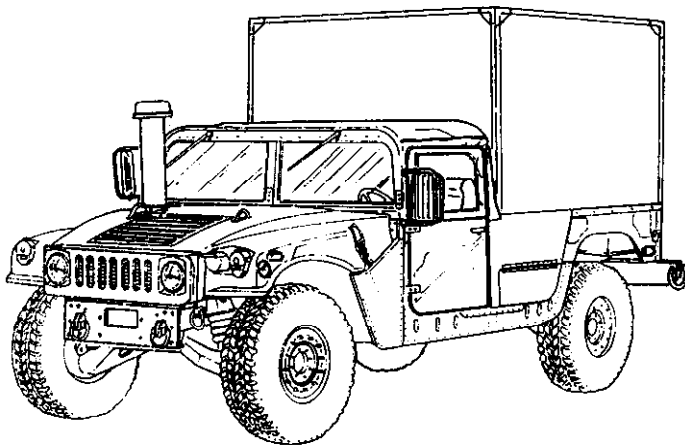


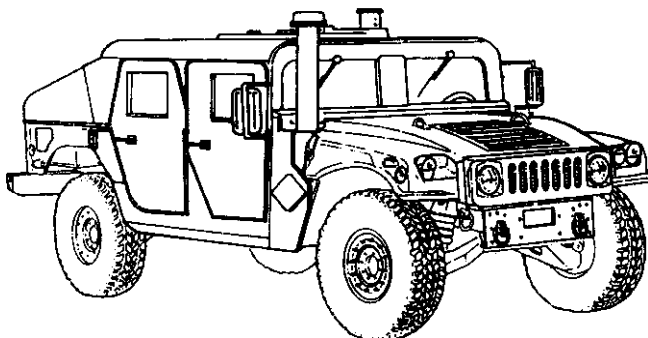
TECHNICAL MANUAL
UNIT, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE

FOR

**TRUCK, UTILITY: S250 SHELTER
CARRIER, 4X4, M1113
(2320-01-412-0143) (EIC: B6B)**



**TRUCK, UTILITY: UP-ARMORED
CARRIER, 4X4, M1114
(2320-01-413-3739) (EIC: B6C)**



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**CHANGE
NO. 1**

**HEADQUARTERS,
DEPARTMENTS OF THE ARMY, AND
THE AIR FORCE
Washington, D.C., 31 October 2001**

**TECHNICAL MANUAL
VOLUME 2 OF 2
UNIT, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE
FOR**

TRUCK, UTILITY: S250 SHELTER CARRIER, 4X4, M1113 (2320-01-412-0143) (EIC: B6B)

TRUCK, UTILITY: UP - ARMORED CARRIER, 4X4, M1114 (2320-01-413-3739) (EIC: B6C)

TM 9-2320-387-24-2, December 1997, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.
3. File this change sheet in front of the publication for reference purposes.

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By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0119704

By Order of the Secretary of the Air Force:

RONALD R. FOGLEMAN
General, United States Air Force
Chief of Staff

Official:

HENRY VICCELLIO, JR.
General, United States Air Force
Commander, Air Force Materiel Command

Distribution:

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WARNING

EXHAUST GASES CAN KILL

Brain damage or death can result from heavy exposure. Precautions must be followed to ensure personnel safety when the personnel heater or engine of any vehicle is operated for any purpose.

1. Do not operate your vehicle engine in enclosed areas.
2. Do not idle vehicle engine with vehicle windows closed.
3. Be alert at all times for exhaust odors.
4. Be alert for exhaust poisoning symptoms. They are:
 - Headache
 - Dizziness
 - Sleepiness
 - Loss of muscular control
5. If you see another person with exhaust poisoning symptoms:
 - Remove person from area
 - Expose to open air
 - Keep person warm
 - Do not permit physical exercise
 - Administer artificial respiration, if necessary*
 - Notify a medic
- * For artificial respiration, refer to FM 21-11.
6. BE AWARE, the field protective mask for nuclear, biological, or chemical (NBC) protection will not protect you from exhaust poisoning.

THE BEST DEFENSE AGAINST EXHAUST POISONING IS ADEQUATE VENTILATION.

WARNING SUMMARY

- Improper cleaning methods and use of unauthorized cleaning solutions may cause injury to personnel or damage to equipment. See TM 9-247 for correct information.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).
- Do not touch hot exhaust system components with bare hands. Severe injury will result.
- Gloves must be worn whenever handling winch cable. Severe injury may result.
- Seatbelts are to be replaced as a set. Failure to do this may cause injury to personnel or damage to equipment.
- Direct all personnel to stand clear during any hoisting operations. A heavy, swinging load can be extremely dangerous. Failure to do so may cause injury to personnel or damage to equipment.
- Diesel fuel is highly flammable. Do not perform any procedure near fires, flames, or sparks. Severe injury or death may result.
- Ensure engine compartment is free of all tools and working material before starting engine. Failure to do this may cause injury to personnel or damage to equipment.
- Do not remove surge tank filler cap before depressurizing system when engine temperature is above 190°F (88°C). Steam or hot coolant under pressure will cause severe burns.
- Do not drain oil when engine is hot. Severe injury to personnel will result.
- Allow transmission/transfer case to cool before performing maintenance. Failure to do this may cause injury.
- When steam cleaning, protective clothing must be used. Failure to do this may cause injury.
- Air pressure must not exceed 50 psi (345 kPa) when air checking forward and direct clutch piston or injury to personnel or damage to equipment may result.
- Direct all personnel to stand clear of vehicle before starting engine. Transmission slipping into gear may cause injury to personnel or damage to equipment.
- When sanding fiberglass, personal protective equipment (respirator, goggles/shield, gloves, coveralls, etc.) must be used. Failure to do this may cause injury.
- Do not operate heater in enclosed areas. Exhaust gases can kill. Make sure work area is well ventilated and exhaust fumes are routed away from test area.
- Drycleaning solvent is flammable and will not be used near an open flame. A fire extinguisher will be kept nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel or damage to equipment.
- Always wear eye protection around R-134a or when servicing the air-conditioning system. Exercise extreme care when handling R-134a; direct contact between R-134a and skin may cause frostbite. Never smoke in areas where R-134a is used or stored. Ensure adequate ventilation whenever R-134a is being discharged. Personnel with a history of cardiac rhythm abnormalities should be made aware of potential aggravation as a result of exposure to R-134a. Failure to do so may result in injury to personnel.
- Air-conditioning system must be discharged prior to replacing components. Failure to do this may result in injury to personnel or damage to equipment.

LIST OF EFFECTIVE PAGES

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page.

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TECHNICAL MANUAL
NO. 9-2320-387-24-2

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON, D.C., 31 December 1997

TECHNICAL ORDER
NO. 36A12-1A-3052-2

**TECHNICAL MANUAL
VOLUME 2 OF 2
UNIT, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE
FOR**

**TRUCK, UTILITY: S250 SHELTER
CARRIER, 4X4, M1113
(2320-01-412-0143) (EIC: B6B)**

**TRUCK, UTILITY: UP-ARMORED
CARRIER, 4X4, M1114
(2320-01-413-3739) (EIC: B6C)**

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This manual is published in two parts. TM 9-2320-387-24-1 contains chapters 1 through 9. TM 9-2320-387-24-2 contains chapters 10 through 33 and appendices A through H.

This manual contains a table of contents and alphabetical index for both volumes 1 and 2.

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CHAPTER 10 BODY AND ACCESSORIES (UNIT) MAINTENANCE

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10-2. FUEL FILLER HOUSING MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound
 (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Fuel door open (M1114 only) (TM 9-2320-387-10).

Maintenance Level

Unit

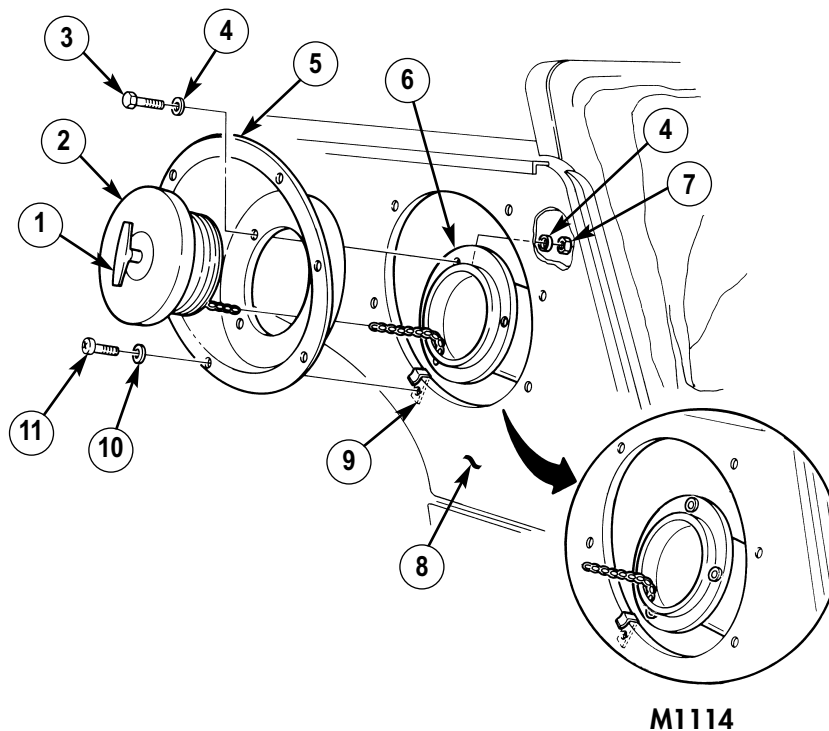
a. Removal

1. Turn filler cap T-handle (1) and remove filler cap (2) from filler spout (6).

NOTE

M1114 vehicles are equipped with plusnuts instead of nuts and washers.

2. Remove three nuts (7), washers (4), capscrews (3), and washers (4) from filler housing (5) and filler spout (6).
3. Remove six screws (11) and washers (10) from fuel filler housing (5) and right outer wheelhouse panel (8).
4. Push filler cap (2) through filler housing (5) and remove filler housing (5).
5. Inspect six speednuts (9) for presence or damage. Replace if defective or missing.



10-2. FUEL FILLER HOUSING MAINTENANCE (Cont'd)

b. Inspection

Refer to para. 10-56 for plusnut (11) inspection and replacement.

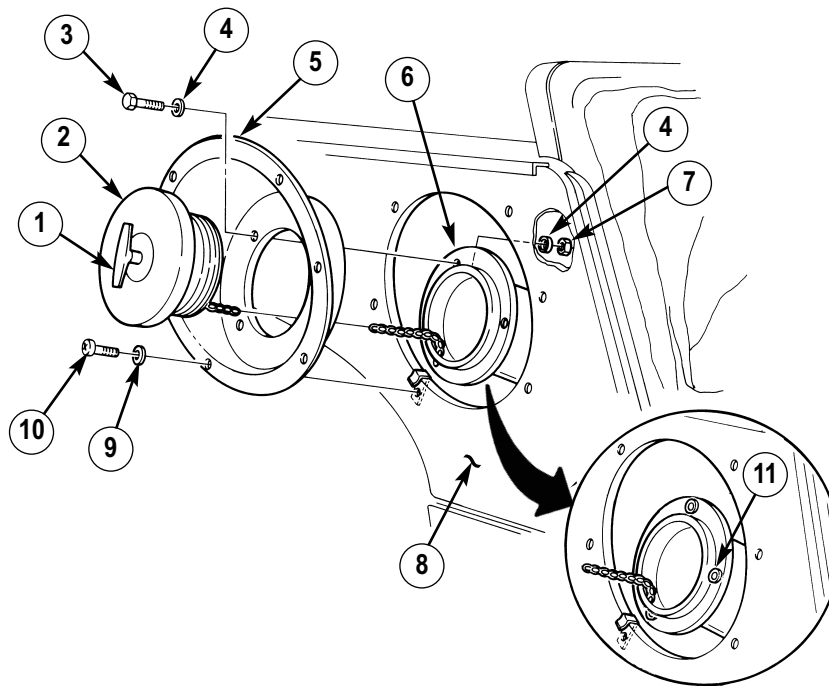
c. Installation

1. Pull filler cap (2) through filler housing (5) on right outer wheelhouse panel (8).
2. Install filler housing (5) on right outer wheelhouse panel (8) with six washers (9) and screws (10). Tighten screws (10) to 20 lb-in. (2 N·m).

NOTE

M1114 vehicles are equipped with plusnuts instead of nuts and washers. Apply sealing compound on threads for M1114 vehicles only.

3. Install filler housing (5) on filler spout (6) with three washers (4), capscrews (3), washers (4), and nuts (7). For M1114 only, tighten capscrews (3) to 75 lb-in. (9 N·m).
4. Install filler cap (2) on filler spout (6) with T-handle (1).



M1114

FOLLOW-ON TASK: Close fuel door (M1114 only) (TM 9-2320-387-10).

10-3. FUEL DOOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Fuel door open (TM 9-2320-387-10).

Maintenance Level

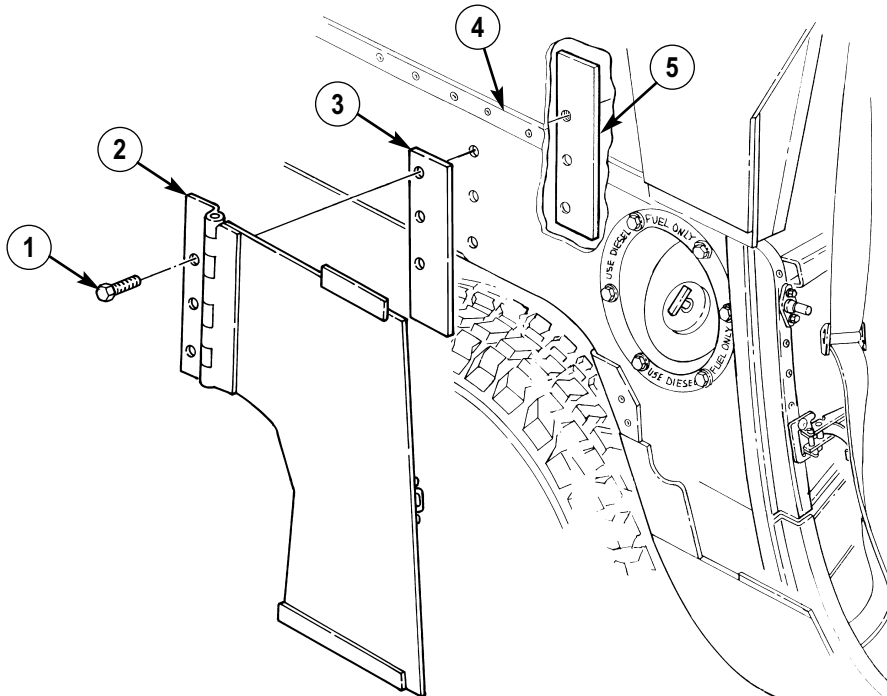
Unit

a. Removal

Remove three capscrews (1), fuel door (2), shim (3), and mounting plate (5) from body (4).

b. Installation

Apply sealing compound to threads of three capscrews (1), and install mounting plate (5), shim (3), and fuel door (2) on body (4) with capscrews (1). Tighten capscrews (1) to 10 lb-ft (14 N·m).



FOLLOW-ON TASK: Close fuel door (TM 9-2320-387-10).

10-4. FUEL DOOR CATCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two rivets (Appendix G, Item 353)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Fuel door open (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

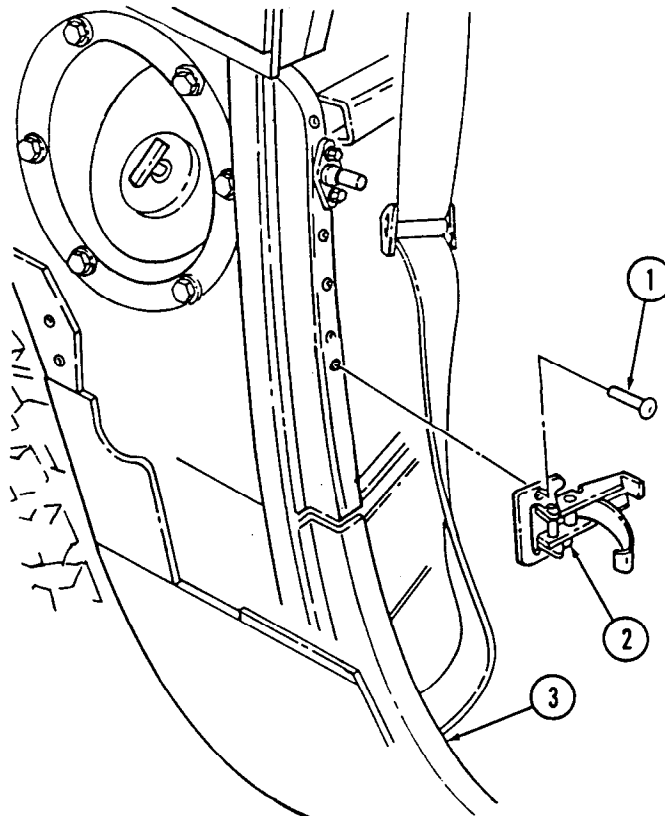
NOTE

For rivet replacement instructions, refer to para. 10-56.

Remove two rivets (1) and catch (2) from body (3).

b. Installation

Install catch (2) on body (3) with two rivets (1).



FOLLOW-ON TASK: Close fuel door (TM 9-2320-387-10).

10-5. HOOD LATCH MAINTENANCE

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts (Appendix G, Item 109)
 Cotter pin (Appendix G, Item 29)
 Spring pin (Appendix G, Item 450)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

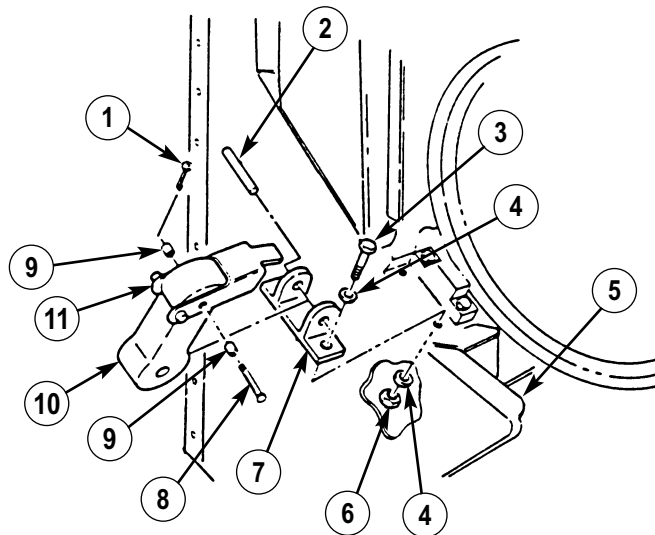
a. Removal

NOTE

- If only rubber latch is to be replaced, spring pin does not have to be completely out of base.
 - M1114 vehicles are equipped with plusnuts/tapping blocks instead of nuts and washers.
1. Remove two locknuts (6), washers (4), capscrews (3), washers (4), and base (7) from body (5). Discard locknuts (6).
 2. Remove spring pin (2) and latch (10) from base (7). Discard spring pin (2).

b. Disassembly

Remove cotter pin (1), pin (8), two rollers (9), and hood latch (11) from latch (10). Discard cotter pin (1).



10-5. HOOD LATCH MAINTENANCE (Cont'd)

c. Assembly

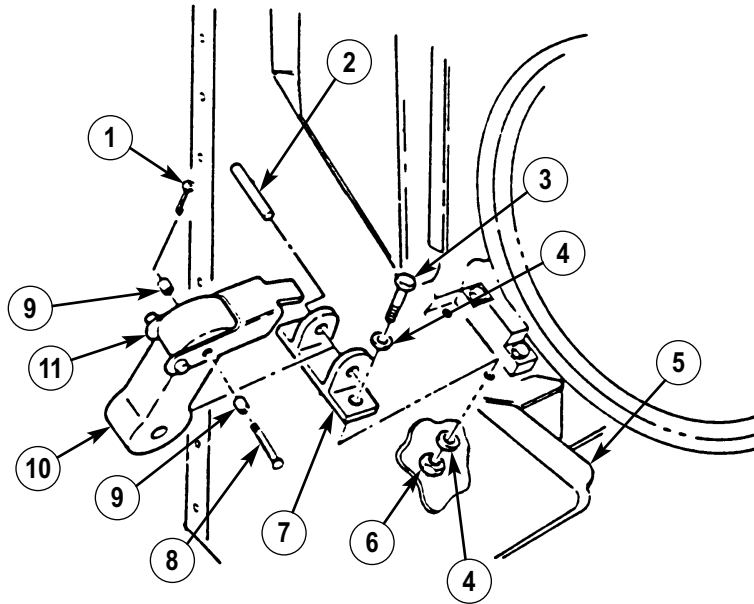
Install hood latch (11) on latch (10) with two rollers (9), pin (8), and cotter pin (1).

d. Installation

NOTE

- If only rubber latch is to be replaced, spring pin may not be completely out of base.
- M1114 vehicles are equipped with plusnuts/tapping blocks instead of nuts and washers. Apply sealing compound to threads of capscrews for M1114 vehicles only.

1. Install latch (10) on base (7) with spring pin (2).
2. Install base (7) on body (5) with two washers (4), capscrews (3), washers (4), and locknuts (6). Tighten capscrews (3) to 6 lb-ft (8 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-6. HOOD LATCH BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Five locknuts (Appendix G, Item 109)

Equipment Condition

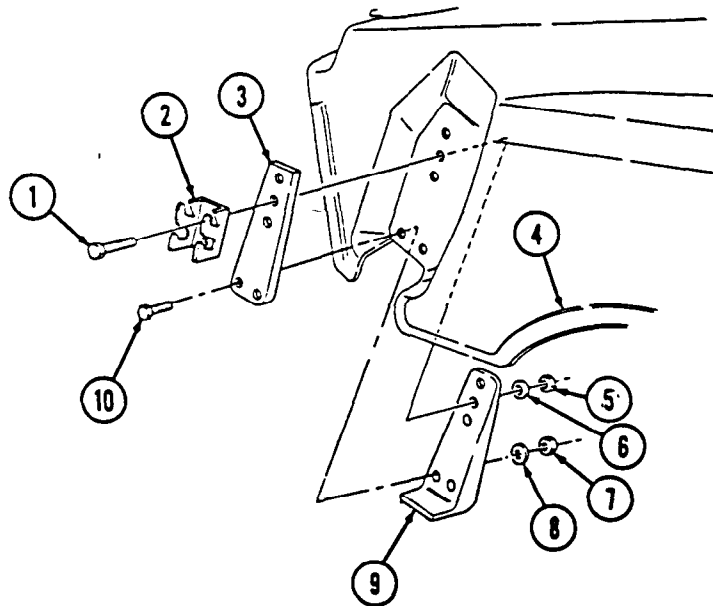
Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

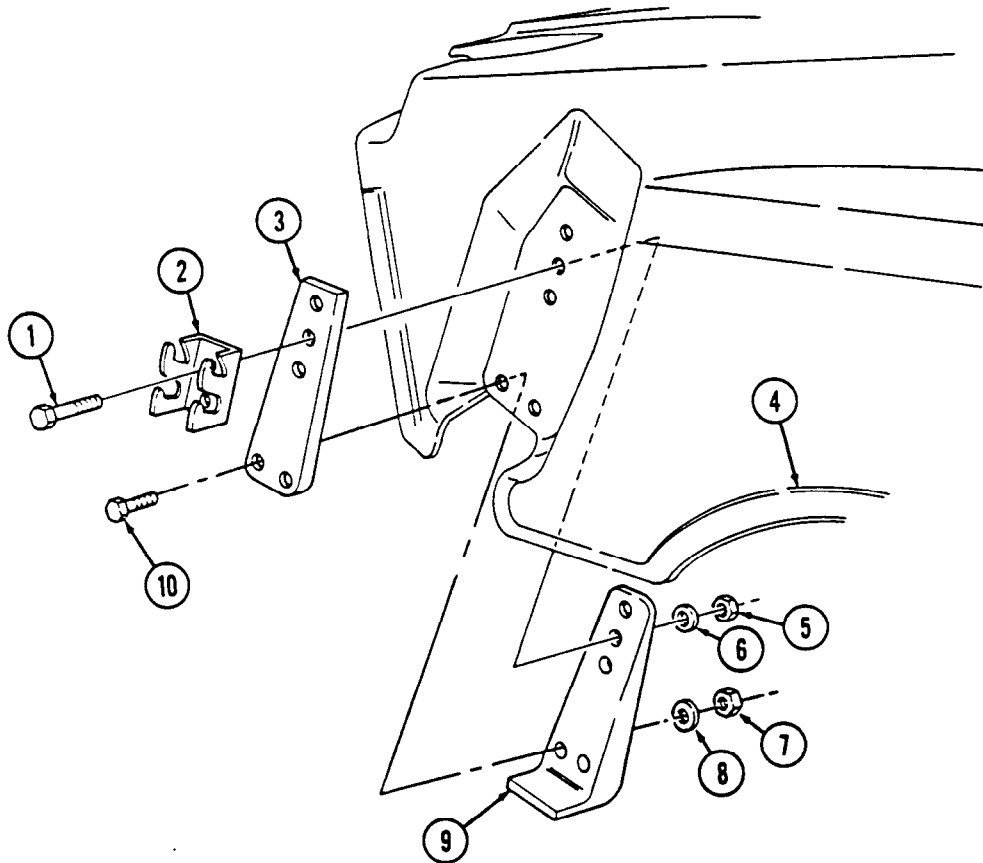
1. Remove two locknuts (5), washers (6), capscrews (1), and latch bracket (2) from hood (4). Discard locknuts (5).
2. Remove three locknuts (7), washers (8), capscrews (10), latch stop bracket (9), and latch plate (3) from hood (4). Discard locknuts (7).



10-6. HOOD LATCH BRACKET REPLACEMENT (Cont'd)

b. Installation

1. Install latch plate (3) and latch stop bracket (9) on hood (4) with three capscrews (10), washers (8), and locknuts (7).
2. Install latch bracket (2) on latch plate (3) and hood (4) with two capscrews (1), washers (6), and locknuts (5). Tighten locknuts (5) and (7) to 10 lb-ft (14 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-7. HOOD LATCH TAPPING BLOCK REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Hood latch removed (para. 10-5).
- Side hood stop removed (para. 10-11).

Maintenance Level

Unit

a. Removal

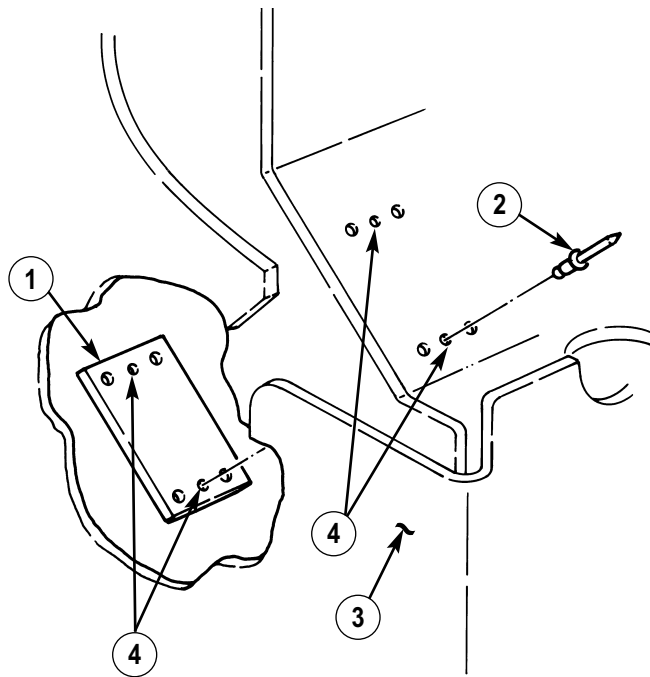
NOTE

For instructions on replacement of rivets, refer to para. 10-56.

Remove two rivets (2) and tapping block (1) from body (3).

b. Installation

1. If new tapping block (1) is being installed, drill two 3/16-in. (4.8-mm) diameter rivet holes (4) through body (3) and tapping block (1).
2. Install tapping block (1) on body (3) with two rivets (2).



- FOLLOW-ON TASKS:**
- Install side hood stop (para. 10-11).
 - Install hood latch (para. 10-5).

10-8. HOOD PROP ROD AND BRACKET MAINTENANCE

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Removal b. Disassembly c. Inspection | <ul style="list-style-type: none"> d. Assembly e. Installation |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four lockwashers (Appendix G, Item 207)
 Locknut (Appendix G, Item 116)
 Cotter pin (Appendix G, Item 30)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

General Safety Instructions

Hood must be supported during hood prop rod and bracket replacement.

Maintenance Level

Unit

WARNING

Hood must be supported during hood prop rod and bracket replacement. Failure to support hood may cause injury to personnel or damage to equipment.

a. Removal

1. Remove cotter pin (4), washer (3), hood prop rod (2), and washer (3) from hood (1). Discard cotter pin (4).
2. Remove four screws (8), lockwashers (7), and bracket (6) from airlift bracket (5). Discard lockwashers (7).

b. Disassembly

1. Remove hood prop rod (2) from eyebolt (15).
2. Remove locknut (9), washer (10), bushing (16), spring (11), eyebolt (15), and washer (14) from bracket (6). Discard locknut (9).
3. Remove snapping (12) and bushing (13) from bracket (6).

c. Inspection

Inspect bushings (13) and (16) and spring (11) for cracks, wear, or distortion. Replace bushings (13) and (16) and spring (11) if cracked, worn, or distorted.

d. Assembly

1. Install bushing (13) on bracket (6) with snapping (12).

NOTE

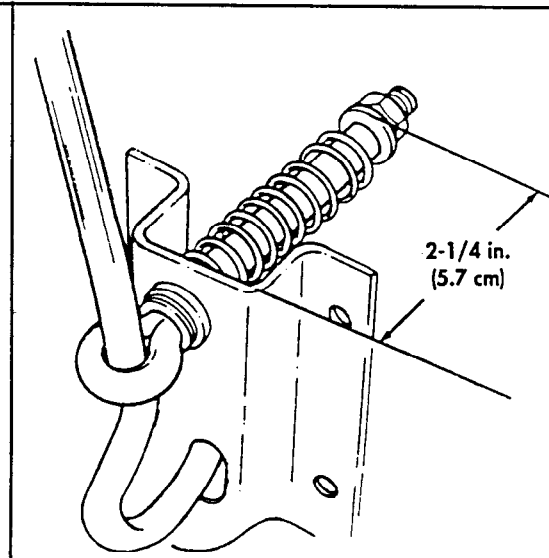
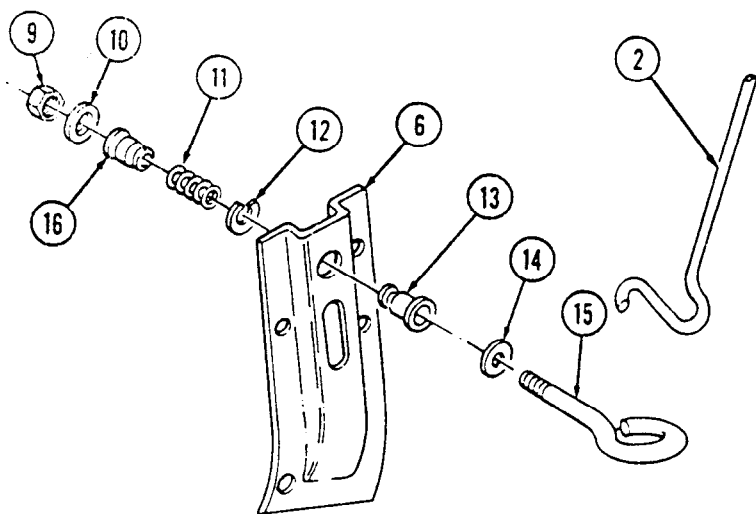
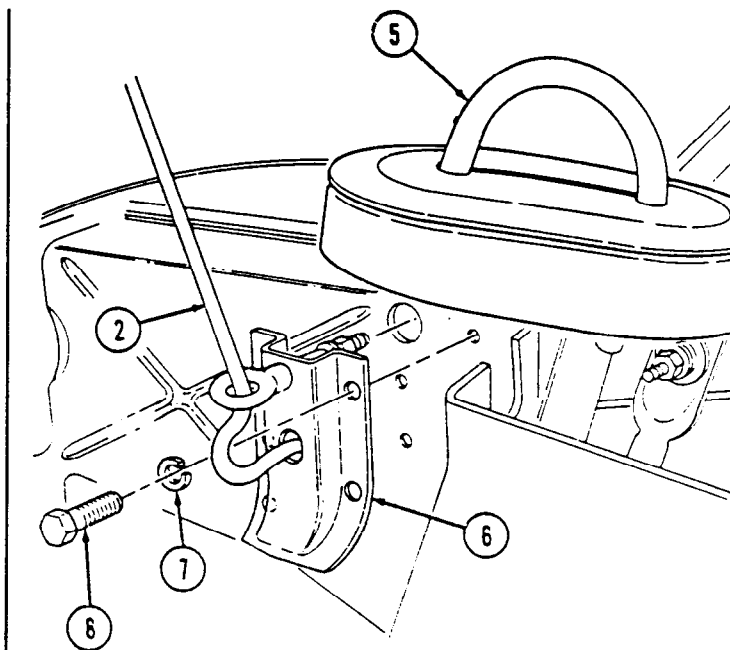
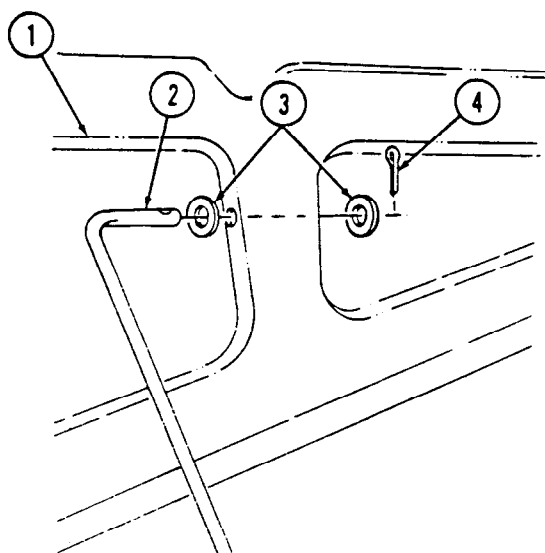
Length of spring with bracket assembled is 2-1/4 in. (5.7 cm).

2. Install washer (14), eyebolt (15), and spring (11) on bracket (6) with bushing (16), washer (10), and locknut (9).
3. Install hood prop rod (2) into eyebolt (15).

10-8. HOOD PROP ROD AND BRACKET MAINTENANCE (Cont'd)

e. Installation

1. Install hood prop rod (2) and bracket (6) on airlift bracket (5) with four lockwashers (7) and screws (8). Tighten screws (8) to 6 lb-ft (8 N.m).
2. Install washer (3) and hood prop rod (2) on hood (1) with washer (3) and cotter pin (4).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-9. HOOD AND HINGE MAINTENANCE

This task covers:

- a. Removal
- b. Installation
- c. Alignment

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three cotter pins (Appendix G, Item 30)
 Eight locknuts (Appendix G, Item 109)
 Antiseize compound (Appendix C, Item 17)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P
 TM 43-0139

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

General Safety Instructions

Hood must be supported during removal and installation.

Maintenance Level

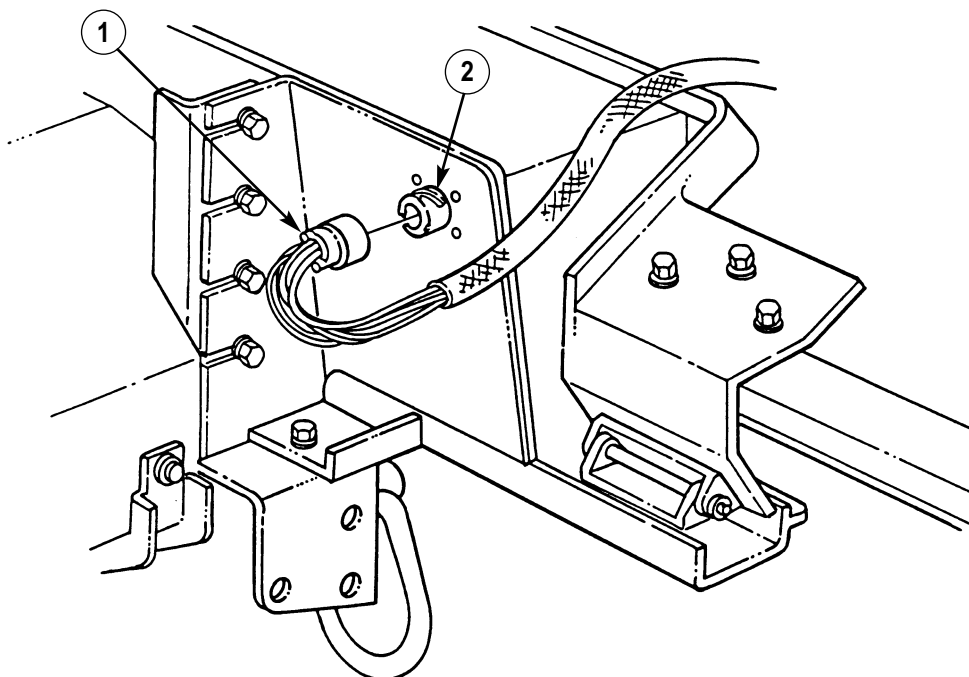
Unit

WARNING

Hood must be supported during removal and installation. Failure to support hood may cause injury to personnel or damage to equipment.

a. Removal

1. Disconnect left and right hood harness connectors (1) from harness connectors (2).

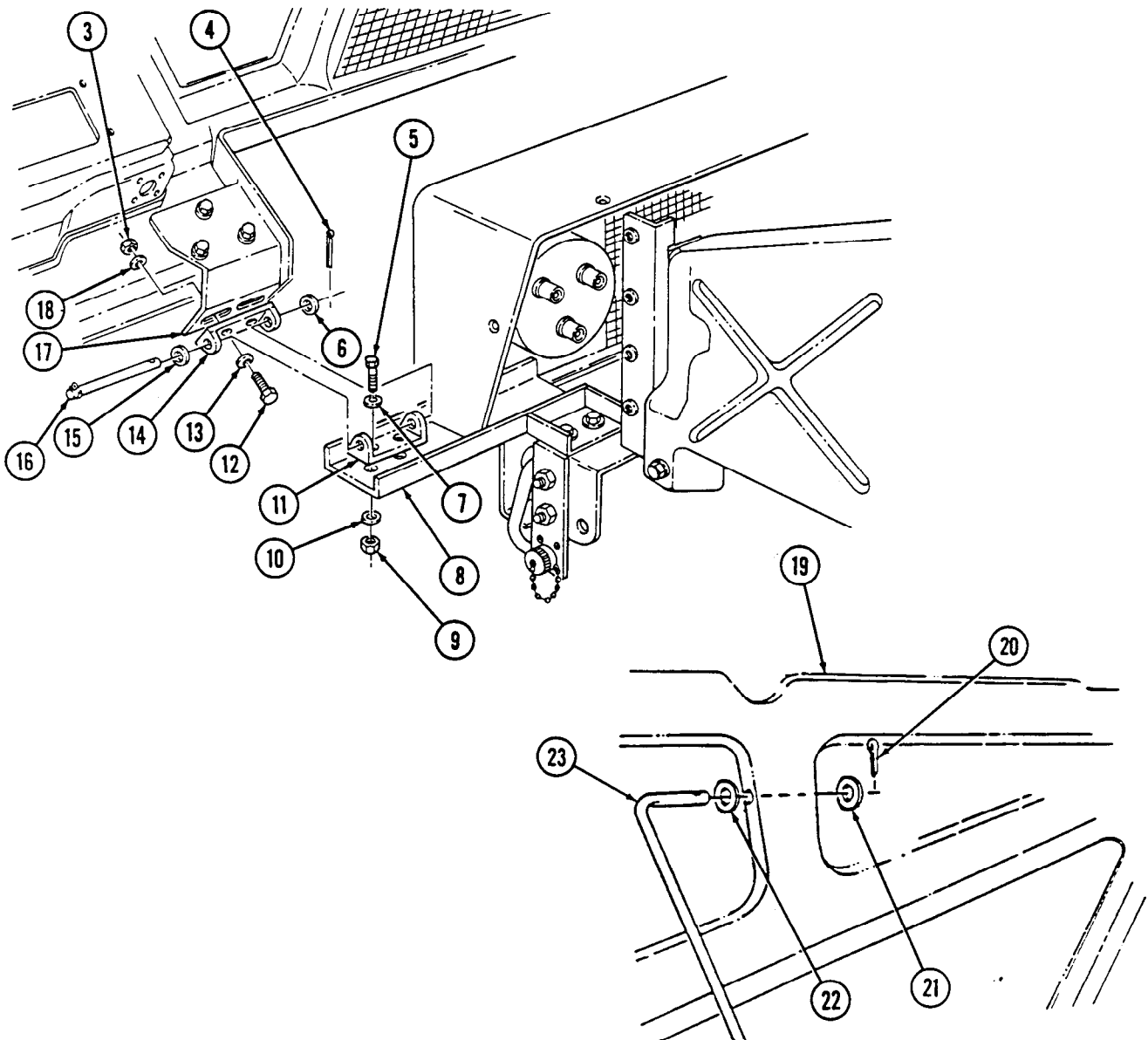


10-9. HOOD AND HINGE MAINTENANCE (Cont'd)

2. Remove two cotter pins (4), washers (6), hinge pins (16), and washers (15) from upper hinge halves (14) and lower hinge halves (11). Discard cotter pins (4).
3. Remove cotter pin (20), washer (21), hood prop rod (23), and washer (22) from hood (19). Discard cotter pin (20).
4. Remove hood (19).

NOTE

- Perform steps 5 and 6 if replacing hinges.
 - Note position of hinge halves prior to removal for installation.
5. Remove four locknuts (3), washers (18), capscrews (12), washers (13), and two upper hinge halves (14) from hood brackets (17). Discard locknuts (3).
 6. Remove four locknuts (9), washers (10), capscrews (5), washers (7), and two lower hinge halves (11) from headlight housing (8). Discard locknuts (9).



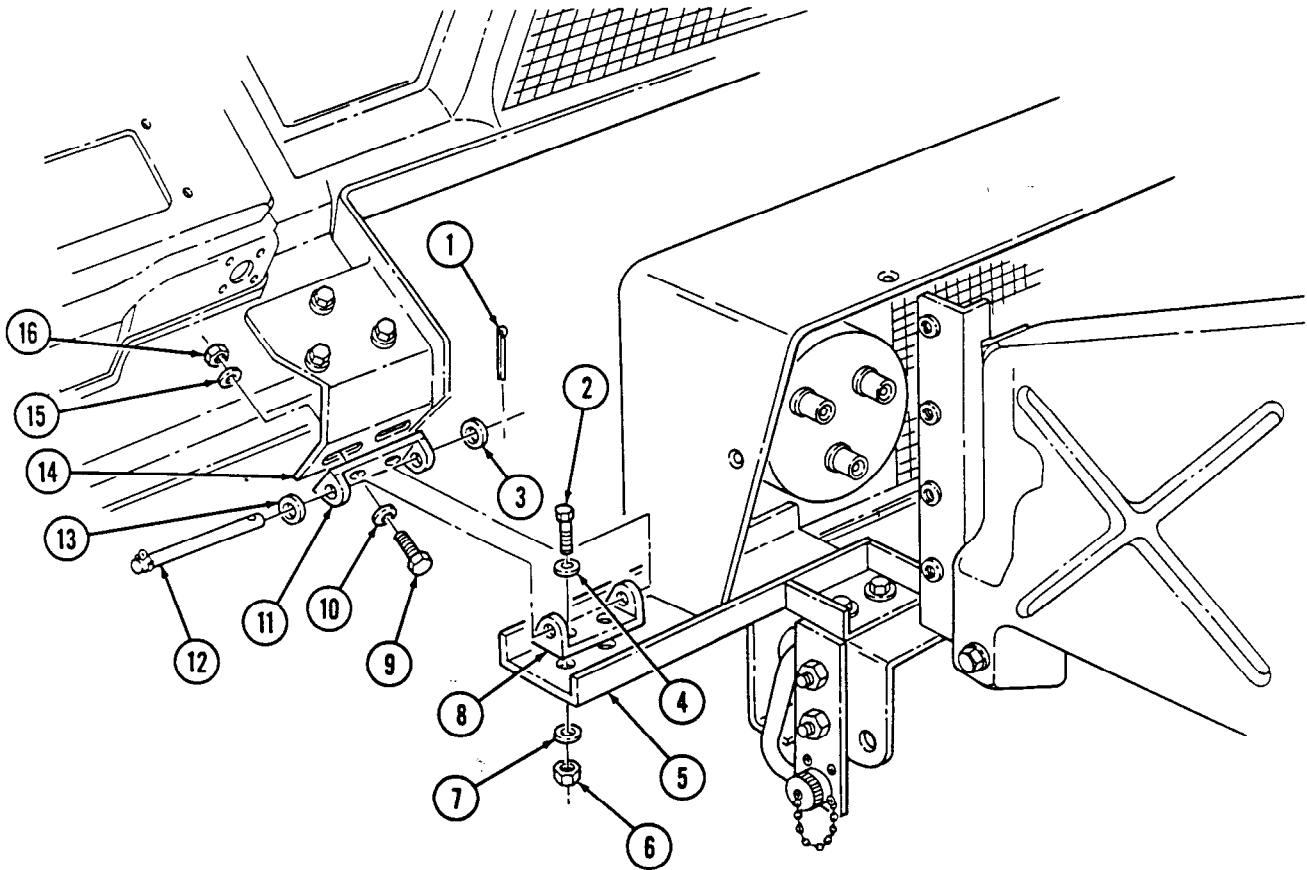
10-9. HOOD AND HINGE MAINTENANCE (Cont'd)

b. Installation

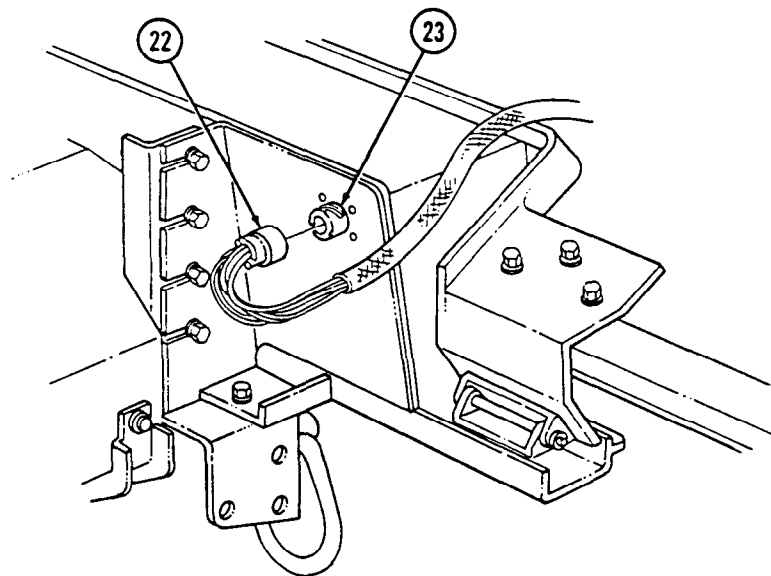
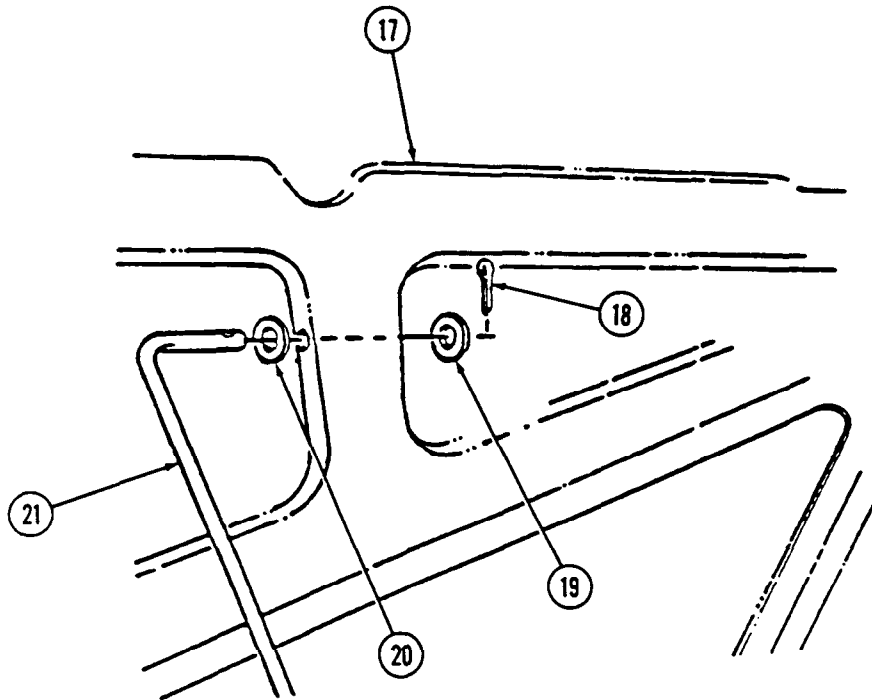
NOTE

Perform steps 1 and 2 if hinges were removed.

1. Install two lower hinge halves (8) on headlight housing (5) with four washers (4), capscrews (2), washers (7), and locknuts (6). Do not tighten locknuts (6).
2. Install two upper hinge halves (11) on hood brackets (14) with four washers (10), capscrews (9), washers (15), and locknuts (16). Tighten locknuts (16) to 28 lb-ft (38 N·m).
3. Install hood (17) and align two upper hinge halves (11) with lower hinge halves (8).
4. Install two upper hinge halves (11) on lower hinge halves (8) with washers (13), hinge pins (12), washers (3), and cotter pins (1).
5. Install washer (20) and hood prop rod (21) on hood (17) with washer (19) and cotter pin (18).
6. Connect left and right hood harness connectors (22) to harness connector (23).



10-9. HOOD AND HINGE MAINTENANCE (Cont'd)



10-9. HOOD AND HINGE MAINTENANCE (Cont'd)

c. Alignment

NOTE

Spacing between A-pillar and hood should be no less than 1/2 in. (12.7 mm).

1. Lower hood (4) and check alignment of hood stop guide (3) with center hood stop (2) on A-pillar (1) and hood latch plate (5) with side hood stop (6).

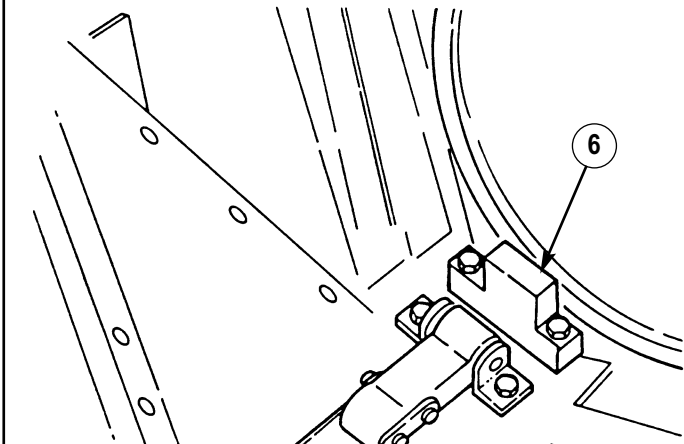
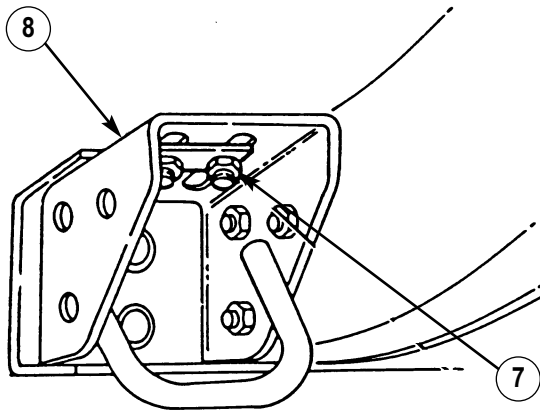
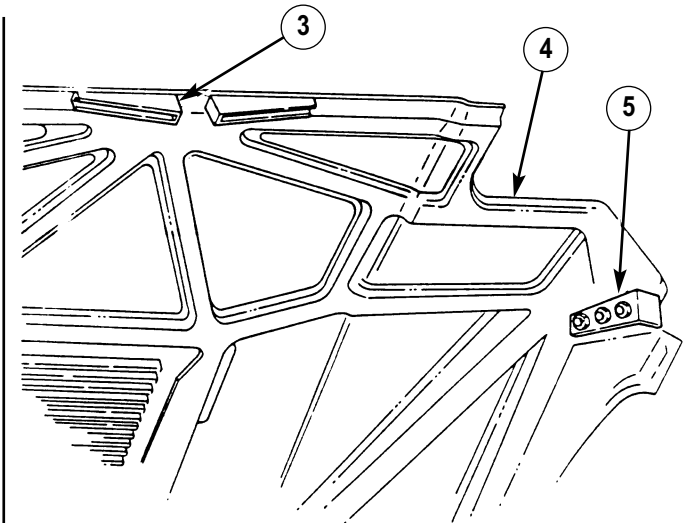
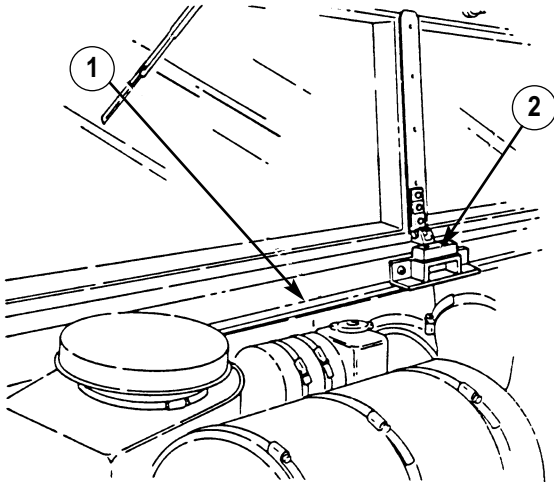
NOTE

Upper and lower hinge halves contain slotted mounting holes to allow for adjustment.

2. With hood (4) lowered and secured, and alignment correct, tighten four locknuts (7) on lower hinge half (8) to 60 lb-ft (81 N·m).

NOTE

After hood alignment is completed, some contact may occur between hood and left mirror bracket. If contact exists, use file and trim about 1/4 in. (6.4 mm) off left corner and edge of hood. Trim until hood closes without hitting left mirror bracket. Touch up with paint (TM 43-0139).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-9.1. JACK RETAINING STRAP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four locknuts (Appendix G, Item 152.1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Left front underbody armor removed (M1114 only)
(para. 11-36.1)

Maintenance Level

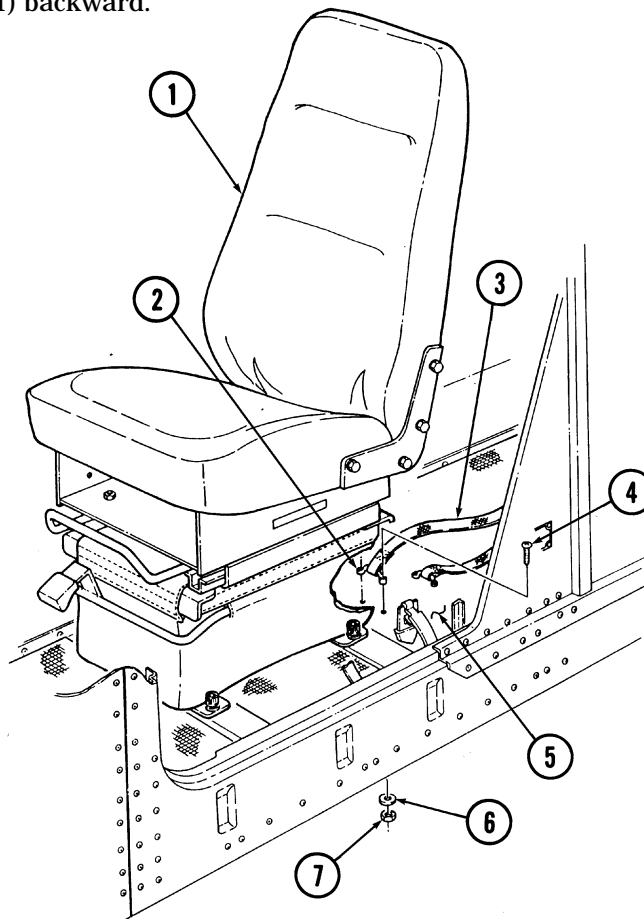
Unit

a. Removal

1. Slide driver's seat (1) forward.
2. Remove four locknuts (7), washers (6), screws (4), two footman loops (2), and jack retaining strap (3) from vehicle floor (5). Discard locknuts (7).

b. Installation

1. Install jack retaining strap (3) and two footman loops (2) on vehicle floor (5) with four screws (4), washers (6), and locknuts (7).
2. Slide driver's seat (1) backward.



FOLLOW-ON TASK: Install left front underbody armor (para 11-36.1).

10-10. OUTER HOOD SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

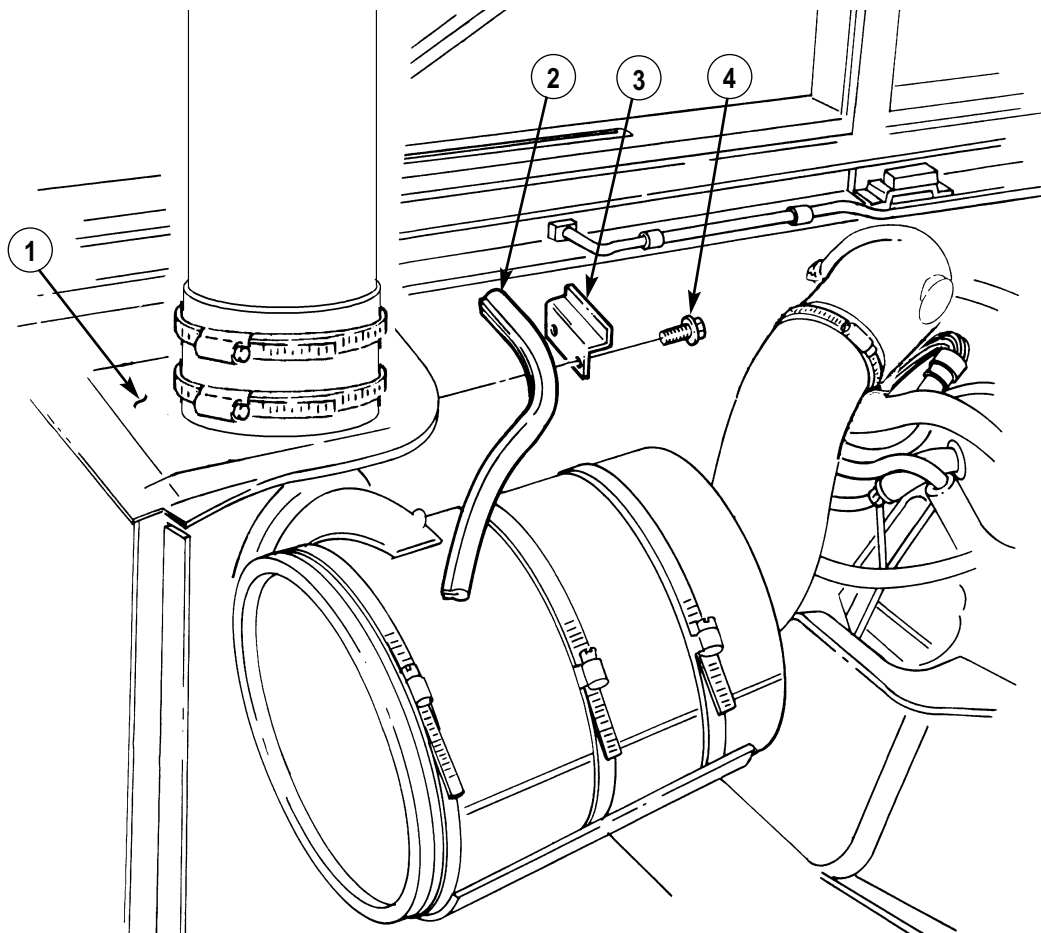
Unit

a. Removal

Remove four capscrews (4), two seal retainers (3), and hood seal (2) from body (1).

b. Installation

Install hood seal (2) on body (1) with two seal retainers (3) and four capscrews (4).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-11. SIDE HOOD STOP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts
 (Appendix G, Item 109)
 Sealing compound
 (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

NOTE

M1114 vehicles are equipped with plusnuts/tapping blocks instead of nuts and washers.

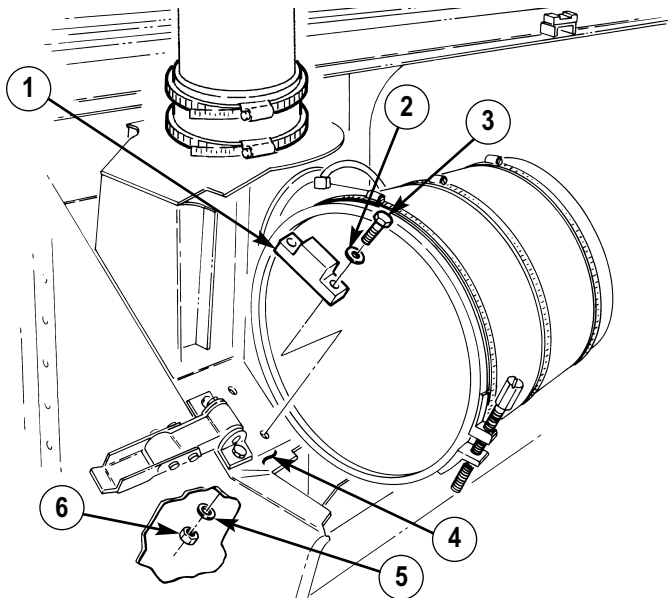
Remove two locknuts (6), washers (5), capscrews (3), washers (2), and side hood stop (1) from body (4). Discard locknuts (6).

b. Installation

NOTE

M1114 vehicles are equipped with plusnuts/tapping blocks instead of nuts and washers. Apply sealing compound to threads of capscrews at installation for M1114 vehicles only.

Install side hood stop (1) on body (4) with two washers (2), capscrews (3), washers (5), and locknuts (6). Tighten capscrews (3) to 6 lb-ft (8 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-12. CENTER HOOD STOP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

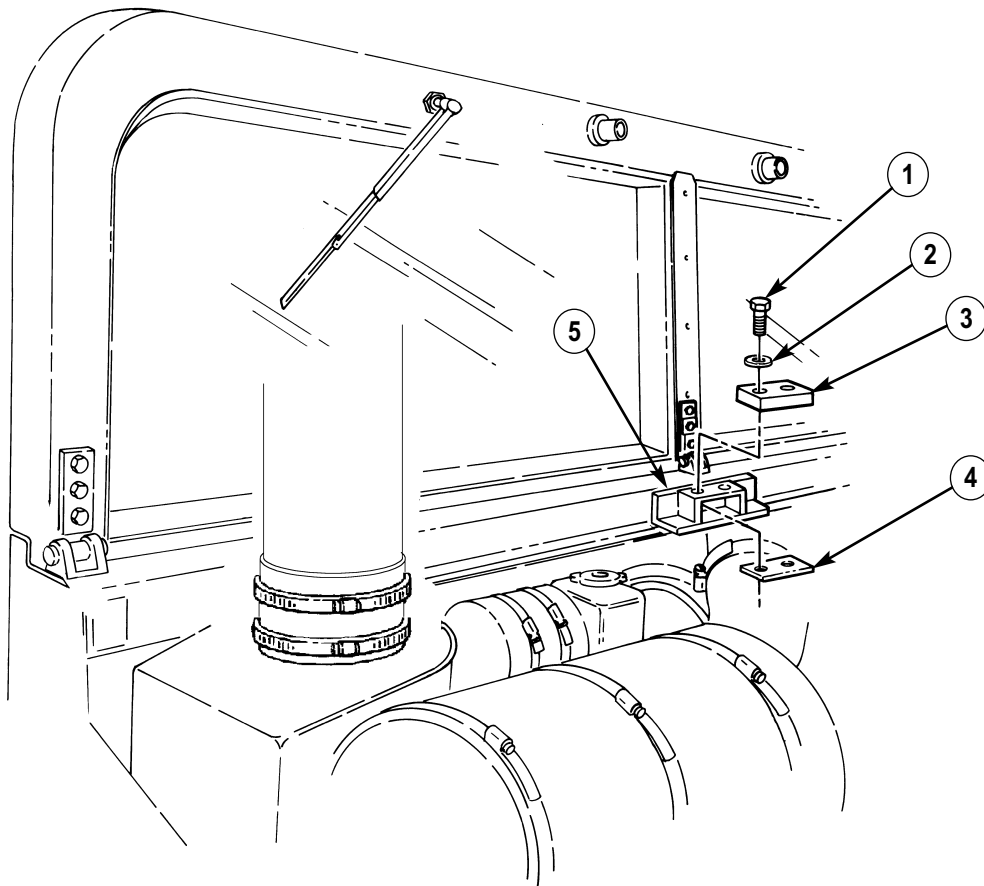
Unit

a. Removal

Remove two capscrews (1), washers (2), center hood stop (3), and plate (4) from A-beam (5).

b. Installation

Install center hood stop (3) and plate (4) on A-beam (5) with two washers (2) and capscrews (1). Tighten capscrews (1) to 12 lb-ft (16 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-13. FOOTMAN LOOP AND STRAP MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Lower tailgate (TM 9-2320-387-10)

Maintenance Level

Unit

NOTE

Replacement procedures for footman loops and straps are basically the same. The footman loop and strap on M1113 model is behind the driver's seat. This procedure covers footman loop and strap on tailgate.

a. Removal

1. Remove two screws (2) and footman loop (3) from tailgate (4).
2. Remove strap (1) from footman loop (3).

b. Inspection

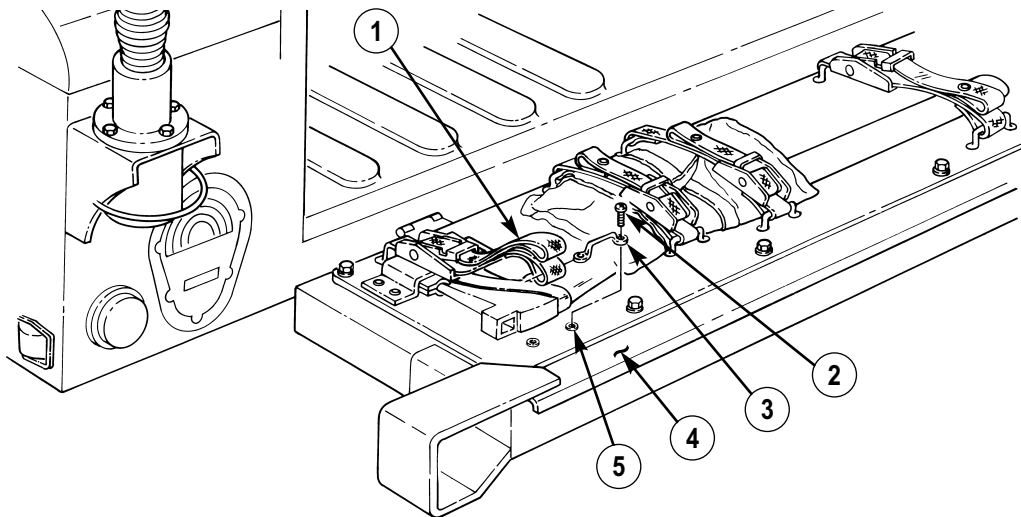
NOTE

For inspection and removal of insertnut, refer to para. 10-56.

Inspect four insertnuts (5). Replace if damaged.

c. Installation

Apply sealing compound to threads of two screws (2) and install strap (1) and footman loop (3) on tailgate (4) with screws (2). Tighten screws (2) to 20 lb-in. (2 N·m).



FOLLOW-ON TASK: Raise tailgate (TM 9-2320-387-10).

10-14. CENTER HOOD STOP GUIDE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

Materials/Parts

Six locknuts (Appendix G, Item 109)

Manual References

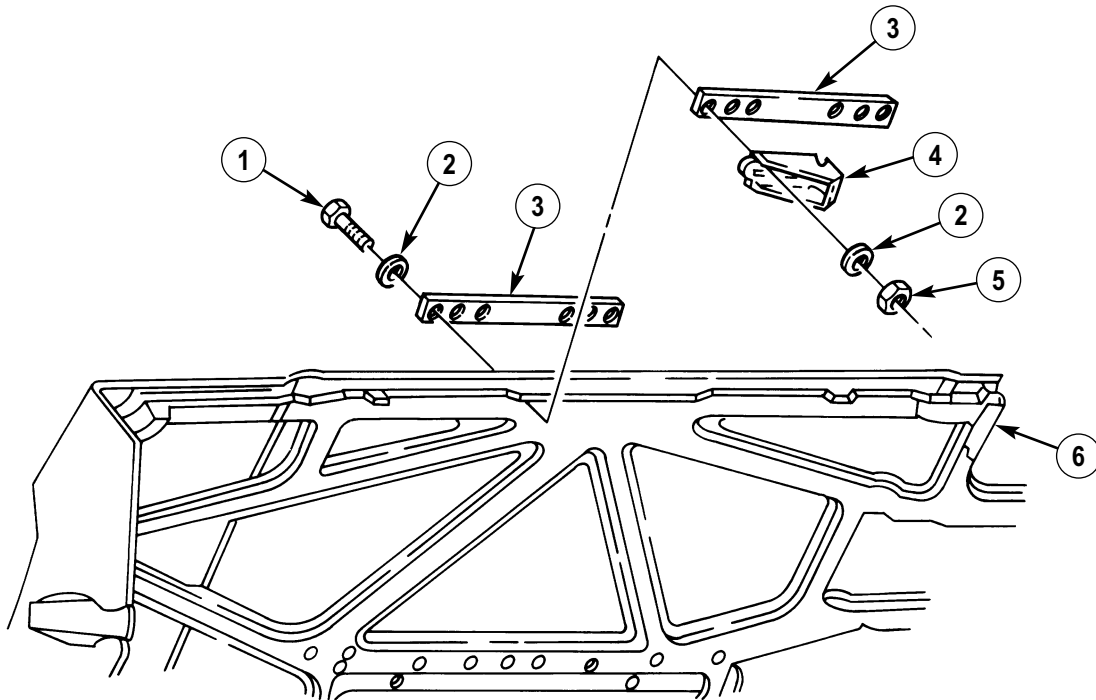
TM 9-2320-387-10
 TM 9-2320-387-24P

a. Removal

Remove six locknuts (5), washers (2), capscrews (1), washers (2), two guide plates (3), and guide brackets (4) from hood (6). Discard locknuts (5).

b. Installation

Install two guide plates (3) and guide brackets (4) on hood (6) with six washers (2), capscrews (1), washers (2), and locknuts (5). Tighten locknuts (5) to 10 lb-ft (14 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-15. FRONT GRILLE SCREEN REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Equipment Condition

Headlight housing removed (para. 10-18).

Materials/Parts

Sealing compound (Appendix C, Item 64)

Maintenance Level

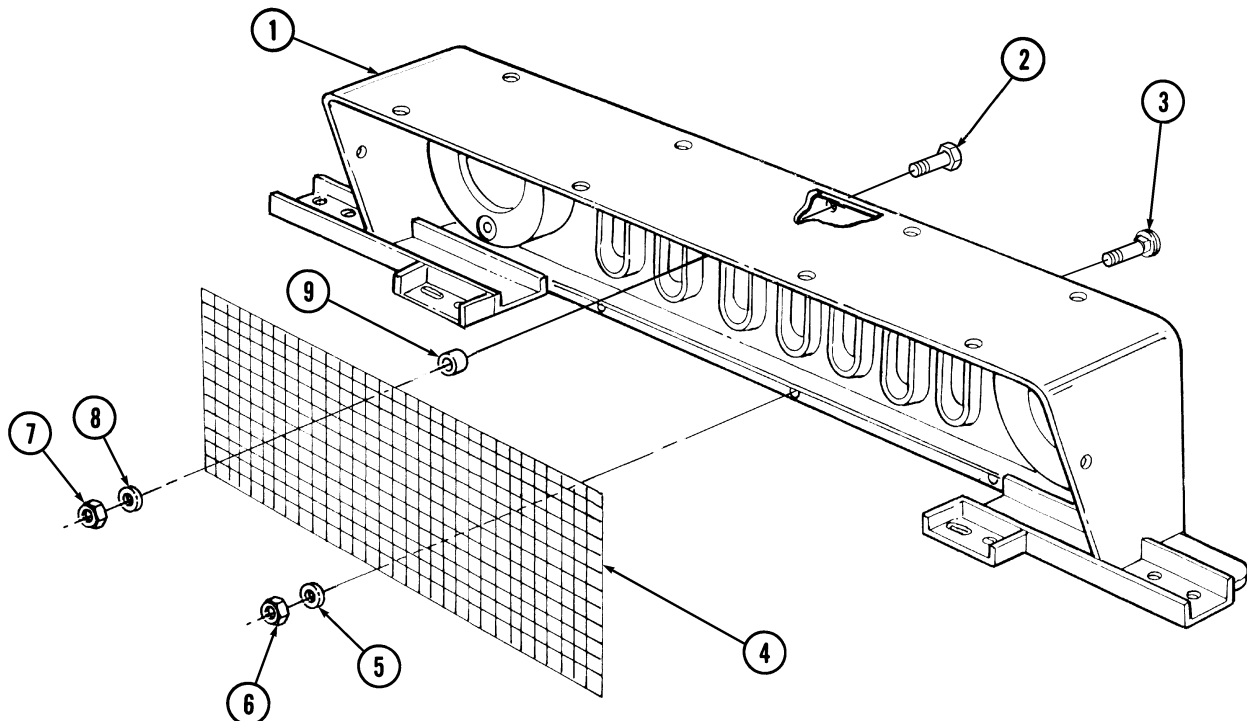
Unit

a. Removal

1. Remove lower three nuts (6), washers (5), and carriage bolts (3) from lower part of front grille screen (4) and headlight housing (1).
2. Remove upper three nuts (7), washers (8), front grille screen (4), three spacers (9), and capscrews (2) from upper part of headlight housing (1).

b. Installation

1. Apply sealing compound to threads of three capscrews (2) and install spacers (9) and front grille screen (4) on upper part of headlight housing (1) with capscrews (2), washers (8), and nuts (7). Tighten nuts (7) to 20-30 lb-in. (2-3 N·m).
2. Apply sealing compound to threads of three carriage bolts (3) and secure front grille screen (4) to lower part of headlight housing (1) with carriage bolts (3), washers (5), and locknuts (6). Tighten locknuts (6) to 20-30 lb-in. (2-3 N·m).



FOLLOW-ON TASK: Install headlight housing (para. 10-18).

10-16. GRILLE FRAME REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three locknuts (Appendix G, Item 109)
Six lockwashers (Appendix G, Item 190)
Sealing compound (Appendix C, Item 64)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

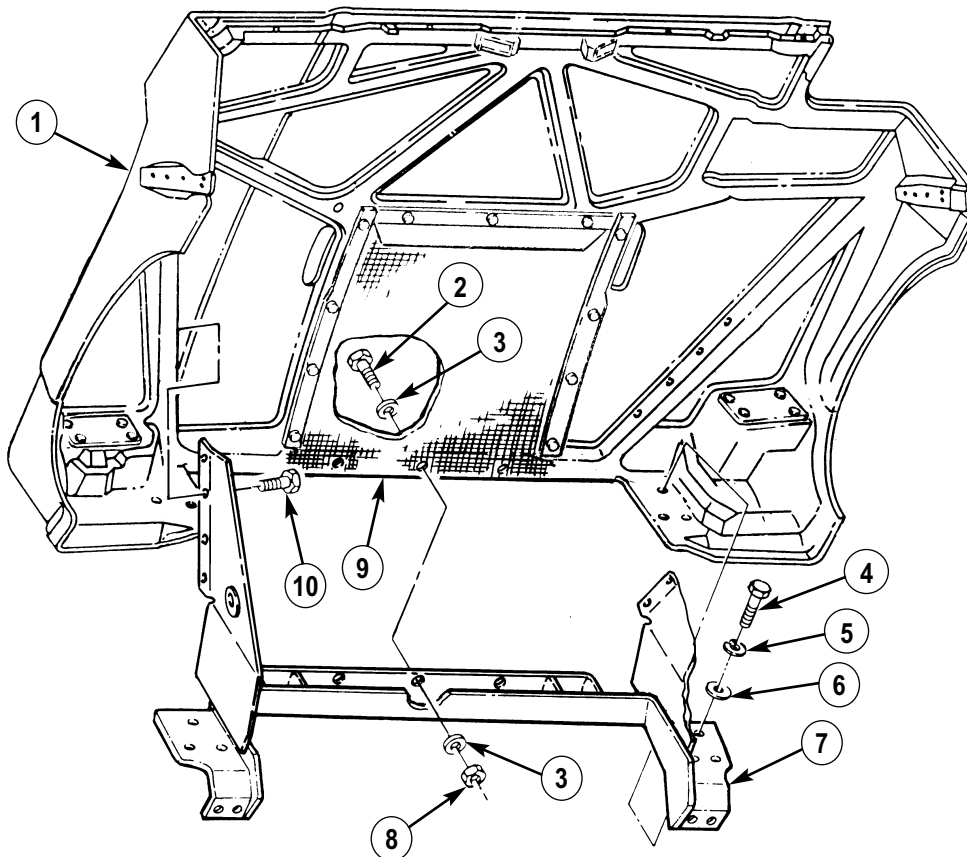
Hood removed (para. 10-9).

Maintenance Level

Unit

a. Removal

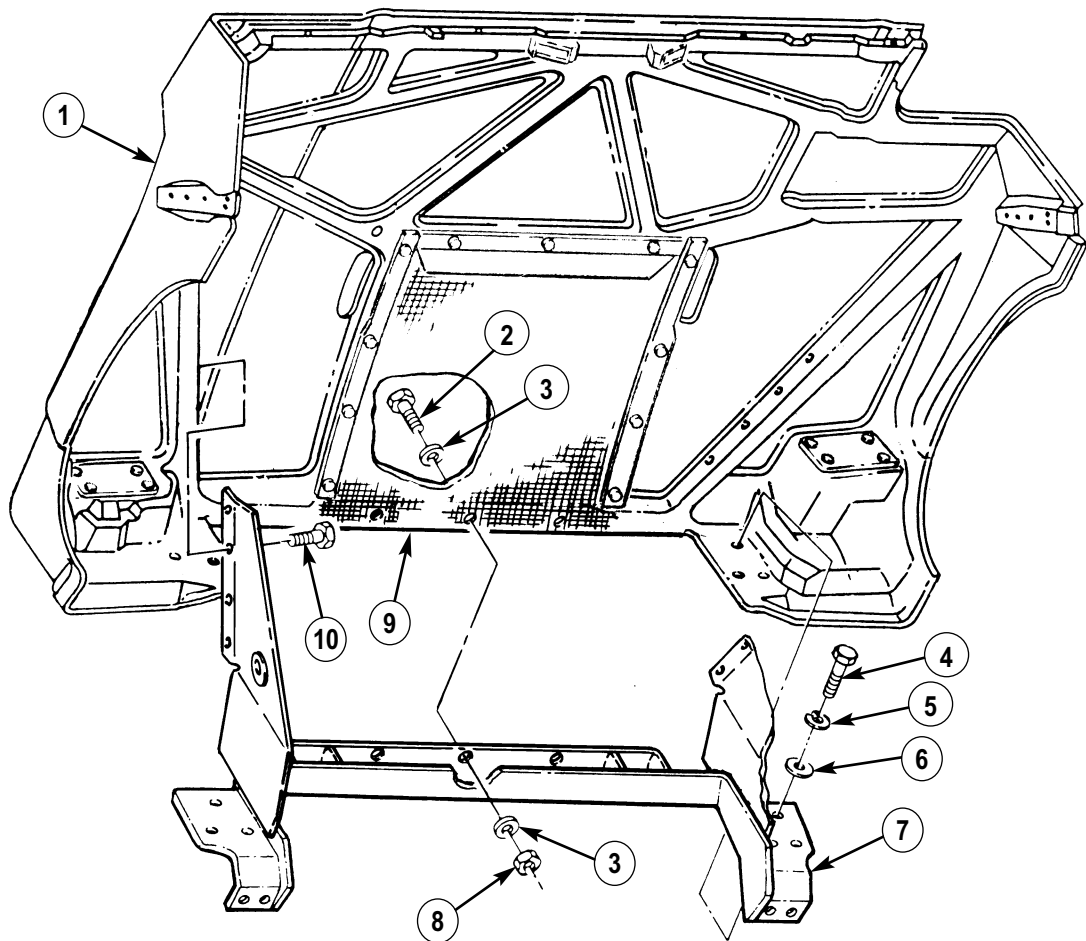
1. Remove three locknuts (8), washers (3), capscrews (2), and washers (3) from grille (9) and grille frame (7). Discard locknuts (8).
2. Remove eight capscrews (10), six capscrews (4), lockwashers (5), washers (6), and grille frame (7) from hood (1). Discard lockwashers (5).



10-16. GRILLE FRAME REPLACEMENT (Cont'd)

b. Installation

1. Apply sealing compound to threads of eight capscrews (10), and install grille frame (7) on hood (1) with six lockwashers (5), washers (6), capscrews (4), and eight capscrews (10).
2. Install three washers (3), capscrews (2), washers (3), and locknuts (8) on grille frame (7) and grille (9).



FOLLOW-ON TASK: Install hood (para. 10-9).

10-17. HOOD GRILLE AND SCREEN REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Six locknuts (Appendix G, Item 109)
Six locknuts (Appendix G, Item 111)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

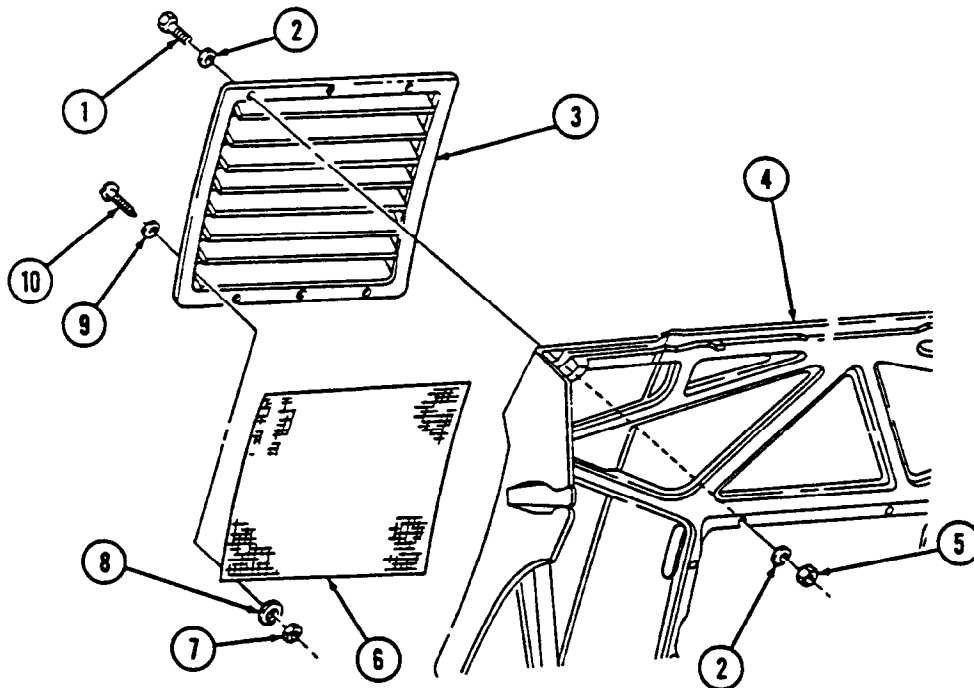
Unit

a. Removal

1. Remove six locknuts (5), washers (2), capscrews (1), washers (2), and grille (3) from hood (4). Discard locknuts (5).
2. Remove six locknuts (7), washers (8), capscrews (10), washers (9), and screen (6) from grille (3). Discard locknuts (7).

b. Installation

1. Install screen (6) on grille (3) with six washers (9), capscrews (10), washers (8), and locknuts (7). Tighten locknuts (7) to 6 lb-ft (8 N·m).
2. Install grille (3) on hood (4) with six washers (2), capscrews (1), washers (2), and locknuts (5). Tighten locknuts (5) to 7 lb-ft (10 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-18. HEADLIGHT HOUSING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Hood removed (para. 10-9).

Materials/Parts

Six locknuts (Appendix G, Item 176)
Eight lockwashers (Appendix G, Item 206)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

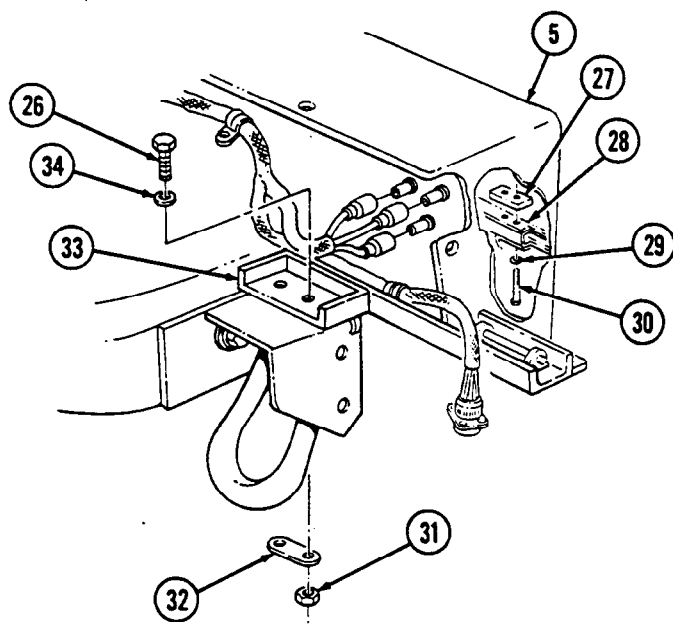
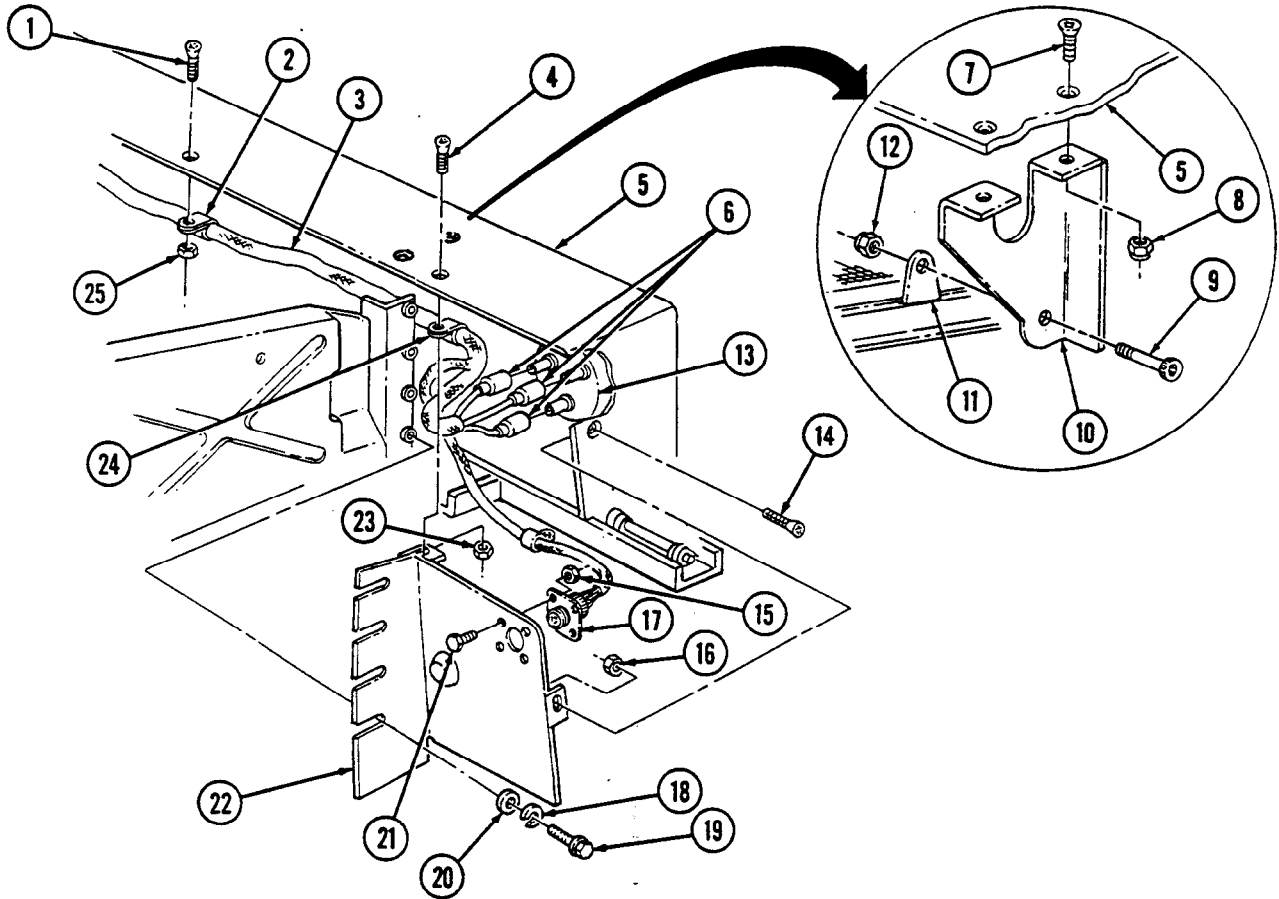
a. Removal

1. Remove four screws (19), washers (20), and lockwashers (18) from plate (22). Discard lockwashers (18).
2. Remove locknut (16) and screw (14) from plate (22) and headlight housing (5). Discard locknut (16).
3. Remove nut (23), screw (4), clamp (24), harness (3), and plate (22) from headlight housing (5).
4. Remove four nuts (15) and screws (21) and disconnect harness connector (17) from plate (22).
5. Remove five nuts (25), clamps (2), harness (3), and screws (1) from headlight housing (5).
6. Remove two nuts (8), screws (7), nut (12), socket-head screw (9), and bracket (10) (if equipped) from headlight housing (5) and hinge (11).
7. Remove three leads (6) from headlight (13).
8. Repeat steps 1 through 7 for other side.
9. Remove four locknuts (31), two plates (32), four screws (26), and washers (34) from headlight housing (5) and two frame brackets (33). Discard locknuts (31).
10. Remove four screws (30), washers (29), two spacers (27), and headlight housing (5) from frame extension (28).

b. Installation

1. Install headlight housing (5) on frame extension (28) with two spacers (27), four washers (29), and screws (30).
2. Install headlight housing (5) on two frame brackets (33) with four washers (34), screws (26), two plates (32), and four locknuts (31).
3. Install bracket (10) (if removed) on hinge (11) and headlight housing (5) with two screws (7), nuts (8), socket-head screw (9), and nut (12).
4. Install harness (3) on headlight housing (5) with five clamps (2), screws (1), and nuts (25).
5. Install three leads (6) on headlight (13).
6. Install harness connector (17) on plate (22) with four screws (21) and nuts (15).
7. Install plate (22) on headlight housing (5) with screw (4), clamp (24), and nut (23).
8. Install plate (22) on headlight housing (5) with four lockwashers (18), washers (20), screws (19), screw (14), and locknut (16).
9. Repeat steps 3 through 8 for other side.

10-18. HEADLIGHT HOUSING REPLACEMENT (Cont'd)



FOLLOW-ON TASKS:

- Connect battery ground cables (para. 4-68).
- Install hood (para. 10-9).

10-19. DOOR HANDLE ASSEMBLY MAINTENANCE

This task covers:

- | | |
|------------------------------------|------------------------|
| <p>a. Removal</p> <p>b. Repair</p> | <p>c. Installation</p> |
|------------------------------------|------------------------|

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

Spring pin (Appendix G, Item 451)
 Adhesive (Appendix C, Item 8)

NOTE

Some door handle assemblies may separate. To prevent or fix door handle assembly separation, perform task b.

a. Removal

1. Remove screw (5), inside door handle (4), and door handle spring (6) from door frame (7) and outside door handle (1).
2. Remove outside door handle (1) and washer (3) from door frame (7).

b. Repair

NOTE

Repair procedures for all door handle assemblies are basically the same. This procedure covers the left front door handle assembly.

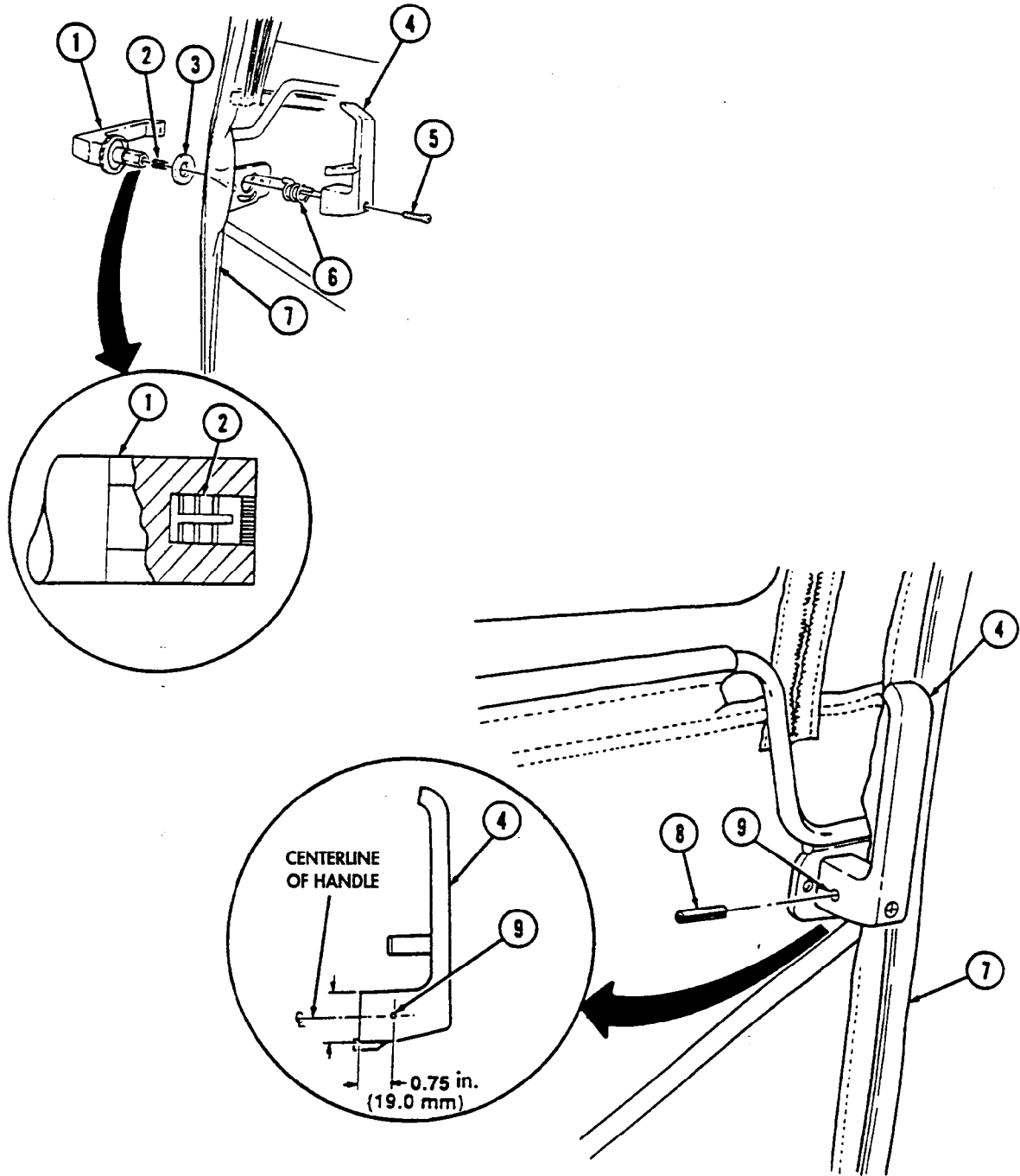
1. Tighten screw (5) on inside door handle (4) to 15 lb-in. (1.7 N•m).
 - If screw will secure inside door handle, perform steps 2 and 3.
 - If screw will not secure inside door handle, perform steps 4 through 10.
2. Locate, mark, and drill 0.125-in. (3.2-mm) diameter hole (9) through inside door handle (4) and outside door handle (1).
3. Install spring pin (8) through inside door handle (4) and outside door handle (1).

NOTE

Inside door handle can separate from outside door handle without removing screw.

4. Remove inside door handle (4) and door handle spring (6) from outside door handle (1) and door frame (7).
5. Remove outside door handle (1) and washer (3) from door frame (7).
6. Remove screw (5) and insert (2) from inside door handle (4).
7. Apply adhesive to outside of insert (2) and install insert (2) in outside door handle (1). Allow adhesive to cure for five minutes.
8. Install washer (3) and outside door handle (1) on door frame (7).
9. Install inside door handle spring (6) and inside door handle (4) on outside door handle (1) and door frame (7) with screw (5). Tighten screw (5) to 15 lb-in. (1.7 N•m).
10. Perform steps 2 and 3.

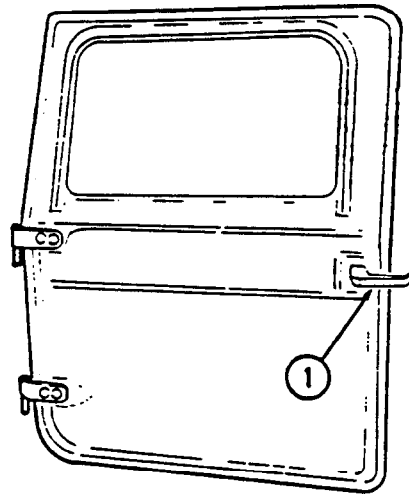
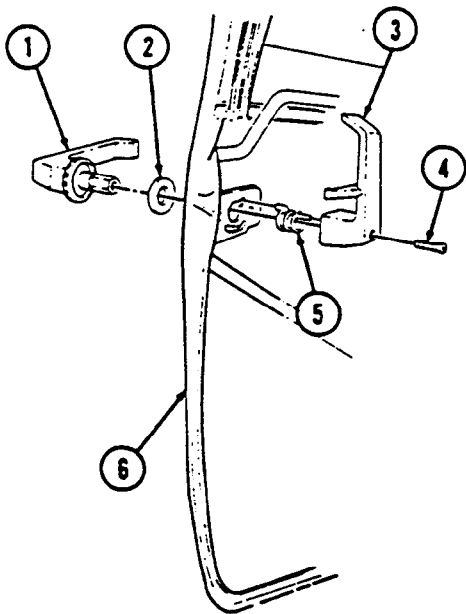
10-19. DOOR HANDLE ASSEMBLY MAINTENANCE (Cont'd)



10-19. DOOR HANDLE ASSEMBLY MAINTENANCE (Cont'd)

c. Installation

1. Install washer (2) and outside door handle (1) on door frame (6).
2. Install door handle spring (5) and inside door handle (3) on outside door handle (1) in door frame (6).
3. Place outside door handle (1) in horizontal position, and place inside door handle (3) in vertical position with grip end of handle pointing to top of door.
4. Install inside door handle (3) on outside door handle (1) and door frame (6) with screw (4). Tighten screw (4) to 15 lb-in. (1.7 N-m).



10-20. FIXED REAR DOOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Remove shelter (para. 11-78).

Materials/Parts

Door seals (Appendix G, Item 45)

Maintenance Level

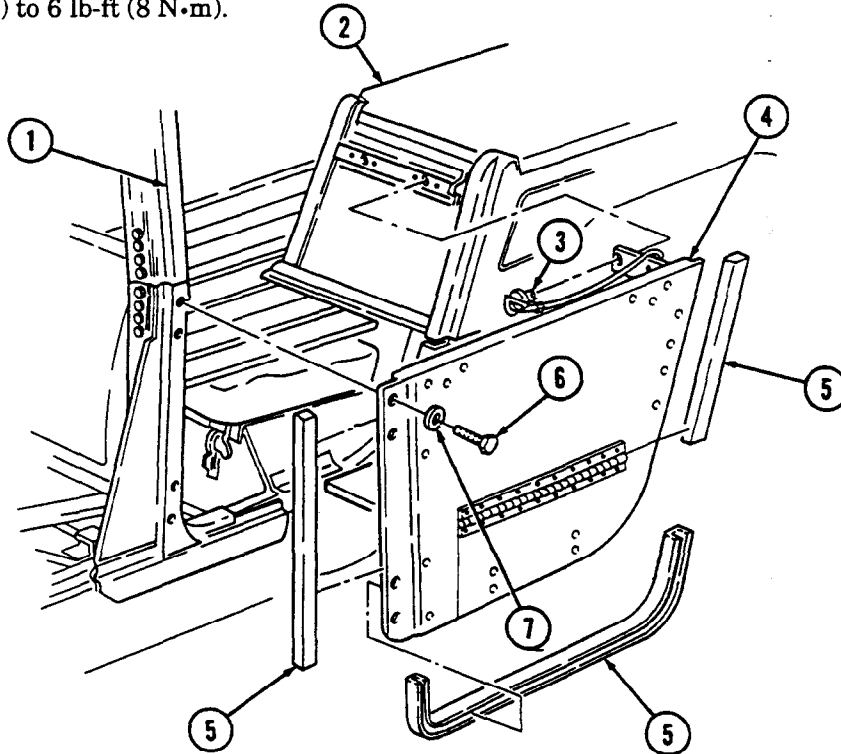
Unit

a. Removal

1. Remove four capscrews (6) and washers (7) from fixed rear door (4) and B-pillar (1).
2. Remove locking pin (3) and fixed rear door (4) from body (2).
3. Remove three seals (5) from fixed rear door (4). Discard seals (5).

b. Installation

1. Install three seals (5) on fixed rear door (4).
2. Install fixed rear door (4) on body (2) with locking pin (3).
3. Install fixed rear door (4) on B-pillar (1) with four washers (7) and capscrews (6). Tighten capscrews (6) to 6 lb-ft (8 N·m).



FOLLOW-ON TASK: Install shelter (para. 11-78).

10-21. ENGINE ACCESS COVER FLEXIBLE LATCH AND HOLDDOWN STRIKE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Engine access cover removed (para. 10-22).

Materials/Parts

Four rivets (Appendix G, Item 325)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

a. Removal

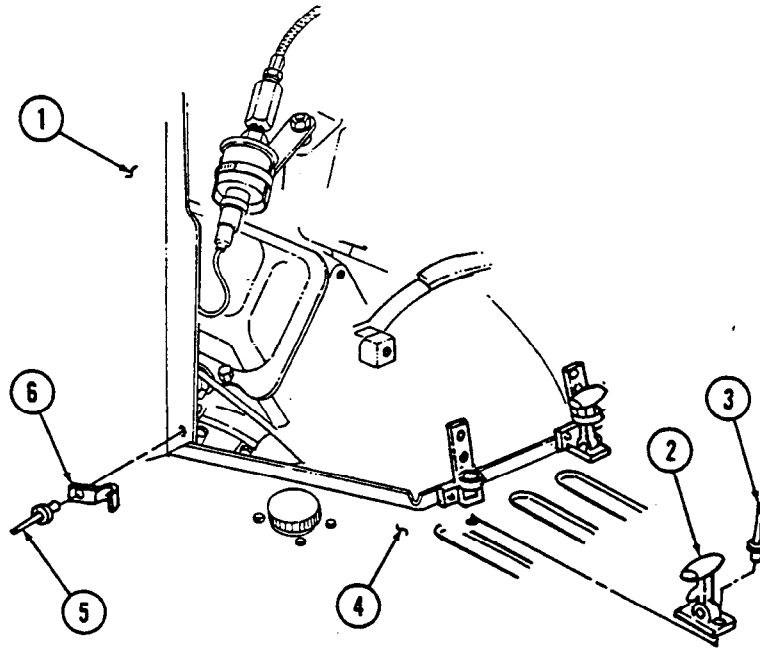
NOTE

For rivet replacement instructions, refer to para. 10-56.

1. Remove two rivets (5) and holddown strike (6) from body (1).
2. Remove two rivets (3) and flexible latch (2) from cargo floor (4).

b. Installation

1. Install flexible latch (2) on cargo floor (4) with two rivets (3).
2. Install holddown strike (6) on body (1) with two rivets (5).



FOLLOW-ON TASK: Install engine access cover (para. 10-22).

10-22. ENGINE ACCESS COVER MAINTENANCE

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two locknuts (Appendix G, Item 116)
Four rivets (Appendix G, Item 357)
Seven rivets (Appendix G, Item 358)
Eight rivets (Appendix G, Item 359)

Manual References

TM 9-2320-387-24P

Equipment Condition

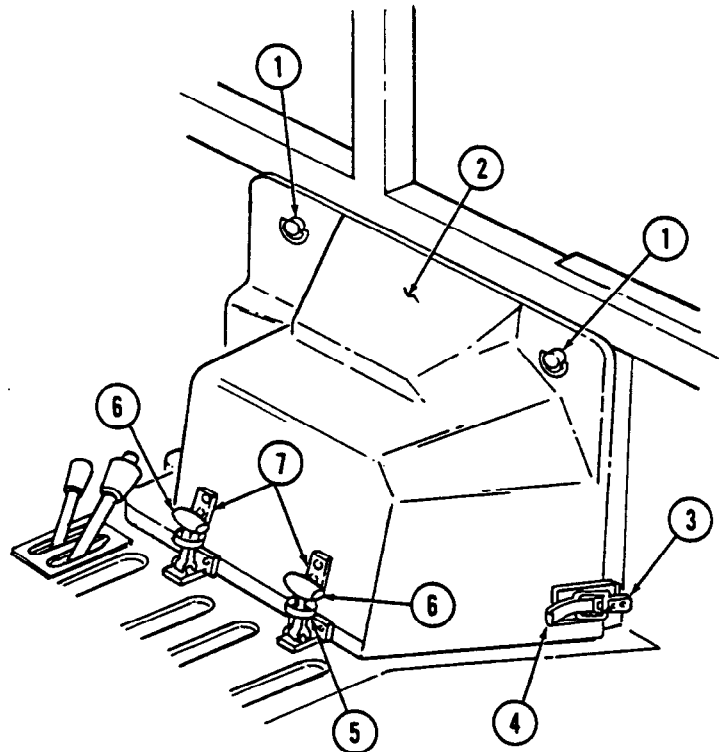
Front radio rack removed (para. 12-17).

Maintenance Level

Unit

a. Removal

1. Unlatch two flexible latches (6) from keepers (5) on holddown brackets (7).
2. Unlatch two holddown latches (4) from holddown strikes (3).
3. Turn two ring studs (1) and remove access cover (2) from vehicle.



10-22. ENGINE ACCESS COVER MAINTENANCE (Cont'd)

b. Disassembly

NOTE

For rivet replacement instructions, refer to para. 10-56.

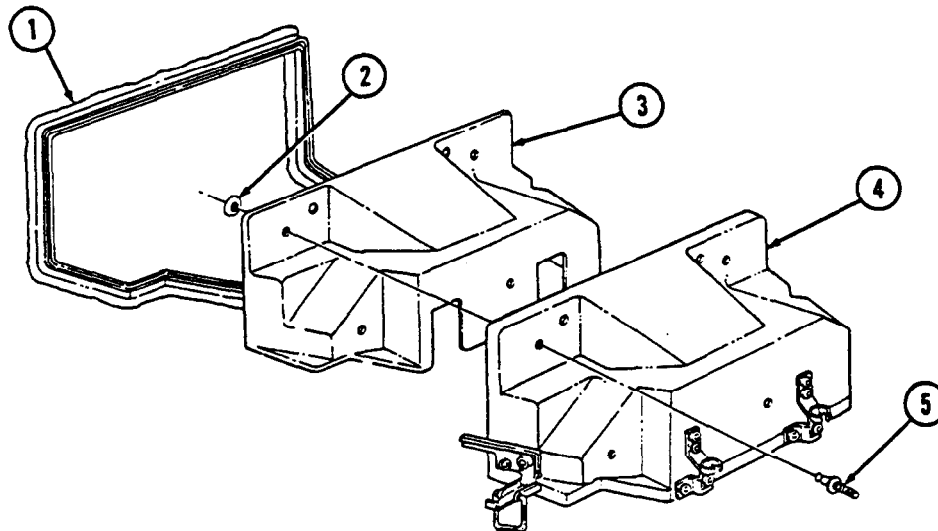
1. Remove seven rivets (5), retainers (2), and insulation (3) from access cover (4).
2. Remove seal (1) from access cover (4).
3. Remove four retaining rings (6), two washers (7), ring studs (8), and washers (7) from access cover (4).
4. Remove two locknuts (14), shoulder bolts (17), and latches (16) from access cover (4). Discard locknuts (14).
5. Remove two rivets (18), backing plates (15), and guide plates (19) from access cover (4).
6. Remove two rivets (12) and keepers (11) from holddown brackets (9).
7. Remove eight rivets (10), two holddown brackets (9), and backing plates (13) from access cover (4).

c. Assembly

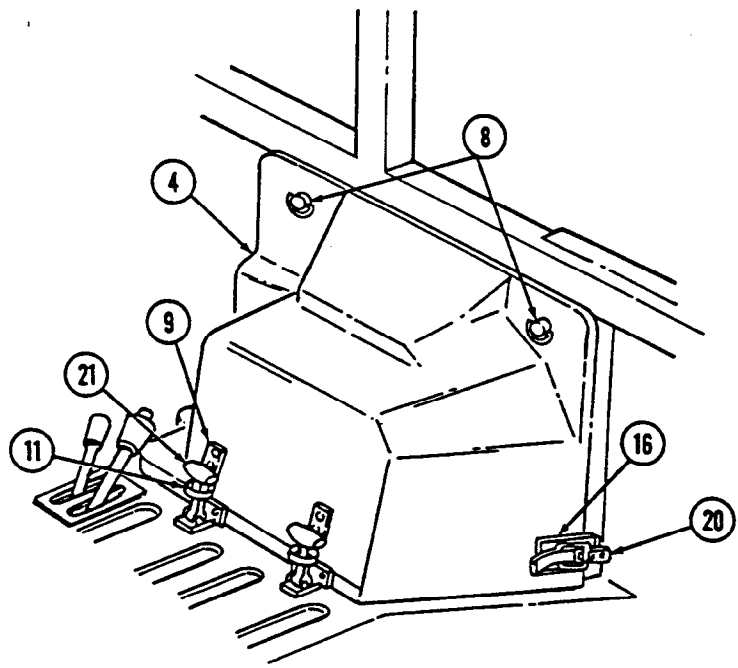
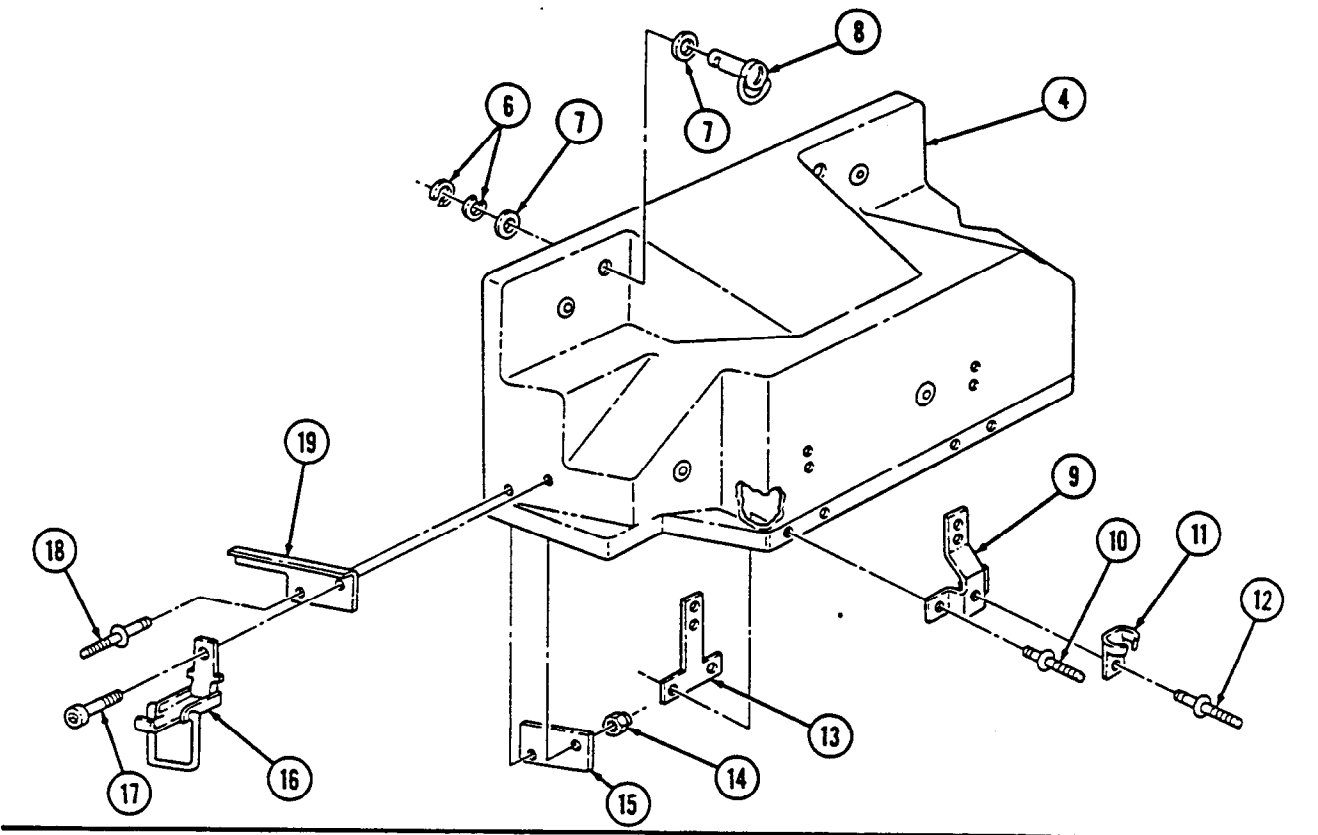
1. Install two holddown brackets (9) and backing plates (13) on access cover (4) with eight rivets (10).
2. Install two keepers (11) on holddown brackets (9) with two rivets (12).
3. Install two backing plates (15) and guide plates (19) on access cover (4) with two rivets (18).
4. Install two latches (16) on guide plates (19) and access cover (4) with two shoulder bolts (17) and locknuts (14).
5. Install two washers (7) and ring studs (8) on access cover (4) with two washers (7) and four retaining rings (6).
6. Install insulation (3) on access cover (4) with seven retainers (2) and rivets (5).
7. Install seal (1) on access cover (4).

d. Installation

1. Install access cover (4) on vehicle with two ring studs (8).
2. Install two holddown latches (16) on holddown strikes (20).
3. Latch two flexible latches (21) to keepers (11) on holddown brackets (9).



10-22. ENGINE ACCESS COVER MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install front radio rack (para. 12-17).

10-23. ENGINE LEFT SPLASH SHIELD MAINTENANCE

This task covers:

- | | |
|--------------------------------------|--|
| <p>a. Removal
b. Disassembly</p> | <p>c. Assembly
d. Installation</p> |
|--------------------------------------|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Eleven locknuts (Appendix G, Item 116)
Nut and lockwasher assembly
(Appendix G, Item 248)
Four rivets (Appendix G, Item 326)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Hood prop rod and bracket removed (para. 10-8).
- Fuel drainvalve removed (M1114 only) (para. 3-35).

General Safety Instructions

Hood must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Hood must be supported during removal and installation. Failure to support hood may cause injury to personnel or damage to equipment.

a. Removal

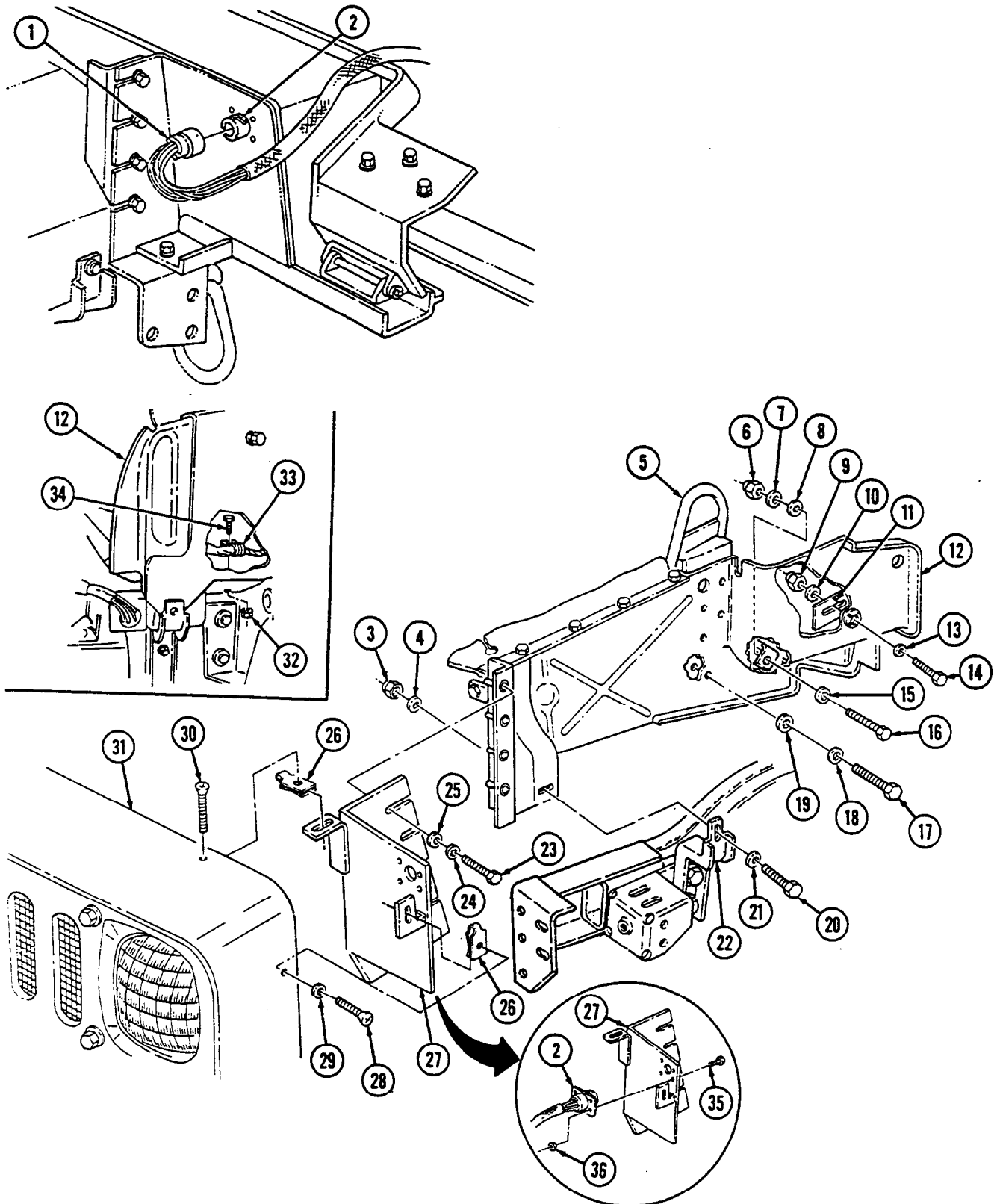
1. Disconnect hood harness connector (1) from connector (2).

NOTE

Perform steps 2 through 6 and step 9 for M1114 models only.
Perform steps 2 through 9 for M1113 models only.

2. Remove four capscrews (23), washers (24), and washers (25) from plate (27) and left splash shield (12).
3. Remove hex-head screws (28) and (30), washer (29), plates (27), and two spring nuts (26) from headlight housing (31).
4. Remove four nuts (36), screws (35), and connector (2) from plate (27).
5. Remove nut and lockwasher assembly (32), screw (34), and harness and clamp (33) from left splash shield (12). Discard nut and lockwasher assembly (32).
6. Remove locknut (3), washer (4), capscrew (20), washer (21), and left splash shield (12) from support bracket (22). Discard locknut (3).
7. Remove locknut (6), washer (7), washer (8), capscrew (16), and washer (15) from left splash shield (12) and airlift bracket (5). Discard locknut (6).
8. Remove capscrew (17), washer (18), washer (19), and left splash shield (12) from airlift bracket (5).
9. Remove locknut (9), washer (10), capscrew (14), and washer (13) from master cylinder bracket (11) and splash shield (12). Discard locknut (9) and remove splash shield (12) from vehicle.

10-23. ENGINE LEFT SPLASH SHIELD MAINTENANCE (Cont'd)



10-23. ENGINE LEFT SPLASH SHIELD MAINTENANCE (Cont'd)

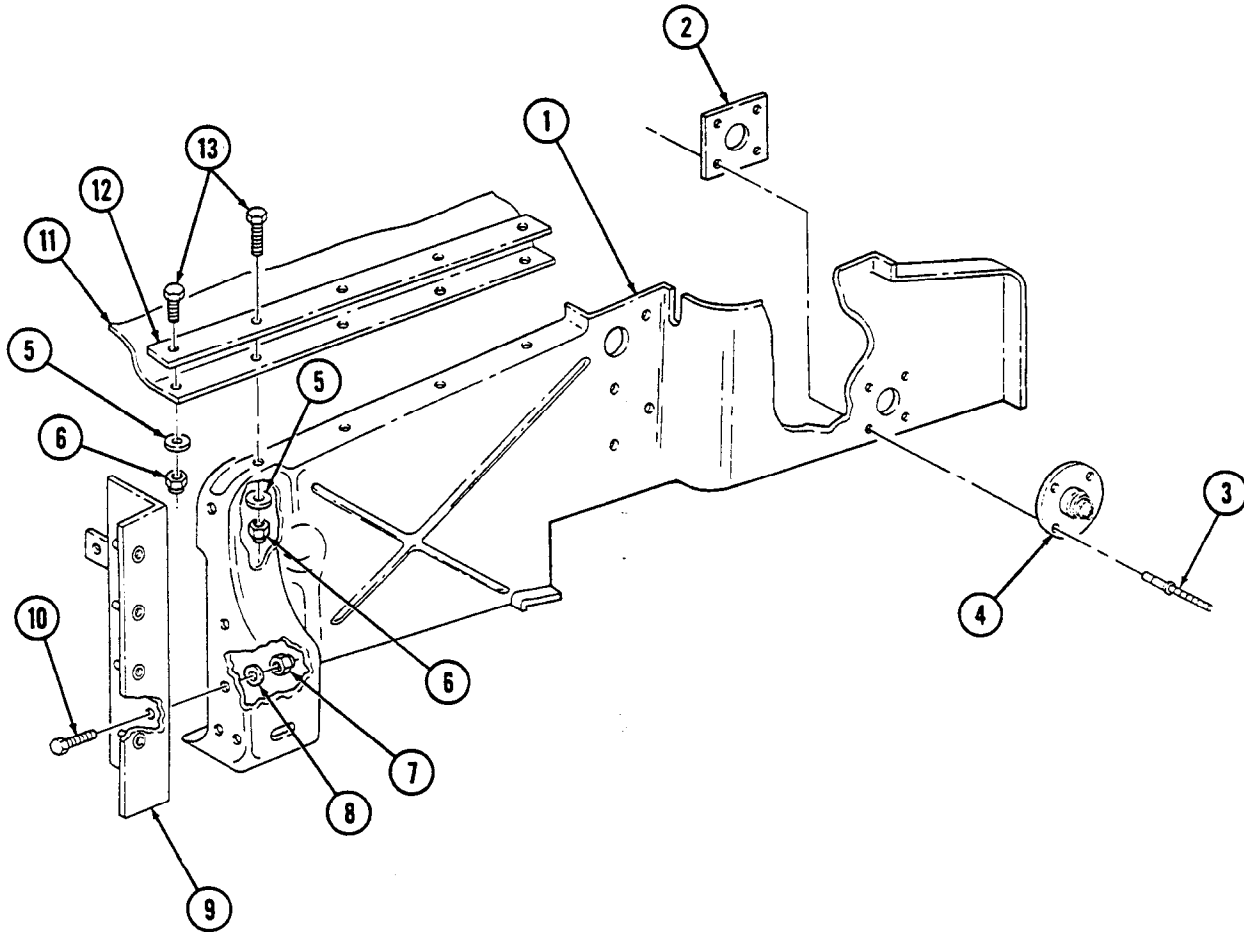
b. Disassembly

1. Remove three locknuts (7), washers (8), capscrews (10), and bracket (9) from left splash shield (1). Discard locknuts (7).
2. Remove five locknuts (6), washers (5), capscrews (13), seal retainer (12), and seal (11) from splash shield (1). Discard locknuts (6).

NOTE

For rivet replacement instructions, refer to para. 10-56.

3. Remove four rivets (3), support (4), and reinforcement (2) from splash shield (1). Discard rivets (3).



c. Assembly

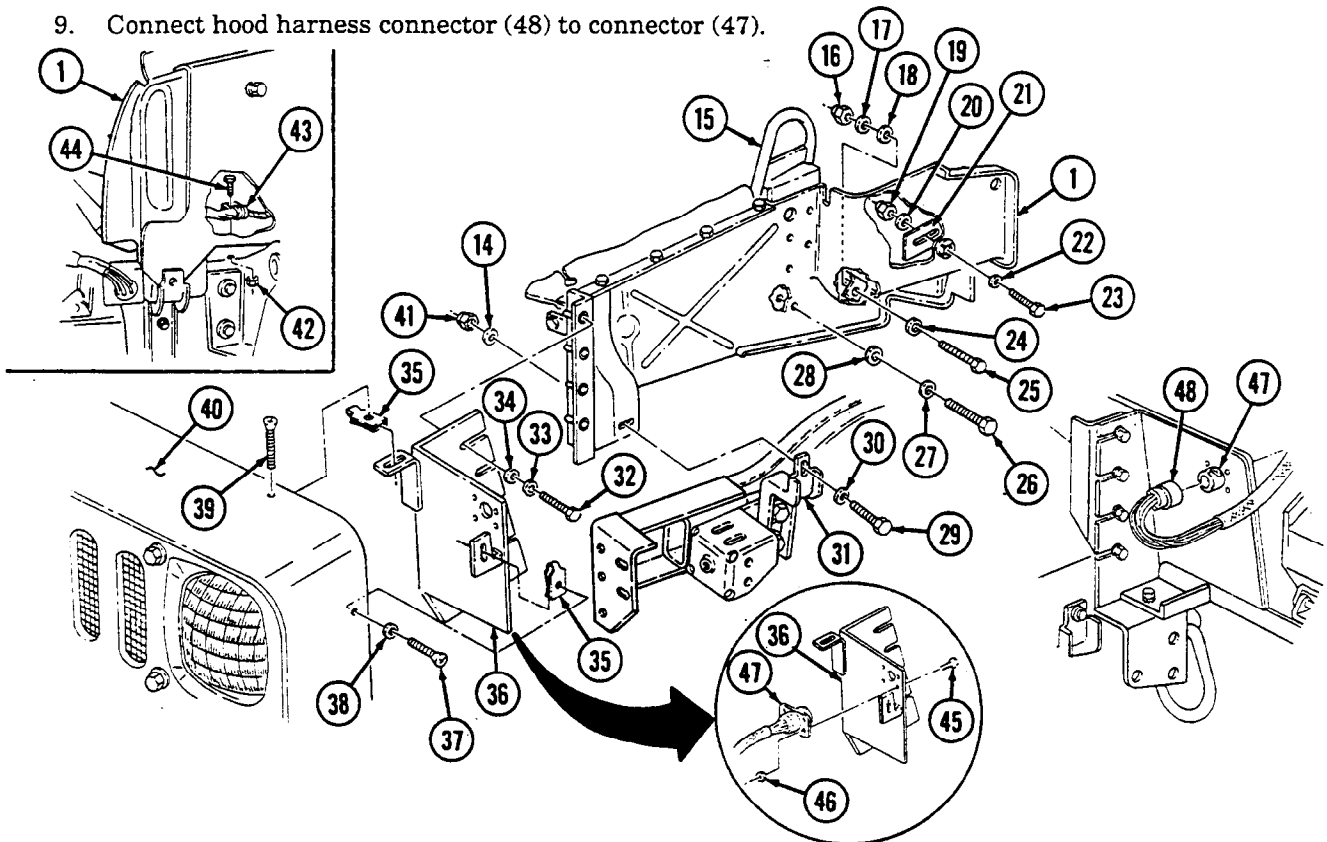
1. Install support (4) and reinforcement (2) on left splash shield (1) with four rivets (3).
2. Install seal (11) and seal retainer (12) on splash shield (1) with five capscrews (13), washers (5), and locknuts (6).
3. Install bracket (9) on splash shield (1) with three capscrews (10), washers (8), and locknuts (7).

10-23. ENGINE LEFT SPLASH SHIELD MAINTENANCE (Cont'd)

d. Installation

NOTE

- Perform steps 2 and 4 through step 9 for M1114 models only.
Perform steps 1 through 9 for M1113 models only.
 - Ensure left splash shield clears oil cooler lines.
1. Install splash shield (1) on airlift bracket (15) with washer (24), capscrew (25), washer (18), washer (17), and locknut (16). Tighten capscrew (25) to 10 lb-ft (14 N•m).
 2. Install splash shield (1) on master cylinder bracket (21) with washer (22), capscrew (23), washer (20), and locknut (19).
 3. Install splash shield (1) on airlift bracket (15) with washer (28), washer (27), and capscrew (26).
 4. Install splash shield (1) on support bracket (31) with washer (30), capscrew (29), washer (14), and locknut (41). Tighten capscrew (29) to 15 lb-ft (20 N•m).
 5. Install harness and clamp (43) on splash shield (1) with screw (44) and nut and lockwasher assembly (42).
 6. Install connector (47) on plate (36) with four screws (45) and nuts (46).
 7. Install plate (36) on splash shield (1) with four washers (34), washers (33), and capscrews (32).
 8. Install spring nuts (35) and plate (36) on headlight housing (40) with washer (38) and hex-head screws (37) and (39).
 9. Connect hood harness connector (48) to connector (47).



- FOLLOW-ON TASKS:
- Install fuel drainvalve (M1114 only) (para. 3-35).
 - Install hood prop rod and bracket (para. 10-8).
 - Connect battery ground cables (para. 4-68).

10-24. ENGINE RIGHT SPLASH SHIELD MAINTENANCE

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Fifteen locknuts (Appendix G, Item 116)
Seven lockwashers (Appendix G, Item 206)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Disconnect hood harness connector (33) from connector (34).
2. Remove four capscrews (18), lockwashers (19), and washers (20) from plate (16) and splash shield bracket (8). Discard lockwashers (19).
3. Remove two hex-head screws (11), harness (14), clamp (15), plate (16), and spring nuts (13) and (17) from headlight housing (12).
4. Remove four nuts (35), capscrews (36), and plate (16) from connector (34).
5. Remove locknut (10), washer (9), capscrew (25), and washer (26) from splash shield (1) and support bracket (24). Discard locknut (10).

NOTE

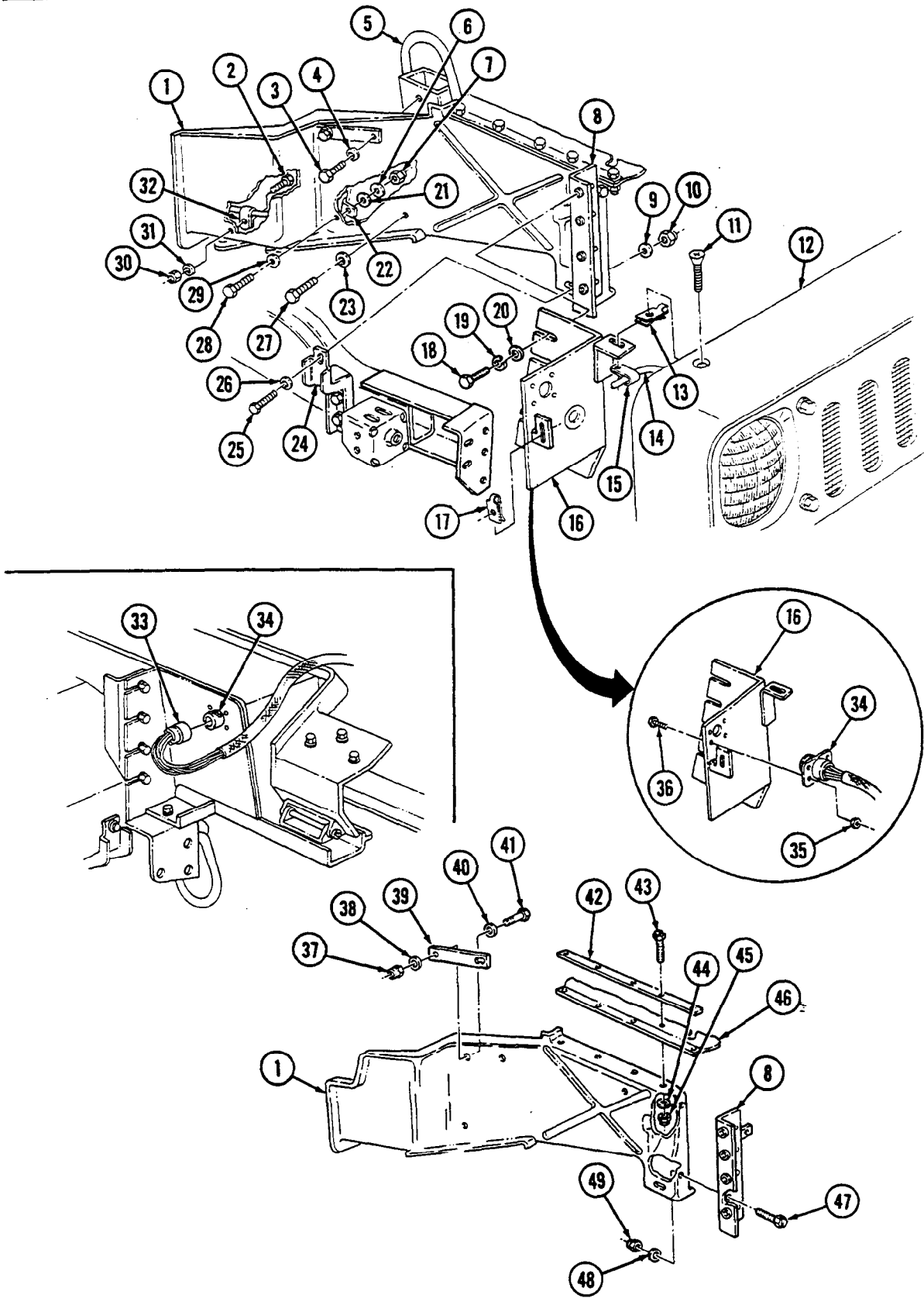
Perform steps 6 and 7 for M1113 models only.

6. Remove locknut (7), washers (6) and (21), capscrews (27) and (28), washers (23) and (29), and clamp (22) from splash shield (1) and airlift bracket (5). Discard locknut (7).
7. Remove locknut (30), washer (31), capscrew (2), and vent line clamp (32) from splash shield (1). Discard locknut (30).
8. Remove screw (3), washer (4), and splash shield (1) from airlift bracket (5).

b. Disassembly

1. Remove locknut (37), washer (38), capscrew (41), washer (40), and bracket (39) from splash shield (1). Discard locknut (37).
2. Remove three locknuts (49), washers (48), capscrews (47), and support bracket (8) from splash shield (1). Discard locknuts (49).
3. Remove five locknuts (45), washers (44), capscrews (43), seal retainer (42), and seal (46) from splash shield (1). Discard locknuts (45).

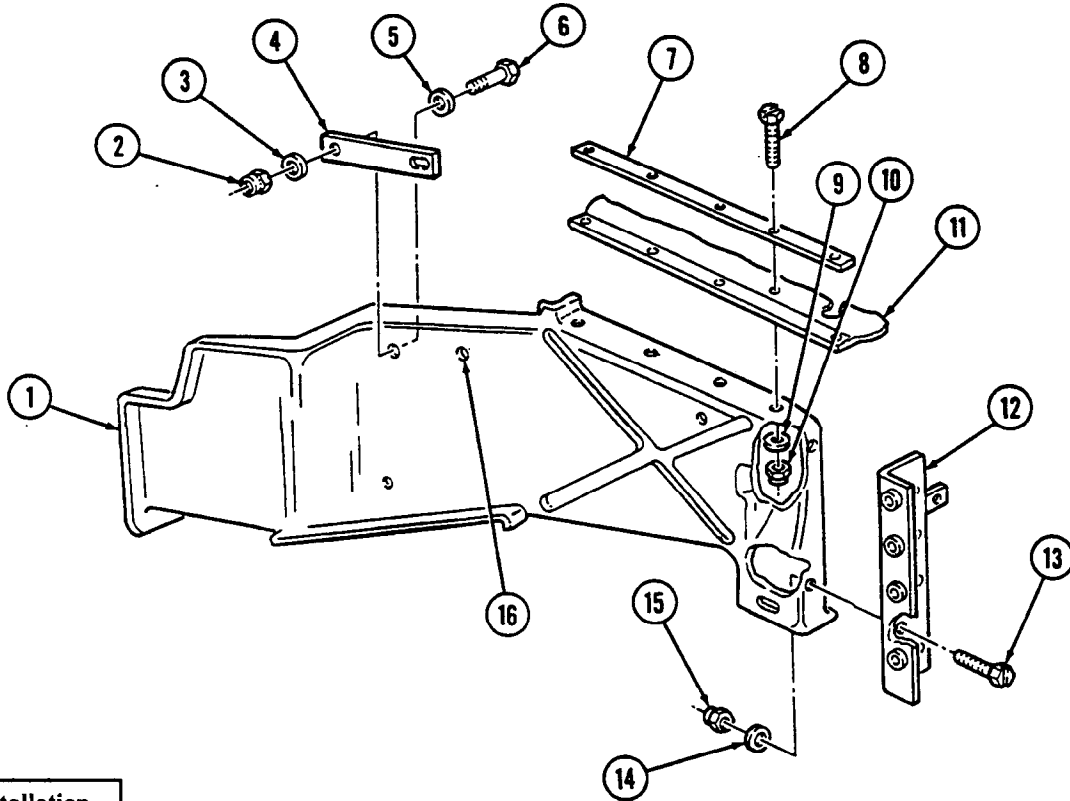
10-24. ENGINE RIGHT SPLASH SHIELD MAINTENANCE (Cont'd)



10-24. ENGINE RIGHT SPLASH SHIELD MAINTENANCE (Cont'd)

c. Assembly

1. Install support bracket (12) on splash shield (1) with three capscrews (13), washers (14), and locknuts (15).
2. Install seal (11) and seal retainer (7) on splash shield (1) with five capscrews (8), washers (9), and locknuts (10).
3. Install bracket (4) on splash shield (1) with washer (5), capscrew (6), washer (3), and locknut (2). Ensure second hole in bracket (4) aligns with hole (16) in splash shield (1).



d. Installation

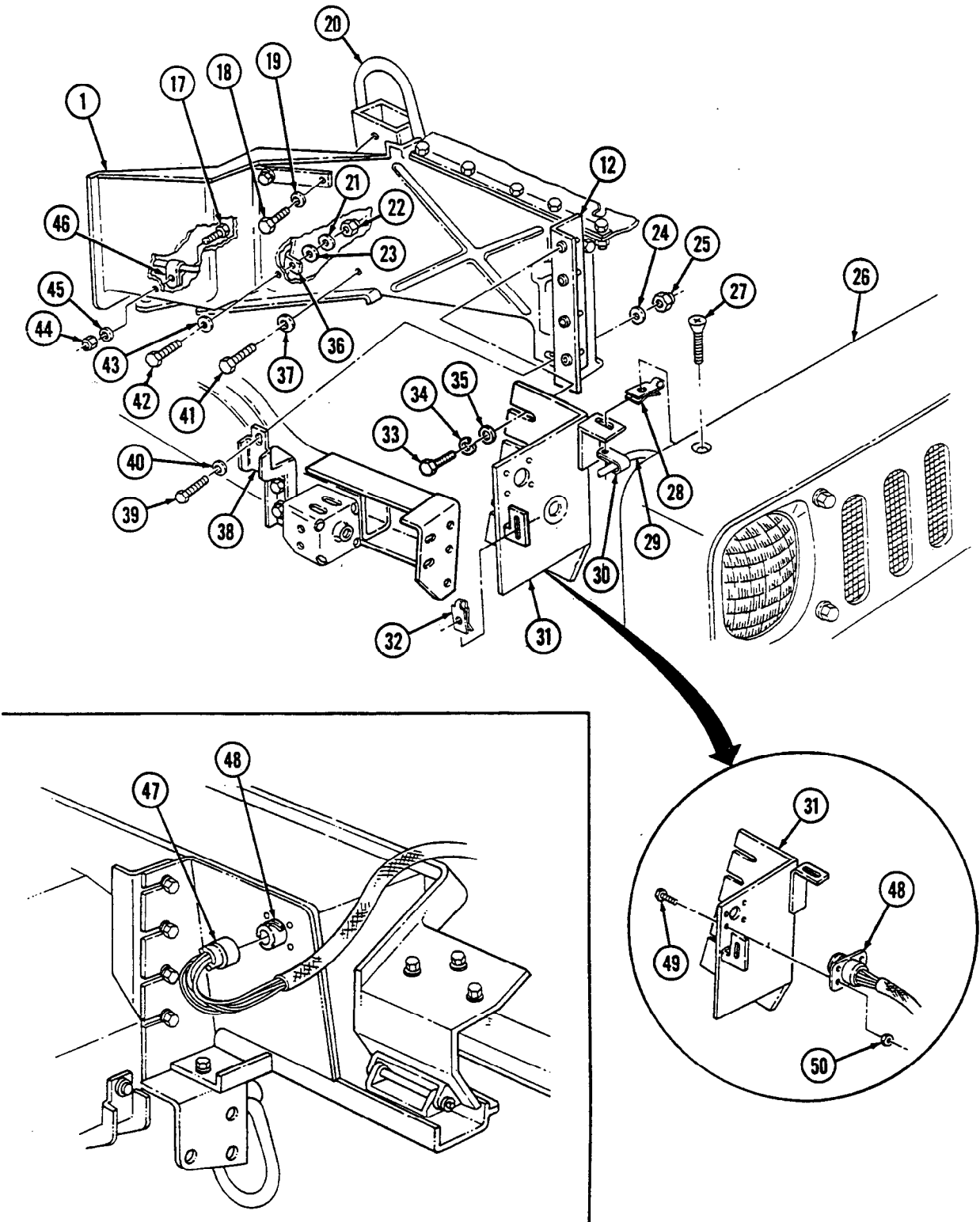
1. Install splash shield (1) on airlift bracket (20) with washer (19) and capscrew (18).
2. Install splash shield (1) on splash shield mount (38) with washer (40), capscrew (39), washer (24), and locknut (25). Tighten capscrew (39) to 15 lb-ft (20 N·m).

NOTE

Perform steps 3 through 5 for M1113 models only.

3. Install splash shield (1) on lower airlift bracket (36) with washer (43), capscrew (42), washer (23), lockwasher (21), and locknut (22). Tighten capscrew (42) to 10 lb-ft (14 N·m).
4. Install clamp (46) on splash shield (1) with capscrew (17), washer (45), and locknut (44).
5. Install splash shield (1) on airlift bracket (20) with lockwasher (37) and capscrew (41).
6. Install plate (31) on connector (48) with four screws (49) and nuts (50).
7. Install spring nuts (28) and (32) and plate (31) on headlight housing (26) with two hex-head screws (27), harness (29), and clamp (30).
8. Install plate (31) on support bracket (12) with four washers (35), lockwashers (34), and capscrews (33).
9. Connect hood harness connector (47) to connector (48).

10-24. ENGINE RIGHT SPLASH SHIELD MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-25. ENGINE LEFT SPLASH SHIELD ACCESS COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Maintenance Level

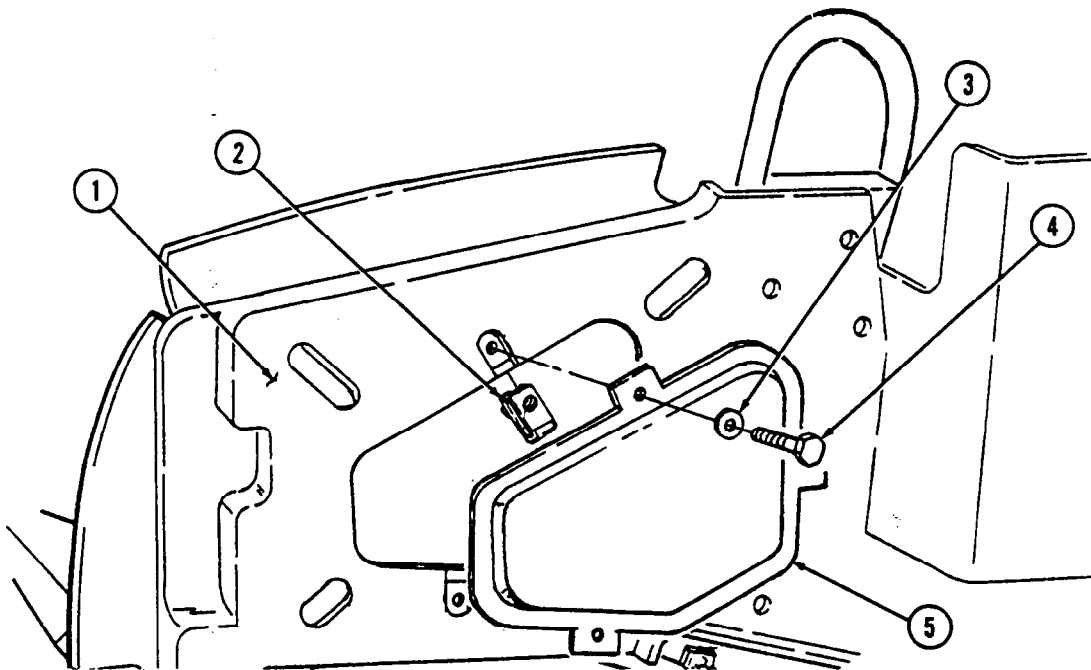
Unit

a. Removal

1. Remove three capscrews (4), washers (3), and splash shield access cover (5) from engine left splash shield (1).
2. Inspect spring nuts (2). Replace if damaged.

b. Installation

Install splash shield access cover (5) on engine left splash shield (1) with three washers (3) and capscrews (4).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-26. WINDSHIELD GLASS AND WEATHERSTRIP REPLACEMENT (M1113)

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Sealing compound (Appendix C, Item 68)

Manual References

TM 9-2320-387-24P

Equipment Condition

Windshield wiper blade and arm removed
(para. 10-62).

General Safety Instructions

Eyeshields and gloves are required when installing
and removing windshield glass.

Maintenance Level

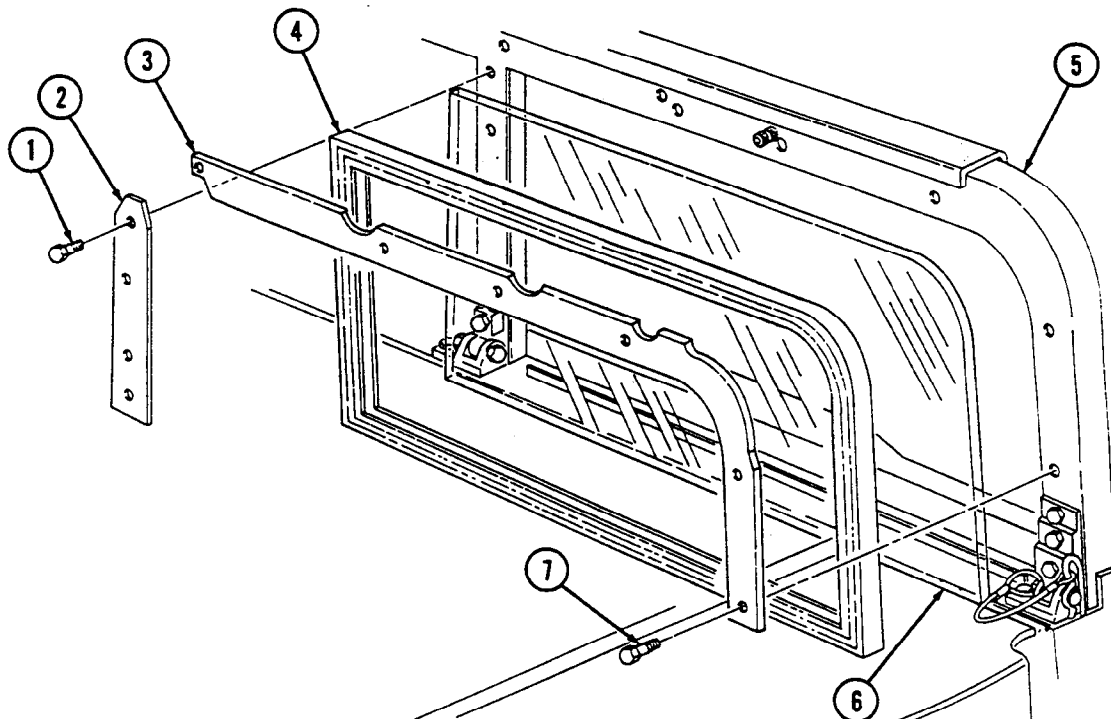
Unit

WARNING

Use eyeshields and gloves when removing and installing
windshield glass. Glass could shatter and cause injury.

a. Removal

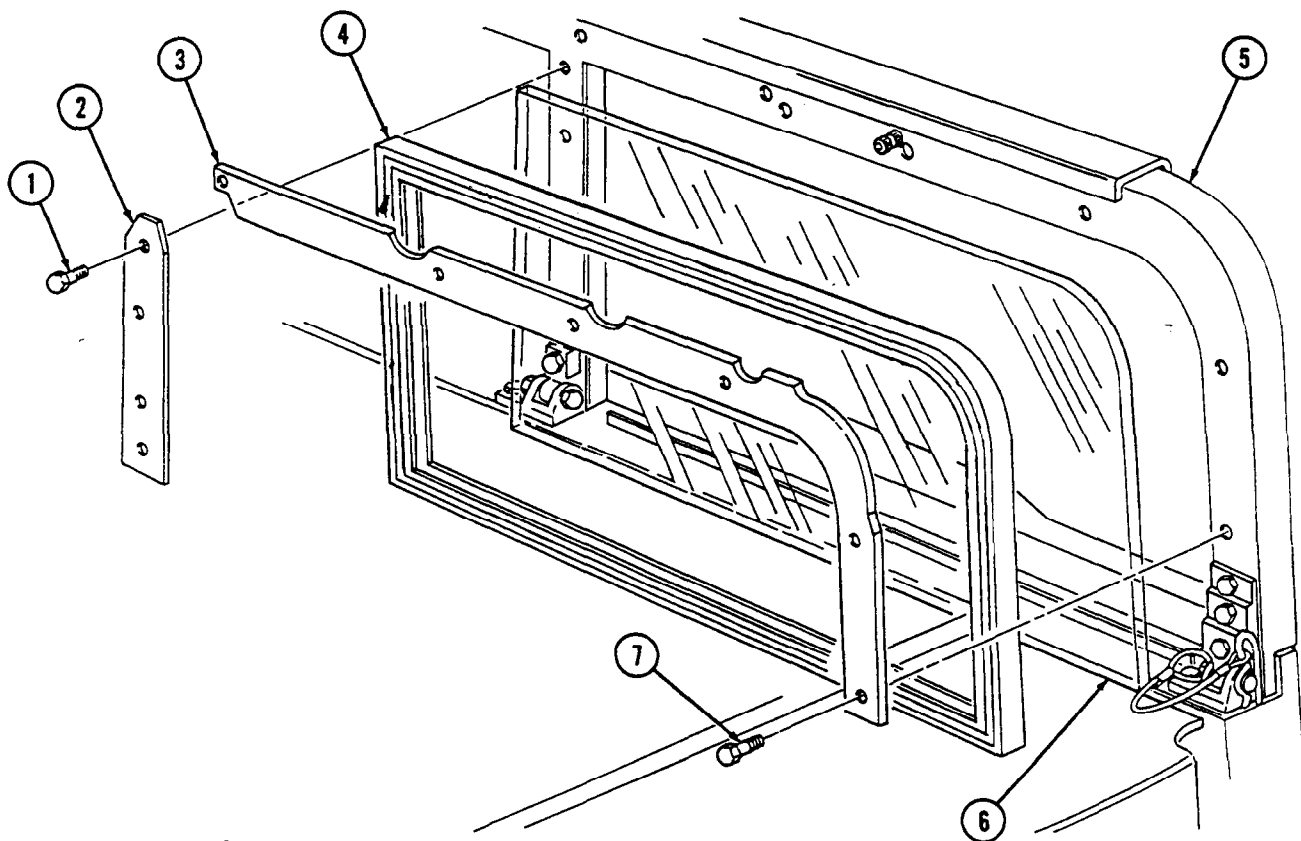
1. Remove six capscrews (7) and upper retainer (3) from windshield frame (5).
2. Remove four capscrews (1) and center retainer (2) from windshield frame (5).
3. Remove weatherstrip (4) and glass (6) from windshield frame (5).
4. Clean sealant from windshield frame (5).



10-26. WINDSHIELD GLASS AND WEATHERSTRIP REPLACEMENT (M1113) (Cont'd)

b. Installation

1. Apply a 1/8-in. (3-mm) bead of sealing compound to edge of glass (6) and to windshield frame (5).
2. Install weatherstrip (4) on glass (6).
3. Install glass (6) and weatherstrip (4) on windshield frame (5) with center retainer (2) and four capscrews (1).
4. Install upper retainer (3) on windshield frame (5) with six capscrews (7).
5. Apply thin bead of sealing compound to top edge of outside weatherstrip (4).



FOLLOW-ON TASK: Install windshield wiper blade and arm (para. 10-62).

10-27. WINDSHIELD GLASS MAINTENANCE (M1114)

This task covers:

- a. Removal
- b. Inspection

c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three locknuts (right side only)
 (Appendix G, Item 170)
 Sealing compound (Appendix C, Item 63)
 Sealing compound, windshield
 (Appendix C, Item 68)
 Two locknuts (Appendix G, Item 181)
 Two lockwashers (Appendix G, Item 201)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Windshield wiper blade and arm removed (para. 10-62).
- Rearview mirror removed (para. 10-68).
- Hood raised and secured (TM 9-2320-387-10).
- A/C air distribution duct register removed (right side only) (para. 11-82).
- Air intake assembly removed (right side only) (para. 3-19).
- Windshield de-icer removed removed (para. 10-67).

Maintenance Level

Unit

NOTE

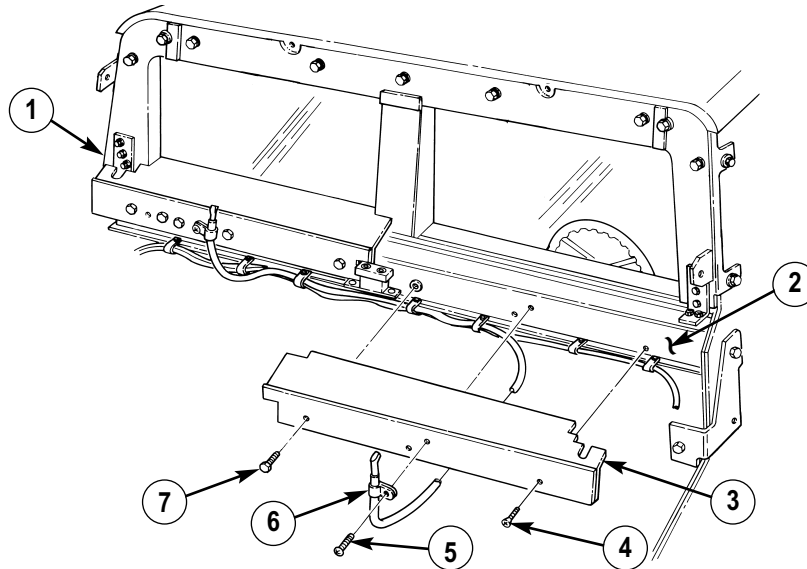
Replacement procedures for left and right windshield glass are basically the same. This procedure covers the left windshield glass.

a. Removal

NOTE

Use cardboard and masking tape to cover windshield glass.

1. Remove screw (5) and clamp (6) from left deflector (3).
2. Remove two capscrews (7), capscrew (4), and left deflector (3) from body (2) and windshield (1).



10-27. WINDSHIELD GLASS MAINTENANCE (M1114) (Cont'd)

3. Remove three capscrews (18) from windshield bracket (15) and left capping ring (12).
4. Remove two locknuts (20), lockwashers (19), socket-head screws (16), and windshield bracket (15) from body (3). Discard locknuts (20) and lockwashers (19).
5. Remove five capscrews (21) and upper capping ring (22) from windshield frame (11).
6. Remove two capscrews (17), capscrews (14), washers (13), and left capping ring (12) from windshield frame (11).
7. Remove two capscrews (9) and center capping ring (10) from windshield frame (11).
8. Remove windshield glass (25) from windshield frame (11).
9. Remove neoprene weatherstrips (23) and (24) from windshield glass (25).
10. Remove gasket (26) from windshield glass (25).

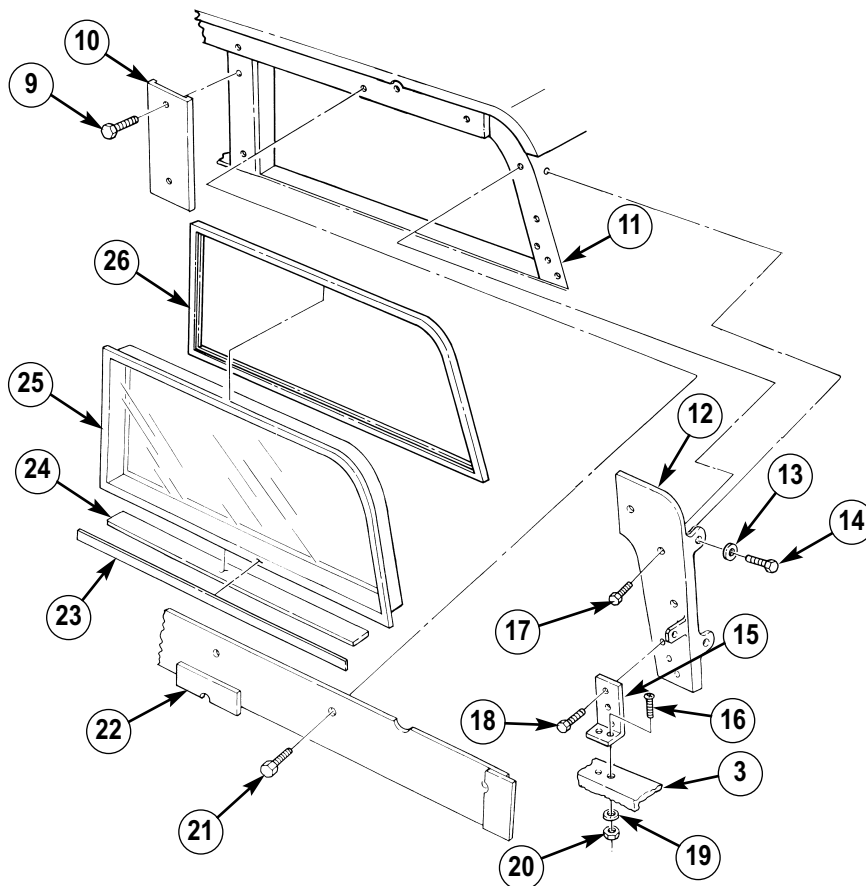
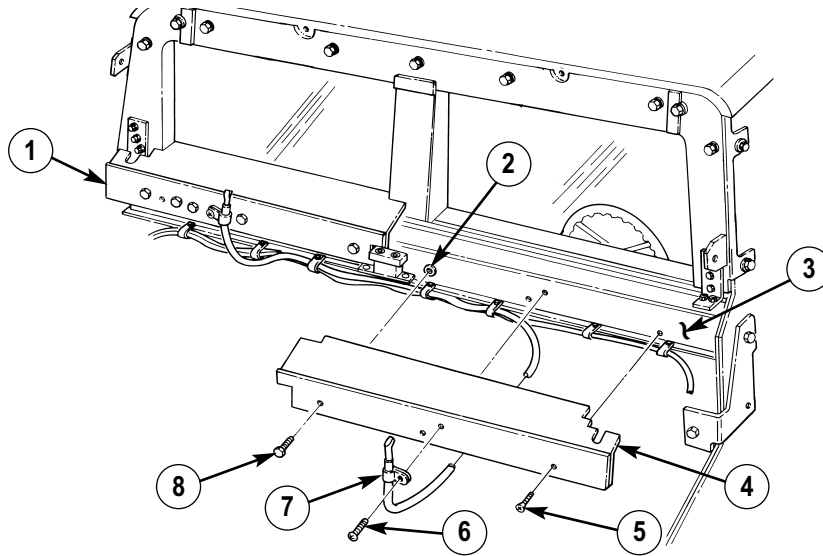
b. Inspection

Refer to para. 10-56 for plusnut (2) inspection and replacement.

c. Installation

1. Apply a thin coat of windshield sealing compound to side and bottom of windshield glass (25).
2. Install neoprene weatherstrips (23) and (24) on sides and bottom of windshield glass (25).
3. Install gasket (26) on windshield glass (25).
4. Install windshield glass (25) on windshield frame (11).
5. Apply sealing compound to threads of two capscrews (9), and install center capping ring (10) on windshield frame (11) with capscrews (9). Tighten capscrews (9) to 68-82 lb-in. (8-9 N·m).
6. Apply sealing compound to threads of five capscrews (21), and install upper capping ring (22) on windshield frame (11) with capscrews (21). Tighten capscrews (21) to 68-82 lb-in. (8-9 N·m).
7. Apply sealing compound to threads of two capscrews (14) and (17), and install left capping ring (12) on windshield frame (11) with two washers (13), capscrews (14), and capscrews (17). Tighten capscrews (17) to 68-82 lb-in. (8-9 N·m).
8. Apply sealing compound to threads of three capscrews (18), and install windshield bracket (15) on left capping ring (12) with capscrews (18). Tighten capscrews (18) to 40-60 lb-in. (5-7 N·m).
9. Install windshield bracket (15) on body (3) with two socket-head screws (16), lockwashers (19), and locknuts (20). Tighten socket-head screws (16) to 40-60 lb-in. (5-7 N·m).
10. Apply sealing compound to threads of two capscrews (8) and capscrew (5), and install left deflector (4) on body (3) and windshield (1) with two capscrews (8) and capscrew (5). Tighten capscrews (8) and (5) to 68-82 lb-in. (8-9 N·m).
11. Apply sealing compound to threads of screw (6), and install clamp (7) on left deflector (4) with screw (6). Tighten screw (6) to 33-37 lb-in. (3.7-4.2 N·m).

10-27. WINDSHIELD GLASS MAINTENANCE (M1114) (Cont'd)



- FOLLOW-ON TASKS:**
- Install windshield de-icer (para. 10-67).
 - Install wiper blade and arm (para. 10-62).
 - Install rearview mirror (para. 10-68).
 - Install air intake assembly, if removed (para. 3-19).
 - Lower and secure hood (TM 9-2320-387-10).
 - Install A/C distribution duct register, if removed (para. 11-82).

10-28. WINDSHIELD ASSEMBLY MAINTENANCE (M1113)

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Soft top enclosure removed, if installed (TM 9-2320-387-10).
- Windshield wiper arm pivot removed (para. 10-60).
- Windshield retention bracket removed (para. 10-29).

General Safety Instructions

Windshield must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Windshield must be supported during removal and installation. Failure to support windshield may cause injury to personnel or damage to equipment.

a. Removal

1. Remove five hitch pins (5) from hinge pins (6).
2. Remove five hinge pins (6) from upper hinge halves (2) and lower hinge halves (4).
3. Remove grommet (11) from A-pillar (12) and remove jumper harness (10).
4. Remove windshield assembly (1) from A-pillar (12).
5. Remove two seals (3) from windshield assembly (1).
6. Clean remains of seal (3) from windshield assembly (1).

b. Disassembly

1. Remove thirteen screws (9), former (8), and seal (7) from windshield assembly (1).
2. Clean remains of seal (7) from windshield assembly (1).

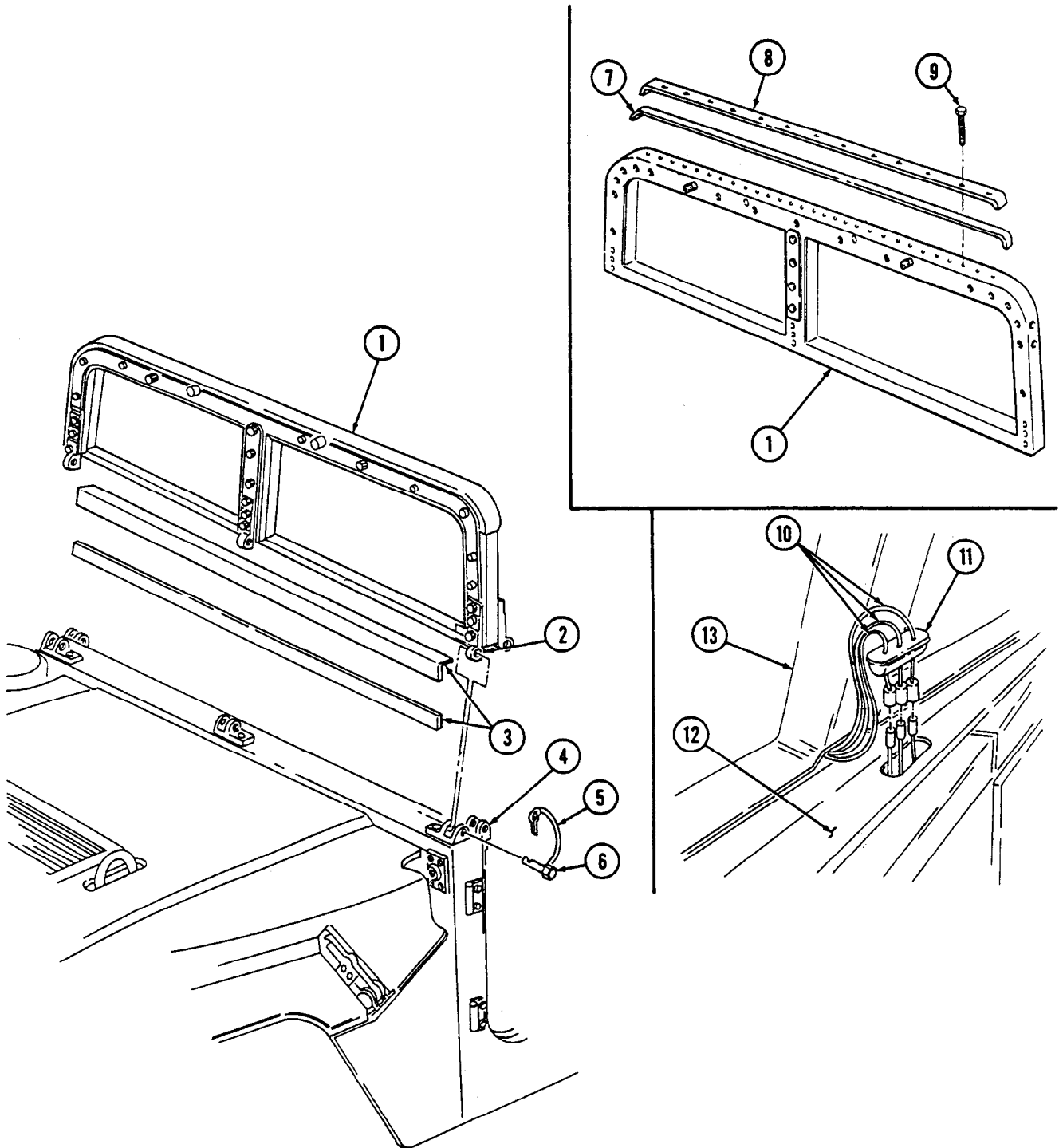
c. Assembly

1. Peel paper backing from seal (7) and install seal (7) on windshield assembly (1).
2. Install former (8) on seal (7) and windshield assembly (1) with thirteen screws (9).

d. Installation

1. Peel paper backing from two seals (3) and install seals (3) on windshield assembly (1).
2. Install windshield assembly (1) on A-pillar (12).
3. Install jumper harness (10) on windshield center pillar (13) and install grommet (11) on A-pillar (12).
4. Install upper hinge halves (2) on lower hinge halves (4) with five hinge pins (6).
5. Install five hitch pins (5) in hinge pins (6).

10-28. WINDSHIELD ASSEMBLY MAINTENANCE (M1113) (Cont'd)



- FOLLOW-ON TASKS:
- Install windshield retention bracket (para. 10-29).
 - Install windshield wiper arm pivot (para. 10-60).
 - Install soft top enclosure, if removed (TM 9-2320-387-10).

10-29. WINDSHIELD RETENTION BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

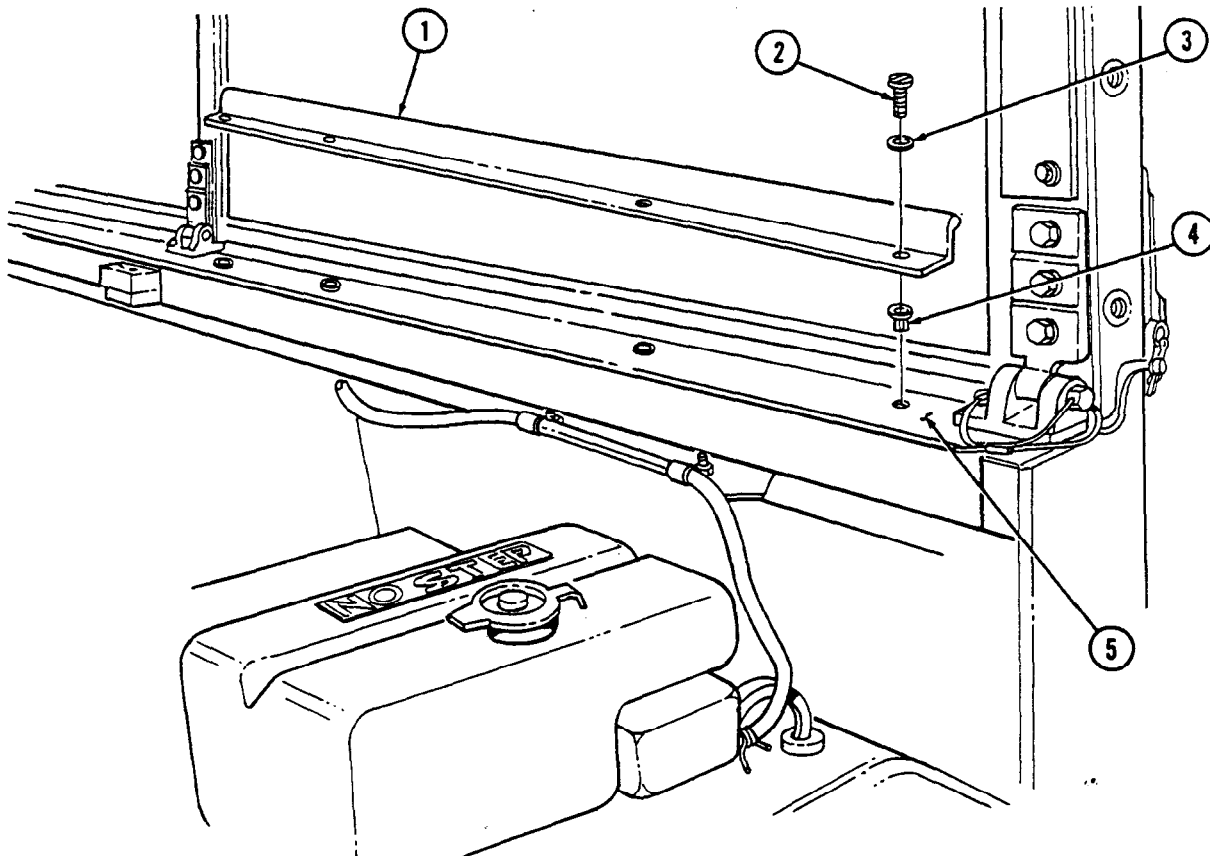
Four lockwashers (Appendix G, Item 206)

a. Removal

1. Remove four capscrews (2), lockwashers (3), and retention bracket (1) from windshield frame (5). Discard lockwashers (3).
2. Inspect four nut inserts (4). Replace if damaged.

b. Installation

Install retention bracket (1) on windshield frame (5) with four lockwashers (3) and capscrews (2).



10-30. LEFT OUTER COWL INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

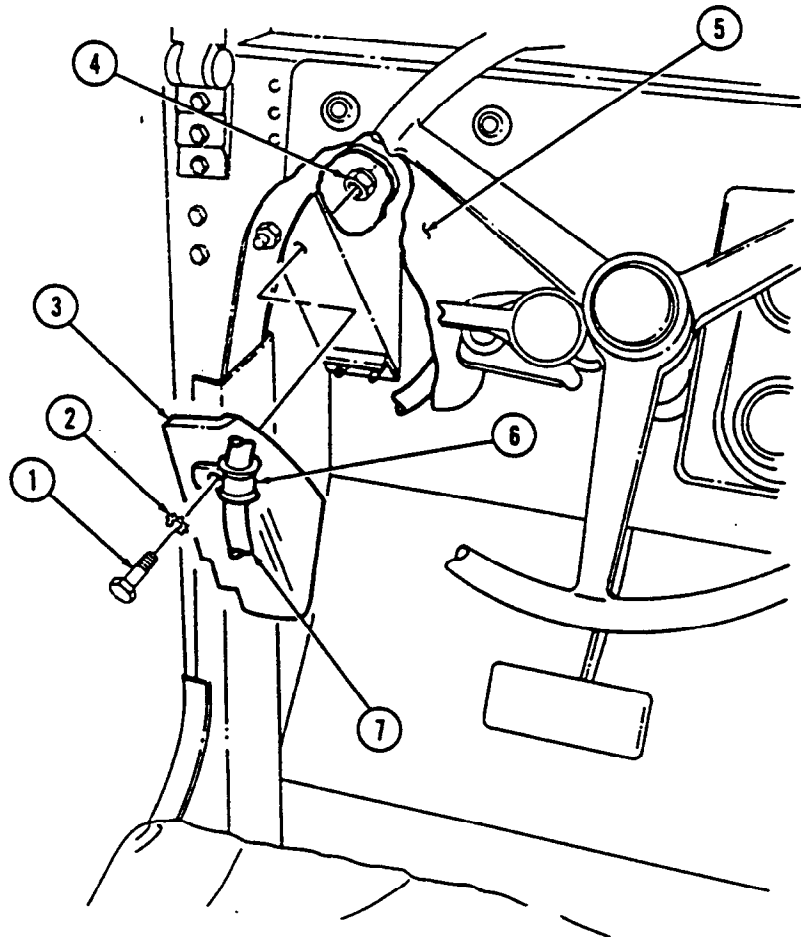
Locknut (Appendix G, Item 109)
Lockwasher (Appendix G, Item 205)

a. Removal

Remove locknut (4), capscrew (1), lockwasher (2), clamp (6), wiring harness (7), and insulation (3) from cowl (5). Discard lockwasher (2) and locknut (4).

b. Installation

Install insulation (3) and wiring harness (7) on cowl (5) with clamp (6), lockwasher (2), capscrew (1), and locknut (4).



10-31. LEFT FRONT COWL INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Five locknuts (Appendix G, Item 109)
 Two lockwashers (Appendix G, Item 205)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Personnel Required

One mechanic
 One assistant

Equipment Condition

Headlight beam selector switch and bracket removed (para. 4-59).

Maintenance Level

Unit

a. Removal

NOTE

M1114 models are equipped with insertnuts, not with nuts and lockwashers as indicated in step 1.

1. Remove two nuts (1), capscrews (5), lockwashers (4), and clamps (3) from wiring harness (2), insulation (10), and body (6). Discard lockwashers (4).

NOTE

Perform steps 2 and 3 for M1113 vehicles only.

2. Remove locknut (17), washer (16), spacer (15), capscrew (8), and washer (7) from insulation (10) and floor (12). Discard locknut (17).
3. Remove four locknuts (13), washers (14), capscrews (9), retainer (11), and insulation (10) from floor (12). Discard locknuts (13).

b. Installation

NOTE

Perform steps 1 and 2 for M1113 vehicles only.

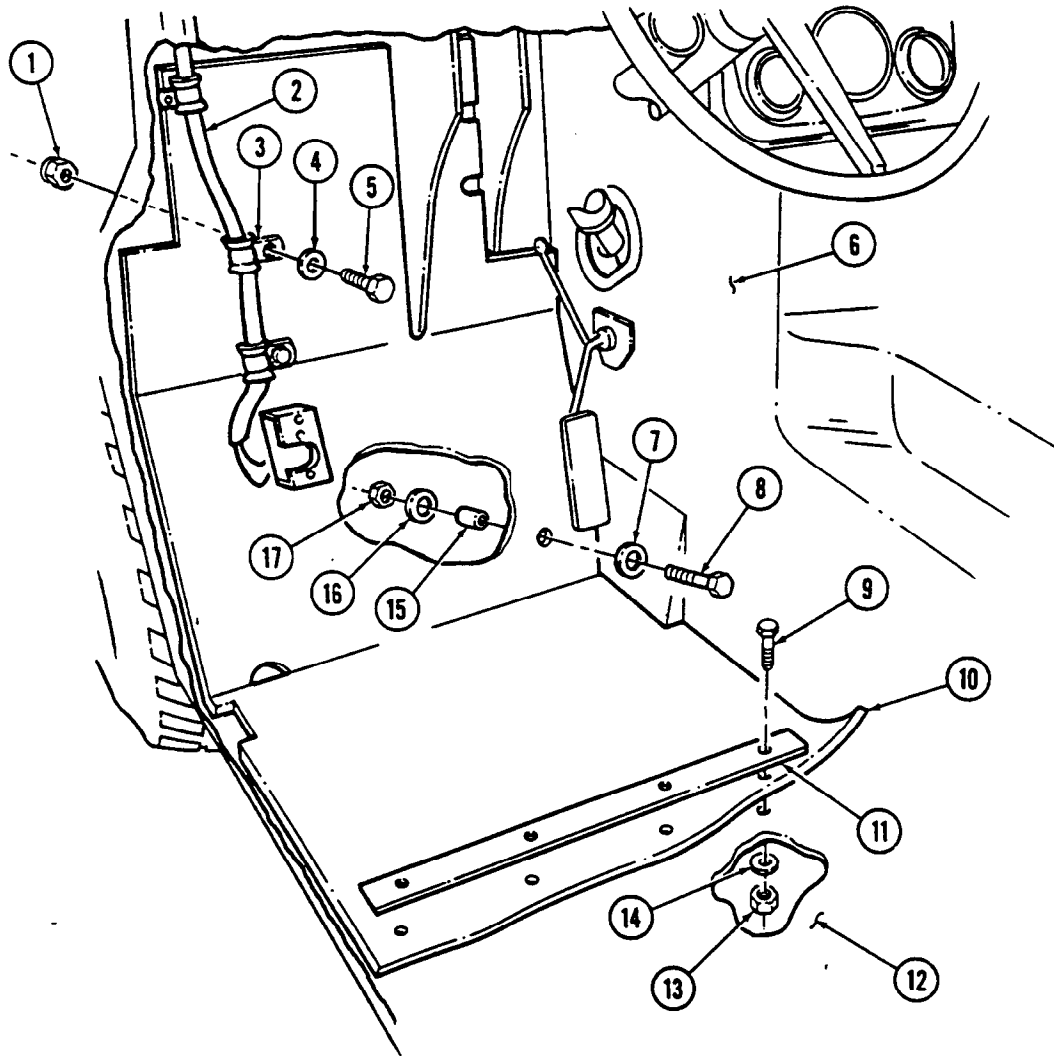
1. Install insulation (10) and retainer (11) on floor (12) with four capscrews (9), washers (14), and locknuts (13). Tighten locknuts (13) to 6 lb-ft (8 N·m).
2. Install washer (7), capscrew (8), spacer (15), washer (16), and locknut (17) on insulation (10) and floor (12).

NOTE

M1114 vehicles are equipped with insertnuts, not with nuts and lockwashers as indicated in step 3. Apply sealing compound to threads of capscrews at installation for M1114 vehicles only.

3. Install wiring harness (2) on insulation (10) and body (6) with two clamps (3), lockwashers (4), capscrews (5), and nuts (1).

10-31. LEFT FRONT COWL INSULATION REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install headlight beam selector switch and bracket (para. 4-59).

10-32. RIGHT FRONT COWL INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Four locknuts (Appendix G, Item 109)

Maintenance Level

Unit

Personnel Required

One mechanic
One assistant

NOTE

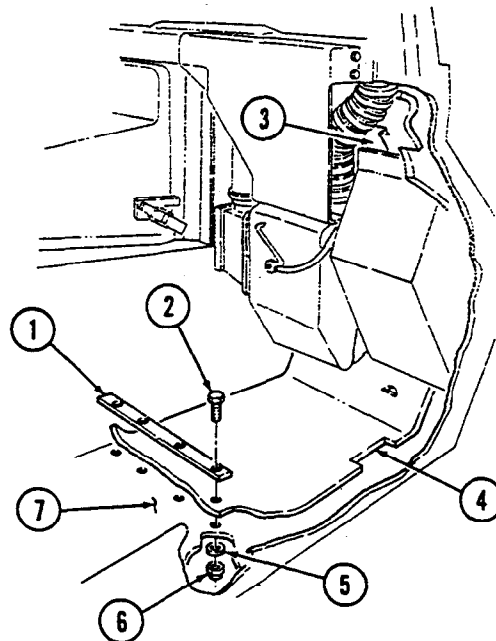
M1114 model insulation has no floor mounting hardware. The following procedure applies to M1113 models.

a. Removal

Remove four locknuts (6), washers (5), capscrews (2), retainer (1), and insulation (4) from floor (7). Discard locknuts (6).

b. Installation

1. Install insulation (4) and retainer (1) on floor (7) with four capscrews (2), washers (5), and locknuts (6). Tighten locknuts (6) to 6 lb-ft (8 N•m).
2. Press insulation (4) into place on cowl (3).



10-33. TUNNEL INTERIOR SIDE INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left front cowl insulation removed (para. 10-31).
- Gunner's platform removed (M1114 only) (para. 11-71).
- Rifle support removed (M1114 only) (para. 11-66).

Maintenance Level

Unit

NOTE

Replacement procedures for all tunnel interior side insulation are basically the same. This procedure covers the left front insulation.

a. Removal

1. Remove six screws (3), retainer rods (1), (2), (4), and insulation (6) from tunnel (5).

NOTE

Perform step 2 for M1114 models and step 3 for M1113 models.

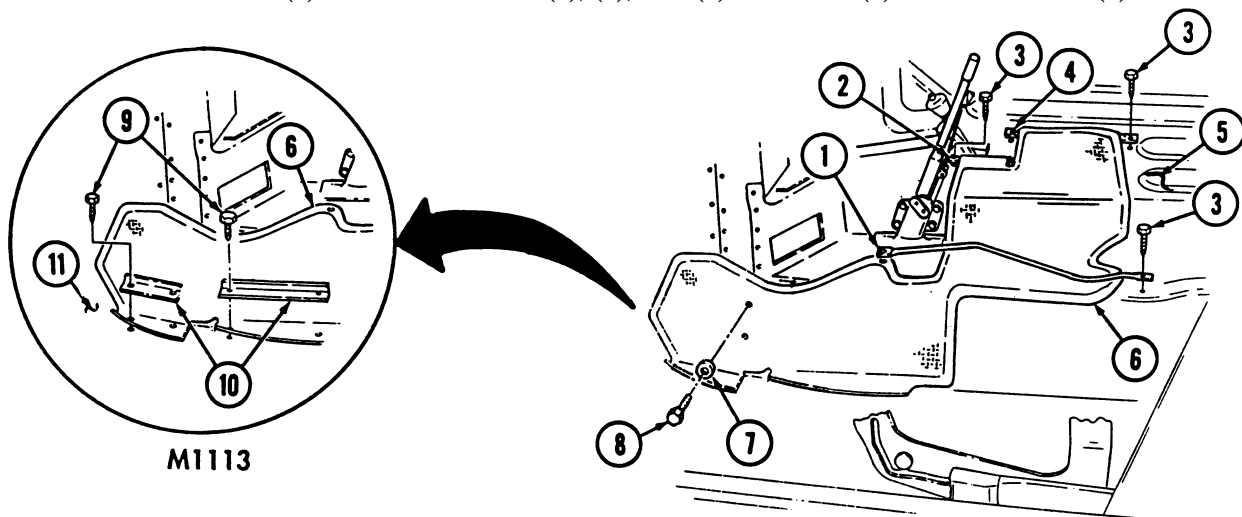
2. Remove two screws (8) and washers (7) from insulation (6) and tunnel (5).
3. Remove four screws (9), two angle brackets (10), and insulation (6) from floor (11).

b. Installation

NOTE

Perform step 1 for M1113 models and step 2 for M1114 models.

1. Install insulation (6) and two angle brackets (10) on floor (11) with four screws (9).
2. Install insulation (6) on tunnel (5) with two washers (7) and screws (8).
3. Install insulation (6) and retainer rods (1), (2), and (4) on tunnel (5) with six screws (3).



- FOLLOW-ON TASKS:**
- Install left front cowl insulation (para. 10-31).
 - Install gunner's platform (M1114 only) (para. 11-71).
 - Install rifle support (M1114 only) (para. 11-66).

10-34. REAR SEAT FLOOR INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

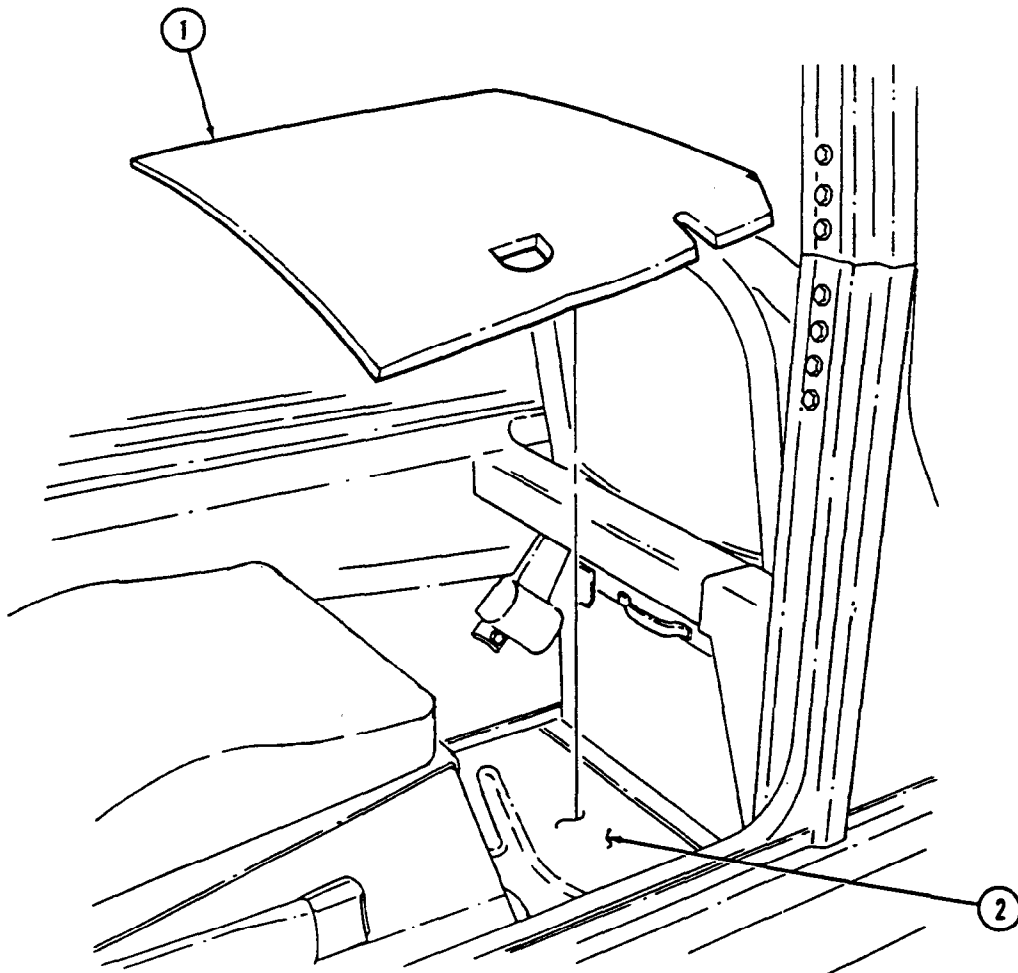
Unit

a. Removal

Remove insulation (1) from floor (2).

b. Installation

Install insulation (1) on floor (2).



10-35. TAILGATE CHAIN AND BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four locknuts (Appendix G, Item 116)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Tailgate lowered (TM 9-2320-387-10).

Maintenance Level

Unit

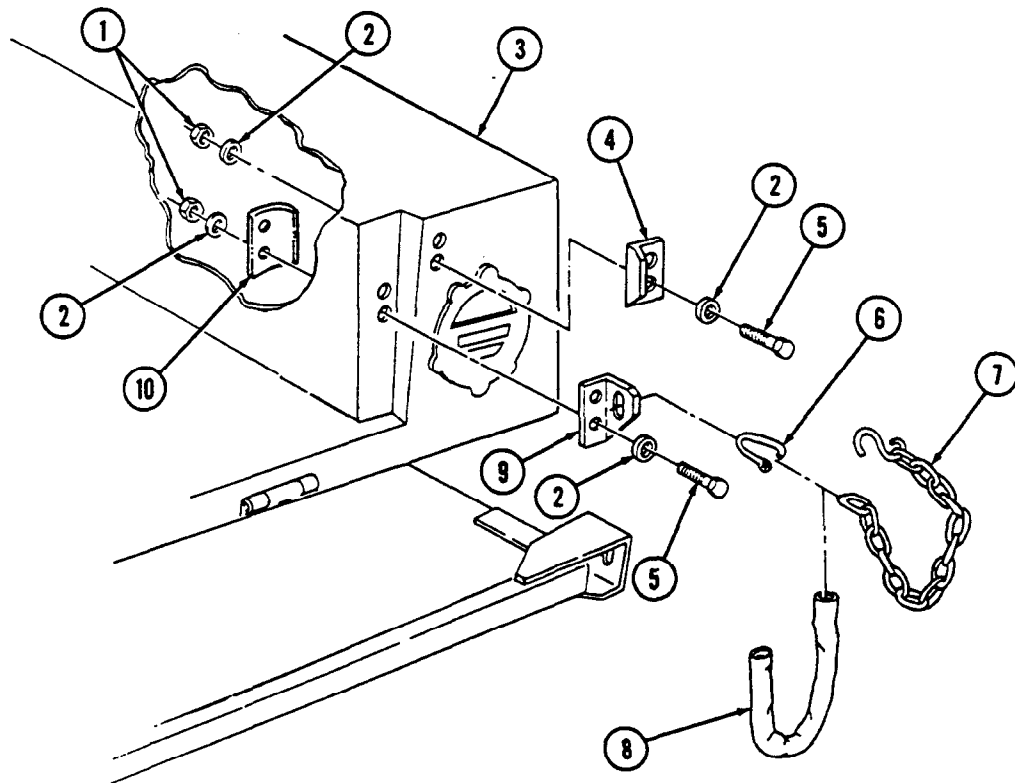
a. Removal

1. Open tailgate chain cap link (6) and disconnect tailgate chain (7) from bracket (9).
2. Unhook tailgate chain (7) from tailgate chain bracket (4) and remove tailgate chain (7).
3. Remove four locknuts (1), washers (2), capscrews (5), washers (2), angle bracket (10), chain bracket (9), and latch bracket (4) from body (3). Discard locknuts (1).

NOTE

Perform step 4 only if tailgate chain cover is damaged.

4. Remove cover (8) from tailgate chain (7).



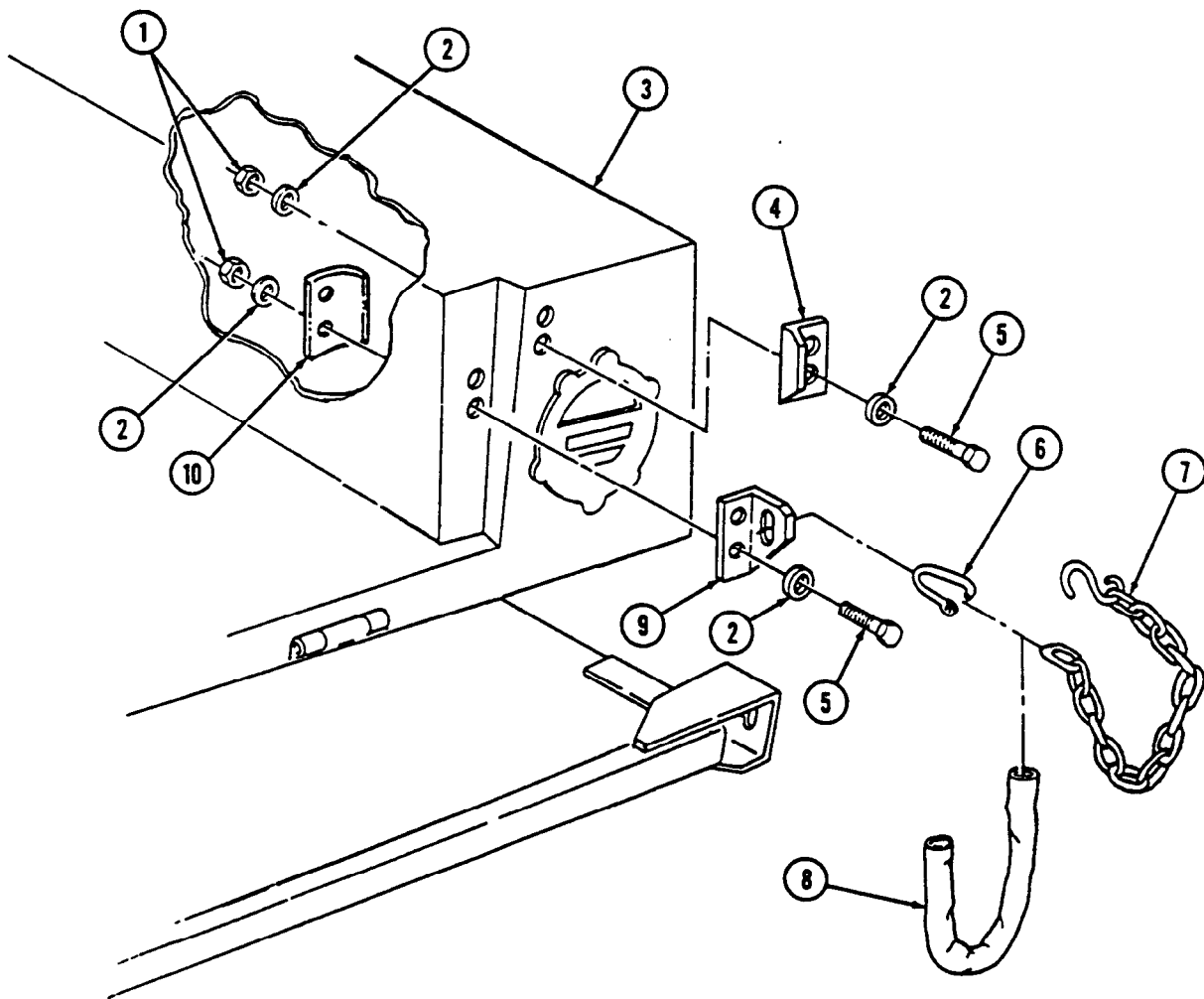
10-35. TAILGATE CHAIN AND BRACKETS REPLACEMENT (Cont'd)

b. Installation

NOTE

Perform step 1 only if tailgate chain cover was removed.

1. Install cover (8) on tailgate chain (7).
2. Install angle bracket (10), chain bracket (9), and latch bracket (4) on body (3) with four washers (2), capscrews (5), washers (2), and locknuts (1). Tighten capscrews (5) to 15 lb-ft (20 N.m).
3. Hook tailgate chain (7) to tailgate chain bracket (4).
4. Connect tailgate chain cap link (6) to bracket (9) and chain (7) by closing chain cap link (6).



FOLLOW-ON TASK: Raise and secure tailgate (TM-9-2320-387-10).

10-36. CAMOUFLAGE SCREEN STOWAGE STRAPS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

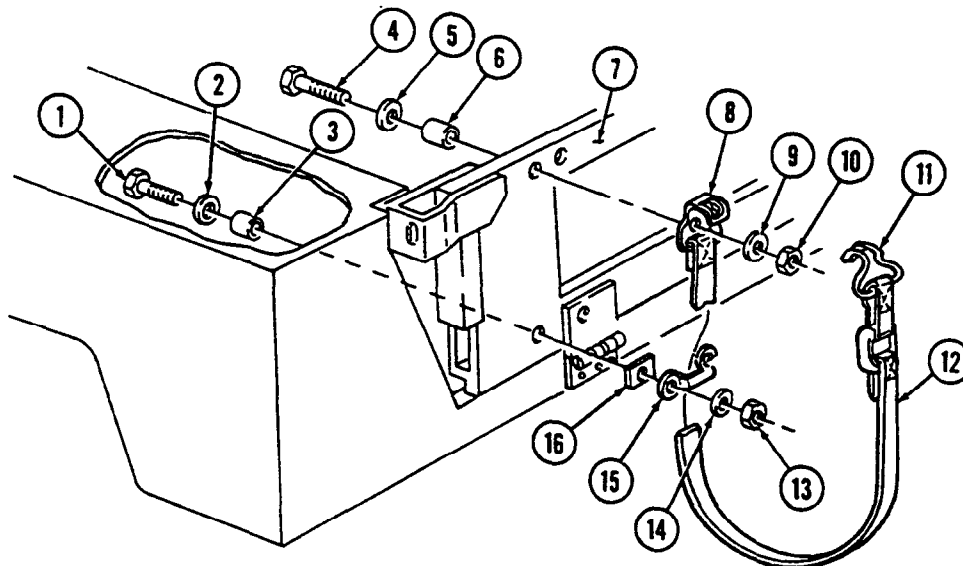
Sixteen locknuts (Appendix G, Item 113)

a. Removal

1. Remove strap hook (11) from strap buckle (8).
2. Remove two locknuts (10), washers (9), capscrews (4), washers (5), spacers (6), and strap buckle (8) from tailgate (7). Discard locknuts (10).
3. Remove two locknuts (13), washers (14), handle (15), spacer (16), capscrews (1), washers (2), spacers (3), and strap (12) from tailgate (7).
4. Repeat steps 1 through 3 for other three straps (12).

b. Installation

1. Install spacer (16), strap (12), and handle (15) on tailgate (7) with two spacers (3), washers (2), capscrews (1), washers (14), and locknuts (13).
2. Install strap bracket (8) on tailgate (7) with two spacers (6), washers (5), capscrews (4), washers (9), and locknuts (10).
3. Install strap hook (11) on strap buckle (8).
4. Repeat steps 1 through 3 for other three straps (12).



10-37. PIONEER TOOL KIT STOWAGE STRAP AND BRACKET MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

NOTE

The replacement procedure for all stowage straps on tailgate is basically the same. This procedure covers one strap.

a. Removal

1. Remove strap (3) from loop (5).
2. Remove four screws (1) and holder (2) from tailgate (6).
3. Remove four screws (4), two loops (5), and strap (3) from tailgate (6).

b. Inspection

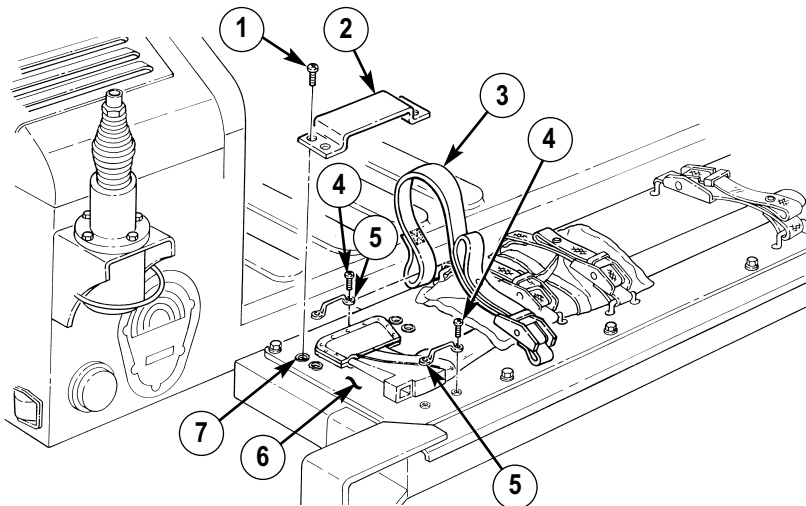
NOTE

For inspection and removal of insertnuts, refer to para. 10-56.

Inspect insertnuts (7). Replace if damaged.

c. Installation

1. Apply sealing compound to threads of four screws (4), and install two loops (5) and strap (3) on tailgate (6) with screws (4). Tighten screws (4) to 20 lb-in. (2 N·m).
2. Apply sealing compound to threads of four screws (1), and install holder (2) on tailgate (6) with screws (1). Tighten screws (1) to 32-41 lb-in. (4-5 N·m).
3. Install strap (3) on loop (5).



10-38. TAILGATE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Camouflage screen stowage straps removed
(para. 10-36).

Materials/Parts

Six locknuts (Appendix G, Item 156)

Maintenance Level

Unit

Personnel Required

One mechanic
One assistant

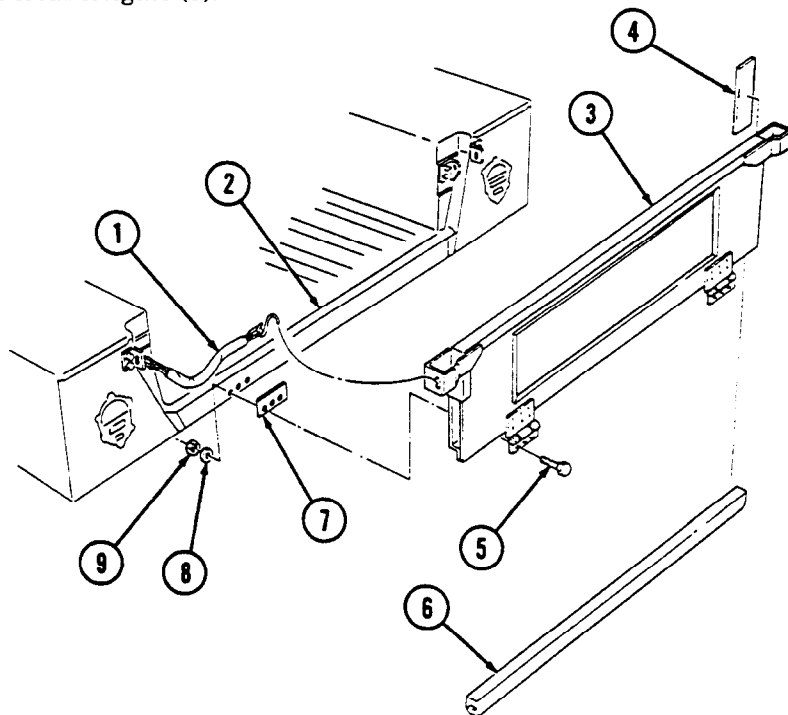
a. Removal

1. Remove six locknuts (9), washers (8), and capscrews (5) from tailgate (3) and body (2). Discard locknuts (9).
2. Disconnect two tailgate chains (1) from tailgate (3) and remove tailgate (3) and shims (7).

NOTE

Perform step 3 if replacing seal(s).

3. Remove seals (4) and (6) from tailgate (3).
4. Clean adhesive from tailgate (3).



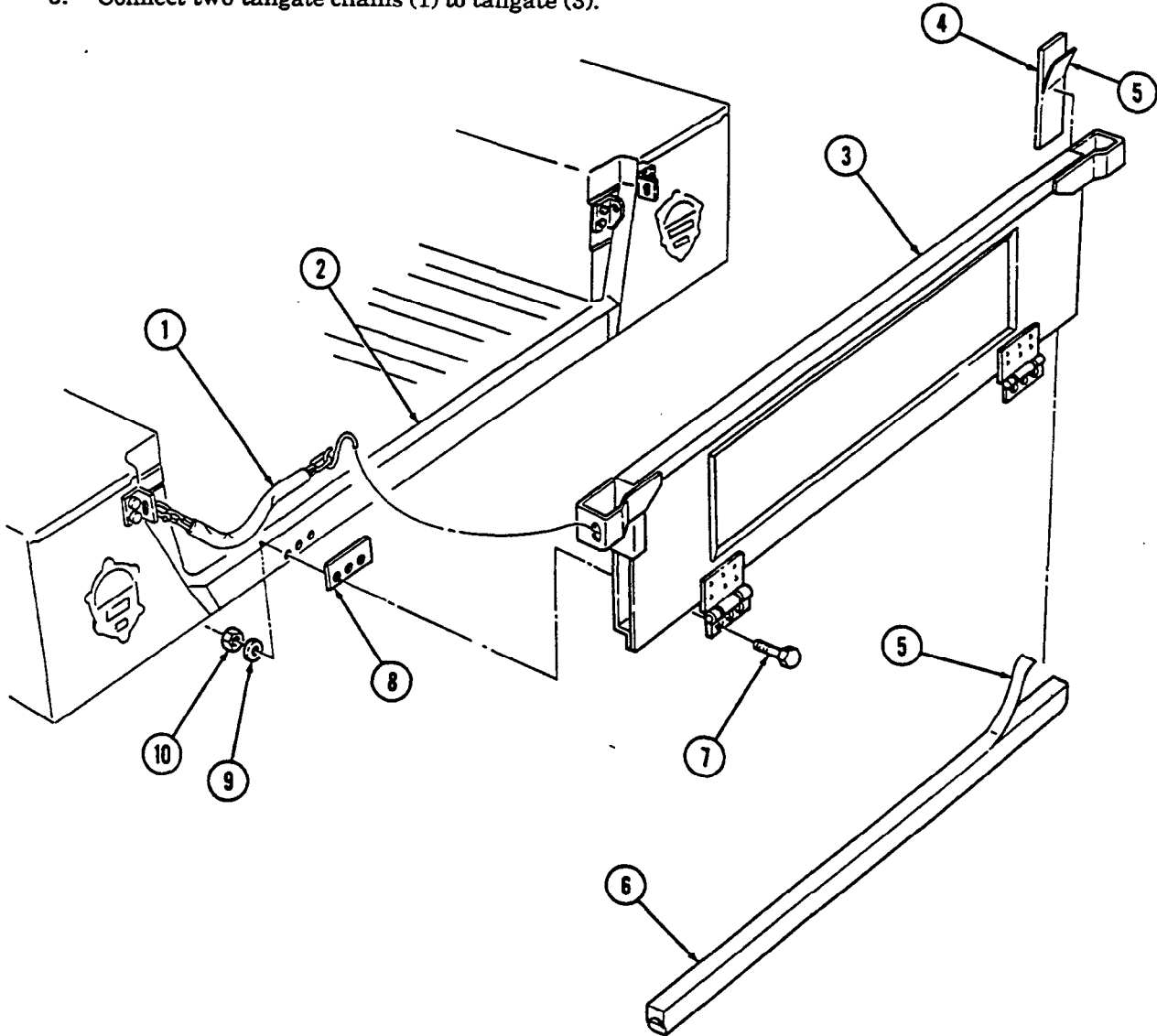
10-38. TAILGATE REPLACEMENT (Cont'd)

b. Installation

NOTE

Perform step 1 if replacing seal(s).

1. Peel paper backing (5) from seals (4) and (6) and install seals (4) and (6) on tailgate (3).
2. Install shims (8) and tailgate (3) on body (2) with six capscrews (7), washers (9), and locknuts (10). Tighten capscrews (7) to 26 lb-ft (35 N·m).
3. Connect two tailgate chains (1) to tailgate (3).



FOLLOW-ON TASK: Install camouflage screen stowage straps (para. 10-36).

10-39. TAILGATE UPPER HINGE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Six locknuts (Appendix G, Item 148)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Tailgate removed (para. 10-38).

Maintenance Level

Unit

a. Removal

NOTE

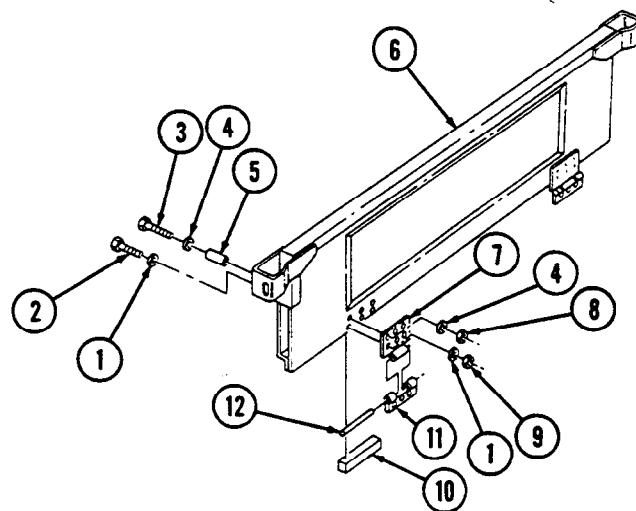
- Replacement procedures for left and right tailgate upper hinges are basically the same. This procedure covers the left tailgate upper hinge.
- The upper hinge is installed with rivets during manufacturing. A kit has been developed to repair the upper hinge. Use kit P/N 57K0107 for installation.

1. Remove seal (10) from tailgate (6) behind upper hinge (7).

NOTE

Note direction of capscrews for installation.

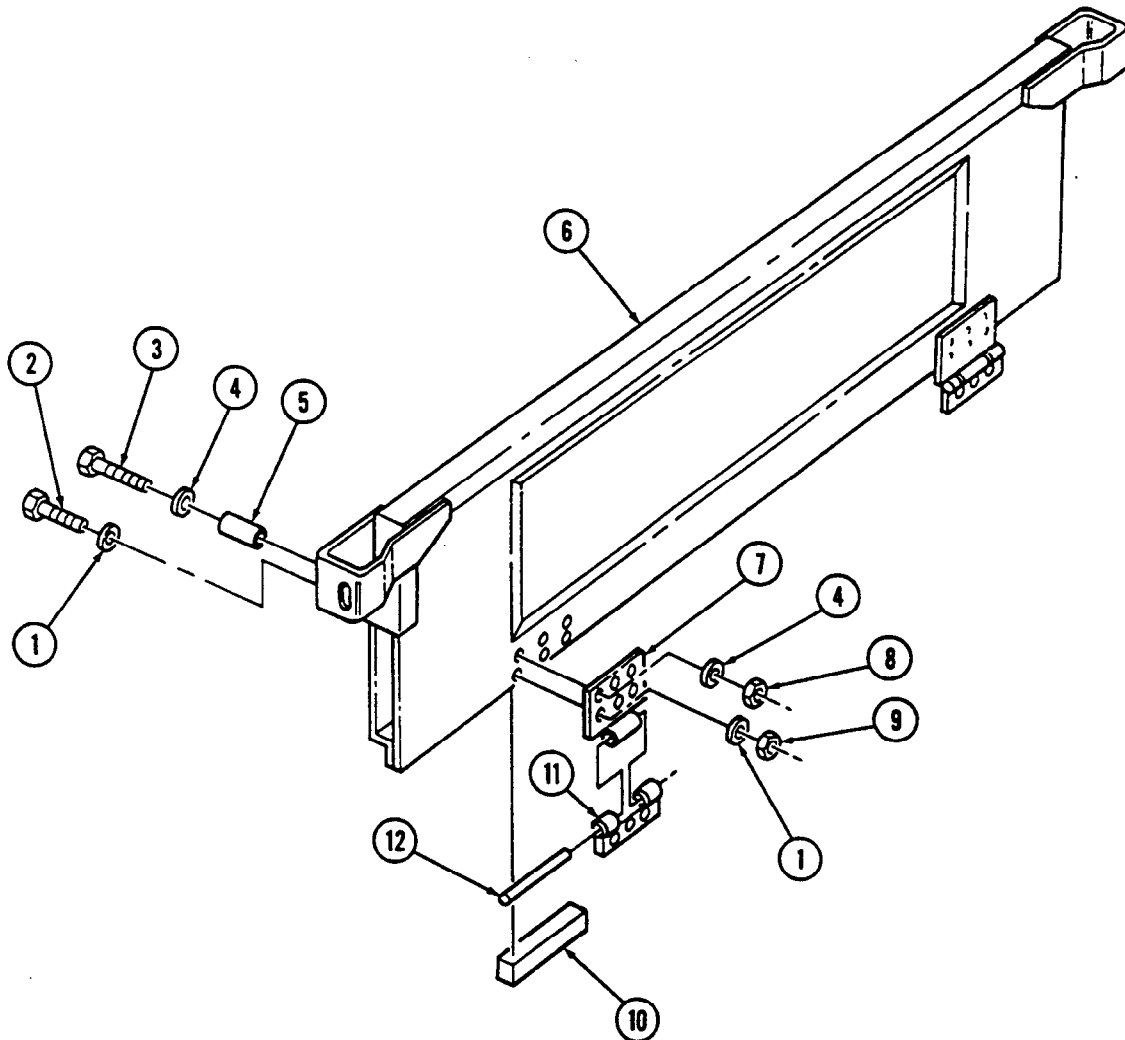
2. Remove three locknuts (8), washers (4), capscrews (3), washers (4), and spacers (5) from upper hinge (7) and tailgate (6). Discard locknuts (8).
3. Remove three locknuts (9), washers (1), capscrews (2), washers (1), and upper hinge (7) from tailgate (6). Discard locknuts (9).
4. Remove pin (12) and lower hinge (11) from upper hinge (7).



10-39. TAILGATE UPPER HINGE REPLACEMENT (Cont'd)

b. Installation

1. Install lower hinge (11) on upper hinge (7) with pin (12).
2. Install upper hinge (7) on tailgate (6) with three washers (1), capscrews (2), washers (1), and locknuts (9). Tighten locknuts (9) to 8 lb-ft (11 N·m).
3. Secure upper hinge (7) to tailgate (6) with three spacers (5), washers (4), capscrews (3), washers (4), and locknuts (8). Tighten locknuts (8) to 8 lb-ft (11 N·m).
4. Install seal (10) on tailgate (6) behind upper hinge (7).



FOLLOW-ON TASK: Install tailgate (para. 10-38).

10-40. DRIVER'S SEAT ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

Materials/Parts

Four lockwashers (Appendix G, Item 206)
 Tape (Appendix C, Item 78)

a. Removal

1. Spread cover (7) to allow access to socket-head screws (2).

NOTE

Perform step 2 for M1113 models only. Perform step 3 for M1114 models only.

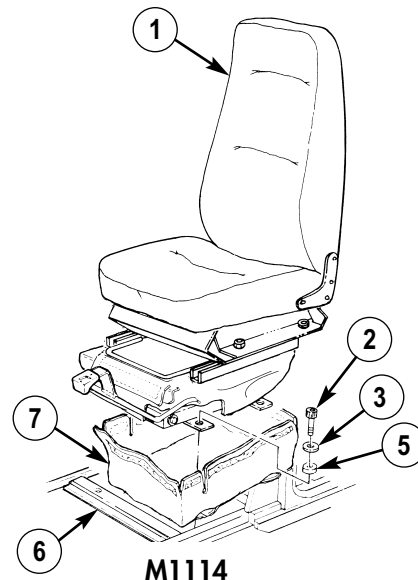
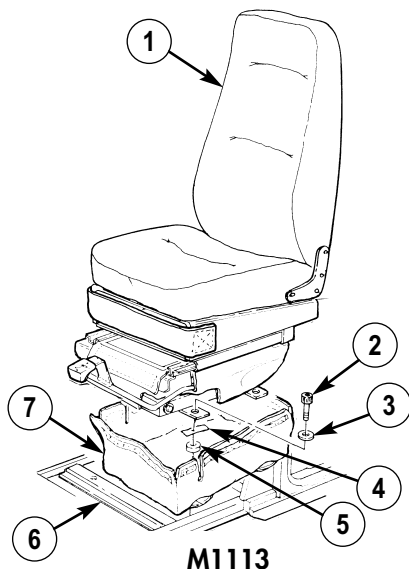
2. Remove four socket-head screws (2), lockwashers (3), cover (7), seat assembly (1), tape (4), and four washers (5) from supports (6). Discard lockwashers (3).
3. Remove four socket-head screws (2), lockwashers (3), washers (5), cover (7), and seat assembly (1) from supports (6). Discard lockwashers (3).

b. Installation

NOTE

Perform step 1 for M1113 models only. Perform step 2 for M1114 models only.

1. Install four washers (5), tape (4), cover (7), and seat assembly (1) on supports (6) with four lockwashers (3) and socket-head screws (2).
2. Install seat assembly (1) on supports (6) with four washers (5), lockwashers (3), and socket-head screws (2). Tighten socket-head screws (2) to 140-170 lb-in. (15-19 N·m).



10-41. DRIVER'S SEAT ASSEMBLY MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Driver's seat assembly removed (para. 10-40).

Materials/Parts

Four lockwashers (Appendix G, Item 206)
Four lockwashers (Appendix G, Item 228)
Eight locknuts (Appendix G, Item 129)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

NOTE

Slide seat back and forth to gain access to slide set hardware.

a. Disassembly

1. Remove four locknuts (13), washers (12), socket-head screws (8), lockwashers (10), height adjuster (14), and cover (15) from slide set (11). Discard locknuts (13) and lockwashers (10).

NOTE

Perform steps 2 and 3 for M1114 models only. Perform steps 4 through 7 for M1113 models only.

2. Remove four nuts (9), lockwashers (17), and seat (2) from absorber (21). Discard lockwashers (17).
3. Remove four locknuts (3), washers (4), capscrews (16), and absorber (21) from slide set (11). Discard locknuts (3).
4. Remove four nuts (9), lockwashers (17), and seat (2) from riser (6). Discard lockwashers (17).
5. Remove four locknuts (3), washers (4), capscrews (16), riser (6), and tray (5) from slide set (11). Discard locknuts (3).
6. Remove two nuts (18), capscrews (20), loop (19), and strap (1) from riser (6).
7. Inspect velcro strip (7) on riser (6) and replace if damaged.

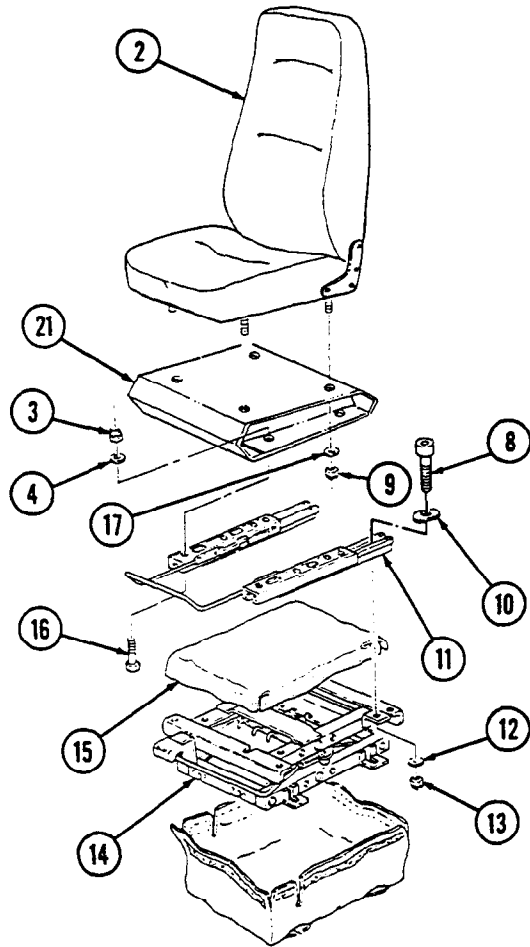
b. Assembly

NOTE

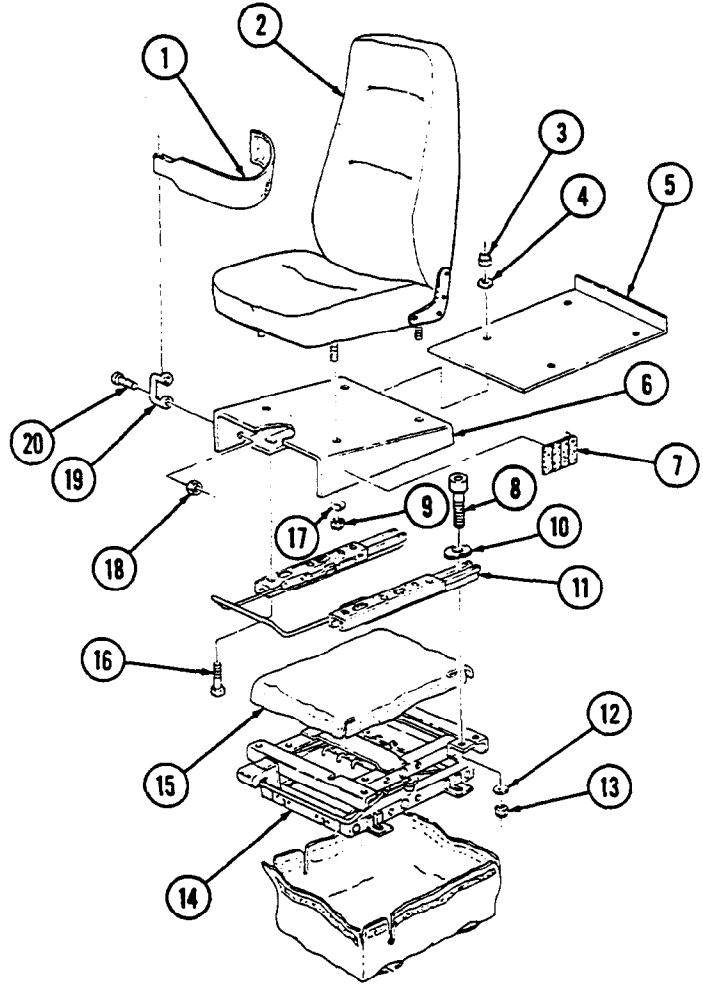
Perform steps 1 through 3 for M1113 models only. Perform steps 4 and 5 for M1114 models only.

1. Install strap (1) and loop (19) on riser (6) with two capscrews (20) and nuts (18).
2. Install tray (5) and riser (6) on slide set (11) with four capscrews (16), washers (4), and locknuts (3).
3. Install seat (2) on riser (6) with four lockwashers (17) and nuts (9).
4. Install absorber (21) on slide set (11) with four capscrews (16), washers (4), and locknuts (3).
5. Install seat (2) on absorber (21) with four lockwashers (17) and nuts (9).
6. Install height adjuster (14) and cover (15) on slide set (11) with four lockwashers (10), socket-head screws (8), washers (12), and locknuts (13).

10-41. DRIVER'S SEAT ASSEMBLY MAINTENANCE (Cont'd)



M1114



M1113

FOLLOW-ON TASK: Install driver's seat assembly (para. 10-40).

10-42. BATTERY BOX COVER CATCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two rivets (Appendix G, Item 329)
Two rivets (Appendix G, Item 327)

Manual References

TM 9-2320-387-24P

Equipment Condition

Batteries removed (para. 4-74).

Maintenance Level

Unit

NOTE

For instruction on replacement of rivets, refer to para. 10-56.

a. Removal

NOTE

M1113 models are equipped with bracket as indicated in step 1.

1. Remove two rivets (1) and striker catch (2) from battery box cover (3) and bracket (7).
2. Remove two rivets (6) and clamping catch (5) from battery box (4).

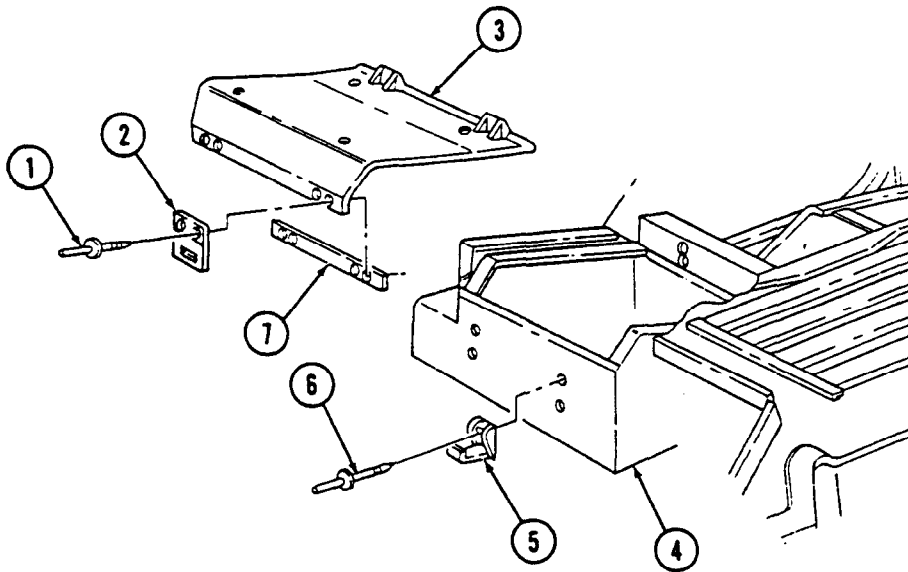
b. Installation

1. Install clamping catch (5) on battery box (4) with two rivets (6).

NOTE

M1113 models are equipped with bracket as indicated in step 2.

2. Install striker catch (2) on battery box cover (3) and bracket (7) with two rivets (1).



FOLLOW-ON TASK: Install batteries (para. 4-74).

10-43. COMPANION SEAT ASSEMBLY AND BATTERY BOX COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Maintenance Level

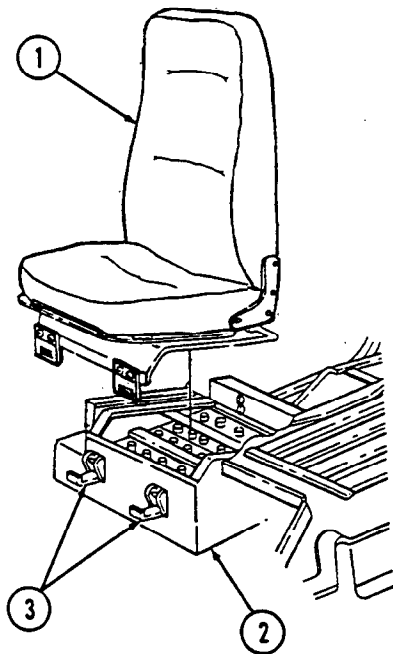
Unit

a. Removal

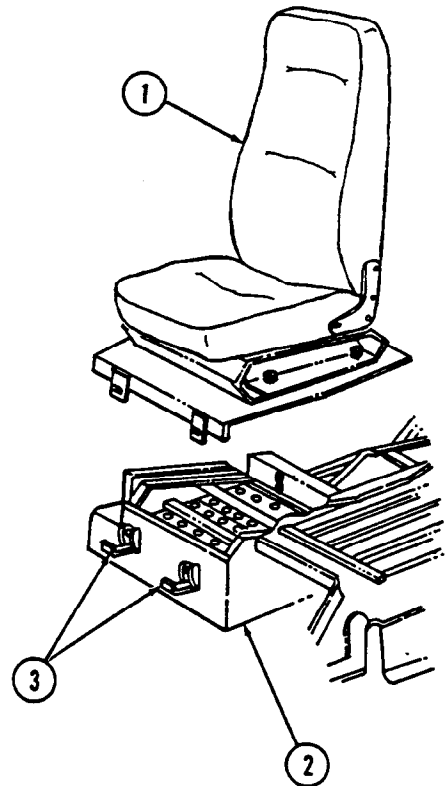
1. Release two latches (3) from companion seat and battery box cover (1).
2. Lift up and pull forward on companion seat and battery box cover (1) and remove from battery box (2).

b. Installation

Install companion seat and battery box cover (1) on battery box (2) with two latches (3).



M1113



M1114

10-44. COMPANION SEAT ASSEMBLY MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four lockwashers (Appendix G, Item 206)
(M1113)
Eight lockwashers (Appendix G, Item 206)
(M1114)

Manual References

TM 9-2320-387-24P

Equipment Condition

Companion seat assembly and battery box cover removed (para. 10-43).

Maintenance Level

Unit

a. Disassembly

NOTE

Perform step 1 for M1113 models only. Perform steps 2 and 3 for M1114 models only.

1. Remove four nuts (6), lockwashers (5), spacers (4), seat (1), and plate (2) from battery box cover (3). Discard lockwashers (5).
2. Remove four nuts (9), lockwashers (8), and seat (1) from absorber (7). Discard lockwashers (8).
3. Remove four nuts (12), lockwashers (11), and capscrews (10) from absorber (7) and battery box cover (3). Discard lockwashers (11).

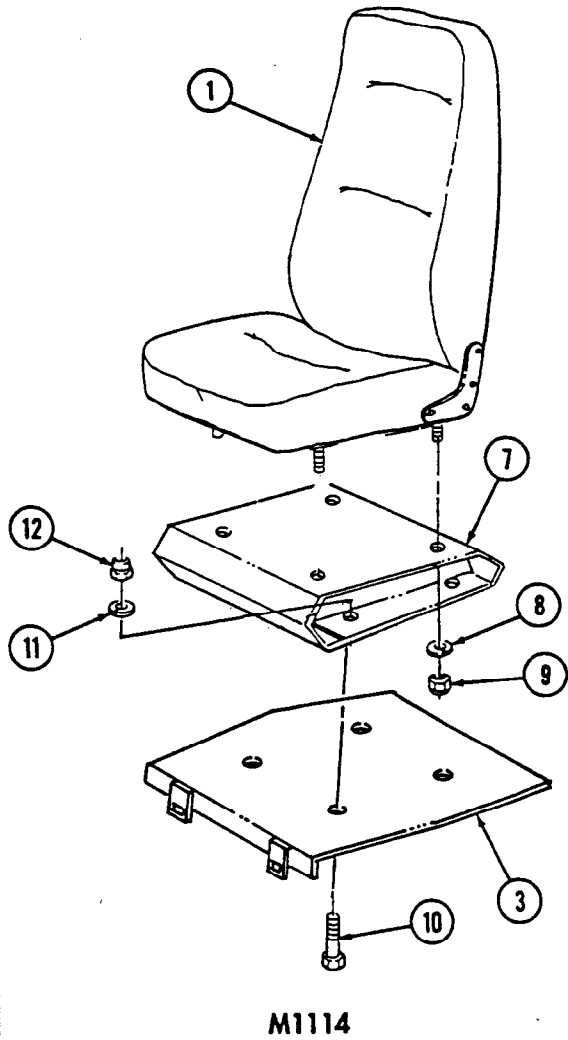
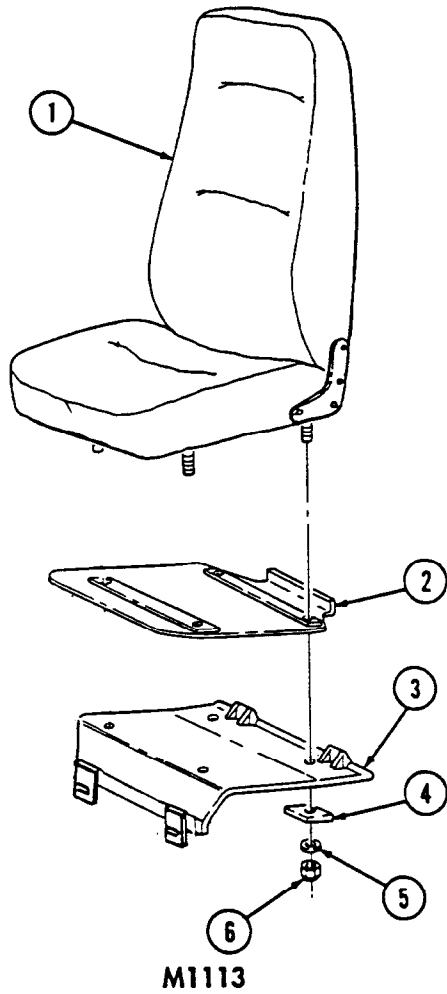
b. Assembly

NOTE

Perform step 1 for M1113 models only. Perform steps 2 and 3 for M1114 models only.

1. Install plate (2) and seat (1) on battery box cover (3) with four spacers (4), lockwashers (5), and nuts (6). Tighten nuts (6) to 15 lb-ft (20 N·m).
2. Install seat (1) on absorber (7) with four lockwashers (8) and nuts (9).
3. Install absorber (7) and seat (1) on battery box cover (3) with four capscrews (10), lockwashers (11), and nuts (12).

10-44. COMPANION SEAT ASSEMBLY MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install companion seat assembly and battery box cover (para. 10-43).

10-45. PASSENGER SEAT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four lockwashers (Appendix G, Item 204)

Manual References

TM 9-2320-387-24P

Maintenance Level

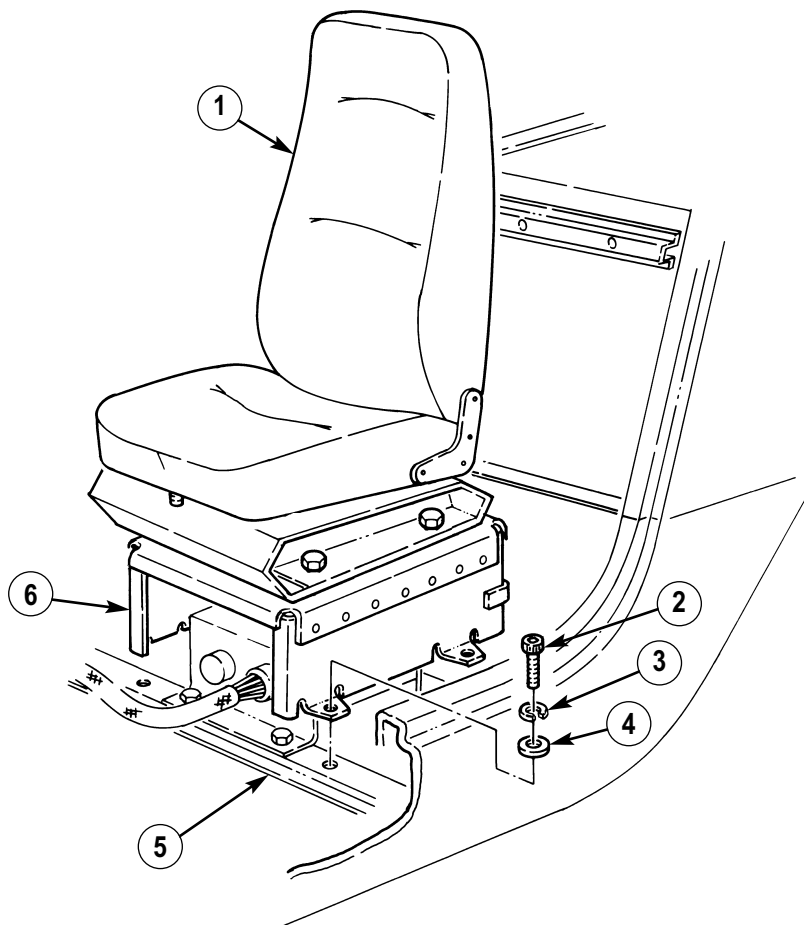
Unit

a. Removal

Remove four socket-head screws (2), lockwashers (3), washers (4), and passenger seat (1) with base (6) from supports (5). Discard lockwashers (3).

b. Installation

Install base (6) with passenger seat (1) on supports (5) with four washers (4), lockwashers (3), and socket-head screws (2). Tighten socket-head screws (2) to 140-170 lb-in. (16-19 N·m).



10-45.1. PASSENGER SEAT MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Eight locknuts (Appendix G, Item 116)
 Four lockwashers (Appendix G, Item 204)

Manual References

TM 9-2320-387-24P

Maintenance Level

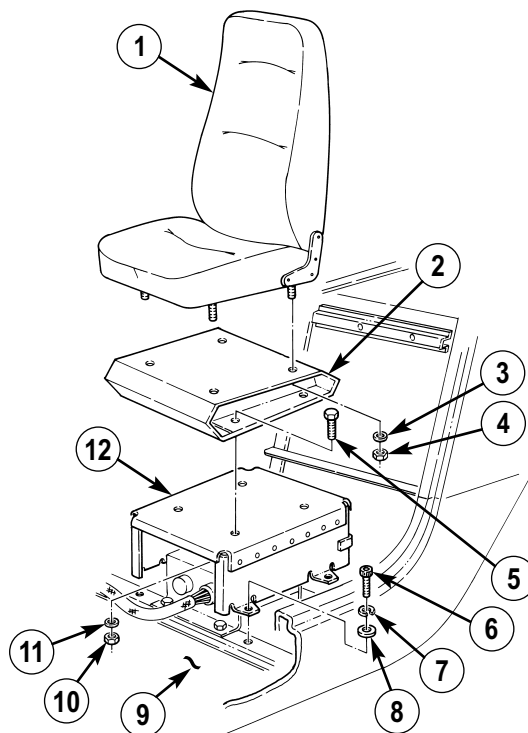
Unit

a. Disassembly

1. Remove four locknuts (10), washers (11), capscrews (5), absorber (2), and passenger seat (1) from base (12). Discard locknuts (10).
2. Remove four locknuts (4), washers (3), and absorber (2) from seat (1). Discard locknuts (4).
3. Remove four socket-head screws (6), lockwashers (7), washers (8), and base (12) from floor (9). Discard lockwashers (7).

b. Assembly

1. Install base (12) on floor (9) with four washers (8), lockwashers (7), and socket-head screws (6). Tighten socket-head screws (6) to 140-170 lb-in. (16-19 N·m).
2. Install absorber (2) on seat (1) with four washers (3) and locknuts (4).
3. Install passenger seat (1) and absorber (2) on base (12) with four capscrews (5), washers (11), and locknuts (10).



10-46. THREE POINT SEATBELT BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Three point seatbelt removed (para. 10-47).

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

NOTE

Replacement procedures for left and right seatbelt brackets are basically the same. This procedure covers the left seatbelt bracket.

a. Removal

NOTE

Perform step 1 for M1113 models only.

1. Remove four capscrews (3), washers (2), and upper bracket (1) from B-pillar (4).
2. Remove four capscrews (6), washers (5), and lower bracket (7) from B-pillar (4).

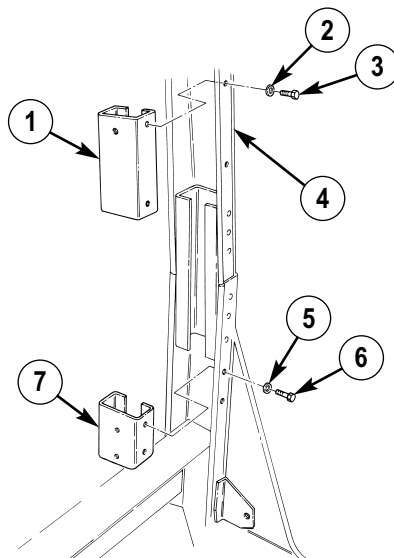
b. Installation

1. Install lower bracket (7) on B-pillar (4) with four washers (5) and capscrews (6). Tighten capscrews (6) to 15-21 lb-ft (20-28 N·m).

NOTE

Perform step 2 for M1113 models only.

2. Install upper bracket (1) on B-pillar (4) with four washers (2) and capscrews (3). Tighten capscrews (3) to 15-21 lb-ft (20-28 N·m).



FOLLOW-ON TASK: Install three point seatbelt (para. 10-47).

10-47. THREE POINT SEATBELT MAINTENANCE

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Front Seatbelt Removal b. Front Seatbelt Bracket Inspection c. Front Seatbelt Installation | <ul style="list-style-type: none"> d. Rear Seatbelt Removal e. Rear Seatbelt Bracket Inspection f. Rear Seatbelt Installation |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Locknut (Appendix G, Item 169)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Passenger seat removed (M1114 only) (para. 10-45).
- Companion seat and battery box cover removed (companion seatbelt only) (para. 10-43).

General Safety Instructions

Seatbelts are to be replaced as a set.

Maintenance Level

Unit

WARNING

Seatbelts are to be replaced as a set. Failure to do this may cause injury to personnel or damage to equipment.

NOTE

Maintenance procedures for left and right seatbelts are basically the same. This procedure covers left seatbelts.

a. Front Seatbelt Removal

1. Remove capscrew (20), buckle assembly (21), and washer (22) from body (23).
2. Remove capscrew (19), connector assembly (18), and washer (17) from bracket (16).

NOTE

Perform steps 3 and 4 for M1114 models only.

3. Remove two screws (9), washers (9.1), saddle block (10), and clamp (11) from upper support (3) and padding (5).
4. Remove locknut (1), washer (2), screw (8), washer (7), D-ring (6), padding (5), and bracket (4) from upper support (3). Discard locknut (1).

NOTE

Perform step 5 for M1113 models only.

5. Remove capscrew (12), D-ring (13), and washer (14) from padding (15).
6. Remove capscrew (24), washer (25), and retractor (26) from lower bracket (27).

b. Front Seatbelt Bracket Inspection

1. Inspect bracket (4) for breaks, bends, or cracks. Replace if broken, bent, or cracked.
2. Inspect upper bracket (15) for breaks, bends, or cracks. Replace if broken, bent, or cracked (para. 10-46).
3. Inspect lower bracket (27) for breaks, bends, or cracks. Replace if broken, bent, or cracked (para. 10-46).

10-47. THREE POINT SEATBELT MAINTENANCE (Cont'd)

c. Front Seatbelt Installation

1. Install retractor (26) on lower bracket (27) with washer (25) and capscrew (24). Tighten capscrew (24) to 43-60 lb-ft (58-81 N·m).

NOTE

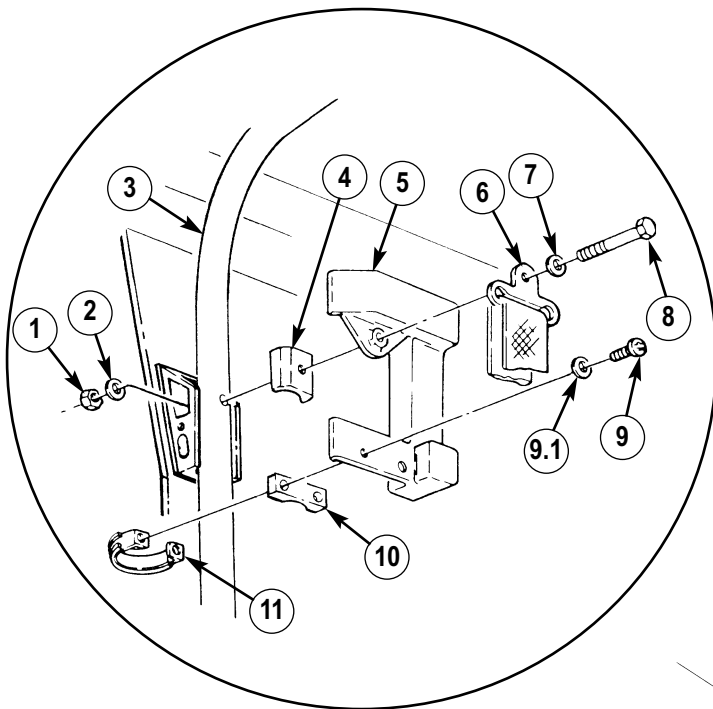
Perform steps 2 and 3 for M1114 models only.

2. Install bracket (4), padding (5), and D-ring (6) on upper support (3) with washer (7), screw (8), washer (2), and locknut (1). Tighten screw (8) to 37 lb-ft (50 N·m).
3. Install clamp (11) and saddle block (10) on upper support (3) with two washers (9.1) and screws (9). Tighten screws (9) to 35 lb-in. (4 N·m).

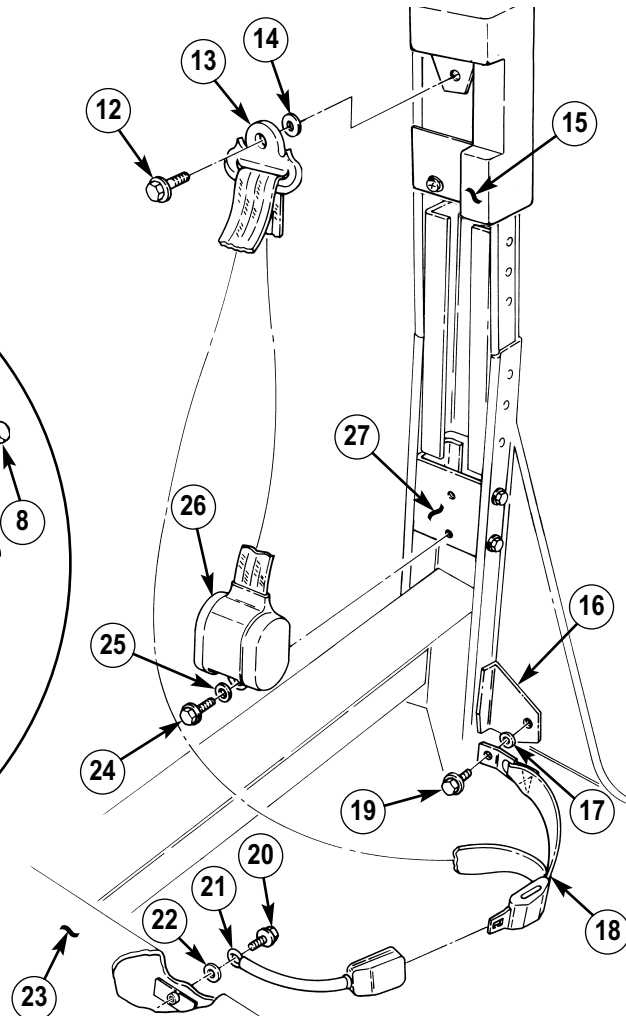
NOTE

Perform step 4 for M1113 models only.

4. Install washer (14) and D-ring (13) on padding (15) with capscrew (12). Tighten capscrew (12) to 35-40 lb-ft (47-54 N·m).
5. Install washer (17) and connector assembly (18) on bracket (16) with capscrew (19). Tighten capscrew (19) to 35-40 lb-ft (47-54 N·m).
6. Install washer (22) and buckle assembly (21) on body (23) with capscrew (20). Tighten capscrew (20) to 35-40 lb-ft (47-54 N·m).



M1114 VEHICLES



10-47. THREE POINT SEATBELT MAINTENANCE (Cont'd)

d. Rear Seatbelt Removal

NOTE

Maintenance procedures for left and right seatbelts are basically the same. This procedure covers the right seatbelt.

1. Remove capscrew (11), buckle assembly (14), and washer (12) from body (13).
2. Remove capscrew (10), connector assembly (15), and washer (9) from bracket (8).
3. Remove capscrew (1), D-ring (2), and washer (3) from bracket (4).
4. Remove capscrew (6), washer (5), and retractor (7) from bracket (4).

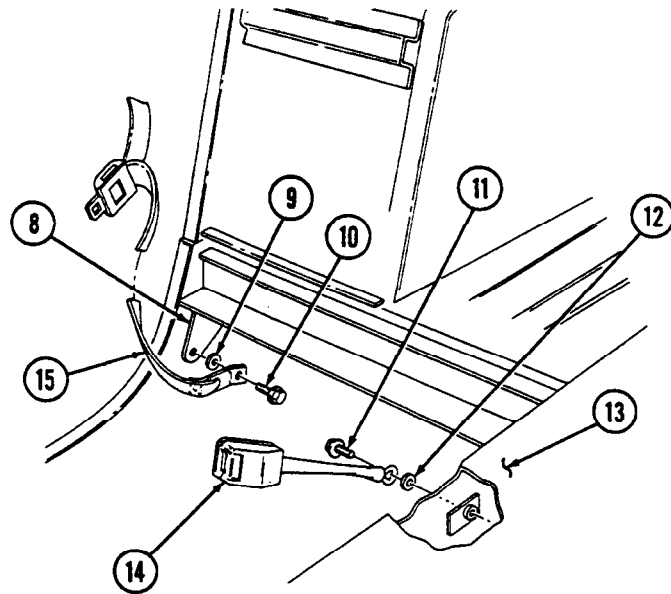
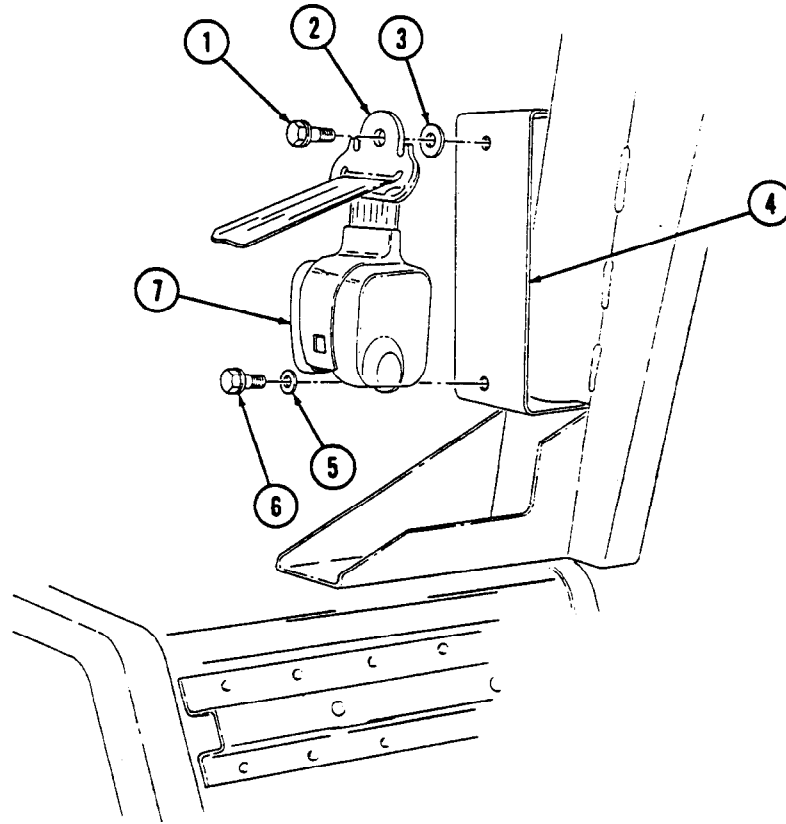
e. Rear Seatbelt Bracket Inspection

Inspect brackets (4) and (8). Replace if broken, bent, or cracked.

f. Rear Seatbelt Installation

1. Install retractor (7) on bracket (4) with washer (5) and capscrew (6). Tighten capscrew (6) to 35-40 lb-ft (47-54 N·m).
2. Install washer (3) and D-ring (2) on bracket (4) with capscrew (1). Tighten capscrew (1) to 35-40 lb-ft (47-54 N·m).
3. Install washer (9) and connector assembly (15) on bracket (8) with capscrew (10). Tighten capscrew (10) to 35-40 lb-ft (47-54 N·m).
4. Install washer (12) and buckle assembly (14) on body (13) with capscrew (11). Tighten capscrew (11) to 35-40 lb-ft (47-54 N·m).

10-47. THREE POINT SEATBELT MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install passenger seat (M1114 only) (para. 10-45).
 - Install companion seat and battery box cover (companion seatbelt only) (para. 10-43).

10-48. STEERING WHEEL LOCK REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

NOTE

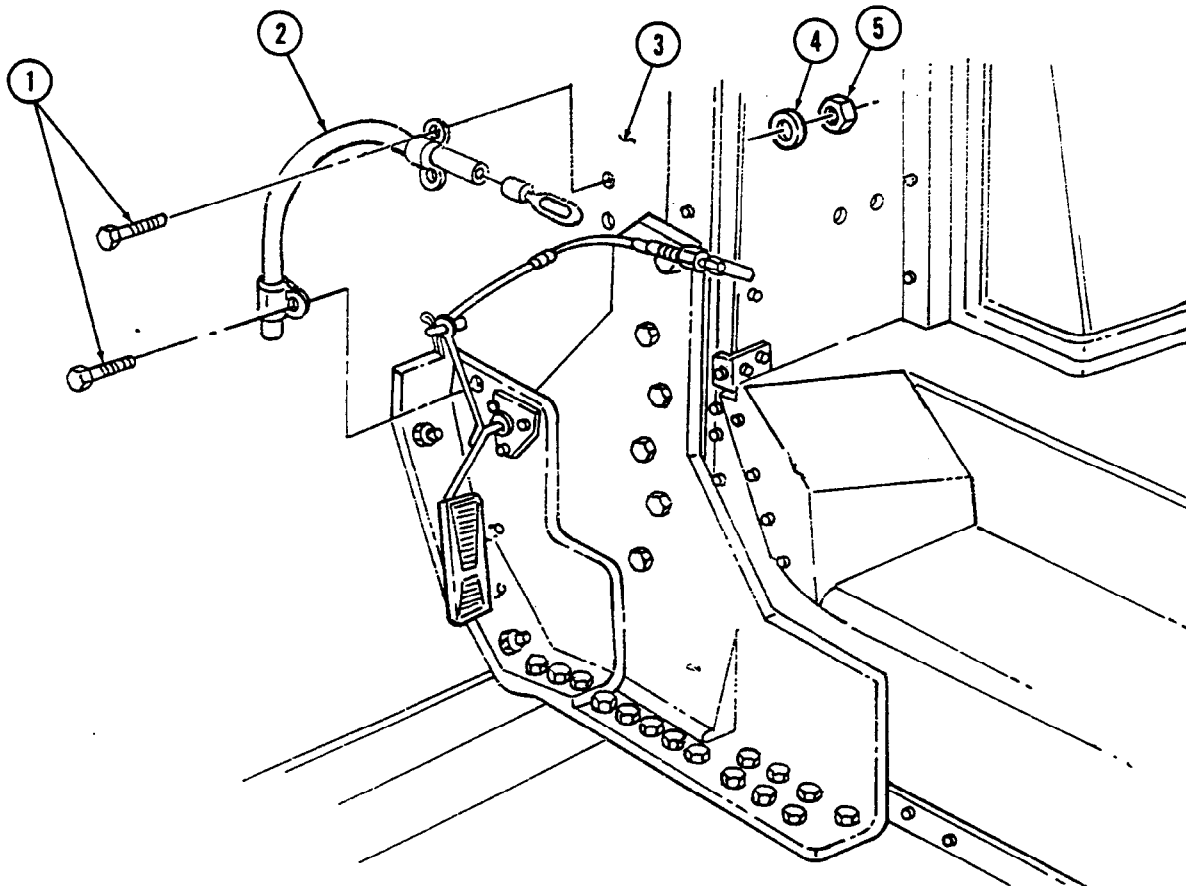
Replacement procedure for steering wheel lock on the M1113 and M1114 vehicle is basically the same. The M1114 vehicle has three screws instead of four.

a. Removal

Remove four nuts (5), washers (4), screws (1), and wheel lock assembly (2) from body (3).

b. Installation

Install wheel lock assembly (2) on body (3) with four screws (1), washers (4), and nuts (5). Tighten screws (1) to 5 lb-ft (7 N•m).



10-49. CARGO BULKHEAD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four lockwashers (Appendix G, Item 220)

Manual References

TM 9-2320-387-24P

Maintenance Level

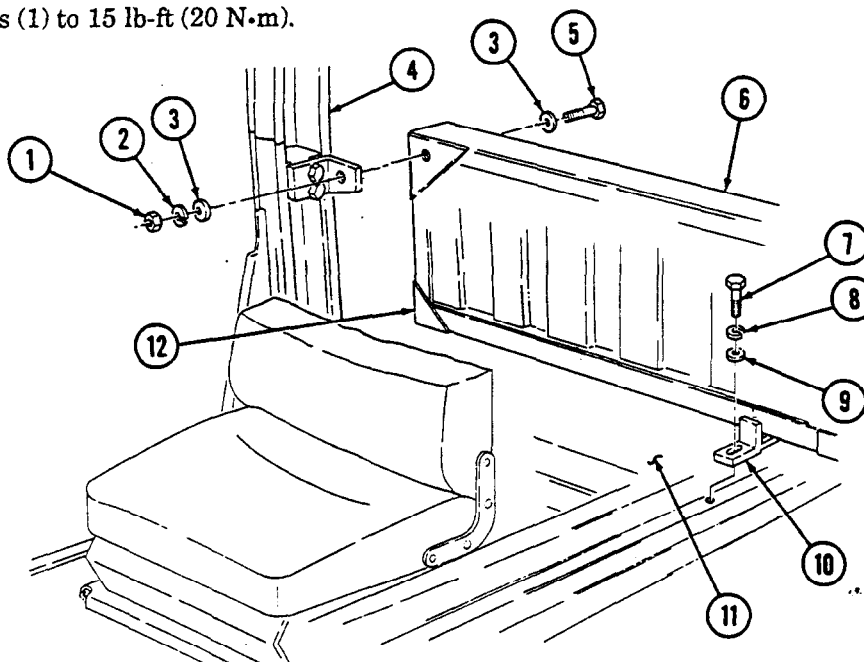
Unit

a. Removal

1. Remove two capscrews (7), lockwashers (8), washers (9), and cargo bulkhead bracket (10) from cargo floor (11). Discard lockwashers (8).
2. Remove two nuts (1), lockwashers (2), washers (3), capscrews (5), and washers (3) from cargo bulkhead (6) and B-pillar (4). Discard lockwashers (2).
3. Remove cargo bulkhead (6) from vehicle.
4. Inspect antinoise pads (12). Replace if damaged.

b. Installation

1. Install cargo bulkhead (6) on cargo floor (11).
2. Install cargo bulkhead (6) on B-pillar (4) with two washers (3), capscrews (5), washers (3), lockwashers (2), and nuts (1).
3. Install cargo bulkhead bracket (10) on cargo floor (11) with two washers (9), lockwashers (8), and capscrews (7). Tighten capscrews (7) to 65 lb-ft (88 N·m).
4. Tighten nuts (1) to 15 lb-ft (20 N·m).



10-50. CARGO BULKHEAD EXTENSION MAINTENANCE

This task covers:

- | | |
|---|---|
| <p>a. Removal</p> <p>b. Disassembly</p> | <p>c. Assembly</p> <p>d. Installation</p> |
|---|---|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Eight locknuts (Appendix G, Item 127)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

Remove quick-release pin (12) from post assembly (4) and remove cargo barrier extension (5) from cargo bulkhead (13).

b. Disassembly

1. Remove screw (6) and lanyard (7) from post assembly (4).
2. Remove twenty-four screws (1), nut and washer assemblies (3), and three backboards (2) from four post assemblies (4).
3. Remove eight locknuts (11), washers (9), capscrews (8), washers (9), and four mounting brackets (10) from cargo bulkhead (13). Discard locknuts (11).

c. Assembly

1. Install lanyard (7) on post assembly (4) with screw (6).
2. Install three backboards (2) on post four assemblies (4) with twenty-four screws (1) and nut and washer assemblies (3).
3. Install four mounting brackets (10) on cargo bulkhead (13) with eight washers (9), capscrews (8), washers (9), and locknuts (11).

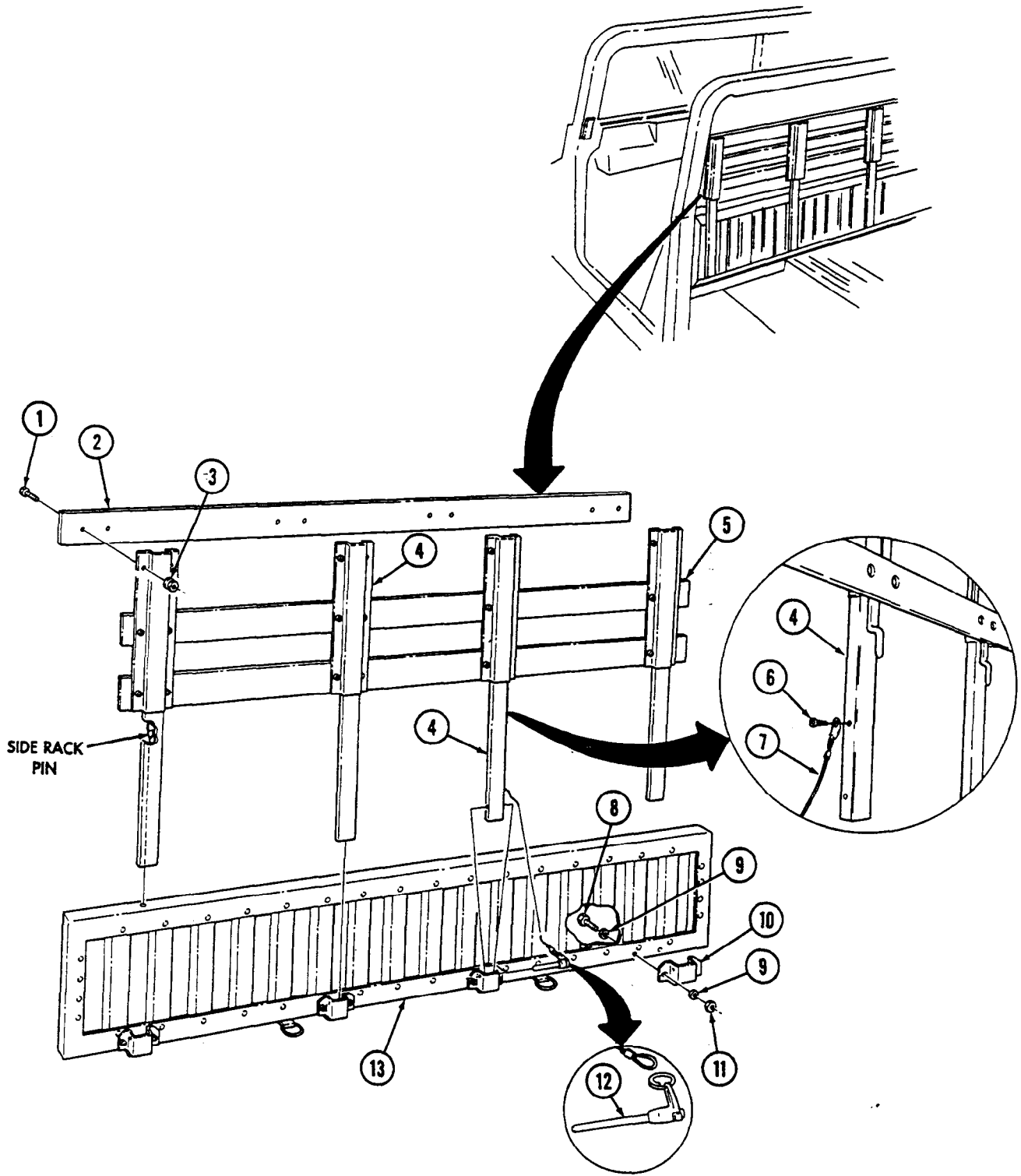
d. Installation

NOTE

When installing cargo barrier extension, ensure side rack pins on post assemblies slide into holes of cargo bulkhead.

Install cargo barrier extension (5) on cargo bulkhead (13) with quick-release pin (12).

10-50. CARGO BULKHEAD EXTENSION MAINTENANCE (Cont'd)



10-51. CARGO BULKHEAD MOUNTING BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Cargo bulkhead removed (para. 10-49).

Maintenance Level

Unit

a. Removal

1. Remove nut (6), washer (7), capscrew (10), washer (7), cargo bracket (9), and tiedown (8) from cargo floor (5).

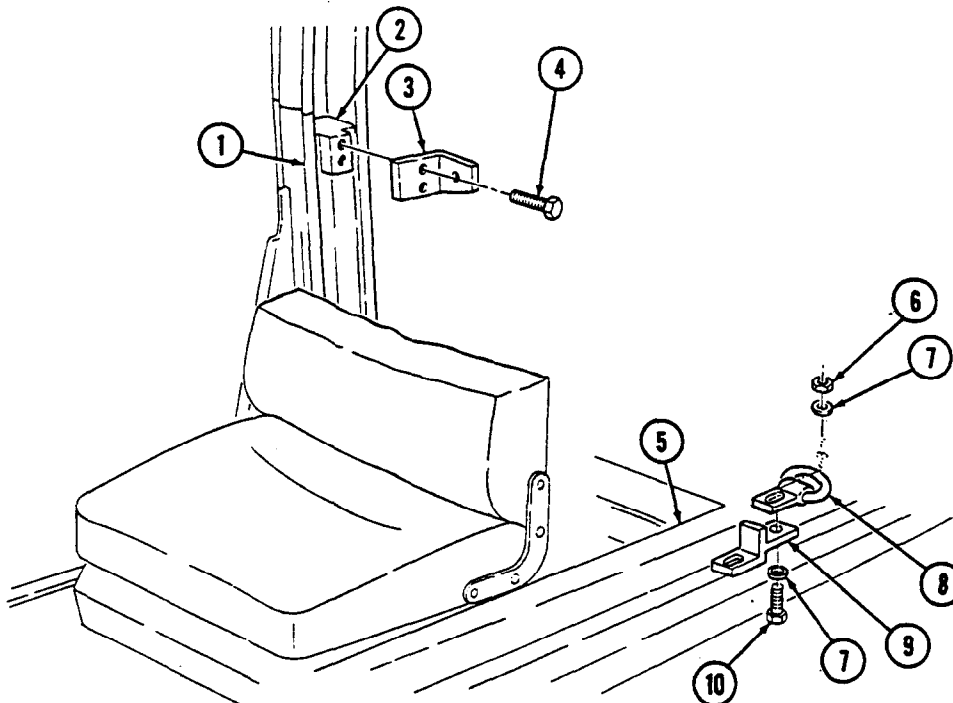
NOTE

Note position of latch on B-pillar for installation.

2. Remove two capscrews (4), latch (3), and latch retainer (2) from B-pillar (1).

b. Installation

1. Install latch retainer (2) and latch (3) on B-pillar (1) with two capscrews (4). Tighten capscrews (4) to 6 lb-ft (8 N·m)
2. Install tiedown (8) and bracket (9) on cargo floor (5) with washer (7), capscrew (10), washer (7), and nut (6). Tighten capscrews (10) to 26 lb-ft (35 N·m).



FOLLOW-ON TASK: Install cargo bulkhead (para. 10-49).

10-52. CARGO TIEDOWN REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

Materials/Parts

Locknut (Appendix G, Item 121)

Personnel Required

One mechanic
 One assistant

a. Removal

NOTE

For removal of rear cargo tiedown, one assistant will be needed.

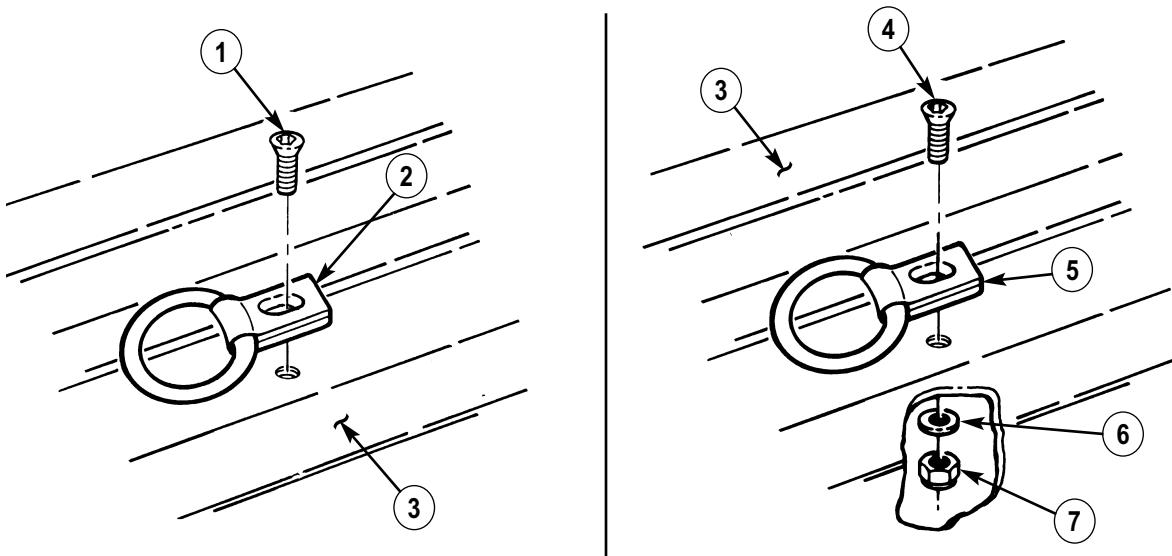
1. Remove hex-head screw (1) and front cargo tiedown (2) from cargo floor (3).
2. Remove locknut (7), washer (6), hex-head screw (4), and rear cargo tiedown (5) from cargo floor (3). Discard locknut (7).

b. Installation

NOTE

For installation of rear cargo tiedown, one assistant will be needed.

1. Install front cargo tiedown (2) on cargo floor (3) with hex-head screw (1). Tighten hex-head screw (1) to 65 lb-ft (88 N·m).
2. Install rear cargo tiedown (5) on cargo floor (3) with hex-head screw (4), washer (6), and locknut (7). Tighten locknut (7) to 65 lb-ft (88 N·m).



10-53. FIRE EXTINGUISHER BRACKET MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Fire extinguisher removed (TM 9-2320-387-10).

Maintenance Level

Unit

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

a. Removal

1. Remove four capscrews (6) and retainer plate (4) from two supports (3).
2. Remove four capscrews (1), washers (2), and fire extinguisher bracket (7) from retainer plate (4).

b. Inspection

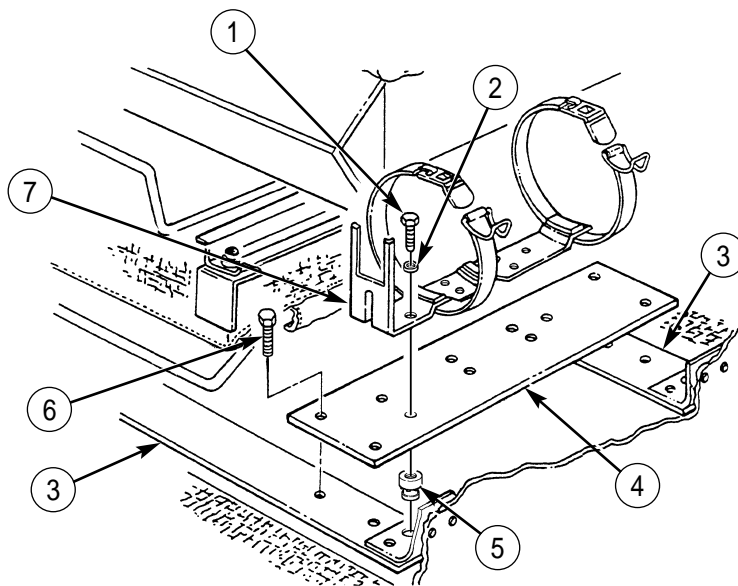
NOTE

For inspection and removal of struxnuts, refer to para. 10-56.

Inspect four struxnuts (5). Replace if damaged.

c. Installation

1. Install fire extinguisher bracket (7) on retainer plate (4) with four washers (2) and capscrews (1). Tighten capscrews (1) to 6 lb-ft (8 N·m).
2. Install retainer plate (4) on two supports (3) with four capscrews (6). Tighten capscrews (6) to 68-82 lb-in. (8-9 N·m).



FOLLOW-ON TASK: Install fire extinguisher (TM 9-2320-387-10).

10-54. BODY HINGE MOUNT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

a. Removal

NOTE

Perform step 1 for upper front body hinge removal.

1. Remove two nuts (1), washers (2), twelve-point screws (5), washers (4), and upper front body hinge mount (3) from body (6).

NOTE

Perform step 2 for lower front body hinge removal.

2. Remove two twelve-point screws (9), washers (8), and lower front body hinge mount (7) from body (6).

b. Installation

NOTE

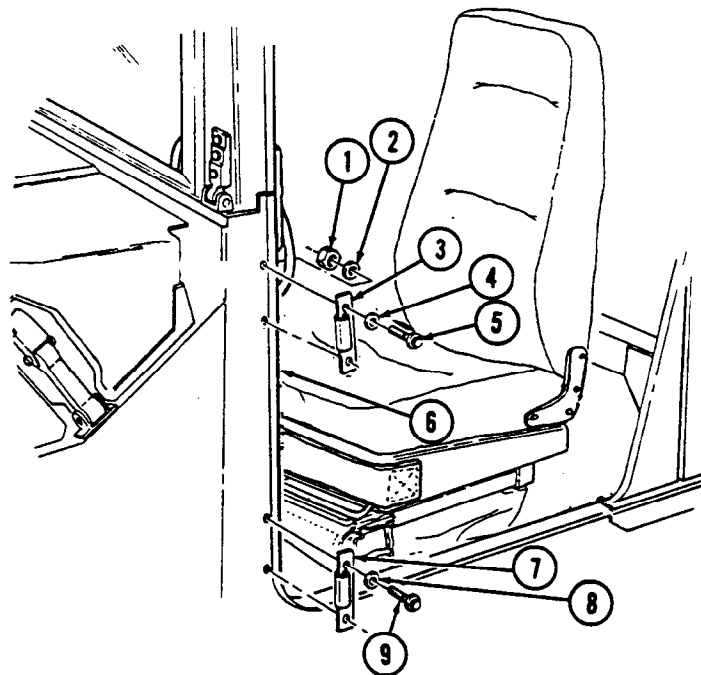
Perform step 1 for lower front body hinge mount installation.

1. Install lower body hinge mount (7) on body (6) with two washers (8) and twelve-point screws (9). Tighten twelve-point screws (9) to 8 lb-ft (11 N-m).

NOTE

Perform step 2 for upper front body hinge installation.

2. Install upper body hinge mount (3) on body (6) with two washers (4), twelve-point screws (5), washers (2), and nuts (1). Tighten twelve-point screws (5) to 8 lb-ft (11 N-m).



10-55. AIRLIFT BRACKET-TO-HOOD SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Maintenance Level

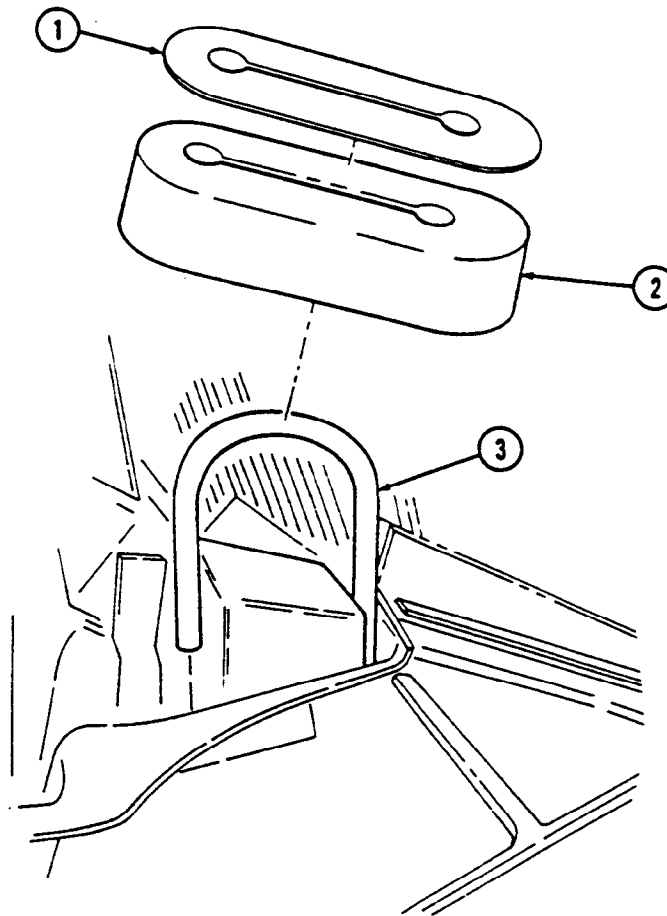
Unit

a. Removal

Remove protector (1) and seal (2) from airlift bracket (3).

b. Installation

Install seal (2) and protector (1) on airlift bracket (3).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-56. BODY REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. General b. Inspection | <ul style="list-style-type: none"> c. Rivet Replacement |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Tool kit, riveter (Appendix B, Item 123)

Materials/Parts

Sealing compound (Appendix C, Item 59)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. General

1. The body is constructed from aluminum alloys that have been heat-treated to obtain high strength. Welding cannot be used to make body repairs. Heat generated in welding will reverse the heat treatment process and cause a great reduction in strength of material.
2. Solid 3/16-in. diameter aluminum rivets are the primary method of joining body components. Rivets are inserted into a hole through two pieces of metal, and a second head is formed by manual or pneumatic impact or by squeezing the rivet. A bucking bar is used to back up the rivet to form rivet head. When making repairs, use blind rivets of the same size or oversize diameter with the appropriate grip length.
3. Blind structural aluminum rivets of 3/16-in. diameter are used in applications where there is access from only one side of the part. Blind rivets are installed using a tool that pulls on the rivet stem, causing a bulbed head to form on the back side of the part. Fastening is complete when stem breaks off. High strength is obtained in blind structural rivets by mechanically locking the remaining stem inside rivet body. Blind pop rivets are used in locations where nonstructural attachments such as latches, striker plates, etc., are attached to the body.
4. Steel pull-type lockbolt fasteners in 3/16 and 1/4-in. diameter are used where tension or high shear loads exist. Lockbolts are two-piece unthreaded fasteners. One part is a high-strength, steel-headed, bolt-like part with serrations on its shank. The mating part is a collar which is swaged over the serrations, causing the fastener to be locked in place.
5. Rivnut/plusnut fasteners are tubular rivets with internal threads. Rivnut/plusnut fasteners are installed using a tool that engages the threads of the fastener and extends a pull, causing the shank to expand tightly against the material being fastened. This process is called "upsetting" a rivnut/plusnut.
- 5.1. Struxnut fasteners are round, steel, with internal threads. Struxnut fasteners are installed using an automated or manual ramming device.
6. To facilitate repairs to body, it is acceptable to replace lockbolts and rivets with 1/4-in. AN4 series bolts. Do not replace lockbolts with rivets. Standard threaded fasteners should not be used, as these will quickly wear the aluminum structure. Bolt lengths should be chosen so that the cylindrical portion of bolt is bearing on all members being joined. Bolts are designated as AN4-XX or AN4C-XX where XX defines grip length. Tighten all bolts to 70-75 lb-in. (8-9 N·m).
7. Fatigue strength of riveted joints and seams is increased by one part epoxy adhesive. This adhesive requires special material storage and metal preparation along with a low-temperature heat cycle for curing. Because of its impracticality in field repairs, epoxy adhesive will not be used. Where possible, extra rivets and thicker metal gauges should be used instead of adhesives. When making repairs, note epoxy exists and that parts may be difficult to separate, even after rivets are removed.

10-56. BODY REPAIR (Cont'd)

b. Inspection

1. The damaged area should be thoroughly cleaned and inspected to determine cause and extent of damage. Body parts should be inspected for holes, cracks, dents, distortion, or breaks. Fasteners should be inspected for breaks, stretching, looseness, cocked heads, or hole elongation. Seams, flanges, and joints should be inspected for straightness or local deformation which is an indication that fasteners may have been stretched or holes elongated. It is possible for this to happen and fasteners can still appear to be tight in their holes. In addition, make thorough inspection of adjacent areas to determine if high loads have been transmitted from the damaged area to other areas. This can result in secondary damage of distorted panels or seams, loosened or sheared fasteners, elongated fastener holes, and cracks.
2. Signs of rivet failure include tipped heads, looseness, and sometimes chipped or cracked paint. If heads are tipped in the same direction and rivets are loose in consecutive groups, the joint has undergone excessive load. Rivet heads which are tipped in different directions and are not in groups may be improperly installed. With chipped or cracked paint, it may be necessary to remove paint to check true condition of rivets. Rivets subjected to critical loads but showing no distortion should be inspected if failure is suspected. The head should be drilled off, and the shank should be carefully punched out. Failure is indicated by notched rivet shank and misaligned holes. Flush rivets showing head slippage within the dimple or countersink indicate either sheet bearing or rivet shear failure and must be removed for inspection and replacement. If failure of rivets cannot be detected by visual inspection, the joint can be checked by drilling and punching out several rivets. If rivet shanks are notched, rivets should be replaced with next larger size rivets. If rivet holes show elongation due to local failure in tearing of the sheet, the next larger size rivet must be used in replacement. Any deformation of the sheet around the rivet, tear-outs, or cracks between rivets usually indicates partially failed or damaged rivets. Complete repair of the joint will require replacement by the next larger size rivets. Use the next 1/32-in. larger diameter rivet to obtain a tight joint when original hole has been enlarged. If original size rivet is installed, the rivet will not be able to carry its share of the shear load, and the joint would not meet its strength requirement.

c. Rivet Replacement

NOTE

When removing rivets, do not enlarge rivet hole because this would require use of an oversize or larger rivet for replacement.

1. Solid Rivet Removal.
 - (a) File a flat surface on the manufactured head if accessible. It is always preferable to work on manufactured head rather than the one that is bucked over, since the former will always be more symmetrical around the shank.
 - (b) Indent center of the filed surface with a center punch.
 - (c) Drill through rivet head. Be sure to use a drill slightly smaller than diameter of rivet shank to avoid making rivet hole oversized.
 - (d) Shear weakened rivet head off with a sharp chisel. For this operation, support back side of rivet and cut rivet head along direction of rivet line or panel edge. This will prevent distortion of the panel.
 - (e) Firmly support the panel from the opposite side and drive out shank with a pin punch. If rivet is unduly tight because of swelling between sheets, drill rivet shank out with an undersize drill.
2. Blind Rivet Removal.
 - (a) File a small flat on rivet head.
 - (b) Center-punch the flat. Support rivet backside, if possible.
 - (c) Using a small drill about the size of rivet pin, drill off tapered end of pin which forms the lock.

10-56. BODY REPAIR (Cont'd)

- (d) Shear lock using a pin punch to drive out pin.
 - (e) Pry out remainder of locking collar.
 - (f) Using a drill slightly smaller than rivet shank, drill almost through rivet head.
 - (g) Pry off rivet head with a pin punch.
 - (h) Tap out rivet shank with a pin punch.
3. Rivnut/Plusnut Removal.
- (a) Drill through rivnut head.
 - (b) Punch out shank.
4. Rivet Hole Drilling.
- (a) Center-punch all new rivet locations. Center punch mark must be large enough to prevent drill from slipping out of position, yet it must not dent the surface of the material. To prevent denting, place a bucking bar behind material during punching.
 - (b) Make sure drill is the correct size (tables 10-1 and 10-2) and point is properly ground. A No. 10 drill is used to install standard 3/16-in. blind rivets.
 - (c) Place drill in center mark for new rivet locations, or align drill with old hole when replacing old rivets with oversize rivets. When using a power drill, give the bit a few turns with fingers before starting motor. This will help assure that drill does not jump out of position when motor is started.

Table 10-1. Drill Sizes for Solid Shank Rivets.

RIVET DIAMETER (INCH)	DRILL SIZE	DRILL BIT DIAMETER (INCH)
1/16	#51	0.0670
3/32	#41	0.0960
1/8	#30	0.1285
5/32	#21	0.1590
3/16	#10	0.1910
1/4	F	0.2570
5/16	P	0.3230
3/8	W	0.3860

Table 10-2. Drill Sizes for Blind Rivets.

NOMINAL DIAMETER (INCH)				OVERSIZE DIAMETER (INCH)			
RIVET DIAMETER	DRILL SIZE	MINIMUM	MAXIMUM	RIVET DIAMETER	DRILL SIZE	MINIMUM	MAXIMUM
1/8	#30	0.129	0.132	1/8	#27	0.143	0.146
5/32	#20	0.160	0.164	5/32	#16	0.176	0.180
3/16	#10	0.192	0.196	3/16	#5	0.205	0.209

10-56. BODY REPAIR (Cont'd)

NOTE

- While drilling, hold drill at 90° angle to material surface. Avoid letting drill wobble, marking oblong holes.
 - Avoid excessive pressure. Let drill bit do the cutting.
 - Do not push drill through material.
- (d) Remove all burrs with a metal countersink or file.
- (e) Clean away all drill chips. Care must be taken to assure no chips are trapped between sheets of metal.
- (f) Apply sealing compound to hole and surrounding area.
5. Hole Countersinking.

NOTE

Some rivet installations in the body require that rivet head be flush with the material surface. In these instances, countersunk or flush-head rivets are used.

- (a) When using countersunk rivets, rivet holes must be countersunk with a tool having a 100° taper so rivet head will fit flush with surface.
- (b) When using a hand-operated countersink, the hole must be tried with a rivet so the recess will not be too deep or too shallow. It is best to use a countersink with a stop on it so depth of countersink can be controlled. Typical countersinking dimensions for blind rivets are shown in table 10-3. The minimum sheet thickness that can be machined for 100° countersink rivets is given in table 10-4.
- (c) Do not remove edge of hole on blind side of joint.

Table 10-3. Countersinking Dimensions for 100° Countersunk Blind Rivets.

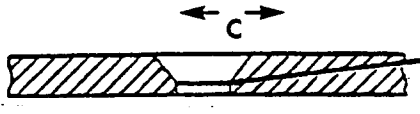
COUNTERSINKING DIMENSIONS (100°)		
		
RIVET DIAMETER (INCH)	C (INCH)	
	MINIMUM	MAXIMUM
1/8	0.222	0.228
5/32	0.283	0.289
3/16	0.350	0.356

Table 10-4. Minimum Sheet Gauge for 100° Machine Countersink.

RIVET SIZE (INCH)	3/32	1/8	5/32	3/16	1/4
GAUGE (INCH)	0.040	0.050	0.064	0.072	0.072

10-56. BODY REPAIR (Cont'd)

6. Blind Rivet Driving Practices and Precautions.
- (a) Rivets should be inspected for proper installation. The grip length of each rivet is marked on top of its head to provide positive identification. Use of proper grip length will produce a rivet installation where locking collar is flush with top surface of rivet head. Tolerance limit on flushness is 0.02 in. (0.5 mm).
 - (b) For proper rivet installation, it is imperative that holes be properly prepared, tools be in good working order, and rivets properly applied. When problems occur, the source of trouble could be in any of these areas.
7. Blind Rivet Installation.

NOTE

- Prior to installing blind rivets, the hole must be prepared with the parts aligned and clamped firmly in place. These steps are the same as for solid riveting operations. Proper drill sizes for standard and oversized blind rivets are given in table 10-2. Countersinking dimensions and minimum sheet gauge for countersunk blind rivets are shown in tables 10-3 and 10-4.
- It is very important that the proper length rivet is selected for each application. Rivet lengths are sized by the range of material thickness that the rivet will grip. Selecting the proper rivet length is critical because rivets can tolerate only 1/16-in. variation in material thickness for each particular rivet length. Rivet grip lengths are called out as a dash number at the end of the manufacturer's part number. Grip lengths are determined as shown in table 10-5.
- For double-dimpled sheets, add countersunk head height to material thickness.
- Use rivet installation tool kit for all blind rivets.

Table 10-5. Rivet Grip Length Determination.

MATERIAL THICKNESS RANGE (INCH)		RIVET GRIP NO.
MINIMUM	MAXIMUM	
	1/16	1
	1/8	2
1/8	3/16	3
3/16	1/4	4
1/4	5/16	5
5/16	3/8	6
3/8	7/16	7
7/16	1/2	8
1/2	9/16	9
9/16	5/8	10
5/8	11/16	11
11/16	3/4	12

10-56. BODY REPAIR (Cont'd)

- (a) Insert rivet stem into pulling head of rivet gun.
- (b) Hold rivet gun in line with axis of rivet as accurately as possible.
- (c) Apply a steady, firm pressure against rivet head.
- (d) Squeeze handles of manual gun. The rivet clamping action will pull sheets together, seat rivet head, and break stem flush with head of rivet.

8. Rivnut/Plusnut/Insertnut Installation.

- (a) Thread rivnut onto mandrel of installation tool.
- (b) Insert rivnut into hole for installation.
- (c) Apply steady, firm pressure against rivnut head.
- (d) Squeeze handles of tool to clinch rivnut shank against material.
- (e) Remove mandrel from rivnut.

9. Struxnut Installation.

- (a) Position struxnut over hole.
- (b) Apply force sufficient using riveter to seat struxnut.
- (c) The struxnut is properly staked when head of nut rests securely and flush on surface of component being staked.

10-57. B-PILLAR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Twelve locknuts (Appendix G, Item 127)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Soft top removed, if installed (TM 9-2320-387-10).
- Soft top door strikers removed, if installed (para. 10-94).
- Front seatbelts removed (para. 10-47).

Maintenance Level

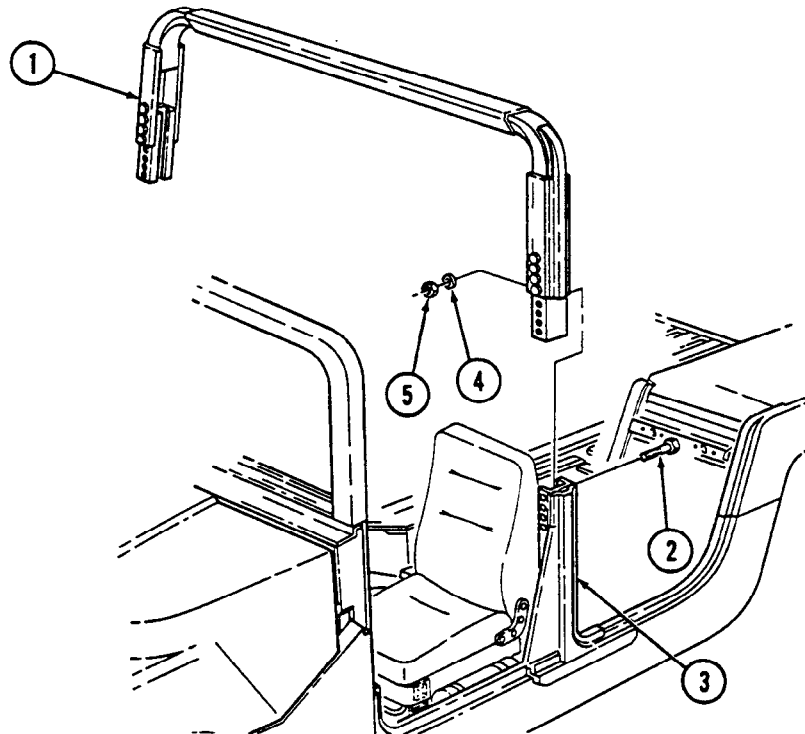
Unit

a. Removal

Remove twelve locknuts (5), washers (4), capscrews (2), and B-pillar (1) from body (3). Discard locknuts (5).

b. Installation

Install B-pillar (1) on body (3) with twelve capscrews (2), washers (4), and locknuts (5). Tighten locknuts (5) to 15 lb-ft (20 N·m).



- FOLLOW-ON TASKS:
- Install soft top, if removed (TM 9-2320-387-10).
 - Install soft top door strikers, if removed (para. 10-94).
 - Install front seatbelts (para. 10-47).

10-58. M13 DECONTAMINATION BRACKETS INSTALLATION

This task covers:

Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

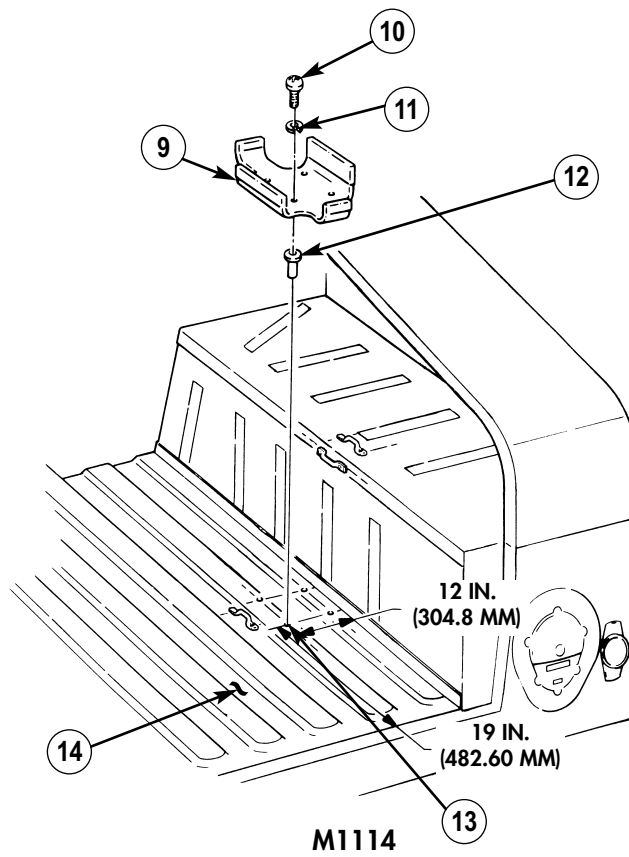
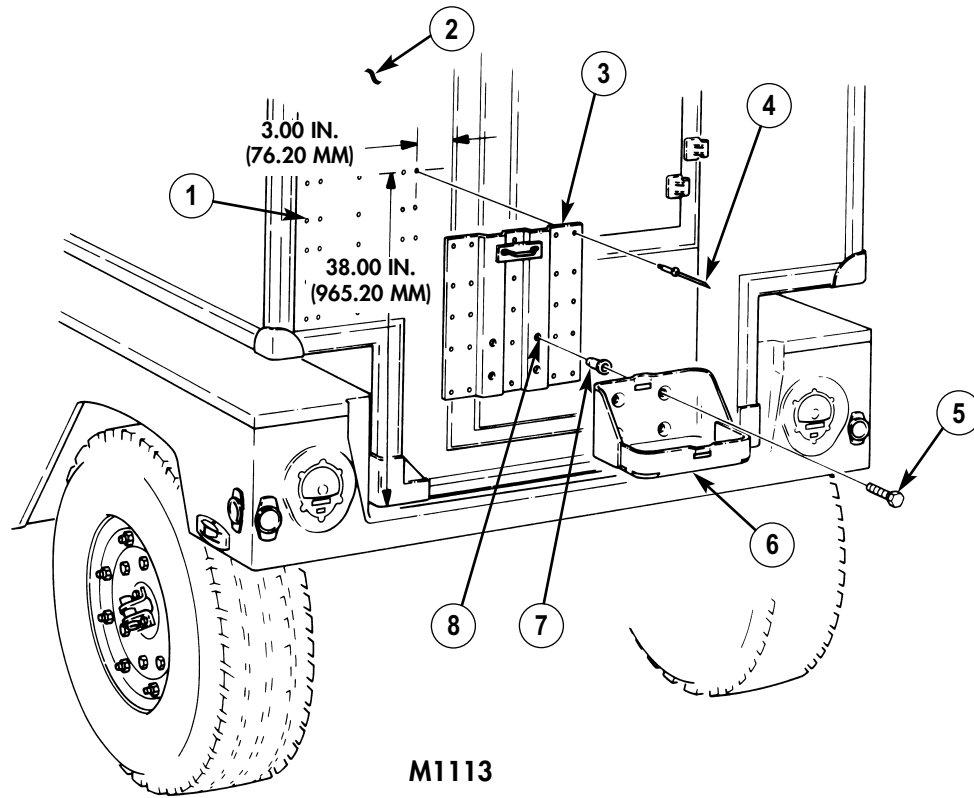
NOTE

- The following procedure is for initial installation of apparatus (P/N E5-51-527). This apparatus is not included in TM 9-2320-387-24P.
- Perform steps 1 through 4 for M1113 vehicle only. Perform steps 5 through 7 for M1114 vehicle only.

Installation

1. Using plate (3) as template, locate, mark, and drill twenty-four 0.187-in. diameter holes (1) in rear of shelter (2).
2. Install plate (3) on shelter (2) with twenty-five rivets (4).
3. Install four rivnuts (7) in holes (8) of plate (3).
4. Install bracket (6) on plate (3) with four capscrews (5). Tighten capscrews (5) to 49 lb-ft (66 N·m).
5. Using bracket (9) as a template, locate, mark, and drill four 0.333 diameter holes (13) in cargo floor (14).
6. Install four rivnuts (12) in holes (13).
7. Install bracket (9) on cargo floor (14) with four lockwashers (11) and screws (10).

10-58. M13 DECONTAMINATION BRACKETS INSTALLATION (Cont'd)



10-58.1. FLOOR DRAIN HOLE PLATE INSTALLATION

This task covers:

Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Special Tools

Tool kit, riveter (Appendix B, Item 123)

Materials/Parts

Adhesive sealant (Appendix C, Item 7.1)
 Three rivets (Appendix G, Item 331)
 Five rivets (Appendix G, Item 333)

Manual References

TM 9-2320-387-24P
 TM 43-0139

Maintenance Level

Unit

Installation

NOTE

All drain hole plates are installed basically the same. This procedure covers one drain hole plate.

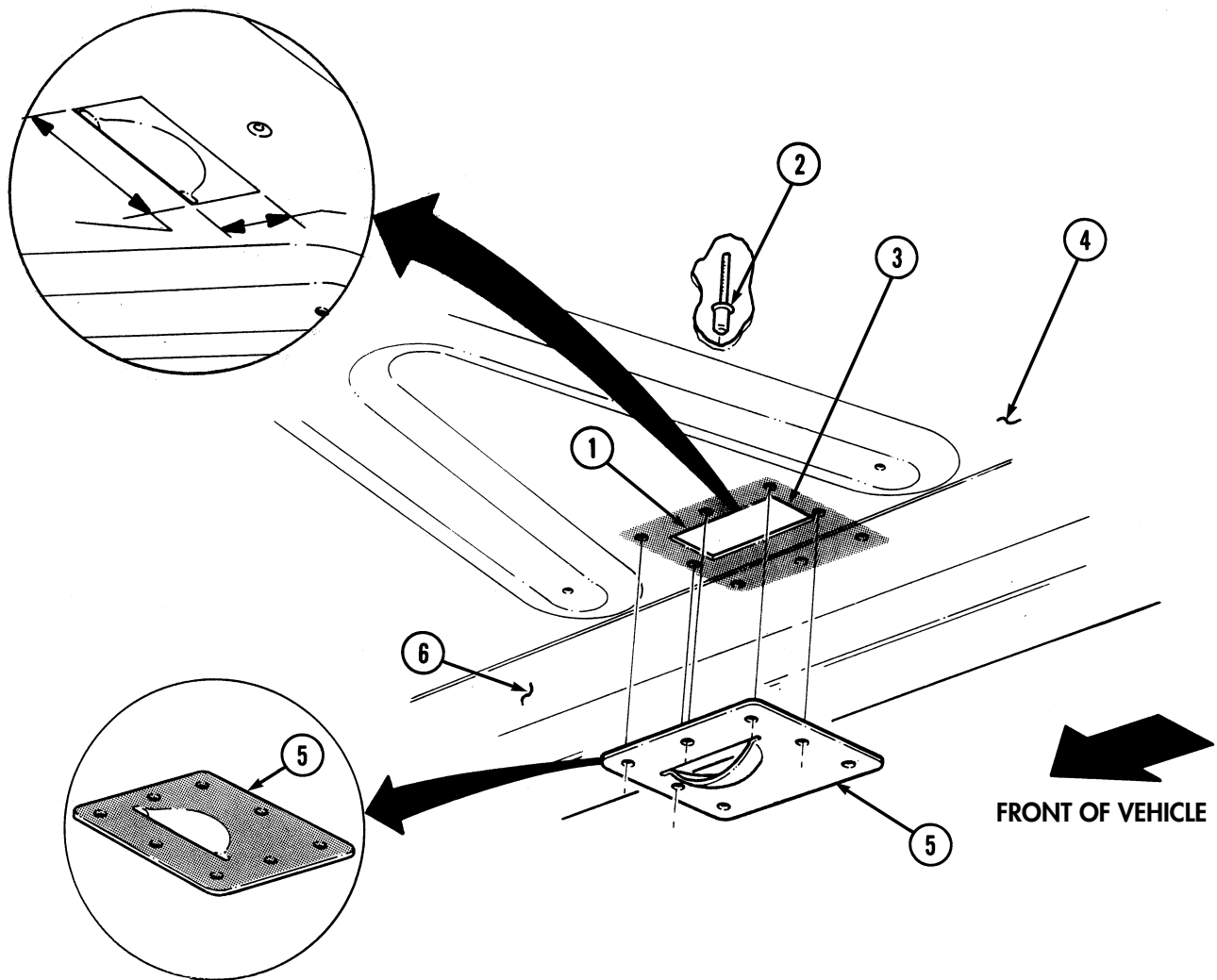
1. Mark an outline at drain hole (3) on floor panel (4).
2. Cut and remove drain hole material (1) from floor panel (4), and remove sharp edges and burrs from floor panel (4).
3. Mark underside of floor panel (4) with two lines centered over damaged floor drain area.
4. Using a 0.187-inch diameter drill, remove rivet (2) securing floor panel (4) to side body panel (6).

NOTE

- It may be necessary to bend or shape the drain hole plate to the contour of the floor panel.
- When installed, the drain hole plate opening faces toward the center of the vehicle.

5. Position drain hole plate (5) to underside of floor panel (4). Bend or shape drain hole plate (5) to the contour of the floor panel (4).
6. Using drain hole plate (5) as a template, locate, mark, and drill seven 0.187-in (4.8-mm) diameter holes on floor panel (4).
7. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded mating surface on drain hole plate (5).
8. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded mating surface on underside of floor panel (4) and side body panel (6).
9. Position drain hole plate (5) to underside of floor panel (4) and install seven rivets (2) on floor panel (4) and drain hole plate (5).
10. Using rivet hole drilled in step 4 as a template, drill 0.187-in. (4.8-mm) diameter hole through drain hole plate (5).
11. Install rivet (2) on floor panel (4), side body panel (6), and drain hole plate (5).
12. Remove excessive adhesive and clean edges on floor panel (4) and drain hole plate (5).
13. Spot-paint floor panel (4) and drain hole plate (5) (TM 43-0139).

10-58.1. FLOOR DRAIN HOLE PLATE INSTALLATION (Cont'd)



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT

This task covers:

- | | |
|---------------------------------|--------------------------------------|
| a. Front Skid Plate Removal | g. Fuel Tank Shield Installation |
| b. Front Shield Removal | h. Rear Shield Installation |
| c. Intermediate Shield Removal | i. Transfer Case Shield Installation |
| d. Transfer Case Shield Removal | j. Intermediate Shield Installation |
| e. Rear Shield Removal | k. Front Shield Installation |
| f. Fuel Tank Shield Removal | l. Front Skid Plate Installation |

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit: automotive
(Appendix B, Item 1)

Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

General Safety Instructions

- Do not perform this procedure near fire, flames, or sparks.
- Fuel tank must be supported during removal and installation.

Materials/Parts

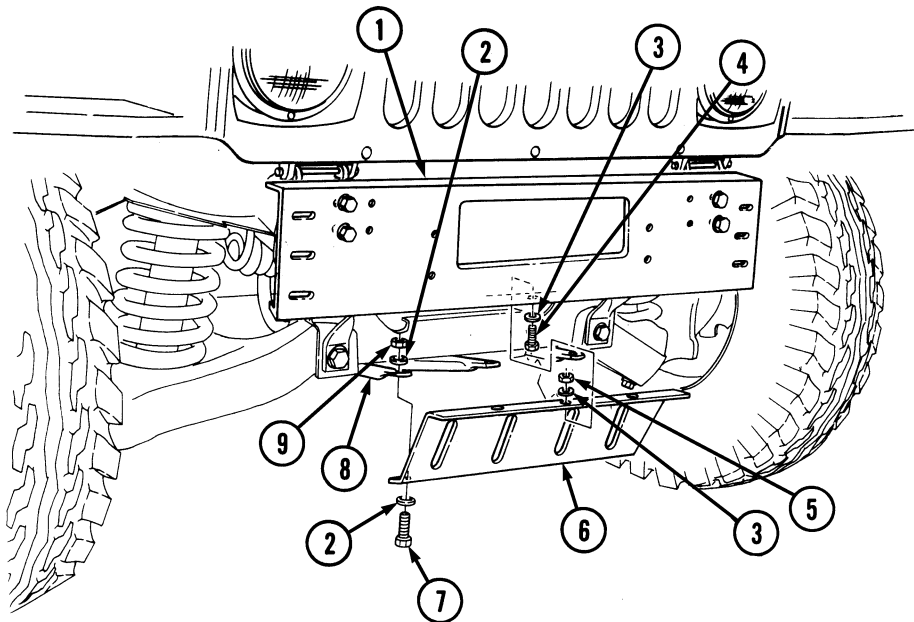
Four rubber washers (Appendix G, Item 363.1)
Forty-six locknuts (Appendix G, Item 156)

Maintenance Level

Unit

a. Front Skid Plate Removal

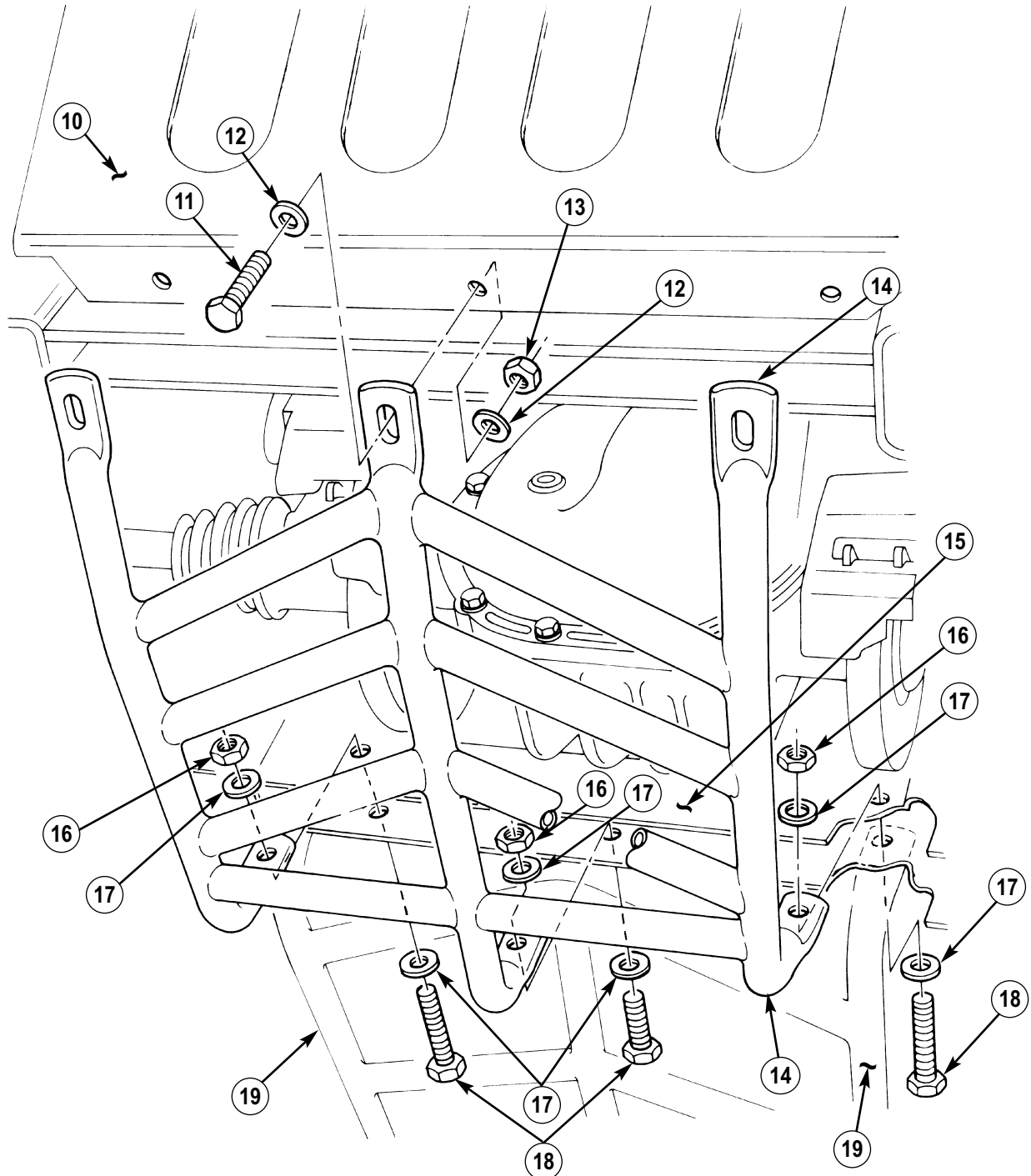
1. Remove three locknuts (9), washers (2), capscrews (7), washers (2), and front skid plate (6) from front shield (8). Discard locknuts (9).
2. Remove three locknuts (5), washers (3), capscrews (4), washers (3), and front skid plate (6) from front bumper (1). Discard locknuts (5).



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

b. Front Shield Removal

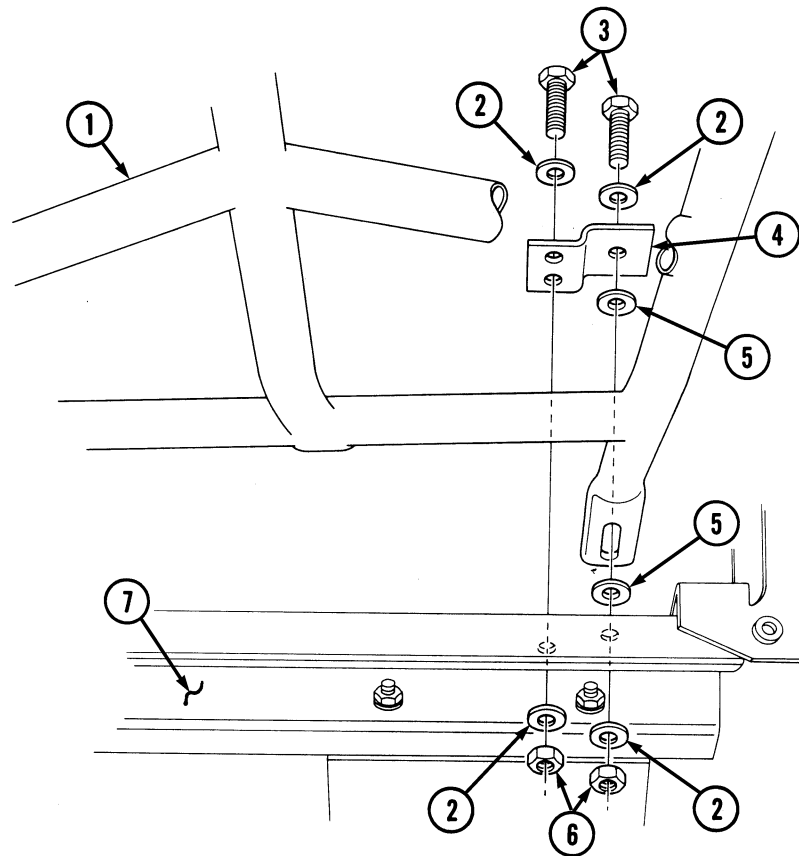
1. Remove three locknuts (16), washers (17), capscrews (18), and washers (17) from front shield (14), front crossmember (15), and intermediate shield (19). Discard locknuts (16).
2. Remove three locknuts (13), washers (12), capscrews (11), washers (12), and front shield (14) from front skid plate (10). Discard locknuts (13).



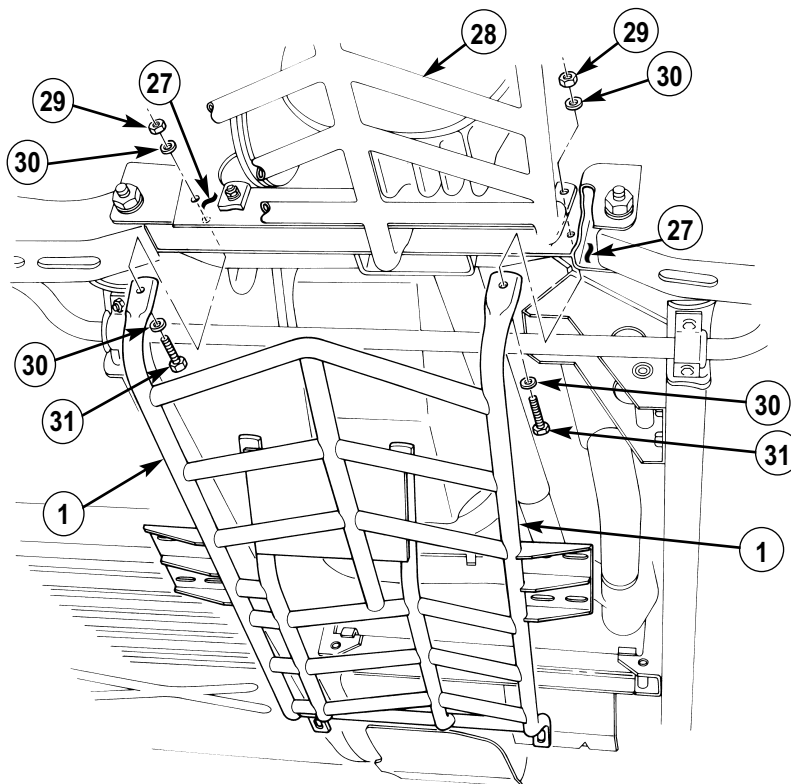
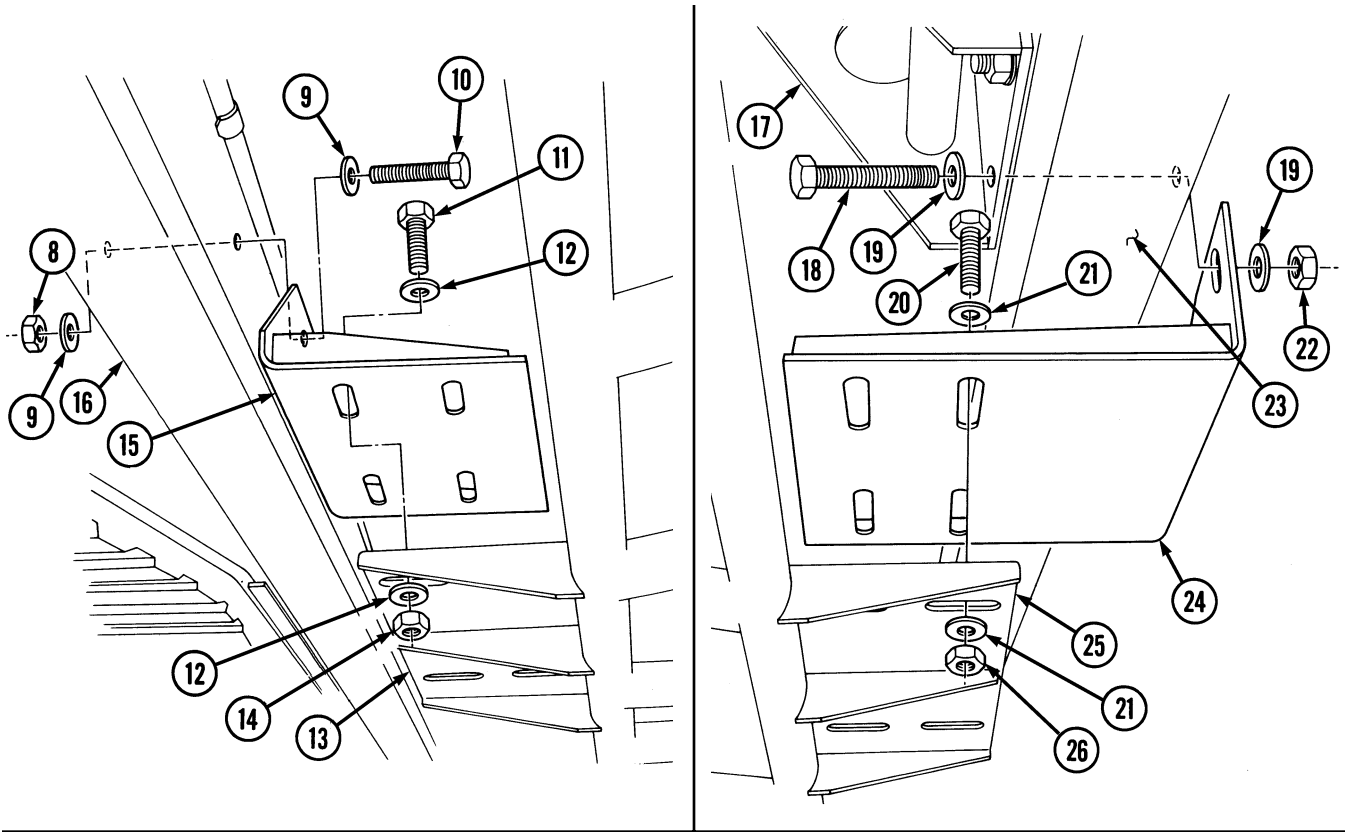
10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

c. Intermediate Shield Removal

1. Remove six locknuts (6), washers (2), capscrews (3), washers (2), two transmission support brackets (4), and four rubber washers (5) from intermediate shield (1) and transmission mount crossmember (7). Discard locknuts (6) and rubber washers (5).
2. Remove locknut (8), washer (9), capscrew (10), and washer (9) from right support bracket (15) and right side frame rail (16). Discard locknut (8).
3. Remove locknut (22), washer (19), capscrew (18), and washer (19) from left support bracket (24), engine mount bracket (17), and left side frame rail (23). Discard locknut (22).
4. Remove four locknuts (14), washers (12), capscrews (11), washers (12), and right side support bracket (15) from right side mounting bracket (13). Discard locknuts (14).
5. Remove four locknuts (26), washers (21), capscrews (20), washers (21), and left side support bracket (24) from left side mounting bracket (25). Discard locknuts (26).
6. Remove two locknuts (29), washers (30), capscrews (31), washers (30), and intermediate shield (1) from front crossmember (27) and front shield (28). Discard locknuts (29).



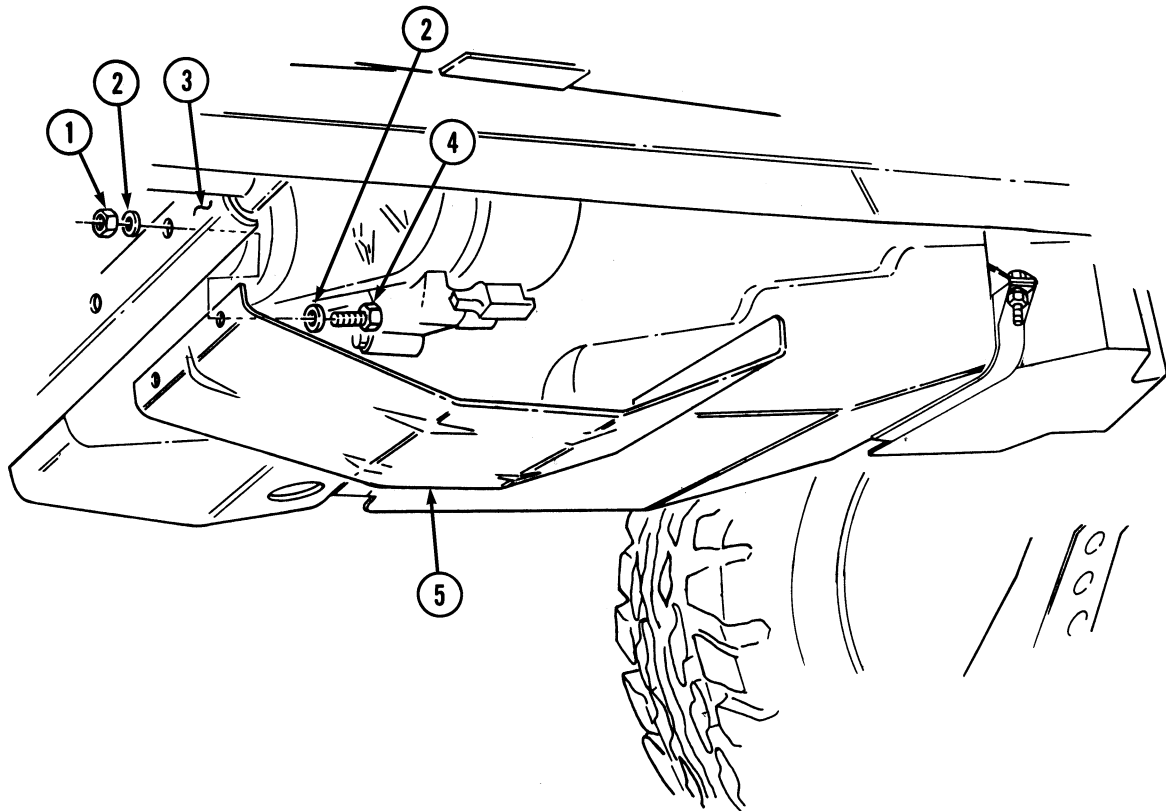
10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

d. Transfer Case Shield Removal

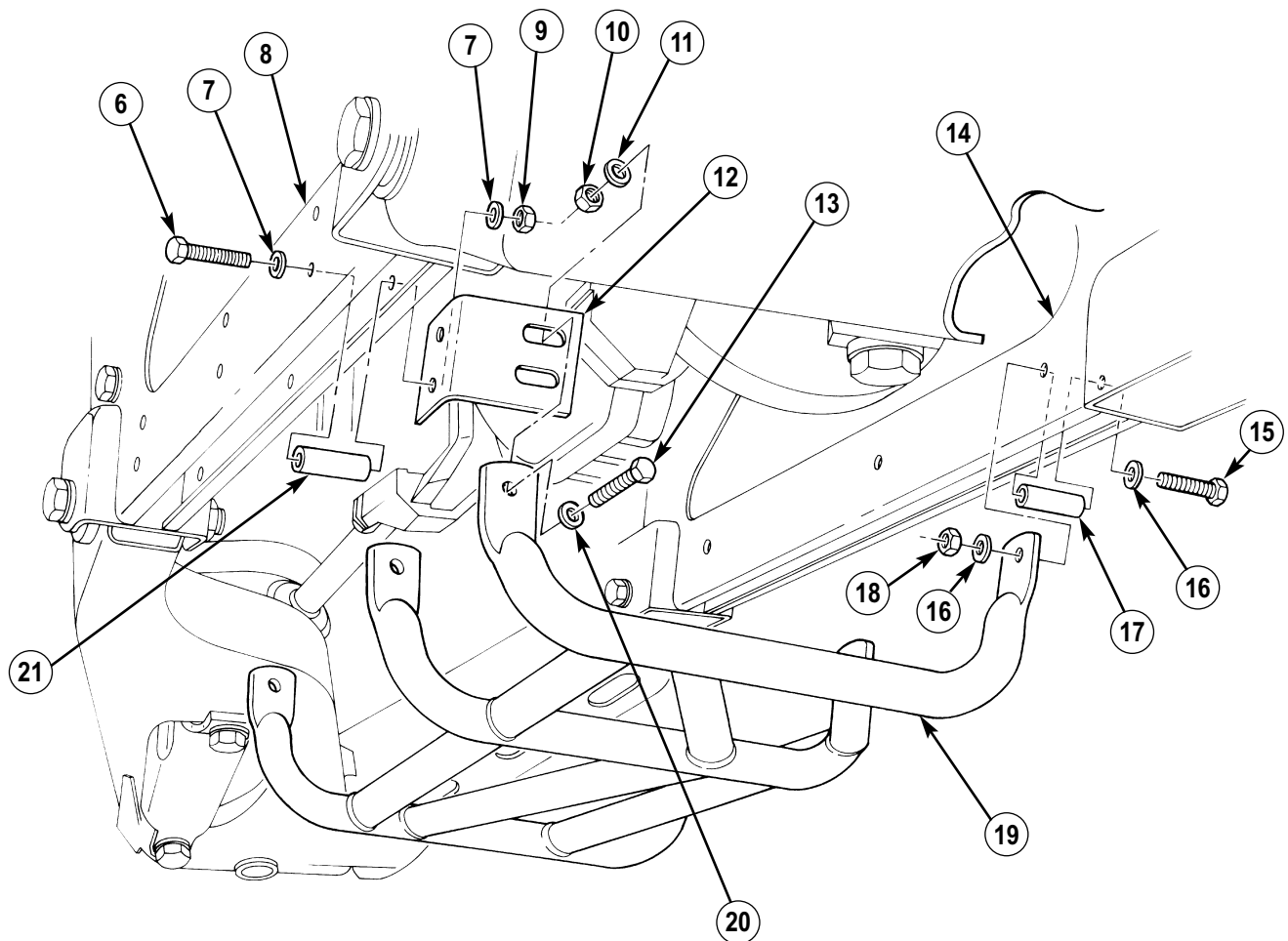
Remove two locknuts (1), washers (2), capscrews (4), washers (2), and transfer case shield (5) from cross-member (3). Discard locknuts (1).



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

e. Rear Shield Removal

1. Remove three locknuts (18), washers (16), capscrews (15), washers (16), and spacers (17) from rear shield (19) and rear-front crossmember (14). Discard locknuts (18).
2. Remove three locknuts (10), washers (11), capscrews (13), washers (20), and rear shield (19) from three mounting brackets (12). Discard locknuts (20).
3. Remove six locknuts (9), washers (7), capscrews (6), washers (7), spacers (21), and three mounting brackets (12) from rear-rear crossmember (8). Discard locknuts (9).



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

f. Fuel Tank Shield Removal

WARNING

- Fuel tank must be supported during removal. Failure to do so may cause damage to fuel tank or injury to personnel.
 - Diesel fuel is highly flammable. Do not perform this task near fire, flames, or sparks. Severe injury or death may result.
1. Drain fuel tank (1) (refer to para. 3-25).
 2. Remove two locknuts (6), washers (2), capscrews (3), washers (2), and support straps (5) from upper straps (4). Discard locknuts (6).
 3. Swing support straps (5) down and remove fuel tank shield (7).

g. Fuel Tank Shield Installation

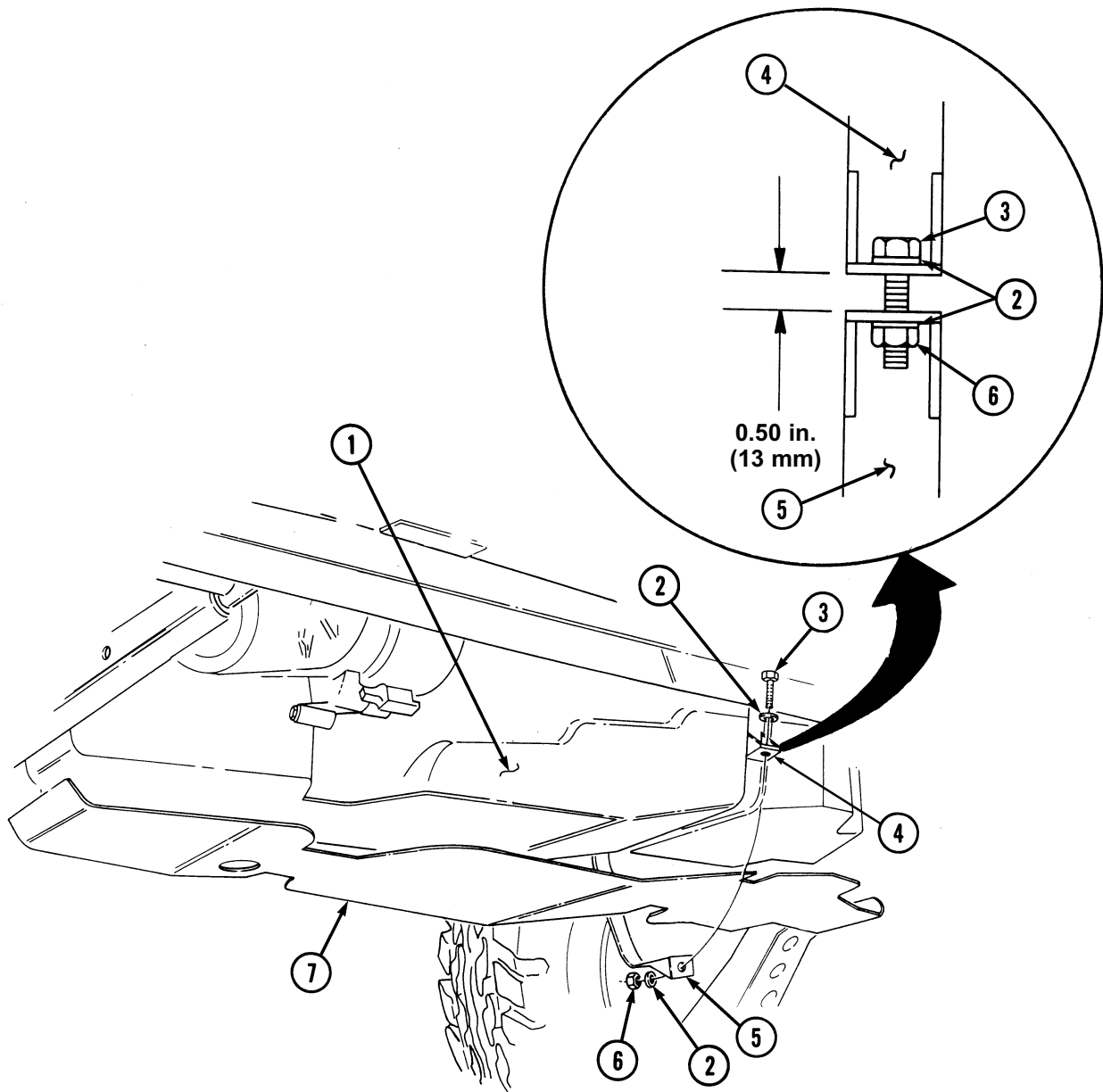
WARNING

- Fuel tank must be supported during installation. Failure to do so may cause damage to fuel tank or injury to personnel.
 - Diesel fuel is highly flammable. Do not perform this task near fire, flames, or sparks. Severe injury or death may result.
1. Position fuel tank shield (7) on fuel tank (1) and raise support straps (5).

NOTE

- Maintain 0.50-in. (13-mm) clearance between upper and lower straps when tightening locknuts.
2. Install support straps (5) on upper straps (4) with two washers (2), capscrews (3), washers (2), and locknuts (6). Tighten locknuts (6) to 37 lb-ft (50 N·m).
 3. Fill fuel tank (1) (refer to TM 9-2320-387-10).

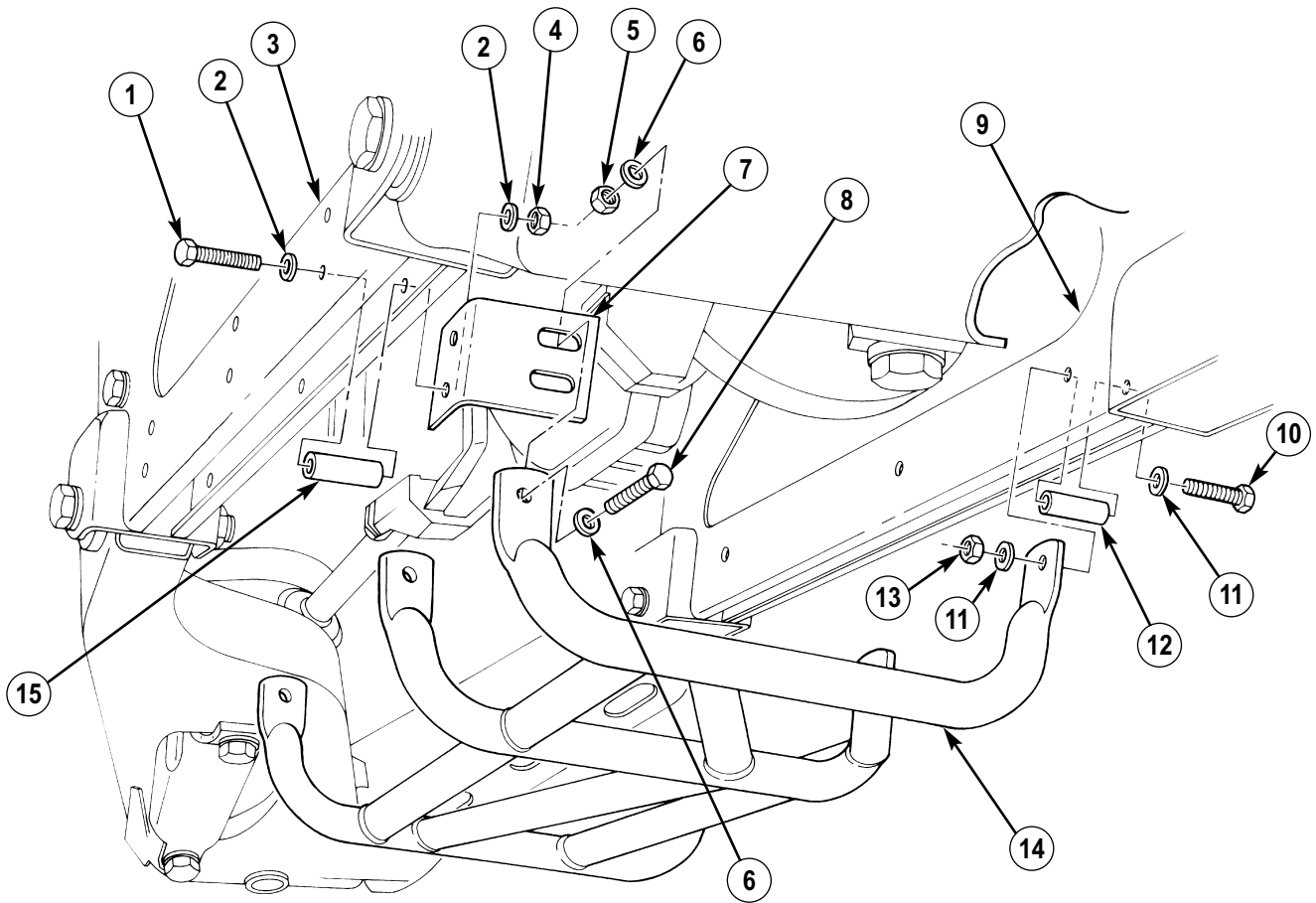
10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

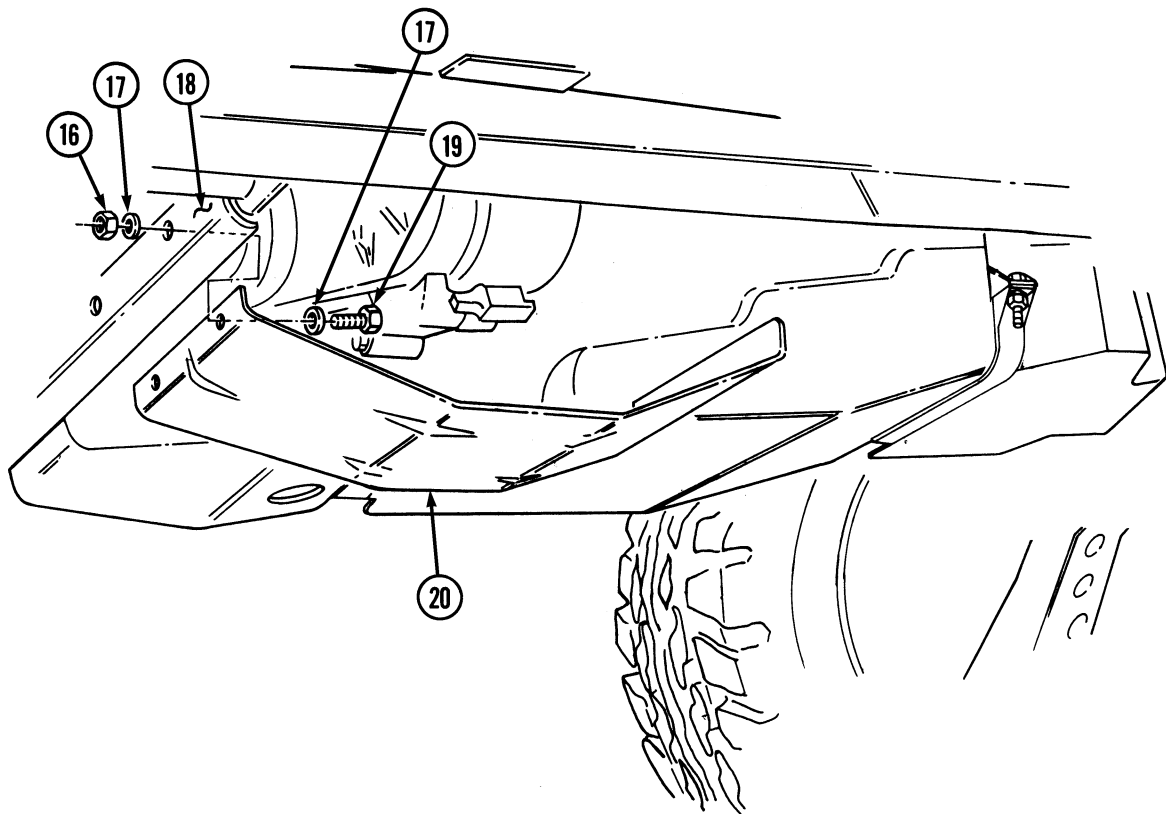
h. Rear Shield Installation

1. Install rear shield (14) on rear-front crossmember (9) with three spacers (12), washers (11), and locknuts (13). Tighten locknuts (13) to 44 lb-ft (60 N·m).
2. Install rear shield (14) on three mounting brackets (7) with three washers (6), capscrews (8), washers (6), and locknuts (5). Do not tighten locknuts (5).
3. Install three mounting brackets (7) on rear-rear crossmember (3) with six spacers (15), washers (2), capscrews (1), washers (2), and locknuts (4). Tighten locknuts (4) to 24 lb-ft (33 N·m).
4. Tighten three locknuts (5) to 24 lb-ft (33 N·m).



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)**i. Transfer Case Shield Installation**

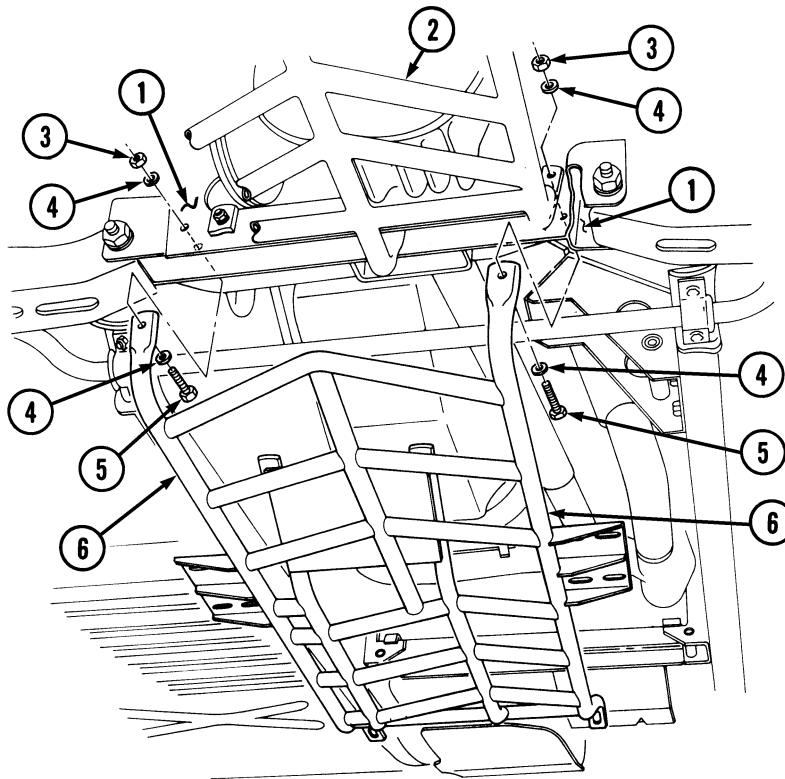
Install transfer case shield (20) on crossmember (18) with two washers (17), capscrews (19), washers (17), and locknuts (16).



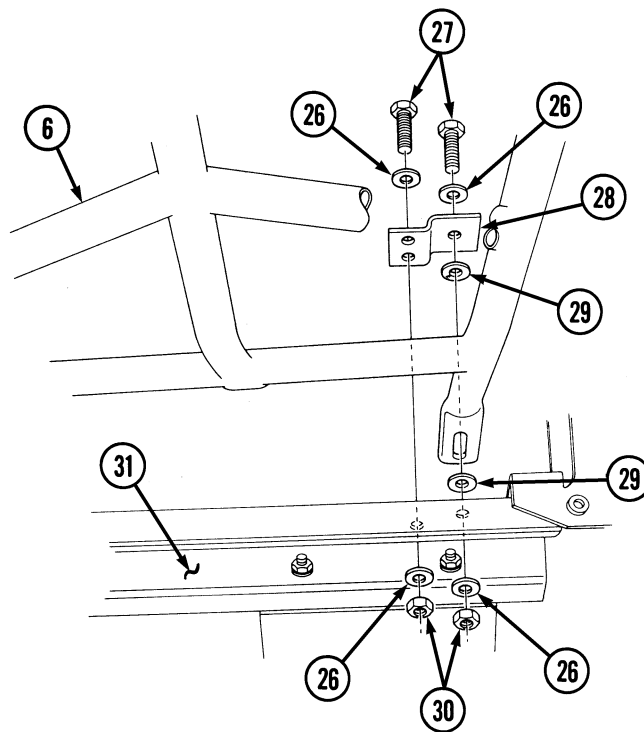
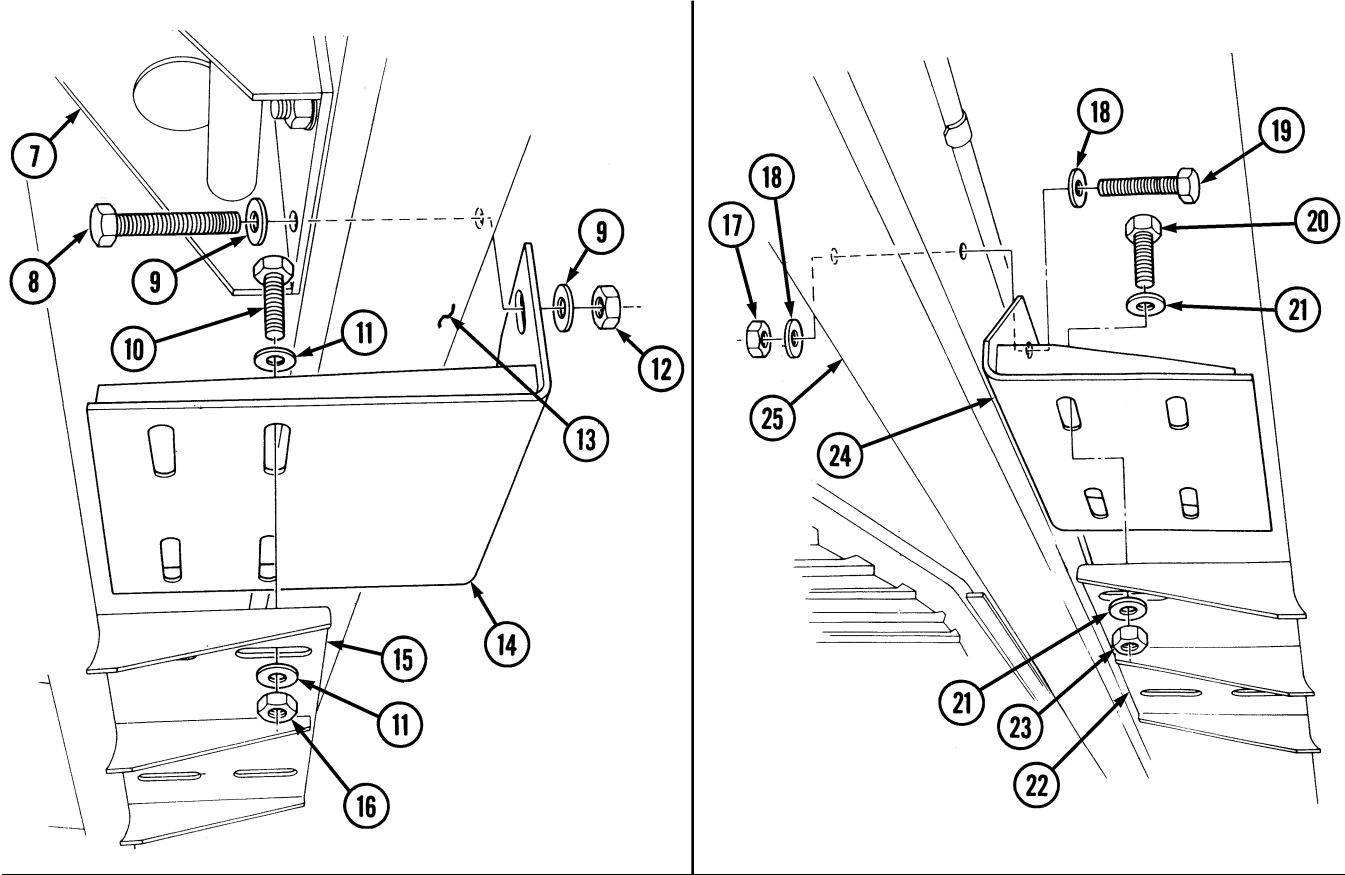
10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

j. Intermediate Shield Installation

1. Install intermediate shield (6) and front shield (2) on front crossmember (1) with two washers (4), capscrews (5), washers (4), and locknuts (3). Tighten locknuts (3) to 44 lb-ft (60 N·m).
2. Install left side support bracket (14) on left side mounting bracket (15) with four washers (11), capscrews (10), washers (11), and locknuts (16). Do not tighten locknuts (16).
3. Install right side support bracket (24) on right side mounting bracket (22) with four washers (21), capscrews (20), washers (21), and locknuts (23). Do not tighten locknuts (23).
4. Install left side support bracket (14) on engine mount bracket (7) and left side frame rail (13) with washer (9), capscrew (8), washer (9), and locknut (12). Tighten locknut (12) to 105 lb-ft (142 N·m).
5. Install right side support bracket (24) on right side frame rail (25) with washer (18), capscrew (19), washer (18), and locknut (17). Tighten locknut (17) to 105 lb-ft (142 N·m).
6. Install two transmission support brackets (28) on intermediate shield (6) and transmission mount crossmember (31) with four rubber washers (29), six washers (26), capscrews (27), washers (26), and locknuts (30). Tighten locknuts (30) to 30 lb-in. (3 N·m).
7. Tighten locknuts (16) and (23) to 24 lb-ft (33 N·m).



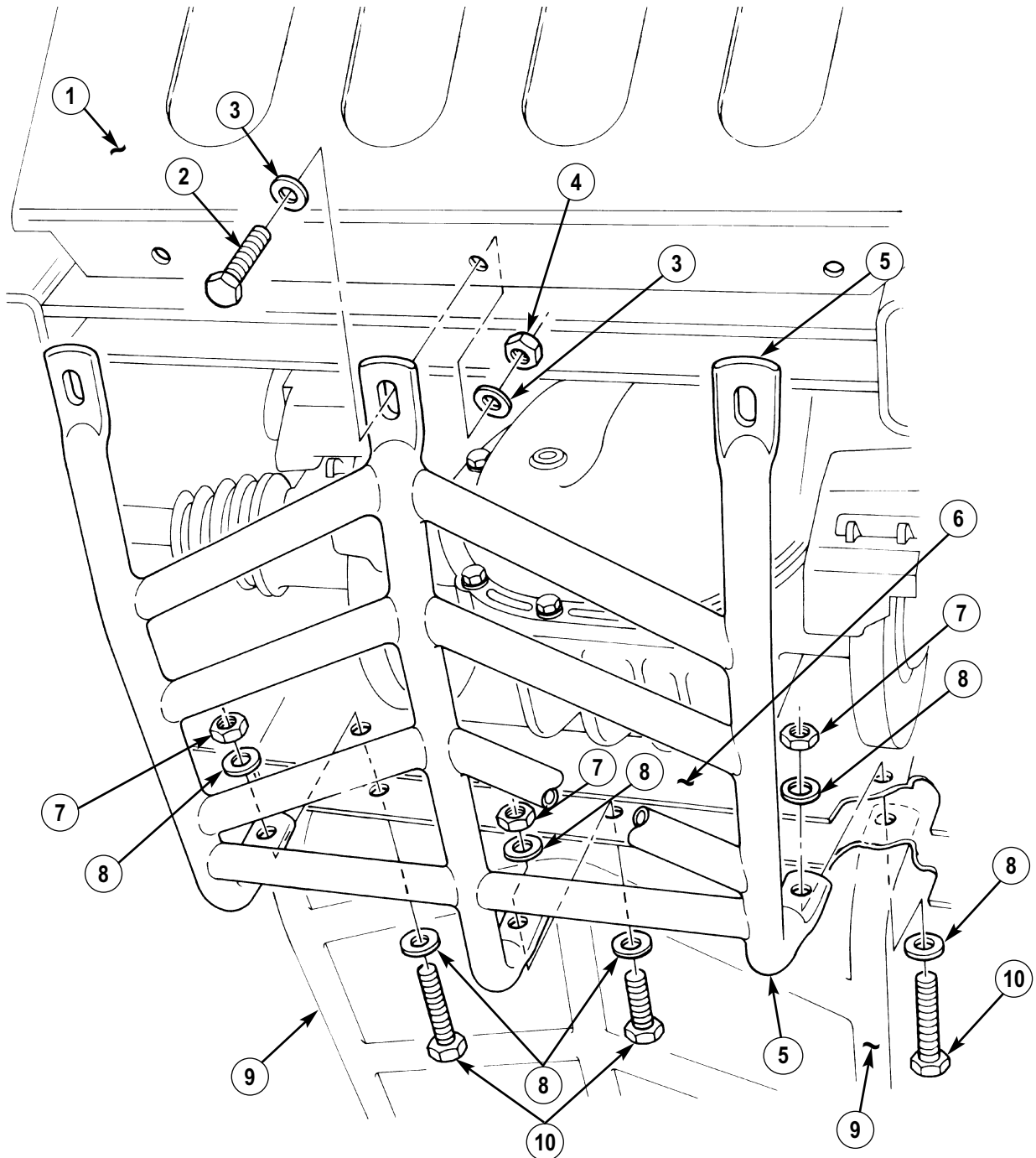
10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)

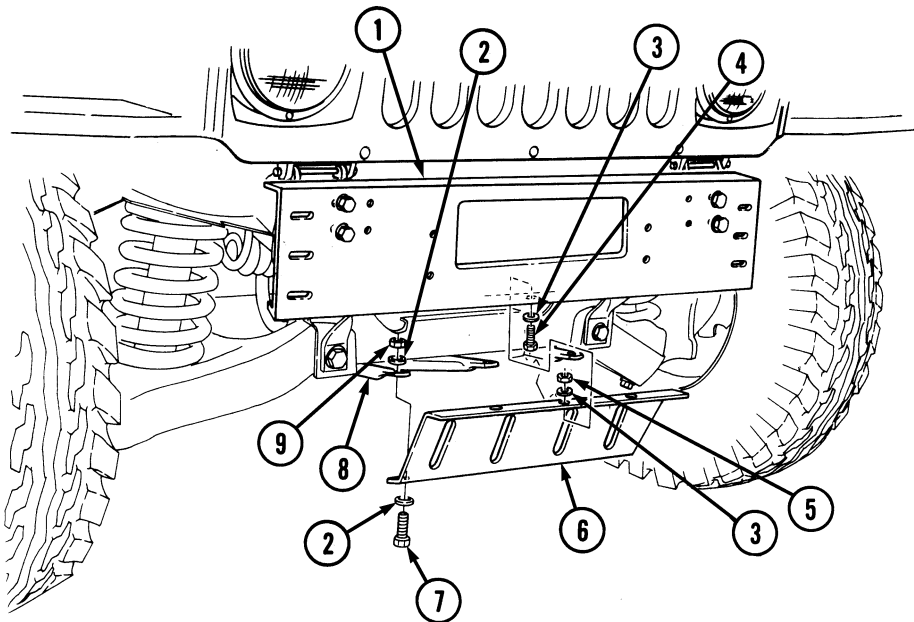
k. Front Shield Installation

1. Install front shield (5) on front skid plate (1) with three washers (3), capscrews (2), washers (3), and locknuts (4). Do not tighten locknuts (4).
2. Install front shield (5) on front crossmember (6) and intermediate shield (9) with three washers (8), capscrews (10), washers (8), and locknuts (7).
3. Tighten locknuts (4) and (7) to 44 lb-ft (60 N·m).



10-58.2. UNDERBODY PROTECTION KIT REPLACEMENT (Cont'd)**1. Front Skid Plate Installation**

1. Install front skid plate (16) on front bumper (11) with three washers (13), capscrews (14), washers (13), and locknuts (15). Tighten locknuts (15) to 24 lb-ft (33 N·m).
2. Install front skid plate (16) on front shield (18) with three washers (12), capscrews (17), washers (12), and locknuts (19). Tighten locknuts (19) to 44 lb-ft (60 N·m).



Section II. BODY ACCESSORIES MAINTENANCE

10-59. BODY ACCESSORIES MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
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10-62.	Windshield Wiper Blade and Arm Maintenance	10-104
10-63.	Windshield Wiper Switch/Motor Replacement	10-106
10-64.	Windshield Washer Reservoir and Pump Assembly Maintenance	10-108
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10-66.	Windshield Washer Nozzle Replacement	10-112
10-67.	Windshield De-Icer, Defroster Switch, and Circuit Breaker Replacement	10-114
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10-72.	Heater Shutoff Valve Replacement	10-124
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10-60. WINDSHIELD WIPER ARM PIVOT MAINTENANCE

This task covers:

- | | |
|----------------------|-----------------|
| a. Repair (Optional) | c. Installation |
| b. Removal | |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Windshield wiper linkage removed (para. 10-61).
- Windshield wiper blade and arm removed (para. 10-62).

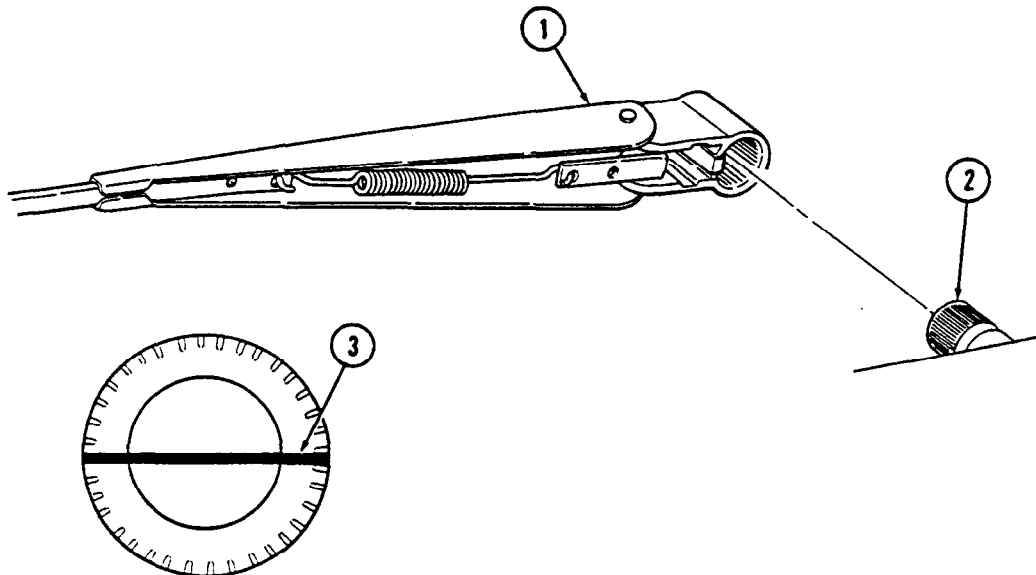
Maintenance Level

Unit

a. Repair (Optional)

NOTE

- Steps 1 through 3 are an alternative repair for the windshield wiper arm pivot. Repair can be left up to the discretion of the commander.
 - For easy handling, use of an old wiper arm as a hole guide is recommended. This will also protect the splined surface of the pivot.
 - Use roll pin (5315-01-027-4759) for repair.
1. Center punch side of wiper arm (1). Position wiper arm (1) so it is horizontal for drilling.
 2. Drill a 3/32-in. (2.4-mm) hole halfway through center shaft (2). Remove old wiper arm (1) and continue drilling all the way through shaft (2) and cap.
 3. Using a small hammer or punch, drive roll pin (3) into hole until it is flush with the surface. Replace original wiper arm (1).



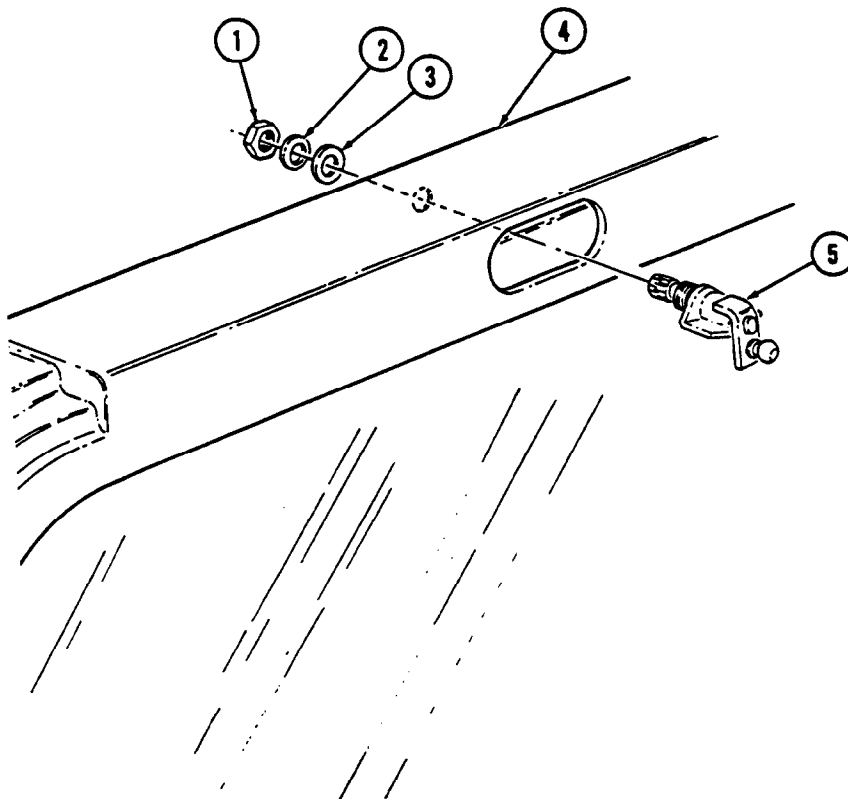
10-60. WINDSHIELD WIPER ARM PIVOT MAINTENANCE (Cont'd)

b. Removal

Remove nut (1), washer (2), seal (3), and pivot (5) from windshield frame (4).

c. Installation

Install pivot (5) on windshield frame (4) with seal (3), washer (2), and nut (1).



- FOLLOW-ON TASKS:
- Install windshield wiper blade and arm (para. 10-62).
 - Install windshield wiper linkage (para. 10-61).

10-61. WINDSHIELD WIPER LINKAGE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Eight lockwashers (Appendix G, Item 207)

Manual References

TM 9-2320-387-24P

Equipment Condition

Windshield wiper motor removed (para. 10-63).

Maintenance Level

Unit

a. Removal

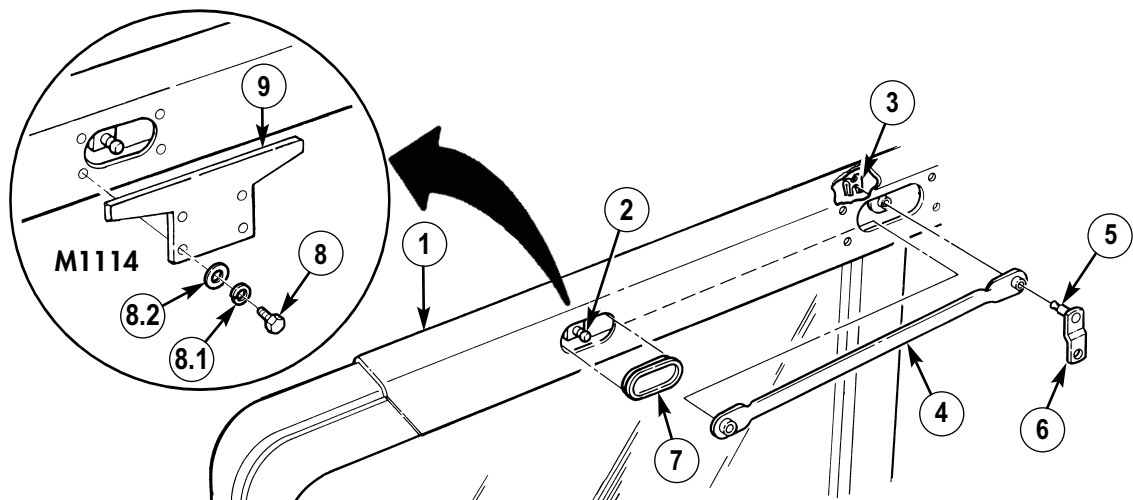
1. Remove two access covers (7) (M1113), or eight capscrews (8), lockwashers (8.1), washers (8.2), and two plates (9) (M1114), from windshield frame (1). Discard lockwashers (8.1).
2. Pull connector arm retainer (3) from ball stud (5) and remove motor drive lever (6) from connector arm (4).
3. Disconnect connector arm (4) from wiper arm pivots (2) and remove connector arm (4) through center access in windshield frame (1).

b. Installation

CAUTION

Install left (driver's) side connector arm first, or damage to equipment will result.

1. Install connector arm (4) through center access on windshield frame (1) and connect connector arm (4) to wiper arm pivots (2).
2. Connect connector arm (4) together with motor drive lever (6) and connector arm retainer (3) on ball stud (5).
3. Install two access covers (7) (M1113), or two plates (9) with eight washers (8.2), lockwashers (8.1), and capscrews (8) (M1114), on windshield frame (1). Tighten capscrews (8) to 75 lb-in. (9 N·m).



FOLLOW-ON TASK: Install windshield wiper motor (para. 10-63).

10-62. WINDSHIELD WIPER BLADE AND ARM MAINTENANCE

This task covers:

- a. Removal
- c. Installation
- b. Repair (Optional)

INITIAL SETUP:

<p><u>Tools</u></p> <p>General mechanic's tool kit: automotive (Appendix B, Item 1)</p>	<p><u>Manual References</u></p> <p>TM 9-2320-387-10 TM 9-2320-387-24P</p>
<p><u>Materials/Part</u></p> <p>Spring (Appendix G, Item 454)</p>	<p><u>Maintenance Level</u></p> <p>Unit</p>

a. Removal

NOTE

- Ensure windshield wiper motor switch is in OFF position. Note position of wiper arm for installation.
 - Perform step 1 only if blade assembly is to be replaced.
1. Remove nut (10), screw (1), and blade assembly (8) from wiper arm (2).
 2. Lift wiper arm (2) away from windshield (9).
 3. Lift up wiper arm latch (3) at base of wiper arm (2) and remove wiper arm (2) from splined shaft (4).

b. Repair (Optional)

NOTE

- Steps 1 and 2 apply to M1113 only.
 - If spring inside wiper arm loses tension, replace spring as an alternate to replacing the wiper arm.
1. Remove spring (7) from wiper arm (2). Discard spring (7).
 2. Install spring (7) in second hole (6) of wiper arm tab (5) and wiper arm (2).

c. Installation

1. Ensure wiper arm latch (3) is unlocked.

NOTE

With motor switched OFF (parked position), mount wiper arm approximately 60° to vertical centerline, so that a sweep of approximately 120° will be achieved during operation.

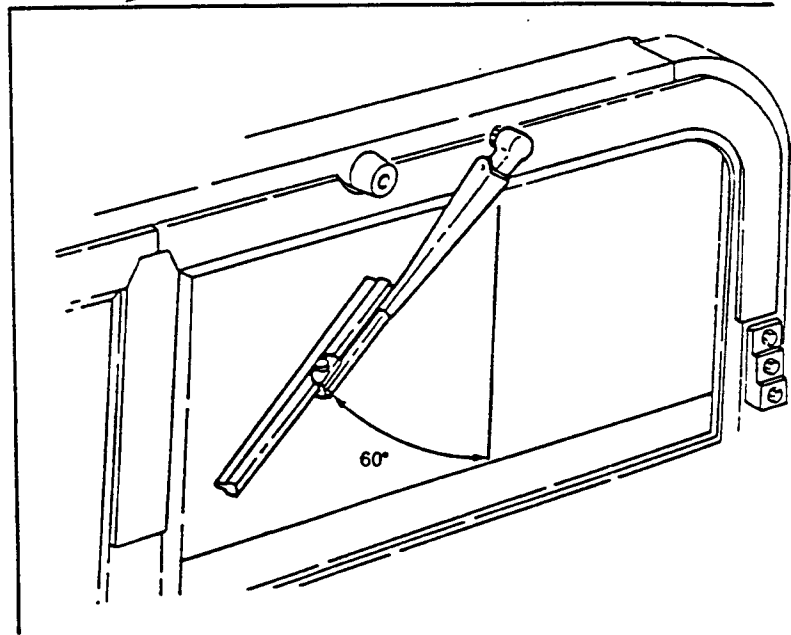
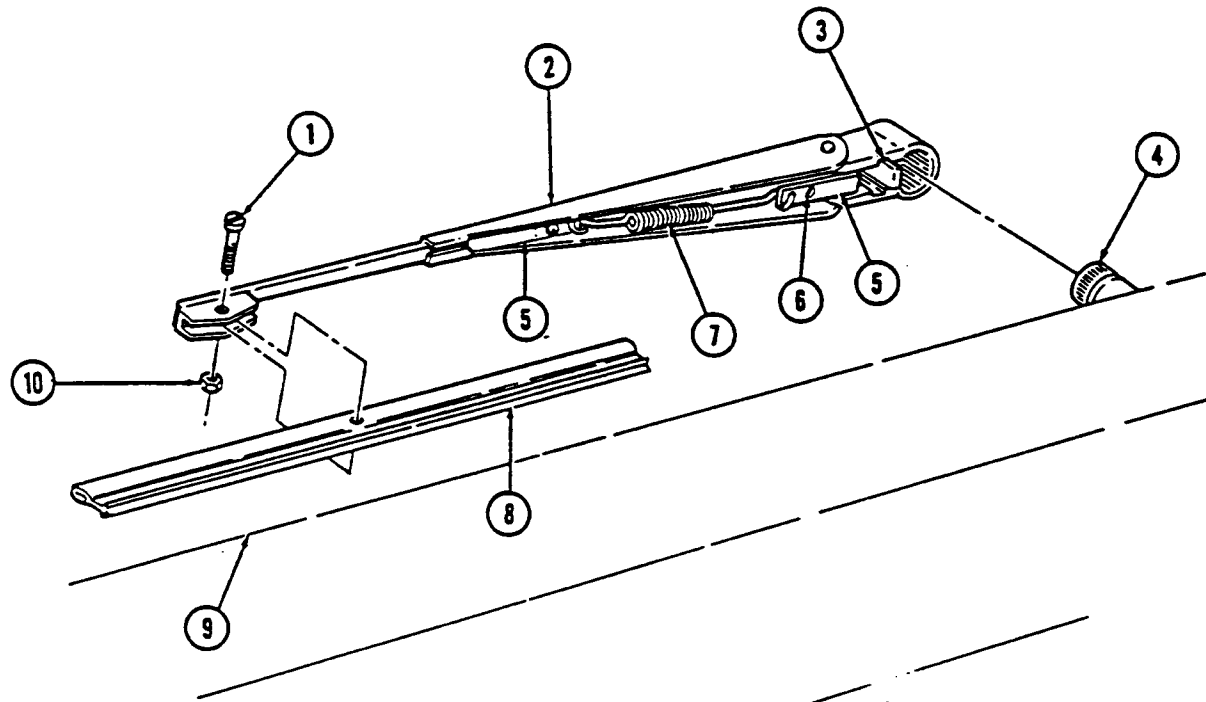
2. Install wiper arm (2) on splined shaft (4).

NOTE

Perform step 3 only if blade assembly was removed.

3. Install blade assembly (8) on wiper arm (2) with screw (1) and nut (10).

10-62. WINDSHIELD WIPER BLADE AND ARM MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Check windshield wiper for proper operation (TM 9-2320-387-10).

10-63. WINDSHIELD WIPER SWITCH/MOTOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Two lockwashers (Appendix G, Item 221)
Lockwasher (Appendix G, Item 222)

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

a. Removal

NOTE

Perform steps 1 through 5 for removal of wiper motor switch.
Proceed to step 6 for removal of wiper motor assembly.

1. Disconnect lead (12) from wiper switch (11).
2. Depress retaining clip on back of knob (15) and remove knob (15) from wiper switch (11).
3. Remove nut (14) and lockwasher (13) from wiper switch (11) and wiper motor mounting plate (10). Discard lockwasher (13).
4. Disconnect switch connector (9) from wiper motor (5) and remove wiper switch (11).
5. Remove screw (16), lockwasher (17), ground lead 57G (18), wiper switch ground lead (6), and lockwasher (19) from wiper motor mounting plate (10). Discard lockwashers (17) and (19).
6. Remove three capscrews (8) and washers (7) from wiper motor (5) and windshield frame (1).
7. Pull wiper motor (5) away from windshield frame (1) for access to clip (2).
8. Remove clip (2) and connecting arms (3) from wiper motor shaft (4) and remove wiper motor shaft (4) from windshield frame (1).

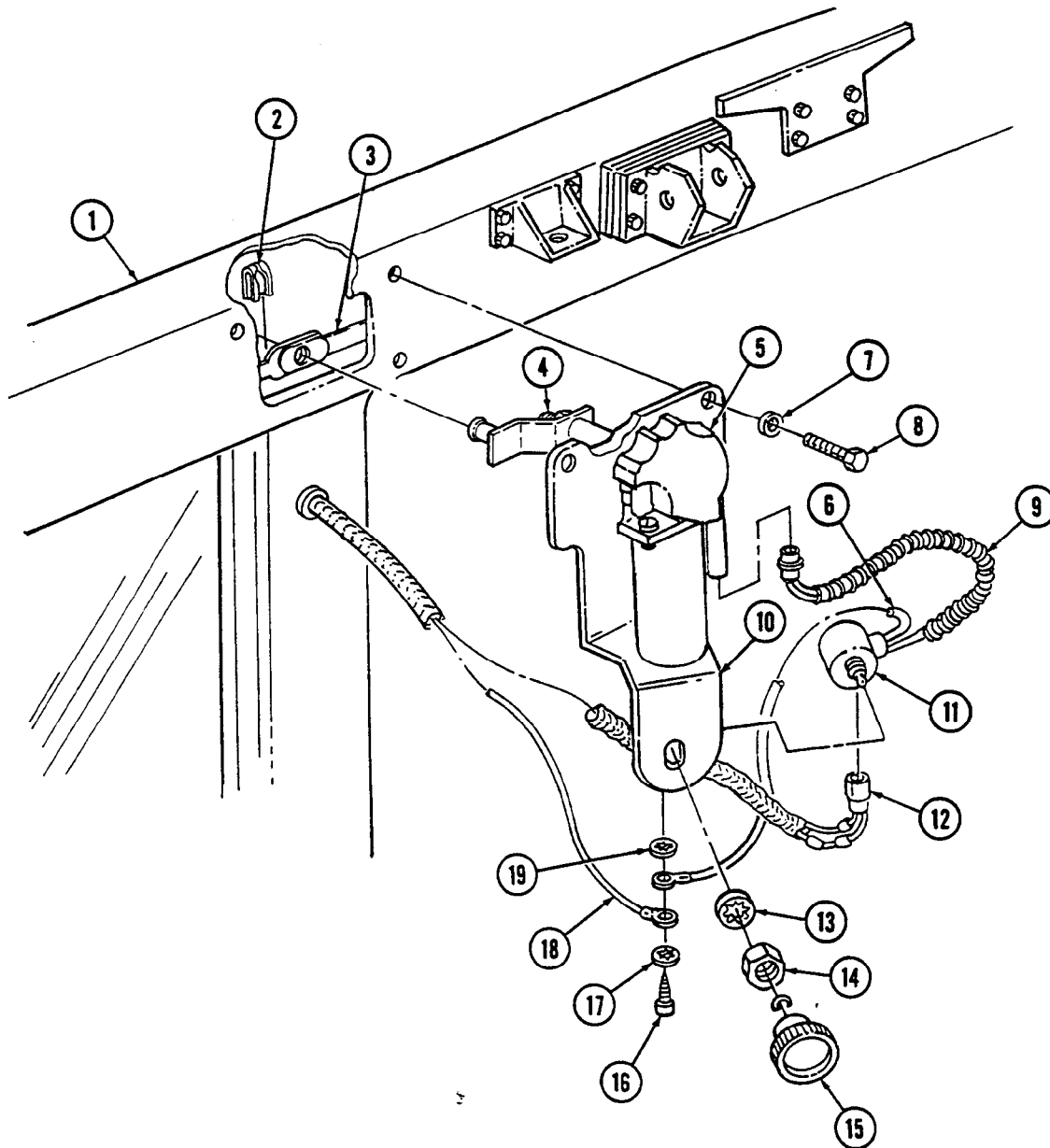
b. Installation

NOTE

Perform steps 1 through 5 for installation of wiper motor switch.
Proceed to step 6 for installation of wiper motor assembly.

1. Install wiper switch (11) on wiper motor mounting plate (10) with lockwasher (13) and nut (14).
2. Depress retaining clip on back of knob (15) and install knob (15) on wiper switch (11).
3. Connect switch connector (9) to wiper motor (5).
4. Connect lead (12) to wiper switch (11).
5. Install lockwasher (19), wiper switch ground lead (6), and ground lead 57G (18) on wiper motor mounting plate (10) with lockwasher (17) and screw (16).
6. Position wiper motor (5) in windshield frame (1) and connecting arms (3) on wiper motor shaft (4) with clip (2).
7. Install wiper motor (5) on windshield frame (1) with three washers (7) and capscrews (8).

10-63. WINDSHIELD WIPER SWITCH/MOTOR REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Check wiper motor for proper operation (TM 9-2320-387-10).

10-64. WINDSHIELD WASHER RESERVOIR AND PUMP ASSEMBLY MAINTENANCE

This task covers:

- | | |
|---|------------------------|
| <p>a. Removal</p> <p style="margin-left: 20px;">a.1. Inspection</p> | <p>b. Installation</p> |
|---|------------------------|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three lockwashers (Appendix G, Item 207)
 Seal (Appendix G, Item 428)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

NOTE

M1114 models are equipped with plusnuts, not with nuts, washers, and lockwashers as indicated in steps 1 and 2.

1. Remove two nuts (17), lockwashers (18), capscrews (1), and washers (2) from reservoir (3), pump (8), and cowl (19). Discard lockwashers (18).
2. Remove nut (14), lockwasher (15), washer (16), capscrew (4), and washer (5) from pump (8) and cowl (19). Discard lockwasher (15).
3. Disconnect hose (6) from pump (8).
4. Disconnect harness lead 57D (12) and lead 71C (13) from pump terminals (11) and remove grommet (7) and reservoir (3) from cowl (19).
5. Remove pushnut (10), seal (9), and pump (8) from reservoir (3).

a.1. Inspection

For plusnut inspection and replacement (M1114), refer to para 10-56.

b. Installation

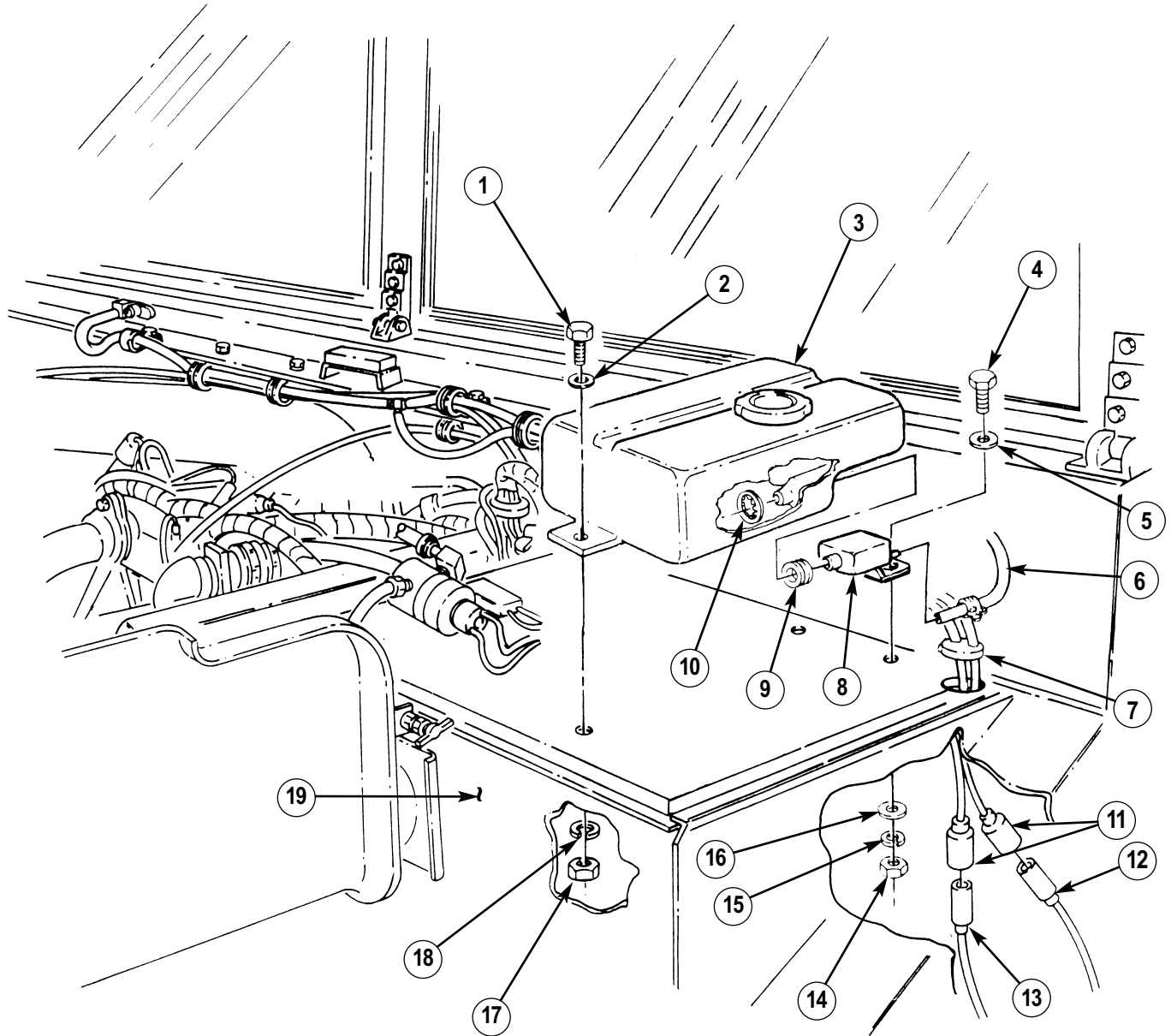
1. Install seal (9) and pump (8) on reservoir (3) with pushnut (10).
2. Position reservoir (3) on cowl (19), connect harness lead 57D (12) and lead 71C (13) to pump terminals (11), and install grommet (7) on cowl (19).
3. Connect hose (6) on pump (8).

NOTE

M1114 models are equipped with plusnuts, not with nuts, washers, and lockwashers as indicated in steps 4 and 5.

4. Install pump (8) on cowl (19) with washer (5), capscrew (4), washer (16), lockwasher (15), and nut (14). Tighten nut (14) to 6-10 lb-ft (8-14 N·m) on M1113 and capscrew (4) to 36 lb-in. (4 N·m) on M1114.
5. Install reservoir (3) and pump (8) on cowl (19) with two washers (2), capscrews (1), lockwashers (18), and nuts (17). Tighten nuts (17) to 8 lb-ft (11 N·m) on M1113 and capscrew (1) to 68-82 lb-in. (8 N·m) on M1114.

10-64. WINDSHIELD WASHER RESERVOIR AND PUMP ASSEMBLY MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Fill reservoir (TM 9-2320-387-10).
 - Lower and secure hood (TM 9-2320-387-10).
 - Connect battery ground cables (para. 4-68).

10-65. WINDSHIELD WASHER HOSES REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove nut (18), washer (4), capscrew (5), washer (4), clamp (3), and washer hose (1) from body (14).
2. Remove two nuts (12), washers (11), capscrews (16), washers (11), clamps (10), and washer hose (13) from body (14).
3. Disconnect washer hose (13) from pump (15) and tee (6), and remove through clamps (17).

NOTE

Perform steps 4 and 5 for M1114 models only. Perform steps 6 and 7 for M1113 models only.

4. Remove two screws (19), clamps (21), and nozzles (20) from body (14).
5. Remove washer hoses (1) and (8) from nozzles (20).
6. Remove clamp (7) and washer hose (8) from tee (6) and nozzle (9).
7. Remove clamp (7) and washer hose (1) from tee (6) and nozzle (2).
8. Remove washer hoses (8) and (1) through clamps (17).

b. Installation

NOTE

Perform steps 1 and 2 for M1113 models only. Perform steps 3 and 4 for M1114 models only.

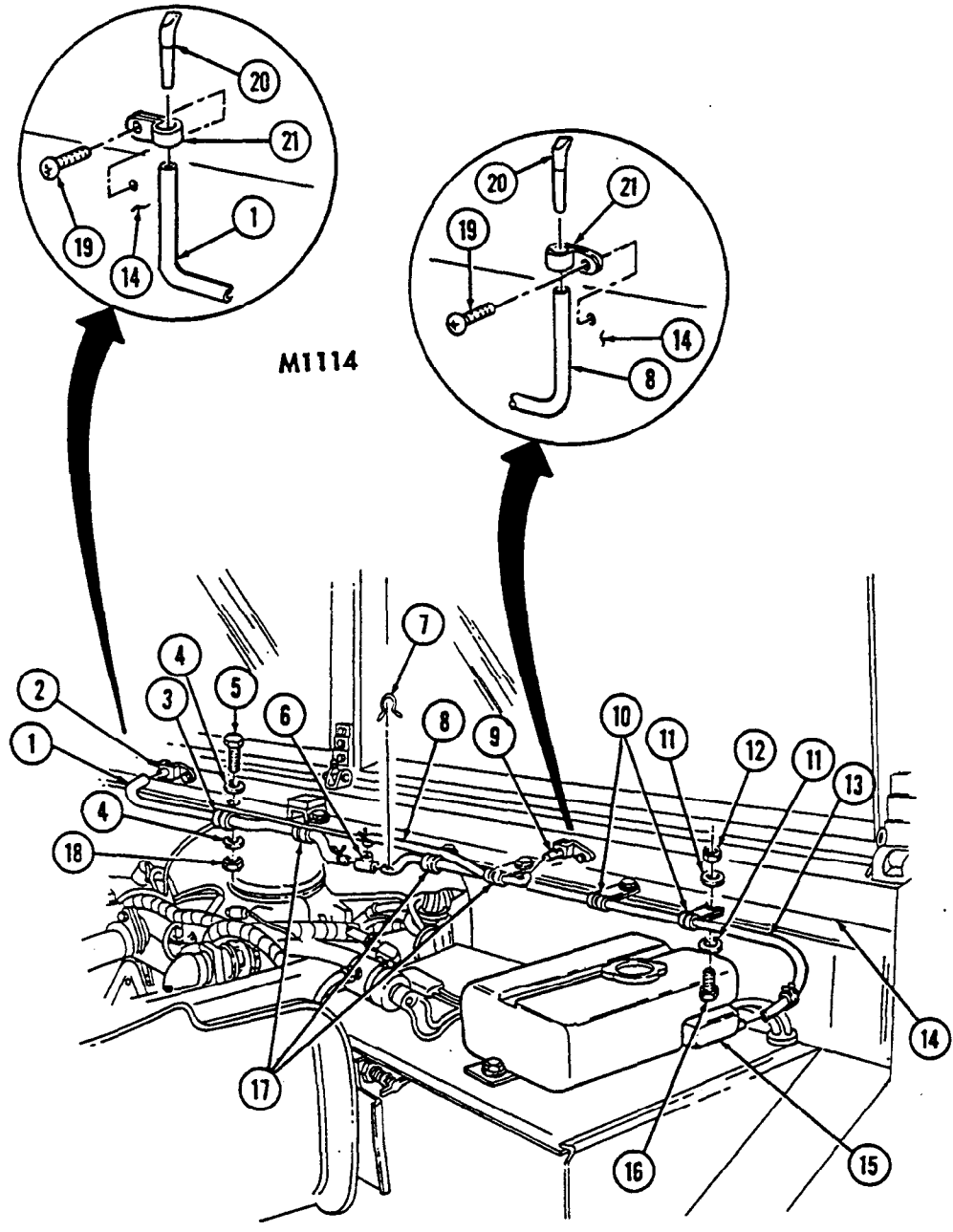
1. Install washer hose (1) through clamps (17) and connect to nozzle (2) and tee (6).
2. Install washer hose (8) through clamps (17) and connect to nozzle (9) and tee (6).
3. Install two nozzles (20) on washer hoses (1) and (8).
4. Apply sealing compound to screws (19) and install washer hoses (1) and (8) and two nozzles (20) on body (14) with two clamps (21) and screws (19). Tighten screws (19) to 35 lb-in (4 N·m).
5. Install washer hose (13) through clamps (17) and connect to tee (6) and pump (15).

NOTE

When installing clamps, ensure they are positioned below hood rest, so hood does not interfere with clamps or hose when lowered.

6. Install clamp (3) on washer hose (1) and body (14) with washer (4), capscrew (5), washer (4), and nut (18).
7. Install two clamps (10) on washer hose (13) and body (14) with two washers (11), capscrews (16), washers (11), and nuts (12).

10-65. WINDSHIELD WASHER HOSES REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-66. WINDSHIELD WASHER NOZZLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

NOTE

Perform steps 1 and 2 for M1113 models only.

1. Disconnect hose (2) from nozzle (3).
2. Remove screw (1) and nozzle (3) from body (4).

NOTE

Perform steps 3 and 4 for M1114 models only.

3. Remove screw (5), clamp (7), and nozzle (6) from armor (9).
4. Disconnect hose (8) from nozzle (6).

b. Installation

NOTE

Perform steps 1 and 2 for M1113 models only.

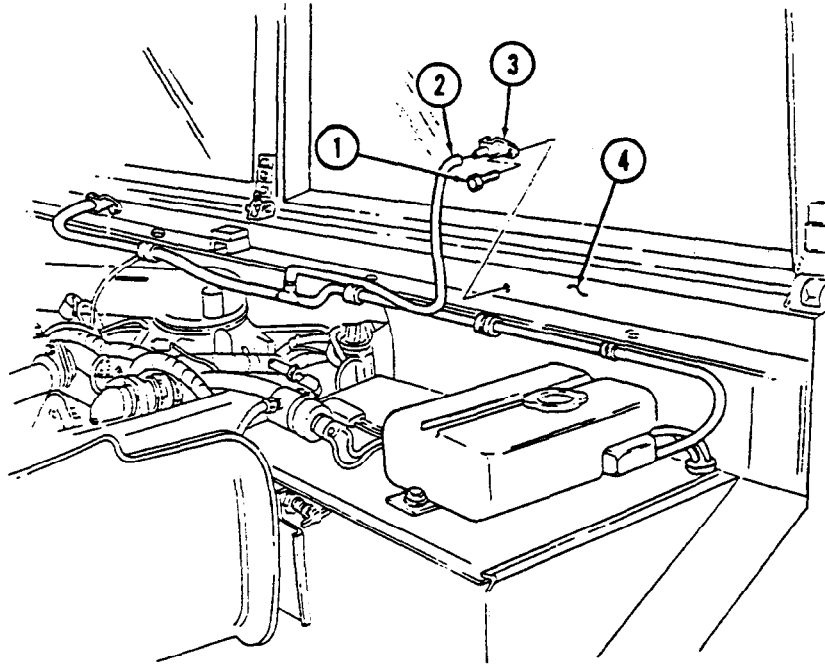
1. Install nozzle (3) on body (4) with screw (1).
2. Connect hose (2) to nozzle (3).

NOTE

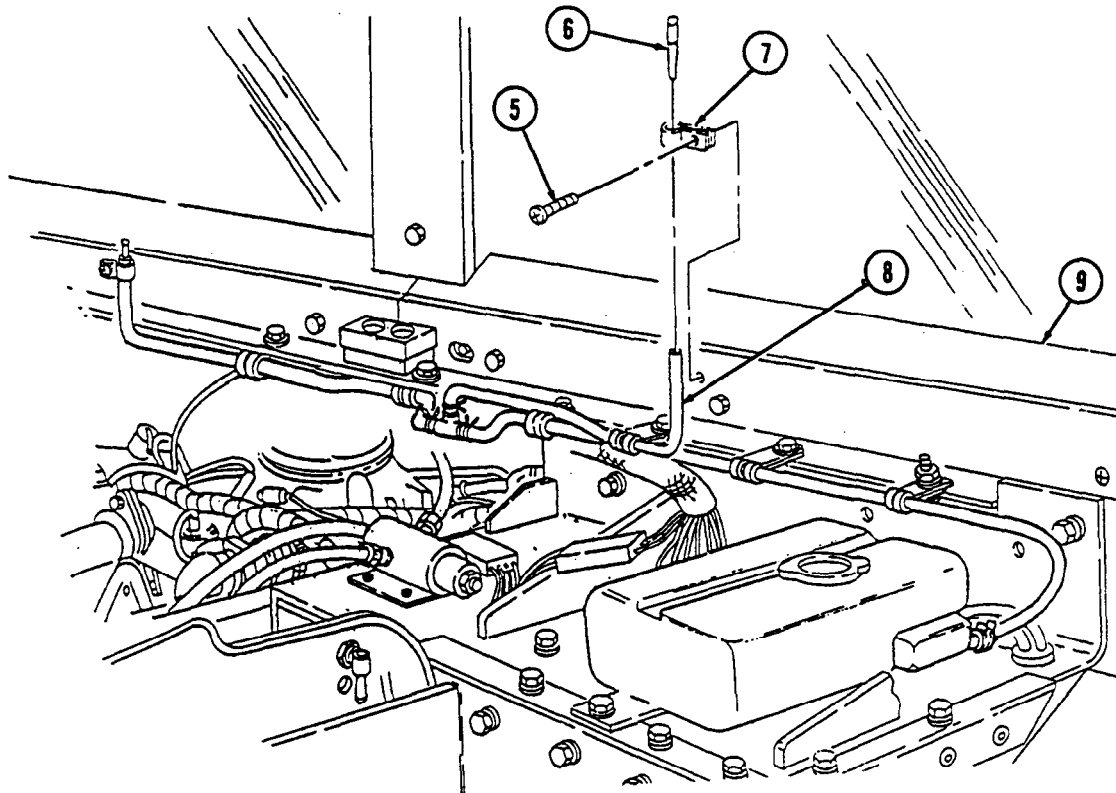
Perform steps 3 and 4 for M1114 models only.

3. Connect hose (8) to nozzle (6).
4. Install nozzle (6) on armor (9) with clamp (7) and screw (5).

10-66. WINDSHIELD WASHER NOZZLE REPLACEMENT (Cont'd)



M1113



M1114

FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-67. WINDSHIELD DE-ICER, DEFROSTER SWITCH, AND CIRCUIT BREAKER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- A/C front air distribution duct removed (para. 11-81).

Materials/Parts

Sealing compound (Appendix C, Item 70)
 Tiedown straps (Appendix G, Item 463)

Maintenance Level

Unit

a. Removal

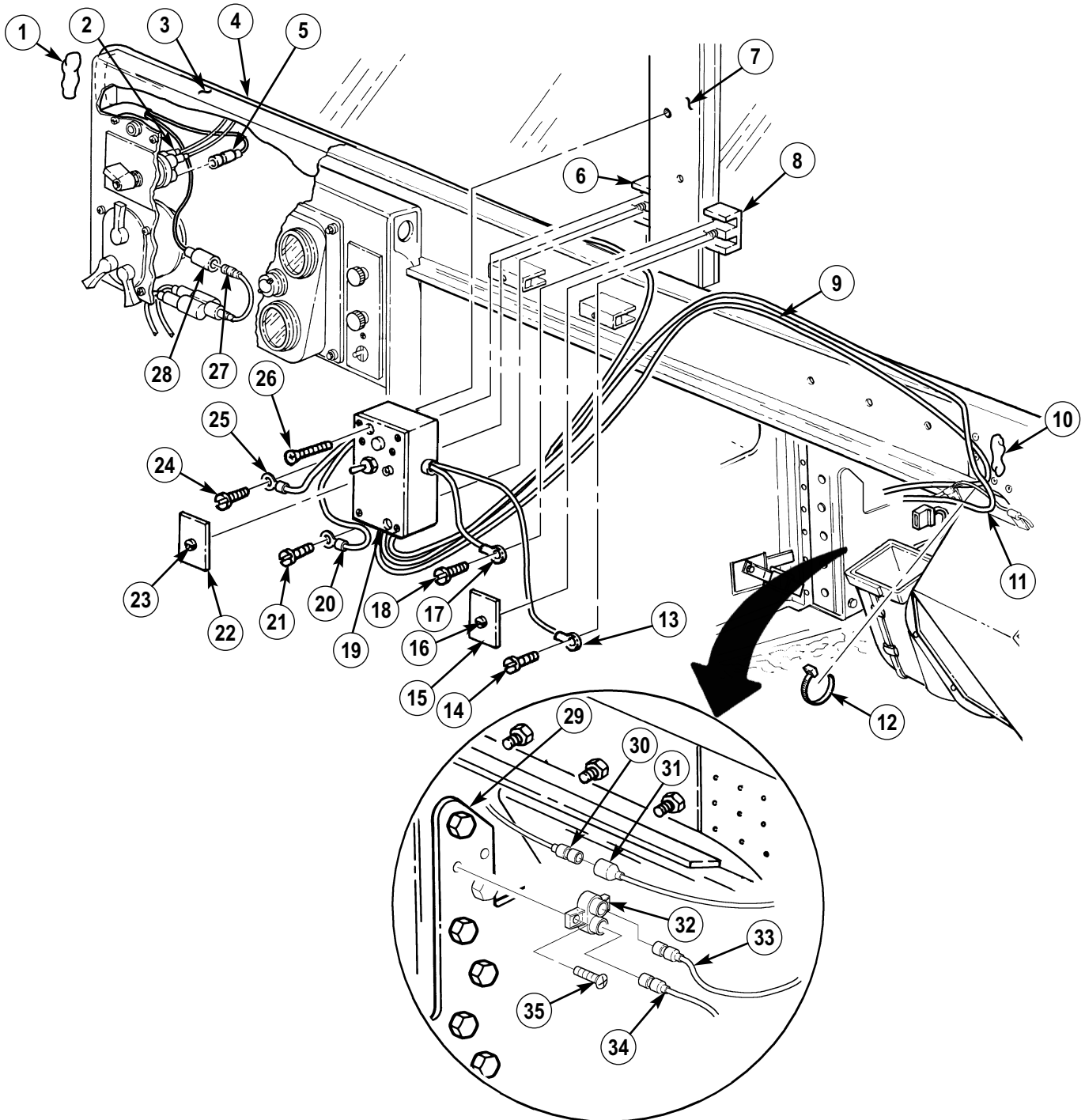
1. Disconnect lead (5) from rotary switch (2).
2. Disconnect lead (28) from body harness connector (27).
3. Disconnect right side de-icer connector (33) of cable (11) from defroster switch circuit breaker (32).
4. Disconnect de-icer power wiring connector (34) from defroster switch circuit breaker (32).
5. Remove two screws (35) and defroster switch circuit breaker (32) from footwell armor (29).
6. Disconnect de-icer ground wiring connector (31) from A/C wiring harness ground connector (30).
7. Remove tiedown straps (12), as required, from right side de-icer cable (11) and de-icer ground cable (9). Discard tiedown straps (12).
8. Loosen screws (16) and (23) and remove covers (15) and (22) from de-icers (6) and (8).
9. Remove screws (21) and (24) and leads (20) and (25) from de-icer (6).
10. Remove screws (14) and (18) and leads (13) and (17) from de-icer (8).
11. Remove sealing compound (1) and (10) from end of instrument panel (3).
12. Remove two screws (26), de-icer control unit (19), and ends of cables (4), (11), and de-icer ground cable (9) from center pillar (7).

b. Installation

1. Install de-icer control unit (19) on center pillar (7) with two screws (26). Tighten screws (26) to 12 lb-in. (1 N·m).
2. Install leads (13) and (17) on de-icer (8) with screws (14) and (18).
3. Install leads (20) and (25) on de-icer (6) with screws (21) and (24).
4. Install covers (15) and (22) on de-icers (6) and (8) and tighten screws (16) and (23).
5. Connect de-icer ground wiring connector (31) to A/C wiring harness ground connector (30).
6. Install defroster switch circuit breaker (32) on footwell armor (29) with two screws (35).
7. Secure right side cable (11) and de-icer cable (9) with tiedown straps (12), as required.
8. Connect right side de-icer connector (33) of cable (11) to defroster switch circuit breaker (32).
9. Connect de-icer power wiring connector (34) to defroster switch circuit breaker (32).

10-67. WINDSHIELD DE-ICER, DEFROSTER SWITCH, AND CIRCUIT BREAKER REPLACEMENT (Cont'd)

10. Connect lead (28) to body harness connector (27).
11. Connect lead (5) to rotary switch (2).
12. Apply sealing compound (1) and (10) to end of instrument panel (3) and to ends of cables (4), (9), and (11).



- FOLLOW-ON TASKS:**
- Install A/C front air distribution duct (para. 11-81).
 - Connect battery ground cables (para. 4-68).

10-68. REARVIEW MIRROR MAINTENANCE

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Removal b. Inspection c. Disassembly | <ul style="list-style-type: none"> d. Assembly e. Installation |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Maintenance Level

Unit

Materials/Parts

Four lockwashers (Appendix G, Item 206)
 Seven locknuts (Appendix G, Item 156)

NOTE

Replacement procedures for left and right rearview mirrors are basically the same. This procedure covers the left rearview mirror.

a. Removal

NOTE

Perform step 1 for M1113 models only. Perform step 2 for M1114 models only.

1. Remove two capscrews (3), lockwashers (4), washers (5), and mirror assembly (2) from windshield frame (7) and body (6). Discard lockwashers (4).
2. Remove two locknuts (9), capscrews (3), and mirror assembly (2) from windshield frame (7) and rearview mirror brackets (8). Discard locknuts (9).

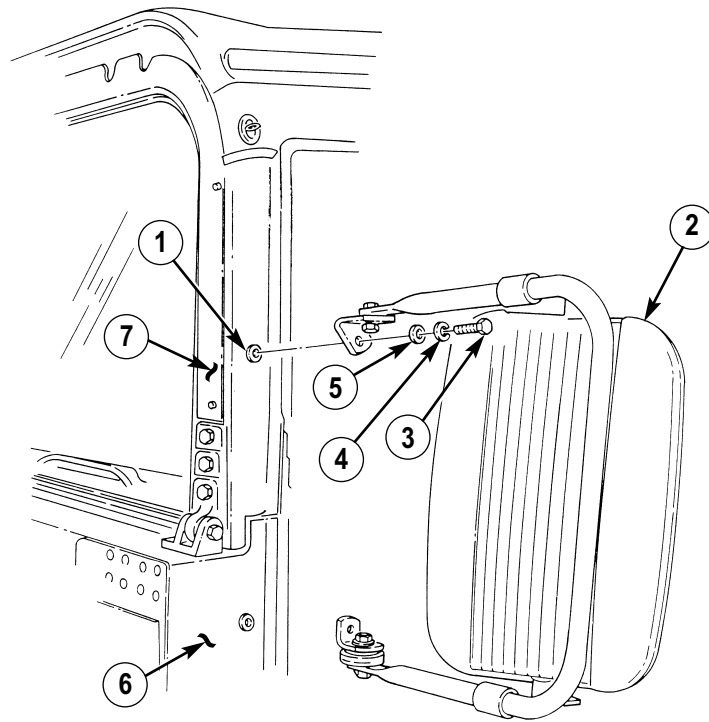
b. Inspection

NOTE

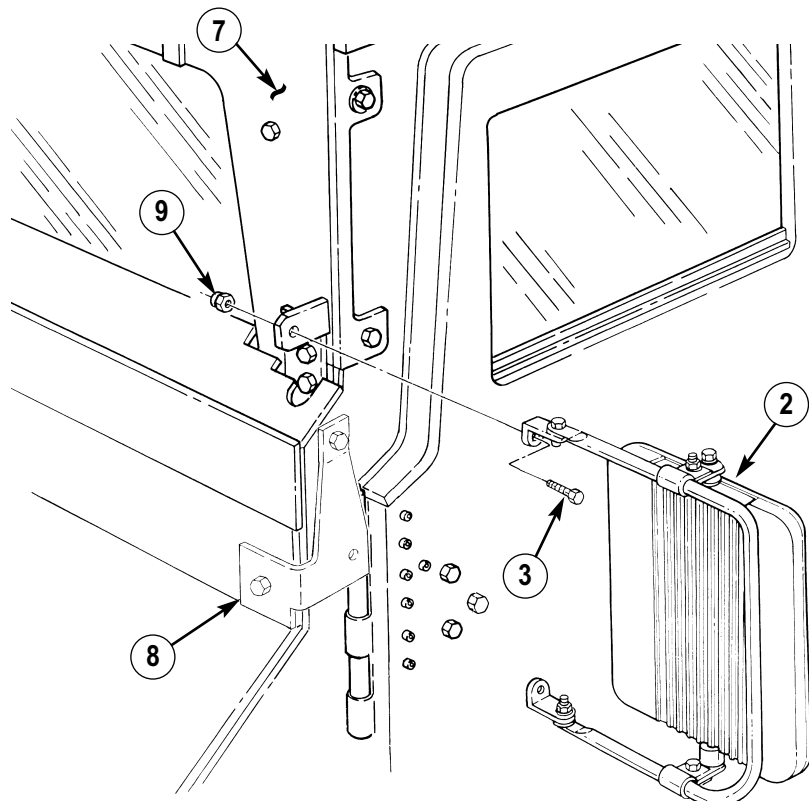
For inspection and removal of insertnut, refer to para. 10-56.

Inspect insertnut (1). Replace if damaged.

10-68. REARVIEW MIRROR MAINTENANCE (Cont'd)



M1113



M1114

10-68. REARVIEW MIRROR MAINTENANCE (Cont'd)

c. Disassembly

1. Remove two capscrews (10), lockwashers (9), washers (8), spacers (6), and mirror assembly (5) from mirror brackets (7). Discard lockwashers (9).
2. Remove locknut (21), washer (22), nylon washers (23) and (2), capscrew (4), and upper mounting bracket (1) from mirror arm assembly (3). Discard locknut (21).
3. Remove locknut (20), washer (19), and lower mounting bracket (18) from mirror lock (17). Discard locknut (20).
4. Remove locknut (15), washer (16), and mirror lock (17) from arm assembly (3). Discard locknut (15).

NOTE

To remove clamps, slide clamps off mirror arm assembly.

5. Remove two locknuts (11), washers (12), capscrews (14), clamps (13), and brackets (7) from mirror arm assembly (3). Discard locknuts (11).

d. Assembly

NOTE

- To install clamps, slide clamps on mirror arm assembly.
- Ensure clamps are positioned on mirror arm assembly to align with center of mirror head.

1. Install two clamps (13) and mirror brackets (7) on mirror arm assembly (3). Install mirror brackets (7) between clamps (13) with two capscrews (14), washers (12), and locknuts (11).
2. Install mirror lock (17) on mirror arm assembly (3) with washer (16) and locknut (15).
3. Install lower mounting bracket (18) on mirror lock (17) with washer (19) and locknut (20).
4. Install upper mounting bracket (1) on mirror arm assembly (3) with capscrew (4), nylon washers (2) and (23), washer (22), and locknut (21).

NOTE

Spacers must be positioned between mirror head and mirror brackets for proper installation.

5. Install mirror assembly (5) and two spacers (6) on mirror brackets (7) with washers (8), lockwashers (9), and capscrews (10).

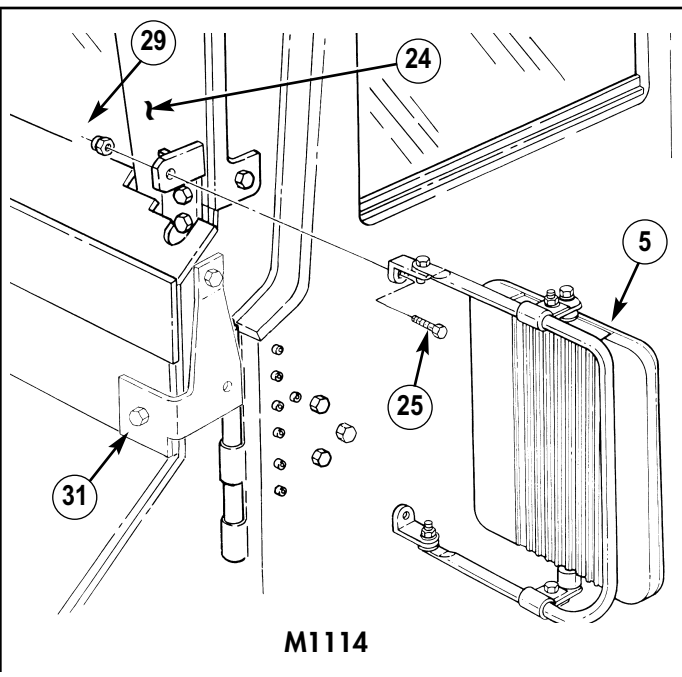
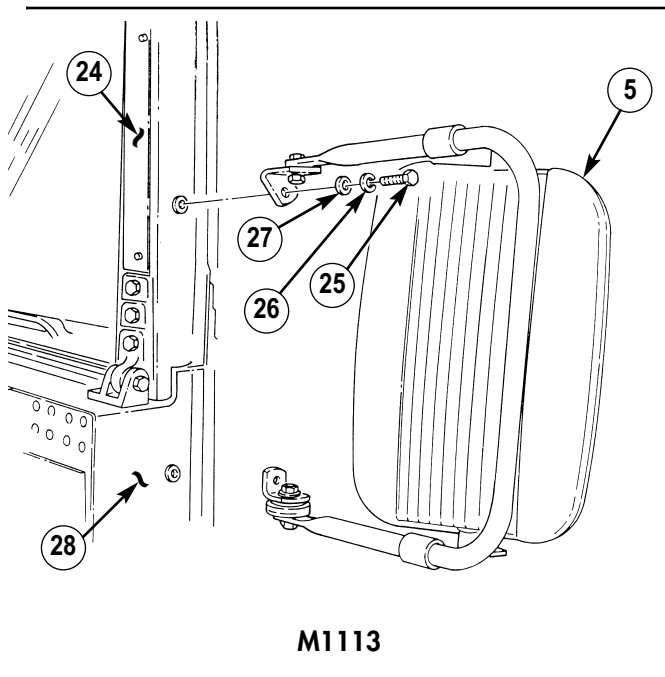
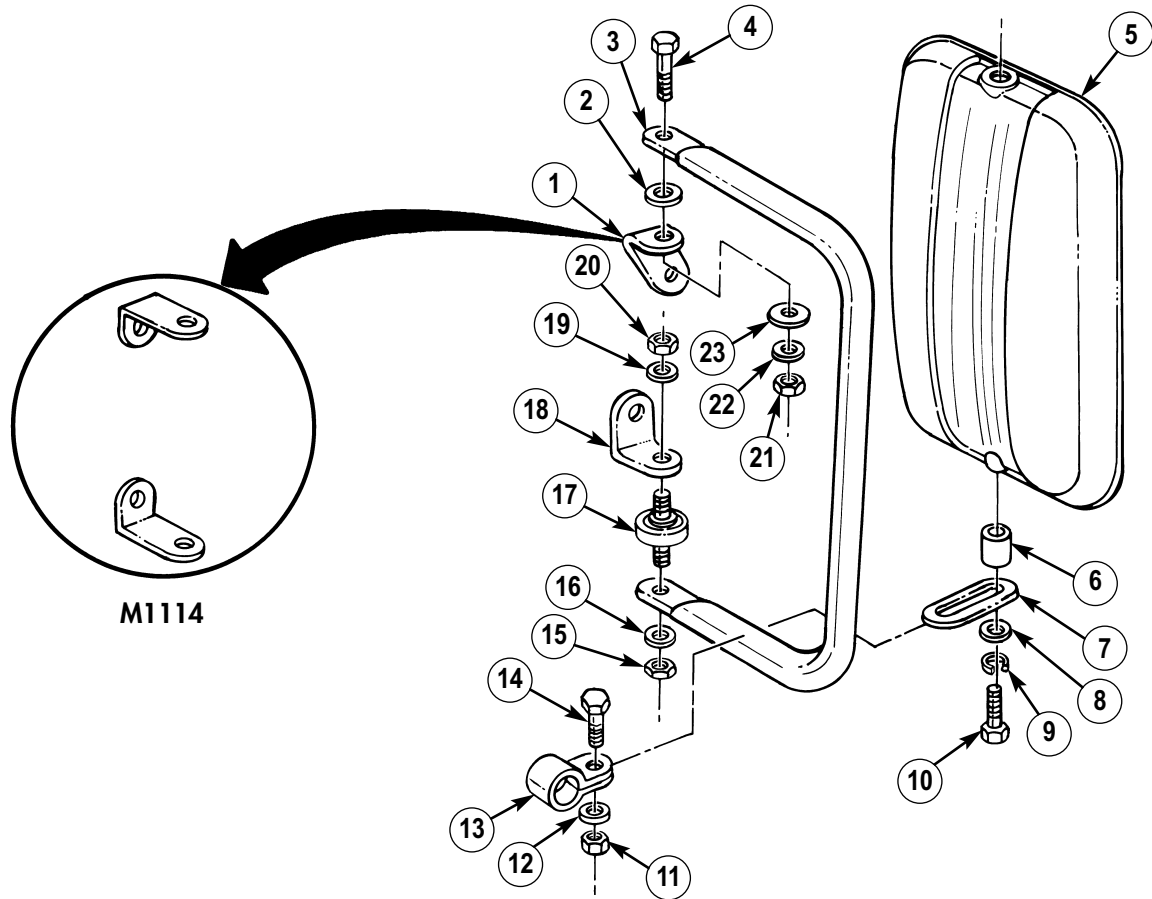
e. Installation

NOTE

Perform step 1 for M1113 models only. Perform step 2 for M1114 models only.

1. Install mirror assembly (5) on windshield frame (24) and body (28) with two washers (27), lockwashers (26), and capscrews (25).
2. Install mirror assembly (5) on windshield frame (24) and rearview mirror bracket (31) with two capscrews (25) and locknuts (29). Tighten capscrews (25) to 10 lb-ft (14 N•m).

10-68. REARVIEW MIRROR MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Adjust rearview mirror (TM 9-2320-387-10).

10-69. DRIVER'S REARVIEW MIRROR BRACKET MAINTENANCE

This task covers:

- a. Removal
 - a.1. Inspection

- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Rearview mirror removed (para. 10-68).

Maintenance Level

Unit

a. Removal

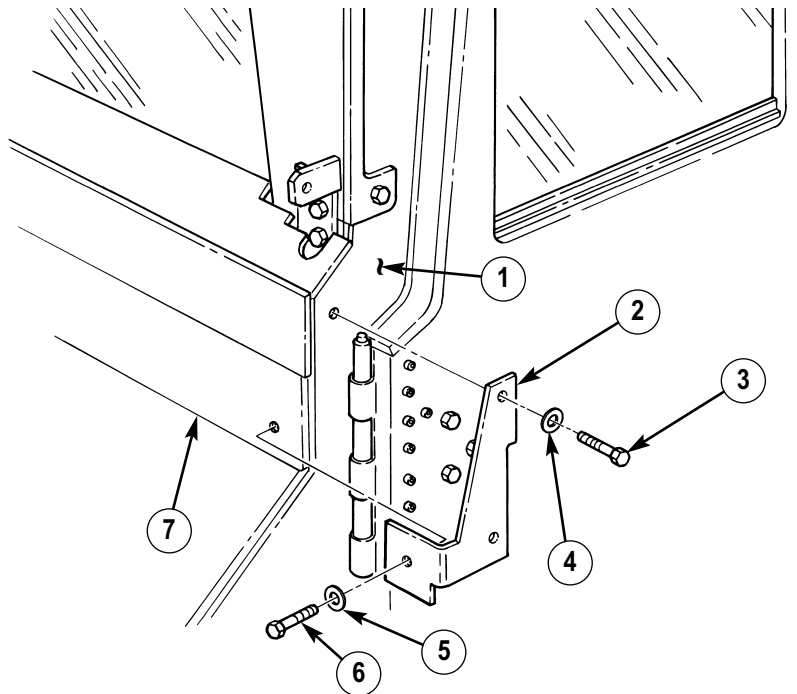
Remove capscrew (3), washer (4), capscrew (6), washer (5), and bracket (2) from A-pillar armor (1) and firewall armor (7).

a.1. Inspection

For plusnut inspection and replacement, refer to para. 10-56.

b. Installation

Apply sealing compound to threads of capscrews (3) and (6), and install bracket (2) on firewall armor (7) and A-pillar armor (1) with washer (4), capscrew (3), washer (5), and capscrew (6). Tighten capscrew (3) to 21 lb-ft (29 N·m) and capscrew (6) to 68-75 lb-in. (8-9 N·m).



FOLLOW-ON TASK: Install rearview mirror (para. 10-68).

10-70. SUN VISOR MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Four lockwashers (Appendix G, Item 206)

Maintenance Level

Unit

NOTE

The replacement procedures for left and right sun visors are basically the same. This procedure covers the left sun visor.

a. Removal

Remove four capscrews (4), lockwashers (3), and sun visor (1) from windshield frame (2). Discard lockwashers (3).

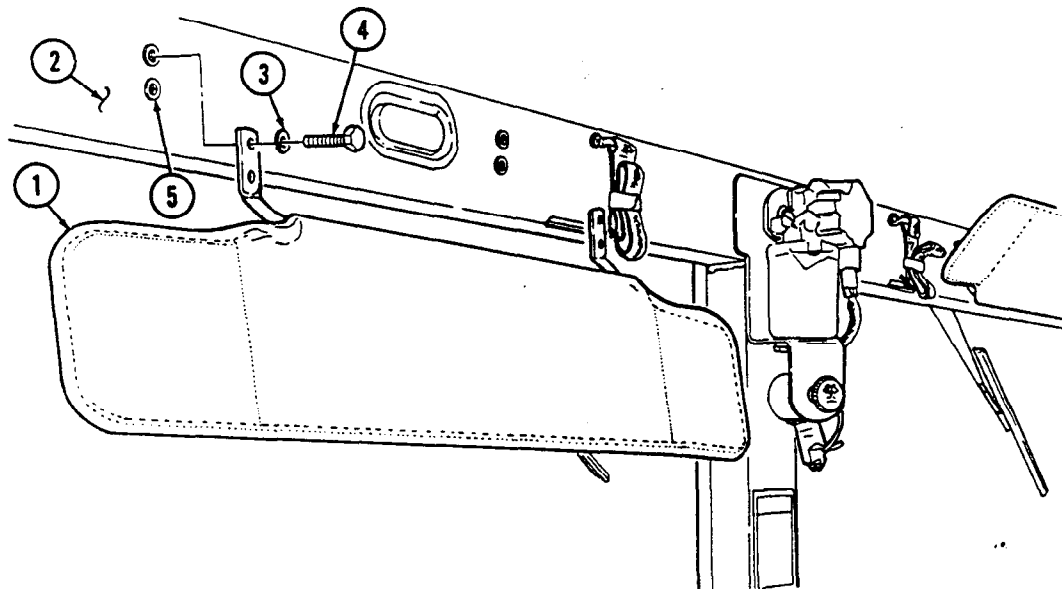
b. Inspection

NOTE

For inspection and removal of insertnut, refer to para. 10-56.
Inspect four insertnuts (5). Replace if damaged.

c. Installation

Install sun visor (1) on windshield frame (2) with four lockwashers (3) and capscrews (4).



10-71. HEATER OUTLET/INLET PIPING MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Cooling system drained as required (para. 3-61).

Maintenance Level

Unit

NOTE

Replacement procedures for inlet and outlet piping are basically the same. This procedure covers the outlet piping.

a. Removal

1. Loosen clamp (9) and disconnect heater outlet hose (10) from water pump nipple (8).
2. Remove nut (12), washer (7), capscrew (6), and washer (7) from inlet hose clamp (5) and outlet hose clamp (13).
3. Loosen clamp (2) and remove heater outlet hoses (3) and (10) and heater outlet tube (11) from heater outlet port (1) and vehicle.
4. Loosen two clamps (4) and remove heater outlet hoses (3) and (10) from heater outlet tube (11).
5. Remove clamps (2), (4), (13), and (9) from hoses (3) and (10).

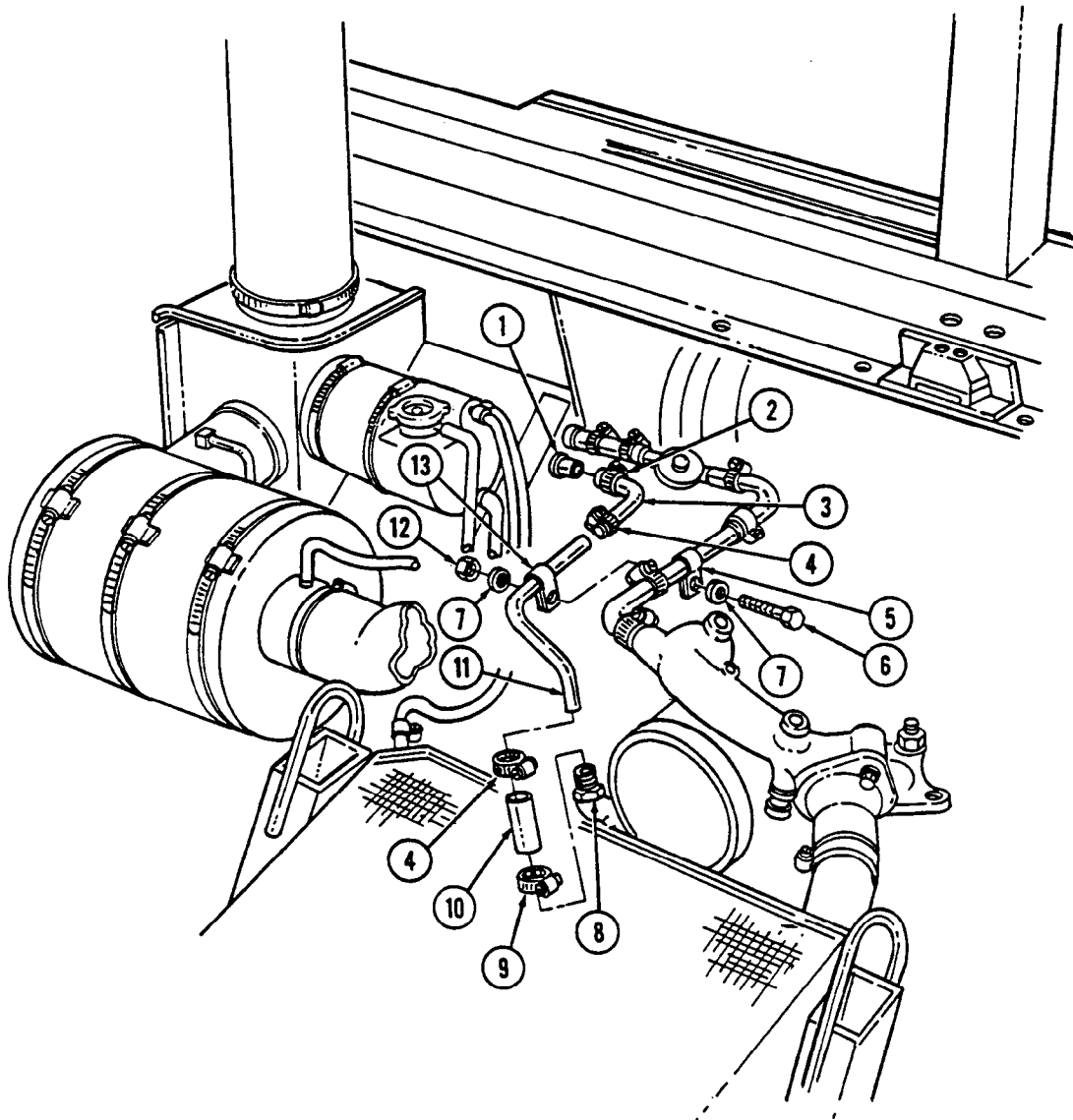
b. Inspection

Inspect heater outlet port (1) and water pump nipple (8). Replace if damaged.

c. Installation

1. Install clamps (2), (4), (13), and (9) on hoses (3) and (10).
2. Install two heater outlet hoses (3) and (10) on heater outlet tube (11) and tighten two clamps (4).
3. Install heater outlet hoses (3) and (10) and heater outlet tube (11) on heater outlet port (1) and water pump nipple (8) and tighten clamps (2) and (9).
4. Install outlet hose clamp (13) on inlet hose clamp (5) with washer (7), capscrew (6), washer (7), and nut (12).

10-71. HEATER OUTLET/INLET PIPING MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Fill cooling system (para. 3-61).
 - Start engine (TM 9-2320-387-10) and check outlet piping for leaks.

10-72. HEATER SHUTOFF VALVE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Cooling system drained as required (para. 3-61).

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Maintenance Level

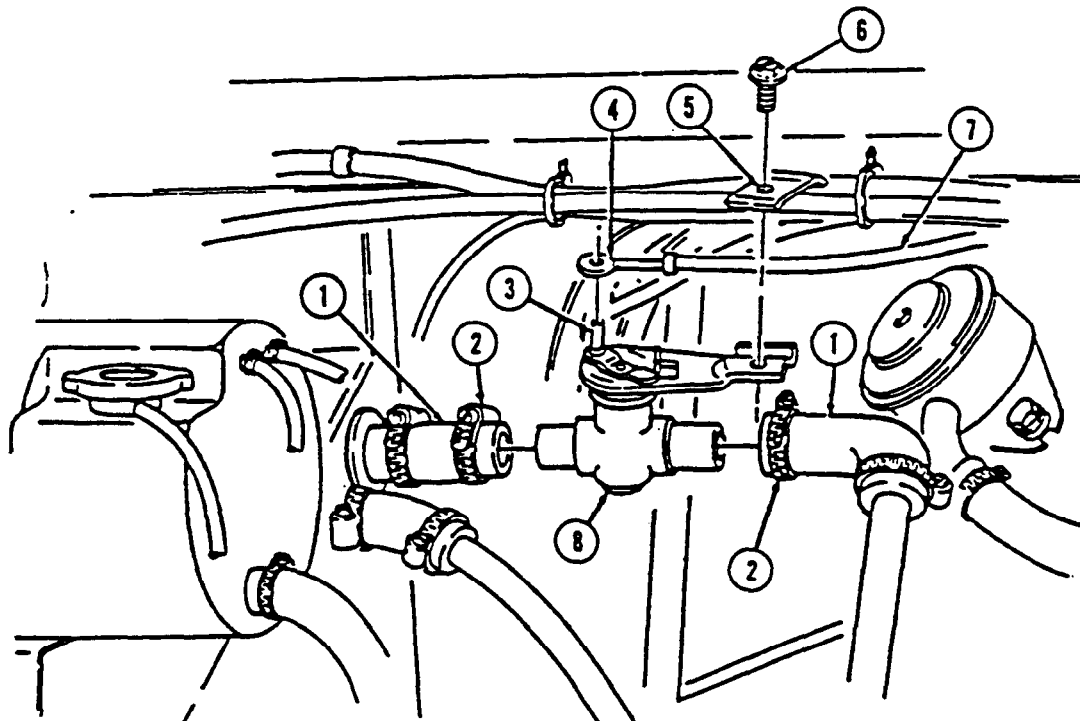
Unit

a. Removal

1. Remove screw (6) and clip (5) from shutoff valve (8).
2. Disconnect control wire (4) of heater control cable (7) from pin (3) on shutoff valve (8).
3. Loosen two clamps (2) and remove shutoff valve (8) from hoses (1).

b. Installation

1. Install shutoff valve (8) on two hoses (1) and tighten clamps (2).
2. Install control wire (4) of heater control cable (7) to pin (3) on shutoff valve (8) with clip (5) and screw (6).



- FOLLOW-ON TASKS:
- Fill cooling system (para. 3-61).
 - Start engine (TM 9-2320-387-10) and check shutoff valve for leaks.

10-73. HEATER FAN SWITCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

1. Remove four capscrews (8) from instrument cluster (1) and instrument panel (6), and pull instrument cluster (1) away from panel (6) for access to fan switch (2).
2. Remove two screws (7) from fan switch (2) and panel (6).
3. Pull fan switch (2) out from behind panel (6).

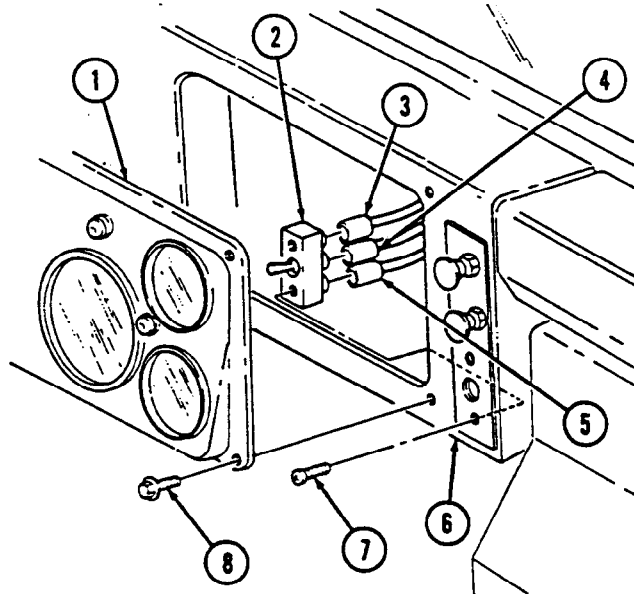
NOTE

Prior to removal, tag leads for installation.

4. Disconnect leads 399 (3), 27D (4), and 400 (5) from fan switch (2) and remove fan switch (2).

b. Installation

1. Connect leads 399 (3), 27D (4), and 400 (5) to fan switch (2).
2. Install fan switch (2) on panel (6) with two screws (7).
3. Install instrument cluster (1) on panel (6) with four capscrews (8).



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Check heater fan for proper operation (TM 9-2320-387-10).

10-74. AIR DUCT ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Equipment Condition

Heater boot removed (para. 10-85).

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Manual References

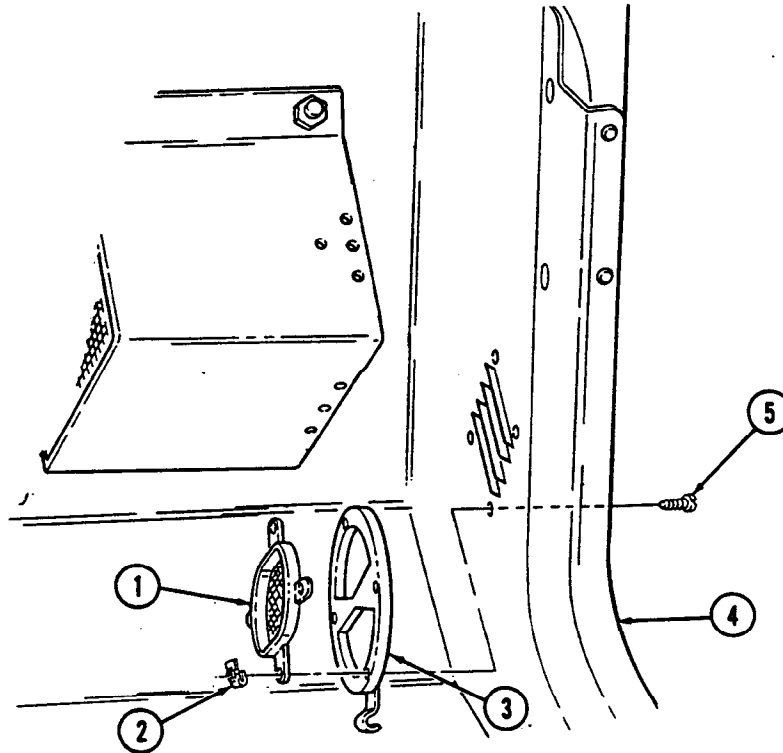
TM 9-2320-387-24P

a. Removal

Remove four speed nuts (2), screws (5), air duct retainer (1), and grille assembly (3) from body (4).

b. Installation

Install grille assembly (3) and air duct retainer (1) on body (4) with four screws (5) and speed nuts (2).



FOLLOW-ON TASK: Install heater boot (para. 10-85).

10-75. HEATER FAN MOTOR RESISTOR ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

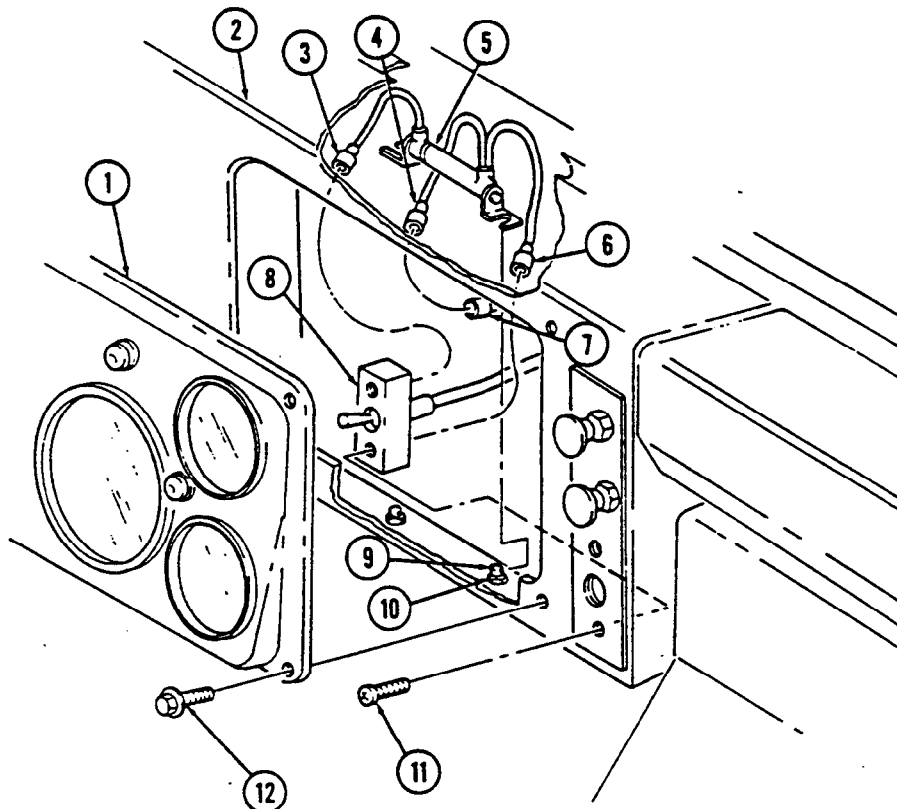
a. Removal

1. Remove four capscrews (12) from instrument cluster (1) and instrument panel (2), and pull instrument cluster (1) away from panel (2) for access to resistor assembly (5).
2. Remove two screws (11) and heater fan switch (8) from panel (2). Pull heater fan switch (8) out from behind panel (2).

NOTE

Prior to removal, tag leads for installation.

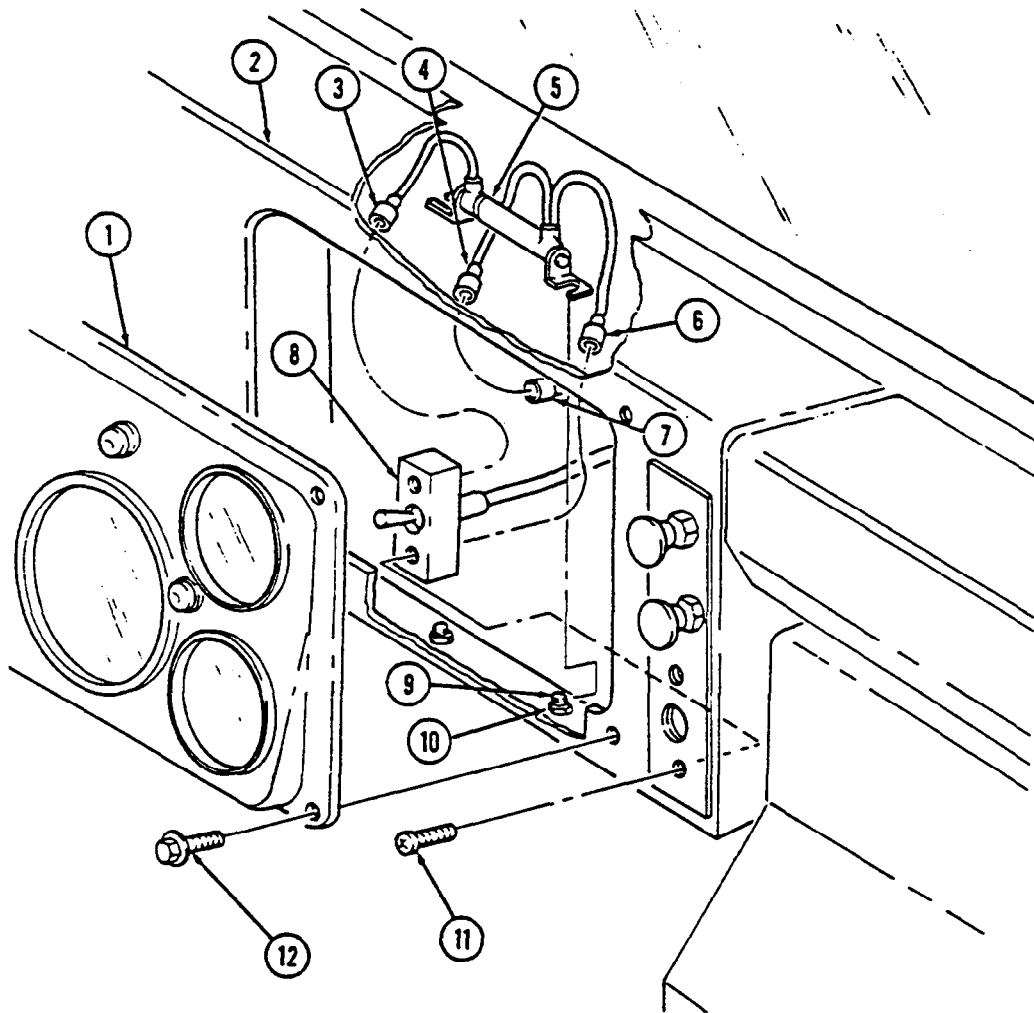
3. Disconnect leads 399 (3) and 400 (6) from heater fan switch (8). Disconnect lead 400 (4) from harness lead 400D (7).
4. Loosen two screws (9) and nuts (10) and remove resistor assembly (5) from panel (2).



10-75. HEATER FAN MOTOR RESISTOR ASSEMBLY REPLACEMENT (Cont'd)

b. Installation

1. Connect lead 400 (4) to harness lead 400D (7). Connect leads 400 (6) and 399 (3) to heater fan switch (8).
2. Install resistor assembly (5) on panel (2) and tighten two screws (9) and nuts (10).
3. Install heater fan switch (8) on panel (2) with two screws (11).
4. Install instrument cluster (1) on panel (2) with four capscrews (12).



- FOLLOW-ON TASKS:
- Connect battery ground cables (para. 4-68).
 - Check heater fan for proper operation (TM 9-2320-387-10).

10-76. HEATER ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 116)
 Nut and lockwasher assembly
 (Appendix G, Item 245)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

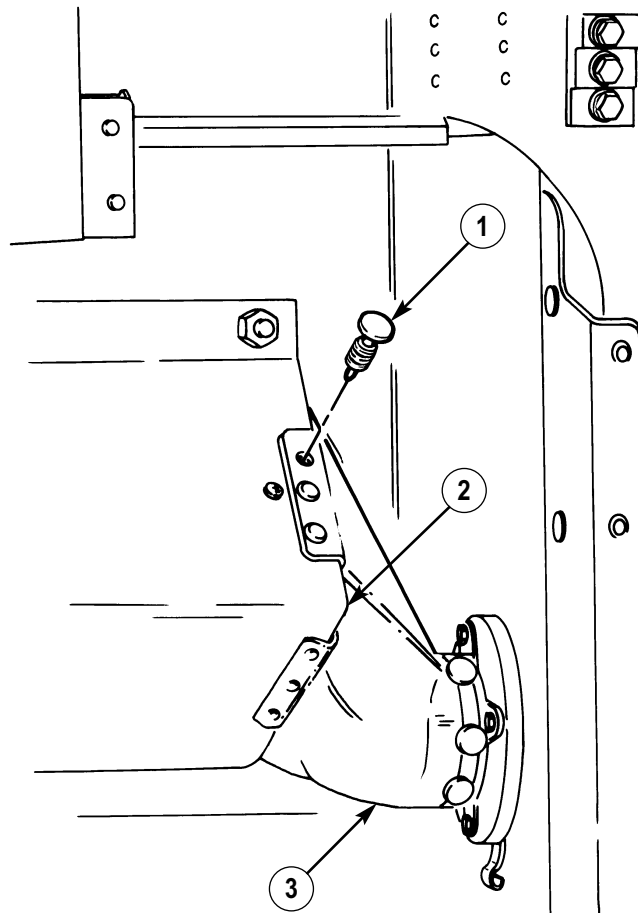
- Battery ground cables disconnected (para. 4-68).
- Cooling system drained as required (para. 3-61).
- Air intake assembly removed (para. 3-19).
- Diverter box removed (para. 10-81).

Maintenance Level

Unit

a. Removal

1. Remove ten clips (1) from heater boot (3) and heater assembly (2).



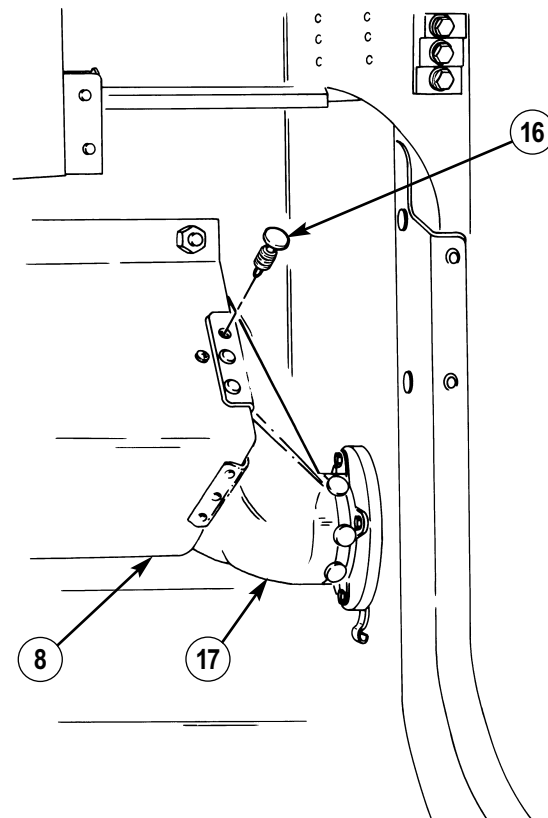
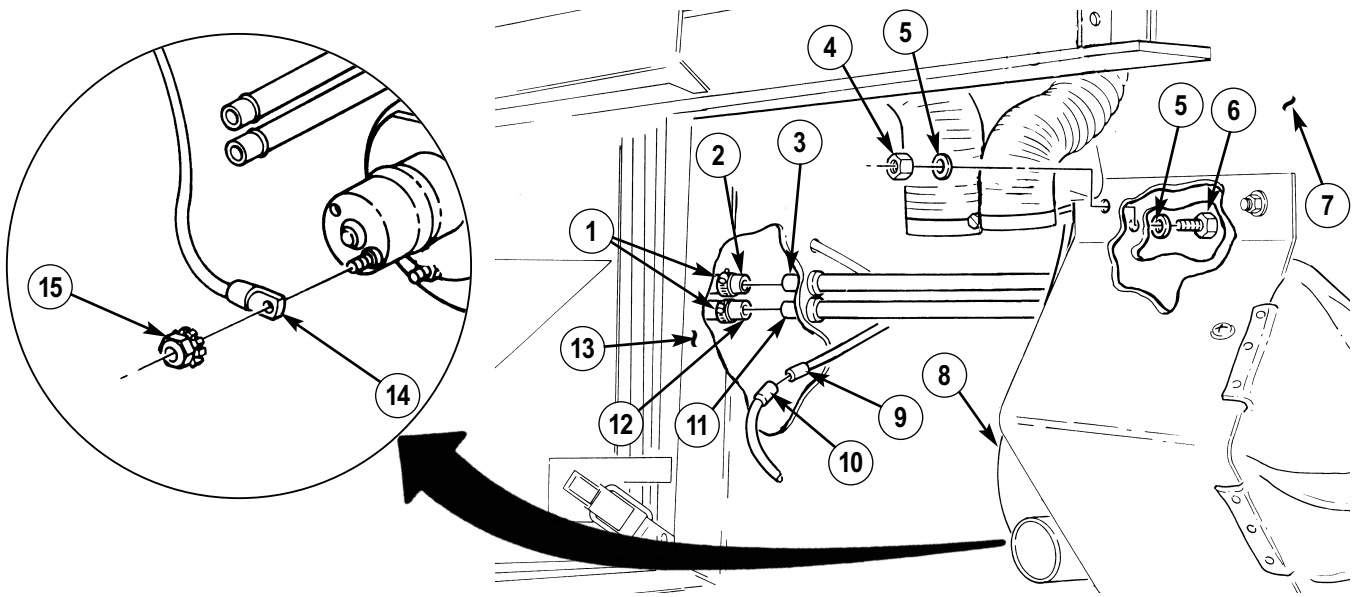
10-76. HEATER ASSEMBLY REPLACEMENT (Cont'd)

2. Loosen two clamps (1) and disconnect heater inlet hose (2) and heater outlet hose (12) from inlet port (3) and outlet port (11).
3. Remove four locknuts (4), washers (5), capscrews (6), and washers (5) from heater assembly (8) and body (7). Discard locknuts (4).
4. Disconnect harness lead 400D (9) from heater assembly lead (10).
5. Remove nut and lockwasher assembly (15) and lead 57E (14) from heater assembly (8). Discard nut and lockwasher assembly (15).
6. Slide heater assembly (8) right and away from firewall (13) to allow heater inlet port (3) and outlet port (11) to clear grommet openings in firewall (13) and remove heater assembly (8).

b. Installation

1. Install heater assembly (8) on firewall (13) and insert heater inlet port (3) and heater outlet port (11) through grommet openings in firewall (13).
2. Connect heater inlet hose (2) and heater outlet hose (12) to inlet port (3) and outlet port (11) and tighten two clamps (1).
3. Install lead 57E (14) on heater assembly (8) with nut and lockwasher assembly (15).
4. Connect harness lead 400D (9) to heater assembly lead (10).
5. Install heater assembly (8) on body (7) with four washers (5), capscrews (6), washers (5), and locknuts (4). Tighten locknuts (4) to 15 lb-ft (20 N·m).
6. Install heater boot (17) on heater assembly (8) with ten clips (16).

10-76. HEATER ASSEMBLY REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install diverter box (para. 10-81).
 - Install air intake assembly (para. 3-19).
 - Connect battery ground cables (para. 4-68).
 - Fill cooling system (para. 3-61).
 - Check heater assembly for proper operation (TM 9-2320-387-10).

10-77. DEFROST CONTROL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Pushnut (Appendix G, Item 313)
Lockwasher (Appendix G, Item 215)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

Unit

a. Removal

1. Remove four capscrews (2) from instrument cluster (5) and instrument panel (3).
2. Pull instrument cluster (5) away from panel (3).
3. Remove screw (15) from clip (10) and diverter box (12).
4. Remove pushnut (13) and disconnect defroster cable core (11) from baffle pin (14). Discard pushnut (13).
5. Pull control cable (6) through firewall (9) and three clamps (7) on A-beam (8) and firewall (9).
6. Remove nut (4) from threaded shaft (1) and instrument panel (3) and pull control cable (6) through panel (3).

b. Installation

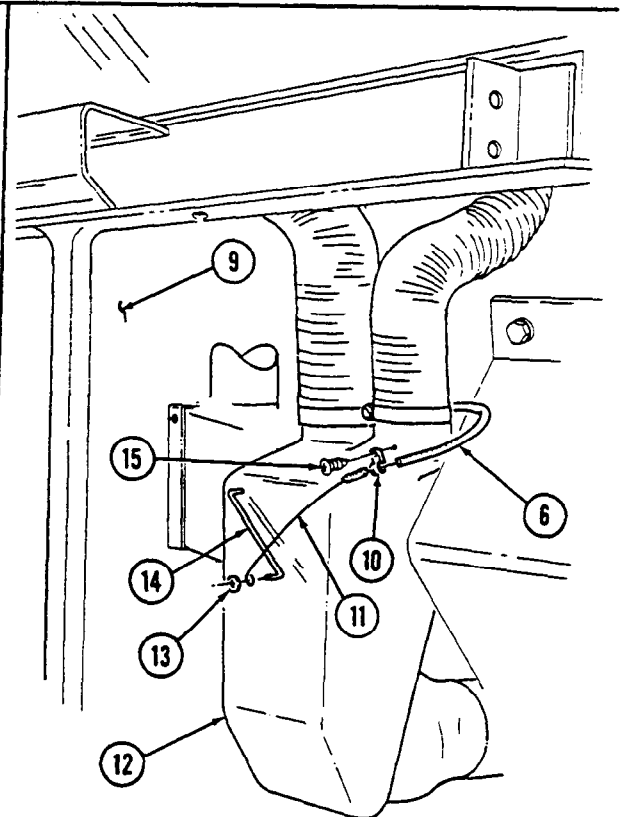
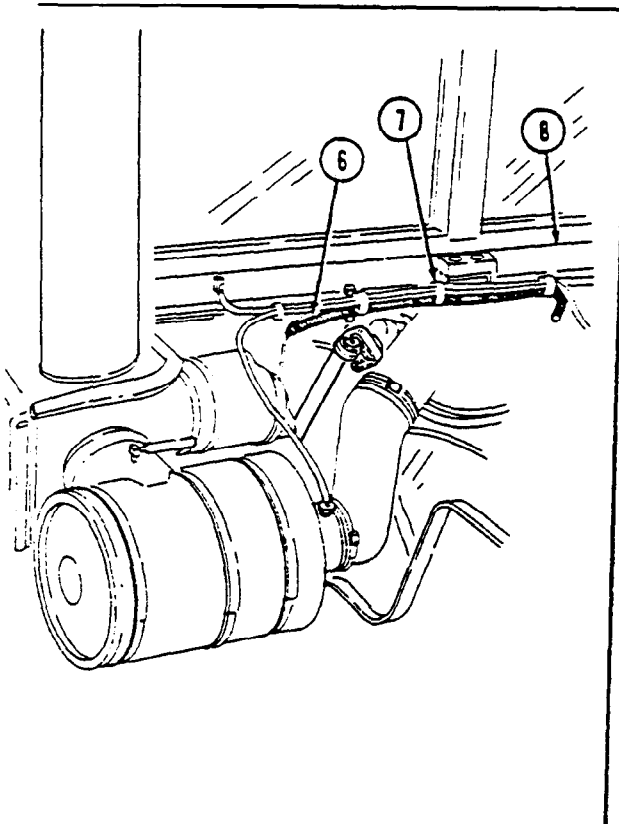
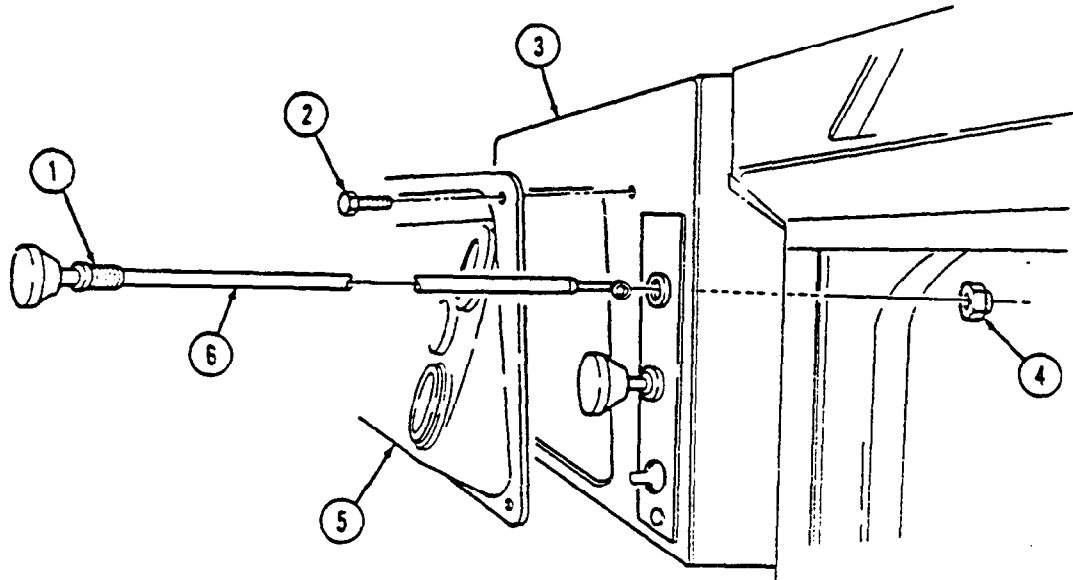
1. Feed control cable (6) through instrument panel (3) and install threaded shaft (1) on panel (3) with nut (4).
2. Route control cable (6) through three clamps (7) on A-beam (8) and firewall (9).
3. Connect defroster cable core (11) on baffle pin (14) and install pushnut (13).

NOTE

Control wire and knob must be pushed in, and baffle pin must be in the upward position before securing control cable to diverter box.

4. Install clip (10) on diverter box (12) with screw (15).
5. Install instrument cluster (5) on panel (3) with four capscrews (2).

10-77. DEFROST CONTROL REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Lower and secure hood (TM 9-2320-387-10).
 - Install engine access cover (para. 10-22).
 - Check defroster control for proper operation (TM 9-2320-387-10).

10-78. HEATER CONTROL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

1. Remove screw (12) and clamp (11) from cable (7) and heater shutoff valve (15).
2. Remove control wire (10) from pin (9) on heater shutoff valve (15).
3. Carefully feed cable (7) through three clips (13) along A-beam (14).
4. Remove four capscrews (2) from instrument cluster (6) and instrument panel (3).
5. Pull instrument cluster (6) away from instrument panel (3).
6. Loosen nut (4) and slide along cable (7).
7. Pull cable (7) through nut (4) and instrument panel (3).

b. Installation

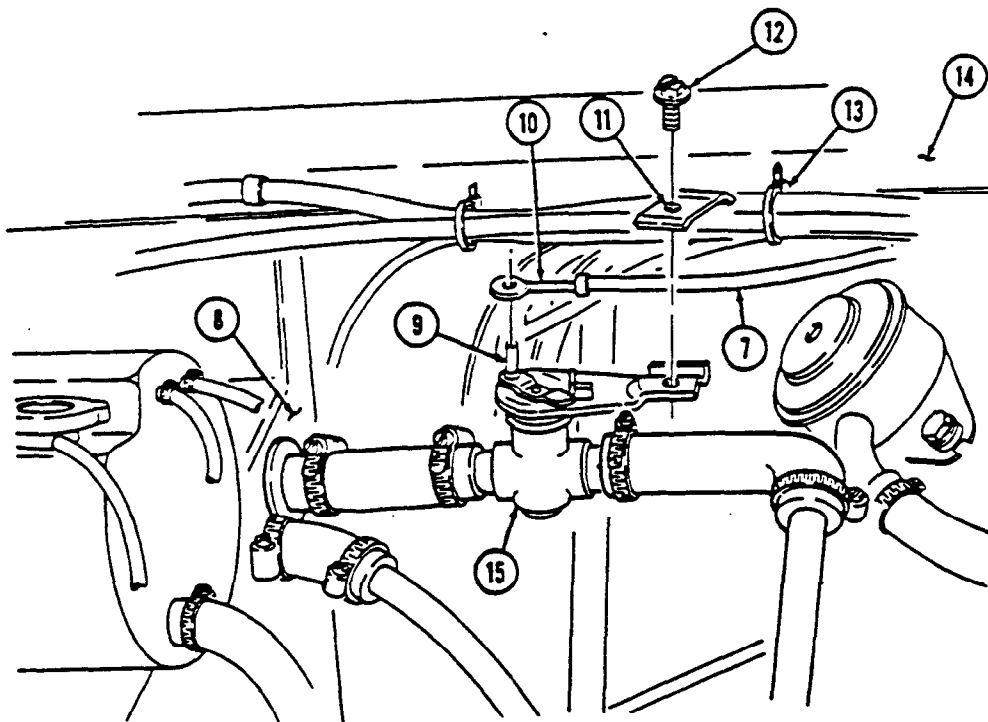
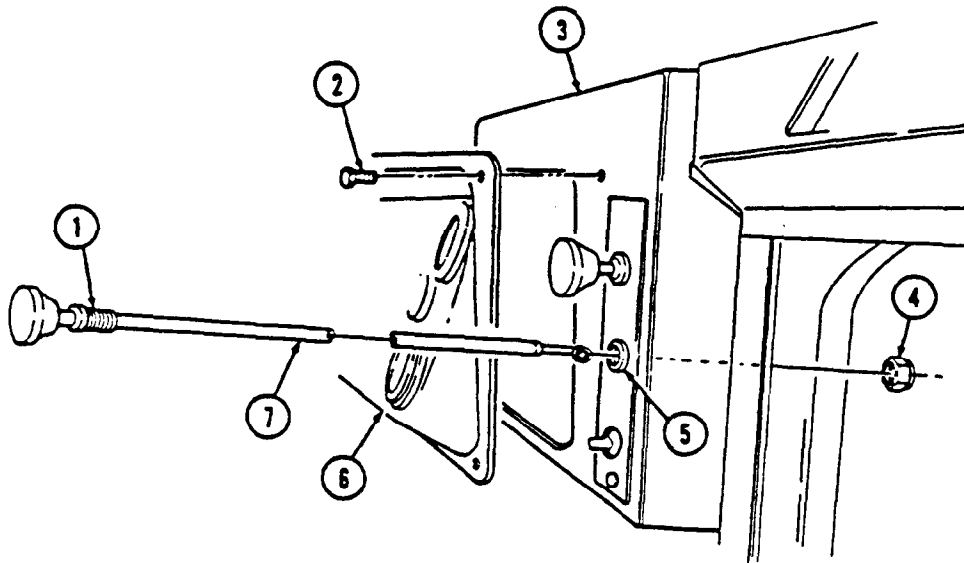
1. Feed cable (7) through instrument panel (3) and seat threaded shaft (1) in grommet (5).
2. Place nut (4) over cable (7) and secure threaded shaft (1) on instrument panel (3) by tightening nut (4).
3. Install instrument cluster (6) on instrument panel (3) with four capscrews (2).
4. Carefully feed cable (7) through three clips (13) along A-beam (14).
5. Slip coiled end of control wire (10) over pin (9).

NOTE

Control wire and knob must be pushed in, and pin and lever rotated toward heater before anchoring cable to shutoff valve.

6. With control wire (10) and knob all the way in, and pin (9) moved as close to heater (8) as possible, install cable (7) on shutoff valve (15) with clamp (11) and screw (12).

10-78. HEATER CONTROL REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Lower and secure hood (TM 9-2320-387-10).
 - Install engine access cover (para. 10-22).
 - Check heater control for proper operation (TM 9-2320-387-10).

10-79. HEATER CONTROL CABLE AND SHUTOFF VALVE ADJUSTMENT

This task covers:

Adjustment

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Lubricating oil (Appendix C, Item 45)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

General Safety Instructions

Ensure engine is cool prior to performing this procedure.

Maintenance Level

Unit

NOTE

Perform the following procedure if the heater temperature control assembly is difficult to operate. The repositioning of the heater temperature control cable and heater shutoff valve will reduce cable bends and allow access for lubrication.

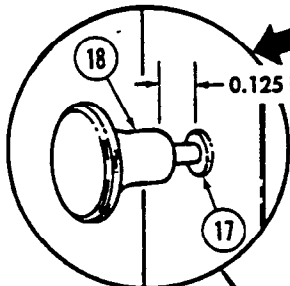
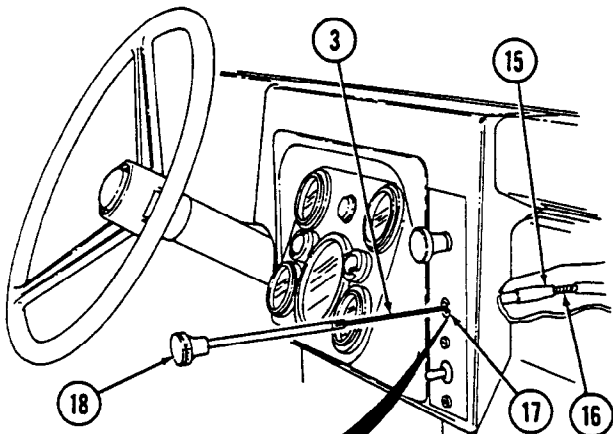
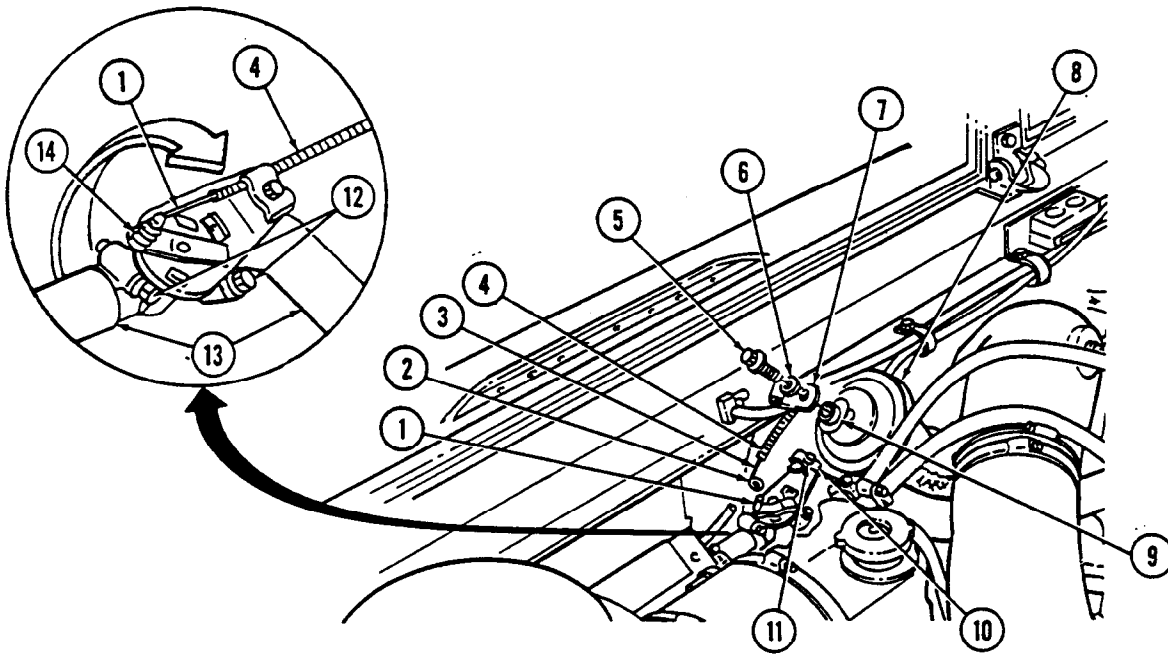
Adjustment

WARNING

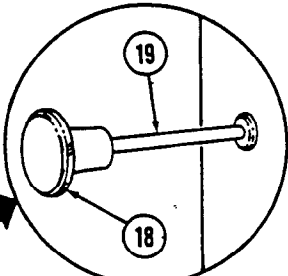
Ensure engine is cool prior to performing this procedure. Steam or hot coolant under pressure can cause injury to personnel.

1. Push heater control knob (18) to OFF position.
2. Loosen two clamps (12) on hoses (13).
3. Rotate heater shutoff valve (1) and position heater shutoff valve lever (14) in the upward position.
4. Tighten two clamps (12) on hoses (13).
5. Loosen screw (11) and clip (10) and remove cable assembly (4) from heater shutoff valve (1).
6. Remove screw (5), washer (6), clamp (7), and crankcase depression regulator valve (8) from mounting bracket (9).
7. Install crankcase depression regulator valve (8) on mounting bracket (9) with washer (6) and screw (5).
8. Cut loop end (2) from spring wire (3). Cut as close to loop end (2) as possible.
9. Remove spring wire (3) from steel casing (16) and tube (15) by pulling heater control knob (18). Remove any kinks in spring wire (3).
10. Remove a 5-in. (127.0-mm) section from steel casing (16).
11. Route steel casing (16) through clamp (20).
12. Install spring wire (3) into steel casing (16) and tube (15).
13. Position end of steel casing (16) 0.75 in. (19 mm) from clip (10) and install steel casing (16) on heater shutoff valve (1) with clip (10) and screw (11).
14. Position heater control knob (18) 0.125 in. (3.18 mm) from instrument panel (17).
15. Turn spring wire (3) three turns around heater shutoff valve pin (21). Cut off any excess spring wire (3).
16. Pull out heater control knob (18) to ON position.
17. Apply lubricating oil to heater shutoff valve lever (14) and shutoff valve pin (21).
18. Apply lubricating oil to plunger (19).
19. Move heater control knob (18) to OFF and ON several times to distribute oil.
20. Check engine coolant level (TM 9-2320-387-10).
21. Start engine (TM 9-2320-387-10) and check heater shutoff valve (1) connections for leaks.

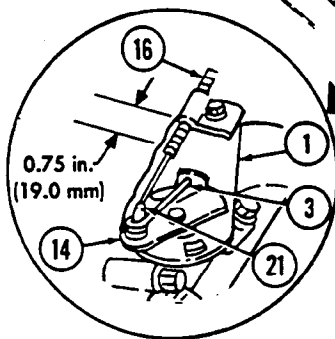
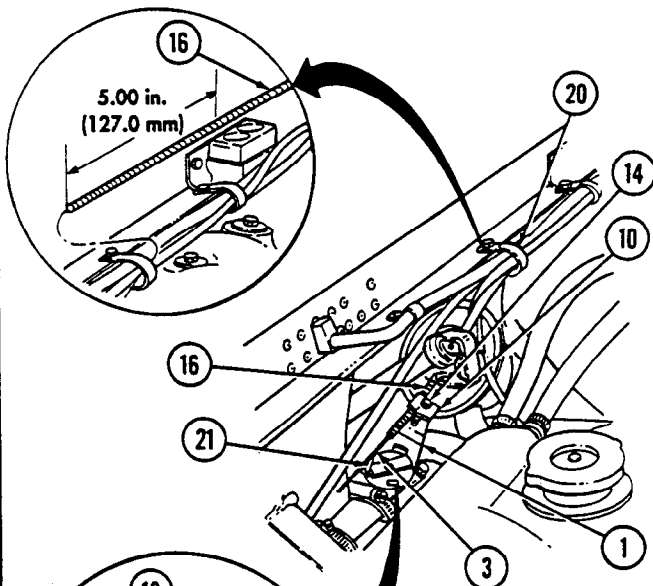
10-79. HEATER CONTROL CABLE AND SHUTOFF VALVE ADJUSTMENT (Cont'd)



OFF POSITION



ON POSITION



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

10-80. HEATER DUCTING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Engine access cover removed (para. 10-22).

Materials/Parts

Two locknuts (Appendix G, Item 156)

Maintenance Level

Unit

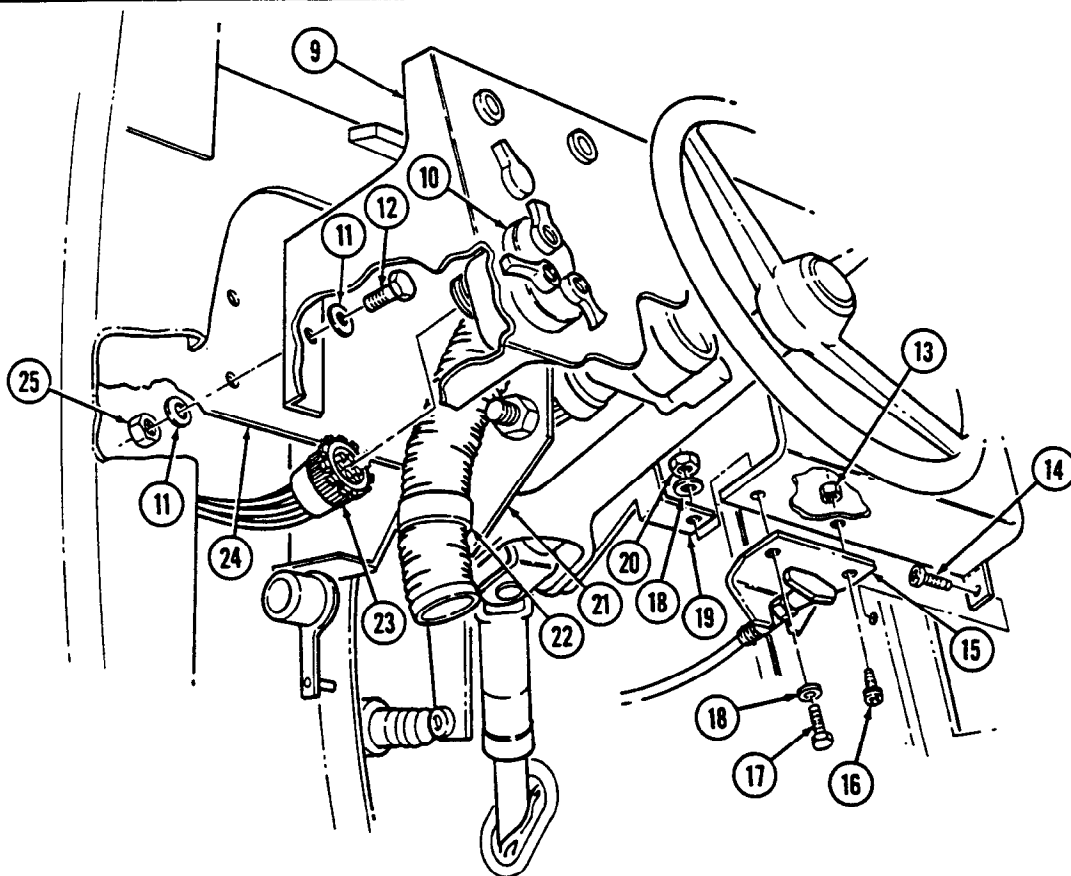
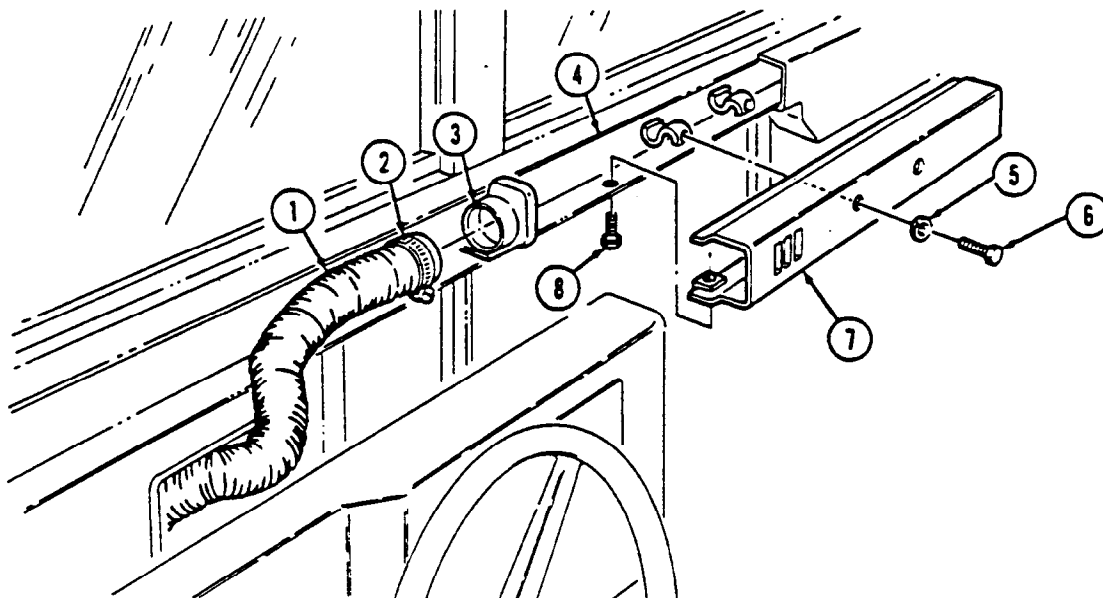
a. Removal

1. Remove nine screws (8), two capscrews (6), washers (5), and plenum (7) from A-beam (4).
2. Disconnect connector (23) from light switch (10).
3. Remove two locknuts (25), washers (11), capscrews (12), and washers (11) from instrument panel (9) and firewall (24). Discard locknuts (25).
4. Remove nut (20), washer (18), capscrew (17), and washer (18) from panel (9), hand throttle bracket (15), and steering column bracket (19).
5. Remove nut (13), screw (16), and hand throttle bracket (15) from instrument panel (9).
6. Remove screw (14) from panel (9) and firewall (24) and pull panel (9) away from A-beam (4) for access to heat flex duct (1).
7. Loosen clamp (2) and remove heat flex duct (1) from A-beam (4) and plenum bracket (3).
8. Loosen clamp (22) and remove heat flex duct (1) from steering column mount (21).

b. Installation

1. Install heat flex duct (1) on steering column mount (21) and tighten clamp (22).
2. Install heat flex duct (1) on A-beam (4) and plenum bracket (3) and tighten clamp (2).
3. Place panel (9) on A-beam (4). Install panel (9) to firewall (24) with screw (14).
4. Install panel (9) and hand throttle bracket (15) on steering column bracket (19) with washer (18), capscrew (17), washer (18), and nut (20).
5. Install hand throttle bracket (15) on instrument panel (9) with screw (16) and nut (13).
6. Install panel (9) on firewall (24) with two washers (11), capscrews (12), washers (11), and locknuts (25).
7. Connect connector (23) to light switch (10).
8. Install plenum (7) on A-beam (4) with nine screws (8), two washers (5), and capscrews (6).

10-80. HEATER DUCTING REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install engine access cover (para. 10-22).

10-81. DIVERTER BOX MAINTENANCE

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Removal b. Disassembly | <ul style="list-style-type: none"> c. Assembly d. Installation |
|--|--|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Pushnut (Appendix G, Item 313)
Two rivets (Appendix G, Item 342)
Four rivets (Appendix G, Item 335)

Equipment Conditions

Diverter ducting removed (para. 10-86).

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

1. Remove two screws (14) from transition diverter (12) and transition (13).
2. Remove two screws (8) from diverter (9) and heater (7).
3. Remove screw (5) and clamp (4) from diverter (9).
4. Remove pushnut (11) and disconnect defroster cable core (6) from baffle pin (10). Discard pushnut (11).
5. Pull diverter (9) away from A-beam (1), loosen two clamps (3), and remove diverter (9) from flex ducts (2).

b. Disassembly

1. Remove four rivets (21) and transition diverter (12) from diverter (9).
2. Remove screw (15), spring (16), and louver (17) from transition diverter (12).
3. Remove two rivets (19), flap (20), and bracket (18) from diverter (9).

c. Assembly

1. Install flap (20) and bracket (18) on diverter (9) with two rivets (19).
2. Install louver (17) on transition diverter (12) with spring (16) and screw (15).
3. Install diverter (9) on transition diverter (12) with four rivets (21).

d. Installation

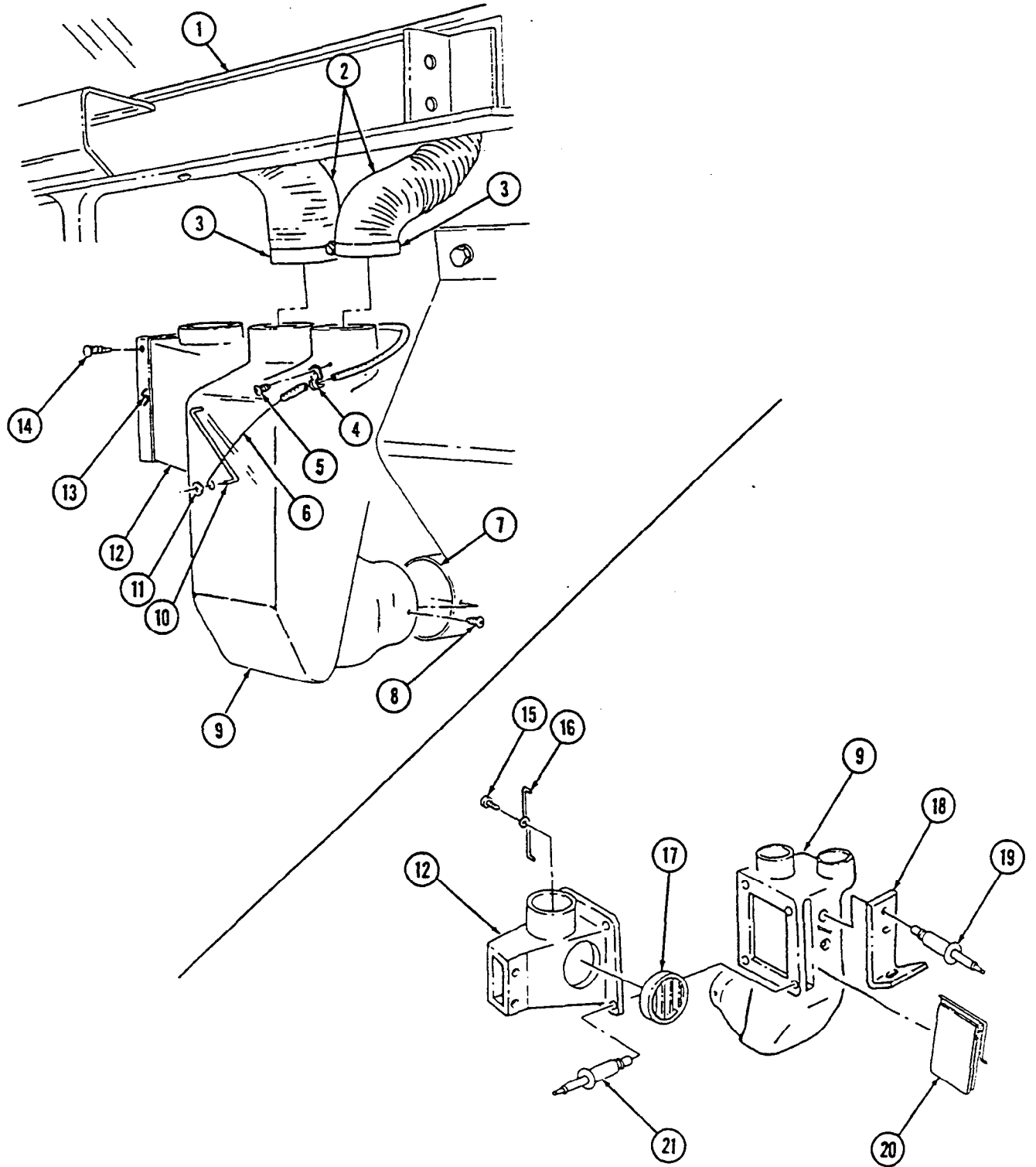
1. Position diverter (9) under A-beam (1) and connect two defroster flex ducts (2) on diverter (9).
2. Secure flex ducts (2) to diverter (9) with two clamps (3).
3. Connect defroster cable core (6) on baffle pin (10) and secure with pushnut (11).
4. Install transition diverter (12) on transition (13) with two screws (14).

NOTE

Control cable must be pushed in, and baffle pin must be in the upward position before securing control cable to diverter box.

5. Install clamp (4) on diverter (9) with screw (5).
6. Install diverter (9) on heater (7) with two screws (8).

10-81. DIVERTER BOX MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install diverter ducting (para. 10-86).

10-82. DEFROSTER DUCTING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Adhesive (Appendix C, Item 12)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

Unit

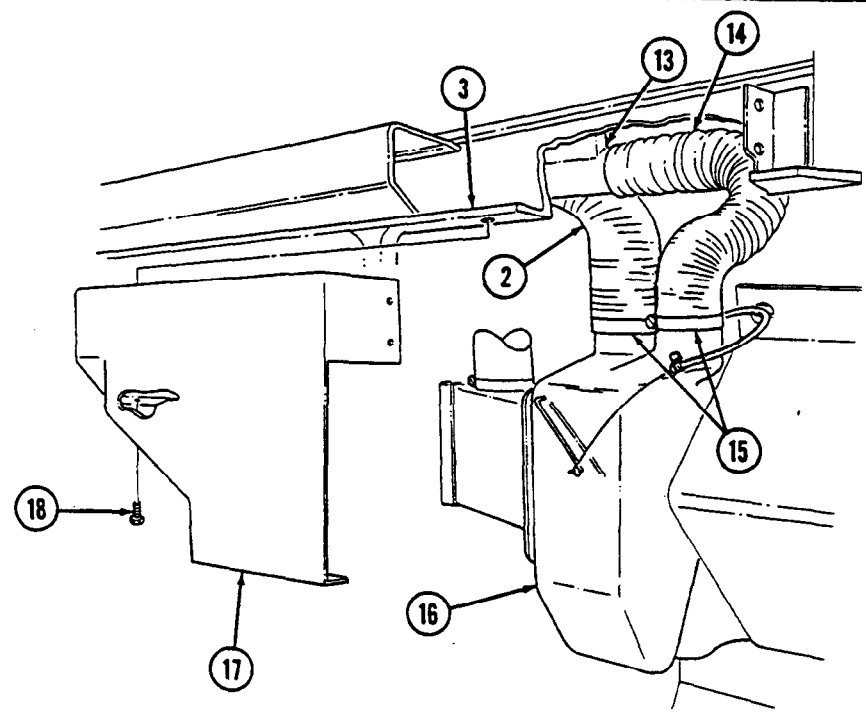
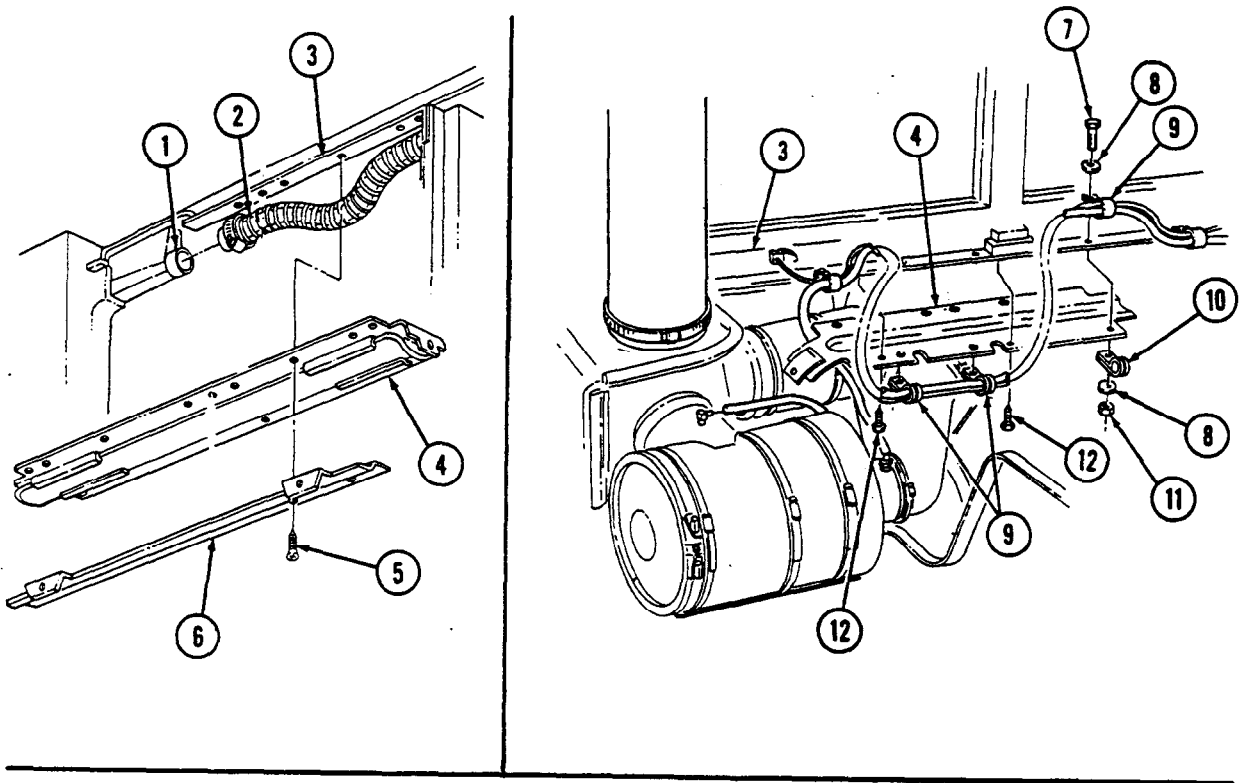
a. Removal

1. Remove ten screws (5), retainer (6), and closeout panel (4) from A-beam (3).
2. Remove three nuts (11), washers (8), capscrews (7), and washers (8) from three clamps (9), cable clamp (10), closeout panel (4), and A-beam (3).
3. Remove three screws (12) from closeout panel (4) and A-beam (3).
4. Disconnect left flex duct (2) from left defroster nozzle (1).
5. Remove four screws (18) and diverter cover (17) from A-beam (3).
6. Disconnect right flex duct (14) from right defroster nozzle (13).
7. Loosen two clamps (15) and disconnect left flex duct (2) and right flex duct (14) from diverter housing (16).

b. Installation

1. Connect left flex duct (2) and right flex duct (14) to diverter housing (16) and tighten two clamps (15).
2. Apply adhesive sealant and connect right flex duct (14) to right defroster nozzle (13).
3. Install diverter cover (17) on A-beam (3) with four screws (18).
4. Apply adhesive and connect left flex duct (2) to left defroster nozzle (1).
5. Install retainer (6) and closeout panel (4) on A-beam (3) with ten screws (5).
6. Secure closeout panel (4) to A-beam (3) with three screws (12).
7. Install three clamps (9), cable clamp (10), and closeout panel (4) on A-beam (3) with three washers (8), capscrews (7), washers (8), and nuts (11).

10-82. DEFROSTER DUCTING REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install engine access cover (para. 10-22).
 - Lower and secure hood (TM 9-2320-387-10).

10-83. LEFT DEFROSTER NOZZLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Lockwasher (Appendix G, Item 205)
Three locknuts (Appendix G, Item 156)
Adhesive (Appendix C, Item 12)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

Unit

a. Removal

1. Remove ten screws (5) and retainer (6) from closeout panel (4) and A-beam (7).
2. Remove three nuts (28), washers (25), capscrews (24), and washers (25) from three clamps (26), cable clamp (27), closeout panel (4), and A-beam (7).
3. Remove three screws (29) and closeout panel (4) from A-beam (7).
4. Disconnect defroster duct (3) from defroster nozzle (2).
5. Remove locknut (21), screw (15), and ground wire 57C (20) from steering column (19). Discard locknut (21).
6. Remove locknut (17), washer (18), capscrew (23), washer (22), and two brackets (16) from steering column (19). Discard locknut (17).
7. Remove locknut (9), lockwasher (10), washer (11), and pin (14) from steering column (19) and bracket (13), and lower steering column (19). Discard locknut (9) and lockwasher (10).
8. Remove retaining pin (12) from defroster nozzle (2) and bracket (13).

NOTE

Note position of defroster nozzle for installation.

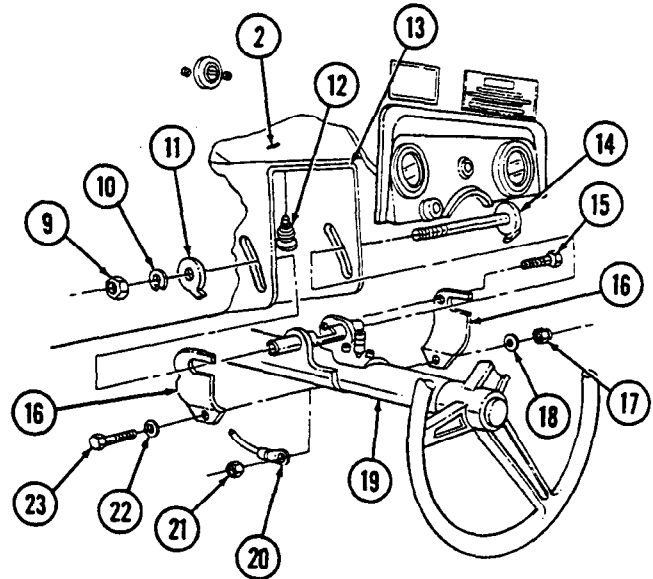
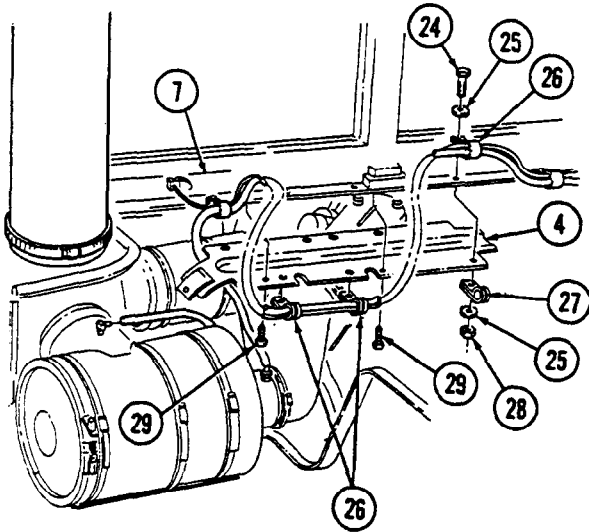
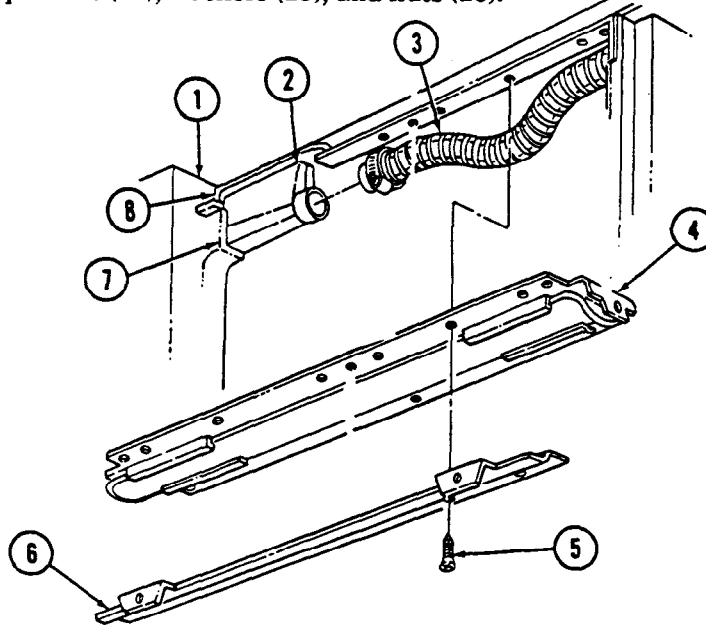
9. Turn defroster nozzle (2) counterclockwise and remove from A-beam (7).

b. Installation

1. Install defroster nozzle (2) on A-beam (7).
2. Turn defroster nozzle (2) clockwise until defroster nozzle outlets (8) align with windshield frame louvers (1).
3. Install defroster nozzle (2) on steering column bracket (13) with retaining pin (12).
4. Place steering column (19) in desired position, and install on bracket (13) with pin (14), washer (11), lockwasher (10), and locknut (9). Tighten locknut (9) to 31 lb-ft (42 N·m).
5. Install two brackets (16) on steering column (19) with washer (22), capscrew (23), washer (18), and locknut (17).
6. Install ground wire 57C (20) on steering column (19) with screw (15) and locknut (21).
7. Apply adhesive and connect defroster duct (3) to defroster nozzle (2).

10-83. LEFT DEFROSTER NOZZLE REPLACEMENT (Cont'd)

8. Install retainer (6) and closeout panel (4) on A-beam (7) with ten screws (5).
9. Secure closeout panel (4) to A-beam (7) with three screws (29).
10. Install closeout panel (4), three clamps (26), and cable clamp (27) on A-beam (7) with three washers (25), capscrews (24), washers (25), and nuts (28).



- FOLLOW-ON TASKS:**
- Lower and secure hood (TM 9-2320-387-10).
 - Install engine access cover (para. 10-22).

10-84. RIGHT DEFROSTER NOZZLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Defroster ducting removed (para. 10-82).

Maintenance Level

Unit

a. Removal

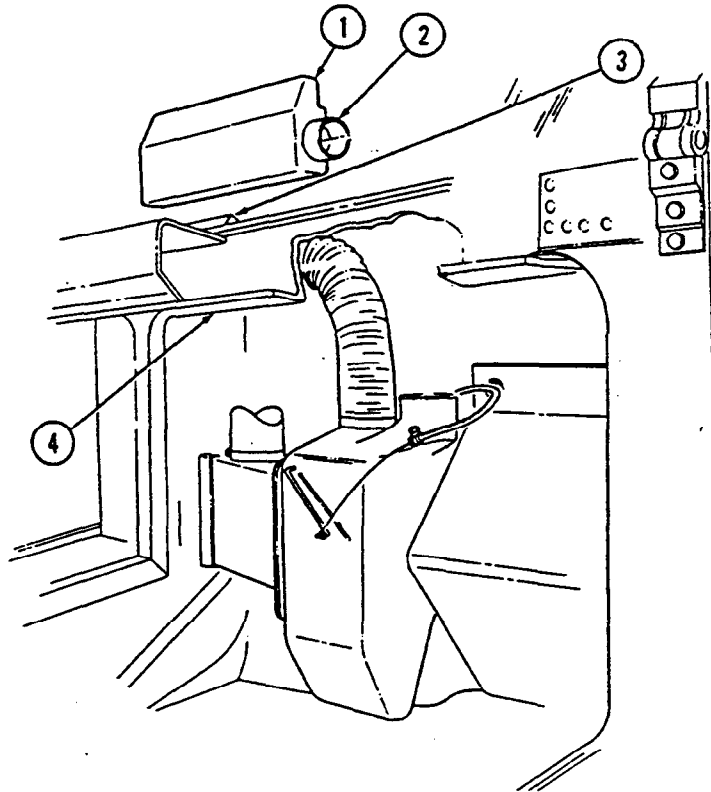
NOTE

Note position of defroster nozzle for installation.

Turn defroster nozzle (2) counterclockwise and remove from A-beam (4).

b. Installation

Install defroster nozzle (2) on A-beam (4) and turn defroster nozzle (2) clockwise until defroster nozzle outlets (1) align with windshield frame louvers (3).



FOLLOW-ON TASK: Install defroster ducting (para. 10-82).

10-85. HEATER BOOT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

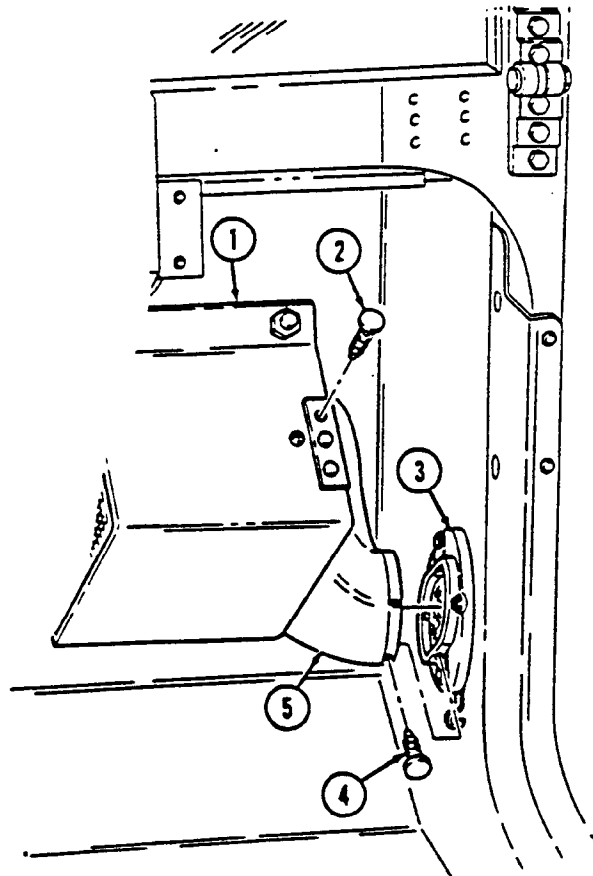
Unit

a. Removal

1. Remove ten clips (2) from heater boot (5) and heater assembly (1).
2. Remove six clips (4) and heater boot (5) from air duct retainer (3).

b. Installation

1. Install heater boot (5) on air duct retainer (3) with six clips (4).
2. Install heater boot (5) on heater assembly (1) with ten clips (2).



10-86. DIVERTER DUCTING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual Reference

Diverter box cover removed (para. 10-89).

Maintenance Level

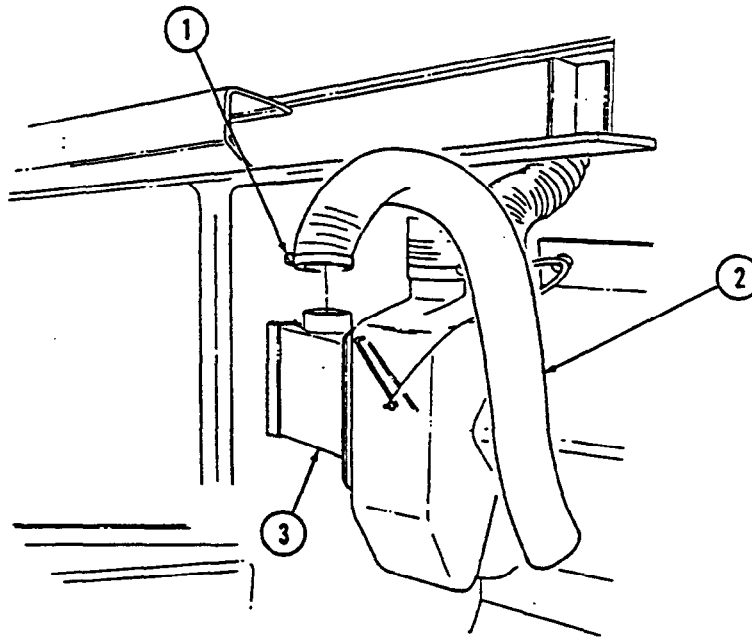
Unit

a. Removal

Loosen clamp (1) and remove diverter ducting (2) from diverter duct (3).

b. Installation

Install diverter ducting (2) on diverter duct (3) and tighten clamp (1).



FOLLOW-ON TASK: Install diverter box cover (para. 10-89).

10-87. HEATER DEFLECTOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:**Applicable Models**

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

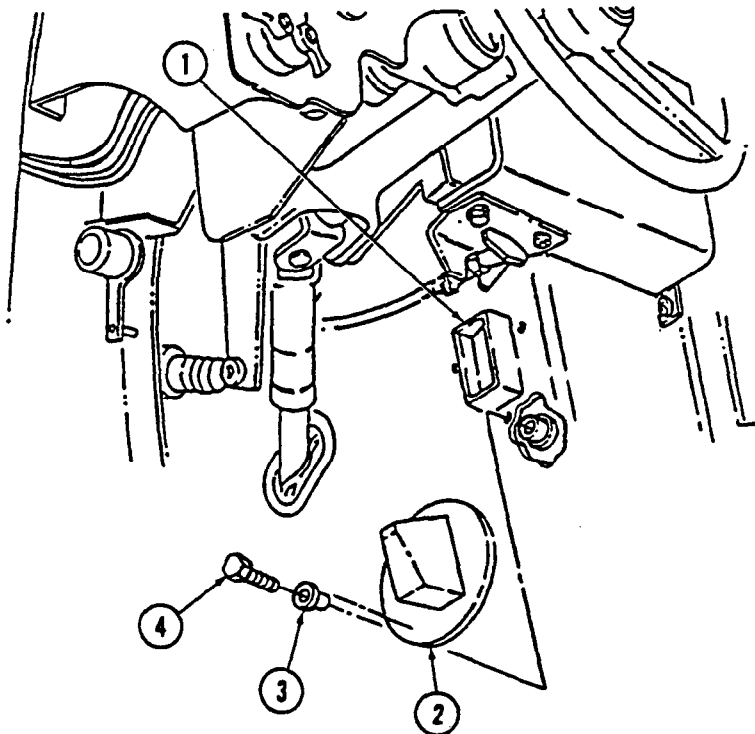
Unit

a. Removal

Remove three capscrews (4), guides (3), and deflector (2) from transition (1).

b. Installation

Install deflector (2) on transition (1) with three guides (3) and capscrews (4).



10-88. HEATER HOSE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Adhesive (Appendix C, Item 12)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

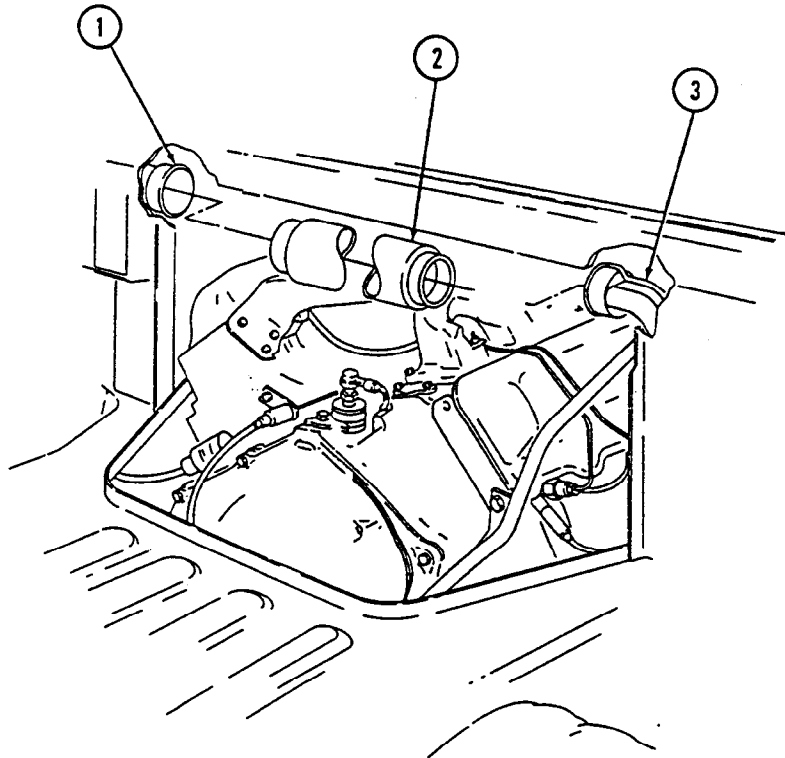
Unit

a. Removal

Disconnect heater hose (2) from left duct (1) and right duct (3), and remove heater hose (2).

b. Installation

Apply adhesive and connect heater hose (2) to left duct (1) and right duct (3).



- FOLLOW-ON TASKS:
- Install engine access cover (para. 10-22).
 - Lower and secure hood (TM 9-2320-387-10).

10-89. DIVERTER BOX COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

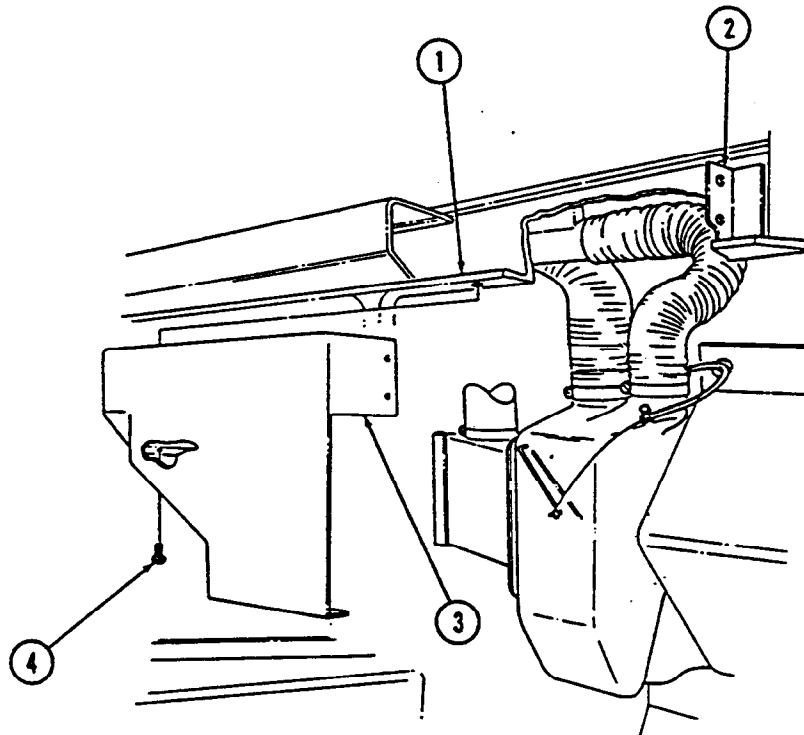
Unit

a. Removal

Remove three capscrews (4) and diverter box cover (3) from right mounting bracket (2) and A-beam (1).

b. Installation

Install diverter box cover (3) on right mounting bracket (2) and A-beam (1) with three capscrews (4).



10-90. A-PILLAR FORMER ASSEMBLY MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Soft top removed (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove thirteen screws (3) and A-pillar former (2) from A-pillar (1).
2. Clean weatherstrip from A-pillar (1).

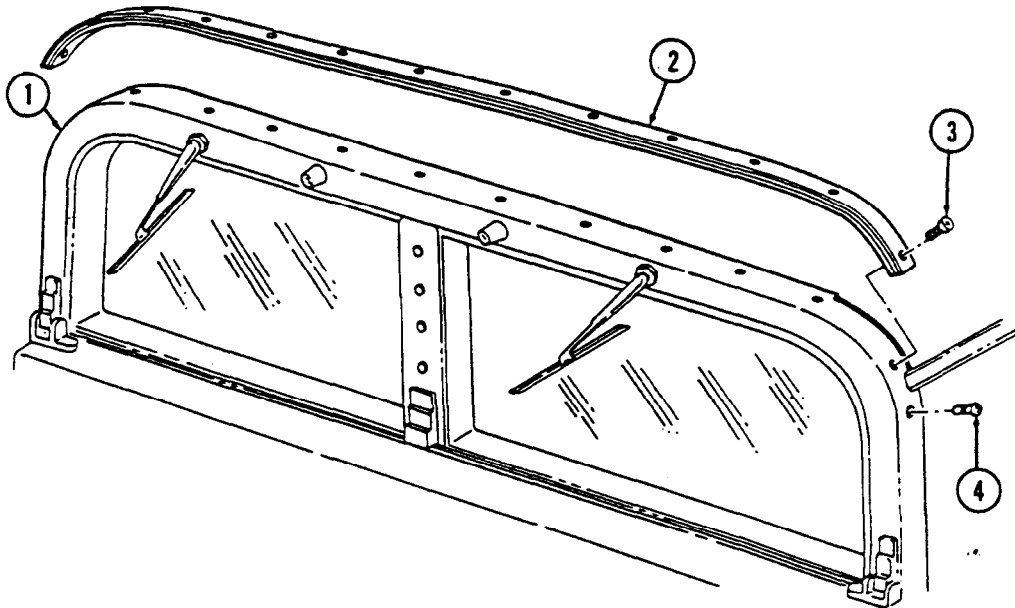
b. Inspection

NOTE

For inspection and removal of rivnut, refer to para. 10-56.
Inspect rivnut (4). Replace if damaged.

c. Installation

1. Peel backing paper from A-pillar former (2).
2. Install A-pillar former (2) on A-pillar (1) with thirteen screws (3).



FOLLOW-ON TASK: Install soft top (TM 9-2320-387-10).

10-91. SOFT TOP DOOR HINGE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Soft top door removed (TM 9-2320-387-10).

Materials/Parts

Two nut and lockwasher assemblies
(Appendix G, Item 245)

Maintenance Level

Unit

NOTE

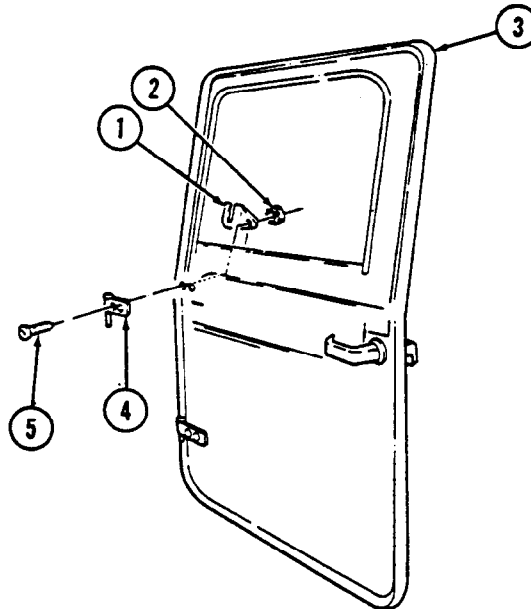
- Doorstrap brackets are attached to upper hinges only.
- Replacement procedures for all door hinges are basically the same. This procedure covers the upper left door hinge.

a. Removal

Remove two nut and lockwasher assemblies (2), screws (5), hinge (4), and bracket (1) from door (3). Discard nut and lockwasher assemblies (2).

b. Installation

Install hinge (4) and bracket (1) on door (3) with two screws (5) and nut and lockwasher assemblies (2). Tighten nut and lockwasher assemblies (2) to 6 lb-ft (8 N·m).



- FOLLOW-ON TASKS:**
- Install soft top door (TM 9-2320-387-10).
 - Adjust soft top door (para. 10-92).

10-92. SOFT TOP DOOR ADJUSTMENT

This task covers:

Adjustment

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)

Maintenance Level

Unit

Personnel Required

One mechanic
 One assistant

Adjustment

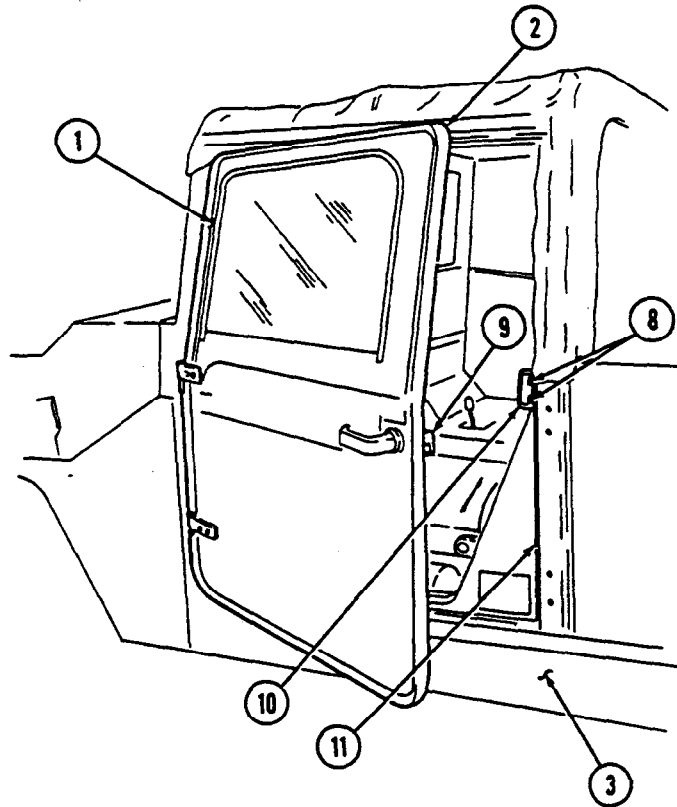
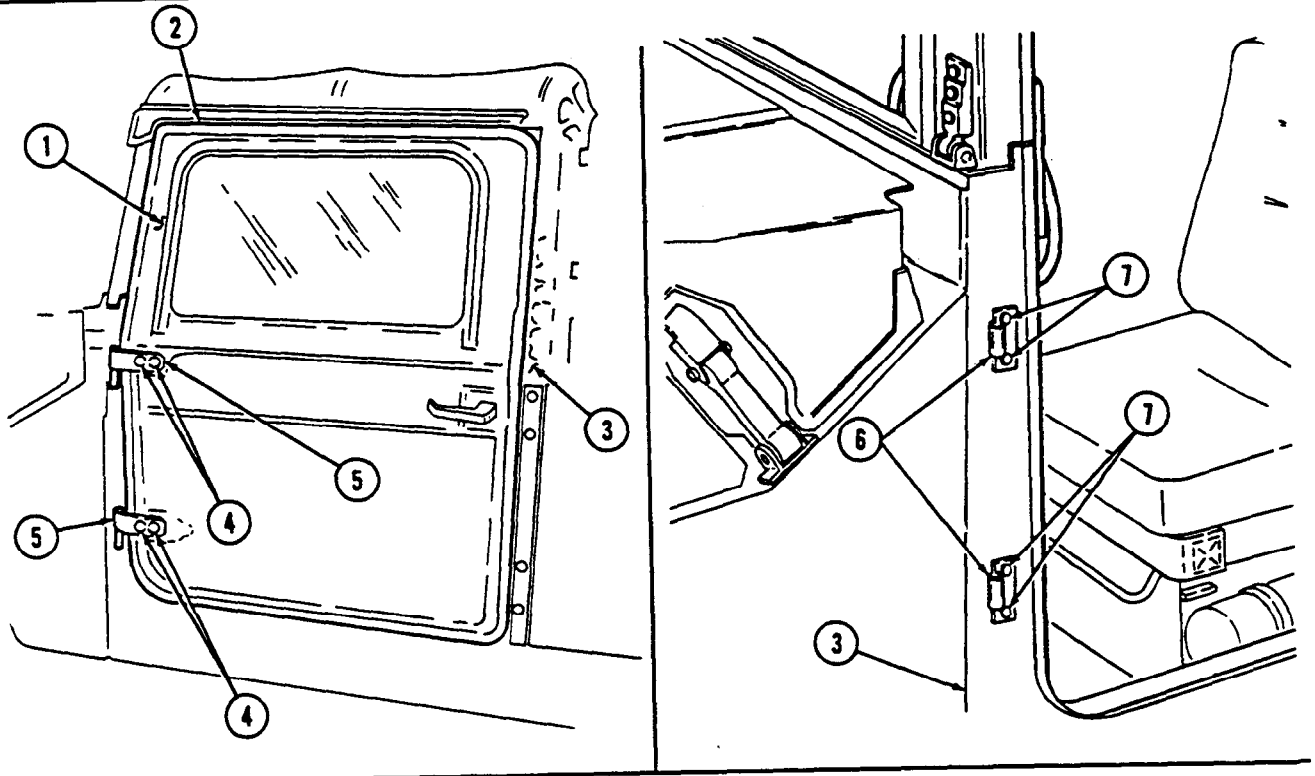
1. Open and close door (1) to check fit of door seal (2) to body (3). Door seal (2) should fit inside and contact door outline on body (3).
2. For vertical and horizontal adjustment of door (1), loosen four screws (4) on two hinges (5) and door (1). Slide door (1) to fit door outline on body (3). Hold door (1) in position, and tighten four screws (4) on two door hinges (5) and door (1).

NOTE

If additional vertical adjustment is needed, follow step 3. If no additional vertical adjustment is needed, go to step 4.

3. For additional vertical adjustment of door (1), remove door (1) from body (3) (TM 9-2320-387-10). Loosen four capscrews (7) on two body hinge mounts (6) and body (3) and slide body hinge mounts (6) up or down for adjustment. Hold body hinge mounts (6) in position, and tighten four capscrews (7) to 8 lb-ft (11 N·m). Install door (1) (TM 9-2320-387-10).
4. For in and out adjustment of door (1), loosen two capscrews (8) on striker (10) and B-pillar (11). With door (1) closed and door seal (2) pressed against body (3), slide striker (10) against inner door handle latch (9) and tighten two capscrews (8). Open door (1) and tighten two capscrews (8) to 15 lb-ft (20 N·m).
5. Close door (1) and check for fit of door seal (2) to door outline on body (3) and inner door handle latch (9) operation. Readjust door (1) if necessary.

10-92. SOFT TOP DOOR ADJUSTMENT (Cont'd)



10-93. SOFT TOP REPAIR

This task covers:

- a. Inspection and Cleaning
- b. Soft Top Material Repair
- c. Soft Top Window Repair
- d. Soft Top Window Zipper Repair (Temporary)

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two plastic sheets
(Appendix D, Figure D-100)

Materials/Parts (Cont'd)

Adhesive (Appendix C, Item 4)
Hook and pile material tape (Appendix C, Item 79)

Manual Reference

TM 9-2320-387-24P

Maintenance Level

Unit

a. Inspection and Cleaning

1. Inspect soft top doors and top for pin holes and leaks around the seam areas.
2. Clean area to be sealed on the outer side of canvas with soapy water solution and stiff brush. Allow to dry.

b. Soft Top Material Repair

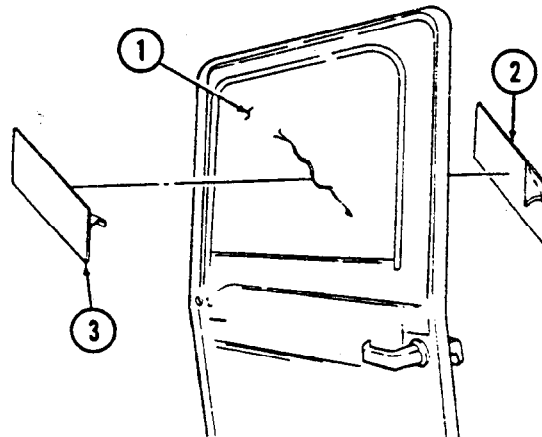
1. Apply adhesive to cleaned area where leak occurred. Ensure adhesive is pressed into stitching of seams.
2. Allow 20 minutes for adhesive to cure.

c. Soft Top Window Repair

NOTE

The use of pressure-sensitive, adhesive-coated plastic sheets for temporary repair of small window cracks and holes should only be utilized if it does not hinder operator's vision. If damaged area is large enough so that plastic sheets will hinder operator's vision, door assembly should be replaced.

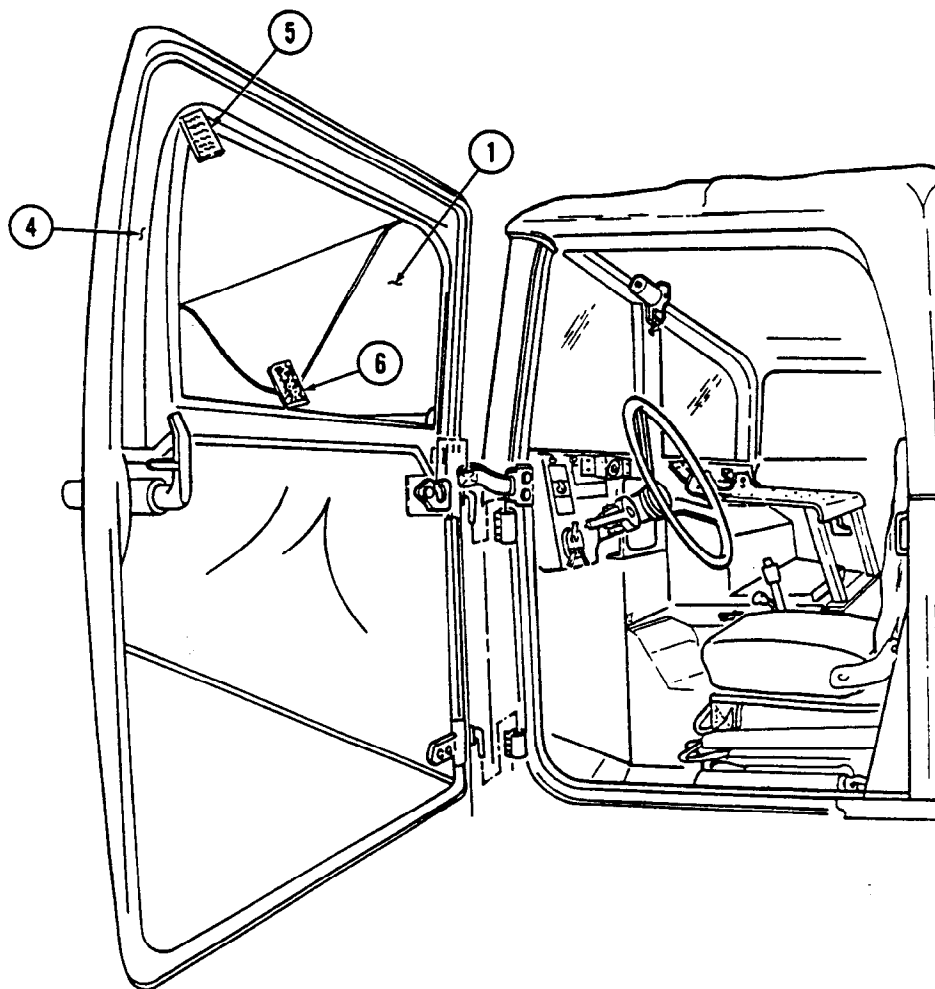
1. Ensure damaged area of window (1) is clean and dry.
2. Peel backing off plastic sheet (2) and apply to damaged area of window (1).
3. Peel backing off plastic sheet (3) and apply to other side of damaged area of window (1).



10-93. SOFT TOP REPAIR (Cont'd)**d. Soft Top Window Zipper Repair (Temporary)****NOTE**

Use hook and pile material tape as a temporary measure to secure window with failed zipper until zipper or door can be replaced.

1. Apply half of the self-adhesive hook and pile material (5) on inside of door (4) around window (1).
2. Put mating half of hook and pile material tape (6) on window (1). Apply strips as required to firmly secure window.



10-94. SOFT TOP DOOR STRIKER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Maintenance Level

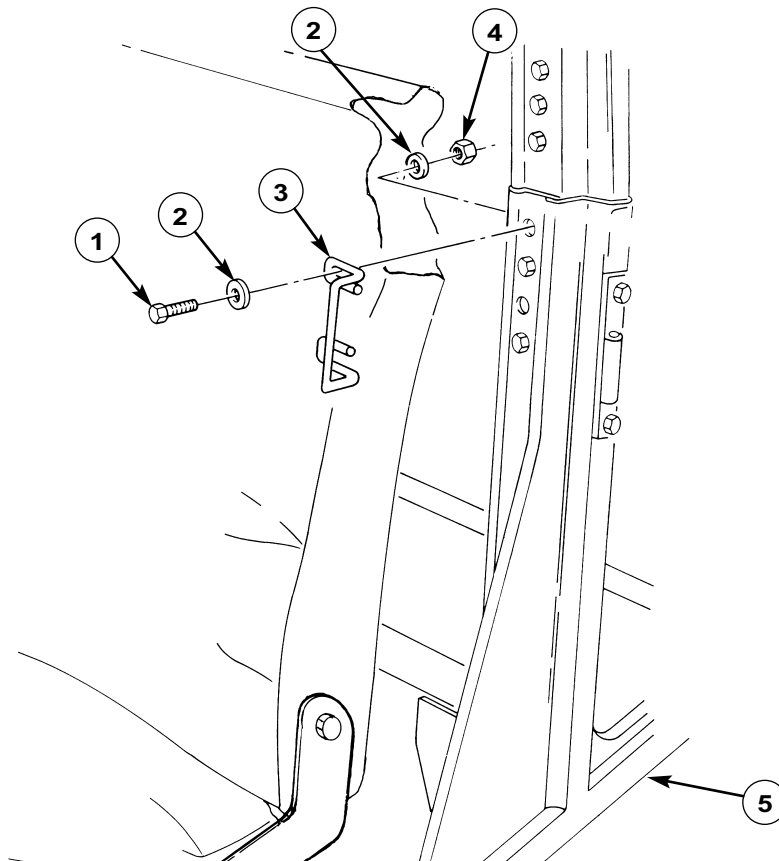
Unit

a. Removal

Remove two nuts (4), washers (2), capscrews (1), washers (2), and door striker (3) from body (5).

b. Installation

Install door striker (3) on body (5) with two washers (2), capscrews (1), washers (2), and nuts (4). Tighten capscrews (1) to 15 lb-ft (20 N·m).



FOLLOW-ON TASK: Adjust soft top door (para. 10-92).

10-95. DIVERTER MANIFOLD AND HOUSING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

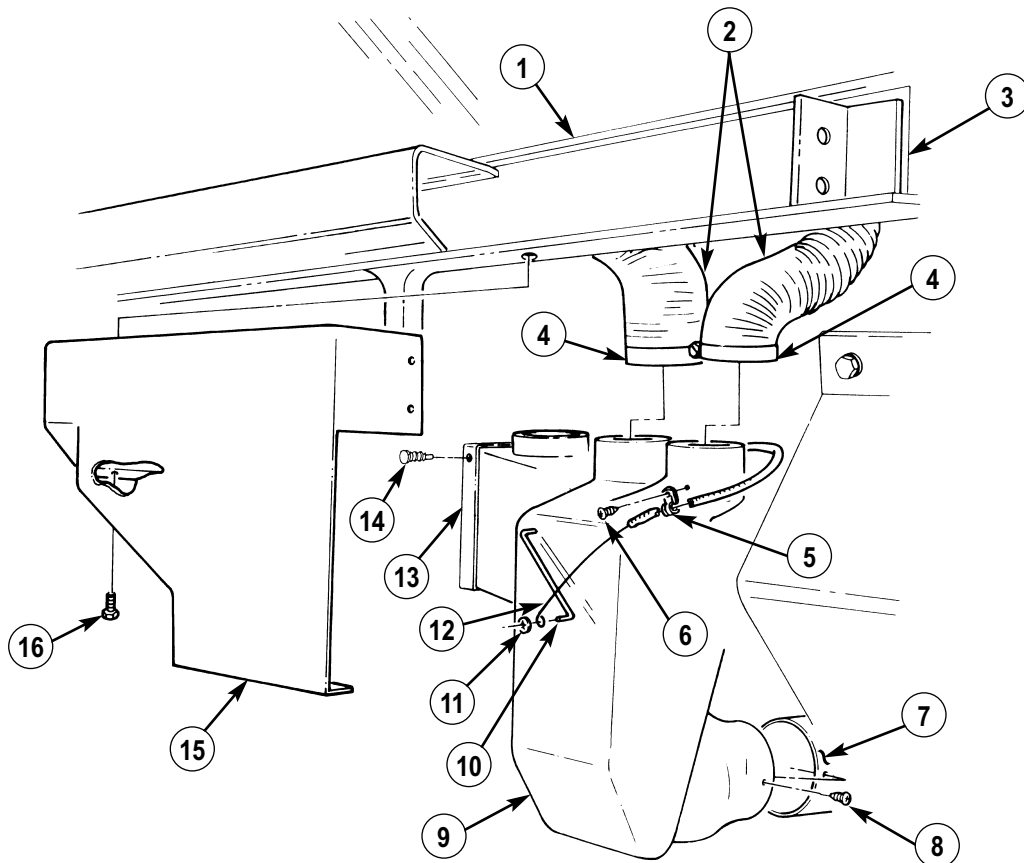
Pushnut (Appendix G, Item 313)
Four rivets (Appendix G, Item 347.3)

Manual References

TM 9-2320-387-24P

a. Removal

1. Remove four screws (16) and panel assembly (15) from right mounting bracket (3) and A-beam (1).
2. Remove four rivets (14) from manifold and housing (9) and duct (13).
3. Remove two screws (8) from manifold and housing (9) and heater (7).
4. Remove screw (6) from clip (5) and manifold and housing (9).
5. Remove pushnut (11) and disconnect defroster cable core (12) from baffle pin (10). Discard pushnut (11).
6. Pull manifold and housing (9) away from A-beam (1) and loosen two clamps (4) securing defroster flex ducts (2) to manifold and housing (9).
7. Remove manifold and housing (9) from heater (7).



10-95. DIVERTER MANIFOLD AND HOUSING REPLACEMENT (Cont'd)

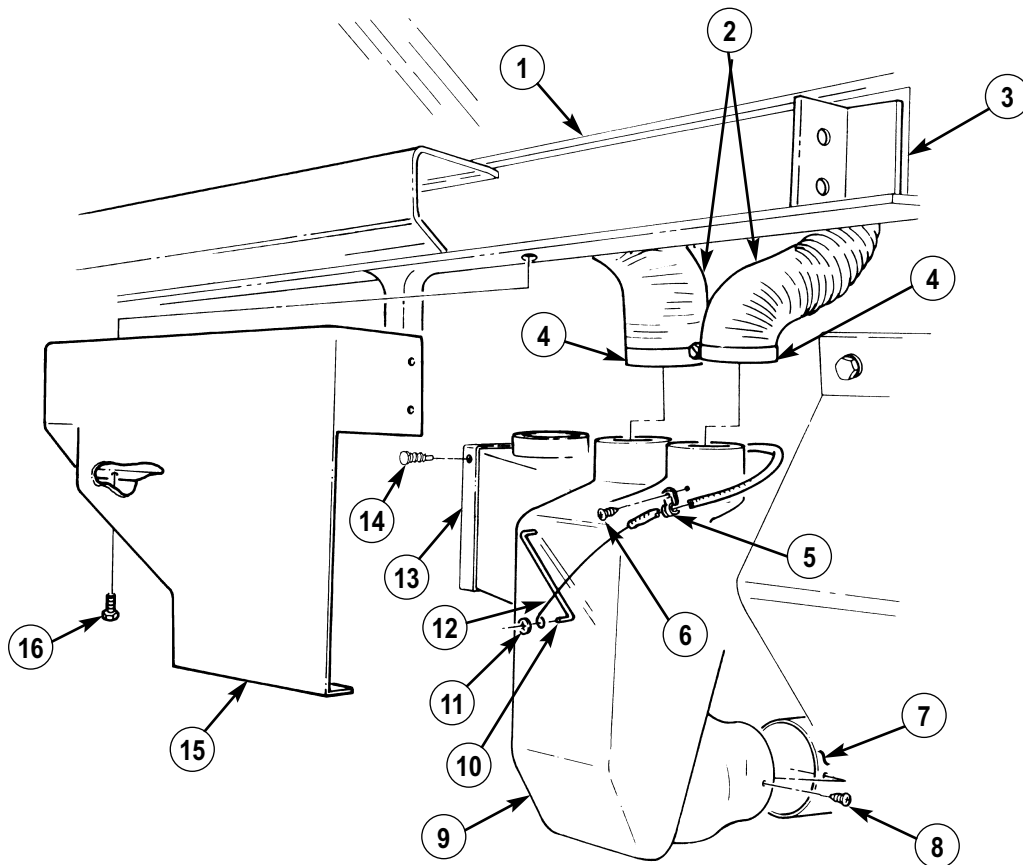
b. Installation

1. Position manifold and housing (9) under A-beam (1) and connect two defroster flex ducts (2) to manifold and housing (9) with two clamps (4).
2. Connect defroster cable core (12) to baffle pin (10) and install pushnut (11).
3. Install duct (13) on manifold and housing (9) with four rivets (14).

NOTE

Ensure diverter control knob is pushed into cowl and baffle pin is in the downward position before securing control cable to diverter box.

4. Install clip (5) on manifold and housing (9) with screw (6).
5. Install manifold and housing (9) on heater (7) with two screws (8).
6. Install panel assembly (15) on A-beam (1) and right mounting bracket (3) with four screws (16).



CHAPTER 11

SPECIAL PURPOSE BODIES (UNIT) MAINTENANCE

Section I. WEAPON CARRIER BODY MAINTENANCE

11-1. WEAPON CARRIER BODY MAINTENANCE TASK SUMMARY

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11-2. FRONT DOOR AND HINGE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)
 Riveter tool kit (Appendix B, Item 123)

Materials/Parts

Fifteen rivets (Appendix G, Item 351)
 Locknut (Appendix G, Item 166)
 Six lockwashers (Appendix G, Item 202)
 Closed-cell foam rubber (Appendix G, Item 23.1)
 Adhesive (Appendix C, Item 2.1)
 Sealing compound (Appendix C, Item 60)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

General Safety Instructions

Vehicle door is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Vehicle door is extremely heavy and must be supported during removal and installation. Failure to do so may cause injury to personnel or damage to equipment.

CAUTION

To prevent damage to armored glass, protect all exposed glass surfaces when replacing rivets.

a. Removal

1. Remove locknut (4), screw (2), and door check strap (8) from door bracket (3). Discard locknut (4).
2. Remove sixteen capscrews (10), washers (9.1), and door (1) from A-pillar (7).
- 2.1. Remove foam rubber strip (13) from rivet (11) heads.
3. Remove fifteen rivets (11) and hinge (12) from door (1).
4. Remove six capscrews (5), lockwashers (6), and two stop blocks (9) from door (1). Discard lockwashers (6).
5. Remove old adhesive completely from door (1), A-pillar (7), and hinge (12). Ensure all rust is removed from bonded area.

b. Installation

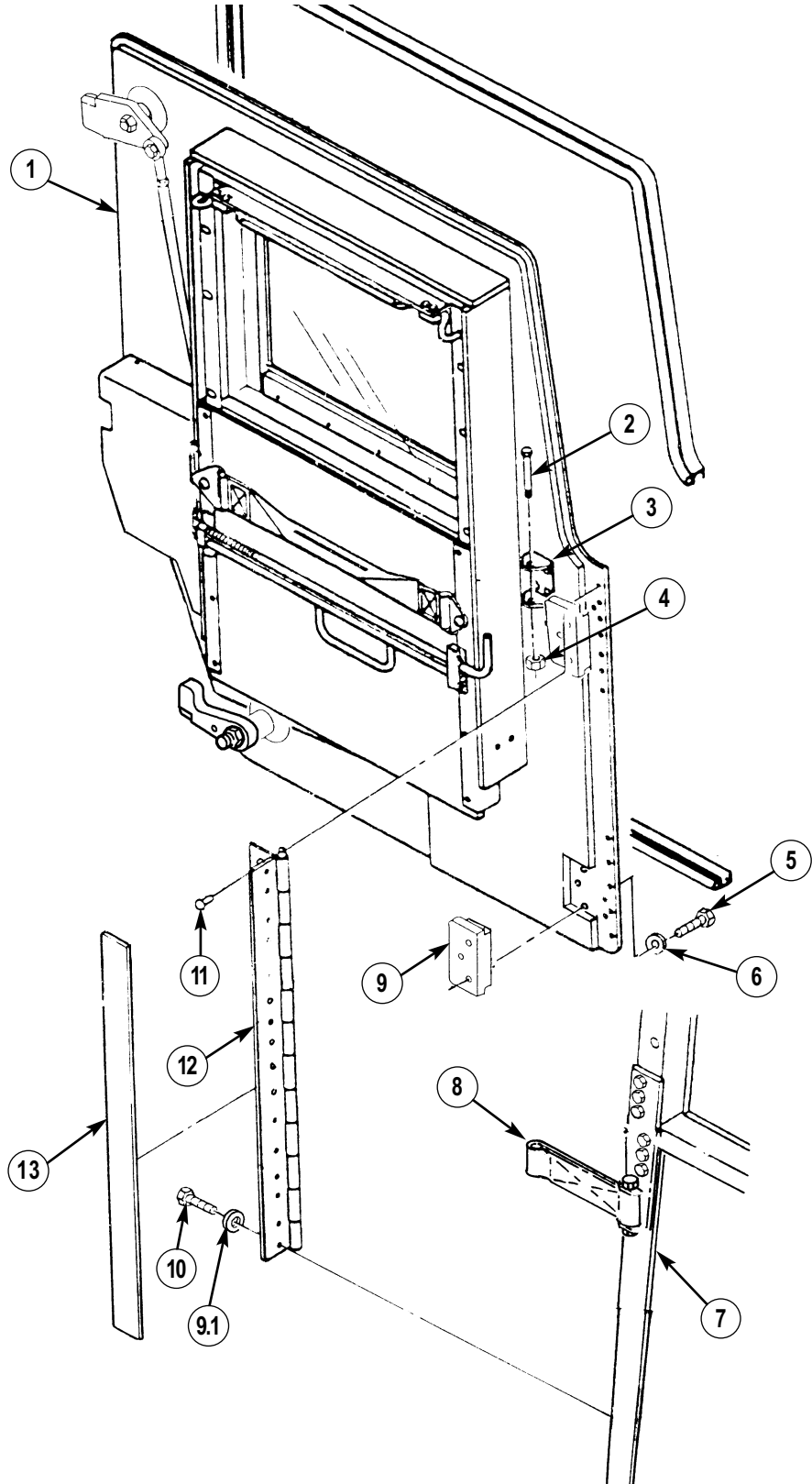
1. Install two stop blocks (9) on door (1) with six lockwashers (6) and capscrews (5). Tighten capscrews (5) to 10 lb-ft (14 N·m).
2. Apply adhesive to hinge (12) and door (1). Install hinge (12) on door (1) with fifteen rivets (11).

NOTE

New capscrews come with preapplied thread locking compound. If old capscrews are to be used, mating threads must be cleaned and sealing compound applied to threads of capscrews.

3. Apply sealing compound to sixteen capscrews (10) (for used capscrews only). Apply adhesive to hinge (12) and A-pillar (7). Install hinge (12) on A-pillar (7) with sixteen washers (9.1) and capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N·m).
- 3.1. Apply foam rubber strip (13) over rivet (11) heads on door (1).
4. Install door check strap (8) on door bracket (3) with screw (2) and locknut (4).

11-2. FRONT DOOR AND HINGE REPLACEMENT (Cont'd)



11-2.1. REAR DOOR AND HINGE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)
 Riveter tool kit (Appendix B, Item 123)

Materials/Parts

Thirty-five rivets (Appendix G, Item 351)
 Locknut (Appendix G, Item 166)
 Six lockwashers (Appendix G, Item 202)
 Adhesive (Appendix C, Item 2.1)
 Closed-cell foam rubber (Appendix G, Item 23.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

General Safety Instructions

Vehicle door is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Vehicle door is extremely heavy and must be supported during removal and installation. Failure to do so may cause injury to personnel or damage to equipment.

CAUTION

To prevent damage to armored glass, protect all exposed glass surfaces when replacing rivets.

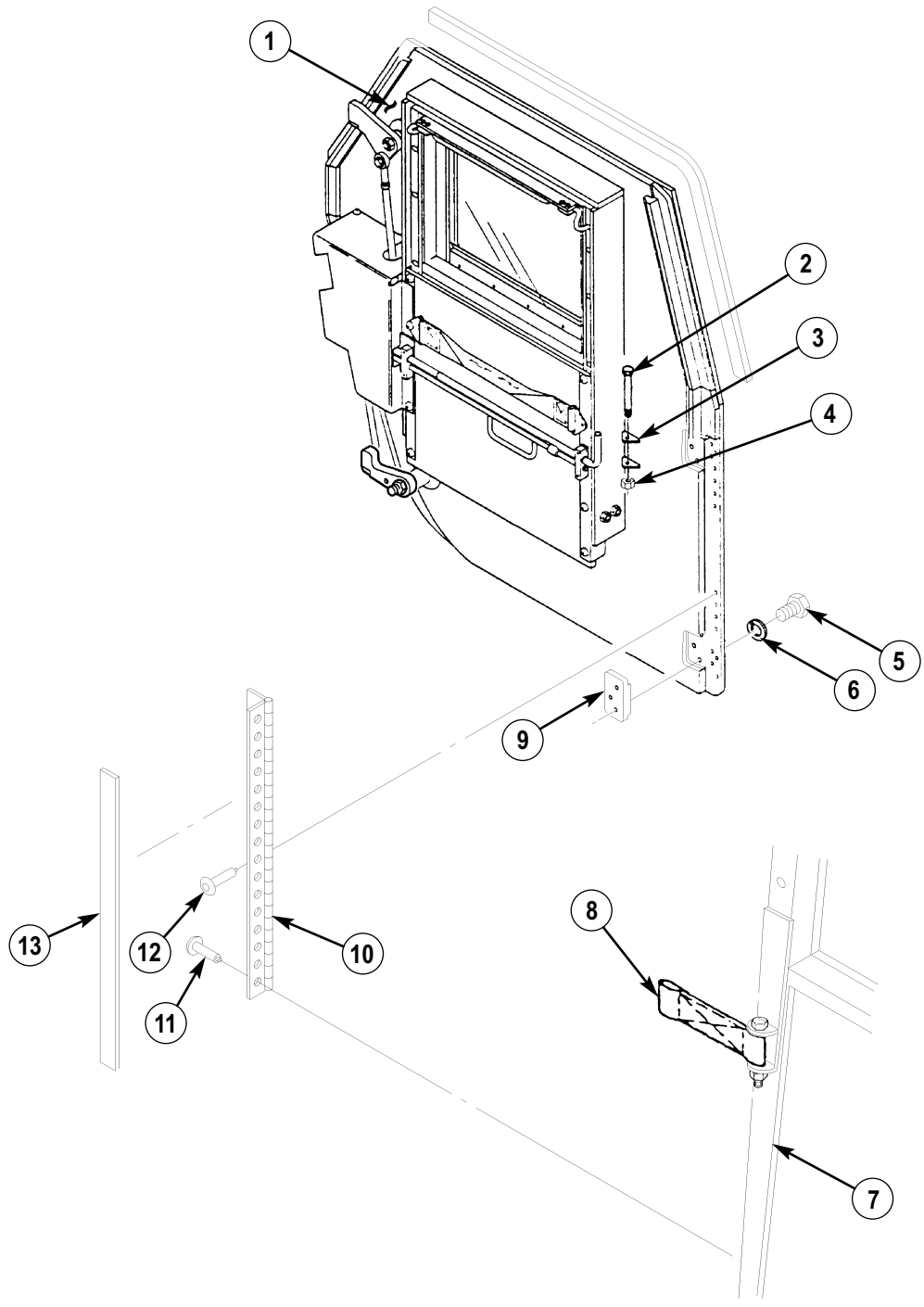
a. Removal

1. Remove locknut (4), screw (2), and door check strap (8) from door bracket (3). Discard locknut (4).
2. Remove foam rubber strip (13) from rivet (12) heads.
3. Remove seventeen rivets (11) and door (1) from B-pillar (7).
4. Remove eighteen rivets (12) and hinge (10) from door (1).
5. Remove six capscrews (5), lockwashers (6), and two stop blocks (9) from door (1). Discard lockwashers (6).
6. Remove old adhesive completely from door (1), B-pillar (7), and hinge (10). Ensure all rust is removed from bonded area.

b. Installation

1. Install two stop blocks (9) on door (1) with six lockwashers (6) and capscrews (5). Tighten capscrews (5) to 10 lb-ft (14 N·m).
2. Apply adhesive to hinge (10) and door (1). Install hinge (10) on door (1) with eighteen rivets (12).
3. Apply adhesive to hinge (10) and B-pillar (7). Install hinge (10) on B-pillar (7) with seventeen rivets (11).
4. Apply foam rubber strip (13) over rivet (12) heads on door (1).
5. Install door check strap (8) on door bracket (3) with screw (2) and locknut (4).

11-2.1. REAR DOOR AND HINGE REPLACEMENT (Cont'd)



11-3. DOOR WINDOW REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Five lockwashers (Appendix G, Item 200)
 Eight locknuts (Appendix G, Item 178)
 Seal (Appendix G, Item 395)
 Two cotter pins (Appendix G, Item 28)
 Sealing compound (Appendix C, Item 66)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Window in raised (closed) position (TM 9-2320-387-10).
- Locking pawl and connecting rods removed (para. 11-7).
- Locking rod and door release handle removed (para. 11-8).

Maintenance Level

Unit

CAUTION

Interior side of window glass is covered with a film which is crucial to the protection integrity. Scratching, bumping, or incorrect cleaning practices will damage glass and reduce ballistic protection.

a. Removal

NOTE

Note location of five screws for installation.

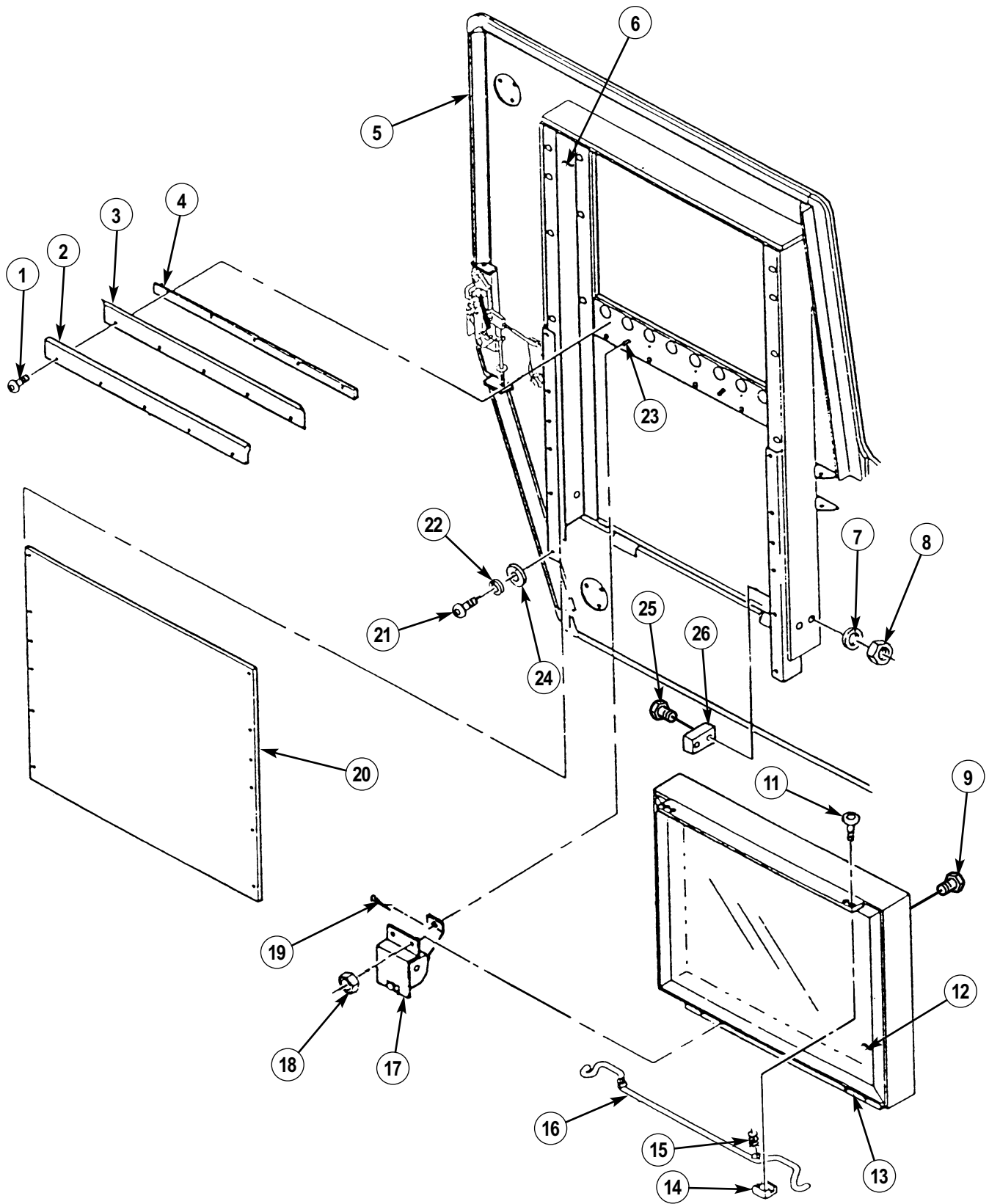
1. Remove five capscrews (21), lockwashers (22), and washers (24) and slide door cover (20) from door (5). Discard lockwashers (22).
2. Remove four locknuts (8), washers (7), socket-head screws (25), and two protective bumpers (26) from window channels (6). Discard locknuts (8).
3. Remove two locknuts (18) and capscrews (9) from negator spring assembly (17) and window frame (13). Discard locknuts (18).
4. Pull two negator spring assemblies (17) down from side window (12) and install a 4-in. (102-mm) piece of flat bar stock to gain access to cotter pin (19).
5. Remove cotter pin (19) from stud (23) and remove tongue of negator spring (17). Discard cotter pin (19).
6. Repeat steps 3 through 5 for remaining negator spring (17).

CAUTION

Support window before removing retainer plates.

7. Remove four screws (11), two retainer plates (14), springs (15), and locking rod (16) from window (12).
8. Lower window (12) and remove from window channel (6) and door (5).
9. Remove five screws (1), clamp bar (2), seal (3), and spacer (4) from door (5). Discard seal (3).

11-3. DOOR WINDOW REPLACEMENT (Cont'd)



11-3. DOOR WINDOW REPLACEMENT (Cont'd)

b. Installation

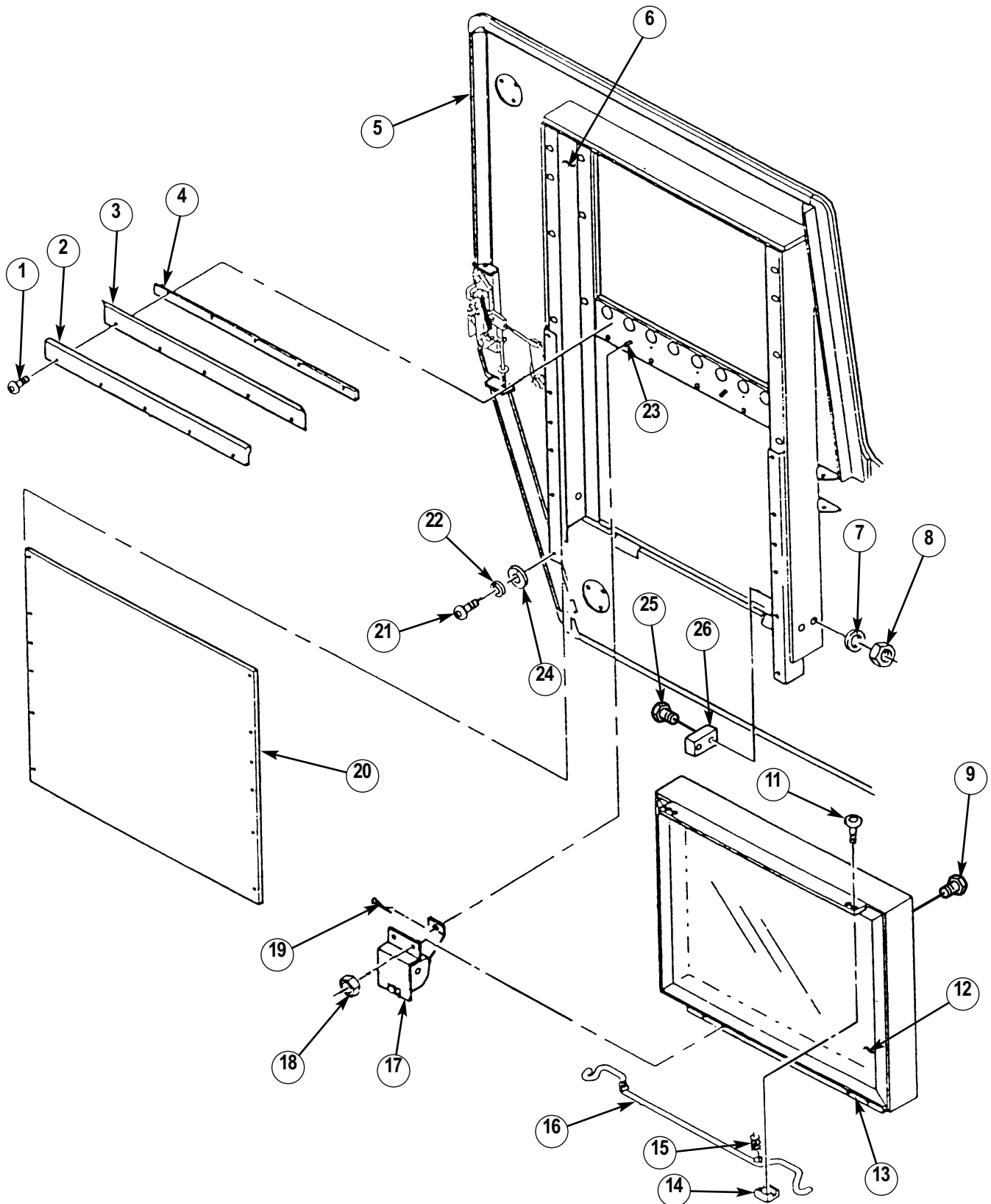
1. Apply sealing compound to threads of five screws (1).
2. Install spacer (4), seal (3), and clamp bar (2) on door (5) with five screws (1). Tighten screws (1) to 13-16 lb-in. (1.5-1.8 N·m).

CAUTION

Support window until retainer plates and negator springs are installed.

3. Position window (12) at bottom of window channels (6) in door (5) and slide window (12) to highest position.
4. Position hole in tongue end of negator spring assembly (17) over stud (23) on door (5).
5. Install cotter pin (19) through hole in stud (23).
6. Install negator spring assembly (17) on window frame (13) with two capscrews (9) and locknuts (18). Tighten locknuts (18) to 10 lb-ft (14 N·m).
7. Repeat steps 4 through 6 for remaining negator spring (17).
8. Apply sealing compound to threads of four screws (11), and install locking rod (16) on window (12) with two retainer plates (14), springs (15), and screws (11). Tighten screws (11) to 20-23 lb-in. (2.2-2.6 N·m).
9. Install two protective bumpers (26) on window channels (6) with four socket-head screws (25), washers (7), and locknuts (8). Tighten locknuts (8) to 10 lb-ft (14 N·m).
10. Install door cover (20) at bottom of grooves in door (5) with beveled corners down. Slide door cover (20) up and secure door cover (20) to door (5) with five washers (24), lockwashers (22), and capscrews (21). Tighten capscrews (21) to 20-23 lb-in. (2.2-2.6 N·m).

11-3. DOOR WINDOW REPLACEMENT (Cont'd)



- FOLLOW-ON-TASKS:**
- Install locking rod and door release handle (para. 11-8).
 - Install locking pawl and connecting rods (para. 11-7).

11-4. DOOR LATCH MAINTENANCE

This task covers:

- a. Removal
- b. Inspection

- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Lockwasher (Appendix G, Item 202.1)
 Locknut (Appendix G, Item 167)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Door latch cover removed (para. 11-6).

Maintenance Level

Unit

a. Removal

1. Remove locknut (11) and bushing (10) from link rod (14) on door release handle (9). Discard locknut (11).
2. Remove link rod (14), washer (13), and spring (12) from door latch (4) and door release handle (9).
3. Remove capscrew (1) and link rod boss (2) from door latch (4).
4. Remove link rod boss (2) from door handle lever (8).
- 4.1. Loosen nut (16) and remove rod (17), lockwasher (18), and nut (16) from link rod boss (2). Discard lockwasher (18).
5. Remove four screws (3), door latch (4), two spacer plates (5), and spring (15) from door (7).
6. Remove spring (15) from latch (4).

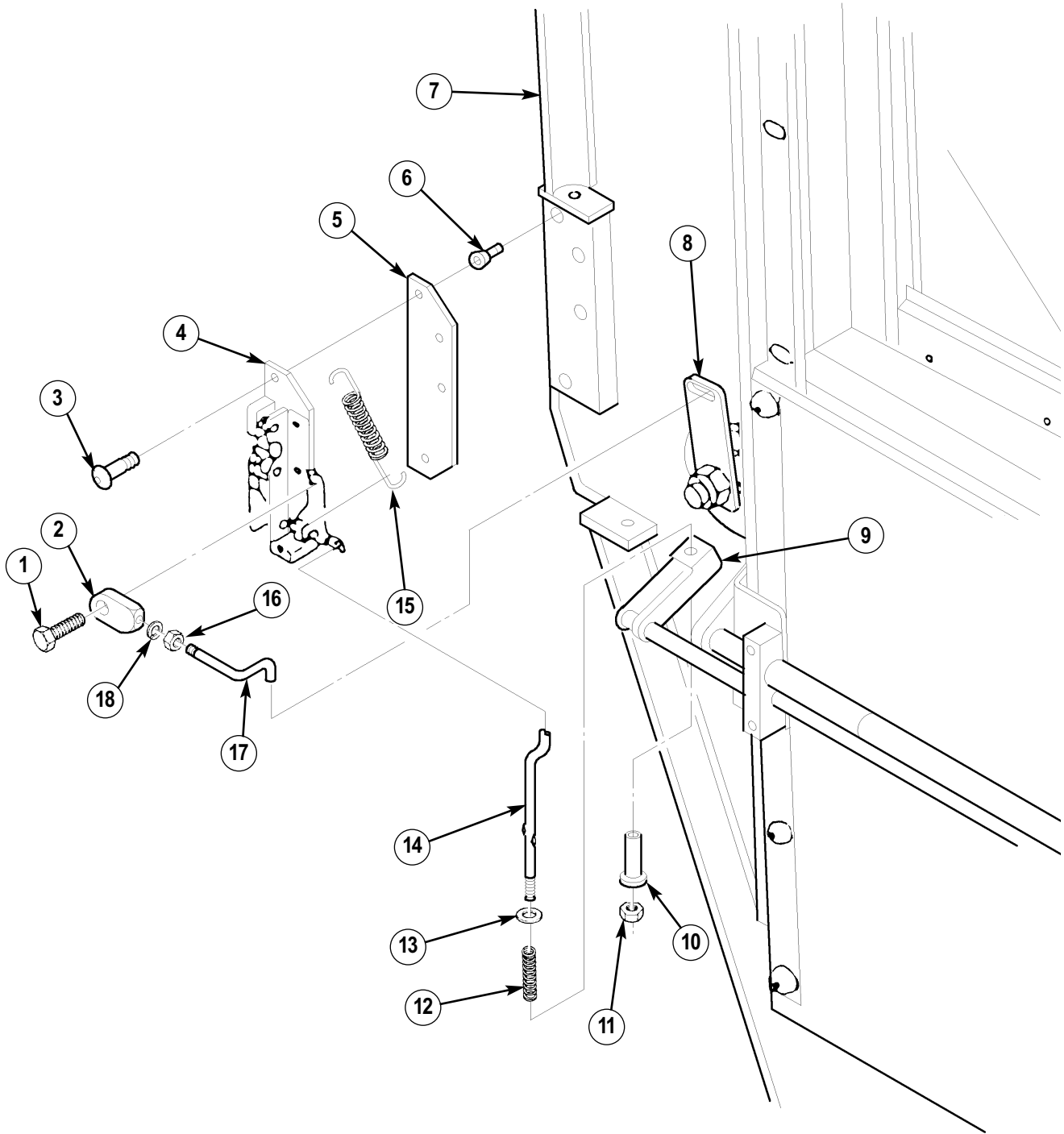
b. Inspection

Refer to para. 10-56 for plusnuts (6) inspection and replacement.

c. Installation

1. Install spring (15) on latch (4).
2. Apply sealing compound to threads of four screws (3), and install two spacer plates (5), door latch (4), and spring (15) on door (7) with screws (3).
3. Apply sealing compound to threads of capscrew (1), and install link rod boss (2) on door latch (4) with capscrew (1). Tighten capscrew (1) to 10 lb-ft (14 N·m).
- 3.1 Install nut (16) and lockwasher (18) on rod (17).
- 3.2 Install rod (17) on link rod boss (2) and tighten nut (16).
4. Install rod (17) on door handle lever (8).
- 4.1. Install washer (13) and spring (12) on link rod (14).
5. Install link rod (14) on door latch (4) and through door release handle (9).
6. Attach link rod (14) to door release handle (9) with bushing (10) and locknut (11).

11-4. DOOR LATCH MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install door latch cover (para. 11-6).
 - Adjust door latch (para. 11-9).

11-5. DOOR HANDLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

O-ring (Appendix G, Item 258.1)
Locknut (Appendix G, Item 172)
Locknut (Appendix G, Item 153.1)

Materials/Parts (Cont'd)

Lithium grease (Appendix C, Item 36)

Manual References

TM 9-2320-387-24P

Equipment Condition

Door latch cover removed (para. 11-6).

Maintenance Level

Unit

a. Removal

1. Remove locknut (1), washer(s) (3), lever (2), and washer(s) (3) from link rod (5.1) and door handle (7). Discard locknut (1).
2. Remove locknut (11), retainer washer (4), handle (7), O-ring (6), handle retainer (8), backing plate (9), and gasket (10) from door (5). Discard locknut (11) and O-ring (6).

b. Installation

NOTE

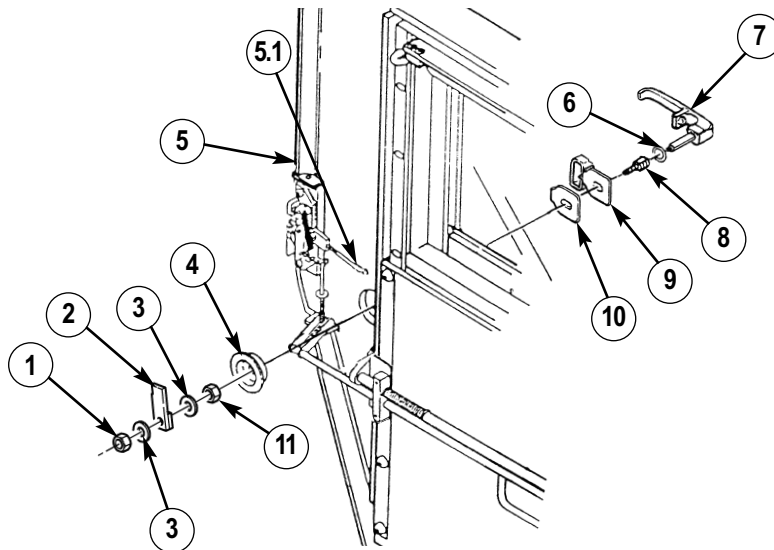
Apply a light coat of white lithium grease to uncoated surfaces of handle and O-ring prior to assembly.

1. Install O-ring (6), handle retainer (8), backing plate (9), and gasket (10) on handle (7) and install handle (7) on door (5) with retainer washer (4) and locknut (11).

NOTE

A total of six washers are required. Install washers under lever as required to position link rod parallel to door.

2. Install washer(s) (3), lever (2), washer(s) (3), and locknut (1) on door handle (7) and link rod (5.1).



FOLLOW-ON TASK: Adjust door latch (para. 11-9).

11-6. DOOR LATCH COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Tools

General mechanic's tool kit:

automotive (Appendix B, Item 1)

Maintenance and repair shop equipment:

automotive (Appendix B, Item 2)

Equipment Condition

- Window in raised (closed) position (TM 9-2320-387-10).
- Pull strap removed (para. 11-11).

Materials/Parts

Three lockwashers (Appendix G, Item 200)

Maintenance Level

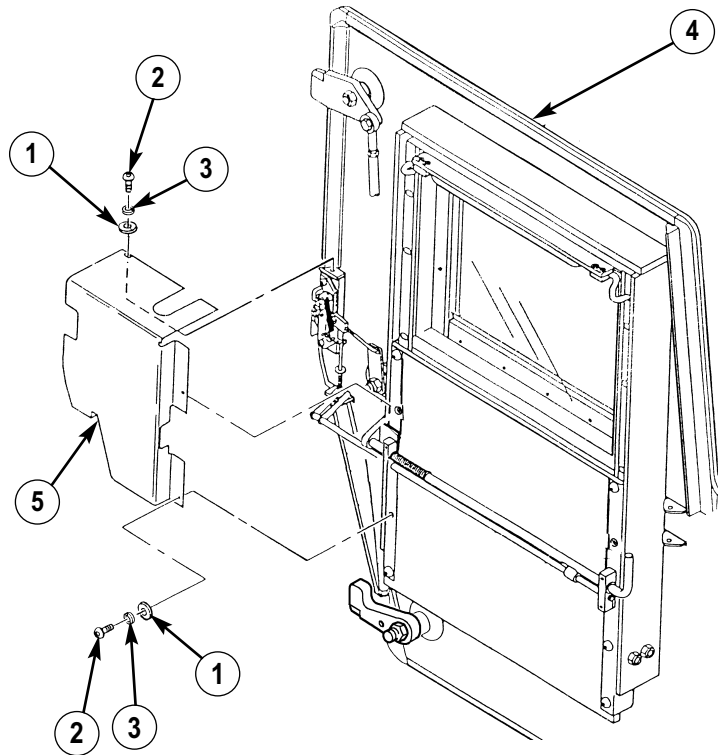
Unit

a. Removal

Remove three screws (2), lockwashers (3), washers (1), and latch cover (5) from door (4). Discard lockwashers (3).

b. Installation

Install latch cover (5) on door (4) with three washers (1), lockwashers (3), and screws (2). Tighten screws (2) to 20-23 lb-in. (2-3 N-m).



FOLLOW-ON TASK: Install pull strap (para. 11-11).

11-7. LOCKING PAWL AND CONNECTING ROD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts (Appendix G, Item 182)
 Four lockwashers (Appendix G, Item 201)
 Six lockwashers (Appendix G, Item 202)
 Four lockwashers (Appendix G, Item 202.1)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Door latch cover removed (para. 11-6).

Maintenance Level

Unit

a. Removal

1. Remove four screws (1), lockwashers (1.1), two connecting rods (12), and four lockwashers (9) from upper and lower locking pawls (3) and locking rod (13). Discard lockwashers (1.1) and (9).

NOTE

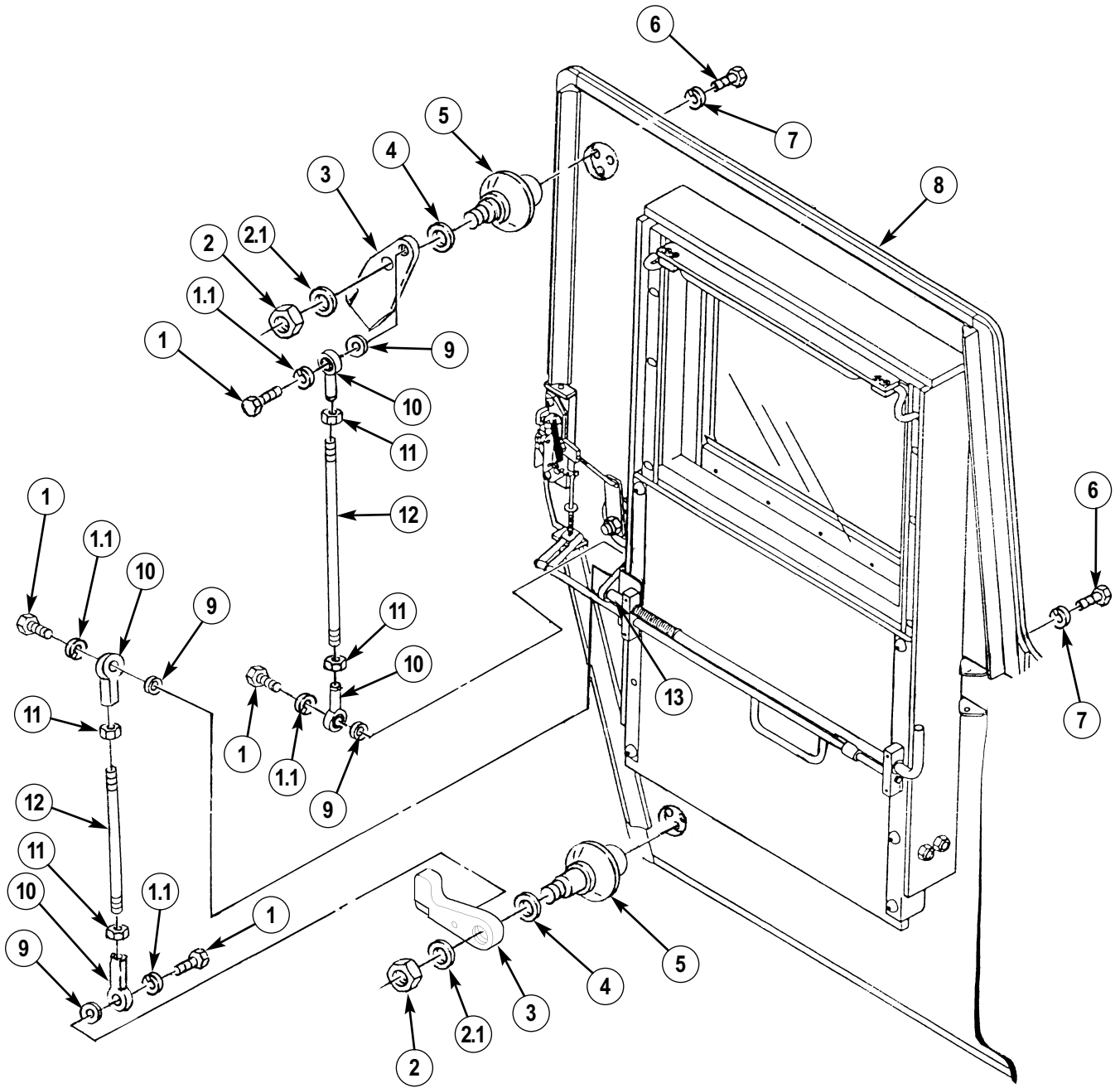
Tie washers together to be used in installation.

2. Remove two locknuts (2), washers (2.1), locking pawls (3), and washers (4) from upper and lower pivot bases (5). Discard locknuts (2).
3. Remove six capscrews (6), lockwashers (7), and two pivot bases (5) from door (8). Discard lockwashers (7).
4. Remove four rod ends (10) and locking nuts (11) from two connecting rods (12).

b. Installation

1. Install upper and lower pivot bases (5) on door (8) with six lockwashers (7) and capscrews (6). Tighten capscrews (6) to 21 lb-ft (29 N·m).
2. Install washers (4) and locking pawls (3) on upper and lower pivot bases (5) with two washers (2.1) and locknuts (2), tighten locknuts (2) until tight, then loosen 1/2 turn.
3. Install four locking nuts (11) and rod ends (10) on two connecting rods (12).
4. Apply sealing compound to threads of four screws (1), and install two connecting rods (12) on locking rod (13) and upper and lower locking pawls (3) with four lockwashers (9), lockwashers (1.1), and screws (1).

11-7. LOCKING PAWL AND CONNECTING ROD REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Adjust door latch (para. 11-9).

11-8. LOCKING ROD AND DOOR RELEASE HANDLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Door link rod removed (para. 11-4).
- Door locking pawls and connecting rods removed (para. 11-7).

Materials/Parts

Four lockwashers (Appendix G, Item 200)

Maintenance Level

Unit

NOTE

Replacement procedures for locking rod and door release handle are basically the same. This procedure covers the left front door.

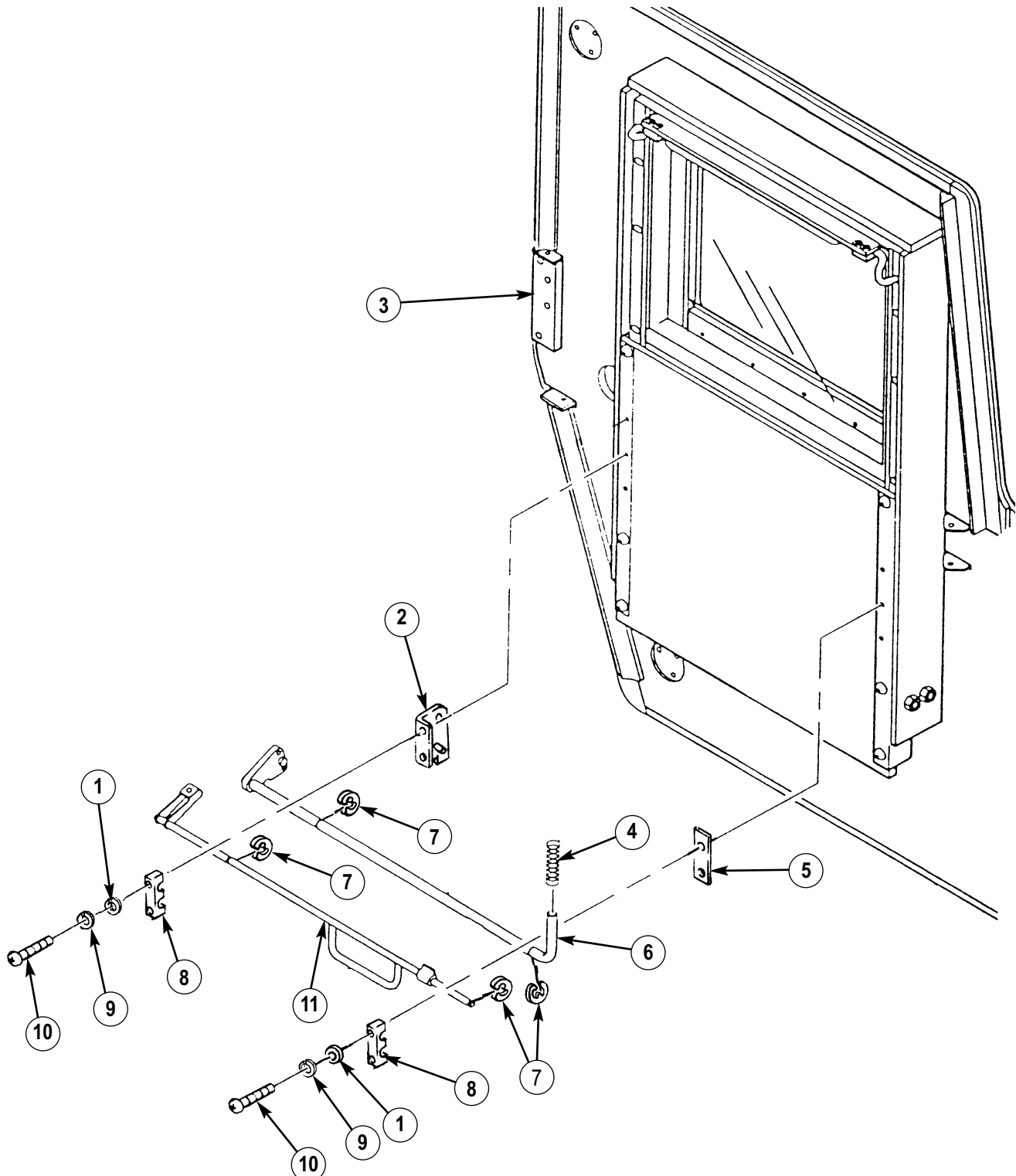
a. Removal

1. Remove four retaining rings (7) from locking rod (6) and door release handle (11) and uncompress spring (4).
2. Remove four screws (10), lockwashers (9), washers (1), two retainer blocks (8), locking rod (6), door release handle (11), retainer (5), and detent bracket (2) from door (3). Discard lockwashers (9).
3. Remove spring (4) from locking rod (6).

b. Installation

1. DELETED.
2. Install spring (4) on locking rod (6), and install detent bracket (2), retainer (5), door release handle (11), and locking rod (6) on door (3) with two retainer blocks (8), four washers (1), lockwashers (9), and screws (10). Tighten screws (10) to 21 lb-in. (2 N·m).
3. Compress spring (4) and install four retaining rings (7) on locking rod (6) and door release handle (11).

11-8. LOCKING ROD AND DOOR RELEASE HANDLE REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install door locking pawls and connecting rods (para. 11-7).
 - Install door link rod (para. 11-4).
 - Adjust door latch (para. 11-9).

11-9. DOOR LATCH ADJUSTMENT

This task covers:

- a. Exterior Handle Adjustment
- b. Interior Handle Adjustment

- c. Locking Rod Adjustment

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Door latch cover removed (para. 11-6).

Maintenance Level

Unit

a. Exterior Handle Adjustment

1. Loosen nut (4).
2. Remove capscrew (2) and boss (3) from latch (1).
3. Adjust boss (3) until rod (5) contacts end of slot (6) with door handle (18) in contact with lower flange (19) and bolt hole in boss (3) aligns with threaded hole in latch (1).
4. Install capscrew (2) on boss (3) and tighten nut (4).

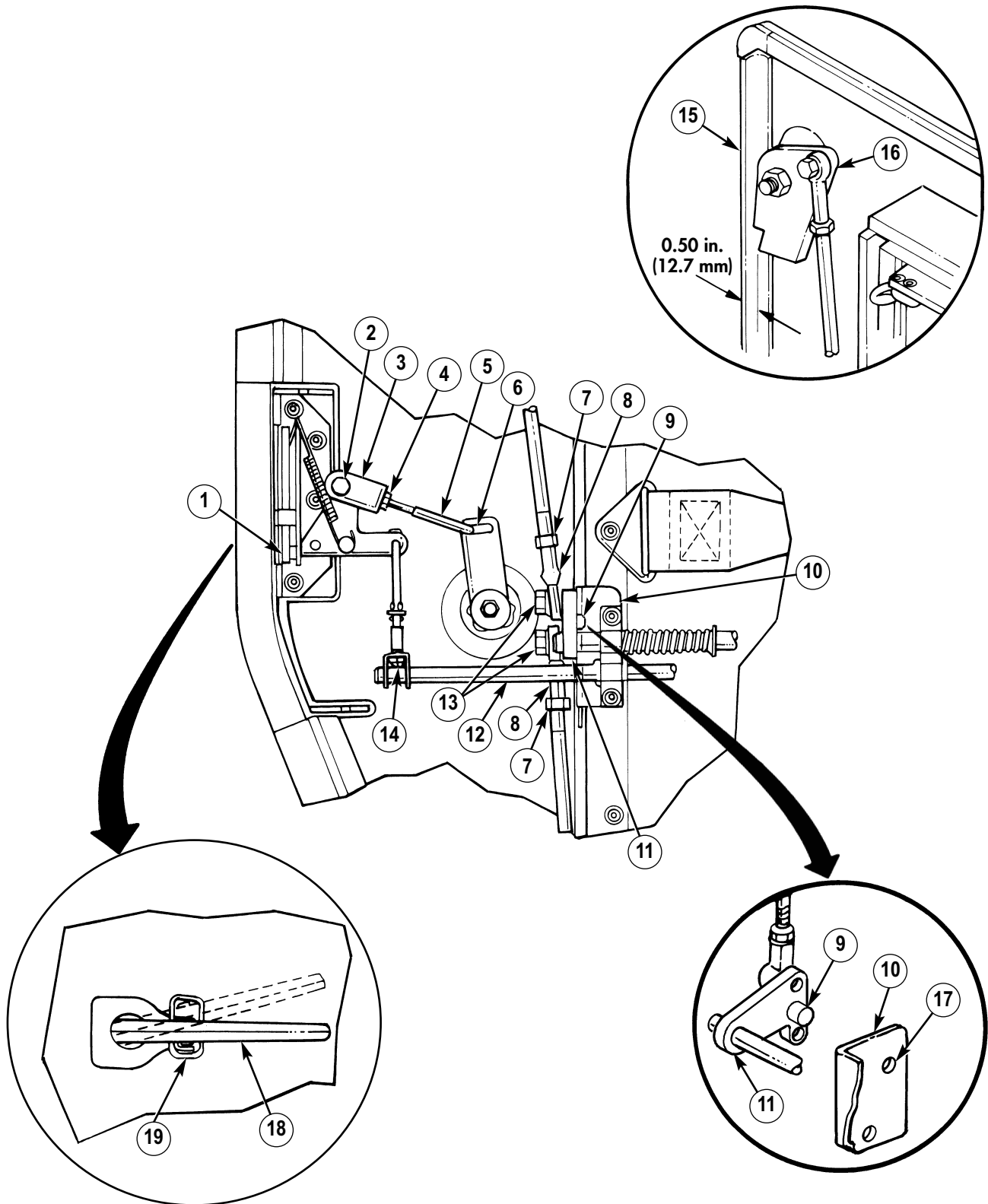
b. Interior Handle Adjustment

1. Close latch (1).
2. Tighten or loosen nut (14) until handle (18) releases latch (1) prior to detent pin (9) bottoming in recess of lock rod (12).

c. Locking Rod Adjustment

1. Loosen two nuts (7) on clevises (8).
2. Remove two screws (13) and clevises (8) from locking rod bracket (11).
3. Position detent pin (9) to upper hole (17) in detent bracket (10).
4. Adjust clevises (8) until lock pawls (16) are 1/2 in. (12.7 mm) from door channel (15) and bolt holes in clevises (8) align with threaded holes in locking rod bracket (11).
5. Install clevises (8) on locking rod bracket (11) with two screws (13).
6. Tighten two nuts (7) on clevises (8).

11-9. DOOR LATCH ADJUSTMENT (Cont'd)



FOLLOW-ON TASK: Install door latch cover (para. 11-6).

11-10. DOOR WINDOW SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Door window removed (para. 11-3).

Materials/Parts

Seal (Appendix G, Item 377)
Drycleaning solvent (Appendix C, Item 26)
Adhesive (Appendix C, Item 4)

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Unit

WARNING

Drycleaning solvent is highly flammable. Do not perform this procedure near fire, flames, or sparks. Injury to personnel and/or damage to equipment will result.

a. Removal

NOTE

Use drycleaning solvent to remove adhesive from window channels.

1. Remove three seals (2) from window channels (3).
2. Remove five seals (1) from window channels (3).

b. Installation

1. Apply a thin coat of adhesive on inside of window channel (3).

NOTE

Seal is supplied in bulk and must be cut to fit.

2. Trim three seals (2) to fit window channels (3), as required.

NOTE

Ensure mating surfaces of seals are installed on window channels evenly.

3. Apply a thin coat of adhesive on three seals (2) and install seals (2) on window channels (3).

NOTE

Two seals will be trimmed 21.25-in. (540 mm) in length, two seals will be 20.00-in. (508 mm) in length, and one seal will be 16.00-in. (406 mm) in length.

4. Trim five seals (1) to fit window channels (3), as required.

NOTE

Ensure mating surfaces of seals are installed on window channels evenly.

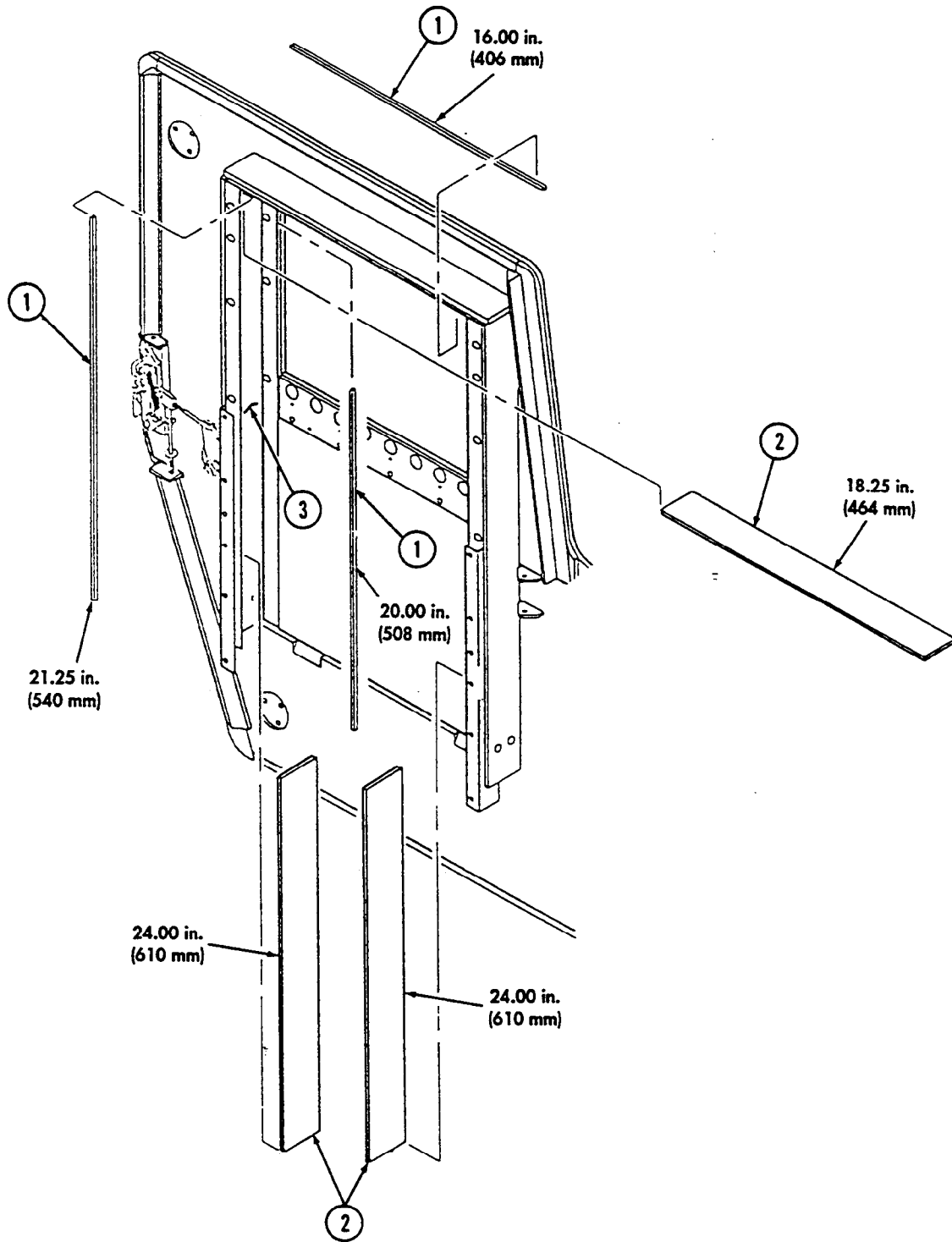
5. Apply a thin coat of adhesive on edges of window channels (3) and on contact edge of five door seals (1).

NOTE

Two seals are located on right side, two seals on left side, and one seal on top of window channels.

6. Install five seals (1) on window channels (3).

11-10. DOOR WINDOW SEAL REPLACEMENT (Cont'd)



FOLLOW-ON-TASK: Install door window (para. 11-3).

11-11. DOOR SEAL AND PULL STRAP REPLACEMENT

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Door Seal Removal b. Door Seal Installation | <ul style="list-style-type: none"> c. Door Pull Strap Removal d. Door Pull Strap Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Maintenance Level

Unit

Materials/Parts

Seal (Appendix G, Item 400)
 Two lockwashers (Appendix G, Item 200)
 RTV sealant (Appendix C, Item 74)

a. Door Seal Removal

Remove door seal (2) from door (1) and clean adhesive from door (1).

b. Door Seal Installation

Install door seal (2) on door (1) with sealant.

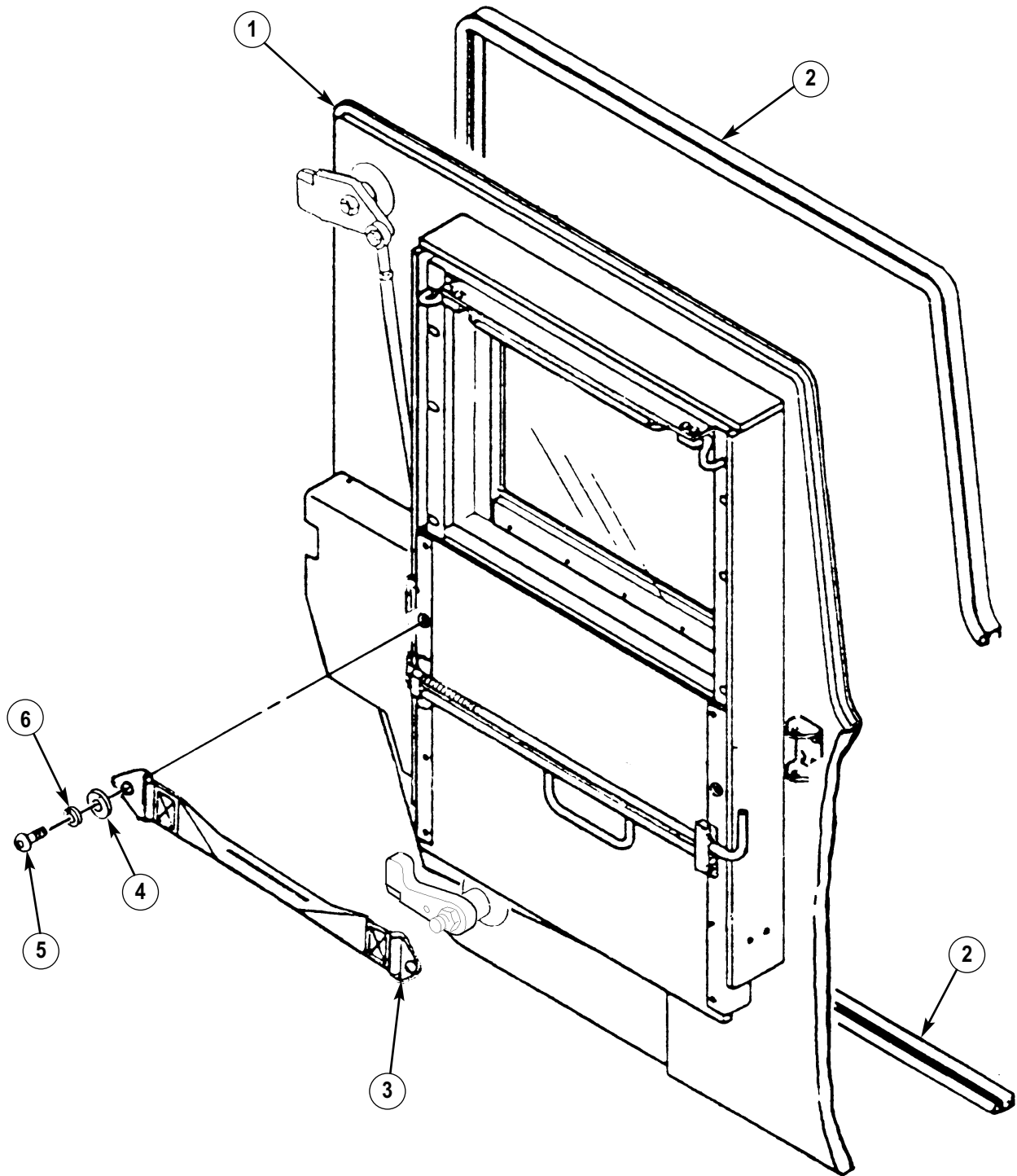
c. Door Pull Strap Removal

Remove two screws (5), lockwashers (6), washers (4), and door pull strap (3) from door (1). Discard lockwashers (6).

d. Door Pull Strap Installation

Install door pull strap (3) on door (1) with two washers (4), lockwashers (6), and screws (5). Tighten screws (5) to 21 lb-in. (2 N·m).

11-11. DOOR SEAL AND PULL STRAP REPLACEMENT (Cont'd)



11-12. DOOR LATCH CATCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

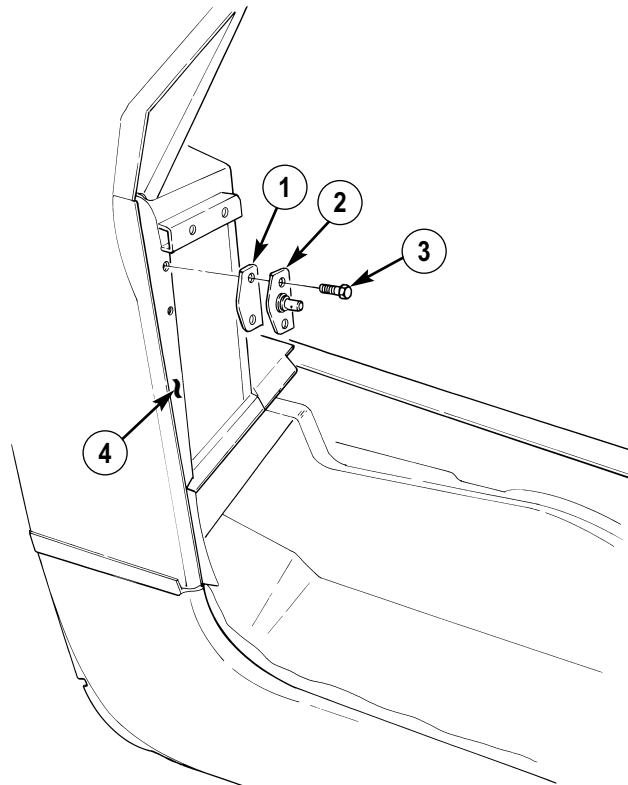
NOTE

Replacement procedures for door latch catches are basically the same. This procedure covers the right door latch catch.

Remove two capscrews (3), door latch catch (2), and spacer (1) from body (4).

b. Installation

Apply sealing compound to threads of two capscrews (3), and install spacer (1) and door latch catch (2) on body (4) with capscrews (3). Tighten capscrews (3) to 75 lb-in. (8 N-m).



11-13. CARGO SHELL DOOR ARMOR MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Maintenance Level

Unit

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

a. Removal

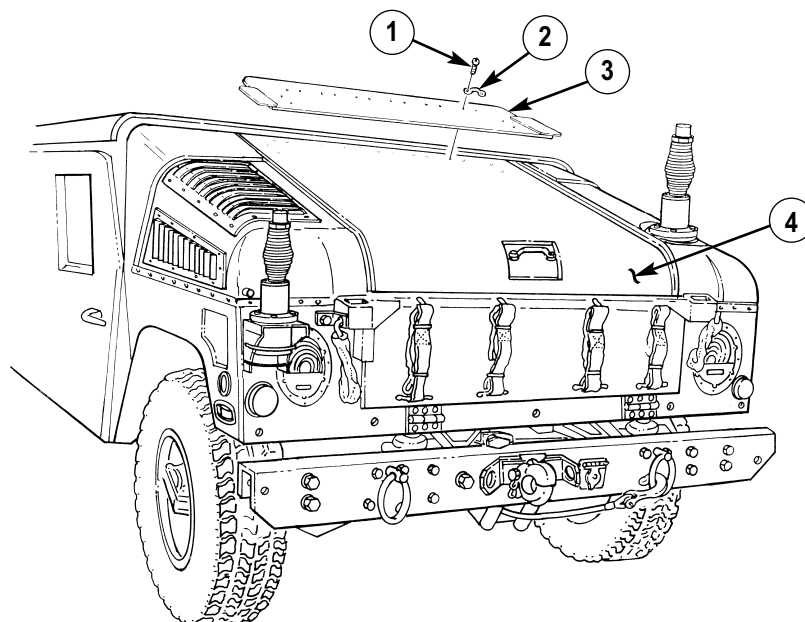
Remove sixteen screws (1), eight footman loops (2), and cargo shell door armor (3) from cargo shell door (4).

b. Inspection

Refer to para. 10-56 for plusnuts inspection and replacement.

c. Installation

Apply sealing compound to screws (1), and install cargo shell door armor (3) and eight footman loops (2) on cargo shell door (4) with sixteen screws (1). Tighten screws (1) to 29-35 lb-in. (3-4 N·m).



11-14. CARGO SHELL DOOR MAINTENANCE

This task covers:

- | | |
|---------------------------------------|--|
| <p>a. Removal
a.1. Inspection</p> | <p>b. Installation
c. Adjustment</p> |
|---------------------------------------|--|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 154)
Two screw-assembled lockwashers
(Appendix G, Item 370)
Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Cargo shell door armor removed (para. 11-13).
- Cargo shell door raised (TM 9-2320-387-10).

General Safety Instructions

- Never open one end of cargo shell door before ensuring opposite end is securely closed.
- Cargo door must be supported before removal of gas springs.

Maintenance Level

Unit

a. Removal

WARNING

Opening one end of cargo door before ensuring opposite end is fully closed may cause both ends to open simultaneously, resulting in injury to personnel or damage to equipment.

1. Remove two screw-assembled lockwashers (4), footman loop (5), and strap (3) from cargo door (1). Discard screw-assembled lockwashers (4).
2. Remove two capscrews (15), footman loop (16), and strap (14) from cargo door (1).
3. Lower cargo door (1) slightly, and remove two locknuts (9), shoulder bolts (6), and retention cables (10) from retention cable brackets (8). Discard locknuts (9).

WARNING

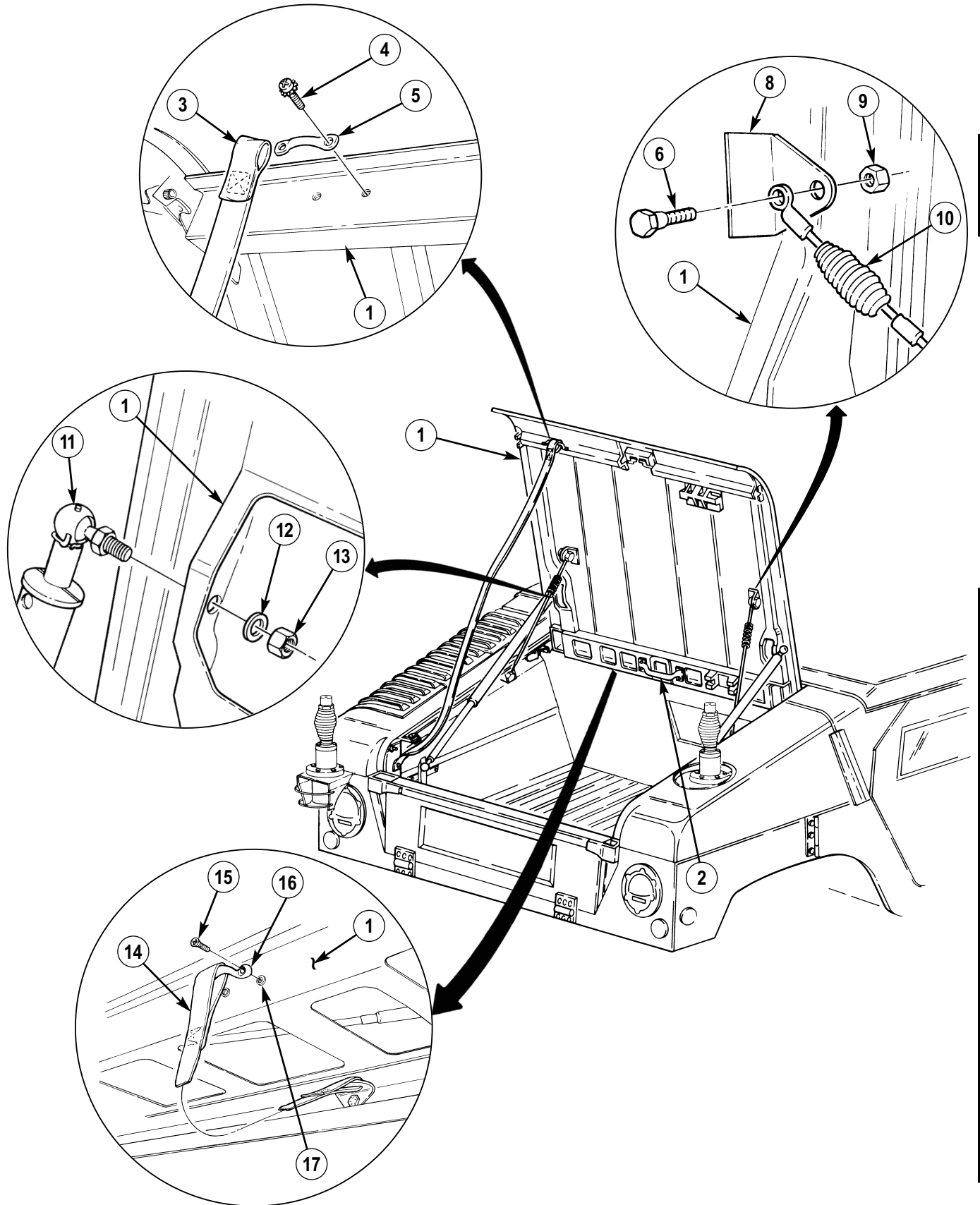
Cargo door must be supported before removal of gas springs. Failure to do so may result in injury to personnel or damage to equipment.

4. Slowly raise cargo door (1) as far as possible to allow removal of gas springs (11) from cargo door (1).
5. Remove two locknuts (13), washers (12), and gas springs (11) from cargo door (1) and place gas springs (11) inside vehicle. Discard locknuts (13).
6. Lower cargo door (1), release front handle latch (2), and remove cargo door (1) from vehicle.

a.1. Inspection

Refer to para. 10-56 for plusnuts (17) inspection and replacement.

11-14. CARGO SHELL DOOR MAINTENANCE (Cont'd)



11-14. CARGO SHELL DOOR MAINTENANCE (Cont'd)

b. Installation

1. Install front latches (5) on front striker pins (6).
2. Push down on cargo door (1) edge to ensure front striker pins (6) are locked in front latches (5).

WARNING

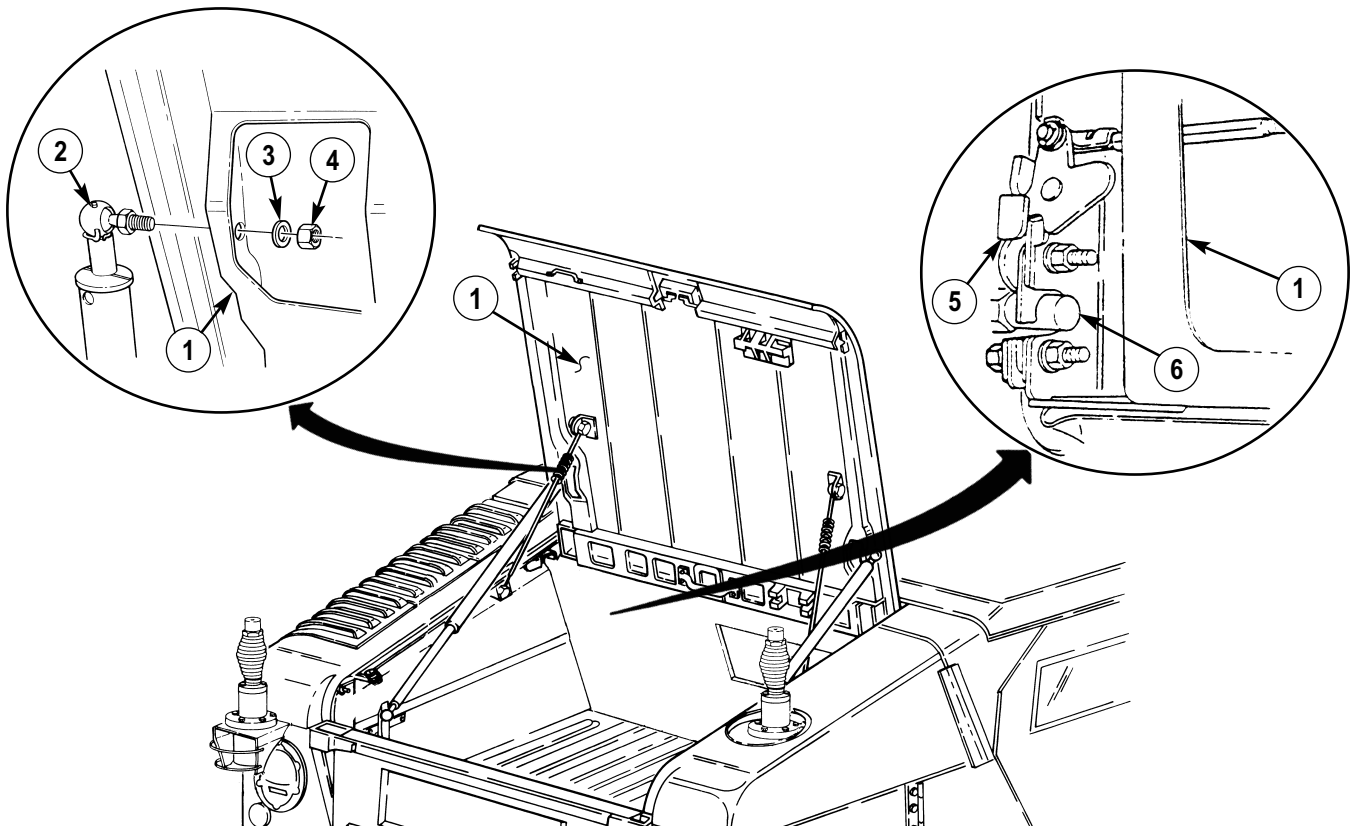
Cargo door must be supported before installation of gas springs.
Failure to do so may result in injury to personnel or damage to equipment.

3. Slowly raise cargo door (1) as far as possible to allow installation of gas springs (2) on cargo door (1).
4. Install two gas springs (2) on cargo door (1) with two washers (3) and locknuts (4). Tighten locknuts (3) to 15-20 lb-ft (20-27 N·m).
5. Connect two retention cables (13) to retention cable brackets (11) with two shoulder bolts (10) and locknuts (12). Tighten locknuts (12) to 85-110 lb-in. (10-12 N·m).
6. Install strap (7) on cargo door (1) with footman loop (9) and two screw-assembled lockwashers (8). Tighten screw-assembled lockwashers (8) to 21 lb-in. (2 N·m).
7. Apply sealing compound to threads of two screws (17), and install strap (16) on cargo door (1) with footman loop (18) and screws (17).

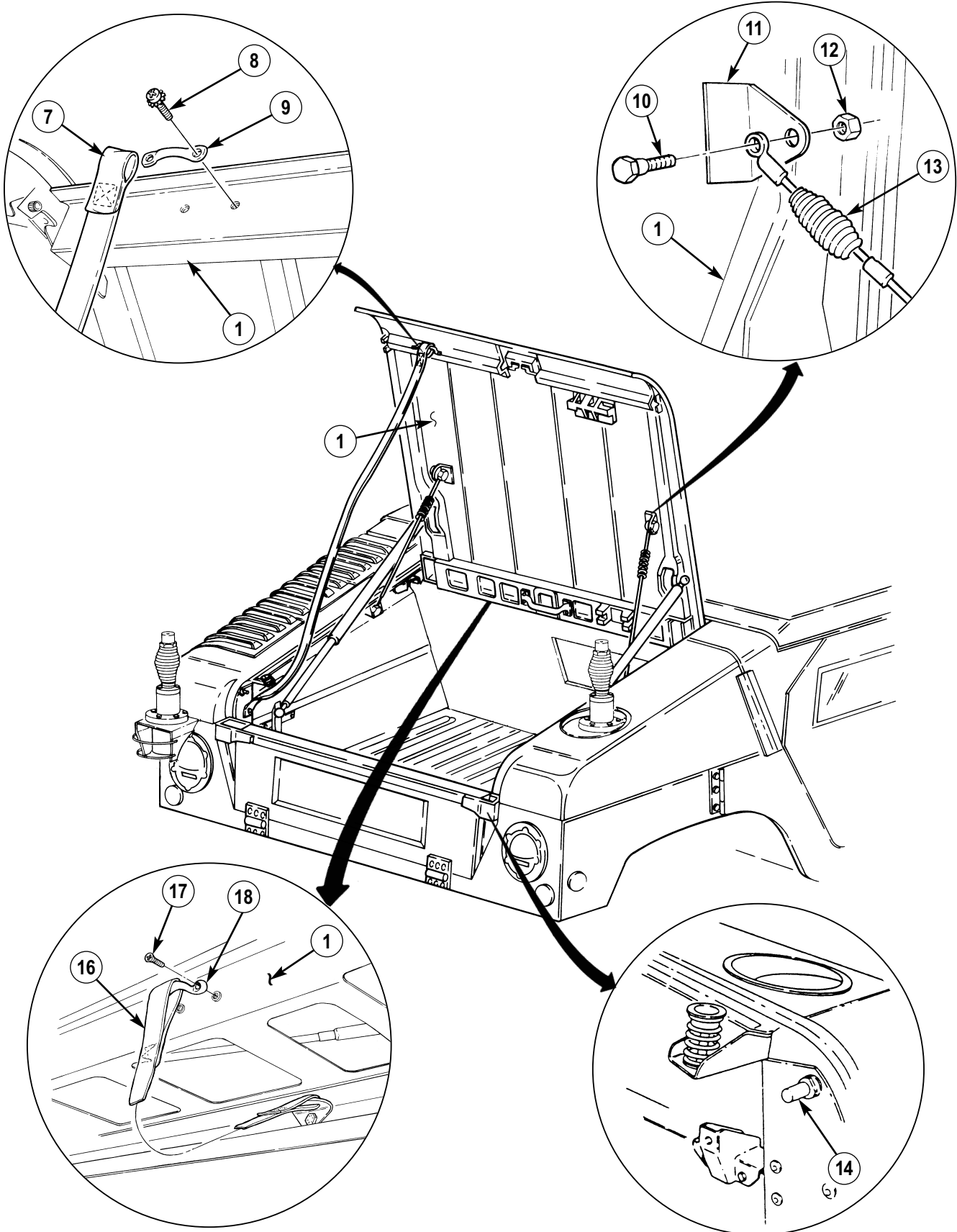
NOTE

To assist closing of cargo shell door, a grab loop may be added.
Refer to cargo shell door strap replacement (para. 11-23).

8. Close cargo door (1), and ensure cargo door (1) is securely latched on two rear striker pins (14).



11-14. CARGO SHELL DOOR MAINTENANCE (Cont'd)



11-14. CARGO SHELL DOOR MAINTENANCE (Cont'd)

c. Adjustment

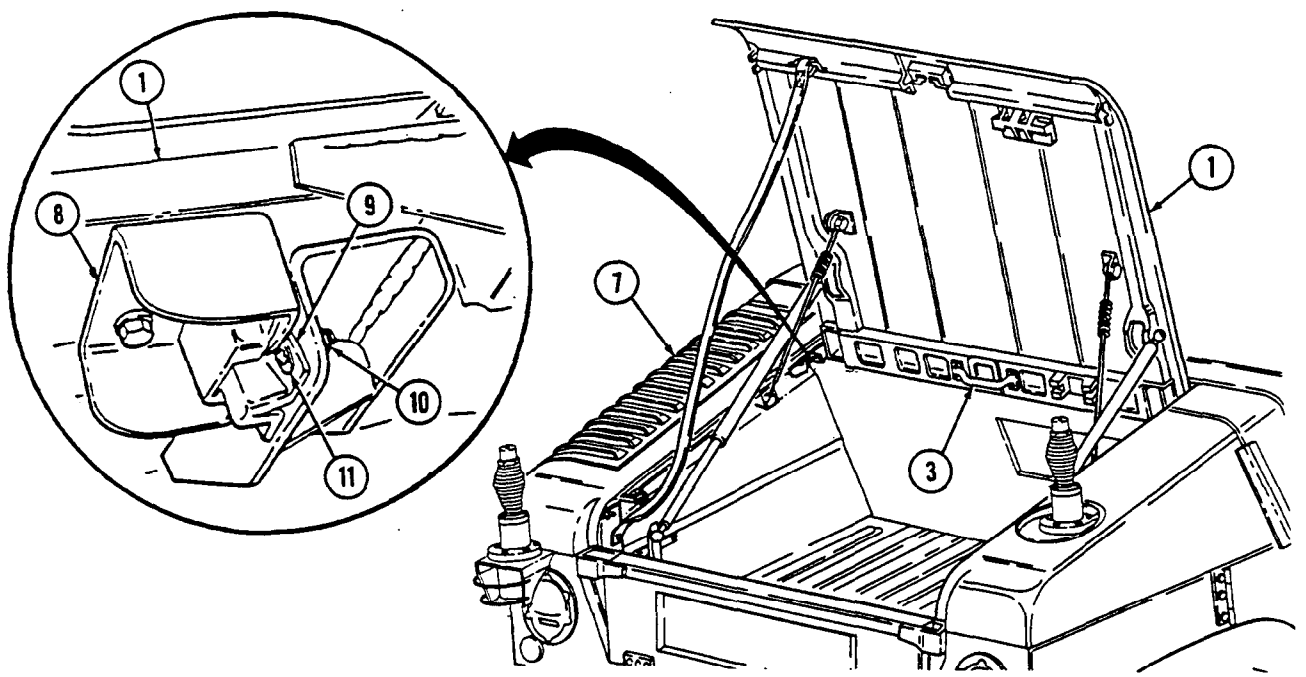
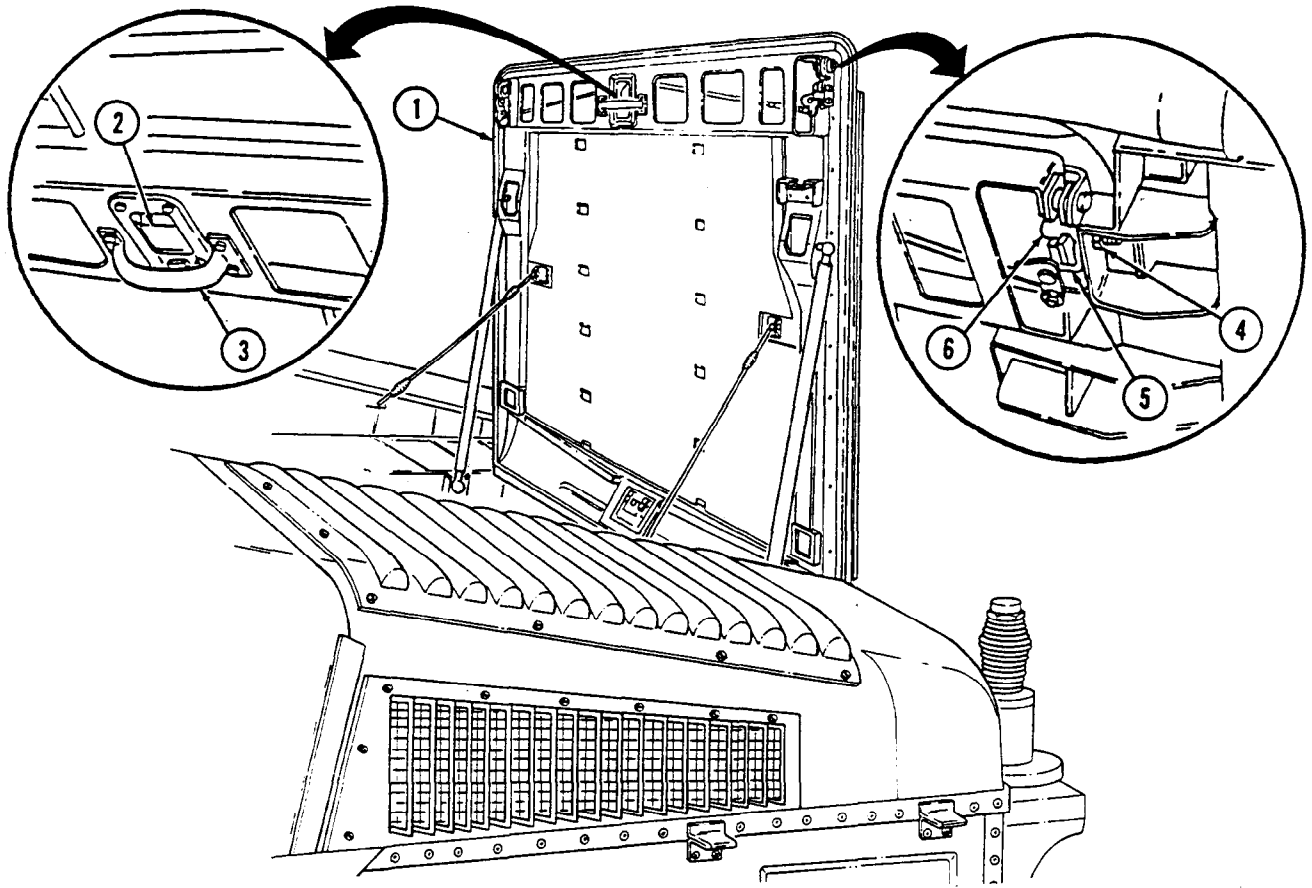
1. Raise rear end of cargo shell door (1) (TM 9-2320-387-10).
2. Perform task a., steps 1 and 5.
3. Close cargo door (1).
4. Release front handle latch (2) and push cargo door (1) open.
5. Loosen two front striker pin mounting nuts (4).
6. Loosen two countersunk screws (11) and nuts (10) to allow movement of male dovetail (9).
7. Close cargo door (1). Ensure front striker pins (6) are secured and centered in front latches (5).
8. Ensure male dovetail (9) is aligned with female dovetail (8).

NOTE

It may be necessary to shim front striker pins for proper door alignment and operation.

9. Pull down on handle (3) to ensure cargo door (1) properly seals to cargo shell (7). With striker pins (6) properly adjusted, tighten striker pin mounting nuts (4) to 35-45 lb-ft (47-61 N·m).
10. Release handle latch (2) and push cargo door (1) open.
11. Tighten two nuts (10) on male dovetail (9) to 85-110 lb-in. (10-12 N·m).
12. Lower cargo door (1). Ensure front striker pins (6) are secured and centered in front latches (5).
13. Raise cargo door (1) with handle (3) and perform task b., steps 3, 4, and 6.
14. Insert a piece of paper between door seals and door opening. With cargo door (1) closed, resistance should be felt when pulling out paper. If not, readjust cargo door (1).

11-14. CARGO SHELL DOOR MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install cargo shell door armor (para. 11-13).

11-15. CARGO SHELL DOOR WIRE HANDLE LOCK REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)

Equipment Condition

Tailgate lowered (TM 9-2320-387-10).

Materials/Parts

Two pushnuts (Appendix G, Item 312)
 Sealing compound (Appendix C, Item 70)

Maintenance Level

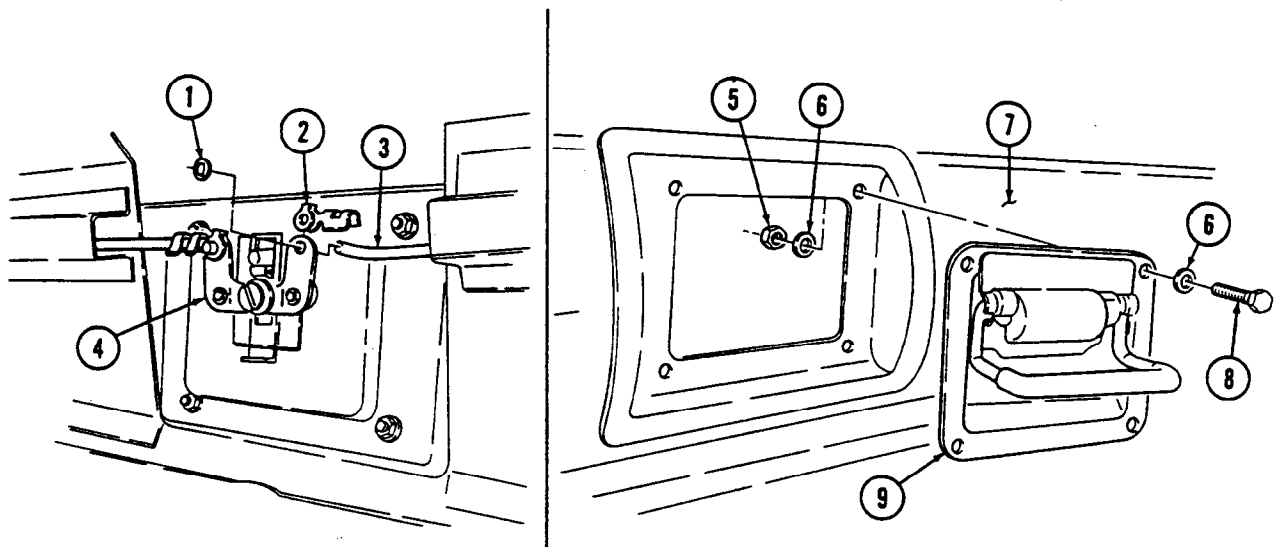
Unit

a. Removal

1. Remove two pushnuts (1), rod end clips (2), and latch rods (3) from wire handle lock pivot arms (4). Discard pushnuts (1).
2. Remove four nuts (5), washers (6), capscrews (8), washers (6), and wire handle lock (9) from cargo door (7).

b. Installation

1. Apply sealing compound to threads of four capscrews (8).
2. Install wire handle lock (9) on cargo door (7) with four washers (6), capscrews (8), washers (6), and nuts (5).
3. Install two latch rods (3) on wire handle lock pivot arms (4) with rod end clips (2) and pushnuts (1).



- FOLLOW-ON TASKS:**
- Raise and secure tailgate (TM 9-2320-387-10).
 - Check cargo shell door for proper operation (TM 9-2320-387-10).

11-16. CARGO SHELL DOOR GRAB HANDLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Forward end of cargo shell door raised
(para. 11-90).

Materials/Parts

Four lockwashers (Appendix G, Item 203)
Sealing compound (Appendix C, Item 64)

Maintenance Level

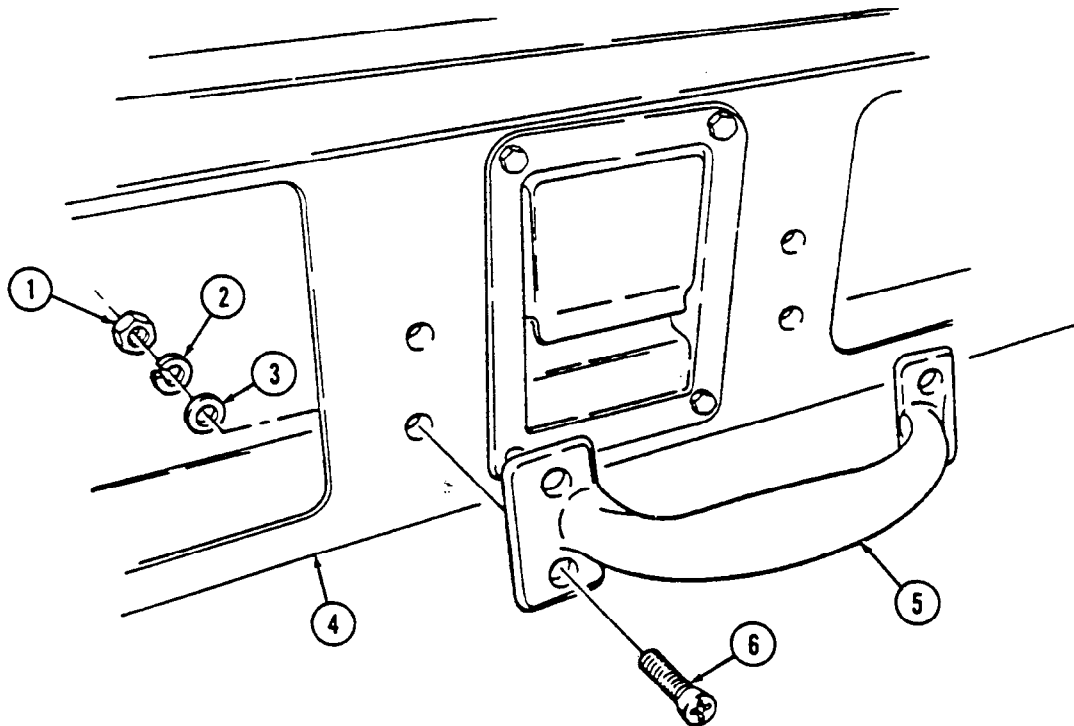
Unit

a. Removal

Remove four nuts (1), lockwashers (2), washers (3), countersunk screws (6), and grab handle (5) from cargo door (4). Discard lockwashers (2).

b. Installation

1. Apply sealing compound to threads of four countersunk screws (6).
2. Install grab handle (5) on cargo door (4) with four countersunk screws (6), washers (3), lockwashers (2), and nuts (1).



FOLLOW-ON TASK: Lower cargo shell door (para. 11-90).

11-17. CARGO SHELL DOOR HANDLE LATCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Forward end of cargo shell door raised
(para. 11-90).

Materials/Parts

Two pushnuts (Appendix G, Item 312)

Maintenance Level

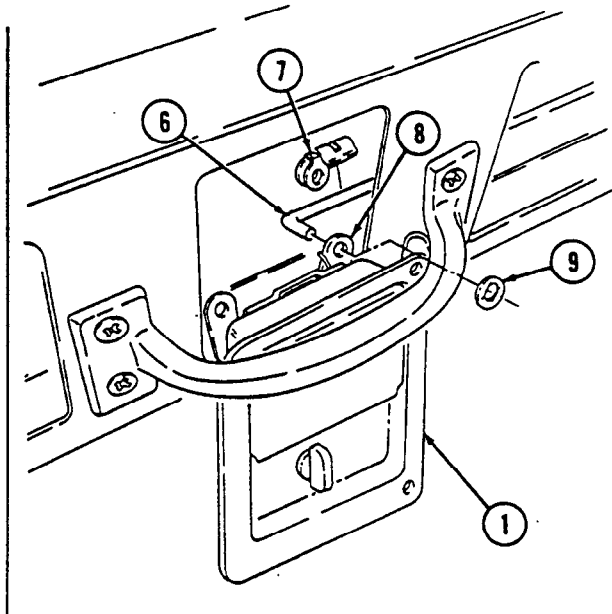
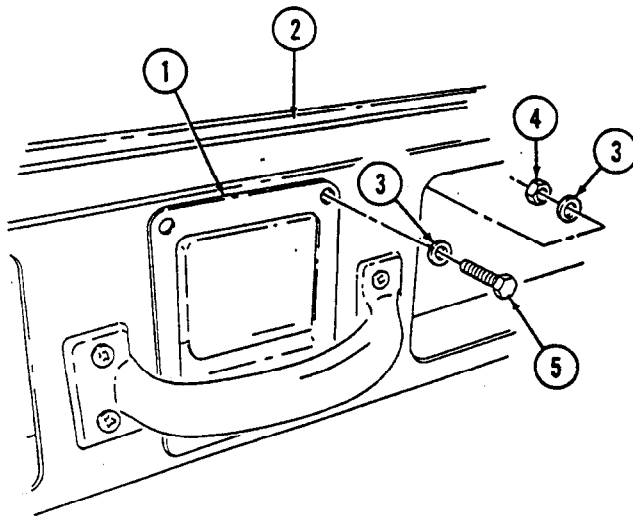
Unit

a. Removal

1. Remove four nuts (4), washers (3), capscrews (5), and washers (3) from handle latch (1) and cargo door (2).
2. Pull handle latch (1) out and down until two latch rods (6) are visible.
3. Remove two pushnuts (9), rod end clips (7), and latch rods (6) from handle latch pivot arms (8) and remove handle latch (1). Discard pushnuts (9).

b. Installation

1. Position handle latch (1) to cargo door (2) until two latch rods (6) can be connected to handle latch pivot arms (8) and install two latch rods (6) on pivot arms (8) with rod end clips (7) and pushnuts (9).
2. Install handle latch (1) on cargo door (2) with four washers (3), capscrews (5), washers (3), and nuts (4).



FOLLOW-ON TASK: Lower cargo shell door (para. 11-90).

11-18. CARGO SHELL DOOR LATCH MAINTENANCE

This task covers:

- | | |
|-----------------|---------------|
| a. Removal | c. Adjustment |
| b. Installation | |

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three lockwashers (Appendix G, Item 206)
 Pushnut (Appendix G, Item 312)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
 (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

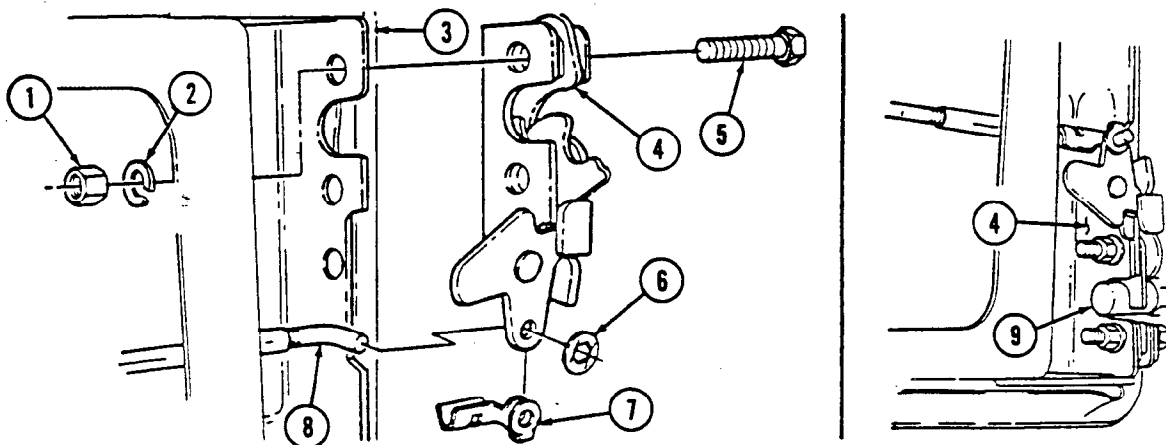
1. Remove pushnut (6), rod end clip (7), and rod (8) from door latch (4). Discard pushnut (6).
2. Remove three nuts (1), lockwashers (2), capscrews (5), and door latch (4) from cargo door (3). Discard lockwashers (2).

b. Installation

Install door latch (4) on cargo door (3) with three capscrews (5), lockwashers (2), and nuts (1). Finger-tighten nuts (1).

c. Adjustment

1. Loosen three nuts (1) on door latch (4) and cargo door (3).
2. Close cargo door (3), ensuring latches (4) are fully engaged on door striker pins (9).
3. Tighten three nuts (1) to 17 lb-ft (23 N·m).
4. Open cargo door and install rod (8) on latch (4) with rod end clip (7) and pushnut (6).



- FOLLOW-ON TASKS:
- Lubricate door latch (TM 9-2320-387-10).
 - Check cargo shell door for proper operation (TM 9-2320-387-10).

11-19. CARGO SHELL DOOR LATCH ROD MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Installation | <ul style="list-style-type: none"> c. Adjustment |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two pushnuts (Appendix G, Item 312)

Manual References

TM 9-2320-387-24P

Equipment Condition

Forward end of cargo shell door raised
(para. 11-90).

Maintenance Level

Unit

NOTE

Maintenance procedures for all cargo shell door latch rods are basically the same. This procedure covers the left rear latch rod.

a. Removal

1. Remove pushnut (1), rod end clip (3), and latch rod (4) from pivot arm (2) on wire handle lock (5). Discard pushnut (1).
2. Remove pushnut (7), rod end clip (6), and latch rod (4) from door latch (8). Discard pushnut (7).

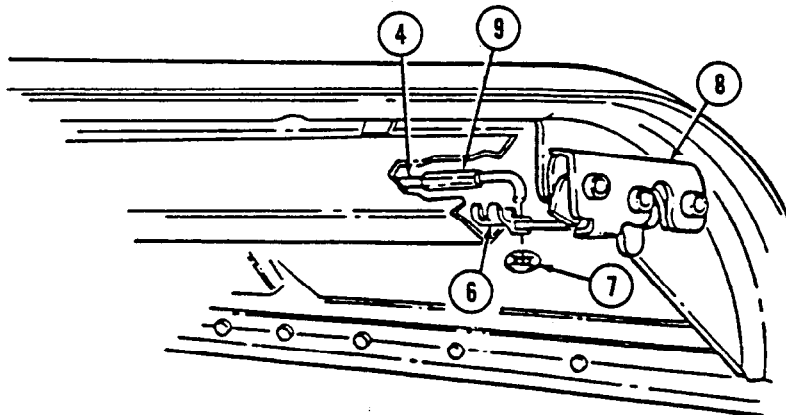
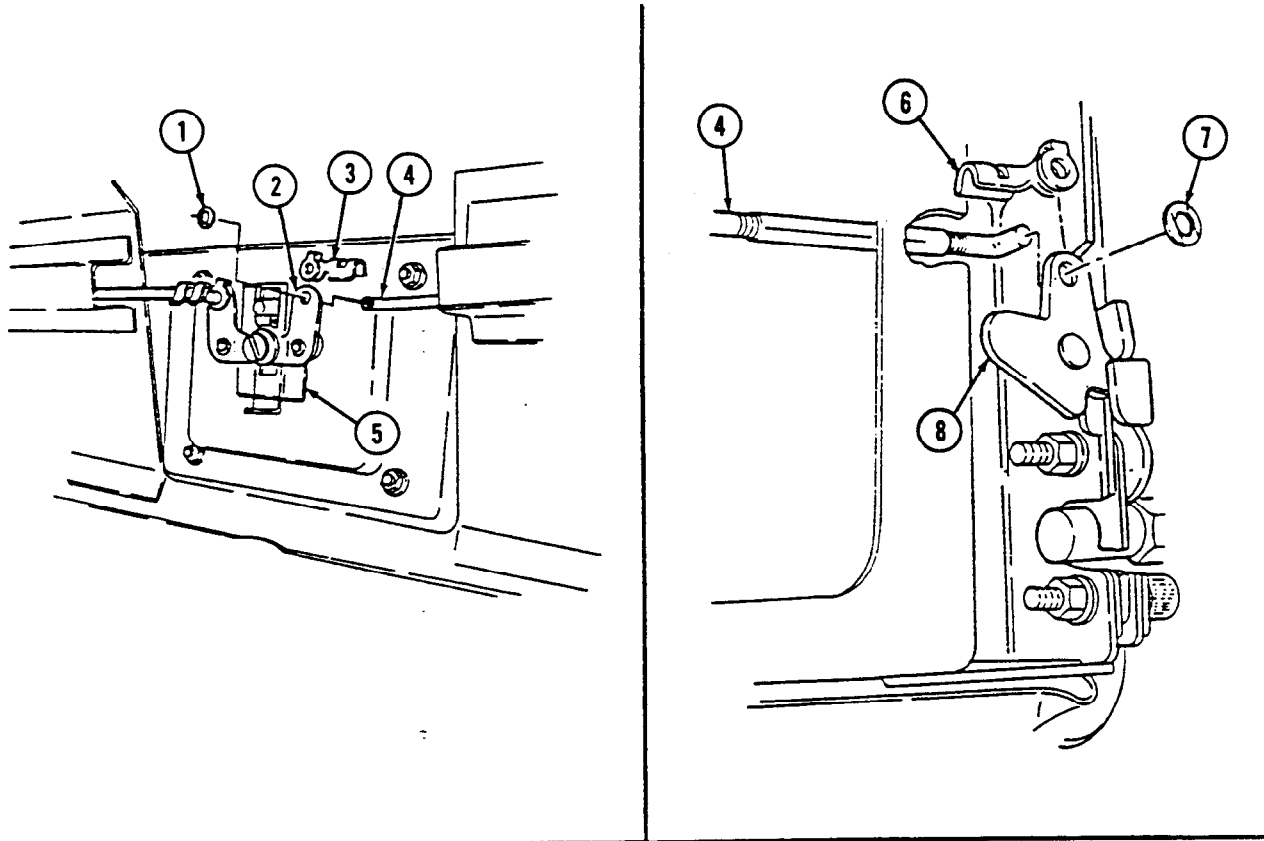
b. Installation

1. Connect latch rod (4) to door latch (8) with rod end clip (6).
2. Connect latch rod (4) to pivot arm (2) on wire handle lock (5) with rod end clip (3) and pushnut (1).
3. Close forward end of cargo door.

c. Adjustment

1. Open rear end of cargo door.
2. Close both rear door latches (8) to check latch action.
3. Gently pull wire handle lock (5) and observe movement of door latches (8). If both door latches (8) unlatch at the same time, install pushnut (7) on latch rod (4); no adjustment is necessary. If door latches (8) do not unlatch at the same time, go to step 4.
4. Remove rod end clip (6) from rod (4) and door latch (8). Rotate rod adjuster (9) clockwise if door latch (8) unlatches after opposite latch (8), or rotate rod adjuster (9) counterclockwise if door latch (8) unlatches before opposite door latch (8).
5. Repeat step 4 until both door latches (8) unlatch at the same time.
6. Install latch rod (4) on door latch (8) with rod end clip (6) and pushnut (7).

11-19. CARGO SHELL DOOR LATCH ROD MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Lower cargo shell door (para. 11-90).

11-20. CARGO SHELL DOOR DOVETAIL ASSEMBLY MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Installation | <ul style="list-style-type: none"> c. Adjustment |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts (Appendix G, Item 178)
 Two lockwashers (Appendix G, Item 221)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
 (TM 9-2320-387-10).

Maintenance Level

Unit

NOTE

The cargo shell door dovetail assembly is of two-piece construction. The female half is mounted on the cargo door. The male half is mounted on a bracket attached to the left cargo shell. Both halves are adjustable and function as door alignment devices.

a. Removal

1. Remove two capscrews (1), lockwashers (2), washers (3), and female dovetail (4) from cargo door (5). Discard lockwashers (2).
2. Remove two locknuts (6), washers (7), countersunk screws (11), male dovetail (10), and shim (9) from cargo shell bracket (8). Discard locknuts (6).

b. Installation

1. Install shim (9) and male dovetail (10) on cargo shell bracket (8) with two countersunk screws (11), washers (7), and locknuts (6). Leave male dovetail (10) loose enough to allow movement from left to right.
2. Install female dovetail (4) on cargo door (5) with two washers (3), lockwashers (2), and capscrews (1). Leave dovetail (4) loose enough to allow up and down movement.
3. Close rear end of cargo door (5).

c. Adjustment

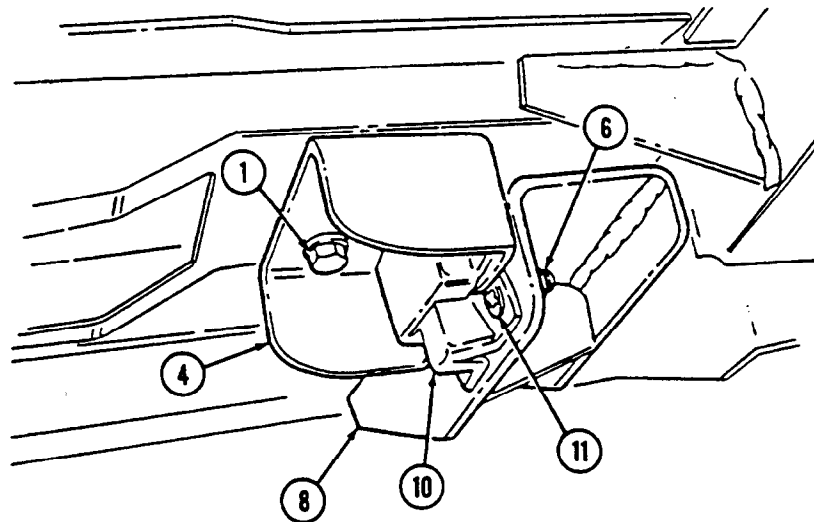
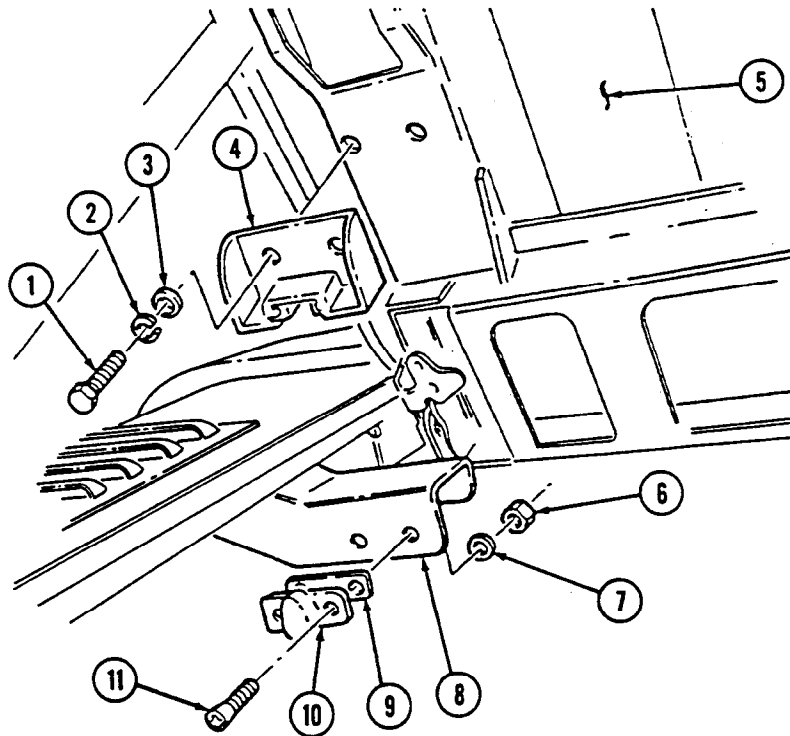
1. Open forward end of cargo door (5).

NOTE

Perform steps 2 and 3 if dovetails were not removed.

2. Loosen two capscrews (1) from female dovetail (4) and cargo door (5) until female dovetail (4) will slide up and down.
3. Loosen two countersunk screws (11) and locknuts (6) from male dovetail (10) and cargo shell bracket (8) until male dovetail (10) can be moved from left to right.
4. Gently close cargo door (5) until male dovetail (10) and female dovetail (4) fully seat without interference. Once this condition exists, tighten mounting hardware of dovetails (4) and (10).
5. Open and close cargo door (5) several times to ensure dovetails (4) and (10) are properly adjusted.
6. Tighten two capscrews (1) on female dovetail (4) to 10 lb-ft (14 N·m).
7. Tighten two locknuts (6) on male dovetail (10) to 85-100 lb-in. (10-11 N·m).

11-20.. CARGO SHELL DOOR DOVETAIL ASSEMBLY MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-21. CARGO SHELL DOOR RETENTION CABLE MAINTENANCE

This task covers:

- a. Removal
- a.1. Inspection
- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)
 Two locknuts (Appendix G, Item 109)

Manual References

TM 9-2320-387-24P

Equipment Condition

Forward end of cargo shell door raised
 (para. 11-90).

Maintenance Level

Unit

a. Removal

NOTE

It will be necessary to lower cargo shell door slightly to relieve cable tension during step 1.

1. Remove locknut (4), shoulder bolt (1), and spring end of cable (5) from cargo door bracket (3). Discard locknut (4).

NOTE

Perform step 1.1 for right side cable and step 2 for left side cable.

- 1.1 Remove locknut (6.1), washer (6.2), plate (6.3), cable (5), and shoulder bolt (7) from cargo door bracket (6). Discard locknut (6.1).
2. Remove shoulder bolt (7) and cable (5) from cargo shell bracket (6).

a.1. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

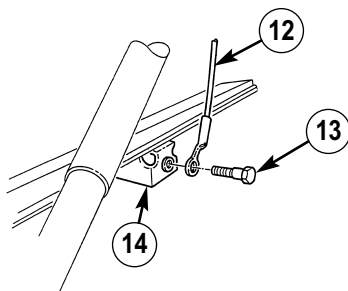
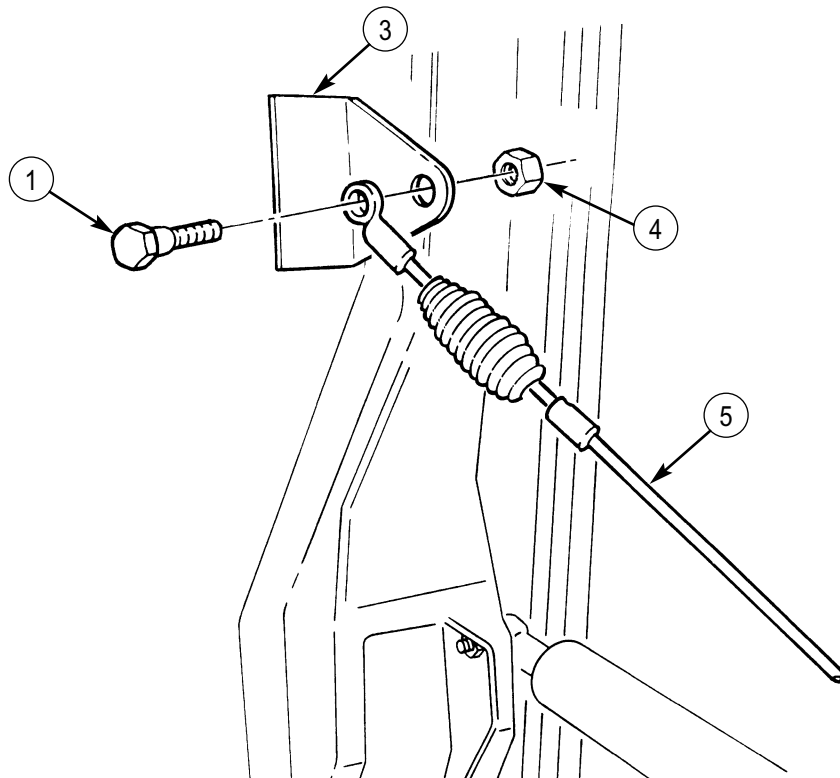
b. Installation

NOTE

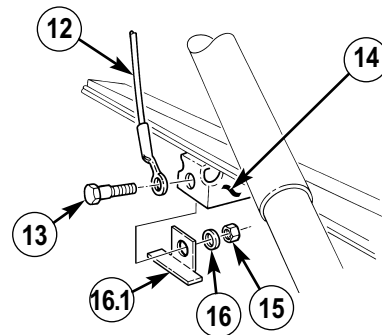
Perform step 1 for left side cable and step 1.1 for right side cable.

1. Apply sealing compound to threads of shoulder bolt (7), and install cable (5) on cargo shell bracket (6) with shoulder bolt (7).
- 1.1 Install cable (5) on cargo shell bracket (6) with shoulder bolt (7), plate (6.3), washer (6.2), and locknut (6.1). Tighten locknut (6.1) to 85-110 lb-in. (10-12 N·m).
2. Install spring end of cable (5) on cargo door bracket (3) with shoulder bolt (1) and locknut (4). Tighten locknut (4) to 85-110 lb-in. (10-12 N·m).

11-21. CARGO SHELL DOOR RETENTION CABLE MAINTENANCE (Cont'd)



LEFT SIDE



RIGHT SIDE

FOLLOW-ON TASK: Lower cargo shell door (para. 11-90).

11-22. CARGO SHELL DOOR GAS SPRING MAINTENANCE

This task covers:

- | | |
|----------------|-----------------|
| a. Rotating | c.1. Inspection |
| b. Removal | d. Assembly |
| c. Disassembly | e. Installation |

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four locknuts (Appendix G, Item 109)
Two retaining rings (Appendix G, Item 321)
Two screw-assembled lockwashers
(Appendix G, Item 370)
Grease (Appendix C, Item 34)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
(TM 9-2320-387-10).

General Safety Instructions

- Do not attempt to remove gas cylinders from spring rods.
- An assistant will be required to hold the cargo door open when either one or both gas springs are being removed or installed.

Maintenance Level

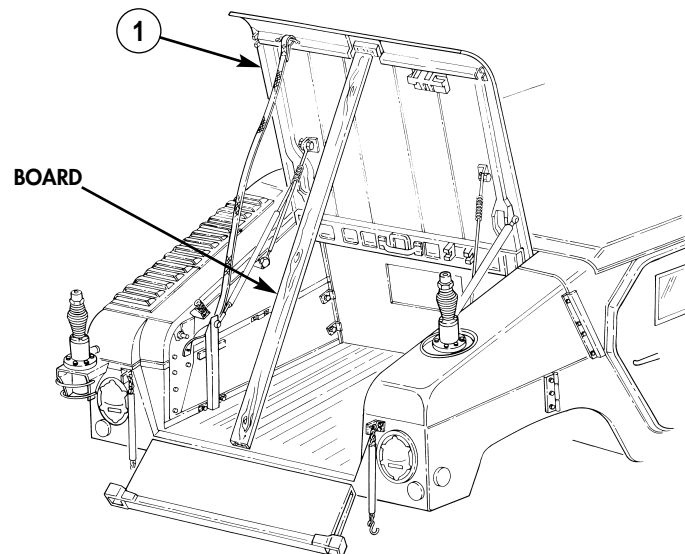
Unit

a. Rotating

NOTE

- Prior to starting any maintenance, ensure forward end of cargo shell door is locked.
- A 2x4x79.25 in. board can be used to support cargo door in the open position.

1. Secure rear cargo door (1) in full open position.



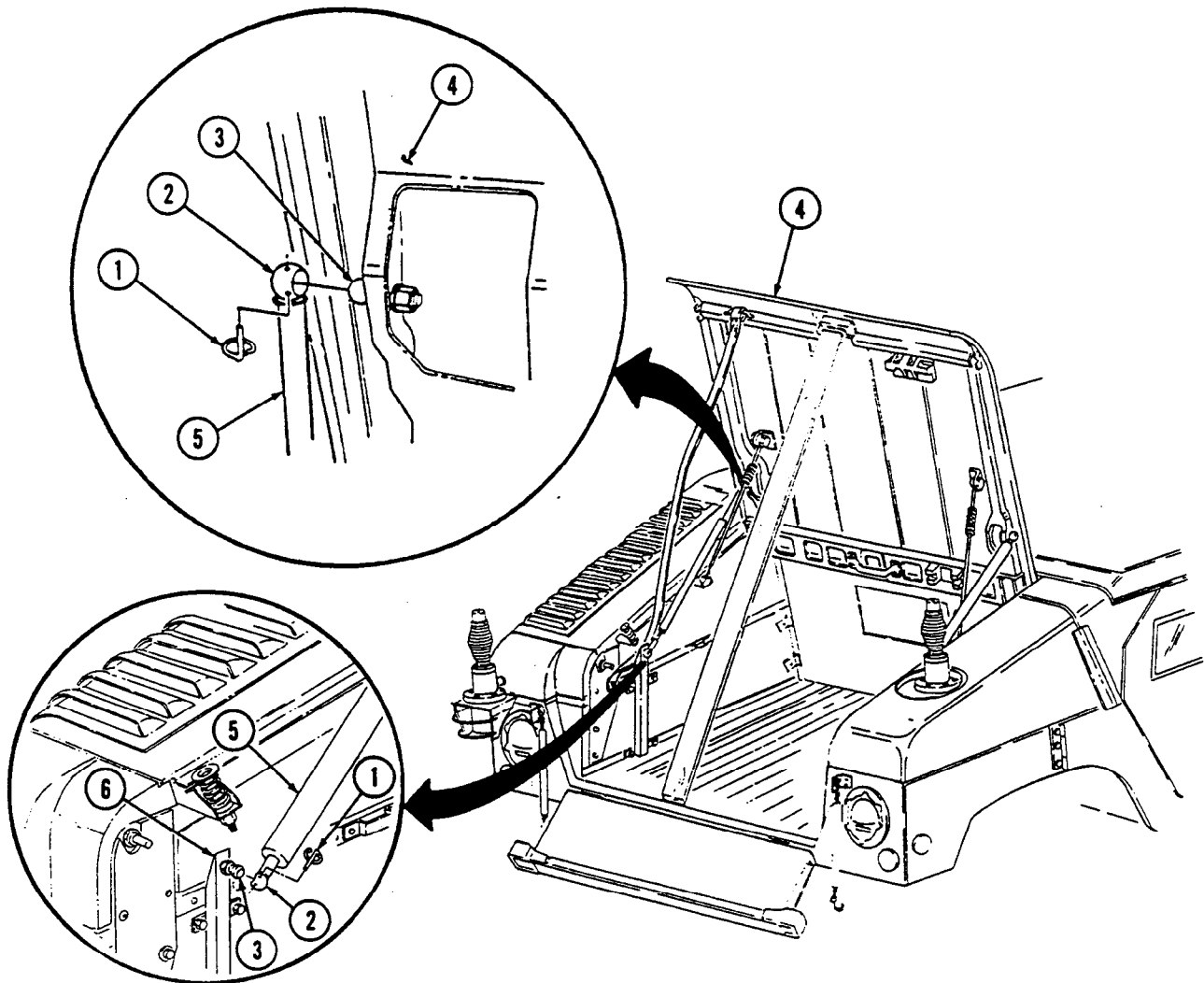
11-22. CARGO SHELL DOOR GAS SPRING MAINTENANCE (Cont'd)

2. Remove four retaining rings (1) from rod sockets (2) on two gas spring assemblies (5).

WARNING

Do not attempt to remove gas spring assemblies from ball studs until cargo door is supported in full open position. Failure to do so may result in injury to personnel or damage to equipment.

3. Remove left and right gas spring assemblies (5) from ball studs (3) on cargo door (4) and body bracket (6).
4. Invert left gas spring assembly (5) 180° and position to right side of vehicle.
5. Invert right gas spring assembly (5) 180° and position to left side of vehicle.
6. Install left and right gas spring assemblies (5) over ball studs (3) on cargo door (4) and body brackets (6).
7. Install four retaining rings (1) in rod sockets (2) on two gas springs (5).
8. Remove cargo door support.

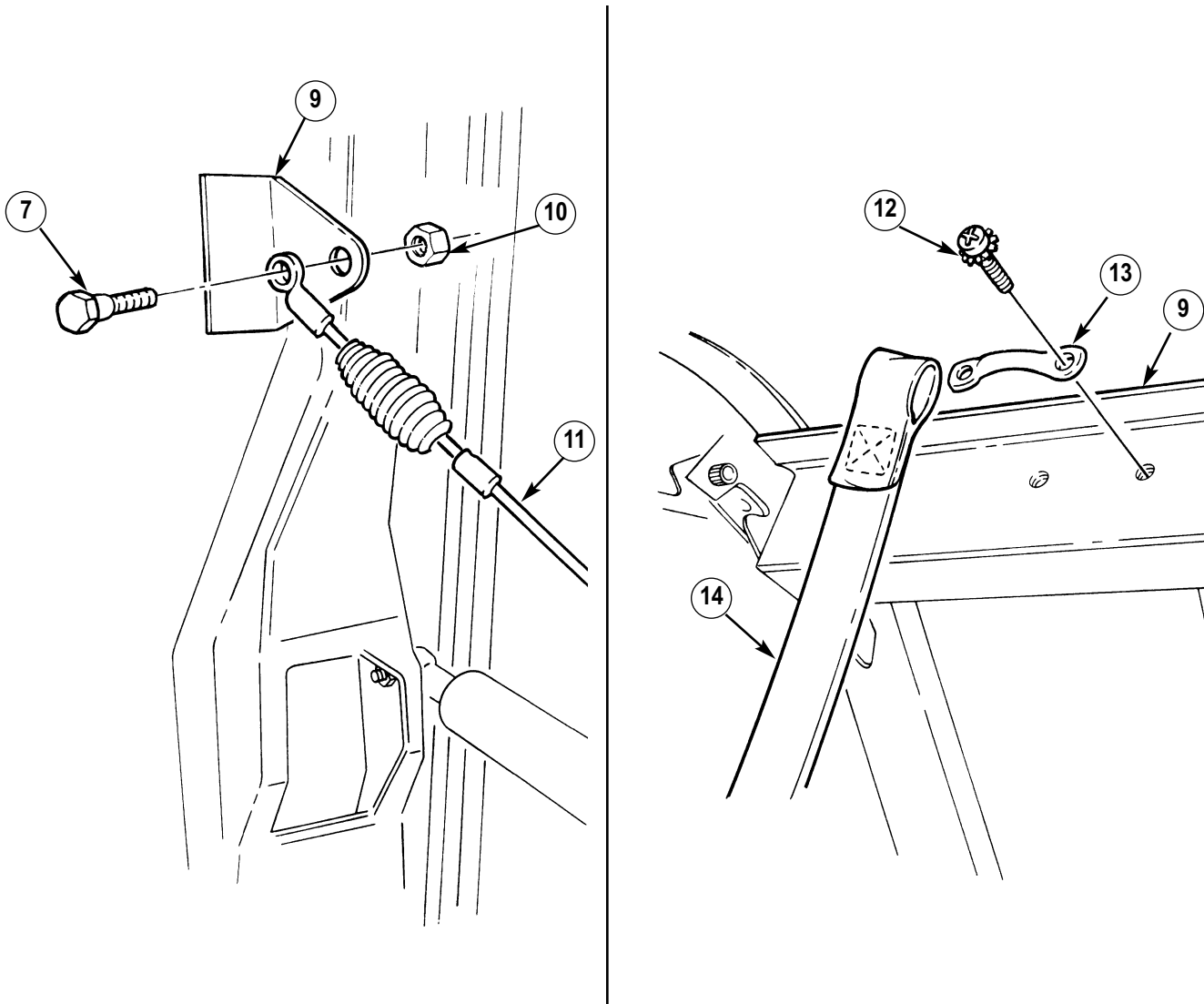


11-22. CARGO SHELL DOOR GAS SPRING MAINTENANCE (Cont'd)**WARNING**

An assistant will be required to hold the cargo door open when either one or both gas springs are being removed or installed. Failure to do so may result in injury to personnel or damage to equipment.

b. Removal

1. Remove two locknuts (10), shoulder bolts (7), and retention cables (11) from cargo door bracket (9). Discard locknuts (10).
2. Remove two screw-assembled lockwashers (12), footman loop (13), and cargo door strap (14) from cargo door (9). Discard screw-assembled lockwashers (12).



11-22. CARGO SHELL DOOR GAS SPRING MAINTENANCE (Cont'd)

3. Remove two locknuts (1), washers (2), and gas spring assembly (4) from cargo door (3) and body bracket (5). Discard locknuts (1).

c. Disassembly

1. Remove inner spring tube (6) from outer spring tube (13).
2. Remove two retaining rings (8) from ball studs (11) and rod sockets (12). Remove two ball studs (11) from rod sockets (12). Discard retaining rings (8).
3. Remove two clamps (10) from bushings (9) and spring rods (7) and (14). Pull spring rods (7) and (14) approximately 1 in. (2.54 cm) out of tubes (6) and (13) and remove two bushings (9).

WARNING

Do not attempt to remove gas cylinders from inner spring rod or outer spring rod. High internal pressure will cause cylinder to explode and may result in injury to personnel.

4. Pull inner spring rod (7) from inner tube (6) and outer spring rod (14) from outer tube (13).

c.1. Inspection

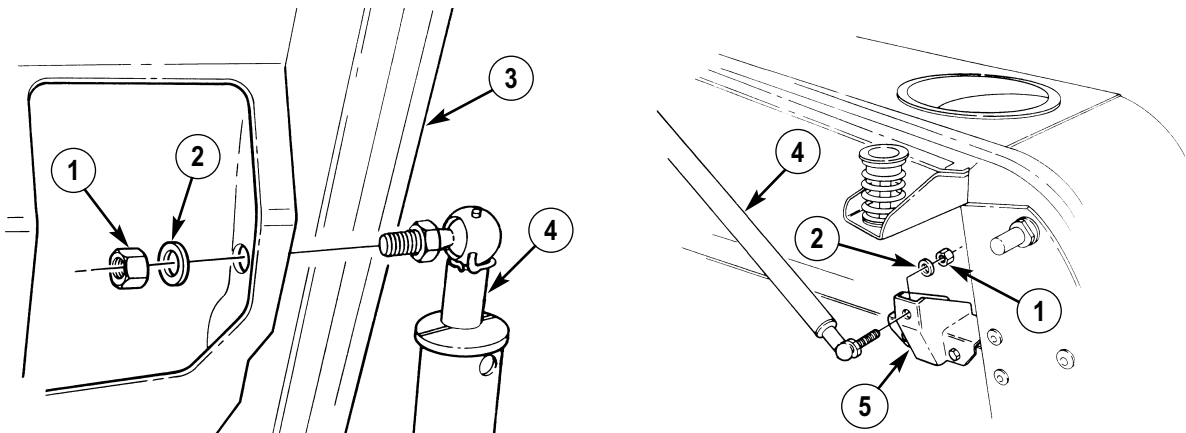
Refer to para. 10-56 for plusnut inspection and replacement.

d. Assembly

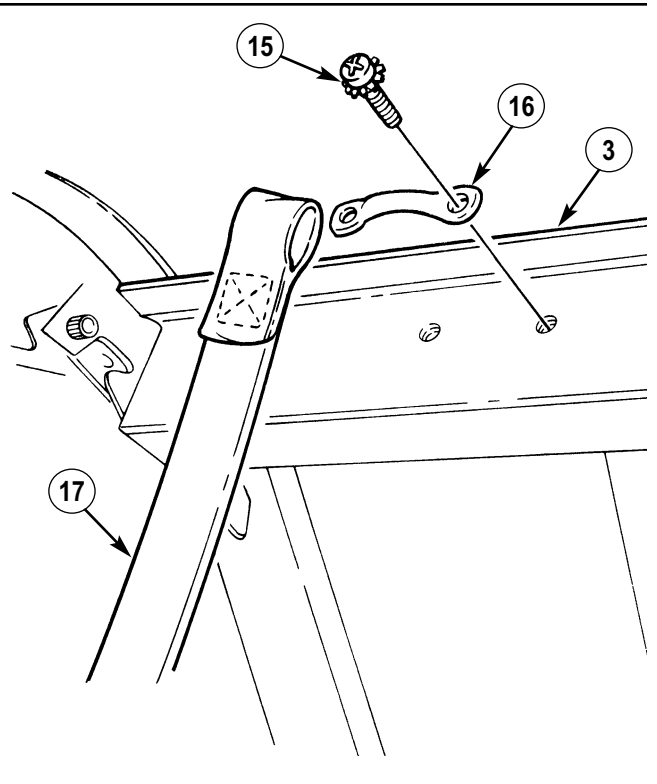
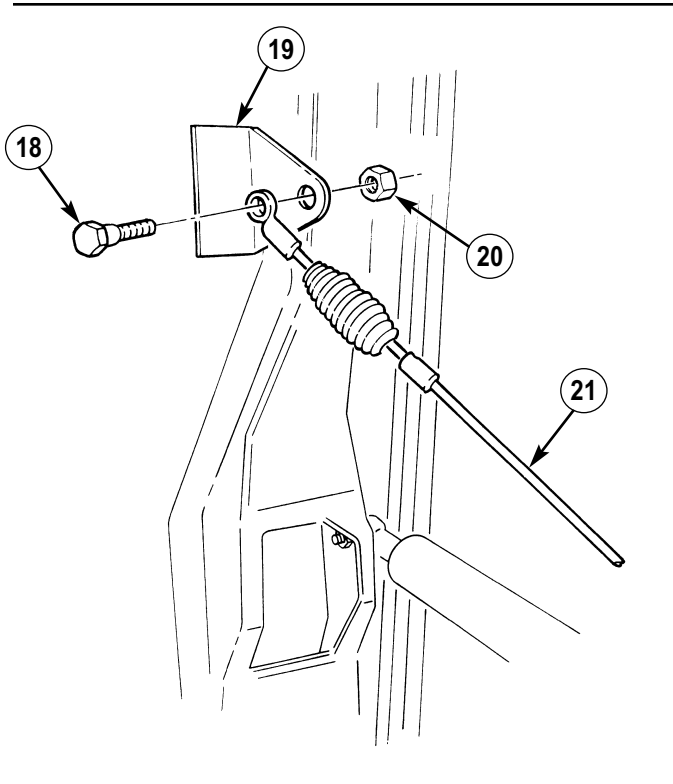
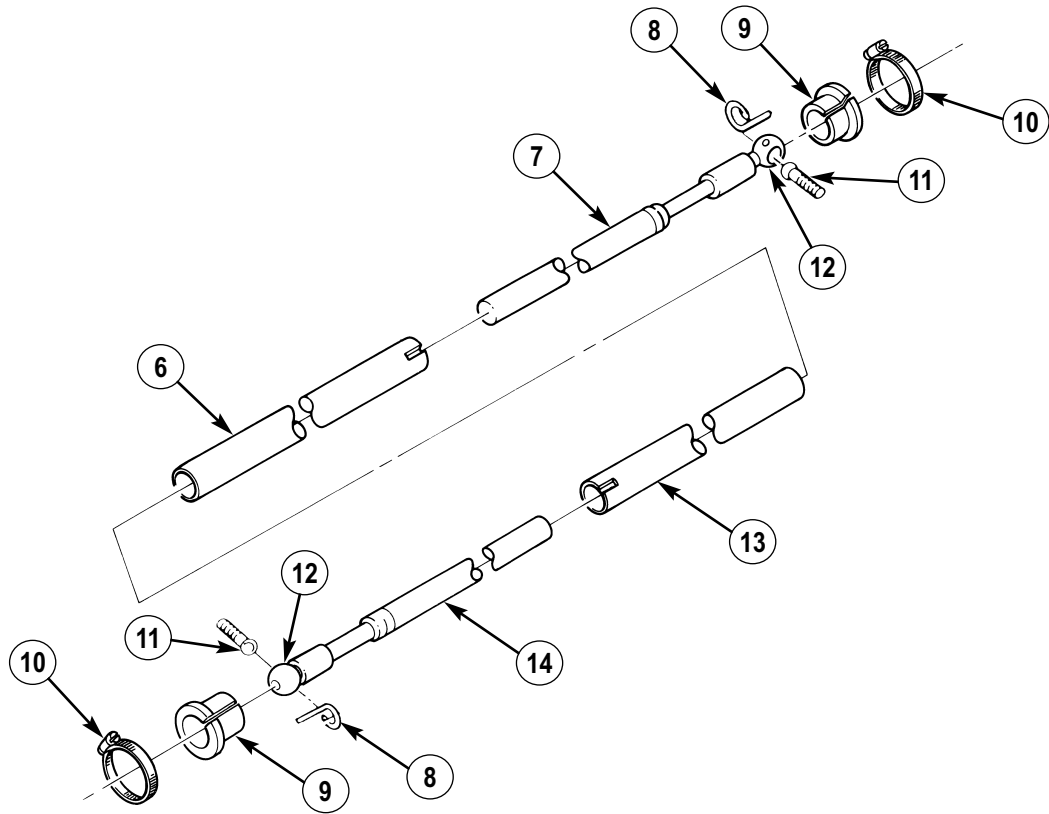
1. Install longer outer spring rod (14) on outer tube (13), leaving approximately 1 in. (2.54 cm) of the small diameter portion of rod (14) exposed for installation of bushing (9).
2. Install bushing (9) on outer spring rod (14), ensuring bushing (9) is fully seated on outer tube (13) and rod socket (12) end is fully seated on bushing (9). Install clamp (10) and tighten.
3. Apply grease to rod end socket (12), and install ball stud (11) on socket (12) with retaining ring (8).
4. Repeat steps 1 through 3 for inner tube (6) and inner spring rod (7).
5. Install inner tube (6) into outer tube (13).

e. Installation

1. Install gas spring assembly (4) on body bracket (5) and cargo door (3) with two washers (2) and locknuts (1). Tighten locknuts (1) to 85-110 lb-ft (10-12 N·m).
2. Install footman loop (16) and cargo door strap (17) on cargo door (3) with two screw-assembled lockwashers (15). Tighten screw-assembled lockwashers (15) to 21 lb-in. (2 N·m).
3. Install two retention cables (21) on cargo door bracket (19) with two shoulder bolts (18) and locknuts (20). Tighten locknuts (20) to 85-110 lb-in. (10-12 N·m).



11-22. CARGO SHELL DOOR GAS SPRING MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Check cargo shell door for proper operation (TM 9-2320-387-10).

11-23. CARGO SHELL DOOR STRAP MAINTENANCE

This task covers:

- a. Removal
 - a.1 Inspection

- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two screw-assembled lockwashers
 (Appendix G, Item 370)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
 (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove two screw-assembled lockwashers (3), footman loop (2), and strap (1) from cargo door (4). Discard screw-assembled lockwashers (3).
2. Remove capscrew (6), washer (5), and strap (1) from left gas spring mounting bracket (7).

a.1. Inspection

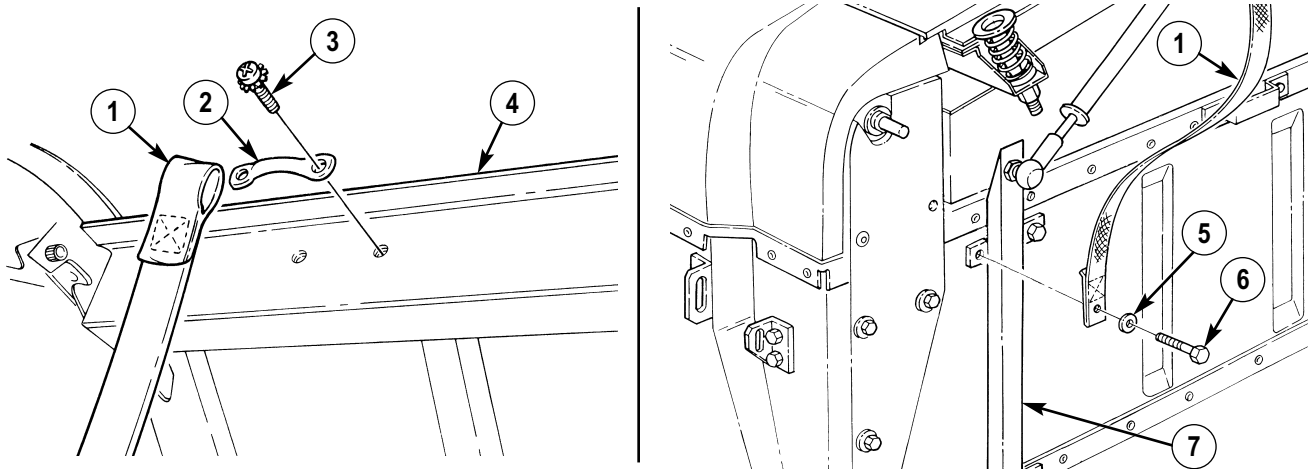
Refer to para. 10-56 for plusnut inspection and replacement.

b. Installation

NOTE

To assist closing cargo shell door, a grab loop may be added. Refer to appendix D, fig. D-42.

1. Apply sealing compound to threads of capscrew (6), and install strap (1) on left gas spring mounting bracket (7) with washer (5) and capscrew (6). Tighten capscrew (6) to 75 lb-in. (8 N·m).
2. Install strap (1) and footman loop (2) on cargo door (4) with two screw-assembled lockwashers (3). Tighten screw-assembled lockwashers (3) to 21 lb-in. (2 N·m).



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-24. CARGO SHELL DOOR SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Manual References

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Sealing compound (Appendix C, Item 59)

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Equipment Condition

- Cargo shell door armor removed (para. 11-13).
- Rear end of cargo shell door raised (TM 9-2320-387-10).

Maintenance Level

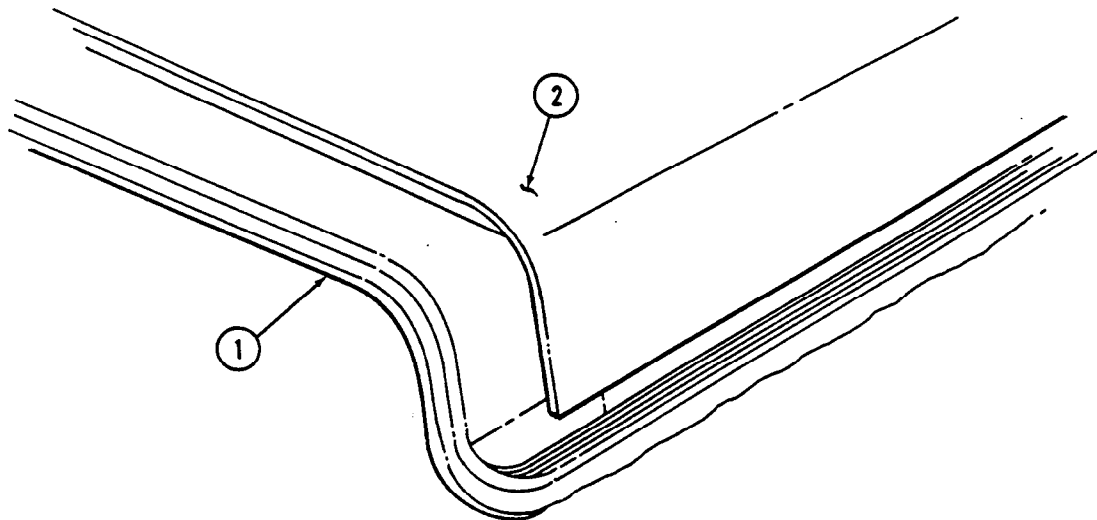
Unit

a. Removal

Remove seal (1) from cargo door (2). Clean edge around cargo door (2) to remove dirt, corrosion, or remaining adhesive.

b. Installation

1. Install seal (1) on cargo door (2), ensuring seal (1) is fully seated.
2. Detach seal (1) at rear edge of cargo door (2) only, and apply sealing compound in seal (1) channel the entire length of rear edge of cargo door (2).
3. Install seal (1) on rear edge of cargo door (2), ensuring seal (1) is fully seated.



- FOLLOW-ON TASKS:
- Install cargo door armor (para. 11-13).
 - Close and secure shell door (TM 9-2320-387-10).

11-25. CARGO SHELL DOOR FRONT STRIKER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Locknut (Appendix G, Item 180)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Forward end of cargo shell door raised
 (para. 11-90).

Maintenance Level

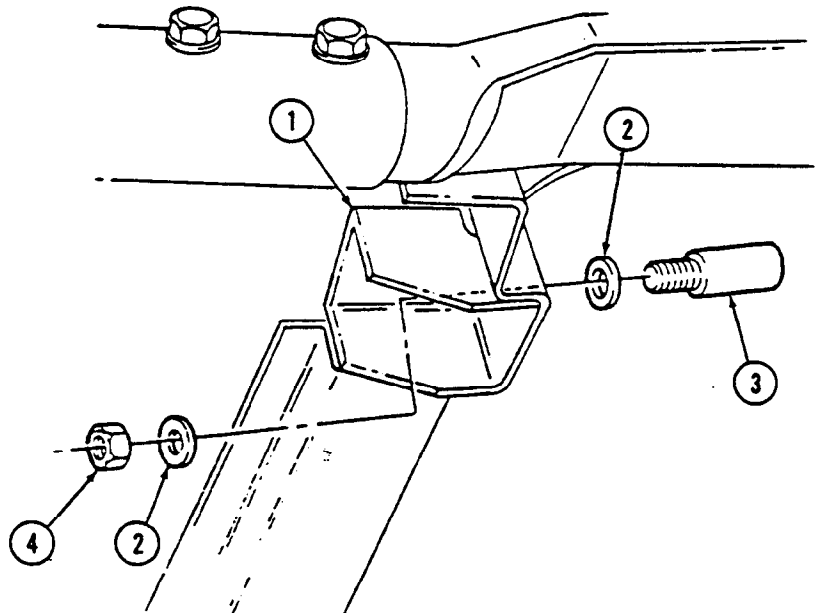
Unit

a. Removal

Remove locknut (4), washer (2), front striker (3), and washer (2) from body bracket (1). Discard locknut (4).

b. Installation

Install washer (2) and front striker (3) on body bracket (1) with washer (2) and locknut (4). Tighten locknut (4) to 35-45 lb-ft (47-61 N·m).



FOLLOW-ON TASK: Adjust cargo shell door (para. 11-14).

11-26. CARGO SHELL DOOR REAR STRIKER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Locknut (Appendix G, Item 180)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Tailgate lowered (TM 9-2320-387-10).
- Rear end of cargo shell door raised (TM 9-2320-387-10).

Maintenance Level

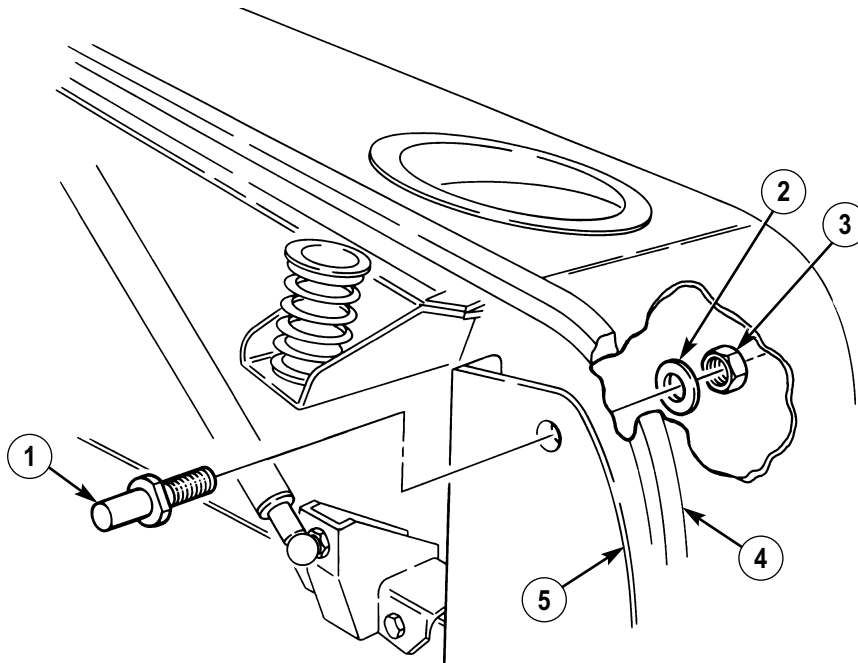
Unit

a. Removal

Remove locknut (3), washer (2), and striker (1) from striker plate (5) and wheelhouse (4). Discard locknut (3).

b. Installation

Install striker (1) on striker plate (5) and wheelhouse (4) with washer (2) and locknut (3). Tighten locknut (3) to 190-210 lb-ft (258-285 N·m).



- FOLLOW-ON TASKS:
- Raise and secure tailgate (TM 9-2320-387-10).
 - Close cargo shell door (TM 9-2320-387-10).

11-27. CARGO SHELL DOOR REAR STRIKER MOUNTING PLATE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Six locknuts (Appendix G, Item 130)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Rear striker removed (para. 11-26).
- Cargo shell door strap removed (left side only) (para. 11-23).

Maintenance Level

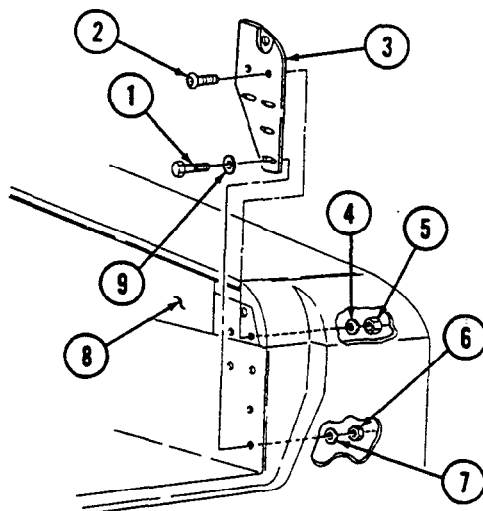
Unit

a. Removal

1. Remove locknut (5), washer (4), and socket-head screw (2) from striker mounting plate (3) and wheelhouse (8). Discard locknut (5).
2. Remove five locknuts (6), washers (7), capscrews (1), washers (9), and striker mounting plate (3) from wheelhouse (8). Discard locknuts (6).

b. Installation

1. Install striker mounting plate (3) on wheelhouse (8) with five washers (9), capscrews (1), washers (7), and locknuts (6).
2. Install striker mounting plate (3) on wheelhouse (8) with socket-head screw (2), washer (4), and locknut (5). Tighten locknuts (5) and (6) to 25-30 lb-ft (34-41 N·m).



- FOLLOW-ON TASKS:**
- Install cargo shell door strap (left side only) (para. 11-23).
 - Install rear striker (para. 11-26).

11-28. CARGO SHELL DOOR DOVETAIL SPRING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts (Appendix G, Item 130)
 Lockwasher (Appendix G, Item 213)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Rear end of cargo shell door raised (TM 9-2320-387-10).
- Tailgate lowered (TM 9-2320-387-10).

Maintenance Level

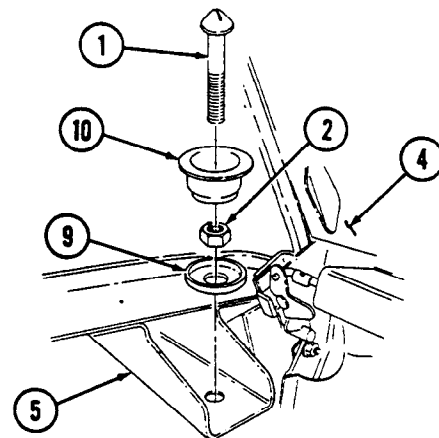
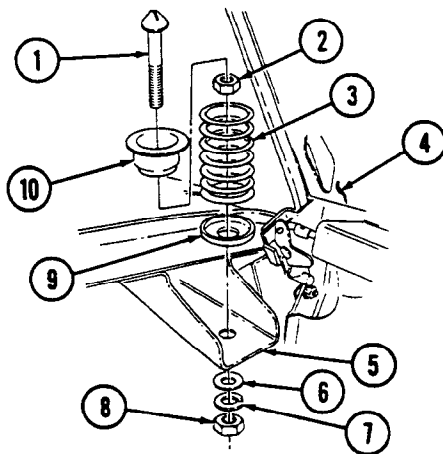
Unit

a. Removal

Remove locknut (8), lockwasher (7), washer (6), cup (9), spring (3), locknut (2), retainer (10), and head bolt (1) from cargo shell dovetail (5). Discard locknuts (2) and (8) and lockwasher (7).

b. Installation

1. Install retainer (10) on head bolt (1) and install locknut (2) to end of threads on head bolt (1).
2. Install cup (9) and head bolt (1) on dovetail (5).
3. Lower cargo door.
4. Hold locknut (2) and adjust head bolt (1) up until head bolt (1) touches bottom of cargo door (4).
5. Raise cargo door (4).
6. Remove head bolt (1) from dovetail (5).
7. Install spring (3), cup (9), and head bolt (1) on dovetail (5) with washer (6), lockwasher (7), and locknut (8). Tighten locknut (8) to 55 lb-ft (75 N·m).



FOLLOW-ON TASKS: • Close cargo shell door (TM 9-2320-387-10).
 • Raise and secure tailgate (TM 9-2320-387-10).

11-29. CARGO SHELL DOOR LEFT SIDE GAS SPRING MOUNTING BRACKET MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Personnel Required

One mechanic
 One assistant

Materials/Parts

Sealing compound (Appendix C, Item 72.1)
 Two locknuts (Appendix G, Item 169)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Tailgate lowered (TM 9-2320-387-10).
- Cargo shell door gas spring removed (para. 11-22).

Maintenance Level

Unit

a. Removal

1. Remove two locknuts (10), washers (9), and capscrews (7) from wheelhouse (8). Discard locknuts (10).
2. Remove capscrews (3) and (6), washer (5), strap (4), and bracket (2) from wheelhouse (8).

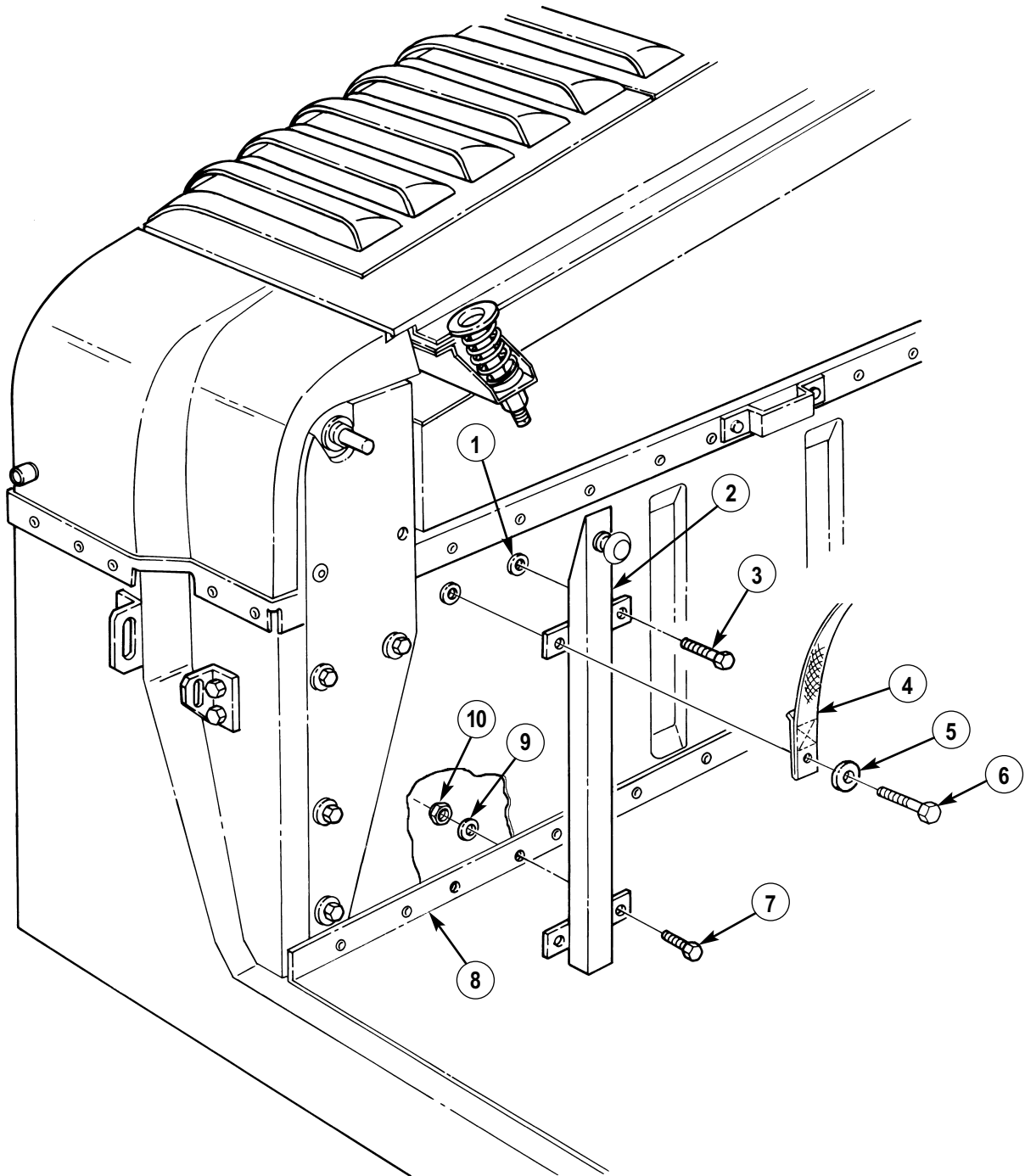
b. Inspection

Refer to para. 10-56 for plusnut (1) inspection and installation.

c. Installation

1. Apply sealing compound to threads of capscrews (3) and (6), and install bracket (2) and strap (4) on wheelhouse (8) with washer (5) and capscrews (3) and (6). Tighten capscrews (3) and (6) to 75 lb-in. (8 N·m).
2. Install bracket (2) on wheelhouse (8) with two capscrews (7), washers (9), and locknuts (10). Tighten locknuts (10) to 10 lb-ft (14 N·m).

11-29. CARGO SHELL DOOR LEFT SIDE GAS SPRING MOUNTING BRACKET MAINTENANCE



FOLLOW-ON TASKS: • Install gas spring (para. 11-22).
 • Raise and secure tailgate (TM 9-2320-387-10).

11-30. INSULATION PANEL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Adhesive (Appendix C, Item 6)
Drycleaning solvent (Appendix C, Item 26)

Manual References

TM 9-2320-387-24P

General Safety Instructions

Do not perform this procedure near fire, flames or sparks.

Maintenance Level

Unit

WARNING

Dry cleaning solvent is highly flammable. Do not perform this procedure near fire, flames, or sparks. Injury to personnel and/or damage to equipment will result.

NOTE

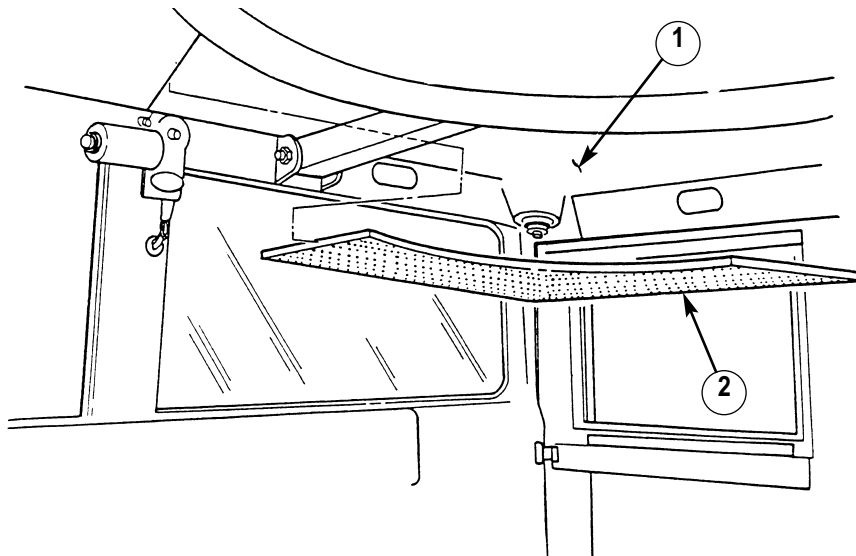
All insulation panels are replaced basically the same. This procedure covers the roof insulation panel. Refer to facing page art for locations of other insulation panels.

a. Removal

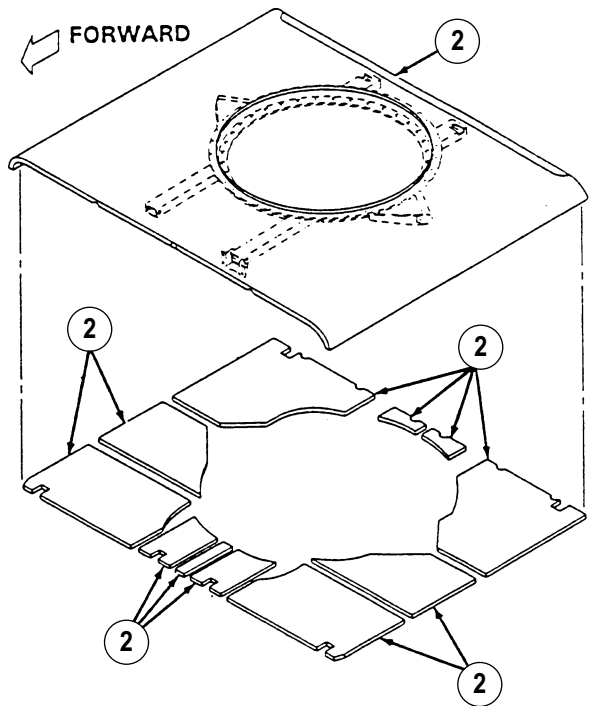
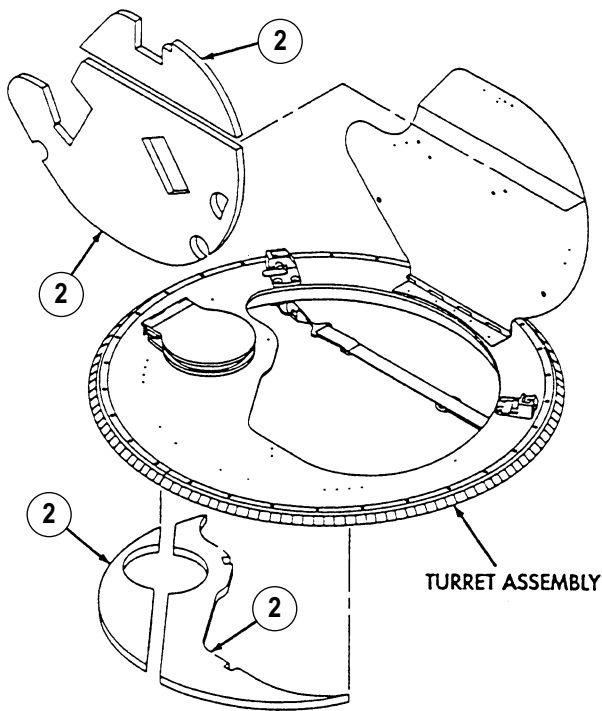
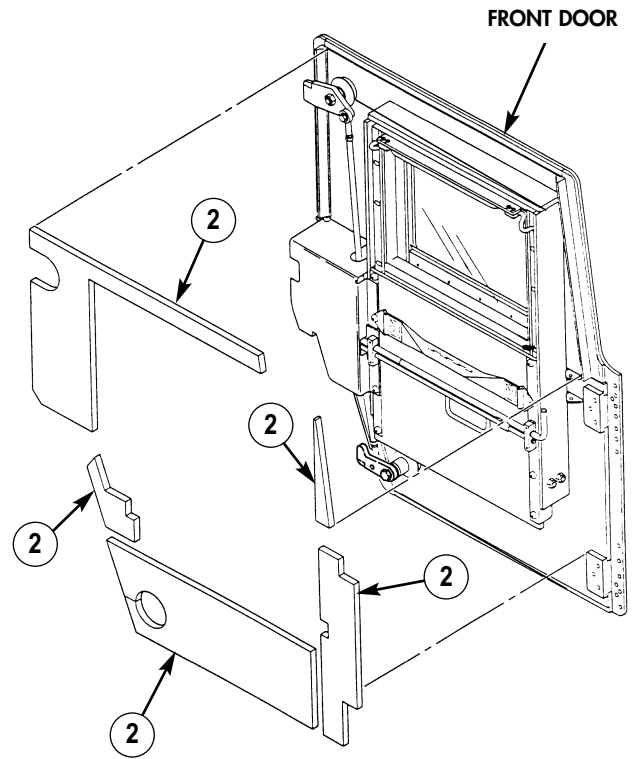
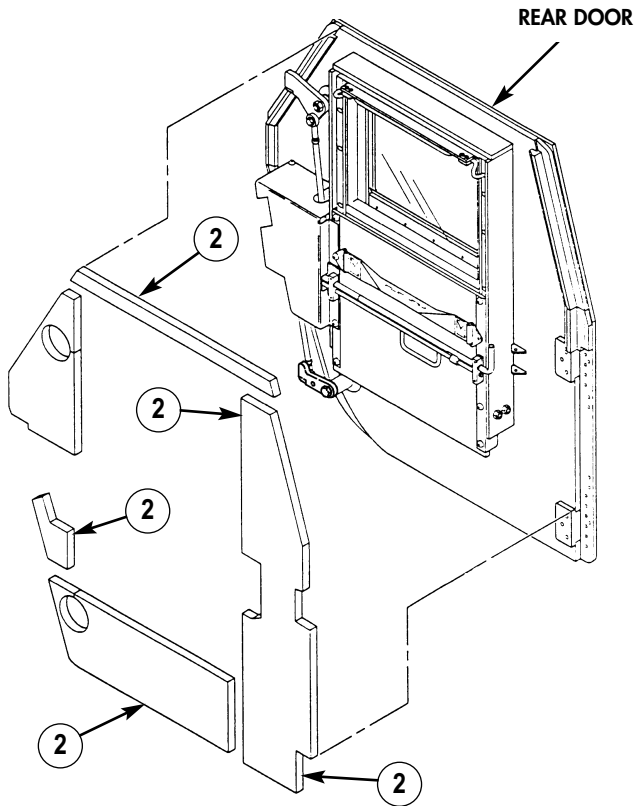
1. Remove insulation panel (2) from roof (1).
2. Clean surface of roof (1) with drycleaning solvent to remove adhesive.

b. Installation

1. Apply adhesive on roof (1), and install panel (2) on roof (1).
2. Press surface of panel (2) to ensure adhesion.



11-30. INSULATION PANEL REPLACEMENT (Cont'd)



11-31. CARGO SHELL DOOR LINER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Twelve clips (Appendix G, Item 23)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
(TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove ten screws (6), washers (5), clips (4), and two retainers (7) from cargo shell door (1).
2. Remove twelve fastener clips (8) from liner (3) and door (1). Discard fastener clips (8).
3. Remove liner (3) and three sound dampeners (2) from door (1).
4. Clean cargo door (1) to remove adhesive.

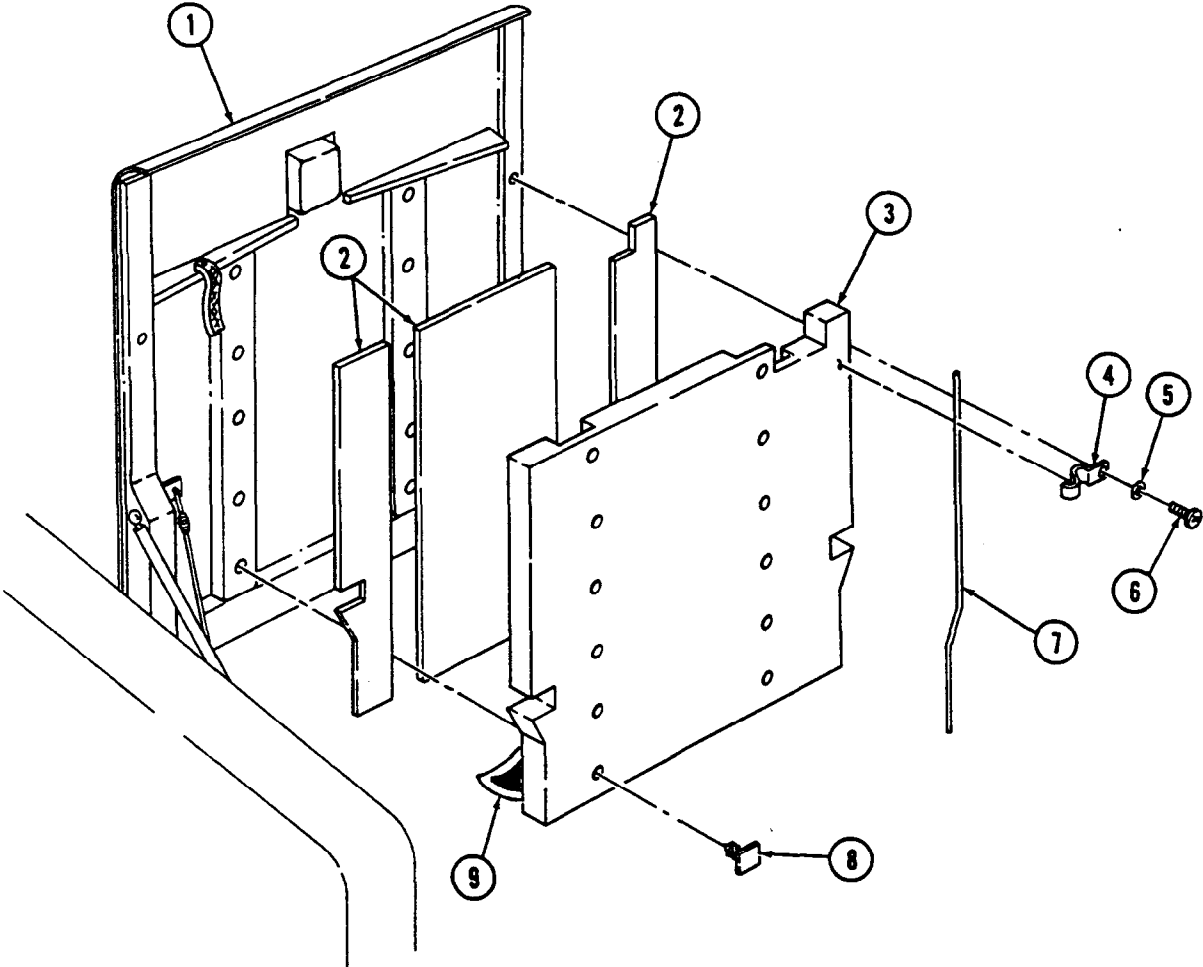
b. Installation

NOTE

Ensure surface is free of dirt and oil before applying adhesive backing.

1. Position three sound dampeners (2) on door (1).
2. Place four fastener clips (8) in two top and two bottom holes of liner (3). Ensure heads of fastener clips (8) are on side of liner (3) without adhesive.
3. Peel paper backing (9) from liner (3).
4. Align liner (3) with door (1), ensuring top and bottom fastener clips (8) in liner (3) align with top and bottom holes in door (1), and install liner (3) on door (1) with top and bottom fastener clips (8). Press entire surface of liner (3) to ensure adhesion.
5. Install eight remaining fastener clips (8) through liner (3) into door (1).
6. Install two retainers (7) on door (1) with ten clips (4), washers (5), and screws (6).

11-31. CARGO SHELL DOOR LINER REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-32. LEFT SIDE A-PILLAR ARMOR MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Twelve locknuts (Appendix G, Item 169)
 Adhesive (Appendix C, Item 2.1)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left front door and hinge removed (para. 11-2).
- Driver's rearview mirror bracket removed (para. 10-69).
- Left front underbody armor removed (para. 11-36).
- A-pillar to rocker gap plate removed (para. 11-34).

Maintenance Level

Unit

a. Removal

1. Remove two capscrews (4) and washers (3) from A-pillar armor (6) and A-pillar (2).
2. Remove twelve locknuts (1), capscrews (5), and A-pillar armor (6) from A-pillar (2) and footwell armor (7). Discard locknuts (1).
3. Remove spacer plate (6.1), shim (4.1), and two washers (4.2) from A-pillar armor (6).
4. Remove old adhesive completely from A-pillar armor (6), spacer plate (6.1), shim (4.1), and two washers (4.2).

b. Inspection

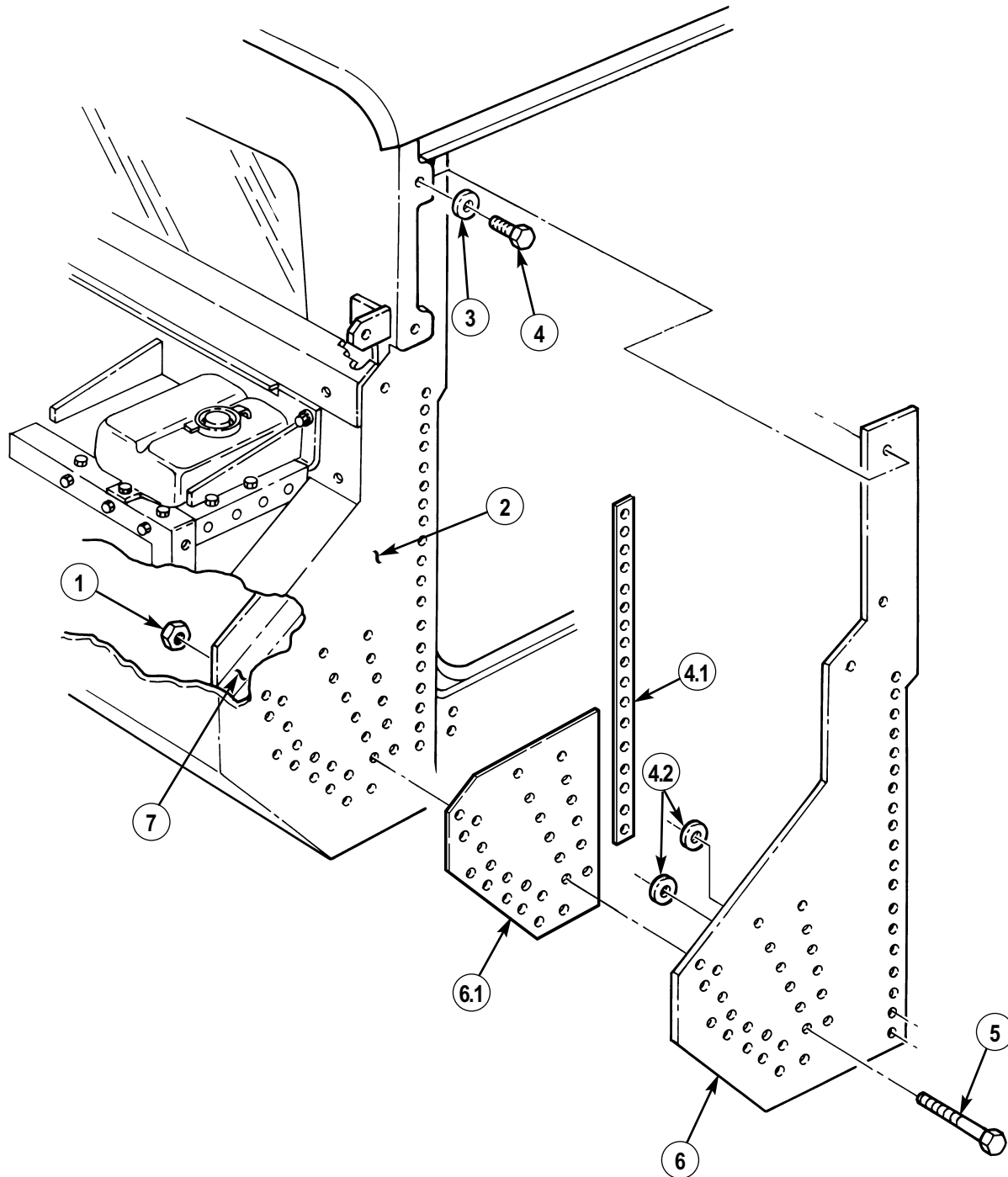
Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

NOTE

- Apply adhesive to inboard side of shim.
 - Ensure that all holes are aligned on installation.
1. Apply adhesive to spacer plate (6.1), shim (4.1), and two washers (4.2), and position on A-pillar armor (6).
 2. Apply sealing compound to threads of two capscrews (4), and install A-pillar armor (6) on A-pillar (2) with two washers (3) and capscrews (4). Tighten capscrews (4) to 37 lb-ft (50 N·m).
 3. Secure A-pillar armor (6) to A-pillar (2) and footwell armor (7) with twelve capscrews (5) and locknuts (1). Tighten locknuts (1) to 35 lb-ft (47 N·m).

11-32. LEFT SIDE A-PILLAR ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install A-pillar to rocker gap plate (para. 11-34).
 - Install left front underbody armor (para. 11-36).
 - Install driver's rearview mirror bracket (para. 10-69).
 - Install left front door and hinge (para. 11-2).

11-33. RIGHT SIDE A-PILLAR ARMOR MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Ten locknuts (Appendix G, Item 169)
 Adhesive (Appendix C, Item 2.1)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Right front door and hinge removed (para. 11-2).
- Right rearview mirror removed (para. 10-68).
- Right front underbody armor removed (para. 11-38).
- A-pillar to rocker gap plate removed (para. 11-35).

Maintenance Level

Unit

a. Removal

1. Remove two capscrews (1) and washers (2) from A-pillar armor (7) and A-pillar (3).
 - 1.1. Remove capscrew (6.1) from A-pillar armor (7) and A-pillar (3).
2. Remove ten locknuts (4), capscrews (6), and A-pillar armor (7) from A-pillar (3). Discard locknuts (4).
3. Remove spacer plate (5), shim (5.2), and three washers (5.1) from A-pillar armor (7).
4. Remove old adhesive completely from A-pillar armor (7), spacer plate (5), shim (5.2), and three washers (5.1).

b. Inspection

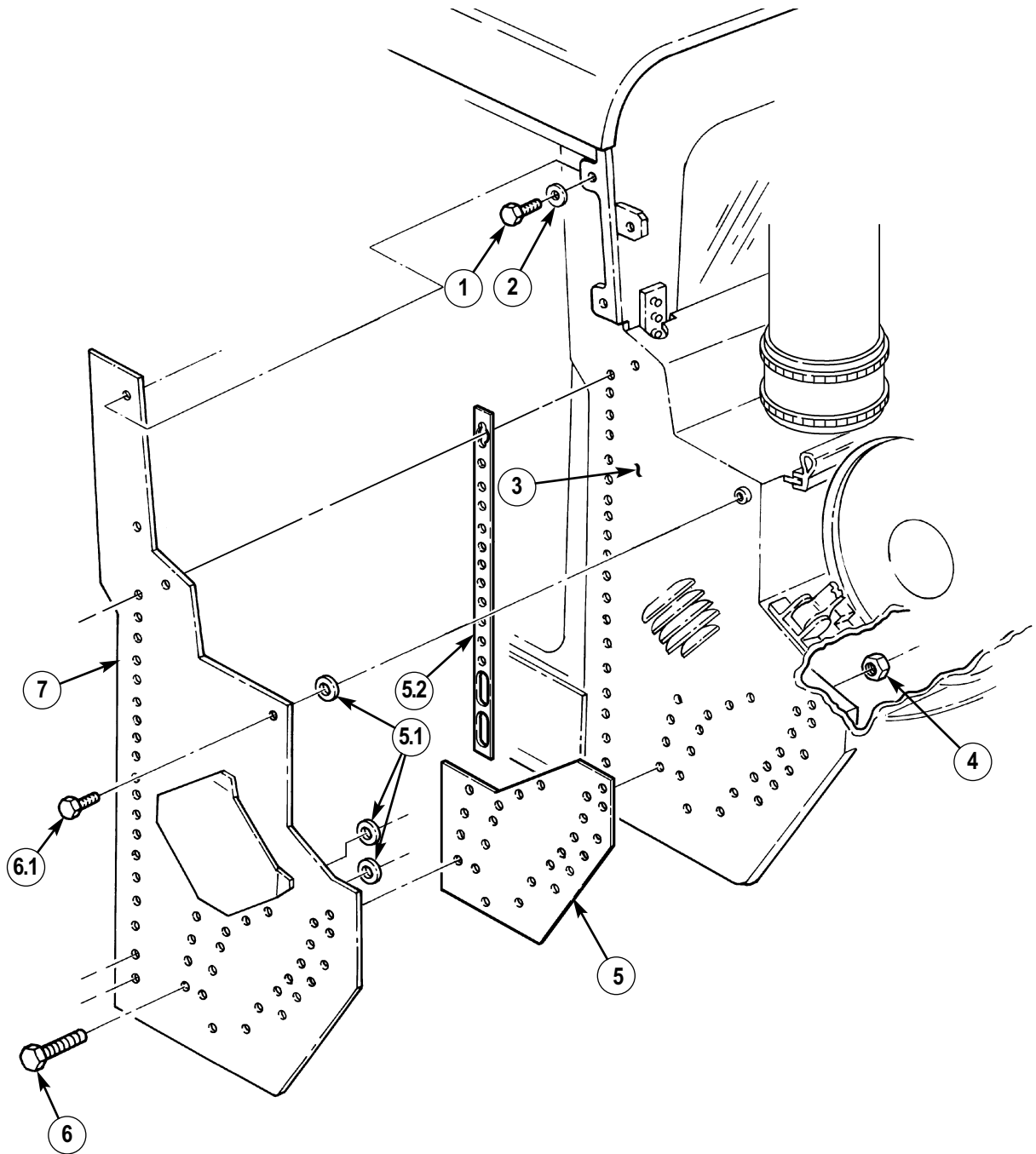
Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

NOTE

- Apply adhesive to inboard side of shim.
 - Ensure that all holes are aligned on installation.
1. Apply adhesive to spacer plate (5), shim (5.2), and three washers (5.1), and position on A-pillar armor (7).
 - 1.1. Apply sealing compound to threads of capscrew (6.1), and install A-pillar armor (7) on A-pillar (3) with capscrew (6.1). Tighten capscrew (6.1) to 35 lb-ft (47 N·m).
 - 1.2. Apply sealing compound to threads of two capscrews (1), and install A-pillar armor (7) on A-pillar (3) with two washers (2) and capscrews (1). Tighten capscrews (1) to 37 lb-ft (50 N·m).
 2. Install A-pillar armor (7) on A-pillar (3) with ten capscrews (6) and locknuts (4). Tighten locknuts (4) to 35 lb-ft (47 N·m).

11-33. RIGHT SIDE A-PILLAR ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install A-pillar to rocker gap plate (para. 11-35).
 - Install right front underbody armor (para. 11-38).
 - Install right rearview mirror (para. 10-68).
 - Install right front door and hinge (para. 11-2).

11-34. LEFT SIDE ROCKER PANEL ARMOR AND INSIDE PROTECTION PLATE MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Fourteen locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Fire extinguisher removed (TM 9-2320-387-10).
- Left passenger seat removed (para. 10-45).

Maintenance Level

Unit

a. Removal

1. Remove three capscrews (15) from A-pillar to rocker gap plate (16) and A-pillar armor (17).
2. Remove four locknuts (1), washers (3), capscrews (13), A-pillar to rocker gap plate (16), rocker panel armor (14), and four washers (7) from rocker panel (6) and inside protection plate (18). Discard locknuts (1).
3. Remove six locknuts (2), washers (3), capscrews (12), rocker panel armor (11), inside protection plate (18), and six washers (7) from rocker panel (6). Discard locknuts (2).
4. Remove four locknuts (4), washers (3), capscrews (10), capscrew (8), rocker panel armor (9), inside protection plate (5), and four washers (7) from rocker panel (6). Discard locknuts (4).

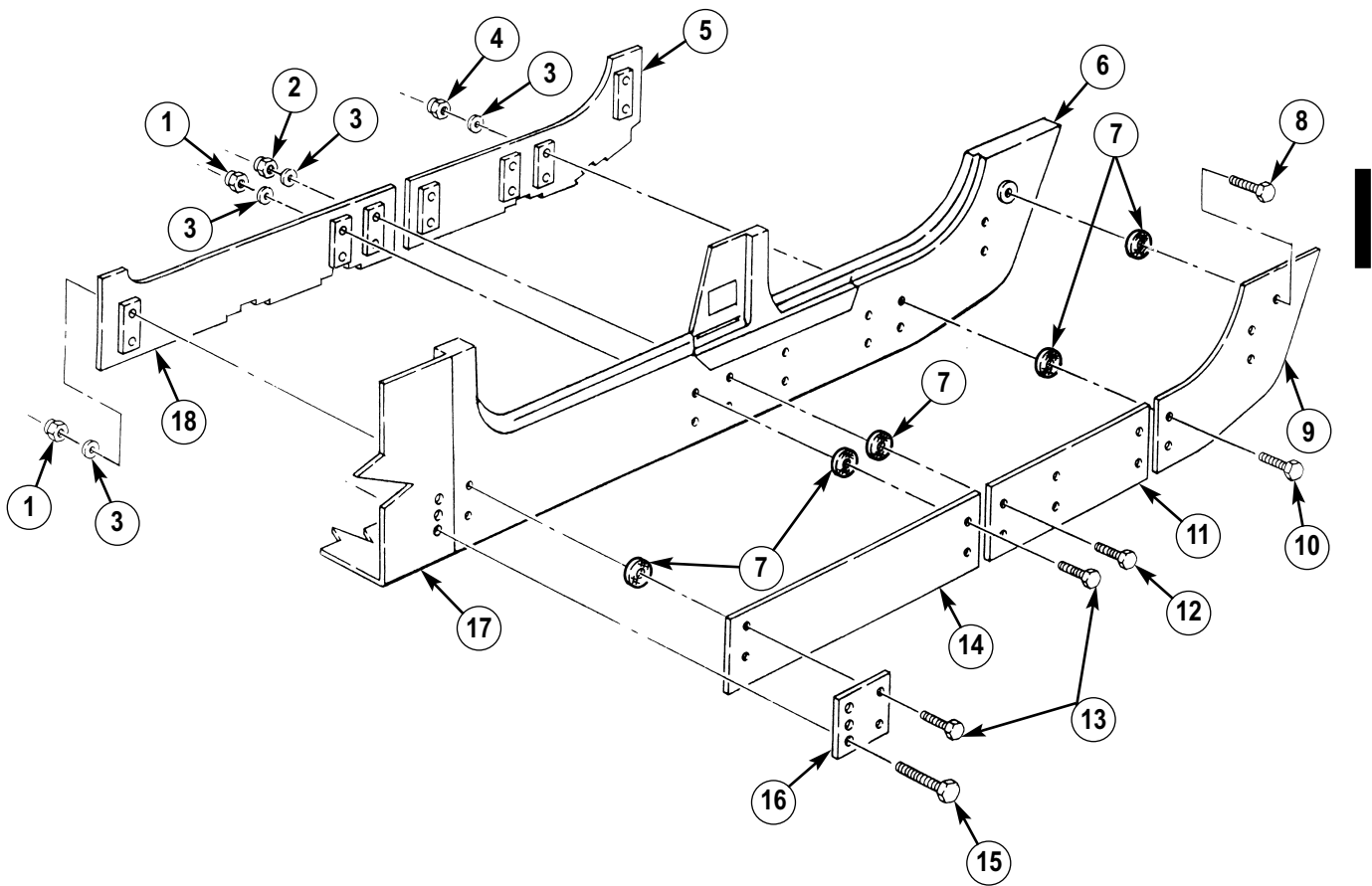
b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

1. Apply sealing compound to threads of capscrew (8), and install four washers (7), rocker panel armor (9), and inside protection plate (5) on rocker panel (6) with four capscrews (10), washers (3), locknuts (4), and capscrew (8). Do not tighten locknuts (4).
2. Install six washers (7), rocker panel armor (11), and inside protection plates (5) and (18) on rocker panel (6) with six capscrews (12), washers (3), and locknuts (2). Do not tighten locknuts (2).
3. Install rocker panel armor (14), four washers (7), inside protection plate (18), and A-pillar to rocker gap plate (16) on rocker panel (6) with four capscrews (13), washers (3), and locknuts (1). Do not tighten locknuts (1).
4. Apply sealing compound to threads of three capscrews (15), and secure A-pillar to rocker gap plate (16) to A-pillar armor (17) with capscrews (15). Tighten capscrews (15) to 35 lb-ft (47 N·m).
5. Tighten locknuts (1), (2), and (4) to 10 lb-ft (14 N·m).

11-34. LEFT SIDE ROCKER PANEL ARMOR AND INSIDE PROTECTION PLATE MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install left passenger seat (para. 10-45)
 - Install fire extinguisher (TM 9-2320-387-10).

11-35. RIGHT SIDE ROCKER PANEL ARMOR AND INSIDE PROTECTION PLATE MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sixteen locknuts (Appendix G, Item 169)
 Four locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Right passenger seat removed (para. 10-45).
- Companion seat assembly removed (para. 10-44).

Maintenance Level

Unit

a. Removal

1. Remove three capscrews (13) from A-pillar to rocker gap plate (12) on A-pillar armor (11).
2. Remove eight locknuts (8), washers (2), capscrews (15), two capscrews (14), A-pillar to rocker gap plate (12), rocker panel armor (16), two washers (3), and inside protection plates (9) and (10) and from rocker panel (4) and A-pillar armor (11). Discard locknuts (8).
3. Remove six locknuts (8), washers (2), capscrews (15), rocker panel armor (17), six washers (3), and inside protection plate (7) from rocker panel (4). Discard locknuts (8).
4. Remove four locknuts (6), washers (2), capscrews (17.1), capscrew (1), rocker panel armor (18), four washers (3), and inside protection plate from rocker panel (4). Discard locknuts (6).

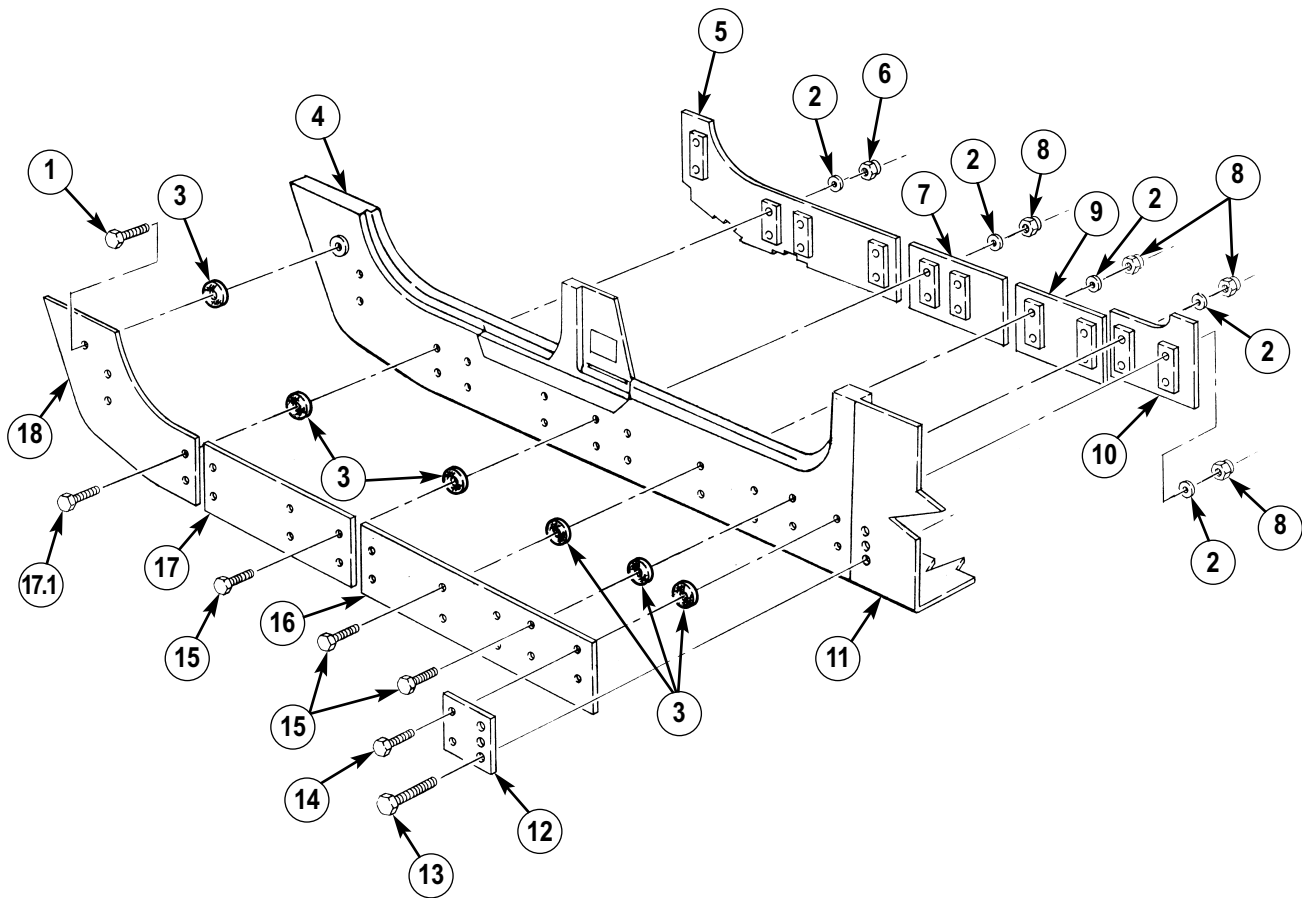
b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

1. Apply sealing compound to threads of capscrew (1), and install four washers (3), rocker panel armor (18), and inside protection plate (5) on rocker panel (4) with four capscrews (17.1), washers (2), locknuts (6), and capscrew (1). Do not tighten locknuts (6).
2. Install six washers (3), rocker panel armor (17), and inside protection plate (7) on rocker panel (4) with six capscrews (15), washers (2), and locknuts (8). Do not tighten locknuts (8).
3. Install two washers (3), rocker panel armor (16), A-pillar to rocker gap plate (12), and inside protection plates (9) and (10) on rocker panel (4) with two capscrews (14), eight capscrews (15), and ten locknuts (8). Do not tighten locknuts (8).
4. Apply sealing compound to threads of three capscrews (13), and secure A-pillar to rocker gap plate (12) to A-pillar armor (11) with capscrews (13). Tighten capscrews (13) to 35 lb-ft (47 N·m).
5. Tighten locknuts (6) and (8) to 10 lb-ft (14 N·m).

11-35. RIGHT SIDE ROCKER PANEL ARMOR AND INSIDE PROTECTION PLATE MAINTENANCE (Cont'd)



- FOLLOW-ON-TASKS:**
- Install companion seat assembly (para. 10-44).
 - Install right passenger seat (para. 10-45).

11-36. LEFT FRONT UNDERBODY ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Twelve locknuts (Appendix G, Item 169)
 Twenty locknuts (Appendix G, Item 170)
 Adhesive (Appendix C, Item 2.1)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Left side rocker panel armor removed (para. 11-34).
- Left front cowl insulation removed (para. 10-31).

General Safety Instructions

Left front underbody armor plate is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Left front underbody armor plate is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

NOTE

If new left front underbody armor is being installed, perform para. 11-36.1.

a. Removal

1. Remove four capscrews (21) and washers (21.1) from left front underbody armor (16), shim (22), and bracket (1).
2. Remove six capscrews (23) from left front underbody armor (16) and left side cowl (3).

NOTE

- Note location of spacers for installation.
- Note number and location of screws for installation.

3. Remove twelve locknuts (20), spacers (26), and capscrews (2) from left front underbody armor (16) and body (24). Discard locknuts (20).
4. Remove six socket-head screws (18) and three plates (17) from left front underbody armor (16) and three brackets (8).
5. Remove seven capscrews (14), washers (15), and spacers (13) from left front underbody armor (16) and body (24).
6. Remove fifteen capscrews (4) from driver's footwell armor (5) and left front underbody armor (16).
7. Remove fourteen locknuts (25) and capscrews (19) from left front underbody armor (16) and body (24). Discard locknuts (25).
8. Remove eight socket-head screws (12) and left front underbody armor (16) from rocker panel (7).

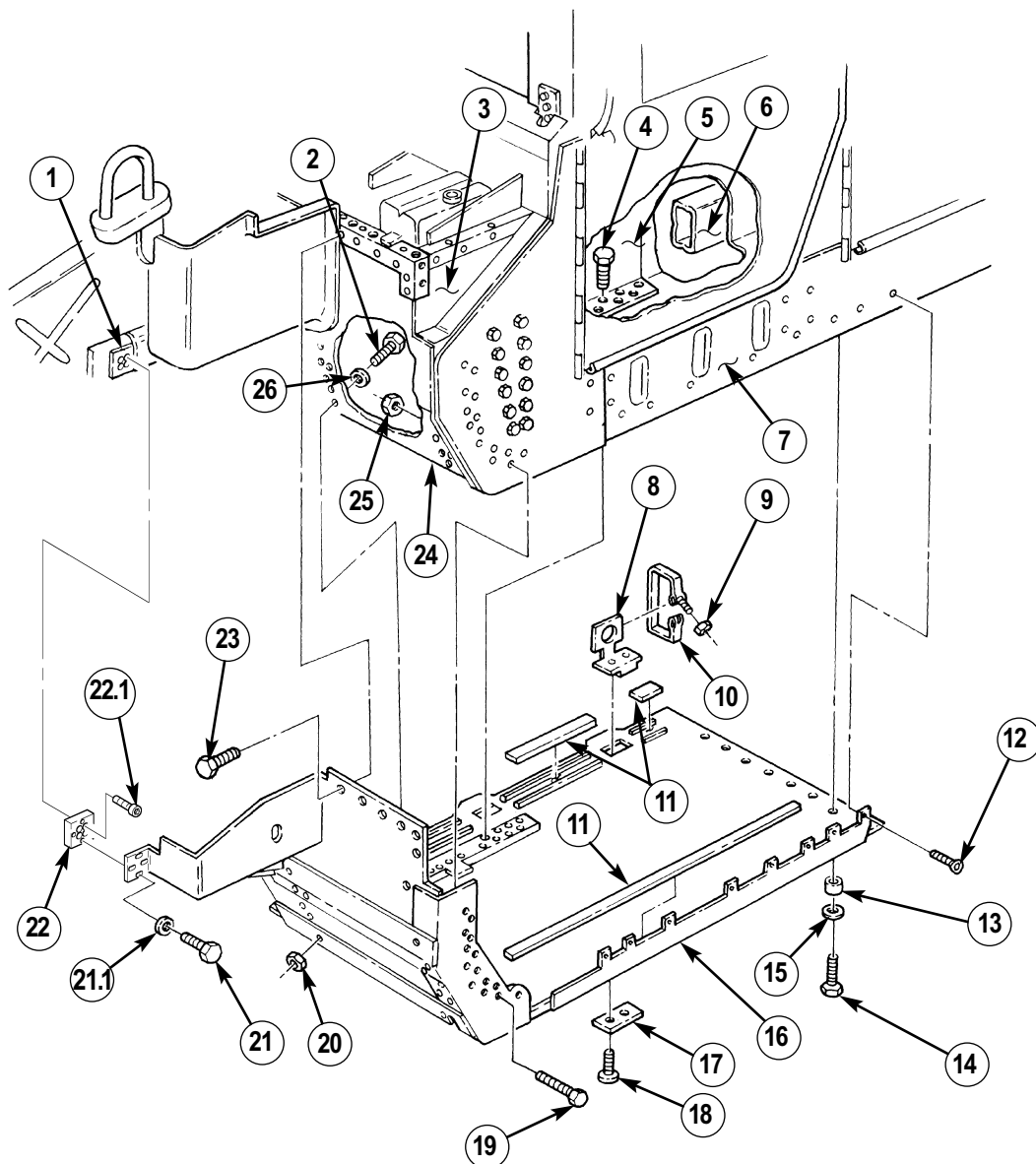
11-36. LEFT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)

NOTE

- Perform step 9 if clamps and/or brackets are damaged.
 - Mark bracket locations for installation.
9. Remove six locknuts (9), clamps (10), and three mounting brackets (8) from frame rail (6). Discard locknuts (9).
 10. Remove four socket-head screws (22.1) and shim (22) from bracket (1).

b. Inspection

1. Refer to para. 10-56 for plusnut inspection and replacement.
2. Inspect rubber strips (11). Replace rubber strips (11) if damaged using adhesive.



11-36. LEFT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)

c. Installation

CAUTION

Ensure position of clamps on frame are under vent lines. Failure to do so will result in damage to equipment.

NOTE

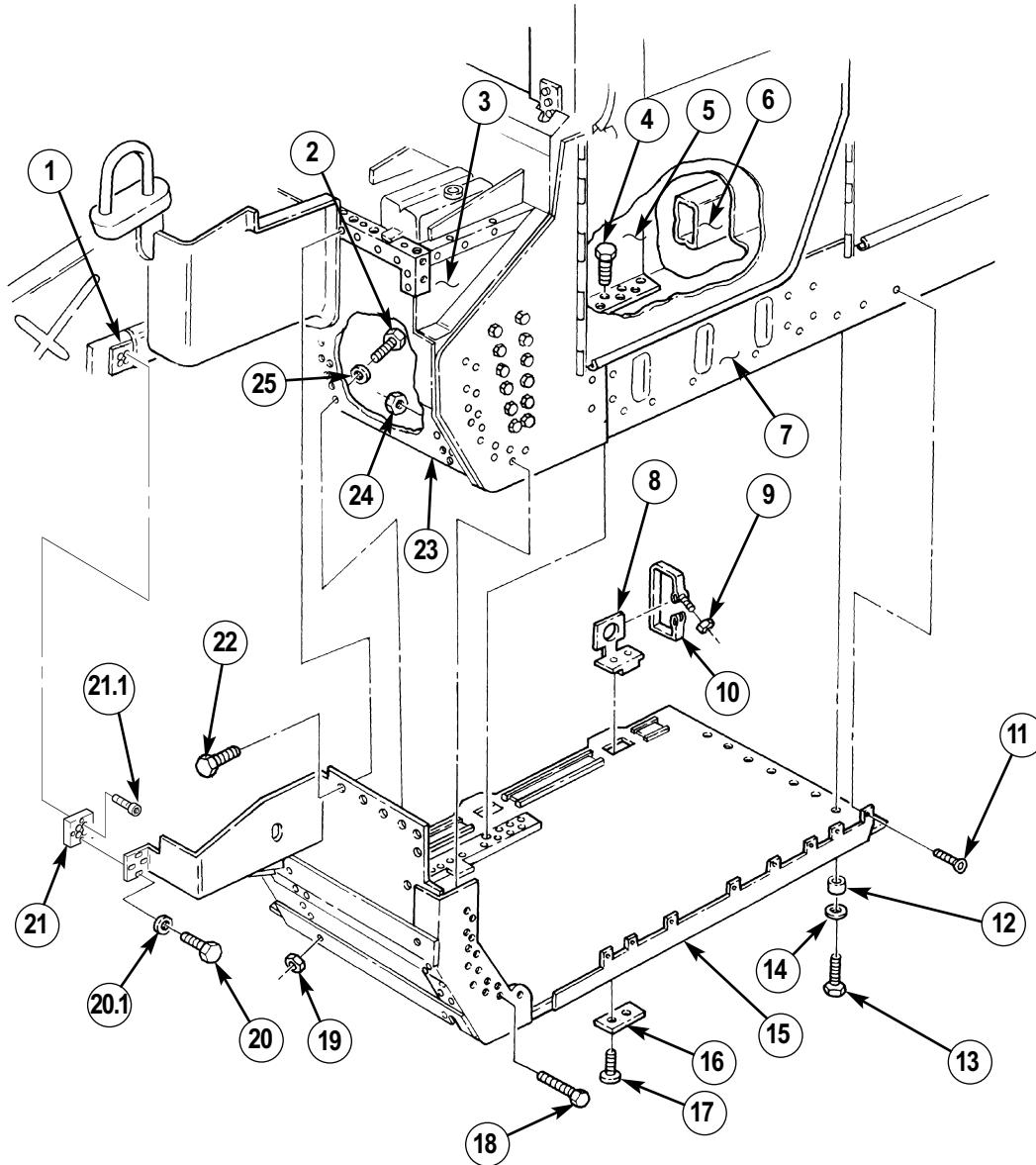
- If new left front underbody armor is installed, perform para. 11-36.1 in place of task C.
 - Perform step 2 if clamps and brackets were removed.
 - Ensure all old adhesive and paint is removed from area to be adhesive bonded.
1. Apply sealing compound to threads of four socket-head screws (21.1), and install shim (21) on bracket (1) with socket-head screws (21.1). Tighten socket-head screws (21.1) to 10 lb-ft (14 N·m).
 2. Apply adhesive to three mounting brackets (8) and install mounting brackets (8) with six clamps (10) on frame rail (6) with six locknuts (9). Tighten locknuts (9) to 64-68 lb-in. (7-8 N·m).
 3. Apply sealing compound to threads of eight socket-head screws (11), and install underbody armor (15) on rocker panel (7) with eight socket-head screws (11). Tighten socket-head screws (11) to 68-82 lb-in. (7-9 N·m).
 4. Install underbody armor (15) on body (23) and left side cowl (3) with fourteen capscrews (18) and locknuts (24). Tighten locknuts (24) to 35 lb-ft (47 N·m).
 5. Apply sealing compound to threads of seven capscrews (13), and install underbody armor (15) on body (23) with seven spacers (12), washers (14), and capscrews (13). Tighten capscrews (13) to 23 lb-ft (31 N·m).
 6. Apply sealing compound to threads of six socket-head screws (17), and install three plates (16) and underbody armor (15) on three brackets (8) with socket-head screws (17). Tighten socket-head screws (17) to 37 lb-ft (50 N·m).

NOTE

Ensure large spacers are installed in upper holes.

7. Install underbody armor (15) on body (23) with twelve capscrews (2), spacers (25), and locknuts (19). Tighten locknuts (19) to 37 lb-ft (50 N·m).
8. Apply sealing compound to threads of six capscrews (22), and install underbody armor (15) on left side cowl (3) with capscrews (22). Tighten capscrews (22), to 68-82 lb-in. (7-9 N·m).
9. Apply sealing compound to threads of four capscrews (20), and install underbody armor (15) on shim (21) and bracket (1) with four washers (20.1) and capscrews (20). Tighten capscrews (20) to 10 lb-ft (14 N·m).
10. Apply sealing compound to threads of fifteen capscrews (4), and install underbody armor (15) on driver's footwell armor (5) with capscrews (4). Tighten capscrews (4) to 23 lb-ft (31 N·m).

11-36. LEFT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install left front cowl insulation (para. 10-31).
 - Install left side rocker panel armor (para. 11-34).
 - Lower and secure hood (TM 9-2320-387-10).

11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION

This task covers:

- | | |
|---|--|
| <p>a. New Driver's Side Footwell Outer Armor Installation</p> <p>b. New Driver's Side Footwell Inner Armor Installation</p> | <p>c. New Front Underbody Armor Installation</p> |
|---|--|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Fifteen AVK fasteners (Appendix G, Item 3.1)
 Forty-two locknuts (Appendix G, Item 169)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Materials/Parts

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Raise and secure hood (TM 9-2320-387-10).
- Remove accelerator linkage (para. 3-43).
- Remove steering wheel lock (para. 10-48).
- Remove engine access cover (para. 10-22).
- Remove tunnel insulation (para. 10-33).
- Remove left front cowl insulation (para. 10-31).
- Remove left front underbody armor (para. 11-36).
- Remove driver's side footwell outer armor (para. 11-40).
- Remove driver's side footwell inner armor (para. 11-41).

General Safety Instructions

Left front underbody armor is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Left front underbody armor is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

NOTE

Installing a new left front underbody armor requires match drilling of the underbody to the vehicle. In addition, the driver's side footwell left inner and outer liners will have to be replaced.

a. New Driver's Side Footwell Outer Armor Installation

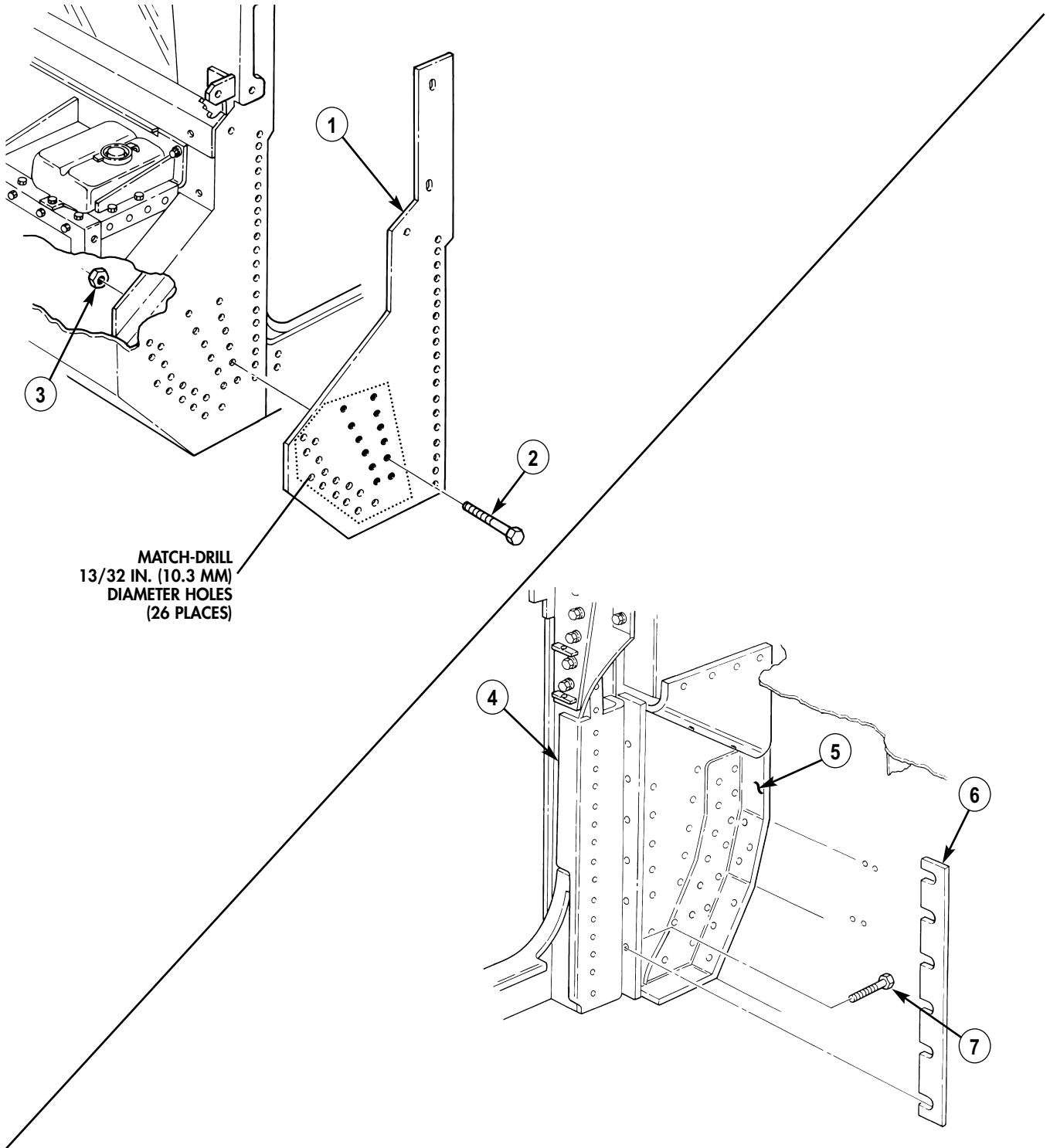
1. Install driver's side footwell outer armor (5) and spacer (6) on left A-beam armor (4) with six capscrews (7). Tighten capscrews (7) to 35 lb-ft (47 N·m).
2. Using A-pillar armor (1) as a template, drill one 13/32-in. (10.3 mm) diameter hole from A-pillar armor (1) through driver's side footwell outer armor (5).

NOTE

Capscrews in steps 3 and 5 are installed in darkened hole locations in A-pillar armor.

3. Install one capscrew (2) and locknut (3) through A-pillar armor (1) and driver's side footwell outer armor (5). Tighten locknut (3) to 35 lb-ft (47 N·m).
4. Using A-pillar armor (1) as a template, match-drill twenty-five 13/32 in. (10.3 mm) diameter holes from A-pillar armor (1) through driver's side footwell outer armor (5).
5. Install eleven capscrews (2) and locknuts (3) through A-pillar armor (1) and driver's side footwell outer armor (5). Tighten locknuts (3) to 35 lb-ft (47 N·m).

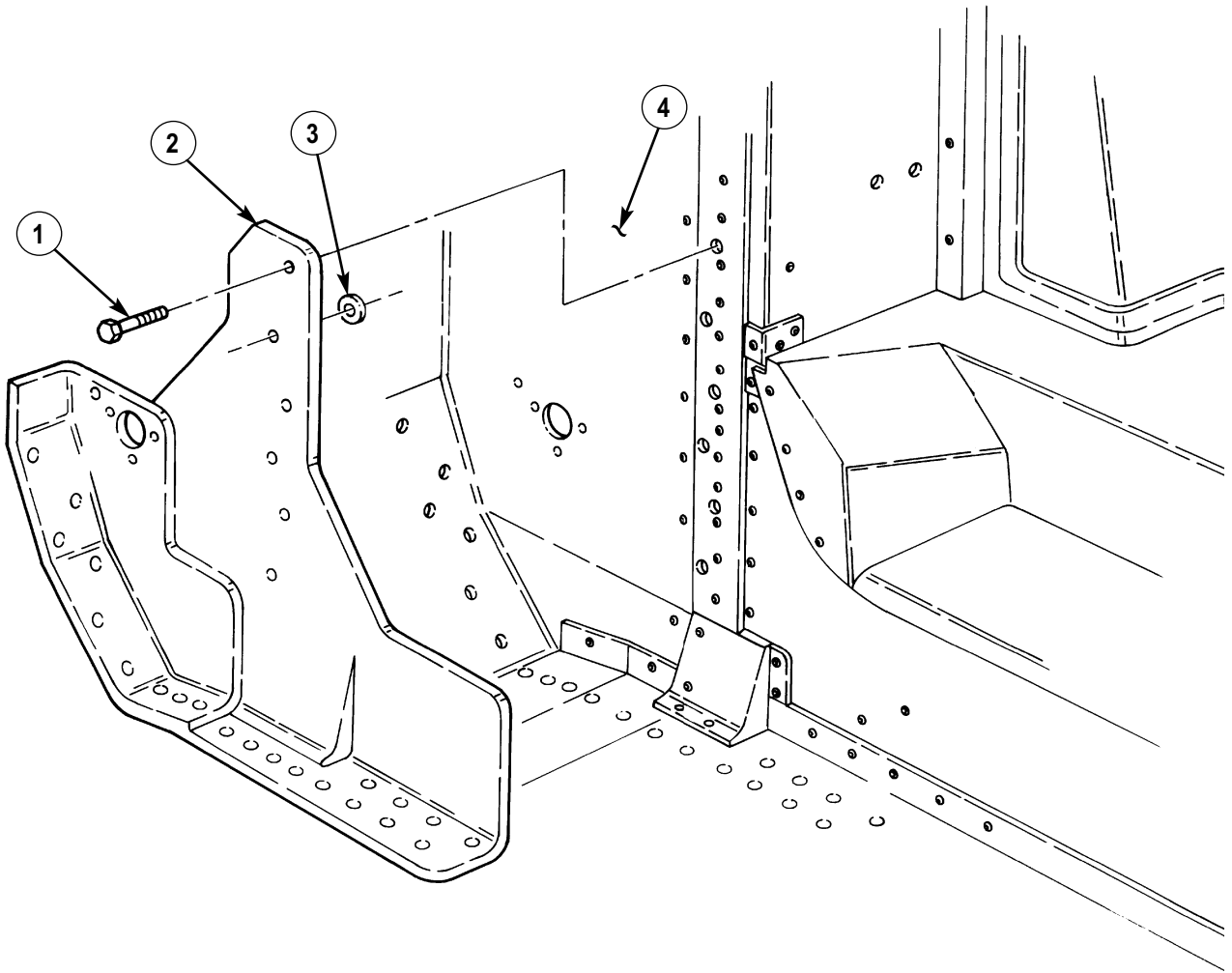
11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

b. New Driver's Side Footwell Inner Armor Installation

1. Apply sealing compound to threads of six capscrews (1), and install driver's side footwell inner armor (2) on vehicle tunnel (4) with capscrews (1) and one washer (3) (behind armor). Tighten capscrews (1) to 23 lb-ft (31 N·m).



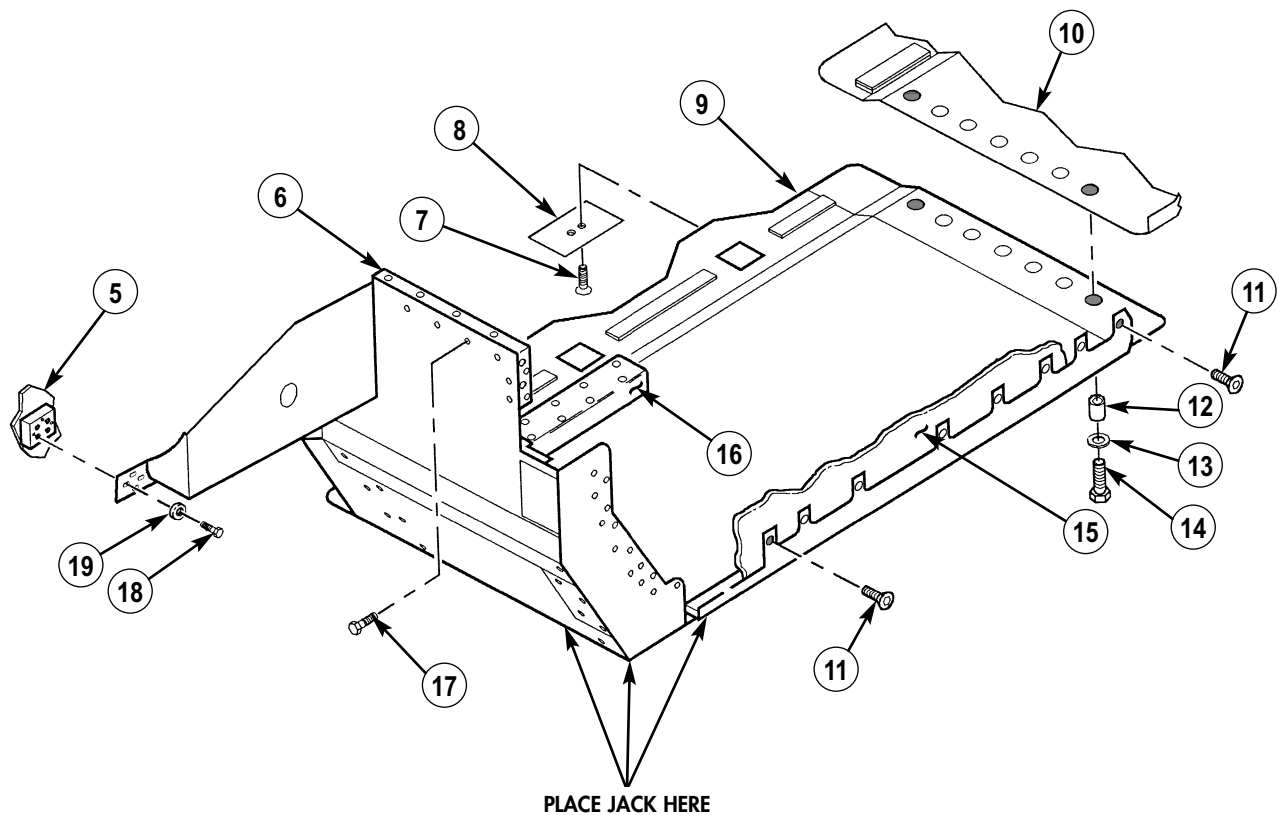
11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

c. New Front Underbody Armor Installation

NOTE

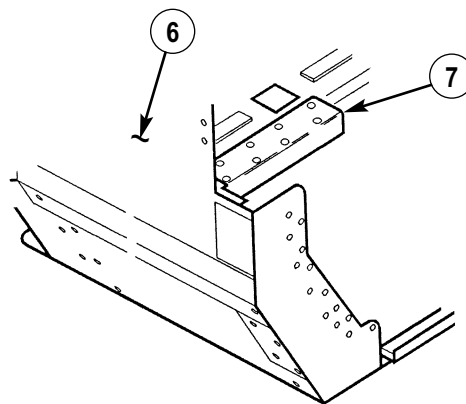
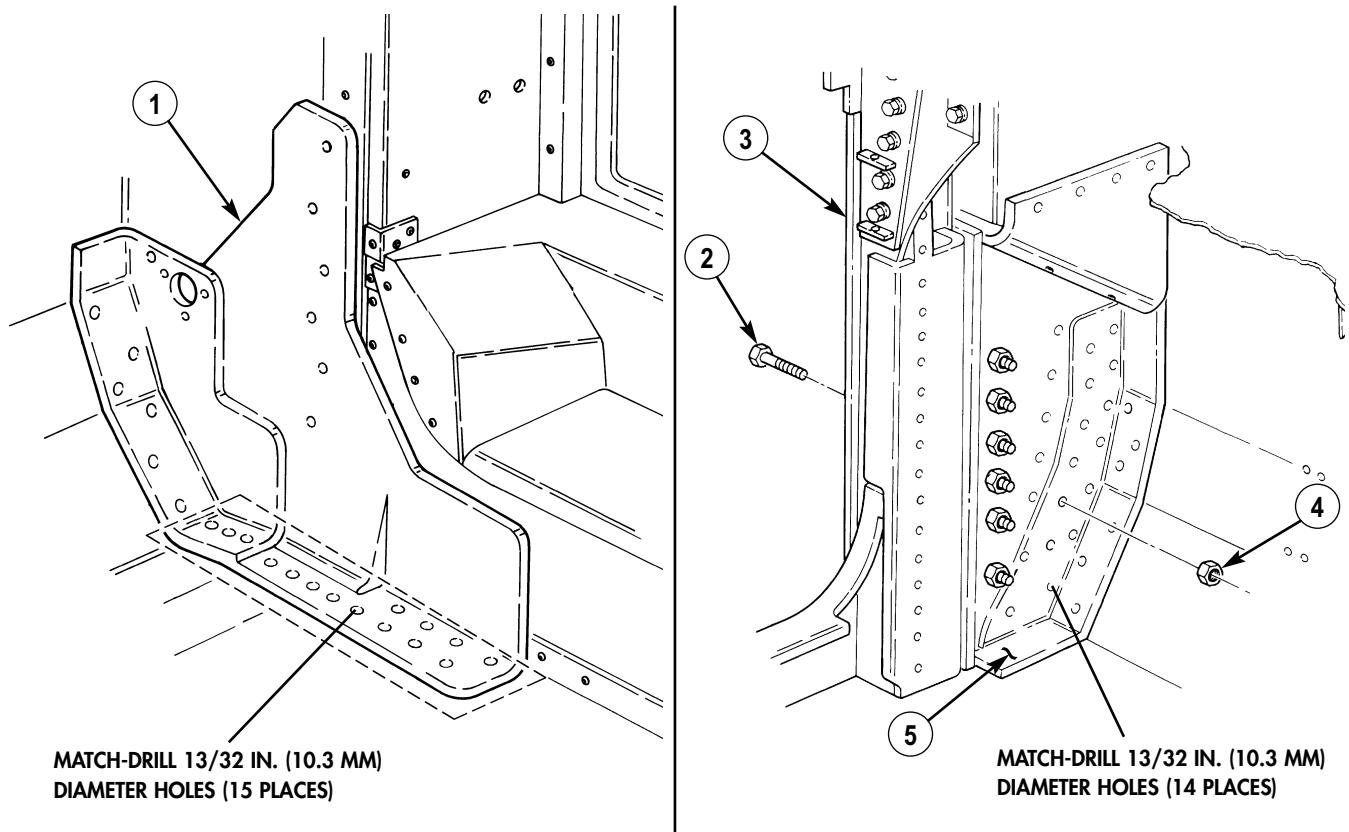
Steps 1 through 8 are performed to temporarily install a new left front underbody armor segment in order to perform match-drilling to provide a secure interface with other vehicle body armor brackets and liners prior to final installation.

1. Move new left front underbody armor (9) into place underneath vehicle with hydraulic jack and slowly raise left front underbody armor (9) into position on vehicle.
2. Install left front underbody armor (9) to left rear underbody (10) with two spacers (12), washers (13), and capscrews (14) in inner and outer holes. Tighten capscrews (14) to 23 lb-ft (31 N·m).
3. Install left front underbody armor (9) to vehicle side panel (15) with two socket-head screws (11) into front and rear holes. Tighten socket-head screws (11) to 75 lb-in. (8.5 N·m).
4. Secure left front underbody armor (9) to resilient mount shim (5) with four washers (19) and capscrews (18). Tighten capscrews (18) to 10 lb-ft (14 N·m).
5. Install three retainer plates (8) to left front underbody armor (9) and secure each with two socket-head screws (7). Tighten socket-head screws (7) to 37 lb-ft (50 N·m).
6. Install left front underbody armor (9) to left front underbody angle (6) with six capscrews (17). Tighten capscrews (17) to 75 lb-in. (8 N·m).



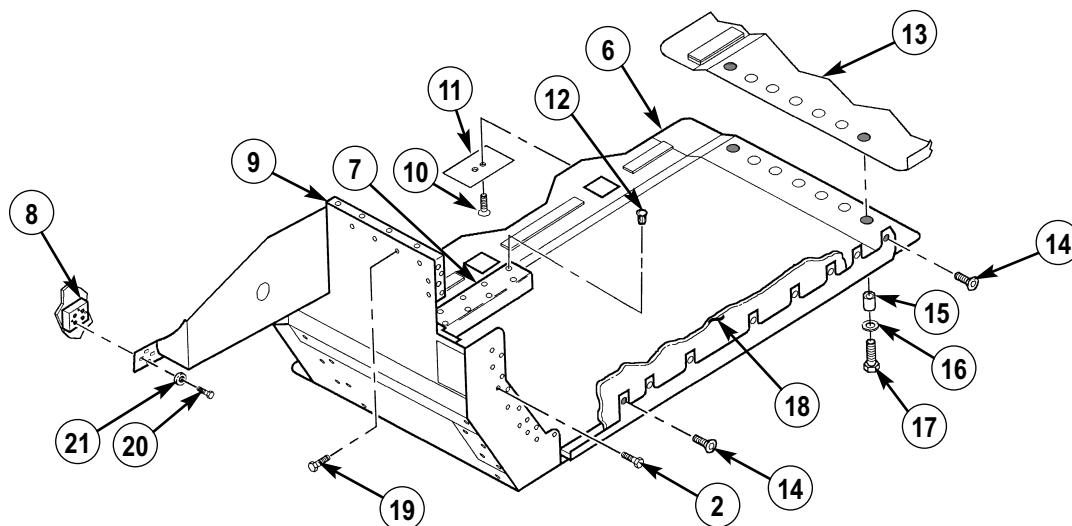
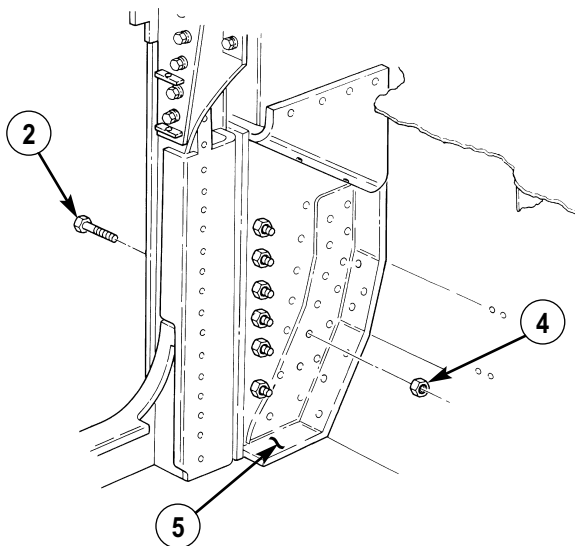
11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

7. From inside vehicle, match-drill fourteen 13/32-in. (10.3-mm) diameter holes from driver's side footwell outer armor (5), and A-pillar armor (3) through left front underbody armor (6).
8. Install three capscrews (2) and locknuts (4) through driver's side footwell outer armor (5), A-pillar armor (3), and left front underbody armor (6). Tighten locknuts (4) to 35 lb-ft (47 N·m).
9. Using driver's side footwell inner armor (1) as a template, match-drill fifteen 13/32-in. (10.3-mm) diameter holes from driver's side footwell inner armor (1) into left front underbody armor (6). Stop drilling when drill bit penetrates hat section (7). Do not drill completely through left front underbody armor (6).



11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

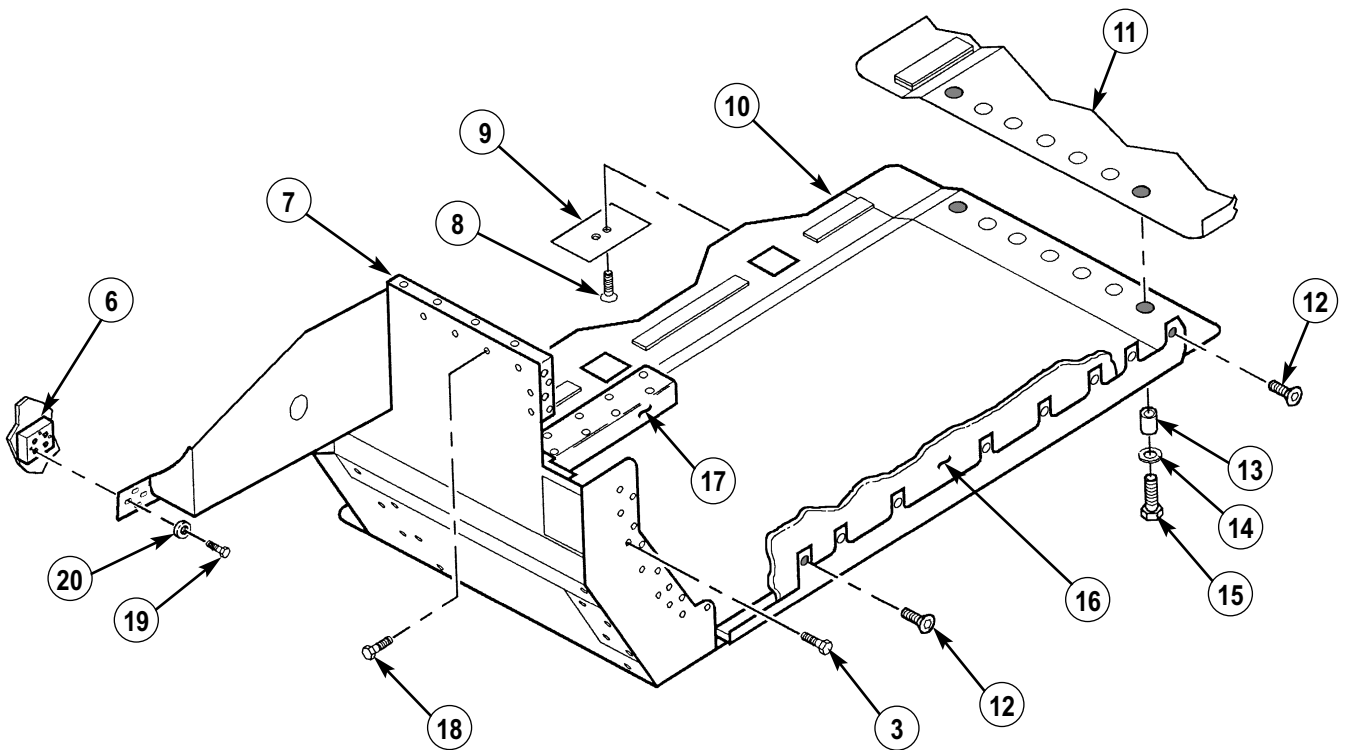
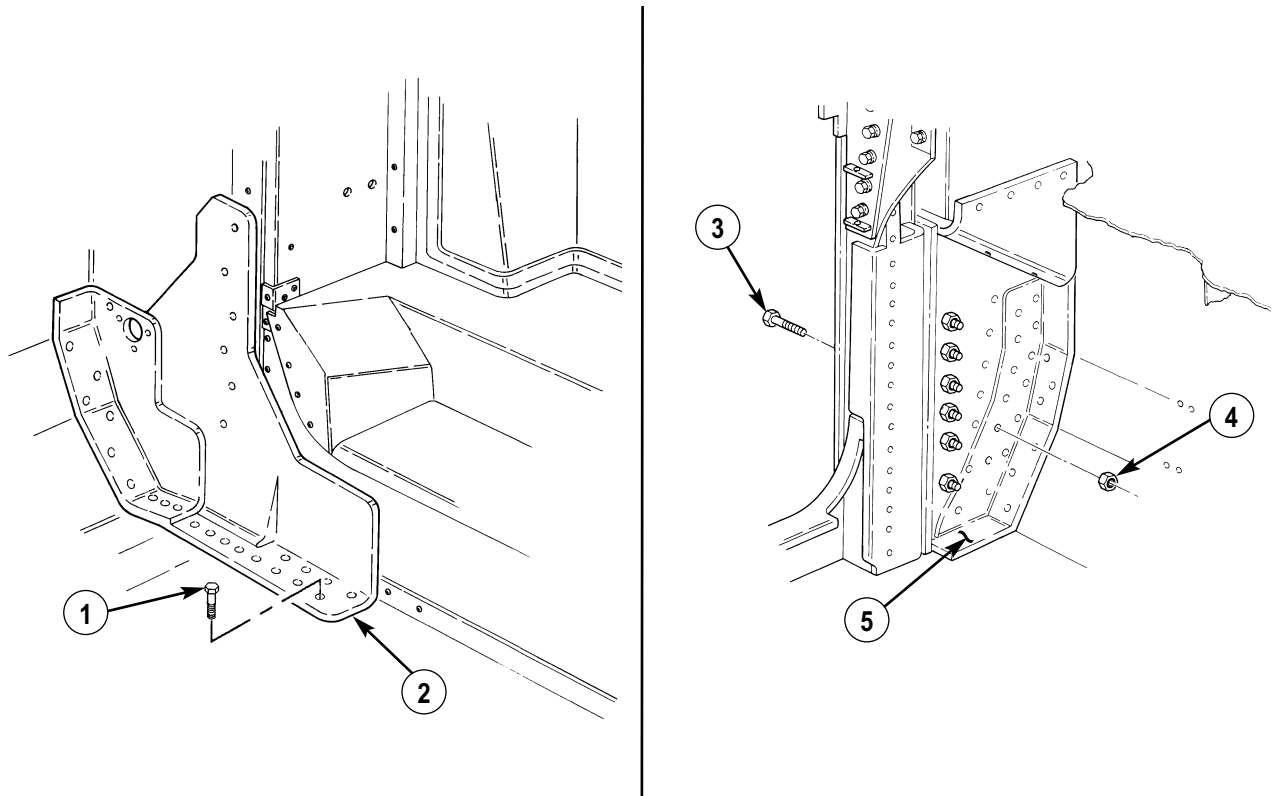
10. Remove four capscrews (20) and washers (21) securing left front underbody armor (6) to resilient mount shim (8).
11. Remove six capscrews (19) from left front underbody armor (6) and left front underbody angle (9).
12. Remove six socket-head screws (10) and three retainer plates (11).
13. Remove two capscrews (17), washers (16), and spacers (15), from inner and outer holes in left front underbody armor (6) and left rear underbody (13).
14. Remove three capscrews (2) and locknuts (4) from left front underbody armor (6) and driver's side footwell outer armor (5).
15. Remove two socket-head screws (14) from front and rear holes in left front underbody armor (6) and vehicle side panel (18).
16. Using hydraulic jack, slowly lower left front underbody armor (6) and remove from underneath vehicle.
17. Enlarge fifteen holes in left front underbody armor hat section (7) to 17/32 in. (13.5 mm).
18. Install fifteen AVK fasteners (12) into left front underbody hat section (7).



11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

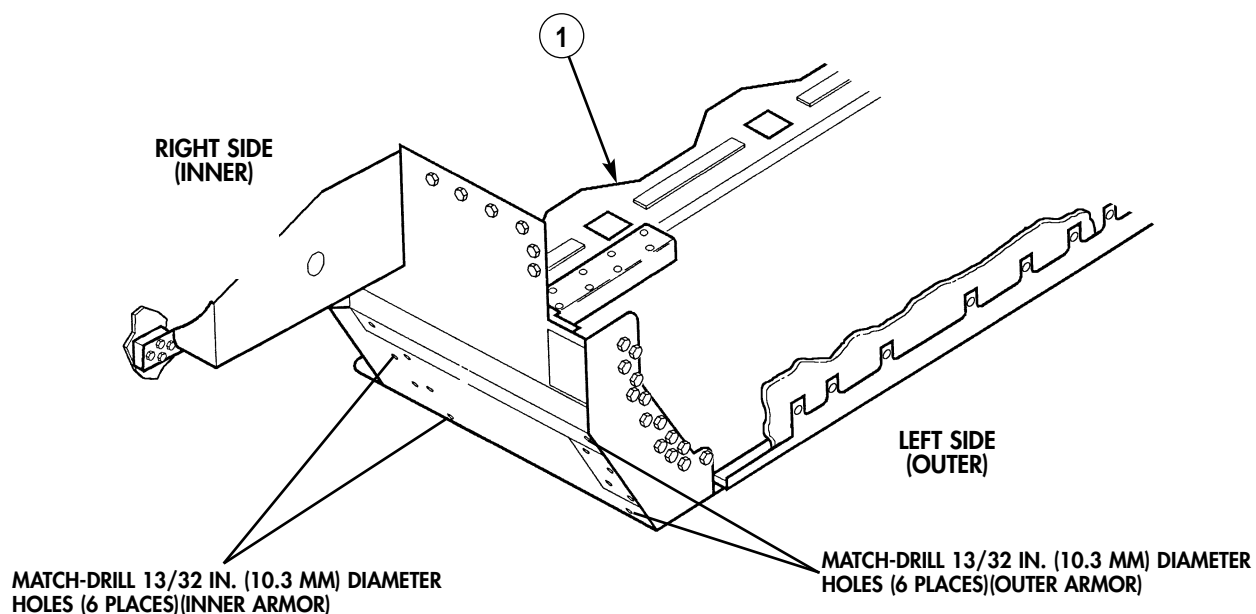
19. Move left front underbody armor (10) into place underneath vehicle with hydraulic jack and slowly raise left front underbody armor (10) into position on vehicle.
20. Apply sealing compound to seven capscrews (15), and install left front underbody armor (10) to left rear underbody (11) with seven spacers (13), washers (14), and capscrews (15). Tighten capscrews (15) to 23 lb-ft (31 N·m).
21. Apply sealing compound to eight socket-head screws (12), and install left front underbody armor (10) on vehicle side panel (16) with socket-head screws (12). Tighten socket head screws (12) to 75 lb-in. (8 N·m).
22. Apply sealing compound to four capscrews (19) and secure left front underbody armor (10) to resilient mount shim (6) with four washers (20) and capscrews (19). Tighten capscrews (19) to 10 lb-ft (14 N·m).
23. Apply sealing compound to six socket-head screws (8), and install three retainer plates (9) and secure each with two socket-head screws (8). Tighten socket-head screws (8) to 37 lb-ft (50 N·m).
24. Install driver's side footwell outer armor (5) on left front underbody armor (10) with fourteen capscrews (3) and locknuts (4). Tighten locknuts (4) to 35 lb-ft (50 N·m).
25. Apply sealing compound to six capscrews (18), and install left front underbody armor (10) to left front underbody angle (7) with capscrews (18). Tighten capscrews (18) to 68-82 lb-in. (7-9 N·m).
26. Apply sealing compound to fifteen capscrews (1), and secure driver's side footwell inner armor (2) to left front underbody armor hat section (17) with capscrews (1). Tighten capscrews (1) to 23 lb-ft (31 N·m).

11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

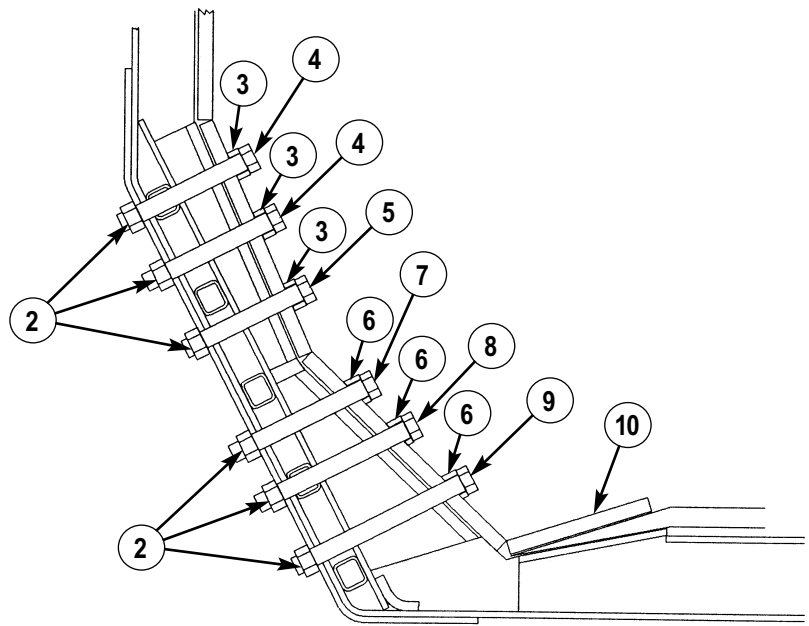


11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

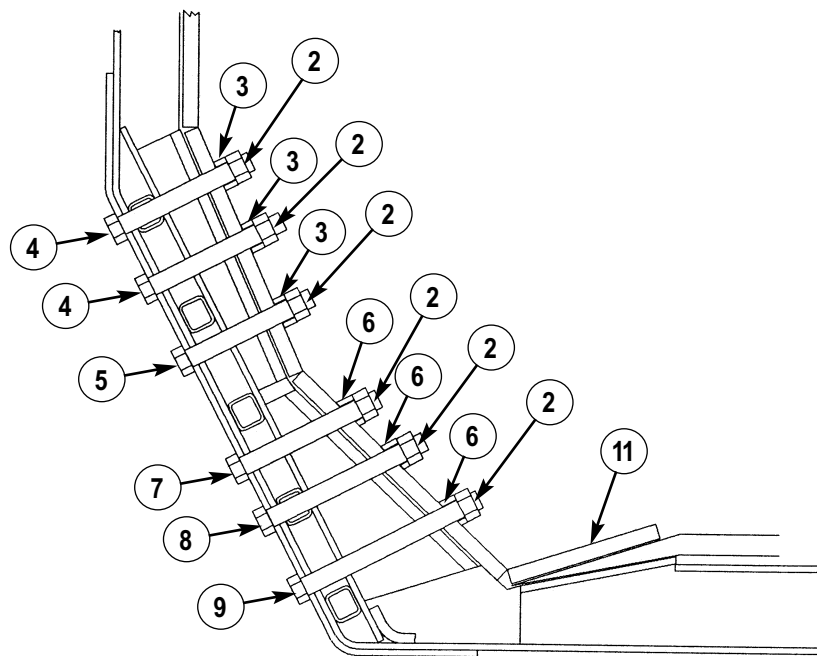
27. Match-drill six 13/32-in. (10.3-mm) diameter holes from left front underbody armor (1) through driver's side footwell inner armor (right side (inner)).
28. Match-drill six 13/32-in. (10.3-mm) diameter holes from left front underbody armor (1) through driver's side footwell outer armor (left side (outer)).
29. Secure driver's side footwell inner liner (10) to left front underbody armor (1) with capscrews (4), (5), (7), (8), and (9), three spacers (3), spacers (6), and six locknuts (2). Tighten locknuts (2) to 35 lb-ft (50 N.m).
30. Secure driver's side footwell outer liner (11) to left front underbody armor (1) with capscrews (4), (5), (7), (8), and (9), three spacers (3), spacers (6), and six locknuts (2). Tighten locknuts (2) to 35 lb-ft (50 N.m).



11-36.1. LEFT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



INNER LINER INSTALLATION



OUTER LINER INSTALLATION

- FOLLOW-ON TASKS:**
- Install left front cowl insulation (para. 11-31).
 - Install engine access cover (para. 10-22).
 - Install tunnel insulation (para. 10-33).
 - Install steering wheel lock (para. 10-48).
 - Install accelerator linkage (para. 3-43).
 - Lower and secure hood (TM 9-2320-387-10).

11-37. LEFT REAR UNDERBODY ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Twelve locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)
 Adhesive (Appendix C, Item 2.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left side rocker panel armor removed (para. 11-34).
- Tailpipe removed (para. 3-48).
- Tailpipe hanger bracket removed (para. 3-53).
- Left front underbody armor removed (para. 11-36).
- C-pillar bottom left side armor removed (para. 11-46).

General Safety Instructions

Left rear underbody armor plate is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Left rear underbody armor plate is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

a. Removal

NOTE

Note location of screws, nuts, spacers, and brackets for installation.

1. Remove capscrew (10), washer (9), socket-head screw (8), and tiedown (7) from wheelwell (14).
2. Remove two locknuts (24), capscrews (5), and washers (6) from left rear underbody armor (18) and wheelwell (14). Discard locknuts (24).
3. Remove three locknuts (19), capscrews (15), and washers (16) from bracket (22). Discard locknuts (19).
4. Remove three capscrews (20), washers (21), and bracket (22) from left rear underbody armor (18).
5. Remove seven capscrews (36), washers (35), and bracket (34) from left rear underbody armor (18).
6. Remove four socket-head screws (28) and two plates (26) from rubber strips (25), left rear underbody armor (18), and bracket (31).
7. Remove three locknuts (23), capscrews (12), and bar (11) from left rear underbody armor (18) and wheelwell (14). Discard locknuts (23).
8. Remove eighteen socket-head screws (27), left rear underbody armor (18), and armor plate (17) from rocker panel (4) and wheelwell (14).
9. Remove three capscrews (2), bar (1), and spacer (30) from rubber strip (29) and body.

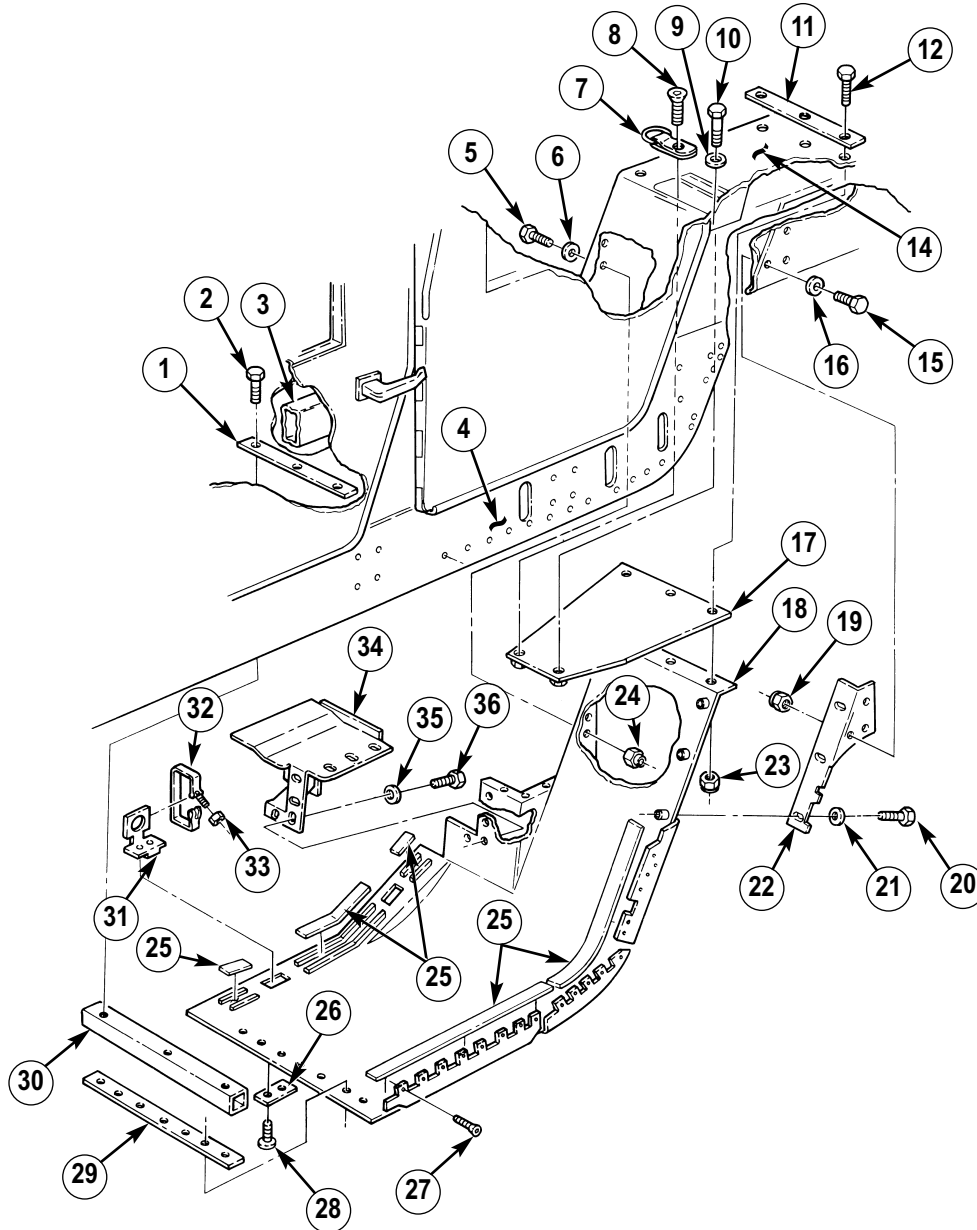
NOTE

- Perform step 10 if clamps and/or brackets are damaged.
 - Mark bracket locations for installation.
10. Remove four locknuts (33), clamps (32), and two mounting brackets (31) from frame rail (3). Discard locknuts (33).

11-37. LEFT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)

b. Inspection

1. Refer to para. 10-56 for plusnut inspection and replacement.
2. Inspect rubber strips (25) and (29). Replace if damaged.



11-37. LEFT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)

c. Installation

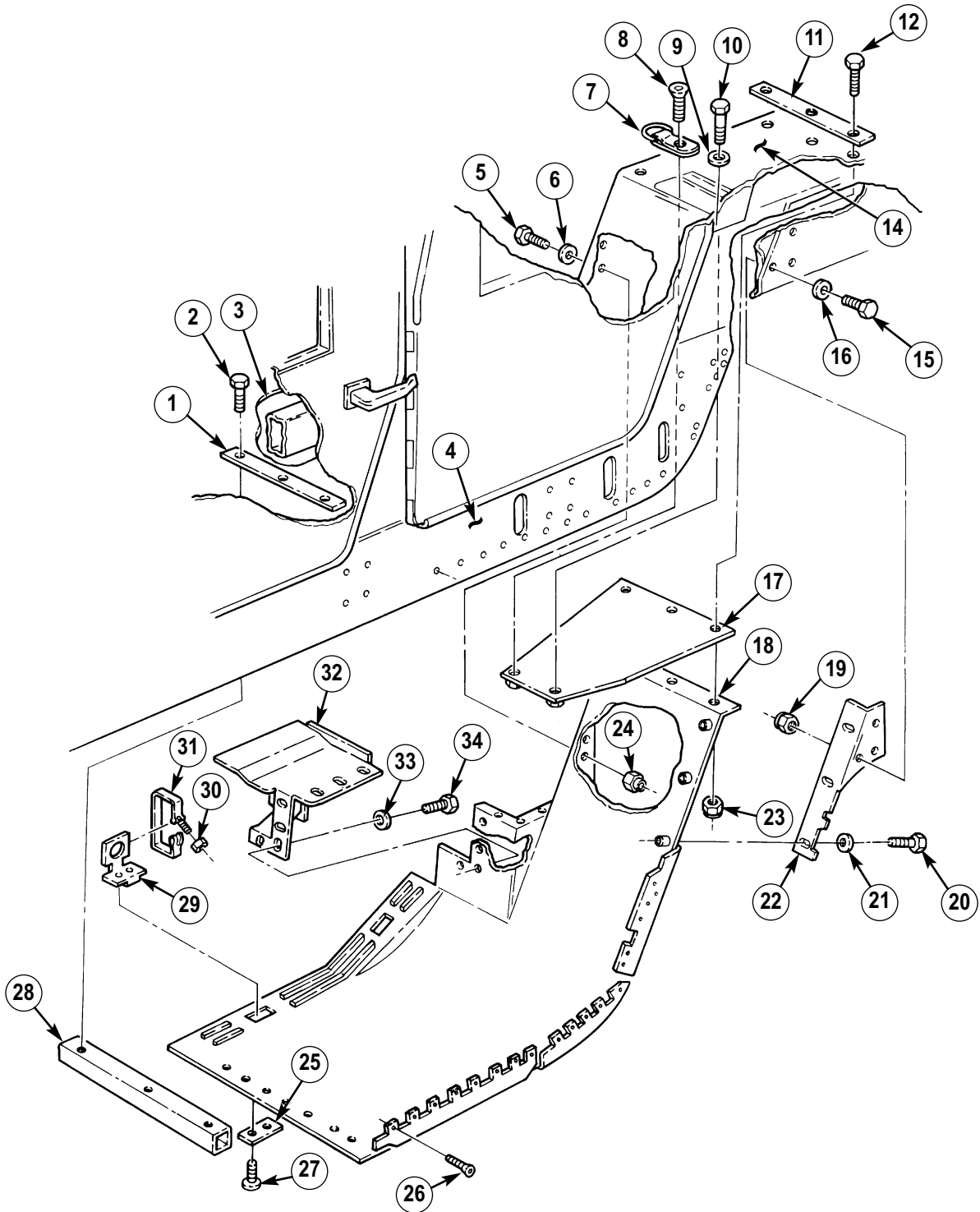
CAUTION

Ensure position of clamps on frame are under vent lines. Failure to do so will result in damage to equipment.

NOTE

- Perform step 1 if clamps and brackets were removed.
 - Ensure all old adhesive and paint are removed from area to be adhesive bonded.
1. Apply adhesive to two brackets (29) and install brackets (29) and four clamps (31) on frame rail (3) with four locknuts (30). Tighten locknuts (30) to 64-68 lb-in. (7-8 N·m).
 2. Apply sealing compound to threads of three capscrews (2), and install bar (1) and spacer (28) on body with capscrews (2). Tighten capscrews (2) to 68-82 lb-in. (7-8 N·m).
 3. Apply sealing compound to threads of eighteen socket-head screws (26), and install armor plate (17) and left rear underbody armor (18) on rocker panel (4) with socket-head screws (26). Tighten socket-head screws (26) to 68-82 lb-in. (8-9 N·m).
 4. Install bar (11) on wheelwell (14) with three capscrews (12) and locknuts (23). Tighten locknuts (23) to 10 lb-ft (14 N·m).
 5. Apply sealing compound to threads of four socket-head screws (27), and install two plates (25) and left rear underbody armor (18) on brackets (29) with socket-head screws (27). Tighten socket-head screws (27) to 37 lb-ft (50 N·m).
 6. Apply sealing compound to threads of seven capscrews (34), and install bracket (32) on left rear underbody armor (18) with seven washers (33) and capscrews (34). Tighten capscrews (34) to 21 lb-ft (28 N·m).
 7. Install left rear underbody armor (18) on wheelwell (14) with two washers (6), capscrews (5), and locknuts (24). Tighten locknuts (24) to 10 lb-ft (14 N·m).
 8. Apply sealing compound to threads of three capscrews (20), and install bracket (22) on left rear underbody armor (18) with three washers (21) and capscrews (20). Tighten capscrews (20) to 21 lb-ft (28 N·m).
 9. Install bracket (22) on wheelwell (14) with three washers (16), capscrews (15), and locknuts (19). Tighten locknuts (19) to 37 lb-ft (50 N·m).
 10. Apply sealing compound to threads of socket-head screw (8), and install tiedown (7) on wheelwell (14) with socket-head screw (8). Tighten socket-head screw (8) to 81-99 lb-ft (110-134 N·m).
 11. Apply sealing compound to threads of capscREW (10), and install washer (9) and capscREW (10) on wheelwell (14). Tighten capscREW (10) to 37 lb-ft (50 N·m).

11-37. LEFT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install C-pillar bottom left side armor (para. 11-46).
 - Install left front underbody armor (para. 11-36).
 - Install tailpipe hanger bracket (para. 3-53).
 - Install tailpipe (para. 3-48).
 - Install left side rocker panel armor (para. 11-34).

11-38. RIGHT FRONT UNDERBODY ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Personnel Required

Thirty-one locknuts (Appendix G, Item 169)
 Six locknuts (Appendix G, Item 170)
 Sealing compound (Appendix C, Item 72.1)
 Adhesive (Appendix C, Item 2.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Air cleaner removed (para. 3-12).
- Right side rocker panel armor removed (para. 11-35).
- Right front cowl insulation removed (para. 10-32).
- Heater/evaporator removed (para. 25-21).

General Safety Instructions

Right front underbody armor plate is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Right front underbody armor plate is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

NOTE

If new right front underbody armor is being installed, perform para. 11-38.1.

a. Removal

NOTE

Note location of screws, nuts, spacers, and brackets for installation.

1. Remove four capscrews (12), washers (11.1), and shim (10) from from right front underbody armor (11) and bracket (8).
2. Remove six socket-head screws (17) and three plates (18) from right front underbody armor (11) and three brackets (24).
3. Remove twelve capscrews (2) from right front underbody armor (11) and footwell armor (3).
4. Remove fourteen locknuts (6) and capscrews (16) from right front underbody armor (11). Discard locknuts (6).
5. Remove twelve locknuts (4), spacers (5), and capscrews (15) from right front underbody armor (11) and body (7). Discard locknuts (4).
6. Remove seven screws (19), washers (20), and spacers (21) from right front underbody armor (11) and body (7).

NOTE

Support upper cowl liner when removing right front underbody armor.

- 6.1 Remove five locknuts (9) and capscrews (5.1) from upper cowl liner (5.2), body (7), and right front underbody armor (11). Discard locknuts (9).
7. Remove eight socket-head screws (22) and right front underbody armor (11) from rocker panel (27).

NOTE

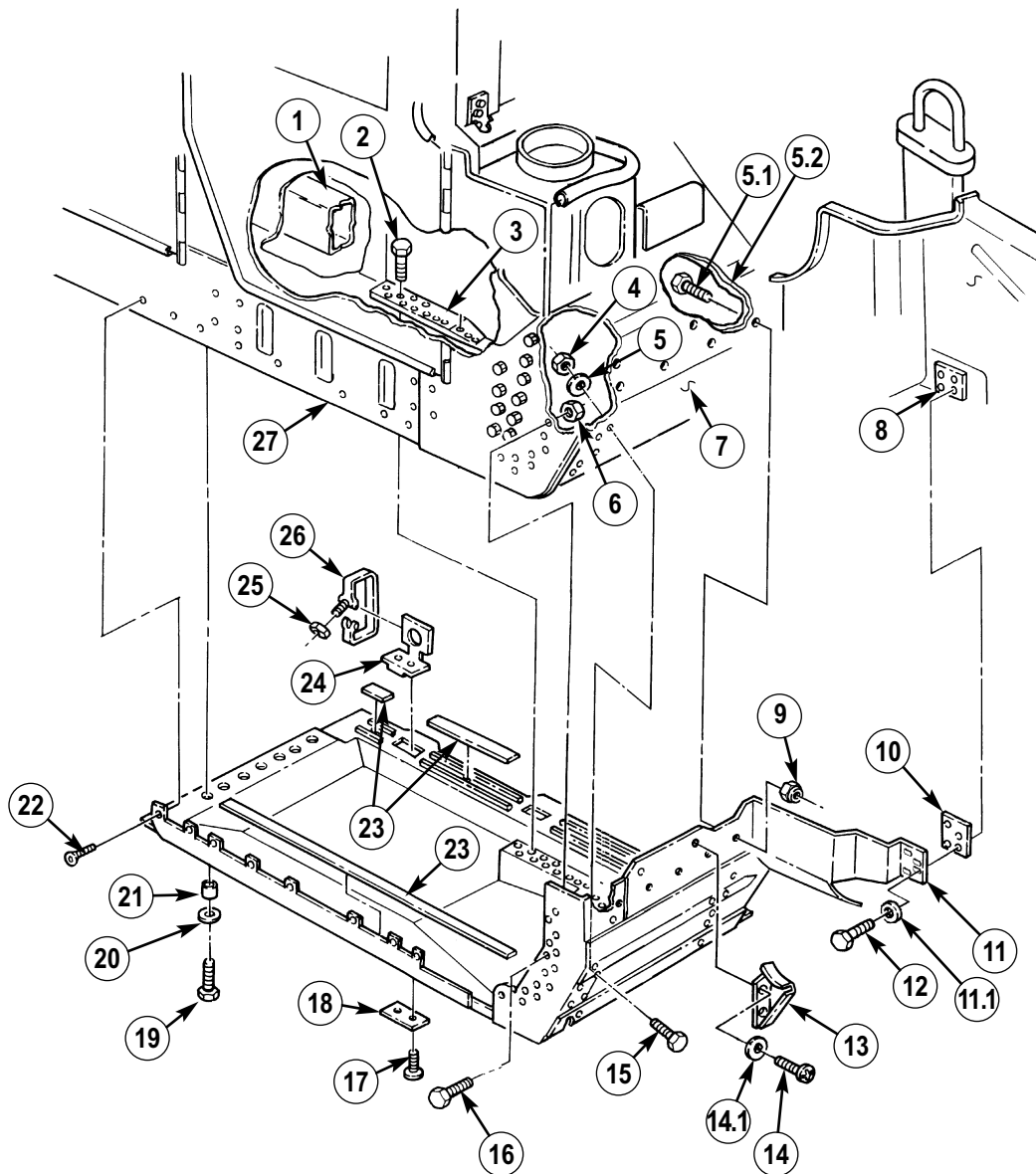
- Perform step 8 if removing air cleaner mounting brackets.
- Perform step 9 if removing brackets and clamps.

11-38. RIGHT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)

8. Remove four capscrews (14), washers (14.1), and two air cleaner brackets (13) from right front underbody armor (11).
9. Remove six locknuts (25), clamps (26), and three brackets (24) from frame rail (1). Discard locknuts (25).

b. Inspection

1. Refer to para. 10-56 for plusnut inspection and replacement.
2. Inspect rubber strips (23). Replace if damaged.



11-38. RIGHT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)

c. Installation

CAUTION

Ensure position of clamps on frame are under brake lines. Failure to do so will result in damage to equipment.

NOTE

- Perform step 1 if air cleaner mounting brackets were removed.
 - Perform step 2 if brackets and clamps were removed.
 - Ensure all old adhesive and paint is removed from area to be adhesive bonded.
1. Apply sealing compound to four capscrews (13), and install two air cleaner brackets (12) on right front underbody armor (10) with four washers (13.1) and capscrews (13). Tighten capscrews (13) to 35 lb-in (4 N·m).
 2. Apply adhesive to three brackets (22) and install six clamps (24) and three brackets (22) on frame rail (1) with six locknuts (23). Tighten locknuts (23) to 64-68 lb-in. (7-8 N·m).

NOTE

Ensure upper cowl liner is positioned against bulkhead.

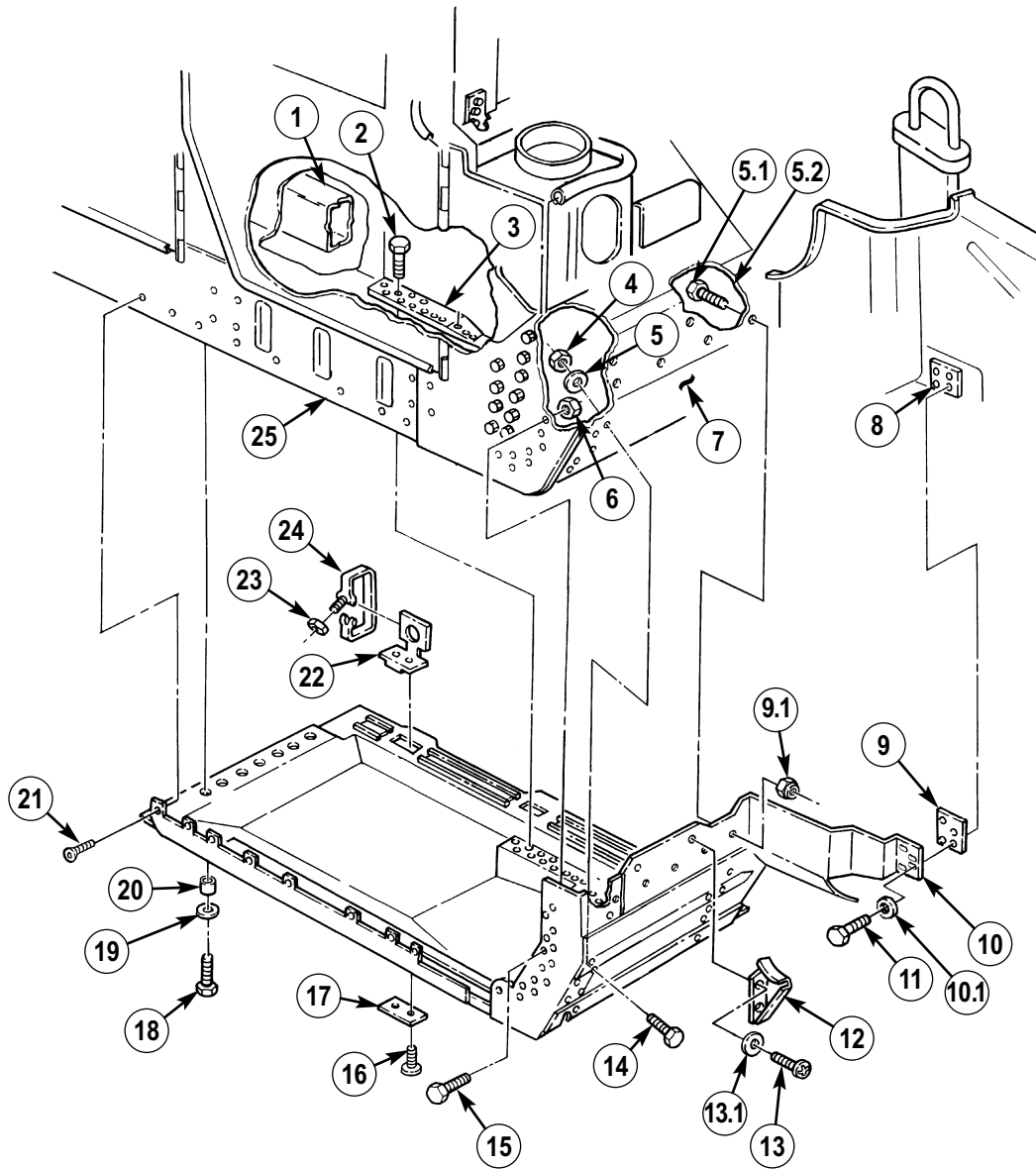
- 2.1 Install right front underbody armor (10) on body (7) and upper cowl liner (5.2) with five capscrews (5.1) and locknuts (9.1). Tighten locknuts (9.1) to 37 lb-ft (50 N·m).
3. Apply sealing compound to seven capscrews (18), and install right front underbody armor (10) on body (7) with seven spacers (20), washers (19), and capscrews (18). Tighten capscrews (18) to 23 lb-ft (31 N·m).
4. Apply sealing compound to eight socket-head screws (21), and install right front underbody armor (10) on rocker panel (25) with socket-head screws (21). Tighten socket-head screws (21) to 68-82 lb-in. (8-9 N·m).

NOTE

Ensure large spacers are installed in upper holes.

5. Install right front underbody armor (10) on body (7) and footwell armor (3) with twelve capscrews (14), spacers (5), and locknuts (4). Tighten locknuts (4) to 37 lb-ft (50 N·m).
6. Install right front underbody armor (10) on body (7) and footwell armor (3) with fourteen capscrews (15) and locknuts (6). Tighten locknuts (6) to 37 lb-ft (50 N·m).
7. Apply sealing compound to twelve capscrews (2), and install right front underbody armor (10) on footwell armor (3) and body (7) with capscrews (2). Tighten capscrews (2) to 37 lb-ft (50 N·m).
8. Apply sealing compound to six socket-head screws (16), and install right front underbody armor (10) and three plates (17) on brackets (22) with socket-head screws (16). Tighten socket-head screws (16) to 37 lb-ft (50 N·m).
9. Apply sealing compound to four capscrews (11), and install shim (9) and right front underbody armor (10) on bracket (8) with four washers (10.1) and capscrews (11). Tighten capscrews (11) to 10 lb-ft (14 N·m).

11-38. RIGHT FRONT UNDERBODY ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install heater/evaporator (para. 25-21).
 - Install right front cowl insulation (para. 10-32).
 - Install right side rocker panel armor (para. 11-35).
 - Install air cleaner (para. 3-12).

11-39. RIGHT REAR UNDERBODY ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit: automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment: automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 144.1)
 Eight locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)
 Adhesive (Appendix C, Item 2.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Rear cargo door raised and secured (TM 9-2320-387-10).
- Fuel filler armor cover opened (TM 9-2320-387-10).
- Right side rocker panel armor and inside protection plate removed (para. 11-35).
- Right front underbody armor removed (para. 11-38).

General Safety Instructions

Right rear underbody armor plate is extremely heavy and must be supported during removal and installation.

Maintenance Level

Unit

WARNING

Right rear underbody armor plate is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

a. Removal

1. Remove socket-head screw (6), capscrew (5), washer (4), and tiedown (7) from right rear underbody armor (24) and wheelwell (8).
2. Remove two locknuts (29), capscrews (10), and washers (9) from right rear underbody armor (24) and wheelwell (8). Discard locknuts (29).
3. Remove three locknuts (32), capscrews (34), and washers (35) from bracket (25). Discard locknuts (32).
4. Remove three capscrews (27), washers (26), and bracket (25) from right rear underbody armor (24).
5. Remove five capscrews (30), washers (31), and bracket (15) from right rear underbody armor (24).
6. Remove four socket-head screws (21) and two plates (22) from right rear underbody armor (24) and two brackets (18).
7. Remove three locknuts (28), capscrews (1), and bar (3) from armor plate (33) and wheelwell (8). Discard locknuts (28).
8. Remove eighteen socket-head screws (23), right rear underbody armor (24), and armor plate (33) from rocker panel (14) and wheelwell (8).
9. Remove three capscrews (12), bar (13), and spacer (20) from body.

NOTE

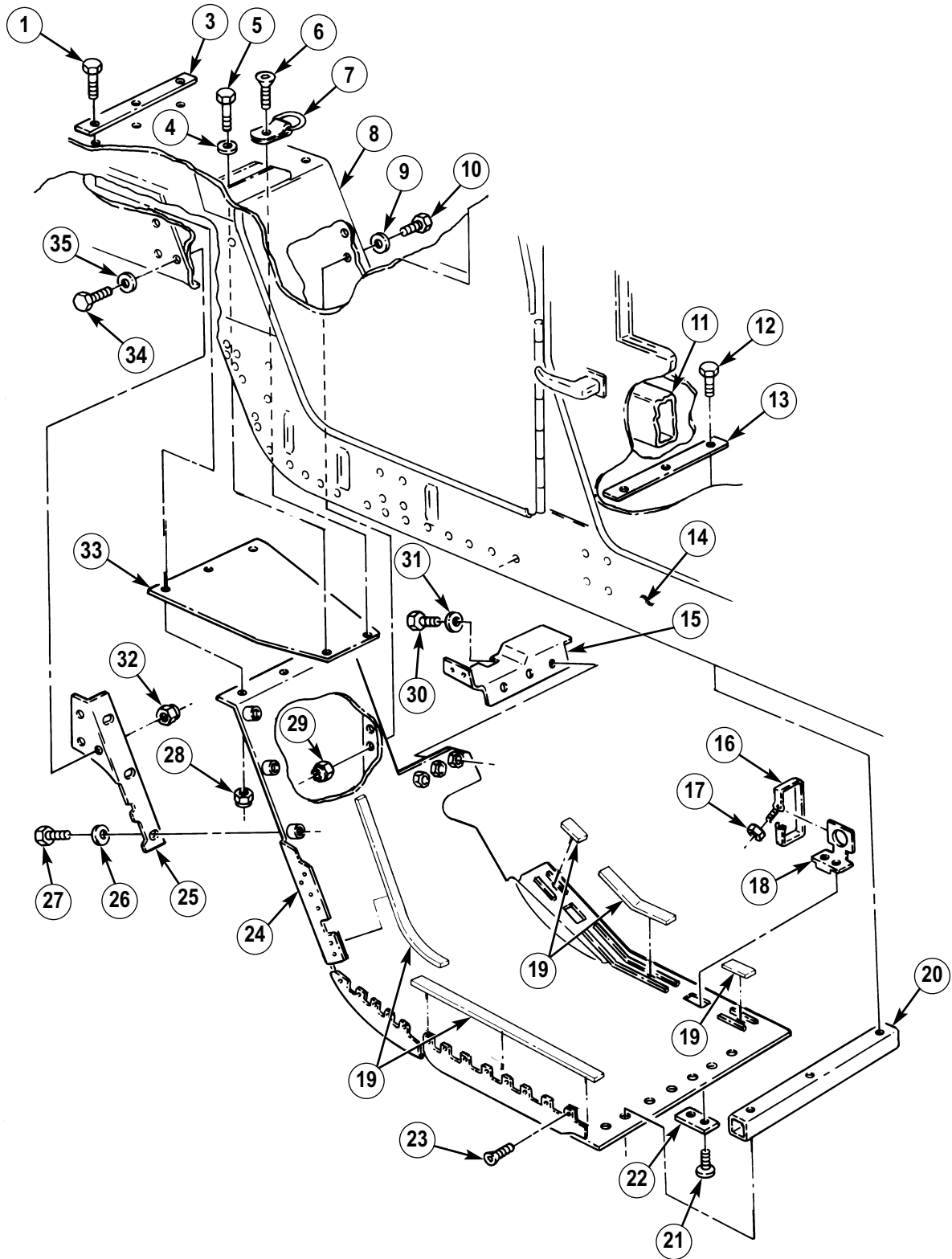
Perform step 10 if brackets and clamps are damaged.

10. Remove four locknuts (17), clamps (16), and two brackets (18) from frame rail (11). Discard locknuts (17).

b. Inspection

1. Refer to para. 10-56 for plusnut inspection and replacement.
2. Inspect rubber strips (19). Replace if damaged.

11-39. RIGHT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)



11-39. RIGHT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)

c. Installation

CAUTION

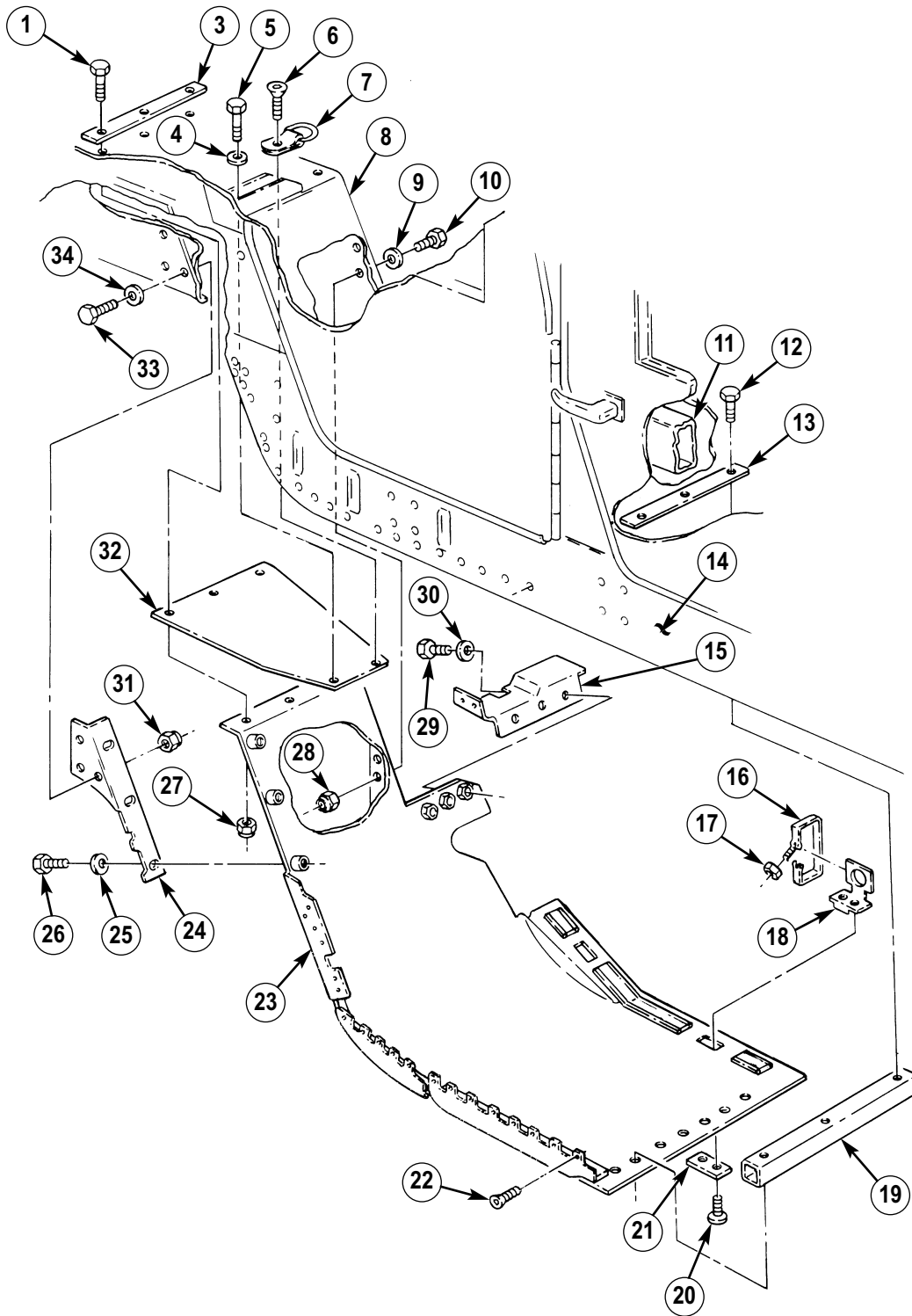
Ensure position of clamps on frame are under brake lines. Failure to do so will result in damage to equipment.

NOTE

- Perform step 1 if brackets and clamps were removed.
- Ensure all old adhesive and paint is removed from area to be adhesive bonded.

1. Apply adhesive to two brackets (18) and install brackets (18) and four clamps (16) on frame rail (11) with four locknuts (17).
2. Apply sealing compound to threads of three capscrews (12), and install bar (13) and spacer (19) on body with capscrews (12). Tighten capscrews (12) to 68-82 lb-in. (8-9 N·m).
3. Apply sealing compound to threads of eighteen socket-head screws (22), and install armor plate (32) and right rear underbody armor (23) on rocker panel (14) with socket-head screws (22). Tighten socket-head screws (22) to 68-82 lb-in. (8-9 N·m).
4. Install bar (3) and right rear underbody armor (23) on wheelwell (8) with three capscrews (1) and locknuts (27). Tighten locknuts (27) to 10 lb-ft. (14 N·m).
5. Apply sealing compound to threads of four socket-head screws (20), and install two plates (21) and right rear underbody armor (23) on bracket (18) with socket-head screws (20). Tighten socket-head screws (20) to 37 lb-ft (50 N·m).
6. Apply sealing compound to threads of five capscrews (29), and install bracket (15) on right rear underbody armor (23) with five washers (30) and capscrews (29). Tighten capscrews (29) to 21 lb-ft (28 N·m).
7. Apply sealing compound to threads of three capscrews (26), and install bracket (24) on right rear underbody armor (23) with three washers (25) and capscrews (26). Tighten capscrews (26) to 21 lb-ft (28 N·m).
8. Install bracket (24) on wheelwell (8) with three washers (34), capscrews (33), and locknuts (31). Tighten locknuts (31) to 10 lb-ft (14 N·m).
9. Install tiedown (7) on wheelwell (8) with socket-head screw (6), washer (4), and capscrow (5). Tighten socket-head screw (6) to 81-99 lb-ft (110-134 N·m) and capscrow (5) to 37 lb-ft (50 N·m).
10. Install two washers (9), capscrews (10), and locknuts (28) on wheelwell (8) and right rear underbody armor (23). Tighten capscrews (10) to 10 lb-ft (14 N·m).

11-39. RIGHT REAR UNDERBODY ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON-TASKS:**
- Install right front underbody armor (para. 11-38).
 - Install right side rocker panel armor and inside protection plate (para. 11-35).
 - Close fuel filler armor cover (TM 9-2320-387-10).
 - Lower and secure rear cargo door (TM 9-2320-387-10).

11-40. DRIVER'S FOOTWELL OUTER ARMOR MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 178)
 Thirty-two locknuts (Appendix G, Item 169)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Headlight beam selector switch and bracket removed (para. 4-59).
- Protective control box removed (para. 4-4).

Maintenance Level

Unit

NOTE

If new driver's footwell outer armor is installed, perform para 11-36.1.

a. Removal

1. Remove six capscrews (10) and spacer (6) from footwell armor (4) and A-beam armor (11).
2. Remove twelve locknuts (9) and capscrews (13) from footwell armor (4) and outer cowl (2). Discard locknuts (9).
3. Remove fourteen locknuts (8) and capscrews (14) from footwell armor (4) and outer cowl (2). Discard locknuts (8).

NOTE

Note location of screws and spacers for installation.

4. Remove six locknuts (12), spacers (7), and capscrews (5) from footwell armor (4) and footwell (10.1). Discard locknuts (12).
5. Remove four locknuts (3), socket-head screws (1), and footwell armor (4) from outer cowl (2). Discard locknuts (3).

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

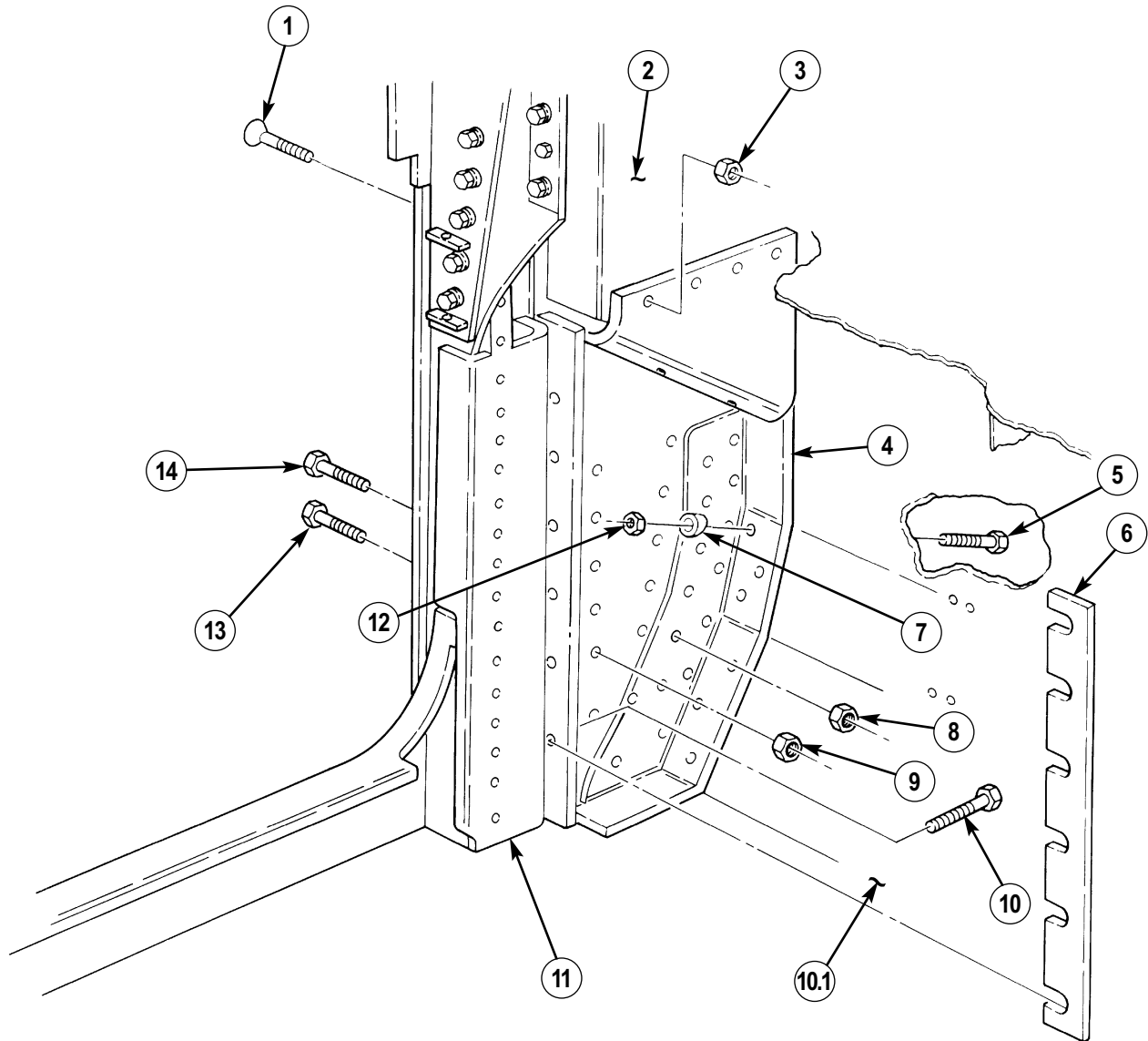
c. Installation

NOTE

Ensure large spacers are installed in upper holes.

1. Install footwell armor (4) on footwell (10.1) with six capscrews (5), spacers (7), and locknuts (12). Tighten locknuts (12) to 35 lb-ft (47 N·m).
2. Secure footwell armor (4) to outer cowl (2) with four socket-head screws (1), locknuts (3), twelve capscrews (13), locknuts (9), fourteen capscrews (14), and locknuts (8). Tighten locknuts (8) and (9) to 37 lb-ft (50 N·m). Tighten socket-head screws (1) to 10 lb-ft (13 N·m).
3. Apply sealing compound to threads of six capscrews (10), and install spacer (6) and footwell armor (4) on A-beam armor (11) with capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N·m).

11-40. DRIVER'S FOOTWELL OUTER ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install protective control box (para. 4-4).
 - Install headlight beam selector switch and bracket (para. 4-59).

11-40.1. LEFT FOOTWELL OUTER ARMOR INSTALLATION

This task covers:

Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive

Special Tools

Rivet tool kit (Appendix B, Item 2)

Materials/Parts

Thirty-two locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)
 Four locknuts (Appendix G, Item 178)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24-2
 TM 9-2320-387-24

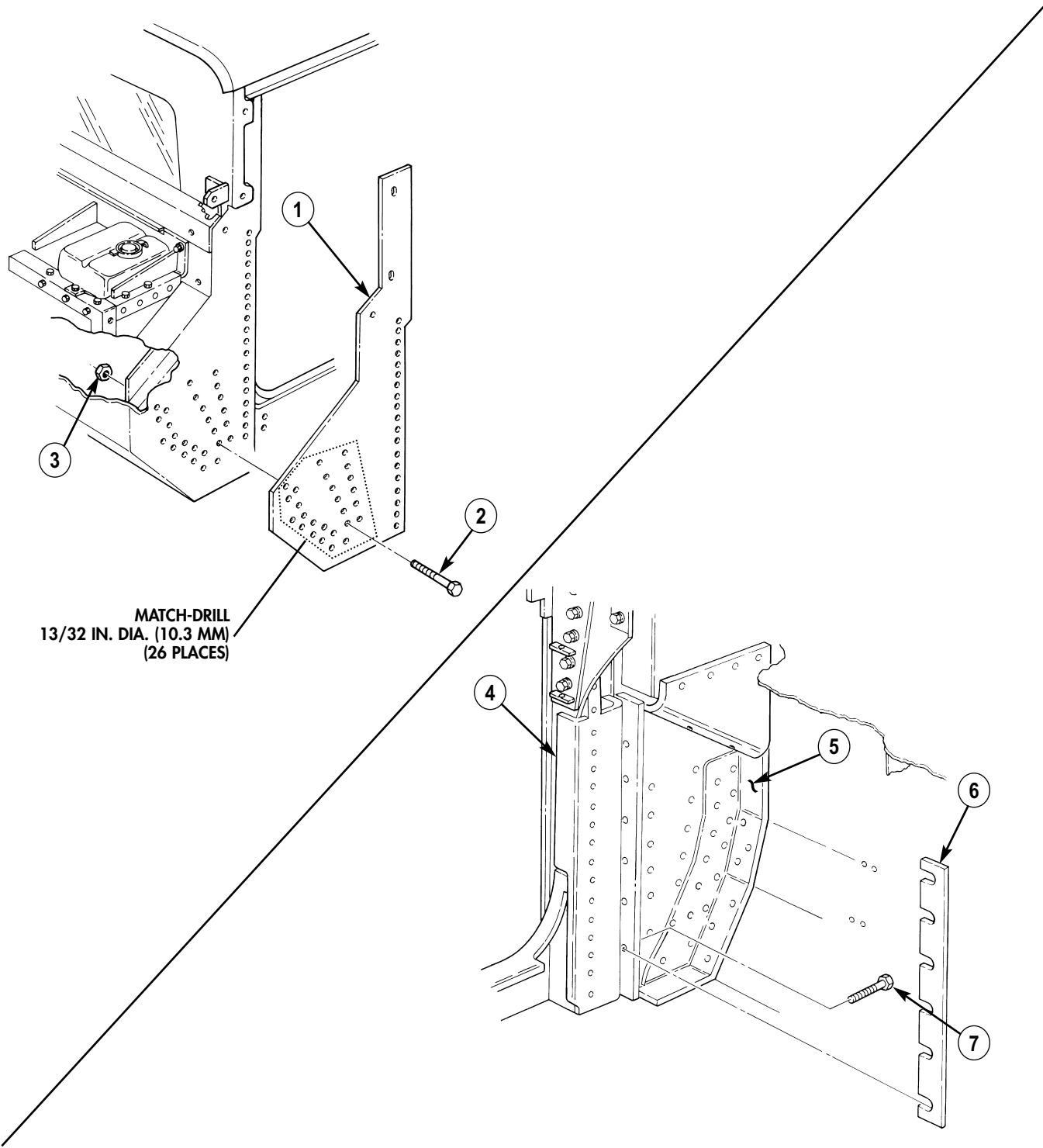
Equipment Condition

Driver's footwell outer armor
 removed (para. 11-40).

Installation

1. Install new driver's side footwell outer armor (5), and spacer (6) and secure left A-beam armor (1) with six capscrews (7). Tighten capscrews (7) to 35 lb ft. (47 N•m).
2. Drill one 13/32 in. hole from A-pillar armor (1) through driver's side footwell outer armor (5).
3. Install one capscrew (2) and locknut (3) through A-pillar armor (1) and driver's side footwell outer armor (5). Tighten locknuts (3) to 35 lb ft. (47 N•m).
4. Match drill 25 13/32 in. holes from A-pillar armor (1) and driver's side footwell outer armor (5).
5. Install 12 capscrews (2) and locknuts (3) through A-pillar armor (1) and driver's side footwell outer armor (5). Tighten locknuts (3) to 35 lb ft. (47 N•m).

11-40.1. LEFT FOOTWELL OUTER ARMOR INSTALLATION (Cont'd)



FOLLOW-ON TASKS: • Install protective control box (para. 4-4).
• Install selector switch bracket (para. 4-59).

11-41. DRIVER'S FOOTWELL INNER ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Six locknuts (Appendix G, Item 169)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Accelerator linkage removed (para. 3-43).
- Steering wheel lock removed (para. 10-48).
- Tunnel interior side insulation removed (para. 10-33).
- Left front cowl insulation removed (para. 10-31).

Maintenance Level

Unit

NOTE

If new driver's footwell inner armor is installed, perform para 11-36.1.

a. Removal

NOTE

Note location of screws and spacers for installation.

1. Remove fifteen capscrews (7) from footwell armor (1), footwell (6.2), and left front underbody (6.1).
2. Remove six locknuts (5), capscrews (4), and spacers (3) from footwell armor (1) and footwell (6.2). Discard locknuts (5).
3. Remove six capscrews (2), washer (4.1), and footwell armor (1) from inner cowl (6).

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

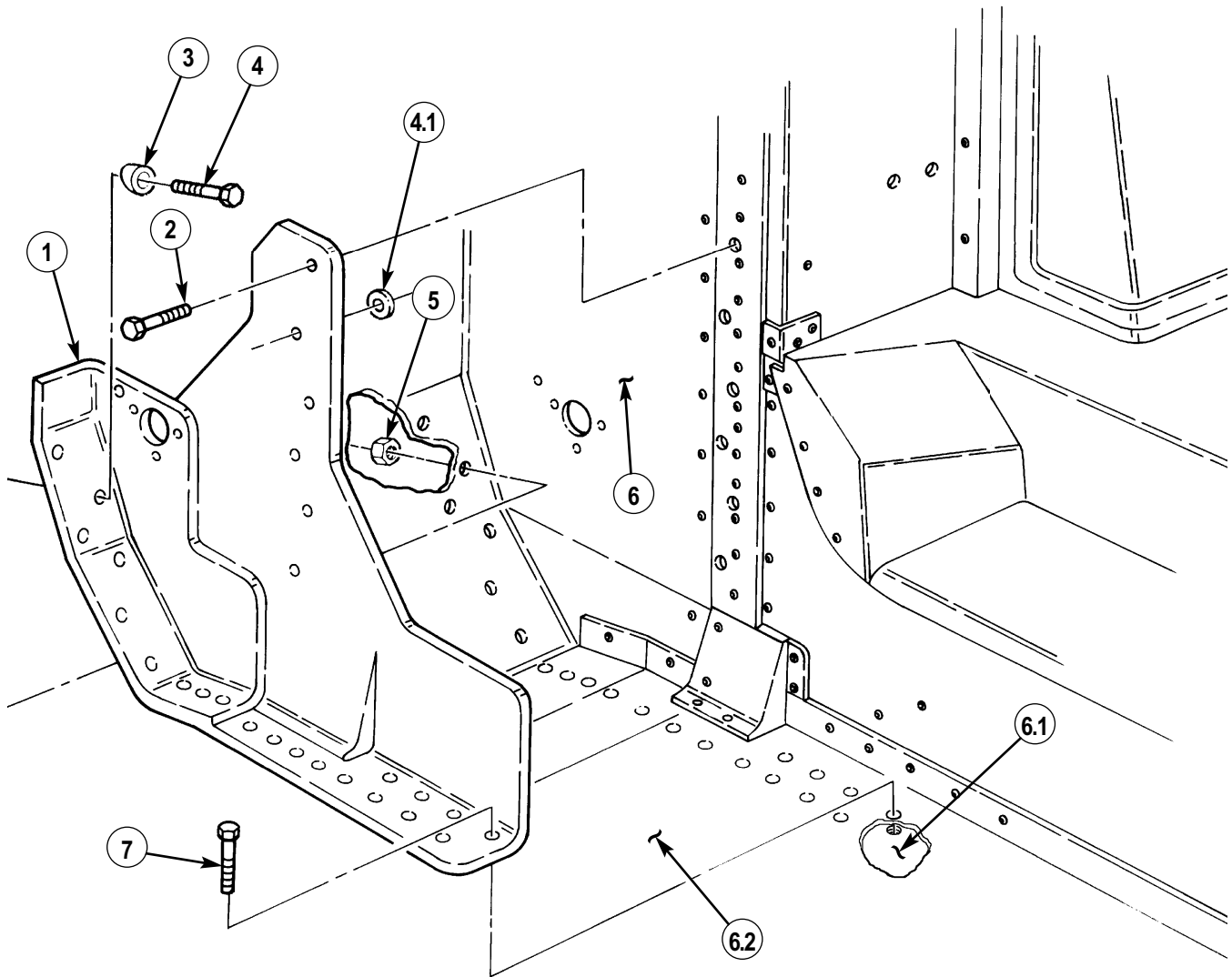
1. Apply sealing compound to threads of six capscrews (2), and install footwell armor (1) on inner cowl (6) with capscrews (2) and washer (4.1). Tighten capscrews (2) to 23 lb-ft (31 N·m).

NOTE

Ensure large spacers are installed in upper holes.

2. Install six spacers (3), capscrews (4), and locknuts (5) on footwell armor (1) and footwell (6.2). Tighten locknuts (5) to 35 lb-ft (47 N·m).
3. Apply sealing compound to threads of fifteen capscrews (7), and install capscrews (7) on footwell armor (1), footwell (6.2), and left front underbody (6.1). Tighten capscrews (7) to 35 lb-ft (47 N·m).

11-41. DRIVER'S FOOTWELL INNER ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install left front cowl insulation (para. 10-31).
 - Install tunnel interior side insulation (para. 10-33).
 - Install steering wheel lock (para. 10-48).
 - Install accelerator linkage (para. 3-43).

11-41.1. PASSENGER SIDE FOOTWELL OUTER ARMOR REPLACEMENT

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- A/C heater/evaporator assembly removed (para. 25-21).
- Right front cowl insulation removed (para. 10-32).

Materials/Parts

Thirty locknuts (Appendix G, Item 169)
 Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Unit

Personnel Required

One mechanic
 One assistant

NOTE

If new passenger side footwell outer armor is being installed, perform 11-38.1.

a. Removal

NOTE

Note location of capscrews, nuts, and spacers for installation.

1. Remove six locknuts (11), spacers (12), and capscrews (1) from footwell armor (2) and outer cowl (7). Discard locknuts (11).
2. Remove twenty-four locknuts (9) and capscrews (5) from footwell armor (2), A-pillar armor (4), and outer cowl (7). Discard locknuts (9).
3. Remove four capscrews (10) from footwell armor (2) and A-beam armor (6).
4. Remove nut (12.2) and capscrew (12.1) from footwell armor (2).
5. Remove capscrew (13), footwell armor (2), and spacers (3) and (8) from outer cowl (7).

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

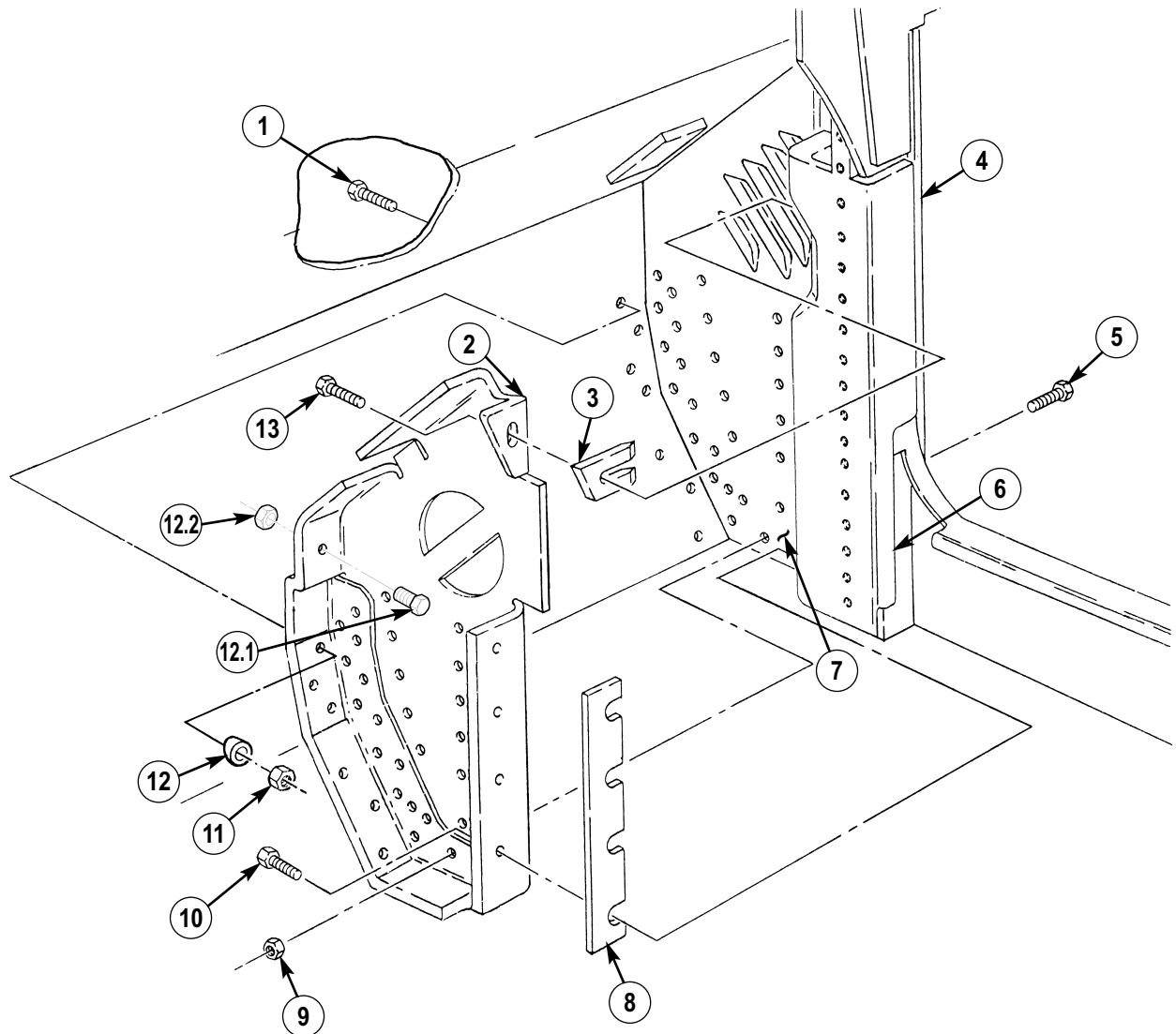
1. Apply sealing compound to threads of four capscrews (10) and install spacer (8) and footwell armor (2) on A-beam armor (6) with capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N·m).
 - 1.1. Install capscrew (12.1) and nut (12.2) on footwell armor (2).
2. Apply sealing compound to threads of capscrew (13) and install spacer (3) and capscrew (13) on footwell armor (2) and A-pillar armor (4). Tighten capscrew (13) to 37 lb-ft (50 N·m).
3. Install twenty-four capscrews (5) and locknuts (9) on footwell armor (2), A-pillar armor (4), and outer cowl (7). Tighten locknuts (9) to 37 lb-ft (50 N·m).

11-41.1. PASSENGER SIDE FOOTWELL OUTER ARMOR REPLACEMENT (Cont'd)

NOTE

Ensure large spacers are installed in upper holes.

4. Install six capscrews (1), spacers (12), and locknuts (11) on footwell armor (2) and outer cowl (7). Tighten locknuts (11) to 35 lb-ft (47 N·m).



- FOLLOW-ON TASKS:
- Install A/C heater/evaporator assembly (para. 25-21).
 - Install front cowl insulation (para. 10-32).

11-41.2. PASSENGER SIDE FOOTWELL INNER ARMOR REPLACEMENT

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Rifle support removed (para. 11-66).
- Engine access cover removed (para. 10-22).
- A/C front distribution duct removed (para. 11-81).
- A/C heater/evaporator assembly removed (para. 25-21).
- Tunnel interior side insulation removed (para. 10-33).
- Right front cowl insulation removed (para. 10-32).
- Surge tank removed (para. 3-65).
- Right front underbody armor removed (para. 11-38).

Materials/Parts

Eleven locknuts (Appendix G, Item 171)
 Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Unit

Personnel Required

One mechanic
 One assistant

NOTE

If new passenger side footwell inner armor is being installed, perform para.11-38.1.

a. Removal

NOTE

Note location of capscrews and locknuts for installation.

1. Remove screw (6) and circuit breaker (5) from footwell armor (3).
2. Remove eight capscrews (4) from body (7) and footwell armor (3).
3. Remove eleven locknuts (1), capscrews (8), inner/outer cowl reinforcement (2), and footwell armor (3) from body (7). Discard locknuts (1).

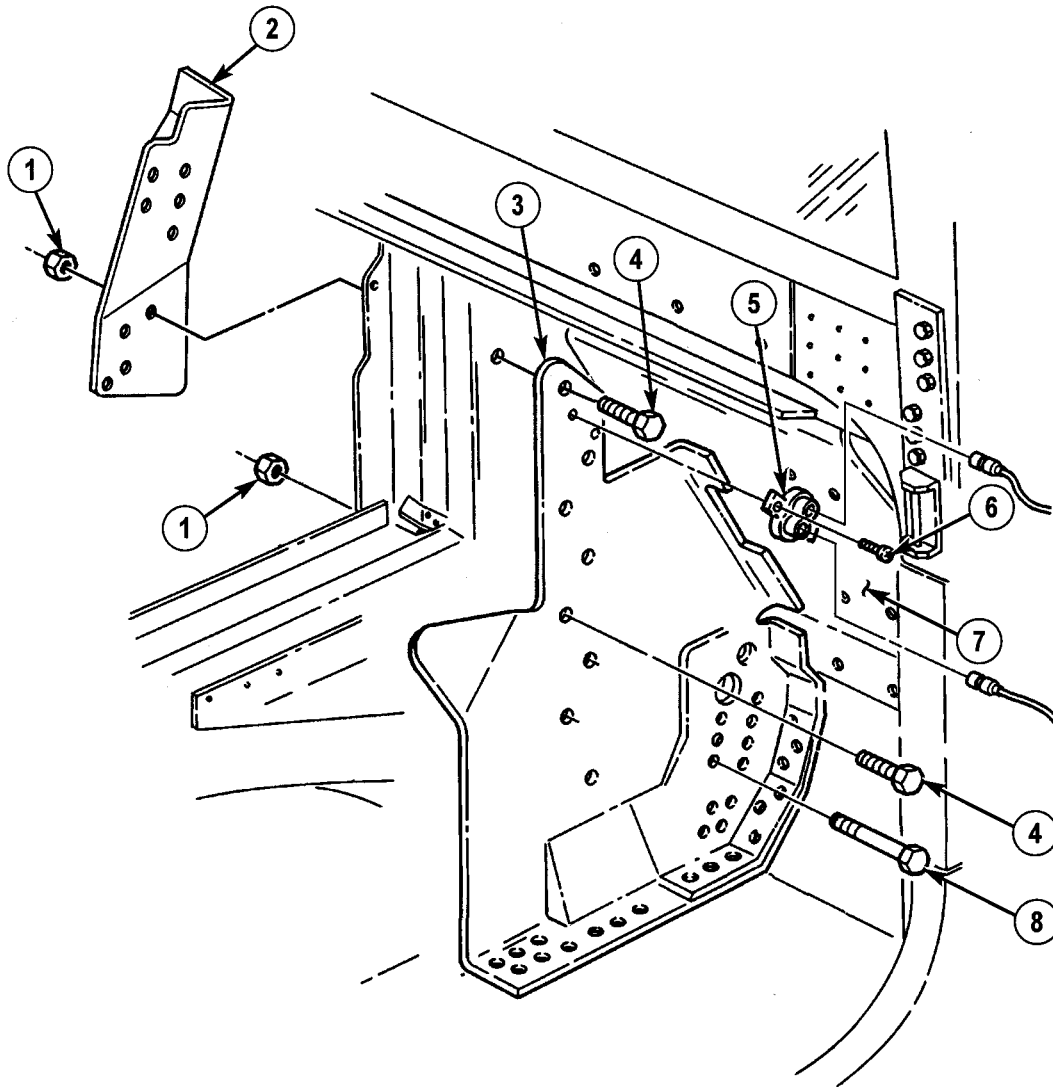
b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

1. Apply sealing compound to threads of eight capscrews (4) and install capscrews (4) on footwell armor (3) and body (7). Tighten capscrews (4) to 37 lb-ft (50 N·m).
2. Install footwell armor (3) and inner/outer cowl reinforcement (2) on body (7) with eleven capscrews (8) and locknuts (1). Tighten locknuts (1) to 37 lb-ft (50 N·m).
3. Install circuit breaker (5) on footwell armor (3) with screw (6).

11-41.2. PASSENGER SIDE FOOTWELL INNER ARMOR REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install A/C heater/evaporator assembly (para. 25-21).
 - Install A/C front distribution duct (para. 11-81).
 - Install engine access cover (para. 10-22).
 - Install rifle support (para. 11-66).
 - Install tunnel interior side insulation (para 10-33).
 - Install right front cowl insulation (para. 10-32).
 - Install surge tank (para 3-65).
 - Install right front underbody armor (para. 11-38).

11-41.3. PASSENGER SIDE UPPER COWL LINER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Passenger side footwell outer armor removed (para. 11-41.1).
- Passenger side footwell inner armor removed (para. 11-41.2).

Maintenance Level

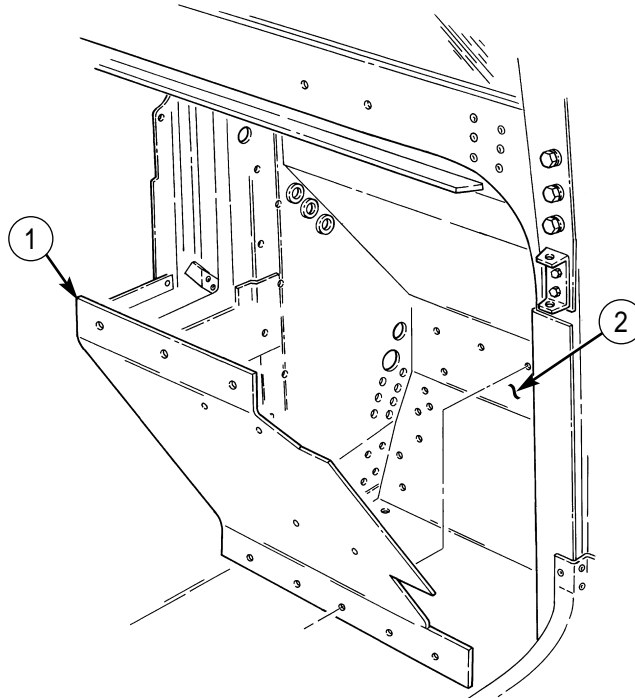
Unit

a. Removal

Remove liner (1) from cowl (2).

b. Installation

Position liner (1) on cowl (2).



- FOLLOW-ON TASKS:
- Install passenger side footwell inner armor (para. 11-41.2).
 - Install passenger side footwell outer armor (para. 11-41.1).

11-42. A-BEAM LEFT SIDE ARMOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Driver's side door removed (para. 11-2).
- Left front underbody armor removed (para. 11-36).

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Unit

Personnel Required

One mechanic
 One assistant

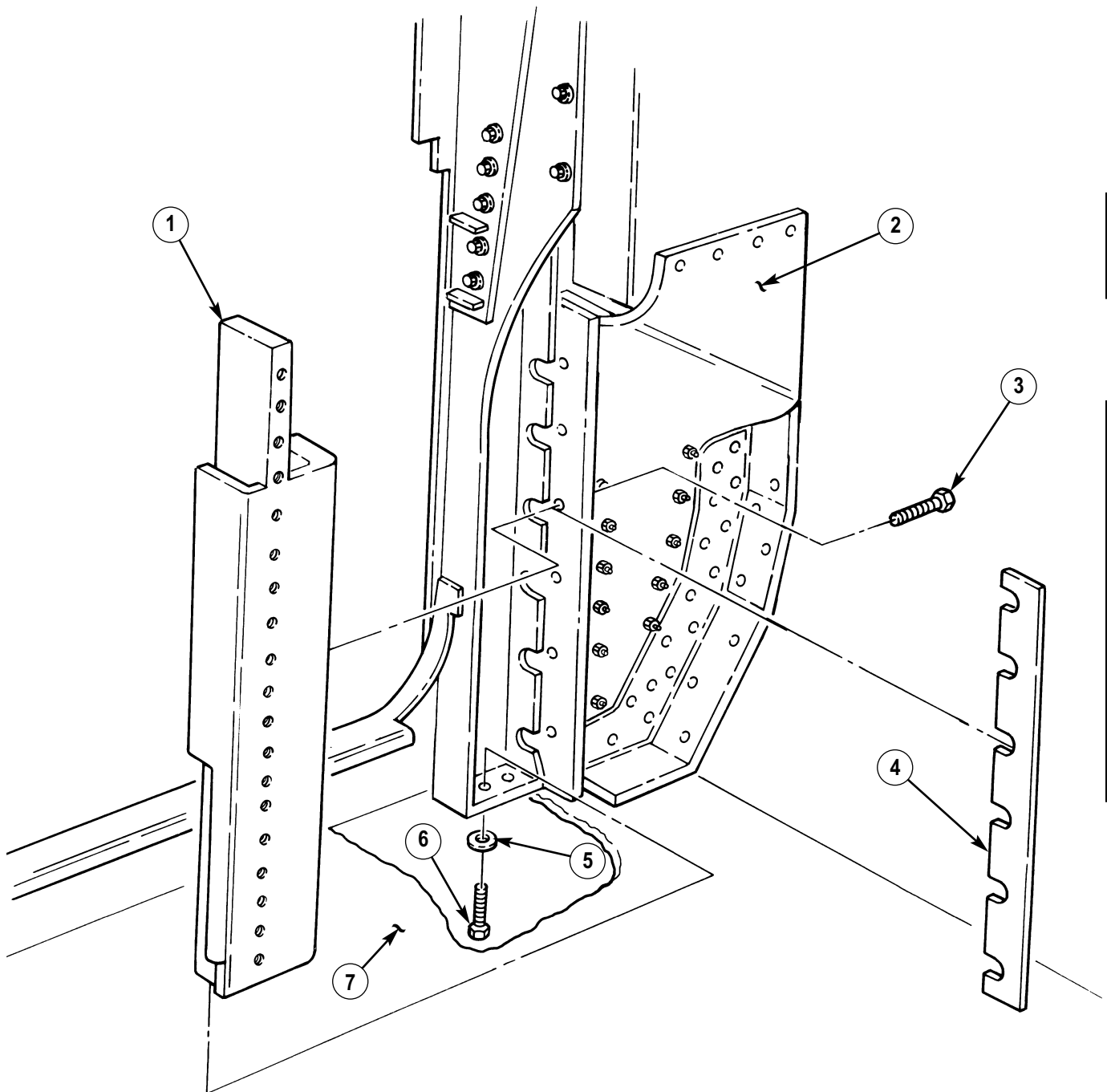
a. Removal

1. Remove two capscrews (6) and washers (5) from A-beam armor (1) and body (7).
2. Remove six capscrews (3), A-beam armor (1), and spacer (4) from left side footwell outer armor (2).

b. Installation

1. Apply sealing compound to threads of six capscrews (3), and install spacer (4) and A-beam armor (1) on left side footwell outer armor (2) with capscrews (3). Tighten capscrews (3) to 37 lb-ft (50 N·m).
2. Apply sealing compound to threads of two capscrews (6), and install A-beam armor (1) on body (7) with two washers (5) and capscrews (6). Tighten capscrews (6) to 37 lb-ft (50 N·m).

11-42. A-BEAM LEFT SIDE ARMOR REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install left front underbody armor (para. 11-36).
 - Install driver's side door (para. 11-2).

11-43. A-BEAM RIGHT SIDE ARMOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)
 Riveter tool kit (Appendix B, Item 123)

Equipment Condition

- Right front door removed (para. 11-2).
- Right front underbody armor removed (para. 11-38).

Maintenance Level

Unit

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

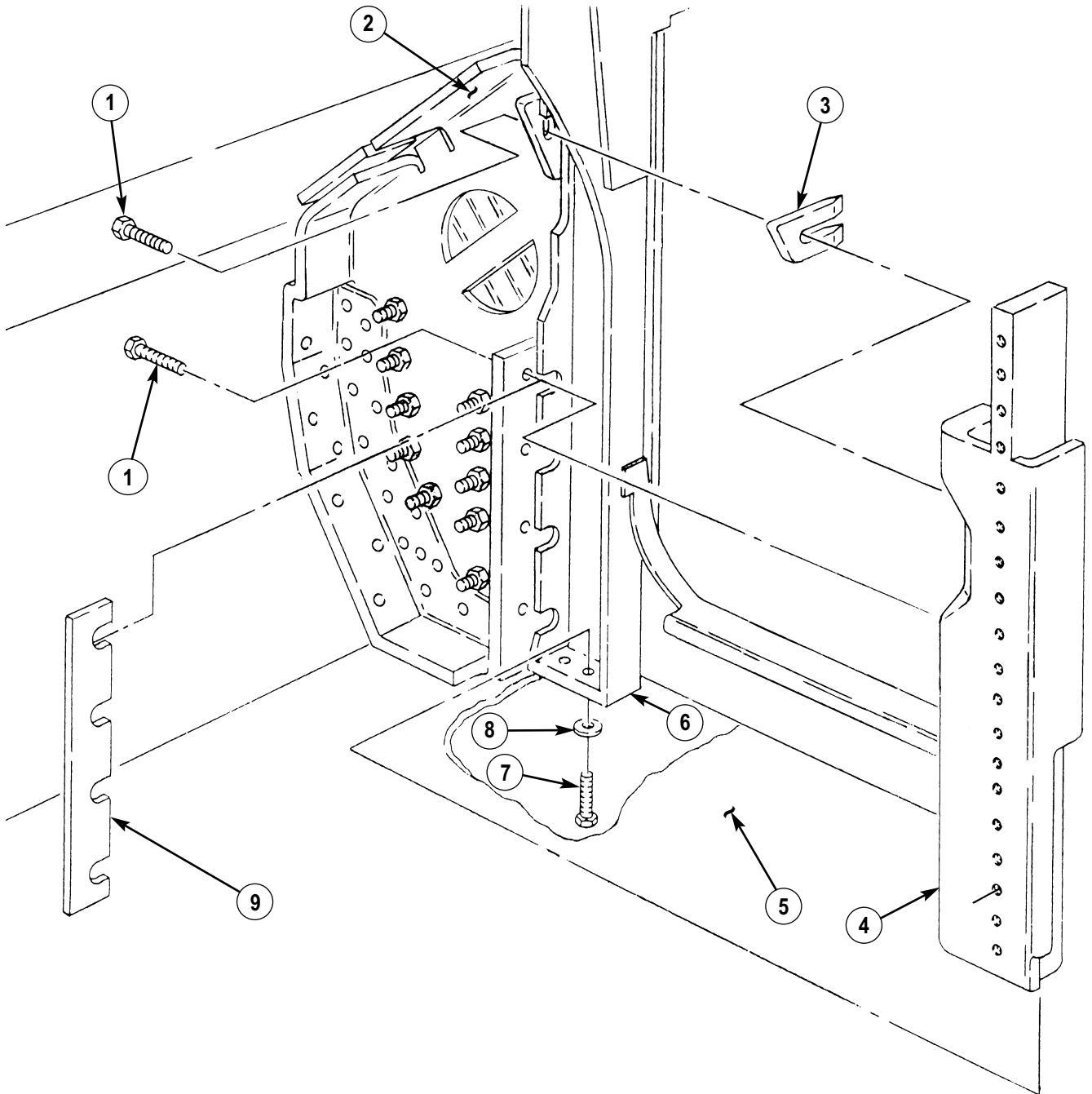
a. Removal

1. Remove two capscrews (7) and washers (8) from body (5) and A-beam armor (4).
2. Remove five capscrews (1), A-beam armor (4), and spacers (3) and (9) from right side footwell outer armor (2) and A-beam (6).

b. Installation

1. Apply sealing compound to threads of five capscrews (1), and install spacers (3) and (9) and A-beam armor (4) on right side footwell outer armor (2) with capscrews (1). Tighten capscrews (1) to 37 lb-ft (50 N·m).
2. Apply sealing compound to threads of two capscrews (7), and install A-beam armor (4) on A-beam (6) and body (5) with two washers (8) and capscrews (7). Tighten capscrews (6) to 37 lb-ft (50 N·m).

11-43. A-BEAM RIGHT SIDE ARMOR REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install right front underbody armor (para. 11-38).
 - Install right front door (para. 11-2).

11-44. B-PILLAR ARMOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)
 Riveter tool kit (Appendix B, Item 123)

Materials/Parts

Adhesive (Appendix C, Item 4)
 Two rivets (Appendix G, Item 353)
 Two rivets (Appendix G, Item 358)
 Eight locknuts (Appendix G, Item 176)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Rear door and hinge removed (para. 11-2.1).

Maintenance Level

Unit

NOTE

Replacement procedures for left and right B-pillar armor are basically the same. This procedure covers left side B-pillar armor.

a. Removal

NOTE

For replacement of rivets, refer to para. 10-56.

1. Remove two rivets (15) from B-pillar armor (1) and B-pillar back-up armor (2).

NOTE

Rifle mount bracket is used on right side B-pillar armor in place of shims.

2. Remove three locknuts (9), washers (10), shims (11) and (11.1), and three capscrews (16) from armor (1) and bracket (8). Discard locknuts (9).
3. Remove two locknuts (4), capscrews (17), and B-pillar armor (1) from B-pillar back-up armor (2). Discard locknuts (4).
4. Remove any adhesive from B-pillar armor (1) and B-pillar back-up armor (2).
5. Remove three locknuts (5), capscrews (3), shims (6), and B-pillar back-up armor (2) from header (7) and body (12). Discard locknuts (5).

NOTE

Perform step 6 if spacer is damaged.

6. Remove two rivets (14) and spacer (13) from body (12).

b. Installation

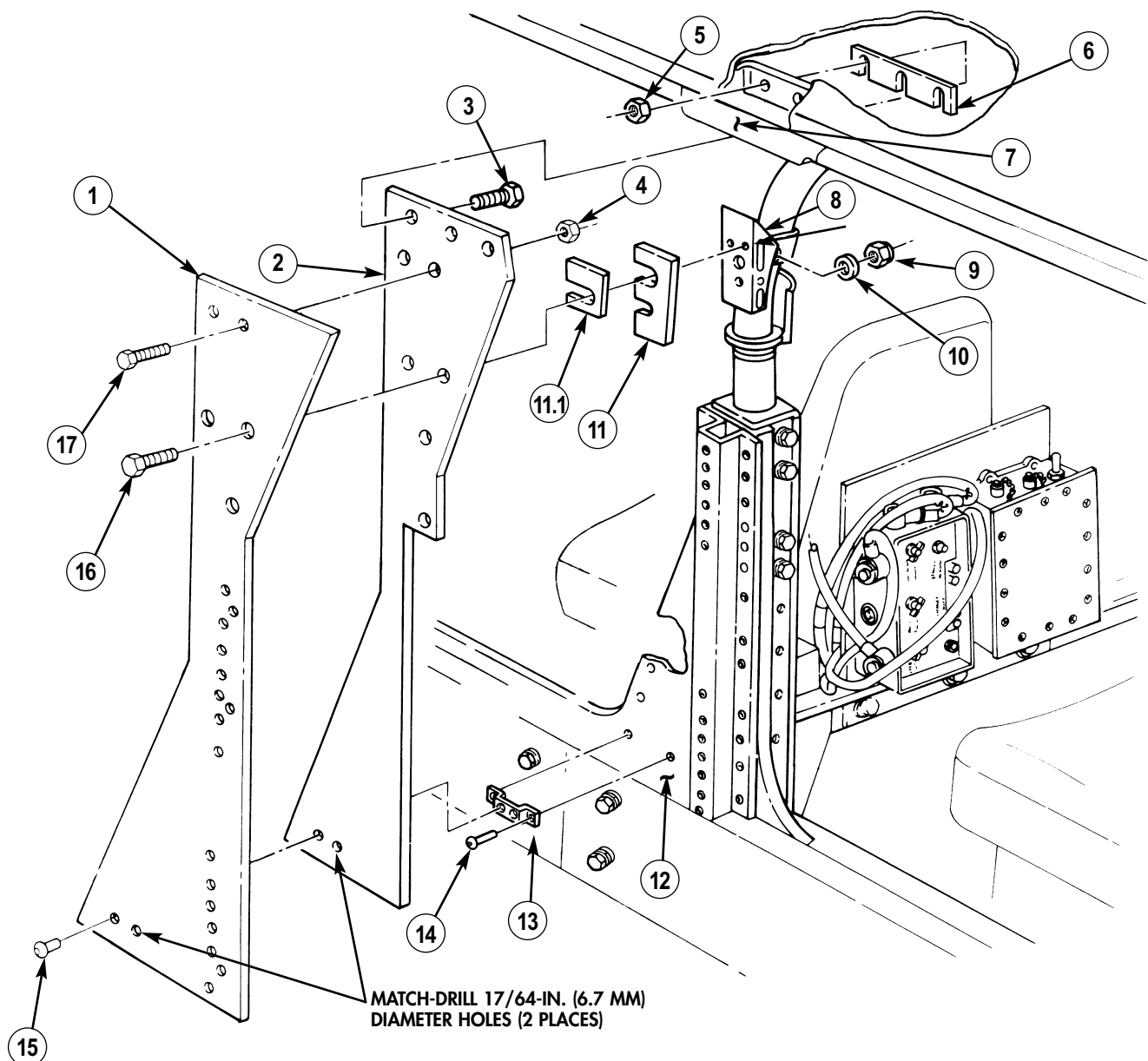
NOTE

Perform step 1 if spacer was removed.

1. Install spacer (13) on body (12) with two rivets (14).
2. Install B-pillar back-up armor (2) and shims (6) on body (12) and header (7) with three capscrews (3) and locknuts (5). Tighten capscrews (3) to 5 lb-ft (7 N·m).

11-44. B-PILLAR ARMOR REPLACEMENT (Cont'd)

3. Install B-pillar armor (1) on B-pillar back-up armor (2) with two capscrews (17) and locknuts (4). Tighten locknuts (4) to 10 lb-ft (13 N·m).
4. Install three capscrews (16), washers (10), shims (11) and (11.1), and three locknuts (9) on B-pillar armor (1) and bracket (8). Tighten locknuts (9) to 51 lb-ft (69 N·m).
- 4.1. If new spacer (13) is installed, it will be necessary to match-drill two 17/64-in. (6.7 mm) diameter holes through B-pillar armor (1) and B-pillar back-up armor (2) into spacer (13).
5. Install B-pillar armor (1) on B-pillar back-up armor (2) with two rivets (15).
6. Seal top of B-pillar armor (1) with adhesive.



FOLLOW-ON TASK: Install rear door and hinge (para. 11-2.1).

11-45. C-PILLAR TOP ARMOR MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 178)
 Four locknuts (Appendix G, Item 170)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- C-pillar bottom left side armor removed (para. 11-46).
- Condenser fan access panel removed (para. 11-86).

Maintenance Level

Unit

a. Removal

NOTE

Mark location of capscrews for installation.

1. Remove three locknuts (4) and capscrews (3) securing C-pillar top armor (2) to cargo shell (8). Discard locknuts (4).
2. Remove three locknuts (15) and capscrews (9) from cargo shell (8) and C-pillar top armor (2). Discard locknuts (15).
3. Remove two capscrews (1) and bracket (6) from C-pillar top armor (2) and header assembly (5).
4. Remove two capscrews (19) and plate (11) from C-pillar (10).
5. Remove two locknuts (12), capscrews (16), shim (14), and C-pillar top armor (2) from bracket (13). Discard locknuts (12).
6. Remove four capscrews (17) and bracket (13) from C-pillar (10).

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

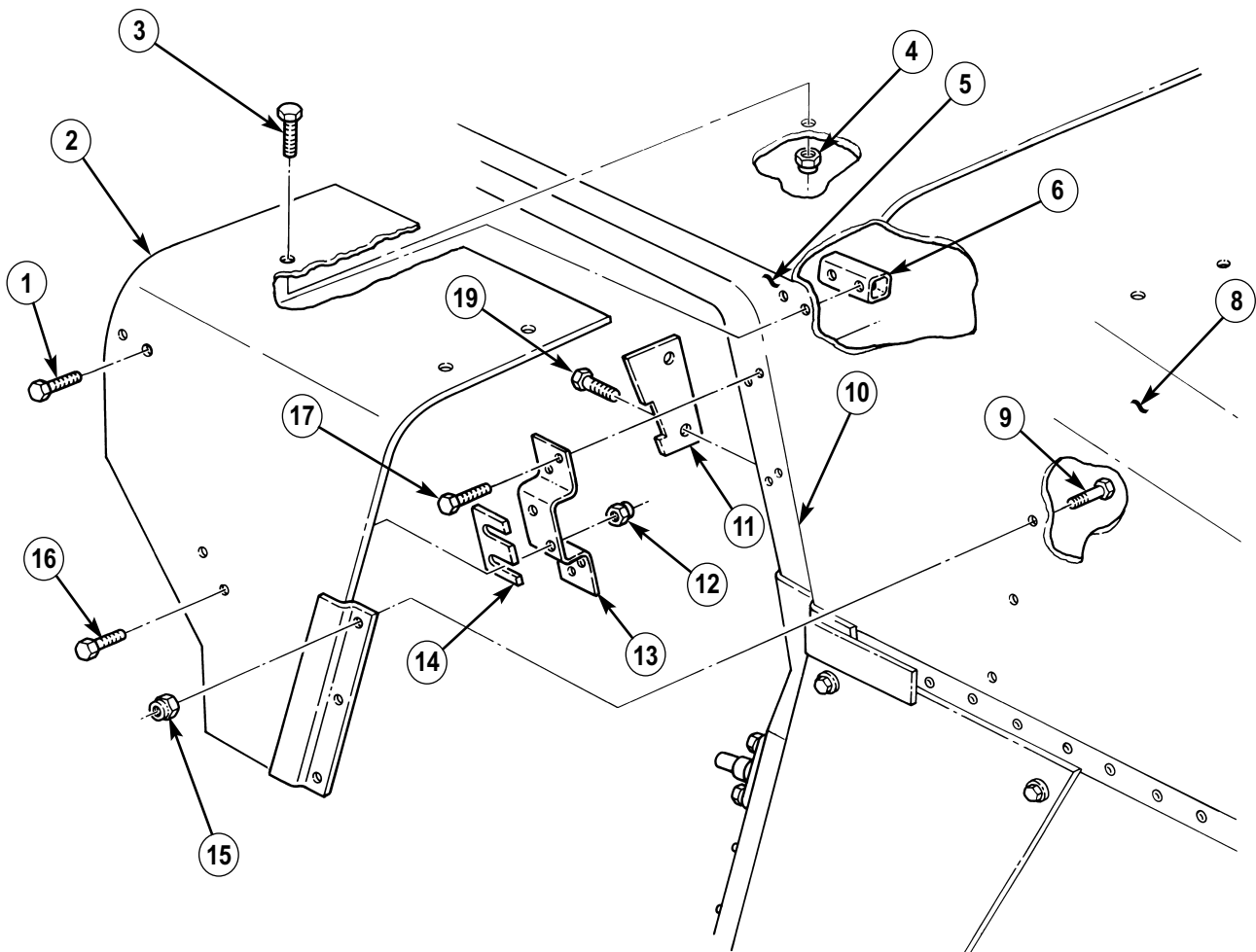
c. Installation

NOTE

- Apply sealing compound on capscrews in steps 1, 3, and 6.
 - If bracket is being replaced, drill two 9/32-in. (7.1 mm) diameter holes from C-pillar top armor to bracket.
1. Install bracket (13) on C-pillar (10) with four capscrews (17). Tighten capscrews (17) to 68-82 lb-in. (8-9 N·m).
 2. Install C-pillar top armor (2) and shim (14) on bracket (13) with two capscrews (16) and locknuts (12). Tighten capscrews (16) to 10 lb-ft (14 N·m).
 3. Install C-pillar top armor (2) and bracket (6) on header assembly (5) with two capscrews (1). Tighten capscrews (1) to 10 lb-ft (14 N·m).
 4. Install C-pillar top armor (2) on cargo shell (8) with three capscrews (3) and locknuts (4). Tighten capscrews (3) to 10 lb-ft (14 N·m).
 5. Install C-pillar top armor (2) on cargo shell (8) with three capscrews (9) and locknuts (15). Tighten capscrews (9) to 10 lb-ft (14 N·m).

11-45. C-PILLAR TOP ARMOR MAINTENANCE (Cont'd)

6. Install plate (11) on C-pillar (10) with two capscrews (19). Tighten capscrews (19) to 68-82 lb-in. (7-9 N·m).



- FOLLOW-ON TASKS:**
- Install C-pillar bottom left side armor (para. 11-46).
 - Install condenser fan access panel (para. 11-86).

11-46. C-PILLAR BOTTOM LEFT SIDE ARMOR MAINTENANCE

This task covers:

- a. Removal
- a.1. Inspection
- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

Maintenance Level

Unit

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

a. Removal

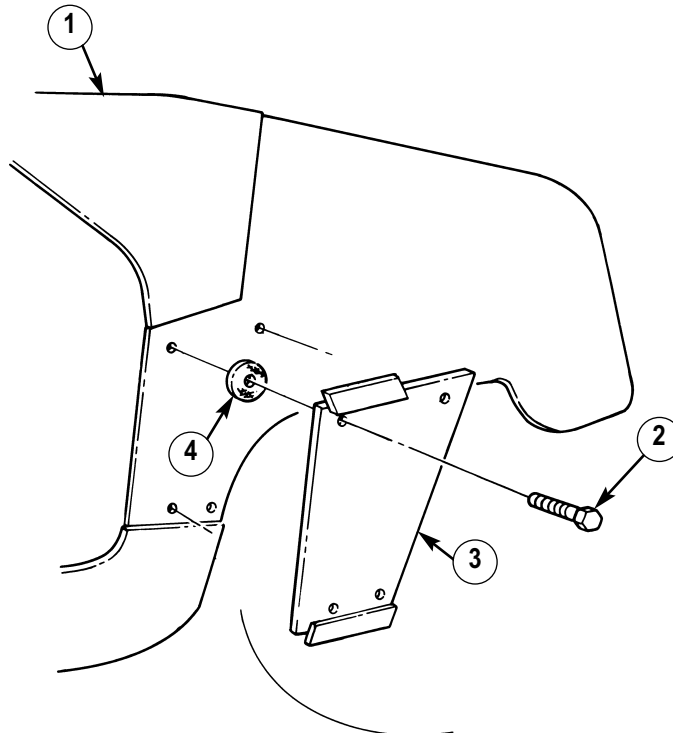
Remove four capscrews (2), bottom left side armor (3), and four washers (4) from body (1).

a.1. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

b. Installation

Apply sealing compound to threads of four capscrews (2), and install four washers (4) and bottom left side armor (3) on body (1) with capscrews (2). Tighten capscrews (2) to 68-82 lb-in. (8-9 N·m).



11-47. TAILGATE ARMOR PLATE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Nine lockwashers (Appendix G, Item 207)
 Sound dampener (Appendix G, Item 443)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Tailgate lowered (TM 9-2320-387-10).
- Pioneer tool kit stowage straps and bracket removed (para. 10-37).

Maintenance Level

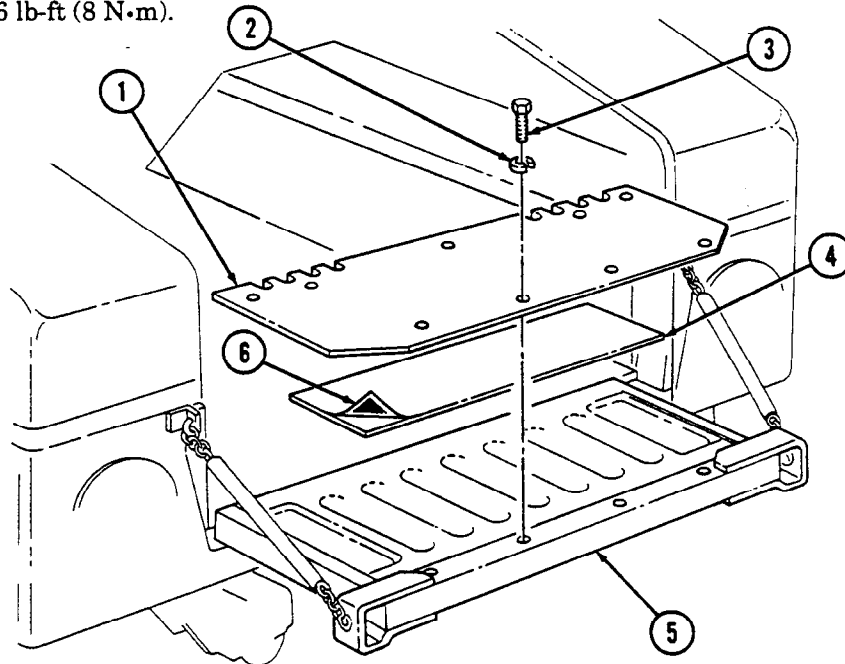
Unit

a. Removal

1. Remove nine capscrews (3), lockwashers (2), armor plate (1), and sound dampener (4) from tailgate (5). Discard lockwashers (2) and sound dampener (4).
2. Clean armor plate (1) to remove adhesive.

b. Installation

1. Peel paper backing (6) from sound dampener (4) and install sound dampener (4) on armor plate (1).
2. Install armor plate (1) on tailgate (5) with nine lockwashers (2) and capscrews (3). Tighten capscrews (3) to 6 lb-ft (8 N·m).



- FOLLOW-ON TASKS:
- Raise and secure tailgate (TM 9-2320-387-10).
 - Install pioneer tool kit stowage straps and bracket (para. 10-37).

11-48. FIREWALL ARMOR MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Left front firewall cowl armor removed (para. 11-49).

Maintenance Level

Unit

a. Removal

1. Remove capscrew (3) and left front firewall armor (1) from body (2).
2. Remove two capscrews (5) and right side firewall armor (4) from body (2).
3. Remove two capscrews (7) and center firewall armor (6) from body (2).

b. Inspection

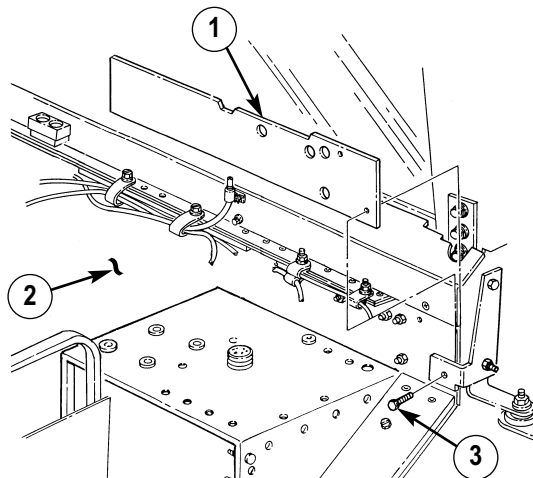
Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

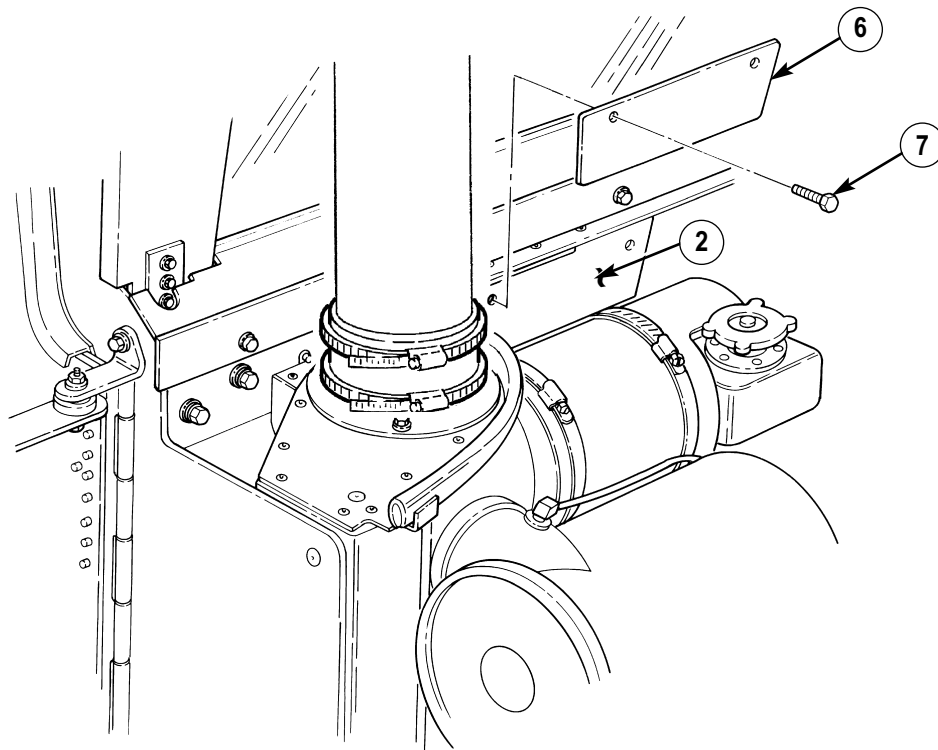
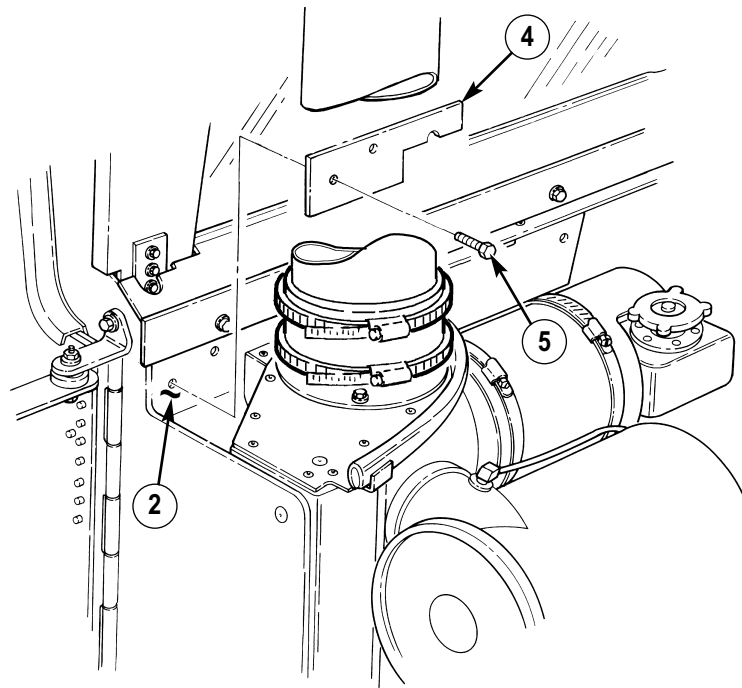
NOTE

Apply sealing compound to capscrews prior to installation.

1. Install center firewall armor (6) on body (2) with two capscrews (7). Tighten capscrews (7) to 68-82 lb-in. (8-9 N·m).
2. Install right side firewall armor (4) on body (2) with two capscrews (5). Tighten capscrews (5) to 68-82 lb-in. (8-9 N·m).
3. Install left front firewall armor (1) on body (2) with capscrew (3). Tighten capscrew (3) to 68-82 lb-in. (8-9 N·m).



11-48. FIREWALL ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install left front firewall cowl armor (para. 11-49).
 - Lower and secure hood (TM 9-2320-387-10).

11-49. COWL ARMOR MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Eight locknuts (Appendix G, Item 178)
 Adhesive (Appendix C, Item 4)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Windshield washer reservoir and pump assembly removed (para. 10-64).
- Protective control box removed (para. 4-4).
- Directional signal flasher removed (para. 4-61).

Maintenance Level

Unit

a. Removal

1. Deleted.
2. Remove six capscrews (18) from left front underbody armor (12) and bracket (17).
3. Remove four locknuts (14) and screws (1) from bracket (19) and move time-delay module (2), control valve (20), and bracket (19) off to one side. Discard locknuts (14).
4. Remove four locknuts (10) and socket-head screws (8) from bracket (7). Discard locknuts (10).
5. Remove two socket-head screws (9) from bracket (17).
6. Remove three capscrews (4) and bracket (17) from cowl armor (3).
7. Remove two capscrews (6) and cowl armor (3) from cowl (11).
8. Remove twelve washers (16) from cowl (11).

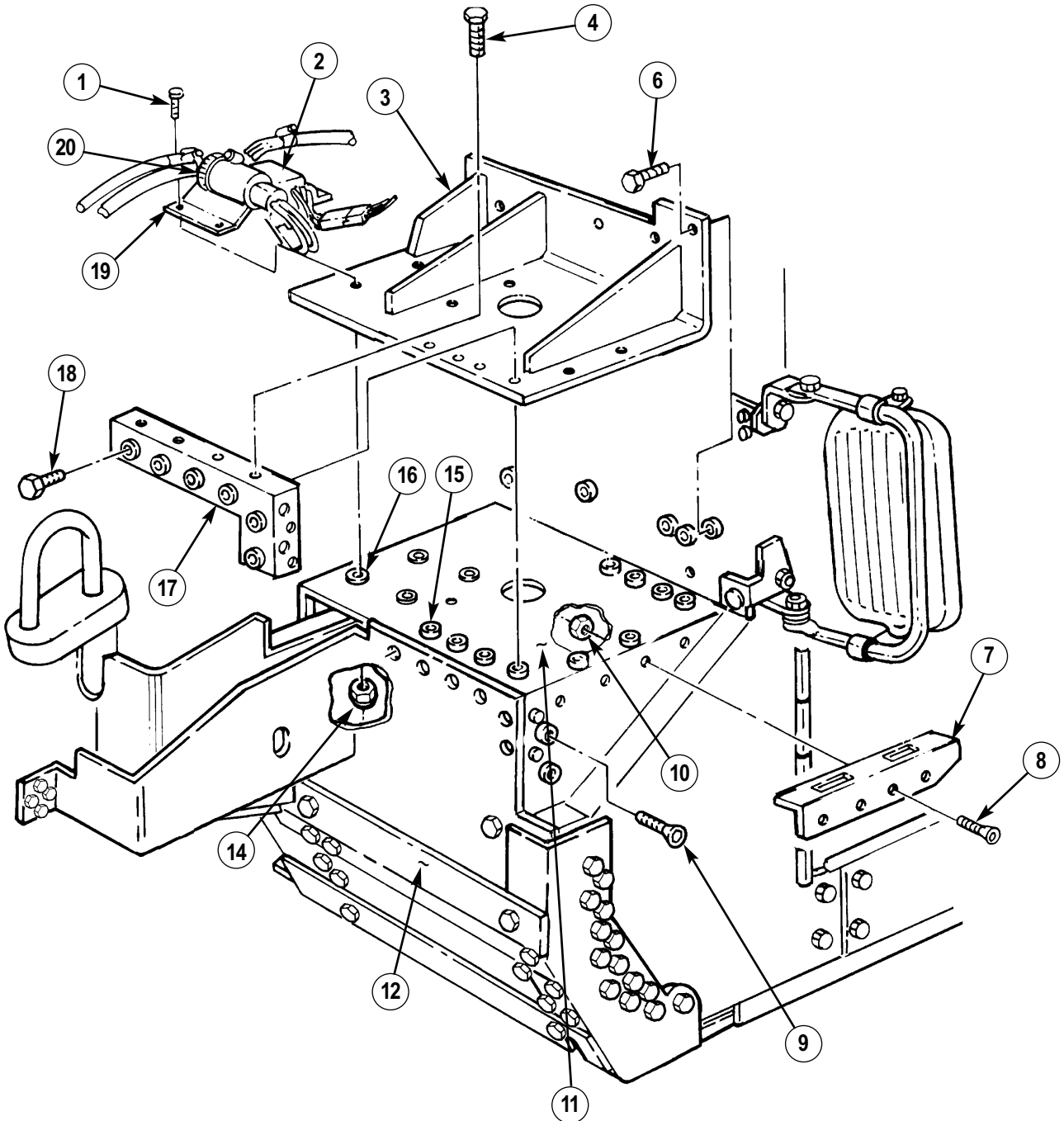
b. Inspection

Refer to para. 10-56 for plusnut (15) inspection and replacement.

c. Installation

1. Install twelve washers (16) onto cowl (11) with adhesive. Wait for adhesive to dry.
2. Apply sealing compound to threads of two capscrews (6), and install cowl armor (3) on cowl (11) with capscrews (6). Tighten capscrews (6) to 68-82 lb-in. (8-9 N·m).
3. Apply sealing compound to threads of three capscrews (4), and install bracket (17) on armor plate (3) with capscrews (4). Tighten capscrews (4) to 68-82 lb-in. (8-9 N·m).
4. Install four socket-head screws (8) and locknuts (10) on bracket (7) and cowl armor (3).
5. Install two socket-head screws (9) on bracket (17).
6. Install time-delay module (2), control valve (20), and bracket (19) on cowl armor (3) with four capscrews (1) and locknuts (14). Tighten capscrews (1) to 10 lb-ft (14 N·m).
7. Apply sealing compound to threads of six capscrews (18), and install capscrews (18) on left front underbody armor (12) and bracket (17). Tighten capscrews (18) to 68-82 lb-in. (8-9 N·m).

11-49. COWL ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:
- Install directional signal flasher (para. 4-61).
 - Install protective control box (para. 4-4).
 - Install windshield washer reservoir and pump assembly (para. 10-64).

11-50. TURRET ARMOR AND TURRET BEARING HATCH LATCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

RTV sealant (Appendix C, Item 74)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

NOTE

To increase latch tension, 3/8 in. (9.5 mm) washers may be added between bottom of turret armor and hatch latch.

a. Removal

NOTE

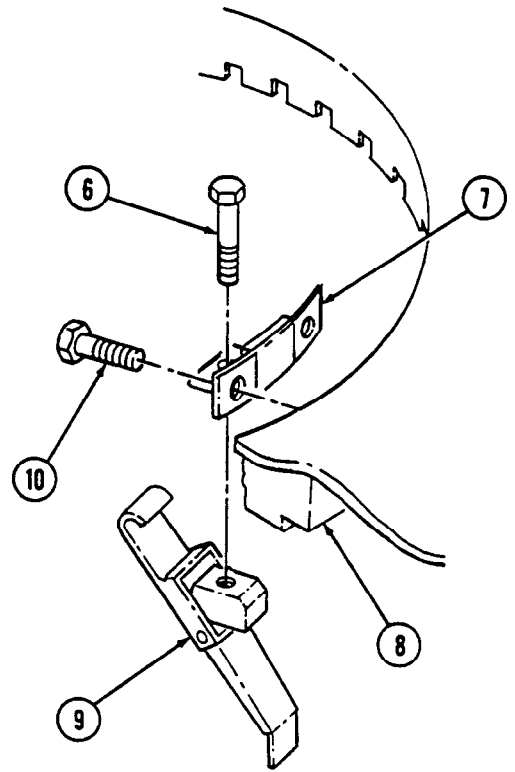
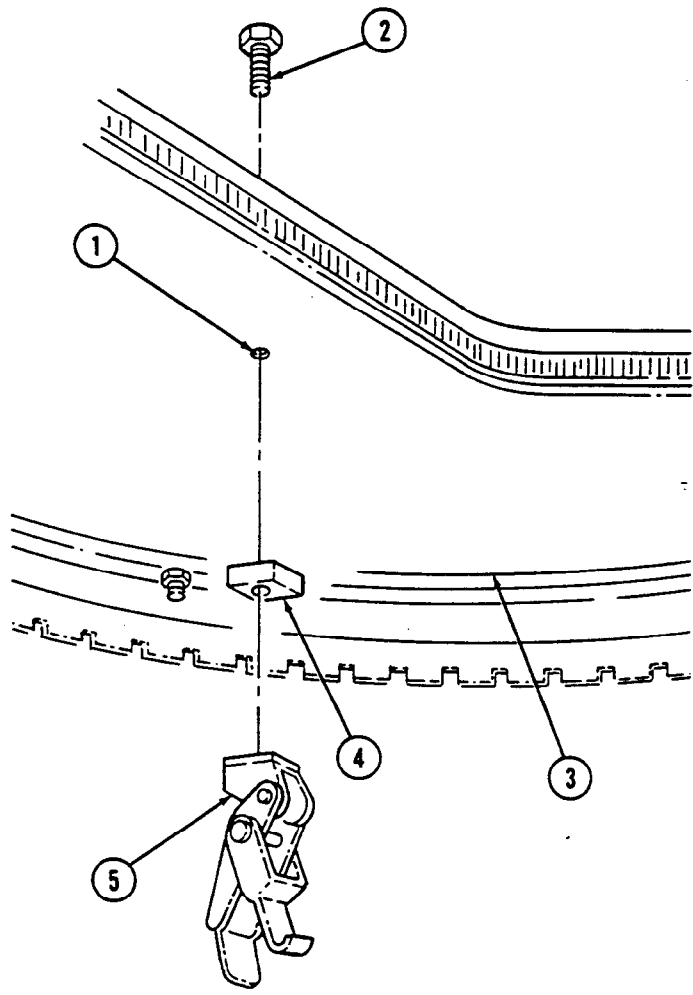
- Perform step 1 for turret armor-mounted hatch latch.
 - Perform steps 2 and 3 for turret bearing-mounted hatch latch.
1. Remove capscrew (2), hatch latch (5), and spacer (4) from turret armor (3).
 2. Remove capscrew (6) and hatch latch (9) from turret hatch clamp bracket (7).
 3. Remove two capscrews (10) and turret hatch clamp bracket (7) from turret bearing (8).

b. Installation

NOTE

- Apply sealant to capscrews prior to installation.
 - Perform steps 1 and 2 for turret armor-mounted hatch latch.
 - Perform steps 3 and 4 for turret bearing-mounted hatch latch.
1. Apply RTV sealant around mount hole (1) prior to installing capscrew (2).
 2. Install spacer (4) and hatch latch (5) on turret armor (3) with capscrew (2). Tighten capscrew (2) to 37 lb-ft (50 N•m).
 3. Install turret hatch clamp bracket (7) on turret bearing (8) with two capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N•m).
 4. Install hatch latch (9) on turret hatch clamp bracket (7) with capscrew (6). Tighten capscrew (6) to 37 lb-ft (50 N•m).

11-50. TURRET ARMOR AND TURRET BEARING HATCH LATCH REPLACEMENT (Cont'd)



11-51. TURRET ARMOR BRUSH SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)

Equipment Condition

- Turret pintle mount removed (para. 11-62).
- Night vision lid bumper bracket removed (para. 11-58).

Materials/Parts

Twenty-eight rivets (Appendix G, Item 351)
 RTV sealant (Appendix C, Item 74)

Maintenance Level

Unit

a. Removal

NOTE

- Note brush seals location for installation.
- For replacement of rivets, refer to para. 10-56.

Remove twenty-eight rivets (1) and two brush seals (3) from turret armor (2).

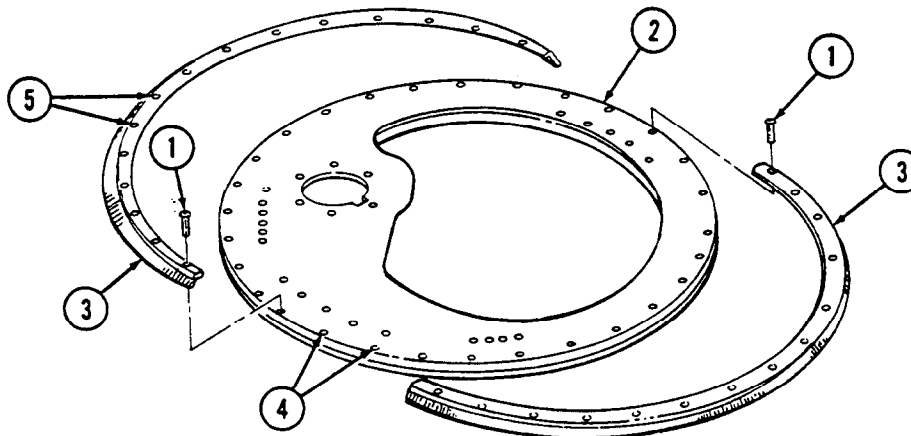
b. Installation

1. Apply a small amount of sealant to brush seal mount holes (4).

NOTE

Ensure two rivet holes are left open for night vision lid bumper bracket.

2. Position two brush seals (3) on turret armor (2) and install twenty-eight rivets (1) (leave two rivet holes (5) open).
3. Seal butt joints of brush seals (3) with sealant.



- FOLLOW-ON TASKS:**
- Install turret pintle mount (para. 11-62).
 - Install night vision lid bumper bracket (para. 11-58).

11-52. TURRET ARMOR AND SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

RTV sealant (Appendix C, Item 74)
 Sealing compound (Appendix C, Item 64)
 Adhesive (Appendix C, Item 4)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Night vision mount removed (para. 11-60).
- Turret pintle mount removed (para. 11-62).
- Turret armor brush seal removed (para. 11-51), if required.
- Turret door removed (para. 11-53), if required.
- Turret armor hatch latch removed (para. 11-50).
- Turret hatch pivot base removed (para. 11-59).

Maintenance Level

Unit

a. Removal

1. Remove seal (2) from turret armor (3). Thoroughly clean the edge of turret armor (3).

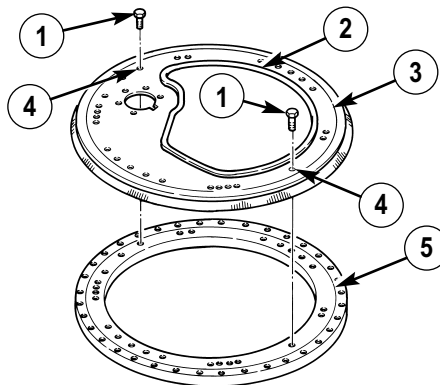
NOTE

Note location of mount holes for installation.

2. Remove two capscrews (1) and turret armor (3) from turret bearing (5).

b. Installation

1. Apply a 1/16-in. (1.6-mm) to 1/8-in. (3.2-mm) bead of adhesive to seal (2) lip.
2. Starting somewhere other than at a corner, press seal over lip of turret armor (3).
3. Allow seal (2) to set and cure undisturbed for about one hour.
4. Apply sealant around turret armor mount holes (4).
5. Apply sealing compound to capscrews (1).
6. Install turret armor (3) on turret bearing (5) with two capscrews (1). Tighten capscrews (1) to 37 lb-ft (50 N·m).



- FOLLOW-ON TASKS:
- Install turret hatch pivot base (para. 11-59).
 - Install turret armor hatch latch (para. 11-50).
 - Install turret door (para. 11-53), if removed.
 - Install turret armor brush seal (para. 11-51).
 - Install turret pintle mount (para. 11-62).
 - Install night vision mount (para. 11-60).

11-53. TURRET DOOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Turret backrest removed (para. 11-54).

Maintenance Level

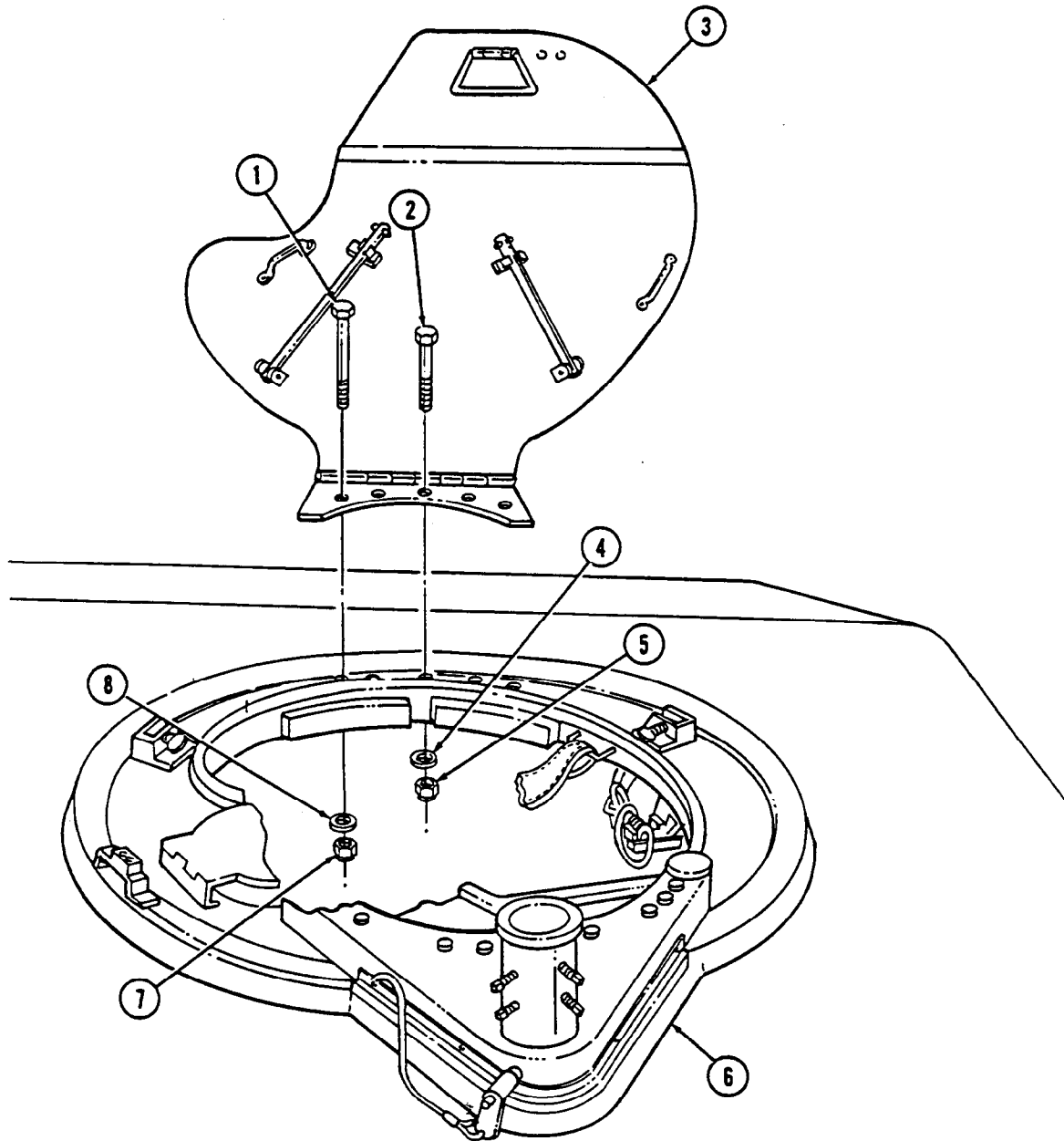
Unit

a. Removal

1. Open turret hatch door (3) flat against turret (6).
2. Remove four nuts (7), washers (8), and capscrews (1) from turret door (3) and turret (6).
3. Remove nut (5), washer (4), and capscrew (2) from turret door (3) and turret (6).
4. Remove turret door (3) from turret (6).

b. Installation

1. Position turret door (3) on turret (6) and secure with capscrew (2), washer (4), and nut (5). Tighten capscrew (2) to 37 lb-ft (50 N·m).
2. Install four capscrews (1), washers (8), and nuts (7) on turret door (3) and turret (6). Tighten capscrews (1) to 37 lb-ft (50 N·m).

11-53. TURRET DOOR REPLACEMENT (Cont'd)

- FOLLOW-ON TASKS:**
- Install turret backrest (para. 11-54).
 - Close and secure turret door (TM 9-2320-387-10).

11-54. TURRET BACKREST REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

RTV sealant (Appendix C, Item 74)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Turret door opened (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove two nuts (3), washers (4), and capscrews (1) from turret hatch door (9) and turret (2).
2. Remove capscrew (5), washer (6), backrest (7), and spacer (8) from turret (2).

b. Installation

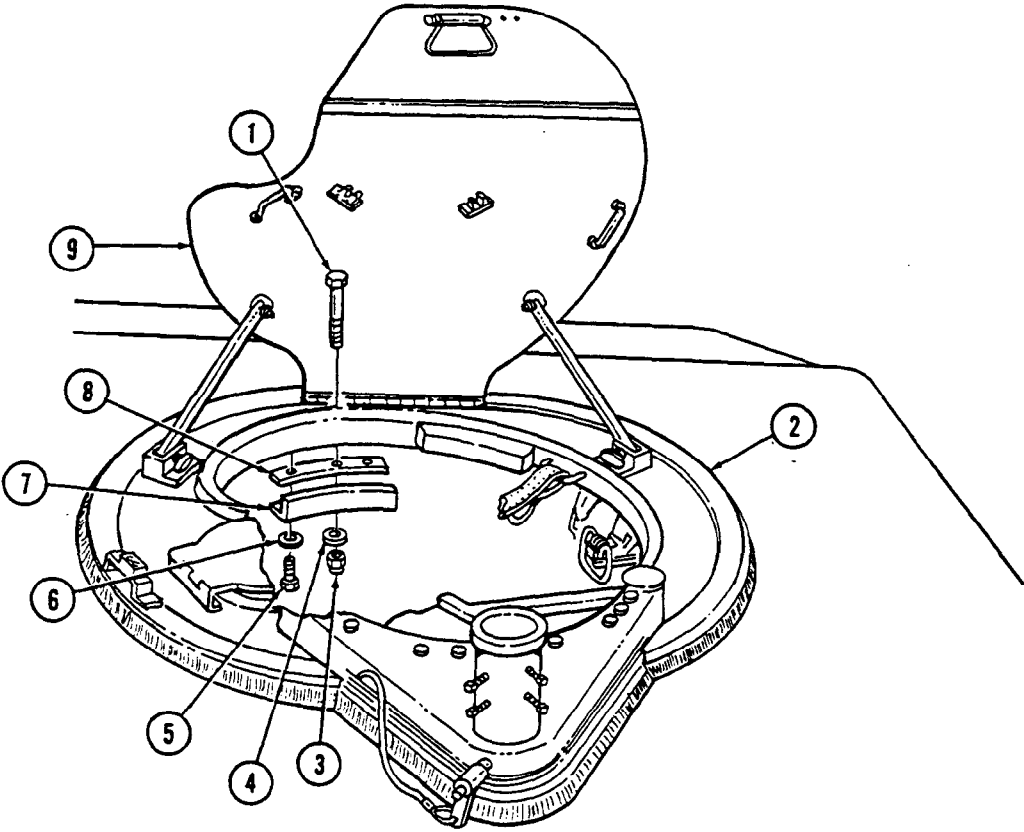
1. Apply sealant around screw mounting holes in turret hatch door (9).

NOTE

Apply sealant to capscrews prior to installation.

2. Install spacer (8) and backrest (7) on turret (2) with washer (6) and capscrew (5). Tighten capscrew (5) to 37 lb-ft (50 N•m).
3. Install two capscrews (1), washers (4), and nuts (3) on turret hatch door (9) and turret (2). Tighten capscrews (1) to 37 lb-ft (50 N•m).

11-54. TURRET BACKREST REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Close and secure turret door (TM 9-2320-387-10).

11-55. TURRET BRAKE AND BASE MAINTENANCE

This task covers:

- a. Removal
- b. Installation
- c. Adjustment

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 181)
 Sealing compound (Appendix C, Item 64)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

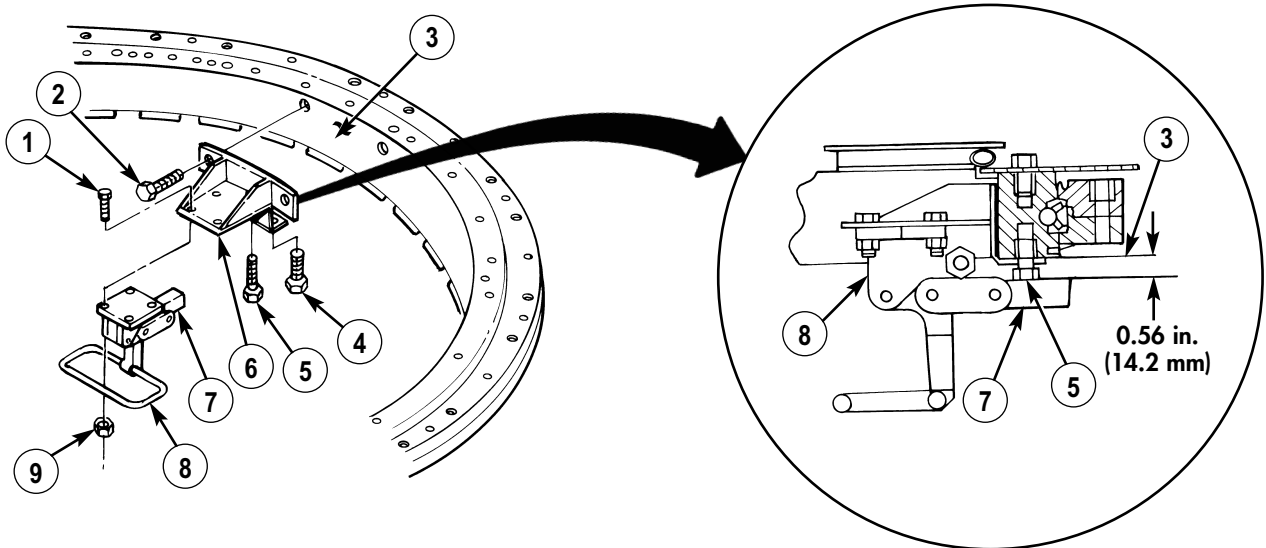
1. Remove four locknuts (9), capscrews (1), and brake (8) from base (6). Discard locknuts (9).
2. Remove two capscrews (2) from base (6) and turret (3).
3. Remove two capscrews (4), capscrew (5), and base (6) from turret (3).

b. Installation

1. Install base (6) on turret (3) with two capscrews (2). Tighten capscrews (2) to 37 lb-ft (50 N·m).
2. Apply sealing compound to threads of two capscrews (4) and capscrew (5), and install capscrews (4) and capscrew (5) on base (6) and turret (3). Tighten capscrews (4) and (5) to 37 lb-ft (50 N·m).
3. Install brake assembly (8) on base (6) with four capscrews (1) and locknuts (9). Tighten locknuts (9) to 19-23 lb-ft (25-31 N·m).

c. Adjustment

1. Adjust capscrew (5) to 0.56 in. (14.2 mm).
2. Close brake assembly (8).
3. Adjust capscrew (5) to contact detent arm (7) of brake assembly (8) plus 1/4-1/3 turn.



11-56. GUNNER'S SLING AND HOOK REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Maintenance Level

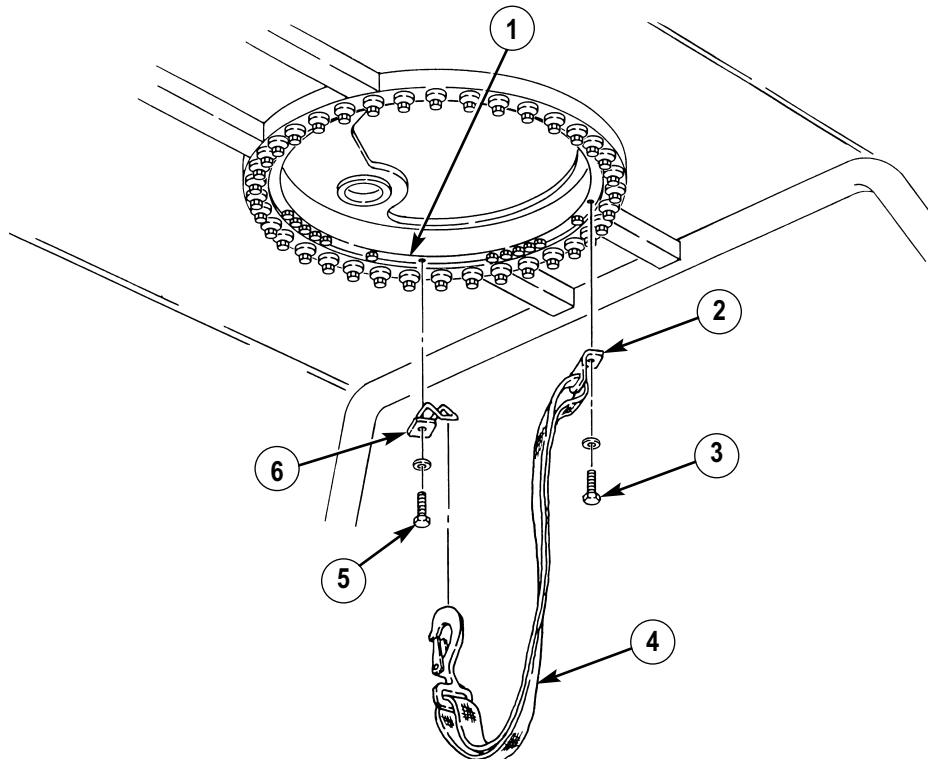
Unit

a. Removal

1. Remove gunner's sling (4), capscrew (3), and bracket (2) from turret (1).
2. Remove capscrew (5) and gunner's sling hook (6) from turret (1).

b. Installation

1. Apply sealing compound to threads of capscrews (5) and (3).
2. Install gunner's sling hook (6) on turret (1) with capscrew (5). Tighten capscrew (5) to 37 lb-ft (50 N·m).
3. Install gunner's sling (4) and bracket (2) on turret (1) with capscrew (3). Tighten capscrew (3) to 37 lb-ft (50 N·m).



11-57. TURRET BEARING AND STOP RING MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Turret armor removed (para. 11-52).
- Turret brake and base removed (para. 11-55).
- Turret backrest removed (para. 11-54).
- Gunner's sling and hook removed (para. 11-56).

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Unit

Personnel Required

One mechanic
 One assistant

NOTE

Note location of camouflage net bracket for installation.

a. Removal

1. Remove thirty-six capscrews (7), thirty-five washers (6), net bracket (8), and thirty-six lower bushings (5) from turret frame (4).
2. Remove bearing assembly (2) from turret frame (4).
3. Remove stop ring (1) from turret frame (4).
4. Remove thirty-six upper bushings (3) from turret frame (4).

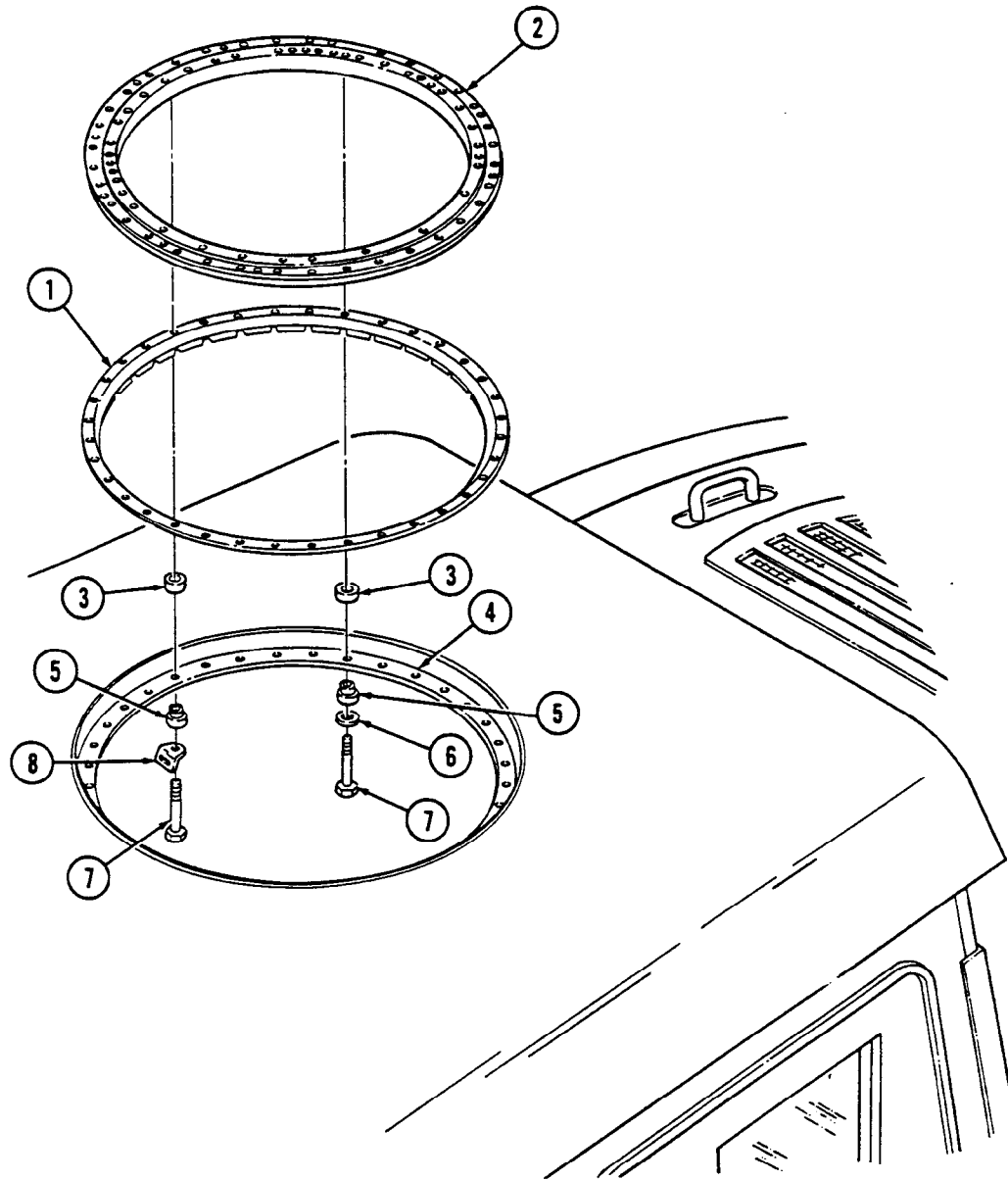
b. Inspection

Inspect bushings (3) for serviceability. Replace if damaged.

c. Installation

1. Install thirty-six upper bushings (3) on turret frame (4).
2. Install stop ring (1) on turret frame (4) with holes in upper bushings (3) aligned.
3. Install bearing assembly (2) on stop ring (1) with holes in turret frame (4) aligned.
4. Apply sealing compound to threads of thirty-six capscrews (7), and secure bearing assembly (2) to turret frame (4) with thirty-six lower bushings (5), net bracket (8), thirty-five washers (6), and thirty-six capscrews (7). Tighten capscrews (7) to 37 lb-ft (50 N·m).

11-57. TURRET BEARING AND STOP RING MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:
- Install turret armor (para. 11-52).
 - Install turret brake and base (para. 11-55).
 - Install turret backrest (para. 11-54).
 - Install gunner's sling and hook (para. 11-56).

11-58. NIGHT VISION LID BUMPER AND BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)
 Riveter tool kit (Appendix B, Item 123)

Materials/Parts

Two rivets (Appendix G, Item 349)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

NOTE

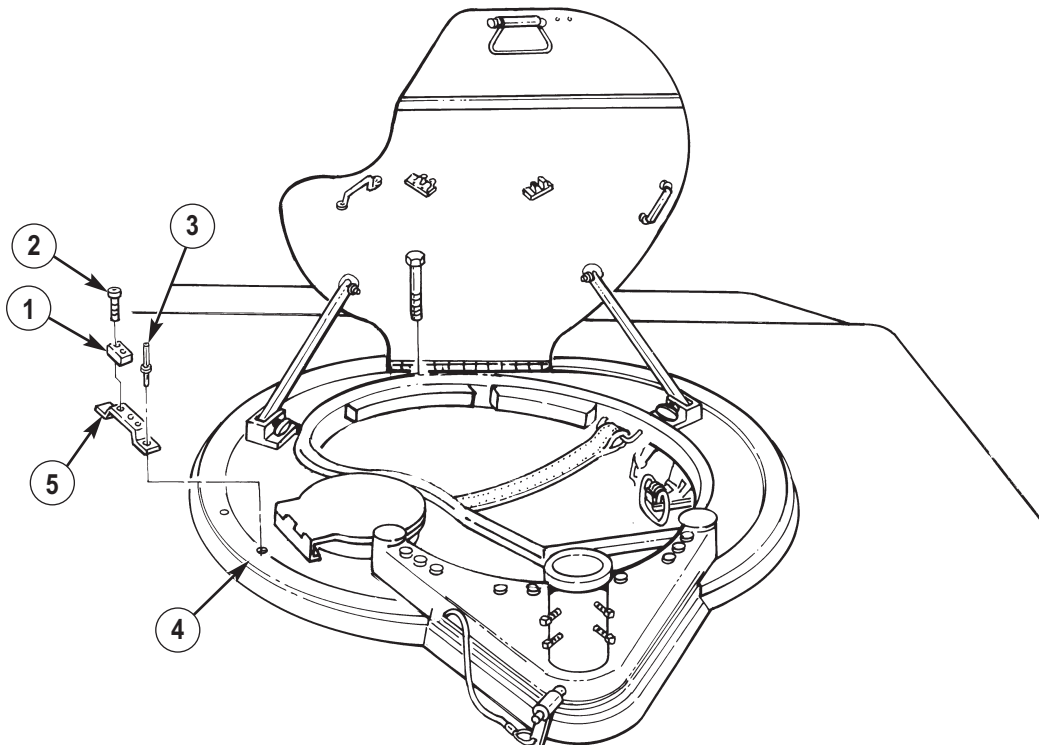
For replacement of rivets, refer to para. 10-56.

a. Removal

1. Remove two socket-head screws (2) and bumper (1) from night vision lid bumper bracket (5).
2. Remove two rivets (3) and night vision lid bumper bracket (5) from brush seal (4).

b. Installation

1. Install night vision lid bumper bracket (5) on brush seal (4) with two rivets (3).
2. Apply sealing compound to threads of two socket-head screws (2), and install bumper (1) on night vision lid bumper bracket (5) with socket-head screws (2). Tighten socket-head screws (2) to 68-82 lb-in. (8-9 N·m).



11-59. TURRET HATCH PIVOT BASE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

RTV sealant (Appendix C, Item 74)
 Sealing compound (Appendix C, Item 64)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

NOTE

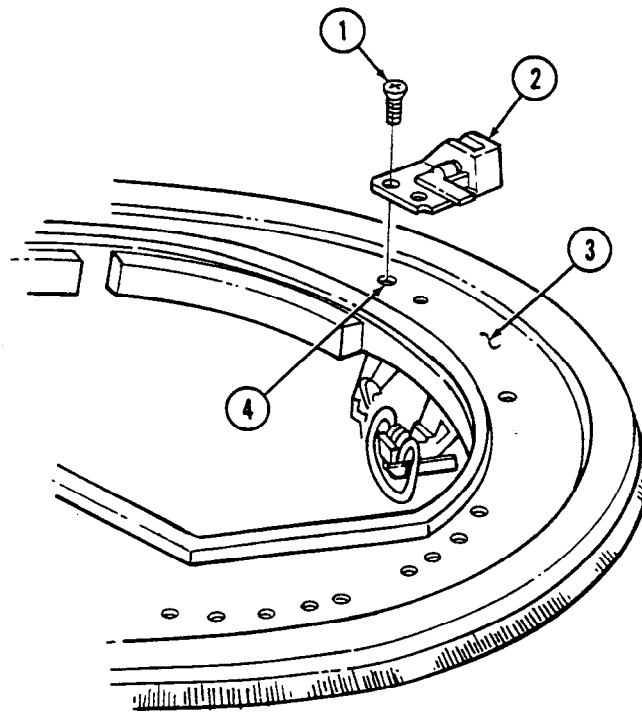
Replacement procedures for left and right turret hatch pivot bases are basically the same. This procedure covers the right pivot base.

a. Removal

Remove two socket-head screws (1) and turret hatch pivot base (2) from turret armor (3).

b. Installation

1. Apply sealing compound on socket-head screws (1).
2. Apply sealant around screw holes (4), and install turret hatch pivot base (2) on turret armor (3) with two socket-head screws (1). Tighten socket-head screws (1) to 37 lb-ft (50 N·m).



11-60. NIGHT VISION MOUNT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Turret door open (TM 9-2320-387-10)

Maintenance Level

Unit

Materials/Parts

Sealant (Appendix C, Item 74)
 Sealing compound (Appendix C, Item 72.1)

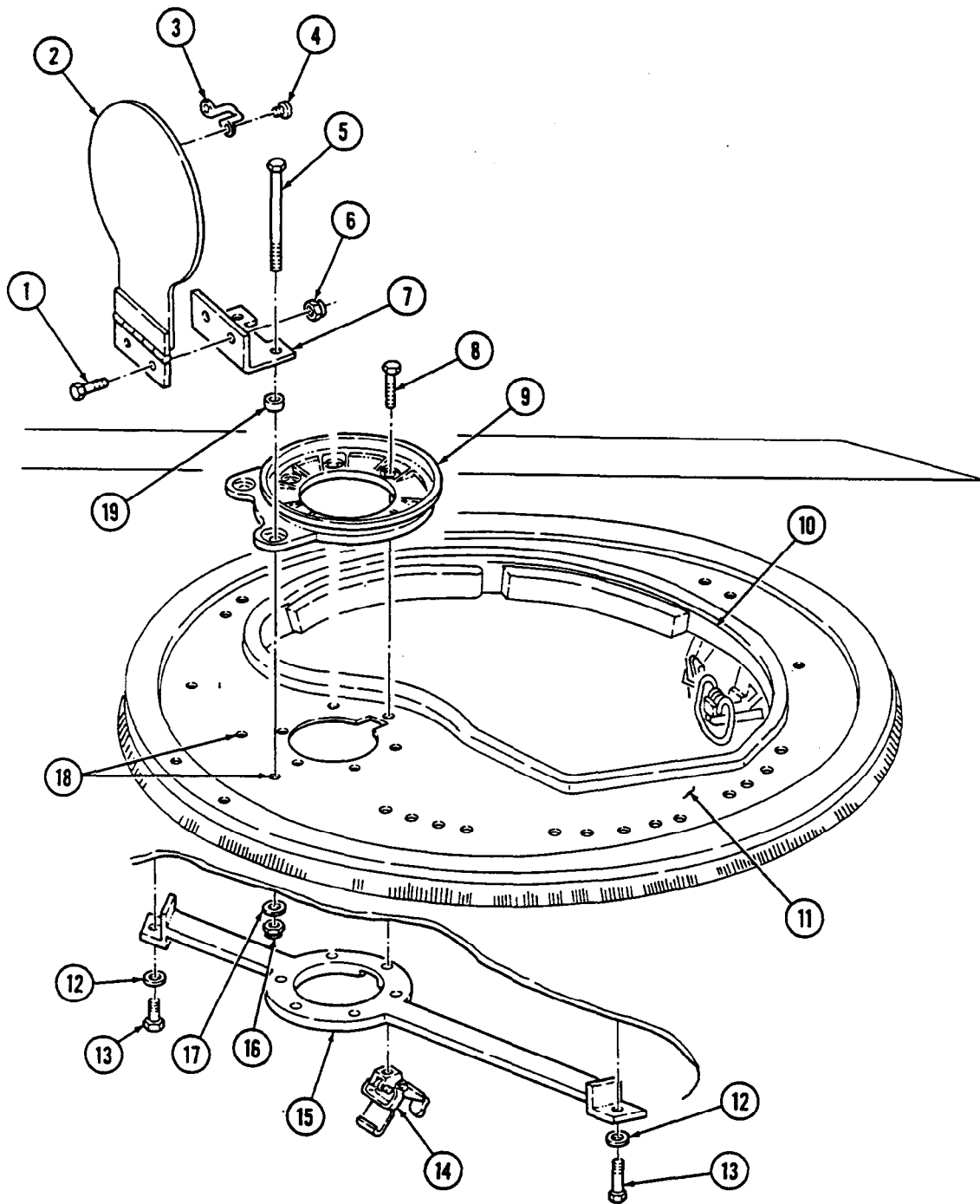
a. Removal

1. Remove two capscrews (4) and footman loop (3) from bracket lid (2).
2. Remove two nuts (6), capscrews (1), and bracket lid (2) from bracket (7).
3. Remove two nuts (16), washers (17), capscrews (5), bracket (7), and two spacers (19) from pedestal (9).
4. Remove six capscrews (8), clamping catch (14), and pedestal (9) from turret armor (11) and support (15).
5. Remove two capscrews (13), washers (12), and support (15) from turret armor (11) and turret bearing (10).

b. Installation

1. Apply sealing compound to threads of two capscrews (13), and install support (15) on turret bearing (10) and turret armor (11) with two washers (12) and capscrews (13). Tighten capscrews (13) to 37 lb-ft (50 N·m).
2. Apply sealant around pedestal mount holes (18) in turret armor (11).
3. Apply sealing compound to threads of six capscrews (8), and install pedestal (9) and clamping catch (14) on turret armor (11) with capscrews (8). Tighten capscrews (8) to 37 lb-ft (50 N·m).
4. Apply sealant around bracket (7) mounting holes in pedestal (9).
5. Install two spacers (19) and bracket (7) on pedestal (9) with two capscrews (5), washers (17), and nuts (16). Tighten nuts (16) to 37 lb-ft (50 N·m).
6. Install lid (2) on bracket (7) with two capscrews (1) and nuts (6). Tighten nuts (6) to 10 lb-ft (14 N·m).
7. Apply sealing compound to threads of two capscrews (4), and install footman loop (3) on bracket lid (2) with capscrews (4). Tighten capscrews (4) to 30 lb-in. (3 N·m).

11-60. NIGHT VISION MOUNT REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Close turret door (TM 9-2320-387-10).

11-61. TURRET HATCH ASSEMBLY COMPONENTS REPLACEMENT

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Pivot Rod Removal b. Pivot Lug Removal c. Strap Fastener Loop Removal d. Hatch Support Rod Clip Removal e. Protective Bumper Removal | <ul style="list-style-type: none"> f. Protective Bumper Installation g. Hatch Support Rod Clip Installation h. Strap Fastener Loop Installation i. Pivot Lug Installation j. Pivot Rod Installation |
|---|--|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

O-ring (Appendix G, Item 273)
 Four locknuts (Appendix G, Item 183)
 Locknut (Appendix G, Item 181)
 RTV sealant (Appendix C, Item 74)
 Lithium grease (Appendix C, Item 36)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Pivot Rod Removal

NOTE

Replacement procedures for left and right pivot rods are basically the same. This procedure covers the left pivot rod.

1. Raise and support turret hatch (4).
2. Disconnect pivot rod (8) from hatch support rod clip (5).
3. Remove locknut (7), socket-head screw (9), and pivot rod (8) from pivot lug (10). Discard locknut (7).

b. Pivot Lug Removal

NOTE

Replacement procedures for left and right pivot lugs are basically the same. This procedure covers the left pivot lug.

1. Remove pivot rod (8) (task a.).
2. Remove nut (14), washer (13), O-ring (12), pivot lug (10), and washer (11) from turret hatch (4). Discard O-ring (12).

c. Strap Fastener Loop Removal

NOTE

Replacement procedures for strap fastener loops are basically the same. This procedure covers the strap fastener loop with lifting loop.

1. Raise and support turret hatch (4).
2. Remove two locknuts (19), screws (16), lifting loop (18), and strap fastener loop (17) from turret hatch (4). Discard locknuts (19).

11-61. TURRET HATCH ASSEMBLY COMPONENTS REPLACEMENT (Cont'd)

d. Hatch Support Rod Clip Removal

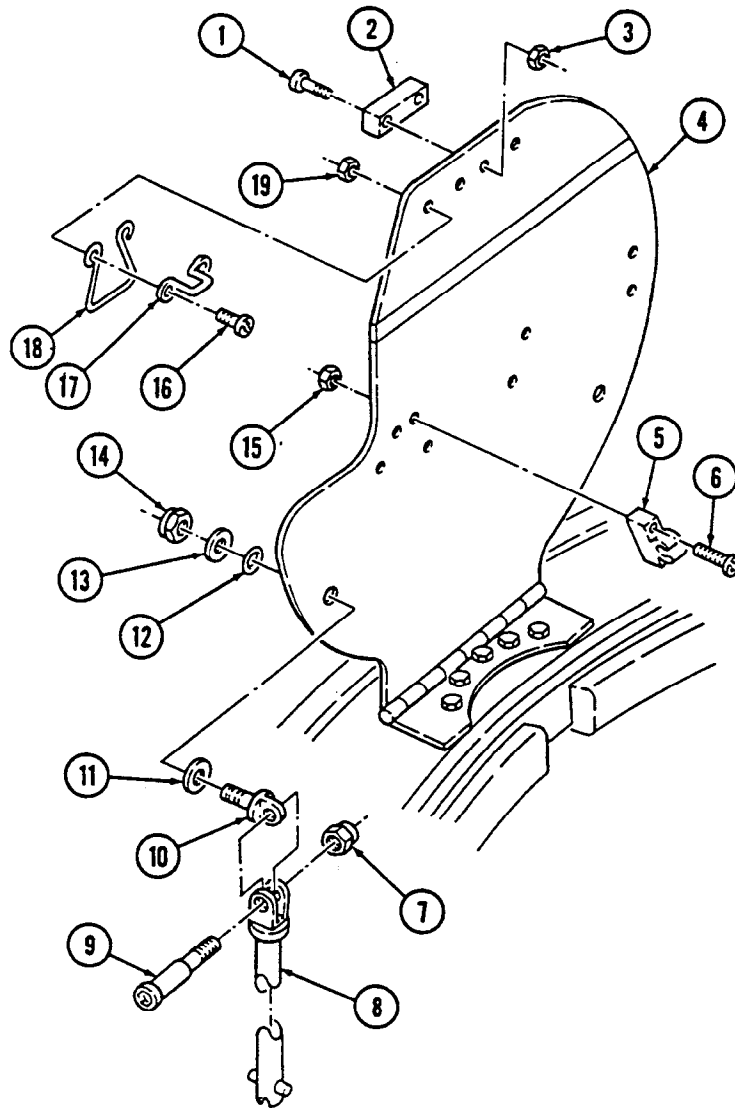
NOTE

Replacement procedures for left and right hatch support rod clips are basically the same. This procedure covers the left hatch support rod clip.

1. Raise and support turret hatch (4).
2. Remove two locknuts (15), screws (6), and hatch support rod clip (5) from turret hatch (4). Discard locknuts (15).

e. Protective Bumper Removal

1. Raise and support turret hatch (4).
2. Remove two locknuts (3), screws (1), and protective bumper (2) from turret hatch (4). Discard locknuts (3).



11-61. TURRET HATCH ASSEMBLY COMPONENTS REPLACEMENT (Cont'd)

NOTE

Apply a small amount of sealant around all screw holes prior to installation of components.

f. Protective Bumper Installation

1. Install protective bumper (2) on turret hatch (4) with two screws (1) and nuts (3). Tighten nuts (3) to 10 lb-ft (14 N•m).
2. Lower and close turret hatch (4).

g. Hatch Support Rod Clip Installation

1. Install hatch support rod clip (5) on turret hatch (4) with two screws (6) and locknuts (15). Tighten locknuts (15) to 30 lb-in. (3 N•m).
2. Lower and close turret hatch (4).

h. Strap Fastener Loop Installation

1. Install lifting loop (18) and strap fastener loop (17) on turret hatch (4) with two screws (16) and locknuts (19). Tighten locknuts (19) to 30 lb-in. (3 N•m).
2. Lower and close turret hatch (4).

i. Pivot Lug Installation

NOTE

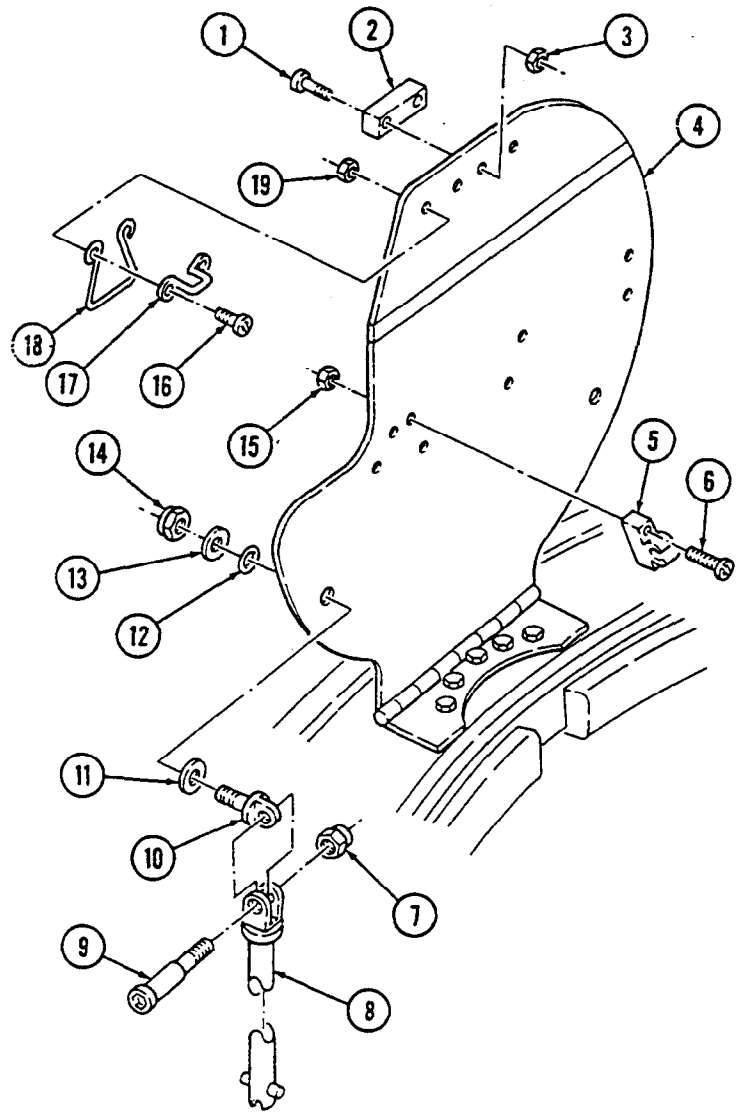
Pivot lug must rotate by hand after installation.

1. Lightly lubricate shaft of pivot lug (10) and O-ring (12) and install pivot lug (10) on turret hatch (4) with washer (11), O-ring (12), washer (13), and nut (14). Ensure pivot lug (10) will rotate by hand.
2. Install pivot rod (8) (task j.).

j. Pivot Rod Installation

1. Install pivot rod (8) on pivot lug (10) with socket-head screw (9) and locknut (7). Tighten locknut (7) to 21 lb-ft (28 N•m).
2. Connect pivot rod (8) to hatch support rod clip (5).
3. Lower and close turret hatch (4).

11-61. TURRET HATCH ASSEMBLY COMPONENTS REPLACEMENT (Cont'd)



11-62. TURRET PINTLE MOUNT MAINTENANCE

This task covers:

- a. Removal
- c. Installation
- b. Inspection

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

RTV sealant (Appendix C, Item 74)
 Sealing compound (Appendix C, Item 64)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Turret hatch open (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

1. Remove twelve capscrews (6) and washers (7) from turret armor (3) and turret pintle mount (1).
2. Remove capscrew (5) and washer (4) from turret armor (3) and turret pintle mount (1).
3. Remove turret pintle mount (1) from turret armor (3).
4. Remove four screws (9), pin assembly (8), and pintle brush seal (2) from turret pintle mount (1).

b. Inspection

Inspect pintle brush seal (2). Replace if damaged.

c. Installation

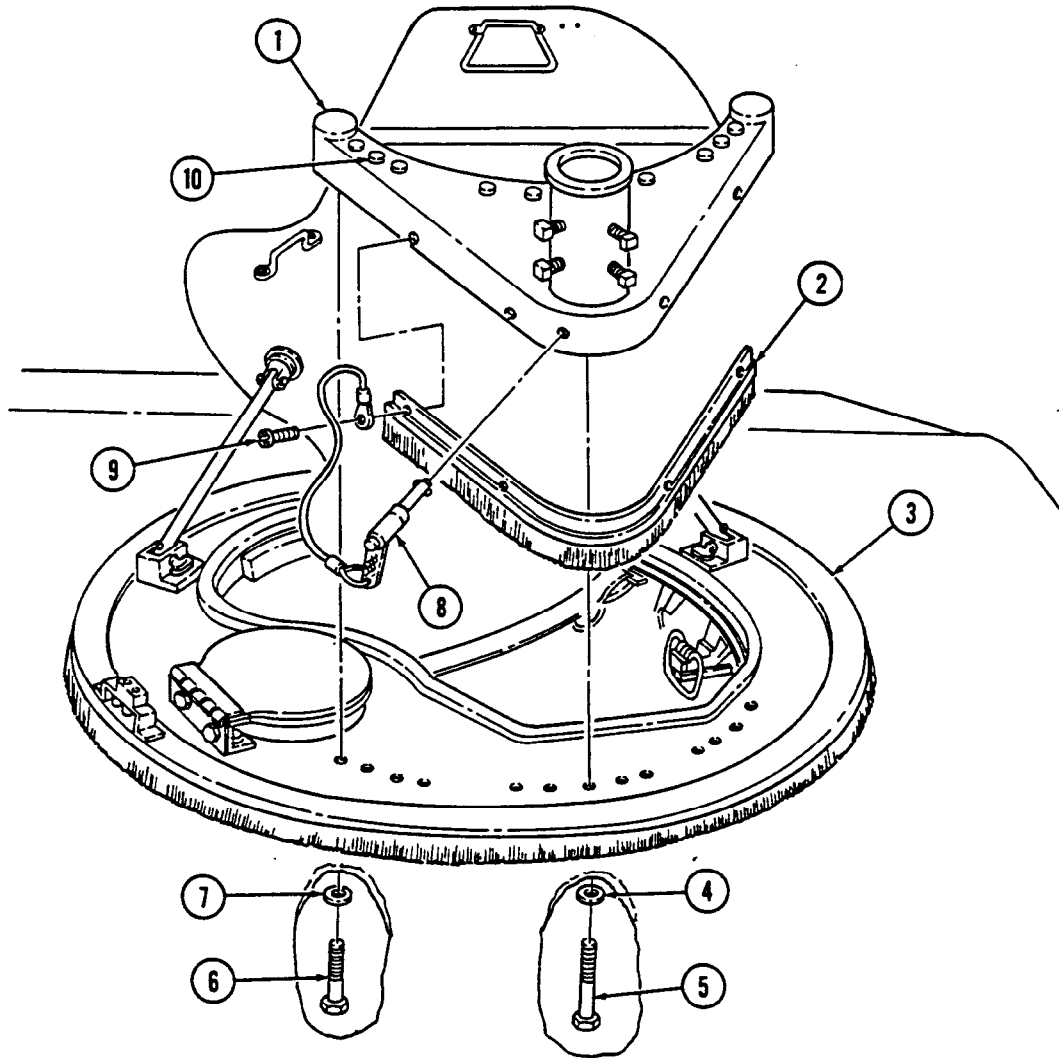
1. Install pintle brush seal (2) and pin assembly (8) on turret pintle mount (1) with four screws (9). Tighten screws (9) to 30 lb-in. (3 N·m).
2. Apply sealant to thirteen bosses (10) on bottom of pintle mount (1) and around holes in turret armor (3).
3. Install turret pintle mount (1) on turret armor (3) with washer (4) and capscrew (5). Do not tighten capscrew (5).

NOTE

Apply sealing compound to capscrews prior to installation.

4. Install twelve washers (7) and capscrews (6) on turret pintle mount (1) and turret armor (3). Tighten capscrews (6) and (5) to 37 lb-ft (50 N·m).

11-62. TURRET PINTLE MOUNT MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Close and secure turret hatch (TM 9-2320-387-10).

11-63. INTERCOM AND BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

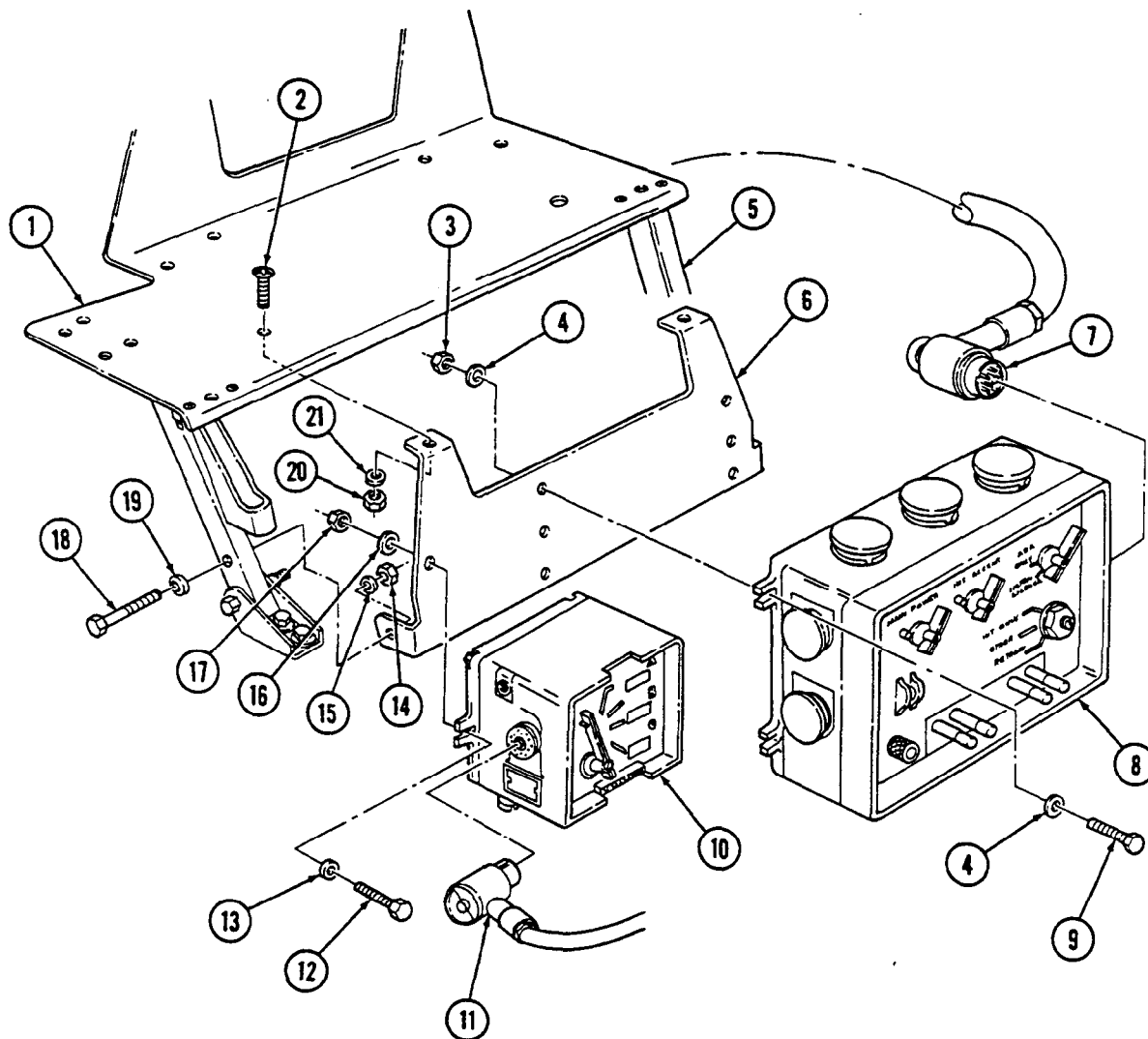
a. Removal

1. Disconnect intercom cable (11) from intercom control (10).
2. Remove two nuts (17), washers (16), capscrews (12), washers (13), and intercom control (10) from intercom mounting bracket (6).
3. Disconnect cable (7) from audio amplifier (8).
4. Remove four nuts (3), washers (4), capscrews (9), washers (4), and audio amplifier (8) from intercom mounting bracket (6).
5. Remove two nuts (14), washers (15), capscrews (18), and washers (19) from intercom mounting bracket (6) and radio rack support (5).
6. Remove two nuts (20), washers (21), screws (2), and intercom mounting bracket (6) from radio rack (1).

b. Installation

1. Install intercom mounting bracket (6) on radio rack support (5) with two washers (19), capscrews (18), washers (15), and nuts (14).
2. Install intercom mounting bracket (6) on radio rack (1) with two screws (2), washers (21), and nuts (20).
3. Install audio amplifier (8) on intercom mounting bracket (6) with four washers (4), capscrews (9), washers (4), and nuts (3). Connect cable (7) to audio amplifier (8).
4. Install intercom control (10) on intercom mounting bracket (6) with two washers (13), capscrews (12), washers (16), and nuts (17). Connect intercom cable (11) to intercom control (10).

11-63. INTERCOM AND BRACKETS REPLACEMENT (Cont'd)



11-64. COMMANDER'S CONTROL BOX MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three locknuts (Appendix G, Item 109)

Manual References

TM 9-2320-387-24P

Maintenance Level

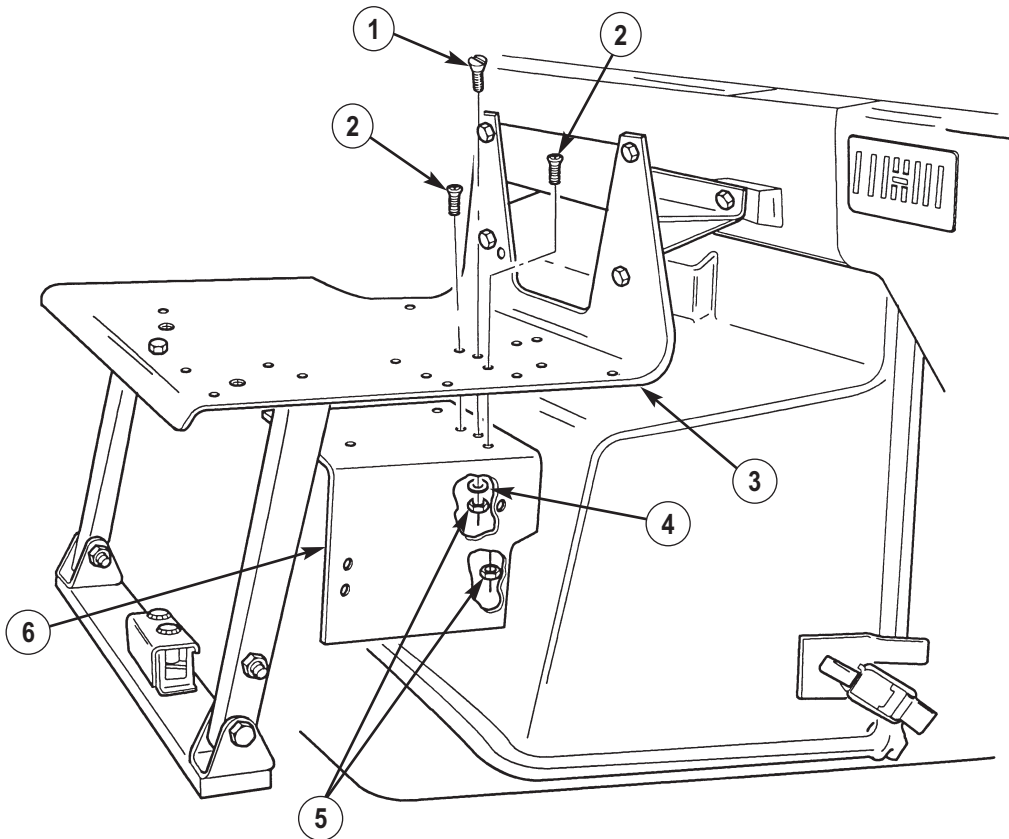
Unit

a. Removal

Remove three locknuts (5), two washers (4), screw (1), two screws (2), and commander's control box mounting bracket (6) from underside of radio rack (3). Discard locknuts (5).

b. Installation

Install commander's control box mounting bracket (6) on underside of radio rack (3) with screw (1), two screws (2), washers (4), and three locknuts (5). Tighten locknuts (5) to 6 lb-ft (8 N·m).



11-65. FIELD GLASSES BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Three locknuts (Appendix G, Item 109)

Manual References

TM 9-2320-387-24P

Maintenance Level

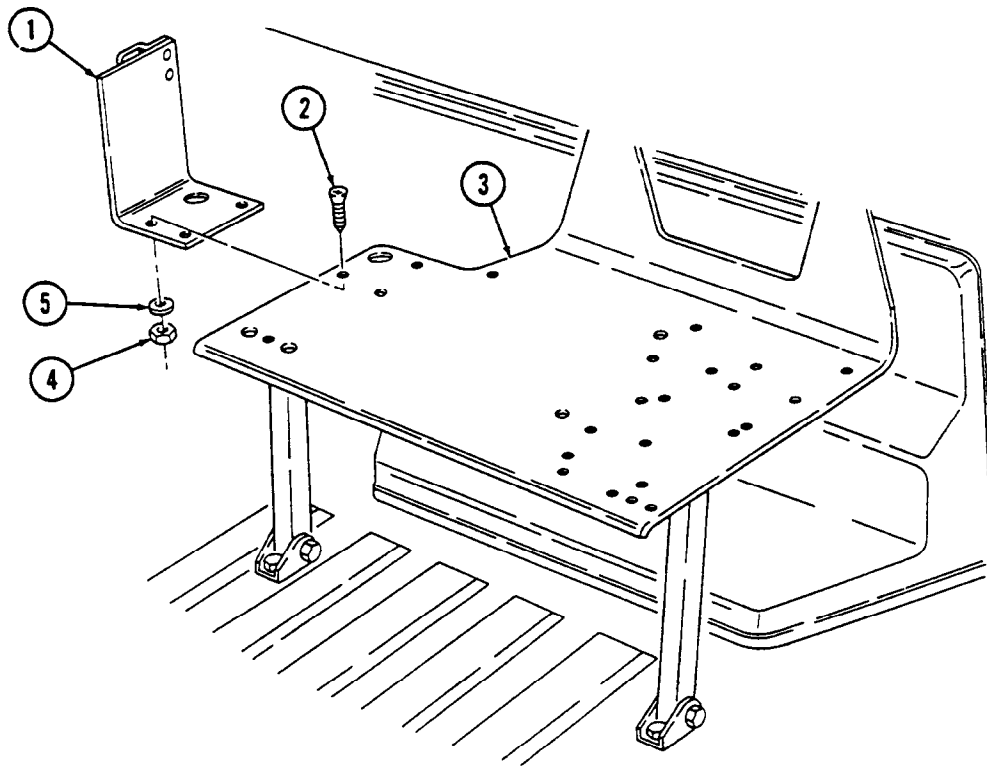
Unit

a. Removal

Remove three locknuts (4), washers (5), screws (2), and field glasses bracket (1) from radio rack (3). Discard locknuts (4).

b. Installation

Install field glasses bracket (1) on radio rack (3) with three screws (2), washers (5), and locknuts (4). Tighten locknuts (4) to 6 lb-ft (8 N·m).



11-66. RIFLE SUPPORT MAINTENANCE

This task covers:

- a. Removal
- a.1. Inspection
- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

NOTE

Perform step 1 for removal of left front rifle support. Perform step 2 for removal of right front rifle support. Perform step 3 for removal of right rear rifle support.

1. Remove capscrew (2) and rifle support (1) from floor tunnel (3).
2. Remove two capscrews (5) and rifle support (4) from right footwell (6).
3. Remove two capscrews (7) and rifle support (10) from bracket (9).

a.1. Inspection

Refer to para. 10-56 for plusnut (8) inspection and replacement.

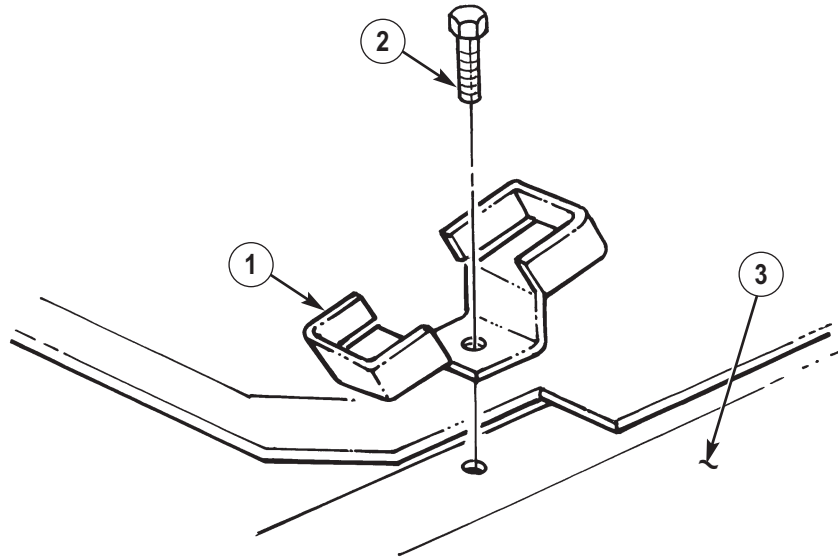
b. Installation

NOTE

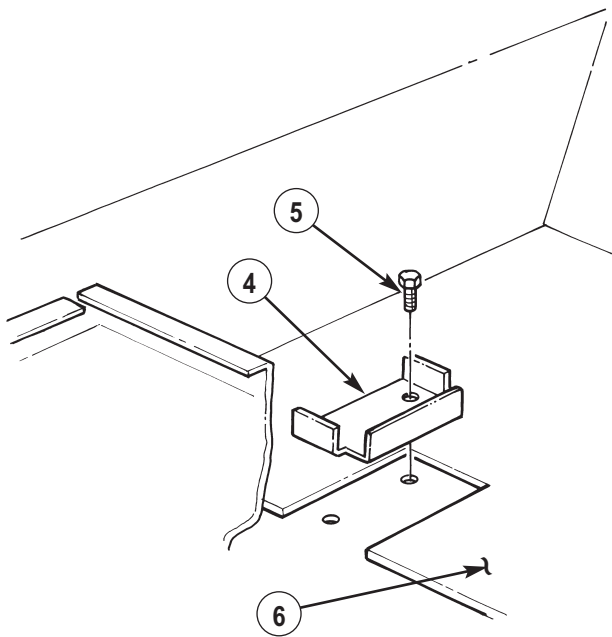
Perform step 1 for installation of left front rifle support. Perform step 2 for installation of right front rifle support. Perform step 3 for installation of right rear rifle support.

1. Apply sealing compound to threads of capscrew (2), and install rifle support (1) on floor tunnel (3) with capscrew (2). Tighten capscrew (2) to 68-82 lb-in. (8-9 N·m).
2. Apply sealing compound to threads of two capscrews (5), and install rifle support (4) on right footwell (6) with capscrews (5). Tighten capscrews (5) to 68-82 lb-in. (8-9 N·m).
3. Apply sealing compound to threads of two capscrews (7), and install rifle support (10) on bracket (9) with capscrews (7). Tighten capscrews (7) to 68-82 lb-in. (8-9 N·m).

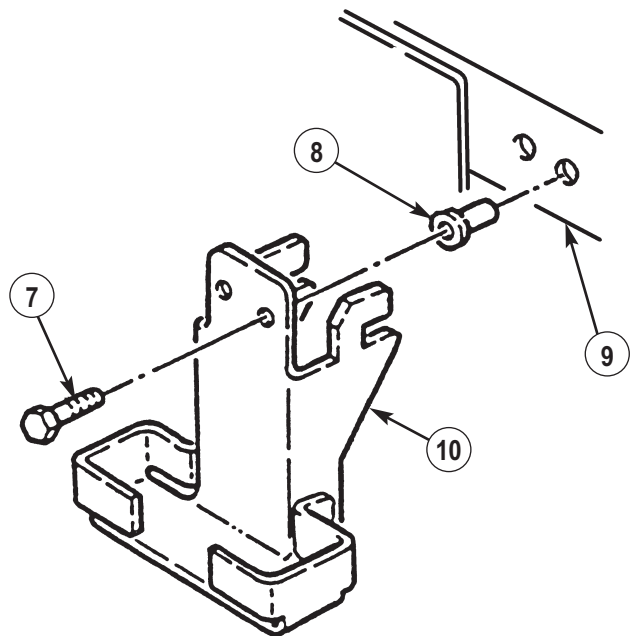
11-66. RIFLE SUPPORT MAINTENANCE (Cont'd)



LEFT SIDE FRONT



RIGHT SIDE FRONT



RIGHT SIDE REAR

11-67. RIFLE MOUNTING CLAMP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Six locknuts (Appendix G, Item 133)
Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

NOTE

Perform step 1 and 2 for removal of left front rifle mounting clamp.
Perform step 3 for removal of right front rifle mounting clamp.
Perform step 4 for removal of right rear rifle mounting clamp.

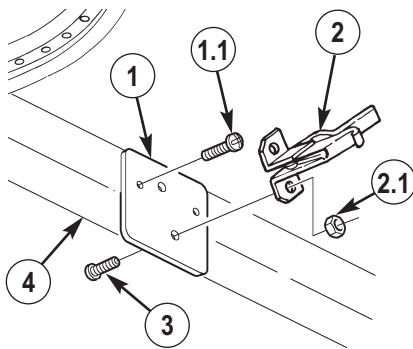
1. Remove two screws (1.1) and clamp bracket (1) from turret support (4).
2. Remove two locknuts (2.1), screws (3), and clamp (2) from clamp bracket (1) and turret support (4). Discard locknuts (2.1).
3. Remove two locknuts (9), screws (7), and clamp (6) from clamp bracket (8) on radio rack (5). Discard locknuts (9).
4. Remove two locknuts (11), screws (14), and clamp (10) from clamp bracket (13) on B-pillar (12). Discard locknuts (11).

b. Installation

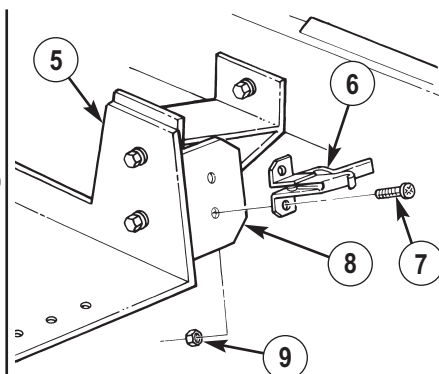
NOTE

Perform step 1 and 2 for installation of left front rifle mounting clamp. Perform step 3 for installation of right front rifle mounting clamp. Perform step 4 for installation of right rear rifle mounting clamp.

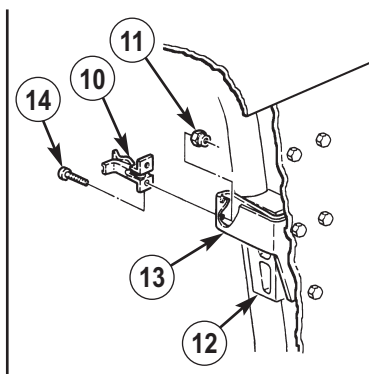
1. Install clamp (2) on clamp bracket (1) with two screws (3) and locknuts (2.1).
2. Apply sealing compound to threads of two screws (1.1) and install clamp bracket (1) on turret support (4) with screws (1.1).
3. Install clamp (6) on clamp bracket (8) and radio rack (5) with two screws (7) and locknuts (9).
4. Install clamp (10) on clamp bracket (13) and B-pillar (12) with two screws (14) and locknuts (11).



LEFT SIDE FRONT



RIGHT SIDE FRONT



RIGHT SIDE REAR

11-68. DOUBLE AMMO BOX TRAY (CALIBER .50) MAINTENANCE

This task covers:

- a. Removal
a.1. Inspection

- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Rear end of cargo shell door raised
(TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

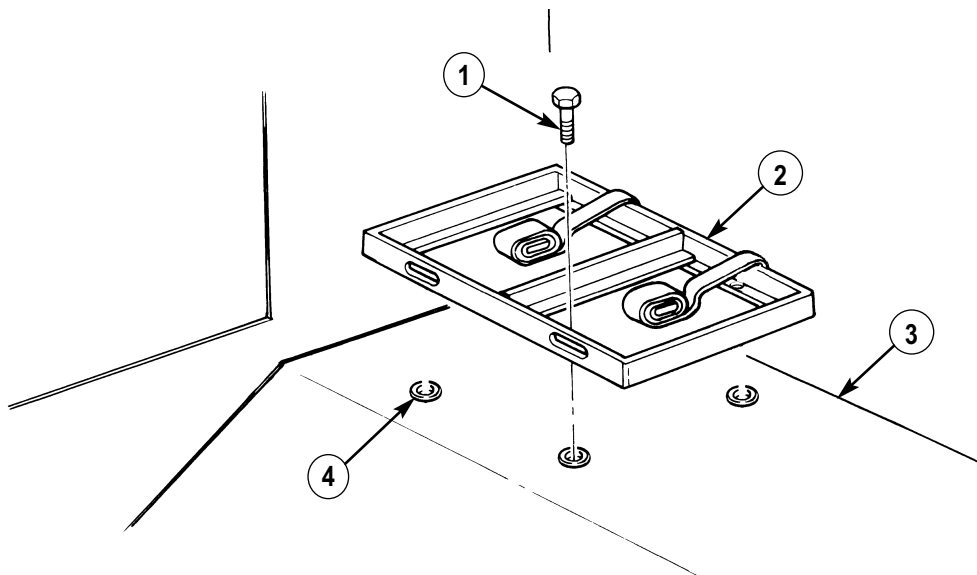
Remove four capscrews (1) and ammo box tray (2) from wheelhouse (3).

a.1. Inspection

Refer to para. 10-56 for plusnut (4) inspection and replacement.

b. Installation

Apply sealing compound to threads of four capscrews (1), and install ammo box tray (2) on wheelhouse (3) with capscrews (1). Tighten capscrews (1) to 75 lb-in. (8 N·m).



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-69. TRIPLE AMMO BOX TRAY (40 MM) REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Rear of cargo shell door raised
 (TM 9-2320-387-10).

Maintenance Level

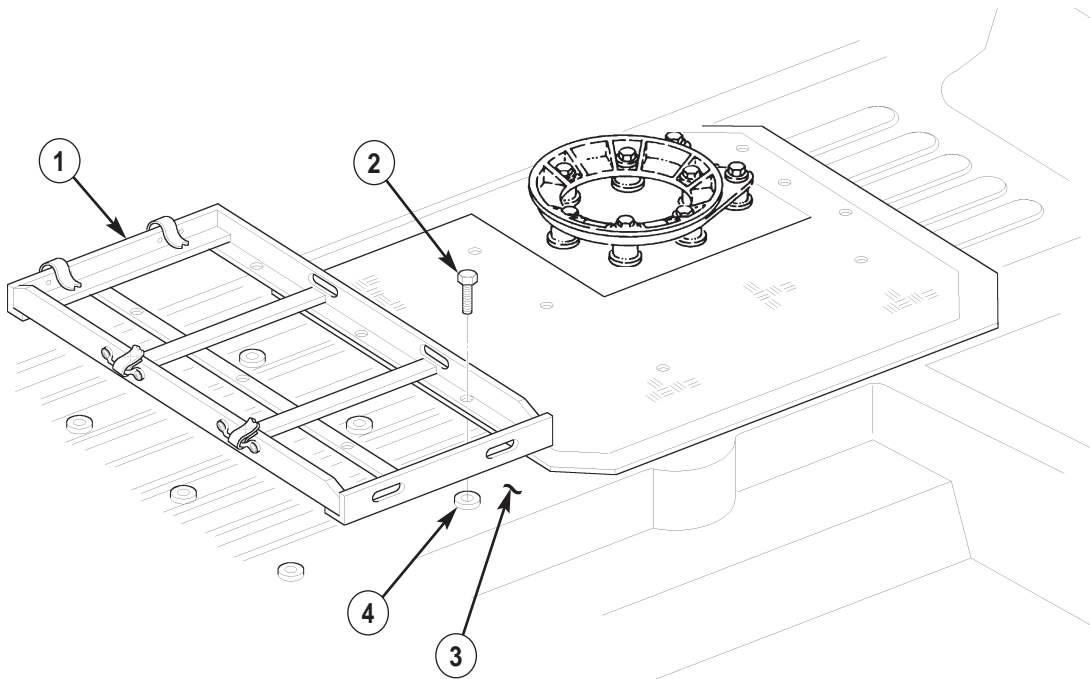
Unit

a. Removal

1. Remove six capscrews (2) and ammo box tray (1) from cargo floor (3).
2. Inspect rivnuts (4). Replace if damaged (refer to para. 10-56).

b. Installation

Apply sealing compound to threads of six capscrews (2), and install ammo box tray (1) on cargo floor (3) with capscrews (2). Tighten capscrews (2) to 6 lb-ft (8 N·m).



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-70. WATER CAN TRAY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Rear of cargo shell door raised (TM 9-2320-387-10).

Maintenance Level

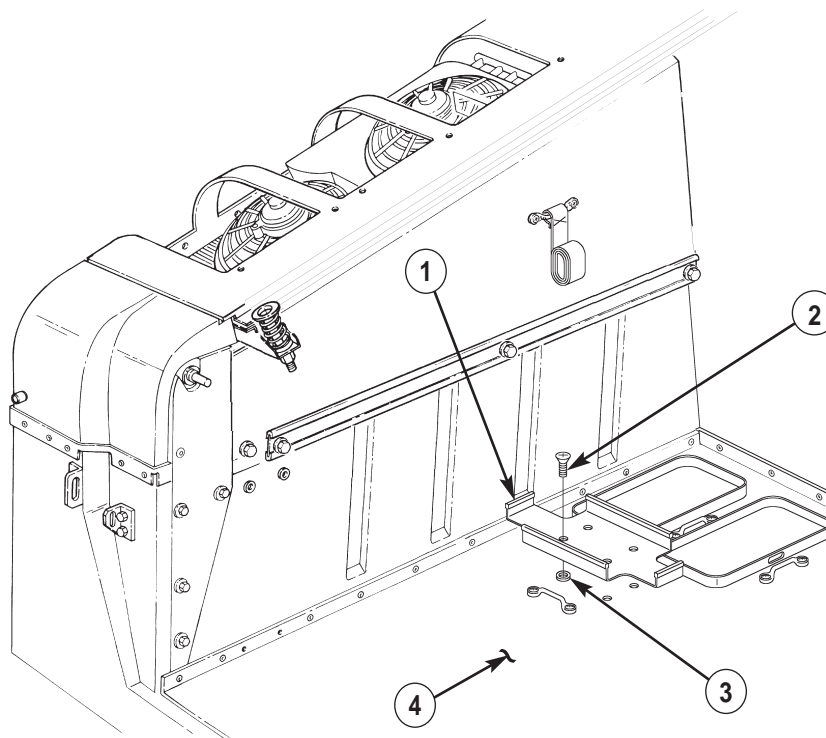
Unit

a. Removal

1. Remove four screws (2) and water can tray (1) from cargo floor (4).
2. Inspect rivnuts (3). Replace if damaged (refer to para. 10-56).

b. Installation

Apply sealing compound to threads of four screws (2), and install water can tray (1) on cargo floor (4) with screws (2). Tighten screws (2) to 6 lb-ft (8 N·m).



FOLLOW-ON TASK: Close cargo shell door (TM 9-2320-387-10).

11-71. STOWAGE PEDESTAL AND GUNNER'S PLATFORM MAINTENANCE

This task covers:

- a. Removal
 - a.1. Inspection
- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools:

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-1425-450-12
 TM 9-1425-472-12
 TM 9-2320-387-24P

Equipment Condition

- Traversing unit mount adapter removed (TM 9-1425-450-12, TM 9-1425-472-12).
- Triple ammo box tray removed (para. 11-69).

Maintenance Level

Unit

a. Removal

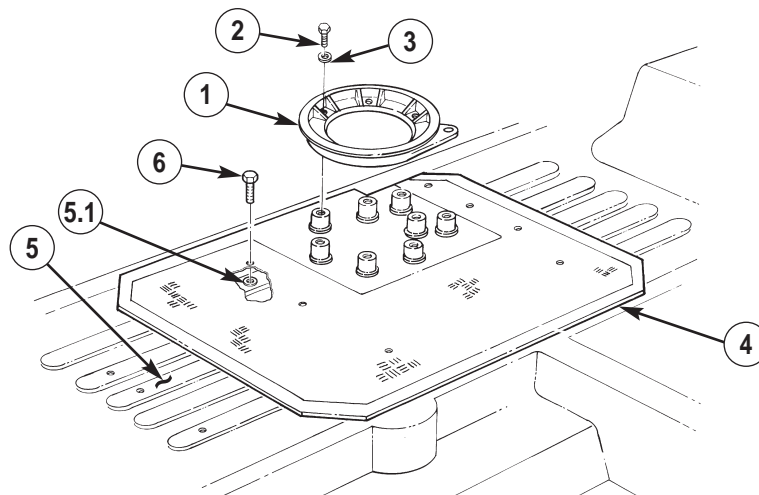
1. Remove eight capscrews (2), washers (3), and stowage pedestal (1) from gunner's platform (4).
2. Remove eight capscrews (6) and gunner's platform (4) from floor (5).

a.1. Inspection

Refer to para. 10-56 for plusnut (5.1) inspection and replacement.

b. Installation

1. Apply sealing compound to threads of eight capscrews (6), and install gunner's platform (4) on floor (5) with capscrews (6).
2. Apply sealing compound to threads of eight capscrews (2), and install stowage pedestal (1) on gunner's platform (4) with washers (3) and capscrews (2). Tighten capscrews (2) to 31 lb-ft (42 N·m).



FOLLOW-ON TASKS: • Install traversing unit mount adapter (TM 9-1425-450-12, TM 9-1425-472-12).
 • Install triple ammo box tray (para. 11-69).

Section II. SHELTER CARRIER BODY MAINTENANCE

11-72. SHELTER CARRIER BODY MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
11-73.	Shelter Mounting Bracket Replacement	11-134
11-74.	Shelter Carrier Tailgate Bracket Replacement	11-135
11-75.	Shelter Carrier Tailgate Replacement	11-136
11-76.	Shelter Support Reinforcement Replacement	11-137
11-77.	Shelter Carrier Tailgate Chain Maintenance	11-138
11-78.	Shelter Replacement	11-140
11-79.	Shelter Support Assembly Replacement	11-142

11-73. SHELTER MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Shelter removed (para. 11-78).

Materials/Parts

Capscrew (Appendix G, Item 15)
Lockwasher (Appendix G, Item 226)

Maintenance Level

Unit

NOTE

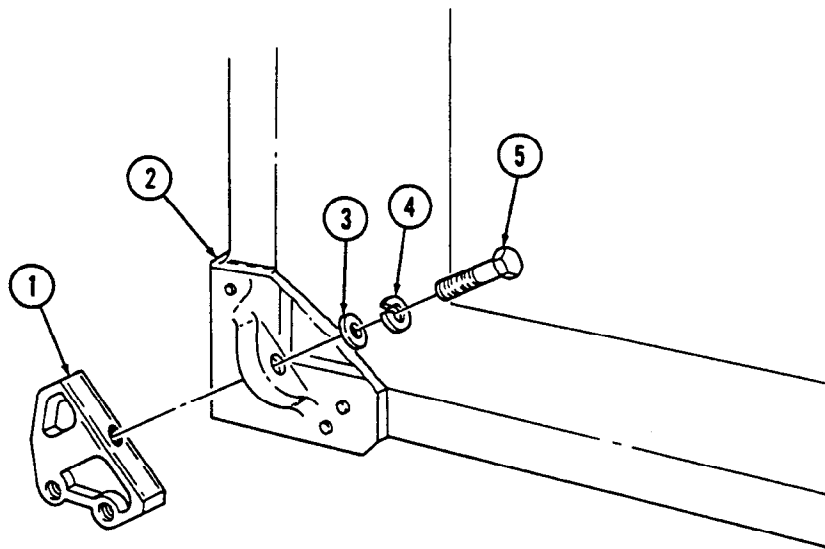
Replacement procedures for all four mounting brackets are basically the same. This procedure covers the left rear mounting bracket.

a. Removal

Remove capscrew (5), lockwasher (4), washer (3), and mounting bracket (1) from shelter (2). Discard capscrew (5) and lockwasher (4).

b. Installation

Install mounting bracket (1) on shelter (2) with washer (3), lockwasher (4), and capscrew (5). Do not tighten capscrew (5) until shelter (2) is installed.



FOLLOW-ON TASK: Install shelter (para. 11-78).

11-74. SHELTER CARRIER TAILGATE BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Shelter carrier tailgate removed (para. 11-75).

Maintenance Level

Unit

Materials/Parts

Four locknuts (Appendix G, Item 134)

NOTE

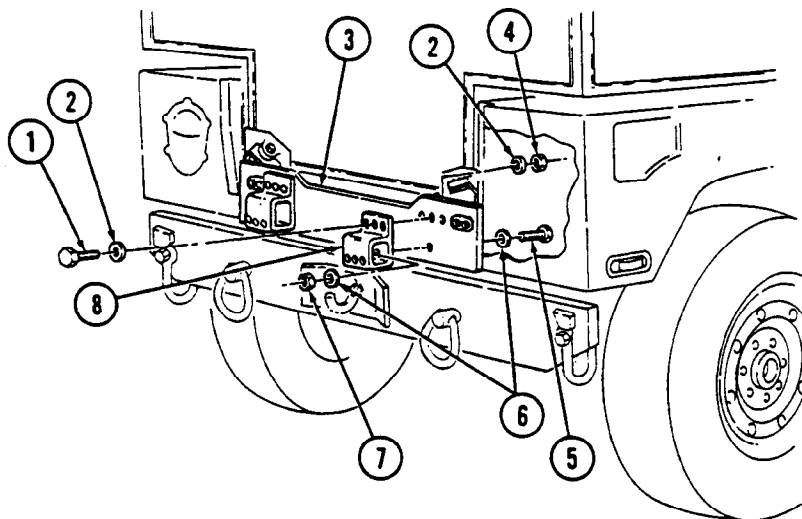
Replacement procedures for right and left tailgate brackets are basically the same. This procedure covers the right tailgate bracket.

a. Removal

1. Remove locknut (7), washer (6), capscrew (5), and washer (6) from tailgate bracket (8) and shelter support assembly (3). Discard locknut (7).
2. Remove three locknuts (4), washers (2), capscrews (1), washers (2), and tailgate bracket (8) from shelter support assembly (3). Discard locknuts (4).

b. Installation

1. Install tailgate bracket (8) on shelter support assembly (3) with three washers (2), capscrews (1), washers (2), and locknuts (4). Do not tighten capscrews (1).
2. Install washer (6), capscrew (5), washer (6), and locknut (7) on shelter support assembly (3) and tailgate bracket (8). Tighten locknut (7) to 65 lb-ft (88 N·m).
3. Tighten capscrews (1) to 26 lb-ft (35 N·m).



FOLLOW-ON TASK: Install shelter carrier tailgate (para. 11-75).

11-75. SHELTER CARRIER TAILGATE REPLACEMENT

This task covers:

- a. Removal b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Ten locknuts (Appendix G, Item 184)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Removal

1. Remove four locknuts (9), washers (2), capscrews (1), washers (2), and right and left side tailgate chain brackets (10) from tailgate (8). Discard locknuts (9).

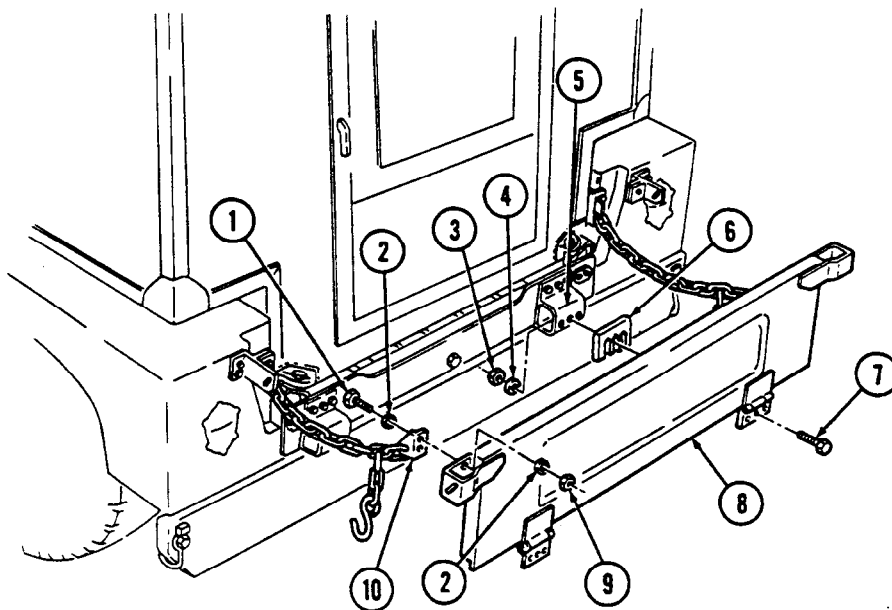
NOTE

Note number and location of shims prior to removal for installation.

2. Remove six locknuts (3), washers (4), capscrews (7), tailgate (8), and shims (6) from two tailgate mounting brackets (5). Discard locknuts (3).

b. Installation

1. Install shims (6) and tailgate (8) on two tailgate mounting brackets (5) with six capscrews (7), washers (4), and locknuts (3). Tighten locknuts (3) to 26 lb-ft (35 N·m).
2. Install right and left side tailgate chain brackets (10) on tailgate (8) with four washers (2), capscrews (1), washers (2), and locknuts (9). Tighten locknuts (9) to 15 lb-ft (20 N·m).



11-76. SHELTER SUPPORT REINFORCEMENT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Two capscrews (Appendix G, Item 18)
 Two lockwashers (Appendix G, Item 225)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Tailgate lowered (TM 9-2320-387-10).

Maintenance Level

Unit

a. Removal

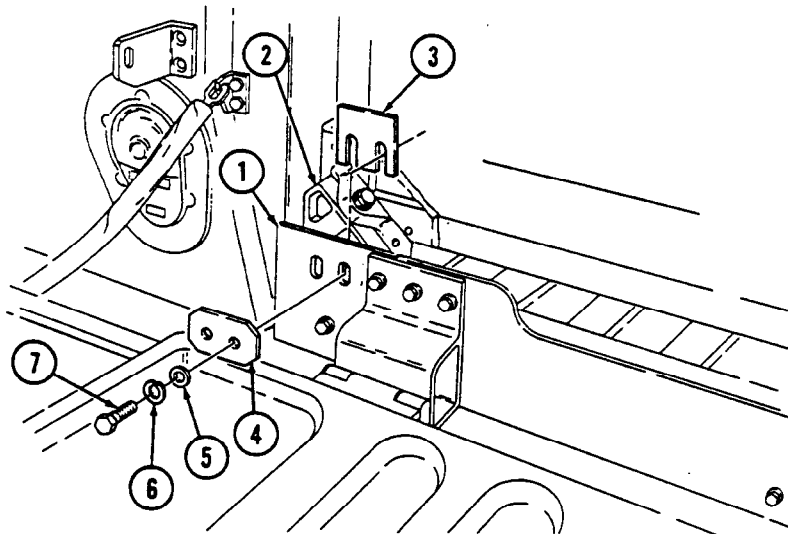
NOTE

- It may be necessary to detach cab rear panel straps and turnbuttons and roll cab rear panel upward to gain access to front support reinforcements.
- Note number and location of shims prior to removal for installation.

Remove two capscrews (7), lockwashers (6), washers (5), reinforcement (4), and shims (3), if present, from mounting bracket (2) and support assembly (1). Discard capscrews (7) and lockwashers (6).

b. Installation

Install shims (3), if removed, and reinforcement (4) on support assembly (1) and mounting bracket (2) with two washers (5), lockwashers (6), and capscrews (7). Tighten capscrews (7) to 90 lb-ft (122 N·m).



FOLLOW-ON TASK: Raise and secure tailgate (TM 9-2320-387-10).

11-77. SHELTER CARRIER TAILGATE CHAIN MAINTENANCE

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four locknuts (Appendix G, Item 114)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Tailgate lowered (TM 9-2320-387-10).

Maintenance Level

Unit

NOTE

Replacement procedures for right and left tailgate chain assemblies are basically the same. This procedure covers the left tailgate chain assembly.

a. Removal

1. Remove two locknuts (1), washers (2), reinforcing bracket (3), capscrews (5), washers (2), and tailgate chain mounting bracket (4) from body (10). Discard locknuts (1).
2. Remove two locknuts (9), washers (7), capscrews (6), washers (7), and tailgate chain mounting bracket (4) from tailgate (8). Discard locknuts (9).

NOTE

Perform disassembly and assembly of tailgate chain assembly only if damaged.

b. Disassembly

1. Pry apart two chain links (11) and remove two chain mounting brackets (4) from chain (15).
2. Pry apart S-hook (14) and remove S-hook (14) from chain (13).
3. Pry apart chain link (12) and remove chain (13) from chain (15).

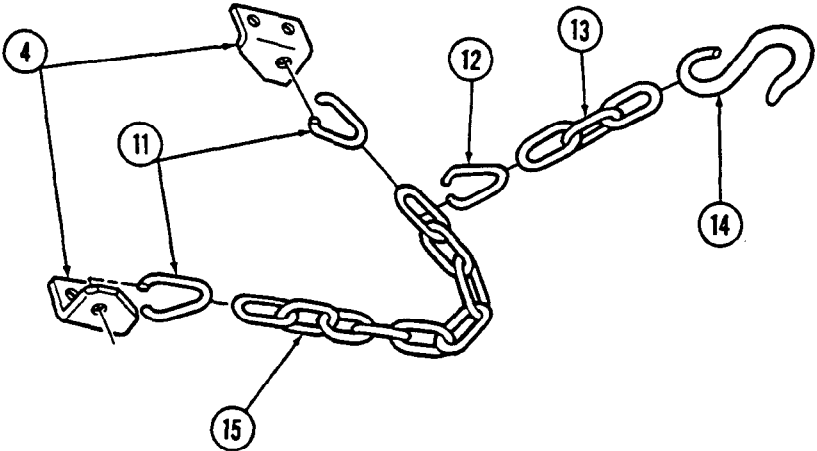
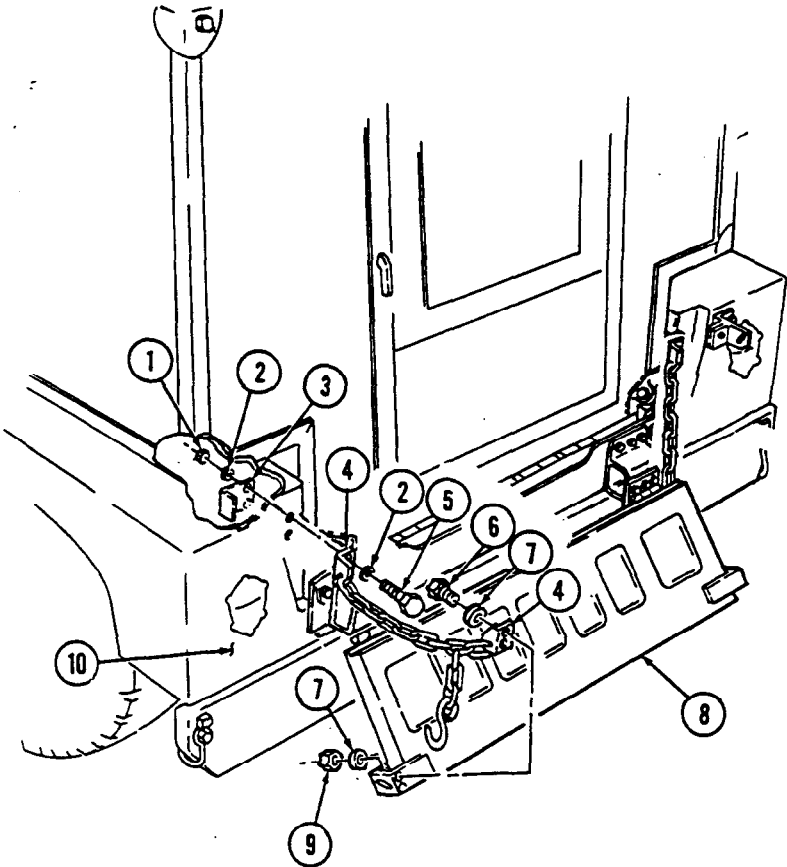
c. Assembly

1. Install chain (13) on chain (15) with chain link (12). Bend chain link (12) closed.
2. Install S-hook (14) on chain (13) and bend S-hook (14) closed.
3. Install two chain mounting brackets (4) on chain (15) with two chain links (11). Bend chain links (11) closed.

d. Installation

1. Install tailgate chain mounting bracket (4) and reinforcing bracket (3) on body (10) with two washers (2), capscrews (5), washers (2), and locknuts (1). Tighten locknuts (1) to 15 lb-ft (20 N·m).
2. Install tailgate chain mounting bracket (4) on tailgate (8) with two washers (7), capscrews (6), washers (7), and locknuts (9). Tighten locknuts (9) to 15 lb-ft (20 N·m).

11-77. SHELTER CARRIER TAILGATE CHAIN MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Raise and secure tailgate (TM 9-2320-387-10).

11-78. SHELTER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Eight capscrews (Appendix G, Item 18)
 Eight lockwashers (Appendix G, Item 225)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Tailgate lowered (TM 9-2320-387-10).

General Safety Instructions

Direct all personnel to stand clear during hoisting operations.

Maintenance Level

Unit

a. Removal

WARNING

Direct all personnel to stand clear during hoisting operations. A heavy, swinging load can cause injury to personnel and damage to equipment.

1. Position chain hoist (2) over top of shelter (3).
2. Connect lifting chains (1) to chain hoist (2) and four corners of shelter (3).

NOTE

- It may be necessary to detach cab rear panel straps and turnbuttons and roll cab rear panel upward to gain access to front mounting brackets.
 - Note number and location of shims prior to removal for installation.
3. Remove eight capscrews (12), lockwashers (11), washers (10), and four reinforcements (9) from mounting brackets (6) and support assembly (4), and remove shims (7), if present. Discard capscrews (12) and lockwashers (11).
 4. Using chain hoist (2), remove shelter (3) from support assembly (4).
 5. Remove mounting brackets (6) (para. 11-76).

b. Installation

WARNING

Direct all personnel to stand clear during hoisting operations. A heavy, swinging load can cause injury to personnel and damage to equipment.

1. Install mounting brackets (para. 11-73).
2. Position shelter (3) over support assembly (4) and gradually lower shelter (3) into position on support assembly (4) with front mounting points (5) aligned.

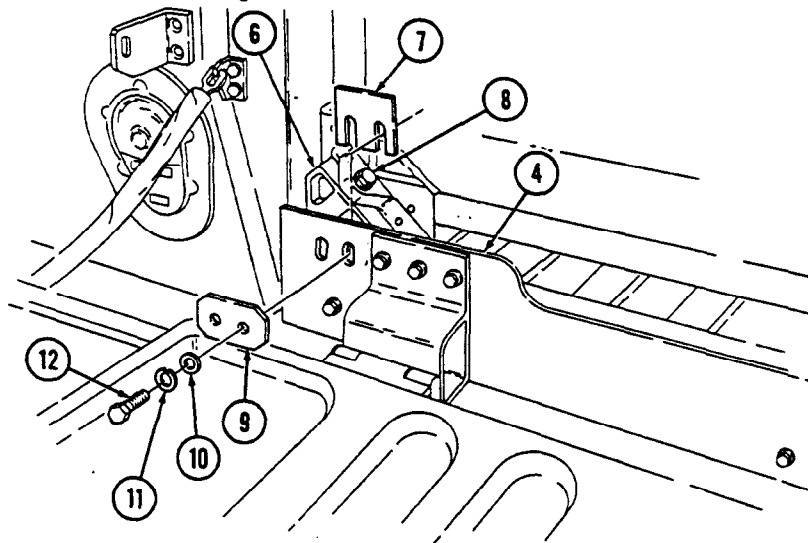
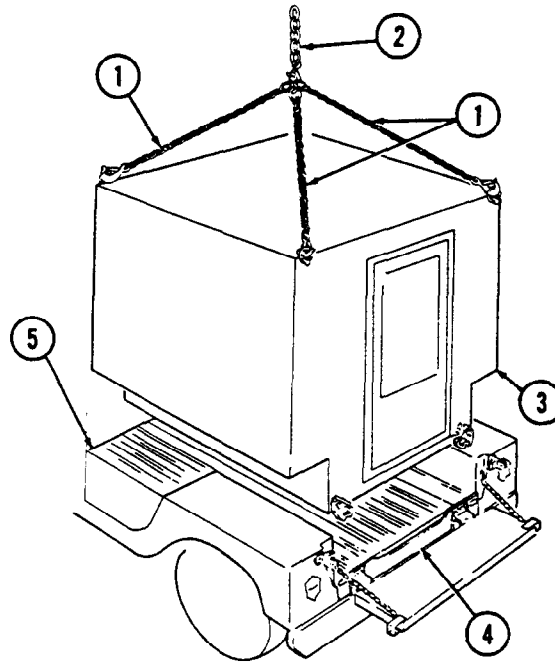
NOTE

Shelter should be tightly fitted on front of support assembly and centered from side to side. Shims should only be added at rear shelter mounting brackets.

3. Install shelter (3) on front of support assembly (4) and two mounting brackets (6) with reinforcements (9), four washers (10), lockwashers (11), and capscrews (12). Tighten capscrews (12) to 90 lb-ft (122 N·m) and capscrews (8) to 60 lb-ft (81 N·m).

11-78. SHELTER REPLACEMENT (Cont'd)

4. Install two reinforcements (9), four washers (10), lockwashers (11), and capscrews (12) on rear of support assembly (4) and two mounting brackets (6). Do not tighten capscrews (12).
5. Add shims (7) at rear of two shelter mounting brackets (6), and tighten four capscrews (12) to 90 lb-ft (122 N·m) and capscrews (8) to 60 lb-ft (81 N·m).
6. Disconnect lifting chains (1) and chain hoist (2) from shelter (3).



FOLLOW-ON TASK: Raise and secure tailgate (TM 9-2320-387-10).

11-79. SHELTER SUPPORT ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Locknut (Appendix G, Item 109)
 Sixteen locknuts (Appendix G, Item 134)
 Four locknuts (Appendix G, Item 184)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Shelter carrier tailgate brackets removed (para. 11-74).
- Fuel filler housing removed (para. 10-2).
- Rear soft top curtain rolled up (TM 9-2320-387-10).
- Shelter removed (para. 11-78).

Maintenance Level

Unit

a. Removal

1. Remove two locknuts (24), washers (2), capscrews (4), washers (5), and spacers (6) from support assembly (27), cargo floor (22), and B-beam (26). Discard locknuts (24).
2. Remove six locknuts (24), washers (2), reinforcement plates (23) and (25), six capscrews (3), washers (2), and spacers (1) from support assembly (27), cargo floor (22), and B-beam (26). Discard locknuts (24).
3. Remove two locknuts (21), washers (7), capscrews (9), and washers (10) from support assembly (27) and cargo floor (22). Discard locknuts (21).
4. Remove locknut (34), washer (33), capscrew (29), and washer (30) from clamp (32) on fuel filler spout (28) and body (31). Pull fuel filler spout (28) away for access to locknut (21). Discard locknut (34).
5. Remove two locknuts (21), washers (7), capscrews (8), and washers (7) from support assembly (27) and cargo floor (22). Discard locknuts (21).
6. Remove four locknuts (19), washers (14), capscrews (13), and washers (14) from support assembly (27) and cargo floor (22). Discard locknuts (19).
7. Remove three locknuts (20), washers (15), capscrews (16), and washers (15) from support assembly (27), cargo floor (22), and D-beam (17). Discard locknuts (20).
8. Remove locknut (18), washer (12), capscrew (11), washer (12), and support assembly (27) from cargo floor (22) and D-beam (17). Discard locknut (18).

b. Installation

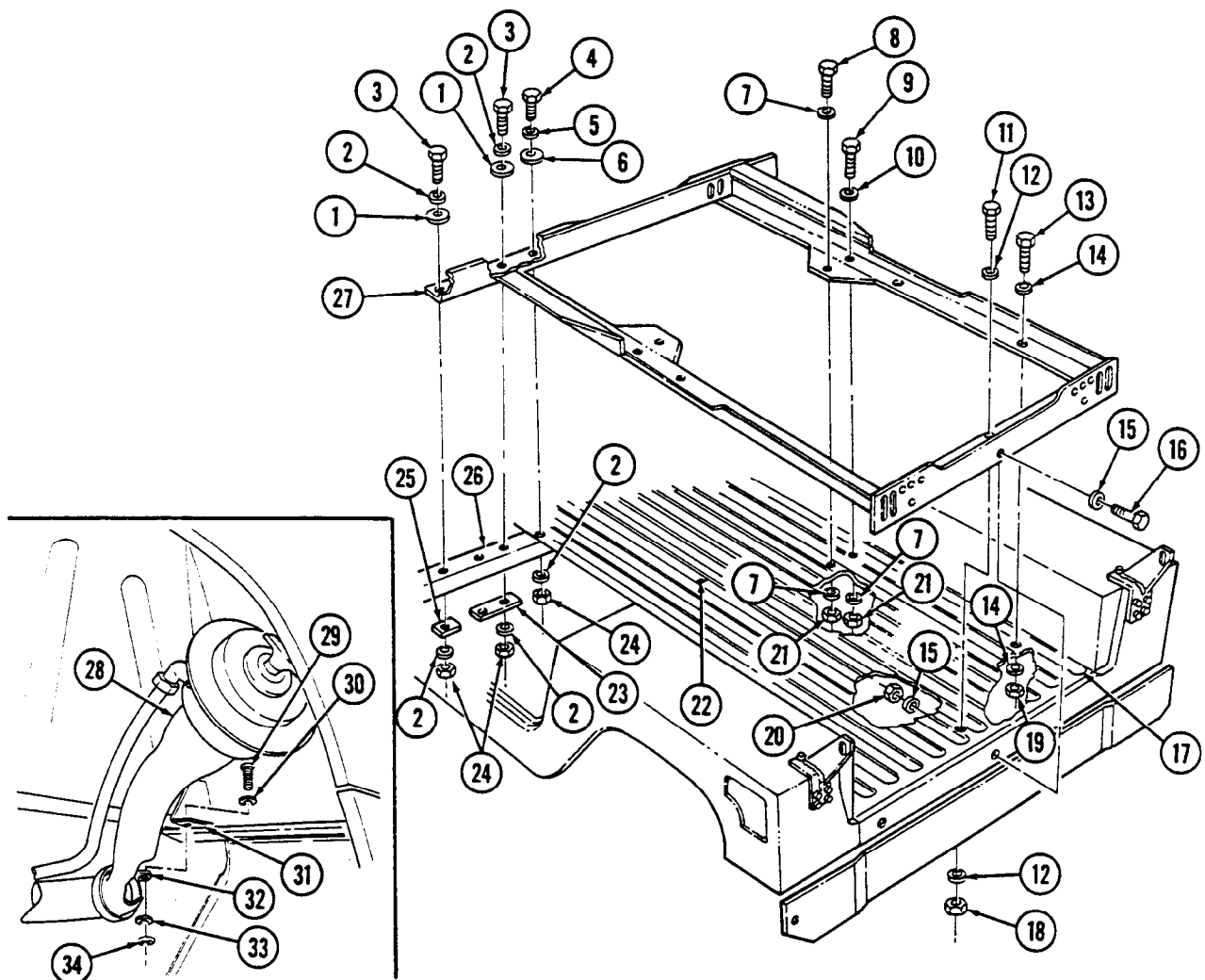
NOTE

Do not tighten hardware until all hardware is installed.

1. Install support assembly (27) on cargo floor (22) and D-beam (17) with washer (12), capscrew (11), washer (12), and locknut (18).
2. Install three washers (15), capscrews (16), washers (15), and locknuts (20) on support assembly (27), cargo floor (22), and D-beam (17).
3. Install four washers (14), capscrews (13), washers (14), and locknuts (19) on support assembly (27) and cargo floor (22).

11-79. SHELTER SUPPORT ASSEMBLY REPLACEMENT (Cont'd)

4. Install two washers (7), capscrews (8), washers (7), and locknuts (21) on support assembly (27) and cargo floor (22).
5. Install six spacers (1), washers (2), capscrews (3), reinforcement plates (23) and (25), six washers (2), and locknuts (24) on support assembly (27), cargo floor (22), and B-beam (26).
6. Install two spacers (6), washers (5), capscrews (4), washers (2), and locknuts (24) on support assembly (27), cargo floor (22), and B-beam (26).
7. Install two washers (10), capscrews (9), washers (7), and locknuts (21) on support assembly (27) and cargo floor (22).
8. Tighten four locknuts (19) to 26 lb-ft (35 N·m).
9. Tighten locknuts (18), (20), (21), and (24) to 65 lb-ft (88 N·m).
10. Install clamp (32) on fuel filler spout (28) and body (31) with washer (30), capscrew (29), washer (33), and locknut (34).



- FOLLOW-ON TASKS:**
- Install shelter (para. 11-78).
 - Roll down rear soft top curtain (TM 9-2320-387-10).
 - Install fuel filler housing (para. 10-2).
 - Install shelter carrier tailgate brackets (para. 11-74).

Section III. AIR CONDITIONING MAINTENANCE

11-80. AIR CONDITIONING MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
11-81.	A/C Front Air Distribution Duct Replacement	11-146
11-82.	A/C Front Air Distribution Duct Registers Replacement	11-148
11-83.	A/C Front Evaporator Drain Hose Replacement	11-149
11-84.	A/C Toggle Switch and Harness Replacement	11-150
11-85.	Condenser Fan Exhaust and Supply Vent Maintenance	11-152
11-86.	Condenser Fan Access Panel Maintenance	11-154
11-87.	A/C Rear Distribution Duct and Register Maintenance	11-156
11-88.	A/C Rear Evaporator Drain Hose Replacement	11-158

11-81. A/C FRONT AIR DISTRIBUTION DUCT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three locknuts (Appendix G, Item 169)
RTV silicone sealant (Appendix C, Item 70)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Radio rack removed (para. 12-17).

Maintenance Level

Unit

a. Removal

1. Remove nut (7) and screw (9) from clamp (10).
2. Remove two right registers (13) from air distribution duct (14) by carefully prying out.
3. Remove two screws (2) from air distribution duct (14) and mounting bracket (1).
4. Remove three locknuts (12), washers (11), and capscrews (4) from air distribution duct (14) and body (3). Discard locknuts (12).
5. Disconnect wiring harness connector (6) from air distribution connector (5).
6. Remove air distribution duct (14) from evaporator (8).
7. Remove clamp (10) from evaporator (8).
8. Remove A/C toggle switch and harness (only if replacement duct will be installed) (para. 11-84).
9. Remove A/C front air distribution duct registers (only if replacement duct will be installed) (para. 11-82).

b. Installation

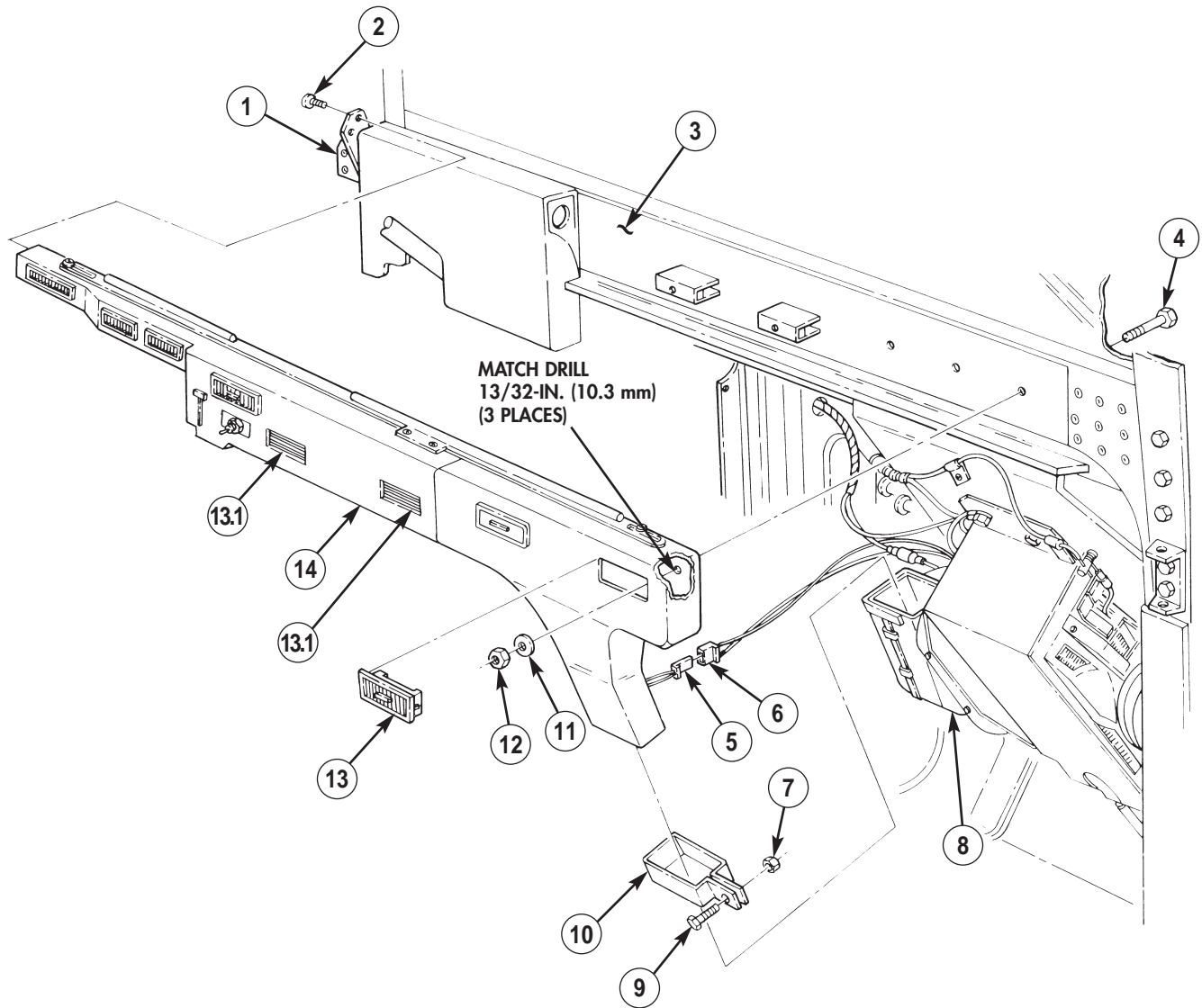
1. Install A/C toggle switch and harness, if removed (para. 11-84).
2. Install front A/C air distribution duct registers, if removed (para. 11-82).
3. Install clamp (10) on evaporator (8).
4. Install air distribution duct (14) on evaporator (8).
5. Connect wiring harness connector (6) to air distribution connector (5).
6. Install air distribution duct (14) on mounting bracket (1) with two screws (2).

NOTE

If new air distribution duct is being installed, match-drill three 13/32-in. (10.3 mm) holes from body to air distribution duct.

7. Apply RTV sealant to heads of three capscrews (4), and install air distribution duct (14) on body (3) with capscrews (4), washers (11), and locknuts (12).
8. Install two right registers (13) on air distribution duct (14) by carefully pushing in place.
9. Install screw (9) and nut (7) on clamp (10).
10. Fill around radio bracket holes (13.1) with RTV sealant.

11-81. A/C FRONT AIR DISTRIBUTION DUCT REPLACEMENT (Cont'd)



FOLLOW-ON TASKS:

- Install radio rack (para. 12-17).
- Connect battery ground cables (para. 4-68).

11-82. A/C FRONT AIR DISTRIBUTION DUCT REGISTERS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

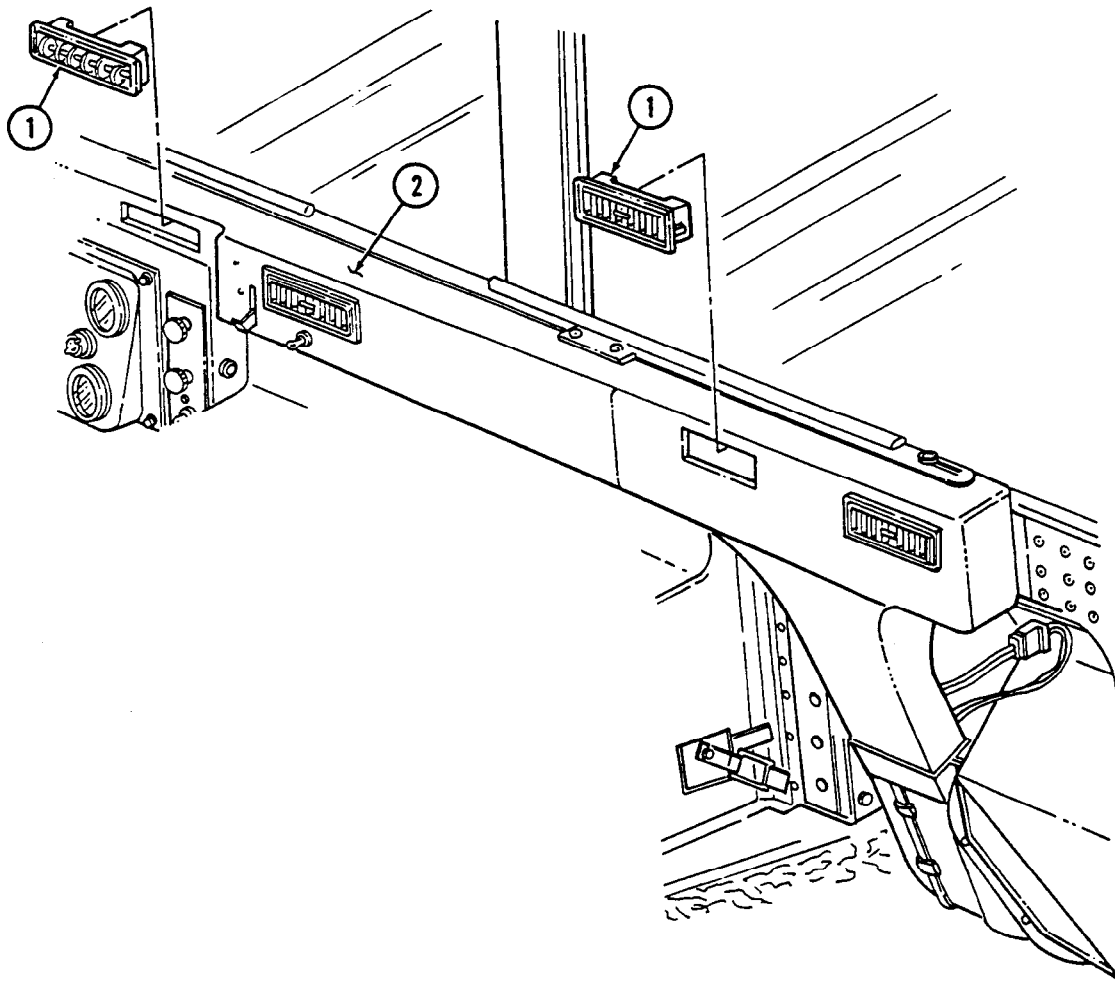
Unit

a. Removal

Remove two registers (1) from air distribution duct (2) by carefully prying out.

b. Installation

Install two registers (1) on air distribution duct (2) by carefully pushing in place.



11-83. A/C FRONT EVAPORATOR DRAIN HOSE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

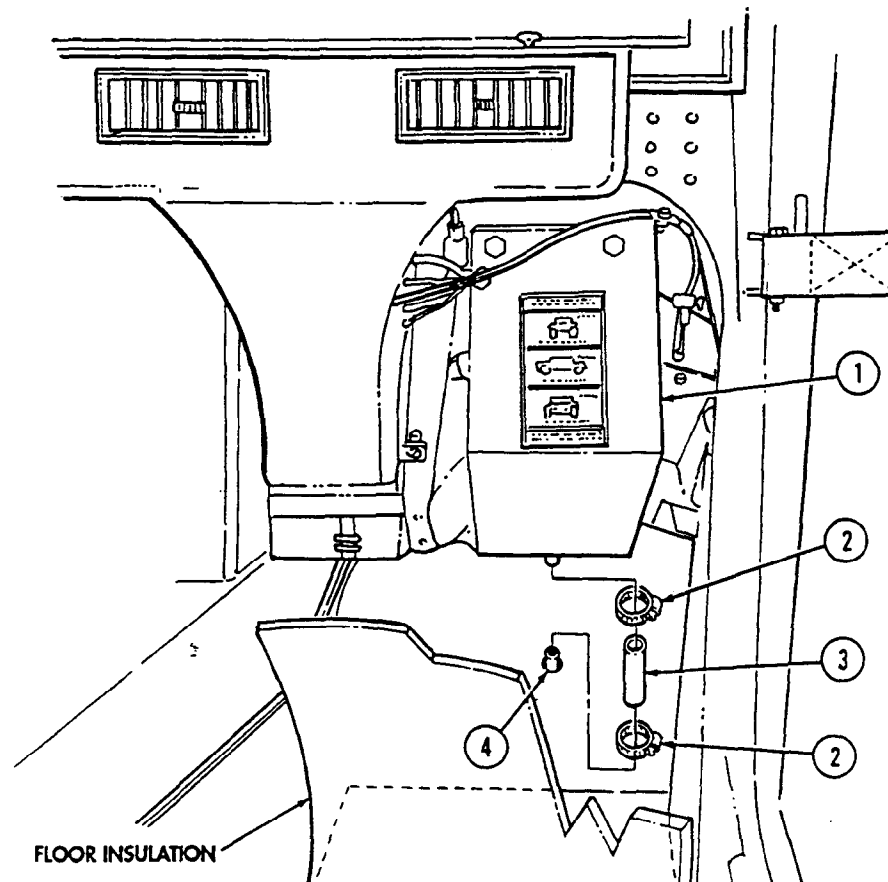
Unit

a. Removal

Pull back floor insulation, loosen two clamps (2), and remove drain hose (3) from drain tube (4) and evaporator housing (1).

b. Installation

Install drain hose (3) on drain tube (4) and evaporator housing (1) and tighten two clamps (2).



11-84. A/C TOGGLE SWITCH AND HARNESS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

NOTE

Prior to removal, tag leads for installation.

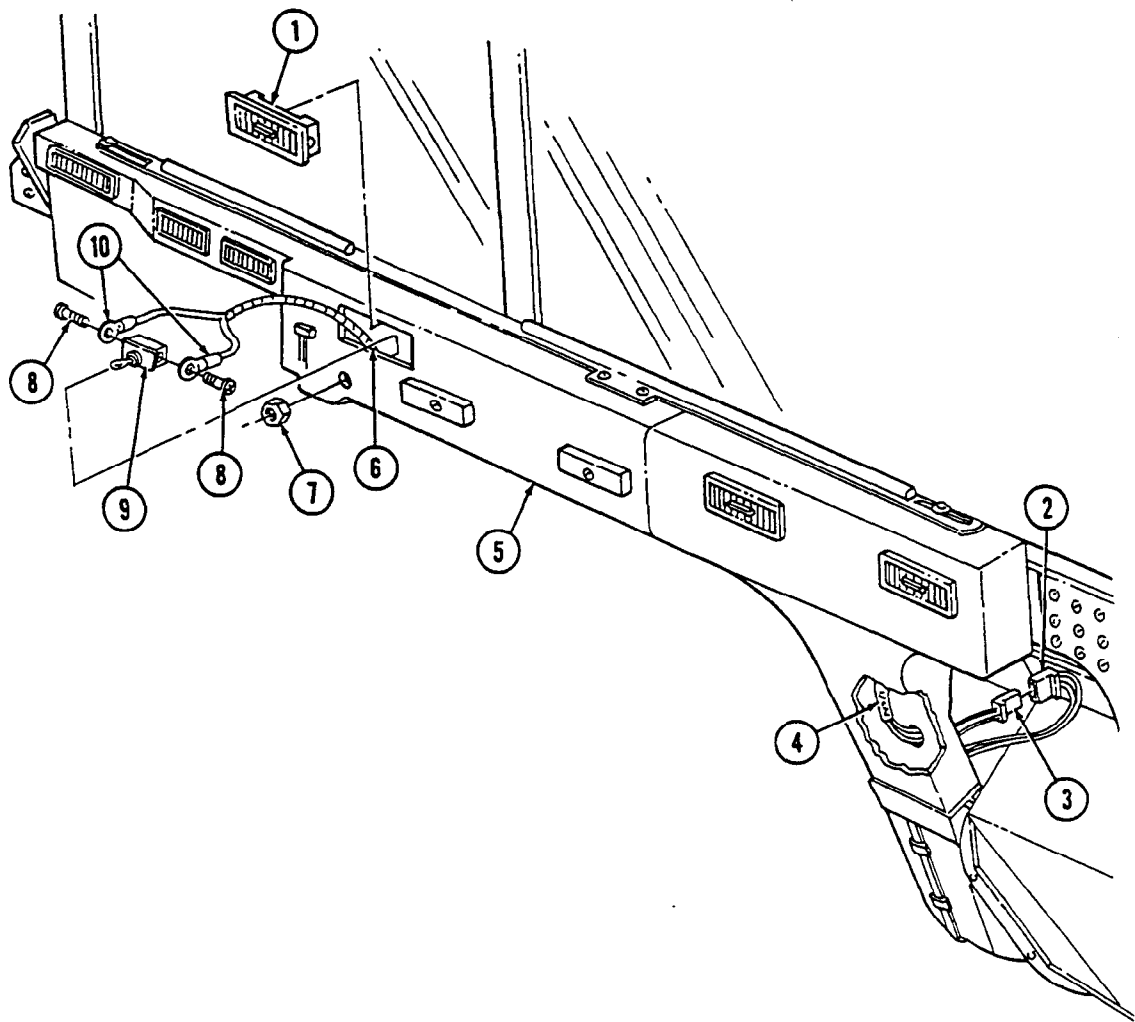
a. Removal

1. Remove register (1) from air distribution duct (5) by carefully prying out.
2. Remove nut (7) from toggle switch (9).
3. Remove toggle switch (9) from air distribution duct (5) and route toggle switch (9) through register opening (6).
4. Remove two screws (8) and leads (10) from toggle switch (9).
5. Disconnect harness connector (2) from connector (3) and remove harness (4) from air distribution duct (5).

b. Installation

1. Position harness (4) in air distribution duct (5).
2. Install two leads (10) on toggle switch (9) with two screws (8).
3. Install toggle switch (9) on air distribution duct (5) with nut (7).
4. Install register (1) on air distribution duct (5) by carefully pushing in place.
5. Connect harness connector (2) to connector (3).

11-84. A/C TOGGLE SWITCH AND HARNESS REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

11-85. CONDENSER FAN EXHAUST AND SUPPLY VENT MAINTENANCE

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Exhaust Vents Removal b. Supply Vents Removal c. Inspection | <ul style="list-style-type: none"> d. Exhaust Vents Installation e. Supply Vents Installation |
|--|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)
 Twenty-seven lockwashers
 (Appendix G, Item 200)

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

a. Exhaust Vents Removal

Remove fifteen screws (3), lockwashers (3.1), washers (3.2), and three A/C exhaust vents (2) from cargo shell (1). Discard lockwashers (3.1).

b. Supply Vents Removal

Remove twelve screws (6), lockwashers (6.1), washers (6.2), two A/C supply vents (5), and screen (4) from cargo shell (1). Discard lockwashers (6.1).

c. Inspection

Refer to para. 10-56 for plusnut (7) inspection and replacement.

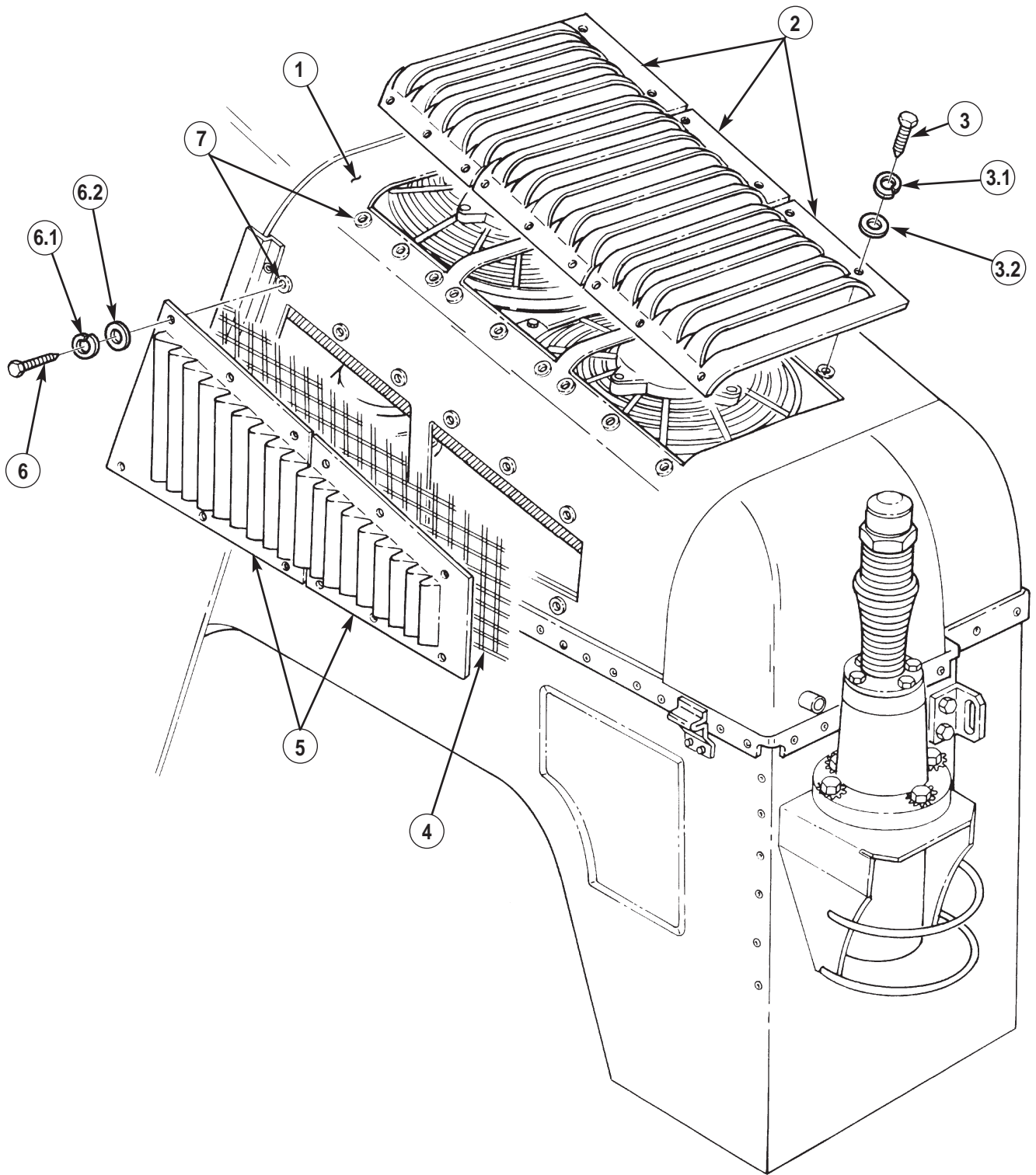
d. Exhaust Vents Installation

Apply sealing compound to threads of fifteen screws (3), and install three A/C exhaust vents (2) on cargo shell (1) with fifteen washers (3.2), lockwashers (3.1), and screws (3). Tighten screws (3) to 36 lb-in. (4 N·m).

e. Supply Vents Installation

Apply sealing compound to threads of twelve screws (6), and install screen (4) and two A/C supply vents (5) on cargo shell (1) with twelve washers (6.2), lockwashers (6.1), and screws (6). Tighten screws (6) to 36 lb-in. (4 N·m).

11-85. CONDENSER FAN EXHAUST AND SUPPLY VENT MAINTENANCE (Cont'd)



11-86. CONDENSER FAN ACCESS PANEL MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Equipment Condition

- Condenser fan exhaust vents removed (para. 11-85).
- Cargo shell door gas spring mounting bracket removed (para. 11-29).

Maintenance Level

Unit

a. Removal

1. Remove three capscrews (9), washers (8), and bracket (7) from access panel (2).
2. Remove capscrew (9.1) and washer (9.2) from access panel (2).
3. Remove three self-tapping screws (4), washers (3), and access panel (2) from condenser tray (11) and cargo shell (1).
4. Remove two screws (6) and footman loop (5) from access panel (2).

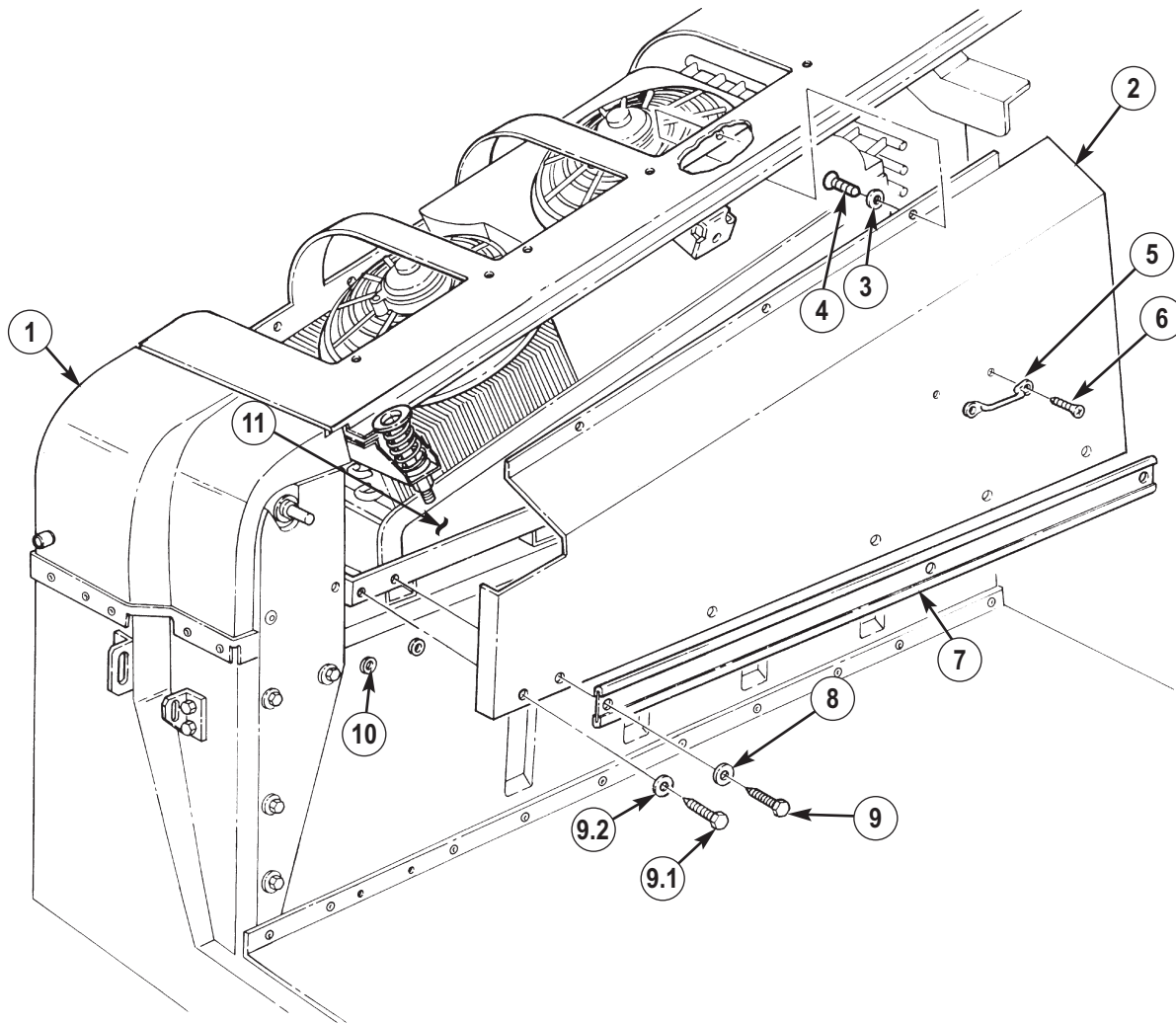
b. Inspection

Refer to para. 10-56 for plusnut (10) inspection and replacement.

c. Installation

1. Install footman loop (5) on access panel (2) with two screws (6).
2. Install access panel (2) on condenser tray (11) and cargo shell (1) with three washers (3) and self-tapping screws (4).
3. Apply sealing compound to threads of capscrews (9), and install bracket (7) on access panel (2) with three washers (8) and capscrews (9). Tighten capscrews (9) to 10 lb-ft (14 N·m).
4. Apply sealing compound to threads of capscrew (9.1), and install washer (9.2) and capscrew (9.1) on access panel (2). Tighten capscrew (9.1) to 10 lb-ft (14 N·m).

11-86. CONDENSER FAN ACCESS PANEL MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install cargo door gas spring mounting bracket (para. 11-29).
 - Install condenser fan exhaust vents (para. 11-85).

11-87. A/C REAR AIR DISTRIBUTION DUCT AND REGISTER MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

a. Removal

1. Remove two screws (7) and bracket (6) from air distribution duct (1) and evaporator (5).
2. Remove three screws (3) and A/C distribution duct (1) from rear A/C blower motor (4).
3. Remove register (2) from air distribution duct (1) by carefully prying out.

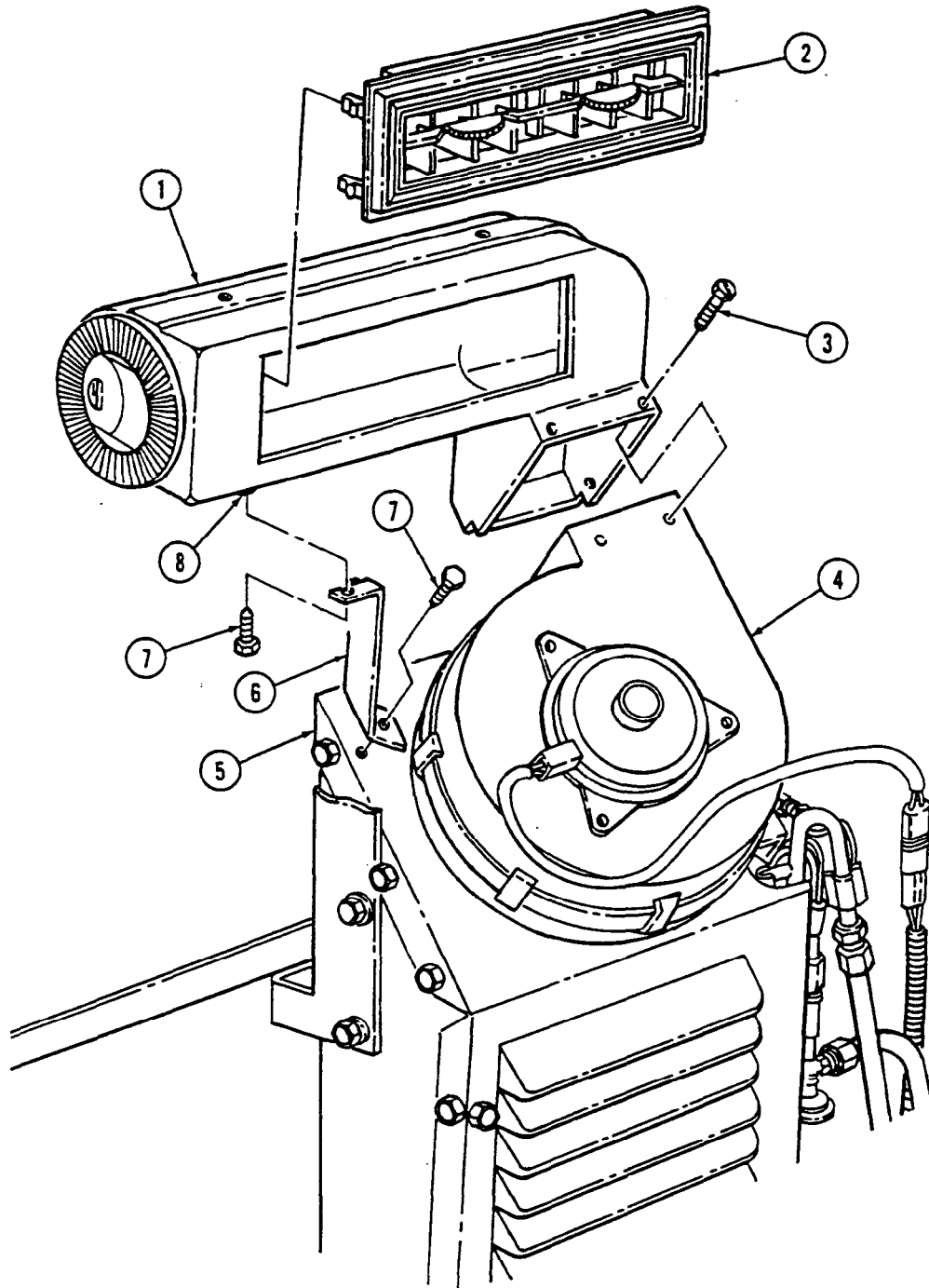
b. Inspection

Refer to para. 10-56 for plusnut (8) inspection and replacement.

c. Installation

1. Install A/C distribution duct (1) on rear A/C blower motor (4) with three screws (3).
2. Install register (2) on air distribution duct (1) by carefully pushing in place.
3. Install bracket (6) on air distribution duct (1) and evaporator (5) with two screws (7).

11-87. A/C REAR AIR DISTRIBUTION DUCT AND REGISTER MAINTENANCE (Cont'd)



11-88. A/C REAR EVAPORATOR DRAIN HOSE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Equipment Condition

Left passenger seat removed (para. 10-45).

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Manual References

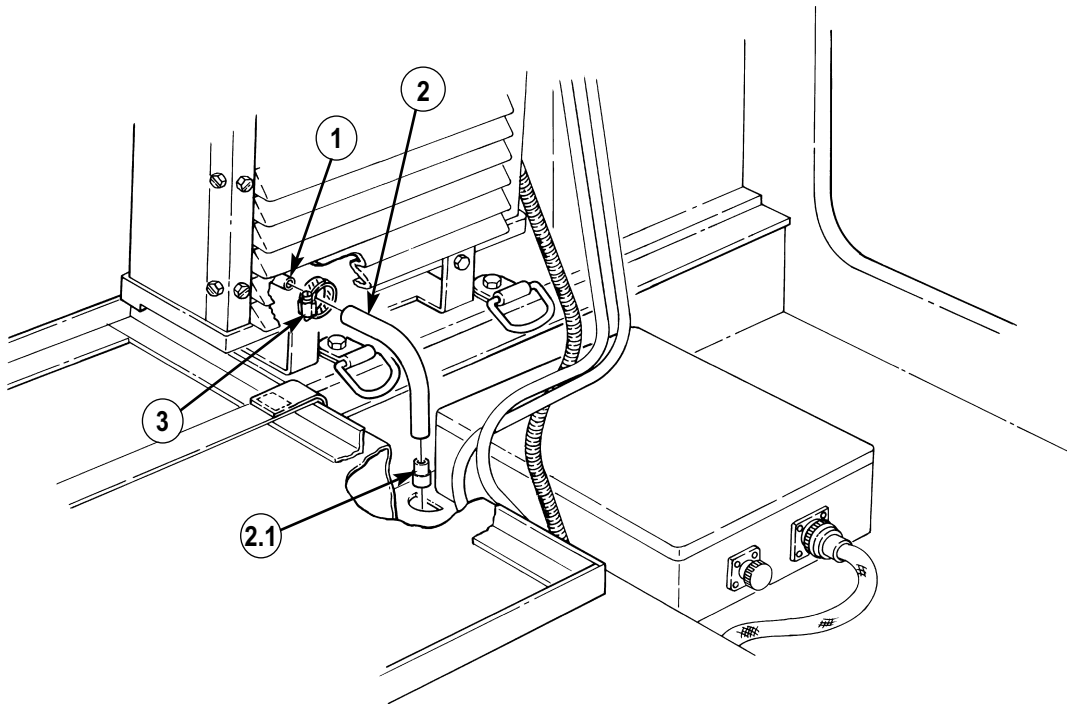
TM 9-2320-387-24P

a. Removal

1. Remove clamp (3) and hose (2) from tube (1).
2. Remove drain plug restrictor (2.1) from end of hose (2).

b. Installation

1. Install drain plug restrictor (2.1) on end of hose (2).
2. Install hose (2) on tube (1) with clamp (3).



FOLLOW-ON TASK: Install left passenger seat (para. 10-45).

Section IV. REAR CARGO DOOR ACCESS

11-89. REAR CARGO DOOR ACCESS TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
11-90.	Rear Cargo Door Access	11-160

11-90. REAR CARGO DOOR ACCESS

This task covers:

a. Lifting

b. Lowering

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

General Safety Instructions

Stand clear during hoisting operations. A heavy or swinging load can cause injury.

Maintenance Level

Unit

WARNING

Direct all personnel to stand clear during hoisting operations. A heavy or swinging load can cause injury to personnel and damage to equipment.

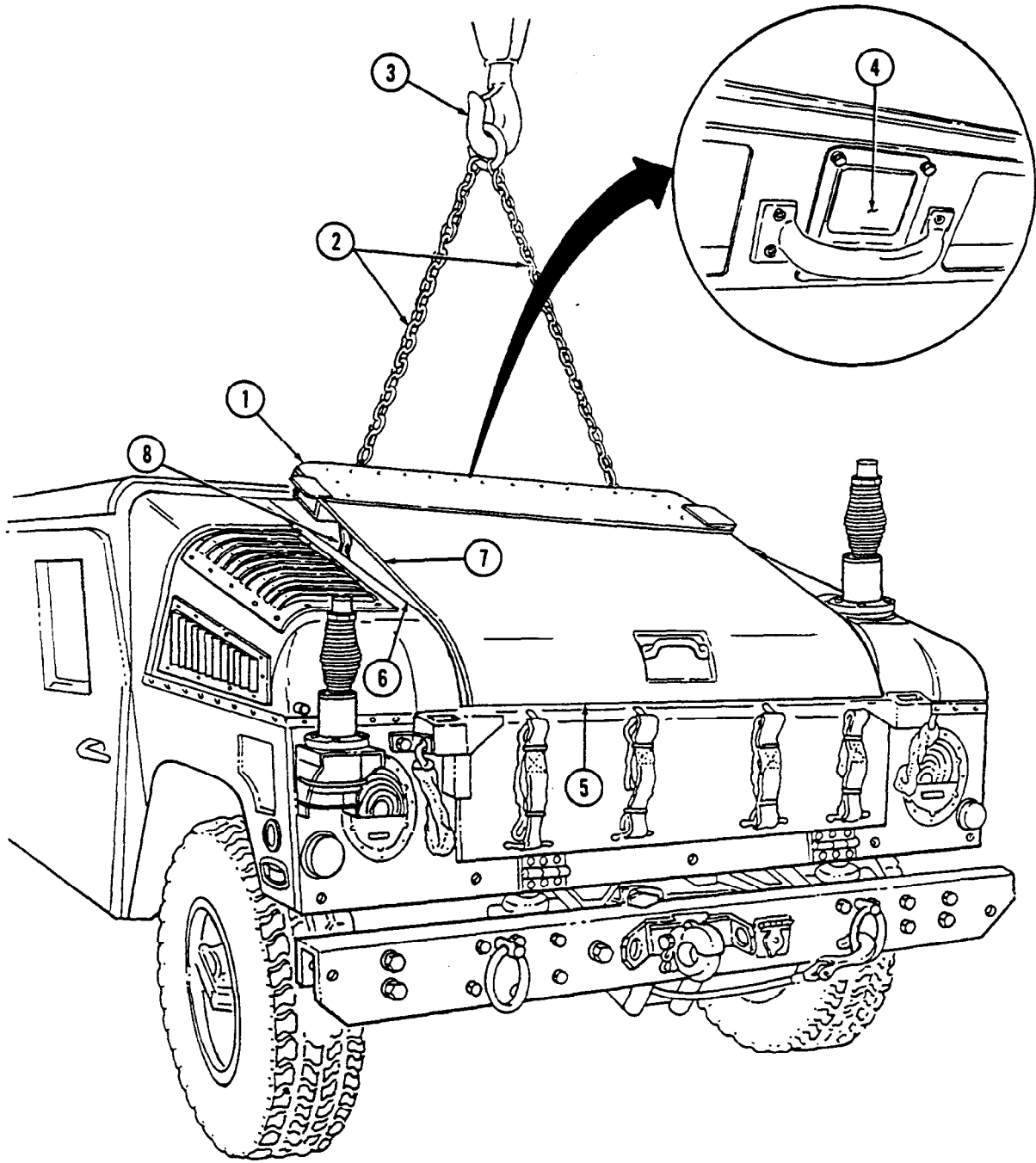
a. Lifting

1. Position lifting device over top of rear cargo door (1).
2. Pull door handle (4) and release.
3. Connect lifting chains (2) to lifting device (3).
4. Holding rear cargo door (1) open, connect lifting chains (2) at two corners of rear cargo door (1).
5. Using lifting device, raise rear cargo door (1) to full open position.
6. Remove lifting chains (2) and lifting device (3).

b. Lowering

Pull on strap (8) to lower door (1), then slam door (1) shut. Ensure door (1) is locked by observing alignment of door surface (7) with cargo shell surface side (6) and bottom edges (5).

11-90. REAR CARGO DOOR ACCESS (Cont'd)



CHAPTER 12

SPECIAL PURPOSE KITS (UNIT) MAINTENANCE

Section I. ENGINE/CREW COMPARTMENT HEATER MAINTENANCE

12-1. ENGINE/CREW COMPARTMENT HEATER MAINTENANCE TASK SUMMARY

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12-2. ENGINE/CREW COMPARTMENT HEATER HEAT SHIELD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic’s tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Two lockwashers (Appendix G, Item 210)
Two lockwashers (Appendix G, Item 238.1)
Three lockwashers (Appendix G, Item 239.1)

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Maintenance Level

Unit

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

WARNING

Do not touch hot exhaust system components with bare hands.
Severe injury may result.

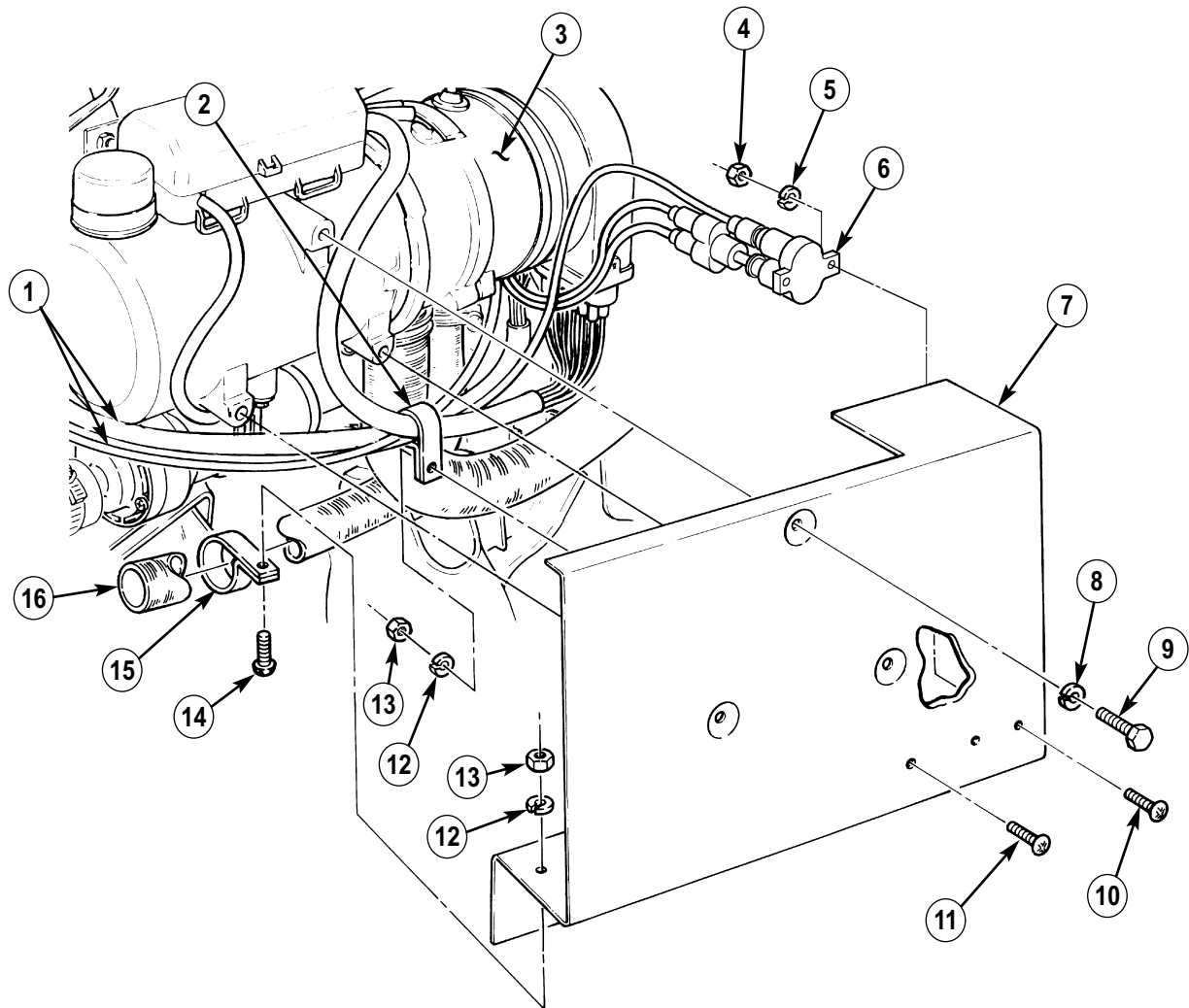
a. Removal

1. Remove nut (13), lockwasher (12), screw (14), and clamp (15) from intake pipe (16) and heat shield (7). Discard lockwasher (12).
2. Remove nut (13), lockwasher (12), screw (11), and clamp (2) from wiring harness (1) and heat shield (7). Discard lockwasher (12).
3. Remove three screws (9) and lockwashers (8) from heat shield (7) and heater (3). Discard lockwashers (8).
4. Remove two nuts (4), lockwashers (5), and screws (10) from heat shield (7) and circuit breaker (6). Discard lockwashers (5).
5. Remove heat shield (7) from heater (3).

b. Installation

1. Install circuit breaker (6) on heat shield (7) with two screws (10), lockwashers (5), and nuts (4).
2. Install heat shield (7) on heater (3) with three lockwashers (8) and screws (9).
3. Install clamp (2) on wiring harness (1) and heat shield (7) with screw (11), lockwasher (12), and nut (13).
4. Install clamp (15) on intake pipe (16) and heat shield (7) with screw (14), lockwasher (12), and nut (13).

12-2. ENGINE/CREW COMPARTMENT HEATER HEAT SHIELD REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-3. ENGINE/CREW COMPARTMENT HEATER EXHAUST MUFFLER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Materials/Parts

Lockwasher (Appendix G, Item 238)

Maintenance Level

Unit

Manual References

TM 9-2320-387-24P

WARNING

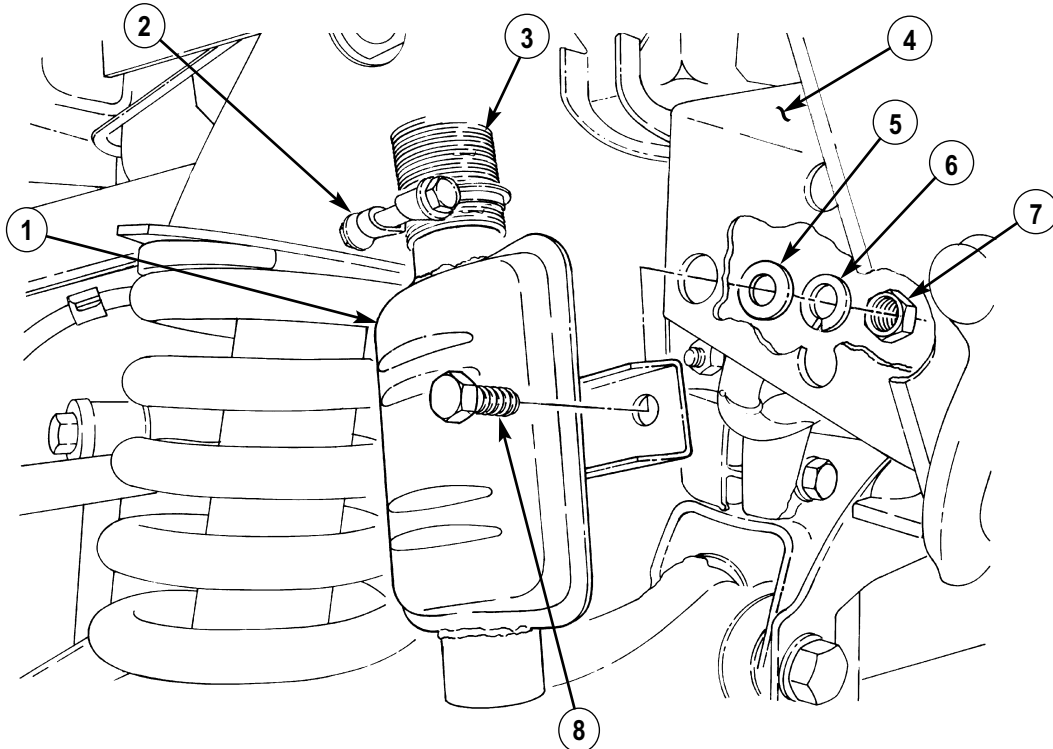
Do not touch hot exhaust system components with bare hands.
Severe injury may result.

a. Removal

1. Remove nut (7), lockwasher (6), washer (5), capscrew (8), and muffler (1) from bracket (4). Discard lockwasher (6).
2. Loosen clamp (2) and remove muffler (1) from exhaust pipe (3).

b. Installation

1. Install muffler (1) on exhaust pipe (3) and tighten clamp (2).
2. Install muffler (1) on bracket (4) with capscrew (8), washer (5), lockwasher (6), and nut (7).



12-4. ENGINE/CREW COMPARTMENT HEATER EXHAUST PIPE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Heat shield removed (para. 12-2).

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Maintenance Level

Unit

WARNING

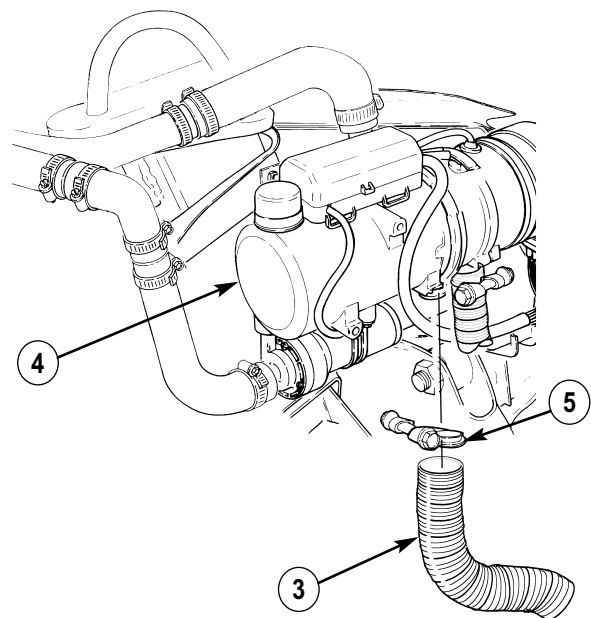
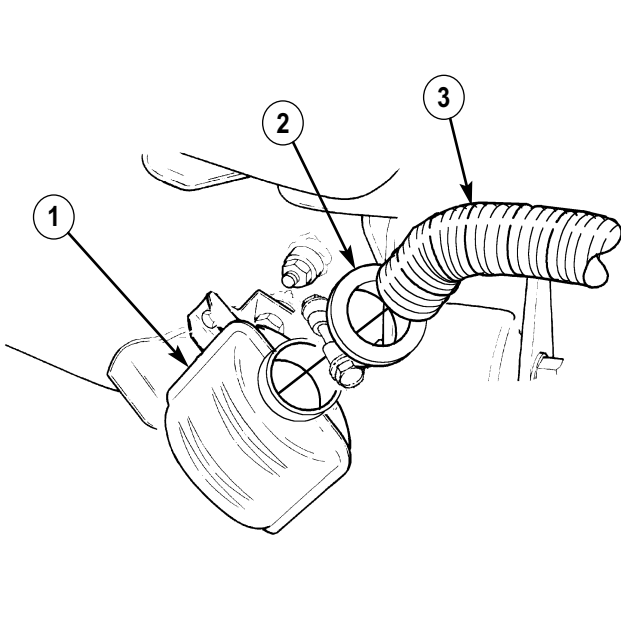
Do not touch hot exhaust system components with bare hands.
Severe injury may result.

a. Removal

1. Remove clamp (2) and exhaust pipe (3) from muffler (1).
2. Remove clamp (5) and exhaust pipe (3) from heater (4).

b. Installation

1. Install clamps (2) and (5) on exhaust pipe (3).
2. Install exhaust pipe (3) on heater (4) and tighten clamp (5).
3. Install exhaust pipe (3) on muffler (1) and tighten clamp (2).



FOLLOW-ON TASK: Install heat shield (para. 12-2).

12-4.1. ENGINE/CREW COMPARTMENT HEATER INLET PIPE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Heat shield removed (para. 12-2).

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Maintenance Level

Unit

WARNING

Do not touch hot exhaust system components with bare hands.
Severe injury may result.

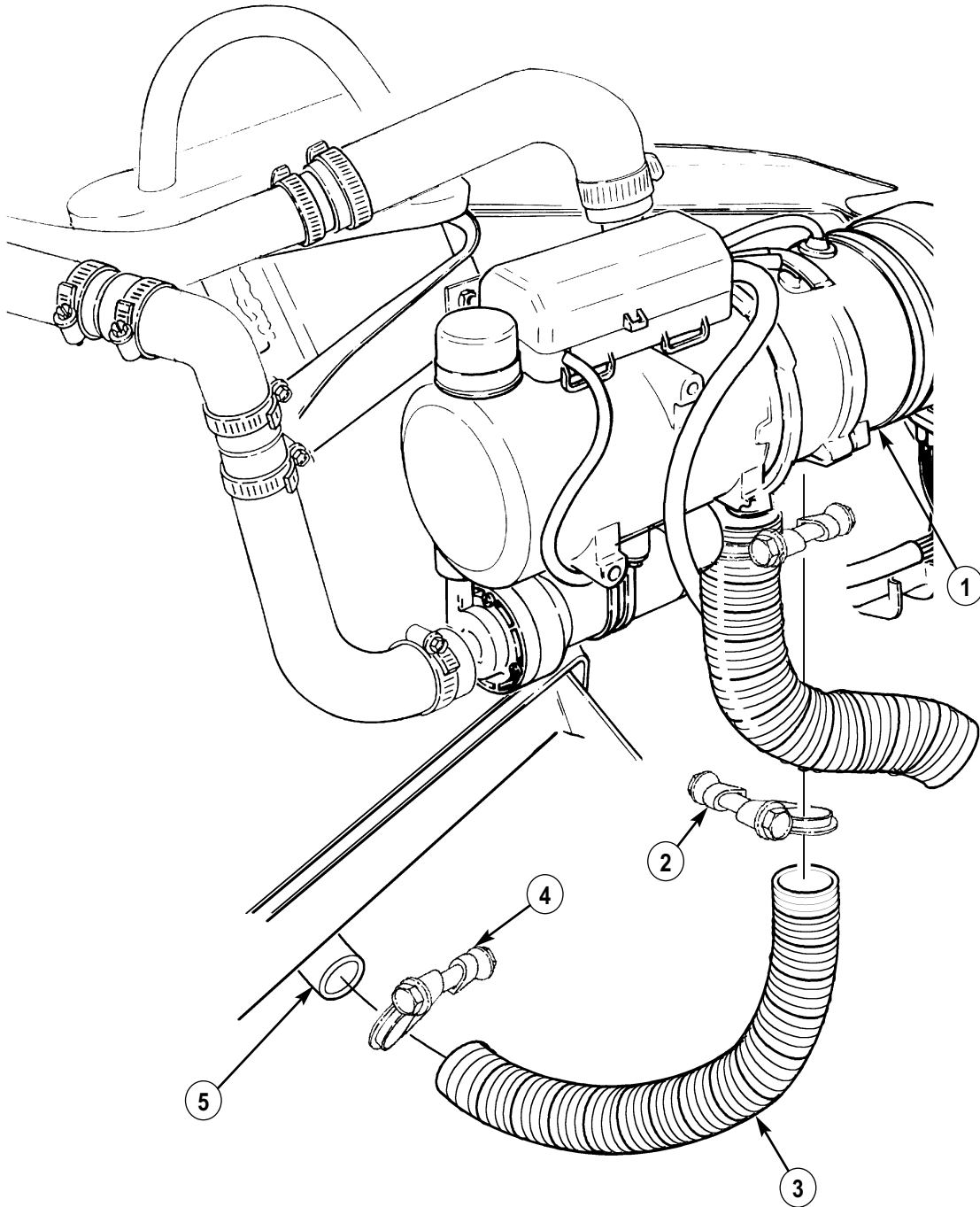
a. Removal

1. Remove clamp (4) and inlet pipe (3) from muffler (5).
2. Remove clamp (2) and inlet pipe (3) from heater (1).

b. Installation

1. Install clamps (2) and (4) on inlet pipe (3).
2. Install inlet pipe (3) on heater (1) and tighten clamp (2).
3. Install inlet pipe (3) on muffler (5) and tighten clamp (4).

12-4.1. ENGINE/CREW COMPARTMENT HEATER INLET PIPE REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install heat shield (para. 12-2).

12-5. ENGINE/CREW COMPARTMENT HEATER LOWER HOSE ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Cooling system drained (para. 3-61).

Manual References

TM 9-2320-387-24P

Maintenance Level

Unit

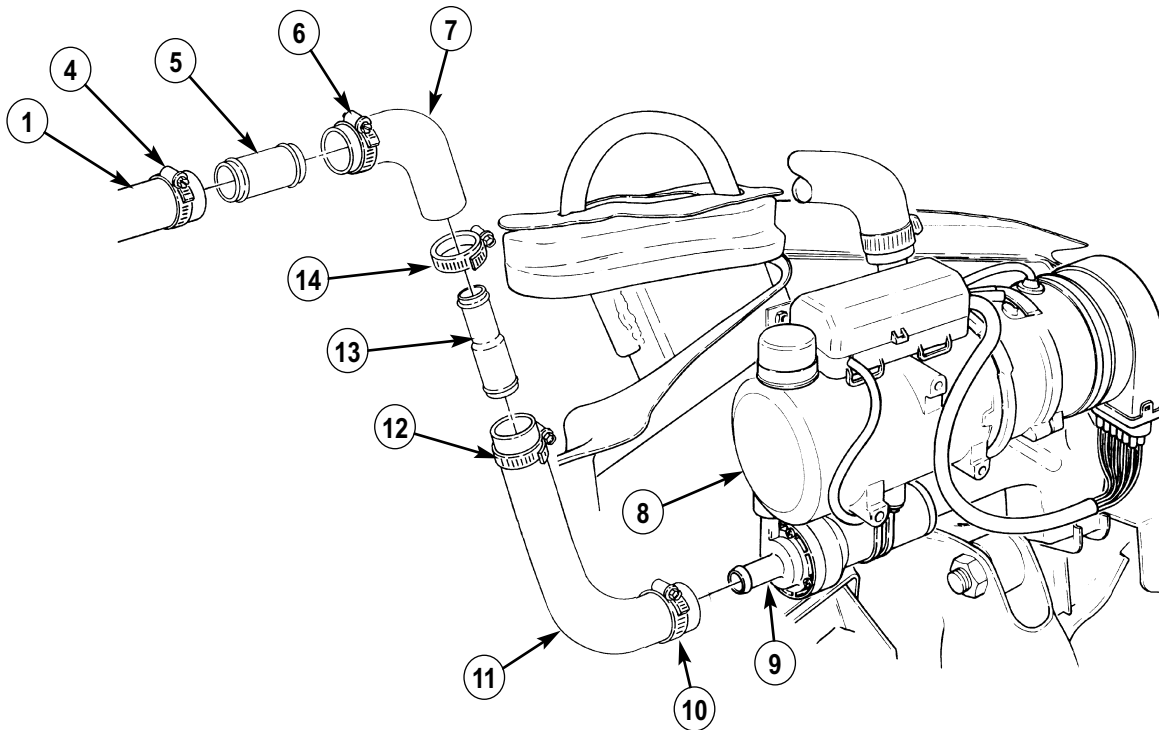
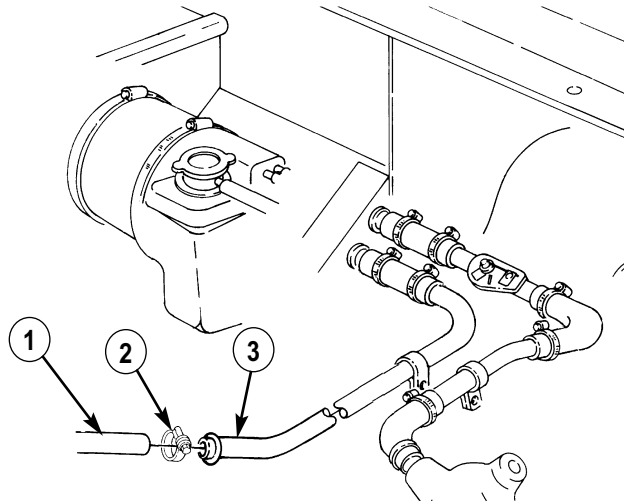
a. Removal

1. Loosen clamp (2) and disconnect heater hose (1) from heater tube (3).
2. Loosen clamp (10) and disconnect elbow (11) from inlet port (9) on heater (8).
3. Loosen clamps (12) and (14), and disconnect reducer (13) from elbow (11) and elbow (7).
4. Loosen clamps (4) and (6) and disconnect mender (5) from heater hose (1) and elbow (7).

b. Installation

1. Install clamps (4), (6), (14), (12), (10), and (2) on heater tube (3), heater hose (1), and elbows (7) and (11).
2. Connect heater hose (1) to heater tube (3) and tighten clamp (2).
3. Connect elbow (11) to inlet port (9) on heater (8) and loosely tighten clamp (10).
4. Connect mender (5) to heater hose (1) and elbow (7), and tighten clamps (4) and (6).
5. Connect reducer (13) to elbows (7) and (11) and tighten clamps (12), (14), and (10).

12-5. ENGINE/CREW COMPARTMENT HEATER LOWER HOSE ASSEMBLY REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Fill cooling system (para. 3-61).

12-6. ENGINE/CREW COMPARTMENT HEATER OUTLET HOSE ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Air horn removed (para. 3-14).
- Cooling system drained, as required (para. 3-61).

Maintenance Level

Unit

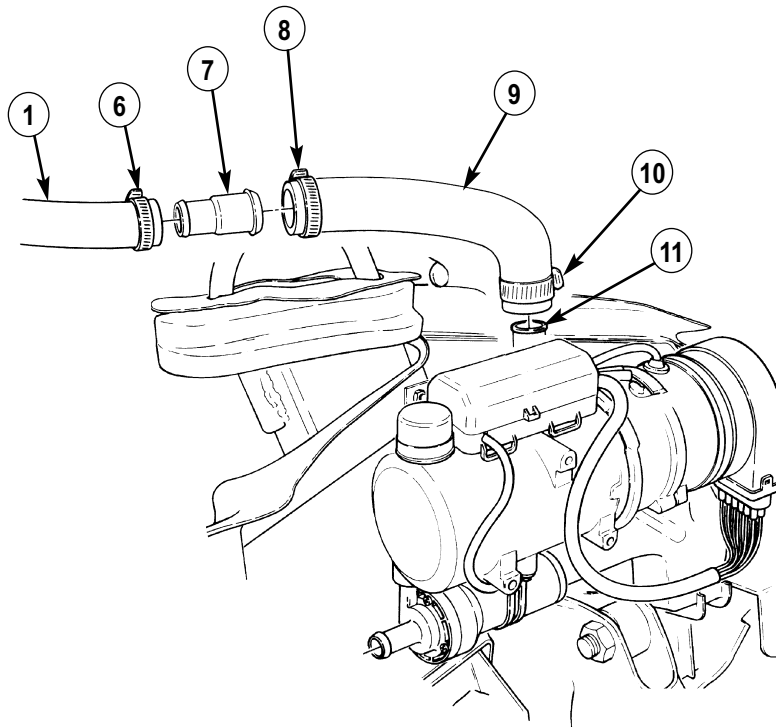
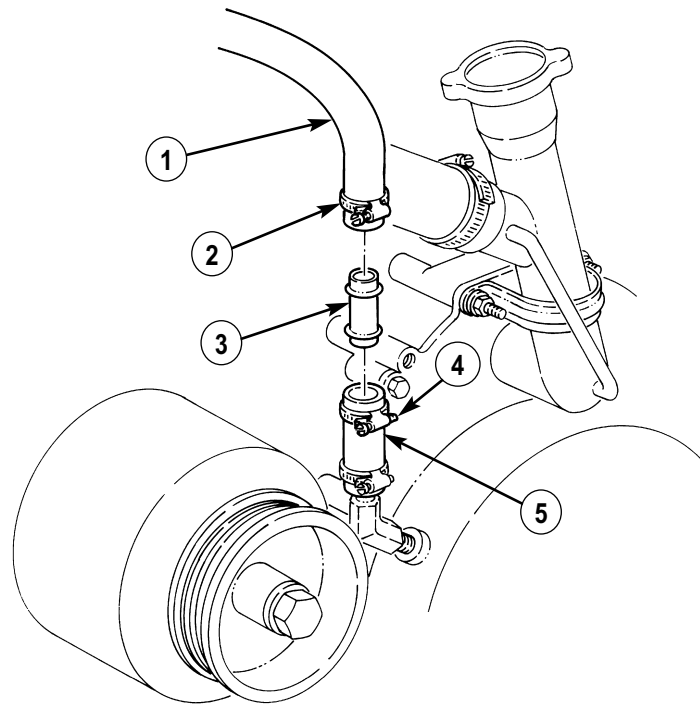
a. Removal

1. Loosen clamp (4) and remove mender (3) from water pump hose (5).
2. Loosen clamp (2) and remove mender (3) from heater hose (1).
3. Loosen clamp (10) and disconnect elbow (9) from heater outlet port (11).
4. Loosen clamps (6) and (8) and remove reducer (7) from heater hose (1) and elbow (9).

b. Installation

1. Install reducer (7) on heater hose (1) and elbow (9) and tighten clamps (6) and (8).
2. Connect elbow (9) on heater outlet port (11) and tighten clamp (10).
3. Install mender (3) on heater hose (1) and tighten clamp (2).
4. Install mender (3) with heater hose (1) on water pump hose (5) and tighten clamp (4).

12-6. ENGINE/CREW COMPARTMENT HEATER OUTLET HOSE ASSEMBLY REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install air horn (para. 3-14).
 - Fill cooling system (para. 3-61).
 - Connect battery ground cables (para. 4-68).

12-7. ENGINE/CREW COMPARTMENT HEATER CIRCULATING PUMP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

O-ring (Appendix G, Item 261.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Cooling system drained, as required (para. 3-61).
- Heater lower hose assembly disconnected (para. 12-5).

Maintenance Level

Unit

a. Removal

NOTE

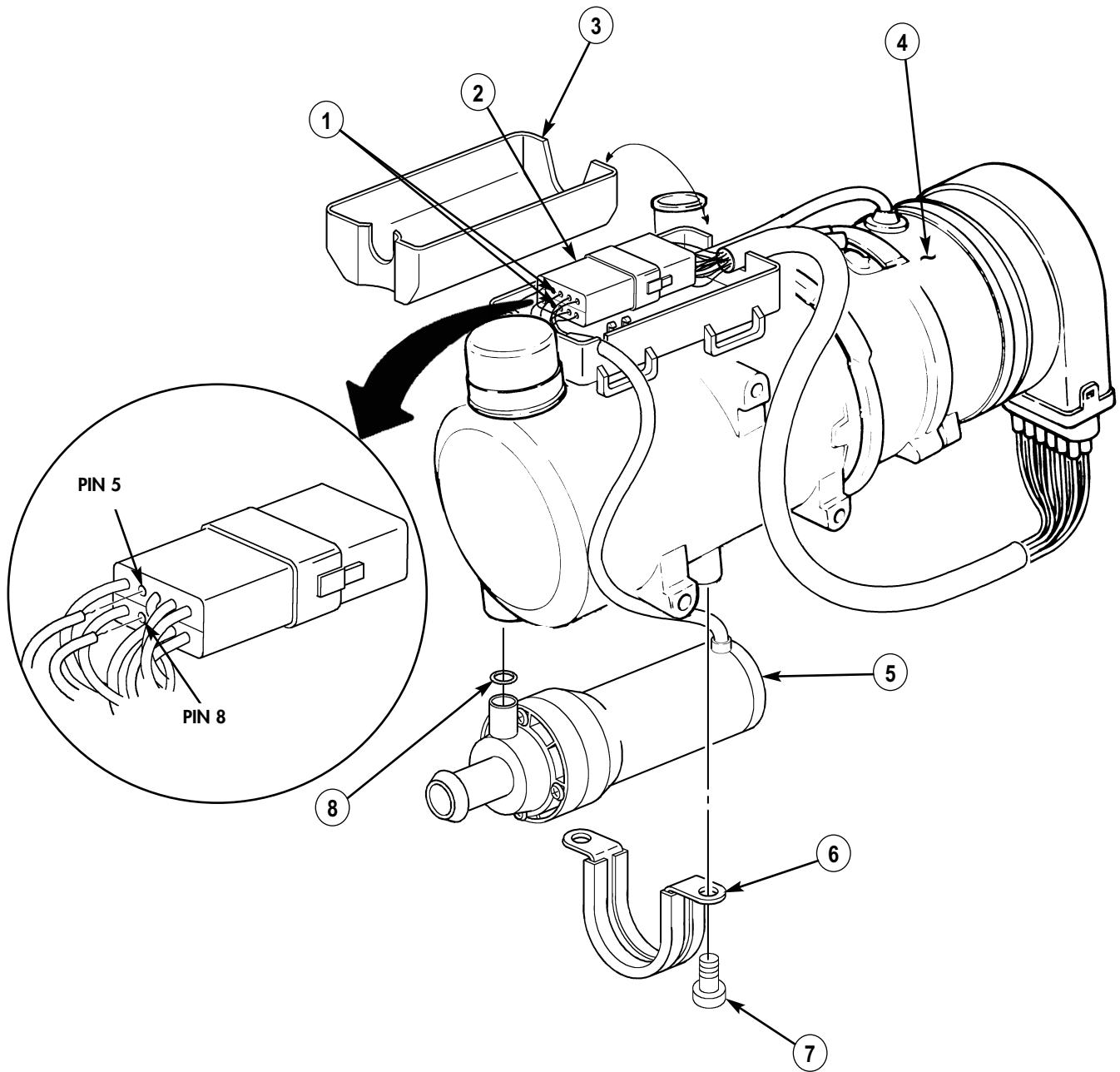
Prior to removal, tag leads for installation.

1. Remove heater harness connector cover (3) from harness connector (2).
2. Disconnect two leads (1) (brown 5 and black 8) from heater harness connector (2).
3. Remove two screws (7), clamp (6), heater pump (5), and O-ring (8) from heater (4). Discard O-ring (8).

b. Installation

1. Install O-ring (8) and heater pump (5) on heater (4) with clamp (6) and two screws (7).
2. Connect two leads (1) (brown 5 and black 8) to heater harness connector (2).
3. Install heater harness connector cover (3) on harness connector (2).

12-7. ENGINE/CREW COMPARTMENT HEATER CIRCULATING PUMP REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Connect heater lower hose assembly (para. 12-5).
 - Fill cooling system (para. 3-61).
 - Connect battery ground cables (para. 4-68).

12-8. ENGINE/CREW COMPARTMENT HEATER FUEL LINES REPLACEMENT

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Heater Fuel Line Removal b. Heater Fuel Line Installation | <ul style="list-style-type: none"> c. Tank Fuel Line and Supply Tube Removal d. Tank Fuel Line and Supply Tube Installation |
|---|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four lockwashers (Appendix G, Item 206)
Two lockwashers (Appendix G, Item 205)

Manual References

TM 9-2320-387-24P

Equipment Condition

Heat shield removed (para. 12-2).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Unit

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

Cover or plug all open connections immediately after removal to prevent contamination. Remove all covers or plugs prior to connection.

NOTE

Have drainage container ready to catch fuel.

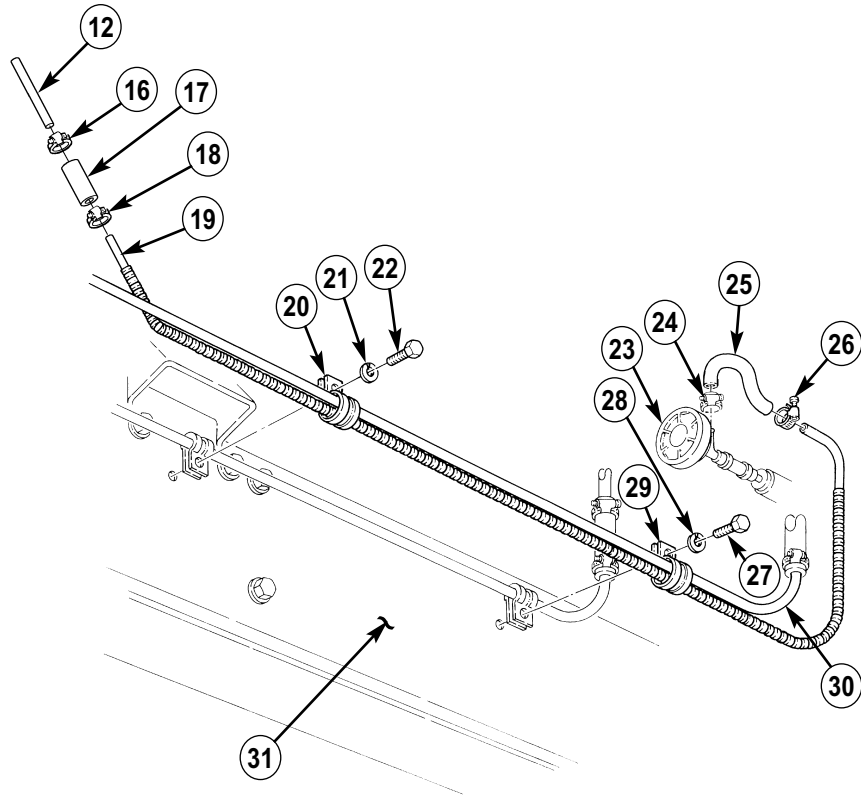
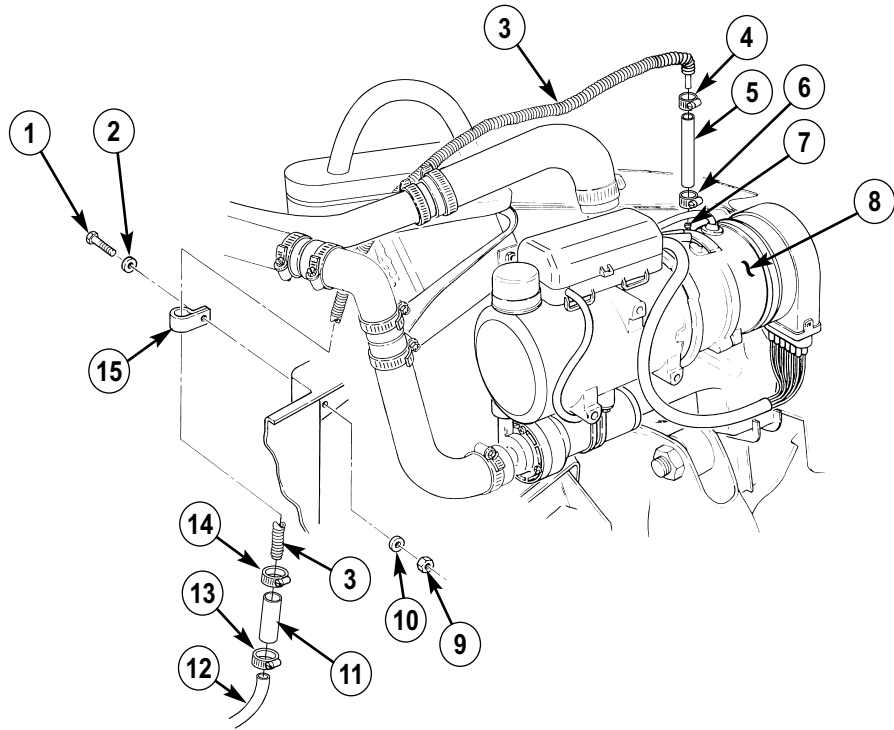
a. Heater Fuel Line Removal

1. Remove clamps (4) and (6) and hose section (5) from fuel line (3) and inlet tube (7) on heater (8).
2. Remove nut (9), washer (10), screw (1), washer (2), and clamp (15) from fuel line (3).
3. Remove clamps (13) and (14) and hose section (11) from fuel lines (3) and (12).
4. Remove clamps (16) and (18) and hose section (17) from fuel lines (12) and (19). Allow fuel to drain.
5. Remove clamps (24) and (26) and elbow (25) from fuel line (19) and fuel pump (23).
6. Remove screws (22) and (27), lockwashers (21) and (28), clamps (20) and (29), and fuel line (19) from transmission cooler tube (30) and frame (31). Discard lockwashers (21) and (28).

b. Heater Fuel Line Installation

1. Install clamps (24) and (26) on elbow (25) and install elbow (25) on fuel pump (23) and fuel line (19). Tighten clamps (24) and (26).
2. Install clamps (20) and (29) on fuel line (19) and secure fuel line (19) to transmission cooler tube (30) and frame (31) with lockwashers (21) and (28) and screws (22) and (27).
3. Install clamps (16) and (18) on hose section (17) and install hose section (17) on fuel lines (12) and (19). Tighten clamps (16) and (18).
4. Install clamps (13) and (14) on hose section (11) and install hose section (11) on fuel lines (12) and (3). Tighten clamps (13) and (14).
5. Install clamps (4) and (6) on hose section (5) and install hose section (5) on fuel line (3) and inlet tube (7) of heater (8). Tighten clamps (4) and (6).
6. Install clamp (15) on fuel line (3) with washer (2), screw (1), washer (10), and nut (9).

12-8. ENGINE/CREW COMPARTMENT HEATER FUEL LINES REPLACEMENT (Cont'd)



12-8. ENGINE/CREW COMPARTMENT HEATER FUEL LINES REPLACEMENT (Cont'd)

NOTE

Fuel line replacement for the M1114 requires fuel tank removal to provide access (para. 3-25).

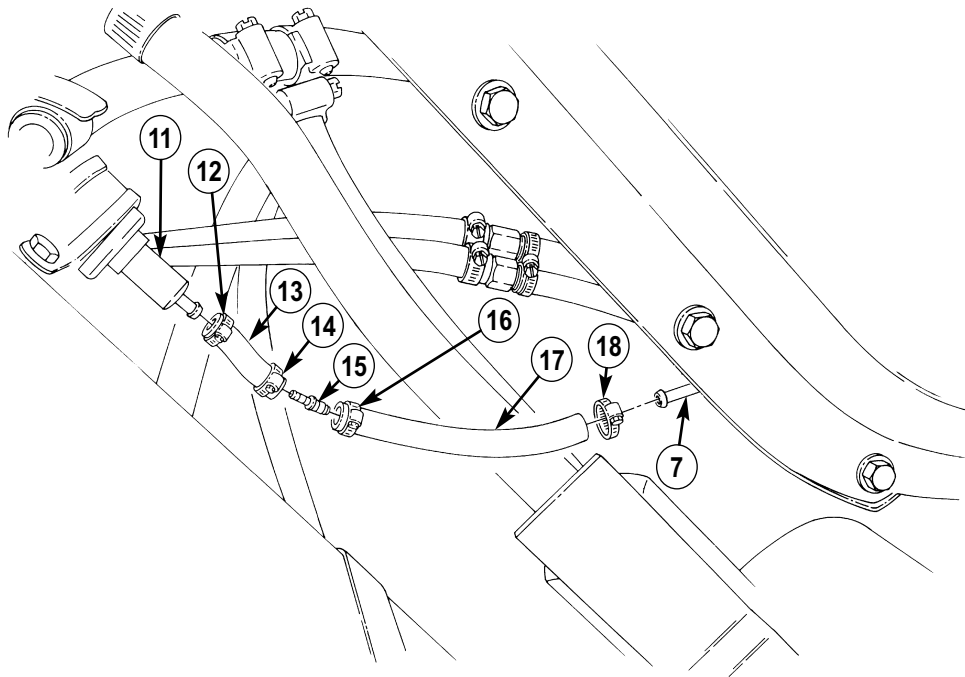
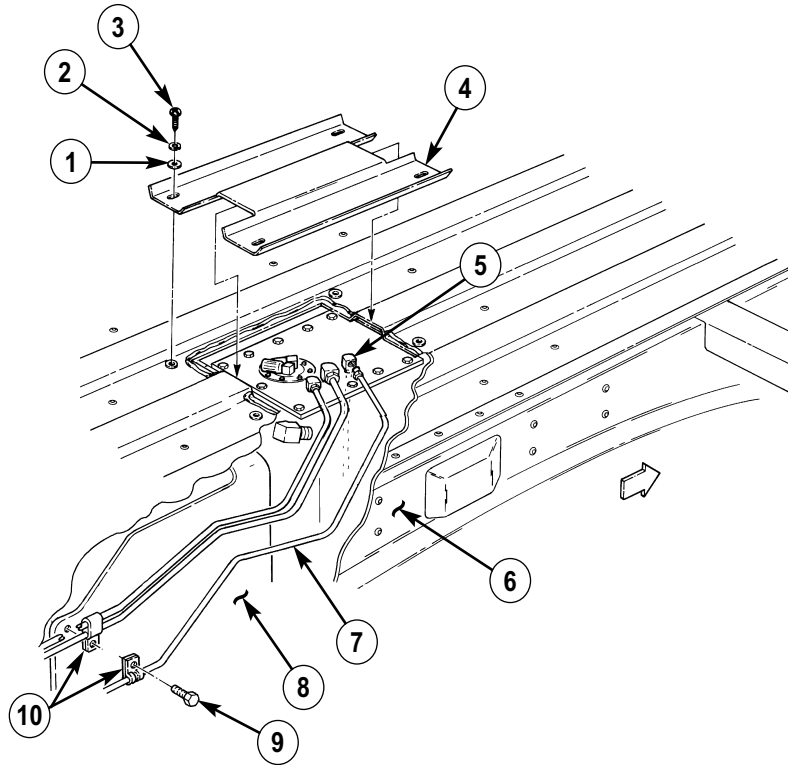
c. Tank Fuel Line and Supply Tube Removal

1. Remove four screws (3), lockwashers (2), washers (1), and access cover (4) from tunnel (6). Discard lockwashers (2).
2. Disconnect fuel line (7) from in-tank fitting (5) on fuel tank (8).
3. Remove hose clamps (16) and (18), fuel hose (17), screw (9), two clamps (10), and fuel line (7) from fuel tank (8).
4. Remove hose clamps (12) and (14), union (15), and hose section (13) from fuel pump (11).

d. Tank Fuel Line and Supply Tube Installation

1. Install hose section (13) on fuel pump (11) and union (15) with clamps (12) and (14).
2. Install fuel hose (17) on union (15) and fuel line (7) with clamps (18) and (16).
3. Connect fuel line (7) to in-tank fitting (5) on fuel tank (8).
4. Install two clamps (10) on fuel line (7) and fuel tank (8) with screw (9).
5. Install access cover (4) on tunnel (6) with four washers (1), lockwashers (2), and screws (3).

12-8. ENGINE/CREW COMPARTMENT HEATER FUEL LINES REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install heat shield (para. 12-2).
 - Bleed heater fuel system (para. 12-14).

12-9. ENGINE/CREW COMPARTMENT HEATER FUEL PUMP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected
(para. 4-68).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Unit

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

Cover or plug all open connections immediately after removal to prevent contamination. Remove all covers or plugs prior to connection.

NOTE

Have drainage container ready to catch fuel.

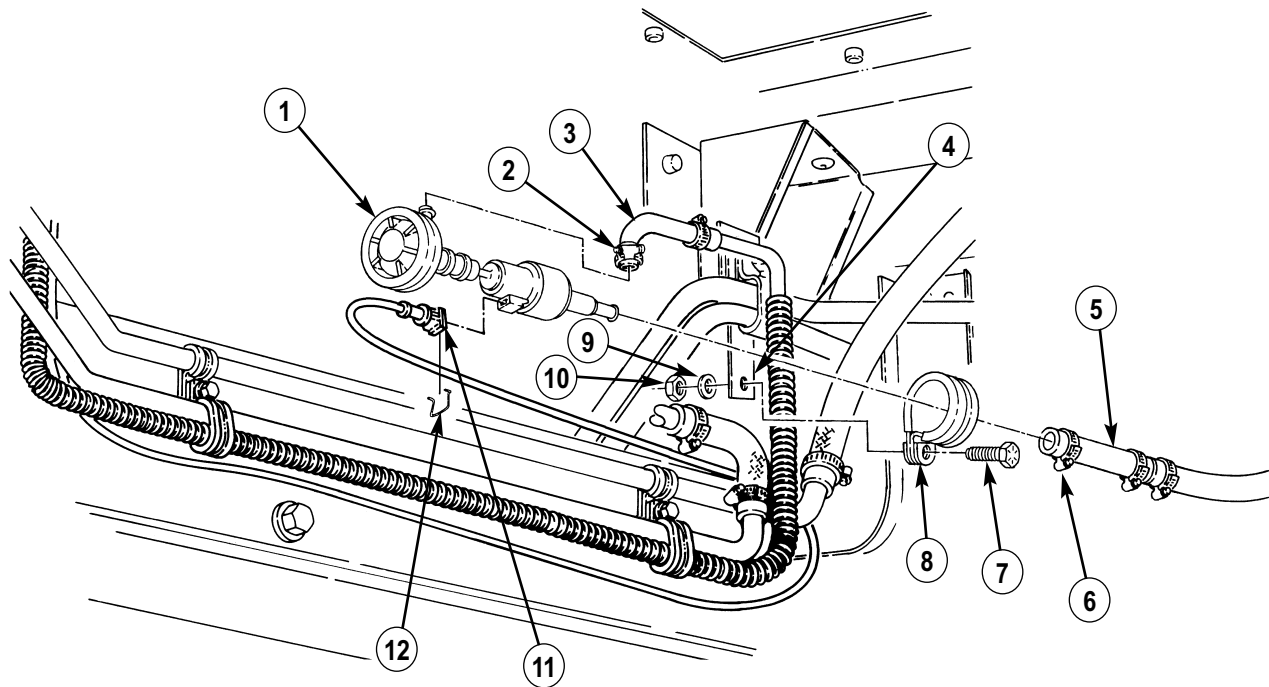
a. Removal

1. Remove clip (12) and connector (11) from fuel pump (1).
2. Loosen clamp (2) and remove fuel line (3) from fuel pump (1) and allow fuel to drain.
3. Loosen clamp (6) and remove fuel line (5) from fuel pump (1).
4. Remove nut (10), washer (9), screw (7), clamp (8), and fuel pump (1) from frame rail bracket (4).

b. Installation

1. Install fuel pump (1) on frame rail bracket (4) with clamp (8), screw (7), washer (9), and nut (10).
2. Connect fuel line (5) to fuel pump (1) and tighten clamp (6).
3. Connect fuel line (3) to fuel pump (1) and tighten clamp (2).
4. Install connector (11) on fuel pump (1) with clip (12).

12-9. ENGINE/CREW COMPARTMENT HEATER FUEL PUMP REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Bleed heater fuel system (para. 12-14).

12-10. ENGINE/CREW COMPARTMENT HEATER ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three lockwashers (Appendix G, Item 206)
Three lockwashers (Appendix G, Item 239.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Heater exhaust pipe removed (para. 12-4).
- Heater inlet pipe removed (para. 12-4.1).
- Heater lower hose removed (para. 12-5).
- Heater outlet hose removed (para. 12-6).

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Maintenance Level

Unit

WARNING

Do not touch hot exhaust system components with bare hands.
Severe injury may result.

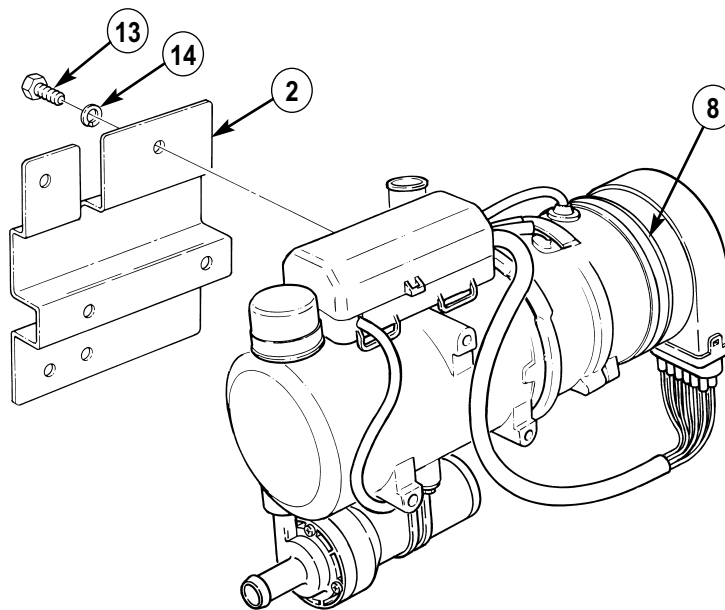
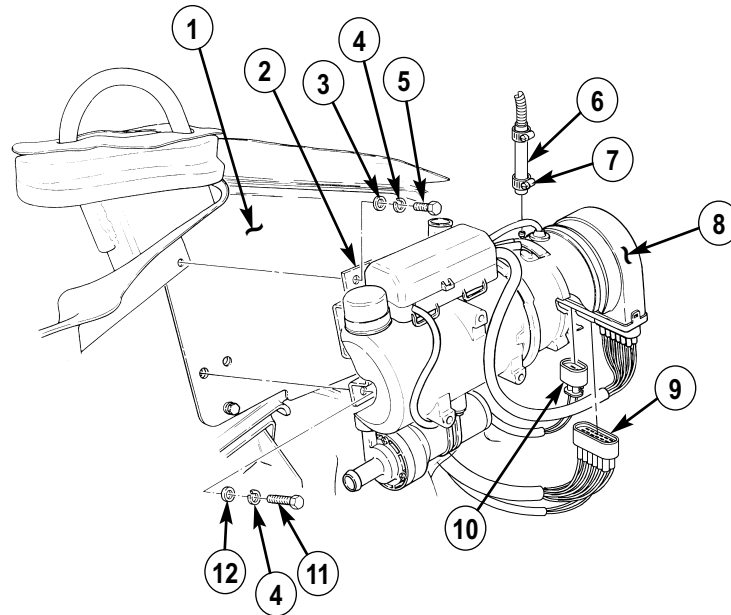
a. Removal

1. Loosen clamp (7) and disconnect fuel supply hose (6) from heater (8).
2. Disconnect plug (10) and connector (9) from heater (8).
3. Remove capscrew (5), lockwasher (4), and washer (3) from bracket (2) and splash shield (1). Discard lockwasher (4).
4. Remove two capscrews (11), lockwashers (4), washers (12), and heater (8) from splash shield (1). Discard lockwashers (4).
5. Remove three capscrews (13), lockwashers (14), and bracket (2) from heater (8). Discard lockwashers (14).

b. Installation

1. Install bracket (2) on heater (8) with three lockwashers (14) and capscrews (13).
2. Install heater (8) and bracket (2) on splash shield (1) with two washers (12), lockwashers (4), and capscrews (11).
3. Install bracket (2) on splash shield (1) with washer (3), lockwasher (4), and capscrew (5).
4. Connect plug (10) and connector (9) to heater (8).
5. Connect fuel supply hose (6) to heater (8) and tighten clamp (7).

12-10. ENGINE/CREW COMPARTMENT HEATER ASSEMBLY REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install heater outlet hose installed (para. 12-6).
 - Install heater lower hose (para. 12-5).
 - Install heater inlet hose (para. 12-4.1).
 - Install heater exhaust pipe (para. 12-4).
 - Connect battery ground cables (para. 4-68).
 - Fill cooling system (para. 3-61).

12-11. ENGINE/CREW COMPARTMENT HEATER WIRING HARNESS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Heat shield removed (para. 12-2).
- Air horn removed (para. 3-14).

Maintenance Level

Unit

a. Removal

CAUTION

Use care when removing harness. Failure to do so will cause damage to harness.

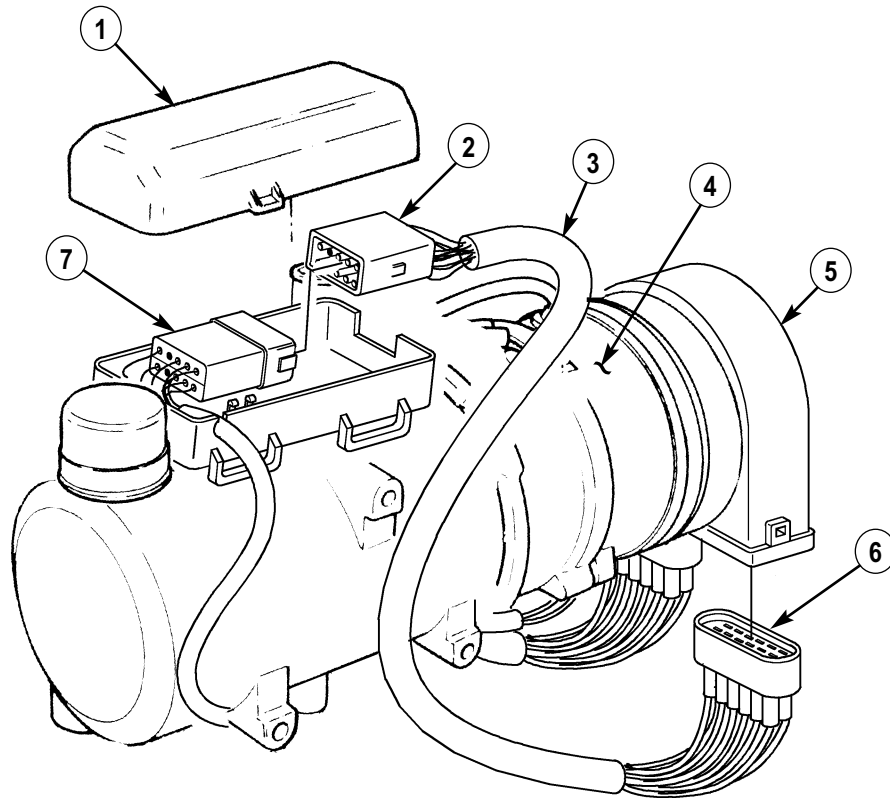
1. Remove cover (1) from heater (4).
2. Disconnect wiring harness connector (2) from heater harness connector (7).
3. Disconnect wiring harness connector (6) from heater control unit (5).
4. Remove wiring harness (3) from vehicle.

b. Installation

CAUTION

Use care when installing harness. Failure to do so will cause damage to harness.

1. Position wiring harness (3) in vehicle.
2. Connect wiring harness connector (2) to heater harness connector (7).
3. Connect wiring harness connector (6) to heater control unit (5).
4. Install cover (1) on heater (4).

**12-11. ENGINE/CREW COMPARTMENT HEATER WIRING HARNESS
REPLACEMENT (Cont'd)**

- FOLLOW-ON TASKS:
- Install air horn (para. 3-14).
 - Install heat shield (para. 12-2).
 - Connect battery ground cables (para. 4-68).

12-12. ENGINE/CREW COMPARTMENT HEATER CIRCUIT BREAKER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two lockwashers (Appendix G, Item 238.1)
Three lockwashers (Appendix G, Item 239.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

a. Removal

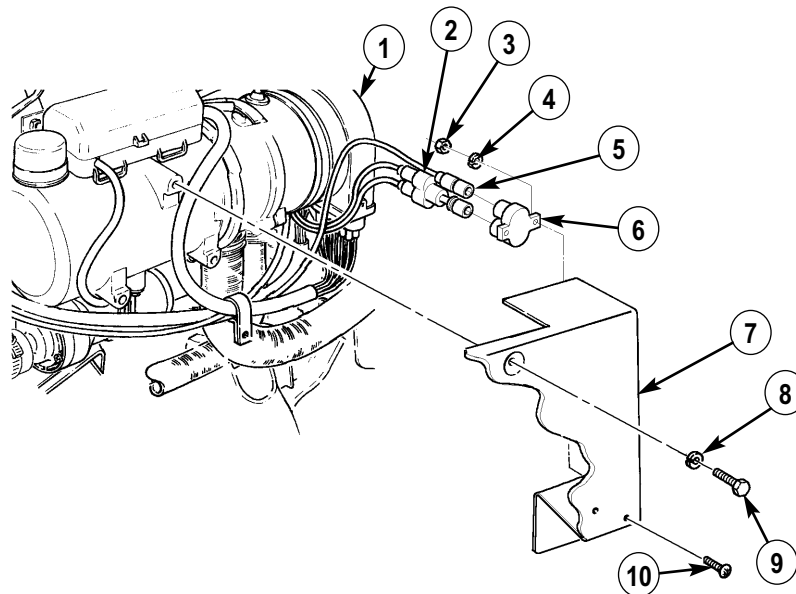
NOTE

Prior to removal, tag leads for installation.

1. Remove three screws (9) and lockwashers (8) from heat shield (7) and heater (1). Discard lockwashers (8).
2. Move heat shield (7) away from heater (1) and disconnect cable (5) and connector (2) from circuit breaker (6).
3. Remove two nuts (3), lockwashers (4), screws (10), and circuit breaker (6) from heat shield (7). Discard lockwashers (4).

b. Installation

1. Install circuit breaker (6) on heat shield (7) with two screws (10), lockwashers (4), and nuts (3).
2. Connect cable (5) and connector (2) to circuit breaker (6).
3. Install heat shield (7) on heater (1) with three lockwashers (8) and screws (9).



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

12-13. ENGINE/CREW COMPARTMENT HEATER CONTROLLER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three lockwashers (Appendix G, Item 239.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

a. Removal

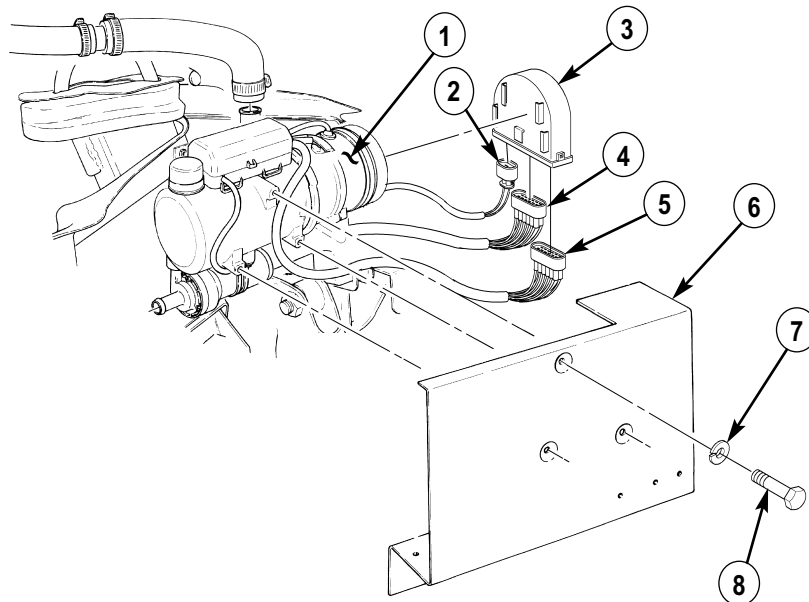
NOTE

Prior to removal, tag leads for installation.

1. Remove three capscrews (8) and lockwashers (7) from heat shield (6). Discard lockwashers (7).
2. Move heat shield (6) away from heater (1) and disconnect plug (2) and harness connectors (4) and (5) from controller (3).
3. Lift up on controller (3) and remove from heater (1).

b. Installation

1. Install controller (3) on heater (1).
2. Connect plug (2) and harness connectors (4) and (5) to controller (3).
3. Install heat shield (6) on heater (1) with three lockwashers (7) and capscrews (8).



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

12-14. ENGINE/CREW COMPARTMENT HEATER FUEL SYSTEM BLEEDING

This task covers:

Bleeding

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Unit

WARNING

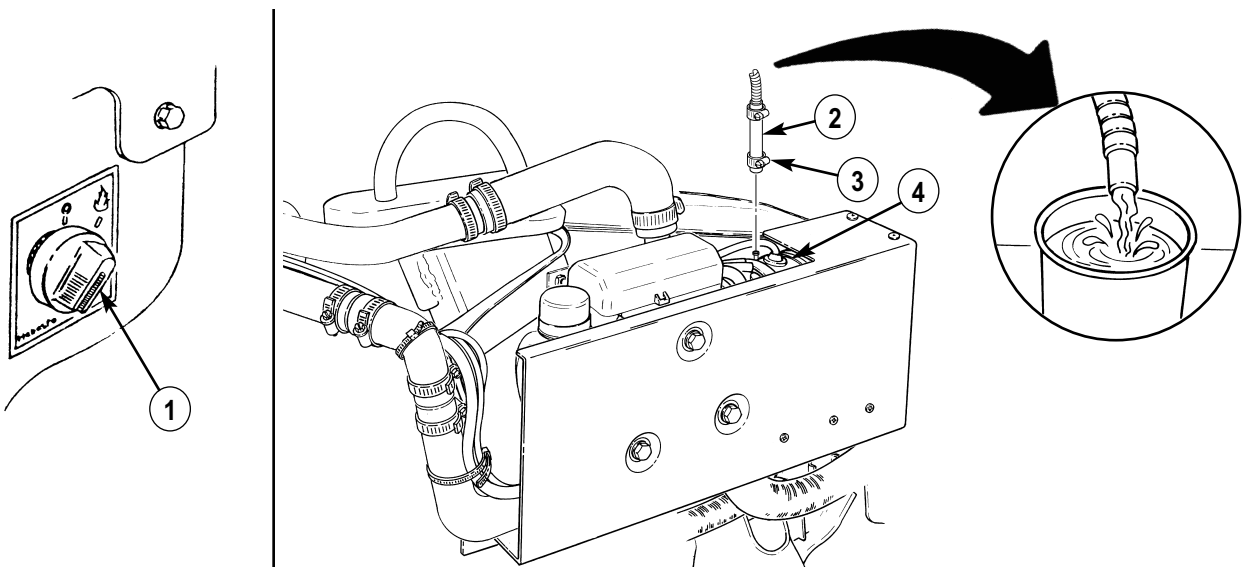
Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

NOTE

Have drainage container ready to catch fuel.

Bleeding

1. Loosen clamp (3) and disconnect heater fuel line (2) from heater (4).
2. Place end of fuel line (2) in drainage container.
3. Turn heater switch (1) to ON position. Hold switch (1) in ON position until fuel flows free of air bubbles.
4. Turn switch (1) to OFF position.
5. Connect fuel line (2) to heater (4) and tighten clamp (3).



FOLLOW-ON TASK: Install heat shield (para. 12-2).

Section II. COMMUNICATIONS KITS (UNIT) MAINTENANCE

12-16. COMMUNICATIONS KITS MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
12-17.	Radio Rack and Mounting Brackets Replacement	12-27
12-18.	Terminal Board Replacement	12-32
12-19.	Headphone Mounting Bracket Replacement	12-34
12-20.	Antenna Ground Strap Replacement	12-35
12-21.	AS 1729/VRC Antenna Replacement	12-37
12-22.	Rear Antenna Mounting Bracket Replacement	12-38
12-23.	AB-652/GR Antenna Replacement	12-39
12-24.	Rear Antenna Cables Replacement	12-40
12-25.	Power Cable Replacement	12-47

12-17. RADIO RACK AND MOUNTING BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two nut and lockwasher assemblies
(Appendix G, Item 245)
Seven lockwashers (Appendix G, Item 192)
Six locknuts (Appendix G, Item 109)
Two locknuts (Appendix G, Item 167)
Two locknuts (Appendix G, Item 156)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Vehicle Power Conditioner (VPC) mounting bracket removed (M1114) (para. 11-64).
- Field glasses bracket removed (M1114) (para. 11-65).
- Terminal board removed (M1114) (para. 12-18).

Maintenance Level

Unit

12-17. RADIO RACK AND MOUNTING BRACKETS REPLACEMENT (Cont'd)

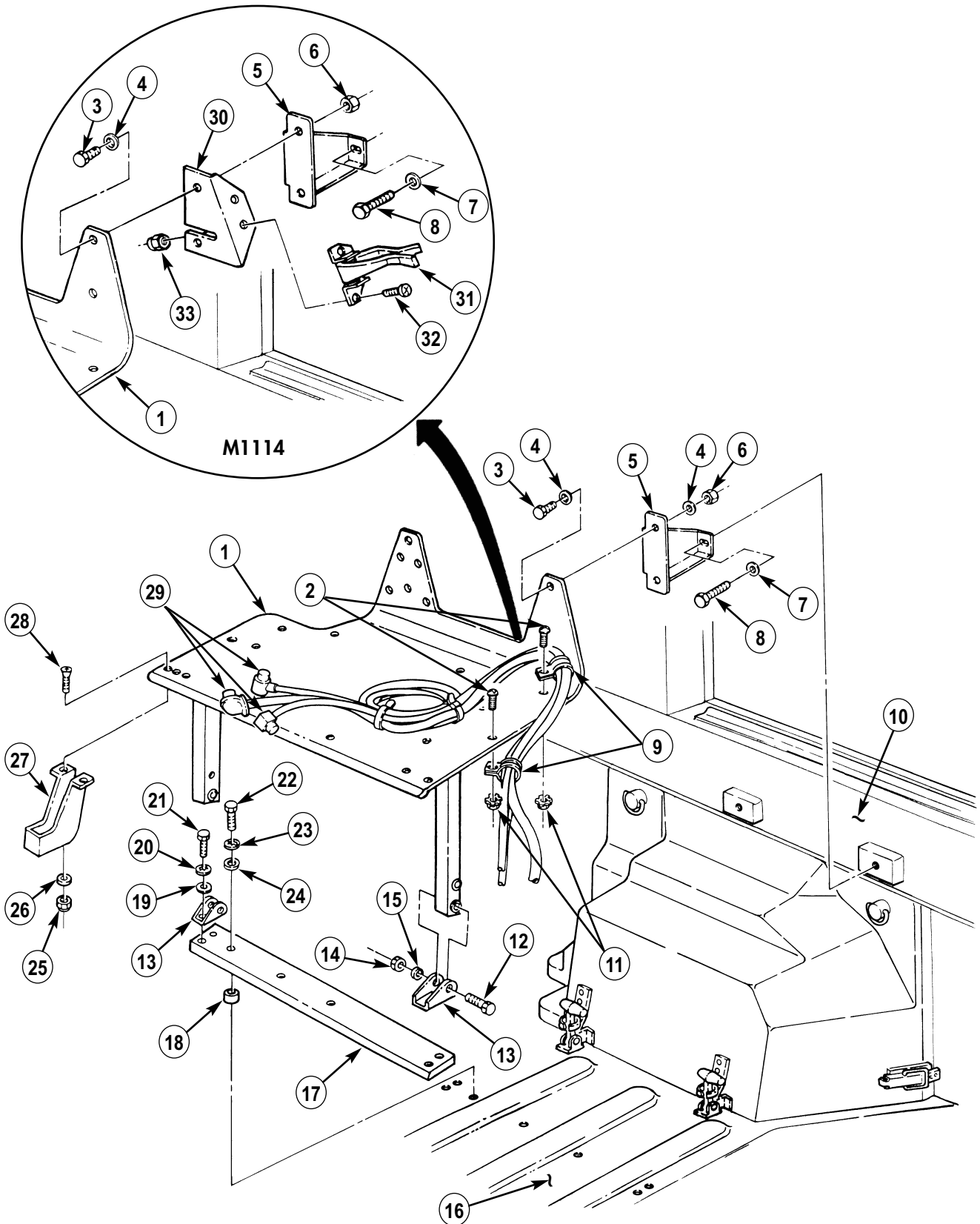
a. Removal

NOTE

Perform steps 1 and 2 for M1113 vehicles. Perform steps 3 and 4 for M1114 vehicles.

1. Remove two nut and lockwasher assemblies (11), screws (2), clamps (9), and cables (29) from radio rack (1). Discard nut and lockwasher assemblies (11).
2. Remove four locknuts (6), washers (4), capscrews (3), and washers (4) from two brackets (5) and radio rack (1). Discard locknuts (6).
3. Remove four locknuts (6), capscrews (3), washers (4), radio rack (1), and bracket (30) with rifle mounting clamp (31) from two brackets (5). Discard locknuts (6).
4. Remove two locknuts (33), capscrews (32), and rifle mounting clamp (31) from bracket (30). Discard locknuts (34).
5. Remove two locknuts (14), washers (15), capscrews (12), and radio rack (1) from two brackets (13). Discard locknuts (14).
6. Remove two locknuts (25), washers (26), screws (28), and headphone mounting bracket (27) from radio rack (1). Discard locknuts (25).
7. Remove two capscrews (8), washers (7), and brackets (5) from A-beam (10).
8. Remove four capscrews (21), lockwashers (20), washers (19), and two brackets (13) from support bracket (17). Discard lockwashers (19).
9. Remove three capscrews (22), lockwashers (23), washers (24), support bracket (17), and three spacers (18) from tunnel floor (16). Discard lockwashers (23).

12-17. RADIO RACK AND MOUNTING BRACKETS REPLACEMENT (Cont'd)



12-17. RADIO RACK AND MOUNTING BRACKETS REPLACEMENT (Cont'd)

b. Installation

1. Position three spacers (18) and support bracket (17) on tunnel floor (16) and install with three washers (24), lockwashers (23), and capscrews (22).
2. Install two brackets (13) on support bracket (17) with four washers (19), lockwashers (20), and capscrews (21). Tighten capscrews (21) to 8 lb-ft (11 N·m).
3. Install two brackets (5) on A-beam (10) with two washers (7) and capscrews (8). Tighten capscrews (8) to 6 lb-ft (8 N·m).
4. Install headphone mounting bracket (27) on radio rack (1) with two screws (28), washers (26), and locknuts (25). Tighten locknuts (25) to 6 lb-ft (8 N·m).
5. Install radio rack (1) on two brackets (13) with two capscrews (12), washers (15), and locknuts (14). Tighten locknuts (14) to 8-10 lb-ft (11-14 N·m).

NOTE

Perform steps 6 and 7 for M1114 vehicles.

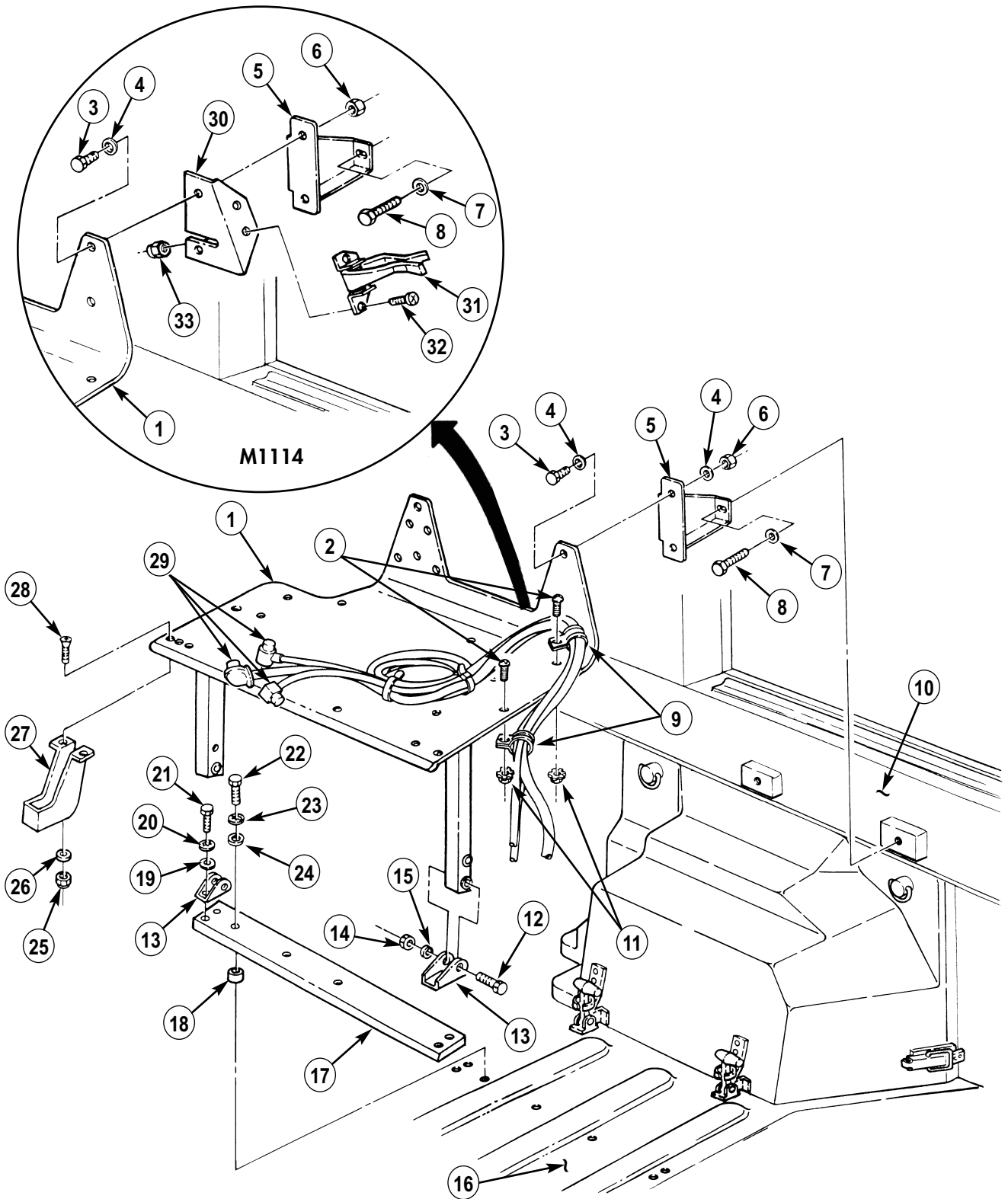
6. Install rifle mounting clamp (31) on bracket (30) with two capscrews (32) and locknuts (33).
7. Install bracket (30) with rifle mounting clamp (31) and radio rack (1) on two brackets (5) with four capscrews (3), washers (4), and locknuts (6).

NOTE

Perform steps 8 and 9 for M1113 vehicles.

8. Install radio rack (1) on two brackets (5) with four washers (4), capscrews (3), washers (4), and locknuts (6).
9. Install cables (29) and two clamps (9) on radio rack (1) with two screws (2) and nut and lockwasher assemblies (11).

12-17. RADIO RACK AND MOUNTING BRACKETS REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install terminal board (M1114) (para. 12-18).
 - Install field glasses bracket (M1114) (para. 11-65).
 - Install Vehicle Power Conditioner (VPC) mounting bracket (M1114) (para. 11-64).
 - Connect battery ground cables (para. 4-68).

12-18. TERMINAL BOARD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Sealing compound (Appendix C, Item 70)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

a. Removal

NOTE

Tag all leads for installation.

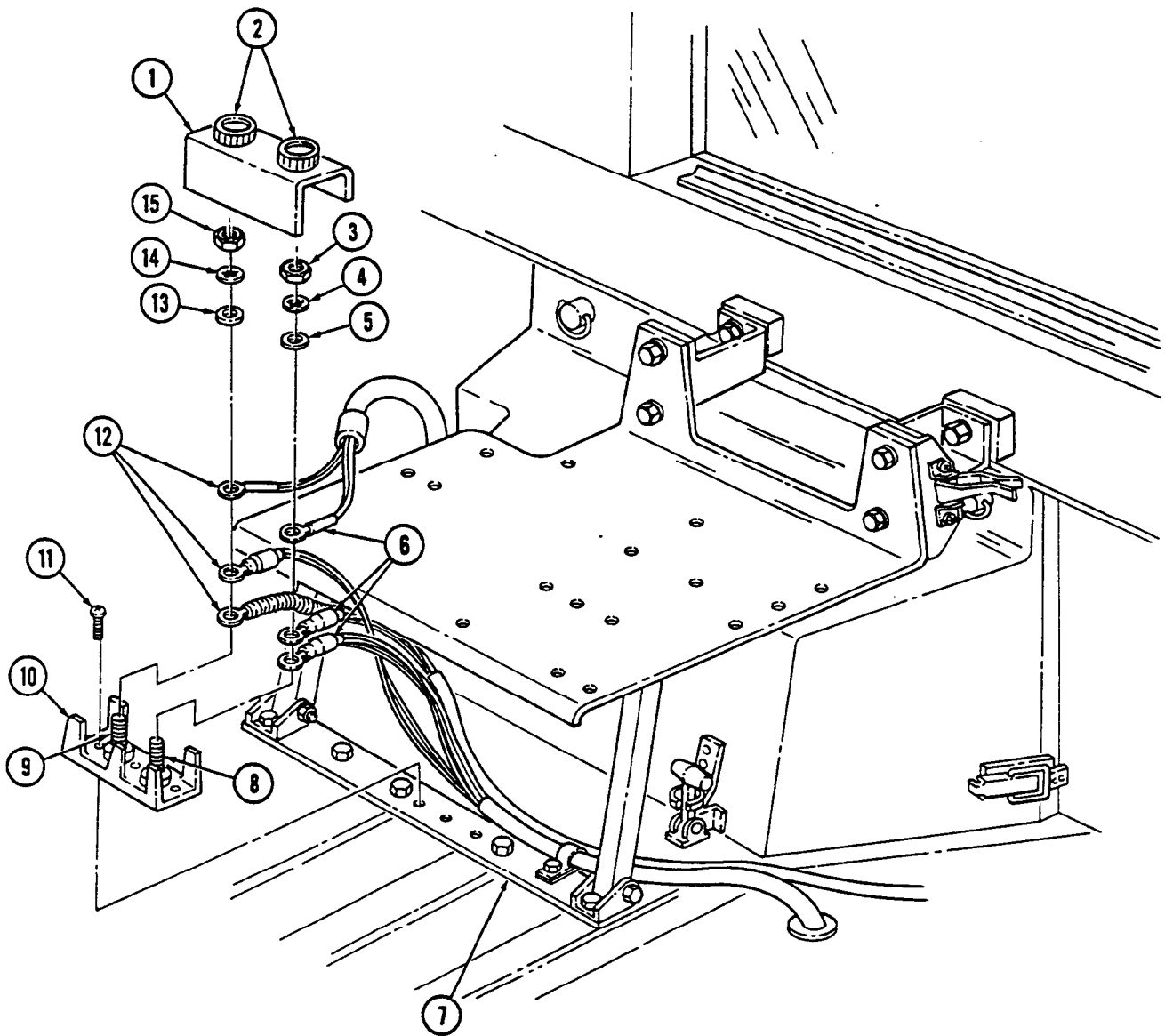
1. Loosen two terminal lugs (2) and remove cover (1) from terminal board (10).
2. Remove nut (15), lockwasher (14), washer (13), and three leads (12) from positive post (9) of terminal board (10). Discard lockwasher (14).
3. Remove nut (3), lockwasher (4), washer (5), and three leads (6) from negative post (8) of terminal board (10). Discard lockwasher (4).
4. Remove three screws (11) and terminal board (10) from support bracket (7).

b. Installation

NOTE

Apply sealant compound to negative and positive posts on terminal board.

1. Install terminal board (10) on support bracket (7) with three screws (11).
2. Install three leads (6) on negative post (8) of terminal board (10) with washer (5), lockwasher (4), and nut (3).
3. Install three leads (12) on positive post (9) of terminal board (10) with washer (13), lockwasher (14), and nut (15).
4. Install cover (1) on terminal board (10) and tighten two terminal lugs (2).

12-18. TERMINAL BOARD REPLACEMENT (Cont'd)

FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

12-19. HEADPHONE MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Two locknuts (Appendix G, Item 109)

Maintenance Level

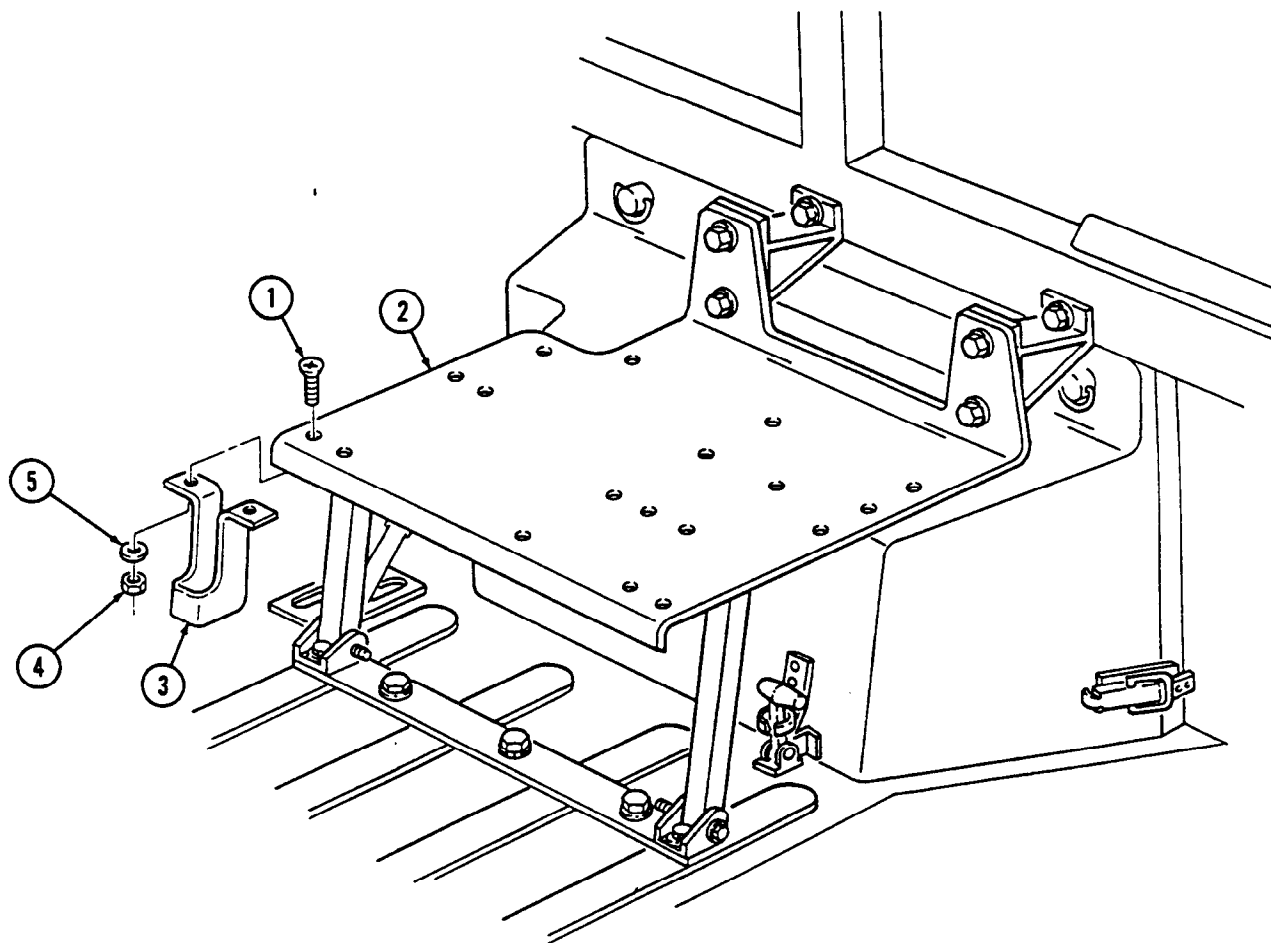
Unit

a. Removal

Remove two locknuts (4), washers (5), screws (1), and headphone mounting bracket (3) from radio rack (2). Discard locknuts (4).

b. Installation

Install headphone mounting bracket (3) on radio rack (2) with two screws (1), washers (5), and locknuts (4). Tighten locknuts (4) to 6 lb-ft (8 N·m).



12-20. ANTENNA GROUND STRAP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Two lockwashers (Appendix G, Item 209)
Locknut (Appendix G, Item 156)
Antiseize compound (Appendix C, Item 16)

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Cargo shell door raised (TM 9-2320-387-10).

Maintenance Level

Unit

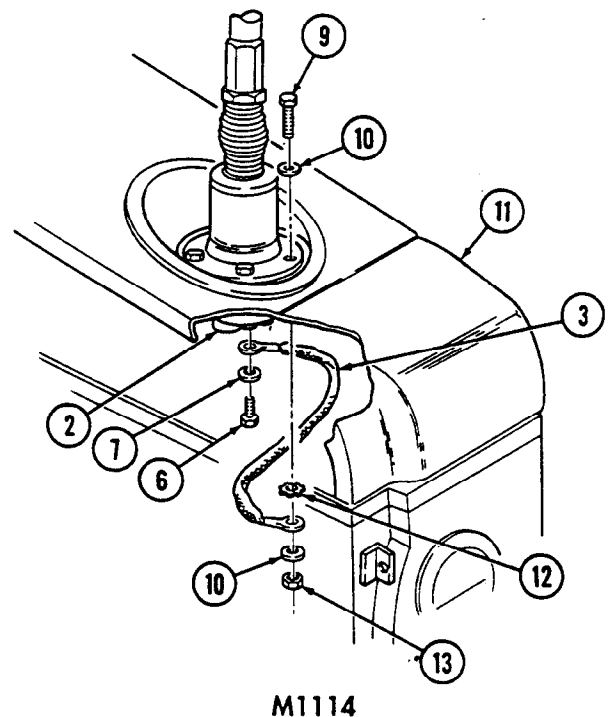
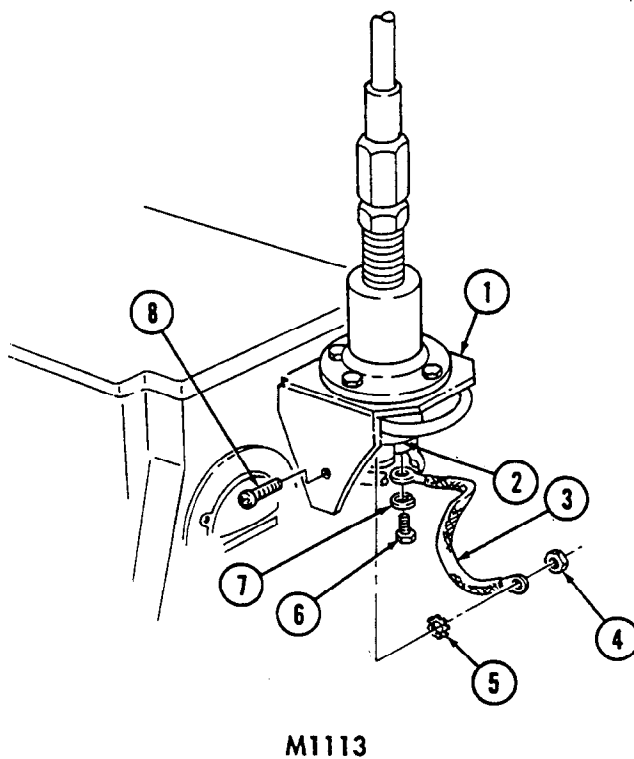
a. Removal

1. Remove screw (6), lockwasher (7), and ground strap (3) from antenna base (2). Discard lockwasher (7).

NOTE

Perform step 2 for M1113 models only. Perform step 3 for M1114 models only.

2. Remove locknut (4), ground strap (3), lockwasher (5), and screw (8) from antenna mounting bracket assembly (1). Discard locknut (4) and lockwasher (5).
3. Remove locknut (13), washer (10), ground strap (3), lockwasher (12), capscrew (9), and washer (10), from cargo shell (11). Discard locknut (13) and lockwasher (12).



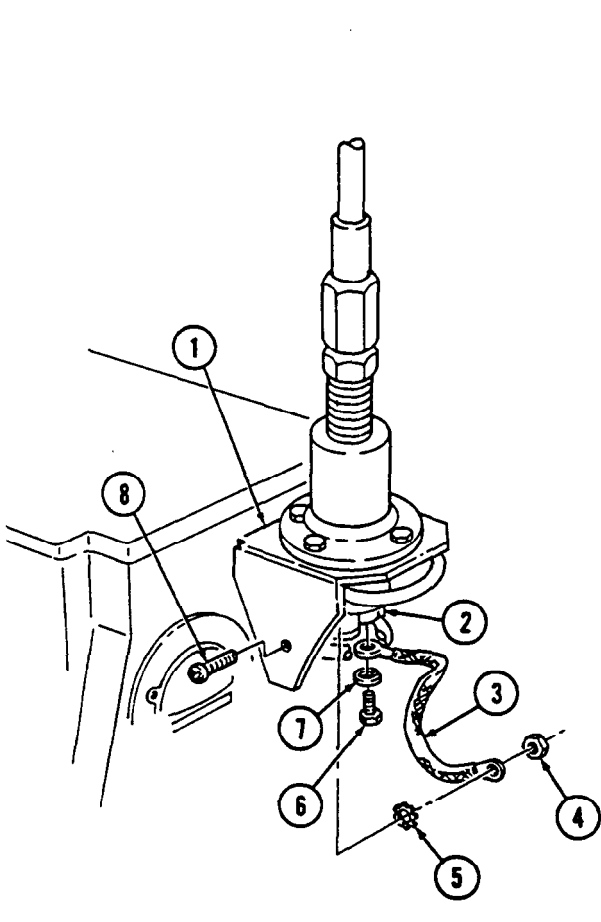
12-20. ANTENNA GROUND STRAP REPLACEMENT (Cont'd)

b. Installation

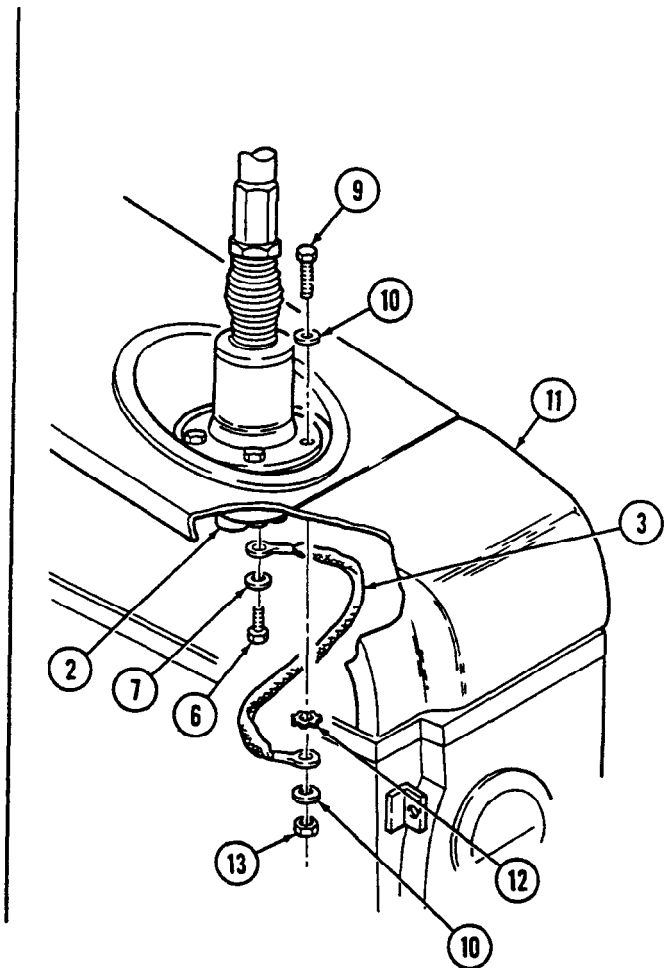
NOTE

Perform step 1 for M1114 models only. Perform steps 2 and 3 for M1113 models only.

1. Install lockwasher (12) and ground strap (3) on cargo shell (11) with washer (10), capscrew (9), washer (10), and locknut (13). Tighten locknut (13) to 31 lb-ft (42 N·m).
2. Apply antiseize compound to threads of screw (8).
3. Install screw (8), lockwasher (5), and ground strap (3) on antenna mounting bracket assembly (1) with locknut (4).
4. Install ground strap (3) on antenna base (2) with lockwasher (7) and screw (6).



M1113



M1114

- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Lower cargo shell door (TM 9-2320-387-10).

12-21. AS 1729/VRC ANTENNA REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three locknuts (Appendix G, Item 156)

Manual References

TM 9-2320-387-24P

Equipment Condition

Antenna ground strap removed (para. 12-20).

Maintenance Level

Unit

NOTE

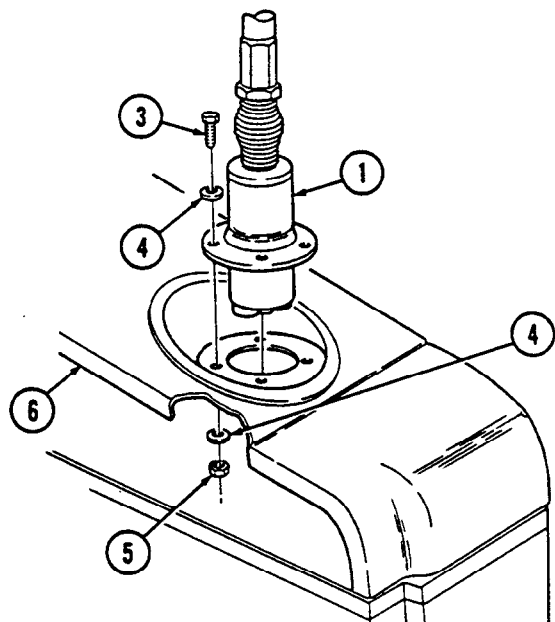
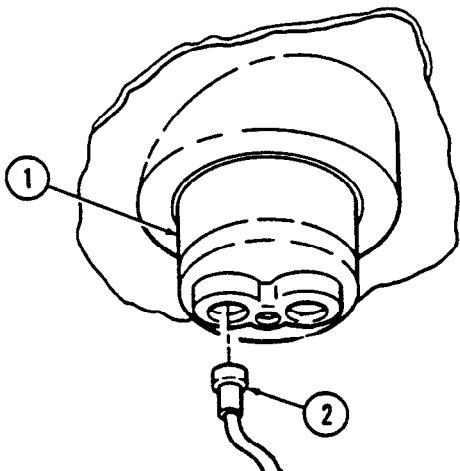
Replacement procedures for the antenna are basically the same for both models, except the M1113 uses an external antenna mounting bracket. This procedure covers the M1114 model.

a. Removal

1. Disconnect radio antenna cable (2) from antenna (1).
2. Remove three locknuts (5), washers (4), capscrews (3), washers (4), and antenna (1) from cargo shell (6). Discard locknuts (5).

b. Installation

1. Install antenna (1) on cargo shell (6) with three washers (4), capscrews (3), washers (4), and locknuts (5). Tighten locknuts (5) to 26 lb-ft (35 N·m).
2. Connect radio antenna cable (2) to antenna (1).



FOLLOW-ON TASK: Install antenna ground strap (para. 12-20).

12-22. REAR ANTENNA MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- AS 1729/VRC antenna removed (para. 12-21), if installed.
- AB-652/GR antenna removed (para. 12-23), if installed.

Special Tools

Crowfoot, 3/8-in. (Appendix B, Item 142)
Socket adapter, 3/8-in. (Appendix B, Item 135)

Maintenance Level

Unit

Materials/Parts

Three locknuts (Appendix G, Item 179)

a. Removal

1. Remove grommet (3) from body (1).

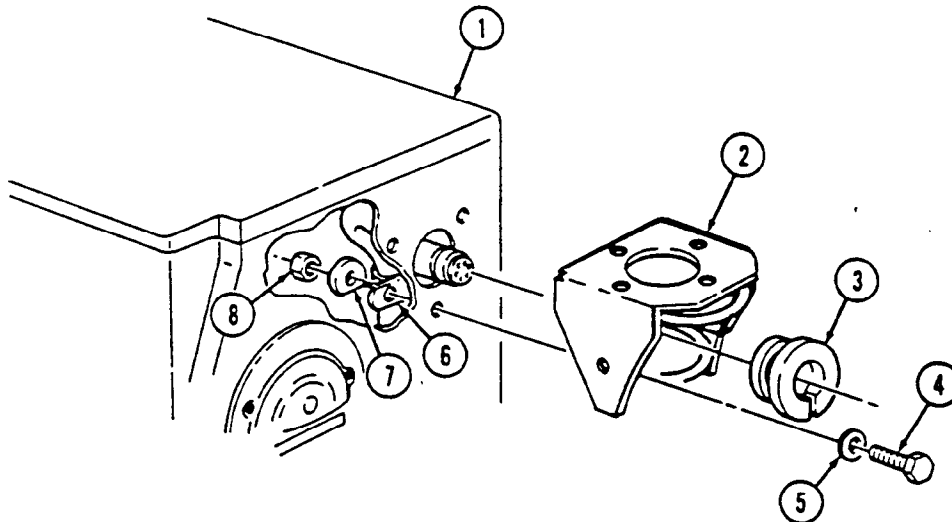
NOTE

Note position of washers and clamp for installation.

2. Remove three locknuts (8), washers (7), capscrews (4), washers (5), antenna mounting bracket (2), and clamp (6) from body (1). Discard locknuts (8).

b. Installation

1. Install antenna mounting bracket (2) and clamp (6) on body (1) with three washers (5), capscrews (4), washers (7), and locknuts (8). Using crowfoot, tighten locknuts (8) to 15 lb-ft (20 N·m).
2. Install grommet (3) on body (1).



FOLLOW-ON TASKS:

- Install AS 1729/VRC antenna (para. 12-21), if removed.
- Install AB-652/GR antenna (para. 12-23), if removed.

12-23. AB-652/GR ANTENNA REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Four locknuts (Appendix G, Item 156)

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

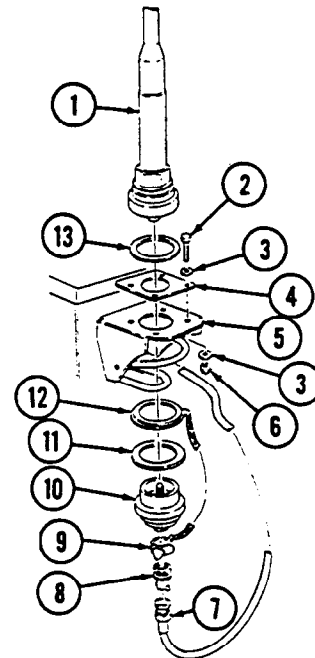
Unit

a. Removal

1. Disconnect antenna cable (7) from adapter (8).
2. Loosen ground clamp (9) and remove from adapter (8).
3. Remove adapter (8) from lower insulator (10).
4. Remove antenna (1), rubber washer (13), ground ring (12), rubber washer (11), and lower insulator (10) from antenna mounting bracket (5).
5. Remove four locknuts (6), washers (3), capscrews (2), washers (3), and adapter (4) from antenna mounting bracket (5). Discard locknuts (6).

b. Installation

1. Install adapter (4) on antenna mounting bracket (5) with four washers (3), capscrews (2), washers (3), and locknuts (6).
2. Install ground ring (12), rubber washer (11), lower insulator (10), rubber washer (13), and antenna (1) on mounting bracket (5).
3. Install adapter (8) on lower insulator (10).
4. Install ground clamp (9) on adapter (8) and tighten.
5. Connect antenna cable (7) to adapter (8).



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

12-24. REAR ANTENNA CABLES REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Two tiedown straps (Appendix G, Item 462)
Eleven nut and lockwasher assemblies
(Appendix G, Item 245)
Three locknuts (Appendix G, Item 156)
Two lockwashers (Appendix G, Item 217)

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Right rear passenger seat back removed (M1114 only) (para. 10-45).
- Cargo shell door raised (TM 9-2320-387-10).
- Right rear underbody armor removed (M1114 only) (para 11-39).

Personnel Required

One mechanic
One assistant

Maintenance Level

Unit

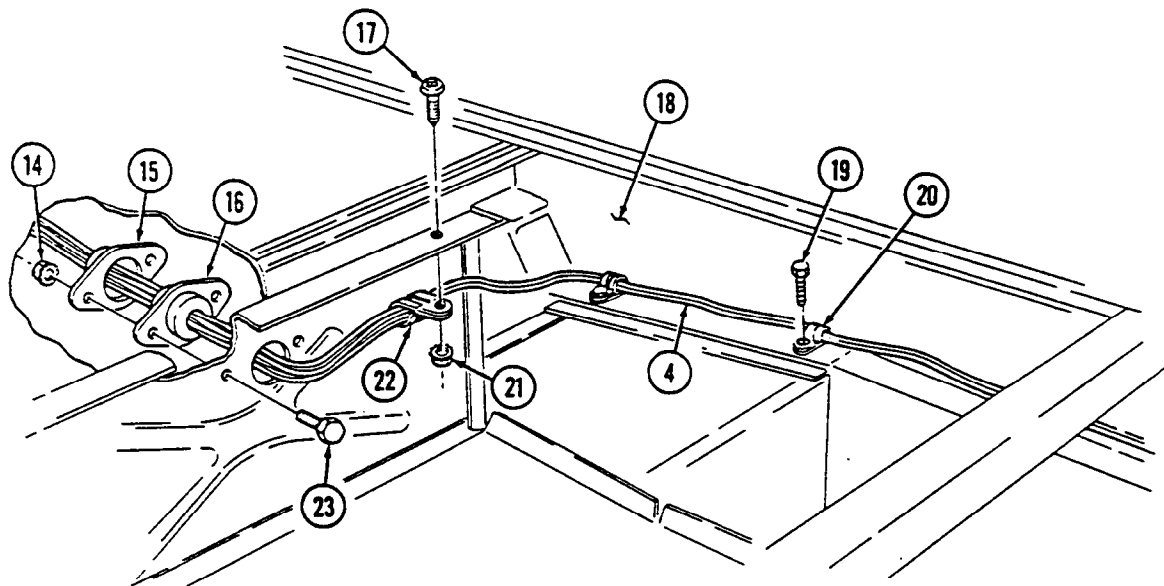
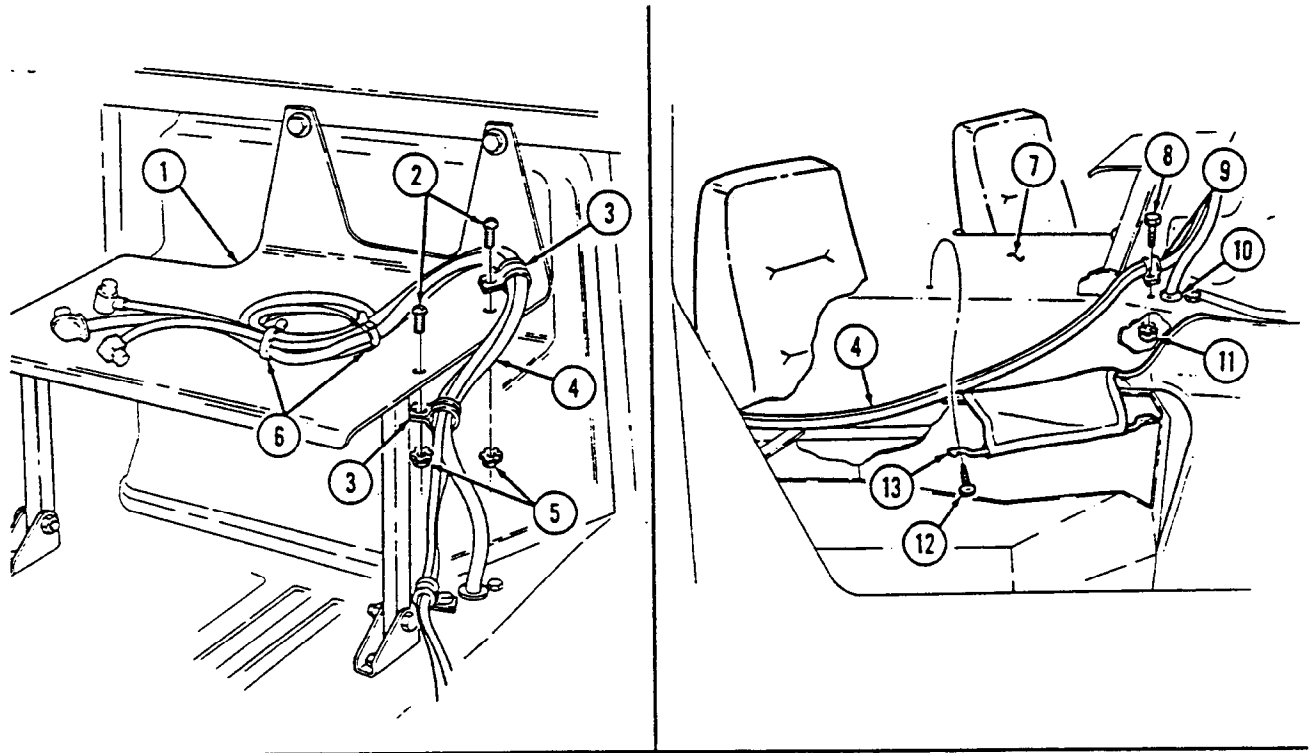
NOTE

Replacement procedures for left and right rear antenna cables are replaced basically the same, except the left antenna cables have an additional six clamps securing cables across rear of vehicle. This procedure covers the right rear antenna cables.

a. Removal

1. Remove two tiedown straps (6) from antenna cables (4). Discard tiedown straps (6).
2. Remove two nut and lockwasher assemblies (5), screws (2), clamps (3), and antenna cables (4) from front radio rack (1). Discard nut and lockwasher assemblies (5).
3. Remove nut and lockwasher assembly (11), capscrew (8), and clamp (9) from two antenna cables (4) and grommet (10). Discard nut and lockwasher assembly (11).
4. Remove two screws (12) and insulation retainer (13) from cargo floor (7) and pull insulation retainer (13) away from cargo floor (7).
5. Remove three capscrews (19), clamps (20), and two antenna cables (4) from body (18).
6. Remove nut and lockwasher assembly (21), screw (17), and clamp (22) from two antenna cables (4) and body (18). Discard nut and lockwasher assembly (21).
7. Remove two nut and lockwasher assemblies (14), capscrews (23), antenna cables (4), grommet (16), and retainer (15) from body (18). Discard nut and lockwasher assemblies (14).

12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)



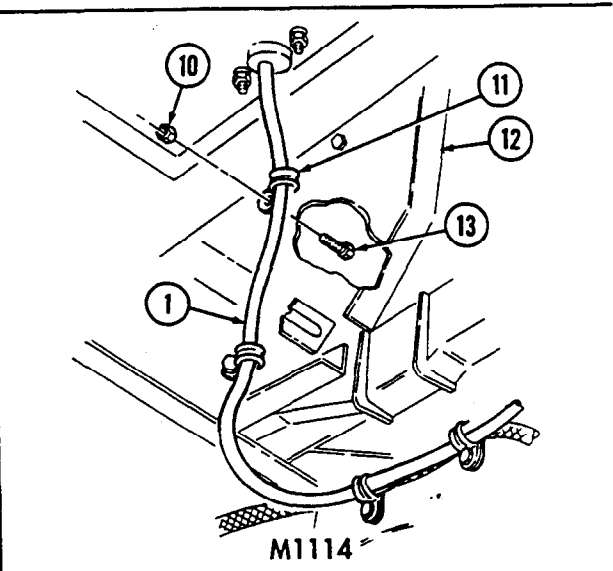
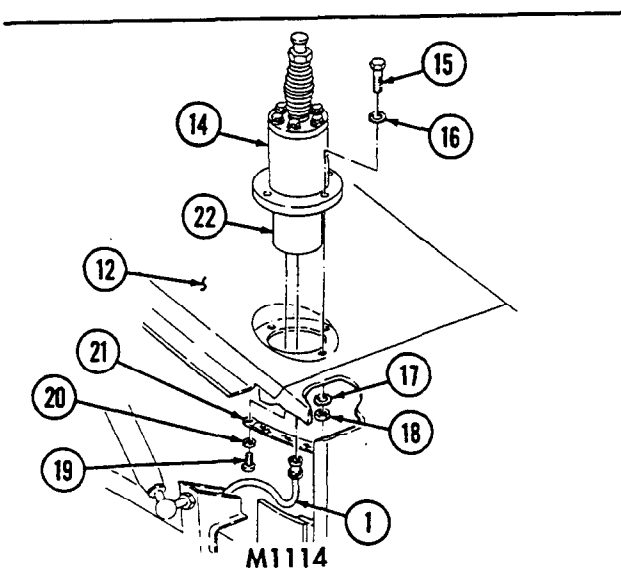
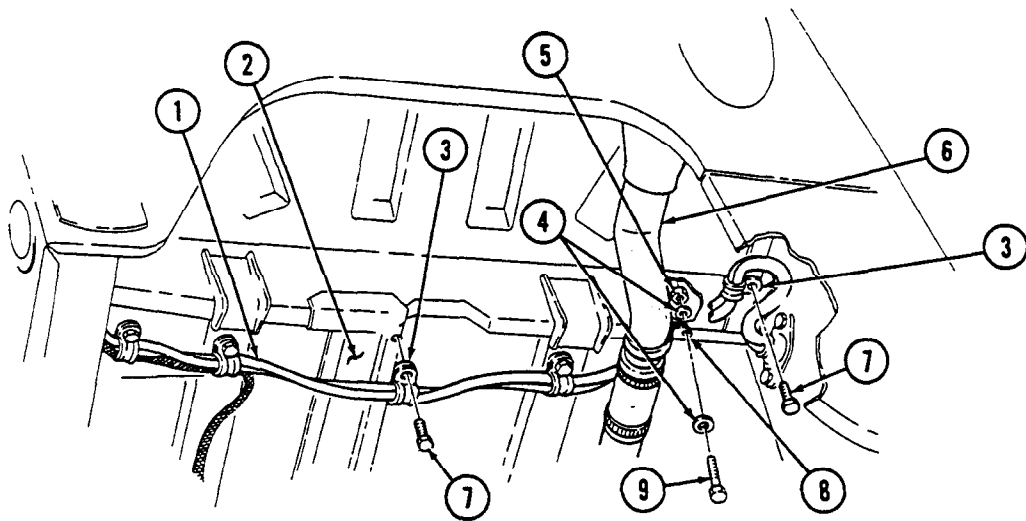
12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)

8. Remove five capscrews (7), clamps (3), and antenna cables (1) from underbody (2).
9. Remove locknut (5), washer (4), capscrew (9), washer (4), and filler pipe clamp (8) from underbody (2) and filler pipe (6). Discard locknut (5).

NOTE

Perform steps 10 through 14 for M1114 models only.

10. Remove two locknuts (10), screws (13), clamps (11), and antenna cables (1) from wheelhouse (12). Discard locknuts (10).
11. Remove screw (19), lockwasher (20), and ground strap (21) from antenna base (22). Discard lockwasher (20).
12. Remove four nuts (18), lockwashers (17), capscrews (15), lockwashers (16), and antenna (14) from wheelhouse (12). Discard lockwashers (16) and (17).
13. Disconnect antenna cables (1) from antenna base (22) and remove antenna cables (1).
14. Remove four clamps (11) from antenna cables (1).



12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)

NOTE

Perform steps 15 through 21 for M1113 models only.

15. Remove nut and lockwasher assembly (28), capscrew (30), clamp (31), two antenna cables (1), and body harness (29) from body (27). Discard nut and lockwasher assembly (28).
16. Remove two capscrews (33) and lockwashers (32) from cable shield (26) and body (27). Pull cable shield (26) away from body (27) to allow access to clamps (35). Discard lockwashers (32).
17. Remove two nut and lockwasher assemblies (34), capscrews (25), clamps (35), antenna cables (1), and body harness (29) from cable shield (26). Discard nut and lockwasher assemblies (34).

NOTE

Note position of clamp for installation.

18. Remove nut (23), clamp (36), and two antenna cables (1) from antenna mounting bracket cap-screw (24). Discard nut (23).
19. Disconnect two antenna cables (1) from antenna base (14), and push grommet (38) and antenna cables (1) through grommet opening (37) in body (27). Remove grommet (38) from antenna cables (1).
20. Remove antenna cables (1).
21. Remove clamps (31), (35), and (36) from two antenna cables (1) and body harness (29), as required.

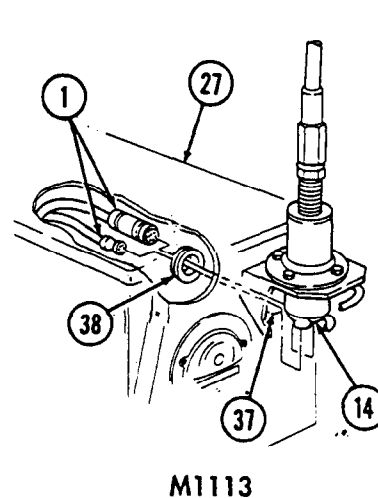
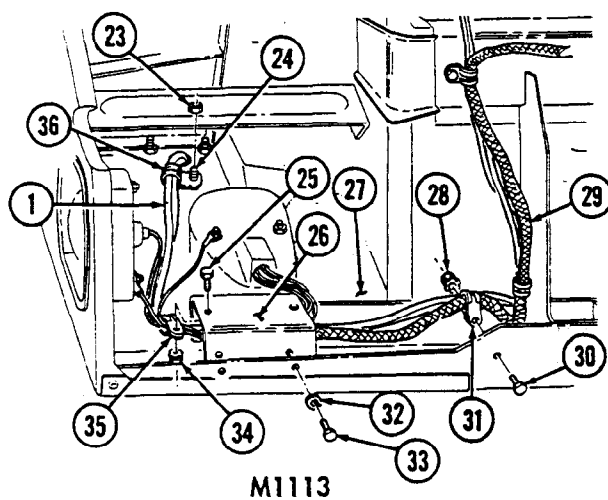
b. Installation

1. Position two antenna cables (1) in approximate mounting location.

NOTE

Perform steps 2 through 8 for M1113 models only.

2. Install clamps (31), (35), and (36) and grommet (38) on two antenna cables (1) and body harness (29), as required.
3. Insert antenna cables (1) through grommet opening (37) and install grommet (38) in body (27).
4. Connect antenna cables (1) to antenna base (14).
5. Install two antenna cables (1) on antenna mounting bracket cap-screw (24) with clamp (36) and nut (23).
6. Install two antenna cables (1) and body harness (29) on shield (26) with two clamps (35), cap-screws (25), and nut and lockwasher assemblies (34).
7. Install shield (26) on body (27) with two lockwashers (32) and capscrews (33).
8. Install two antenna cables (1) and body harness (29) on body (27) with clamp (31), capscrew (30), and nut and lockwasher assembly (28).

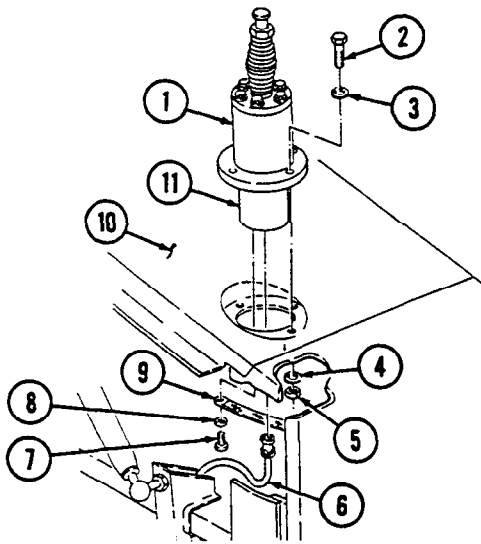


12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)

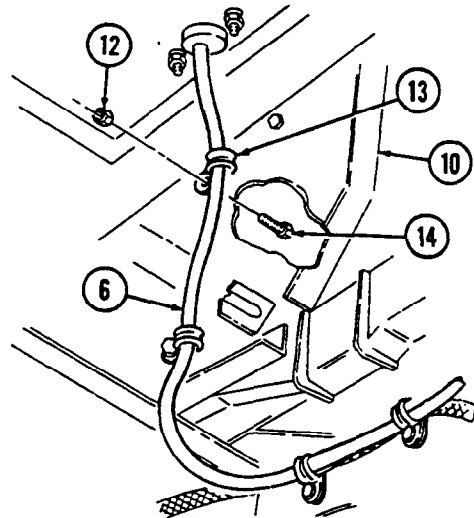
NOTE

Perform steps 9 through 12 for M1114 models only.

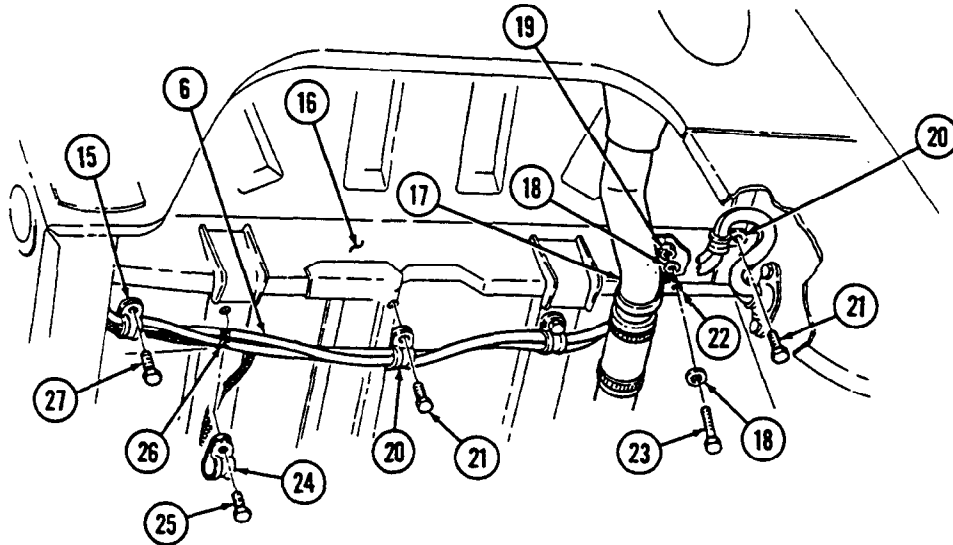
9. Connect antenna cable (6) to antenna base (11).
10. Install antenna (1) and ground strap (9) on wheelhouse (10) with four lockwashers (3), capscrews (2), lockwashers (4), and nuts (5).
11. Install ground strap (9) on antenna base (11) with lockwasher (8) and capscrew (7).
12. Install antenna cable (6) on wheelhouse (10) with four clamps (13), capscrews (14), and locknuts (12).
13. Install antenna cable (6) on underbody (16) with clamp (15) and capscrew (27).
14. Position clamp (24) over yellow locator tape (26) on two antenna cables (6) and install on underbody (16) with capscrew (25).
15. Install two antenna cables (6) on underbody (16) with five clamps (20) and capscrews (21).
16. Install clamp (22) on filler spout (17) and underbody (16) with washer (18), capscrew (23), washer (18), and locknut (19).



M1114

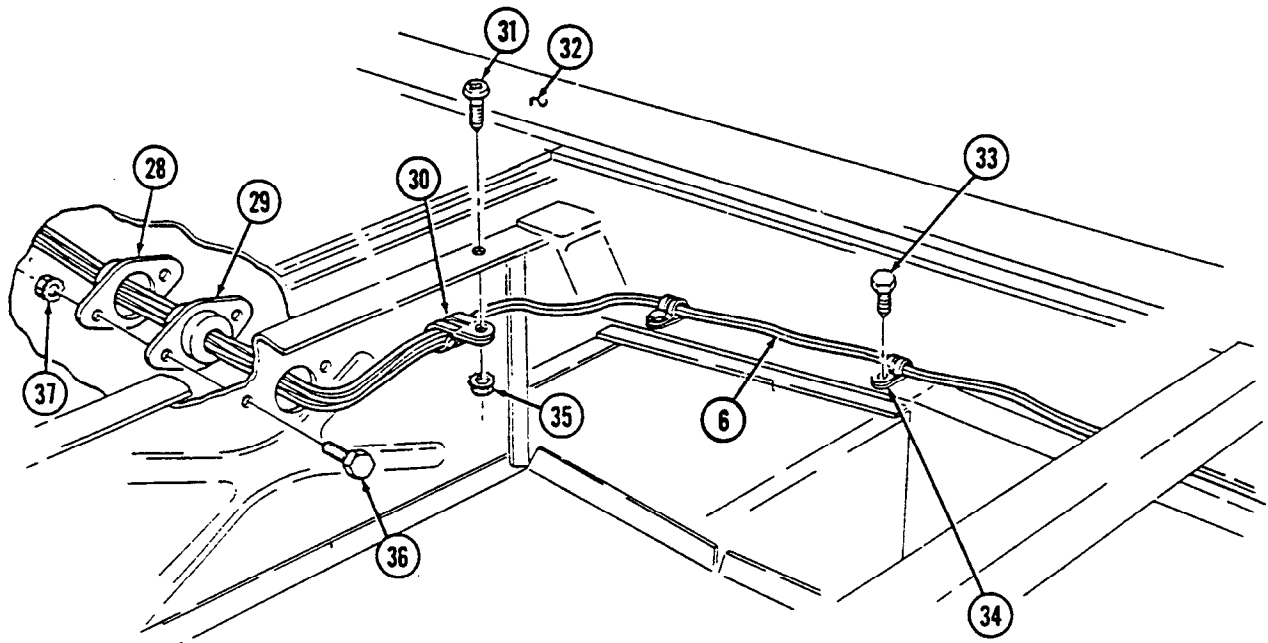


M1114



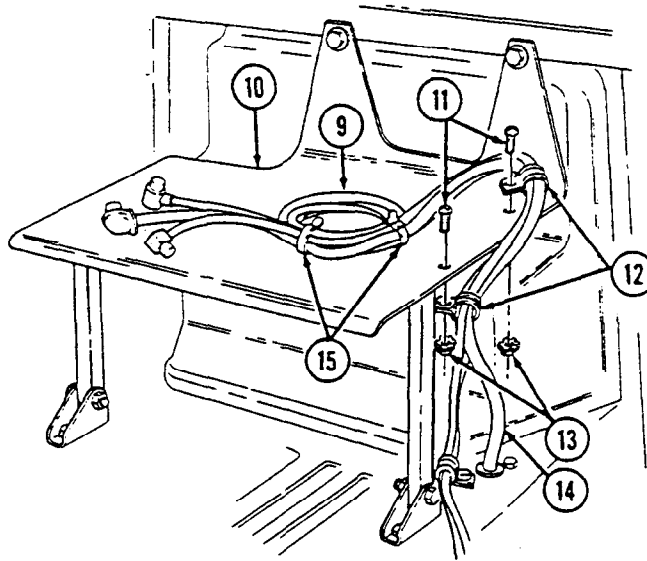
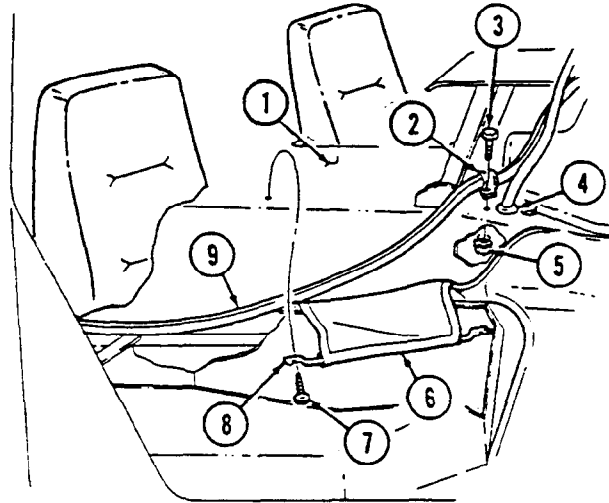
12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)

17. Install grommet (29) and retainer (28) on two antenna cables (6).
18. Install two antenna cables (6), grommet (29), and retainer (28) on body (32) with two capscrews (36) and nut and lockwasher assemblies (37).
19. Install two antenna cables (6) on body (32) with clamp (30), screw (31), and nut and lockwasher assembly (35).
20. Install two antenna cables (6) on body (32) with three clamps (34) and capscrews (33).



12-24. REAR ANTENNA CABLES REPLACEMENT (Cont'd)

21. Route two antenna cables (9) under insulation (6) along cargo floor (1).
22. Install insulation retainer (8) on cargo floor (1) with two screws (7).
23. Install two antenna cables (9) and grommet (4) on cargo floor (1) with clamp (2), capscrew (3), and nut and lockwasher assembly (5).
24. Install two antenna cables (9) and power cable (14) on front radio rack (10) with two clamps (12), screws (11), and nut and lockwasher assemblies (13).
25. Secure two antenna cables (9) to radio power cable (14) with two tiedown straps (15).



- FOLLOW-ON TASKS:
- Install right rear passenger seat (M1114 only) (para. 10-45).
 - Connect battery ground cables (para. 4-68).
 - Lower cargo shell door (TM 9-2320-387-10).
 - Install right rear underbody armor (M1114 only) (para. 11-39).

12-25. POWER CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four nut and lockwasher assemblies
(Appendix G, Item 245)
Two lockwashers (Appendix G, Item 217)
Two tiedown straps (Appendix G, Item 462)
Sealing compound (Appendix C, Item 70)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

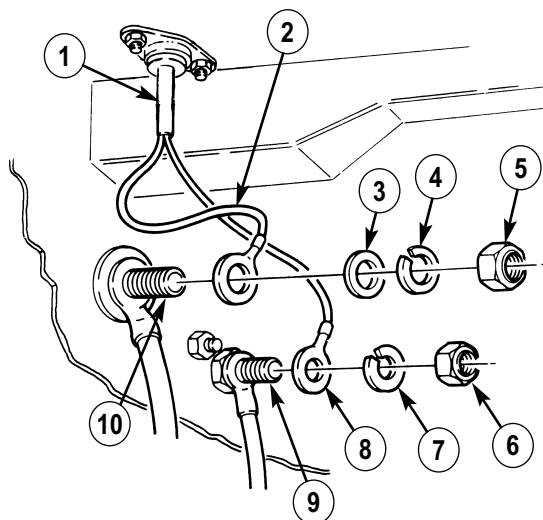
Maintenance Level

Unit

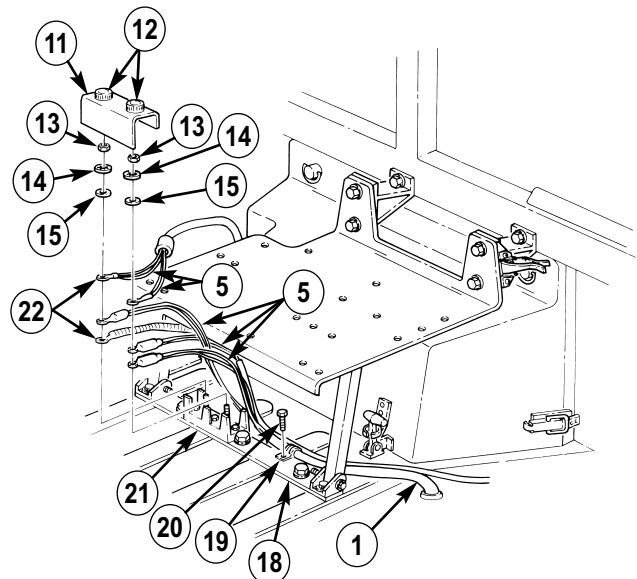
a. Removal

NOTE

- Perform steps 1 and 2 for M1113 models only.
 - Perform steps 3 through 5 for M1114 models only.
1. Remove nut (5), lockwasher (4), washer (3), and positive lead (2) from power feed-through stud (10). Discard lockwasher (4).
 2. Remove nut (6), lockwasher (7), and negative lead (8) from shunt stud (9). Discard lockwasher (7).
 3. Loosen terminal lugs (12) and remove cover (11) from terminal board (21).
 4. Remove two nuts (13), lockwashers (14), washers (15), power cable leads (17), and cable leads (16) and (22) from terminal board (21).
 5. Remove screw (20), clamp (19), and power cable (1) from support bracket (18).



M1113



M1114

12-25. POWER CABLE REPLACEMENT (Cont'd)

6. Remove two tiedown straps (16) from power cable (13) and antenna cables (18). Discard tiedown straps (16).
7. Remove two nut and lockwasher assemblies (8), screws (4), clamps (7), and power cable (13) from radio rack (17). Discard nut and lockwasher assemblies (8).

NOTE

Perform step 8 for M1113 vehicles. Perform step 8.1 for M1114 vehicles.

8. Remove four locknuts (3), washers (2), capscrews (1), washers (2), and radio rack (17) from two brackets (5). Pull radio rack (17) away from A-beam (6). Discard locknuts (3).
- 8.1. Remove four locknuts (3), capscrews (1), washers (2), rifle mounting clamp bracket (17.1), and radio rack (17) from two brackets (5). Pull radio rack (17) away from A-beam (6). Discard locknuts (3).
9. Remove engine access cover (para. 10-22).
10. Remove two nut and lockwasher assemblies (15) and capscrews (9) from clamp (10), retainer (14), grommet (12), power cable (13), and body (11). Discard nut and lockwasher assemblies (15).

b. Installation

1. Position power cable (13) in approximate mounting location.
2. Install grommet (12), retainer (14), clamp (10), and power cable (13) on body (11) with two capscrews (9) and nut and lockwasher assemblies (15). Tighten nut and lockwasher assemblies (15) to 5 lb-ft (7 N·m).
3. Install engine access cover (para. 10-22).

NOTE

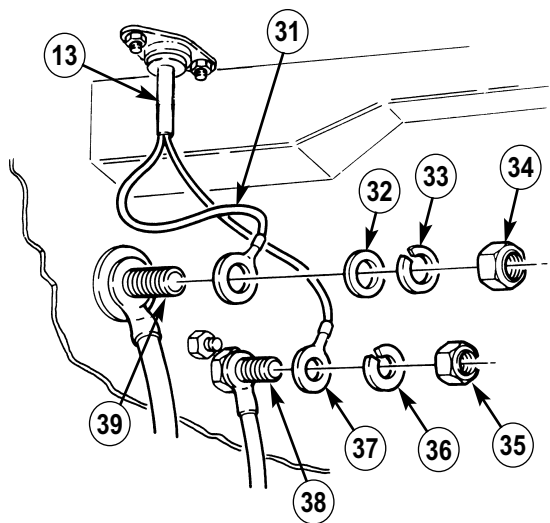
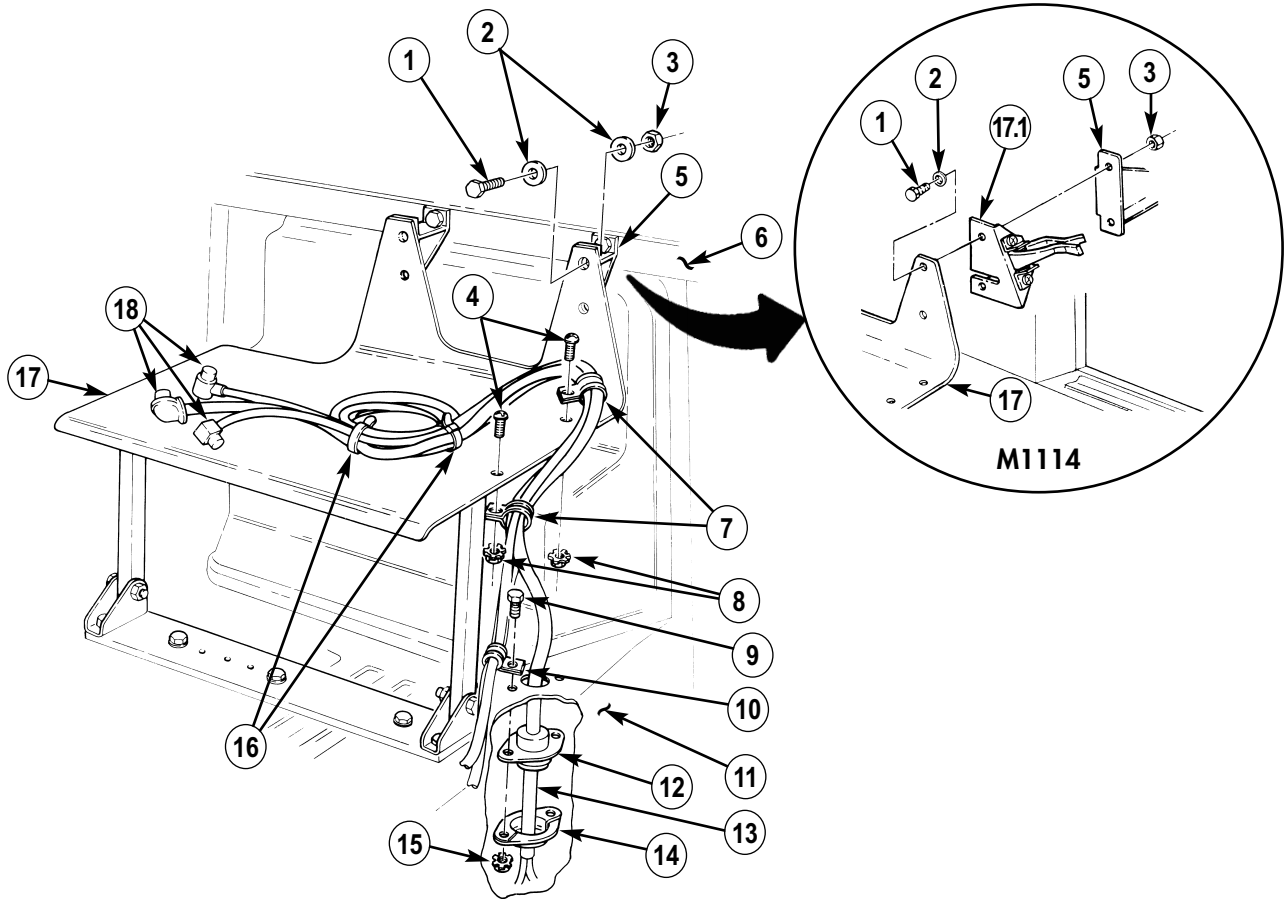
Perform step 4 for M1113 vehicles. Perform step 4.1 for M1114 vehicles.

4. Install radio rack (17) on two brackets (5) with four washers (2), capscrews (1), washers (2), and locknuts (3). Tighten locknuts (3) to 6 lb-ft (8 N·m).
- 4.1. Install radio rack (17) on two brackets (5) with rifle mounting clamp bracket (17.1), four washers (2), capscrews (1), and locknuts (3). Tighten locknuts (3) to 6 lb-ft (8 N·m).
5. Install power cable (13) on antenna cables (18) with two tiedown straps (16).
6. Install power cable (13) on radio rack (17) with two clamps (7), screws (4), and nut and lockwasher assemblies (8).

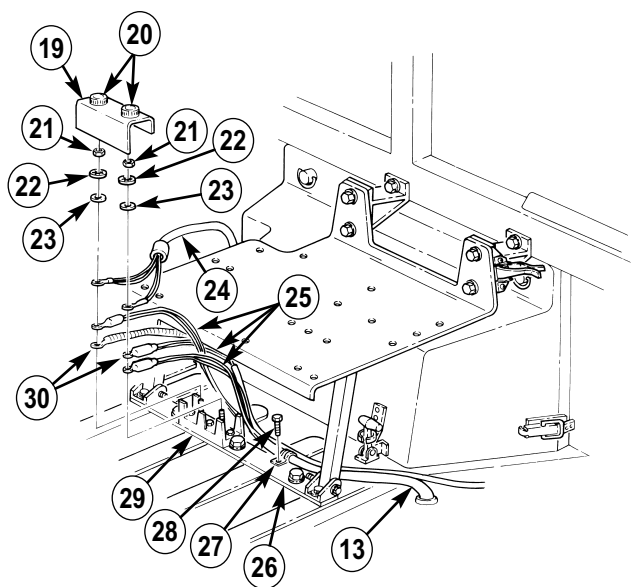
NOTE

- Perform steps 7 and 8 for M1113 models only.
 - Perform steps 9 through 11 for M1114 models only.
 - Apply sealing compound to studs and terminal board after attaching leads in step 7 through 9.
7. Install negative lead (37) on shunt stud (38) with lockwasher (36) and nut (35). Tighten nut (35) to 75 lb-ft (102 N·m).
 8. Install positive lead (31) on power stud (39) with washer (32), lockwasher (33), and nut (34). Tighten nut (34) to 26 lb-ft (35 N·m).
 9. Install power cable leads (25) and cable leads (24) and (30) on terminal board (29) with two washers (23), lockwashers (22), and nuts (21).
 10. Install power cable (13) and clamp (27) on support bracket (26) with screw (28).
 11. Install cover (19) on terminal board (29). Tighten terminal lugs (20).

12-25. POWER CABLE REPLACEMENT (Cont'd)



M1113



M1114

FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

Section III. WINCH KIT MAINTENANCE

12-26. WINCH KIT MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
12-27.	Front Winch Replacement	12-52
12-27.1.	10,500 lb Hydraulic Winch and Brackets Replacement	12-54.2
12-28.	Winch Cable Replacement	12-56
12-28.1.	10,500 lb Hydraulic Winch Cable Replacement	12-56.2
12-29.	Winch Vent Line Replacement	12-58
12-30.	Front Fairlead Roller Bracket Assembly Replacement	12-59
12-31.	Front Winch Clutch Rod Replacement	12-60
12-31.1.	10,500 lb Hydraulic Winch Hose Replacement	12-60.2
12-32.	Front Winch Receptacle Bracket Replacement	12-61
12-32.1.	10,500 lb Hydraulic Winch Controller Plug Replacement	12-62
12-33.	Rear Winch Replacement	12-63
12-34.	Rear Winch Vent Line Replacement	12-66
12-35.	Rear Fairlead Roller Bracket Assembly Replacement	12-67
12-36.	Rear Winch Clutch Cable Replacement	12-68
12-36.1.	10,500 lb Rear Hydraulic Winch Assembly and Brackets Replacement	12-68.1
12-36.2.	10,500 lb Rear Hydraulic Winch Cable Replacement	12-68.4
12-36.3.	10,500 lb Rear Hydraulic Winch Fairlead Roller Bracket Assembly Replacement	12-68.6
12-36.4.	10,500 lb Rear Hydraulic Winch Hose Replacement	12-68.8
12-36.5.	10,500 lb Rear Hydraulic Winch Valve Assembly Replacement	12-68.20
12-36.6.	10,500 lb Rear Hydraulic Winch Controller Plug Replacement	12-68.26

12-27. FRONT WINCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four lockwashers (Appendix G, Item 205)
Four tiedown straps (Appendix G, Item 464)
Nut and lockwasher assembly
(Appendix G, Item 245)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Engine right splash shield removed (para. 10-24).
- Front winch clutch rod removed (para. 12-31).

General Safety Instructions

Winch must be supported during removal and installation.

Maintenance Level

Unit

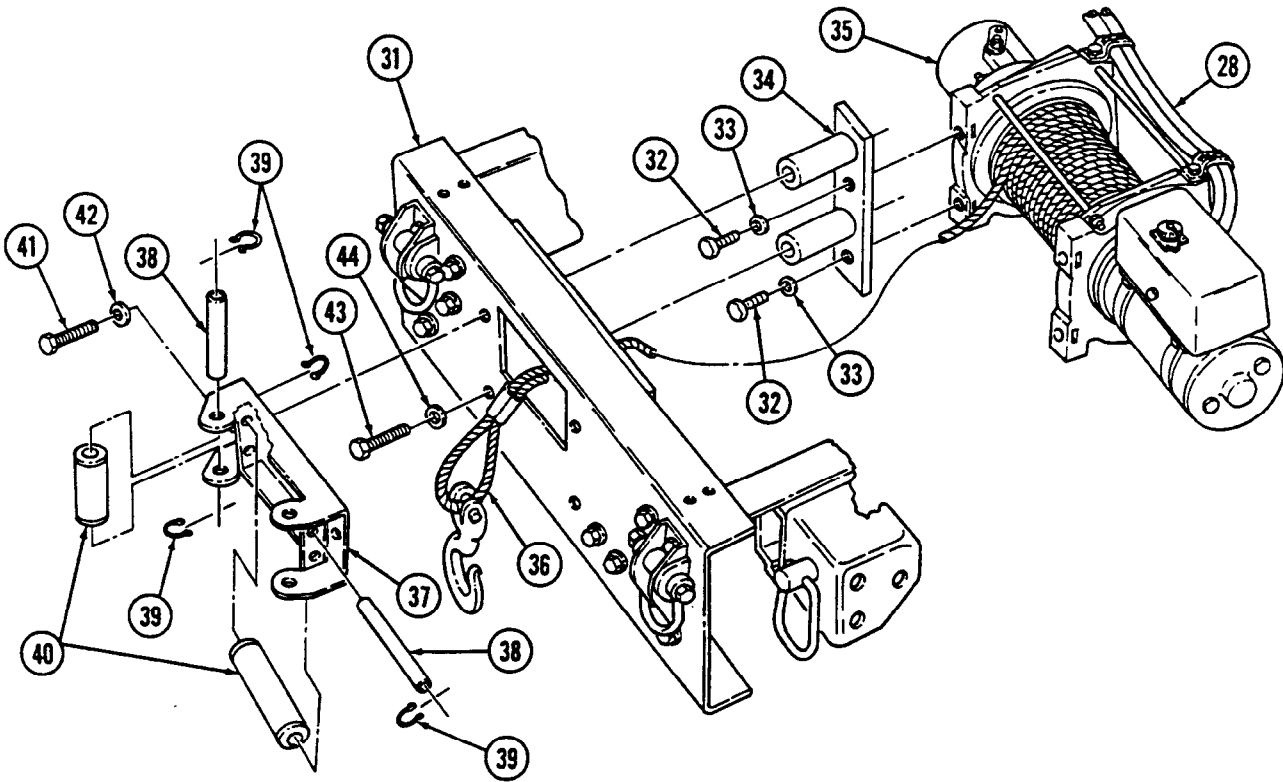
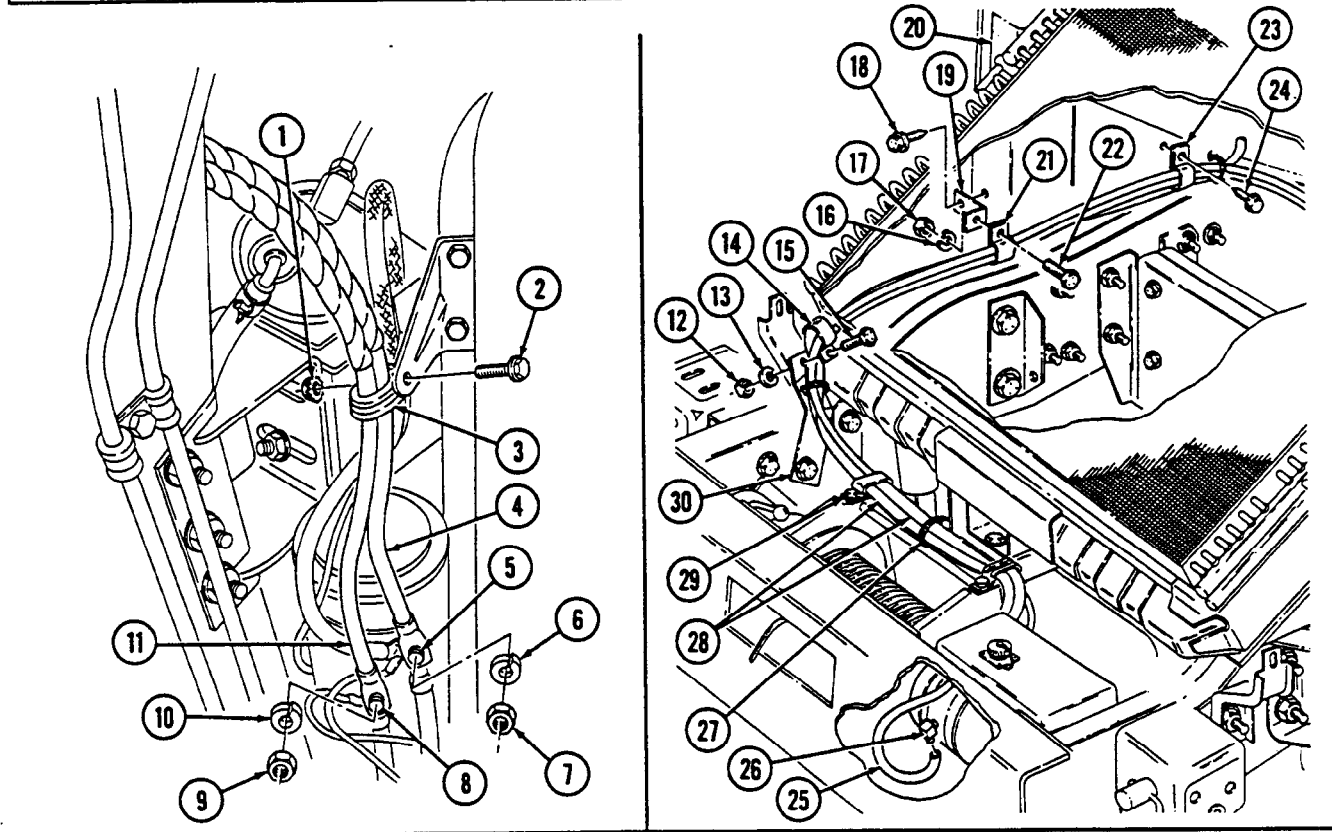
WARNING

Winch must be supported during removal and installation. Failure to support winch may result in injury to personnel or damage to equipment.

a. Removal

1. Remove nut (9) and lockwasher (10) and disconnect lead 7 (11) from starter terminal (8). Discard lockwasher (10).
2. Remove nut (7) and lockwasher (6) and disconnect lead 6 (4) from starter terminal (5). Discard lockwasher (6).
3. Remove nut and lockwasher assembly (1) and clamp (3) from oil pan bracket screw (2). Discard nut and lockwasher assembly (1).
4. Remove capscrew (24), clamp (23), capscrew (18), and bracket (19) from airlift bracket (20).
5. Remove nut (12), lockwasher (13), capscrew (15), and clamp (14) from frame bracket (30). Discard lockwasher (13).
6. Disconnect vent line (25) from fitting (26) and remove three tiedown straps (27) and vent line (25) from power cables (28). Pull cables (28) to front of vehicle. Discard tiedown straps (27).
7. Remove four retaining rings (39), two shafts (38), and rollers (40) from fairlead roller bracket (37). Pull cable (36) through bumper (31).
8. Remove two capscrews (43) and washers (44) from winch (35) and bumper (31).
9. Remove two capscrews (41), washers (42), and fairlead roller bracket (37) from bumper (31). Lower and remove winch (35).
10. Measure length of power cables (28) from clamp (29) on winch (35) to clamp (21) on bracket (19) and record. Remove nut (17), lockwasher (16), capscrew (22), clamp (21), and bracket (19) from power cables (28). Discard lockwasher (16).
11. Remove four capscrews (32), washers (33), and two brackets (34) from winch (35).

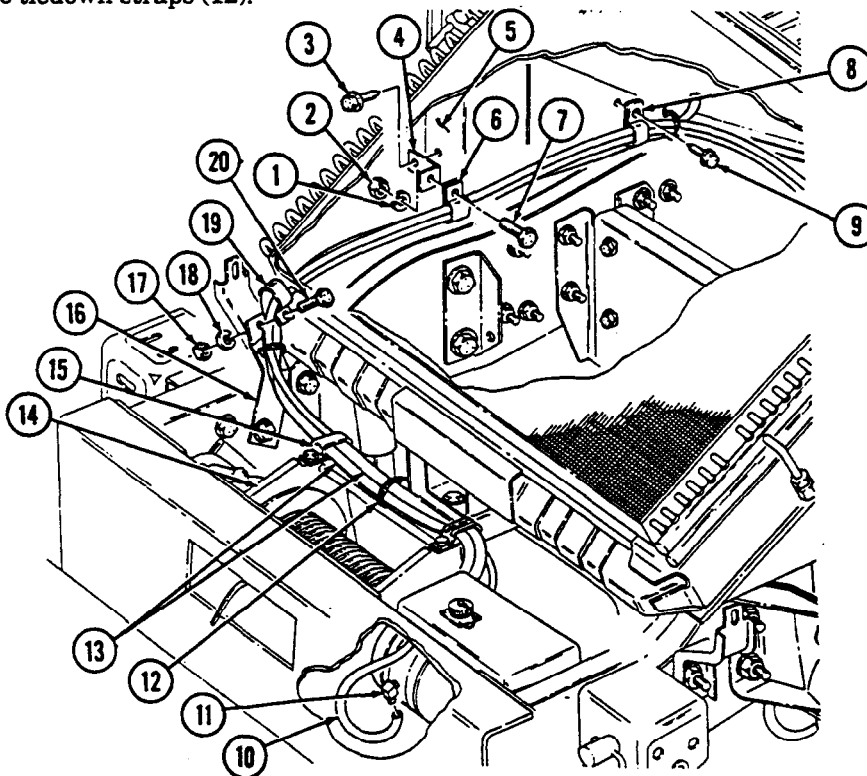
12-27. FRONT WINCH REPLACEMENT (Cont'd)



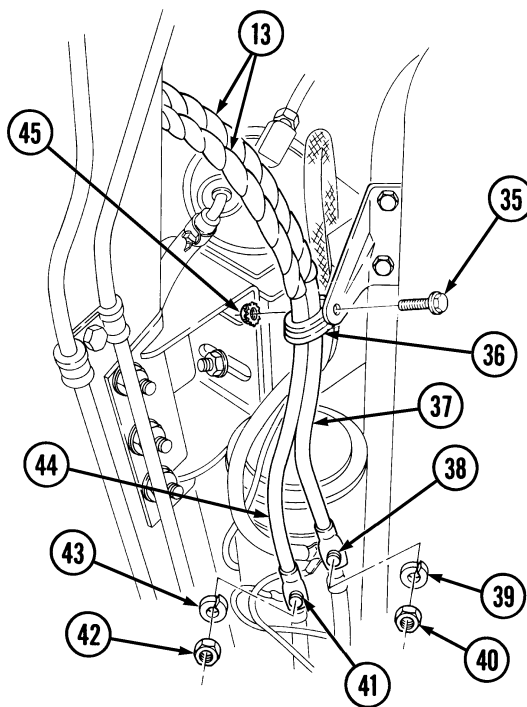
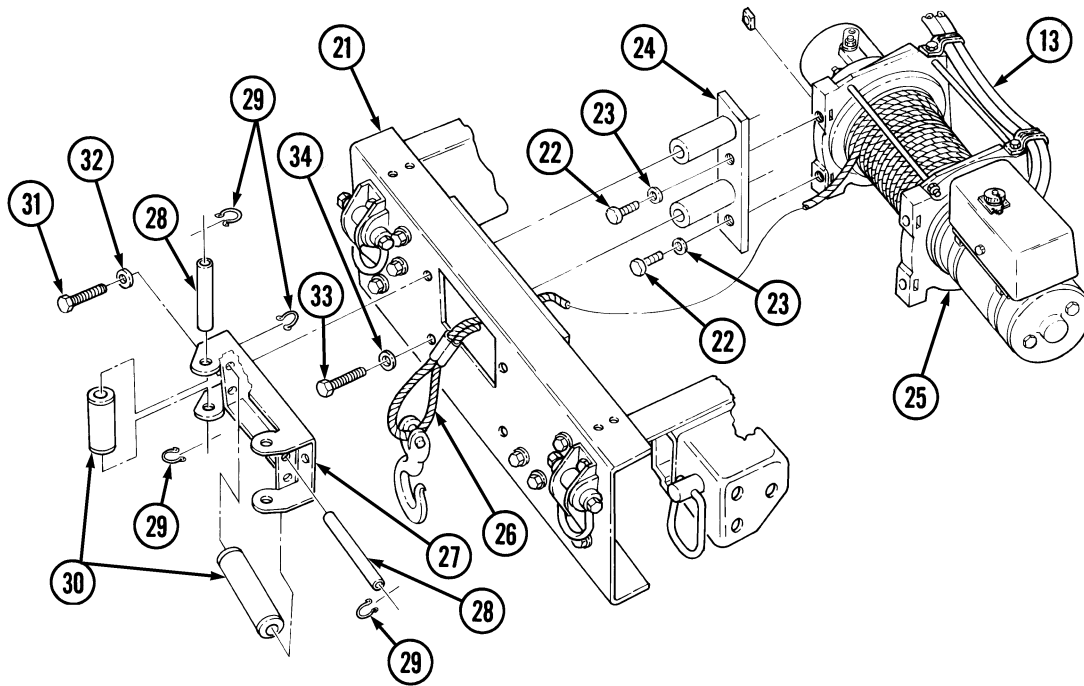
12-27. FRONT WINCH REPLACEMENT (Cont'd)

b. Installation

1. Install two brackets (24) on winch (25) with four washers (23) and capscrews (22). Tighten capscrews (22) to 35 lb-ft (47 N·m).
2. Position clamp (6) on power cables (13) at same distance from clamp (15) on winch (25) that was recorded in removal.
3. Install clamp (6) and bracket (4) on power cables (13) with capscrew (7), lockwasher (1), and nut (2).
4. Install winch (25) and fairlead roller bracket (27) on bumper (21) with two washers (32) and capscrews (31). Tighten capscrews (31) finger-tight. Feed cable (26) through bumper (21) and roller bracket (27).
5. Secure winch (25) on bumper (21) with two washers (34) and capscrews (33). Tighten capscrews (33) and (31) to 35 lb-ft (47 N·m).
6. Install two rollers (30) and shafts (28) on fairlead roller bracket (27) with four retaining rings (29).
7. Route power cables (13) in approximate mounting location in vehicle.
8. Install lead 7 (44) on starter terminal (41) with lockwasher (43) and nut (42). Tighten nut (42) to 15 lb-ft (20 N·m).
9. Install lead 6 (37) on starter terminal (38) with lockwasher (39) and nut (40). Tighten nut (40) to 25 lb-ft (34 N·m).
10. Install clamp (36) and power cables (13) on oil pan bracket screw (35) with nut and lockwasher assembly (45).
11. Install clamp (8) and power cables (13) on airlift bracket (5) with capscrew (9).
12. Install bracket (4) on airlift bracket (5) with capscrew (3), capscrew (7), lockwasher (1), and nut (2).
13. Install clamp (19) on power cables (13) and frame bracket (16) with capscrew (20), lockwasher (18), and nut (17).
14. Connect vent line (10) to fitting (11) on winch housing (14). Install vent line (10) on power cables (13) with three tiedown straps (12).



12-27. FRONT WINCH REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install front winch clutch rod (para. 12-31).
 - Install engine right splash shield (para. 10-24).
 - Connect battery ground cables (para. 4-68).

12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT

This task covers:

- a. Winch Removal
- b. Brackets Removal
- c. Brackets Installation
- d. Winch Installation

INITIAL SETUP:

Applicable Models:

M1113

Tools

General mechanics tool kit: automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment: automotive (Appendix B, Item 2)

Materials/Parts

Locknut (Appendix G, Item 109)
 Six locknuts (Appendix G, Item 117)
 Four locknuts (Appendix G, Item 121)
 Two locknuts (Appendix G, Item 130)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Underbody protection kit removed (if applicable) (para. 10-58.2).
- Brake protection guards removed (if applicable) (para. 7-11).

General Safety Instructions

Support winch and bumper during winch replacement.

Maintenance Level

Unit

NOTE

Tag all leads prior to removal.

a. Winch Removal

1. Disconnect controller plug lead 758C (10) from winch lead 758C (9).
2. Disconnect controller plug lead 758A (8) from winch lead 758A (7).
3. Disconnect controller plug lead 758B (6) from lead wire 758B (5).
4. Remove locknut (14), washer (13), screw (11), and two clamps (12) with hydraulic hose assemblies (1) and (4) from winch and bumper assembly (15). Discard locknut (14).

CAUTION

Cover or plug hoses and connections immediately after removal to prevent contamination. Remove all plugs prior to connecting hoses.

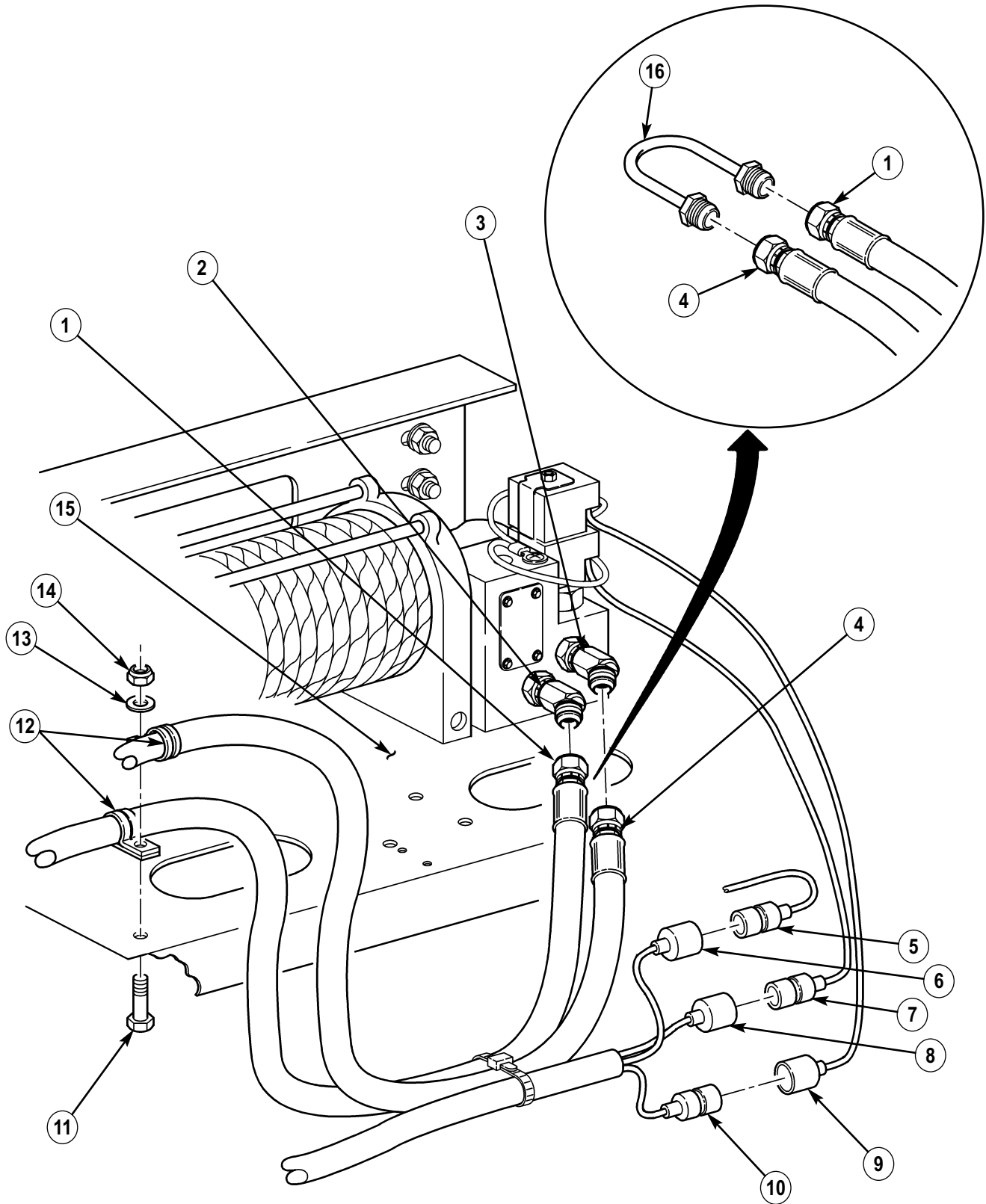
5. Disconnect hydraulic hose (1) from elbow (2) on bottom winch outlet port on winch (15) .
6. Disconnect hydraulic hose (4) from elbow (3) on top winch inlet port on winch (15).

NOTE

If vehicle is to be operated with winch assembly removed, perform step 7.

7. Connect tube assembly (16) to hydraulic hose assemblies (1) and (4).

12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT (Cont'd)



12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT (Cont'd)**WARNING**

Winch and bumper must be supported with a floor jack during winch replacement. Failure to support winch may result in injury to personnel or damage to equipment.

8. Remove four locknuts (14), washers (10), capscrews (11), washers (10), and two tow brackets (9) from winch and bumper assembly (8) and left and right bracket assemblies (5). Discard locknuts (14).
9. Remove two locknuts (12), washers (13), and winch and bumper assembly (8) from left and right lower control arm screws (1). Discard locknuts (12).

b. Brackets Removal**NOTE**

- Brackets may not require replacement. Replace brackets only when damaged.
 - The left and right side brackets are removed the same. This procedure covers the left side.
1. Remove three locknuts (3), washers (2), capscrews (15), and washers (2) from left hand bracket assembly (5) and frame (16). Discard locknuts (3).
 2. Remove capscrew (7), washer (6), and left hand bracket assembly (5) from grille extension (4).

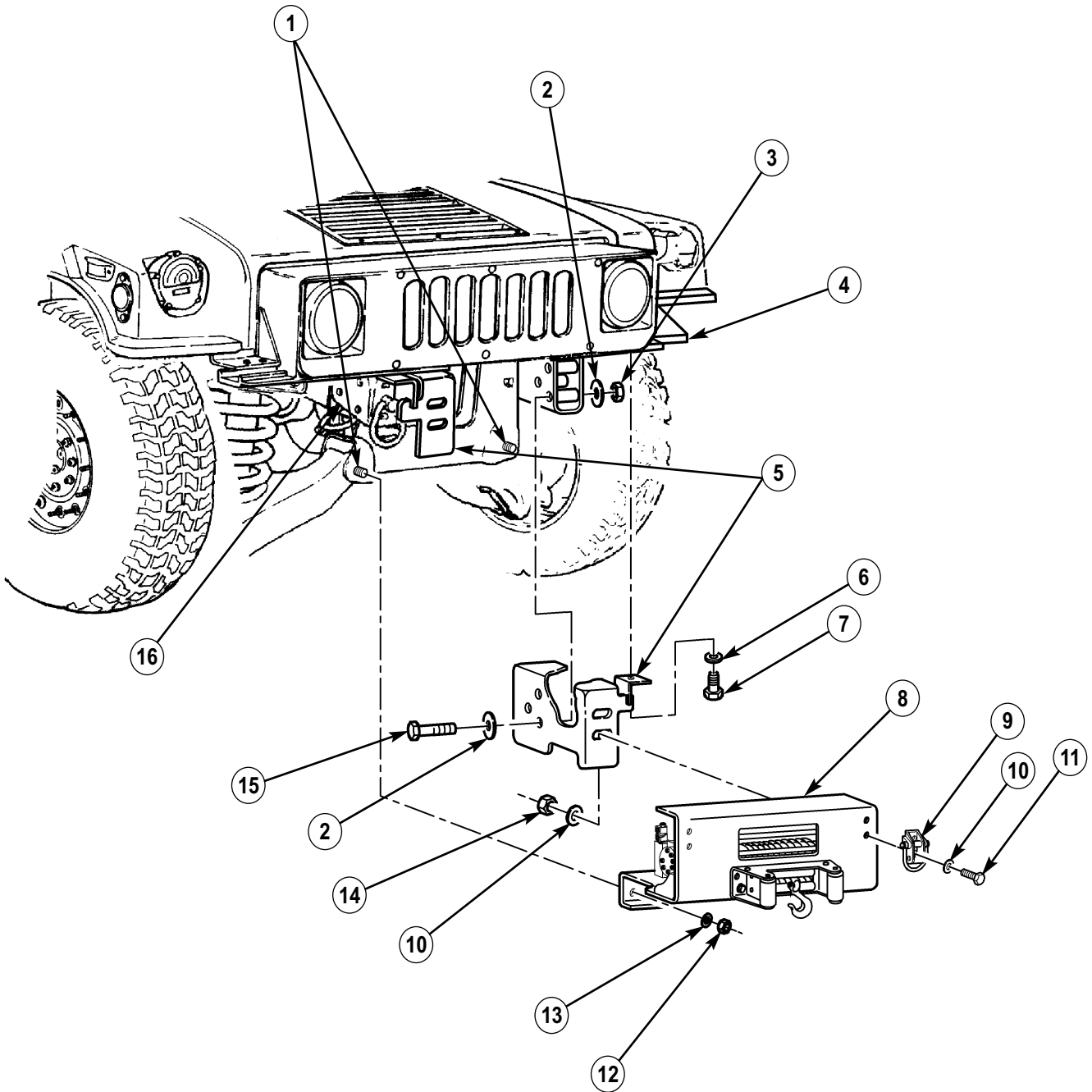
c. Brackets Installation

1. Install left hand bracket assembly (5) on grille extension (4) with washer (6) and capscrew (7). Finger tighten capscrew (7).
2. Install left hand bracket assembly (5) on frame rail (16) with three washers (2), capscrews (15), washers (2), and locknuts (3). Tighten locknuts (3) to 225 lb-ft (303 N•m).

d. Winch Installation

1. Install winch and bumper assembly (8) on left and right lower control arm screws (1) with two washers (13) and locknuts (12). Finger tighten locknuts (12).
2. Secure winch and bumper assembly (8) and two tow brackets (9) on left and right bracket assemblies (5) with four washers (10), capscrews (11), washers (10), and locknuts (14).
3. Tighten locknuts (12) to 260 lb-ft (353 N•m).

12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT (Cont'd)



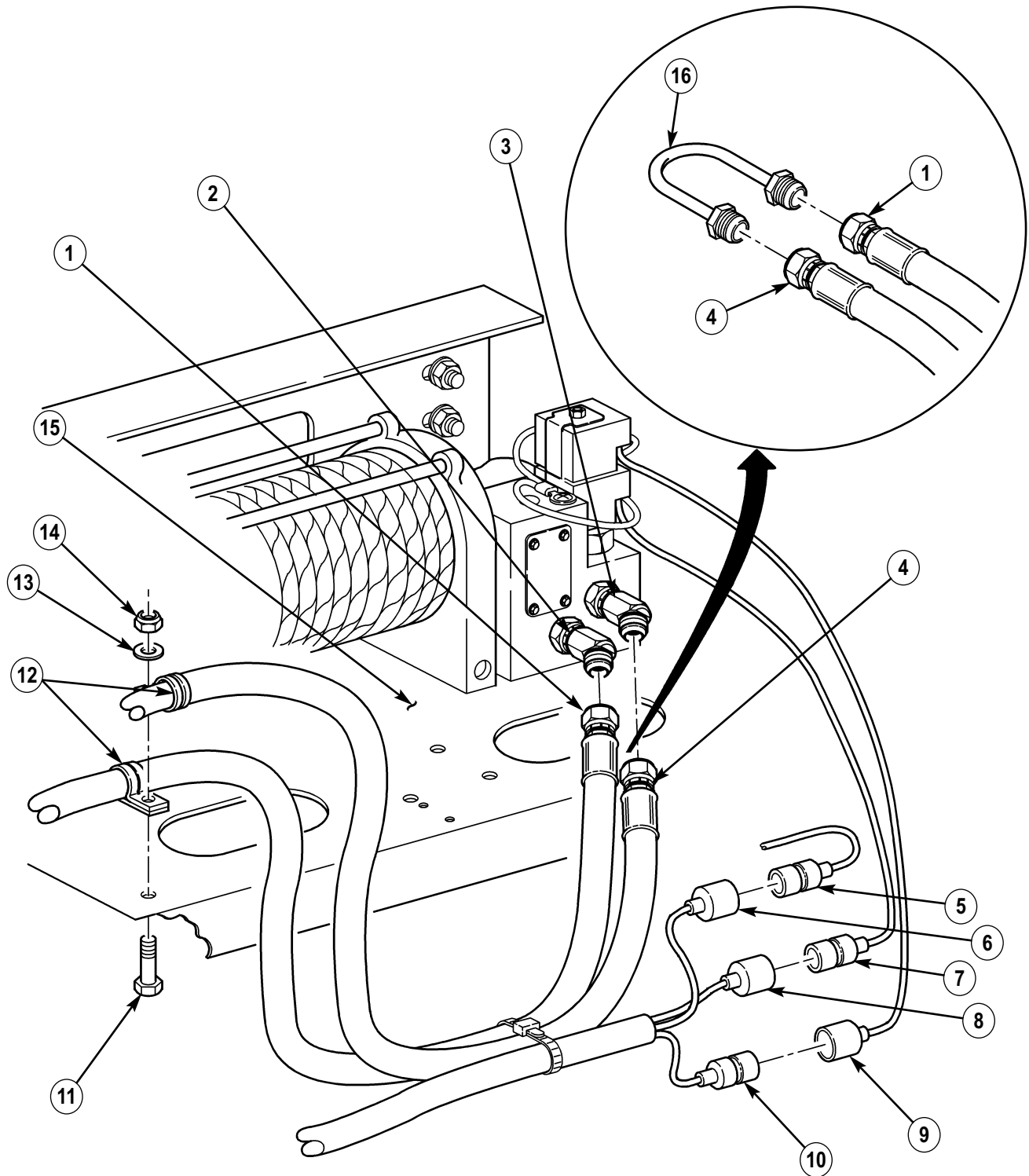
12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT (Cont'd)

NOTE

If tube assembly is installed, perform step 4.

4. Disconnect tube assembly (16) from hydraulic hose assemblies (1) and (4).
5. Connect hydraulic hose assembly (4) to elbow (3) on top winch inlet port on winch (15).
6. Connect hydraulic hose assembly (1) to elbow (2) on bottom winch outlet port on winch (15).
7. Install hydraulic hose assemblies (1) and (4) on winch and bumper assembly (15) with two clamps (12), capscrew (11), washer (13), locknut (14).
8. Connect controller plug lead 758B (6) to lead wire 785B (5).
9. Connect controller plug lead 758A (8) to winch lead 758A (7).
10. Connect controller plug lead 758C (10) to winch lead 758C (9).

12-27.1. 10,500 LB HYDRAULIC WINCH AND BRACKETS REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install brake protection guards (if applicable) (para. 7-11).
 - Install underbody protection kit (if applicable) (para. 10-58.2).
 - Connect battery ground cables (para. 4-68).
 - Bleed power steering system (para. 8-27).

12-28. WINCH CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Cotter pin (Appendix G, Item 31)

General Safety Instructions

Wear leather gloves when handling winch cable.

Personnel Required

One mechanic
One assistant

Maintenance Level

Unit

WARNING

Gloves must be worn when handling winch cable or severe personnel injury may result.

a. Removal

1. Unwind winch cable (2) from drum assembly (1) (TM 9-2320-387-10).
2. Remove capscrew (6) and winch cable (2) from drum assembly (1).
3. Remove cotter pin (5), clevis pin (3), and hook (4) from winch cable (2). Discard cotter pin (5).

b. Installation

NOTE

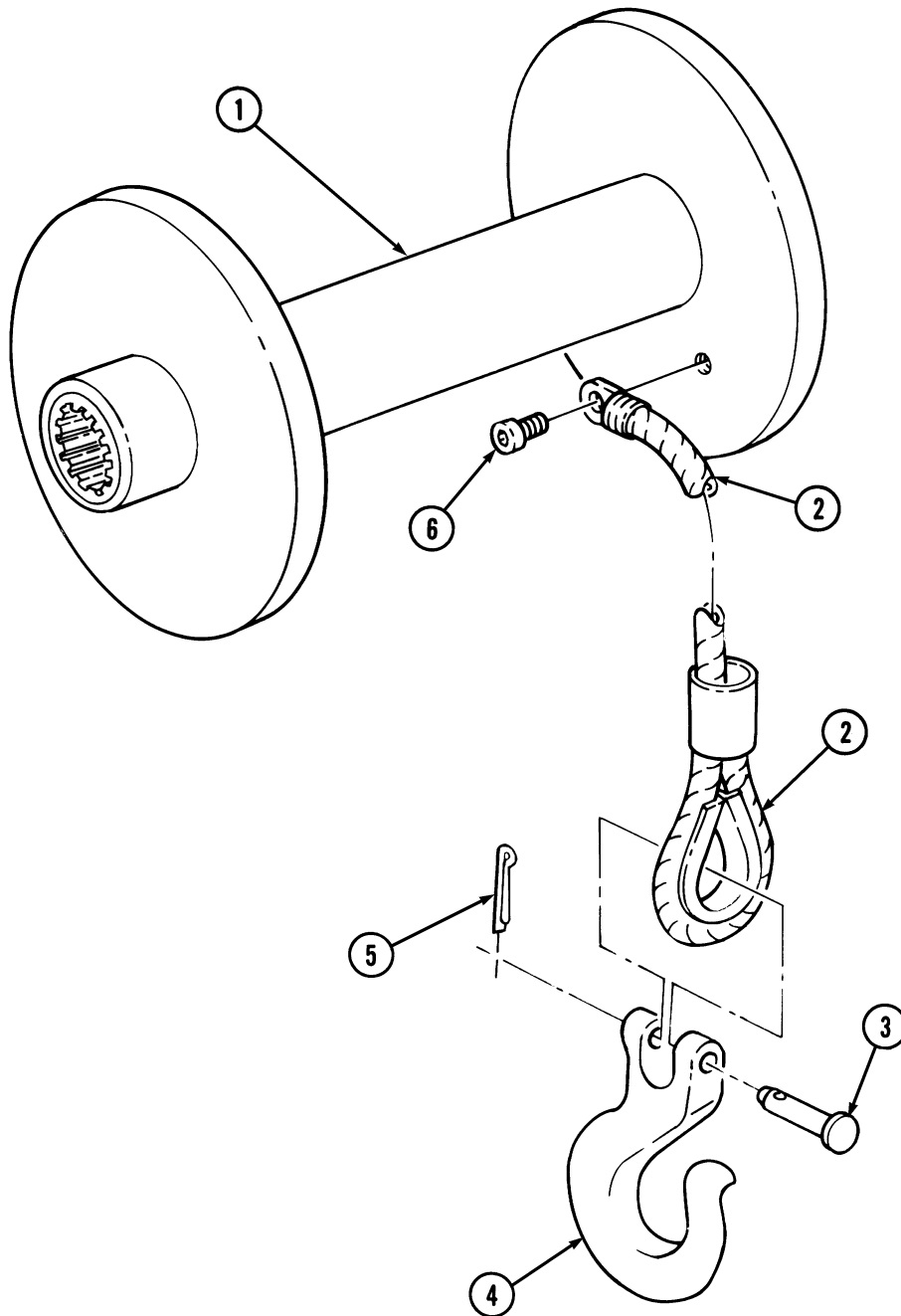
Install clamp on winch cable to keep wires from shearing or breaking. Refer to appendix D, fig. D-102 for instructions.

1. Install hook (4) on winch cable (2) with clevis pin (3) and cotter pin (5).
2. Install winch cable (2) on drum assembly (1) with capscrew (6).

CAUTION

- The winch cable must be spooled on the drum according to the direction of rotation label on the winch or brake will not function.
 - Winch cable must be installed on drum under a load of at least 500 lb (227 kg) or outer wraps will draw into inner wraps and damage winch cable.
3. Wind winch cable (2) on drum assembly (1) (TM 9-2320-387-10).

12-28. WINCH CABLE REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Lubricate winch cable (TM 9-2320-387-10).
 - Check winch for proper operation (TM 9-2320-387-10).

12-28.1. 10,500 LB HYDRAULIC WINCH CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Models:

M1113

Tools

General mechanics tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Cotter pin (Appendix G, Item 31)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

General Safety Instructions

Wear leather gloves when handling
winch cable.

Maintenance Level

Unit

WARNING

Gloves must be worn when handling winch cable or severe
personnel injury may result.

a. Removal

1. Unwind winch cable (2) from drum assembly (1) (TM 9-2320-387-10).
2. Remove capscrew (4), terminal (3), and winch cable (2) from drum assembly (1).
3. Remove cotter pin (7), clevis pin (5), and hook (6) from winch cable (2). Discard cotter pin (7).

b. Installation

CAUTION

Install clamp on winch cable to keep wires from shearing or
breaking. Refer to appendix D, fig. D-102 for instructions.

1. Install hook (6) on winch cable (2) with clevis pin (5) and cotter pin (7).

CAUTION

When installing cable on drum assembly, route cable in through
fairlead assembly, under drum, and install on top of drum.
Failure to do so may cause damage to cable and winch.

NOTE

It may be necessary to place the drumlock handles in FREE to
route the winch cable through the rear winch mounting bracket,
reinforcement plate, and roller assembly. Place drumlock handle
back to ENGAGED position to prevent cable from unwrapping
from drum.

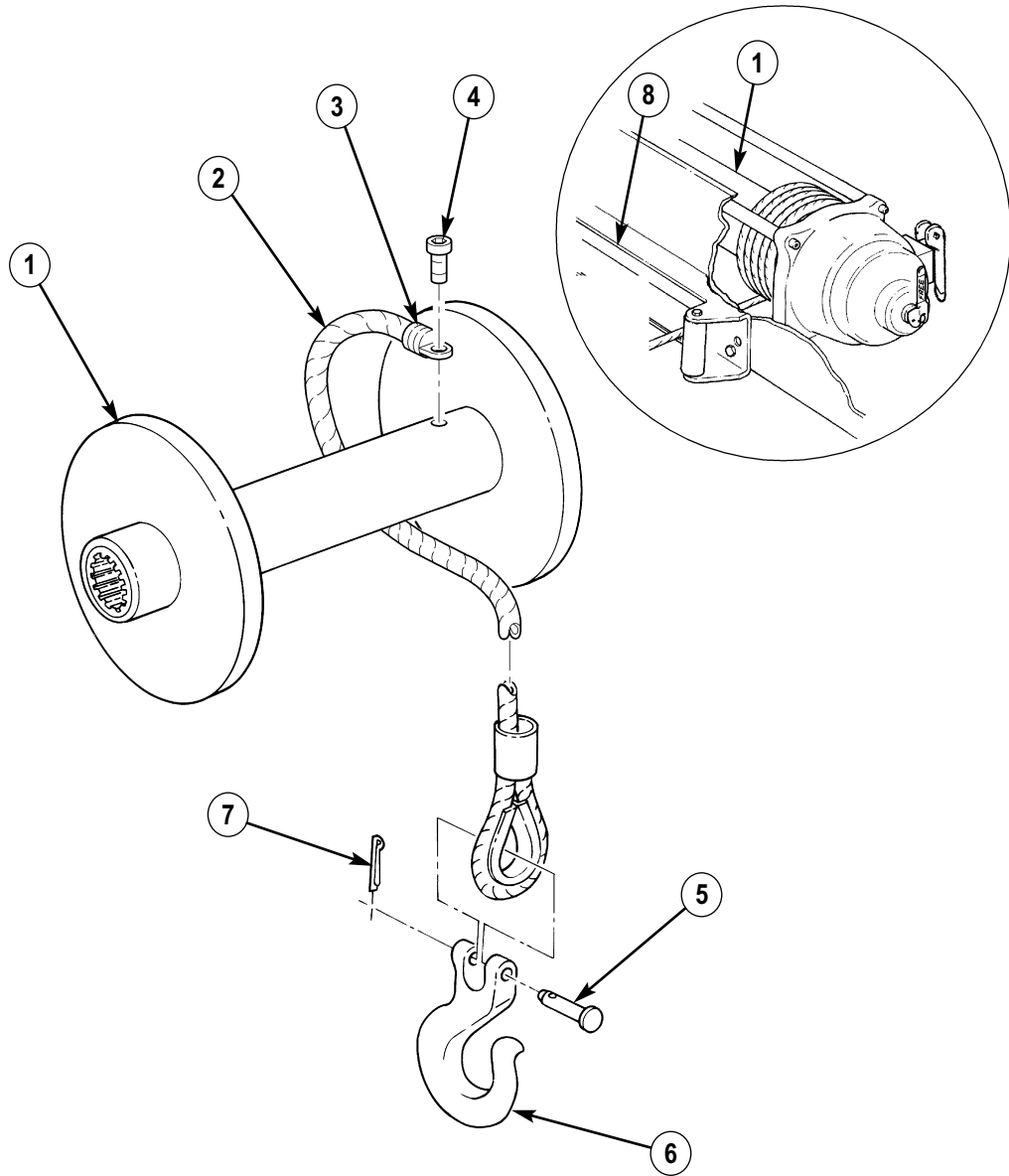
2. Route winch cable (2) through fairlead assembly (8), under drum assembly (1), and install
terminal (3) on drum assembly (1) with capscrew (4).

CAUTION

- The winch cable must be spooled on the drum according to the
direction of rotation label on the winch or brake will not function.
- Winch cable must be installed on drum under a load of at least
500 lb (227kg) or outer wraps will draw into inner wraps and
damage winch cable.

3. Install winch cable (2) on drum assembly (1) (TM 9-2320-387-10).

12-28.1. 10,500 LB HYDRAULIC WINCH CABLE REPLACEMENT (Cont'd)



- FOLLOW ON TASKS:
- Lubricate winch cable (TM 9-2320-387-10).
 - Check winch for proper operation (TM 9-2320-387-10).

12-29. WINCH VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Three tiedown straps (Appendix G, Item 463)

Maintenance Level

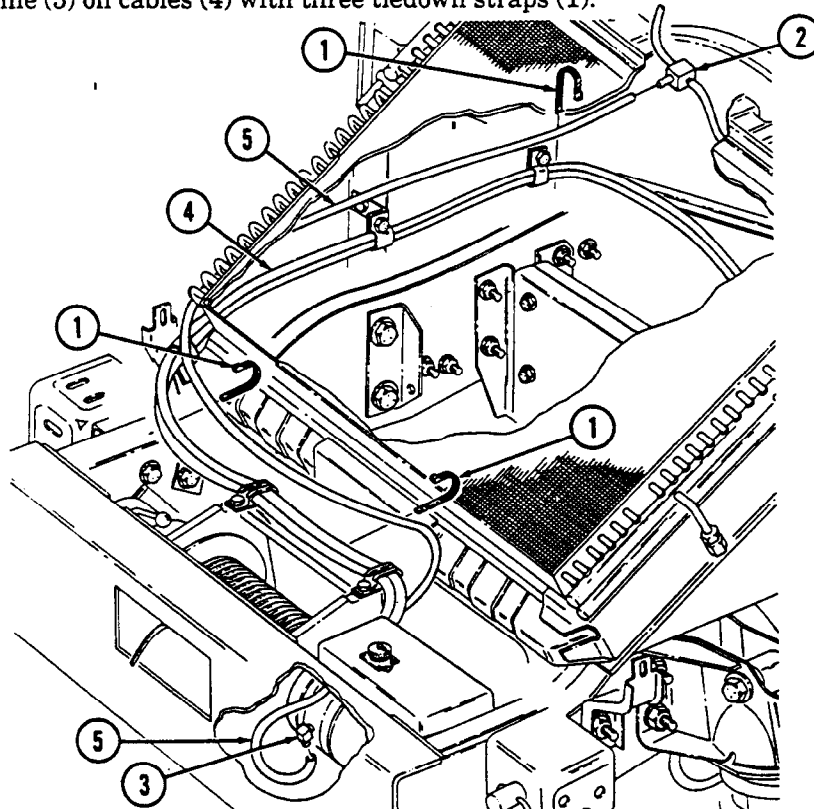
Unit

a. Removal

1. Disconnect vent line (5) from winch fitting (3).
2. Remove three tiedown straps (1) from vent line (5) and cables (4). Discard tiedown straps (1).
3. Disconnect vent line (5) from tee fitting (2) and remove vent line (5).

b. Installation

1. Connect vent line (5) to tee fitting (2) and winch fitting (3).
2. Install vent line (5) on cables (4) with three tiedown straps (1).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-30. FRONT FAIRLEAD ROLLER BRACKET ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

General Safety Instructions

Winch must be supported during removal and installation.

Maintenance Level

Unit

WARNING

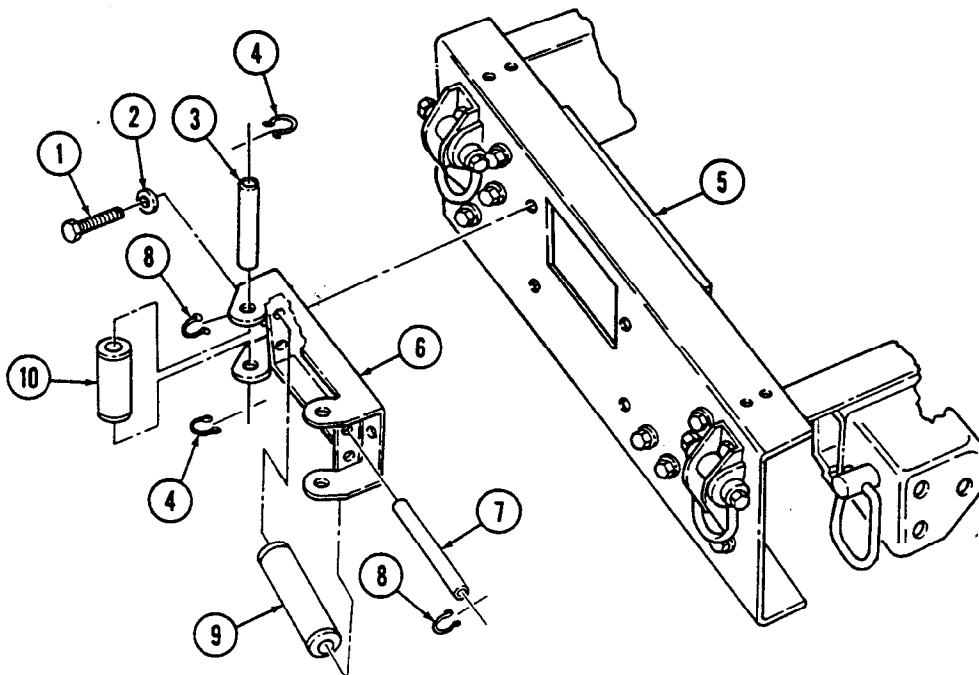
Winch must be supported during removal and installation. Failure to support winch may result in injury to personnel or damage to equipment.

a. Removal

1. Remove four retaining rings (8), two shafts (7), and rollers (9) from bracket (6).
2. Remove four retaining rings (4), two shafts (3), and rollers (10) from bracket (6).
3. Remove two capscrews (1), washers (2), and bracket (6) from bumper (5).

b. Installation

1. Install bracket (6) on bumper (5) with two washers (2) and capscrews (1). Tighten capscrews (1) to 35 lb-ft (47 N·m).
2. Install two rollers (10) and shafts (3) on bracket (6) with four retaining rings (4).
3. Install two rollers (9) and shafts (7) on bracket (6) with four retaining rings (8).



12-31. FRONT WINCH CLUTCH ROD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

Locknut (Appendix G, Item 162)

a. Removal

1. Remove locknut (9), washer (10), rod end (12), two washers (11), and capscrew (13) from lever (1). Discard locknut (9).
2. Remove rod end (12) from clutch rod (6).
3. Remove clutch rod (6) through bracket (7) and frame (2).
4. Loosen nut (5) and remove handle (4) and nut (5) from clutch rod (6).
5. Remove capscrew (3) and bracket (7) from winch (8).

b. Installation

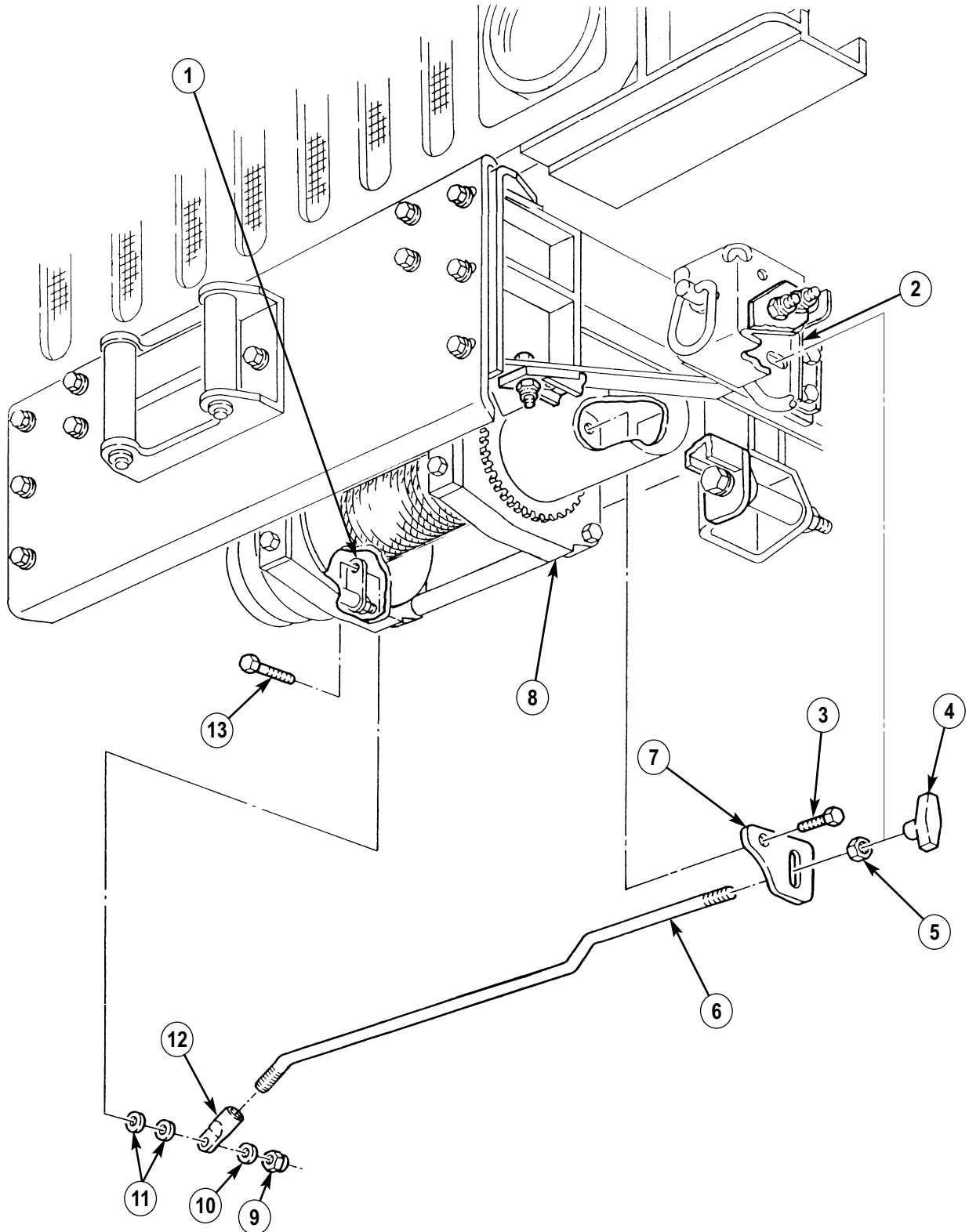
1. Install bracket (7) on winch (8) with capscrew (3).
2. Install nut (5) and handle (4) on clutch rod (6). Tighten nut (5).
3. Install clutch rod (6) through frame (2) and bracket (7).
4. Install rod end (12) on clutch rod (6).

NOTE

Adjust rod end as required to allow full clutch operation.

5. Install capscrew (13), two washers (11), and rod end (12) on lever (1) with washer (10) and locknut (9).

12-31. FRONT WINCH CLUTCH ROD REPLACEMENT (Cont'd)



12-31.1. 10,500 LB WINCH HYDRAULIC HOSE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models:

M1113

Tools

General mechanics tool kit: automotive
(Appendix B, Item 1)

Materials/Parts

Seven tiedown straps
(Appendix G, Item 463)
Dexron III® (Appendix C, Item 37)
Locknut (Appendix G, Item 109)
Two O-rings (Appendix G, Item 86.1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured
(TM 9-2320-387-10)
- Engine left splash shield removed.
(para. 10-23)
- Battery ground cables disconnected.
(para. 4-68)

Maintenance Level

Unit

a. Removal

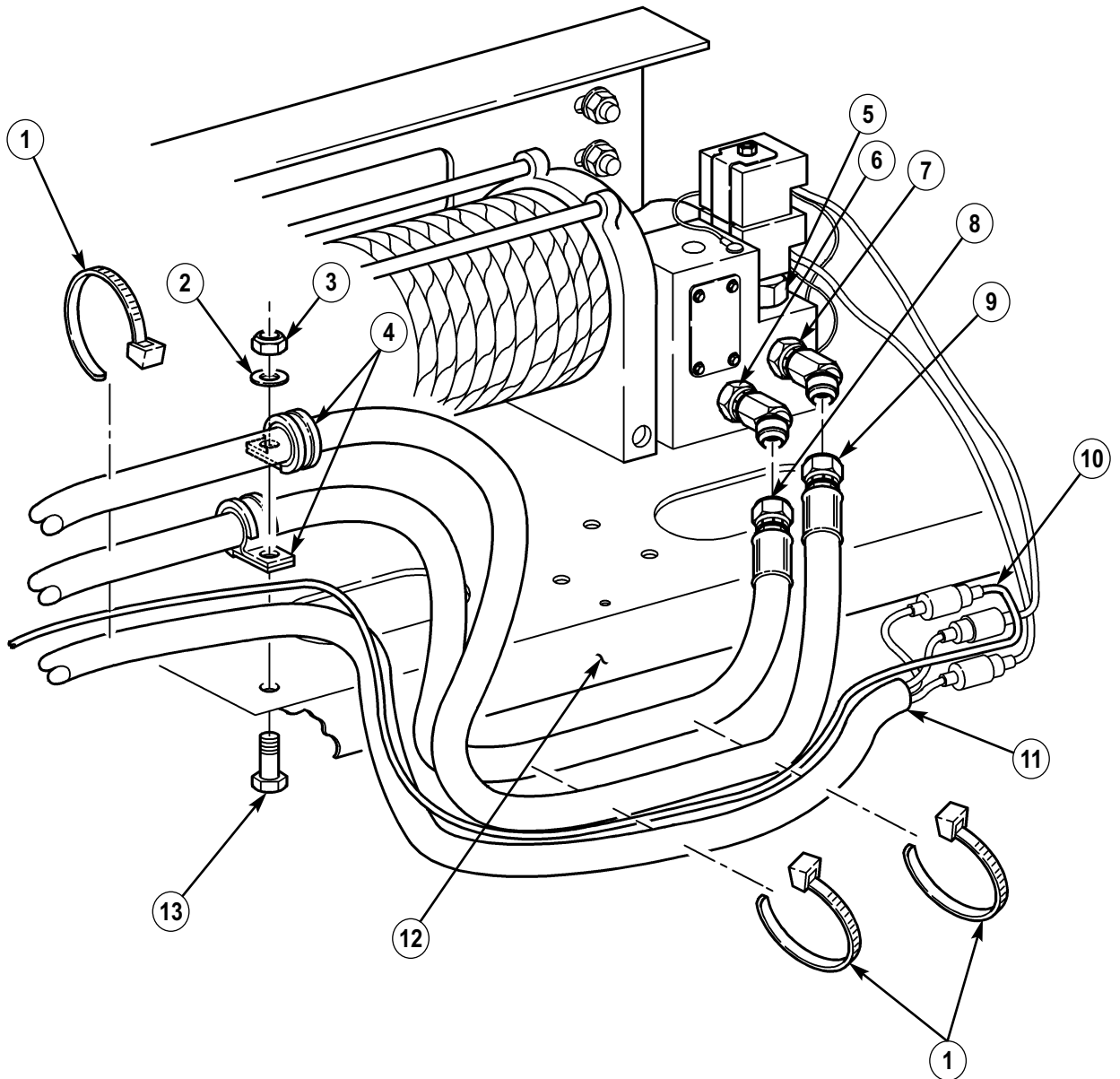
1. Remove locknut (3), washer (2), capscrew (13), and two clamps (4) with hydraulic hose assemblies (8) and (9) from winch and bumper assembly (12). Discard locknut (3).
2. Remove three tiedown straps (1) from hydraulic hose assemblies (8) and (9), lead wire (10), and controller plug harness (11). Discard tiedown straps (1).

CAUTION

Cover or plug power steering gear and hydro-boost connections immediately after removing hoses to prevent contamination. Remove all plugs prior to connecting hoses.

3. Disconnect hydraulic hose (8) from elbow (6) at bottom winch outlet port on winch (5).
4. Disconnect hydraulic hose (9) from elbow (7) at top winch inlet port on winch (5).

12-31.1. 10,500 LB WINCH HYDRAULIC HOSE REPLACEMENT (Cont'd)



12-31.1. 10,500 LB WINCH HYDRAULIC HOSE REPLACEMENT (Cont'd)

5. Remove four tiedown straps (1) from hydraulic hose assemblies (4) and (7), lead wire (3), and controller plug harness (2). Discard tiedown straps (1).

NOTE

Ensure area around power steering port and hydro-boost is clean before removing hydraulic hose assembly.

6. Disconnect hydraulic hose assembly (7) and O-ring (6) from power steering gear port (8). Discard O-ring (6).
7. Disconnect hydraulic hose assembly (4) and O-ring (6) from hydro-boost port (5). Discard O-ring (6).
8. Remove hydraulic hose assemblies (4) and (7) from vehicle.

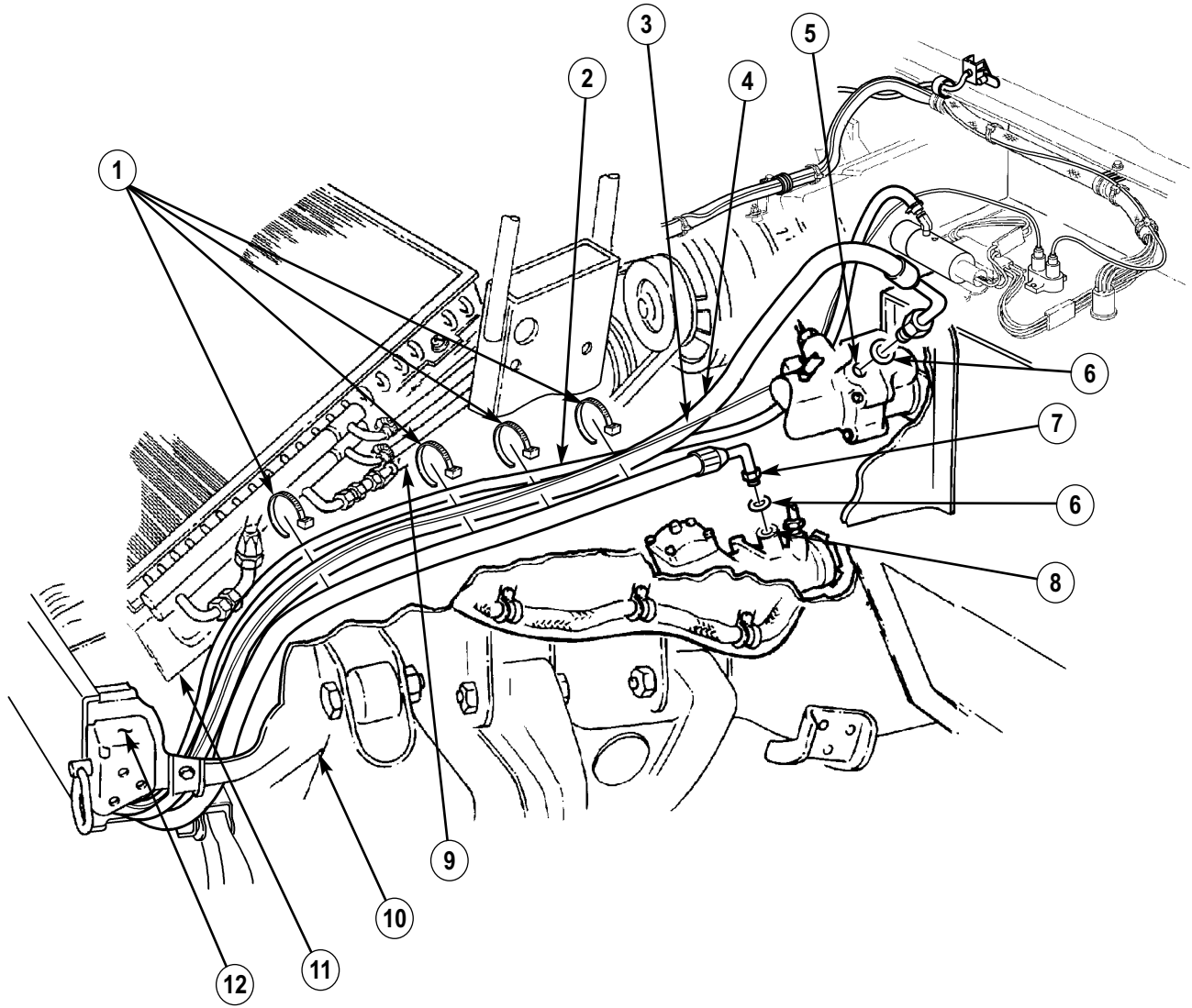
b. Installation

NOTE

Lubricate O-rings with Dexron III® prior to installation.

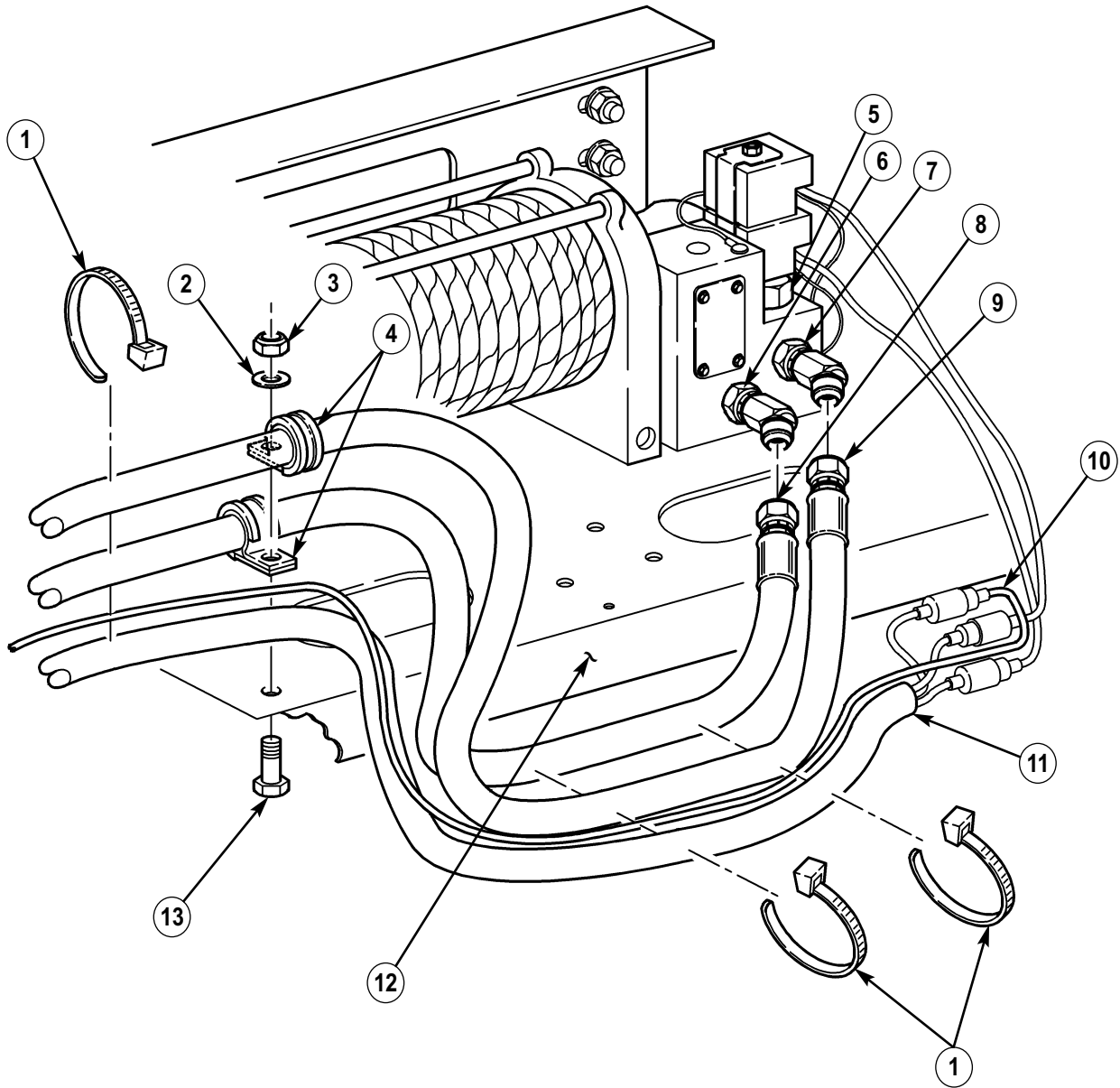
1. Install O-ring (6) on hydraulic hose assembly (4).
2. Connect hydraulic hose assembly (4) to hydro-boost port (5).
3. Route hydraulic hose (4) from hydro-boost port (5) along frame rail (10), oil cooler hose (9), and between frame rail (10) and radiator shroud (11) towards winch and bumper assembly (12).
4. Install O-ring (6) on hydraulic hose assembly (7).
5. Connect hydraulic hose assembly (7) to power steering gear port (8).
6. Route hydraulic hose (7) from power steering gear port (8) along hydraulic hose assembly (4).
7. Secure lead wire (3) and controller plug harness (2) to hydraulic hose assemblies (4) and (7) with four tiedown straps (1).

12-31.1. 10,500 LB WINCH HYDRAULIC HOSE REPLACEMENT (Cont'd)



12-31.1. 10,500 LB WINCH HYDRAULIC HOSE REPLACEMENT (Cont'd)

8. Connect hydraulic hose (9) to elbow (7) at top inlet port on winch (5).
9. Connect hydraulic hose (8) to elbow (6) at bottom outlet port on winch (5).
10. Install hydraulic hose assemblies (8) and (9) on winch and bumper assembly (12) with two clamps (4), capscrew (13), washer (2), and locknut (3).
11. Secure lead wire (10) and controller plug (11) to hydraulic hose assemblies (8) and (9) with three tiedown straps (1).



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Bleed power steering system (para. 8-27).
 - Install engine left splash shield (para. 10-23).

12-32. FRONT WINCH RECEPTACLE BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

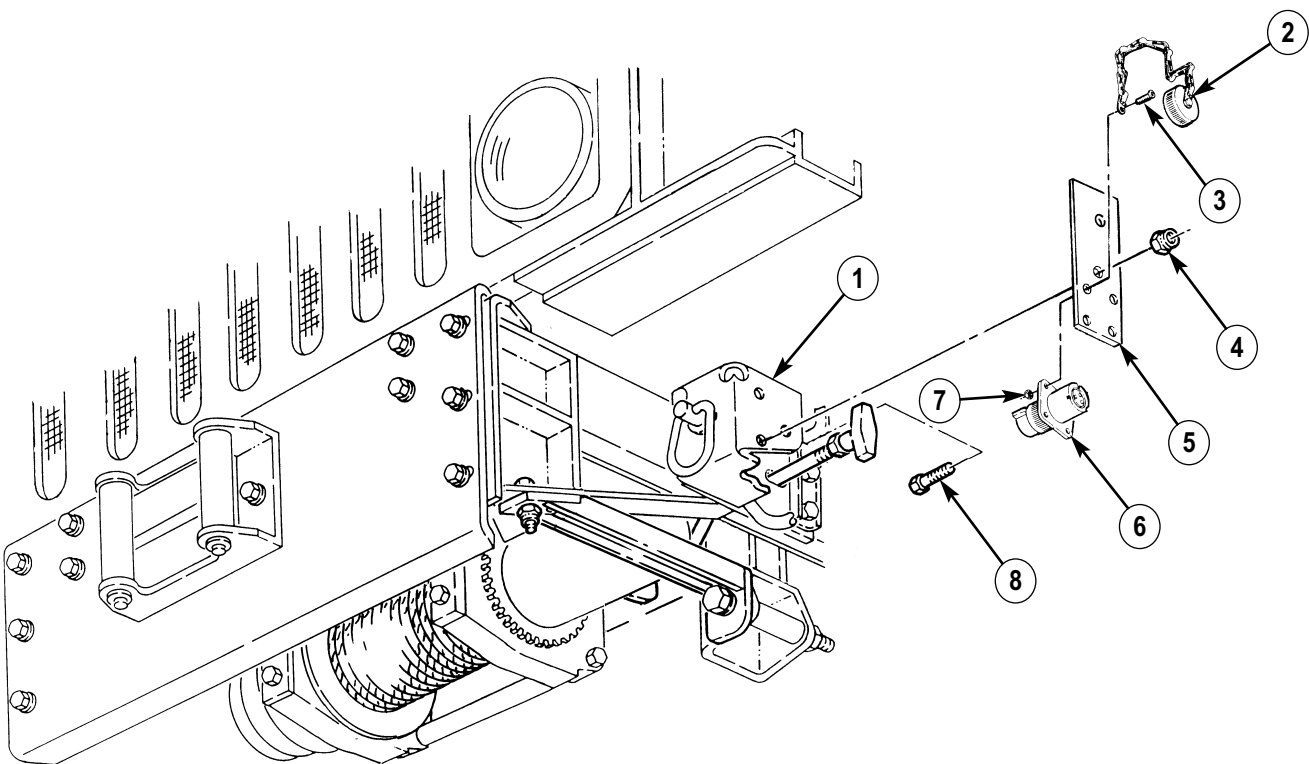
Two locknuts (Appendix G, Item 126)

a. Removal

1. Remove four nuts (7), capscrews (3), control receptacle (6), and cover (2) from bracket (5).
2. Remove two locknuts (4), capscrews (8), and bracket (5) from mounting bracket (1). Discard locknuts (4).

b. Installation

1. Install bracket (5) on mounting bracket (1) with two capscrews (8) and locknuts (4).
2. Install cover (2) and control receptacle (6) on bracket (5) with four capscrews (3) and nuts (7).



12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanics tool kit:
automotive (Appendix B, Item1)

Materials/Parts

Eight tiedown straps
(Appendix G, Item 463)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

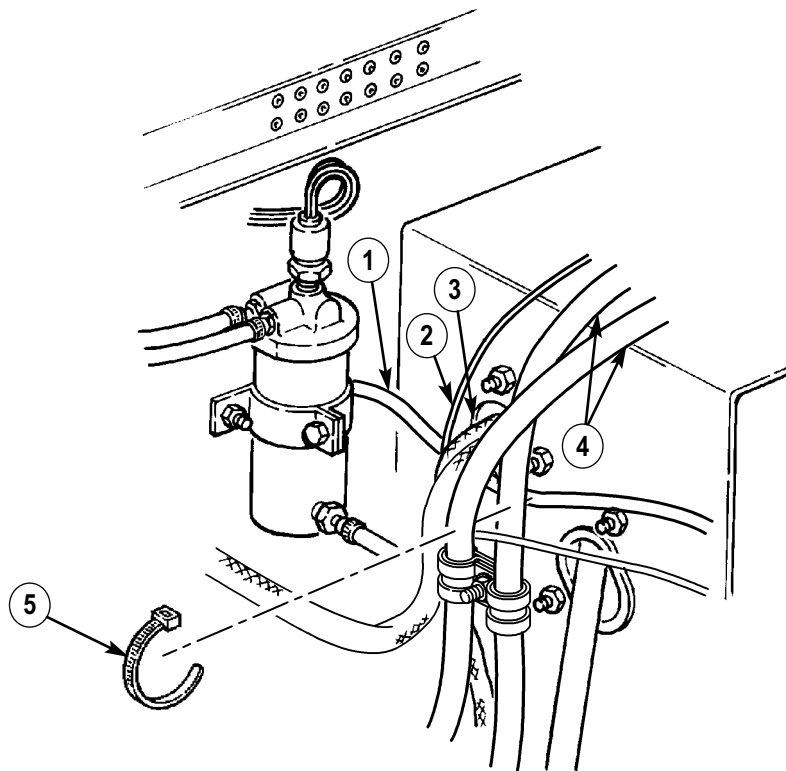
- Hood raised and secured (TM 9-2320-387-10).
- Battery ground cables disconnected (para 4-68).
- Engine left splash shield removed (para 10-23).

Maintenance Level

Unit

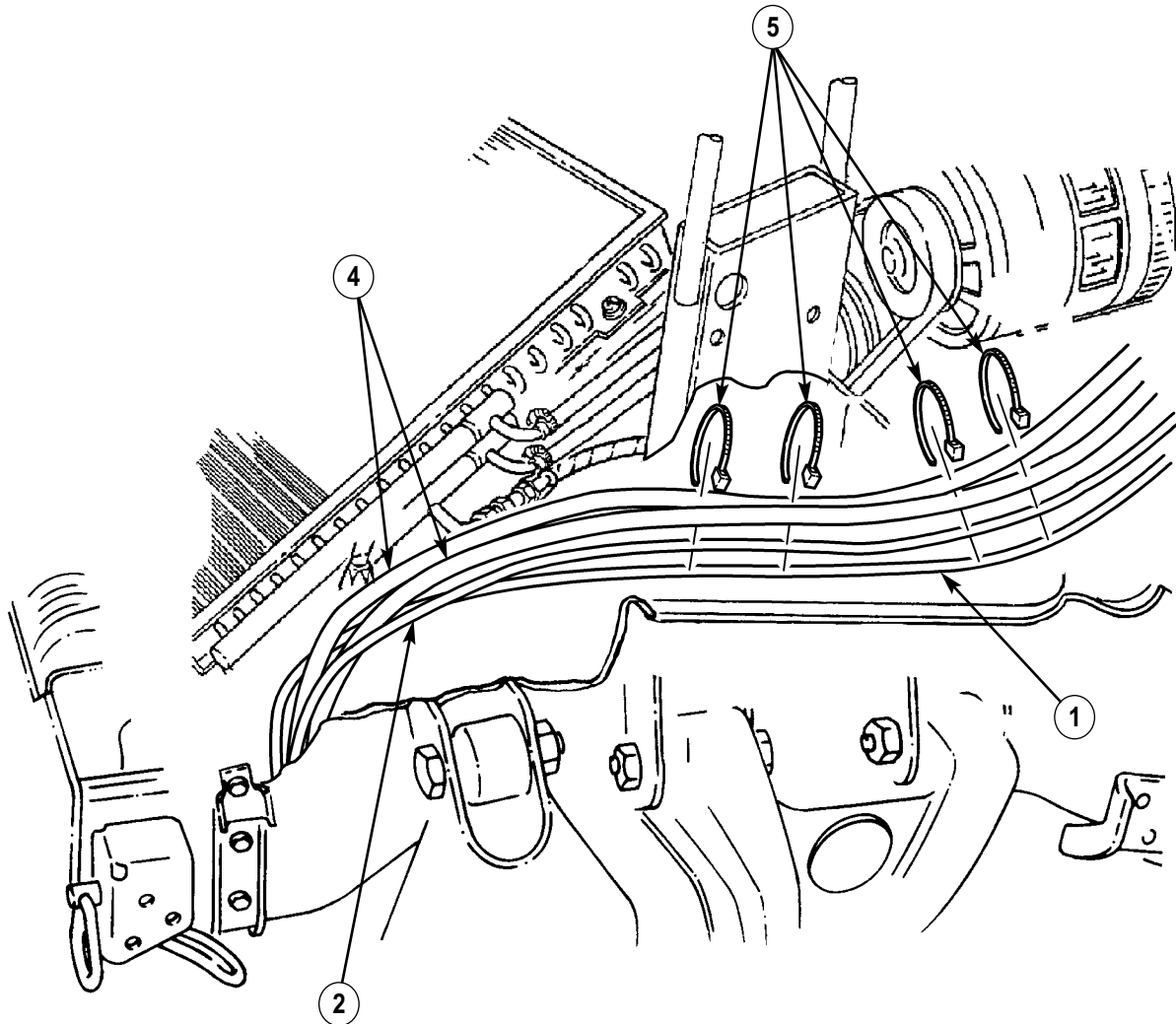
a. Removal

1. Remove tiedown strap (5) from controller plug harness (1), harness (3), lead wire (2), and hydraulic hose assemblies (4). Discard tiedown strap (5).



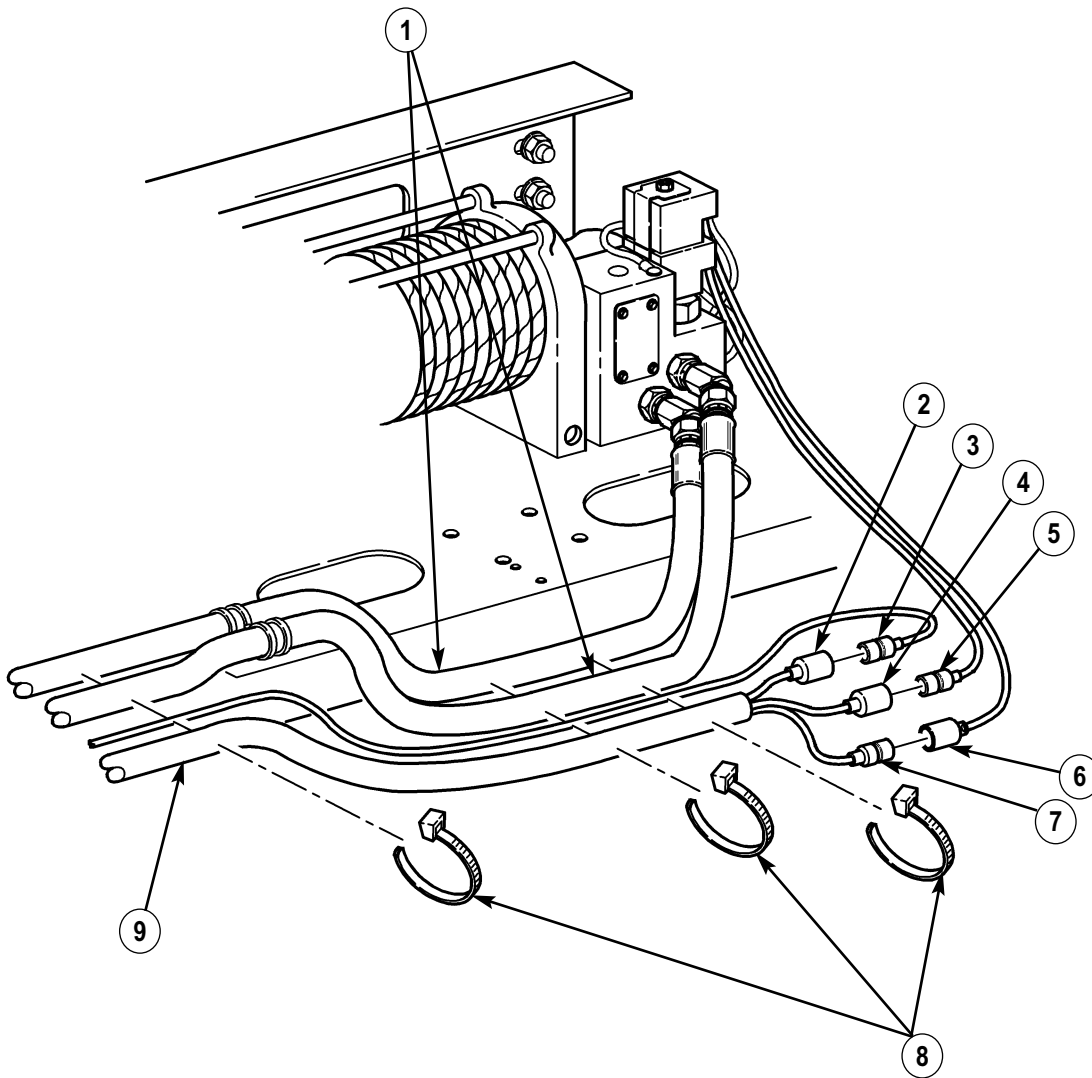
12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

2. Remove four tiedown straps (5) from controller plug harness (1), lead wire (2), and hydraulic hose assemblies (4). Discard tiedown straps (5).



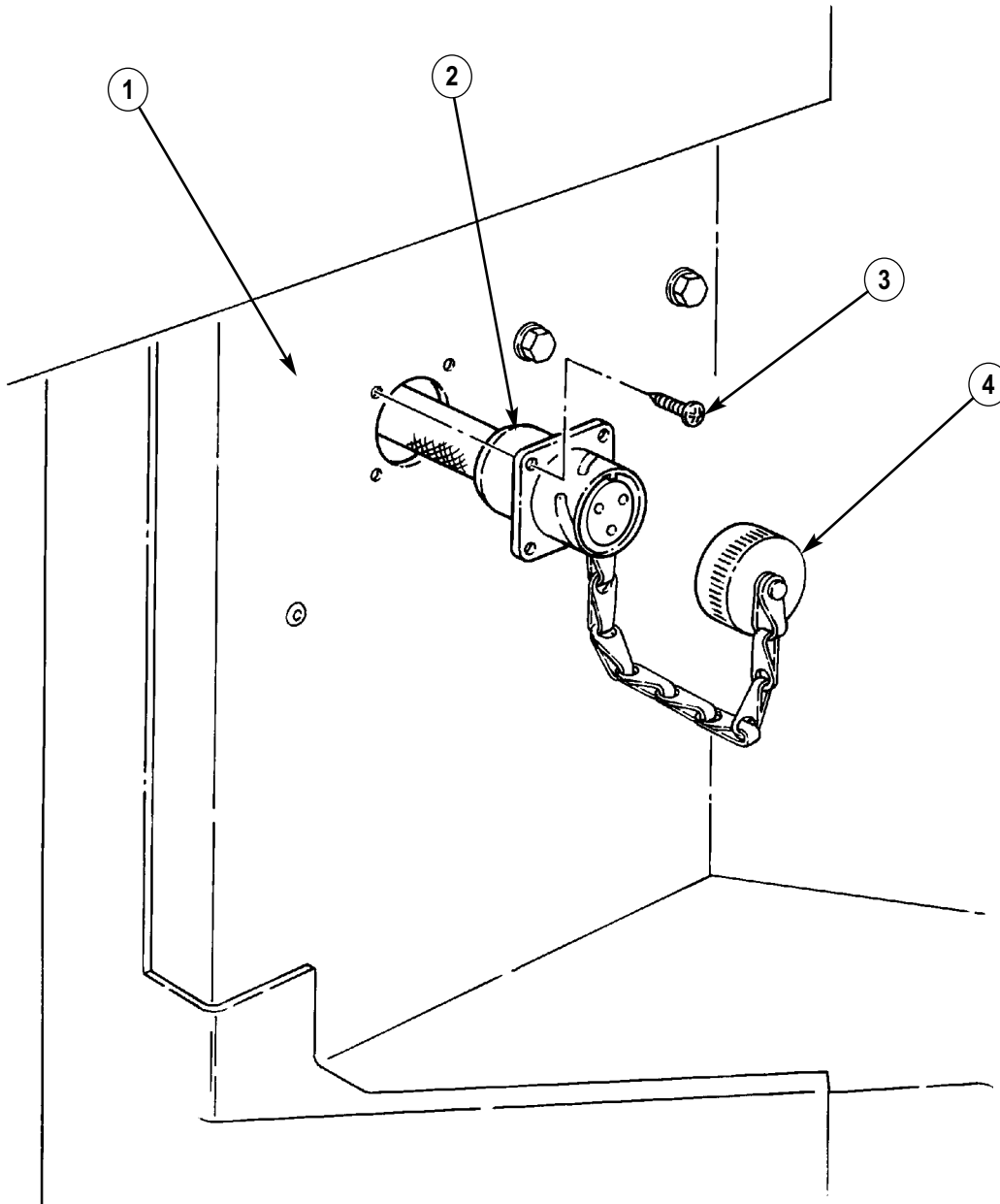
12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

3. Remove three tiedown straps (8) from controller plug harness (9), lead wire (3), and hydraulic hose assemblies (1). Discard tiedown straps (8).
4. Disconnect controller plug lead 785C (7) from winch lead 785C (6).
5. Disconnect controller plug lead 785A (4) from winch lead 785A (5).
6. Disconnect controller plug lead 785B (2) from lead wire 785B (3).



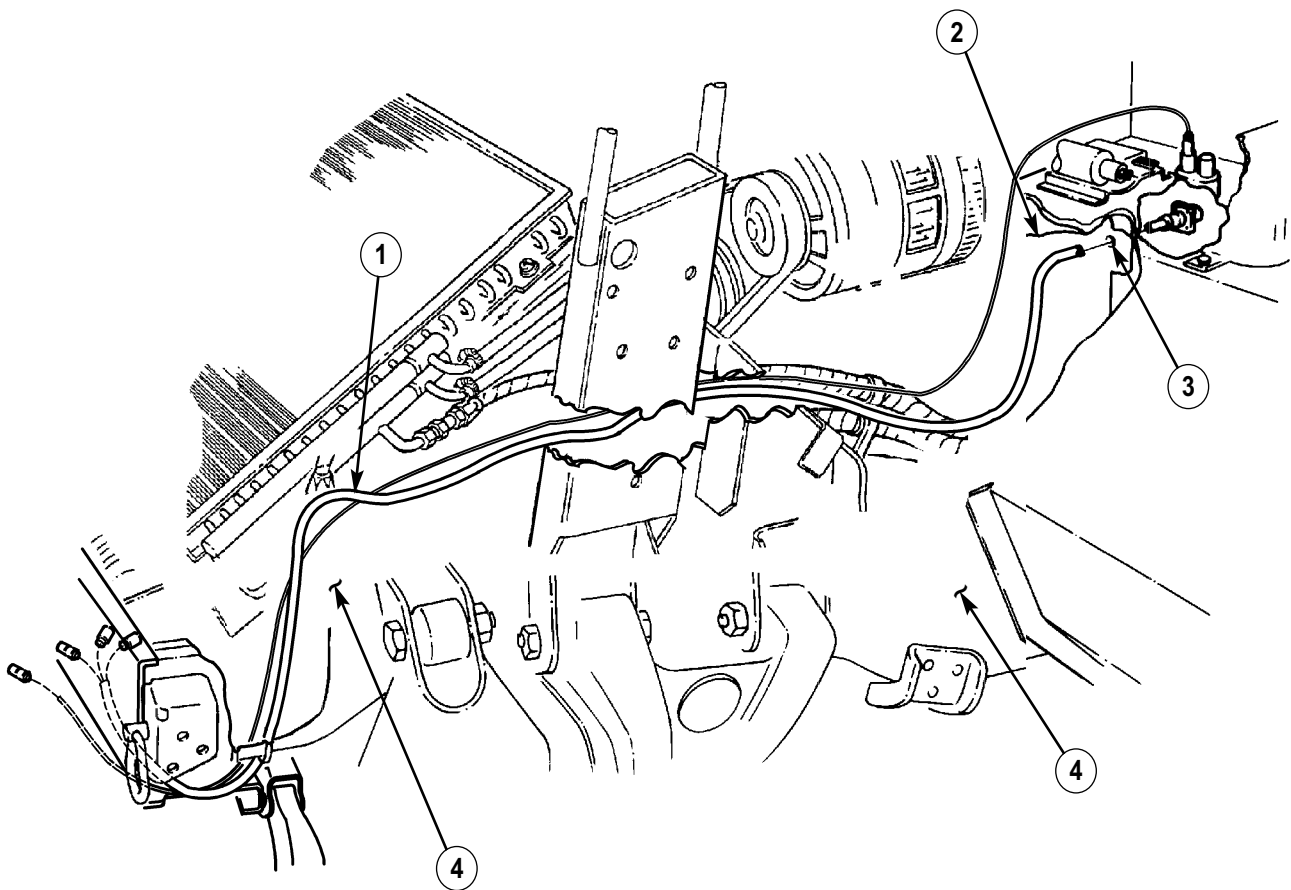
12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

7. Remove four screws (3), controller plug (2), and cap with chain (4) from body panel (1).



12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

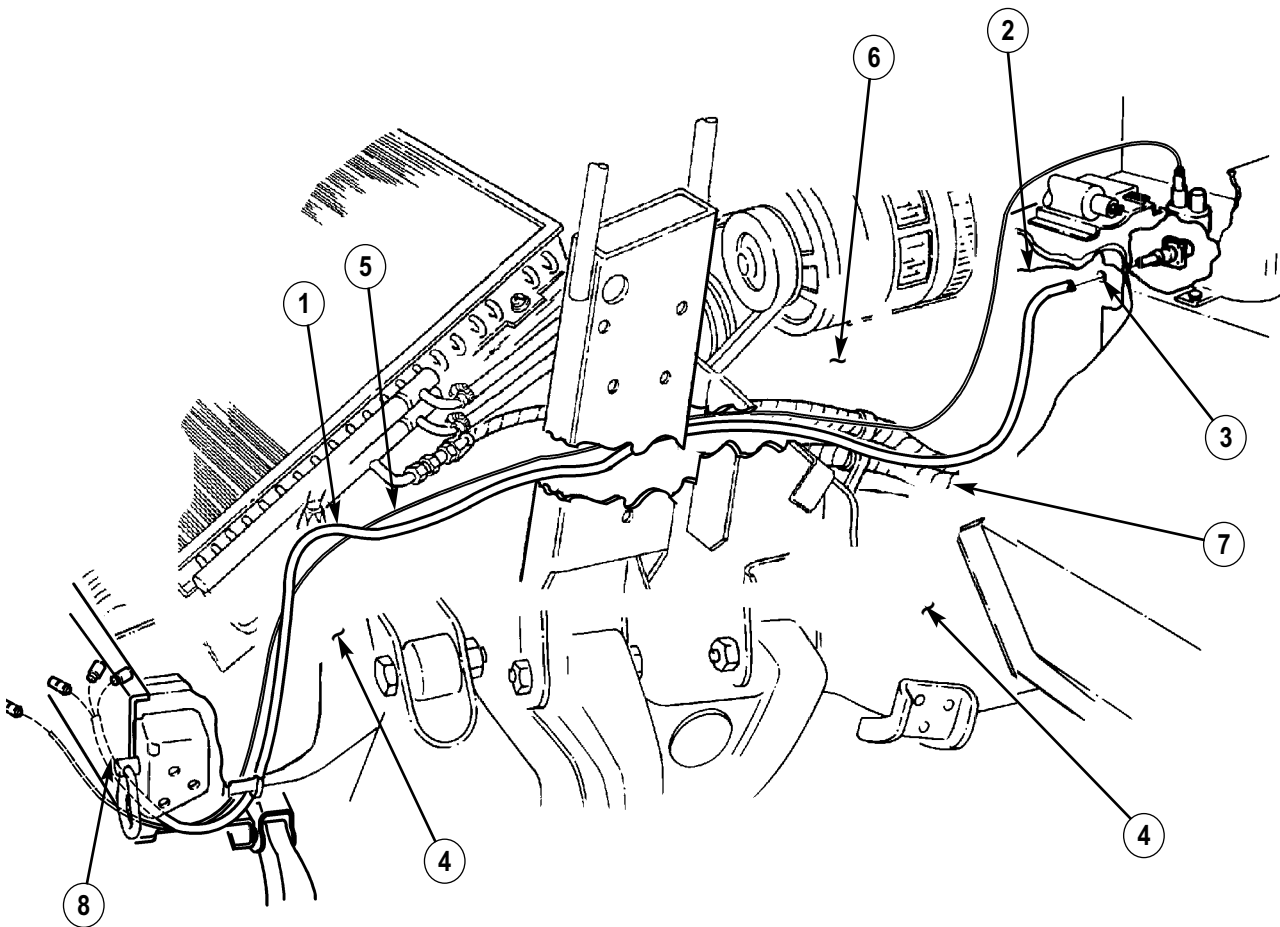
8. Move controller plug harness (1) away from frame rail (4) and from around fuel filter (2) and route controller plug harness (1) back through hole in body panel (3).



12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)**b. Installation****CAUTION**

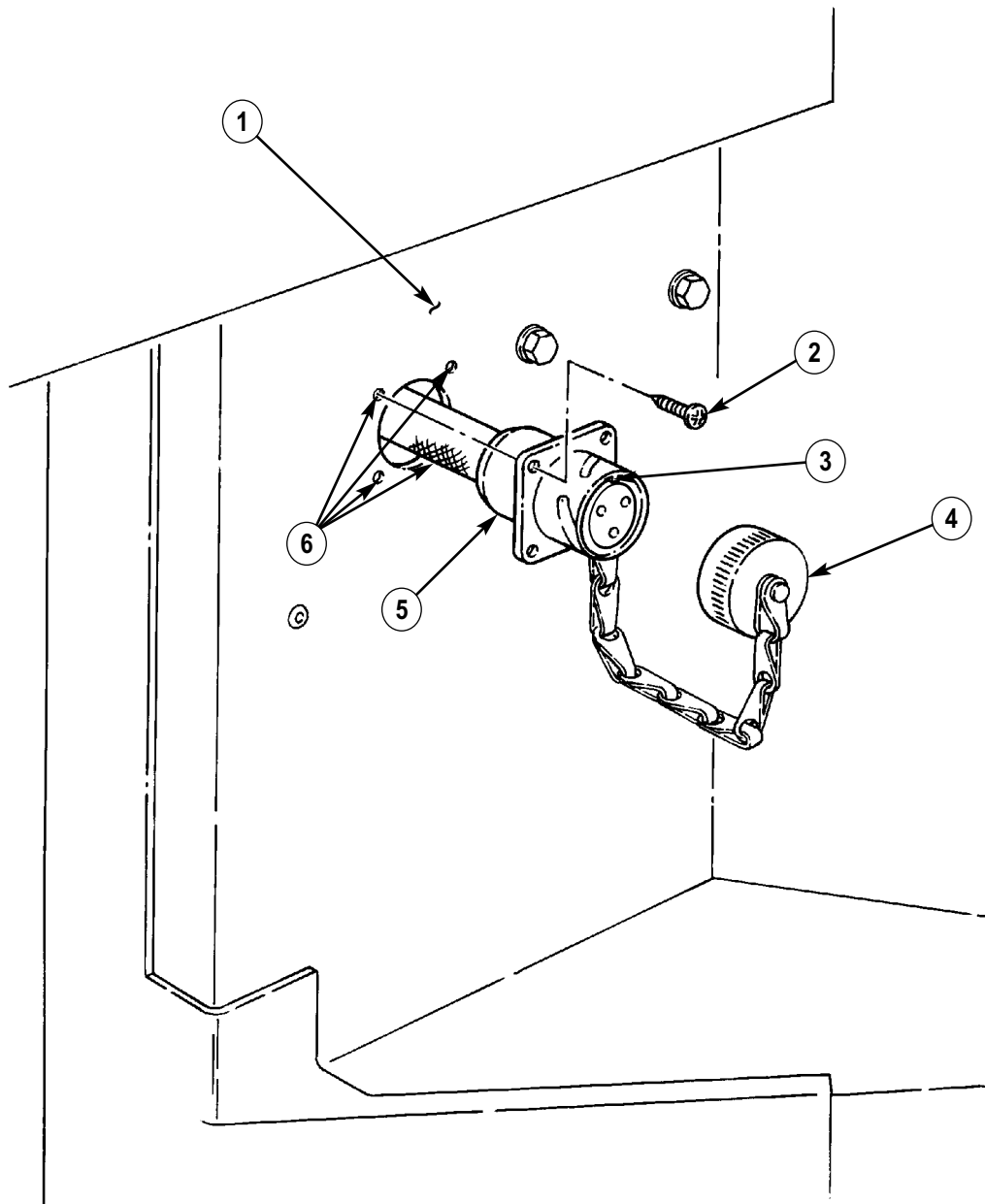
Ensure controller plug harness does not contact any moving parts.

1. Route controller plug harness (1) through hole in body panel (3) into engine compartment (6).
2. Route controller plug harness (1) around fuel filter (2) and along body wiring harness (7) and lead wire (5) to frame rail (4) and then down to winch valve assembly (8).



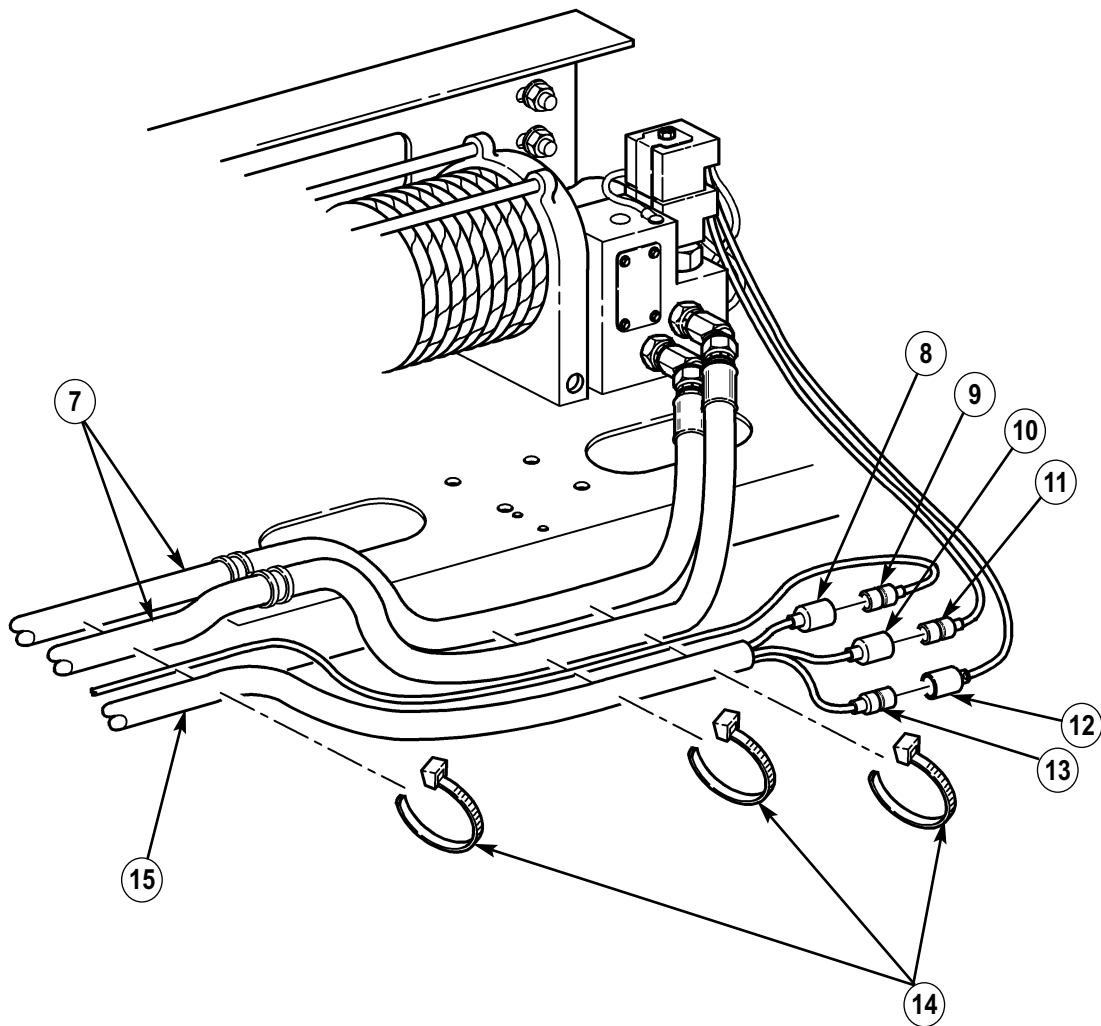
12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

3. Align holes in controller plug (5) with holes (6) in body panel (1) and blind spline (3) at top position and install controller plug (5) and cap with chain (4) on body panel (1) with four screws (2).



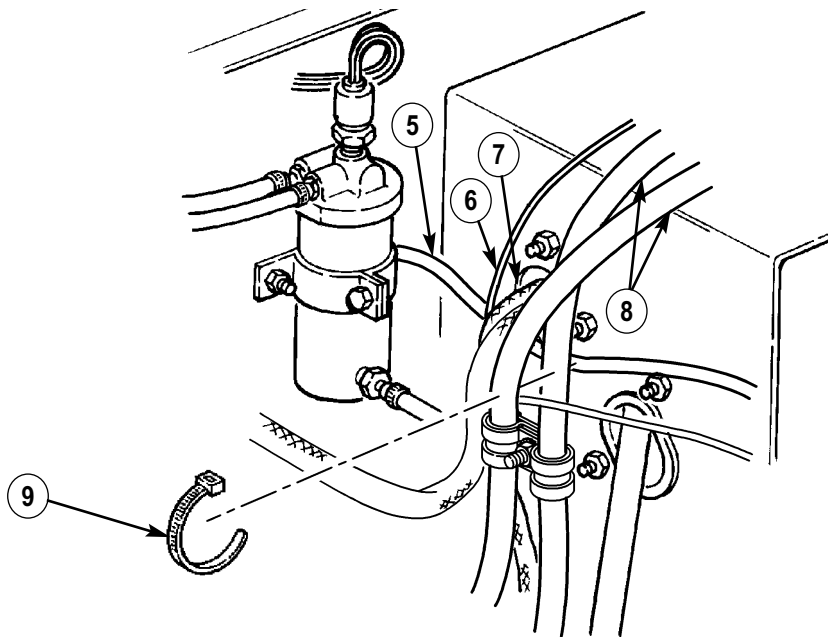
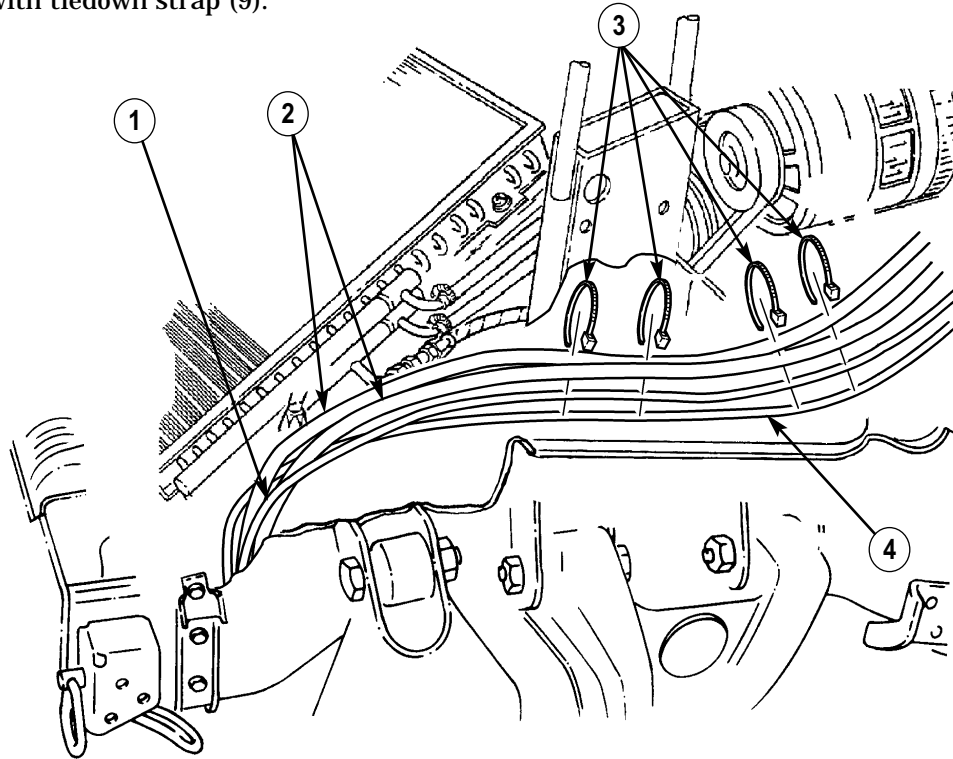
12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

4. Connect lead wire 785B (9) to controller plug lead (8) 785B.
5. Connect controller plug lead 785A (10) to winch lead 785A (11).
6. Connect controller plug lead 785C (13) to winch lead 785C (12).
7. Secure controller plug harness (15) and lead wire (9) to hydraulic hose assemblies (7) with three tiedown straps (14).



12-32.1. 10,500 LB HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

8. Secure lead wire (1) and controller plug harness (4) to hydraulic hose assemblies (2) with four tiedown straps (3).
9. Secure controller plug harness (5), body harness (7), and lead wire (6) to hydraulic hose assemblies (8) with tiedown strap (9).



FOLLOW-ON TASKS:

- Install engine left splash shield. (para. 10-23).
- Connect battery ground cables (para. 4-68).

12-33. REAR WINCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

RTV sealant (Appendix C, Item 74)
Locknut (Appendix G, Item 162)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

General Safety Instructions

Winch must be supported during removal and installation.

Maintenance Level

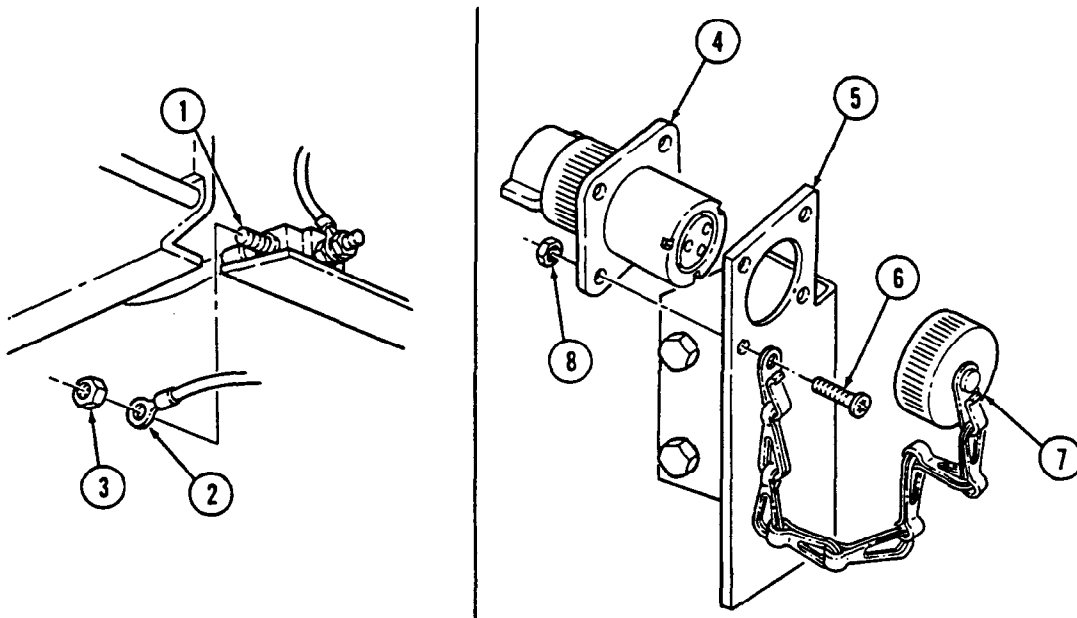
Unit

WARNING

Winch must be supported during removal and installation. Failure to support winch may result in injury to personnel or damage to equipment.

a. Removal

1. Remove nut (3) and power lead (2) from solenoid pack power stud (1).
2. Remove four nuts (8), capscrews (6), cover (7), and control receptacle (4) from bracket (5).



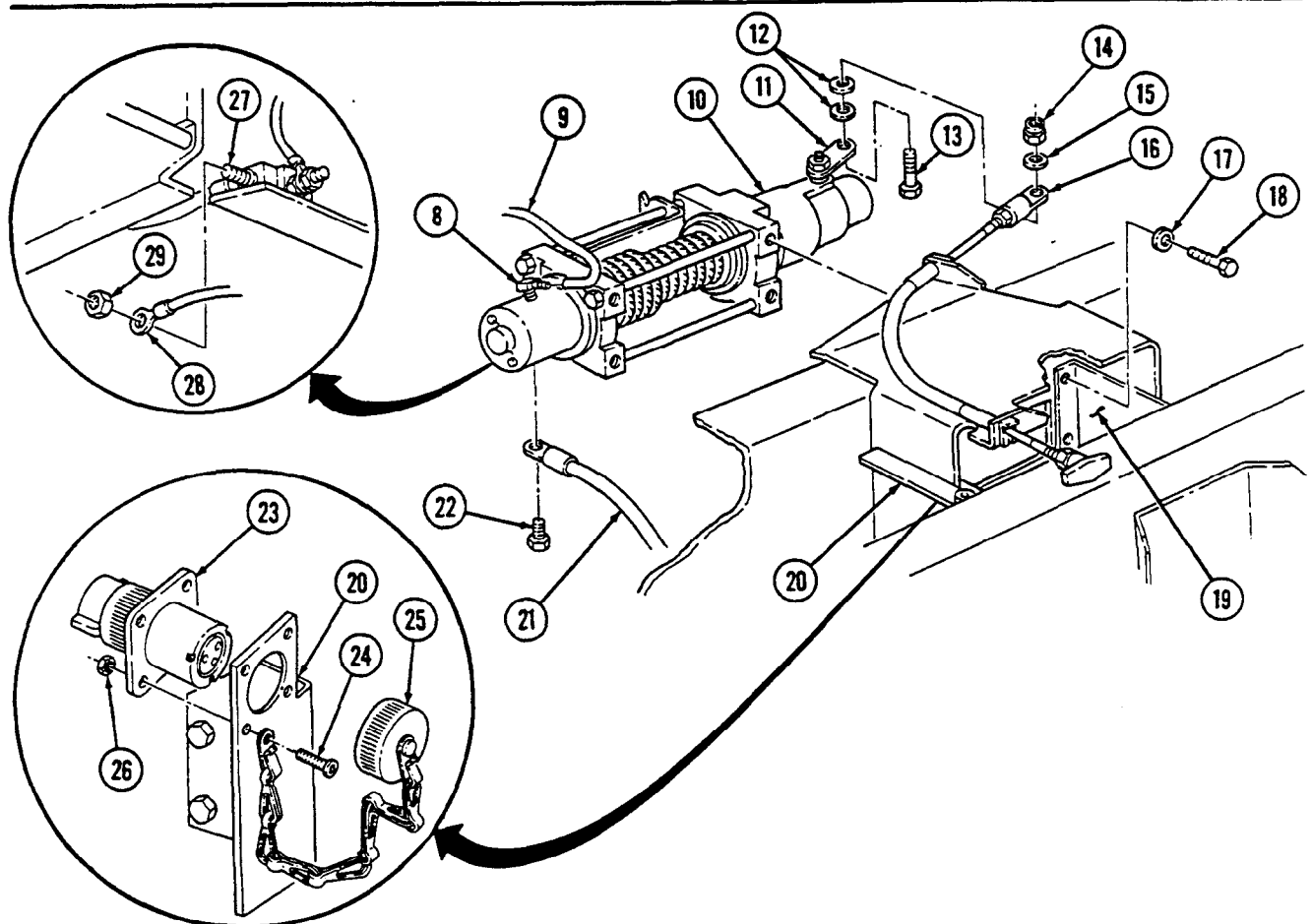
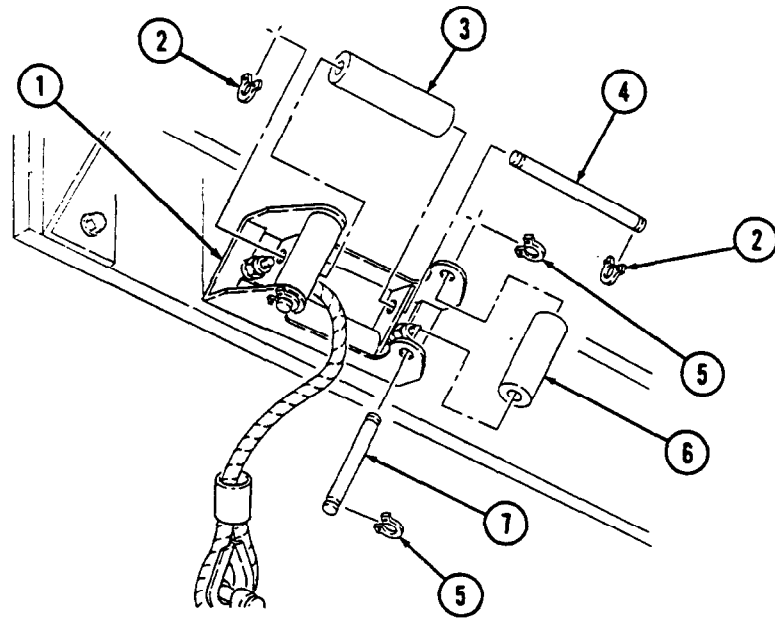
12-33. REAR WINCH REPLACEMENT (Cont'd)

3. Remove two retaining rings (2), shaft (4), and roller (3) from bracket (1).
4. Remove two retaining rings (5), shaft (7), and roller (6) from bracket (1).
5. Remove capscrew (22) and ground lead (21) from winch (10).
6. Remove locknut (14), washer (15), rod end (16), capscrew (13), and two washers (12) from lever (11). Discard locknut (14).
7. Disconnect vent line (9) from elbow (8).
8. Remove four capscrews (18), washers (17), and winch (10) from winch mount (19) and bracket (20).

b. Installation

1. Install winch (10) on winch mount (19) and bracket (20) with four washers (17) and capscrews (18). Tighten capscrews (18) to 60 lb-ft (81 N·m).
2. Install two washers (12), capscrew (13), and rod end (16) on lever (11) with washer (15) and locknut (14). Tighten locknut (14) to 44 lb-ft (60 N·m).
3. Install ground lead (21) on winch (10) with capscrew (22). Tighten capscrew (22) to 25 lb-ft (34 N·m).
4. Connect vent line (9) to elbow (8).
5. Install roller (6) and shaft (7) on bracket (1) with two retaining rings (5).
6. Install roller (3) and shaft (4) on bracket (1) with two retaining rings (2).
7. Install cover (25) and control receptacle (23) on bracket (20) with four screws (24) and nuts (26).
8. Connect power lead (28) to solenoid pack power stud (27) with nut (29).
9. Apply RTV sealant on power lead (28) and stud (27).

12-33. REAR WINCH REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

12-34. REAR WINCH VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

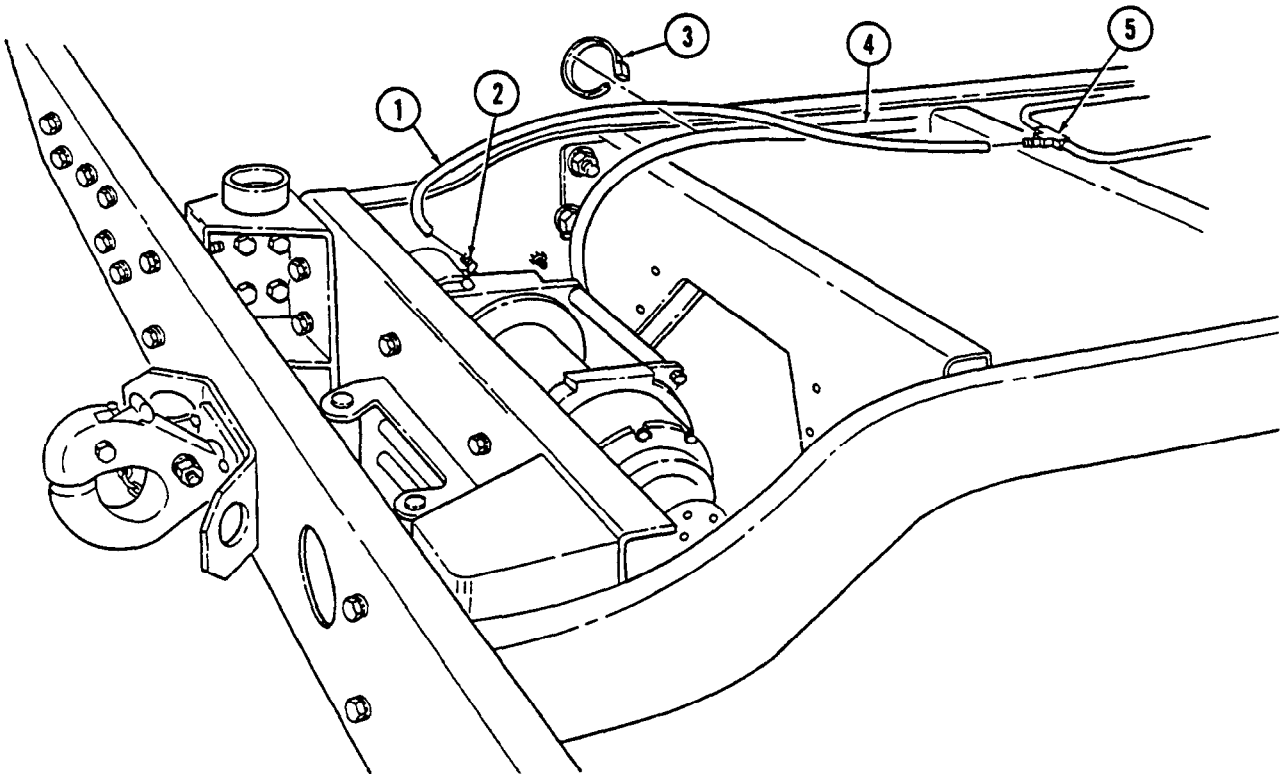
Two tiedown straps (Appendix G, Item 464)

a. Removal

1. Disconnect vent line (1) from elbow (2).
2. Remove two tiedown straps (3) from vent line (1) and air line (4). Discard tiedown straps (3).
3. Disconnect vent line (1) from tee (5) and remove vent line (1).

b. Installation

1. Connect vent line (1) to tee (5) and elbow (2).
2. Secure vent line (1) to air line (4) with two tiedown straps (3).



12-35. REAR FAIRLEAD ROLLER BRACKET ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

General Safety Instructions

Wear leather gloves when handling winch cable.

Materials/Parts

Two locknuts (Appendix G, Item 130)

Maintenance Level

Unit

WARNING

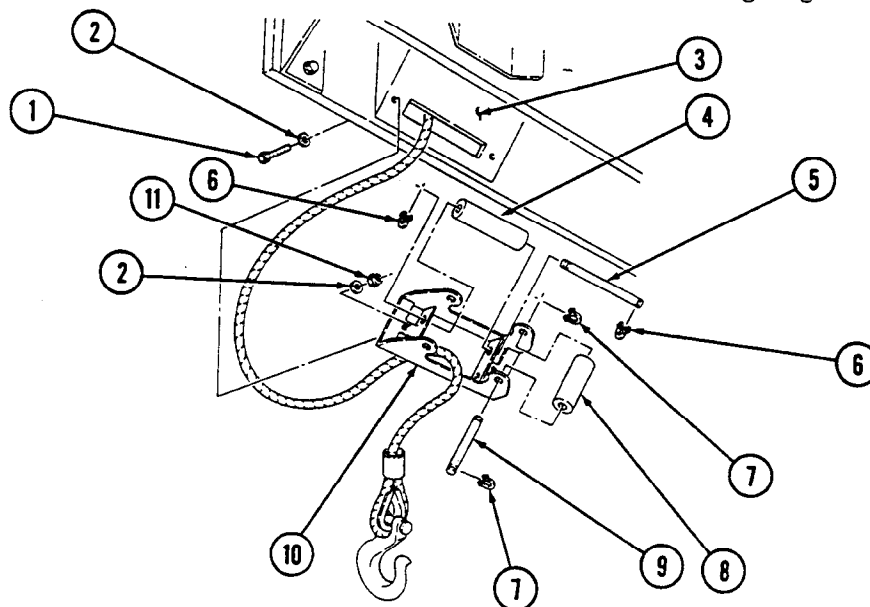
Gloves must be worn when handling winch cable. Failure to do so may cause severe injury to personnel.

a. Removal

1. Remove four retaining rings (6), two shafts (5), and rollers (4) from bracket (10).
2. Remove four retaining rings (7), two shafts (9), and rollers (8) from bracket (10).
3. Remove two locknuts (11), washers (2), capscrews (1), washers (2), and bracket (10) from frame (3). Discard locknuts (11).

b. Installation

1. Install bracket (10) on frame (3) with two washers (2), capscrews (1), washers (2), and locknuts (11). Tighten locknuts (11) to 35 lb-ft (47 N·m).
2. Install two rollers (8) and shafts (9) on bracket (10) with four retaining rings (7).
3. Install two rollers (4) and shafts (5) on bracket (10) with four retaining rings (6).



12-36. REAR WINCH CLUTCH CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Maintenance Level

Unit

Materials/Parts

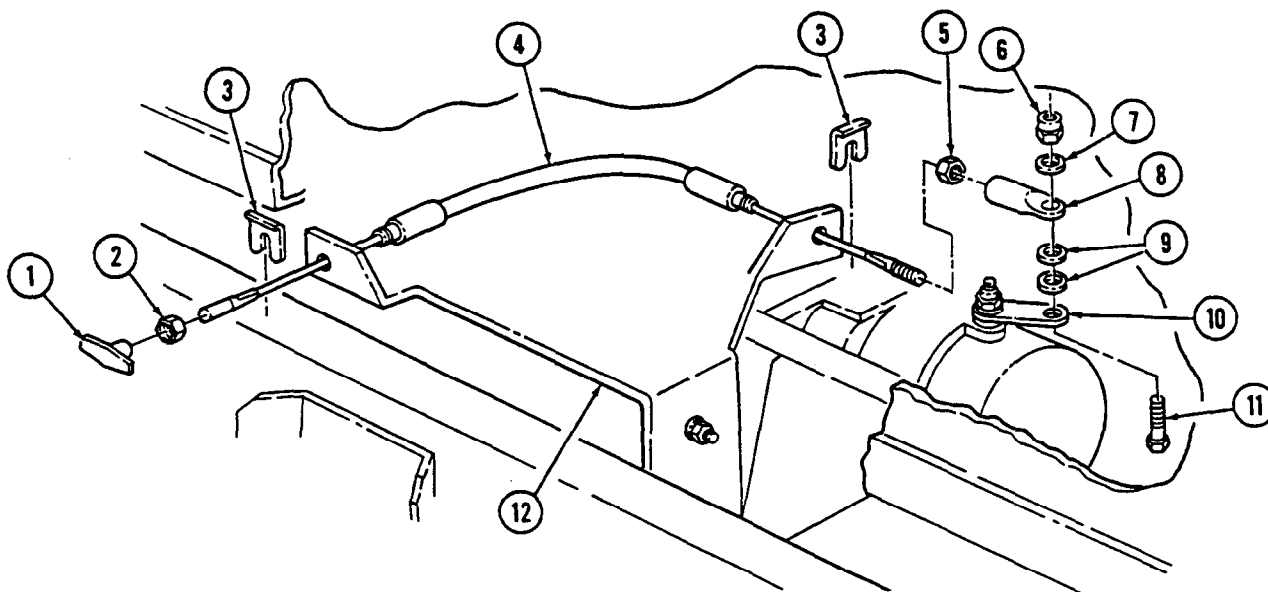
Locknut (Appendix G, Item 160)

a. Removal

1. Remove locknut (6), washer (7), rod end (8), two washers (9), and capscrew (11) from lever (10). Discard locknut (6).
2. Loosen nut (5) and remove rod end (8) and nut (5) from cable (4).
3. Loosen nut (2) and remove handle (1) and nut (2) from cable (4).
4. Remove two clips (3) and cable (4) from bracket (12).

b. Installation

1. Install cable (4) on bracket (12) with two clips (3).
2. Install nut (2) and handle (1) on cable (4). Tighten nut (2).
3. Install nut (5) and rod end (8) on cable (4) and adjust rod end (8) and nut (5) as required to allow full clutch operation.
4. Tighten nut (5).
5. Install capscrew (11), two washers (9), and rod end (8) on lever (10) with washer (7) and locknut (6).



12-36.1. 10,500 LB REAR HYDRAULIC WINCH ASSEMBLY AND BRACKETS REPLACEMENT

This task covers:

- | | |
|---|---|
| <p>a. Winch Removal</p> <p>b. Bracket Removal</p> | <p>c. Bracket Installation</p> <p>d. Winch Installation</p> |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit: automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment: automotive (Appendix B, Item 2)

Materials/Parts

Two locknuts (Appendix G, Item 174)
 Six locknuts (Appendix G, Item 121)
 Four locknuts (Appendix G, Item 186.2)
 Two locknuts (Appendix G, Item 130)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

General Safety Instructions

Support winch and bumper during winch replacement.

Maintenance Level

Unit

a. Winch Removal

WARNING

Winch and motor assembly and rear winch mounting bracket must be supported during winch replacement. Failure to support winch and motor assembly and rear winch mounting bracket may result in injury to personnel or damage to equipment.

CAUTION

Cover or plug all hoses and connections immediately after removal to prevent contamination. Remove all plugs prior to connecting hoses.

12-36.1. 10,500 LB REAR HYDRAULIC WINCH ASSEMBLY AND BRACKETS REPLACEMENT (Cont'd)

1. Disconnect hydraulic hose (24) from front port 2 elbow (23) on rear winch assembly (25).
2. Disconnect hydraulic hose (21) from rear port 4 elbow (22) on rear winch assembly (25).

NOTE

Perform step 3 only if vehicle is to be operated with winch assembly removed. Tube assembly is located in stowage box under commander's (companion) seat inside vehicle.

3. Connect tube assembly (26) to hydraulic hose assemblies (21) and (24).

NOTE

On some vehicles rear body mount bolts may interfere with removal of right and left hand rear bracket nuts. Perform step 4 if rear body mounting screws interfere with removal of winch/bumper mounting bracket screws.

4. Remove two locknuts (17), screws (20), and spacers (19) from left and right rear body mounts (18). Discard locknuts (17).
5. Remove two locknuts (9) and washers (8) from lower control arm bolts (5). Discard locknuts (9).
6. Remove four locknuts (15), screws (16), eight washers (11), and winch and bumper assembly (10) from two lower control arm bolts (5) and rear brackets (6). Discard locknuts (15).

b. Bracket Removal

NOTE

Brackets may not require replacement, replace only if damaged.

Remove six locknuts (2), capscrews (7), twelve washers (3), and two rear brackets (6) from rear bumper (1) and frame rails (4). Discard locknuts (2).

c. Bracket Installation

Install two rear brackets (6) on frame rail (4) and rear bumper (1) with six capscrews (7), twelve washers (3), and six locknuts (2).

d. Winch Installation

1. Install winch and bumper assembly (10) on two lower control arm bolts (5) with washers (8) and locknuts (9). Do not tighten locknuts (9).
2. Install winch and bumper assembly (10) on rear brackets (6) with four screws (16), eight washers (11), and four locknuts (15). Tighten four locknuts (15) to 37 lb-ft (50 N•m) and locknuts (9) to 260 lb-ft (352 N•m).

NOTE

Perform step 3 if tube assembly was installed. Store tube assembly in stowage box under commander's (companion) seat inside vehicle.

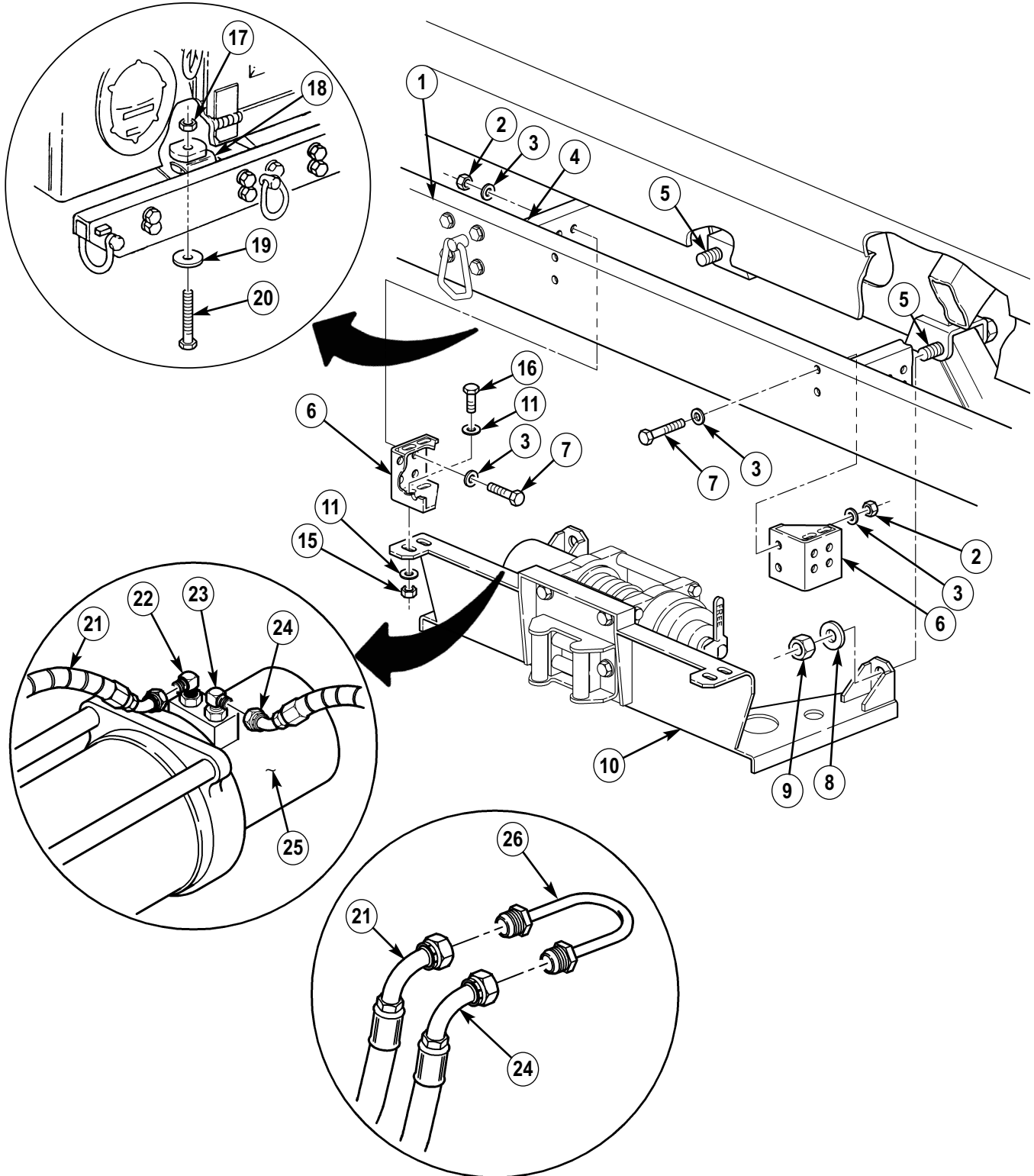
3. Disconnect tube assembly (26) from hydraulic hose assemblies (21) and (24).

NOTE

Perform step 4 if body mount bolts were removed for access to left and right hand rear bracket nuts.

4. Install two screws (20), spacers (19), and locknuts (17) on left and right rear body mounts (18). Tighten locknuts (17) to 90 lb-ft (122 N•m).
5. Connect hydraulic hose (21) to rear port 4 elbow (22) on rear winch assembly (25).
6. Connect hydraulic hose (24) to front port 2 elbow (23) on rear winch assembly (25).

**12-36.1. 10,500 LB REAR HYDRAULIC WINCH ASSEMBLY AND BRACKETS
REPLACEMENT (Cont'd)**



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Bleed power steering system (para. 8-27).

12-36.2. 10,500 LB REAR HYDRAULIC WINCH CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit: automotive
(Appendix B, Item 1)

Materials/Parts

Cotter pin (Appendix G, Item 31)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

General Safety Instructions

Wear leather gloves when handling winch cable.

Maintenance Level

Unit

WARNING

Gloves must be worn when handling winch cable or severe personnel injury may result.

a. Removal

1. Unwind winch cable (2) from drum assembly (1) (TM 9-2320-387-10).
2. Remove capscrew (4), clamp (3), and winch cable (2) from drum assembly (1).
3. Remove cotter pin (7), clevis pin (5), and hook (6), from winch cable (2). Discard cotter pin (7).

b. Installation

CAUTION

Install clamp on winch cable to keep wires from shearing or breaking. Refer to appendix D, fig. D-102 for instructions.

1. Install hook (6) on winch cable (2) with clevis pin (5) and cotter pin (7).

CAUTION

When installing cable on drum assembly, route cable in through fairlead assembly, under drum, and install on top of drum. Failure to do so may cause damage to cable and winch.

NOTE

It may be necessary to place the drumlock handles in FREE to route the winch cable through the rear winch mounting bracket, reinforcement plate, and roller assembly. Place drumlock handle back to ENGAGED position to prevent cable from unwrapping from drum.

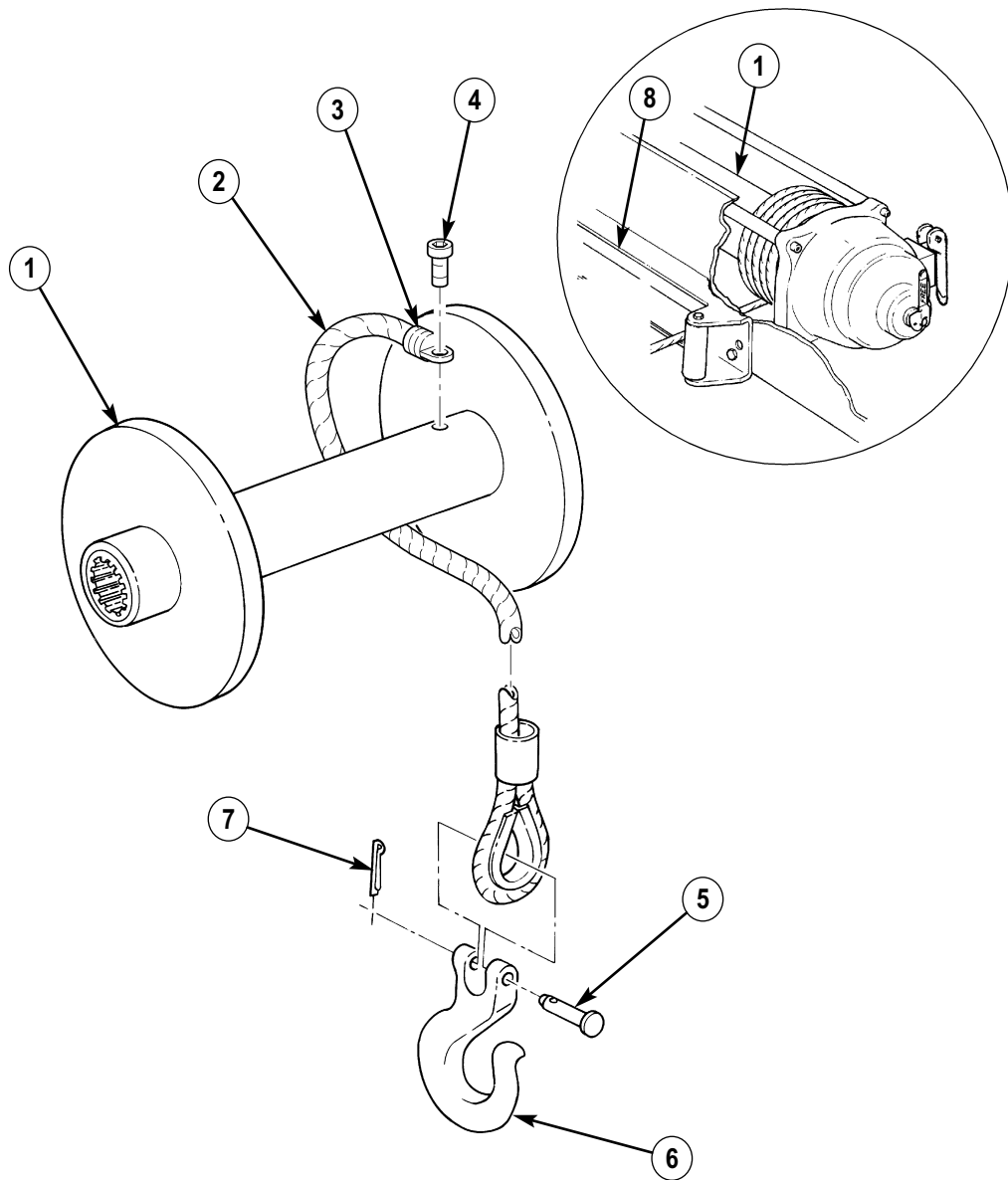
2. Route winch cable (2) through fairlead assembly (8), under drum assembly (1), and install clamp (3) on drum assembly (1) with capscrew (4).

CAUTION

- The winch cable must be spooled on the drum according to the direction of rotation label on the winch or brake will not function.
- Winch cable must be installed on drum under a load of at least 500 lb (227kg) or outer wraps will draw into inner wraps and damage winch cable.

3. Install winch cable (2) on drum assembly (1) (TM 9-2320-387-10).

12-36.2. 10,500 LB REAR HYDRAULIC WINCH CABLE REPLACEMENT (Cont'd)



- FOLLOW ON TASKS:
- Lubricate winch cable (TM 9-2320-387-10).
 - Check winch for proper operation (TM 9-2320-387-10).

12-36.3. 10,500 LB REAR HYDRAULIC WINCH FAIRLEAD ROLLER BRACKET ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit: automotive
(Appendix B, Item 1)
Maintenance and repair shop equipment:
automotive (Appendix B, Item 2)

Materials/ Parts

Four lockwashers (Appendix G, Item 190)

Equipment Condition

Parking brake applied (TM 9-2320-387-10)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

General Safety Instructions

Support winch assembly during fairlead
bracket replacement.

Maintenance Level

Unit

WARNING

Winch assembly must be supported during fairlead bracket removal and installation. Failure to support winch assembly may result in injury to personnel or damage to equipment.

a. Removal

1. Remove four retaining rings (12), two shafts (13), and rollers (14) from fairlead bracket (10).
2. Remove four retaining rings (1), two shafts (2), and rollers (3) from fairlead bracket (10).
3. Remove two capscrews (9), lockwashers (8), and fairlead bracket (10) from winch and bumper assembly (6). Discard lockwashers (8).

NOTE

If reinforcement plate is damaged, perform step 4.

4. Remove two capscrews (4), lockwashers (5), and reinforcement plate (7) from winch and bumper assembly (6). Discard lockwashers (5).

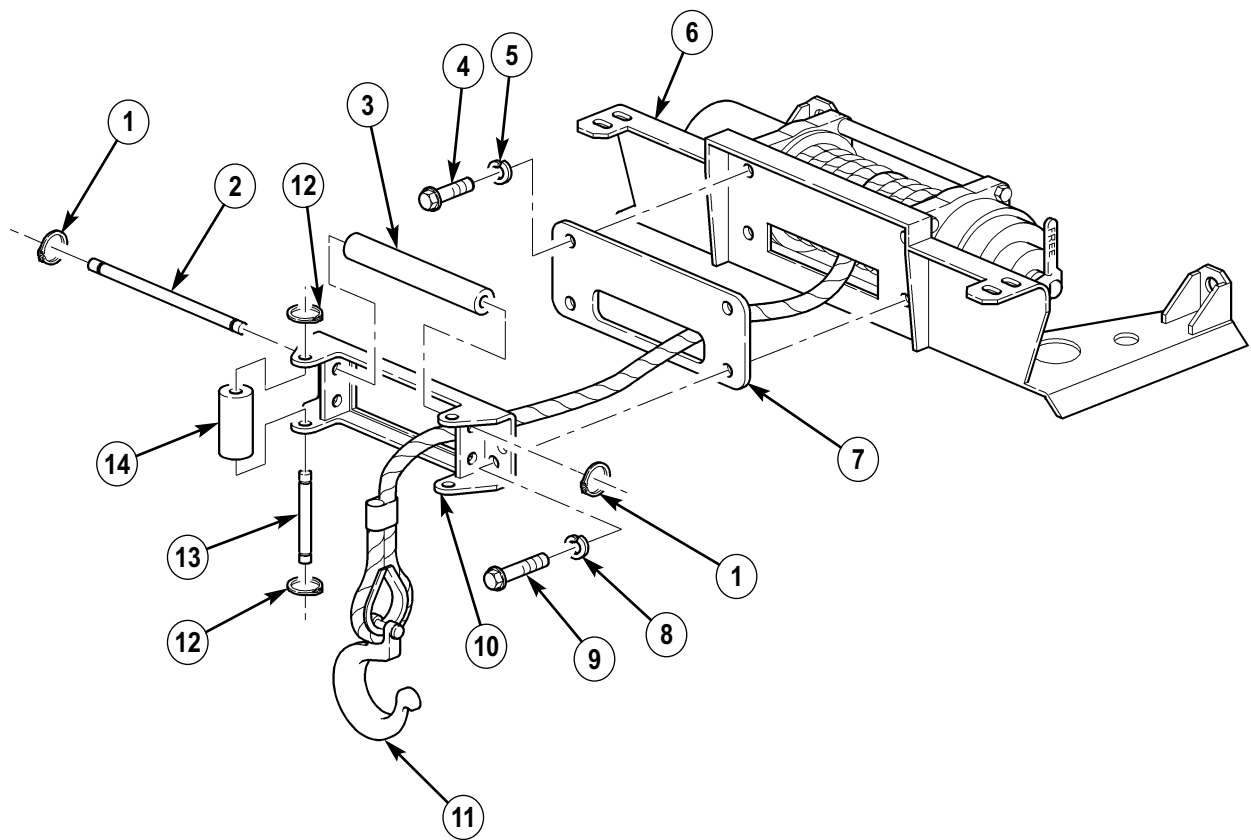
b. Installation

NOTE

If replacing reinforcement plate, perform step 1.

1. Install reinforcement plate (7) on winch and bumper assembly (6) with two lockwashers (5) and capscrews (4). Tighten capscrews (4) to 37 lb-ft (50 N•m).
2. Install fairlead bracket (10) on reinforcement plate (7) and winch and bumper assembly (6) with two lockwashers (8) and capscrews (9). Tighten capscrews (9) to 37 lb-ft (50 N•m).
3. Route winch cable (11) through slot in winch and bumper assembly (6), reinforcement plate (7), and fairlead bracket (10).
4. Install two rollers (3) and shafts (2) in fairlead bracket (10) with four retaining rings (1).
5. Install two rollers (14) and shafts (13) in fairlead bracket (10) with four retaining rings (12).

12-36.3. 10,500 LB REAR HYDRAULIC WINCH FAIRLEAD ROLLER BRACKET ASSEMBLY REPLACEMENT (Cont'd)



12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit: automotive
(Appendix B, Item 1)

Materials/ Parts

Dexron III® (Appendix C, Item 37)
Two O-rings (Appendix G, Item 86.1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine left splash shield removed (para. 10-23).
- Battery ground cables disconnected (para. 4-68).

Maintenance Level

Unit

a. Removal

CAUTION

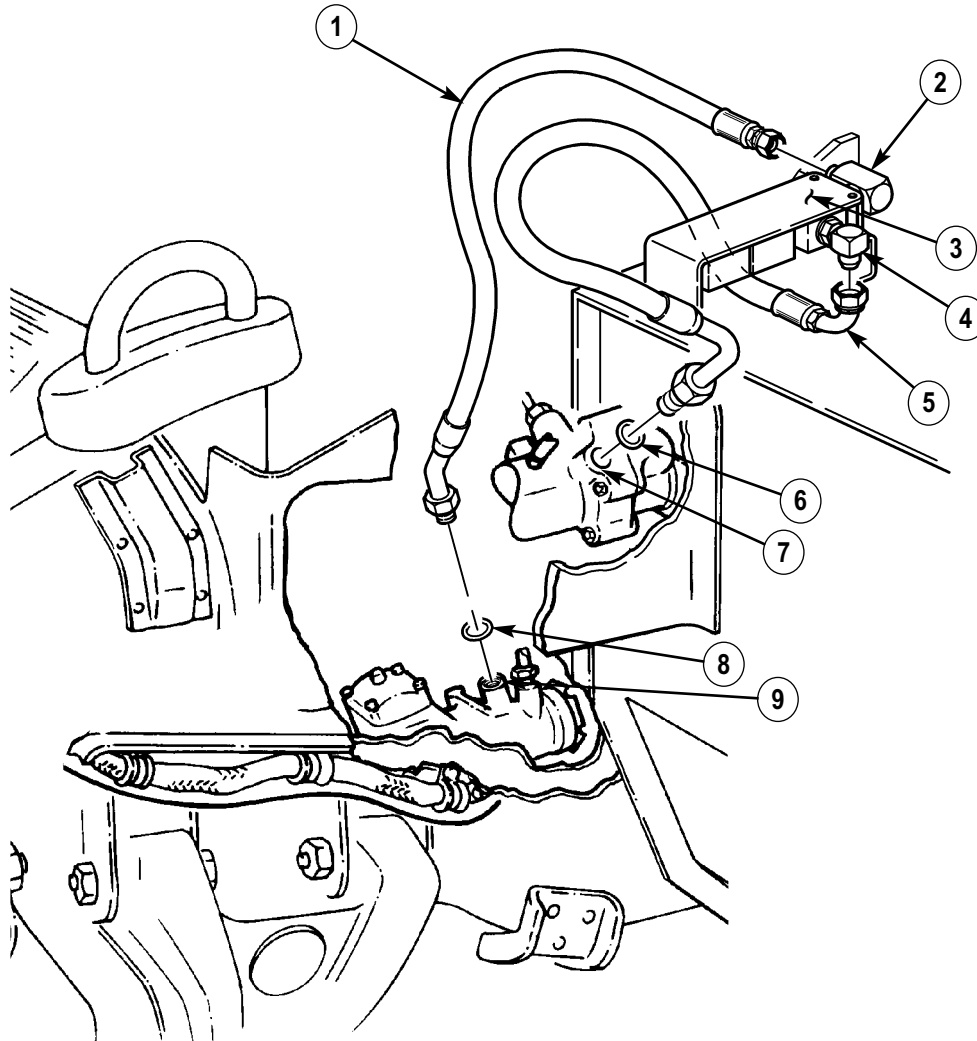
Cover or plug all open hoses and connections immediately after disconnection to prevent contamination. Remove all plugs prior to connecting hoses.

NOTE

Ensure area around valve assembly ports and power steering gear ports are clean before removing hoses.

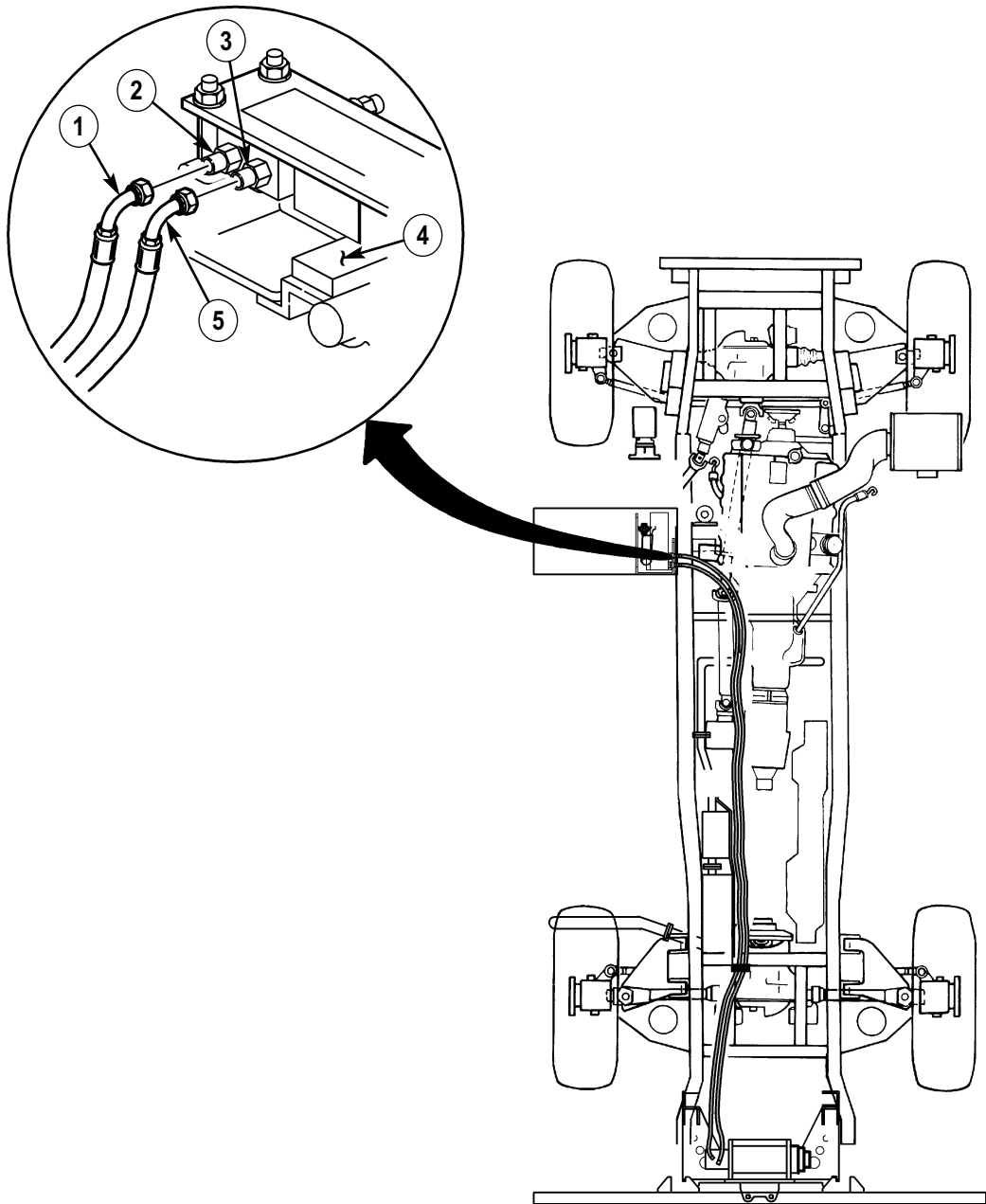
1. Disconnect hydraulic hose assembly (1) from port 1 elbow (2) on valve assembly (3).
2. Disconnect hydraulic hose assembly (1) and O-ring (8) from power steering gear port (9). Discard O-ring (8).
3. Disconnect hydraulic hose assembly (5) from port 3 elbow (4) on valve assembly (3).
4. Disconnect hydraulic hose assembly (5) and O-ring (6) from hydro-boost (7). Discard O-ring (6).

12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)



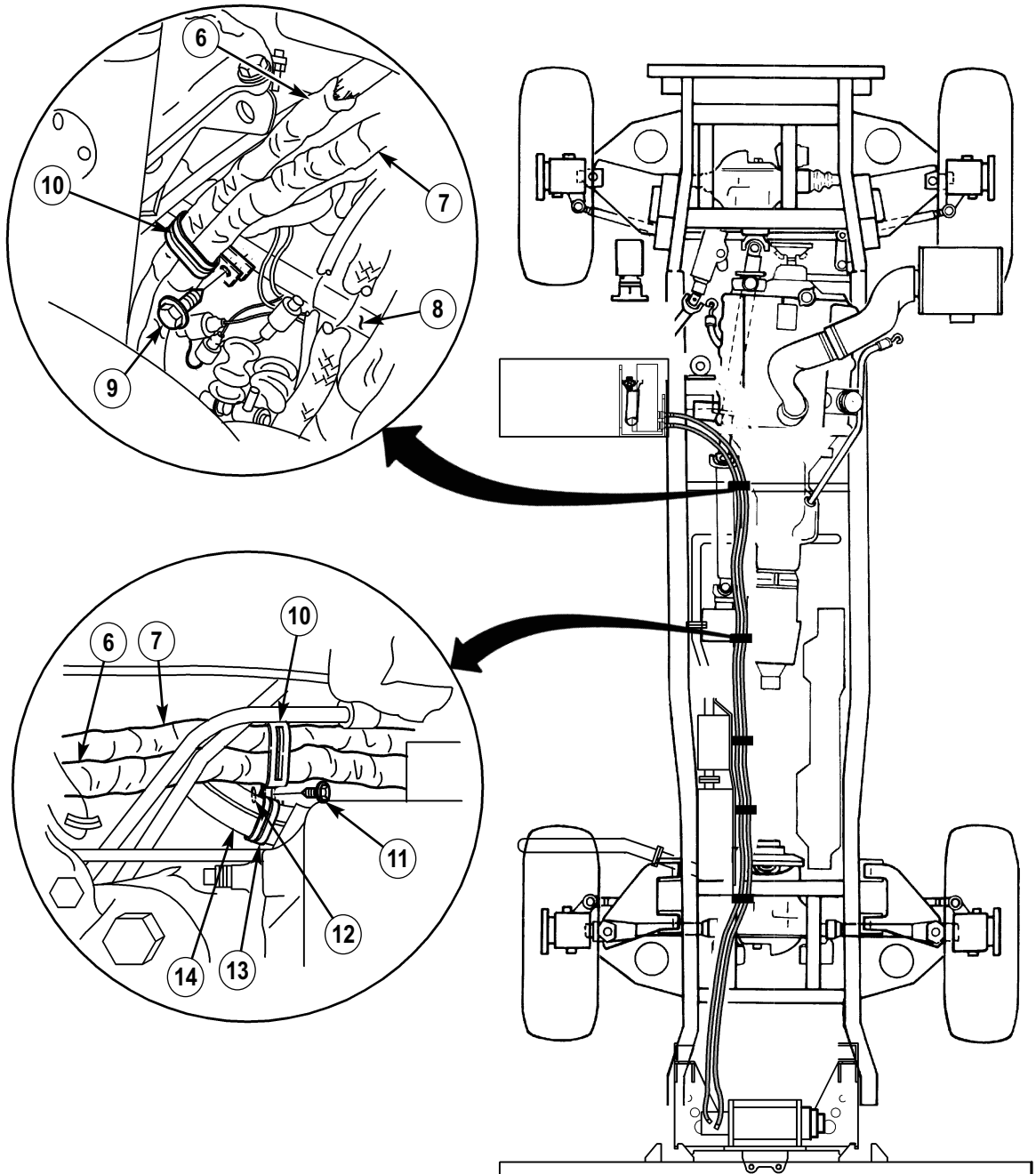
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

5. Disconnect hydraulic hose assembly (5) from port 4 adapter (3) on valve assembly (4).
6. Disconnect hydraulic hose assembly (1) from port 2 adapter (2) on valve assembly (4).



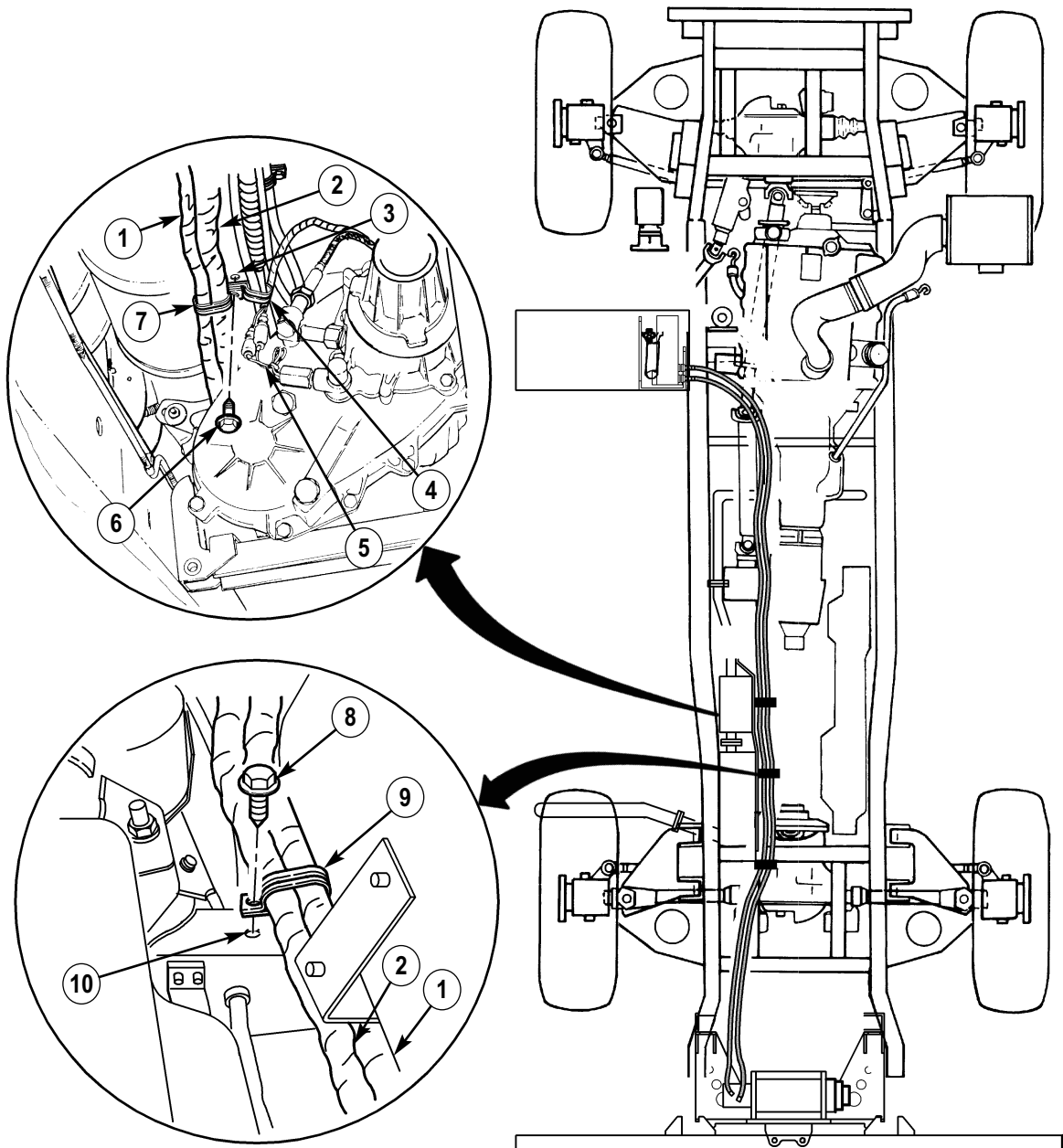
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

7. Remove capscrew (9), clamp (10), and hydraulic hose assemblies (6) and (7) from brace (8).
8. Remove capscrew (11), clamp (13), cables (14), clamp (10), and hydraulic hose assemblies (6) and (7) from front intermediate tunnel support (12).



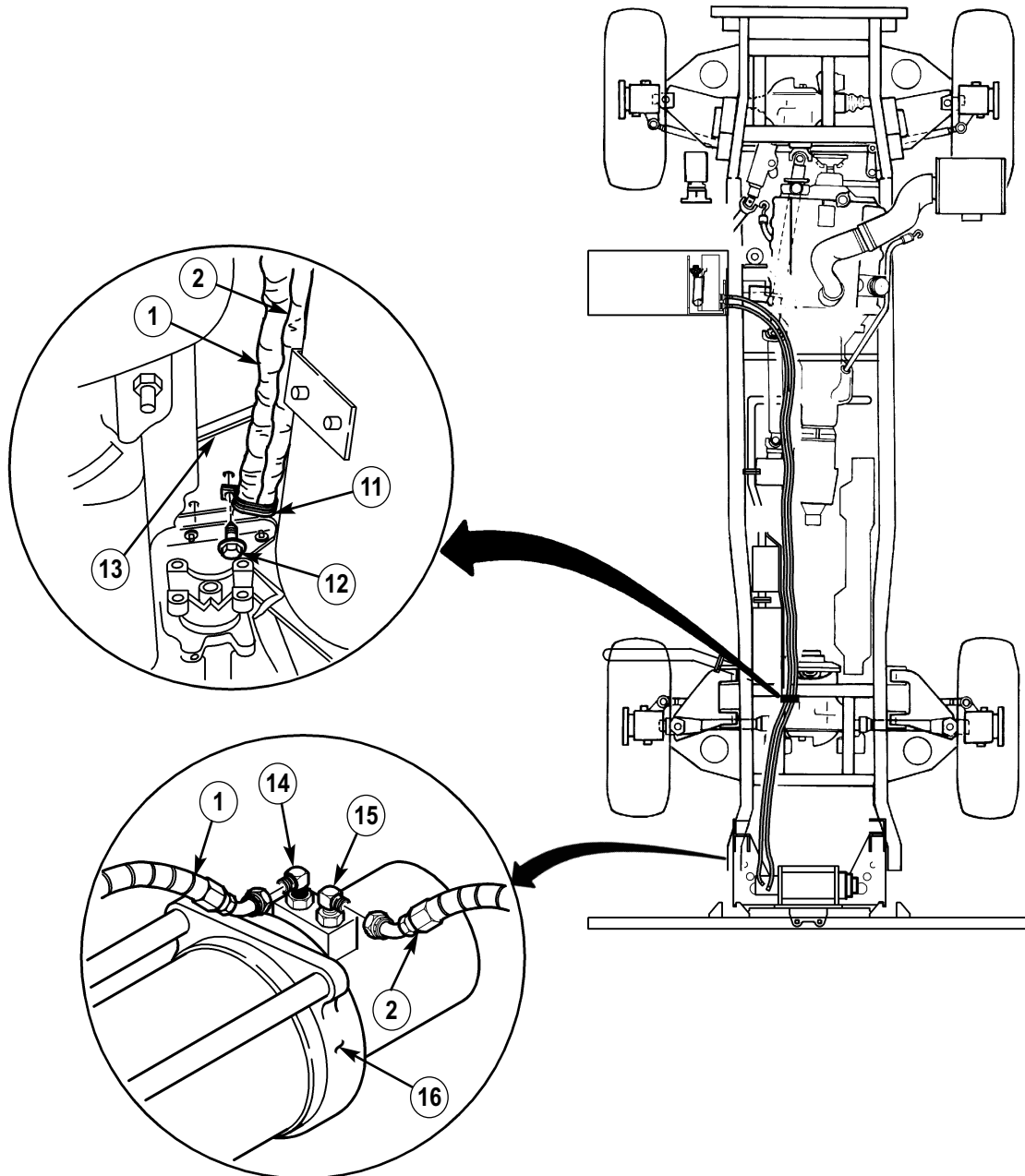
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

9. Remove capscrew (6), clamp (4), cables (5), clamp (7), and hydraulic hose assemblies (1) and (2) from center tunnel support (3).
10. Remove capscrew (8), clamp (9), and hydraulic hose assemblies (1) and (2) from rear intermediate tunnel support (10).



12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

11. Remove capscrew (12), clamp (11), and hydraulic hose assemblies (1) and (2) from rear tunnel support (13).
12. Disconnect hydraulic hose assembly (2) from front port 2 elbow (15) on rear winch assembly (16). Remove hydraulic hose assembly (2) from vehicle.
13. Disconnect hydraulic hose assembly (1) from rear port 4 elbow (14) on rear winch assembly (16). Remove hydraulic hose assembly (1) from vehicle.



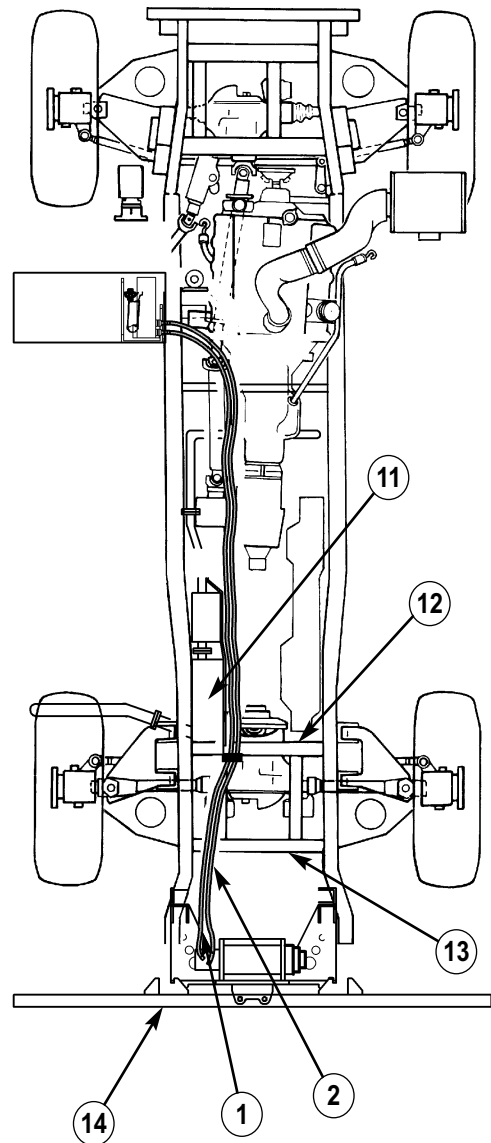
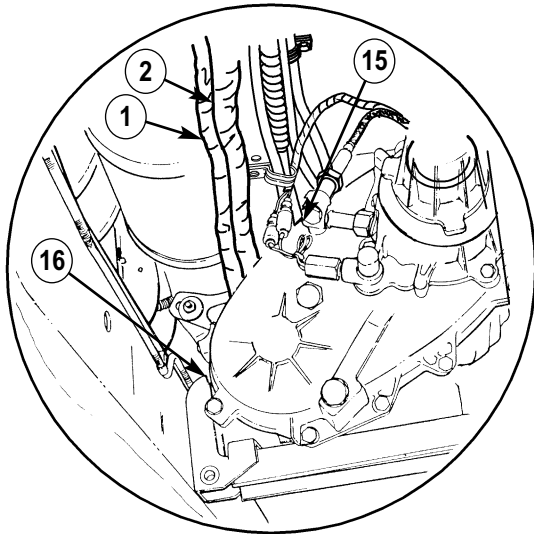
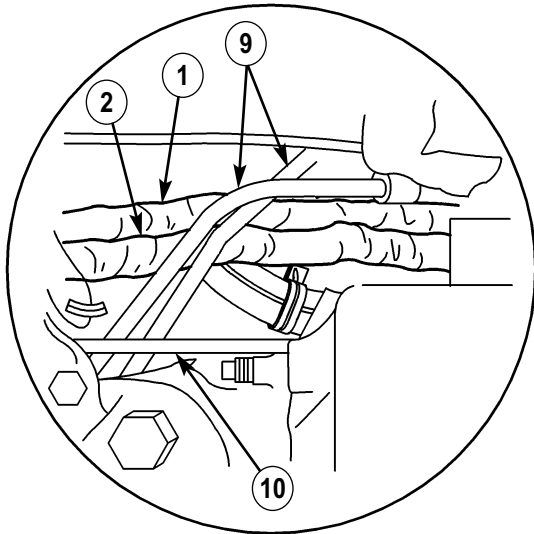
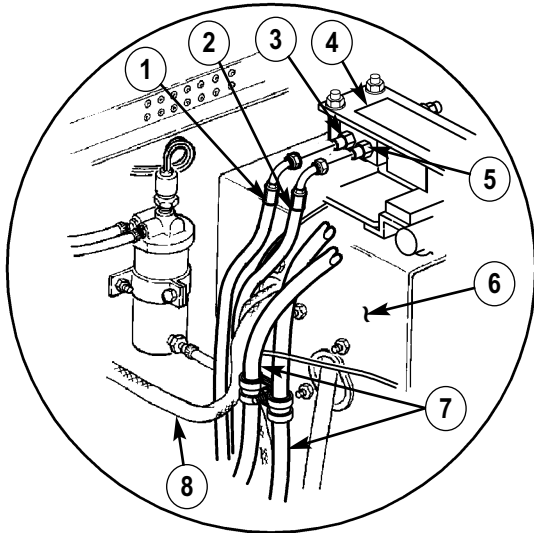
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

b. Installation

NOTE

- Use tape on one hose for ease of installation and identification from rear winch to valve assembly port.
 - When positioning hoses on vehicle, place ends with heat shield closest to fittings at rear of vehicle.
1. Starting from left rear of vehicle (14), route two hydraulic hose assemblies (1) and (2) over rear crossmember (13), over differential support (12), and over muffler (11).
 2. Route two hydraulic hose assemblies (1) and (2) between speedometer drive (15) and transfer case (16). Continue along right side of transmission shift linkage (10), next to transfer case cooler lines (9), and towards front of vehicle.
 3. Route two hydraulic hose assemblies (1) and (2) along left inner cowl (6), two hydraulic hoses (7), and between body wiring harness (8) to port 2 adapter (3) and port 4 adapter (5) on valve assembly (4).
 4. Connect hydraulic hose assembly (1) to port 2 adapter (3) on valve assembly (4).
 5. Connect hydraulic hose assembly (2) to port 4 adapter (5) on valve assembly (4).

12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)



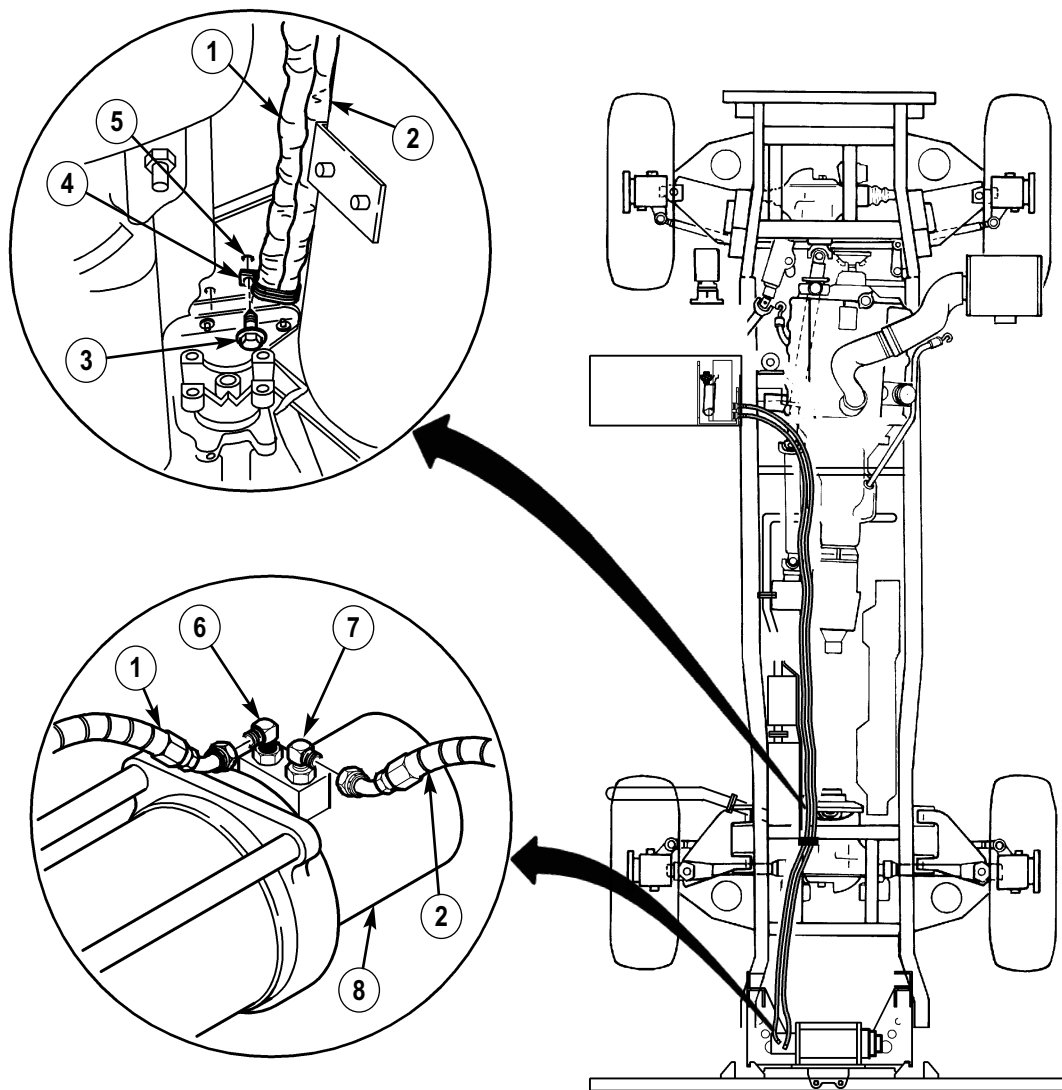
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

6. Connect hydraulic hose assembly (1) to rear port 4 elbow (6) on rear winch assembly (8).
7. Connect hydraulic hose assembly (2) to front port 2 elbow (7) on rear winch assembly (8).

CAUTION

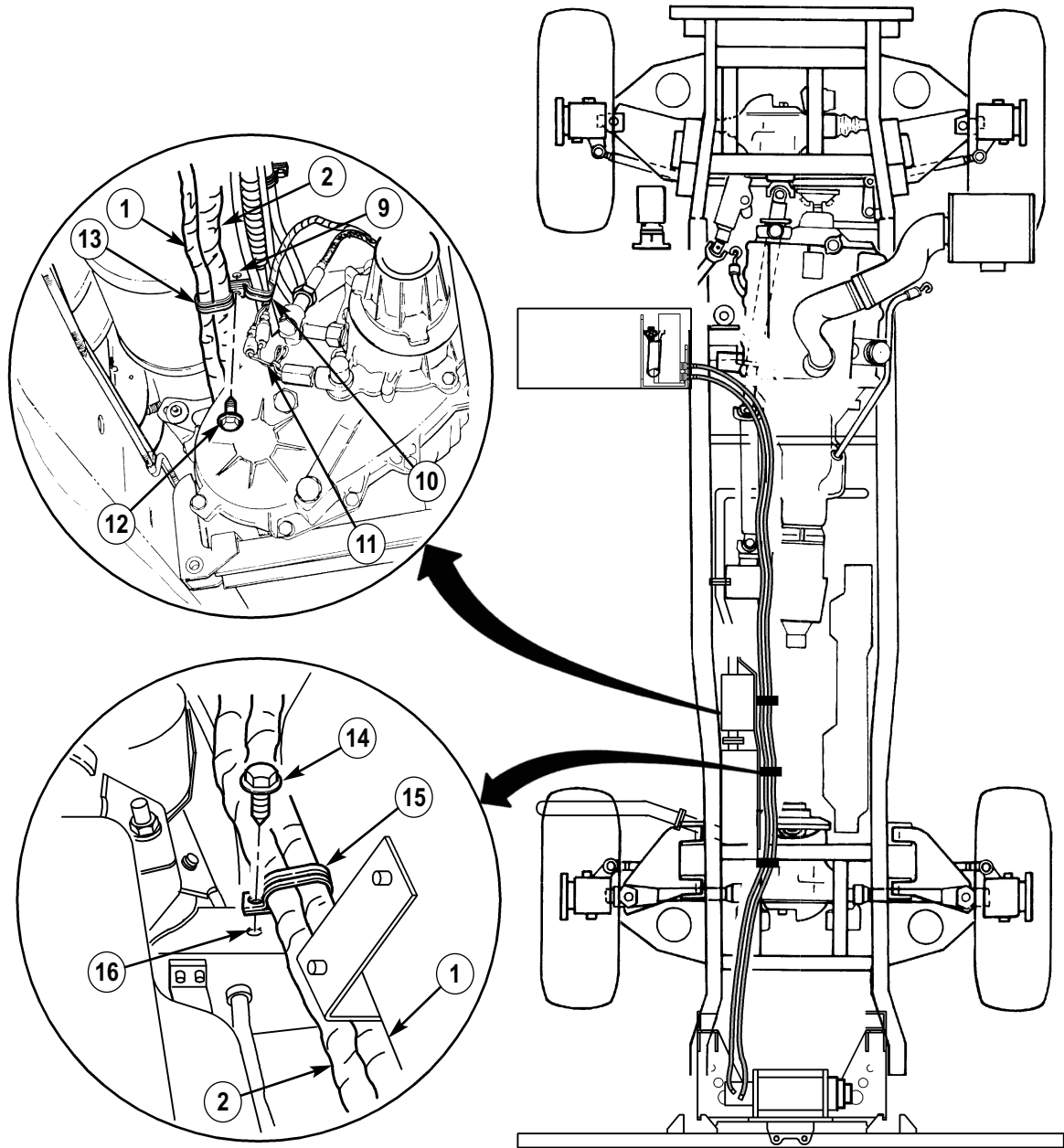
Ensure hydraulic hoses are positioned away from all moving parts and away from heated surfaces.

8. Secure hydraulic hose assemblies (1) and (2) to rear tunnel support (5) with clamp (4) and capscrew (3).



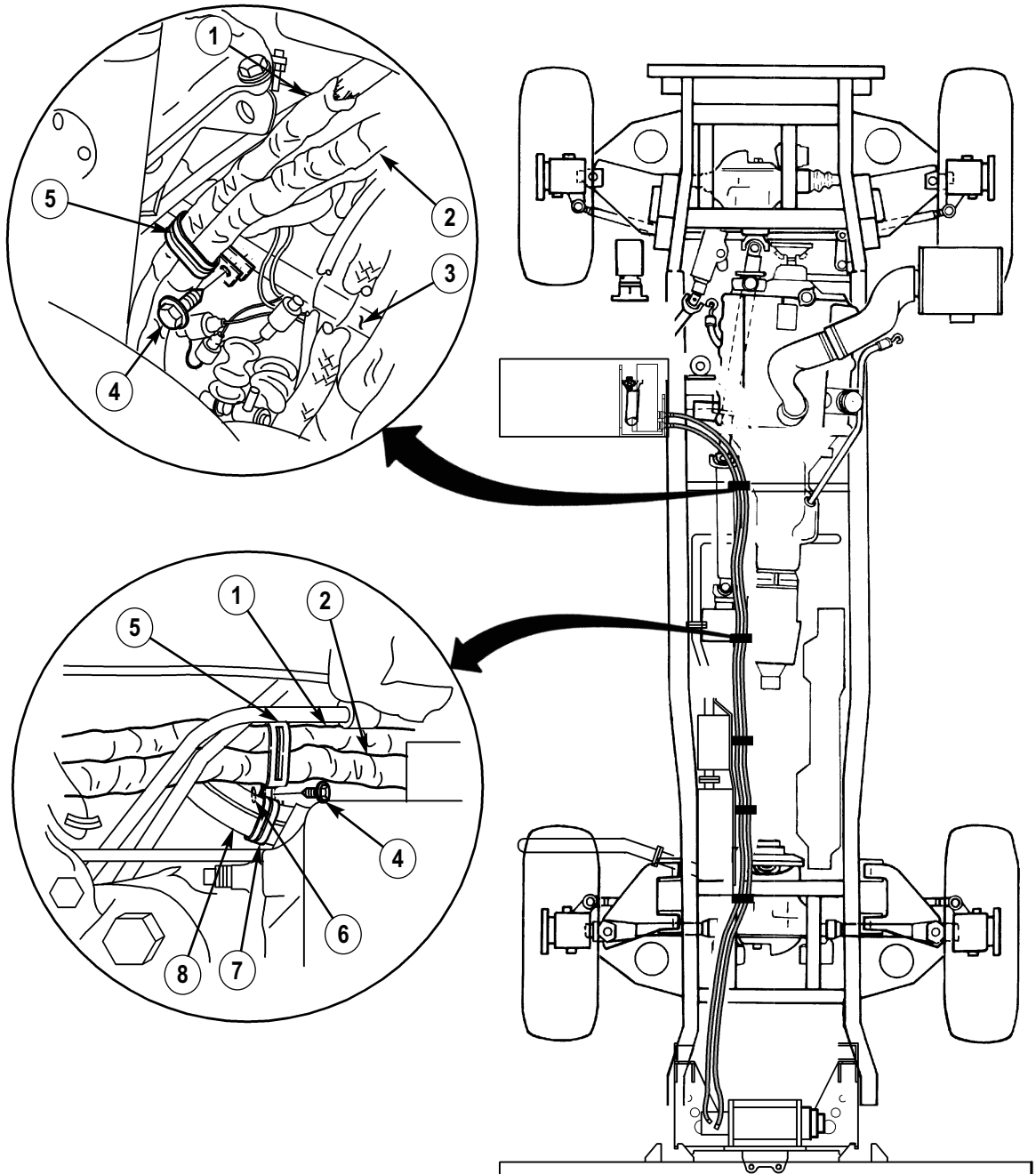
12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

9. Secure hydraulic hose assemblies (1) and (2) to rear intermediate tunnel support (16) with clamp (15) and capscrew (14).
10. Secure cables (11), clamp (10), hydraulic hose assemblies (1) and (2), and clamp (13) to center tunnel support (9) with capscrew (12).



12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

11. Secure cables (8), clamp (7), hydraulic hose assemblies (1) and (2), and clamp (5) to front intermediate tunnel support (6) with capscrew (4).
12. Secure hydraulic hose assemblies (1) and (2) and clamp (5) to intermediate tunnel support (3) with capscrew (4).

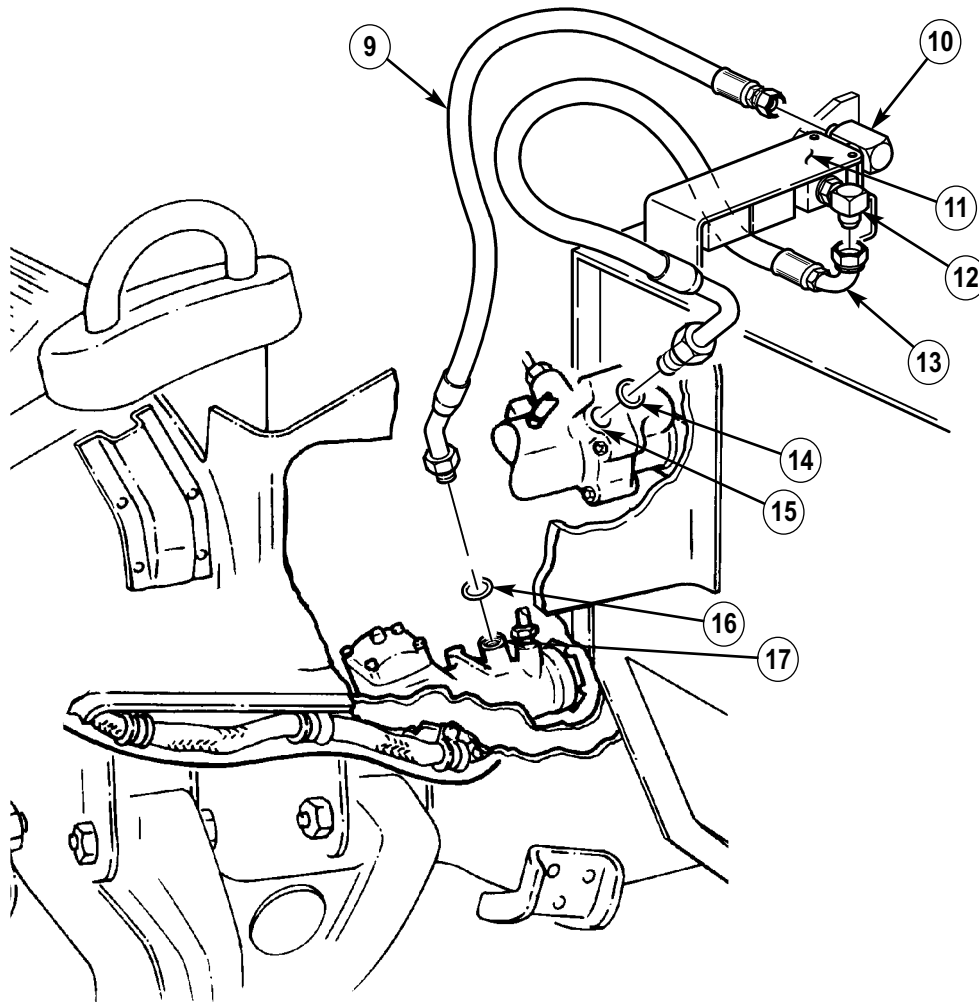


12-36.4. 10,500 LB REAR HYDRAULIC WINCH HOSE REPLACEMENT (Cont'd)

13. Connect hydraulic hose assembly (13) to port 3 elbow (12) on valve assembly (11).
14. Route hydraulic hose assembly (13) from port 3 elbow (12) under valve assembly (11).

NOTE

- Ensure area around hydro-boost and power steering gear port is clean before installing power steering hose assembly.
 - Lubricate O-rings with Dexron III® prior to installation.
15. Install O-ring (14) on hydraulic hose assembly (13) and connect hydraulic hose assembly (13) to hydro-boost (15).
 16. Connect hydraulic hose assembly (9) to port 1 elbow (10) on valve assembly (11).
 17. Route hydraulic hose assembly (9) from port 1 elbow (10) on valve assembly (11) along left inner cowl to power steering gear port (17).
 18. Install O-ring (16) on hydraulic hose assembly (9) and connect hydraulic hose assembly (9) to power steering gear port (17).



- FOLLOW-ON TASKS:
- Connect battery ground cables (para. 4-68).
 - Bleed power steering system (para. 8-27).
 - Install engine left splash shield (para. 10-23).

12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Tiedown strap (Appendix G, Item 463)
Two locknuts (Appendix G, Item 186.1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected
(para. 4-68).

Maintenance Level

Unit

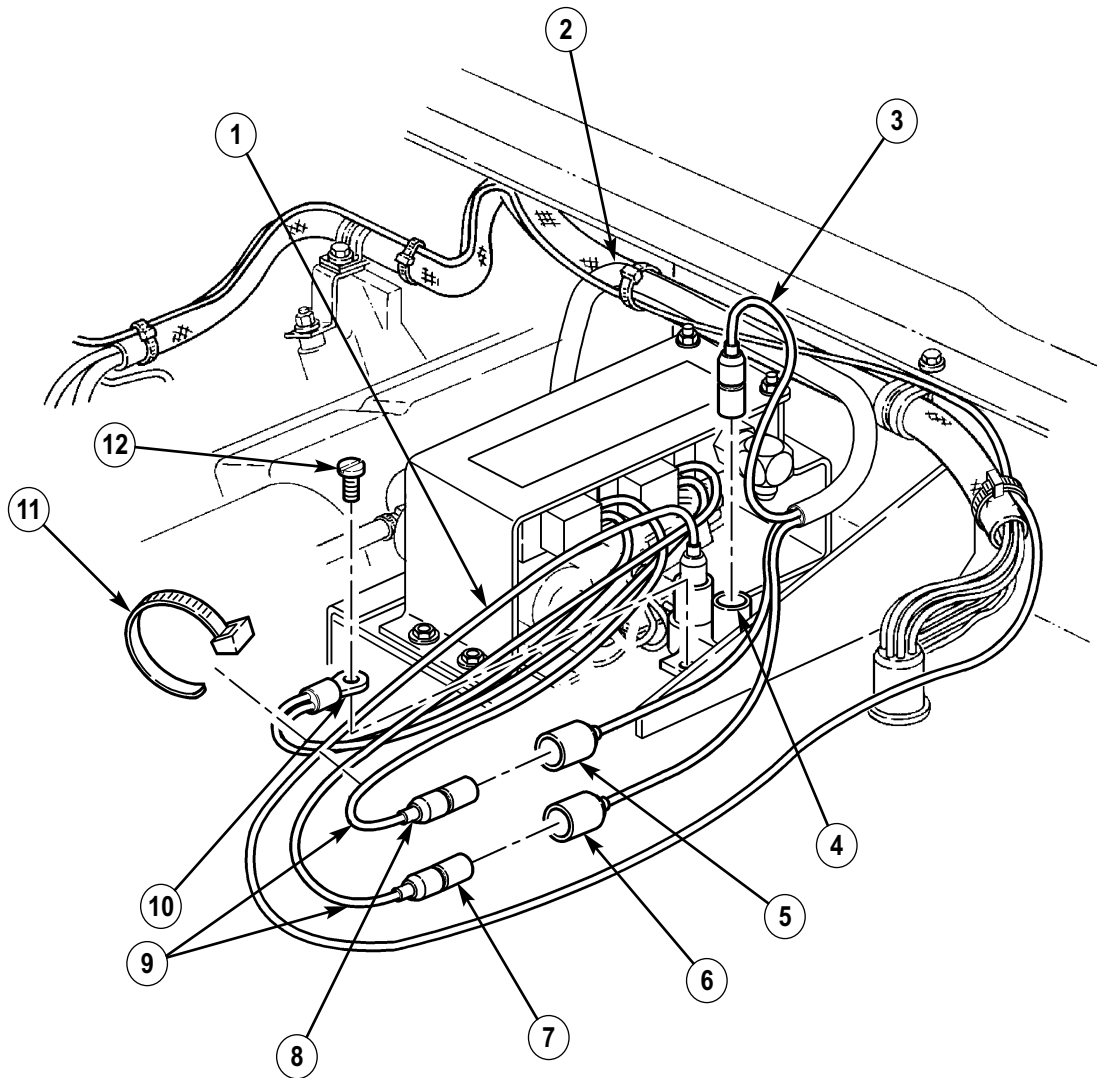
a. Removal

CAUTION

Cover or plug power steering gear and hydro-boost connections immediately after removing hoses to prevent contamination. Remove all plugs prior to connecting hoses.

1. Remove tiedown strap (11) from lead wire (1), controller plug harness (2), and valve assembly wires (9). Discard tiedown strap (11).
2. Disconnect controller plug lead 785C (5) from valve assembly lead 785C (8).
3. Disconnect controller plug lead 785B (3) from circuit breaker (4).
4. Disconnect controller plug lead 785A (6) from valve assembly lead 785A (7).
5. Remove screw (12) and controller ground lead (10) from circuit breaker (4).

12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT (Cont'd)



12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT (Cont'd)

NOTE

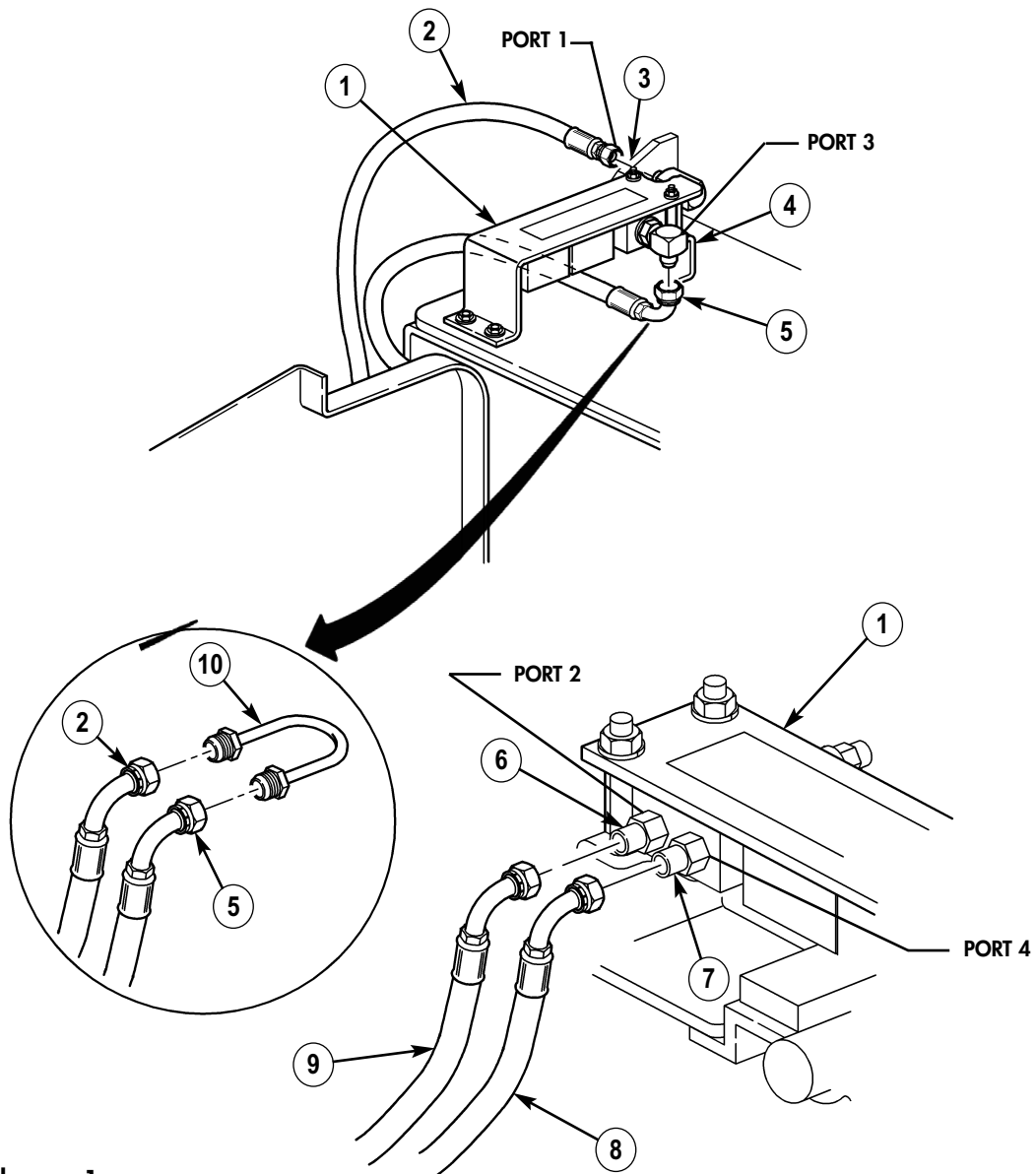
Ensure area around valve assembly ports are clean before removing hoses.

6. Disconnect hydraulic hose assembly (2) from port 1 elbow (3) on valve assembly (1).
7. Disconnect hydraulic hose assembly (5) from port 3 elbow (4) on valve assembly (1).
8. Disconnect hydraulic hose assemblies (9) and (8) from port 2 adapter (6) and port 4 adapter (7) on valve assembly (1).

NOTE

Perform step 9 only if vehicle is to be operated with valve assembly removed. Tube assembly is located in stowage box under commander's (companion) seat inside vehicle.

9. Connect tube assembly (10) to hydraulic hose assemblies (2) and (5).

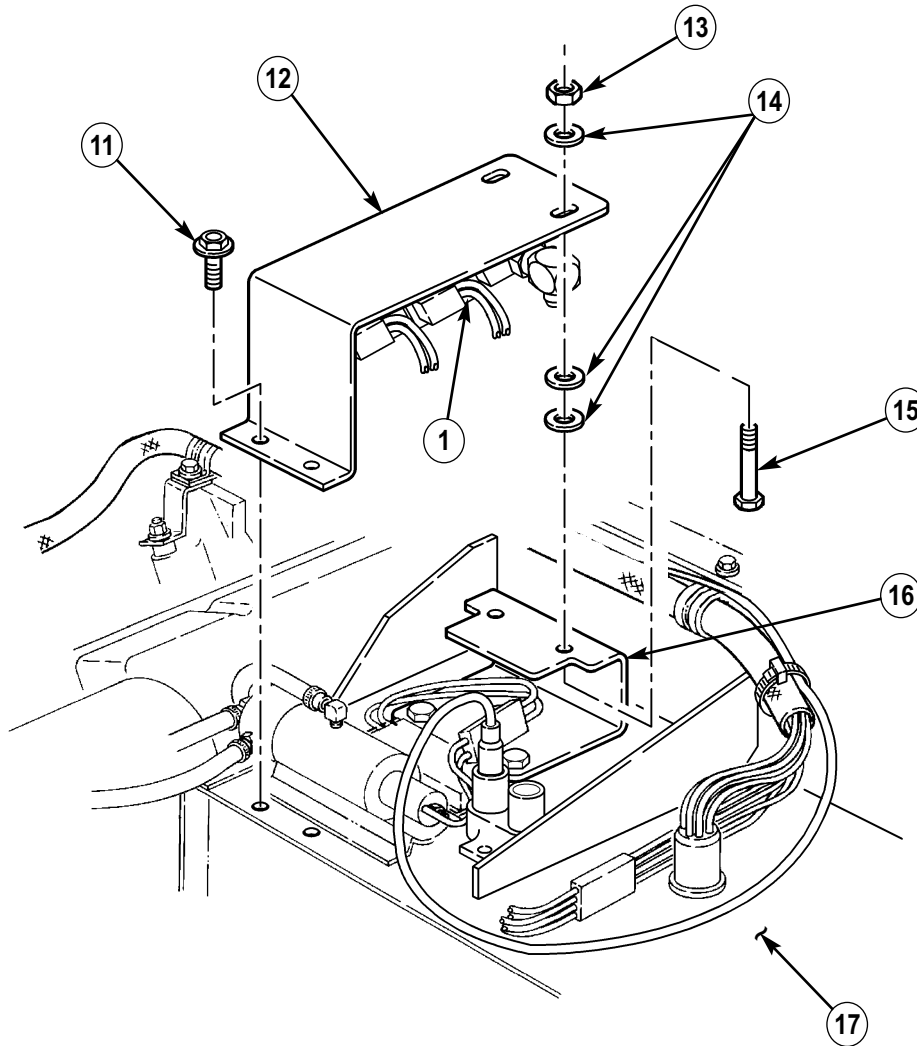


12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT (Cont'd)

10. Remove two screws (11) from shield (12) and top left cowl armor (17).
11. Remove two locknuts (13), capscrews (15), six washers (14), shield (12), and valve assembly (1) from bracket (16). Discard locknuts (13).

b. Installation

1. Install valve assembly (1) and shield (12) on bracket (16) with two capscrews (15), six washers (14), and two locknuts (13).
2. Install shield (12) on top left cowl armor (17) with two screws (11).

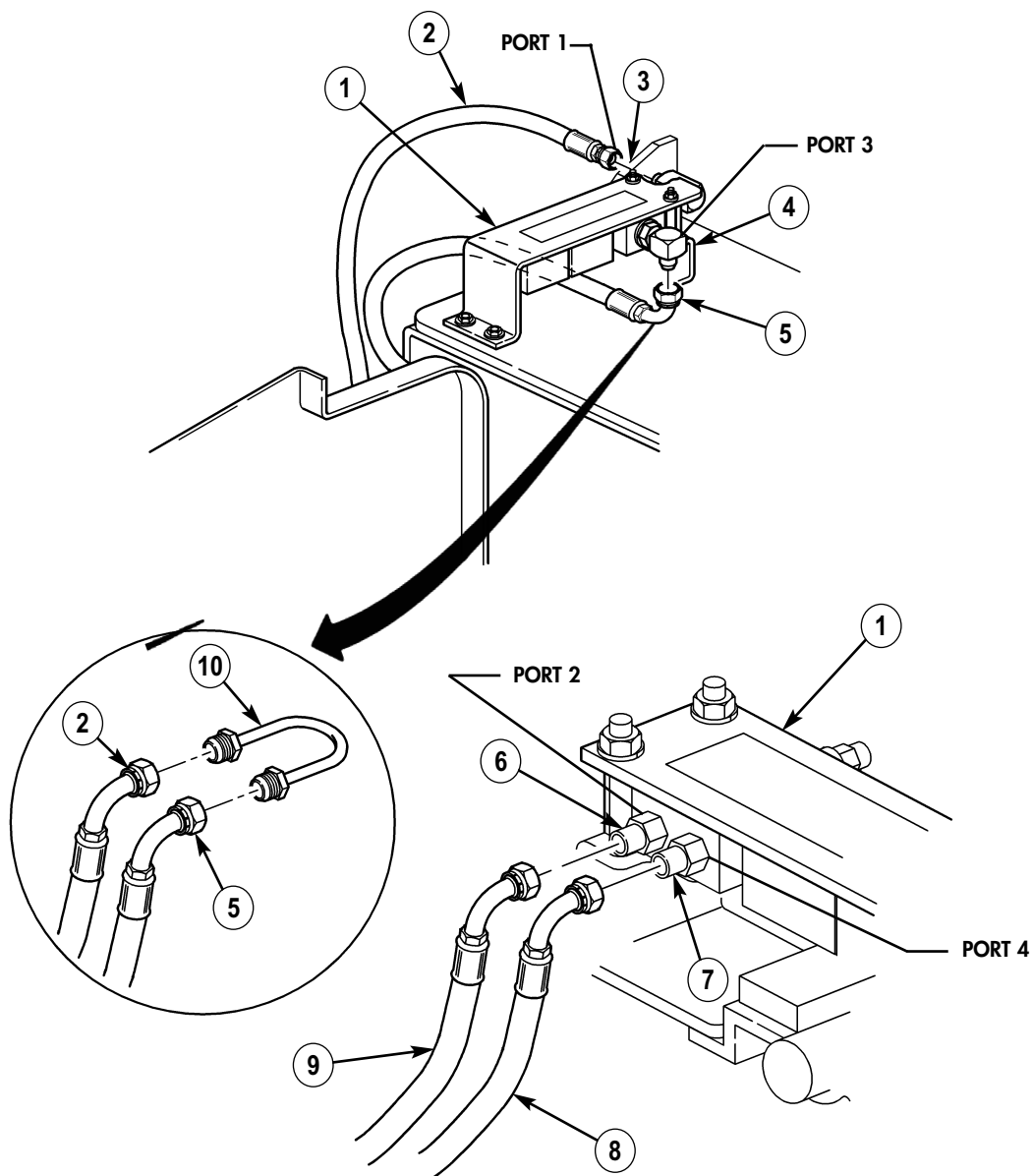


12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT (Cont'd)

NOTE

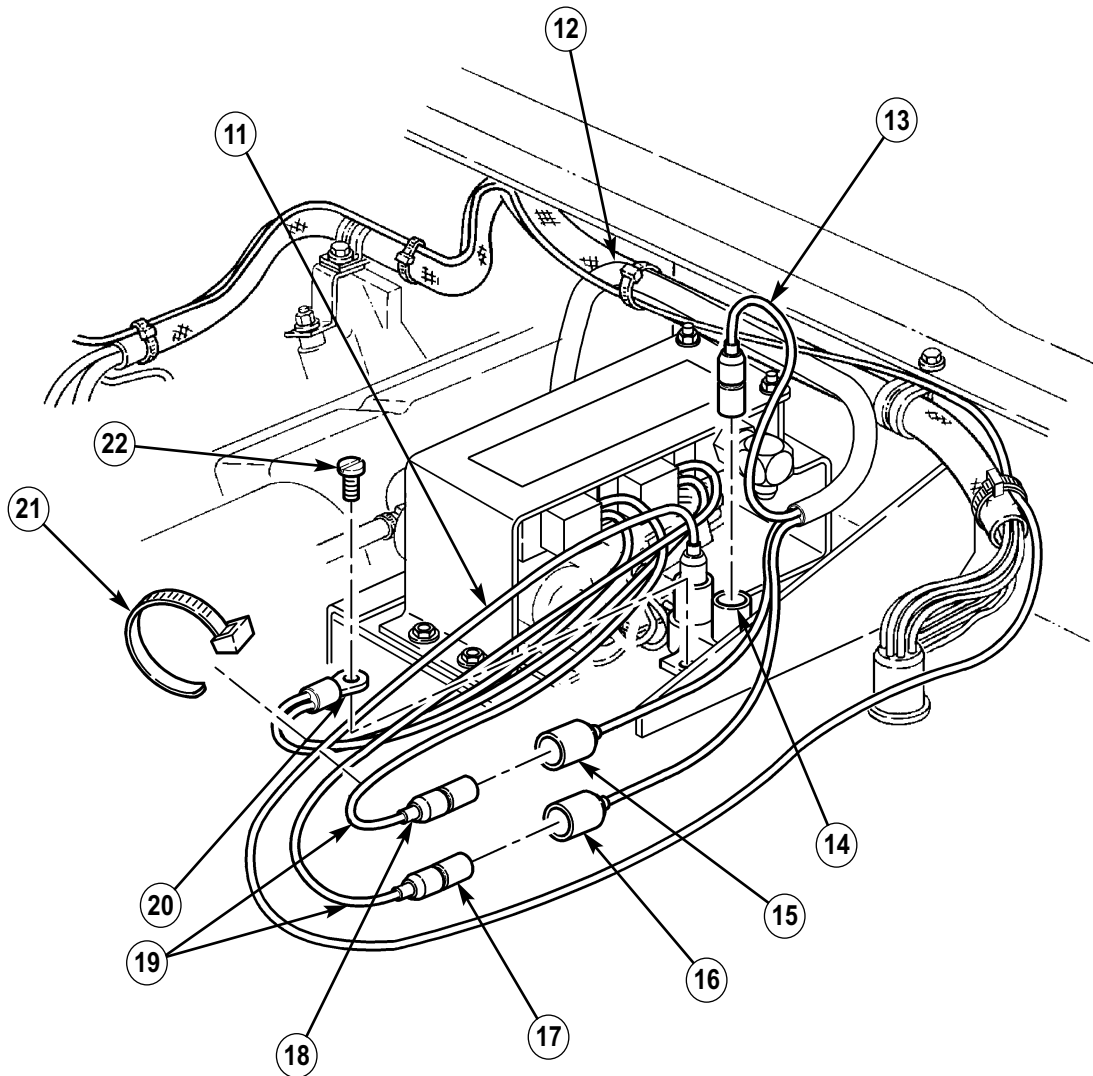
Perform steps 3 and 4 if tube assembly was installed. Store tube assembly in stowage box under commander's (companion) seat inside vehicle.

3. Disconnect tube assembly (10) from hydraulic hose assemblies (2) and (5).
4. Remove plugs from hydraulic hose assemblies (8) and (9).
5. Connect hydraulic hose assemblies (2) and (5) to port 1 elbow (3) and port 3 elbow (4) on valve assembly (1).
6. Connect hydraulic hose assemblies (9) and (8) to port 2 adapter (6) and port 4 adapter (7) on valve assembly (1).



12-36.5. 10,500 LB REAR HYDRAULIC WINCH VALVE ASSEMBLY REPLACEMENT (Cont'd)

7. Connect controller ground lead (20) to circuit breaker (14) with screw (22).
8. Connect controller plug lead 785A (16) to valve assembly lead 785A (17).
9. Connect controller plug lead 785B (13) to circuit breaker (14).
10. Connect controller plug lead 785C (15) to valve assembly lead 785C (18).
11. Install tiedown strap (21) on lead wire (11), controller plug harness (12), and valve assembly wires (19).



FOLLOW ON TASKS: • Connect battery ground cables (para. 4-68).
 • Bleed power steering system (para. 8-27).

12-36.6. 10,500 LB REAR HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanics tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three tiedown straps (Appendix G, Item 463)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected
(para. 4-68).

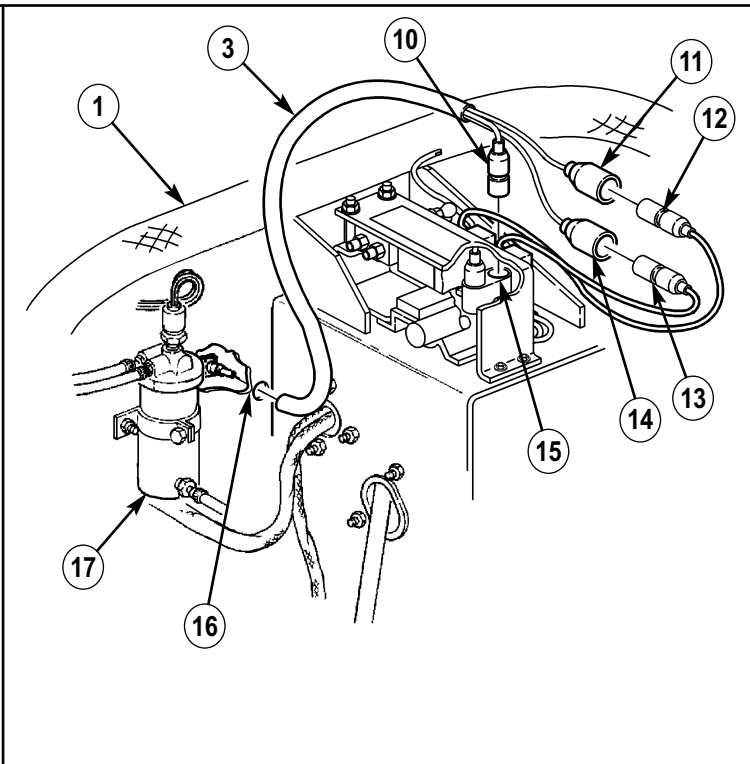
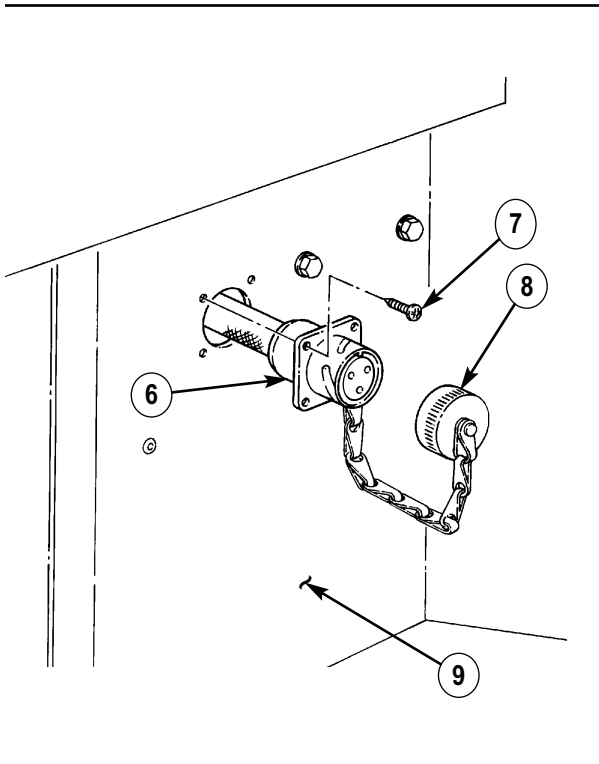
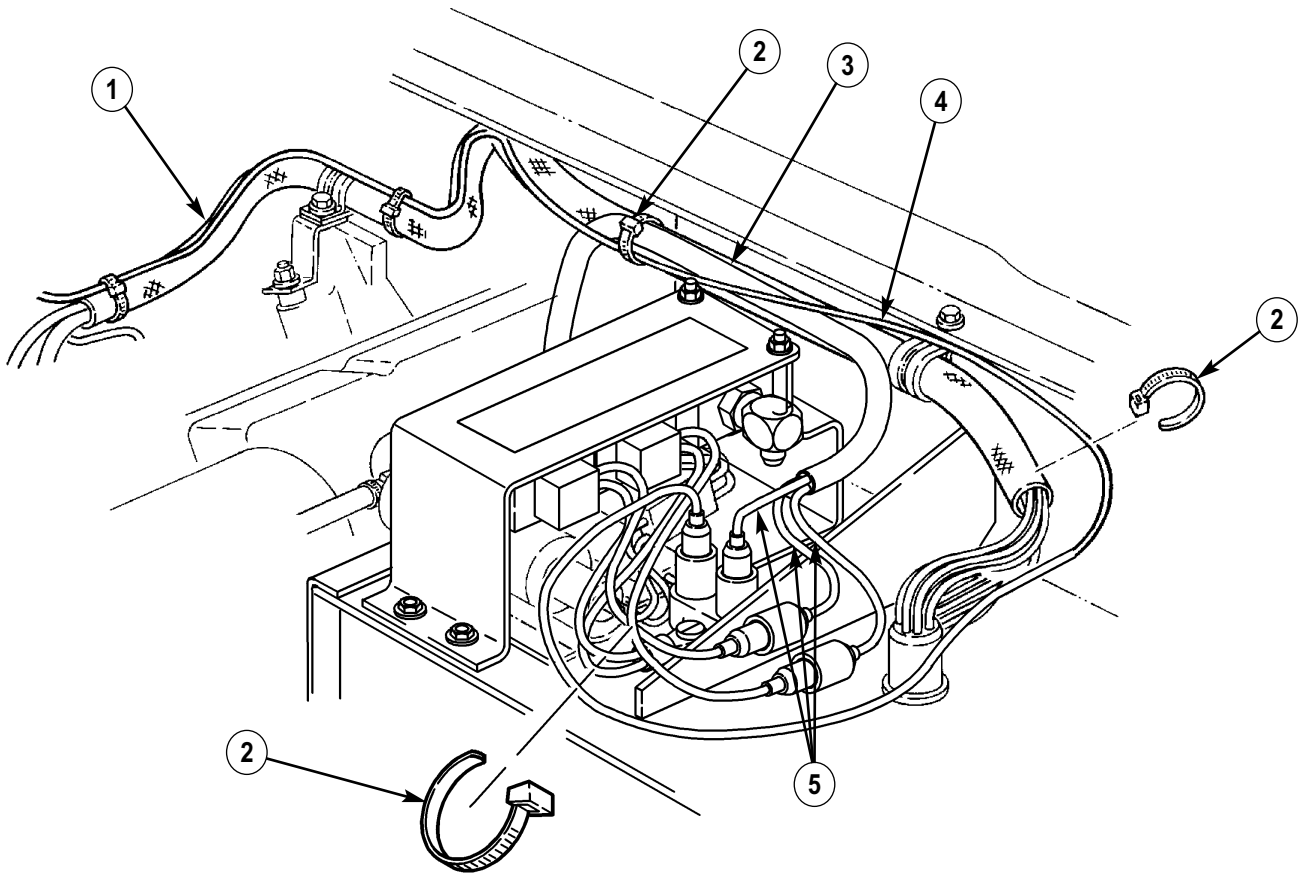
Maintenance Level

Unit

a. Removal

1. Remove three tiedown straps (2) from lead wire (4), controller plug harness (3), valve assembly wires (5), and body wiring harness (1). Discard tiedown straps (2).
2. Disconnect controller plug lead 785C (14) from valve assembly lead 785C (13).
3. Disconnect controller plug lead 785B (10) from circuit breaker (15).
4. Disconnect controller plug lead 785A (11) from valve assembly lead 785A (12).
5. Remove four screws (7) and controller plug (6) with cap and chain (8) from body panel (9).
6. Remove controller plug harness (3) from around fuel filter (17) and back through hole in body panel (16).

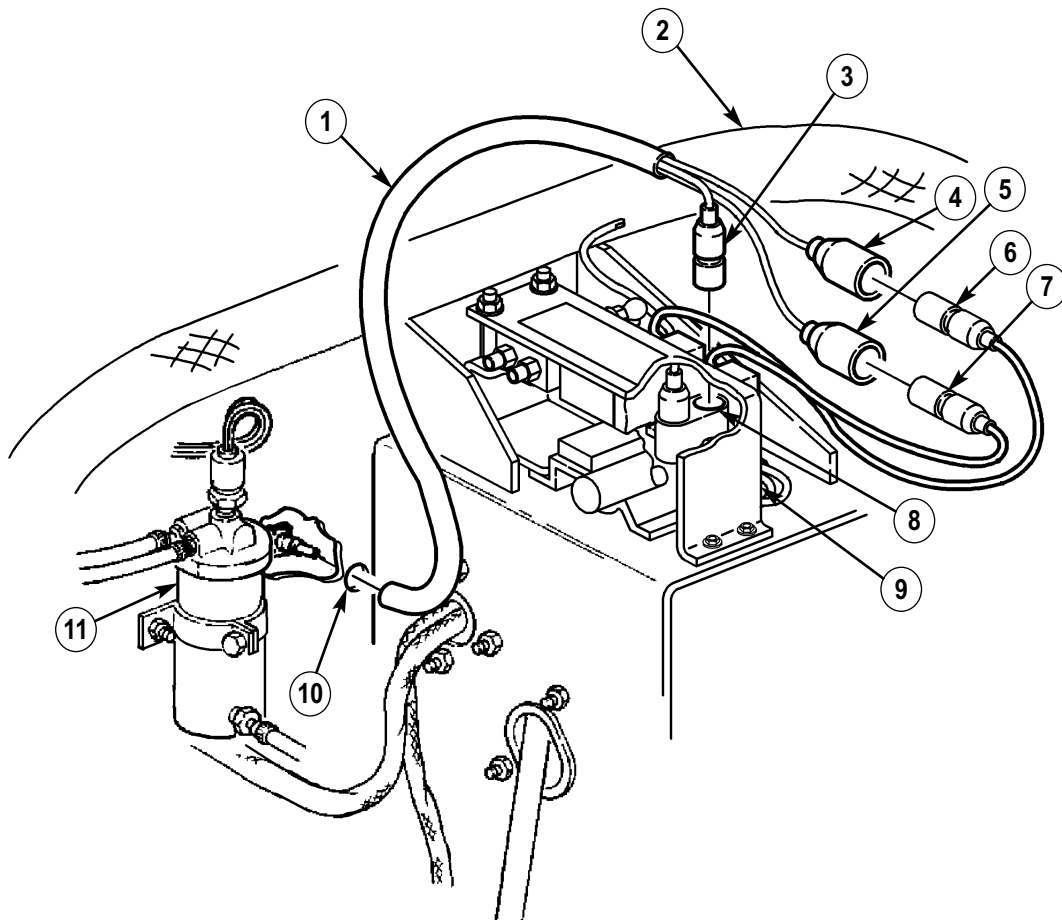
12-36.6. 10,500 LB REAR HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)



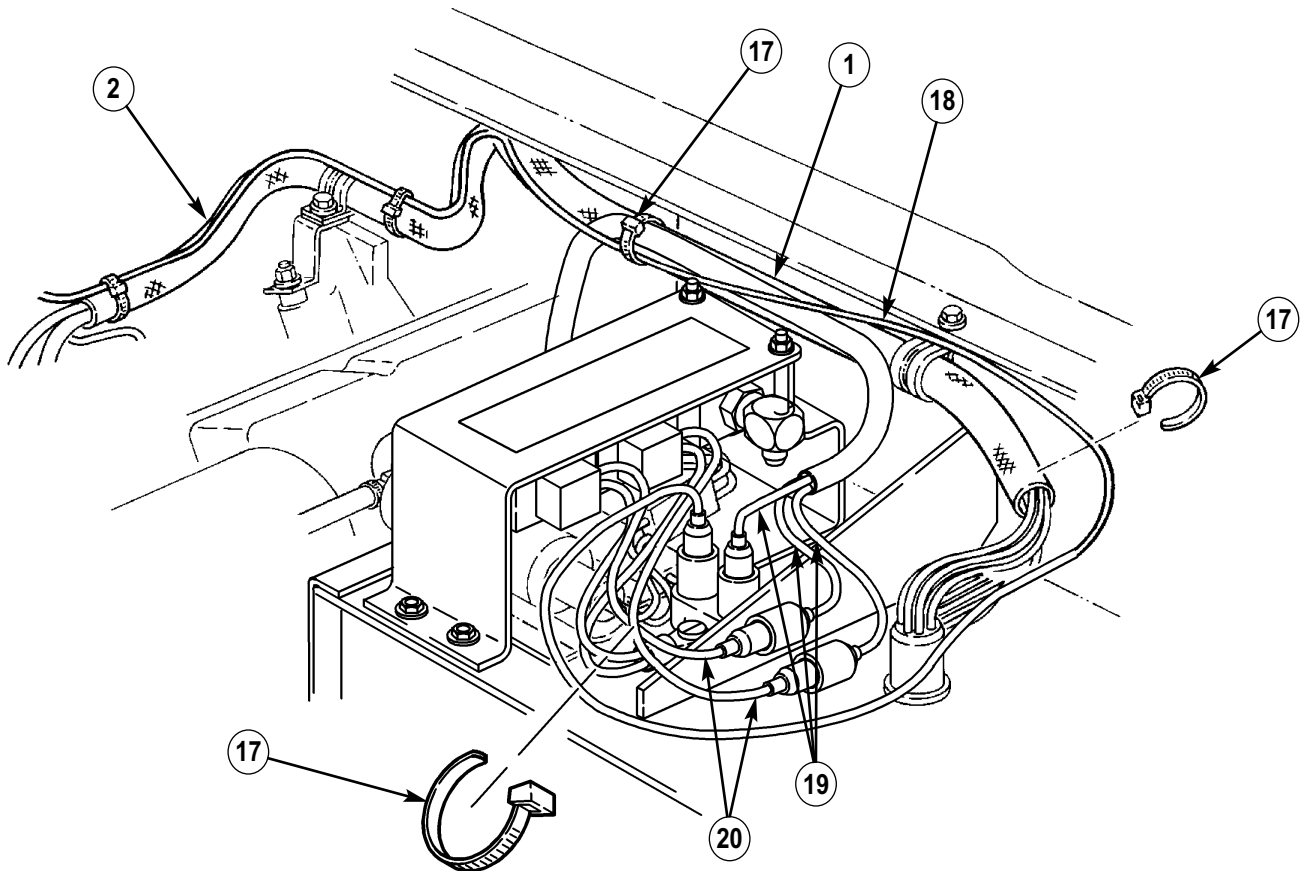
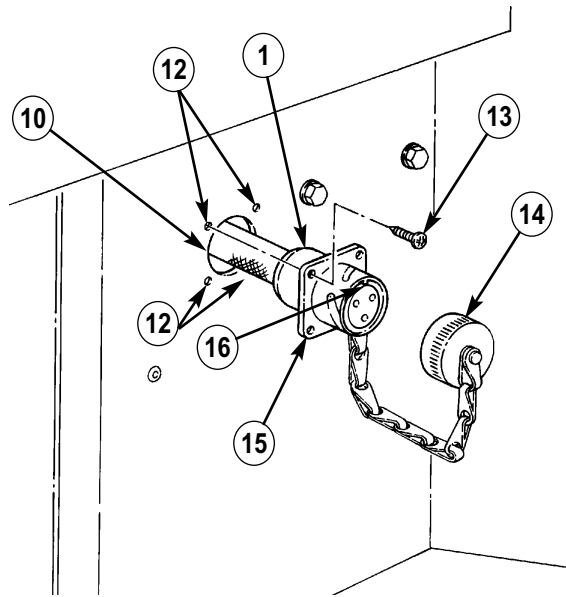
12-36.6. 10,500 LB REAR HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)

b. Installation

1. Route controller plug harness (1) through hole in body panel (10), around fuel filter (11), and along body wiring harness (2) to valve assembly (9).
2. Connect controller plug lead 785A (4) to valve assembly lead 785A (6).
3. Connect controller plug lead 785B (3) to circuit breaker (8).
4. Connect controller plug lead 785C (5) to valve assembly lead 785C (7).
5. Align holes in controller plug (15) with holes (12) in body panel (10) and blind spline (16) at top position and install controller plug (1) and cap and chain (14) on body panel (10) with four screws (13).
6. Secure lead wire (18), controller plug harness (1), controller plug harness leads (19), and valve assembly wires (20) to body harness (2) with three tiedown straps (17).



12-36.6. 10,500 LB REAR HYDRAULIC WINCH CONTROLLER PLUG REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

Section IV. DEEP WATER FORDING KIT MAINTENANCE

12-37. DEEP WATER FORDING KIT MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
12-38.	Deep Water Fording Kit Exhaust Assembly Maintenance	12-70
12-39.	Air Cleaner Extension Elbow Maintenance	12-72
12-40.	Air Cleaner Dust Cap Replacement	12-74
12-41.	Air Cleaner-to-Selector Valve Vent Line Replacement	12-75
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12-49.	Exhaust Reinforcement Bracket Replacement	12-84

12-38. DEEP WATER FORDING KIT EXHAUST ASSEMBLY MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Gasket (Appendix G, Item 55)
Five locknuts (Appendix G, Item 124)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

General Safety Instructions

Do not touch hot exhaust system components with bare hands.

Maintenance Level

Unit

WARNING

Do not touch hot exhaust system components with bare hands.
Severe injury will result.

a. Removal

1. Remove two nuts (14), washers (13), and U-bolt (12) from exhaust assembly (9).
2. Remove two locknuts (4), washers (5), and two spacers (8) from wheelhouse (7) and exhaust assembly (9). Discard locknuts (4).
3. Remove three locknuts (1), washers (2), capscrews (10), washers (2), exhaust assembly (9), and gasket (11) from muffler (3). Discard locknuts (1) and gasket (11).

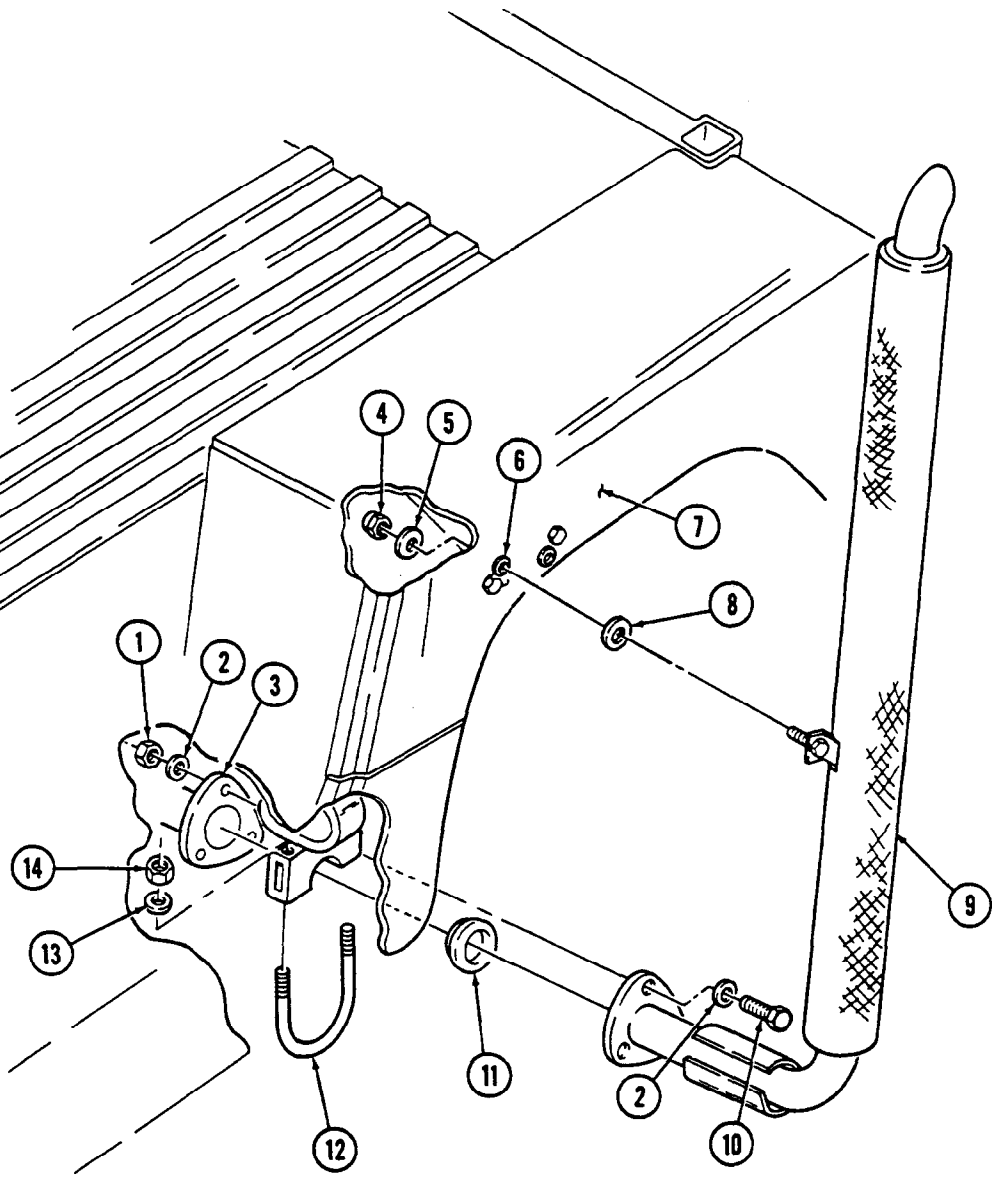
b. Inspection

Inspect two insulators (6) for breaks, cracks, or deterioration. Replace if damaged.

c. Installation

1. Install two spacers (8) and exhaust assembly (9) on wheelhouse (7) with two washers (5) and locknuts (4). Tighten locknuts (4) to 37 lb-ft (50 N·m).
2. Install exhaust assembly (9) and gasket (11) on muffler (3) with three washers (2), capscrews (10), washers (2), and locknuts (1). Tighten locknuts (1) to 26 lb-ft (35 N·m).
3. Install U-bolt (12) on exhaust assembly (9) with two washers (13) and nuts (14).

12-38. DEEP WATER FORDING KIT EXHAUST ASSEMBLY MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Start engine (TM 9-2320-387-10) and check for exhaust leaks.

12-39. AIR CLEANER SHIELD MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

Air intake assembly removed (para. 3-19).

Maintenance Level

Unit

a. Removal

1. Loosen clamp (3) and disconnect air horn-to-air cleaner elbow (4) from air cleaner assembly (6).
2. Disconnect air cleaner-to-selector valve vent line (2) from air cleaner assembly (6).
3. Disconnect air restriction gauge hose (5) from air cleaner assembly (6).
4. Loosen two clamps (7) from air cleaner assembly (6) and support brackets (9).
- 4.1. Remove three screws (1.2), washers (1.3), and air cleaner shield (1.1) from air induction box (1).
5. Remove air cleaner assembly (6) and gasket (8) from air induction box (1).

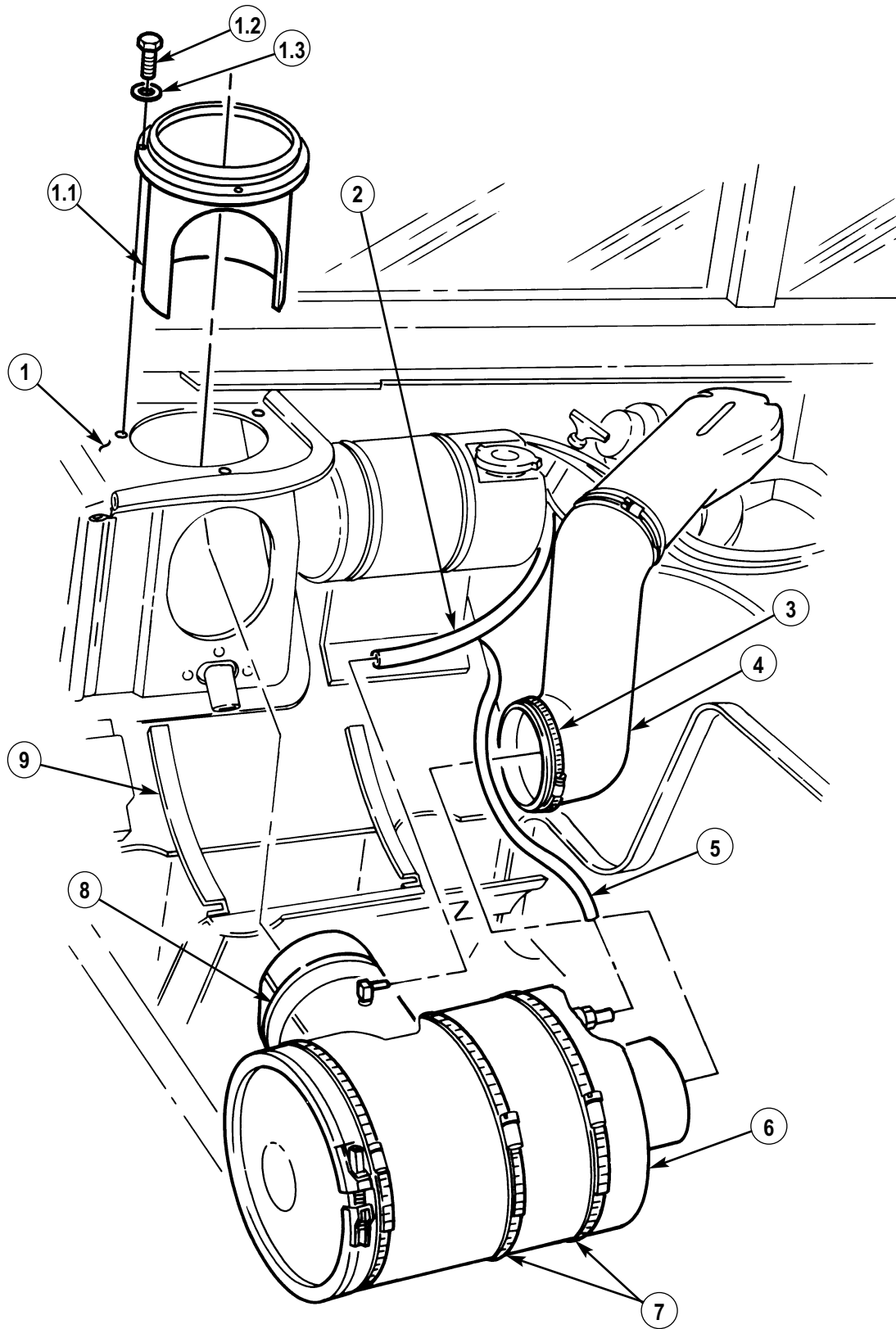
b. Inspection

Inspect gasket (8). Replace if broken or cracked.

c. Installation

1. Install air cleaner assembly (6) and gasket (8) on air induction box (1) and support brackets (9) with two clamps (7). Tighten clamps (7) to 35-40 lb-in. (4-5 N·m).
2. Install air cleaner shield (1.1) on air induction box (1) with three washers (1.3) and screws (1.2).
3. Connect air restriction gauge hose (5) to air cleaner assembly (6).
4. Connect air cleaner-to-selector valve vent line (2) to air cleaner assembly (6).
5. Connect air horn-to-air cleaner elbow (4) to air cleaner assembly (6). Tighten clamp (3) to 45-50 lb-in. (5-6 N·m).

12-39. AIR CLEANER SHIELD MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install air intake assembly (para. 3-19).

12-40. AIR CLEANER DUST CAP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

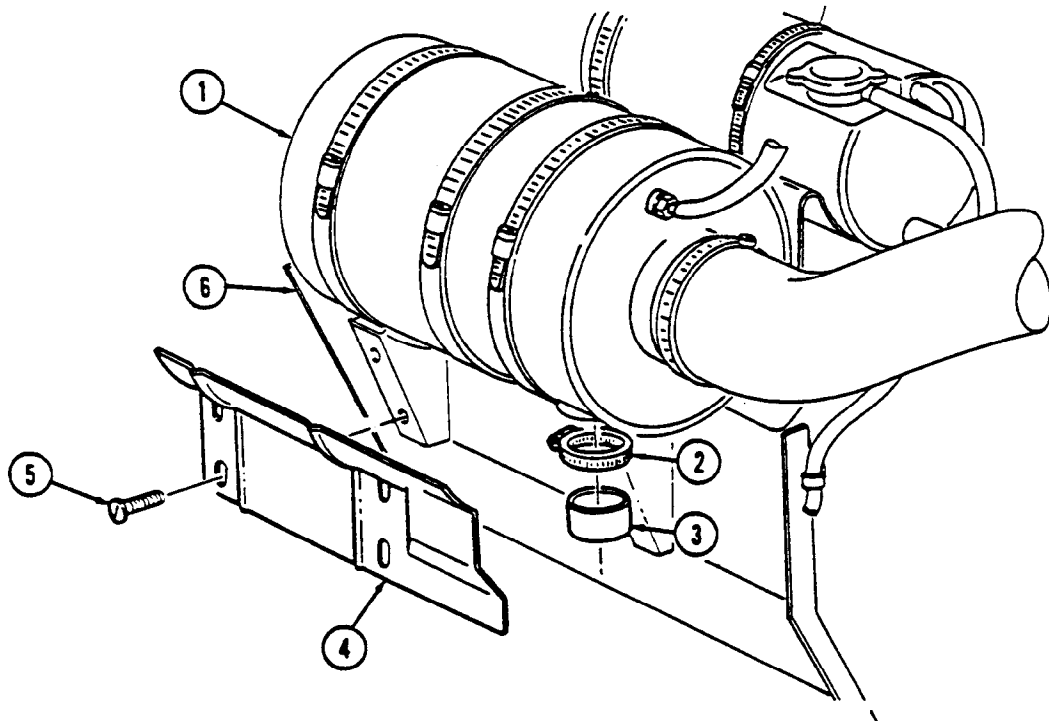
Unit

a. Removal

1. Remove four screws (5) and dust unloader cover plate (4) from air cleaner bracket (6).
2. Remove clamp (2) and air cleaner dust cap (3) from air cleaner assembly (1).

b. Installation

1. Install dust cap (3) on air cleaner assembly (1) with clamp (2). Tighten clamp (2) to 45-50 lb-in. (5-6 N·m).
2. Install dust unloader cover plate (4) on air cleaner bracket (6) with four screws (5).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-41. AIR CLEANER-TO-SELECTOR VALVE VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Three tiedown straps (Appendix G, Item 462)

Maintenance Level

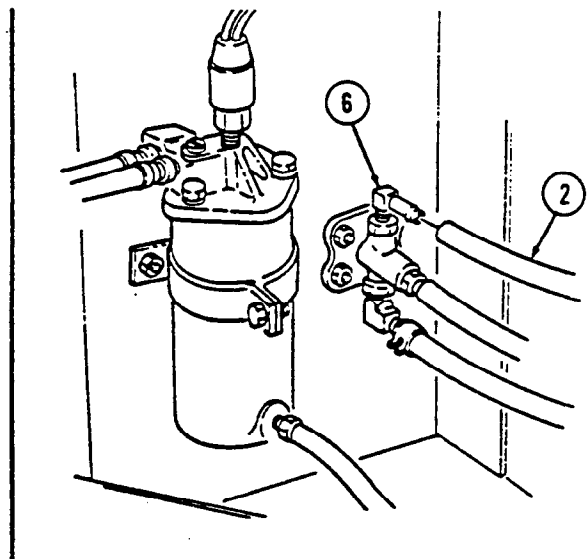
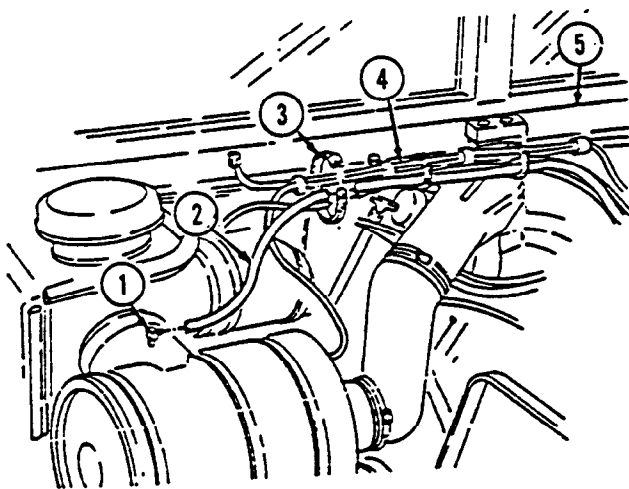
Unit

a. Removal

1. Disconnect air cleaner-to-selector valve vent line (2) from air cleaner assembly fitting (1).
2. Remove three tiedown straps (3) and vent line (2) from hoses (4) on A-beam (5). Discard tiedown straps (3).
3. Remove air cleaner-to-selector valve vent line (2) from selector valve (6).

b. Installation

1. Connect air cleaner-to-selector valve vent line (2) to selector valve (6).
2. Route vent line (2) along A-beam (5) and secure to hoses (4) with three tiedown straps (3).
3. Connect air cleaner-to-selector vent line (2) to air cleaner assembly fitting (1).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-42. FUEL TANK VENT STACK TUBE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Two lockwashers (Appendix G, Item 229)

Maintenance Level

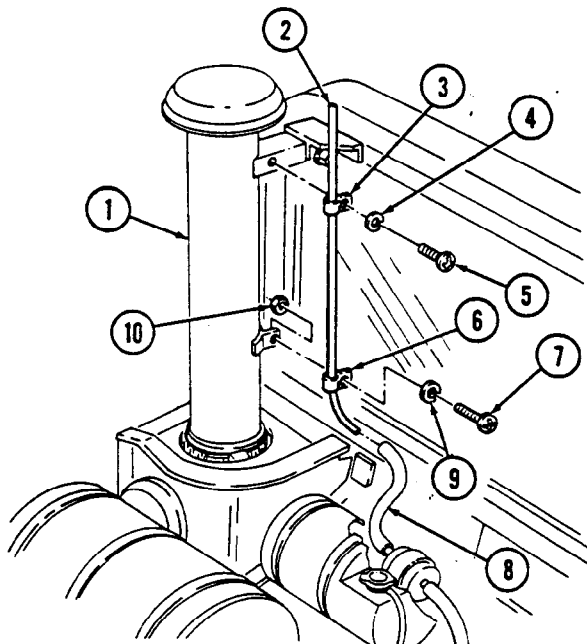
Unit

a. Removal

1. Disconnect fuel tank vent line (8) from fuel tank vent stack tube (2).
2. Remove nut (10), screw (7), lockwasher (9), and clamp (6) from fuel tank vent stack tube (2) and air intake assembly (1). Discard lockwasher (9).
3. Remove screw (5), lockwasher (4), fuel tank vent stack tube (2), and clamp (3) from air intake assembly (1). Discard lockwasher (4).

b. Installation

1. Install fuel tank vent stack tube (2) and clamp (3) on air intake assembly (1) with lockwasher (4) and screw (5).
2. Install fuel tank vent stack tube (2) and clamp (6) on air intake assembly (1) with lockwasher (9), screw (7), and nut (10).
3. Connect vent line (8) to vent stack tube (2).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-43. SELECTOR VALVE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two locknuts (Appendix G, Item 136)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

Unit

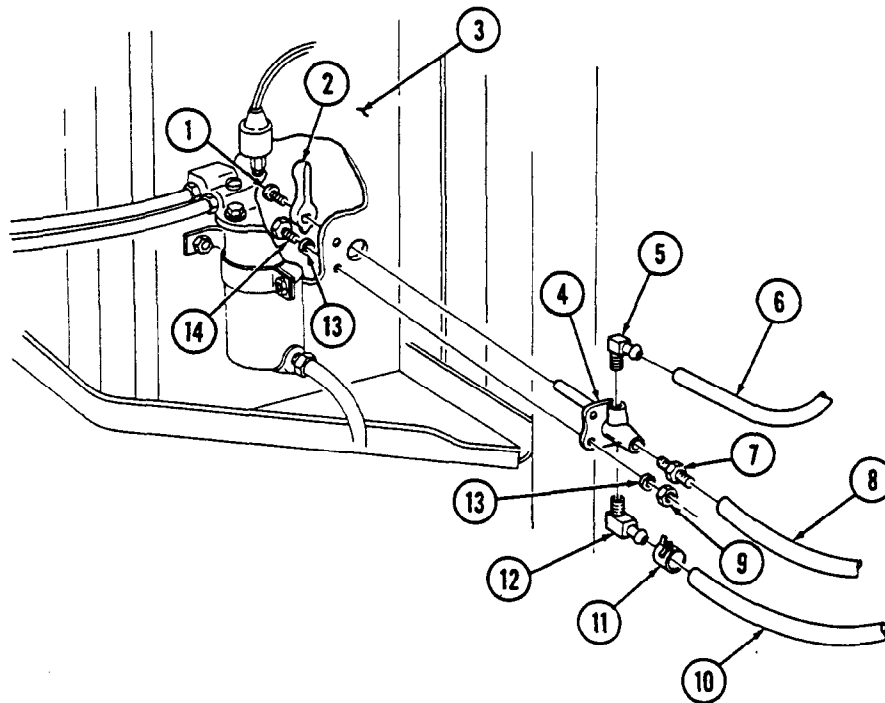
a. Removal

1. Remove screw (1) and selector control (2) from selector valve (4).
2. Remove two locknuts (9), washers (13), capscrews (14), and washers (13) from selector valve (4) and body (3). Discard locknuts (9).

NOTE

Prior to removal, tag vent lines for installation.

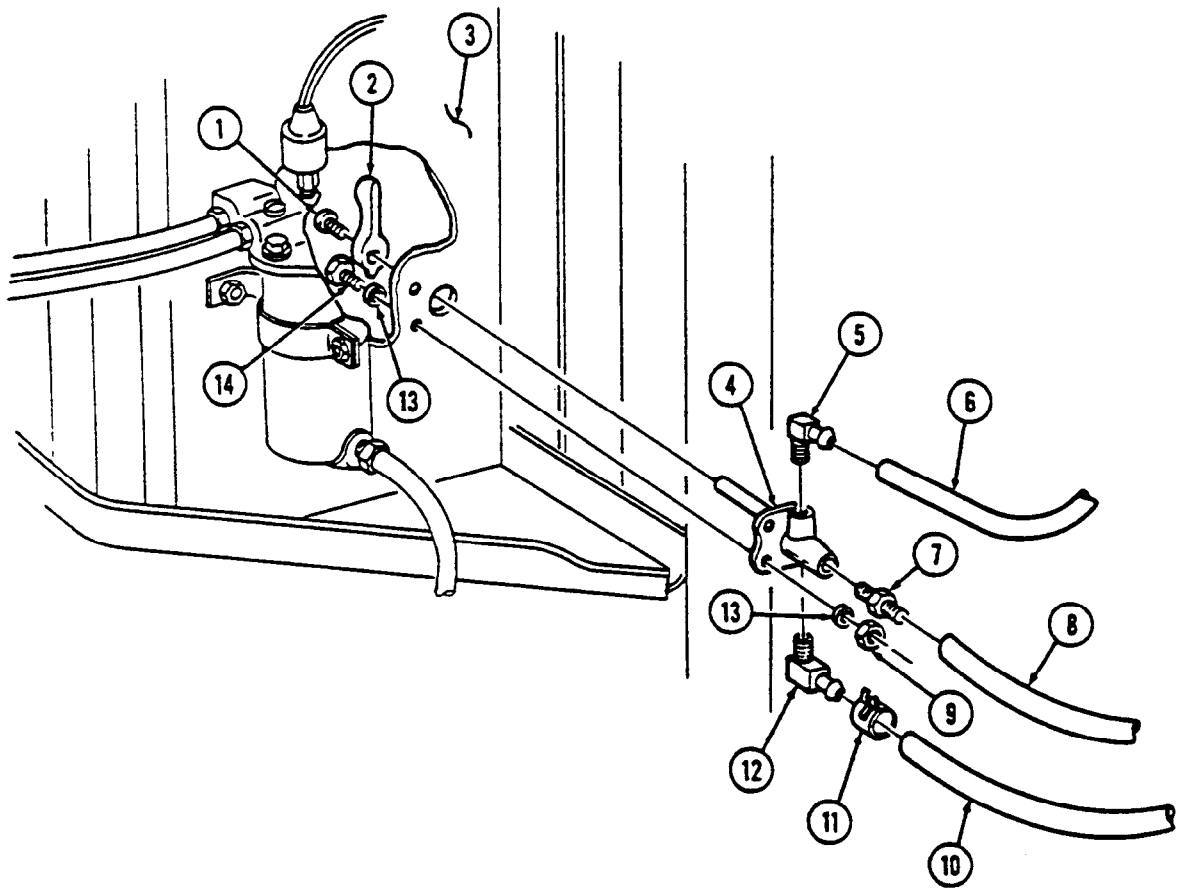
3. Disconnect air cleaner-to-selector valve vent line (6) from elbow (5).
4. Disconnect selector valve-to-union tee vent line (8) from connector (7).
5. Loosen clamp (11) and disconnect CDR valve vent line (10) from elbow (12).
6. Remove elbow (5), connector (7), and elbow (12) from selector valve (4).



12-43. SELECTOR VALVE REPLACEMENT (Cont'd)

b. Installation

1. Install elbow (12), connector (7), and elbow (5) on selector valve (4).
2. Connect CDR valve vent line (10) to selector elbow (12) with clamp (11).
3. Connect selector valve-to-union tee vent line (8) to connector (7).
4. Connect air cleaner-to-selector valve vent line (6) to elbow (5).
5. Install selector valve (4) on body (3) with two washers (13), capscrews (14), washers (13), and locknuts (9). Tighten locknuts (9) to 10 lb-ft (14 N·m).
6. Install selector control (2) on selector valve (4) with screw (1).



- FOLLOW-ON TASKS:**
- Install engine access cover (para. 10-22).
 - Lower and secure hood (TM 9-2320-387-10).

12-44. CDR VALVE VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Two tiedown straps (Appendix G, Item 462)

Maintenance Level

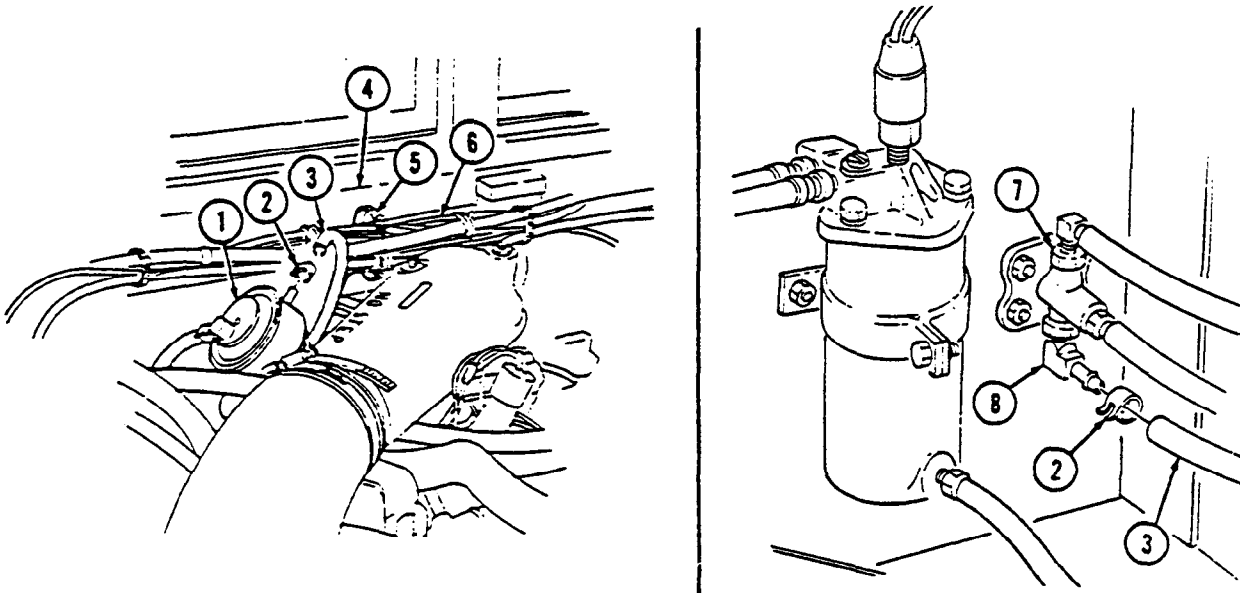
Unit

a. Removal

1. Loosen clamp (2) and disconnect CDR valve vent line (3) from CDR valve (1).
2. Remove two tiedown straps (5) from vent line (3) and existing hoses (6) on A-beam (4). Discard tiedown straps (5).
3. Loosen clamp (2) and remove vent line (3) from elbow (8) on selector valve (7).
4. Remove clamps (2) from vent line (3).

b. Installation

1. Install clamps (2) on vent line (3).
2. Connect vent line (3) to elbow (8) on selector valve (7) with clamp (2).
3. Install vent line (3) along A-beam (4) on existing hoses (6) with two tiedown straps (5).
4. Connect vent line (3) to CDR valve (1) with clamp (2).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-45. HYDRO-BOOST VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Engine left splash shield removed (para. 10-23).

Materials/Parts

Locknut (Appendix G, Item 154)
Nut and lockwasher assembly
(Appendix G, Item 244)

Maintenance Level

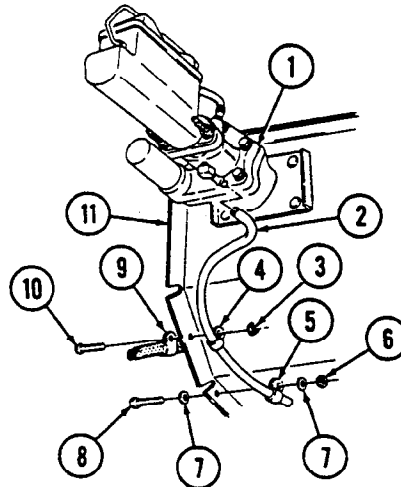
Unit

a. Removal

1. Disconnect hydro-boost vent line (2) from hydro-boost (1).
2. Remove nut and lockwasher assembly (3), capscrew (10), clamp (4), harness clamp (9), and vent line (2) from body (11). Discard nut and lockwasher assembly (3).
3. Remove locknut (6), washer (7), capscrew (8), washer (7), clamp (5), and vent line (2) from body (11). Discard locknut (6).
4. Remove two clamps (4) and (5) from vent line (2).

b. Installation

1. Install two clamps (4) and (5) on vent line (2).
2. Install vent line (2) and clamp (5) on body (11) with washer (7), capscrew (8), washer (7), and locknut (6). Tighten capscrew (8) to 6 lb-ft (8 N·m).
3. Install vent line (2), harness clamp (9), and clamp (4) on body (11) with capscrew (10) and nut and lockwasher assembly (3).
4. Connect vent line (2) to hydro-boost (1).



FOLLOW-ON TASK: Install engine left splash shield (para. 10-23).

12-46. DEEP WATER FORDING SENSOR CUP REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Engine access cover removed (para. 10-22).

Materials/Parts

Two locknuts (Appendix G, Item 109)

Maintenance Level

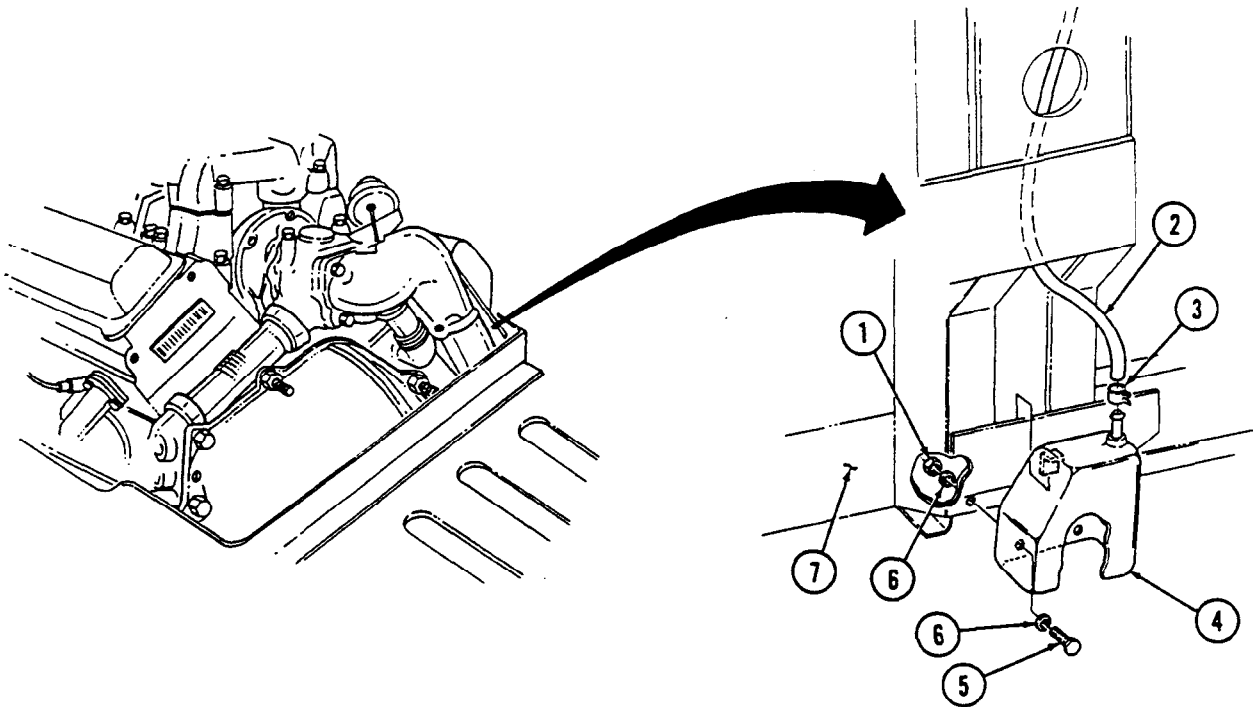
Unit

a. Removal

1. Loosen clamp (3) and disconnect sensor cup vent line (2) from sensor cup (4).
2. Remove two locknuts (1), washers (6), capscrews (5), washers (6), and sensor cup (4) from body (7). Discard locknuts (1).

b. Installation

1. Install sensor cup (4) on body (7) with two washers (6), capscrews (5), washers (6), and locknuts (1). Tighten locknuts (1) to 6 lb-ft (8 N·m).
2. Connect sensor cup vent line (2) to sensor cup (4) with clamp (3).



FOLLOW-ON TASK: Install engine access cover (para. 10-22).

12-47. SENSOR CUP VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Maintenance Level

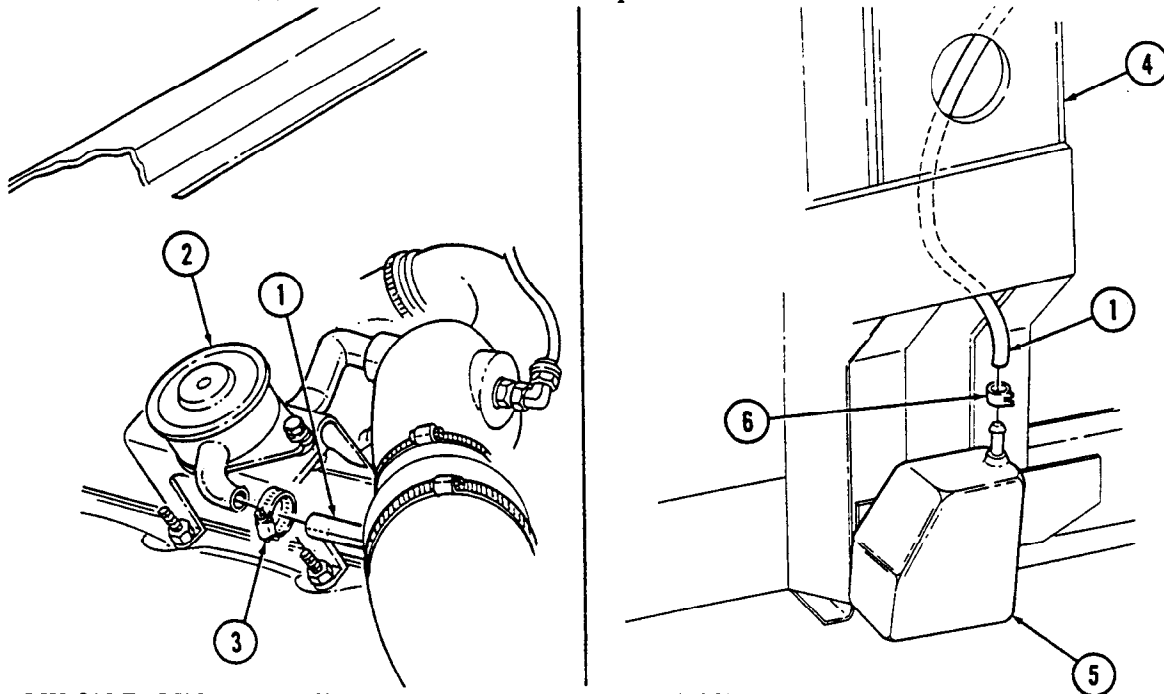
Unit

a. Removal

1. Loosen clamp (3) and disconnect sensor cup vent line (1) from CDR valve (2).
2. Loosen clamp (6) and remove vent line (1) from sensor cup (5).
3. Remove two clamps (3) and (6) from vent line (1).

b. Installation

1. Install two clamps (3) and (6) on vent line (1).
2. Route vent line (1) through A-beam (4).
3. Connect vent line (1) to sensor cup (5) with clamp (6).
4. Connect vent line (1) to CDR valve (2) with clamp (3).



FOLLOW-ON TASKS:

- Install engine access cover (para. 10-22).
- Lower and secure hood (TM 9-2320-387-10).

12-48. POWER STEERING VENT LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

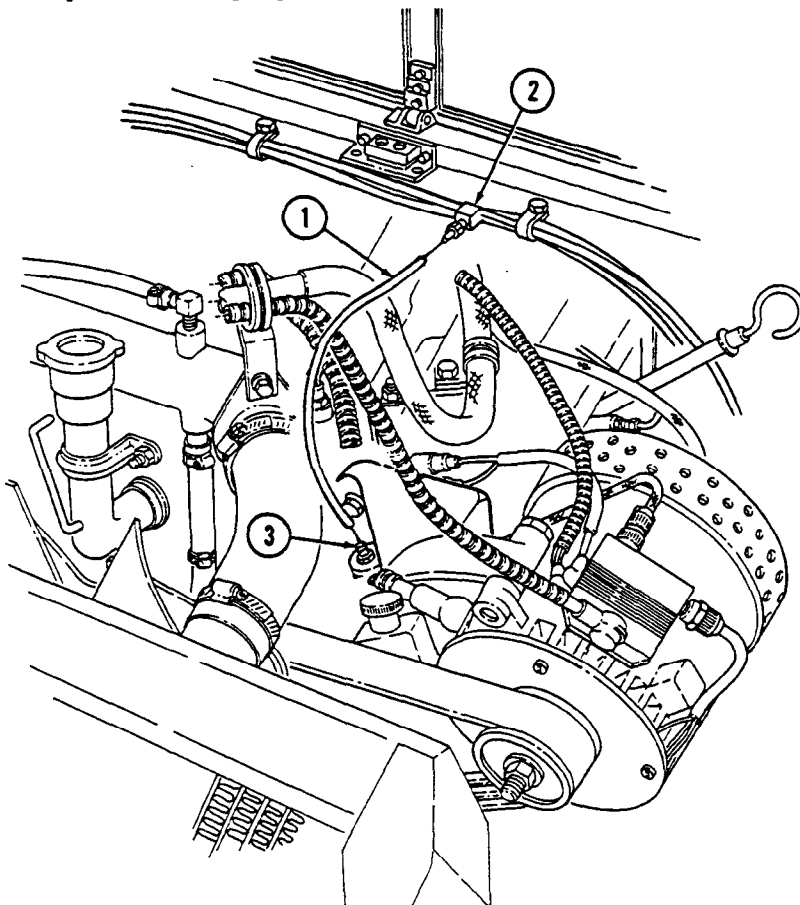
Unit

a. Removal

Remove power steering vent line (1) from power steering pump cap (3) and tee fitting (2).

b. Installation

Connect vent line (1) to power steering cap (3) and tee fitting (2).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

12-49. EXHAUST REINFORCEMENT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1113

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Deep water fording kit exhaust assembly removed
(para. 12-38).

Materials/Parts

Eight locknuts (Appendix G, Item 109)

Maintenance Level

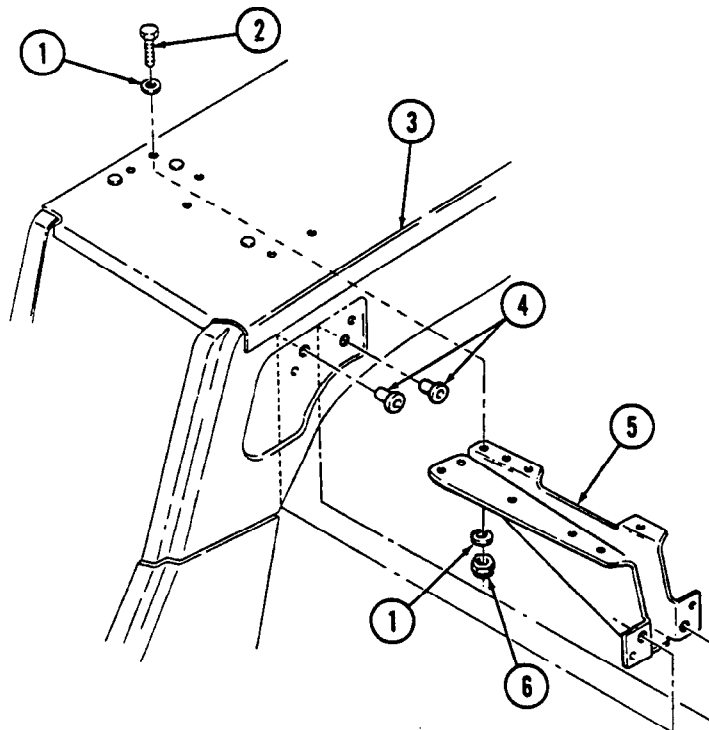
Unit

a. Removal

1. Remove two isolators (4) from wheelhouse (3) and reinforcement bracket (5).
2. Remove eight locknuts (6), washers (1), capscrews (2), washers (1), and reinforcement bracket (5) from wheelhouse (3). Discard locknuts (6).

b. Installation

1. Install reinforcement bracket (5) on wheelhouse (3) with eight washers (1), capscrews (2), washers (1), and locknuts (6). Tighten capscrews (2) to 6 lb-ft (8 N·m).
2. Install two isolators (4) on wheelhouse (3) and reinforcement bracket (5).



FOLLOW-ON TASK: Install deep water fording kit exhaust assembly (para. 12-38).

CHAPTER 13 PREPARATION FOR STORAGE OR SHIPMENT

Section I. GENERAL INSTRUCTIONS

13-1. SCOPE

- a. This chapter describes requirements for preparation of ECV vehicles and components for shipment and limited storage.
- b. When vehicles are shipped or stored, the officer in charge is responsible for preparing the vehicles in a properly maintained and serviceable condition. Vehicles must be properly cleaned, preserved, painted, and lubricated. Vehicles, componentry, and BII must be prepared and protected to prevent corrosion, deterioration, and physical damage.

13-2. ADMINISTRATIVE STORAGE

- a. Administrative storage is the placement of a unit's organic material in a limited care and preservation status for short periods of time.
- b. Instructions and requirements pertaining to administrative storage are found in DA Pam 738-750.

13-3. SECURITY

- a. Equipment and vehicle security requirements are covered in AR 190-13 and AR 190-51.
- b. Cryptographic materials or COMSEC equipment will not be shipped with vehicles or remain in vehicles in storage. Refer to AR 380-40 for information concerning COMSEC materials.
- c. Access to materiel in storage should be strictly controlled to prevent unauthorized cannibalization or pilferage. Refer to AR 750-1.

13-4. SPECIAL PACKAGING AND SHIPPING REQUIREMENTS

- a. When required, wrap, pack, mark, and stow uninstalled government-furnished equipment and BII in accordance with MIL-B-12841, MIL-STD-129, MIL-V-62038, and TM 746-10.
- b. Height and width of vehicles prepared for rail transportation must not exceed the limitations of AR 700-15. Whenever possible, local transportation personnel must be consulted about limitations of particular railroad lines to be used for movement in order to avoid delays, dangerous conditions, or damage to equipment.
- c. Loading and blocking procedures must be in accordance with pamphlet number MD-7, Rules Governing the Loading of Defense Materiel on Open-Top Cars, published by the Association of American Railroads.
- d. Loading and blocking of vehicles for highway shipment must be in accordance with Interstate Commerce Commission Publication, Motor Carrier Safety Regulations.
- e. For specific instructions concerning loading and blocking of vehicles for air, land, or sea shipment, refer to TM 55-2320-280-14.

Section II. PREPARATION FOR STORAGE AND SHIPMENT

13-5. GENERAL STORAGE AND SHIPPING INFORMATION

- a. Storage procedures will be such that the vehicle can be returned to service and operated with minimum delay. Disassembly should be limited to that necessary to clean and preserve exposed surfaces and equipment and to the maximum extent consistent with safe storage. The vehicle will be placed in storage in as nearly a completely assembled condition as practical.
- b. Storage site selection should offer maximum protection from the environment and provide access for inspection, maintenance, and vehicle exercise if necessary.
- c. For long-term storage, refer to MIL-V-62038 for information concerning preparation of vehicles and components.

13-6. CLEANING

- a. Before applying preservatives, thoroughly clean all vehicle surfaces of corrosion, soil, grease, damaged paint, or other foreign materials. Refer to TM 9-2320-387-10 for cleaning instructions.

WARNING

- Drycleaning solvent is flammable and will not be used near an open flame. A fire extinguisher will be kept nearby when the solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and/or damage to equipment.
- Protective gloves, clothing, and/or respiratory equipment must be worn whenever caustic, toxic, or flammable cleaning solutions are used. Failure to do this may result in injury to personnel and/or damage to equipment.

CAUTION

- Do not allow cleaning compounds to come into contact with rubber, leather, vinyl, or canvas materials. Damage to equipment may result.
 - Do not use compressed air when cleaning vehicle interiors. Damage to equipment may result.
- b. Descriptions and uses of cleaning compounds, solvents, drycleaning solutions, and corrosion-removing compounds are found in TM 9-247. Refer to TM 9-2320-387-10 as a general guide of cleaning materials used in removing contaminants from vehicles.

13-7. INSPECTIONS, STOWAGE, AND INVENTORY

- a. Perform semiannual (S) PMCS on vehicles intended for limited storage or shipment (para. 2-12).
- b. Apply all urgent MWOs to vehicle and equipment (DA Pam 25-30).
- c. Inventory the vehicle and components (TM 9-2320-387-10-HR) and ensure proper stowage of components and BII (TM 9-2320-387-10).
- d. Prepare uninstalled BII and government-furnished equipment in accordance with para. 13-4a.

13-8. REPAIR, PAINTING, AND PRESERVATION

- a. All equipment deficiencies noted during inspections should be repaired in accordance with vehicle TMs.
- b. All unpainted metal surfaces must be protected during storage or shipment. Inspect, clean, and spot-paint metal surfaces as required in TM 9-2320-387-10. Unpainted exposed machined surfaces must be prepared with corrosion-preventive compounds or oil and grease as referenced in TM 9-2320-387-10. Be sure to select preservatives that will not harm vehicle interior components.
- c. Sunlight, heat, moisture, and dirt accelerate deterioration. Install all covers authorized for the equipment. Close and secure all openings except those required for venting and drainage. Seal all openings to prevent the entry of rain, snow, or dust.
- d. Inflate tires to a maximum of 30 psi (207 kPa).

13-9. LUBRICATION

Lubricate vehicles in accordance with TM 9-2320-387-10 before shipment or storage.

13-10. RECORDS AND REPORTS

Maintenance records required by AR 750-1 will be maintained and reports submitted in accordance with DA Pam 738-750 and AR 220-1.

CHAPTER 14 TROUBLESHOOTING (DS/GS)

Section I. MECHANICAL TROUBLESHOOTING

14-1. GENERAL

Information in this section is for use by support maintenance personnel in conjunction with, and as a supplement to, troubleshooting procedures in chapter 2.

14-2. MECHANICAL TROUBLESHOOTING INSTRUCTIONS

a. The troubleshooting procedures in this section cannot give answers to every possible vehicle malfunction encountered. However, the procedures do list the most common answers to a problem in an organized step-by-step study. Faults are listed in the order they are most likely to occur, and instruction directs tests and inspections toward the source of a problem and successful correction.

CAUTION

Operation of a deadlined vehicle without preliminary inspection could cause further damage.

b. Do the easiest things first. Look for the most obvious cause to a problem. For example:

(1) Excessive oil consumption may be the result of leaks at gaskets or loose line connections.

(2) Always check the easiest and most obvious things first. This simple rule saves time and trouble.

c. Doublecheck diagnosis before disassembly. The source of most engine problems can be traced to more than one part in a system. For example:

(1) Excessive fuel consumption may not be caused by the fuel pump alone. Instead, the trouble could be a clogged air cleaner or a restricted exhaust passage causing severe back pressure.

(2) Engines are often disassembled in search of a problem and the real evidence of the problem is destroyed. Check again to be sure an easier solution to the problem has not been overlooked.

d. Before correcting a problem, diagnose the cause of the problem. Do not allow the same failure to occur again.

TROUBLESHOOTING SYMPTOM INDEX

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Table 14-1. Mechanical Troubleshooting.

MALFUNCTION TEST OR INSPECTION

ENGINE

1. ENGINE WILL NOT CRANK

- Step 1. Remove converter housing cover (para. 5-11 or 5-12) and check for damaged flywheel. Replace flywheel (TM 9-2815-237-34) if damaged.
- Step 2. Remove all glow plugs (para. 3-39). Using socket and breaker bar at crankshaft pulley, rotate crankshaft and check for mechanical or hydrostatic lock. If crankshaft will not turn, replace engine (para. 15-26). If crankshaft turns and liquid is discharged from glow plug holes, determine if liquid is coolant or fuel. If coolant is discharged, remove cylinder heads (paras. 15-4 and 15-5) and check for cracked cylinder block, cylinder heads, or leaking head gaskets. Replace damaged parts. If fuel is discharged from glow plug holes, remove and test fuel injection nozzles. Replace defective fuel injection nozzles (para. 16-3).

END OF TESTING!

2. ENGINE CRANKS BUT WILL NOT START

- Step 1. Loosen fuel injection lines at injection nozzles and crank engine. If no fuel leaks from fuel injection lines while cranking engine, replace fuel injection pump (para. 16-6).
- Step 2. Remove and test fuel injection nozzles. Replace defective fuel injection nozzles (para. 16-3).
- Step 3. Using compression tester J 6692, elbow NSN 4730-00-985-4804, coupling NSN 4730-01-042-5266, and adapter J 26999-30, check compression of each cylinder following steps (a) through (f).
- (a) Remove all glow plugs (para. 3-39).
 - (b) Remove air cleaner element (para. 3-13).
 - (c) Disconnect lead 54A from fuel injection pump.
 - (d) Install compression gauge adapter on glow plug hole of cylinder to be tested and connect compression gauge.

CAUTION

Do not add oil to any cylinder when checking compression or damage to engine may result.

NOTE

Compression reading may exceed 450 psi (3,103 kPa).

- (e) Crank engine. Allow engine to crank long enough to accumulate six compression pulses, and record highest reading.
 - (f) Repeat steps (d) and (e) for remaining cylinders.
 - (g) All cylinders should build up quickly and evenly to a minimum of 380 psi (2,620 kPa), and lowest reading should not be less than 80% of highest cylinder reading.
- Step 4. Check for warped or damaged cylinder heads. Replace warped or damaged cylinder heads (paras. 15-4 and 15-5).
- Step 5. Check for damaged valves. Replace damaged valves (TM 9-2815-237-34).
- Step 6. Check for damaged or worn pistons and piston rings. Replace pistons or piston rings if worn or damaged (TM 9-2815-237-34).

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

<p>MALFUNCTION TEST OR INSPECTION</p>
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3. ENGINE STOPS DURING NORMAL OPERATION

- Step 1. Perform step 1 of malfunction 1.
- Step 2. Perform steps 1 and 2 of malfunction 2.

END OF TESTING!

4. ENGINE KNOCKS (MECHANICAL NOISE)

- Step 1. Remove converter housing cover (para. 5-11 or 5-12) and tighten torque converter capscrews to 32 lb-ft (43 N·m).
- Step 2. Remove and test fuel injection nozzles. Replace defective fuel injection nozzles (para. 16-3).
- Step 2.1. Check for defective fuel injection pump. Replace defective fuel injection pump (para. 16-6).
- Step 3. Check for worn or damaged connecting rod bearings. Replace worn or damaged connecting rod bearings (TM 9-2815-237-34).
- Step 4. Check for worn or damaged main bearings. Replace worn or damaged main bearings (TM 9-2815-237-34).
- Step 5. Check for worn or damaged crankshaft. Replace worn or damaged crankshaft (TM 9-2815-237-34).
- Step 6. Check for worn or damaged pistons and connecting rods. Replace worn or damaged pistons and connecting rods (TM 9-2815-237-34).

END OF TESTING!

5. EXCESSIVE OIL LOSS OR CONSUMPTION

- Step 1. Check for oil leaks around oil pan, rocker arm covers, and timing gear cover oil seal. If any leakage is found, repair as necessary (chapter 15).
- Step 2. Check for worn valve oil seals. Replace worn valve oil seals (TM 9-2815-237-34).
- Step 3. Check for worn valve guides. Replace worn valve guides (TM 9-2815-237-34).
- Step 4. Check for worn or damaged piston rings. Replace worn or damaged piston rings (TM 9-2815-237-34).

END OF TESTING!

5.1. INJECTION PUMP LEAKS FUEL FROM THROTTLE SHAFT

- Step 1. Check for clogged/restricted fuel return lines (para. 16-4). Replace clogged/restricted fuel return lines.
- Step 2. Check for defective fuel line check valve. Replace defective fuel return line check valve with new valve, or known good valve (TM 9-2815-237-34).
- Step 3. Check for defective fuel injection pump. Replace fuel injection pump (para. 16-6).

END OF TESTING!

6. LOW OIL PRESSURE

- Step 1. Check for worn oil pump. Replace worn oil pump (para. 15-15).
- Step 2. Check for worn and damaged main bearings. Replace worn or damaged main bearings (TM 9-2815-237-34).
- Step 3. Check for worn or damaged rod bearings. Replace worn or damaged rod bearings (TM 9-2815-237-34).
- Step 4. Check for worn or damaged crankshaft. Replace worn or damaged crankshaft (TM 9-2815-237-34).

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

END OF TESTING!

7. EXCESSIVE ENGINE VIBRATION

- Step 1. Check for air in fuel lines. Bleed air from fuel lines (para. 3-33).
- Step 2. Remove and test fuel injection nozzles. Replace defective fuel injection nozzles (para. 16-3).
- Step 2.1. Check defective fuel injection pump. Replace defective fuel injection pump (para. 16-6).
- Step 3. Check for broken engine mounts. Replace broken engine mounts (para. 15-3).
- Step 4. Remove converter housing cover (para. 5-11 or 5-12) and tighten torque converter capscrews to 32 lb-ft (43 N·m).
- Step 5. Check for loose or damaged torsional damper. Replace if damaged (para. 15-7).
- Step 6. Check for damaged flywheel and missing counterweight on flywheel. Replace flywheel if damaged or counterweight is missing (TM 9-2815-237-34).

END OF TESTING!

8. EXCESSIVE EXHAUST SMOKE

a. Black Smoke

- Step 1. Check for restricted exhaust pipe, catalytic converter, muffler, and intake manifold. Replace exhaust pipe (para. 3-48), catalytic converter, muffler (para. 3-49) or intake manifold (para. 15-16 or 15-17) if restricted.
- Step 2. Remove and test fuel injection nozzles. Replace worn fuel injection nozzles (para. 16-3).
- Step 3. Check fuel injection pump timing (para. 15-23).
- Step 4. Check for worn or damaged fuel injection pump. Replace worn or damaged fuel injection pump (para. 16-6).

END OF TESTING!

b. White Smoke

- Step 1. Perform step 2 of malfunction 12.
- Step 2. Remove and test glow plugs. Replace inoperative glow plugs (TM 9-2815-237-34).
- Step 3. Remove and test fuel injection nozzles. Replace worn fuel injection nozzles (para. 16-3).
- Step 4. Check for worn or damaged fuel injection pump. Replace worn or damaged fuel injection pump (para. 16-6).

END OF TESTING!

c. Blue Smoke

- Step 1. Perform step 3 of malfunction 2.
- Step 2. Check for worn valve oil seals. Replace worn valve oil seals (TM 9-2815-237-34).
- Step 3. Check for worn valve guides. Replace worn valve guides (TM 9-2815-237-34).
- Step 4. Check for worn or damaged pistons and piston rings. Replace worn or damaged pistons and piston rings (TM 9-2815-237-34).
- Step 5. Check for worn or damaged cylinder block. Replace engine (para. 15-26) if cylinder block

Table 14-1. Mechanical Troubleshooting (Cont'd).

<p>MALFUNCTION TEST OR INSPECTION</p>
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9. ACCELERATOR PEDAL STICKS OR FULL THROTTLE CANNOT BE OBTAINED

Disconnect accelerator cable from fuel injection pump. Move throttle lever on injection pump to wide open throttle. If throttle lever does not move freely, replace injection pump (para. 16-6).

END OF TESTING!

10. LEAKING EXHAUST GASES OR EXHAUST NOISES

Check for leaking exhaust gases around exhaust manifolds. Replace any leaking exhaust manifold gaskets or exhaust manifolds (para. 3-57).

END OF TESTING!

11. LOSS OF COOLANT

Step 1. Pressurize coolant system and check for leaks at water pump and around cylinder heads. If any leakage is present, replace cylinder head gaskets, cylinder heads (para. 15-4 or 15-5), or water pump (para. 3-78).

Step 2. Check cylinder block for cracks. Replace engine (para. 15-26) if cylinder block is cracked.

END OF TESTING!

12. ENGINE OVERHEATS

Step 1. Check for leaking or defective water pump. Replace leaking or defective water pump (para. 3-78).

Step 2. Remove surge tank cap (TM 9-2320-387-10). With engine running, check for excessive bubbles in surge tank that may indicate leaking head gaskets or cracked cylinder heads. If bubbles are present, remove cylinder heads (paras. 15-4 and 15-5) and check for defective head gaskets, cracked cylinder heads, or cracked cylinder block. Replace cylinder heads (paras. 15-4 and 15-5) if damaged. Replace engine (para. 15-26) if cylinder block is cracked.

END OF TESTING!

13. ENGINE DOES NOT DEVELOP FULL POWER

Step 1. Remove and test fuel injection nozzles. Replace worn fuel injection nozzles (para. 16-3).

Step 2. Check for worn or damaged fuel injection pump. Replace worn or damaged fuel injection pump (para. 16-6).

Step 3. Perform step 3 of malfunction 2.

Step 4. Check for damaged lifters. Replace damaged lifters (TM 9-2815-237-34).

Step 5. Check for damaged camshaft. Replace damaged camshaft (TM 9-2815-237-34).

Step 6. Check for burned valves. Replace burned valves (TM 9-2815-237-34).

Step 7. Check for worn or damaged pistons and piston rings. Replace worn or damaged pistons and piston rings (TM 9-2815-237-34).

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

and piston rings (TM 9-2815-237-34).

END OF TESTING!

14. CRANKCASE OIL DILUTED

Step 1. Remove and test fuel injection nozzles. Replace worn fuel injection nozzles (para. 16-3).

Step 2.1. Check defective fuel injection pump. Replace defective fuel injection pump (para. 16-6).

Step 2. Check for broken piston rings. Replace broken piston rings (TM 9-2815-237-34).

END OF TESTING!

15. ENGINE FAILS TO STOP WITH ROTARY SWITCH OFF

Check for inoperative fuel shutoff solenoid. Replace inoperative fuel shutoff solenoid (para. 16-8).

END OF TESTING!

TRANSMISSION

NOTE

- The transmission is an electronically-controlled four speed. The Transmission Control Module (TCM), an on-board computer, receives and processes input signals from sensors on the vehicle and delivers output signals to the solenoids located on the control valve assembly. These solenoids control the transmission operating pressures, upshift and downshift patterns, and Torque Converter Clutch (TCC) operation. Unit Maintenance has recorded the trouble codes stored in the TCM. Refer to chapter 2 (para. 2-40) for definitions of trouble codes.
- In the event of a major transmission malfunction involving the torque converter or oil pump, replace filter and flush oil cooler and lines before replenishing fluid.
- Perform the transmission system tests (para. 2-40) and record the readings for use during troubleshooting.
- Perform a road test (para. 5-14).
- Perform electrical check-out at transmission electrical connector of malfunction 16.

16. TRANSMISSION CONTROL MODULE (TCM) CODES ARE 59, 71, 75, 79, 81, 82, 83

a. Shift solenoid A (1-2) may not function properly (1st and 4th gears only, 2nd and 3rd gears only).

Step 1. Disconnect transmission electrical connector.

Step 2. Check resistance between pins A and E. Resistance should be between 18 to 24 ohms.

Step 3. If resistance at connector is high or low, proceed to step 4.

Step 4. Check wires to solenoid for open or short circuit and bad connections. Replace internal harness if damaged (para. 28-3). If ok, proceed to step 5.

Table 14-1. Mechanical Troubleshooting (Cont'd).

<p>MALFUNCTION TEST OR INSPECTION</p>
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- b. Shift solenoid B (2-3) may not function properly (1st and 2nd gears only, 2nd gear only, 3rd and 4th gears only).

- Step 1. Disconnect transmission electrical connector.
- Step 2. Check resistance between pins B and E. Resistance should be between 18 to 24 ohms.
- Step 3. If resistance at connector is high or low, proceed to step 4.
- Step 4. Check wires to solenoid for open or short circuits and bad connections. Replace internal harness if damaged (para. 28-3). If ok, proceed to step 5.
- Step 5. Replace solenoid (para. 28-17).

END OF TESTING!

- c. Force motor (pressure control solenoid) may not function properly (harsh shifting and soft shift).

- Step 1. Disconnect transmission electrical connector.
- Step 2. Check resistance between pins C and D. Resistance should be between 3.5 to 5.0 ohms.
- Step 3. If resistance at connector is high or low, proceed to step 4.
- Step 4. Check wires to solenoid for open or short circuits and bad connections. Replace internal harness if damaged (para. 28-3). If ok, proceed to step 5.
- Step 5. Replace solenoid (para. 28-17).

END OF TESTING!

- d. Torque converter clutch solenoid (no 4th gear, or clutch stuck on).

- Step 1. Disconnect transmission electrical connector.
- Step 2. Check resistance between pins S and E. Resistance should be between 10 to 14 ohms.
- Step 3. If resistance at connector is high or low, proceed to step 4.
- Step 4. Check wires from connector to solenoid for breaks or shorts. Replace internal harness if damaged (para. 28-3). If ok, proceed to step 5.
- Step 5. Replace solenoid (para. 28-17).

END OF TESTING!

- e. Transmission fluid temperature sensor may not function properly (incorrect TCC apply and release).

- Step 1. Disconnect transmission electrical connector.
- Step 2. Check resistance between pins M and L (the resistance should be high at low temperatures and low at high temperatures).
 - (a) The resistance at connector at 32°F (0°C) should be less than 11,000 ohms and more than 7,800 ohms.
 - (b) The resistance at connector at 68°F (20°C) should be less than 4,100 ohms and more than 2,900 ohms.
 - (c) The resistance at connector at 104°F (40°C) should be less than 1,700 ohms and 1,200 ohms.
 - (d) The resistance at room temperature (72°F) should be between 2,500 and 5,000 ohms.
 If any of the above conditions are not met, replace transmission fluid temperature sensor (para. 28-17).
- Step 3. Check wires from connector to sensor for breaks or shorts. Replace internal harness if damaged (para. 28-3).

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

17. NO 1-2 UPSHIFT OR DELAYED UPSHIFT

- Step 1. If oil pressure in **D** (overdrive) at 1,000 rpm is normal, proceed to step 2. If oil pressure is high, proceed to step 3.
- Step 2. Check results of control valve and governor line pressure test (para. 2-41).
- Step 3. If oil pressure in N (neutral) at 1,000 rpm was normal or high, proceed to step 4.
- Step 4. Check control valve spacer plate for obstructions. Clean or replace spacer plate (chapter 28).

END OF TESTING!

18. 1-2 SHIFT SOFT OR SLIPS

- Step 1. Check transmission oil pressure response to varying throttle openings. Pressure should respond rapidly to quick changes in throttle opening. If oil pressure response is poor, proceed to step 2. If oil pressure response is normal, proceed to step 3.
- Step 2. If oil pressure in **D** (overdrive) at 1,000 rpm is low, proceed to step 3. If oil pressure is normal, proceed to step 9.
- Step 3. Check oil pump for obstructed oil passages or damage. Repair oil pump (para. 28-18).
- Step 4. Check forward clutch seals for damage. Replace damaged seals (para. 28-11).
- Step 5. Check center support oil seal rings for damage. Replace damaged rings (para. 28-9).
- Step 6. Check rear servo piston and oil seal rings for damage. Repair rear servo (para. 28-16) if damaged.
- Step 7. Check front accumulator piston and oil seal rings for damage. Replace control valve (chapter 28) if accumulator piston components are damaged.
- Step 8. Check transmission case for internal damage or porosity. Replace transmission (para. 19-3) if case is damaged or porous.
- Step 9. Inspect control valve for nicks on machined surfaces or voids in casting. Check 1-2 accumulator valve train for stuck valves or incorrect assembly. Check front accumulator piston and oil seal rings for damage. Replace control valve (chapter 28) if any damage is found.
- Step 10. Check rear servo and rear accumulator pistons and oil seal rings for damage. Repair rear servo (para. 28-16) if damaged.
- Step 11. Check center support bolt for looseness. Tighten to 20-25 lb-ft (27-34 N·m).

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).

- Step 12. Air-check intermediate clutch piston for proper operation. If operation is normal, proceed to step 13. If piston exhibits excessive leakage, proceed to step 14.
- Step 13. Check intermediate clutch piston, plates, and release springs for damage or incorrect assembly. Repair intermediate clutch piston (para. 28-14) if damaged.
- Step 14. Check center support for missing orifice plug. Replace transmission (para. 19-3) if plug is missing.

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

19. 1-2 SHIFT FIRM OR ROUGH

- Step 1. If oil pressure in **D** (overdrive) at 1,000 rpm is normal, proceed to step 2. If oil pressure is high, proceed to step 6.
- Step 2. Check 1-2 accumulator valve train for stuck valves or incorrect assembly. Replace control valve (para. 28-17) if any damage is found.
- Step 3. Check rear accumulator piston and oil seal rings for damage. Repair rear servo (para. 28-16) if damaged.
- Step 4. Check transmission case for restricted oil passages, damage, or porosity. Remove obstructions or replace transmission (para. 19-3) if case is damaged or porous.
- Step 5. Check for missing or incorrectly installed check balls. Replace missing check balls (chapter 28).
- Step 6. Check control valve spacer plate for obstructions and damaged or misaligned gasket. Clean or replace spacer plate (chapter 28).
- Step 7. Check oil pump for obstructed oil passages or damage. Repair oil pump (para. 28-18) if damaged.

END OF TESTING!

20. NO 2-3 UPSHIFT OR DELAYED UPSHIFT

NOTE

If malfunction only occurs at or near full throttle, check engine timing for proper adjustment and check exhaust system for restrictions.

- Step 1. Check control valve for a stuck 2-3 valve, and misaligned or damaged gaskets. Replace control valve (chapter 28) if damaged.
- Step 2. Check direct clutch for damage or burned clutch plates. Repair direct clutch (para. 28-10) if damaged.

END OF TESTING!

21. 2-3 SHIFT SOFT OR SLIPS

- Step 1. If oil pressure in **D** (overdrive) at 1,000 rpm is low, proceed to step 2. If oil pressure is normal, proceed to step 3.
- Step 2. Perform steps 3 through 8 of malfunction 18.
- Step 3. Perform steps 6 and 7 of malfunction 19.
- Step 4. Check front servo for broken or missing spring and leak at servo pin. Repair front servo (para. 28-15) if damaged.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).

- Step 5. Air-check direct clutch piston for proper operation. If piston exhibits excessive leakage, proceed to step 6. If operation is normal, proceed to step 7.

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION	TEST OR INSPECTION
	<p>Step 6. Check direct clutch piston, plates, and release springs for damage or incorrect assembly. Repair direct clutch (para. 28-10) if damaged.</p> <p>Step 7. Check transmission case passages for leaks. Replace transmission (para. 19-3) if case is damaged.</p> <p style="text-align: center;">END OF TESTING!</p>
22. 2-3 SHIFT FIRM OR ROUGH	<p>Step 1. If oil pressure in D (overdrive) at 1,000 rpm is normal, proceed to step 2. If oil pressure is high, proceed to step 5.</p> <p>Step 2. Check front accumulator for damaged piston, rings, and broken or missing spring. Check valve to accumulator feed for obstructions. Replace control valve (para. 28-17) if damaged.</p> <p style="text-align: center;"><u>WARNING</u></p> <p style="text-align: center;">Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).</p> <p>Step 3. Air-check direct clutch piston for leak to outer area of clutch piston. Check center piston seal for damage. Repair direct clutch (para. 28-10) if damaged.</p> <p>Step 4. Check center support and second oil ring for damage. Repair center support (para. 28-9) if damaged.</p> <p>Step 5. Perform steps 6 and 7 of malfunction 19.</p> <p style="text-align: center;">END OF TESTING!</p>
23. NO 3-4 UPSHIFT OR DELAYED UPSHIFT	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">If malfunction only occurs at or near full throttle, check engine timing for proper adjustment and check exhaust system for restrictions.</p> <p>Step 1. Check control valve for a stuck 2-3 valve and misaligned or damaged gaskets. Replace control valve (chapter 28) if damaged.</p> <p>Step 2. Check direct clutch for damage or burned clutch plates. Repair direct clutch (para. 28-10) if damaged.</p> <p style="text-align: center;">END OF TESTING!</p>
24. 3-4 SHIFT SOFT OR SLIPS	<p>Step 1. If oil pressure in D (overdrive) at 1,000 rpm is low, proceed to step 2. If oil pressure is normal, proceed to step 4.</p> <p>Step 2. Perform steps 3 through 8 of malfunction 18.</p> <p>Step 3. Perform steps 6 and 7 of malfunction 19.</p> <p>Step 4. Check front servo for broken or missing spring and leak at servo pin. Repair front servo (para. 28-15) if damaged.</p>

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).

- Step 5. Air-check direct clutch piston for proper operation. If piston exhibits excessive leakage, proceed to step 6. If operation is normal, proceed to step 7.
- Step 6. Check direct clutch piston, plates, and release springs for damage or incorrect assembly. Repair direct clutch (para. 28-10) if damaged.
- Step 7. Check transmission case passages for leaks. Replace transmission (para. 19-3) if case is damaged.

END OF TESTING!

25. 3-4 SHIFT FIRM OR ROUGH

- Step 1. If oil pressure in **(D)** (overdrive) at 1,000 rpm is normal, proceed to step 2. If oil pressure is high, proceed to step 5.
- Step 2. Check front accumulator for damaged piston, rings, and broken or missing spring. Check valve to accumulator feed for obstructions. Replace piston rings and broken or missing spring (para. 28-17) if damaged.

NOTE

Ensure control valve makes contact; clean electrical connections.

- Step 3. Check control valve for proper electrical connection. Replace control valve if stuck in off position (para. 28-17).

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).

- Step 4. Air-check direct clutch piston for leak to outer area of clutch piston. Check center piston seal for damage. Repair direct clutch (para. 28-10) if damaged.
- Step 5. Check center support and second oil ring for damage. Repair center support (para. 28-9) if damaged.
- Step 6. Perform steps 6 and 7 of malfunction 19.

END OF TESTING!

26. NO ENGINE BRAKING – THIRD GEAR

- Step 1. Check front servo piston for leaking oil rings and damaged piston. Replace damaged components (para. 28-15).
- Step 2. Check front accumulator piston for leaking oil rings and damaged piston. Replace damaged or worn components (para. 28-17).
- Step 3. Check front band for damage and proper installation. Replace front band (para. 28-14) if damaged.

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

27. NO ENGINE BRAKING – SECOND GEAR

- Step 1. Check front servo piston for leaking oil rings and damaged piston. Replace damaged components (para. 28-15).
- Step 2. Check front accumulator piston for leaking oil rings and damaged piston. Replace damaged or worn components (para. 28-17).
- Step 3. Check front band for damage and proper installation. Replace front band (para. 28-14) if damaged.

END OF TESTING!

28. NO ENGINE BRAKING – FIRST GEAR

- Step 1. Check for missing or incorrectly installed check balls. Replace missing check balls (chapter 28).
- Step 2. Check transmission case for damage at check ball locations. Replace transmission (para. 19-3) if damaged.
- Step 3. Check rear servo for leaking oil seal rings and damaged piston. Repair rear servo (para. 28-16) if damaged.
- Step 4. Check rear band apply pin for proper length. Replace pin (para. 28-7) if length is not correct.
- Step 5. Check rear band for damage and proper installation. Replace rear band (para. 28-7) if damaged.

END OF TESTING!

29. NO DRIVE OR SLIPS IN DRIVE

- Step 1. If oil pressure in **D** (overdrive) at 1,000 rpm is low, proceed to step 2. If oil pressure is normal, proceed to step 4.
- Step 2. Perform steps 3, 4, and 8 of malfunction 18.
- Step 3. Check forward clutch for damage and burned clutch plates. Repair forward clutch (para. 28-11) if damaged.
- Step 4. Check roller clutch for damage and proper installation. Replace roller clutch (para. 28-13) if damaged.

END OF TESTING!

30. NO REVERSE OR SLIPS IN REVERSE

- Step 1. If oil pressure in **D** (overdrive) at 1,000 rpm is low, proceed to step 2. If oil pressure is normal, proceed to step 4.
- Step 2. Perform steps 4 and 6 through 9 of malfunction 18.
- Step 3. Check control valve spacer plate for obstructions and misaligned gasket. Clean or replace spacer plate (chapter 28) if damaged.
- Step 4. Check control valve for damaged or leaking oil passages and stuck valves or incorrect assembly. Replace control valve (para. 28-17) if damaged.

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

- Step 5. Check rear servo and accumulator piston for damaged oil seal rings, pistons, and band apply pin. Check for correct length of band apply pin. Repair rear servo and accumulator (para. 28-16) if damaged.
- Step 6. Check center support and oil seal rings for damage and wear. Repair center support (para. 28-9) if damaged or worn.
- Step 7. Check direct clutch for damage and burned clutch plates. Repair direct clutch (para. 28-10) if damaged.
- Step 8. Check rear band for damage and proper installation. Replace band (para. 28-7) if damaged.
- Step 9. Check forward clutch for damage and binding (will not release). Repair forward clutch (para. 28-11) if damaged.

END OF TESTING!

31. VEHICLE MOVES IN NEUTRAL

- Step 1. Check manual valve for damage and proper installation. Replace manual valve (para. 28-3) if damaged.
- Step 2. Check oil pump for leaking oil passages and damage. Repair oil pump (para. 28-18) if damaged.
- Step 3. Check forward clutch for damage and burned clutch plates. Repair forward clutch (para. 28-11) if damaged.

END OF TESTING!

32. VEHICLE MOVES IN PARK

Check parking lock pawl and actuator assembly for damage and proper installation. Replace (para. 28-6) if damaged.

END OF TESTING!

33. TRANSMISSION NOISY

NOTE

Check engine accessory drive components: water pump, power steering pump, alternator, and air conditioner compressor (if installed) for the source of noise before checking transmission.

a. Noise in Neutral and All Driving Ranges

- Step 1. Check torque converter for loose mounting capscrews and damage. Tighten capscrews or replace torque converter (para. 28-4) if damaged.
- Step 2. Check flywheel for damage. Replace flywheel (TM 9-2815-237-34) if damaged.
- Step 3. Check oil pump for obstructed oil passages, damage, and proper assembly. Repair oil pump (para. 28-18) if damaged.

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION
TEST OR INSPECTION

b. Noise in 1st, 2nd, 3rd, and Reverse

Step 1. Check gear unit thrust bearings and races for damage. Replace bearing(s) and races if either is damaged (para. 28-8).

Step 2. Inspect gears for damage and wear. Replace damaged or worn components (para. 28-8).

Step 3. Inspect front internal gear ring for damage. Replace gear ring if damaged (para. 28-8).

c. Noise During Acceleration – Any Gear

Check engine and transmission mounts for looseness or damage. Secure or replace mounts (para. 15-3).

END OF TESTING!

TRANSFER CASE

34. TRANSFER CASE DIFFICULT TO SHIFT

Step 1. Check transfer case shift linkage for improper adjustment or damage which would interfere with operation. Adjust or replace shift rod (para. 5-16).

Step 2. Check transfer case fluid level. Add fluid (para. 2-12) if necessary.

Step 3. Repair or replace transfer case (para. 20-3).

END OF TESTING!

35. TRANSFER CASE NOISY

Step 1. Check transfer case fluid level. Add fluid (para. 2-12) if necessary.

Step 2. Repair or replace transfer case (para. 20-3).

END OF TESTING!

DIFFERENTIAL

36. DIFFERENTIAL NOISY

Step 1. Check differential and axle free play tolerance (para. 21-10).

Step 2. Replace differential (para. 21-5).

END OF TESTING!

BRAKES

37. NOISY BRAKES

Step 1. Check for worn brake pads. Replace brake pads (para. 7-3) if worn.

Step 2. Check for hard spots on brake rotors. Replace brake rotors if hard spots are present (para. 22-3).

END OF TESTING!

Table 14-1. Mechanical Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

38. BRAKE PEDAL PULSATION

Check brake rotor lateral runout (para. 22-3). Turn or replace any rotor not meeting specifications.
END OF TESTING!

39. ERRATIC BRAKING ACTION

Check for seized or binding brake caliper pistons. Repair any binding or seized caliper pistons (para. 22-4).
END OF TESTING!

WHEELS, SUSPENSION, AND STEERING

40. POOR DIRECTIONAL STABILITY OR UNEVEN TIRE WEAR

- Step 1. Check for proper tire inflation (TM 9-2320-387-10).
 - Step 2. Check front and rear ball joints. Replace front or rear ball joints if worn (para. 6-24).
 - Step 3. Check front and rear tie rods. Replace front or rear tie rods if worn (para. 8-13).
 - Step 4. Check front and rear wheel alignment (para. 21-8).
- END OF TESTING!

41. NOISY SUSPENSION

Check for broken or cracked springs or spring seats. Replace any damaged springs or spring seats (para. 24-5).
END OF TESTING!

42. HARD STEERING OR EXCESSIVE PLAY IN STEERING

- Step 1. Check power steering reservoir (TM 9-2320-387-10).
 - Step 2. Bleed power steering system (para. 8-27).
 - Step 3. Check front ball joints. Replace front or rear ball joints if worn (para. 6-24).
 - Step 4. Check front tie rods. Replace tie rods if worn (para. 8-13).
 - Step 5. Check centerlink. Replace centerlink if damaged or worn (para. 8-15).
 - Step 6. Check idler arm. Replace idler arm if worn (para. 8-17).
 - Step 7. Check front wheel alignment (para. 21-8).
- END OF TESTING!

Section II. AIR CONDITIONING TROUBLESHOOTING

14-3. GENERAL

Information in this section is used by support maintenance personnel to diagnose and correct air conditioning system malfunctions.

14-4. AIR CONDITIONING TROUBLESHOOTING INSTRUCTIONS

Before taking any action to correct a possible air conditioning malfunction, perform the following:

- (1) Question vehicle operator about nature of complaint and conditions under which problem occurs.
- (2) Record symptoms and compare symptoms of listed malfunctions to help identify problem.
- (3) Conduct visual inspection of system to identify obvious problems (loose belt or fittings, disconnected wires, dirty condenser, or evaporator surfaces, blown fuses, and massive leak).

14-5. INITIAL TEST CONDITIONS

- a. Install manifold gauge set on compressor (para. 25-15).
 - b. Ensure a full charge of refrigerant is in system at start of test.
 - (1) Check sight glass reading for low refrigerant indication.
 - (2) Add refrigerant (para. 25-15), if necessary.
- NOTE**
- Gauge readings taken at normal engine idle may not accurately reflect condition of system.
- c. Set engine speed at 1,500 rpm (TM 9-2320-387-10).
 - d. Set air conditioner cooling and blower speed settings to maximum value (TM 9-2320-387-10).
 - e. Open vehicle doors to permit fresh flow of air through passenger compartment.
 - f. Run engine with air conditioner on for a minimum of five minutes to allow temperature and pressure stabilization.

14-6. SYSTEM PERFORMANCE EVALUATION

a. Measure air temperature at outlet duct in crew compartment by inserting end of thermometer in center air duct louver. Normal operation air temperature at duct louver is 40°-50°F (4°-10°C), while ambient (air) temperature is 70°F (21°C) and humidity is low. Refer to table 14-2 for relative humidity effect on normal operation air temperature at duct louver.

NOTE

In a properly functioning system, air temperature at duct will increase as the ambient air temperature and humidity increase.

- b. Low and high side gauge readings on manifold gauge set are used to identify and diagnose system problems. Refer to table 14-2 for normal low and high side pressure readings.
- c. After troubleshooting, repair, evacuation, and recharging are complete, conduct performance test of system. Refer to table 14-2 for performance guidelines.
- d. Perform pressure gauge and in-vehicle cold air duct readings to confirm system has been restored to peak operating condition.
- e. Verify refrigerant level is correct before returning vehicle to service.

Table 14-2. Normal Operating Pressures and Temperatures.

AMBIENT TEMP	HIGH SIDE PRESSURE	LOW SIDE PRESSURE	ACCEPTABLE FRONT AND REAR EVAPORATOR LOUVER TEMPERATURES										
			0%RH	10%RH	20%RH	30%RH	40%RH	50%RH	60%RH	70%RH	80%RH	90%RH	100%RH
85	225-175 PSI CYCLING 4 TIMES PER MINUTE	32-26 PSI CYCLING 4 TIMES PER MINUTE	48.00	48.00	49.00	51.40	54.20	59.00	63.00	66.60	69.80	73.40	76.60
90	190-185 CONDENSER FANS ENGAGE AT 225 PSIG THEN DROP TO ABOVE CONSTANT PRESSURES	35-32 PSI	50.00	50.80	50.60	54.40	58.40	61.20	64.00	68.00	71.60	74.80	77.60
95	223-221 PSI UNIT RUNS CONTINUOUSLY NO CYCLING	34-33 PSI	53.00	53.00	53.84	55.52	60.14	64.76	69.38	74.42	77.78	80.72	83.24
100	233-230 PSI UNIT RUNS CONTINUOUSLY NO CYCLING	37-36 PSI	58.00	58.00	58.00	58.84	62.62	67.86	79.00	81.94	84.86	87.82	89.92

AIR CONDITIONING TROUBLESHOOTING SYMPTOM INDEX

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING PROCEDURE PAGE
-----------------	-------------	--------------------------------

AIR CONDITIONER

- 1. Insufficient cooling 14-19
- 2. Intermittent cooling 14-21

AIR CONDITIONER COMPRESSOR

- 3. Insufficient cooling 14-21
- 4. Unusual noise with clutch engaged 14-22
- 5. Unusual noise with clutch disengaged 14-22
- 6. Incorrect oil level or leak 14-22

Table 14-3. Air Conditioning Troubleshooting.

MALFUNCTION TEST OR INSPECTION

AIR CONDITIONER

1. INSUFFICIENT COOLING

a. Check for refrigerant loss.

- Step 1. Connect manifold gauge set to service ports (para. 25-15).
- Step 2. Open all doors.
- Step 3. Start vehicle and allow vehicle engine to idle (TM 9-2320-387-10).
- Step 4. Engage system blower to high position (TM 9-2320-387-10).
- Step 5. Engage A/C system switch (TM 9-2320-387-10).
- Step 6. Both front and rear systems should be set to a maximum blower position (TM 9-2320-387-10).
- Step 7. After five minutes, record the pressure readings and temperature of discharge air coming from unit outlets.
- Step 8. Subtract air temperature from the ambient temperature of the surroundings.
- Step 9. Compare this temperature drop to the temperature drop as corrected for relative humidity (table 14-2).

NOTE

A slow refrigerant leak is often indicated by a dirty, oily patch at or near the point of leakage. This is especially true along high pressure hoses and connections. A slight oily patch near the shaft nut of pulley and clutch assembly is normal seepage.

- Step 10. Check low and high side gauges for low readings. If these conditions occur, perform leak test, repair leak, evacuate and recharge with R-134a (para. 25-15).

b. Check for air or moisture in system.

- Step 1. Perform, steps 1 through 8 of malfunction 1a.
- Step 2. Check low side gauge for normal to high readings and thermometer for high reading. Discharge system. Evacuate and recharge with R-134a (para. 25-15).

c. Check expansion valve.

- Step 1. Perform steps 1 through 8 of malfunction 1a.

NOTE

If control tube must be repositioned, rewrap bulb with insulating tape.

- Step 2. If low side gauge is low or in vacuum and high side is normal to high with no cooling at louver, replace expansion valve (para. 25-26).
- Step 3. If low side gauge is high and high side gauge is normal to low and thermometer reading is high, check bulb on expansion valve to ensure it is tightly clamped to suction tube on evaporator and wrapped. If this is ok, replace valve (para. 25-26).

d. Check thermostat.

- Step 1. Perform steps 1 through 8 of malfunction 1a.
- Step 2. If all gauge readings are normal (table 14-2) and thermometer reading is normal to low and continues to fall, check thermostat probe. Ensure the probe is in the fins of the evaporator coil.

Table 14-3. Air Conditioning Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

- Step 3. If the thermostat does not cycle off when discharge temperature of front unit drops to approximately 40°F, replace thermostat (para. 25-24).
- Step 4. If thermostat cycles off but does not come back on for a long period, refer to step 3.
- Step 5. If clutch on compressor does not come on and evaporator temperature is above 40°F, jump across thermostat. If this engages clutch, replace thermostat (para. 25-24).
- e. Check for high side restriction.
 - Step 1. Perform steps 1 through 8 of malfunction 1a.
 - Step 2. Check high side gauge for high reading and low side for normal to low reading. Monitor hoses and tubes for frost or ice.
 - Step 3. Check liquid hose/tube for temperature. The liquid hose/tube should be hot to the touch. If not, check condenser for damage.
 - Step 4. If no frost or ice is noticed and low side gauge is normal to high or in a vacuum and replacing expansion valve did not fix system, replace suction hose.

NOTE

- An ice or frost patch on hoses/tubes is a sign of restriction. Flush hose/tube or condenser. If this does not work, replace hose.
- Barrier hose has an internal barrier. It can collapse and cause a restriction.

- f. Check condenser.
 - Step 1. Perform steps 1 through 8 of malfunction 1a.
 - Step 2. Check low side of manifold gauge for normal or high reading and high side for high reading (table 14-2). If discharge (evaporator) air is warm, liquid line is hot, air flow through condenser is restricted, or bubbles are seen in sight glass, clean condenser exterior. If condenser fans are inoperative, refer to electrical system trouble-shooting (chapter 2). Flush condenser (para. 25-15) or replace condenser (para. 25-18) if damaged.
- g. Check for overcharged system.
 - Step 1. Perform steps 1 through 8 of malfunction 1a.
 - Step 2. Check low side of manifold gauge for normal to high reading and high side for high reading (table 14-2). If system runs continuously, compressor is noisy on start-up, or discharge (evaporator) air is warm, then a partial system discharge is required; continue to step 3.
 - Step 3. Insert center hose of manifold gauge set in an empty bottle or can.

NOTE

Do not allow refrigerant R-134a to escape too quickly. Refrigerant oil will escape.

- Step 4. Turn low-pressure gauge valve and high-pressure gauge valve counterclockwise slightly to permit refrigerant to slowly escape through center hose until correct pressure is obtained.

END OF TESTING!

Table 14-3. Air Conditioning Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

2. INTERMITTENT COOLING

Check air conditioner output for temperature variation. If air is intermittently warm and cold, perform the following:

- Step 1. Check for air or moisture in system by performing malfunction 1b.
- Step 2. Ensure temperature sensing probe is inserted properly in the evaporator fins near the outlet (para. 25-26).
- Step 3. Perform mechanical troubleshooting, malfunction 9.
- Step 4. Check sight glass reading for oil streaks indicating too much oil in system.
- Step 5. If there is excess oil in system, flush A/C system (para. 25-15). Charge A/C system with correct quantity of refrigerant oil (para. 25-15).

END OF TESTING!

AIR CONDITIONER COMPRESSOR**NOTE**

Before beginning compressor troubleshooting or inspection procedures, always clean away oil, grease, dirt, and refrigerant residue.

3. INSUFFICIENT COOLING

- a. If air conditioner compressor runs smoothly, perform the following:
 - Step 1. Connect manifold gauge set to low and high service connector ports (para. 25-15).
 - Step 2. Run compressor at idle speed (1,500 rpm) for five minutes.
 - Step 3. If unusually high low pressure is observed in combination with unusually low high side pressure, stop compressor and measure elapsed time before high side pressure is equal to low side pressure. If less than two minutes, then reed valve or head gasket may be defective. Replace compressor (para. 25-20).
 - Step 4. If unusually low side pressure and high side pressure are observed, check for low refrigerant charge or refrigerant leaks and replenish refrigerant as necessary (para. 25-15).
 - Step 5. Check for compressor oil leak at front shaft seal in pulley and clutch assembly. Replace compressor if there is more than a minor dry patch (para. 25-20).
 - Step 6. Check compressor for oil leaks. If leaking at compressor hose junction, replace seals (para. 25-30). Any other compressor housing leaks require compressor replacement (para. 25-20).
- b. If air conditioner compressor runs intermittently or is inoperative, check clutch air gap (space between pulley and front clutch plate) with feeler gauge. Gap must be within range of 0.016 - 0.031 in. (0.406 - 0.787 mm). If gap is out of specification, replace compressor (para. 25-20).
- c. If compressor runs roughly, perform the following:
 - Step 1. Discharge air conditioning system (para. 25-15).
 - Step 2. Disconnect field coil harness connector from field coil.
 - Step 3. Rotate compressor shaft clockwise (facing compressor) using 3/4-in. socket and wrench on shaft nut.
 - Step 4. Check for severe rough spots or catches while rotating shaft nut. If rough spots or catches are observed, replace compressor (para. 25-20).

END OF TESTING!

Table 14-3. Air Conditioning Troubleshooting (Cont'd).

MALFUNCTION TEST OR INSPECTION

4. UNUSUAL NOISE WITH CLUTCH ENGAGED

- a. Inspect compressor mounting component.
 - Step 1. Check for a loose belt.
 - Step 2. Check for broken bracket or compressor mounting gear. Replace damaged components (para. 25-20).
 - Step 3. Check for missing, broken, or loose bolts at compressor and engine mounting points. Replace damaged or missing components (para. 25-20).
 - Step 4. Check for loose or wobbling compressor pulley and for shaft nut torque and bottoming. Repair or replace damaged components (para. 25-20).
- b. Inspect engine compartment.
 - Step 1. Disconnect serpentine belt (para. 3-81) and operate engine at idle to isolate engine noise from air conditioner compressor noise. If noise condition stops, continue to step 2. If noise condition still exists, refer to mechanical troubleshooting (table 2-1).
 - Step 2. Check for proper refrigerant charge (malfunction 1a). Low or excessive refrigerant charge can cause unusual noise.
 - Step 3. Check clutch air gap (space between pulley and front clutch plate) with feeler gauge. Gap must be within range of 0.016 - 0.031 in. (0.406 - 0.787 mm). If air gap is incorrect, replace compressor (para. 25-20).
- c. Check clutch and pulley bearing operation.
 - Step 1. Remove serpentine belt (para. 3-81).
 - Step 2. Rotate pulley by hand and listen for bearing noise while feeling for hard spots. If noise or hard spots are excessive, replace compressor (para. 25-20).
- d. Check oil level.

Insufficient amount of oil may cause compressor to be noisy. Restore oil to correct level (para. 25-15).

END OF TESTING!

5. UNUSUAL NOISE WITH CLUTCH DISENGAGED

- a. Check clutch air gap (space between pulley and front clutch plate) with feeler gauge. Gap must be within range of 0.016 - 0.031 in. (0.406 - 0.787 mm). If air gap is out of specification, replace compressor (para. 25-20).
- b. Check for defective clutch pulley. Replace compressor (para. 25-20).

END OF TESTING!

6. INCORRECT OIL LEVEL OR LEAK

NOTE

There is no oil dipstick port on this A/C compressor. Oil quantity can only be checked in compressor by removing and draining the compressor.

After a system component has been replaced or there is reason to suspect an incorrect oil level or leak, check system (para. 25-20).

END OF TESTING!

CHAPTER 15 ENGINE (DS) MAINTENANCE

Section I. GENERAL ENGINE MAINTENANCE

15-1. INTRODUCTION

This chapter contains instructions for replacement and repair of engine components at the direct support maintenance level. Some subassemblies and parts must be removed before engine components can be accessed. They are referenced to other paragraphs in this manual.

15-2. GENERAL ENGINE MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
15-3.	Engine Mount and Insulator Maintenance	15-2
15-4.	Left Cylinder Head Repair	15-8
15-5.	Right Cylinder Head Repair	15-12
15-6.	Crankshaft Pulley Replacement	15-14
15-7.	Torsional Damper Replacement	15-15
15-8.	Rocker Arm Shafts and Pushrods Replacement	15-17
15-9.	Hydraulic Valve Lifter Replacement	15-18
15-10.	Timing Chain Cover, Timing Chain, and Drive Sprockets Maintenance	15-20
15-11.	Left Rocker Arm Cover Replacement	15-24
15-12.	Right Rocker Arm Cover Replacement	15-26
15-13.	Front Cover Oil Seal Replacement	15-28
15-14.	Oil Pump Drive Replacement	15-29
15-15.	Oil Pump Maintenance	15-30
15-16.	Left Intake Manifold Replacement	15-32
15-17.	Right Intake Manifold Replacement	15-34
15-18.	Wastegate Housing Replacement	15-35
15-19.	Wastegate Actuator Replacement	15-36
15-20.	Intake Crossover Replacement	15-37
15-21.	Turbocharger Replacement	15-38
15-22.	Glow Plug Tip Removal (Damaged or Broken)	15-40
15-23.	Engine Injection Pump Timing	15-42
15-24.	Engine Run-In	15-46

15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE

This task covers:

- | | |
|--------------------------------------|--|
| <p>a. Removal
b. Disassembly</p> | <p>c. Assembly
d. Installation</p> |
|--------------------------------------|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Crowfoot, 5/8-in. (Appendix B, Item 138)
Torque adapter, 9/16-in. (Appendix B, Item 133)
Torque adapter, 3/4-in. (Appendix B, Item 134)
Adapter, 3/8-1/2-in. (Appendix B, Item 135)
Engine lifting sling (Appendix B, Item 24)

Materials/Parts

Three lockwashers (Appendix G, Item 190)
Eight locknuts (Appendix G, Item 156)
Two locknuts (Appendix G, Item 121)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Fuel pump removed (right engine mount only) (para. 3-24).
- Right engine splash shield removed (para. 10-24).
- Engine access cover removed (para. 10-22).
- Front propeller shaft removed (left engine mount only) (para. 6-2).
- Glow plug controller removed (para. 4-33).
- Air horn support and engine lift bracket removed (para. 3-16).

General Safety Instructions

Direct all personnel to stand clear during hoisting operation.

Maintenance Level

Direct support

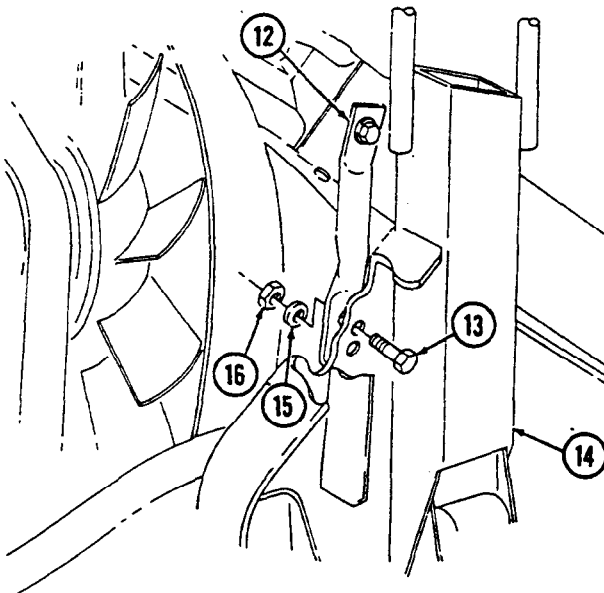
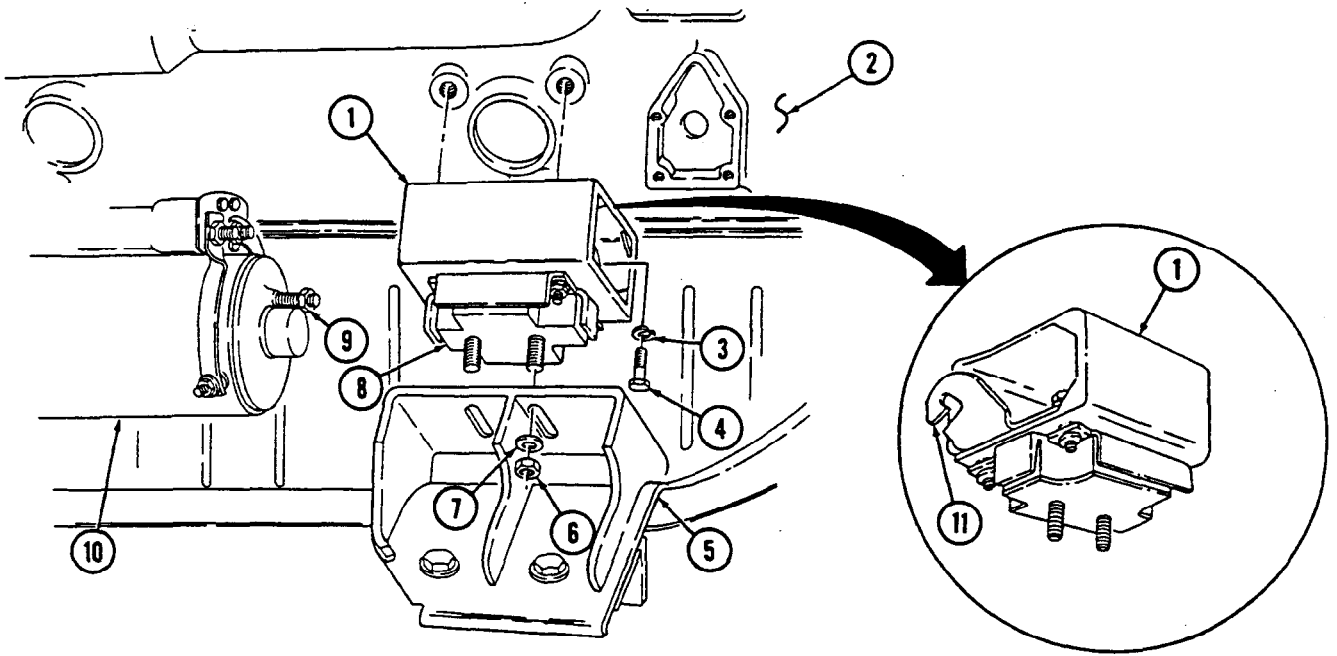
a. Removal

NOTE

Left and right engine mounts are removed basically the same.

1. Remove two locknuts (6) and washers (7) from insulator (8) on engine mount bracket (5). Discard locknuts (6).
2. Loosen nut (9) securing starter (10) to starter support bracket (11).
3. Remove three capscrews (4) and lockwashers (3) from right engine mount (1) and cylinder block (2). Discard lockwashers (3).
4. Remove four locknuts (16), washers (15), and capscrews (13) from two radiator supports (12) and airlift brackets (14). Discard locknuts (16).

15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE (Cont'd)



15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE (Cont'd)

NOTE

- Install sling bracket on rear of engine first.
 - Use four 15x25-mm capscrews to install lifting sling on engine.
5. Install engine lifting sling on engine (2) and right cylinder head (7) with two capscrews (6).
 6. Install sling bracket (4) on left cylinder head (5) with two capscrews (3). Tighten capscrews (6) and (3) and install bracket (4) on engine lifting sling with pin (1).

WARNING

Direct all personnel to stand clear during hoisting operation.
Failure to do this may cause injury to personnel.

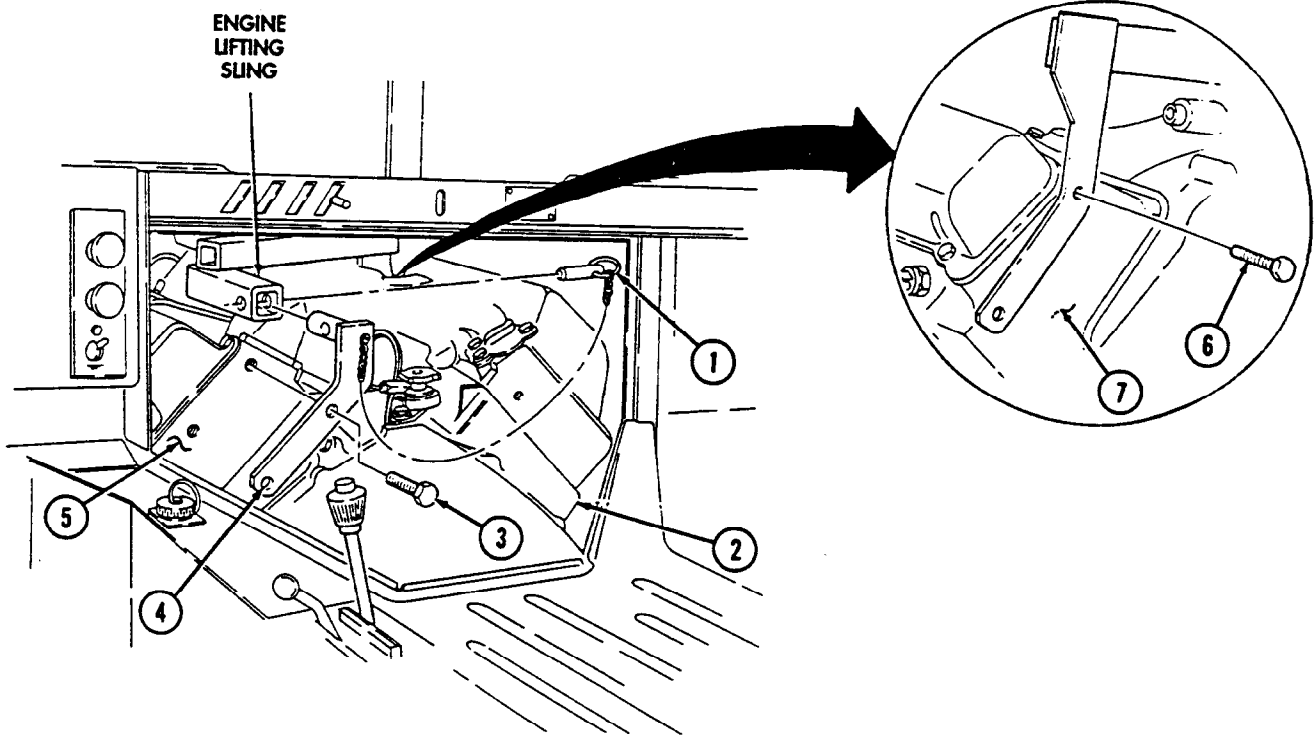
7. Attach hoist to engine lifting sling. Slowly raise engine (2) enough to remove engine mount (8) and insulator (10) from engine mount bracket (9).
8. Remove engine mount (8) and insulator (10) from engine mount bracket (9).

b. Disassembly

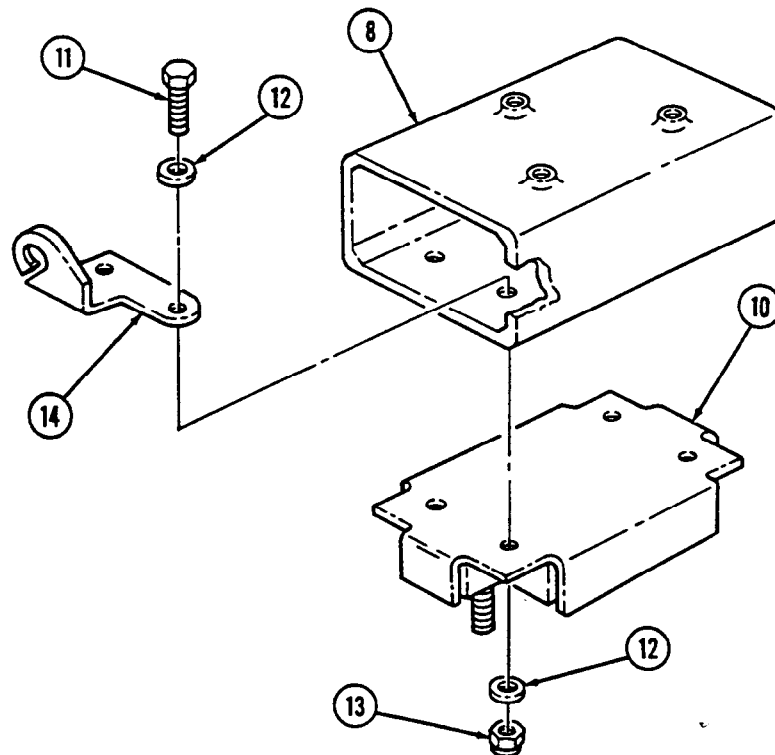
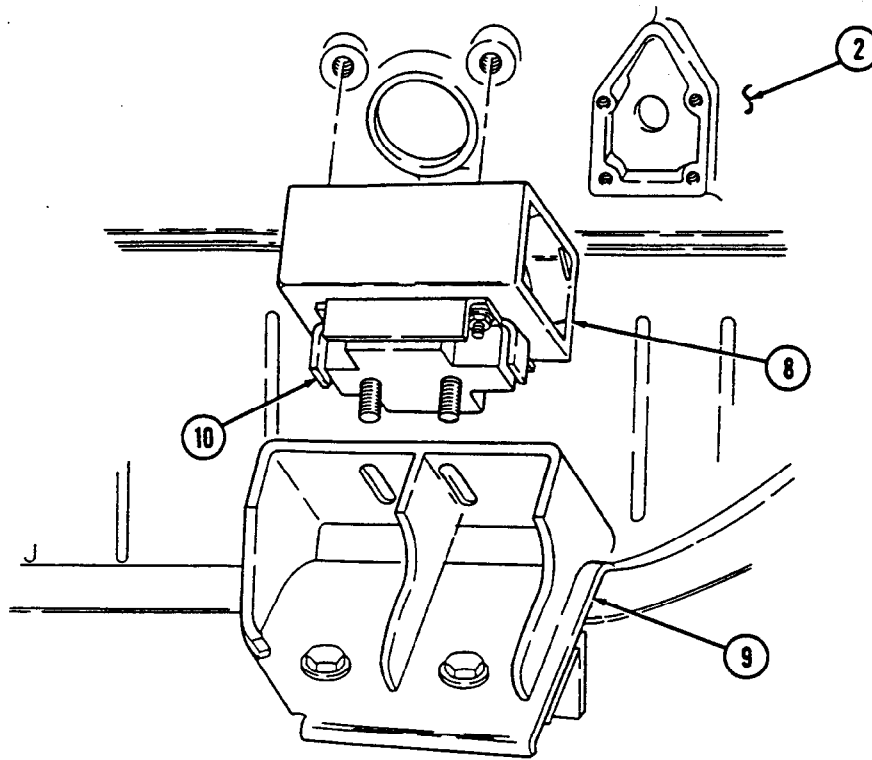
Remove four locknuts (13), washers (12), capscrews (11), washers (12), starter bracket (14) (for right mount), and insulator (10) from engine mount (8). Discard locknuts (13).

c. Assembly

Install insulator (10) and starter bracket (14) (for right mount) on engine mount (8) with four washers (12), capscrews (11), washers (12), and locknuts (13). Tighten locknuts (13) to 37 lb-ft (50 N•m).



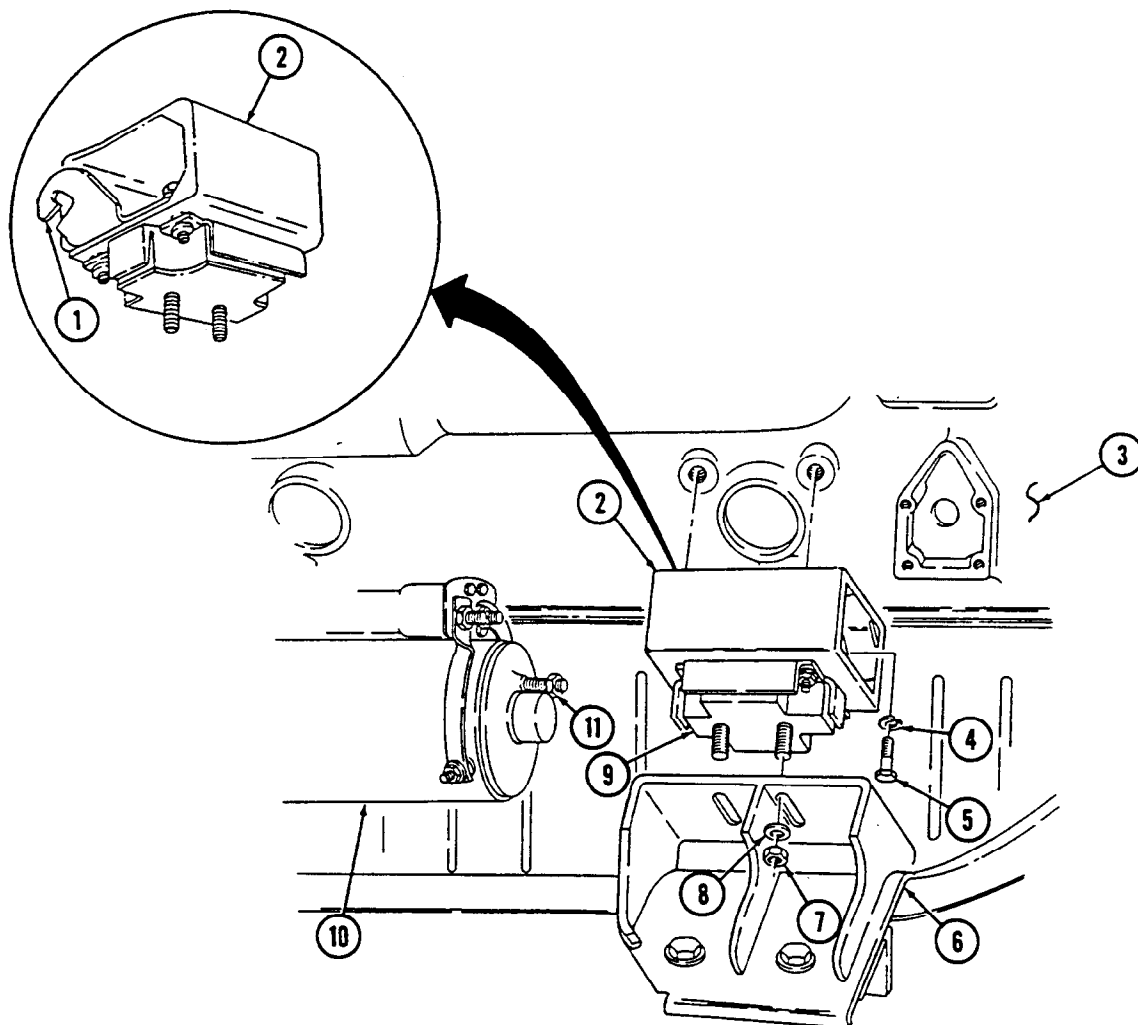
15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE (Cont'd)



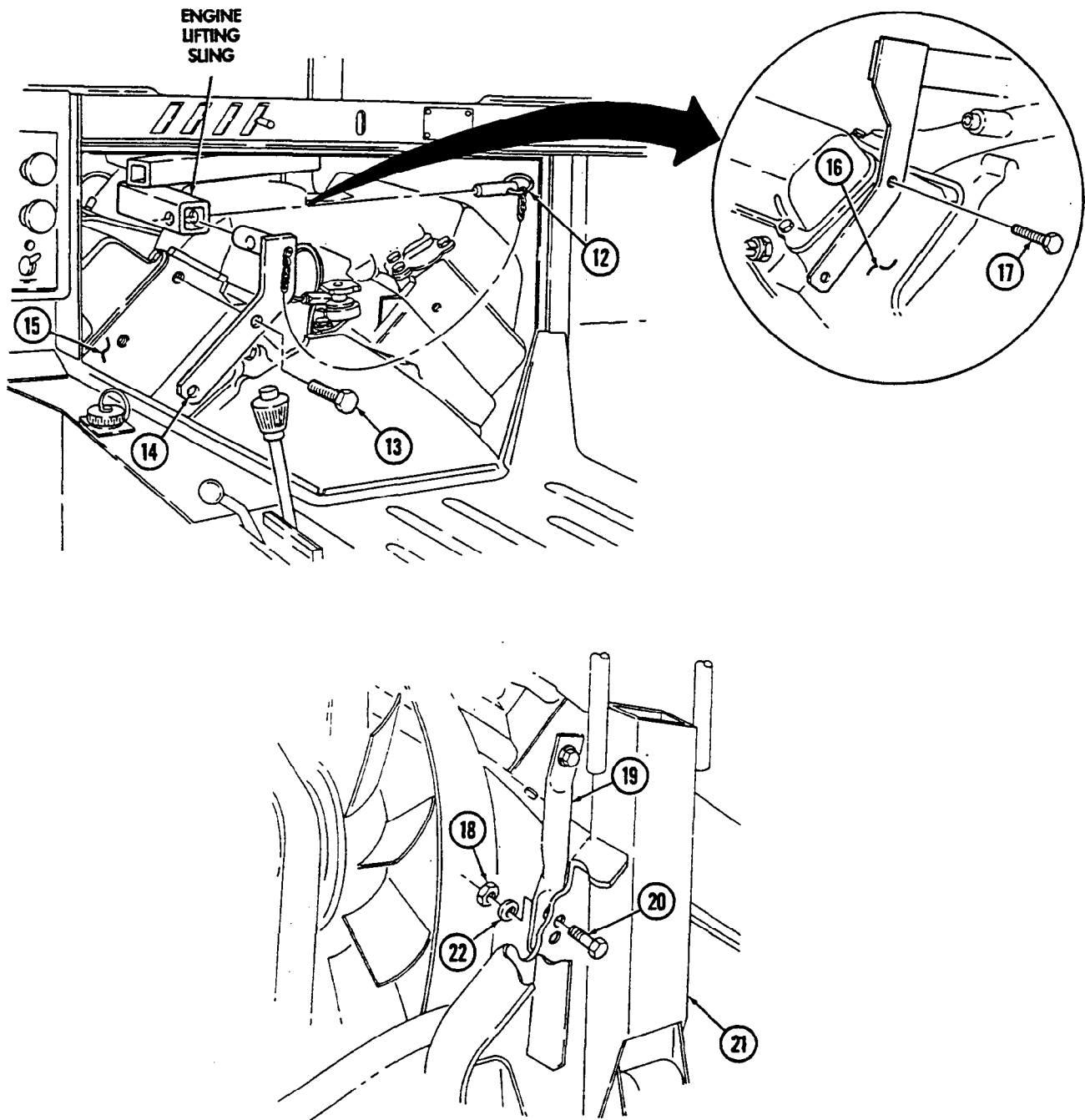
15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE (Cont'd)

d. Installation

1. Install engine mount (2) and insulator (9) on engine (3) with three lockwashers (4) and capscrews (5). Using 9/16-in. torque adapter, tighten capscrews (5) to 30-40 lb-ft (41-54 N·m).
2. Using crowfoot and adapter, tighten nut (11) to 24 lb-ft (33 N·m) on starter support bracket (1) and starter (10).
3. Lower engine (3) until insulator (9) is aligned and resting on engine mount bracket (6). Install two washers (8) and locknuts (7) on insulator (9) and engine mount bracket (6). Using 3/4-in. torque adapter, tighten locknuts (7) to 90 lb-ft (122 N·m).
4. Remove pin (12) from sling bracket (14) and engine lifting sling.
5. Remove two capscrews (13) and sling bracket (14) from left cylinder head (15).
6. Remove two capscrews (17) and engine lift sling from right cylinder head (16).
7. Install two radiator supports (19) on airlift brackets (21) with four capscrews (20), washers (22), and locknuts (18). Tighten capscrews (20) to 37 lb-ft (50 N·m).



15-3. ENGINE MOUNT AND INSULATOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install fuel pump (right engine mount only) (para. 3-24).
 - Install air horn support and engine lift bracket (para. 3-16).
 - Install right engine splash shield (para. 10-24).
 - Install engine access cover (para. 10-22).
 - Install front propeller shaft (left engine mount only) (para. 6-2).
 - Install glow plug controller (para. 4-33).

15-4. LEFT CYLINDER HEAD REPAIR

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Repair | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Gasket (Appendix G, Item 74)
Antiseize compound (Appendix C, Item 16)
Pipe sealing compound (Appendix C, Item 62)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P
TM 9-2815-237-34

Equipment Condition

- Fuel drain-back tube removed (para. 3-38).
- Alternator/power steering mounting bracket removed (para. 4-3).

Equipment Condition (Cont'd)

- Left exhaust manifold removed (para. 3-57).
- Left intake manifold removed (para. 15-16).
- Water crossover removed (para. 3-79).
- Rocker arm shafts and pushrods removed (para. 15-8).
- Fuel injection return hoses removed (para. 3-37).
- Fuel injection nozzles removed (para. 16-3).
- Glow plugs removed (para. 3-39).
- Oil pressure sending unit removed (para. 4-29).

General Safety Instructions

Cylinder head must be supported during removal and installation.

Maintenance Level

Direct support

WARNING

Cylinder head must be supported during removal and installation. Failure to support cylinder head may cause injury to personnel or damage to equipment.

a. Removal

1. Disconnect harness lead 33B (5) from engine temperature sending unit (4).

CAUTION

Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

2. Remove seventeen capscrews (2) from cylinder head (1) and cylinder block (6).
3. Remove cylinder head (1) and gasket (3) from cylinder block (6). Discard gasket (3).
4. For cylinder head (1) and valve repair procedures, notify general support (TM 9-2815-237-34).

b. Repair

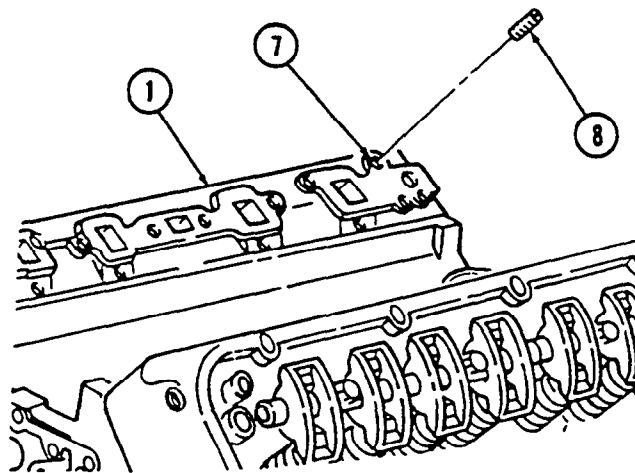
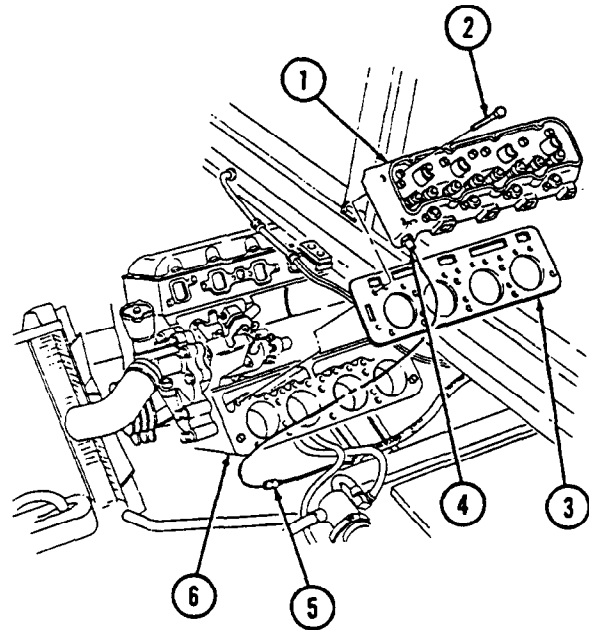
1. Extract broken portion of bolt (8) from cylinder head (1).

NOTE

If threaded hole cannot be repaired, the left cylinder head can be interchanged with the right cylinder head.

2. If threads are unserviceable, use threaded inserts to repair threaded hole (7) in cylinder head (1).

15-4. LEFT CYLINDER HEAD REPAIR (Cont'd)



15-4. LEFT CYLINDER HEAD REPAIR (Cont'd)

c. Installation

CAUTION

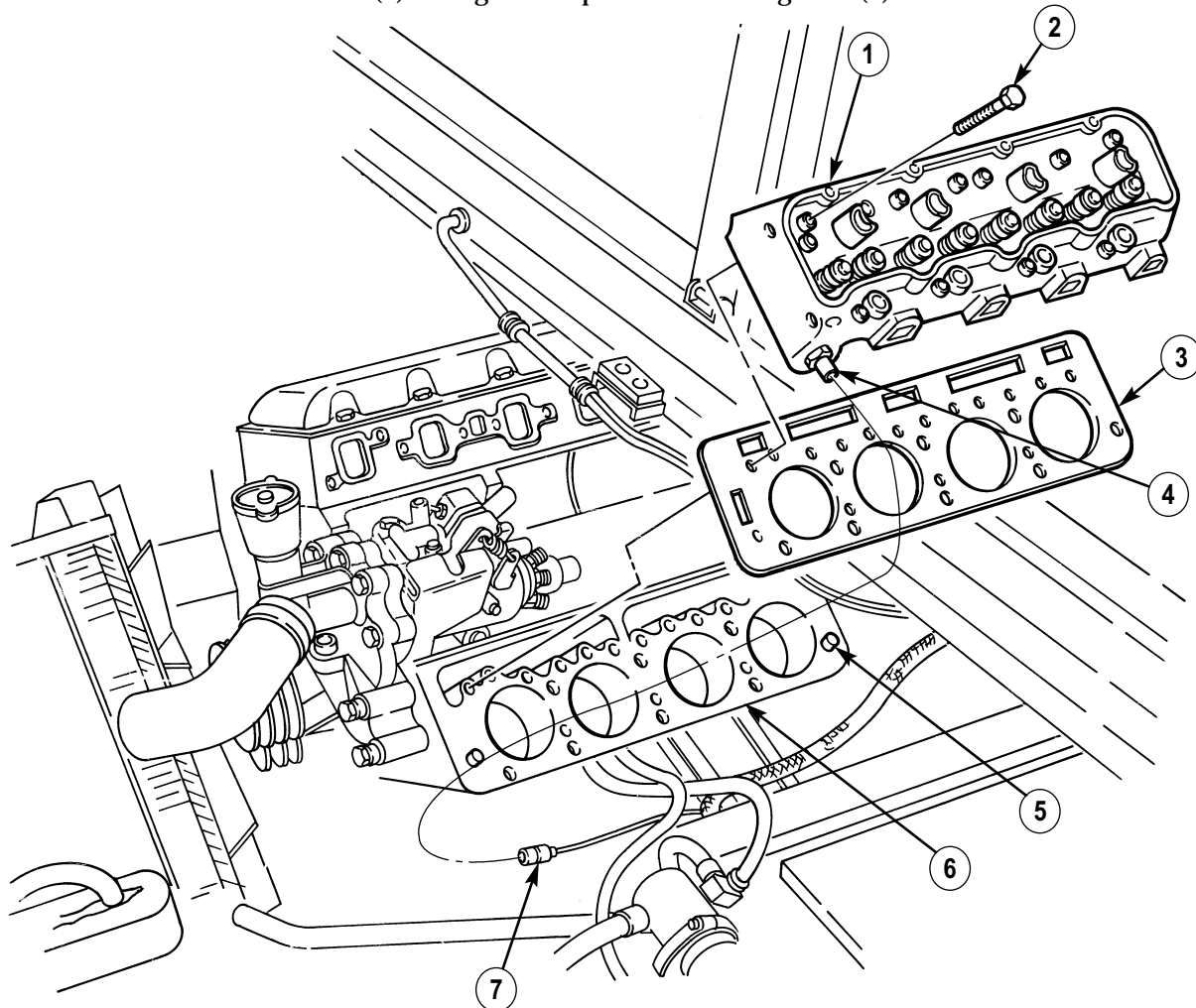
Head gasket must be used without a sealer. Sealant may cause leaks or damage to engine.

1. Install head gasket (3) over dowel pins (5) on cylinder block (6).
2. Apply pipe sealing compound to threads and under heads of seventeen capscrews (2).

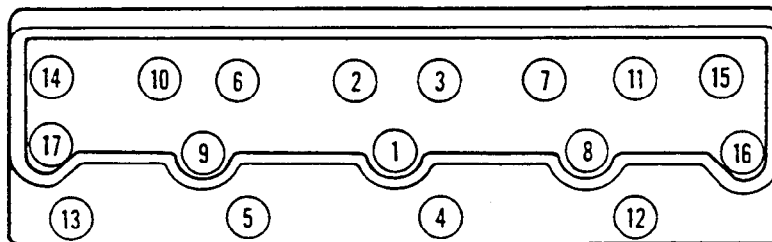
CAUTION

Failure to tighten cylinder head capscrews in proper torque sequence may result in leaks or damage to cylinder head.

3. Install cylinder head (1) on cylinder block (6) with seventeen capscrews (2). Tighten capscrews (2) to 20 lb-ft (27 N·m) following torque sequence.
4. Tighten seventeen capscrews (2) to 55 lb-ft (75 N·m) following torque sequence.
5. Retighten seventeen capscrews (2) to 55 lb-ft (75 N·m) following torque sequence shown.
6. Tighten seventeen capscrews (2) an additional 90° following torque sequence and mark capscrews (2).
7. Connect harness lead 33B (7) to engine temperature sending unit (4).



15-4. LEFT CYLINDER HEAD REPAIR (Cont'd)



TORQUE SEQUENCE

- FOLLOW-ON TASKS:**
- Install oil pressure sending unit (para. 4-29).
 - Install glow plugs (para. 3-39).
 - Install fuel injection nozzles (para. 16-3).
 - Install fuel injection return hoses (para. 3-37).
 - Install rocker arm shafts and pushrods (para. 15-8).
 - Install water crossover (para. 3-79).
 - Install left intake manifold (para. 15-16).
 - Install left exhaust manifold (para. 3-57).
 - Install alternator/power steering mounting bracket (para. 4-3).

15-5. RIGHT CYLINDER HEAD REPAIR

This task covers:

- a. Removal
- b. Repair

- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Gasket (Appendix G, Item 74)
Pipe sealing compound (Appendix C, Item 62)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2350-387-24P
TM 9-2815-237-34

Equipment Condition

- Right exhaust manifold removed (para. 3-57).
- Water crossover removed (para. 3-79).
- Right intake manifold removed (para. 15-17).
- Rocker arm shafts and pushrods removed (para. 15-8).
- Fuel injection return hoses removed (para. 3-37).
- Fuel injection nozzles removed (para. 16-3).
- Glow plugs removed (para. 3-39).

General Safety Instructions

Cylinder head must be supported during removal and installation.

Maintenance Level

Direct support

WARNING

Cylinder head must be supported during removal and installation. Failure to support cylinder head may cause injury to personnel or damage to equipment.

a. Removal

CAUTION

Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

1. Remove cold-advance switch (2) from cylinder head (1).
2. Remove seventeen capscrews (3) from cylinder head (1) and cylinder block (5).
3. Remove cylinder head (1) and gasket (6) from cylinder block (5). Discard gasket (6).
4. For cylinder head (1) and valve repair procedures, notify general support (TM 9-2815-237-34).

b. Repair

Refer to para. 15-4, task b., for extraction of broken bolts.

c. Installation

CAUTION

Head gasket must be used without a sealer. Sealant may cause leaks or damage to engine.

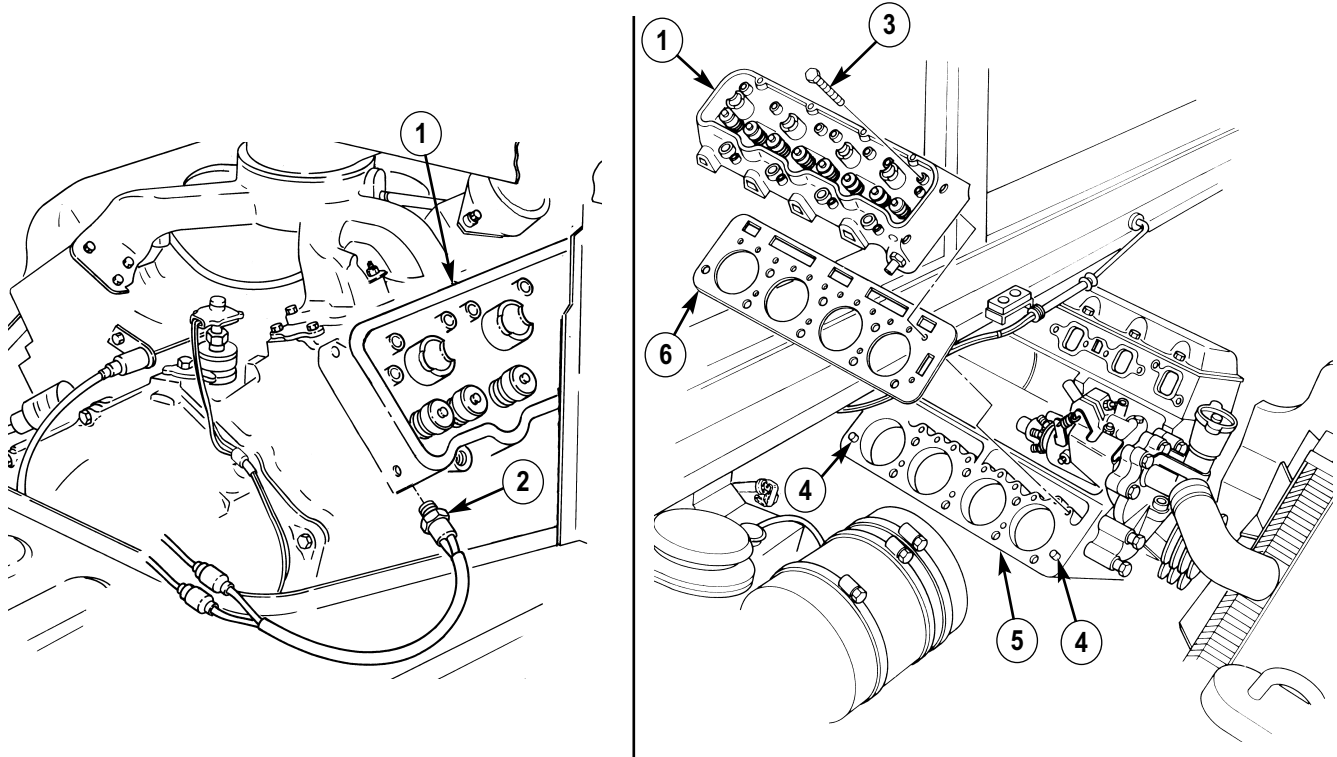
1. Install head gasket (6) over dowel pins (4) on cylinder block (5).
2. Apply pipe sealing compound to threads and under heads of seventeen capscrews (3).

CAUTION

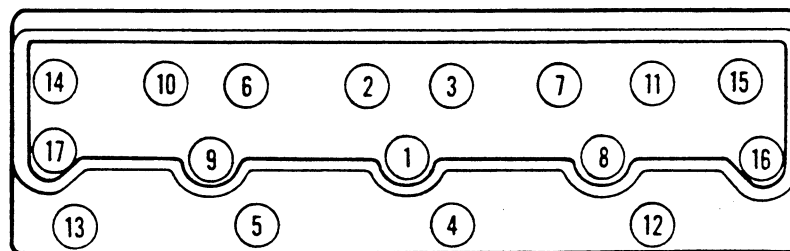
Failure to tighten cylinder head capscrews in proper torque sequence may result in leaks or damage to cylinder head.

15-5. RIGHT CYLINDER HEAD REPLACEMENT (Cont'd)

3. Install cylinder head (1) on cylinder block (5) with seventeen capscrews (3). Tighten capscrews (3) to 20 lb-ft (27 N·m) following torque sequence.
4. Tighten seventeen capscrews (3) to 55 lb-ft (75 N·m) following torque sequence.
5. Retighten seventeen capscrews (3) to 55 lb-ft (75 N·m), following torque sequence shown.
6. Tighten seventeen capscrews (3) an additional 90° following torque sequence and mark capscrews (3).
7. Install cold-advance switch (2) on cylinder head (1).



TORQUE SEQUENCE



- FOLLOW-ON TASKS:**
- Install fuel injection return hoses (para. 3-37).
 - Install rocker arm shafts and pushrods (para. 15-8).
 - Install right intake manifold (para. 15-17).
 - Install right exhaust manifold (para. 3-57).
 - Install water crossover (para. 3-79).
 - Install glow plugs (para. 3-39).
 - Install fuel injection nozzles (para. 16-3).

15-6. CRANKSHAFT PULLEY REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Sealing compound (Appendix C, Item 69)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

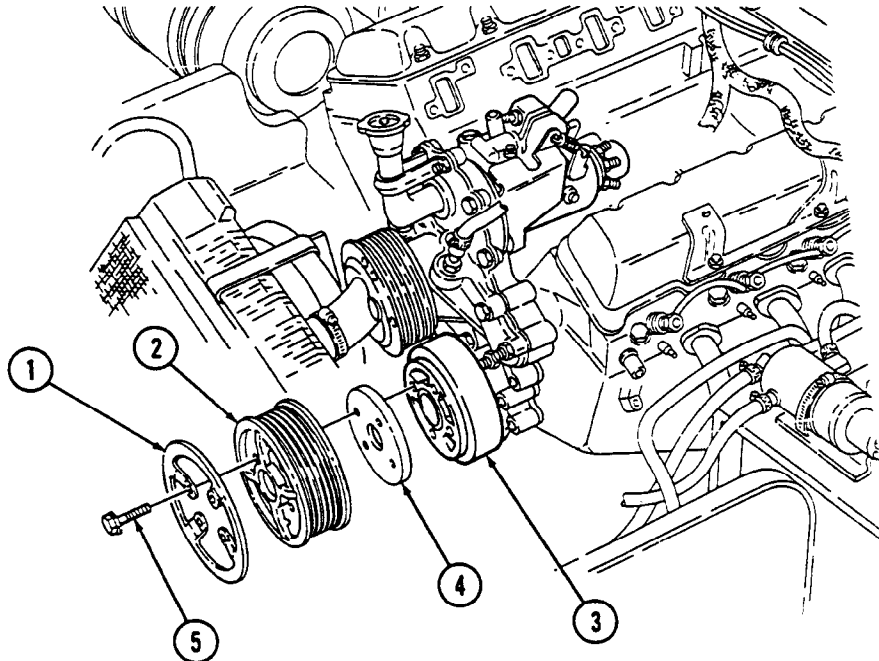
Direct support

a. Removal

1. Remove serpentine belt (para. 3-81).
2. Remove four capscrews (5), mudshield (1), crankshaft pulley (2), and spacer (4) from torsional damper (3).

b. Installation

1. Apply sealing compound to four capscrews (5).
2. Install spacer (4), crankshaft pulley (2), and mudshield (1) on torsional damper (3) with four capscrews (5). Tighten capscrews (5) to 48 lb-ft (65 N·m).
3. Install serpentine belt (para. 3-81).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

15-7. TORSIONAL DAMPER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Lubricating oil (Appendix C, Item 44)
Sealing compound (Appendix C, Item 69)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Crankshaft pulley removed (para. 15-6).

General Safety Instructions

Torsional damper must be supported during removal and installation.

Maintenance Level

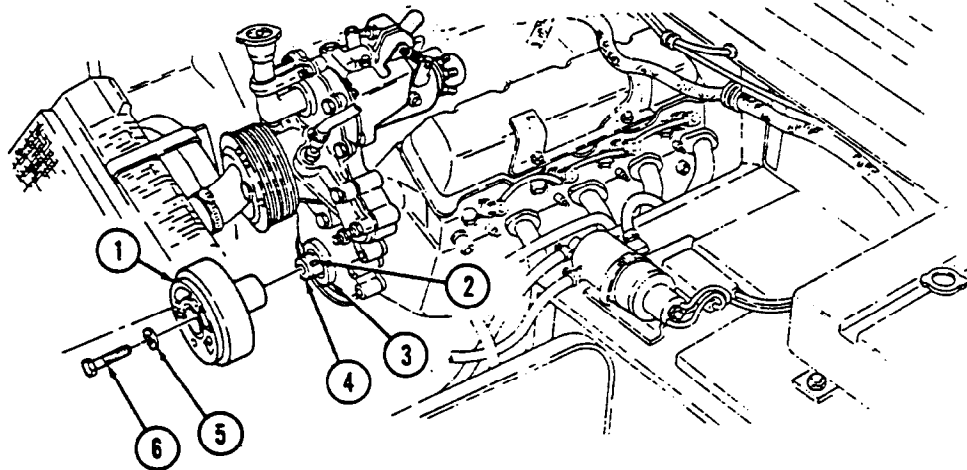
Direct support

WARNING

Torsional damper must be supported during removal and installation.
Failure to do this may cause injury to personnel or damage to equipment.

a. Removal

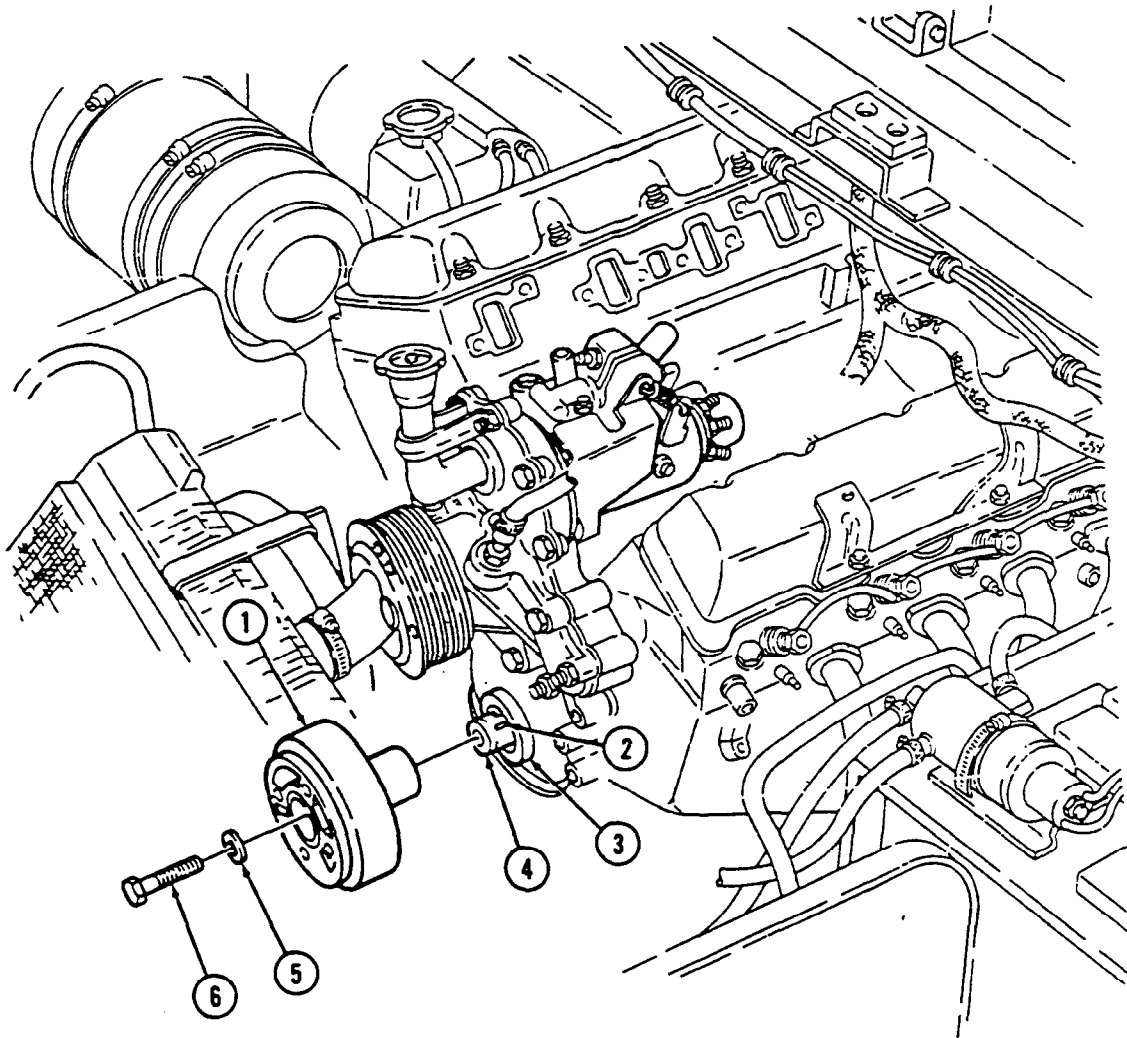
1. Remove capscrew (6) and washer (5) connecting torsional damper (1) to crankshaft (4).
2. Reinstall capscrew (6) and loosen torsional damper (1) from crankshaft (4) with puller.
3. Remove capscrew (6) and torsional damper (1) from crankshaft (4).
4. Inspect woodruff key (2) and front cover seal (3) for damage. Replace woodruff key (2) or front cover seal (3) (para. 15-10) if damaged.



15-7. TORSIONAL DAMPER REPLACEMENT (Cont'd)

b. Installation

1. Apply lubricating oil to seal (3) surface and torsional damper (1).
2. Align torsional damper (1) with woodruff key (2) and install torsional damper (1) on crankshaft (4) far enough to install washer (5) and capscrew (6). Secure torsional damper (1) with capscrew (6). Tighten capscrew (6) to 140-162 lb-ft (190-220 N·m).



- FOLLOW-ON TASKS:
- Install crankshaft pulley (para. 15-6).
 - Lower and secure hood (TM 9-2320-387-10).

15-8. ROCKER ARM SHAFTS AND PUSHRODS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Left or right rocker arm cover removed
(para. 15-11 or 15-12).

Manual References

TM 9-2320-387-24P

Maintenance Level

Direct support

a. Removal

1. Remove four capscrews (2) and retainers (3) from two arm rocker shaft assemblies (4) and cylinder head (5).

NOTE

Tag rocker arm shaft assemblies for assembly.

2. Remove two rocker arm shaft assemblies (4) from cylinder head (5).

NOTE

Tops of pushrods are hardened and must be tagged for assembly.

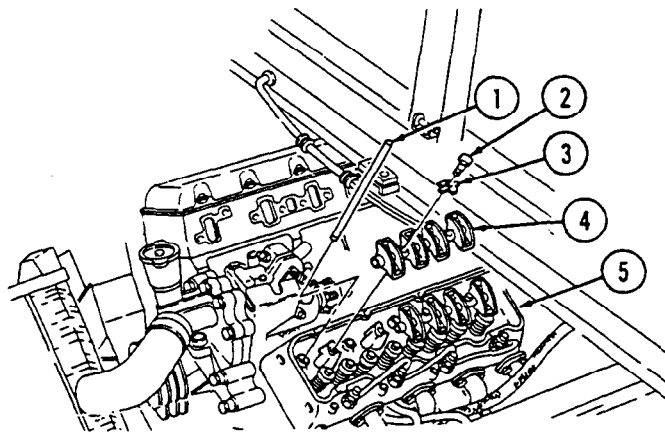
3. Remove eight pushrods (1) from cylinder head (5).

b. Installation

CAUTION

Marked ends of pushrods must point up when installed or engine damage may result.

1. Install eight pushrods (1) in cylinder head (5) in proper location with marked ends of pushrods (1) up. Ensure pushrods (1) properly seat in lifters.
2. Install two rocker arm shaft assemblies (4) on cylinder head (5). Ensure pushrods (1) properly seat in rocker arms (4).
3. Secure rocker arm shaft assemblies (4) with four retainers (3) and capscrews (2).
4. Tighten capscrews (2) to 41 lb-ft (56 N•m).



FOLLOW-ON TASK: Install left or right rocker arm cover (para. 15-11 or 15-12).

15-9. HYDRAULIC VALVE LIFTER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Hydraulic valve lifter remover
(Appendix B, Item 23)

Materials/Parts

Lubricating oil (Appendix C, Item 44)

Manual References

TM 9-2320-387-24P

Equipment Condition

Left or right cylinder head removed
(para. 15-4 or 15-5).

General Safety Instructions

Diesel fuel is flammable. Do not perform this
procedure near fire, flames, or sparks.

Maintenance Level

Direct support

a. Removal

1. Remove capscrew (1), guide plate clamp (2), and guide plate(s) (3) from cylinder block (5).

NOTE

Tag lifters for installation if more than one lifter is being removed.

2. Using hydraulic valve lifter remover, remove valve lifter(s) (4) from cylinder block (5).

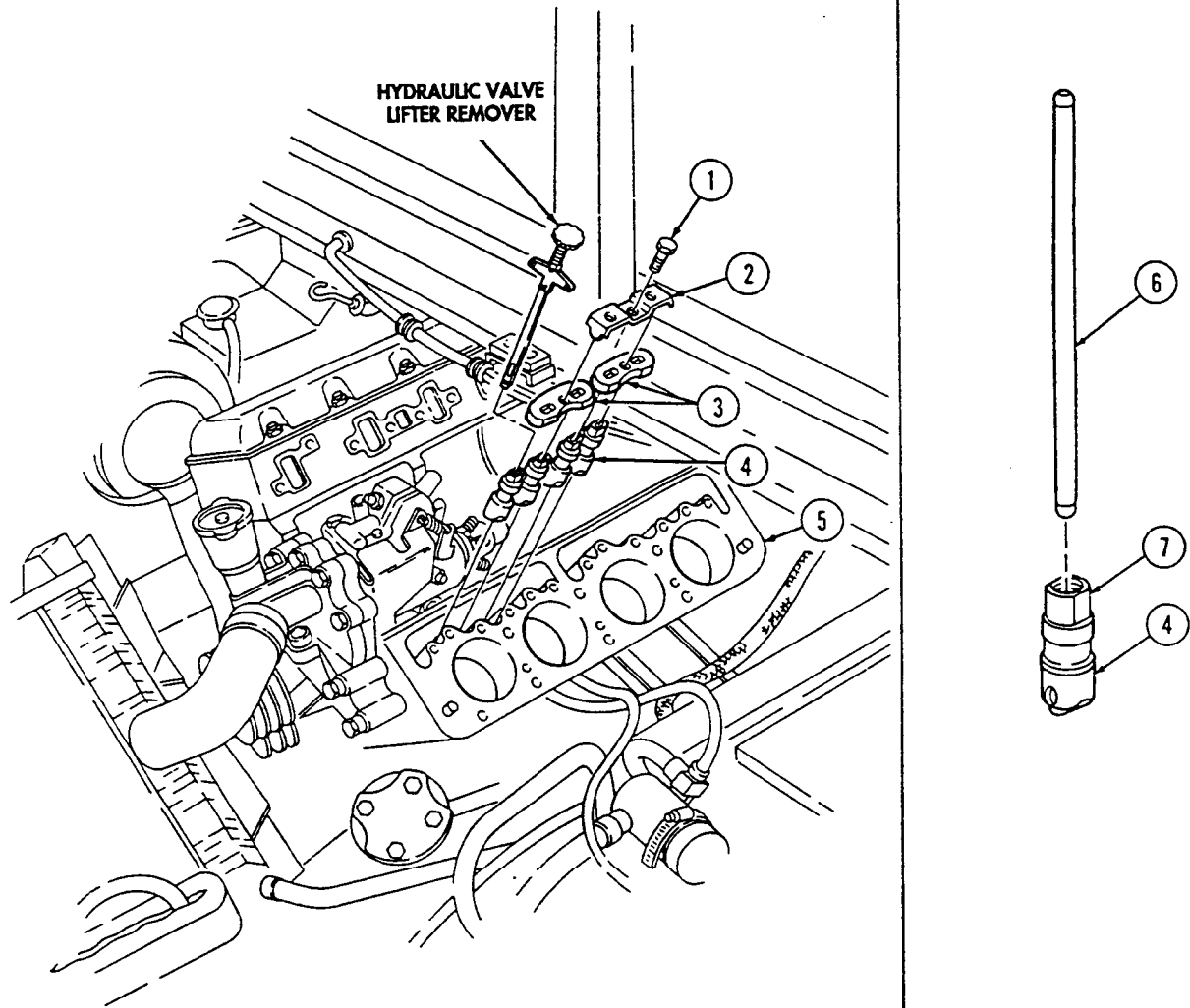
b. Installation

WARNING

Diesel fuel is flammable. Do not perform this procedure near fire,
flames, or sparks. Severe injury or death may result.

1. Prime lifter(s) (4) by submerging in clean diesel fuel or kerosene and working plunger (7) up and down on pushrod (6).
2. Apply lubricating oil to lifter(s) (4).
3. Install lifter(s) (4) into cylinder block (5).
4. Install guide plate(s) (3) on lifter(s) (4).
5. Install guide plate clamp (2) on cylinder block (5) with capscrew (1). Tighten capscrew (1) to 15-20 lb-ft (20-27 N•m).

15-9. HYDRAULIC VALVE LIFTER REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install left or right cylinder head (para. 15-4 or 15-5).

15-10. TIMING CHAIN COVER, TIMING CHAIN, AND DRIVE SPROCKETS MAINTENANCE

This task covers:

- | | |
|-------------------------------------|------------------------|
| <p>a. Removal
b. Inspection</p> | <p>c. Installation</p> |
|-------------------------------------|------------------------|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)

Materials/Parts

Gasket (Appendix G, Item 72)
 Three woodruff keys (Appendix G, Item 469)
 Sealant gasket set (Appendix C, Item 65)
 Lubricating oil (Appendix C, Item 44)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Torsional damper removed (para. 15-7).
- Water pump and adapter plate removed (para. 3-78).

Maintenance Level

Direct support

a. Removal

NOTE

In some cases, flanged-head fasteners may be present instead of standard fasteners and washers. In all cases, washers should be used when replacing a flanged-head fastener with a standard fastener.

1. Remove three capscrews (1) and driven gear (2) from injection pump (7).
2. Remove two capscrews (16), nut (3), and baffle (4) from timing chain cover (5).
3. Remove three nuts (9) and washers (8) from injection pump (7) and timing chain cover (5).
4. Remove four capscrews (11) from timing chain cover (5) and oil pan (12).
5. Remove five capscrews (14), four washers (13), timing chain cover (5), and gasket (6) from cylinder block (10). Discard gasket (6).

NOTE

When measuring timing chain deflection, slack should be removed from one side before measurement is taken on opposite side.

6. Using dial indicator, check deflection of timing chain (21) midway between camshaft sprocket (20) and crankshaft sprocket (27). Total deflection must not exceed 0.810 in. (20.6 mm). If deflection exceeds specification, timing chain (21) must be replaced.
7. Using dial indicator, check end play of camshaft (22). End play must not be more than 0.012 in. (0.3 mm). If end play exceeds specification, camshaft sprocket (20) and thrust plate (24) must be inspected for wear after removal.
8. Remove capscrew (17), washer (18), pump drive gear (19), and camshaft sprocket (20) from camshaft (22).
9. Remove crankshaft sprocket (27), camshaft sprocket (20), and timing chain (21) as an assembly.

NOTE

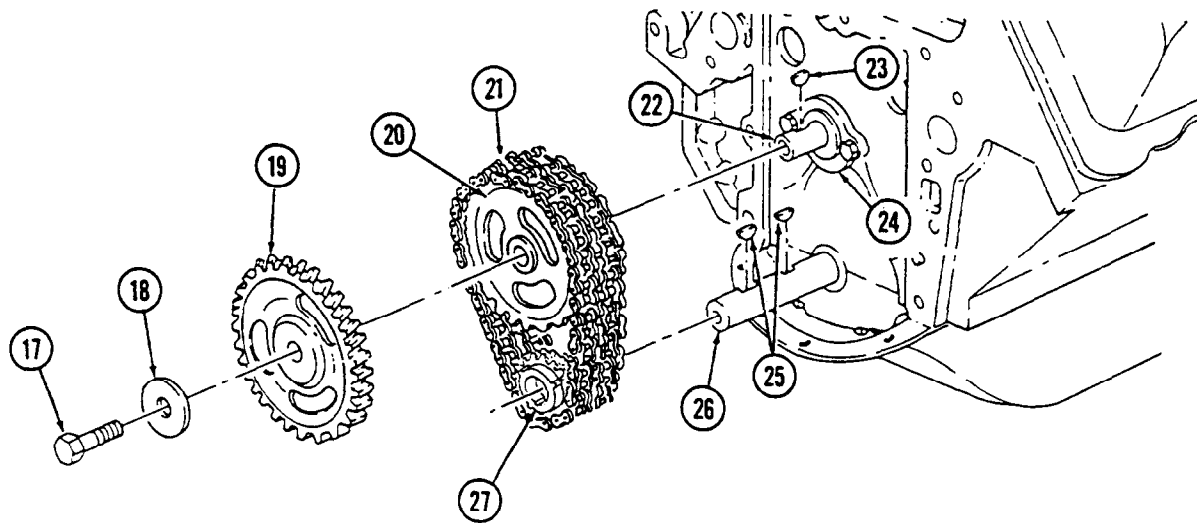
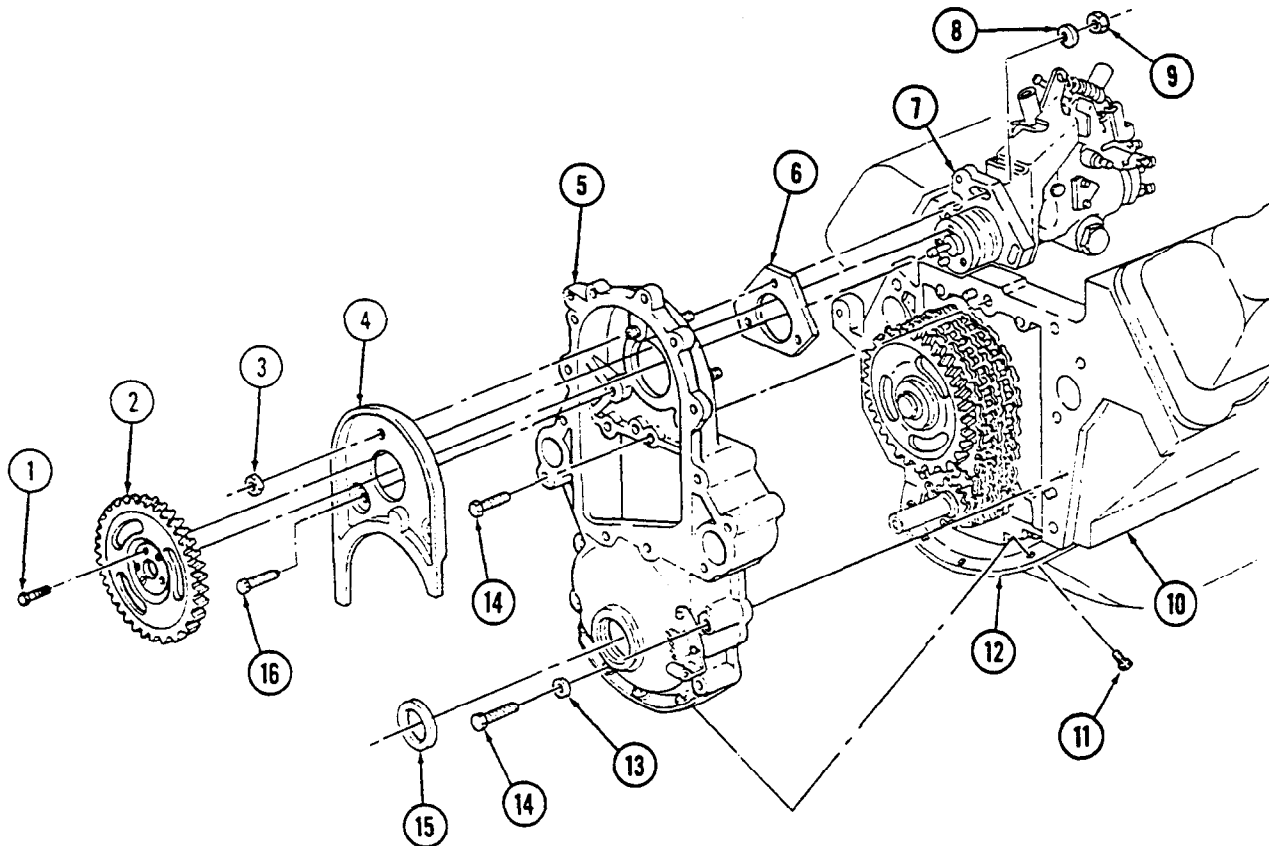
Cover oil pan opening to prevent woodruff keys from falling into oil pan.

10. Remove two woodruff keys (25) from crankshaft (26) and woodruff key (23) from camshaft (22). Discard woodruff keys (25) and (23).

15-10. TIMING CHAIN COVER, TIMING CHAIN, AND DRIVE SPROCKETS MAINTENANCE
(Cont'd)

b. Inspection

Inspect front cover oil seal (15). Replace seal (15) (para. 15-13) if cracked, broken, or deteriorated.



15-10. TIMING CHAIN COVER, TIMING CHAIN, AND DRIVE SPROCKETS MAINTENANCE (Cont'd)

c. Installation

1. Install woodruff key (8) in camshaft (7) and two woodruff keys (9) in crankshaft (10).
2. Install crankshaft sprocket (11) and camshaft sprocket (5) in timing chain (6) and align timing marks (12).
3. Rotate crankshaft (10) and camshaft (7) so woodruff keys (8) and (9) align with keyway slots in crankshaft sprocket (11) and camshaft sprocket (5).

CAUTION

Timing marks on crankshaft sprocket and camshaft sprocket must remain aligned after installation or engine damage may result.

4. Install crankshaft sprocket (11), camshaft sprocket (5), and timing chain (6) as an assembly onto camshaft (7) and crankshaft (10).
5. Install pump drive gear (3) on camshaft (7) with timing mark (4) at 0 degrees with washer (2) and capscrew (1). Tighten capscrew (1) to 55-66 lb-ft (75-90 N·m).
6. Apply lubricating oil to timing chain (6).

NOTE

Perform step 7 only if timing chain was replaced.

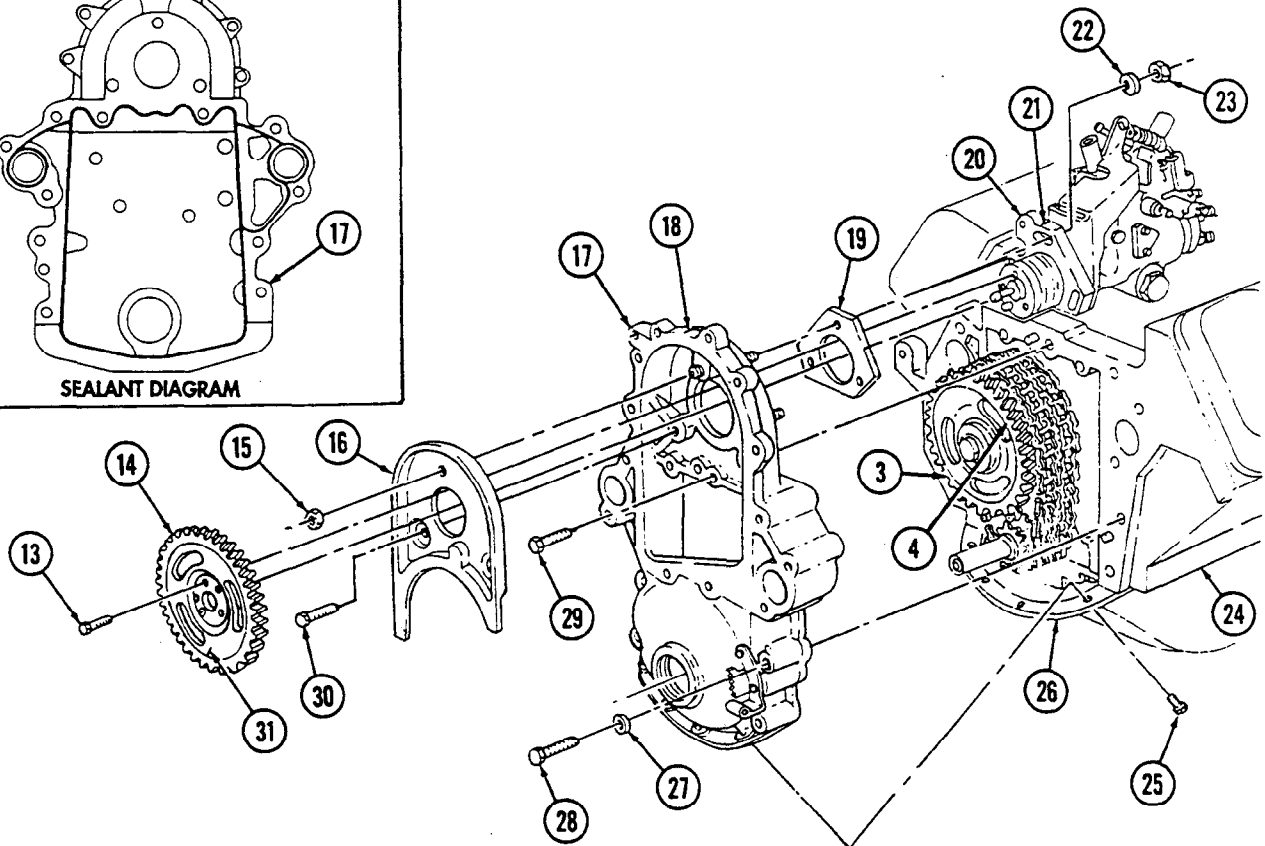
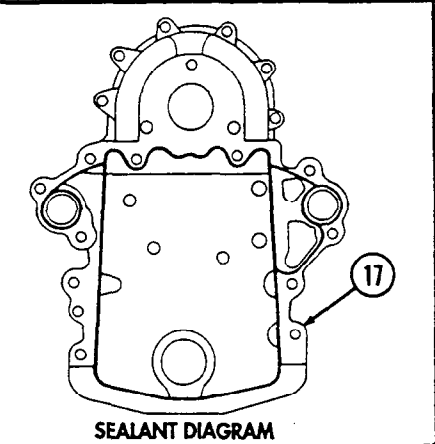
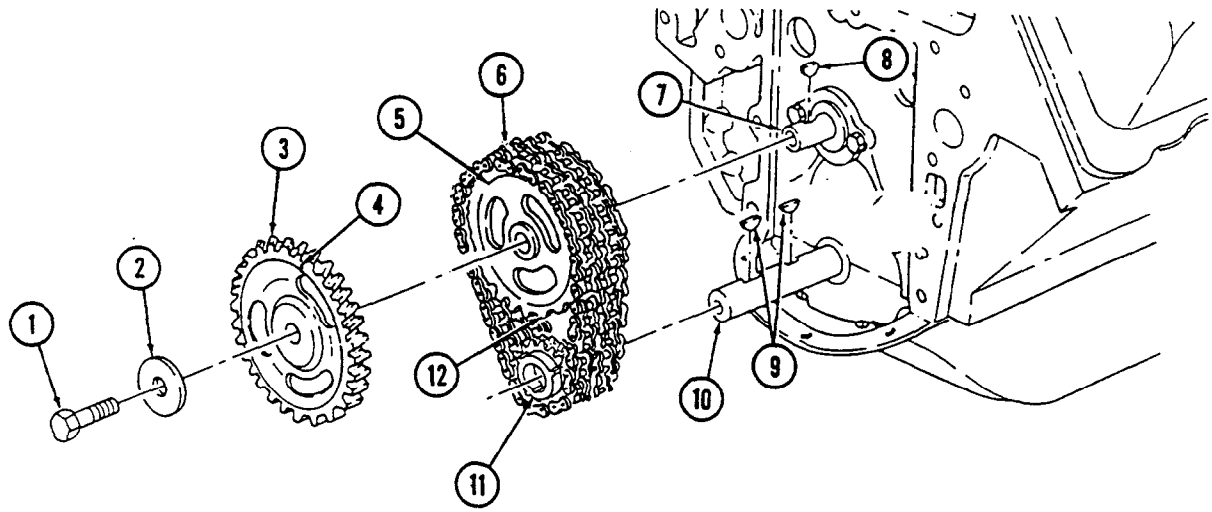
7. Using dial indicator, check deflection of timing chain (6) midway between camshaft sprocket (5) and crankshaft sprocket (11). Total deflection must not exceed 0.5 in. (12.7 mm). If deflection exceeds specification, inspect camshaft sprocket (5) and crankshaft sprocket (11) for damage. Replace either if damaged and recheck deflection.
8. Apply a 0.094 in. (2.4 mm) bead of sealant to sealing surface on timing chain cover (17), following sealant diagram.
9. Install gasket (19) and timing chain cover (17) on cylinder block (24) with four washers (27), capscrews (28), and short capscrew (29). Tighten four capscrews (28) and short capscrew (29) to 33 lb-ft (45 N·m).
10. Secure timing chain cover (17) to oil pan (26) with four capscrews (25). Tighten capscrews (25) to 4-10 lb-ft (5-14 N·m).

CAUTION

Maintain 0.040 in. (1.02 mm) minimum clearance between baffle plate and pump drive gear to avoid noise.

11. Install baffle plate (16) in timing chain cover (17) with two capscrews (30) and nut (15). Tighten capscrews (30) and nut (15) to 33 lb-ft (45 N·m).
12. Align timing mark (21) on injection pump (20) with timing mark (18) on timing chain cover (17) and install three washers (22) and nuts (23).
13. Align timing mark (31) on driven gear (14) with timing mark (4) on drive gear (3) and install three capscrews (13). Tighten capscrews (13) to 15-20 lb-ft (20-27 N·m).

**15-10. TIMING CHAIN COVER, TIMING CHAIN, AND DRIVE SPROCKETS MAINTENANCE
(Cont'd)**



- FOLLOW-ON TASKS:**
- Install water pump and adapter plate (para. 3-78).
 - Install torsional damper (para. 15-7).

15-11. LEFT ROCKER ARM COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Fuel injection lines removed (para. 16-4).
- Left fuel injection lines bracket removed (para. 3-41).

Materials/Parts

Valve cover gasket (Appendix G, Item 97)
RTV sealant (Appendix C, Item 74)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

a. Removal

NOTE

In some cases, flanged-head fasteners may be present instead of standard fasteners and washers. In all cases, washers should be used when replacing a flanged-head fastener with a standard fastener.

1. Remove nut (2), washer (1), clamp (8), and fuel drain-back tube (9) from rocker arm cover stud (3).
2. Remove a combination of five capscrews (5), three studs (3), eight washers (6), and rocker arm cover (4) from cylinder head (7).

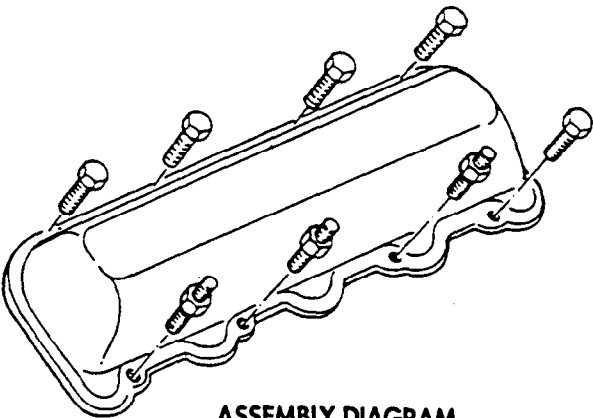
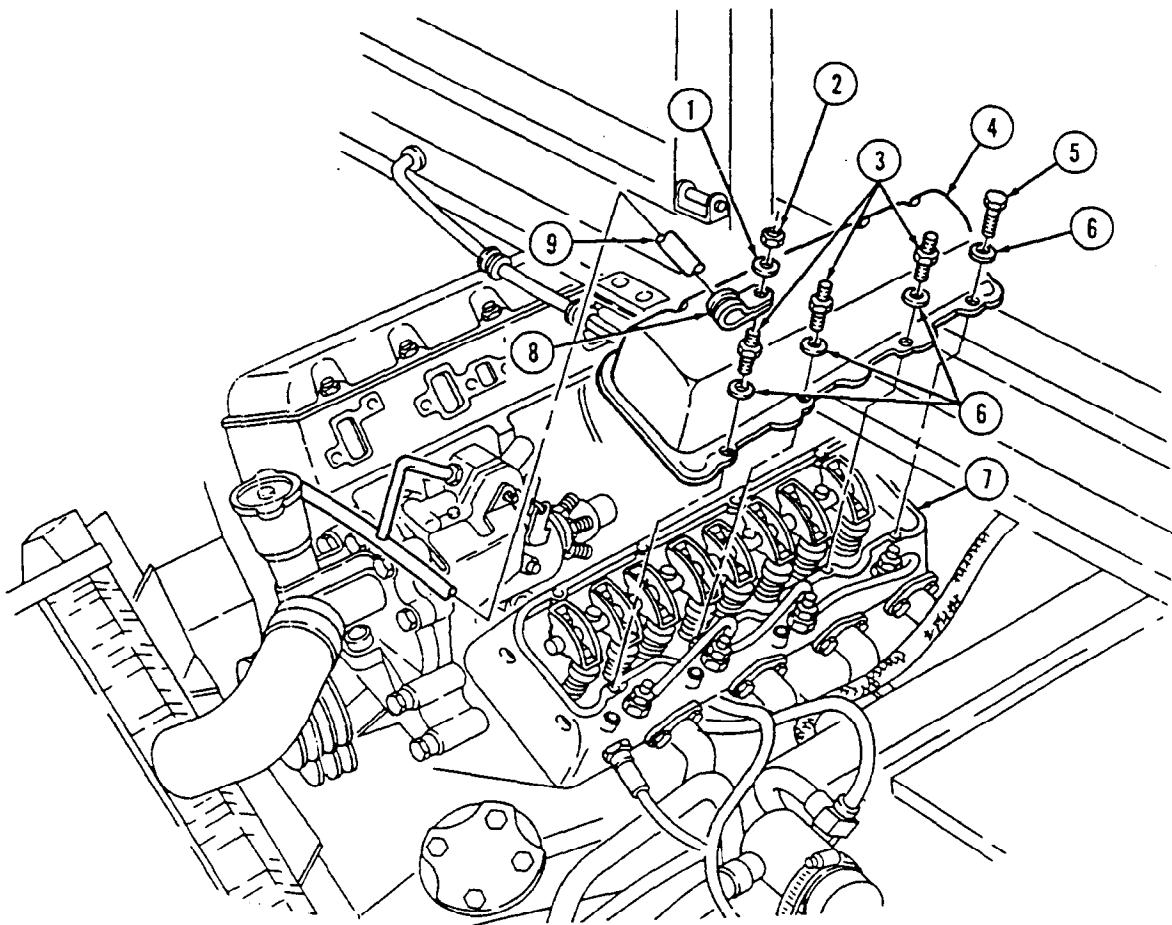
b. Installation

NOTE

- When applying RTV sealant, keep sealant out of capscrew holes.
- During installation, RTV sealant or new gasket is approved.
- If applying RTV sealant, perform step 1.
- If installing new gasket, RTV sealant may be applied with the gasket, but is not required.

1. Apply a .06 in. (1.5 mm) bead of RTV sealant around rocker arm cover (4) sealing surface.
2. Install rocker arm cover (4) on cylinder head (7) with eight washers (6), five capscrews (5), and three studs (3), following assembly diagram.
3. Tighten capscrews (5) and studs (3) to 15-25 lb-ft (20-34 N•m).
4. Install fuel drain-back tube (9) and clamp (8) on stud (3) with washer (1) and nut (2).

15-11. LEFT ROCKER ARM COVER REPLACEMENT (Cont'd)



ASSEMBLY DIAGRAM

- FOLLOW-ON TASKS:**
- Install left fuel injection lines bracket (para. 3-41).
 - Install fuel injection lines (para. 16-4).

15-12. RIGHT ROCKER ARM COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Valve cover gasket (Appendix G, Item 97)
RTV sealant (Appendix C, Item 74)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Engine access cover removed (para. 10-22).
- Fuel injection lines removed (para. 16-4).
- Right fuel injection lines bracket removed (para. 3-40).
- CDR valve and bracket removed (para. 3-9).
- Heater outlet/inlet piping removed (para. 10-71).

Maintenance Level

Direct support

a. Removal

NOTE

In some cases, flanged-head fasteners may be present instead of standard fasteners and washers. In all cases, washers should be used when replacing a flanged-head fastener with a standard fastener.

1. Remove capscrew (10) and transmission oil dipstick tube (11) from cylinder head (9).
2. Remove nut (4), washer (5), clamp (3), and fuel drain-back tube (8) from rocker arm cover stud (7).
3. Remove capscrew (2), seven studs (7), eight washers (1), and rocker arm cover (6) from cylinder head (9).

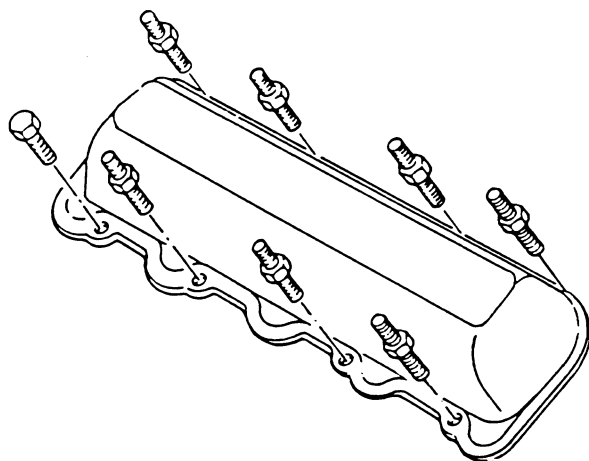
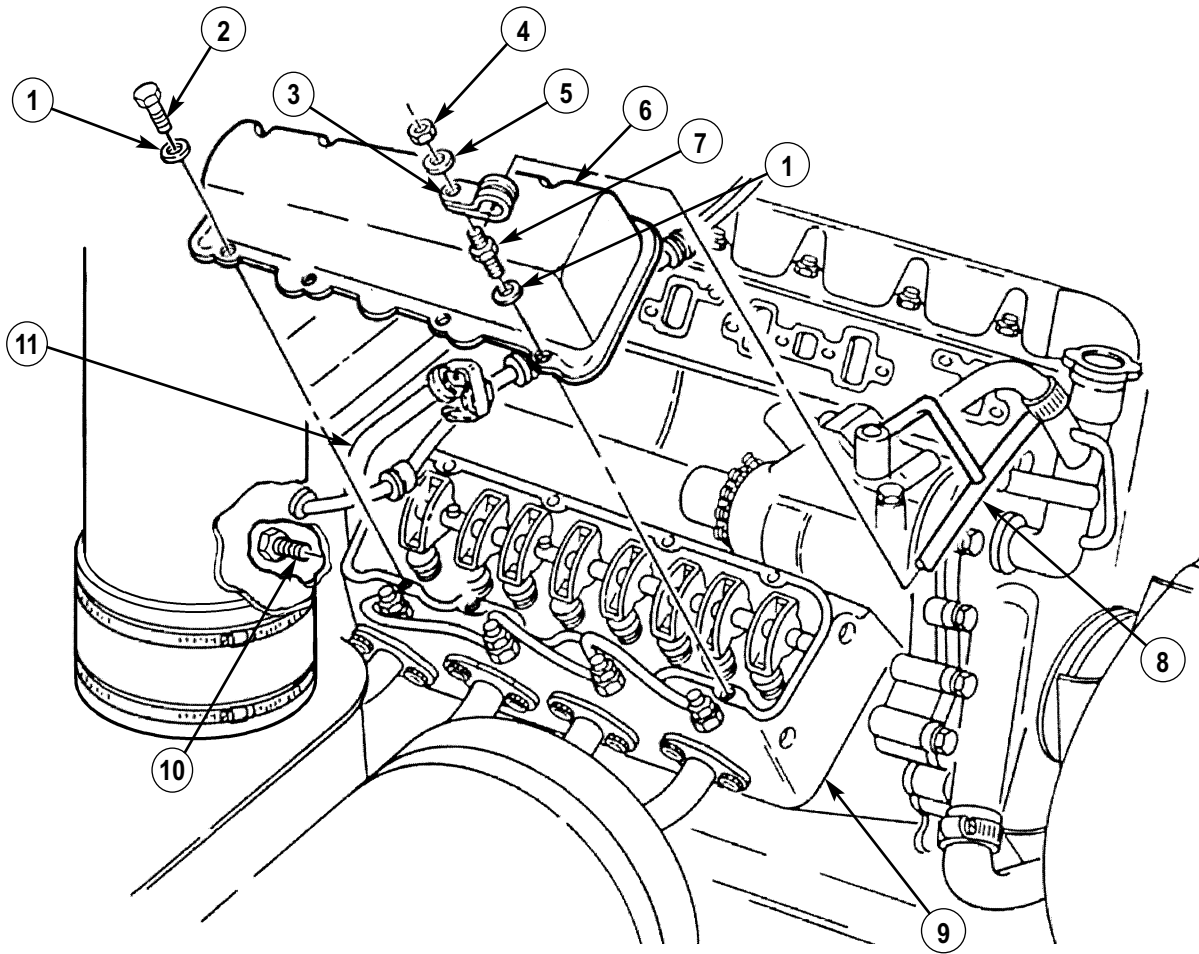
b. Installation

NOTE

- When applying RTV sealant, keep sealant out of capscrew holes.
- During installation, RTV sealant or new gasket is approved.
- If applying RTV sealant, perform step 1.
- If installing new gasket, RTV sealant may be applied with the gasket, but is not required.

1. Apply a 0.06 in. (1.5 mm) bead of RTV sealant around rocker arm cover (6) sealing surface.
2. Install rocker arm cover (6) on cylinder head (9) with eight washers (1), capscrew (2), and seven studs (7), following assembly diagram.
3. Tighten capscrew (2) and studs (7) to 15-25 lb-ft (20-34 N·m).
4. Install fuel drain-back tube (8) and clamp (3) on stud (7) with washer (5) and nut (4).
5. Install transmission oil dipstick tube (11) on cylinder head (9) with capscrew (10). Tighten capscrew (10) to 25-37 lb-ft (34-50 N·m).

15-12. RIGHT ROCKER ARM COVER REPLACEMENT (Cont'd)



ASSEMBLY DIAGRAM

- FOLLOW-ON TASKS:**
- Install heater outlet/inlet piping (para. 10-71).
 - Install CDR valve and bracket (para. 3-9).
 - Install right fuel injection lines bracket (para. 3-40).
 - Install fuel injection lines (para. 16-4).
 - Install engine access cover (para. 10-22).

15-13. FRONT COVER OIL SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Seal (Appendix G, Item 398)

Manual References

TM 9-2320-387-24P

Equipment Condition

Torsional damper removed (para. 15-7).

Maintenance Level

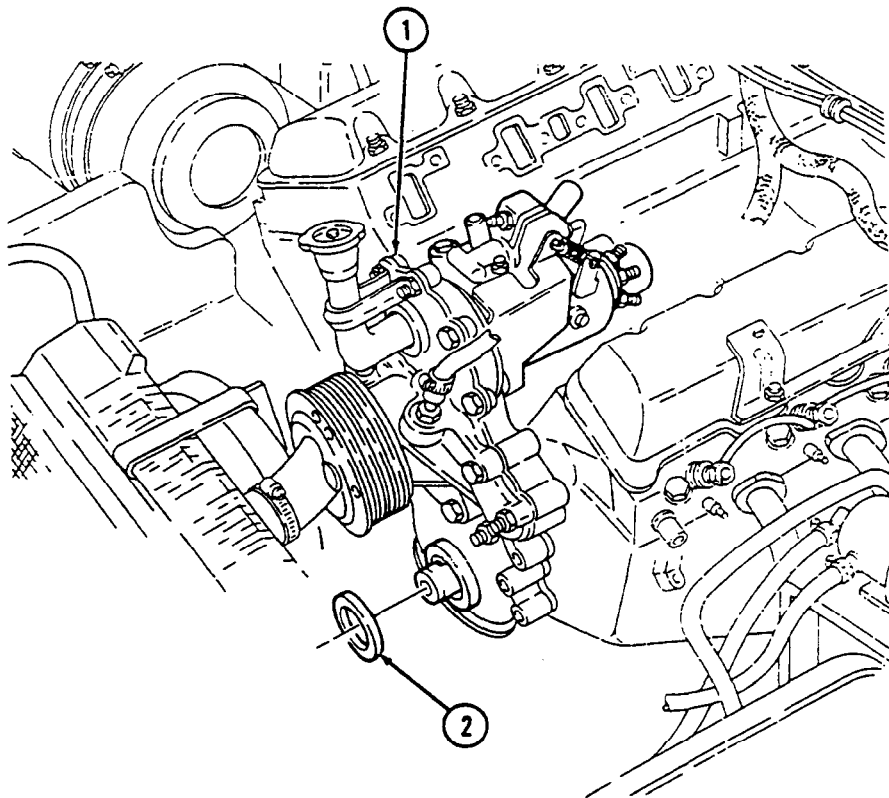
Direct support

a. Removal

Remove front cover seal (2) from timing chain cover (1). Discard front cover seal (2).

b. Installation

Install front cover seal (2) on timing chain cover (1), ensuring lip of seal (2) faces inward.



FOLLOW-ON TASK: Install torsional damper (para. 15-7).

15-14. OIL PUMP DRIVE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Turbocharger removed (para. 15-21).

Materials/Parts

Gasket (Appendix G, Item 80)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

a. Removal

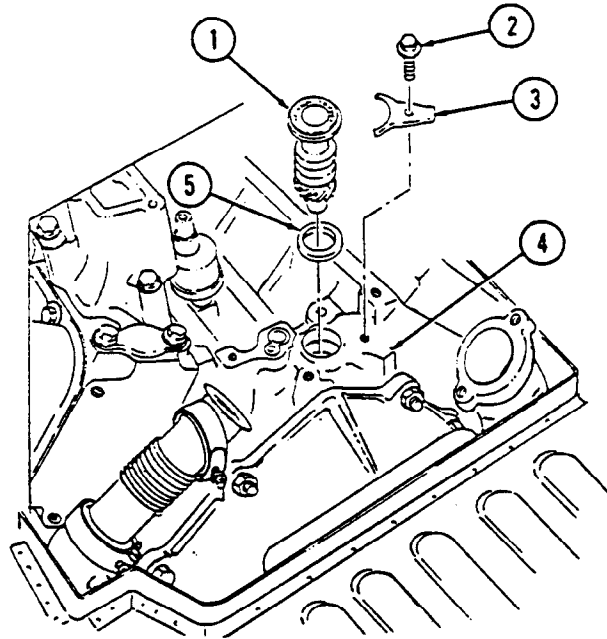
NOTE

Prying may be performed around head of oil pump drive to assist in loosening oil pump drive for removal.

1. Remove capscrew (2) and clamp (3) from engine cylinder block (4).
2. Remove oil pump drive (1) and gasket (5) from engine cylinder block (4). Discard gasket (5).

b. Installation

1. Install gasket (5) and oil pump drive (1) in engine cylinder block (4).
2. Secure oil pump drive (1) to engine cylinder block (4) with clamp (3) and capscrew (2). Tighten capscrew (2) to 25-37 lb-ft (34-50 N·m).



- FOLLOW-ON TASKS:**
- Install turbocharger (para. 15-21).
 - Connect battery ground cables (para. 4-68).

15-15. OIL PUMP MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Oil pan removed (para. 3-6).

Manual References

TM 9-2320-387-24P

Maintenance Level

Direct support

a. Removal

1. Remove nut (6) from pickup tube bracket (4) and stud (7).
2. Loosen capscrew (3) from bracket (4) and oil pickup tube (5) and slide bracket (4) off stud (7).
3. Remove stud (7) from oil pump (8) and rear main bearing cap (2).
4. Remove oil pump (8) and shaft (9) from cylinder block (1).
5. Remove capscrew (3) and bracket (4) from oil pickup tube (5).

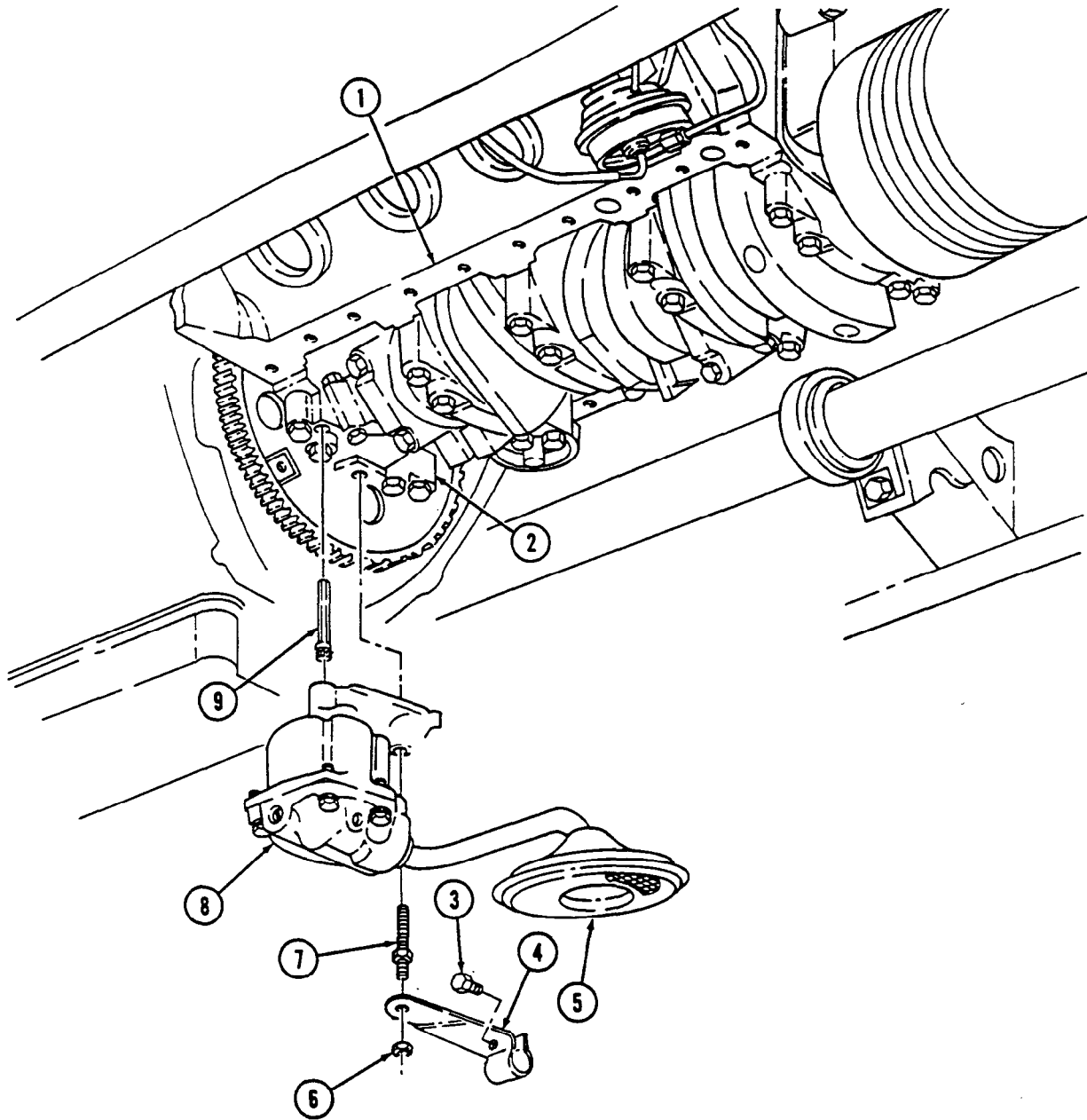
b. Inspection

Inspect shaft (9) for damage. Replace oil pump (8) if damaged.

c. Installation

1. Install bracket (4) on oil pickup tube (5) with capscrew (3). Finger-tighten capscrew (3).
2. Install oil pump (8) and shaft (9) on cylinder block (1).
3. Install stud (7) on oil pump (8) and rear main bearing cap (2) and tighten to 59-74 lb-ft (80-100 N·m).
4. Install bracket (4) on stud (7) with nut (6). Tighten nut (6) to 35 lb-ft (47 N·m).
5. Tighten capscrew (3) to 12 lb-ft (16 N·m).

15-15. OIL PUMP MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install oil pan (para. 3-6).

15-16. LEFT INTAKE MANIFOLD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Air horn removed (para. 3-14).
- Intake crossover removed (para. 15-20).

Materials/Parts

Intake manifold gasket (Appendix G, Item 75)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

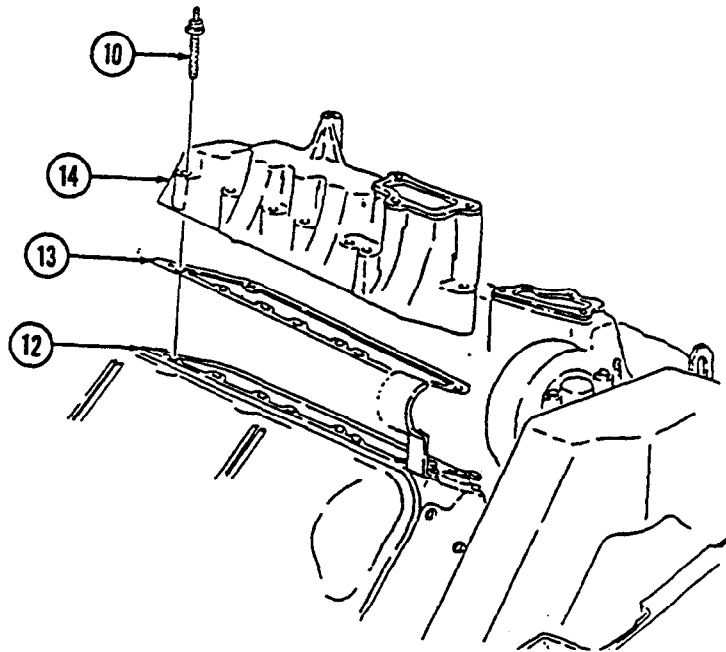
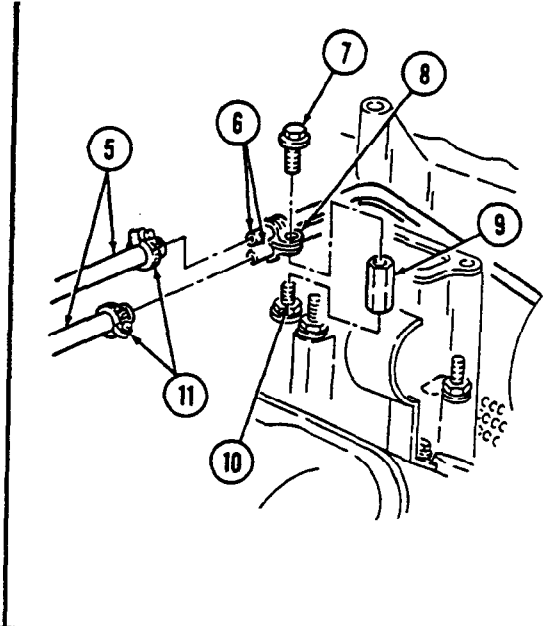
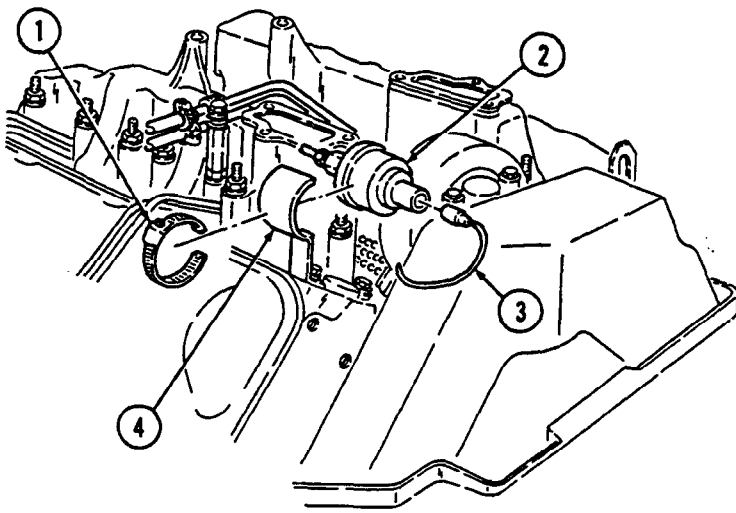
a. Removal

1. Remove clamp (1) and oil pressure sending unit (2) from bracket (4). Disconnect lead (3) and move sending unit (2) out of the way.
2. Loosen two fuel hose clamps (11) and disconnect fuel hoses (5) from fuel lines (6).
3. Remove capscrew (7) and two fuel line clamps (8) from stud nut (9) and move fuel lines (6) out of the way.
4. Remove stud nut (9) from stud (10).
5. Remove eight studs (10) from intake manifold (14).
6. Remove intake manifold (14) and gasket (13) from cylinder head (12). Discard gasket (13).
7. Clean mating surfaces of cylinder head (12) and intake manifold (14).

b. Installation

1. Install gasket (13) and intake manifold (14) on cylinder head (12) with eight studs (10).
2. Tighten studs (10), beginning at center of intake manifold (14) and working toward ends, to 30 lb-ft (41 N·m).
3. Install stud nut (9) on stud (10).
4. Install two fuel lines (6) and fuel line clamps (8) on stud nut (9) with capscrew (7).
5. Connect two fuel hoses (5) on fuel lines (6) and tighten clamps (11).
6. Install oil pressure sending unit (2) on bracket (4) with clamp (1). Connect lead (3) to sending unit (2).

15-16. LEFT INTAKE MANIFOLD REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install intake crossover (para. 15-20).
 - Install air horn (para. 3-14).

15-17. RIGHT INTAKE MANIFOLD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Intake manifold gasket (Appendix G, Item 75)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Air horn removed (para. 3-14).
- Intake crossover removed (para. 15-20).
- CDR valve and bracket removed (para. 3-9).
- Wastegate actuator removed (para. 15-19).

Maintenance Level

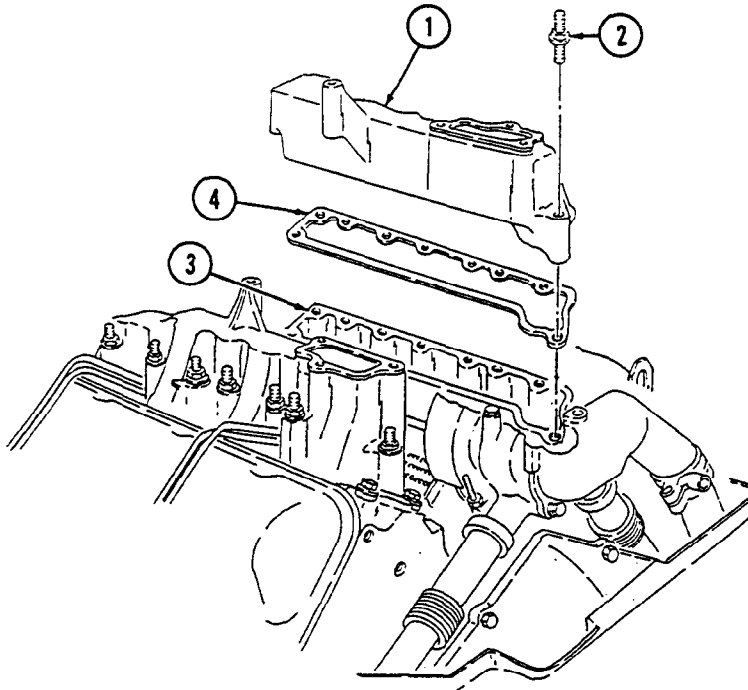
Direct support

a. Removal

1. Remove eight intake manifold studs (2) from intake manifold (1).
2. Remove intake manifold (1) and gasket (4) from cylinder head (3). Discard gasket (4).
3. Clean mating surfaces of cylinder head (3) and manifold (1).

b. Installation

1. Install gasket (4) and intake manifold (1) on cylinder head (3) with eight studs (2).
2. Tighten studs (2), beginning at center of intake manifold (1) and working toward ends, to 30 lb-ft (41 N·m).



- FOLLOW-ON TASKS:**
- Install wastegate actuator (para. 15-19).
 - Install CDR valve and bracket (para. 3-9).
 - Install intake crossover (para. 15-20).
 - Install air horn (para. 3-14).

15-18. WASTEGATE HOUSING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two lockwashers (Appendix G, Item 198)

Manual References

TM 9-2320-387-24P

Equipment Condition

Wastegate actuator removed (para. 15-19).

Maintenance Level

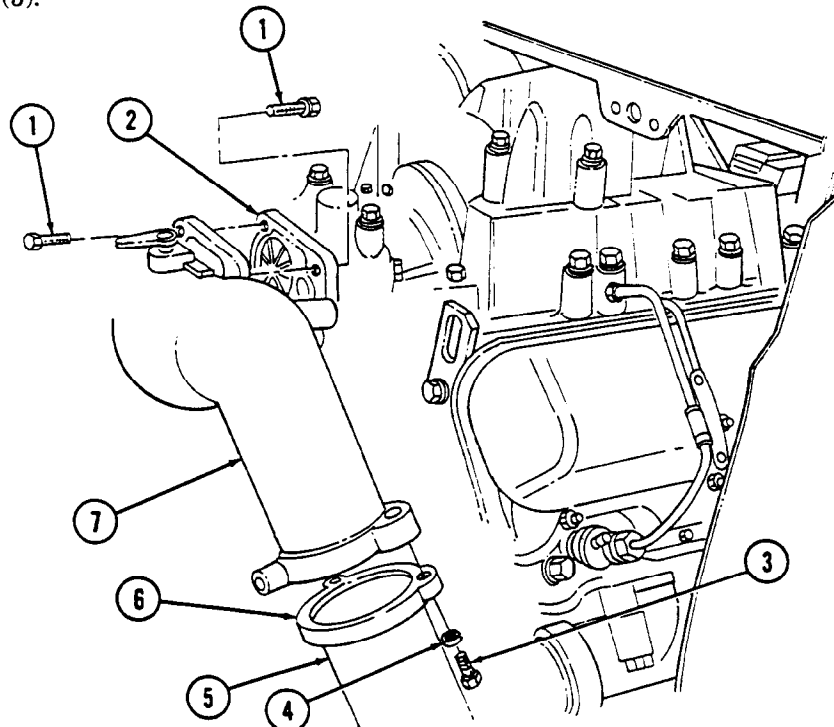
Direct support

a. Removal

1. Remove two capscrews (3), lockwashers (4), flange (6), and exhaust pipe (5) from wastegate housing (7). Discard lockwashers (4).
2. Remove four capscrews (1) and wastegate housing (7) from turbocharger (2).
3. Clean mating surfaces on turbocharger (2) and wastegate housing (7).

b. Installation

1. Install wastegate housing (7) on turbocharger (2) with four capscrews (1).
2. Install flange (6) and exhaust pipe (5) on wastegate housing (7) with two lockwashers (4) and capscrews (3).



FOLLOW-ON TASK: Install wastegate actuator (para. 15-19).

15-19. WASTEGATE ACTUATOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Rear heat shield removed (para. 3-52).

Manual References

TM 9-2320-387-24P

Maintenance Level

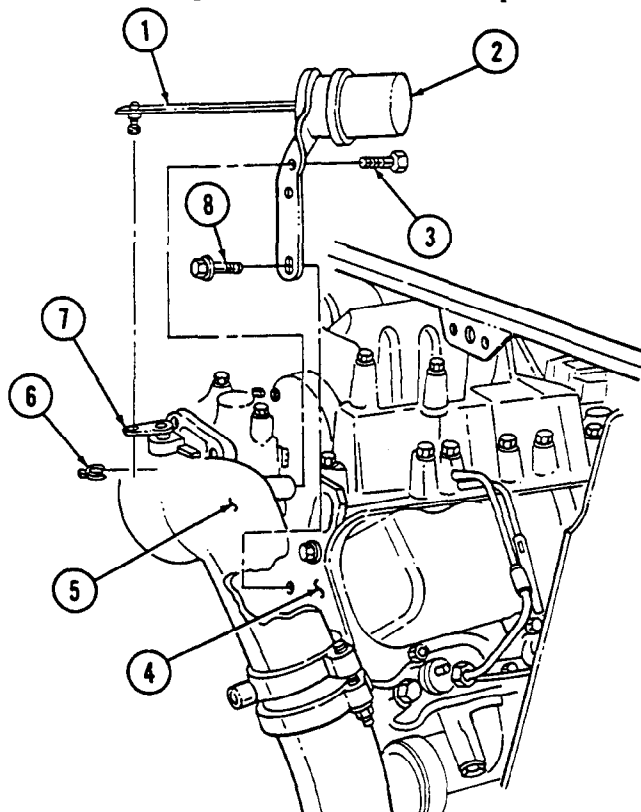
Direct support

a. Removal

1. Remove clip (6) and actuator rod (1) from wastegate bellcrank (7).
2. Remove two capscrews (3) from wastegate actuator (2) and wastegate housing (5).
3. Remove capscrew (8) and wastegate actuator (2) from cylinder head (4).

b. Installation

1. Install wastegate actuator (2) on cylinder head (4) with capscrew (8).
2. Install wastegate actuator (2) on wastegate housing (5) with two capscrews (3).
3. Install actuator rod (1) on wastegate bellcrank (7) with clip (6).



FOLLOW-ON TASK: Install rear heat shield (para. 3-52).

15-20. INTAKE CROSSOVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).

Materials/Parts

Crossover O-ring (Appendix G, Item 256.1)
Two gaskets (Appendix G, Item 68)

Maintenance Level

Direct support

Manual References

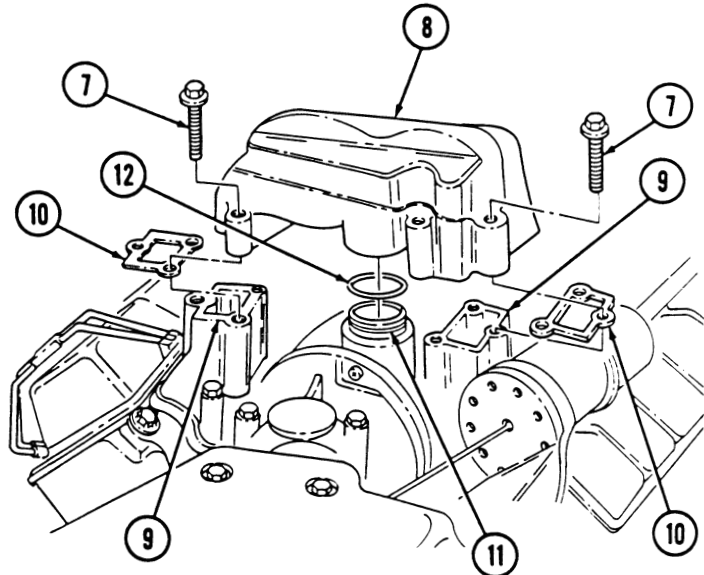
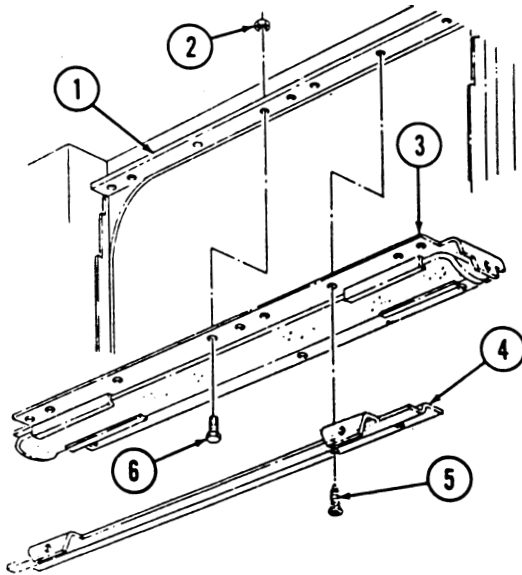
TM 9-2320-387-10
TM 9-2320-387-24P

a. Removal

1. Remove ten nuts (2), capscrews (6), two screws (5), retainer (4), and closeout panel (3) from A-beam (1).
2. Remove six capscrews (7), intake crossover (8), and two gaskets (10) from intake manifolds (9) and turbocharger (11). Discard gaskets (10).
3. Remove crossover O-ring (12) from turbocharger (11). Discard crossover O-ring (12). Clean mating surfaces.

b. Installation

1. Install crossover O-ring (12) on turbocharger (11).
2. Install two gaskets (10) and intake crossover (8) on intake manifolds (9) and turbocharger (11) with six capscrews (7). Tighten capscrews (7) to 17 lb-ft (23 N·m).
3. Install closeout panel (3) and retainer (4) on A-beam (1) with two screws (5), ten capscrews (6), and nuts (2).



- FOLLOW-ON TASKS:
- Install engine access cover (para. 10-22).
 - Lower and secure hood (TM 9-2320-387-10).

15-21. TURBOCHARGER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Wastegate housing removed (para. 15-18).
- Intake crossover removed (para. 15-20).

Materials/Parts

Turbocharger oil gasket (Appendix G, Item 76)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

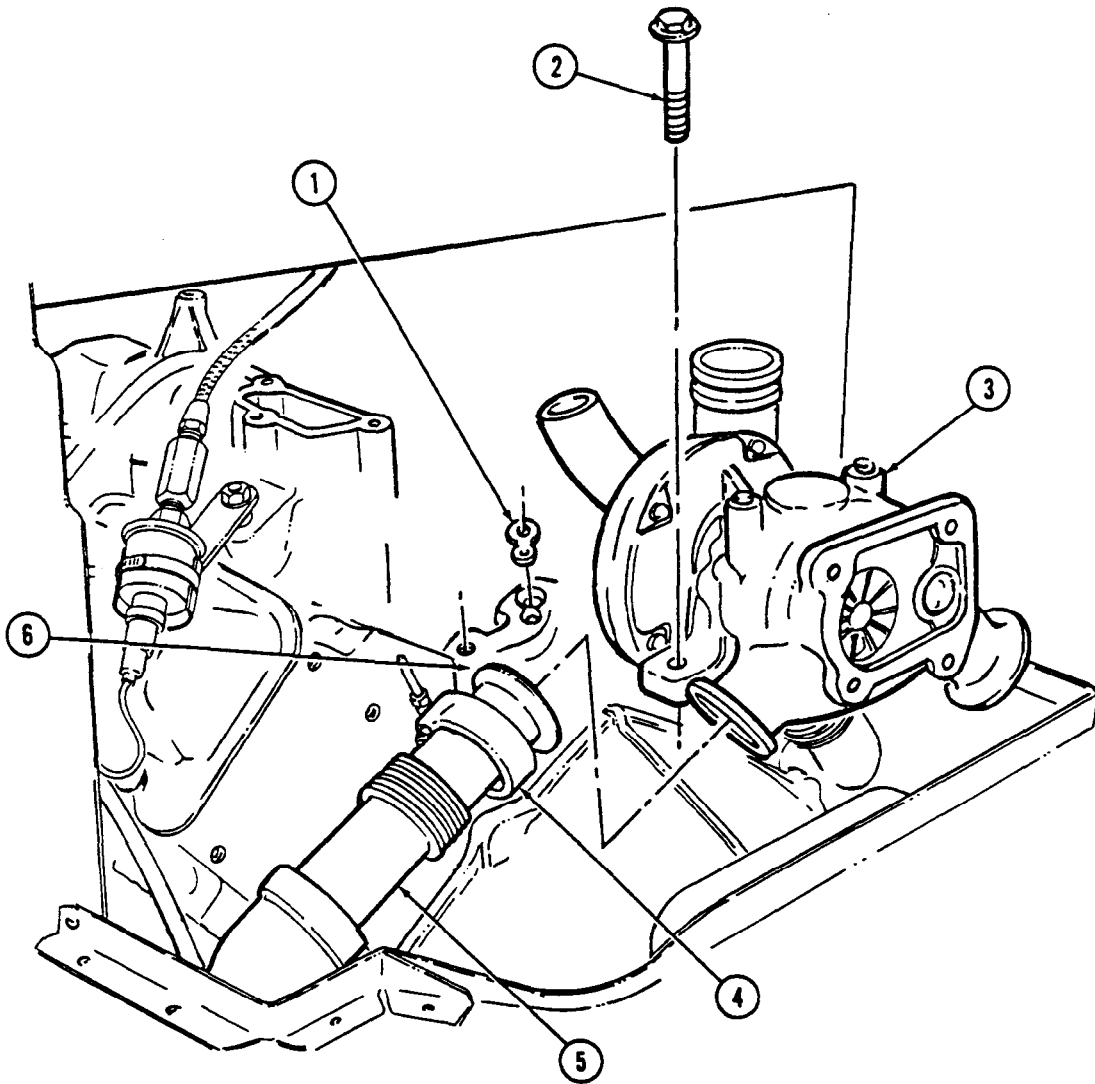
a. Removal

1. Loosen clamp (4) on exhaust pipe (5) and turbocharger (3). Slide clamp (4) onto exhaust pipe (5).
2. Remove two capscrews (2) and turbocharger (3) from engine block (6).
3. Remove turbocharger oil gasket (1) from engine block (6). Discard gasket (1) and clean mating surfaces.

b. Installation

1. Install turbocharger oil gasket (1) and turbocharger (3) on engine block (6) with two capscrews (2).
2. Install exhaust pipe (5) on turbocharger (3) and tighten clamp (4).

15-21. TURBOCHARGER REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install intake crossover (para. 15-20).
 - Install wastegate housing (para. 15-18).

15-22. GLOW PLUG TIP REMOVAL (DAMAGED OR BROKEN)

This task covers:

Removal

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Needlenose pliers (Appendix B, Item 31)

Special Tools

Socket, 3/8-in. (Appendix B, Item 144)

Manual References

TM 9-2320-387-24P

Personnel Required

One mechanic
 One assistant

Equipment Condition

- Fuel injector nozzle removed (para. 16-3).
- Serpentine drivebelt removed (para. 3-81).

General Safety Instructions

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa).

Maintenance Level

Direct support

Removal

NOTE

Affected cylinder piston must be brought to Top Dead Center (TDC) position to ensure intake and exhaust valves are closed.

1. Using socket wrench and breaker bar on torsion damper bolt (3), rotate crankshaft to bring piston (in affected cylinder) to TDC position.

NOTE

Perform steps 2 and 3 if failed glow plug is still installed in cylinder head. Perform step 4 if failed glow plug has been removed from the cylinder head and glow plug tip is broken off in cylinder head prechamber. Perform steps 5 and 6 if failed glow plug tip is swollen.

2. Insert needlenose pliers through injector nozzle opening (1), grasp glow plug tip, break off expanded tip, and remove piece from prechamber.
3. Remove glow plug (para. 3-39).

WARNING

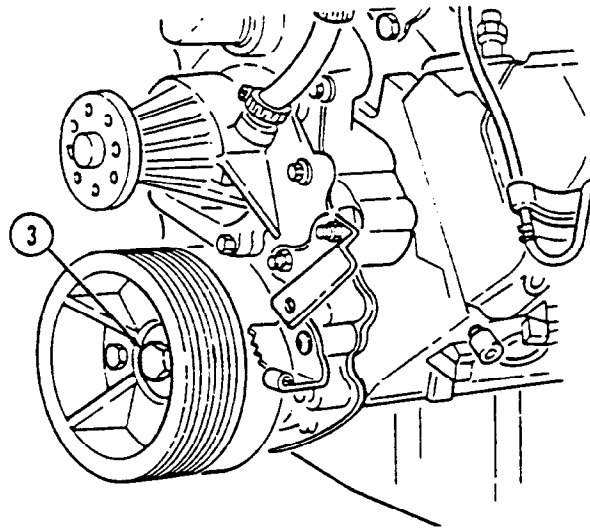
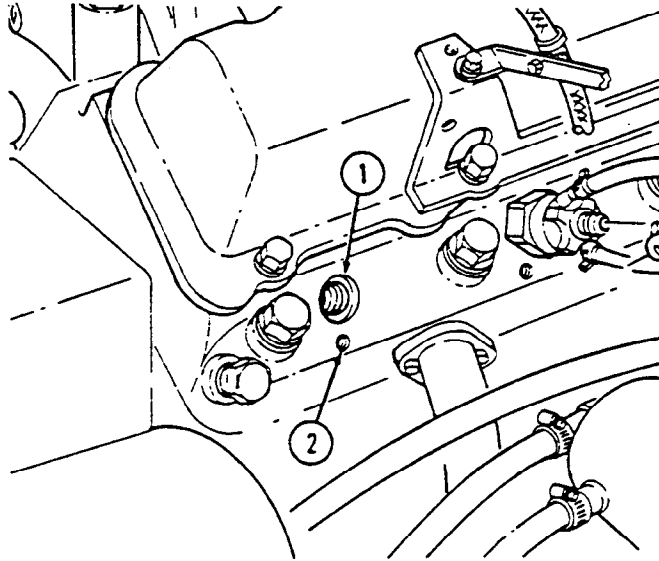
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles, shield, gloves, etc.).

4. Direct compressed air into glow plug port (2) to expel broken tip from prechamber through injector nozzle opening (1).
5. Coil one end of an 18-in. piece of tie wire the size of the injector nozzle opening (1). Place flat coil end over preheater to combustion chamber hole.

NOTE

In some cases it may be necessary to remove cylinder head to remove expanded glow plug tip.

6. Using needlenose pliers with a 90 degrees bend, insert pliers through injector nozzle opening (1), grasp glow plug tip, break off expanded tip, and remove piece from prechamber.
7. Install new glow plug (para. 3-39).

15-22. GLOW PLUG TIP REMOVAL (DAMAGED OR BROKEN) (Cont'd)

- FOLLOW-ON TASKS:**
- Install fuel injector nozzle (para. 16-3).
 - Install serpentine drivebelt (para. 3-81).

15-23. ENGINE INJECTION PUMP TIMING

This task covers:

a. Timing Check

b. Timing Adjustment

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Timing gauge (Appendix B, Item 26)
Dynamic timing meter (Appendix B, Item 27)

Materials/Parts

Metallic wool (Appendix C, Item 83)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22).
- Companion seat and battery box cover removed (para. 10-43).

General Safety Instructions

Never adjust timing while engine is running.

Maintenance Level

Direct support

a. Timing Check

NOTE

Magnetic pickup receptacle on timing bracket must be correctly positioned or timing meter will not register correctly.

1. Insert timing gauge into magnetic pickup receptacle (8) on timing bracket (1).
2. Rotate timing gauge so pointer on gauge fits into Top Dead Center (TDC) notch (9) in timing bracket (1).
3. If pointer on gauge does not fit exactly into TDC notch (9), bend magnetic pickup receptacle (8) until pointer on gauge fits exactly into TDC notch (9).
4. Remove timing gauge from pickup receptacle (8) on timing bracket (1).

NOTE

End of magnetic pickup must be 0.06 in. (1.5 mm) from torsional damper.

5. Install magnetic pickup (7) into magnetic pickup receptacle (8) and connect pickup lead (6) to dynamic timing meter.

NOTE

Clamp-on pickup must be used on a straight section of tube no farther than 4 in. (10 cm) from injection nozzle.

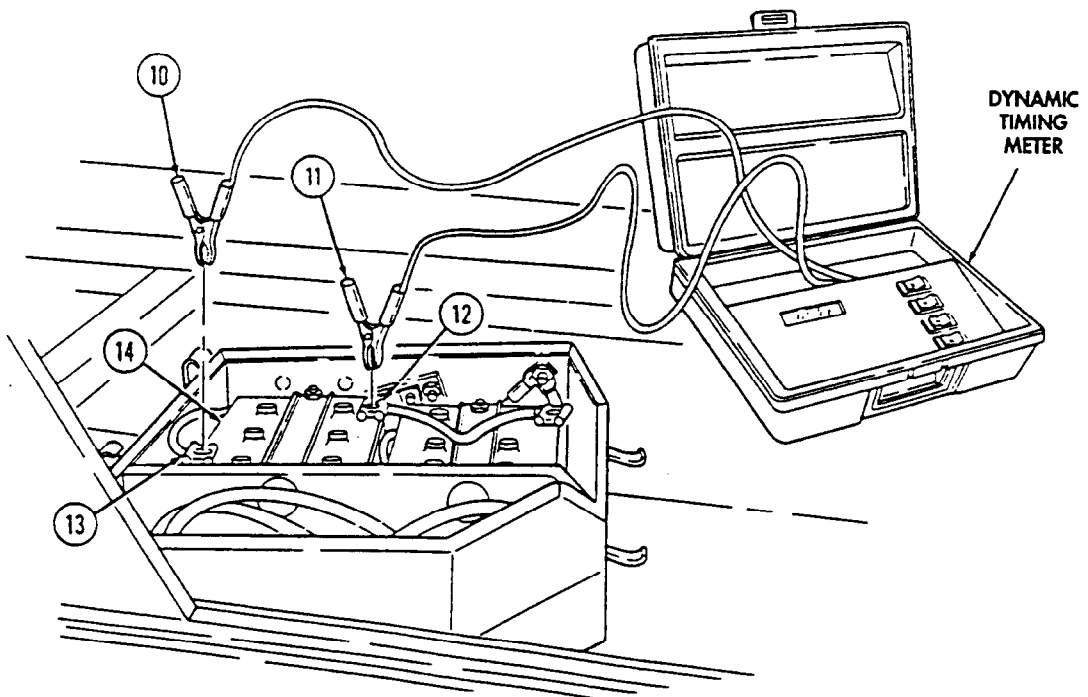
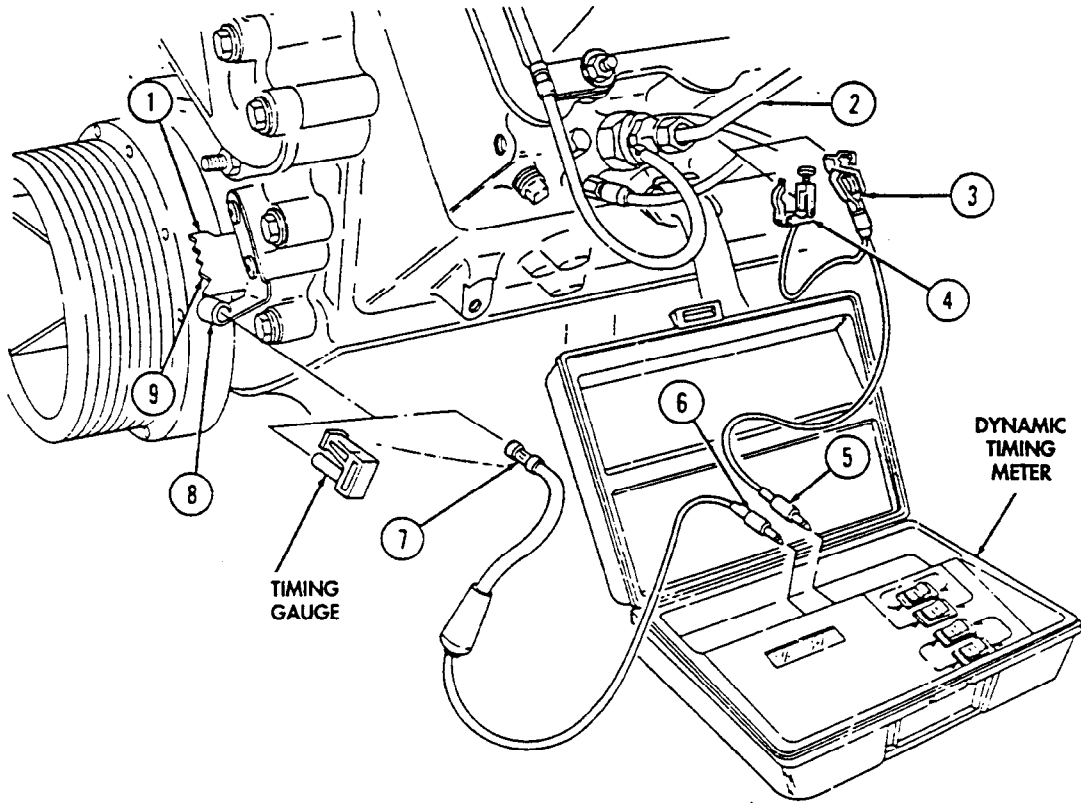
6. Clean cylinder number one injection line (2) with metallic wool.

CAUTION

Do not overtighten clamp-on pickup or damage to pickup will result.

7. Install pickup (4) on injection line (2).
8. Connect ground clip (3) to fuel injection line (2) and connect pickup lead (5) to timing meter.
9. Route power leads of timing meter into battery compartment and connect red power lead (11) to positive battery terminal (12) on rear battery (14).
10. Connect black ground lead (10) to negative battery terminal (13) on rear battery (14). Display should light up and read: SE-1 20.0.

15-23. ENGINE INJECTION PUMP TIMING (Cont'd)



15-23. ENGINE INJECTION PUMP TIMING (Cont'd)

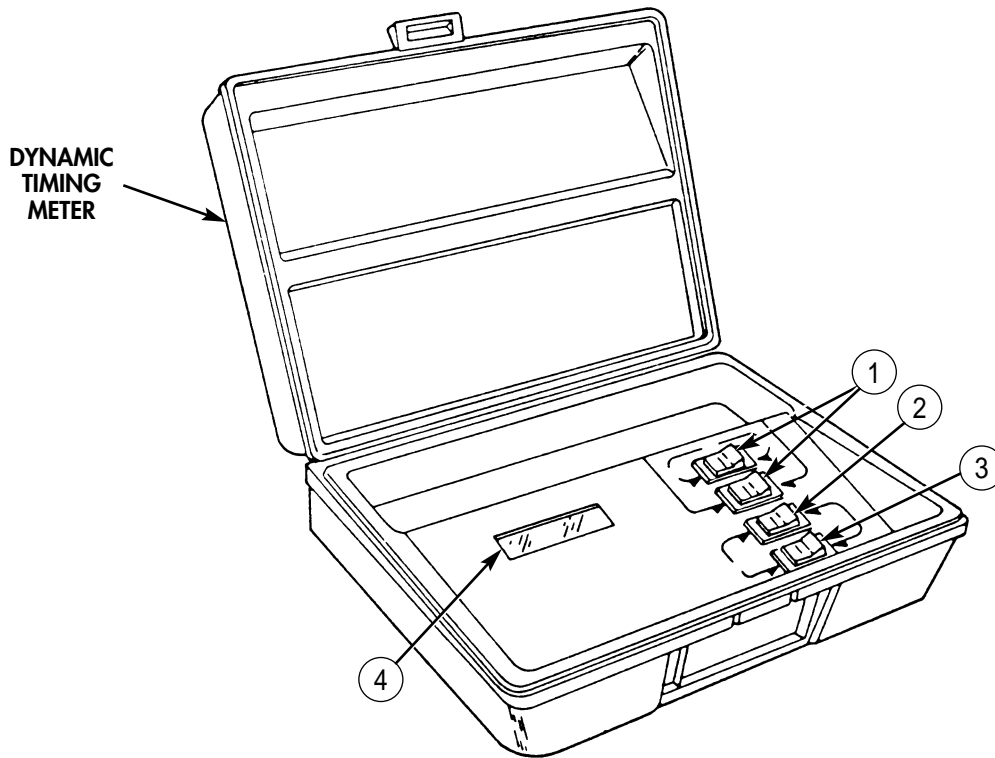
CAUTION

Ensure all cables and wires are clear from fan, belts, and exhaust manifolds before starting engine or damage to equipment will result.

NOTE

If sensor light is not blinking, check clamp-on pickup fuel injection line for proper installation.

11. Depress offset adjustment switch (3) and hold.
12. Operate increase/decrease switch (2) until offset adjustment reads 30.5 on display (4). Release offset adjustment switch (3). Display (4) should not read: 0000 . . . 0.0.
13. Start engine (TM 9-2320-387-10) and warm up to operating temperature.
14. Position sensor switches (1) to clamp-on and magnetic pickup positions.
15. Raise engine speed to 1,300 rpm and read injection pump timing on display (4). Timing must be 5 degrees before Top Dead Center (TDC). If timing is not 5 degrees before TDC, stop engine (TM 9-2320-387-10) and adjust timing (task b.).
16. Disconnect timing meter.



15-23. ENGINE INJECTION PUMP TIMING (Cont'd)

b. Timing Adjustment

WARNING

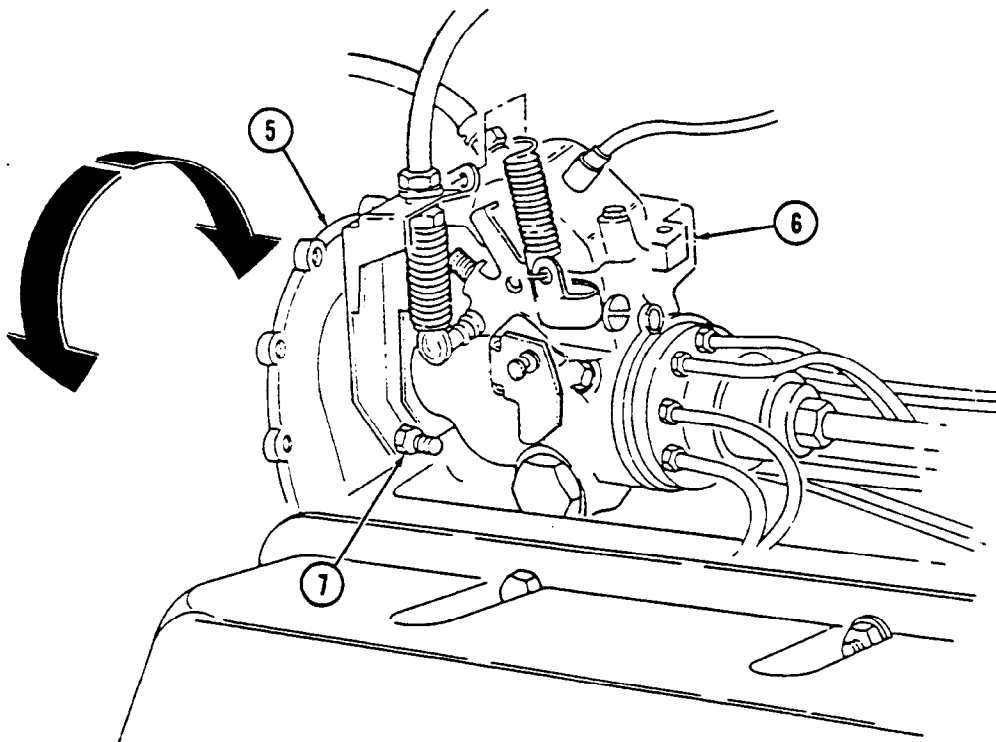
Never adjust injection pump timing with engine running or injury to personnel and damage to equipment may result.

1. Loosen three nuts (7) securing injection pump (6) to timing chain cover (5).

NOTE

Moving injection pump 0.03 in. (0.8 mm) is equal to approximately one degree of injection pump timing.

2. Move injection pump (6) clockwise to retard timing; counterclockwise to advance timing.
3. Tighten three nuts (7) securing injection pump (6) to timing chain cover (5) and recheck timing (task a.).



- FOLLOW-ON TASKS:
- Install companion seat and battery box cover (para. 10-43).
 - Install engine access cover (para. 10-22).
 - Lower and secure hood (TM 9-2320-387-10).

15-24. ENGINE RUN-IN

This task covers:

In-chassis Run-In

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10

Equipment Condition

Engine installed in vehicle (para. 15-28).

General Safety Instructions

Ensure engine compartment is free of all tools and working material before starting engine.

Maintenance Level

Direct support

In-chassis Run-In

WARNING

Ensure engine compartment is free of all tools and working material before starting engine. Failure to do this may cause injury to personnel or damage to equipment.

CAUTION

If any leaks or abnormal noise is noted, stop engine immediately and correct as necessary. Any abnormalities must be corrected before proceeding.

1. Start engine (TM 9-2320-387-10) and allow engine to idle for five to ten minutes.
2. Stop engine and inspect oil and coolant levels (TM 9-2320-387-10).
3. Check for leaks. If any leaks are found, correct as necessary.

NOTE

It may be necessary to block air flow to radiator.

4. Start engine (TM 9-2320-387-10) and run at 1/4- to 1/2-engine throttle until coolant temperature reaches 165°-195°F (74°-91°C).
5. Repeat steps 2 and 3.
6. Set engine idle speed (para. 3-45).

FOLLOW-ON TASK: Perform break-in service (TM 9-2320-387-10).

Section II. ENGINE REPLACEMENT**15-25. ENGINE REPLACEMENT TASK SUMMARY**

TASK PARA.	PROCEDURES	PAGE NO.
15-26.	Engine Removal	15-48
15-27.	Engine Preparation	15-78
15-28.	Engine Installation	15-98
15-29.	Engine Replacement in Shipping/Storage Container	15-126

15-26. ENGINE REMOVAL

This task covers:

Removal

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Engine lifting sling (Appendix B, Item 24)
Hex-head driver, 8-mm (Appendix B, Item 145)

Materials/Parts

Crossover O-Ring seal
(Appendix G, Item 256.1)
Engine/transmission support sling
(Appendix D, Figs. 84 through 97) (Optional)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Batteries removed (para. 4-74).
- Engine access cover removed (para. 10-22).
- Firewall armor removed (M1114 model) (para. 11-48).
- A/C system discharged (M1114 model) (para. 25-15).

General Safety Instructions

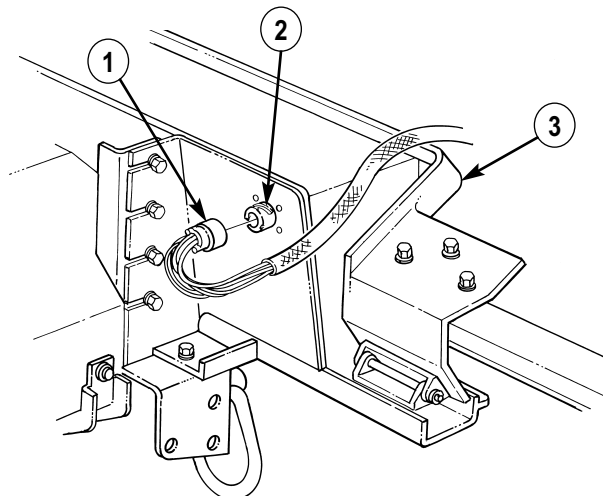
- Hood must be supported during removal.
- Do not remove surge tank filler cap before depressurizing system.
- Do not drain oil when engine is hot.
- Alternator must be supported during removal.
- Do not touch hot exhaust system components with bare hands.
- Do not use diesel fuel near fire, flames, or sparks.
- Transmission must be supported during engine removal.
- Direct personnel to stand clear during hoisting operation.
- Do not use hands to free engine of hangups or snags.

Maintenance Level

Direct support

Removal

1. Raise and secure hood (3) (TM 9-2320-387-10).
2. Disconnect hood harness connector (1) from harness connector (2).

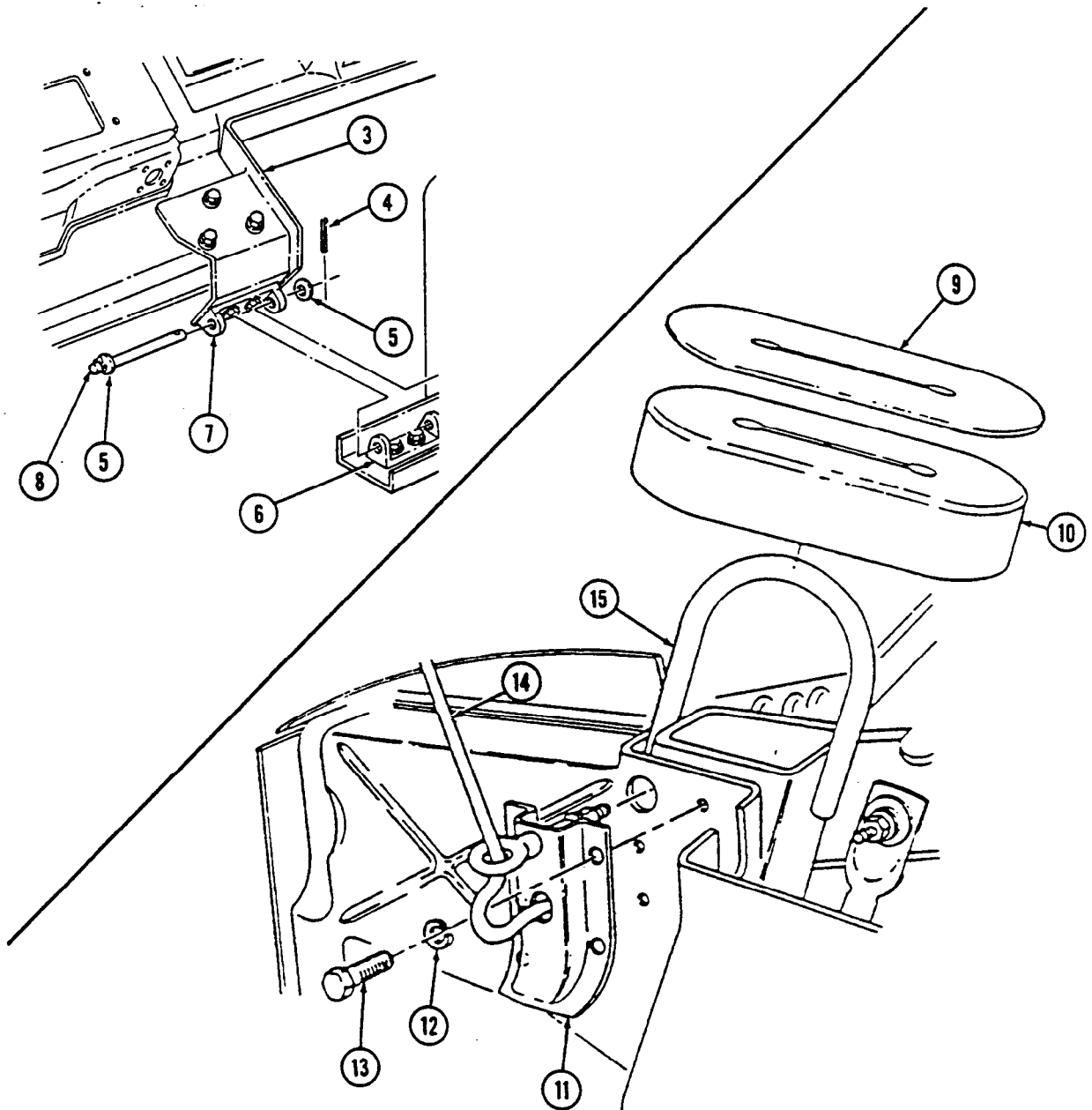


15-26. ENGINE REMOVAL (Cont'd)

WARNING

Hood must be supported during removal. Failure to support hood may cause injury to personnel and damage to equipment.

3. Remove four screws (13), lockwashers (12), and bracket (11) from airlift bracket (15). Discard lockwashers (12).
4. Lower hood (3) and remove two cotter pins (4), washers (5), hinge pins (8), and washers (5) from upper hinge halves (7) and lower hinge halves (6). Discard cotter pins (4).
5. Remove hood (3) with prop rod (14) and bracket (11) attached.
6. Remove two cover plates (9) and seals (10) from airlift brackets (15).

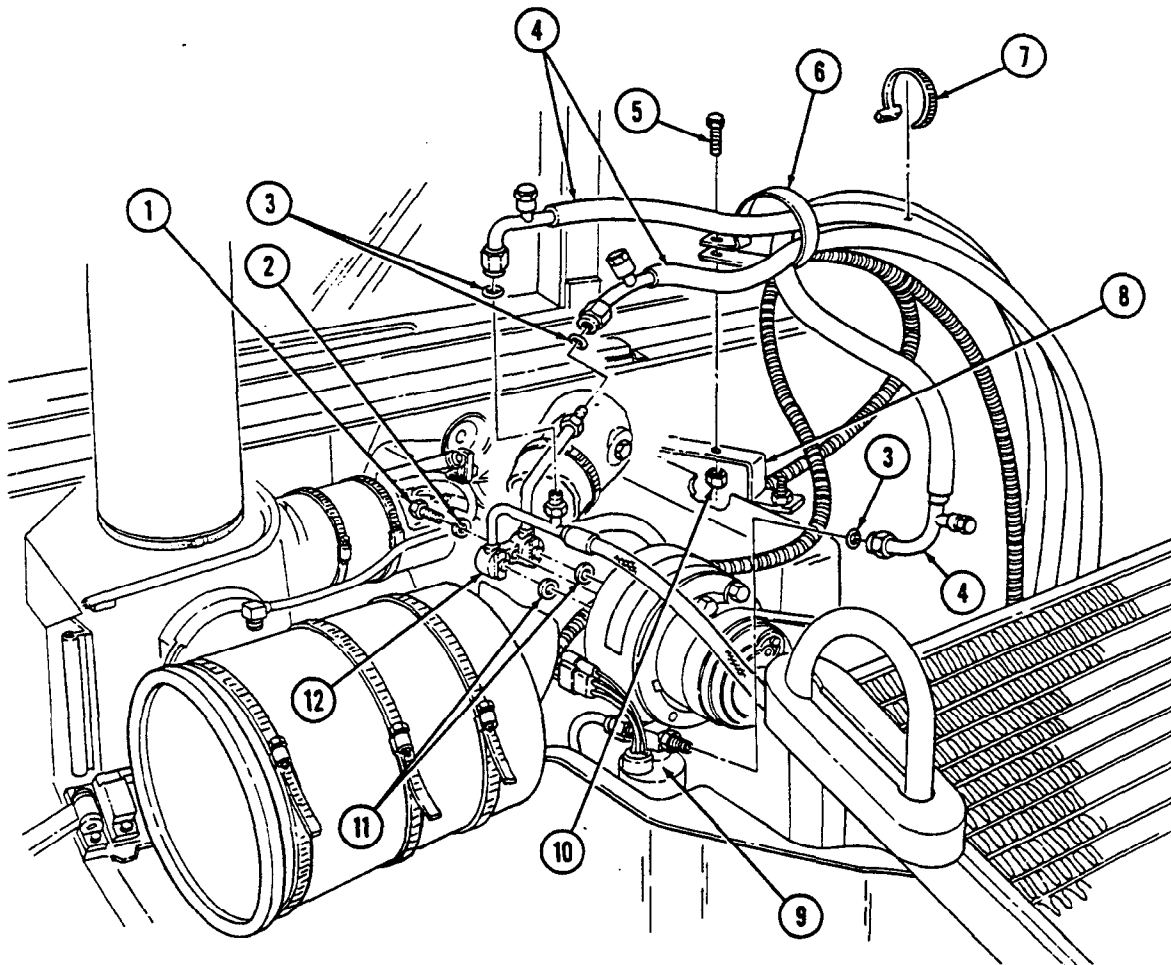


15-26. ENGINE REMOVAL (Cont'd)

NOTE

Perform steps 7 through 9 for M1114 models only.

7. Remove three A/C hoses (4) and O-rings (3) from tube assembly (12) and receiver/dryer (9). Discard O-rings (3).
8. Remove tiedown strap (7), nut (10), capscrew (5), and clamp (6) from bracket (8) and move A/C hoses (4) through clamp (6) and off to one side. Discard tiedown strap (7).
9. Remove screw (1), lockwasher (2), tube assembly (12), and two seals (11) and set tube assembly (12) aside. Discard lockwasher (2) and seals (11).



15-26. ENGINE REMOVAL (Cont'd)**WARNING**

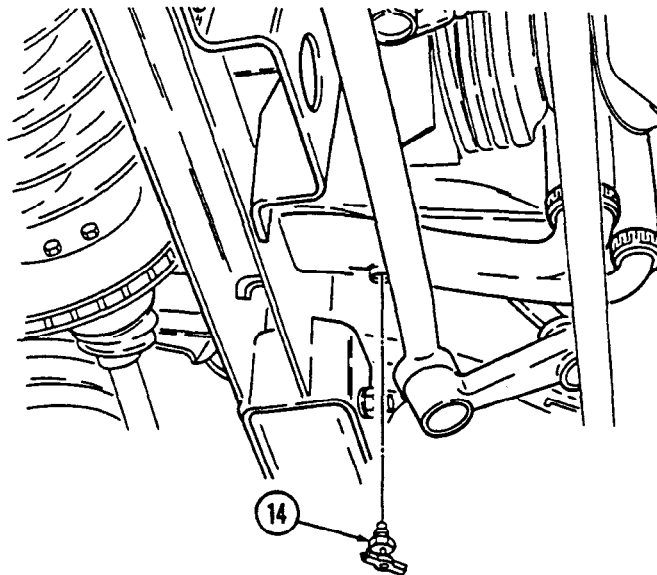
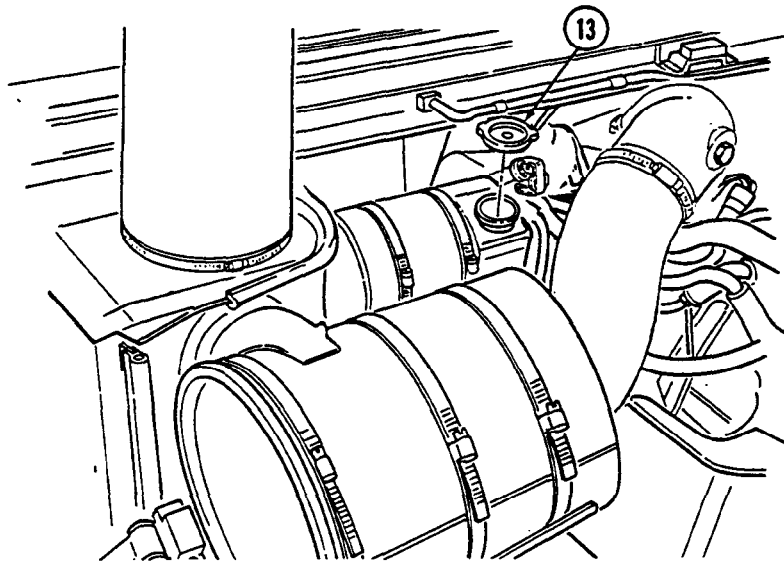
Do not remove surge tank filler cap before depressurizing system when engine temperature is above 190°F (88°C). Steam or hot coolant under pressure will cause severe burns.

10. If engine is hot, remove surge tank filler cap (13) by placing a thick cloth over cap (13). Press down and turn cap (13) counterclockwise to its first stop to release internal pressure.
11. After pressure has escaped, press down and turn cap (13) counterclockwise again and remove.

NOTE

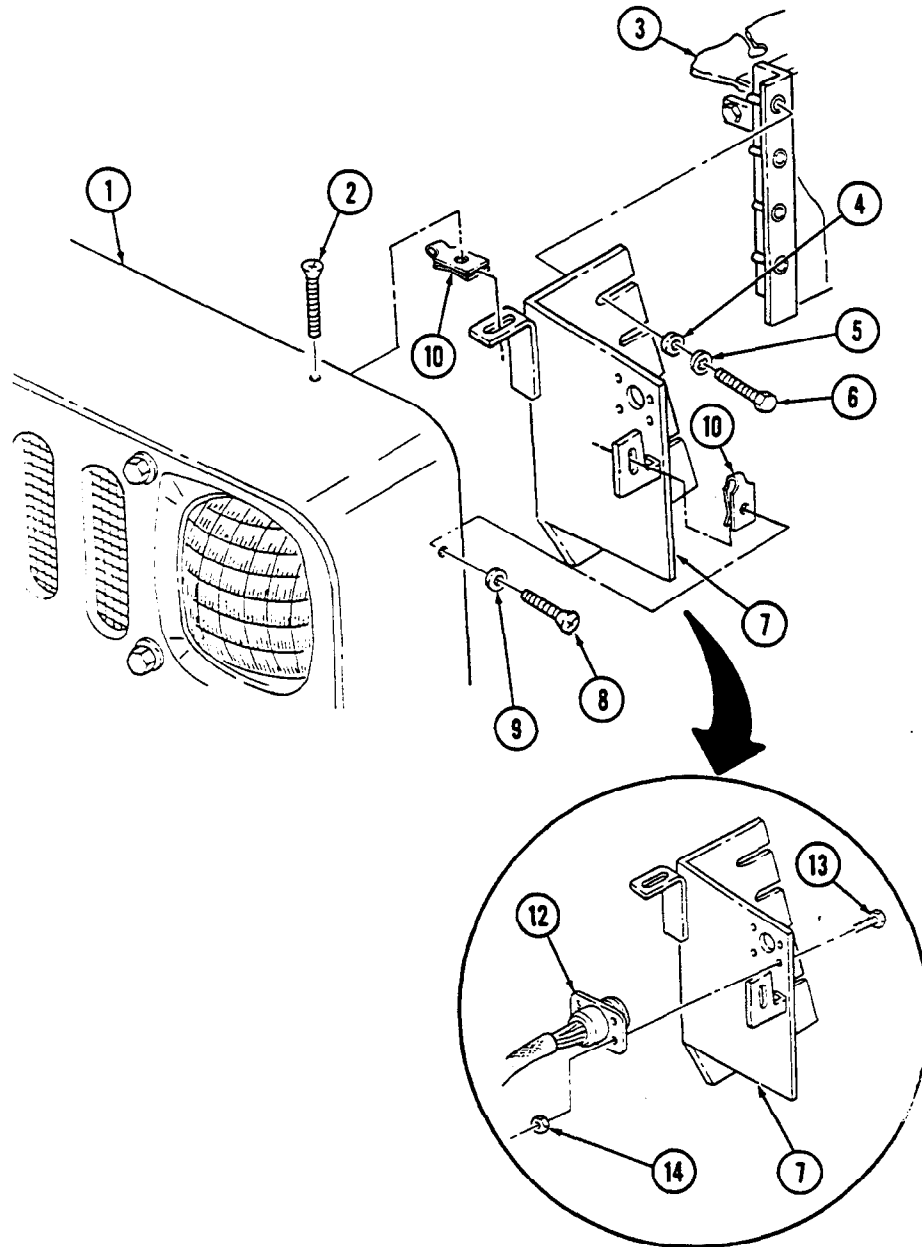
Have drainage container ready to catch coolant.

12. Open and remove drainvalve (14) and allow system to drain.



15-26. ENGINE REMOVAL (Cont'd)

13. Remove four capscrews (6), washers (4), and lockwashers (5) from splash shield (3) and plate (7). Discard lockwashers (5).
14. Remove hex-head screws (8) and (2), washer (9), plate (7), and spring nuts (10) and (11) from headlight housing (1).
15. Remove four nuts (14), screws (13), and harness connector (12) from plate (7).



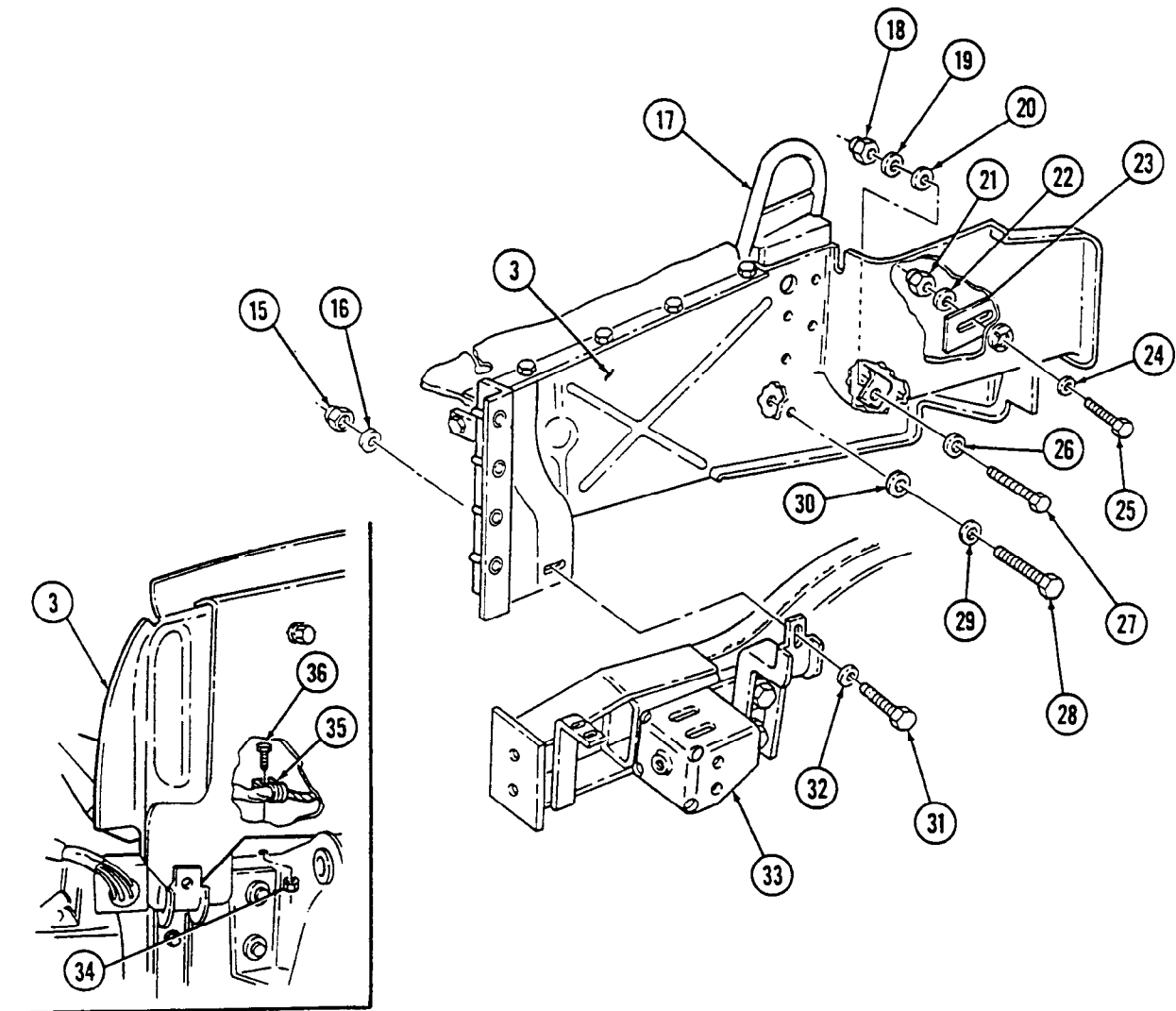
15-26. ENGINE REMOVAL (Cont'd)

16. Remove nut and lockwasher assembly (34), screw (36), and harness with clamp (35) from left splash shield (3). Discard nut and lockwasher assembly (34).

NOTE

Perform steps 17 and 18 for M1113 models only.

17. Remove locknut (18), washer (19), washer (20), capscrew (27), and washer (26) from left splash shield (3) and airlift bracket (17). Discard locknut (18).
18. Remove capscrew (28), washer (30), lockwasher (29), and left splash shield (3) from airlift bracket (17). Discard lockwasher (29).
19. Remove locknut (15), washer (16), capscrew (31), washer (32), and left splash shield (3) from support bracket (33). Discard locknut (15).
20. Remove locknut (21), washer (22), capscrew (25), washer (24), and splash shield (3) from master cylinder bracket (23). Discard locknut (21).



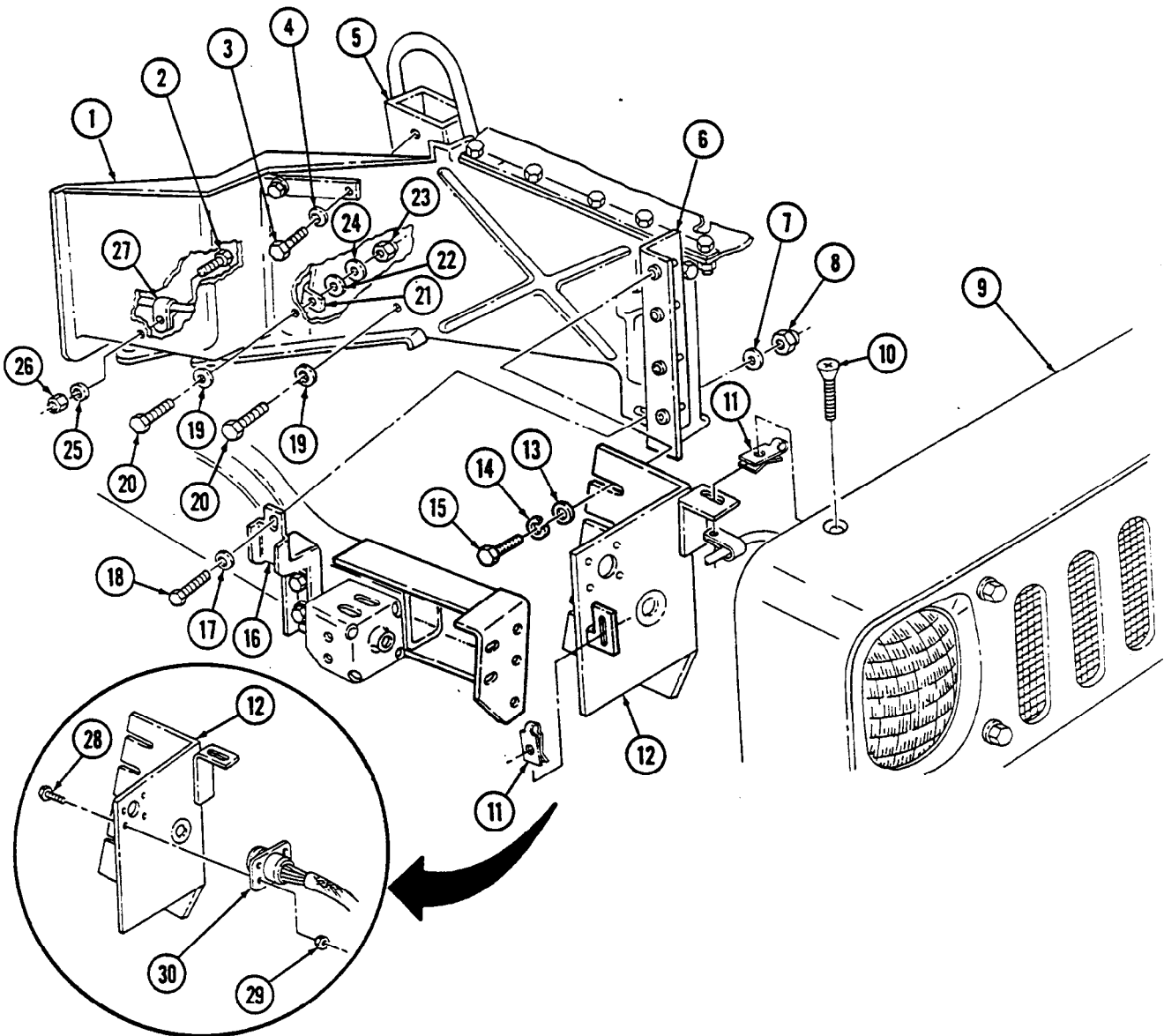
15-26. ENGINE REMOVAL (Cont'd)

21. Remove four capscrews (15), washers (13), and lockwashers (14) from plate (12) and splash shield bracket (6). Discard lockwashers (14).
22. Remove two hex-head screws (10), plate (12), and spring nuts (11) from headlight housing (9).
23. Remove four nuts (29), screws (28), and harness connector (30) from plate (12).
24. Remove locknut (8), washer (7), capscrew (18), and washer (17) from right splash shield (1) and support bracket (16). Discard locknut (8).

NOTE

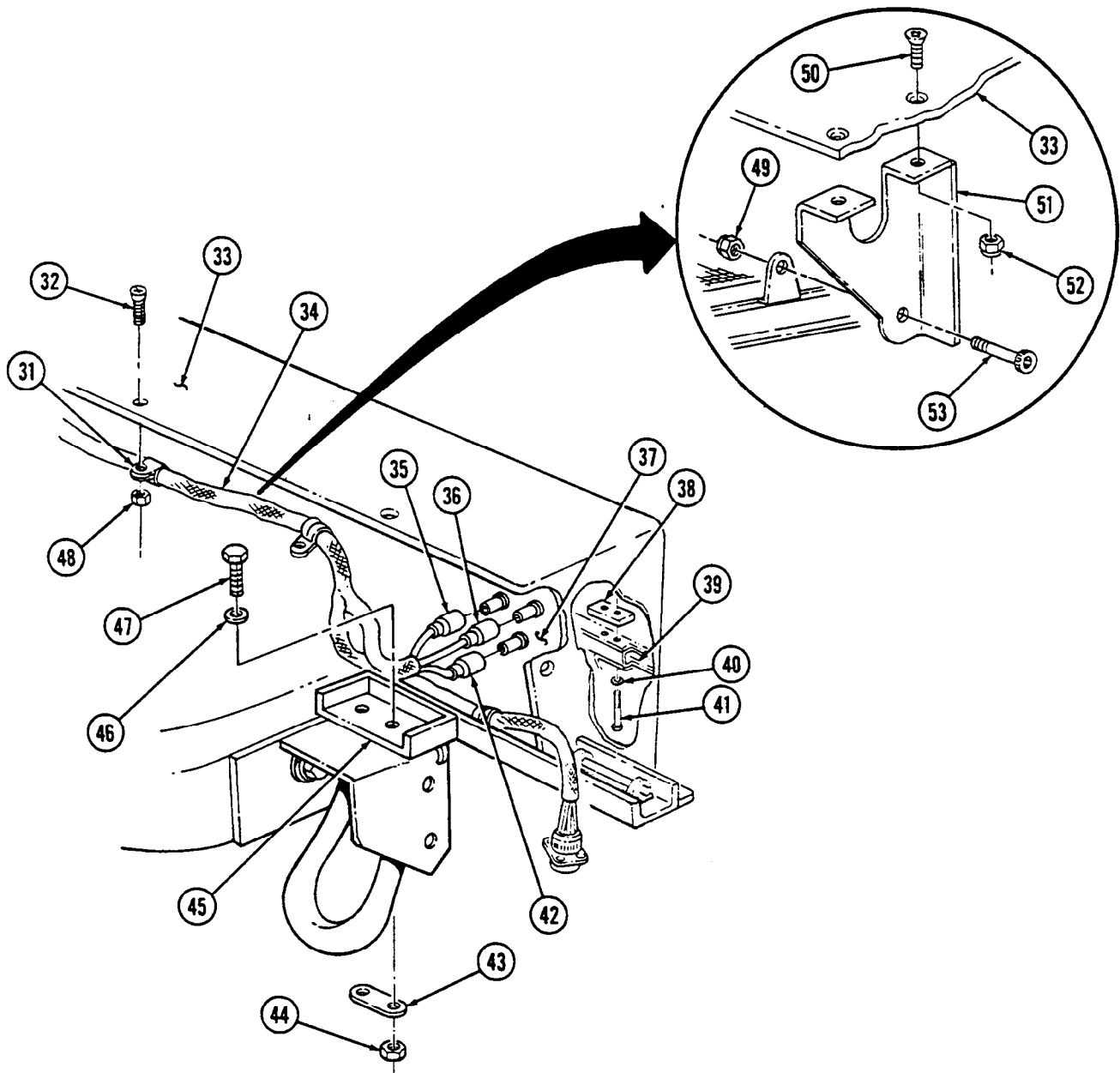
Perform steps 25 and 26 for M1113 models only.

25. Remove locknut (23), washer (24), washer (22), two capscrews (19), washers (20), and clamp (21) from right splash shield (1) and airlift bracket (5). Discard locknut (23).
26. Remove locknut (26), washer (25), capscrew (2), and vent line clamp (27) from right splash shield (1). Discard locknut (26).
27. Remove screw (3), washer (4), and right splash shield (1) from airlift bracket (5).



15-26. ENGINE REMOVAL (Cont'd)

28. Remove leads 17 (36), 18 (42), and 91 (35) from headlight assembly (37).
29. Remove two locknuts (48), clamps (31), body harness (34), and two screws (32) from headlight housing (33). Discard locknuts (48).
30. Remove locknut (49) and screw (53) from bracket (51) (if equipped). Discard locknut (49).
31. Remove two locknuts (52), screws (50), and bracket (51) (if equipped) from headlight housing (33). Discard locknuts (52).
32. Remove four locknuts (44), two plates (43), four screws (47), and washers (46) from headlight housing (33) and two frame brackets (45). Discard locknuts (44).
33. Remove two screws (41), washers (40), spacer (38), and headlight housing (33) from frame extension (39).



15-26. ENGINE REMOVAL (Cont'd)

34. Loosen clamp (1) and disconnect radiator inlet hose (2) from engine (14).
35. Loosen clamp (5) and disconnect surge tank-to-radiator vent hose (4) from adapter (6).
36. Loosen clamp (16) and disconnect control valve hose (15) from bulkhead adapter (17).
37. Disconnect fan drive hose quick-disconnect (18) from fan drive (19).
38. Loosen clamp (9) and disconnect lower radiator front hose (10) from radiator (3).
39. Remove locknut (35), washer (36), capscrew (41), washer (40), large washer (39), and lower mount (37) from frame bracket (38) and radiator (3). Discard locknut (35).
40. Remove four locknuts (11), washers (12), capscrews (13), and two brackets (8) from airlift left and right brackets (7) and (26). Discard locknuts (11).

WARNING

Do not drain engine oil when engine is hot. Severe injury to personnel may result.

CAUTION

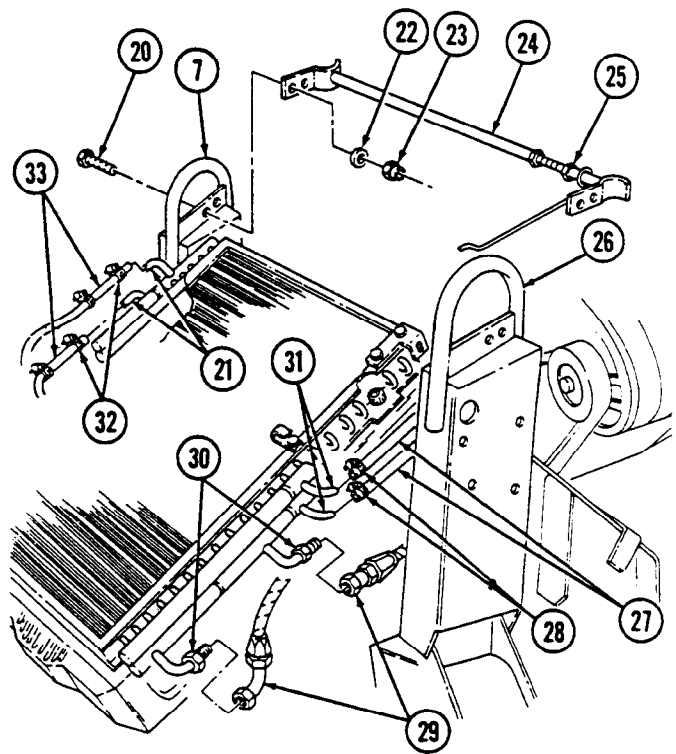
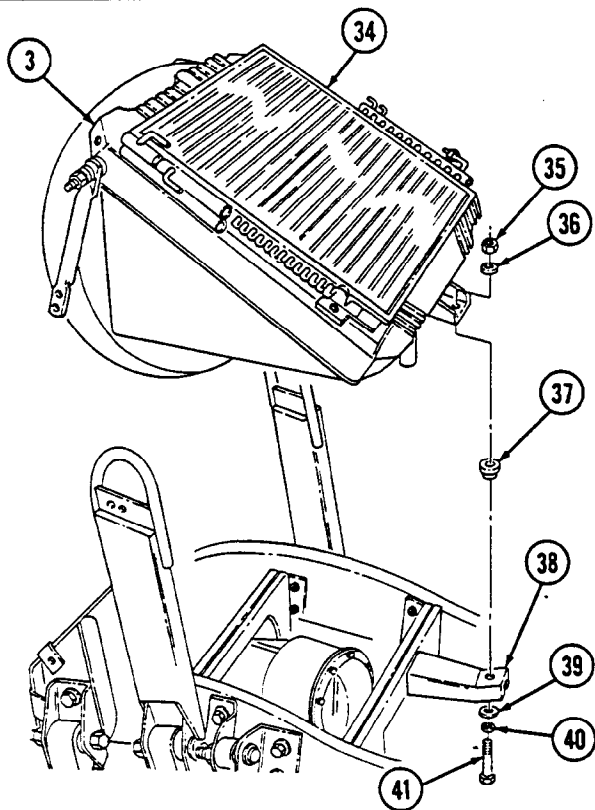
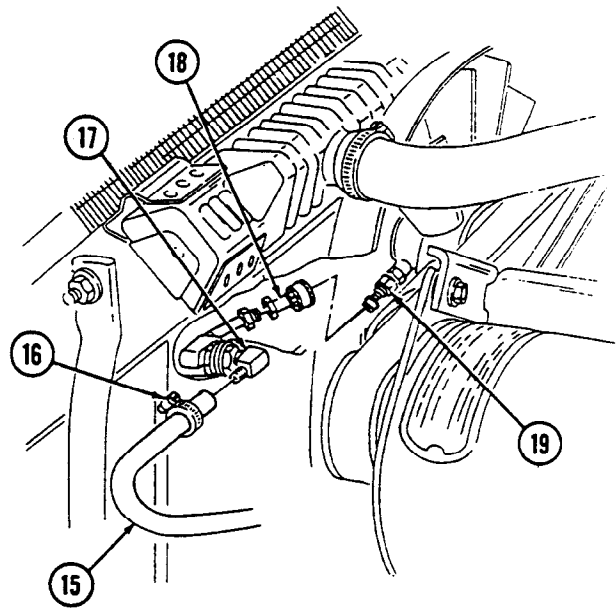
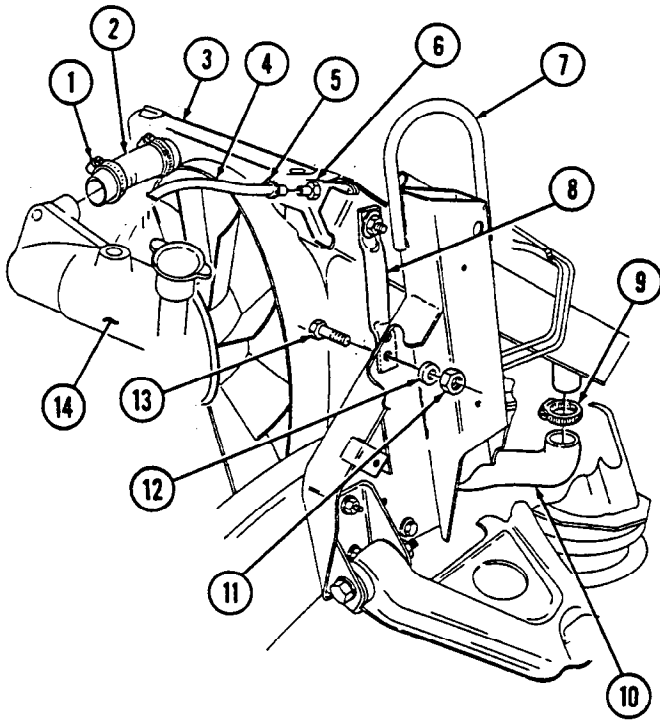
Cover or plug all hoses and connections immediately after disconnection to prevent contamination. Remove all plugs prior to connection.

NOTE

Have drainage container ready to catch oil.

41. Disconnect engine oil cooler supply and return lines (29) from engine, transmission, and power steering oil cooler ports (30).
42. Loosen two clamps (28) and disconnect power steering hoses (27) from engine, transmission, and power steering oil cooler ports (31).
43. Loosen two hose clamps (32) and disconnect transmission oil cooler line connector hoses (33) from transmission oil cooler ports (21).
44. Loosen nut (25) and release tension from crossbrace (24).
45. Remove four locknuts (23), washers (22), capscrews (20), and crossbrace (24) from airlift brackets (26) and (7). Discard locknuts (23).
46. Lift up radiator (3) and engine, transmission, and power steering oil cooler assembly (34) and remove from vehicle.

15-26. ENGINE REMOVAL (Cont'd)



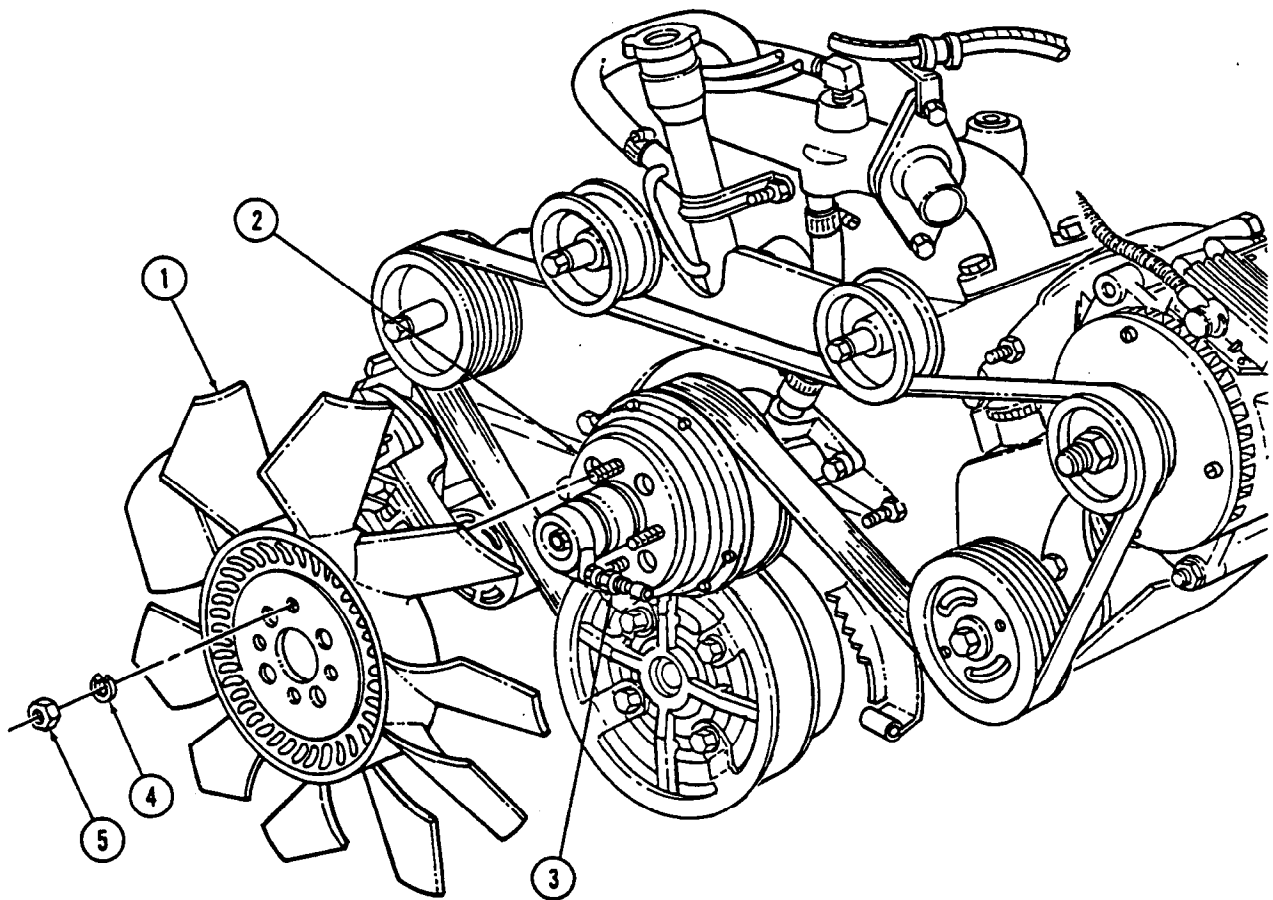
15-26. ENGINE REMOVAL (Cont'd)

47. Position clutch adapter fitting (3) at the 6 o'clock position.

NOTE

- Mark front of fan blade for installation.
- Ensure clutch adapter fitting is at the 6 o'clock position when removing fan blade.

48. Remove four nuts (5), lockwashers (4), and fan blade (1) from fan drive (2). Discard lockwashers (4).



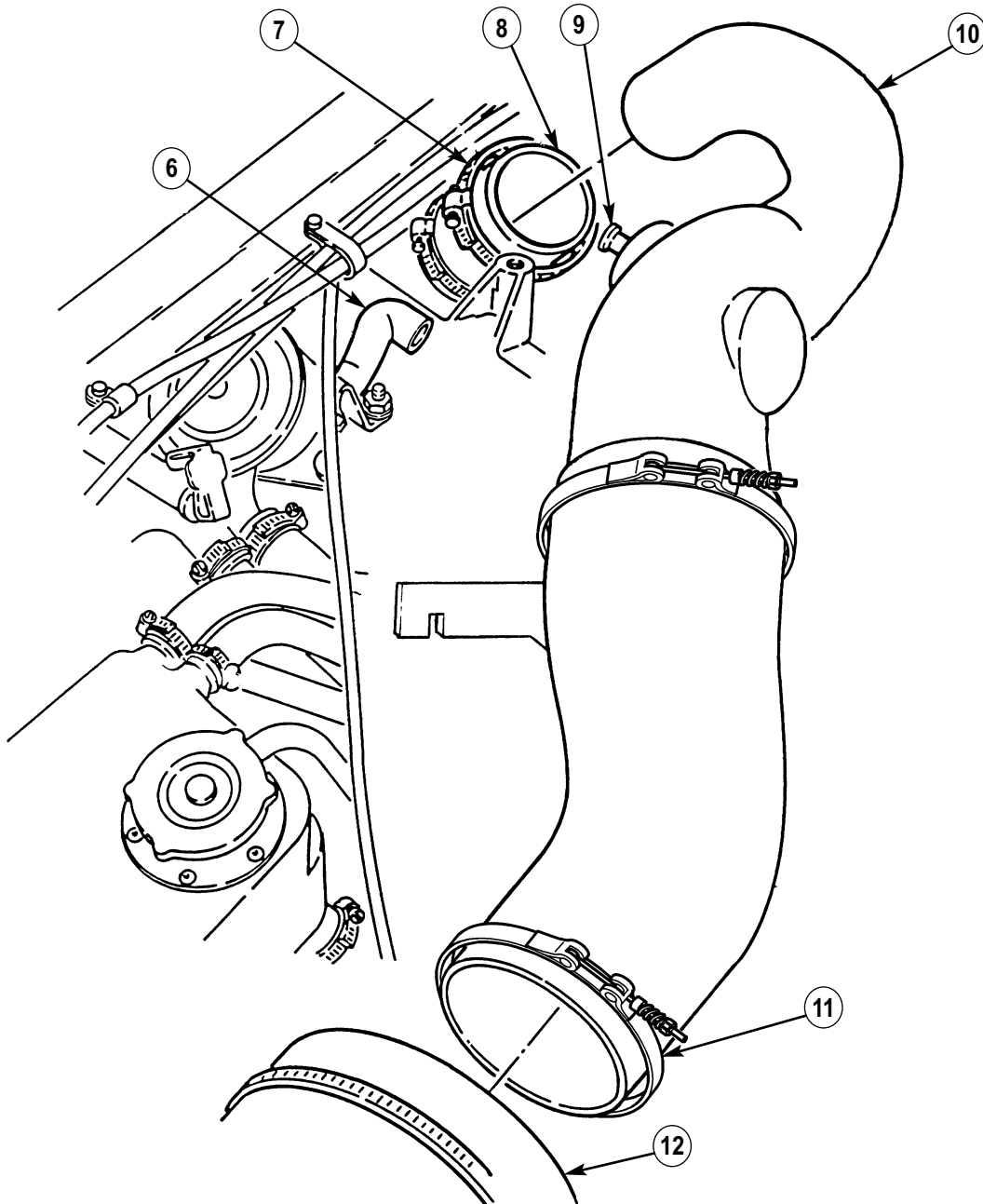
15-26. ENGINE REMOVAL (Cont'd)

49. Disconnect CDR hose (6) from air horn adapter (9).

CAUTION

Cover opening of intake manifold to prevent foreign material from entering engine.

50. Loosen two clamps (11) and remove air horn (10) from turbocharger intake hose (8) and air cleaner (12).



15-26. ENGINE REMOVAL (Cont'd)

NOTE

- Prior to removal, tag leads for installation.
- Steps 51 through 58 are for the 200-ampere dual voltage alternator. The 400-ampere dual voltage alternator procedures are similar.

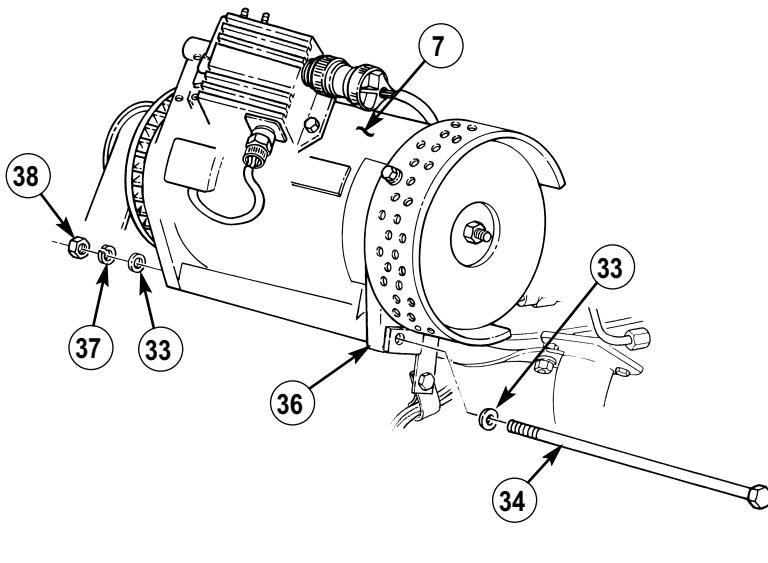
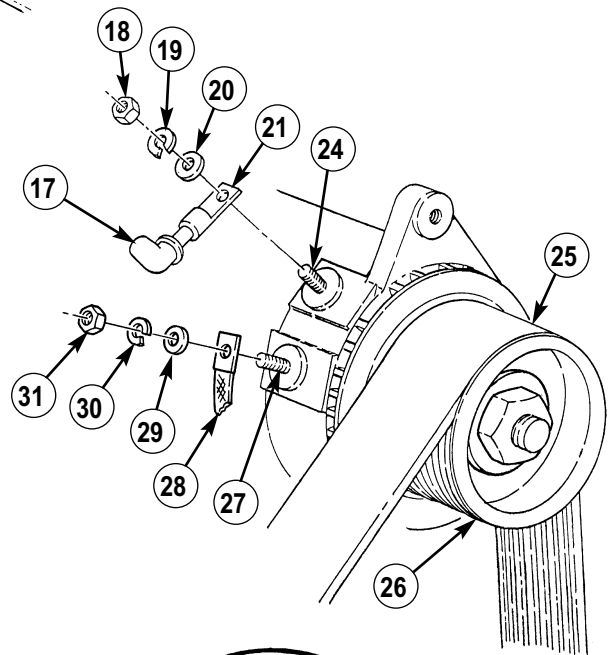
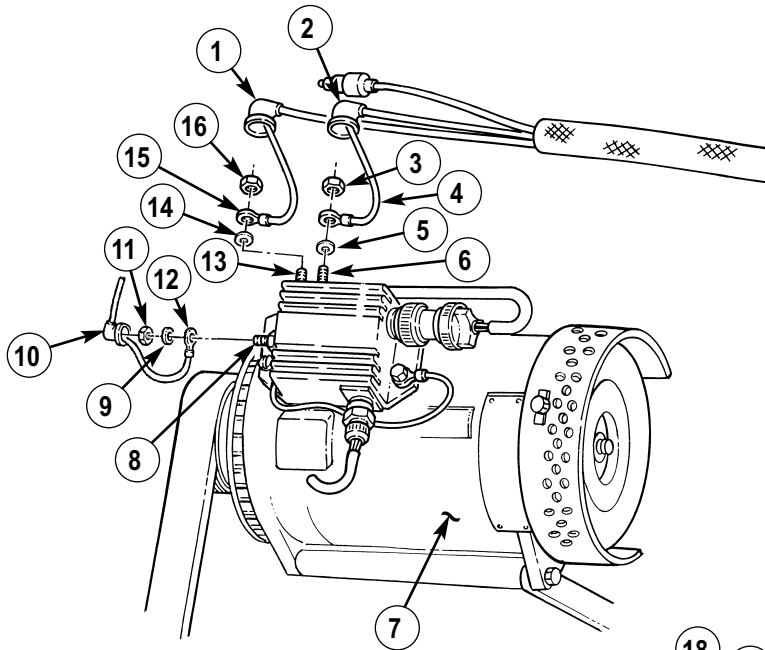
51. Slide back rubber boot (1) and remove nut (16), lead 568 (15), and washer (14) from IGN terminal (13).
52. Slide back rubber boot (2) and remove nut (3), lead 2A (4), and washer (5) from AC terminal (6).
53. Slide back rubber boot (10) and remove nut (11), washer (9), and lead (12) from terminal (8).
54. Remove nut (31), lockwasher (30), washer (29), and ground strap (28) from negative stud (27). Discard lockwasher (30).
55. Slide back rubber boot (17) and remove nut (18), lockwasher (19), washer (20), and alternator positive cable (21) from positive stud (24). Discard lockwasher (19).
56. Position 3/8-in. breaker bar or, as appropriate, a 1/2-in. ratchet wrench on belt tensioner (32), move tensioner (32) clockwise, and remove drivebelt (25) from alternator pulley (26).

WARNING

Alternator must be supported during removal. Failure to support alternator may cause injury to personnel or damage to equipment.

57. Remove nut (38), lockwasher (37), washer (33), capscrew (34), and washer (33) from alternator (7) and support bracket (36). Discard lockwasher (37).
58. Remove alternator (7).

15-26. ENGINE REMOVAL (Cont'd)



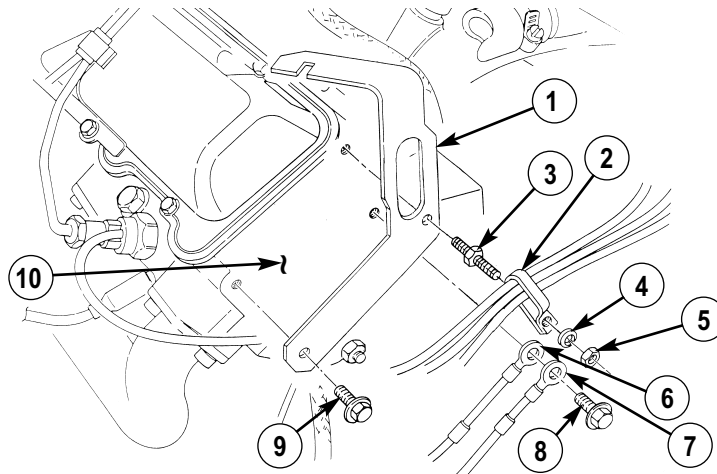
15-26. ENGINE REMOVAL (Cont'd)

59. Remove capscrew (8) and ground leads 7A (7) and 7E (6) from cylinder head (10).

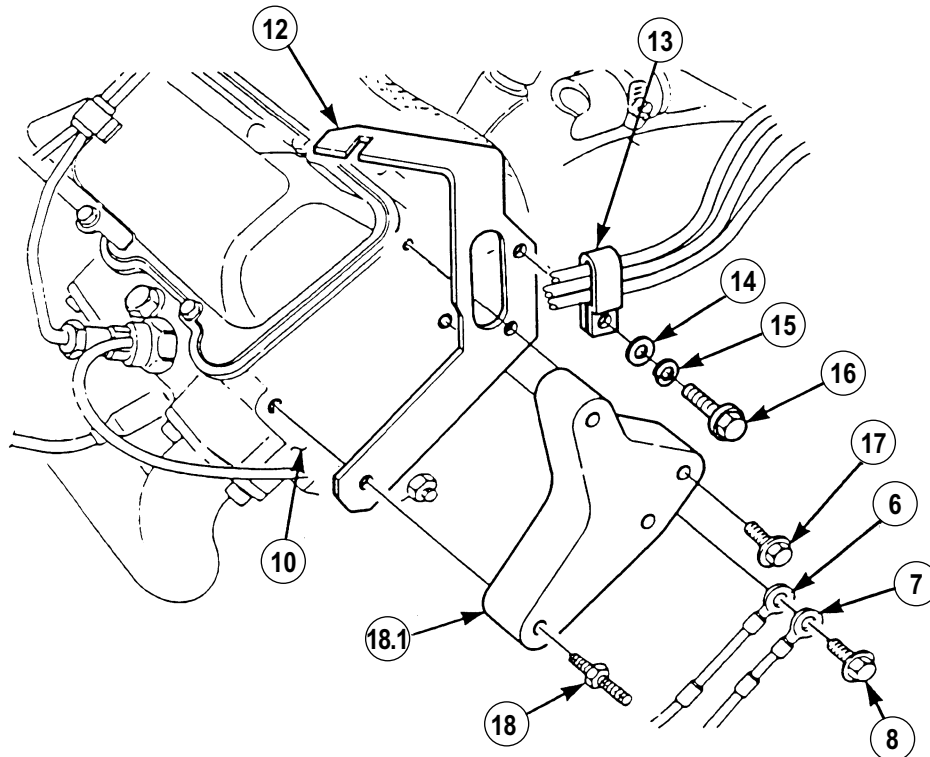
NOTE

Perform step 60 for M1113 models. Perform step 61 for M1114 models.

60. Remove capscrew (9), nut (5), lockwasher (4), stud (3), harness clamp (2), and air horn support bracket (1) from cylinder head (10). Discard lockwasher (4).
61. Remove capscrew (16), lockwasher (15), washer (14), harness clamp (13), capscrew (17), stud (18), adapter (18.1), and air horn support bracket (12) from cylinder head (10). Discard lockwasher (15).



M1113

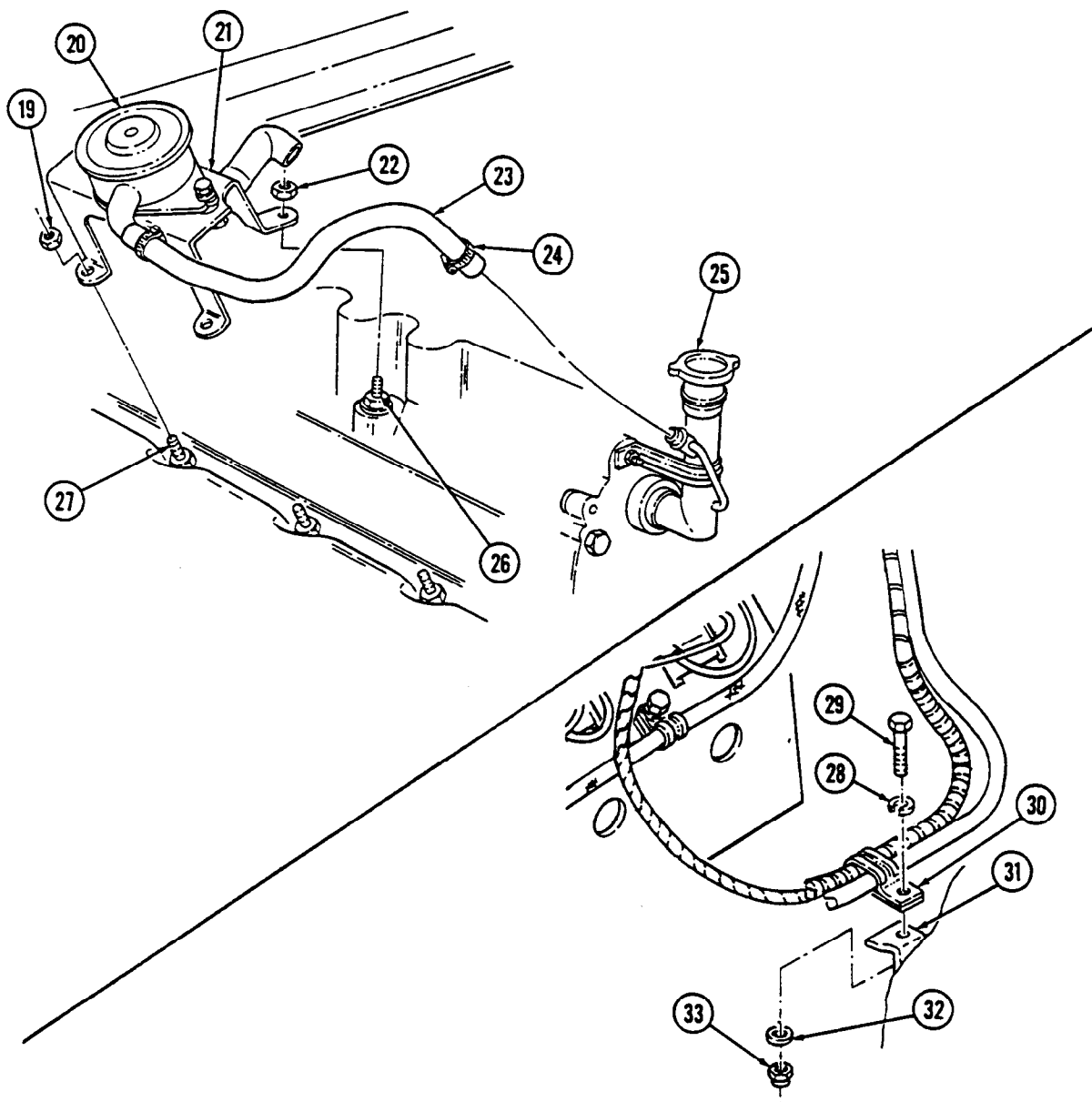


M1114

15-26. ENGINE REMOVAL (Cont'd)

NOTE

- CDR valves on vehicles equipped with deep water fording kit contain two additional vent lines.
 - Leave hoses connected to CDR valve.
62. Loosen clamp (24) and disconnect CDR valve oil fill tube hose (23) from oil fill tube (25).
 63. Remove two nuts (22) from intake manifold studs (26).
 64. Remove two nuts (19) and CDR valve (20) with bracket (21) from valve cover studs (27) and manifold studs (26).
 65. Remove nut (33), washer (32), capscrew (29), lockwasher (28), and clamp (30) from body (31). Discard lockwasher (28).



15-26. ENGINE REMOVAL (Cont'd)

WARNING

Do not touch hot exhaust system components with bare hands.
Severe injury will result.

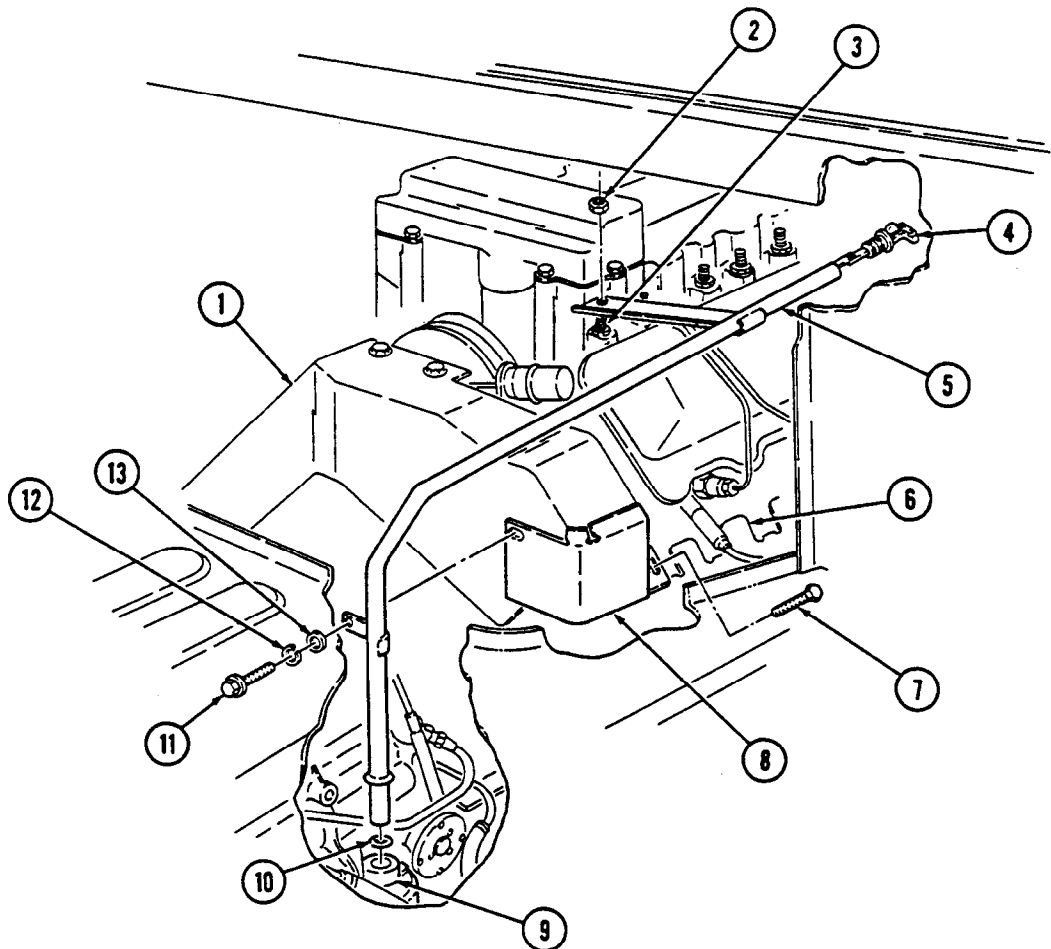
CAUTION

Plug open transmission port to prevent contamination of parts.

NOTE

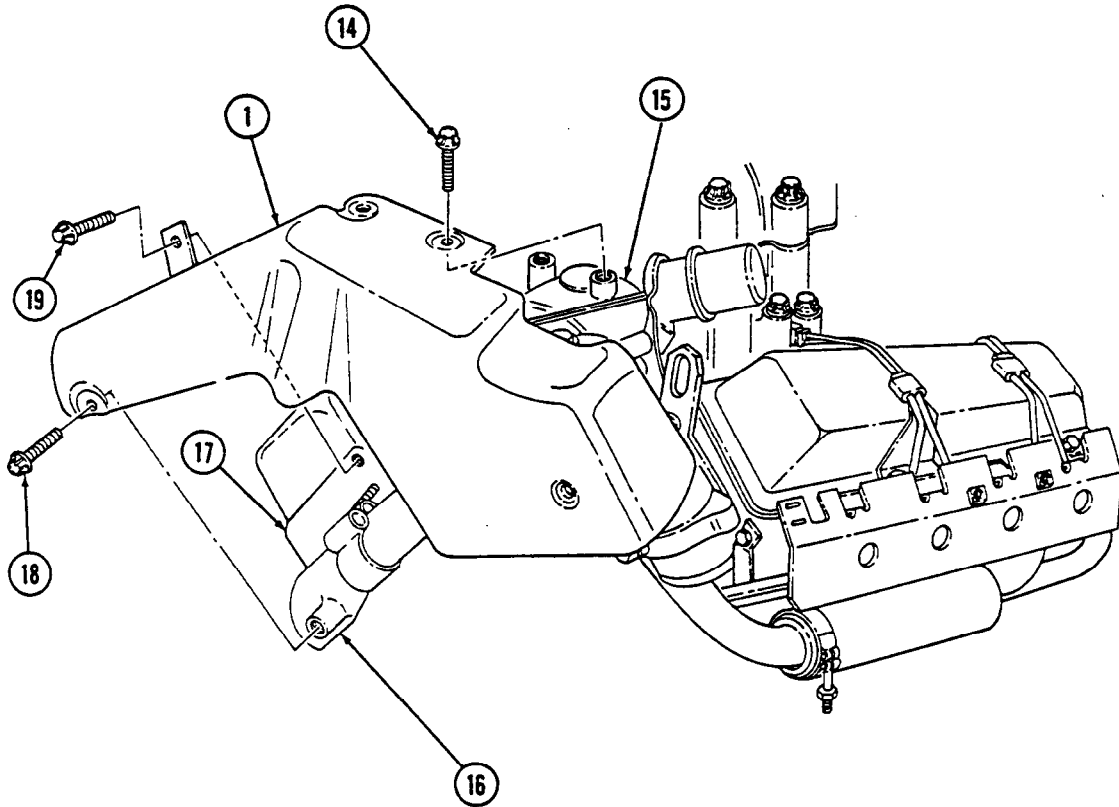
Have drainage container ready to catch fluid.

66. Remove transmission oil dipstick (4) from dipstick tube (5).
67. Remove two screws (7) from right rear heat shield (8) and right exhaust manifold heat shield (6).
68. Remove capscrew (11), lockwasher (12), washer (13), and right rear heat shield (8) from dipstick tube (5) and rear heat shield (1). Discard lockwasher (12).
69. Remove nut (2) and dipstick tube (5) from manifold stud (3).
70. Remove dipstick tube (5) from transmission (9).
71. Remove O-ring seal (10) from dipstick tube (5). Discard O-ring seal (10).



15-26. ENGINE REMOVAL (Cont'd)

72. Remove capscrew (18) from rear heat shield (1) and left exhaust manifold (16).
73. Remove capscrew (19) from rear heat shield (1) and left cylinder head (17).
74. Remove two capscrews (14) and rear heat shield (1) from turbocharger (15).



15-26. ENGINE REMOVAL (Cont'd)

CAUTION

Cover or plug all hoses and connections immediately after disconnection to prevent contamination. Remove all plugs prior to connection.

- 75. Loosen clamp (5) and disconnect surge tank-to-water crossover hose (4) from water crossover (3).
- 76. Loosen two clamps (2) and disconnect heater hoses (1) at water crossover (3) and water pump (6).

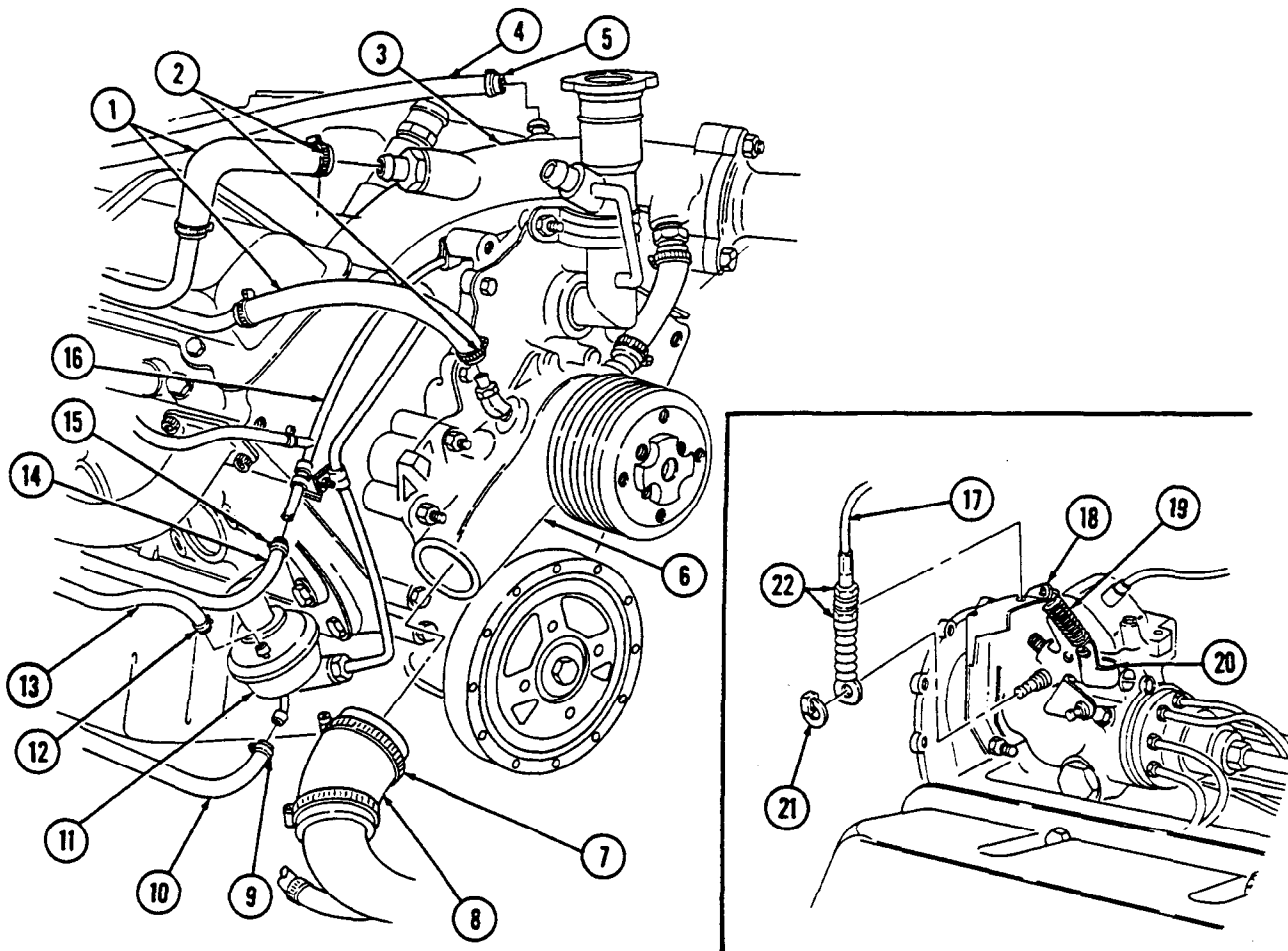
WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

NOTE

Tag fuel lines for installation.

- 77. Loosen clamp (15) and disconnect fuel return hose (14) from fuel return line (16).
- 78. Loosen clamp (9) and disconnect fuel supply line (10) from fuel pump (11).
- 79. Loosen clamp (12) and disconnect vent line (13) from fuel pump (11).
- 80. Loosen clamp (7) and disconnect water pump inlet hose (8) from water pump (6).
- 81. Disconnect throttle return spring (19) from bracket (18).
- 82. Loosen two nuts (22) and disconnect cable assembly (17) from bracket (18).
- 83. Remove accelerator cable clip (21) and disconnect cable assembly (17) from throttle shaft lever (20). Retain clip (21) for installation.



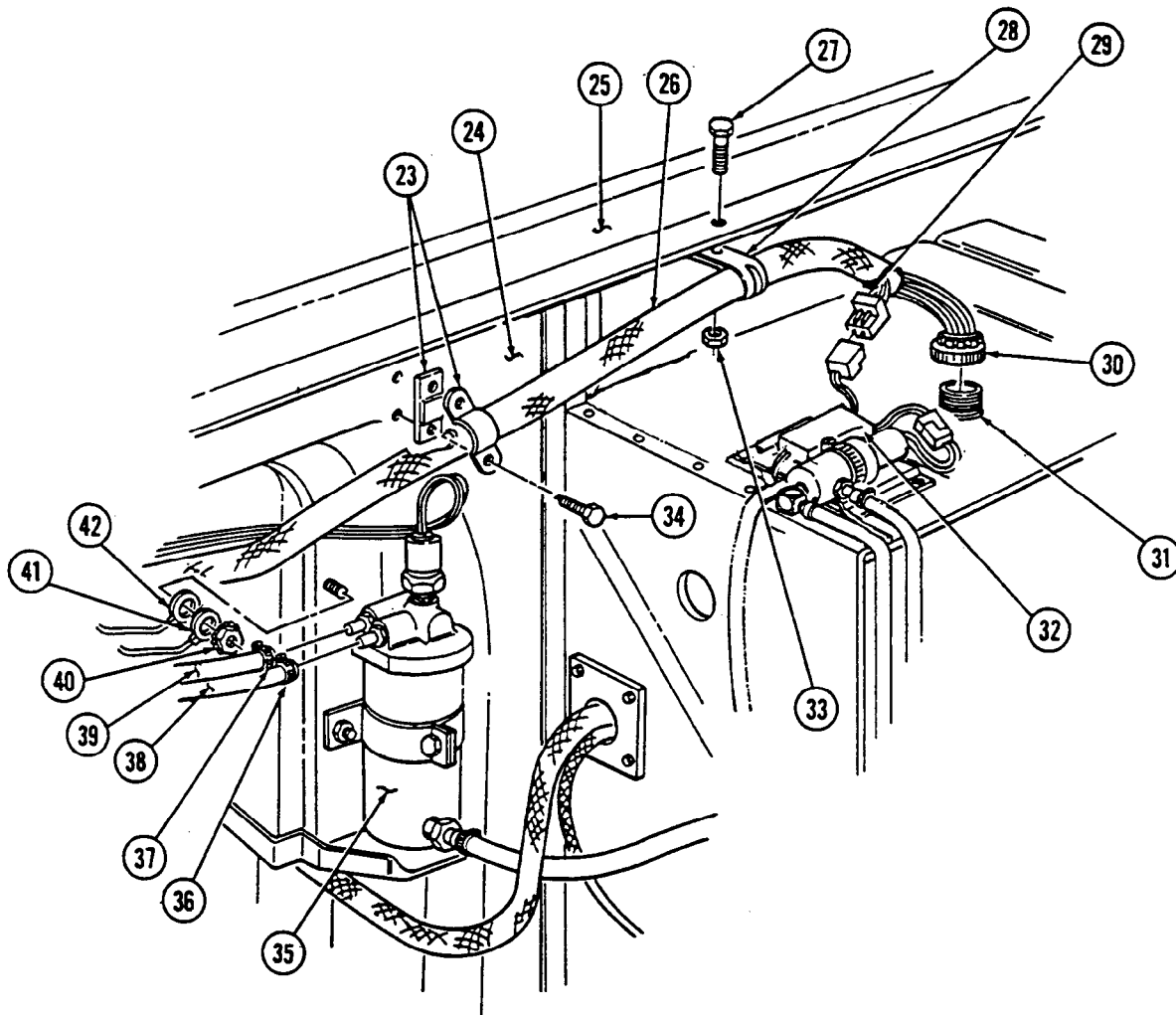
15-26. ENGINE REMOVAL (Cont'd)

84. Loosen clamps (36) and (37) and disconnect fuel inlet line (38) and fuel outlet line (39) from fuel filter (35).
85. Remove nut and lockwasher assembly (40), engine harness ground 3C (41), and body harness ground 58B (42) from body (24). Discard nut and lockwasher assembly (40).

NOTE

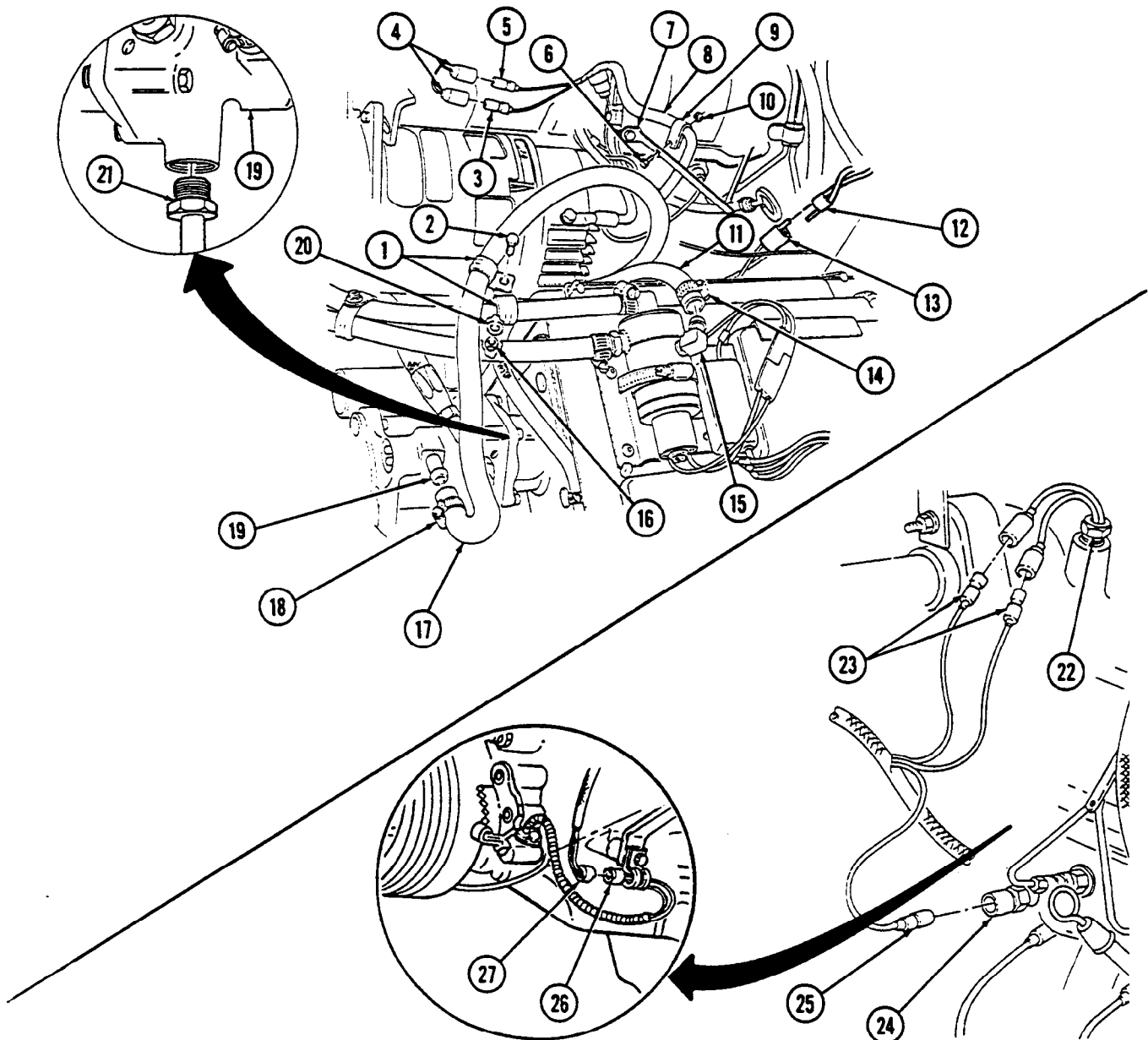
Perform steps 86 through 88 for M1113 models only.

86. Disconnect engine harness connector (29) from time-delay module (32).
87. Disconnect engine harness connector plug (30) from protective control box (31).
88. Remove nut (33), capscrew (27), clamp (28), and engine harness (26) from A-beam (25).
89. Remove two screws (34), clamp (23), and engine harness (26) from body (24).



15-26. ENGINE REMOVAL (Cont'd)

90. Loosen hose clamps (14) and (18) and disconnect control valve hose (11) from control valve (15) and hydro-booster hose (17) from hydro-booster (19).
91. Remove nut (16), washer (20), and capscrew (2) from two clamps (1).
92. Disconnect high-pressure line (21) from hydro-booster (19).
93. Remove nut (10), screw (6), clamp (9), and body harness (8) from dipstick support bracket (7).
94. Disconnect two leads 458A (4) from leads 458C (3) and 458D (5).
95. Disconnect body harness leads 350B/359A/355A (12) from engine harness leads 349A (13).
96. Disconnect harness lead 33B (25) from engine temperature sending unit (24) and harness lead (27) from engine rpm sensor lead (26).
97. Disconnect harness leads 458A and 458B (23) from water temperature sending unit (22).



15-26. ENGINE REMOVAL (Cont'd)**NOTE**

Prior to removal, tag leads for installation.

98. Disconnect lead 36A (32) from oil pressure sending unit (28).

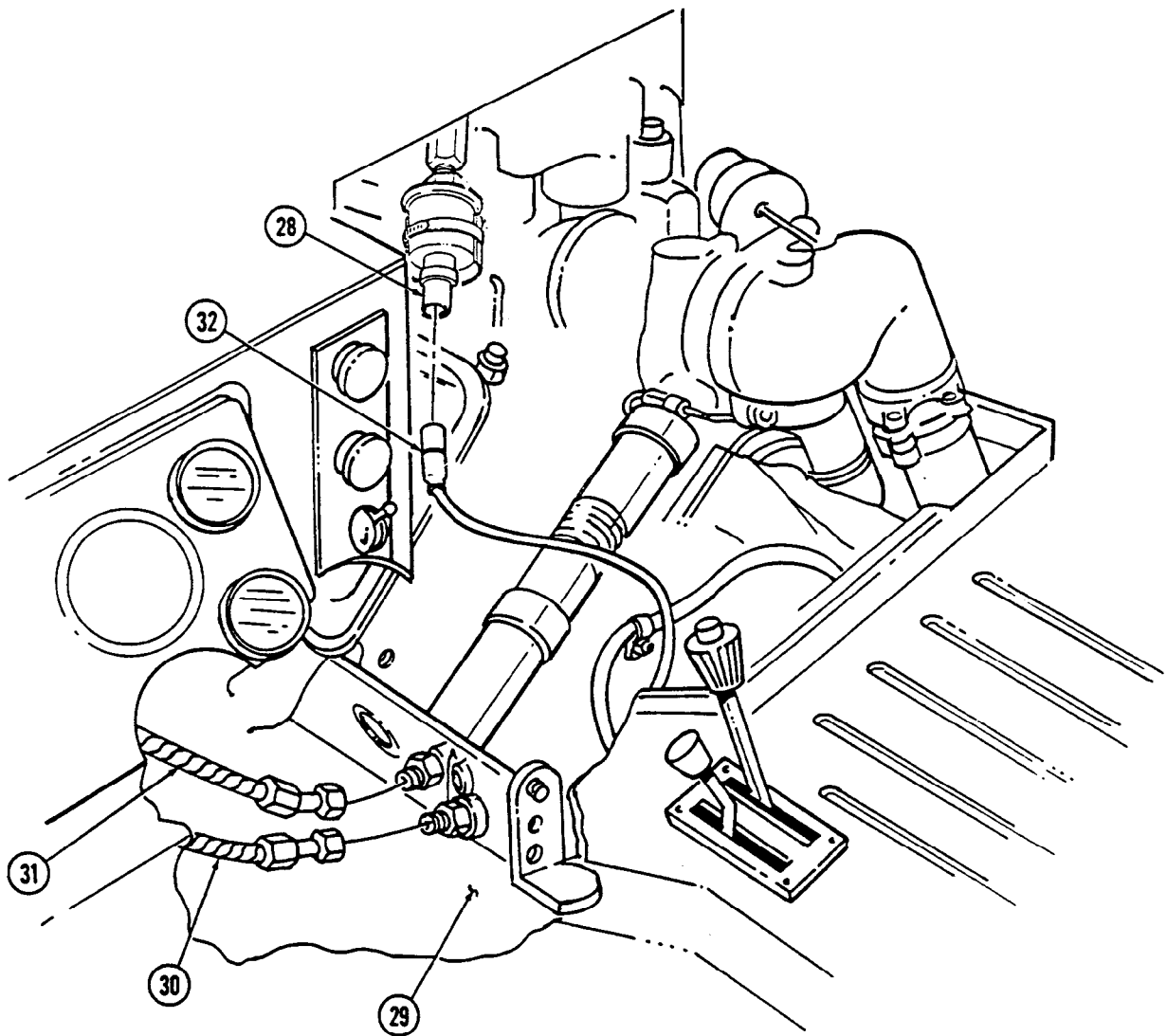
CAUTION

Cover or plug all hoses and connections immediately after disconnection to prevent contamination. Remove all plugs prior to connection.

NOTE

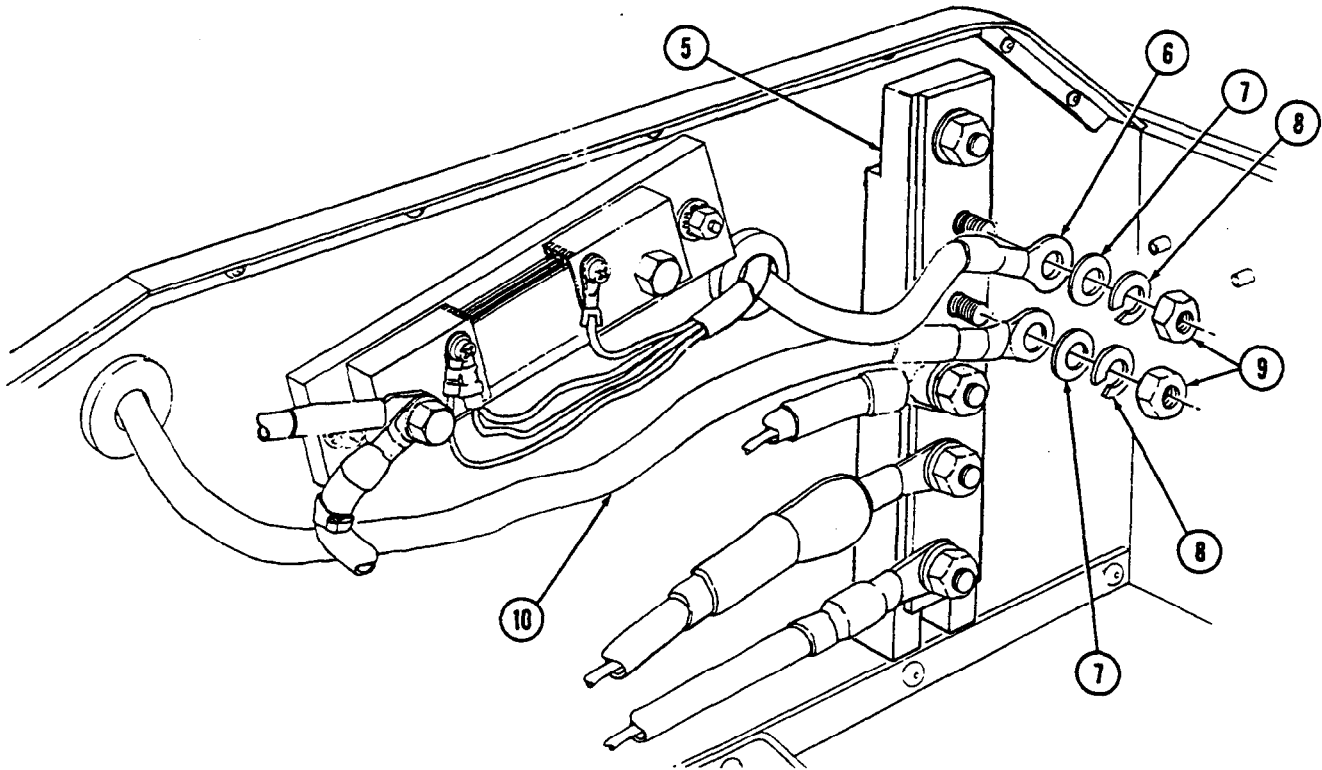
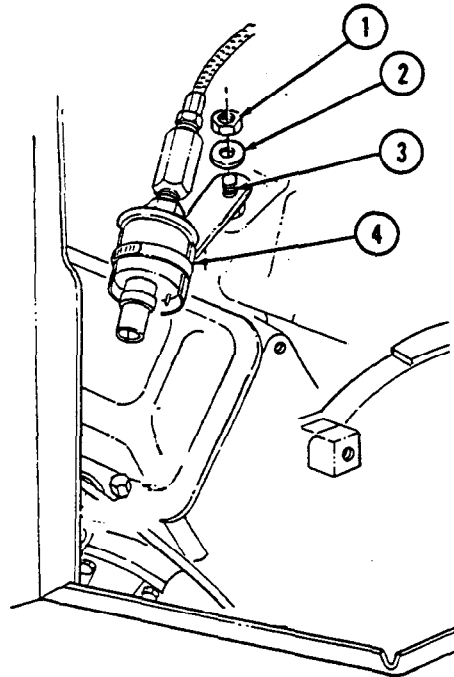
Have drainage container ready to catch oil.

99. Disconnect oil cooler supply line (30) and oil cooler return line (31) from engine (29).



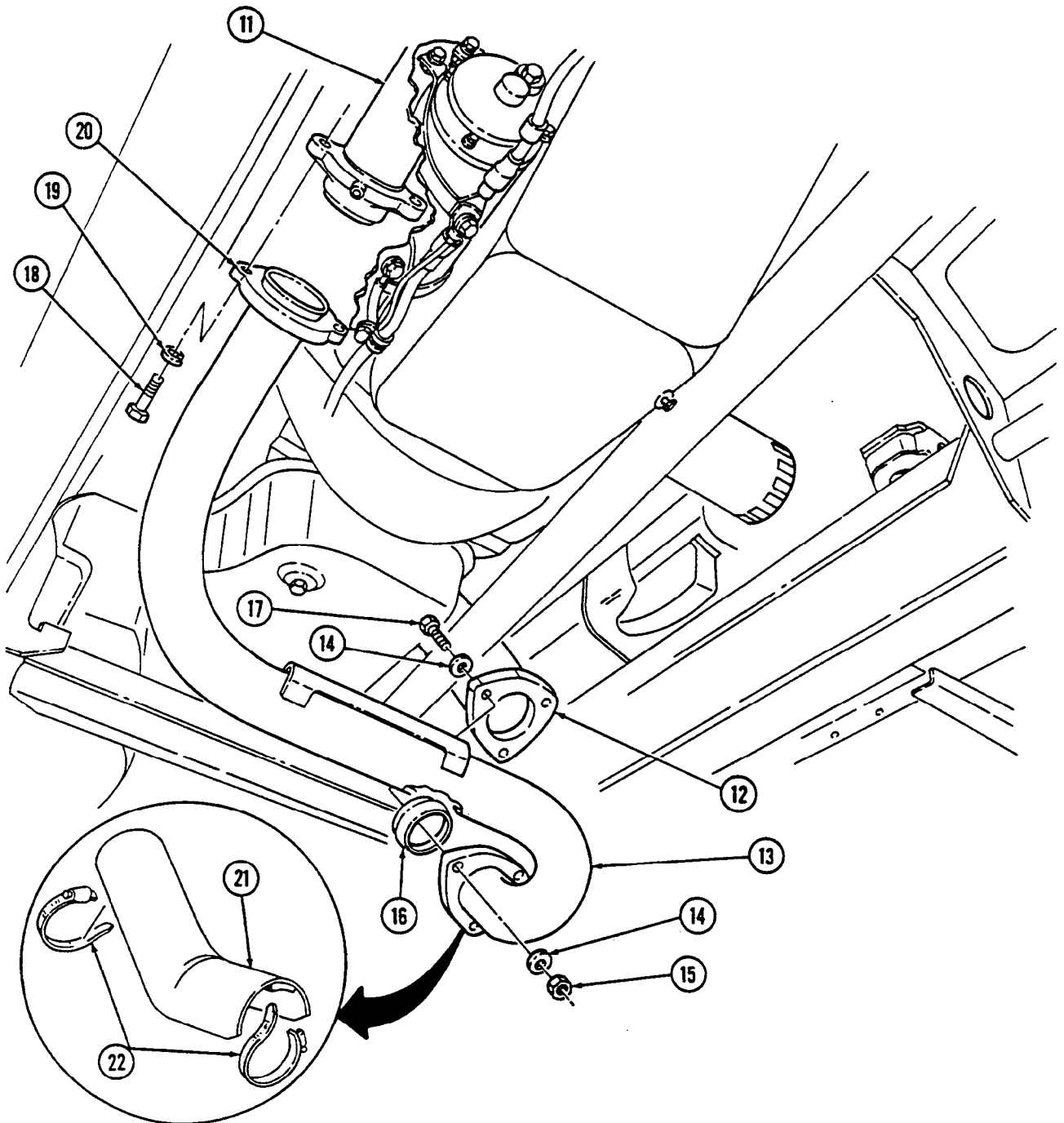
15-26. ENGINE REMOVAL (Cont'd)

- 100. Remove nut (1), washer (2), and oil pressure sending unit (4) from stud (3).
- 101. Remove two nuts (9), lockwashers (8), washers (7), engine harness cable (6), and 200-amp alternator cable (10) from buss bar (5). Discard lockwashers (8).



15-26. ENGINE REMOVAL (Cont'd)

102. Remove two clamps (22) and heat shield (21) from exhaust pipe (13).
103. Remove three locknuts (15), washers (14), capscrews (17), washers (14), and exhaust pipe (13) from muffler pipe (12). Discard locknuts (15).
104. Remove two capscrews (18), washers (19), flange (20), and exhaust pipe (13) from wastegate housing (11).
105. Remove gasket (16) from muffler pipe (12). Discard gasket (16).



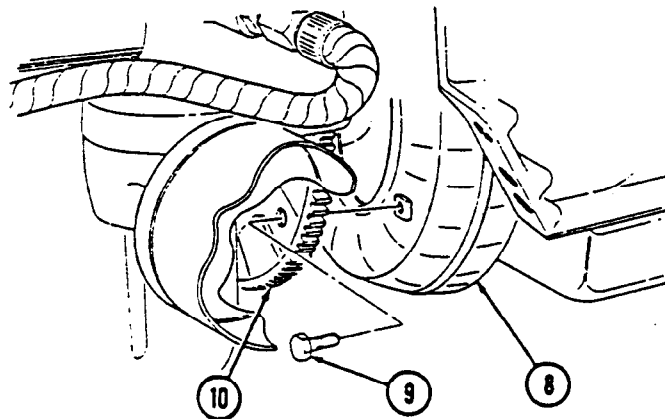
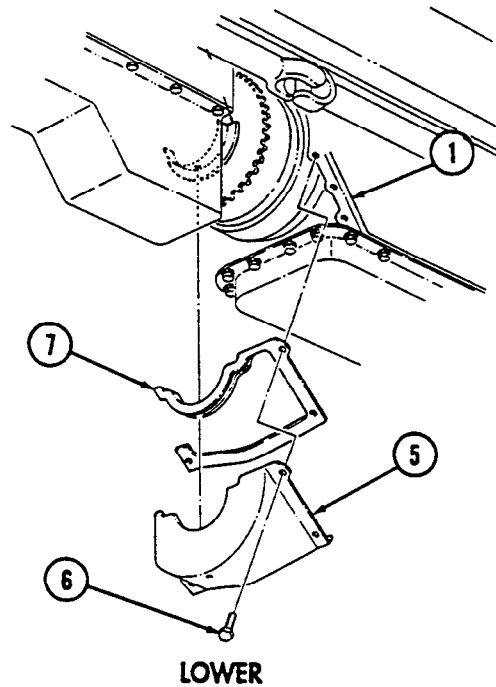
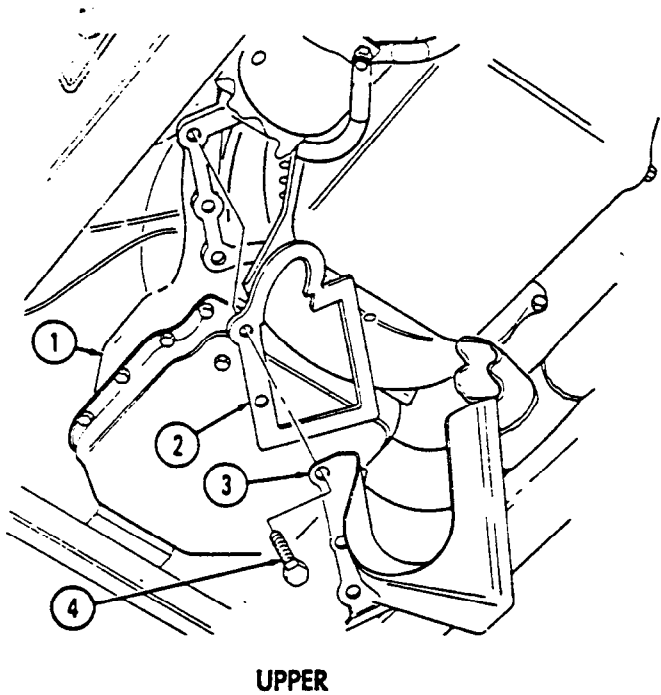
15-26. ENGINE REMOVAL (Cont'd)

106. Remove two capscrews (4) and upper converter housing cover (3) from transmission (1).
107. Remove four capscrews (6) and lower converter housing cover (5) from transmission (1).
108. Remove gaskets (2) and (7) from converter housing covers (3) and (5). Discard gaskets (2) and (7).

NOTE

- It will be necessary to rotate flywheel clockwise from capscrew in front of crankshaft to gain access to capscrews securing torque converter.
- Have assistant hold crankshaft pulley in place when removing capscrews securing flywheel to torque converter.

109. Remove six capscrews (9) and torque converter (8) from flywheel (10) and slide torque converter (8) away from flywheel (10).



15-26. ENGINE REMOVAL (Cont'd)

110. Install drainvalve (11) in radiator (12) and close drainvalve (11).

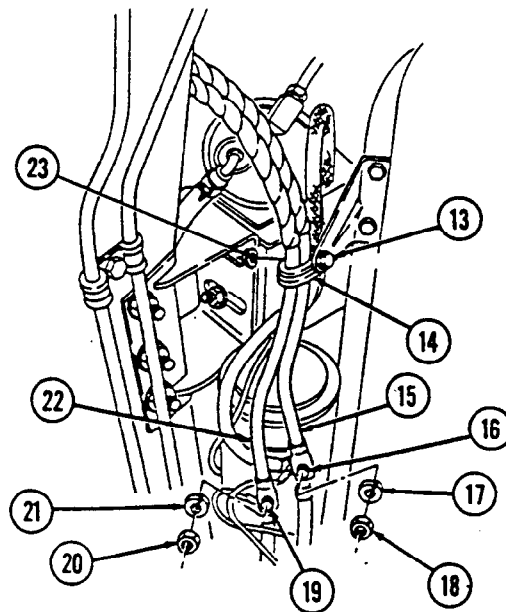
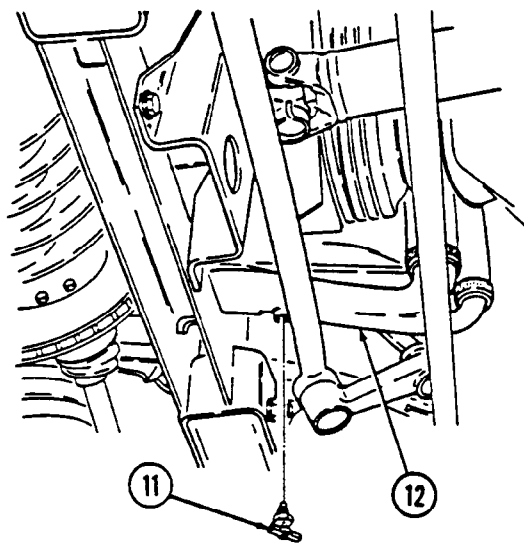
NOTE

- Prior to removal, tag leads for installation.
- Perform steps 111 and 112 if winch kit is installed on M1113.

111. Remove nut (20), lockwasher (21), and winch lead 7 (22) from starter negative terminal (19). Discard lockwasher (21).

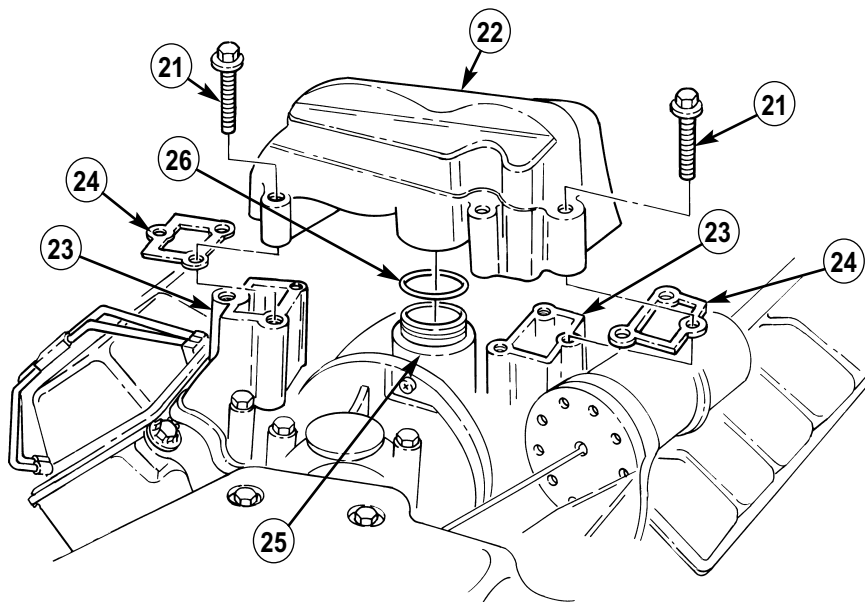
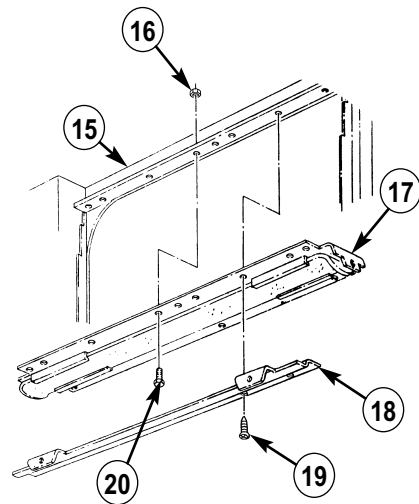
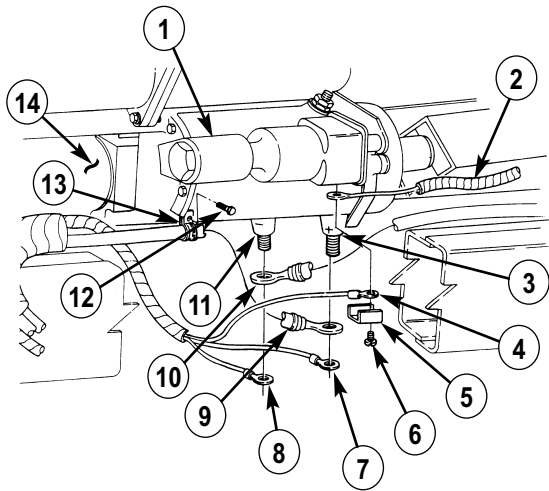
112. Remove nut (18), lockwasher (17), and winch lead 6 (15) from starter positive terminal (16). Discard lockwasher (17).

113. Remove nut and lockwasher assembly (23) and clamp (14) from oil pan bracket screw (13). Discard nut and lockwasher assembly (23).



15-26. ENGINE REMOVAL (Cont'd)

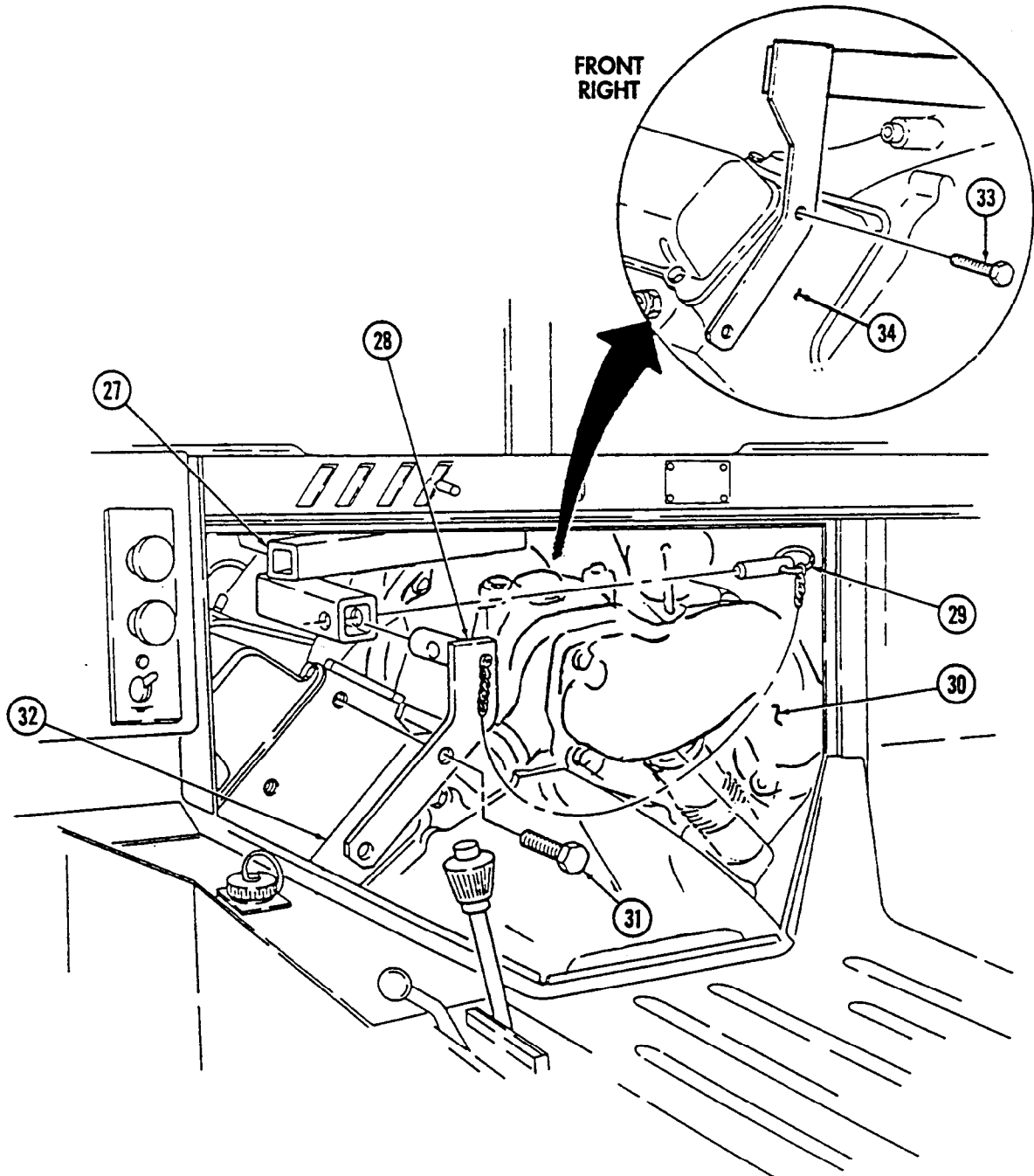
114. Remove lead 3D (8) and lead 7A (10) from starter negative terminal (11).
115. Remove screw (12), clamp (13), and positive cable 6A (9) from starter (14).
116. Remove lead 81B (7) and cable 6A (9) from starter positive terminal (3).
117. Remove screw (6), clip (5), and leads 74B (4) and 74A (2) from solenoid (1).
118. Remove ten nuts (16), capscrews (20), two screws (19), retainer (18), and closeout panel (17) from A-beam (15).
119. Remove six capscrews (21), intake crossover (22), and two gaskets (24) from intake manifolds (23) and turbocharger (25). Discard gaskets (24).
120. Remove crossover O-ring (26) from turbocharger (25). Discard crossover O-ring (26). Clean mating surfaces.



15-26. ENGINE REMOVAL (Cont'd)

NOTE

- Install sling bracket on rear of engine first.
 - Use four 15x25 mm capscrews to install lifting sling on engine.
121. Position engine lifting sling (27) on engine (30) and install on right cylinder head (34) with two capscrews (33).
 122. Install sling bracket (28) on left cylinder head (32) with two capscrews (31). Tighten capscrews (31) and (33). Install sling bracket (28) on engine lifting sling (27) with pin (29).



15-26. ENGINE REMOVAL (Cont'd)

CAUTION

When using front eyelet on lifting sling, engine oil pan must be supported during engine removal to prevent rear eyelet of lifting sling from damaging windshield.

NOTE

Hoist must be attached to intermediate eyelet when lifting engine and attached to rear eyelet when lifting engine and transmission together.

123. Raise engine (5) only enough to take pressure off mounting brackets (2).
124. Remove two locknuts (3) and washers (4) from right engine mount insulator (1) and engine mount bracket (2). Discard locknuts (3). Repeat for left engine mount.

WARNING

Transmission must be supported during engine removal. Failure to do this may cause injury to personnel or damage to equipment.

CAUTION

If vehicle is moved because of limited shop space or tactical movement, damage to transmission and vehicle may occur. To prevent damage, engine/transmission support sling can be installed.

125. Support transmission (7) and remove four capscrews (8) and two studs (6) from transmission (7) and engine (5).

WARNING

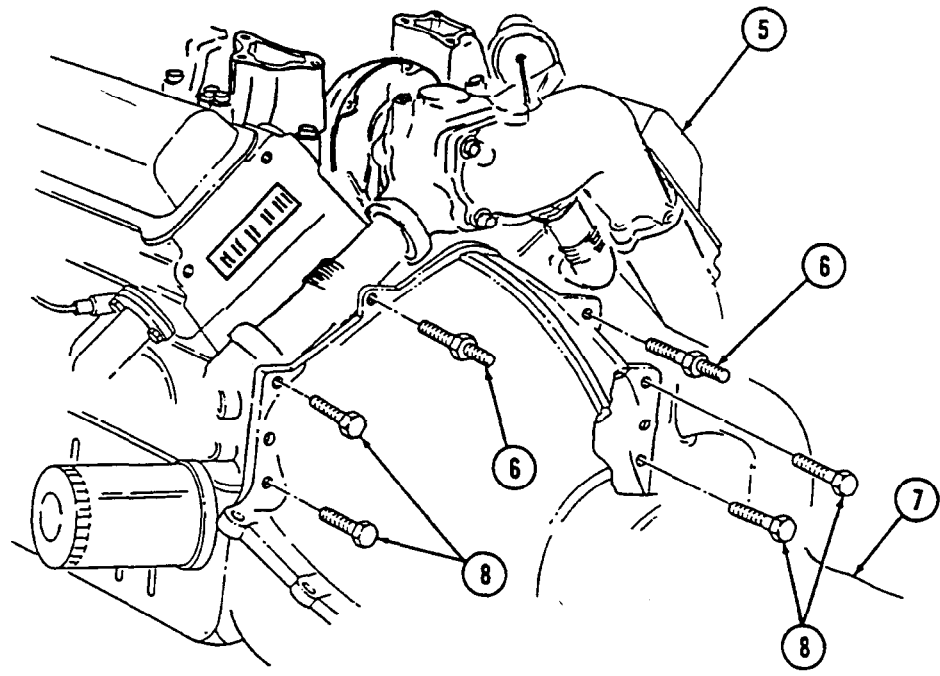
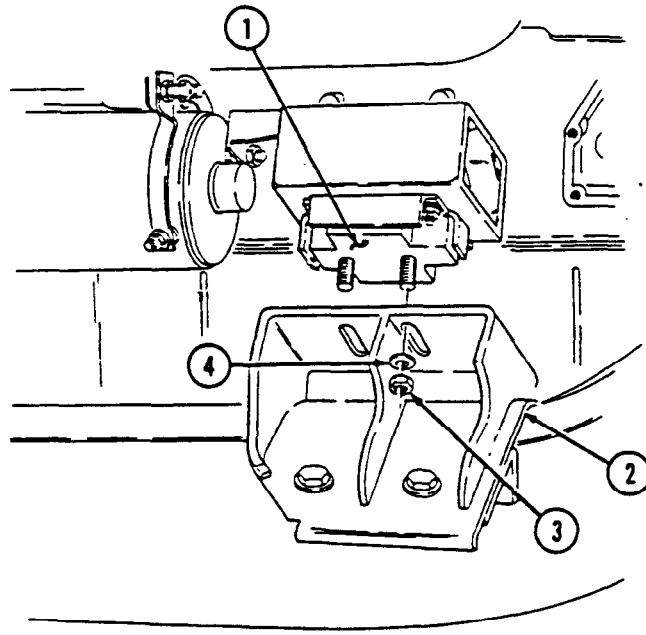
- Direct all personnel not participating in engine removal to stand clear during hoisting operation. Failure to do this may cause injury to personnel.
- Do not use hands to free engine of hangups or snags. Use prybars to avoid injury.

CAUTION

Always remove engine slowly and watch for engine binding. Something may still be connected to engine that must be removed. Ensure wiring, lines, cables, and rods are not in the path of removal.

126. Hoist engine (5) slowly out of vehicle.

15-26. ENGINE REMOVAL (Cont'd)



FOLLOW-ON TASK: Prepare engine for disassembly (para. 15-27).

15-27. ENGINE PREPARATION

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Hex-head driver, 8-mm (Appendix B, Item 145)
Torque adapter, 9/16-in. (Appendix B, Item 133)
Crowfoot, 9/16-in. (Appendix B, Item 139)
Engine stand (Appendix B, Item 28)

Materials/Parts

Five lockwashers (Appendix G, Item 239)
O-ring seal (Appendix G, Item 279)
Six lockwashers (Appendix G, Item 205)
Two lockwashers (Appendix G, Item 238)
Six lockwashers (Appendix G, Item 217)
Nut and lockwasher assembly
(Appendix G, Item 245)
Antiseize compound (Appendix C, Item 16)
RTV sealant (Appendix C, Item 10)

Materials/Parts (Cont'd)

Sealing compound (Appendix C, Item 65)
Sealing compound, thread-locking
(Appendix C, Item 66)

Manual References

TM 9-2320-387-24P

Equipment Condition

Engine removed (para. 15-26).

General Safety Instructions

- Direct personnel to stand clear during hoisting operation.
- Starter must be supported during removal and installation.
- Power steering pump must be supported during removal and installation.

Maintenance Level

Direct support

WARNING

Direct personnel to stand clear during hoisting operation. Failure to do this may cause injury to personnel.

a. Disassembly

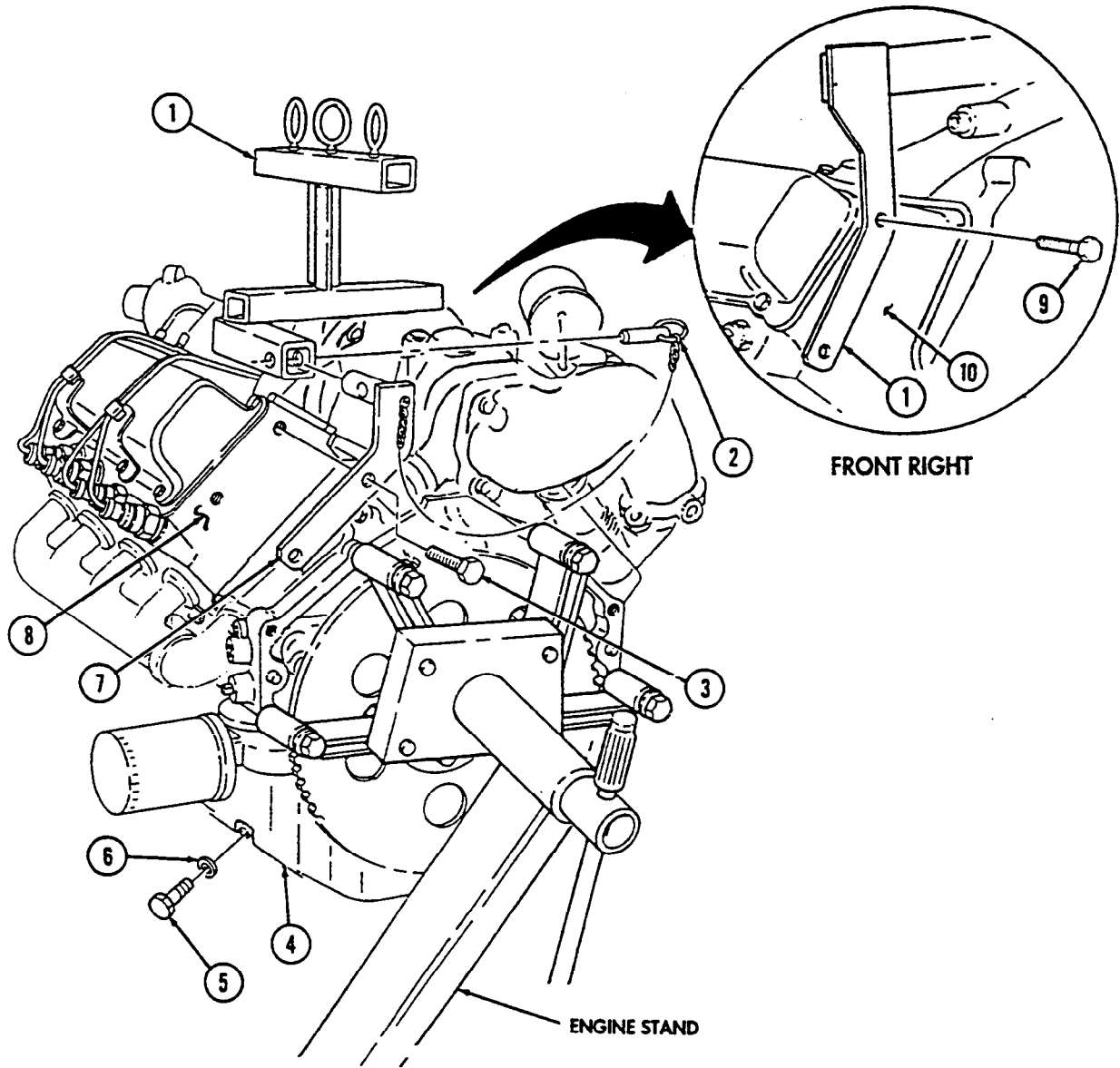
1. Place engine on stand and disconnect hoist.

NOTE

Have drainage container ready to catch oil.

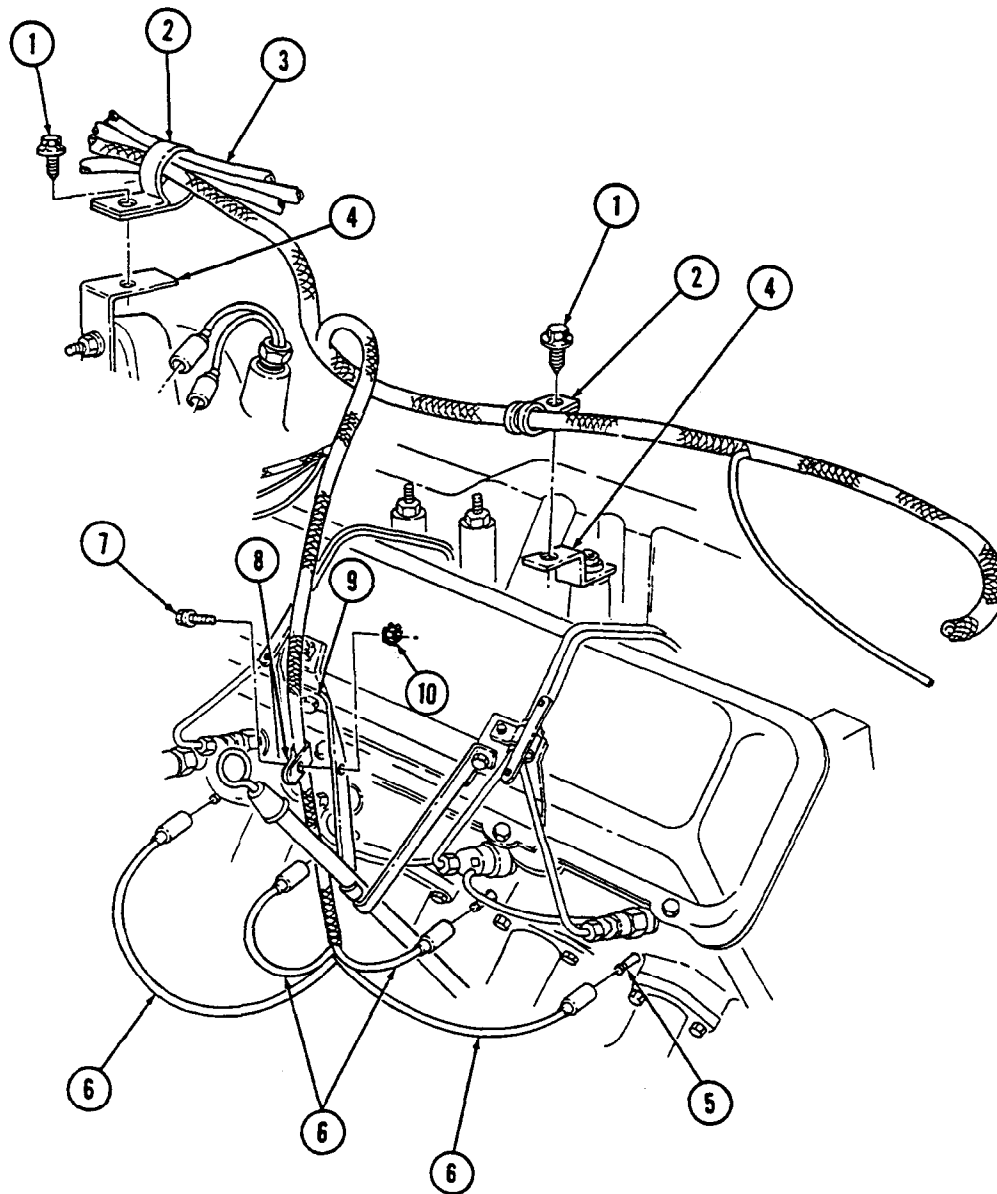
2. Remove drainplug (5) and gasket (6) from oil pan (4). Allow oil to drain completely.
3. Install gasket (6) and drainplug (5) on oil pan (4). Tighten drainplug (5) to 20 lb-ft (27 N·m).
4. Remove two capscrews (3) and sling bracket (7) from left cylinder head (8).
5. Remove pin (2) from sling bracket (7) and engine lifting sling (1).
6. Remove two capscrews (9) and engine lifting sling (1) from right cylinder head (10).

15-27. ENGINE PREPARATION (Cont'd)



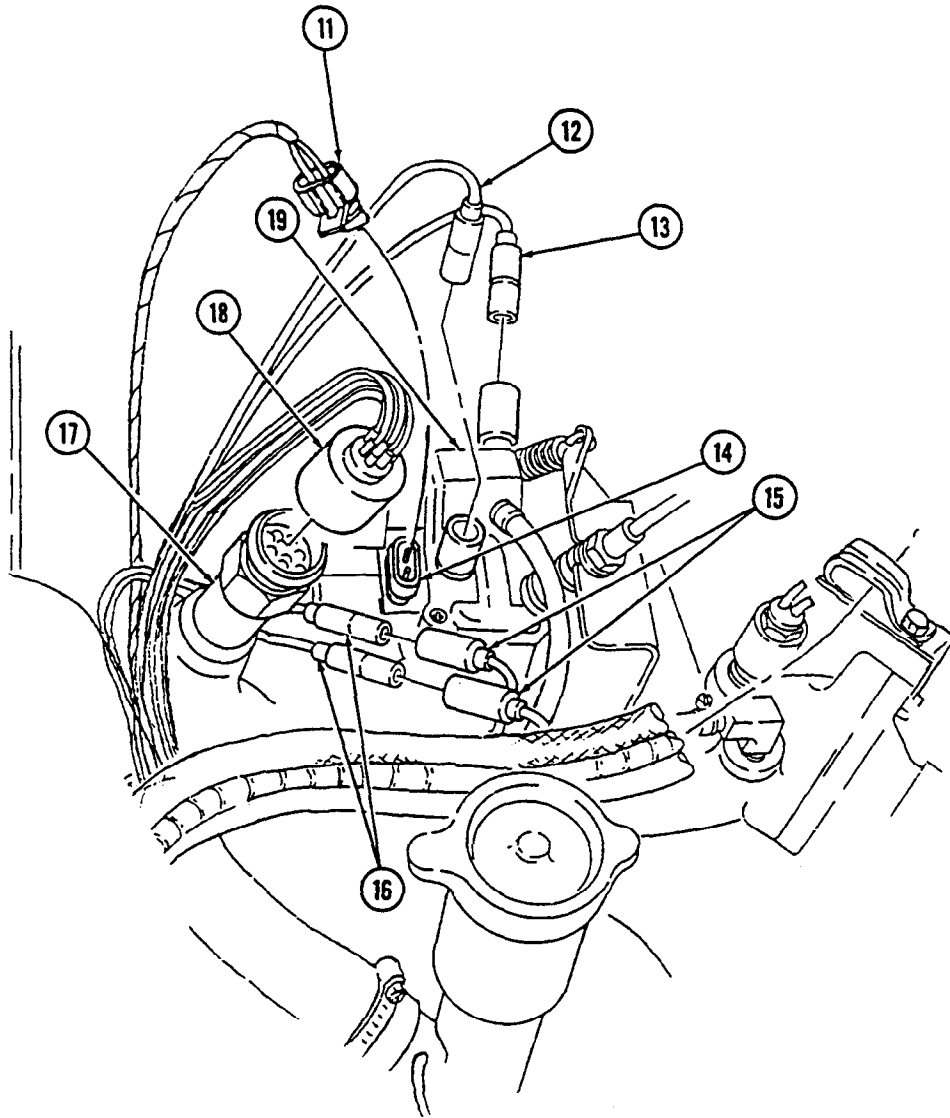
15-27. ENGINE PREPARATION (Cont'd)

7. Remove two capscrews (1), clamps (2), and harness (3) from brackets (4).
8. Remove nut and lockwasher assembly (10), capscrew (7), clamp (8), and harness (3) from dipstick bracket (9). Discard nut and lockwasher assembly (10).
9. Disconnect four harness leads (6) from glow plugs (5).



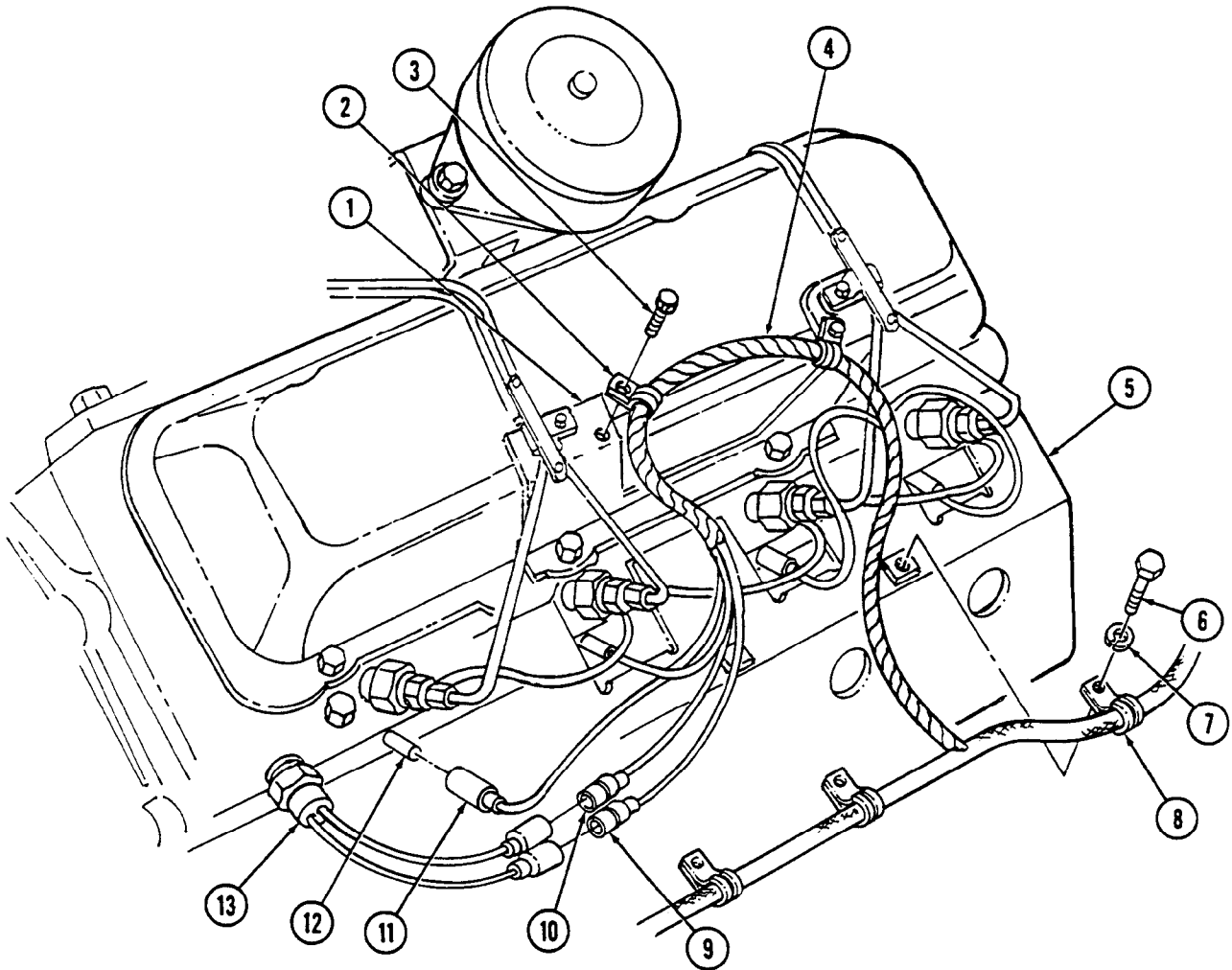
15-27. ENGINE PREPARATION (Cont'd)

10. Disconnect harness connector (18) from glow plug controller (17).
11. Disconnect leads 315A/315B (16) from fan cut-off switch leads (15).
12. Disconnect harness connector (11) from transmission TP sensor (14).
13. Disconnect leads 54A (12) and 569B (13) from fuel injection pump (19).



15-27. ENGINE PREPARATION (Cont'd)

14. Disconnect leads 569A (10) and 569B (9) from cold-advance switch (13).
15. Disconnect four harness boots (11) from glow plugs (12).
16. Remove three capscrews (6), lockwashers (7), clamps (8), and harness (4) from heat shield (5).
17. Remove two screws (3), clamps (2), and harness (4) from intake manifold bracket (1).



15-27. ENGINE PREPARATION (Cont'd)

NOTE

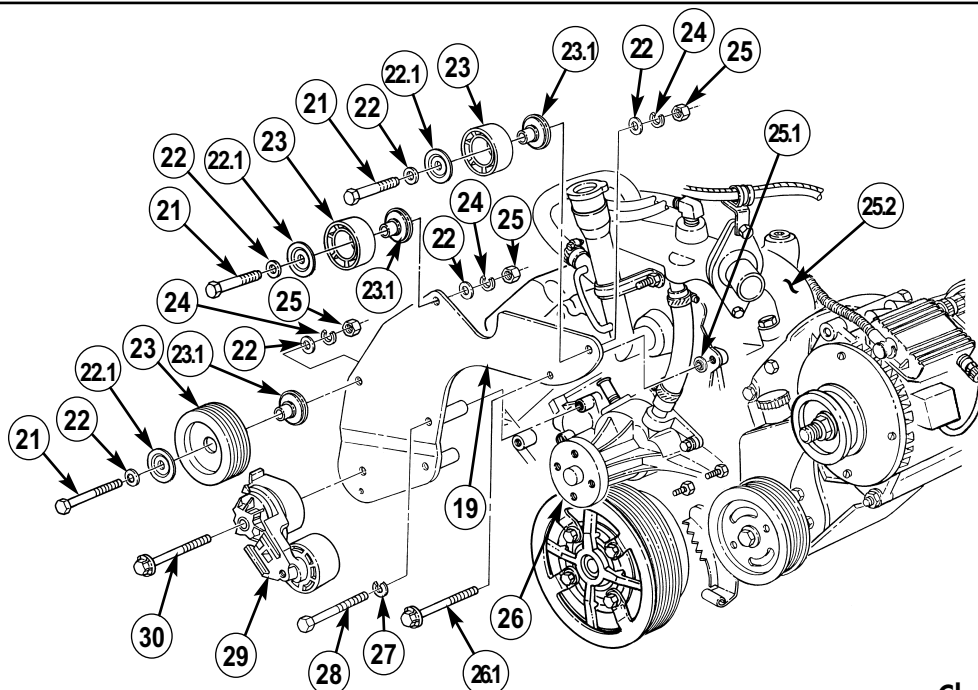
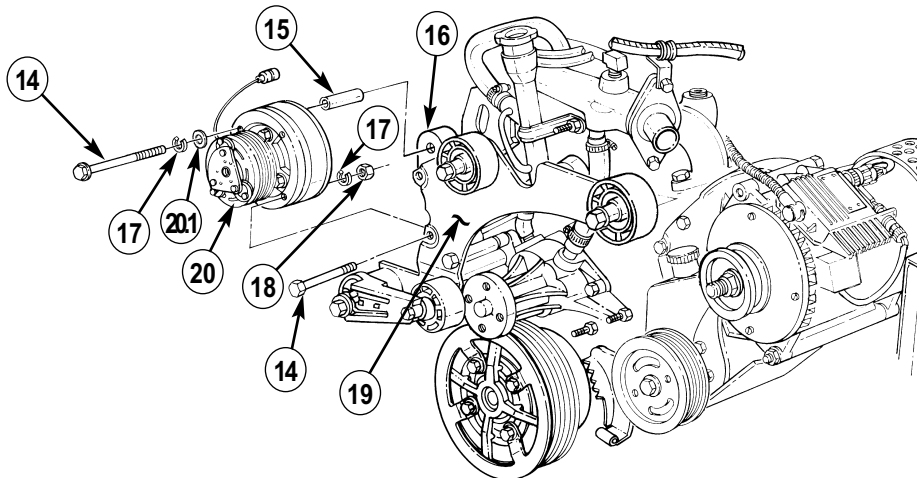
Perform step 18 for M1114 vehicles only.

18. Remove two nuts (18), lockwashers (17), capscrews (14), washer (20.1), lockwasher (17), A/C compressor (20), and spacer (15) from mounting bracket (19) and bracket (16). Discard lockwashers (7).
19. Remove capscrew (30) and belt tensioner (29) from mounting bracket (19).

NOTE

On M1114 vehicles equipped with A/C, the compressor pulley is in place of the lower idler pulley.

20. Remove three nuts (25), lockwashers (24), washers (22), supports (23.1), capscrews (21), washers (22), dust covers (22.1), and idler pulleys (23) from mounting bracket (19). Discard lockwashers (24).
21. Remove two capscrews (28) and lockwashers (27) from mounting bracket (19) and water pump (26). Discard lockwashers (27).
- 21.1. Remove screw (26.1), collar washer (25.1), and mounting bracket (19) from engine (25.2).

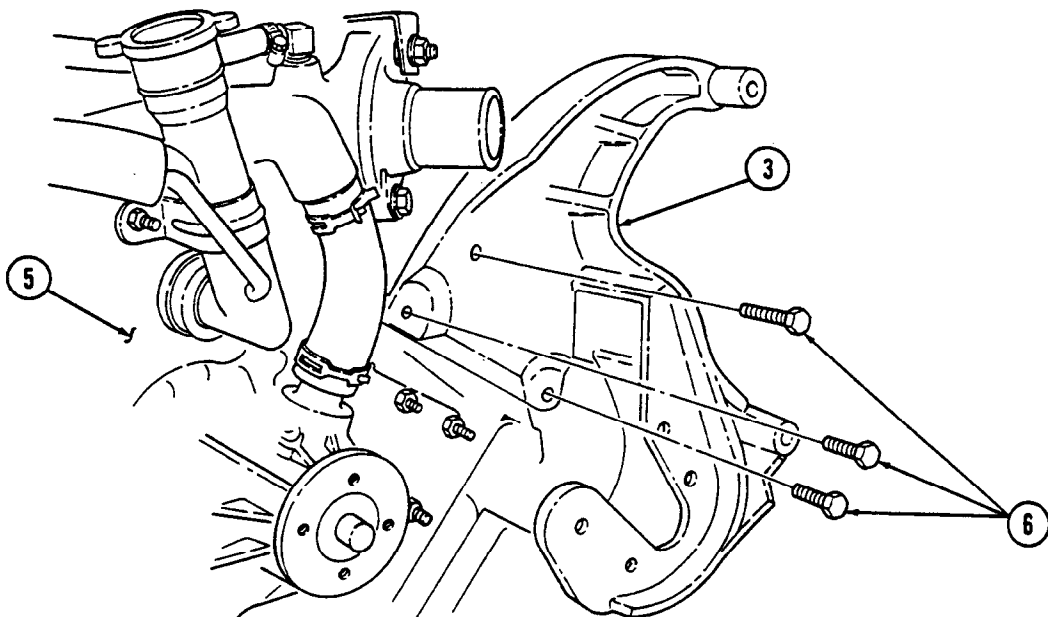
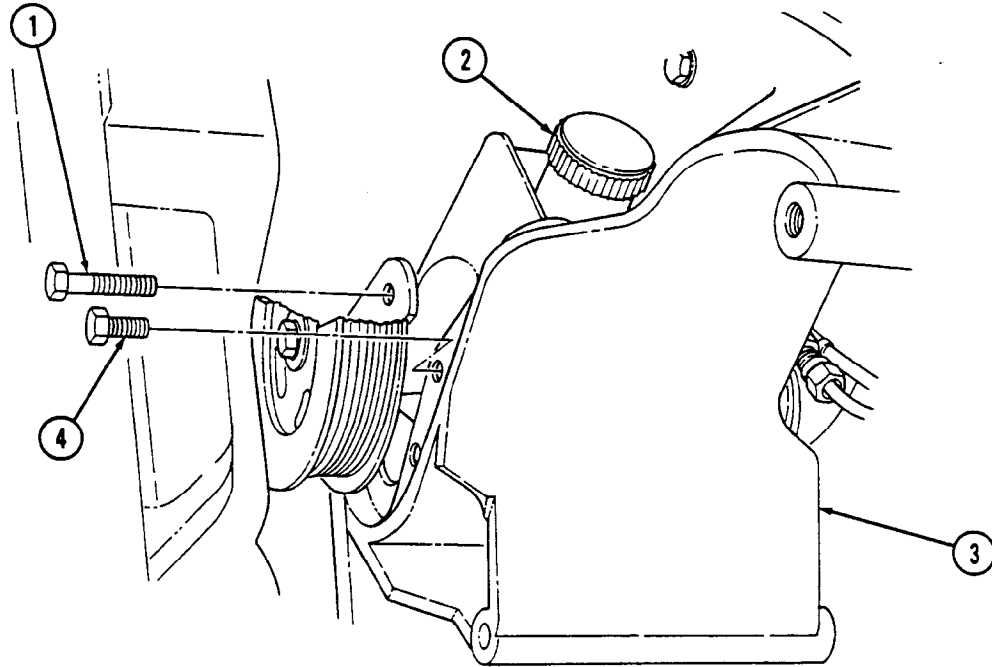


15-27. ENGINE PREPARATION (Cont'd)

WARNING

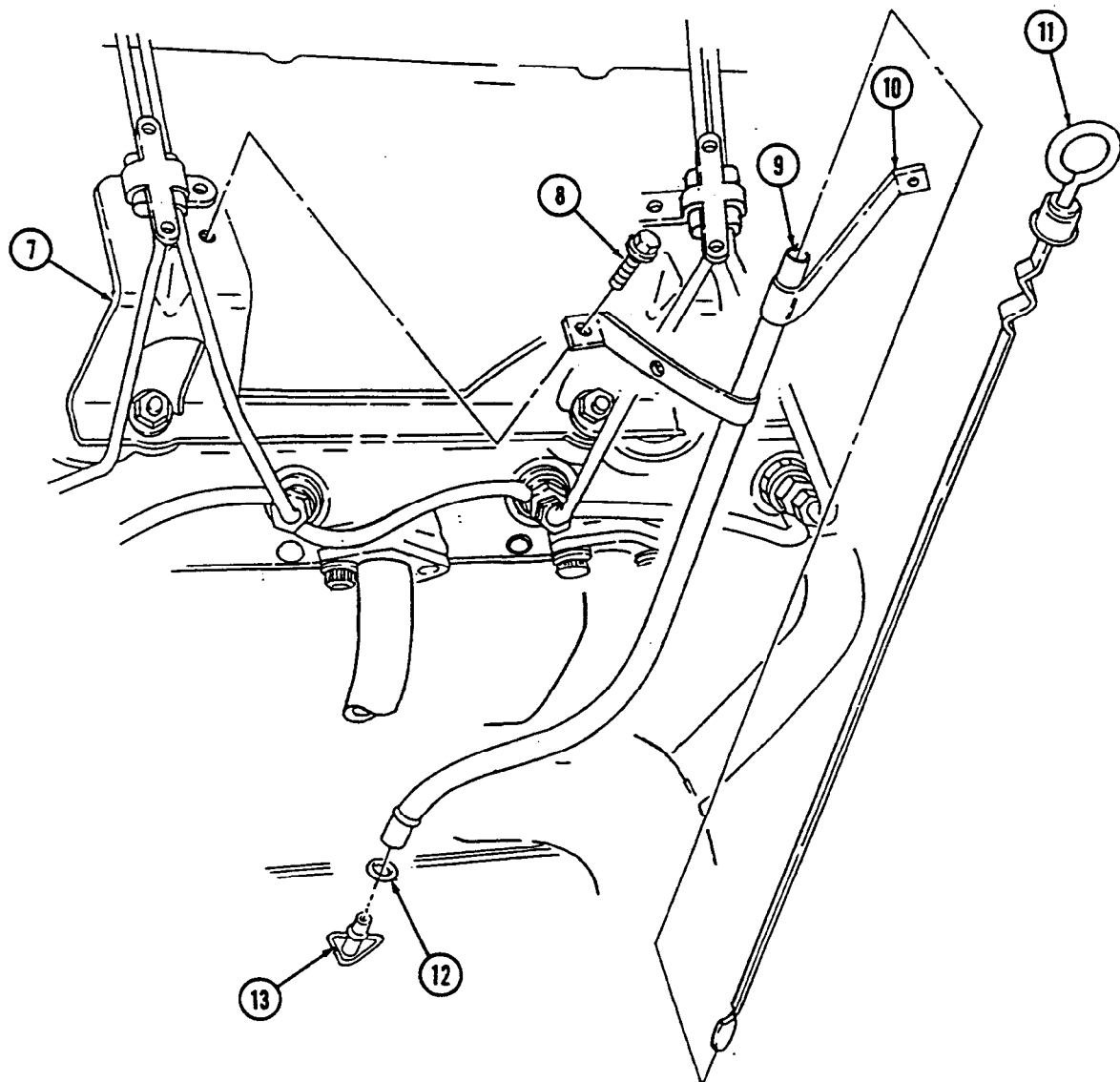
Power steering pump must be supported during removal and installation. Failure to do this may cause injury to personnel.

22. Remove two capscrews (1) and capscrew (4) from alternator/power steering bracket (3).
23. Remove power steering pump (2).
24. Remove three capscrews (6) and alternator/power steering bracket (3) from engine (5).



15-27. ENGINE PREPARATION (Cont'd)

25. Remove oil dipstick (11) from oil dipstick tube (9).
26. Remove two screw-assembled washers (8) and dipstick tube bracket (10) from two fuel line brackets (7).
27. Remove oil dipstick tube (9) from engine oil pan (13). Remove and discard O-ring seal (12).



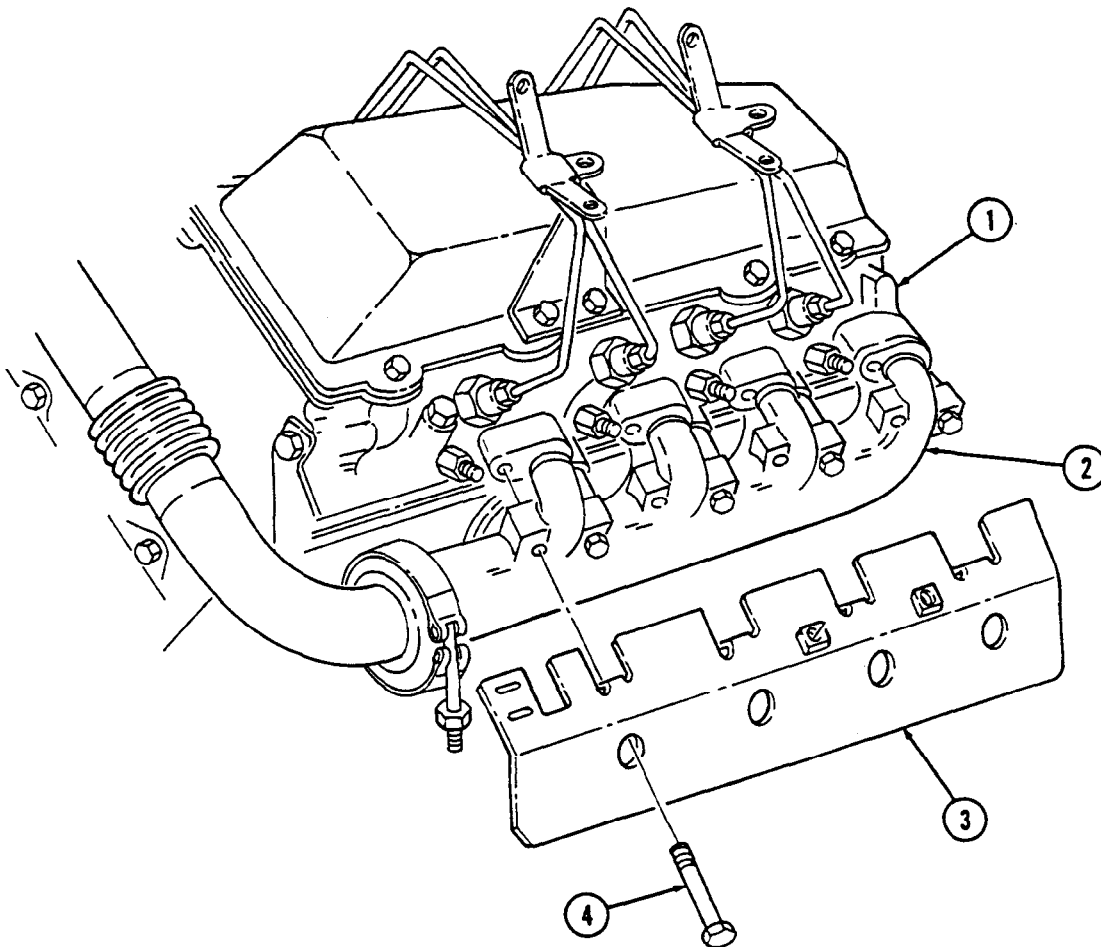
15-27. ENGINE PREPARATION (Cont'd)

28. Remove four capscrews (4) and right exhaust manifold heat shield (3) from exhaust manifold (2) and cylinder head (1).
29. Loosen locknut (9) and washer (8) on front of starter (7) and bracket (10).

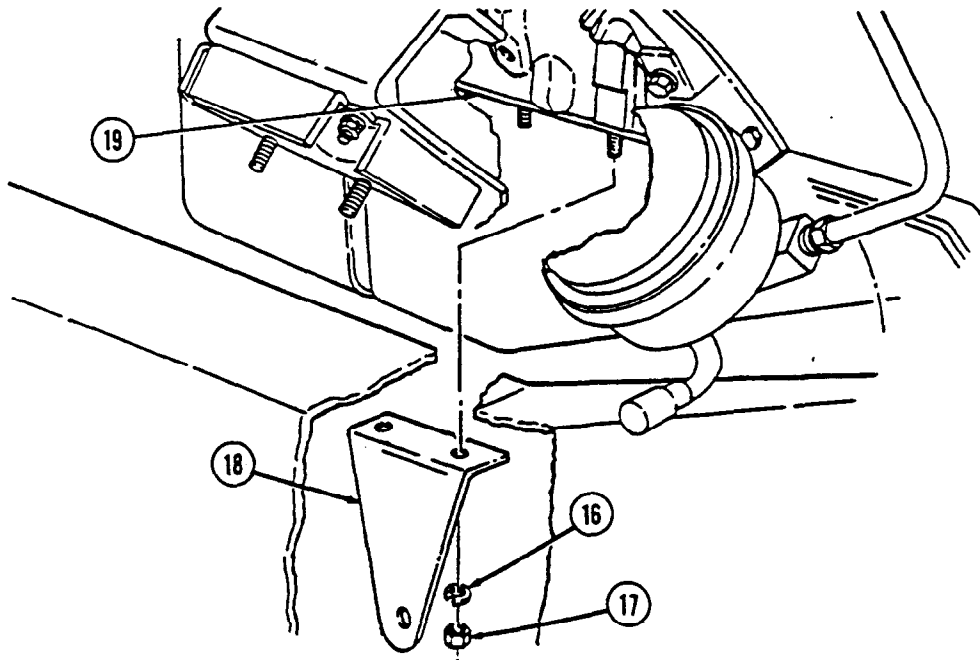
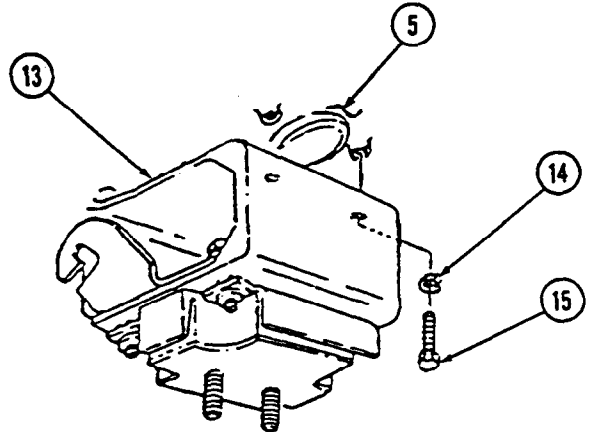
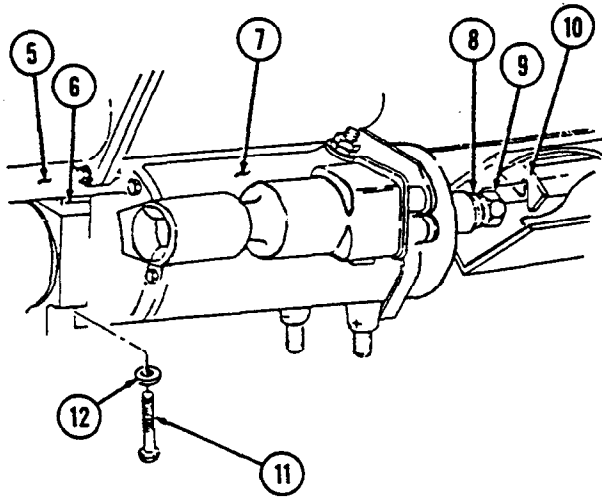
WARNING

Starter must be supported during removal. Failure to support starter may cause injury to personnel or damage to equipment.

30. Remove two capscrews (11), washers (12), starter (7), and shim(s) (6), if present, from engine (5).
31. Remove three capscrews (15), lockwashers (14), and left and right engine mount and insulator assemblies (13) from engine (5). Discard lockwashers (14).
32. Remove two nuts (17), lockwashers (16), and wiring harness bracket (18) from oil pan (19). Discard lockwashers (16).



15-27. ENGINE PREPARATION (Cont'd)



15-27. ENGINE PREPARATION (Cont'd)

33. Remove fitting (1) from clutch fan adapter (2).

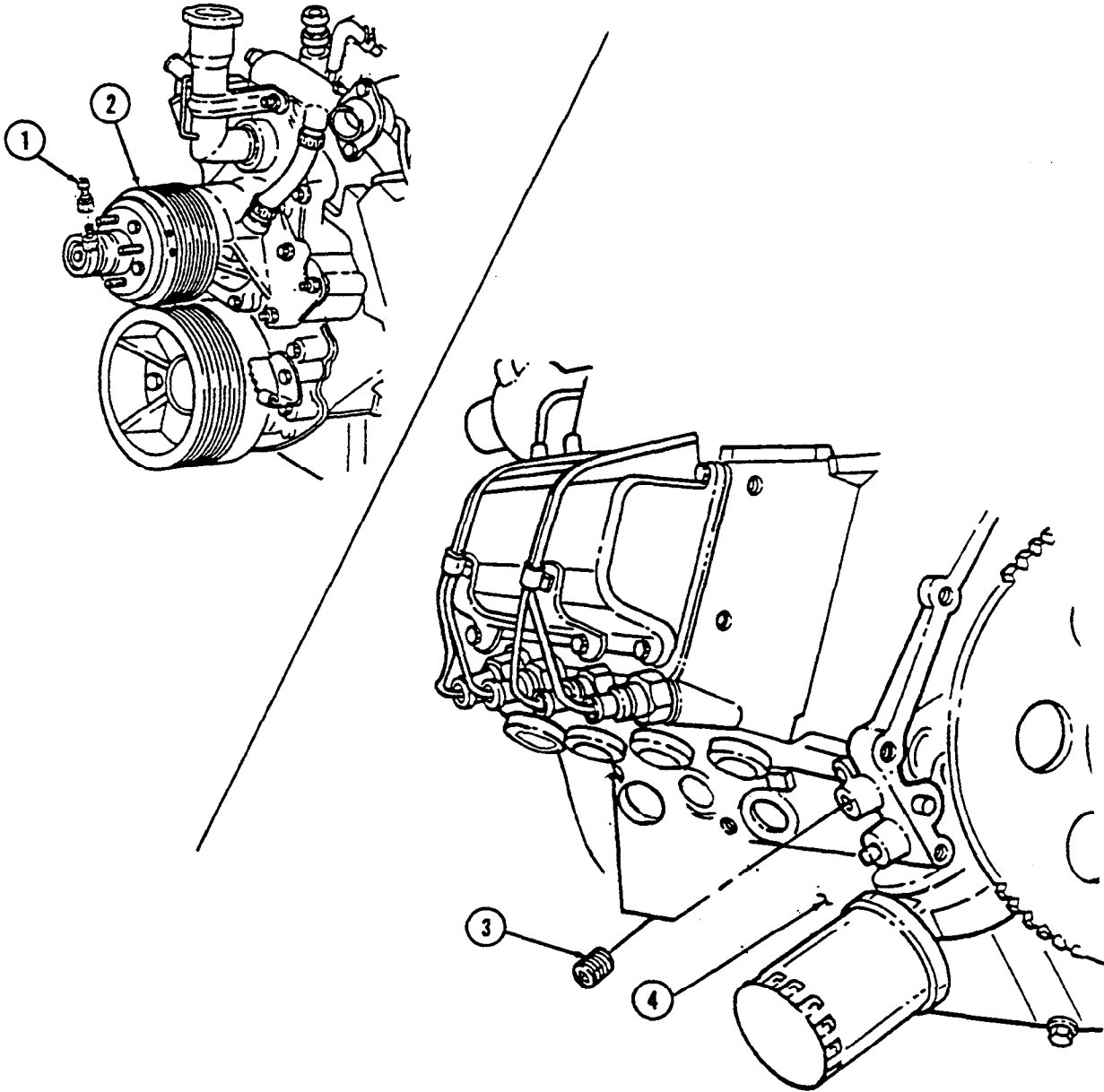
NOTE

Have drainage container ready to catch fluid.

34. Remove two plugs (3) and drain coolant from engine (4).

b. Assembly

1. Install fitting (1) on clutch fan adapter (2).
2. Apply antiseize compound to two plugs (3) and install in engine (4).



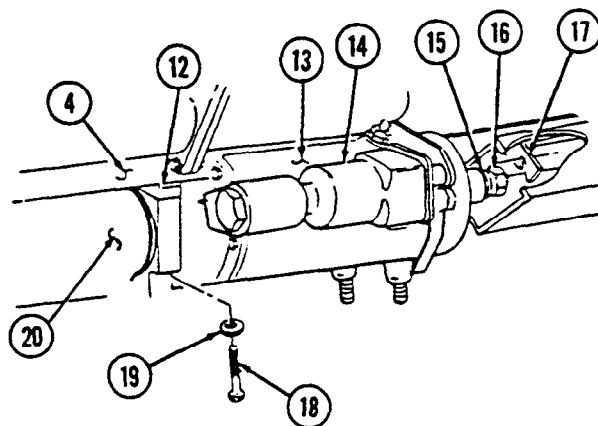
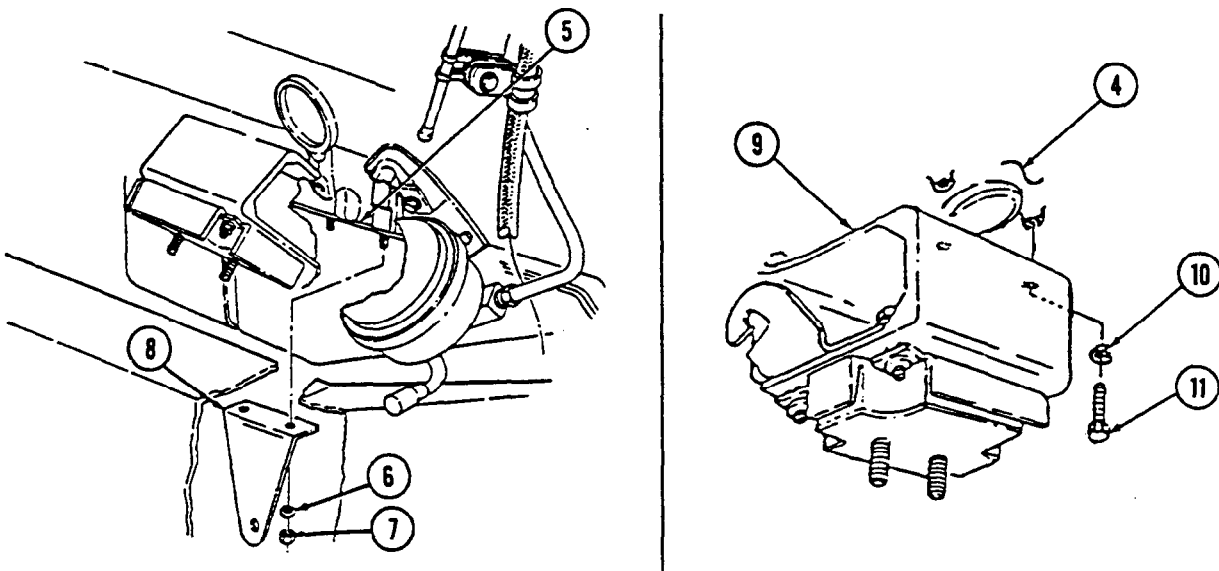
15-27. ENGINE PREPARATION (Cont'd)

3. Install wiring harness bracket (8) on oil pan (5) with two lockwashers (6) and nuts (7).
4. Install left and right engine mount and insulator assemblies (9) on engine (4) with three lockwashers (10) and capscrews (11). Using 9/16-in. torque adapter, tighten capscrews (11) to 30-40 lb-ft (41-54 N·m).

WARNING

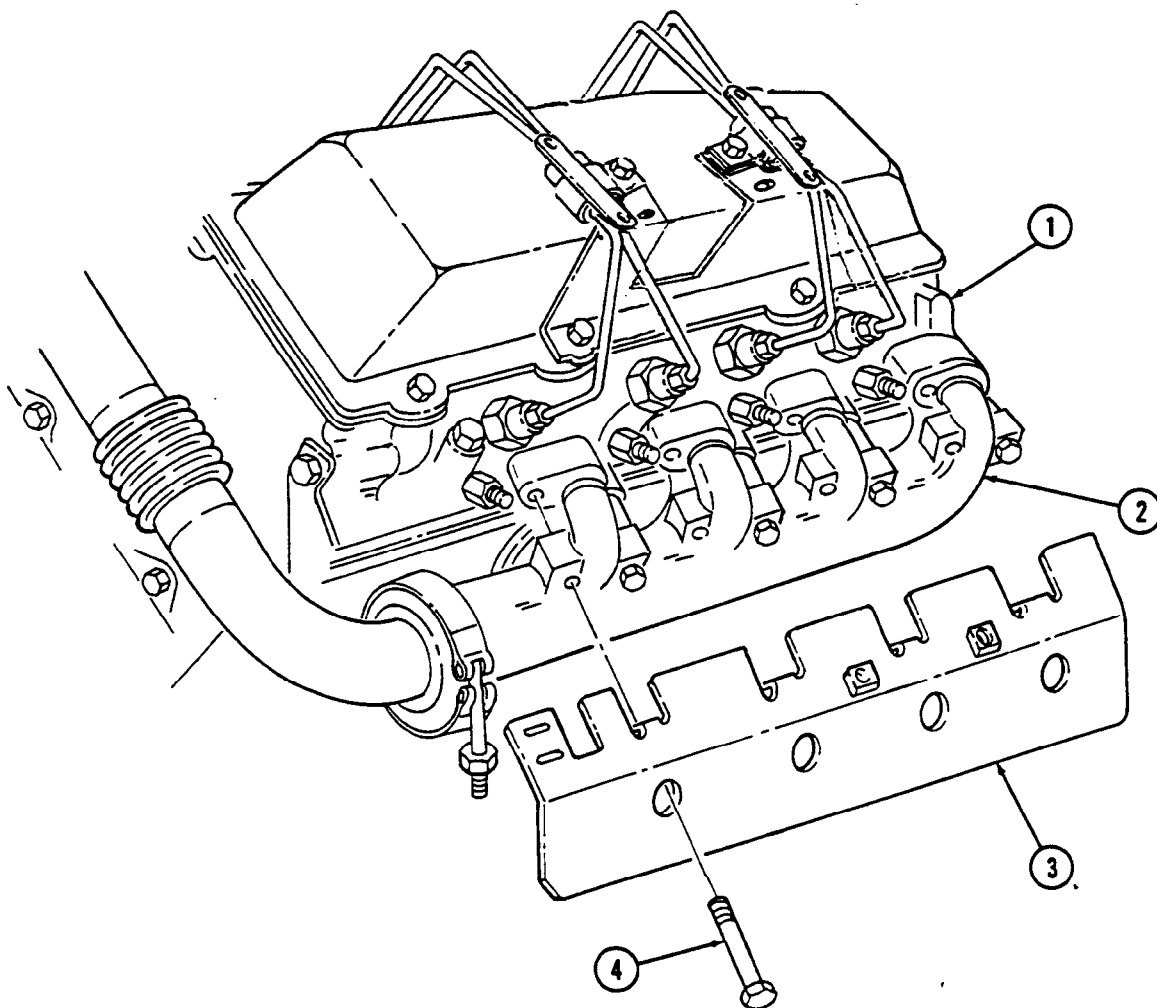
Starter must be supported during installation. Failure to support starter may cause injury to personnel or damage to equipment.

5. Position shim(s) (12), if removed, and starter (13) on flywheel housing (20) with solenoid (14) facing outward.
6. Slide front of starter (13) in bracket (17), ensuring bracket (17) is between washer (15) and starter (13).
7. Apply thread-locking compound to capscrews (18). Install two washers (19) and capscrews (18) on starter (13) and engine (4). Tighten capscrews (18) to 30-40 lb-ft (41-54 N·m).
8. Using crowfoot, tighten locknut (16) to 15-19 lb-ft (20-26 N·m).



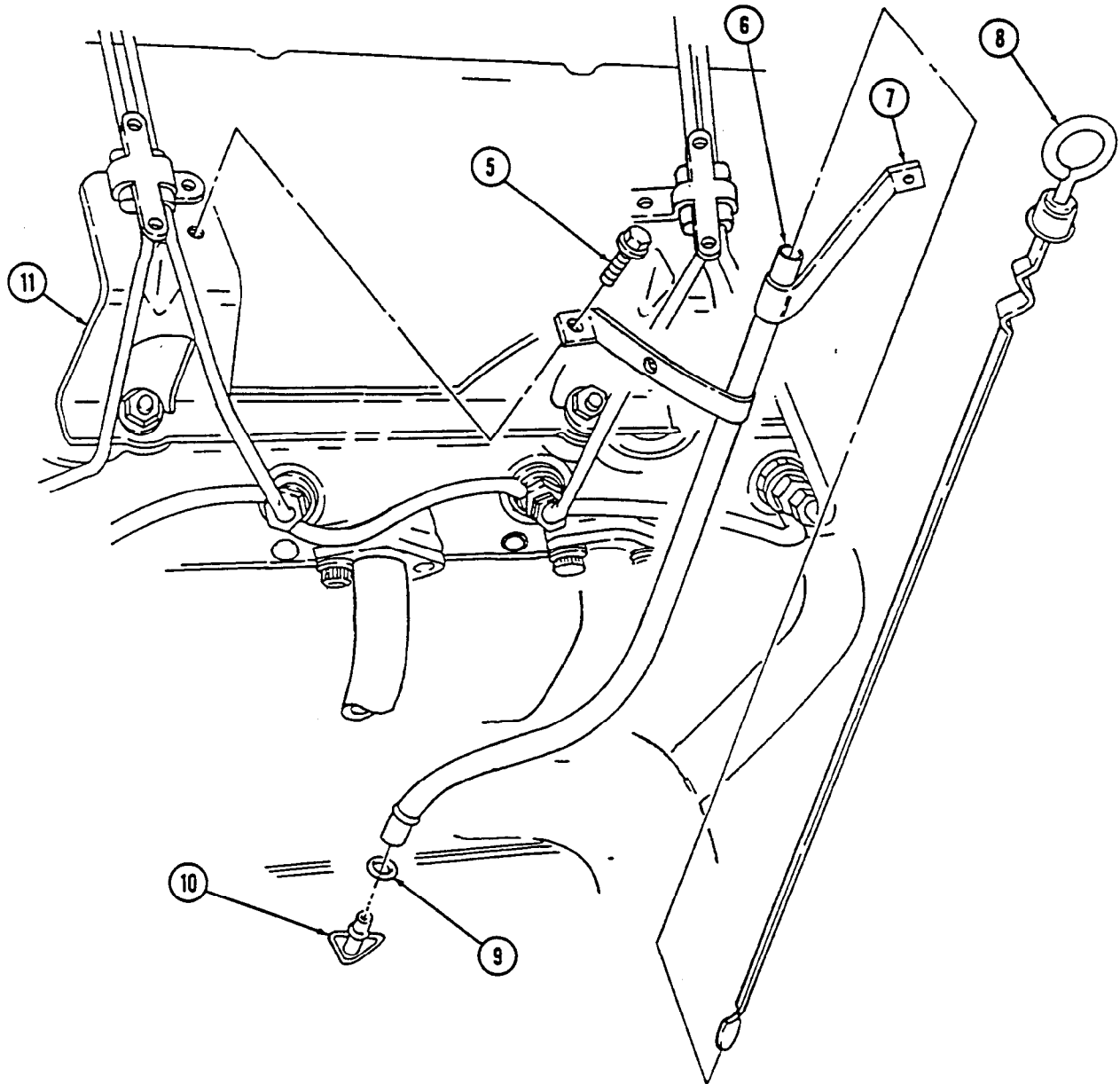
15-27. ENGINE PREPARATION (Cont'd)

9. Install right exhaust manifold heat shield (3) on exhaust manifold (2) and cylinder head (1) with four capscrews (4).



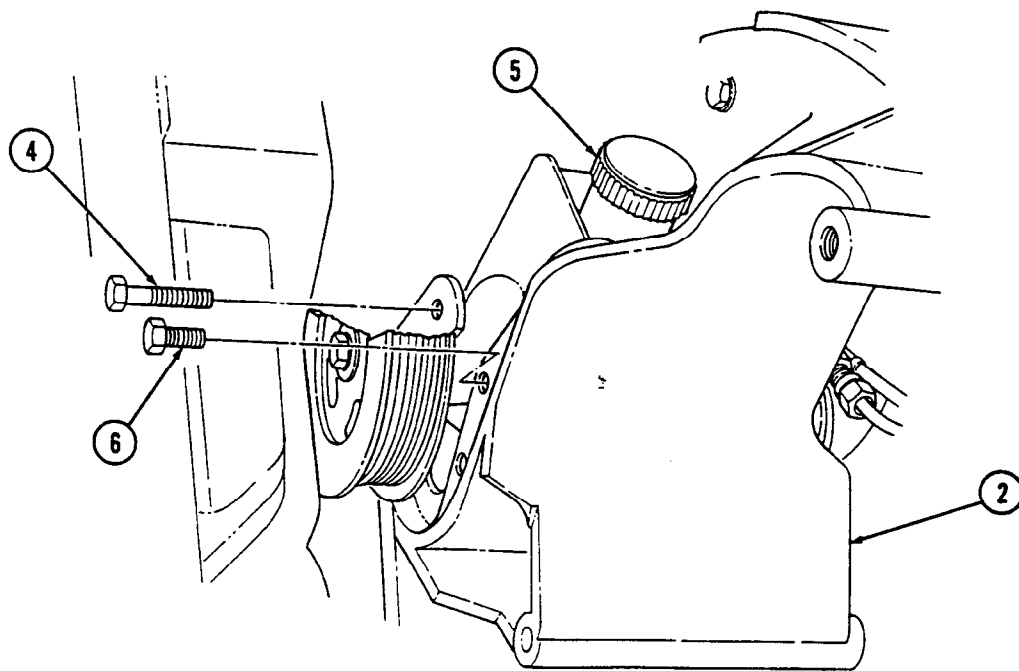
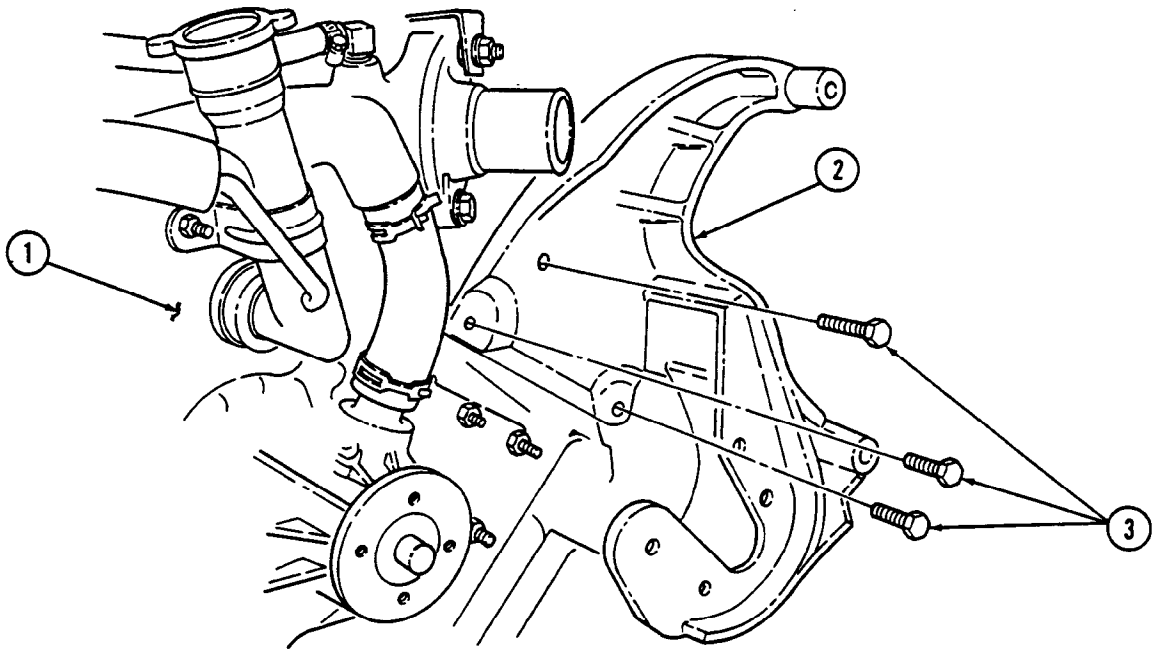
15-27. ENGINE PREPARATION (Cont'd)

10. Apply RTV sealant to O-ring seal (9) and install O-ring seal (9) on oil dipstick tube (6).
11. Insert oil dipstick tube (6) into engine oil pan (10).
12. Install dipstick tube bracket (7) on two fuel line brackets (11) with screw-assembled washers (5).
13. Install oil dipstick (8) into oil dipstick tube (6).



15-27. ENGINE PREPARATION (Cont'd)

14. Apply sealing compound to three capscrews (3).
15. Install alternator/power steering bracket (2) on engine (1) with three capscrews (3). Tighten capscrews (3) to 48 lb-ft (65 N·m).
16. Install power steering pump (5) on alternator/power steering bracket (2) with two capscrews (4) and capscrew (6).



15-27. ENGINE PREPARATION (Cont'd)

- 16.1 Install mounting bracket (13) on engine (11.2) with collar washer (11.1) and capscrew (12.1).
- 17. Install mounting bracket (13) on water pump (12) with two lockwashers (14) and capscrews (15).

NOTE

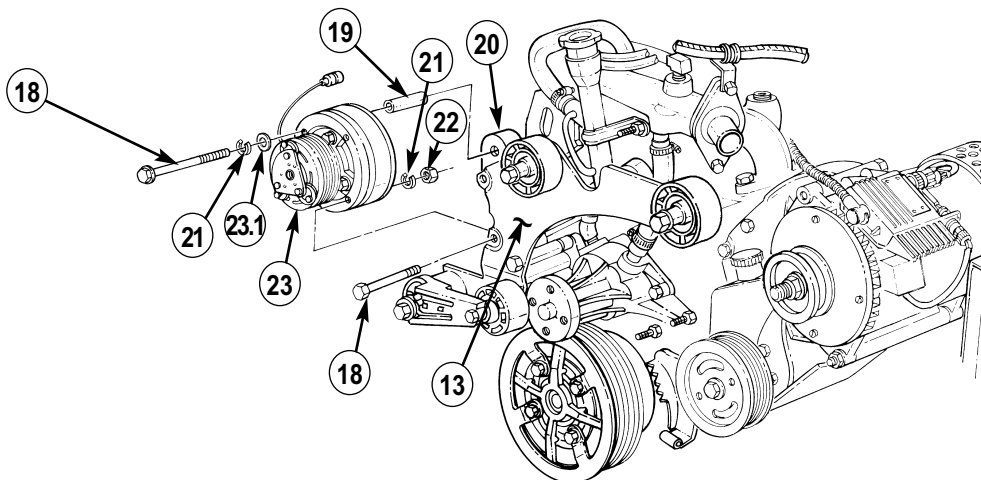
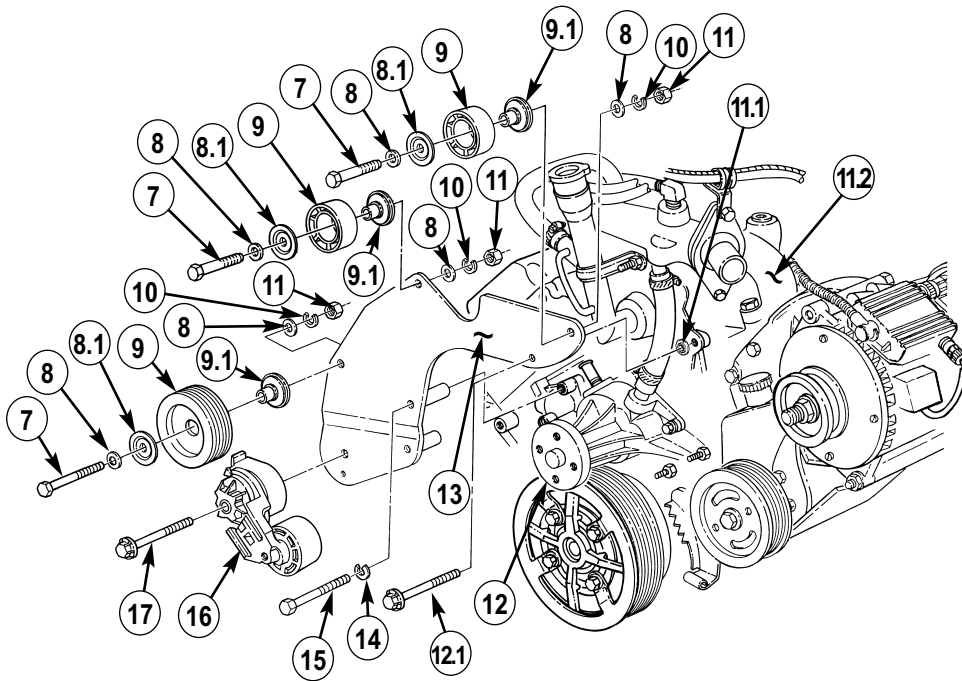
On M1114 vehicles equipped with A/C, the compressor pulley is in place of the lower idler pulley.

- 18. Install three supports (9.1) and idler pulleys (9) on mounting bracket (13) with three dust covers (8.1), washers (8), capscrews (7), washers (8), lockwashers (10), and nuts (11).
- 19. Install belt tensioner (16) on mounting bracket (13) with capscrew (17).

NOTE

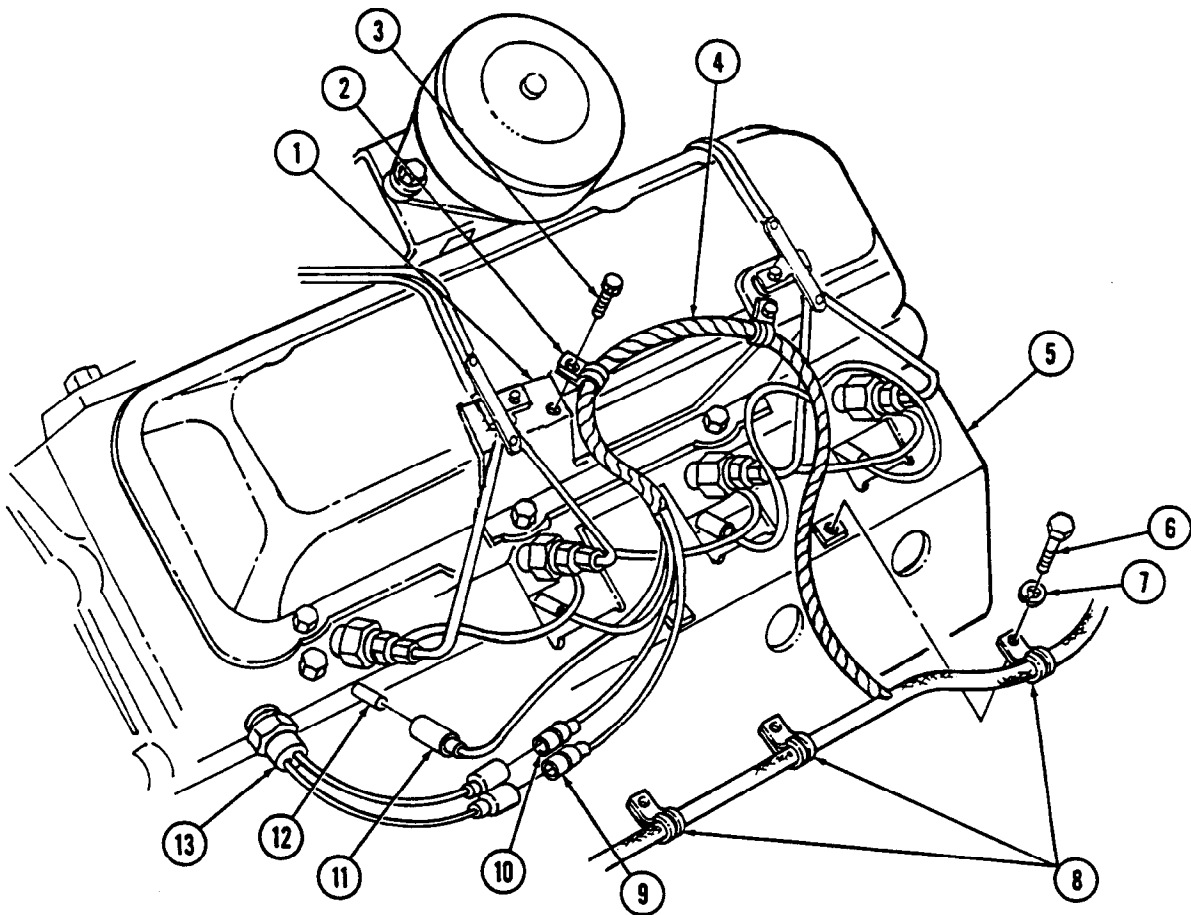
Perform step 20 for M1114 vehicles only.

- 20. Install spacer (19) and A/C compressor (23) on bracket (20) and mounting bracket (13) with washer (23.1), two lockwashers (21), capscrews (18), and nuts (22).

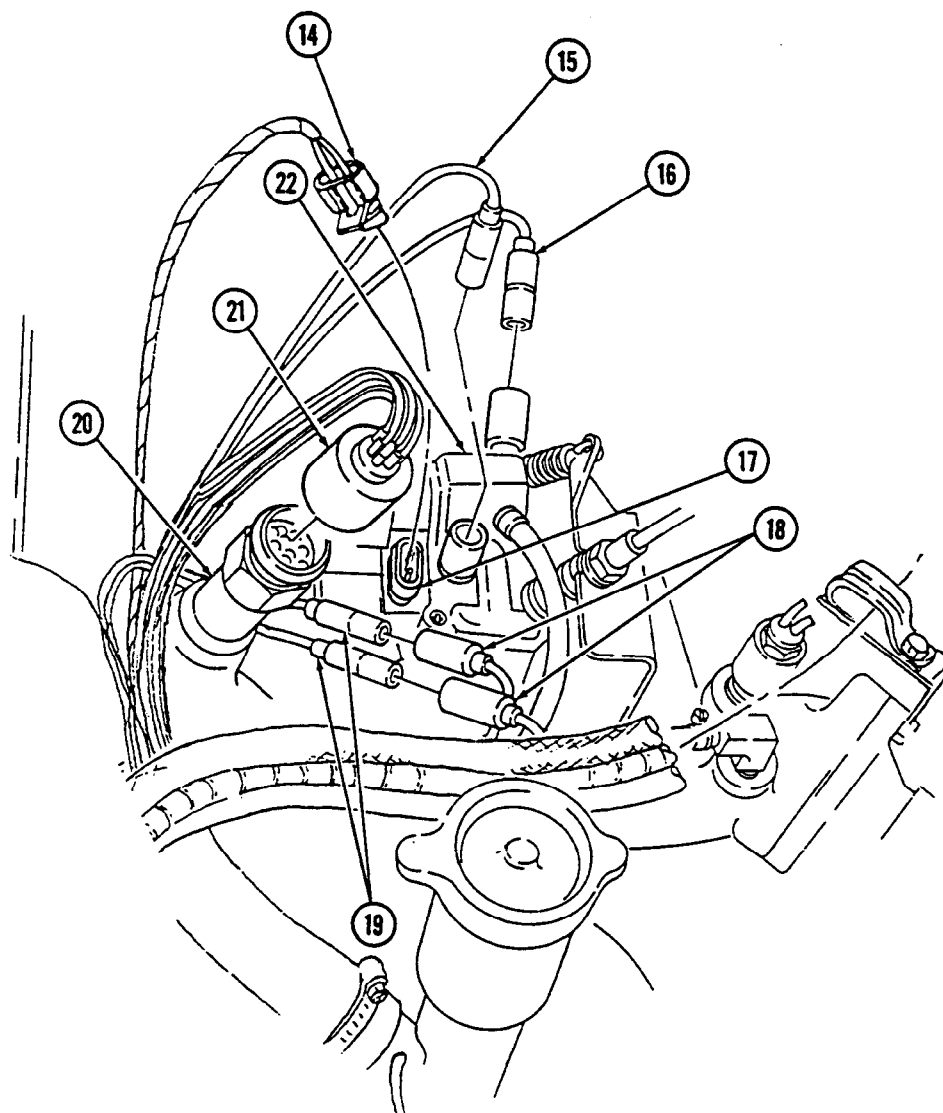


15-27. ENGINE PREPARATION (Cont'd)

21. Connect four harness boots (11) to glow plugs (12).
22. Connect harness leads 569A (9) and 569B (10) to cold-advance switch (13).
23. Install harness (4) on heat shield (5) with three clamps (8), lockwashers (7), and capscrews (6).
24. Install harness (4) on intake manifold bracket (1) with two clamps (2) and capscrews (3).
25. Connect harness connector (21) to glow plug controller (20).
26. Connect harness leads 315A/315B (19) to fan cut-off switch leads (18).
27. Connect harness leads 54A (15) and 569B (16) to fuel injection pump terminals (22).
28. Connect harness connector (14) to transmission TP sensor (17).

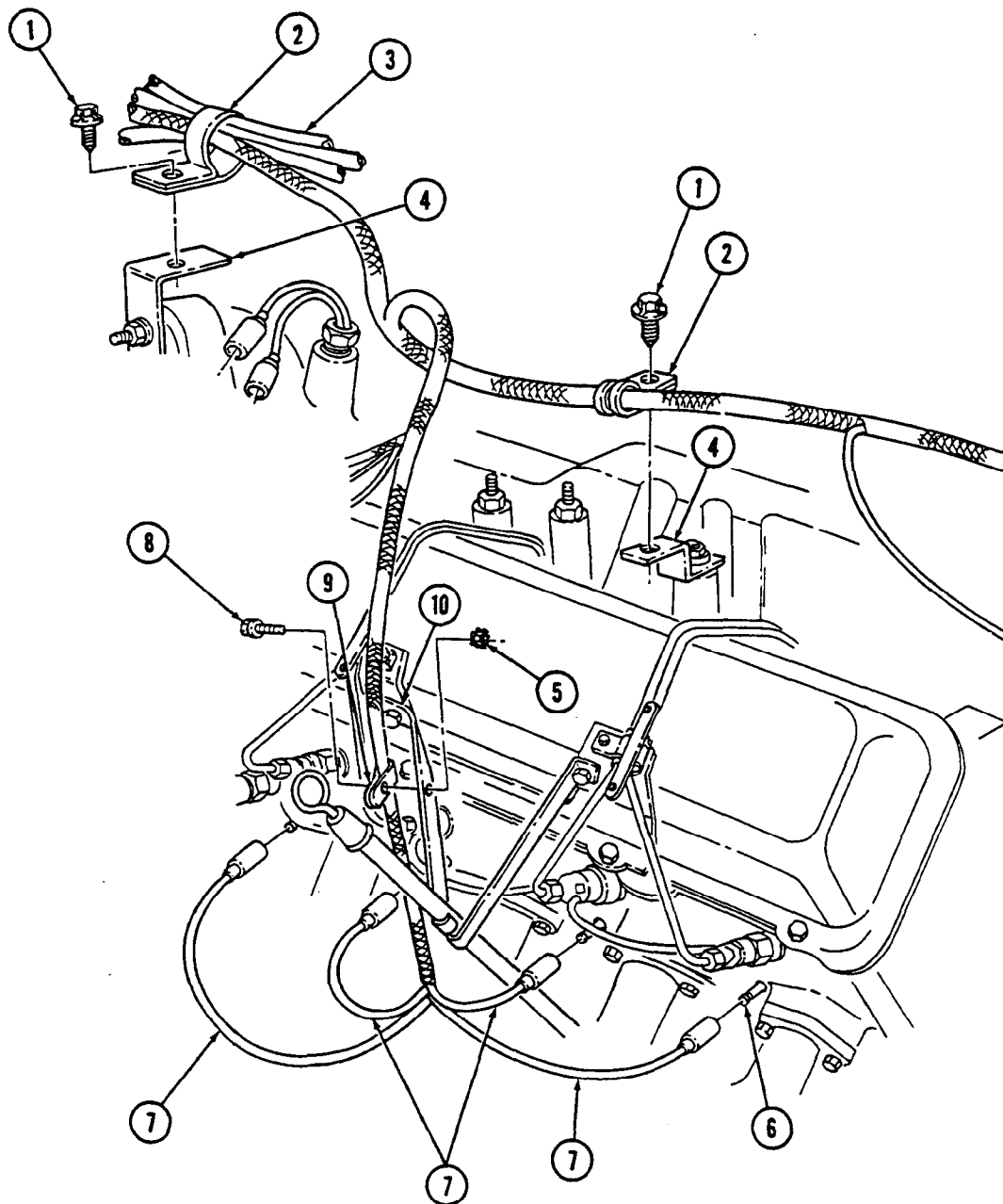


15-27. ENGINE PREPARATION (Cont'd)



15-27. ENGINE PREPARATION (Cont'd)

29. Connect four harness leads (7) to glow plugs (6).
30. Install harness (3) on two brackets (4) with clamps (2) and capscrews (1).
31. Install harness (3) on dipstick mounting bracket (10) with clamp (9), capscrew (8), and nut and lockwasher assembly (5).

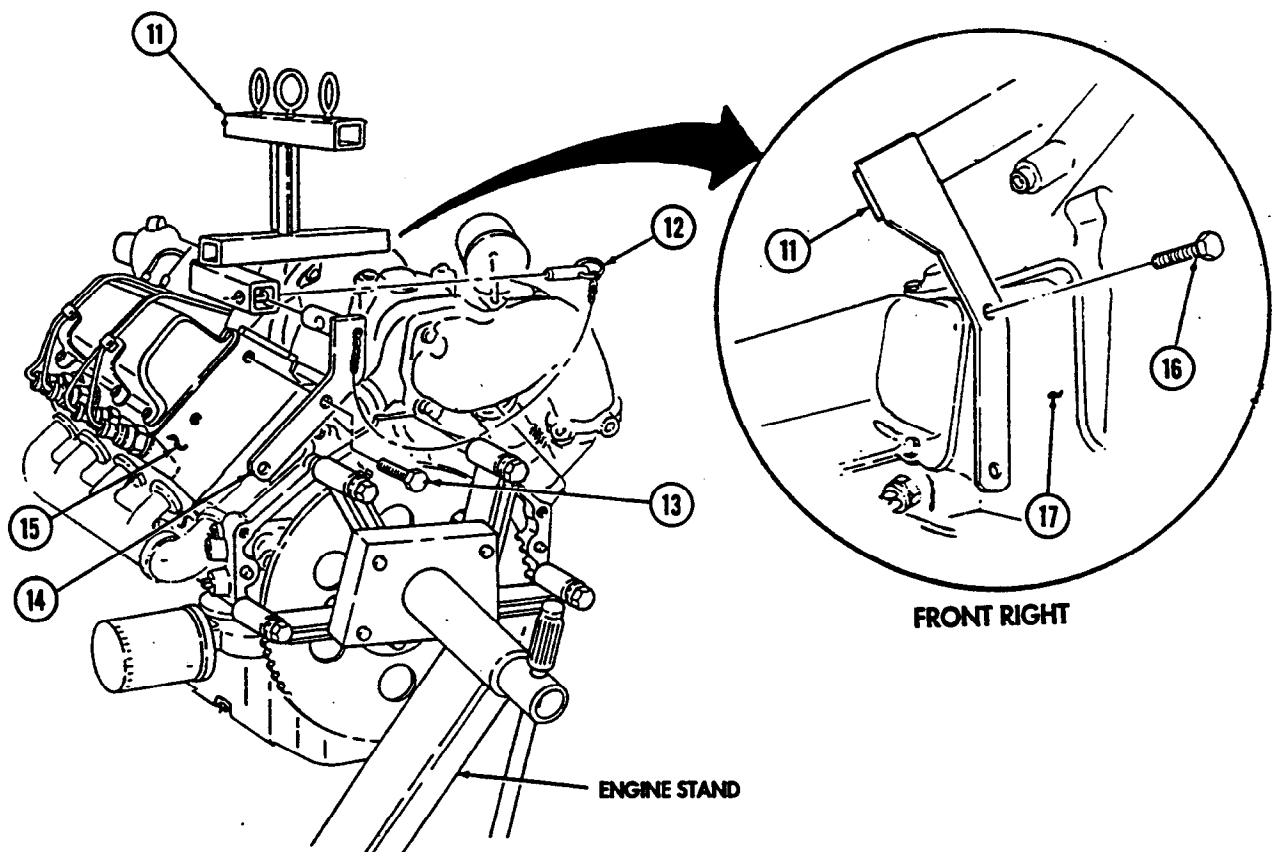


15-27. ENGINE PREPARATION (Cont'd)

NOTE

Hoist must be attached to intermediate eyelet when lifting engine and attached to rear eyelet when lifting engine and transmission together.

32. Install sling bracket (14) on left cylinder head (15) with two capscrews (13).
33. Install engine lifting sling (11) on right cylinder head (17) with two capscrews (16).
34. Install sling bracket (14) on engine lifting sling (11) with pin (12).



FOLLOW-ON TASK: Install engine (para. 15-28).

15-28. ENGINE INSTALLATION

This task covers:

Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Engine lifting sling (Appendix B, Item 24)
Torque adapter, 3/4-in. (Appendix B, Item 134)
Hex-head driver, 8-mm (Appendix B, Item 145)

Materials/Parts

Eight lockwashers (Appendix G, Item 190)
Two cotter pins (Appendix G, Item 43)
Ten locknuts (Appendix G, Item 156)
Three nut and lockwasher assemblies
(Appendix G, Item 251)
Ten lockwashers (Appendix G, Item 205)
Eight lockwashers (Appendix G, Item 207)
Lockwasher (Appendix G, Item 232)
Lockwasher (Appendix G, Item 233)
Lockwasher (Appendix G, Item 193)
Lockwasher (Appendix G, Item 231)
Lockwasher (Appendix G, Item 234)
Two locknuts (Appendix G, Item 121)
Six locknuts (Appendix G, Item 116)
Six locknuts (Appendix G, Item 123)
Two locknuts (Appendix G, Item 183)
Two locknuts (Appendix G, Item 109)
Gasket (Appendix G, Item 54)
O-ring seal (Appendix G, Item 279)
Two exhaust gaskets (Appendix G, Item 55)
Two intake manifold gaskets
(Appendix G, Item 75)
Tiedown strap (Appendix G, Item 462)
Three O-rings (Appendix G, Item 264)

Materials/Parts (Cont'd)

Two seals (Appendix G, Item 395)
Crossover O-ring (Appendix G, Item 256.1)
Adhesive (Appendix C, Item 8)
Antiseize compound (Appendix C, Item 17)
RTV sealant (Appendix C, Item 10)
Engine/transmission support sling
(Appendix D, Figs. 84 through 97) (Optional)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Engine prepared for installation (para. 15-27).

General Safety Instructions

- Direct personnel to stand clear during hoisting operation.
- Do not use hands to free engine of hangups or snags.
- Transmission must be supported during engine installation.
- Ensure fuel vent line is properly attached to top vent line fitting.

Maintenance Level

Direct support

Installation

WARNING

- Direct all personnel not participating in engine installation to stand clear during hoisting operation. Failure to do this may cause injury to personnel.
- Do not use hands to free engine of hangups or snags. Use prybars to avoid injury.

CAUTION

- Always install engine slowly. Lower into chassis carefully and closely observe all engine components to prevent engine damage.
- If transmission support sling was installed, remove prior to engine installation.

NOTE

- All plugs must be removed from hoses and connections prior to reconnection.
- Assistant will be needed for steps 1 through 7.

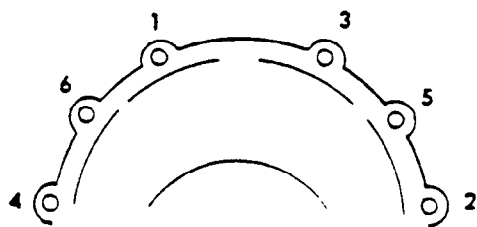
15-28. ENGINE INSTALLATION (Cont'd)

1. Lower engine (1) into vehicle.

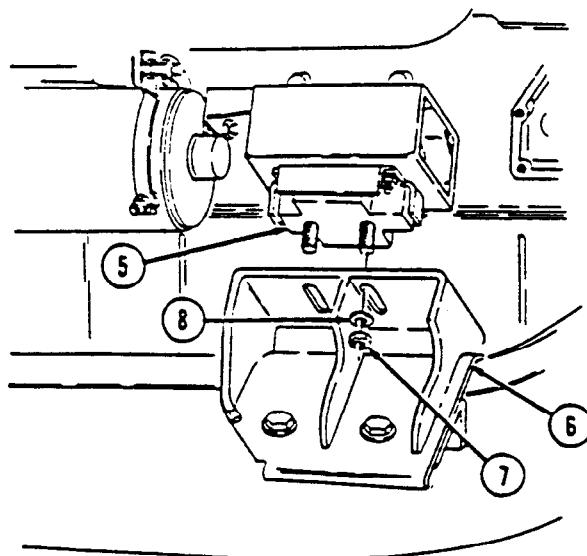
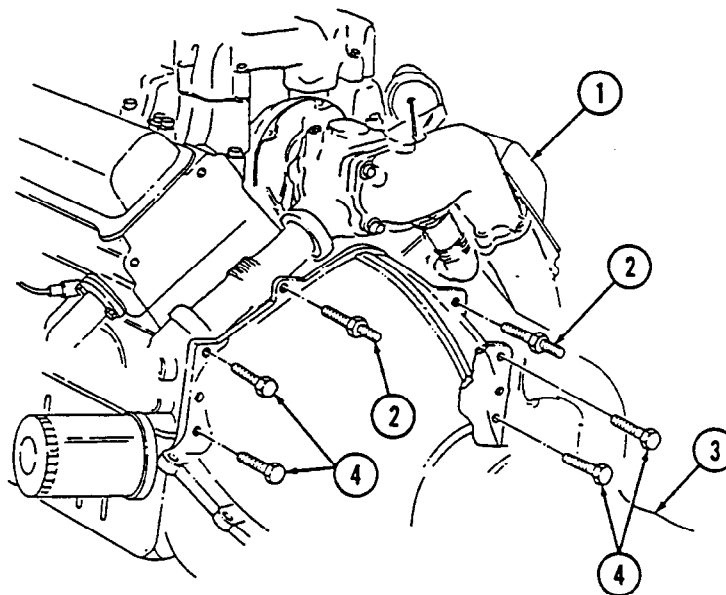
WARNING

Transmission must be supported during engine installation. Failure to do this may cause injury to personnel or damage to equipment.

2. Raise and support transmission (3).
3. Install transmission (3) on engine (1) with four capscrews (4) and two studs (2). Using torque sequence shown, tighten capscrews (4) and studs (2) to 35 lb-ft (47 N·m)
4. Align right engine mount insulator (5) on engine mount bracket (6) and install two washers (8) and locknuts (7). Repeat for left engine mount. Using torque adapter, tighten locknuts (7) to 90 lb-ft (122 N·m).

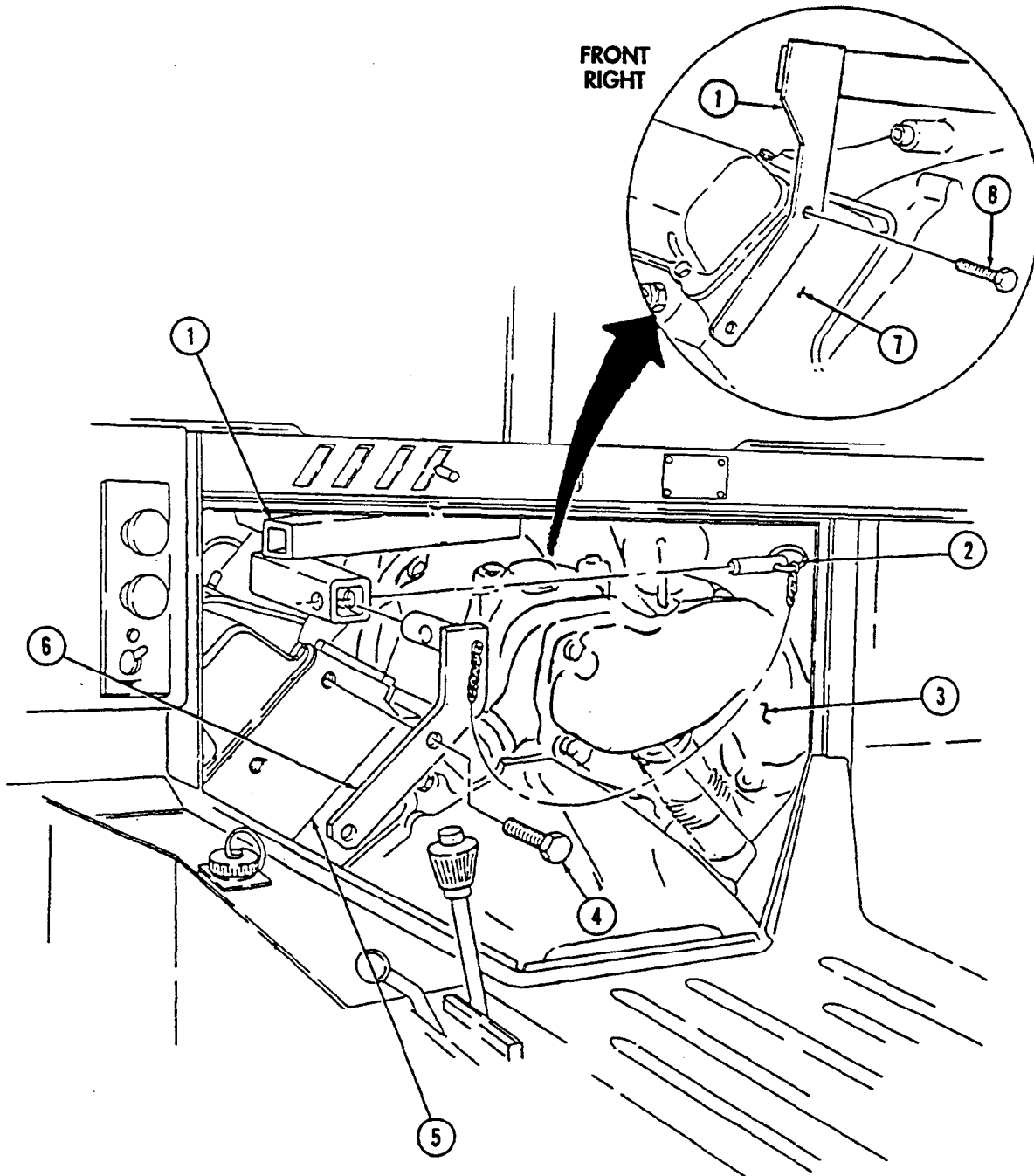


**TRANSMISSION
TORQUE SEQUENCE**



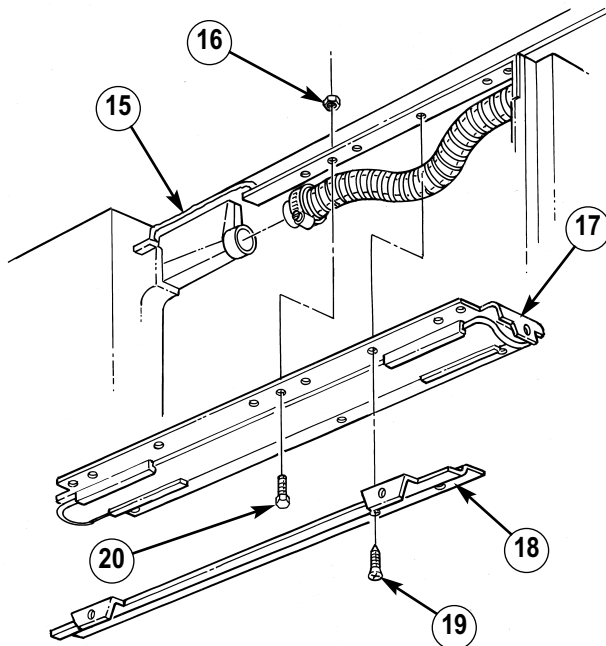
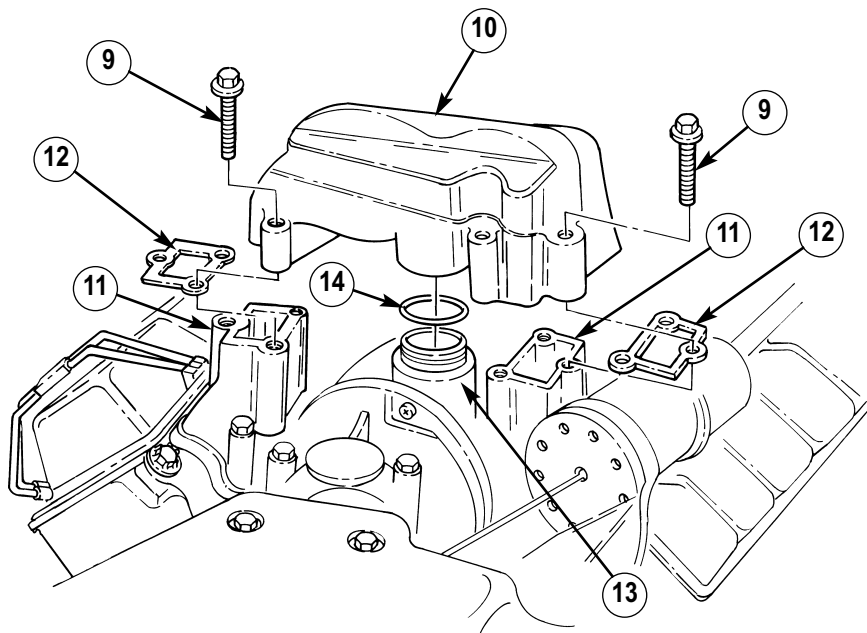
15-28. ENGINE INSTALLATION (Cont'd)

5. Remove lifting device from engine lifting sling (1).
6. Remove two capscrews (4) and sling bracket (6) from left cylinder head (5).
7. Remove pin (2) and sling bracket (6) from engine lifting sling (1).
8. Remove two capscrews (8) and engine lifting sling (1) from right cylinder head (7) and engine (3).



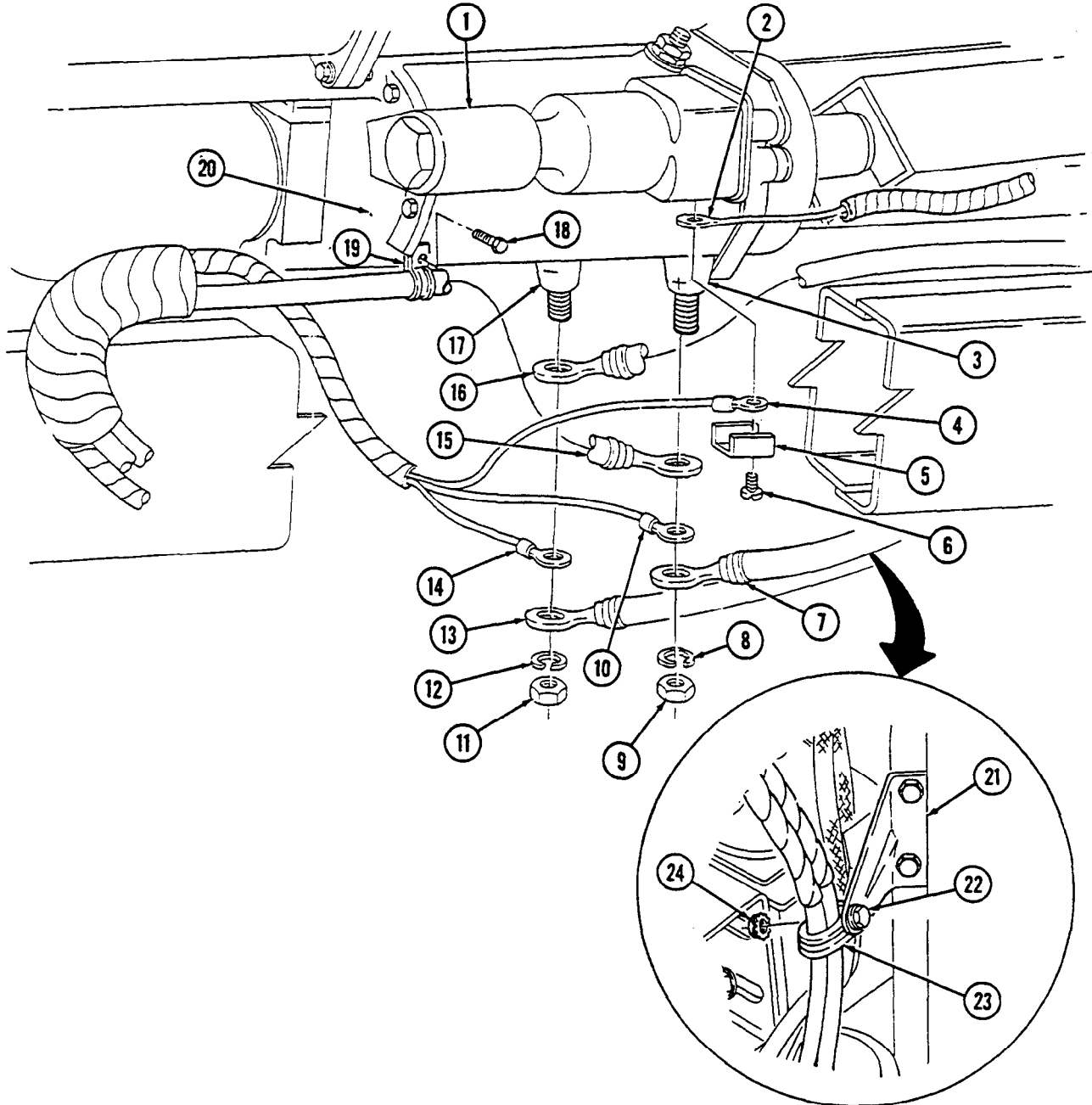
15-28. ENGINE INSTALLATION (Cont'd)

9. Install crossover O-ring (14) on turbocharger (13).
10. Install two gaskets (12) and intake crossover (10) on intake manifolds (11) and turbocharger (13) with six capscrews (9). Tighten capscrews (9) to 17 lb-ft (23 N-m).
11. Install closeout panel (17) and retainer (18) on A-beam (15) with two screws (19), ten capscrews (20), and nuts (16).



15-28. ENGINE INSTALLATION (Cont'd)

12. Install leads 74A (4) and 74B (2) on solenoid (1) with clip (5) and screw (6).
13. Install cable 6A (15), lead 81B (10), and winch cable 6 (7), if equipped, on starter terminal (3) with lockwasher (8) and nut (9). Using torque adapter, tighten nut (9) to 25 lb-ft (34 N·m).
14. Install negative cable 7A (16), lead 3D (14), and winch cable 7 (13), if equipped, on starter terminal (17) with lockwasher (12) and nut (11). Using torque adapter, tighten nut (11) to 15 lb-ft (20 N·m).
15. Install clamp (19) and negative cable 7A (15) on starter (20) with screw (18).
16. Install clamp (23) and winch cables 6 (7) and 7 (13) on oil pan bracket (21), if equipped, with capscrew (22) and nut and lockwasher assembly (24).



15-28. ENGINE INSTALLATION (Cont'd)

NOTE

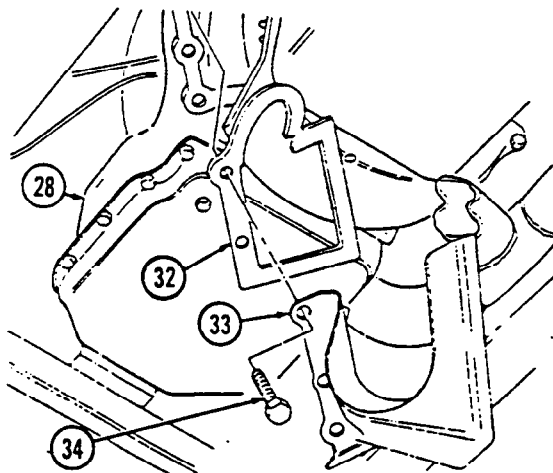
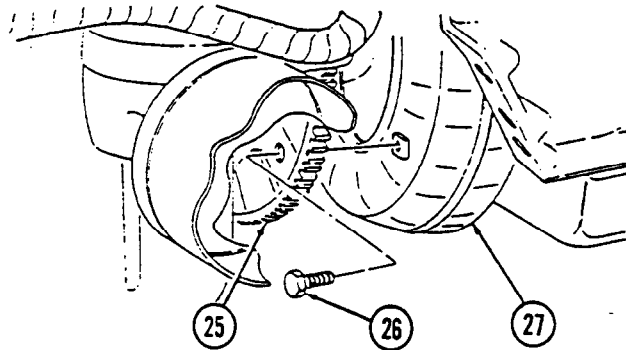
- It will be necessary to rotate flywheel clockwise from capscrew in front of crankshaft to gain access to install capscrews to torque converter.
- Have assistant hold crankshaft pulley in place when installing flywheel to torque converter.

17. Align torque converter (27) to flywheel (25) and install six capscrews (26).
18. Tighten capscrews (26) to 32 lb-ft (43 N-m).

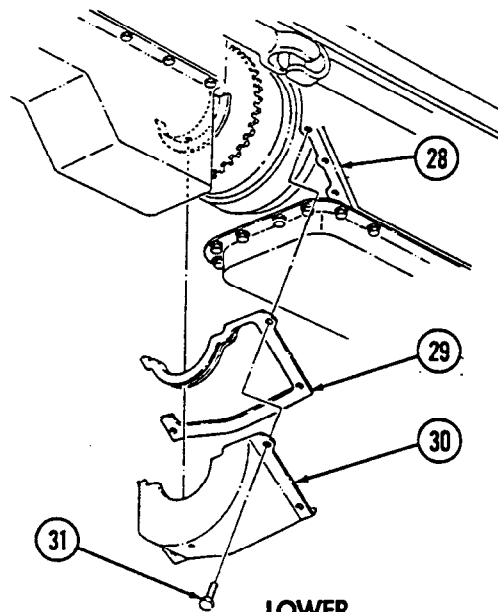
NOTE

Gaskets may require bending over edge of converter housing cover to make gaskets seal properly.

19. Apply RTV sealant to upper converter housing cover gasket (32). Install gasket (32) and upper converter housing cover (33) on transmission (28) with four capscrews (34).
20. Apply RTV sealant to lower converter housing cover gasket (29). Install gasket (29) and lower converter housing cover (30) on transmission (28) with two capscrews (31).



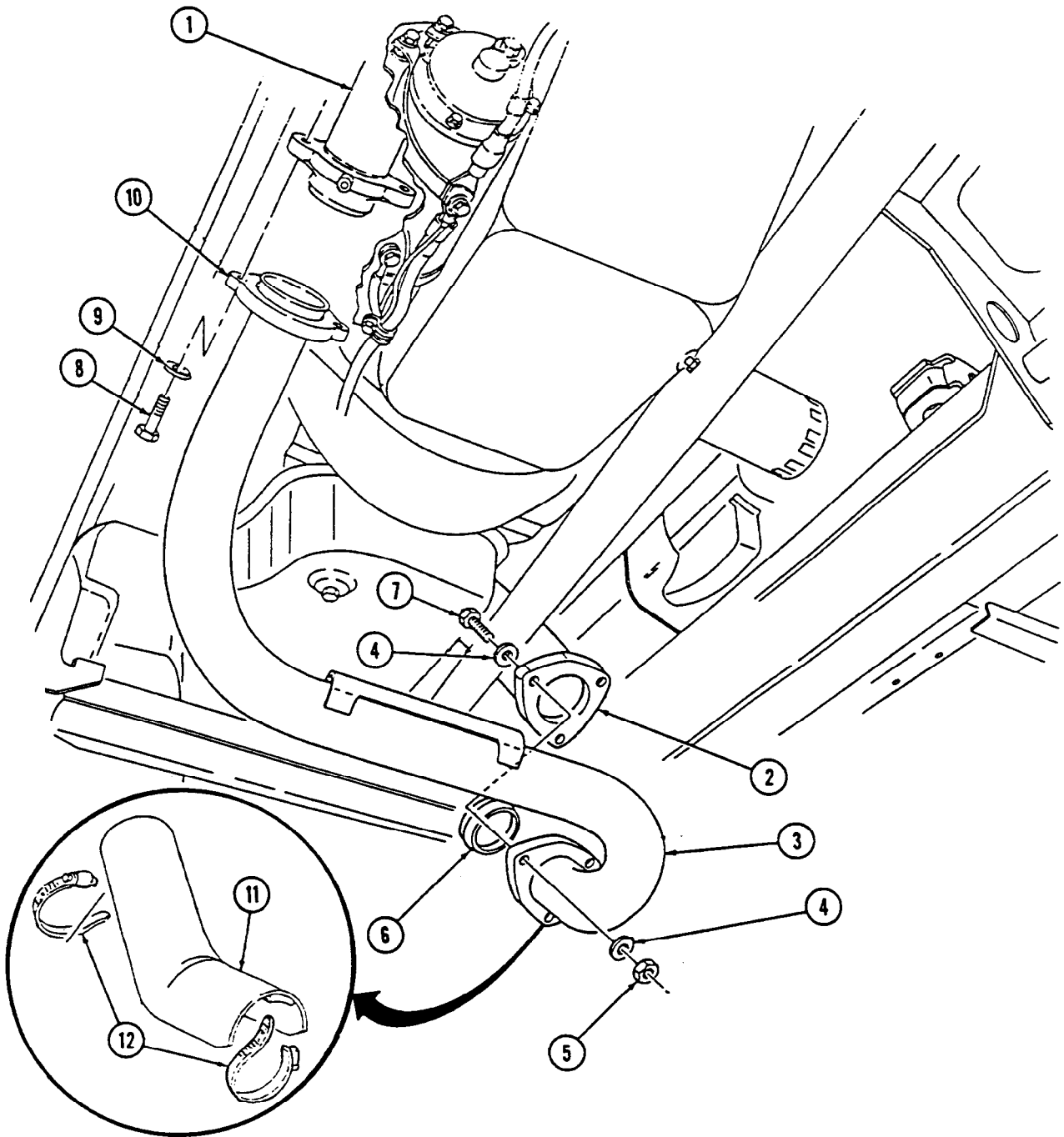
UPPER



LOWER

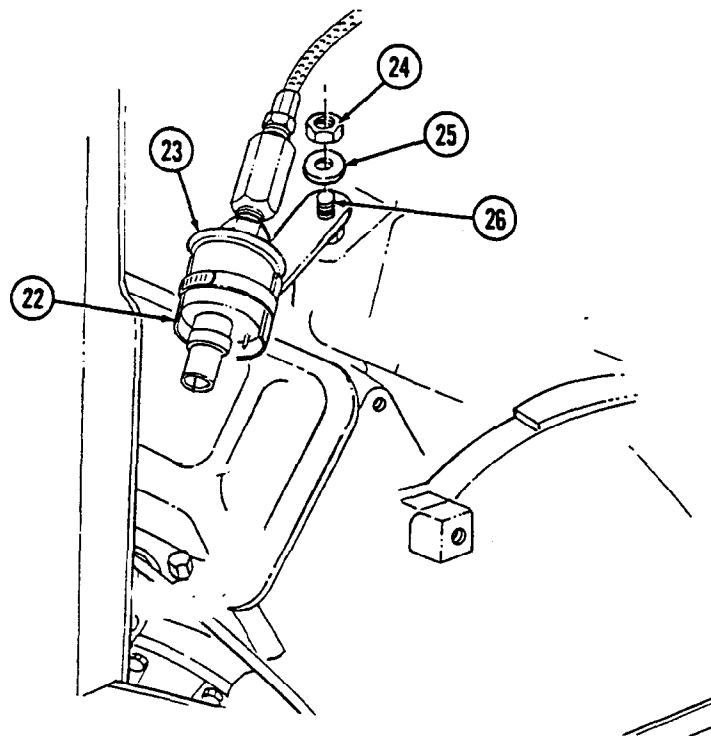
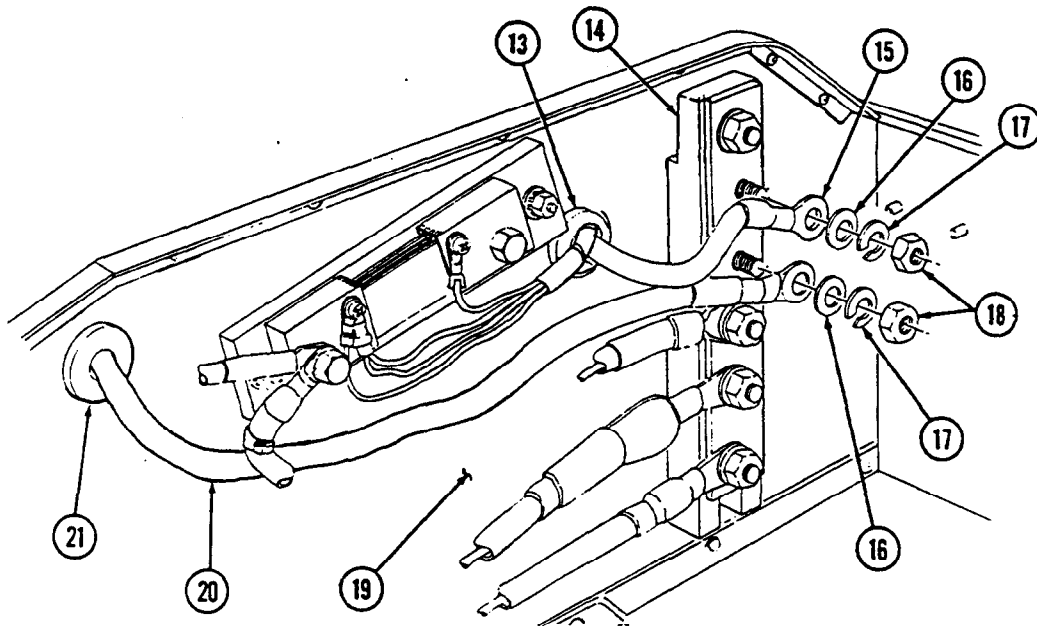
15-28. ENGINE INSTALLATION (Cont'd)

21. Install flange (10) and exhaust pipe (3) on wastegate housing (1) with two washers (9) and capscrews (8).
22. Install gasket (6) and exhaust pipe (3) on muffler (2) with three washers (4), capscrews (7), washers (4), and locknuts (5).
23. Tighten locknuts (5) to 26 lb-ft (35 N·m).
24. Install heat shield (11) on exhaust pipe (3) with two clamps (12).



15-28. ENGINE INSTALLATION (Cont'd)

25. Feed engine harness cable (15) and 200-amp alternator cable (20) through grommets (21) and (13) in battery box (19) and install on buss bar (14) with two washers (16), lockwashers (17), and nuts (18).
26. Install oil pressure sending unit (23) and bracket (22) on stud (26) with washer (25) and nut (24).



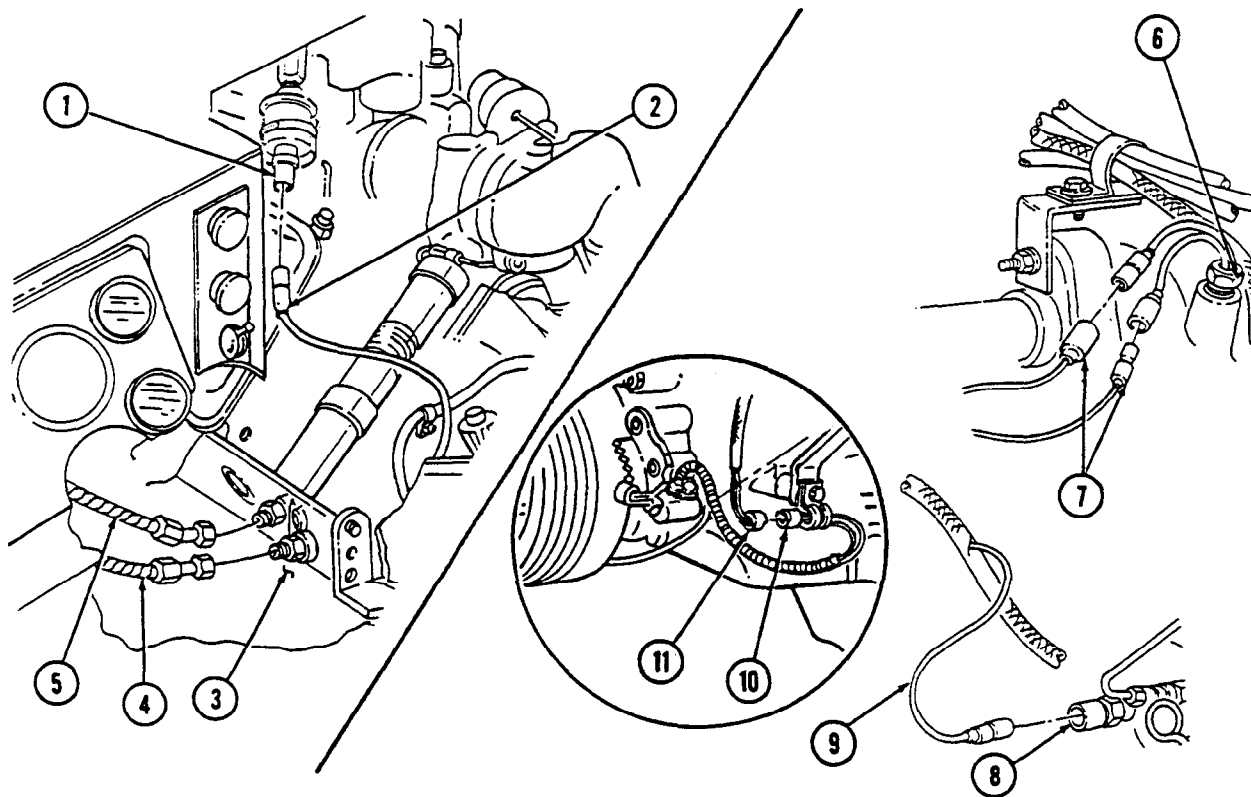
15-28. ENGINE INSTALLATION (Cont'd)

- 27. Connect lead 36A (2) to oil pressure sending unit (1).
- 28. Connect oil cooler supply line (4) and oil cooler return line (5) to engine (3).
- 29. Connect two leads 458A (12) to leads 458C (31) and 458D (13).
- 30. Connect engine harness lead 349A (20) to body harness leads 350B/359A/355A (21).
- 31. Install clamp (17) and body harness (16) on dipstick support bracket (14) with screw (15) and nut (18).
- 32. Connect control valve hose (19) to control valve (23) and hose (25) to hydro-booster (27) and tighten clamps (22) and (26) to 10-20 lb-in. (1-2 N·m).
- 33. Connect two clamps (29) with capscrew (30), washer (28), and nut (24).
- 34. Connect high-pressure line (32) to hydro-booster (27).
- 35. Connect fuel inlet (48) and fuel outlet (49) lines to fuel filter (45) and tighten clamps (46) and (47).

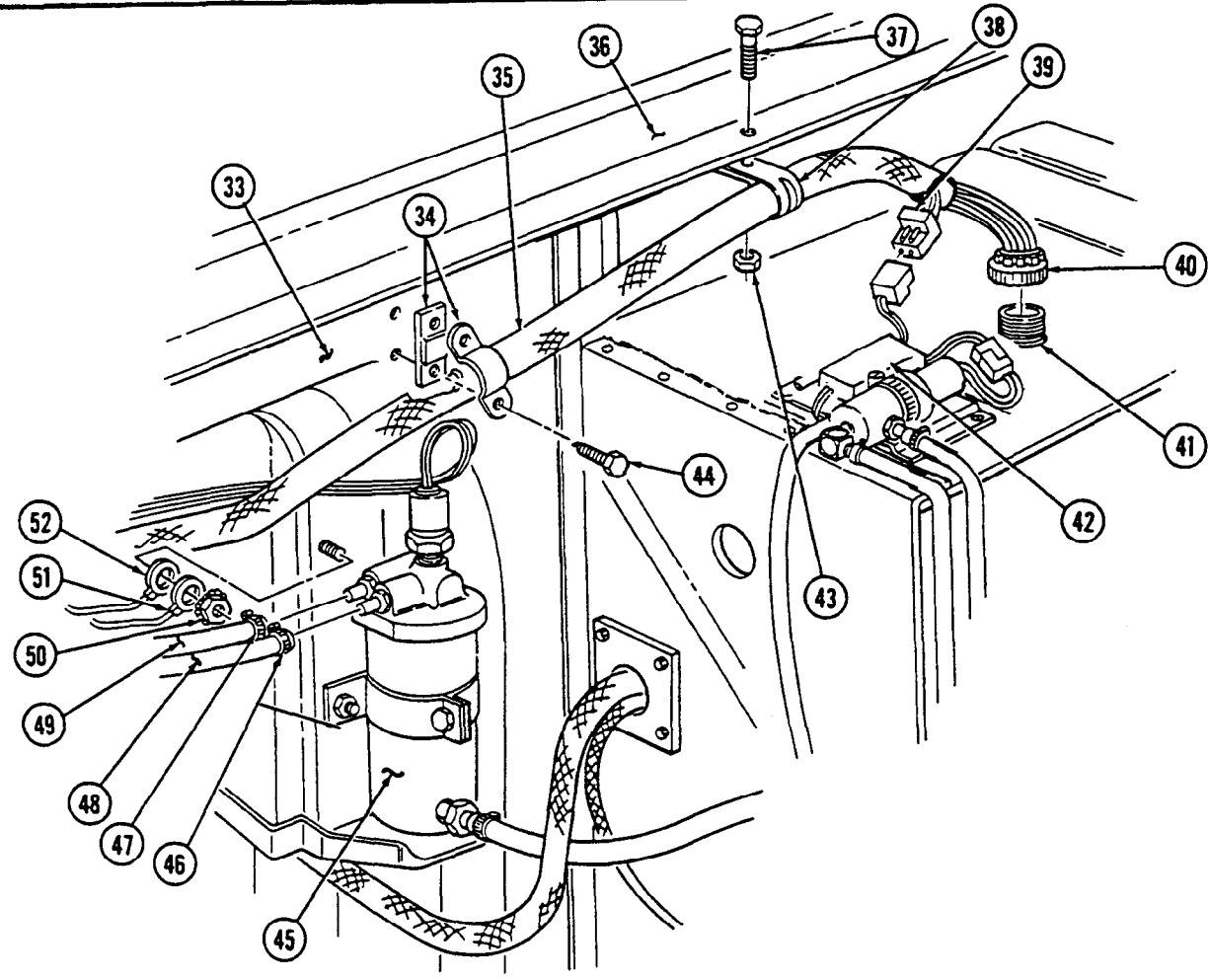
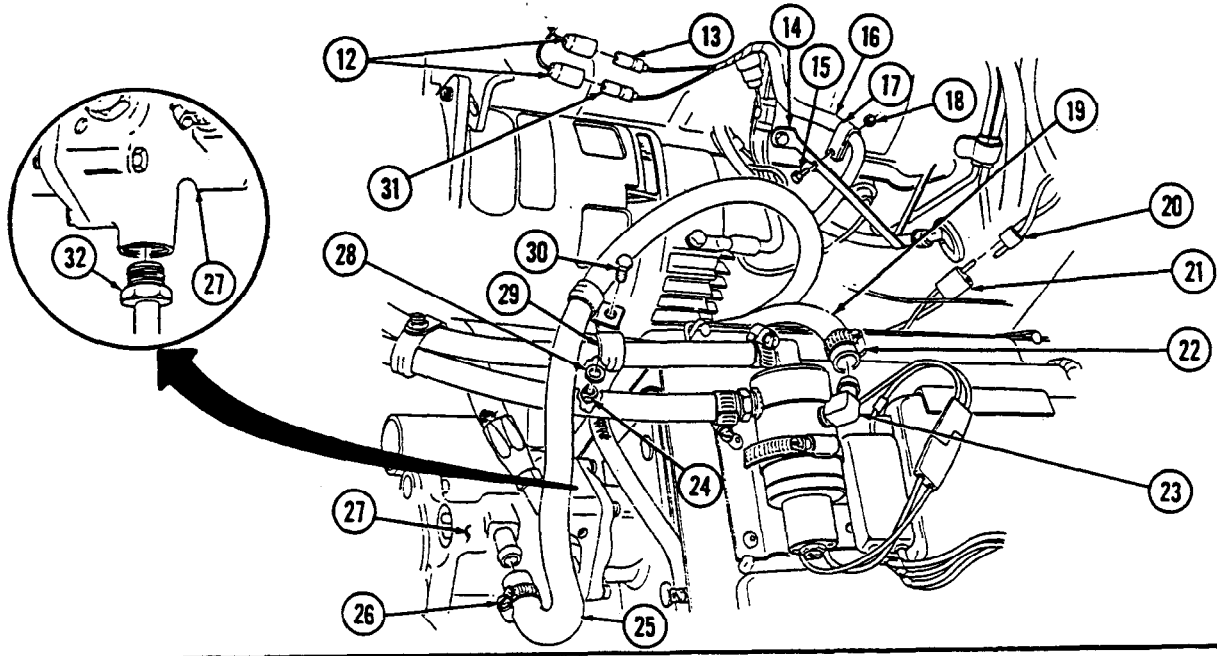
NOTE

Perform steps 36 and 37 for M1113 models only.

- 36. Connect engine harness connector (39) to time-delay module (42).
- 37. Connect harness connector plug (40) to protective control box (41).
- 38. Apply antiseize compound to engine harness ground 3C (51) and body harness ground 58B (52) and install on body (33) with nut and lockwasher assembly (50).
- 39. Install engine harness (35) on body (33) with clamp (34) and two screws (44).
- 40. Install engine harness (35) on A-beam (36) with clamp (38), capscrew (37), and nut (43).
- 41. Connect harness lead 33B (9) to engine temperature sending unit (8) and harness lead (11) to engine rpm sensor lead (10).
- 42. Install two leads (7) on water temperature sending unit (6).



15-28. ENGINE INSTALLATION (Cont'd)



15-28. ENGINE INSTALLATION (Cont'd)

43. Install cable assembly (1) on throttle shaft lever (4) with accelerator cable clip (7).
44. Install cable assembly (1) on cable bracket (2) and tighten two nuts (8).
45. Connect throttle return spring (3) to cable bracket (2).

NOTE

Steps 46 through 51 cover accelerator linkage adjustment.

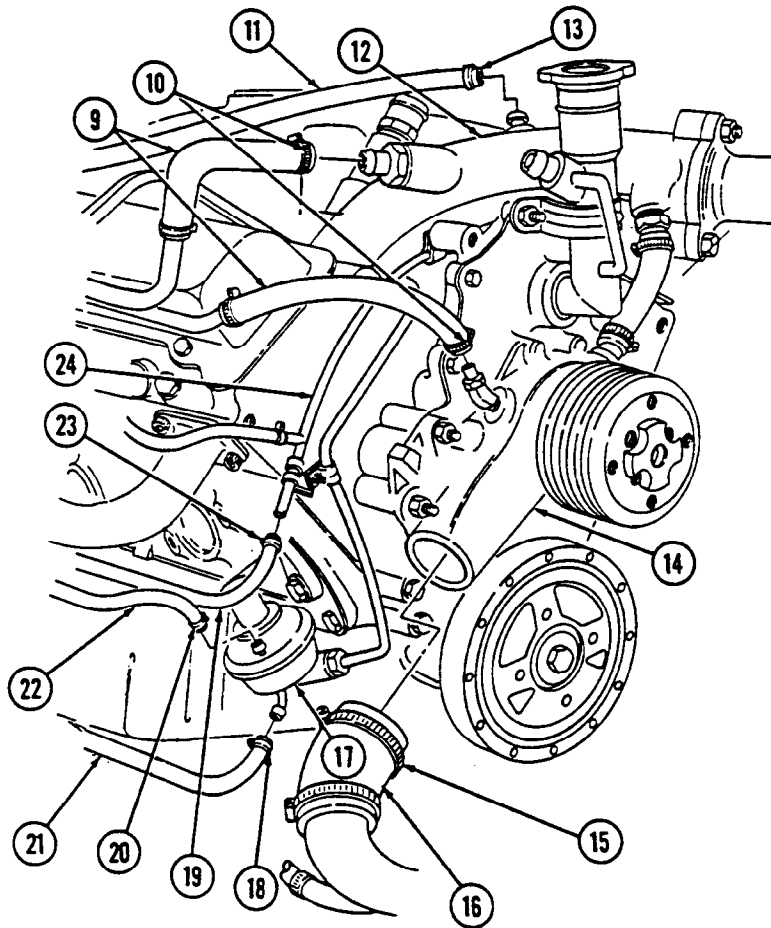
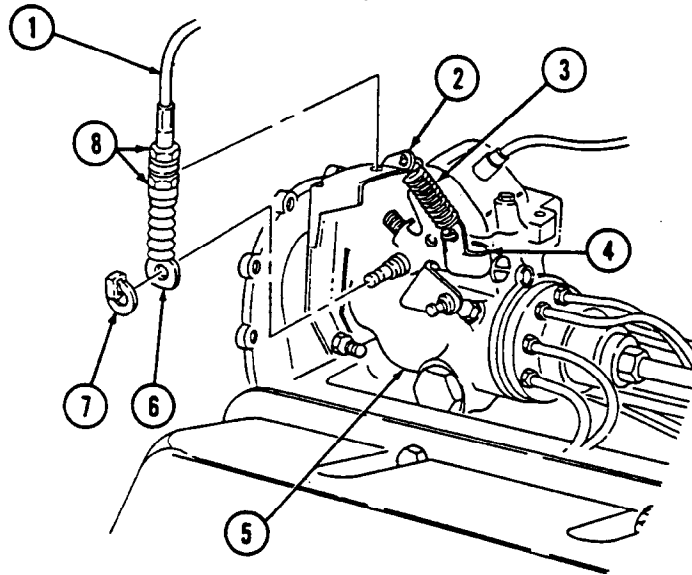
46. Loosen nuts (8) on cable assembly (1) and cable bracket (2).
47. Fully depress accelerator pedal.
48. Hold throttle shaft lever (4) on injection pump (5) in full-throttle position.
49. Adjust two nuts (8) up or down so cable end (6) holds throttle shaft lever (4) in full-throttle position.
50. Tighten two nuts (8) connecting cable assembly (1) to cable bracket (2).
51. Release accelerator pedal and ensure throttle shaft lever (4) returns all the way to idle position.

WARNING

Ensure fuel pump vent line is properly attached to top vent line fitting of fuel pump. Improper vent line installation may cause injury to personnel or damage to equipment.

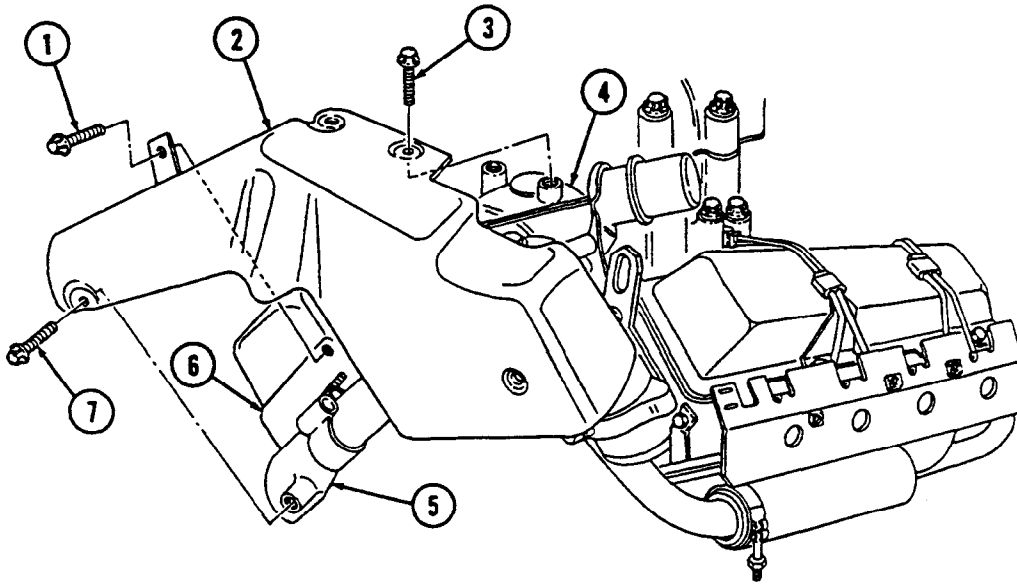
52. Connect vent line (22) to fuel pump (17) and tighten clamp (20).
53. Connect fuel supply line (21) to fuel pump (17) and tighten clamp (18) to 10-20 lb-in. (1-2 N·m).
54. Connect fuel return hose (19) to fuel return line (24) and tighten clamp (23) to 10-20 lb-in. (1-2 N·m).
55. Connect two water hoses (9) to water crossover (12) and water pump (14) and tighten two clamps (10).
56. Connect water pump inlet hose (16) to water pump (14) and tighten clamp (15).
57. Connect surge tank-to-water crossover hose (11) to crossover (12) and tighten clamp (13) to 10-20 lb-in. (1-2 N·m).

15-28. ENGINE INSTALLATION (Cont'd)



15-28. ENGINE INSTALLATION (Cont'd)

58. Install rear heat shield (2) on turbocharger (4) with two capscrews (3).
59. Install capscrew (1) on rear heat shield (2) and left cylinder head (6).
60. Install capscrew (7) on rear heat shield (2) and left exhaust manifold (5).



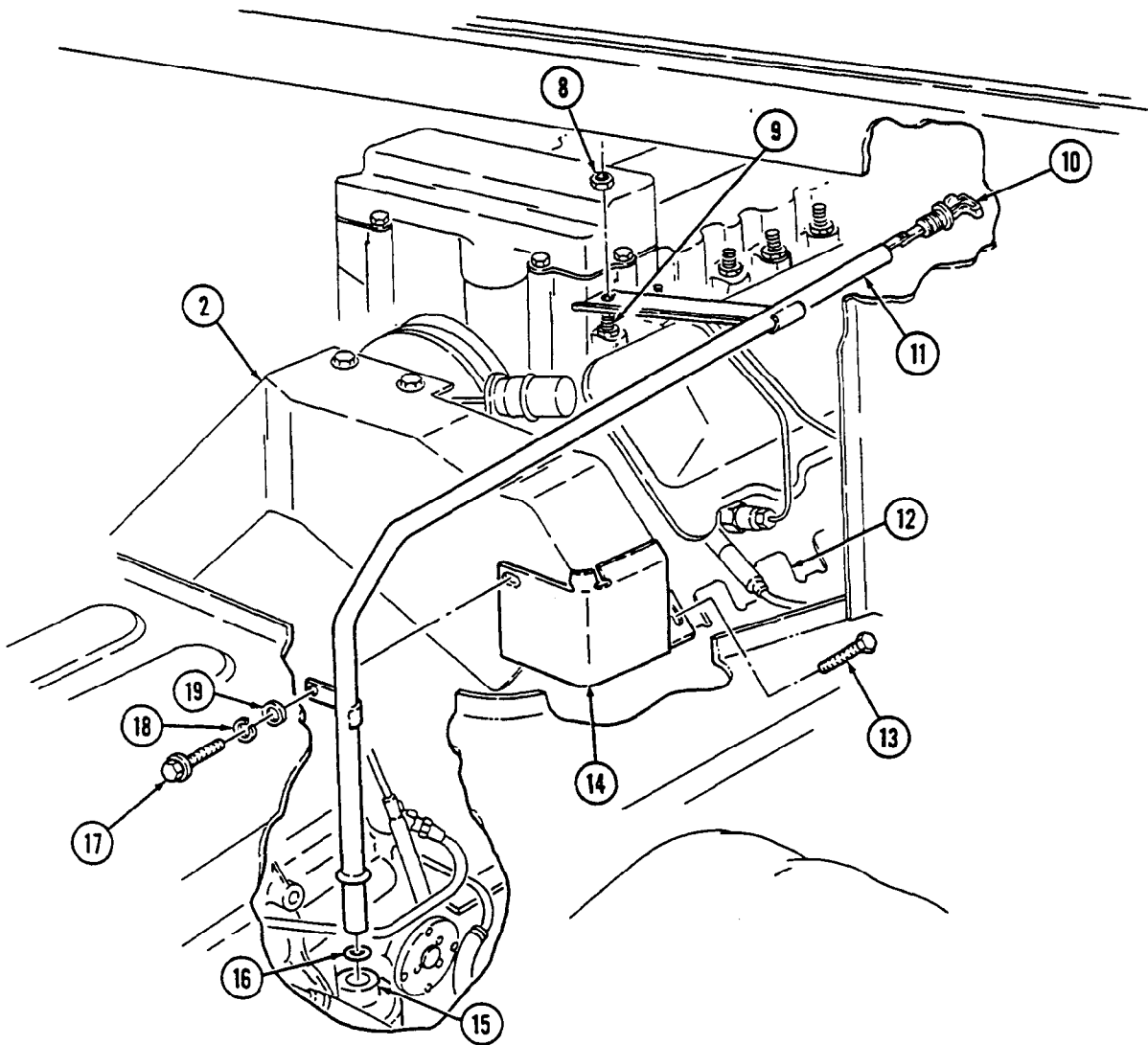
15-28. ENGINE INSTALLATION (Cont'd)

61. Install right rear heat shield (14) on right exhaust manifold heat shield (12) and rear heat shield (2) with two screws (13).

NOTE

Remove plug prior to installation of transmission oil dipstick tube.

62. Install O-ring seal (16) on dipstick tube (11).
 63. Install dipstick tube (11) into transmission (15).
 64. Install dipstick tube (11) on manifold stud (9) with nut (8).
 65. Install dipstick tube (11) on right rear heat shield (14) with washer (19), lockwasher (18), and capscrew (17). Tighten capscrew (17) 25-37 lb-ft (34-50 N·m).
 66. Install transmission oil dipstick (10) in dipstick tube (11).

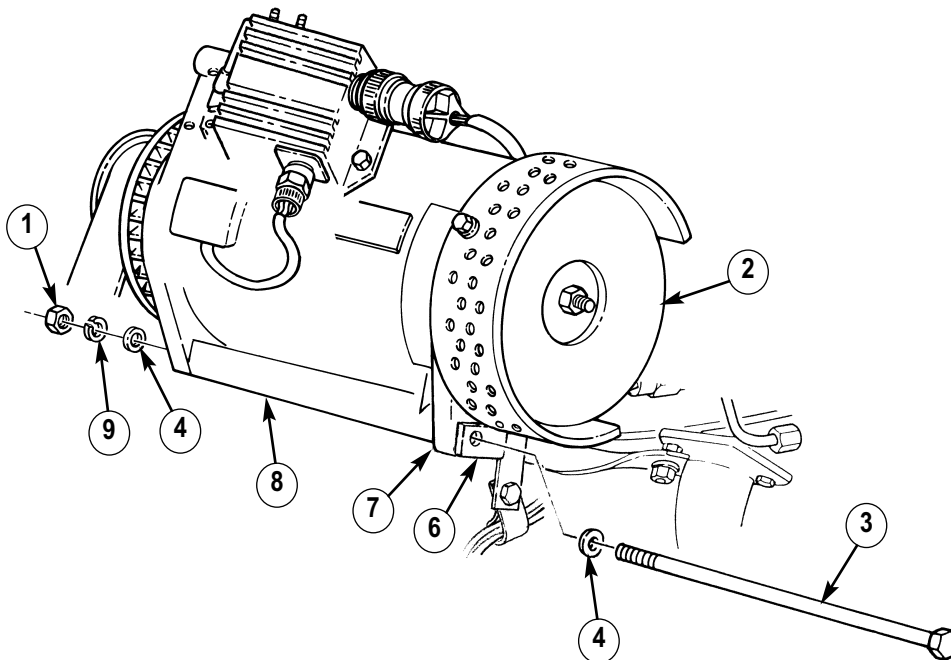


15-28. ENGINE INSTALLATION (Cont'd)

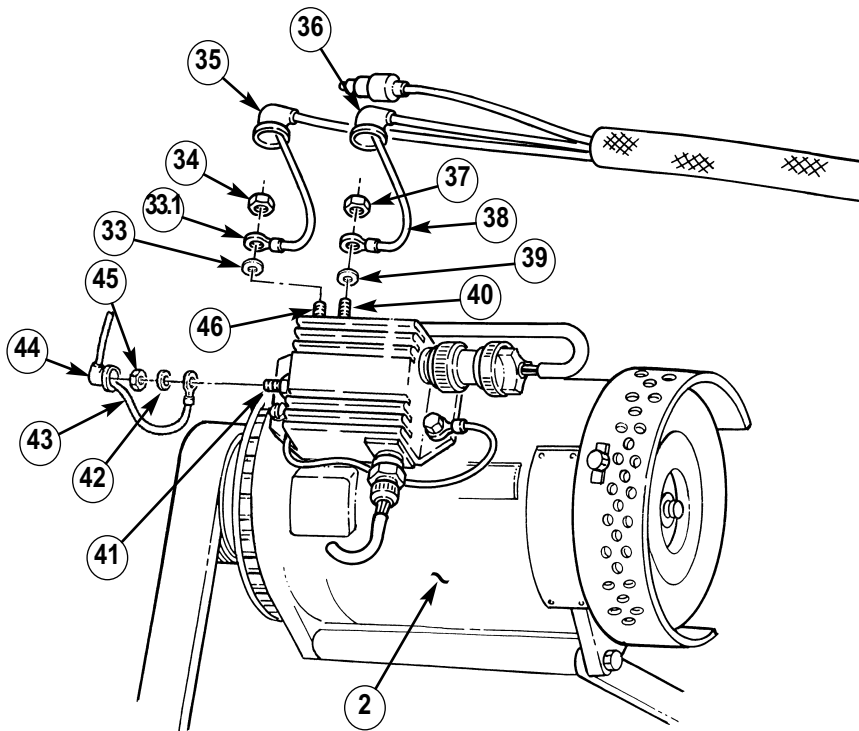
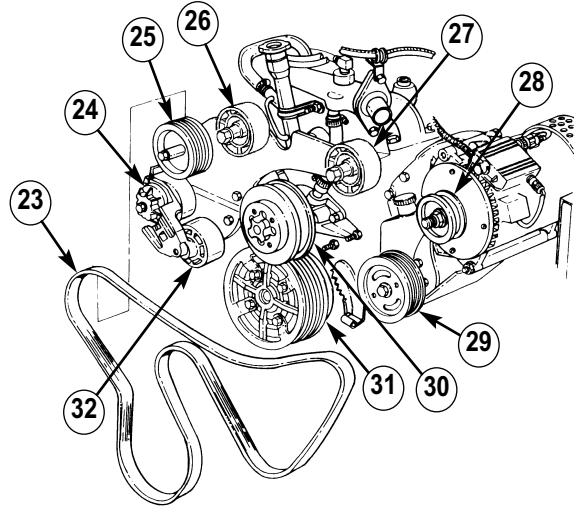
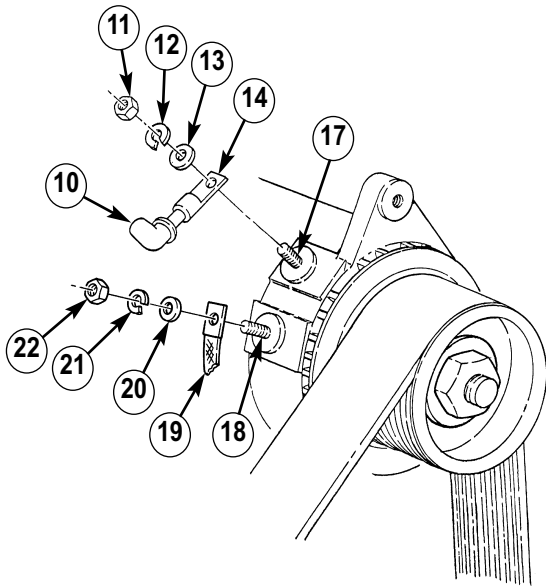
67. Position alternator (2) on mounting bracket (8) with support bracket (6) on outside of alternator mounting flange (7) and install washer (4), capscrew (3), washer (4), lockwasher (9), and nut (1).
68. Install positive cable (14) on stud (17) with washer (13), lockwasher (12), and nut (11). Tighten nut (11) to 10-15 lb-ft (14-20 N·m).
69. Install rubber boot (10) over stud (17).
70. Install ground strap (19) on negative stud (18) with washer (20), lockwasher (21), and nut (22). Tighten nut (22) to 8-12 lb-ft (11-16 N·m).

NOTE

- Ensure terminals are clean before connections are made.
 - Steps 67 through 75 are for the 200-amp dual voltage alternator. The 400-amp dual voltage alternator procedures are similar.
71. Position 3/8-in. breaker bar or, as appropriate, a 1/2-in. ratchet wrench on belt tensioner (24) and move tensioner (24) clockwise to allow installation of drivebelt (23).
 72. Feed drivebelt (23) into groove on crankshaft pulley (31), A/C compressor or idler pulley (25), alternator pulley (28), power steering pump pulley (29), upper idler pulleys (26) and (27), water pump pulley (30), and tensioner pulley (32). Release belt tensioner (24).
 73. Install lead (43), washer (42), and nut (45) on terminal (41). Tighten nut (45) to 18-22 lb-in. (2.0-2.5 N·m). Slide rubber boot (44) over terminal (41).
 74. Install washer (33), lead 568 (33.1), and nut (34) on IGN terminal (46). Tighten nut (34) to 23-27 lb-in. (2.6-3.0 N·m). Slide rubber boot (35) over terminal (46).
 75. Install washer (39), lead 2A (38), and nut (37) on AC terminal (40). Tighten nut (37) to 18-22 lb-in. (2.0-2.5 N·m). Slide rubber boot (36) over terminal (40).

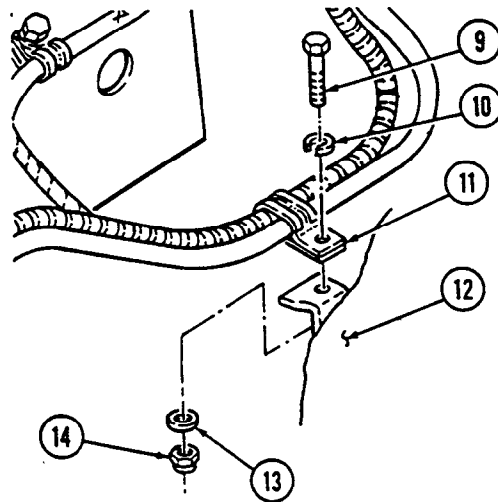
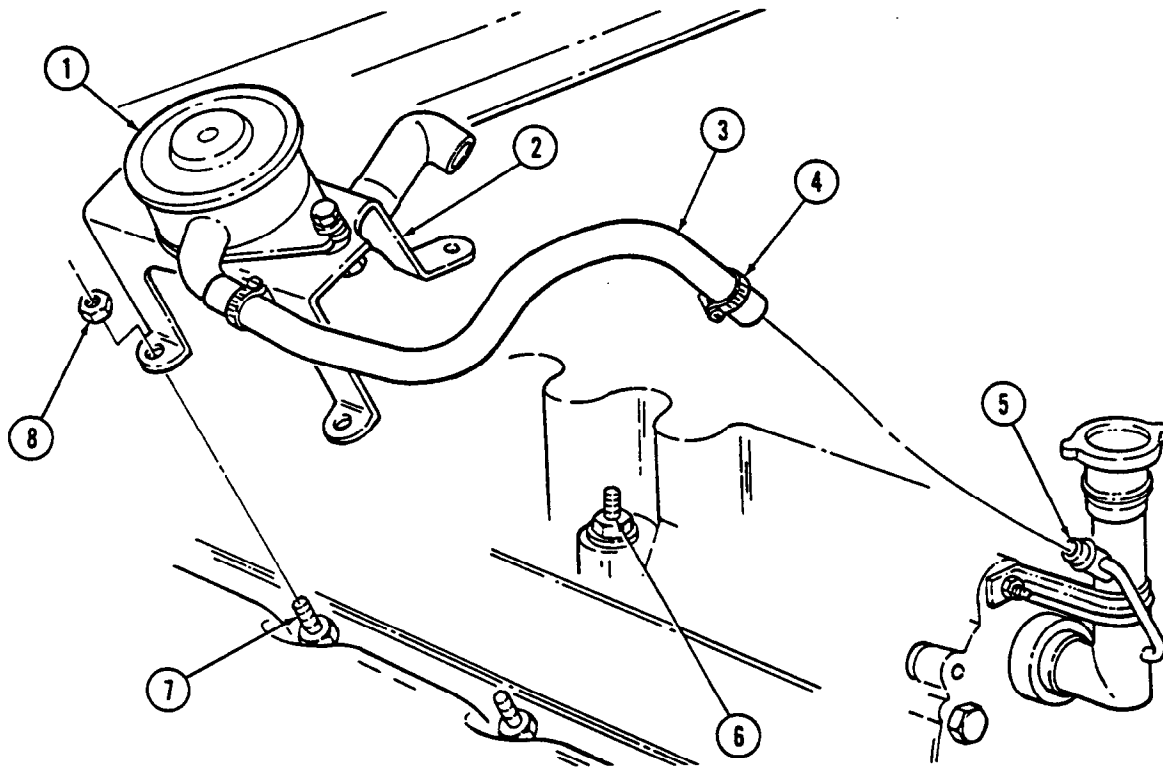


15-28. ENGINE INSTALLATION (Cont'd)



15-28. ENGINE INSTALLATION (Cont'd)

- 76. Position CDR valve (1) and bracket (2) over two intake manifold studs (7) and valve cover studs (6).
- 77. Secure CDR valve (1) and bracket (2) with four nuts (8). Tighten nuts (8) to 15 lb-ft (20 N·m).
- 78. Connect CDR valve oil fill tube hose (3) to oil fill tube (5) and tighten clamp (4).
- 79. Install clamp (11) on body (12) with lockwasher (10), capscrew (9), washer (13), and nut (14).

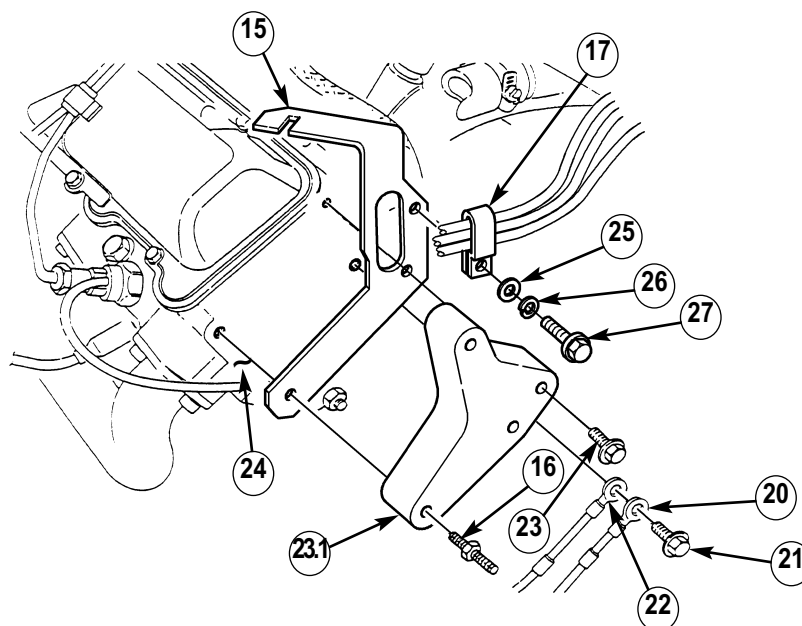
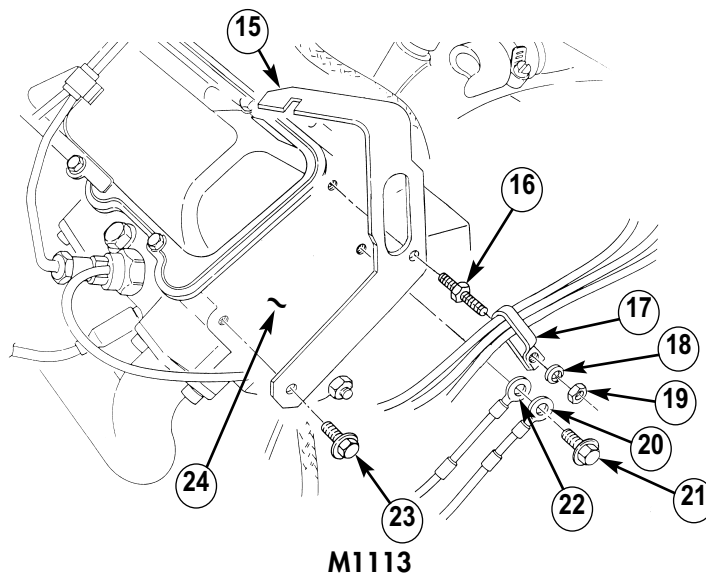


15-28. ENGINE INSTALLATION (Cont'd)

NOTE

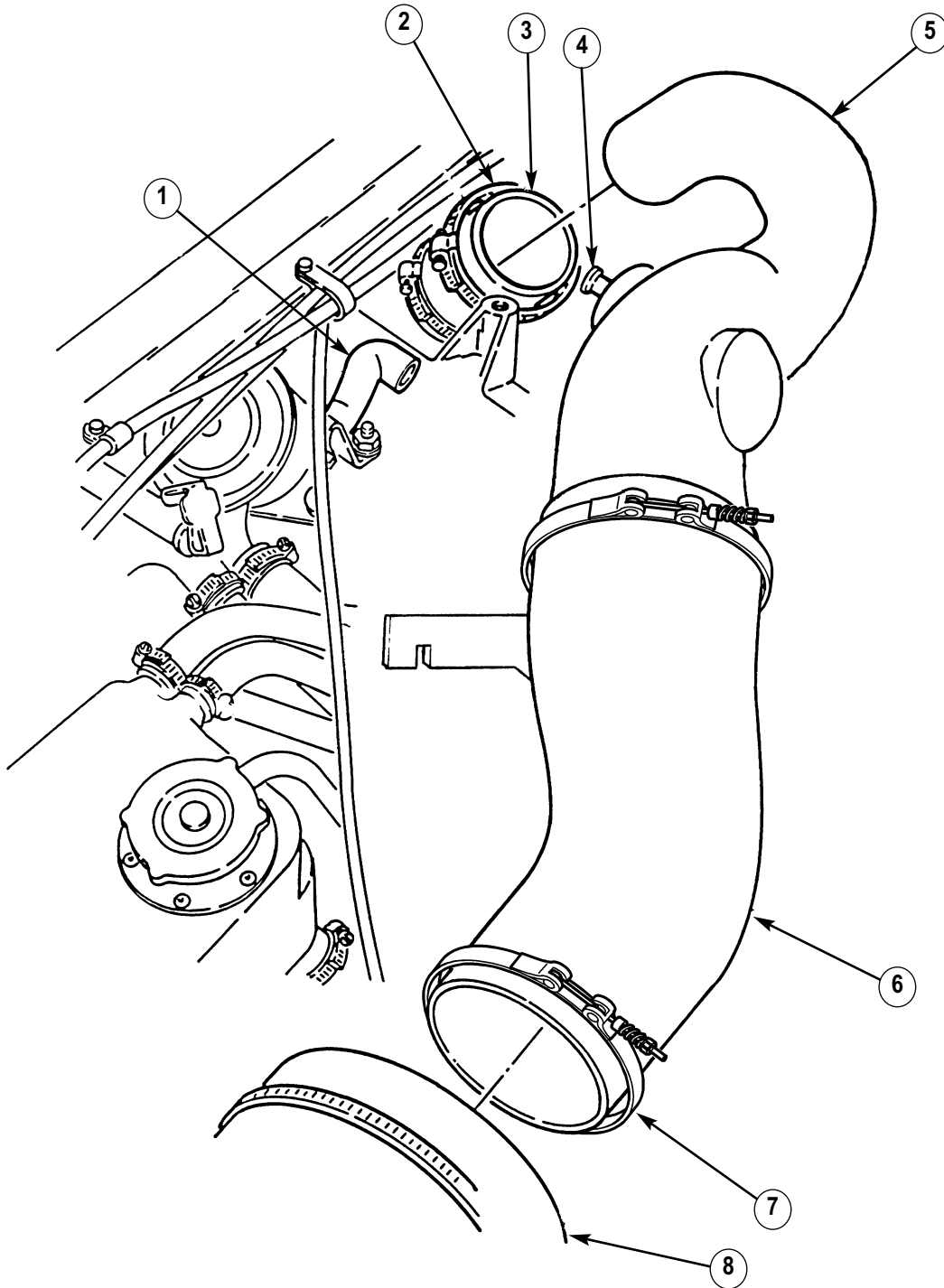
Perform step 80 for M1113 models. Perform step 81 for M1114 models.

80. Install air horn support bracket (15) on cylinder head (24) with stud (16), harness clamp (17), lockwasher (18), nut (19), and capscrew (23).
81. Install air horn support bracket (15) and adapter (23.1) on cylinder head (24) with stud (16) and capscrew (23). Secure clamp (17) on air horn support bracket (15) with washer (25), lockwasher (26), and capscrew (27).
82. Install ground leads 7A (22) and 7E (20) on cylinder head (24) with capscrew (21).



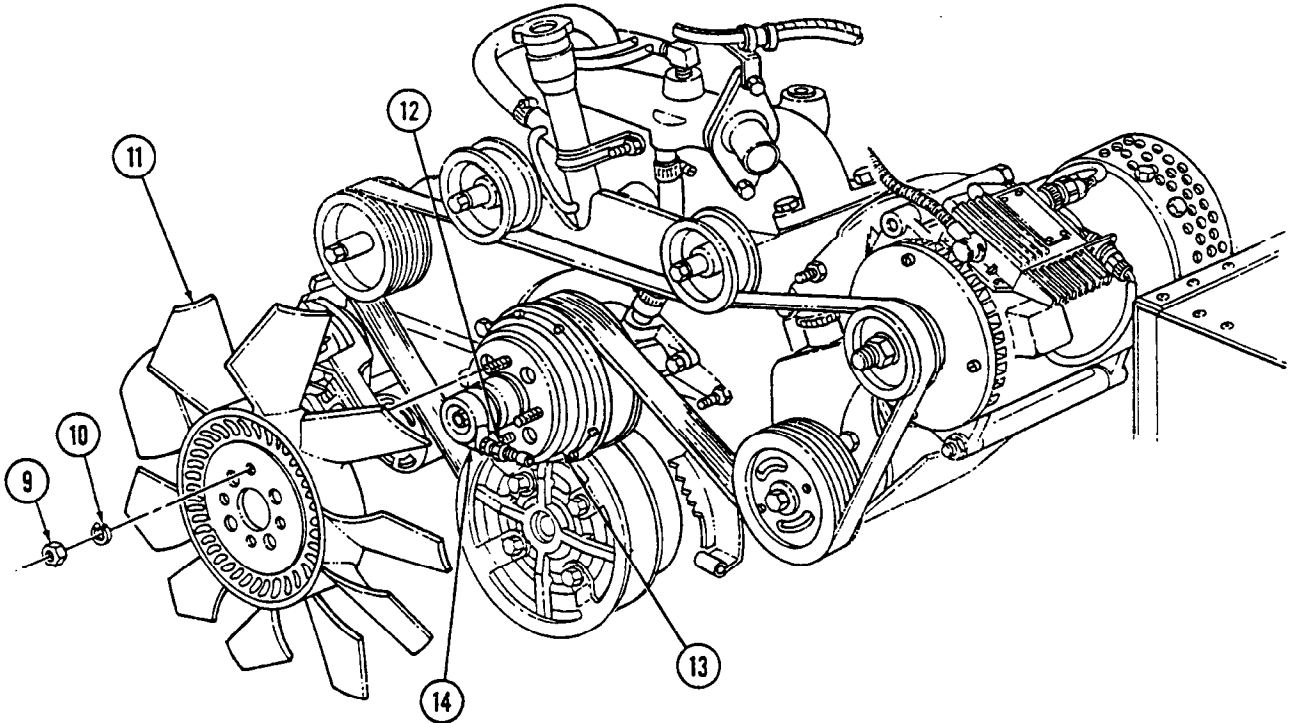
15-28. ENGINE INSTALLATION (Cont'd)

- 83. Connect air horn (5) to turbocharger intake hose (3) and tighten clamp (2).
- 84. Connect elbow (6) to air cleaner (8) and tighten clamp (7).
- 85. Connect CDR hose (1) to air horn adapter (4).



15-28. ENGINE INSTALLATION (Cont'd)

86. Position fitting (12) on clutch adapter (14) at 6 o'clock.
87. Align fan blade (11) onto fan drive (13) and install with four lockwashers (10) and nuts (9). Tighten nuts (9) to 45 lb-ft (61 N·m).



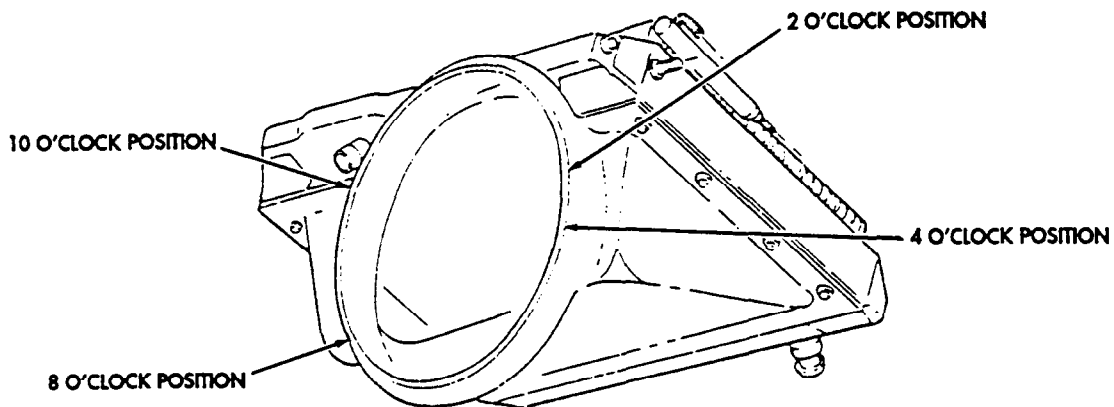
15-28. ENGINE INSTALLATION (Cont'd)

88. Align radiator assembly (3) and oil cooler (33) to frame bracket (38) and two rear support brackets (13) to airlift brackets (7).
89. Install two rear support brackets (13) on airlift brackets (7) with four capscrews (12), washers (11), and locknuts (10). Do not tighten locknuts (10).
90. Install radiator assembly (3), large washer (36), and mount (37) on frame bracket (38) with large washer (36), washer (39), capscrew (40), washer (35), and locknut (34). Do not tighten capscrew (40).
91. Install crossbrace (23) on airlift brackets (7) with four capscrews (20), washers (21), and locknuts (22).
92. Tighten nut (24) to increase tension on crossbrace (23).
93. Connect two transmission oil cooler line connector hoses (32) to transmission oil cooler ports (30) and tighten hose clamps (31) to 10-20 lb-in. (1-2 N·m).
94. Connect two engine oil cooler supply and return lines (27) to engine oil cooler ports (28).
95. Connect two power steering hoses (25) to power steering cooler ports (29) and tighten clamps (26).

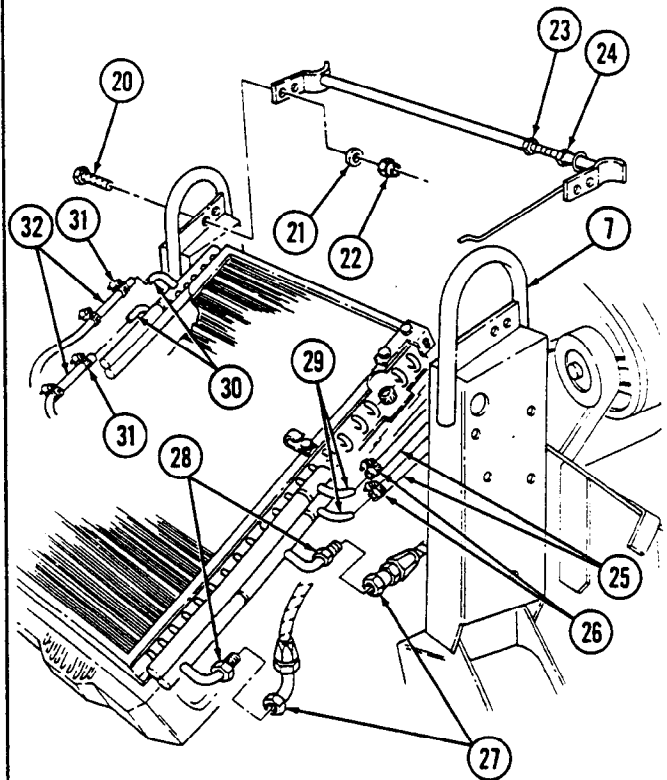
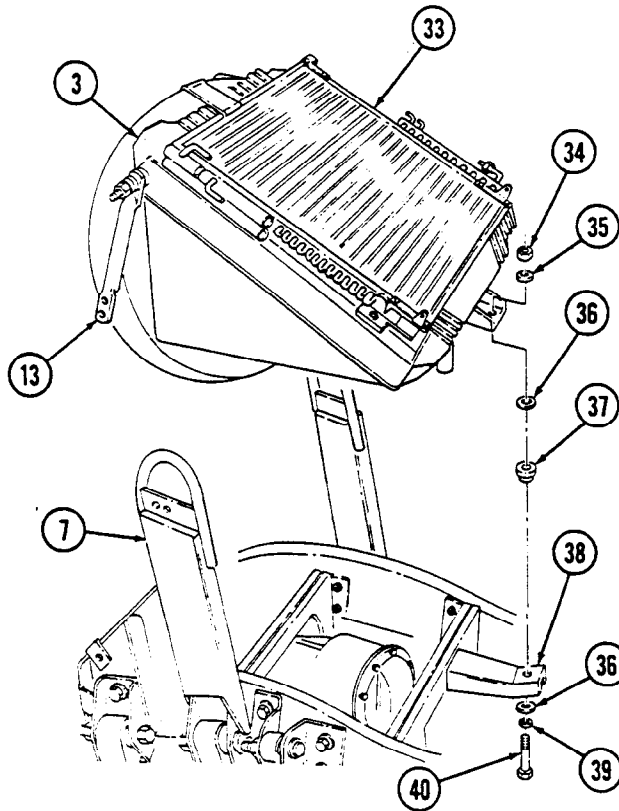
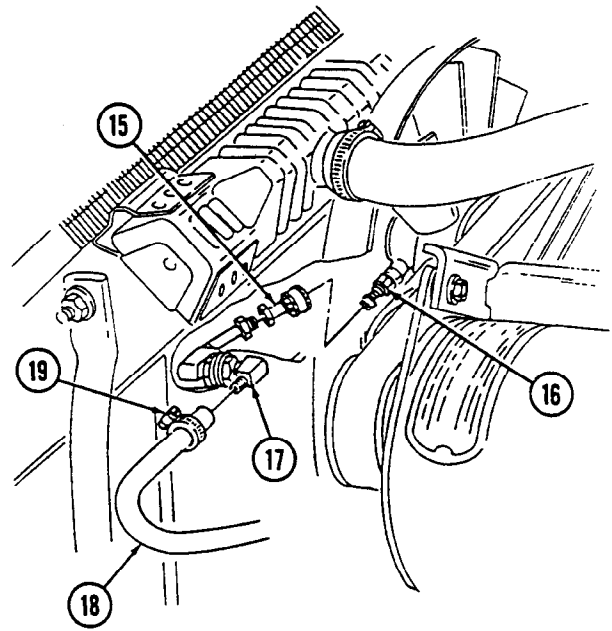
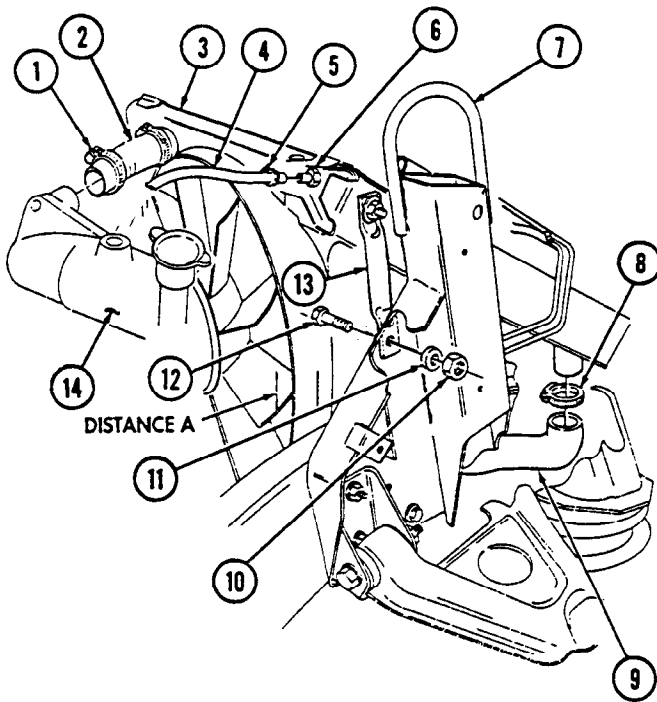
NOTE

- Fan shroud should be aligned so the following dimensions are maintained. Adjustments may be made by tilting the radiator/shroud assembly. Distance A from the edge of shroud ring and rear edge of fan must be $1\text{-}1/2 \pm 1/4$ in. (38.1 ± 6 mm). Measure distance A at the 2, 4, 8, and 10 o'clock positions.
- Fan blade to fan shroud clearance, the distance between the top of the fan blade and fan shroud, must not be less than $1/4$ in. (6 mm) at any position.

96. Align radiator assembly (3) and tighten locknuts (10) to 26 lb-ft (35 N·m). Tighten capscrew (40) to 30 lb-ft (41 N·m).
97. Connect lower radiator front hose (9) to radiator (3) and tighten clamp (8).
98. Connect fan drive hose quick-disconnect (15) to fan drive disconnect (16).
99. Connect control valve hose (18) to bulkhead adapter (17) and tighten clamp (19).
100. Connect radiator inlet hose (2) to engine (14) and tighten clamp (1).
101. Connect surge tank-to-radiator vent hose (4) to adapter (6) and tighten clamp (5).

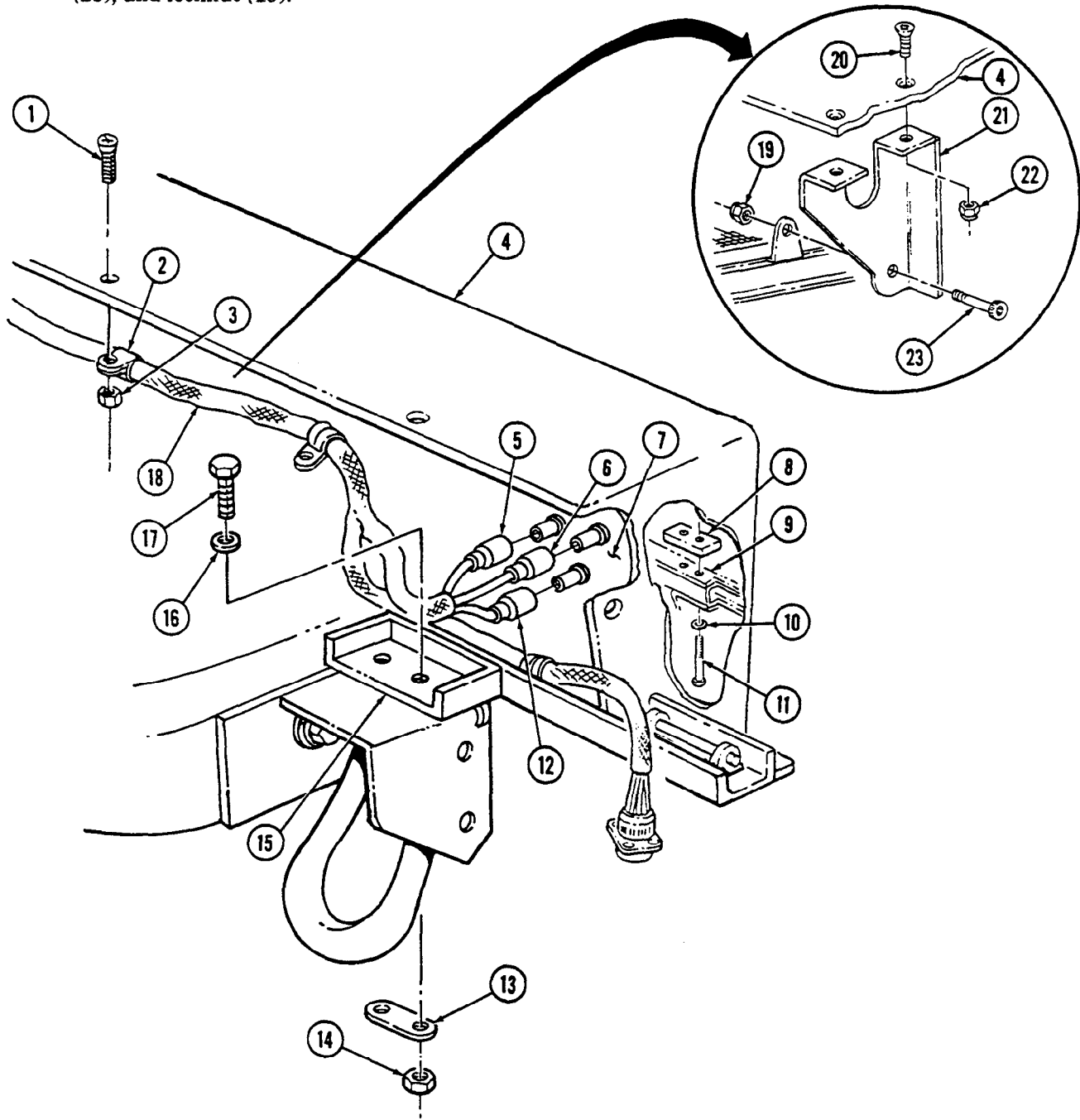


15-28. ENGINE INSTALLATION (Cont'd)



15-28. ENGINE INSTALLATION (Cont'd)

- 102. Install leads 17 (6), 18 (12), and 91 (5) on headlight assembly (7).
- 103. Install headlight housing (4) on frame extension (9) with spacer (8), two washers (10), and screws (11).
- 104. Install headlight housing (4) on two frame brackets (15) with four washers (16), screws (17), two plates (13), and four locknuts (14).
- 105. Install body harness (18) on headlight housing (4) with two screws (1), clamps (2), and locknuts (3).
- 106. Install bracket (21), if removed, on headlight housing (4) with two screws (20), locknuts (22), screw (23), and locknut (19).



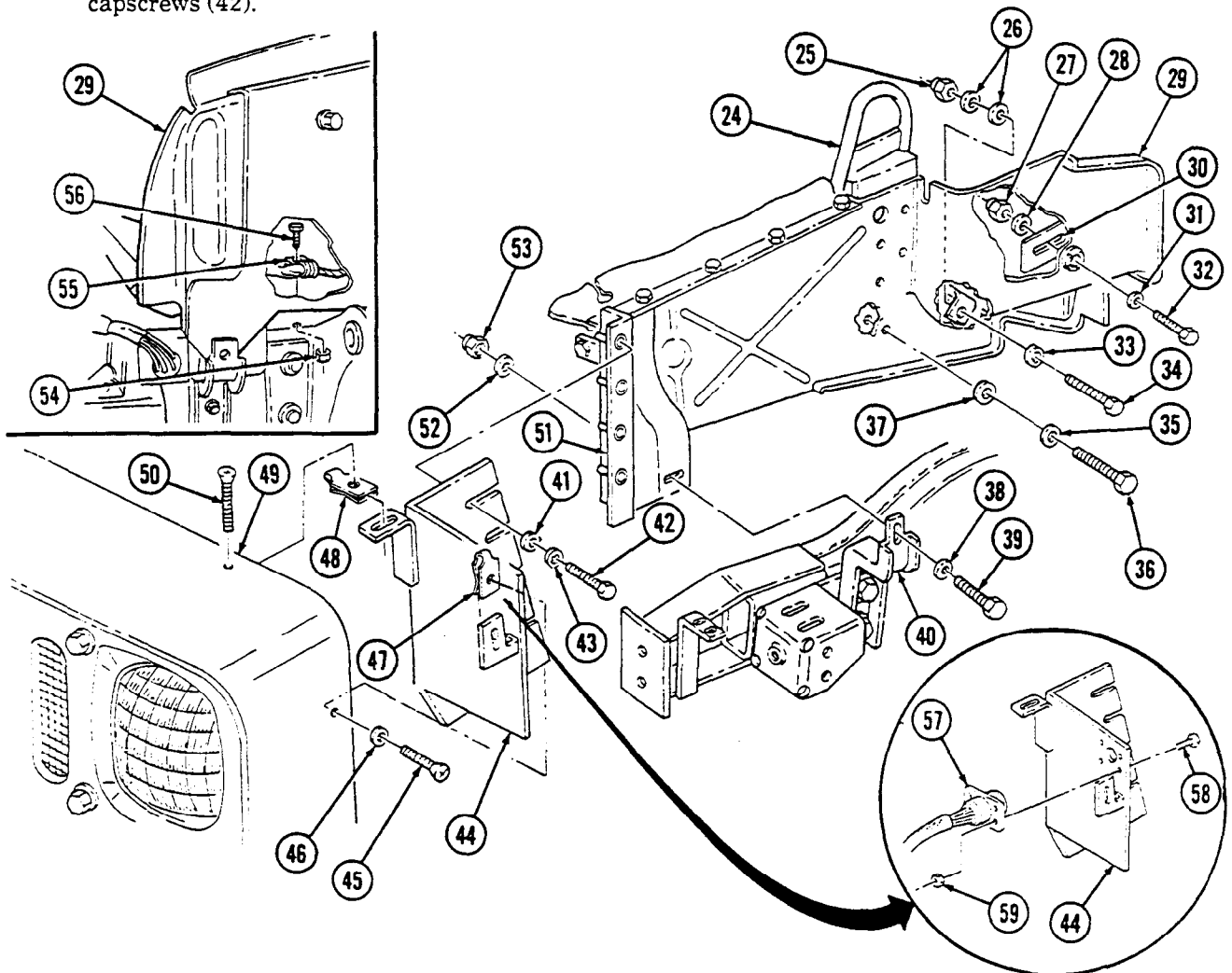
15-28. ENGINE INSTALLATION (Cont'd)

- 107. Install left splash shield (29) on bracket (40) with washer (38), capscrew (39), washer (52), and locknut (53).
- 108. Install harness and clamp (55) on splash shield (29) with screw (56) and nut and lockwasher assembly (54).
- 109. Install splash shield (29) on master cylinder bracket (30) with washer (31), capscrew (32), washer (28), and locknut (27).

NOTE

Perform steps 110 and 111 for M1113 models only.

- 110. Install left splash shield (29) on airlift bracket (24) with lockwasher (35), washer (37), and capscrew (36). Tighten capscrew (36) to 15 lb-ft (20 N·m).
- 111. Install left splash shield (29) on airlift bracket (24) with washer (33), capscrew (34), two washers (26), and locknut (25). Tighten capscrew (34) to 95-145 lb-in. (11-16 N·m).
- 112. Install connector (57) on plate (44) with four screws (58) and nuts (59).
- 113. Install plate (44) and spring nuts (48) and (47) on headlight housing (49) with washer (46) and hex-head screws (45) and (50).
- 114. Install plate (44) on splash shield bracket (51) with four lockwashers (43), washers (41), and capscrews (42).



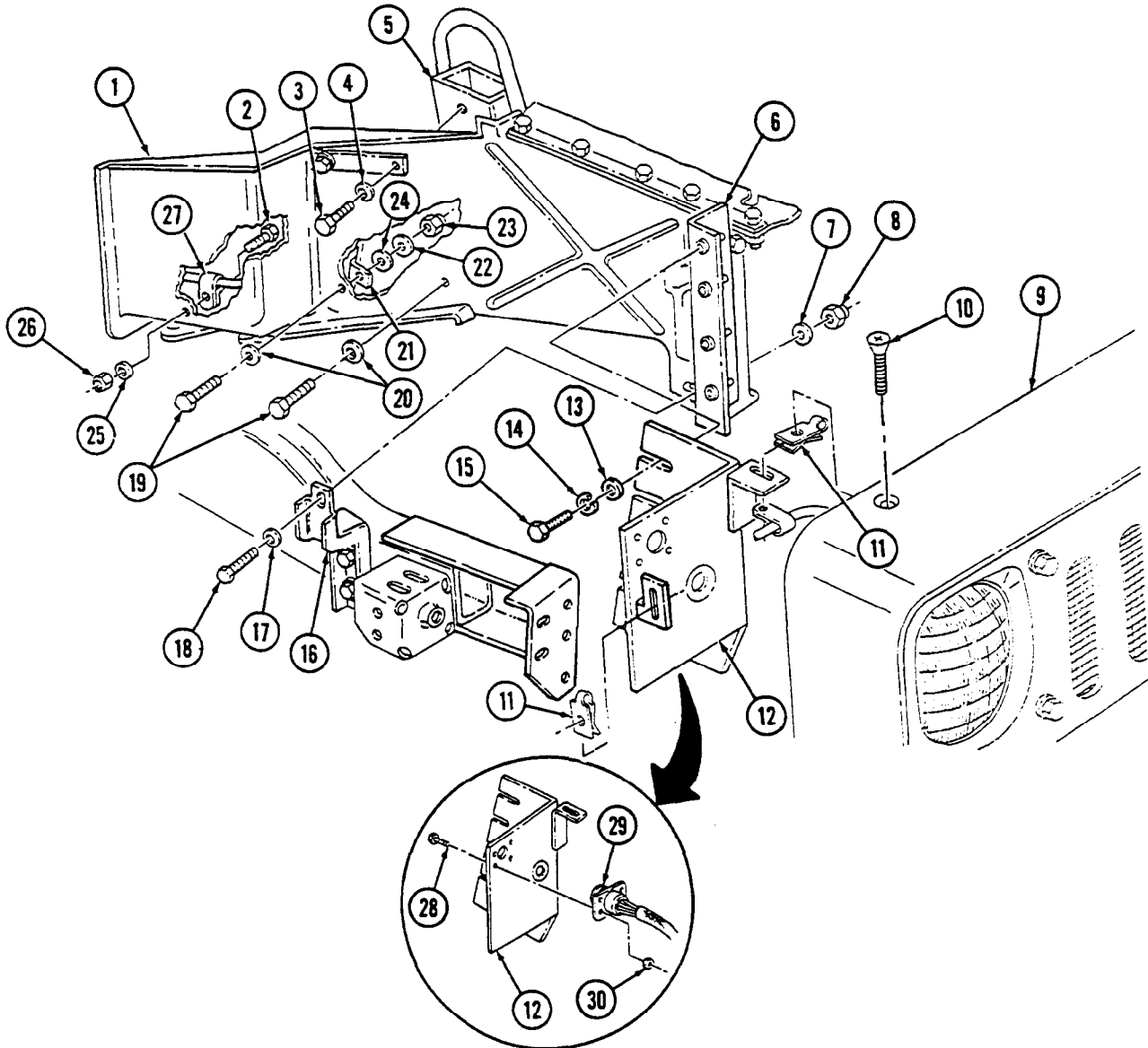
15-28. ENGINE INSTALLATION (Cont'd)

- 115. Install right splash shield (1) on airlift bracket (5) with washer (4) and screw (3).
- 116. Install right splash shield (1) on support bracket (16) with washer (17), capscrew (18), washer (7), and locknut (8). Tighten capscrew (18) to 15 lb-ft (20 N·m).

NOTE

Perform steps 117 and 118 for M1113 models only.

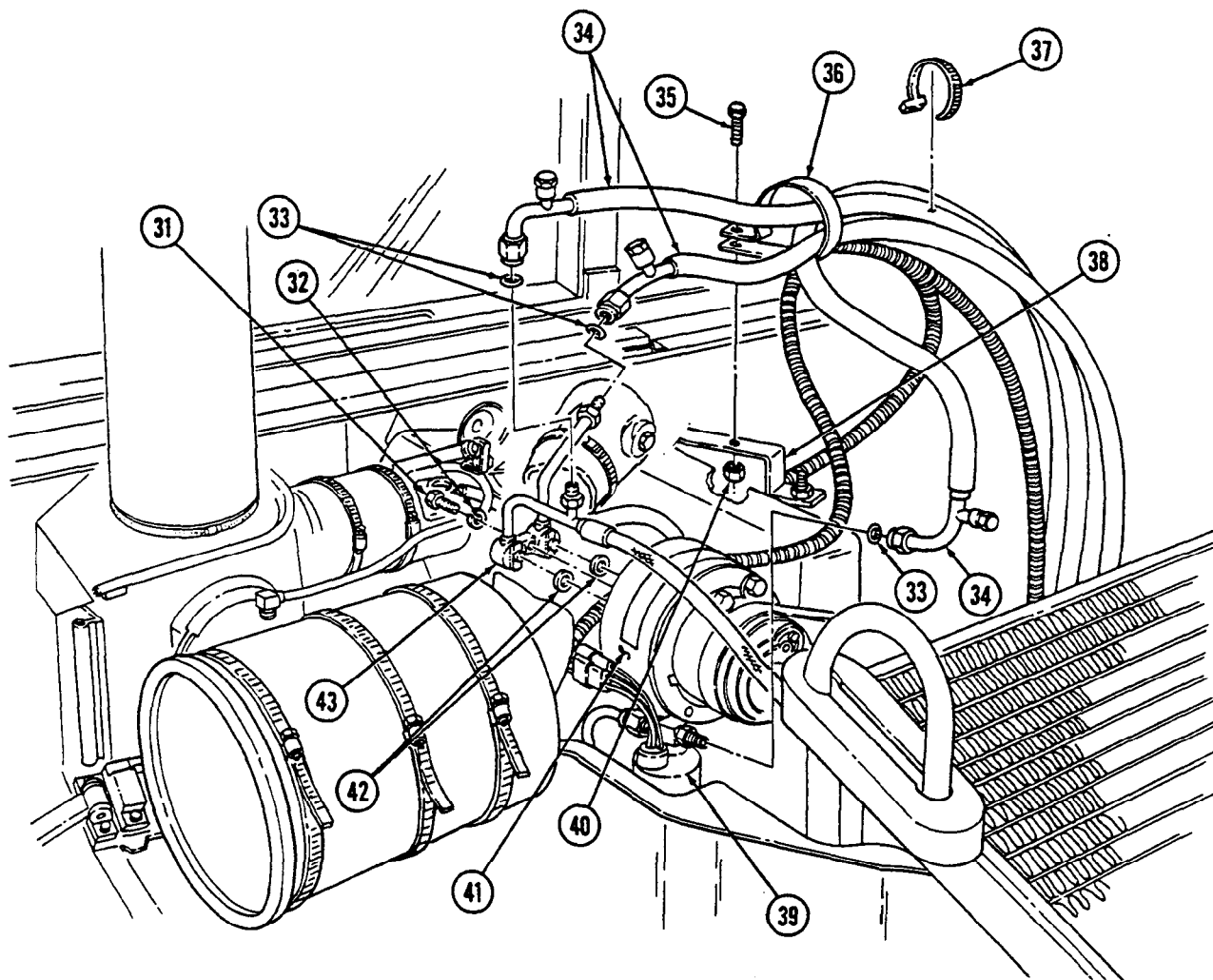
- 117. Install right splash shield (1) on airlift bracket (5) with two washers (20), capscrews (19), clamp (21), washer (24), washer (22), and locknut (23). Tighten capscrews (19) to 15 lb-ft (20 N·m).
- 118. Install vent line clamp (27) on right splash shield (1) with capscrew (2), washer (25), and locknut (26). Tighten locknut (26) to 15 lb-ft (20 N·m).
- 119. Install harness connector (29) on plate (12) with four screws (28) and nuts (30).
- 120. Install plate (12) and spring nuts (11) on headlight housing (9) with two hex-head screws (10).
- 121. Install right splash shield (1) on bracket (6) and plate (12) with four lockwashers (14), washers (13), and capscrews (15).



15-28. ENGINE INSTALLATION (Cont'd)**NOTE**

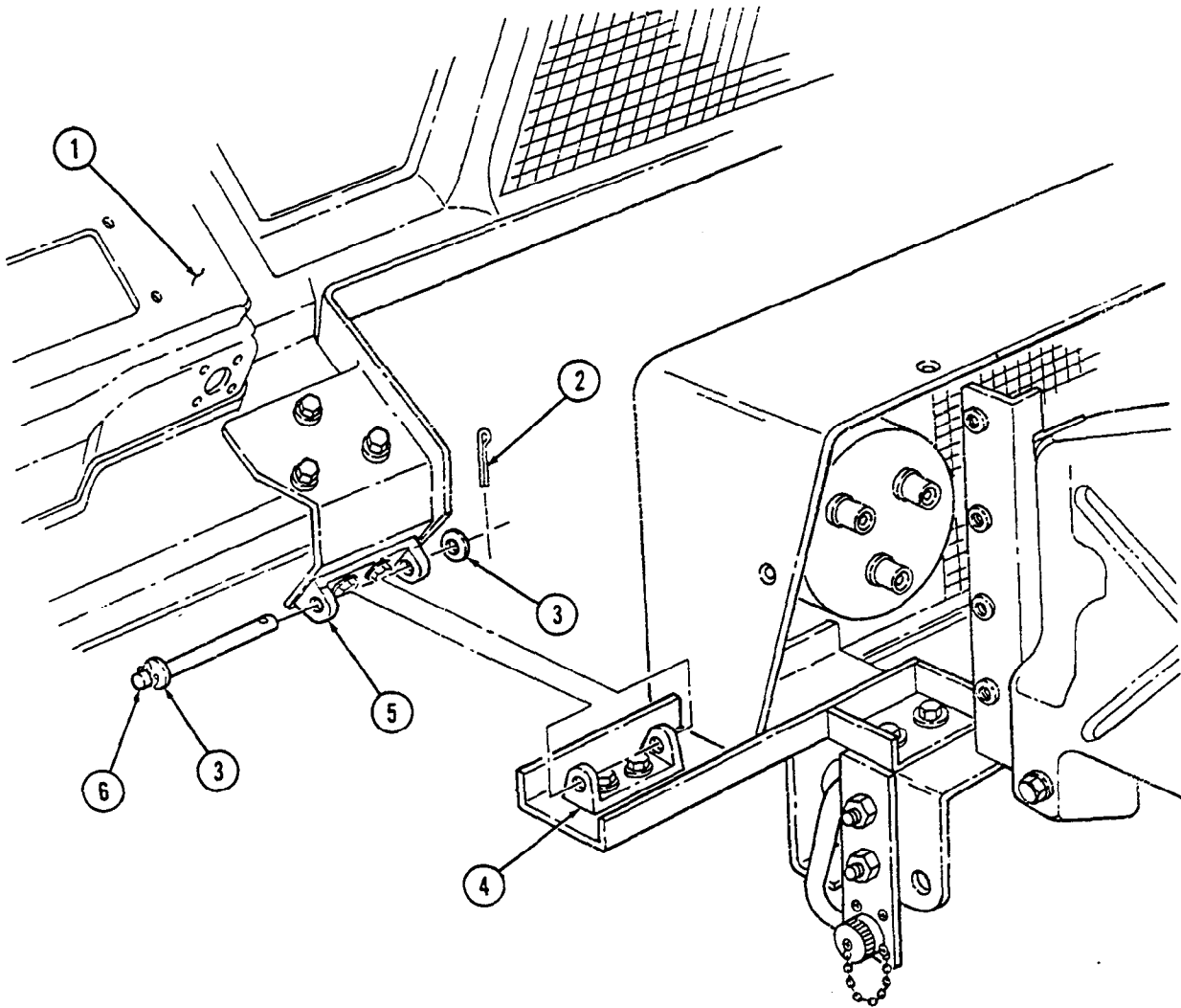
Perform steps 122 through 124 for M1114 models only.

122. Position three A/C hoses (34) through clamp (36) and install clamp (36) on bracket (38) with cap screw (35) and nut (40). Install tiedown strap (37) on A/C hoses (34).
123. Install two seals (42) and tube assembly (43) on compressor (41) with lockwasher (32) and screw (31).
124. Install three O-rings (33) and A/C hoses (34) on receiver/dryer (39) and tube assembly (43).

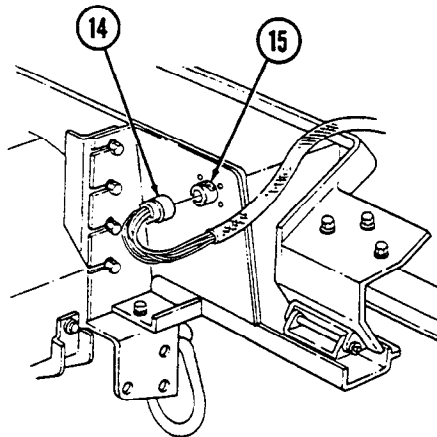
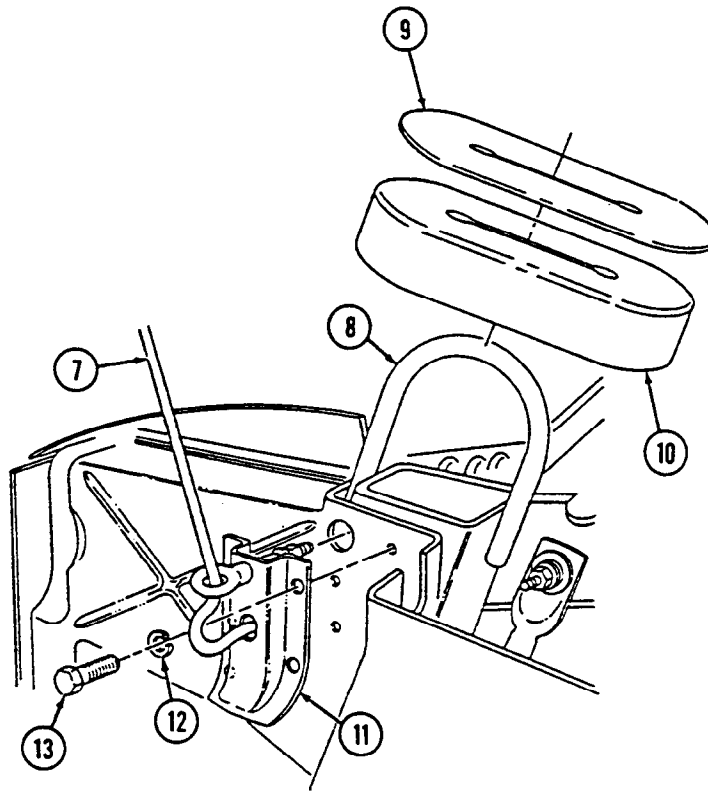


15-28. ENGINE INSTALLATION (Cont'd)

125. Install hood (1) and align two upper hinge halves (5) with lower hinge halves (4).
126. Install two upper hinge halves (5) on lower hinge halves (4) with washers (3), hinge pins (6), washers (3), and cotter pins (2).
127. Install hood prop rod (7) and bracket (11) on airlift bracket (8) with four lockwashers (12) and screws (13). Tighten screws (13) to 6 lb-ft (8 N·m).
128. Install two seals (10) and cover plates (9) on airlift brackets (8).
129. Connect hood harness connector (14) to harness connector (15).



15-28. ENGINE INSTALLATION (Cont'd)



- FOLLOW-ON TASKS:**
- Fill engine oil, transmission fluid, and power steering fluid to proper levels (TM 9-2320-387-10).
 - Install batteries (para. 4-74).
 - Install engine access cover (para. 10-22).
 - Charge A/C system (para. 25-15).
 - Perform engine run-in (para. 15-24).

15-29. ENGINE REPLACEMENT IN SHIPPING/STORAGE CONTAINER

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Engine lifting sling (Appendix B, Item 24)

Materials/Parts

Eight lockwashers (Appendix G, Item 205)

Personnel Required

One mechanic
One assistant

General Safety Instructions

Direct personnel to stand clear during hoisting operation.

Maintenance Level

Direct support

a. Removal

1. If engine container (5) is closed and sealed, press air-release button (1) located at center of breather valve (2) before opening engine container (5).
2. Remove twenty-six nuts (19), washers (18), capscrews (16), and upper container (4) from lower container (13).
3. Position engine lifting sling on engine (6) and install on right cylinder head (25) with two capscrews (24).
4. Install sling bracket (21) on left cylinder head (20) with two capscrews (23). Tighten capscrews (23) and install sling bracket (21) to engine lifting sling with pin (22).
5. Remove four capscrews (14), lockwashers (8), and washers (7) from two engine mounts (12). Discard lockwashers (8).
6. Remove four capscrews (9), lockwashers (8), and washers (7) from two rear engine mounts (10). Discard lockwashers (8).

WARNING

Direct personnel to stand clear during hoisting operation. Failure to do this may cause injury to personnel.

7. Attach hoist to engine lifting sling and remove engine (6) from lower container (13).
8. Prepare engine for assembly (para. 15-27).

b. Installation

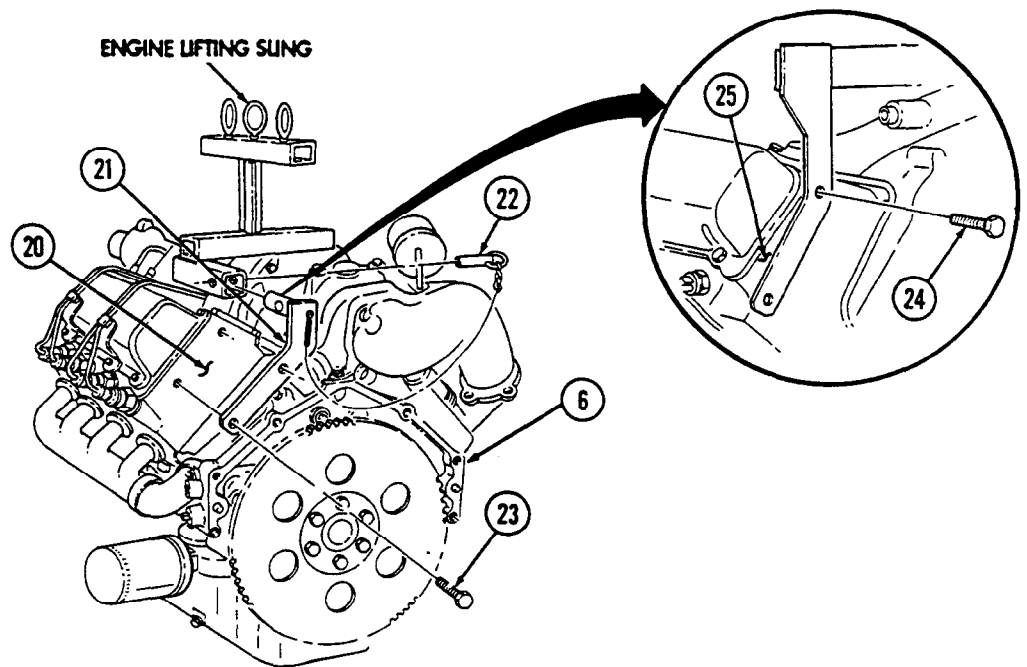
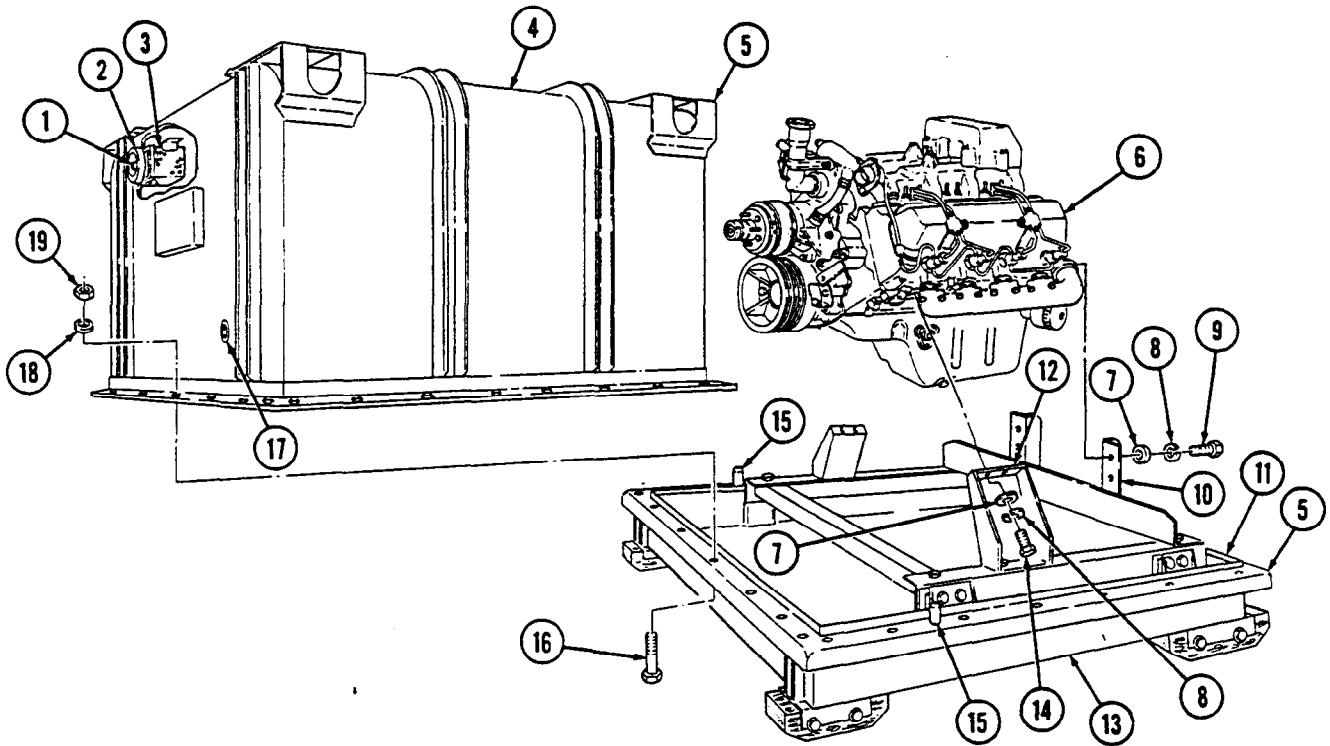
1. Install engine assembly (6) in lower container (13).
2. Install engine assembly (6) on two rear engine mounts (10) with four lockwashers (8), washers (7), and capscrews (9).
3. Install engine assembly (6) on two engine mounts (12) with four lockwashers (8), washers (7), and capscrews (14).
4. Remove pin (22) from sling bracket (21).
5. Remove two capscrews (24) and lifting sling from right cylinder head (25).
6. Remove two capscrews (23) and sling bracket (21) from left cylinder head (20).
7. Visually check humidity indicator (17) for discolorization. If indicator (17) is dark purple, replace desiccant (3).

15-29. ENGINE REPLACEMENT IN SHIPPING/STORAGE CONTAINER (Cont'd)

NOTE

Ensure gasket is seated properly.

8. Position upper container (4) using alignment pins (15) on gasket (11) and lower container (13).
9. Install upper container (4) on lower container (13) with twenty-six capscrews (16), washers (18), and nuts (19).



CHAPTER 16

FUEL SYSTEM (DS) MAINTENANCE

16-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of fuel system components at the direct support maintenance level. Some subassemblies and parts must be removed before fuel system components can be accessed. They are referenced to other paragraphs of this manual.

16-2. FUEL SYSTEM MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
16-3.	Fuel Injection Nozzle Replacement	16-2
16-4.	Fuel Injection Lines Maintenance	16-4
16-5.	Servo Advance Seal Replacement	16-6
16-6.	Fuel Injection Pump Maintenance	16-8
16-7.	Fuel Injection Pump Cover Replacement	16-12
16-8.	Fuel Injection Pump Shutoff Solenoid Maintenance	16-16
16-9.	Fuel Injection Pump Cold-Advance Solenoid Maintenance	16-18
16-10.	Accelerator Cable Mounting Bracket Maintenance	16-20

16-3. FUEL INJECTION NOZZLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Injection nozzle remover (Appendix B, Item 32)
Crowfoot, 19-mm (Appendix B, Item 137)
Crowfoot, 7/8-in. (Appendix B, Item 142)
(rear injection nozzle only)

Materials/Parts

Gasket (Appendix G, Item 81)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Engine access cover removed (para. 10-22)
(rear injection nozzles only).
- Battery ground cables disconnected (para. 4-68).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Direct support

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

NOTE

- Refer to engine decal model number on left rocker arm cover before ordering replacement parts.
- The replacement procedure for all eight injection nozzles is basically the same. This procedure covers one injection nozzle.

a. Removal

NOTE

- Have drainage container available to catch fuel.
 - Perform step 1 if replacing rear injection nozzles.
1. Loosen two clamps (6) and remove fuel return hose (2) and cap (10) from fuel injection nozzle (7).
 2. Loosen two clamps (6) and disconnect fuel return hoses (2) from fuel injection nozzle (7) .
 3. Remove screw-assembled washer (4) from clamp (3) and support bracket (1).
 4. Loosen and disconnect two fuel injection line nuts (5) from fuel injection nozzles (7).
 5. Using injection nozzle remover, remove fuel injection nozzle (7) and gasket (8) from cylinder head (9). Discard gasket (8).

16-3. FUEL INJECTION NOZZLE REPLACEMENT (Cont'd)

b. Installation

NOTE

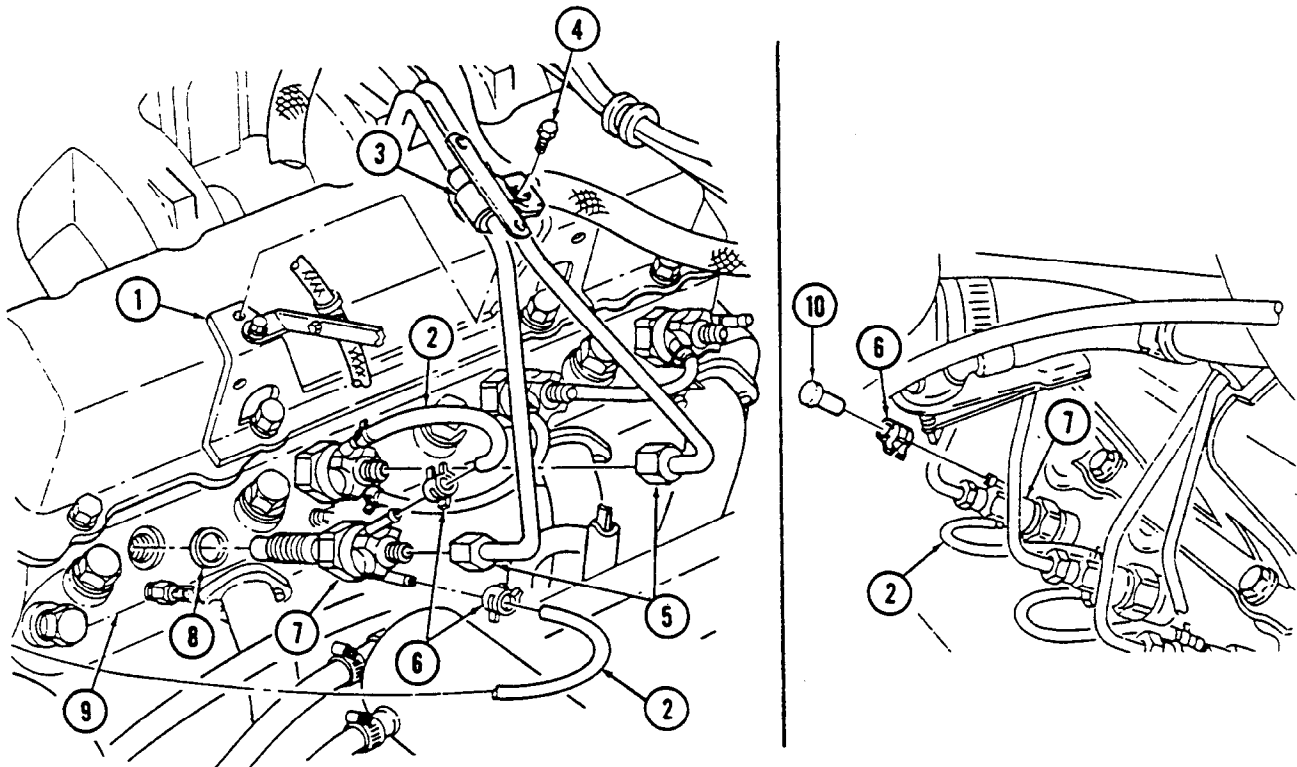
If replacing rear injection nozzles, tighten nozzles in accordance with step 2. Tighten fuel injection line nuts in accordance with step 4.

1. Install gasket (8) and fuel injection nozzle (7) on cylinder head (9). Using injection nozzle remover, tighten fuel injection nozzle (7) to 44-60 lb-ft (60-81 N·m).
2. Using injection nozzle remover and 7/8-in. crowfoot, tighten fuel injection nozzle (7) to 44-60 lb-ft (60-81 N·m).
3. Install fuel injection line nuts (5) on fuel injection nozzles (7).
4. Using 19-mm crowfoot, tighten fuel injection line nuts (5) to 20 lb-ft (27 N·m).
5. Install clamp (3) on support bracket (1) with screw-assembled washer (4). Tighten screw-assembled washer (4) to 3-4 lb-ft (4-5 N·m).

NOTE

Perform step 6 if replacing rear injection nozzles.

6. Install fuel return hose (2) and cap (10) on fuel injection nozzle (7) with clamps (6).
7. Install two fuel return hoses (2) on fuel injection nozzle (7) with clamps (6).
8. Bleed fuel lines (para. 16-4, task d.).



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Start engine (TM 9-2320-387-10) and check for fuel leakage.
 - Install engine access cover (para. 10-22) (rear injection nozzles only).
 - Lower and secure hood (TM 9-2320-387-10).

16-4. FUEL INJECTION LINES MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation
- d. Bleeding

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Crowfoot, 16-mm (Appendix B, Item 136)
Crowfoot, 19-mm (Appendix B, Item 137)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Left and right intake manifolds removed (paras. 15-16 and 15-17).
- Fuel injection pump boot removed (para. 3-23).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Direct support

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

a. Removal

NOTE

Have drainage container ready to catch fuel.

1. Loosen two fuel injection line nuts (2) and disconnect fuel injection lines (3) from fuel injection nozzles (7).
2. Remove screw-assembled washer (4) and clamp (5) from support bracket (8).

NOTE

Tag fuel injection lines by cylinder number for assembly.

3. Loosen two fuel injection line nuts (2) and remove fuel injection lines (3) from fuel injection pump (1).
4. Remove clamp (5) and two grommets (6) from fuel injection lines (3).

b. Inspection

1. Inspect fuel injection lines (3). Replace if cracked, bent, or damaged.
2. Inspect grommets (6). Replace if damaged.

16-4. FUEL INJECTION LINES MAINTENANCE (Cont'd)

c. Installation

1. Install two grommets (6) on fuel injection lines (3).
2. Install two fuel injection lines (3) on fuel injection pump (1) and fuel injection nozzles (7).
3. Using 16-mm crowfoot, tighten two fuel injection line nuts (2) on fuel injection lines (3) and fuel injection pump (1) to 20 lb-ft (27 N·m).
4. Install clamp (5) and fuel injection lines (3) on support bracket (8) with screw-assembled washer (4). Tighten screw-assembled washer (4) to 3-4 lb-ft (4-5 N·m).

d. Bleeding

1. Loosen eight fuel injection line nuts (2) at eight injection nozzles (7).

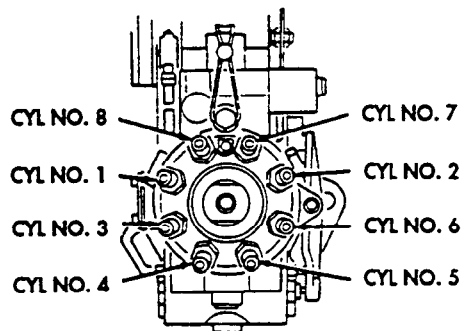
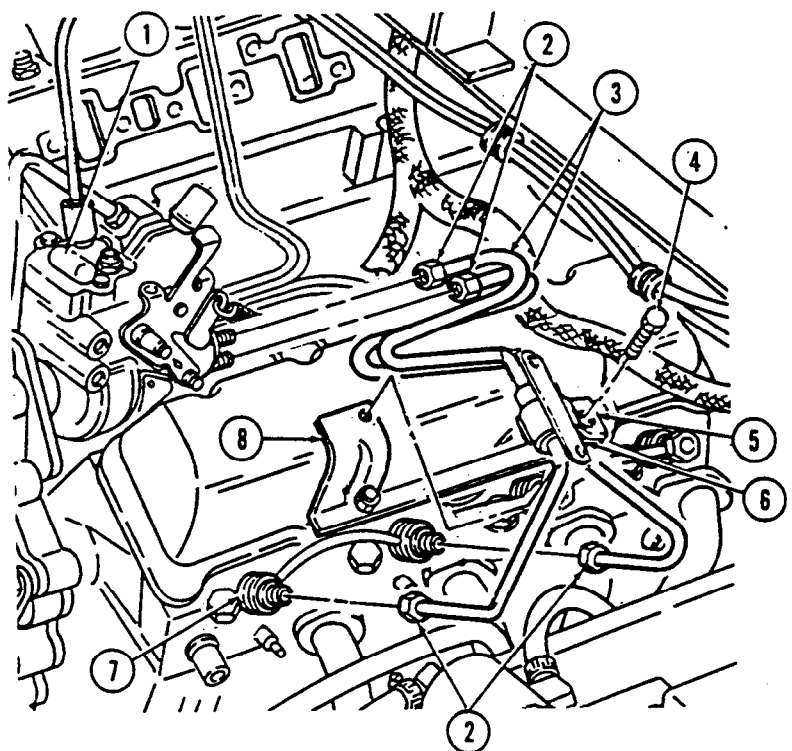
CAUTION

Do not operate starter continuously for more than 20 seconds; wait 10 to 15 seconds between periods of operation. Failure to do so may result in damage to the starter.

NOTE

Have drainage container ready to catch fuel.

2. Crank engine until fuel exits from all fuel injection lines (3).
3. Using 19-mm crowfoot, tighten fuel injection line nuts (2) to 20 lb-ft (27 N·m).



- FOLLOW-ON TASKS:**
- Install fuel injection pump boot (para. 3-23).
 - Install left and right intake manifolds (paras. 15-16 and 15-17).
 - Start engine (TM 9-2320-387-10) and check for fuel leaks.

16-5. SERVO ADVANCE SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Modified box wrench (Appendix D, Fig. 76)

Materials/Parts

Seal (Appendix G, Item 389)

Manual References

TM 9-2320-387-24P

Maintenance Level

Direct support

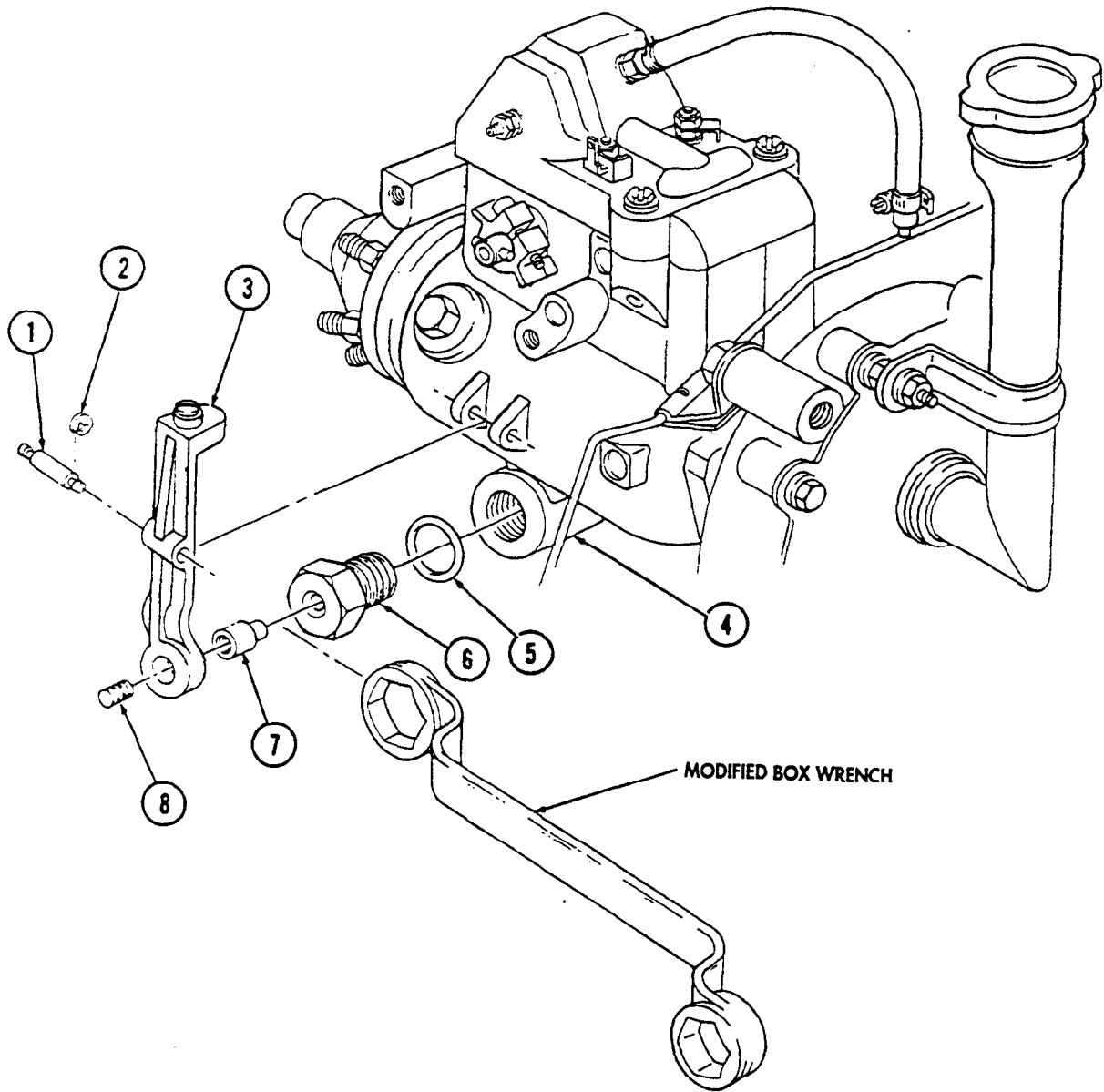
a. Removal

1. Remove two retaining rings (2) and pin (1) from rocker lever (3) and fuel injection pump (4).
2. Remove setscrew (8), rocker lever (3), and plunger (7) from piston plug nut (6).
3. Using a modified box wrench, remove piston plug nut (6) from fuel injection pump (4).
4. Remove seal (5) from piston plug nut (6). Discard seal (5).

b. Installation

1. Install seal (5) on piston plug nut (6).
2. Using modified box wrench, install piston plug nut (6) on fuel injection pump (4).
3. Install rocker lever (3) on piston plug nut (6) with plunger (7) and setscrew (8).
4. Install rocker lever (3) on fuel injection pump (4) with pin (1) and two retaining rings (2).

16-5. SERVO ADVANCE SEAL REPLACEMENT (Cont'd)



16-6. FUEL INJECTION PUMP MAINTENANCE

This task covers:

- a. Removal
- b. Repair
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Gasket (Appendix G, Item 90)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P
TM 9-2815-237-34

Equipment Condition

- Engine oil filler tube removed (para. 3-3).
- Fuel injection lines removed (para. 16-4).

Equipment Condition (Cont'd)

- TP sensor removed (para. 4-46).
- Fan cut-off switch removed (para. 4-42).
- Accelerator cable mounting bracket removed (para. 16-10).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Direct support

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

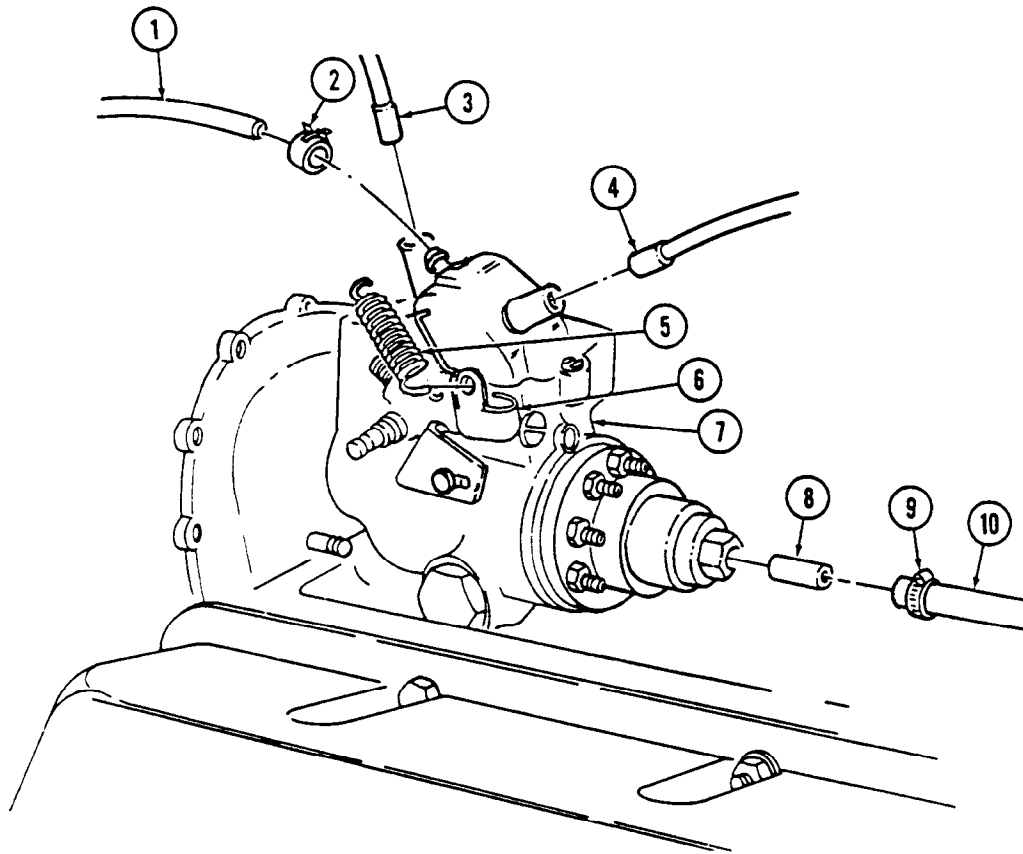
Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

a. Removal

NOTE

- In some cases, flanged-head fasteners may be present instead of standard fasteners and washers. In all cases, washers should be used when replacing a flanged-head fastener with a standard fastener.
 - Prior to removal, tag leads for installation.
 - Have drainage container ready to catch fuel.
1. Disconnect leads 54A (3) and 569B (4) at fuel injection pump (7).
 2. Loosen clamp (2) and disconnect fuel drainback hose (1) from fuel injection pump (7).
 3. Loosen clamp (9) and disconnect outlet hose (10) from hose adapter (8).
 4. Remove return spring (5) from throttle shaft lever (6).
 5. Remove hose adapter (8) from fuel injection pump (7).

16-6. FUEL INJECTION PUMP MAINTENANCE (Cont'd)



16-6. FUEL INJECTION PUMP MAINTENANCE (Cont'd)

NOTE

Rotate engine in order to gain access to driven gear and injection pump retaining capscrews.

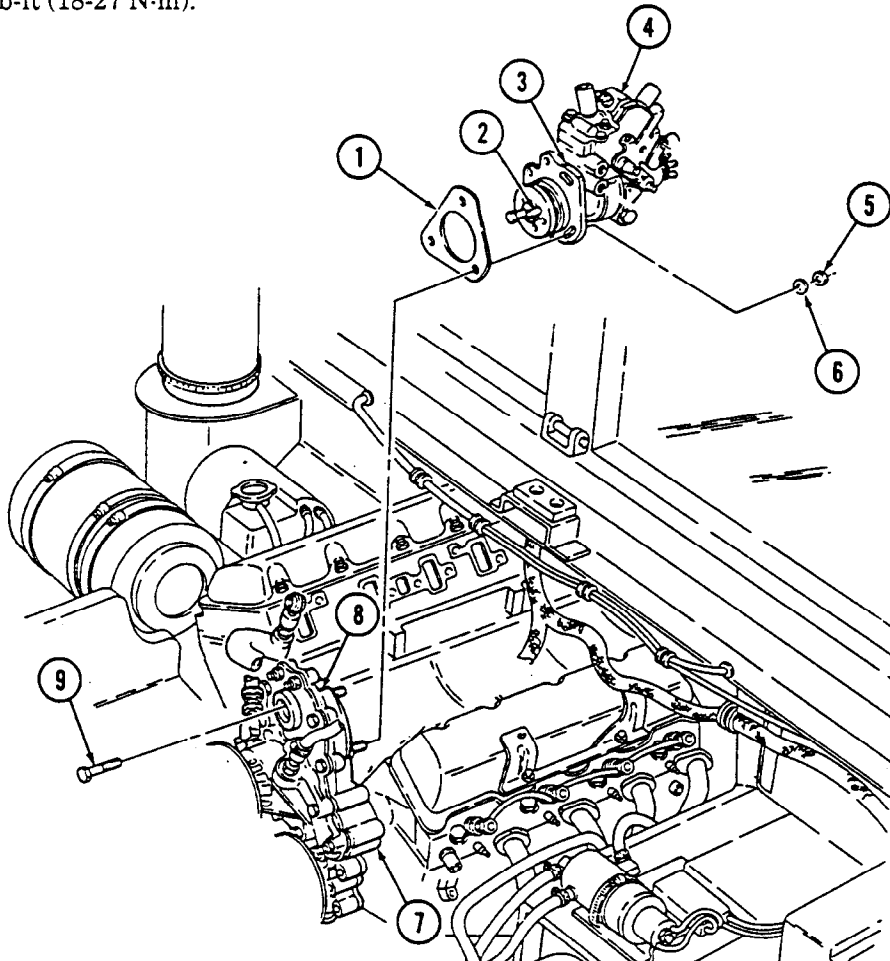
6. Remove three capscrews (9) from pump-driven gear and fuel injection pump (4).
7. Remove three nuts (5), washers (6), fuel injection pump (4), and gasket (1) from timing gear cover (7). Discard gasket (1).
8. Clean gasket surface of timing gear cover (7) and fuel injection pump (4).

b. Repair

For fuel injection pump repair procedures, notify general support (TM 9-2815-237-34).

c. Installation

1. Align pin (2) on pump drive with elongated hole in pump-driven gear.
2. Install gasket (1) and fuel injection pump (4) on timing gear cover (7).
3. Align fuel injection pump timing marks (3) and gear cover timing marks (8).
4. Install fuel injection pump (4) on timing gear cover (7) with three washers (6) and nuts (5).
5. Secure pump-driven gear on fuel injection pump (4) with three capscrews (9). Tighten capscrews (9) to 13-20 lb-ft (18-27 N-m).



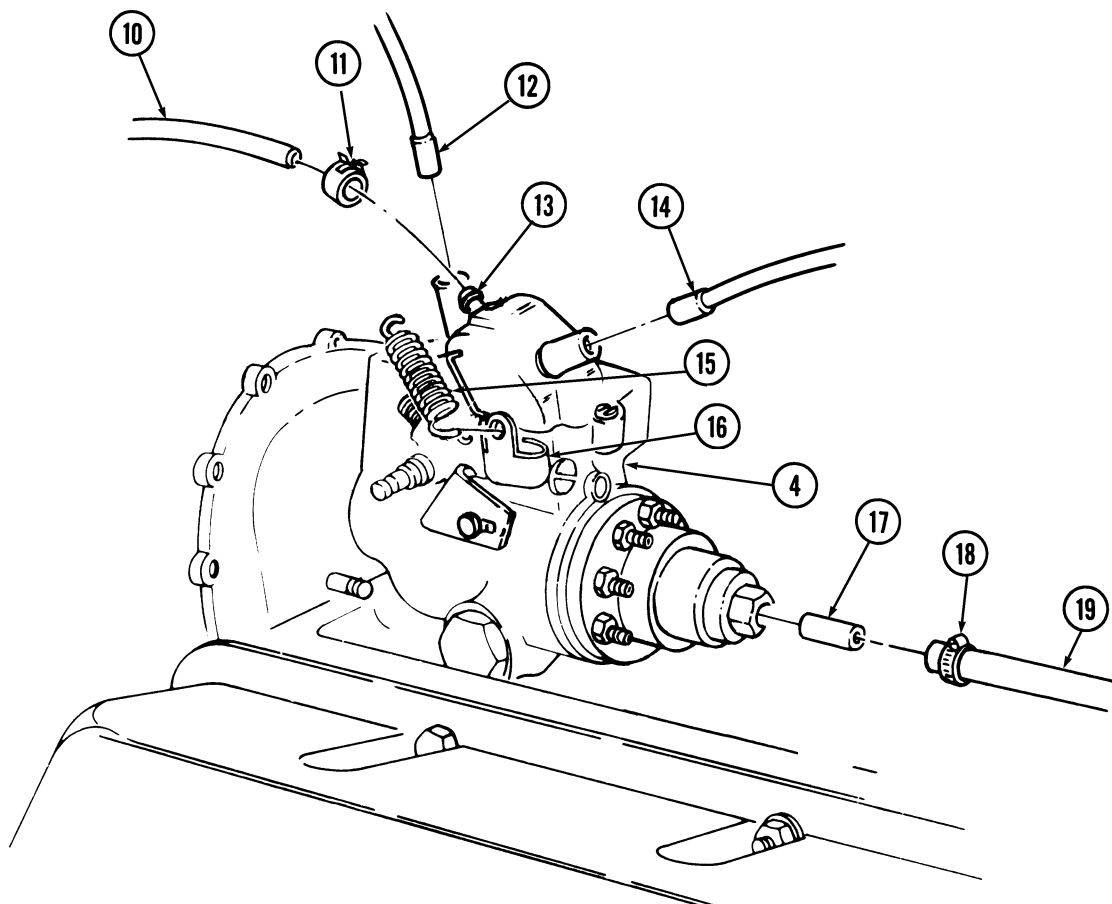
16-6. FUEL INJECTION PUMP MAINTENANCE (Cont'd)

6. Install hose adapter (17) on fuel injection pump (4).
7. Install accelerator cable mounting bracket (para. 16-10).
8. Connect throttle return spring (15) to throttle shaft lever (16).
9. Connect fuel filter outlet hose (19) to hose adapter (17) and tighten clamp (18).
10. Install engine oil filler tube (para. 3-3).
11. Install fuel injection lines (para. 16-4), but do not bleed air from lines.
12. Adjust accelerator linkage (para. 3-43).

CAUTION

Do not operate starter continuously for more than 20 seconds; wait 10 to 15 seconds between periods of operation. Failure to do so may result in damage to the starter.

13. Crank engine until fuel exits from check valve (13) on fuel injection pump (4).
14. Connect fuel drainback hose (10) to check valve (13) with clamp (11).
15. Connect leads 54A (12) and 569B (14) to fuel injection pump (4).



- FOLLOW-ON TASKS:**
- Install TP sensor (para. 4-46).
 - Install fan cut-off switch (para. 4-42).
 - Bleed fuel system (para. 16-4).
 - Start engine (TM 9-2320-387-10) and check for fuel leaks.
 - Time injector pump (para. 15-23).

16-7. FUEL INJECTION PUMP COVER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Retaining tool (Appendix B, Item 48)

Materials/Parts

Gasket (Appendix G, Item 83)
 O-ring (Appendix G, Item 258)
 Three lockwashers (Appendix G, Item 188)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Battery ground cables disconnected (para. 4-68).

General Safety Instructions

Do not perform this procedure near fire, flames, or sparks.

Maintenance Level

Direct support

WARNING

Diesel fuel is highly flammable. Do not perform this procedure near fire, flames, or sparks. Severe injury or death may result.

CAUTION

Cover or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

a. Removal

NOTE

Prior to removal, tag leads for installation.

1. Loosen clamp (2) and disconnect fuel drainback hose (1) from fuel injection pump (6).
2. Disconnect leads 54A (3) and 569B (5) at fuel injection pump (6).

CAUTION

Fuel pump body must be thoroughly cleaned before disconnecting any attaching components to prevent foreign particles from entering pump.

NOTE

Working area should be clean, well-ventilated, and free from blowing dirt and dust.

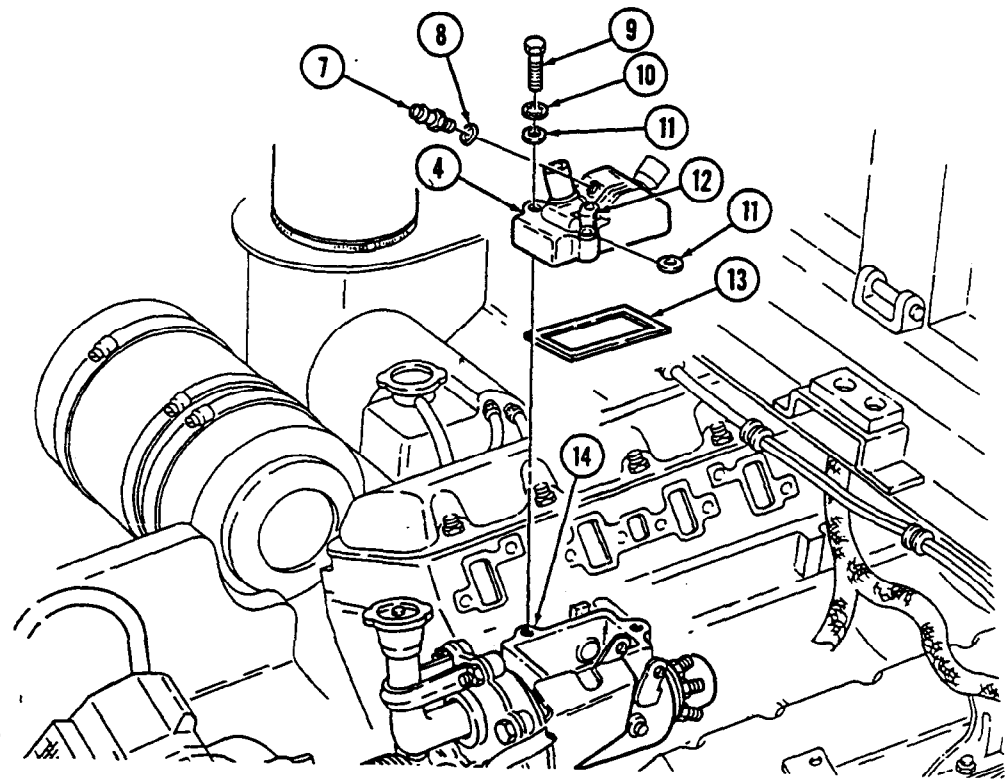
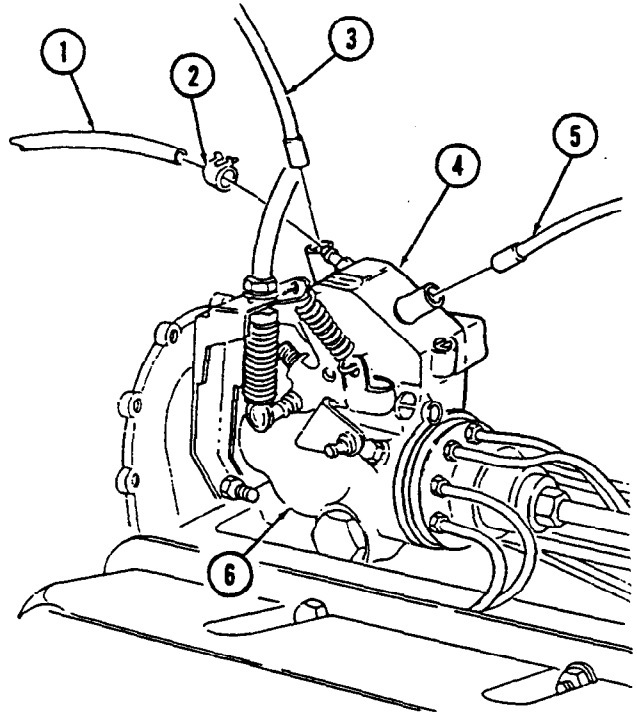
3. Clean exterior of fuel injection pump (6) in accordance with para. 2-14.
4. Remove three screws (9), lockwashers (10), four washers (11), and ground strap (12) from cover (4). Discard lockwashers (10).
5. Remove cover (4) and gasket (13) from fuel injection pump housing (14). Discard gasket (13).

NOTE

Perform step 6 only if fuel injection pump cover is being replaced.

6. Remove fuel return line check valve (7) and O-ring (8) from cover (4). Discard O-ring (8).
7. Inspect fuel return line check valve (7). Replace if damaged.

16-7. FUEL INJECTION PUMP COVER REPLACEMENT



16-7. FUEL INJECTION PUMP COVER REPLACEMENT (Cont'd)

b. Installation

NOTE

Perform step 1 only if check valve was removed.

1. Install O-ring (8) and fuel return line check valve (7) in cover (4).
2. Install gasket (13) on fuel injection pump housing (14).
3. Install retaining tool on cover (4) to restrict shutoff solenoid linkage (15).

CAUTION

Incorrect installation of cover may cause damage to cover gasket or pump to malfunction.

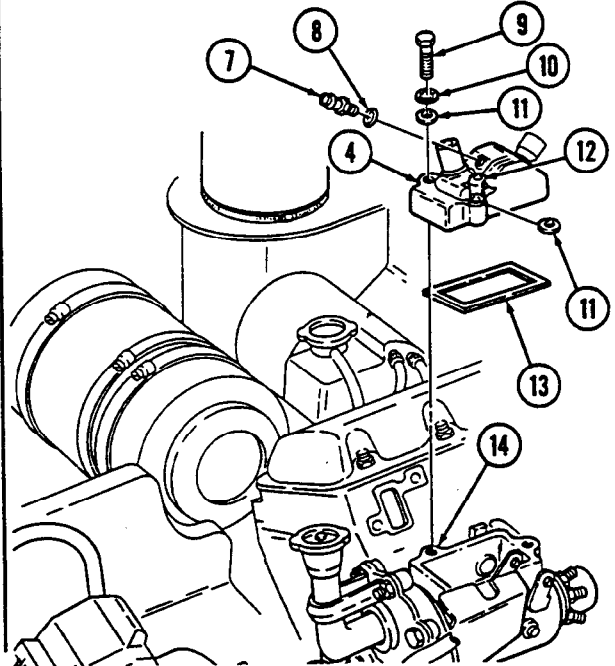
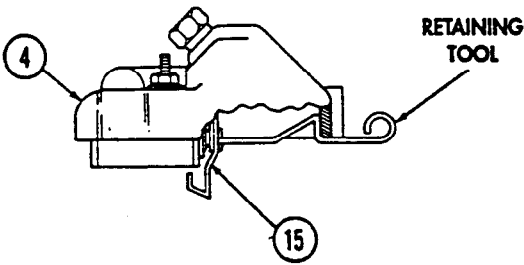
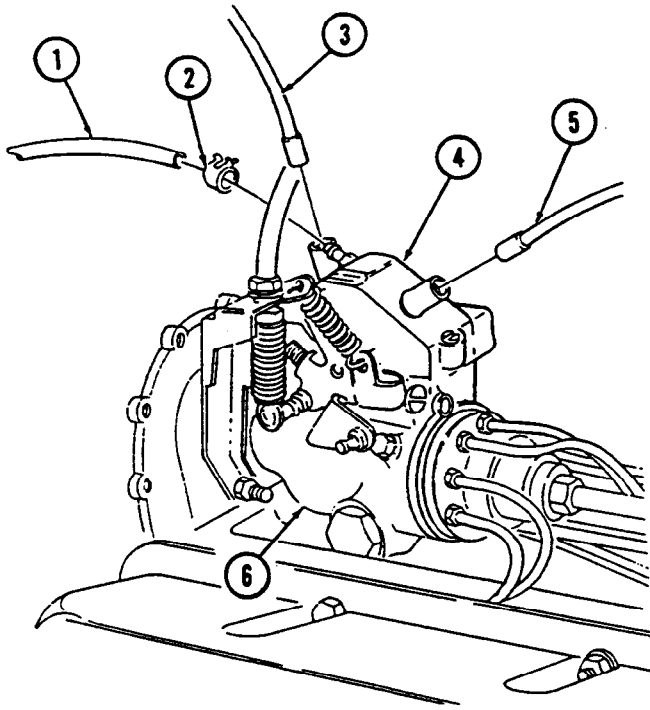
4. Position cover (4) over fuel injection pump housing (14) ahead of threaded holes in housing and slide rearward and downward to align holes in cover (4) with threaded holes in fuel injection pump housing (14).
5. Twist retaining tool to release solenoid linkage (15) and slide tool out from between cover (4) and fuel injection pump housing (14). Do not damage gasket (13).
6. Position washer (11) between ground strap (12) and cover (4).
7. Secure cover (4) and ground strap (12) with three washers (11), lockwashers (10), and screws (9). Tighten screws (9) to 34-45 lb-in. (4-5 N·m).
8. Connect fuel drainback hose (1) to fuel injection pump (6) with clamp (2).
9. Connect battery ground cables (para. 4-68).

CAUTION

Do not attempt to start engine until the following step is completed. If no clicking noise is present in the cover of the fuel injection pump, the linkage may possibly be jammed in the wide-open throttle position. If engine is started with linkage in wide-open throttle position, engine runaway will occur and engine damage will result.

10. Place rotary switch to RUN position. Listen for a clicking noise when connecting and disconnecting lead 54A (3) to fuel injection pump (6). If no clicking noise is present, remove and reinstall cover (4). If clicking noise is present, connect harness leads 54A (3) and 569B (5) to fuel injection pump (6).

16-7. FUEL INJECTION PUMP COVER REPLACEMENT (Cont'd)



FOLLOW-ON TASKS:

- Start engine (TM 9-2320-387-10) and check for fuel leaks.
- Lower and secure hood (TM 9-2320-387-10).

16-8. FUEL INJECTION PUMP SHUTOFF SOLENOID MAINTENANCE

This task covers:

- a. Removal
- c. Installation
- b. Inspection

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Three lockwashers (Appendix G, Item 198)
Locknut (Appendix G, Item 160)
Two fiber washers (Appendix G, Item 50)

Equipment Condition

Fuel injection pump cover removed (para. 16-7).

Maintenance Level

Direct support

NOTE

Working area should be clean, well-ventilated, and free from blowing dirt and dust.

a. Removal

1. Remove terminal (5), washer (6), and shell (7) from stud (12).
2. Remove nut (8), lockwasher (9), washer (10), and fiber washer (11) from stud (12). Discard lockwasher (9) and fiber washer (11).
3. Remove locknut (4), ground strap (3), lockwasher (2), nut (8), lockwasher (9), washer (10), and fiber washer (11) from stud (14). Discard locknut (4), lockwashers (2) and (9), and fiber washer (11).
4. Remove electrical shutoff solenoid (13) from cover (1).

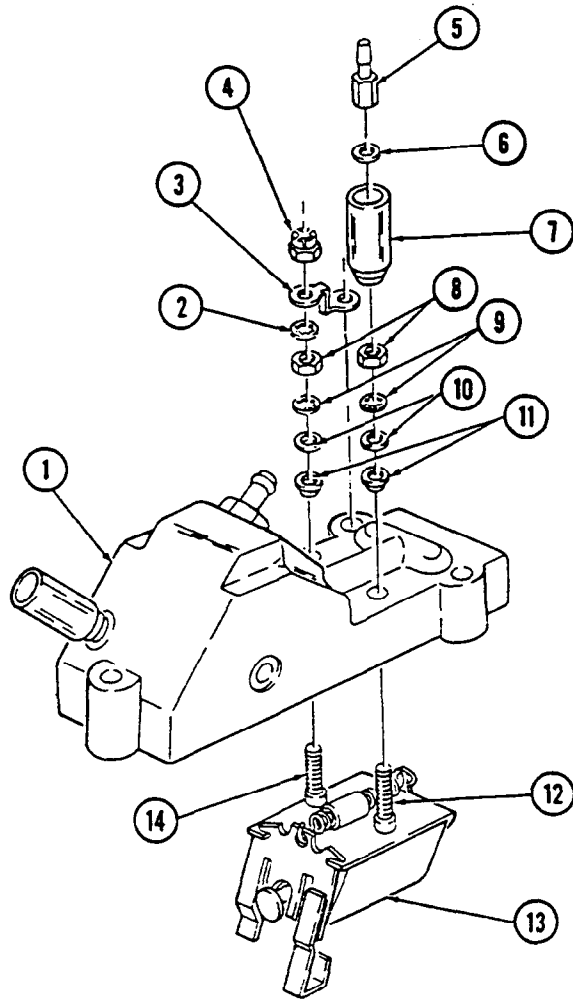
b. Inspection

Inspect shell (7). Replace if cracked, deteriorated, or damaged.

c. Installation

1. Install electrical shutoff solenoid (13) in cover (1).
2. Install fiber washer (11), washer (10), lockwasher (9), nut (8), lockwasher (2), ground strap (3), and locknut (4) on stud (14).
3. Install fiber washer (11), washer (10), lockwasher (9), and nut (8) on stud (12).
4. Install shell (7), washer (6), and terminal (5) on stud (12).

16-8. FUEL INJECTION PUMP SHUTOFF SOLENOID MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install fuel injection pump cover (para. 16-7).

16-9. FUEL INJECTION PUMP COLD-ADVANCE SOLENOID MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Two lockwashers (Appendix G, Item 198)
Locknut (Appendix G, Item 160)
O-ring (Appendix G, Item 256)
Two fiber washers (Appendix G, Item 50)

Equipment Condition

Fuel injection pump shutoff solenoid removed
(para. 16-8).

Maintenance Level

Direct support

NOTE

Working area should be clean, well-ventilated, and free from blowing dirt and dust.

a. Removal

1. Remove terminal (1), washer (2), and ribbed shell (3) from stud (15).
2. Remove nut (4), lockwasher (5), washer (6), and fiber washer (7) from stud (15). Discard lockwasher (5) and fiber washer (7).
3. Remove locknut (11), nut (4), lockwasher (5), washer (6), and fiber washer (7) from stud (12). Discard lockwasher (5), locknut (11), and fiber washer (7).
4. Remove check valve (9) and O-ring (8) from cover (10). Discard O-ring (8).
5. Remove cold-advance solenoid (13) and plunger (14) from cover (10).
6. Remove plunger (14) from cold-advance solenoid (13).

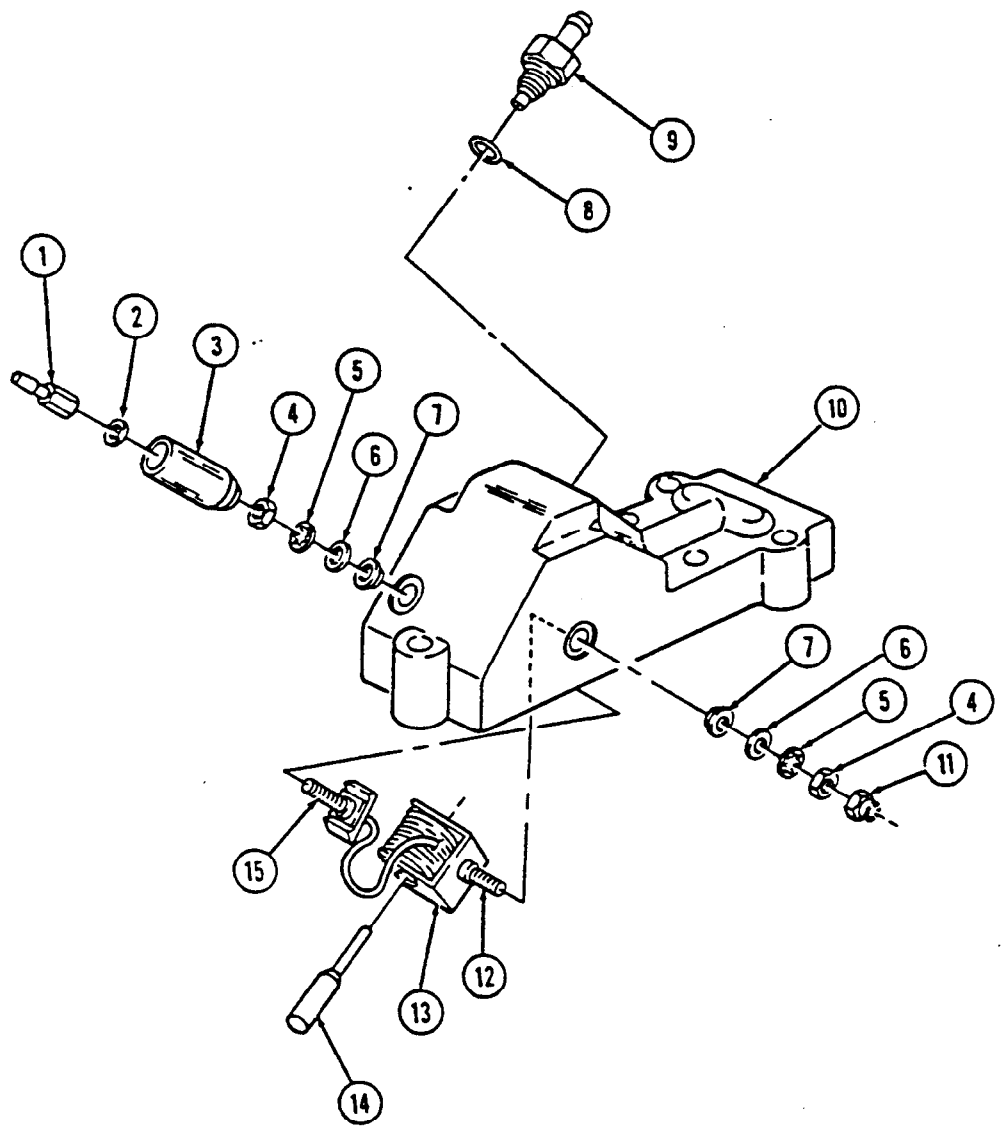
b. Inspection

Inspect ribbed shell (3). Replace if cracked, deteriorated, or damaged.

c. Installation

1. Install plunger (14) in cold-start advance solenoid (13). Install stud (15) in hole in rear of cover (10).
2. Install O-ring (8) and check valve (9) in cover (10).
3. Install cold-start advance solenoid (13) in cover (10) so small tip of plunger (14) fits in port of check valve (9) and stud (12) fits through hole in side of cover (10).
4. Install fiber washer (7), washer (6), lockwasher (5), nut (4), and locknut (11) on stud (12).
5. Install fiber washer (7), washer (6), lockwasher (5), and nut (4) on stud (15).
6. Install ribbed shell (3), washer (2), and terminal (1) on stud (15).

16-9. FUEL INJECTION PUMP COLD-ADVANCE SOLENOID MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install fuel injection pump shutoff solenoid (para. 16-8).

16-10. ACCELERATOR CABLE MOUNTING BRACKET MAINTENANCE

This task covers:

- a. Removal
- b. Inspection

c. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Maintenance Level

Direct support

a. Removal

1. Loosen two nuts (7) and disconnect cable assembly (1) from bracket (5).
2. Disconnect throttle return spring (2) from bracket (5).
3. Remove stop collar (6) and disconnect cable assembly (1) from fuel injection pump (4).
4. Remove nut (8) and washer (9) from fuel injection pump (4) and stud (11).
5. Remove two capscrews (10) and bracket (5) from fuel injection pump (4).

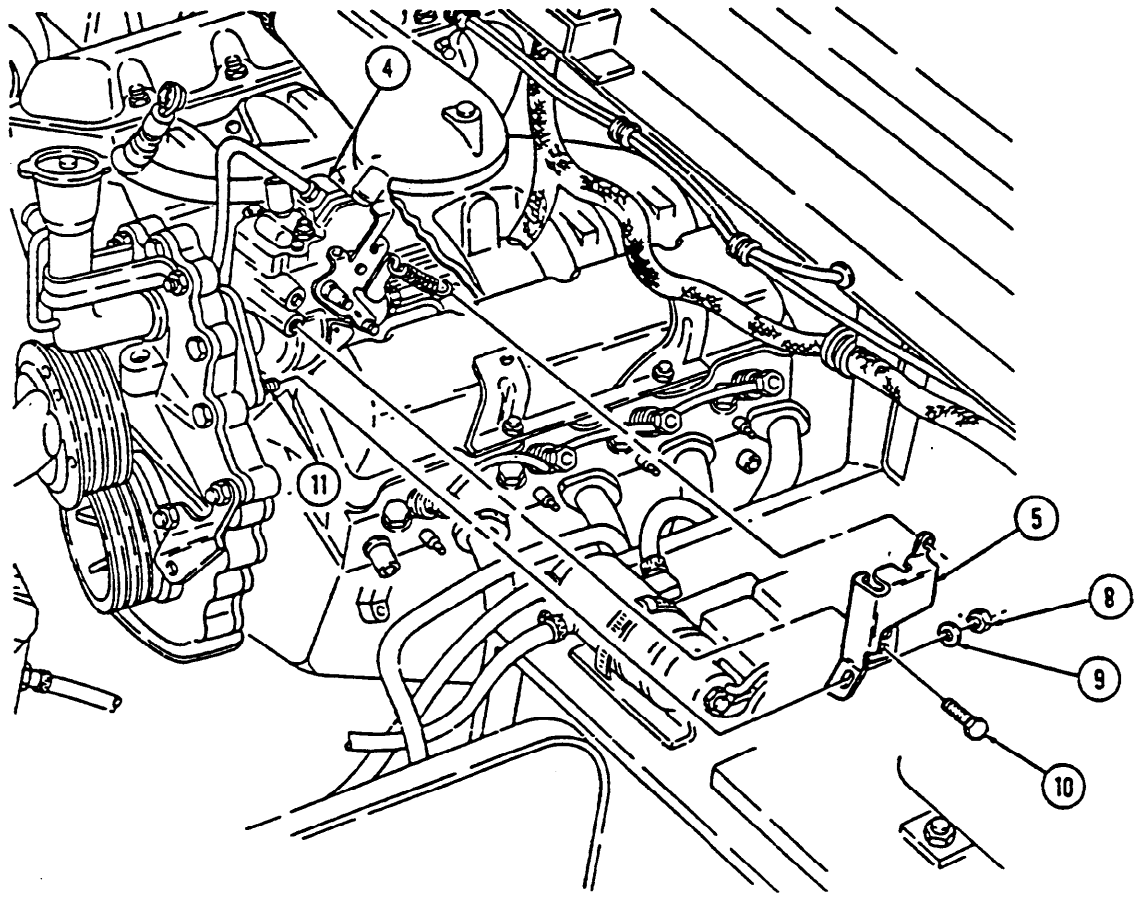
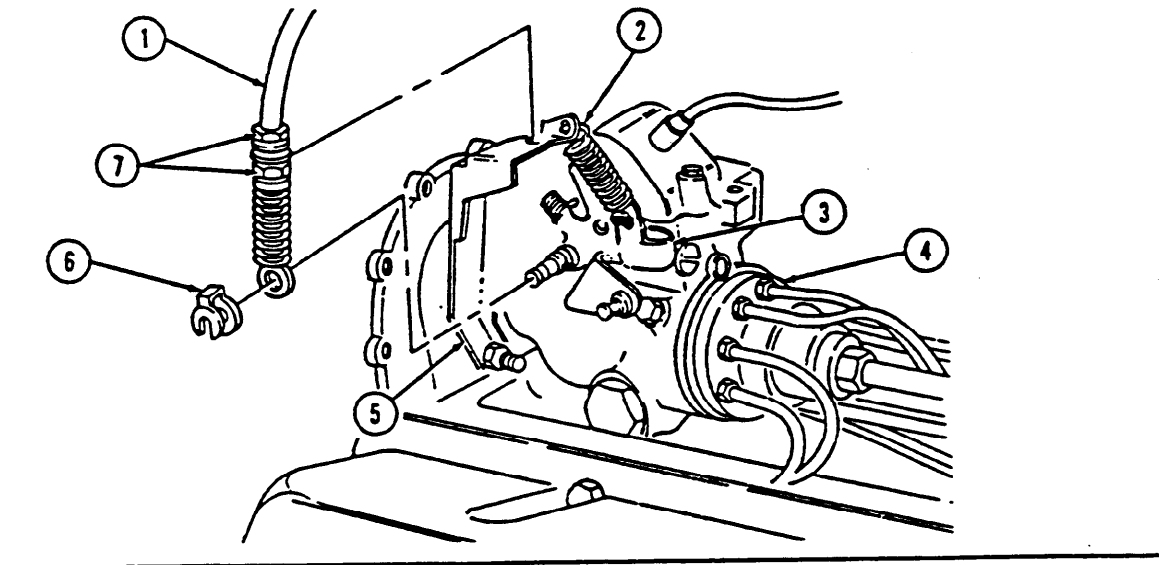
b. Inspection

Inspect throttle return spring (2). Replace if defective.

c. Installation

1. Install bracket (5) on fuel injection pump (4) and stud (11) with washer (9) and nut (8).
2. Install bracket (5) on fuel injection pump (4) with two capscrews (10). Tighten capscrews (10) to 13 lb-ft (18 N·m).
3. Position throttle shaft lever (3) to full-throttle position and secure cable assembly (1) to throttle shaft lever (3) with stop collar (6).
4. Connect throttle return spring (2) to bracket (5).
5. Install cable assembly (1) on bracket (5) and tighten two nuts (7).

16-10. ACCELERATOR CABLE MOUNTING BRACKET MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Adjust accelerator linkage (para. 3-43).

CHAPTER 17 COOLING SYSTEM (DS) MAINTENANCE

17-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of cooling system components at the direct support maintenance level. Some subassemblies and parts must be removed before cooling system components can be accessed. They are referenced to other paragraphs of this manual.

17-2. COOLING SYSTEM MAINTENANCE TASK SUMMARY

TASK PARA	PROCEDURES	PAGE NO.
17-3.	Radiator and Oil Cooler Maintenance	17-1

17-3. RADIATOR AND OIL COOLER MAINTENANCE

For authorized cleaning, inspection, troubleshooting, preventive maintenance, and repair of the radiator and oil cooler, refer to TM 750-254. When splicing radiator water tubes, the splices must be between the funneled ends of each tube. If the tube ends are damaged and cannot be repaired, the tube must be blocked (refer to TM 750-254) or the radiator should be declared unserviceable.

CHAPTER 18

ELECTRICAL SYSTEM (DS) MAINTENANCE

18-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repair of electrical system components at the direct support maintenance level. Some subassemblies and parts must be removed before electrical system components can be accessed. They are referenced to other paragraphs of this manual.

18-2. ELECTRICAL SYSTEM MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
18-3.	200-Ampere Dual Voltage Alternator Testing and Repair	18-2
18-3.1.	400-Ampere Dual Voltage Alternator Testing and Repair	18-10.2
18-4.	Starter Repair	18-12
18-5.	STE/ICE-R Wiring Harness Replacement	18-28
18-6.	Engine Wiring Harness Replacement	18-34

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR

This task covers:

- a. Alternator Output Testing
- b. Disassembly
- c. Static Testing
- d. Cleaning
- e. Assembly

INITIAL SETUP:

Test Equipment

Multimeter (Appendix B, Item 155)
 Test stand (Appendix B, Item 56)

Personnel Required

One mechanic
 One assistant

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Puller (Appendix B, Item 54)

Manual References

TM 9-2320-387-24P
 TM 9-4910-663-12
 TM 9-4910-485-12

Materials/Parts

Silicone compound (Appendix C, Item 75)
 RTV sealant (Appendix C, Item 74)
 Locknut (Appendix G, Item 175)
 Eighteen locknuts (Appendix G, Item 176)
 Three lockwashers (Appendix G, Item 191)
 Twelve locknuts (Appendix G, Item 177)
 Locknut (Appendix G, Item 172)
 Lockwasher (Appendix G, Item 239)
 Lockwasher (Appendix G, Item 205)
 Locknut (Appendix G, Item 112)

Equipment Condition

Alternator removed (para. 4-5).

General Safety Instructions

Always support alternator core and shaft assembly during removal and installation.

Maintenance Level

Direct support

a. Alternator Output Testing

1. Mount pivot arm of 500-amp test stand to high-speed side and install mounting flange adapter on pivot arm. Connect pulley driveshaft to high-speed head. Install pulley driveshaft on mounting flange adapter.
2. Mount alternator to starter/alternator mounting bracket on 500-amp test stand. Connect belt from 500-amp test stand pulley to alternator pulley. Adjust belt tension.
3. Connect cable from alternator ground terminal to 500-amp test stand G- terminal. Connect cable from alternator battery terminal to 500-amp test stand G+ terminal. Connect cable from alternator regulator IGN to 500-amp test stand F terminal.
4. Install voltage regulator (para. 4-8).
5. Connect 28VDC output and 14VDC output to test stand. Auxiliary voltage and current meters may be required to measure 14VDC output.
6. Fabricate a jumper wire with a ring terminal at both ends. Connect jumper wire on 500-amp test stand from IGNITION SWITCH terminal to F-B terminal.

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

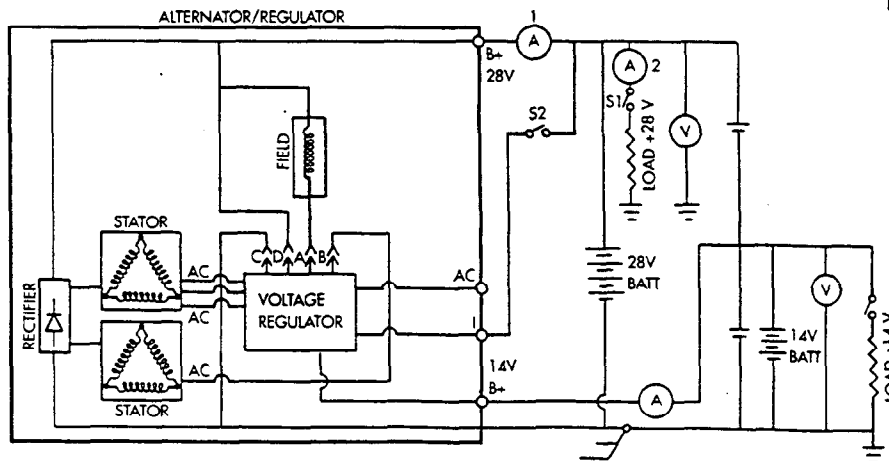
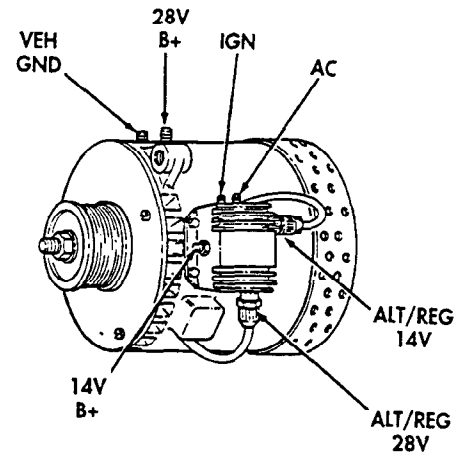
CAUTION

Ensure auxiliary measuring equipment is properly grounded to test stand. Failure to do so may lead to erroneous readings or damage to equipment.

NOTE

Prior to operation of test stand, ensure all switches and controls are in initial positions as referenced in Operator and Maintenance Manual, TM 9-4910-663-12 (UMC Model GSAR-500), or Operator and Maintenance Manual, TM 9-4910-485-12 (Sun Model AGT-99A).

- | | | | |
|----|---|-----------------------|----------------------|
| 7. | Set 500-amp test stand as follows: | <u>Model GSAR-500</u> | <u>Model AGT-99A</u> |
| | (a) DC ammeter load and starter selector | X10 | 500 amp |
| | (b) DC ammeter field and battery charge selector | X1 | 5 amp |
| | (c) Field circuit switch | Regulator | Regulator |
| | (d) DC voltmeter circuit selector | RECT/GEN | RECT/GEN |
| | (e) Connect DC voltmeter (0-50VDC) from point between regulator 14 VDC output and load in 14 volt circuit (or 14 volt battery). | | |
| | (f) Connect ammeter (0-75ADC) in load line from 14 V regulator to 14 V load. | | |
8. Turn 500-amp test stand master power switch and master load switch to ON, and turn battery switch to 24 VDC. Green lamp on 500-amp test stand must illuminate.
9. Perform no-load test. Set test stand battery circuit selector to 24 VDC, IGN switch to ON, and start varidrive. Observing the DC voltmeter output voltage and tachometer rpm, increase speed until tachometer reads 5,000 rpm. Record voltmeter reading and refer to table 18-1 for diagnosis.



18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

NOTE

- When tachometer reaches 3,000 rpm, green lamp should go off indicating proper charging from alternator.
 - Normal voltage range is 26-30 VDC. High amperage is +10 percent over the rated alternator output of 182 amps at 5,000 rpm.
10. Perform no-load test. Increase alternator speed to 5,000 rpm; record results. Refer to table 18-1 for diagnosis.
 11. Perform full-load test. Ensure all load switches are in ON position on 500-amp test stand, and increase alternator speed to 5,000 rpm. Set load to 182 amps/min; record results. Refer to table 18-2 for diagnosis.

Table 18-1. No-Load Test.

AMPS (28V)	28V	VOLTS	14V	DIAGNOSIS
161-200	21-25		10.5-12.5	Test bench battery is discharged (or defective). Allow to charge (or replace).
161-200	26-30		13-15	Give time to stabilize while monitoring VOLTS. If VOLTS rise above normal range (26-30 volts), regulator and/or tube assembly must be replaced. If AMPS fall, charging systems OK.
161-200	31-35		15.5-17.5	STOP TEST. Regulator and/or tube assembly must be replaced. Refer to static testing, task c.
80-119	21-25		10.5-12.5	Alternator and/or regulator must be repaired or replaced. Refer to table 18-3.
80-119	26-30		13-15	Regulator OK. Refer to table 18-2.
80-119	31-35		15.5-17.5	STOP TEST. Bench malfunction or wiring error.

Table 18-2. Full-Load Test.

AMPS (28V)	28V	VOLTS	14V	DIAGNOSIS
161-200	21-25		10.5-12.5	Test bench battery is discharged (or defective). Allow to charge (or replace).
161-200	26-30		13-15	Charging system OK.
161-200	31-35		15.5-17.5	STOP TEST. Regulator and/or tube assembly must be replaced. Refer to static testing, task c.
80-119	21-25		10.5-12.5	Alternator and/or regulator must be replaced. Refer to table 18-4.
80-119	26-30		13-15	Increase load.
80-119	31-35		15.5-17.5	STOP TEST. Test bench malfunction or wiring error.

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

12. Alternator speed and current output tracking values. Refer to table 18-3.

Table 18-3. Alternator Speed and Current Tracking.

ALTERNATOR SPEED (RPM)	28VDC	14VDC	ALTERNATOR SPEED (RPM)	28VDC	14VDC
	OUTPUT CURRENT ±5 AMP	OUTPUT CURRENT MINIMUM AMP		OUTPUT CURRENT ±5 AMP	OUTPUT CURRENT MINIMUM AMP
1,200	*0	34	2,000	105	27
	4	33		120	12
	20	17		**132	0
	30	7	*0	23	
	**37	0	14	50	
1,500	*0	40	3,000	110	50
	6	50		130	30
	50	40		150	10
	60	30		**160	0
	74	16	*0	10	
	**90	0	15	50	
2,000	*0	31	TO	140	50
	8	50	8,000	165	25
	90	42		180	10
**190					
0					

* Dependant on ammeter location in test circuit.
 ** Minimum acceptable current with no load on 14 VDC system.

13. Perform regulator bypass test. Prepare alternator as in full-load test.

NOTE

- Perform this test only when instructed from tables 18-1 and 18-2.
- Use jumper wire rated for 15 amps.

14. Disconnect alternator connector from regulator. With alternator spinning, use jumper wire and short pin A to ground momentarily. Record results.
15. Amperage should rise within ± 10 percent of rated value with jumper wire connected, and fall with jumper disconnected. Refer to table 18-4 for diagnosis.
16. Turn test stand master power switch and load switch to OFF.
17. Disconnect jumper wires from terminals on test stand and alternator.
18. Remove belt from test stand pulley and alternator pulley. Remove alternator from test stand.

Table 18-4. Regulator Bypass Test.

CONNECT	DISCONNECT	DIAGNOSIS
AMPS RISE	AMPS FALL	Alternator OK. See note. Replace regulator only if low AMPS (80-119)/low VOLTS (21-25) are indicated in table 18-1 and/or table 18-2.
NO CHANGE	NO CHANGE	Alternator must be repaired. Refer to static testing, task c.

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

b. Disassembly

NOTE

Complete alternator disassembly is not required for static testing.

1. Remove voltage regulator (para. 4-8).
2. Remove locknut (6), washer (5), fan (4), and bearing bushing (3) from core and shaft assembly (11). Discard locknut (6).
3. Remove three screws (21), lockwashers (22), and plate cover (20) from front housing (18). Discard lockwashers (22).
4. Scribe alignment marks on front housing (18), stator shell (9), and end housing (2).
5. Remove nine locknuts (7) from end housing (2) and studs of stator shell (9). Discard locknuts (7).
6. Using puller, remove end housing (2) from stator shell (9).
7. Remove six locknuts (1) from rear rotor (24) and studs of core and shaft assembly (11). Discard locknuts (1).
8. Using three 10-32 x 2-in. long machine screws as jacks in threaded holes on end plate of rear rotor (24), gradually tighten screws and remove rear rotor (24) from core and shaft assembly (11). Remove machine screws.

NOTE

Prior to removal, tag leads for installation.

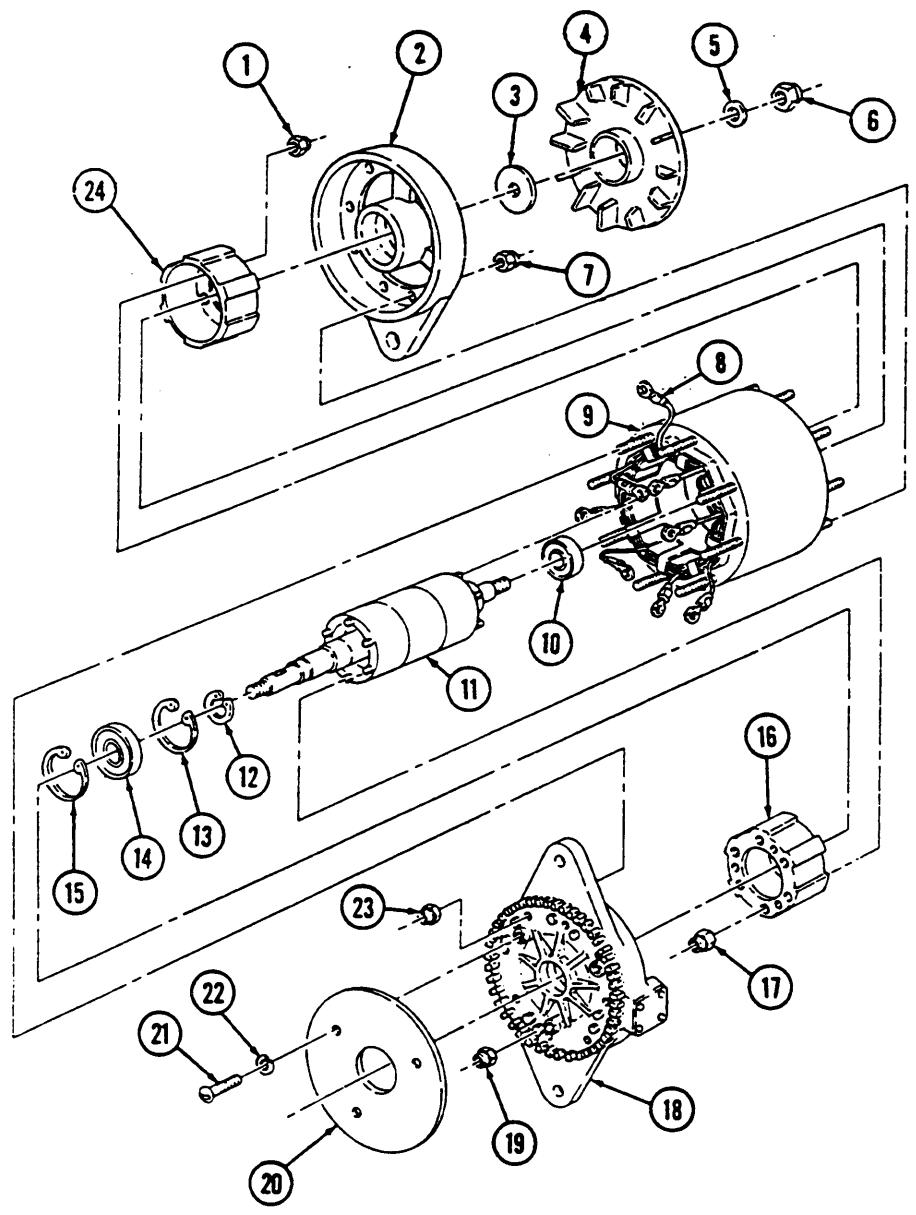
9. Remove eight nuts (19) and disconnect two field and six phase leads (8) from diodes in front housing (18).
10. Remove nine locknuts (23) from front housing (18) and studs of stator shell (9). Discard locknuts (23).
11. Remove front housing (18) from stator shell (9) by tapping lightly with a soft-faced mallet.
12. Remove shaft retaining ring (12) from core and shaft assembly (11).

WARNING

Always support alternator core and shaft assembly during removal.
Failure to do so may cause injury to personnel or equipment damage.

13. Using press, remove core and shaft assembly (11) from front bearing (14) and front housing (18).
14. Remove front (15) and rear (13) retaining rings from front housing (18).
15. Using press, remove front bearing (14) from front housing (18).
16. Remove six locknuts (17) from front rotor (16) and studs of core and shaft assembly (11). Discard locknuts (17).
17. Using three 10-32 x 2-in. long machine screws as jacks in threaded holes on end plate of front rotor (16), gradually tighten screws and remove front rotor (16) from core and shaft assembly (11). Remove machine screws.
18. Using press, remove rear bearing (10) from core and shaft assembly (11).

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)



18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

c. Static Testing

NOTE

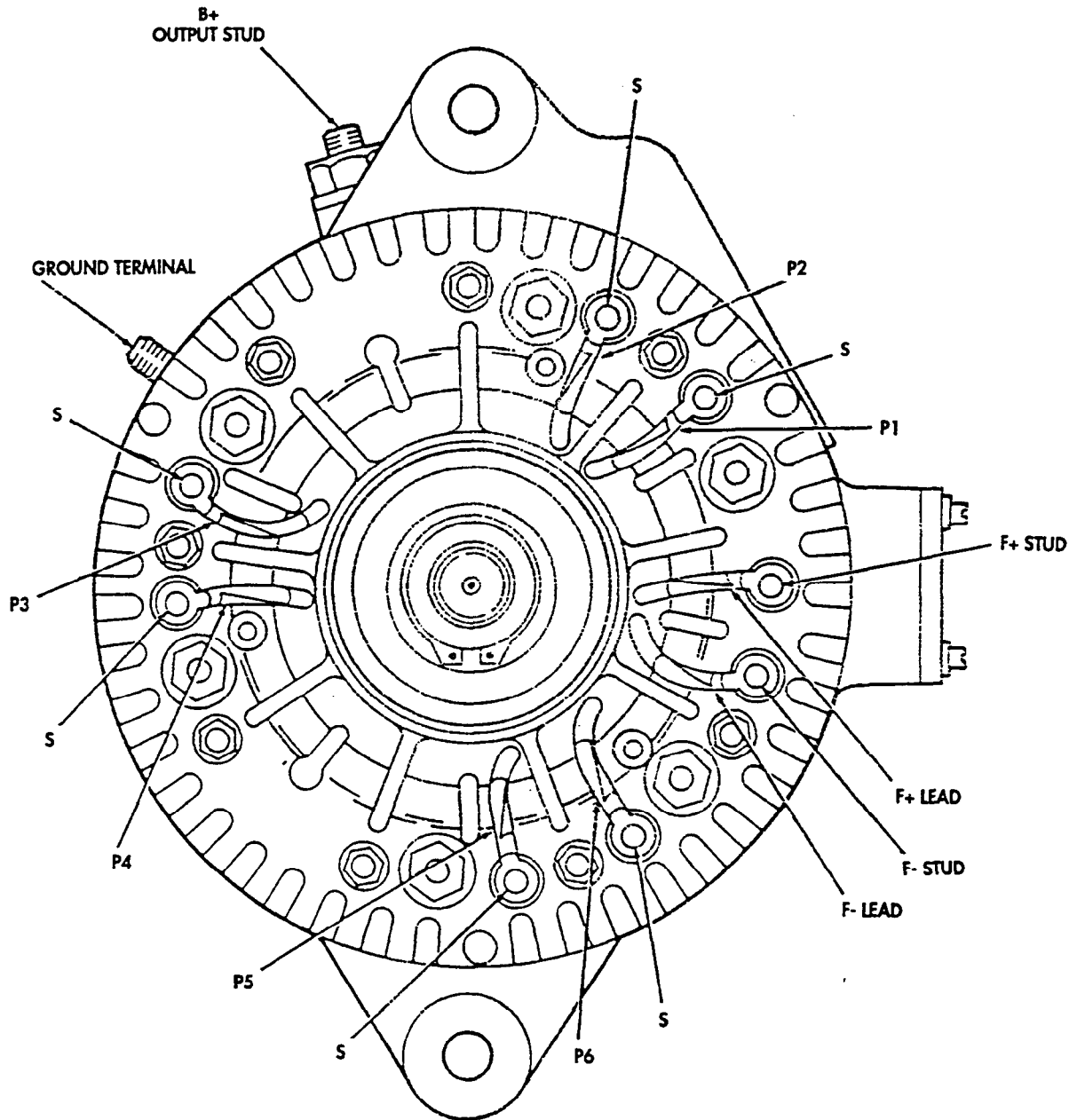
Refer to disassembly for component removal, if necessary.

1. Perform Stator Test:
 - (a) Remove six nuts and phase leads from diodes in front housing.
 - (b) Set multimeter to XI scale and zero multimeter.
 - (c) Connect multimeter leads between each successive pair of stator phase leads P1-P2, P2-P3, and P1-P3. Multimeter should read less than 1 ohm. If multimeter reads infinity (∞), the stator is open; replace alternator.
 - (d) Set multimeter to X10 scale and zero multimeter.
 - (e) Connect multimeter leads between each phase lead, P1, P2, and P3 and the ground terminal on outside of front housing. Multimeter should read infinity (∞). If multimeter reads zero, the stator is grounded; replace alternator.
 - (f) Repeat step (e) to check phase lead P4, P5, and P6.
2. Perform Field Coil Test:
 - (a) Remove two nuts and field coil leads (F+, F-) from diodes in front housing.
 - (b) Set multimeter to XI scale and zero multimeter.
 - (c) Connect multimeter leads to the two field leads and measure the resistance. Multimeter should read less than 3 ohms. If multimeter reads more than 3 ohms, the field coil is open; replace alternator.
 - (d) Set multimeter to X10K scale and zero multimeter.
 - (e) Connect one multimeter lead to a field lead and the other to the ground stud on the front housing. Multimeter should read infinity (∞). If multimeter reads less than 100K ohms, the field coil is grounded. Replace alternator.
3. Perform Positive Diode Test:
 - (a) Set multimeter to X100 scale and zero multimeter.
 - (b) Connect one ohmmeter lead to the B+ output stud and the other lead to each of the six diode terminals S. Multimeter should read either less than 600 ohms or infinity (∞) for all six diode terminals. Reverse multimeter leads. Multimeter should read nearly alike for all six, but opposite the first set of readings. If readings are not opposite, the diode rectifier assembly is open. Replace alternator.
4. Perform Negative Diode Test:
 - (a) Set multimeter to X100 scale and zero multimeter.
 - (b) Connect one multimeter lead to the ground terminal and the other lead to each of the six diode terminals S. Multimeter should read either less than 600 ohms or infinity (∞) for all six diode terminals. Reverse multimeter leads. Multimeter should read nearly alike for all six, but opposite the first set of readings. If readings are not opposite, the diode rectifier assembly is open. Replace alternator.

d. Cleaning

Clean all alternator components in accordance with para. 2-14.

18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)



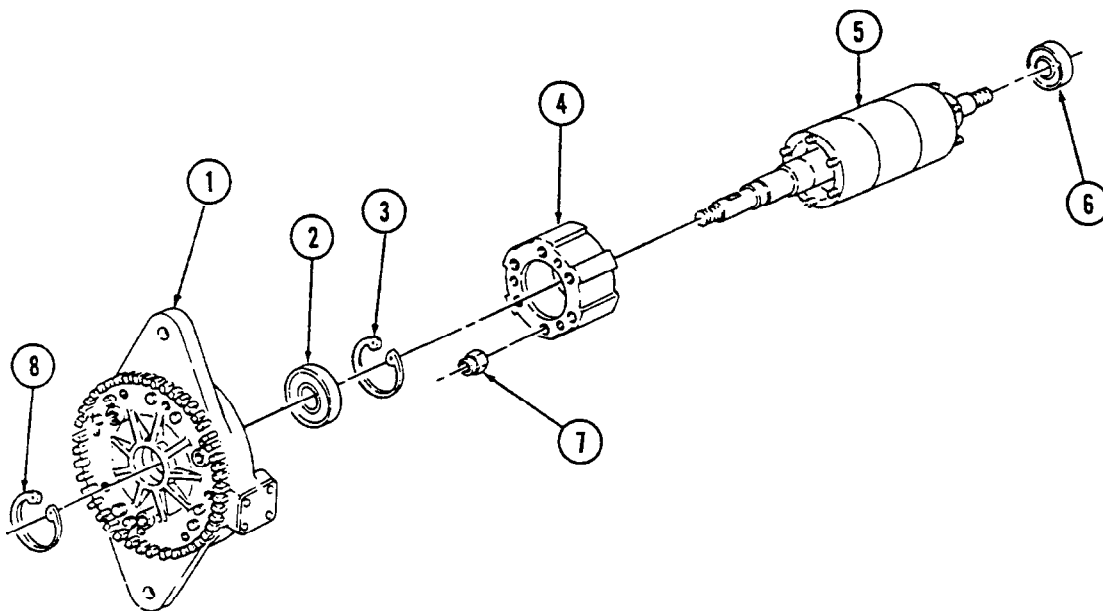
18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

e. Assembly

WARNING

Always support alternator core and shaft assembly during installation.
Failure to do so may cause injury to personnel or equipment damage.

1. Using press, install rear bearing (6) on core and shaft assembly (5).
2. Install front rotor (4) on core and shaft assembly (5).
3. Apply silicone compound to studs of core and shaft assembly (5).
4. Install core and shaft assembly (5) on front rotor (4) with six locknuts (7). Tighten locknuts (7) to 45 lb-in. (5 N·m).
5. Coat outer race of front bearing (2) with a thin coat of silicone compound.
6. Using press, install front bearing (2) on front housing (1).
7. Install front retaining ring (8) and rear retaining ring (3) on front housing (1).



8. Using press, install front bearing (2) with housing assembly (1) on core and shaft assembly (5).
9. Install shaft retaining ring (19) on core and shaft assembly (5).
10. Insert core and shaft assembly (5) and front housing (1) into stator shell (15).

NOTE

Align scribe marks on front housing and stator shell.

11. Feed leads (17) from stator shell (15) through front housing (1).
12. Apply silicone compound to studs (16) on stator shell (15).
13. Install front housing (1) on stator shell (15) with nine locknuts (25). Tighten locknuts (25) to 18 lb-in. (2 N·m).
14. Install six phase leads and two field leads (17) on diodes on front housing (1) with eight nuts (18).
15. Apply thin coat of RTV sealant on leads (17) and diodes on front housing (1).
16. Install rear rotor (24) on core and shaft assembly (5).

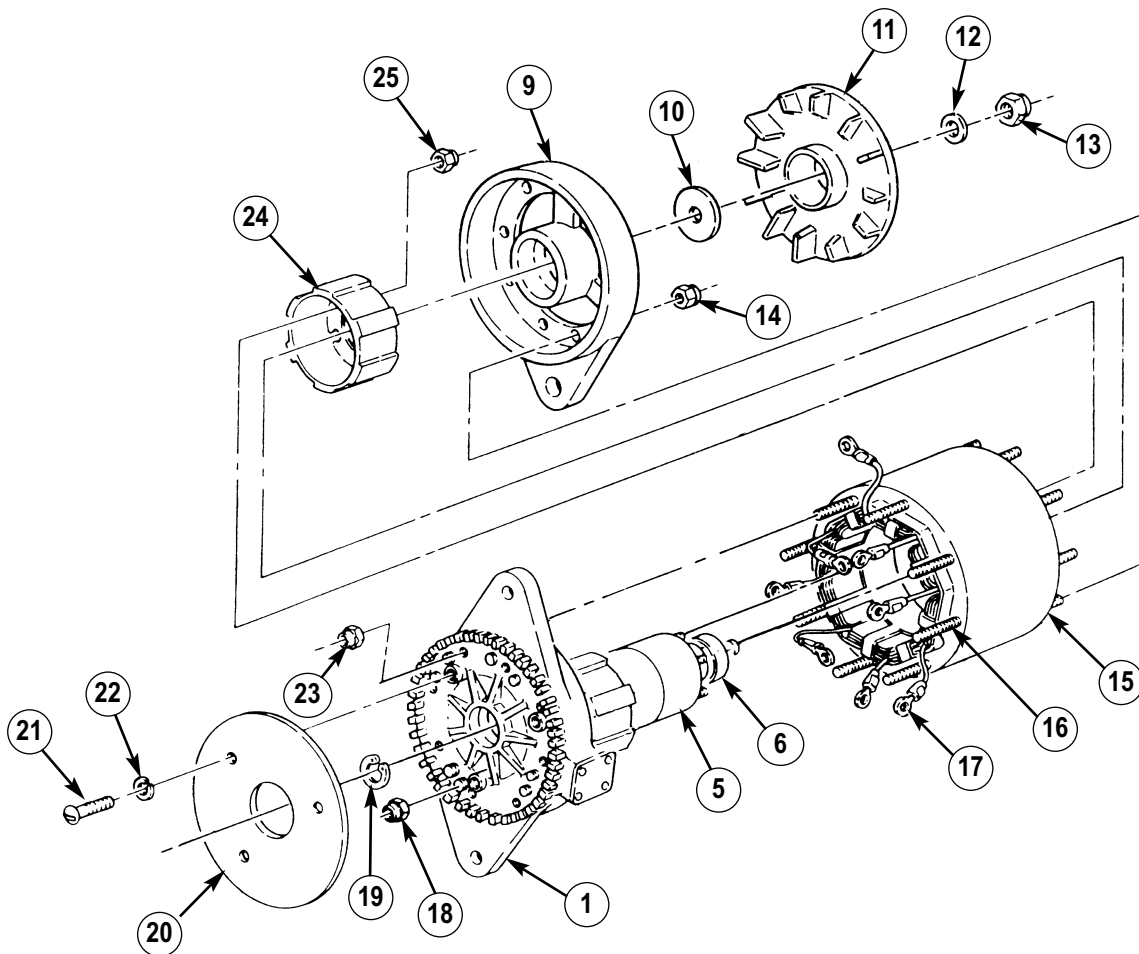
18-3. 200-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

17. Apply silicone compound to studs on core and shaft assembly (5).
18. Install core and shaft assembly (5) on rear rotor (24) with six locknuts (25). Tighten locknuts (25) to 45 lb-in. (5 N·m).

NOTE

Align scribe marks on end housing and stator shell.

19. Install end housing (9) on core and shaft assembly (5) and rear bearing (6). Tap lightly with a soft-faced mallet.
20. Apply silicone compound to studs on stator shell (15).
21. Install end housing (9) on stator shell (15) with nine locknuts (14). Tighten locknuts (14) to 18 lb-in. (2 N·m).
22. Install cover plate (20) on front housing (1) with three lockwashers (22) and screws (21).
23. Install bearing bushing (10) on core and shaft assembly (5).
24. Install fan (11) on core and shaft assembly (5) with washer (12) and locknut (13). Tighten locknut (13) to 50 lb-ft (68 N·m).



FOLLOW ON TASK: Install alternator (para. 4-5)

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Alternator Output Testing b. Disassembly c. Static Testing | <ul style="list-style-type: none"> d. Cleaning e. Assembly |
|---|--|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive and repair: field
 maintenance, basic (Appendix B, Item 6)
 Puller (Appendix B, Item 54)

Test Equipment

Multimeter (Appendix B, Item 155)
 Test stand (Appendix B, Item 56)

Materials/Parts

Silicone compound (Appendix B, Item 75)
 RTV sealant (Appendix B, Item 74)
 Locknut (Appendix G, Item 175.1)
 Locknut (Appendix G, Item 175)
 Eighteen locknuts (Appendix G, Item 175.2)
 Twelve locknuts (Appendix G, Item 177)
 Twelve lockwashers (Appendix G, Item 231.1)
 Two lockwashers (Appendix G, Item 231)
 Two seals (Appendix G, Item 424.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P
 TM 9-4910-663-12
 TM 9-4910-485-12

Equipment Condition

Alternator removed (para. 4-8.3).

General Safety Instructions

Always support alternator core and shaft assembly during removal and installation.

Maintenance Level

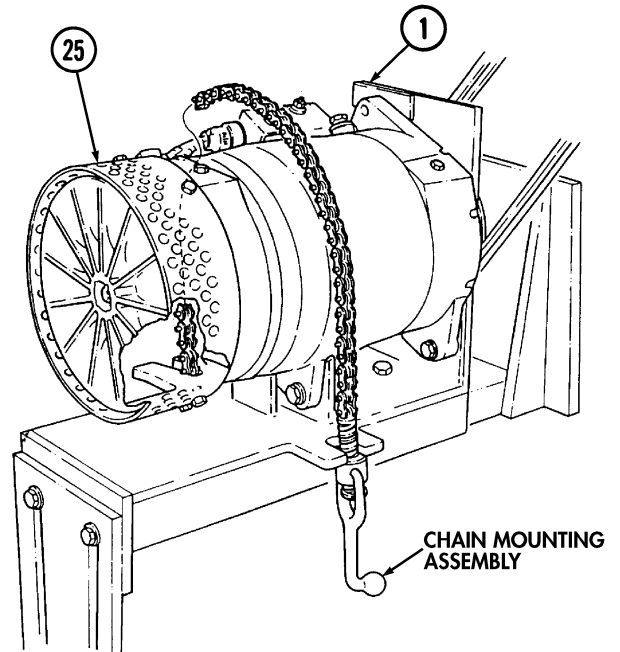
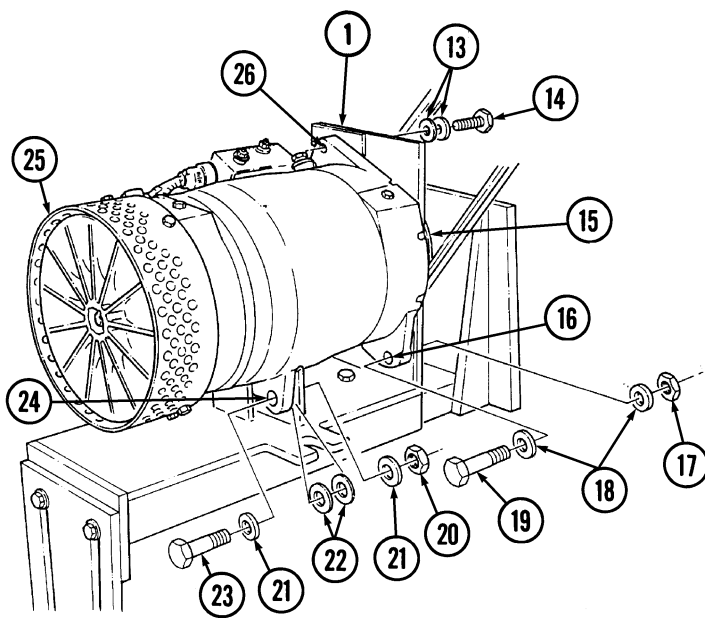
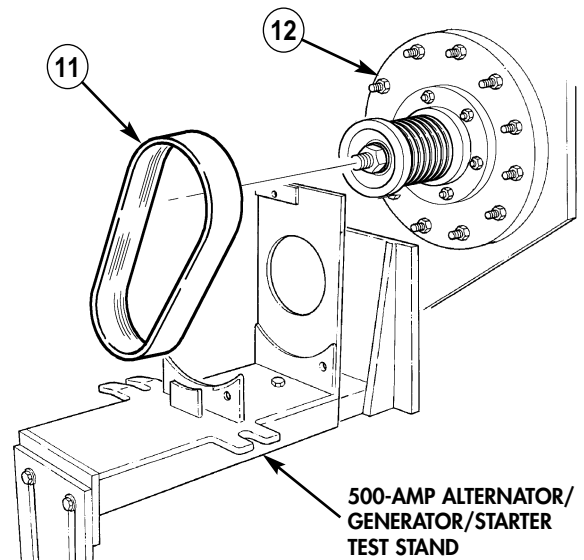
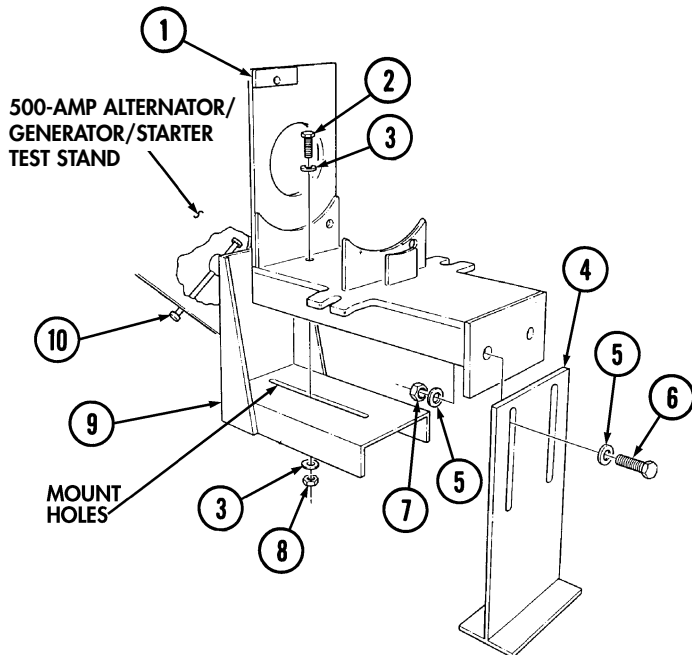
Direct support

a. Alternator Output Testing

1. Mount 500-amp test stand pivot arm to high-speed side and install mounting flange adapter on pivot arm. Connect pulley driveshaft to high-speed head. Install pulley driveshaft on mounting flange adapter.
2. Position adapter mount (1) to bracket (9) on test stand.
3. Install adapter mount (1) on bracket (9) with washer (3), screw (2), washer (3), and nut (8). Do not tighten screw (2).
4. Loosen locking handle (10) on bracket (9), raise bracket (9) to highest point, and tighten locking handle (10).
5. Install support plate (4) on adapter mount (1) with two washers (5), screws (6), washers (5), and nuts (7). Do not tighten nuts (7).
6. Install serpentine belt (11) on driver pulley (12) on alternator/generator/starter test stand.
7. Position alternator (25) on adapter mount (1) and install serpentine belt (11) on pulley (15).
8. Position two washers (22) between rear lower mount (24) on alternator (25) and adapter mount (1), and install washer (21), screw (23), washer (21), and nut (20). Do not tighten nut (20).
9. Align front lower mount holes (16) on alternator (25) and adapter mount (1) and install washer (18), screw (19), washer (18), and nut (17). Do not tighten nut (17).
10. Align top mount hole (26) on alternator (25) and adapter mount (1) and install two washers (13) and screw (14).
11. Tighten nuts (20) and (17) to 40 lb-ft (54 N·m).

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

12. Position chain mounting assembly over alternator (25) and secure to adapter mount (1).
13. Loosen locking handle (10) on bracket (9), lower bracket (9) to obtain tension on serpentine belt (11), and tighten locking handle (10).
14. Adjust support plate (4) on adapter mount (1) until support plate (4) contacts floor surface and tighten screws (2) and (6) and nuts (7) and (8).



18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

NOTE

- Ensure a jumper cable is attached to both alternator ground points when attaching cables from test stand G- terminals.
 - Ensure a jumper cable is attached to both alternator 28V B+ terminals when attaching cables from test stand G+ terminals.
15. Connect cables from both alternator ground terminals to test stand G- terminal.
 16. Connect cables from both alternator positive terminals to test stand G+ terminal.
 17. Connect cable from alternator regulator IGN to test stand F terminal.
 18. Connect 28 VDC output and 14 VDC output to test stand.

NOTE

Auxiliary voltage and current meters may be required to measure 14 VDC output.

19. Fabricate a jumper wire with a ring terminal at both ends. Connect test stand wire from IGNITION SWITCH terminal to F-B terminal.

CAUTION

Ensure auxiliary measuring equipment is properly grounded to test stand. Failure to do so may lead to erroneous readings or damage to equipment.

NOTE

Prior to operation of test stand, ensure all switches and controls are in "initial" positions as referenced in Operator and Maintenance Manual, TM 9-4910-663-12 (UMC Model GSAR-500), or Operator and Maintenance Manual, TM 9-4910-485-12 (Sun Model AGT-9/9A).

- | | | | |
|-----|--|-----------------------|-----------------------|
| 20. | Set test stand as follows: | <u>Model GSAR-500</u> | <u>Model AGT-9/9A</u> |
| | (a) DC ammeter load and starter selector | X10 | 500 amp |
| | (b) DC ammeter field and battery charge selector | X1 | 5 amp |
| | (c) Field circuit switch | Regulator | Regulator |
| | (d) DC voltmeter circuit selector | RECT/GEN | RECT/GEN |
| | (e) Connect DC voltmeter (0-50 VDC) from point between regulator 14 VDC output and load in 14 volt circuit (or 14 volt battery). | | |
| | (f) Connect ammeter (0-75 ADC) in load line from 14 V regulator to 14 V load. | | |
21. Turn test stand master power switch and master load switch to ON, and turn battery switch to 24 VDC. Green lamp on test stand must illuminate.
 22. Perform no-load test. Set test stand battery circuit selector to 24 VDC, IGN switch to ON, and start varidrive. Observing the DC voltmeter output voltage and tachometer rpm, increase speed until tachometer reads 5000 rpm. Record voltmeter reading and refer to table 18-5, No-Load Test, for diagnosis.

NOTE

- When tachometer reaches 3000 rpm, green lamp should go off indicating proper charging from alternator.
 - Normal voltage range is 26-30 VDC. High amperage is +10 percent over the rated alternator output of 364 amps at 5000 rpm.
23. Perform no-load test. Increase alternator speed to 5000 rpm; record results. Refer to table 18-5, No-Load Test, for diagnosis.

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

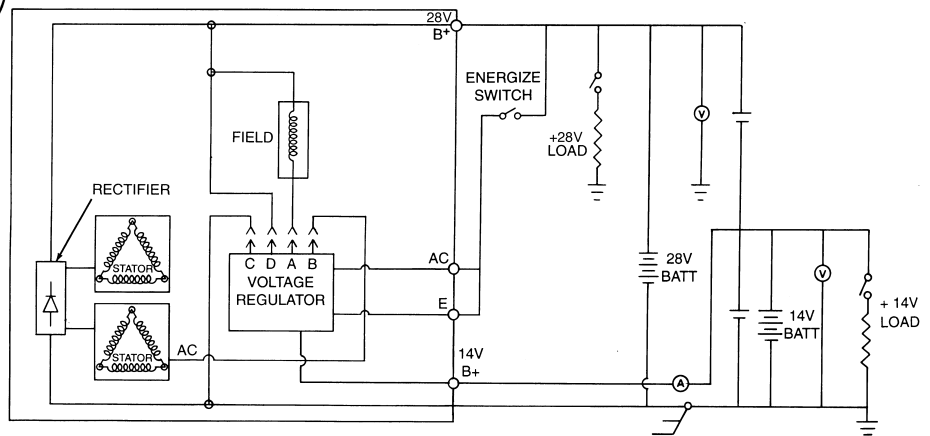
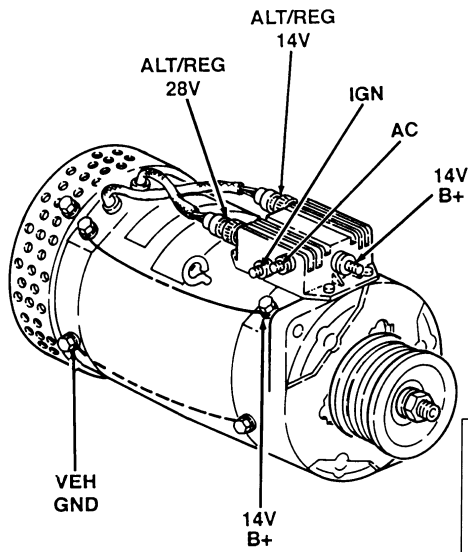


Table 18-5. No-Load Test.

AMPS	28VDC	14VDC	DIAGNOSIS
322-400	21-25	10.5-12.5	Test bench battery is discharged (or defective). Allow to charge (or replace).
322-400	26-30	13-15	Give time to stabilize while monitoring VOLTS. If VOLTS rise above normal range (26-30 volts), regulator and/or tube assembly must be replaced. If AMPS fall, charging system is OK.
322-400	31-35	15.5-17.5	STOP TEST. Regulator and/or tube assembly must be replaced. Refer to static testing, task c.
160-238	21-25	10.5-12.5	Alternator and/or regulator must be repaired or replaced. Refer to table 18-8.
160-238	26-30	13-15	Regulator OK. Refer to table 18-6.
160-238	31-35	15.5-17.5	STOP TEST. Bench malfunction or wiring error.

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

- 24. Perform full-load test. Ensure all load switches are in ON position on test stand, and increase alternator speed to 5000 rpm. Set load to 364 amps/min; record results. Refer to table 18-6, Full-Load Test, for diagnosis.
- 25. Alternator speed and current output tracking values. Refer to table 18-7.

Table 18-6. Full-Load Test.

AMPS	28VDC	14VDC	DIAGNOSIS
322-400	21-25	10.5-12.5	Test bench battery is discharged (or defective). Allow to charge (or replace).
322-400	26-30	13-15	Charging system OK.
322-400	31-35	15.5-17.5	STOP TEST. Regulator and/or tube assembly must be replaced. Refer to static testing, task c.
160-238	21-25	10.5-12.5	Alternator and/or regulator must be replaced. Refer to table 18-8.
160-238	26-30	13-15	Increase load.
160-238	31-35	15.5-17.5	STOP TEST. Test bench malfunction or wiring error.

Table 18-7. Alternator Speed and Current Tracking.

ALTERNATOR SPEED (RPM)	28VDC	14VDC	ALTERNATOR SPEED (RPM)	28VDC	14VDC
	OUTPUT CURRENT ±5 AMP	OUTPUT CURRENT MINIMUM AMP		OUTPUT CURRENT ±5 AMP	OUTPUT CURRENT MINIMUM AMP
1200	*3	45	2000	255	50
	10	38		275	30
	20	28		**302	3
	30	18	3500	*5	10
	**44	4		70	20
1500	*5	20		200	50
	10	30		350	50
	50	50		380	20
	100	50	**397	3	
	140	50	5000	*5	10
	160	30		70	20
	*187	3		200	25
2000	*5	16		8000	350
	60	30	380		20
	97	50	**397		3
	120	50			

* Dependent on ammeter location in test circuit.
 **Minimum acceptable current with no load on 28 VDC system.

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

26. Perform regulator bypass test. Prepare alternator as in full-load test.

NOTE

- Perform this test only when instructed from tables 18-5 and 18-6.
- Use jumper wire rated for 15 amps.

27. Disconnect alternator connector from regulator. With alternator spinning, use jumper wire and short pin A to ground momentarily. Record results.

28. Amperage should rise within ± 10 percent of rated value with jumper wire connected, and fall with jumper disconnected. Refer to table 18-8, Regulator Bypass Test, for diagnosis.

Table 18-8. Regulator Bypass Test.

CONNECT	DISCONNECT	DIAGNOSIS
AMPS RISE	AMPS FALL	Alternator OK. Replace regulator only if low AMPS (160-238)/low VOLTS (21-25) are indicated in table 18-5 and/or table 18-6.
NO CHANGE	NO CHANGE	Alternator must be repaired. Refer to static testing, task c.

29. Turn test stand master power switch and load switch to OFF.

30. Disconnect jumper wires from terminals on test stand and alternator.

31. Remove belt from test stand pulley and alternator pulley. Remove alternator from test stand.

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

b. Disassembly

NOTE

Complete disassembly is not required for static testing.

1. Disconnect two cannon plugs (2) from voltage regulator (39).
2. Remove three screws (37), two lockwashers (38), three washers (40), and voltage regulator (39) from front housing (27). Discard lockwashers (38).
3. Remove locknut (31), washer (32), pulley (30), and pulley bushing (33) from core and shaft assembly (24). Discard locknut (31).
4. Remove four screws (8), washers (9), and fan guard (10) from stator (20).
5. Remove locknut (11), washer (12), fan (13), and spring ring (14) from core and shaft assembly (24). Discard locknut (11).
6. Scribe alignment marks on front housing (27), stator (20), and end housing (1).
7. Remove six screws (7), lockwashers (6), and plate cover (15) from end housing (1). Discard lockwashers (6).

NOTE

Prior to removal, tag leads for installation.

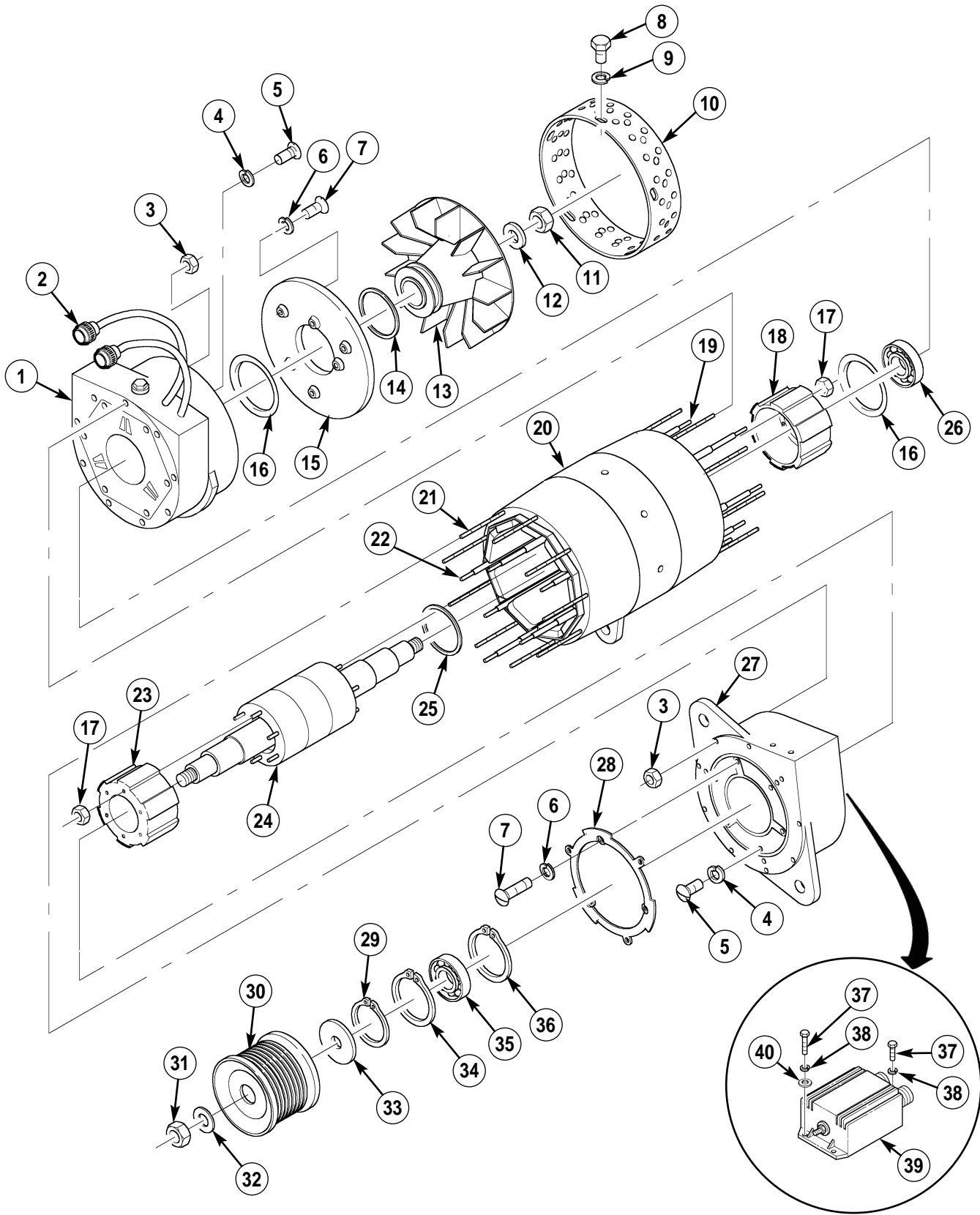
8. Remove eight screws (5) and washers (4), and disconnect two field leads (19) and six phase leads (22) from diodes in end housing (1).
9. Remove nine locknuts (3) from front housing (27) and studs (21) of stator (20). Discard locknuts (3).
10. Using a soft-faced mallet, tap from side-to-side to remove end housing (1) from stator (20).
11. Remove six locknuts (17) from studs of core and shaft assembly (24). Discard locknuts (17).
12. Using a gear puller, remove rotor (18) from core and shaft assembly (24).
13. Using a gear puller, remove rear bearing (26), two seals (16), and spring ring (25) from core and shaft assembly (24). Discard two seals (16).
14. Remove six screws (7), lockwashers (6), and plate cover (28) from front housing (27). Discard lockwashers (6).

NOTE

Prior to removal, tag leads for installation.

15. Remove five screws (5) and washers (4), and disconnect two field leads (19) and three phase leads (22) from diodes in front housing (27).
16. Remove nine locknuts (3) from front housing (27) and studs (21) from stator (20). Discard locknuts (3).
17. Using a soft-faced mallet, tap from side-to-side to remove front housing (27) from stator (20).
18. Remove shaft retaining ring (29) from core and shaft assembly (24).
19. Using an arbor press, remove core and shaft assembly (24) from front housing (27).
20. Remove front (34) and rear (36) retaining rings from front housing (27).
21. Using an arbor press, remove bearing (35) from front housing (27).
22. Remove six locknuts (17) from studs on core and shaft assembly (24). Discard locknuts (17).
23. Using a gear puller, remove rotor (23) from core and shaft assembly (24).

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)



18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

c. Static Testing

NOTE

Refer to disassembly for component removal, if necessary.

1. Perform Stator Test:

NOTE

- Steps (a) through (f) apply to test procedure for end housing.
- Steps (a) through (e) apply to test procedure for front housing.

- (a) Remove six nuts and phase leads from diodes in end housing.
 - (b) Set multimeter to X1 scale and zero multimeter.
 - (c) Connect multimeter leads between each phase leads P1-P2, P2-P3, and P1-P3. Multimeter should read less than 1 ohm. If multimeter reads infinity (∞), the stator is open; replace alternator.
 - (d) Set multimeter to X1 scale and zero multimeter.
 - (e) Connect multimeter leads between each phase lead, P1, P2, and P3 and ground terminal on outside of front housing. Multimeter should read infinity (∞). If multimeter reads zero, the stator is grounded; replace alternator.,
 - (f) Repeat step (e) to check phase lead P4, P5, and P6.
- #### 2. Perform Field Coil Test for End Housing Only:
- (a) Remove two nuts and field coil leads (F+, F-) from diodes in end housing.
 - (b) Set multimeter to XI scale and zero multimeter.
 - (c) Connect multimeter leads to the two field leads and measure the resistance. Multimeter should read less than 3 ohms. If multimeter reads more than 3 ohms, field coil is open; replace alternator.
 - (d) Set multimeter to X10K scale and zero multimeter.
 - (e) Connect one multimeter lead to a field lead and other to ground stud on front housing. Multimeter should read infinity (∞). If multimeter reads less than 100K ohms, field coil is grounded. Replace alternator.
- #### 3. Perform Positive Diode Test:
- (a) Set multimeter to X100 scale and zero multimeter.
 - (b) Connect one ohmmeter lead to B+ output stud and other lead to each of six diode terminals S. Multimeter should read either less than 600 ohms or infinity (∞) for all six diode terminals. Reverse multimeter leads. Multimeter should read nearly alike for all six, but opposite first set of readings. If readings are not opposite, diode rectifier assembly is open. Replace alternator.
- #### 4. Perform Negative Diode Test:
- (a) Set multimeter to X100 scale and zero multimeter.
 - (b) Connect one multimeter lead to ground terminal and other lead to each of six diode terminals S. Multimeter should read either less than 600 ohms or infinity (∞) for all six diode terminals. Reverse multimeter leads. Multimeter should read nearly alike for all six, but opposite first set of readings. If readings are not opposite, diode rectifier assembly is open. Replace alternator.

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

d. Cleaning

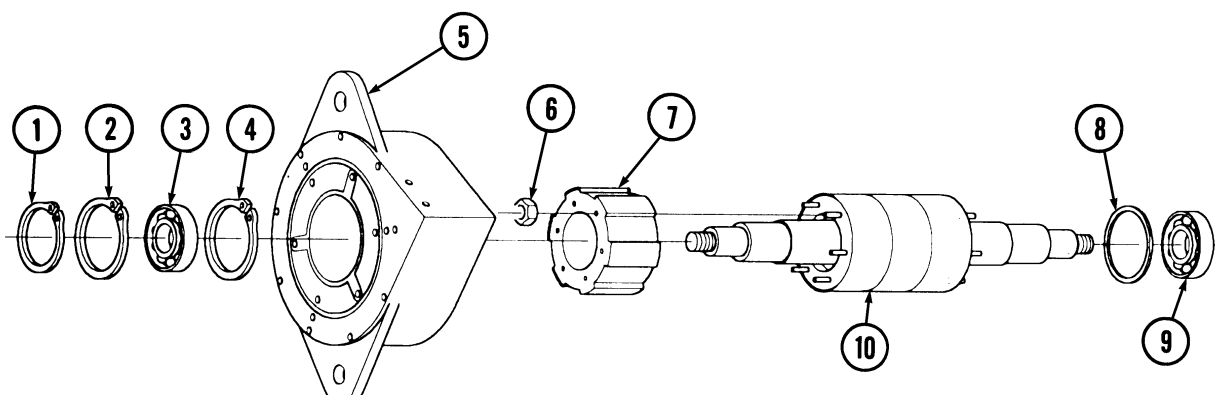
Clean all alternator components in accordance with para. 2-14.

e. Assembly

WARNING

Always support alternator core and shaft assembly during installation. Failure to do so may cause injury to personnel or equipment damage

1. Using press, install spring ring (8) and rear bearing (9) on core and shaft assembly (10).
2. Position front rotor (7) on core and shaft assembly (10).
3. Apply silicone compound to studs of core and shaft assembly (10).
4. Install core and shaft assembly (10) on front rotor (7) with six locknuts (6). Tighten locknuts (6) to 45 lb-in. (5 N·m).
5. Coat outer race of front bearing (3) with a thin coat of silicone compound.
6. Install retaining ring (4) on front housing (5).
7. Using a press, install front bearing (3) on front housing (5) and secure with retaining ring (2).
8. Using press, install front bearing (3) with housing assembly (5) on core and shaft assembly (10).
9. Install shaft retaining ring (1) on core and shaft assembly (10).



18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)

10. Insert core and shaft assembly (9) and front housing (10) in stator (24).

NOTE

Align scribe marks on front housing and stator.

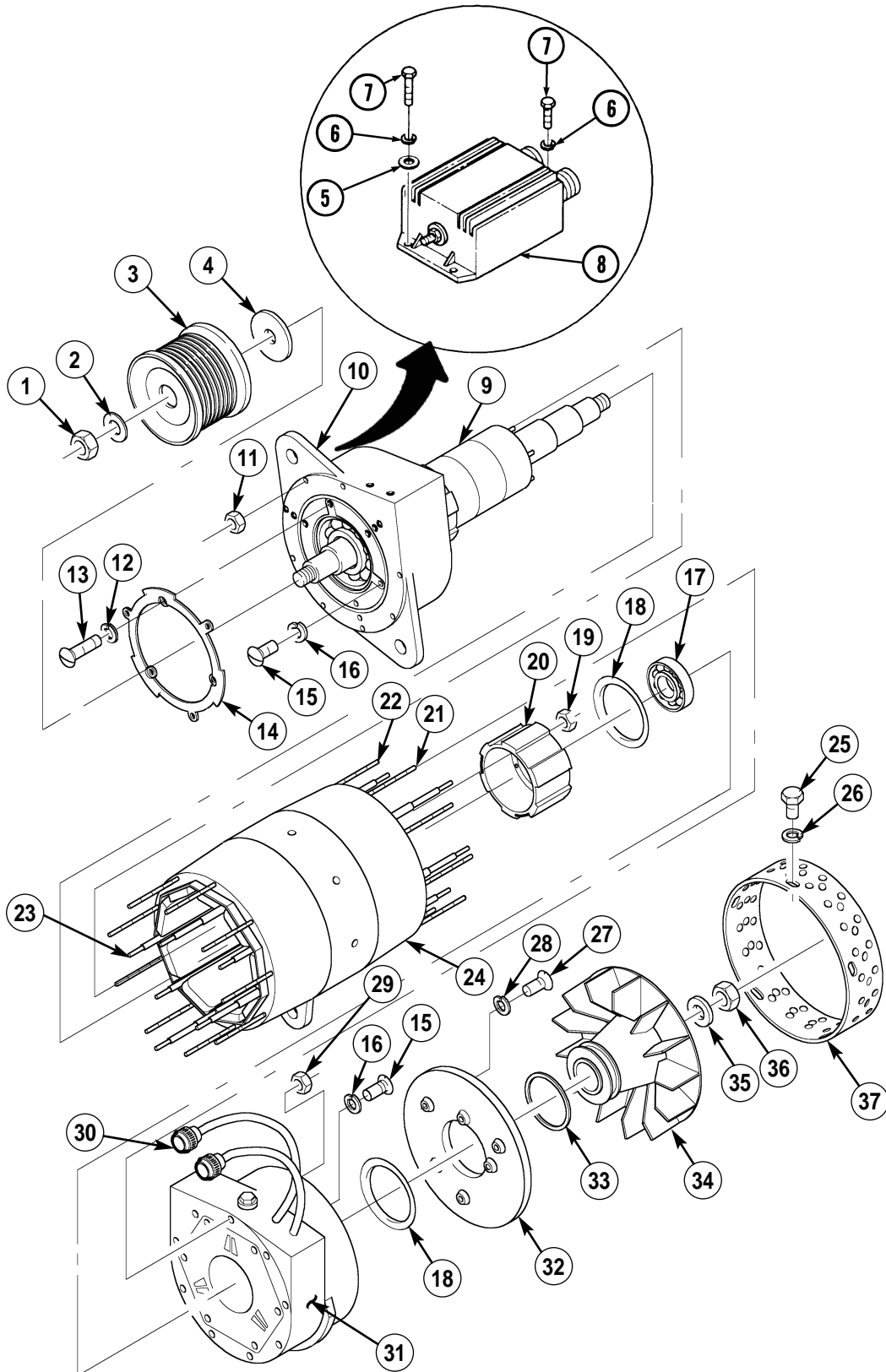
11. Feed leads (23) and (21) from stator (24) through front housing (10).
12. Apply silicone compound to studs (22) on stator (24).
13. Install three phase leads (23) and two field leads (21) on diodes of front housing (10) with eight washers (16) and screws (15).
14. Apply a thin coat of RTV sealant on leads (23) and (21) and diodes of front housing (10).
15. Using a soft-faced mallet, tap from side to side to install front housing (10) on stator (24).
16. Secure front housing (10) to studs (22) on stator (24) with nine locknuts (11). Tighten locknuts (11) to 18 lb-in. (2 N·m).
17. Install rear rotor (20) on core and shaft assembly (9) with six locknuts (19). Tighten locknuts (19) to 45 lb-in. (5 N·m).
18. Apply silicone compound to studs on core and shaft assembly (9).
19. Using an arbor press, install ring bearing (17) and two seals (18) on core and shaft assembly (9).
20. Insert end housing (31) on stator (24).

NOTE

Align scribe marks on end housing and stator.

21. Feed leads (23) and (21) from stator (24) through end housing (31).
22. Apply silicone compound to studs (22) on stator (24).
23. Install six phase leads (23) and two field leads (21) on diodes of end housing (31) with eight washers (16) and screws (15).
24. Apply thin coat of RTV sealant on leads (23) and (21) and diodes of end housing (31).
25. Using a soft-faced mallet, tap from side to side to install end housing (31) on stator (24).
26. Secure end housing (31) to studs (22) on stator (24) with nine locknuts (29). Tighten locknuts (29) to 18 lb-in. (2 N·m)
27. Install plate cover (32) on end housing (31) with six lockwashers (28) and screws (27).
28. Install plate cover (14) on front housing (10) with six lockwashers (12) and screws (13).
29. Install spring ring (33) on fan (34).
30. Install fan (34) on core and shaft assembly (9) with washer (35) and locknut (36). Tighten locknut (36) to 50 lb-ft (68 N·m).
31. Install fan guard (37) on stator (24) with four washers (26) and screws (25).
32. Install pulley bushing (4), pulley (3), washer (2), and locknut (1) on core and shaft assembly (9). Tighten locknut (1) to 120 lb-ft (163 N·m).
33. Install voltage regulator (8) on stator (24) with three washers (5), two lockwashers (6), and three screws (7).
34. Connect two cannon plugs (30) to voltage regulator (8).

18-3.1. 400-AMPERE DUAL VOLTAGE ALTERNATOR TESTING AND REPAIR (Cont'd)



FOLLOW-ON TASK: Install alternator (para. 4-8.3).

18-4. STARTER REPAIR

This task covers:

- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Assembly
- e. Bench Testing and Adjustment

INITIAL SETUP:

Test Equipment

- Switch (Appendix B, Item 55)
- Multimeter (Appendix B, Item 155)
- Carbon pile (Appendix B, Item 52)
- Armature test set (Appendix B, Item 53)

Tools

- General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

- Pinion stop and snapping kit (Appendix G, Item 300)
- Thrust washer and spacer kit (Appendix G, Item 459)
- Gasket set (Appendix G, Item 101)
- Gasket set (Appendix G, Item 103)
- Core parts kit (Appendix G, Item 26)
- Gasket kit, commutator end head (Appendix G, Item 100)

Materials/Parts (Cont'd)

- Two locknuts (Appendix G, Item 164)
- Pinion O-ring (Appendix G, Item 293)
- Washer kit (Appendix G, Item 468)
- Adhesive sealant (Appendix C, Item 13)
- Aircraft grease (Appendix C, Item 32)
- Lithium grease (Appendix C, Item 36)
- Lubricating oil (Appendix C, Item 49)
- Core shaft nut tool (Appendix D, Fig. 63)

Manual References

- TM 9-2320-387-24P

Equipment Condition

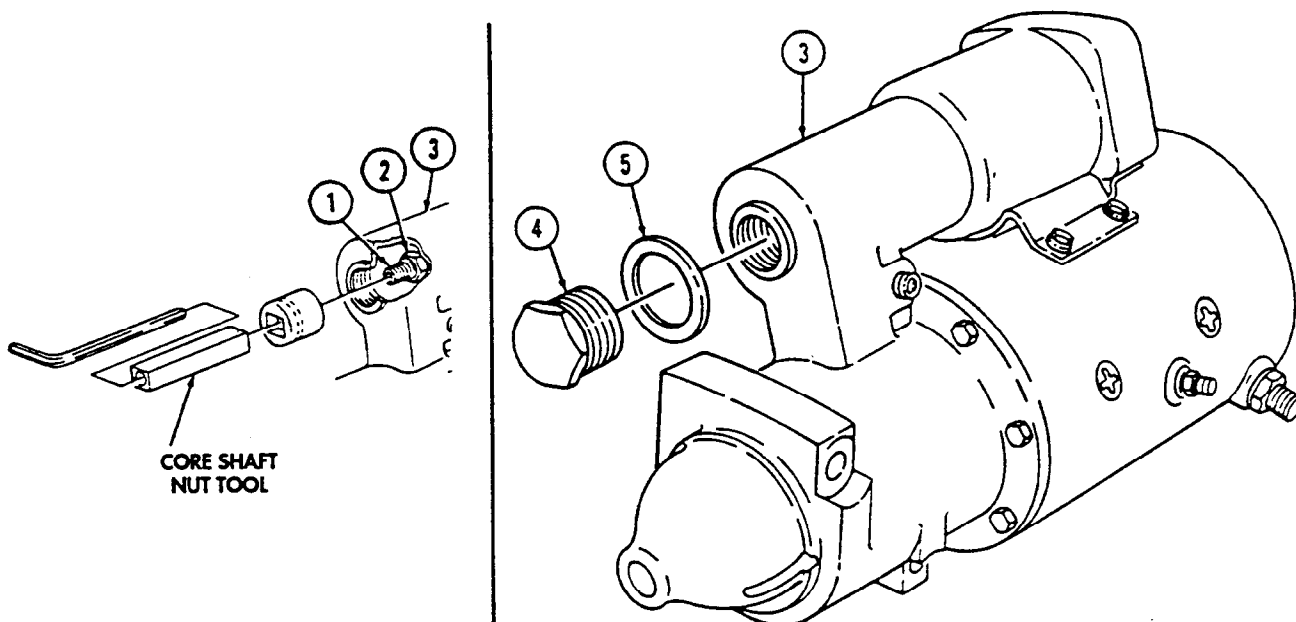
- Starter removed (para. 4-11).

Maintenance Level

- Direct support

a. Disassembly

1. Remove plug (4) and gasket (5) from pinion housing (3). Discard gasket (5).
2. Using core shaft nut tool, remove locknut (2) from end of core shaft (1) located inside pinion housing (3). Discard locknut (2).



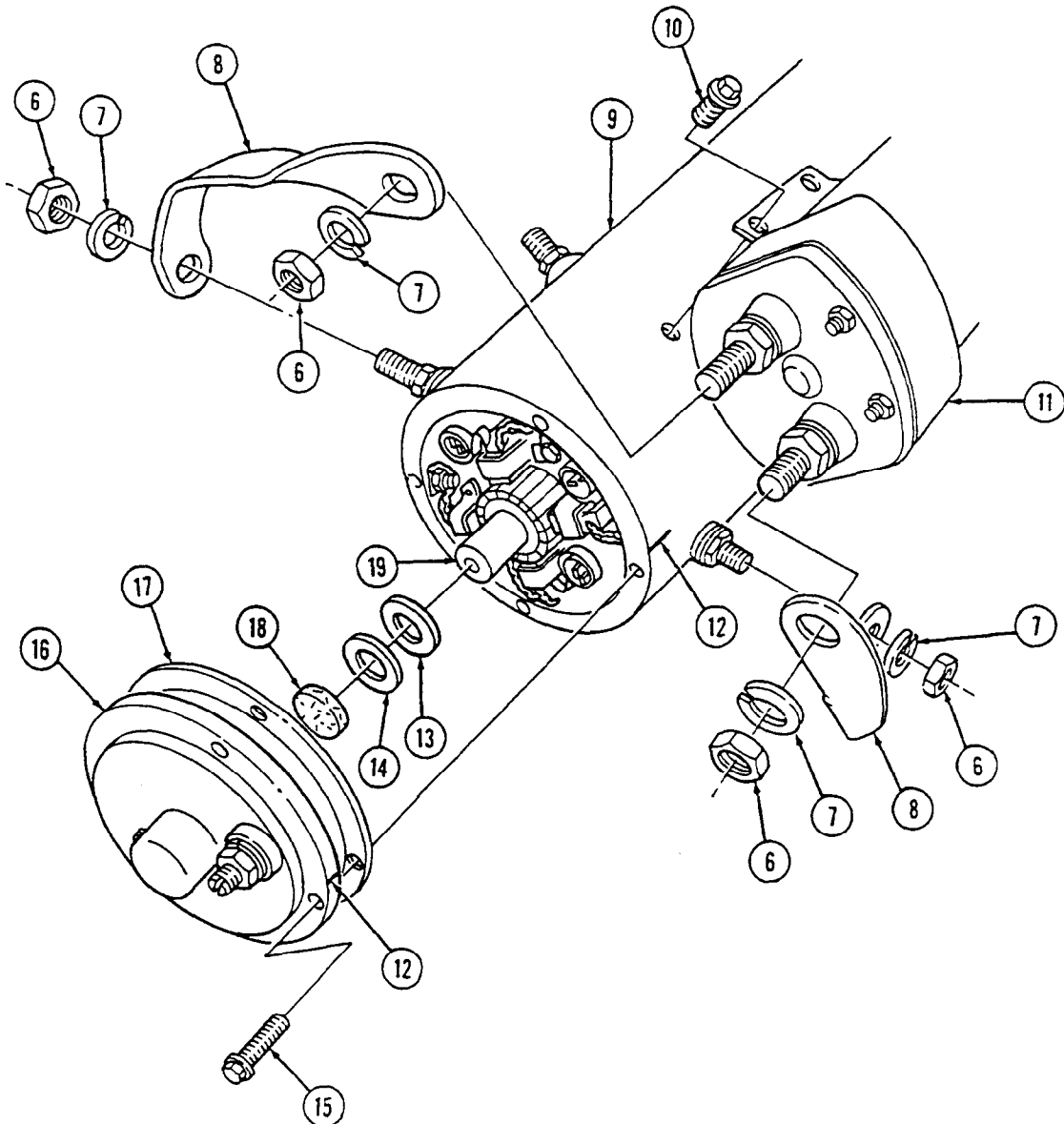
18-4. STARTER REPAIR (Cont'd)

3. Remove four nuts (6), lockwashers (7), and two solenoid lead connectors (8) from field and armature terminals on starter motor frame (9) and solenoid (11). Discard lockwashers (7).
4. Remove four capscrews (10) and solenoid (11) from starter motor frame (9).
5. Scribe a locating mark (12) on commutator end frame (16) and starter motor frame (9).
6. Remove four capscrews (15), commutator end frame (16), and gasket (17) from starter motor frame (9). Discard gasket (17).

NOTE

Measure and note combined thickness of thrust washer(s) and spacer for installation.

7. Remove thrust washer(s) (14) and spacer (13) from armature shaft (19). Discard spacer (13) and thrust washer(s) (14).
8. Remove oil felt washer (18) from commutator end frame (16). Discard felt washer (18).



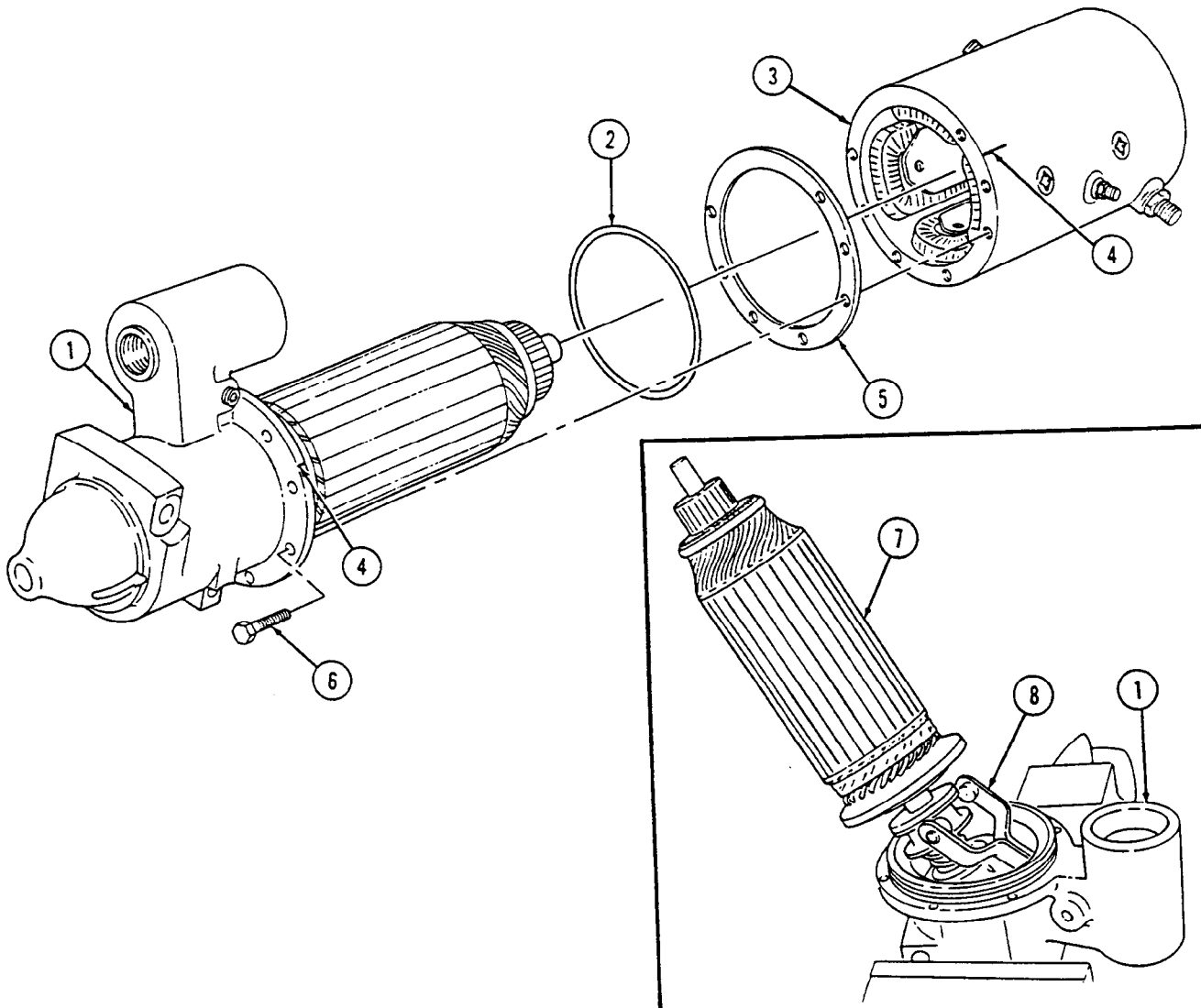
18-4. STARTER REPAIR (Cont'd)

9. Scribe a locating mark (4) on pinion housing (1) and starter motor frame (3).
10. Remove seven capscrews (6), starter motor frame (3), gasket (5), and O-ring (2) from pinion housing (1). Discard gasket (5) and O-ring (2).
11. Remove two plugs (9) and pin (10) from shift lever (8) and pinion housing (1).

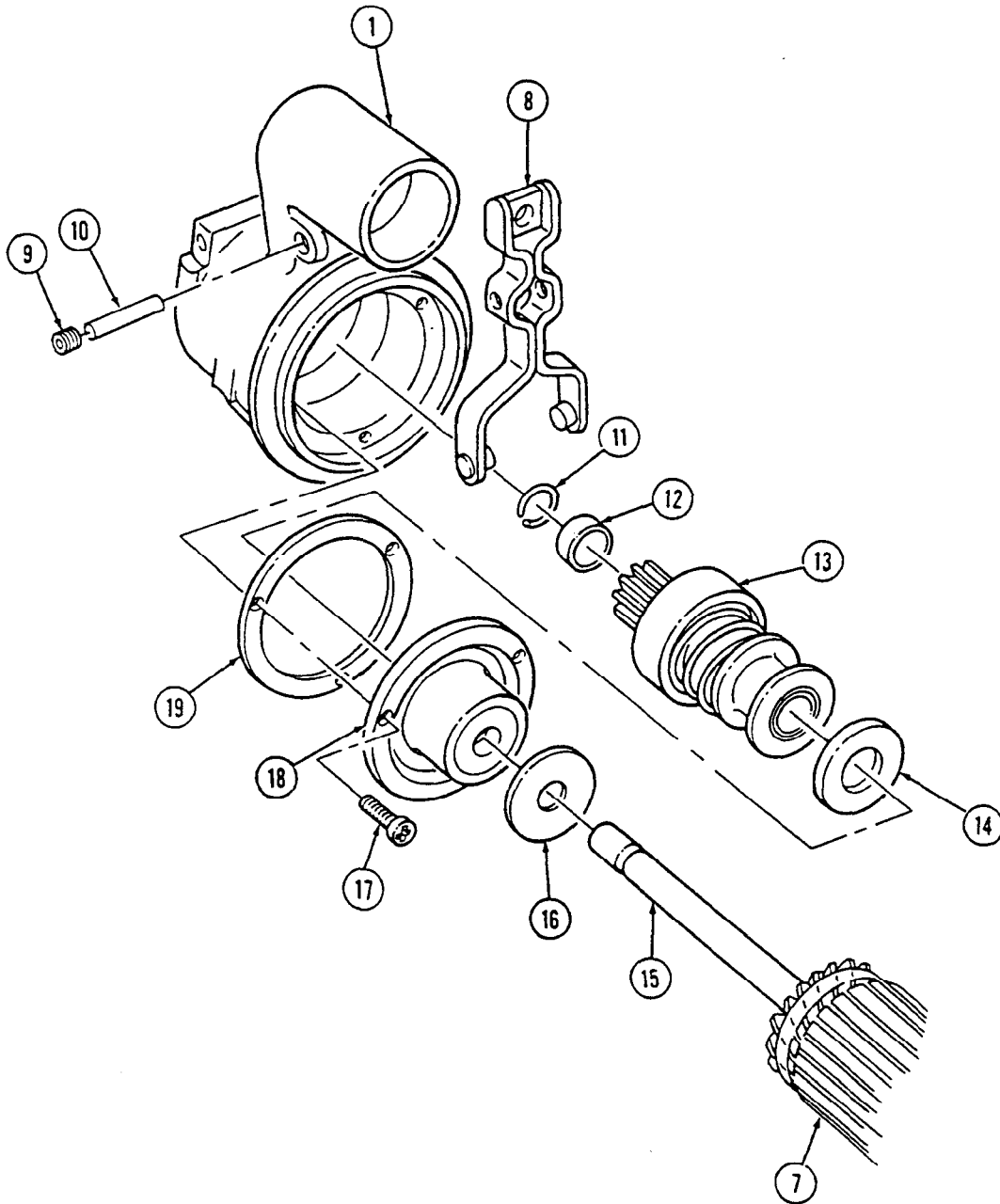
NOTE

Armature and shift lever must be positioned as shown for removal from pinion housing.

12. Clamp pinion housing (1) in vise and remove three screws (17) from pinion housing (1). Slide armature (7) and shift lever (8) out from pinion housing (1).
13. Remove snapping (11) and pinion stop (12) from armature shaft (15), and slide clutch (13) off armature shaft (15). Discard snapping (11) and pinion stop (12).
14. Remove washer (14), pinion housing end plate (18), and washer (16) from armature shaft (15). Discard washers (14) and (16).
15. Remove gasket (19) from pinion housing end plate (18). Discard gasket (19).

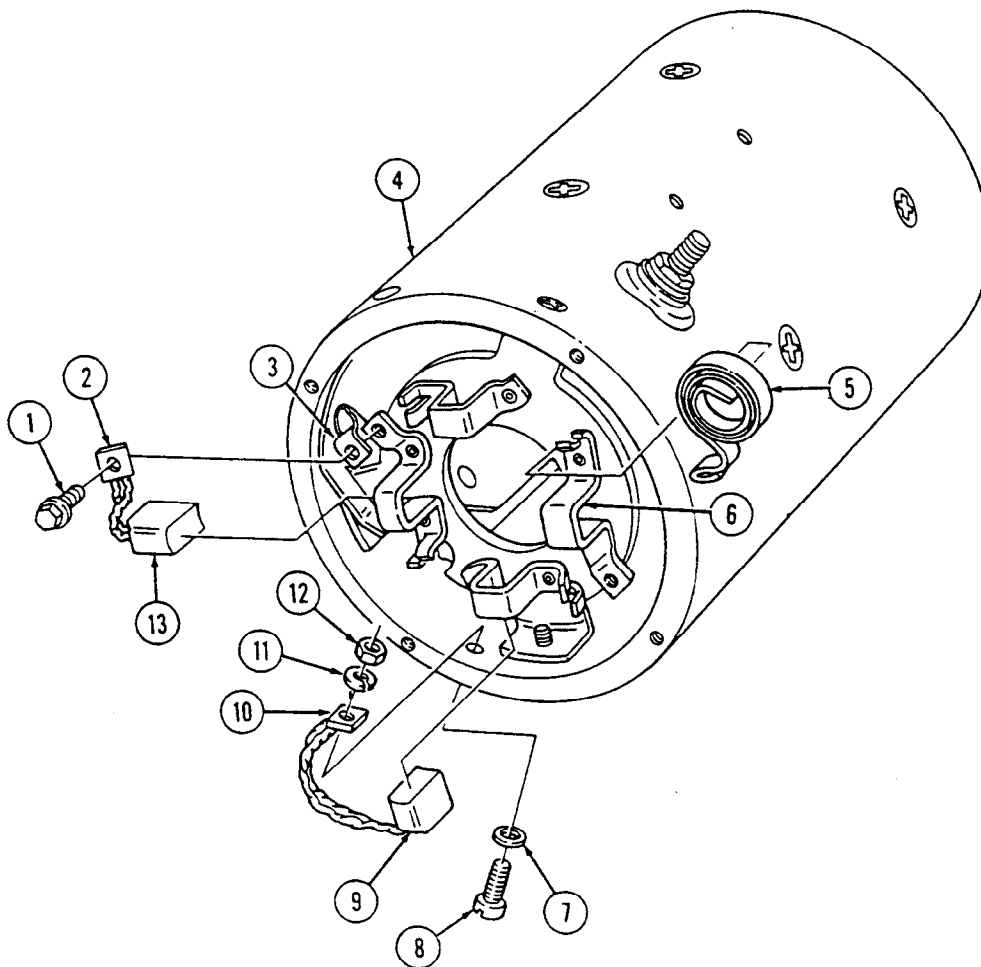


18-4. STARTER REPAIR (Cont'd)

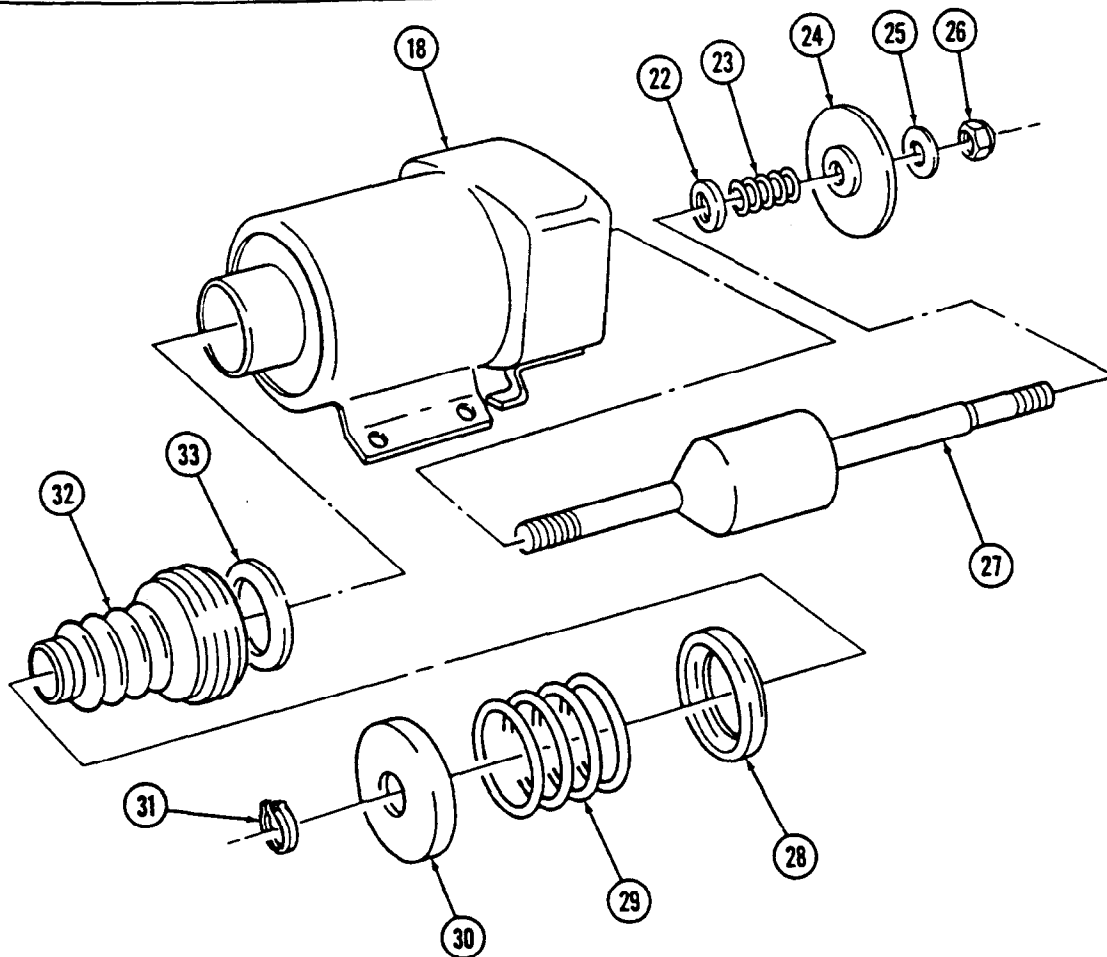
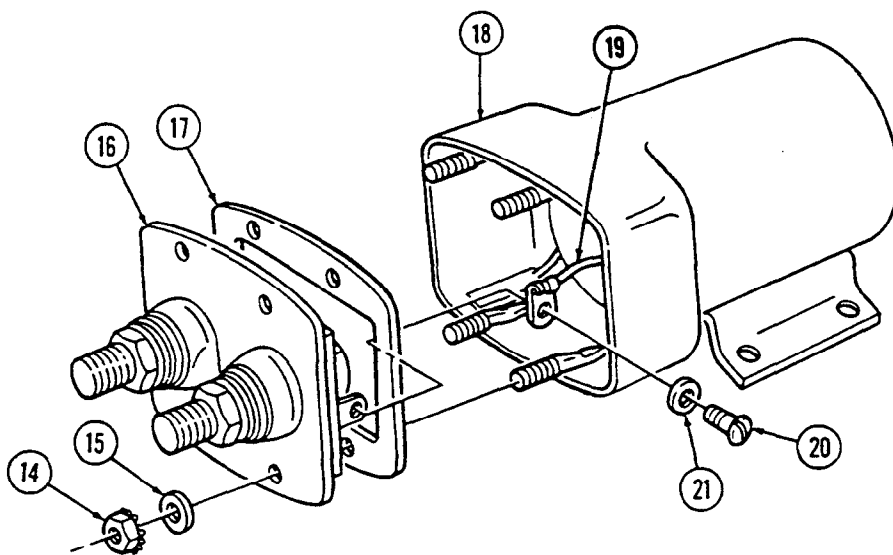


18-4. STARTER REPAIR (Cont'd)

16. Remove two nuts (12), lockwashers (11), screws (8), washers (7), and two brush leads (10) from starter motor frame (4). Remove two brushes (9) from brush holder (6). Discard two lockwashers (11).
17. Remove two screws (1), two brush leads (2), and brushes (13) from field coil (3) and brush holder (6).
18. Remove four springs (5) from brush holder (6).
19. Remove four nut and lockwasher assemblies (14), rubber washers (15), and cover (16) from studs of solenoid housing (18). Pull cover (16) away from solenoid housing (18) far enough to allow access to series winding lead (19) and screw (20). Discard rubber washers (15) and nut and lockwasher assemblies (14).
20. Remove screw (20), washer (21), and series winding lead (19) from cover (16), and remove cover (16) and gasket (17) from solenoid housing (18). Discard gasket (17).
21. Remove snapping (31), spring retainer (30), spring (29), spring retainer (28), rubber boot (32), and washer (33) from core shaft (27), and remove core shaft (27) from solenoid housing (18). Discard snapping (31).
22. Hold core shaft (27) and remove locknut (26), washer (25), contact (24), spring (23), and washer (22) from core shaft (27). Discard locknut (26).



18-4. STARTER REPAIR (Cont'd)



18-4. STARTER REPAIR (Cont'd)

b. Cleaning

Clean all starter motor components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect clutch (7) for damage, roughness, or damaged pinion. Replace clutch (7) if defective.
2. Check brushes (4) for roughness, galling, and wear. Replace brushes (4) if worn or brush length is less than 0.375 in. (9.52 mm).
3. Check the brush springs (5) for loss of spring tension or damage. Replace brush springs (5) if weak or damaged.
4. Inspect commutator end head bearing (1) for roughness, galling, or wear. Replace commutator end head bearing (1) if worn.
5. Inspect pinion housing bearing (6) for roughness, galling, or wear. Replace pinion housing bearing (6) if worn.
6. Check the commutator (10) for damage or evidence of excessive wear or arcing. Inspect the armature shaft (11) for rough bearing surfaces and rough or damaged splines (8). Turn commutator (10) and undercut insulation or replace starter motor if damaged.
7. The armature (9), field coils (3), and brush holder (2) should be checked for shorts, grounds, and open circuits with armature test set. Replace starter motor if armature (9), field coils (3), or brush holder (2) is shorted.
8. Inspect core spring (20) and rubber boot (23) for damage. Replace if damaged.
9. Inspect contact (15) for burns or damage. Replace if burned or damaged.

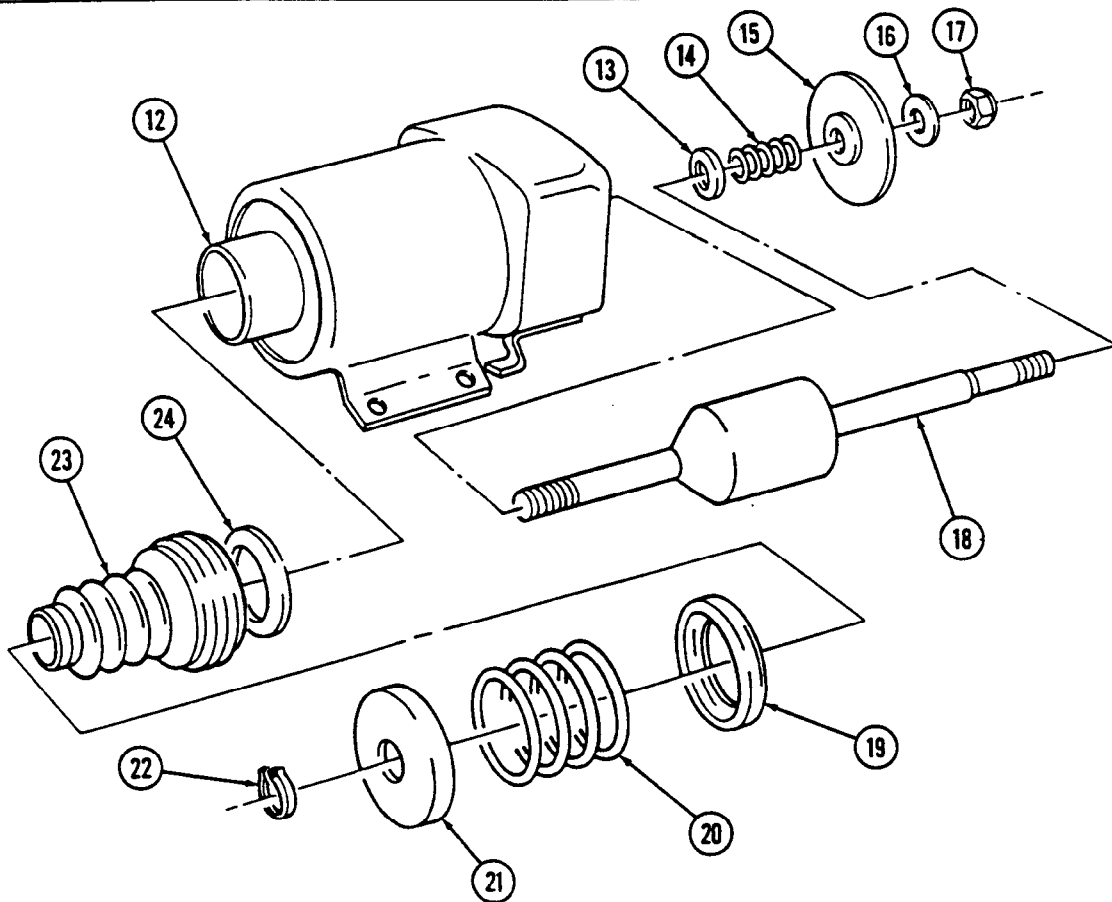
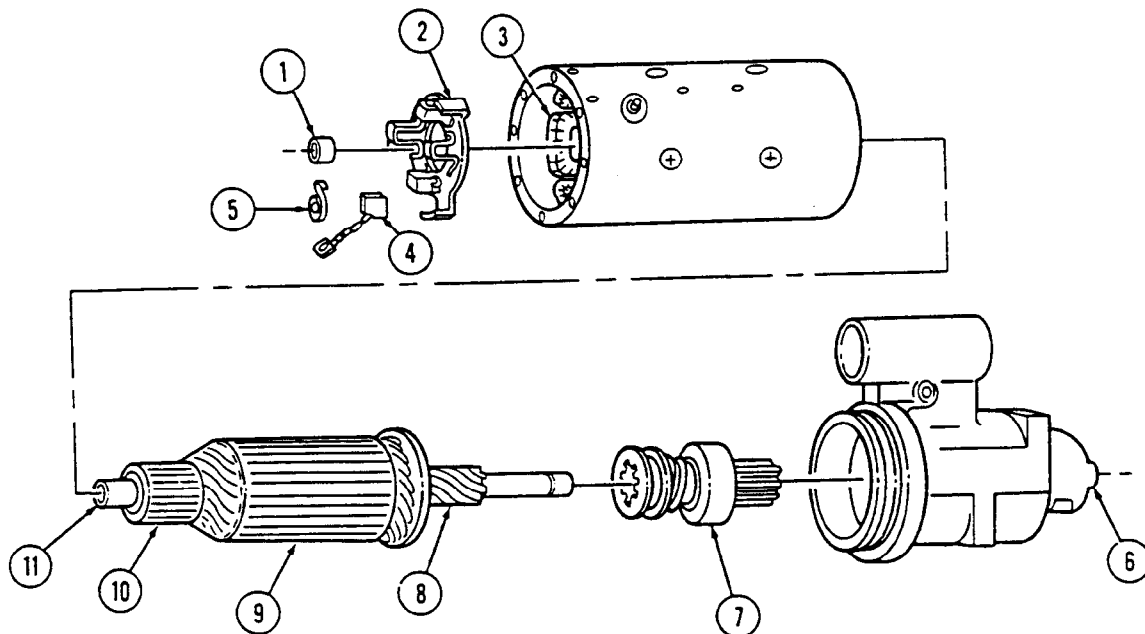
d. Assembly

NOTE

For general assembly instructions, refer to para. 2-17.

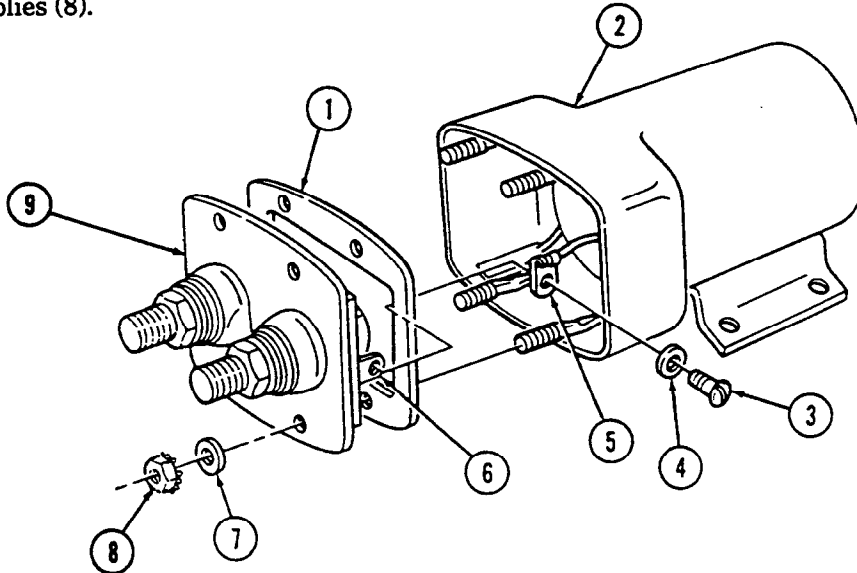
1. Position core shaft (18) in solenoid housing (12), and install washer (13), spring (14), contact (15), washer (16), and locknut (17) on core shaft (18). Hold core shaft (18) and tighten locknut (17).
2. Install washer (24), rubber boot (23), spring retainer (19), spring (20), and spring retainer (21) on core shaft (18) with retaining ring (22).

18-4. STARTER REPAIR (Cont'd)

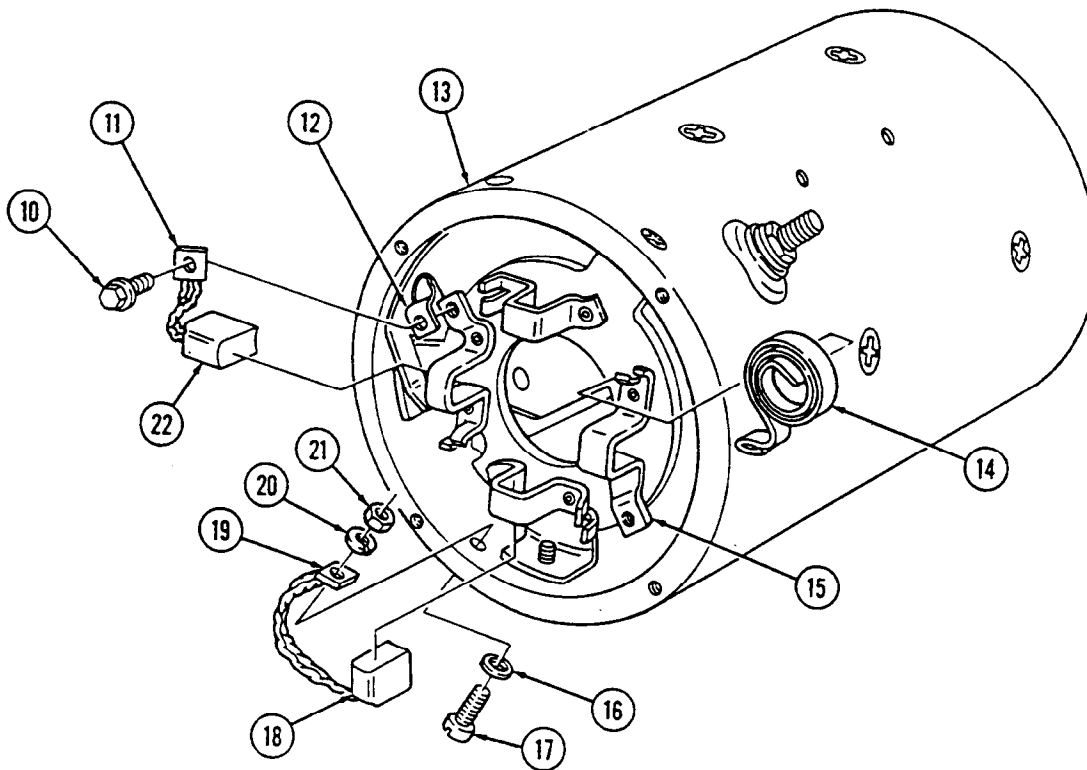


18-4. STARTER REPAIR (Cont'd)

3. Position gasket (1) on cover (9) and connect series winding lead (5) to series winding connection (6) with washer (4) and screw (3).
4. Install cover (9) on solenoid housing (2) with four rubber washers (7) and nut and lockwasher assemblies (8).



5. Connect two brush leads (11) to field coil (12) and brush holder (15) with two screws (10).
6. Connect two brush leads (19) to starter motor frame (13) with two washers (16), screws (17), lockwashers (20), and nuts (21). Cover heads of screws (17) with adhesive sealant.
7. Install two brushes (18) and two brushes (22) on brush holder (15) with four springs (14).



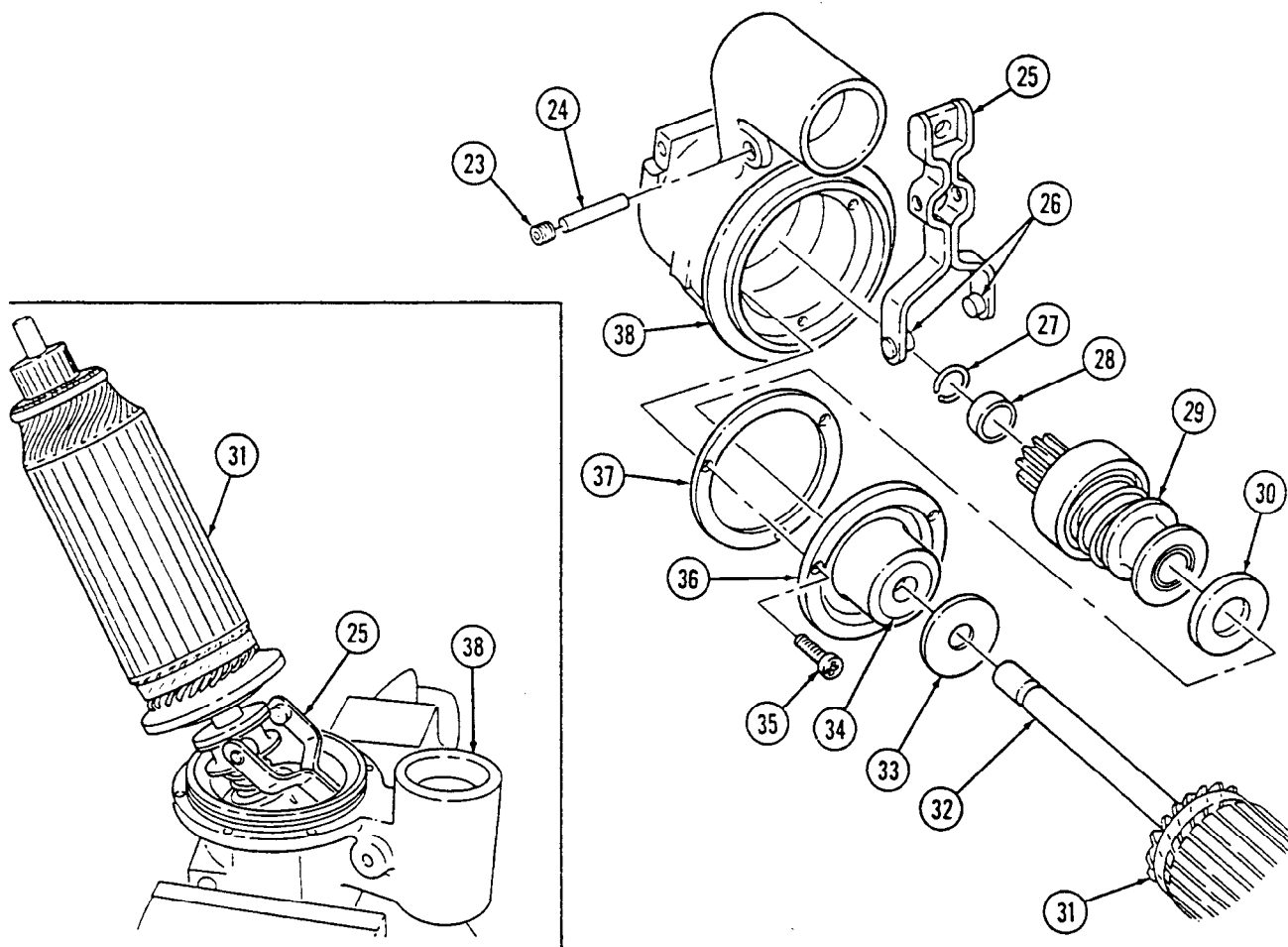
18-4. STARTER REPAIR (Cont'd)

8. Apply aircraft grease to armature shaft (32), shift lever studs (26), and the inside diameter of pinion housing end plate seal (34).
9. Install washer (33), pinion housing end plate (36), gasket (37), and washer (30) on armature shaft (32).
10. Install clutch (29) on armature shaft (32) with pinion stop (28) and snapping (27).

NOTE

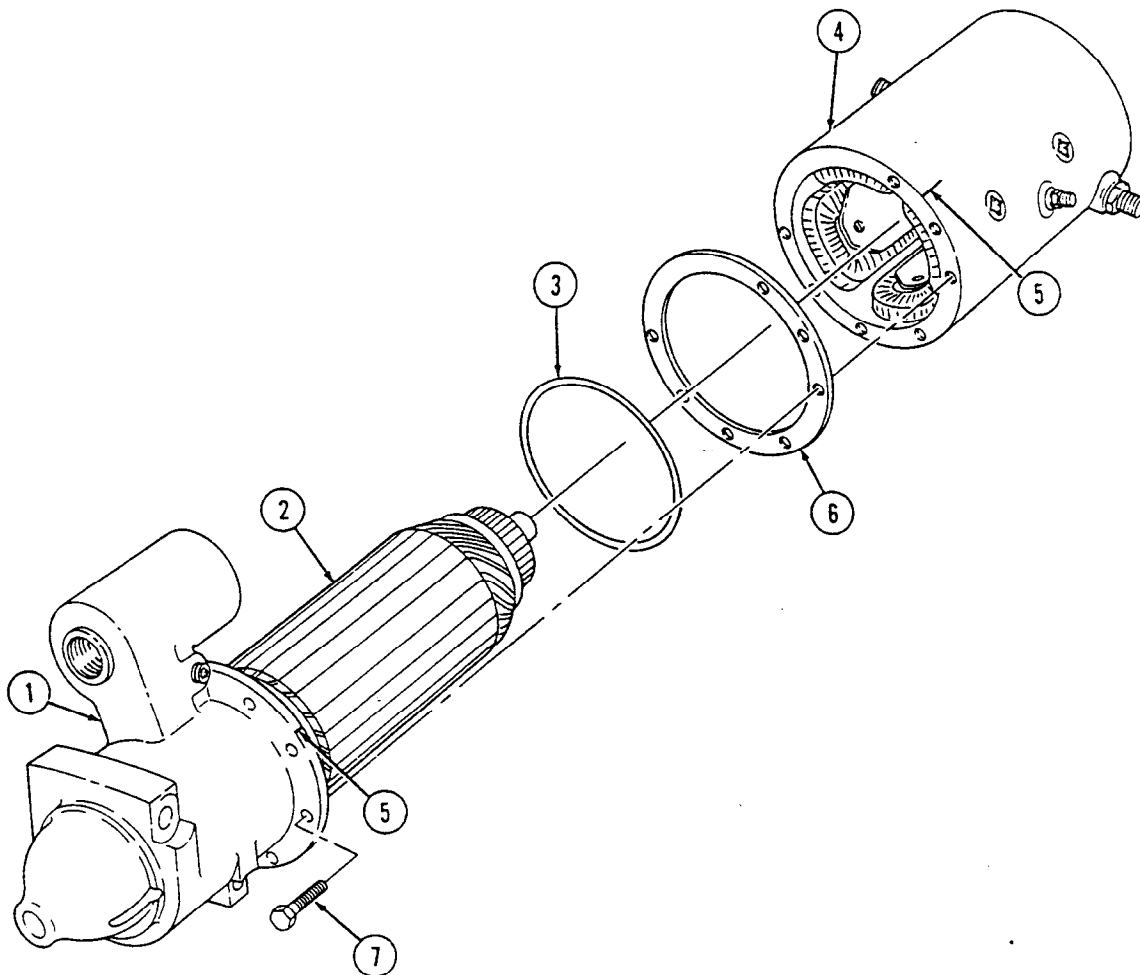
Armature and shift lever must be positioned as shown for installation into pinion housing.

11. Install pinion shift lever (25) and armature (31) on pinion housing (38). Install pinion housing end plate (36) on pinion housing (38) with three screws (35). Tighten screws (35) to 40 lb-in. (5 N·m).
12. Install pin (24) on pinion shift lever (25) and pinion housing (38) and install two plugs (23) on pinion housing (38).

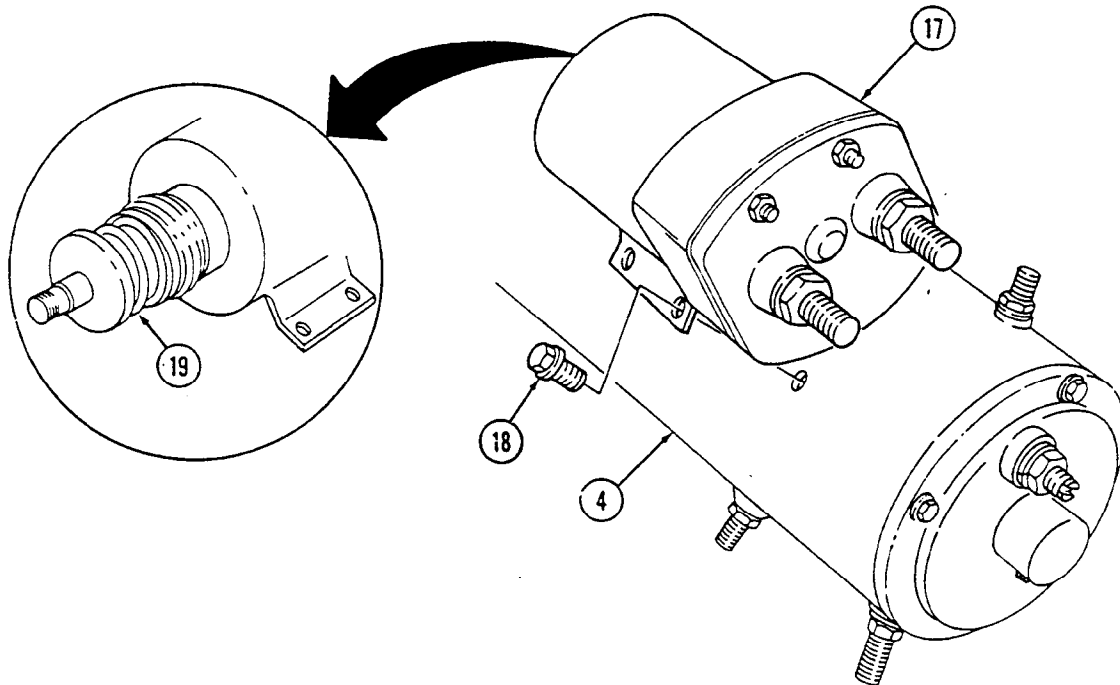
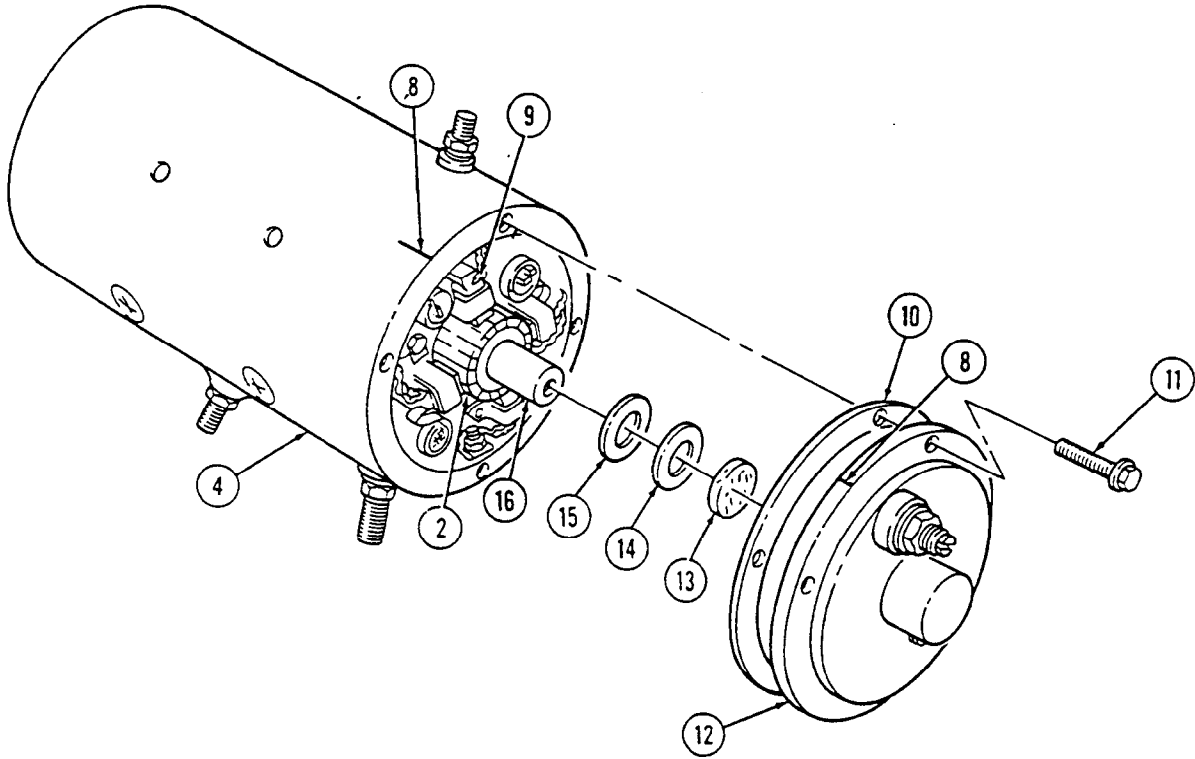


18-4. STARTER REPAIR (Cont'd)

13. Install gasket (6) and O-ring seal (3) on pinion housing (1) and align locating scribe marks (5) on pinion housing (1) and starter motor frame (4).
14. Coat threads of seven capscrews (7) with adhesive sealant.
15. Position armature (2) in starter motor frame (4) with brushes (9) on commutator of armature (2). Secure pinion housing (1) to starter motor frame (4) with seven capscrews (7). Tighten capscrews (7) to 50 lb-in. (6 N·m).
16. Saturate felt washer (13) with lubricating oil and install on commutator end frame (12).
17. Install spacer (15) and thrust washer(s) (14) on armature shaft (16).
18. Align locating marks (8) on commutator end frame (12) and starter motor frame (4).
19. Coat threads of four capscrews (11) with adhesive sealant.
20. Install commutator end frame (12) and gasket (10) on starter motor frame (4) with four capscrews (11). Tighten capscrews (11) to 25 lb-in. (3 N·m).
21. Coat threads of four capscrews (18) with adhesive sealant. Coat ribbed area of boot (19) with lithium grease.
22. Install solenoid (17) on starter motor frame (4) with four capscrews (18). Tighten capscrews (18) to 50 lb-in. (6 N·m).



18-4. STARTER REPAIR (Cont'd)

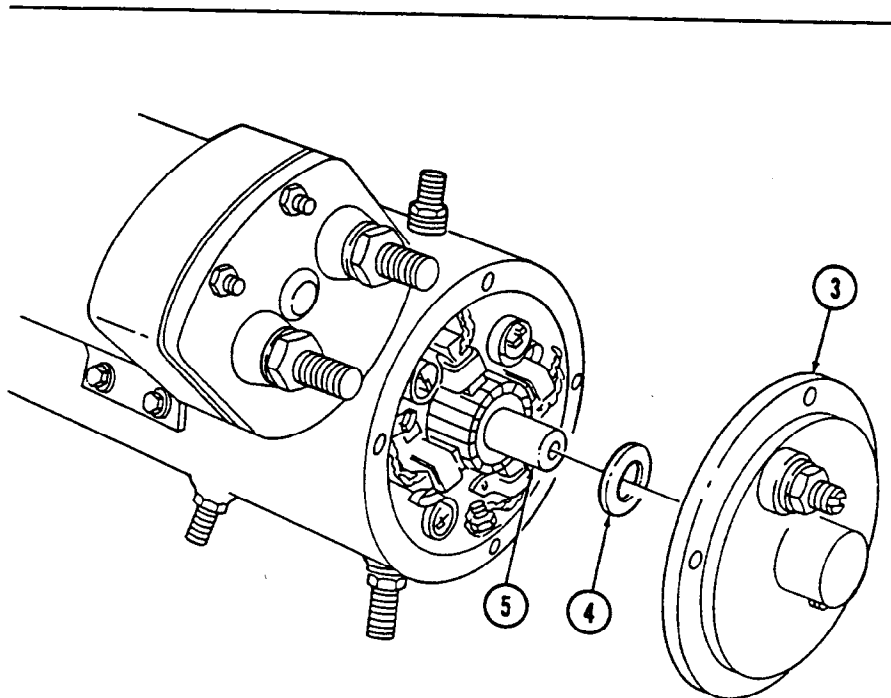
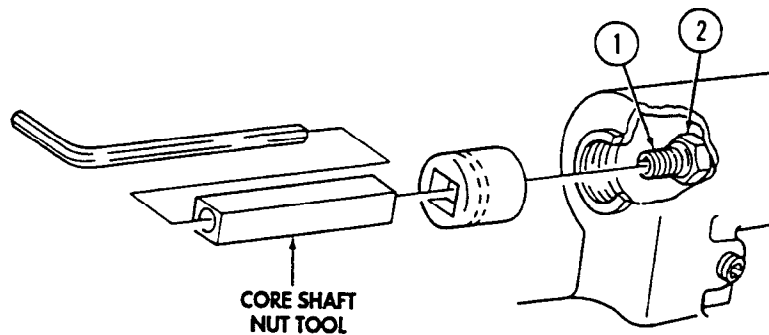


18-4. STARTER REPAIR (Cont'd)

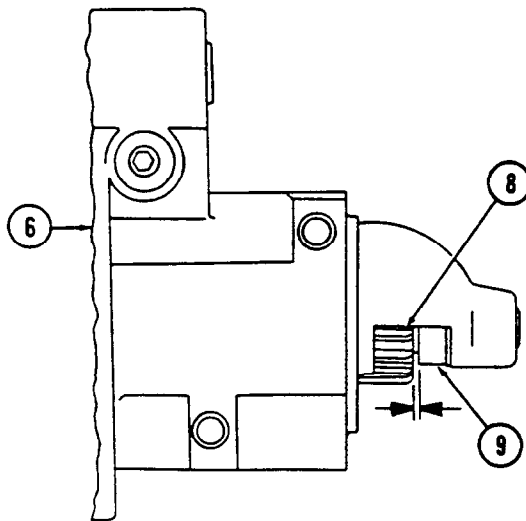
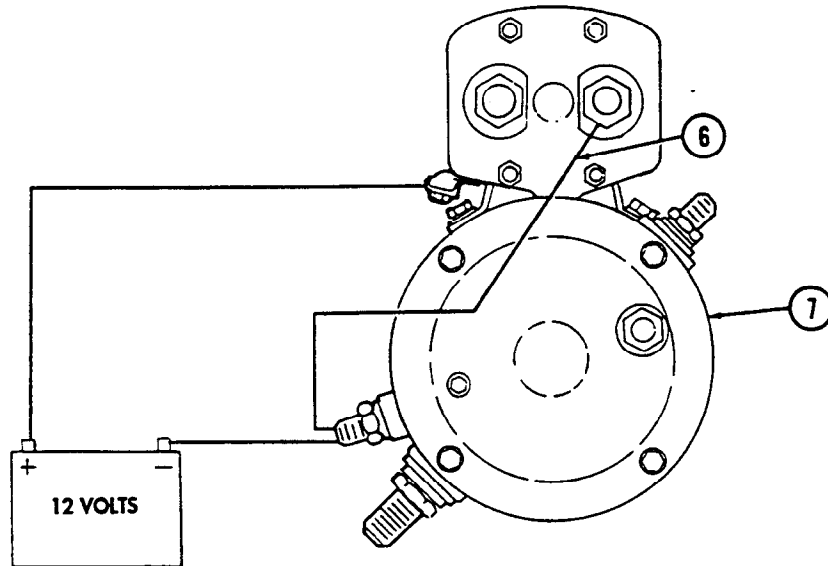
23. Using core shaft nut tool, install locknut (2) on core shaft (1).

e. Bench Testing and Adjustment

1. Adjust armature end play to 0.005-0.030 in. (0.127-0.762 mm) by removing commutator end frame (3) and adding or removing thrust washer(s) (4) on commutator end of armature shaft (5).
2. Connect 12 volts (not 24 volts) direct current to starter motor (7). Momentarily connect jumper lead (6) as shown. This will shift pinion (8) into cranking position until battery is disconnected.
3. Push pinion (8) towards commutator end of starter motor (6) to end of travel, and measure distance between outside edge of pinion (8) and pinion stop (9). End play must be 0.020-0.050 in. (0.508-1.27 mm). Adjust end play by turning core shaft locknut (2) in or out.

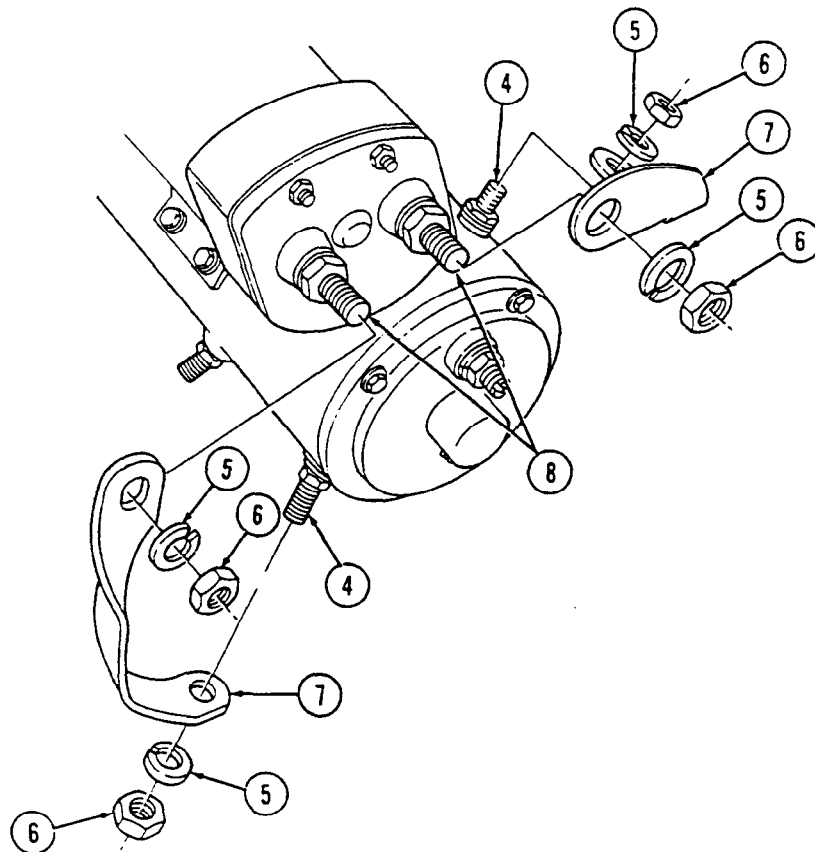
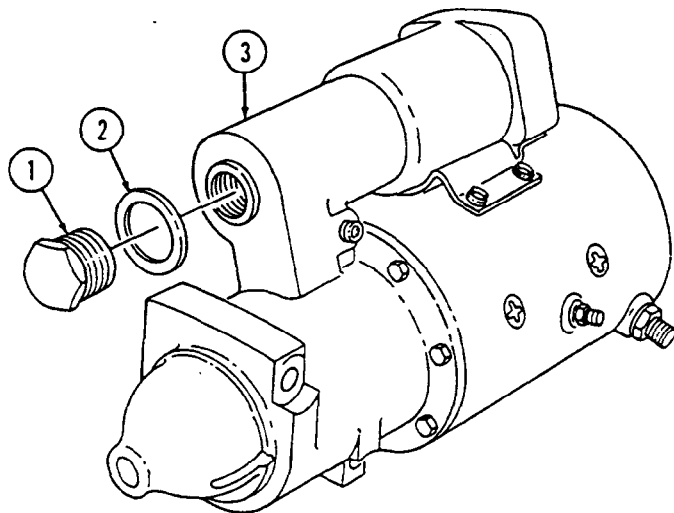


18-4. STARTER REPAIR (Cont'd)



18-4. STARTER REPAIR (Cont'd)

- 4. Install gasket (2) and plug (1) on pinion housing (3).
- 5. Install two solenoid lead connectors (7) on solenoid terminals (8) and starter motor terminals (4) with four lockwashers (5) and nuts (6).



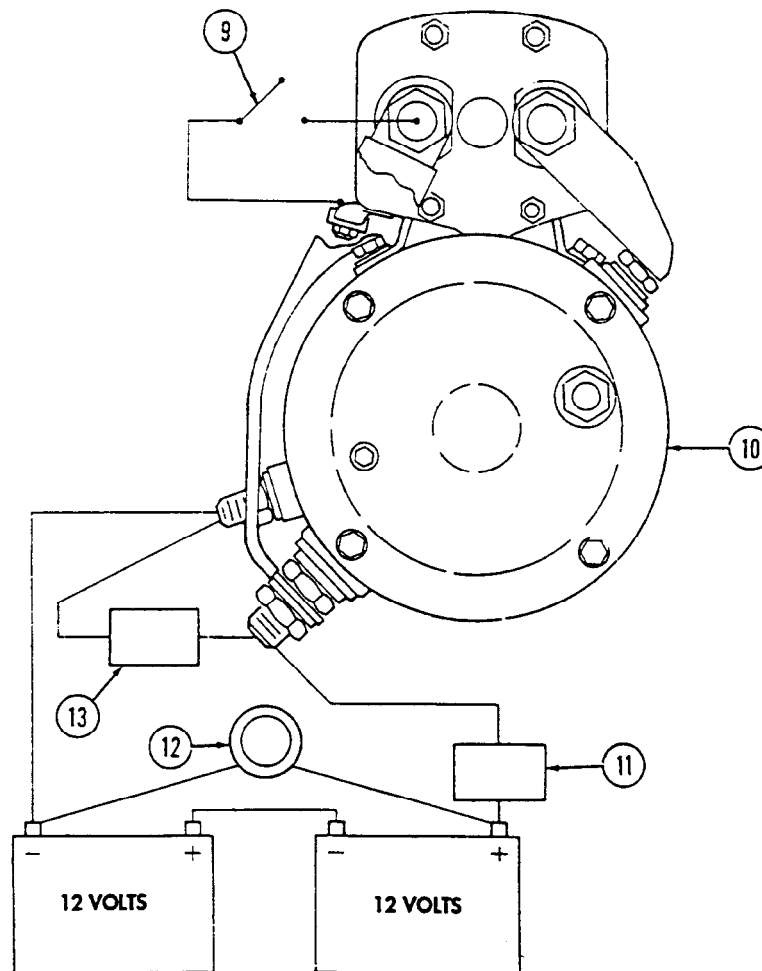
18-4. STARTER REPAIR (Cont'd)

6. Connect 24 volts direct current to starter motor (10).

CAUTION

Do not operate starter motor for more than 30 seconds at a time.
Allow starter motor to cool at least 2 minutes between tests, or
damage to starter motor may result.

7. Close switch (9), adjust voltage to 20 volts on voltmeter (13) using carbon pile (12), and check rotating speed of armature with tachometer. Check current draw on ammeter (11).
8. Maximum current draw should be 65 amperes with a minimum armature speed of 5,000 rpm. If low-speed, high-current draw condition exists, check bearing alignment or inspect armature for shorts or grounds. If low-speed, low-current draw exists, inspect starter motor for faulty connections or poor brush contact.



FOLLOW-ON TASK: Install starter (para. 4-11).

18-5. STE/ICE-R WIRING HARNESS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Torque adapter, 3/4-in. (Appendix B, Item 134)

Materials/Parts

Five lockwashers (Appendix G, Item 238)
Four nut and lockwasher assemblies
(Appendix G, Item 251)
Antiseize compound (Appendix C, Item 16)

Manual Reference

TM 9-2320-387-24P

Equipment Condition

- Battery holddown removed (para. 4-73).
- Engine access cover removed (para. 10-22).

Maintenance Level

Direct support

a. Removal

NOTE

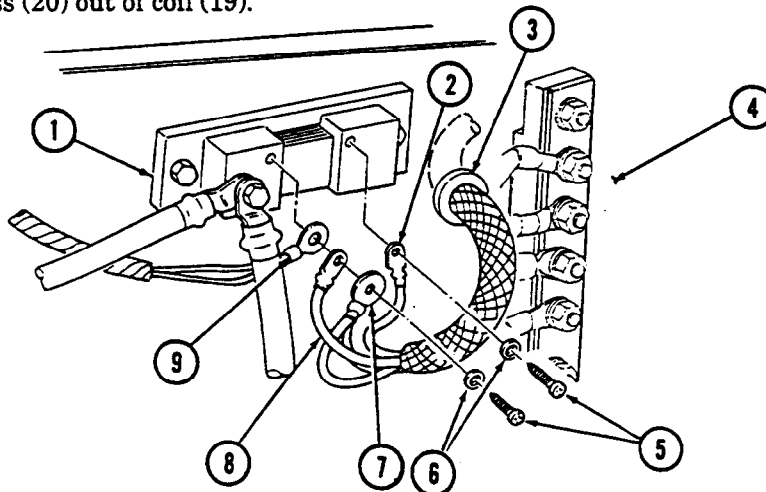
Prior to removal, tag leads for installation.

1. Remove two screws (5), lockwashers (6), and STE/ICE-R harness leads 7B-7D (7), 8A (2), 57T-9A (8), and 599C (9) from shunt (1). Discard lockwashers (6).
2. Slide boot (21) off power stud (22) and remove nut (25), lockwasher (26), and leads 6B-6C (24) and 6A (23) from power stud (22). Discard lockwasher (26).
3. Remove nut (27), lockwasher (28), and lead 3D (16) from starter terminal (29). Discard lockwasher (28).
4. Remove nut (15), lockwasher (14), leads 81A (13), 81B (12), and 6A (23) from starter (11). Discard lockwasher (14).
5. Remove screw (30), clip (31), and leads 74B (32) and 74A (33) from starter solenoid (10).
6. Remove screw (18), clamp (17), and leads 3D (16), 6A (23), 74B (32), and 81A (13) from starter (11).

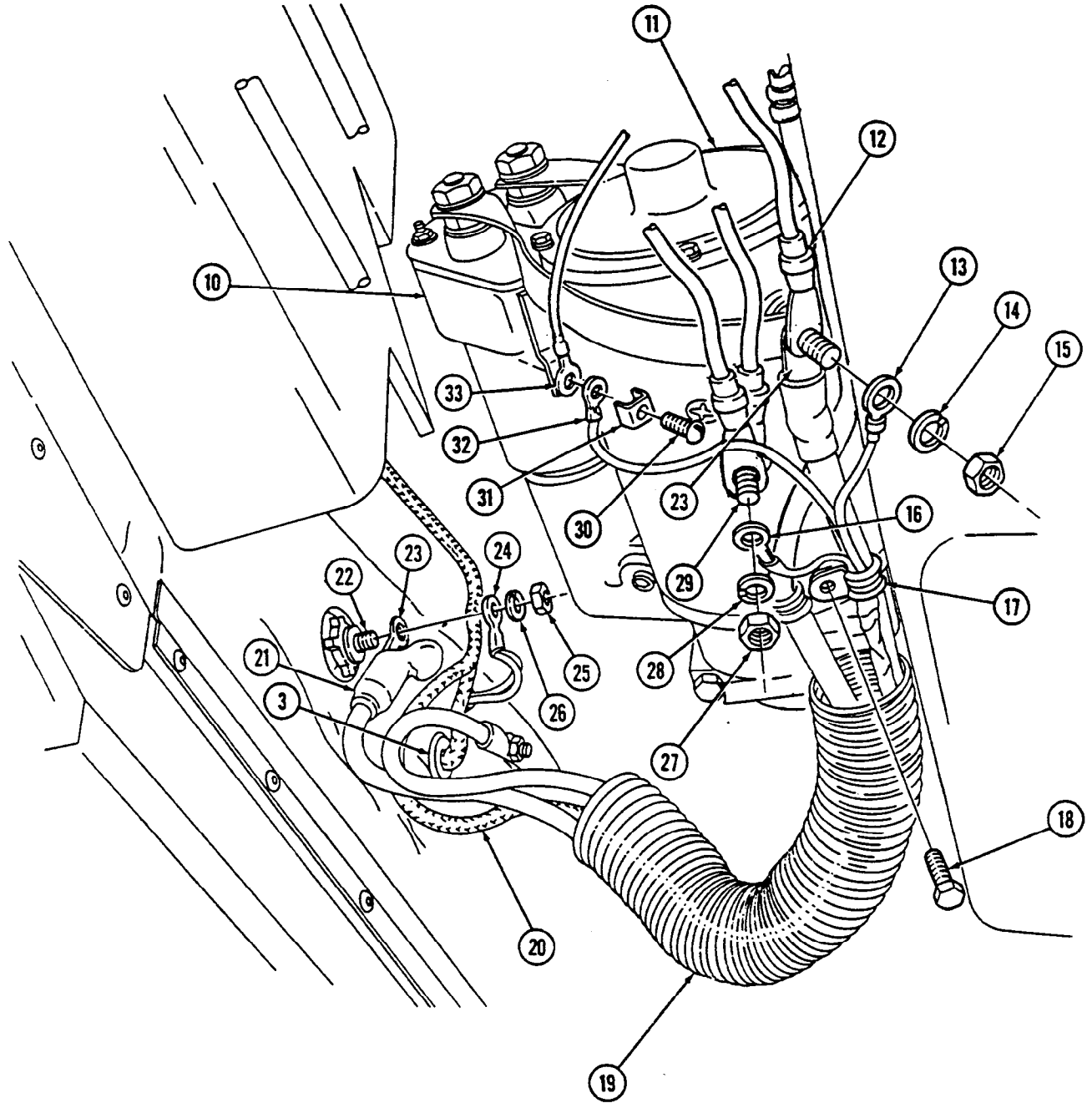
CAUTION

Use care when removing harness. Snagging or pulling may cause damage to harness.

7. Remove harness (20) and grommet (3) from battery compartment (4).
8. Pull harness (20) out of coil (19).



18-5. STE/ICE-R WIRING HARNESS REPLACEMENT (Cont'd)



18-5. STE/ICE-R WIRING HARNESS REPLACEMENT (Cont'd)

9. Remove three screws (2) and clamps (16) from harness (9) and body (1).
10. Remove two screws (10) and clamps (12) from body harness (11), harness (9), and body (1).
11. Disconnect harness connector (18) from rpm sensor connector (19) at right front wheelwell (17).
12. Disconnect harness connector (8) from fuel pressure transducer connector (7).
13. Remove cover (5) from STE/ICE-R Diagnostic Connector Assembly (DCA) cable (6).
14. Remove nut and lockwasher assembly (13), washer (14), harness ground 7C (15), screw (4), and cover retainer (3) from body (1) and DCA cable (6). Discard nut and lockwasher assembly (13).
15. Remove remaining three nut and lockwasher assemblies (13), washers (14), and screws (4) from DCA cable (6) and body (1). Discard nut and lockwasher assemblies (13).
16. Remove DCA cable (6) and harness (9) from body (1).

NOTE

Refer to para. 4-80 for wiring harness connector repair instructions.

17. Repair or replace harness (9).

b. Installation

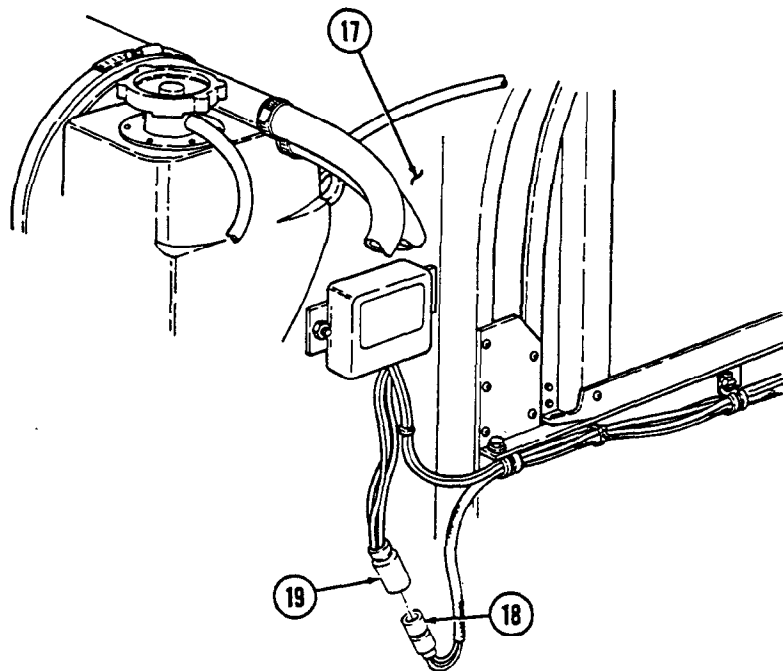
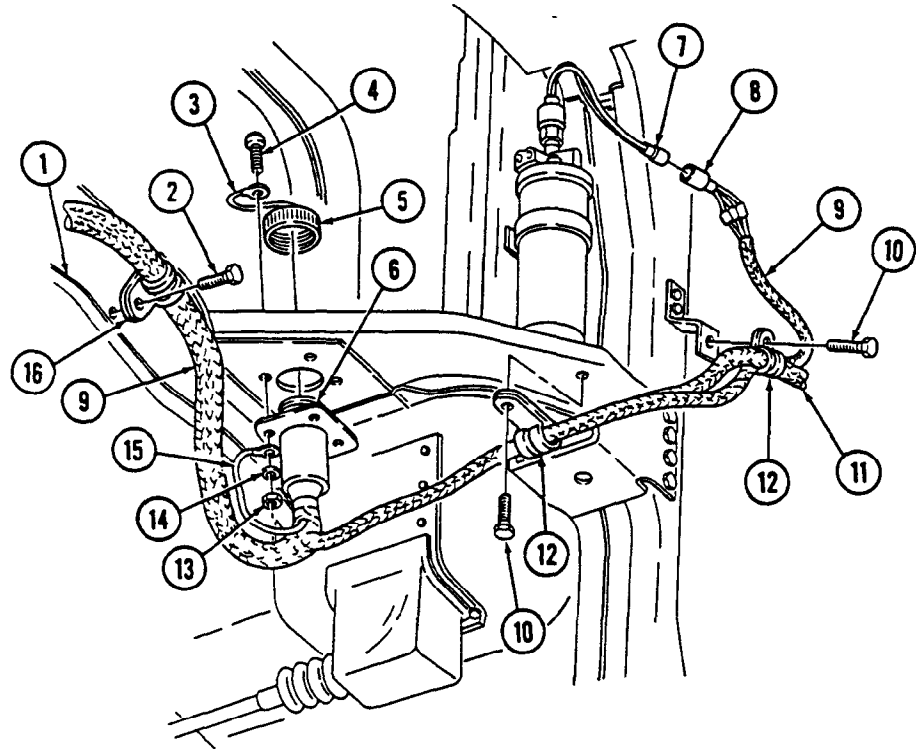
1. Install harness (9) on body (1) in approximate mounting location.

CAUTION

Use care when routing harness. Snagging or pulling may cause damage to harness.

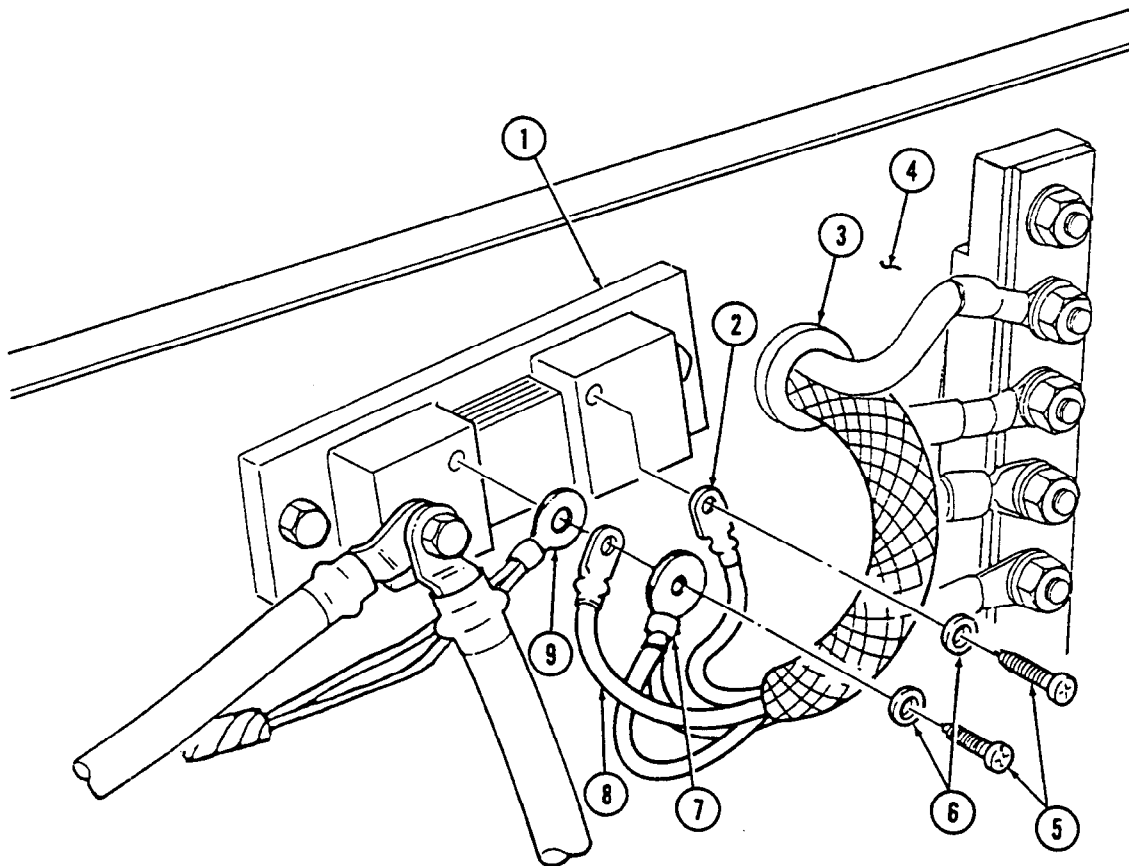
2. Connect harness connector (8) to fuel pressure transducer connector (7).
3. Connect harness connector (18) to rpm sensor connector (19) at right front wheelwell (17).
4. Install harness (9) and body harness (11) on body (1) with two clamps (12) and screws (10). Finger-tighten screws (10).
5. Install DCA cable (6) on body (1) with three screws (4), washers (14), and nut and lockwasher assemblies (13).
6. Apply antiseize compound to harness ground 7C (15) and install cover retainer (3) and harness ground 7C (15) on body (1) and DCA cable (6) with screw (4), washer (14), and nut and lockwasher assembly (13).
7. Install cover (5) on DCA cable (6).
8. Install harness (9) on body (1) with three clamps (16) and screws (2). Finger-tighten screws (2).
9. Tighten screws (2) and (10).

18-5. STE/ICE-R WIRING HARNESS REPLACEMENT (Cont'd)

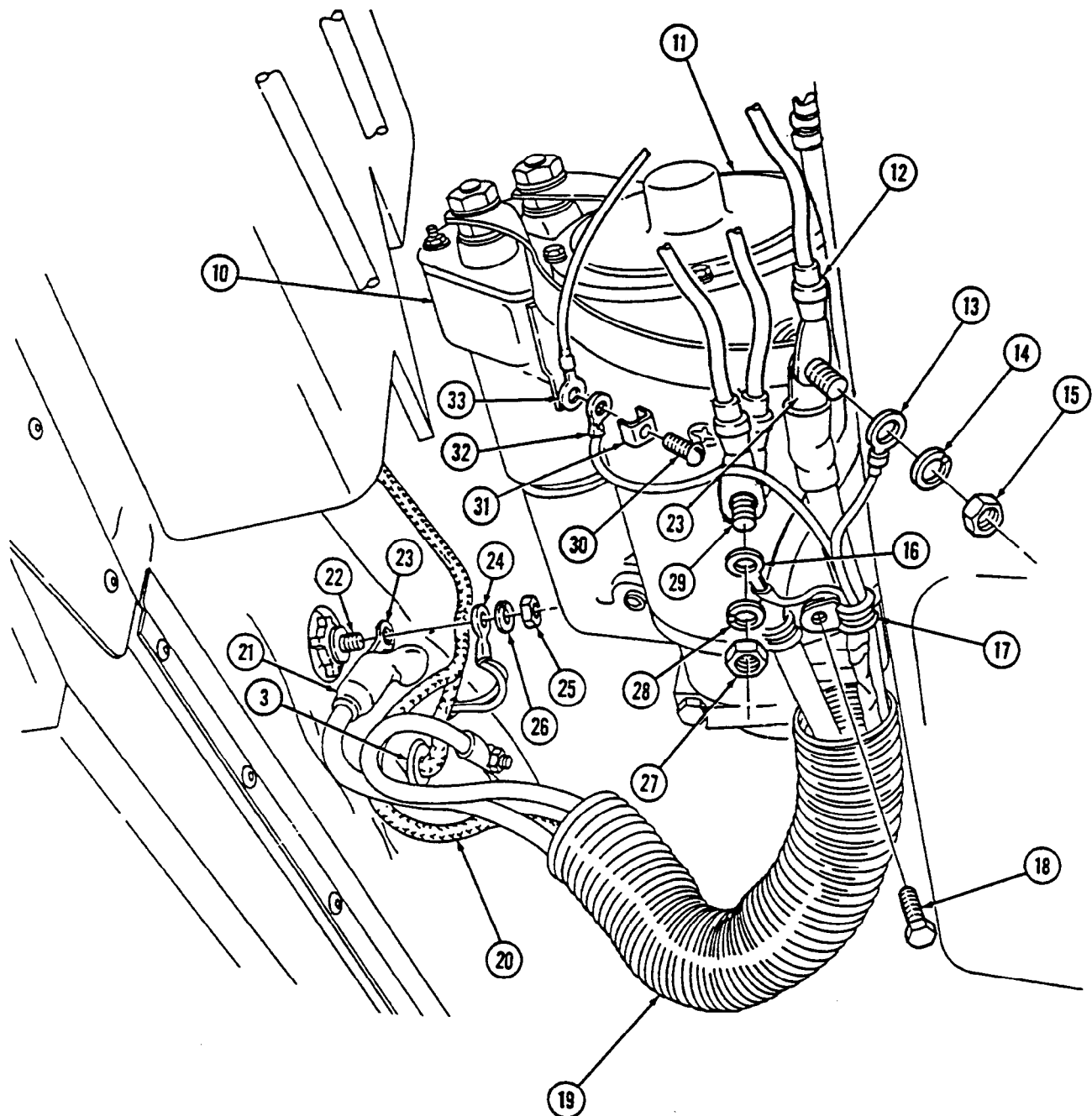


18-5. STE/ICE-R WIRING HARNESS REPLACEMENT (Cont'd)

10. Pull harness (20) through protective coil (19).
11. Insert harness (20) through battery compartment (4) and install grommet (3) on battery compartment (4).
12. Install harness leads 6B-6C (24) and 6A (23) on power stud (22) with lockwasher (26) and nut (25). Slide boot (21) over power stud (22).
13. Install harness lead 8A (2) on right side of shunt (1) with lockwasher (6) and screw (5).
14. Install harness leads 599C (9), 57T-9A (8), and 7B-7D (7) on left side of shunt (1) with lockwasher (6) and screw (5).
15. Install leads 74A (33) and 74B (32) on starter solenoid (10) with clip (31) and screw (30).
16. Install harness lead 3D (16) on starter terminal (29) with lockwasher (28) and nut (27).
17. Install harness leads 6A (23), 81B (12), and 81A (13) on starter (11) with lockwasher (14) and nut (15).
18. Install leads 3D (16), 6A (23), 74B (32), and 81A (13) on starter (11) with clamp (17) and screw (18).
19. Tighten nut (27) to 15-20 lb-ft (20-27 N·m). Using torque adapter, tighten nut (15) to 25-30 lb-ft (34-41 N·m).



18-5. STE/ICE-R WIRING HARNESS REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install engine access cover (para. 10-22).
 - Install battery holddown (para. 4-73).
 - Perform STE/ICE-R G01, VTM connections and checkout test (para. 2-46).

18-6. ENGINE WIRING HARNESS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive and repair: field
 maintenance, basic (Appendix B, Item 6)

Special Tools

Torque adapter, 3/4-in. (Appendix B, Item 134)

Materials/Parts

Eight lockwashers (Appendix G, Item 205)
 Two nut and lockwasher assemblies
 (Appendix G, Item 251)
 Locknut (M1114) (Appendix G, Item 172)
 Adhesive sealant (Appendix C, Item 13)
 Silicone compound (Appendix C, Item 73)
 Antiseize compound (Appendix C, Item 16)
 Grease (Appendix C, Item 33)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (TM 9-2320-387-10).
- Battery ground cables disconnected (para. 4-68).
- Engine access cover removed (para. 10-22).
- Air horn removed (para. 3-14).

Maintenance Level

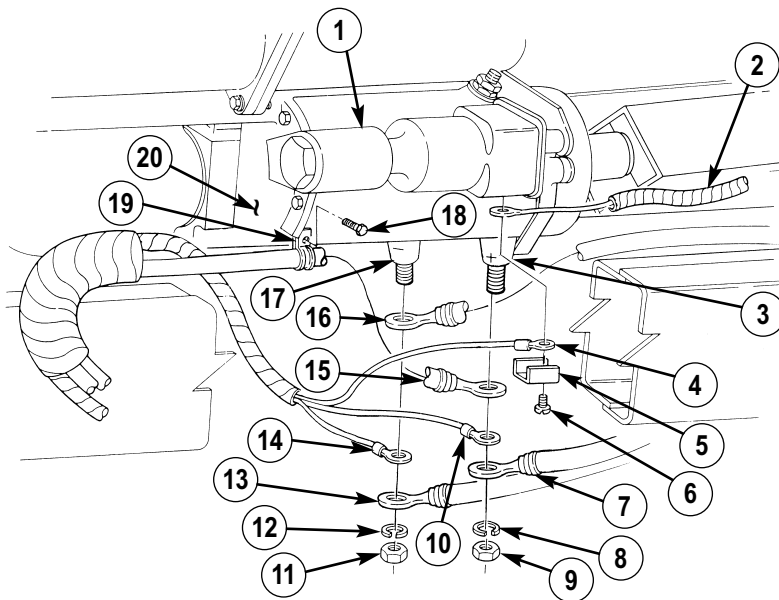
Direct support

a. Removal

NOTE

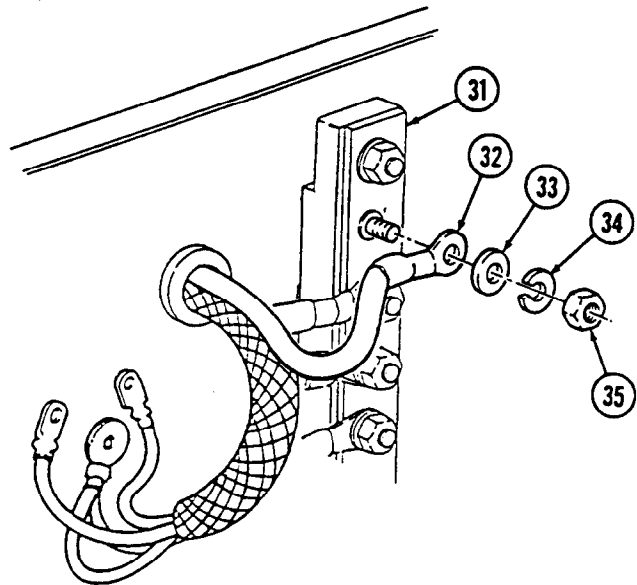
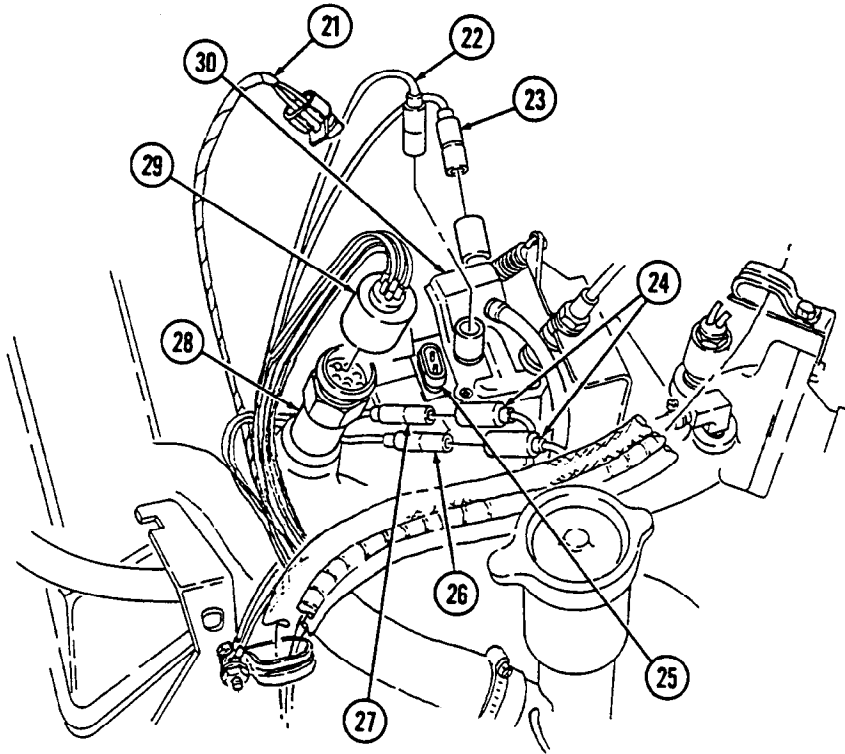
Prior to removal, tag leads for installation.

1. Remove screw (6), clip (5), and two leads 74A (4) and 74B (2) from starter solenoid (1).
2. Remove nut (9), lockwasher (8), winch cable 6W (7), if equipped, lead 81B (10), and battery cable 6A (15) from starter positive terminal (3). Discard lockwasher (8).
3. Remove nut (11), lockwasher (12), winch cable 7W (13), if equipped, lead 3D (14), and battery cable 7A (16) from starter negative terminal (17). Discard lockwasher (12).
4. Remove screw (18), clamp (19), and battery cable 6A (15) from starter motor (20).
5. Remove nut (35), lockwasher (34), washer (33), and lead 81A (32) from buss bar (31). Discard lockwasher (34).



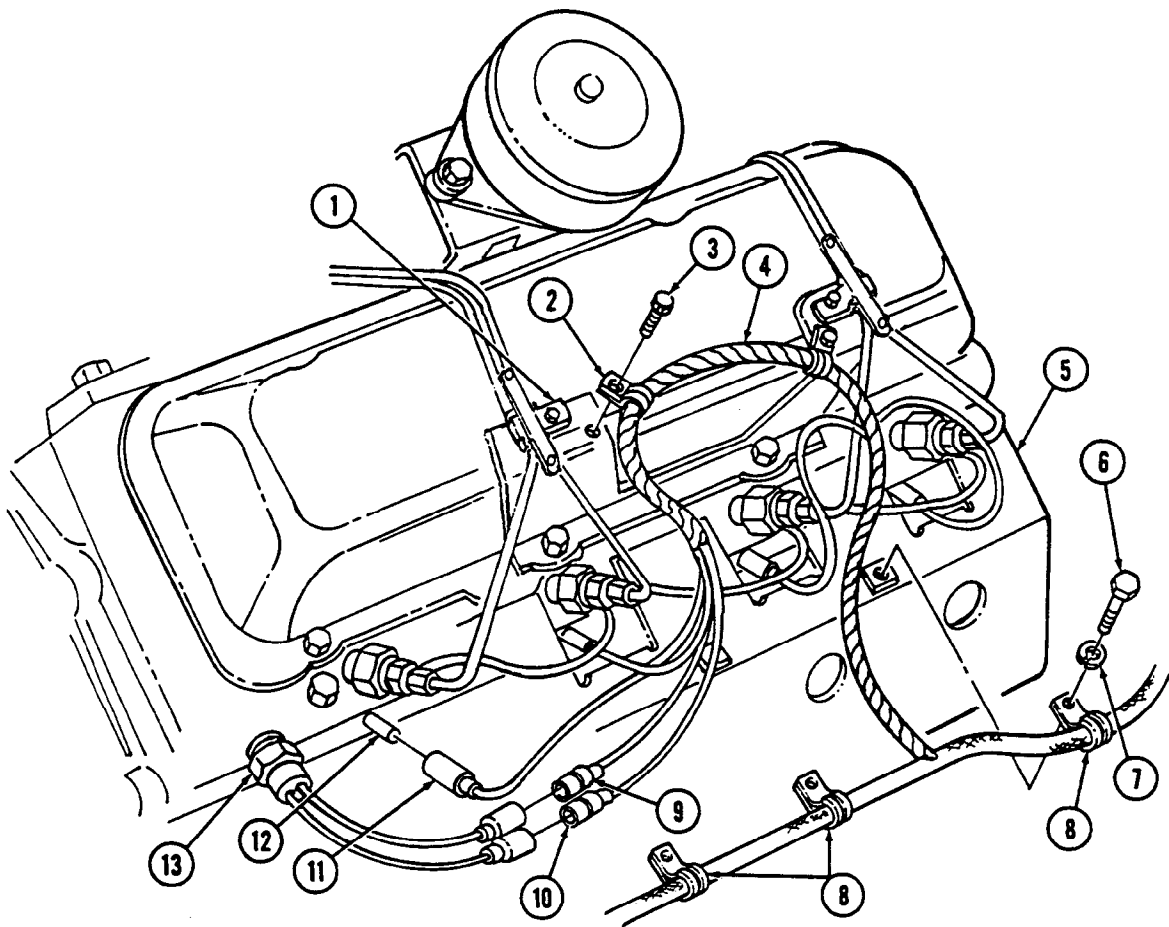
18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

6. Disconnect harness connector (21) from Throttle Position (TP) sensor (25).
7. Disconnect harness connector (29) from glow plug controller (28).
8. Disconnect leads 315A (27) and 315B (26) from fan cut-off switch leads (24).
9. Disconnect leads 54A (22) and 569B (23) from fuel injection pump (30).



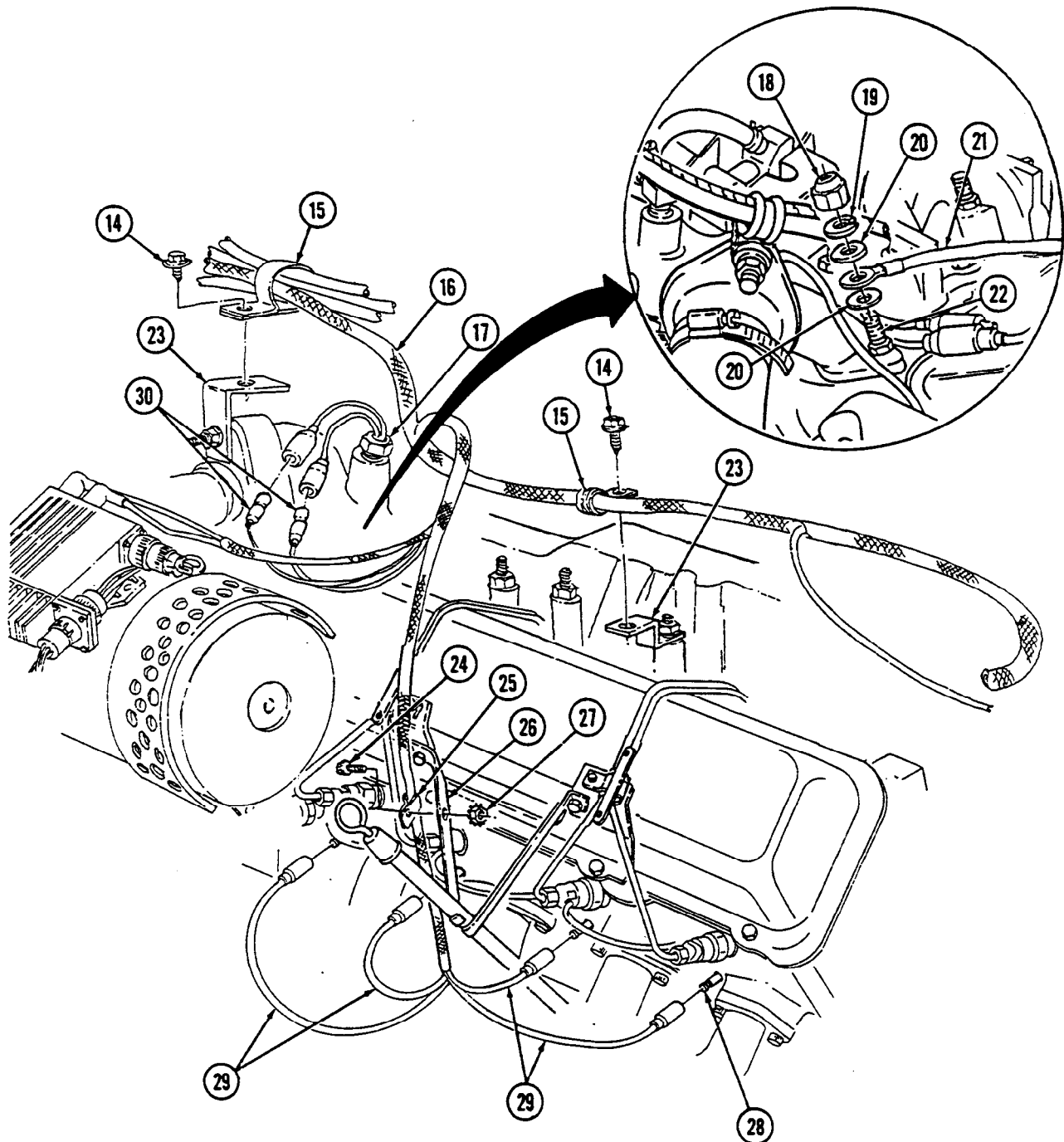
18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

10. Disconnect leads 569A (9) and 569B (10) from cold-advance switch (13).
11. Disconnect four harness leads (11) from glow plugs (12).
12. Remove three capscrews (6), lockwashers (7), clamps (8), and harness (4) from heat shield (5). Discard lockwashers (7).
13. Remove two screws (3), clamps (2), and harness (4) from bracket (1).



18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

14. Remove two screws (14), clamps (15), and harness (16) from brackets (23).
15. Remove nut (18), lockwasher (19), washer (20), ground lead (21), and washer (20) from stud (22). Discard lockwasher (19).
16. Remove nut and lockwasher assembly (27), capscrew (24), clamp (25), and harness (16) from dipstick mounting bracket (26). Discard nut and lockwasher assembly (27).
17. Disconnect four harness leads (29) from glow plugs (28).
18. Disconnect two harness connectors (30) from water temperature sending unit (17).

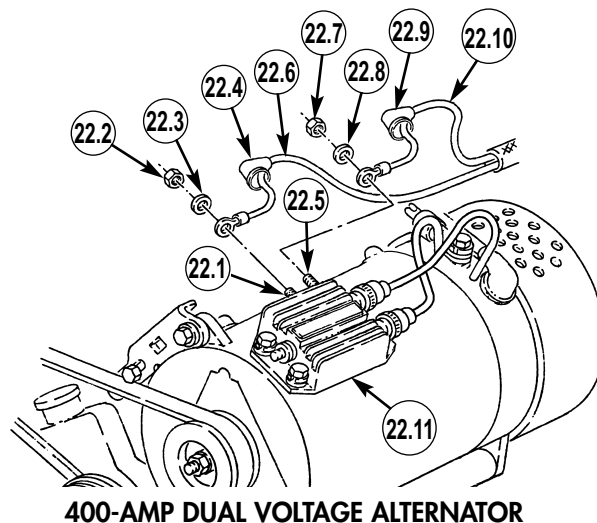
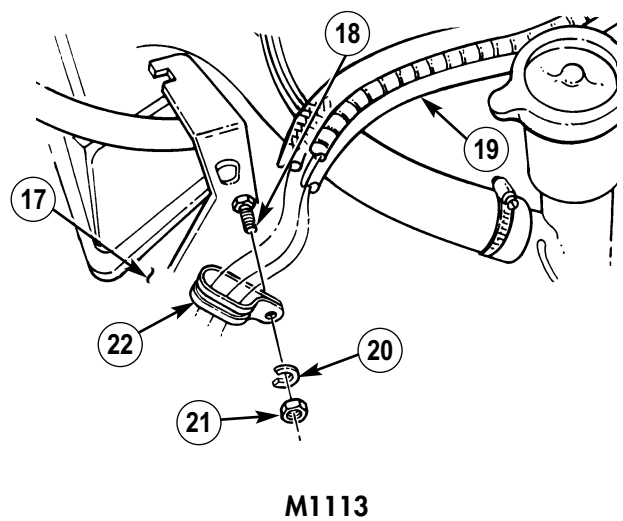
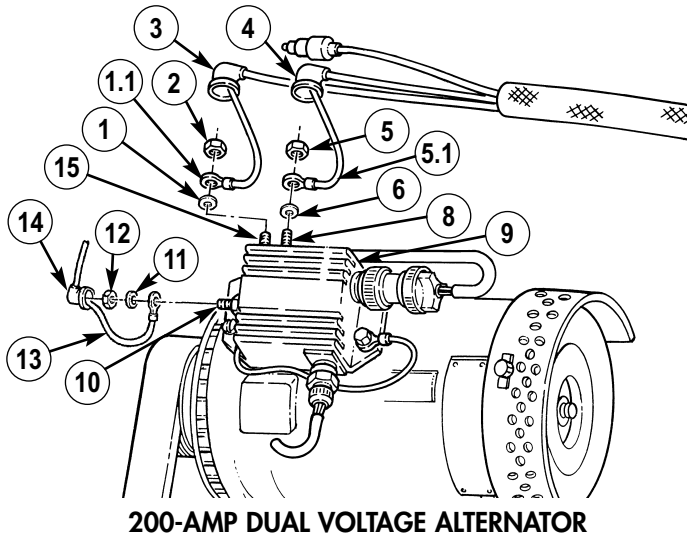


18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

NOTE

- Perform steps 19 through 21 for 200-amp dual voltage alternators only.
- Perform steps 21.1 and 21.2 for 400-amp dual voltage alternators only.

19. Slide back rubber boot (3) and remove nut (2), lead 568 (1.1), and washer (1) from IGN terminal (15) on voltage regulator (9).
20. Slide back rubber boot (4) and remove nut (5), lead 2A (5.1), and washer (6) from AC terminal (8) on voltage regulator (9).
21. Slide back rubber boot (14) and remove nut (12), washer (11), and lead 68A (13) from terminal (10) on voltage regulator (9).
- 21.1. Slide back rubber boot (22.9) and remove nut (22.7), washer (22.8), and lead 5A (22.10) from red terminal (22.5) on voltage regulator (22.11).
- 21.2. Slide back rubber boot (22.4) and remove nut (22.2), washer (22.3), and lead 2A (22.6) from yellow terminal (22.1) on voltage regulator (22.11).

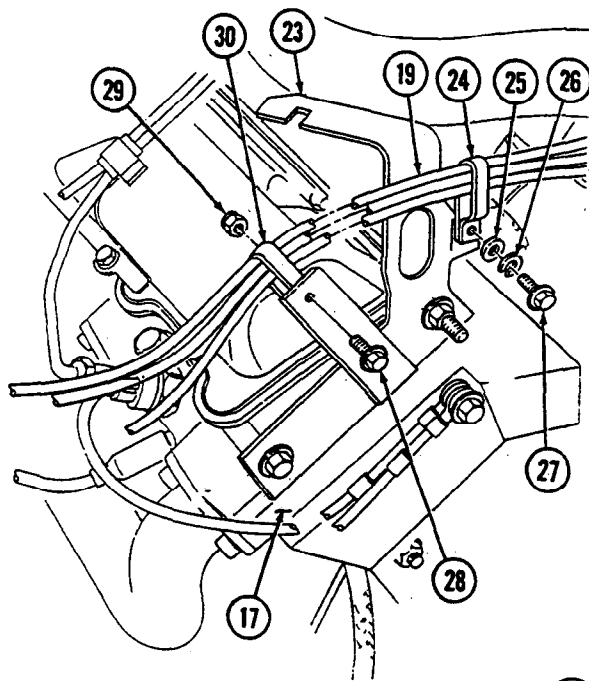


18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

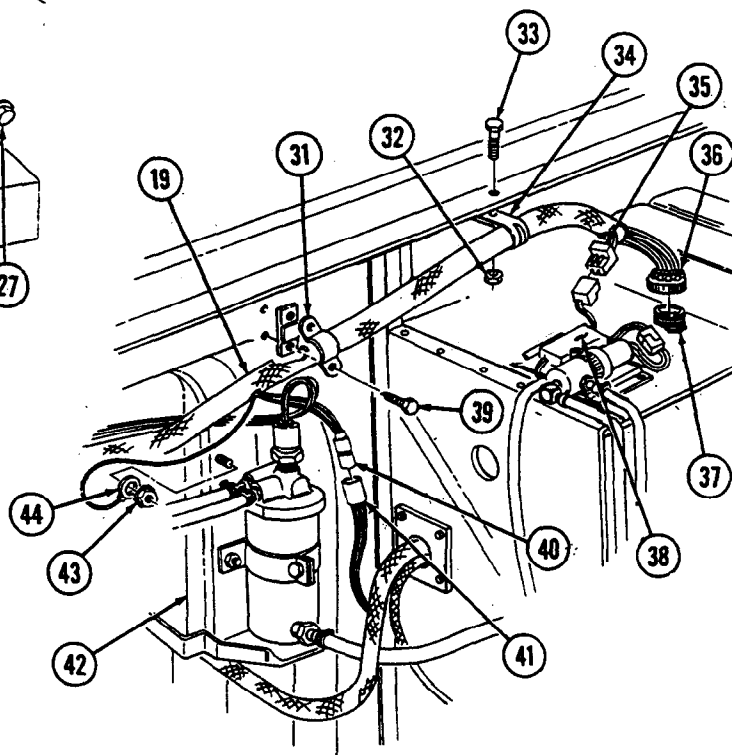
NOTE

Perform step 22 for M1113 models. Perform steps 23 and 24 for M1114 models.

22. Remove nut (21), lockwasher (20), clamp (22), and harness (19) from stud (18) on right front cylinder head (17). Discard lockwasher (20).
23. Remove capscrew (27), lockwasher (26), washer (25), and clamp (24) from bracket (23) on right cylinder head (17). Discard lockwasher (26).
24. Remove locknut (29), clamp (30), harness (19), and screw (28) from bracket (23) on right cylinder head (17). Discard locknut (29).
25. Remove nut and lockwasher assembly (43) and lead 3C (44) from body (42). Discard nut and lockwasher assembly (43).
26. Remove two capscrews (39), clamp (31), and harness (19) from body (42).
27. Remove nut (32), capscrew (33), clamp (34), and harness (19) from body (42).
28. Disconnect harness connector (35) from fan clutch time delay (38).
29. Disconnect harness connector (36) from protective control box receptacle (37).
30. Disconnect body harness (41) from harness connector (40).
31. Remove harness (19) from body (42).



M1114



18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

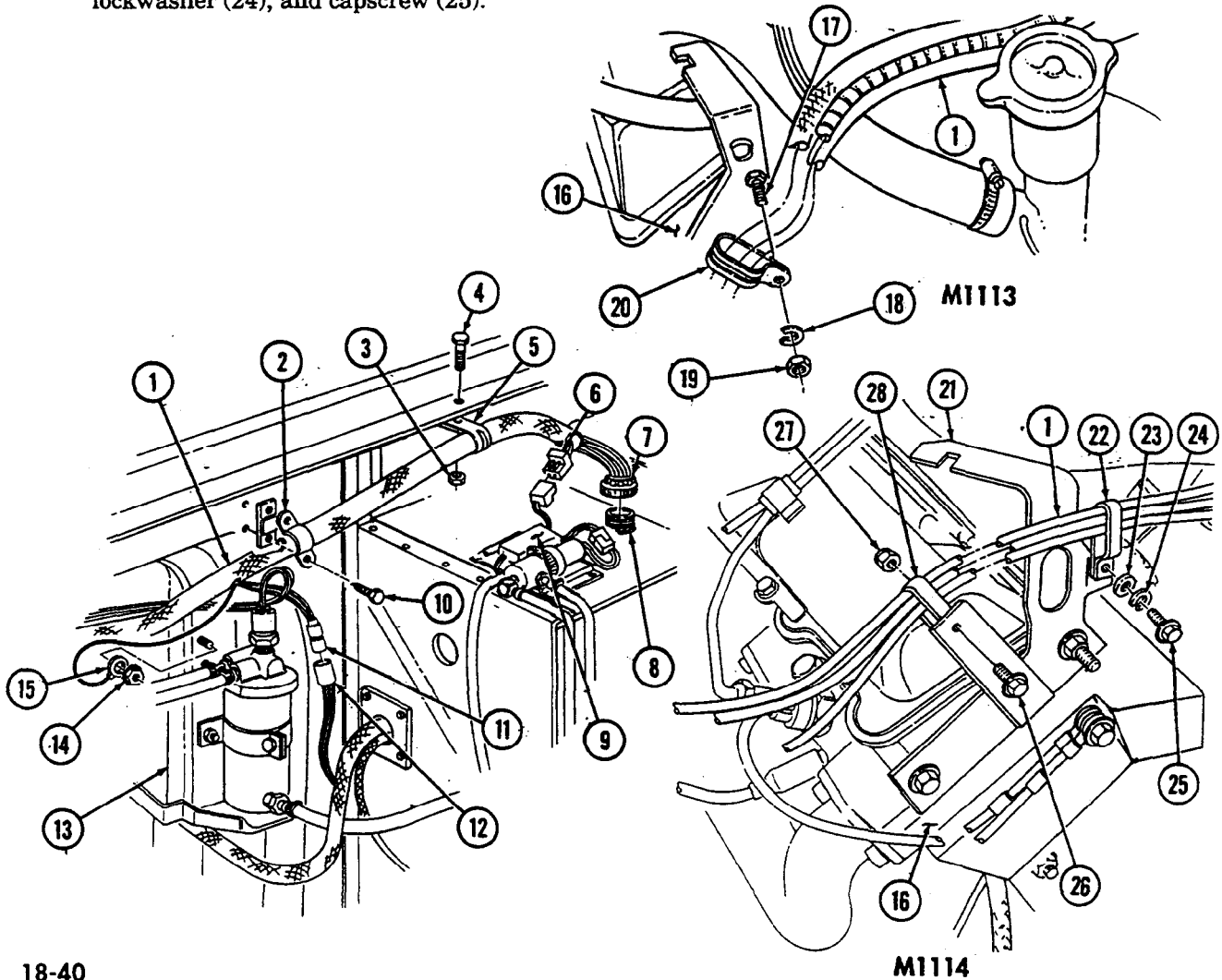
b. Installation

1. Position harness (1) in approximate mounting location.
2. Connect body harness (12) to harness connector (11).
3. Connect harness connector (7) to protective control box receptacle (8).
4. Connect harness connector (6) to fan clutch time delay (9).
5. Install harness (1) on body (13) with clamp (2) and two capscrews (10).
6. Install harness (1) on body (13) with clamp (5), capscrew (4), and nut (3).
7. Apply antiseize compound to lead 3C (15), and install lead 3C (15) on body (13) with nut and lockwasher assembly (14).

NOTE

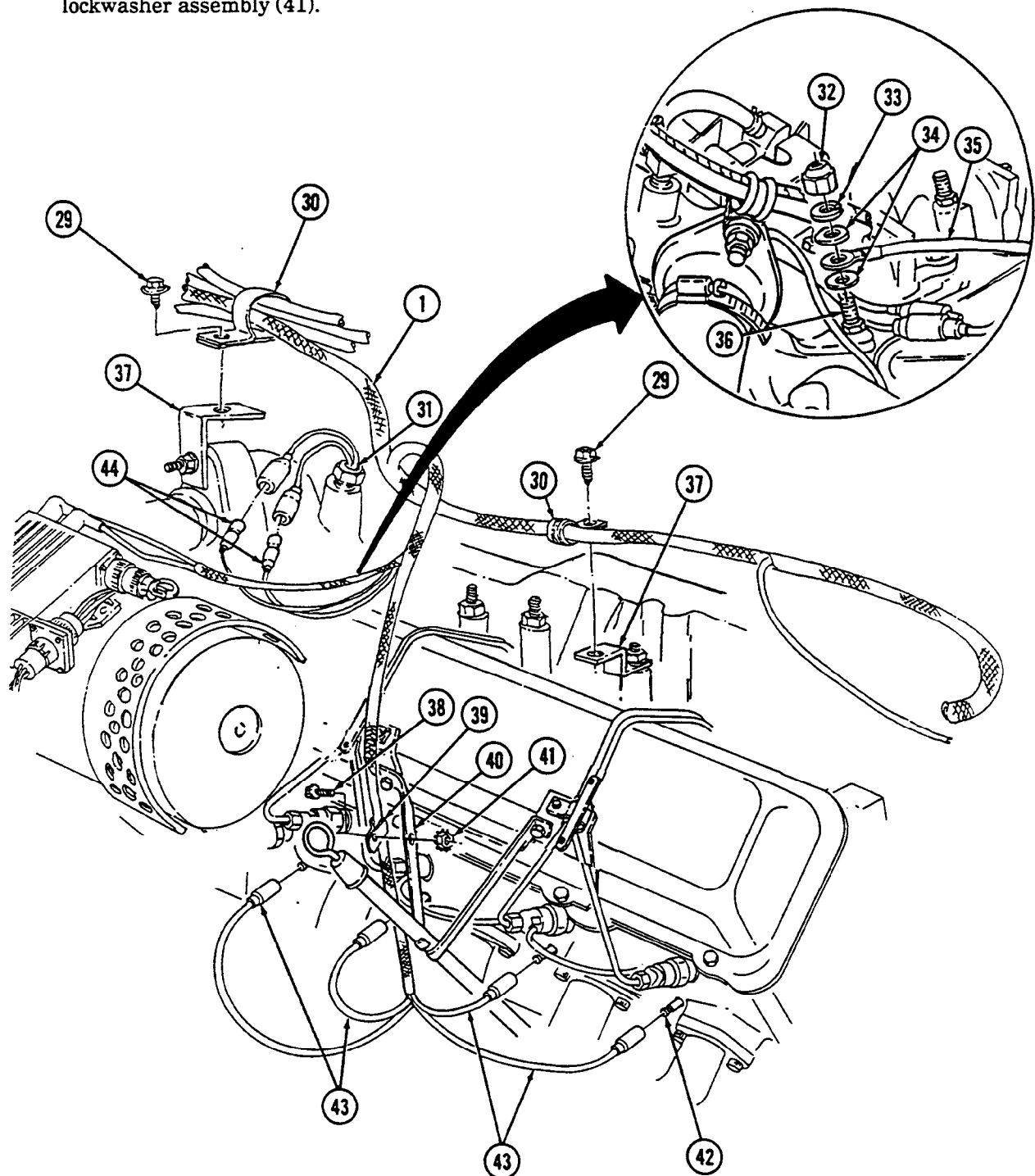
Perform step 8 for M1113 models. Perform steps 9 and 10 for M1114 models.

8. Install harness (1) on stud (17) at right cylinder head (16) with clamp (20), lockwasher (18), and nut (19).
9. Install harness (1) on back side of bracket (21) at right cylinder head (16) with clamp (28), screw (26), and locknut (27).
10. Install harness (1) on bracket (21) at right cylinder head (16) with clamp (22), washer (23), lockwasher (24), and capscrew (25).



18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

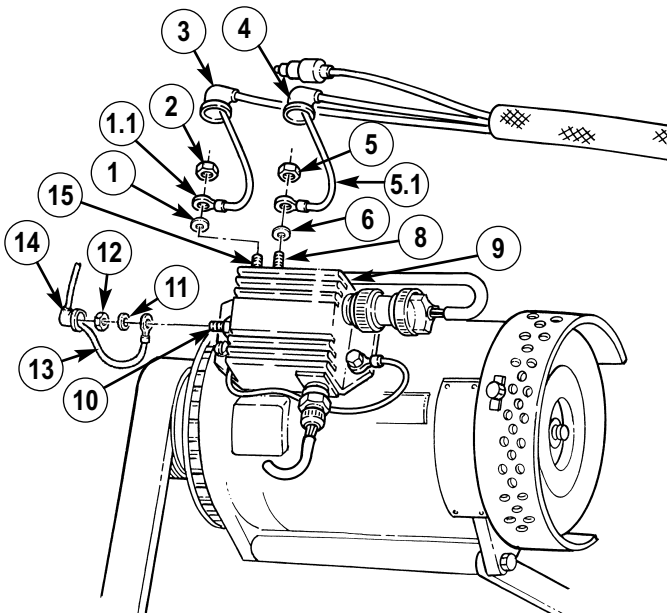
11. Connect four harness leads (43) to glow plugs (42).
12. Connect two harness leads (44) to engine temperature sending unit (31).
13. Install harness (1) on two brackets (37) with clamps (30) and screws (29).
14. Install washer (34), ground lead (35), washer (34), lockwasher (33), and nut (32) on stud (36).
15. Install harness (1) on dipstick mounting bracket (40) with clamp (39), capscrew (38), and nut and lockwasher assembly (41).



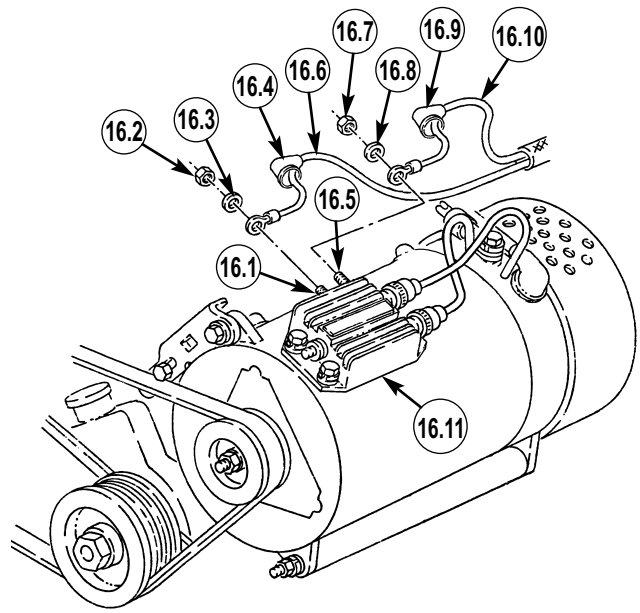
18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

NOTE

- Perform steps 16 through 18 for 200-amp dual voltage alternators only.
 - Perform steps 18.1 through 18.4 for 400-amp dual voltage alternators only.
16. Install lead 68A (13), washer (11), and nut (12) on terminal (10) of voltage regulator (9). Tighten nut (12) to 18-22 lb-in. (2.0-2.5 N·m). Slide rubber boot (14) over terminal (10).
 17. Install washer (1), lead 568 (1.1), and nut (2) on IGN terminal (15) of voltage regulator (9). Tighten nut (2) to 23-27 lb-in. (2.6-3.0 N·m). Slide rubber boot (3) over terminal (15).
 18. Install washer (6), lead 2A (5.1), and nut (5) on AC terminal (8) of voltage regulator (9). Tighten nut (5) to 18-22 lb-in. (2.0-2.5 N·m). Slide rubber boot (4) over terminal (8).
 - 18.1. Install lead 5A (16.10), washer (16.8), and nut (16.7) on red terminal (16.5) of voltage regulator (16.11). Tighten nut (16.7) to 35 lb-in. (4 N·m).
 - 18.2. Apply grease to red terminal (16.5), lead 5A (16.10), and inside of boot (16.9), and slide boot (16.9) over red terminal (16.5).
 - 18.3. Install lead 2A (16.6), washer (16.3), and nut (16.2) on yellow terminal (16.1) of voltage regulator (16.11). Tighten nut (16.2) to 20 lb-in. (2 N·m).
 - 18.4. Apply grease to yellow terminal (16.1), lead 2A (16.6), and inside of boot (16.4), and slide boot (16.4) over yellow terminal (16.1).



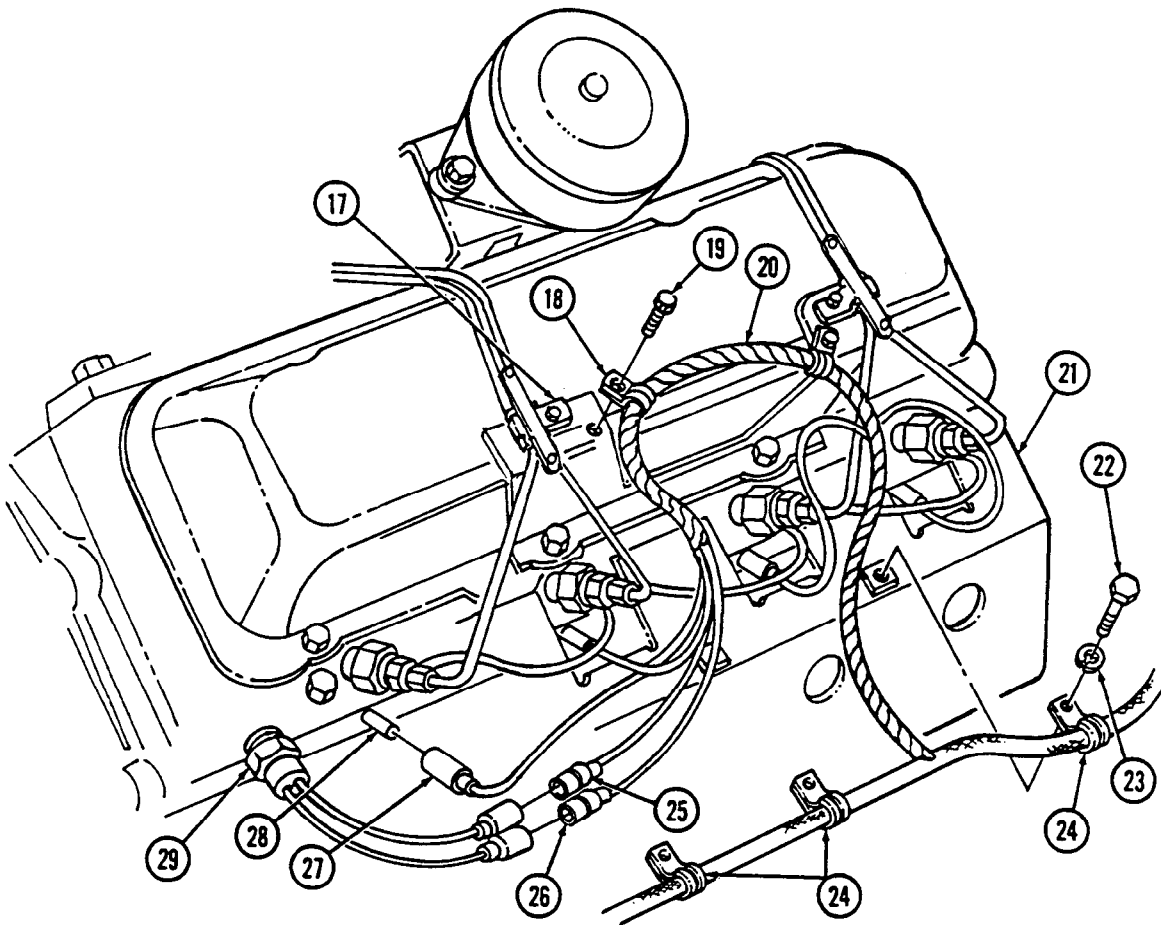
200-AMP DUAL VOLTAGE ALTERNATOR



400-AMP DUAL VOLTAGE ALTERNATOR

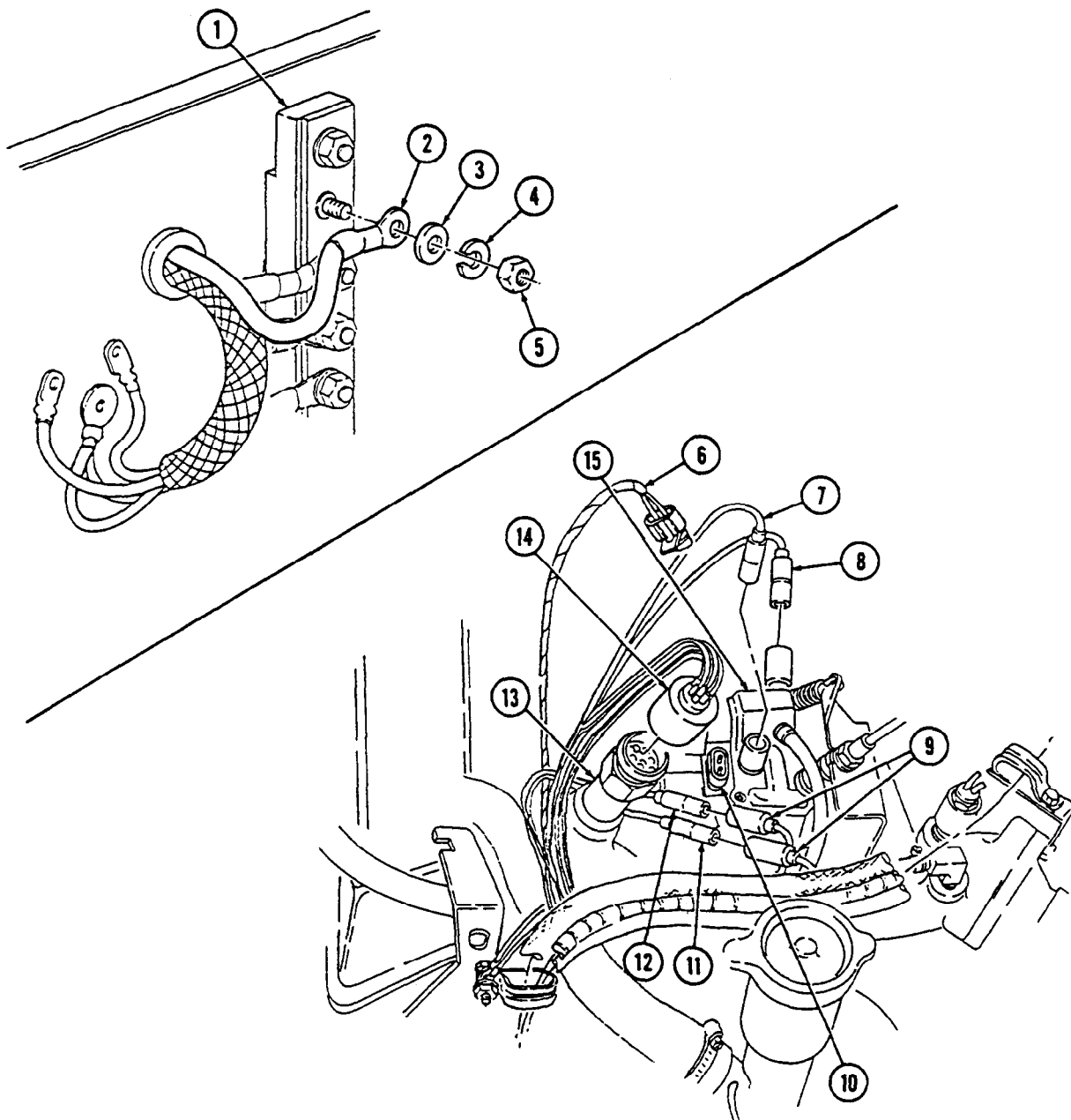
18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

19. Connect four harness leads (27) to glow plugs (28).
20. Connect harness leads 569A (26) and 569B (25) to cold-advance switch (29).
21. Install harness (20) on heat shield (21) with three clamps (24), lockwashers (23), and capscrews (22).
22. Install harness (20) on bracket (17) with two clamps (18) and capscrews (19).



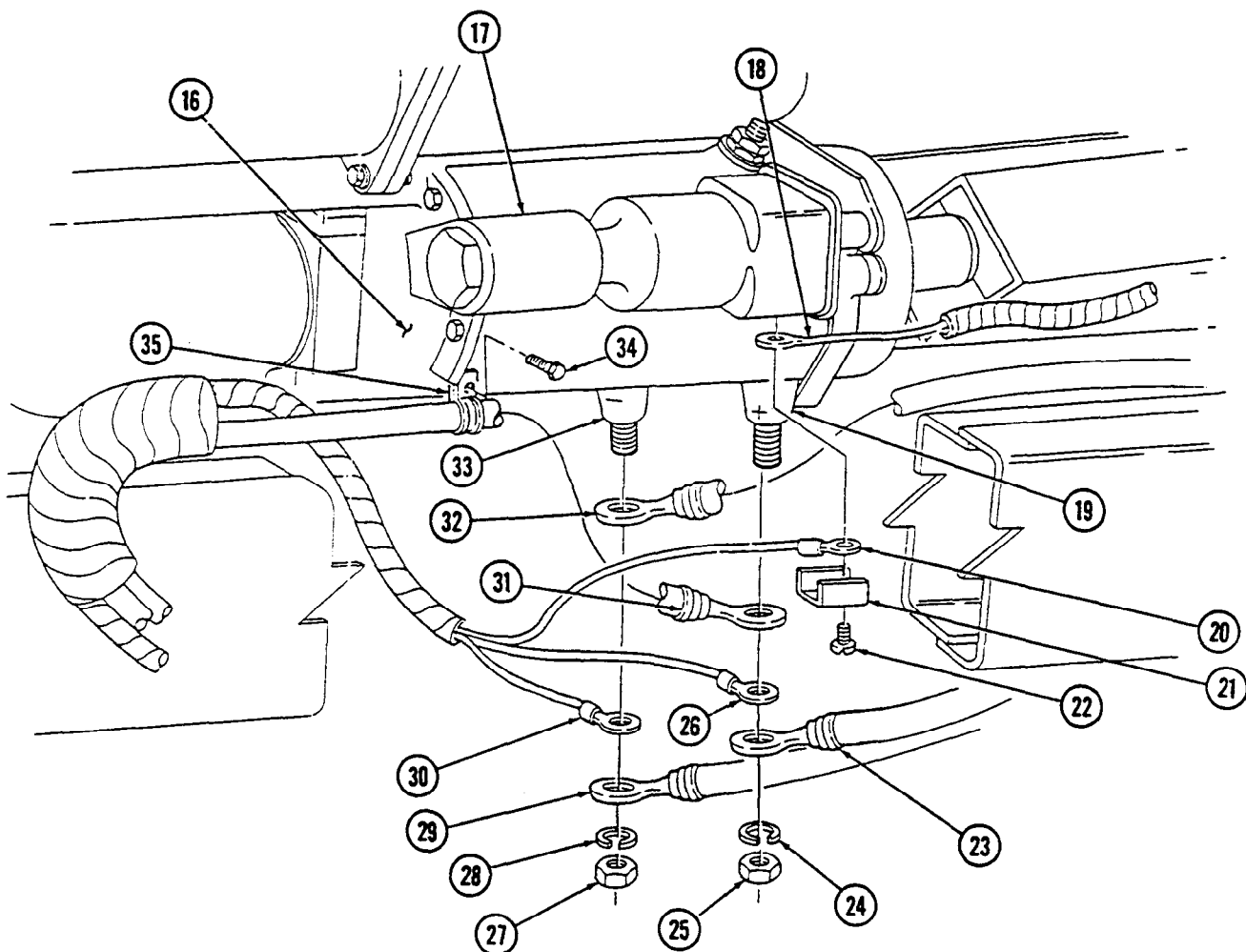
18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

23. Install lead 81A (2) on buss bar (1) with washer (3), lockwasher (4), and nut (5).
24. Connect harness connector (14) to glow plug controller (13).
25. Connect harness leads 315A (12) and 315B (11) to fan cut-off switch leads (9).
26. Connect harness leads 54A (7) and 569B (8) to fuel injection pump (15).
27. Connect harness connector (6) to TP sensor (10).



18-6. ENGINE WIRING HARNESS REPLACEMENT (Cont'd)

28. Install battery cable 7A (32), lead 3D (30), and winch cable 7W (29), if equipped, on starter negative terminal (33) with lockwasher (28) and nut (27). Tighten nut (27) to 39 lb-ft (53 N•m).
29. Install battery cable 6A (31), lead 81B (26), and winch cable 6W (23), if equipped, on starter positive terminal (19) with lockwasher (24) and nut (25). Tighten nut (25) to 39 lb-ft (53 N•m).
30. Install leads 74B (18) and 74A (20) on starter solenoid (17) with clip (21) and screw (22).
31. Install battery cable 6A (31) on starter motor (16) with clamp (35) and screw (34).



- FOLLOW-ON TASKS:**
- Install air horn (para. 3-14).
 - Install engine access cover (para. 10-22).
 - Connect battery ground cables (para. 4-68).
 - Lower and secure hood (TM 9-2320-387-10).
 - Start engine (TM 9-2320-387-10) and check for proper operation.

CHAPTER 19

TRANSMISSION (DS) MAINTENANCE

19-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of transmission components at the direct support maintenance level. Some subassemblies and parts must be removed before transmission system components can be accessed. They are referenced to other paragraphs of this manual.

19-2. TRANSMISSION MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
19-3.	Transmission/Transfer Case Assembly Removal	19-2
19-4.	Transmission/Transfer Case Assembly Installation	19-7
19-5.	Transmission Preparation	19-14

19-3. TRANSMISSION/TRANSFER CASE ASSEMBLY REMOVAL

This task covers:

Removal

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Engine/transmission support sling
(Appendix D, Figs. 81 through 97) (Optional)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Engine access cover removed (para. 10-22).
- Muffler support bracket removed (para. 3-55).
- Rear propeller shaft removed (para. 6-4).
- Sealed upper converter housing cover removed (para. 5-12).
- Transmission oil dipstick removed (para. 5-5).
- Transmission fluid drained (para. 5-2).
- Front propeller shaft removed (para. 6-2).

General Safety Instructions

- Allow transmission/transfer case to cool before performing this task.
- Torque converter and transmission must be removed as an assembly and transmission must be level.
- Do not use hands to free transmission/transfer case assembly of hangups or snags.

Maintenance Level

Direct support

Removal

WARNING

Allow transmission/transfer case to cool before performing this task. Failure to do this may cause injury.

CAUTION

Cover or plug all open lines and connections immediately after disconnection to prevent contamination. Remove all covers or plugs prior to connection.

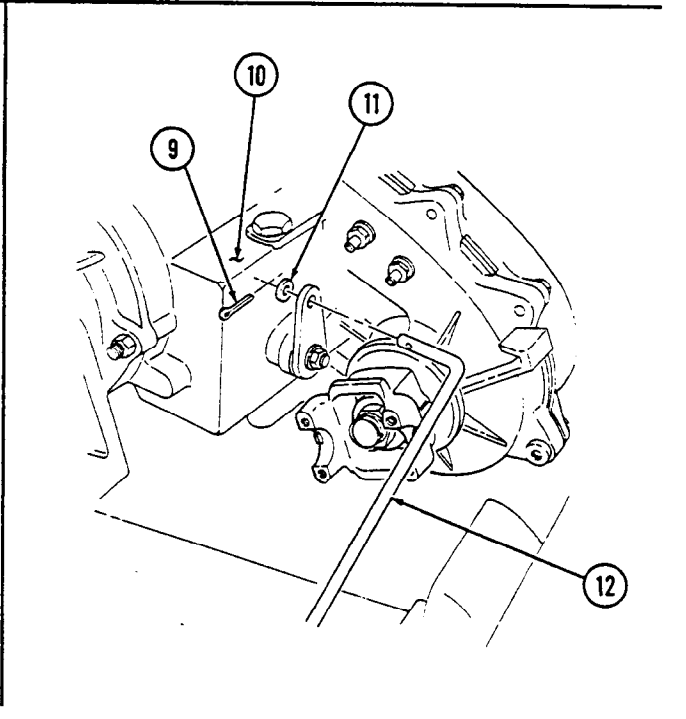
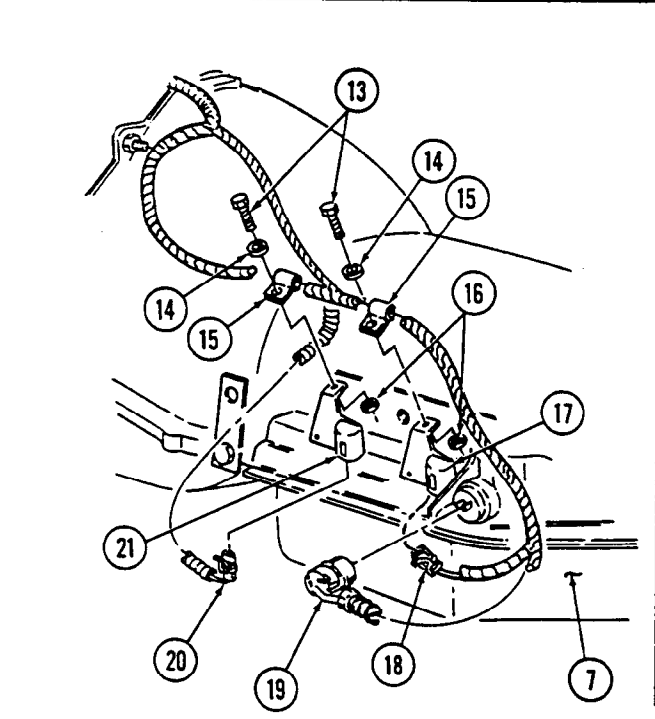
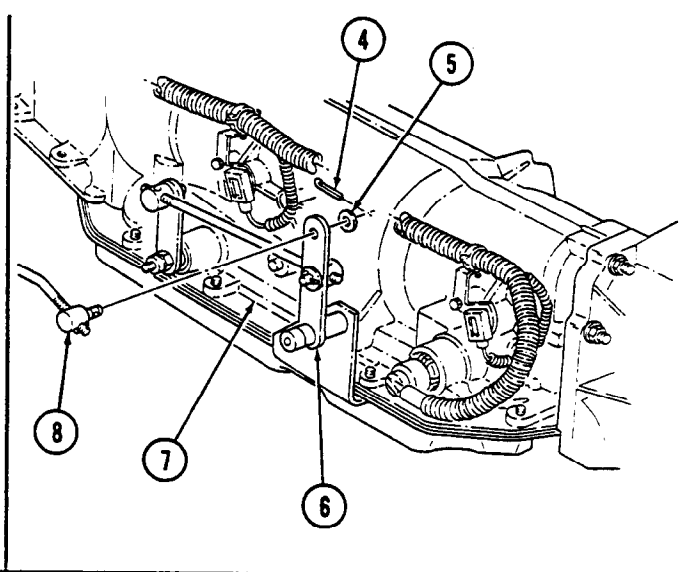
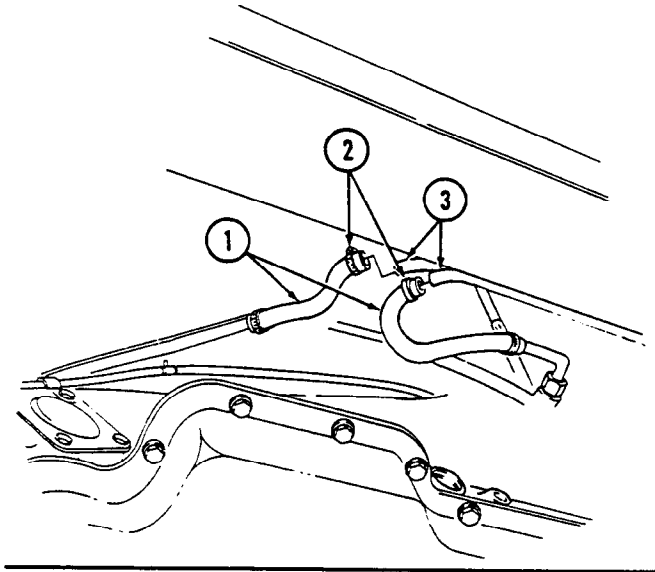
1. Raise and support rear of vehicle (para. 8-2).

NOTE

- Have drainage container ready to catch fluid.
 - Tag hoses for installation.
2. Loosen two hose clamps (2) and disconnect hoses (1) from cooler lines (3).
 3. Remove cotter pin (4), washer (5), and shift rod and trunnion (8) from relay lever (6). Discard cotter pin (4).
 4. Remove cotter pin (9) and washer (11) from transfer case shift rod (12). Disconnect shift rod (12) from transfer case (10). Discard cotter pin (9).

19-3. TRANSMISSION/TRANSFER CASE ASSEMBLY REMOVAL (Cont'd)

5. Disconnect wiring harness connector (19) from transmission (7).
6. Disconnect connectors 495/496 (20) and 497/498 (18) from input speed sensor (21) and output speed sensor (17).
7. Remove two nuts (16), capscrews (13), washers (14), and clamps (15) from sensors (17) and (21).



19-3. TRANSMISSION/TRANSFER CASE ASSEMBLY REMOVAL (Cont'd)

NOTE

It will be necessary to rotate flywheel clockwise from capscrew in front of crankshaft to gain access to capscrews securing torque converter.

8. Remove six capscrews (33) from torque converter (32) and flywheel (34) and slide torque converter (32) away from flywheel (34).

CAUTION

Safety chain must be routed under transmission oil cooler lines and speedometer cable or damage may result.

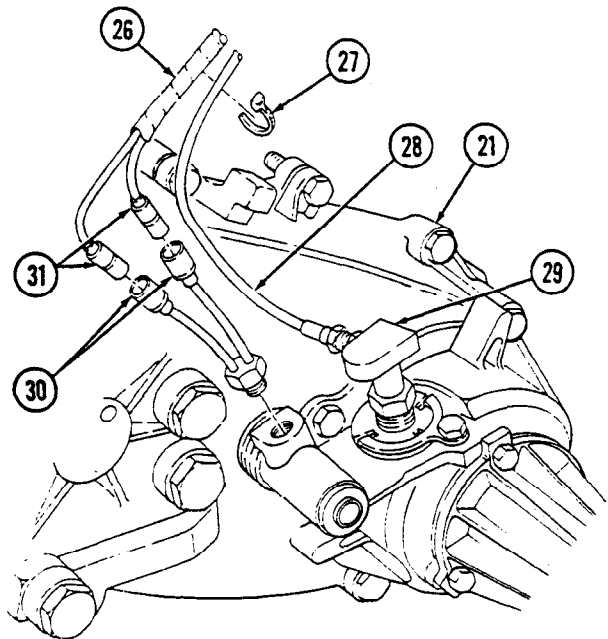
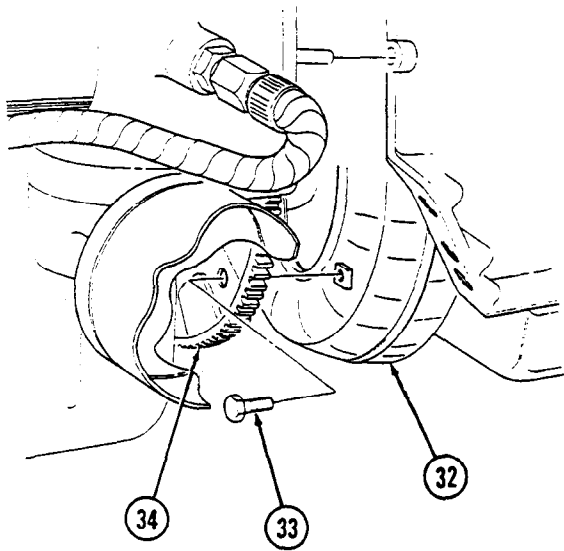
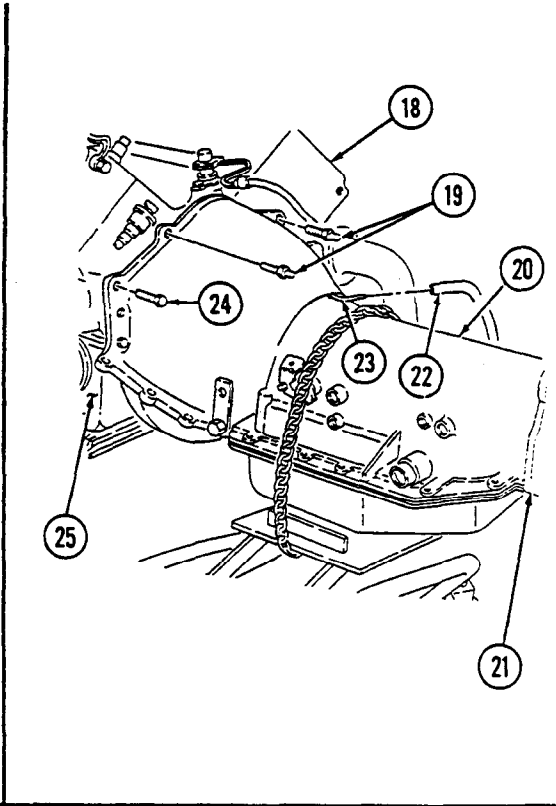
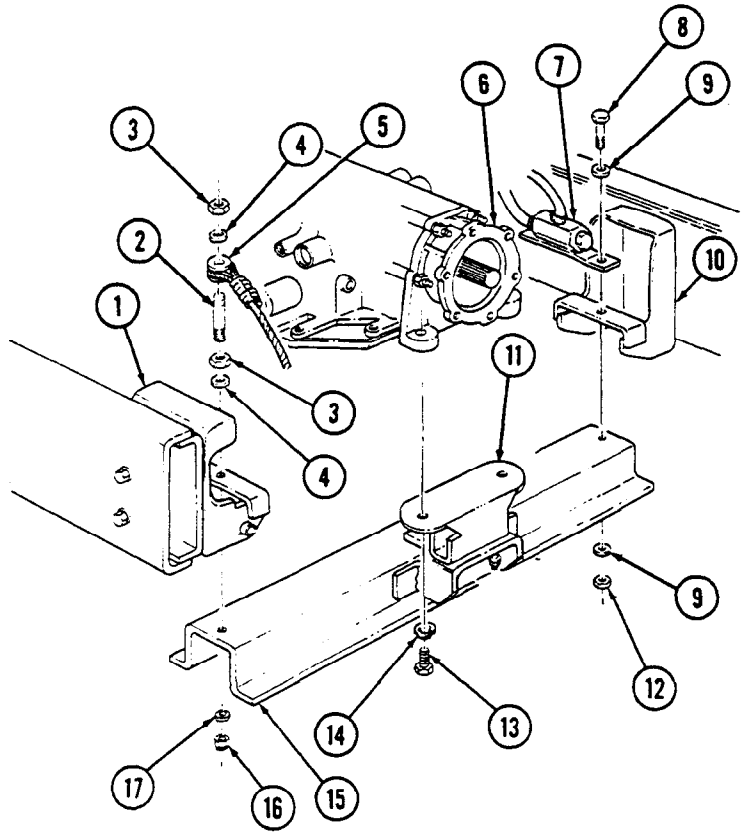
9. Support transmission (20) with transmission jack and secure with safety chain.
10. Remove two capscrews (13) and lockwashers (14) from transmission adapter (6) and mount (11). Discard lockwashers (14).
11. Remove locknut (12), washer (9), capscrew (8), washer (9), and bypass valve (7) from right side of crossmember (15) and support bracket (10). Discard locknut (12).
12. Remove locknut (16), washer (17), and crossmember (15) from support bracket (1). Discard locknut (16).
13. Remove nut (3), washer (4), cable (5), washer (4), nut (3), and stud (2) from support bracket (1).

CAUTION

- If transmission is lowered too far, cooling fan damage will result.
- Wood block must completely cover bottom of engine oil pan or oil pan damage will result.

14. Lower transmission (20) slightly and support engine under oil pan (25) with wood block and stand.
15. Disconnect main vent line (22) from transmission/transfer case vent line (23).
16. Remove 90° speedometer adapter (29) with speedometer cable (28) from transfer case (21). Secure 90° speedometer adapter (29) and speedometer cable (28) away from transfer case (21).
17. Disconnect two leads (31) from transfer case switch leads (30) on transfer case (21).
18. Remove four tiedown straps (27) and harness (26) from speedometer cable (28). Discard tiedown straps (27).
19. Remove four capscrews (24) and two studs (19) from transmission (20) and engine (18).

19-3. TRANSMISSION/TRANSFER CASE ASSEMBLY REMOVAL (Cont'd)



19-3. TRANSMISSION/TRANSFER CASE ASSEMBLY REMOVAL (Cont'd)

WARNING

- Torque converter and transmission must be removed as an assembly. Keep transmission level. The converter may slide off front of transmission and cause injury to personnel or damage to converter.
- Do not use hands to free transmission/transfer case assembly of hangups or snags. Use prybar to avoid injury.

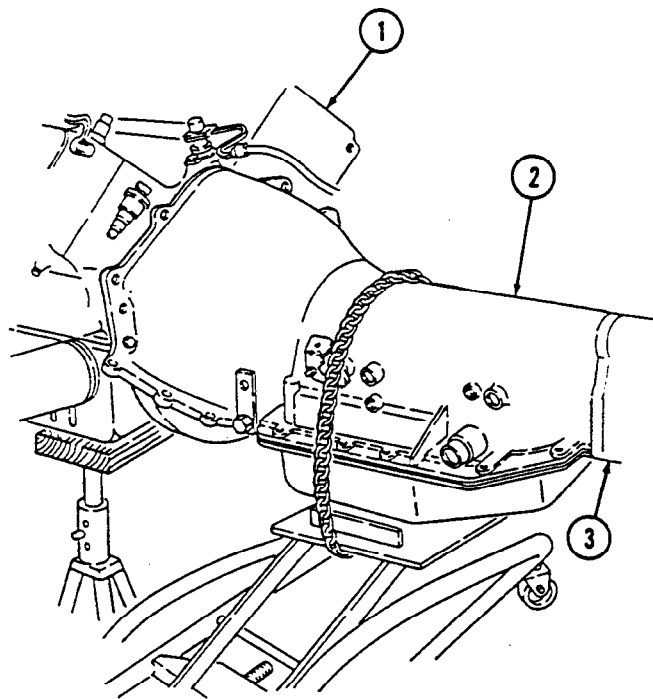
CAUTION

Always remove transmission/transfer case assembly slowly and watch for binding or hangups. Something may still be connected and must be removed. Ensure wiring, lines, cables, and rods are not in the path of the removal.

20. Move transmission (2) and transfer case (3) rearward to clear engine (1).
21. Lower transmission (2) and transfer case (3) slowly.
22. Remove transmission (2) and transfer case (3) from under vehicle.

CAUTION

If vehicle is moved because of limited shop space or tactical movement, damage to engine and vehicle may occur. To prevent damage, engine/transmission support sling can be installed.



FOLLOW-ON TASK: Prepare transmission for disassembly (para. 19-5).

19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION

This task covers:

Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two lockwashers (Appendix G, Item 213)
Two cotter pins (Appendix G, Item 27)
Four tiedown straps (Appendix G, Item 462)
Two locknuts (Appendix G, Item 130)

Personnel Required

One mechanic
One assistant

Manual References

TM-9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

Transmission/transfer case assembly prepared for installation (para. 19-5).

General Safety Instructions

- Torque converter and transmission must be installed as an assembly. Transmission must be level.
- Do not use hands to free transmission/transfer case assembly of hangups or snags.

Maintenance Level

Direct support

Installation

WARNING

Torque converter and transmission must be installed as an assembly. Keep transmission level. The torque converter may slide off front of transmission and cause injury to personnel or damage to converter.

CAUTION

- Torque converter must be properly installed in transmission or transmission damage will result.
- Safety chain must be routed under transmission oil cooler lines or damage to cooler lines will result.

19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

1. Place transmission (3) and transfer case (4) on transmission jack and secure with safety chain.

WARNING

Do not use hands to free transmission/transfer case assembly of hangups or snags. Use prybar to avoid injury.

CAUTION

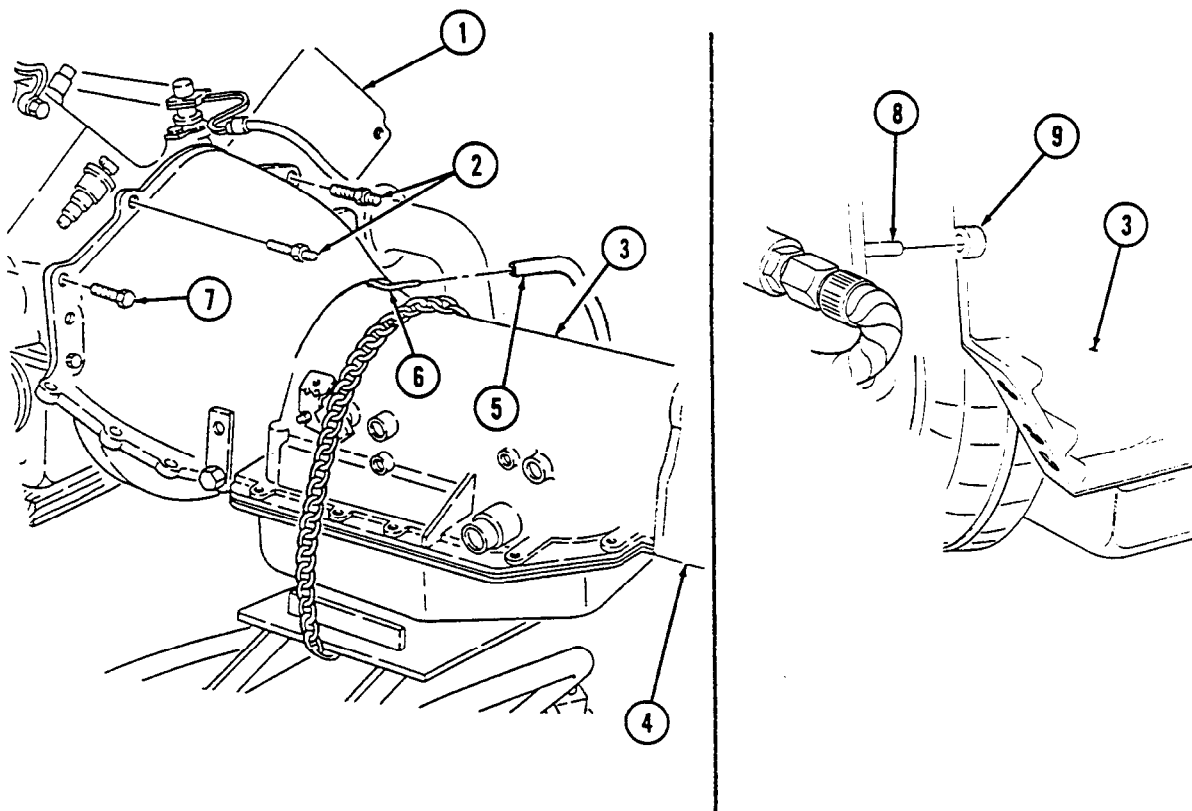
Always install transmission/transfer case assembly slowly. Raise into chassis carefully, and closely observe all components to prevent damage.

2. Position transmission (3) and transfer case (4) under vehicle and raise into place, aligning converter housing pilot holes (9) with engine dowels (8).

NOTE

Ensure torque converter rotates freely.

3. Move transmission (3) forward onto engine dowels (8). Install transmission (3) on engine (1) with four capscrews (7) and two studs (2). Tighten capscrews (7) and studs (2) to 35 lb-ft (47 N·m).
4. Connect main vent line (5) to transmission/transfer case vent line (6).
5. Raise transmission (3) and transfer case (4) and remove stand supporting engine (1).

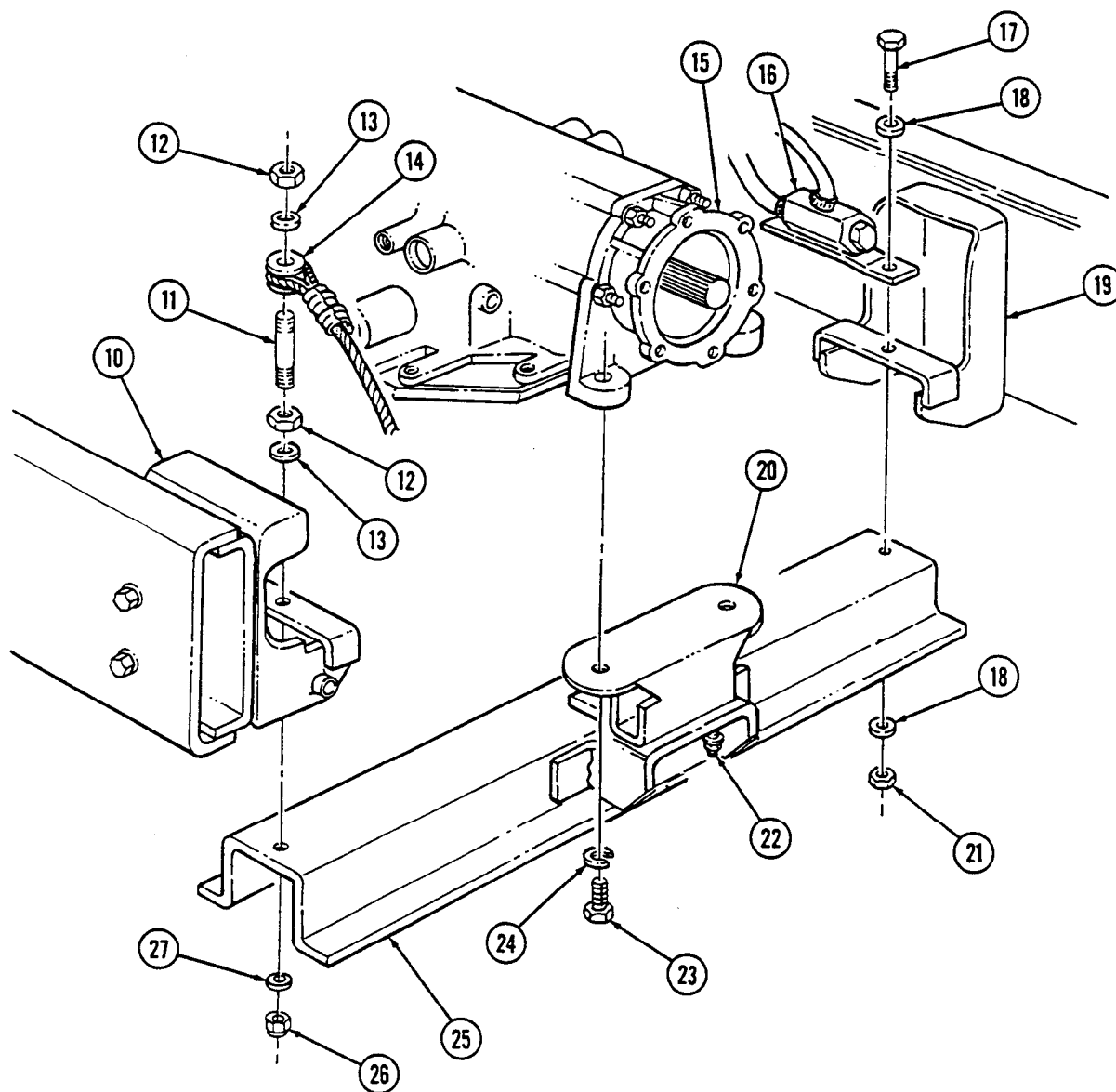


19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

NOTE

Nuts on mount must be loosened prior to installation of crossmember on vehicle for proper alignment.

6. Loosen two nuts (22) on mount (20) and crossmember (25).
7. Install mount (20) and crossmember (25) on transmission adapter (15) with two lockwashers (24) and capscrews (23). Tighten capscrews (23) to 65 lb-ft (88 N·m).
8. Install stud (11), nut (12), washer (13), cable (14), washer (13), and nut (12) on support bracket (10). Secure crossmember (25) on stud (11) with washer (27) and locknut (26).
9. Install bypass valve (16) and crossmember (25) on support bracket (19) with washer (18), capscrew (17), washer (18), and locknut (21). Tighten locknut (21) to 65 lb-ft (88 N·m).
10. Tighten two nuts (22) to 65 lb-ft (88 N·m).



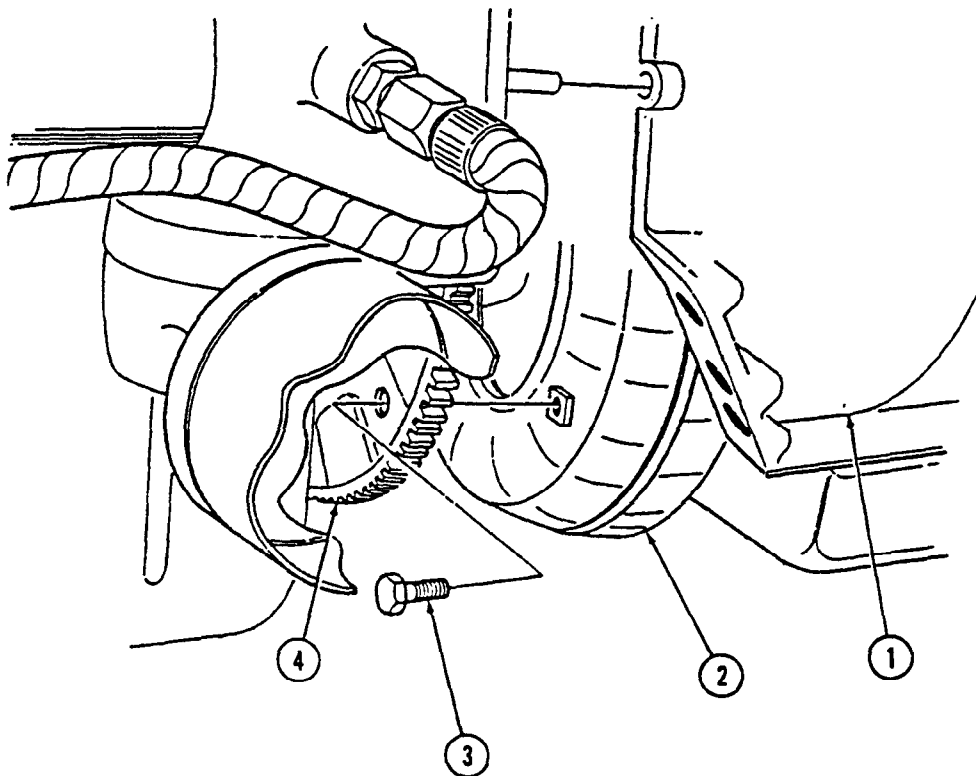
19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

11. Remove safety chain and lower transmission (1).

NOTE

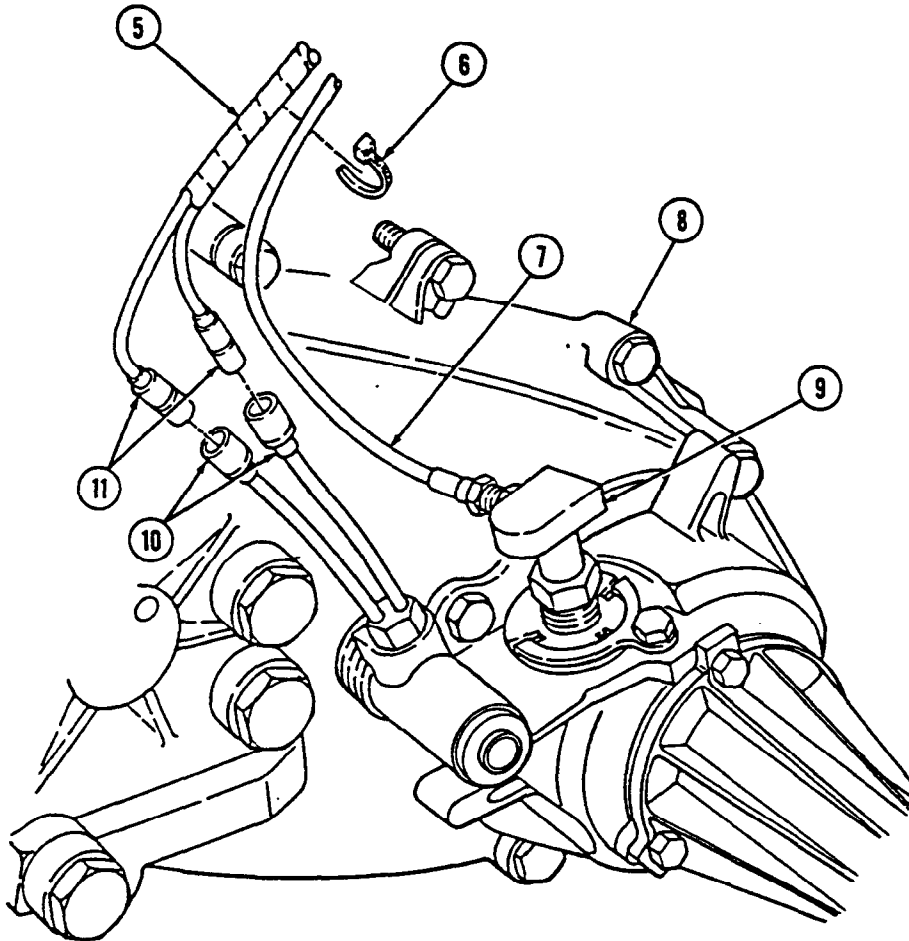
It will be necessary to rotate flywheel clockwise from capscrew in front of crankshaft to gain access to capscrews securing torque converter.

12. Align torque converter (2) with holes in flywheel (4). Install torque converter (2) on flywheel (4) with six capscrews (3).
13. Tighten capscrews (3) to 32 lb-ft (43 N·m).



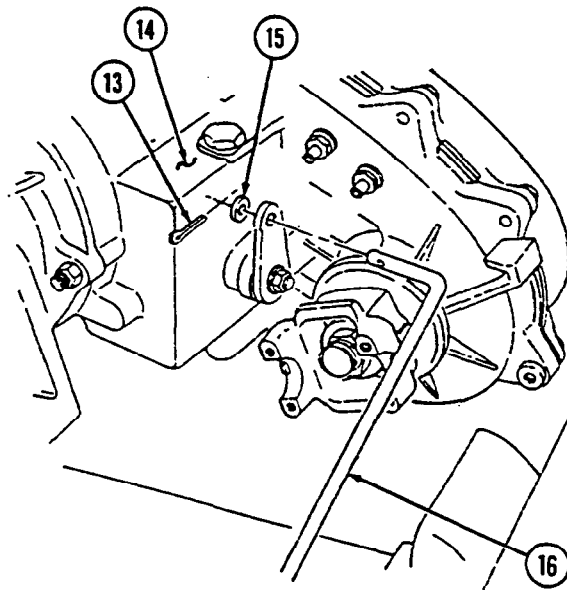
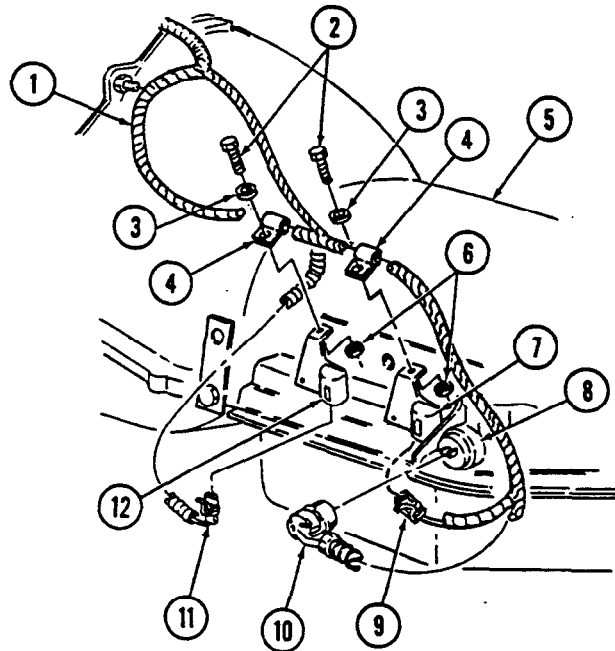
19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

14. Install 90° speedometer cable (7) with speedometer adapter (9) on transfer case (8).
15. Connect two leads 511A and 511B (11) to transfer case switch leads (10).
16. Secure harness (5) to speedometer cable (7) with four tiedown straps (6).



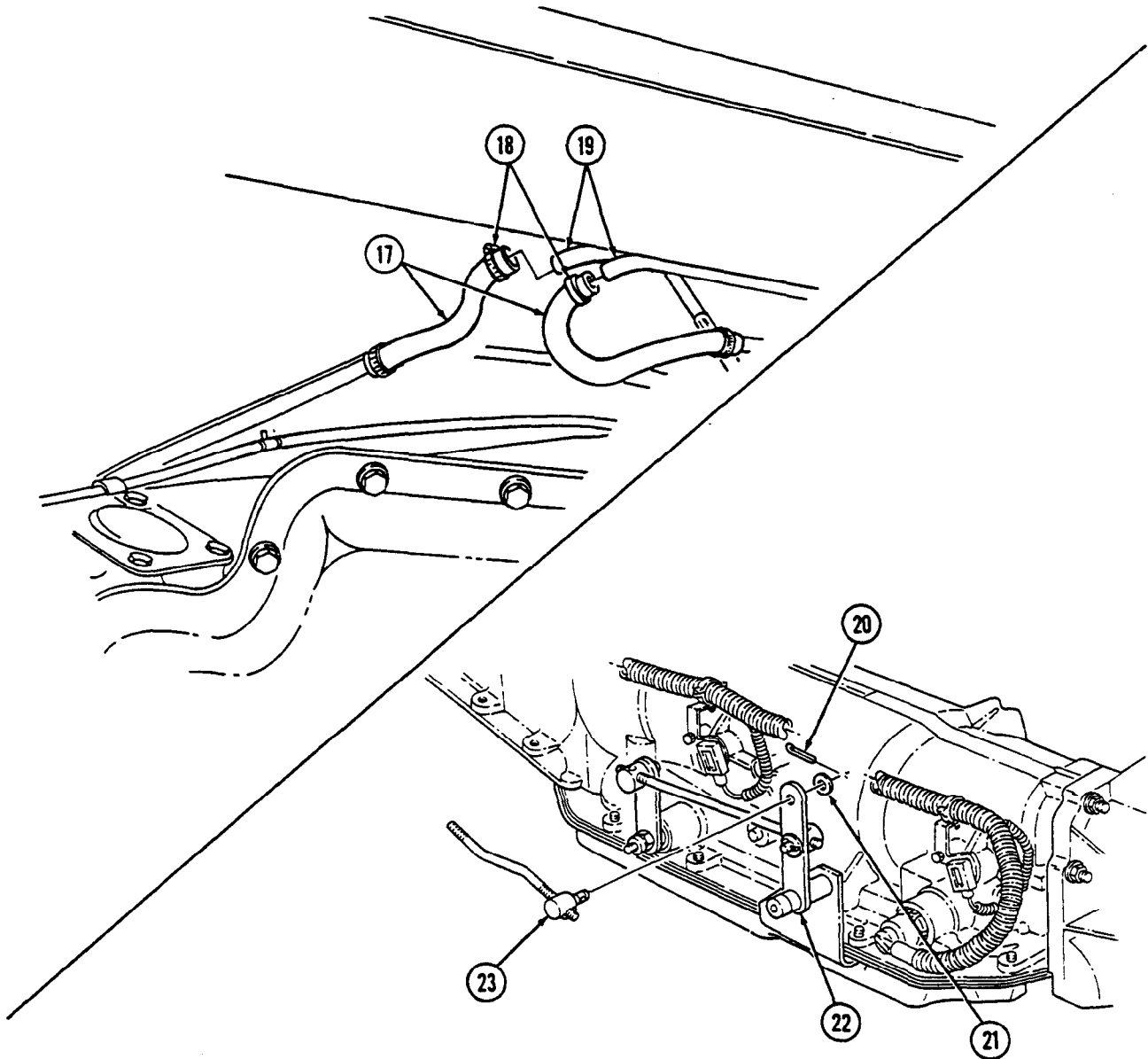
19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

17. Connect wiring harness connector (10) to transmission case connector (8) on transmission (5).
18. Connect connectors 497/498 (9) and 495/496 (11) to output and input speed sensors (7) and (12) on transmission (5).
19. Install wiring harness (1) on sensors (7) and (12) with two clamps (4), washers (3), capscrews (2), and nuts (6).
20. Connect transfer case shift rod (16) to transfer case (14) with washer (15) and cotter pin (13).



19-4. TRANSMISSION/TRANSFER CASE ASSEMBLY INSTALLATION (Cont'd)

21. Connect two hoses (17) to transmission/transfer case cooler lines (19) and tighten hose clamps (18).
22. Install shift rod and trunnion (23) on relay lever (22) with washer (21) and cotter pin (20).
23. Lower rear of vehicle (para. 8-2).



- FOLLOW-ON TASKS:**
- Install front propeller shaft (para. 6-2).
 - Install muffler support bracket (para. 3-55).
 - Install sealed upper converter housing cover (para. 5-12).
 - Install transmission oil dipstick (para. 5-5).
 - Install rear propeller shaft (para. 6-4).
 - Install engine access cover (para. 10-22).
 - Fill transmission to proper fluid level (TM 9-2320-387-10).
 - Start engine (TM 9-2320-387-10) and inspect for leaks.
 - Road-test vehicle (para. 5-14) and check for proper transmission/transfer case operation.

19-5. TRANSMISSION PREPARATION

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Special Tool

Torque adapter, 9/16-in. (Appendix B, Item 133)

Equipment Condition

Transmission/transfer case assembly removed
(para. 19-3).

Materials/Parts

Six locknuts (Appendix G, Item 172)
Anaerobic gasket sealing compound
(Appendix C, Item 58)

Maintenance Level

Direct support

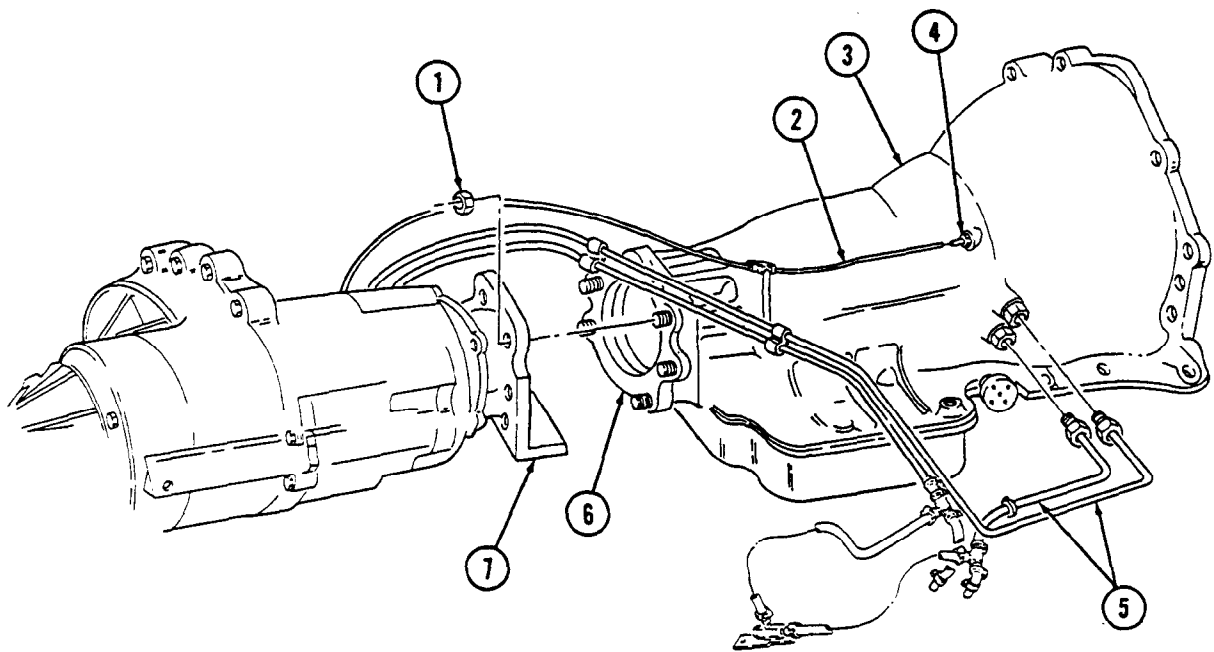
a. Disassembly

1. Disconnect two transmission/transfer case cooler lines (5) from transmission (3).
2. Disconnect transmission/transfer case vent line (2) from transmission vent tube (4).
3. Remove six locknuts (1) and transmission (3) from transfer case adapter (7). Discard locknuts (1).
4. Separate transmission (3) from transfer case adapter (7).

b. Assembly

1. Clean old sealer from transfer case adapter (7) and transmission mounting surface (6).
2. Apply anaerobic gasket sealing compound to transmission mounting surface (6).
3. Install transmission (3) on transfer case adapter (7) with six locknuts (1). Using torque adapter, tighten locknuts (1) to 26 lb-ft (35 N·m).
4. Connect transmission/transfer vent line (2) to transmission vent tube (4).
5. Connect transmission/transfer case cooler lines (5) to transmission (3).

19-5. TRANSMISSION PREPARATION (Cont'd)



FOLLOW-ON TASK: Install transmission/transfer case assembly (para. 19-4).

CHAPTER 20

TRANSFER CASE (DS) MAINTENANCE

20-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of the transfer case at the direct support maintenance level. Some subassemblies and parts must be removed before the transfer case can be accessed. They are referenced to other paragraphs of this manual.

20-2. TRANSFER CASE MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
20-3.	Transfer Case Replacement	20-2
20-4.	Transfer Case Guide Cable Replacement	20-8

20-3. TRANSFER CASE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Torque adapter, 9/16-in.
(Appendix B, Item 133)

Materials/Parts

Six locknuts (Appendix G, Item 172)
Four lockwashers (Appendix G, Item 206)
Cotter pin (Appendix G, Item 27)
Anaerobic gasket sealer
(Appendix C, Item 58)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Muffler and catalytic converter removed (para. 3-49).
- Muffler support bracket removed (para. 3-55).

General Safety Instructions

- Allow transfer case to cool before performing this task.
- Transfer case must be supported during removal and installation.

Maintenance Level

Direct support

a. Removal

WARNING

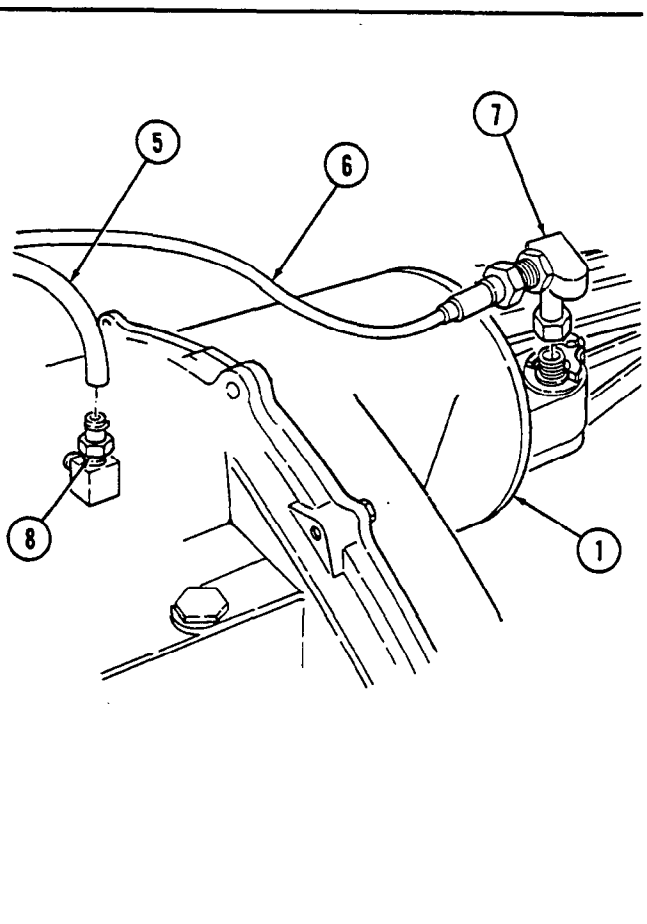
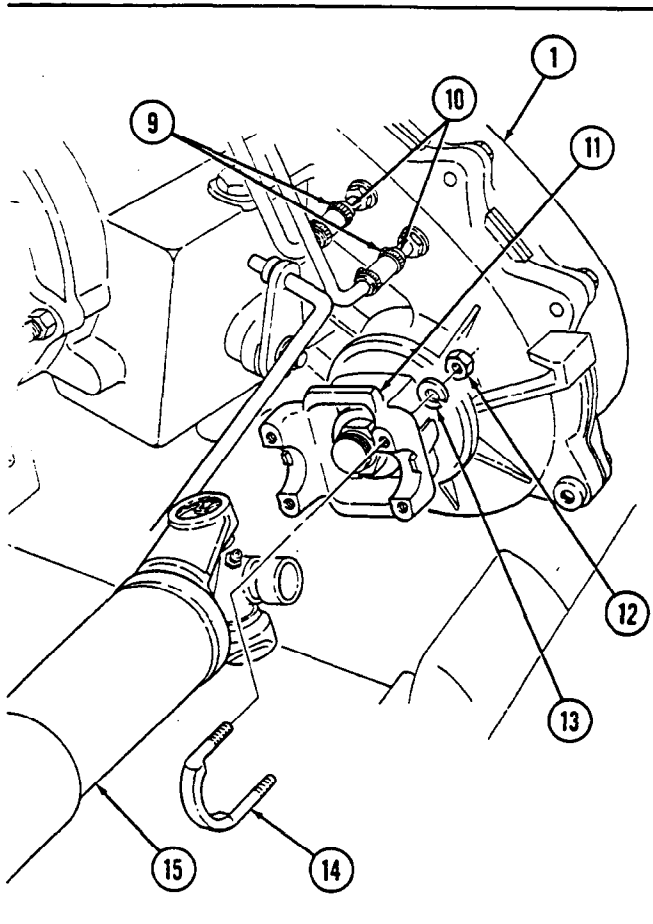
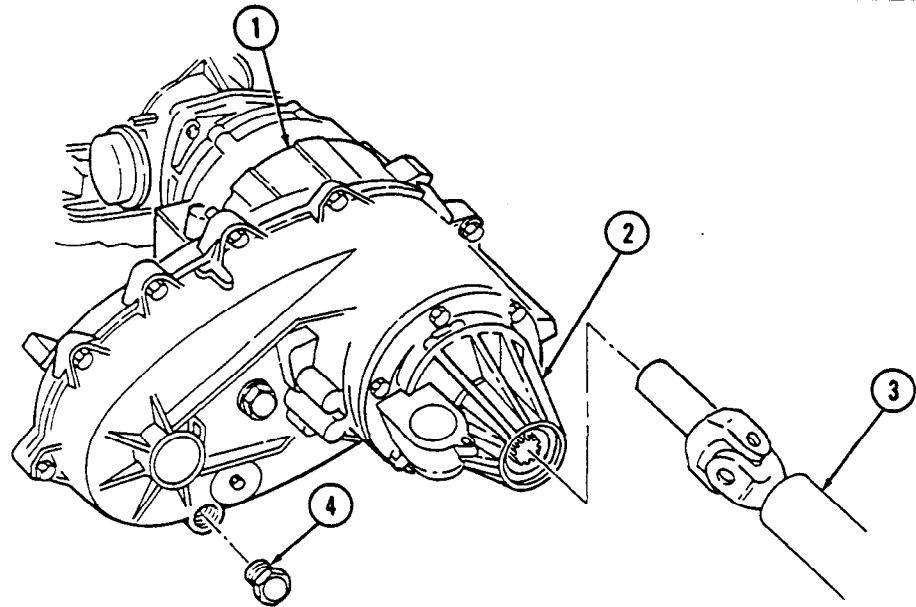
Allow transfer case to cool before performing this task. Failure to do this may cause injury to personnel.

CAUTION

Cover or plug all open lines and connections immediately after disconnection to prevent contamination. Remove all plugs prior to connection.

1. Remove drainplug (4) from transfer case (1). Allow fluid to drain and install drainplug (4). Tighten drainplug (4) to 35 lb-ft (47 N·m).
2. Remove four nuts (12), lockwashers (13), two U-bolts (14), and front propeller shaft (15) from transfer case yoke (11). Discard lockwashers (13).
3. Disconnect vent line (5) from adapter (8) on transfer case (1).
4. Disconnect 90° speedometer cable adapter (7) from transfer case (1) and remove cable adapter (7) with speedometer cable (6).
5. Remove rear propeller shaft (3) from transfer case housing (2).
6. Loosen two hose clamps (9) and disconnect rubber cooling lines (10) from transfer case (1).

20-3. TRANSFER CASE REPLACEMENT (Cont'd)



20-3. TRANSFER CASE REPLACEMENT (Cont'd)

7. Remove cotter pin (1) and washer (3) from shift linkage (4) and transfer case (2) and disconnect shift linkage (4). Discard cotter pin (1).

WARNING

Transfer case must be supported during removal. Failure to do this may cause injury to personnel or damage to equipment.

8. Place transmission jack under transfer case (2) for support.
9. Remove six locknuts (5) from studs (7) on transfer case (2). Discard locknuts (5).
10. Slide transfer case (2) away from transfer case adapter (6). Lower transfer case (2) to clear vehicle and remove transfer case (2).
11. Clean old sealant from transfer case adapter (6) and transfer case (2).

b. Installation

WARNING

Transfer case must be supported during installation. Failure to do this may cause injury to personnel or damage to equipment.

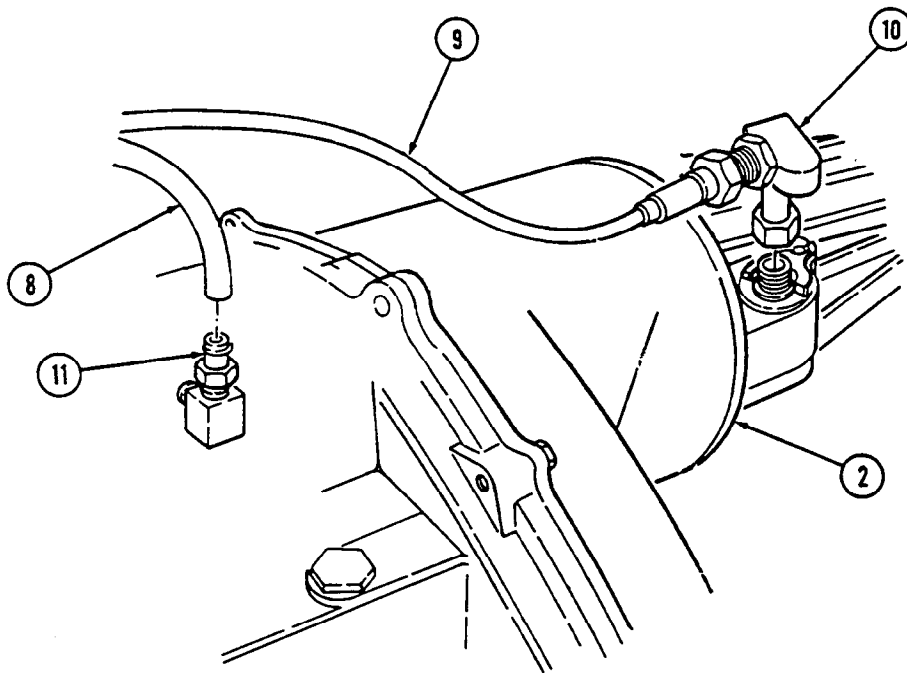
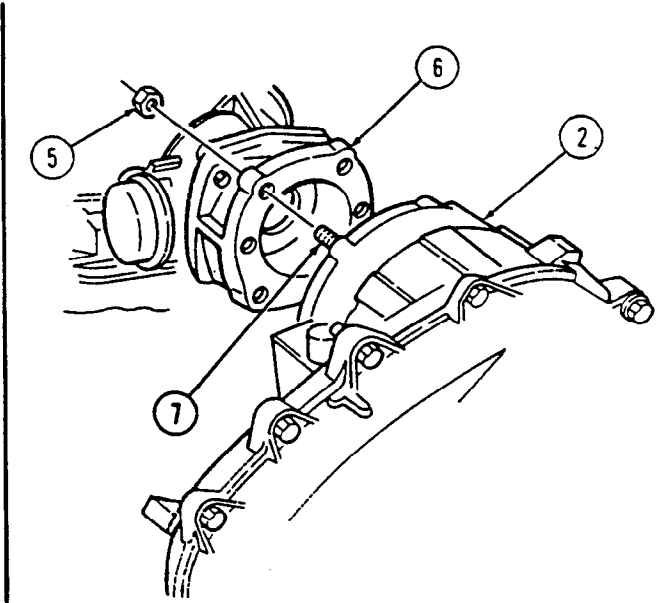
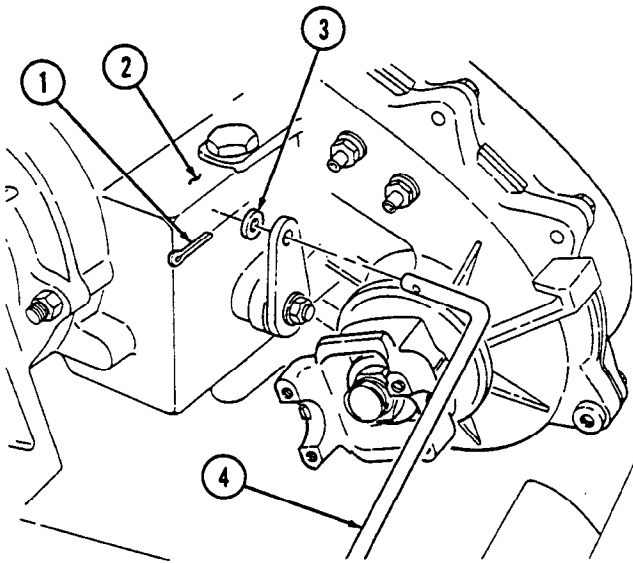
1. Place transfer case (2) on transmission jack.

NOTE

Immediately install transfer case after application of sealer.

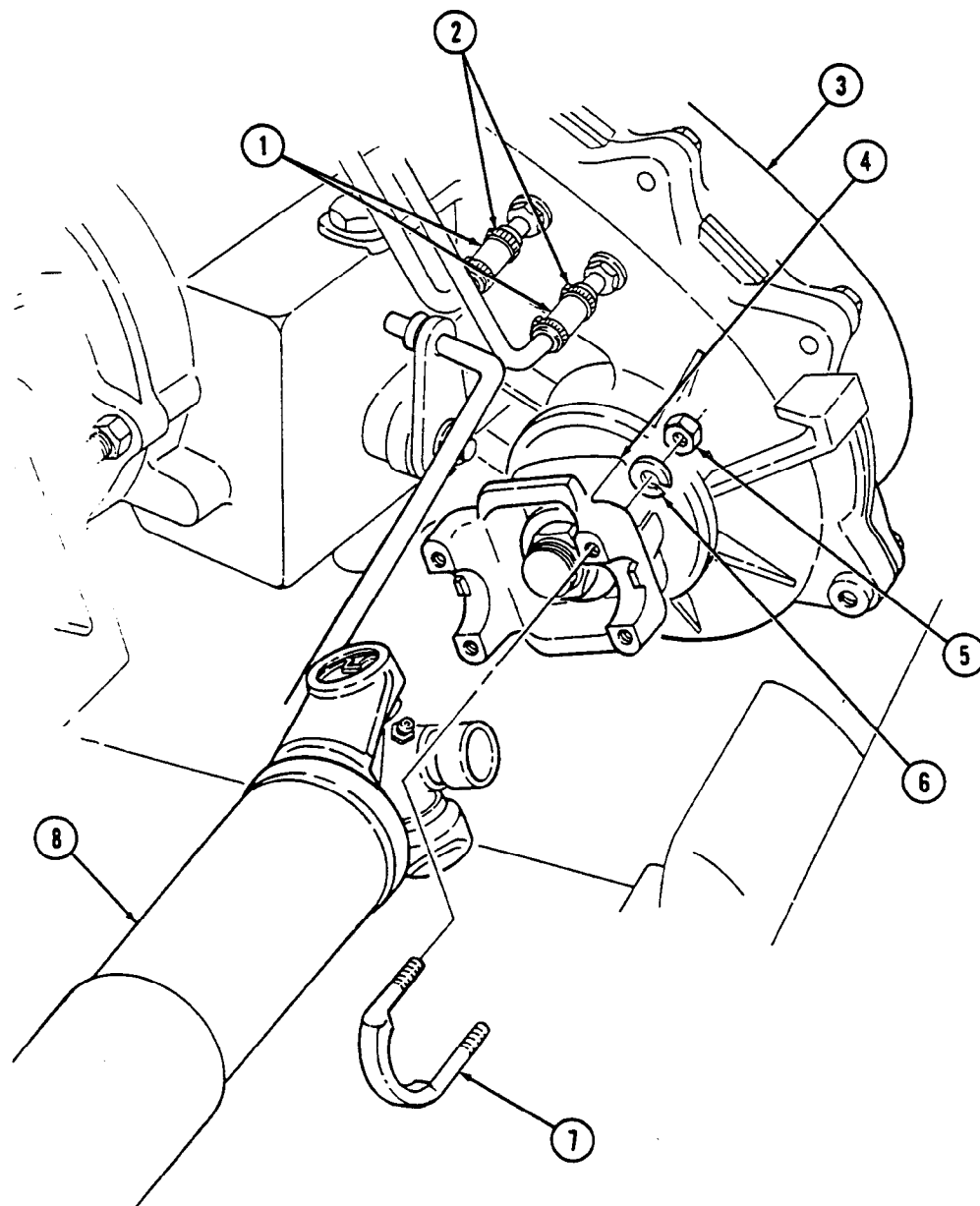
2. Apply anaerobic gasket sealer to mounting surface of transfer case adapter (6).
3. Raise transfer case (2) and slide studs (7) into transfer case adapter (6).
4. Install transfer case (2) on transfer case adapter (6) with six locknuts (5). Tighten locknuts (5) to 26 lb-ft (35 N·m).
5. Remove transmission jack.
6. Connect transfer case shift linkage (4) to transfer case (2) with washer (3) and cotter pin (1).
7. Connect vent line (8) to adapter (11) on transfer case (2).
8. Install 90° speedometer cable adapter (10) with speedometer cable (9) on transfer case (2).

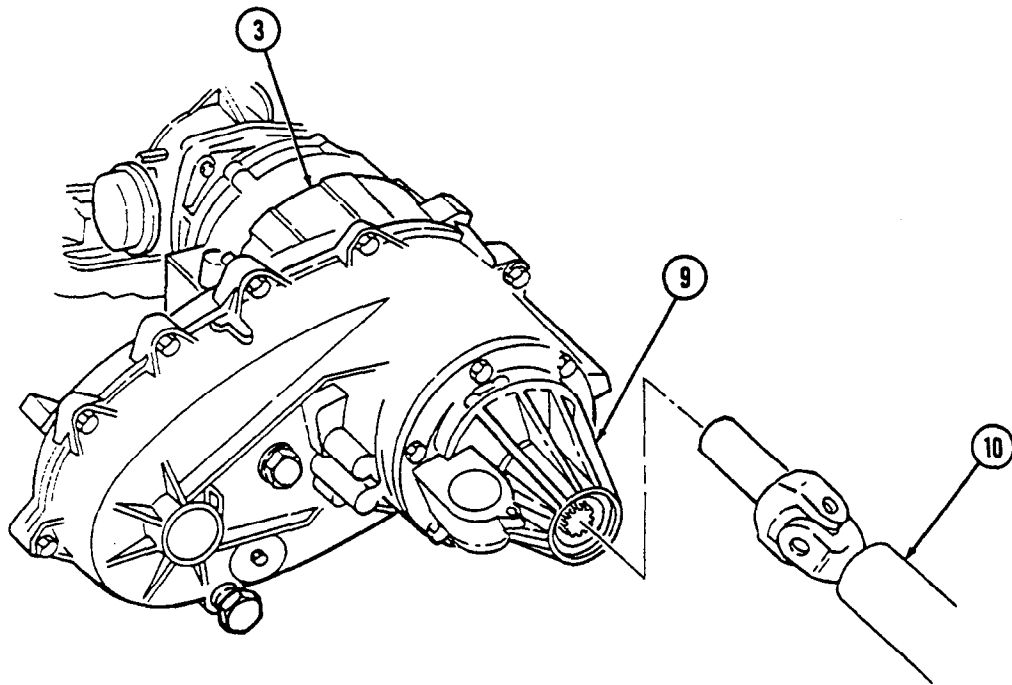
20-3. TRANSFER CASE REPLACEMENT (Cont'd)



20-3. TRANSFER CASE REPLACEMENT (Cont'd)

9. Connect cooler lines (1) to transfer case (3) and tighten two hose clamps (2).
10. Install rear propeller shaft (10) on transfer case housing (9).
11. Connect front propeller shaft (8) on transfer case yoke (4) with two U-bolts (7), four lockwashers (6), and nuts (5). Tighten nuts (5) to 13-18 lb-ft (18-24 N·m).



20-3. TRANSFER CASE REPLACEMENT (Cont'd)

- FOLLOW-ON TASKS:**
- Fill fluid to proper level (para. 2-12).
 - Install muffler support bracket (para. 3-55).
 - Install muffler and catalytic converter (para. 3-49).
 - Adjust shift linkage (para. 5-16).

20-4. TRANSFER CASE GUIDE CABLE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Lockwasher (Appendix G, Item 238)

Manual Reference

TM 9-2320-387-24P

Maintenance Level

Direct support

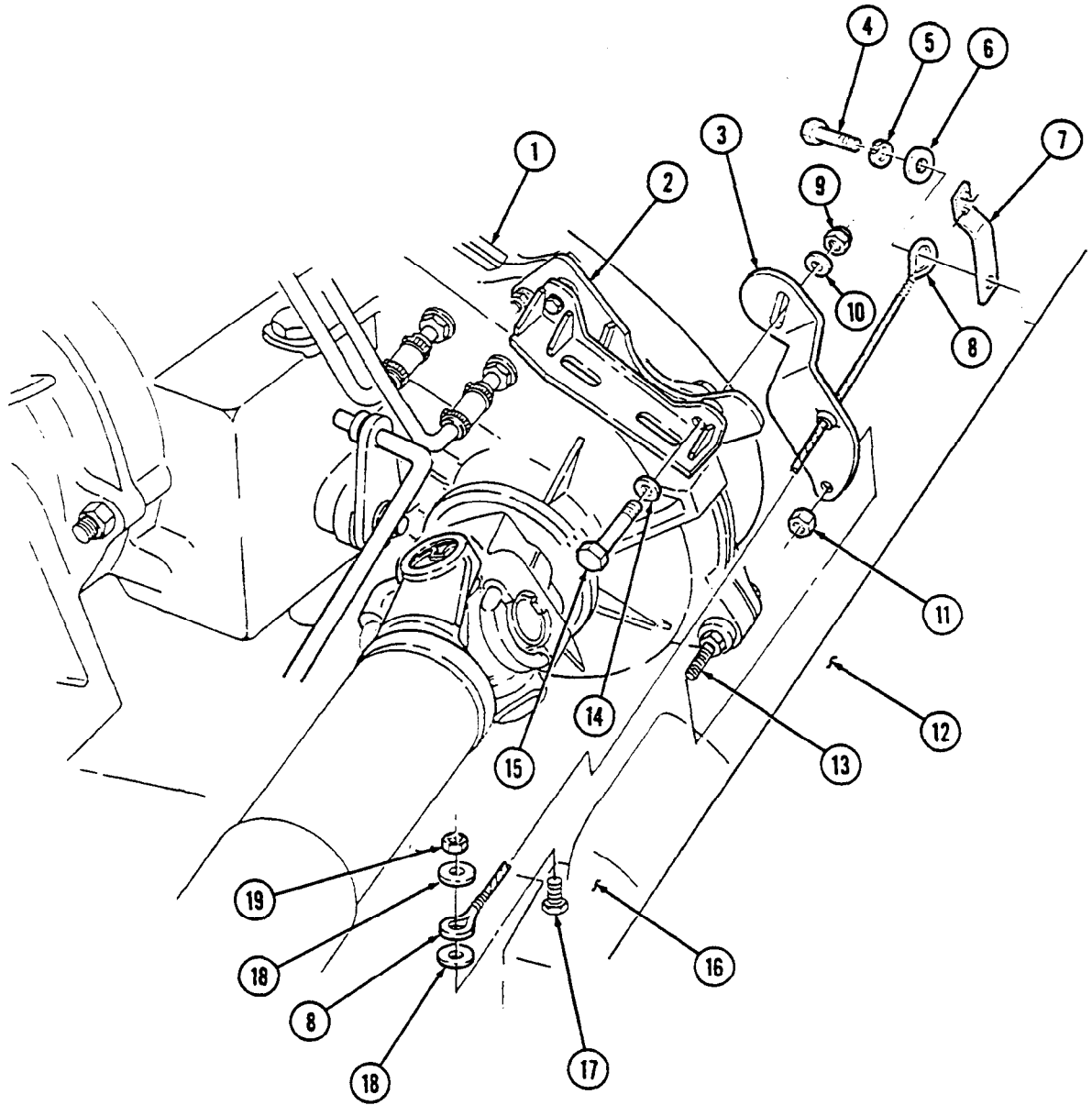
a. Removal

1. Remove nut (9), washer (10), capscrew (15), and washer (14) from muffler mounting bracket (2) and guide cable bracket (3).
2. Remove nut (11) and guide cable bracket (3) from capscrew (13) on transfer case (1).
3. Remove capscrew (4), lockwasher (5), washer (6), guide cable (8), and support bracket (7) from frame (12). Discard lockwasher (5).
4. Remove nut (19), washer (18), guide cable (8), and washer (18) from stud (17) on crossmember support bracket (16).

b. Installation

1. Install guide cable bracket (3) on capscrew (13) with nut (11). Tighten nut (11) to 16-18 lb-ft (22-24 N·m).
2. Install guide cable bracket (3) on muffler mounting bracket (2) with washer (14), capscrew (15), washer (10), and nut (9).
3. Install guide cable (8) and support bracket (7) on frame (12) with washer (6), lockwasher (5), and capscrew (4). Tighten capscrew (4) to 30 lb-ft (41 N·m).
4. Install washer (18) and guide cable (8) on stud (17) and crossmember support bracket (16) with washer (18) and nut (19). Tighten nut (19) to 60 lb-ft (81 N·m).

20-4. TRANSFER CASE GUIDE CABLE REPLACEMENT (Cont'd)



CHAPTER 21

PROPELLER SHAFTS, AXLES, AND SUSPENSION (DS) MAINTENANCE

21-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repair of propeller shafts, axles, and suspension system components at the direct support maintenance level. Some subassemblies and parts must be removed before propeller shafts, axles, and suspension system components can be accessed. They are referenced to other paragraphs of this manual.

21-2. PROPELLER SHAFTS, AXLES, AND SUSPENSION MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
21-3.	Differential Output Shaft Seal Replacement	21-2
21-4.	Pinion Seal Replacement	21-4
21-5.	Differential Replacement	21-6
21-6.	Geared Hub Repair	21-10
21-7.	Control Arm Bushing Replacement	21-18
21-8.	Front Propeller Shaft Maintenance	21-19
21-9.	Differential and Axle Free Play Tolerance Inspection	21-20

21-3. DIFFERENTIAL OUTPUT SHAFT SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Axle shaft and seal installer
(Appendix B, Item 99)

Materials/Parts

Washer seal (Appendix G, Item 422)
Locknut (Appendix G, Item 161)
Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

Service brake rotors removed (para. 7-12).

Maintenance Level

Direct support

a. Removal

1. Remove locknut (5), washer seal (4), and output flange (3) from output shaft (2). Discard washer seal (4) and locknut (5).
2. Remove two capscrews (7) and brake adapter (6) from differential (1).
3. Remove output shaft seal (8) from differential (1).

b. Installation

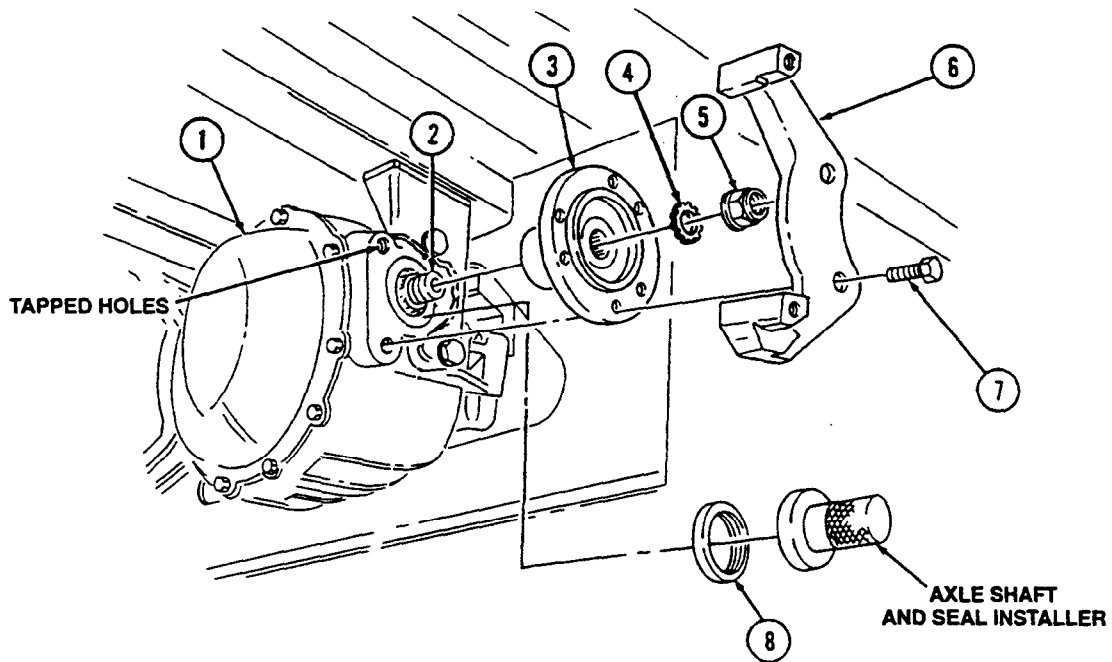
1. Using axle shaft and seal installer, install output shaft seal (8) in differential (1).

CAUTION

Apply a liberal amount of thread sealing compound to the tapped holes of differential. To allow adequate coating of threads, install capscrews shortly after applying thread sealing compound. Failure to do this could allow capscrews to loosen and cause damage to differential.

2. Apply sealing compound to tapped holes of differential (1) and install brake adapter (6) on differential (1) with two capscrews (7). Tighten capscrews (7) to 125-150 lb-ft (170-203 N·m).
3. Install output flange (3), washer seal (4), and locknut (5) on output shaft (2). Tighten locknut (5) to 170 lb-ft (231 N·m).

21-3. DIFFERENTIAL OUTPUT SHAFT SEAL REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install service brake rotors (para. 7-12).

21-4. PINION SEAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Service brake rotors removed (para. 7-12).

Special Tools

Yoke seal installer
(Appendix B, Item 82)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

NOTE

The replacement procedure for pinion seals is basically the same for front and rear differential. This procedure covers the rear differential pinion seal.

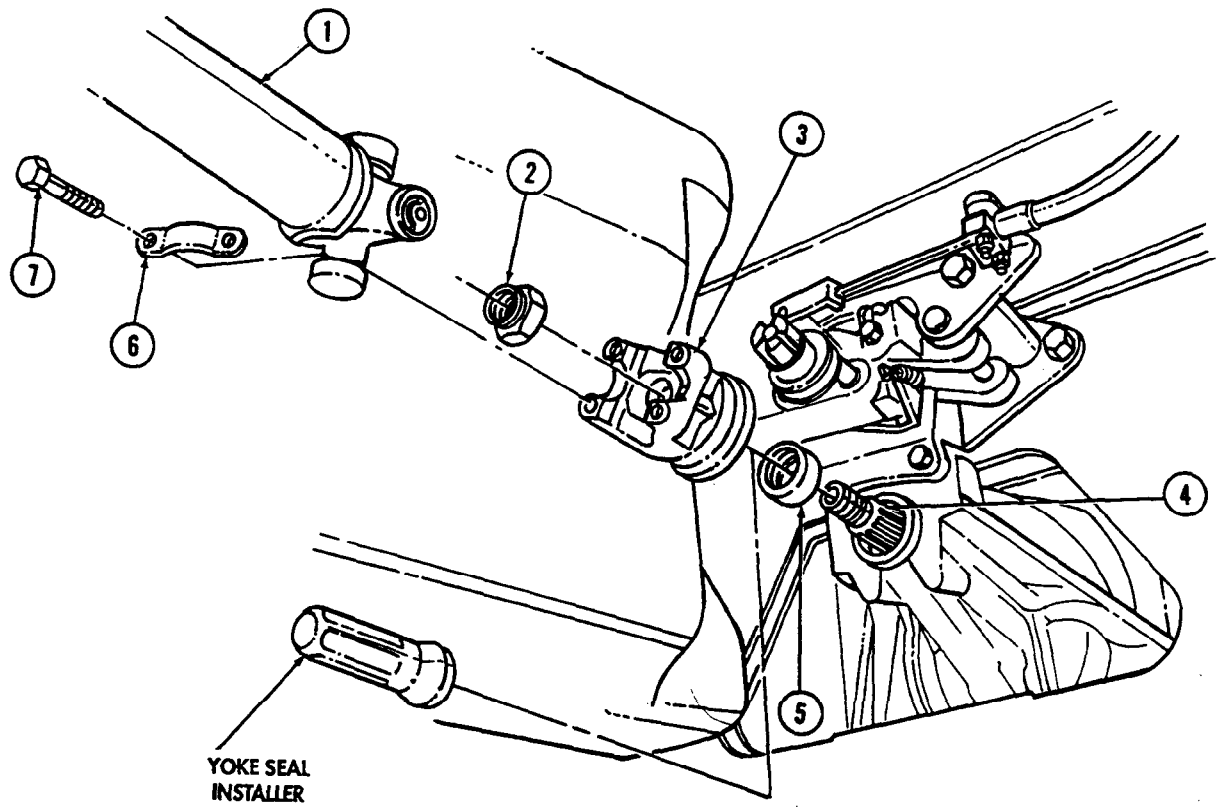
a. Removal

1. Remove four capscrews (7), two straps (6), and rear propeller shaft (1) from pinion flange (3).
2. Using a lb-in. torque wrench, measure torque required to rotate pinion (4), and record measurement.
3. Count and record number of exposed threads on end of pinion (4) and mark locknut (2) and pinion (4) for assembly.
4. Remove locknut (2) and pinion flange (3) from pinion (4).
5. Remove pinion seal (5) from pinion (4).

b. Installation

1. Using seal installer, install pinion seal (5) on pinion (4).
2. Install pinion flange (3) on pinion (4) with locknut (2).
3. Tighten locknut (2) to original position.
4. Tighten locknut (2) in small increments, until torque required to rotate pinion (4) exceeds original measurement by 2 lb-in. (0.2 N·m).
5. Install rear propeller shaft (1) on pinion flange (3) with two straps (6) and four capscrews (7). Tighten capscrews (7) to 60 lb-ft (81 N·m).

21-4. PINION SEAL REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install service brake rotors (para. 7-12).

21-5. DIFFERENTIAL REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Manual References

TM 9-2320-387-24P

Equipment Condition

Service brake rotors removed (para. 7-12).

Materials/Parts

Two locknuts (Appendix G, Item 174)
 Two locknuts (Appendix G, Item 161)
 Two washer seals (Appendix G, Item 422)
 Sealing compound (Appendix C, Item 63)

General Safety Instructions

Differential must be supported during removal and installation.

Maintenance Level

Direct support

Personnel Required

One mechanic
 One assistant

WARNING

Differential must be supported during removal and installation. Failure to do this may cause injury to personnel or damage to equipment.

NOTE

- Have drainage container ready to catch oil.
- The replacement procedure for front and rear differential is basically the same except where noted.

a. Removal

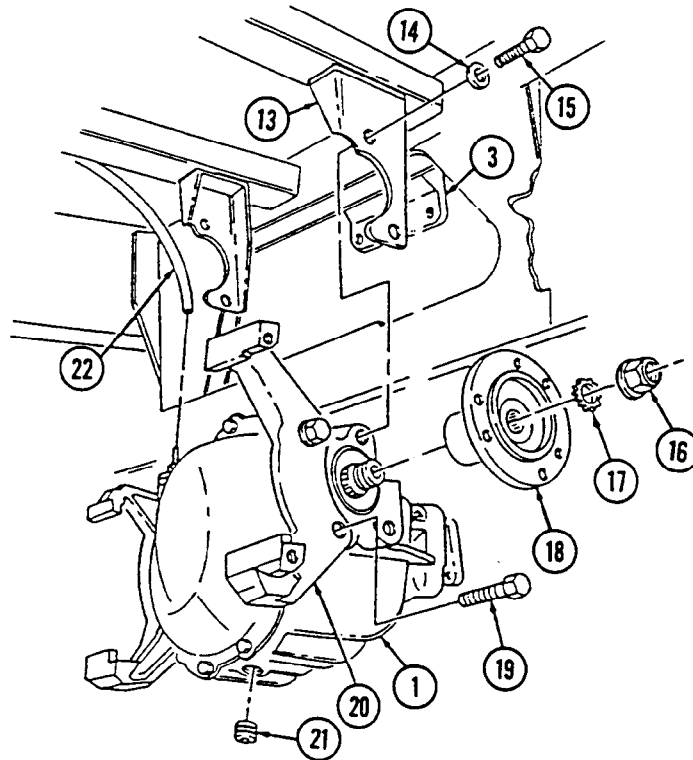
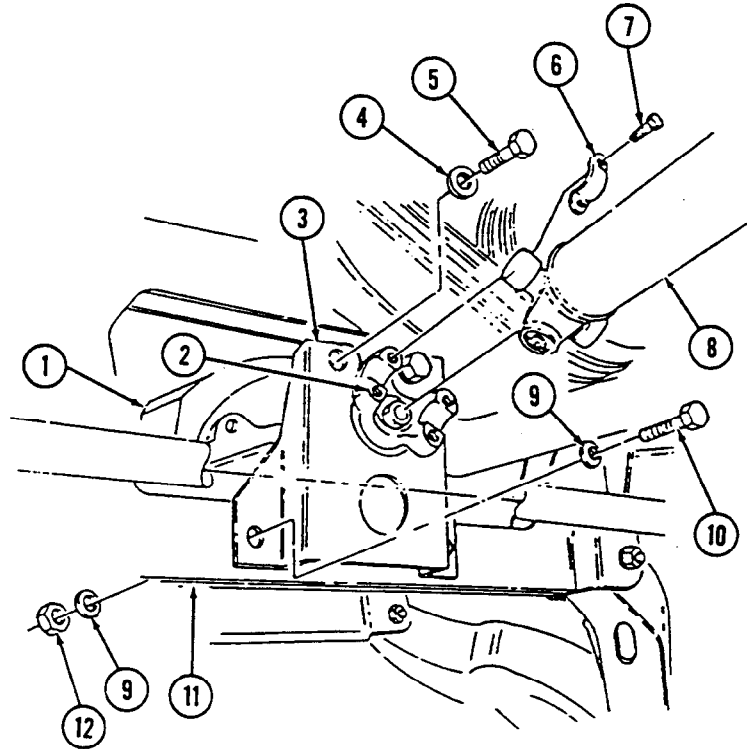
1. Remove drainplug (21) from differential (1). Allow oil to drain and install drainplug (21).
2. Remove four capscrews (7), two straps (6), and propeller shaft (8) from pinion flange (2).

NOTE

Rear differential is not equipped with washers as indicated in step 3.

3. Remove two capscrews (5) and washers (4) from differential (1) and mounting bracket (3).
4. Remove two locknuts (12), washers (9), capscrews (10), washers (9), and mounting bracket (3) from frame crossmember (11). Discard locknuts (12).
5. Remove two locknuts (16), washer seals (17), and output flanges (18) from differential (1). Discard locknuts (16) and washer seals (17).
6. Support differential (1).
7. Remove four capscrews (15) and washers (14) from differential (1) and side mounting brackets (13).
8. Lower differential (1) slightly and disconnect vent line (22).
9. Remove differential (1).
10. Remove four capscrews (19) and two brake caliper adapters (20) from differential (1).

21-5. DIFFERENTIAL REPLACEMENT (Cont'd)



21-5. DIFFERENTIAL REPLACEMENT (Cont'd)**b. Installation****CAUTION**

Apply a liberal amount of thread sealing compound to the tapped holes of differential. To allow adequate coating of threads, install capscrews shortly after applying thread sealing compound. Failure to do this could allow capscrews to loosen and cause damage to differential.

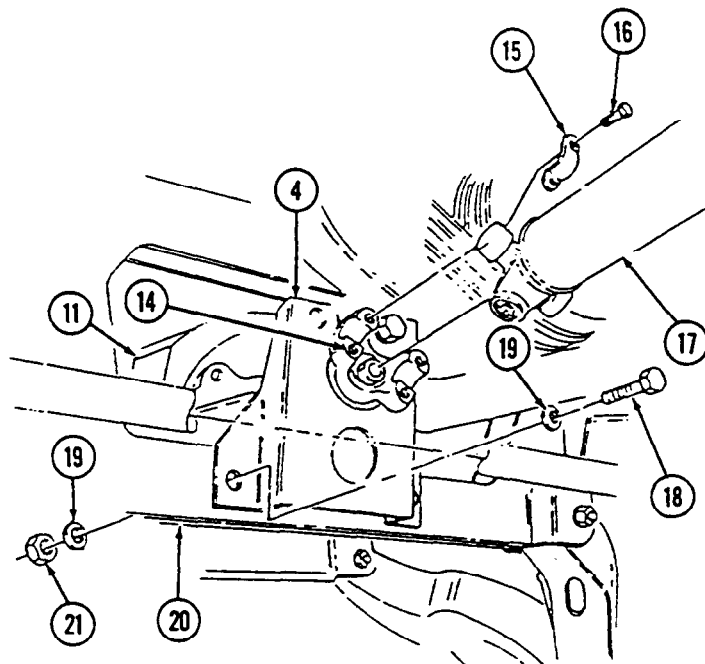
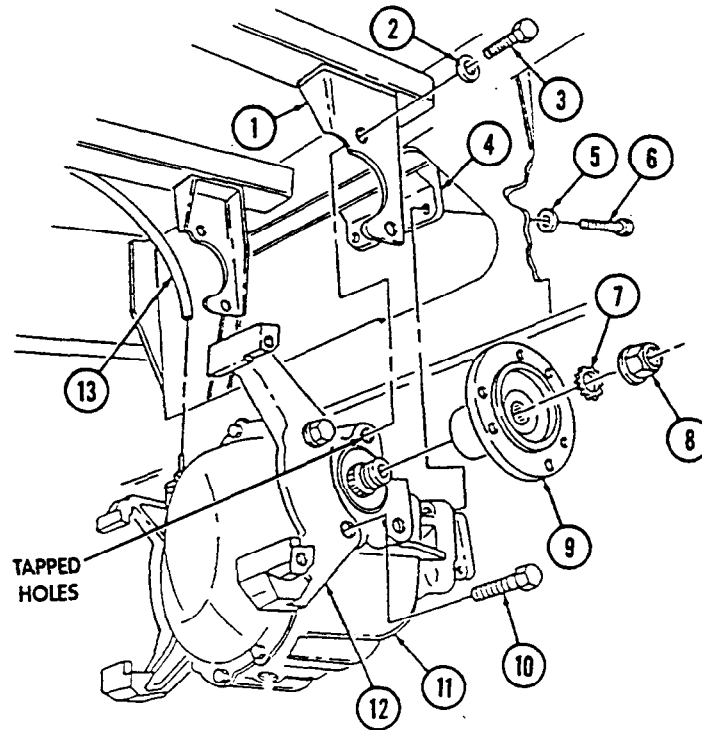
1. For rear differentials, apply sealing compound to tapped holes in differential (11). Install two brake caliper adapters (12) on differential (11) with four capscrews (10). Tighten capscrews (10) to 125-150 lb-ft (170-203 N·m).
2. Raise differential (11) into place and connect vent line (13).
3. Apply sealing compound in tapped holes in differential (11). Install differential (11) on two side mounting brackets (1) with four washers (2) and capscrews (3).
4. Install mounting bracket (4) on frame crossmember (20) with two washers (19), capscrews (18), washers (19), and locknuts (21). Tighten locknuts (21) to 90 lb-ft (122 N·m).

NOTE

Rear differential is not equipped with washers as indicated in step 5.

5. Apply sealing compound to capscrews (6). Install differential (11) on mounting bracket (4) with two washers (5) and capscrews (6).
6. Tighten capscrews (3) and (6) to 125-150 lb-ft (170-203 N·m).
7. Connect propeller shaft (17) to pinion flange (14) with two straps (15) and four capscrews (16). Tighten capscrews (16) to 13-18 lb-ft (18-24 N·m).
8. Install two output flanges (9) on differential (11) with washer seals (7) and locknuts (8). Tighten locknuts (8) to 165-195 lb-ft (224-264 N·m).

21-5. DIFFERENTIAL REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install service brake rotors (para. 7-12).
 - Fill differential to proper level (para. 2-12).

21-6. GEARED HUB REPAIR

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)
 Blind hole puller set
 (Appendix B, Item 112) (Optional)

Special Tools

Input seal installer (Appendix B, Item 107)
 Spindle seal installer (Appendix B, Item 109)
 Driver handle (Appendix B, Item 60)

Materials/Parts

Input seal (Appendix G, Item 405)
 Seal (Appendix G, Item 425)
 Lockwasher (Appendix G, Item 218)

Materials/Parts (Cont'd)

Anaerobic gasket sealing compound
 (Appendix C, Item 58)
 Sealing compound (Appendix C, Item 71)
 Sealing compound (Appendix C, Item 64)
 Sealing compound (Appendix C, Item 62)
 Grease (Appendix C, Item 33)

Manual References

TM 9-2320-387-24P

Equipment Condition

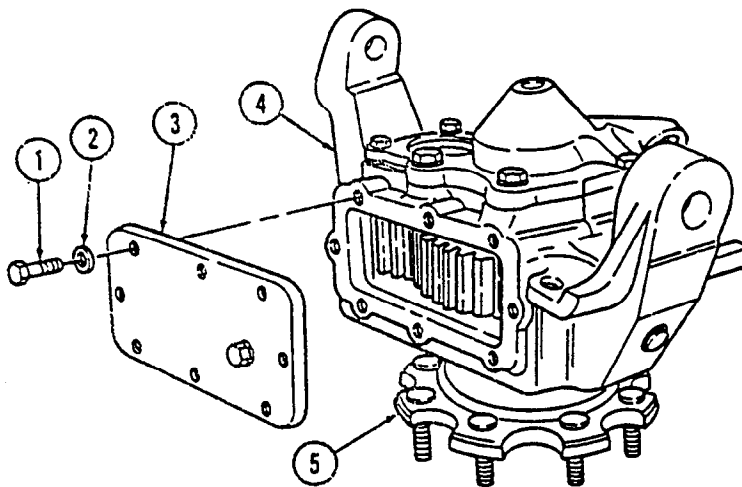
Geared hub removed (para. 6-9).

Maintenance Level

Direct support

a. Disassembly

1. Position geared hub (4) with spindle (5) supporting geared hub (4).
2. Remove eight capscrews (1), washers (2), and side cover (3) from geared hub (4).



21-6. GEARED HUB REPAIR (Cont'd)

NOTE

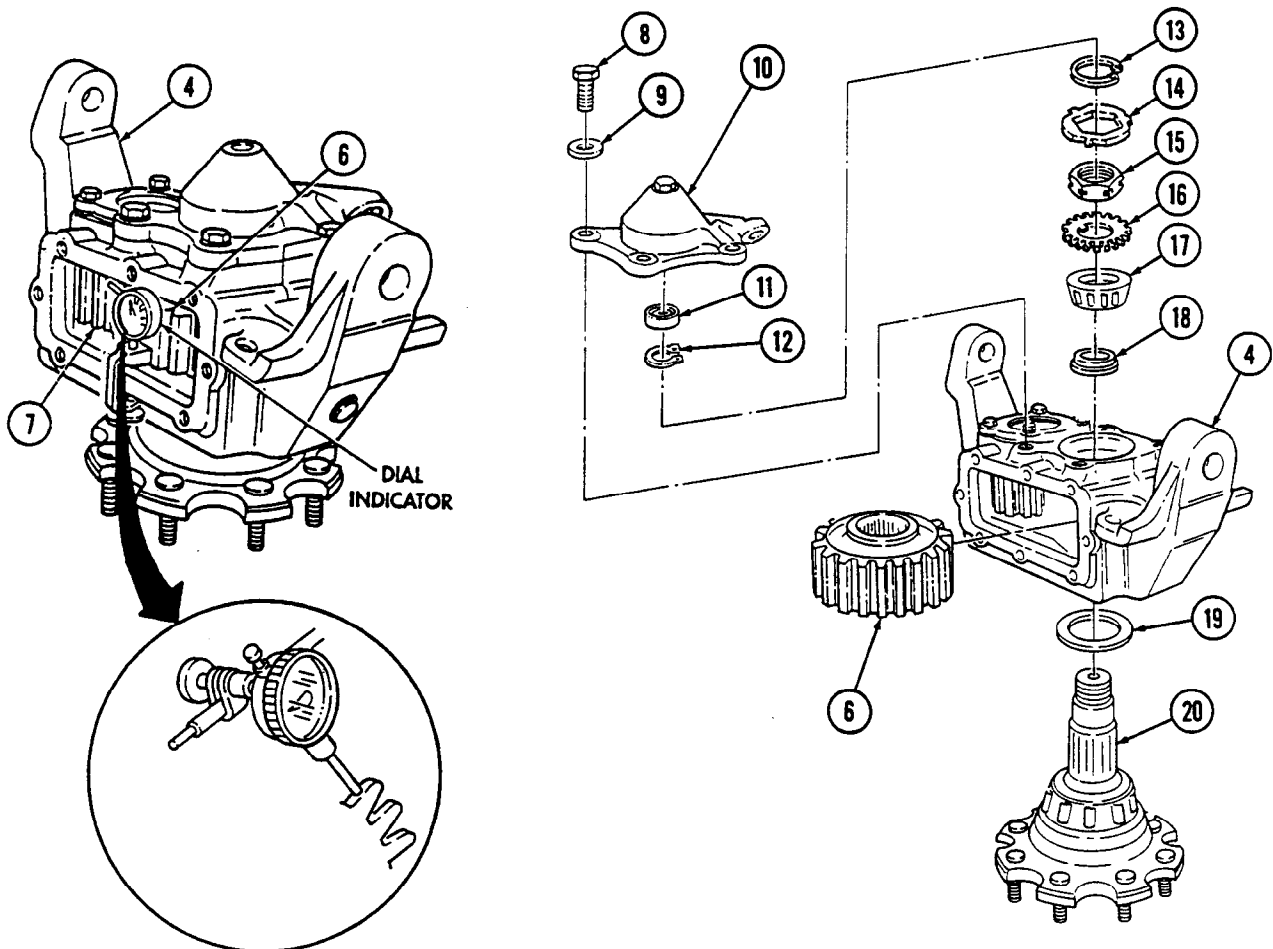
- If backlash between drive and driven gears is more than 0.018 in. (0.46 mm), both gears must be replaced. Worn or damaged bearings may invalidate backlash measurements.
- Backlash measurement must be taken perpendicular to face of gear tooth.

3. Mount dial indicator on geared hub (4) and index indicator to register from one tooth of drive gear (7). Move drive gear (7) back and forth while holding driven gear (6) stationary to read backlash.
4. Remove four capscrews (8), washers (9), and steering arm cover (10) from geared hub (4).
5. Remove retaining ring (12) and seal (11) from steering arm cover (10).
6. Remove retaining ring (13), nut retainer (14), nut (15), and keyed washer (16) from spindle (20).

NOTE

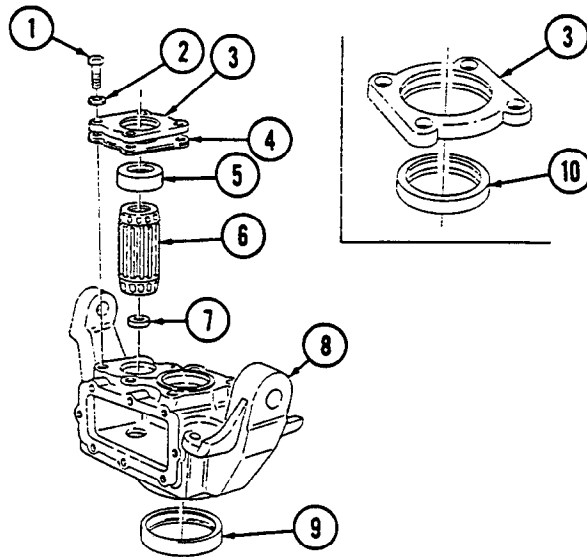
It may be necessary to lightly tap threaded end of spindle to release it from the inner spindle bearing.

7. Lift geared hub (4) off spindle (20).
8. Remove inner bearing (17), inner bearing spindle spacer (18), and driven gear (6) from geared hub (4).
9. Remove outer bearing spacer (19) from spindle (20).



21-6. GEARED HUB REPAIR (Cont'd)

10. Remove four capscrews (1), washers (2), drive gear retainer (3), shim gaskets (4), bearing cup (5), and drive gear (6) from geared hub (8).
11. Remove retaining washer (7) from inside drive gear (6) or geared hub (8).
12. Remove output seal (9) from geared hub (8). Discard seal (9).
13. Remove input seal (10) from drive gear retainer (3). Discard seal (10).



b. Cleaning

Clean all geared hub components in accordance with para. 2-14.

c. Inspection

NOTE

- For general inspection instructions, refer to para. 2-15.
- For general repair instructions, refer to para. 2-16.
- Replace both bearings of a pair if either bearing is damaged.
- A blind hole puller should be used to remove bearing races from geared hub.
- A bearing splitter-type puller should be used to remove drive gear bearings.
- A bearing spacer is seated in geared hub behind inner spindle bearing race. Inspect bearing spacer only if bearing race has to be replaced.

1. Inspect all bearings (12) and bearing races (13) (TM 9-214). Replace if damaged.

NOTE

If all bearings pass inspection and backlash, measured in step 3 of subtask a., was over 0.018 in. (0.45 mm), both drive and driven gears are worn and must be replaced. If any of the bearings failed inspection backlash between drive and driven gear must be rechecked at installation prior to replacing gears. Drive and driven gears must be replaced as matched set.

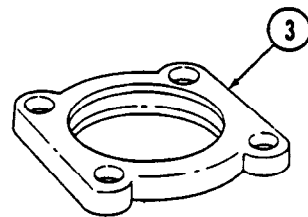
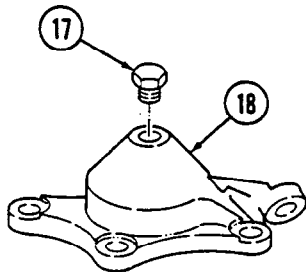
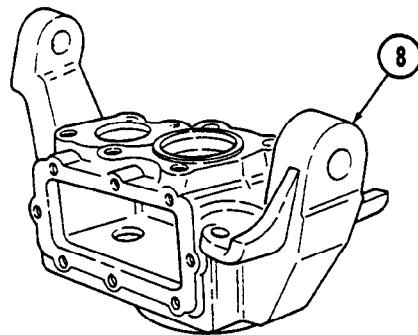
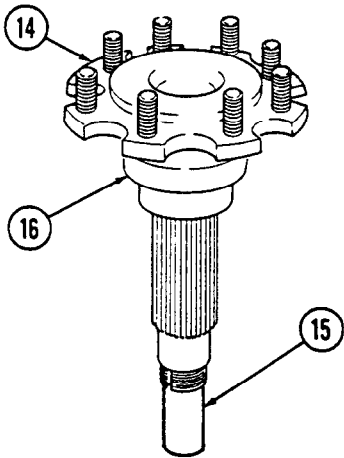
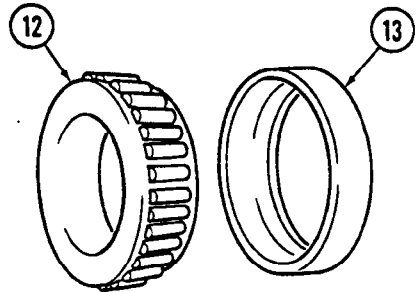
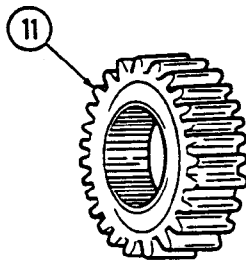
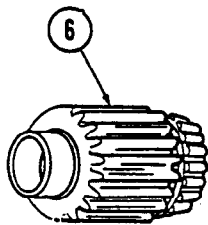
2. Inspect splines and gear teeth on drive gear (6) and driven gear (11). Replace both if damaged.

21-6. GEARED HUB REPAIR (Cont'd)

NOTE

A new spindle extension is required if replacing spindle or if extension is damaged. Apply adhesive sealant on extension prior to pressing it into spindle.

3. Inspect spindle (14) and spindle extension (15) for damage and rough or corroded sealing surface (16). Replace spindle (14) and extension (15) if damaged or if sealing surface (16) is rough or corroded.
4. Inspect geared hub (8) and all threaded holes for damage. Repair any damaged holes using thread repair inserts. Replace geared hub assembly if geared hub (8) is damaged.
5. Remove plug (17) from steering arm cover (18). Inspect steering arm cover (18) and threaded hole. Replace steering arm cover (18) if damaged.
6. Inspect drive gear retainer (3). Replace if damaged.



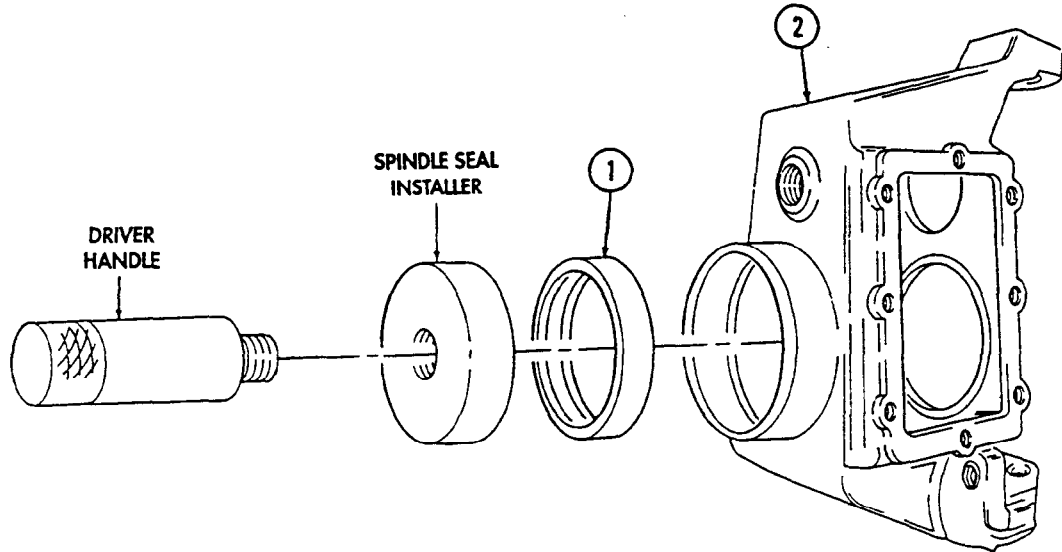
21-6. GEARED HUB REPAIR (Cont'd)

d. Assembly

NOTE

For general assembly instructions, refer to para. 2-17.

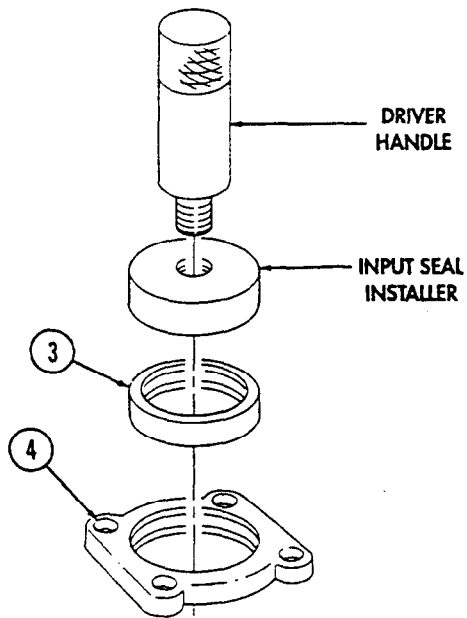
1. Using driver handle and spindle seal installer, install seal (1) in geared hub (2).



NOTE

Ensure radius on outer diameter of input seal faces inside drive gear retainer.

2. Using input seal installer and driver handle, install input seal (3) in drive gear retainer (4).



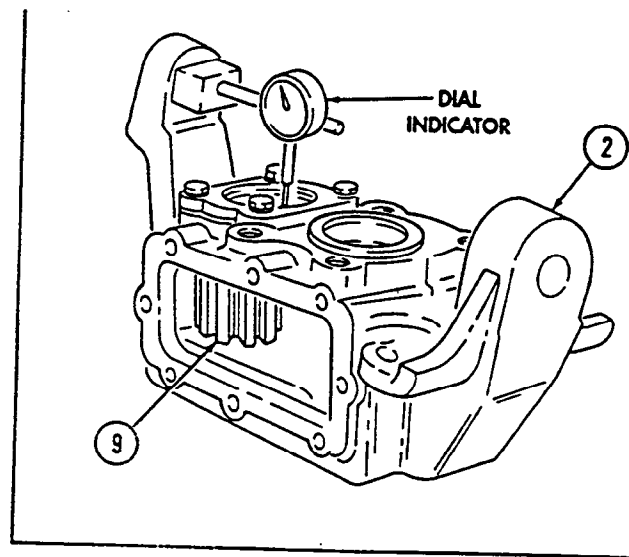
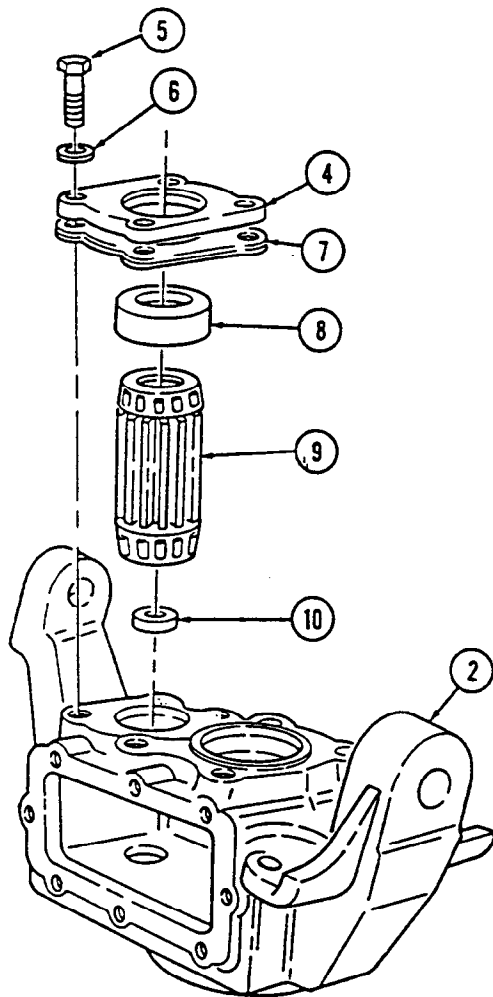
21-6. GEARED HUB REPAIR (Cont'd)

3. Install retaining washer (10) in shallow end of drive gear (9).
4. Install drive gear (9) and inboard bearing cup (8) in geared hub (2).
5. Apply sealing compound to capscrews (5). Install shim gaskets (7) and drive gear retainer (4) on geared hub (2) with four washers (6) and capscrews (5). Tighten capscrews (5) to 25-35 lb-ft (34-48 N·m).
6. Mount dial indicator on geared hub (2) and index indicator to register on end of drive gear (9).

NOTE

Reapply sealing compound to capscrews if removed.

7. Move drive gear (9) up and down to read end play. End play should be 0.001-0.006 in. (0.03-0.15 mm). If end play is incorrect, add or subtract shim gaskets (7) and recheck end play.



21-6. GEARED HUB REPAIR (Cont'd)

8. Install driven gear (11) and spindle spacer (6) in geared hub (7).
9. Install outer bearing spacer (8) on spindle (9).
10. Lower geared hub (7) onto spindle (9) and align splines on driven gear (11) with splines on spindle (9). Ensure outer spindle bearing (10) seats in bearing cup.
11. Apply grease to face of nut (3).
12. Install inner bearing (5), keyed washer (4), and nut (3) on spindle (9).
13. Tighten nut (3) to 40 lb-ft (54 N·m) while rotating geared hub (7) back and forth to seat bearings (4) and (10).
14. Loosen and retighten nut (3) to 23-27 lb-ft (31-37 N·m).

NOTE

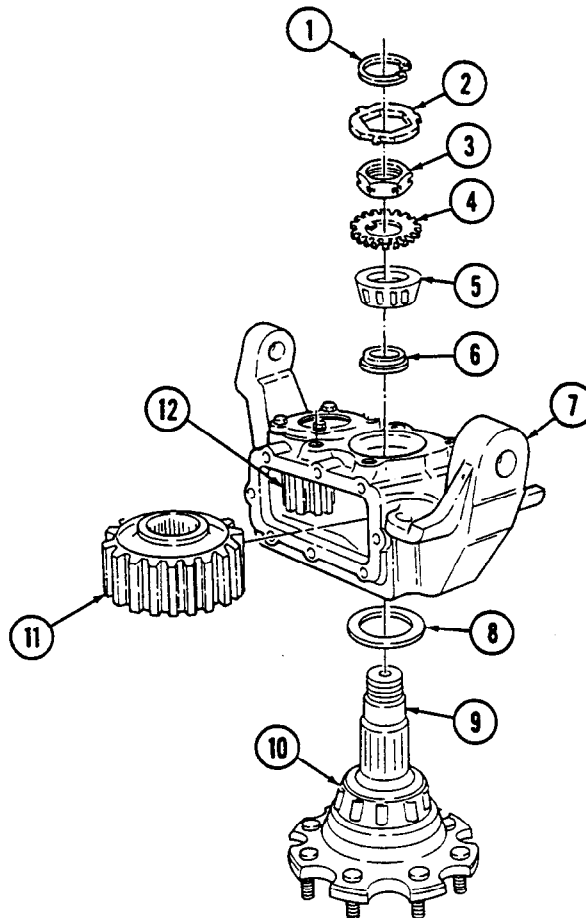
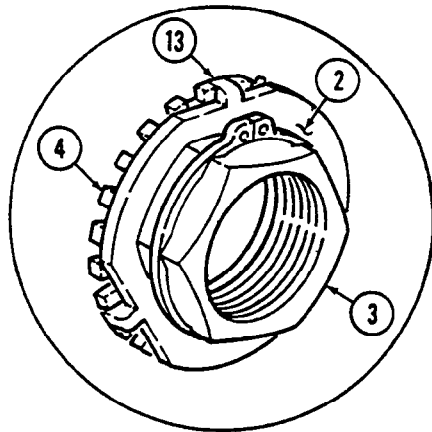
If gear backlash measurement in step 3 of subtask a. indicated a backlash over 0.018 in. (0.46 mm) and any bearings were replaced, remeasure gear backlash.

15. Measure backlash between gears (11) and (12). Refer to subtask a., step 3. If backlash exceeds 0.018 in. (0.44 mm), replace both gears.

NOTE

- It may be necessary to slightly loosen or tighten nut to gain proper alignment with nut retainer and keyed washer.
- Ensure retaining ring is seated in groove on nut.

16. Install nut retainer (2) over nut (3), fitting tabs (13) on retainer (2) in keyed washer (4) and secure with retaining ring (1).

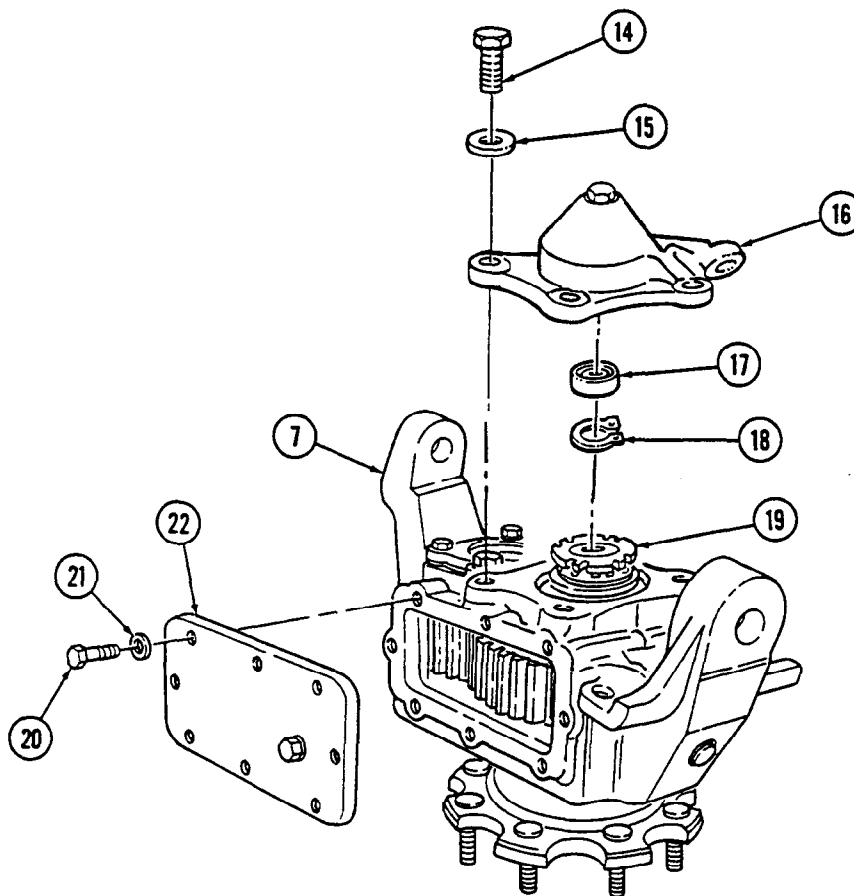


21-6. GEARED HUB REPAIR (Cont'd)

NOTE

Immediately install steering arm cover after application of sealer.

17. Apply sealing compound to seal (17) and install seal (17) on steering arm cover (16) with retaining ring (18).
18. Install steering arm cover (16) on geared hub (7) with four washers (15) and capscrews (14). Tighten capscrews (14) to 65 lb-ft (88 N·m).
19. Apply anaerobic sealer to side cover (22) mating surface and position side cover (22) on geared hub (7).
20. Apply sealing compound to capscrews (20) and install side cover (22) on geared hub (7) with eight washers (21) and capscrews (20). Tighten capscrews (20) to 8-13 lb-ft (11-18 N·m).



FOLLOW-ON TASKS: Install geared hub (para. 6-9).

21-7. CONTROL ARM BUSHING REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Grease (Appendix C, Item 34)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Control arm removed (para. 6-25 or 6-26).

Maintenance Level

Direct support

NOTE

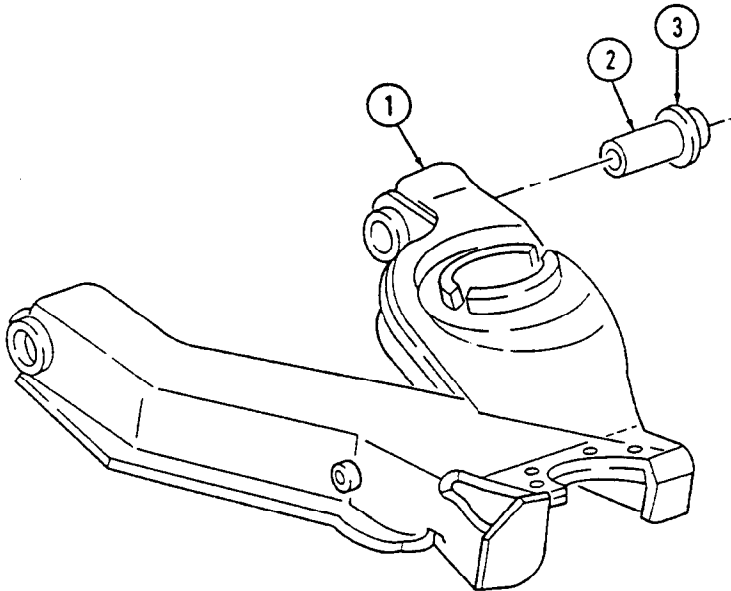
Control arm bushings must be replaced as a set.

a. Removal

Support control arm (1) and press bushing (2) out of control arm (1).

b. Installation

1. Lubricate O.D. of bushing (2) with grease.
2. Insert bushing (2) in control arm (1).
3. Support control arm (1) and press bushing (2) into control arm (1) until flange (3) on bushing (2) seats on control arm (1).



FOLLOW-ON TASK: Install control arm (para. 6-25 or 6-26).

21-8. FRONT PROPELLER SHAFT MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

Front propeller shaft disassembled (para. 6-3).

Maintenance Level

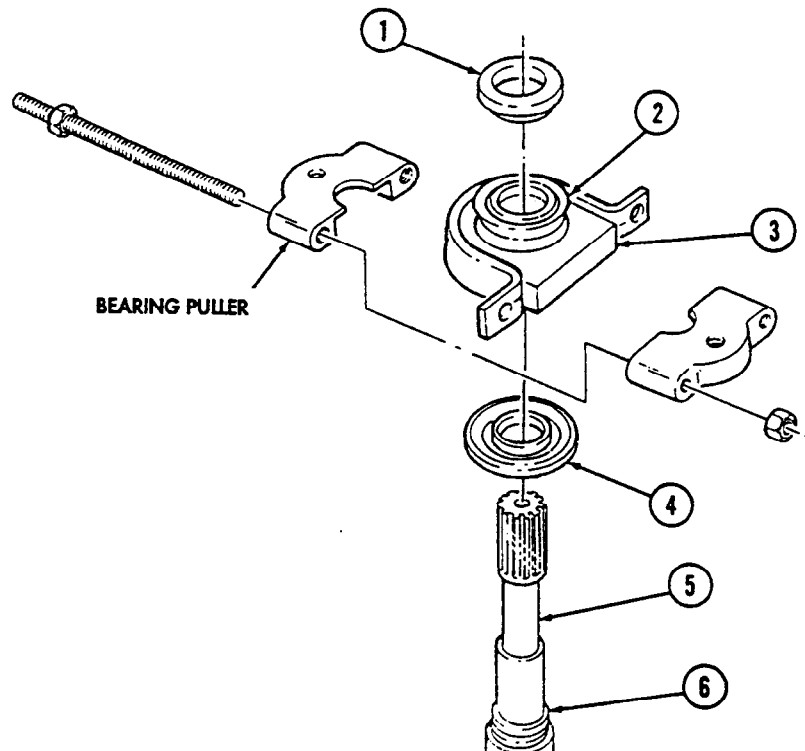
Direct support

a. Disassembly

1. Install bearing puller between center bearing (3) and shield (4).
2. Remove center bearing (3) and retainer (1) from coupling shaft (5).
3. Remove shield (4) from coupling shaft (5).

b. Assembly

1. Install shield (4) on coupling shaft (5).
2. Press center bearing (3) on coupling shaft (5) until seated against shoulder (6). Ensure flange (2) on center bearing (3) faces up.
3. Press bearing retainer (1) on coupling shaft (5).



FOLLOW-ON TASK: Assemble front propeller shaft (para. 6-3).

21-9. DIFFERENTIAL AND AXLE FREE PLAY TOLERANCE INSPECTION

This task covers:

Inspection

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)
 C-clamp (Appendix B, Item 153)

Materials/Parts

Two locknuts (Appendix G, Item 163)

Manual References

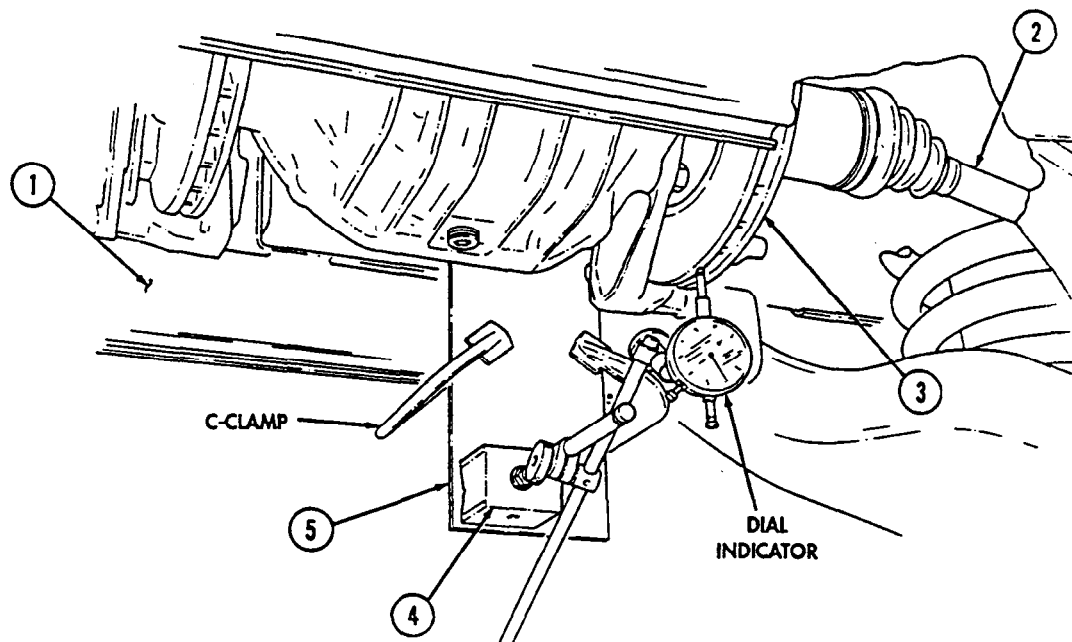
TM 9-2320-387-10
 TM 9-2320-387-24P

Maintenance Level

Direct support

Inspection

1. Park vehicle on a flat surface.
2. Chock front and rear wheels and release parking brake (TM 9-2320-387-10).
3. Use a flat steel plate or scrap metal (5) and C-clamp to position dial indicator mount assembly (4) on crossmember (1).
4. Position dial indicator on disc assembly (3).
5. Manually move axle shaft (2) up and down vertically as far as possible. Note dial indicator reading in each direction and record combined readings.
6. If sum of up and down vertical movement exceeds 0.0236 in. (0.5994 mm), notify general support to disassemble differential, inspect for excessive wear, and replace worn components (para. 30-3).
7. Repeat steps 1 through 6 for remaining axles.



CHAPTER 22

SERVICE BRAKE SYSTEM (DS) MAINTENANCE

22-1. INTRODUCTION

This chapter contains maintenance instructions for repair of service brake system components at the direct support maintenance level. Some subassemblies and parts must be removed before service brake system components can be accessed. They are referenced to other paragraphs of this manual.

22-2. SERVICE BRAKE SYSTEM MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
22-3.	Brake Rotor Repair	22-2
22-4.	Disc Brake Caliper Repair	22-4
22-5.	Rear Parking Brake Caliper Repair	22-8

22-3. BRAKE ROTOR REPAIR

This task covers:

- | | |
|--|--|
| <p>a. Inspection</p> <p>b. Checking Lateral Runout</p> | <p>c. Checking Thickness Variation</p> <p>d. Refinishing</p> |
|--|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)
 Micrometer (Appendix B, Item 156)

Materials/Parts

Abrasive crocus cloth (Appendix C, Item 22)

Manual References

TM 9-2320-387-24P

Equipment Condition

Brake rotor removed (para. 7-12).

Maintenance Level

Direct support

a. Inspection

NOTE

If rotor braking surfaces are rusted or scaled, they must be cleaned before attempting inspection or measurement.

1. Mount rotor (1) in brake lathe and turn while cleaning surfaces with abrasive crocus cloth.
2. Inspect rotor (1) for heat cracks, nicks, scoring, discoloration, and pitting. Replace if damaged.

b. Checking Lateral Runout

1. Mount dial indicator with stylus contacting rotor (1) surface 1 in. (25 mm) in from outer edge.
2. Turn rotor (1) 360° and note indicator reading.
3. If lateral runout exceeds 0.004 in. (0.10 mm) total, replace or refinish rotor.

c. Checking Thickness Variation

1. Measure thickness variation of rotor (1) with a micrometer at four equally-spaced points around rotor (1). Measure 1 in. (25 mm) in from outer edge.

NOTE

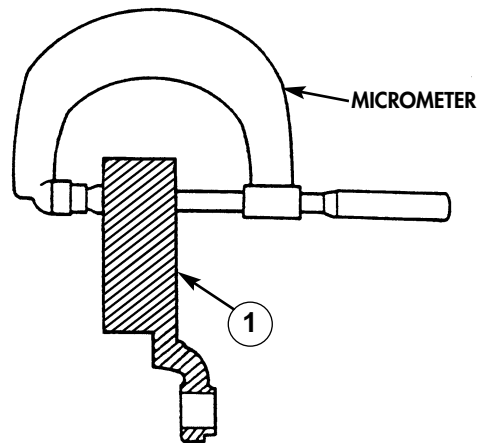
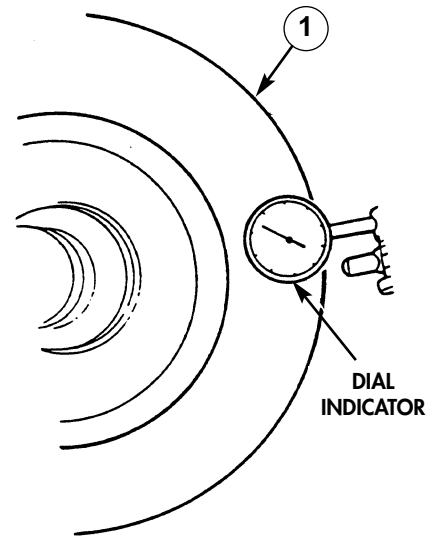
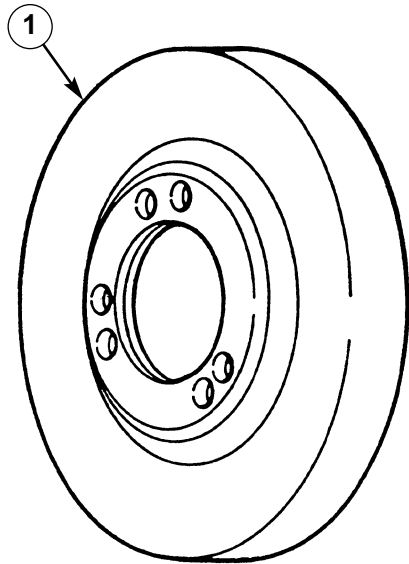
Rotor must be replaced if minimum thickness falls below 0.815 in. (20.7 mm).

2. If thickness variation exceeds 0.005 in. (0.13 mm), replace or refinish rotor (1).

d. Refinishing

1. Mount rotor (1) on brake lathe and refinish surface.
2. Replace rotor (1) if refinishing causes rotor (1) to fall below minimum thickness, 0.815 in. (20.7 mm).

22-3. BRAKE ROTOR REPAIR (CONT'D)



FOLLOW-ON TASK: Install brake rotor (para. 7-12).

22-4. DISC BRAKE CALIPER REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Inspection d. Assembly |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Service brake caliper kit
(Appendix G, Item 439)
Abrasive crocus cloth (Appendix C, Item 22)
Brake fluid, silicone (Appendix C, Item 18)

Manual References

TM 9-2320-387-24P

Equipment Condition

Disc brake caliper removed (para. 7-4).

General Safety Instructions

- Hold caliper so piston is facing away from your body. Keep fingers out of space between piston and wood block.
- Compressed air will not exceed 30 psi (207 kPa). Eyeshield must be worn.

Maintenance Level

Direct support

a. Disassembly

WARNING

- Hold caliper so piston is facing away from your body. Keep fingers out of space between piston and wood block. Failure to do this may cause injury to personnel.
 - Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).
1. Insert wood block between jaw of caliper (3) and piston (1).
 2. Remove piston (1) from caliper (3) by applying air pressure to hose inlet (2) of caliper (3).

CAUTION

Do not use metal tools to remove dust boot and seal from caliper.
Damage to caliper bore may result.

3. Remove piston dust boot (4) and seal (5) from caliper bore (6). Discard dust boot (4) and seal (5).
4. Remove bleeder screw (7) from caliper (3).

b. Cleaning

Clean disc brake caliper components in accordance with para. 2-14.

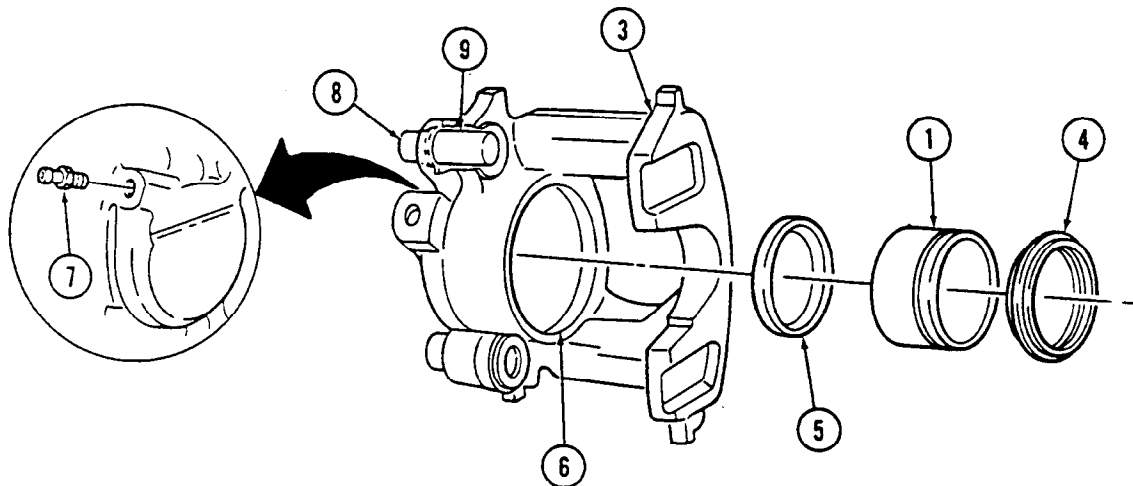
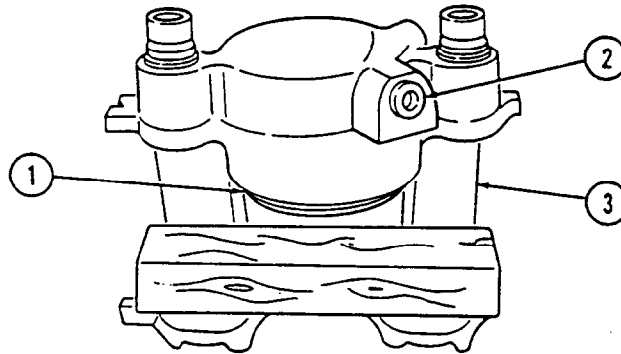
22-4. DISC BRAKE CALIPER REPAIR (Cont'd)

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect caliper bore (6) for scoring, nicks, or corrosion. Bore (6) is not plated and minor corrosion can be polished with abrasive crocus cloth. Replace caliper (3) if bore (6) is not repairable.
2. Inspect piston (1) O.D. for scoring, nicks, corrosion, and worn or damaged chrome plating. Replace piston (1) if there are any surface defects.
3. Inspect bleeder screw (7) for damage or stripped threads. Replace if damaged.
4. Inspect seal (8) and bushing (9) for damage. Replace both if either is damaged.



22-4. DISC BRAKE CALIPER REPAIR (Cont'd)

d. Assembly

CAUTION

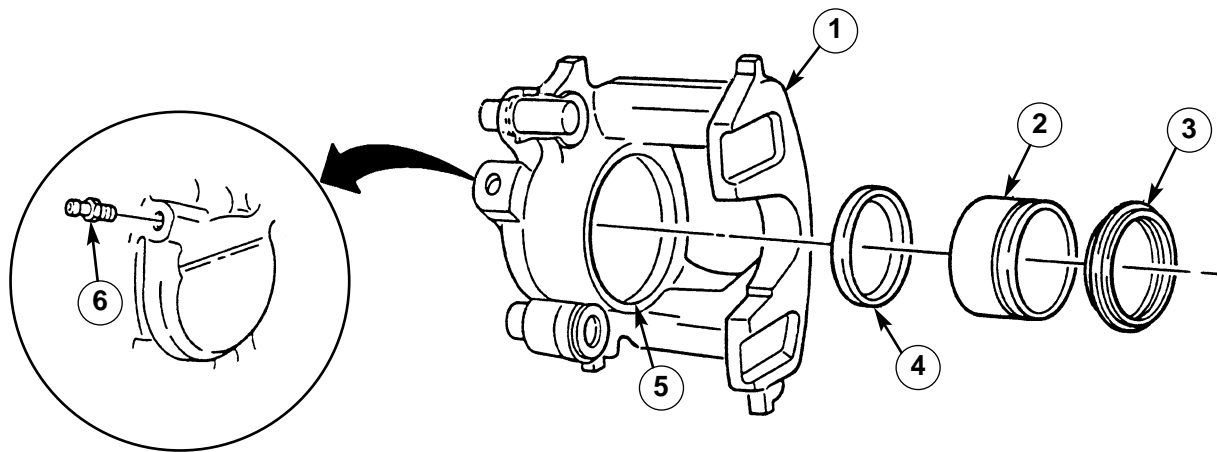
Use silicone brake fluid only, MIL-B-46176. Failure to use BFS will cause damage to brake system.

NOTE

For general assembly instructions, refer to para. 2-17.

1. Lubricate caliper bore (5) and seal (4) with brake fluid.
2. Install seal (4) in groove of caliper bore (5).
3. Lubricate piston (2) with brake fluid and install dust boot (3) on piston (2).
4. Work piston (2) and dust boot (3) into caliper bore (5).
5. Seat dust boot (3) in caliper (1).
6. Install bleeder screw (6) in caliper (1) finger-tight.

22-4. DISC BRAKE CALIPER REPAIR (Cont'd)



FOLLOW-ON TASK: Install disc brake caliper (para. 7-4).

22-5. REAR PARKING BRAKE CALIPER REPAIR

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Rear brake caliper kit
 (Appendix G, Item 314.1)
 Brake fluid, silicone (Appendix C, Item 18)
 Hex wrench (Appendix D, Fig. 103) (optional)
 Open-end wrench (Appendix D, Fig. 104)
 (optional)
 Parking brake spring tool
 (Appendix D, Fig. 105) (optional)

Manual References

TM 9-2320-387-24P

Equipment Condition

Rear parking brake caliper removed
 (para. 7-15).

Maintenance Level

Direct support

a. Disassembly

NOTE

Refer to instructions for parking brake spring tool (Appendix D, Fig. 106) (optional).

1. Remove parking brake spring (10) from parking brake lever (9) and caliper housing (1).
2. Remove screw (11) and parking brake lever (9) from actuator shaft (12).
3. Remove piston cap (25) from piston (21).
4. Remove piston retaining screw (23) from piston (21).
5. Turn piston (21) counterclockwise and remove from caliper housing (1).
6. Remove piston boot (24) and piston seal (20) from caliper housing (1).
7. Remove thrust screw retaining ring (19) and thrust screw spring shield (26) from caliper housing (1).
8. Remove thrust screw spring (27) and thrust screw (28) from caliper housing (1).
9. Remove three actuator shaft bearings (18), bearing plate (17), actuator shaft (12), and washers (15) and (16) from caliper housing (1).
10. Remove actuator dust seal (13) from caliper housing (1). Discard dust seal (13).
11. Remove pin retaining plug assembly (5), antirotation pin spacer (6), and antirotation pin (7) from caliper housing (1).
12. Remove bleeder screw cap (3) and bleeder screw (2) from caliper housing (1).
13. Remove O-rings (4) and (8) from retaining plug assembly (5) and antirotation pin (7). Remove O-rings (22) and (14) from piston retaining screw (23) and actuator shaft (12). Discard O-rings (4), (8), (22), and (14).

22-5. REAR PARKING BRAKE CALIPER REPAIR (Cont'd)

b. Cleaning

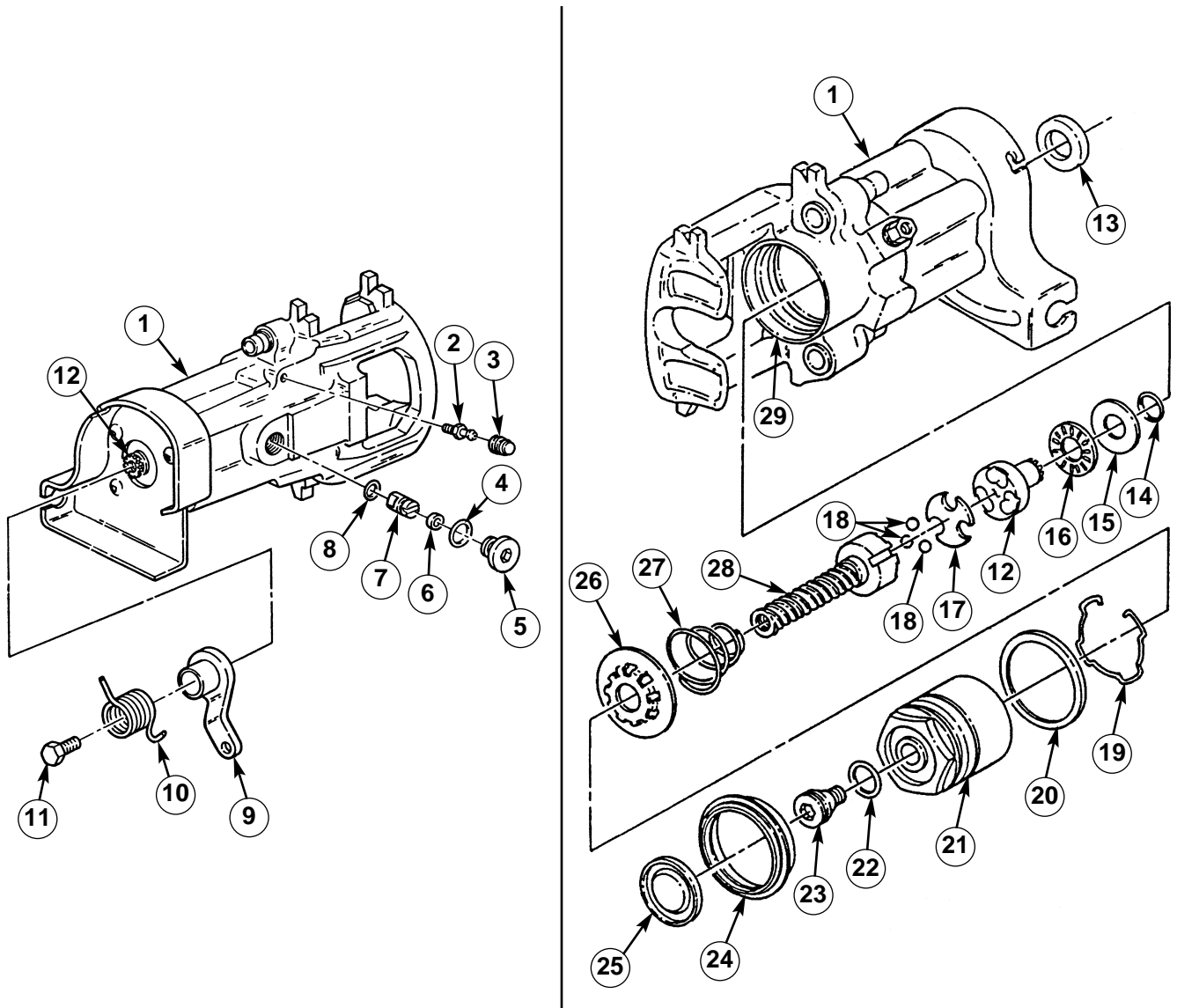
Clean rear brake caliper components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect caliper bore (29) for scoring, nicks, or corrosion. Replace if damaged.
2. Inspect piston (21) O.D. for scoring, nicks, corrosion, and worn or damaged plating. Replace piston (21) if there are any surface defects.
3. Inspect bleeder screw (2) for damage or stripped threads. Replace if damaged.
4. Inspect piston seal (20) and actuator shaft dust shield (13) for damage. Replace if damaged.



22-5. REAR PARKING BRAKE CALIPER REPAIR (Cont'd)

d. Assembly

CAUTION

Use silicone brake fluid only, MIL-B-46176. Failure to use BFS will cause damage to brake system.

NOTE

- For general assembly instructions, refer to para. 2-17.
- Lubricate caliper bore, piston, and piston seal with brake fluid.

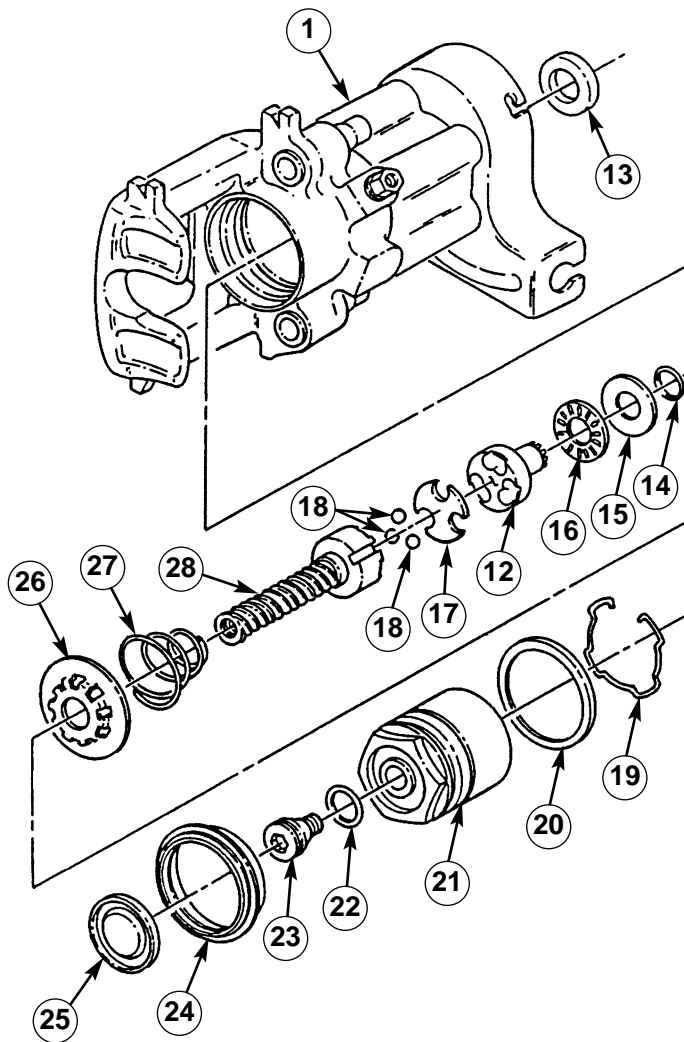
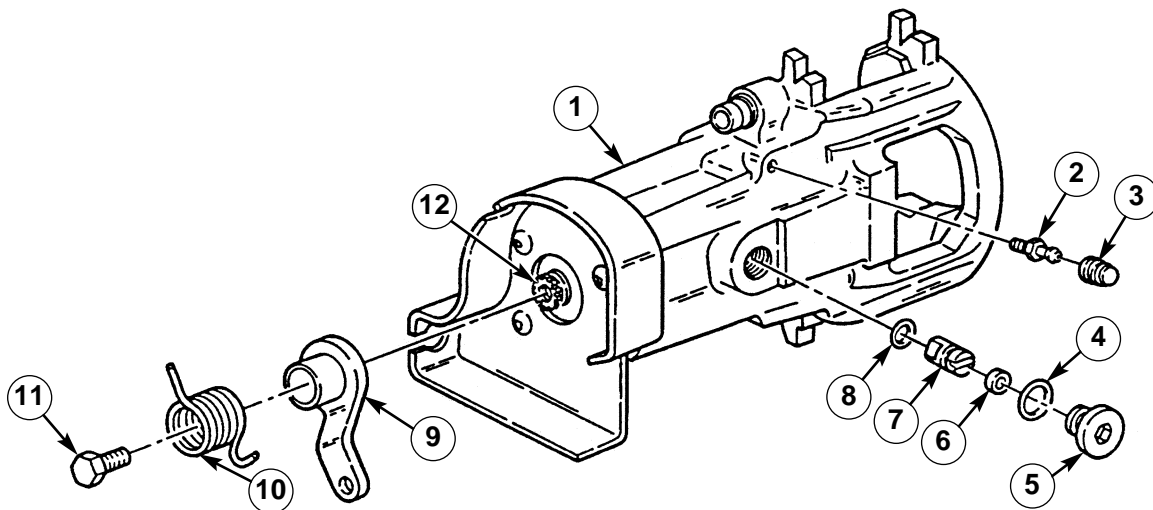
1. Install O-rings (22) and (14) on piston retaining screw (23) and actuator shaft (12).
2. Install O-rings (4) and (8) on pin retaining plug assembly (5) and antirotation pin (7).
3. Install actuator shaft dust seal (13) in caliper housing (1).
4. Install washers (15) and (16) and actuator shaft (12) in caliper housing (1).
5. Install bearing plate (17) and three actuator shaft bearings (18) in caliper housing (1).
6. Install thrust screw (28) in caliper housing (1).

NOTE

Ensure slot in thrust screw is aligned with hole in caliper housing for antirotation pin.

7. Install antirotation pin (7), antirotation pin spacer (6), and pin retaining plug assembly (5) in caliper housing (1). Tighten plug (5) to 8-12 lb-ft (11-16 N·m).
8. Install screw spring (27) and thrust screw spring shield (26) and secure with thrust screw retaining ring (19).
9. Install piston seal (20) in caliper housing (1).
10. Install piston (21) in caliper housing (1) by turning piston (21) clockwise and pushing in on piston (21).
11. Install piston boot (24) on caliper housing (1) and piston (21).
12. Install piston retaining screw (23) in piston (21). Tighten screw (23) to 15-22 lb-ft (20-30 N·m).
13. Install piston cap (25) in piston (21).
14. Install parking brake lever (9) on actuator shaft (12) with screw (11). Tighten screw (11) to 15-25 lb-ft (20-34 N·m).
15. Install parking brake spring (10) on caliper housing (1) and parking brake lever (9).
16. Install bleeder screw (2) in caliper housing (1). Tighten screw (2) to 6-15 lb-ft (8-20 N·m).
17. Install bleeder screw cap (3) on bleeder screw (2).

22-5. REAR PARKING BRAKE CALIPER REPAIR (Cont'd)



FOLLOW-ON TASK: Install rear parking brake caliper (para 7-15).

CHAPTER 23

STEERING SYSTEM (DS) MAINTENANCE

23-1. INTRODUCTION

This chapter contains maintenance instructions for repair and testing of steering system components at the direct support maintenance level. Some subassemblies and parts must be removed before steering system components can be accessed. They are referenced to other paragraphs in this manual.

23-2. STEERING SYSTEM MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
23-3.	Power Steering Pump Repair	23-2
23-4.	Power Steering Pump and Steering Gear Leak Test	23-6

23-3. POWER STEERING PUMP REPAIR

This task covers:

- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Seal service kit (Appendix G Item 403)

Manual References

TM 9-2320-387-24P

Equipment Condition

Power steering pump removed (para. 8-23).

Maintenance Level

Direct support

a. Disassembly

NOTE

Have drainage container ready to catch fluid.

1. Remove reservoir filler cap (1) and drain fluid from pump assembly (7).
2. Remove two mounting studs (2) from pump assembly (7).

NOTE

Fitting assembly is spring-loaded. Remove carefully to avoid losing parts.

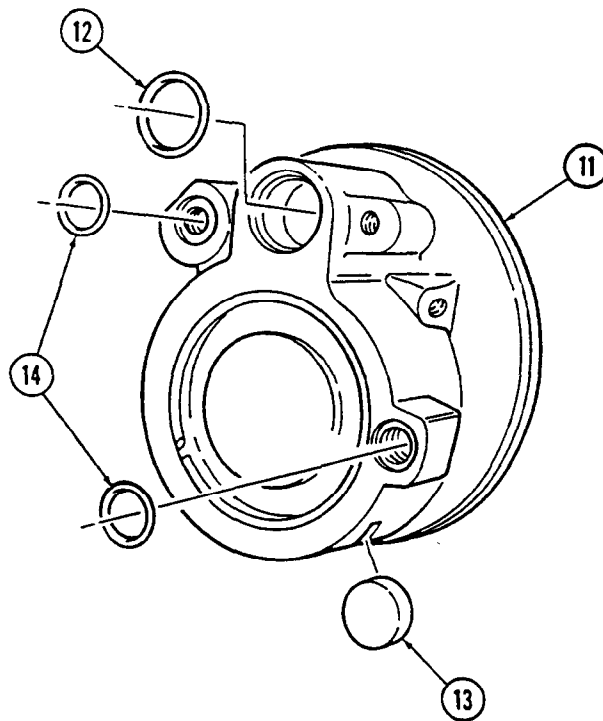
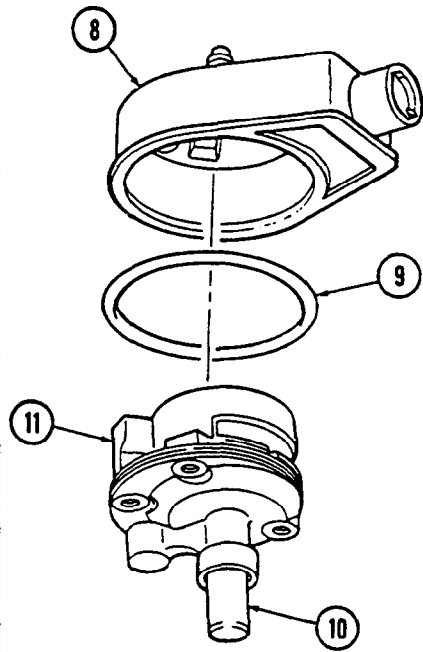
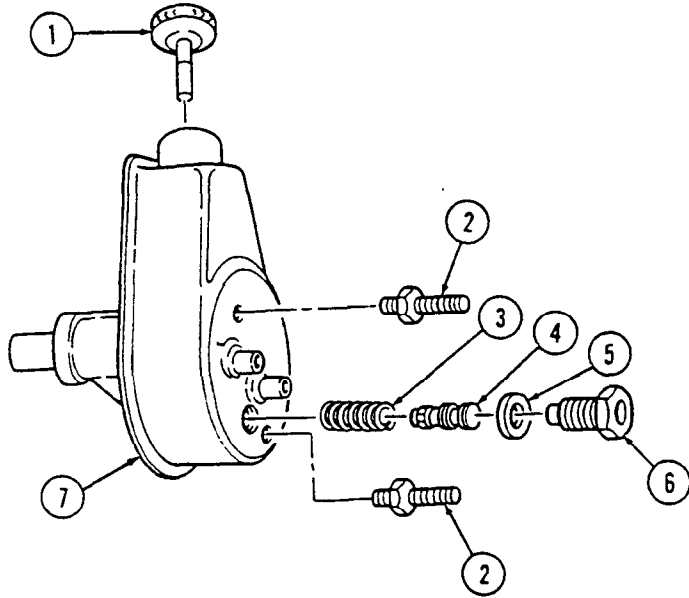
3. Remove fitting assembly (6) and O-ring seal (5) from pump assembly (7). Discard O-ring seal (5).
4. Remove flow control valve (4) and valve spring (3) from pump assembly (7).

CAUTION

Do not overtighten vise as pump body could be distorted.

5. Place pump assembly (7) in vise so pump shaft (10) is pointing down.
6. Tap lightly around edge of reservoir (8).
7. Remove reservoir (8) and O-ring seal (9) from pump body (11). Discard O-ring seal (9).
8. Remove two O-ring seals (14) from pump body (11). Discard O-ring seals (14).
9. Remove magnet (13) from pump body (11). Discard magnet (13).
10. Remove O-ring seal (12) from pump body (11). Discard O-ring seal (12).

23-3. POWER STEERING PUMP REPAIR (Cont'd)



23-3. POWER STEERING PUMP REPAIR (Cont'd)

b. Cleaning

Clean all power steering pump components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

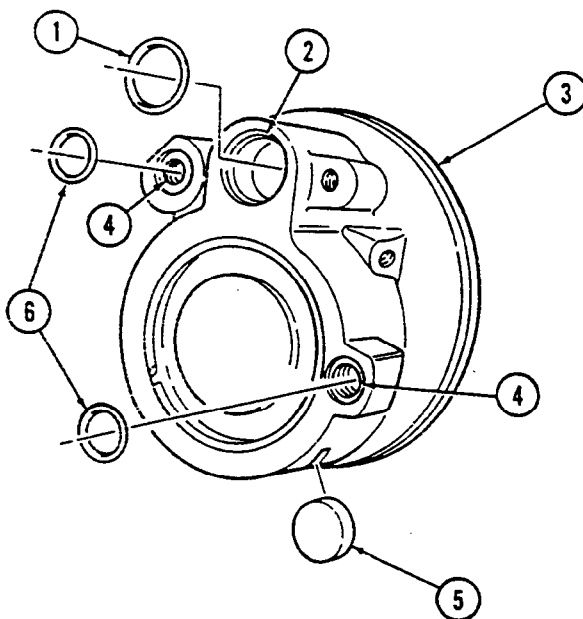
1. Inspect external surface of flow control valve (12) for burrs, nicks, or damage. Inspect flow control valve (12) bore and screen for damage or debris. Inspect valve spring (11) for damage. Replace both flow control valve (12) and valve spring (11) if either is damaged.
2. Inspect studs (10). Replace if damaged.
3. Inspect fitting (14). Replace if damaged.
4. Inspect reservoir filler cap (9). Replace if damaged.
5. Inspect pump body (3). Replace entire power steering pump assembly (15) if pump body (3) is damaged.

d. Assembly

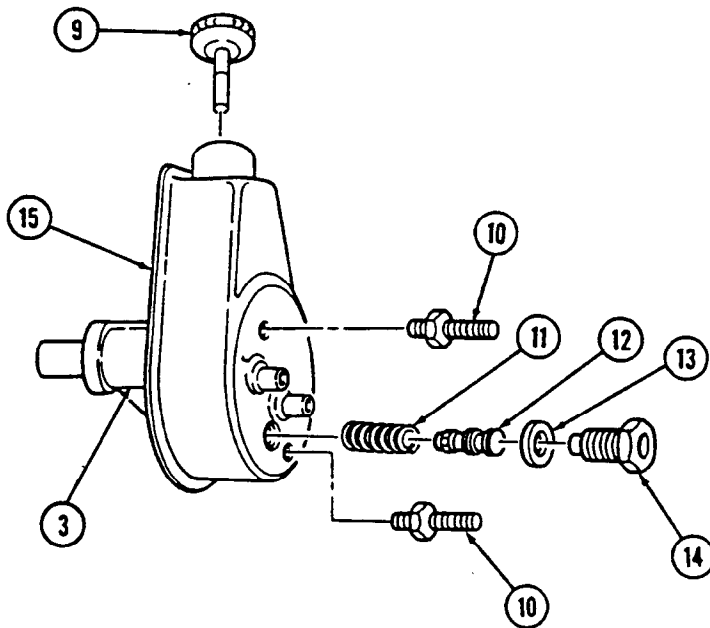
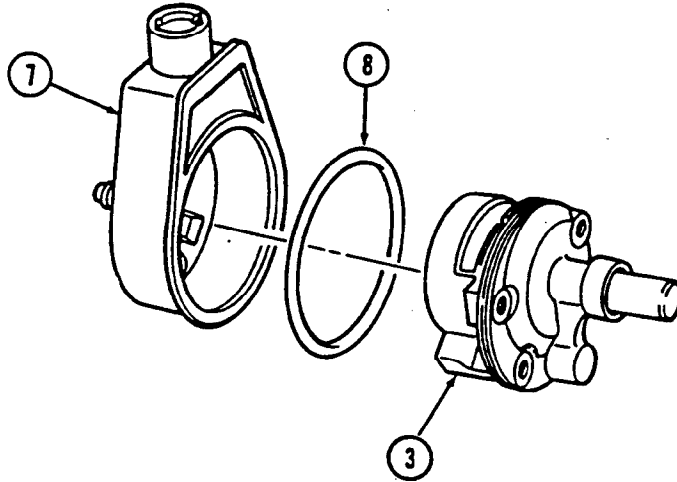
NOTE

For general assembly instructions, refer to para. 2-17.

1. Install magnet (5) in pump body (3).
2. Install O-ring seal (1) into control valve cavity (2) and two O-ring seals (6) into threaded holes (4).
3. Install O-ring seal (8) on pump body (3).
4. Install reservoir (7) on pump body (3).
5. Install two studs (10) on pump assembly (15). Tighten studs (10) to 26 lb-ft (35 N·m).
6. Install valve spring (11) and flow control valve (12) in pump assembly (15).
7. Install O-ring seal (13) and fitting (14) in pump assembly (15). Tighten fitting (14) in pump assembly (15) to 37 lb-ft (50 N·m).
8. Install reservoir filler cap (9) on pump assembly (15).



23-3. POWER STEERING PUMP REPAIR (Cont'd)



- FOLLOW-ON TASKS:**
- Perform leak test (para. 23-4).
 - Install power steering pump (para. 8-23).

23-4. POWER STEERING PUMP AND STEERING GEAR LEAK TEST

This task covers:

Leak Test

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Power steering analyzer
 (Appendix B, Item 120)
 Power steering pump and gear test stand
 (Appendix D, Fig. D-77)

Manual References

TM 9-2320-387-10

Equipment Condition

- Power steering pump and steering gear installed properly on test stand.
- Power steering fluid at proper level (TM 9-2320-387-10).

Maintenance Level

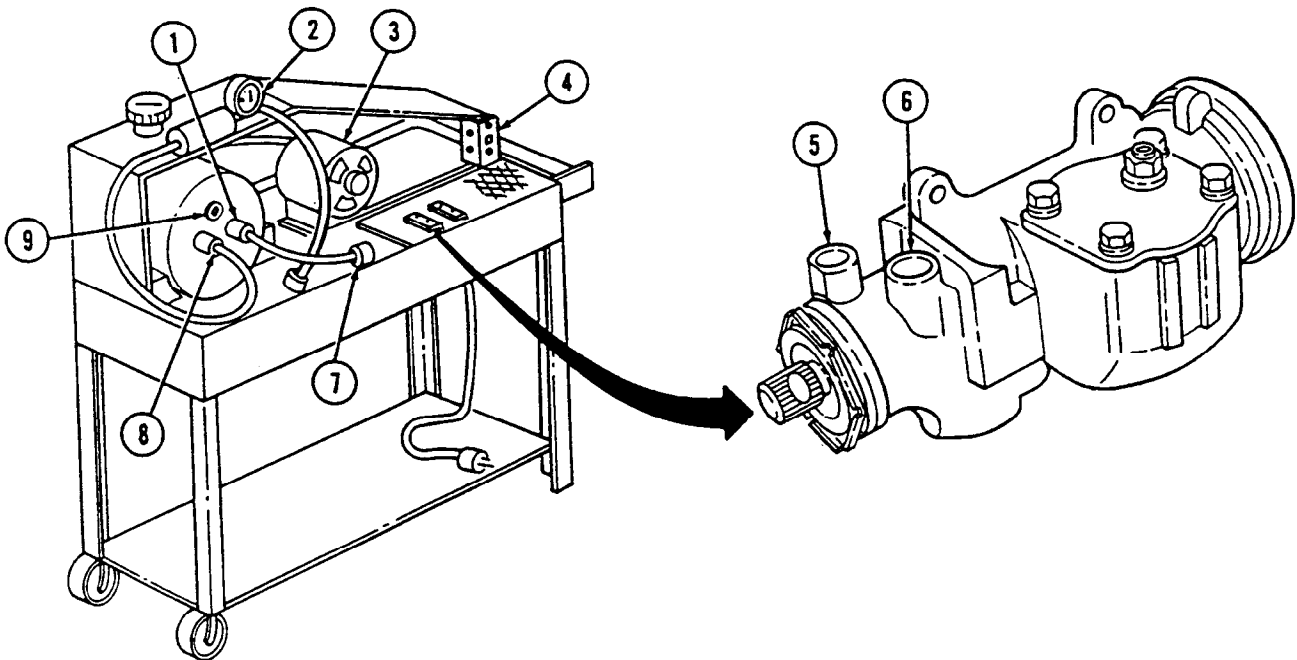
Direct support

Leak Test

NOTE

Mounting of components to stand is left to discretion of user.

1. Connect power steering analyzer (2) between power steering pump high-pressure (output) side (8) and steering gear inlet (6).
2. Connect a pressure hose (7) between power steering return port (1) and steering gear outlet (5).
3. Plug unused power steering pump return port (9).
4. Start electric motor (3) using on/off switch (4).
5. Power steering pump should be operated at 455-1,475 RPM.
6. Adjust power steering analyzer pressure to 140-170 psi (965-1,172 kPa).
7. Check power steering pump and steering gear for leaks.



CHAPTER 24

FRAME (DS) MAINTENANCE

24-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repair of frame components at the direct support maintenance level. Some subassemblies and parts must be removed before frame components can be accessed. They are referenced to other paragraphs of this manual.

24-2. GENERAL

Refer to technical bulletin (TB 9-2300-247-40) for repairs on frames used on the M1113/M1114 series vehicles. Refer to TM 9-2320-387-24P for authorized replacement parts used in frame repair.

24-3. FRAME MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
24-4.	Splash Shield Support Bracket Replacement	24-2
24-5.	Spring Seat Replacement	24-3
24-6.	Front Suspension Brace Replacement	24-4
24-7.	Left Airlift Bracket and Front Upper Control Arm Brackets Replacement	24-6
24-8.	Right Airlift Bracket and Front Upper Control Arm Brackets Replacement	24-8
24-9.	Right Engine Mount Bracket Replacement	24-10
24-10.	Left Engine Mount Bracket Replacement	24-12
24-11.	Rear Upper Control Arm Bracket Replacement	24-14
24-12.	Rear-Rear Tiedown Bracket Replacement	24-16
24-13.	Transmission Crossmember Support Bracket Replacement	24-17
24-14.	Rear-Front Tiedown Bracket Replacement	24-18
24-15.	Differential Support Bracket and Side Mounting Bracket Replacement	24-20
24-16.	Front Suspension Front Crossmember Replacement	24-24
24-17.	Front Suspension Rear Crossmember Replacement	24-26
24-18.	Rear Suspension Front Crossmember Replacement	24-30
24-19.	Rear Suspension Rear Crossmember Replacement	24-34
24-20.	Suspension Crossmember Repair	24-36
24-21.	Rear Crossmember Bracket and Rear Body Mount Bracket Replacement	24-38
24-22.	Rear Bumper Mounting Bracket and Tiedown Bracket Replacement	24-40

24-4. SPLASH SHIELD SUPPORT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

Materials/Parts

Three locknuts (Appendix G, Item 121)

Maintenance Level

Direct support

Manual References

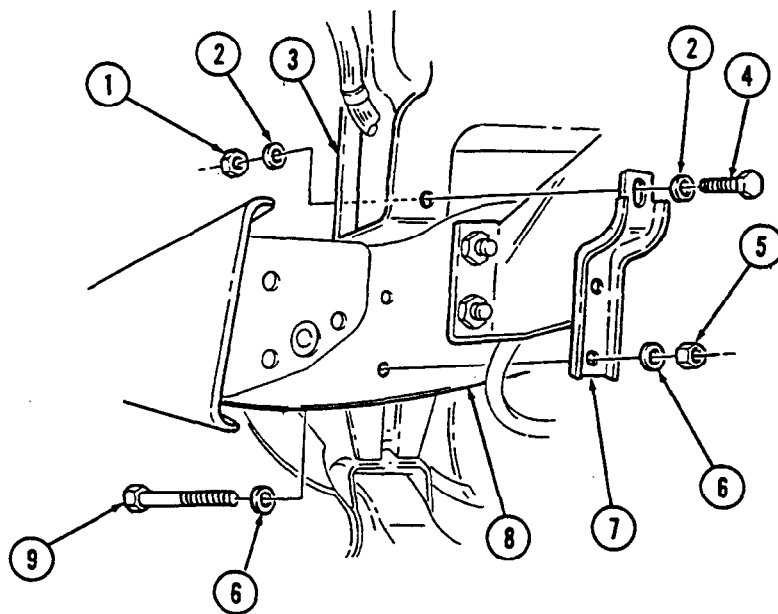
TM 9-2320-387-10
TM 9-2320-387-24P

a. Removal

1. Remove locknut (1), washer (2), capscrew (4), washer (2), and splash shield (3) from bracket (7). Discard locknut (1).
2. Remove two locknuts (5), washers (6), capscrews (9), washers (6), and bracket (7) from frame rail (8). Discard locknuts (5).

b. Installation

1. Install bracket (7) on frame rail (8) with two washers (6), capscrews (9), washers (6), and locknuts (5). Tighten locknuts (5) to 90 lb-ft (122 N·m).
2. Install splash shield (3) on bracket (7) with washer (2), capscrew (4), washer (2), and locknut (1). Tighten capscrew (4) to 15 lb-ft (20 N·m).



FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

24-5. SPRING SEAT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Coil spring removed (para. 6-27).

Materials/Parts

Four locknuts (Appendix G, Item 121)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

a. Removal

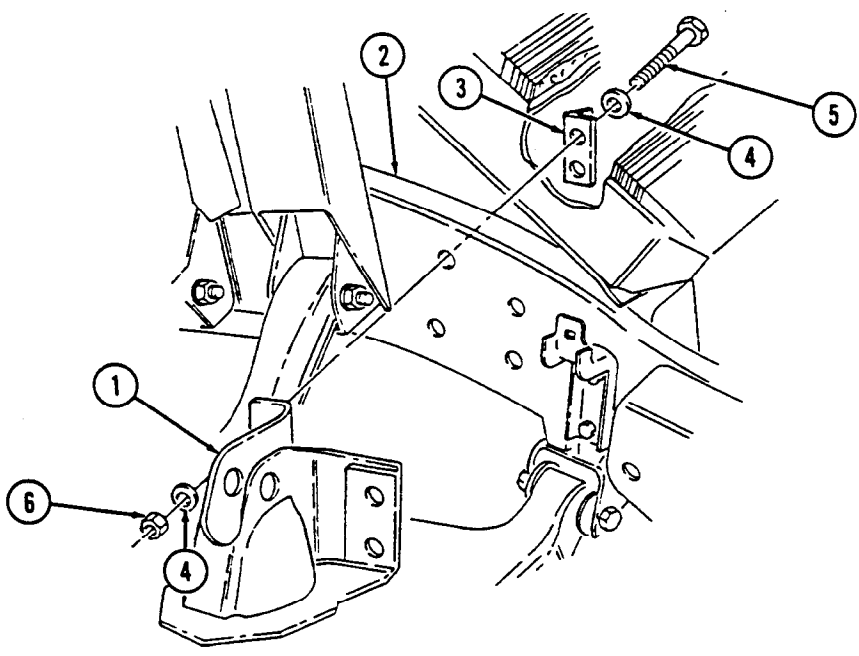
NOTE

The replacement procedure for the four spring seats is basically the same. This procedure covers the right front spring seat.

Remove four locknuts (6), washers (4), capscrews (5), washers (4), two spring brackets (3), and spring seat (1) from frame rail (2). Discard locknuts (6).

b. Installation

Install two spring brackets (3) and spring seat (1) on frame rail (2) with four washers (4), capscrews (5), washers (4), and locknuts (6). Tighten locknuts (6) to 260 lb-ft (353 N.m).



FOLLOW-ON TASK: Install coil spring (para. 6-27).

24-6. FRONT SUSPENSION BRACE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three locknuts (Appendix G, Item 156)

Manual References

TM 9-2320-387-24P

Equipment Condition

Winch removed (M1113 only) (para. 12-27).

General Safety Instructions

Lower control arm must be supported during removal and installation.

Maintenance Level

Direct support

WARNING

Lower control arm must be supported during removal and installation. Failure to support lower control arm may cause injury to personnel or damage to equipment.

NOTE

Replacement procedures for left and right front suspension braces are basically the same. This procedure covers the left front suspension brace.

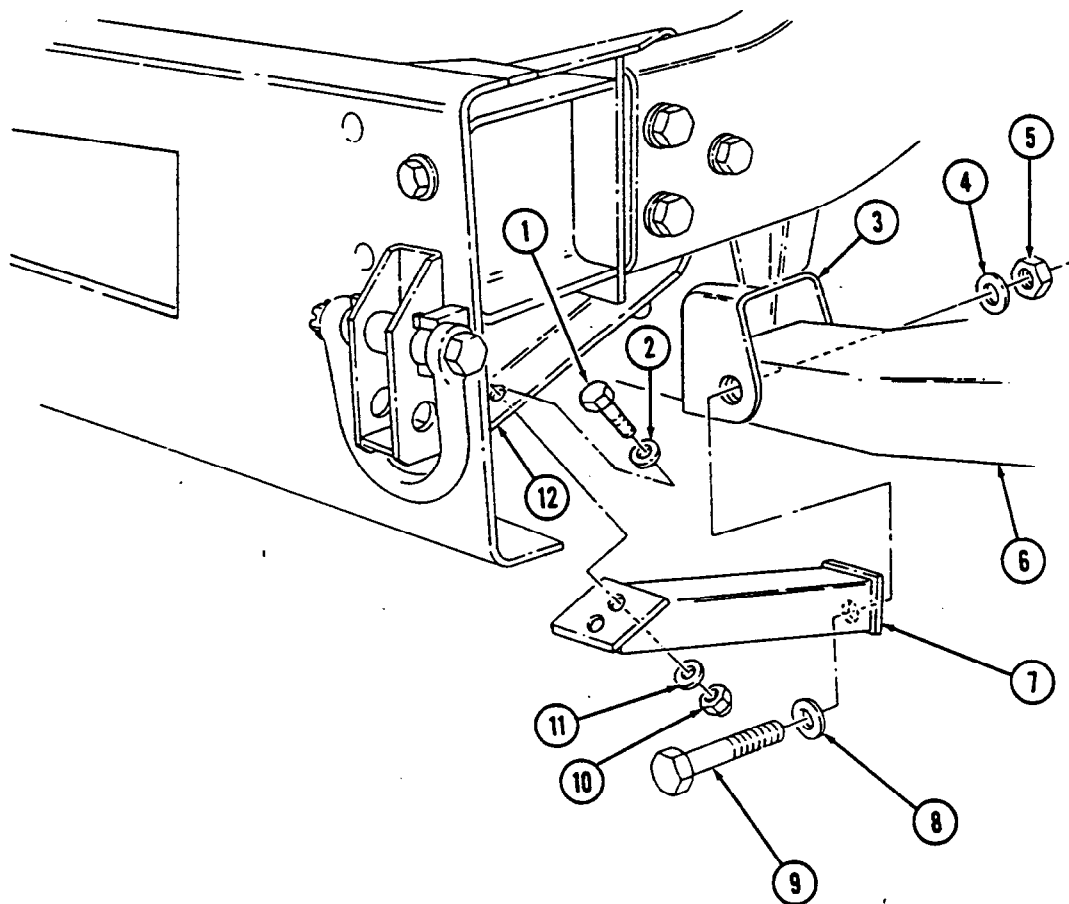
a. Removal

1. Remove two locknuts (10), washers (11), capscrews (1), and washers (2) from brace (7) and frame extension (12). Discard locknuts (10).
2. Remove locknut (5), washer (4), capscrew (9), washer (8), and brace (7) from lower control arm (6) and crossmember (3). Discard locknut (5).

b. Installation

1. Install brace (7) on crossmember (3) and lower control arm (6) with washer (8), capscrew (9), washer (4), and locknut (5). Do not tighten locknut (5).
2. Install brace (7) on frame extension (12) with two washers (2), capscrews (1), washers (11), and locknuts (10). Do not tighten locknuts (10).
3. Tighten locknut (5) to 260 lb-ft (353 N•m) and two locknuts (10) to 178 lb-ft (241 N•m).

24-6. FRONT SUSPENSION BRACE REPLACEMENT



FOLLOW-ON TASK: Install winch (M1113 only) (para. 12-27).

24-7. LEFT AIRLIFT BRACKET AND FRONT UPPER CONTROL ARM BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two locknuts (Appendix G, Item 156)
Two locknuts (Appendix G, Item 121)
Four locknuts (Appendix G, Item 130)
Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

Engine left splash shield removed (para. 10-23).

Maintenance Level

Direct support

a. Removal

1. Raise and support front of vehicle.
2. Remove three screws (9), clamps (7), and harness (8) from airlift bracket (5).
3. Remove two locknuts (2), washers (3), and capscrews (6) from radiator support (4) and airlift bracket (5). Discard locknuts (2).
4. Remove two locknuts (12), washers (13), capscrews (18), and washers (13) and disconnect upper control arm (15) from two control arm brackets (16). Discard locknuts (12).

NOTE

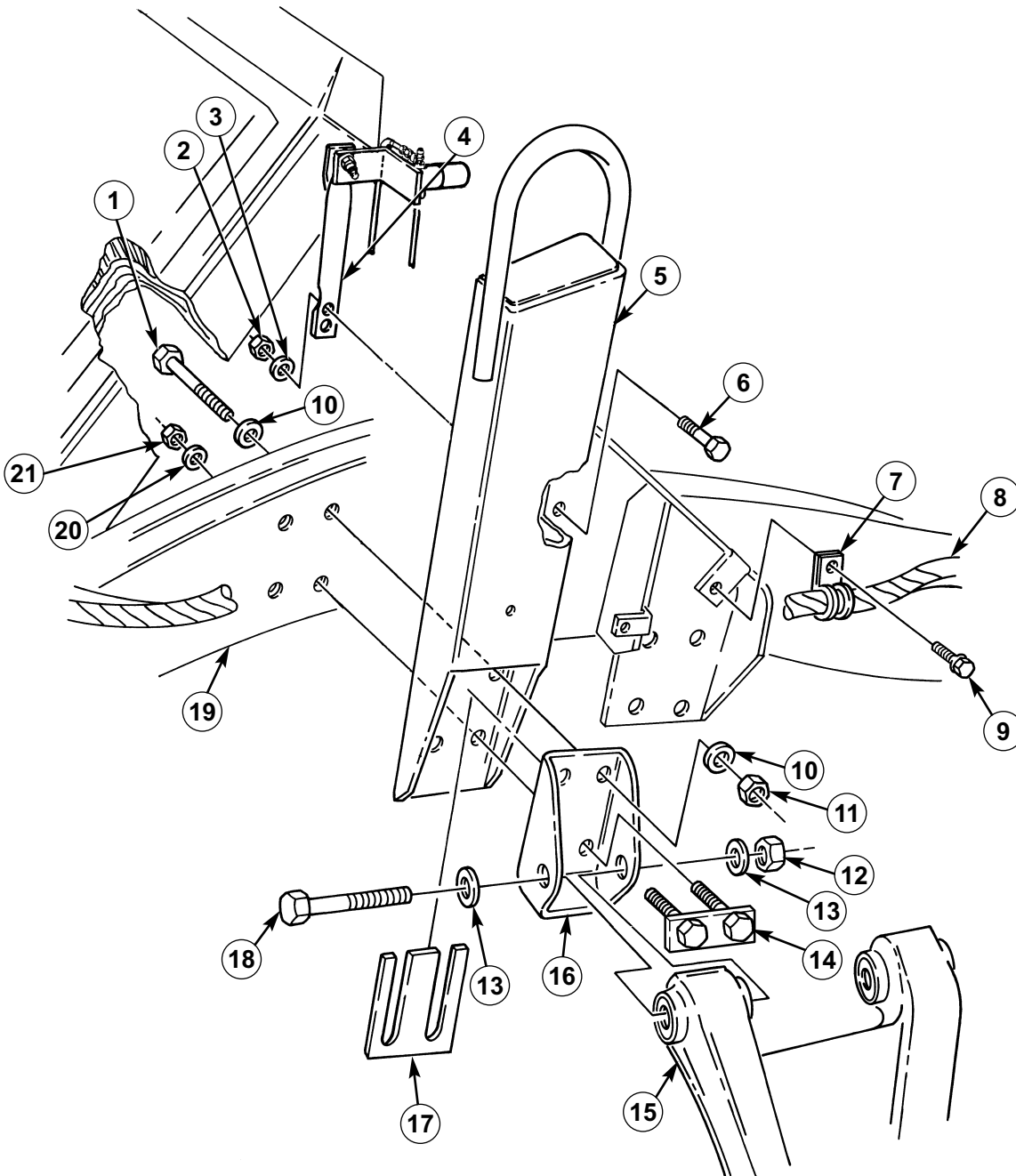
Note direction of capscrews for installation.

5. Remove four locknuts (11), washers (10), capscrews (1), and washers (10) from two control arm brackets (16), airlift bracket (5), and frame rail (19). Discard locknuts (11).
6. Remove four nuts (21), washers (20), two bolt and bracket assemblies (14), control arm brackets (16), shims(s) (17), if present, and airlift bracket (5) from frame rail (19).

b. Installation

1. Install airlift bracket (5), shim(s) (17), if removed, and two control arm brackets (16) on frame rail (19) with four washers (10), capscrews (1), washers (10), and locknuts (11). Tighten locknuts (11) to 90 lb-ft (122 N·m).
2. Apply sealing compound to threads of two bolt and bracket assemblies (14).
3. Secure airlift bracket (5) and two control arm brackets (16) on frame rail (19) with two bolt and bracket assemblies (14), four washers (20), and nuts (21).
4. Install upper control arm (15) on two control arm brackets (16) with two washers (13), capscrews (18), washers (13), and locknuts (12). Tighten locknuts (12) to 260 lb-ft (353 N·m).
5. Install radiator support (4) on airlift bracket (5) with two capscrews (6), washers (3), and locknuts (2). Tighten locknuts (2) to 37 lb-ft (50 N·m).
6. Install harness (8) on airlift bracket (5) with three clamps (7) and screws (9).
7. Lower front of vehicle.

**24-7. LEFT AIRLIFT BRACKET AND FRONT UPPER CONTROL ARM BRACKETS
REPLACEMENT (Cont'd)**



FOLLOW-ON TASK: Install engine left splash shield (para. 10-23).

24-8. RIGHT AIRLIFT BRACKET AND FRONT UPPER CONTROL ARM BRACKETS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Two locknuts (Appendix G, Item 156)
Two locknuts (Appendix G, Item 121)
Four locknuts (Appendix G, Item 130)
Sealing compound (Appendix C, Item 63)

Equipment Condition

Engine right splash shield removed
(para. 10-24).

Maintenance Level

Direct support

a. Removal

1. Raise and support front of vehicle.
2. Remove two locknuts (9), washers (10), and capscrews (4) from radiator support (8) and airlift bracket (5). Discard locknuts (9).
3. Remove two locknuts (16), washers (14), capscrews (12), washers (14), and upper control arm (15) from two control arm brackets (3). Discard locknuts (16).

NOTE

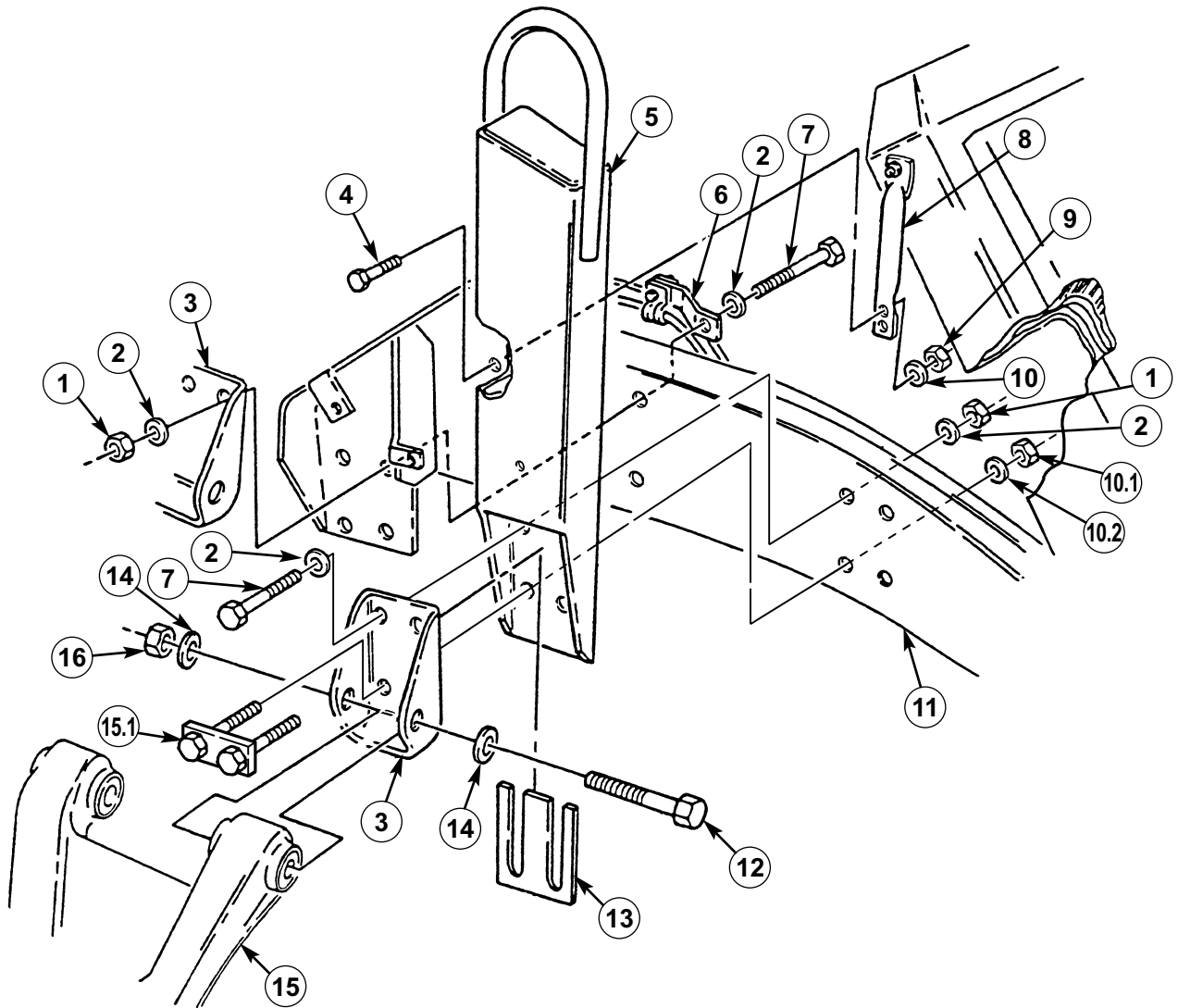
Note direction of capscrews for installation.

4. Remove four locknuts (1), washers (2), capscrews (7), washers (2), and cooler line bracket (6) from two control arm brackets (3), airlift bracket (5), and frame rail (11). Discard locknuts (1).
5. Remove four nuts (10.1), washers (10.2), two bolt and bracket assemblies (15.1), control arm brackets (3), shim(s) (13), if present, and airlift bracket (5) from frame rail (11).

b. Installation

1. Install airlift bracket (5), shim(s) (13), if removed, two control arm brackets (3), and cooler line bracket (6) on frame rail (11) with four washers (2), capscrews (7), washers (2), and locknuts (1). Tighten locknuts (1) to 90 lb-ft (122 N·m).
 - 1.1. Apply sealing compound to threads of two bolt and bracket assemblies (15.1).
 - 1.2. Secure airlift bracket (5) and two control arm brackets (3) on frame rail (11) with two bolt and bracket assemblies (15.1), four washers (10.2), and nuts (10.1).
2. Install upper control arm (15) on two control arm brackets (3) with two washers (14), capscrews (12), washers (14), and locknuts (16). Tighten locknuts (16) to 260 lb-ft (353 N·m).
3. Install radiator support (8) on airlift bracket (5) with two capscrews (4), washers (10), and locknuts (9). Tighten locknuts (9) to 37 lb-ft (50 N·m).
4. Lower front of vehicle.

**24-8. RIGHT AIRLIFT BRACKET AND FRONT UPPER CONTROL ARM BRACKETS
REPLACEMENT (Cont'd)**



FOLLOW-ON TASK: Install engine right splash shield (para. 10-24).

24-9. RIGHT ENGINE MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Engine right mount and insulator removed
(para. 15-3).

Materials/Parts

Five locknuts (Appendix G, Item 121)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

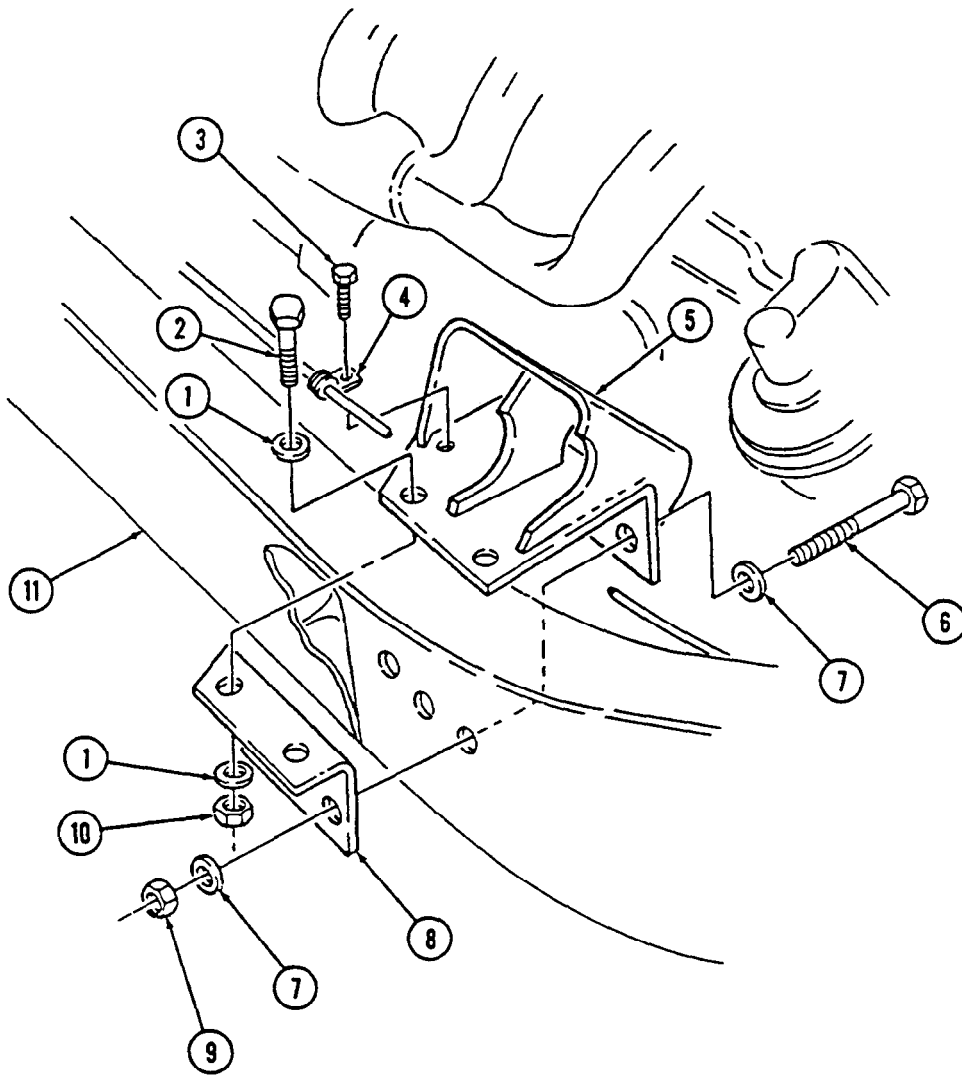
a. Removal

1. Remove two locknuts (10), washers (1), capscrews (2), and washers (1) from support bracket (8) and engine mount bracket (5). Discard locknuts (10).
2. Remove capscrew (3) and vent tube clamp (4) from engine mount bracket (5).
3. Remove three locknuts (9), washers (7), capscrews (6), washers (7), support bracket (8), and engine mount bracket (5) from frame rail (11). Discard locknuts (9).

b. Installation

1. Install support bracket (8) and engine mount bracket (5) on frame rail (11) with three washers (7), capscrews (6), washers (7), and locknuts (9).
2. Secure support bracket (8) on engine mount bracket (5) with two washers (1), capscrews (2), washers (1), and locknuts (10). Tighten locknuts (10) and (9) to 90 lb-ft (122 N•m).
3. Install vent tube clamp (4) on engine mount bracket (5) with capscrew (3).

24-9. RIGHT ENGINE MOUNT BRACKET REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install engine right mount and insulator (para. 15-3).

24-10. LEFT ENGINE MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Six locknuts (Appendix G, Item 121)

Manual References

TM 9-2320-387-24P

Maintenance Level

Direct support

a. Removal

1. Remove two capscrews (2), brake line clamp (1), and oil line clamp (3) from engine mount bracket (4).
2. Remove two locknuts (7) and washers (6) from insulator (5) and engine mount bracket (4). Discard locknuts (7).

CAUTION

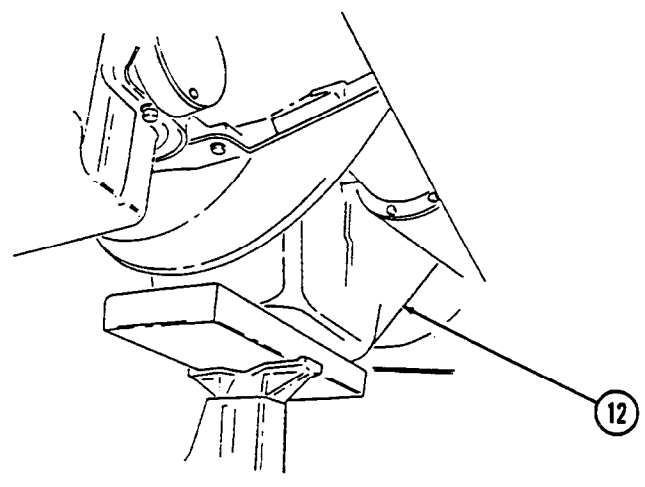
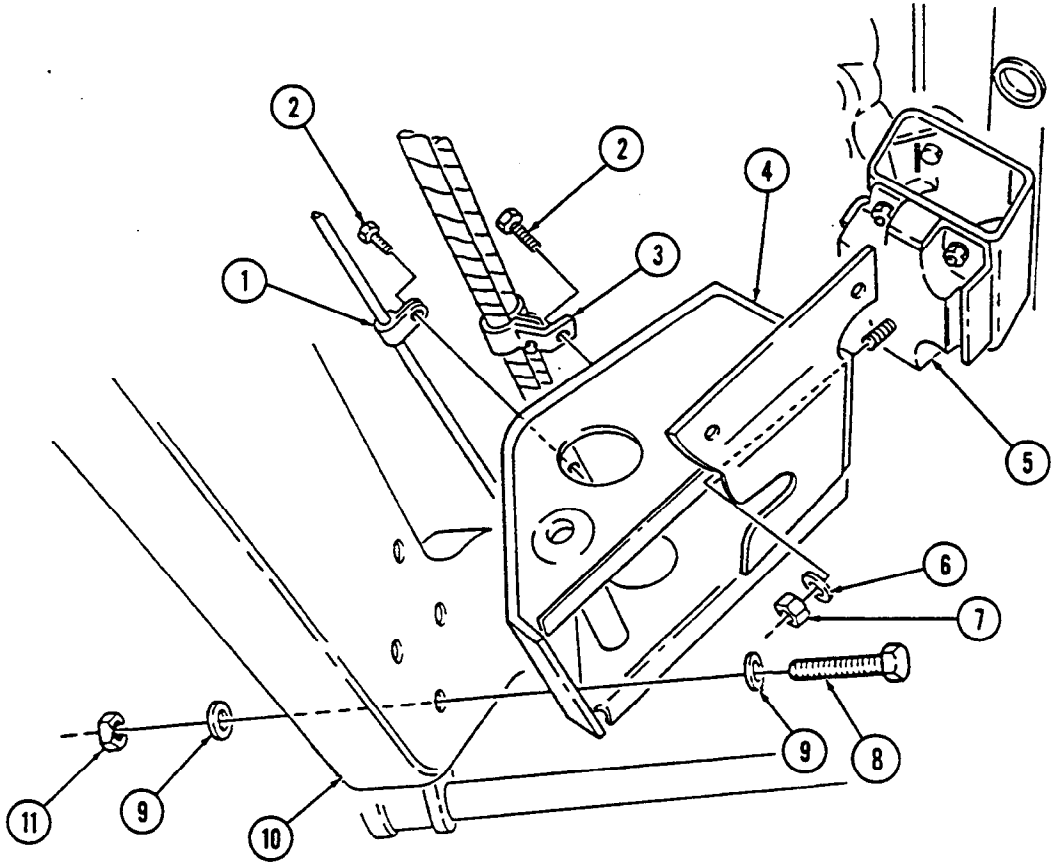
Wood block must completely cover bottom of engine oil pan or damage to oil pan may result.

3. Support engine under engine oil pan (12) with wood block and jack.
4. Remove four locknuts (11), washers (9), capscrews (8), washers (9), and engine mount bracket (4) from frame rail (10). Discard locknuts (11).

b. Installation

1. Install engine mount bracket (4) on frame rail (10) with four washers (9), capscrews (8), washers (9), and locknuts (11). Tighten locknuts (11) to 90 lb-ft (122 N·m).
2. Remove support from engine oil pan (12).
3. Install engine mount bracket (4) on insulator (5) with two washers (6) and locknuts (7). Tighten locknuts (7) to 90 lb-ft (122 N·m).
4. Install brake line clamp (1) and oil line clamp (3) on engine mount bracket (4) with two capscrews (2).

24-10. LEFT ENGINE MOUNT BRACKET REPLACEMENT (Cont'd)



24-11. REAR UPPER CONTROL ARM BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Wheel removed (para. 8-3).

Materials/Parts

Six locknuts (Appendix G, Item 130)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

NOTE

The replacement procedure for four rear upper control arm brackets is basically the same. This procedure covers the right rear upper control arm front bracket.

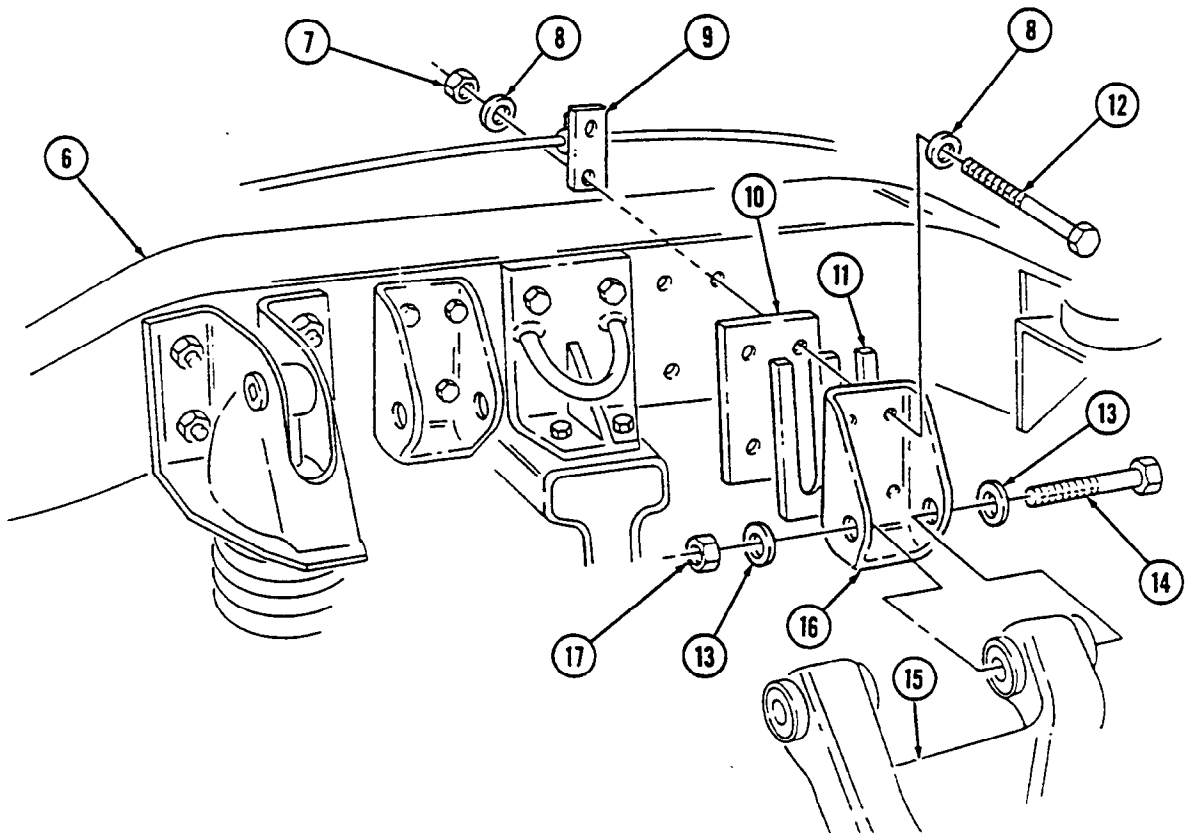
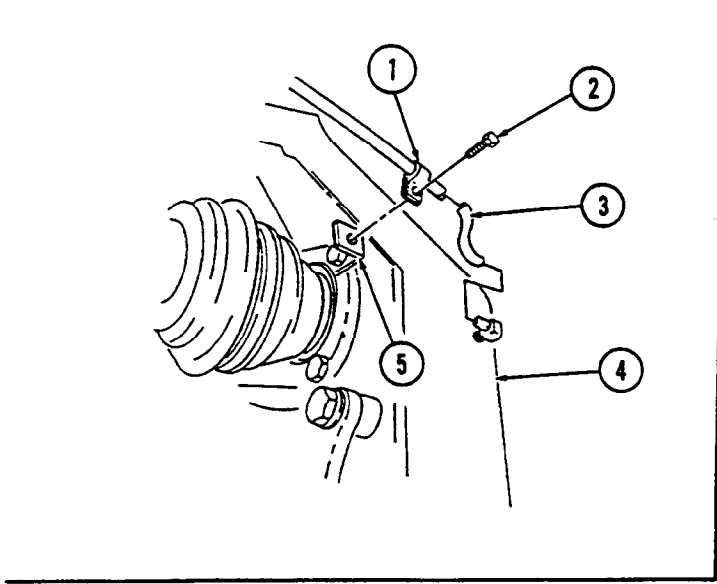
a. Removal

1. Remove capscrew (2) and clamp (1) from bracket (5) and disconnect vent line (3) from geared hub (4).
2. Remove two locknuts (17), washers (13), capscrews (14), washers (13), and upper control arm (15) from two upper control arm brackets (16). Discard locknuts (17).
3. Remove four locknuts (7), washers (8), capscrews (12), washers (8), spacer (10), shim(s) (11), if present, vent line mounting bracket (9), and control arm bracket (16) from frame rail (6). Discard locknuts (7).

b. Installation

1. Install shim(s) (11), if removed, spacer (10), vent line mounting bracket (9), and control arm bracket (16) on frame rail (6) with four washers (8), capscrews (12), washers (8), and locknuts (7). Tighten locknuts (7) to 90 lb-ft (122 N·m).
2. Install upper control arm (15) on two upper control arm brackets (16) with two washers (13), capscrews (14), washers (13), and locknuts (17). Tighten locknuts (17) to 260 lb-ft (353 N·m).
3. Connect vent line (3) to geared hub (4) and install clamp (1) on bracket (5) with capscrew (2).

24-11. REAR UPPER CONTROL ARM BRACKET REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install wheel (para. 8-3).

24-12. REAR-REAR TIEDOWN BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Materials/Parts

Two locknuts (Appendix G, Item 174)

Maintenance Level

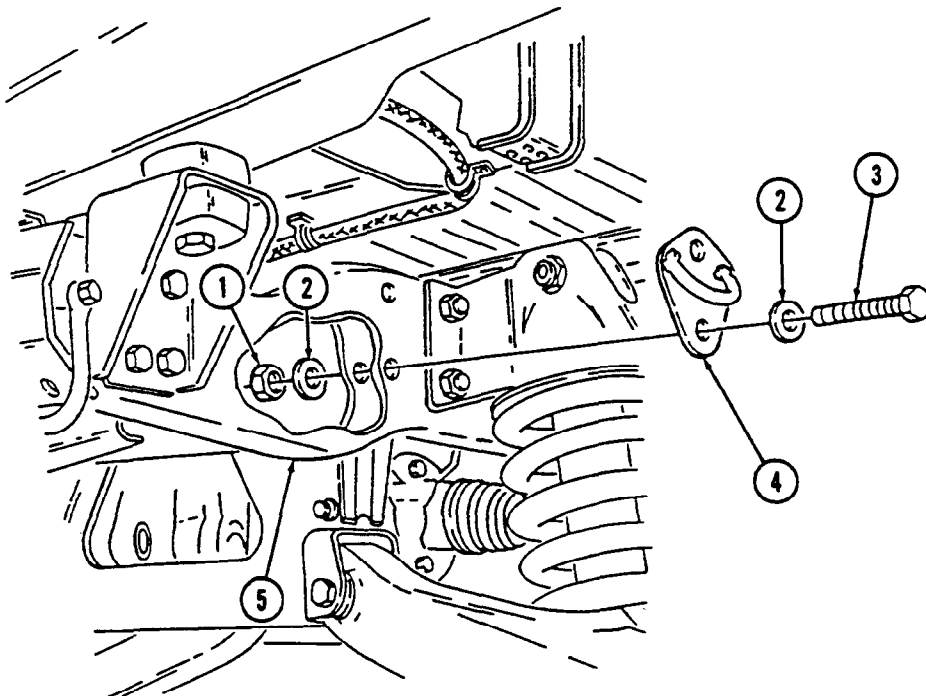
Direct support

a. Removal

Remove two locknuts (1), washers (2), capscrews (3), washers (2), and rear-rear tiedown bracket (4) from frame rail (5). Discard locknuts (1).

b. Installation

Install rear-rear tiedown bracket (4) on frame rail (5) with two washers (2), capscrews (3), washers (2), and locknuts (1). Tighten locknuts (1) to 260 lb-ft (353 N·m).



24-13. TRANSMISSION CROSSMEMBER SUPPORT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Transmission mount crossmember removed
(para. 9-10).

Materials/Parts

Two locknuts (Appendix G, Item 121)

Maintenance Level

Direct support

Manual References

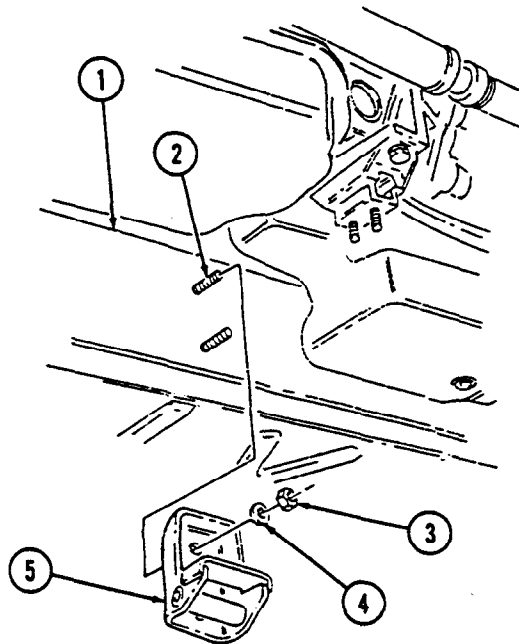
TM 9-2320-387-24P

a. Removal

Remove two locknuts (3), washers (4), and transmission support bracket (5) from two capscrews (2) on frame rail (1). Discard locknuts (3).

b. Installation

Install transmission support bracket (5) on two capscrews (2) on frame rail (1) with two washers (4) and locknuts (3). Tighten locknuts (3) to 90 lb-ft (122 N·m).



FOLLOW-ON TASK: Install transmission mount crossmember (para. 9-10).

24-14. REAR-FRONT TIEDOWN BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Wheel removed (para. 8-3).

Materials/Parts

Six locknuts (Appendix G, Item 174)

Maintenance Level

Direct support

Manual References

TM 9-2320-387-24P

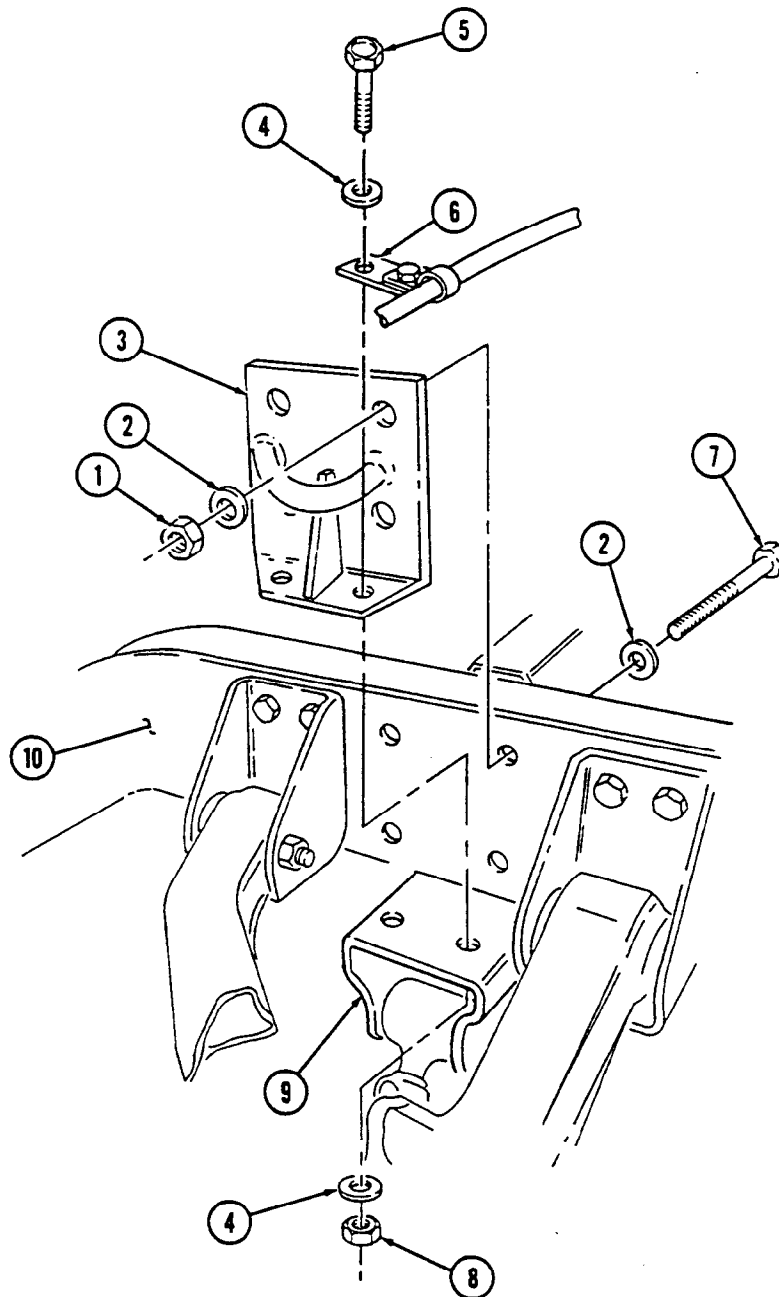
a. Removal

1. Remove four locknuts (1), washers (2), capscrews (7), and washers (2) from tiedown bracket (3) and frame rail (10). Discard locknuts (1).
2. Remove two locknuts (8), washers (4), capscrews (5), washers (4), vent tube mounting bracket (6), and tiedown bracket (3) from rear suspension front crossmember mounting bracket (9). Discard locknuts (8).

b. Installation

1. Install tiedown bracket (3) on frame rail (10) with four washers (2), capscrews (7), washers (2), and locknuts (1). Tighten locknuts (1) to 260 lb-ft (353 N·m).
2. Install tiedown bracket (3) and vent tube mounting bracket (6) on rear suspension front crossmember mounting bracket (9) with two washers (4), capscrews (5), washers (4), and locknuts (8). Tighten locknuts (8) to 90 lb-ft (122 N·m).

24-14. REAR-FRONT TIEDOWN BRACKET REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install wheel (para. 8-3).

24-15. DIFFERENTIAL SUPPORT BRACKET AND SIDE MOUNTING BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

O-ring seal (Appendix G, Item 284)
Four locknuts (Appendix G, Item 121)
Locknut (Appendix G, Item 161)
Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

Service brake rotor removed (para. 7-12).

Maintenance Level

Direct support

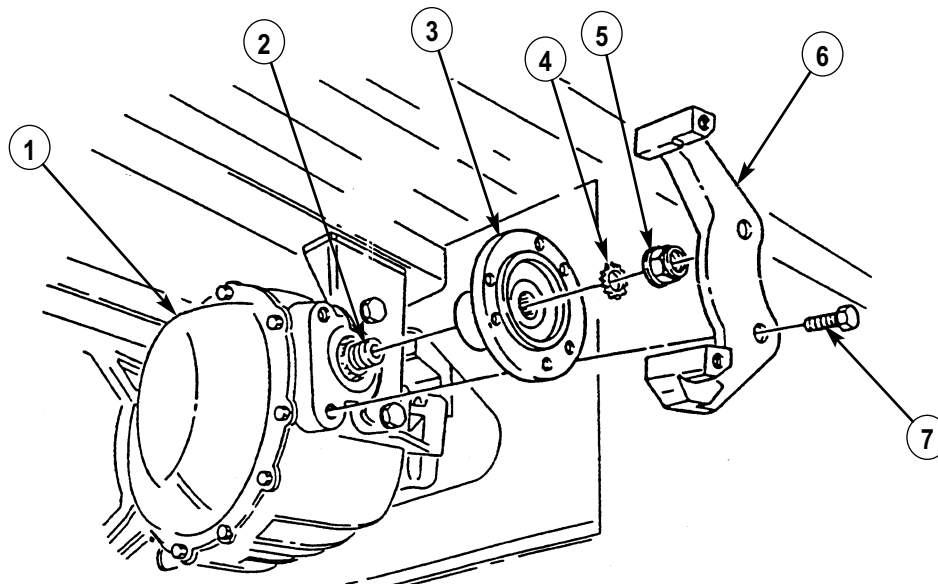
a. Removal

1. Remove locknut (5), O-ring seal (4), and output flange (3) from output shaft (2). Discard O-ring (4) and locknut (5).
2. Remove two capscrews (7) and brake adapter (6) from differential (1).
3. Remove two capscrews (12) and washers (13) from differential side mounting bracket (14) and differential (1).
4. Remove two locknuts (11), washers (8), capscrews (9), washers (8), and differential support bracket (10) with side mounting bracket (14) from suspension crossmember (15). Discard locknuts (11).

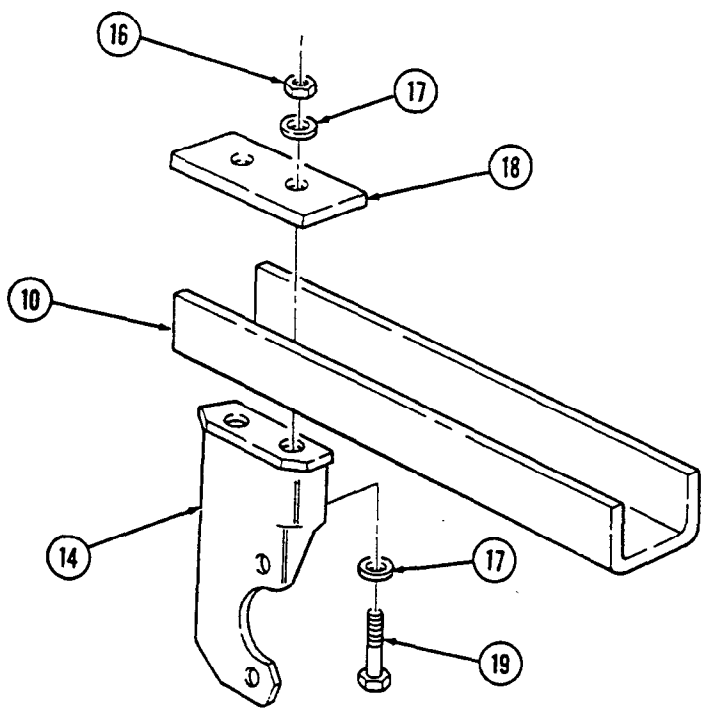
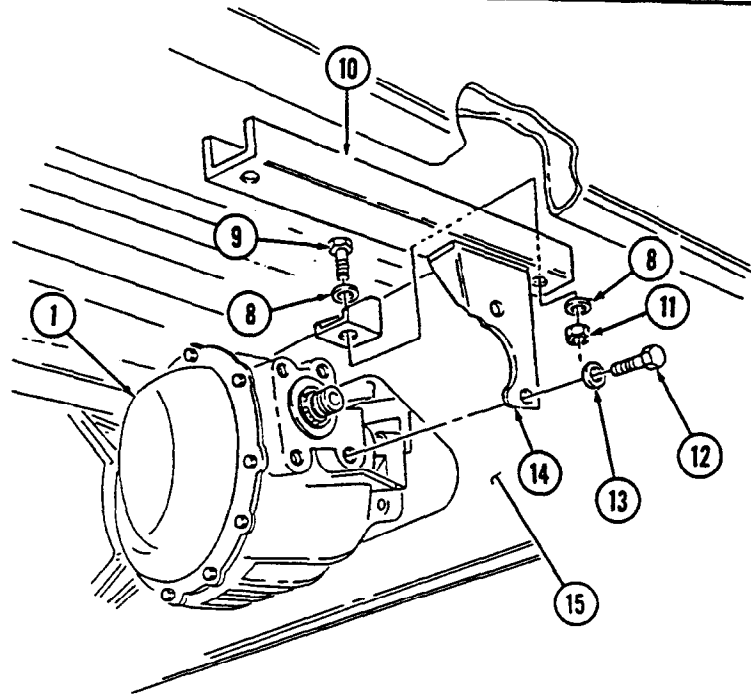
NOTE

Scribe a locating mark on differential support bracket and side mounting bracket for installation.

5. Remove two locknuts (16), washers (17), capscrews (19), washers (17), mounting plate (18), and side mounting bracket (14) from support bracket (10). Discard locknuts (16).



24-15. DIFFERENTIAL SUPPORT BRACKET AND SIDE MOUNTING BRACKET REPLACEMENT (Cont'd)



24-15. DIFFERENTIAL SUPPORT BRACKET AND SIDE MOUNTING BRACKET REPLACEMENT (Cont'd)

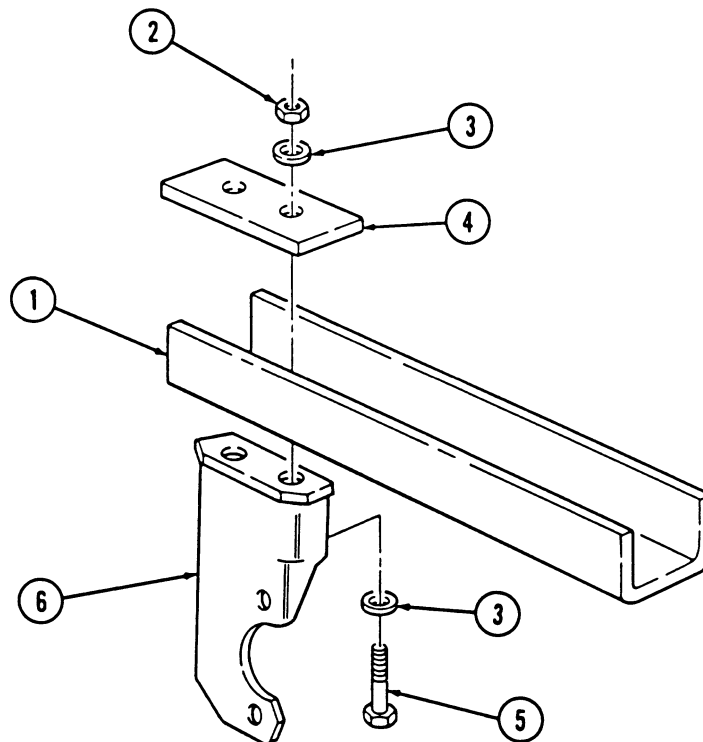
b. Installation

1. Align locating marks and install side mounting bracket (6) and mounting plate (4) on support bracket (1) with two washers (3), capscrews (5), washers (3), and locknuts (2). Tighten capscrews (5) to 90 lb-ft (122 N·m).
2. Install support bracket (1) with side mounting bracket (6) attached on suspension crossmember (11) with two washers (7), capscrews (13), washers (7), and locknuts (8).

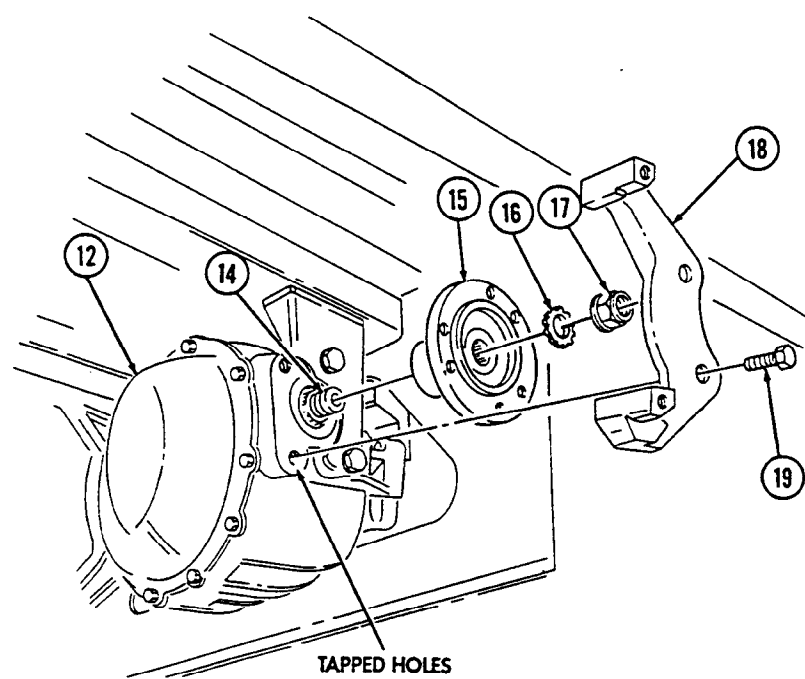
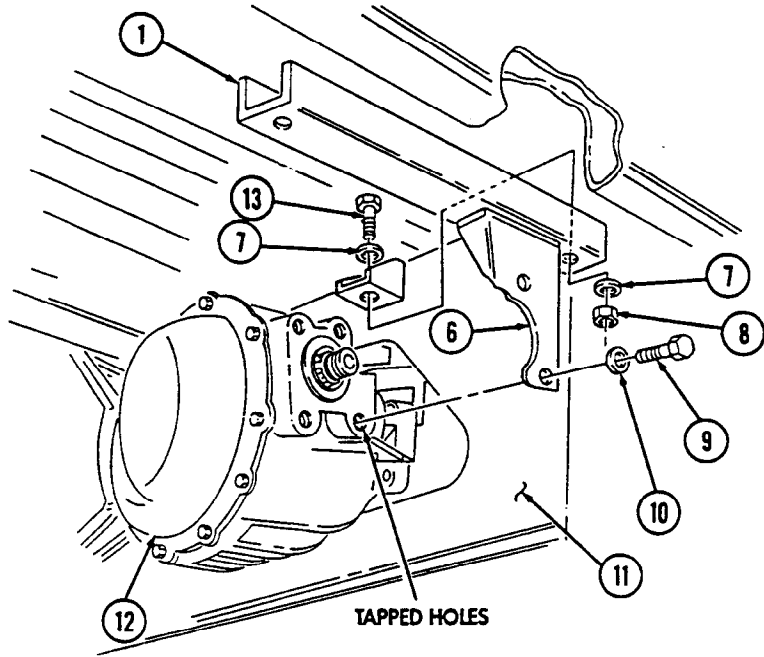
CAUTION

Apply a liberal amount of thread sealing compound to the tapped holes of differential. To allow adequate coating of threads, install capscrews shortly after applying thread sealing compound. Failure to do this could allow capscrews to loosen and cause damage to differential.

3. Apply sealing compound to tapped holes of differential (12). Install side mounting bracket (6) on differential (12) with two washers (10) and short capscrews (9). Tighten capscrews (9) to 125-150 lb-ft (170-203 N·m) and locknuts (8) to 90 lb-ft (122 N·m).
4. Apply sealing compound to tapped holes of differential (12) and install brake adapter (18) on differential (12) with two capscrews (19). Tighten capscrews (19) to 125-150 lb-ft (170-203 N·m).
5. Install output flange (15) on output shaft (14) with O-ring seal (16) and locknut (17). Tighten locknut (17) to 170 lb-ft (231 N·m).



24-15. DIFFERENTIAL SUPPORT BRACKET AND SIDE MOUNTING BRACKET REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install service brake rotor (para. 7-12).

24-16. FRONT SUSPENSION FRONT CROSSMEMBER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Fourteen locknuts (Appendix G, Item 130)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Front lower control arms removed (para. 6-26).
- Lower radiator hose removed (para. 3-72).
- Horn removed (para. 4-26).
- Radiator front mounting bracket removed (para. 9-5).
- Differential removed (para. 21-5).
- Differential support brackets and side mounting brackets removed (para. 24-15).

Maintenance Level

Direct support

a. Removal

NOTE

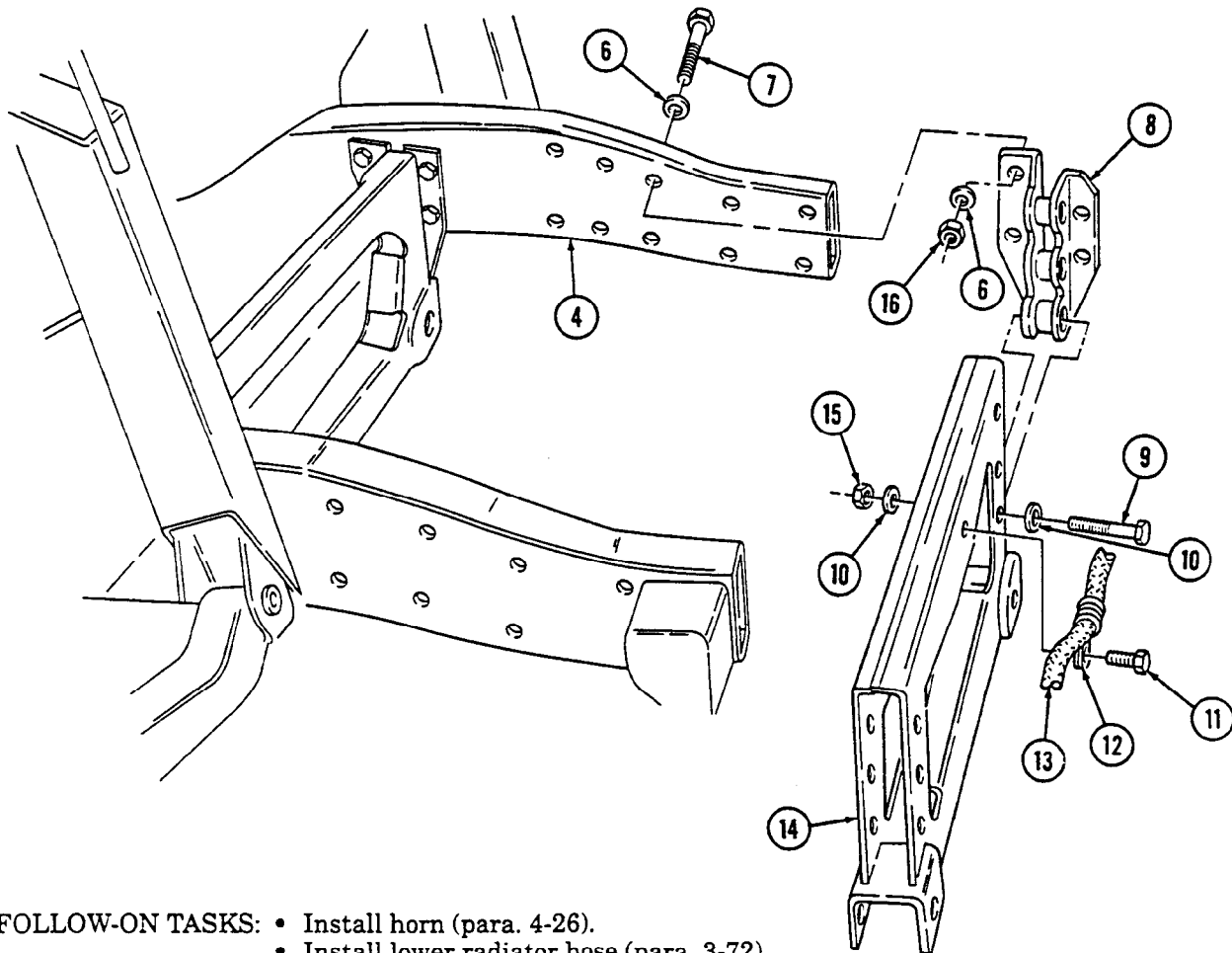
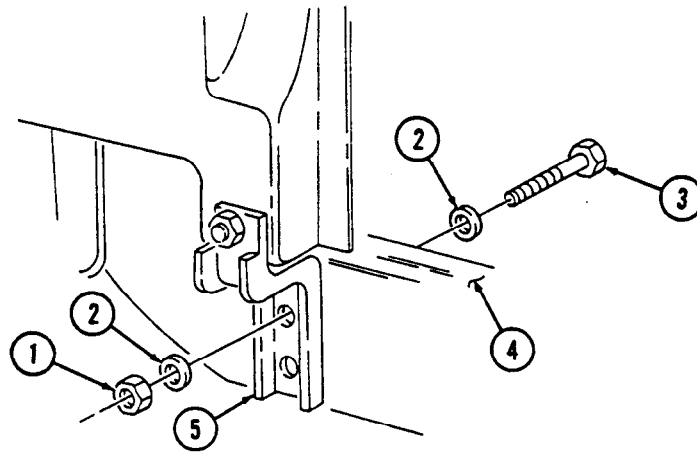
Note direction of capscrews for installation.

1. Remove four locknuts (1), washers (2), capscrews (3), washers (2), and two splash shield brackets (5) from frame rails (4). Discard locknuts (1).
2. Remove screw (11), clamp (12), and harness (13) from front crossmember (14).
3. Remove four locknuts (16), washers (6), capscrews (7), and washers (6) from front crossmember (14) and two frame rails (4). Discard locknuts (16).
4. Remove six locknuts (15), washers (10), capscrews (9), and washers (10) from front crossmember (14) and left and right front crossmember mounting brackets (8). Discard locknuts (15).
5. Slide front crossmember (14) and mounting brackets (8) down and out from under vehicle.
6. Remove left and right mounting brackets (8) from crossmember (14).

b. Installation

1. Install left and right crossmember mounting brackets (8) on front crossmember (14).
2. Install front crossmember (14) and two mounting brackets (8) on frame rails (4) with four washers (6), capscrews (7), washers (6), and locknuts (16).
3. Secure left and right mounting brackets (8) on front crossmember (14) with six washers (10), capscrews (9), washers (10), and locknuts (15).
4. Install two splash shield brackets (5) on frame rails (4) with four washers (2), capscrews (3), washers (2), and locknuts (1).
5. Tighten four locknuts (16) to 260 lb-ft (353 N·m).
6. Tighten four locknuts (1) and six locknuts (15) to 90 lb-ft (122 N·m).
7. Install harness (13) on front crossmember (14) with clamp (12) and screw (11).

24-16. FRONT SUSPENSION FRONT CROSSMEMBER REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install horn (para. 4-26).
 - Install lower radiator hose (para. 3-72).
 - Install radiator front mounting bracket (para. 9-5).
 - Install differential support brackets and side mounting brackets (para. 24-15).
 - Install differential (para. 21-5).
 - Install front lower control arms (para. 6-26).

24-17. FRONT SUSPENSION REAR CROSSMEMBER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three lockwashers (Appendix G, Item 193)
Thirteen locknuts (Appendix G, Item 164)
Sealing compound (Appendix C, Item 69)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Radiator removed (para. 3-62).
- Right front upper control arm removed (para. 6-25).
- Lower radiator tube removed (para. 3-71).
- Right front caliper-to-tee brake line removed (para. 7-7).
- Lower control arms removed (para. 6-26).
- Differential removed (para. 21-5).
- Differential support brackets and side mounting brackets removed (para. 24-15).

Maintenance Level

Direct support

a. Removal

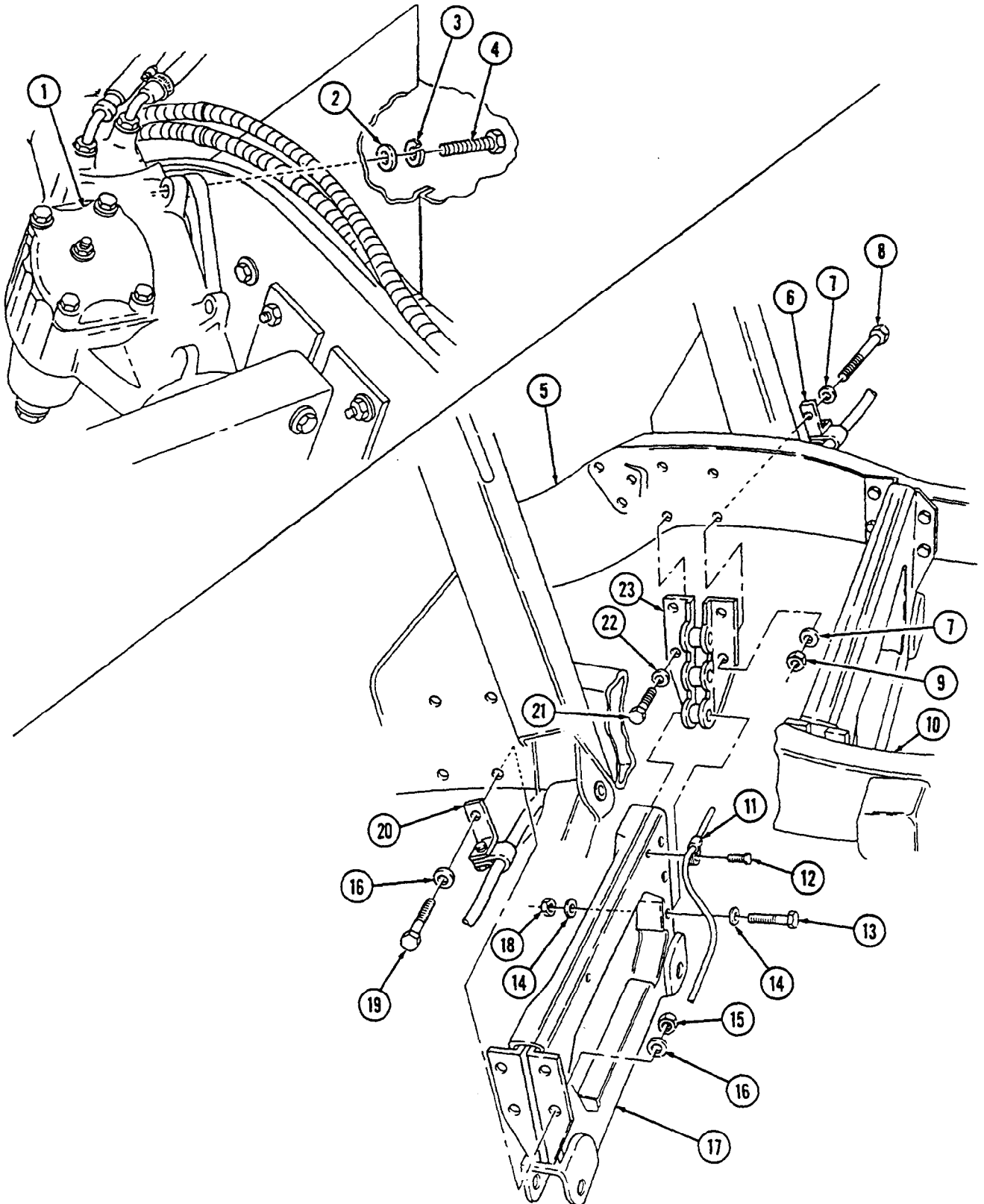
1. Remove three capscrews (4), lockwashers (3), and washers (2) and pull steering gear (1) away from left frame rail (5). Discard lockwashers (3).
2. Remove three capscrews (12) and vent line clamps (11) from rear crossmember (17).

NOTE

Note direction of capscrews for installation.

3. Remove four locknuts (15), washers (16), capscrews (19), washers (16), and vent line bracket (20) from rear crossmember (17) and right frame rail (10). Discard locknuts (15).
4. Remove three locknuts (9), washers (7), capscrews (8), washers (7), and vent line bracket (6) from crossmember (17) and frame rail (5). Discard locknuts (9).
5. Remove capscrew (21) and washer (22) from rear crossmember (17) and frame rail (5).
6. Remove six locknuts (18), washers (14), capscrews (13), and washers (14) from rear crossmember (17) and left and right rear crossmember mounting brackets (23). Discard locknuts (18).
7. Slide rear crossmember (17) and left and right crossmember mounting brackets (23) down and out from under vehicle.
8. Remove left and right crossmember mounting brackets (23) from rear crossmember (17).

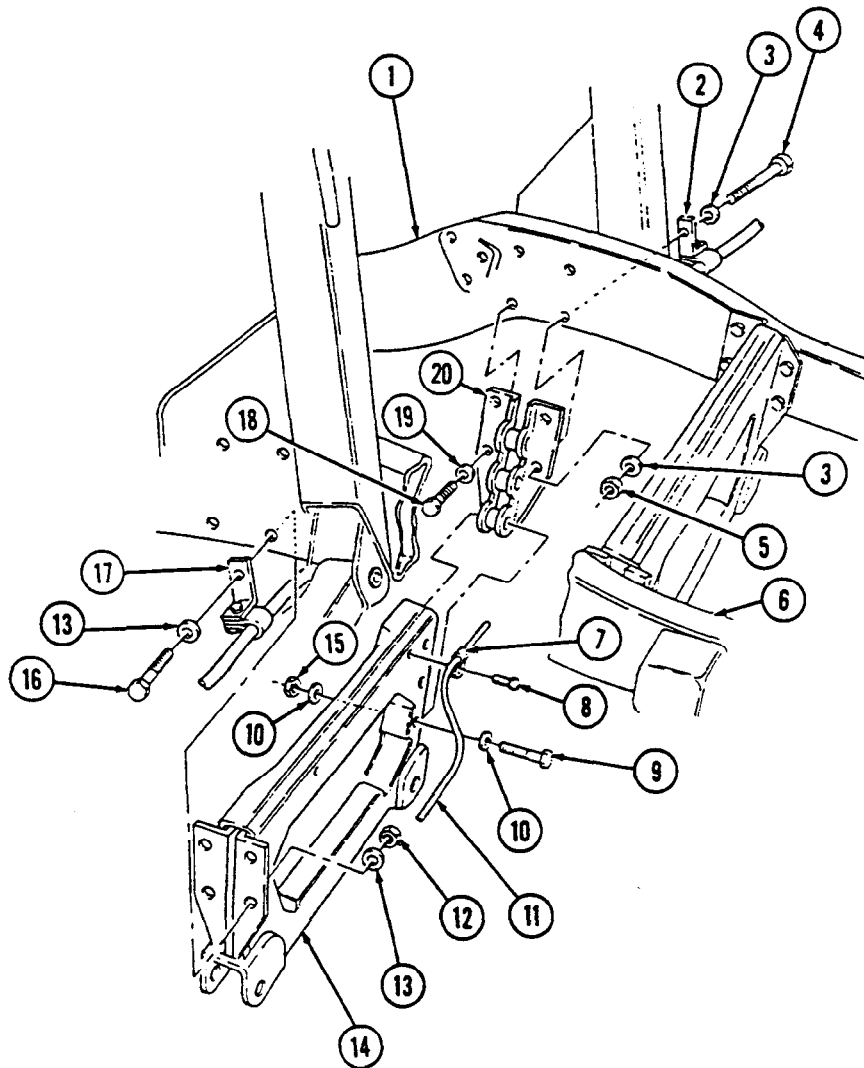
24-17. FRONT SUSPENSION REAR CROSSMEMBER REPLACEMENT (Cont'd)



24-17. FRONT SUSPENSION REAR CROSSMEMBER REPLACEMENT (Cont'd)

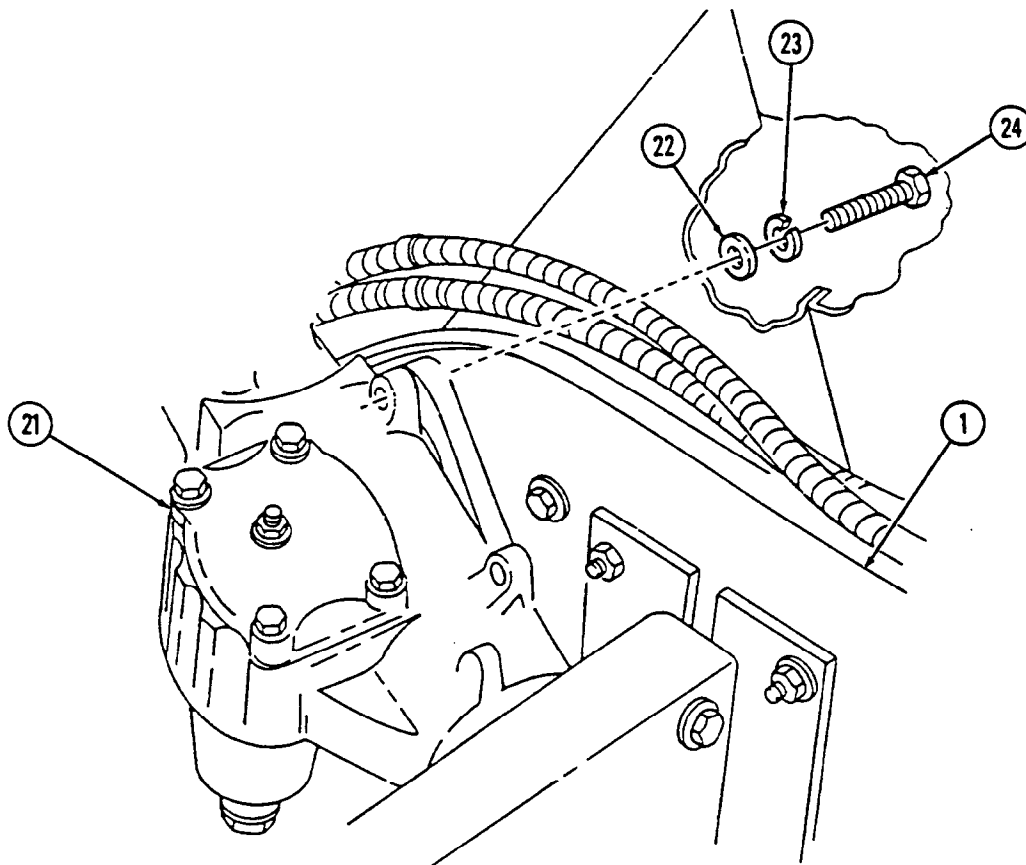
b. Installation

1. Install left and right rear crossmember mounting brackets (20) on rear crossmember (14).
2. Install rear crossmember (14) on frame rails (1) and (6).
3. Apply sealing compound to capscrew (18) and secure rear crossmember (14) on frame rail (1) with washer (19) and capscrew (18).
4. Secure rear crossmember (14) on frame rail (1) with vent line bracket (2), three washers (3), capscrews (4), washers (3), and locknuts (5).
5. Install rear crossmember (14) and vent line bracket (17) on frame rail (6) with four washers (13), capscrews (16), washers (13), and locknuts (12).
6. Install six washers (10), capscrews (9), washers (10), and locknuts (15) on rear crossmember (14) and left and right mounting brackets (20).



24-17. FRONT SUSPENSION REAR CROSSMEMBER REPLACEMENT (Cont'd)

7. Tighten capscrew (18) to 65-78 lb-ft (88-106 N·m).
8. Tighten three capscrews (4) to 90 lb-ft (122 N·m).
9. Tighten four capscrews (16) to 90 lb-ft (122 N·m).
10. Tighten six capscrews (9) to 90 lb-ft (122 N·m).
11. Install vent line (11) on rear crossmember (14) with three clamps (7) and capscrews (8).
12. Install steering gear (21) on frame rail (1) with three washers (22), lockwashers (23), and capscrews (24). Tighten capscrews (24) to 60 lb-ft (81 N·m).



- FOLLOW-ON TASKS:**
- Install differential support brackets and side mounting brackets (para. 24-15).
 - Install differential (para. 21-5).
 - Install lower control arms (para. 6-26).
 - Install right front caliper-to-tee brake line (para. 7-7).
 - Install right front upper control arm (para. 6-25).
 - Install lower radiator tube (para. 3-71).
 - Install radiator (para. 3-62).

24-18. REAR SUSPENSION FRONT CROSSMEMBER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Ten locknuts (Appendix G, Item 174)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Rear-front tiedown brackets removed (para. 24-14).
- Differential removed (para. 21-5).
- Differential support brackets and side mounting brackets removed (para. 24-15).
- Rear lower control arms removed (para. 6-26).

General Safety Instructions

Crossmember must be supported during removal.

Maintenance Level

Direct support

a. Removal

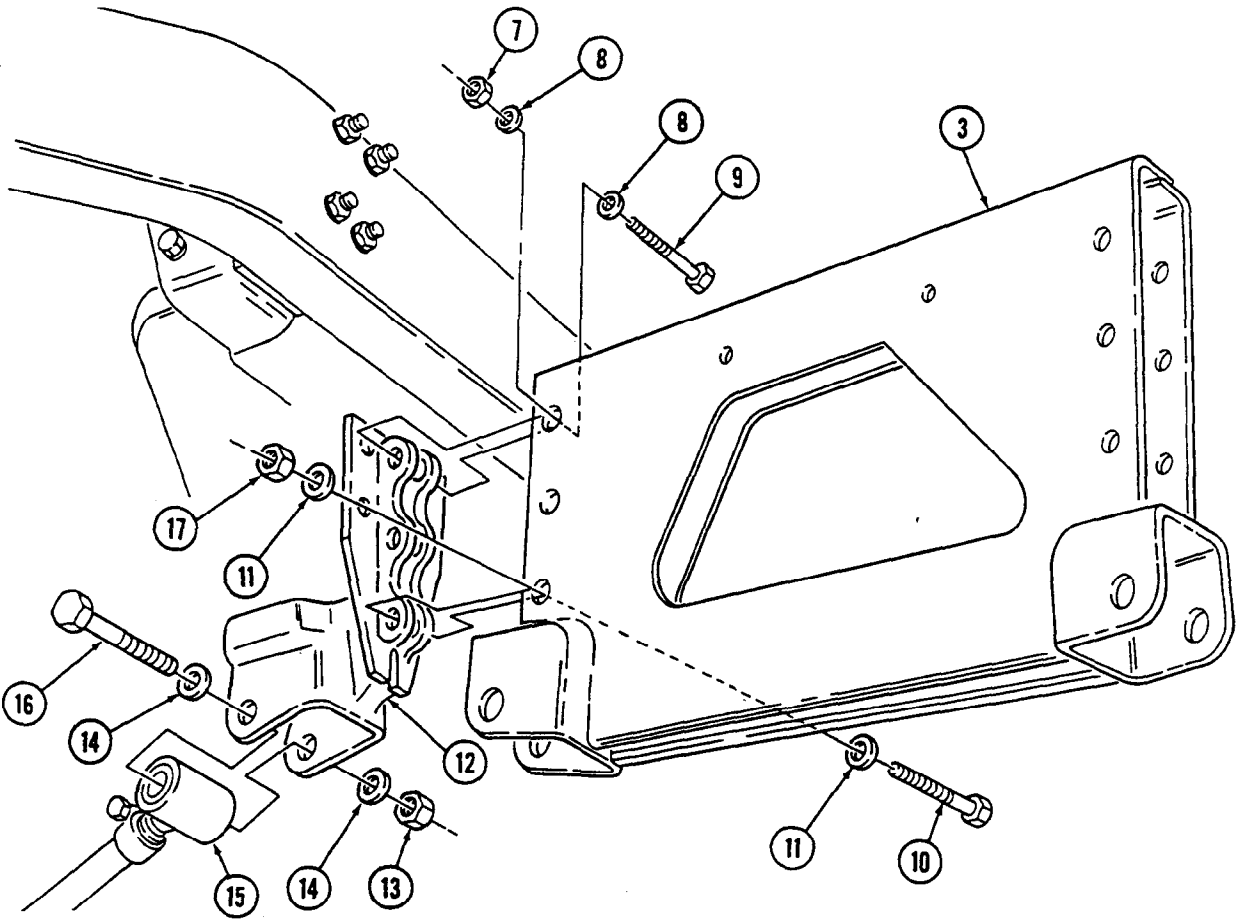
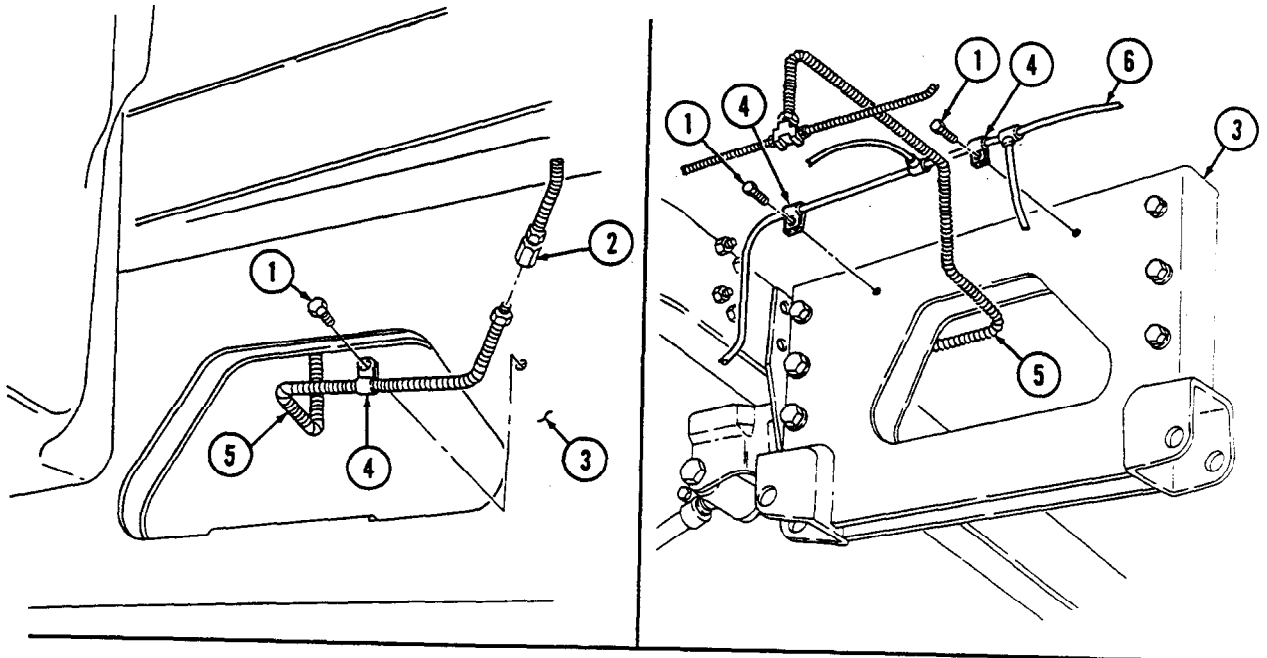
1. Remove three capscrews (1), clamps (4), brake line (5), and vent line (6) from front crossmember (3).
2. Disconnect brake line (5) from tube coupling (2).
3. Remove two locknuts (13), washers (14), capscrews (16), washers (14), and radius rods (15) from crossmember mounting brackets (12). Discard locknuts (13).

WARNING

Crossmember must be supported during removal. Failure to support crossmember during removal may cause injury to personnel or damage to equipment.

4. Loosen two locknuts (7) and four locknuts (17) on front crossmember (3) and two crossmember mounting brackets (12).
5. Slide front crossmember (3) down and out from under vehicle.
6. Remove two locknuts (7), washers (8), capscrews (9), and washers (8) from crossmember mounting brackets (12) and front crossmember (3). Discard locknuts (7).
7. Remove four locknuts (17), washers (11), capscrews (10), washers (11), and two crossmember mounting brackets (12) from front crossmember (3). Discard locknuts (17).

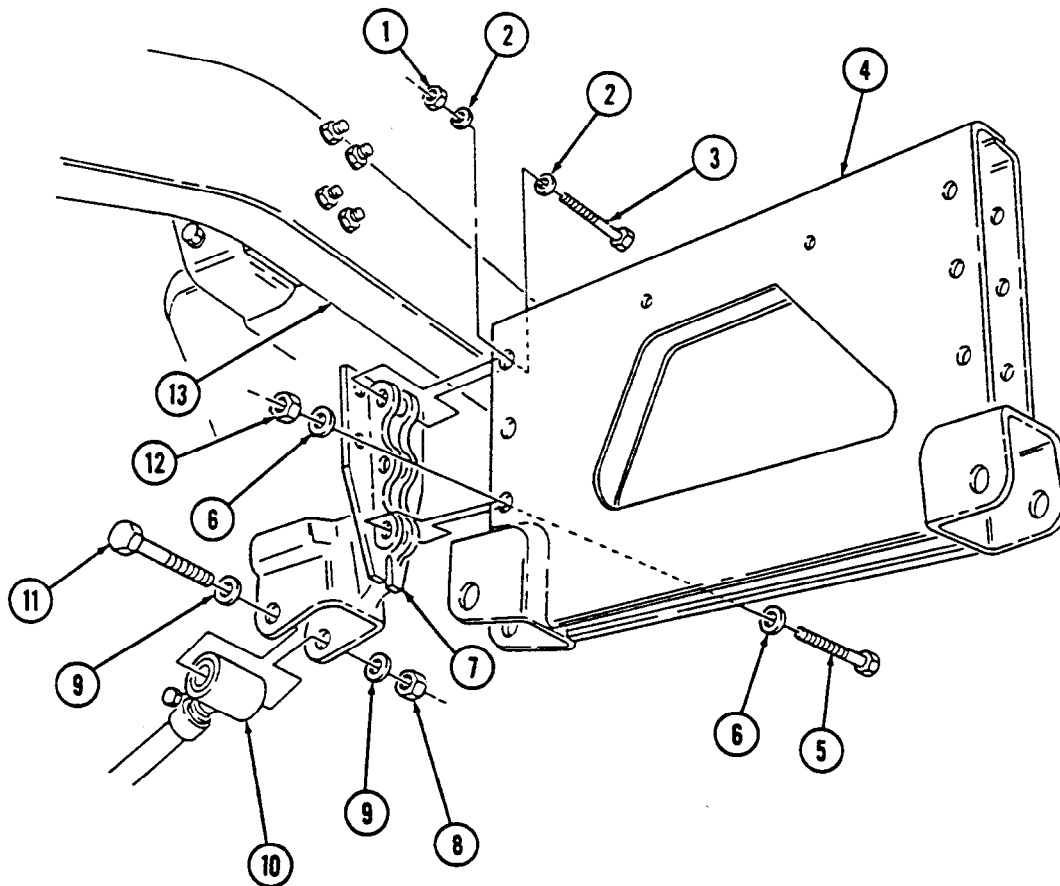
24-18. REAR SUSPENSION FRONT CROSSMEMBER REPLACEMENT (Cont'd)



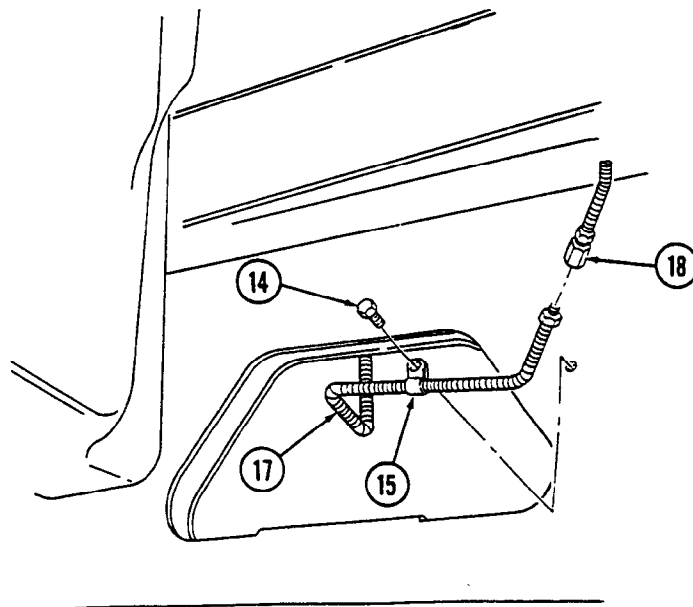
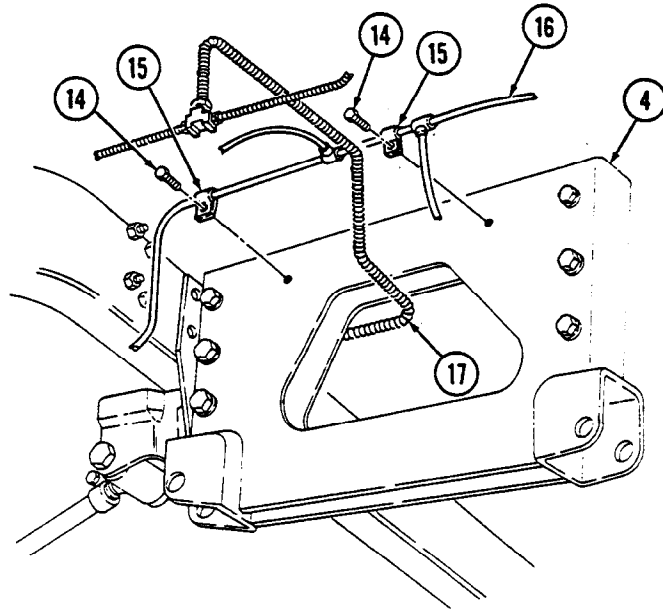
24-18. REAR SUSPENSION FRONT CROSSMEMBER REPLACEMENT (Cont'd)

b. Installation

1. Install two crossmember mounting brackets (7) on front crossmember (4) with two washers (2), capscrews (3), washers (2), and locknuts (1).
2. Install four washers (6), capscrews (5), washers (6), and locknuts (12) on two crossmember mounting brackets (7) and front crossmember (4).
3. Install front crossmember (4) on frame rail (13).
4. Install rear-front tiedown brackets (para. 24-14).
5. Tighten four locknuts (12) to 260 lb-ft (353 N·m) and two locknuts (1) to 90 ft-lb (122 N·m).
6. Install two radius rods (10) on crossmember mounting brackets (7) with washers (9), capscrews (11), washers (9), and locknuts (8). Tighten locknuts (8) to 260 lb-ft (353 N·m).
7. Install brake line (17) on tube coupling (18).
8. Install brake line (17) and vent line (16) on front crossmember (4) with three clamps (15) and capscrews (14).



24-18. REAR SUSPENSION FRONT CROSSMEMBER REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install differential support brackets and side mounting brackets (para. 24-15).
 - Install differential (para. 21-5).
 - Install rear lower control arms (para. 6-26).
 - Bleed rear brakes (para. 7-2).

24-19. REAR SUSPENSION REAR CROSSMEMBER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Ten locknuts (Appendix G, Item 174)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Differential support brackets and side mounting brackets removed (para. 24-15).
- Rear-rear tiedown brackets removed (para. 24-12).
- Rear lower control arms removed (para. 6-26).

General Safety Instructions

Crossmember must be supported during removal.

Maintenance Level

Direct support

a. Removal

WARNING

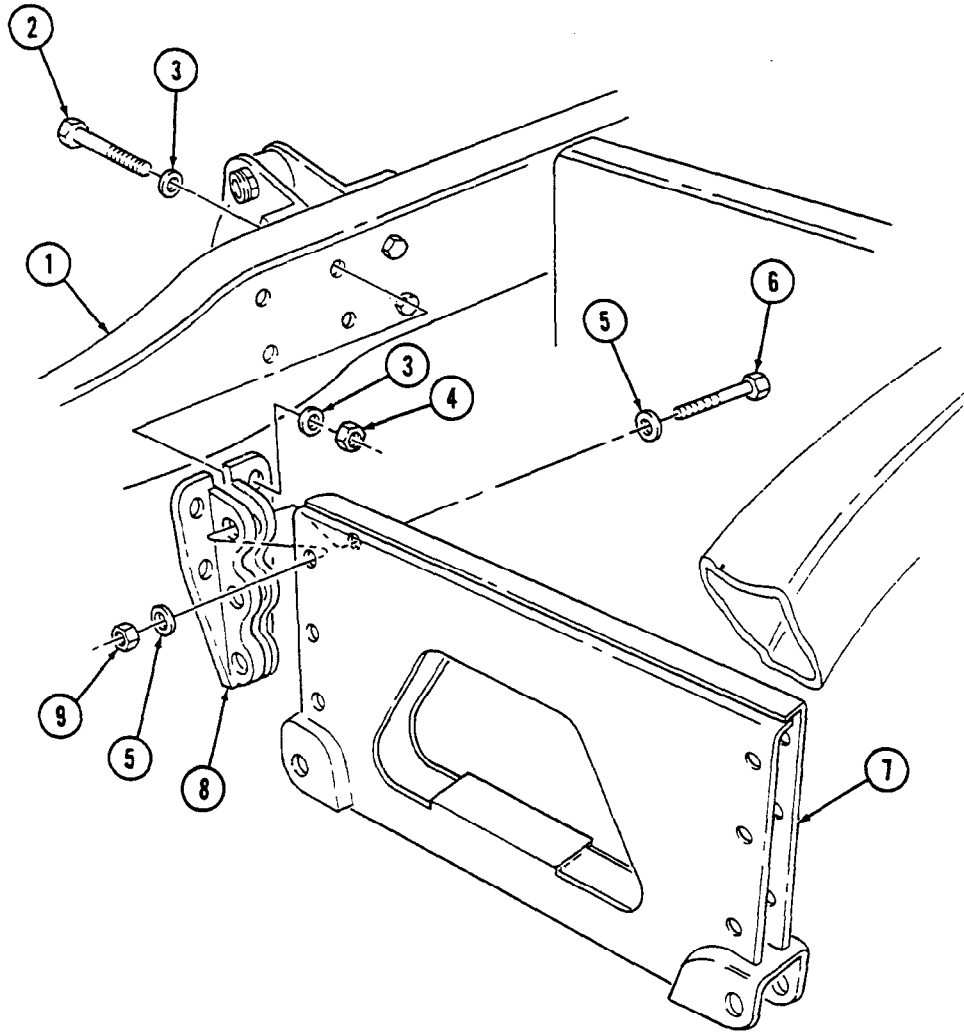
Crossmember must be supported during removal. Failure to support crossmember during removal may cause injury to personnel or damage to equipment.

1. Remove four locknuts (4), washers (3), capscrews (2), and washers (3) from rear crossmember (7) and frame rails (1). Discard locknuts (4).
2. Loosen six locknuts (9) on two rear crossmember mounting brackets (8) and rear crossmember (7).
3. Slide rear crossmember (7) down and out from under vehicle.
4. Remove six locknuts (9), washers (5), capscrews (6), washers (5), and two rear crossmember mounting brackets (8) from rear crossmember (7). Discard locknuts (9).

b. Installation

1. Install two crossmember mounting brackets (8) on rear crossmember (7) with six washers (5), capscrews (6), washers (5), and locknuts (9).
2. Install rear crossmember (7) on frame rails (1) with four washers (3), capscrews (2), washers (3), and locknuts (4). Tighten locknuts (4) to 260 lb-ft (353 N·m).
3. Tighten six locknuts (9) to 90 lb-ft (122 N·m).

24-19. REAR SUSPENSION REAR CROSSMEMBER REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install rear-rear tiedown brackets (para. 24-12).
 - Install differential support brackets and side mounting brackets (para. 24-15).
 - Install rear lower control arms (para. 6-26).

24-20. SUSPENSION CROSSMEMBER REPAIR

This task covers:

a. Inspection

b. Repair

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Metal strip (Appendix C, Item 50)

Manual References

TM 9-237
TM 43-0139
TM 9-2320-387-24P

Maintenance Level

Direct support

a. Inspection

1. Visually inspect the main frame rails for damage or distortion. Vehicles with damaged frame rails should be sent to GS maintenance for repair.

NOTE

Crossmember with end bracket weld breaks of more than 1 in. (2.54 cm) must be replaced. Any crack or tear in the crossmember longer than 1-3/4 in. (4.4 cm) requires replacement of the crossmember.

2. Inspect the crossmember (1) for bends, cracks, or broken end bracket welds. Bent crossmembers (1) should be straightened. Small cracks or tears should be stop-drilled and welded.

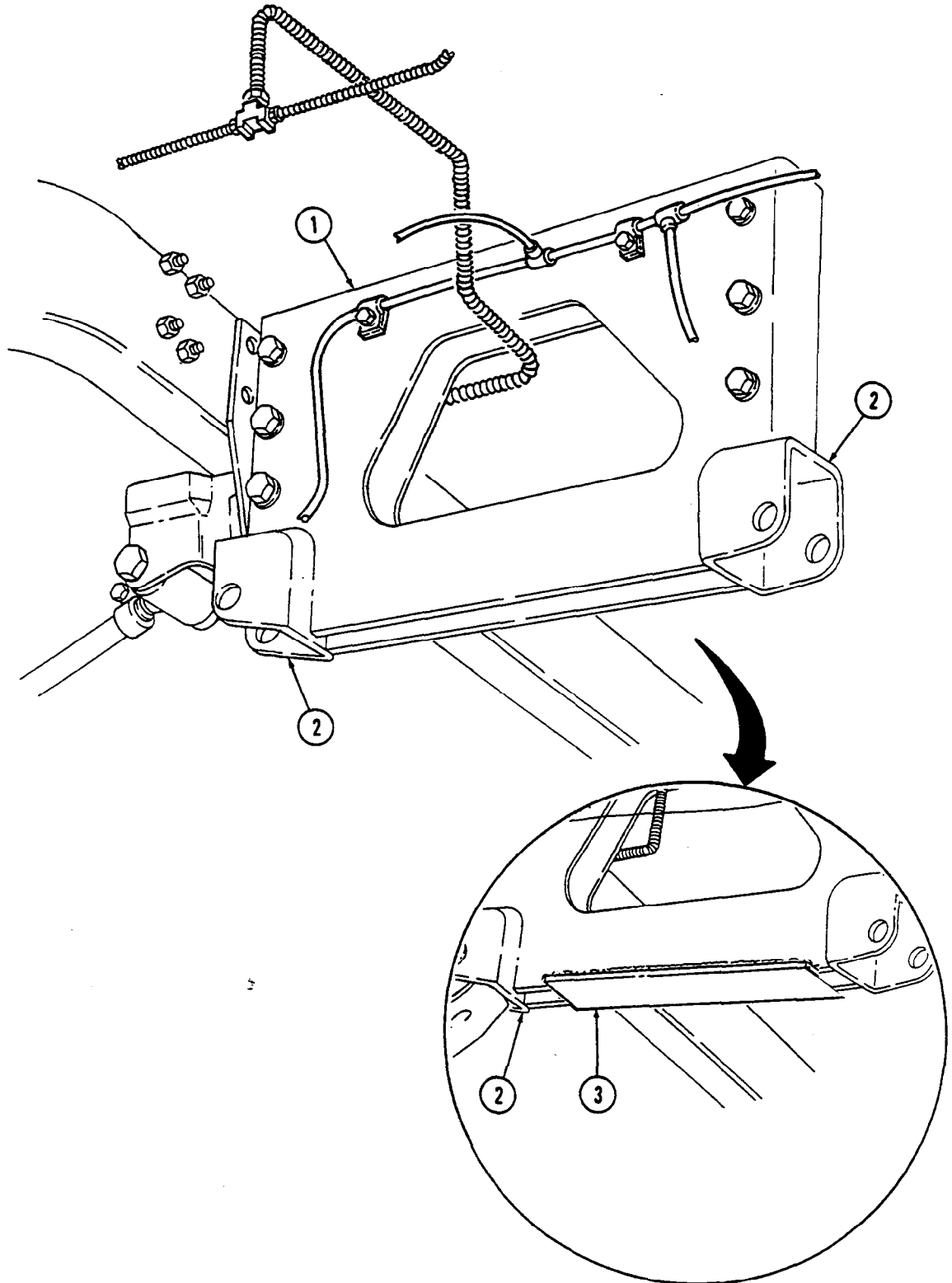
b. Repair

NOTE

- Heli-Arc, MIG, or TIG welding equipment may be used, provided the electrode used has a 70,000 psi (482,650 kPa) tensile strength.
- Avoid heat build-up in the rubber bushing areas toward the outer edges of the crossmember.
- For welding instructions, refer to TM 9-237.

1. Center a 15-1/2-in. (39.4 cm) metal strip (3) between the end brackets (2), flat against bottom edges of the crossmember (1). Weld metal strip (3) to the crossmember (1).
2. Spot-paint welded area (TM 43-0139).

24-20. SUSPENSION CROSSMEMBER REPAIR (Cont'd)



24-21. REAR CROSSMEMBER BRACKET AND REAR BODY MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Four locknuts (Appendix G, Item 121)

Manual References

TM 9-2320-387-24P

Equipment Condition

Rear body mount removed (para. 33-3).

Maintenance Level

Direct support

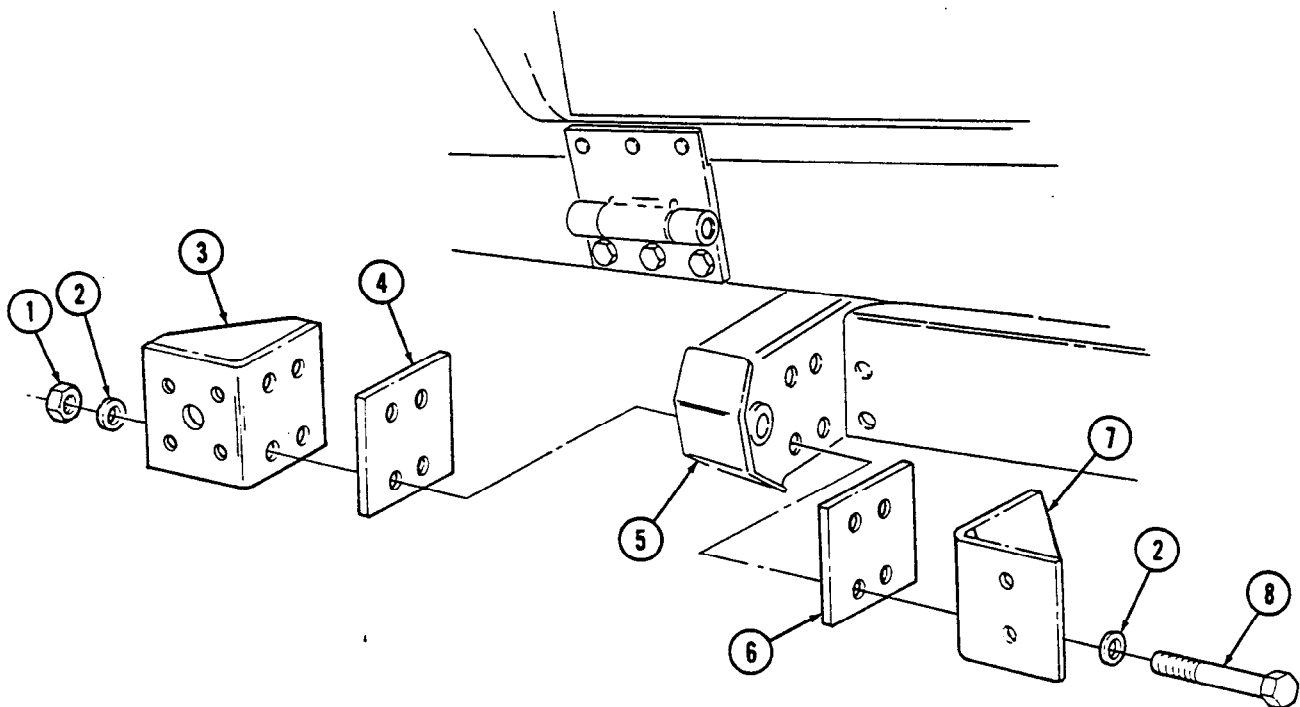
a. Removal

1. Remove four locknuts (1), washers (2), rear body mount bracket (3), and plate (4) from frame rail (5). Discard locknuts (1).
2. Remove four capscrews (8), washers (2), crossmember bracket (7), and plate (6) from frame rail (5).

b. Installation

1. Install plate (6) and crossmember bracket (7) on frame rail (5) with four washers (2) and capscrews (8).
2. Install plate (4) and rear body mount bracket (3) on frame rail (5) with four washers (2) and locknuts (1).
3. Install rear body mount (para. 33-3).
4. Tighten locknuts (1) to 90 lb-ft (122 N•m).

24-21. REAR CROSSMEMBER BRACKET AND REAR BODY MOUNT BRACKET REPLACEMENT (Cont'd)



24-22. REAR BUMPER MOUNTING BRACKET AND TIEDOWN BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

- Rear body mount removed (para. 33-3).
- Tiedown ring removed (para. 9-4).

Materials/Parts

Eight locknuts (Appendix G, Item 121)

Maintenance Level

Direct support

Manual References

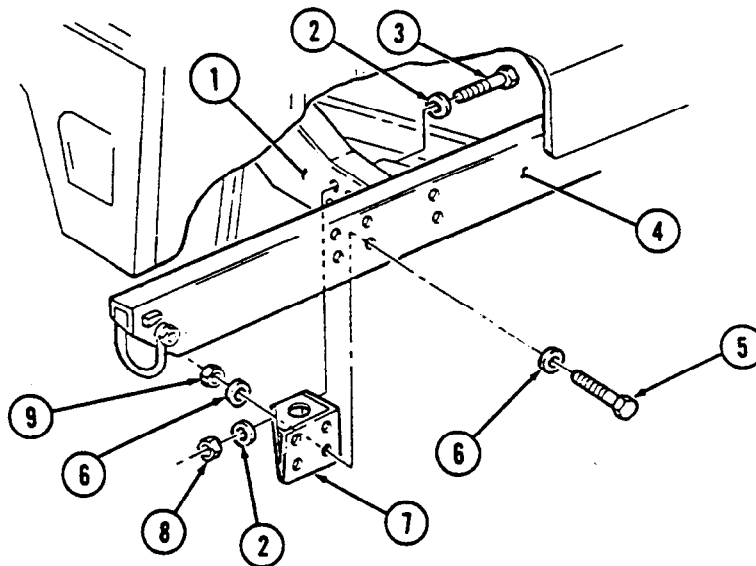
TM 9-2320-387-24P

a. Removal

1. Remove four locknuts (9), washers (6), capscrews (5), and washers (6) from bumper mounting bracket (7) and bumper (4). Discard locknuts (9).
2. Remove four locknuts (8), washers (2), capscrews (3), washers (2), and bumper mounting bracket (7) from frame rail (1). Discard locknuts (8).

b. Installation

1. Install bumper mounting bracket (7) on frame rail (1) with four washers (2), capscrews (3), washers (2), and locknuts (8).
2. Install bumper mounting bracket (7) on bumper (4) with four washers (6), capscrews (5), washers (6), and locknuts (9).
3. Tighten locknuts (8) and (9) to 90 lb-ft (122 N·m).



- FOLLOW-ON TASKS:**
- Install rear body mount (para. 33-3).
 - Install tiedown ring (para. 9-4).

CHAPTER 25

SPECIAL PURPOSE BODIES (DS) MAINTENANCE

25-1. INTRODUCTION

This chapter contains maintenance instructions for replacement and repair of special purpose bodies components at the direct support maintenance level. Some subassemblies and parts must be removed before body components can be accessed. They are referenced to other paragraphs in this manual.

Section I. ARMAMENT CARRIER MAINTENANCE

25-2. ARMAMENT CARRIER MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
25-3.	Roof Panel and Resilient Mount Maintenance	25-2
25-4.	Turret Frame Replacement	25-4
25-5.	Header Maintenance	25-8
25-6.	Windshield Maintenance	25-10
25-7.	Cargo Shell Maintenance	25-16
25-8.	Cargo Shell Repair	25-22
25-9.	C-Pillar Partition Maintenance	25-24
25-10.	Passenger Side Footwell Outer Armor Maintenance	25-28
25-11.	Passenger Side Footwell Inner Armor Maintenance	25-30
25-12.	C-Pillar Door, Guides, Track, and Door Stop Maintenance	25-32
25-13.	Passenger Side Upper Cowl Liner Replacement	25-36
25-13.1.	Air Horn Support Bracket Replacement	25-36.1
25-13.2.	10,500 lb. Hydraulic Winch Repair	25-36.2
25-13.3	Right Front Underbody Armor Installation	25-36.20

25-3. ROOF PANEL AND RESILIENT MOUNT MAINTENANCE

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Removal b. Cleaning and Inspection | <ul style="list-style-type: none"> c. Installation |
|--|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Twenty-nine locknuts (Appendix G, Item 156)
 Tape (Appendix C, Item 80)
 Sealant (Appendix C, Item 74)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Turret bearing and stop ring removed (para. 11-57).

General Safety Instructions

Direct all personnel to stand clear during hoisting operations.

Maintenance Level

Direct support

a. Removal

1. Remove three nuts (19), capscrews (22), and spacer(s) (20) from left and right side roof panel (2).
2. Remove twenty-two locknuts (4) and capscrews (1) from roof panel (2) and turret frame (3). Discard locknuts (4).
3. Remove seven locknuts (12), washers (13), plates (14), resilient mounts (15), and spacers (10) from three C-pillar mounts (17), center roof mounts (9), and right and left side windshield mounts (18). Discard locknuts (12).

WARNING

Direct all personnel to stand clear during hoisting operations. A heavy or swinging load can be dangerous. Failure to do so may cause injury to personnel or damage to equipment.

4. Using a lifting device, lift roof panel (2) until it is clear of resilient mounts (8).
5. Remove seven resilient mounts (8) and plates (7) from roof mounts (5).
6. Remove seven studs (11) and brackets (6) from roof mounts (5).
7. Lift roof panel (2) clear of C-pillar mounts (17), center roof mounts (9), and right and left side windshield mounts (18).

b. Cleaning and Inspection

1. Remove tape and foam rubber from mating surfaces of roof panel (2) and windshield assembly (16).
2. Clean and inspect mating surfaces of roof panel (2) and windshield assembly (16). Ensure mating surfaces are clean and smooth.
3. Ensure seals on header are in place and serviceable.

c. Installation

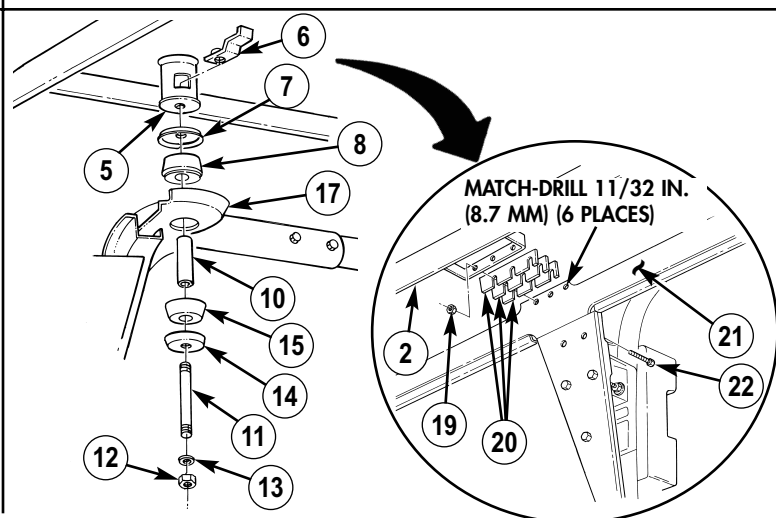
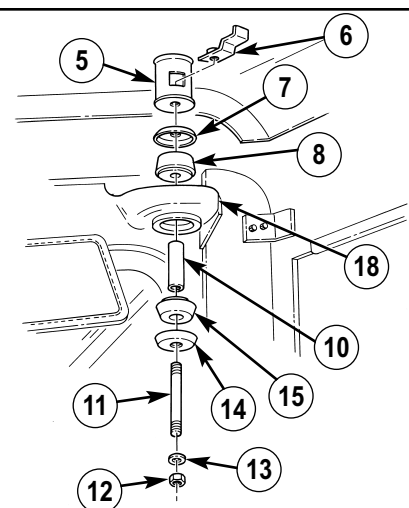
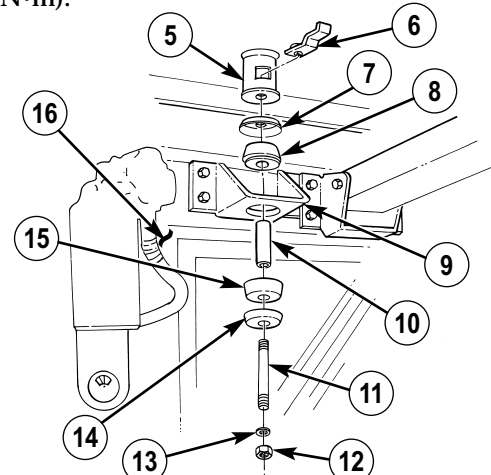
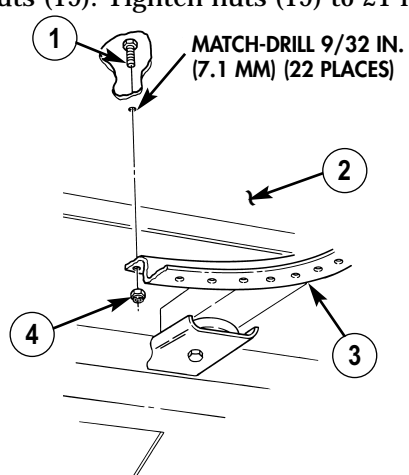
WARNING

Direct all personnel to stand clear during hoisting operations. A heavy or swinging load can be dangerous. Failure to do so may cause injury to personnel or damage to equipment.

1. Using a lifting device, lift roof panel (2) over mounting surfaces.

25-3. ROOF PANEL AND RESILIENT MOUNT MAINTENANCE (Cont'd)

2. Apply tape and foam rubber to forward and rear mating surfaces of roof panel (2) and to top of windshield assembly (16).
3. Install seven resilient mounts (8) and plates (7) on roof mounts (5).
4. Slowly lower roof panel (2) on C-pillar mounts (17), center roof mounts (9), and right and left side windshield mounts (18).
5. Install seven brackets (6) on three C-pillar mounts (17), center roof mounts (9), and right and left side windshield mounts (18).
6. Install seven studs (11) on roof mounts (5) and brackets (6). Thread stud through bracket (6) until three threads are through bracket (6).
7. Install seven spacers (10), resilient mounts (15), plates (14), washers (13), and locknuts (12) on lower end of studs (11). Tighten locknuts (12) to 37 lb-ft (50 N·m).
- 7.1. If new turret frame (3) is installed, match-drill twenty-two 9/32 in. (7.1 mm) holes from roof panel (2) to turret frame (3).
8. Apply sealant around holes prior to installing capscrews (1).
9. Install twenty-two capscrews (1) and locknuts (4) on roof panel (2) and turret frame (3). Tighten locknuts (4) to 160-210 lb-in. (18-24 N·m).
- 9.1. If new roof panel (2) is being installed, match-drill six 11/32 in. (8.7 mm) holes from header (21) to left and right side of roof panel (2).
10. Install left and right side roof panel (2) on header (21) with spacer(s) (20), three capscrews (22), and nuts (19). Tighten nuts (19) to 21 lb-ft (28 N·m).



FOLLOW-ON TASK: Install turret bearing and stop ring (para. 11-57).

25-4. TURRET FRAME REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Eighteen locknuts (Appendix G, Item 156)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Roof panel removed (para. 25-3).

Maintenance Level

Direct support

a. Removal

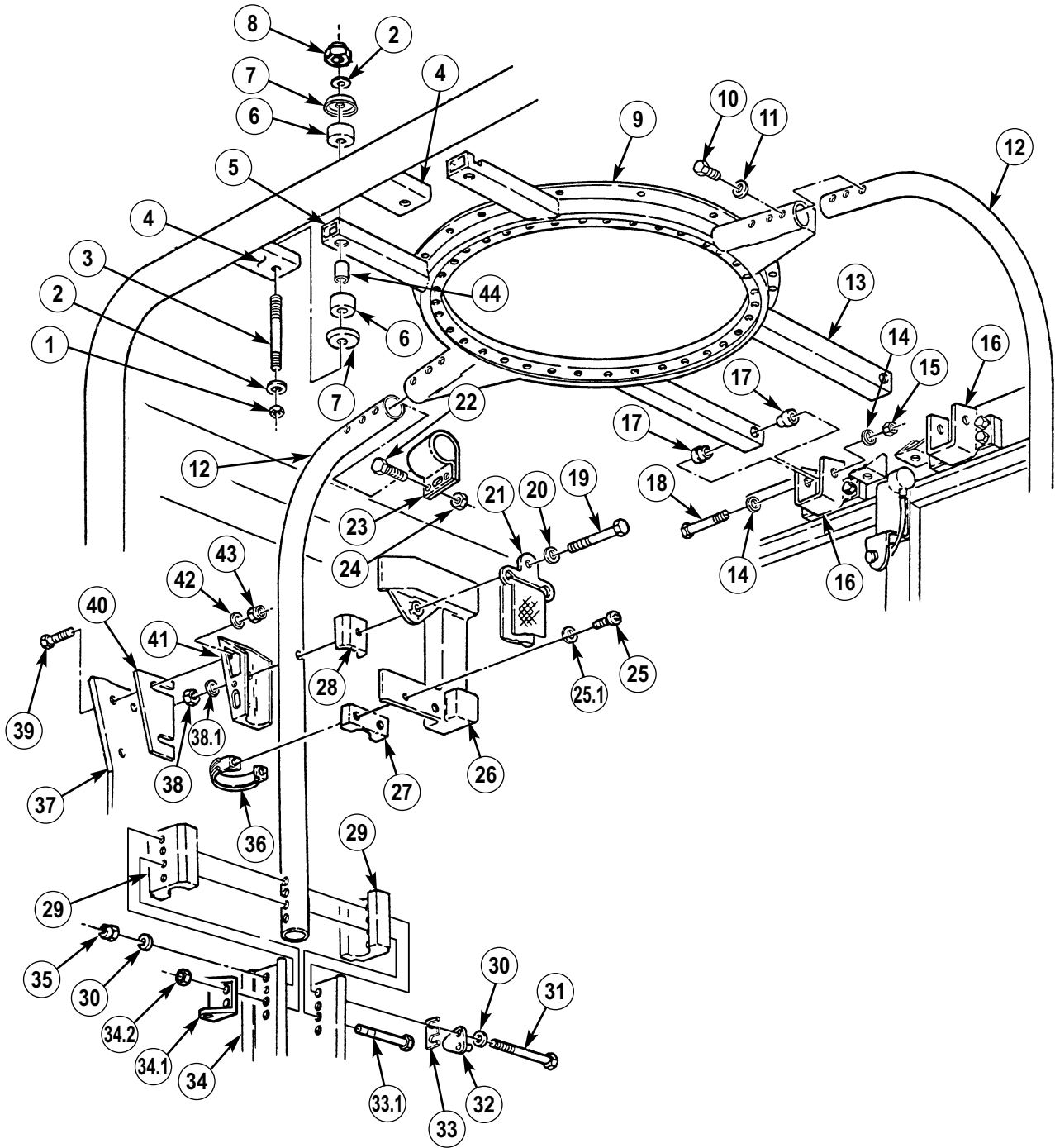
1. Remove four screws (25), washers (25.1), two clamps (36), and saddle blocks (27) from upper supports (12) and paddings (26).
2. Remove two locknuts (38), washers (38.1), capscrews (19), washers (20), D-rings (21), paddings (26), and brackets (28) from upper supports (12). Discard locknuts (38).

NOTE

Mark locations of washers and capscrews for installation.

3. Remove six locknuts (43), washers (42), capscrews (39), two brackets (41), and spacers (40) from B-pillar armor (37). Discard locknuts (43).
4. Remove four locknuts (35), washers (30), capscrews (31), washers (30), two strikers (32), and spacer(s) (33) from connecting blocks (29) and B-pillar (34). Discard locknuts (35). Keep spacer(s) (33) with strikers (32).
- 4.1. Remove four locknuts (34.2), capscrews (33.1), and rear door safety strap brackets (34.1) from connecting blocks (29) and B-pillar (34). Discard locknuts (34.2).
5. Remove two nuts (15), washers (14), capscrews (18), and washers (14) from front mounting clevises (16) and front supports (13).
6. Remove two nuts (1) and washers (2) from C-pillar (4) and rear supports (5).
7. Remove two studs (3), locknuts (8), washers (2), mounts (7), bushings (6), spacers (44), bushings (6), and mounts (7) from C-pillar (4) and rear supports (5). Discard locknuts (8).
8. Remove four isolation mounts (17) from two front supports (13).
9. Remove two upper supports (12) and four connecting blocks (29) from B-pillar (34).
10. Remove support ring (9) and two upper supports (12) from C-pillar (4) and front mounting clevises (16).
11. Remove six screws (10), washers (11), and two upper supports (12) from support ring (9).
12. Remove two capscrews (22), nuts (24) and net bracket (23) from upper support (12).

25-4. TURRET FRAME REPLACEMENT (Cont'd)



25-4. TURRET FRAME REPLACEMENT (Cont'd)

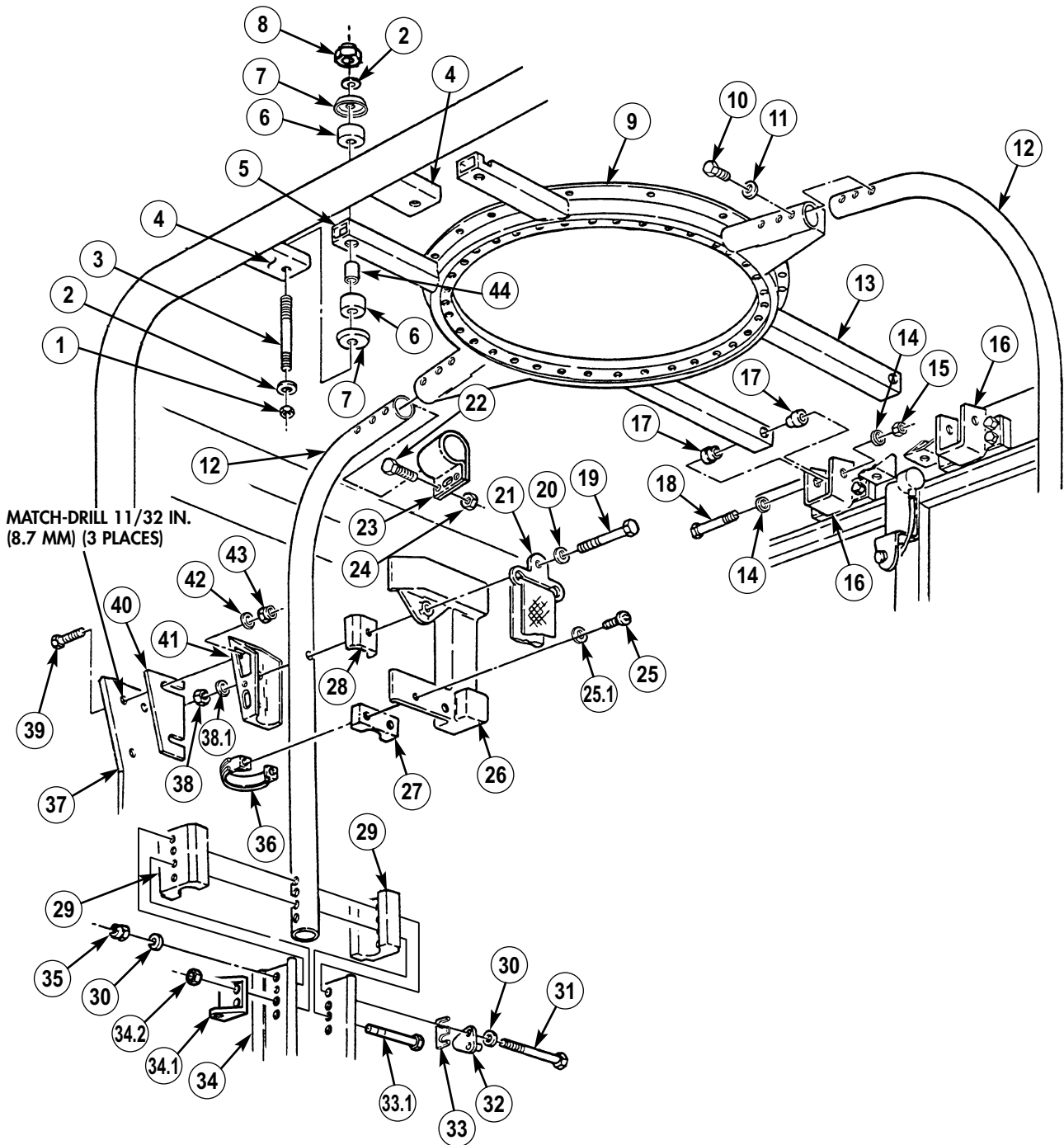
b. Installation

1. Install net bracket (23) on upper support (12) with two capscrews (22) and locknuts (24). Tighten locknuts (24) to 10 lb-ft (14 N·m).
2. Install four isolation mounts (17) on two front supports (13) of support ring (9).
3. Install two upper supports (12) on support ring (9) with six washers (11) and capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N·m).
4. Position support ring (9), two upper supports (12), and four connecting blocks (29) on C-pillar (4), B-pillar (34), and front mounting clevises (16).

NOTE

- Studs have longer threaded area on one end. Install stud with longer threaded end up.
 - Ensure threads on stud extend beyond locknut at least three threads.
5. Secure support ring (9) and rear supports (5) on C-pillar (4) with two spacers (44), four bushings (6), mounts (7), two studs (3), washers (2), locknuts (8), washers (2), and locknuts (1). Tighten locknuts (1) to 37 lb-ft (50 N·m).
 6. Secure support ring (9) on two front mounting clevises (16) with four washers (14), capscrews (18), washers (14), and nuts (15). Tighten nuts (15) to 37 lb-ft (50 N·m).
 7. Secure two upper supports (12) and four connecting blocks (29) on B-pillar (34) with two spacers (33), strikers (32), four washers (30), capscrews (31), washers (30), and locknuts (35). Tighten locknuts (35) to 21 lb-ft (28 N·m).
 - 7.1. Install two rear door safety strap brackets (34.1) to connecting blocks (29) and B-pillar (34) with four capscrews (33.1) and locknuts (34.2). Tighten locknuts (34.2) to 21 lb-ft (28 N·m).
 - 7.2. If new bracket (41) is being installed, match-drill three 11/32 in. (8.7 mm) holes from B-pillar armor (37) to bracket (41).
 8. Install two spacers (40) and brackets (41) on B-pillar armor (37) with six capscrews (39), washers (42), and locknuts (43). Tighten locknuts (43) to 5 lb-ft (7 N·m).
 9. Install two brackets (28), paddings (26), and D-rings (21) on upper supports (12) with two washers (20), capscrews (19), washers (38.1), and locknuts (38). Tighten locknuts (38) to 37 lb-ft (50 N·m).
 10. Install two clamps (36) and saddle blocks (27) on upper supports (12) and paddings (26) with four screws (25) and washers (25.1). Tighten screws (25) to 33-37 lb-ft (45-50 N·m).

25-4. TURRET FRAME REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install roof panel (para. 25-3).

25-5. HEADER MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Automotive maintenance and repair: field
maintenance, basic (Appendix B, Item 6)

Materials/Parts

Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

Roof panel removed (para. 25-3).

Maintenance Level

Direct support

NOTE

Replacement procedures for left and right side headers are basically the same. This procedure is for left side header.

a. Removal

1. Remove two capscrews (1) and block (8) from header (2) and C-pillar (9).
2. Remove two capscrews (5) and header (2) from windshield interior armor (4).

b. Inspection

1. Inspect seals (3), (6), and (7) for damage. If damaged, replace.
2. Refer to para. 10-56 for plusnut inspection and replacement.

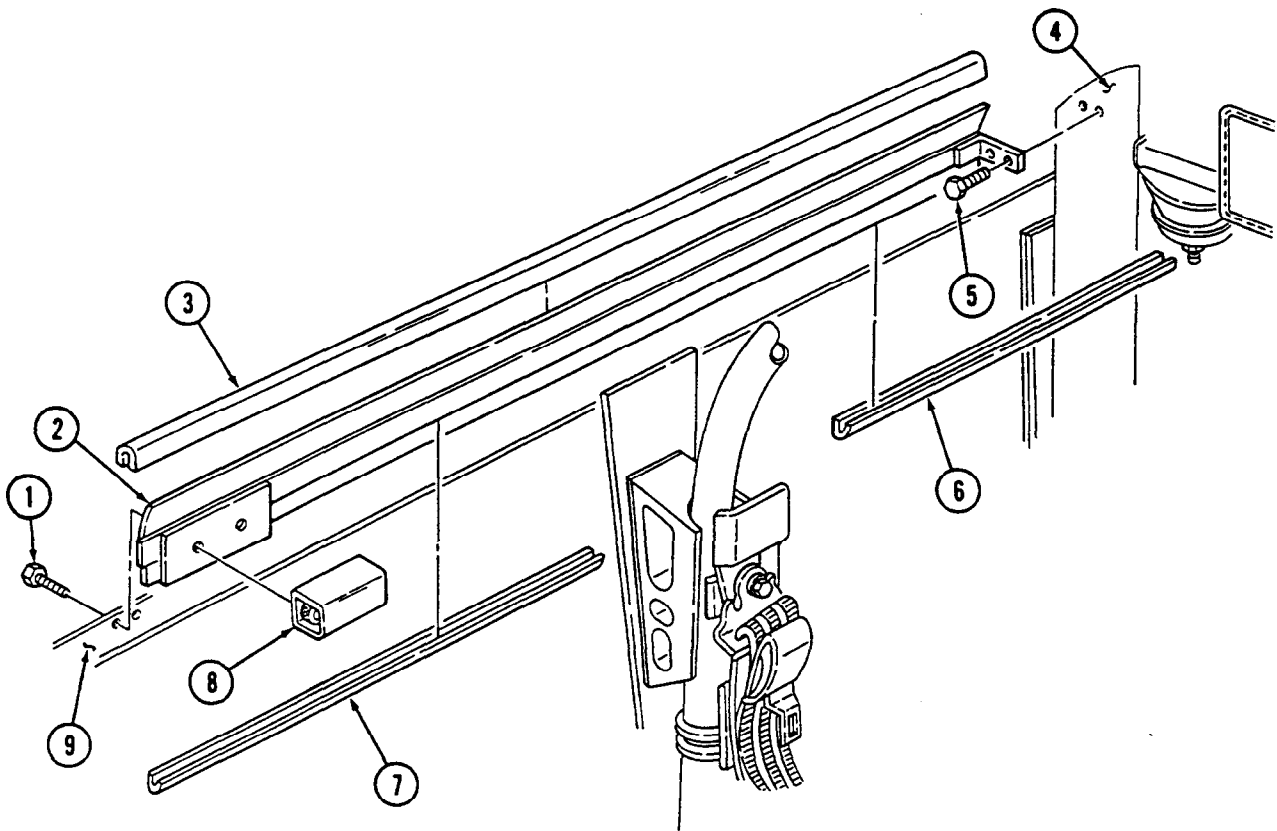
c. Installation

NOTE

Apply sealing compound to threads of capscrews prior to installation.

1. Install header (2) on windshield interior armor (4) with two capscrews (5).
2. Align header (2) and tighten capscrews (5) to 10 lb-ft (14 N·m).
3. Install header (2) on C-pillar (9) with block (8) and two capscrews (1). Tighten capscrews (1) to 68-82 lb-in. (8-9 N·m).

25-5. HEADER MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install roof panel (para. 25-3).

25-6. WINDSHIELD MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Materials/Parts

Sealing compound (Appendix C, Item 72.1)
 Nine locknuts (Appendix G, Item 156)
 Four lockwashers (Appendix G, Item 207)

Equipment Condition

- Rearview mirrors removed (para. 10-68).
- Wiper blades and arms removed (para. 10-62).
- Windshield wiper switch/motor removed (para. 10-63).
- Windshield de-icer removed (para. 10-67).
- Roof panel removed (para. 25-3).
- Hood raised and secured (TM 9-2320-387-10).
- Air intake assembly removed (para. 3-19).
- Sun visors removed (para. 10-70).
- Air distribution duct right two registers removed (para. 11-82).

General Safety Instructions

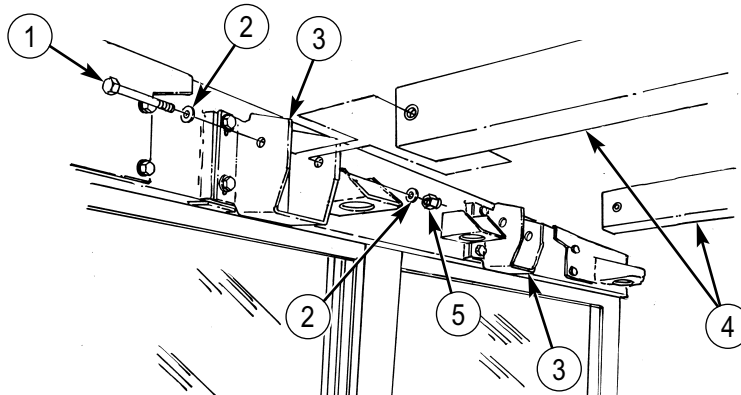
To prevent injury to fingers, place two wood blocks between vehicle and windshield before placing fingers between windshield and vehicle.

Maintenance Level

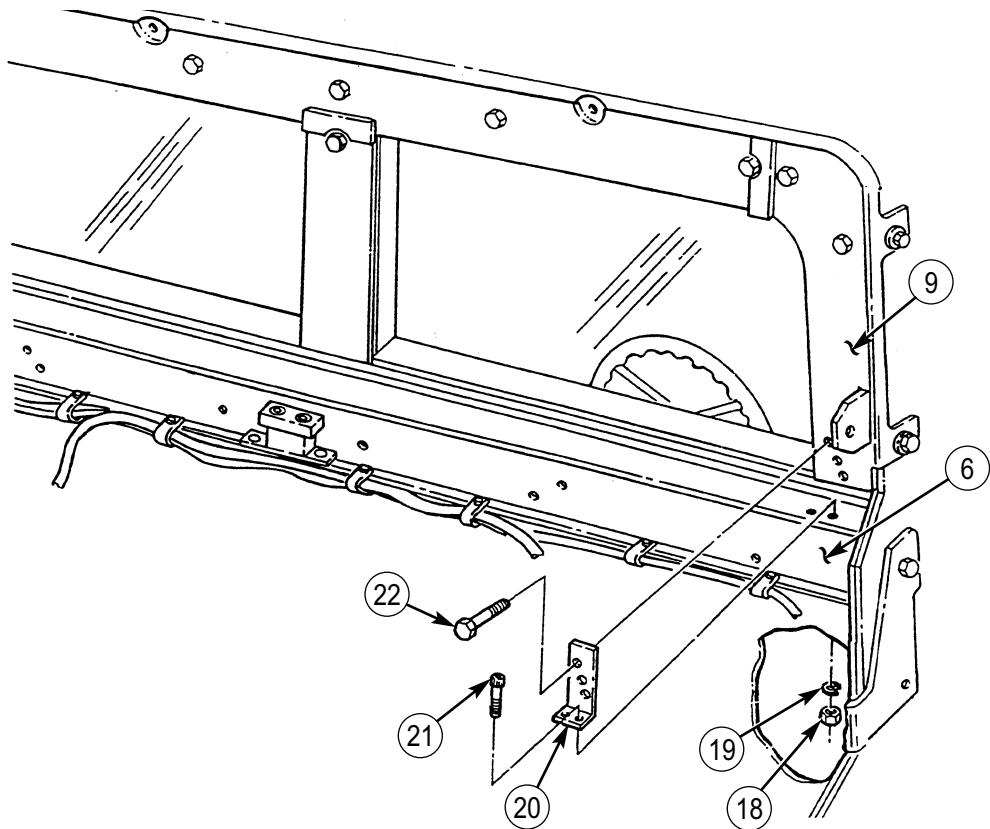
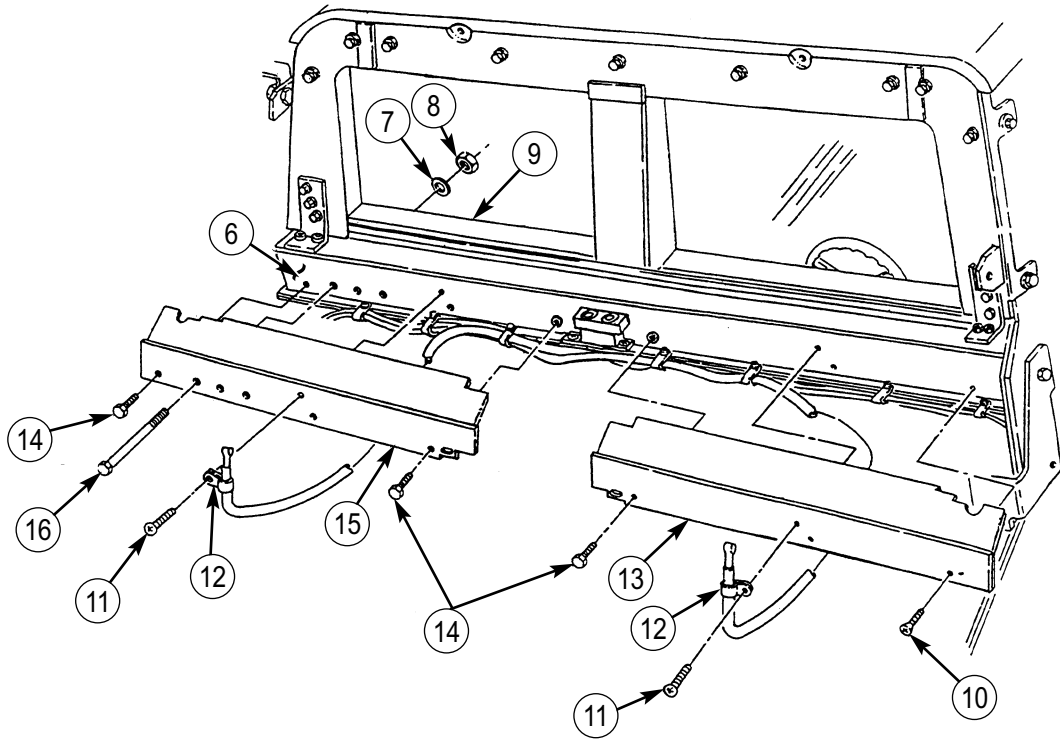
Direct support

a. Removal

1. Install cardboard over windshield glass with masking tape.
2. Remove two nuts (5), washers (2), capscrews (1), washers (2), and front supports (4) from two clevises (3).
3. Remove two screws (11) and clamps (12) from lower left deflector (13) and lower right deflector (15).
4. Remove three nuts (8), washers (7), and capscrews (16) from right deflector (15).
5. Remove screw (10), two capscrews (14), and lower left deflector (13) from body (6).
6. Remove three capscrews (14) and lower right deflector (15) from body (6) and windshield (9).
7. Remove six capscrews (22) from two brackets (20) and windshield (9).
8. Remove four locknuts (18), lockwashers (19), socket-head screws (21), and two brackets (20) from body (6). Discard locknuts (18) and lockwashers (19).



25-6. WINDSHIELD MAINTENANCE (Cont'd)



25-6. WINDSHIELD MAINTENANCE (Cont'd)

9. Remove three locknuts (3), washers (4), capscrews (10), and washers (4) from bracket (1) on each side of windshield (2). Discard locknuts (3).
10. Remove two locknuts (8), capscrews (11), and left and right front door check straps (9) from brackets (1). Discard locknuts (8).
11. Remove two capscrews (7), washers (6), and nut plate (5) from each side of windshield (2).
12. Remove three capscrews (12), washers (13), and bracket (1) from each side of windshield (2).

CAUTION

Windshield assembly must be supported when performing steps 13 through 18.

13. Remove two capscrews (16) and washers (15) from header (14) on each side of windshield (2).
14. Attach lifting device to windshield (2).
15. Lean top of windshield (2) forward.
16. Remove two capscrews (26) and washers (25) from A-pillar armor (24) on each side of windshield (2).

WARNING

To prevent injury to fingers, place two wood blocks between vehicle and windshield before placing fingers between windshield and vehicle.

17. Remove grommet (18) from A-beam (22) and disconnect leads 71 (17), 71B (19), and 57F (20) from three body harness connectors (21).
18. Remove windshield (2) from body (23).

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

1. Using lifting device, position windshield (2) on body (23) with top leaning forward.

WARNING

To prevent injury to fingers, place two wood blocks between vehicle and windshield before placing fingers between windshield and vehicle.

CAUTION

Windshield assembly must be supported when performing steps 2 and 3.

2. Connect leads 71 (17), 71B (19), and 57F (20) to three body harness connectors (21) and install grommet (18) on A-beam (22).

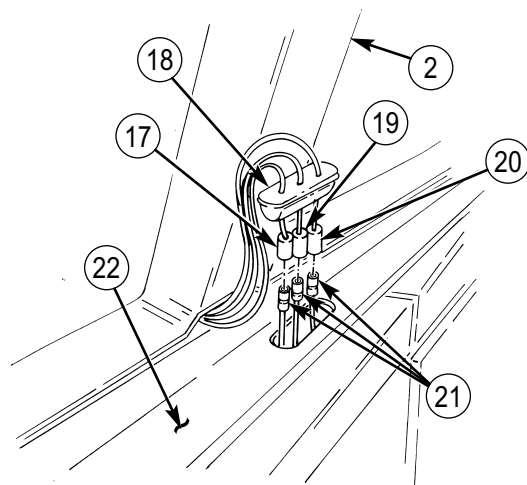
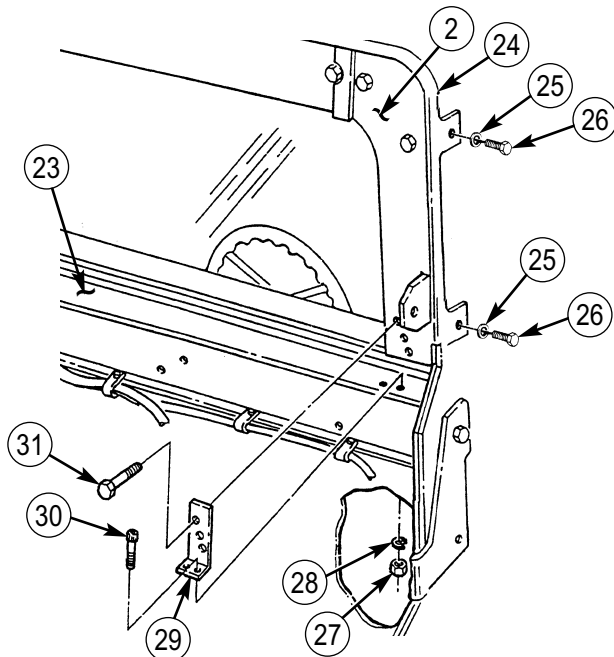
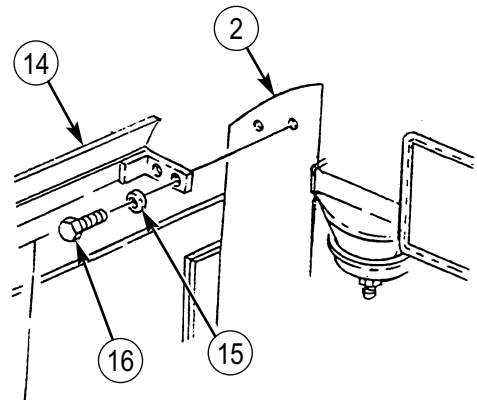
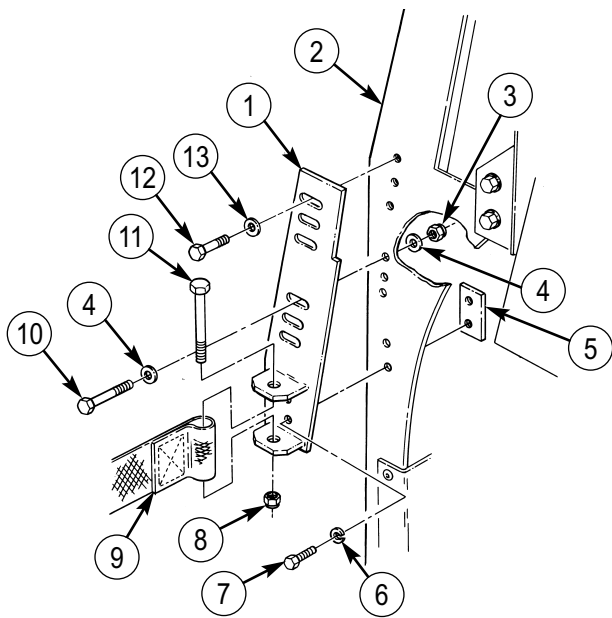
NOTE

Apply sealing compound to capscrews in steps 3, 4, and 7 prior to installation.

3. Push top of windshield (2) into place and install header (14) on each side of windshield (2) with two washers (15) and capscrews (16). Tighten capscrews (16) to 68-82 lb-in. (8-9 N·m).
4. Install two washers (25) and capscrews (26) on windshield (2) and A-pillar armor (24) on each side of windshield (2). Tighten capscrews (26) to 37 lb-ft (50 N·m).
5. Install bracket (1) on each side of windshield (2) with two washers (6), capscrews (7), and nut plate (5). Tighten capscrews (7) to 70-110 lb-in. (8-12 N·m).

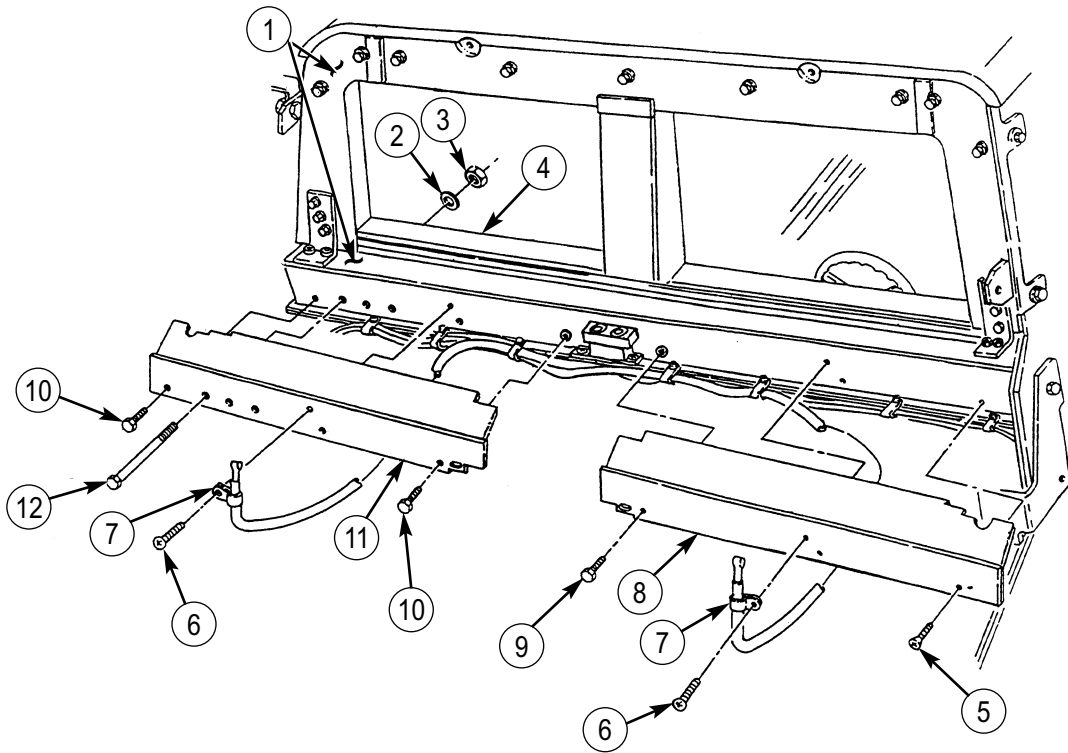
25-6. WINDSHIELD MAINTENANCE (Cont'd)

6. Secure bracket (1) to windshield (2) with three washers (4), capscrews (10), washers (4), and locknuts (3) on each side of windshield (2). Tighten locknuts (3) to 10 lb-ft (14 N·m).
7. Secure bracket (1) to windshield (2) with three washers (13) and capscrews (12) on each side of windshield (2).
8. Install left and right front door check straps (9) on bracket (1) with two capscrews (11) and locknuts (8). Tighten locknuts (8) to 40-60 lb-in. (5-8 N·m).
9. Install bracket (29) on each forward side of body (23) with two socket-head screws (30), lockwashers (28), and locknuts (27). Tighten socket-head screws (30) to 21 lb-ft (28 N·m).
10. Install each lower forward side of windshield (2) on windshield bracket (29) with three capscrews (31). Tighten capscrews (31) to 68-82 lb-in. (8-9 N·m).

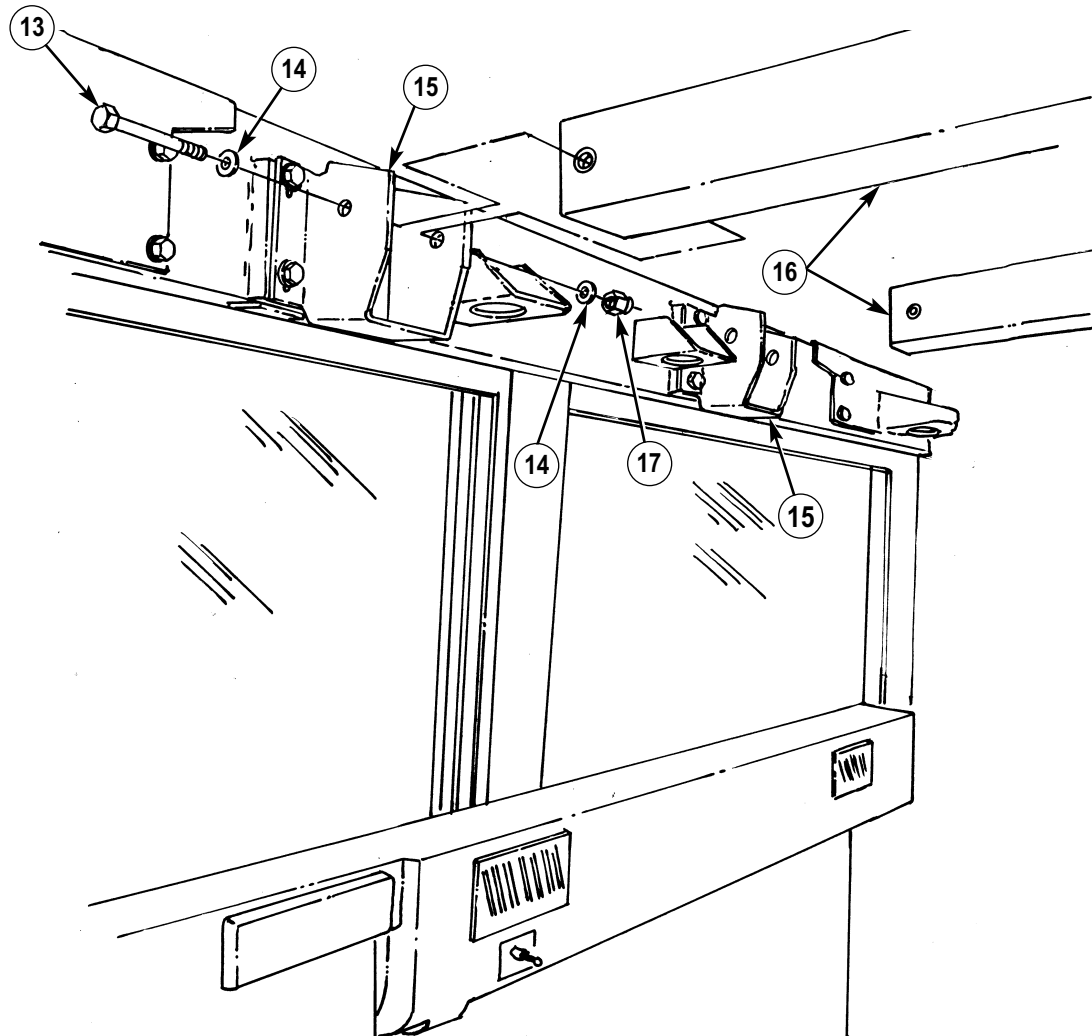


25-6. WINDSHIELD MAINTENANCE (Cont'd)

11. Install lower right deflector (11) on body (1) and windshield (4) with three capscrews (10). Tighten capscrews (10) to 68-82 lb-in. (8-9 N·m).
12. Install three capscrews (12), washers (2), and nuts (3) on lower right deflector (11) and body (1). Tighten capscrews (12) to 37 lb-ft (50 N·m).
13. Install lower left deflector (8) on body (1) with two capscrews (9) and capscrew (5). Tighten capscrews (9) and (5) to 68-82 lb-in. (8-9 N·m).
14. Install two clamps (7) on lower left deflector (8) and lower right deflector (11) with two screws (6). Tighten screws (6) to 13-16 lb-in. (1.5-1.8 N·m).
15. Install front supports (16) on two clevises (15) with washers (14), capscrews (13), washers (14), and nuts (17). Tighten nuts (17) to 37 lb-ft (50 N·m).



25-6. WINDSHIELD MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:
- Install rearview mirrors (para. 10-68).
 - Lower and secure hood (TM 9-2320-387-10).
 - Install wiper blades and arms (para. 10-62).
 - Install windshield de-icer (para. 10-67).
 - Install windshield wiper switch/motor (para. 10-63).
 - Install roof panel (para. 25-3).
 - Install sun visors (para. 10-70).
 - Install air intake assembly (para. 3-19).
 - Install air distribution duct registers (para. 11-82).

25-7. CARGO SHELL MAINTENANCE

This task covers:

- | | |
|--|------------------------|
| <p>a. Removal</p> <p>b. Inspection</p> | <p>c. Installation</p> |
|--|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Five locknuts (Appendix G, Item 130)
 Grease (Appendix C, Item 34)
 Tape, adhesive (Appendix C, Item 80)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Rear three-point seatbelt removed (para. 10-47).
- Cargo shell door removed (para. 11-14).
- Front striker removed (para. 11-25).
- Rear striker removed (para. 11-26).
- Antenna removed, if present (para. 12-24).
- Dovetail spring removed (para. 11-28).
- Ammo box tray removed (para. 11-68 or para. 11-69).
- A/C condenser removed (left cargo shell) (para. 25-18).
- C-pillar top armor removed (para. 11-45).
- Roof panel removed (para. 25-3).

Maintenance Level

Direct support

NOTE

Replacement procedures for right and left cargo shell are basically the same. This procedure covers right cargo shell.

a. Removal

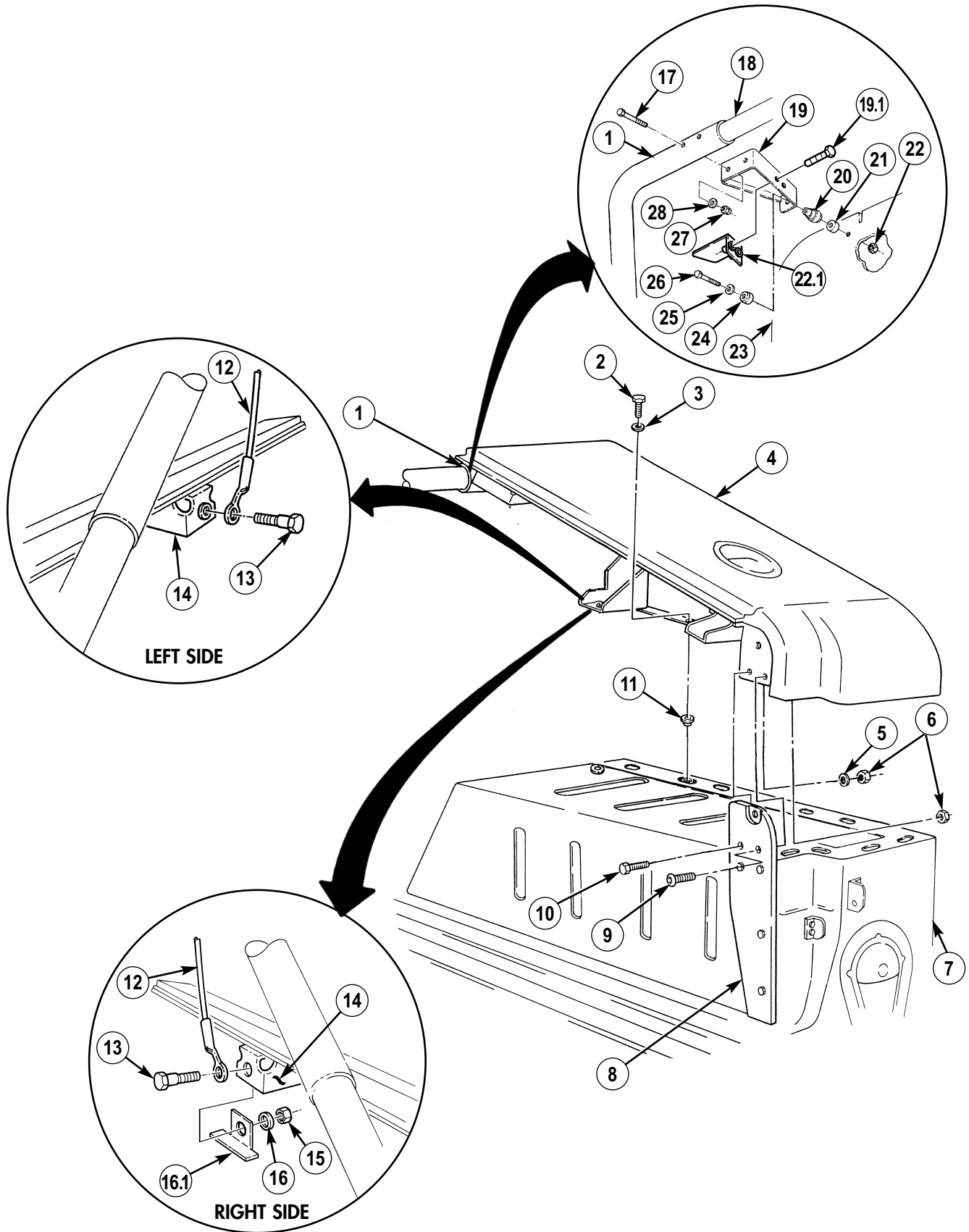
1. Remove two locknuts (6), washer (5), capscrew (10), and socket-head screw (9) from cargo shell (4) and striker mounting plate (8). Discard locknuts (6).
2. Remove nine capscrews (2), washers (3), and spacers (11) from cargo shell (4) and wheelwell (7).

NOTE

Left cargo shell cable uses a plusnut instead of a washer and nut.

3. Remove nut (15), washer (16), two shoulder bolts (13), support bracket (16.1) (right side), and two cables (12) from brackets (14).
- 3.1. Remove two capscrews (19.1) and projectile stop plate (22.1) from bracket (19).
4. Remove two locknuts (27), washers (28), and capscrews (17) from cargo shell support tube (1) and C-pillar (18). Discard locknuts (27).
5. Remove locknut (22), capscrew (26), washer (25), bushing (24), bracket (19), bushing (20), and spacer (21) from C-pillar partition (23). Discard locknut (22).

25-7. CARGO SHELL MAINTENANCE (Cont'd)



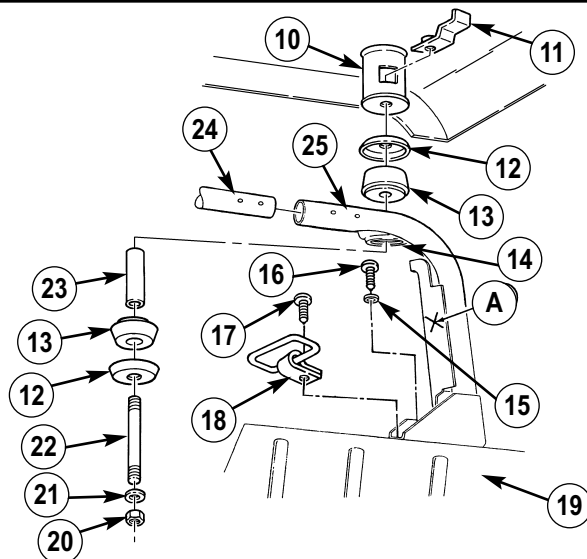
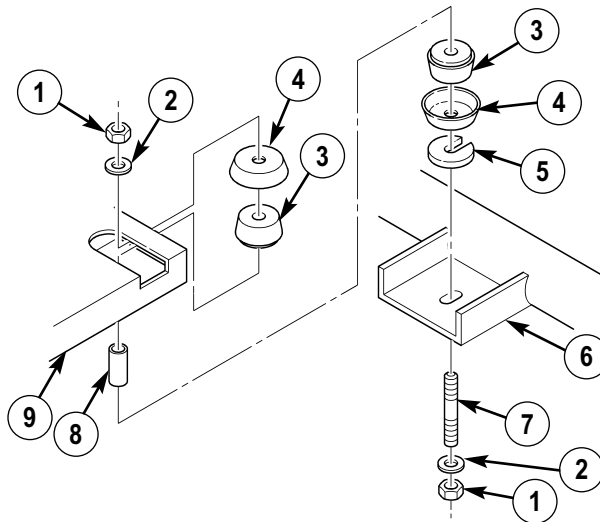
25-7. CARGO SHELL MAINTENANCE (Cont'd)

6. Remove two nuts (1) and washers (2) from stud (7) in turret support ring (9).
7. Remove sleeve spacer (8), two resilient mounts (3), plates (4), stud (7), and shim(s) (5), if present, from between turret support ring (9) and C-pillar support mount (6).
8. Remove nut (20) and washer (21) from stud (22) on right cargo shell mount (14).
9. Remove stud (22), sleeve spacer (23), two resilient mounts (13), plates (12), and bracket (11) from roof mount (10) and C-pillar support mount (14).
10. Remove socket-head screw (17) and cargo tiedown (18) from cargo shell support tube (25) and wheelwell (19).
11. Remove capscrew (16) and washer (15) from wheelwell (19) and support tube (25).

CAUTION

Do not lift cargo shell farther than limits specified in step 12.
Raising cargo shell too far may cause damage to C-pillar.

12. Raise cargo shell (26) approximately 1 in. (2.5 cm) and, using a mallet, rap cargo shell support tube (25) at point A to loosen cargo shell (26), taking care not to bend C-pillar (24). Remove cargo shell (26) from wheelwell (19).
13. Remove cargo shell seal (27) and inspect for damage. Replace if damaged.
14. Remove adhesive tape from cargo shell (26). Discard tape.



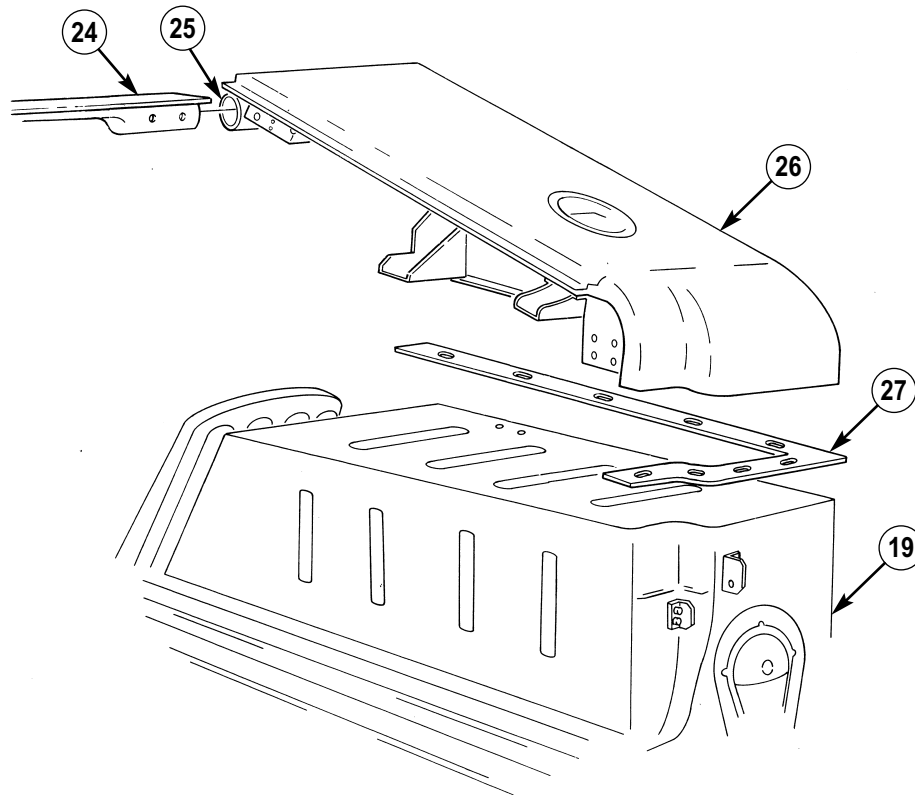
25-7. CARGO SHELL MAINTENANCE (Cont'd)

b. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

c. Installation

1. Apply adhesive tape to cargo shell (26) and wheelwell (19) mounting surface.
2. Using grease, coat inside surface of support tube (25) that makes contact with outside surface of C-pillar (24).
3. Lift rear of cargo shell (26) slightly while installing cargo shell support tube (25) over C-pillar (24).
4. Align cargo shell seal (27) between cargo shell (26) and wheelwell (19).
5. When cargo shell support tube (25) is installed over C-pillar (24), cargo shell (26) is aligned with wheelwell (19) and lower cargo shell (26).
6. Apply sealing compound to threads of capscrew (16), and install support tube (25) on wheelwell (19) with washer (15) and capscrew (16).
7. Apply sealing compound to threads of socket-head screw (17), and install cargo tiedown (18) on wheelwell (19) and support tube (25) with socket-head screw (17).
8. Apply sealing compound to threads of stud (7), and install two resilient mounts (3), plates (4), sleeve spacer (8), and shim(s) (5), if present, between turret support ring (9) and C-pillar support mount (6) with stud (7), two washers (2) and nuts (1). Tighten nuts (1) to 37 lb-ft (50 N·m).
- 8.1. Apply sealing compound to threads of stud (22), and install two resilient mounts (13), plates (12), and sleeve spacer (23) between C-pillar support mount (14) and roof mount (10) with bracket (11), stud (22), washer (21), and nut (20). Tighten nut (20) to 37 lb-ft (50 N·m).



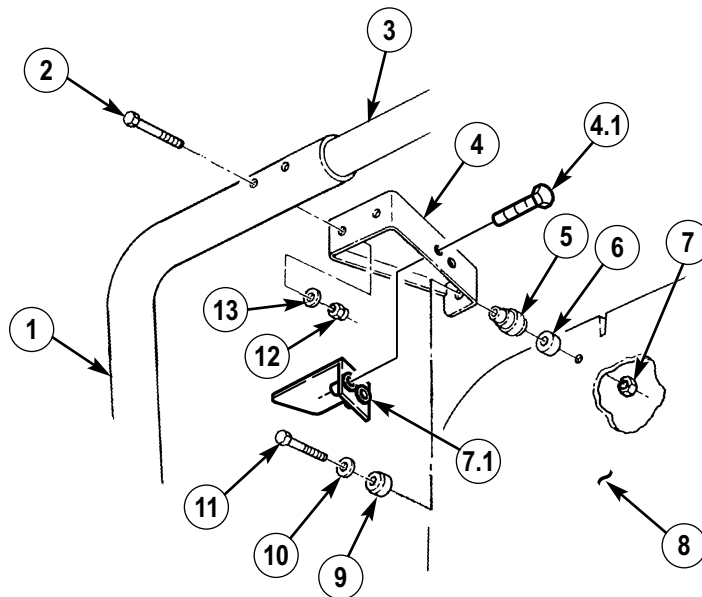
25-7. CARGO SHELL MAINTENANCE (Cont'd)

9. Apply sealing compound to threads of capscrew (11), and install bracket (4) on C-pillar partition (8) with spacer (6), bushing (5), bushing (9), washer (10), capscrew (11), and locknut (7).
10. Install two capscrews (2), washers (13), and locknuts (12) on C-pillar (3), bracket (4), and cargo shell (1).
- 10.1. Install projectile stop plate (7.1) on bracket (4) with two capscrews (4.1).

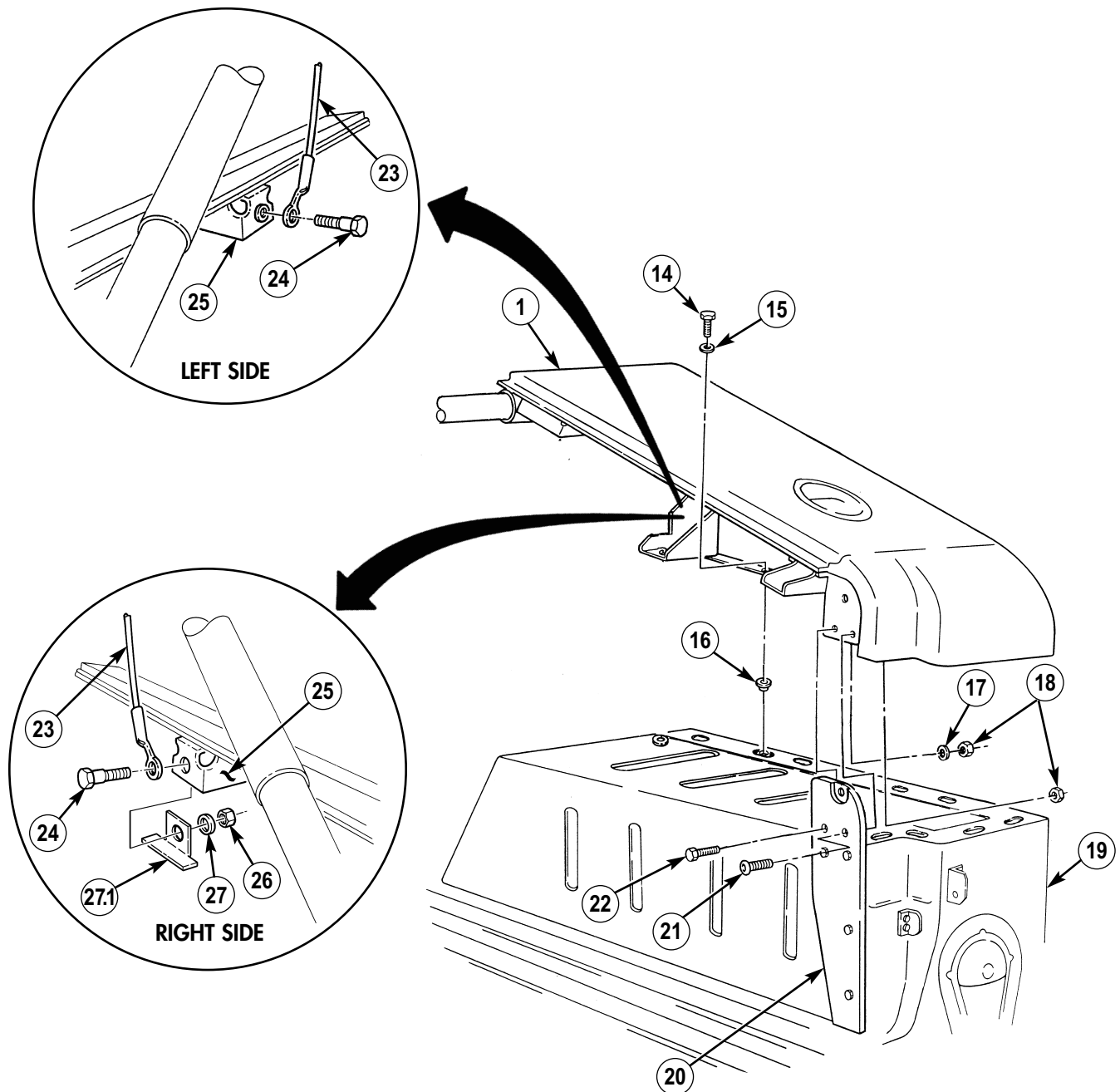
NOTE

Left cargo shell cable uses a plusnut instead of a washer and nut.

11. Apply sealing compound to threads of two shoulder bolts (24) and support bracket (27.1) (right side), and install two cables (23) on brackets (25) with shoulder bolts (24), washer (27), and nut (26).
12. Apply sealing compound to threads of capscrews (14), and install nine spacers (16), washers (15), and capscrews (14) on cargo shell (1) and wheelwell (19).
13. Install capscrew (22), socket-head screw (21), washer (17), and two locknuts (18) on striker mounting plate (20) and cargo shell (1).



25-7. CARGO SHELL MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install dovetail spring (para. 11-28).
 - Install antenna, if removed (para. 12-24).
 - Install front striker plate (para. 11-25).
 - Install rear striker (para. 11-26).
 - Install cargo shell door (para. 11-14).
 - Install A/C condenser (left cargo shell) (para. 25-18).
 - Install ammo box tray (para. 11-68 or 11-69).
 - Install C-pillar top armor (para. 11-45).
 - Install roof panel (para. 25-3).
 - Install three-point seatbelt (para. 10-47).

25-8. CARGO SHELL REPAIR

This task covers:

Repair

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Sealing compound (Appendix C, Item 69)
Primer, weld-through (Appendix C, Item 54)

Manual References

TM 9-2320-387-24P
TM 43-0139
TM 9-237

Equipment Condition

Cargo shell door dovetail spring removed
(para. 11-28).

Maintenance Level

Direct support

Repair

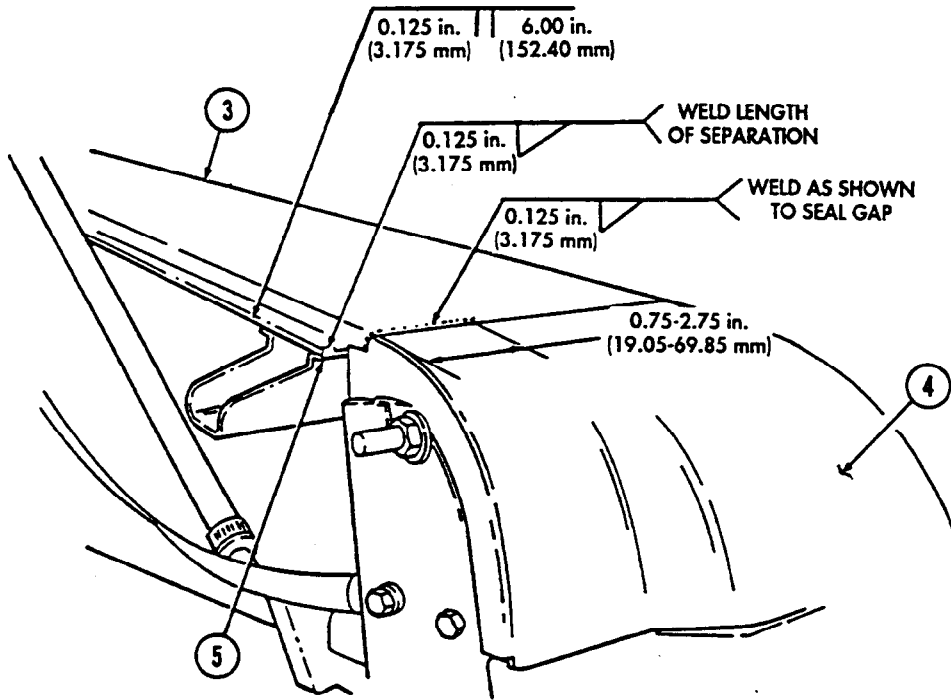
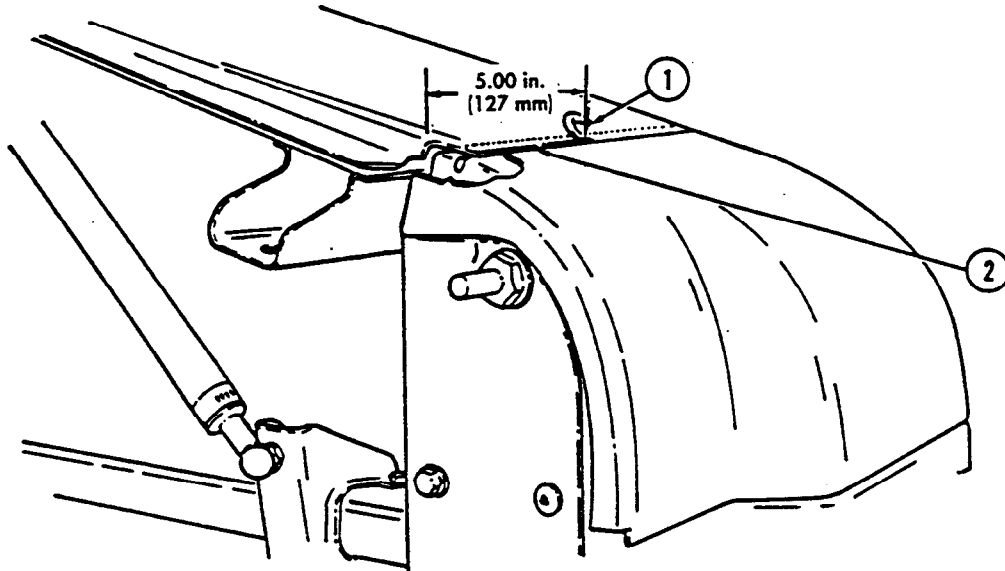
1. Remove sealing compound (1) from cargo shell seam (2).
2. Remove paint from surface area to be welded (refer to TM 43-0139).
3. Prime surface area to be welded with weld-through primer (refer to TM 43-0139).

NOTE

Clamping devices are recommended to hold cargo shell reinforcement to cargo shell during positioning.

4. Position cargo shell reinforcement (5) on cargo shell (3) and corner cap (4).
5. Weld cargo shell reinforcement (5), cargo shell (3), and corner cap (4) (refer to TM 9-237).
6. Apply sealing compound (1) to cargo shell seam (2).
7. Spot-paint welded area (refer to TM 43-0139).

25-8. CARGO SHELL REPAIR (Cont'd)



FOLLOW-ON TASK: Install cargo shell door dovetail spring (para. 11-28).

25-9. C-PILLAR PARTITION MAINTENANCE

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Removal b. Disassembly <li style="padding-left: 20px;">b.1. Inspection | <ul style="list-style-type: none"> c. Assembly d. Installation |
|---|--|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Nine locknuts (Appendix G, Item 168)
 Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Cargo shell door removed (para. 11-14).
- Passenger seats removed (para. 10-45).
- Rear A/C evaporator removed (para. 25-22).
- Cargo shells removed (para. 25-7).

General Safety Instructions

C-pillar partition is extremely heavy and must be supported during removal and installation.

Maintenance Level

Direct support

WARNING

C-pillar partition is extremely heavy and must be supported during removal and installation. Failure to do so may result in serious injury to personnel or damage to equipment.

NOTE

- These procedures cover replacement of left side mounting hardware for the C-pillar partition. Right side is basically the same.
- Note location of capscrews for installation.

a. Removal

1. Remove four capscrews (2) and C-pillar gap bracket (3) from wheelwell (1).
2. Remove two capscrews (12) and washers (11) securing C-pillar partition stop bracket (9) to vehicle floor (10).
3. Remove eight capscrews (7) securing two C-pillar partition isolator brackets (6) to vehicle wheelwells (1).
4. Remove shims (5) and C-pillar partition (4) from vehicle.

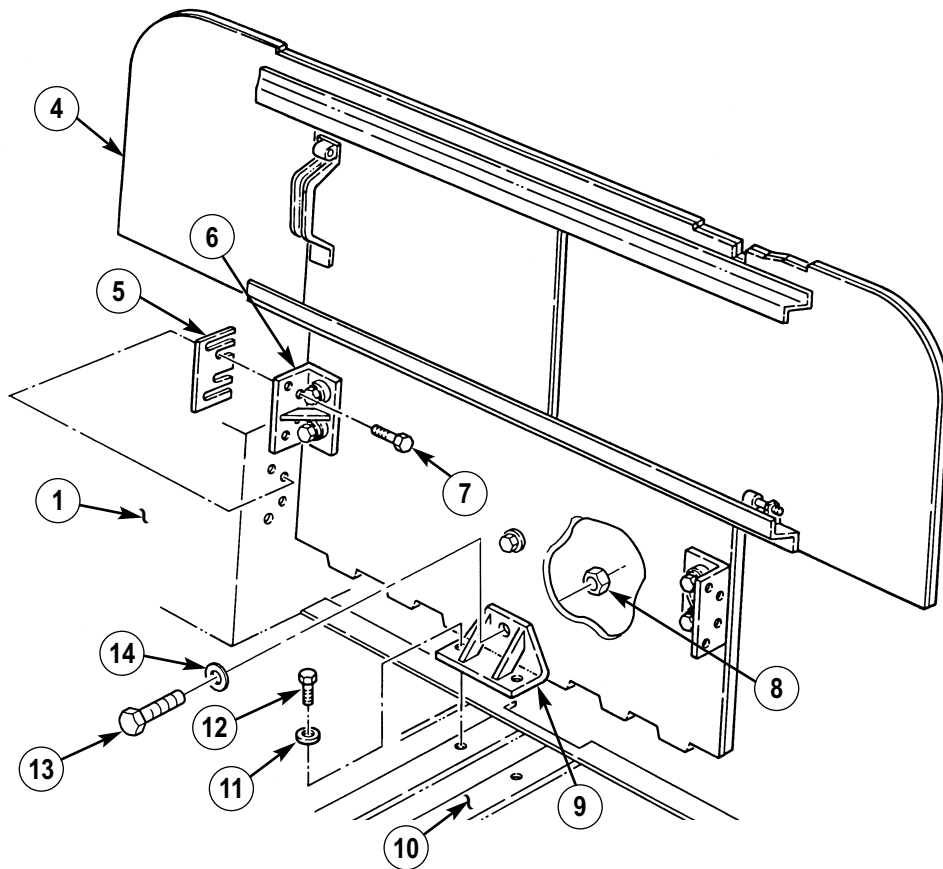
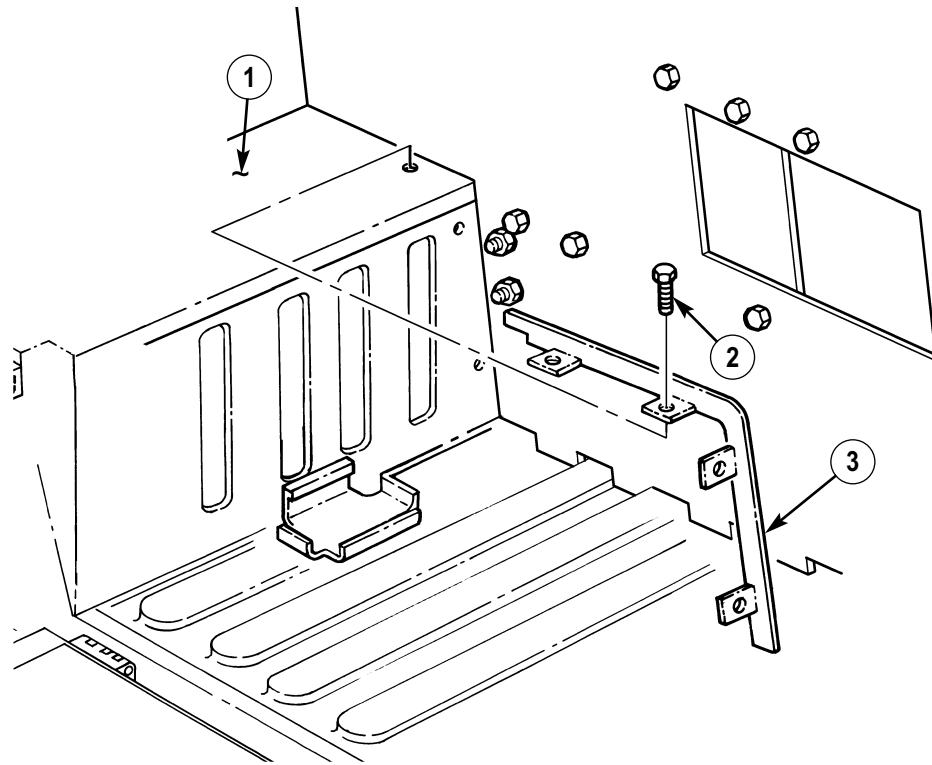
b. Disassembly

NOTE

Note locations of capscrews for installation.

1. Remove locknut (8), capscrew (13), washer (14), and C-pillar partition stop bracket (9) from C-pillar partition (4). Discard locknut (8).

25-9. C-PILLAR PARTITION MAINTENANCE (Cont'd)



25-9. C-PILLAR PARTITION MAINTENANCE (Cont'd)

2. Remove two locknuts (5), capscrews (1), four washers (2), and isolator mount bushings (3) from two C-pillar partition isolator brackets (4). Discard locknuts (5).
3. Remove two locknuts (7), D-ring washers (6), D-rings (8), capscrews (12), washers (10), isolator bushings (11), C-pillar partition isolator brackets (4), isolator bushings (11), and washers (10) from C-pillar partition (9). Discard locknuts (7).
4. Remove locknut (16), D-ring washer (15), D-ring (14), capscrew (13), and washer (17) from C-pillar partition (9). Discard locknut (16).
5. Remove three locknuts (21), capscrews (18), washers (19), and cable access cover (20) from C-pillar partition (9). Discard locknuts (21).

b.1. Inspection

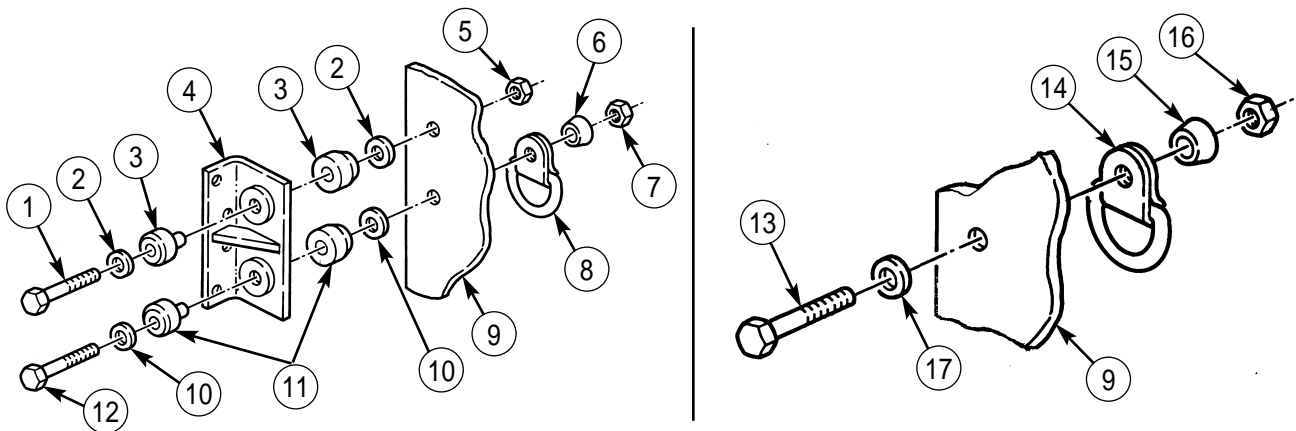
Refer to para. 10-56 for plusnut inspection and replacement.

c. Assembly

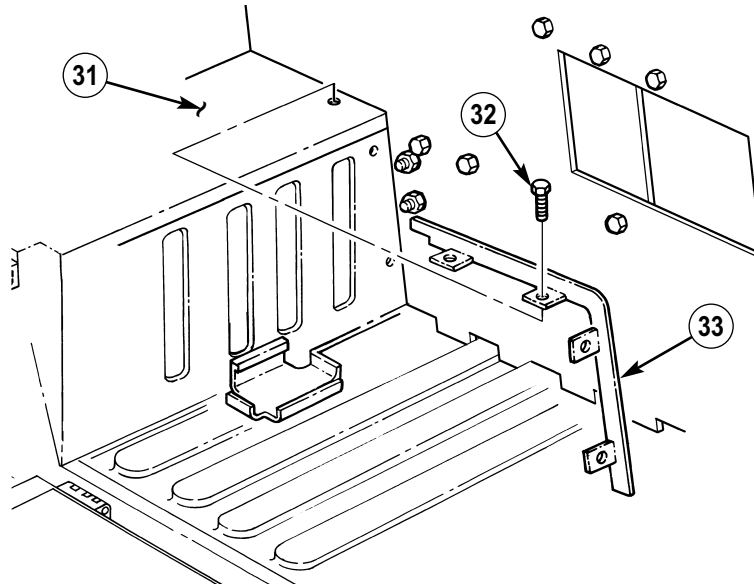
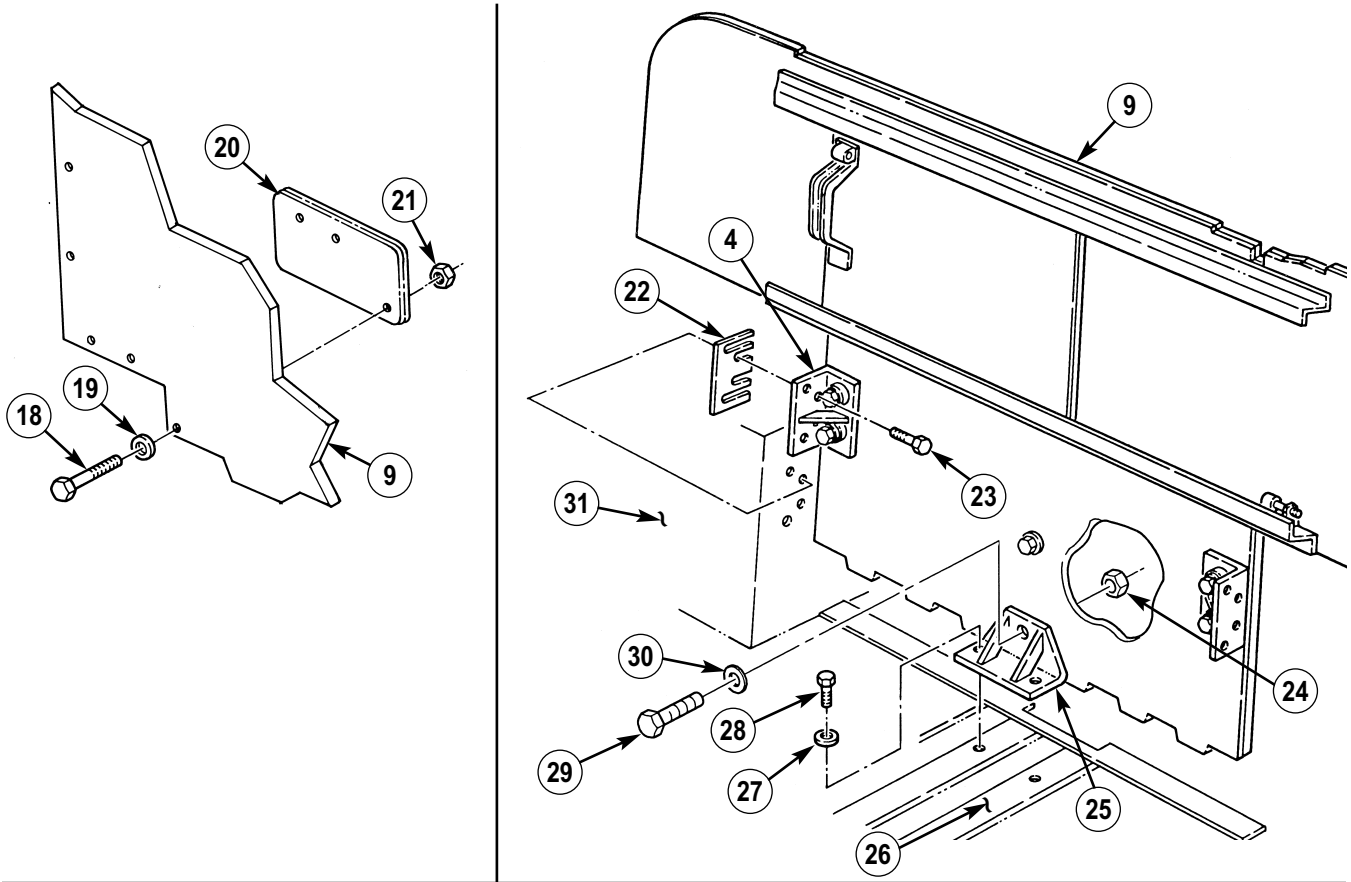
1. Install cable access cover (20) on C-pillar partition (9) with three washers (19), capscrews (18), and locknuts (21). Tighten locknuts (21) to 10 lb-ft (14 N·m).
2. Install D-ring (14) on C-pillar partition (9) with washer (17), capscrew (13), D-ring washer (15), and locknut (16). Tighten locknut (16) to 35 lb-ft (47 N·m).
3. Install two washers (10) and (2), isolator bushings (11) and (3), and C-pillar partition isolator brackets (4) on C-pillar partition (9) with two isolator bushings (11) and (3), washers (10) and (2), capscrews (12) and (1), D-rings (8), D-ring washers (6), and locknuts (7) and (5). Tighten locknuts (7) and (5) to 35 lb-ft (47 N·m).
4. Install stop bracket (25) on C-pillar partition (9) with washer (30), capscrew (29), and locknut (24). Tighten locknut (24) to 10 lb-ft (14 N·m).

d. Installation

1. Position C-pillar partition (9) and two shims (22) on floor (26) between wheelwells (31).
2. Apply sealing compound to threads of eight capscrews (23), and install two C-pillar partition isolator brackets (4) on wheelwells (31) with eight capscrews (23). Tighten capscrews (23) 10 lb-ft (14 N·m).
3. Apply sealing compound to threads of two capscrews (28), and install C-pillar partition stop bracket (25) on floor (26) with two washers (27) and capscrews (28). Tighten capscrews (28) to 75 lb-in. (8 N·m).
4. Install C-pillar gap bracket (33) on wheelwell (31) with four capscrews (32).



25-9. C-PILLAR PARTITION MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install cargo shells (para 25-7).
 - Install turret frame (para. 25-4).
 - Install passenger seats (para. 10-45).
 - Install rear A/C evaporator (para. 25-22).
 - Install cargo shell door (para. 11-14).

25-10. PASSENGER SIDE FOOTWELL OUTER ARMOR MAINTNEANCE

This task covers:

- a. Removal
 - a.1. Inspection
- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- A/C heater/evaporator assembly removed (para. 25-21).
- Right front cowl insulation removed (para. 10-32).

Materials/Parts

Thirty locknuts (Appendix G, Item 169)
 Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Direct support

Personnel Required

One mechanic
 One assistant

NOTE

If new passenger side footwell outer armor is being installed, perform para. 11-38.1.

a. Removal

NOTE

Note location of capscrews, nuts, and spacers for installation.

1. Remove six locknuts (11), spacers (12), and capscrews (1) from footwell armor (2) and outer cowl (7). Discard locknuts (11).
2. Remove twenty-four locknuts (9) and capscrews (5) from footwell armor (2), A-pillar armor (4), and outer cowl (7). Discard locknuts (9).
3. Remove four capscrews (10) from footwell armor (2) and A-beam armor (6).
- 3.1. Remove nut (12.2) and capscrew (12.1) from footwell armor (2).
4. Remove capscrew (13), footwell armor (2), and spacers (3) and (8) from outer cowl (7).

a.1. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

b. Installation

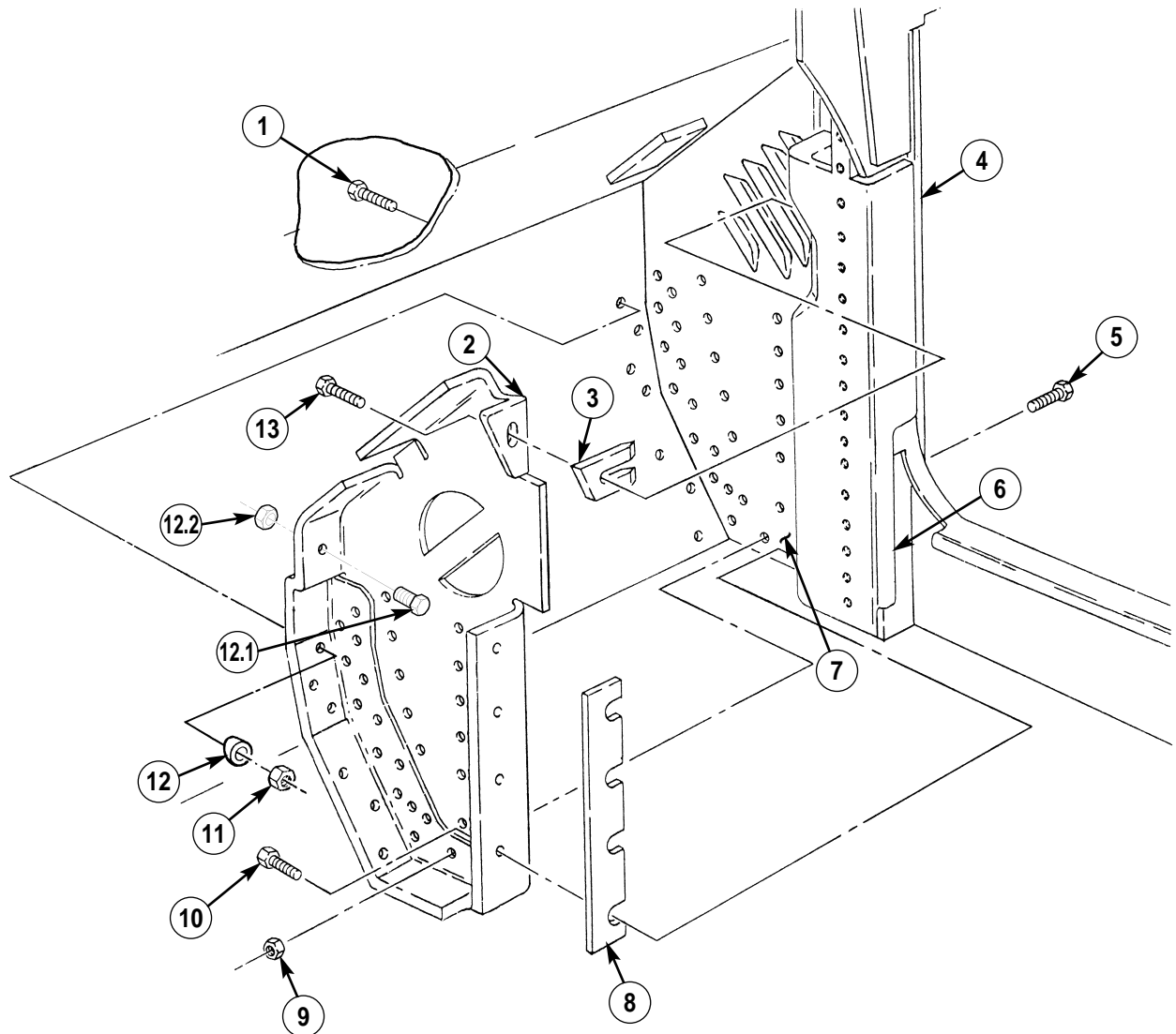
1. Apply sealing compound to threads of four capscrews (10), and install spacer (8) and footwell armor (2) on A-beam armor (6) with capscrews (10). Tighten capscrews (10) to 37 lb-ft (50 N·m).
- 1.1. Install capscrew (12.1) and nut (12.2) on footwell armor (2).
2. Apply sealing compound to threads of capscrew (13), and install spacer (3) and capscrew (13) on footwell armor (2) and A-beam armor (4). Tighten capscrew (13) to 37 lb-ft (50 N·m).
3. Install twenty-four capscrews (5) and locknuts (9) on footwell armor (2), A-pillar armor (4), and outer cowl (7). Tighten locknuts (9) to 37 lb-ft (50 N·m).

25-10. PASSENGER SIDE FOOTWELL OUTER ARMOR MAINTENANCE (Cont'd)

NOTE

Ensure large spacers are installed in upper holes.

4. Install six capscrews (1), spacers (12), and locknuts (11) on footwell armor (2) and outer cowl (7). Tighten locknuts (11) to 35 lb-ft (47 N·m).



- FOLLOW-ON TASKS:
- Install A/C heater/evaporator assembly (para. 25-21).
 - Install front cowl insulation (para. 10-32).

25-11. PASSENGER SIDE FOOTWELL INNER ARMOR MAINTENANCE

This task covers:

- | | |
|---|------------------------|
| <p>a. Removal</p> <p style="margin-left: 20px;">a.1. Inspection</p> | <p>b. Installation</p> |
|---|------------------------|

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

- Rifle support removed (para. 11-66).
- Engine access cover removed (para. 10-22).
- A/C front distribution duct removed (para. 11-81).
- A/C heater/evaporator assembly removed (para. 25-21).
- Tunnel interior side insulation removed (para. 10-33).
- Right front cowl insulation removed (para. 10-32).
- Surge tank removed (para. 3-65).
- Right front underbody armor removed (para. 11-38).

Materials/Parts

Eleven locknuts (Appendix G, Item 171)
 Sealing compound (Appendix C, Item 72.1)

Maintenance Level

Direct support

Personnel Required

One mechanic
 One assistant

NOTE

If new passenger side footwell outer armor is being installed, perform para. 11-38.1.

a. Removal

NOTE

Note location of capscrews and locknuts for installation.

1. Disconnect de-icer wiring harness connector (6) and A/C power wiring connector (9) from de-icer switch circuit breaker (5), and remove two screws (7) and de-icer switch circuit breaker (5) from footwell armor (3).
2. Remove eight capscrews (4) from body (8) and footwell armor (3).
3. Remove eleven locknuts (1), capscrews (10), inner/outer cowl reinforcement (2), and footwell armor (3) from body (8). Discard locknuts (1).

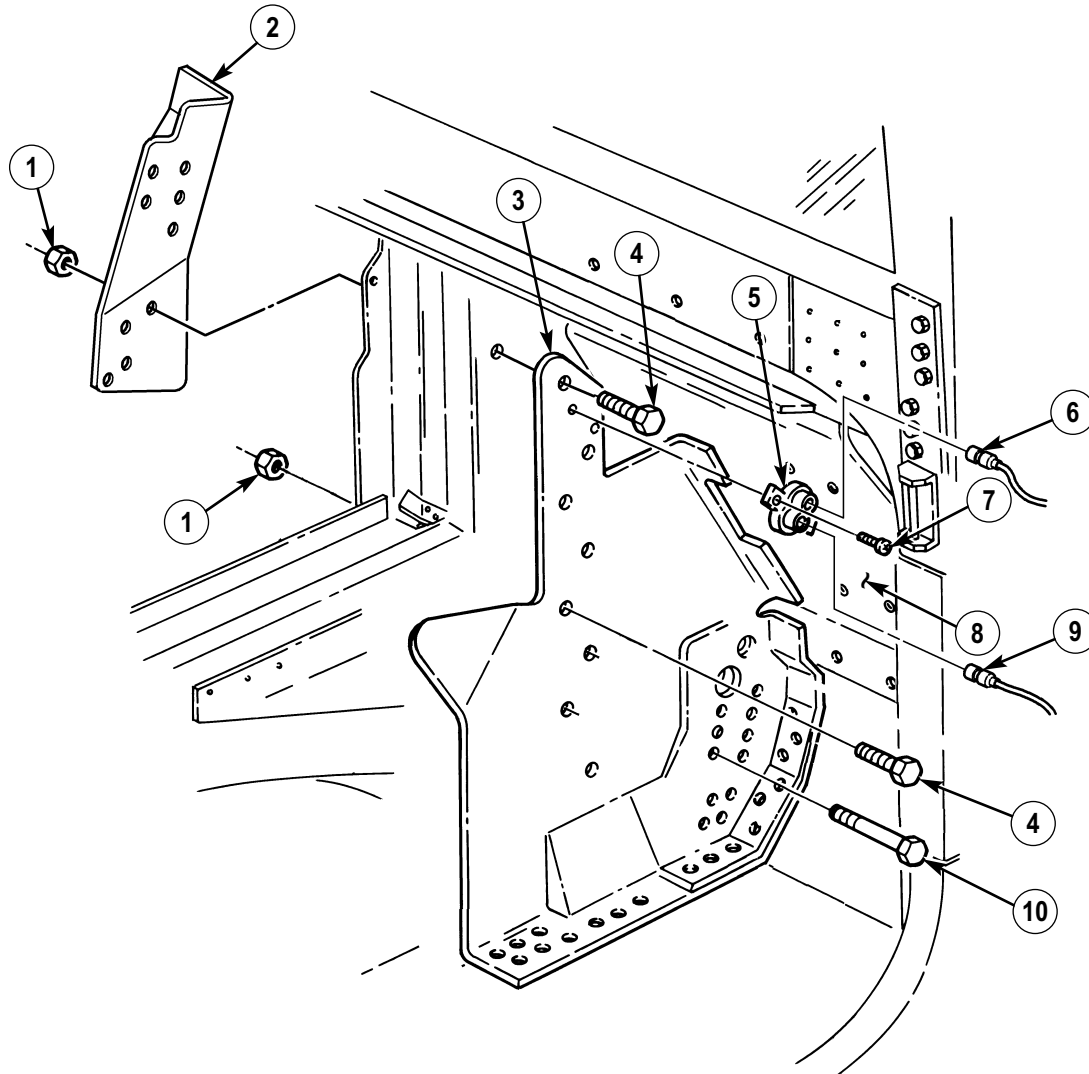
a.1. Inspection

Refer to para. 10-56 for plusnut inspection and replacement.

b. Installation

1. Install footwell armor (3) and inner/outer cowl reinforcement (2) on body (8) with eleven capscrews (10) and locknuts (1). Tighten locknuts (1) to 37 lb-ft (50 N·m).
2. Apply sealing compound to threads of eight capscrews (4), and install capscrews (4) on footwell armor (3) and body (8). Tighten capscrews (4) to 37 lb-ft (50 N·m).
3. Install de-ice switch circuit breaker (5) on footwell armor (3) with two screws (7), and connect de-icer wiring harness connector (6) and A/C power wiring connector (9) to de-icer switch circuit breaker (5).

25-11. PASSENGER SIDE FOOTWELL INNER ARMOR MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install A/C heater/evaporator assembly (para. 25-21).
 - Install A/C front distribution duct (para. 11-81).
 - Install engine access cover (para. 10-22).
 - Install rifle support (para. 11-66).
 - Install tunnel interior side insulation (para 10-33).
 - Install right front cowl insulation (para. 10-32).
 - Install surge tank (para 3-65).
 - Install right front underbody armor (para. 11-38).

25-12. C-PILLAR DOOR, GUIDES, TRACK, AND DOOR STOP MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Eighteen locknuts (Appendix G, Item 178)
 Sealing compound (Appendix C, Item 72.1)

Equipment Condition

- Left passenger seat removed (para. 10-45).
- A/C evaporator assembly (rear) removed (para. 25-27).

Manual References

TM 9-2320-387-24P

Maintenance Level

Direct support

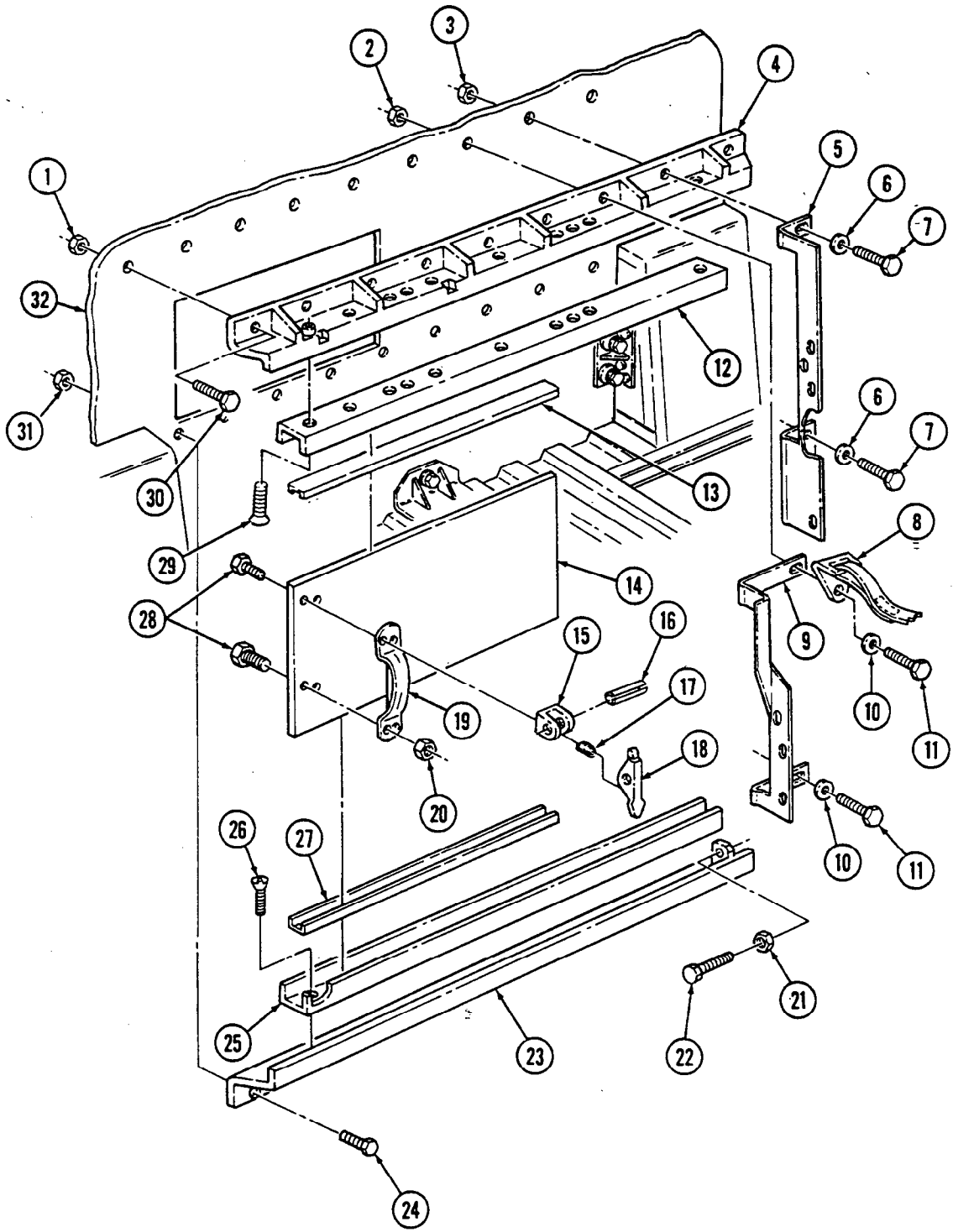
a. Removal

1. Remove pin (16), thumb block (18), and spring (17) from bracket (15).
2. Remove two locknuts (2), capscrews (11), washers (10), right-hand evaporator bracket (9), and strap bracket (8) from upper track (4) and lower track (23). Discard locknuts (2).
3. Remove two locknuts (3), capscrews (7), washers (6), and left-hand evaporator bracket (5) from upper track (4) and lower track (23). Discard locknuts (3).
4. Remove seven locknuts (1) and screws (30) from upper track (4) and C-pillar partition (32). Discard locknuts (1).
5. Remove upper track (4), upper guide (12), and strip (13) from C-pillar partition (32).
6. Remove seven screws (29) from upper guide (12) and separate upper guide (12) from upper track (4).
7. Remove door (14) and strip (27) from lower guide (25).
8. Remove two nuts (20), four capscrews (28), handle (19), and bracket (15) from door (14).
9. Remove seven screws (26) and lower guide (25) from lower track (23).
10. Remove bumper (22) and nut (21) from lower track (23).
11. Remove seven locknuts (31), capscrews (24), and lower track (23) from C-pillar partition (32). Discard locknuts (31).

b. Inspection

Refer to para. 10-56 for plusnuts inspection and replacement.

25-12. C-PILLAR DOOR, GUIDES, TRACK, AND DOOR STOP MAINTENANCE (Cont'd)

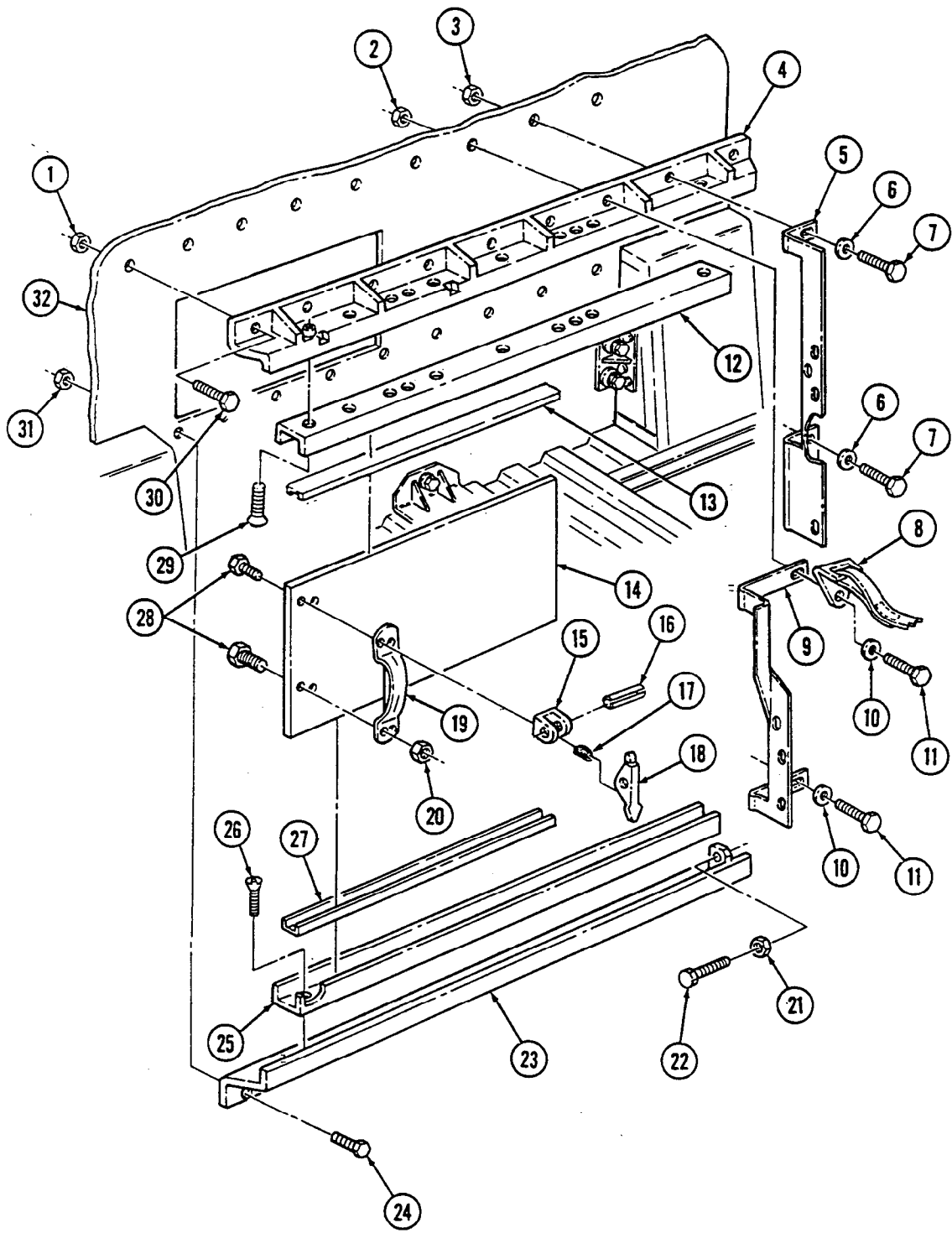


25-12. C-PILLAR DOOR, GUIDES, TRACK, AND DOOR STOP MAINTENANCE (Cont'd)

c. Installation

1. Install lower track (23) on C-pillar partition (32) with seven capscrews (24) and locknuts (31). Tighten capscrews (24) to 10 lb-ft (14 N·m).
2. Install bumper (22) and nut (21) on lower track (23).
3. Apply sealing compound to threads of seven screws (26), and install lower guide (25) on lower track (23) with screws (26).
4. Install door handle (19) and bracket (15) on door (14) with four capscrews (28) and two nuts (20). Tighten nuts (20) to 10 lb-ft (14 N·m).
5. Position strip (27), door (14), and strip (13) in lower guide (25).
6. Apply sealing compound to threads of seven screws (29), and install upper guide (12) on upper track (4) with screws (29).
7. Install upper track (4) on C-pillar partition (32) with seven capscrews (30) and locknuts (1). Tighten locknuts (1) to 10 lb-ft (14 N·m).
8. Install left-hand evaporator bracket (5) on upper track (4) and lower track (23) with two washers (6), capscrews (7), and locknuts (3). Tighten capscrews (7) to 10 lb-ft (14 N·m).
9. Install right-hand evaporator bracket (9) and strap bracket (8) on upper track (4) and lower track (23) with two washers (10), capscrews (11), and locknuts (2). Tighten locknuts (2) to 10 lb-ft (14 N·m).
10. Install spring (17) and thumb block (18) on bracket (15) with pin (16).

25-12. C-PILLAR DOOR, GUIDES, TRACK, AND DOOR STOP MAINTENANCE (Cont'd)



FOLLOW-ON TASKS: • Install A/C evaporator assembly (rear) (para. 25-27).
 • Install left passenger seat (para. 10-45).

25-13. PASSENGER SIDE UPPER COWL LINER REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Automotive maintenance and repair: field
maintenance, basic (Appendix B, Item 6)

Materials/Parts

Five locknuts (Appendix G, Item 169)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Passenger side footwell outer armor removed (para. 25-10).
- Passenger side footwell inner armor removed (para. 25-11).

Maintenance Level

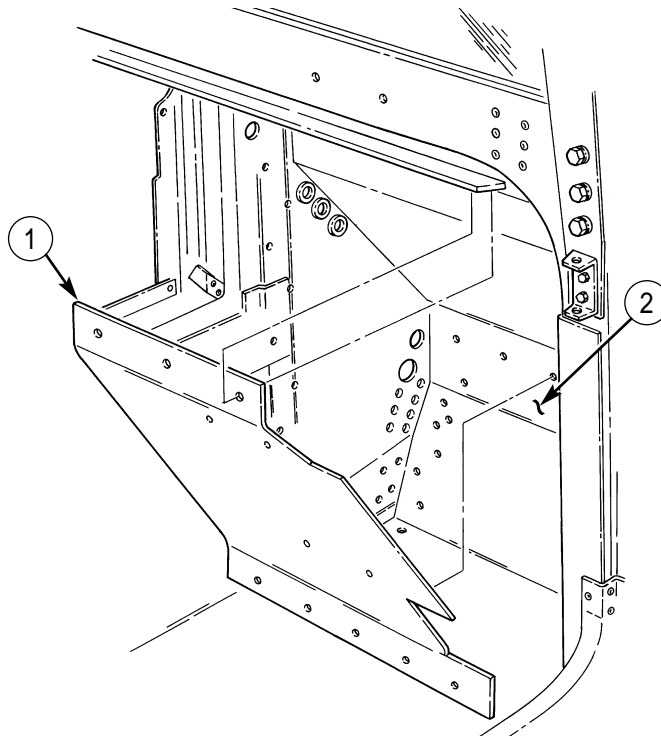
Direct support

a. Removal

Remove liner (1) from cowl (2).

b. Installation

Position liner (1) on cowl (2).



FOLLOW-ON TASKS:

- Install passenger side footwell inner armor (para. 25-11).
- Install passenger side footwell outer armor (para. 25-10).

25-13.1. AIR HORN SUPPORT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Lockwasher (Appendix G, Item 208)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Air horn removed (para. 3-14).
- A/C compressor removed (para. 25-20).

Maintenance Level

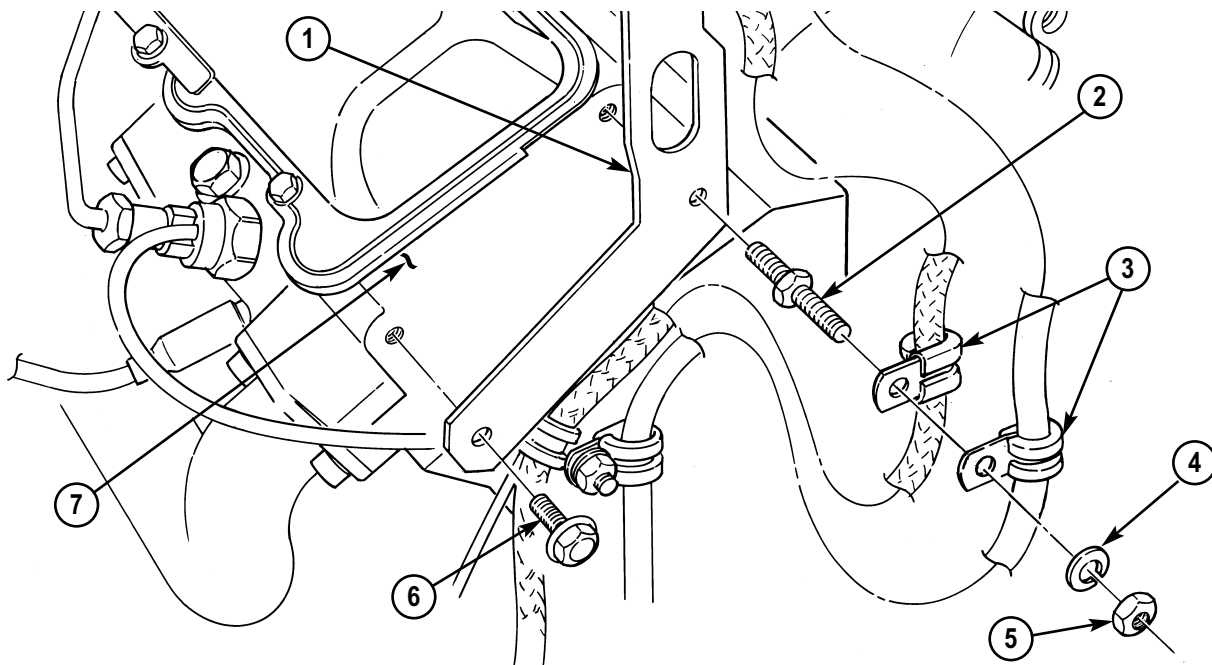
Direct Support

a. Removal

1. Remove nut (5), lockwasher (4), two clamps (3), and stud (2) from air horn support bracket (1) and cylinder head (7). Discard lockwasher (4).
2. Remove capscrew (6) and support bracket (1) from cylinder head (7).

b. Installation

1. Install air horn support bracket (1) on cylinder head (7) with stud (2).
2. Secure air horn support bracket (1) to cylinder head (7) with capscrew (6). Tighten capscrew (6) and stud (2) to 40 lb-ft (54 N·m).
3. Install two clamps (3) on stud (2) with lockwasher (4) and nut (5).



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanics tool kit: automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment: automotive (Appendix B, Item 2)

Materials/Parts

Four copper washers (Appendix G, Item 24.1)
 Two O-rings (Appendix G, Item 293.1)
 O-ring (Appendix G, Item 293.2)
 Two O-rings (Appendix G, Item 293.3)
 O-ring (Appendix G, Item 293.4)
 Two O-rings (Appendix G, Item 293.5)
 Grease (Appendix C, Item 33)
 Adhesive (Appendix C, Item 3.1)
 Hydraulic fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Winch removed (M1113) (para. 12-27.1)
 Winch removed (M1114) (para. 12-36.1)

Maintenance Level

Direct Support

a. Disassembly

NOTE

Tag hydraulic lines for assembly

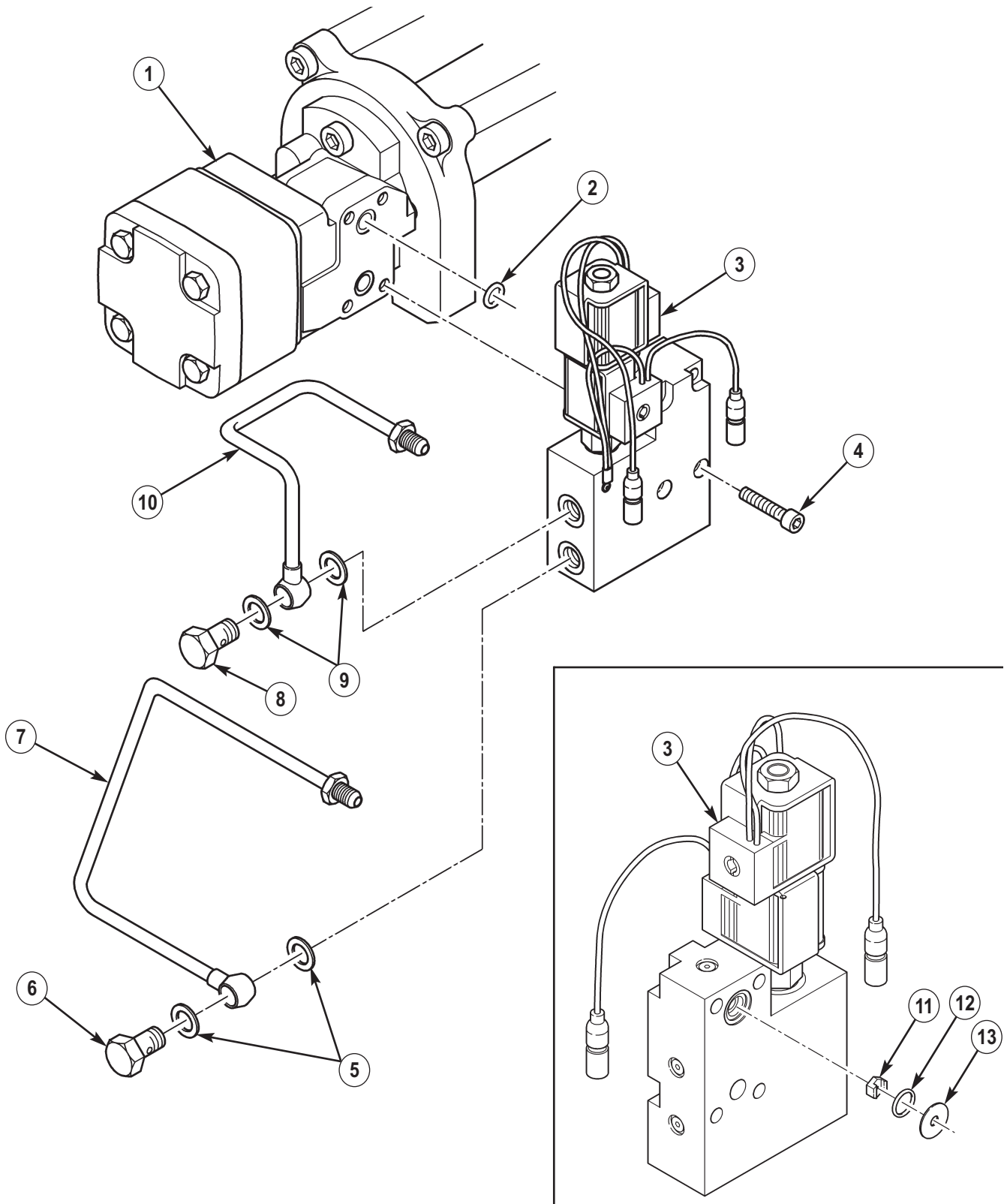
1. Remove banjo screw (8), two copper washers (9), and inlet banjo tube (10) from valve and solenoid assembly (3). Discard copper washers (9).
2. Remove banjo screw (6), two copper washers (5), and outlet banjo tube (7) from valve and solenoid assembly (3). Discard copper washers (5).

NOTE

Restrictor, restrictor washer, and O-ring may come out of valve and solenoid assembly during removal. Be careful to catch parts during disassembly.

3. Remove four socket-head screws (4) and valve and solenoid assembly (3) from motor (1).
4. Remove two O-rings (2) from motor (1). Discard O-rings (2).
5. Remove restrictor (11), restrictor washer (13), and O-ring (12) from valve and solenoid assembly (3).

25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

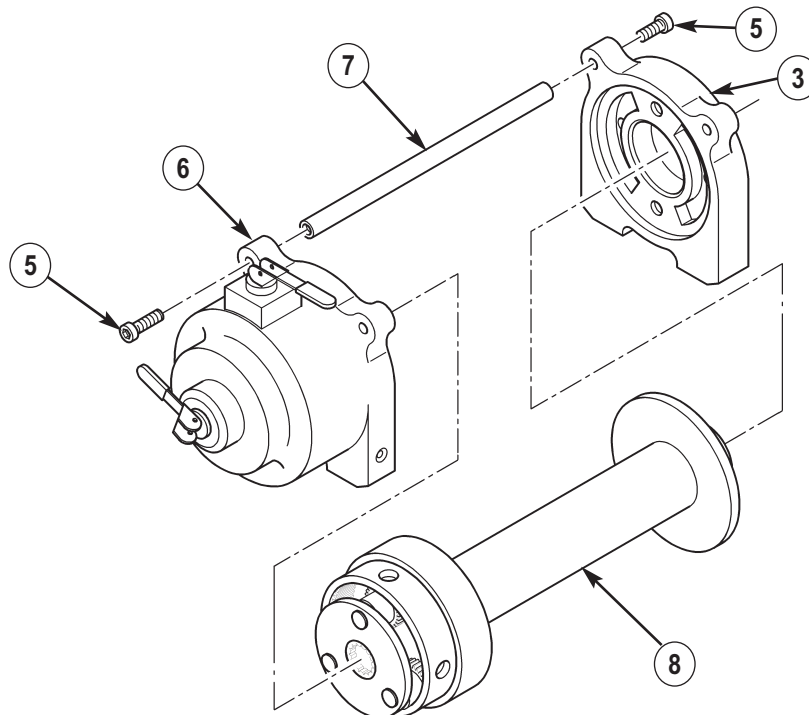
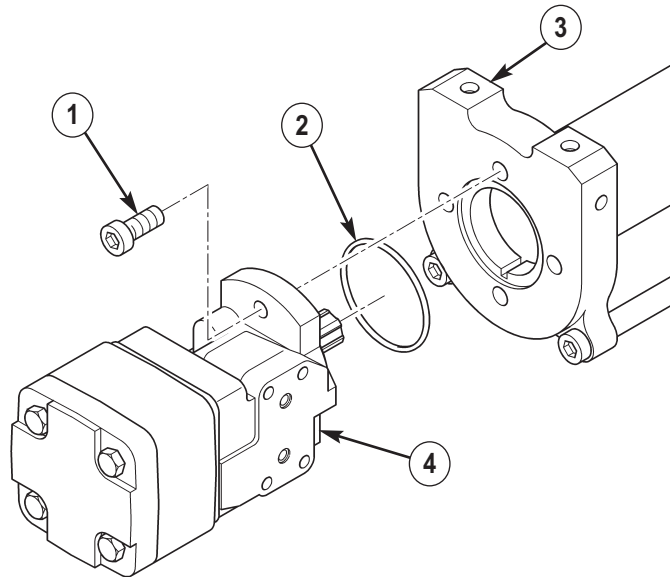


25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

NOTE

Scribe motor and motor end/drum support for assembly.

6. Remove two socket-head screws (1), motor (4), and O-ring (2) from motor end/drum support (3). Discard O-ring (2).
7. Remove four socket-head screws (5) and two tie bars (7) from motor end/drum support (3) and gear box/drum support (6).



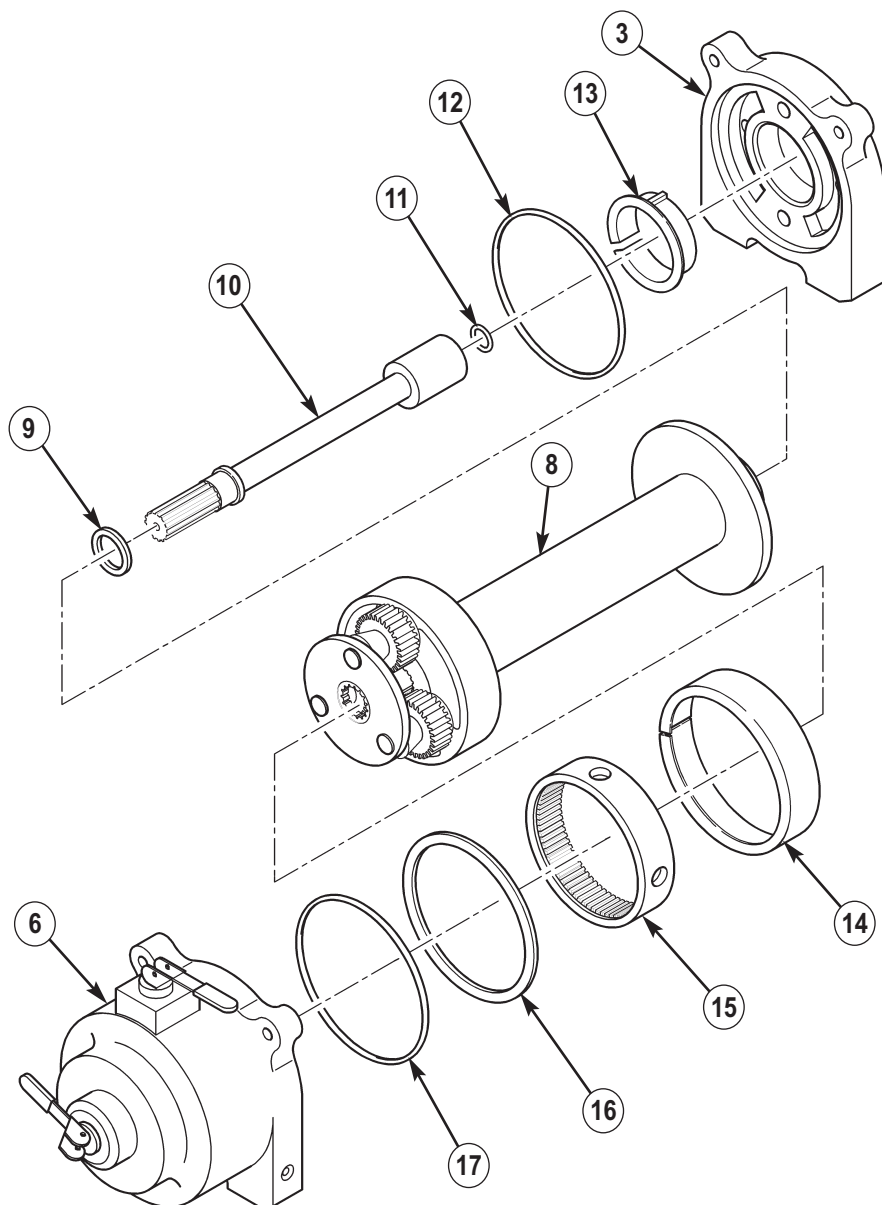
25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

8. Remove motor end/drum support (3), drum bushing (13), and O-ring (12) from drum assembly (8). Discard O-ring (12).

NOTE

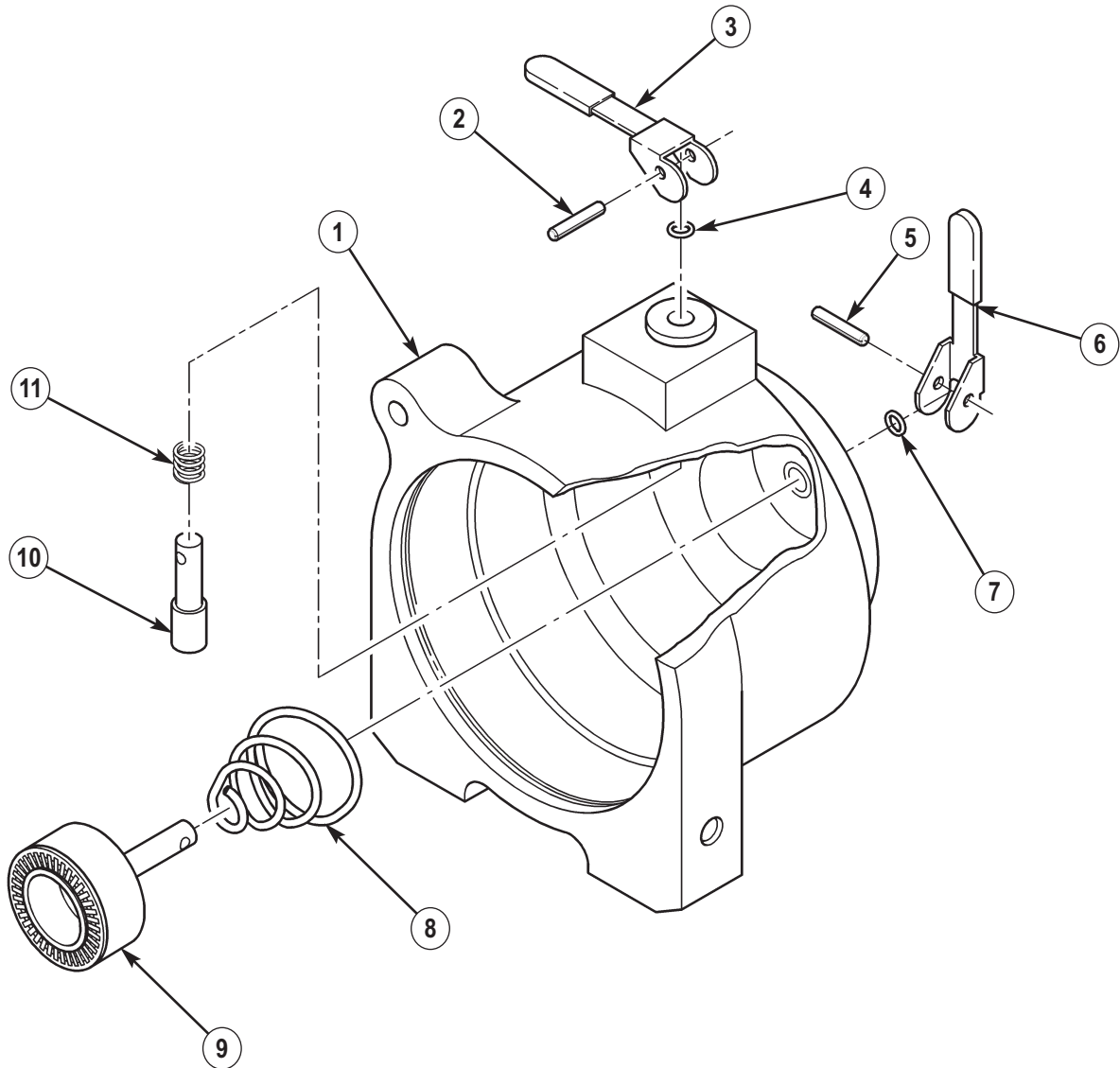
Make sure the high lever and low lever are both in the FREE position.

9. Remove gear box/drum support (6) and O-ring (17) from drum assembly (8). Discard O-ring (17).
10. Remove drive shaft assembly (10) from drum assembly (8). Remove drive shaft thrust washer (9) and O-ring (11) from drive shaft assembly (10). Discard O-ring (11).
11. Remove drum drive bushing (14), ring gear (15), and ring gear thrust washer (16) from gear box/drum support (6).



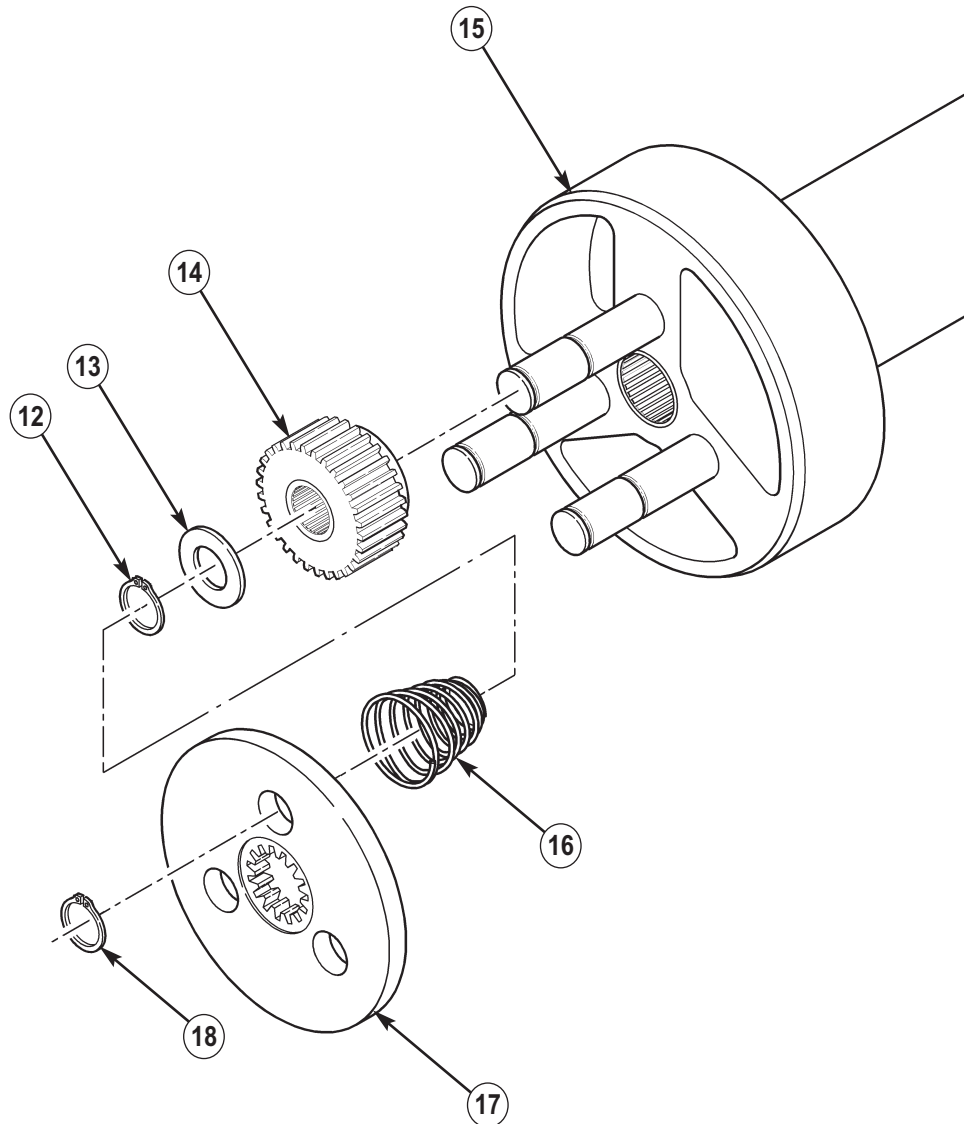
25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

12. Remove lever pin (5), high lever (6), drive shaft plunger (9), drive shaft plunger spring (8), and O-ring (7) from gear box/drum support (1). Discard O-ring (7).
13. Remove lever pin (2), low lever (3), low lever plunger (10), low lever spring (11), and O-ring (4) from gear box/drum support (1). Discard O-ring (4).



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

14. Remove three snap rings (18), shaft plunger plate (17), and three planetary springs (16) from drum assembly (15).
15. Remove three snap rings (12), planetary washers (13), and planetary gears (14) from drum assembly (15)



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

b. Cleaning

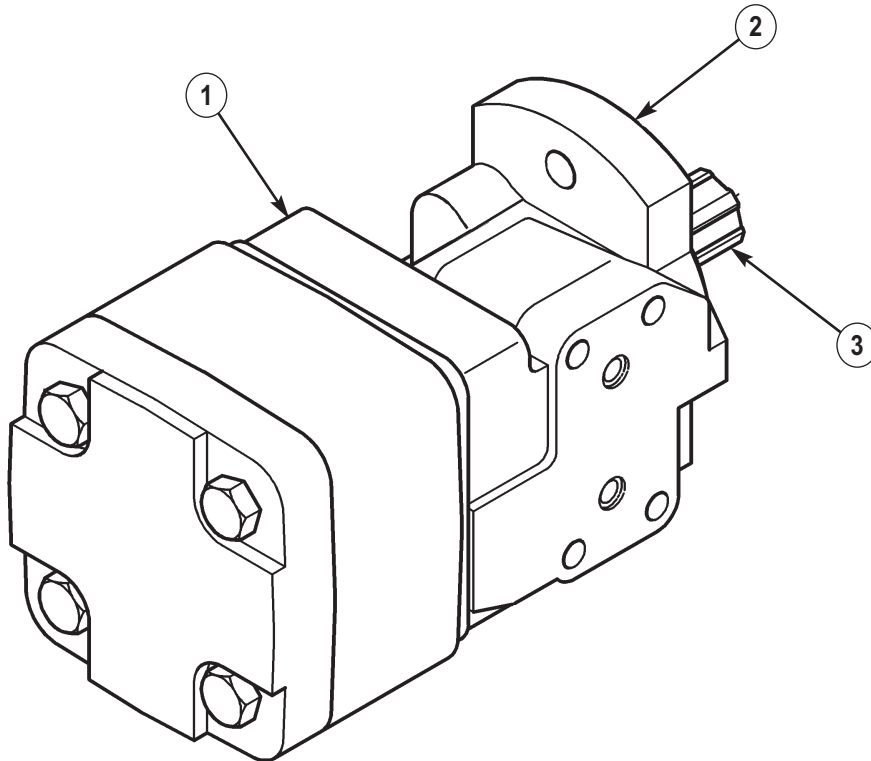
Clean all winch components in accordance with para. 2-14.

c. Inspection

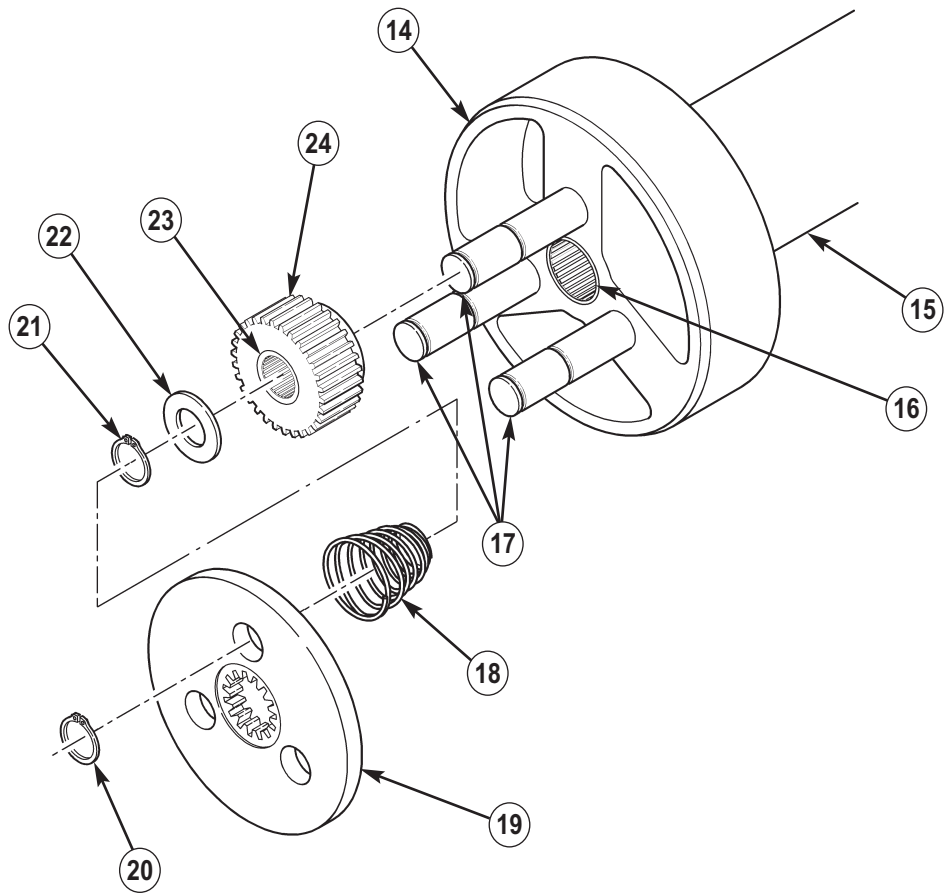
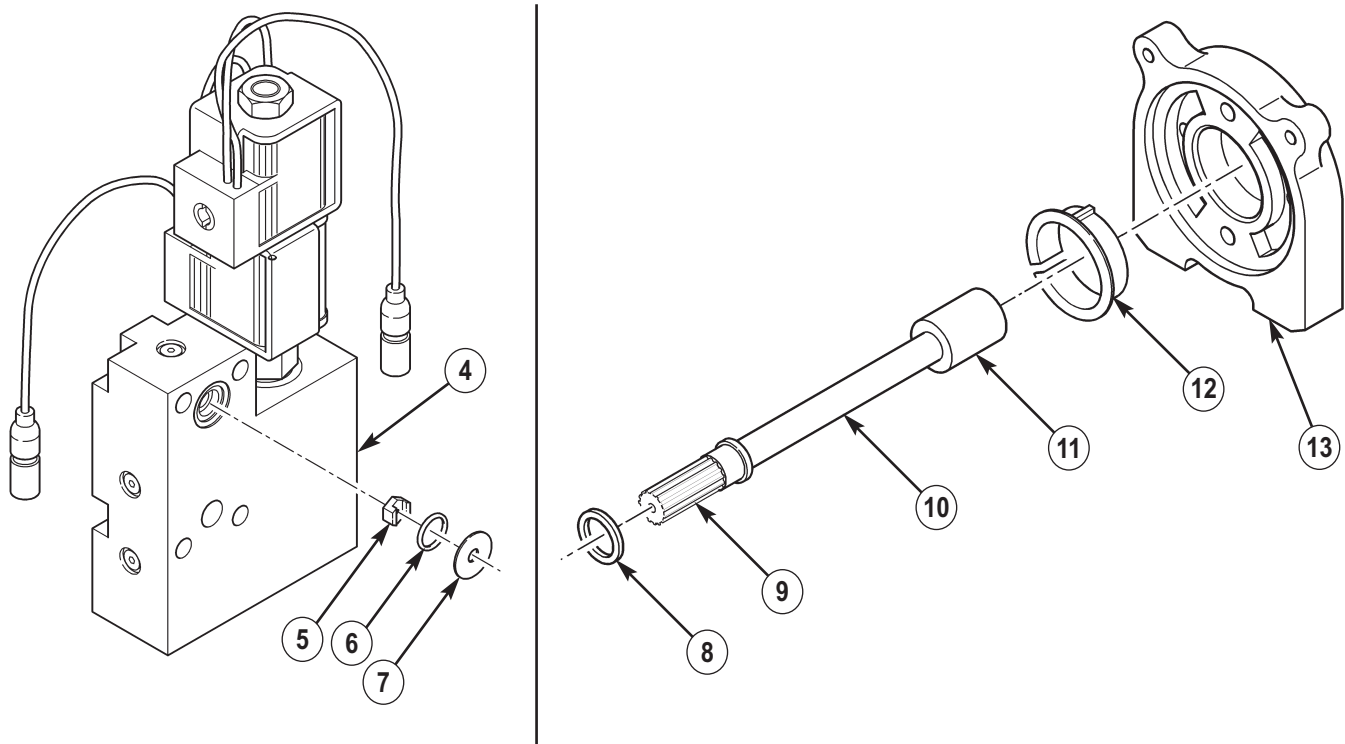
NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect motor (1), splines (3), and mating surface (2) for damage or wear. Replace if damaged or worn.
2. Inspect valve and solenoid assembly (4) and restrictor (5), O-ring (6), and restrictor washer (7) for damage or wear. Replace valve and solenoid assembly (4) if any parts are damaged or worn.
3. Inspect motor end/drum support (13) and drum bushing (12) for damage or wear. Replace any damaged or worn parts.
4. Inspect drive shaft thrust washer (8), splines (9), and machine surfaces (11) of drive shaft assembly (10) for damage or wear. Replace any damaged or worn parts.
5. Inspect drum assembly (14) for damage to roller bearing (16), planetary gear shafts (17), and tube (15). Replace drum assembly (14) if any parts are damaged or worn.
6. Inspect shaft plunger plate (19), three planetary gears (24) and bearings (23), planetary springs (18), planetary washers (22), snaprings (20), and snaprings (21) for damage or wear. Replace drum assembly (14) if any parts are damaged or worn.

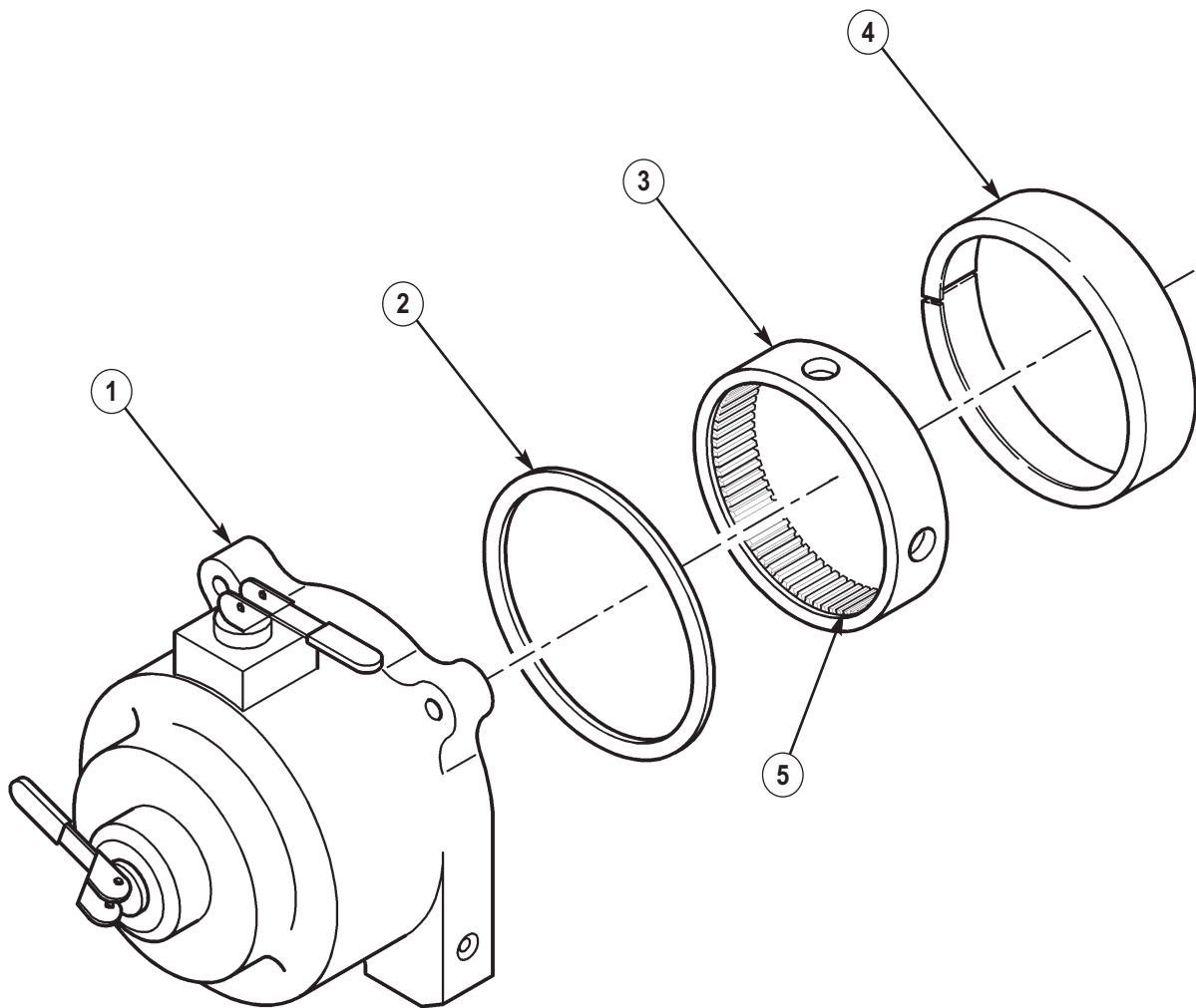


25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)



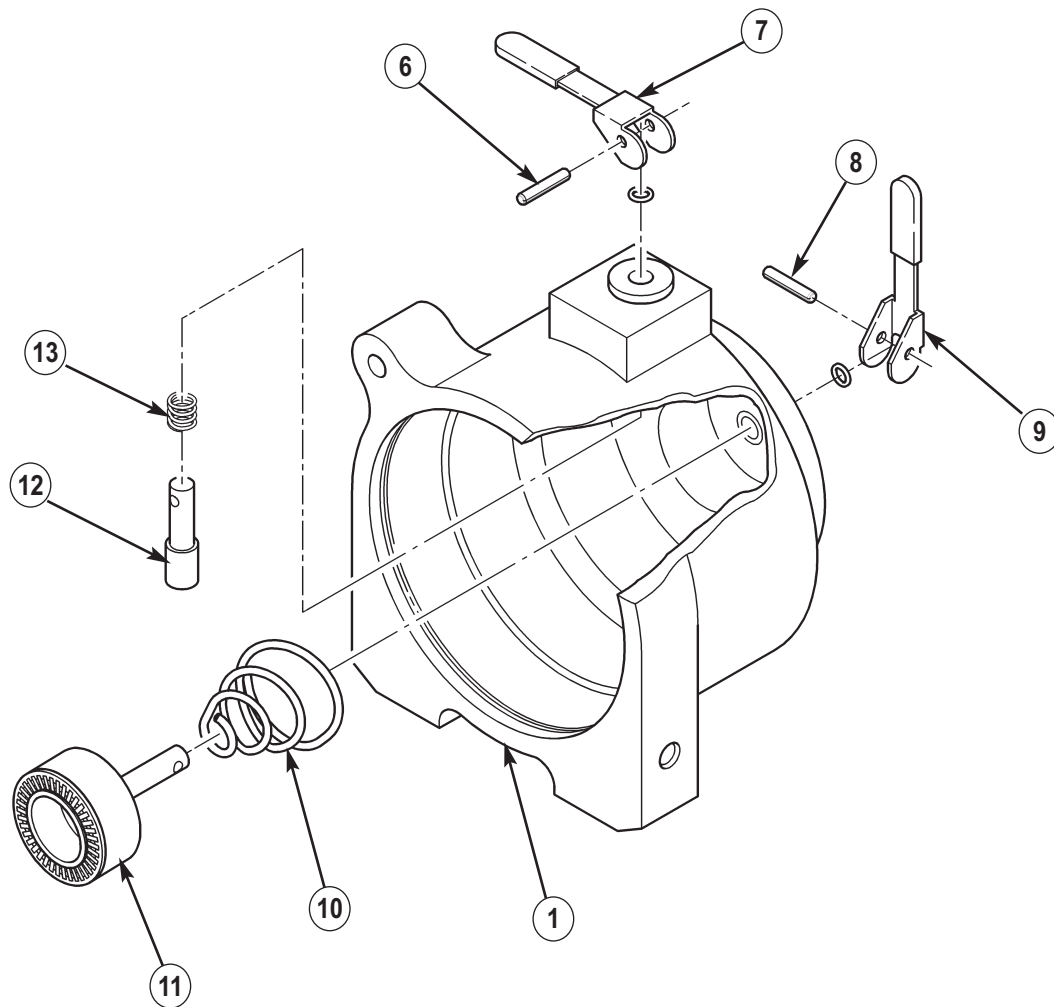
25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

7. Inspect ring gear thrust bushing (2) and drum drive bushing (4) for damaged or wear. Replace any damaged or worn parts.
8. Inspect gear teeth (5) and machined surfaces of ring gear (3) for damage or wear. Replace any damaged or worn parts.



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

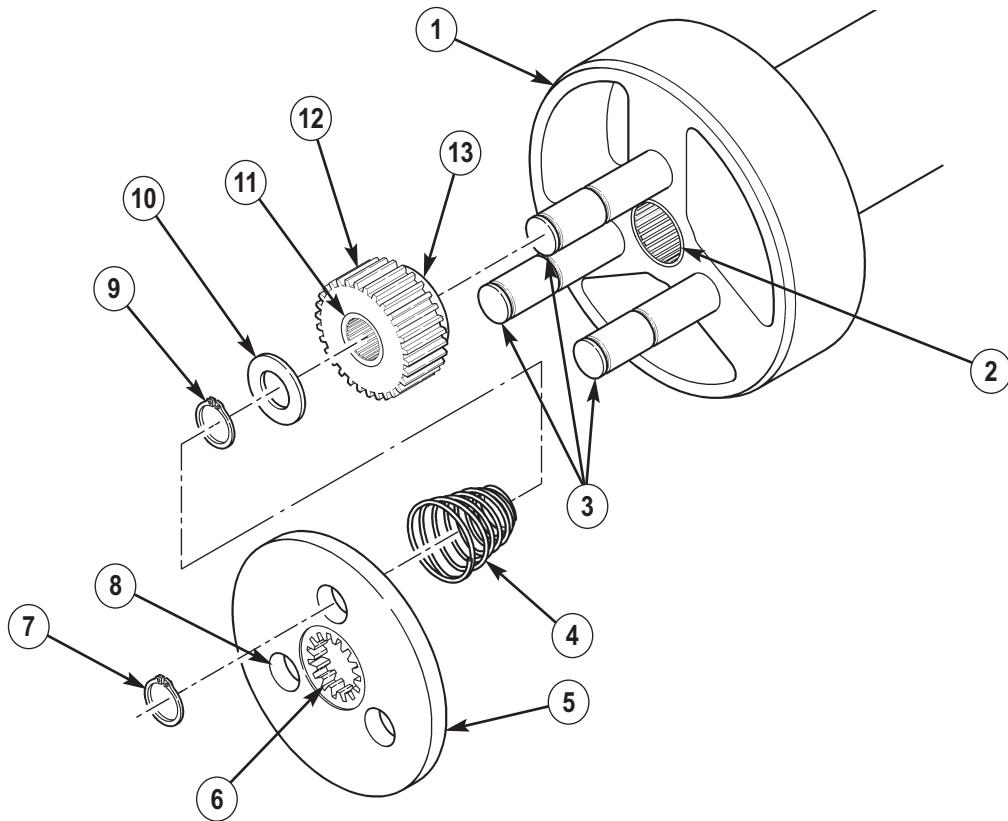
9. Inspect gear housing/drum support (1) for damage or wear. Replace if damaged or worn.
10. Inspect low lever (7), lever pin (6), low lever plunger (12), and low lever spring (13) for damage or wear. Replaced any damaged or worn parts.
11. Inspect high lever (9), lever pin (8), drive shaft plunger (11), and drive shaft plunger spring (10) for damage or wear. Replace any damaged or worn parts..



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

d. Assembly

1. Apply grease to roller bearings (2) of drum assembly (1).
2. Apply grease to three planetary gear shafts (3) of drum assembly (1), to roller bearings (11) and gear teeth (12) of three planetary gears (13), and washers (10).
3. Install three planetary gears (13), planetary washers (10), and snap rings (9) on planetary shafts (3) of drum assembly (1).
4. Apply grease to splines (6) and planetary shaft holes (8) of plunger plate assembly (5).
5. Install three planetary gear springs (4) (with smaller diameter of spring towards planetary gears (13), plunger plate assembly (5), and three snap rings (7) on shafts (3) of drum assembly (1).



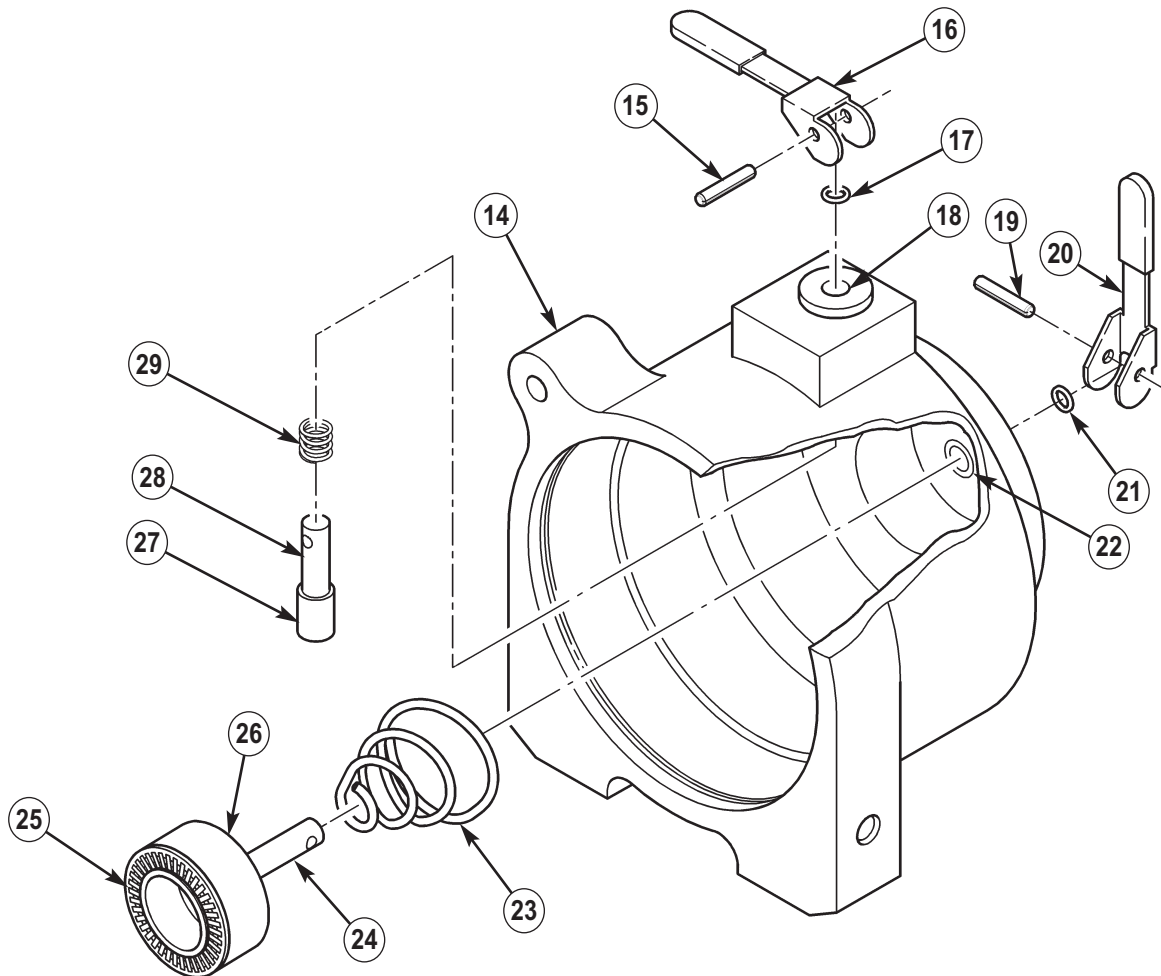
25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

6. Apply hydraulic fluid to O-ring (17) and install into hole (18) of gear box/drum support (14).
7. Apply hydraulic fluid to O-ring (21) and install into hole (22) of gear box/drum support (14).
8. Apply grease to needle bearings (25) and shaft (24) of drive shaft plunger (26).

NOTE

The drive shaft assembly may be used to depress drive shaft plunger and drive shaft plunger spring to aid assembly.

9. Place drive shaft plunger spring (23) onto drive shaft plunger (26) (with smaller diameter of spring towards drive shaft plunger) and install into hole (22) of gear box/drum support (14). Depress drive shaft plunger (26) and drive shaft plunger spring (23) and install high lever (20) and lever pin (19).
10. Apply grease to shaft (28) of low lever plunger (27).
11. Place low lever spring (29) onto low lever plunger (27) and install into hole (18) of gear box/drum support (14). Depress low lever plunger (27) and low lever spring (29) and install low lever (16) and lever pin (15).



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

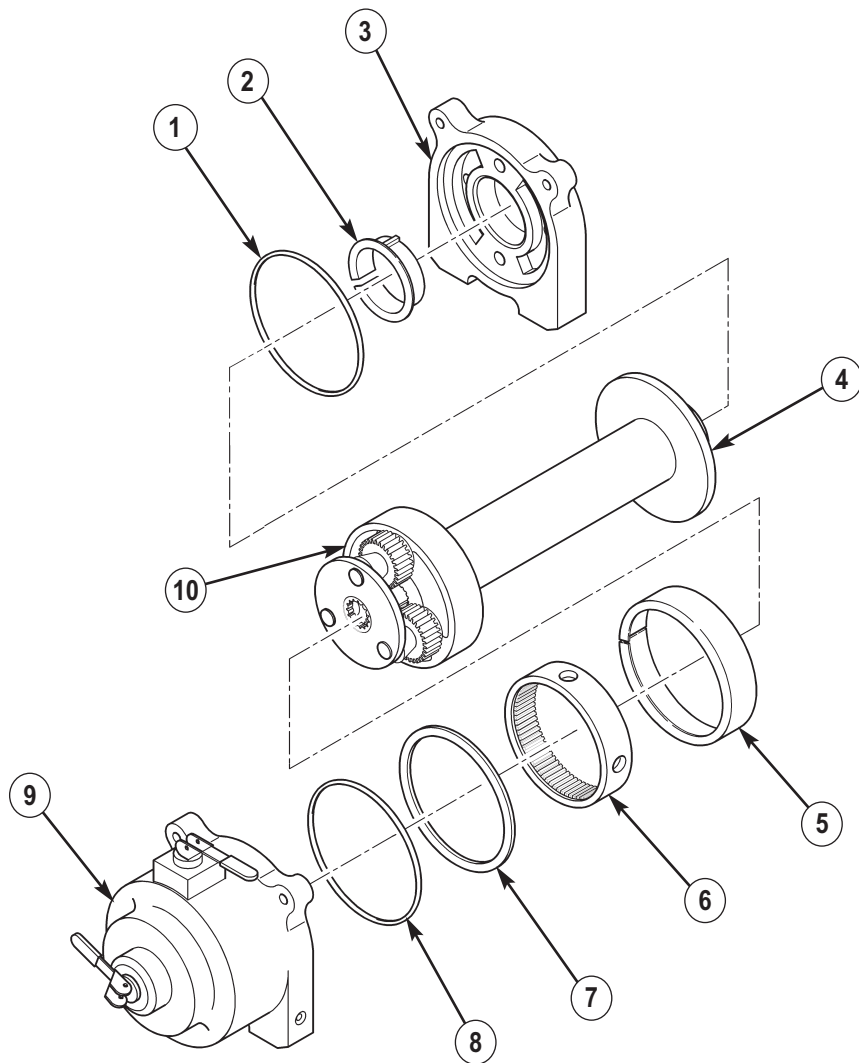
12. Apply grease to ring gear thrust bushing (7) and install into gear box/drum support (9).
13. Apply hydraulic fluid to O-ring (8) and install into gear box/drum support (9).
14. Apply grease to drum drive bushing (5). Install drum drive bushing (5) onto planetary gear end (10) of drum assembly (4).
15. Apply grease to gear teeth and machined surfaces of ring gear (6). Install ring gear (6) onto planetary gear end (10) of drum assembly (4) with wider machined edge of ring gear (6) towards drum assembly (4).

NOTE

Make sure high lever and low lever are both in the FREE position.

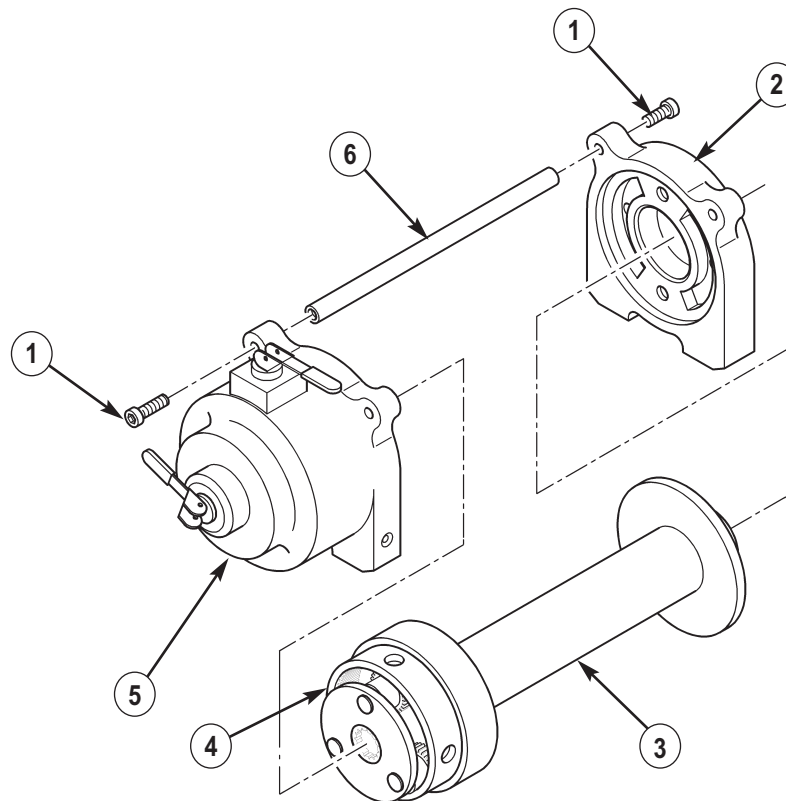
16. Install drum assembly (4) into gear box/drum support (9).
17. Apply grease to drum bushing (2). Align tab on drum bushing (2) with slot on motor end/drum support (3) and install into motor end/drum support (3).
18. Apply hydraulic fluid to O-ring (1) and install into motor end/drum support (3).
19. Install motor end/drum support (3) onto drum assembly (4).

25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

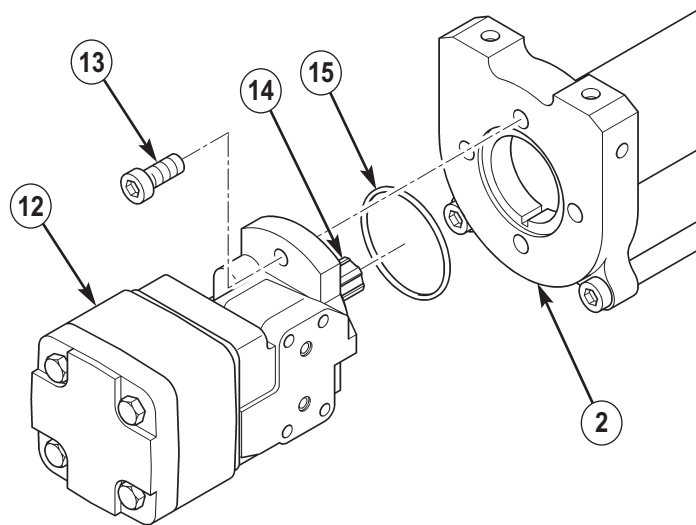
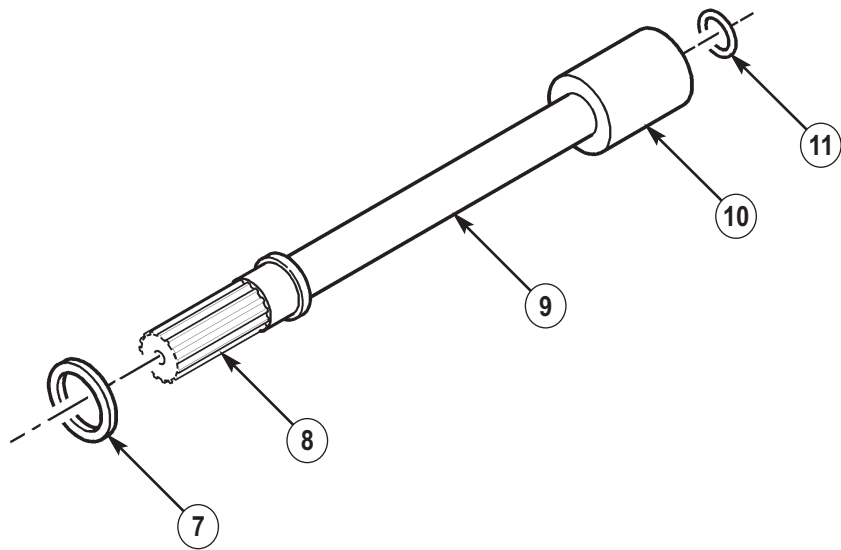


25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

20. Apply adhesive to threads of four socket-head screws (1). With drum assembly (3) in place, install four socket-head screws (1) and two tie bars (6) on motor end/drum support (2) and gear box/drum support (5). Tighten socket-head screws (1) to 18 lb-ft (24 N·m).
21. Apply hydraulic fluid to O-ring (11) and install into motor end (10) of drive shaft assembly (9). Apply grease to internal splines in motor end (10) and external (8) splines of drive shaft assembly (9).
22. Apply grease to drive shaft thrust washer (7) and install onto drive shaft assembly (9).
23. Install drive shaft assembly (9) through motor end/drum support (2) through drum assembly (3) until splines (8) engage planetary gear assembly (4).
24. Apply hydraulic fluid to O-ring (15) and install onto motor (12). Apply grease onto splines (14) of motor (12).
25. Apply adhesive to threads of two socket-head screws (13). Align scribe marks and install motor (12) on motor end/drum support (2) with two socket-head screws (13). Tighten socket-head screws (13) to 45 lb-ft (61 N·m).



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)

26. Apply hydraulic fluid to two O-rings (8) and install in ports (16) of motor (7).

CAUTION

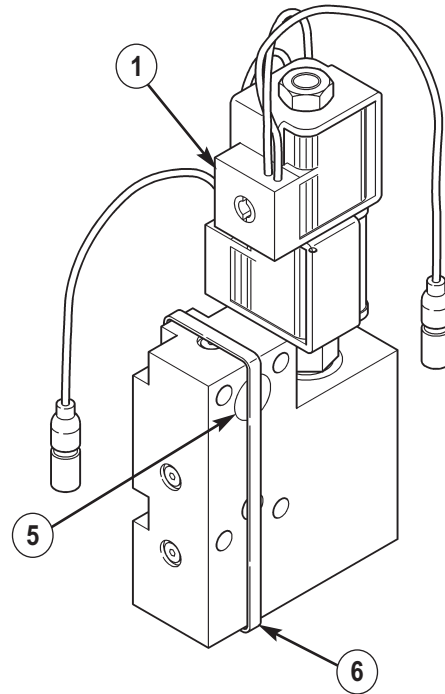
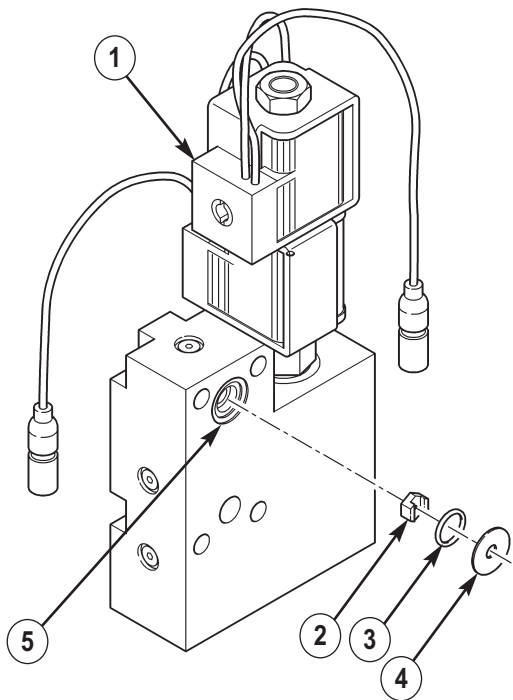
Do not allow restrictor valve assembly to separate from valve and solenoid assembly during installation. Damage to parts may result.

27. Install restrictor (2), O-ring (3), and restrictor washer (4) into port (5) of valve and solenoid assembly (1). Secure restrictor (2), O-ring (3), and restrictor washer (4) with rubber band (6) on valve and solenoid assembly (1).
28. Apply adhesive to threads of four socket-head screws (9) loosely install two socket-head screws (9) then remove rubber band (6) being careful not to allow restrictor valve assembly (2), (3), and (4) to fall out of position in valve and solenoid assembly (1).
29. Install two remaining socket-head screws (9). Tighten socket-head screws (9) to 18 lb-ft (24 N·m).

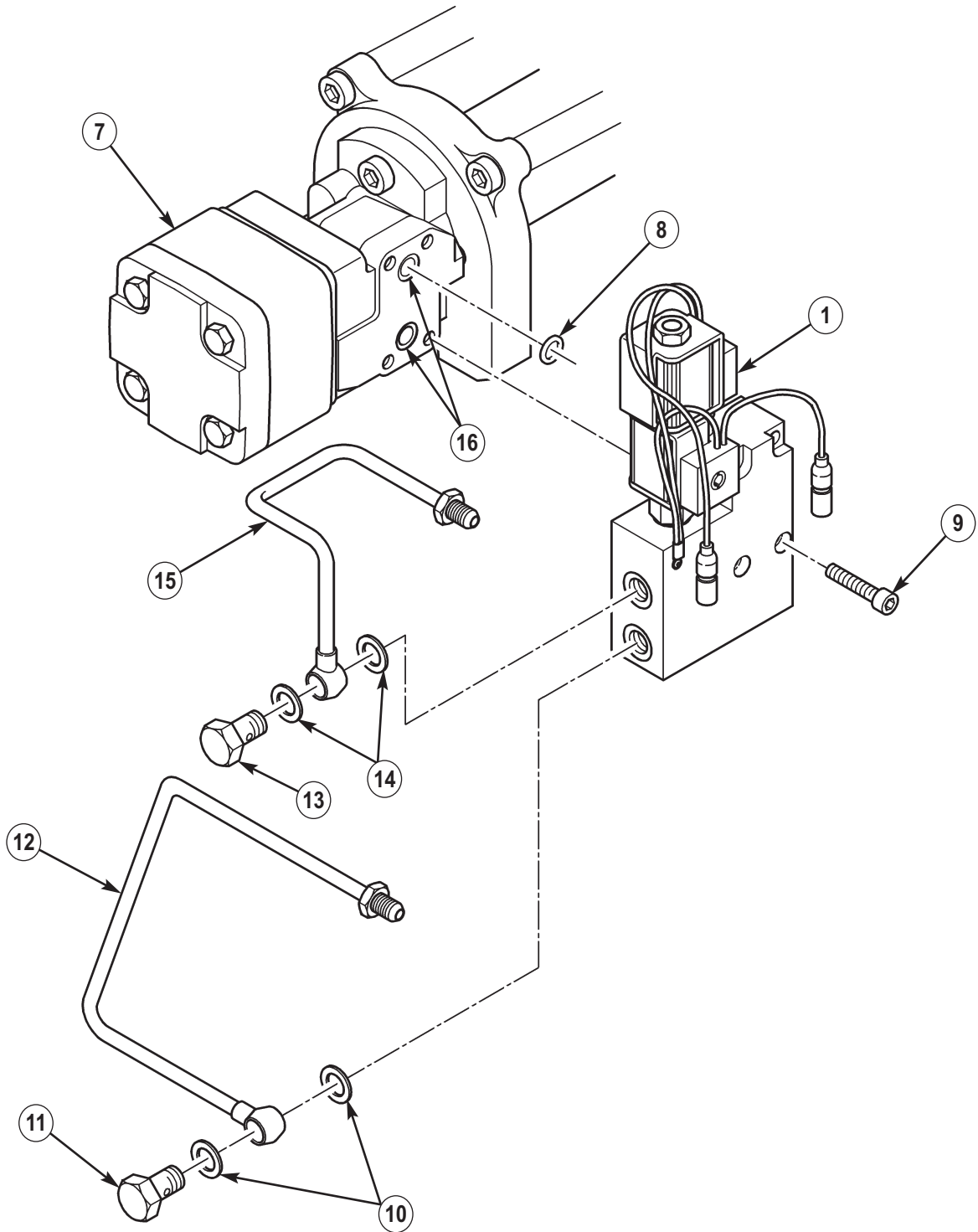
NOTE

Valve and solenoid assembly is stamped with letter "P" at inlet port and with letter "T" at outlet port.

30. Using two copper washers (14) and banjo screw (13) install inlet banjo tube (15) to port "P" on valve and solenoid assembly (1).
31. Using two copper washers (10) and banjo screw (11) install outlet banjo tube (12) to port "T" on valve and solenoid assembly (1).
32. Tighten banjo screws (11) and (13) to 33-40 lb-ft (45-54 N·m).



25-13.2. 10,500 LB HYDRAULIC WINCH REPAIR (Cont'd)



FOLLOW-ON TASKS: • Install winch (M1113) (para. 12-27.1)
 • Install winch (M1114) (para. 12-36.1)

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. New Passenger Side Footwell Upper Armor Installation b. New Passenger Side Footwell Outer Armor Installation | <ul style="list-style-type: none"> c. New Passenger Side Footwell Inner Armor and Inner/Outer Cowl Reinforcement Installation d. New Right Front Underbody Armor Installation |
|--|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Four flatwashers (Appendix G, Item 51.1)
 Two capscrews (Appendix G, Item 20.1)
 Twelve AVK fasteners (Appendix G, Item 3.1)
 Sixty-two locknuts (Appendix G, Item 169)
 Two nuts (Appendix G, Item 243.1)
 Sealing compound (Appendix C, Item 72.1)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Air cleaner removed (para. 3-12).
- Engine access cover removed (para. 10-22).
- Air distribution duct removed (para. 11-81).
- Tunnel insulation removed (para. 10-33).
- Right front underbody armor removed (para. 11-38).
- Passenger side footwell outer armor removed (para. 25-28).
- Passenger side footwell inner armor removed (para. 25-30).
- Passenger side upper cowl liner removed (para. 25-36).

General Safety Instructions

Right front underbody armor is extremely heavy and must be supported during removal and installation.

Maintenance Level

Direct Support

WARNING

Right front underbody armor is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

NOTE

Installing a new right front underbody requires match-drilling of the underbody to the vehicle. In addition, the passenger side footwell upper armor, passenger side footwell outer armor, passenger side footwell inner armor, and passenger side inner/outer cowl reinforcement will have to be replaced.

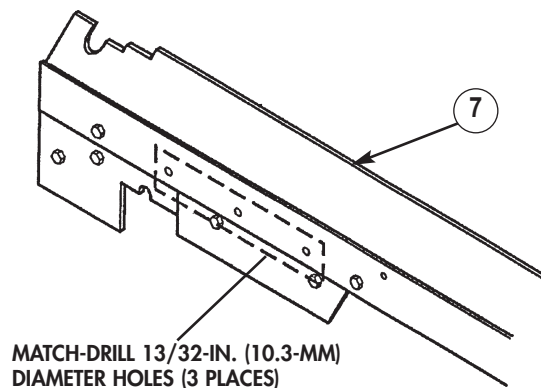
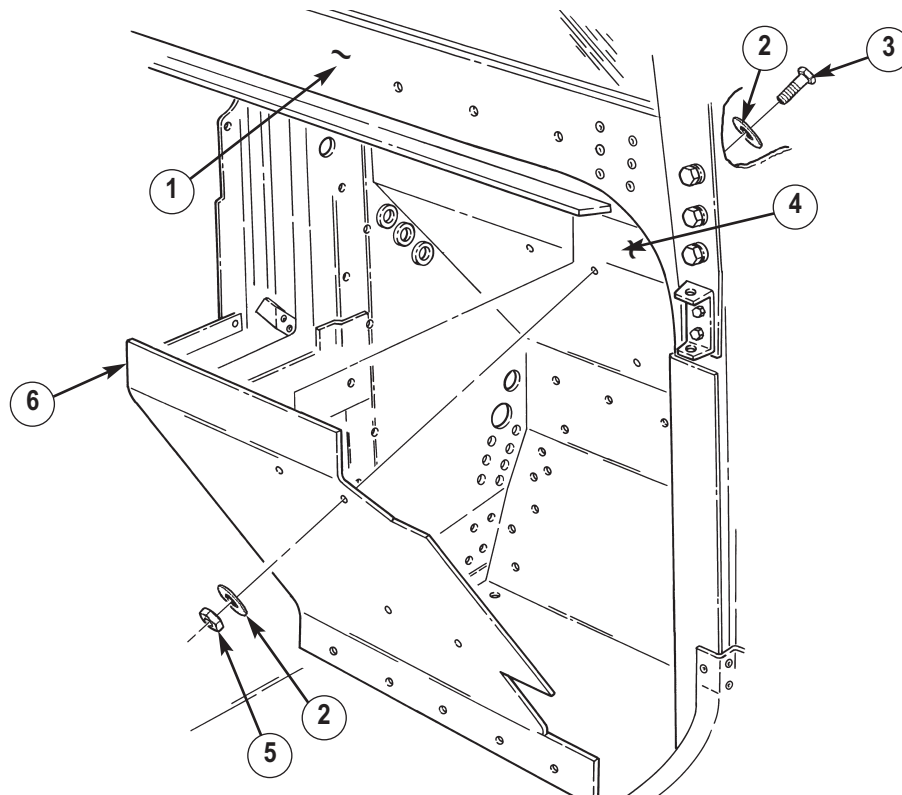
25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

NOTE

Step a. is performed to temporarily install a new right front underbody armor segment in order to perform match-drilling and provide a secure interface with other vehicle body armor brackets and liners prior to final installation.

a. New Passenger Side Footwell Upper Armor Installation

1. Install passenger side footwell upper armor (6) on A-pillar cowl (4) with two capscrews (3), four washers (2), and two nuts (5). Tighten nuts (5) to 10 lb-ft (14 N·m).
2. Using lower right deflector (7) as a template, match-drill three 13/32-in. (10.3-mm) diameter holes from lower right deflector (7) through passenger side footwell upper armor (6).



25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

b. New Passenger Side Footwell Outer Armor Installation

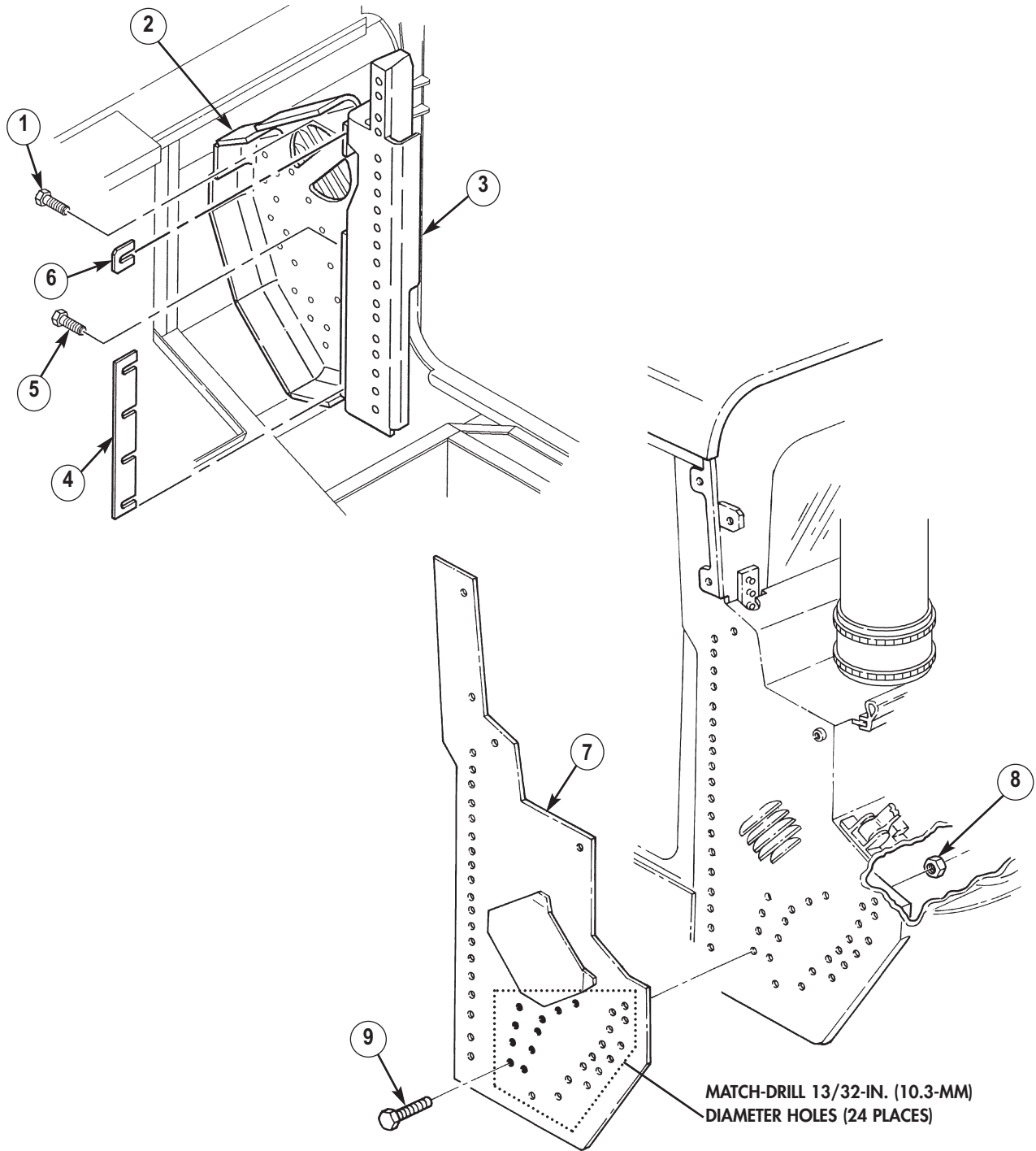
1. Install passenger side footwell outer armor (2) and spacer (6) on right A-beam armor (3) with capscrew (1). Do not tighten capscrew (1).
2. Install spacer (4) and four capscrews (5) on A-beam armor (3). Tighten capscrews (1) and (5) to 35 lb-ft (47 N·m).
3. Using A-pillar armor (7) as a template, match-drill twenty-four 13/32-in. (10.3-mm) diameter holes from A-pillar armor (7) through passenger side footwell outer armor (2).

NOTE

Capscrews in step 4 are installed in darkened hole locations in A-pillar armor.

4. Install ten capscrews (9) and locknuts (8) through A-pillar armor (7) and passenger side footwell outer armor (2). Tighten locknuts (8) to 35 lb-ft (47 N·m).

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

c. New Passenger Side Footwell Inner Armor and Inner/Outer Cowl Reinforcement Installation

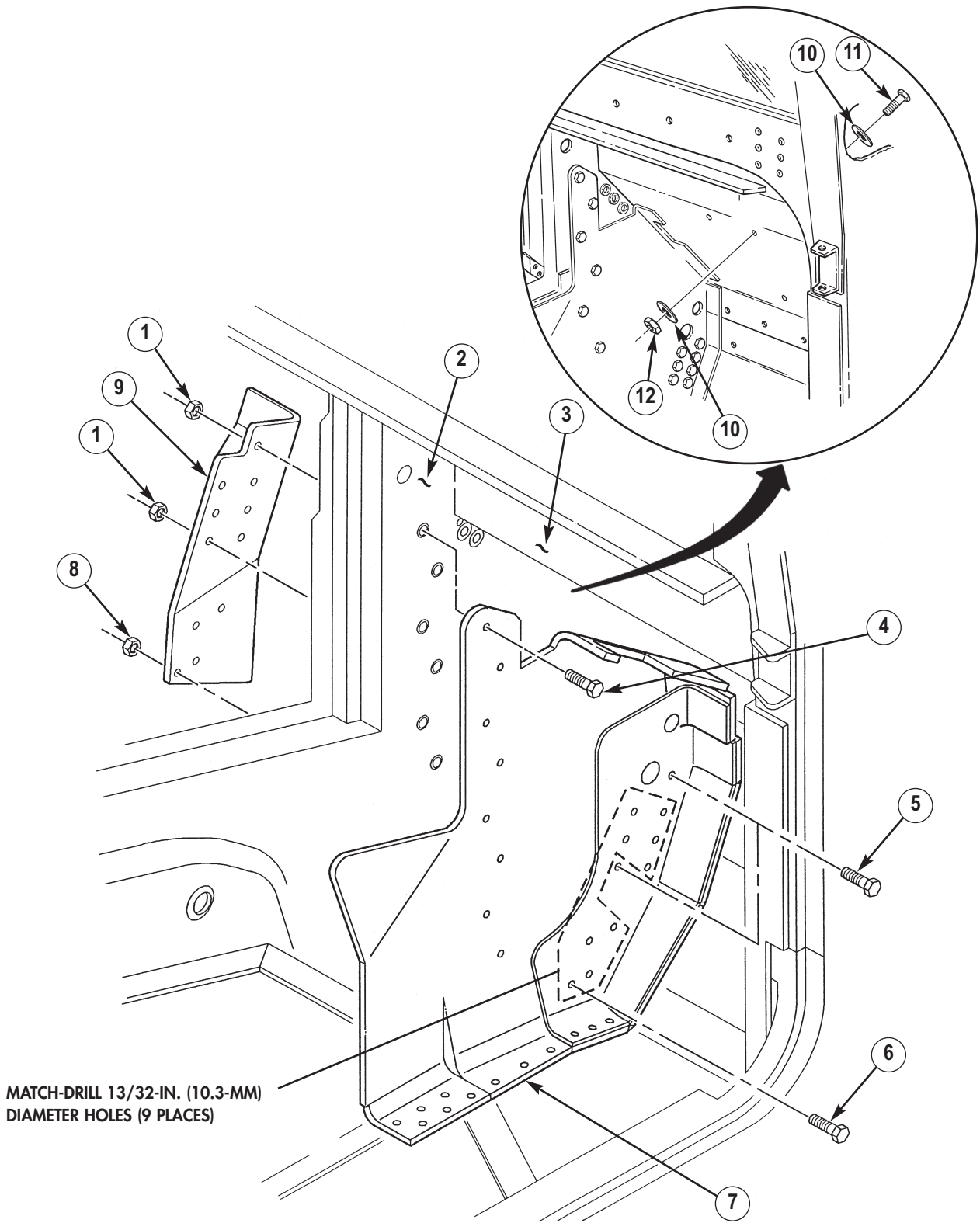
1. Apply sealing compound to threads of eight capscrews (4), and install passenger side footwell inner armor (7) on inner cowl (2) with capscrews (4). Tighten capscrews (4) to 23 lb-ft (31 N·m).
2. Install inner/outer cowl reinforcement (9) on inner cowl (2) with two capscrews (5) and locknuts (1). Tighten capscrews (5) to 35 lb-ft (47 N·m).
3. Match-drill nine 13/32-in. (10.3-mm) diameter holes from passenger side footwell inner armor (7) through inner/outer cowl reinforcement (9).
4. Install nine capscrews (6) and locknuts (8) through passenger side footwell inner armor (7) and inner/outer cowl reinforcement (9). Tighten capscrews (6) to 35 lb-ft (47 N·m).

NOTE

Step 5 removes the temporary mounting hardware installed in Step a.

5. Remove two nuts (12), washers (10), capscrews (11), and washers (10) from passenger side footwell upper armor (3).

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



**MATCH-DRILL 13/32-IN. (10.3-MM)
DIAMETER HOLES (9 PLACES)**

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)**WARNING**

Right front underbody armor is extremely heavy and must be supported during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

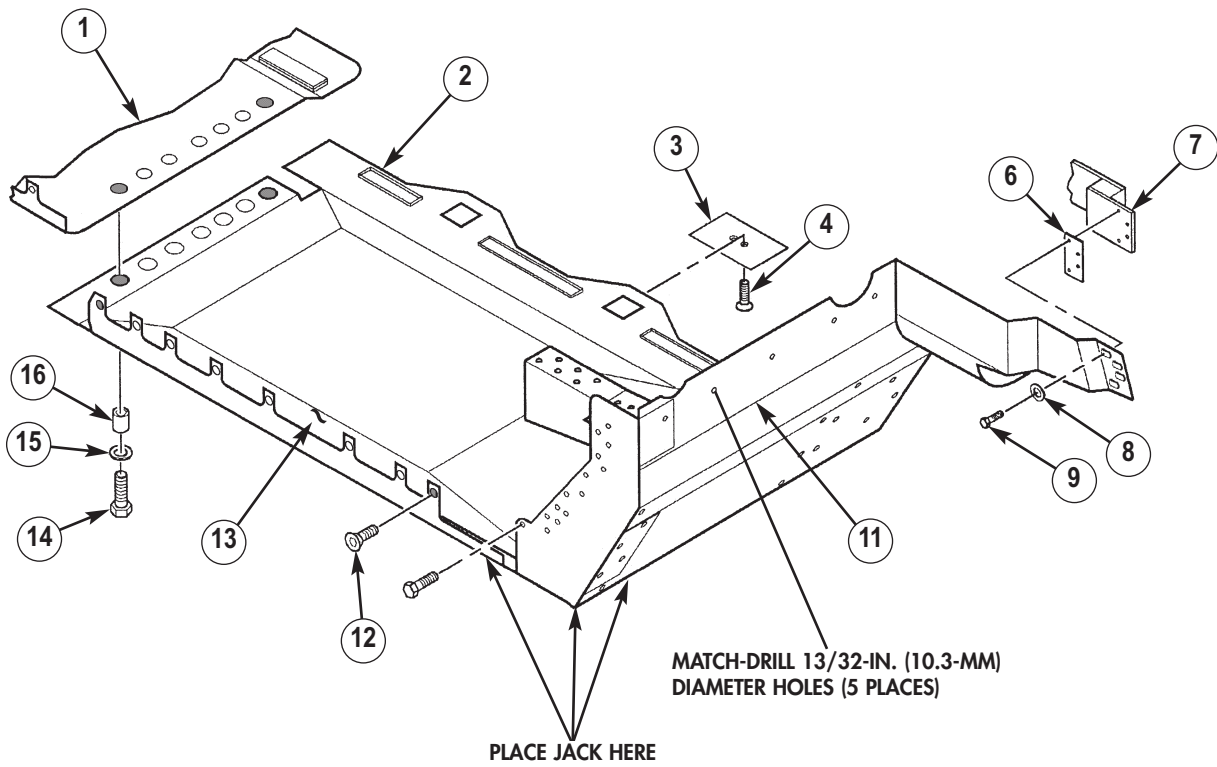
NOTE

Steps 1 through 5, and 7 through 8 are performed to temporarily install a new right front underbody armor segment in order to perform match-drilling and provide a secure interface with other vehicle body armor brackets and lines prior to final installation.

d. New Right Front Underbody Armor Installation

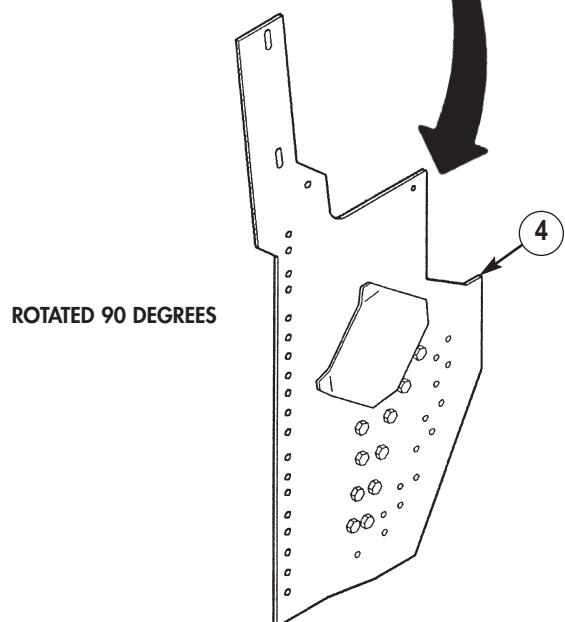
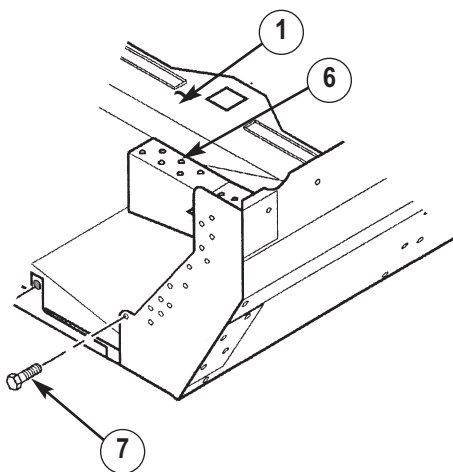
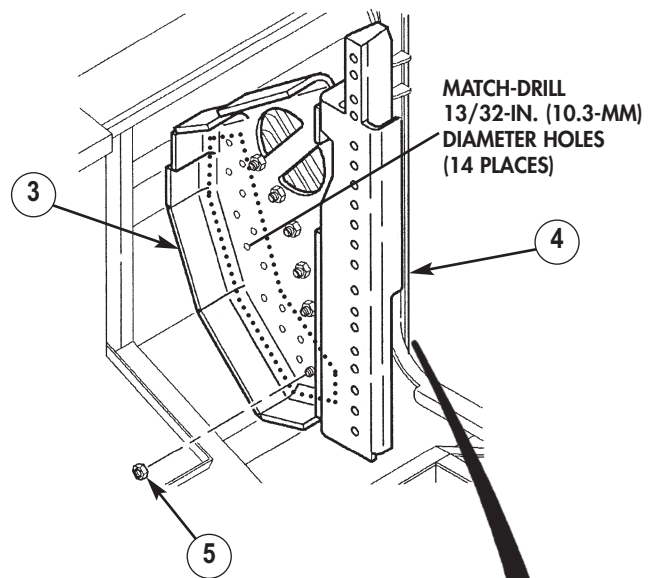
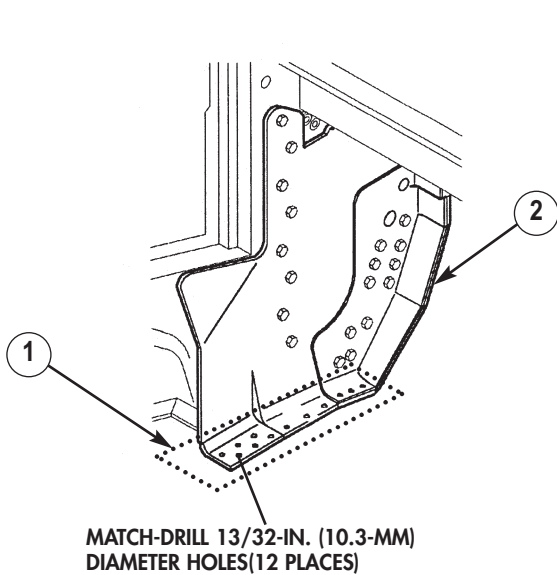
1. Move new right front underbody armor (2) into place underneath vehicle with hydraulic jack and slowly raise right front underbody armor (2) into position on vehicle.
2. Install right front underbody armor (2) to right rear underbody (1) with two spacers (16), washers (15), and capscrews (14) in inner and outer holes. Tighten capscrews (14) to 23 lb-ft (31 N·m).
3. Install right front underbody armor (2) to vehicle side panel (13) with two socket-head screws (12) in front and rear holes. Tighten socket-head screws (12) to 75 lb-in. (8 N·m).
4. Secure right front underbody armor (2) to resilient mount shim (6) and resilient mount (7) with four washers (8) and capscrews (9). Tighten capscrews (9) to 10 lb-ft (14 N·m).
5. Install three retainer plates (3) to right front underbody armor (2) and secure each with two socket-head screws (4). Tighten socket-head screws (4) to 35 lb-ft (47 N·m).
6. Using the right front underbody armor (2) as a template, match-drill five 13/32-in. (10.3-mm) diameter holes from right front underbody armor (2) through the passenger side footwell upper armor (11).
7. Install right front underbody armor (2) to passenger side footwell upper armor (11) with five capscrews (5) and locknuts (10). Tighten capscrews (5) to 35 lb-ft (47 N·m).

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



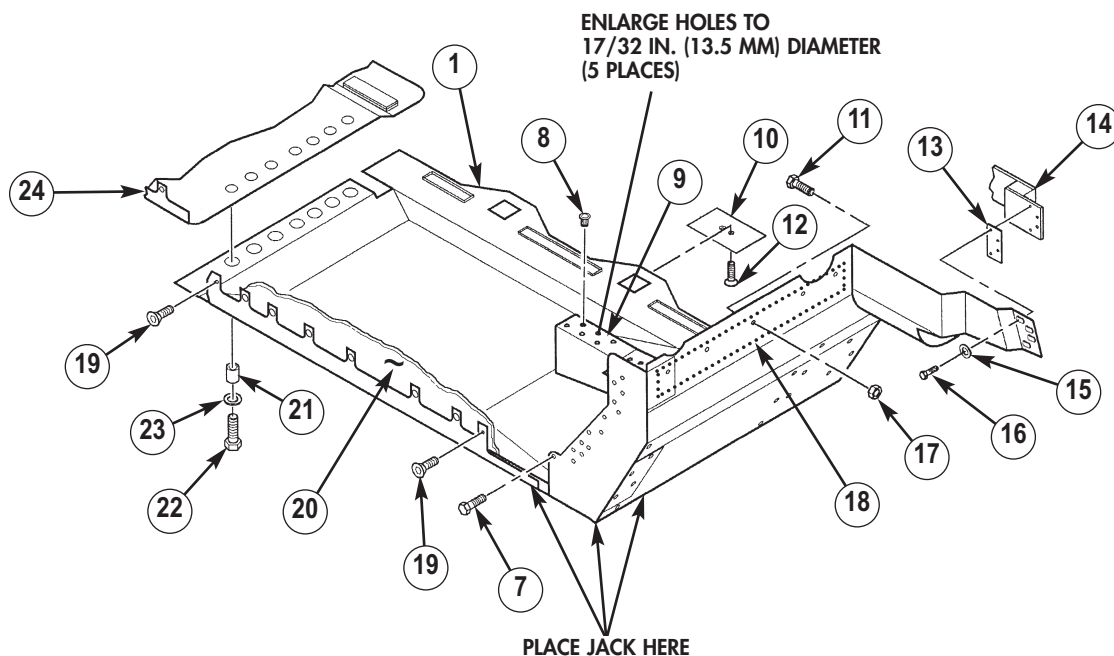
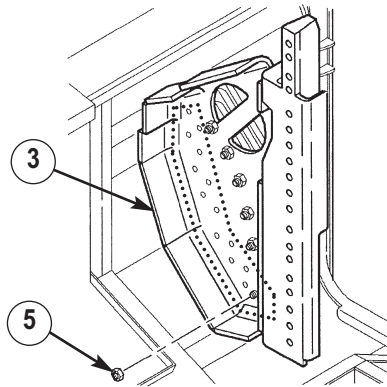
25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

8. From inside vehicle, match-drill fourteen 13/32-in. (10.3-mm) diameter holes from passenger side footwell outer armor (3) and A-pillar armor (4) through right front underbody armor (1).
9. Install three capscrews (7) and locknuts (5) through passenger side footwell outer armor (3), A-pillar armor (4), and right front underbody armor (1). Tighten locknuts (5) to 35 lb-ft (47 N·m).
10. Match-drill twelve 13/32-in. (10.3-mm) diameter holes from passenger side footwell inner armor (2) into right front underbody armor (1). Stop drilling when drill bit penetrates hat section (6). Do not drill completely through right front underbody armor (1).



25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

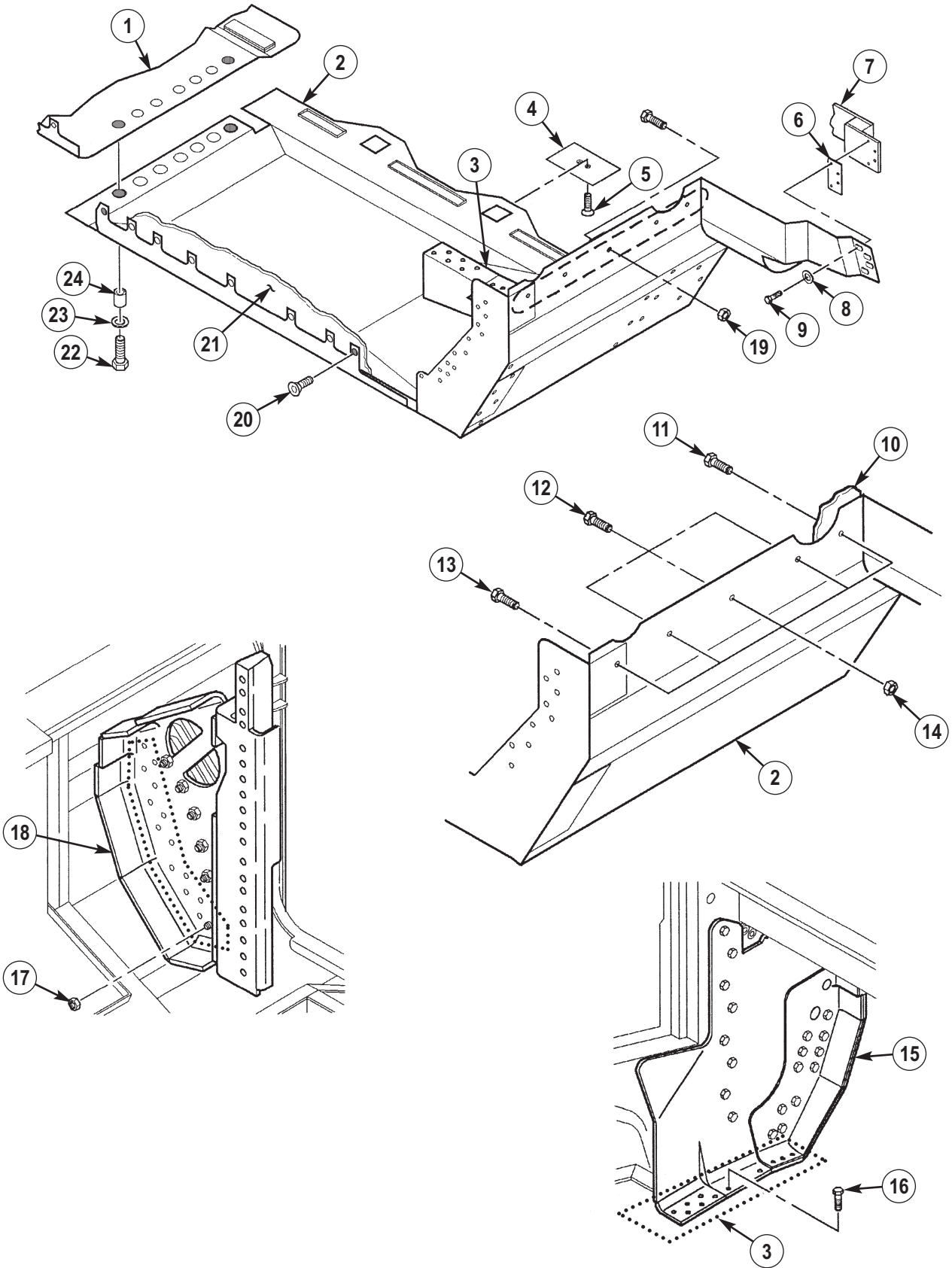
11. Remove five locknuts (17) and capscrews (11) from right front underbody armor (1) and passenger side footwell upper armor (18).
12. Remove six socket-head screws (12) and three retainer plates (10) from right front underbody armor (1).
13. Remove two capscrews (22), washers (23), and spacers (21) from inner and outer holes in right front underbody armor (1) and right rear underbody (24).
14. Remove three locknuts (5) and capscrews (7) from right front underbody armor (1) and passenger side footwell outer armor (3).
15. Remove two socket-head screws (19) from front and rear holes in right front underbody armor (1) and vehicle side panel (20).
16. Remove four capscrews (16), washers (15), and resilient mount shim (13) from resilient mount (14) and right front underbody (1).
17. Using hydraulic jack, slowly lower right front underbody armor (1) and remove from underneath vehicle.
18. Enlarge twelve holes in left front underbody armor hat section (9) to 17/32-in. (13.5-mm) diameter.
19. Install twelve AVK fasteners (8) into right underbody armor hat section (9).



25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

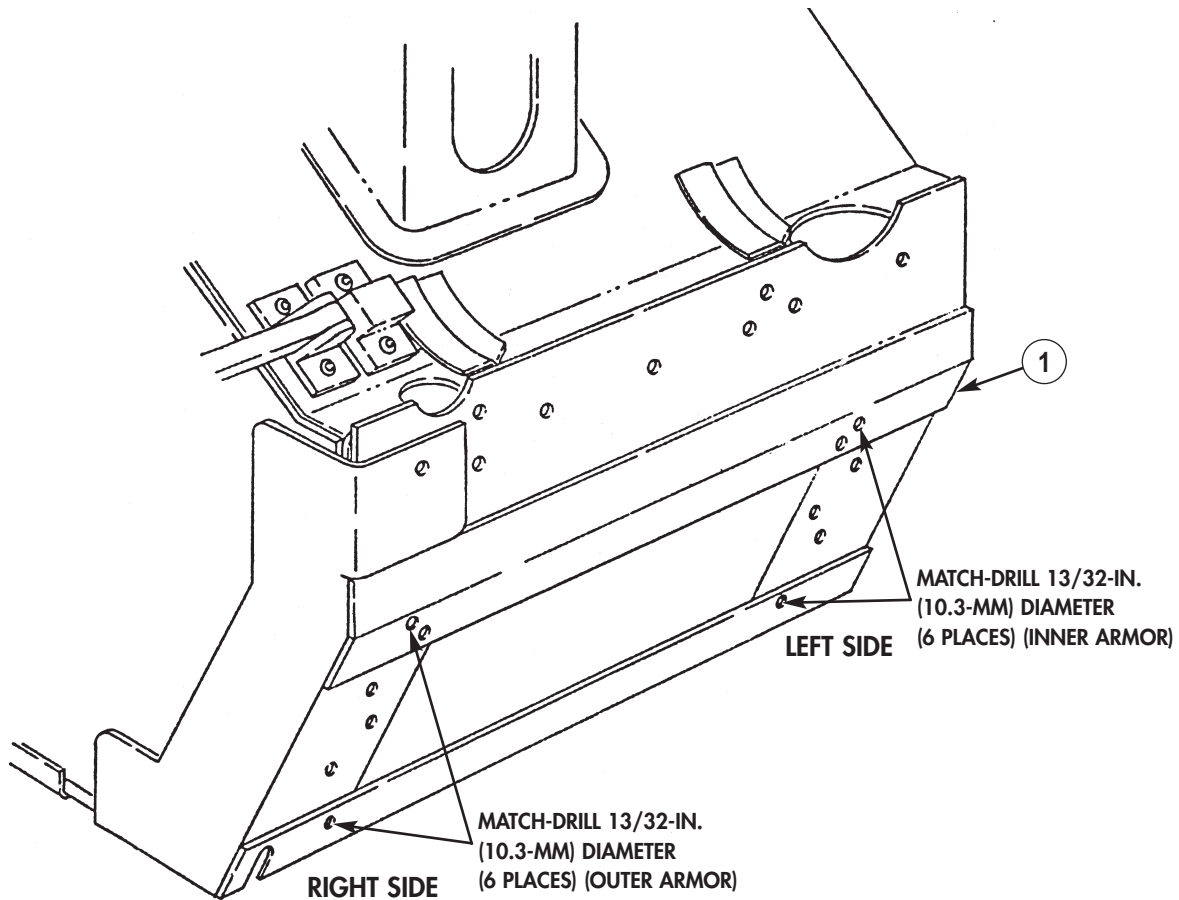
20. Move right front underbody armor (2) into place underneath vehicle with hydraulic jack and slowly raise right front underbody armor (2) into position on vehicle.
21. Apply sealing compound to seven capscrews (22), and install right front underbody armor (2) to right rear underbody (1) with seven spacers (24), washers (23), and capscrews (22). Tighten capscrews (22) to 23 lb-ft (31 N·m).
22. Apply sealing compound to eight socket-head screws (20) and install right front underbody armor (2) on vehicle side panel (21) with socket-head screws (20). Tighten socket-head screws (20) to 75 lb-in. (8 N·m).
23. Apply sealing compound to four capscrews (9), and install right front underbody armor (2) to resilient mount shim (6) and resilient mount (7) with four capscrews (9) and washers (8). Tighten capscrews (9) to 10 lb-ft (14 N·m).
24. Apply sealing compound to six socket-head screws (5), and install three retainer plates (4) and secure each with two socket-head screws (5). Tighten socket-head screws (5) to 35 lb-ft (47 N·m).
25. Install passenger side footwell outer armor (18) on right front underbody armor (2) with fourteen capscrews (19) and locknuts (17). Tighten locknuts (17) to 35 lb-ft (47 N·m).
26. Install right front underbody armor (2) to right upper liner (10) with capscrews (11), (12), and (13) and locknuts (14). Tighten locknuts (14) to 35 lb-ft (47 N·m).
27. Apply sealing compound to twelve capscrews (16), and secure passenger side footwell inner armor (15) to right front underbody armor hat section (3) with capscrews (16). Tighten capscrews (16) to 23 lb-ft (31 N·m).

25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

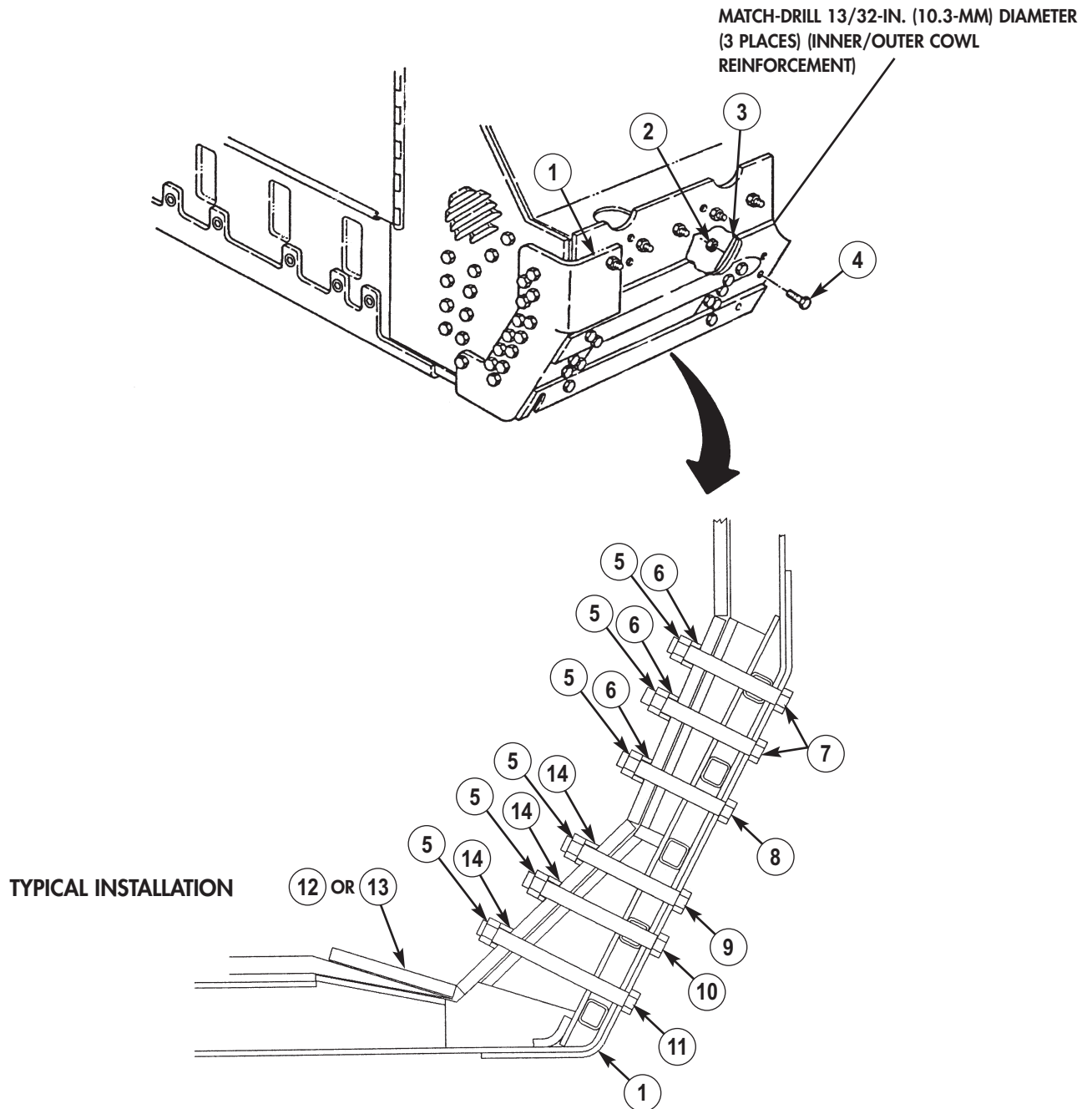


25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)

28. Using the right front underbody armor (1) as a template, match-drill six 13/32-in. (10.3-mm) diameter holes from right front underbody armor (1) through passenger side footwell inner armor (left side).
29. Using the right front underbody armor (1) as a template, match-drill six 13/32-in. (10.3-mm) diameter holes from right front underbody armor (1) through passenger side footwell outer armor (right side).
30. Using right front underbody armor (1) as a template, match-drill three 13/32-in. (10.3-mm) diameter holes from right front underbody armor (1) through passenger side inner/outer cowl reinforcement (3).
31. Install right front underbody armor (1) to passenger side inner/outer cowl reinforcement (3) with three capscrews (4) and locknuts (2). Tighten capscrews (4) to 35 lb-ft (47 N·m).
32. Install passenger side footwell inner liner (12) to right front underbody armor (1) with capscrews (7), (8), (9), (10), and (11), three spacers (6), spacers (14), and six locknuts (5). Tighten locknuts (5) to 35 lb-ft (47 N·m).
33. Install passenger side footwell outer liner (13) to right front underbody armor (1) with capscrews (7), (8), (9), (10), and (11), three spacers (6), spacers (14), and six locknuts (5). Tighten locknuts (5) to 35 lb-ft (47 N·m).



25-13.3. RIGHT FRONT UNDERBODY ARMOR INSTALLATION (Cont'd)



- FOLLOW-ON TASKS:
- Install passenger side upper cowl liner (para. 25-36).
 - Install passenger side footwell inner armor (para. 25-30).
 - Install passenger side footwell outer armor (para. 25-28).
 - Install right front underbody armor (para. 11-38).
 - Install tunnel insulation (para 10-33).
 - Install air distribution duct (para. 11-81).
 - Install engine access cover (para. 10-22).
 - Install air cleaner (para. 3-12).

Section II. AIR CONDITIONING MAINTENANCE

25-14. AIR CONDITIONING MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
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25-16.	A/C Receiver/Dryer (Front) Maintenance	25-48
25-17.	A/C Receiver/Dryer (Rear) Replacement	25-50
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25-18.	A/C Condenser Maintenance	25-52
25-19.	A/C Condenser Fan and Shroud Replacement	25-54
25-20.	A/C Compressor Replacement	25-56
25-20.1.	A/C Compressor Manifold Replacement	25-56.2
25-21.	A/C Heater/Evaporator Assembly (Front) Replacement	25-58
25-22.	A/C Evaporator Assembly (Rear) Maintenance	25-62
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25-34.	A/C and De-Ice Relays Replacement	25-90
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25-36.	Access Hole Cover Plate Maintenance	25-114
25-37.	Left Side Tunnel Insulation Replacement	25-116

25-15. A/C SYSTEM SERVICING

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Manifold Gauge Set Installation b. Manifold Gauge Set Removal c. Discharging System d. Flushing System | <ul style="list-style-type: none"> e. Evacuating System f. Charging System g. Adding Refrigerant Oil |
|--|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Flushing cylinder (Appendix B, Item 128)
 Flush gun (Appendix B, Item 129)
 Service refrigeration unit tool kit
 (Appendix B, Item 131)
 Vacuum pump (Appendix B, Item 132)
 Manifold gauge set (Appendix B, Item 130)

Materials/Parts

Lubricating oil (Appendix C, Item 48)
 Refrigerant R-134a (Appendix C, Item 56)
 Nitrogen (Appendix C, Item 51)
 Flushing agent (Appendix C, Item 30)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Hood raised and secured (TM 9-2320-387-10).

General Safety Instructions

- Always wear eye protection when working with R-134a.
- Exercise extreme care when handling R-134a.
- Do not attempt to connect servicing equipment while engine is running.
- Ensure hand valves on manifold gauge set are closed during connection; hoses must be clear of any moving engine parts.
- Eye protection must be worn when using compressed nitrogen.

Maintenance Level

Direct support

WARNING

- Always wear eye protection when using R-134a or when servicing the air conditioning system. Injury will result if R-134a comes in contact with eyes.
- Exercise extreme care when handling R-134a. Direct contact between R-134a and skin may cause frostbite.
- Always use recovery machine.
- Do not attempt to connect servicing equipment while engine is running. Injury to personnel or damage to equipment may result.

NOTE

Whenever any air conditioning vapor system component needs replacement, the system must be discharged, flushed, and a new dryer bottle installed (para. 25-16).

25-15. A/C SYSTEM SERVICING (Cont'd)

a. Manifold Gauge Set Installation

1. Turn high-pressure gauge valve (2) and low-pressure gauge valve (1) on manifold gauge set (3) clockwise to seated (closed) positions.
2. Remove two caps (6) from service ports (7) and (8).

WARNING

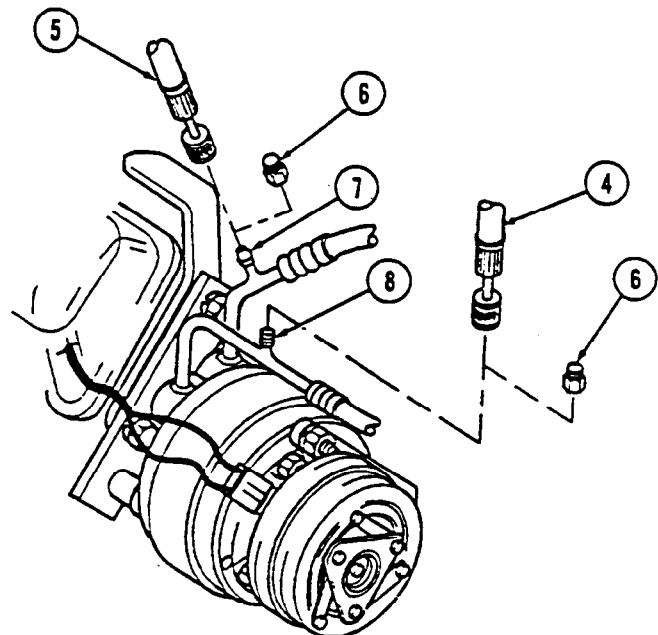
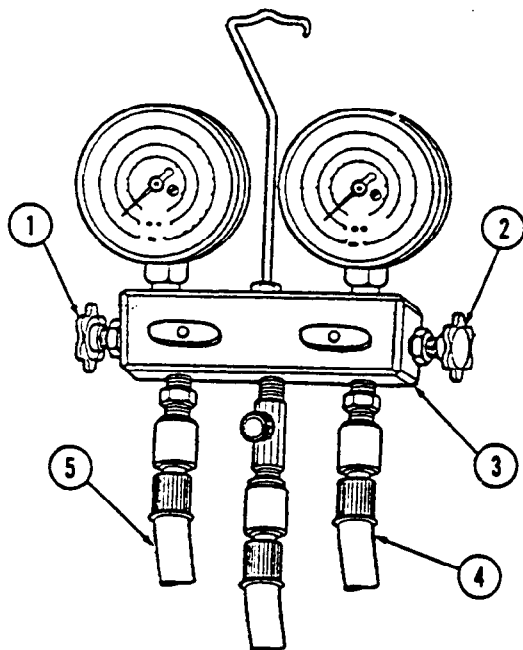
Ensure hand valves on manifold gauge are in closed position during connection and hoses are clear of any moving parts in engine compartment. Injury to personnel or damage to equipment may result.

3. Connect low-pressure gauge hose (5) on manifold gauge set (3) to suction (low side) service port (8).
4. Connect high-pressure gauge hose (4) on manifold gauge set (3) to discharge (high side) service port (7).
5. Hang manifold gauge set (3) so hoses (4) and (5) are well away from moving engine parts.

NOTE

Do not perform step 6 if system is already evacuated. High- and low-pressure hoses must be purged with R-134a for charging purposes (refer to task f.).

6. Slightly loosen low-pressure gauge hose (5) and high-pressure gauge hose (4) at manifold gauge set (3) to purge air from hoses, then tighten.



25-15. A/C SYSTEM SERVICING (Cont'd)

b. Manifold Gauge Set Removal

1. Ensure high-pressure gauge valve (2) and low-pressure gauge valve (1) on manifold gauge set (3) are in seated (clockwise) position.
2. If system was charged with refrigerant, wait several minutes after turning engine off for high and low sides to stabilize before performing next step.

CAUTION

A charged A/C system is always pressurized at 20-30 psi (138-207 kPa). Hose connectors must be held firmly to avoid ends whipping back and damaging equipment.

3. Disconnect low-pressure gauge hose (6) and high-pressure gauge hose (4) from service ports (8) and (9).
4. Install two caps (7) on service ports (8) and (9).

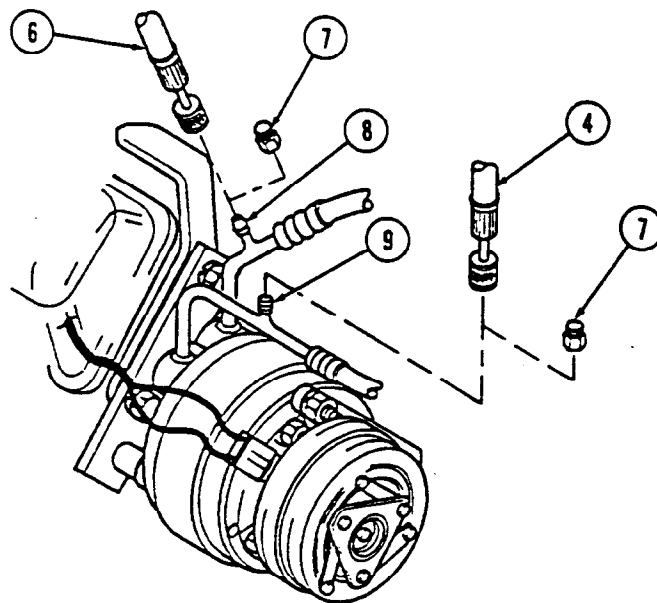
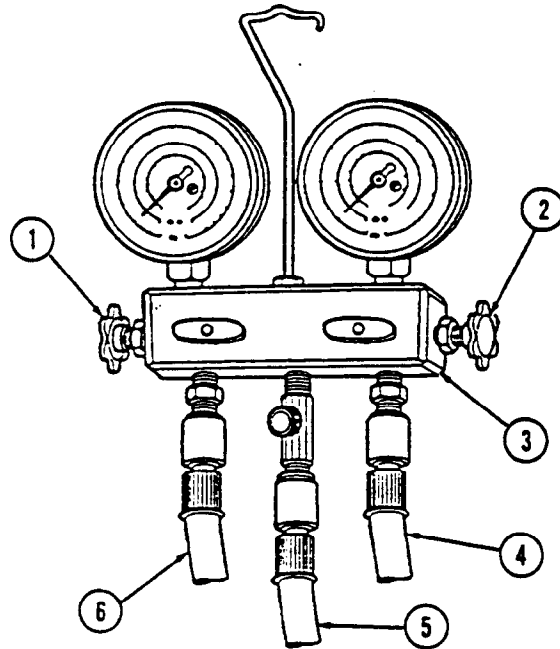
c. Discharging System

1. Install manifold gauge set (refer to task a.).
2. Connect center hose (5) of manifold gauge set (3) to an approved recovery machine.

NOTE

- Do not allow refrigerant R-134a to escape too quickly. Refrigerant oil will escape.
 - When high- and low-pressure gauges read zero, the discharging procedure is complete. Allow machine to run for 5 minutes after gauges read zero.
3. Slightly turn high-pressure gauge valve (2) and low-pressure gauge valve (1) counterclockwise to permit refrigerant to slowly escape through center hose (5) until both gauges read zero.
 4. Measure any significant accumulation of oil in discharge bottle and record for oil charging purposes.
 5. Disconnect manifold gauge set (3) (refer to task b.).

25-15. A/C SYSTEM SERVICING (Cont'd)



25-15. A/C SYSTEM SERVICING (Cont'd)

d. Flushing System

CAUTION

- Never flush compressor. Flushing removes oil. Damage to compressor will result if compressor is flushed.
- Air conditioning system flushing is essential when replacing failed compressors. Failure to flush A/C system will result in damage to new compressor.

NOTE

- Do not attempt to use R-134a as a flushing agent. R-134a will not remain a liquid at ambient temperatures. Use R-111 or R-113 for flushing purposes.
- Flushing is done to remove solid materials such as oil, sludge, and metal particles from failed components.
- For a complete system flush, tools must be installed at A/C lines at compressor.

1. Discharge A/C system (refer to task c.).
2. Fill flushing cylinder (2) with flushing agent.

WARNING

Eye protection must be worn when using compressed nitrogen. Failure to do so may result in injury to personnel.

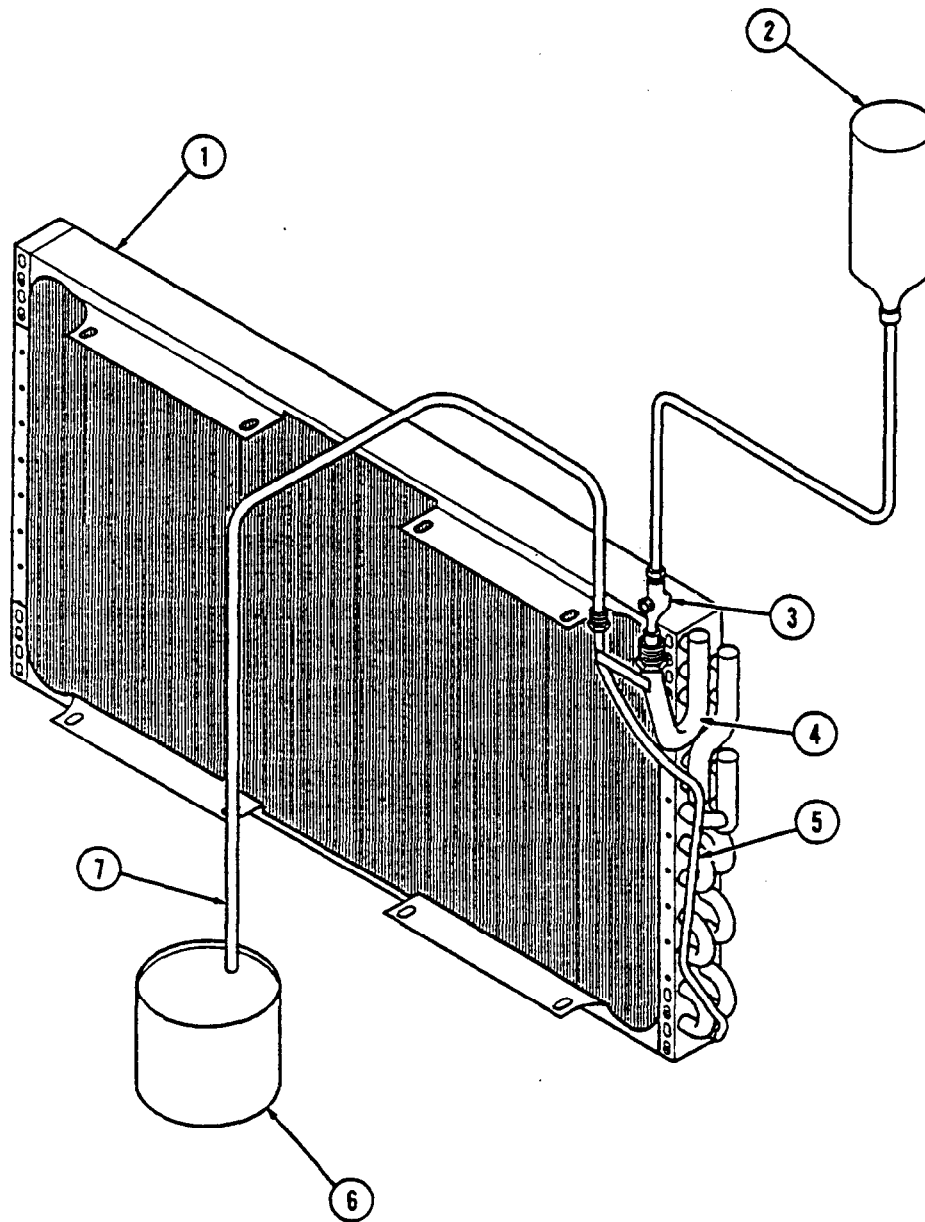
3. Pressurize flushing cylinder (2) with compressed nitrogen to 100 psi (690 kPa).
4. Connect flushing gun (3) to flushing cylinder (2).

NOTE

- Perform steps 5 through 7 on condenser, evaporator, and refrigerant lines. Continue flushing until there is no evidence of oil or contaminants.
- Illustration shows flushing of condenser. Procedure is similar for flushing of other components.

5. Insert flushing gun (3) into refrigerant outlet tube (4) of component to be flushed.
6. Connect a rubber hose (7) over inlet (5) of component to be flushed, and place other end of hose (7) in a drain pan (6).
7. Open flushing gun (3) to blow cleaning agent through component.
8. Remove rubber hose (7) from component and plug refrigerant line.
9. Remove flushing gun (3) from component and plug refrigerant line.

25-15. A/C SYSTEM SERVICING (Cont'd)



25-15. A/C SYSTEM SERVICING (Cont'd)

e. Evacuating System

CAUTION

Never attempt to evacuate A/C system if system has not been completely discharged.

1. Discharge A/C system (refer to task c.) and flush A/C system if necessary (refer to task d.).
2. Connect manifold gauge set (3) (refer to task a.).
3. Connect vacuum pump to center hose (4) on manifold gauge set (3).
4. Turn vacuum pump on and open high-pressure gauge valve (2) and low-pressure gauge valve (1) on manifold gauge set (3).

NOTE

High-pressure side gauge should drop to zero or below. If not, a blockage in A/C system is indicated.

5. Evacuate unit until low-pressure gauge reads 29 in. Hg of vacuum.
6. Continue evacuation for forty-five minutes after correct gauge reading of 29 in. Hg of vacuum has been achieved.
7. Turn high-pressure gauge valve (2) and low-pressure gauge valve (1) on manifold gauge set (3) to closed position after evacuation is complete.
8. Turn off vacuum pump and disconnect center hose (4) from vacuum pump.

NOTE

Vacuum of 29 in. Hg should be sustained on low-pressure gauge for at least ten minutes. If not, a leak in A/C system is indicated. Identify source of leak and repair as necessary.

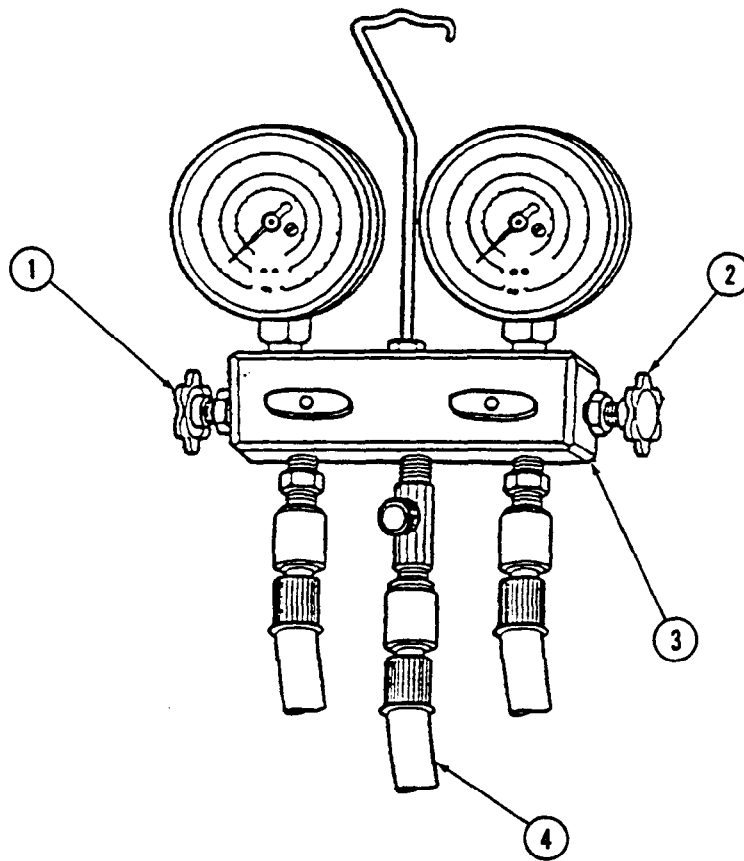
9. Check for leaks ten minutes after gauge valves are turned off.

NOTE

Manifold gauge set can remain connected and service valves left in mid-position if charging A/C system will follow immediately.

10. Disconnect manifold gauge set (3) (refer to task b.).

25-15. A/C SYSTEM SERVICING (Cont'd)



25-15. A/C SYSTEM SERVICING (Cont'd)

f. Charging System

NOTE

If A/C system requires replacement of a major component or has been flushed, refrigerant oil must be added to system to compensate loss (refer to task g.).

1. Evacuate A/C system (refer to task e.).
2. Connect refrigerant R-134a source to center hose (5) of manifold gauge set (3).
3. Open refrigerant R-134a source to allow refrigerant to flow into center hose (5).
4. Purge center hose (5), low-pressure hose (6), and high-pressure hose (4) as follows:
 - a. Slightly loosen center hose (5) at center port (7) of manifold gauge set (3) until refrigerant escapes, then tighten hose (5).
 - b. Open high-pressure gauge valve (2) and low-pressure gauge valve (1) to allow refrigerant to flow into high-pressure hose (4) and low-pressure hose (6).
 - c. Purge high-pressure hose (4) and low-pressure hose (6) at service ports on compressor.
 - d. Turn high-pressure gauge valve (2) and low-pressure gauge valve (1) clockwise to OFF position.
5. Connect STE/ICE-R (para. 2-47) to obtain engine rpm reading.

WARNING

Ensure high-pressure gauge valve is in closed position on manifold gauge set during charging. Failure to do so will cause compressor to build pressure in refrigerant container, causing injury to personnel or damage to equipment.

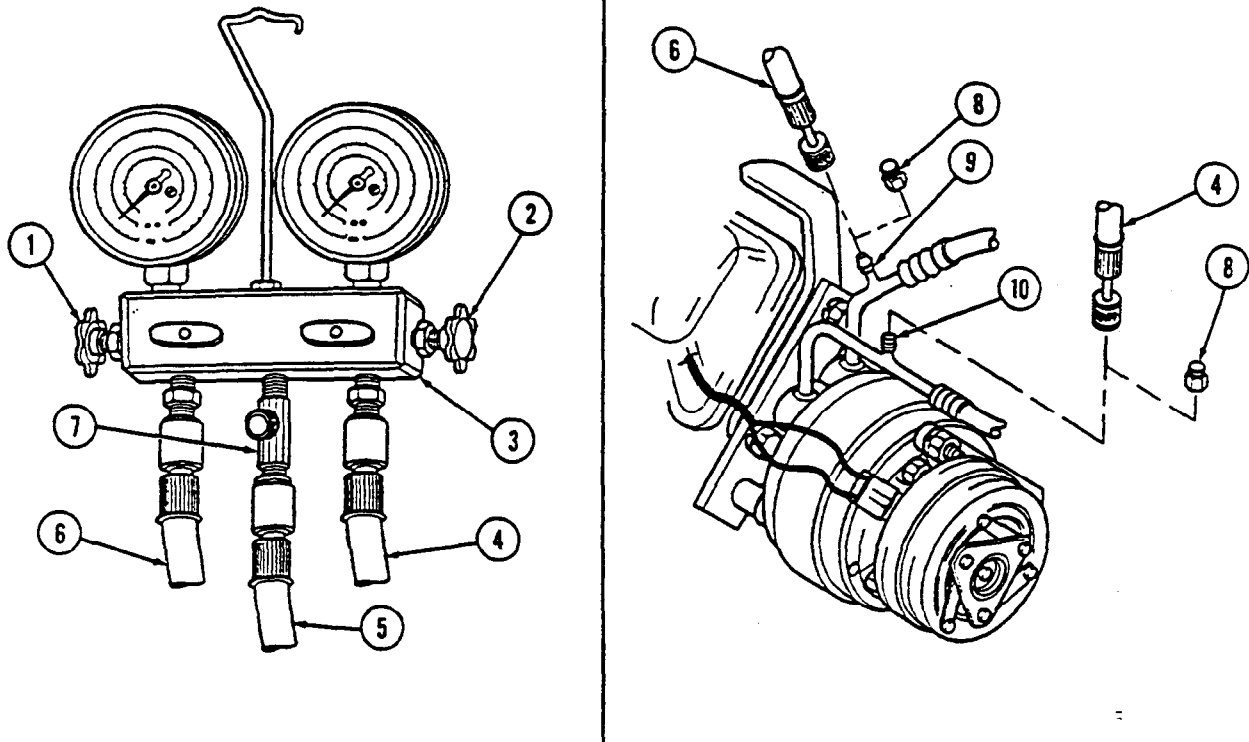
6. Start engine and set engine speed to 1,500 rpm with hand throttle (TM 9-2320-387-10).
7. Turn on A/C system (TM 9-2320-387-10) and set blower fans on high speed.

NOTE

Keep refrigerant container upright at all times so refrigerant enters system as a gas.

8. Open low-pressure gauge valve (1) on manifold gauge set (3) until system is fully charged with 3 lbs 4 oz of R-134a refrigerant (refer to table 14-2).
9. Close low-pressure gauge valve (1) on manifold gauge set (3).
10. Return hand throttle to normal idle (TM 9-2320-387-10).
11. Stop engine (TM 9-2320-387-10).
12. Remove refrigerant R-134a source from center hose (5) of manifold gauge set (3).
13. If no refrigerant oil is needed, disconnect manifold gauge hoses (4) and (6) from A/C system service ports (9) and (10). Install caps (8) on service ports (9) and (10). If refrigerant oil is needed, perform task g.

25-15. A/C SYSTEM SERVICING (Cont'd)



g. Adding Refrigerant Oil

NOTE

- It is not necessary to check or add oil as routine maintenance. It is necessary to add oil when the evaporator, condenser, compressor, or receiver/dryer has been replaced or there was an obvious oil leak. When a system is discharged, it is also necessary to replace any oil carried out with the refrigerant.
 - Vehicle must be on level ground.
 - A new compressor is charged with 6 oz of refrigerant oil.
1. If only the compressor is being replaced, drain and measure oil from compressor being replaced. Drain new compressor and add the same amount of refrigerant oil as was drained from old compressor.
 2. If there is a loss of refrigerant over a period of time and a component is being replaced to correct leak, add refrigerant oil to the component being replaced as follows:
 - Condenser - 1 oz
 - Receiver/Dryer - 1 oz
 - Evaporator - 3 oz
 3. When the system oil level is unknown, or system performance and efficiency are marginal, drain and flush system and add a new 6-oz charge of refrigerant oil to the system.

FOLLOW-ON TASK: Lower and secure hood (TM 9-2320-387-10).

25-16. A/C RECEIVER/DRYER (FRONT) MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

O-ring (Appendix G, Item 265.1)
 Two O-rings (Appendix G, Item 265)
 Two locknuts (Appendix G, Item 115)
 Refrigerant oil (Appendix C, Item 48)
 Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- A/C system discharged (para. 25-15).

Maintenance Level

Direct support

a. Removal

NOTE

Prior to removal, tag lines for installation.

1. Loosen nuts (1) and (5) and remove lines (17) and (6) and O-rings (2) and (4) from receiver/dryer (3). Discard O-rings (2) and (4).
2. Remove trinary switch (7) and O-ring (8) from receiver/dryer (3). Discard O-ring (8).
3. Remove two locknuts (11), washers (10), clamp (9), and receiver/dryer (3) from mounting bracket (16). Discard locknuts (11).
4. Remove two capscrews (12), washers (13), and mounting bracket (16) from body (14).

b. Inspection

Refer to para. 10-56 for plusnut (15) inspection and replacement.

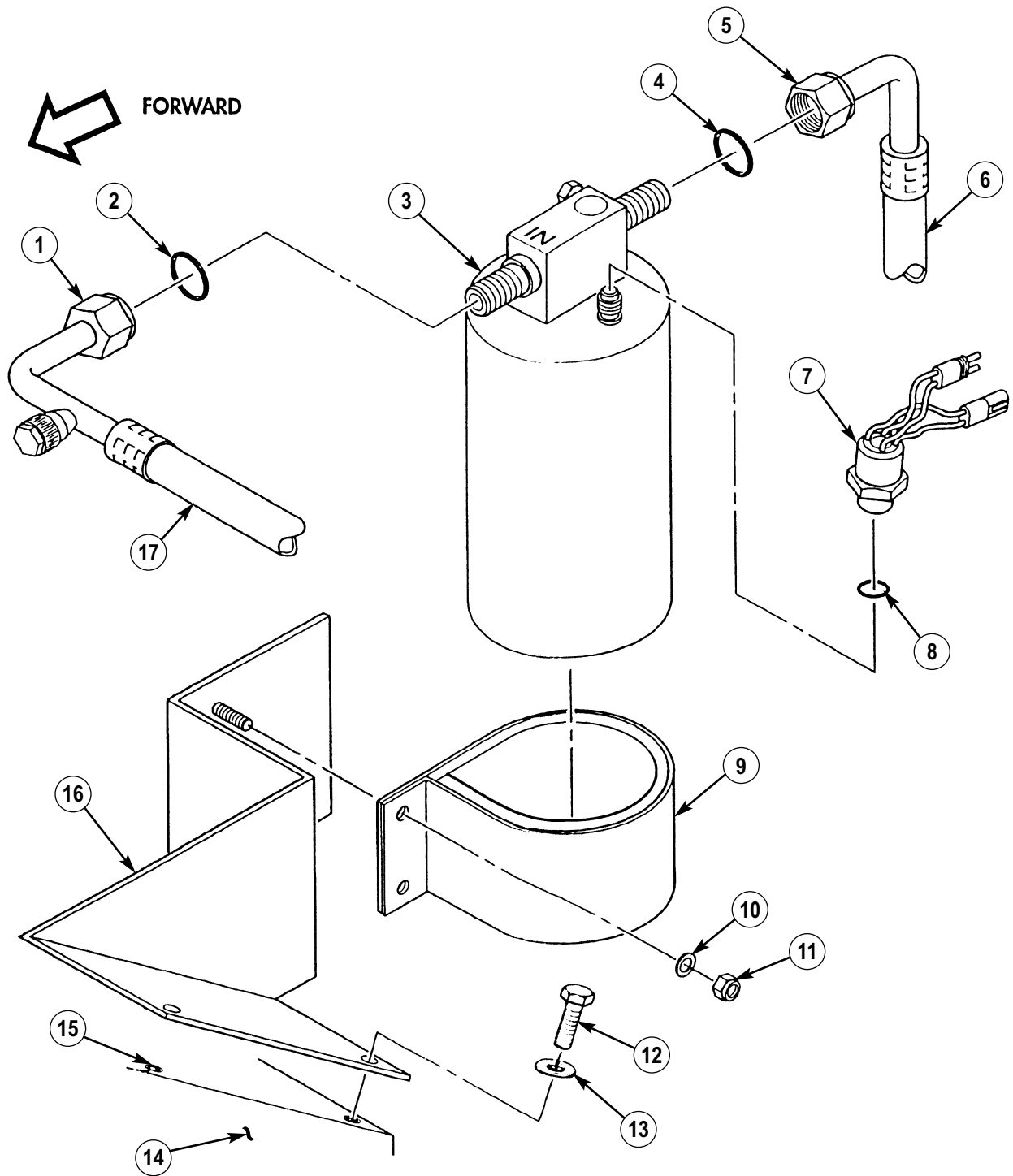
c. Installation

NOTE

When installing receiver/dryer, IN fitting must be toward front of vehicle.

1. Apply sealing compound to two capscrews (12), and install mounting bracket (16) on body (14) with two washers (13) and capscrews (12). Tighten capscrews (12) to 75 lb-in. (8 N·m).
2. Install receiver/dryer (3) and clamp (9) on mounting bracket (16) with two washers (10) and locknuts (11). Tighten locknuts (11) to 10 lb-ft. (14 N·m).
3. Apply refrigerant oil on O-rings (2) and (4), and install O-rings (2) and (4) and lines (17) and (6) on receiver/dryer (3) and tighten nuts (1) and (5) to 12 lb-ft (16 N·m).
4. Apply refrigerant oil on O-ring (8), and install O-ring (8) and trinary switch (7) on receiver/dryer (3).

25-16. A/C RECEIVER/DRYER (FRONT) MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Charge A/C system (para. 25-15).

25-17. A/C RECEIVER/DRYER (REAR) REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Two O-rings (Appendix G, Item 265)
 Refrigerant oil (Appendix C, Item 48)

Manual References

TM 9-2320-387-24P

Equipment Condition

- A/C system discharged (para. 25-15).
- Condenser fan access panel removed (para. 11-86).

Maintenance Level

Direct support

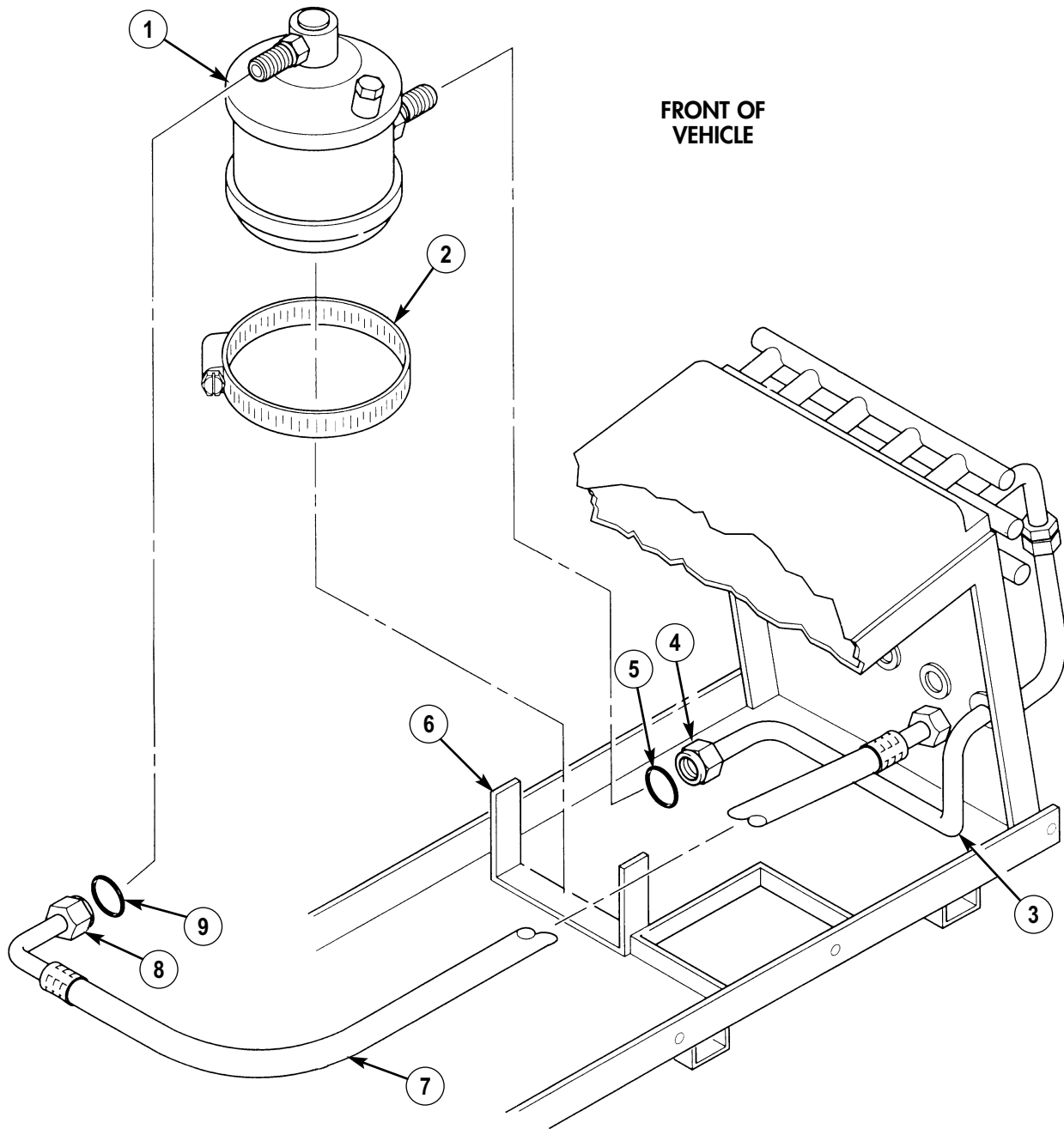
a. Removal

1. Loosen nut (8) and remove return line (7) and O-ring (9) from A/C receiver/dryer (1). Discard O-ring (9).
2. Loosen nut (4) and remove supply line (3) and O-ring (5) from A/C receiver/dryer (1). Discard O-ring (5).
3. Loosen clamp (2) and remove A/C receiver/dryer (1) from bracket (6).

b. Installation

1. Install A/C receiver/dryer (1) on bracket (6) with clamp (2). Do not tighten clamp (2).
2. Apply refrigerant oil to O-ring (5), and install O-ring (5) on supply line (3).
3. Install supply line (3) on A/C receiver/dryer (1) and tighten nut (4) to 12 lb-ft (16 N·m).
4. Apply refrigerant oil to O-ring (9), and install O-ring (9) on return line (7).
5. Install return line (7) on A/C receiver/dryer (1) and tighten nut (8) to 12 lb-ft (16 N·m).
6. Tighten clamp (2).

25-17. A/C RECEIVER/DRYER (REAR) REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Charge A/C system (para. 25-15).
 - Install condenser fan access panel (para. 11-86).

25-17.1. A/C RECEIVER/DRYER (REAR) LINES REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Three O-rings (Appendix G, Item 265)
 Refrigerant oil (Appendix C, Item 48)
 Rubber washer (Appendix G, Item 363.2)

Manual References

TM 9-2320-387-24P

Equipment Condition

- A/C system discharged (para. 25-15).
- A/C condenser removed (para. 25-18).

Maintenance Level

Direct support

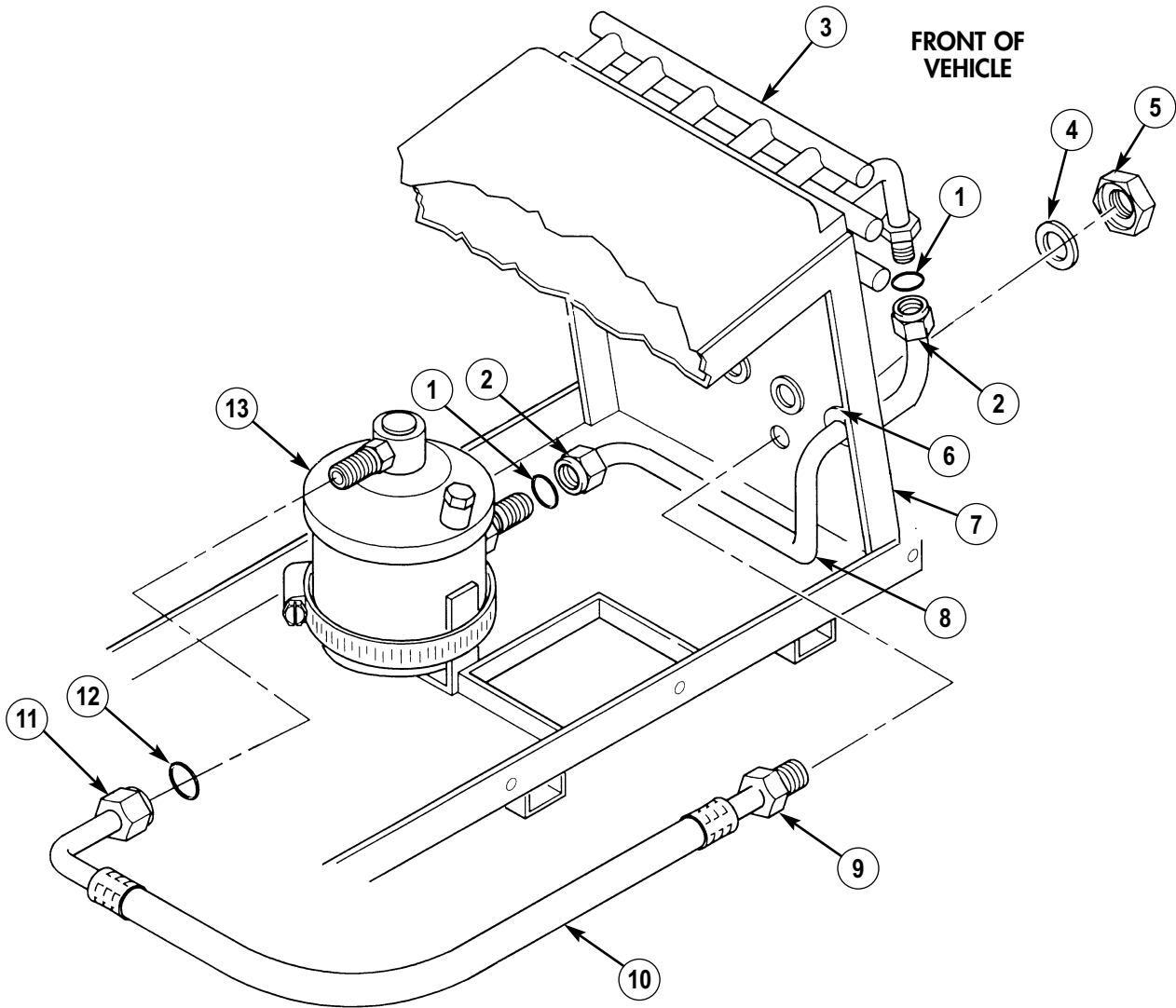
a. Removal

1. Loosen bulkhead fitting (9) and remove nut (5) and rubber washer (4) from forward end of return line (10). Discard rubber washer (4).
2. Loosen nut (11) and remove return line (10) and O-ring (12) from A/C receiver/dryer (13). Discard O-ring (12).
3. Loosen two nuts (2) and remove supply line (8) and two O-rings (1) from A/C receiver/dryer (13) and A/C condenser (3). Discard O-rings (1).
4. Remove supply line (8) and grommet (6) from A/C condenser bracket (7).

b. Installation

1. Apply refrigerant oil to two O-rings (1), and install O-rings (1) on supply line (8).
2. Position supply line (8) and grommet (6) through A/C condenser bracket (7).
3. Install supply line (8) on A/C condenser (3) and A/C receiver/dryer (13) and tighten nuts (2) to 12 lb-ft (16 N·m).
4. Install return line bulkhead fitting (9) through A/C condenser bracket (7) and secure with rubber washer (4) and nut (5).
5. Apply refrigerant oil to O-ring (12), and install O-ring (12) on return line (10).
6. Install return line (10) on A/C receiver dryer (13) and tighten nut (11) to 12 lb-ft (16 N·m).

25-17.1. A/C RECEIVER/DRYER (REAR) LINES REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install A/C condenser (para. 25-18).
 - Charge A/C system (para. 25-15).

25-18. A/C CONDENSER MAINTENANCE

This task covers:

- a. Removal
 - a.1. Inspection

- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Two O-rings (Appendix G, Item 265)
 Refrigerant oil (Appendix C, Item 48)
 Sealing compound (Appendix C, Item 63)
 Tiedown straps (As required)
 (Appendix G, Item 463)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- A/C system discharged (para. 25-15).

Maintenance Level

Direct support

a. Removal

1. Remove tiedown straps (1), as required, from A/C wiring harness (3) and condenser fan grille (2).
2. Disconnect two condenser fan connectors (4) from A/C wiring harness connectors (5).
3. Remove four capscrews (10) and washers (9) from wheelwell (8) and condenser tray (7).
4. Slide A/C condenser (6) off wheelwell (8) to access return line (13) and supply line (17) connectors.
5. Loosen nut (12) and remove return line (13) and O-ring (14) from bulkhead fitting (11). Discard O-ring (14).
6. Loosen nut (16) and remove supply line (17) and O-ring (15) from A/C condenser (6). Discard O-ring (15).
7. Remove A/C condenser (6) from wheelwell (8) and vehicle.

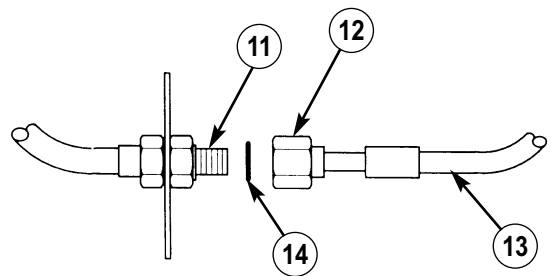
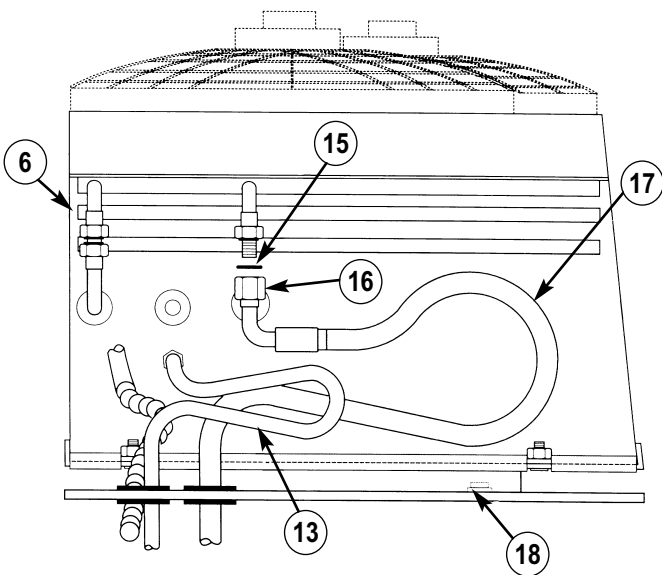
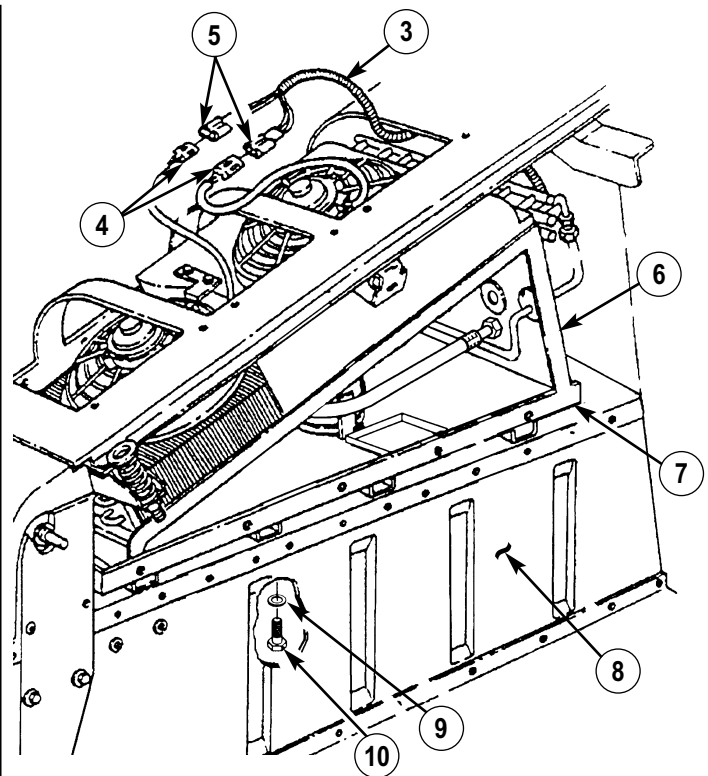
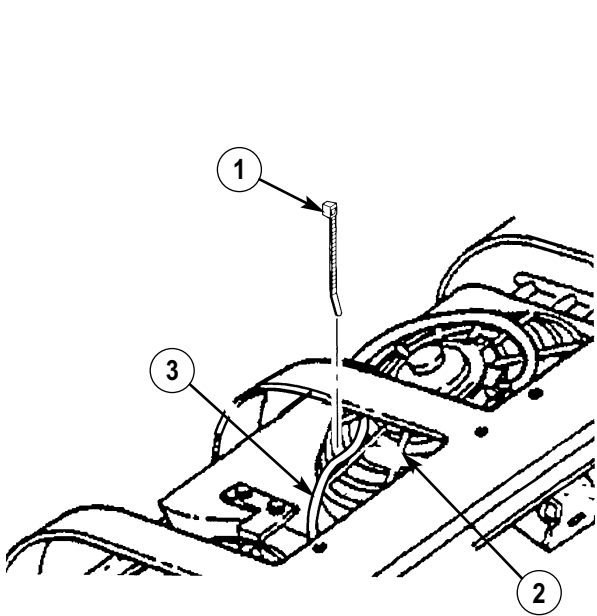
a.1. Inspection

Refer to para. 10-56 for plusnut (18) inspection and replacement.

b. Installation

1. Position A/C condenser (6) on wheelwell (8).
2. Apply refrigerant oil to O-ring (15), and install O-ring (15) on supply line (17).
3. Install supply line (17) on A/C condenser (6) and tighten nut (16) to 18 lb-ft (24 N·m).
4. Apply refrigerant oil to O-ring (14), and install O-ring (14) on return line (13).
5. Install return line (13) on bulkhead fitting (11) and tighten nut (12) to 12 lb-ft (16 N·m).
6. Apply sealing compound to threads of four capscrews (10).
7. Install A/C condenser (6) on wheelwell (8) and secure with four capscrews (10) and washers (9). Tighten capscrews (10) to 6 lb-ft (8 N·m).
8. Route A/C wiring harness (3) over front of A/C condenser (6) and connect two A/C wiring harness connectors (5) to condenser fan connectors (4).
9. Secure A/C wiring harness (3) to condenser fan grille (2) with tiedown straps (1), as required.

25-18. A/C CONDENSER MAINTENANCE (Cont'd)



FOLLOW-ON TASKS:

- Connect battery ground cables (para. 4-68).
- Charge A/C system (para. 25-15).

25-19. A/C CONDENSER FAN AND SHROUD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

A/C condenser removed (para. 25-18).

Maintenance Level

Direct support

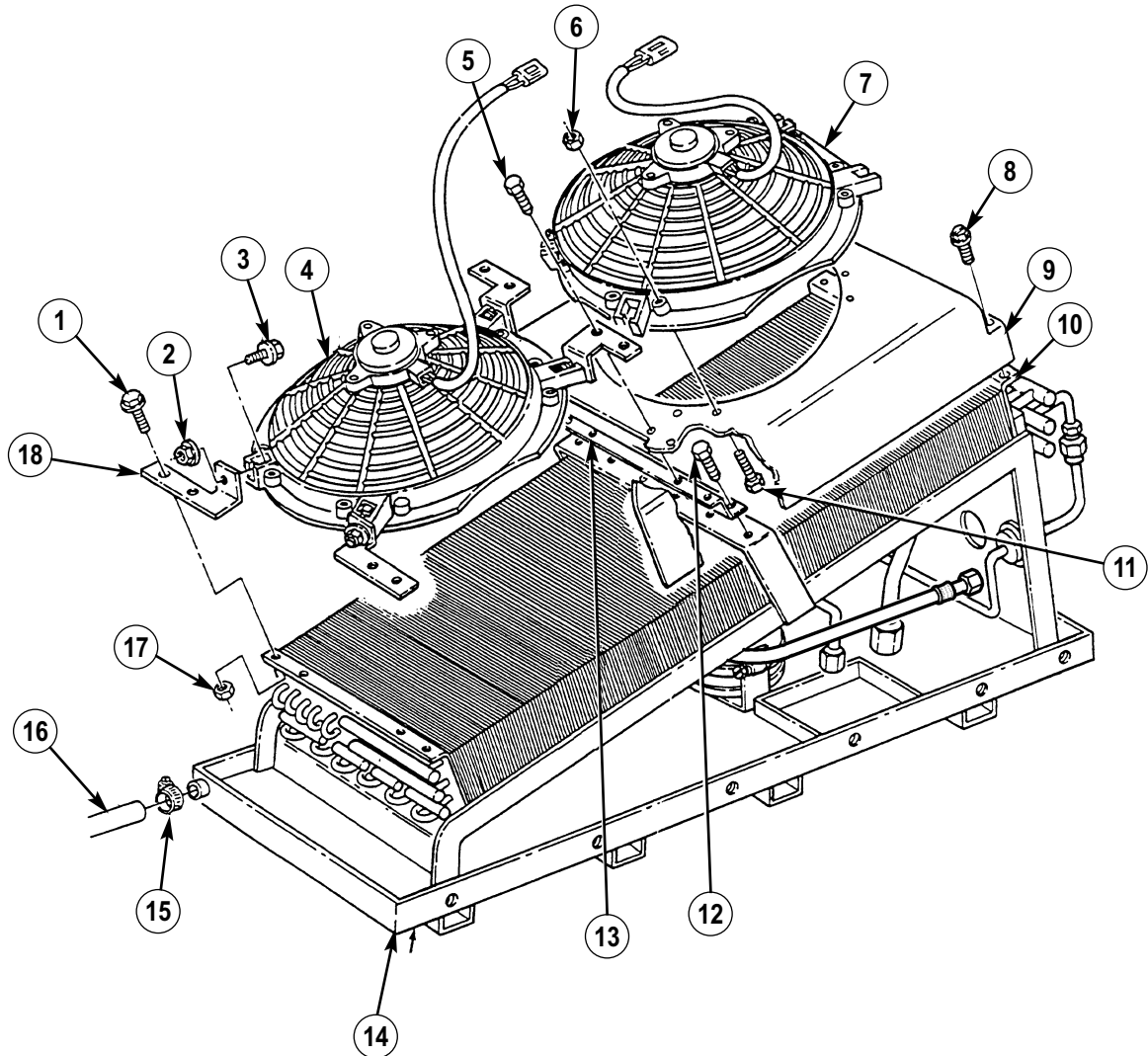
a. Removal

1. Remove five capscrews (8) from shroud (9) and A/C condenser (10).
2. Remove four nuts (17), capscrews (1), capscrews (5), and fan (4) from shroud (9) and A/C condenser (10).
3. Remove eight nuts (6), capscrews (11), and fan (7) from shroud (9).
4. Remove four nuts (2), capscrews (3), and brackets (18) from fan (4).
5. Remove six capscrews (12) and bracket (13) from A/C condenser (10).
6. Loosen clamp (15) and remove drain hose (16) from condenser tray (14).

b. Installation

1. Install bracket (13) on A/C condenser (10) with six capscrews (12).
2. Install four brackets (18) on fan (4) with four capscrews (3) and nuts (2).
3. Install fan (7) on shroud (9) with eight capscrews (11) and nuts (6).
4. Install fan (4) on shroud (9) with four capscrews (5).
5. Secure fan (4) to A/C condenser (10) with four capscrews (1) and nuts (17).
6. Install shroud (9) on A/C condenser (10) with five screws (8).
7. Install drain hose (16) on condenser tray (14) and tighten clamp (15).

25-19. A/C CONDENSER FAN AND SHROUD REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install A/C condenser (para. 25-18).

25-20. A/C COMPRESSOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Seal washer (Appendix G, Item 423.1)
Seal washer (Appendix G, Item 423.2)
Three lockwashers (Appendix G, Item 198)
Lockwasher (Appendix G, Item 239)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Serpentine belt removed (para. 3-81).
- Air horn-to-air cleaner elbow removed (para. 3-15).
- A/C system discharged (para. 25-15).

Maintenance Level

Direct support

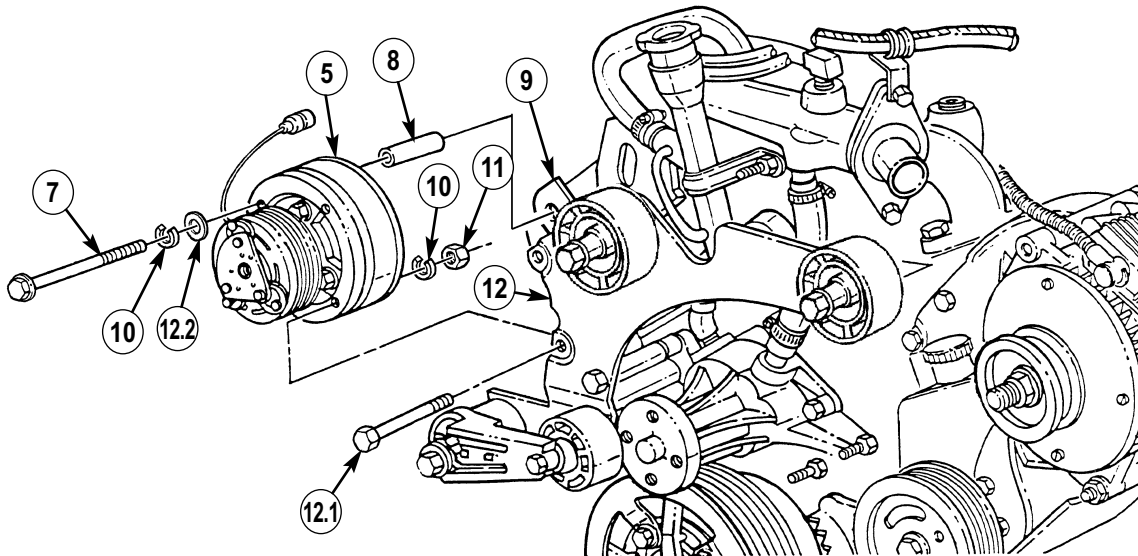
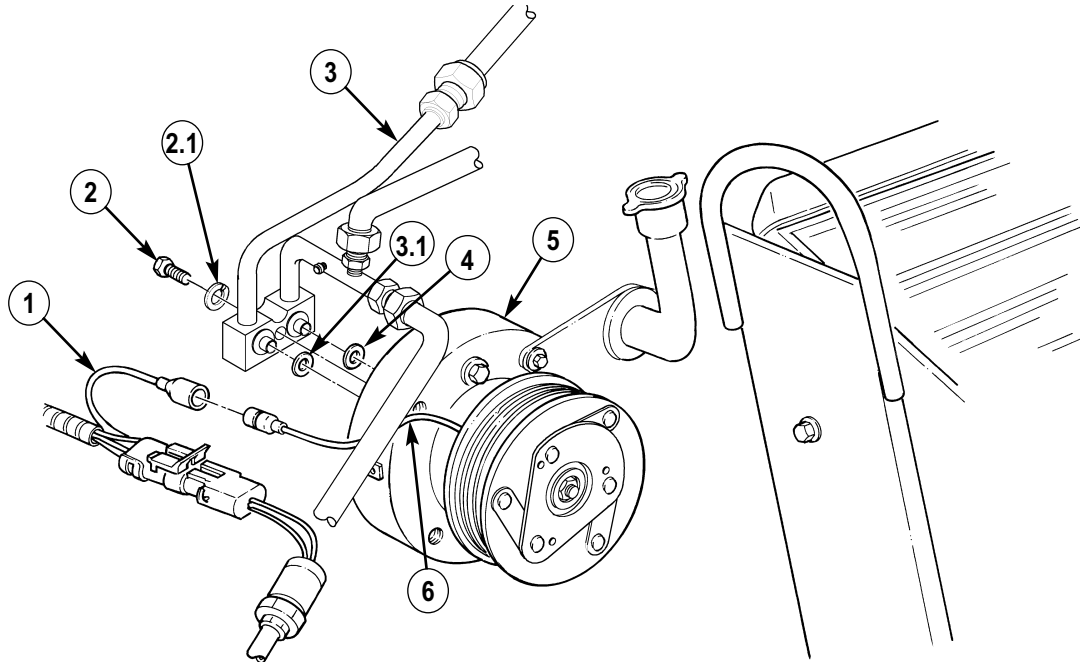
a. Removal

1. Disconnect body wiring harness lead (1) from A/C compressor lead (6).
2. Remove screw (7), lockwasher (10), washer (12.2), and spacer (8) from A/C compressor (5). Discard lockwasher (10).
3. Remove capscrew (2), lockwasher (2.1), compressor manifold (3), and seal washers (4) and (3.1) from A/C compressor (5). Discard lockwasher (2.1), seal washers (4) and (3.1).
4. Remove two nuts (11), lockwashers (10), capscrews (12.1), and A/C compressor (5) from bracket (9) and idler bracket (12). Discard lockwashers (10).

b. Installation

1. Install A/C compressor (5) on bracket (9) and idler bracket (12) with two capscrews (12.1), lockwashers (10), and nuts (11). Do not tighten nuts (11).
2. Install seal washers (4) and (3.1) on compressor manifold (3).
3. Install compressor manifold (3) on A/C compressor (5) with lockwasher (2.1) and capscrew (2).
4. Install spacer (8) between A/C compressor (5) and bracket (9) with lockwasher (10), washer (12.2), and capscrew (7).
5. Connect body wiring harness lead (1) to A/C compressor lead (6).
6. Tighten nuts (11).

25-20. A/C COMPRESSOR REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Install serpentine belt (para. 3-81).
 - Charge A/C system (para. 25-15).
 - Install air horn-to-air cleaner elbow (para. 3-15).

25-20.1. A/C COMPRESSOR MANIFOLD REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Lockwasher (Appendix G, Item 239)
 Three O-rings (Appendix G, Item 265)
 Refrigerant oil (Appendix C, Item 48)
 Seal washer (Appendix G, Item 423.1)
 Seal washer (Appendix G, Item 423.2)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- A/C system discharged (para. 25-15).
- Air horn-to-air cleaner elbow removed (para. 3-15).

Maintenance Level

Direct support

NOTE

Use a wrench to hold the A/C compressor manifold nut stationary while loosening the A/C hose fitting.

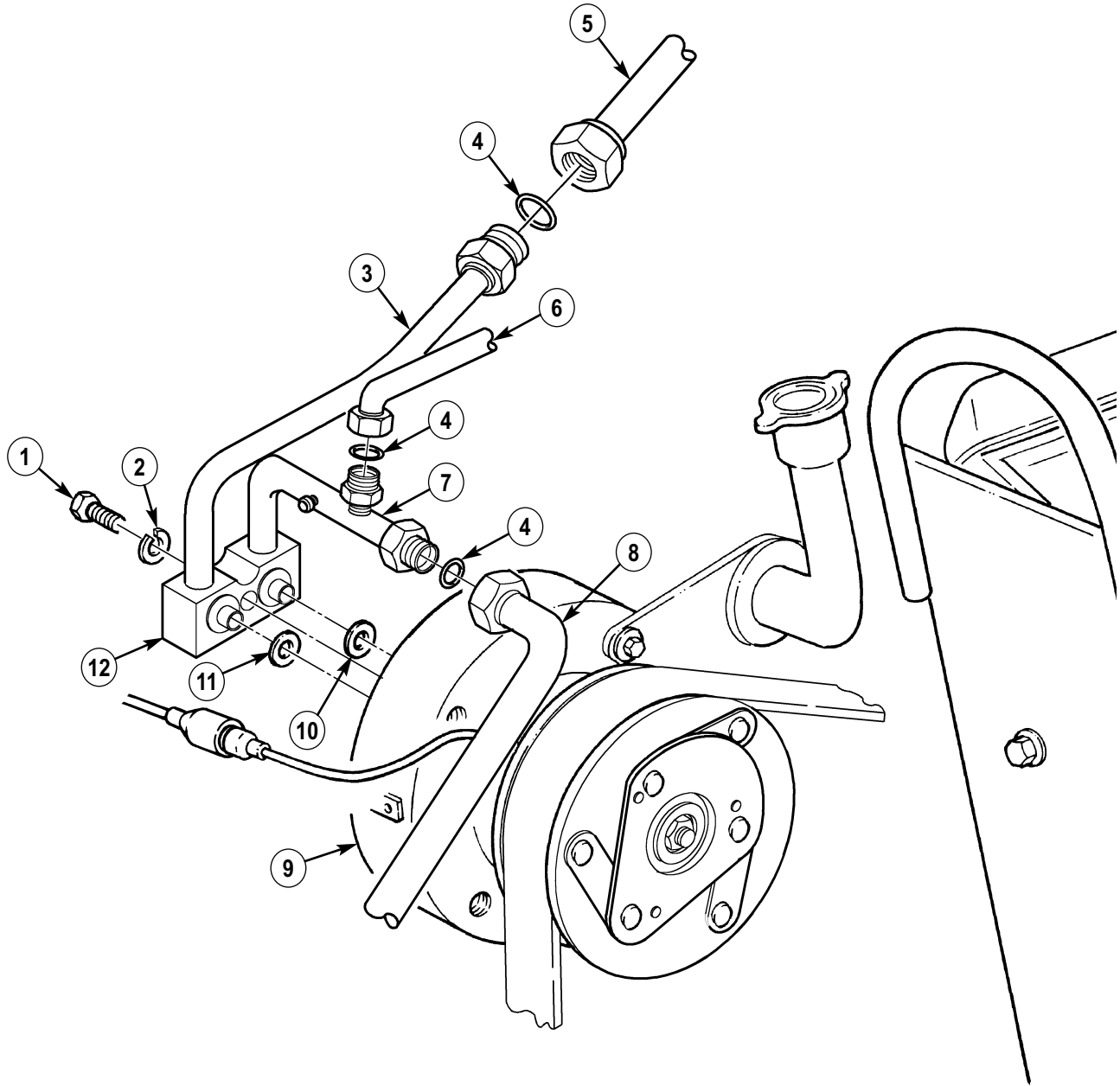
a. Removal

1. Disconnect high-pressure hose (5) from manifold tube (3).
2. Disconnect high-pressure hose (6) from manifold tube (7).
3. Disconnect high-pressure hose (8) from manifold tube (7).
4. Remove three O-rings (4) from manifold tubes (3) and (7). Discard O-rings (4).
5. Remove capscrew (1), lockwasher (2), A/C manifold (12), and seal washers (11) and (10) from A/C compressor (9). Discard lockwasher (2) and seal washers (10) and (11).

b. Installation

1. Install seal washer (10) and seal washer (11) on A/C manifold (12).
2. Install A/C manifold (12) on A/C compressor (9) with lockwasher (2) and capscrew (1). Tighten capscrew (1) to 18 lb-ft (24.4 N·m).
3. Apply refrigerant oil to O-ring (4), and install on high-pressure hose (5).
4. Connect high-pressure hose (5) to manifold tube (3).
5. Apply refrigerant oil to O-ring (4), and install on high-pressure hose (6).
6. Connect high-pressure hose (6) to manifold tube (7).
7. Apply refrigerant oil to O-ring (4), and install on high-pressure hose (8).
8. Connect high-pressure hose (8) to manifold tube (7).

25-20.1. A/C COMPRESSOR MANIFOLD REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Connect battery ground cables (para. 4-68).
 - Charge A/C system (para. 25-15).
 - Install air horn-to-air cleaner elbow (para. 3-15).

25-21. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Lockwasher (Appendix G, Item 199)

Personnel Required

One mechanic
One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

- Air cleaner removed (para 3-12).
- Air distribution duct removed (para. 11-81).
- A/C system discharged (para. 25-15).
- Cooling system drained (para. 3-61).

Maintenance Level

Direct support

a. Removal

NOTE

Prior to removal, tag leads for installation.

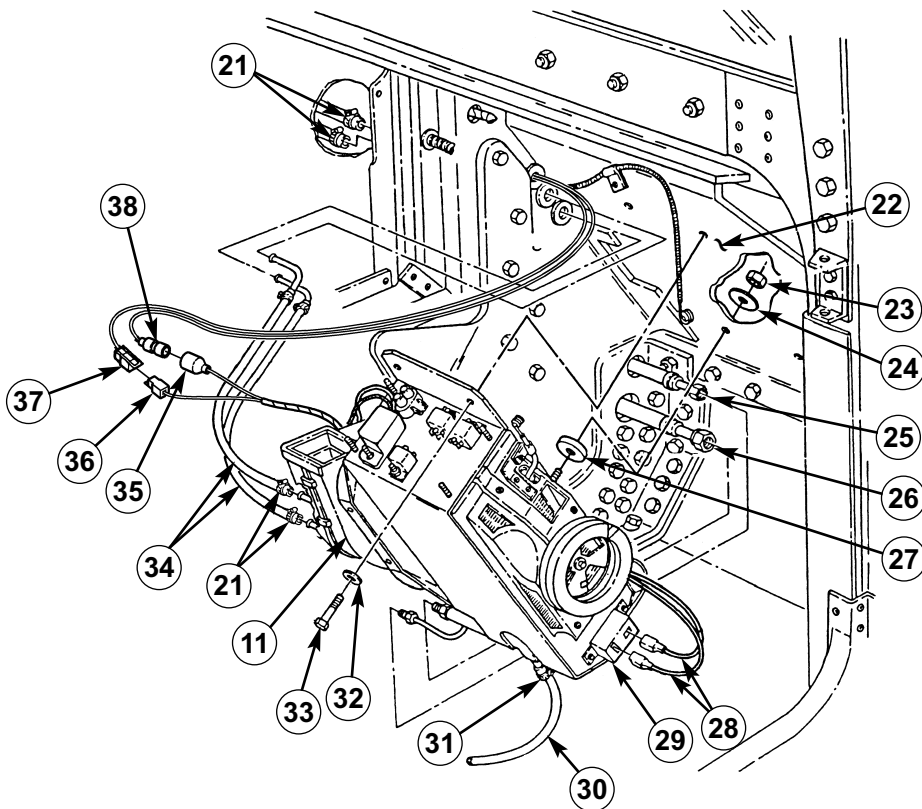
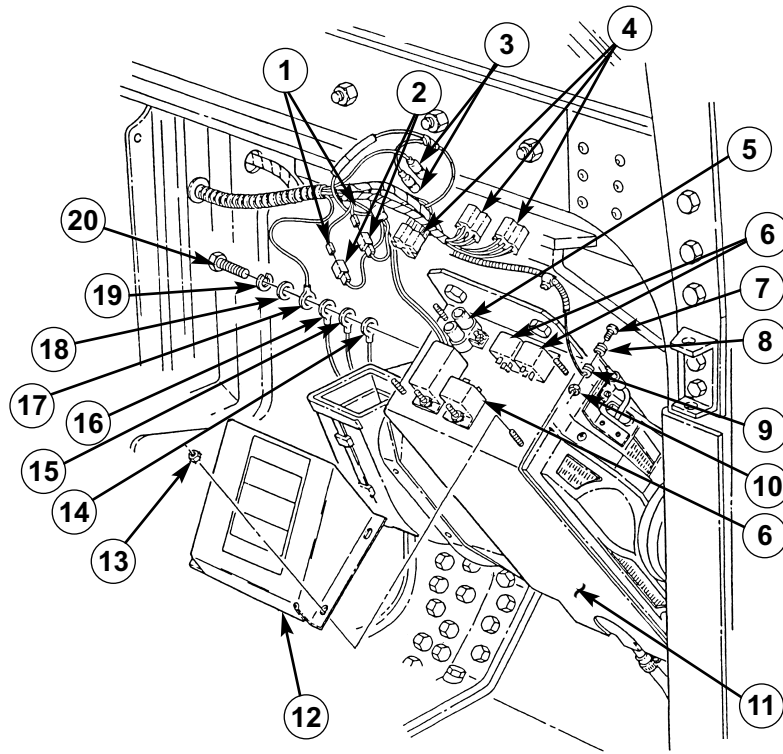
1. Remove four nuts (13) and cover (12) from heater/evaporator assembly (11).
2. Disconnect three relay connectors (4) from relays (6).
3. Remove screw (20), lockwasher (19), washer (18), vehicle ground lead (17), A/C ground lead (16), A/C control module ground lead (15), and blower motor ground lead (14) from side of heater/evaporator assembly (11). Discard lockwasher (19).
4. Disconnect two leads (3) from circuit breaker (5).
5. Disconnect two A/C control module leads (1) from A/C wiring harness leads (2).
6. Remove nut (10), screw (7), and air vent control cable (9) from cable (8).
7. Remove two harness leads (28) from heater/evaporator thermostat (29).

NOTE

Use a container to catch antifreeze solution.

8. Loosen four clamps (21) and disconnect heater hoses (34) from body (22) and heater/evaporator assembly (11).
9. Disconnect low-pressure tube (26) from heater/evaporator assembly (11).
10. Disconnect high-pressure tube (25) from heater/evaporator assembly (11).
11. Loosen clamp (31) and remove drain hose (30) from heater/evaporator assembly (11).
12. Remove two capscrews (33) and washers (32) from heater/evaporator assembly (11).
13. Remove two nuts (23), washers (24), and spacers (27) from heater/evaporator assembly (11).
14. Remove blower motor switch connector (35) from A/C wiring harness connector (38) and blower motor fan connector (36) from vehicle wiring harness connector (37).
15. Remove heater/evaporator assembly (11) from body (22).

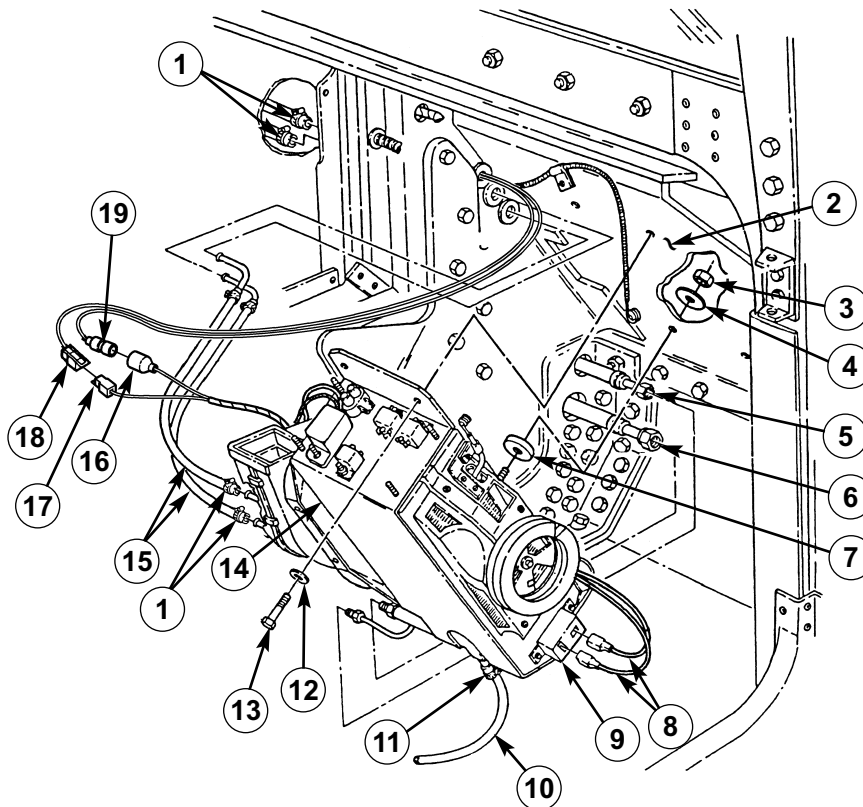
25-21. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) REPLACEMENT (Cont'd)



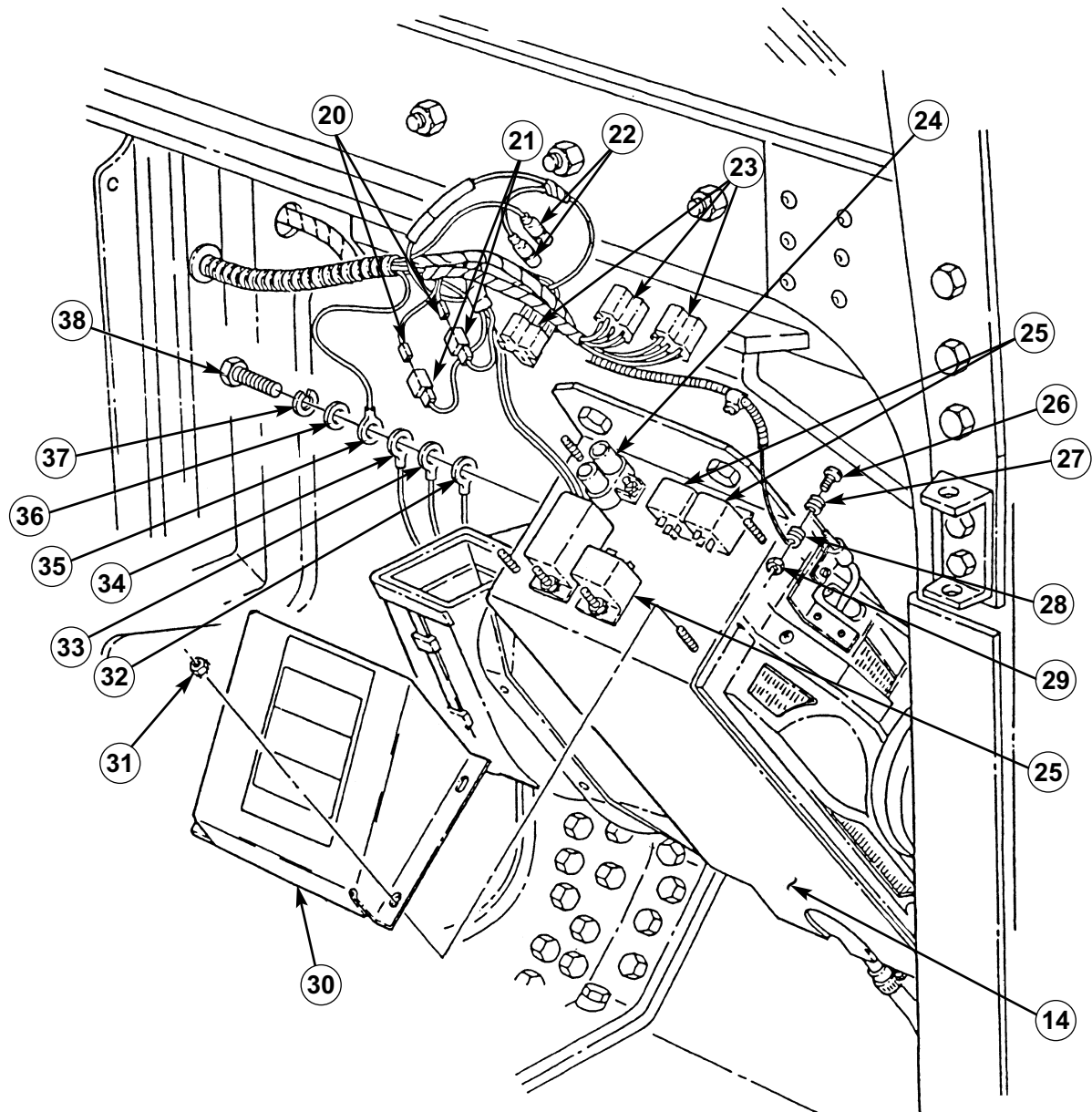
25-21. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) REPLACEMENT (Cont'd)

b. Installation

1. Install heater/evaporator assembly (14) on body (2) with two spacers (7), washers (4), and nuts (3).
2. Install two washers (12) and capscrews (13) on heater/evaporator assembly (14) and body (2).
3. Install blower motor switch connector (17) to A/C wiring harness connector (18) and blower motor fan connector (16) to vehicle wiring harness connector (19).
4. Install drain hose (10) on heater/evaporator assembly (14) and tighten clamp (11).
5. Connect high-pressure tube (5) to heater/evaporator assembly (14).
6. Connect low-pressure tube (6) to heater/evaporator assembly (14).
7. Connect two heater hoses (15) to heater/evaporator assembly (14) and body (2) and tighten four clamps (1).
8. Connect two harness leads (8) to heater/evaporator assembly thermostat (9).
9. Connect air vent control cable (28) to cable (27) with screw (26) and nut (29).
10. Connect two A/C control module leads (20) to A/C wiring harness leads (21).
11. Connect two leads (22) to circuit breaker (24).
12. Install blower motor ground lead (32), A/C control module ground lead (33), A/C ground lead (34), and vehicle ground lead (35) to side of heater/evaporator assembly (14) with washer (36), lockwasher (37), and screw (38).
13. Connect three relay connectors (23) to relays (25).
14. Install cover (30) on heater/evaporator assembly (14) with four nuts (31).



25-21. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Fill cooling system (para. 3-61).
 - Charge A/C system (para. 25-15).
 - Install air distribution duct (para. 11-81).
 - Install air cleaner (para. 3-12).

25-22. A/C EVAPORATOR ASSEMBLY (REAR) MAINTENANCE

This task covers:

- a. Removal
a.1. Inspection

- b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)
Automotive maintenance and repair: field
maintenance, basic (Appendix B, Item 6)

Materials/Parts

Two O-rings (Appendix G, Item 265)
Refrigerant oil (Appendix C, Item 48)
Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Battery ground cables disconnected (para. 4-68).
- Cargo door opened (TM 9-2320-387-10).
- A/C system purged (para. 25-15).
- Left passenger seat removed (para. 10-45).

Maintenance Level

Direct support

a. Removal

1. Disconnect A/C wiring harness connector (14) from evaporator connector (10).
2. Loosen nut (12) and remove rear suction tube (18) and O-ring (13) from evaporator connector (11). Discard O-ring (13).
3. Loosen nut (16) and remove rear liquid tube (17) and O-ring (15) from evaporator connector (7). Discard O-ring (15).
4. Remove four capscrews (5), washers (4), and evaporator (1) from brackets (2) and (3).
5. Loosen clamp (9) and remove drain hose (8) from evaporator (1).

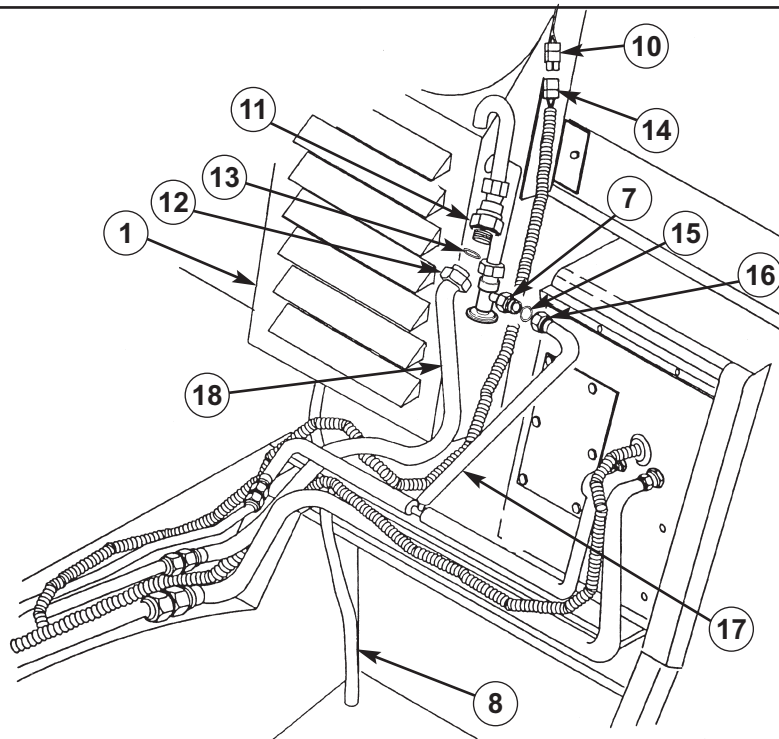
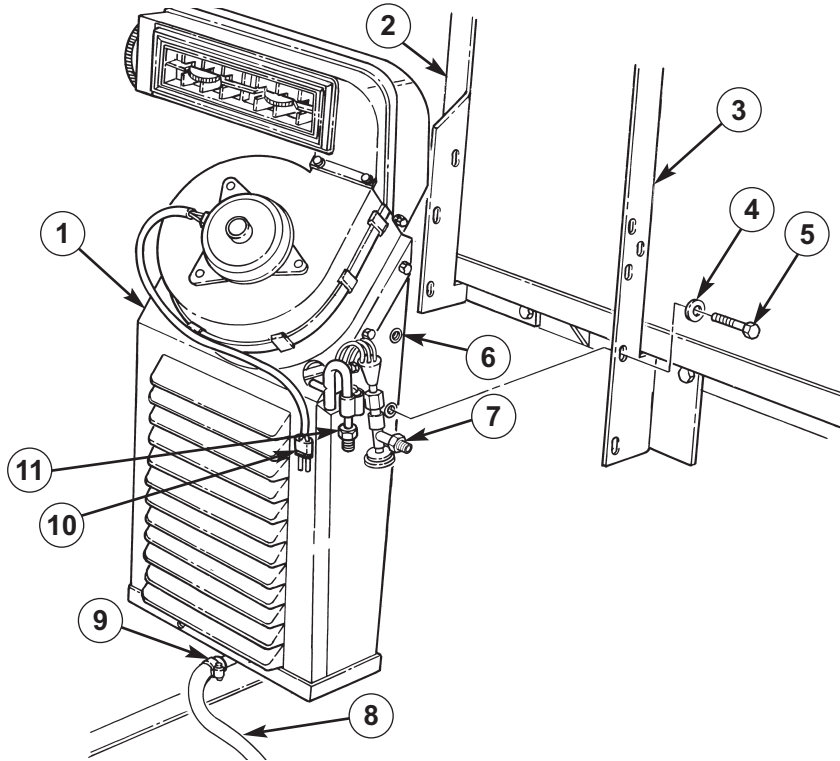
a.1. Inspection

Refer to para. 10-56 for plusnut (6) inspection and replacement.

b. Installation

1. Install drain hose (8) on evaporator (1) and tighten clamp (9).
2. Apply sealing compound to threads of four capscrews (5), and install evaporator (1) on brackets (2) and (3) with four washers (4) and capscrews (5). Tighten capscrews (5) to 6 lb-ft (8 N·m).
3. Lubricate O-rings (13) and (15) with refrigerant oil.
4. Install O-ring (15) and rear liquid tube (17) on evaporator connector (7) and tighten nut (16) to 12 lb-ft (16 N·m).
5. Install O-ring (13) and rear suction tube (18) on evaporator connector (11) and tighten nut (12) to 24 lb-ft (32 N·m).
6. Connect A/C wiring harness connector (14) to evaporator connector (10).

25-22. A/C EVAPORATOR ASSEMBLY (REAR) MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Charge A/C system (para. 25-15).
 - Connect battery ground cables (para. 4-68).
 - Start vehicle, run A/C system, and check for leaks (TM 9-2320-387-10).
 - Close rear cargo door (TM 9-2320-387-10).
 - Install left passenger seat (para. 10-45).

25-23. A/C TRINARY SWITCH REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

O-ring (Appendix G, Item 265.1)
Refrigerant oil (Appendix C, Item 48)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

Direct support

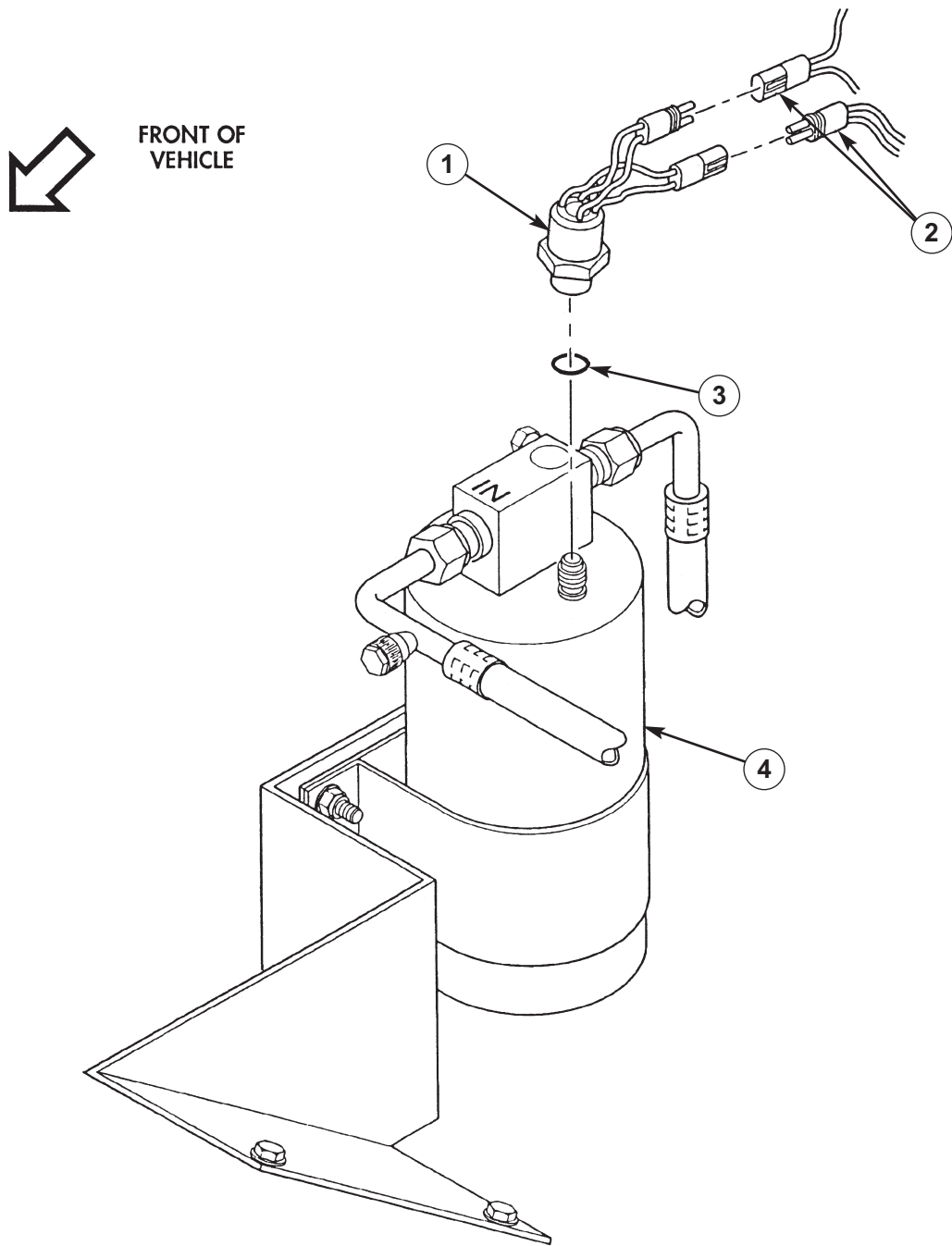
a. Removal

1. Disconnect two wiring harness connectors (2) from trinary switch (1).
2. Remove trinary switch (1) from receiver/dryer (4).
3. Remove O-ring (3) from trinary switch (1). Discard O-ring (3).

b. Installation

1. Lubricate O-ring (3) with refrigerant oil and install on trinary switch (1).
2. Install trinary switch (1) on receiver/dryer (4).
3. Connect two wiring harness connectors (2) to trinary switch (1).

25-23. A/C TRINARY SWITCH REPLACEMENT (Cont'd)



FOLLOW-ON TASKS: Connect battery ground cables (para. 4-68).

25-24. A/C THERMOSTAT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

A/C heater/evaporator assembly removed
(para. 25-21).

Maintenance Level

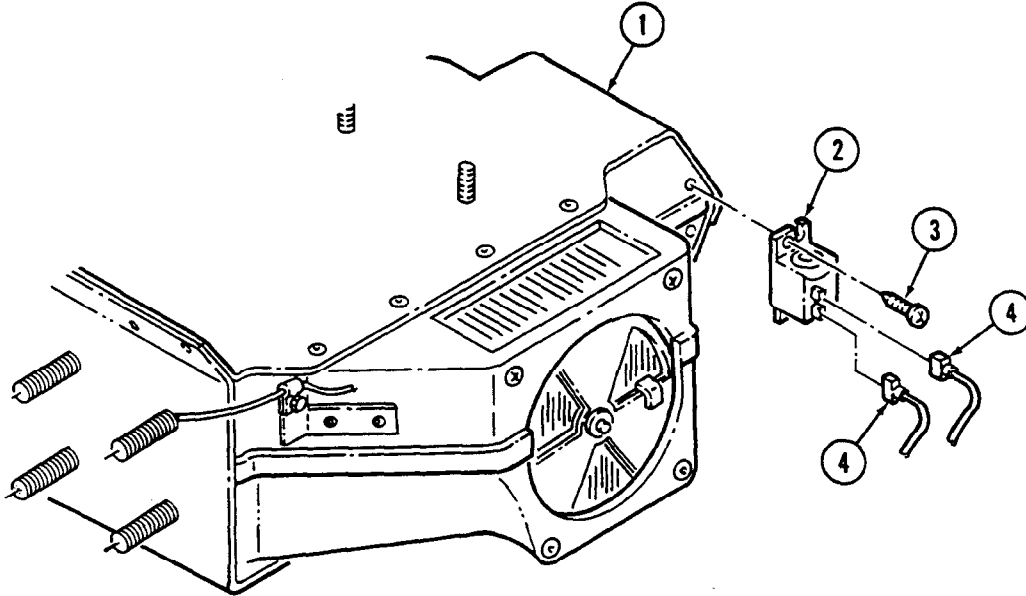
Direct support

a. Removal

1. Disconnect two thermostat wires (4) from thermostat (2).
2. Remove two screws (3) and thermostat (2) from heater/evaporator assembly (1).

b. Installation

1. Install thermostat (2) on heater/evaporator assembly (1) with two screws (3).
2. Connect two thermostat wires (4) to thermostat (2).



FOLLOW-ON TASK: Install A/C heater/evaporator assembly (para. 25-21).

25-25. A/C BLOWER MOTOR REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

A/C heater/evaporator assembly removed
(para. 25-21).

Maintenance Level

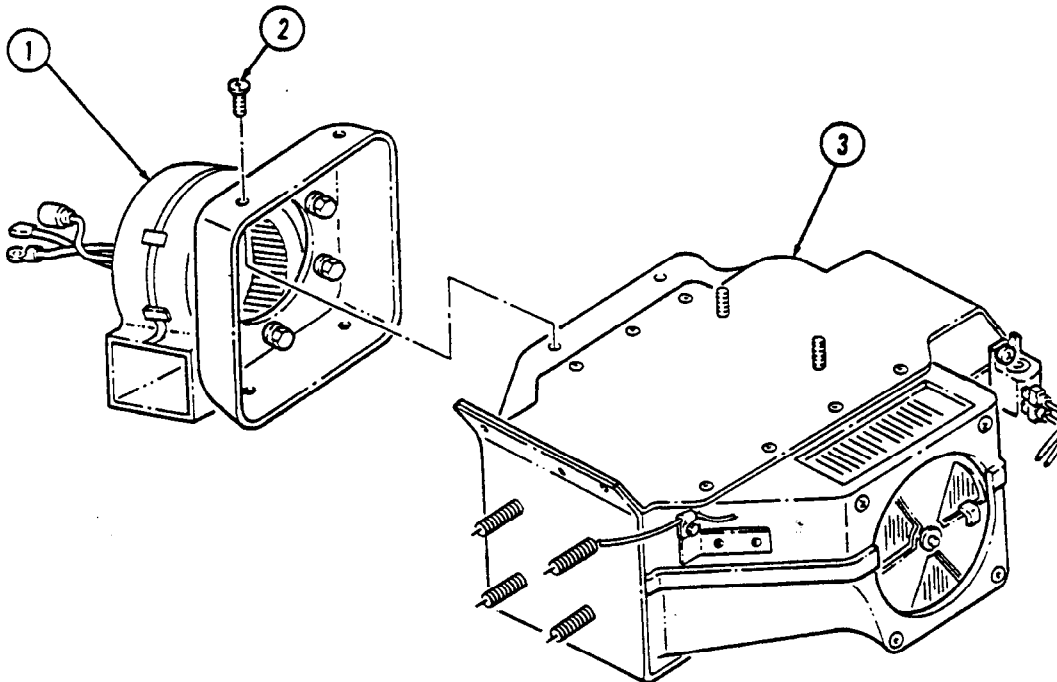
Direct support

a. Removal

Remove four screws (2) and blower assembly (1) from heater/evaporator assembly (3).

b. Installation

Install blower assembly (1) on heater/evaporator assembly (3) with four screws (2).



FOLLOW-ON TASK: Install A/C heater/evaporator assembly (para. 25-21).

25-26. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)

Materials/Parts

Three O-rings (Appendix G, Item 267)
 Ten rivets (Appendix G, Item 355)
 RTV sealant (Appendix C, Item 74)
 Refrigerant oil (Appendix C, Item 48)

Manual References

TM 9-2320-387-24P

Equipment Condition

- A/C thermostat removed (para. 25-24).
- A/C blower motor removed (para. 25-25).

General Safety Instructions

Heater core and evaporator fins are sharp and bend easily.

Maintenance Level

Direct support

a. Disassembly

WARNING

Heater core and evaporator fins are sharp and bend easily. Use care when handling to avoid injury to personnel or damage to equipment.

NOTE

For instructions on replacement of rivets, refer to para. 10-56.

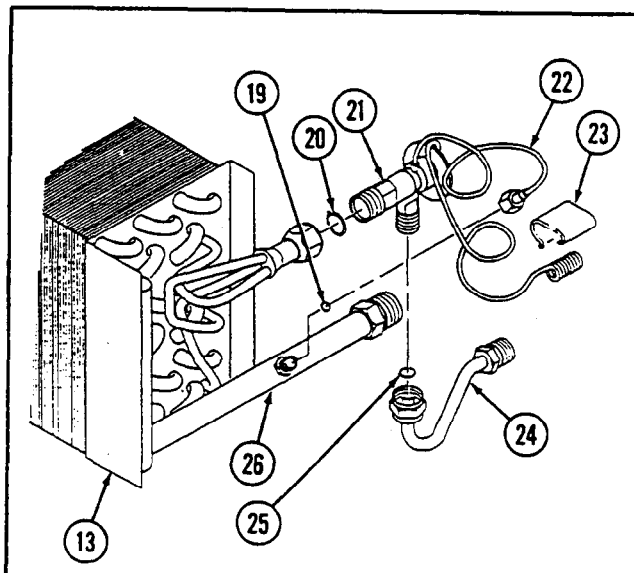
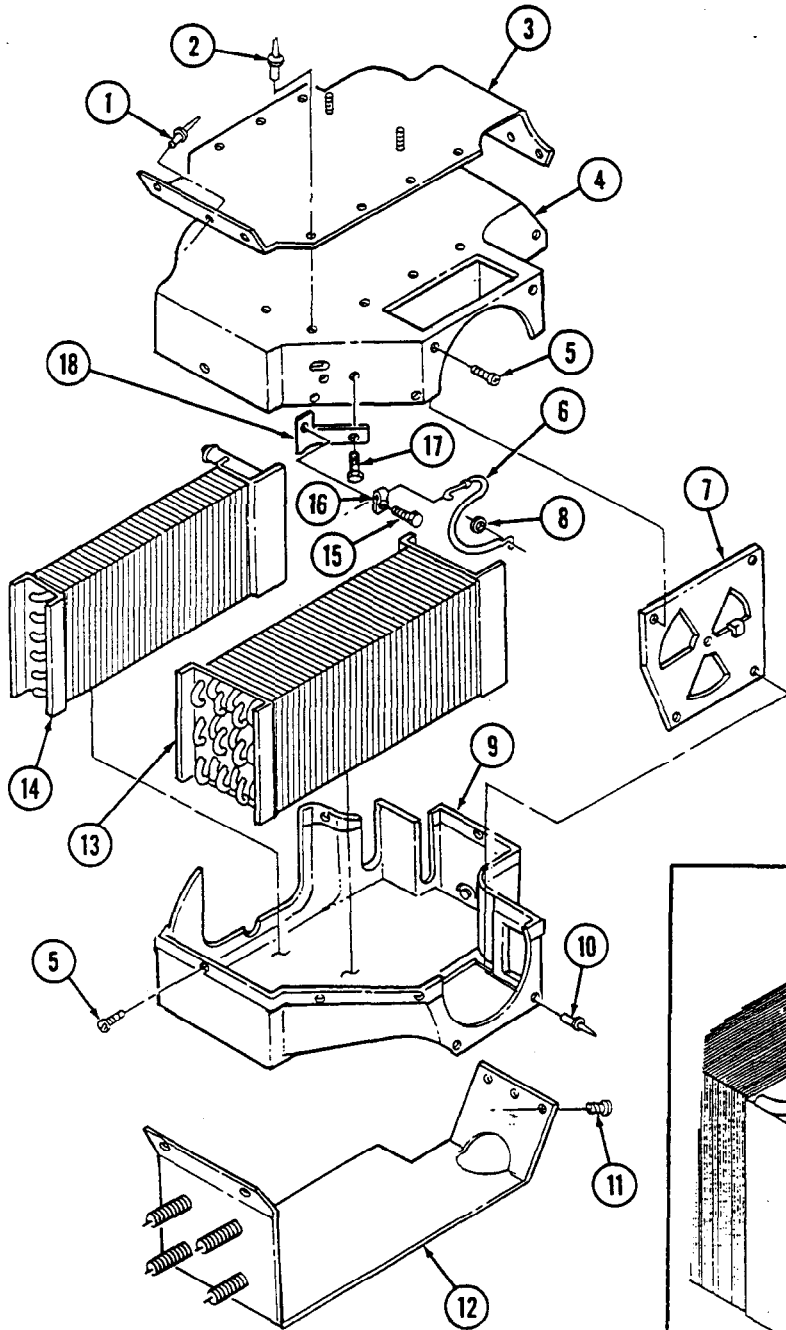
1. Remove three screws (11) and rivet (1) from top mounting bracket (3) and bottom mounting bracket (12).
2. Remove bottom mounting bracket (12) from top mounting bracket (3).
3. Remove seven rivets (2) from top mounting bracket (3) and top case (4) and remove top mounting bracket (3) from case (4).
4. Remove screw (15) and clamp (16) from cable (6) and top case (4).
5. Cut sealant at joint of top case (4) and bottom case (9).
6. Remove ten screws (5) from top case (4) and bottom case (9).
7. Remove sealant from heater core (14) and low-pressure outlet tube (26).
8. Remove top case (4) from bottom case (9). Remove sealant from case joint.
9. Remove heater core (14) from bottom case (9).
10. Remove evaporator (13) from bottom case (9).
11. Remove tube (24) from valve (21).
12. Remove O-ring (25) from tube (24). Discard O-ring (25).
13. Remove bulb clamp (23) from low-pressure outlet tube (26).
14. Disconnect pressure sensor tube (22) from low-pressure outlet tube (26).
15. Remove O-ring (19) from pressure sensor tube (22). Discard O-ring (19).
16. Remove valve (21) and O-ring (20) from evaporator (13). Discard O-ring (20).
17. Remove detent washer (8) and cable (6) from control plate (7).

25-26. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) MAINTENANCE (Cont'd)

NOTE

Two screws may be installed in place of two rivets.

- 18. Remove two rivets (10) and control plate (7) from bottom case (9).
- 19. Remove two capscrews (17) and cable bracket (18) from top case (4).



25-26. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) MAINTENANCE (Cont'd)

b. Assembly

1. Install cable bracket (18) on top case (4) with two capscrews (17).

NOTE

Two screws may be installed in place of two rivets.

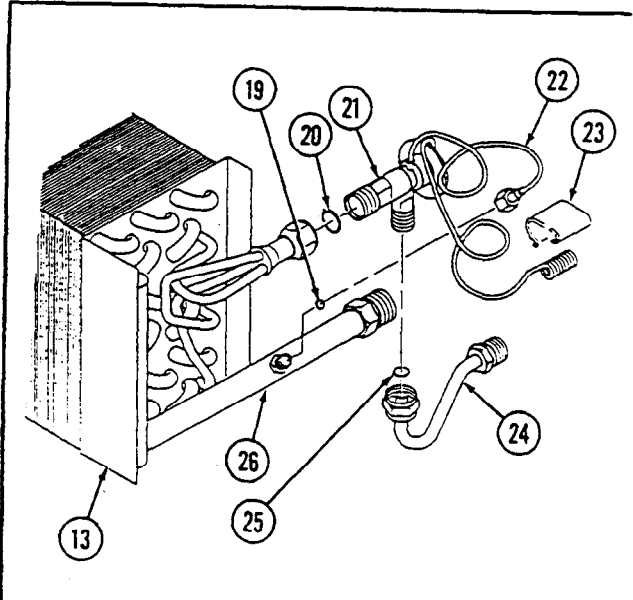
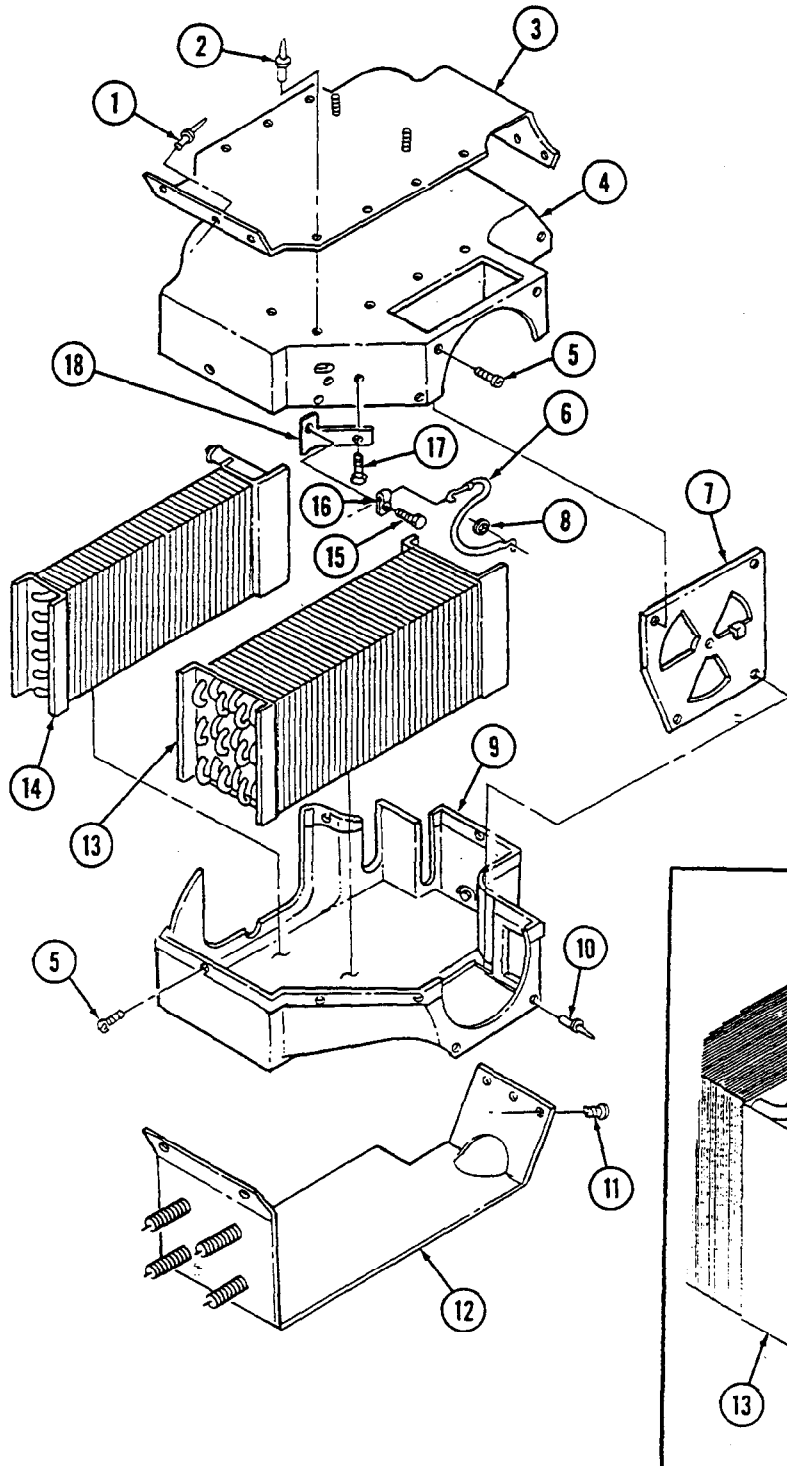
2. Install control plate (7) on bottom case (9) with two rivets (10).
3. Install cable (6) on control plate (7) with detent washer (8).
4. Lubricate O-ring (20) with refrigerant oil and install O-ring (20) and valve (21) on evaporator (13).
5. Lubricate O-ring (19) with refrigerant oil and install on low-pressure outlet tube (26).
6. Connect pressure sensor tube (22) to low-pressure outlet tube (26).
7. Install bulb clamp (23) on low-pressure outlet tube (26) and pressure sensor tube (22).
8. Lubricate O-ring (25) with refrigerant oil and install on tube (24).
9. Install tube (24) on valve (21).

WARNING

Heater core and evaporator fins are sharp and bend easily. Use care when handling to avoid injury to personnel or damage to equipment.

10. Install evaporator (13) on bottom case (9).
11. Install heater core (14) on bottom case (9).
12. Install top case (4) on bottom case (9) with ten screws (5).
13. Apply sealant to top and bottom of case joint.
14. Install cable (6) on cable bracket (18) with clamp (16) and screw (15).
15. Install top mounting bracket (3) on top case (4) with seven rivets (2).
16. Install bottom mounting bracket (12) on top mounting bracket (3) with rivet (1) and three screws (11).
17. Install sealant around heater core (14) and low-pressure outlet tube (26).

25-26. A/C HEATER/EVAPORATOR ASSEMBLY (FRONT) MAINTENANCE (Cont'd)



FOLLOW-ON TASKS: • Install A/C blower motor (para. 25-25).
 • Install A/C thermostat (para. 25-24).

25-27. A/C EVAPORATOR ASSEMBLY (REAR) MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

A/C evaporator assembly (rear) removed
(para. 25-22).

Maintenance Level

Direct support

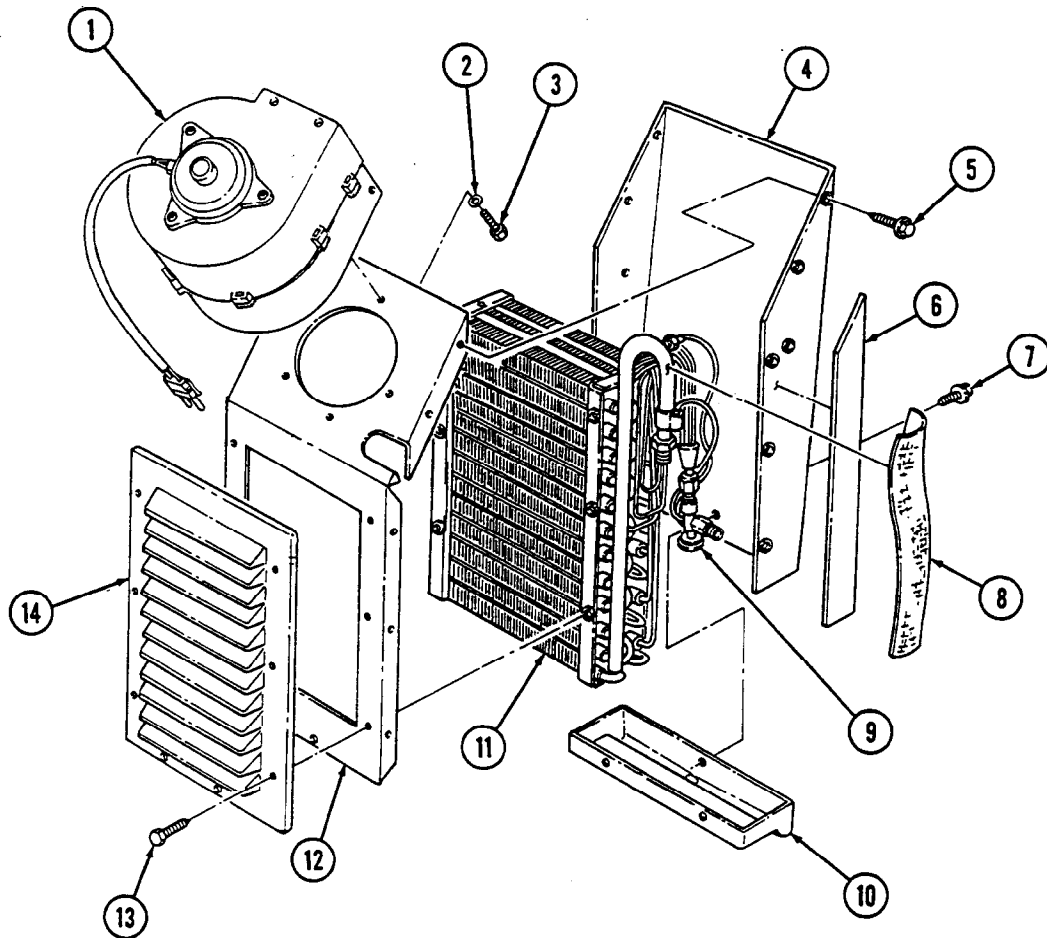
a. Disassembly

1. Remove three screws (7) and drain pan (10) from A/C evaporator (11).
2. Remove insulation packing (8) from thermostat (9).
3. Remove insulation (6) from rear A/C evaporator cover (4).
4. Remove ten screws (5) and rear A/C evaporator cover (4) from front A/C evaporator cover (12).
5. Remove six screws (13), grille (14), and front A/C evaporator cover (12) from A/C evaporator (11).
6. Remove four screws (3), washers (2), and fan assembly (1) from front A/C evaporator cover (12).

b. Assembly

1. Install fan assembly (1) on front A/C evaporator cover (12) with four washers (2) and screws (3).
2. Install grille (14) and front A/C evaporator cover (12) on A/C evaporator (11) with six screws (13).
3. Install rear A/C evaporator cover (4) on front A/C evaporator cover (12) with ten screws (5).
4. Install insulation (6) on rear A/C evaporator cover (4).
5. Install insulation packing (8) on thermostat (9).
6. Install drain pan (10) on evaporator (11) with three screws (7).

25-27. A/C EVAPORATOR ASSEMBLY (REAR) MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install A/C evaporator assembly (rear) (para. 25-22).

25-28. A/C CONDENSER ASSEMBLY MAINTENANCE

This task covers:

a. Disassembly

b. Assembly

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-24P

Equipment Condition

A/C condenser removed (para. 25-18).

Maintenance Level

Direct support

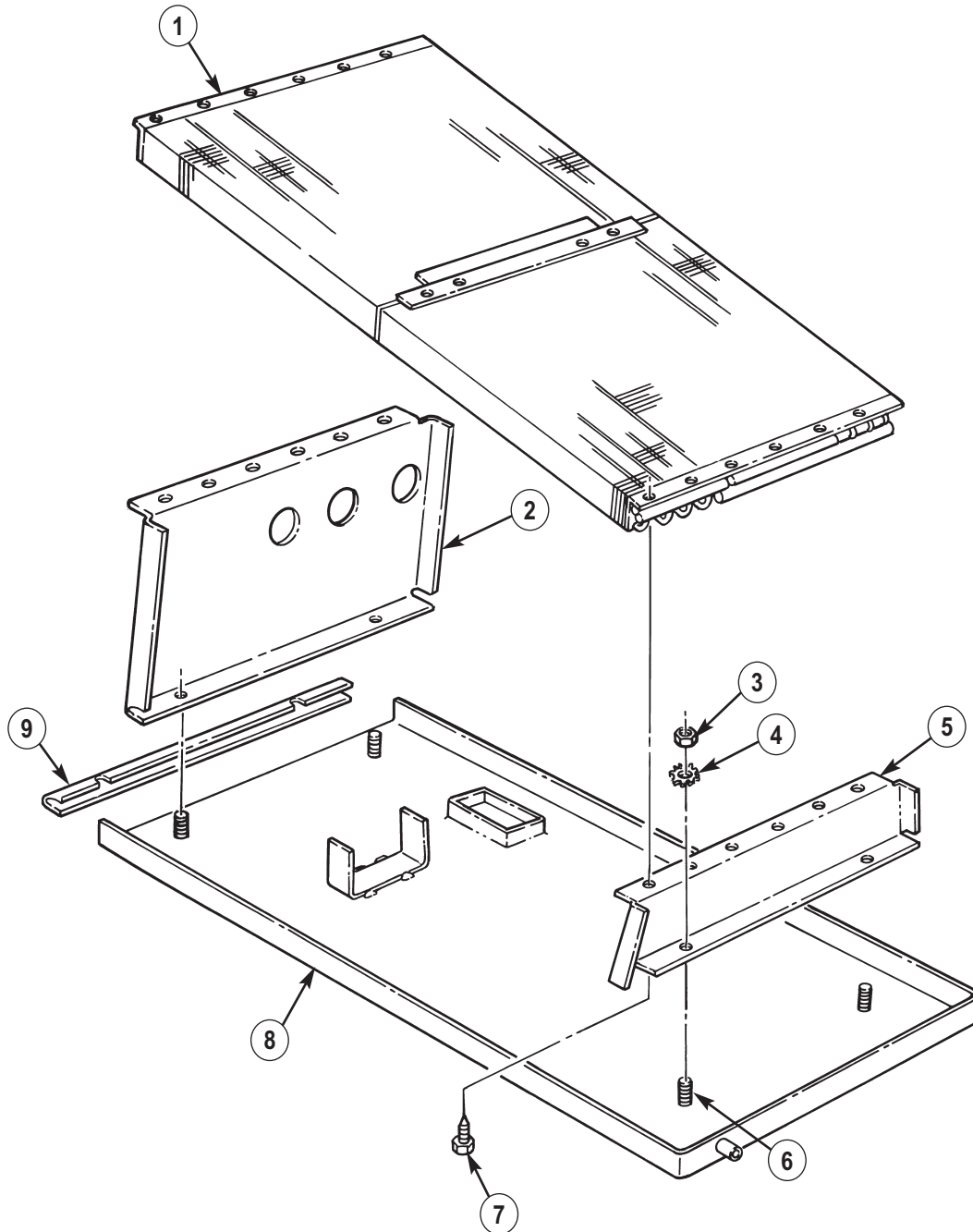
a. Disassembly

1. Remove four nuts (3), washers (4), and A/C condenser brackets (2) and (5) from studs (6) and drain pan (8).
2. Remove twelve screws (7) and A/C condenser (1) from A/C condenser brackets (2) and (5).
3. Remove trim (9) from forward edge of A/C condenser drain pan (8).

b. Assembly

1. Install trim (9) on forward edge of A/C condenser drain pan (8).
- 1.1. Install A/C condenser brackets (2) and (5) on A/C condenser (1) with twelve screws (7).
2. Install A/C condenser brackets (2) and (5) on drain pan (8) and studs (6) with four washers (4) and nuts (3).

25-28. A/C CONDENSER ASSEMBLY MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install A/C condenser (para. 25-18).

25-29. A/C EVAPORATOR (REAR) SUPPLY AND RETURN LINE REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Three O-rings (Appendix G, Item 265)
 Four O-rings (Appendix G, Item 266.1)
 Refrigerant oil (Appendix C, Item 48)

Manual References

TM 9-2320-387-24P

Equipment Condition

- A/C system discharged (para. 25-15).
- Left passenger seat removed (para. 10-45).
- A/C coolant line rear B-pillar cover and left rear HVAC lines covers removed (para. 25-32).

Maintenance Level

Direct support

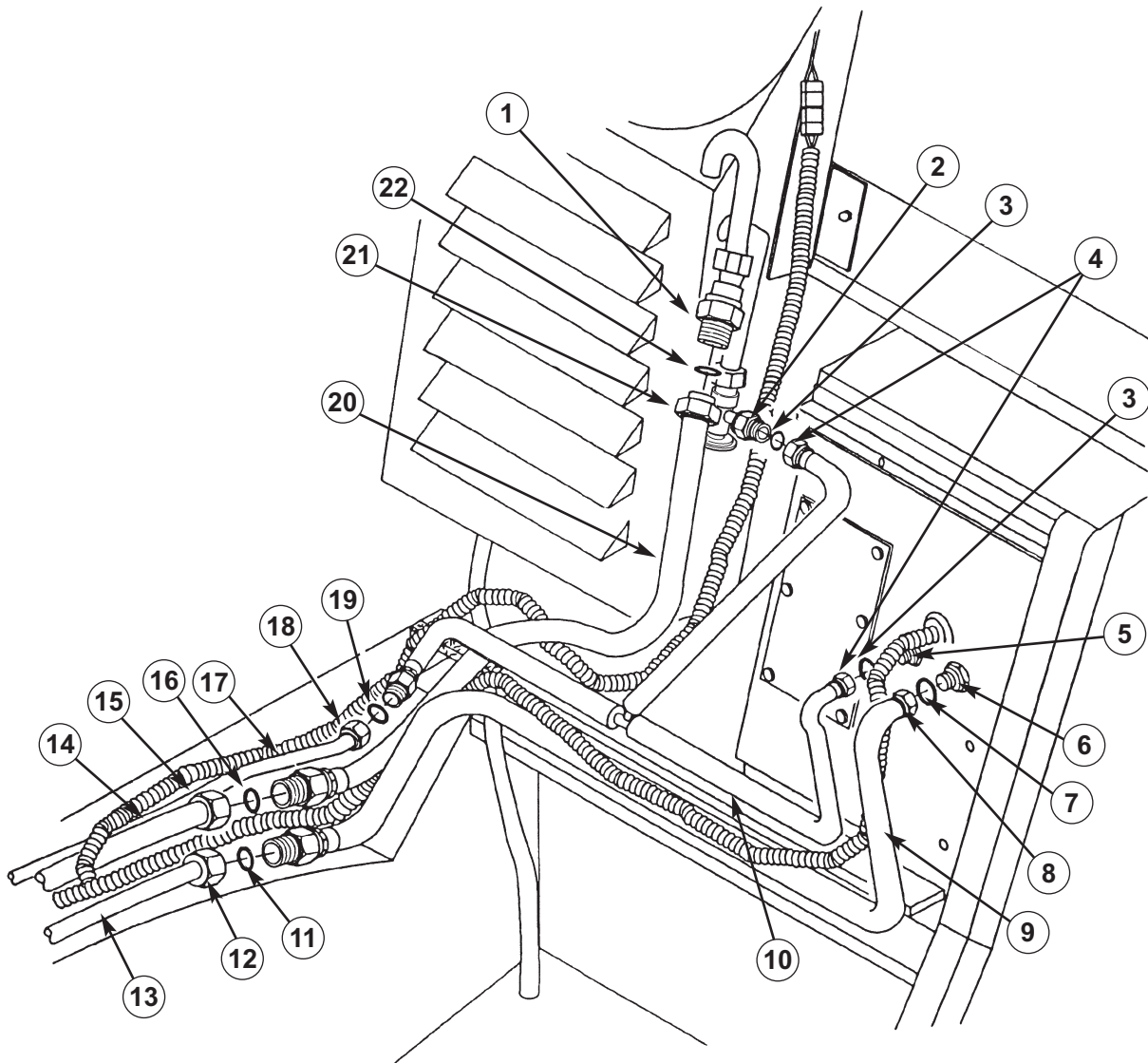
a. Removal

1. Loosen nut (18), disconnect hose assembly (17) from rear liquid tube (10), and remove O-ring (19). Discard O-ring (19).
2. Loosen two nuts (4) and remove rear liquid tube (10) and two O-rings (3) from evaporator connector (2) and bulkhead fitting (5). Discard O-rings (3).
3. Loosen nut (12), disconnect hose assembly (13) from rear discharge tube (9), and remove O-ring (11). Discard O-ring (11).
4. Loosen nut (8) and remove rear discharge tube (9) and O-ring (7) from bulkhead fitting (6). Discard O-ring (7).
5. Loosen nut (15), disconnect hose (14) from rear suction tube (20), and remove O-ring (16). Discard O-ring (16).
6. Loosen nut (21) and remove rear suction tube (20) and O-ring (22) from evaporator connector (1). Discard O-ring (22).

b. Installation

1. Lubricate O-rings (16) and (22) with refrigerant oil.
2. Install O-ring (22) and rear suction tube (20) on evaporator connector (1). Tighten nut (21) to 24 lb-ft (33 N·m).
3. Install O-ring (16) and hose (14) on rear suction tube (20). Tighten nut (15) to 24 lb-ft (33 N·m).
4. Lubricate O-rings (7) and (11) with refrigerant oil.
5. Install O-ring (7) and rear discharge tube (9) on bulkhead fitting (6). Tighten nut (8) to 18 lb-ft (24 N·m).
6. Install O-ring (11) and hose assembly (13) on rear discharge tube (9). Tighten nut (12) to 18 lb-ft (24 N·m).
7. Lubricate two O-rings (3) and O-ring (19) with refrigerant oil.
8. Install two O-rings (3) and rear liquid tube (10) on evaporator connector (2) and bulkhead fitting (5). Tighten nuts (4) to 12 lb-ft (16 N·m).
9. Install O-ring (19) and hose assembly (17) on rear liquid tube (10). Tighten nut (18) to 12 lb-ft (16 N·m).

25-29. A/C EVAPORATOR (REAR) SUPPLY AND RETURN LINE REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Charge A/C system (para. 25-15).
 - Install A/C coolant line rear B-pillar cover and left rear HVAC lines covers (para. 25-32).
 - Install left passenger seat (para. 10-45).

25-30. A/C COMPRESSOR HOSE ASSEMBLY MAINTENANCE

This task covers:

- a. Removal
 - a.1. Inspection

- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Six O-rings (Appendix G, Item 266.1)
 Refrigerant oil (Appendix C, Item 48)
 Sealing compound (Appendix C, Item 63)
 Tiedown straps (as required)
 (Appendix G, Item 461.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Air horn-to-air cleaner elbow removed (para. 3-15).
- A/C system discharged (para. 25-15).
- A/C coolant line covers removed (para. 25-32).

Maintenance Level

Direct support

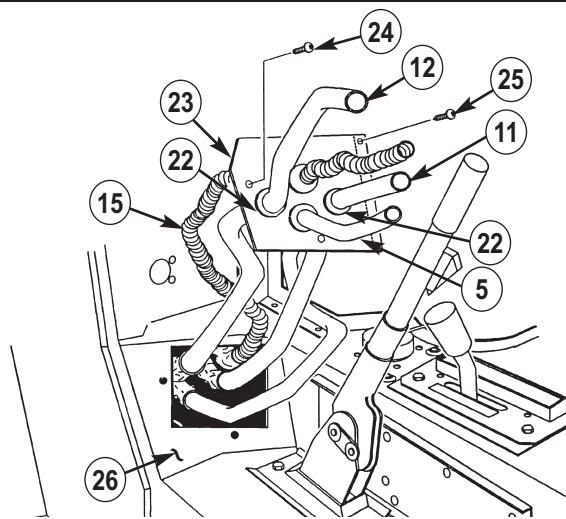
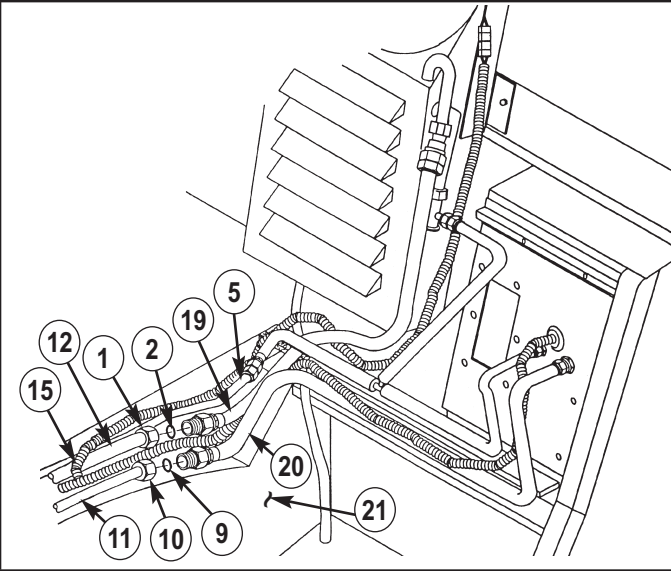
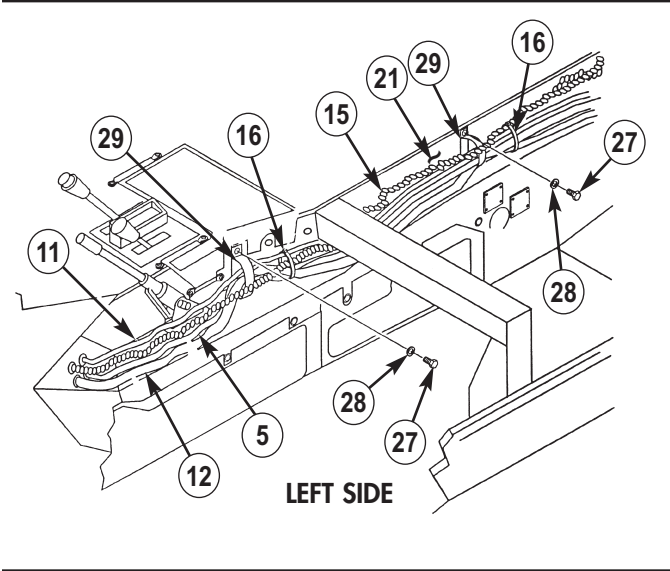
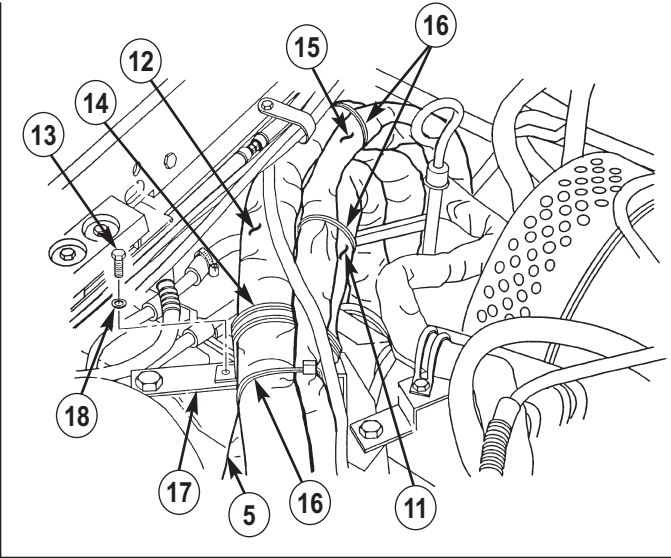
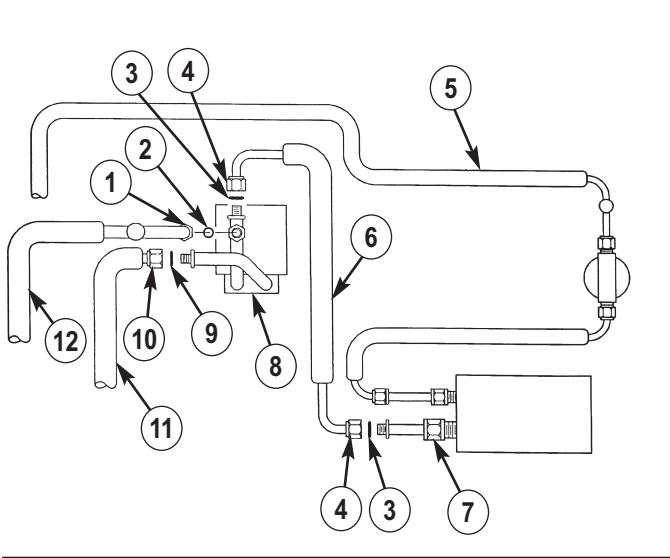
a. Removal

1. Loosen two nuts (4) and remove low-pressure hose (6) and two O-rings (3) from compressor manifold (8) and evaporator tube (7). Discard O-rings (3).
2. Loosen two nuts (1) and remove hose (12) and two O-rings (2) from compressor manifold (8) and rear suction tube (19). Discard O-rings (2).
3. Loosen two nuts (10) and remove hose assembly (11) and two O-rings (9) from compressor manifold (8) and rear discharge tube (20). Discard O-rings (9).
4. Remove tiedown straps (16), as required, from hose (12), hose assemblies (11) and (5), and A/C wiring harness (15) in engine compartment.
5. Remove capscrew (13), washer (18), and clamp (14) from clamping bracket (17).
6. Remove tiedown straps (16), as required, from hose (12), hose assemblies (11) and (5), and A/C wiring harness (15) at left side tunnel (21).
7. Remove two capscrews (27) and washers (28) securing clamps (29) to left side tunnel (21).
8. Remove hose (12) and hose assembly (11) from two clamps (29) at left side tunnel (21).
9. Remove two screws (24), screw (25), and CTIS cover (23) from vehicle body (26).
10. Route hose (12) and hose assembly (11) forward through CTIS cover grommets (22) and up into engine compartment. Remove hose (12) and hose assembly (11) from vehicle.

a.1. Inspection

Refer to para. 10-56 for plusnut (31) inspection and replacement.

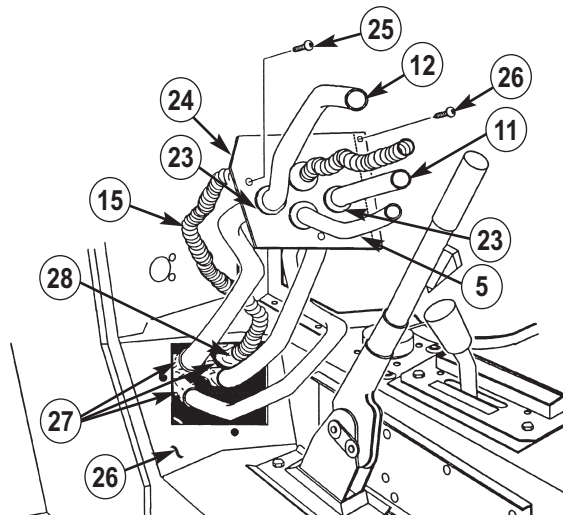
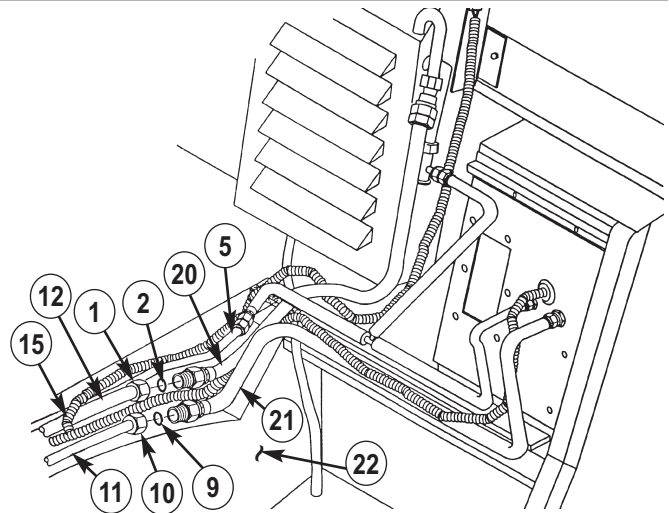
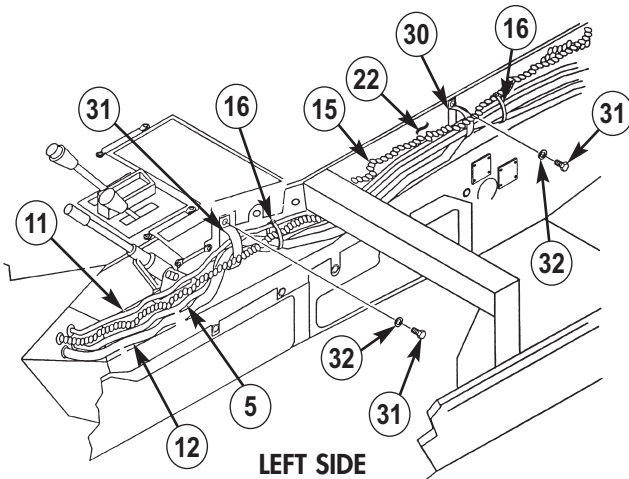
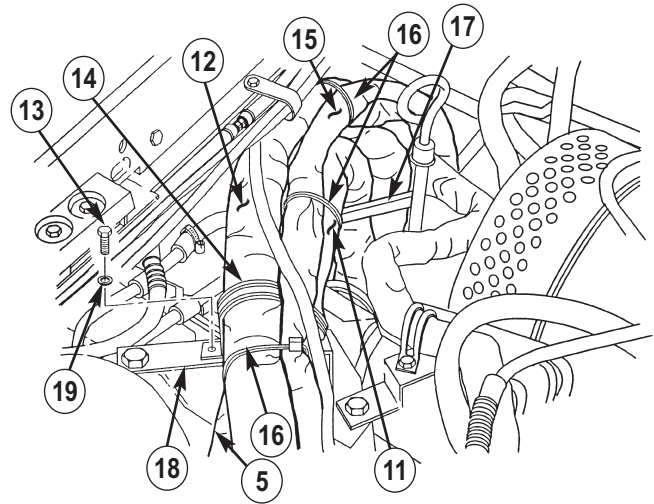
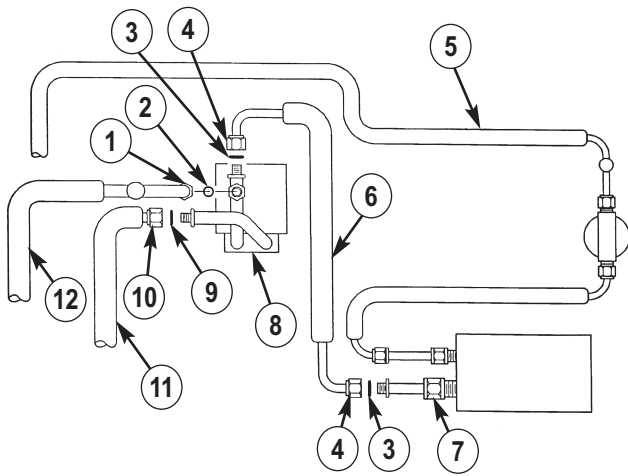
25-30. A/C COMPRESSOR HOSE ASSEMBLY MAINTENANCE (Cont'd)



25-30. A/C COMPRESSOR HOSE ASSEMBLY MAINTENANCE (Cont'd)**b. Installation**

1. Lubricate O-ring (9) with refrigerant oil, and install on hose assembly (11).
2. Connect hose assembly (11) to compressor manifold (8) and tighten nut (10) to 18 lb-ft (24 N·m).
3. Lubricate O-ring (2) with refrigerant oil, and install on hose (12).
4. Connect hose (12) to compressor manifold (8) and tighten nut (1) to 24 lb-ft (33 N·m).
5. Route hose (12) and hose assembly (11) across engine compartment and over upper oil dipstick support bracket (17).
6. Continue routing hose (12) and hose assembly (11) under vehicle and through CTIS cover grommets (23).
7. Pull hose (12), hose assemblies (11) and (5), and A/C wiring harness (15) rearward and slide CTIS cover (24) forward until foil insulation (28) contacts CTIS cover (24). Foil insulation (29) on A/C wiring harness (15) should extend through CTIS cover (24) approximately 1-in. (2.5 cm).
8. Install CTIS cover (24) on vehicle body (27) with two screws (25) and screw (26).
9. Continue routing hose (12) and hose assembly (11) along left side tunnel (22).
10. Lubricate O-ring (9) with refrigerant oil, and install on hose assembly (11).
11. Connect hose assembly (11) to rear discharge tube (21) and tighten nut (10) to 18 lb-ft (24 N·m).
12. Lubricate O-ring (2) with refrigerant oil, and install on hose (12).
13. Connect hose (12) to rear suction tube (20) and tighten nut (1) to 24 lb-ft (33 N·m).
14. Install two clamps (30) around hose (12) and hose assemblies (11) and (5).
15. Apply sealing compound to threads of two capscrews (31).
16. Secure two clamps (30) to left side tunnel (22) with washers (32) and capscrews (31) and tighten capscrews (31) to 6 lb-ft (8 N·m).
17. Install clamp (14) around hose (12) and hose assemblies (11) and (5) in engine compartment.
18. Apply sealing compound to threads of capscrew (13).
19. Secure clamp (14) to clamping bracket (18) with washer (19) and capscrew (13) and tighten capscrew (13) to 10-lb-ft (14 N·m).
20. Lubricate two O-rings (3) with refrigerant oil, and install on low-pressure hose (6).
21. Connect low-pressure hose (6) to compressor manifold (8) and evaporator tube (7) and tighten nuts (4) to 18 lb-ft (24 N·m).
22. Secure hose (12), hose assemblies (11) and (5), and A/C wiring harness (15) in engine compartment with tiedown straps (16), as required.
23. Secure hose (12), hose assemblies (11) and (5), and A/C wiring harness (15) along left side tunnel (22) with tiedown straps (16), as required.

25-30. A/C COMPRESSOR HOSE ASSEMBLY MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install air horn-to-air cleaner elbow (para. 3-15).
 - Charge A/C system (para. 25-15).
 - Install A/C coolant line covers (para. 25-32).

25-31. A/C PRESSURE HOSES MAINTENANCE

This task covers:

a. Removal

b. Installation

a.1. Inspection

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Four O-rings (Appendix G, Item 265)
 Refrigerant oil (Appendix C, Item 48)
 Sealing compound (Appendix C, Item 63)
 Tiedown straps (as required) (Appendix G,
 Item 463)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Air horn-to-air cleaner elbow removed (para. 3-15).
- A/C system discharged (para. 25-15).
- A/C coolant line covers removed (para. 25-32).

Maintenance Level

Direct support

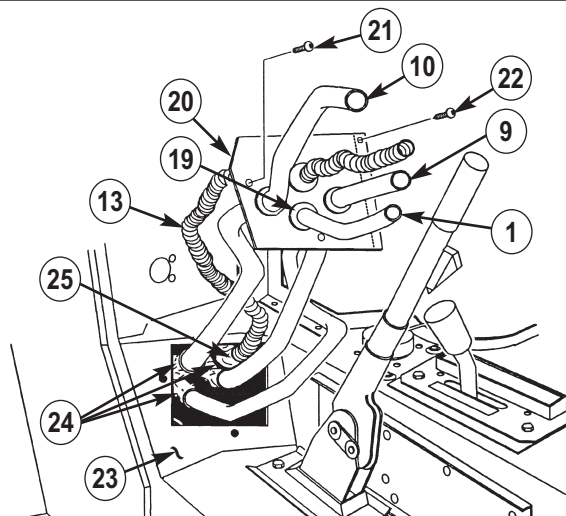
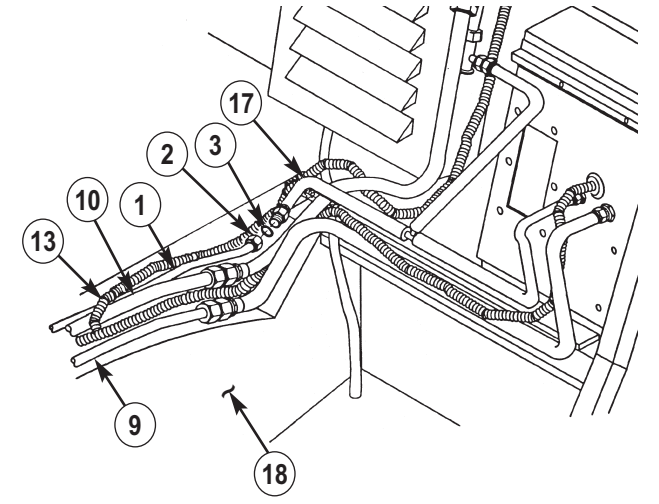
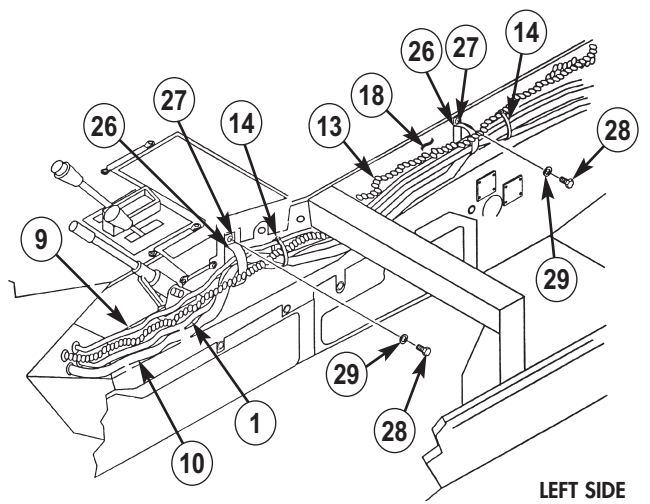
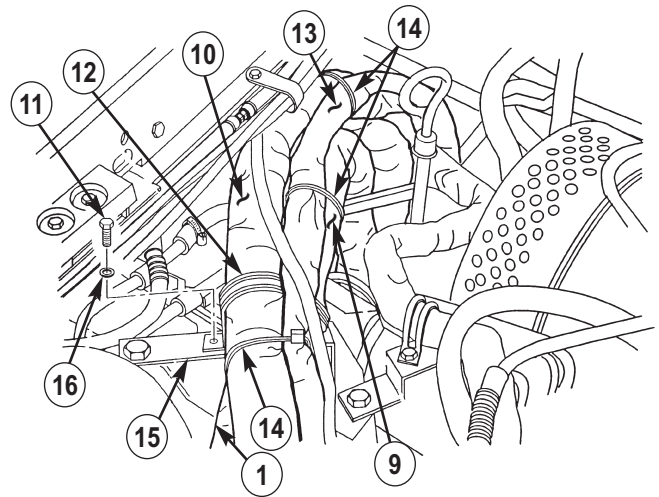
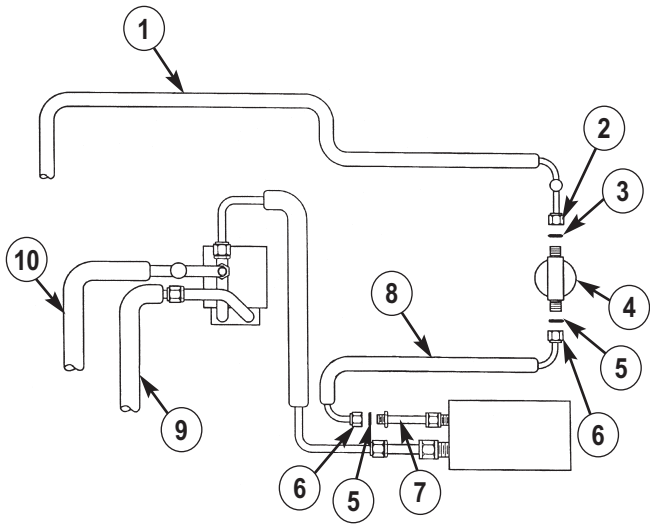
a. Removal

1. Loosen two nuts (6) and remove high-pressure hose (8) and two O-rings (5) from front receiver/dryer (4) and evaporator tube (7). Discard O-rings (5).
2. Loosen two nuts (2) and remove high-pressure hose (1) and two O-rings (3) from front receiver/dryer (4) and rear liquid tube (17). Discard O-rings (3).
3. Remove tiedown straps (14), as required, from hose (10), hose assembly (9), high-pressure hose (1), and A/C wiring harness (13) in engine compartment.
4. Remove capscrew (11), washer (16), and clamp (12) from clamping bracket (15).
5. Remove tiedown straps (14), as required, from hose (10), hose assembly (9), high-pressure hose (1), and A/C wiring harness (13) at left side tunnel (18).
6. Remove two capscrews (28) and washers (29) securing clamps (26) to left side tunnel (18).
7. Remove high-pressure hose (1) from two clamps (26) at left side tunnel (18).
8. Remove two screws (21), screw (22), and CTIS cover (20) from vehicle body (23).
9. Route high-pressure hose (1) forward through CTIS cover grommet (19) and up into engine compartment. Remove high-pressure hose (1) from vehicle.

a.1. Inspection

Refer to para. 10-56 for plusnut (27) inspection and replacement.

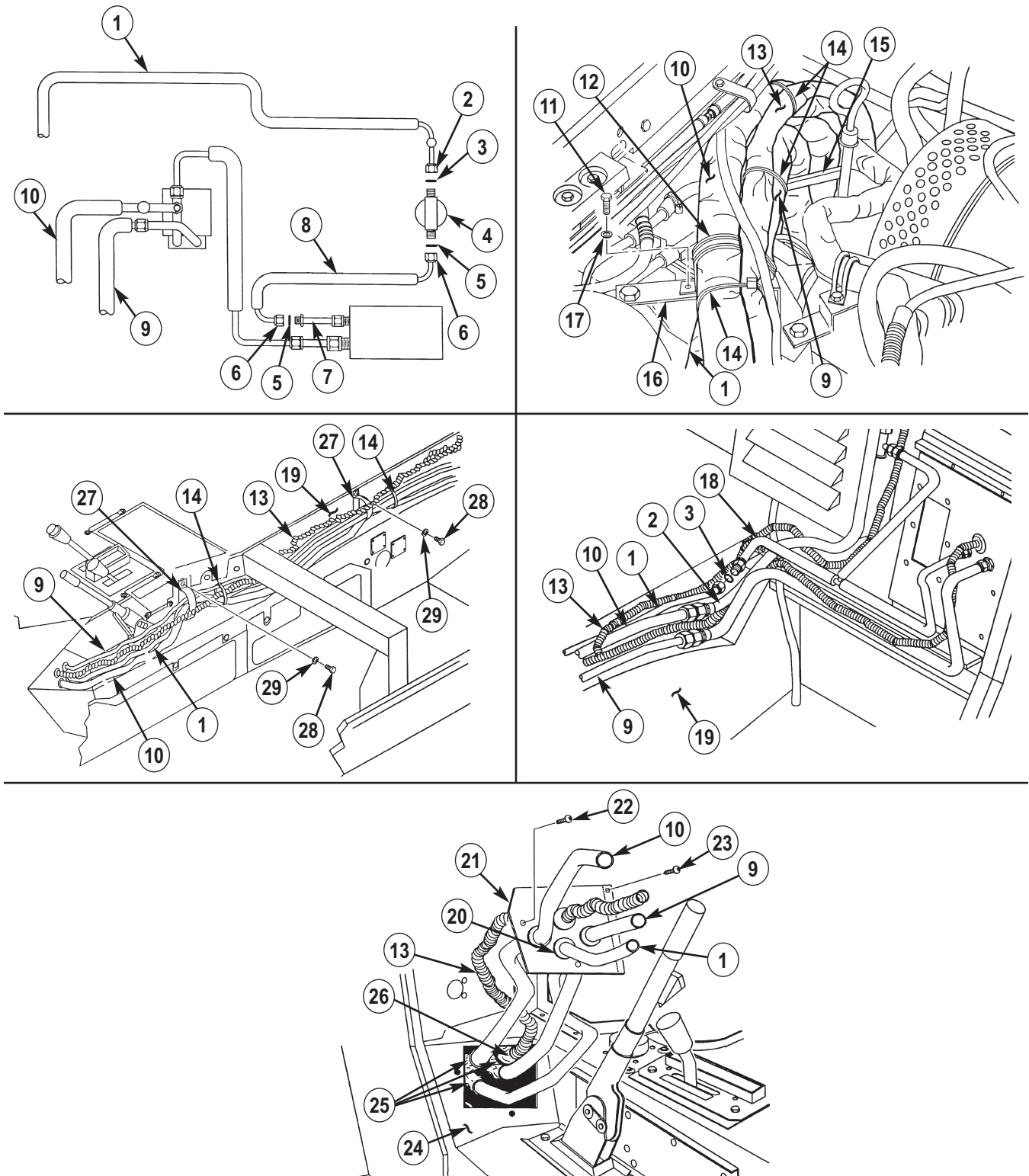
25-31. A/C PRESSURE HOSES MAINTENANCE (Cont'd)



25-31. A/C PRESSURE HOSES MAINTENANCE (Cont'd)**b. Installation**

1. Lubricate O-ring (3) with refrigerant oil, and install on high-pressure hose (1).
2. Connect high-pressure hose (1) to front receiver/dryer (4) and tighten nut (2) to 12 lb-ft (16 N·m).
3. Route high-pressure hose (1) across engine compartment and over upper oil dipstick support bracket (15).
4. Continue routing high-pressure hose (1) under vehicle and through CTIS cover grommet (20).
5. Pull hose (10), hose assembly (9), high-pressure hose (1), and A/C wiring harness (13) rearward and slide CTIS cover (21) forward until foil insulation (25) contacts CTIS cover (21). Foil insulation (26) on A/C wiring harness (13) should extend through CTIS cover (21) approximately 1-in. (2.5 cm).
6. Install CTIS cover (21) on vehicle body (24) and secure with two screws (22) and screw (23).
7. Continue routing high-pressure hose (1) along left side tunnel (19).
8. Lubricate O-ring (3) with refrigerant oil, and install on high-pressure hose assembly (1).
9. Connect high-pressure hose assembly (1) to rear liquid tube (18) and tighten nut (2) to 12 lb-ft (16 N·m).
10. Install two clamps (27) around hose (10), hose assembly (9), and high-pressure hose (1).
11. Apply sealing compound to threads of two capscrews (28), and secure two clamps (27) to left side tunnel (19) with two washers (29) and capscrews (28) and tighten capscrews (28) to 6 lb-ft (8 N·m).
12. Install clamp (12) around hose (10), hose assembly (9), and high-pressure hose (1) in engine compartment.
13. Apply sealing compound to threads of capscrow (11) and secure clamp (12) to clamping bracket (16) with washer (17) and capscrow (11) and tighten capscrow (11) to 10 lb-ft (14 N·m).
14. Lubricate two O-rings (5) with refrigerant oil and install on high-pressure hose (8).
15. Connect high-pressure hose (8) to front receiver/dryer (4) and evaporator tube (7) and tighten nuts (6) to 18 lb-ft (24 N·m).
16. Secure hose (10), hose assembly (9), high-pressure hose (1), and A/C wiring harness (13) in engine compartment with tiedown straps (14), as required.
17. Secure hose (10), hose assembly (9), high-pressure hose (1), and A/C wiring harness (13) along left side tunnel (19) with tiedown straps (14), as required.

25-31. A/C PRESSURE HOSES MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Charge A/C system (para. 25-15).
 - Install A/C coolant line covers (para.25-32).
 - Install air horn-to-air cleaner elbow (dryer-to-heater/evaporator assembly only) (para. 3-15).

25-32. A/C COOLANT LINE COVERS MAINTENANCE

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Removal b. Inspection | <ul style="list-style-type: none"> c. Installation |
|---|---|

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left passenger seat removed (para. 10-45).
- Driver's seat assembly removed (para. 10-40).

Maintenance Level

Direct support

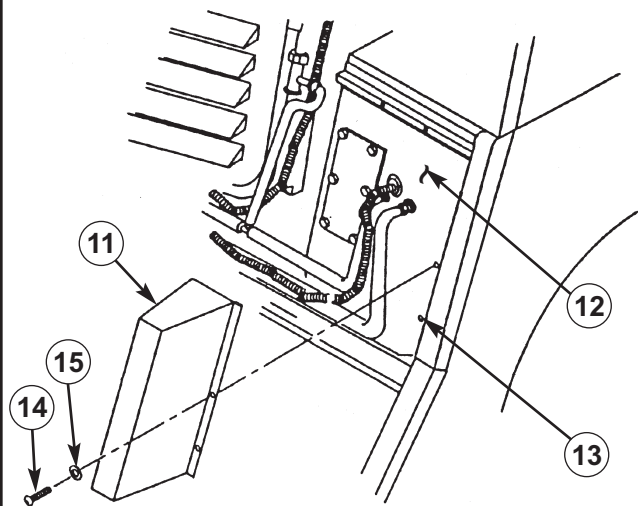
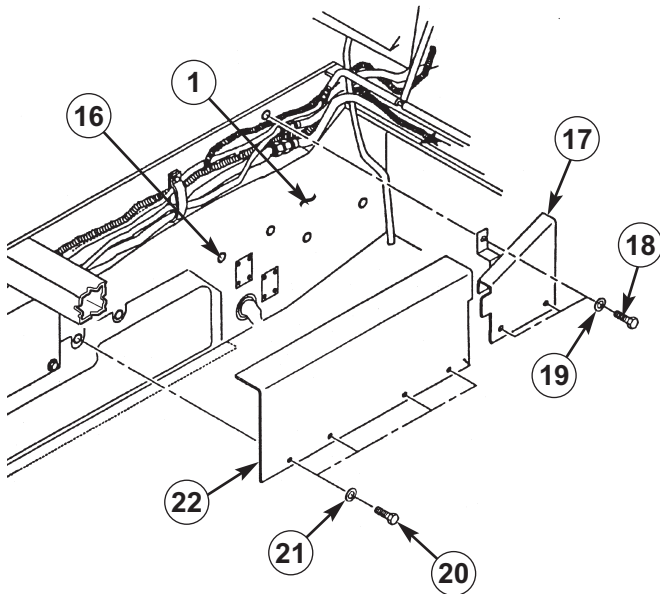
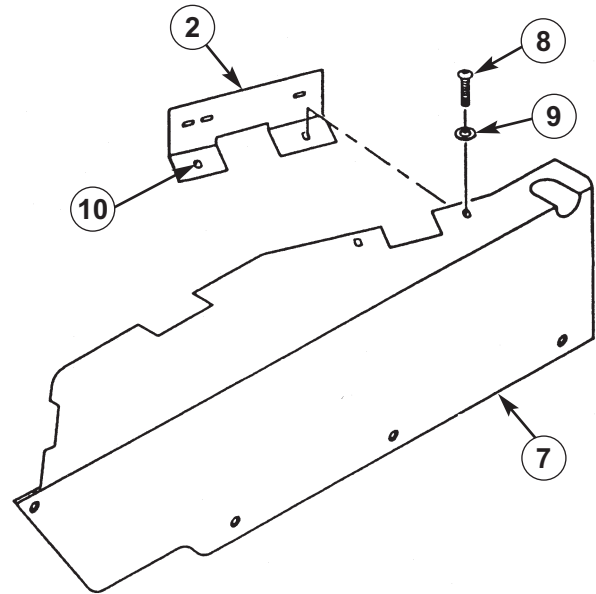
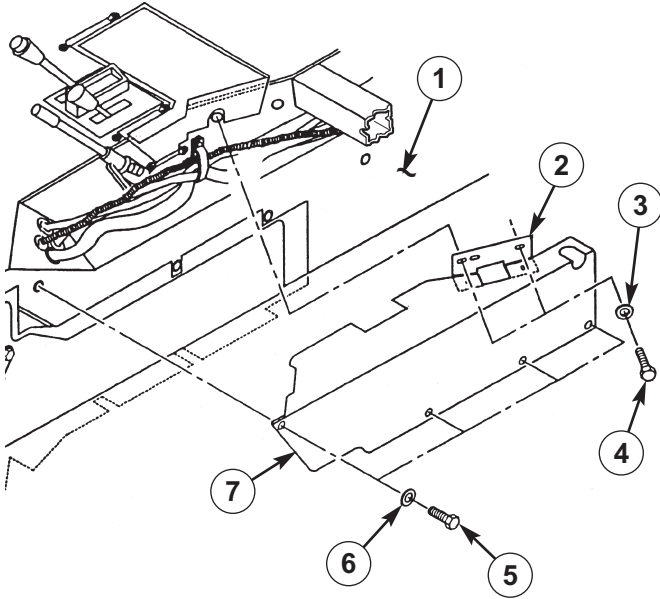
a. Removal

1. Remove four capscrews (5) and washers (6) from A/C coolant line front cover (7) at left side tunnel (1).
2. Remove two capscrews (4) and washers (3) from mounting angle (2) at left side tunnel (1).
3. Remove A/C coolant line front cover (7) with mounting angle (2) from left side tunnel (1).
4. Remove two screws (8), washers (9), and mounting angle (2) from A/C coolant line front cover (7).
5. Remove four capscrews (20), washers (21), and A/C coolant line rear B-pillar cover (22) from left side tunnel (1).
6. Remove three capscrews (18), washers (19), and left rear HVAC lines cover (17) from left side rear tunnel (1).
7. Remove two screws (14), washers (15), and left rear HVAC lines cover (11) from left rear wheelhouse (12).

b. Inspection

Refer to para. 10-56 for plusnuts (10), (13), and (16) inspection and replacement.

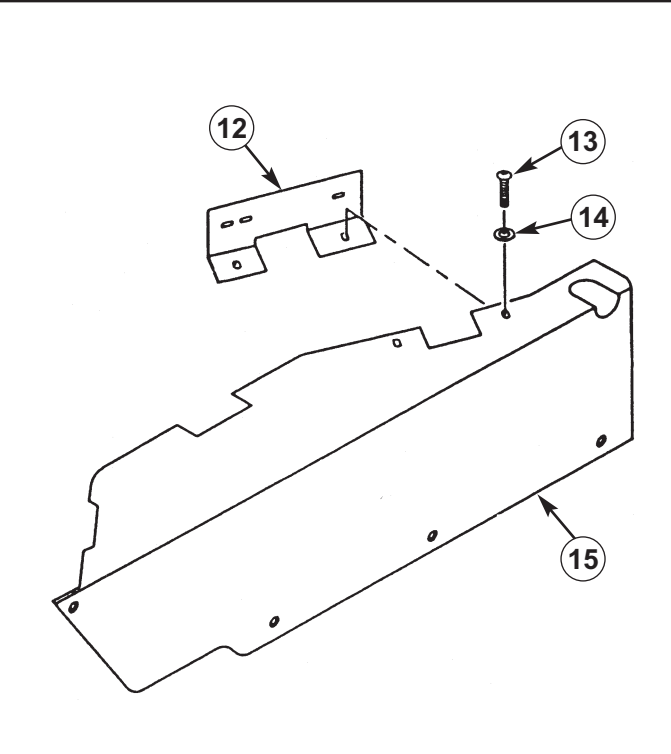
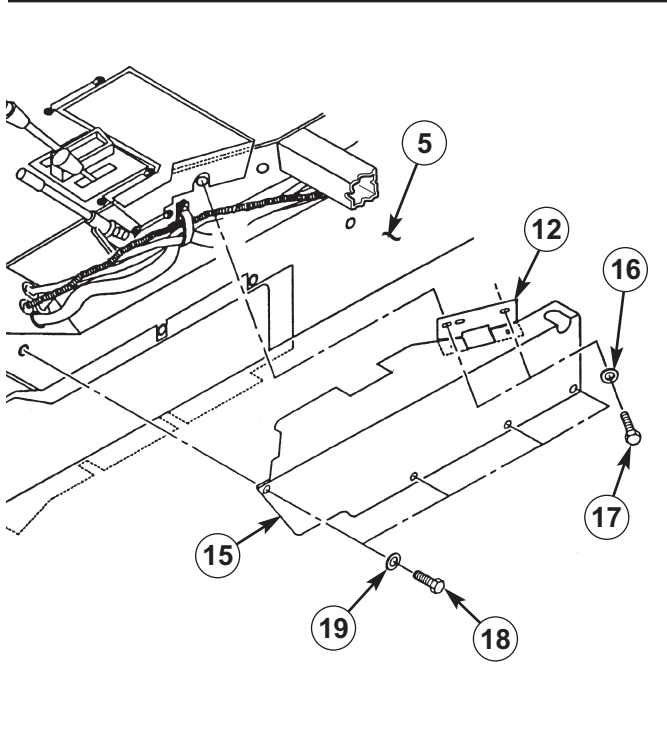
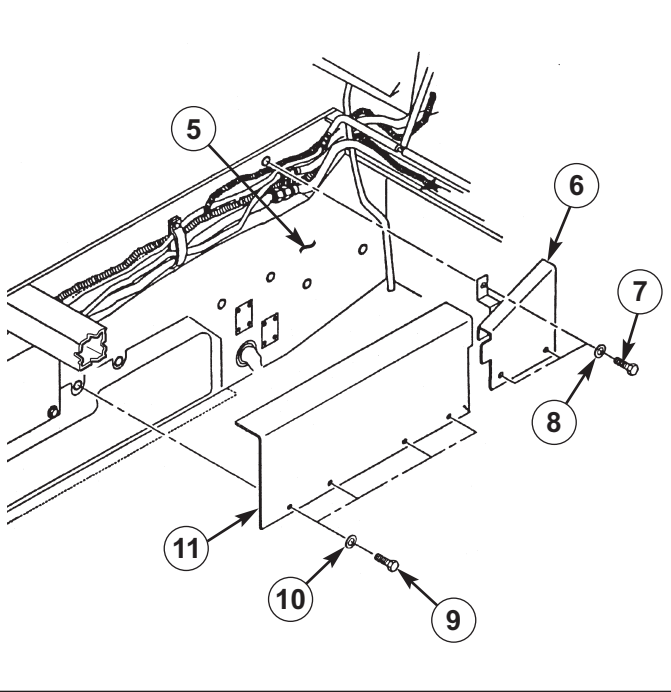
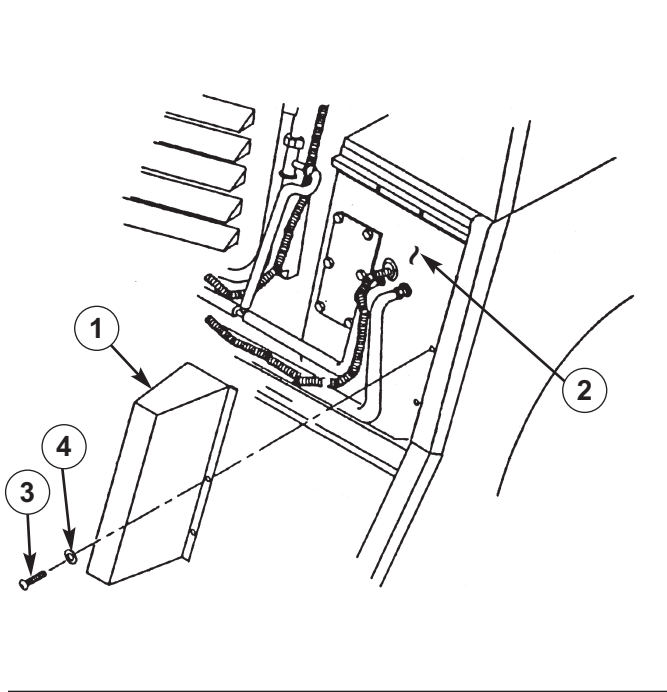
25-32. A/C COOLANT LINE COVERS MAINTENANCE (Cont'd)



25-32. A/C COOLANT LINE COVERS MAINTENANCE (Cont'd)**c. Installation**

1. Apply sealing compound to threads of two screws (3), and install left rear HVAC lines cover (1) on left rear wheelhouse (2) with two washers (4) and capscrews (3). Tighten capscrews (3) to 36 lb-in. (4 N·m).
2. Apply sealing compound to threads of three capscrews (7), and install left rear HVAC lines cover (6) on left side tunnel (5) with three washers (8) and capscrews (7). Tighten capscrews (7) to 6 lb-ft (8 N·m).
3. Apply sealing compound to threads of four capscrews (9), and install A/C coolant line rear B-pillar cover (11) on left side tunnel (5) with four washers (10) and four capscrews (9). Tighten capscrews (9) to 6 lb-ft (8 N·m).
4. Apply sealing compound to threads of two screws (13), and install mounting angle (12) on A/C coolant line front cover (15) with two washers (14) and screws (13). Do not tighten screws (13).
5. Apply sealing compound to threads of four capscrews (18), and install A/C coolant line front cover (15) on left side tunnel (5) with four washers (19) and capscrews (18). Tighten capscrews (18) to 6 lb-ft (8 N·m).
6. Apply sealing compound to threads of two capscrews (17), and secure mounting angle (12) to left side tunnel (5) with two washers (16) and two capscrews (17). Tighten capscrews (17) to 6 lb-ft (8 N·m).
7. Tighten two screws (13) to 36 lb-in. (4 N·m).

25-32. A/C COOLANT LINE COVERS MAINTENANCE (Cont'd)



FOLLOW-ON TASKS:

- Install driver's seat assembly (para. 10-40).
- Install left passenger seat (para. 10-45).

25-33. A/C CONDENSER HOSE ASSEMBLIES REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

O-ring (Appendix G, Item 265)
 O-ring (Appendix G, Item 266.1)
 Refrigerant oil (Appendix C, Item 48)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left rear HVAC lines cover removed (para. 25-32).
- Access hole cover plate removed (para. 25-36).
- A/C condenser removed (para. 25-18).

Maintenance Level

Direct support

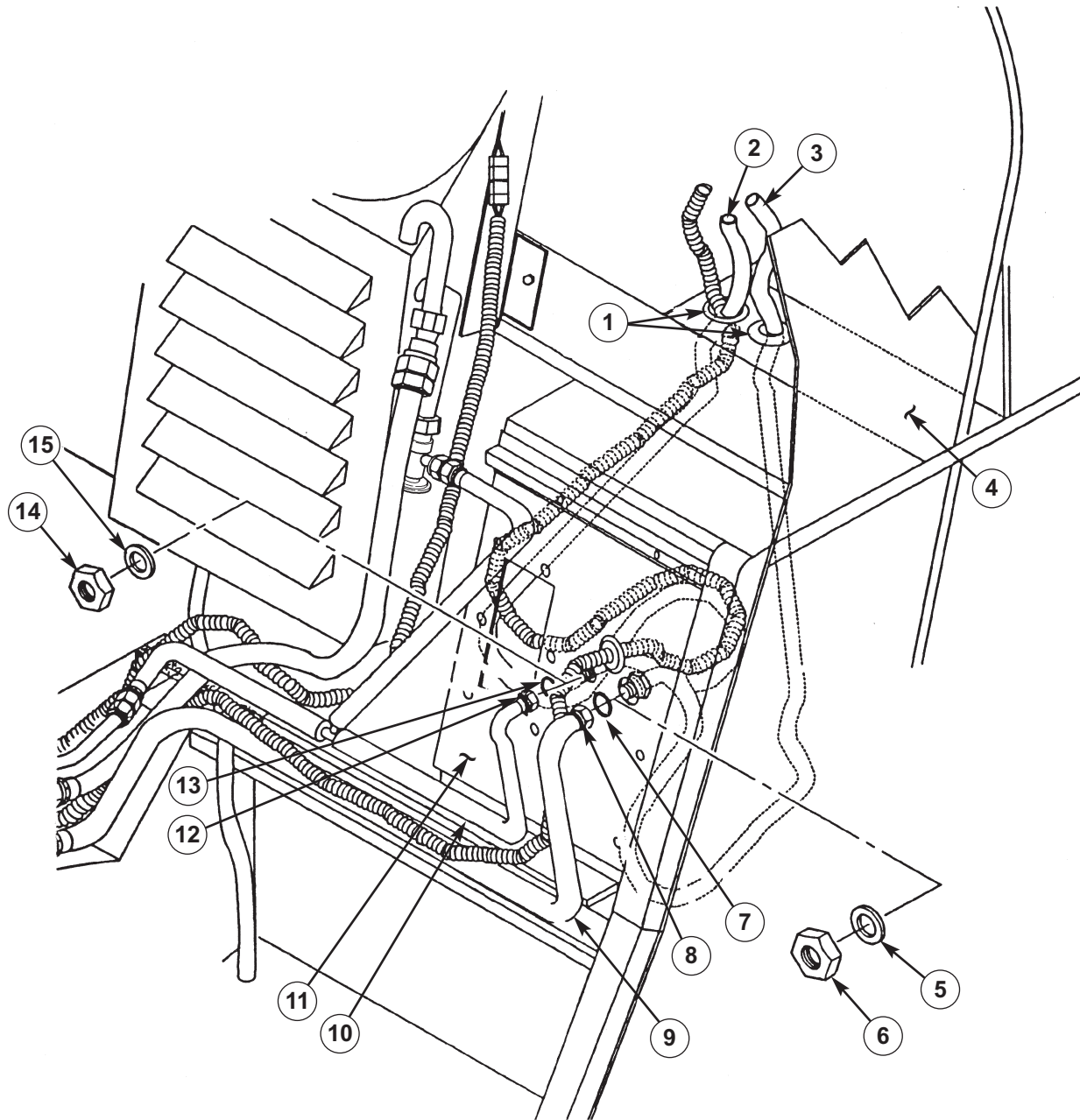
a. Removal

1. Loosen nut (8) and remove rear discharge tube (9) from hose assembly (3) at left rear wheelhouse (11). Remove and discard O-ring (7).
2. Loosen nut (12) and remove rear liquid tube (10) from hose assembly (2) at left rear wheelhouse (11). Remove and discard O-ring (13).
3. Remove nut (14) and washer (15) from hose assembly (2) at left rear wheelhouse (11).
4. Remove nut (6) and washer (5) from hose assembly (3) at left rear wheelhouse (11).
5. Pull hose assemblies (2) and (3) through grommets (1) and remove from left rear wheelwell (4).

b. Installation

1. Install hose assemblies (2) and (3) through grommets (1) on left rear wheelwell (4).
2. Route hose assembly (3) through left rear wheelhouse (11) and install with washer (5) and nut (6).
3. Route hose assembly (2) through left rear wheelhouse (11) and install with washer (15) and nut (14).
4. Lubricate O-ring (7) with refrigerant oil, and install on rear discharge tube (9).
5. Connect rear discharge tube (9) to hose assembly (3) at left rear wheelhouse (11) and tighten nut (8) to 18 lb-ft (24 N·m).
6. Lubricate O-ring (13) with refrigerant oil, and install on rear liquid tube (10).
7. Connect rear liquid tube (10) to hose assembly (2) at left rear wheelhouse (11) and tighten nut (12) to 12 lb-ft (16 N·m).

25-33. A/C CONDENSER HOSE ASSEMBLIES REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:
- Install A/C condenser (para. 25-18).
 - Install access hole cover plate (para. 25-36).
 - Install left rear HVAC lines cover (para. 25-32).

25-34. A/C AND DE-ICE RELAYS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Four locknuts (Appendix G, Item 178)

Manual References

TM 9-2320-387-24P

Equipment Condition

Battery ground cables disconnected (para. 4-68).

Maintenance Level

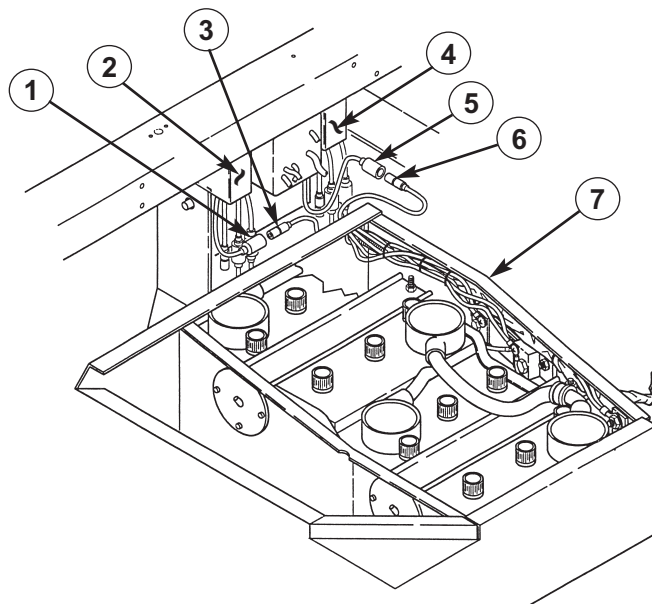
Direct support

a. Removal

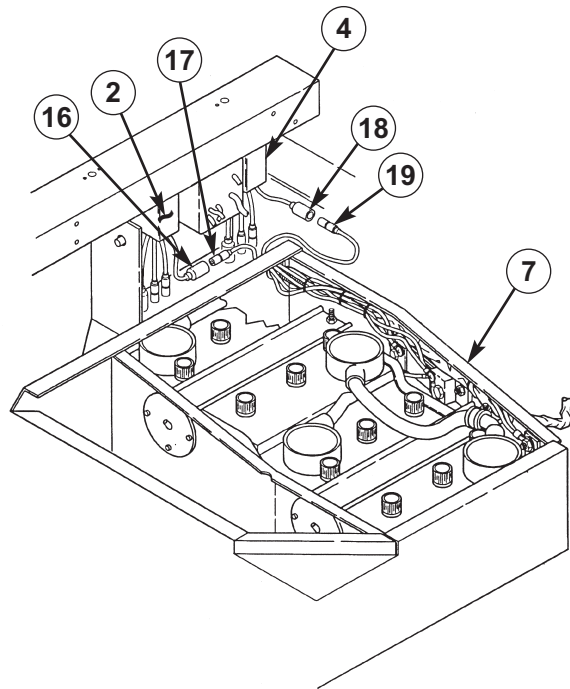
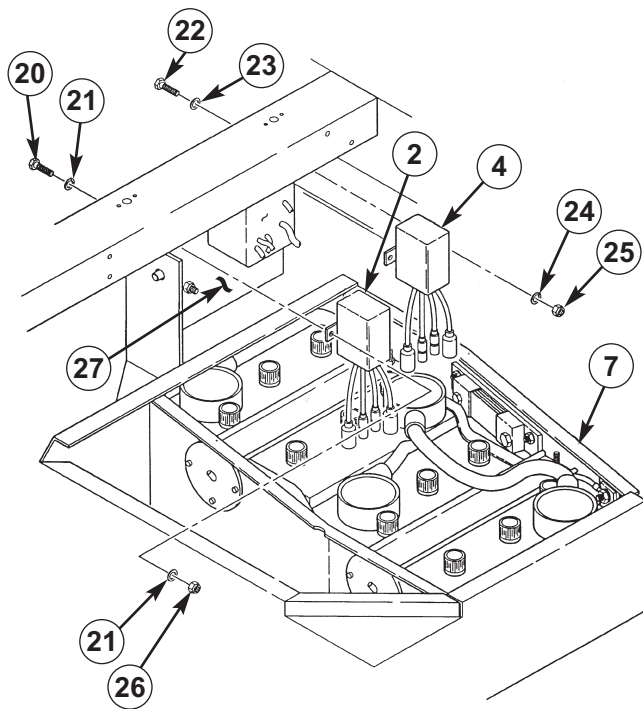
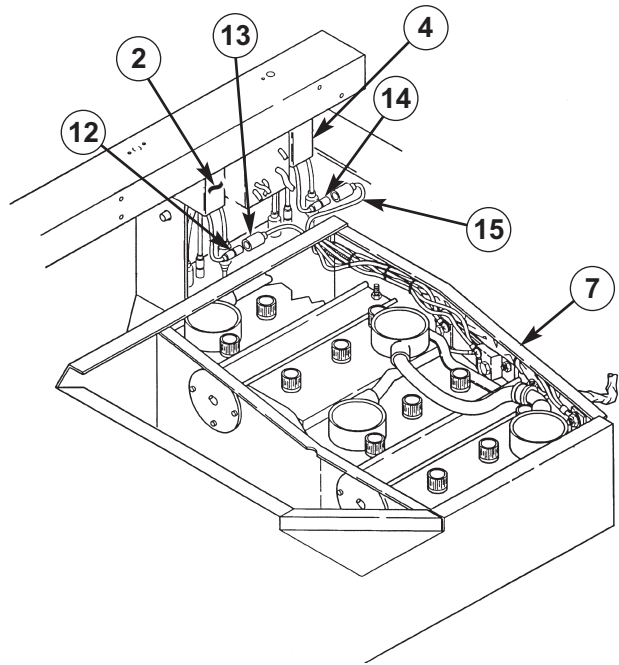
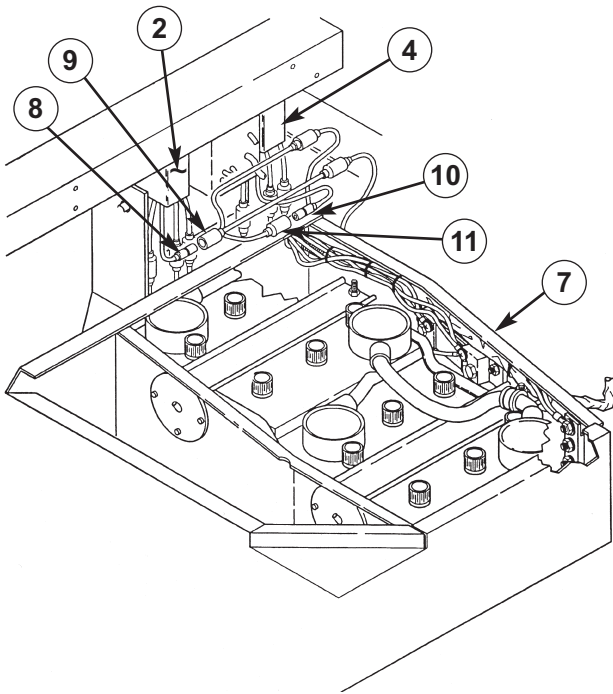
NOTE

Prior to removal, tag leads for installation.

1. Disconnect ignition jumper wiring connector (11) from de-ice relay connector number one (10).
2. Disconnect grounding wiring connector (15) from de-ice relay connector number two (14).
3. Disconnect de-ice power wiring connector (6) from de-ice relay connector number three (5).
4. Disconnect A/C wiring harness de-ice power connector (19) from de-ice relay connector number four (18).
5. Remove two locknuts (25), washers (24), capscrews (22), washers (23), and de-ice relay (4) from B-beam cover plate (27) at rear side of battery box (7). Discard locknuts (25).
6. Disconnect ignition jumper wiring connector (9) from A/C relay connector number one (8).
7. Disconnect grounding wiring connector (13) from A/C relay connector number two (12).
8. Disconnect de-ice power wiring connector (3) from A/C relay connector number three (1).
9. Disconnect A/C wiring harness A/C power connector (17) from A/C relay connector number four (16).
10. Remove two locknuts (26), washers (21), capscrews (20), washers (21), and A/C relay (2) from B-beam cover plate (27) at rear side of battery box (7). Discard locknuts (26).



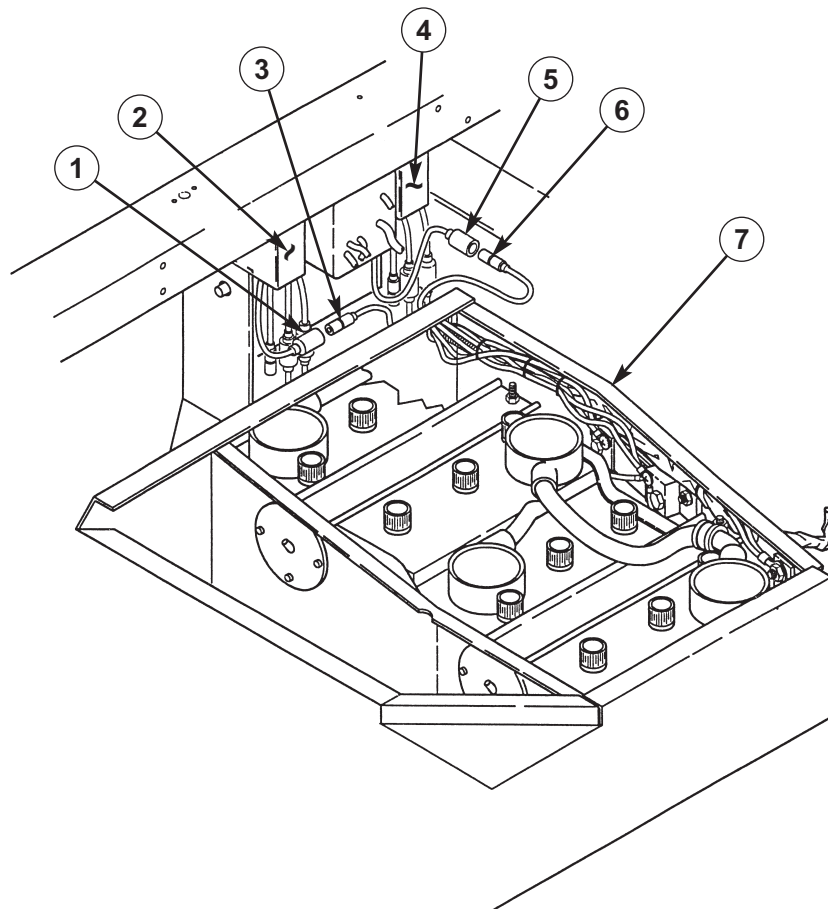
25-34. A/C AND DE-ICE RELAYS REPLACEMENT (Cont'd)



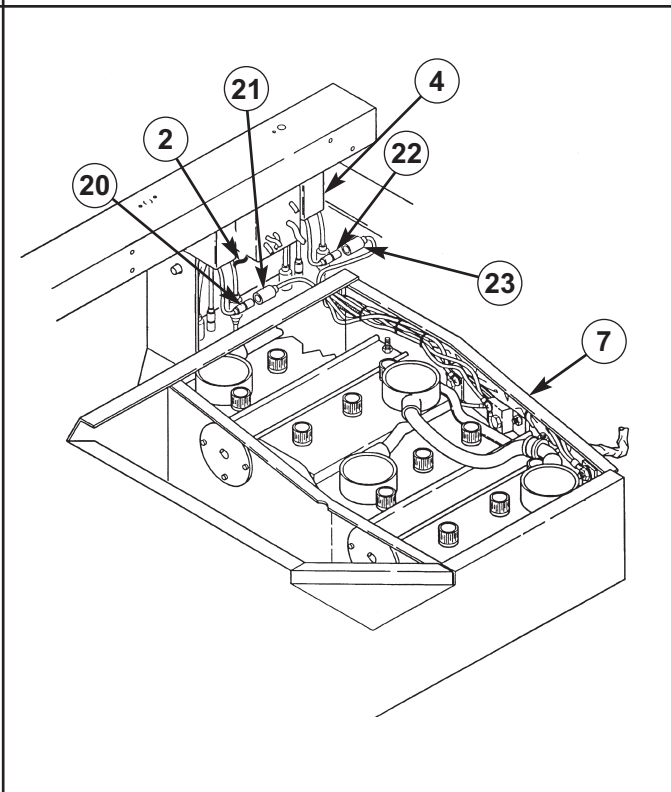
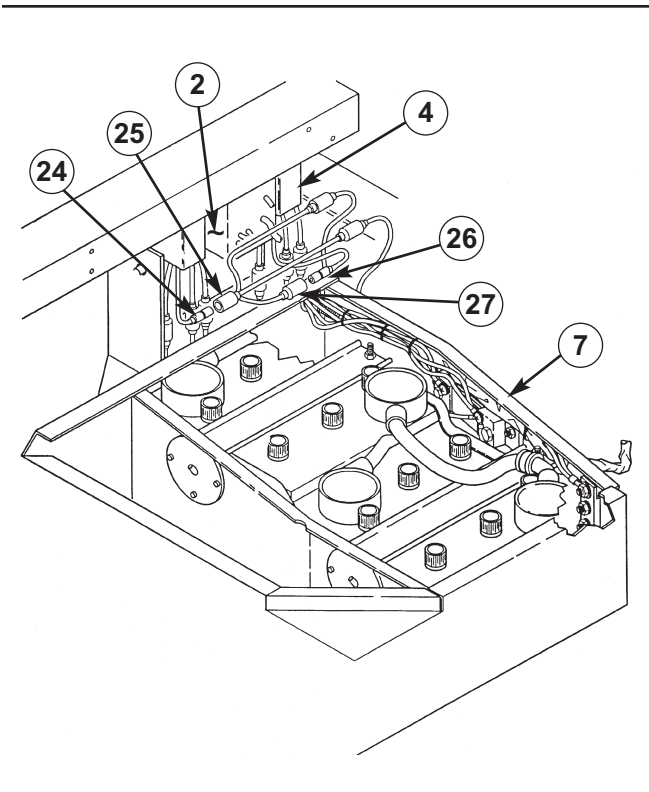
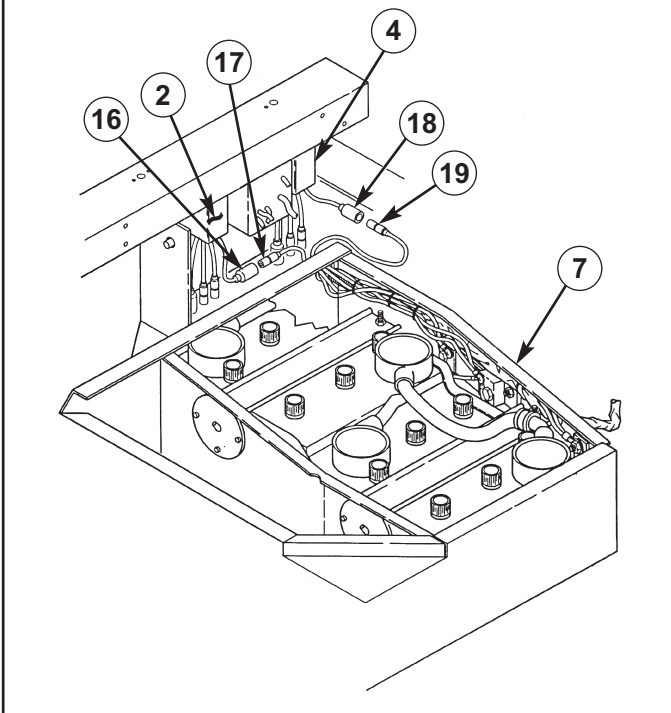
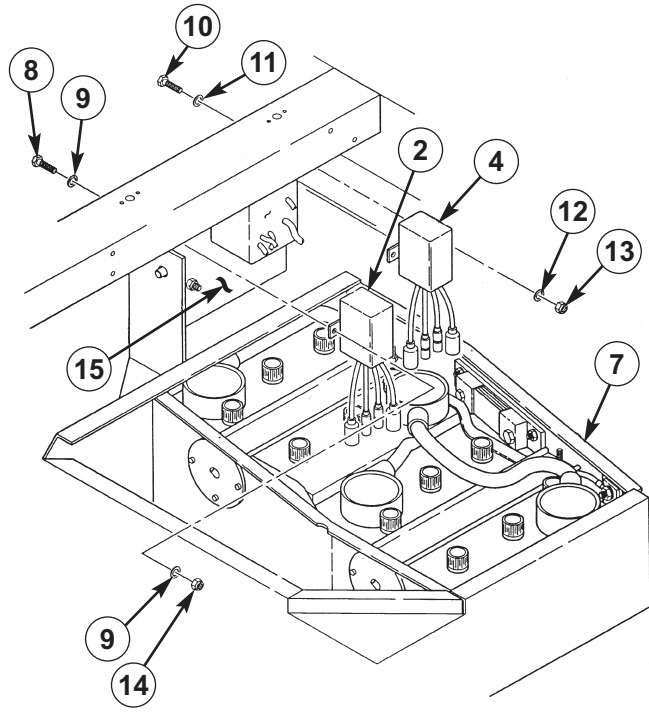
25-34. A/C AND DE-ICE RELAYS REPLACEMENT (Cont'd)

b. Installation

1. Install A/C relay (2) on B-beam cover plate (15) at rear side of battery box (7) with two washers (9), capscrews (8), washers (9), and locknuts (14). Tighten locknuts (14) to 10 lb-ft (14 N·m).
2. Connect A/C wiring harness A/C power connector (17) to A/C relay connector number four (16).
3. Connect de-ice power wiring connector (3) to A/C relay connector number three (1).
4. Connect grounding wiring connector (21) to A/C relay connector number two (20).
5. Connect ignition jumper wiring connector (25) to A/C relay connector number one (24).
6. Install de-ice relay (4) on B-beam cover plate (15) at rear side of battery box (7) with two washers (11), capscrews (10), washers (11), and locknuts (13). Tighten locknuts (13) to 10 lb-ft (14 N·m).
7. Connect A/C wiring harness de-ice power connector (19) to de-ice relay connector number four (18).
8. Connect de-ice power wiring connector (6) to de-ice relay connector number three (5).
9. Connect grounding wiring connector (23) to de-ice relay connector number two (22).
10. Connect ignition jumper wiring connector (27) to de-ice relay connector number one (26).



25-34. A/C AND DE-ICE RELAYS REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Connect battery ground cables (para. 4-68).

25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Sealing compound (Appendix C, Item 63)
 Silicone rubber (Appendix C, Item 12)
 Four lockwashers (Appendix G, Item 199)
 Tiedown straps (as required)
 (Appendix G, Item 461.1)

Manual References

TM 9-2320-387-24P

Equipment Condition

- A/C front air distribution duct removed (para. 11-81).
- Heater/evaporator assembly cover removed (para. 25-21).
- Access hole cover plate removed (para. 25-36).
- Condenser fan access panel removed (para. 11-86).
- Air horn-to-air cleaner elbow removed (para. 3-15).
- A/C coolant line covers removed (para. 25-32).

Maintenance Level

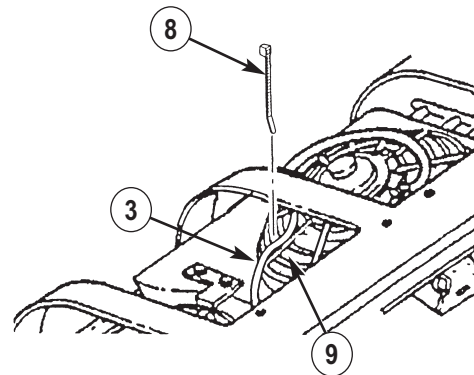
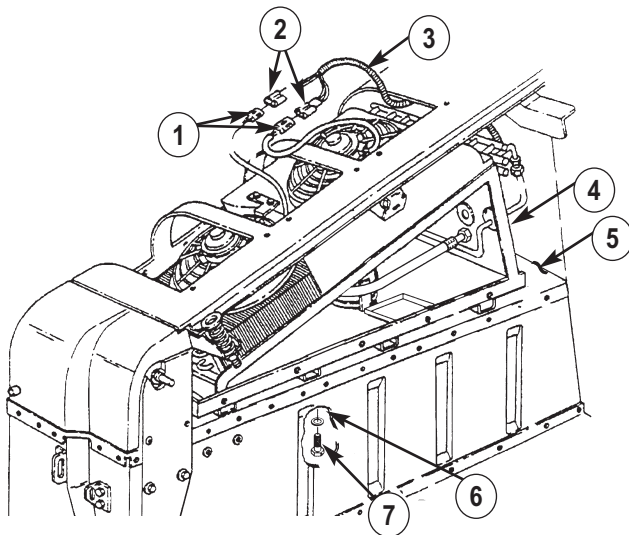
Direct support

a. Removal

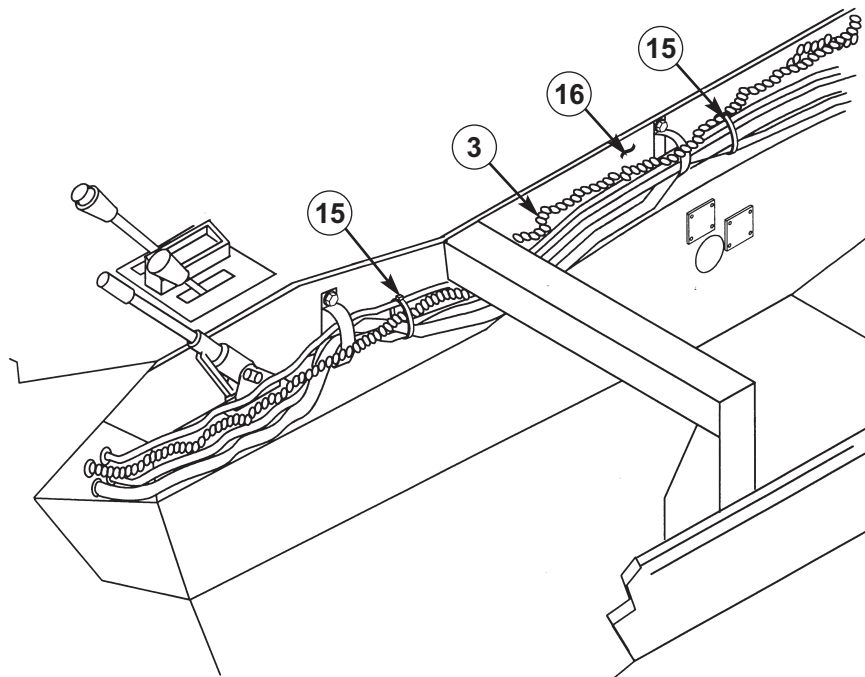
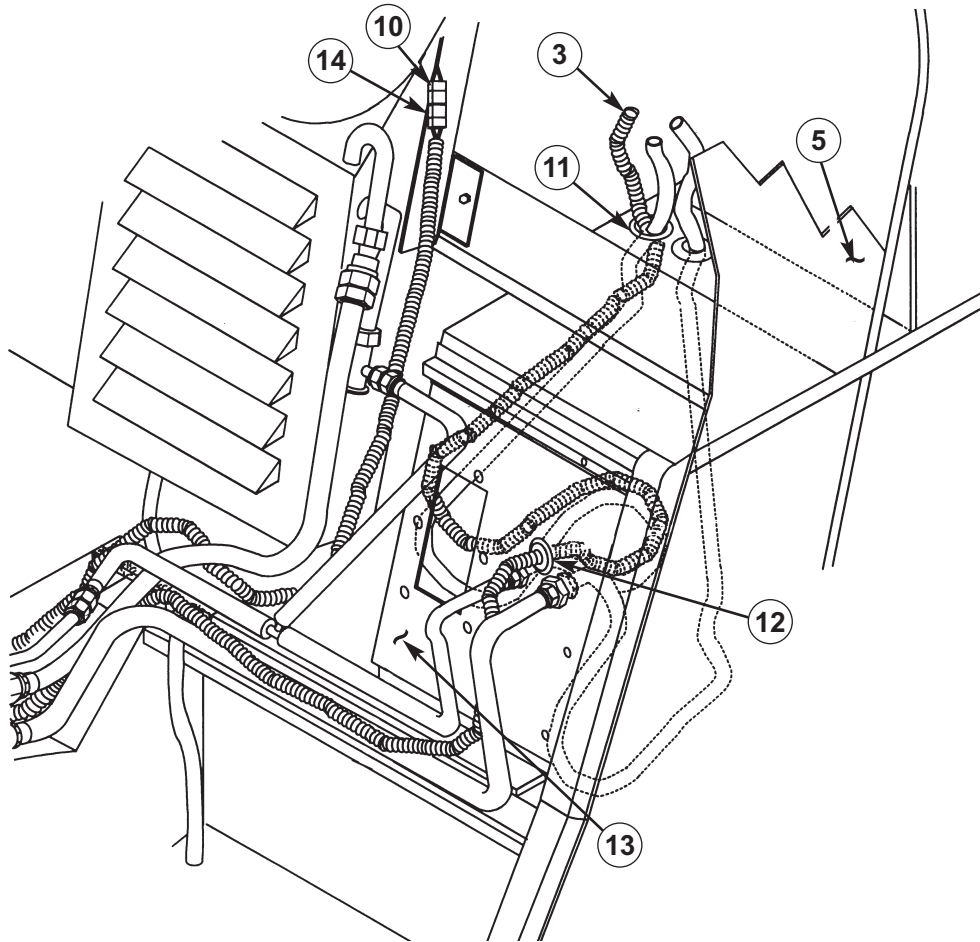
NOTE

Prior to removal tag leads for assembly

1. Remove four capscrews (7) and washers (6) securing A/C condenser (4) to left rear wheelwell (5).
2. Remove A/C condenser (4) from left rear wheelwell (5). Do not disconnect coolant lines.
3. Remove tiedown straps (8), as required, from A/C wiring harness (3) and fan grille (9).
4. Disconnect two A/C wiring harness connectors (2) from A/C condenser fan connectors (1).
5. Remove two A/C wiring harness connectors (2) from A/C wiring harness (3).
6. Route A/C wiring harness (3) down through grommet (11) at left rear wheelwell (5) and forward through grommet (12) at left rear wheelhouse (13).
7. Disconnect A/C wiring harness connector (14) from rear A/C evaporator connector (10).
8. Remove tiedown straps (15), as required, from A/C wiring harness (3) along left side tunnel (16).

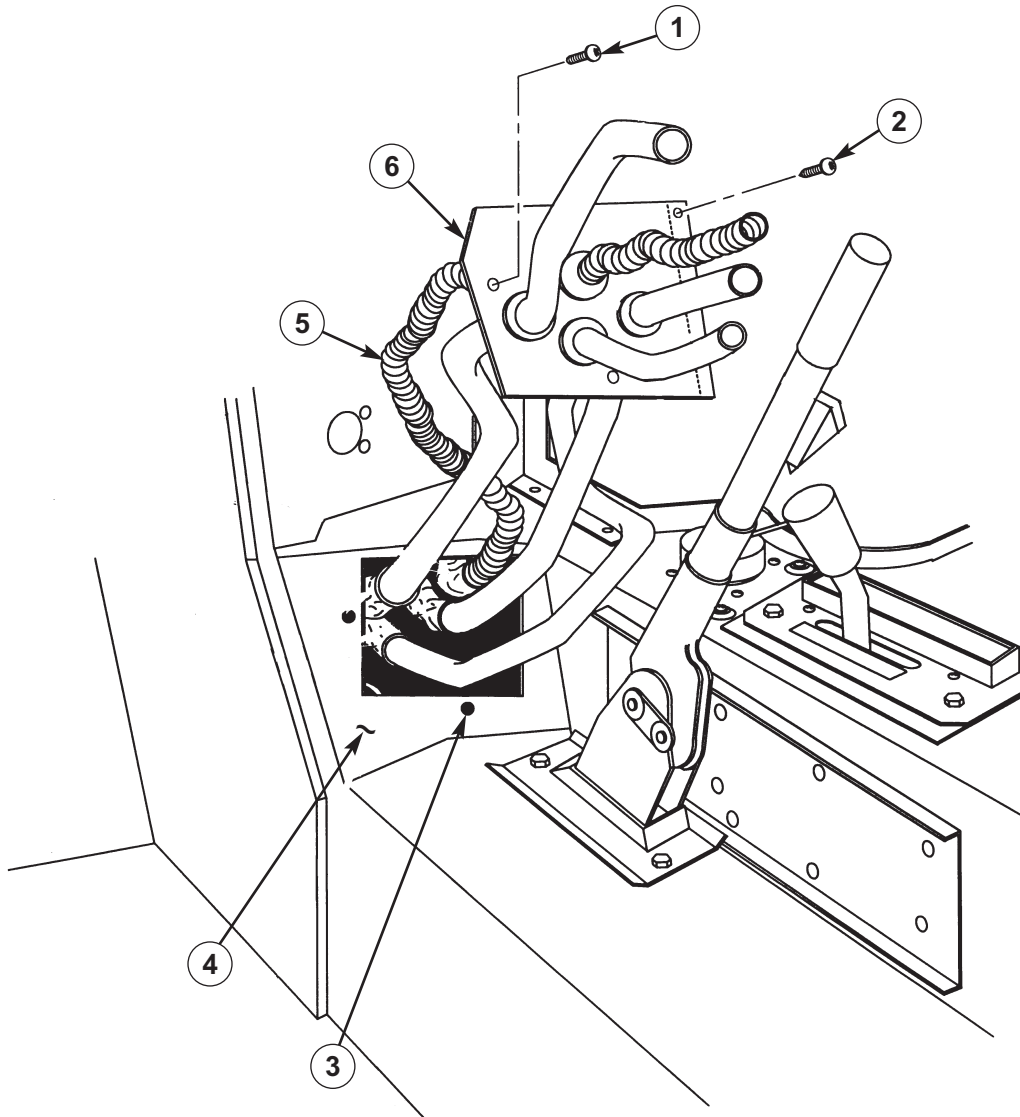


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

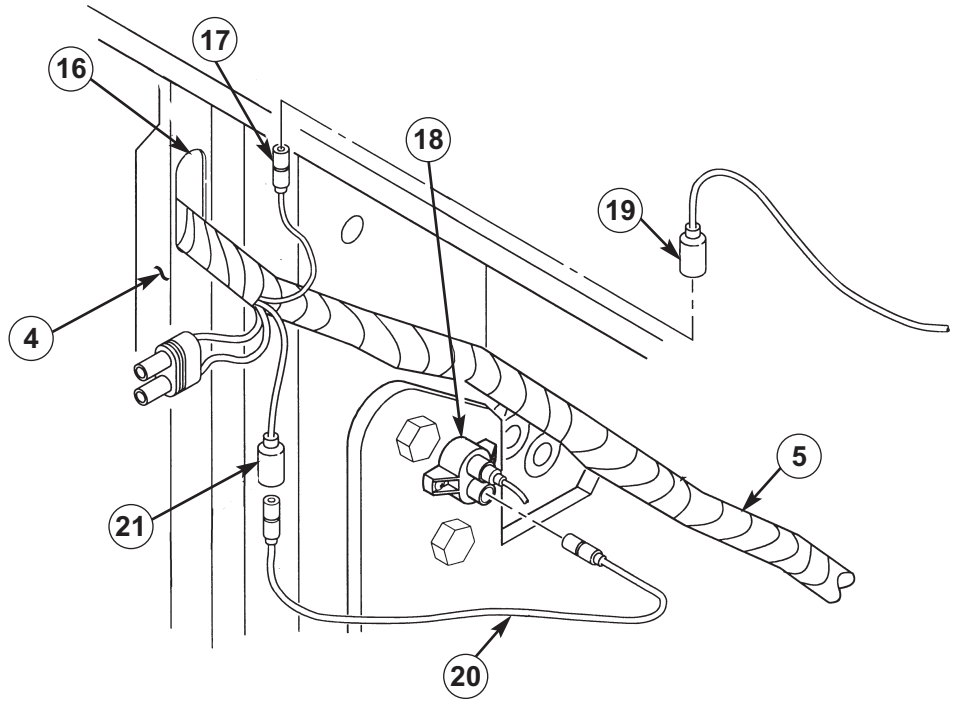
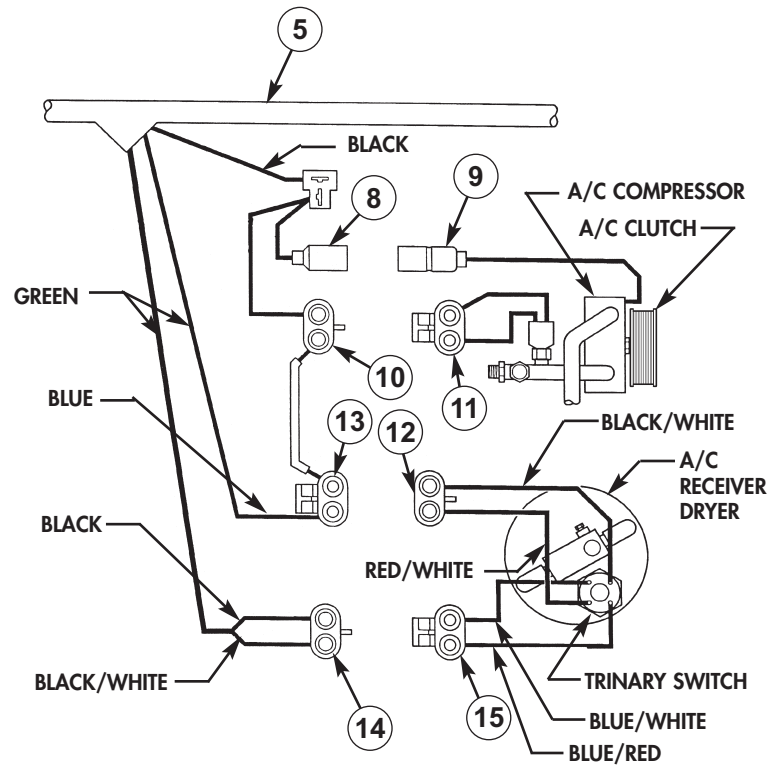
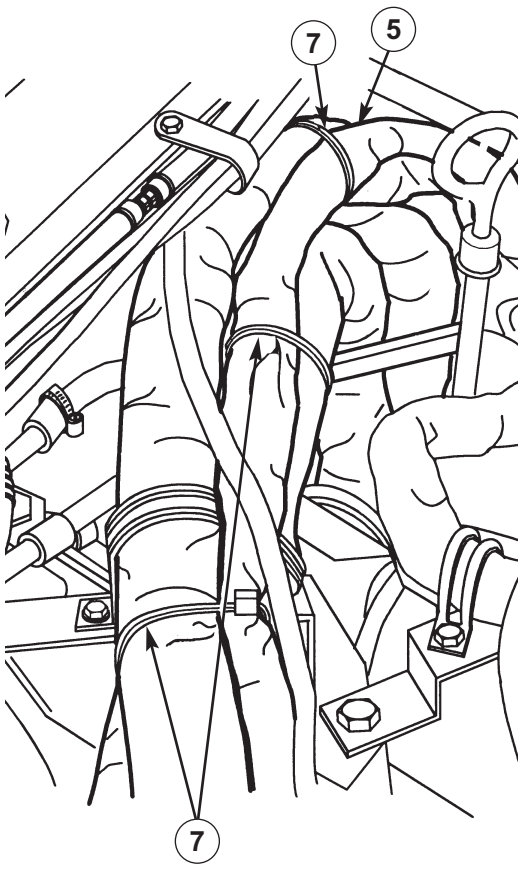


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

9. Remove two screws (1), screw (2), and CTIS cover (6) from plusnut (3) and vehicle body (4).
10. Remove tiedown straps (7), as required, from A/C wiring harness (5) in engine compartment.
11. Pull loose end of A/C wiring harness (5) up into engine compartment.
12. Disconnect A/C wiring harness connector (8) from A/C compressor clutch connector (9).
13. Disconnect A/C wiring harness connector (10) from pressure switch connector (11).
14. Disconnect A/C wiring harness connectors (13) and (14) from trinary switch connectors (12) and (15).
15. Disconnect A/C wiring harness connector (17) from de-ice ground wiring connector (19) near slot (16) in vehicle body.
16. Disconnect de-ice power jumper cable (20) from A/C wiring harness connector (21) and defroster switch circuit breaker (18).

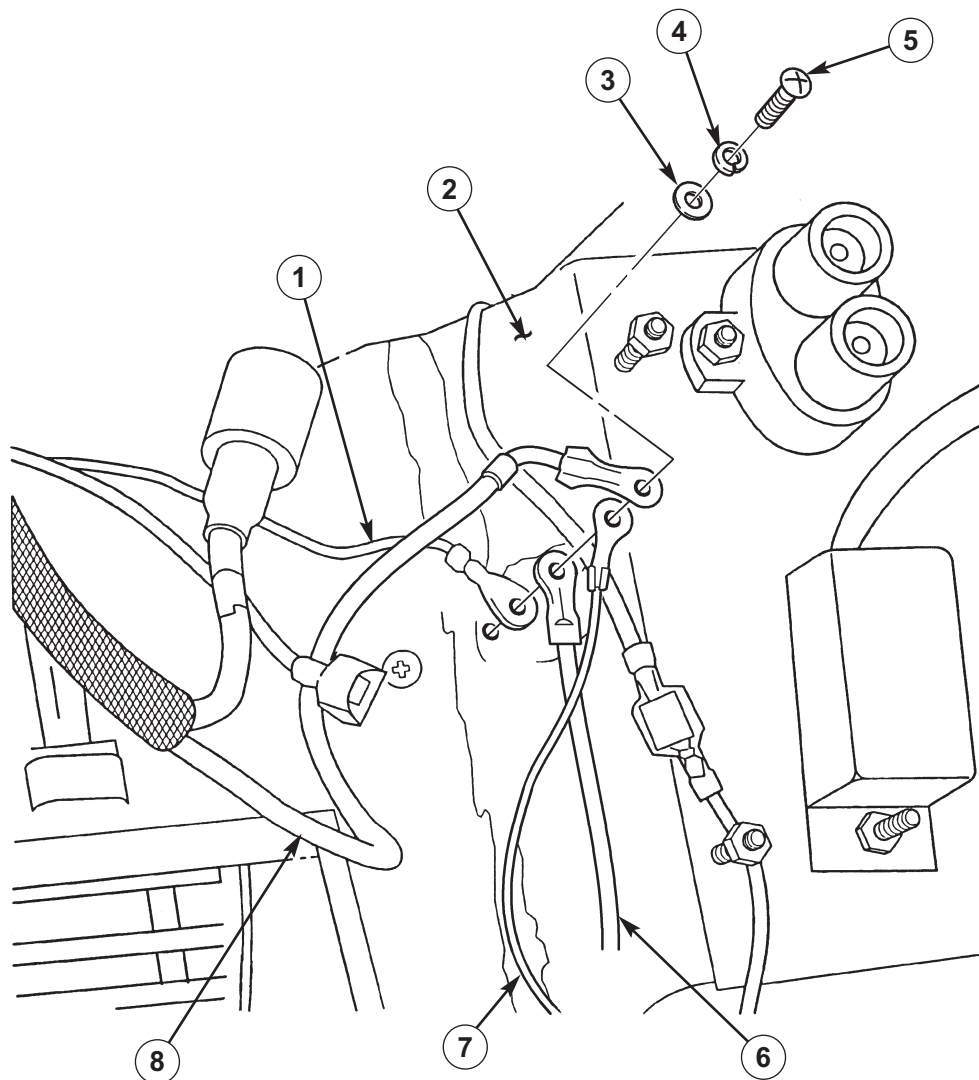


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

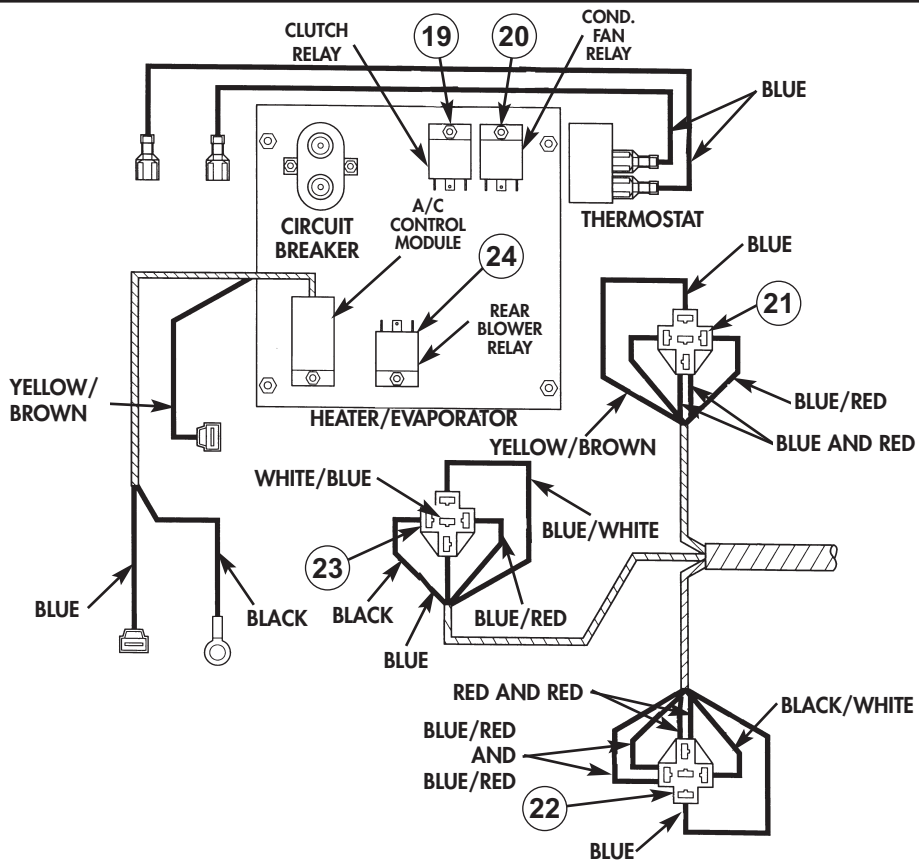
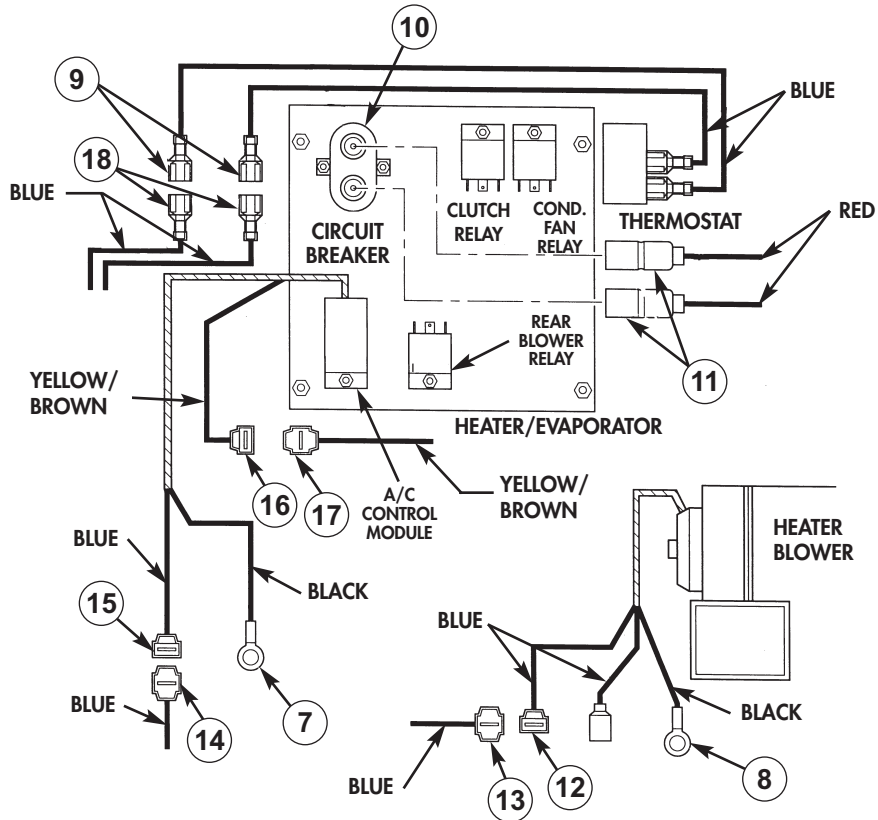


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

17. Remove screw (5), lockwasher (4), and washer (3) securing blower motor ground (8), A/C control module ground (7), A/C wiring harness ground (6), and vehicle harness ground (1) to heater/evaporator assembly (2). Discard lockwasher (4).
18. Remove tiedown straps, as required, from wiring at heater/evaporator assembly (2).
19. Disconnect two A/C wiring harness connectors (18) from thermostat jumper harness connectors (9).
20. Disconnect two A/C wiring harness connectors (11) from circuit breaker (10).
21. Disconnect A/C wiring harness connector (17) from A/C control module connector (16).
22. Disconnect A/C wiring harness connector (14) from A/C control module connector (15).
23. Disconnect A/C wiring harness connector (13) from blower motor connector (12).
24. Disconnect A/C wiring harness connector (21) from clutch relay (19).
25. Disconnect A/C wiring harness connector (22) from condenser fan relay (20).
26. Disconnect A/C wiring harness connector (23) from rear blower relay (24).

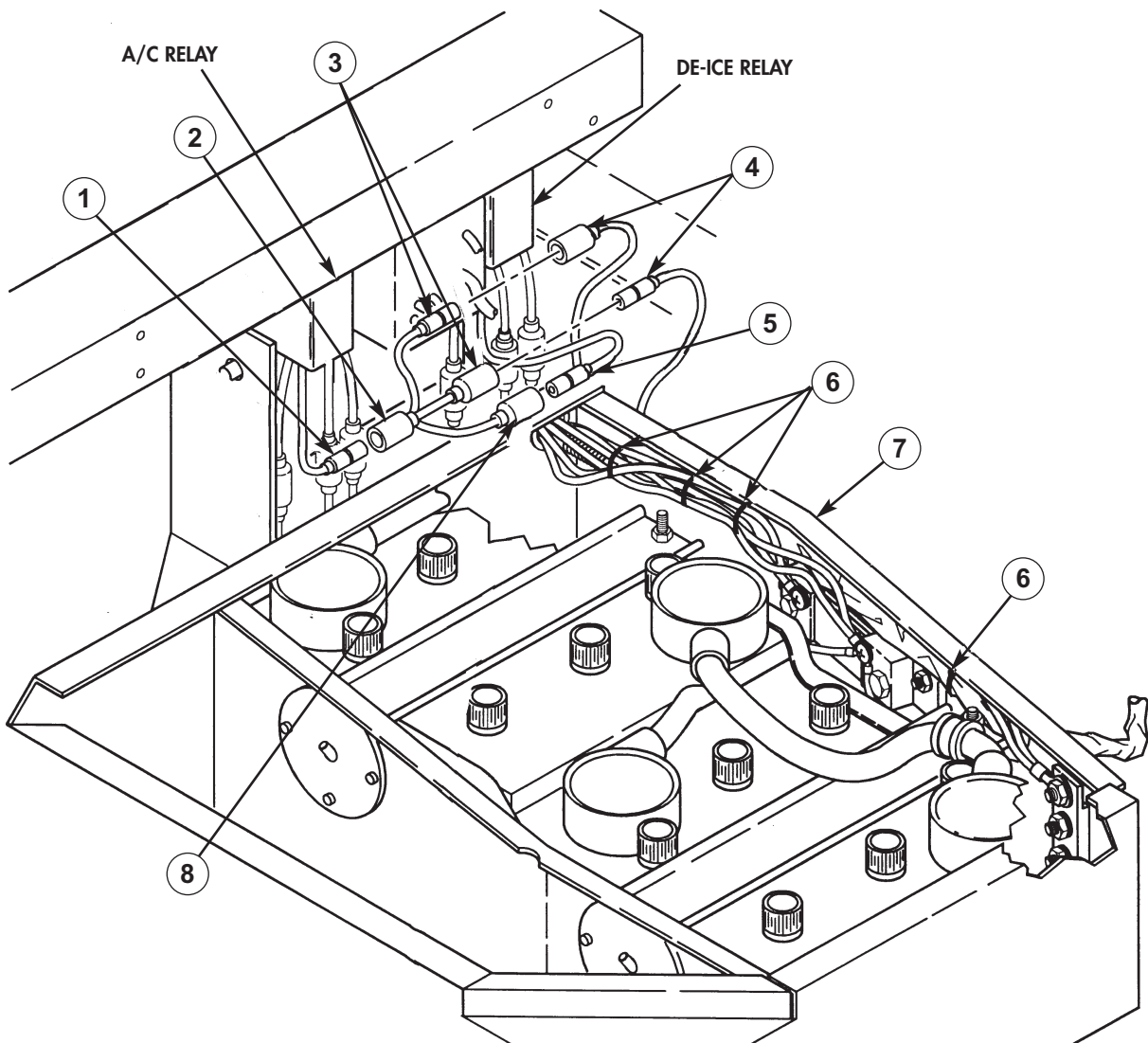


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

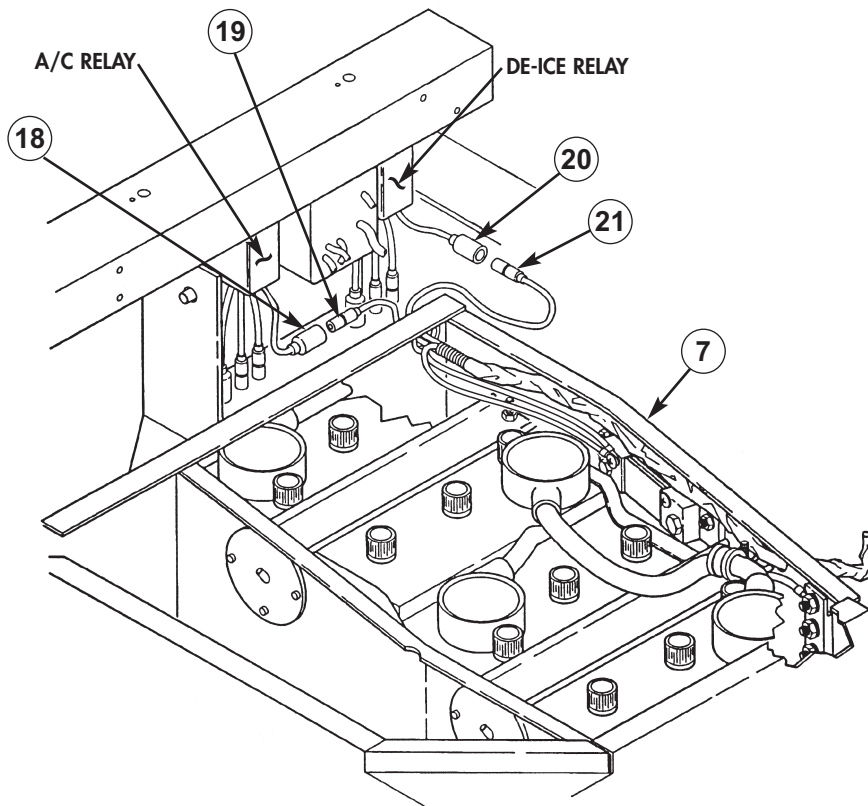
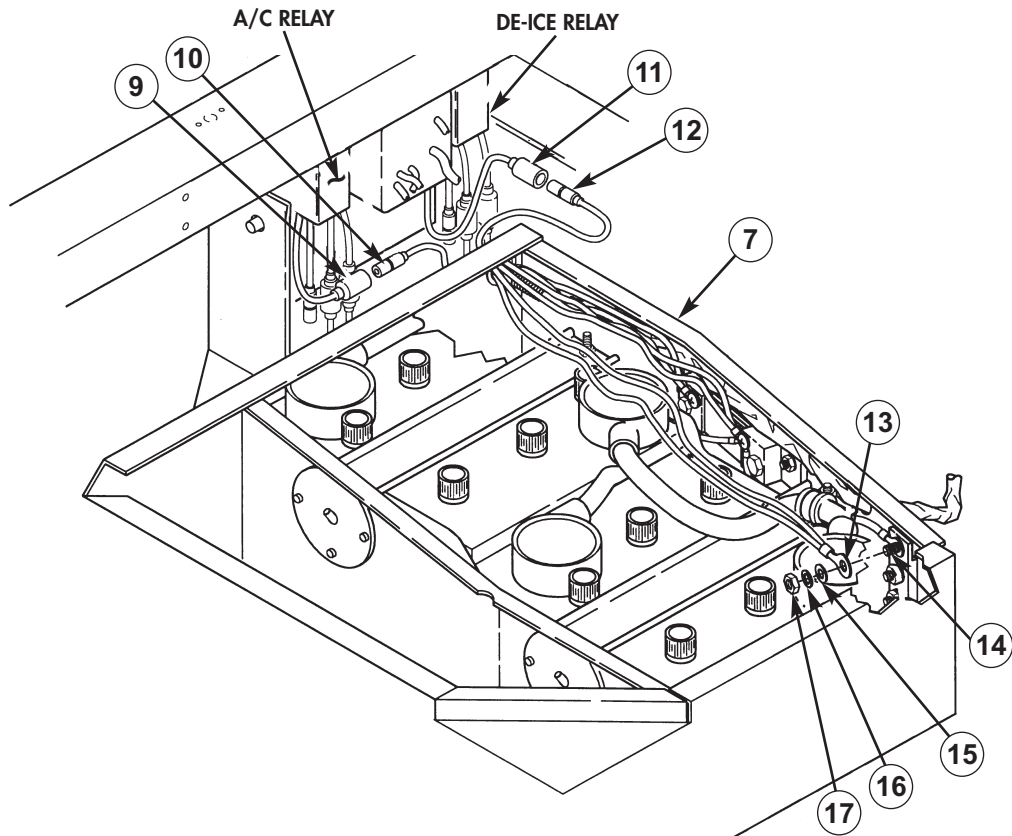


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

27. Remove tiedown straps (6), as required, from wiring in battery box (7).
28. Disconnect two 29Z circuit connectors (4) from ignition jumper wiring connectors (3).
29. Disconnect ignition jumper wiring connector (8) from de-ice relay connector number one (5).
30. Disconnect ignition jumper wiring connector (2) from A/C relay connector number one (1).
31. Remove sealant from buss bar top terminal (14).
32. Remove nut (17), lockwasher (16), washer (15), and de-ice power wiring connector (13) from buss bar top terminal (14). Discard lockwasher (16).
33. Disconnect de-ice power wiring connector (12) from de-ice relay connector number three (11).
34. Disconnect de-ice power wiring connector (10) from A/C relay connector number three (9).
35. Disconnect A/C wiring harness connector (21) from de-ice relay connector number four (20).
36. Disconnect A/C wiring harness connector (19) from A/C relay connector number four (18).



25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

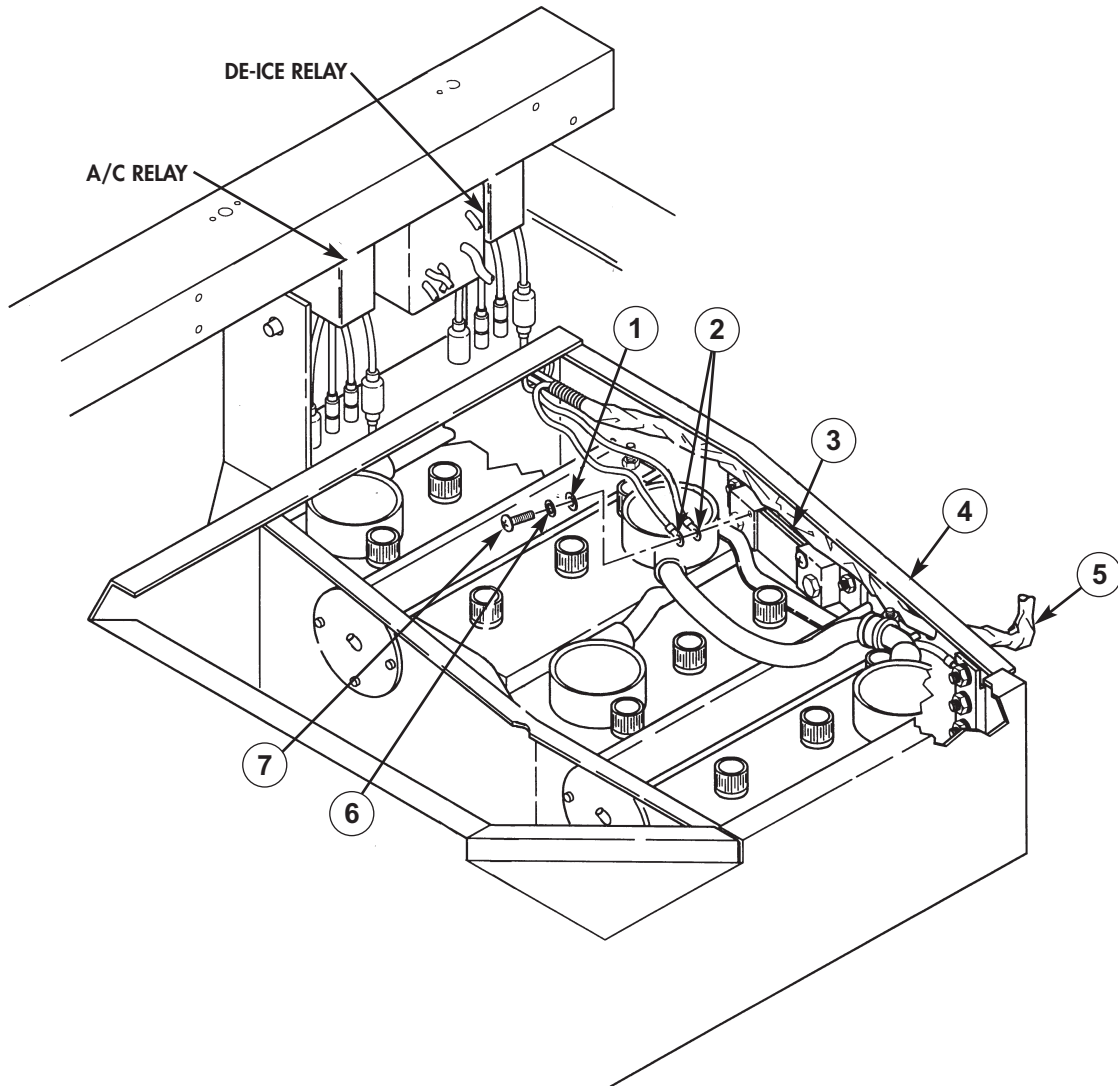


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

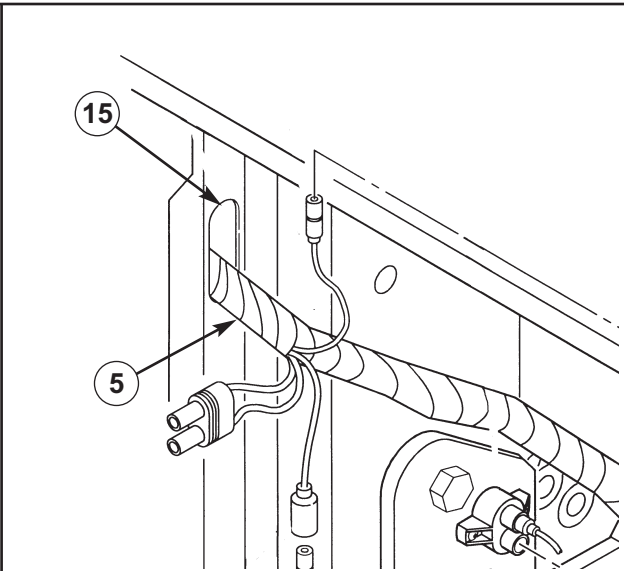
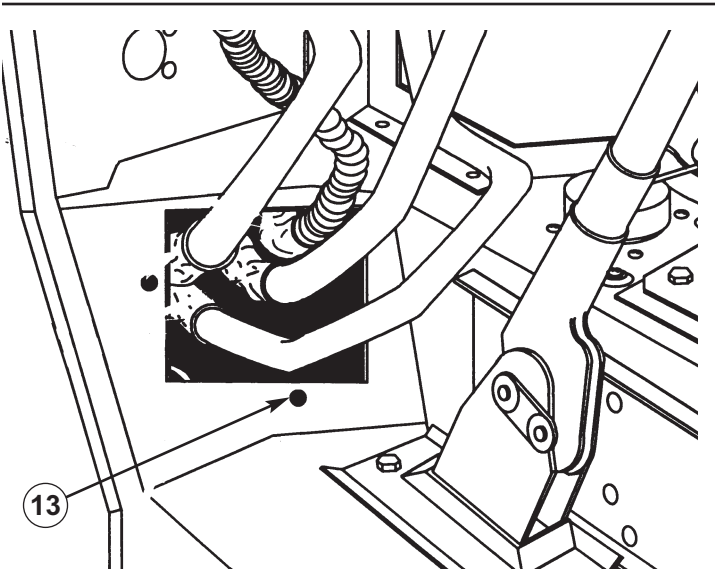
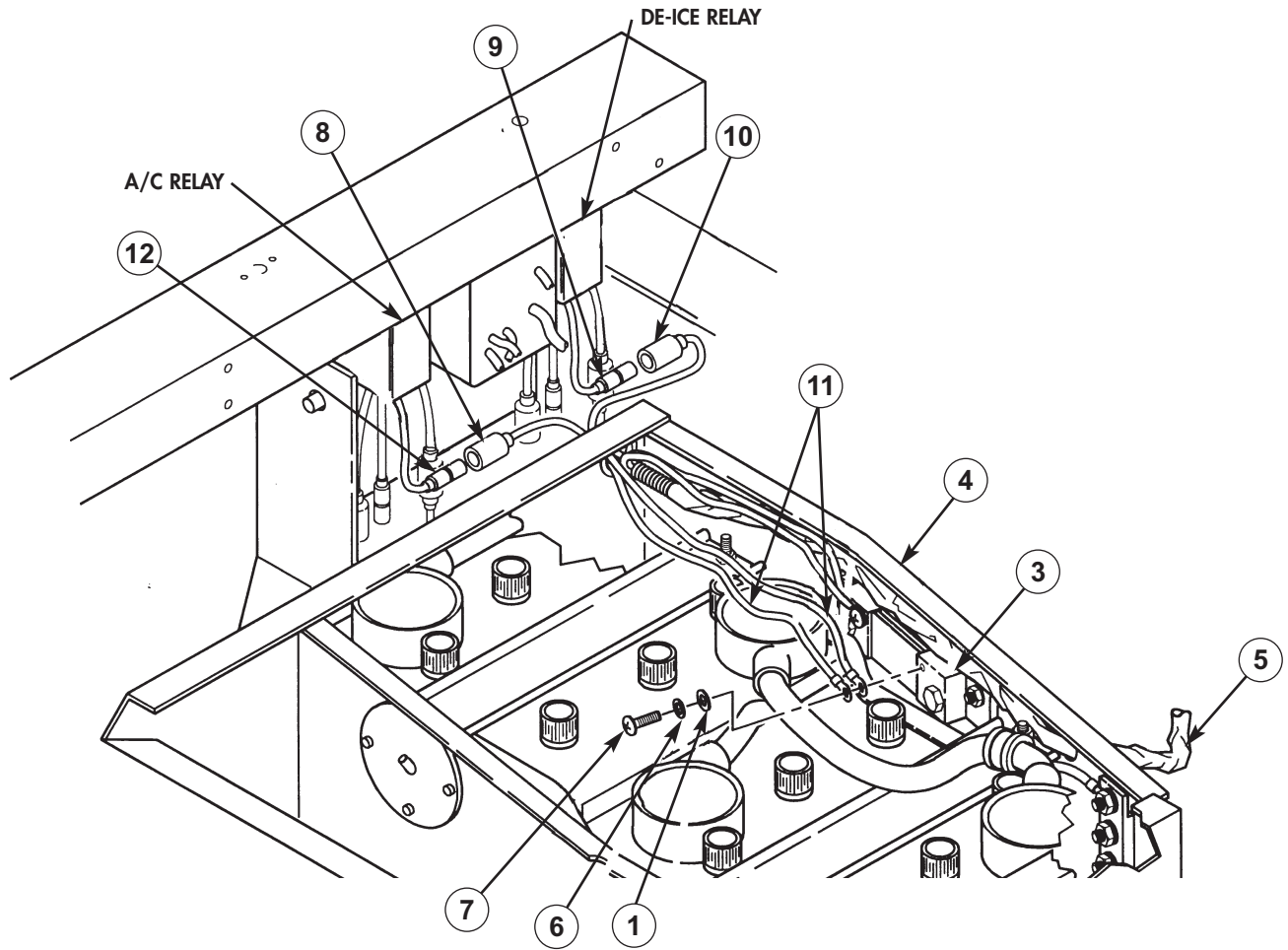
37. Remove screw (7), lockwasher (6), washers (1), and two A/C wiring harness ground connectors (2) from shunt (3). Discard lockwasher (6).
38. Route A/C wiring harness (5) forward and out of battery box (4).
40. Disconnect grounding wiring connector (10) from de-ice relay connector number two (9).
41. Disconnect grounding wiring connector (8) from A/C relay connector number two (12).
42. Remove screw (7), lockwasher (6), washer (1), and two grounding wire connectors (11) at forward end of shunt (3). Discard lockwasher (6).
43. Route A/C wiring harness (5) through slot (15) in vehicle body and up into engine compartment. Remove A/C wiring harness (5) from vehicle.

b. Inspection

Refer to para. 10-56 for plusnut (13) inspection and replacement.



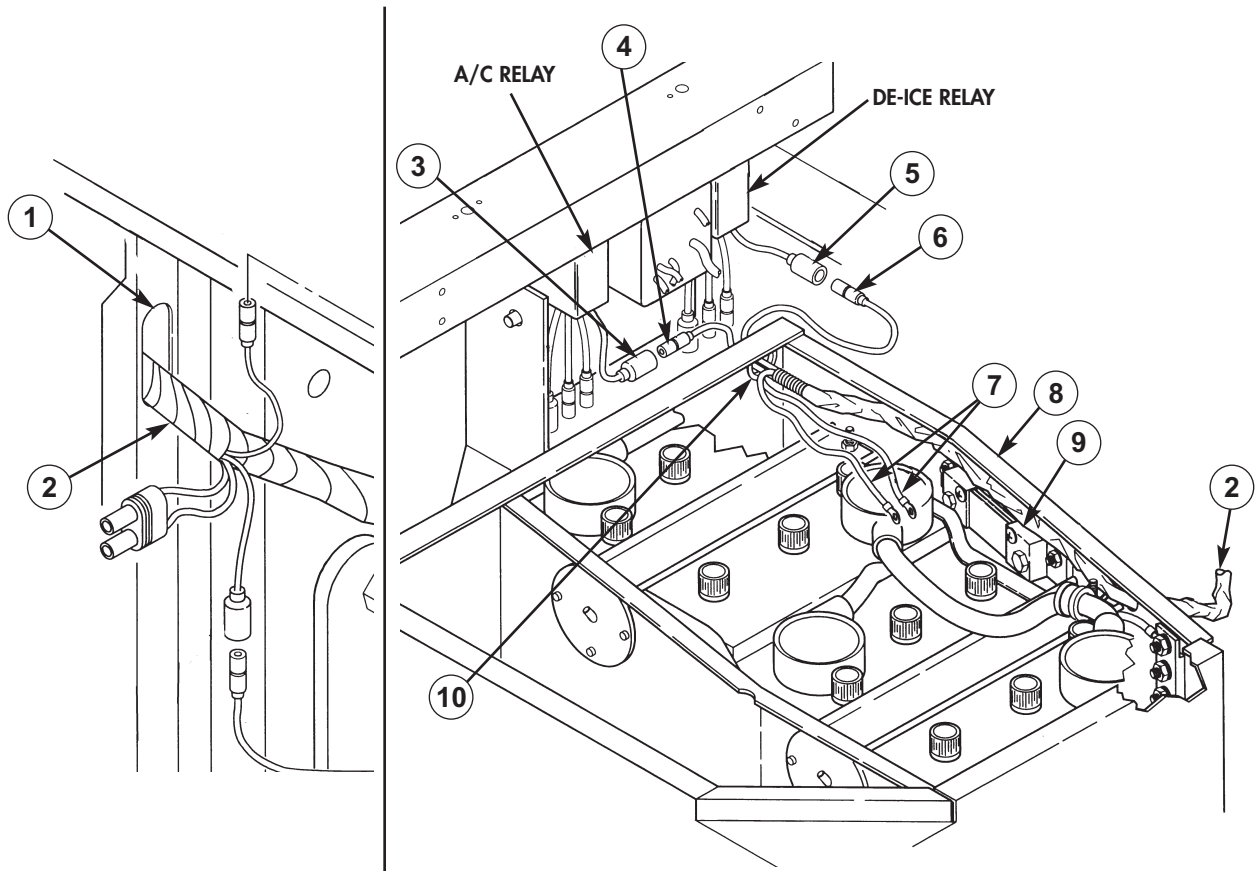
25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)



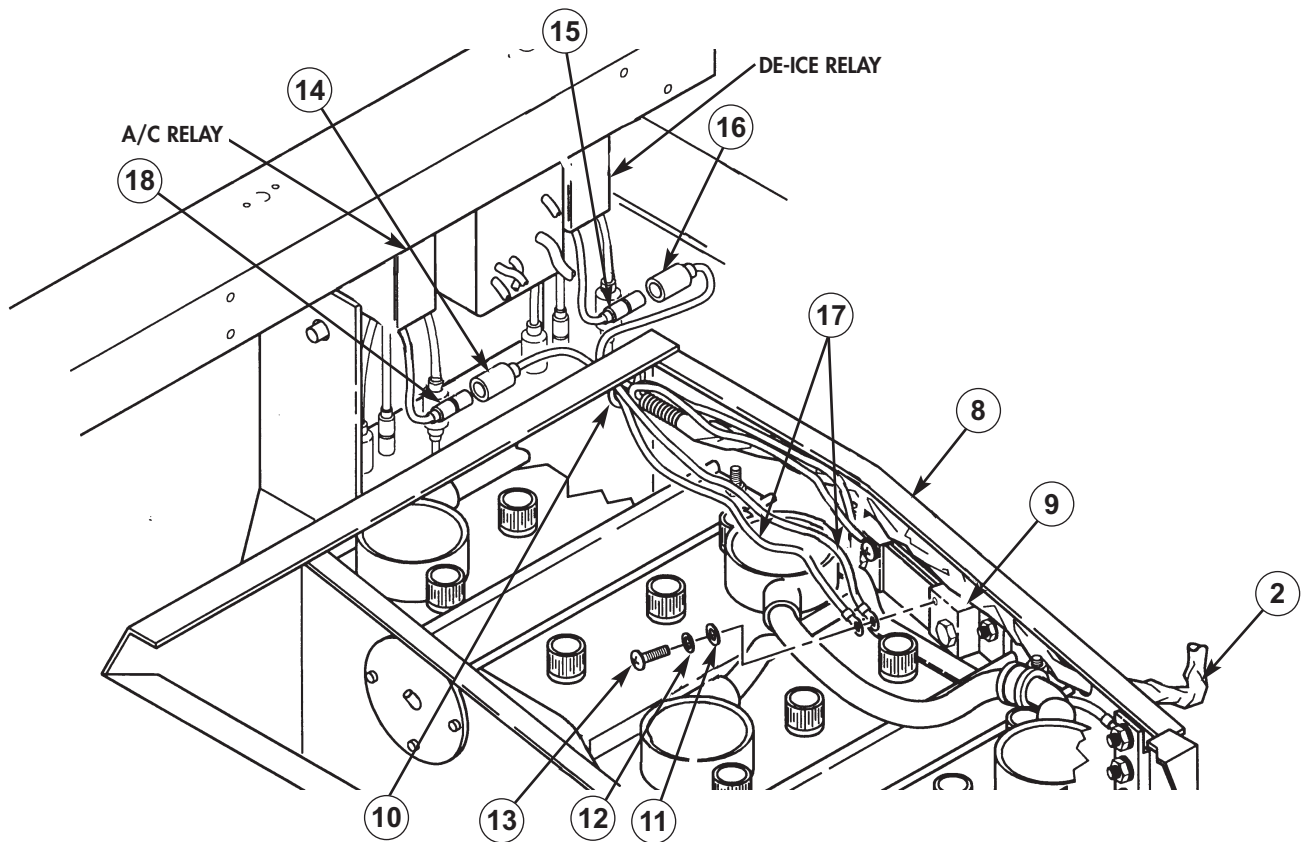
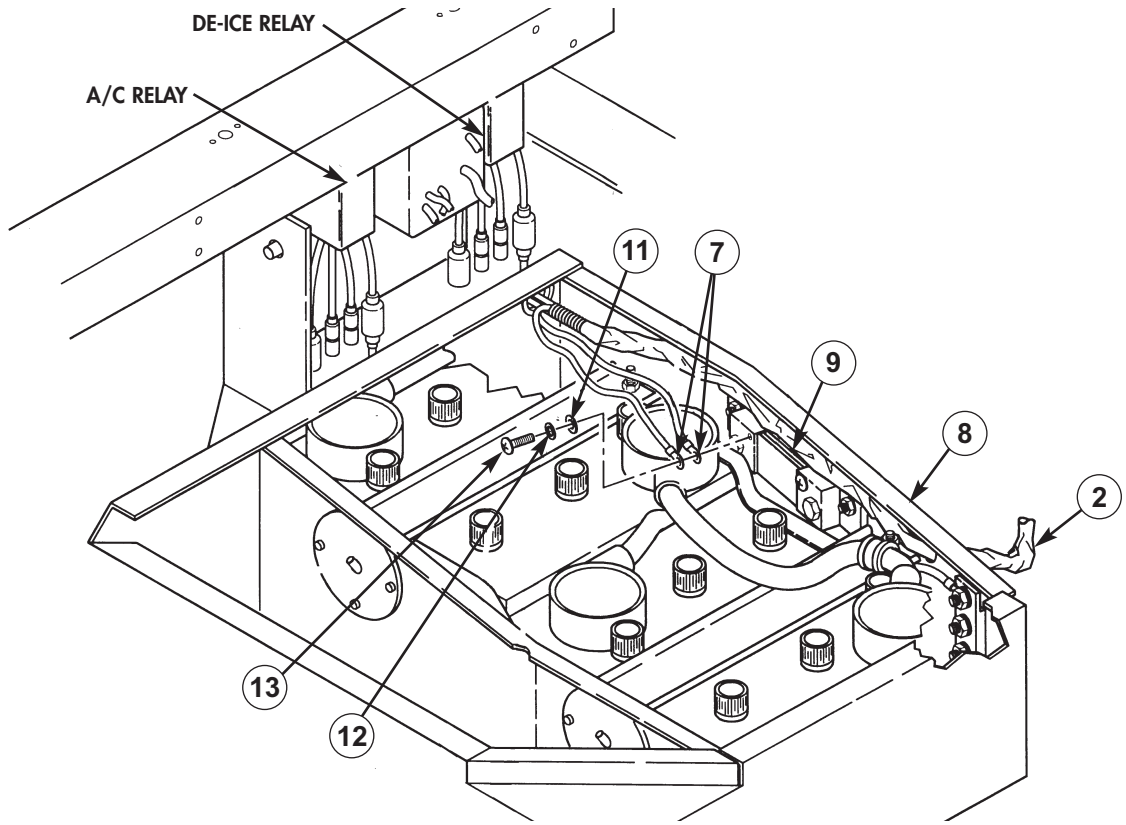
25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

c. Installation

1. Route section of A/C wiring harness (2) down along right side of engine compartment and through slot (1) in vehicle body.
2. Route section of A/C wiring harness (2) with ground connectors (7), de-ice power connector (6), and A/C power connector (4) through forward access hole in battery box (8).
3. Continue routing de-ice power connector (6) and A/C power connector (4) through grommet (10) at rear end of battery box (8).
4. Connect A/C wiring harness de-ice power connector (6) to de-ice relay connector number four (5).
5. Connect A/C wiring harness A/C power connector (4) to A/C relay connector number four (3).
6. Connect two A/C wiring harness ground connectors (7) to rear end of shunt (9) and secure with washer (11), lockwasher (12), and screw (13).
7. Position A/C wiring harness (2) under inboard flange of battery box (8).
8. Connect grounding wiring connector (16) to de-ice relay connector number two (15).
9. Connect grounding wiring connector (14) to A/C relay connector number two (18).
10. Route two grounding wiring connectors (17) forward through grommet (10) at rear end of battery box (8).
11. Connect two grounding wire connectors (17) to forward end of shunt (9) and secure with washer (11), lockwasher (12), and screw (13).

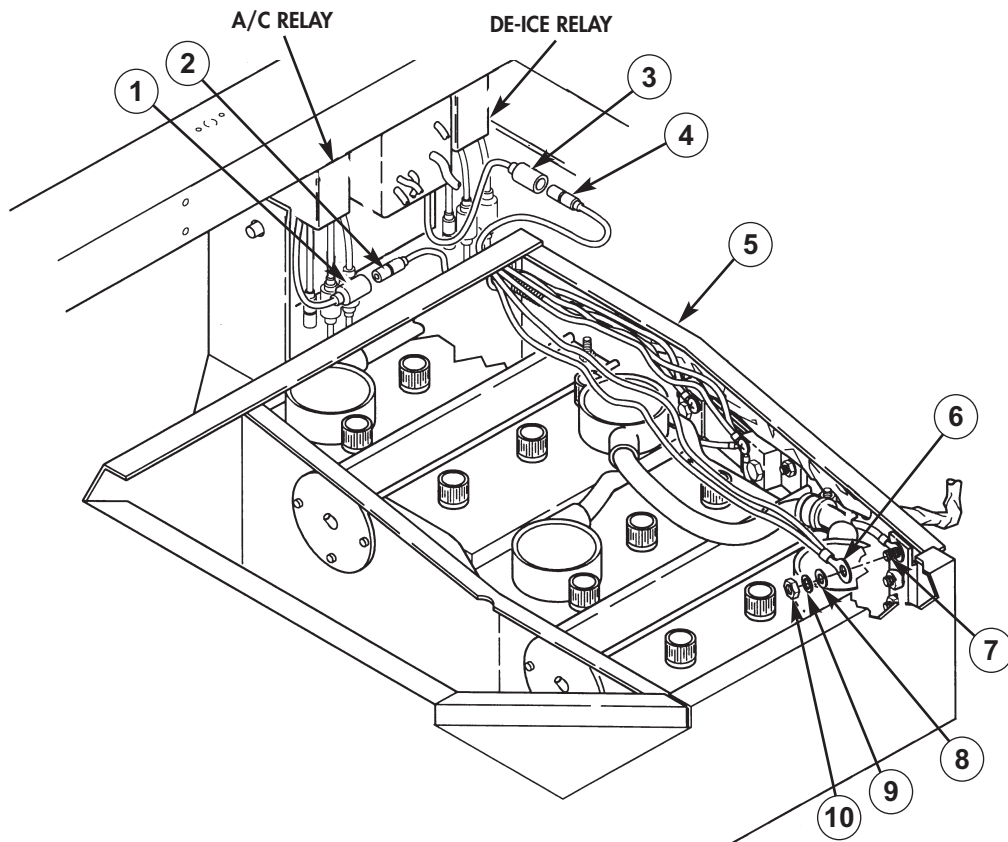


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

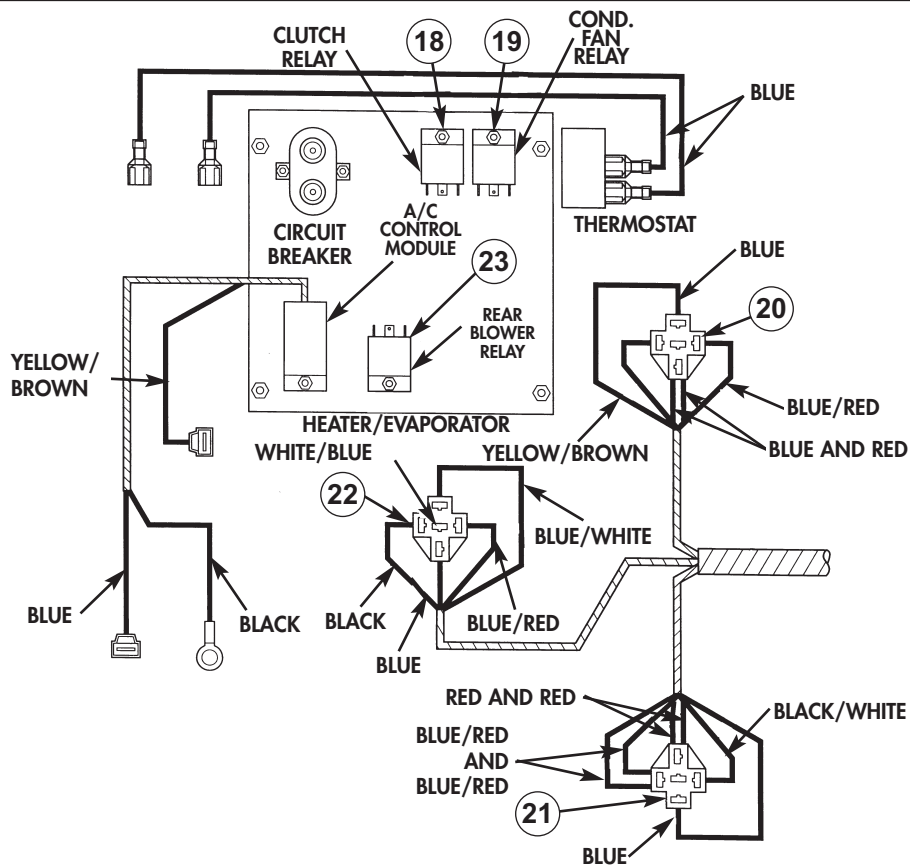
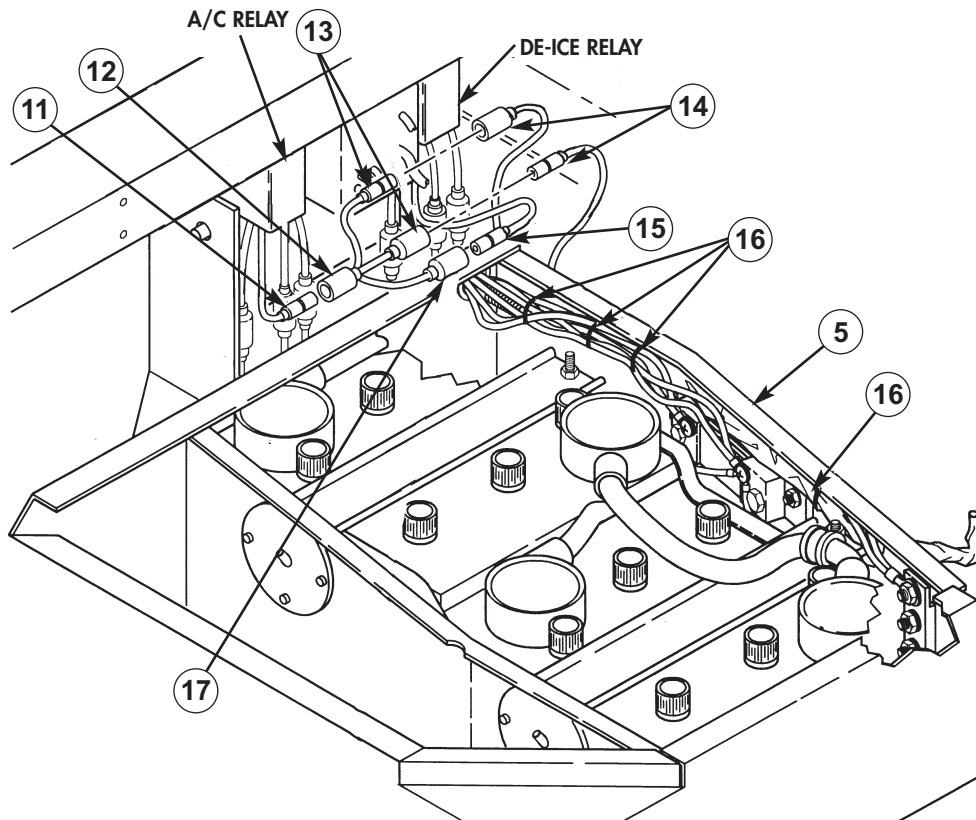


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

12. Connect de-ice power wiring connector (4) to de-ice connector number three (3).
13. Connect de-ice power wiring connector (2) to A/C relay connector number three (1).
14. Route de-ice power wiring connector (6) forward through grommet at rear end of battery box (5).
15. Connect de-ice power wiring connector (6) to buss bar top terminal (7) and secure with washer (8), lockwasher (9), and nut (10).
16. Apply sealing compound to buss bar top terminal (7).
17. Connect two 29Z circuit connectors (14) to ignition jumper wiring connectors (13).
18. Connect ignition jumper wiring connector (17) to de-ice relay connector number one (15).
19. Connect ignition jumper wiring connector (12) to A/C relay connector number one (11).
20. Install tiedown straps (16), as required, on wiring at inboard flange of battery box (5).
21. Connect A/C wiring harness connector (22) to rear blower relay (23).
22. Connect A/C wiring harness connector (21) to condenser fan relay (19).
23. Connect A/C wiring harness connector (20) to clutch relay (18).

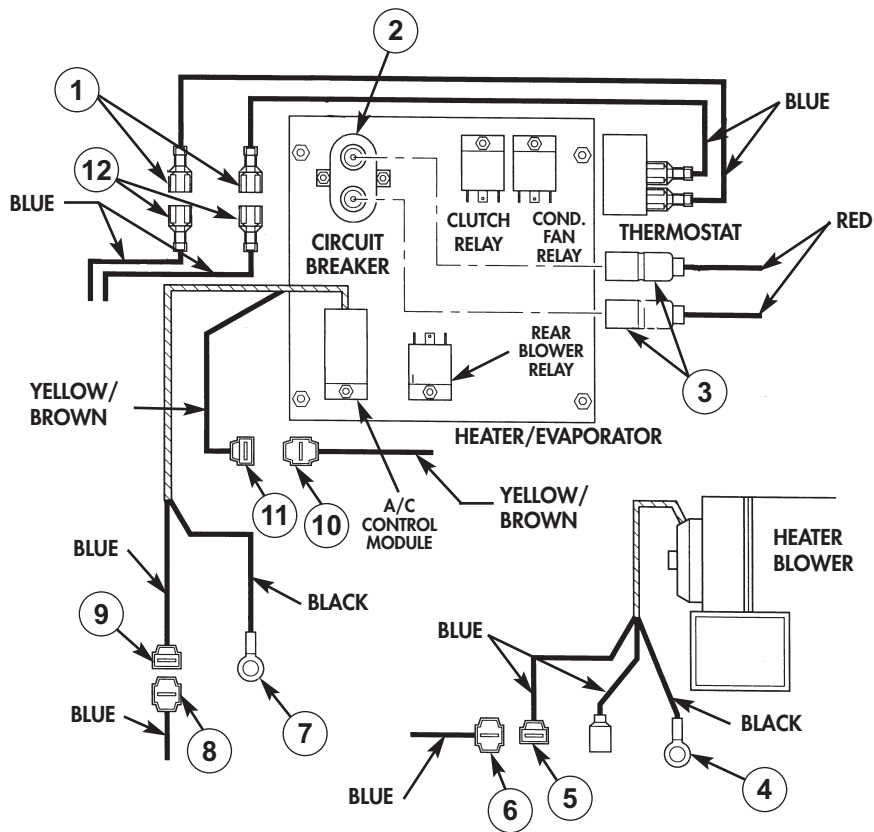


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

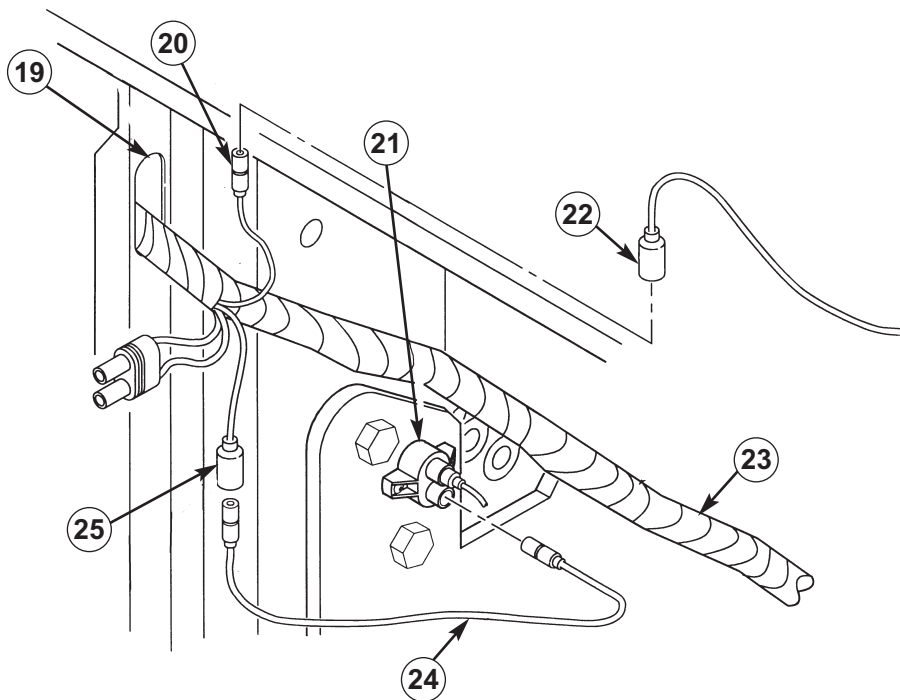
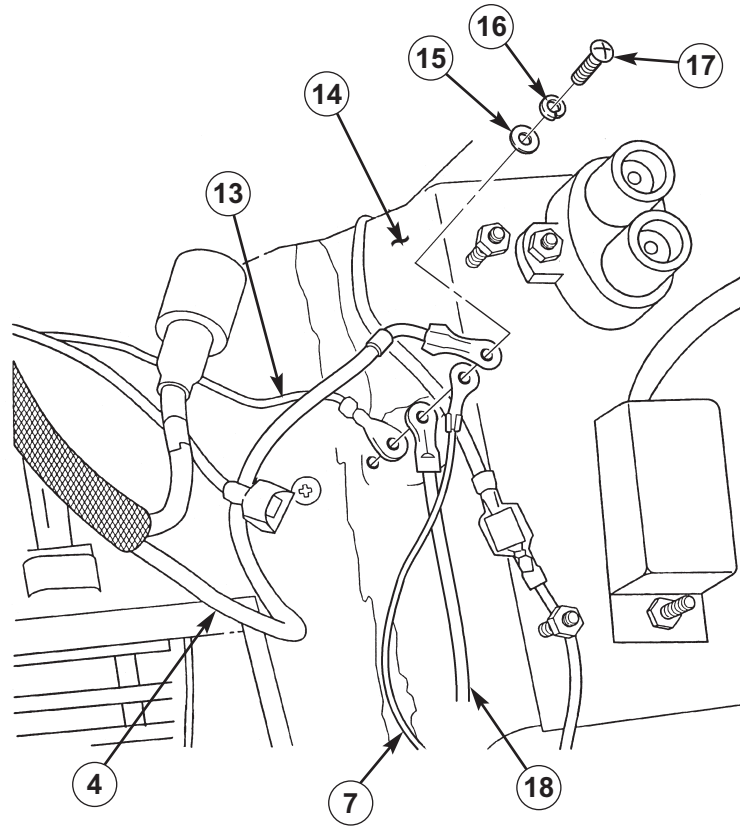


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

24. Connect two A/C wiring harness connectors (3) to circuit breaker (2).
25. Connect two A/C wiring harness connectors (12) to thermostat jumper harness connectors (1).
26. Connect A/C wiring harness connector (11) to A/C control module connector (10).
27. Connect A/C wiring harness connector (8) to A/C control module connector (9).
28. Connect A/C wiring harness connector (6) to blower motor connector (5).
29. Connect vehicle harness ground (13), blower motor ground (4), A/C control module ground (7), and A/C wiring harness ground (18) to heater/evaporator assembly (14) and secure with washer (15), lockwasher (16), and screw (17).
30. Connect A/C wiring harness (23) de-ice ground connector (20) to de-ice ground wiring connector (22).
31. Connect de-ice power jumper cable (24) to A/C wiring harness de-ice power connector (25) and defroster switch circuit breaker (21) near slot (19) in vehicle body.
32. Secure A/C wiring harness (23) to heater/evaporator assembly (14) with tiedown straps as required.

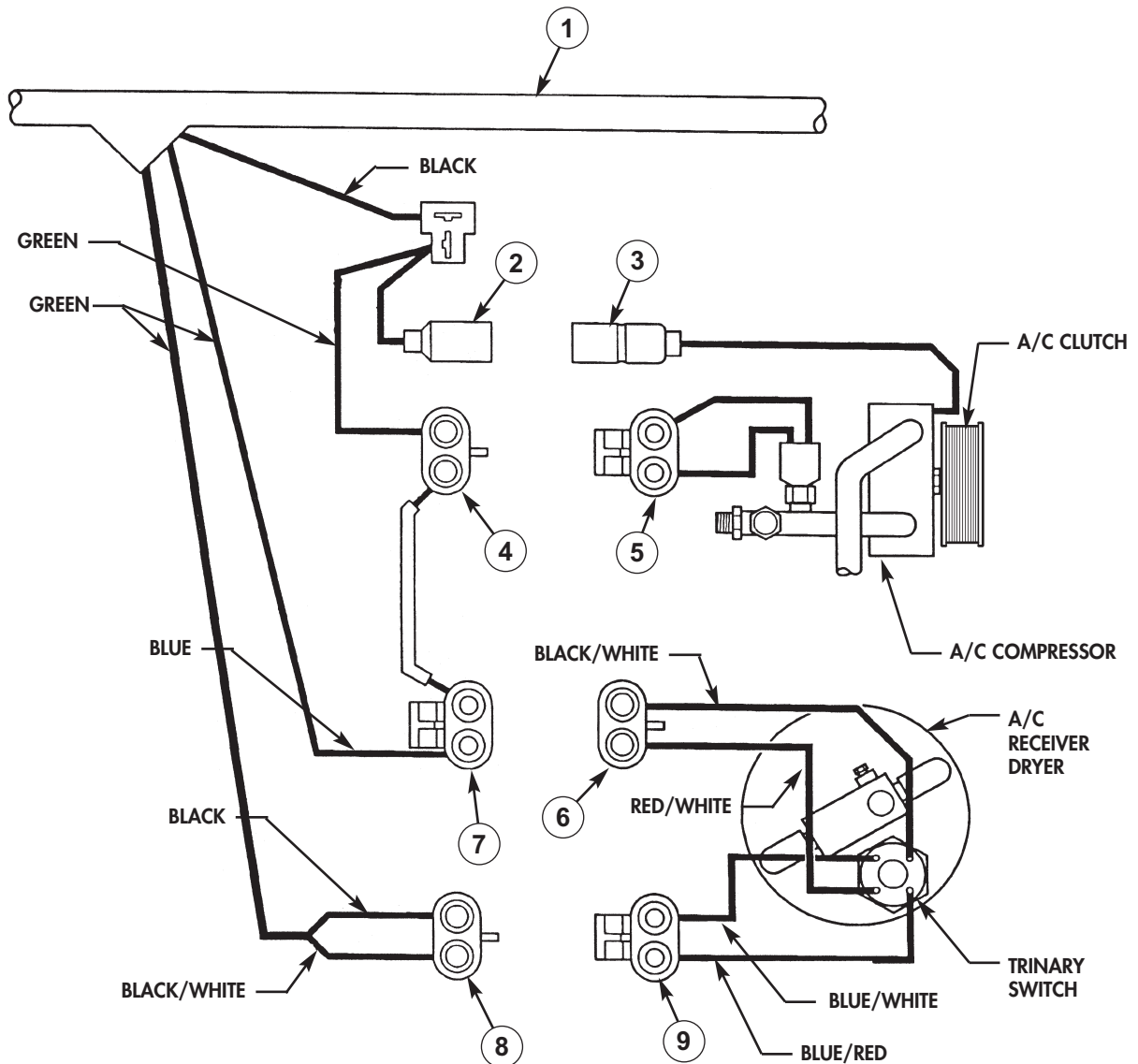


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

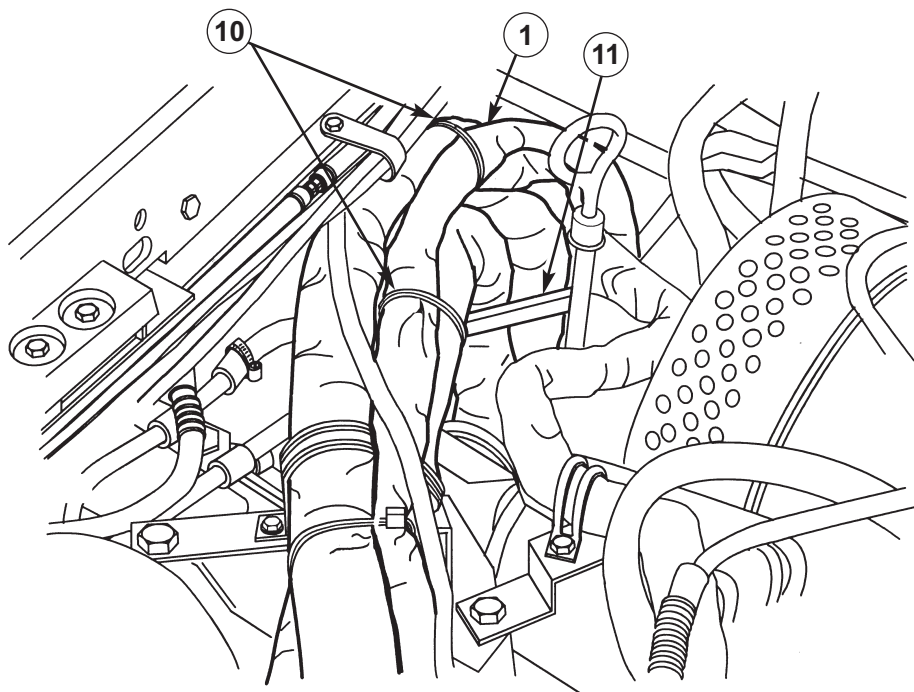
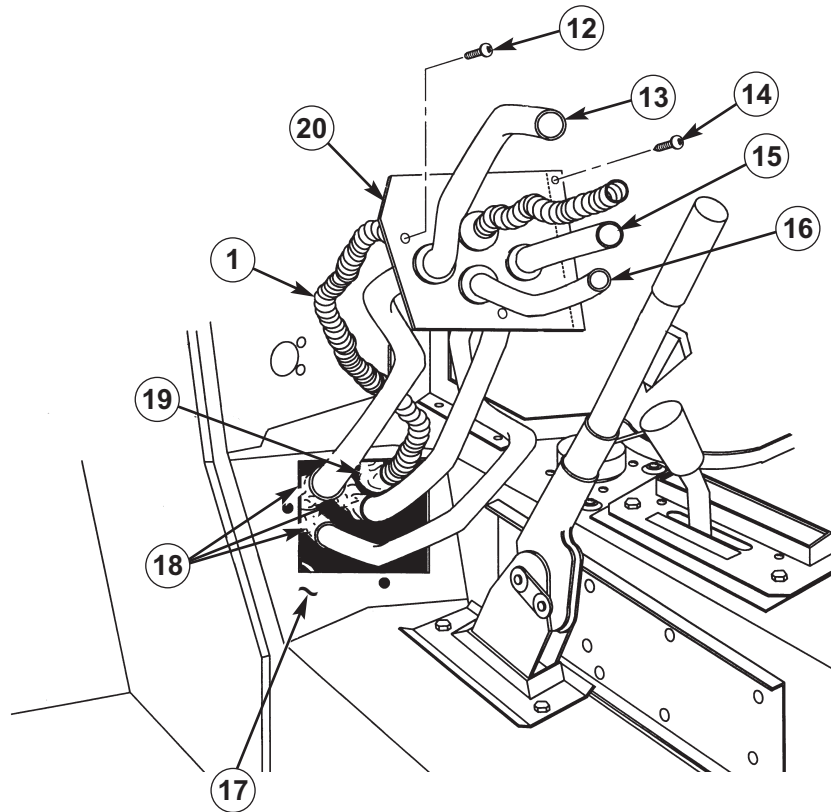


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

33. Connect A/C wiring harness connectors (7) and (8) to trinary switch connectors (6) and (9).
34. Connect A/C wiring harness connector (4) to pressure switch connector (5).
35. Connect A/C wiring harness connector (2) to A/C compressor clutch connector (3).
36. Route loose end of A/C wiring harness (1) across engine compartment, over upper oil dipstick support bracket (11), and down left side of engine compartment and secure with tiedown straps (10) as required.
37. Slide CTIS cover (20) forward until foil insulation (18) on A/C hose assemblies (15) and (16) and A/C hose (13) is in contact with CTIS cover (11).
38. Pull A/C wiring harness (1) rear until foil insulation (19) extends through CTIS cover (20) approximately 1-in. (2.5 cm).
39. Apply sealing compound to two screws (12), and install CTIS cover (20) on vehicle body (17) with screws (12) and screw (14).

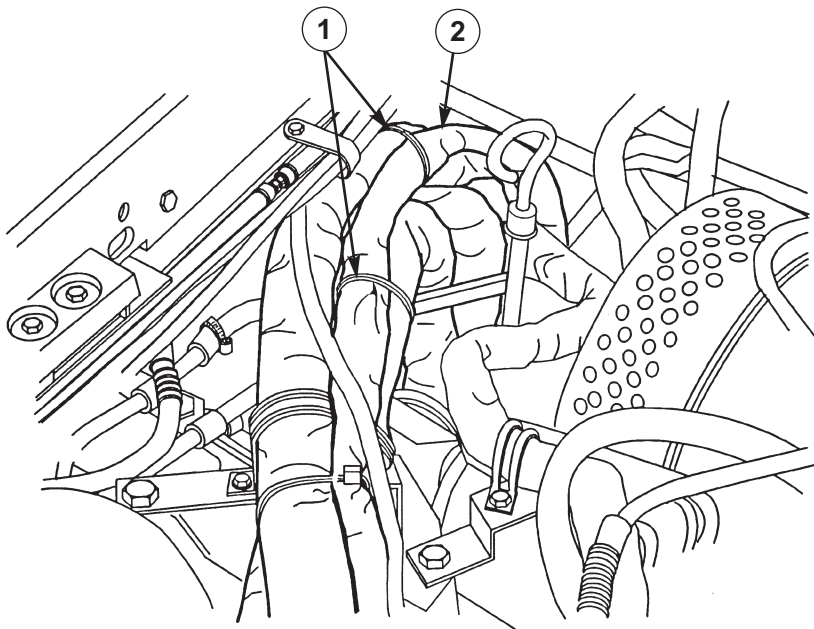
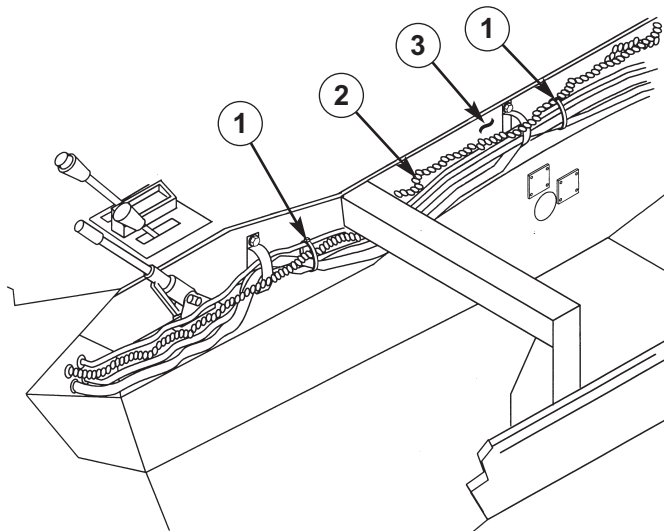


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

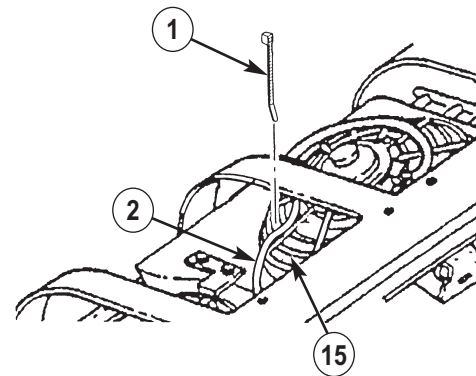
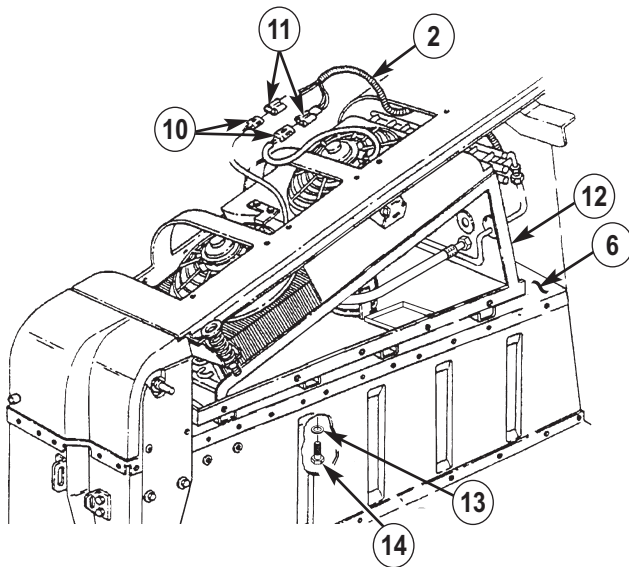
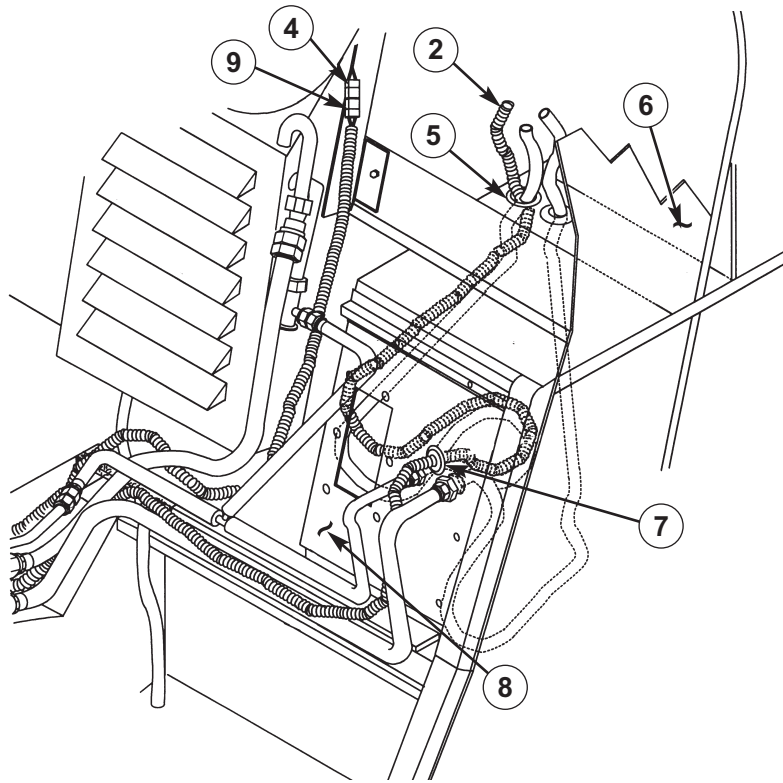


25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)

40. Route A/C wiring harness (2) rearward along left side tunnel (3).
41. Connect A/C wiring harness connector (9) to rear A/C evaporator connector (4).
42. Route remaining section of A/C wiring harness (2) through grommet (7) in left rear wheelhouse (8) and up through grommet (5) in left rear wheelwell (6).
43. Apply sealing compound to threads of four capscrews (14).
44. Install A/C condenser (12) on left rear wheelwell (6) with four washers (13) and capscrews (14). Tighten capscrews (14) to 6 lb-ft (8 N·m).
45. Route A/C wiring harness (2) over forward end of A/C condenser (12) and connect two A/C wiring harness connectors (11) to A/C condenser fan connectors (10).
46. Secure A/C wiring harness (2) to fan grille (15) with tiedown straps (1) as required.
47. Secure A/C wiring harness (2) along left side tunnel (3) with tiedown straps (1) as required.
48. Secure A/C wiring harness (2) in engine compartment with tiedown straps (1) as required.



25-35. A/C WIRING HARNESS AND CABLE MAINTENANCE (Cont'd)



- FOLLOW-ON TASKS:**
- Install A/C coolant line covers (para. 25-32).
 - Install air horn-to-air cleaner elbow (para. 3-15).
 - Install access hole cover plate (para. 25-36).
 - Install condenser fan access panel (para. 11-86).
 - Install heater/evaporator assembly cover (para. 25-21).
 - Install A/C front air distribution duct (para. 11-81).

25-36. ACCESS HOLE COVER PLATE MAINTENANCE

This task covers:

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETUP:

Applicable Models

M1114

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Automotive maintenance and repair: field
 maintenance, basic (Appendix B, Item 6)

Materials/Parts

Sealing compound (Appendix C, Item 63)

Manual References

TM 9-2320-387-24P

Equipment Condition

Left passenger seat removed (para. 10-45).

Maintenance Level

Direct Support

a. Removal

Remove six capscrews (4) and access hole cover plate (3) from left rear wheelhouse (2).

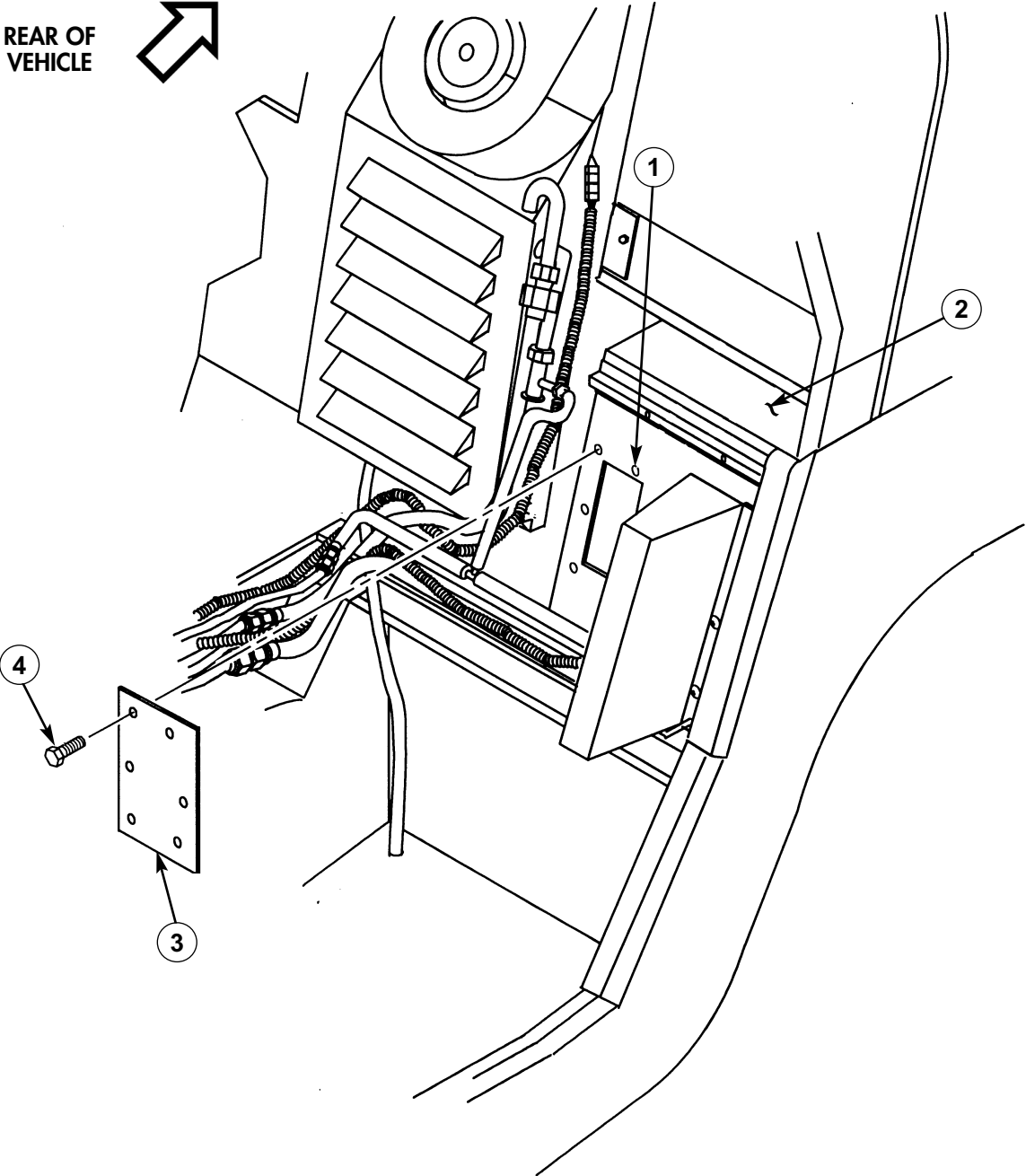
b. Inspection

Refer to para. 10-56 for plusnut (1) inspection and replacement.

c. Installation

1. Apply sealing compound to threads of six capscrews (4).
2. Install access hole cover plate (3) on left rear wheelhouse (2) with six capscrews (4). Tighten capscrews (4) to 6 lb-ft (8 N·m).

25-36. ACCESS HOLE COVER PLATE MAINTENANCE (Cont'd)



FOLLOW-ON TASK: Install left passenger seat (para. 10-45).

25-37. LEFT SIDE TUNNEL INTERIOR INSULATION REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Applicable Models

M1114

Manual References

TM 9-2320-387-24P

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Equipment Condition

A/C coolant line covers removed (para. 25-32).

Maintenance Level

Direct Support

Materials/Parts

Sealing compound (Appendix C, Item 72.1)

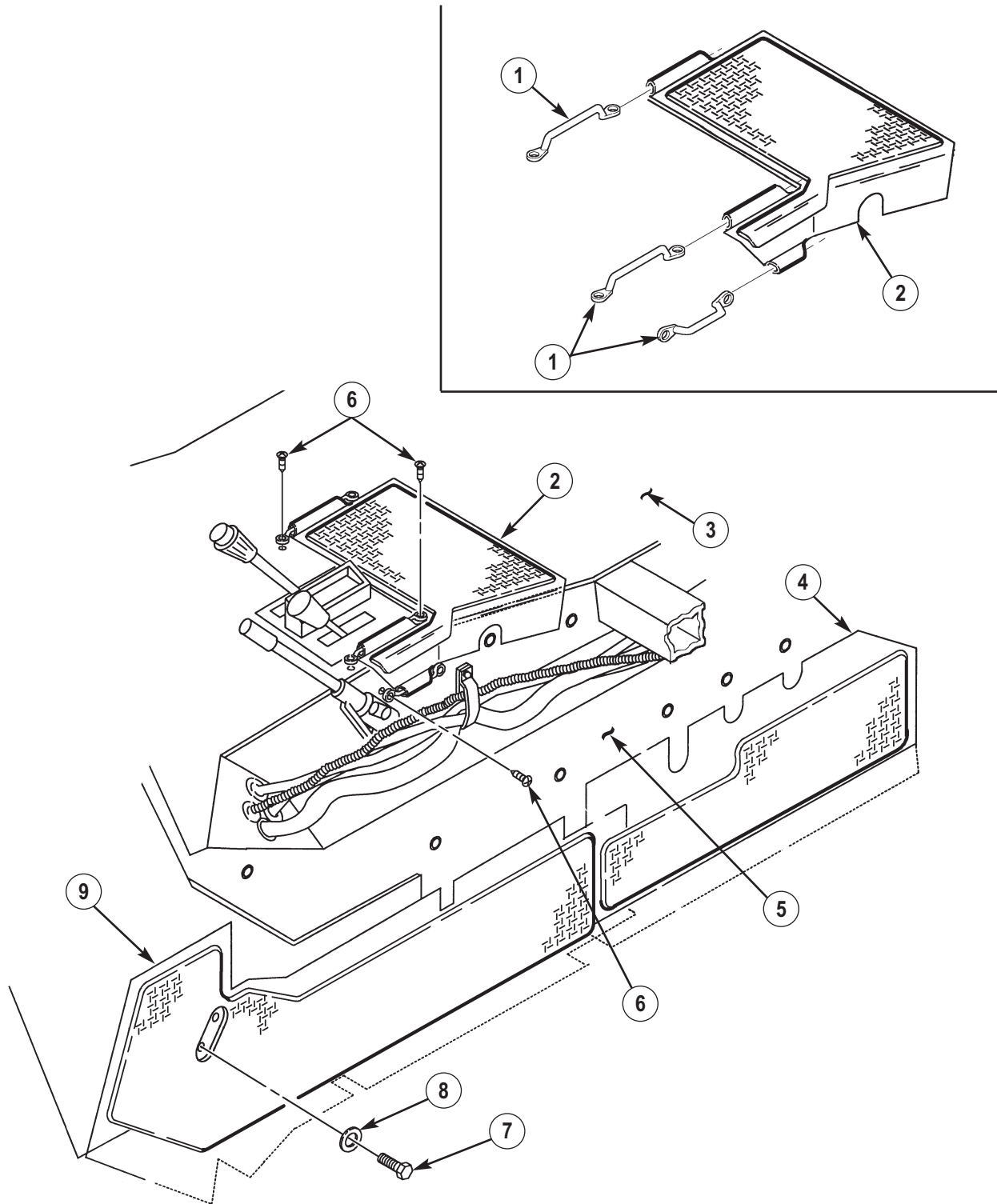
a. Removal

1. Remove left rear interior tunnel insulation (4) from left side tunnel (5).
2. Remove two capscrews (7), washers (8), and left front interior tunnel insulation (9) from left side tunnel (5).
3. Remove six screws (6) and left front top tunnel insulation (2) from tunnel (3).
4. Remove three interior insulation retainers (1) from left front top tunnel insulation (2).

b. Installation

1. Install three interior insulation retainers (1) on left front top tunnel insulation (2).
2. Install left front top tunnel insulation (2) on tunnel (3) with six screws (6).
3. Apply sealing compound to threads of two capscrews (7), and install left front interior tunnel insulation (9) on left side tunnel (5) with capscrews (7) and washers (8). Tighten capscrews (7) to 23 lb-ft (31 N·m).
4. Install left rear interior tunnel insulation (4) on left side tunnel (5).

25-37. LEFT SIDE TUNNEL INTERIOR INSULATION REPLACEMENT (Cont'd)



FOLLOW-ON TASK: Install A/C coolant line covers (para. 25-32).

CHAPTER 26 SPECIAL PURPOSE KITS (DS) MAINTENANCE

26-1. INTRODUCTION

This chapter contains maintenance instructions for disassembly and repair of winch components at the direct support maintenance level. Some subassemblies and parts must be removed before winch components can be accessed. They are referenced to other paragraphs in this manual.

26-2. SPECIAL PURPOSE KITS TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
26-3.	9,000 Lb Winch Repair	26-2

26-3. 9,000 LB WINCH REPAIR

This task covers:

- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Gasket (Appendix G, Item 78)
Two gaskets (Appendix G, Item 79)
Lockwasher (Appendix G, Item 207)
Coating compound (Appendix C, Item 23)
Lubricating oil (Appendix C, Item 42)
Aircraft grease (Appendix C, Item 32)
Anaerobic pipe sealing compound
(Appendix C, Item 62)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Winch removed (M1113) (para. 12-27).
- Winch removed (M1114) (para. 12-33).
- Winch cable removed (para. 12-28).

Maintenance Level

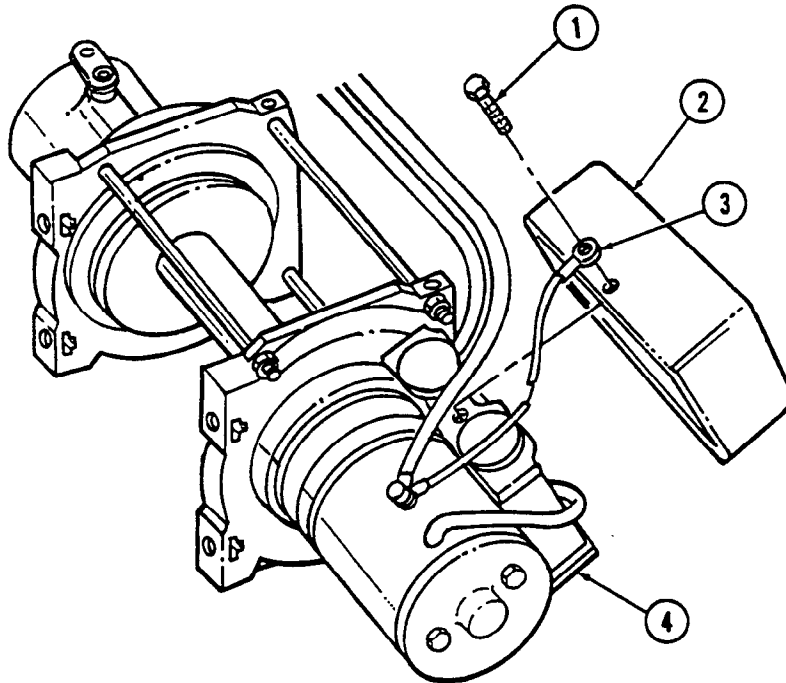
Direct support

a. Disassembly

NOTE

Tag leads for assembly.

1. Remove three screws (1), ground lead (3), and motor control cover (2) from control pack (4).

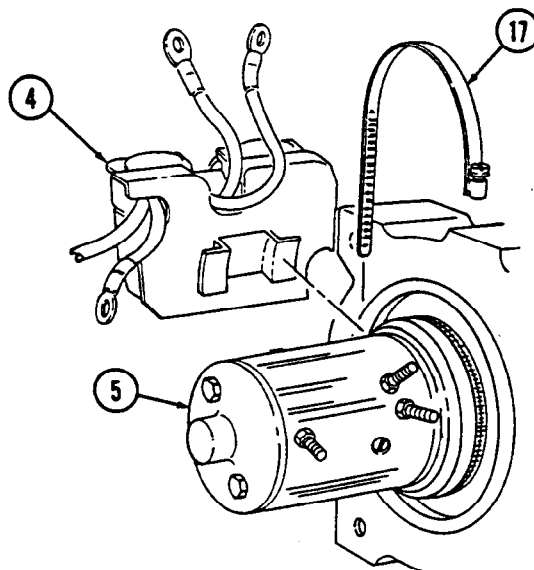
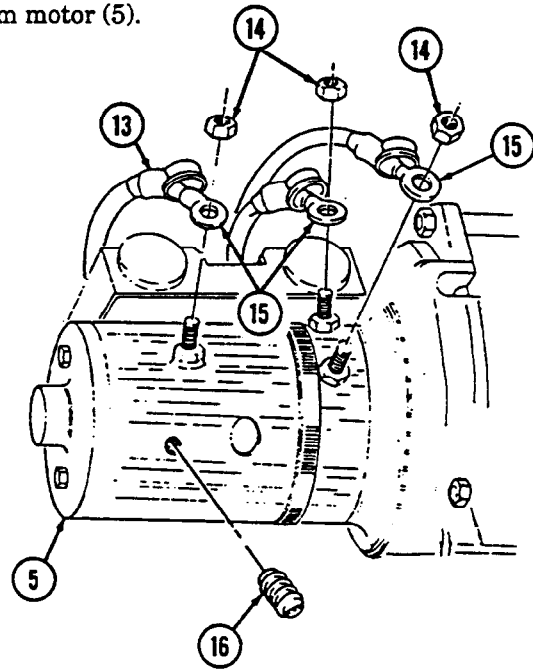
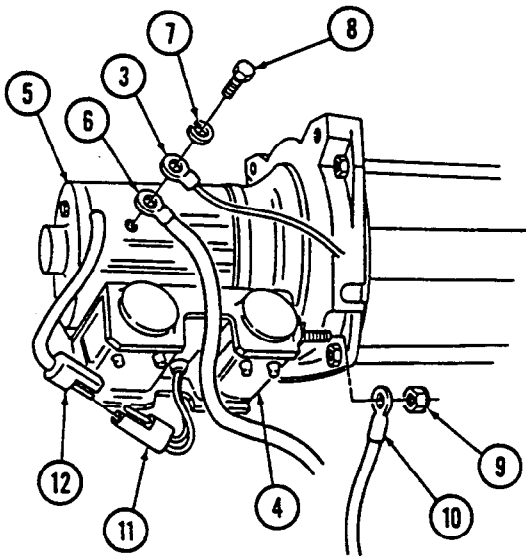


26-3. 9,000 LB WINCH REPAIR (Cont'd)

NOTE

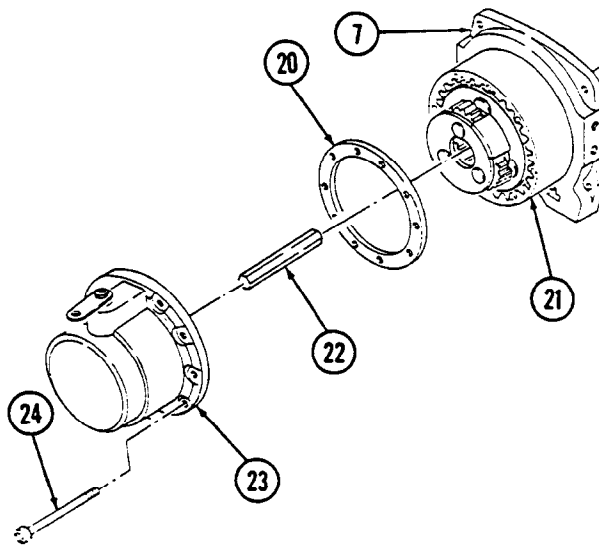
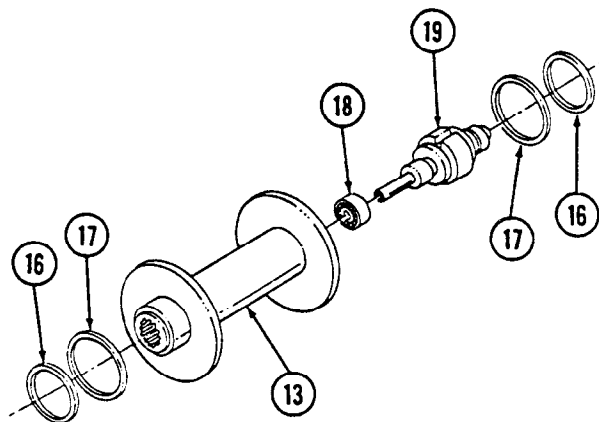
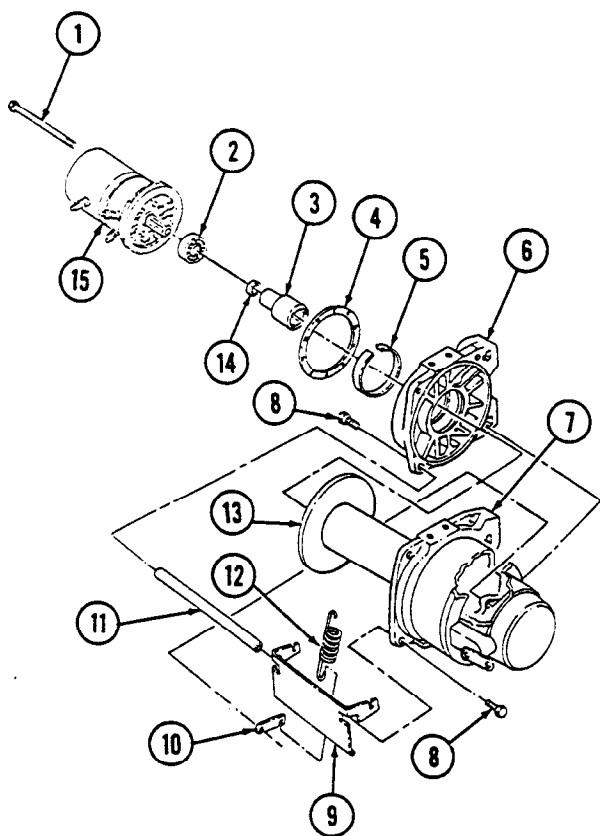
In order to perform steps 2 through 8, it may be necessary to remove plastic coating from winch.

2. Remove nut (9) and lead 6 (10) from control pack (4).
3. Remove capscrew (8), lockwasher (7), lead 7 (6), and ground lead (3) from motor (5). Discard lockwasher (7).
4. Disconnect motor connector (12) from control connector (11).
5. Slide back three rubber boots (13) and remove nuts (14) and control leads (15) from motor (5).
6. Remove setscrew (16) from motor (5).
7. Loosen clamp (17) and remove control pack (4) from motor (5).
8. Remove clamp (17) from motor (5).



26-3. 9,000 LB WINCH REPAIR (Cont'd)

9. Mark motor end drum support (6) and gear end drum support (7) for assembly.
10. Remove six capscrews (8), three tie rods (11), two springs (12), anchors (10), and plate (9) from motor end drum support (6) and gear end drum support (7).
11. Place winch on end with motor end up and remove two hex-head screws (1) and motor (15) from motor end drum support (6).
12. Remove gasket (4) and motor end drum support (6) from drum assembly (13). Discard gasket (4).
13. Remove bearing (2), spacer (14), brake driver (3), and drum bushing (5) from end drum support (6).
14. Remove drum assembly (13) from gear end drum support (7).
15. Remove two oil seals (16) and nylon thrust washers (17) from drum assembly (13).
16. Push brake (19) and bearing (18) through open end of drum assembly (13).
17. Remove driveshaft (22) from output ring gear (21).
18. Turn gear housing (23) over with gear end drum support (7) down and remove ten hex-head screws (24) and gear housing (23) from output ring gear (21).
19. Remove gasket (20) from output ring gear (21). Discard gasket (20).



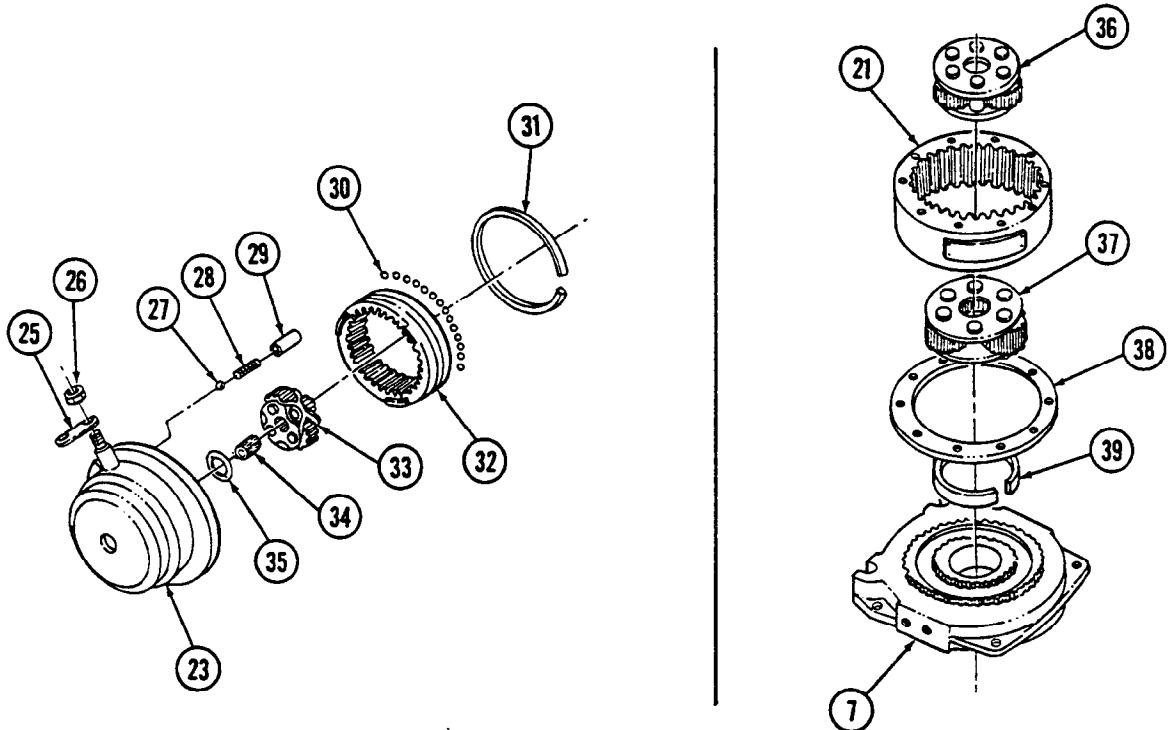
26-3. 9,000 LB WINCH REPAIR (Cont'd)

20. Remove detent spacer (29), spring (28), and detent ball (27) from gear housing (23).
21. Remove nut (26) and clutch lever (25) from gear housing (23).
22. Remove retaining ring (31) from gear housing (23).

NOTE

Intermediate ring gear will come out with 85-87 steel balls. Be careful to catch all 85-87 steel balls.

23. Remove intermediate ring gear (32) and 85-87 steel balls (30) from gear housing (23).
24. Remove input sun gear (34), input gear carrier (33), and thrust plate (35) from gear housing (23).
25. Remove intermediate gear carrier (36), output gear carrier (37), and output ring gear (21) from gear end drum support (7).
26. Remove gasket (38) and drum bushing (39) from gear end drum support (7). Discard gasket (38).



b. Cleaning

CAUTION

Do not clean brake assembly or damage to equipment may result.

Clean all winch components in accordance with para. 2-14.

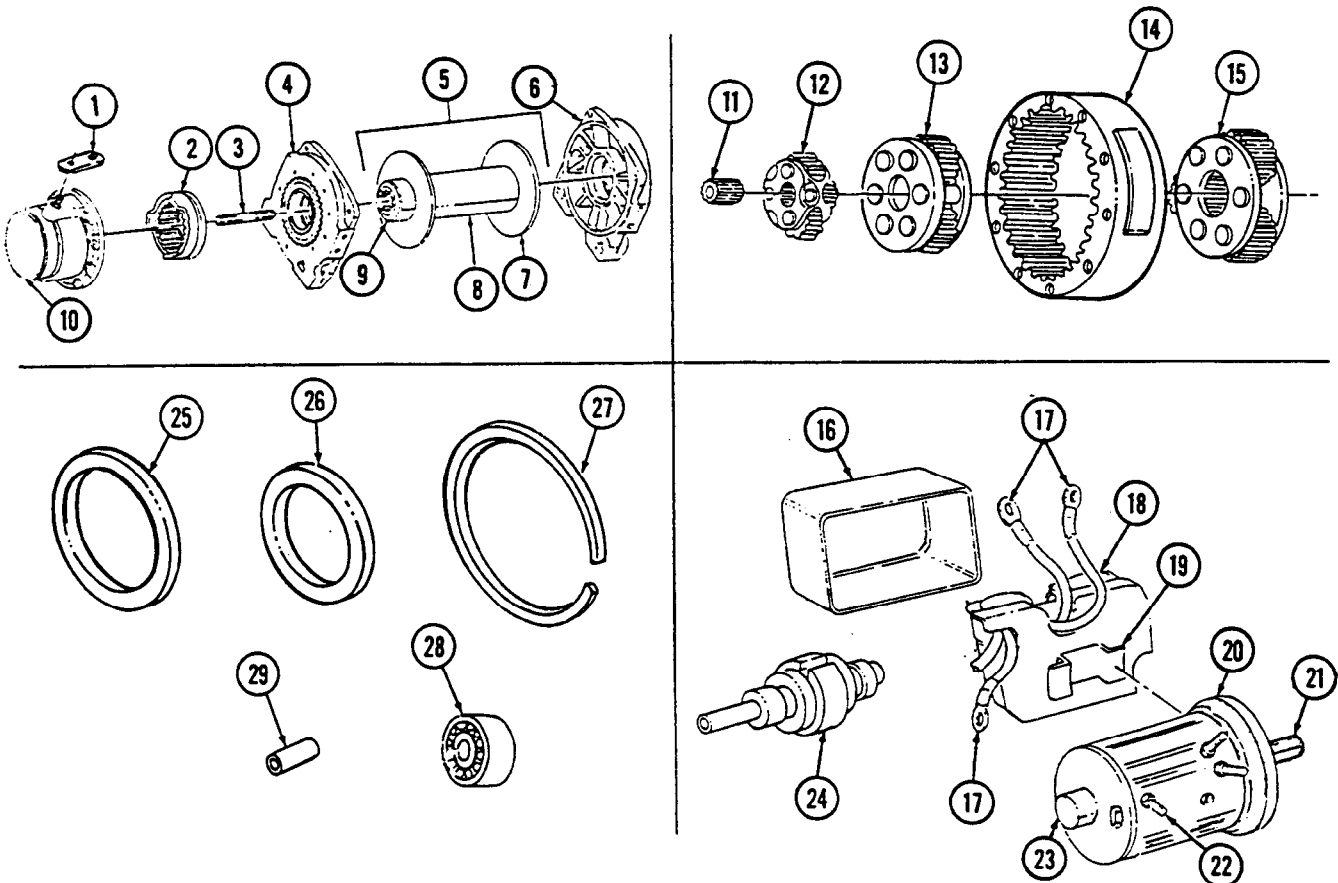
26-3. 9,000 LB WINCH REPAIR (Cont'd)

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect drum (5) for damage to splined end (9), two flanges (7), and tube (8). Replace if damaged.
2. Inspect gear end drum support (6) and motor end drum support (4). Replace if damaged.
3. Inspect gear housing (10). Replace if damaged.
4. Inspect gear teeth and machined surfaces of intermediate ring gear (2). Replace if damaged.
5. Inspect clutch lever (1) and driveshaft (3). Replace if damaged.
6. Inspect gear teeth, splines, and machined surfaces of output ring gear (14), output gear carrier (15), intermediate gear carrier (13), input gear carrier (12), and input sun gear (11). Replace any damaged parts.
7. Inspect brake assembly (24). Replace if damaged.
8. Inspect motor (23), spline (21), mating surface (20), and three terminals (22). Replace if damaged.
9. Inspect cover (16). Replace if damaged.
10. Inspect control pack (18) for damaged leads (17), breaks in plastic coating, and damaged mounting base (19). Replace control pack (18) if damaged or repair plastic coating.
11. Inspect two thrust washers (25), seals (26), retaining rings (27), bearing (28), and detent spacer (29). Replace if damaged.



26-3. 9,000 LB WINCH REPAIR (Cont'd)

d. Assembly

1. Position 85-87 steel balls (35) in groove of intermediate ring gear (2) and install in gear housing (10).

NOTE

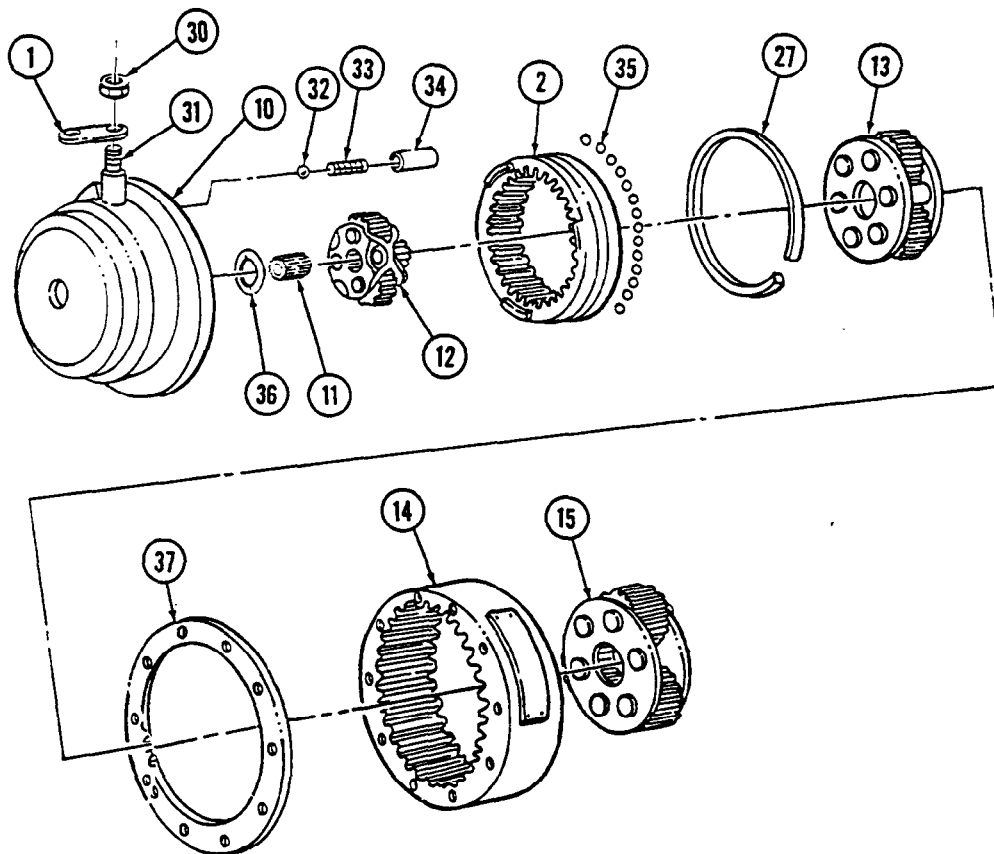
Opening in retaining ring should be 90° from clutch lever.

2. Install retaining ring (27) in gear housing (10).
3. Install thrust plate (36), input sun gear (11), and input gear carrier (12) in gear housing (10).
4. Install clutch lever (1) on clutch shaft (31) with nut (30).
5. Install detent ball (32), spring (33), and detent spacer (34) in gear housing (10).
6. Apply aircraft grease to output ring gear (14), intermediate gear carrier (13), output gear carrier (15), and input gear carrier (12).

NOTE

Ensure ring gear engages in gear housing.

7. Install gasket (37) and output ring gear (14) on gear housing (10).
8. Install intermediate gear carrier (13) on gear housing (10).
9. Install output gear carrier (15) on input gear carrier (12).



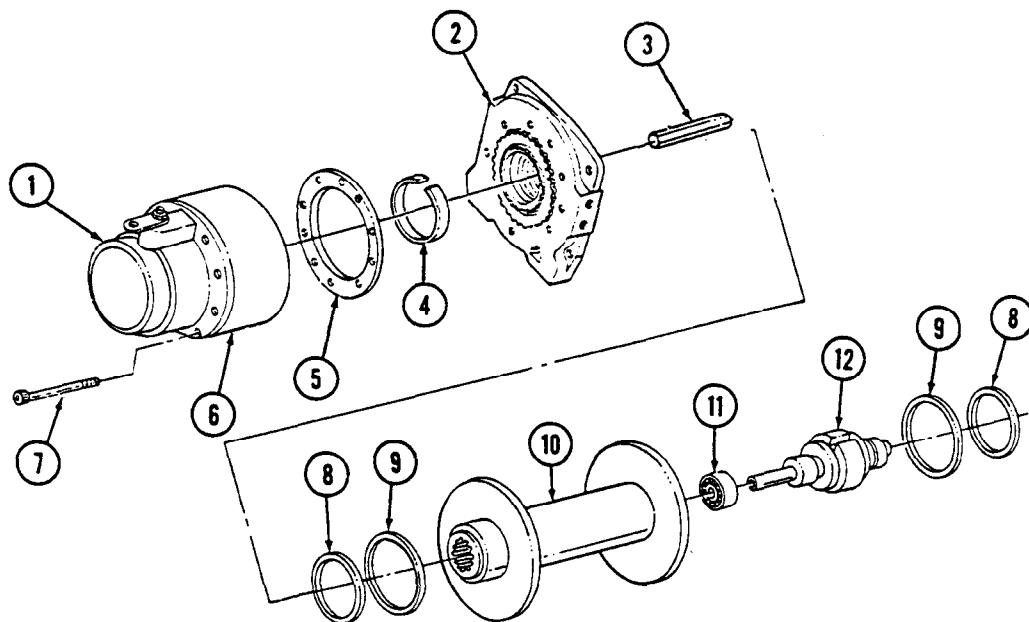
26-3. 9,000 LB WINCH REPAIR (Cont'd)

10. Install gasket (5) and nylon bushing (4) on output ring gear (6).

NOTE

Ensure spline on drum support engages in output ring gear.

11. Install gear end drum support (2) on output ring gear (6).
12. Install gear housing (1) on gear end drum support (2) with ten hex-head screws (7). Tighten hex-head screws (7) to 100 lb-in. (11.3 N•m).
13. Turn gear housing (1) over with gear end drum support (2) facing up.
14. Install driveshaft (3) in gear housing (1).
15. Apply grease to drum assembly (10) and brake (12).
16. With drum assembly (10) horizontal, install bearing (11) and brake (12) into drum assembly (10).
17. Install two nylon thrust washers (9) and oil seals (8) on drum assembly (10).
18. Install drum assembly (10) on gear end drum support (2). Rotate drum assembly (10) as needed to engage driveshaft (3) and brake (12).
19. Install motor end drum support (19) on drum assembly (10).
20. Install drum bushing (18), brake driver (25), spacer (16), and bearing (15) in motor end drum support (19).
21. Install gasket (17) on motor (13) and motor end drum support (19), ensuring to engage motor shaft (26) into brake driver (25).
22. Install two hex-head screws (14) on motor (13) and motor end drum support (19). Tighten hex-head screws (14) to 35 lb-in. (47 N•m).



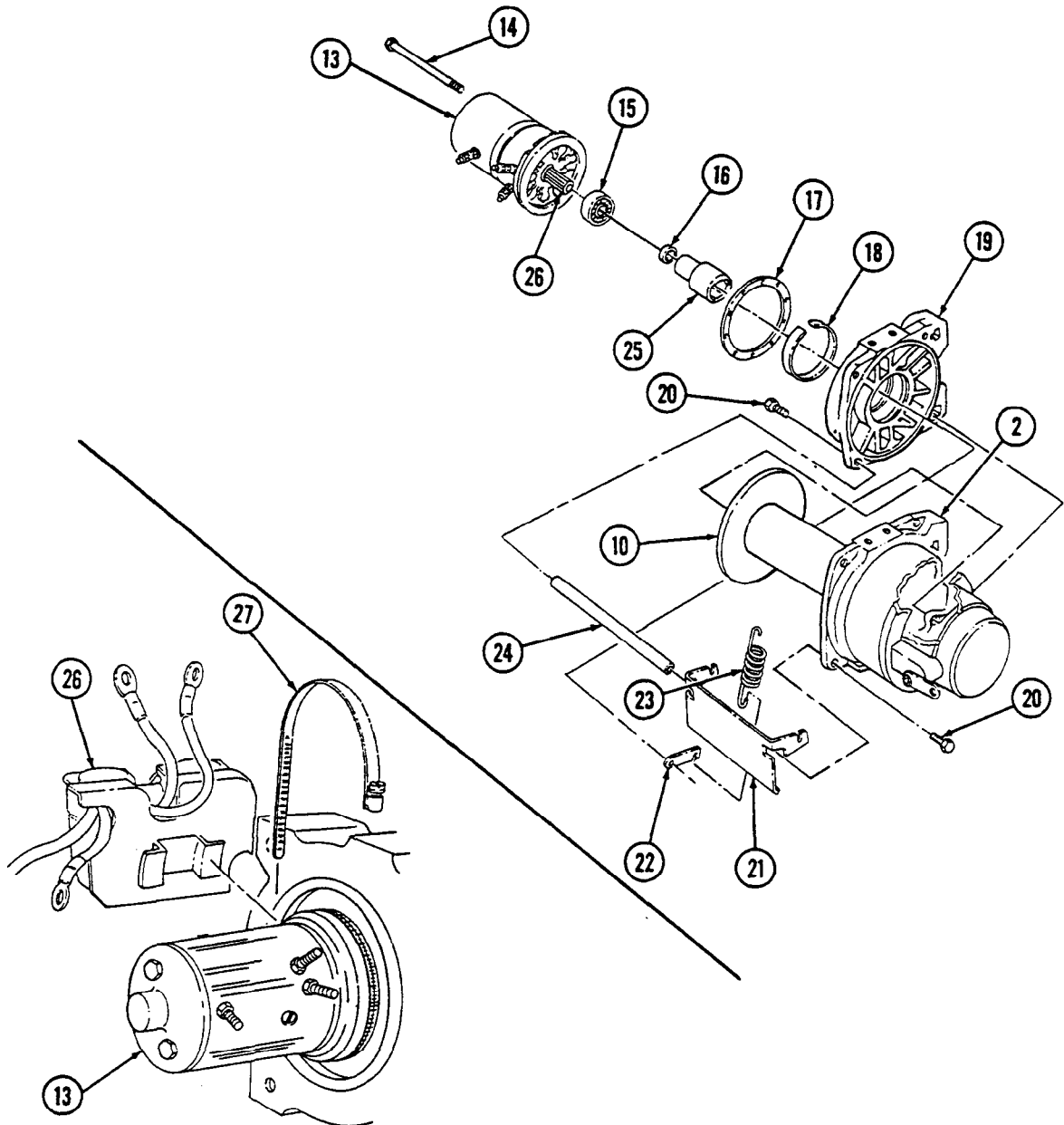
26-3. 9,000 LB WINCH REPAIR (Cont'd)

23. Install plate (21), anchor (22), and three tie rods (24) on drum supports (2) and (19) with six capscrews (20). Tighten capscrews (20) to 18 lb-ft (24 N·m).
24. Install two springs (23) on anchors (22) and plate (21).

NOTE

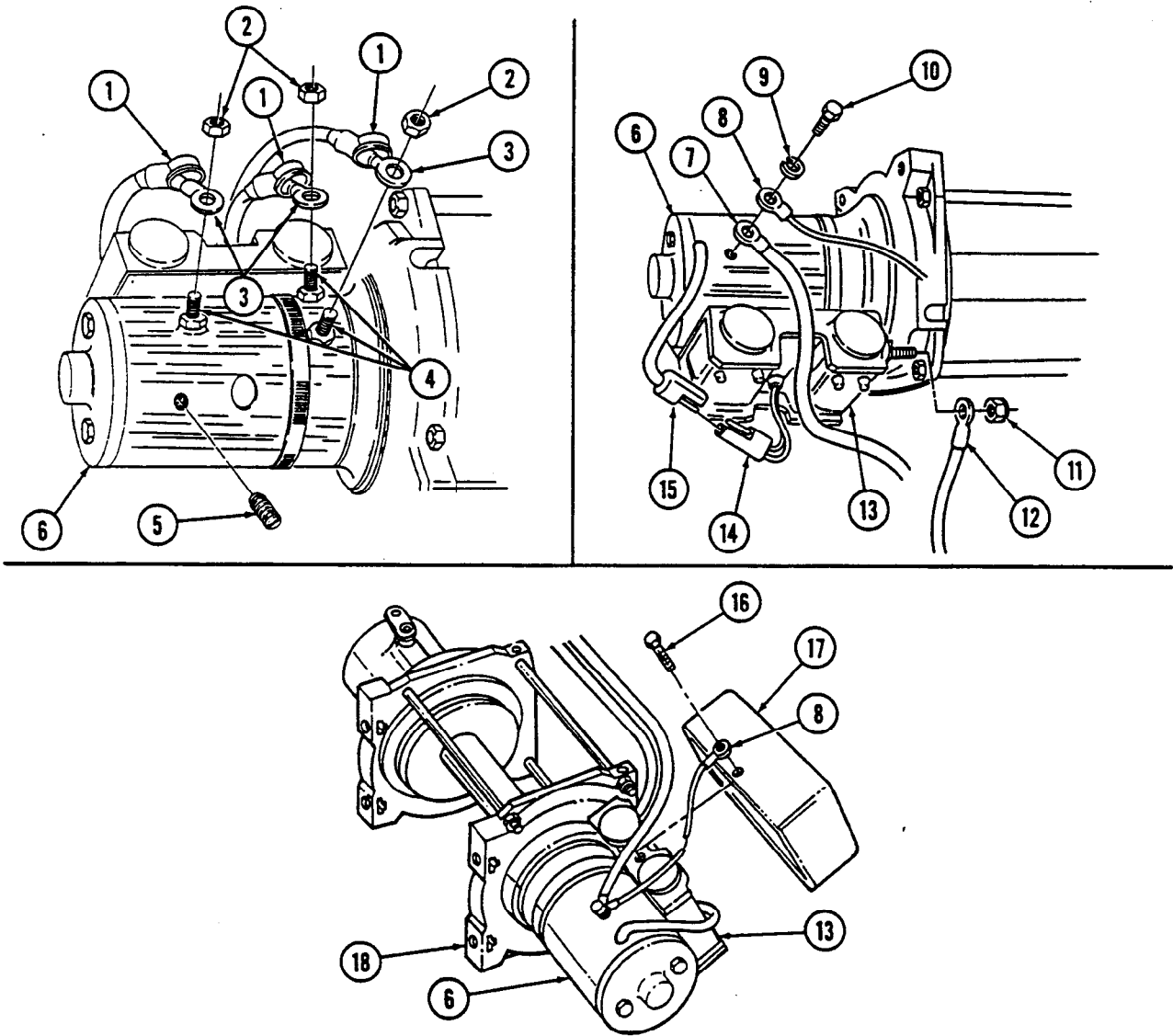
If motor or control have been precoated with sealing compound, remove compound from between motor case and control mounting gear contact area. Failure to do so may cause improper grounding of control.

25. Install clamp (27) on motor (13).
26. Install control pack (26) on motor (13) and tighten clamp (27).



26-3. 9,000 LB WINCH REPAIR (Cont'd)

27. Install three leads (3) on terminals (4) with nuts (2) and slide rubber boots (1) over nuts (2).
28. Apply pipe sealant to threads of setscrew (5) and install on motor (6).
29. Connect control connector (14) to motor connector (15).
30. Install lead 6 (12) on control pack (13) with nut (11).
31. Install lead 7 (7) and ground lead (8) on motor (6) with lockwasher (9) and capscrew (10).
32. Using coating compound, coat motor end of winch (6) up to motor end drum support (18).
33. Install motor control cover (17) and ground lead (8) on control pack (13) with three screws (16).



- FOLLOW-ON TASKS:**
- Install winch (M1114) (para. 12-33).
 - Install winch (M1113) (para. 12-27).
 - Install winch cable (para. 12-28).

CHAPTER 27 ELECTRICAL SYSTEM (GS) REPAIR

27-1. INTRODUCTION

This chapter contains maintenance instructions for replacement of body wiring harness at the general support maintenance level. Some subassemblies and parts must be removed before the body wiring harness can be accessed. They are referenced to other paragraphs of this manual.

27-2. BODY WIRING MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
27-3.	Body Wiring Harness Replacement	27-2

27-3. BODY WIRING HARNESS REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Materials/Parts

Nine lockwashers (Appendix G, Item 207)
Thirteen nut and lockwasher assemblies
(Appendix G, Item 251)
Two locknuts (Appendix G, Item 111)
Twenty-three locknuts (Appendix G, Item 116)
Six tiedown straps (Appendix G, Item 462)
Antiseize compound (Appendix C, Item 16)
Lubricating oil (Appendix C, Item 44)
Silicone compound (Appendix C, Item 73)

Equipment Condition

- Engine access cover removed (para. 10-22).
- Left splash shield removed (para. 10-23).
- Muffler and catalytic converter removed
(para. 3-49).
- Heater ducting removed (para. 10-80).
- Left defroster nozzle removed (para. 10-83).
- Instrument cluster removed (para. 4-14).
- Rear side marker light lenses removed
(para. 4-56).
- Left and right underbody armor removed
(M1114 only) (paras. 11-36 through 11-39).

Personnel Required

One mechanic
One assistant

Maintenance Level

General support

a. Removal

CAUTION

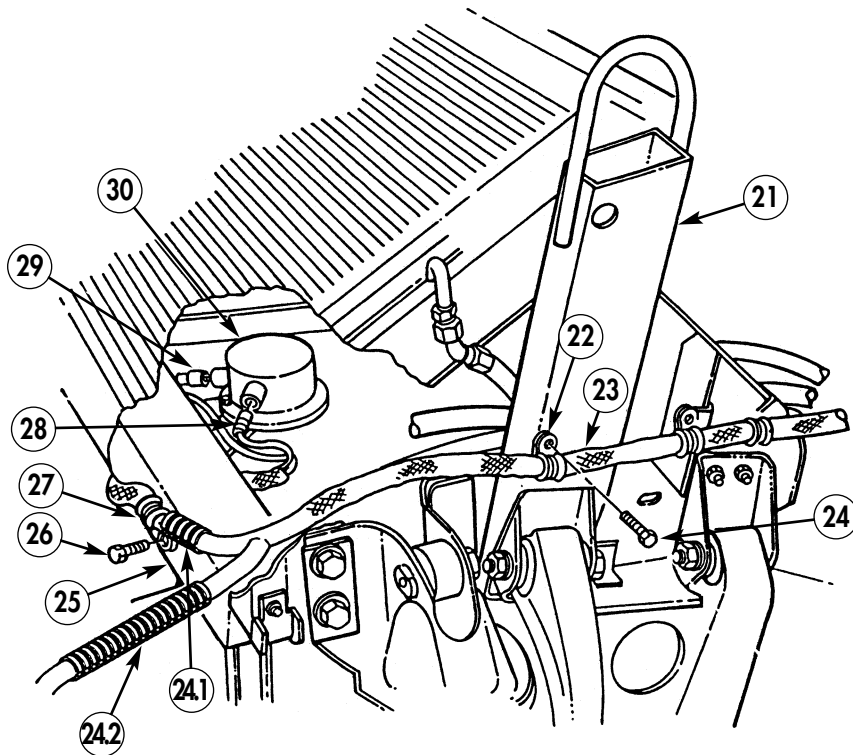
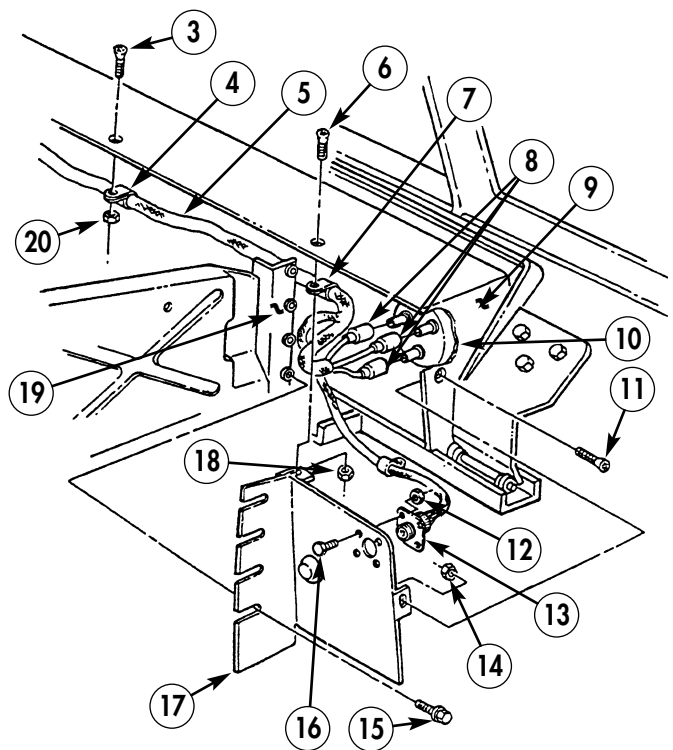
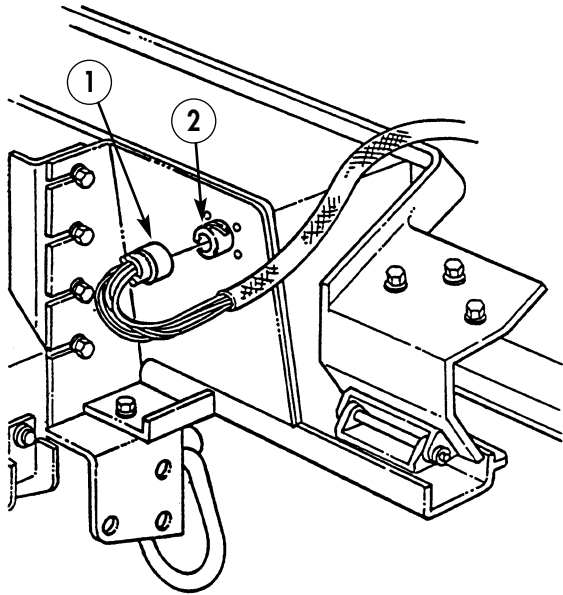
Use care when removing harness. Snagging or pulling may cause damage to harness.

NOTE

Prior to removal, tag leads for installation.

1. Disconnect hood harness connector (1) from headlight housing connector (2).
2. Remove four screws (15) from plate (17) and bracket (19).
3. Remove locknut (14) and screw (11) from plate (17) and headlight housing (9). Discard locknut (14).
4. Remove nut (18), screw (6), clamp (7), harness (5), and plate (17) from headlight housing (9).
5. Remove four nuts (12), screws (16), and harness connector (13) from plate (17).
6. Remove three nuts (20), screws (3), clamps (4), and harness (5) from headlight housing (9).
7. Remove three leads (8) from headlight (10).
8. Repeat steps 1 through 7 for opposite side.
9. Remove three screws (24), clamps (22), and harness (23) from left airlift bracket (21).
10. Disconnect harness leads 25A (28) and 26A (29) from horn (30).
11. Remove screw (26), clamp (27), and harness (23) from crossmember (25).
- 11.1. Remove conduit (24.1) and (24.2) from harness (23) if damaged.

27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



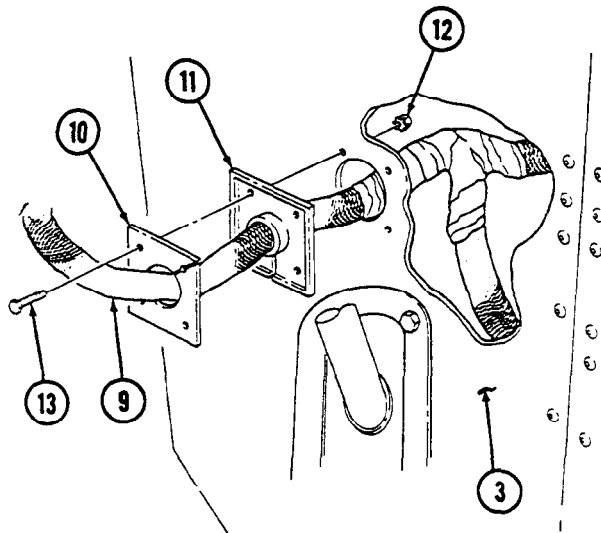
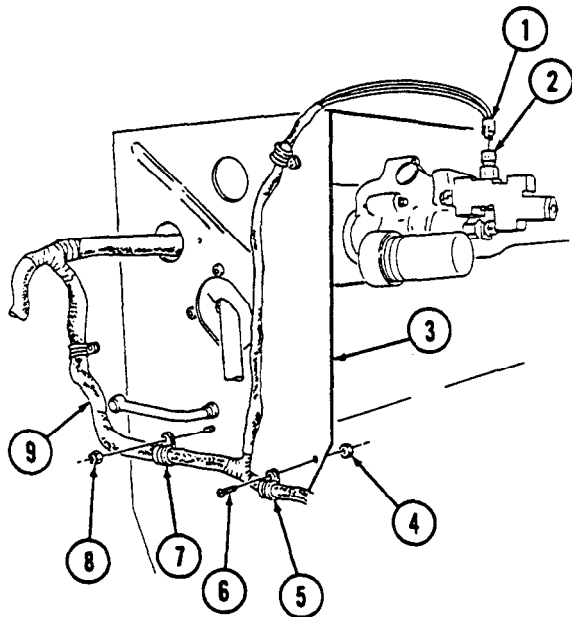
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

12. Disconnect harness connector (1) from brake warning lamp switch (2).
13. Remove three locknuts (4), capscrews (6), clamps (5), and harness (9) from cowl (3). Discard locknuts (4).
14. Remove locknut (8), clamp (7), and harness (9) from cowl (3). Discard locknut (8).

NOTE

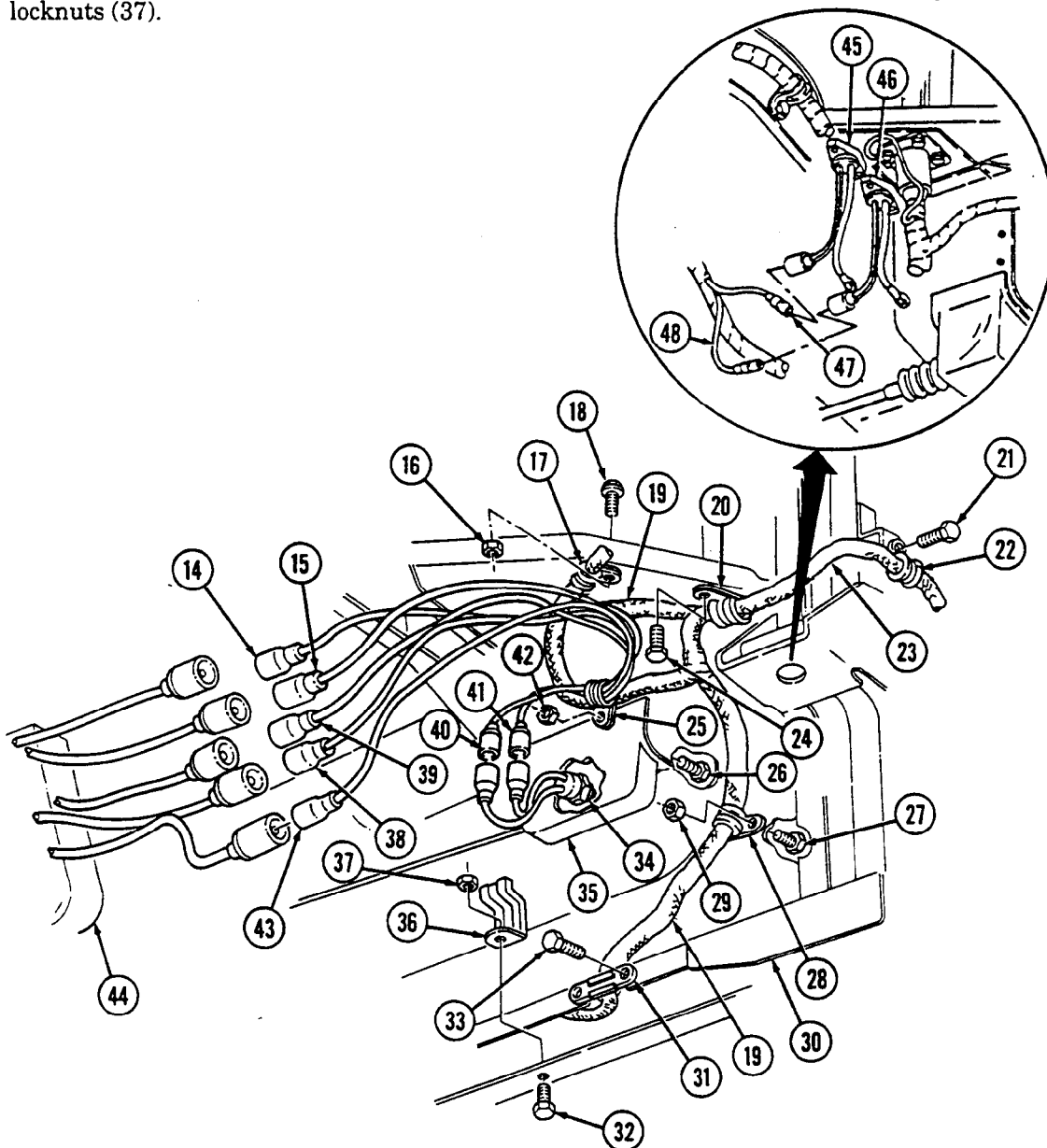
Top screws connecting closeout plate may be longer than other screws if the fuel filter drain tube is routed to top of closeout plate.

15. Remove four locknuts (12), screws (13), closeout plate (10), and grommet (11) from cowl (3). Discard locknuts (12).
16. Remove closeout plate (10) and grommet (11) from harness (9).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

17. Disconnect harness leads 67C (41) and 67E (40) from parking brake switch (34).
18. Disconnect harness leads 14A (14), 14B (15), 467C (39), 457D (38), and 40F (43) from shift controls housing (44).
19. Remove screws (24) and (21), clamps (20) and (22), and harnesses (19) and (23) from body (30).
20. Disconnect harness leads (47) and (48) from transmission and transfer case indicator lights (46) and (45).
21. Remove two screws (33), clamp (31), and harness (19) from body (30).
22. Remove locknut (29), capscrew (27), clamp (28), and harness (19) from body (30). Discard locknut (29).
23. Remove locknut (42), capscrew (26), clamp (25), and harness (19) from parking brake boot (35). Discard locknut (42).
24. Remove locknut (16), capscrew (18), clamp (17), and harness (19) from body (30). Discard locknut (16).
25. Remove four locknuts (37), capscrews (32), clamps (36), and harness (19) from body (30). Discard locknuts (37).

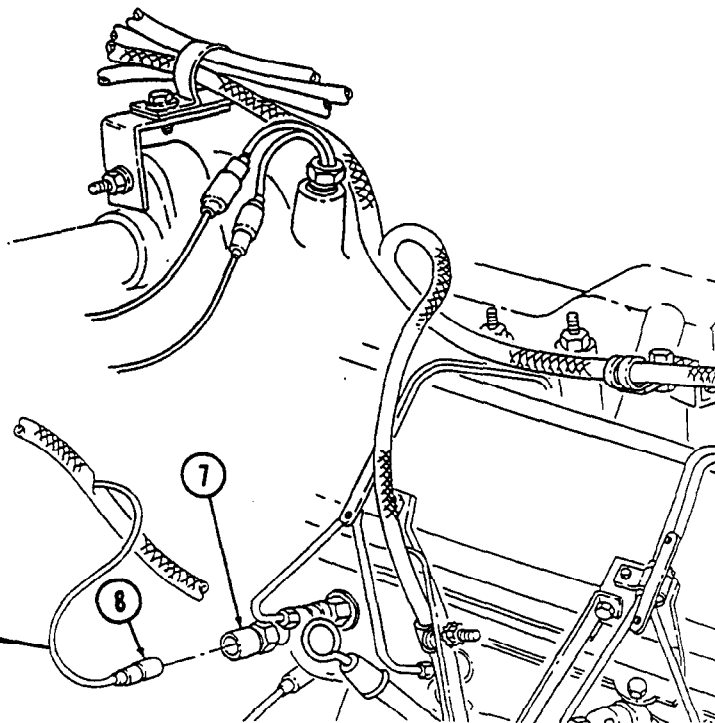
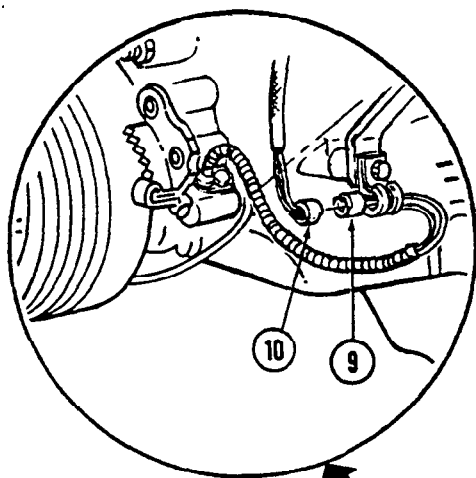
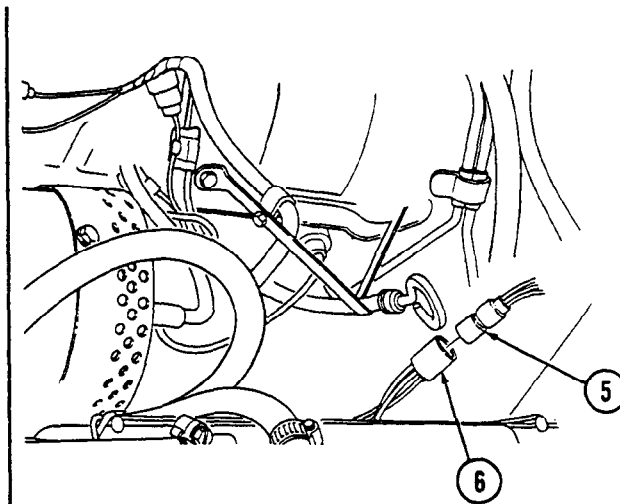
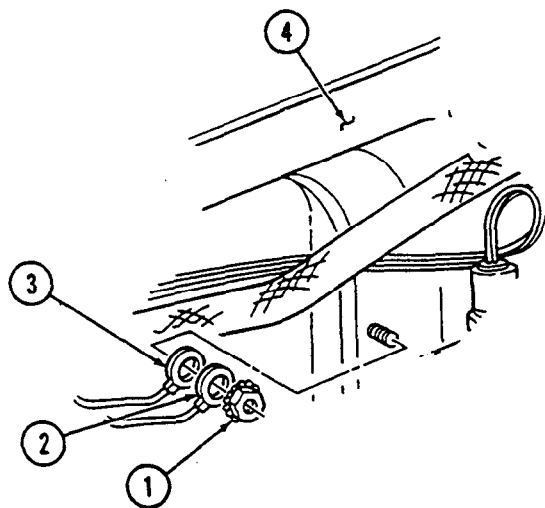


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

NOTE

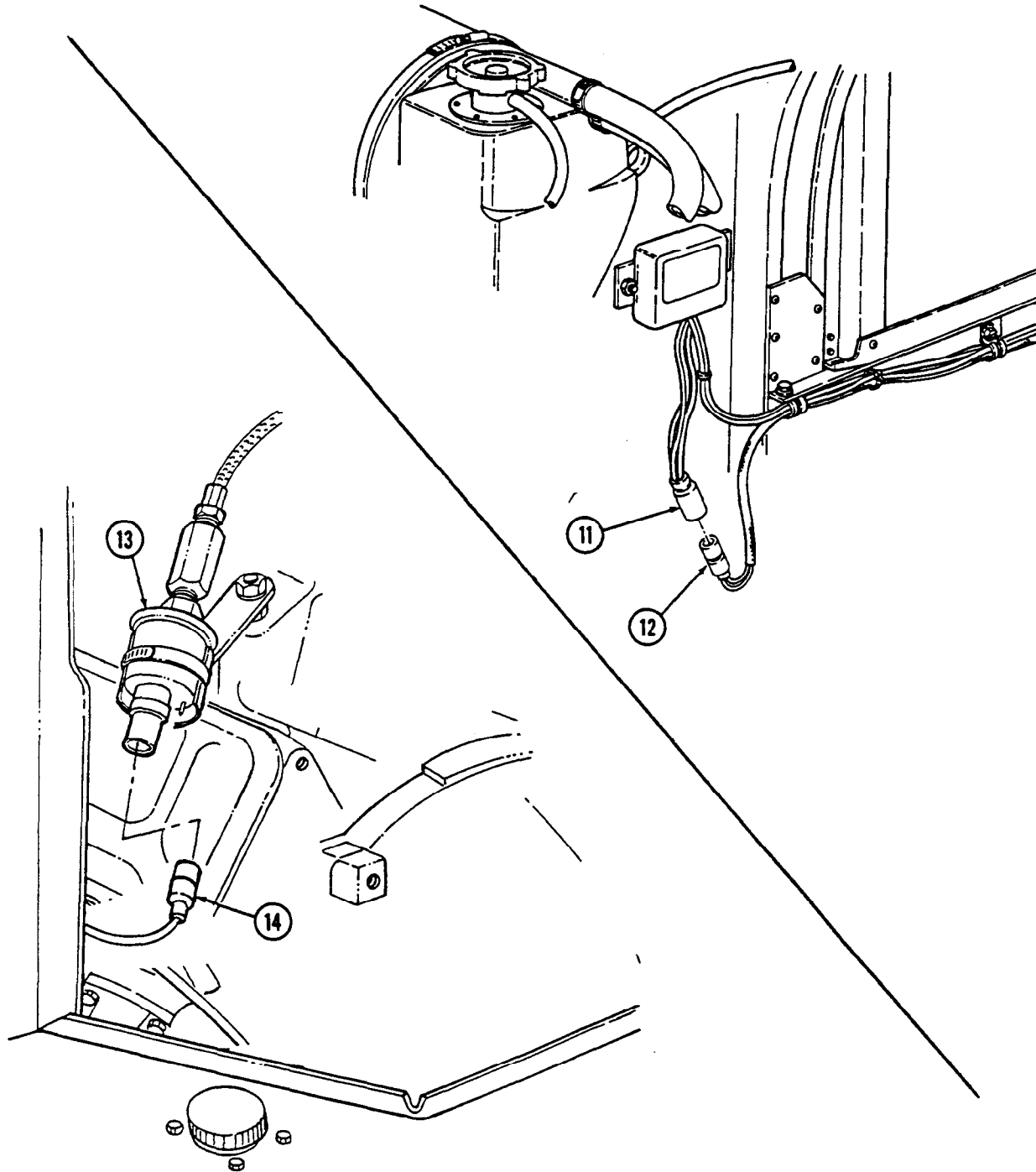
Tag lead lines for installation.

26. Remove nut and lockwasher assembly (1), engine harness ground 3C (2), and body ground lead 58B (3) from body (4). Discard nut and lockwasher assembly (1).
27. Disconnect engine harness 350B/359G/355A lead (5) from body harness lead (6).
28. Disconnect harness lead 33A (8) from engine temperature sending unit (7) and harness leads (10) from engine rpm sensor leads (9).



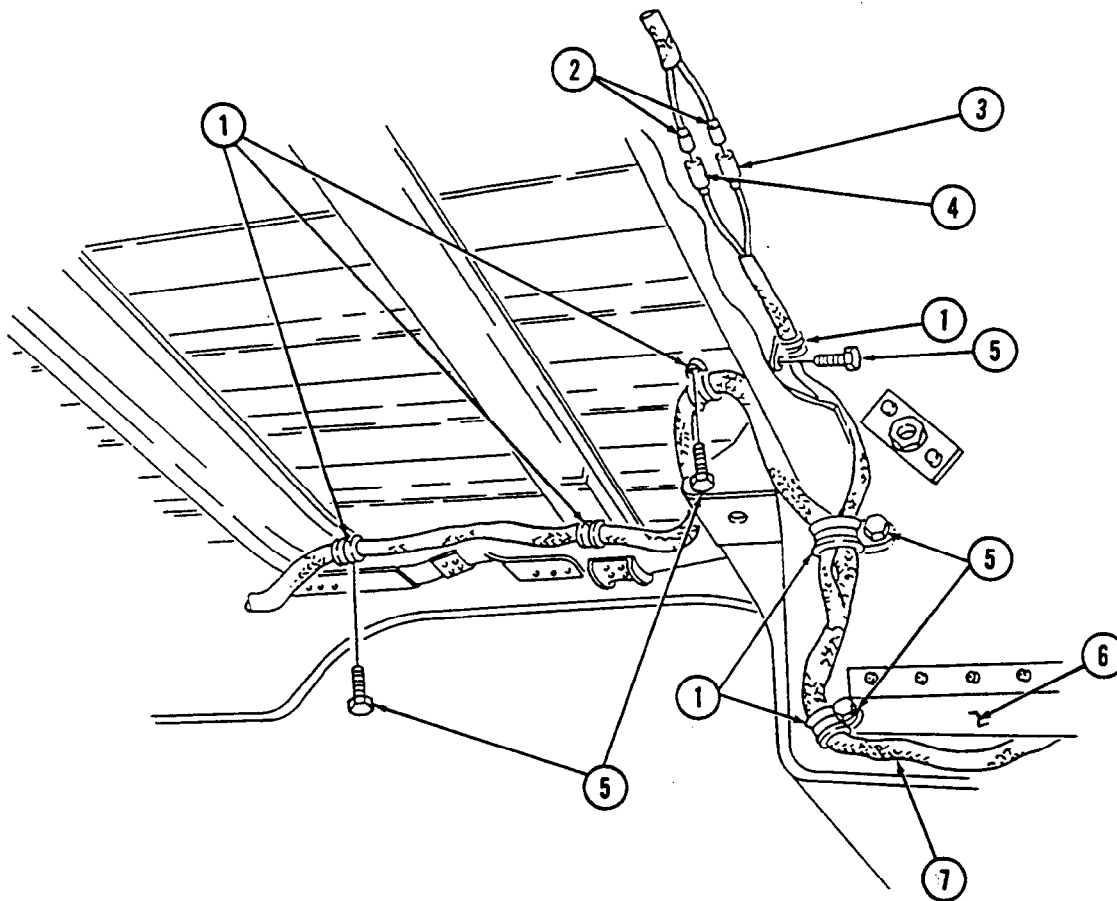
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

29. Disconnect harness connector (12) from STE/ICE-R rpm converter (11).
30. Disconnect harness lead 36A (14) from engine oil pressure sending unit (13).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

31. Disconnect harness leads 28A (3) and 58C (4) from fuel tank jumper harness (2).
32. Remove six screws (5), clamps (1), and harness (7) from body (6).



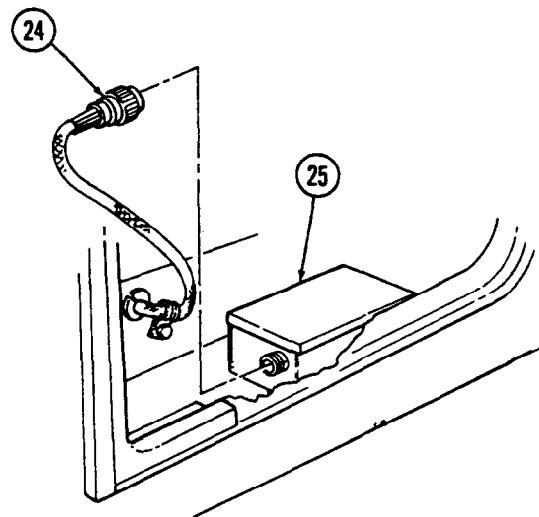
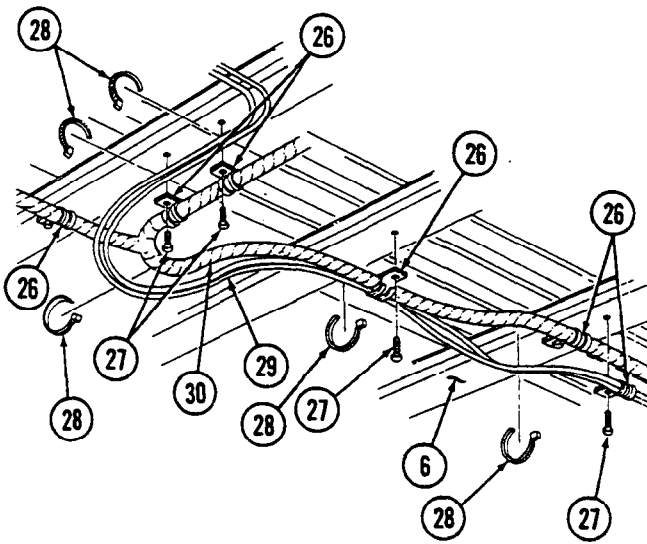
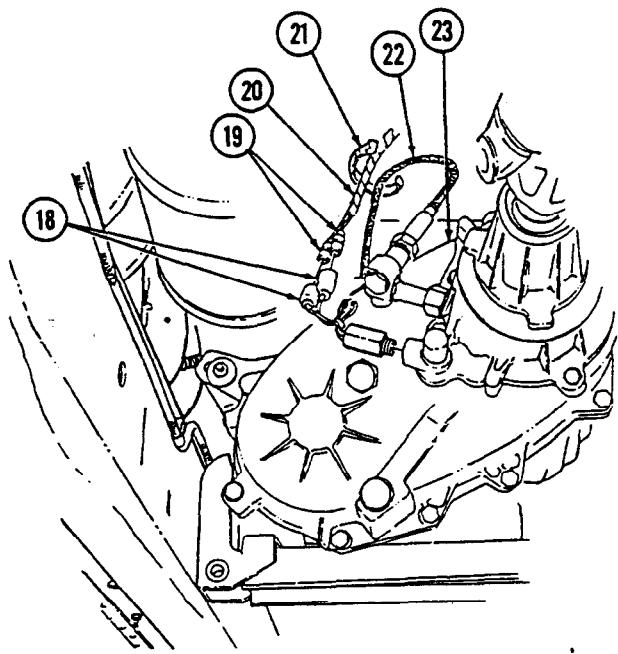
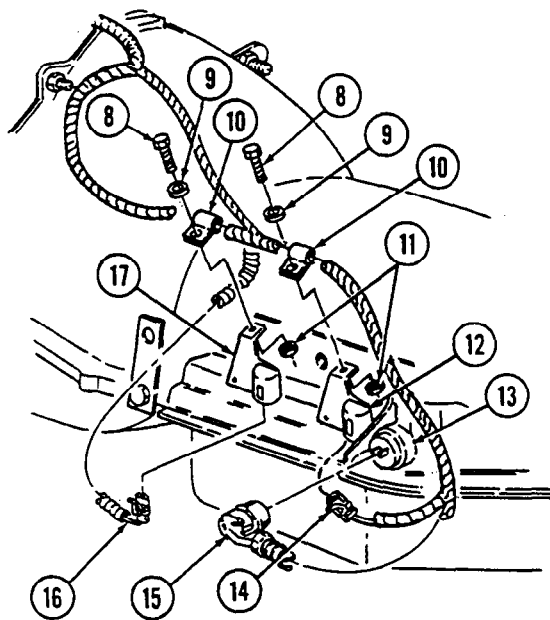
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

33. Disconnect wiring harness connector (15) from sensor (13).
34. Disconnect connectors 497/498 (14) and 495/496 (16) from output and input speed sensors (12) and (17).
35. Remove two nuts (11), capscrews (8), washers (9), and clamps (10) from sensors (12) and (17).
36. Disconnect two leads (19) from transfer case switch leads (18) on transfer case (23).
37. Remove tiedown strap (21) and harness (20) from speedometer adapter (22). Discard tiedown strap (21).
38. Disconnect harness connector (24) from Transmission Control Module (TCM) (25).

NOTE

Perform step 39 for M1114 models only.

39. Remove four screws (27), six clamps (26), five tiedown straps (28), harness (30), and winch cables (29) from body (6). Discard tiedown straps (28).

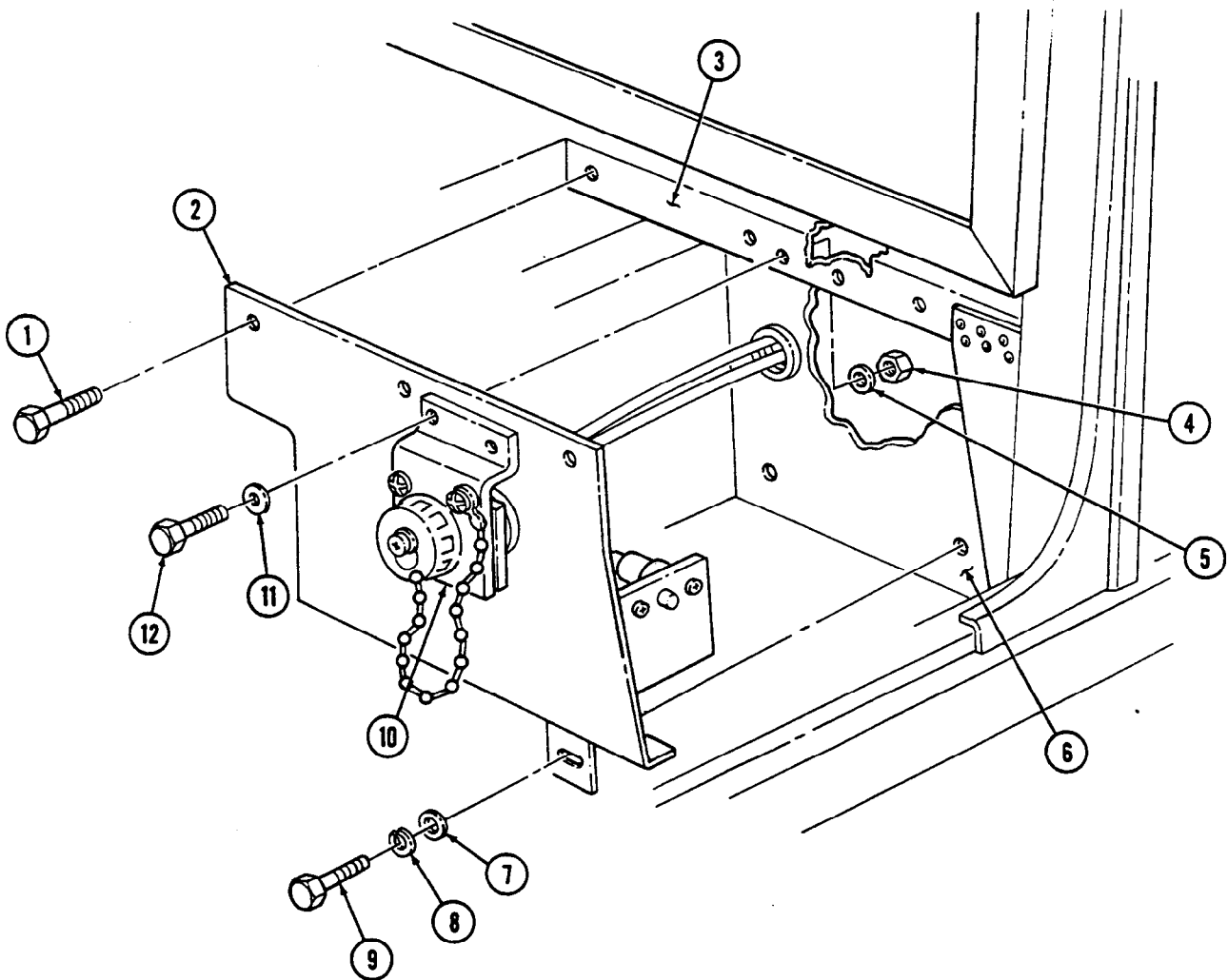


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

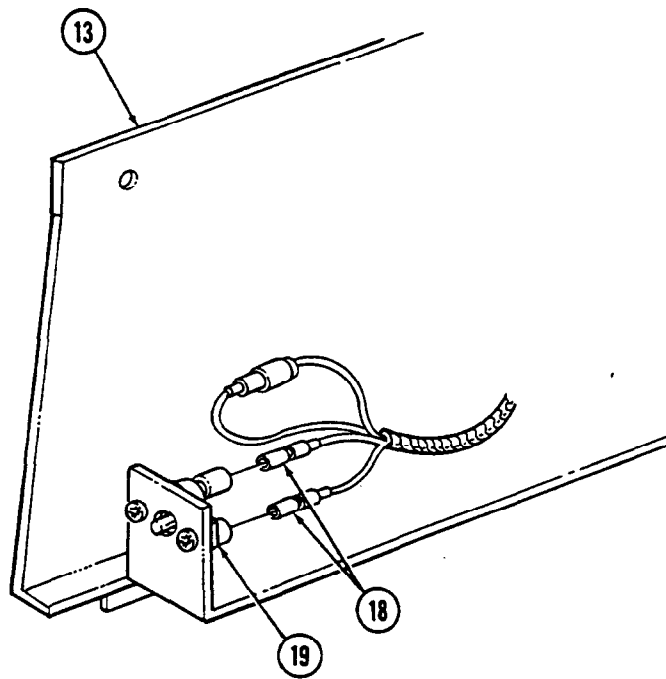
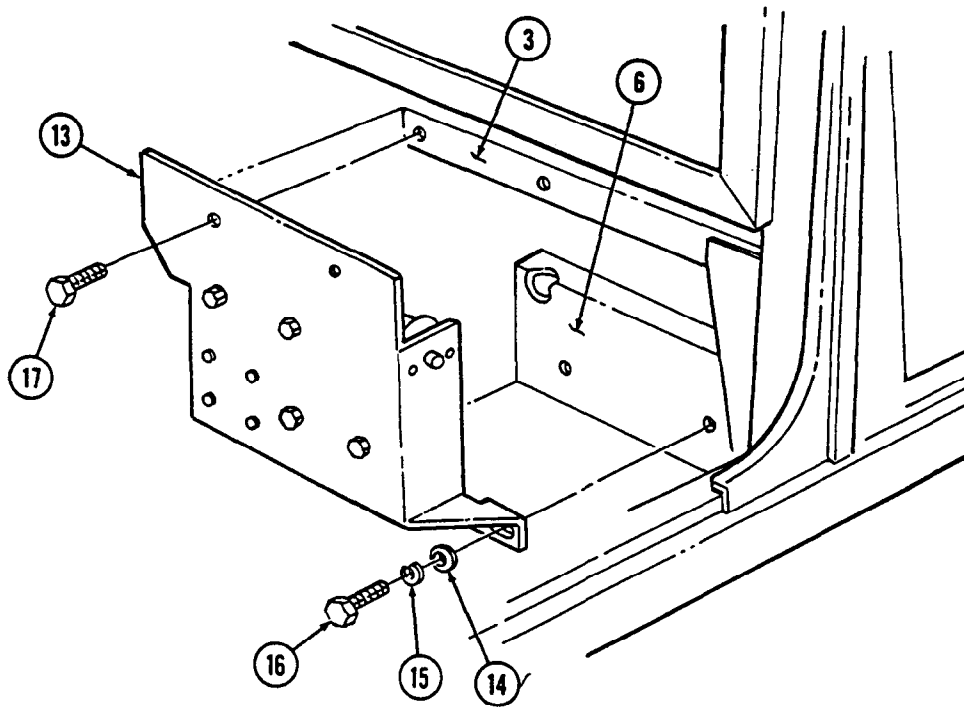
NOTE

Perform step 40 for M1113 models only. Perform steps 41 and 42 for M1114 models only.

- 40. Remove three capscrews (1), two nuts (4), washers (5), screws (12), washers (11), screws (9), lockwashers (8), and washers (7) from bracket (10) and coverplate (2). Remove coverplate (2) from battery box (6) and B-beam (3). Discard lockwashers (8).
- 41. Remove two capscrews (17) from coverplate (13) and B-beam (3).
- 42. Remove two capscrews (16), lockwashers (15), washers (14), and coverplate (13) from battery box (6). Discard lockwashers (15).
- 43. Remove two harness leads (18) from circuit breaker (19).

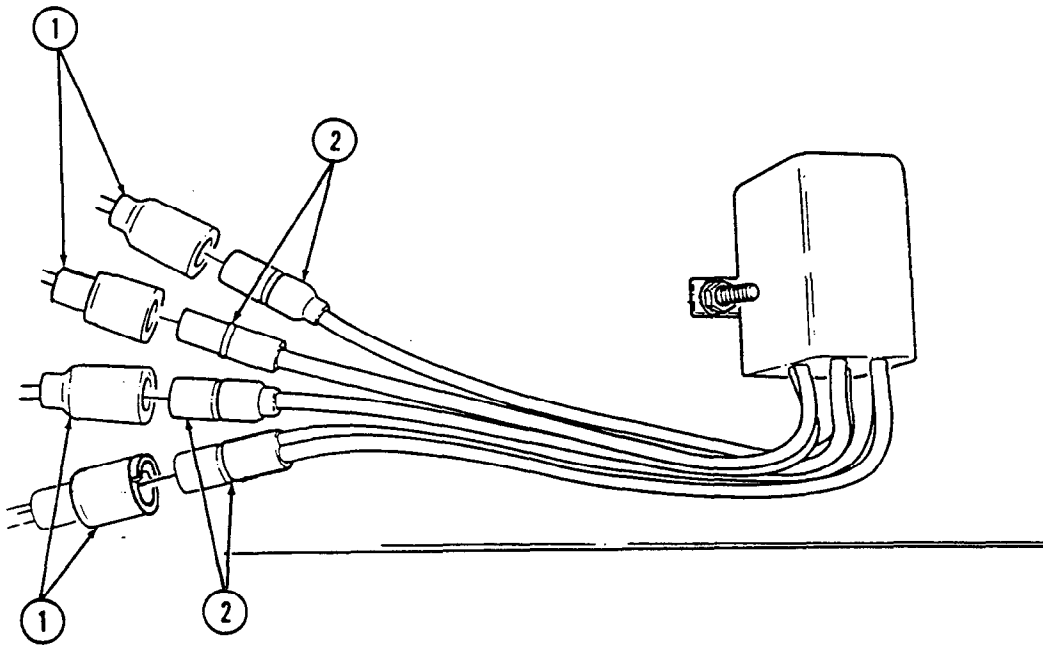


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

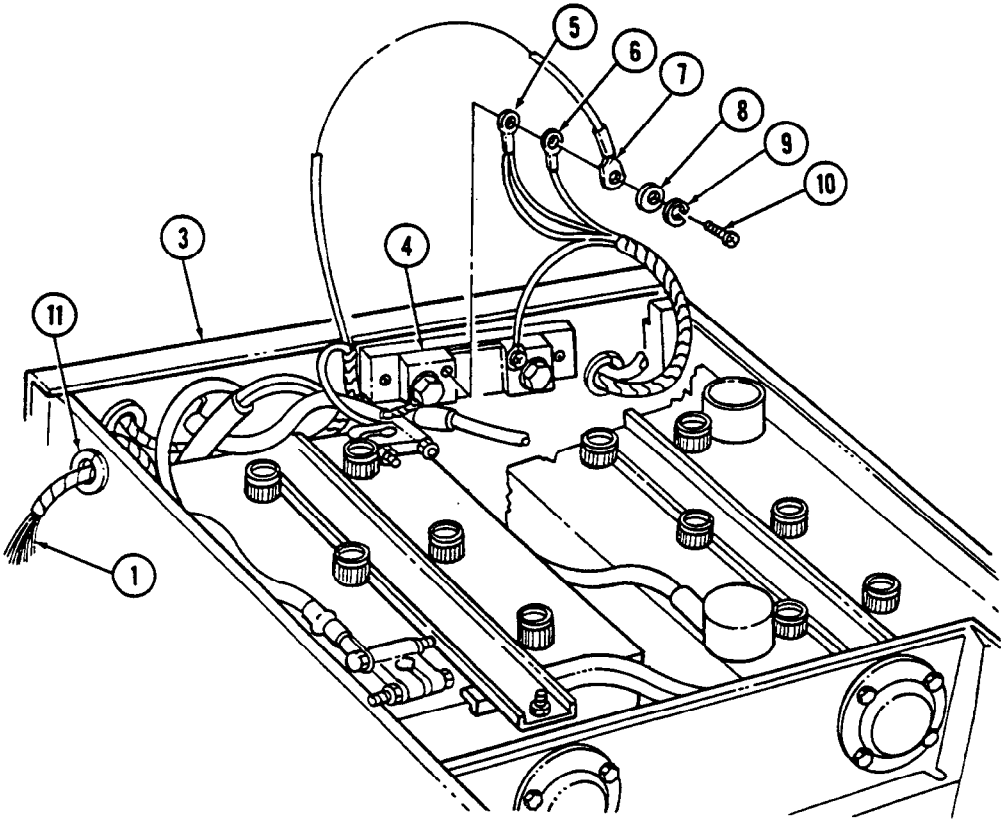


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

- 44. Disconnect four harness leads 57T, 290B/291B, and 290C/291C (1) from transmission relay leads (2).
- 45. Push four leads 57T, 290B/291B, and 290C/291C (1) through grommet (11) in battery box (3).
- 46. Remove screw (10), lockwasher (9), washer (8), lead 290/291/537 (7), and leads (5) and (6) from shunt (4). Discard lockwasher (9).

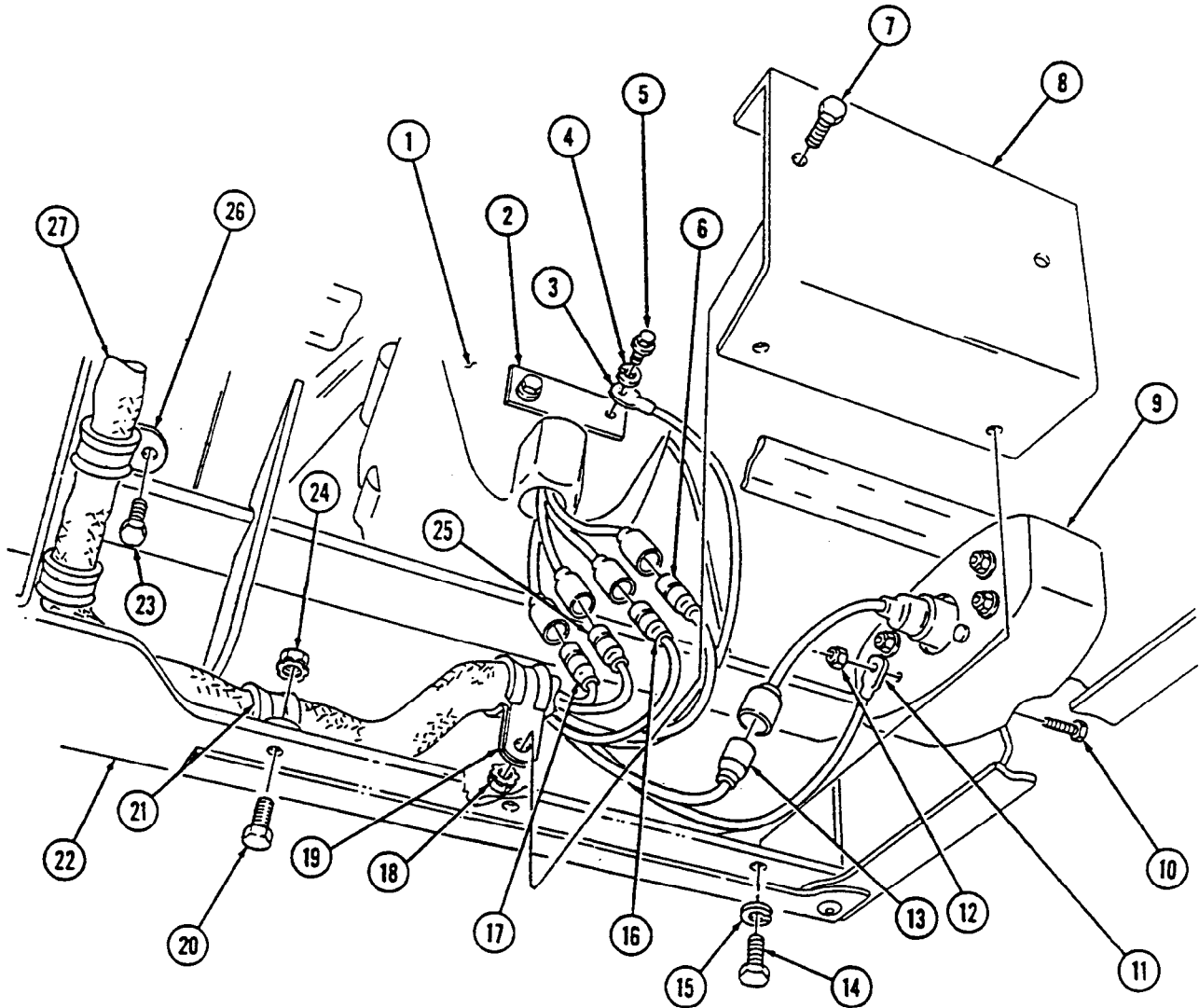


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

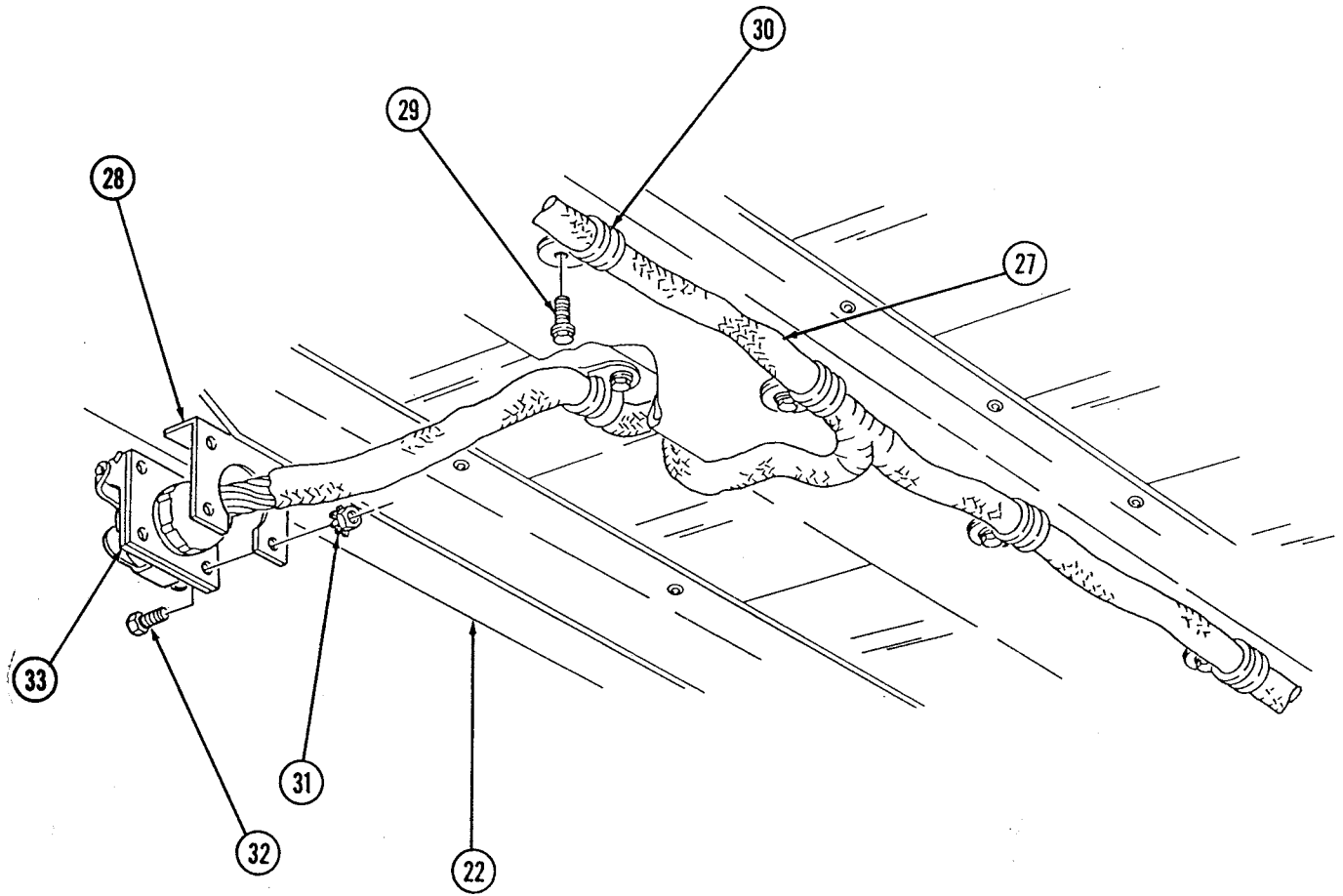


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

47. Remove two screws (23), clamps (26), and harness (27) from body (22).
48. Remove nut and lockwasher assembly (24), capscrew (20), clamp (21), and harness (27) from body (22). Discard nut and lockwasher assembly (24).
49. Remove two screws (14), lockwashers (15), and shield (8) from body (22). Discard lockwashers (15).
50. Remove two nut and lockwasher assemblies (18), capscrews (7), clamps (19), and harness (27) from shield (8). Discard nut and lockwasher assemblies (18).
51. Disconnect harness lead 489A (13) from right rear side marker light (9).
52. Disconnect harness leads 21C (17), 22-461B (25), 23B (16), and 24B (6) at left rear composite light (1).
53. Remove locknut (12), screw (10), and harness ground lead 95C (11) from left rear side marker light (9). Discard locknut (12).
54. Remove capscrew (5), lockwasher (4), and harness ground lead 95B (3) from buss bar (2). Discard lockwasher (4).
55. Remove five screws (29), clamps (30), and harness (27) from body (22).
56. Remove four nut and lockwasher assemblies (31), capscrews (32), and trailer connector (33) from bracket (28). Discard nut and lockwasher assemblies (31).



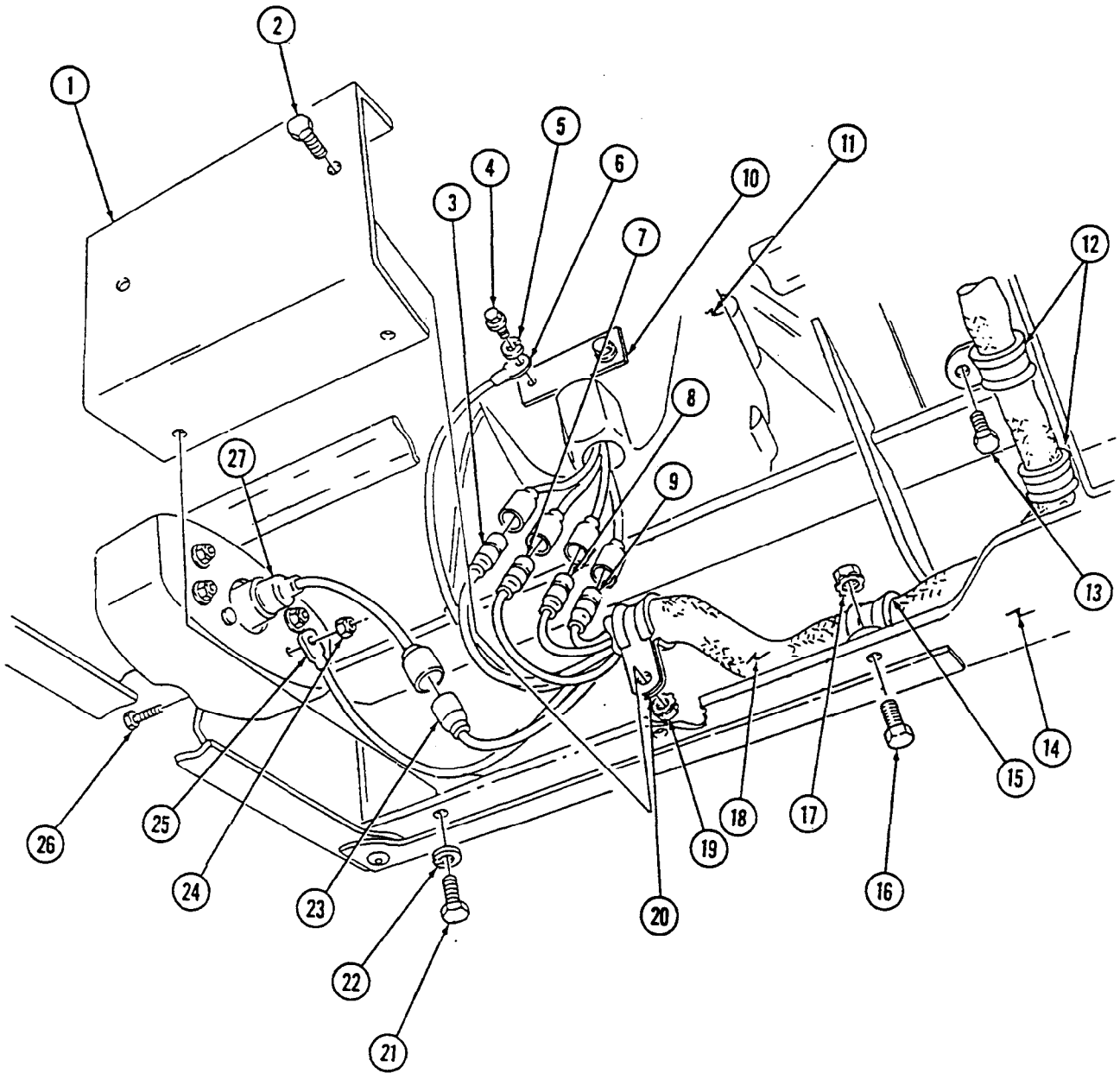
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

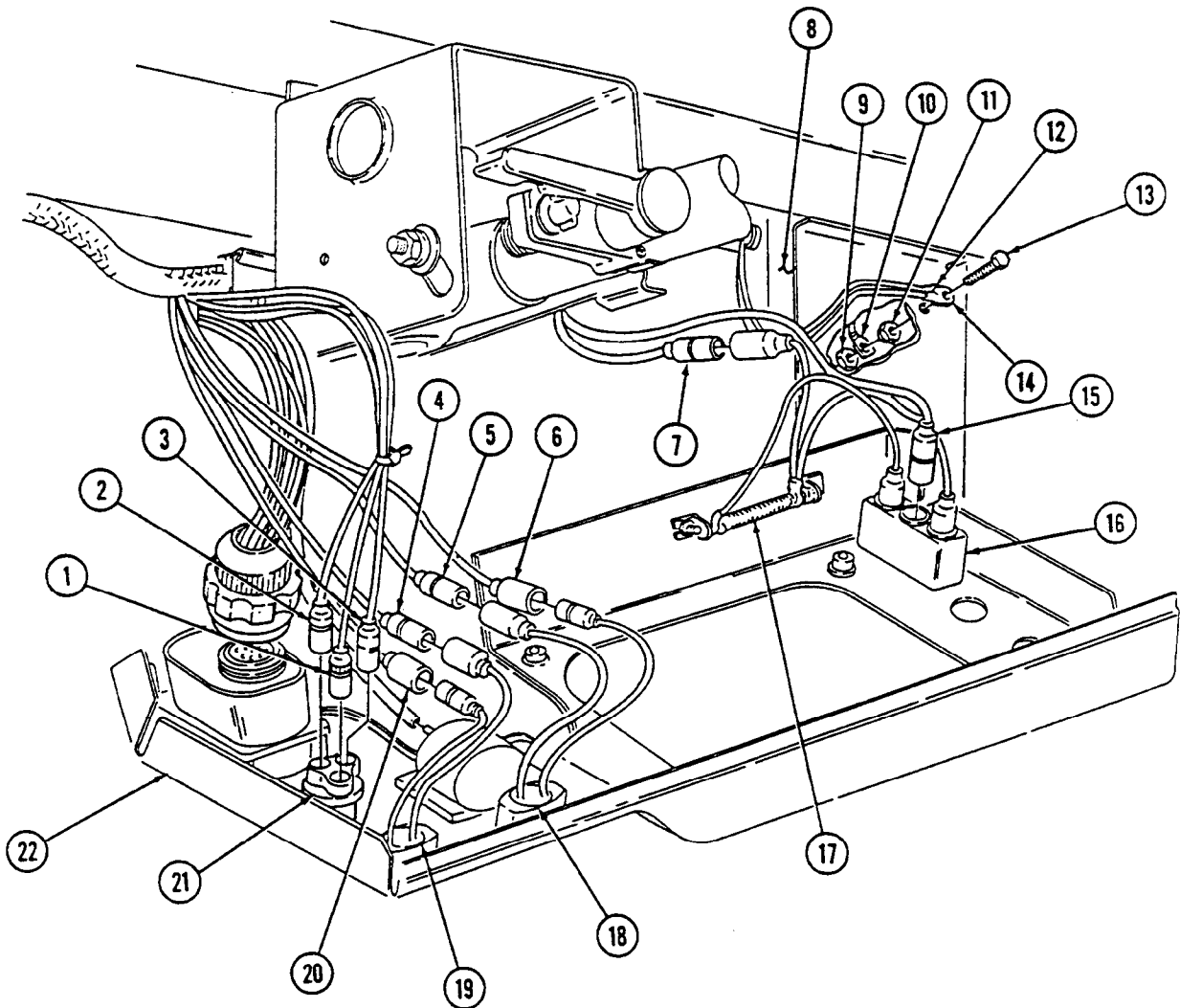
57. Remove two screws (13), clamps (12), and harness (18) from body (14).
58. Remove nut and lockwasher assembly (17), capscrew (16), clamp (15), and harness (18) from body (14). Discard nut and lockwasher assembly (17).
59. Remove two screws (21), lockwashers (22), and shield (1) from body (14). Discard lockwashers (22).
60. Remove two nut and lockwasher assemblies (19), capscrews (2), clamps (20), and harness (18) from shield (1). Discard nut and lockwasher assemblies (19).
61. Disconnect harness lead 489B (23) from right rear side marker light (27).
62. Disconnect harness leads 21E (9), 22-460C (8), 23D (7), and 24C (3) from right rear composite light (11).
63. Remove locknut (24), screw (26), and harness ground lead 95G (25) from right rear side marker light (27). Discard locknut (24).
64. Remove capscrew (4), lockwasher (5), and harness ground lead 95F (6) from buss bar (10). Discard lockwasher (5).

27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



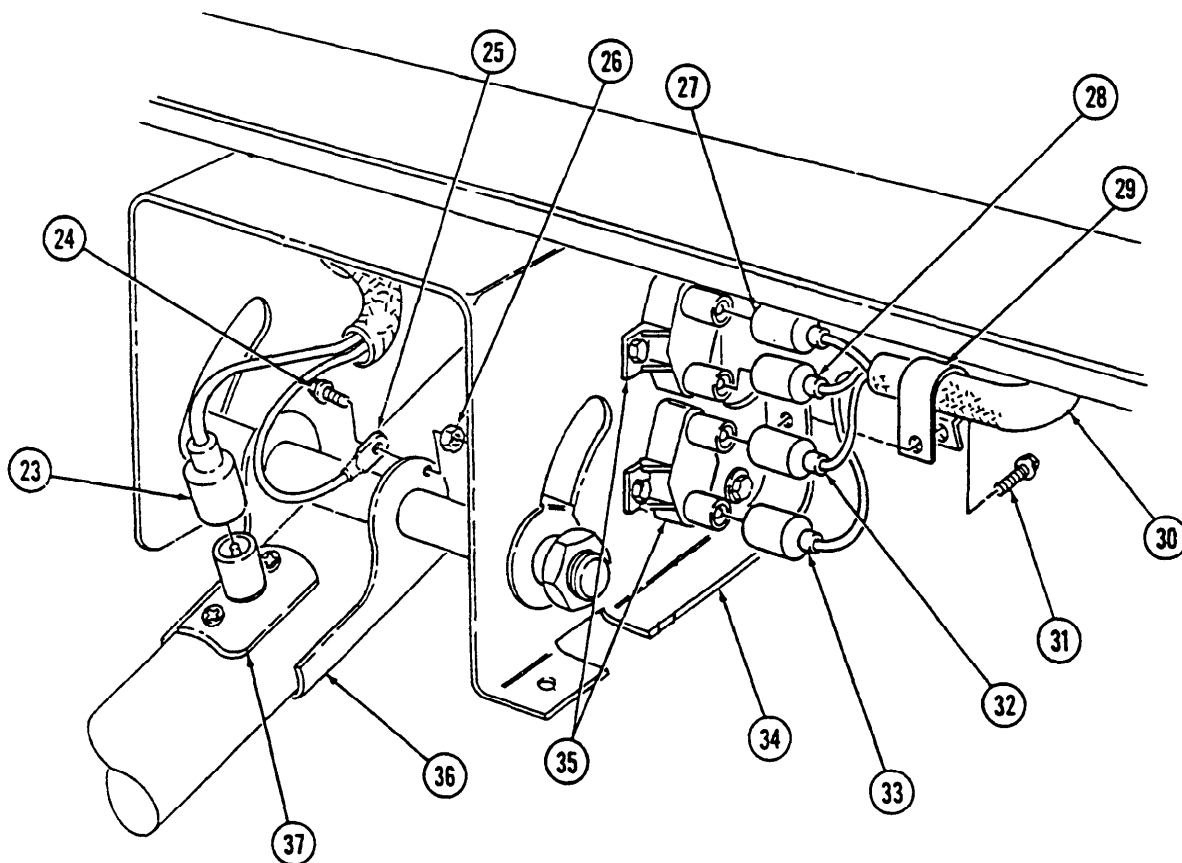
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

65. Disconnect harness leads 11A (1), 14A (2), and 29A (3) from run-start switch (21) behind instrument panel (22).
66. Disconnect harness leads 27F (4) and 571A (20) at wait-to-start indicator light (19).
67. Disconnect harness leads 27L (5) and 67D (6) at parking brake warning indicator light (18).
68. Disconnect harness lead 400D (7) from resistor (17).
69. Disconnect harness lead 27D (15) from blower switch (16).
70. Remove nut and lockwasher assembly (9), engine harness ground lead 3C (10), nut and lockwasher assembly (11), capscrew (13), and harness ground leads 57A (12) and 79A (14) from body (8). Discard nut and lockwasher assemblies (9) and (11).



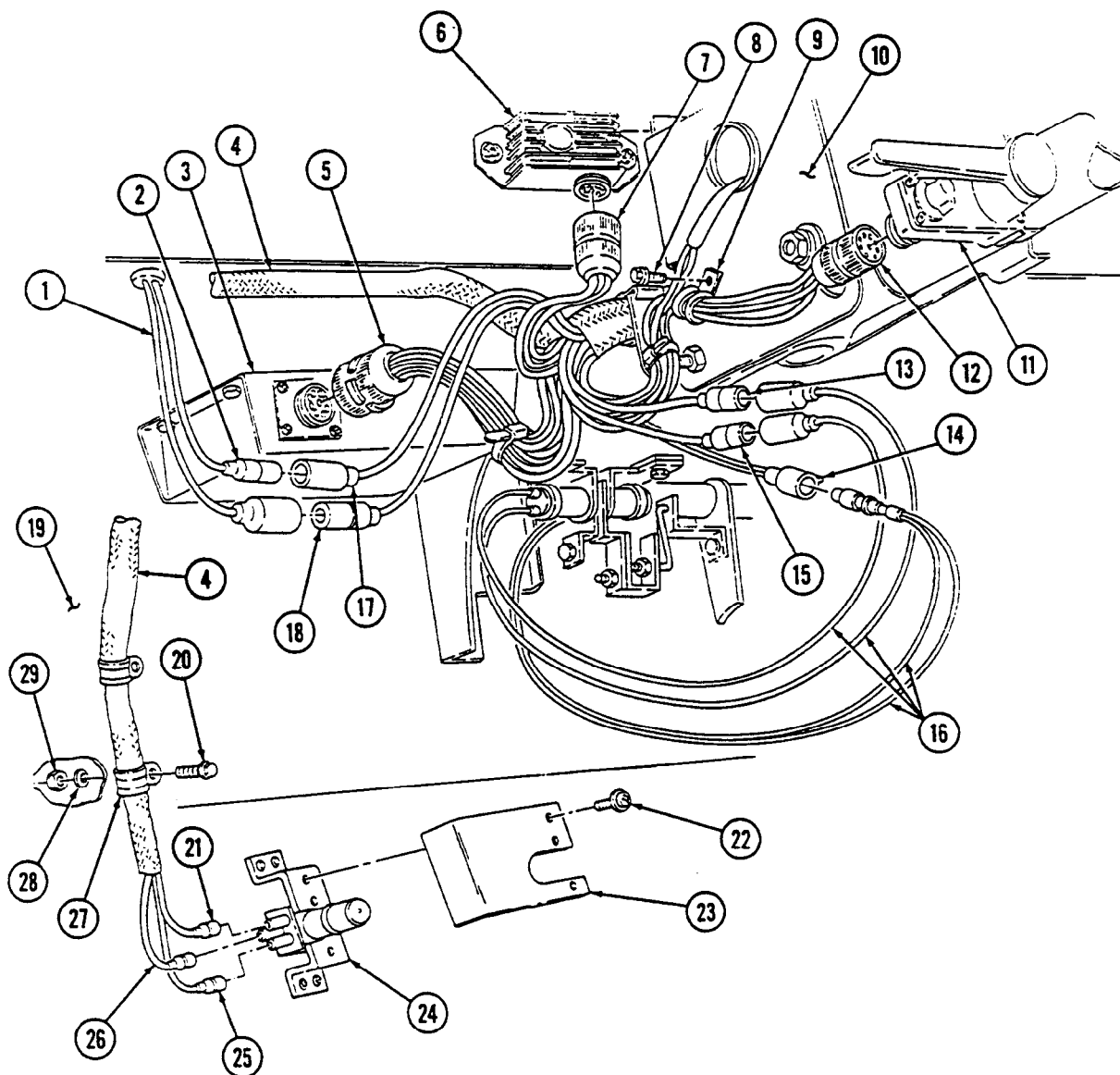
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

71. Disconnect harness leads 27C (27), 27D (28), 27K (32), and 71A (33) from two circuit breakers (35).
72. Remove two screws (31), clamps (29), and harness (30) from steering column support (34).
73. Disconnect harness lead 25A (23) from horn switch (37).
74. Remove locknut (26), capscrew (24), and harness ground lead 57C (25) from steering column (36). Discard locknut (26).



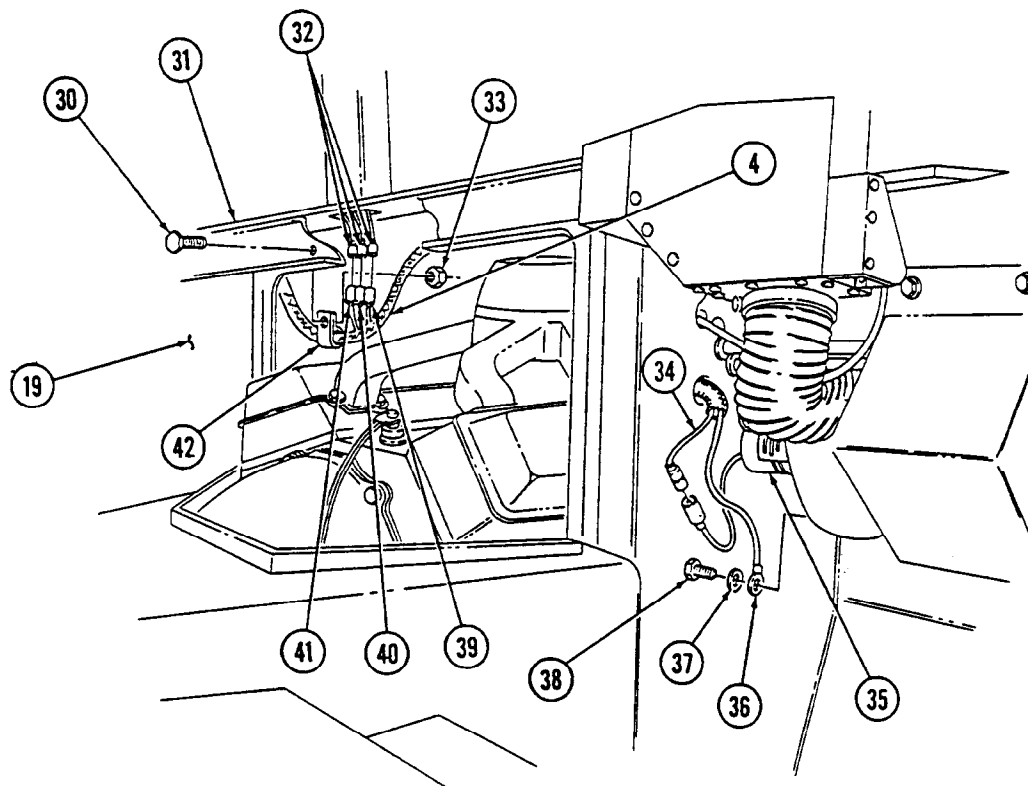
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

75. Disconnect harness connector (12) from turn signal control (11).
76. Disconnect harness connector (7) from turn signal flasher module (6).
77. Disconnect harness leads 75A (13) and 75B (15) and connector 810A/810B (14) from stoplight switch leads (16).
78. Disconnect harness leads 57D (18) and 71C (17) from windshield washer motor leads 57 (1) and 71 (2).
79. Disconnect harness connector (5) from protective control box (3).
80. Remove screw (8), clamp (9), and harness (4) from steering column support (10).
81. Remove three screw-assembled washers (22) and shield (23) from dimmer switch (24).
82. Disconnect harness leads 16A (21), 17A (25), and 18A (26) from dimmer switch (24).
83. Remove three locknuts (29), washers (28), capscrews (20), clamps (27), and harness (4) from body (19). Discard locknuts (29).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

84. Disconnect harness lead 400D (34) from heater motor (35).
85. Remove screw (38), washer (37), and harness ground lead 57E (36) from heater motor (35).
86. Remove two locknuts (33), capscrews (30), clamps (42), and harness (4) from A-beam (31). Discard locknuts (33).
87. Disconnect harness connectors 27K (40), 57F (41), and 71C (39) from windshield wiper motor jumper harness leads (32).
88. Remove harness (4) from A-beam (31) and guide harness (4) into instrument panel area.
89. Remove left body mounts (para. 33-3).
90. Guide harness (4) out through hole in body (19) and remove harness (4) from vehicle.



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

b. Installation

CAUTION

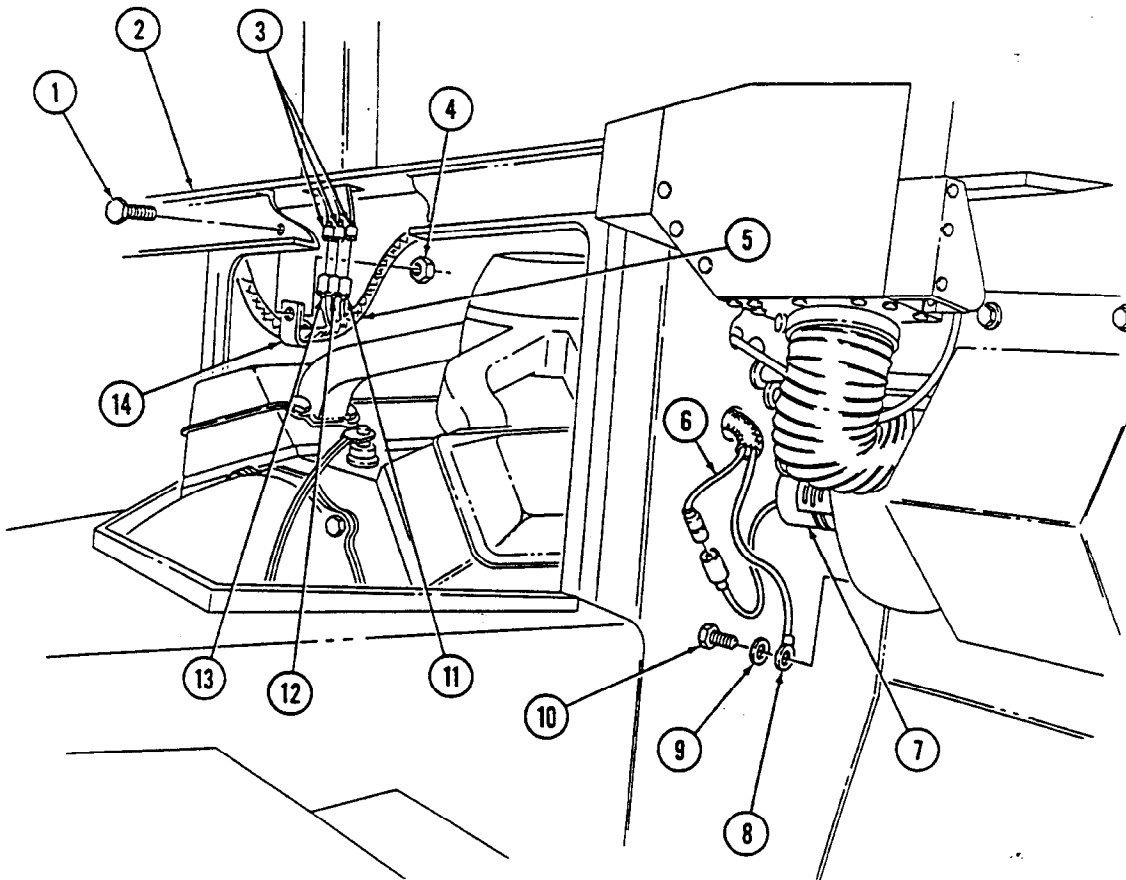
Use care when installing harness. Snagging or pulling may damage harness.

1. Position harness (5) in approximate mounting position. Feed forward branch of harness (5) through hole (17).
2. Install left body mounts (para. 33-3).
3. Install grommet (16) over yellow locator tape (19) and position closeout plate (15) on grommet (16).

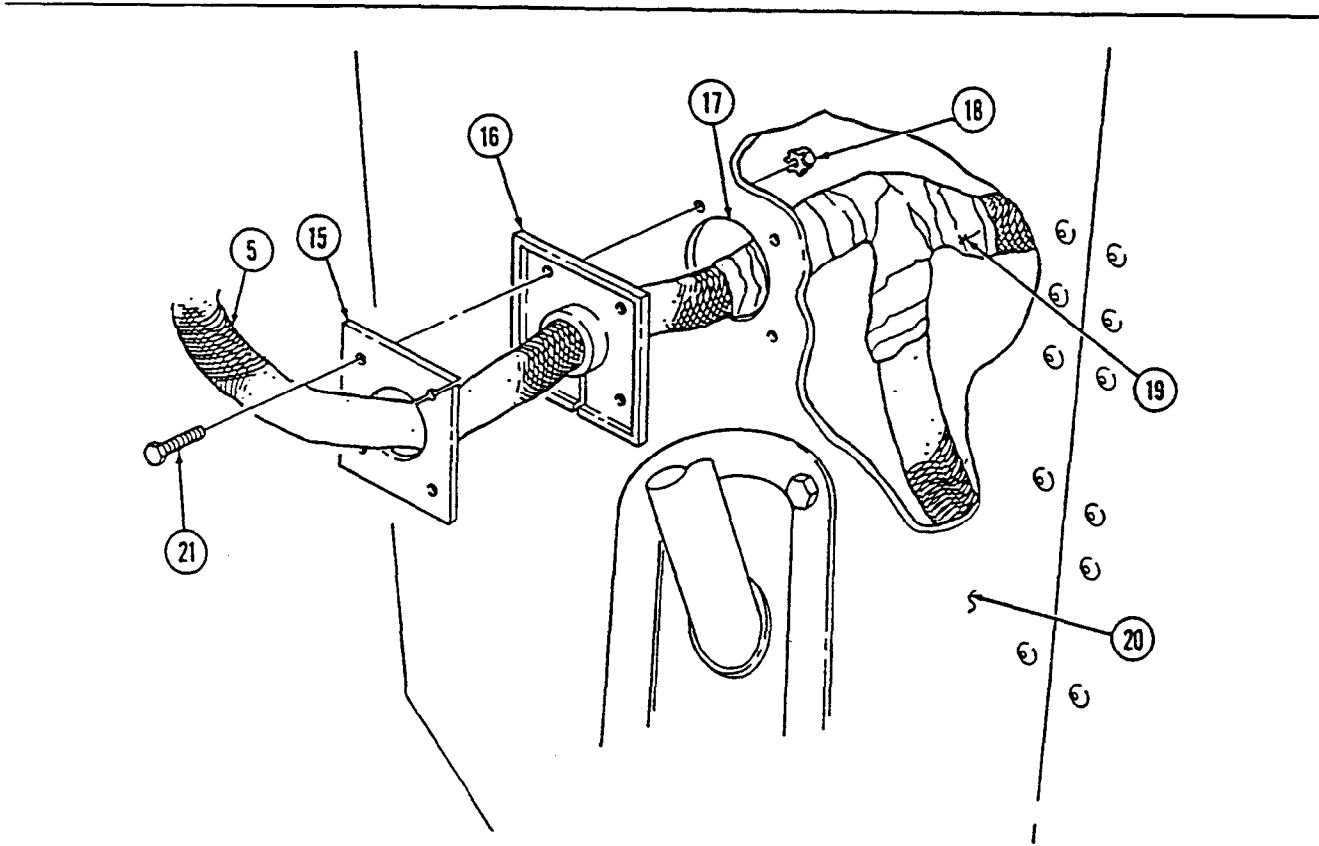
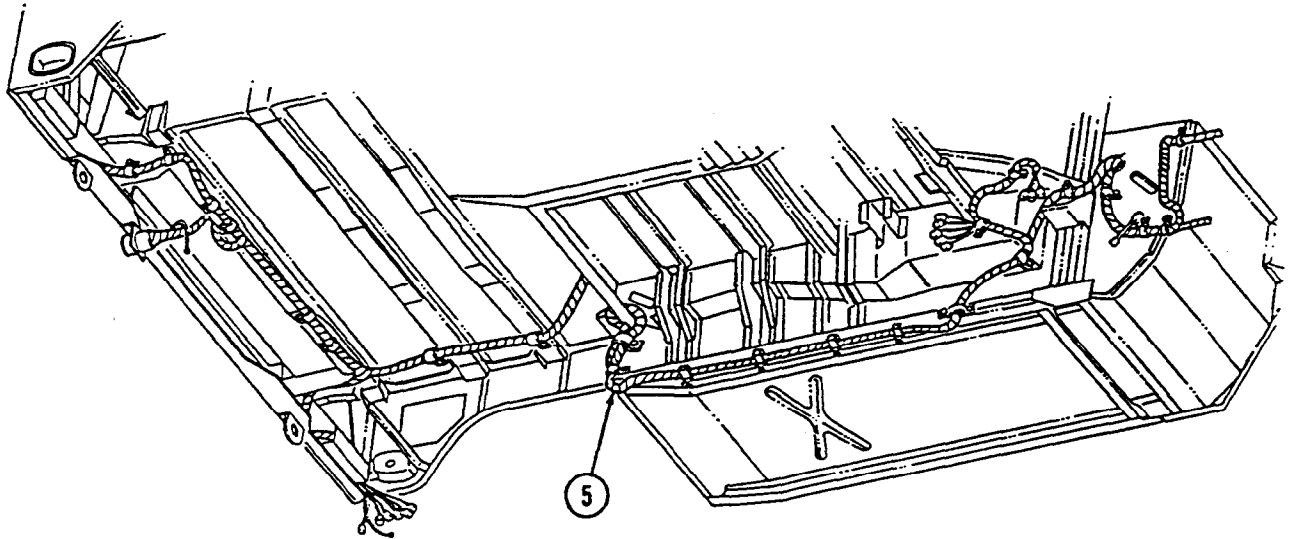
NOTE

Top screws connecting closeout plate may be longer than other screws if fuel filter drain tube is routed to top of closeout plate.

4. Install grommet (16) and closeout plate (15) on cowl (20) with four screws (21) and locknuts (18).
5. Install harness ground lead 57E (8) on heater motor (7) with washer (9) and screw (10).
6. Connect harness lead 400D (6) to heater motor (7).
7. Connect harness leads 27K (12), 57F (13), and 71C (11) to windshield wiper motor jumper harness leads (3).
8. Install harness (5) on A-beam (2) with two clamps (14), capscrews (1), and locknuts (4).

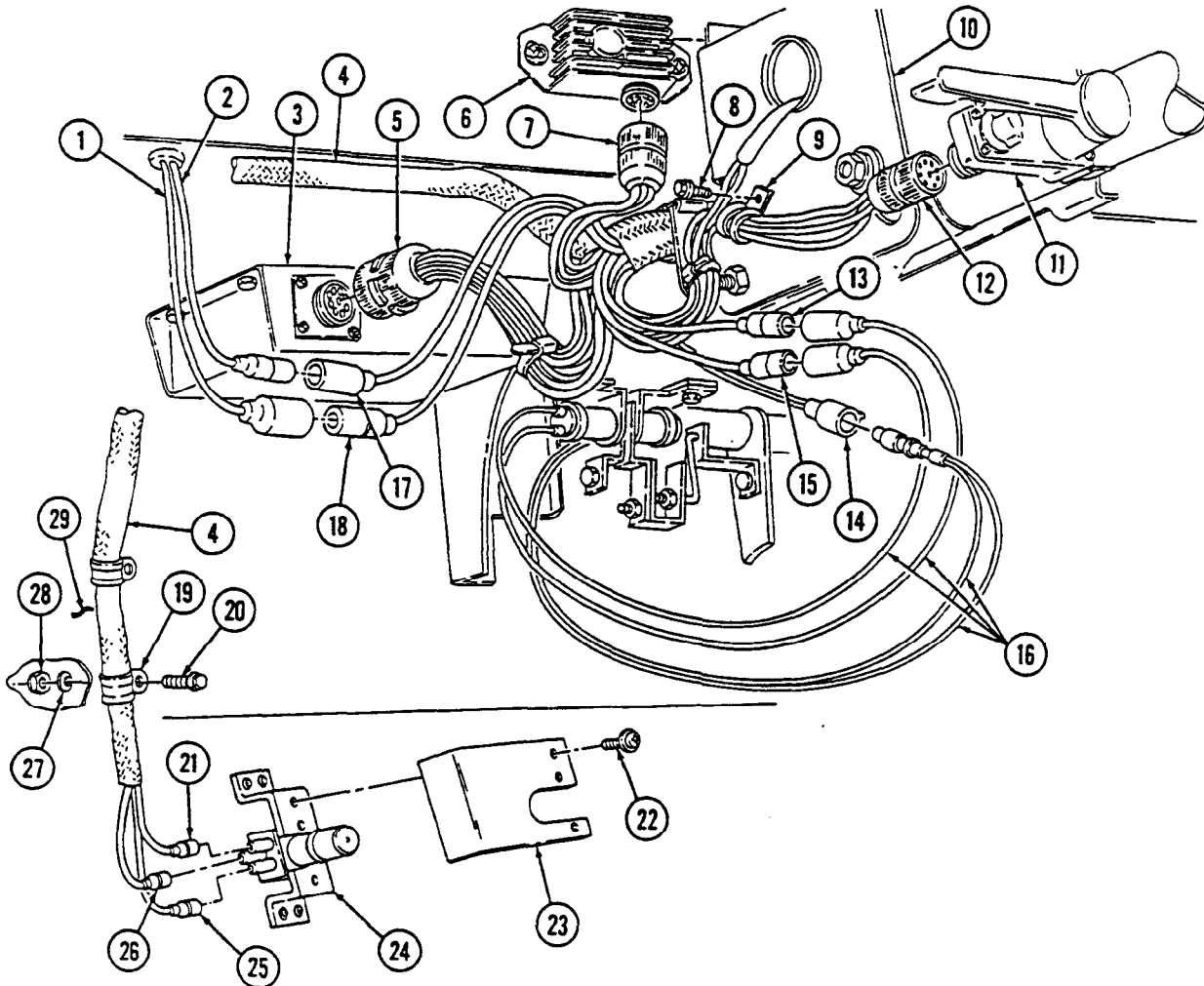


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



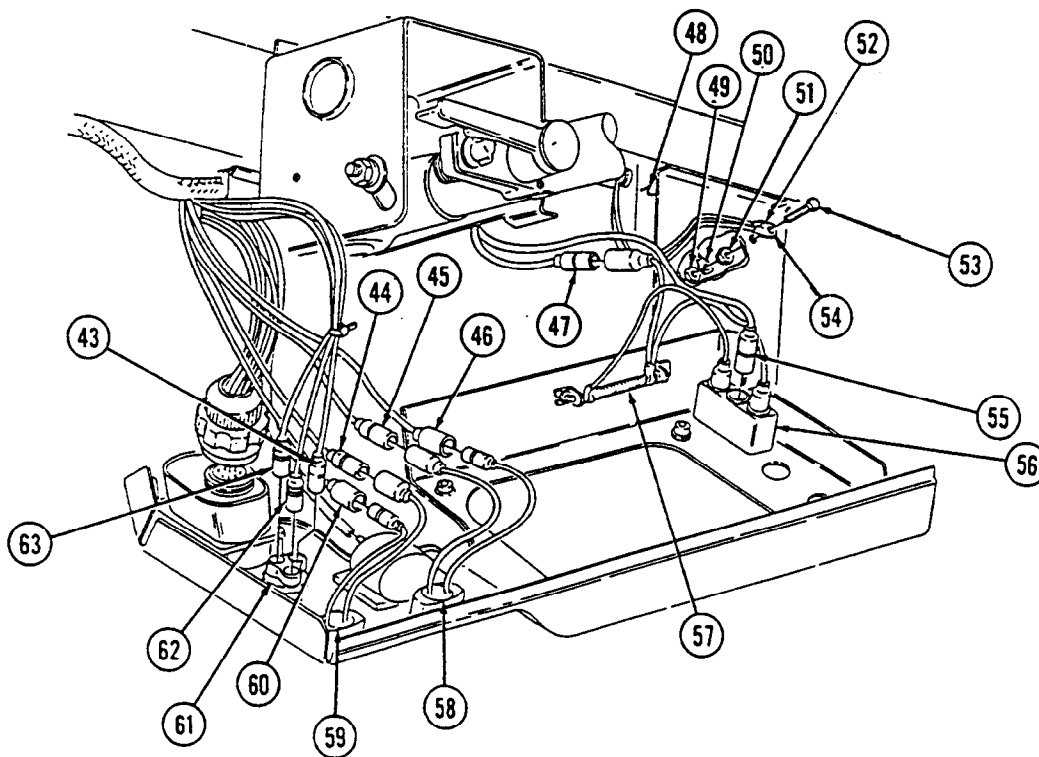
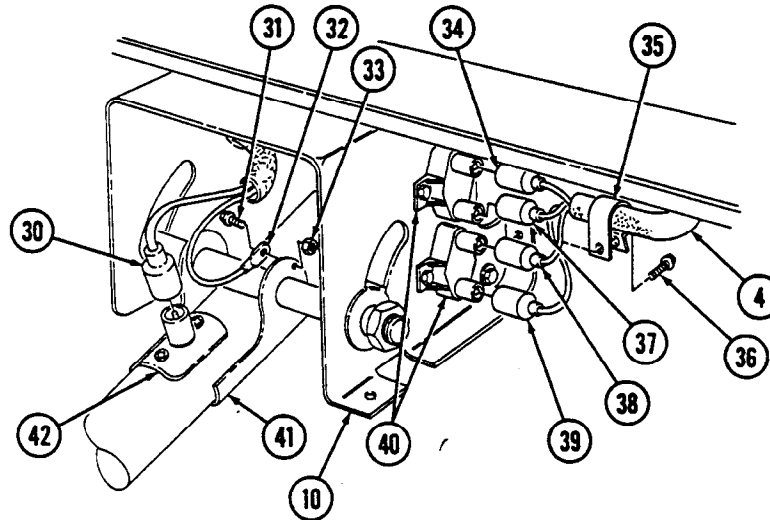
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

9. Connect harness connector (5) to protective control box (3).
10. Connect harness connector (7) to turn signal flasher module (6).
11. Connect harness connector (12) to turn signal control (11).
12. Connect harness leads 75A (13), 75B (15), and 810A/810B (14) to stoplight switch leads (16).
13. Connect harness leads 57D (18) and 71C (17) to windshield washer motor leads 57 (1) and 71 (2).
14. Install harness (4) on steering column support (10) with clamp (9) and screw (8).
15. Connect harness leads 17A (25), 18A (26), and 16A (21) to dimmer switch (24).
16. Install shield (23) on dimmer switch (24) with three screw-assembled washers (22).
17. Install harness (4) on body (29) with three clamps (19), capscrews (20), washers (27), and locknuts (28).
18. Connect harness leads 27C (34), 27D (37), 27K (38), and 71A (39) to two circuit breakers (40).
19. Connect harness lead 25A (30) to horn switch (42).
20. Apply antiseize compound to harness ground lead 57C (32) and install on steering column (41) with capscrew (31) and locknut (33).
21. Install harness (4) on steering column support (10) with two clamps (35) and screws (36).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

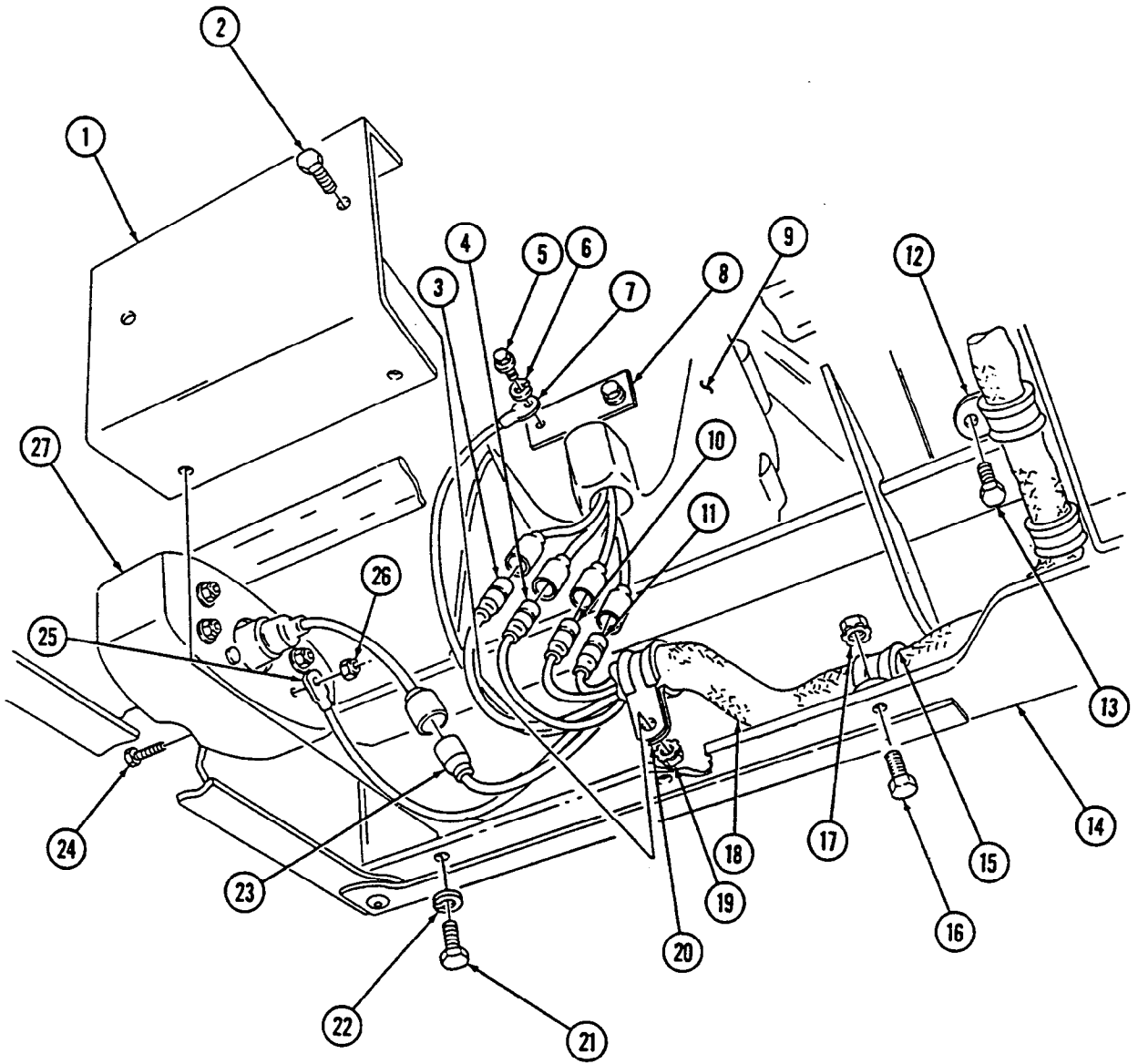
22. Apply antiseize compound to harness leads 57A (52) and 79A (54) and install on body (48) with capscrew (53) and nut and lockwasher assembly (51). Apply antiseize compound to engine harness ground lead 3C (50) and install on body (48) with nut and lockwasher assembly (49).
23. Connect harness lead 27D (55) to blower switch (56).
24. Connect harness lead 400D (47) to resistor (57).
25. Connect harness leads 27L (45) and 67D (46) to parking brake warning indicator light (58).
26. Connect harness leads 27F (44) and 571A (60) to wait-to-start indicator light (59).
27. Connect harness leads 11A (62), 14A (63), and 29A (43) to run-start switch (61).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

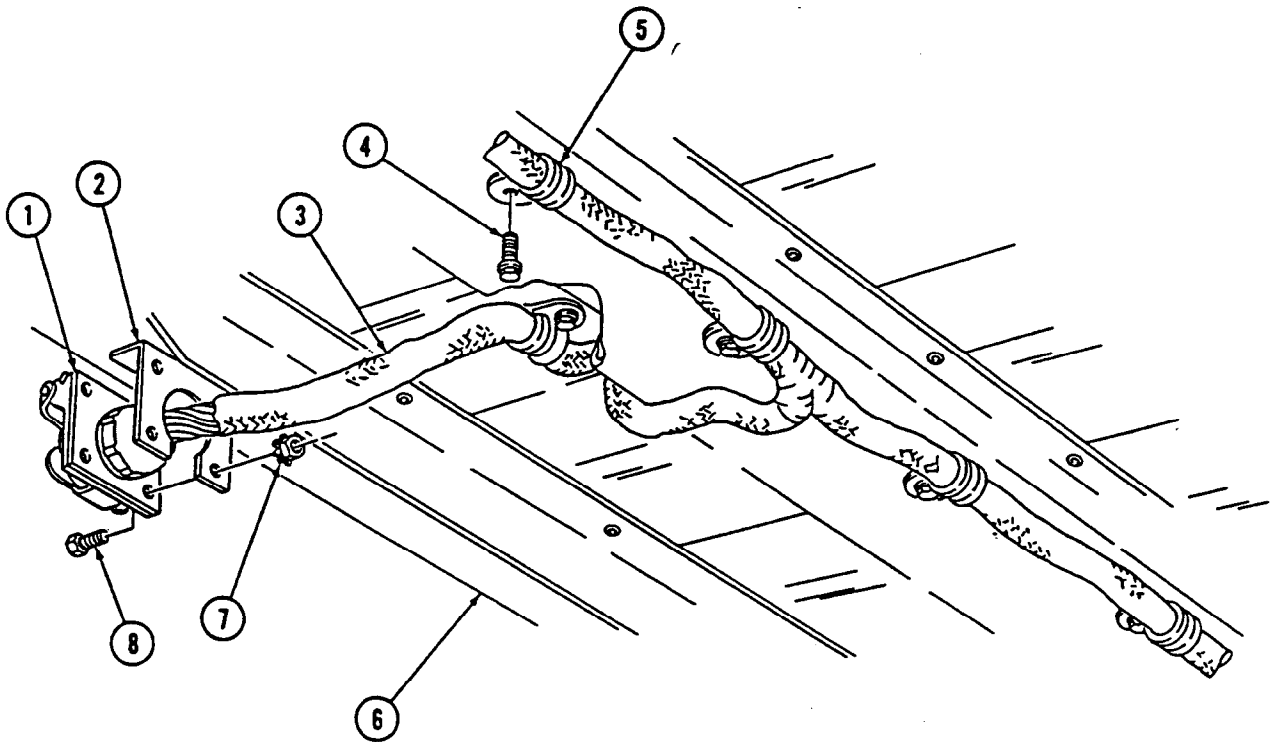
28. Apply antiseize compound to harness ground lead 95F (7) and install on buss bar (8) with lockwasher (6) and capscrew (5).
29. Apply antiseize compound to harness ground lead 95G (25) and install on right rear side marker light (27) with screw (24) and locknut (26).
30. Connect harness leads 21E (11), 22-460C (10), 23D (4), and 24C (3) to right rear composite light (9).
31. Install harness (18) on shield (1) with two clamps (20), capscrews (2), and nut and lockwasher assemblies (19).
32. Install shield (1) on body (14) with two lockwashers (22) and screws (21).
33. Install harness (18) on body (14) with clamp (15), capscrew (16), and nut and lockwasher assembly (17).
34. Install harness (18) on body (14) with two clamps (12) and screws (13).
35. Connect harness lead 489B (23) at right side marker light (27).

27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

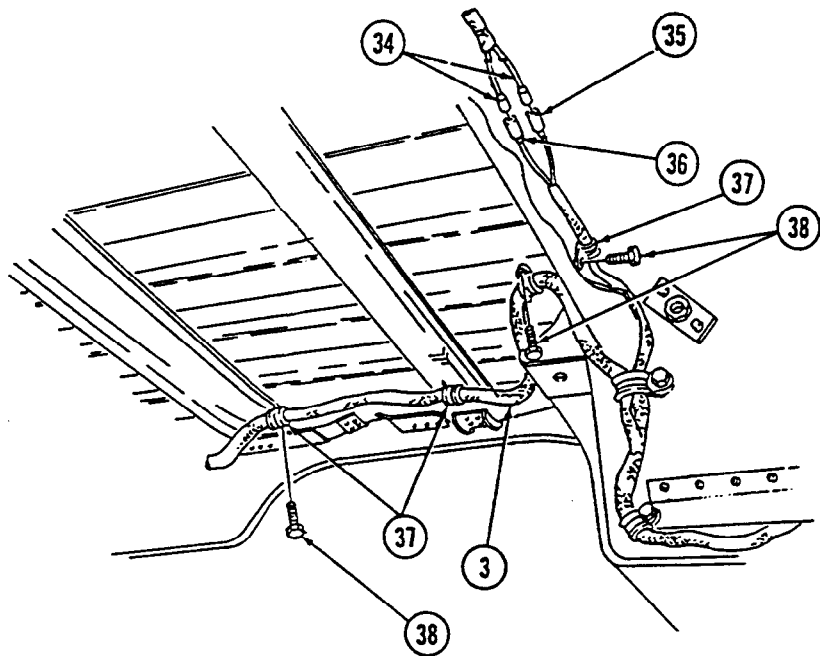
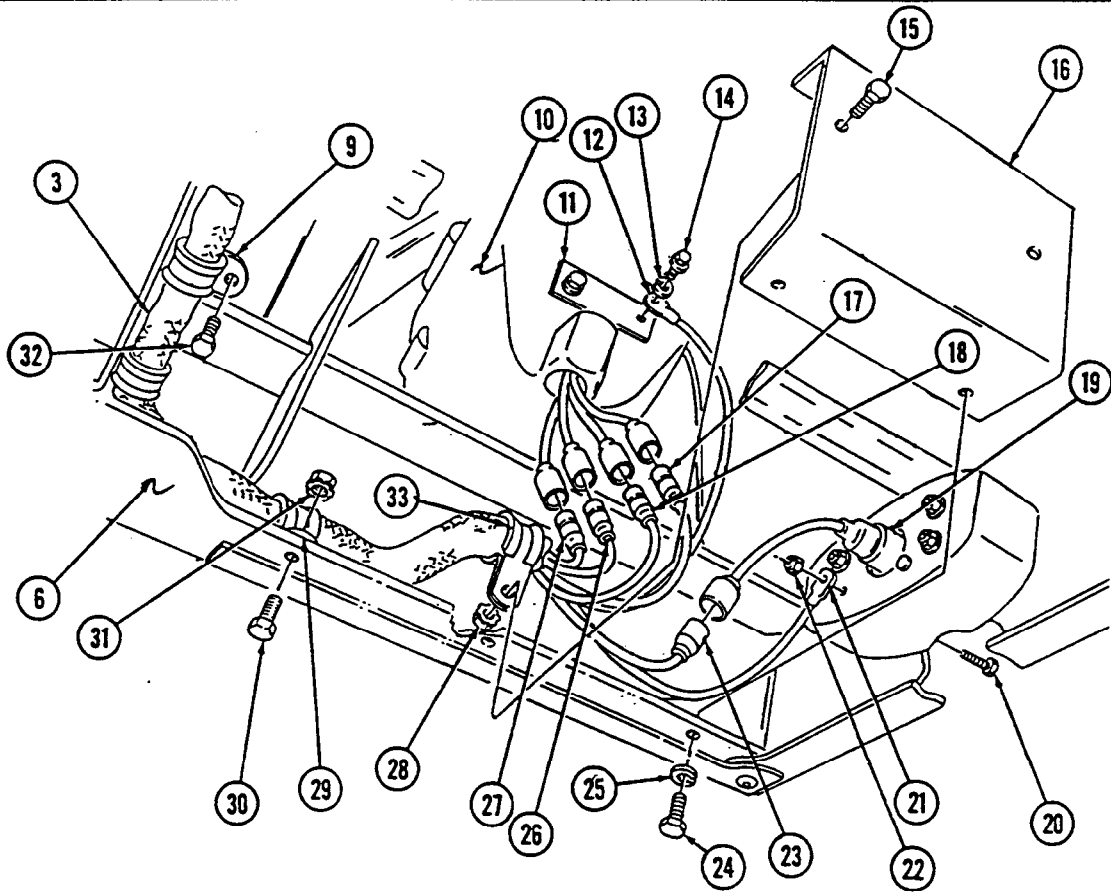


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

36. Install trailer connector (1) in bracket (2) with four capscrews (8) and nut and lockwasher assemblies (7).
37. Install harness (3) on body (6) with five clamps (5) and screws (4).
38. Apply antiseize compound to harness ground lead 95B (12) and install on buss bar (11) with lockwasher (13) and capscrew (14).
39. Apply antiseize compound to harness ground lead 95C (21) and install on left rear side marker light (19) with screw (20) and locknut (22).
40. Connect harness leads 21C (27), 22-461B (26), 23B (18), and 24B (17) to left rear composite light (10).
41. Connect harness lead 489A (23) to left rear side marker light (19).
42. Install harness (3) on shield (16) with two clamps (33), capscrews (15), and nut and lockwasher assemblies (28).
43. Install shield (16) on body (6) with two lockwashers (25) and screws (24).
44. Install harness (3) on body (6) with clamp (29), capscrew (30), and nut and lockwasher assembly (31).
45. Install harness (3) on body (6) with two clamps (9) and screws (32).
46. Install harness (3) on body (6) with six clamps (37) and screws (38).
47. Connect harness leads 28A (36) and 58C (35) to fuel tank jumper harness leads (34).



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

48. Connect wiring harness connector (8) to sensor (6).
49. Connect connectors 497/498 (7) and 495/496 (9) to output and input speed sensors (4) and (10).
50. Install two capscrews (1), washers (2), clamps (3), and nuts (5) on sensors (4) and (10).
51. Connect two leads (16) to transfer case switch leads (15) on transfer case (14).
52. Secure speedometer cable (13) and harness (12) with tiedown strap (11).
53. Connect harness connector (17) to TCM (18).

NOTE

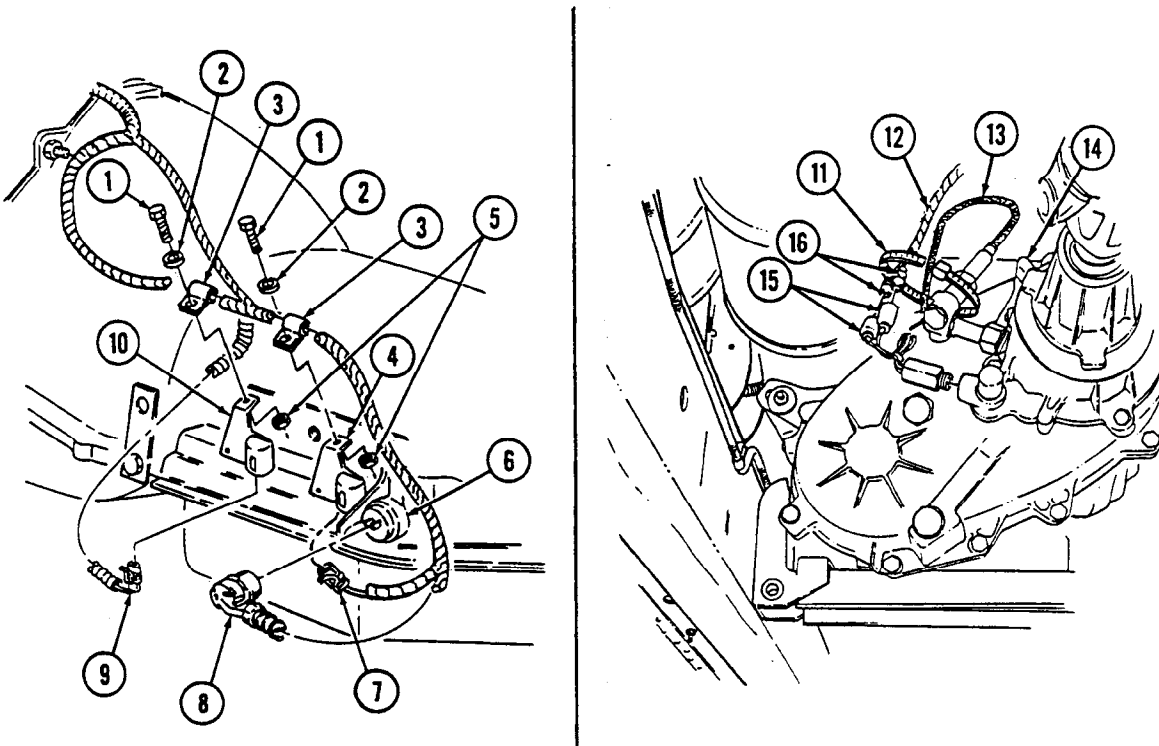
Perform step 54 for M1114 models only.

54. Install winch cables (23) and harness (24) on body (22) with six clamps (20), four screws (21), and five tiedown straps (19).

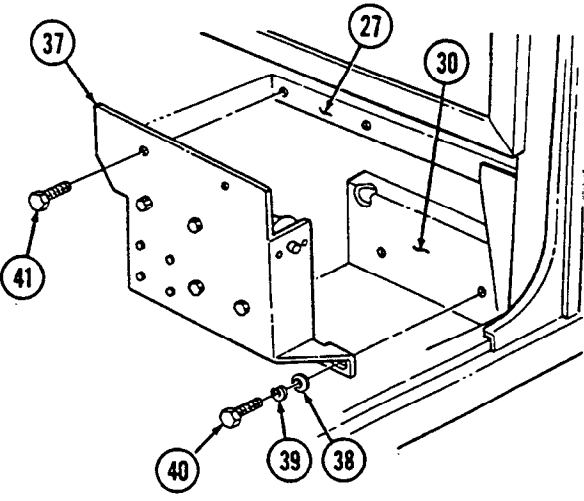
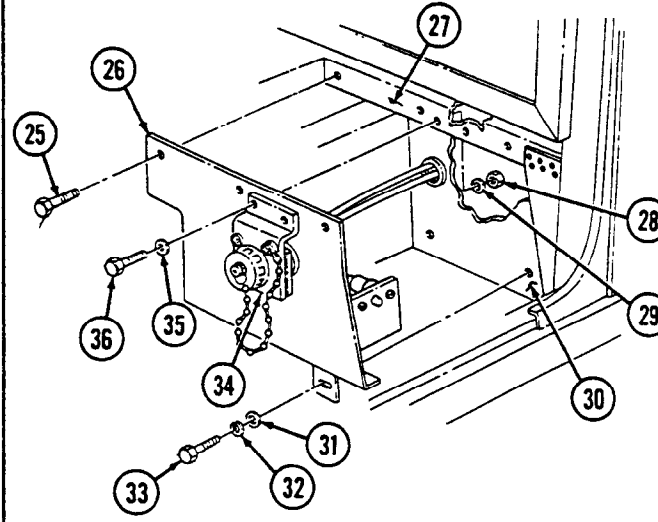
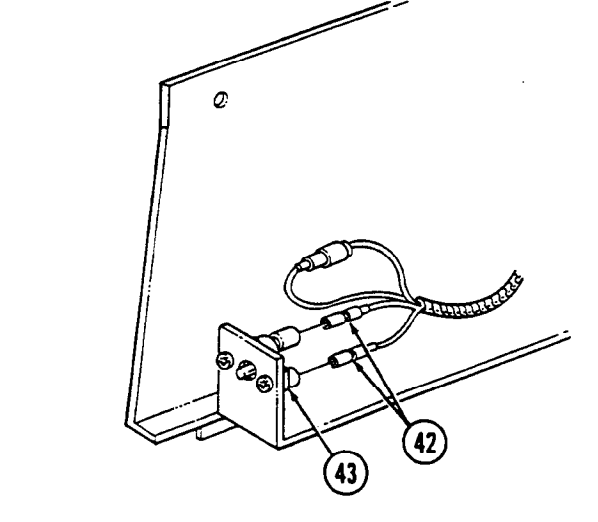
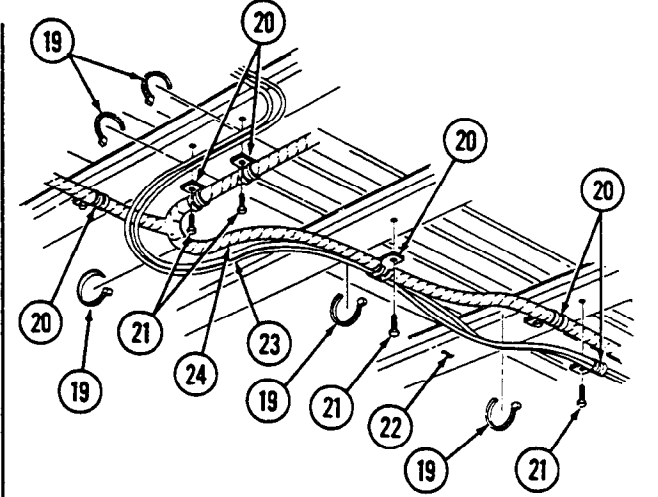
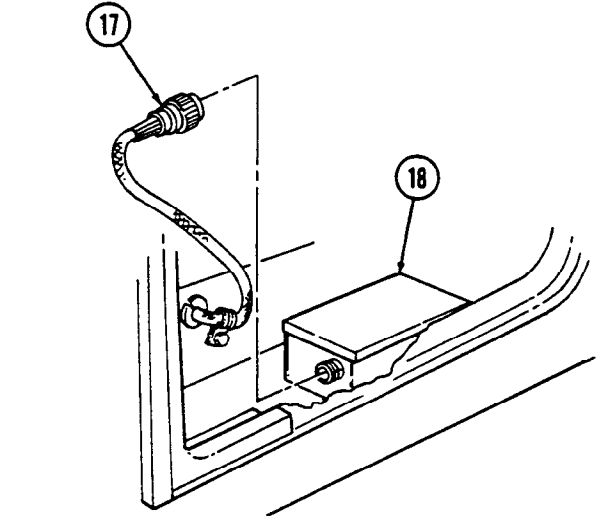
NOTE

Perform step 55 for M1113 models only. Perform steps 56 and 57 for M1114 models only.

55. Install coverplate (26) and bracket (34) on battery box (30) and B-beam (27) with two washers (35), capscrews (36), washers (29), nuts (28), washers (31), lockwashers (32), and capscrews (33) and (25).
56. Install coverplate (37) on battery box (30) with two washers (38), lockwashers (39), and capscrews (40).
57. Install coverplate (37) on B-beam (27) with two capscrews (41).
58. Connect two harness leads (42) to circuit breaker (43).

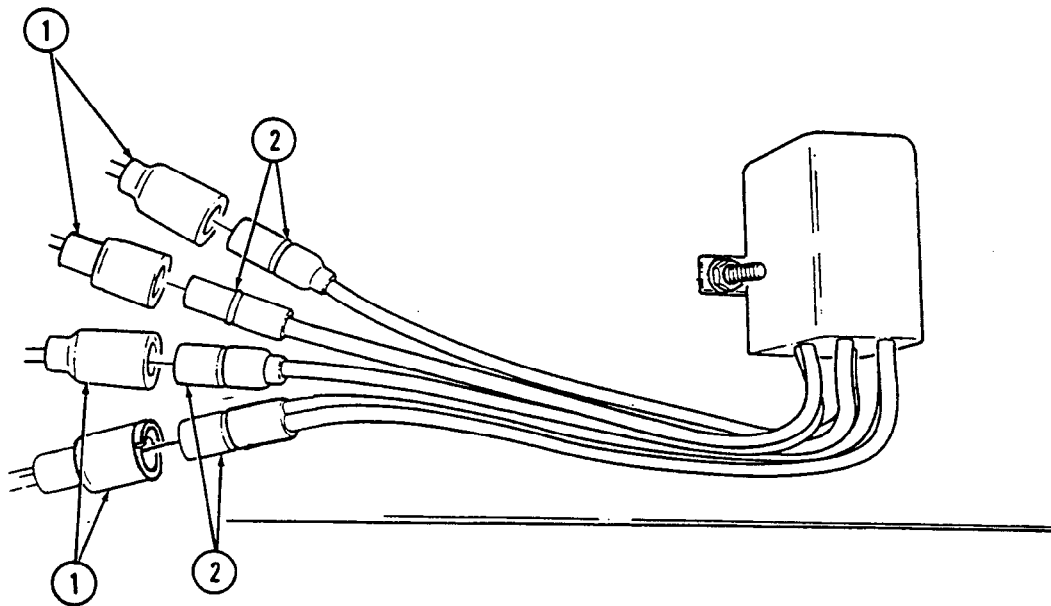


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

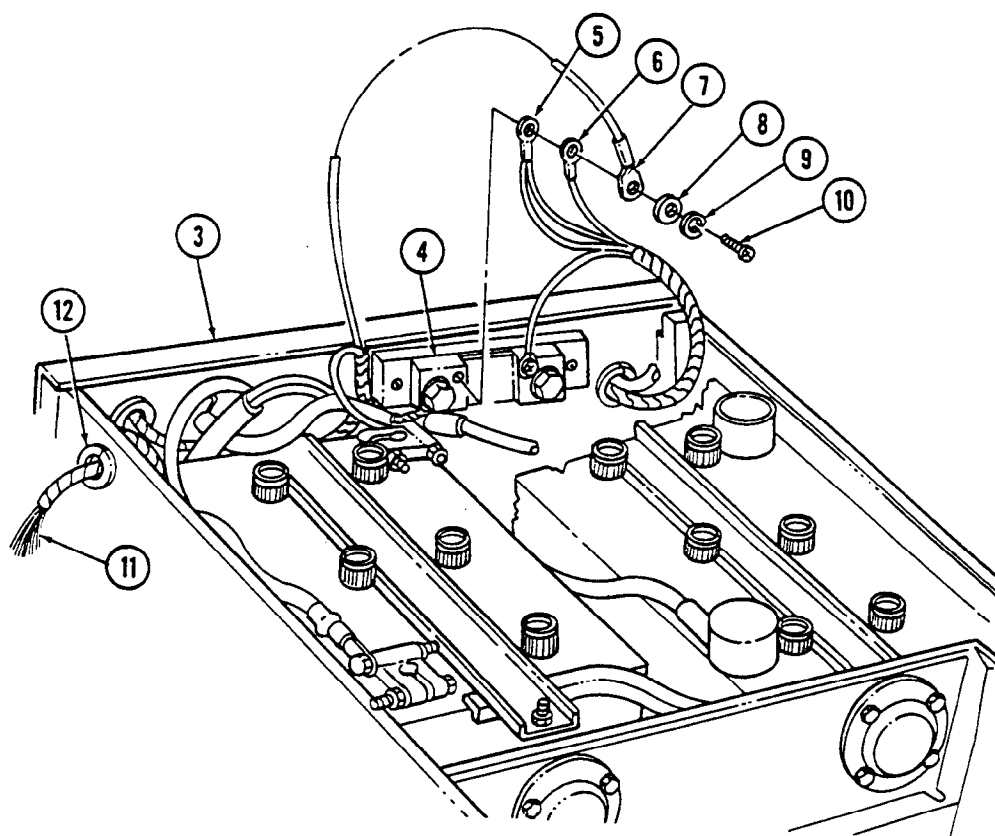


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

- 59. Connect four harness leads 57T, 290B/291B, and 290C/291C (1) on transmission relay leads (2).
- 60. Push four leads 57T, 290B/291B, and 290C/291C (1) of harness (11) through rear grommet (12) in battery box (3).
- 61. Install leads 290/291/537 (7), (5), and (6) to shunt (4) with washer (8), lockwasher (9), and screw (10).

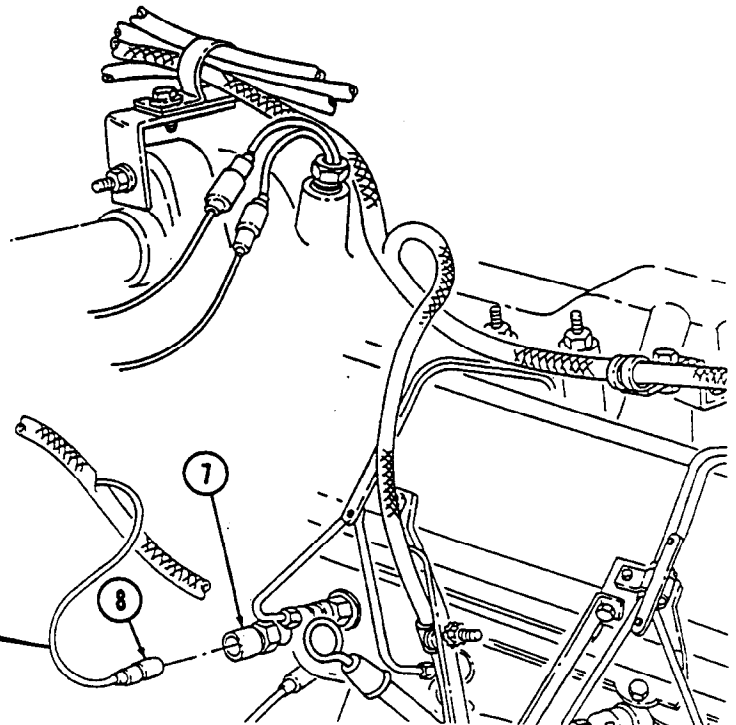
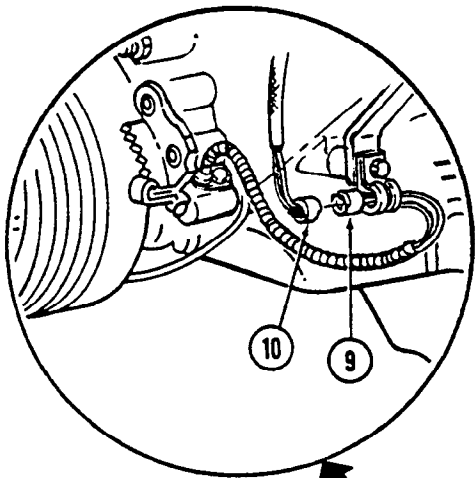
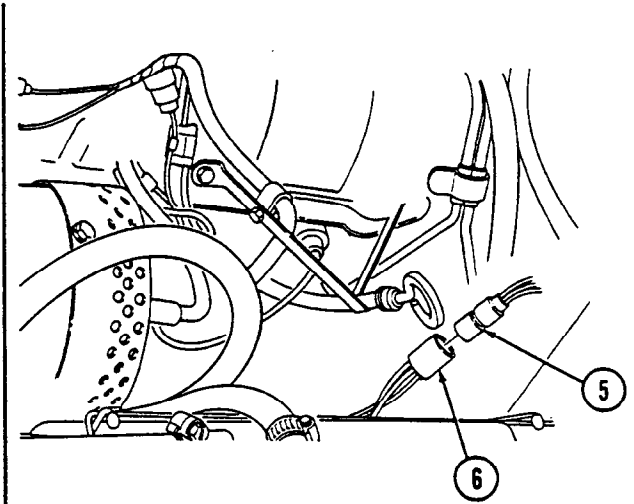
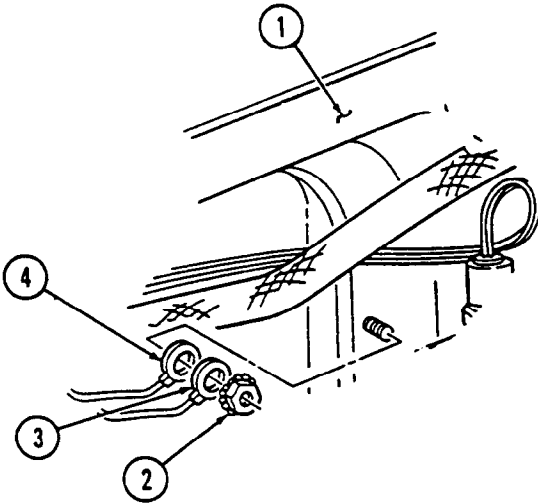


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



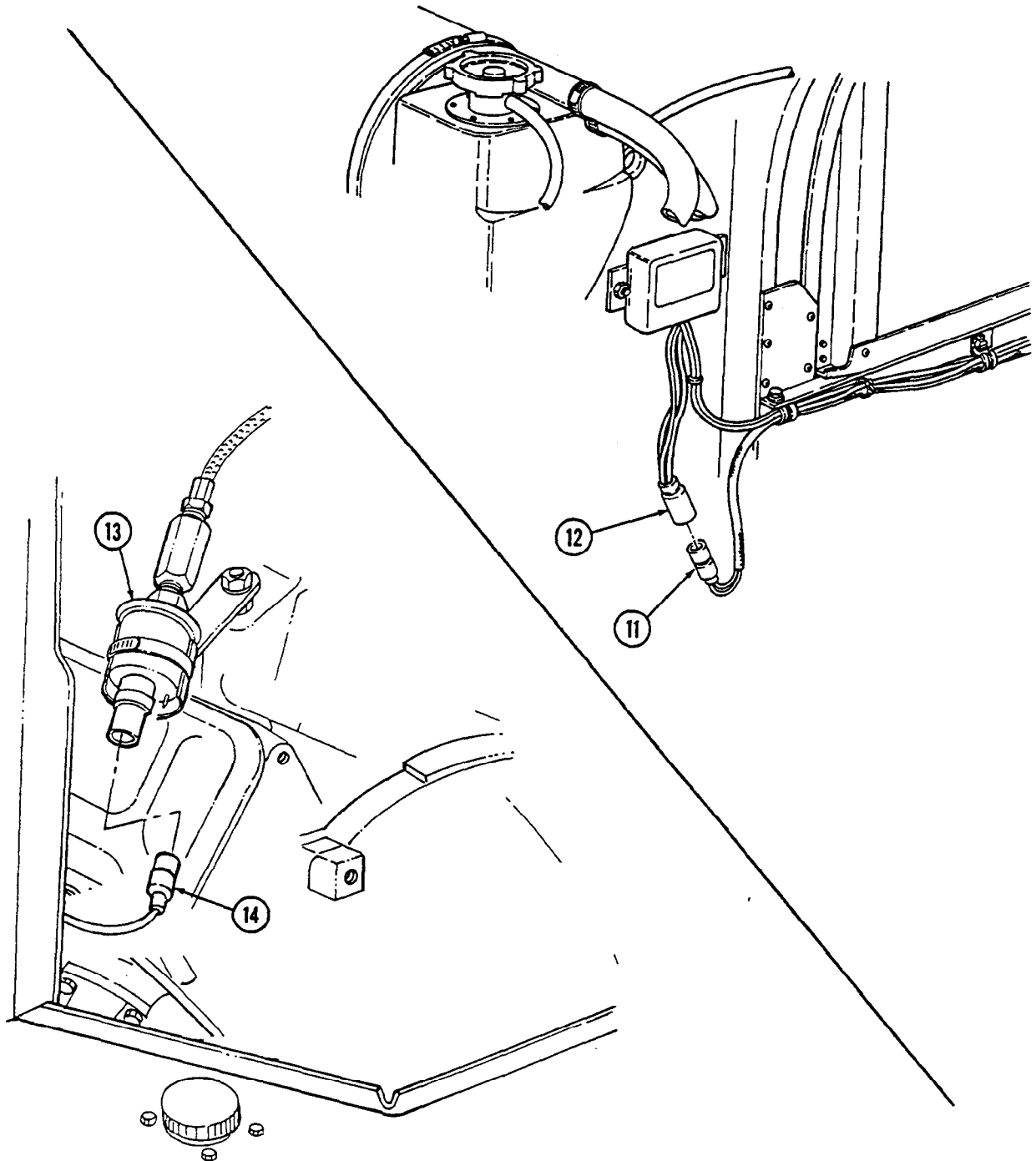
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

62. Install engine harness ground 3C (3) and lead 58B (4) on body (1) with nut and lockwasher assembly (2).
63. Connect engine harness 350B/359G/355A lead (5) to body harness lead (6).
64. Connect harness 33A (8) to engine temperature sending unit (7), and harness lead (10) to engine rpm sensor lead (9).



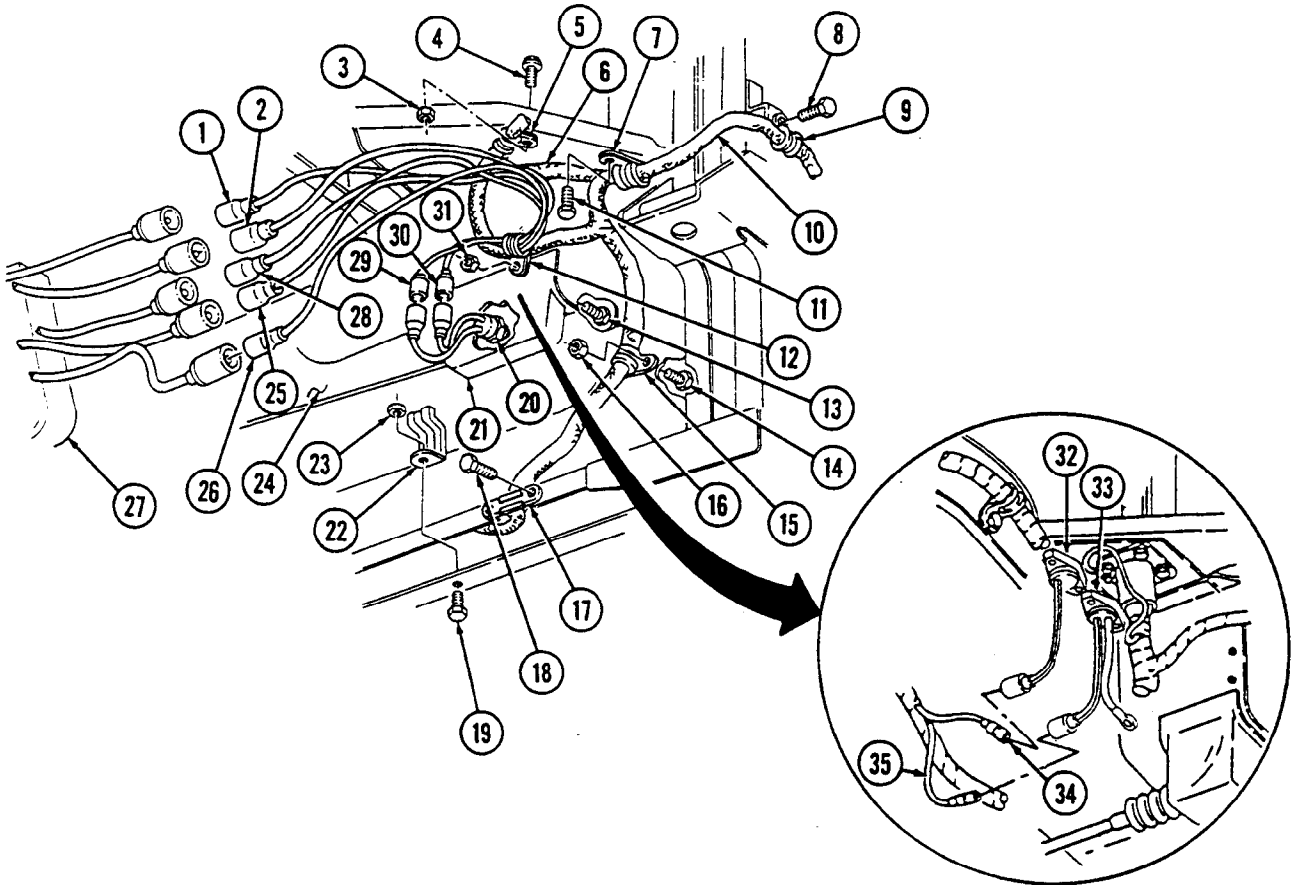
27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

65. Connect harness connector (11) to STE/ICE-R rpm converter (12).
66. Connect harness lead 36A (14) to engine oil pressure sending unit (13).

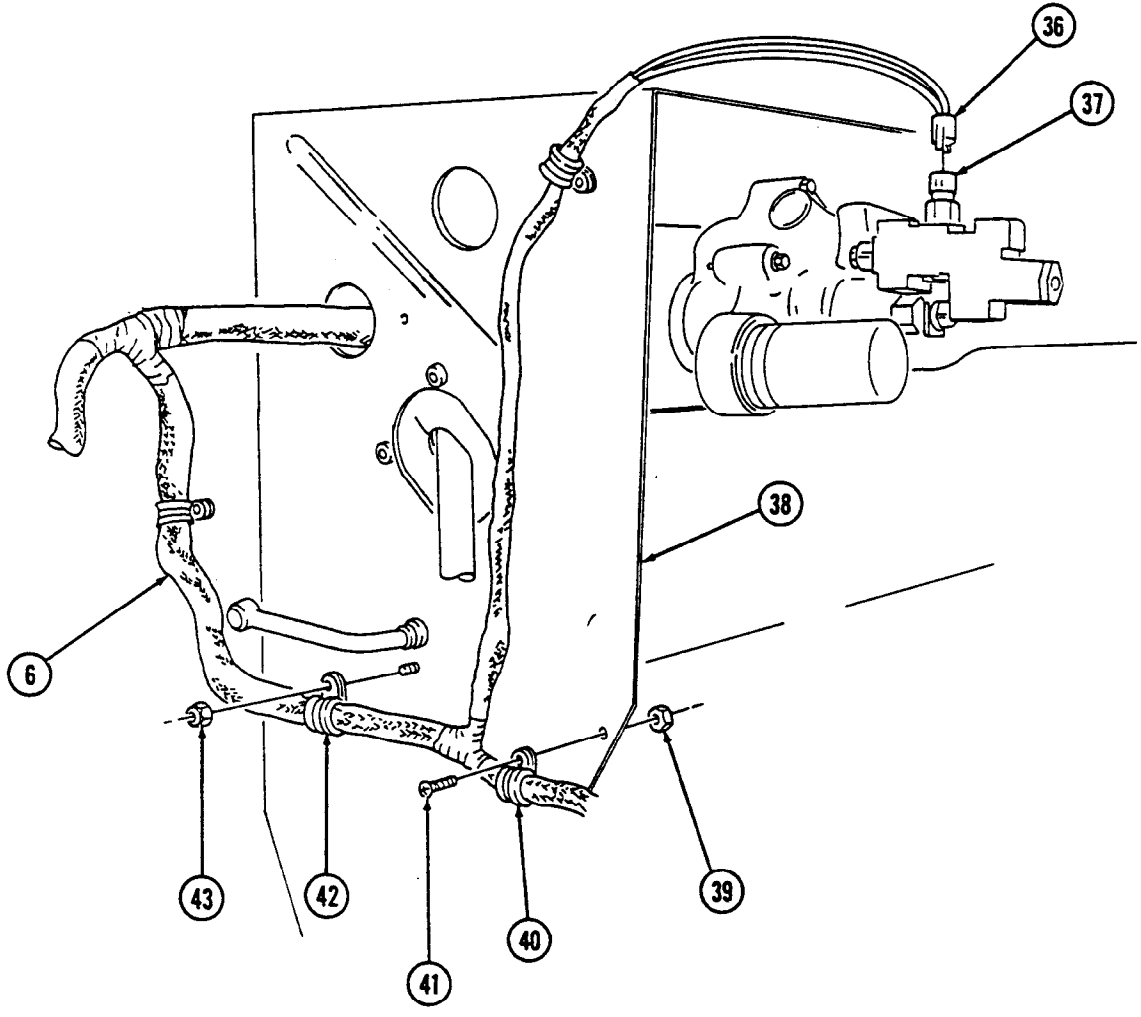


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

67. Install harness (6) on body (24) with four clamps (22), capscrews (19), and locknuts (23).
68. Connect harness leads 67C (30) and 67E (29) to parking brake switch (20).
69. Connect harness leads 467C (28), 457 (25), 14A (1), 14B (2), and 40F (26) to shift controls housing (27).
70. Install harness (6) on body (24) with clamp (17) and two screws (18).
71. Install harness (6) and harness (10) on body (24) with clamps (7) and (9) and screws (8) and (11).
72. Connect harness leads (34) and (35) to transmission and transfer case indicator lights (33) and (32).
73. Install harness (6) on body (24) with clamp (15), capscrew (14), and locknut (16).
74. Install harness (6) on parking brake boot (21) with clamp (12), capscrew (13), and locknut (31).
75. Install harness (6) on body (24) with clamp (5), capscrew (4), and locknut (3).
76. Install harness (6) on cowl (38) with three clamps (40), capscrews (41), and locknuts (39).
77. Install harness (6) on cowl (38) with clamp (42) and locknut (43).
78. Apply lubricating oil to harness connector (36) and to brake warning lamp switch (37).
79. Connect harness connector (36) to brake warning lamp switch (37).

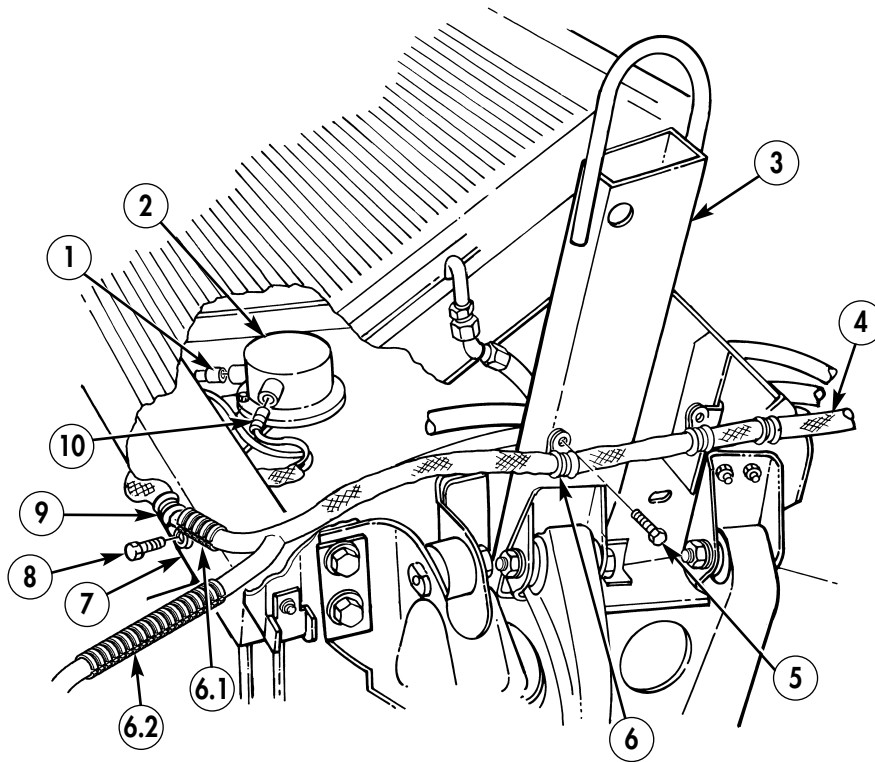


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

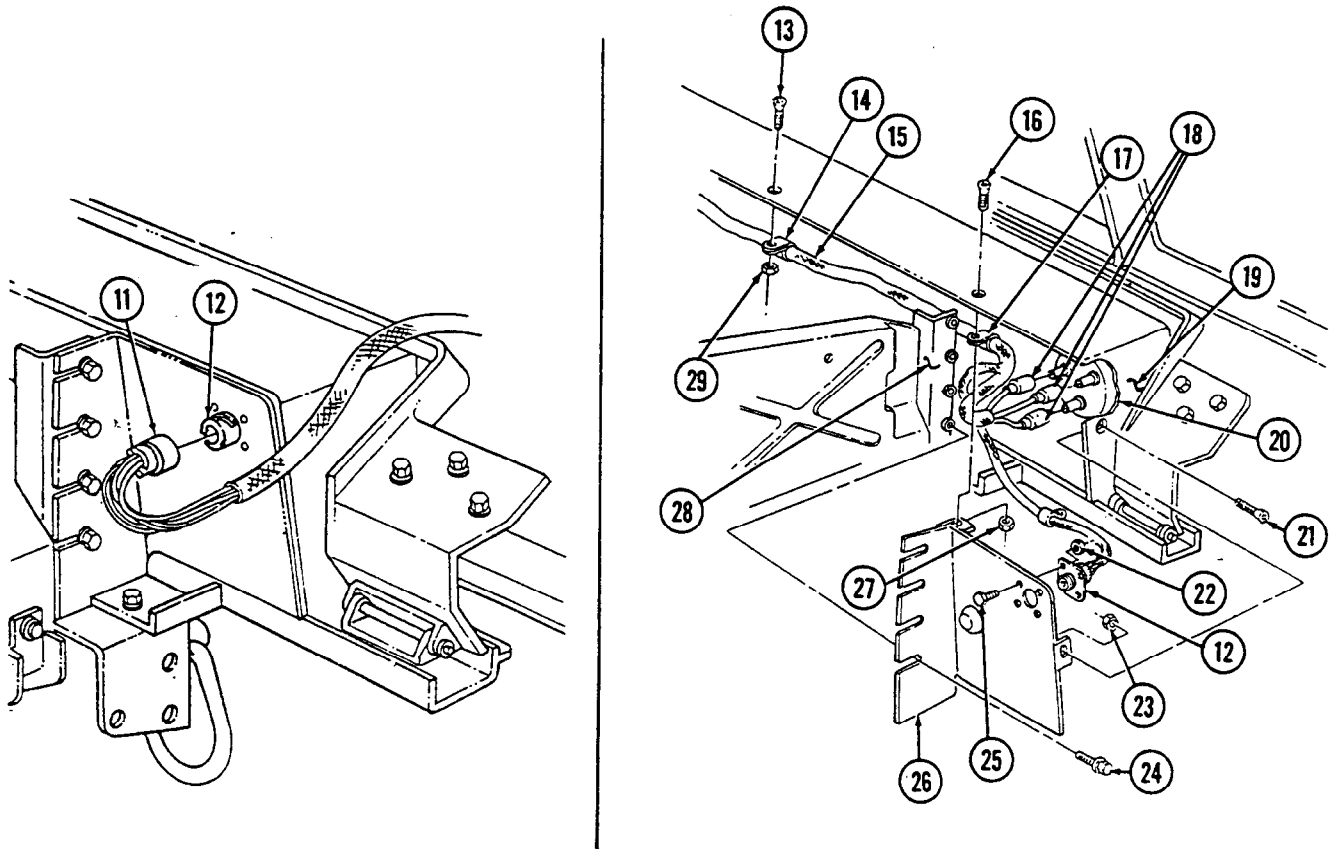


27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)

80. Connect harness leads 25A (10) and 26A (1) to horn (2).
- 80.1. Install conduit (6.1) and (6.2) on harness (4) if removed.
81. Install harness (4) on crossmember (7) with clamp (9) and screw (8).
82. Install harness (4) on left airlift bracket (3) with three clamps (6) and screws (5).
83. Connect harness leads 17E, 18C, and 91D (18) on headlight (20).
84. Install harness (15) on headlight housing (19) with three clamps (14), screws (13), and nuts (29).
85. Install harness connector (12) on plate (26) with four screws (25) and nuts (22).
86. Install plate (26) on headlight housing (19) with screw (16), clamp (17), nut (27), screw (21), and locknut (23).
87. Install plate (26) on bracket (28) with four screws (24).
88. Connect hood harness connector (11) to harness connector (12).
89. Repeat steps 84 through 88 for opposite side.



27-3. BODY WIRING HARNESS REPLACEMENT (Cont'd)



- FOLLOW-ON TASKS:**
- Install left and right underbody armor (M1114 only) (paras. 11-36 through 11-39).
 - Install instrument cluster (para. 4-14).
 - Install rear side marker light lenses (para. 4-56).
 - Install heater ducting (para. 10-80).
 - Install left defroster nozzle (para. 10-83).
 - Install muffler and catalytic converter (para. 3-49).
 - Install left splash shield (para. 10-23).
 - Install engine access cover (para 10-22).
 - Start engine (TM 9-2320-387-10) and check operation of vehicle electrical systems.

CHAPTER 28 TRANSMISSION (GS) REPAIR

28-1. INTRODUCTION

This chapter contains maintenance instructions for disassembly and repair of transmission components at the general support maintenance level. Some subassemblies and parts must be removed before transmission system components can be accessed. They are referenced to other paragraphs in this manual.

TRANSMISSION DISASSEMBLY, REPAIR, AND ASSEMBLY

28-2. TRANSMISSION DISASSEMBLY, REPAIR, AND ASSEMBLY TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
28-3.	Transmission Disassembly into Subassemblies	28-2
28-4.	Torque Converter Maintenance	28-20
28-5.	Transmission Case Maintenance	28-22
28-6.	Parking Lock Pawl and Actuator Assembly Inspection	28-24
28-7.	Rear Band and Selective Thrust Washer Inspection	28-25
28-8.	Gear Unit and Output Assemblies Repair	28-26
28-9.	Center Support Repair	28-32
28-10.	Direct Clutch Assembly Repair	28-38
28-11.	Forward Clutch Assembly Repair	28-42
28-12.	Fourth Clutch Assembly Repair	28-46
28-13.	Turbine Shaft and Overdrive Carrier Assembly Repair	28-48
28-14.	Intermediate Clutch Assembly and Front Band Inspection	28-56
28-15.	Front Servo Repair	28-57
28-16.	Rear Servo Repair (1995)	28-58
28-16.1.	Rear Servo Repair (1996-1998)	28-58.2
28-17.	Control Valve and Accumulator Housing Repair	28-60
28-18.	Oil Pump Assembly Repair	28-66
28-19.	Transmission Assembly from Subassemblies	28-72

28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Torque Converter Removal b. Holding Fixture Installation c. Speed Sensors Removal d. Oil Pan and Filter Assembly Removal e. Control Valve Assembly Removal (1995-1996) e.1. Control Valve Assembly Removal (1997-1998) f. Front Servo Removal g. Rear Servo Removal h. Parking Lock Pawl and Actuator Assembly Removal | <ul style="list-style-type: none"> i. Front End Play Check (Measured) j. Rear Unit End Play Check (Measured) k. Pump Assembly Removal l. Turbine Shaft and Overdrive Carrier Assembly Removal m. Forward Clutch Assembly Removal n. Direct Clutch Assembly Removal o. Intermediate Clutch Assembly Removal p. Gear Unit Assembly and Rear Band Removal q. Center Support Assembly Removal |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)

Special Tools

Transmission holding fixture
 (Appendix B, Item 57)
 Transmission holding fixture base
 (Appendix B, Item 58)
 Holding tool adapter (Appendix B, Item 62)
 Slide hammer adapter (Appendix B, Item 59)
 Oil pump remover/installer tool
 (Appendix B, Item 64)
 Torx drive socket (Appendix B, Item 36)
 Gear unit installer/remover
 (Appendix B, Item 65)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission prepared for disassembly
 (para. 19-5).

General Safety Instructions

Torque converter must be supported during
 removal.

Maintenance Level

General support

a. Torque Converter Removal

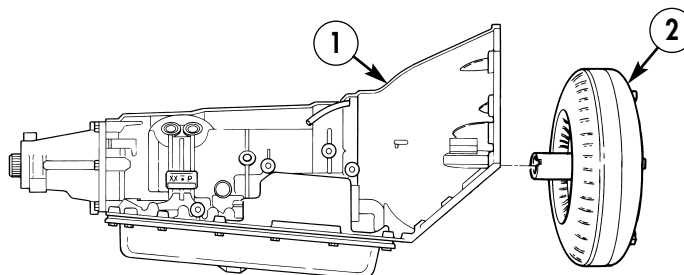
WARNING

Torque converter must be supported during removal and installation. Failure to do this may cause injury to personnel or damage to equipment.

NOTE

Be certain torque converter turns freely. Record any abnormal looseness or noises.

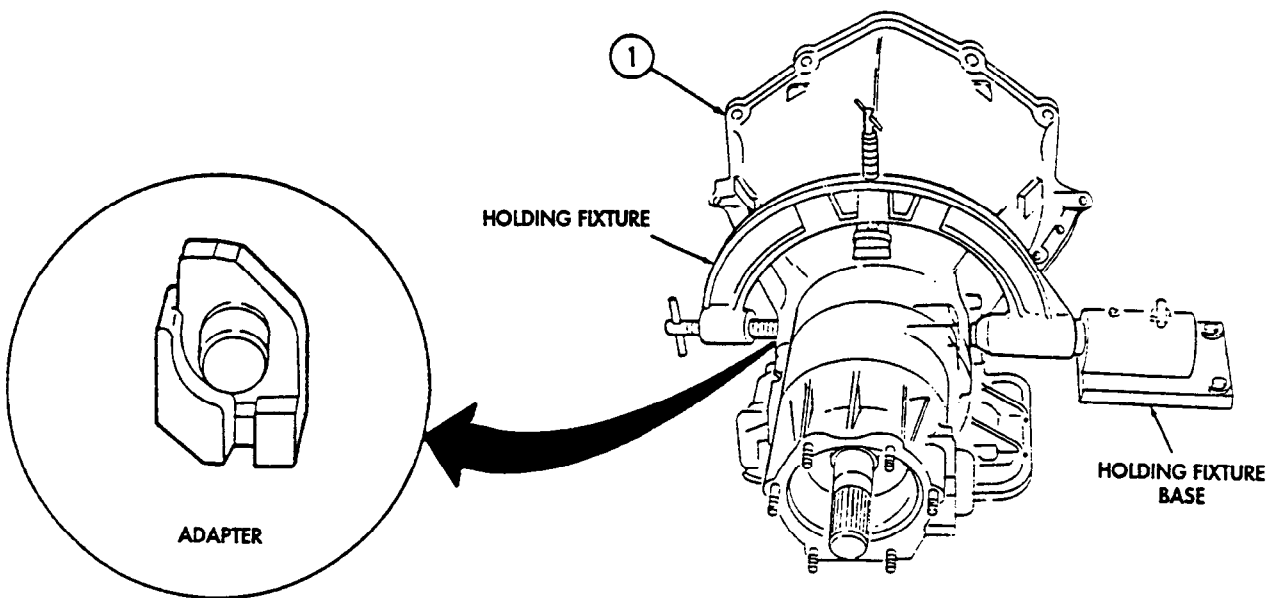
Remove torque converter (2) from transmission (1).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)**b. Holding Fixture Installation****CAUTION**

Do not overtighten screws. This will bind center support.

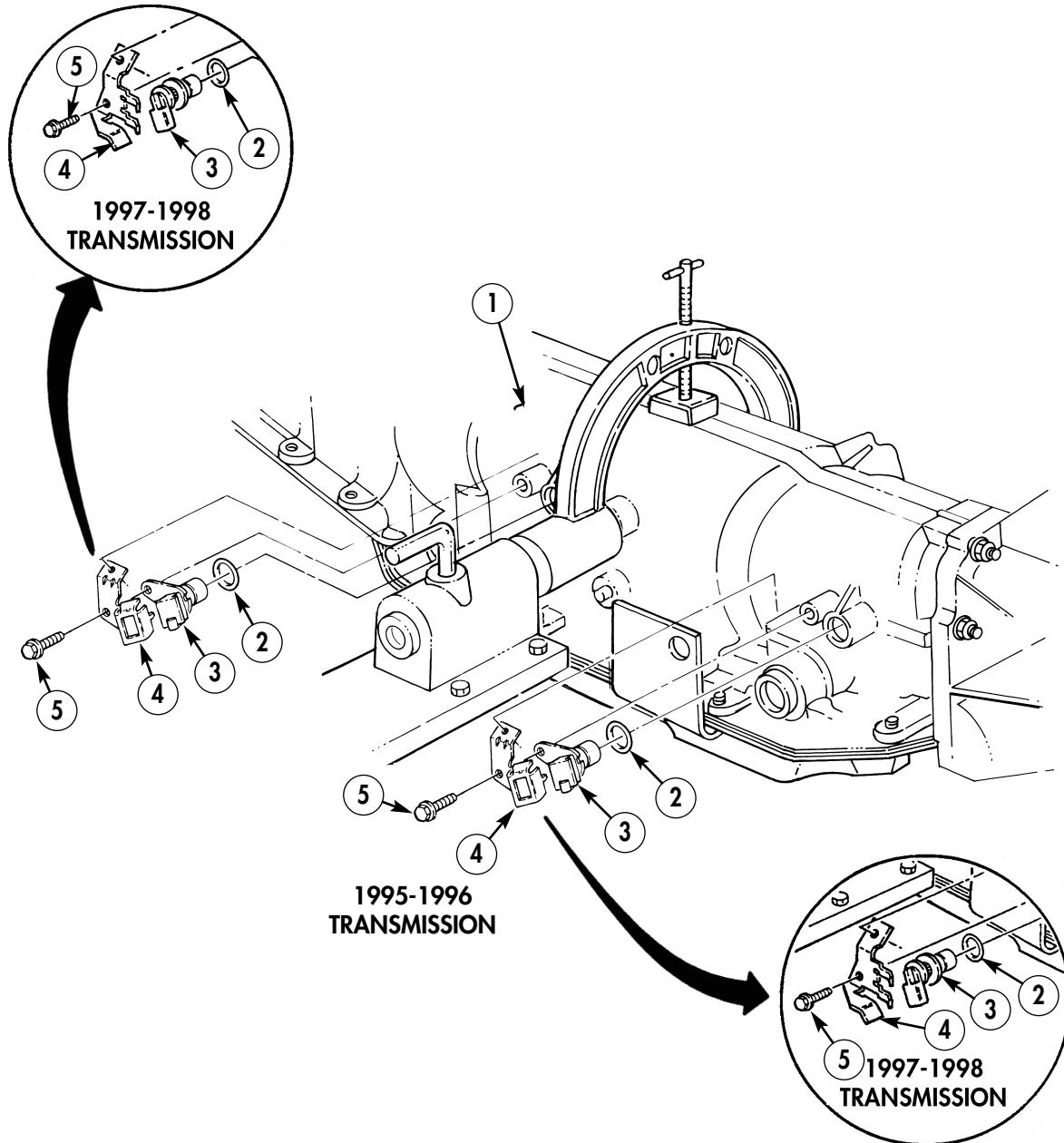
1. Install transmission holding fixture and adapter into locating holes on side of transmission case (1).
2. Install transmission holding fixture and transmission (1) into transmission holding fixture base.



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

c. Speed Sensors Removal

Remove two capscrews (5), brackets (4), speed sensors (3), and O-rings (2) from transmission (1).



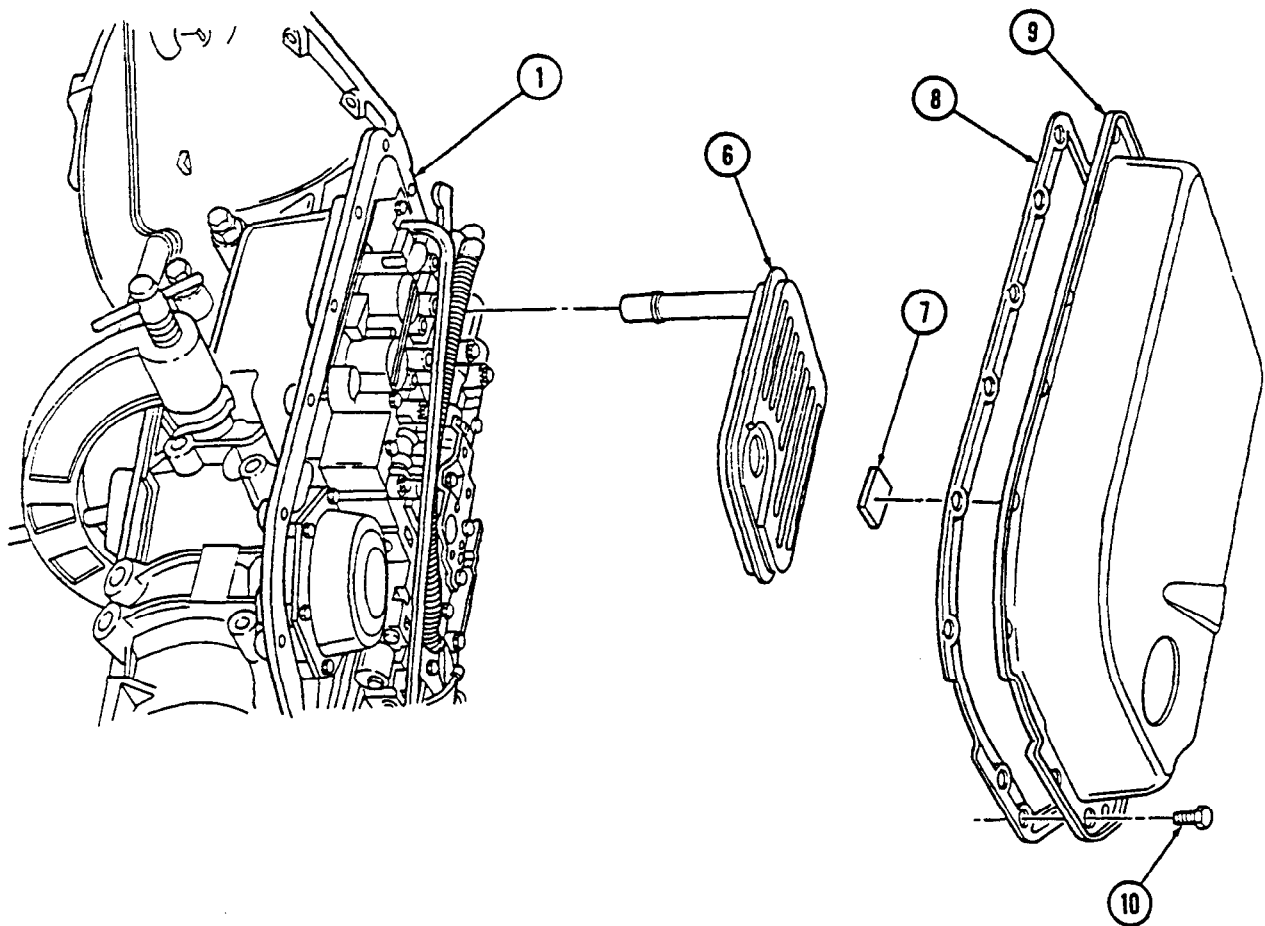
28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)**d. Oil Pan and Filter Assembly Removal**

1. Rotate transmission (1) to a vertical left side position and lock in place. This position will prevent any remaining contaminated fluid from reentering transmission.
2. Remove seventeen capscrews (10) and oil pan (9) from transmission (1).

NOTE

Oil pan gasket seal is reusable. Discard only if damaged.

3. Remove gasket seal (8) and magnet (7) from transmission (1).
4. Remove filter (6) from transmission (1).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

e. Control Valve Assembly Removal (1995-1996)

1. Position transmission (1) so oil pan surface faces up.
2. Disconnect wiring harness (6) from PWM solenoid (7), pressure control solenoid (8), transmission fluid pressure switch (2), 2-3 shift solenoid (5), 1-2 shift solenoid (4), and connector (3).

NOTE

Capscrews are different lengths. Record location of each capscrew for installation.

3. Remove three capscrews (9), wiring harness clips (10), and harness (6) from control valve assembly (12).
4. Remove six capscrews (18) and transmission fluid pressure switch (19) from control valve assembly (12).
5. Remove capscrew (14) and clip (13) from lube pipe (11) and control valve assembly (12).
6. Remove two capscrews (14) and spring and roller assembly (20) from control valve assembly (12).
7. Remove two capscrews (14), fluid level indicator stop (17), capscrew (15), lube pipe retainer (16), and lube pipe (11) from control valve assembly (12).
8. Remove sixteen capscrews (23) (1995 transmission), or fifteen capscrews (23) (1996 transmission), and control valve body assembly (12) from transmission (1).

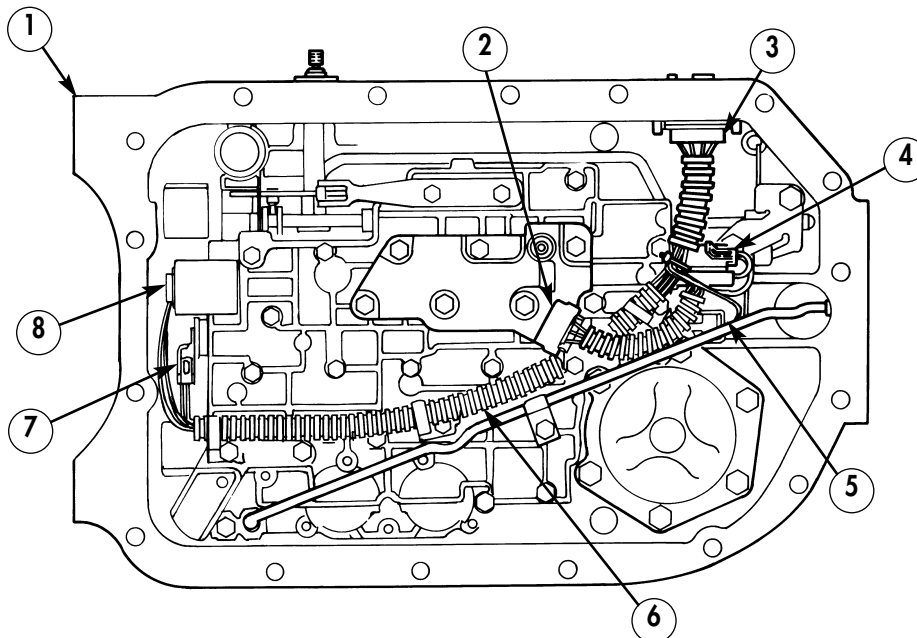
CAUTION

Do not use magnets or any magnetized tools to remove checkballs. Some checkballs are metal and, if magnetized, will pick up debris from oil and cause malfunction of transmission.

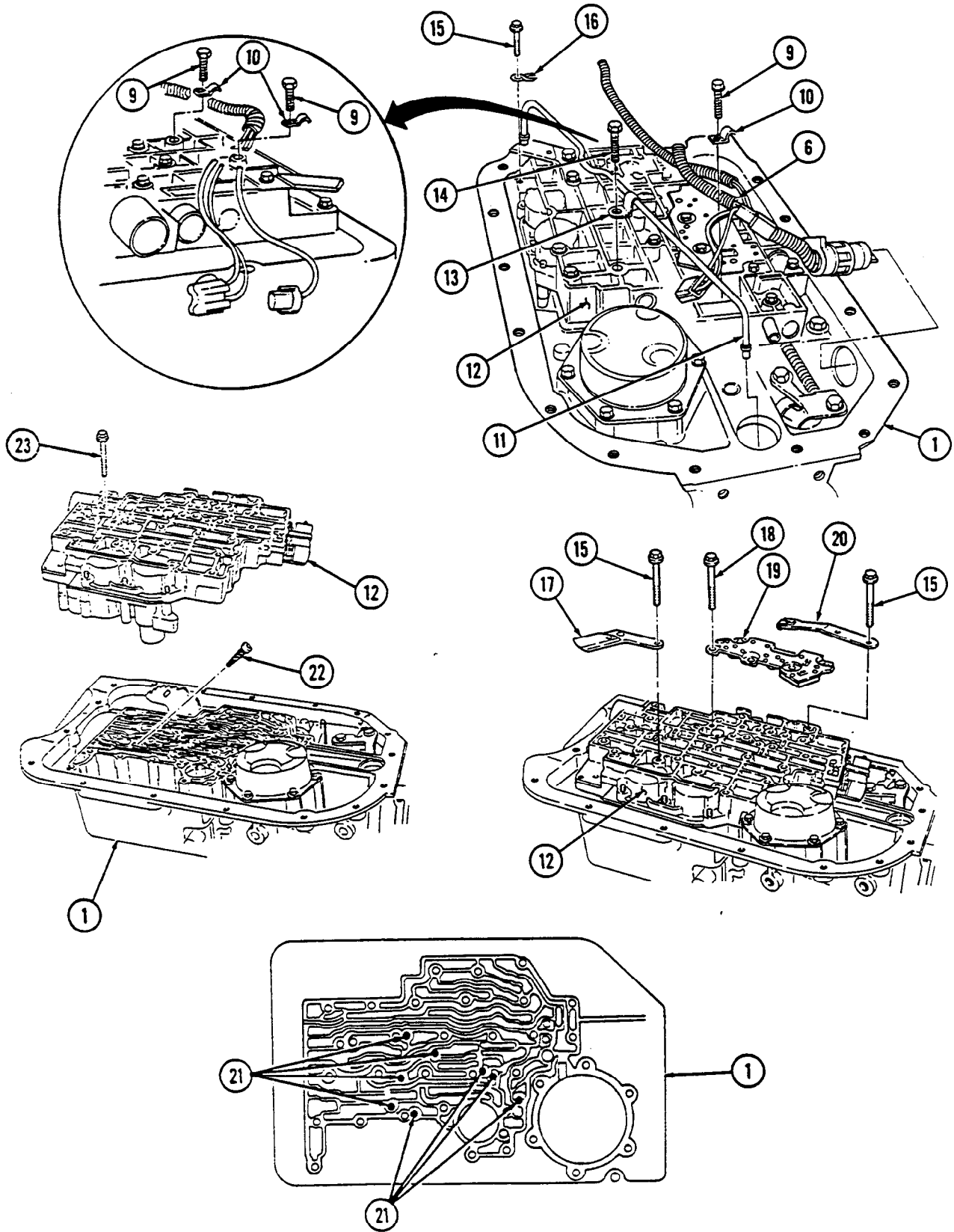
NOTE

Record locations of checkballs for assembly.

9. Remove eight checkballs (21) from transmission (1).
10. Remove screen (22) from transmission (1).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

e.1. Control Valve Assembly Removal (1997-1998)

1. Position transmission (1) so oil pan surface faces up.
2. Disconnect wiring harness (6) from PWM solenoid (7), pressure control solenoid (8), transmission fluid pressure switch (2), 2-3 shift solenoid (5), 1-2 shift solenoid (4), and connector (3).

NOTE

Capscrews are different lengths. Record location of each capscrew for installation.

3. Remove two capscrews (9), wiring harness clips (10), and harness (6) from control valve assembly (14).
4. Remove six capscrews (15) and transmission fluid pressure switch (16) from control valve assembly (14).
5. Remove capscrew (11), clip (12), and lube pipe (13) from control valve assembly (14).
6. Remove two capscrews (18) and spring and roller assembly (17) from control valve assembly (14).
7. Remove seventeen capscrews (21) and control valve assembly (14) from transmission (1).

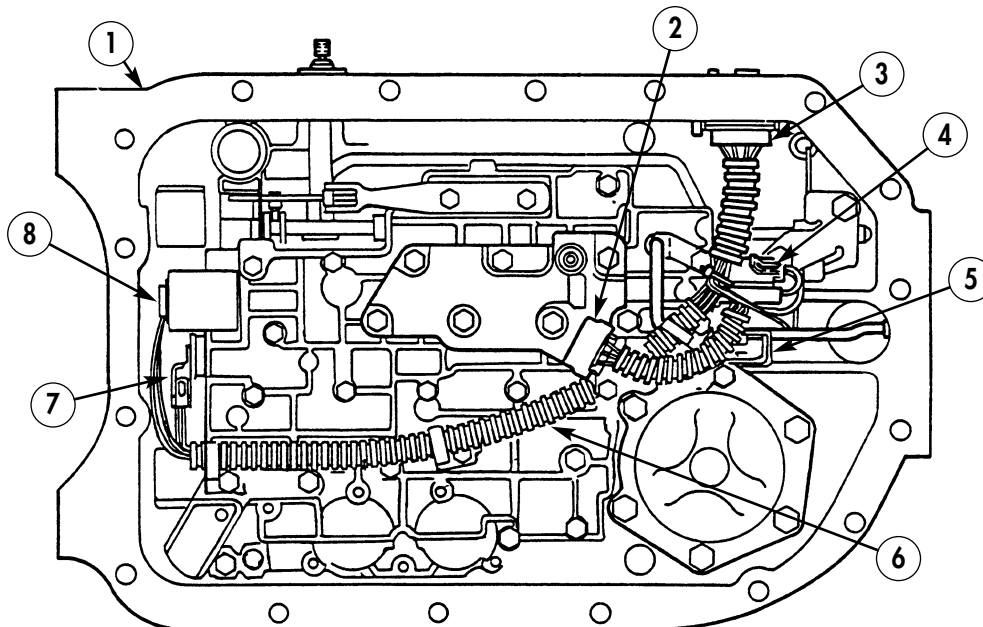
CAUTION

Do not use magnets or any magnetized tools to remove checkballs. Some checkballs are metal and, if magnetized, will pick up debris from oil and cause malfunction of transmission.

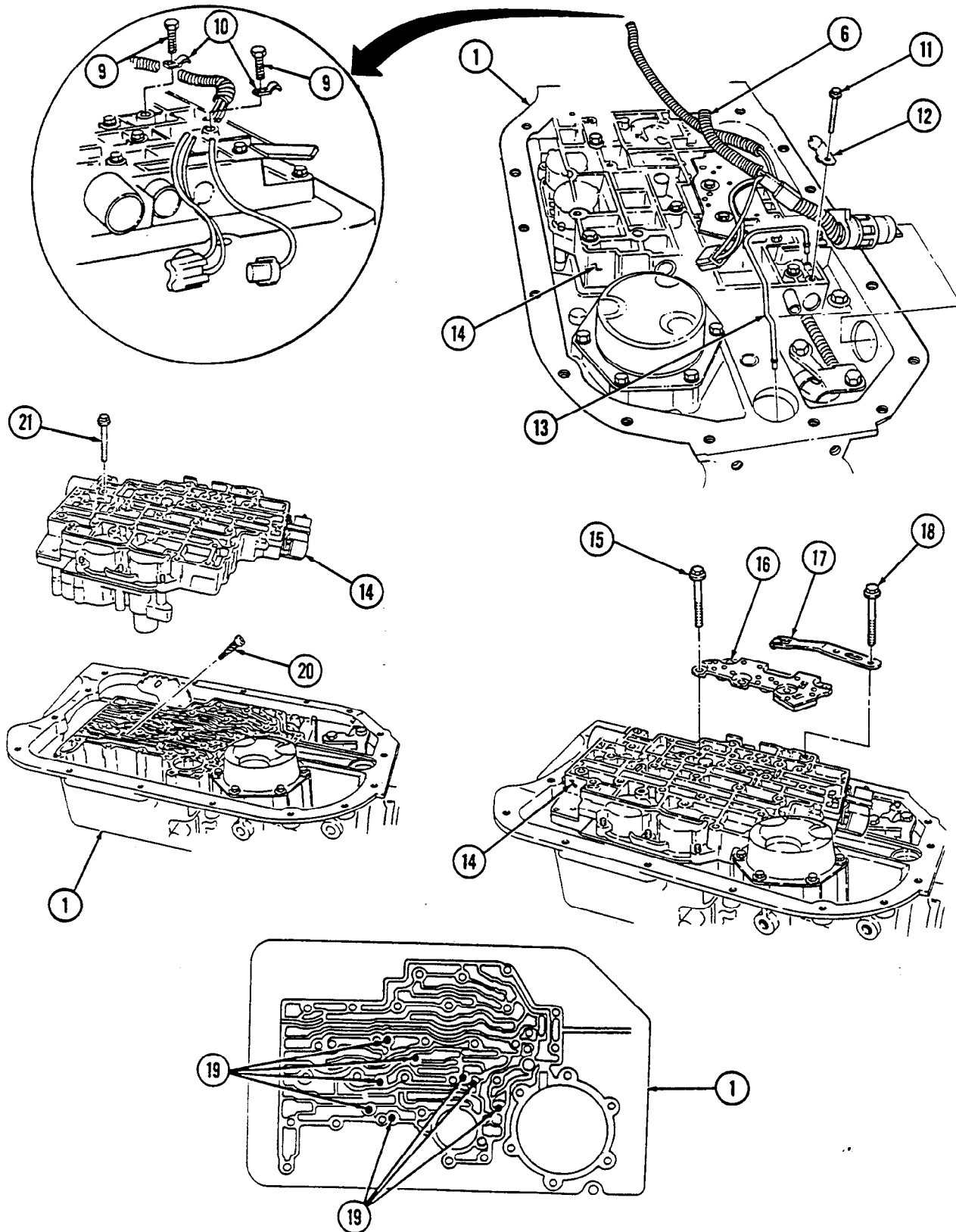
NOTE

Record locations of checkballs for assembly.

8. Remove eight checkballs (19) from transmission (1).
9. Remove screen (20) from transmission (1).



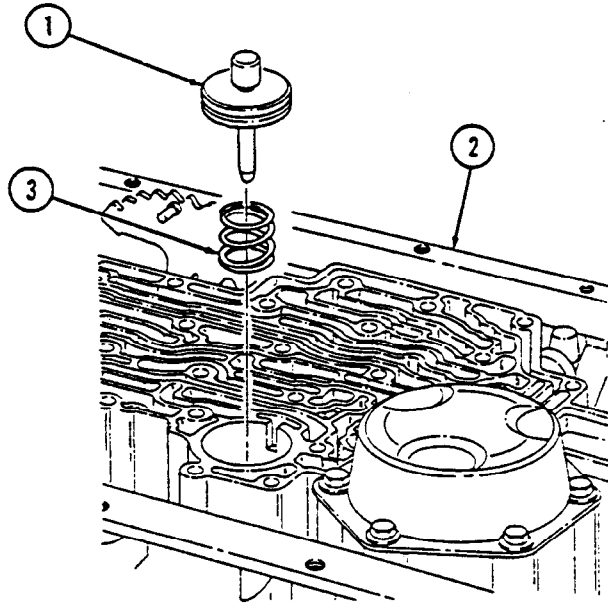
28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

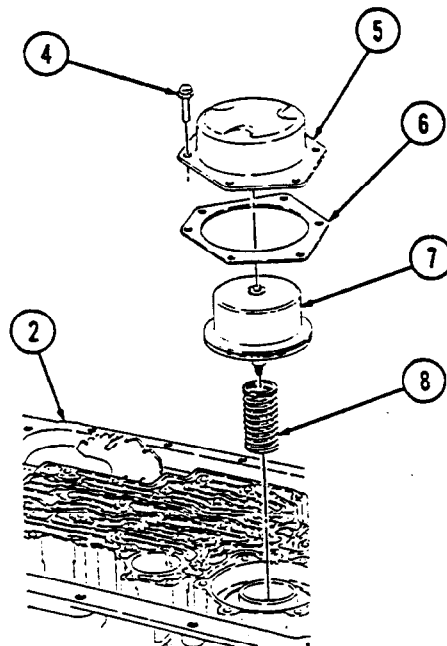
f. Front Servo Removal

Remove servo piston assembly (1) and piston spring (3) from transmission case (2).



g. Rear Servo Removal

1. Remove six capscrews (4), cover (5), and gasket (6) from transmission case (2).
2. Remove servo piston assembly (7) and piston spring (8) from transmission case (2).



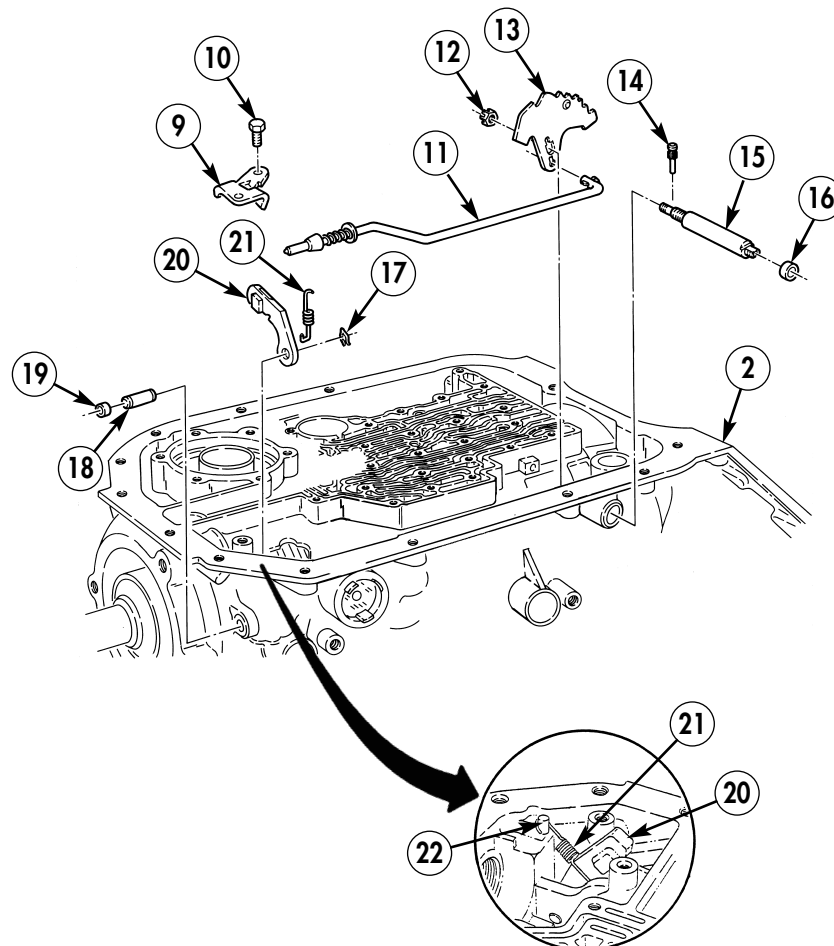
28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

h. Parking Lock Pawl and Actuator Assembly Removal

CAUTION

Do not apply excessive force, prying, or hammering to any parking mechanism parts. Doing so may cause parking system failure.

1. Remove shaft retaining pin (14) from manual shaft (15).
2. Loosen nut (12), slide manual shaft (15) from detent lever (13), and remove nut (12) and detent lever (13).
3. Turn detent lever (13) to free it from parking lock actuator (11).
4. Remove two screws (10) and bracket (9) from transmission case (2).
5. Remove parking lock actuator (11) from pawl (20).
6. Disconnect and remove return spring (21) from pawl (20), retainer (17), and round end on stud (22) in transmission case (2).
7. Remove plug (19) from transmission case (2). Discard plug (19).
8. Remove retainer (17), shaft (18), and pawl (20) from transmission case (2).
9. Remove manual shaft (15) and seal (16) from transmission case (2). Discard seal (16).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)**i. Front End Play Check (Measured)****CAUTION**

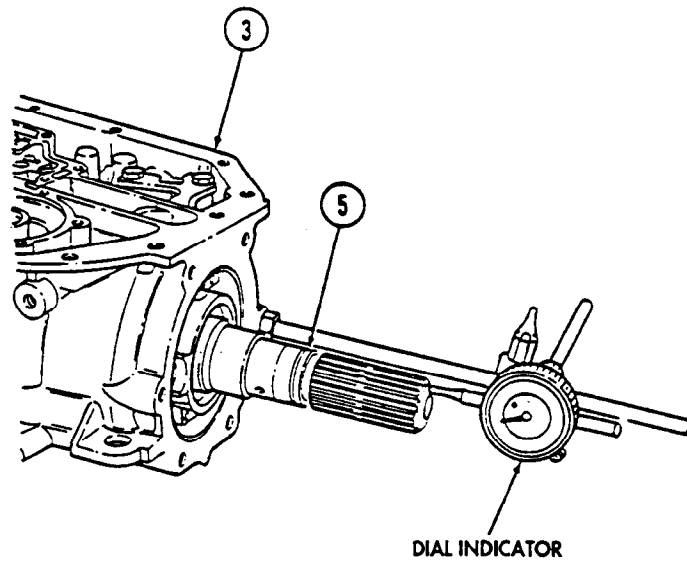
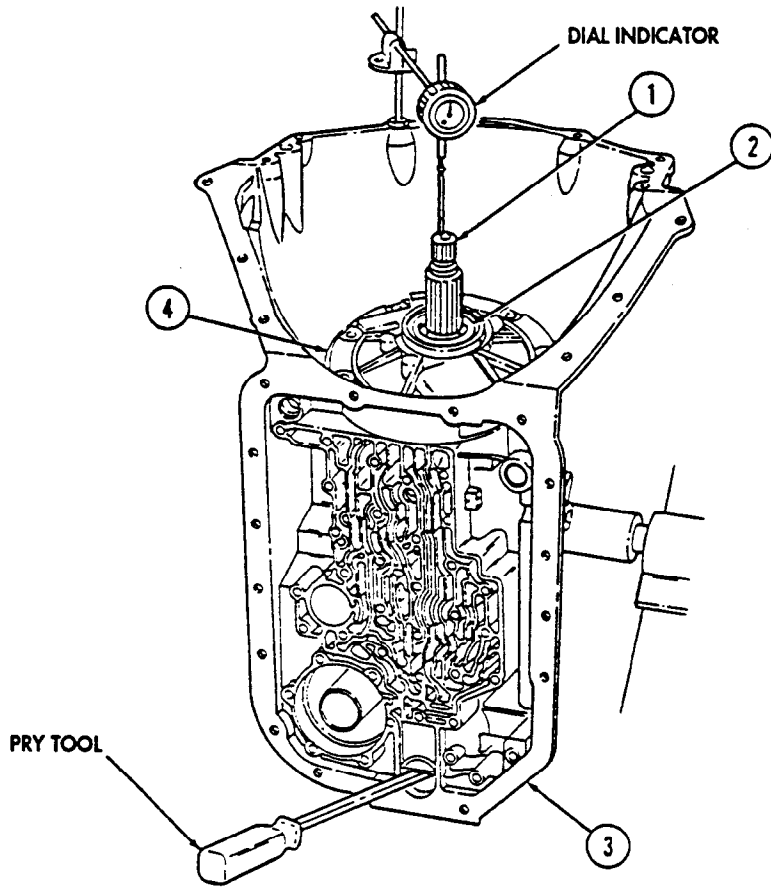
If end play procedures are not closely adhered to, incorrect shim thickness will be selected, which may result in severe damage to internal transmission components.

1. Turn transmission case (3) with turbine shaft (1) vertical.
2. Set dial indicator to read turbine shaft (1) vertical movement.
3. Press down turbine shaft (1) and pry up output carrier to remove rear end play.
4. Lift turbine shaft (1) with light force to remove slack between snapping (2) on turbine shaft (1) and overdrive carrier (4).
5. Index dial indicator to read zero.
6. Pull up turbine shaft (1) and hold up overdrive carrier (4). Use enough force (at least 20 lb (9.1 kg)) to lift front parts. Read amount of movement on dial indicator.
7. Record this value for use in reassembly. Proper end play is 0.004-0.022 in. (0.102-0.559 mm).
8. Remove dial indicator and pry tool.

j. Rear Unit End Play Check (Measured)

1. Turn transmission case (3) with output shaft (5) horizontal.
2. Set dial indicator to read end movement of output shaft (5).
3. Push output shaft (5) into transmission case (3) and zero dial indicator.
4. Pull output shaft (5) out of transmission case (3) and read amount of movement on dial indicator.
5. Record this value for use in reassembly. Proper end play is 0.005-0.025 in. (0.127-0.635 mm).
6. Remove dial indicator.

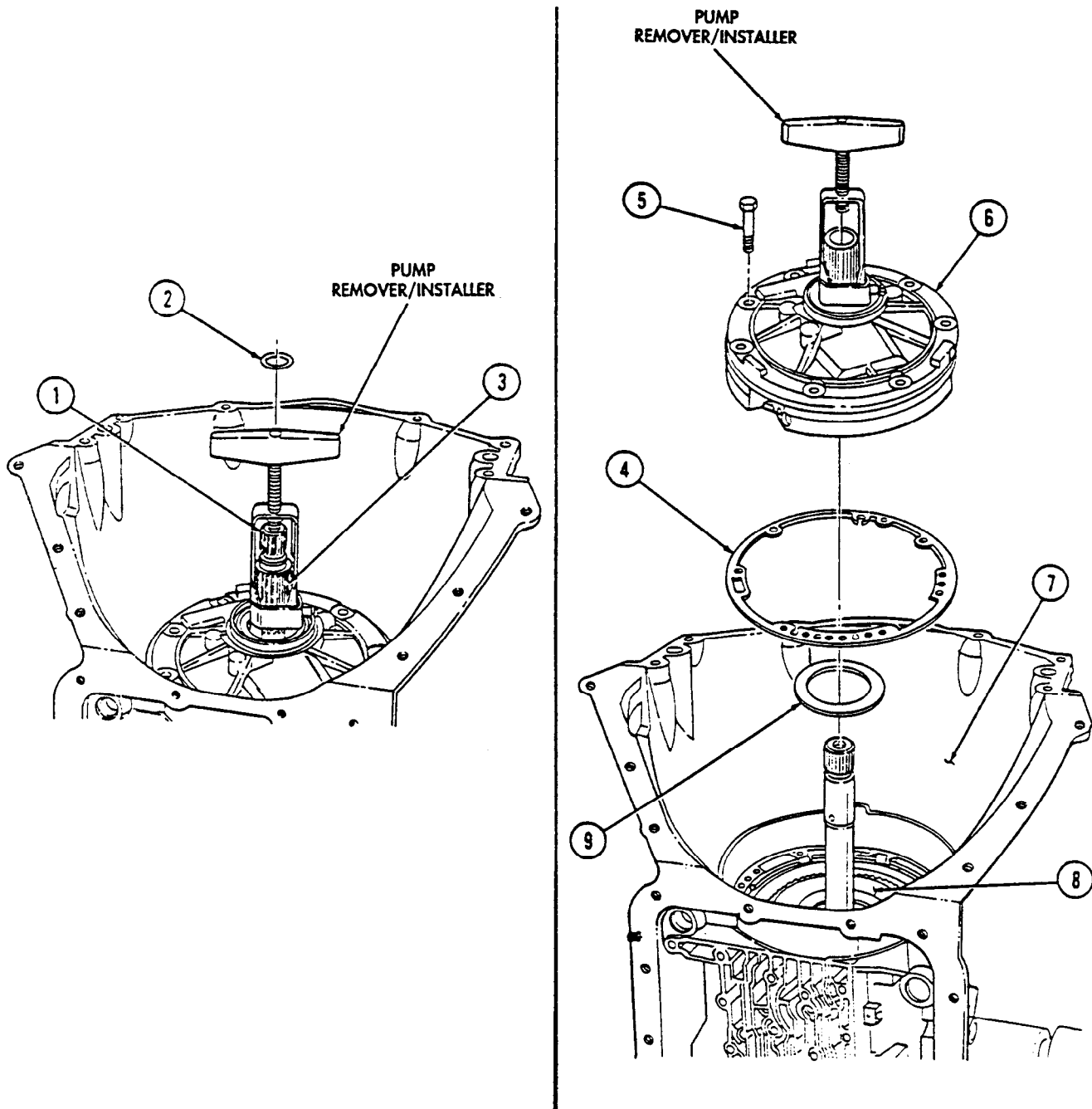
28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

k. Pump Assembly Removal

1. Remove O-ring (2) from turbine shaft (1). Discard O-ring (2).
2. Install pump remover/installer J 37789-A on stator shaft (3).
3. Remove seven screws (5) from pump (6) and transmission case (7).
4. Remove pump (6) and gasket (4) from transmission case (7). Discard gasket (4).
5. Remove thrust washer (9) from overdrive carrier (8).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

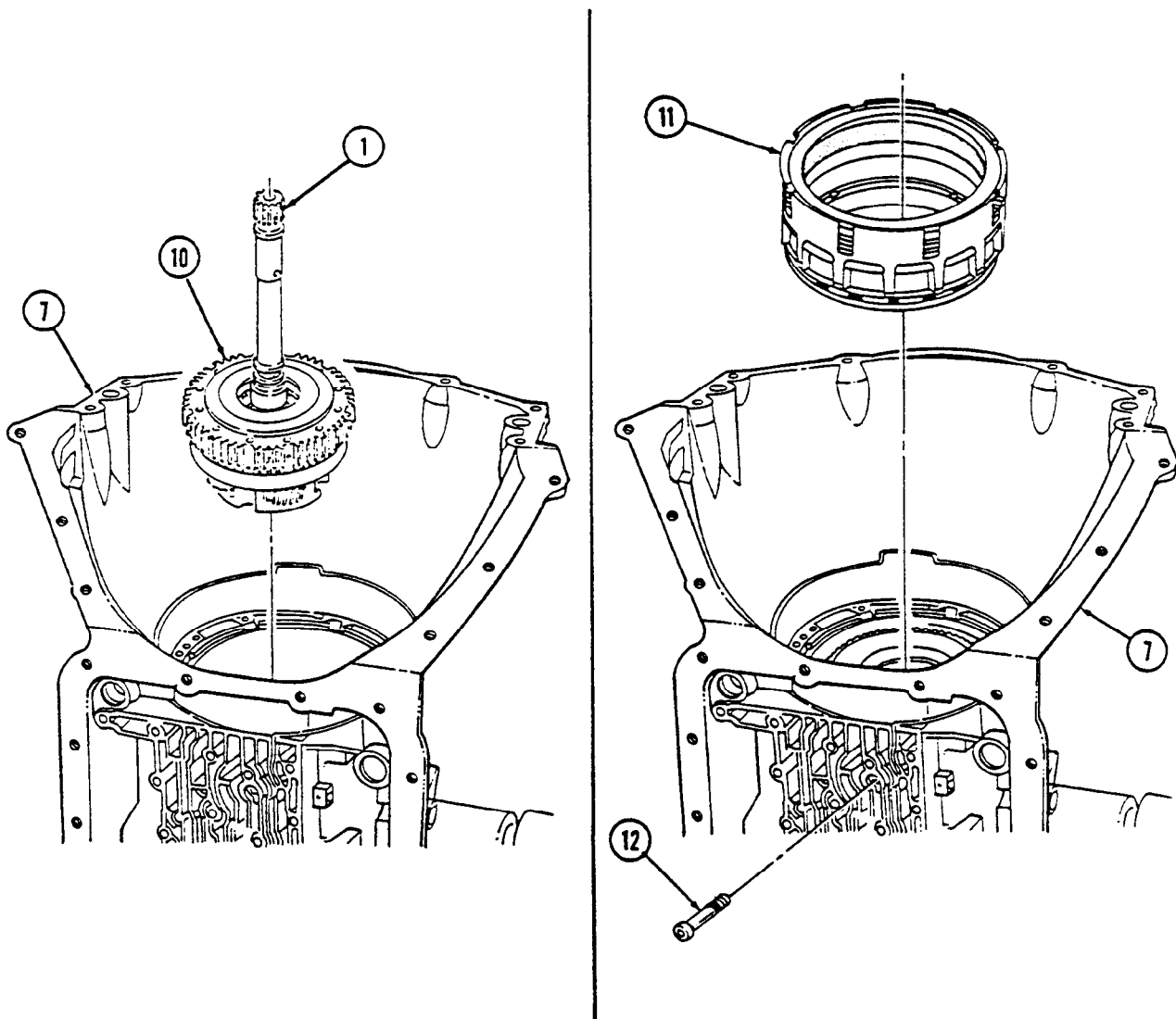
1. Turbine Shaft and Overdrive Carrier Assembly Removal

1. Lift turbine shaft (1) and remove overrun clutch housing assembly (10) from transmission case (7).

CAUTION

Correct torque for installed fourth clutch bolt should be 133 lb-in. (15 N·m). If not tightened to minimum torque, check case for cracks and damaged threads. Replace case if damaged.

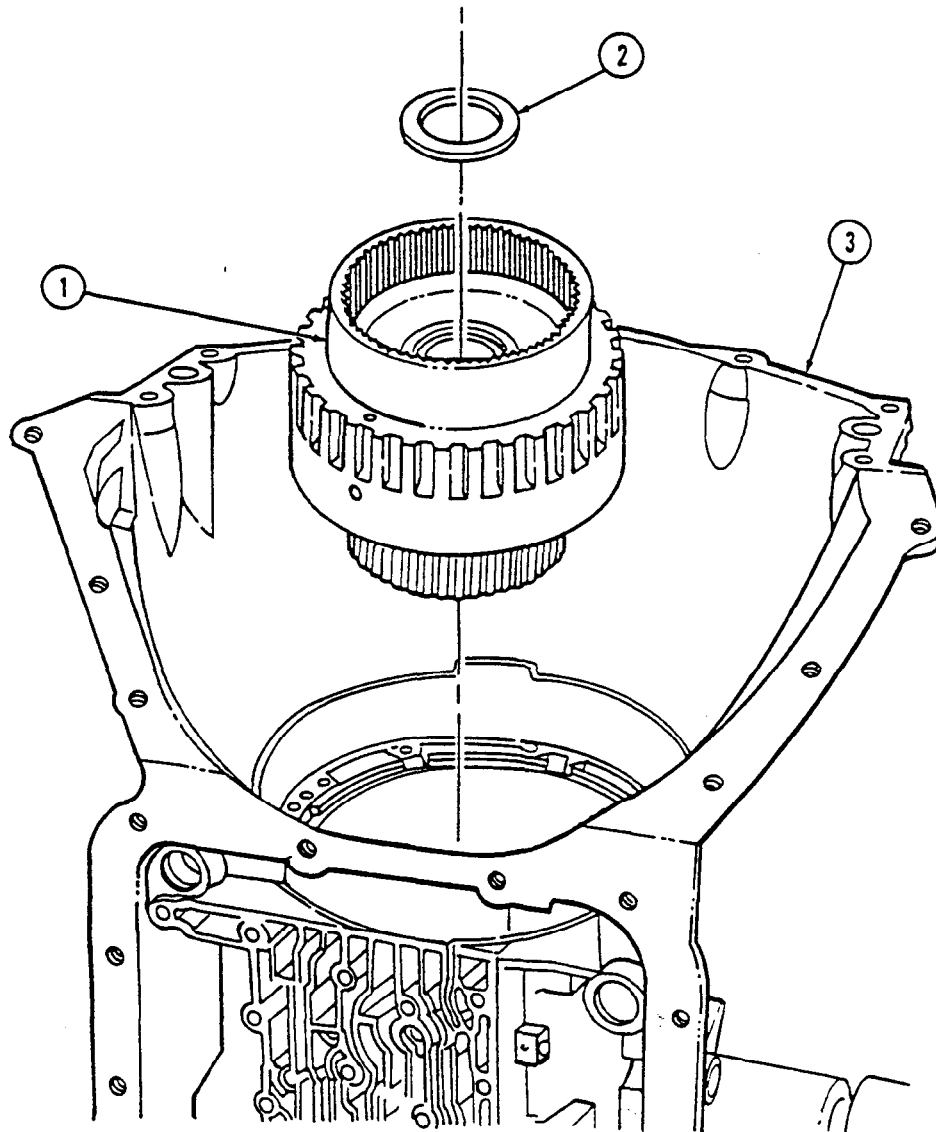
2. Check fourth clutch bolt (12) torque for a minimum of 133 lb-in. (15 N·m).
3. Remove bolt (12) from fourth clutch housing (11) with torx adapter. Discard bolt (12).
4. Remove fourth clutch housing (11).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

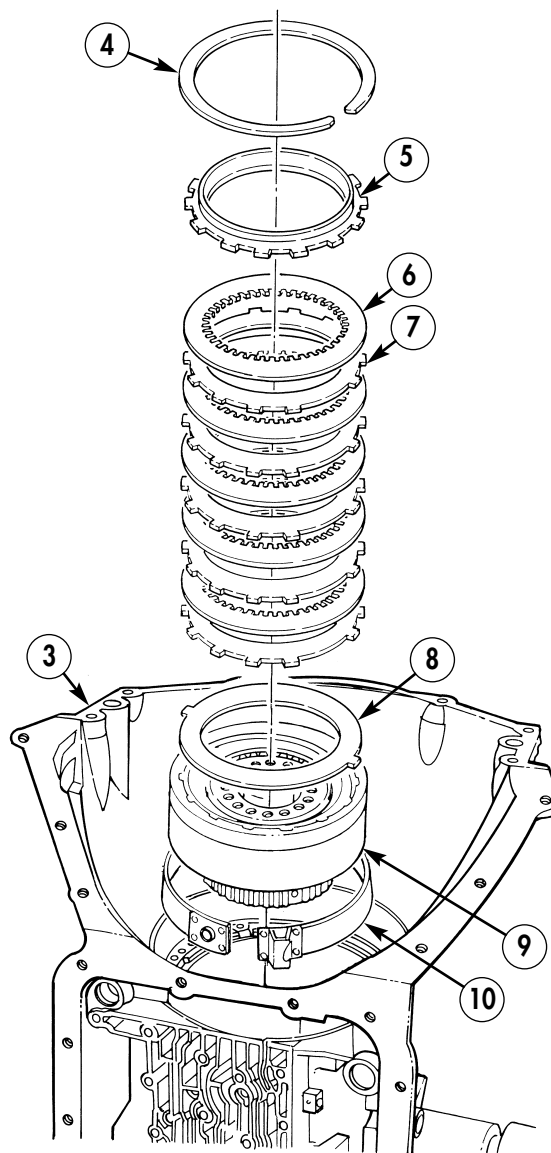
m. Forward Clutch Assembly Removal

1. Remove flat bearing assembly (2) from top of forward clutch assembly (1).
2. Remove forward clutch assembly (1) from transmission case (3).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)**n. Direct Clutch Assembly Removal**

1. Remove snapping (4), direct clutch backing plate (5), five composition clutch plate assemblies (6), clutch plates (7), and dished plate (8) (1995-1996 transmissions only), from direct clutch housing (9).
2. Remove direct clutch housing (9) from transmission case (3).
3. Install dished plate (8) (1995-1996 transmissions only), five clutch plates (7), clutch plate assemblies (6), and backing plate (5) in direct clutch housing (9) with snapping (4).
4. Remove front band (10) from transmission case (3).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)

o. Intermediate Clutch Assembly Removal

NOTE

Wave plate is used on 1997-1998 transmissions only.

Remove snapping (3), backing plate (2), four clutch plate assemblies (4), clutch plates (1), and wave plate (6) from transmission case (5).

p. Gear Unit Assembly and Rear Band Removal

CAUTION

Correct torque for installed center support bolt should be 29 lb-ft (39 N·m). If not tightened to minimum torque, case could be damaged. If center support bolt is not tightened to minimum torque, a new center support and bolt should be installed during reassembly to avoid component damage.

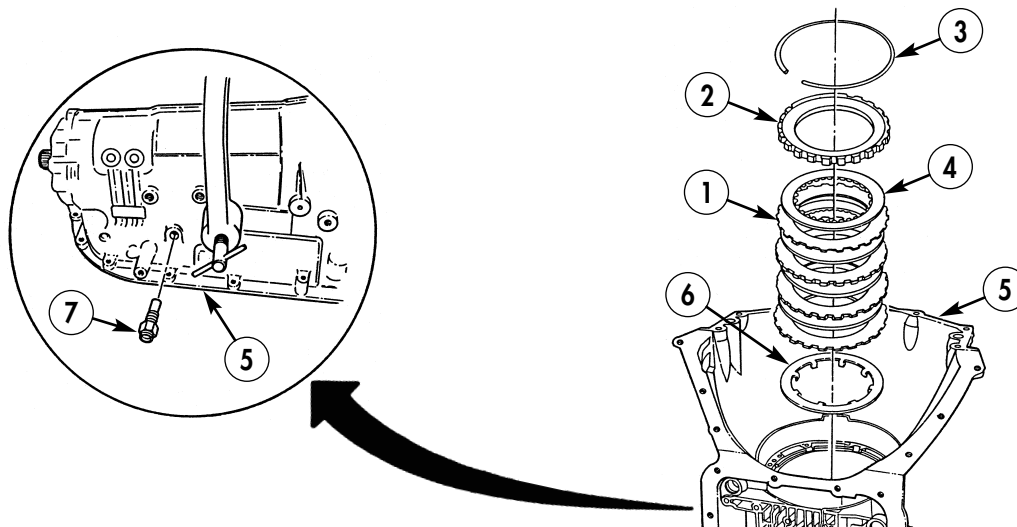
NOTE

Perform step 1 for 1997-1998 transmissions only.

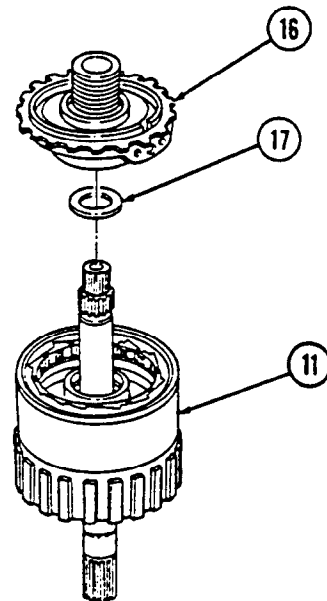
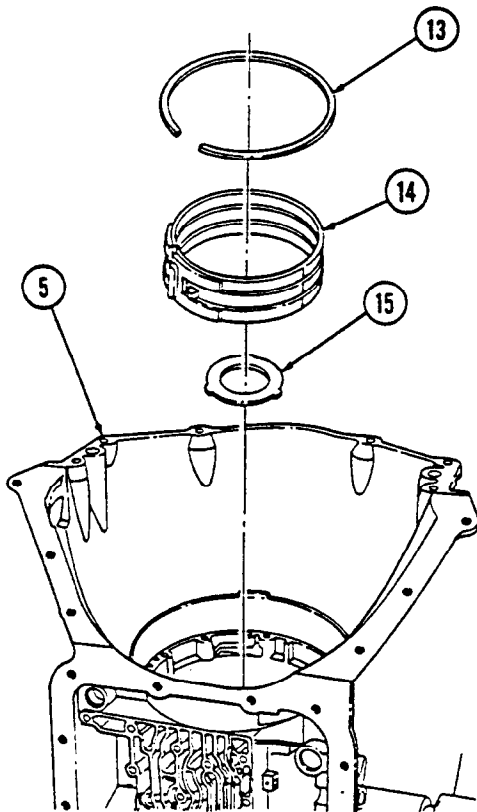
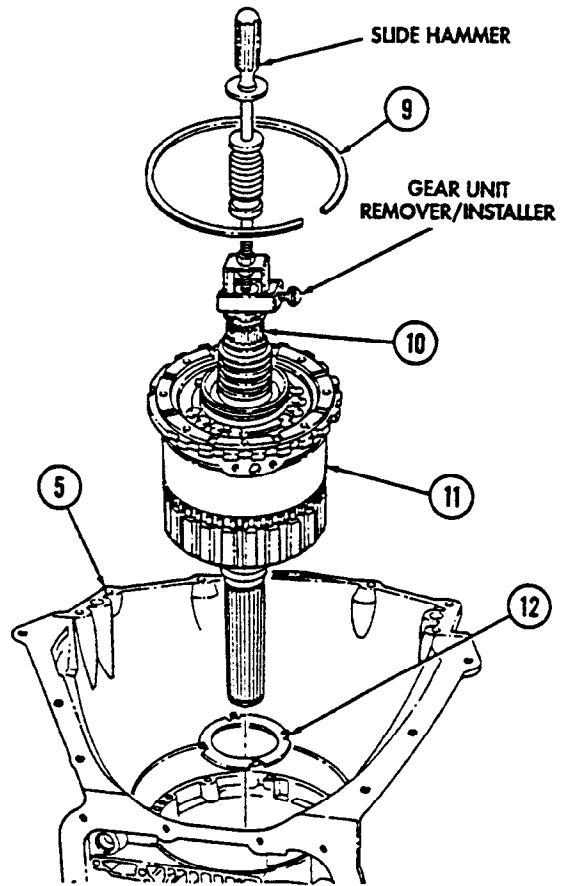
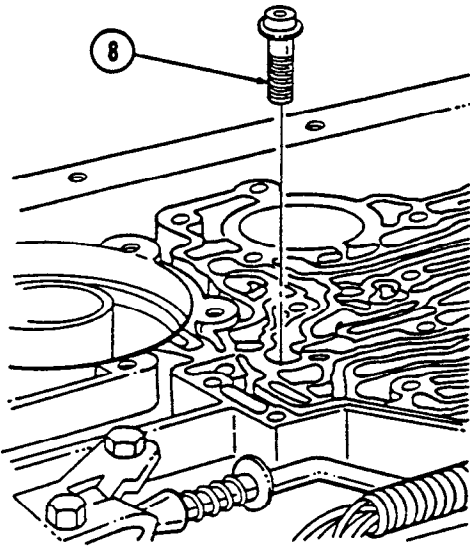
1. Remove oil cooler fitting (7) from transmission case (5).
2. Check center support bolt (8) for torque.
3. Remove and discard center support bolt (8).
4. Remove snapping (9) from transmission case (5).
5. Attach gear unit installer/remover tool and slide hammer to main shaft (10).
6. Lift gear unit (11) out of transmission case (5).
7. Remove thrust washer (12) from gear unit (11).
8. Remove spacer (13), rear band (14), and thrust washer (15) from transmission case (5).

q. Center Support Assembly Removal

Remove center support (16) and thrust washer (17) from gear unit (11).



28-3. TRANSMISSION DISASSEMBLY INTO SUBASSEMBLIES (Cont'd)



28-4. TORQUE CONVERTER MAINTENANCE

This task covers:

a. Cleaning

b. Inspection

INITIAL SETUP:

Manual References

TM 9-2320-387-24P

Maintenance Level

General support

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

a. Cleaning

NOTE

Have drainage container ready to catch fluid.

1. Drain fluid from torque converter (1). Replace torque converter (1) if fluid is contaminated or abnormal looseness or noises were recorded during torque converter removal (para. 28-3).
2. Clean exterior of torque converter (1) in accordance with para. 2-14.

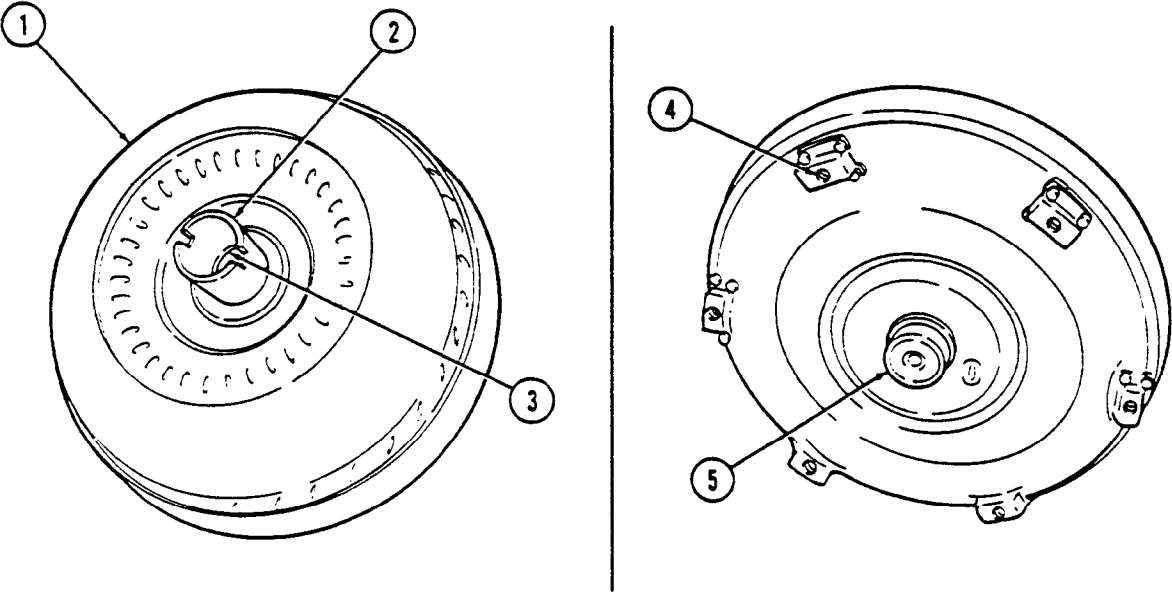
b. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect torque converter hub (2) for damage. Replace torque converter (1) if hub (2) is damaged.
2. Inspect torque converter (1) for proper operation by manually rotating splined inner race (3) in both directions. The splined inner race (3) should turn freely in clockwise direction, but not turn or be very difficult to turn in counterclockwise direction. Replace torque converter (1) if it does not operate properly.
3. Inspect torque converter (1) for damaged or leaking seams and welds. Replace torque converter (1) if damaged.
4. Inspect torque converter pilot (5) for damage. Replace torque converter (1) if damaged.
5. Inspect threaded holes (4) for damage. Repair with thread repair inserts. If unable to repair threaded holes (4), replace torque converter (1).

28-4. TORQUE CONVERTER MAINTENANCE (Cont'd)



28-5. TRANSMISSION CASE MAINTENANCE

This task covers:

a. Cleaning

b. Inspection

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Seal installer (Appendix B, Item 61)

Materials/Parts

Crocus cloth (Appendix C, Item 22)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies (para. 28-3).

General Safety Instructions

- Protective clothing must be used when steam cleaning.
- Compressed air for cleaning purposes will not exceed 30 psi (207 kPa).

Maintenance Level

General support

a. Cleaning

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

1. Remove transmission case (1) from transmission holding fixture.

WARNING

When steam-cleaning, protective clothing must be used. Failure to do this may cause serious injury.

2. Thoroughly steam-clean transmission case (1).

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

3. Blow all dirt and cleaning solution from transmission case (1) with compressed air.

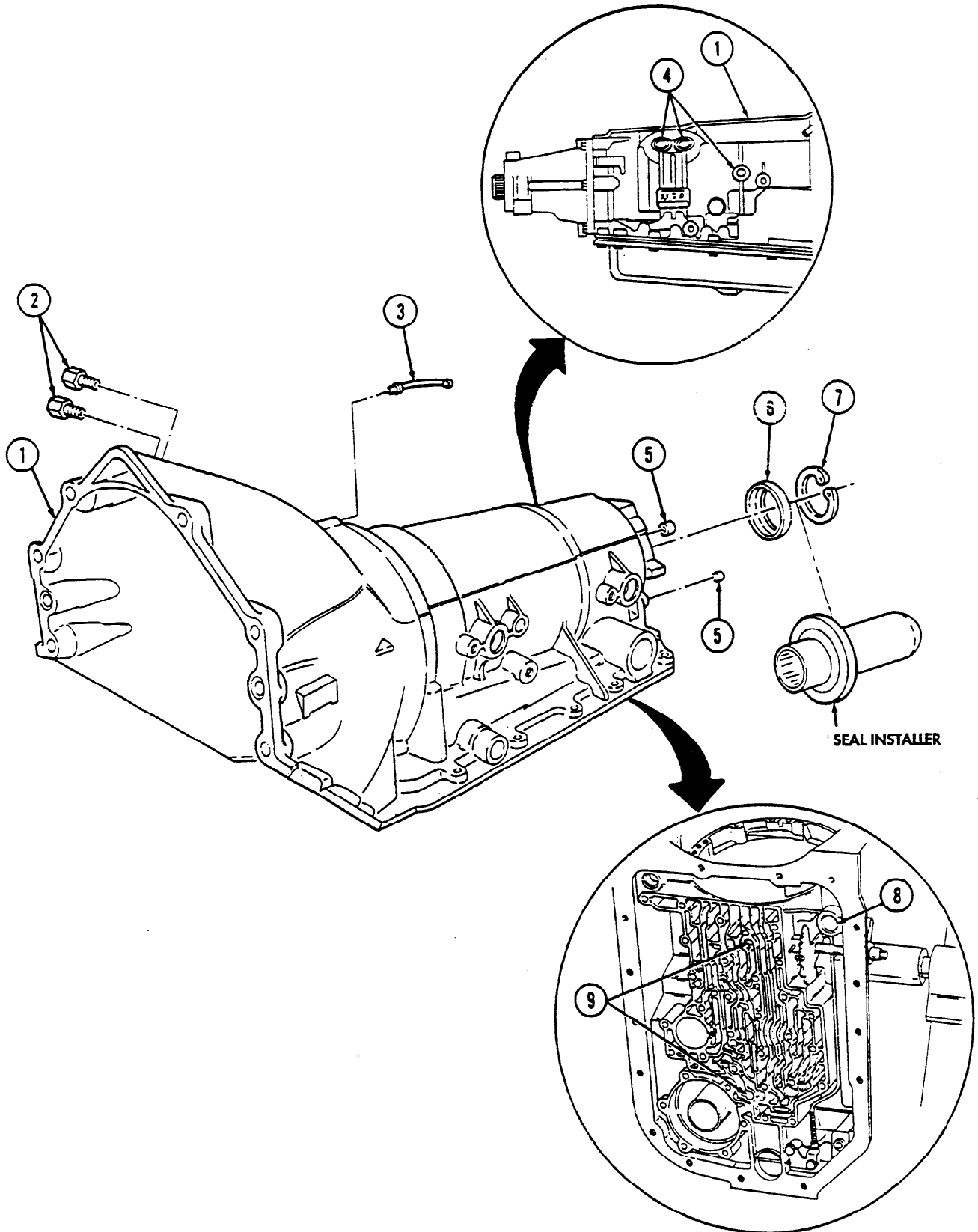
b. Inspection

NOTE

For general inspection procedures, refer to para. 2-15.

1. Inspect all oil passages and bores for cracks, leaks, holes, and burrs. Use soft stone or crocus cloth to remove burrs.
2. Use helicoils to repair damaged threads.
3. Inspect bores for holes or pits as leakage paths. Replace transmission case (1) if holes or pits are present.
4. Inspect anchor pins (4) for damage or looseness. Replace anchor pins (4) if damaged or loose.
5. Inspect internal splines, lugs, and snapping grooves for cracks, breaks, and burrs. Repair minor burrs. Replace damaged transmission case (1).
6. Remove retaining ring (7) and replace seal assembly (6) using seal installer.
7. Inspect plugs (5), cooler fittings (2), and vent pipe (3). Replace damaged parts.
8. Inspect oil multilip seal (8) for damage. Replace if damaged.
9. Inspect bolt holes (9) for damage. Replace transmission case (1) if holes (9) are damaged.

28-5. TRANSMISSION CASE MAINTENANCE (Cont'd)



28-6. PARKING LOCK PAWL AND ACTUATOR ASSEMBLY INSPECTION

This task covers:

Inspection

INITIAL SETUP:

Manual References
TM 9-2320-387-24P

Maintenance Level
General support

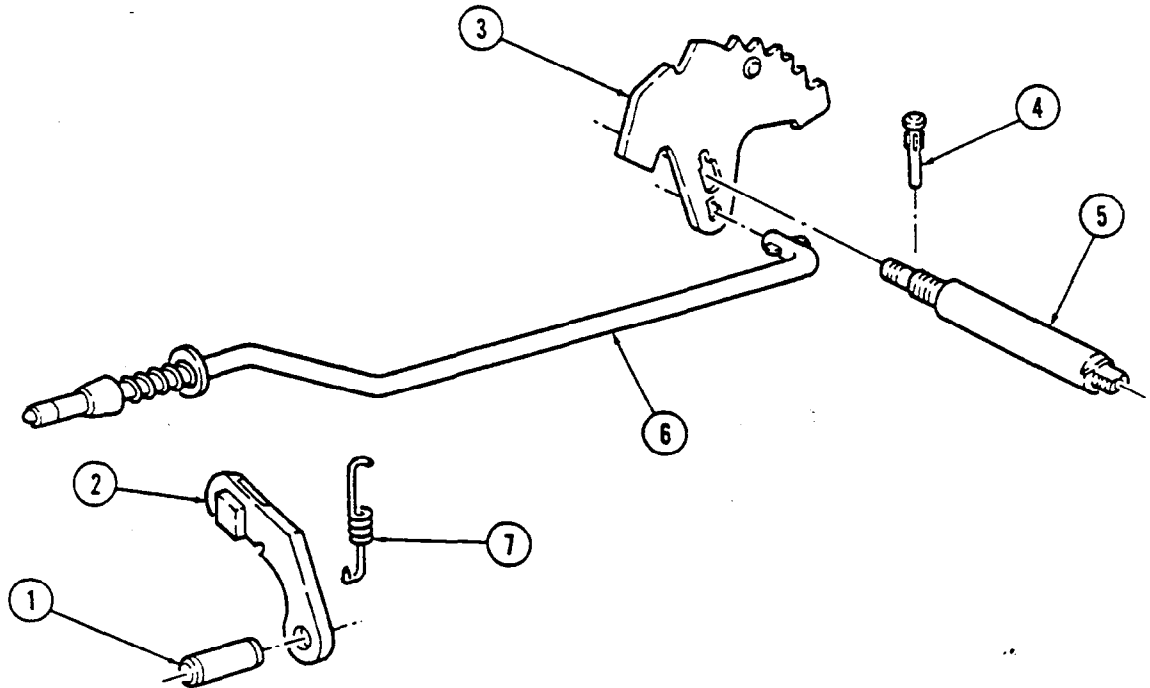
Equipment Condition
Transmission disassembled into subassemblies
(para. 28-3).

Inspection

NOTE

Return spring is part of transmission.

1. Inspect parking lock pawl (2) for cracks and burrs. Remove any minor burrs. Replace if cracked.
2. Inspect pawl shaft (1) for cracks, burrs, and damaged flats. Remove minor burrs. Replace if damaged.
3. Inspect detent lever (3) and manual shaft (5) for cracks, burrs, or threads. Replace both if either is damaged.
4. Inspect actuator assembly (6) for cracks, burrs, free movement, and damaged spring. Replace if damaged.
5. Inspect return spring (7) for breaks and distortion. Replace if damaged.
6. Inspect retaining pin (4) for tightness. Replace if damaged.



28-7. REAR BAND AND SELECTIVE THRUST WASHER INSPECTION

This task covers:

Inspection

INITIAL SETUP:Manual References

TM 9-2320-387-24P

Maintenance Level

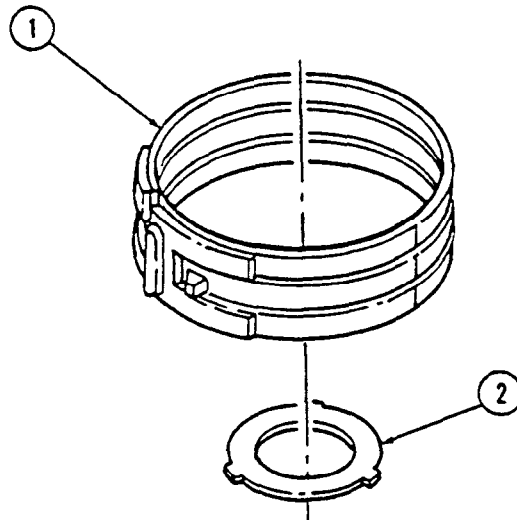
General support

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

Inspection

1. Inspect rear band (1) for burning, scoring, distortion, or other damage. Replace rear band (1) if damaged.
2. Inspect rear selective thrust washer (2) for wear, scoring, breaks, cracks, or heat discoloration. Replace thrust washer (2) if damaged.



28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Disassembly (1995) a.1. Disassembly (1996-1998) b. Cleaning | <ul style="list-style-type: none"> c. Inspection d. Assembly (1995) d.1. Assembly (1996-1998) |
|--|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Petrolatum (Appendix C, Item 52)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies (para. 28-3).

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly (1995)

1. Remove sun gear shaft (4) from sun gear (5) and main shaft (6).
2. Remove reaction drum (2) from output carrier assembly (8).

NOTE

Keep bearing and races together as sets.

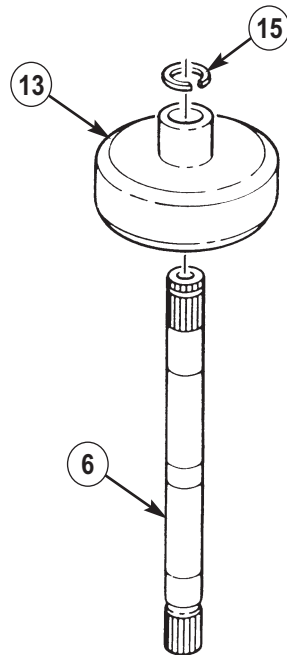
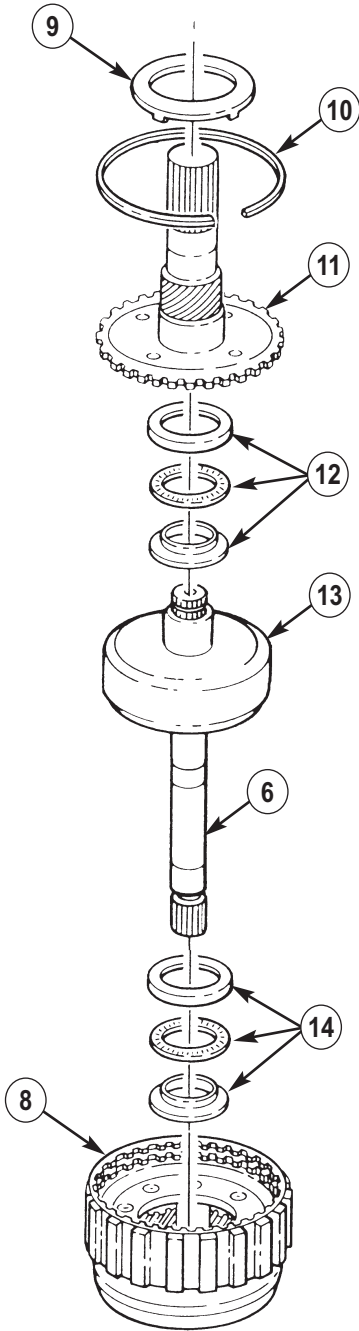
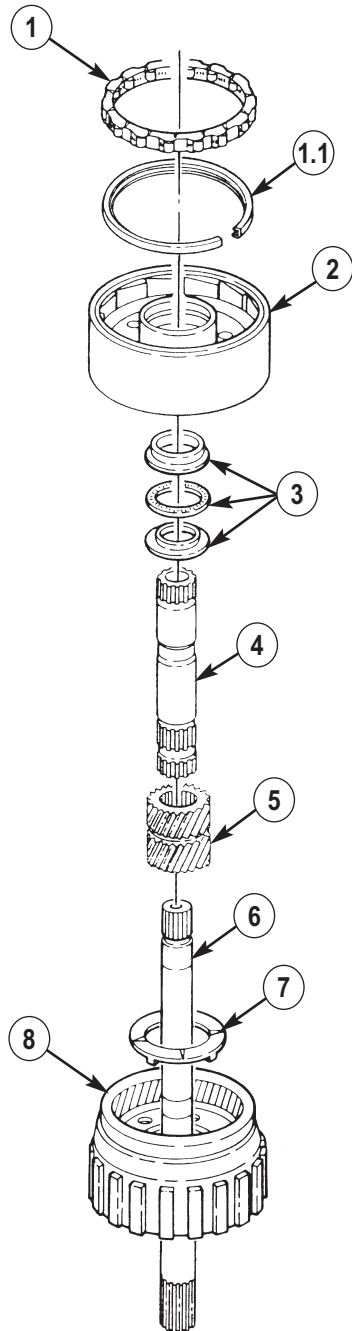
3. Remove bearing and two races (3) and sun gear (5) from output carrier assembly (8).

NOTE

Place output carrier assembly on its side for ease of disassembly.

4. Remove thrust washer (7) from output carrier assembly (8).
5. Remove thrust washer (9), snapping (10), output shaft (11), and bearing and two races (12) from internal gear (13).
6. Remove internal gear (13), main shaft (6), and bearing and two races (14) from output carrier assembly (8).
7. Remove snapping (15) and internal gear (13) from main shaft (6).
8. Remove roller clutch (1) and spacer ring (1.1) from reaction drum (2).

28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)



28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a.1. Disassembly (1996-1998)

1. Remove sun gear shaft (4) from sun gear (5) and main shaft (6).
2. Remove reaction drum (2) from output carrier assembly (8).

NOTE

Keep all bearing and races together as sets.

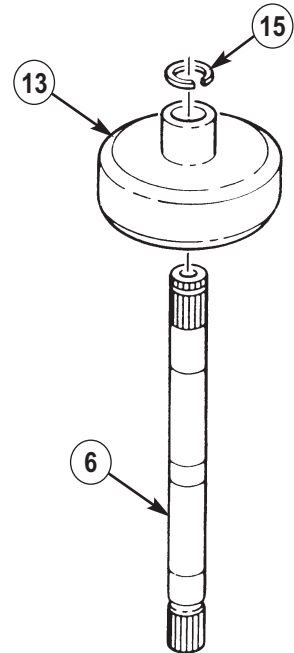
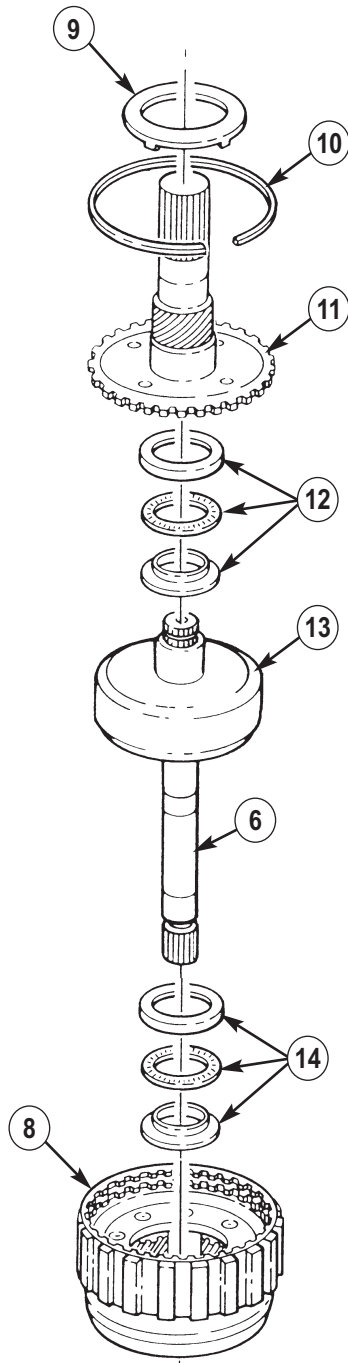
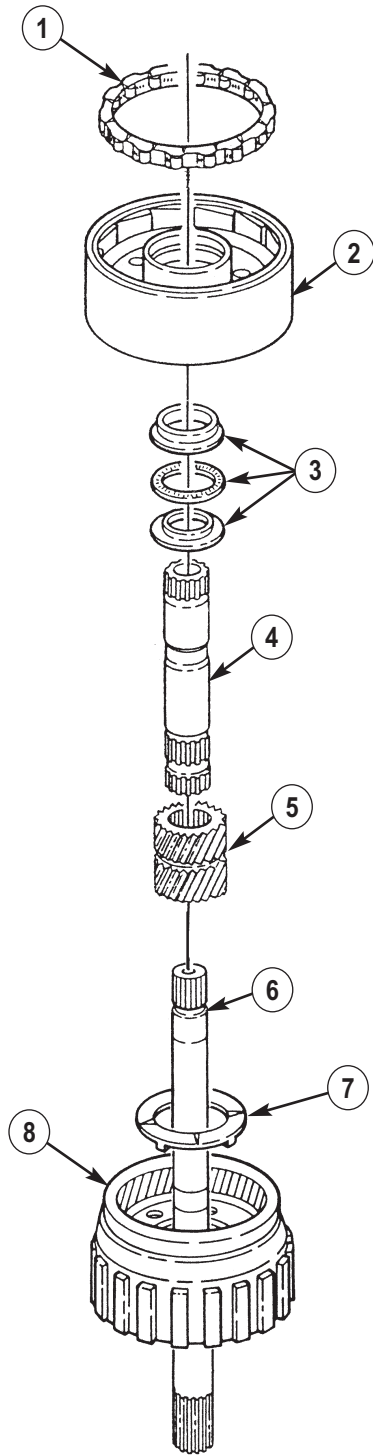
3. Remove bearing and two races (3) and sun gear (5) from output carrier assembly (8).

NOTE

Place output carrier assembly on its side for ease of disassembly.

4. Remove thrust washer (7) from output carrier assembly (8).
5. Remove thrust washer (9), snapping (10), output shaft (11), and bearing and two races (12) from internal gear (13).
6. Remove internal gear (13), main shaft (6), and bearing and two races (14) from output carrier assembly (8).
7. Remove snapping (15) and internal gear (13) from main shaft (6).
8. Remove roller clutch (1) from reaction drum (2).

28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)



28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)

b. Cleaning

Clean all center support components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

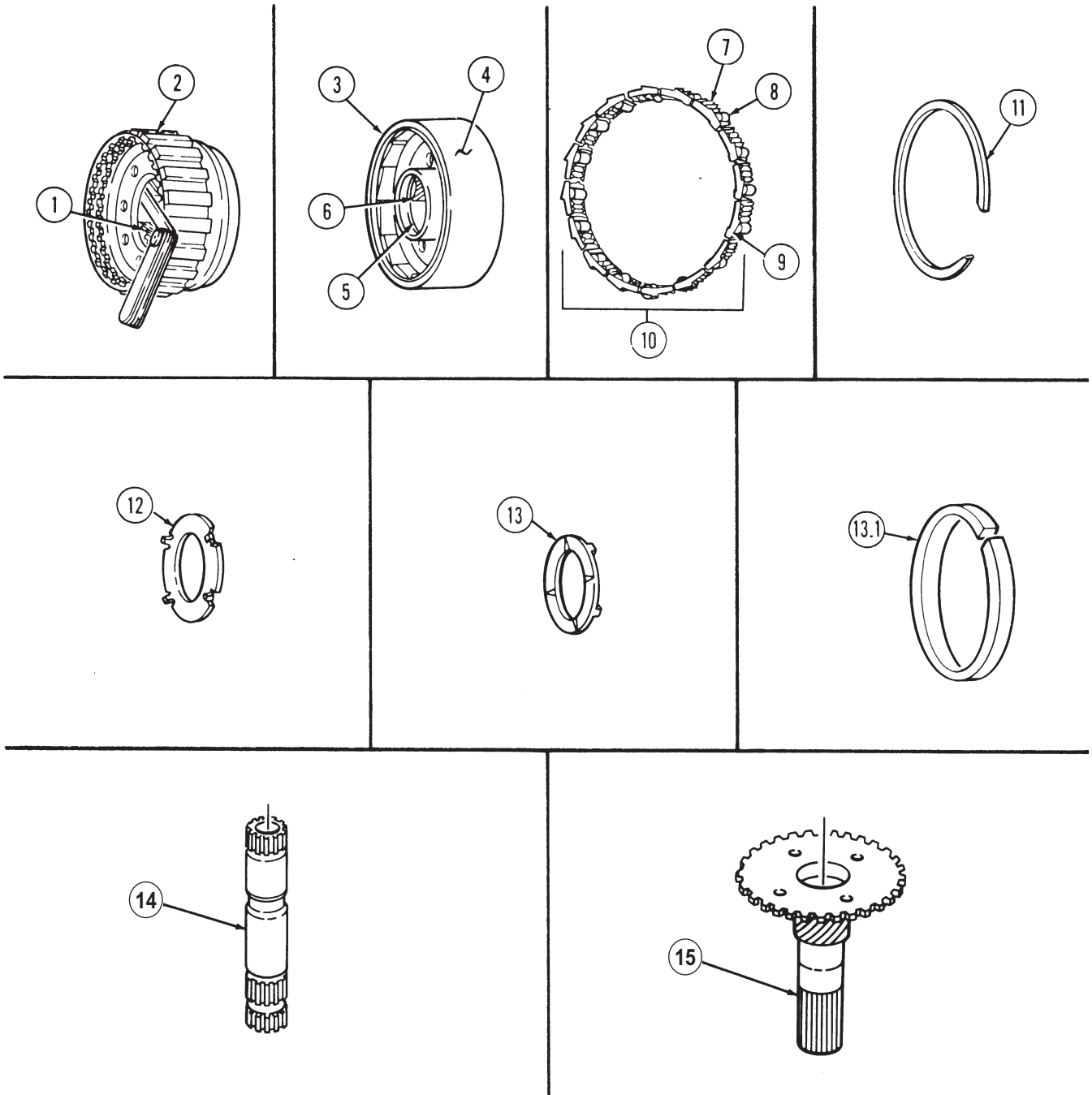
1. Inspect output carrier (2) for damage. Replace if damaged.
2. Inspect output carrier pinion gears (1) for damage, rough bearings, or excessive end play. Using feeler gauge, measure pinion gear end play; end play should not exceed 0.024 in. (0.61 mm). If any of these conditions exist, replace output carrier (2).
3. Inspect band surface (4) on reaction drum (3) for burning, scoring, or galling. Replace if burned, scored, or galled.
4. Inspect reaction carrier bushing (5). Replace reaction drum (3) if bushing (5) is damaged.
5. Inspect reaction carrier pinion gear (6) for damage, rough bearings, or excessive end play. Using feeler gauge, measure pinion gear end play; end play should not exceed 0.024 in. (0.61 mm). If any of these conditions exist, replace reaction drum (3).
6. Inspect roller clutch (10) for damaged rollers (8), springs (7), or cage (9). Replace roller clutch (10) if any parts are damaged.

NOTE

Internal rings are used on 1995-1996 transmissions only.

7. Inspect snapring (11), case thrust washer (12), reaction carrier thrust washer (13), and spacer ring (13.1) for distortion or damage. Replace any part distorted or damaged.
8. Inspect sun gear shaft (14) for damage. Replace if damaged.
9. Inspect output shaft (15) for damage. Replace if damaged.
10. Refer to para. 2-15 for general inspection instructions for all other gear unit parts.

28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)



28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)

d. Assembly (1995)

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

For general assembly instructions, refer to para. 2-17.

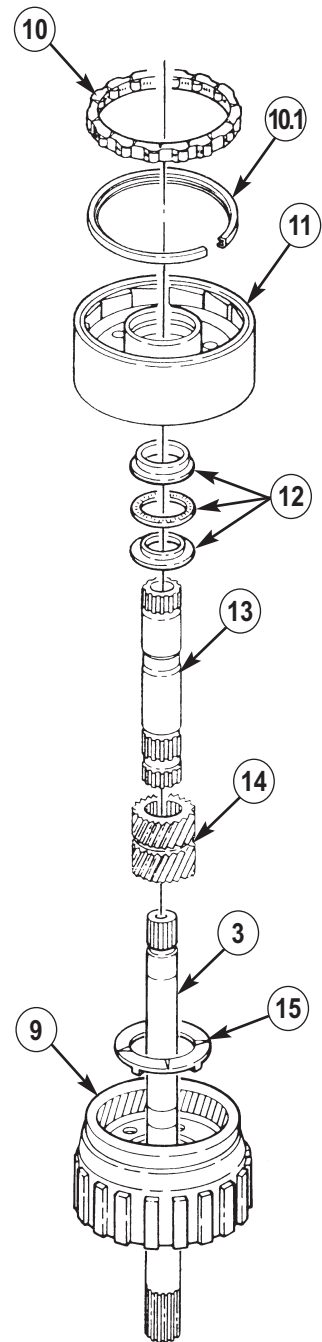
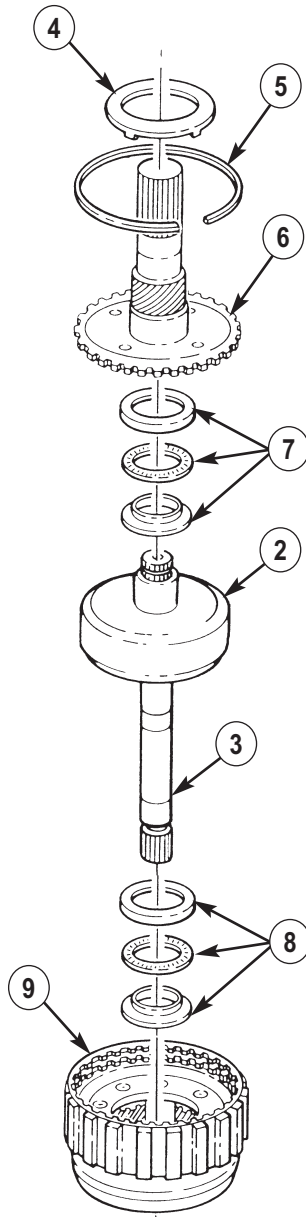
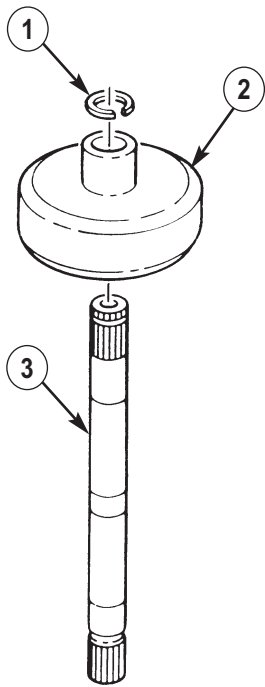
1. Install space ring (10.1) and roller clutch (10) in reaction drum (11).
2. Install main shaft (3) into rear internal gear (2) with snapping (1).
3. Install bearing and two races (7) on rear journal of rear internal gear (2). Retain races (7) with petrolatum.
4. Install output carrier assembly (9), bearing and two races (8), and output shaft (6) on internal gear (2). Secure with snapping (5).

NOTE

The metal thrust washer is installed on output shaft. The plastic thrust washer is installed in output carrier.

5. Install thrust washer (4) on output shaft (6) and retain with petrolatum. Seat tabs in pockets of output shaft (6).
6. Turn partially-assembled gear unit over with main shaft (3) facing up.
7. DELETED.
8. Install plastic thrust washer (15) and reaction drum (11) on output carrier assembly (9). Mesh gears.
9. Install sun gear (14), chamfered edge first, into reaction drum (11) and output carrier assembly (9).
10. Install long, splined end of sun gear shaft (13) in sun gear (14).
11. Install bearing and two races (12) with longer lip race on reaction drum (11). Retain races (12) with petrolatum.

28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)



28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)

d.1. Assembly (1996-1998)

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

For general assembly instructions, refer to para. 2-17.

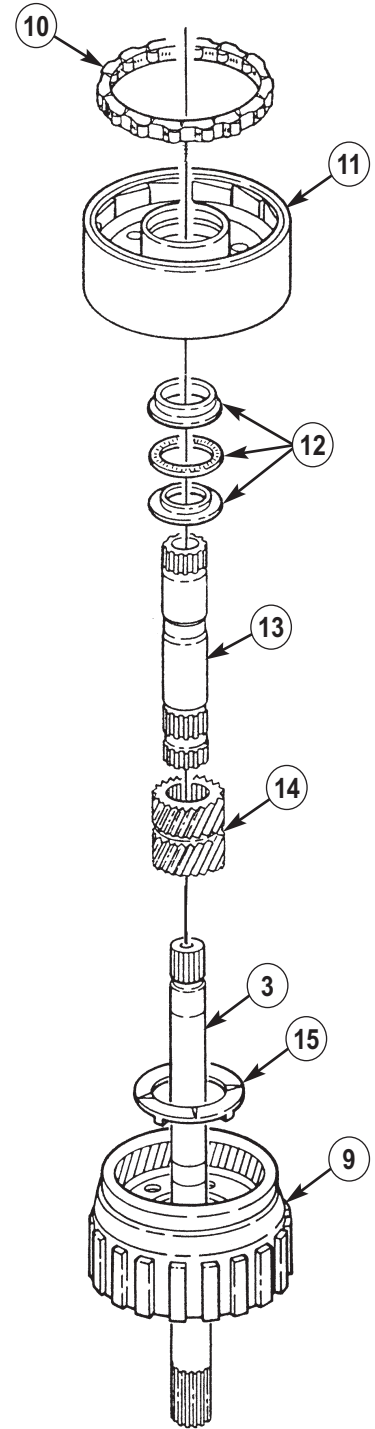
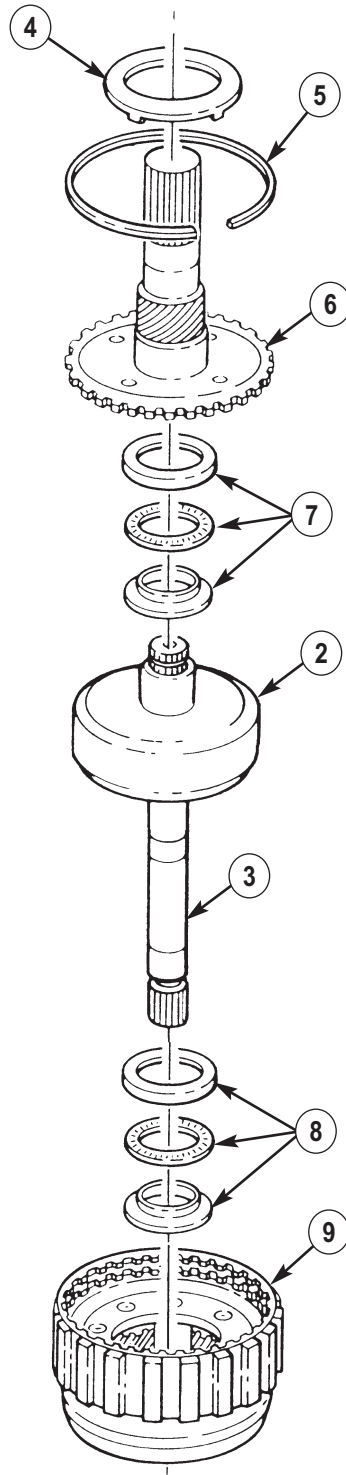
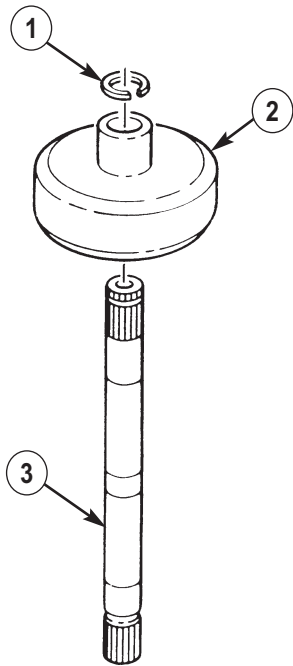
1. Install roller clutch (10) in reaction drum (11).
2. Install main shaft (3) into rear internal gear (2) with snapping (1).
3. Install bearing and two races (7) on rear journal of rear internal gear (2). Retain races (7) with petrolatum.
4. Install output carrier assembly (9), bearing and two races (8), and output shaft (6) on internal gear (2). Secure with snapping (5).

NOTE

The metal thrust washer is installed on output shaft. The plastic thrust washer is installed in output carrier.

5. Install thrust washer (4) on output shaft (6) and retain with petrolatum. Seat tabs in pockets of output shaft (6).
6. Turn partially-assembled gear unit over with main shaft (3) facing up.
7. Install plastic thrust washer (15) and reaction drum (11) on output carrier assembly (9). Mesh gears.
8. Install sun gear (14), chamfered edge first, into reaction drum (11) and output carrier (9).
9. Install long, splined end of sun gear shaft (13) in sun gear (14).
10. Install bearing and two races (12) with longer lip race on reaction drum (11). Retain races (12) with petrolatum.

28-8. GEAR UNIT AND OUTPUT ASSEMBLIES REPAIR (Cont'd)



28-9. CENTER SUPPORT REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Inspection d. Assembly |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Special Tools

Driver handle (Appendix B, Item 60)
 Bushing service set (Appendix B, Item 76)
 Adapter (Appendix B, Item 67)
 Clutch compressor spring adapter
 (Appendix B, Item 69)
 Center support thread reamer
 (Appendix B, Item 73.1)

Materials/Parts

Inner piston seal (Appendix G, Item 304)
 Outer piston seal (Appendix G, Item 307)

Materials/Parts (Cont'd)

Four oil seal rings (Appendix G, Item 415)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies
 (para. 28-3).

General Safety Instructions

Air pressure must not exceed 15 psi (103 kPa)
 when air-checking clutch piston.

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove four oil seal rings (1) from center support (2). Discard oil seal rings (1).
2. Using adapter and clutch spring compressor J 23327, compress spring and retainer (10) and remove snapping (11) from center support (2).
3. Remove spring and retainer (10), releasing springs (9), and remove clutch piston (6) from center support (2).
4. Remove inner piston seal (7) and outer piston seal (8) from clutch piston (6). Discard piston seals (7) and (8).

NOTE

Perform step 5 for 1997-1998 transmissions only.

5. Remove oil cooler fitting seal (8.1) from center support (2).

b. Cleaning

Clean all center support components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

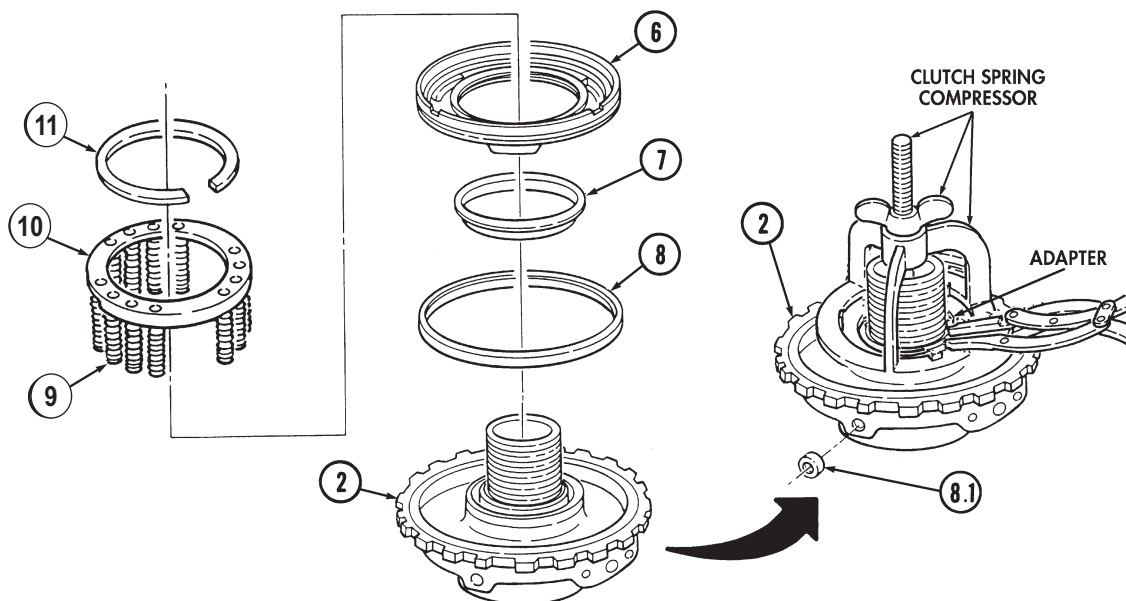
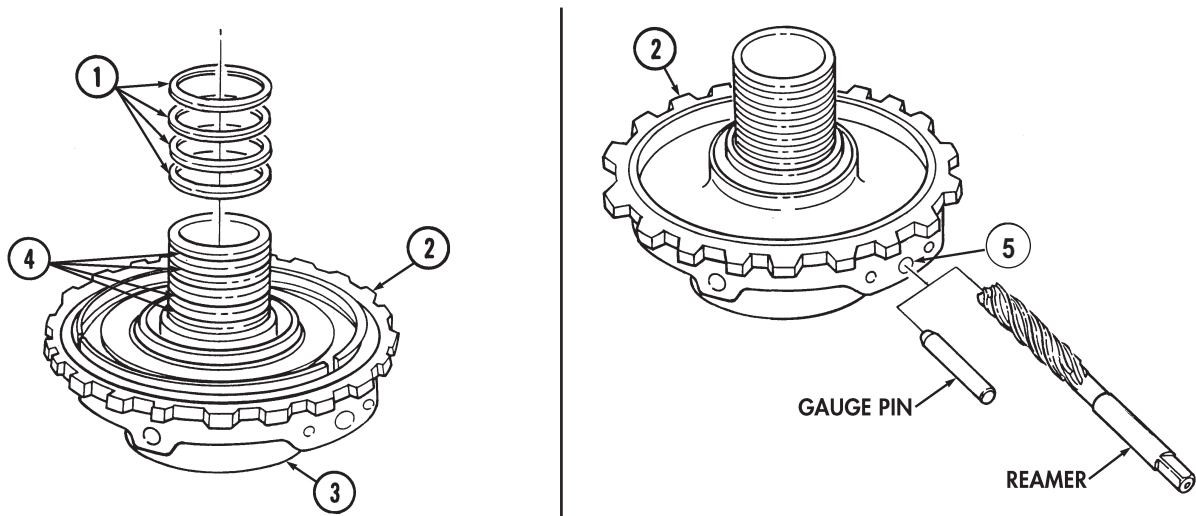
1. Inspect roller clutch inner race (3) for damage. Replace center support (2) if damaged.
2. Inspect oil ring grooves (4) in center support (2) for roughness or damage. Replace center support (2) if damaged.
3. Inspect center support (2) for damage. Replace if damaged.

28-9. CENTER SUPPORT REPAIR (Cont'd)

NOTE

- The center support bolt hole can be reconditioned **ONE TIME ONLY** using a reamer and a new service bolt. This is an optional procedure.
- 1997-1998 transmission center supports are shown. The 1995-1996 transmissions are similar.

- 3.1. Insert, do not force, gauge pin with chamfer end towards hole in bolt hole (5). If gauge pin fits in hole at least half way, go to step 3.2. If half way or more, replace center support (2).
- 3.2. Position reamer in bolt hole (5) and using light pressure, turn clockwise approximately 4-6 times or until reamer bottoms out. Remove reamer and clean center support (2).
4. Check all oil passages in center support (2) for blockage.
5. Inspect release springs (9) for signs of distortion or collapsed coils. Replace all springs (9) if any have distorted or collapsed coils.
6. Inspect clutch piston (6), spring and retainer (10), and snapping (11) for damage or distortion. Replace any part if damaged or distorted.

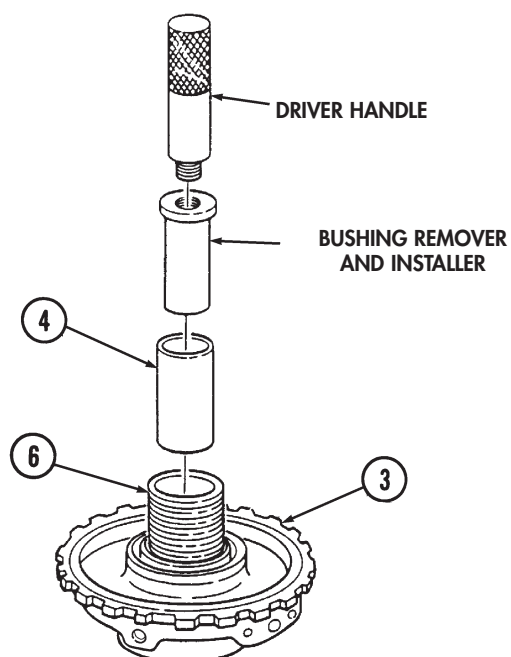
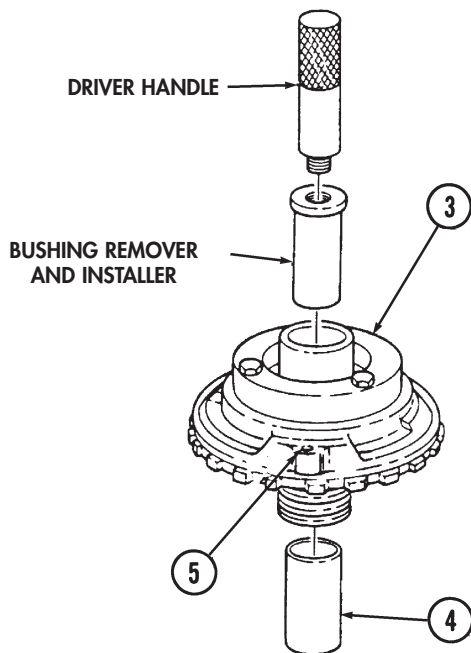
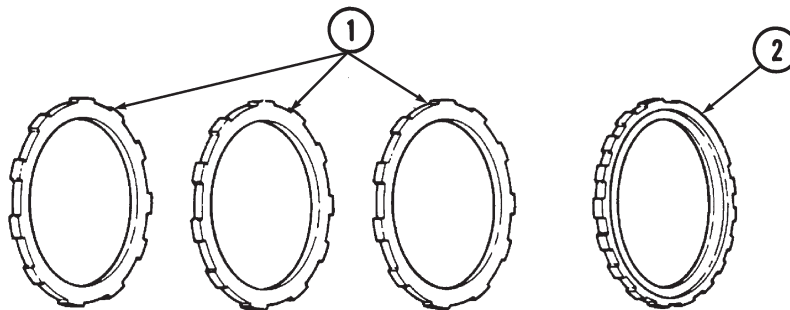


28-9. CENTER SUPPORT REPAIR (Cont'd)

NOTE

Intermediate clutch plates and backing plate were removed during transmission disassembly (para. 28-3).

7. Inspect steel clutch plates (1) and backing plate (2) for signs of burning, scoring, or cracks. Replace any that are burned, scored, or cracked.
8. Inspect bushing (4) in center support (3) for damage. If damaged, perform steps 9 through 11. If not, go to step 12.
9. Using driver handle and bushing remover and installer J 21465-01, remove bushing (4) from center support (3).
10. Align elongated slot in bushing (4) with drilled hole in oil delivery sleeve (6) closest to piston cavity in center support (3).
11. Using driver handle and bushing remover and installer, install bushing (4) into center support (3) until bushing (4) is flush to 0.010 in. (0.254 mm) below top of oil delivery sleeve (6).
12. Check center support (3) for obstructions in orifice plug (5). Remove obstructions with a piece of wire. Replace center support if plug (5) is missing or obstructions cannot be removed.

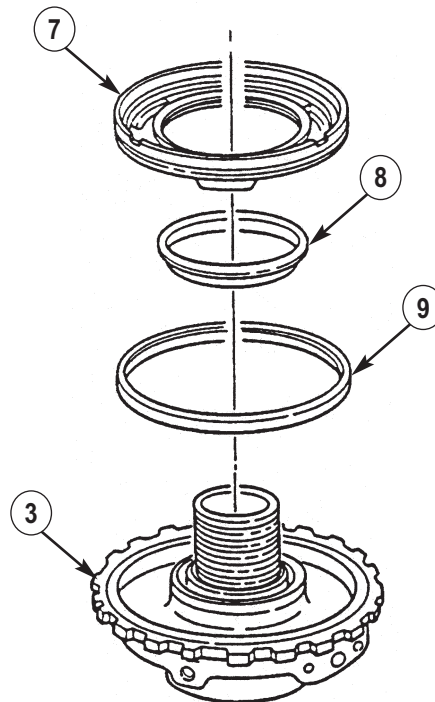


28-9. CENTER SUPPORT REPAIR (Cont'd)**d. Assembly****CAUTION**

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

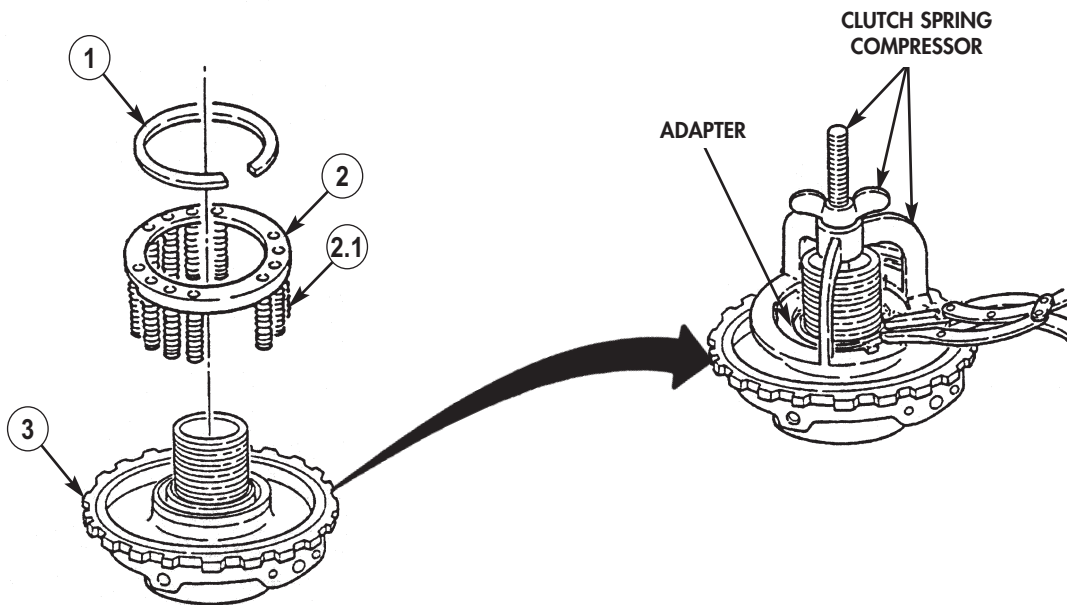
NOTE

- For general assembly instructions, refer to para. 2-17.
 - It may be necessary to use a 0.015-in. (0.381-mm) feeler gauge to start outer and inner piston seals into center support.
1. Install inner piston seal (8) and outer piston seal (9) on clutch piston (7). Ensure lips on piston seals (8) and (9) face away from spring pockets in clutch piston (7).
 2. Install clutch piston (7) in center support (3), indexing spring pockets in clutch piston (7) with cored areas in center support (3).



28-9. CENTER SUPPORT REPAIR (Cont'd)

- 3. Place release springs (2.1) and spring and retainer (2) on center support (3).
- 4. Using adapter and spring compressor J 23327, compress spring and retainer (2) on center support (3) and install snapping (1).



28-9. CENTER SUPPORT REPAIR (Cont'd)

WARNING

Air pressure must not exceed 15 psi (103 kPa) when air-checking clutch piston or injury to personnel or damage to equipment may result.

NOTE

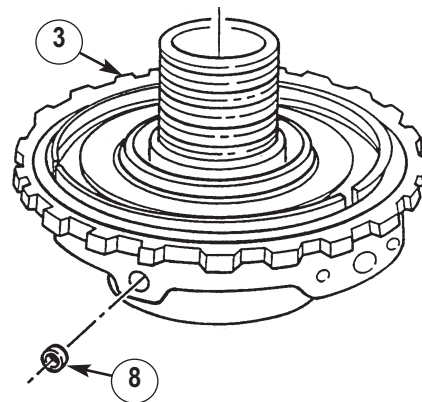
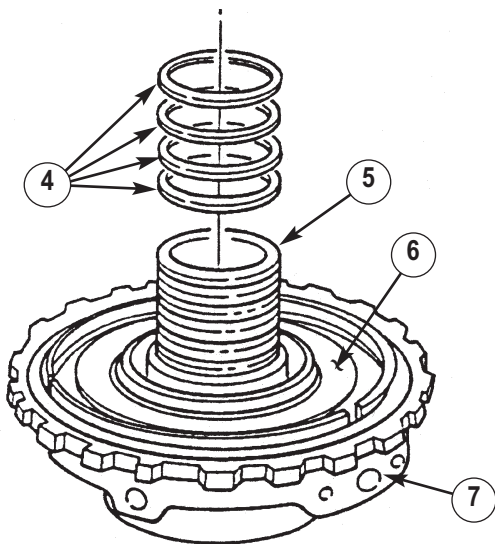
Clutch piston must move up and down freely when air pressure is applied.

5. Apply compressed air through center support bolt hole (7) to check operation of clutch piston (6).
6. Install four oil seal rings (4) on oil delivery sleeve (5).

NOTE

Perform step 7 for 1997-1998 transmissions only.

7. Install oil cooler fitting seal (8) in center support (3).



1997 AND 1998 MODELS

28-10. DIRECT CLUTCH ASSEMBLY REPAIR

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning c. Inspection | <ul style="list-style-type: none"> d. Assembly e. Direct Clutch Piston Movement Measurement |
|--|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)

Special Tools

Clutch spring compressor
 (Appendix B, Item 69)
 Adapter (Appendix B, Item 70)
 Adapter (Appendix B, Item 67)
 Seal protectors (Appendix B, Item 68)

Materials/Parts

Inner seal (Appendix G, Item 386)
 Center seal (Appendix G, Item 385)
 Outer seal (Appendix G, Item 387)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies
 (para. 28-3).

General Safety Instructions

Air pressure must not exceed 80 psi (552 kPa)
 when air-checking clutch piston.

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove snapping (1), clutch retainer (2), and outer race (3) from direct clutch housing (5).
2. Remove sprag assembly (4) from direct clutch housing (5).
3. Remove snapping (6), backing plate (7), five clutch plate assemblies (8), clutch plates (10), and dished plate (9) (1995-1996 transmissions only) from direct clutch housing (5).

NOTE

Piston removed in step 4 is for 1995-1996 transmissions only.

4. Using spring compressor, adapter, and clutch spring adapter, remove snapping (11), spring and retainer assembly (12), and piston (13) from clutch housing (5).

NOTE

Perform step 5 for 1995-1996 transmissions only.

5. Remove inner seal (14), outer seal (15), and center seals (16) from clutch housing (5). Discard seals (14), (15), and (16).

b. Cleaning

Clean all direct clutch components in accordance with para. 2-14.

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-15.

1. Inspect backing plate (7), five clutch plates (10), and dished plate (9) (1995-1996 transmissions only) for signs of burning, scoring, or cracks. Replace any plate if burned, scored, or cracked.

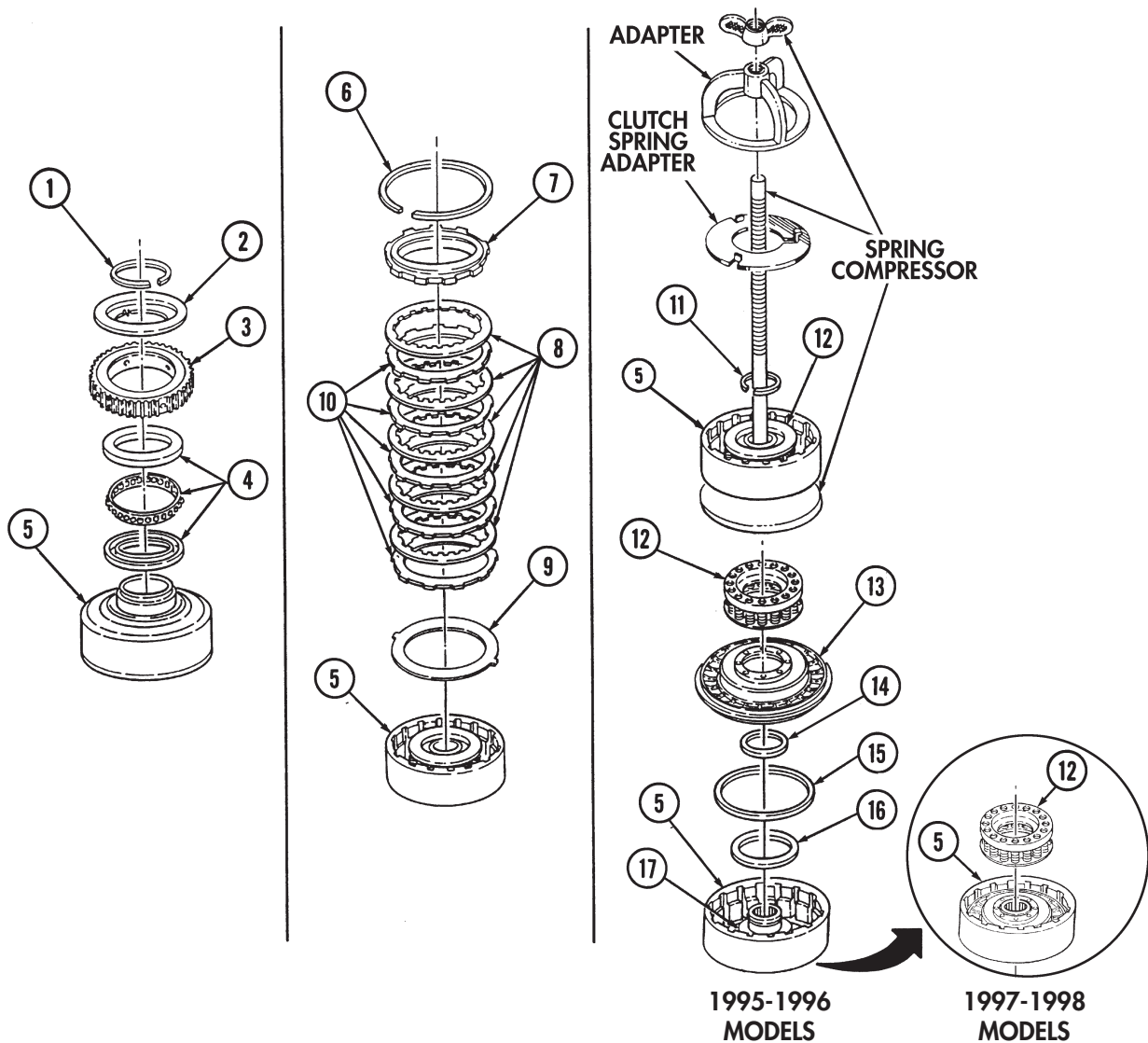
28-10. DIRECT CLUTCH ASSEMBLY REPAIR (Cont'd)

2. Inspect snapping (1), backing plate snapping (6), spring and retainer assembly (12), and clutch retainer (2) for distortion or damage. Replace any part if distorted or damaged.
3. Inspect sprag assembly (4) and outer race (3) for scoring, galling, or damage. Replace any part if scored, galled, or damaged.

NOTE

Perform step 4 for 1995-1996 transmissions only.

4. Inspect piston (13) for distortion or damage. Replace if distorted or damaged.
5. Inspect spring and retainer assembly (12) for collapsed coils or distortion. Replace all if any are collapsed or distorted.
6. Inspect direct clutch housing (5) for damage. Replace if damaged.
7. Check for freeness of checkball (17) and ensure all oil passages in clutch housing (5) are open. Replace direct clutch housing (5) if checkball (17) is not free or oil passages are blocked.



28-10. DIRECT CLUTCH ASSEMBLY REPAIR (Cont'd)

d. Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

- For general assembly instructions, refer to para 2-17.
- Perform step 1 for 1995-1996 models only.

1. With piston (2) facing up, install inner seal (3) and outer seal (4), lip side down, and center seal (5), lip side up, into clutch housing (6).
2. Position seal protectors J 38732-1 and J 21362 on direct clutch housing (6).

NOTE

Perform step 2.1 for 1995-1996 transmissions only.

- 2.1. Install piston (2). Use twisting motion on piston (2) until seated.
3. Using spring compressor and adapter, install spring and retainer assembly (1) on piston (2) with snapping (7).
4. Install sprag assembly (11) over rear hub of direct clutch housing (6).
5. Install outer race (10), groove side up, and clutch retainer (9) over sprag assembly (11) with snapping (8).
6. Check sprag assembly (11) to ensure it only turns clockwise and locks on housing (6) when turned counterclockwise.

NOTE

Perform step 7 for 1995-1996 transmissions only.

7. Install dished plate (15), cupped surface toward piston (2), on direct clutch housing (6).
8. Install five clutch plates (16) and clutch plate assemblies (14) on clutch housing (6). Alternate plates, starting with a clutch plate (16).
9. Install backing plate (13) on housing (6) with snapping (12).

e. Direct Clutch Piston Movement Measurement

1. Set direct clutch assembly (17) on center support (18).
2. Set dial indicator to seat on direct clutch assembly (17).

WARNING

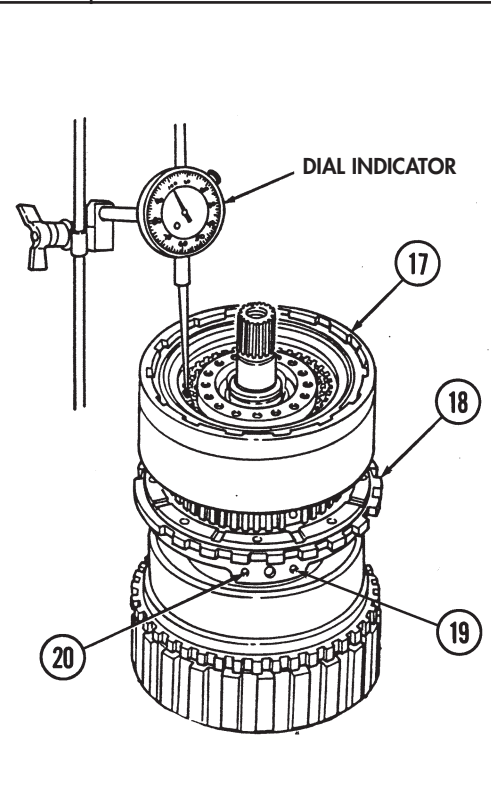
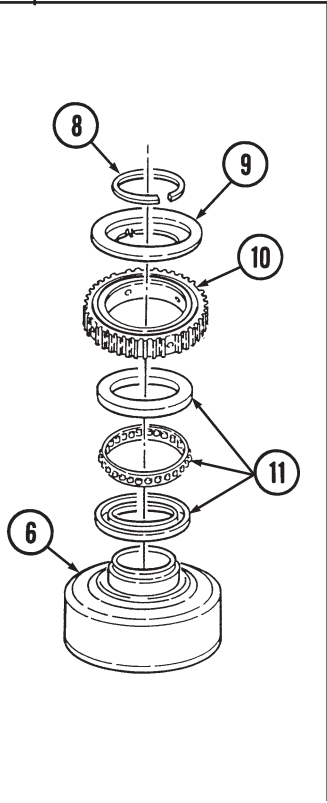
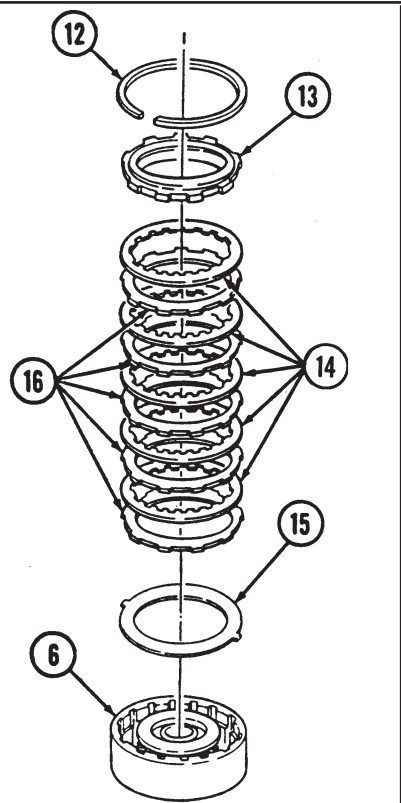
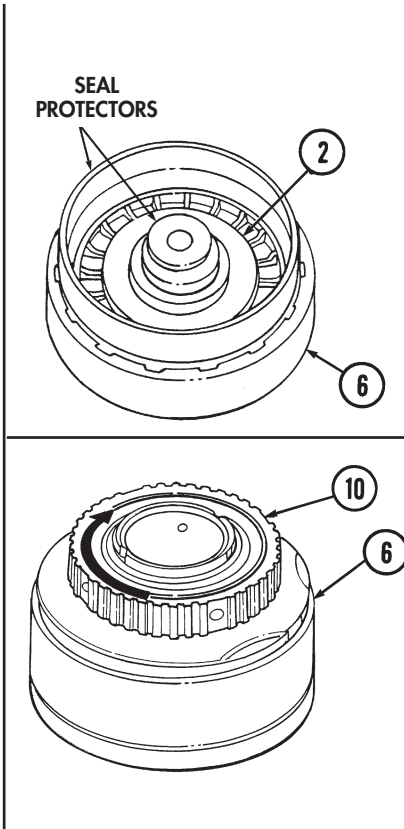
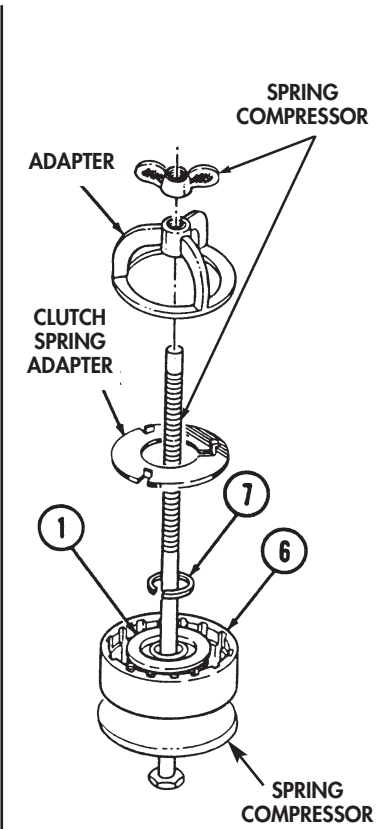
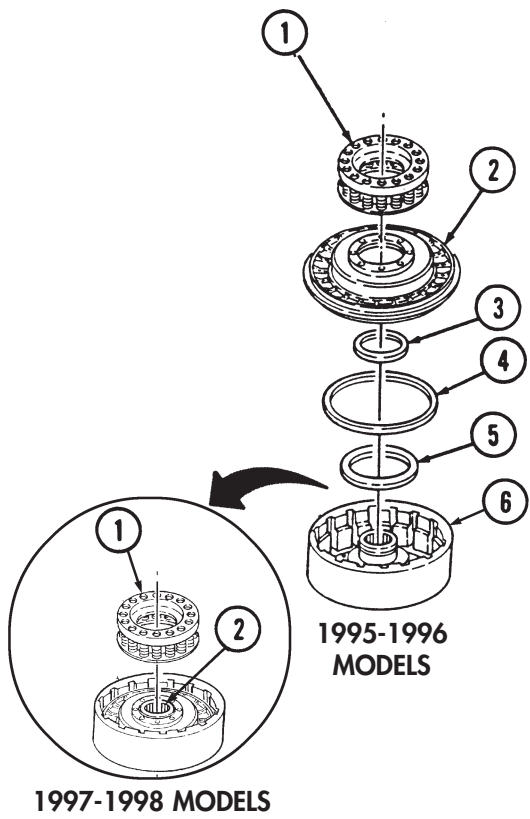
Air pressure must not exceed 80 psi (552 kPa) when air-checking clutch position.

NOTE

Air applied to reverse passage will vent out normally.

3. Apply 80 psi (552 kPa) of air pressure to direct clutch fluid passage (20) in center support (18) only. Do not apply air pressure to reverse passage (19); air will vent out normally.
4. Piston should move to compress clutch plates. Travel should be 0.121-0.186 in. (3.07-4.72 mm).
5. If correct measurement is read, remove direct clutch assembly (17) from center support (18).
6. If incorrect measurement is read, check clutch plates (16) and (14) for proper installation. Replace all clutch plates if damaged.

28-10. DIRECT CLUTCH ASSEMBLY REPAIR (Cont'd)



28-11. FORWARD CLUTCH ASSEMBLY REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Inspection d. Assembly |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)

Special Tools

Clutch spring compressor (Appendix B, Item 69)
 Adapter (Appendix B, Item 70)
 Seal protectors (Appendix B, Item 68)

Materials/Parts

Inner seal (Appendix G, Item 386)
 Outer seal (Appendix G, Item 387)
 Center seal (Appendix G, Item 383)
 Petrolatum (Appendix C, Item 52)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies (para. 29-3).

Maintenance Level

General support

General Safety Instructions

Air pressure must not exceed 80 psi (552 kPa) when air checking clutch position.

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove snapping (1) and direct clutch driving hub (2) from forward clutch housing (8).
2. Remove forward clutch hub (4), thrust washer (3), and bearing washer (5) from direct clutch driving hub (2).
3. Remove five clutch plates (9), clutch plate assemblies (6), and dished clutch plate (7) (1995-1996 transmissions only), from forward clutch housing (8).
4. Using spring compressor, adapter, and clutch spring adapter, compress spring and retainer assembly (11) and remove snapping (10) from forward clutch housing (8).
5. Remove spring and retainer assembly (11) from forward clutch housing (8).

NOTE

Perform steps 6, 7, and 8 for 1995-1996 transmissions only.

6. Remove piston (12) from forward clutch housing (8).
7. Remove inner seal (13) and outer seal (14) from piston (12). Discard seals (13) and (14).
8. Remove center seal (15) from clutch housing (8). Discard center seal (15).

b. Cleaning

Clean all forward clutch components in accordance with para. 2-14.

c. Inspection

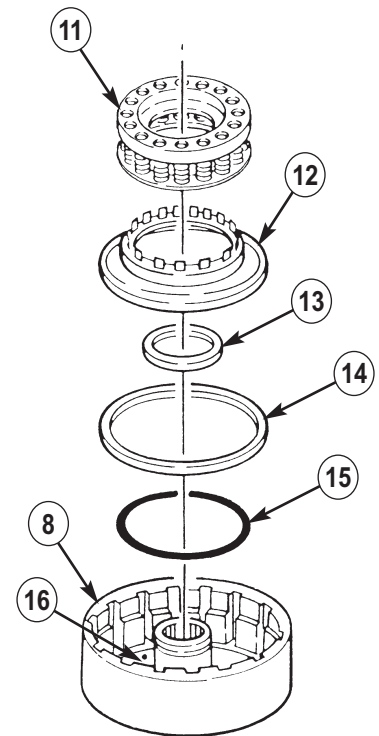
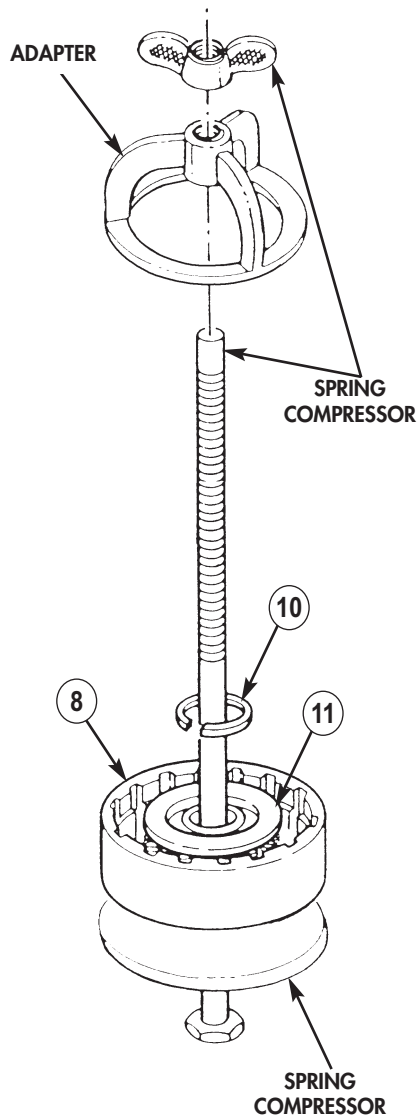
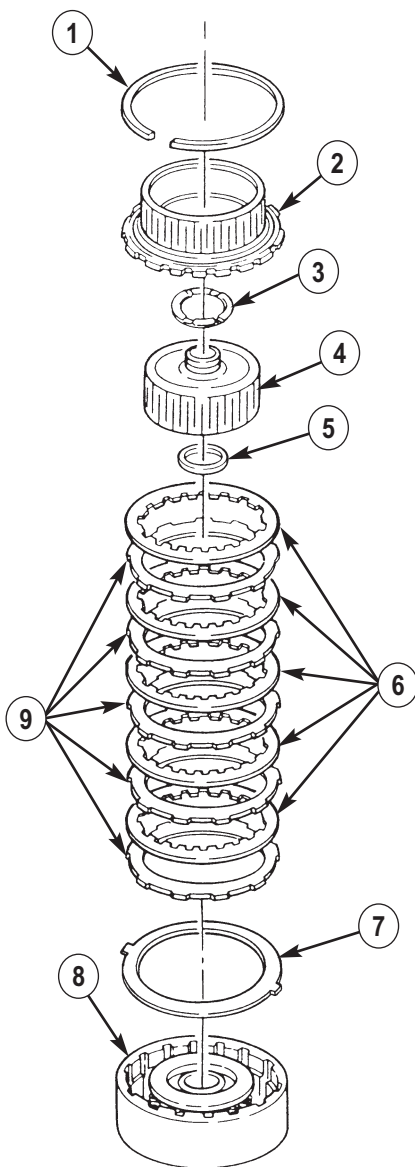
NOTE

For general inspection instructions, refer to para. 2-15.

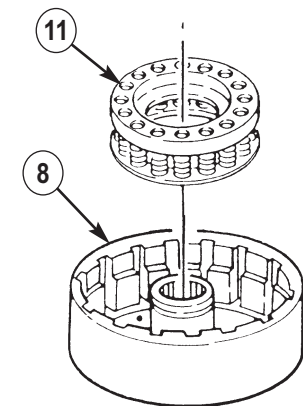
1. Inspect five clutch plates (9) for signs of burning, scoring, or cracks. Replace any that are burned, scored, or cracked.

28-11. FORWARD CLUTCH ASSEMBLY REPAIR (Cont'd)

2. Inspect thrust washer (3), bearing washer (5), spring and retainer assembly (11), and snapping (10) for distortion or damage. Replace any if distorted or damaged.
3. Inspect forward clutch hub (4) and direct clutch hub (2) for damage. Replace either if damaged.
4. Inspect piston (12) for distortion or damage. Replace if distorted or damaged.
5. Inspect spring and retainer assembly (11) for collapsed coils or distortion. Replace if distorted or damaged.
6. Inspect clutch housing (8) for damage. Replace if damaged.
7. Check for freeness of checkball (16) in clutch housing (8), and that all oil passages are open. Replace forward clutch assembly if checkball (16) is not free or if oil passages are blocked.



1995 - 1996 MODELS



1997 - 1998 MODELS

28-11. FORWARD CLUTCH ASSEMBLY REPAIR (Cont'd)

d. Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

Perform steps 1 and 2 for 1995-1996 transmissions only.

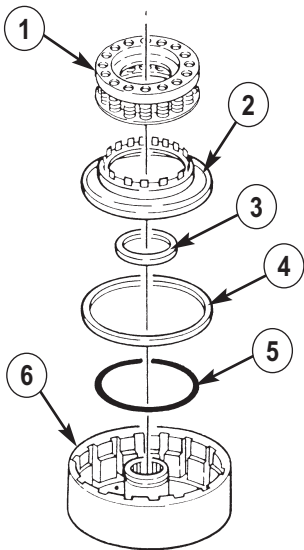
1. Install inner seal (3) and outer seal (4) on piston (2), with lips of seals facing down toward housing (6).
2. Install center seal (5) on forward clutch housing (6), with lip of seal facing up.
3. Install seal protectors over clutch housing (6).
4. Install piston (2) on forward clutch housing (6). Twist slightly to ensure piston (2) seats on housing (6).
5. Using spring compressor and adapter, install spring and retainer assembly (1) on piston (2) and forward clutch housing (6) and secure with snapping (7).
6. Install dished clutch plate (14) (1995-1996 transmissions only), concave side toward piston (2), on forward clutch housing (6).
7. Starting with a clutch plate (15), install five clutch plates (15) and clutch plate assemblies (13) on clutch housing (6).
8. Install direct clutch driving hub (9) in forward clutch housing (6) with snapping (8).
9. Install forward clutch housing (6) on turbine shaft (16).
10. Set up dial indicator to measure piston (2) movement with direct clutch driving hub (9).

WARNING

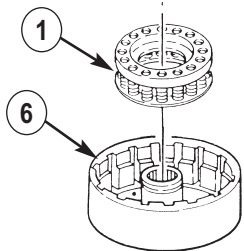
Air pressure must not exceed 80 psi (552 kPa) when checking clutch piston.

11. Apply 80 psi (552 kPa) of air pressure to hole A on forward clutch assembly (6). Piston (2) should move 0.121-0.186 in. (3.07-4.27 mm).
12. Remove turbine shaft (16), snapping (8), and direct clutch driving hub (9) from forward clutch housing (6).
13. Install thrust washer (10) inside forward clutch hub (11) and bearing washer (12) outside forward clutch hub (11) and retain with petrolatum.
14. Install clutch hub (11) on forward clutch housing (6).
15. Install direct clutch driving hub (9) on forward clutch housing (6) with snapping (8).

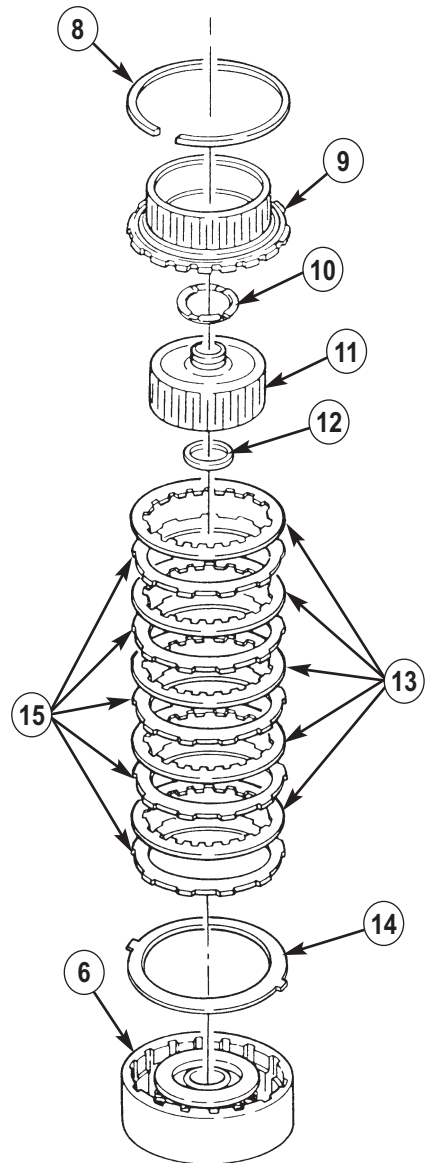
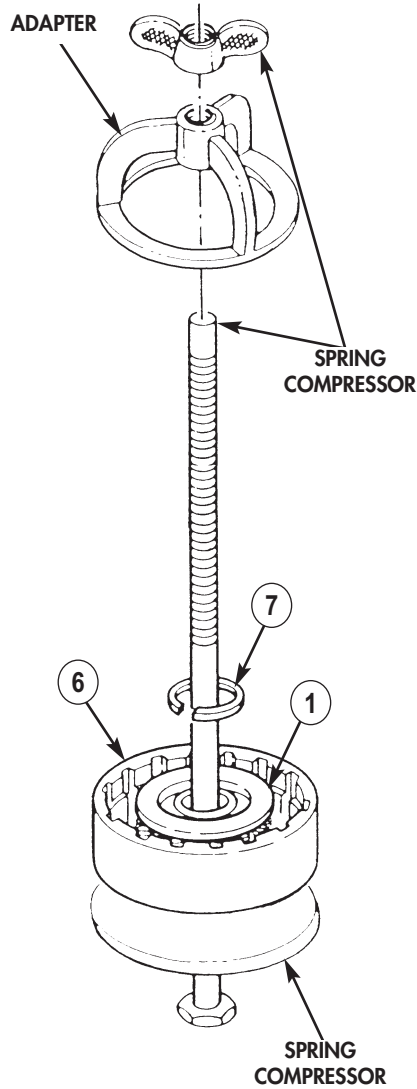
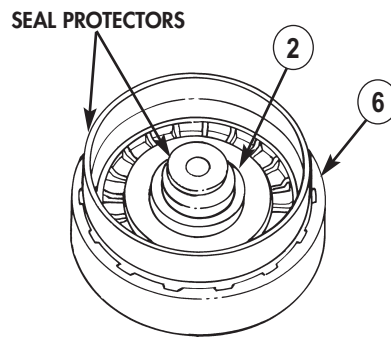
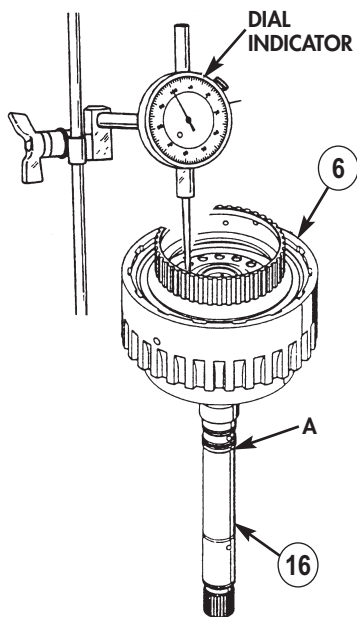
28-11. FORWARD CLUTCH ASSEMBLY REPAIR (Cont'd)



1995 - 1996 MODELS



1997 - 1998 MODELS



28-12. FOURTH CLUTCH ASSEMBLY REPAIR

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning c. Inspection | <ul style="list-style-type: none"> d. Assembly e. End Play Measurement |
|--|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Seal protectors (Appendix B, Item 71)

Materials/Parts

Inner seal (Appendix G, Item 390)
Outer seal (Appendix G, Item 392)
Petrolatum (Appendix C, Item 52)
Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove snapping (1), backing plate (11), four clutch plates (9), and clutch plate assemblies (10) from clutch housing (4).
2. Remove snapping (8) and spring and retainer assembly (7) from clutch housing (4).
3. Remove piston (3) from clutch housing (4).
4. Remove inner seal (2) from piston (3) and outer seal (6) from housing (4). Discard seals (2) and (6).

b. Cleaning

Clean all components in accordance with para. 2-14.

c. Inspection

1. Inspect piston (3), backing plate (11), and clutch housing (4) for cracks, breaks, and damaged seal ring grooves. Replace any that are cracked, broken, or damaged.
2. Inspect plug (5). If missing, replace clutch housing (4).

d. Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

1. Install inner seal (2) on piston (3), with lip facing toward spring and retainer assembly (7) side.
2. Install outer seal (6) on housing (4), with lip facing away from spring and retainer assembly (7) side.
3. Place inner seal protector J 38731-1 on clutch housing (4).
4. Place outer seal protector J 38731-2 on piston (3).
5. Position piston (3) on base J 38731-3 with snapping groove of piston (3) up.
6. Place housing (4) over piston (3) while holding inner seal protector in position.

28-12. FOURTH CLUTCH ASSEMBLY REPAIR (Cont'd)

7. Using both hands with a firm grip on the outside of housing (4), push down on housing (4) until the inner piston (3) protrudes through the center.
8. Place spring and retainer assembly (7) and snapping (8) over piston (3), keeping the housing (4) on base J 38731-3.
9. Compress spring and retainer assembly (7) and install snapping (8).

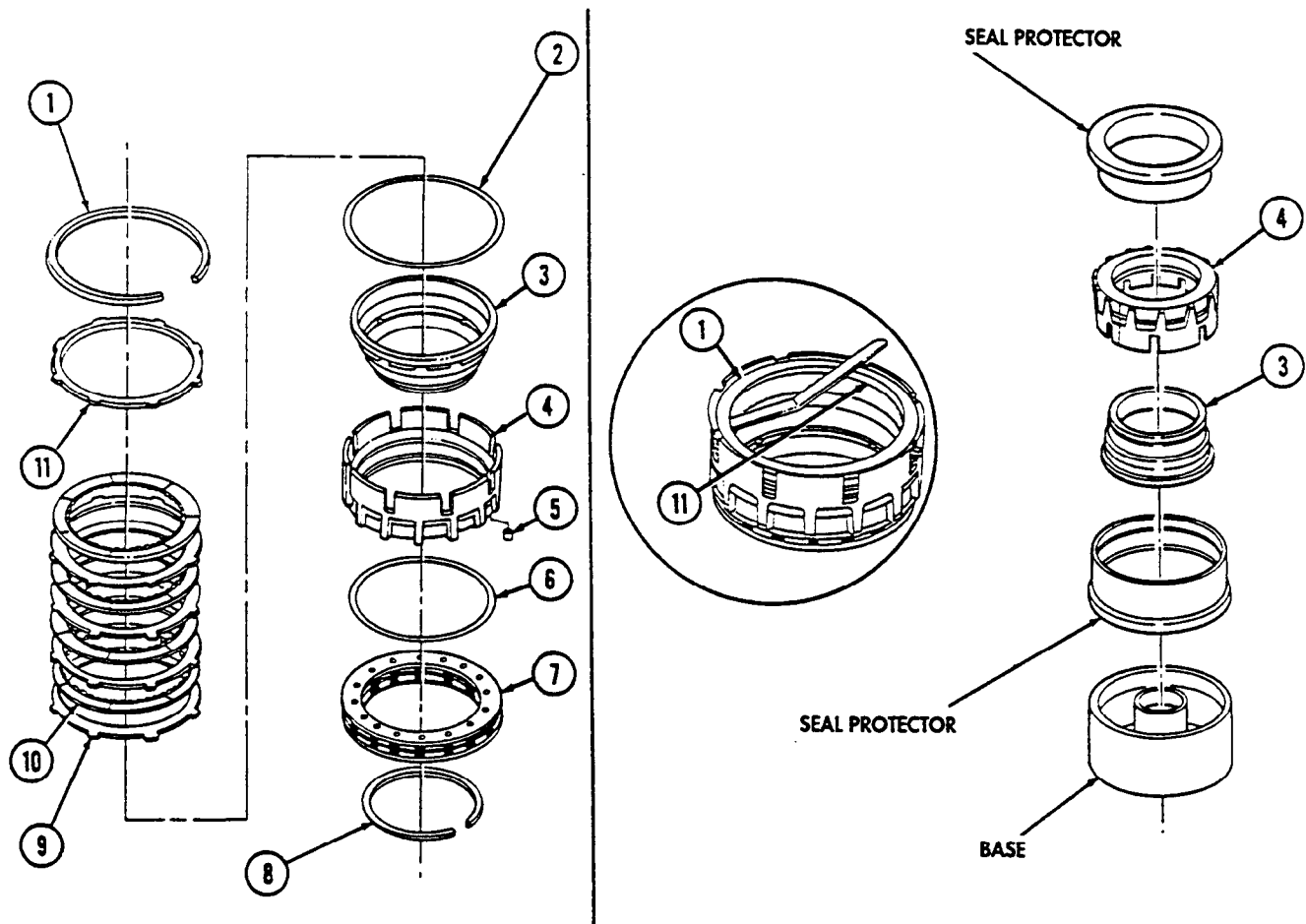
NOTE

Clutch plate index notch is opposite fourth clutch assembly bolt hole in housing.

10. Turn housing (4) over and install four clutch plates (9), clutch plate assemblies (10), and backing plate (11). Start with clutch plate (9). Backing plate (11) must have flat side down.
11. Secure backing plate (11), clutch plates (9), and clutch plate assemblies (10) to housing (4) with snapping (1).

e. End Play Measurement

1. Place fourth clutch assembly (4) on bench with spring and retainer assembly (7) facing down.
2. Press lightly on backing plate (11) and measure gap between snapping (1) and backing plate (11). Measurement should be 0.040-0.100 in. (1.016-2.540 mm). If not, check for correct clutch plate pack or replace worn clutch plate pack.



28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR

This task covers:

- | | |
|-------------------------------|----------------------------------|
| a. Overdrive Unit Disassembly | f. Overdrive Carrier Measurement |
| b. Overrun Clutch Disassembly | g. Overdrive Carrier Cleaning |
| c. Overrun Clutch Cleaning | h. Overdrive Carrier Inspection |
| d. Overrun Clutch Inspection | i. Turbine Shaft Inspection |
| e. Overrun Clutch Assembly | j. Overdrive Unit Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)

Special Tools

Clutch spring compressor (Appendix B, Item 69)
 Adapter (Appendix B, Item 67)
 Seal installer (Appendix B, Item 72)

Materials/Parts

Two seals (Appendix G, Item 381)
 Two seals (Appendix G, Item 380)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies (para. 28-3).

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Overdrive Unit Disassembly

1. Remove snapping (1) and turbine shaft (4) from overdrive carrier assembly (2).
2. Remove four seals (5) from shaft (4). Discard seals (5).
3. Separate overdrive carrier assembly (2) from overrun clutch housing assembly (3).

b. Overrun Clutch Disassembly

1. Remove snapping (6), backing plate (7), three clutch plates (12), and clutch plate assemblies (8) from clutch housing (3).
2. Using spring compressor and adapter, compress spring and retainer assembly (10) and remove snapping (9).
3. Remove spring compressor and adapter, spring and retainer assembly (10), and piston (11) from housing (3).

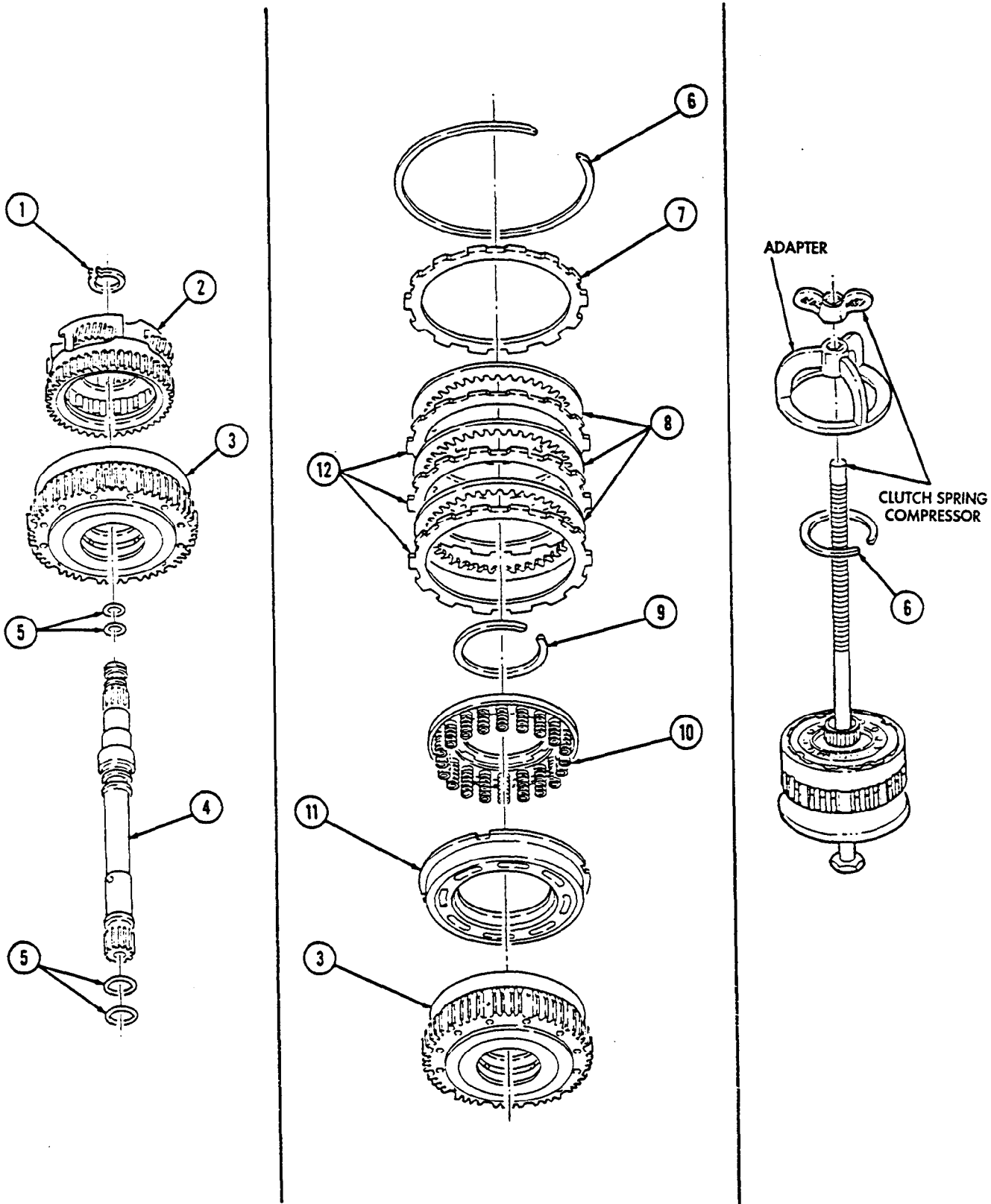
c. Overrun Clutch Cleaning

Clean all overrun clutch components, except piston (11), in accordance with para. 2-14.

d. Overrun Clutch Inspection

1. Inspect all clutch plates (12) and (8) for cracks, breaks, scoring, pitting, and evidence of overheating or composition wear. Replace clutch plates (12) and clutch plate assemblies (8) as a set if any are damaged.
2. Inspect backing plate (7) for cracks, warpage, and scoring. Remove minor scoring. Replace plate (7) if damaged.
3. Inspect spring and retainer assembly (10) for cracks, breaks, and uneven or damaged springs. Replace springs if damaged.
4. Inspect piston (11) for crack or damage. Replace piston (11) if damaged.
5. Inspect housing (3) for cracks, chips, scored or burned thrust faces and plugged holes. Unplug holes. Replace if damaged.

28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)



28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)

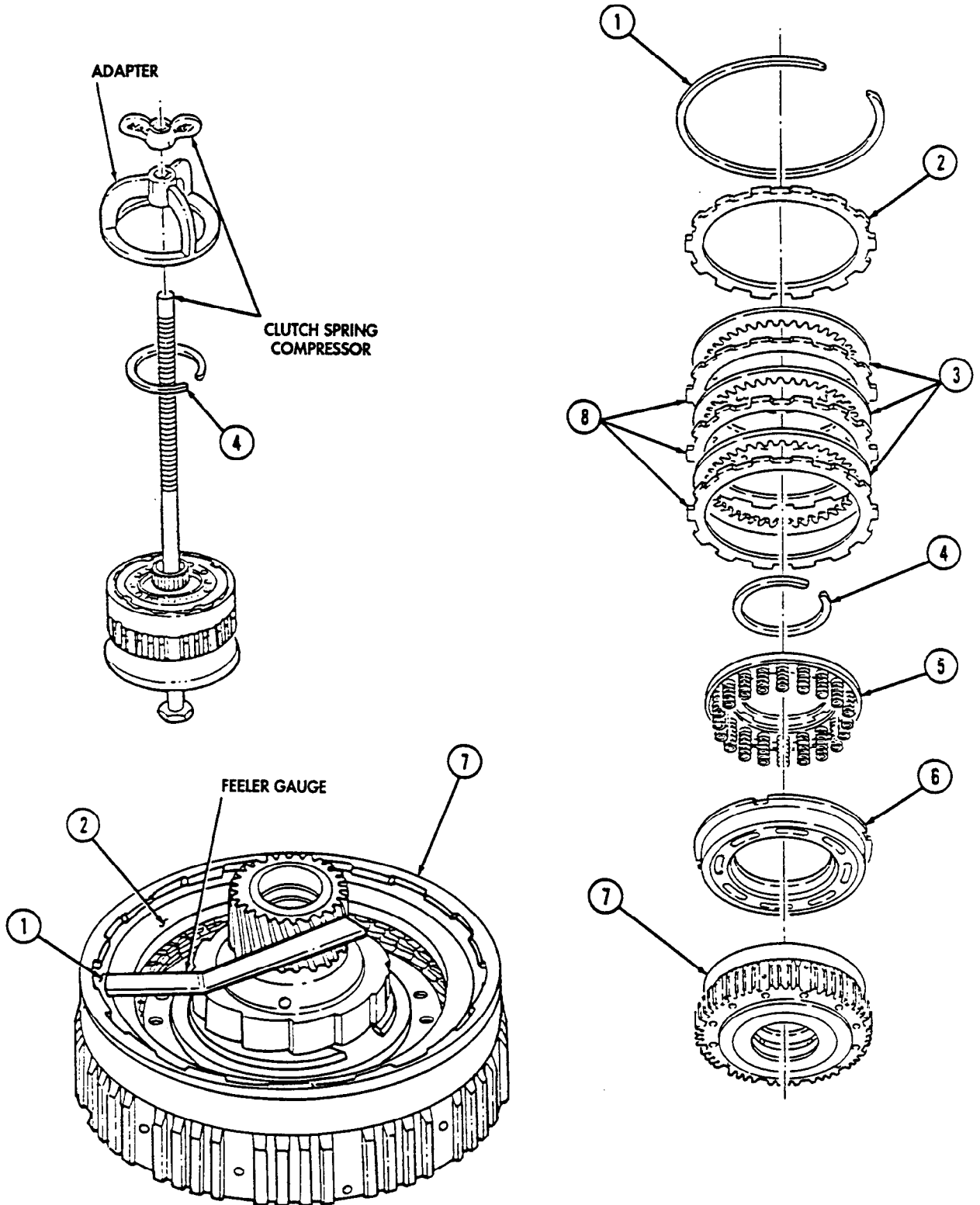
e. Overrun Clutch Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

1. Install piston (6) on clutch housing (7) and rotate piston (6) while seating in housing (7).
2. Using spring compressor and adapter, install spring and retainer assembly (5) on housing (7) and secure with snapping (4).
3. Starting with clutch plate (8), install three clutch plates (8) alternately with clutch plate assemblies (3) in housing (7).
4. Install backing plate (2) over clutch plate assembly (3) and secure with snapping (1).
5. Measure gap between snapping (1) and backing plate (2). Gap should be 0.033-0.094 in. (0.838-2.388 mm). If not, check assembly of clutch plate pack (8) or replace clutch plate pack (8).

28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)



28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)

f. Overdrive Carrier Measurement

1. Set dial indicator to read pinion gear (1) end play.
2. Lift pinion gear (1) and read movement from dial indicator. Normal end freeplay is 0.009-0.024 in. (0.229-0.610 mm). If not, replace overdrive carrier assembly (6).

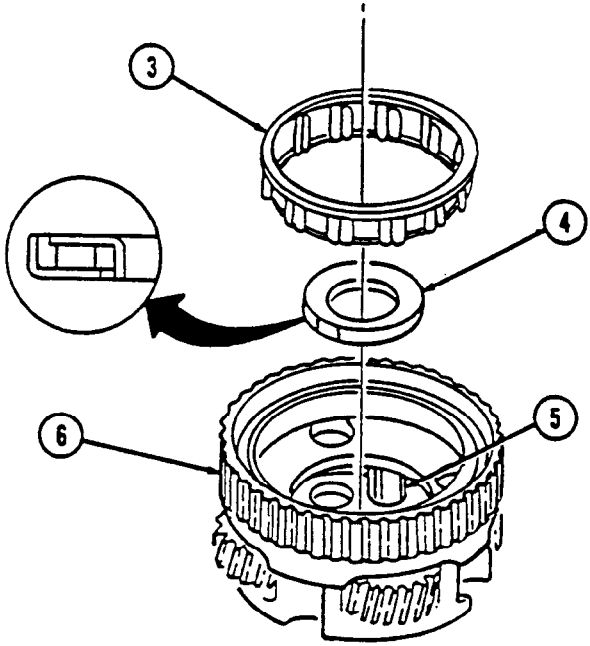
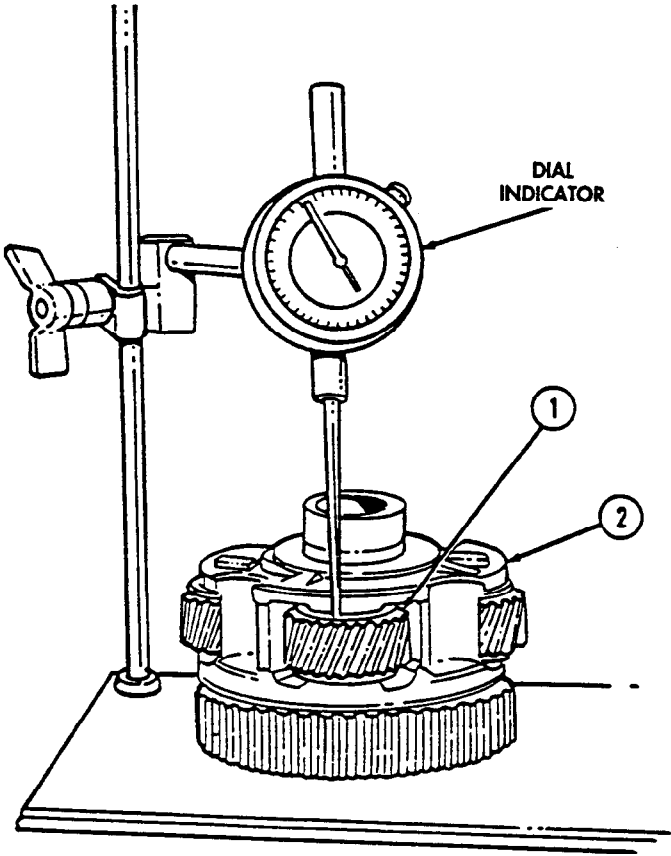
g. Overdrive Carrier Cleaning

Clean all components in accordance with para. 2-14.

h. Overdrive Carrier Inspection

1. Inspect pinion gears (1) surfaces for scoring or burrs. Remove minor burrs. Replace overdrive carrier assembly (6) if damaged.
2. Inspect pinion gears (1) for damaged teeth and scored or damaged bearing bore. Replace overdrive carrier assembly (6) if damaged.
3. Inspect roller clutch assembly (3) for cracked or broken rollers or cage and scoring. Replace roller clutch assembly (3) if damaged.
4. Inspect bearing assembly (4) for damage. Replace if damaged.
5. Inspect carrier (6) for cracks, breaks, or scoring on finished thrust surfaces. Remove minor scoring. Replace overdrive carrier assembly (6) if damaged.
6. Inspect pinion pins (5) and pinion pin retainer (2) for looseness and drainage. Replace overdrive carrier assembly (6) if loose or damaged.

28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)



28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)

i. Turbine Shaft Inspection

1. Ensure that checkball (3) on end of shaft (2) is present. Replace shaft (2) if checkball (3) is missing.
2. Inspect shaft (2) for broken or twisted splines, cracks, and plugged oil passages. Clear oil passages. Replace shaft (2) if damaged.

j. Overdrive Unit Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

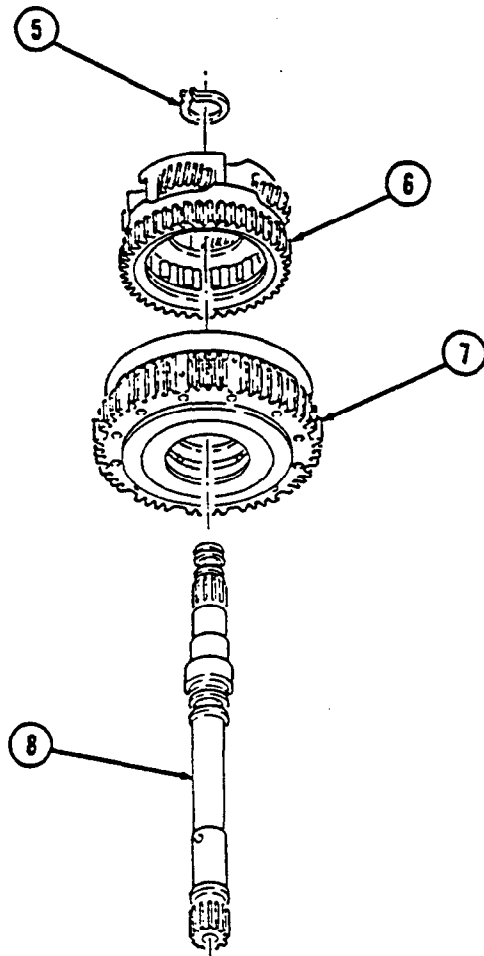
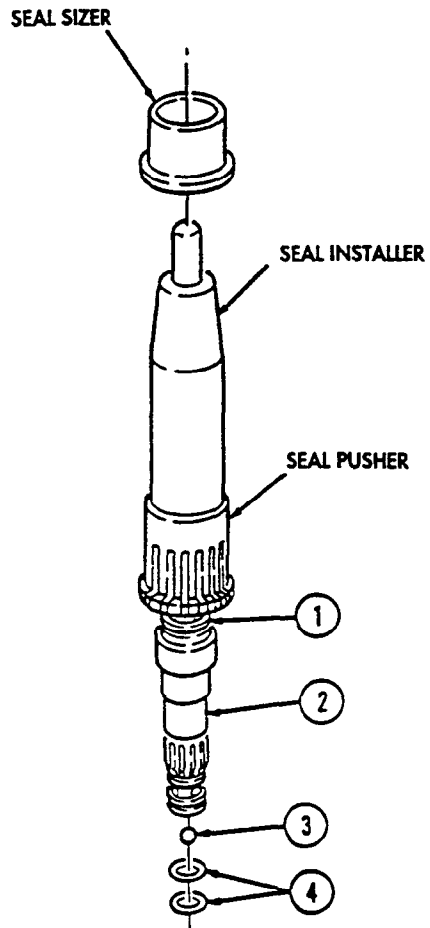
- Steps 1 through 4 apply to one end of shaft. Repeat these steps using different size tools for opposite end of shaft.
 - Use small chamfered end of sizer to do the lower seal. Use larger chamfered end to size all other seals.
 - Install the inner seal ring first, then the outer ring.
1. Place seal installer J 38736-1 on shaft (2).
 2. Using seal pusher J 38736-5, push inner seal ring (1) over and down the installer until in place. Repeat step for outer ring (1).
 3. Remove seal pusher and installer.

NOTE

Sizer must remain on seal for 5 minutes.

4. Place seal sizer J 38736-3 over shaft (2) and size seal ring (1) in place.
5. Repeat steps 1 through 4 for inner and outer seal rings (4).
6. Place carrier assembly (6) in overrun clutch housing (7). Rotate carrier (6) during assembly to align clutch plate assembly teeth.
7. Install turbine shaft (8) through housing (7) and overdrive carrier assembly (6), and secure with snapping (5).

28-13. TURBINE SHAFT AND OVERDRIVE CARRIER ASSEMBLY REPAIR (Cont'd)



28-14. INTERMEDIATE CLUTCH ASSEMBLY AND FRONT BAND INSPECTION

This task covers:

Inspection

INITIAL SETUP:

Manual References

TM 9-2320-387-24P

Maintenance Level

General support

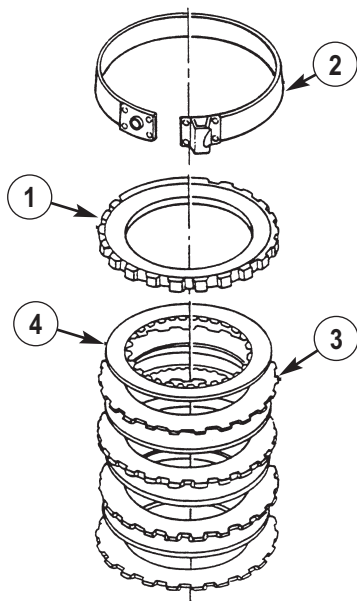
Equipment Condition

Transmission disassembled into subassemblies (para. 28-3).

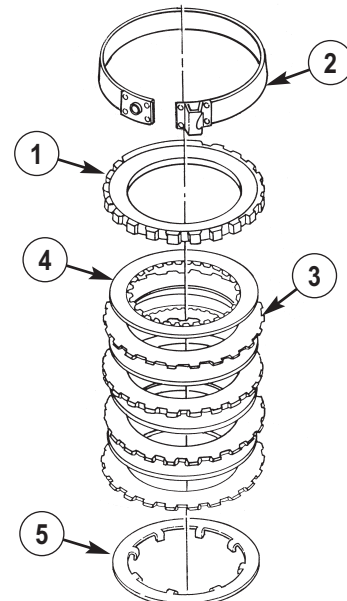
Inspection

NOTE

- Intermediate clutch plates, backing plate, and front band were removed during disassembly. Inspect clutch plates only if they will be reused.
 - Work area should be well-ventilated, clean, and free from blowing dirt and dust.
 - Replace damaged plates as a set.
 - Wave plate is used on 1997-1998 transmissions only.
1. Inspect wave plate (5), four clutch plates (3), and clutch plate assemblies (4) for cracks, wear, and evidence of overheating and scoring.
 2. Inspect backing plate (1) for cracks, breaks, scoring, and evidence of overheating. Replace if damaged.
 3. Inspect front band (2) for cracks, loose or damaged anchor or pin ends, and worn or burned composition material. Replace if damaged.



1995 - 1996 MODELS



1997 - 1998 MODELS

28-15. FRONT SERVO REPAIR

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

Materials/Parts

Transmission fluid (Appendix C, Item 37)

Maintenance Level

General support

Manual References

TM 9-2320-387-24P

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove spring retainer (4) and piston (3) from pin (1).
2. Remove seal (2) from piston (3).

b. Cleaning

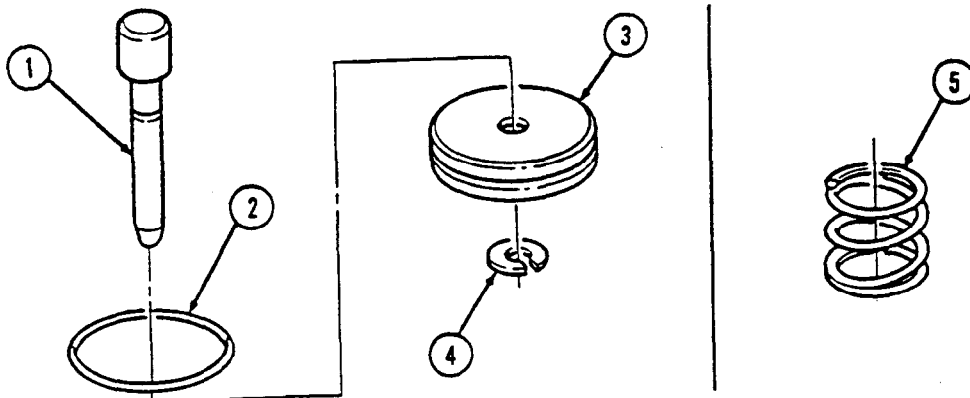
Clean all components in accordance with para. 2-14.

c. Inspection

1. Inspect front servo piston (3) for cracks and broken seal groove. Replace if damaged.
2. Inspect piston pin (1) for cracks, bends, and damaged snapping groove. Replace if damaged.
3. Inspect spring (5) for breaks and distortion. Replace if damaged.

d. Assembly

1. Coat seal (2) with transmission fluid (Dexron[®] III) and install seal (2) on piston (3).
2. Install pin (1) on piston (3) and secure with spring retainer (4).



28-16. REAR SERVO REPAIR (1995)

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

Materials/Parts

Transmission fluid (Appendix C, Item 37)

Maintenance Level

General support

Manual References

TM 9-2320-387-24P

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove retainer clip (1) from pin (8) in servo piston (10).
2. Remove accumulator piston (3), washer (5), servo spring (6), and spring retainer (7) from pin (8).

b. Cleaning

Clean all parts in accordance with para. 2-14.

c. Inspection

1. Inspect pistons (3) and (10) for cracks, porosity, and damaged seal grooves. Remove minor burrs and scoring. Replace if damaged.
2. Inspect servo spring (6) for breaks and distortion. Replace if damaged.
3. Inspect pin (8) for cracks, burrs, bends, and chipped or damaged retainer groove. Replace if damaged.

NOTE

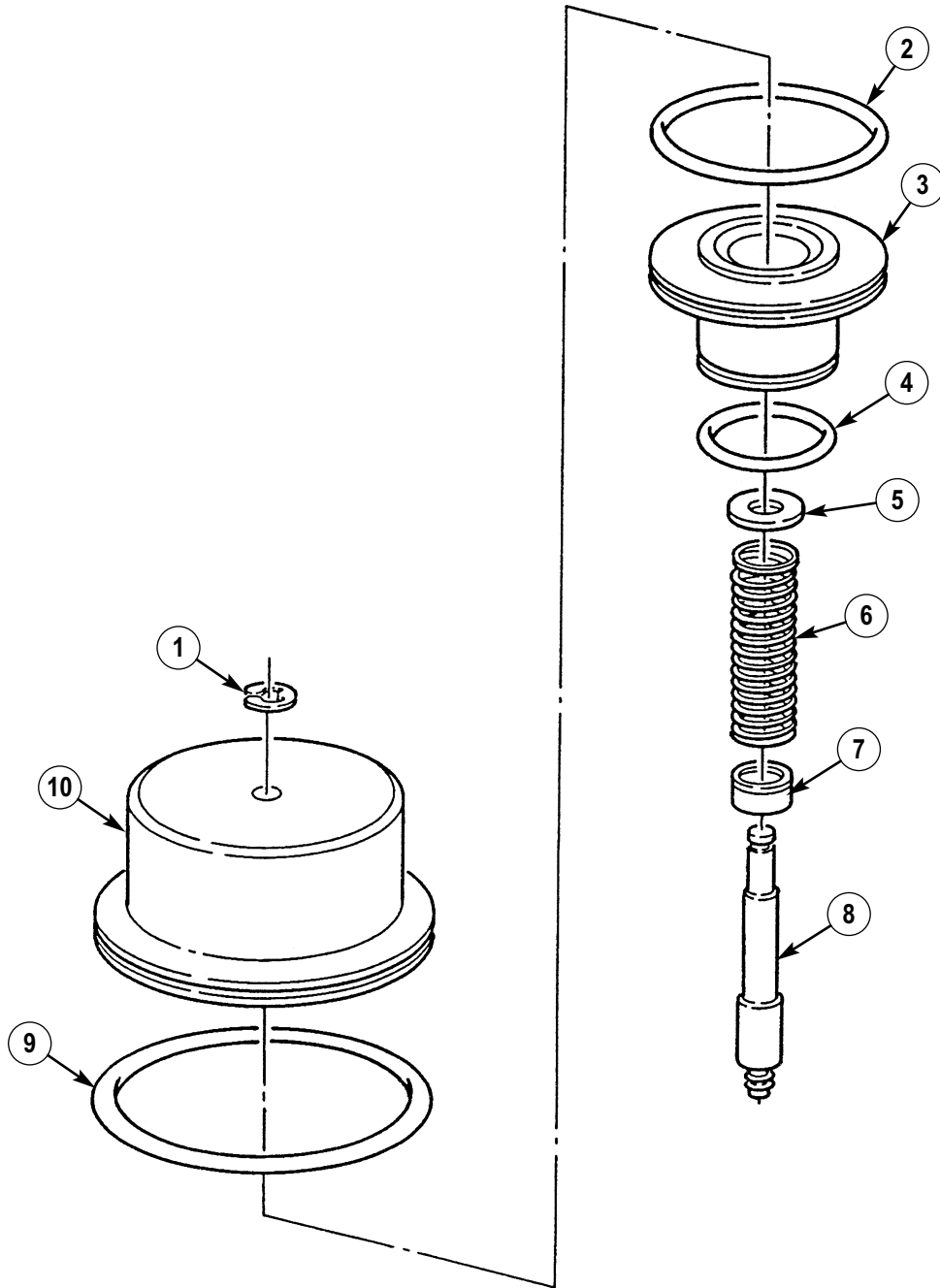
If replacing any seal, coat seal with transmission fluid (Dexron® III).

4. Inspect outer oil seal (9) for nicks, cuts, or damage. Replace seal (9) if nicked, cut, or damaged.
5. Inspect inner seal (2) and piston seal (4) for nicks, cuts, or damage. Replace inner seal (2) and piston seal (4) if nicked, cut, or damaged.

d. Assembly

Install spring retainer (7), servo spring (6), washer (5), pin (8), and accumulator piston (3) on servo piston (10) with clip (1).

28-16. REAR SERVO REPAIR (1995) (Cont'd)



28-16.1. REAR SERVO REPAIR (1996-1998)

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Transmission disassembled into subassemblies
(para. 28-3).

Materials/Parts

Transmission fluid (Appendix C, Item 37)

Maintenance Level

General support

Manual References

TM 9-2320-387-24P

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove retainer clip (11) from pin (8) in servo piston (10).
2. Remove spring (1), accumulator piston (3), spacer (5), servo spring (6), and spring retainer (7) from pin (8).

b. Cleaning

Clean all parts in accordance with para. 2-14.

c. Inspection

1. Inspect pistons (3) and (10) for cracks, porosity, and damaged seal grooves. Remove minor burrs and scoring. Replace if damaged.
2. Inspect servo spring (6) and spring (1) for breaks and distortion. Replace if damaged.
3. Inspect pin (8) for cracks, burrs, bends, and chipped or damaged retainer groove. Replace if damaged.

NOTE

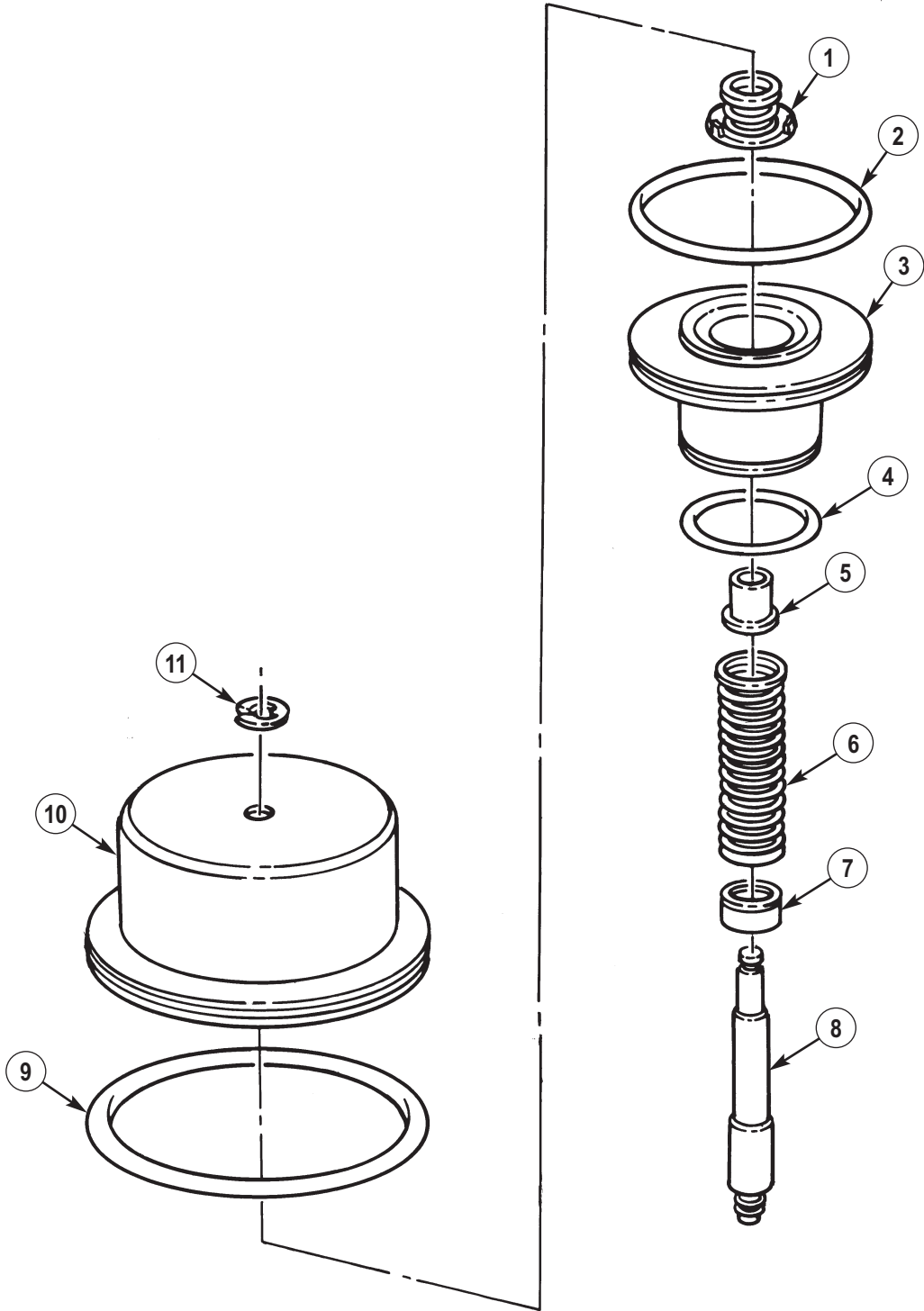
If replacing any seal, coat seal with transmission fluid (Dexron® III).

4. Inspect outer oil seal (9) for nicks, cuts, or damage. Replace seal (9) if nicked, cut, or damaged.
5. Inspect inner seal (2) and piston seal (4) for nicks, cuts, or damage. Replace inner seal (2) and piston seal (4) if nicked, cut, or damaged.

d. Assembly

1. Install spring retainer (7), servo spring (6), spacer (5), and accumulator piston (3) on pin (8).
2. Install spring (1) and accumulator piston (3) in servo piston (10) and install retaining clip (11) on pin (8).

28-16.1. REAR SERVO REPAIR (1996-1998) (Cont'd)



28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR

This task covers:

- | | |
|------------------------------------|-----------------------------------|
| a. Accumulator Housing Cleaning | e. Control Valve Inspection |
| b. Accumulator Housing Disassembly | f. Control Valve Assembly |
| c. Control Valve Disassembly | g. Accumulator Housing Inspection |
| d. Control Valve Cleaning | h. Accumulator Housing Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Materials/Parts

Gasket set kit (Appendix G, Item 104)
 Seal (Appendix G, Item 382)
 Two seals (Appendix G, Item 383)
 O-ring (Appendix G, Item 269)
 Petrolatum (Appendix C, Item 52)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies
 (para. 28-3).

Maintenance Level

General support

CAUTION

Do not use a honing stone, fine sandpaper, or crocus cloth to clean a valve. Use micro-fine lapping compound 900 grit (J 384-59).

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Accumulator Housing Cleaning

1. Clean control valve assembly (8) and accumulator housing (2) thoroughly in solvent.
2. Air-dry control valve assembly (8).

b. Accumulator Housing Disassembly

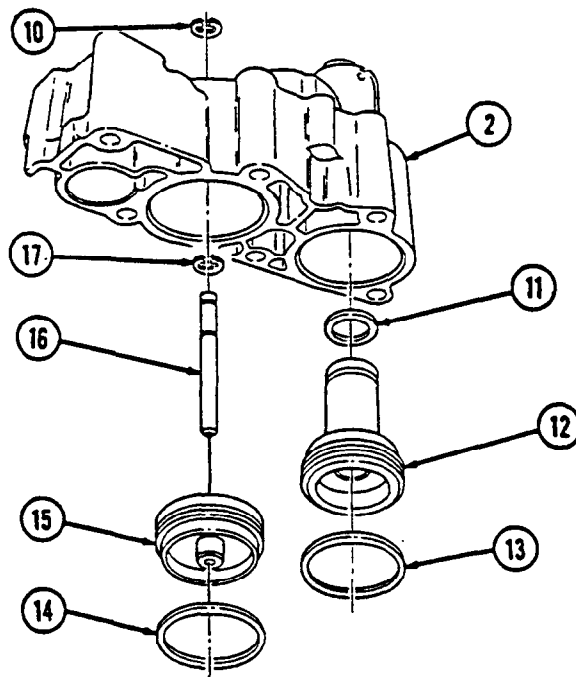
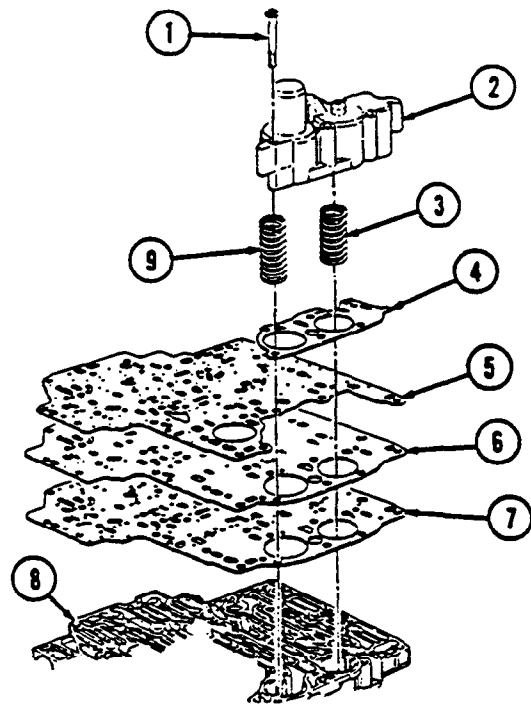
1. Remove six capscrews (1) from accumulator housing (2) and control valve assembly (8).
2. Remove accumulator housing (2), gasket (4), and springs (3) and (9) from control valve assembly (8). Discard gasket (4).
3. Remove gasket (5), spacer plate (6), and gasket (7) from control valve assembly (8). Discard gaskets (7) and (5).
4. Remove snapping (10) and fourth clutch piston assembly (15) with pin (16) from housing (2).

NOTE

Perform step 5 for 1995-1996 transmissions only.

5. Remove snapping (17) and pin (16) from fourth clutch piston (15).
6. Remove seal (14) from fourth clutch piston (15). Discard seal (14).
7. Remove third clutch piston (12) from housing (2).
8. Remove seals (11) and (13) from third clutch piston (12). Discard seals (11) and (13).

28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR (Cont'd)



28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR (Cont'd)

c. Control Valve Disassembly

1. Remove manual valve (30) from body (2).
2. Remove screen filter (1) from body (2).

NOTE

A 5/64-in. (1.984-mm) drill bit may be used to remove spring pins.
While rotating drill bit, lift and remove spring pins.

3. Remove spring pin (9), plug (8), ball (7), bushing (6), O-ring (5), 3-4 shift valve (4), and spring (3) from body (2). Discard O-ring (5).
4. Remove capscrew (10), 2-3 shift solenoid (11), spring pin (12), 2-3 shift valve (13), and spring (14) from body (2).
5. Remove capscrew (18), 1-2 shift solenoid (19), spring pin (17), 1-2 shift valve (16), and spring (15) from body (2).
6. Remove spring pin (20), plug (21), and filter (22) from body (2).
7. Remove sleeve (25), plug (24), and ball (23) from body (2).
8. Remove capscrew (31), clamp (32), and pressure control solenoid (33) from body (2).
9. Remove clip (37), PWM solenoid (38), spring pin (36), TCC valve (35), and spring (34) from body (2).
10. Remove retainer plate (39), spring (40), and feed-limit valve (41) from body (2).
11. Remove spring pin (26), plug (27), spring (28), and accumulator valve (29) from body (2).

d. Control Valve Cleaning

Clean all parts in accordance with para. 2-14.

e. Control Valve Inspection

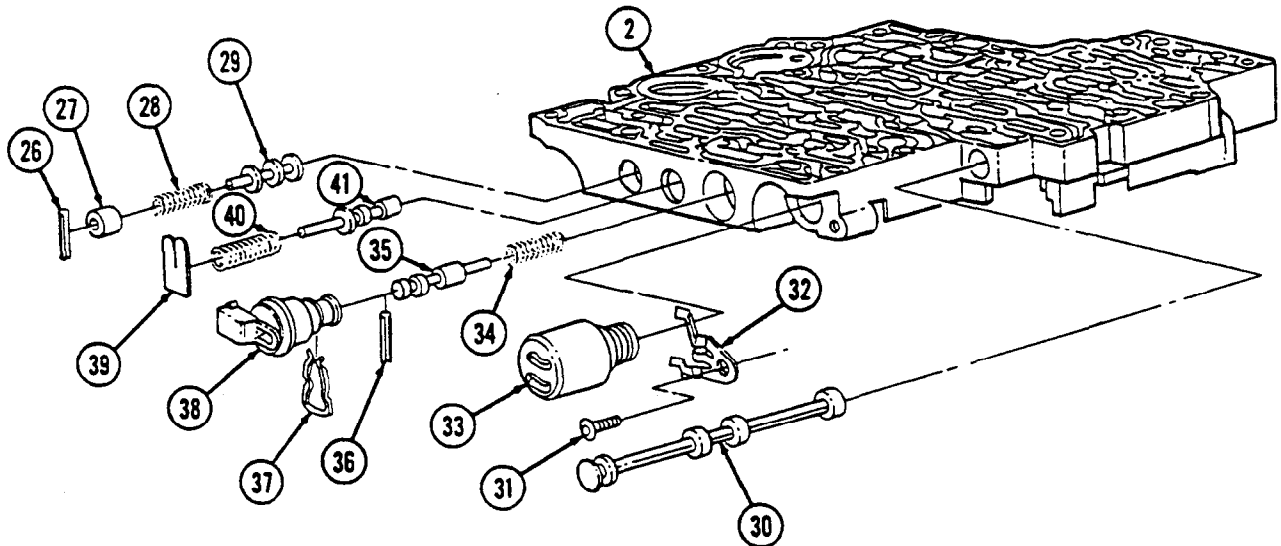
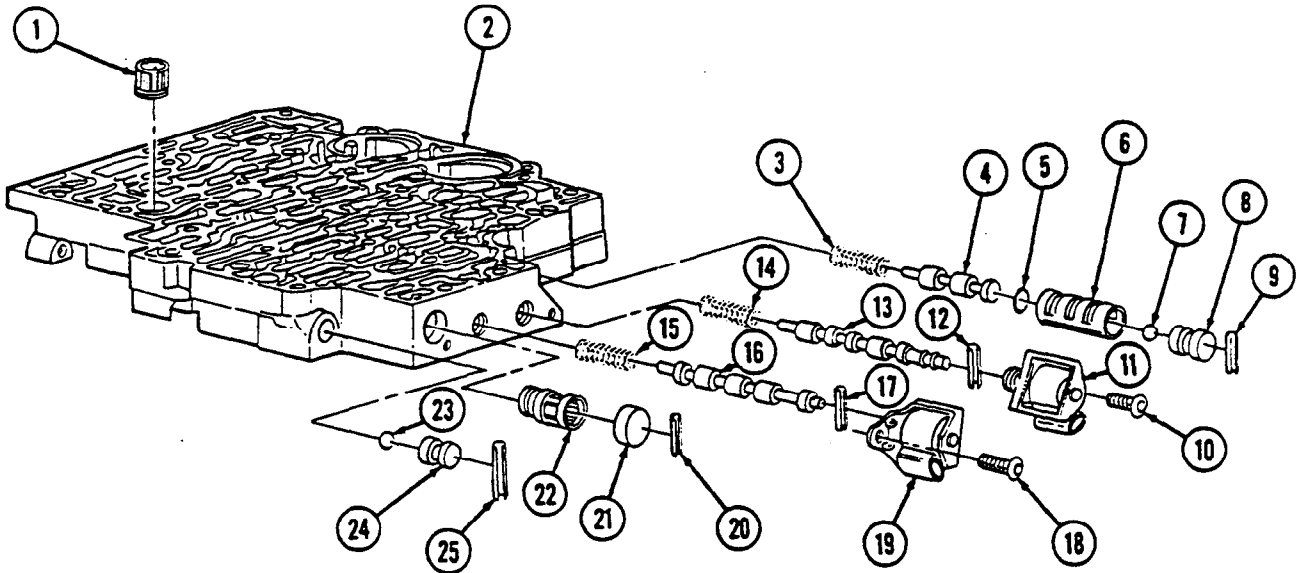
1. Inspect valves (4), (13), (16), (29), (30), (35), and (41) and bushing (6) for scoring, nicks, and scratches. Replace control valve assembly if damaged.
2. Inspect shift solenoids (11) and (19) for O-ring damage. Replace if damaged.
3. Inspect springs (3), (14), (15), (28), (34), and (40) for damage or distorted coils. Replace springs that are damaged.
4. Inspect body (2) for cracks, interconnected passages, and damaged machined surfaces. Replace control valve if damaged.
5. Inspect screen filter (1) for damage. Replace if damaged.

f. Control Valve Assembly

1. Install accumulator valve (29), spring (28), and plug (27) in body (2) with spring pin (26).
2. Install feed-limit valve (41) and spring (40) in body (2) with retainer plate (39).
3. Install spring (34) and TCC valve (35) in body (2) with spring pin (36). Install PWM solenoid (38) with clip (37).
4. Install clamp (32) and pressure control solenoid (33) in body (2) with capscrew (31).
5. Install ball (23) and plug (24) in body (2) with sleeve (25).
6. Install filter (22) and plug (21) in body (2) with spring pin (20).
7. Install spring (15) and 1-2 shift valve (16) in body (2) with spring pin (17). Install 1-2 shift solenoid (19) with capscrew (18).

28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR (Cont'd)

8. Install spring (14) and 2-3 shift valve (13) in body (2) with spring pin (12). Install 2-3 shift solenoid (11) with capscrew (10).
9. Install spring (3), 3-4 shift valve (4), O-ring seal (5), bushing (6), ball (7), and plug (8) in body (2) with spring pin (9).
10. Install manual valve (30) in body (2).
11. Install screen filter (1) in body (2).



28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR (Cont'd)

g. Accumulator Housing Inspection

1. Inspect accumulator housing (2) for cracks, breaks, and scoring on bores and sealing surfaces. Remove minor scoring. Replace if damaged.
2. Inspect springs (11) and (17) for breaks and distortion. Replace if damaged.
3. Inspect pistons (4) and (7) for cracks, breaks, and chipped or damaged seal grooves. Replace if damaged.
4. Inspect pin (8) for cracks, bends, and damaged grooves. Replace if damaged.

h. Accumulator Housing Assembly

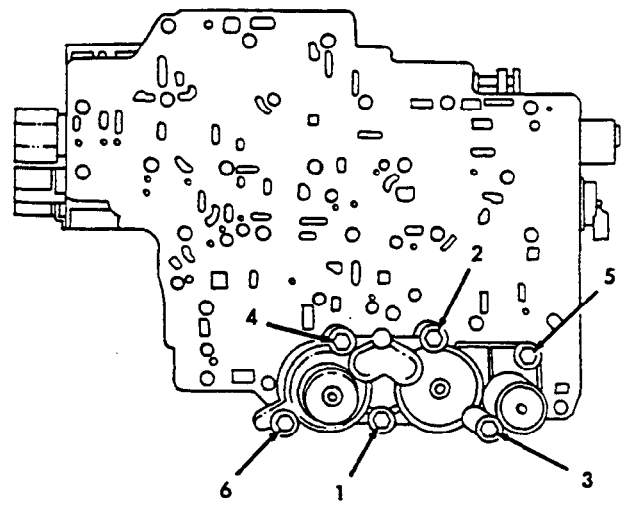
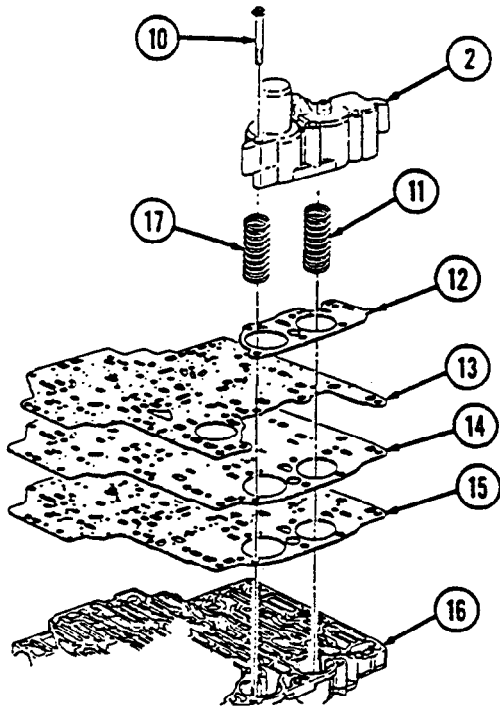
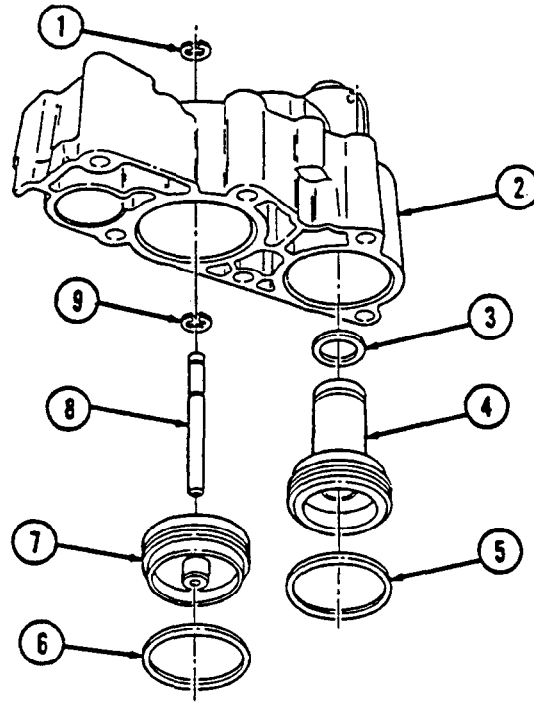
1. Coat seals (3) and (5) with petrolatum and install on third clutch piston (4).
2. Install third clutch piston (4) on housing (2).
3. Coat seal (6) with petrolatum and install on fourth clutch piston (7).

NOTE

Perform step 4 for 1995-1996 transmissions only.

4. Install fourth clutch piston (7) on pin (8) and install snapping (9) in lower snapping groove.
5. Install fourth clutch piston (7) and pin (8) in housing (2) and secure with snapping (1) on the outside housing.
6. Install springs (17) and (11) on control valve assembly (16).
7. Install gasket (15), spacer plate (14), and gasket (13) on control valve assembly (16).
8. Install gasket (12) and accumulator housing (2) on control valve assembly (16) with six capscrews (10). Tighten capscrews (10) in sequence shown to 97 lb-in. (11 N•m).

28-17. CONTROL VALVE AND ACCUMULATOR HOUSING REPAIR (Cont'd)



TORQUE SEQUENCE

28-18. OIL PUMP ASSEMBLY REPAIR

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | c. Inspection |
| b. Cleaning | d. Assembly |

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Special Tools

Output shaft seal installer
 (Appendix B, Item 90)
 Oil pump seal installer (Appendix B, Item 61)

Materials/Parts

Two seals (Appendix G, Item 399)
 Seal (Appendix G, Item 397)
 Oil seal (Appendix G, Item 411)

Materials/Parts (Cont'd)

Petrolatum (Appendix C, Item 52)
 Transmission fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transmission disassembled into subassemblies
 (para. 28-3).

Maintenance Level

General support

NOTE

Work area should be well-ventilated, clean, and free from blowing dirt and dust.

a. Disassembly

1. Remove oil pump seal (32) from pump body (1). Discard oil pump seal (32).

NOTE

Before removal, mark pump body and cover for assembly.

2. Remove five screws (5) from cover (4) and pump body (1). Separate pump body (1) and cover (4).
3. Remove seal (2) from pump body (1). Discard seal (2).

NOTE

Before removal, mark gear faces for assembly.

4. Remove drive gear (3) and driven gear (6) from pump body (1).

CAUTION

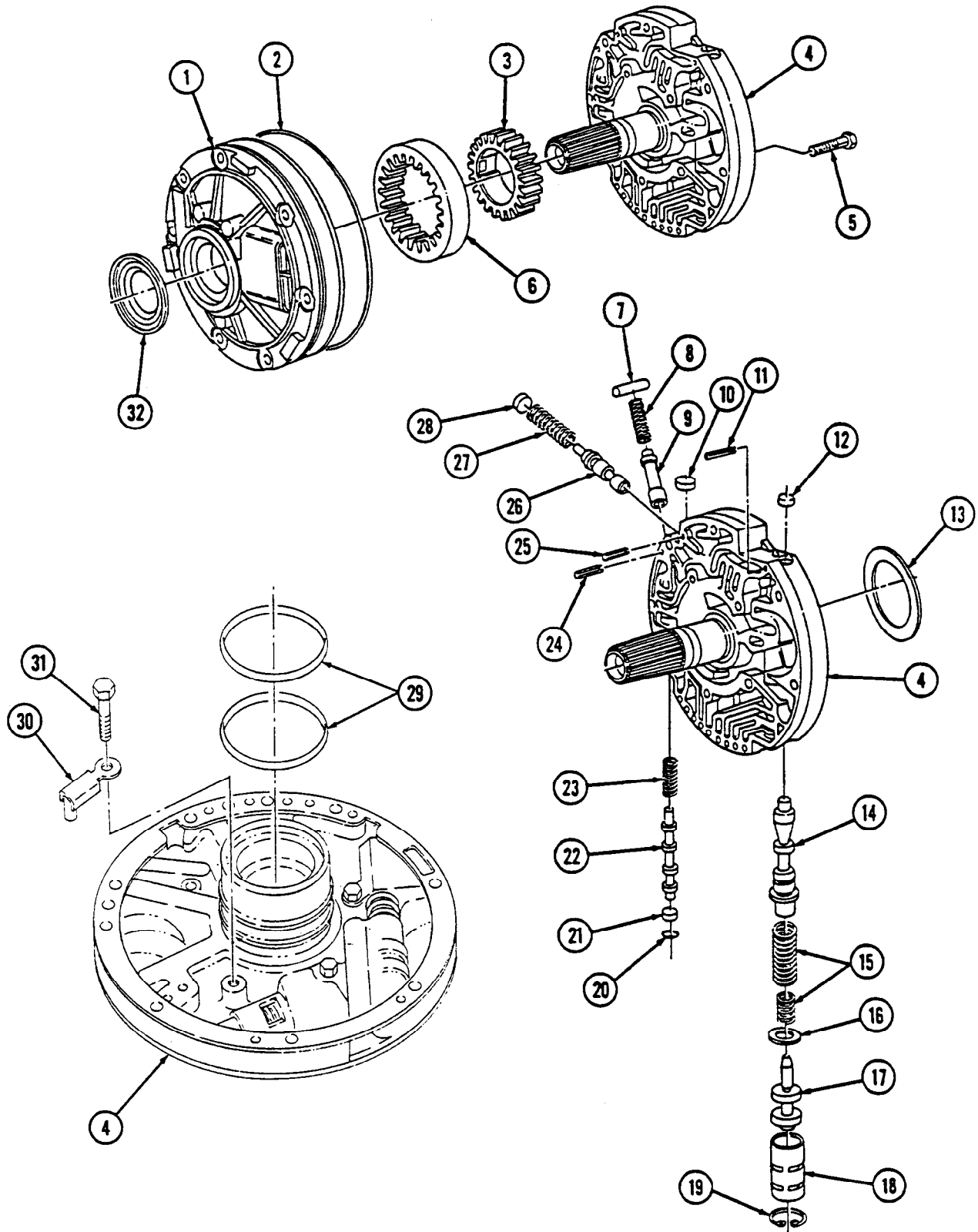
Pressure regulator valve is spring-loaded.

5. Remove snapping (19) from cover (4) and release tension.
6. Remove bushing (18), reverse boost valve (17), spring retainer (16), two springs (15), pressure regulator valve (14), spring pin (11), and plug (12) from cover (4).
7. Remove spring pin (25), plug (28), spring (27), and converter limit valve (26) from cover (4).
8. Remove spring retainer (7), spring (8), and converter enable valve (9) from cover (4).
9. Remove snapping (20), plug (21), converter clutch valve (22), spring (23), spring pin (24), and plug (10) from cover (4).
10. Remove screw (31) and vent shield (30) from cover (4).
11. Remove two seal rings (29) from cover (4). Discard seal rings (29).
12. Remove front selective thrust washer (13) from cover (4).

b. Cleaning

Clean all components in accordance with para. 2-14.

28-18. OIL PUMP ASSEMBLY REPAIR (Cont'd)

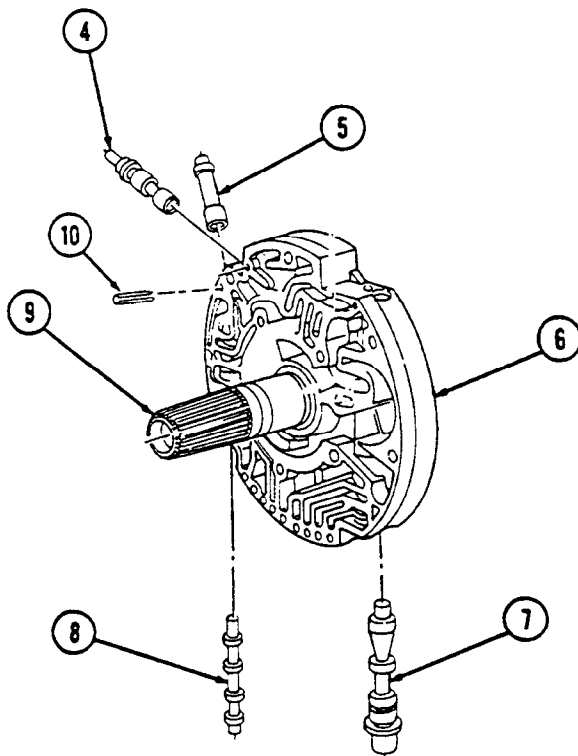
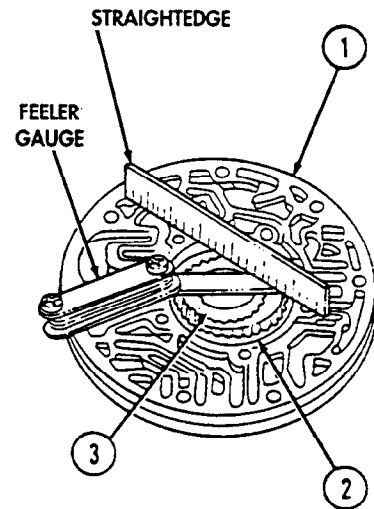
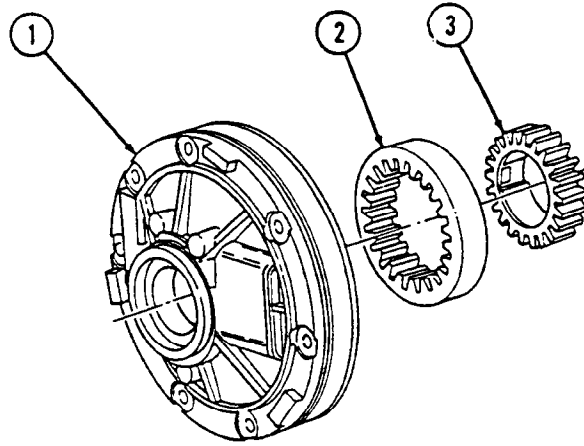


28-18. OIL PUMP ASSEMBLY REPAIR (Cont'd)

c. Inspection

1. Inspect pump body (1) for cracks, breaks, burrs, damaged threads, and chipped seal or snapping grooves. Remove minor burrs. If damaged, replace oil pump.
2. Inspect pump body (1) gear pockets, crescent, bushings, and gear face for nicks, scoring, and wear. Repair minor nicks and scoring. If damaged, replace oil pump.
3. Inspect pump body (1) for blocked oil passages and ports and cross-channel leakage paths. Clear oil passages. If damaged, replace oil pump.
4. Install drive gear (3) and driven gear (2) in pump body (1) with chamfered edges down. Measure clearance of gears (3) and (2) to pump body (1) using a straightedge and feeler gauge. Clearance should be 0.0007-0.0028 in. (0.018-0.071 mm). If clearance does not meet specifications, replace oil pump.
5. Inspect pump cover (6) for cracks, breaks, burrs, and chipped seal or snapping grooves. Remove minor burrs. If damaged, replace oil pump.
6. Inspect stator shaft (9) splines. Replace oil pump if damaged.
7. Inspect pump cover (6) for scored, discolored, or worn bushings. If damaged, replace oil pump.
8. Inspect pump cover (6) for chipped or broken oil seal ring grooves on hub. If damaged, replace oil pump.
9. Inspect pump cover (6) for blocked oil passages and ports, and cross-channel leakage paths. Clear oil passages. If damaged, replace oil pump.
10. Inspect pump cover (6) for blocked breather hole. Unblock hole if plugged.
11. Inspect that pressure regulator (7), converter limit (4), converter clutch (8), and converter enable valves (5) are not broken, burred, or chipped, and can move freely (dry) in cover (6). Replace any damaged items.
12. Inspect spring pins (10) for breaks, burrs, or chips. If damaged, replace oil pump.

28-18. OIL PUMP ASSEMBLY REPAIR (Cont'd)



28-18. OIL PUMP ASSEMBLY REPAIR (Cont'd)

d. Assembly

CAUTION

All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

1. Install plug (8), spring pin (7), regulator valve (11), two springs (12), spring retainer (13), reverse boost valve (14), and bushing (15) in cover (10) with snapping (16).
2. Install converter limit valve (23), spring (2), and plug (1) in cover (10) with spring pin (22).
3. Install converter enable valve (5) and spring (4) in cover (10). Compress spring (4) and install spring retainer (3).
4. Install plug (6), spring pin (21), spring (20), converter clutch valve (19), and plug (18) in cover (10) with snapping (17).
5. Install drive gear (25) and driven gear (24), with marked surfaces facing up, in oil pump body (26).

NOTE

Align reference marks on cover and pump body.

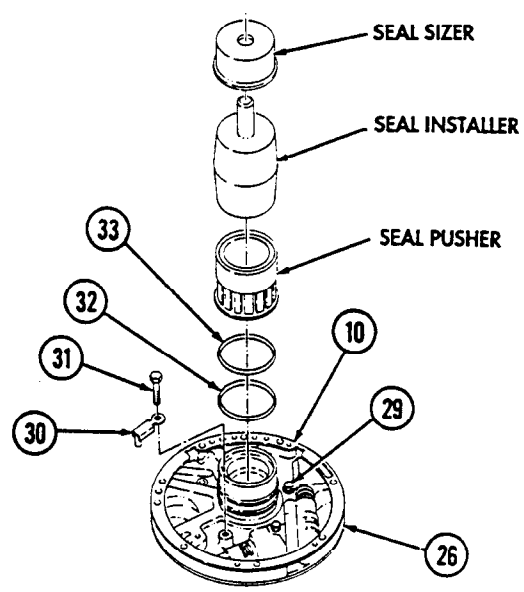
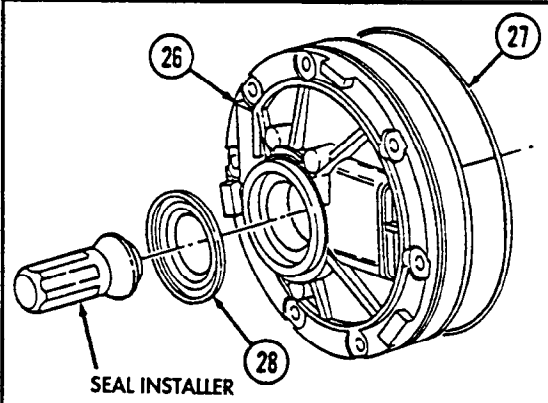
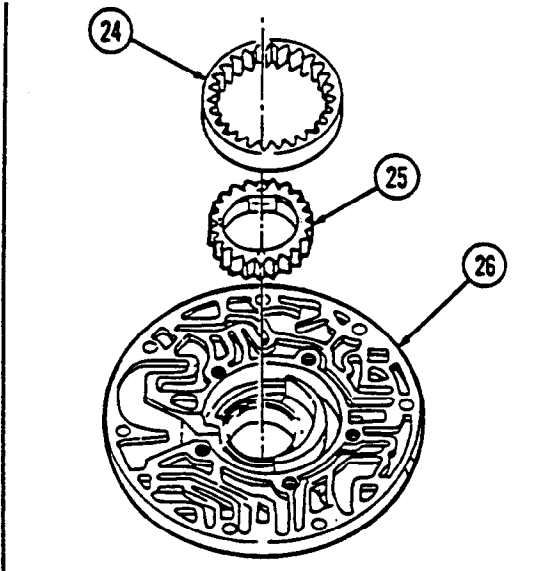
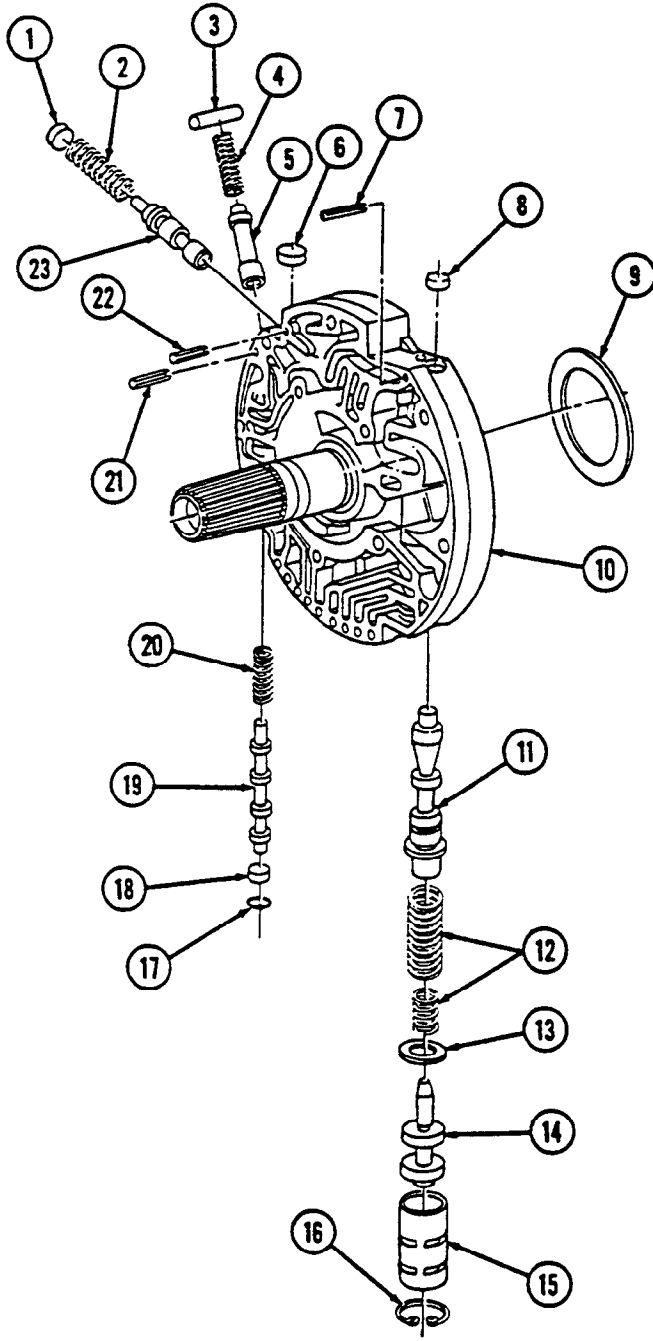
6. Install cover (10) on pump body (26) with five capscrews (29). Tighten capscrews (29) to 18 lb-ft (24 N•m).
7. Coat seal (27) with petrolatum and install on pump body (26).
8. Coat selective thrust washer (9) with petrolatum and install on cover (10).
9. Install vent shield (30) on cover (10) with screw (31).

NOTE

Use small chamfered end of seal installer to install inner seal ring.

10. Using seal installer, pusher, and sizer, install inner seal ring (32) in pump cover (10) groove.
11. Using seal installer, pusher, and sizer, install outer seal ring (33) in pump cover (10) groove.
12. Using oil pump seal installer, install oil pump seal (28) on pump body (26).

28-18. OIL PUMP ASSEMBLY REPAIR (Cont'd)



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Parking Lock Pawl and Actuator Assembly Installation b. Center Support Assembly Installation c. Gear Unit Assembly Installation d. Rear Unit End Play Check e. Intermediate Clutch Assembly Installation f. Direct Clutch Assembly Installation g. Forward Clutch Assembly Installation h. Fourth Clutch, Turbine Shaft, and Overdrive Carrier Assembly Installation | <ul style="list-style-type: none"> i. Pump Assembly Installation j. Front Unit End Play Check k. Front Servo Installation l. Band Apply Pin Check m. Rear Servo Installation n. Control Valve Assembly Installation (1995-1996) n.1. Control Valve Assembly Installation (1997-1998) o. Oil Pan and Filter Assembly Installation p. Speed Sensors Installation q. Holding Fixture Removal r. Torque Converter Installation |
|--|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Maintenance and repair shop equipment:
 (Appendix B, Item 2)
 Dial indicator (Appendix B, Item 113)

Special Tools

Transmission holding fixture
 (Appendix B, Item 57)
 Transmission holding fixture base
 (Appendix B, Item 58)
 Holding tool adapter (Appendix B, Item 62)
 Gear unit installer/remover
 (Appendix B, Item 65)
 Band apply pin checking tool
 (Appendix B, Item 75)
 Pump remover/installer tool
 (Appendix B, Item 64)
 Clutch alignment tool (Appendix B, Item 66)

Materials/Parts

Plug (Appendix G, Item 311)
 Oil pump gasket (Appendix G, Item 96)
 O-ring seal (Appendix G, Item 278)
 Seal (Appendix G, Item 384)
 Oil filter (Appendix G, Item 294)
 Rear servo cover gasket (Appendix G, Item 93)
 Transmission fluid (Appendix C, Item 37)
 Petrolatum (Appendix C, Item 52)
 Silicone compound (Appendix C, Item 74)
 Two guide pins (Appendix D, Fig. 62)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Maintenance Level

General support

a. Parking Lock Pawl and Actuator Assembly Installation

CAUTION

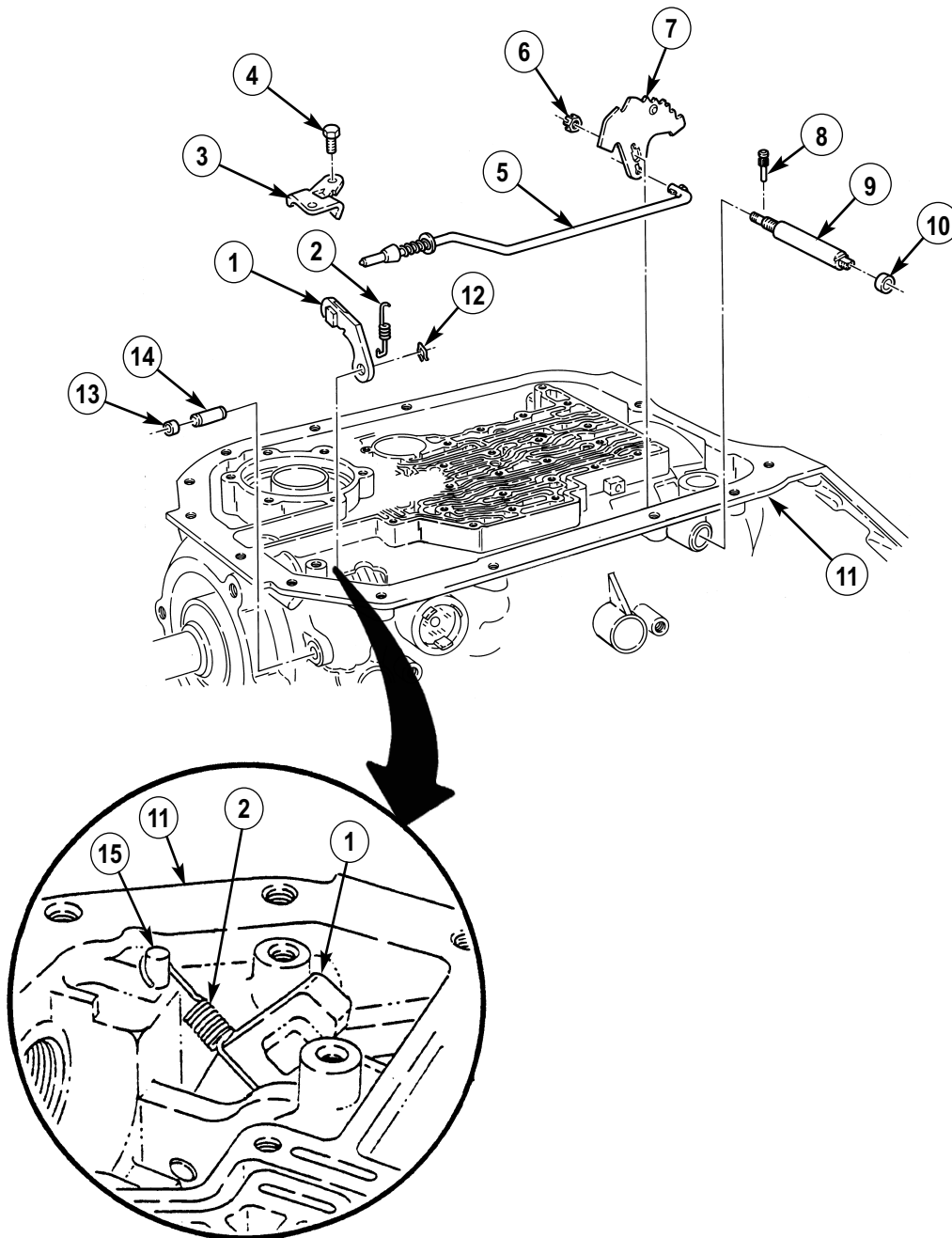
All transmission parts must be lubricated with clean transmission fluid (Dexron® III) before assembly. Foreign material will cause transmission damage.

NOTE

- During assembly operations, it is important to closely inspect each unit to ensure nothing has been overlooked during inspection and repair. Plugs should be checked for tightness, parts kept clean, openings covered, and machined surfaces protected. Application of lubricant should be performed from covered containers.
 - Install transmission case in holding fixture (para. 28-3).
 - For general assembly instructions, refer to para. 2-17.
1. Install shaft (14) and pawl (1) in transmission case (11) and secure with retainer (12).
 2. Using sealant, install plug (13) in transmission case (11).
 3. Install return spring (2) with square hook end under pawl (1) and round end over stud (15) on transmission case (11).

28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

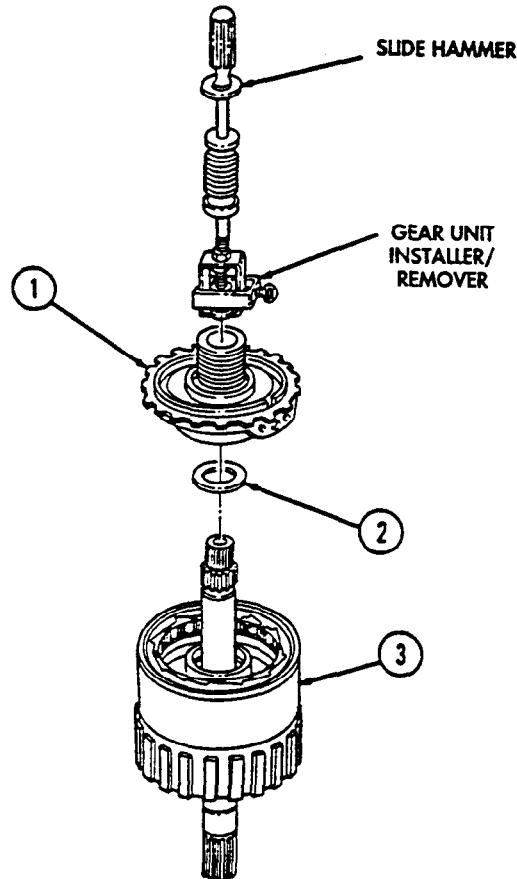
4. Position actuator (5) in detent lever (7) over pawl (1) in transmission case (11).
5. Install shaft seal (10) in transmission case (11).
6. Coat manual shaft (9) with transmission fluid and install shaft (9) on transmission case (11) through seal (10) and detent lever (7).
7. Secure manual shaft (9) to detent lever (7) with nut (6).
8. Adjust position of manual shaft (9) in transmission case (11) and secure manual shaft (9) with retaining pin (8). Tighten nut (6) to 18 lb-ft (24 N·m).
9. Install slide bracket (3) over actuator (5) and transmission case (11) with two capscrews (4).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

b. Center Support Assembly Installation

1. Install thrust washer (2) and center support (1) in gear unit (3).
2. Install gear unit installer/remover and slide hammer to hold assembly together.



c. Gear Unit Assembly Installation

1. Install selective thrust washer (5) in transmission case (6) with smooth side of thrust washer (5) facing up.
2. Position rear band (4) on transmission case (6) with flat end in notch and tab aligned with servo pin hole.

NOTE

Do not confuse center support spacer (0.040 in. (1.016 mm) thick and both sides flat) with either center support snapping (beveled on one side) or intermediate clutch backing plate snapping (0.093 in. (2.362 mm) thick and both sides flat).

3. Install center support spacer (11) on fourth snapping groove (12) in transmission case (6) and position spacer gap at nine o'clock position.
4. Coat thrust washer (10) with petrolatum and install over output shaft (9) onto gear unit (3), ensuring four tabs align with holes on gear unit (3).
5. Align bolt hole (8) in center support (1) with bolt hole in transmission case (6).

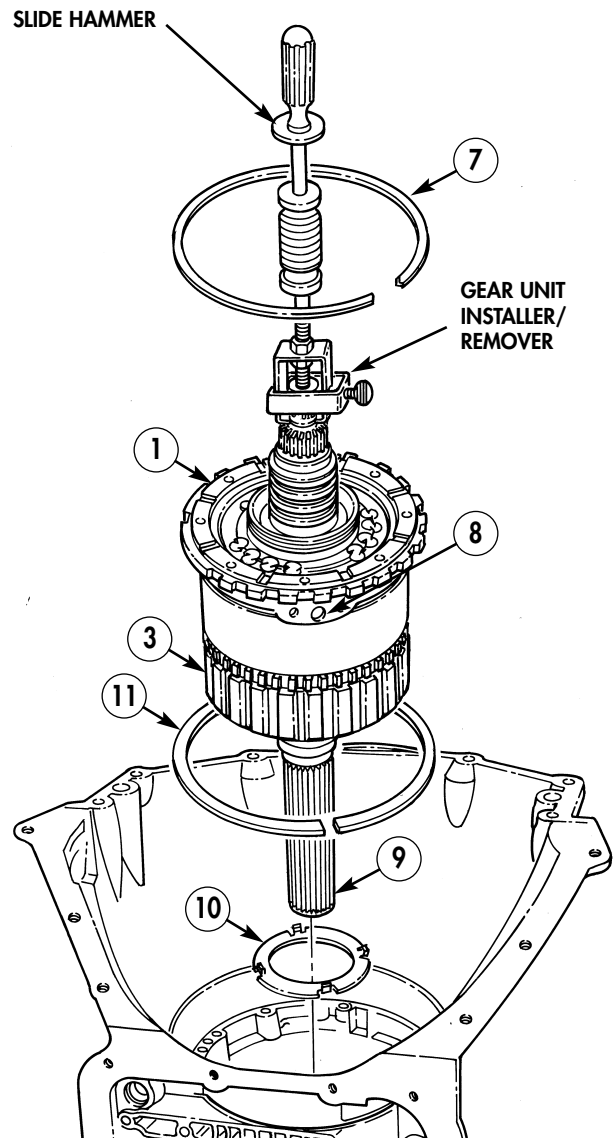
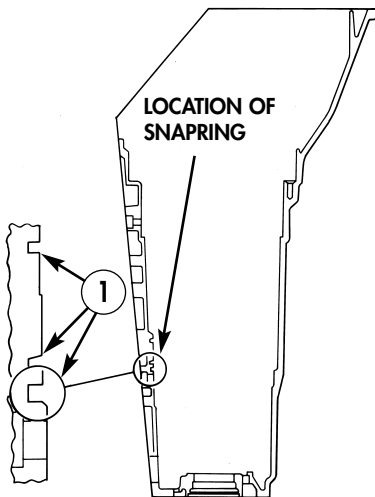
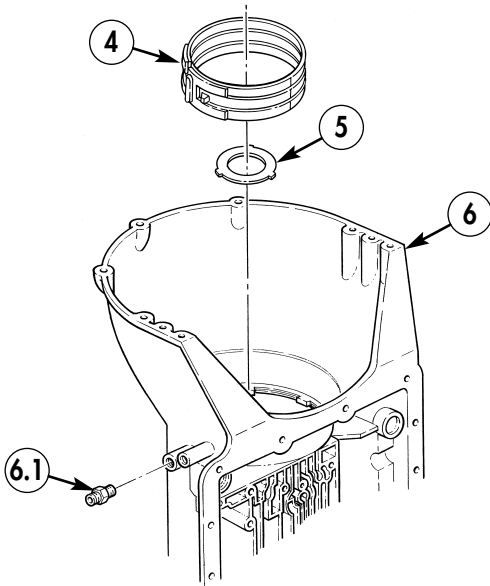
28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

6. Lower gear unit (3) into transmission case (6). Remove gear unit remover/installer.
7. Install center support snapping (7) against center support (1) in second snapping groove. Beveled side of snapping (7) must be in an upward position and snapping gap at nine o'clock position.

NOTE

Perform step 8 for 1997-1998 transmissions only.

8. Install oil cooler fitting (6.1) in transmission case (6).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

d. Rear Unit End Play Check

1. Turn transmission case (1) horizontally, and install dial indicator on case (1) with probe against end of output shaft (2).
2. Push output shaft (2) into case (1) and zero dial indicator.
3. Pull output shaft (2) out and read movement from dial indicator. Repeat twice to check value. Movement should be 0.005-0.025 in. (0.127-0.635 mm). The selective washer controlling this end play is the steel washer having three lugs and located between the rear thrust washer and the rear face of the transmission case (1).

NOTE

If a difference in washer thickness is required to bring end play within specifications, it can be selected from the following table.

Table 28-1. Rear Selective Washer Thickness.

THICKNESS	IDENTIFICATION	
	NOTCHES	NUMERAL
0.074-0.078 in. (1.88-1.98 mm)	None	1
0.082-0.086 in. (2.08-2.18 mm)	1 tab side	2
0.090-0.094 in. (2.29-2.39 mm)	2 tabs side	3
0.098-0.102 in. (2.48-2.59 mm)	1 tab outer diameter	4
0.106-0.110 in. (2.69-2.79 mm)	2 tabs outer diameter	5
0.114-0.118 in. (2.89-2.99 mm)	3 tabs outer diameter	6

4. If end play is not within specifications, remove selective washer and install a new selective washer of proper thickness.

CAUTION

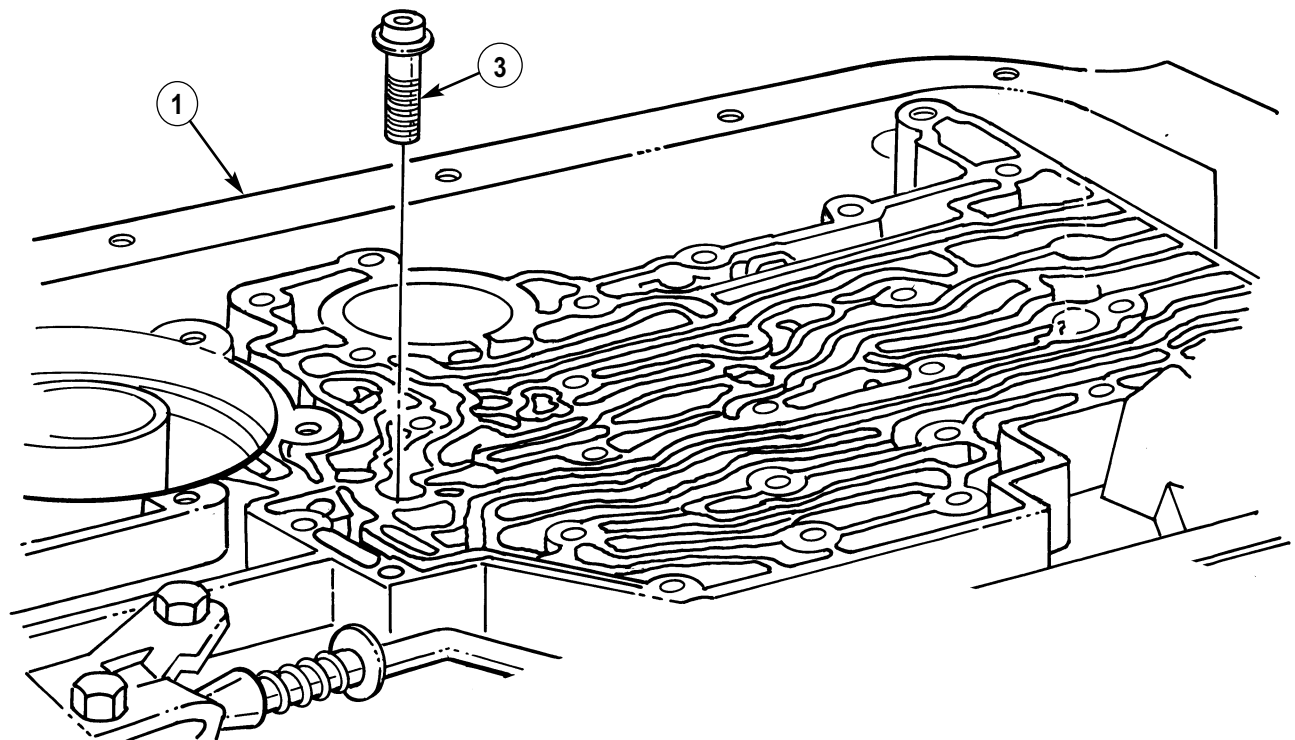
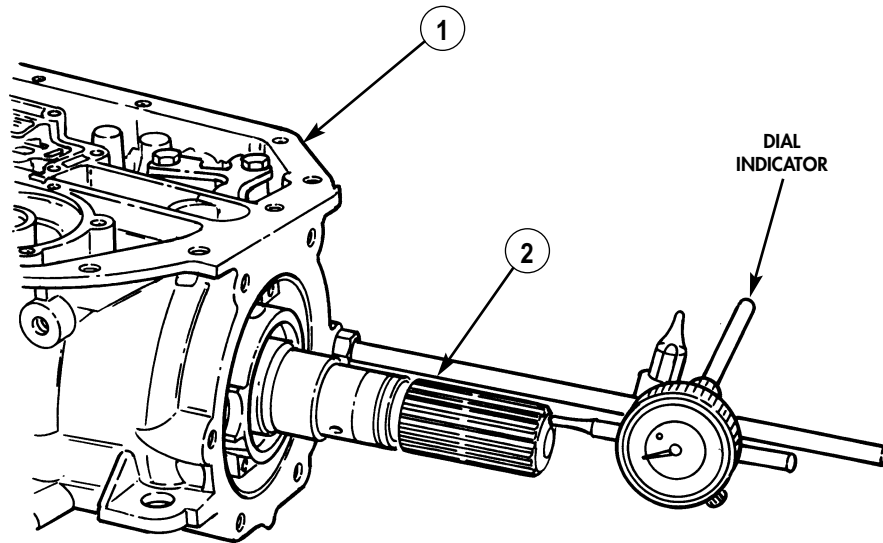
Do not overtorque bolt. Damage to case or bolt could result in transmission malfunction.

NOTE

If center support was reconditioned, bolt will be coated with zinc chromate and will be yellow in color.

5. Install bolt (3). Tighten bolt (3) to 32 lb-ft (43 N·m).

28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

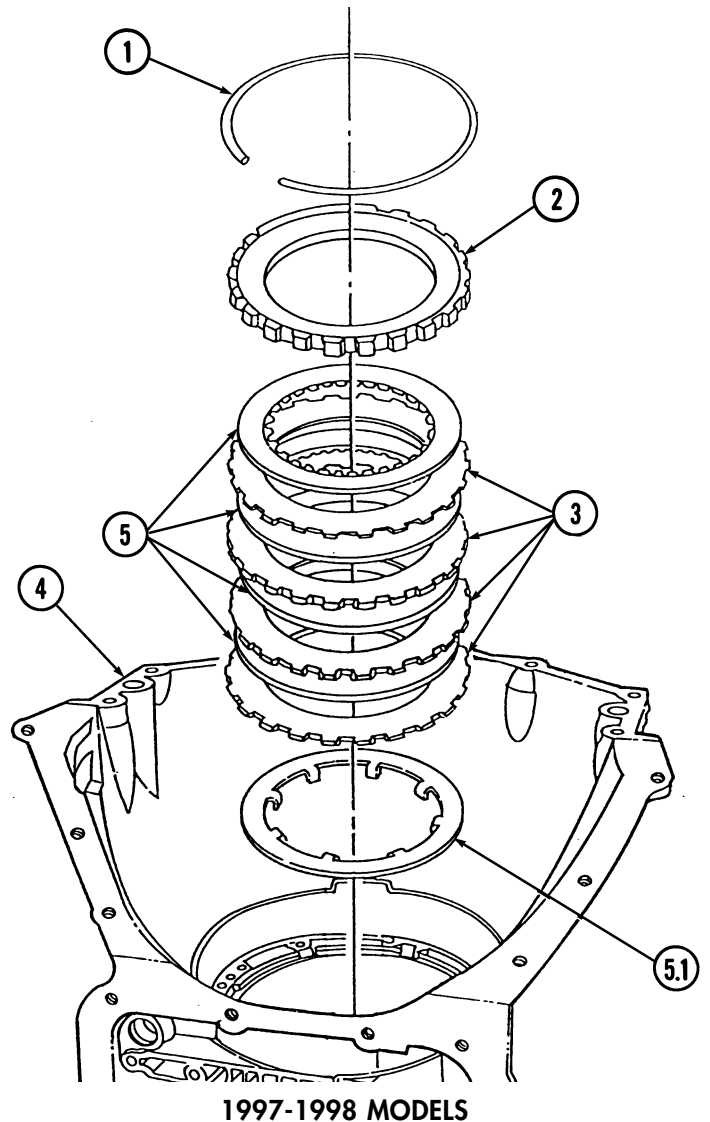
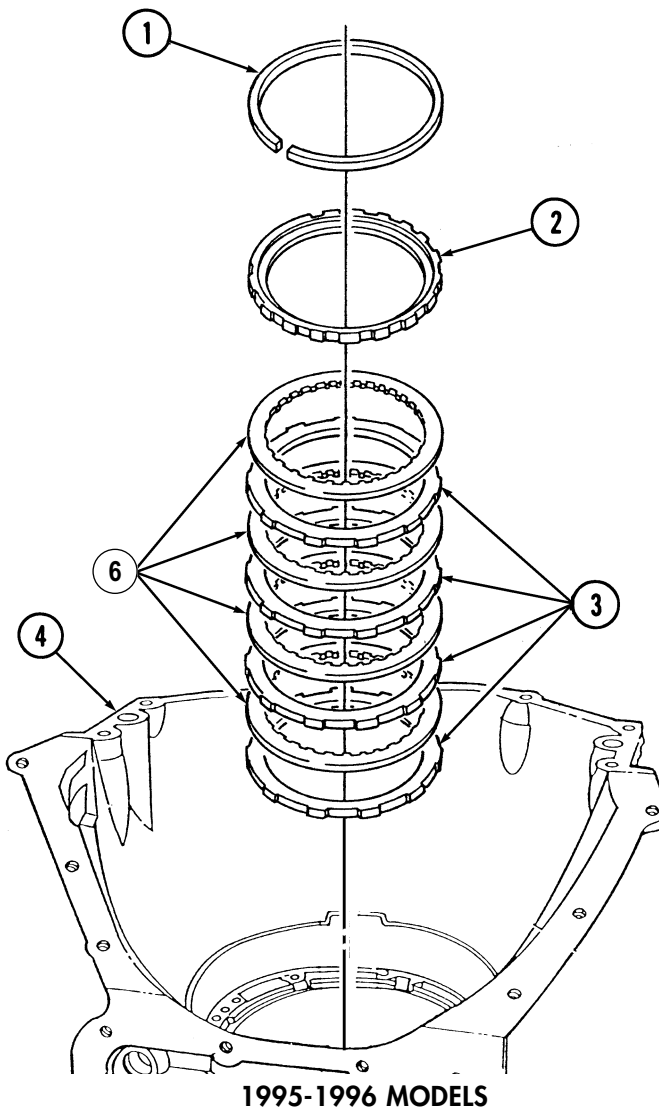


28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

e. Intermediate Clutch Assembly Installation

NOTE

- Soak all clutch plates in transmission fluid (Dexron® III) for at least three minutes before assembly.
 - Wave plate is used on 1997-1998 transmissions only.
1. Install wave plate (5), four clutch plates (3), clutch plate assemblies (6), and backing plate (2) on transmission case (4) starting with clutch plate (3), then alternating clutch plate assemblies (6) with clutch plates (3) and ending with flat side of backing plate (2) facing down.
 2. Secure backing plate (2) to transmission case (4) with snapping (1). Position snapping gap at nine o'clock position.
 3. Measure gap between snapping (1) and backing plate (2). Gap should be 0.040-0.107 in. (1.02-2.72 mm).



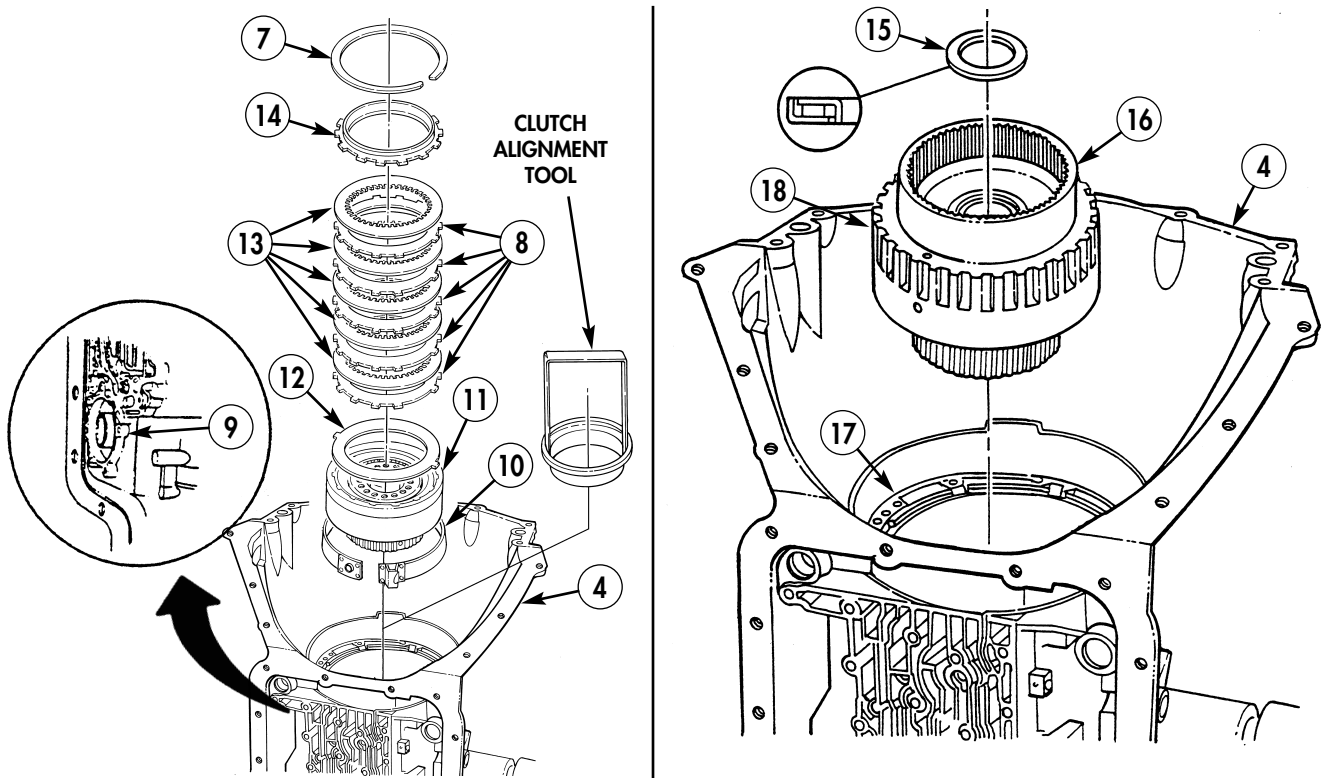
28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

f. Direct Clutch Assembly Installation

1. Install front band (10) on transmission case (4). Ensure pin socket on band is over servo pin hole and tab end can move freely.
2. Remove snapping (7), backing plate (14), five clutch plate assemblies (13), clutch plates (8), and dished plate (12) (1995-1996 transmissions only) from direct clutch housing (11).
3. Using clutch alignment tool, align intermediate clutch plates (3). Do not remove tool.
4. Apply air pressure to intermediate clutch plates (3) through hole (9) in center support bolt. Remove alignment tool and maintain air pressure.
5. Install direct clutch assembly (11) into transmission case (4) and remove air pressure.
6. Install dished clutch plate (12) (1995-1996 transmissions only) on direct clutch housing (11).
7. Install five clutch plates (8) and clutch plate assemblies (13) on clutch housing (11). Alternate plates, starting with a clutch plate (8).
8. Install backing plate (14) on housing (11) with snapping (7).

g. Forward Clutch Assembly Installation

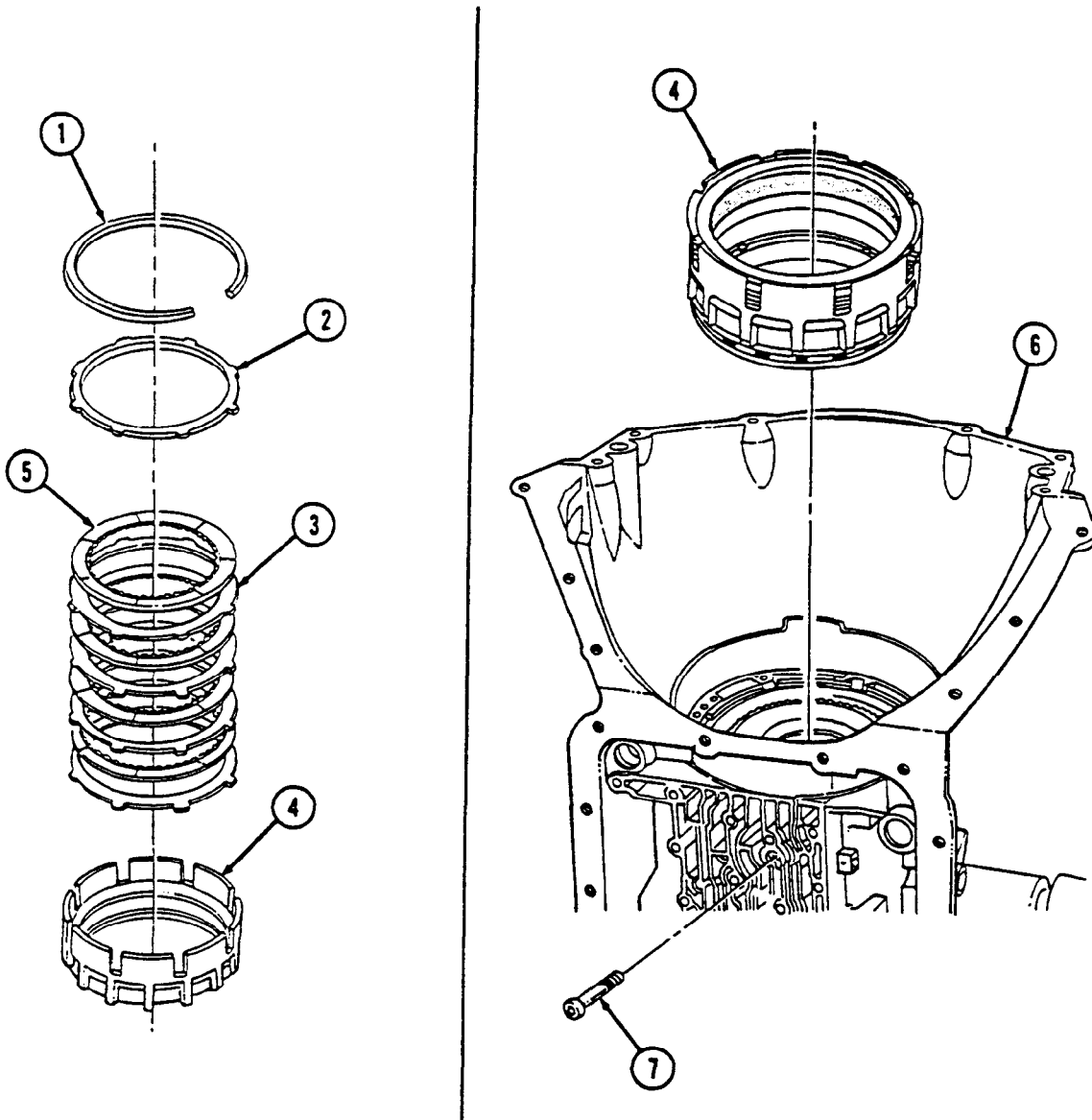
1. Install forward clutch assembly (16) onto direct clutch (11).
2. Ensure that forward clutch assembly (16) is fully seated, and that top of speed sensor ring (18) is 3.85-3.89 in. (97.79-98.81 mm) below oil pump gasket surface (17).
3. Install flat bearing (15) on forward clutch (16).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

h. Fourth Clutch, Turbine Shaft, and Overdrive Carrier Assembly Installation

1. Remove snapping (1), backing plate (2), four clutch plate assemblies (5), and clutch plates (3) from fourth clutch housing (4).
2. Install fourth clutch housing (4) on transmission case (6), aligning bolt hole in housing (4) with bolt hole in case (6).
3. Install bolt (7) on fourth clutch housing (4). Tighten bolt (7) to 13-17 lb-ft (18-23 N·m).



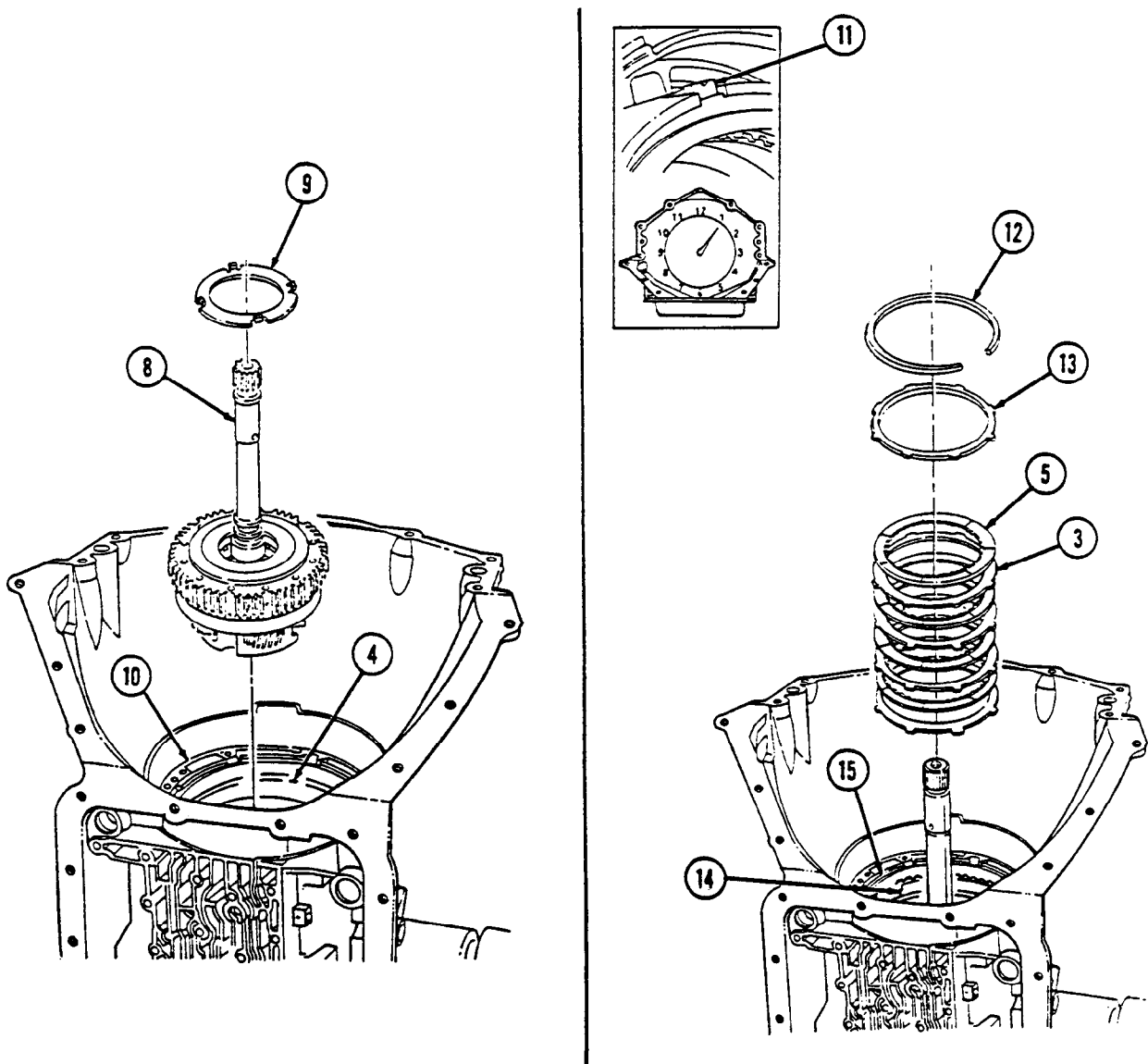
28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

4. Install turbine shaft and overrun clutch housing assembly (8) on fourth clutch assembly (4). Mesh pinion gears in teeth of forward clutch assembly (4).
5. Install selective thrust washer (9) on overrun clutch housing assembly (8).
6. Use a straightedge on pump-to-case surface (10) and over thrust washer (9). The two surfaces should be flush.

NOTE

Ensure clutch plates are saturated with transmission fluid before installation.

7. Install four clutch plates (3) and clutch plate assemblies (5) on fourth clutch housing (15) and overrun carrier assembly (14). Start with clutch plate (3), with the V-notch (11) at the one o'clock position, then alternate with clutch plate assemblies (5).
8. Install backing plate (13), flat side facing down, on clutch plate assemblies (5) and secure with snapping (12). Position snapping (12) with gap at one o'clock position.



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

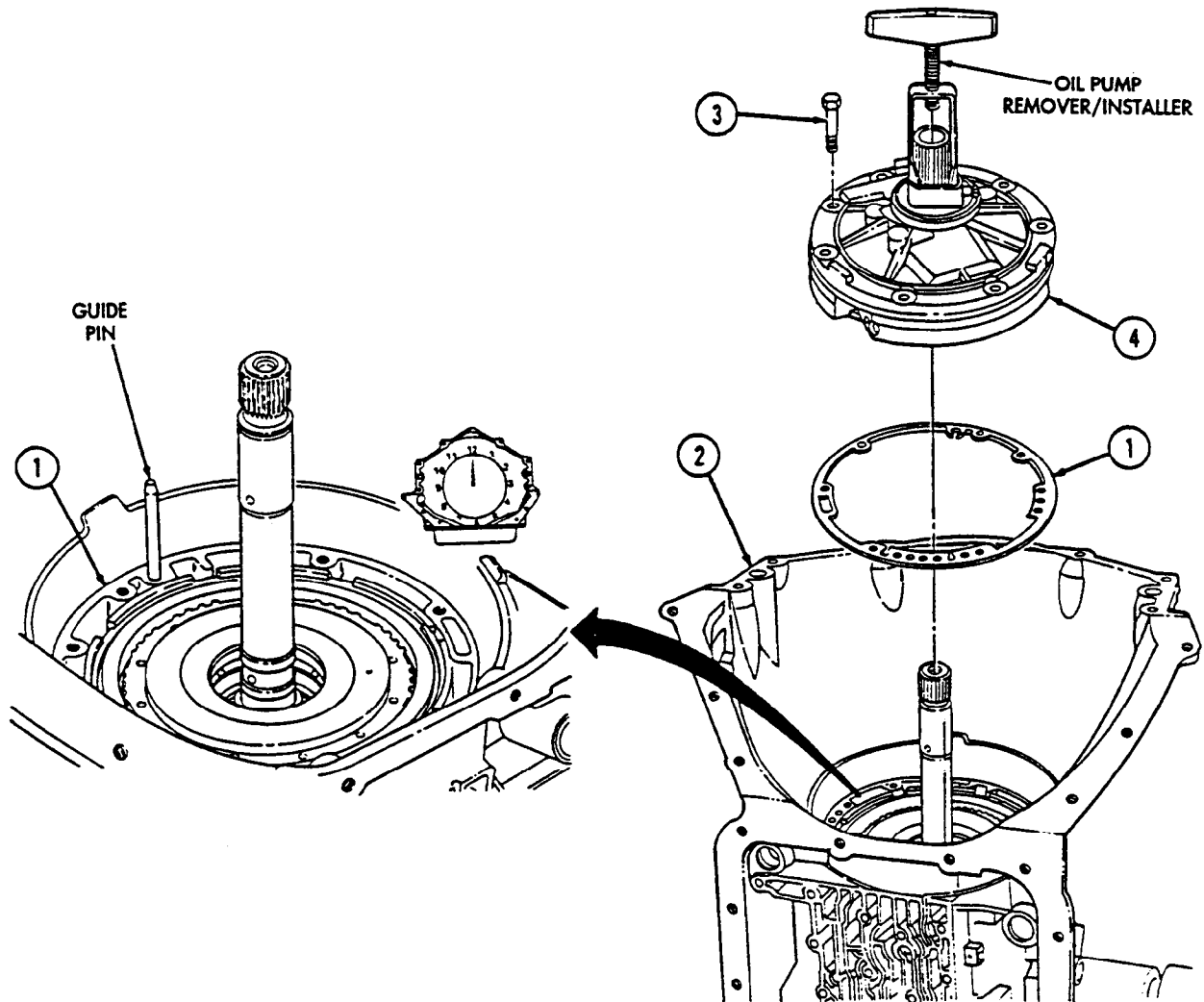
i. Pump Assembly Installation

1. Install two guide pins at 12 and 5 o'clock positions on transmission case (2).
2. Install gasket (1) over guide pins, ensuring it matches holes in transmission case (2).
3. Using pump remover/installer, align pump assembly (4) over guide pins in transmission case (2).

CAUTION

If turbine shaft cannot be rotated as pump assembly is being pulled into place, the overrun, fourth, forward and/or direct clutch housings have not been properly installed. This condition must be corrected before pump assembly is fully installed.

4. Install pump (4) with seven capscrews (3) and tighten evenly to 18 lb-ft (24 N·m).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

j. Front Unit End Play Check

CAUTION

If end play procedures are not closely followed, incorrect shim thickness will be selected, resulting in severe damage to internal transmission components.

1. Install dial indicator on transmission case (2) to read vertical movement on turbine shaft (5).
2. Press down turbine shaft (5) and pry up on output carrier (7) to eliminate slack between end of turbine shaft (5) and stator shaft (6).
3. Pull up turbine shaft (5) to eliminate slack between snapping on turbine shaft (5) and overdrive carrier.
4. Zero dial indicator.
5. Pull turbine shaft (5) forward and read dial indicator.

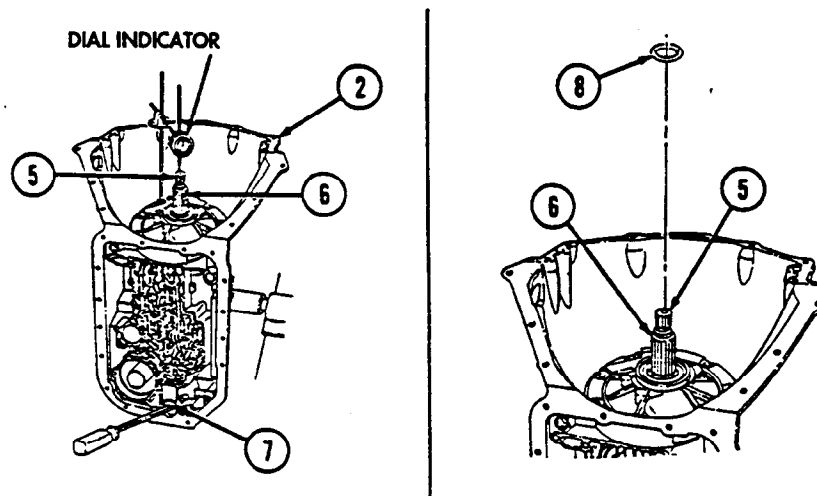
NOTE

- Selective washer controlling end play is located between pump cover and forward clutch housing; refer to para. 28-11. If more or less washer thickness is required to bring end play within specifications, select proper washer from table 28-2.
- An oil-soaked washer may tend to discolor.
- It will be necessary to measure washer for its actual thickness.

Table 28-2. Front Selective Washer Thickness.

THICKNESS	COLOR
0.057-0.061 in. (1.45-1.55 mm)	Blue
0.073-0.077 in. (1.85-1.96 mm)	Red
0.089-0.093 in. (2.26-2.36 mm)	Brown
0.105-0.109 in. (2.67-2.77 mm)	Green
0.121-0.125 in. (3.07-3.18 mm)	Plain

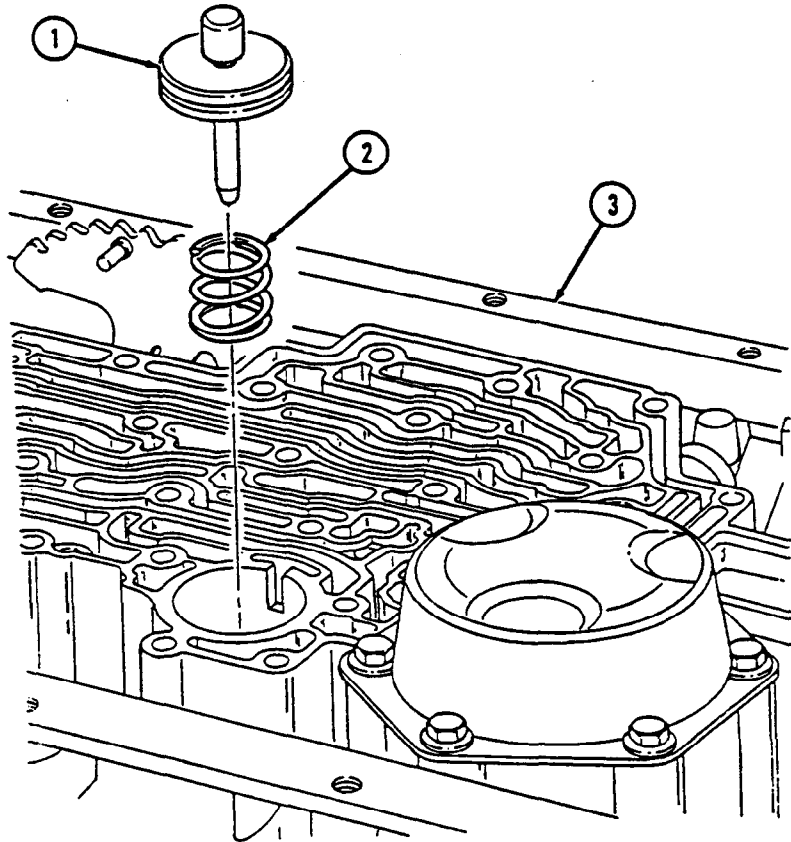
6. Resulting travel or end play should be 0.004-0.022 in. (0.102-0.559 mm). If end play is not within specifications, remove selective washer and install new selective washer of proper thickness.
7. Install O-ring (8) on turbine shaft (5).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

k. Front Servo Installation

Install spring (2) and piston assembly (1) in transmission case (3), ensuring piston assembly (1) is firmly seated on spring (2).



l. Band Apply Pin Check

1. Place gauge pin in rear servo bore of transmission case (3) and rotate to side A.
2. Place checking tool on servo bore with hex nut (5) facing parking pawl side of transmission case (3).
3. Secure checking tool to transmission case (3) with two servo cover screws (4). Tighten screws (4) to 18 lb-ft (24 N·m).
4. Ensure gauge pin can move freely in checking tool.
5. Apply 25 lb-ft (34 N·m) of torque to hex-nut (5).
6. Read edge of gauge pin that is even with checking tool edge at pin gauge. Record number and letter.

28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

7. Determine correct apply pin to be used from table 28-3.

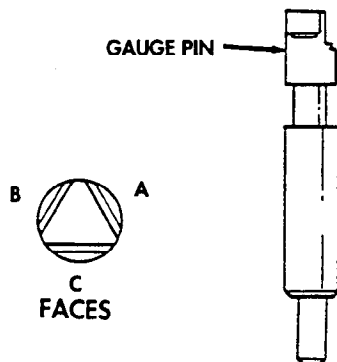
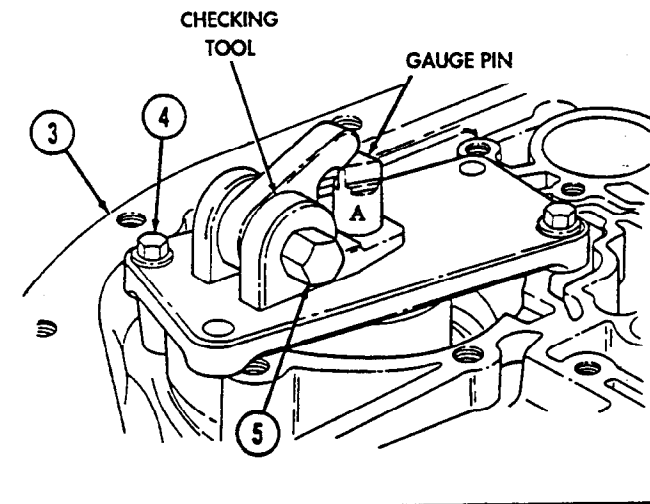
NOTE

- Apply pins are identified by the number of rings around small end of apply pins.
- If necessary to change apply pin, refer to rear servo repair, para. 28-16.

Table 28-3. Apply Pin Selection.

- | | |
|----|---|
| a. | If both flats are above gauge surface, use pin length #1. |
| b. | If one flat is above gauge surface, use pin length #2. |
| c. | If both flats are below gauge surface, rotate to side B. |
| d. | If both flats are above gauge surface, use pin length #3. |
| e. | If one flat is above gauge surface, use pin length #4. |
| f. | If both flats are below gauge surface, rotate to side C. |
| g. | If both flats are above gauge surface, use pin length #5. |
| h. | If one flat is above gauge surface, use pin length #6. |
| i. | If both flats are below gauge surface, use pin length #7. |

8. Remove checking tool and gauge pin.

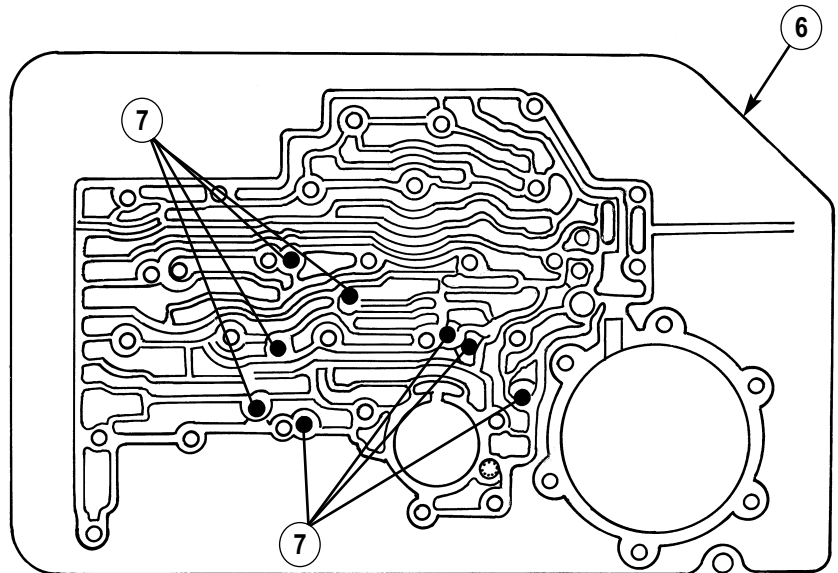
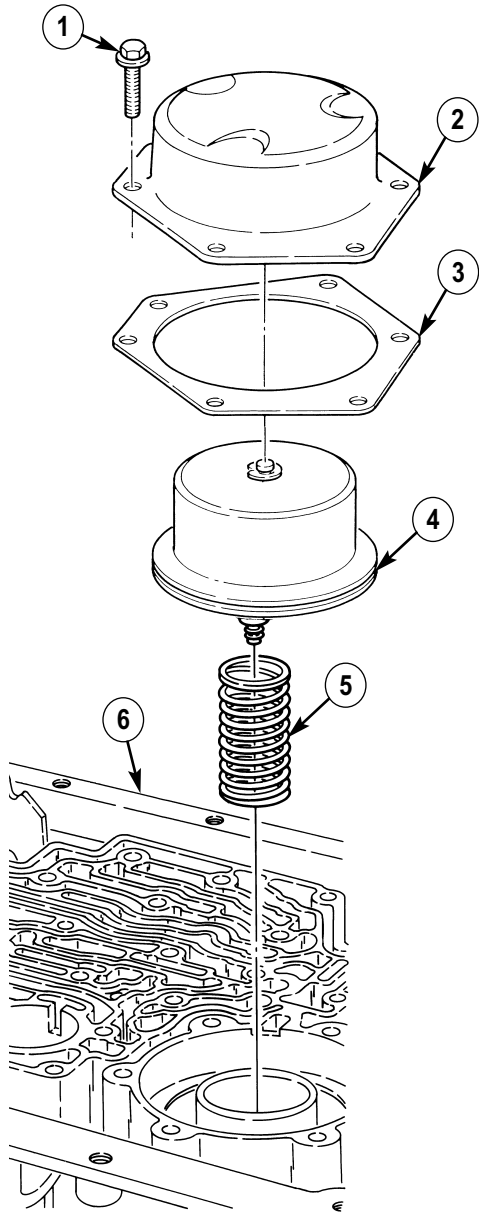


	7	PIN LENGTH	
	#7	3.468-3.474 IN. (88.08-88.23 MM)	
	#6		
	#5	3.440-3.446 IN. (87.37-87.52 MM)	
	6		
	5	3.412-3.418 IN. (86.66-86.81 MM)	
	5		
ROTATE TO SIDE C			
	#4	3.384-3.390 IN. (85.95-86.10 MM)	
	#3		
	4		
	3	3.356-3.362 IN. (85.24-85.39 MM)	
	3		
ROTATE TO SIDE B			
	#2	3.328-3.334 IN. (84.53-84.68 MM)	
	#1		
	1	3.300-3.306 IN. (83.82-83.97 MM)	

28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

m. Rear Servo Installation

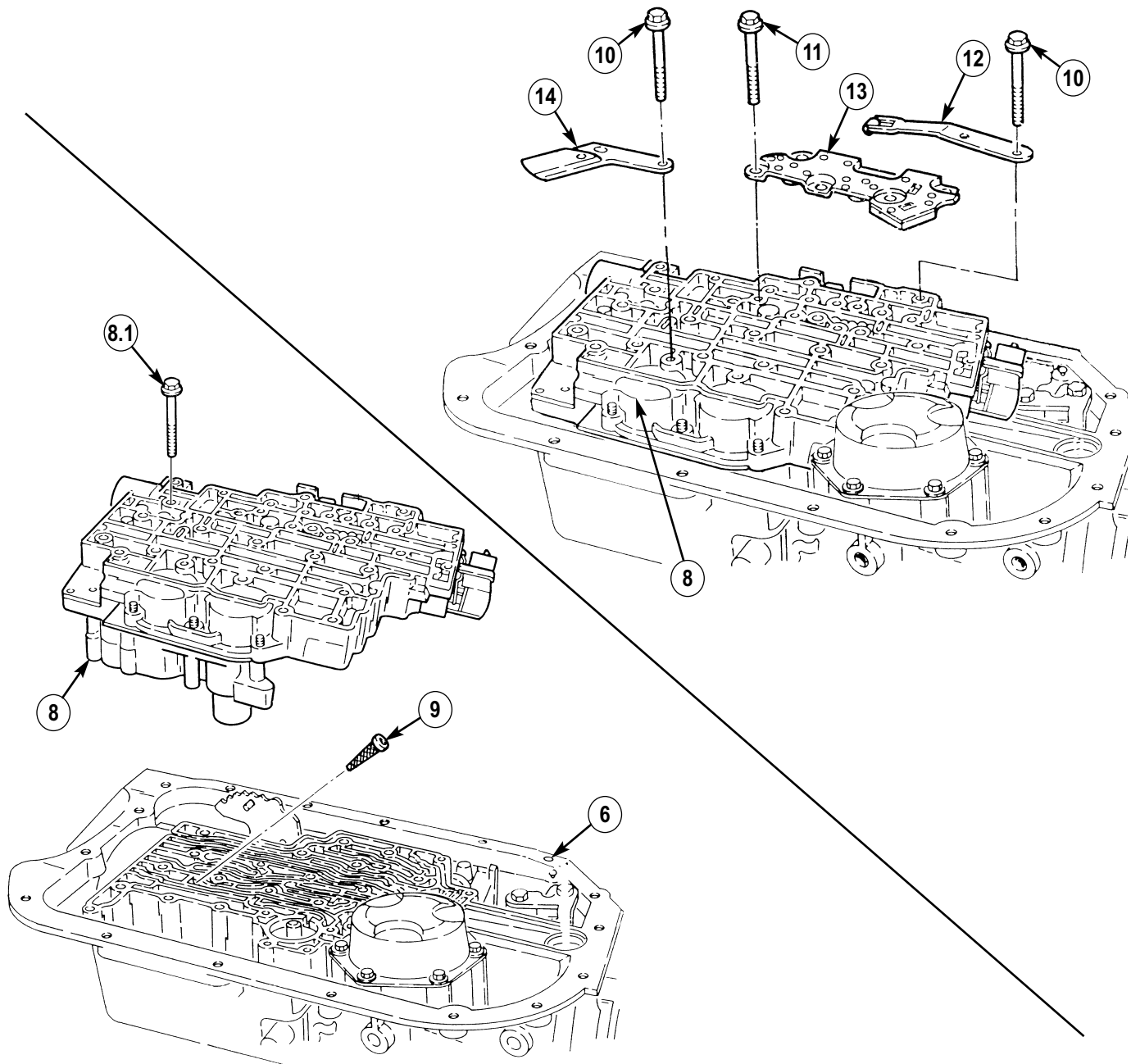
Install spring (5), servo piston (4), gasket (3), and servo cover (2) in transmission case (6) with six capscrews (1). Tighten capscrews (1) to 18 lb-ft (24 N·m).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

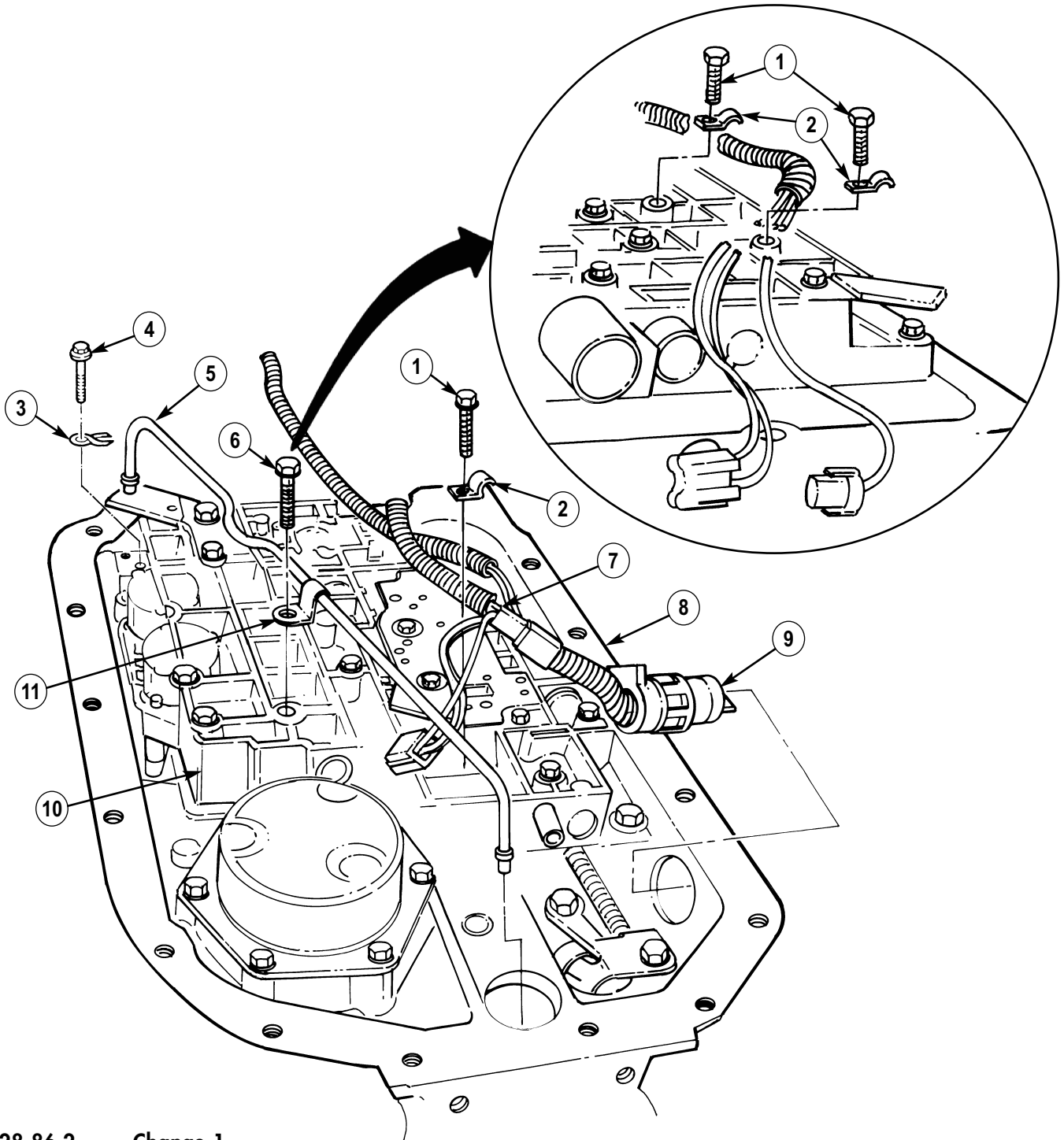
n. Control Valve Assembly Installation (1995-1996)

1. Install screen (9) in transmission case (6).
2. Install eight checkballs (7) in passages of transmission case (6).
3. Position control valve assembly (8) on transmission case (6) and install sixteen capscrews (8.1) (1995 transmission), or fifteen capscrews (8.1) (1996 transmission) finger-tight.
4. Install transmission fluid pressure switch (13) on control valve assembly (8) with six capscrews (11) finger-tight.
5. Install fluid indicator stop (14) on control valve assembly (8) with two capscrews (10) finger-tight.
6. Install spring and roller (12) on control valve assembly (8) with two capscrews (10) finger-tight.



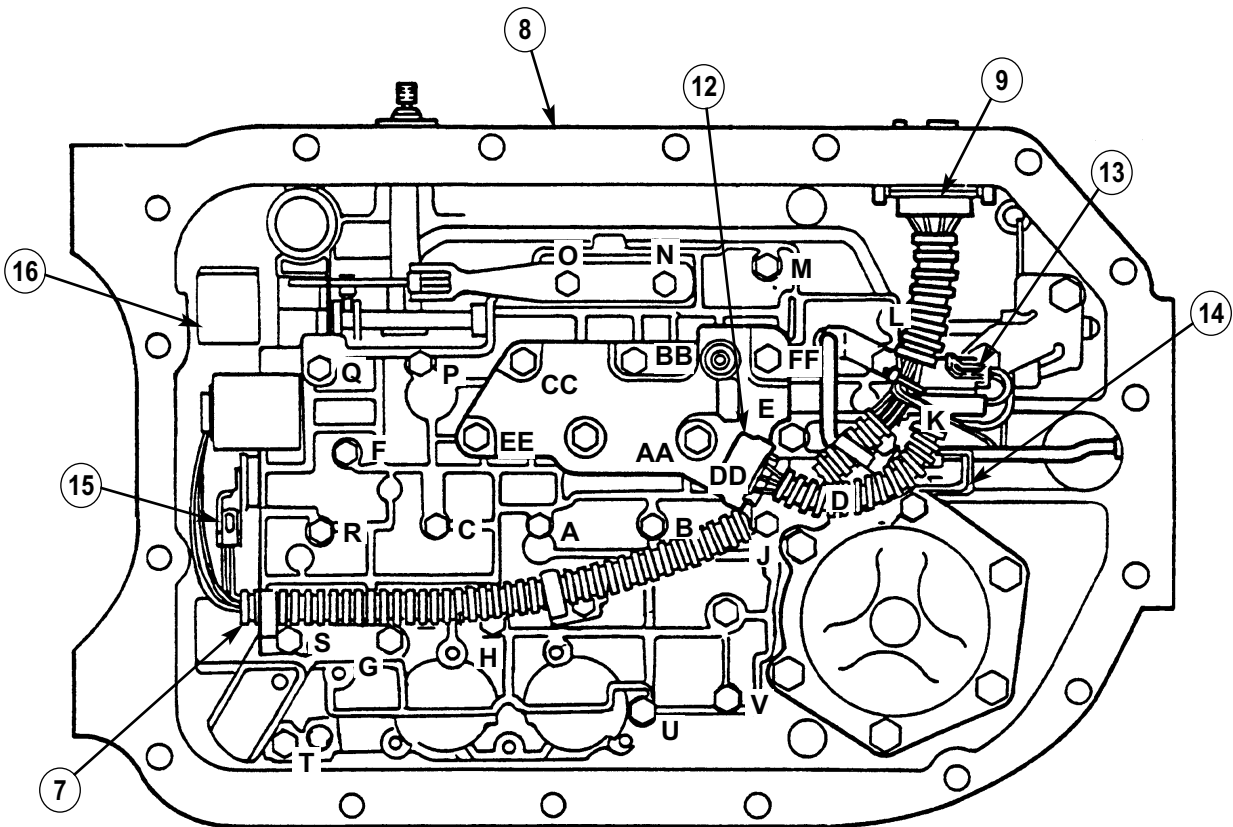
28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

7. Secure lube pipe (5) on transmission case (8) and control valve assembly (10) with clip (11) and capscrew (6). Install lube pipe retainer (3) on transmission case (8) with capscrew (4) finger-tight.
8. Position wiring harness (7) over control valve assembly (10) with electrical connector (9) going through transmission case (8).
9. Install three wiring harness clips (2) and wiring harness (7) on control valve assembly (10) with three capscrews (1).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

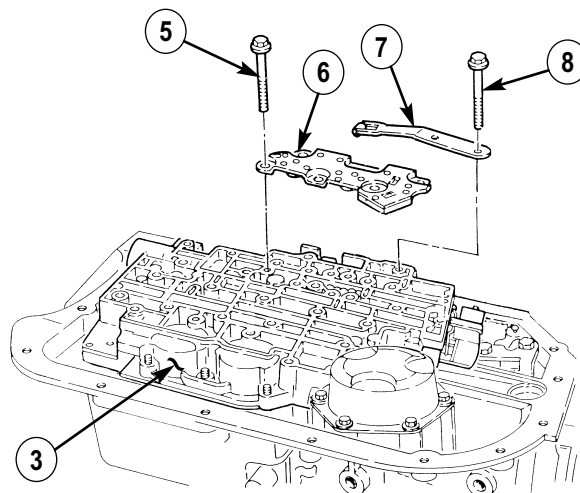
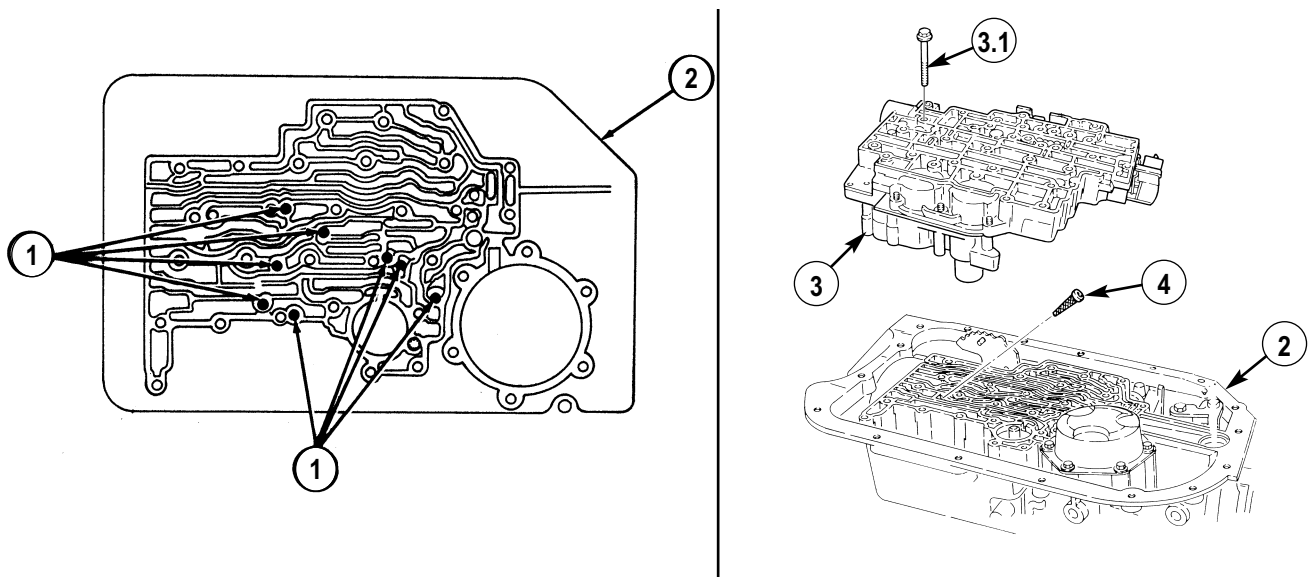
10. Connect wiring harness (7) to pressure control solenoid (16), PWM solenoid assembly (15), 2-3 shift solenoid (14), 1-2 shift solenoid (13), electrical connector (9), and transmission fluid pressure switch assembly (12).
11. Tighten capscrews installed in steps 3, 4, 5, 6, and 7 to 97 lb-in. (11 N·m) in sequence shown, A through V and AA through FF.



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

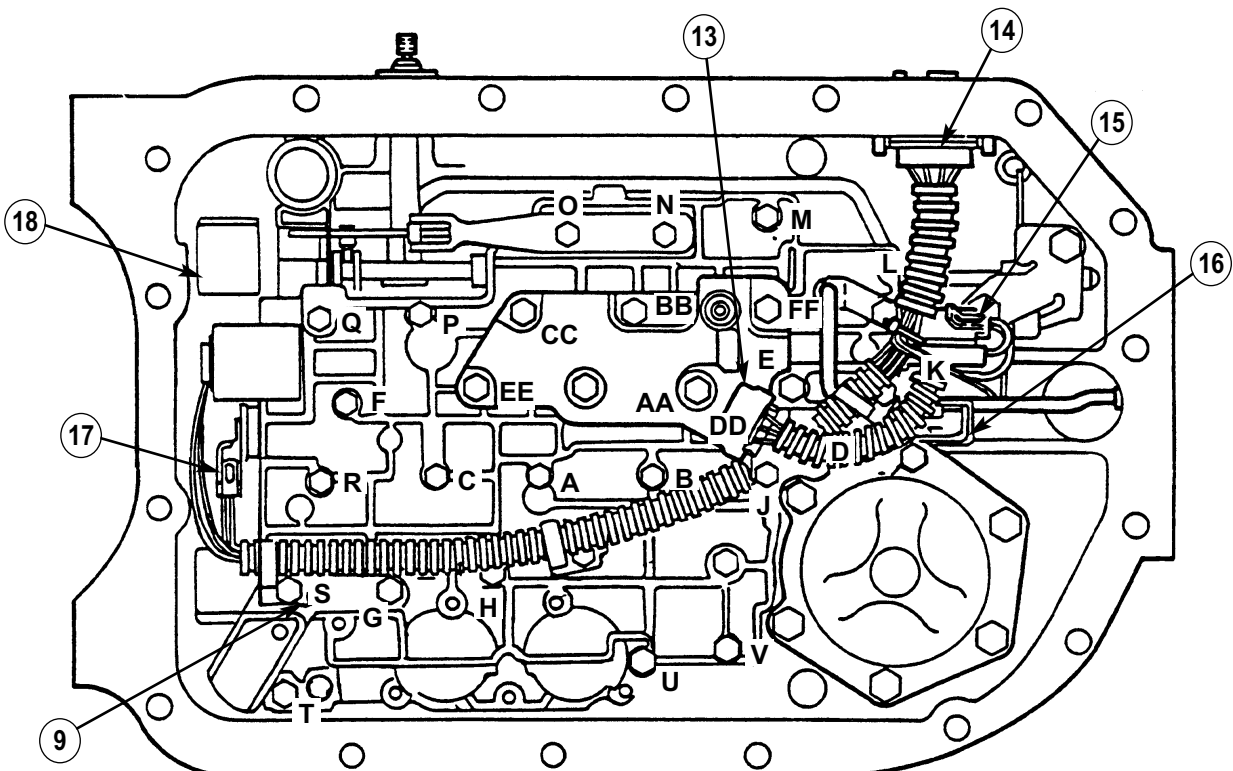
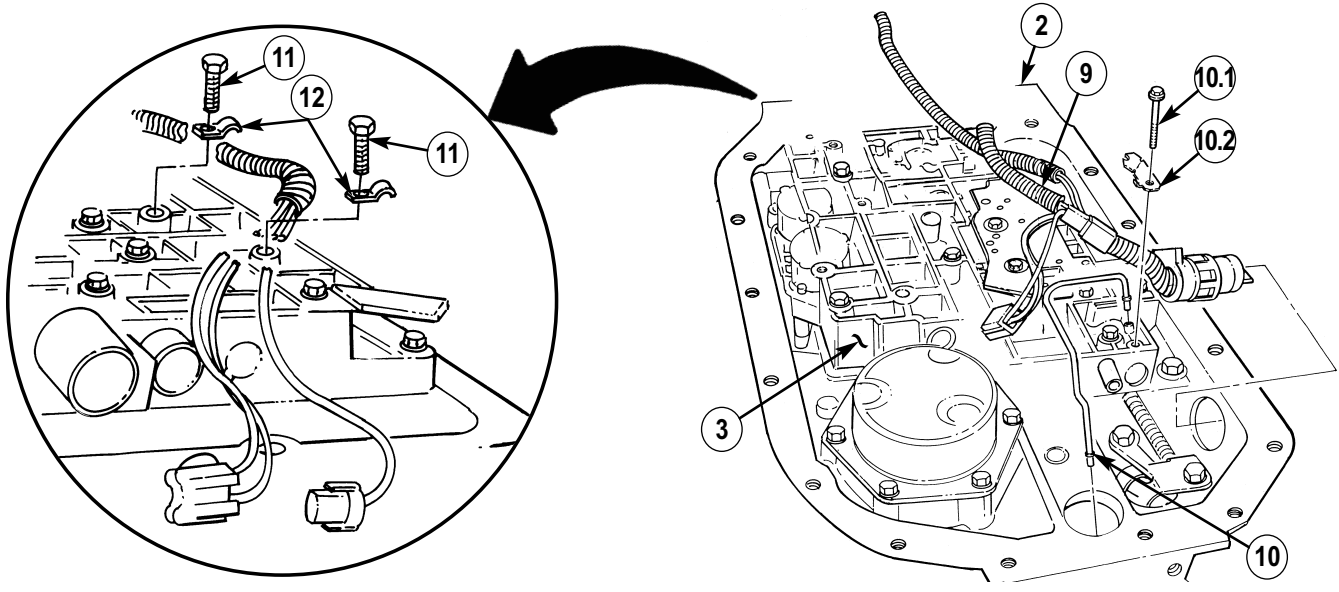
n.1. Control Valve Assembly (1997-1998)

1. Install screen (4) in transmission case (2).
2. Install eight checkballs (1) in passages of transmission case (2).
3. Position control valve assembly (3) on transmission case (2) and install seventeen capscrews (3.1) finger-tight.
4. Install spring and roller assembly (7) on control valve assembly (3) with two capscrews (8).
5. Install lube pipe (10) on transmission case (2) and control valve assembly (3) with clip (10.2) and capscrew (10.1).
6. Install fluid pressure switch assembly (6) on control valve assembly (3) with six capscrews (5) finger-tight.



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

7. Position wiring harness (9) over control valve assembly (3), with electrical connector going through transmission case (2).
8. Install wiring harness (9) on control valve assembly (3) with two clips (12) and capscrews (11).
9. Connect wiring harness (9) to pressure control solenoid (18), PWM solenoid assembly (17), 2-3 shift solenoid (16), 1-2 shift solenoid (15), connector (14), and transmission fluid pressure switch assembly (13).
10. Tighten two capscrews (8), seventeen capscrews (3.1), six capscrews (5),



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

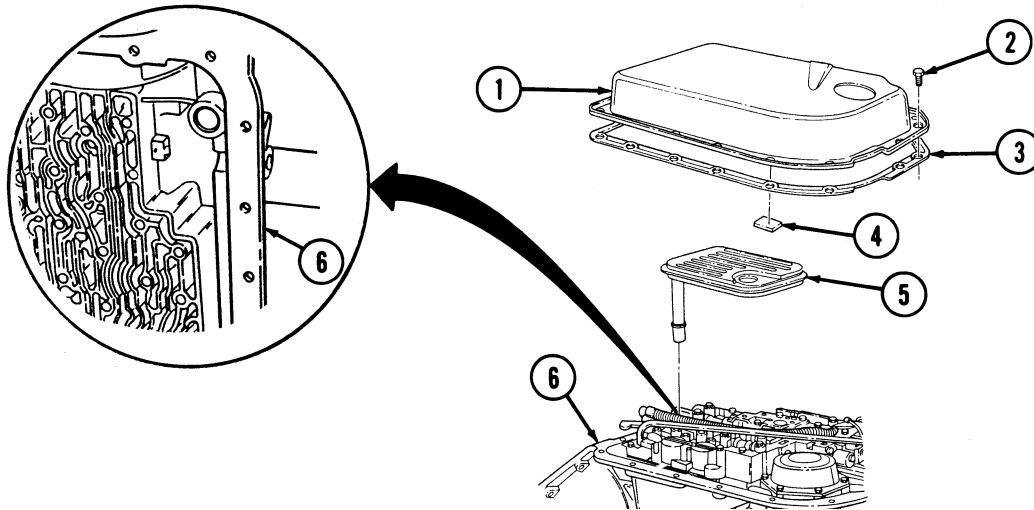
o. Oil Pan and Filter Assembly Installation

1. Install filter (5) on transmission case (6).
2. Install magnet (4) in oil pan (1).

NOTE

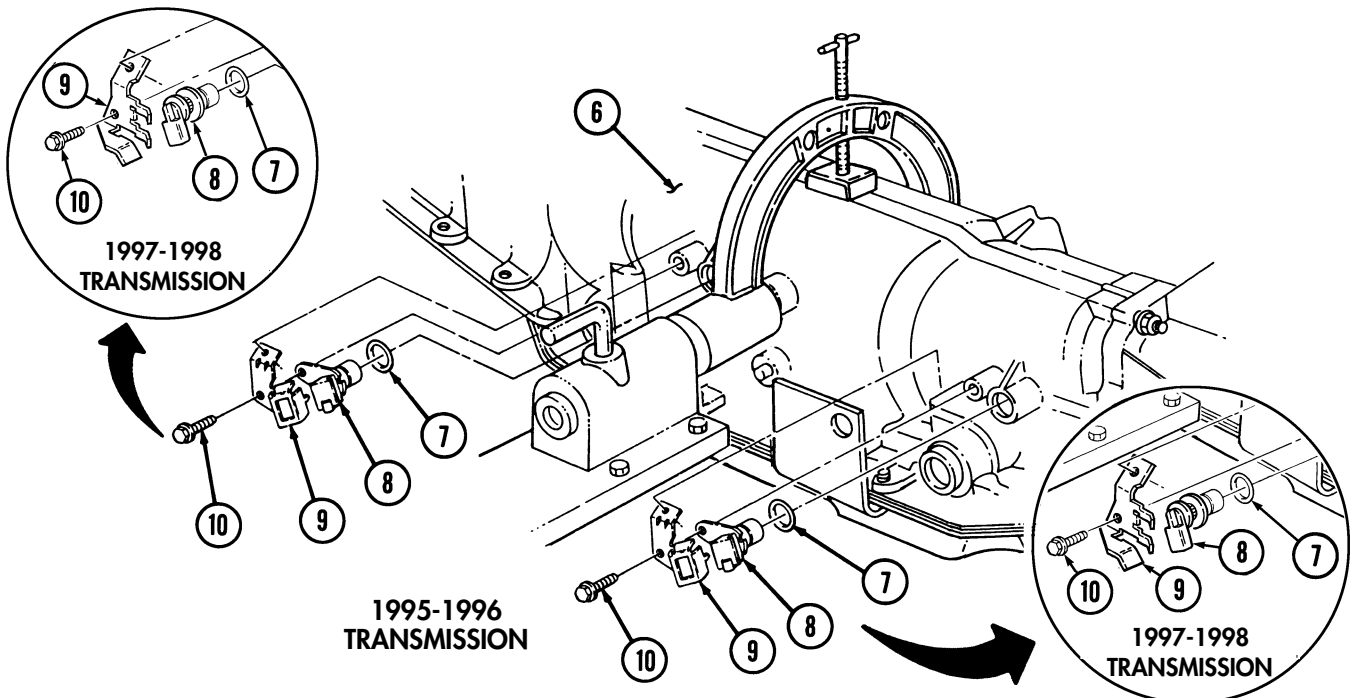
Do not use a sealer or adhesive on oil pan seal, oil pan, or transmission case surface.

3. Install gasket seal (3) and oil pan (1) on transmission case (6) with seventeen capscrews (2). Tighten capscrews (2) to 18 lb-ft (24 N·m).



p. Speed Sensors Installation

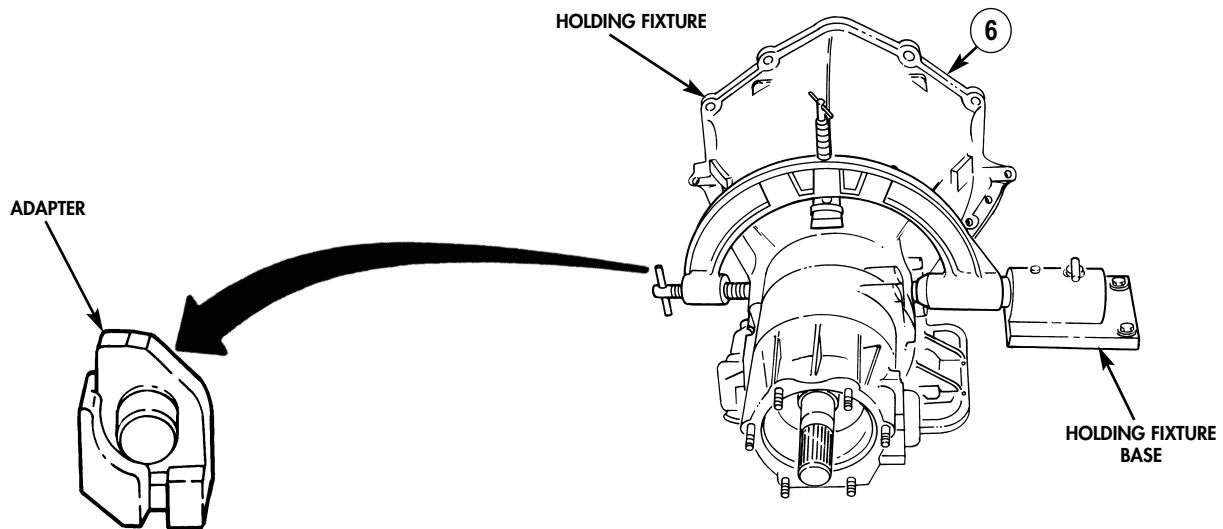
Install two O-rings (7), speed sensors (8), and brackets (9) on transmission case (6) with capscrews (10).



28-19. TRANSMISSION ASSEMBLY FROM SUBASSEMBLIES (Cont'd)

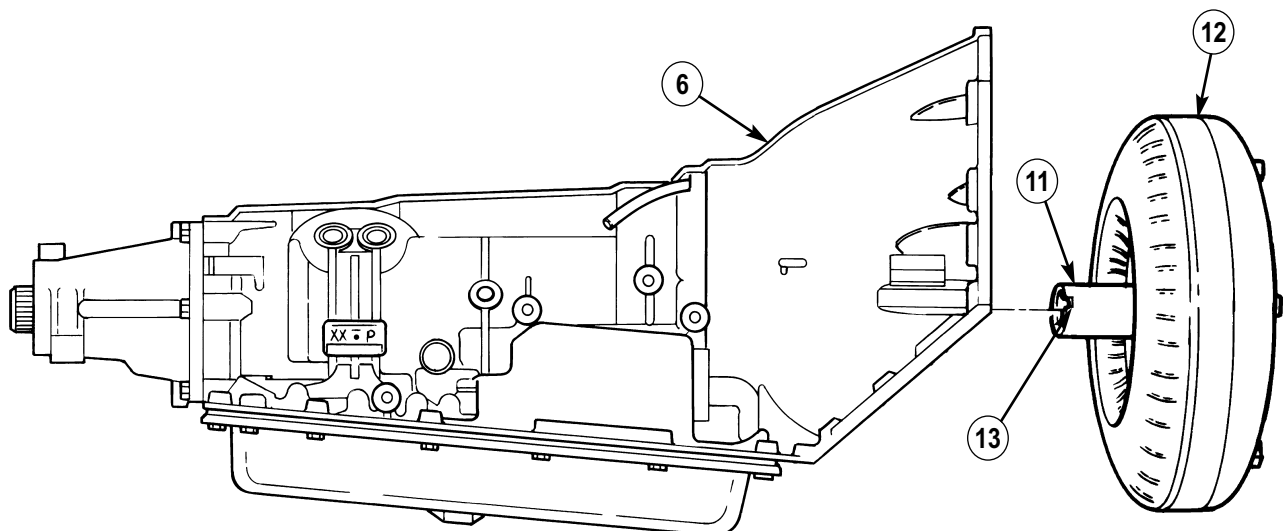
q. Holding Fixture Removal

Remove transmission (6) and adapter from transmission holding fixture.



r. Torque Converter Installation

Install torque converter (12) into transmission (6). Be sure drive lugs of inner pump rotor are properly engaged with drive slots (13) of torque converter hub (11).



FOLLOW-ON TASK: Prepare transmission for installation (para. 19-5).

CHAPTER 29 TRANSFER CASE (GS) REPAIR

29-1. INTRODUCTION

This chapter contains maintenance instructions for disassembly and repair of transfer case components at the general support maintenance level. Some subassemblies and parts must be removed before the transfer case components can be accessed. They are referenced to other paragraphs in this manual.

29-2. TRANSFER CASE REPAIR TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
29-3.	Transfer Case Repair	29-2

29-3. TRANSFER CASE REPAIR

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Inspection and Repair d. Assembly |
|---|---|

INITIAL SETUP:

Tools

- General mechanic's tool kit:
 - automotive (Appendix B, Item 1)
- Maintenance and repair shop equipment:
 - automotive (Appendix B, Item 2)
- Screw extractor set (Appendix B, Item 98)
- Arbor press (Appendix B, Item 111)

Special Tools

- Slide hammer adapter (Appendix B, Item 83)
- Driver handle (Appendix B, Item 60)
- Input gear seal installer (Appendix B, Item 87)
- Output shaft front bearing installer (Appendix B, Item 88)
- Output shaft front bearing remover (Appendix B, Item 89)
- Extension housing bushing remover (Appendix B, Item 91)
- Bushing remover/bearing installer (Appendix B, Item 85)
- Extension housing seal installer (Appendix B, Item 93)
- Bearing inserter (Appendix B, Item 92)
- Mainshaft pilot bearing installer (Appendix B, Item 86)
- Seal installer (Appendix B, Item 95)
- Seal installer (Appendix B, Item 96)

Materials/Parts

- O-ring seal (Appendix G, Item 284)
- Two O-rings (Appendix G, Item 277)
- Washer seal (Appendix G, Item 436)
- Oil tube seal (Appendix G, Item 420)
- Poppet spring seal (Appendix G, Item 409)
- Input seal (Appendix G, Item 405)
- Oil seal (Appendix G, Item 412)
- Rear output seal (Appendix G, Item 419)
- Tapered drive pin (Appendix G, Item 299)
- Anaerobic gasket sealer (Appendix C, Item 58)
- Petrolatum (Appendix C, Item 52)
- Adhesive sealant (Appendix C, Item 4)
- Sealing compound (Appendix C, Item 64)
- Transmission fluid (Appendix C, Item 37)
- Transfer case support stand (Appendix D, Fig. 64)
- Silicone sealant (RTV) (Appendix C, Item 74)

Manual References

TM 9-2320-387-24P

Equipment Condition

Transfer case removed (para. 20-3).

Maintenance Level

General support

a. Disassembly

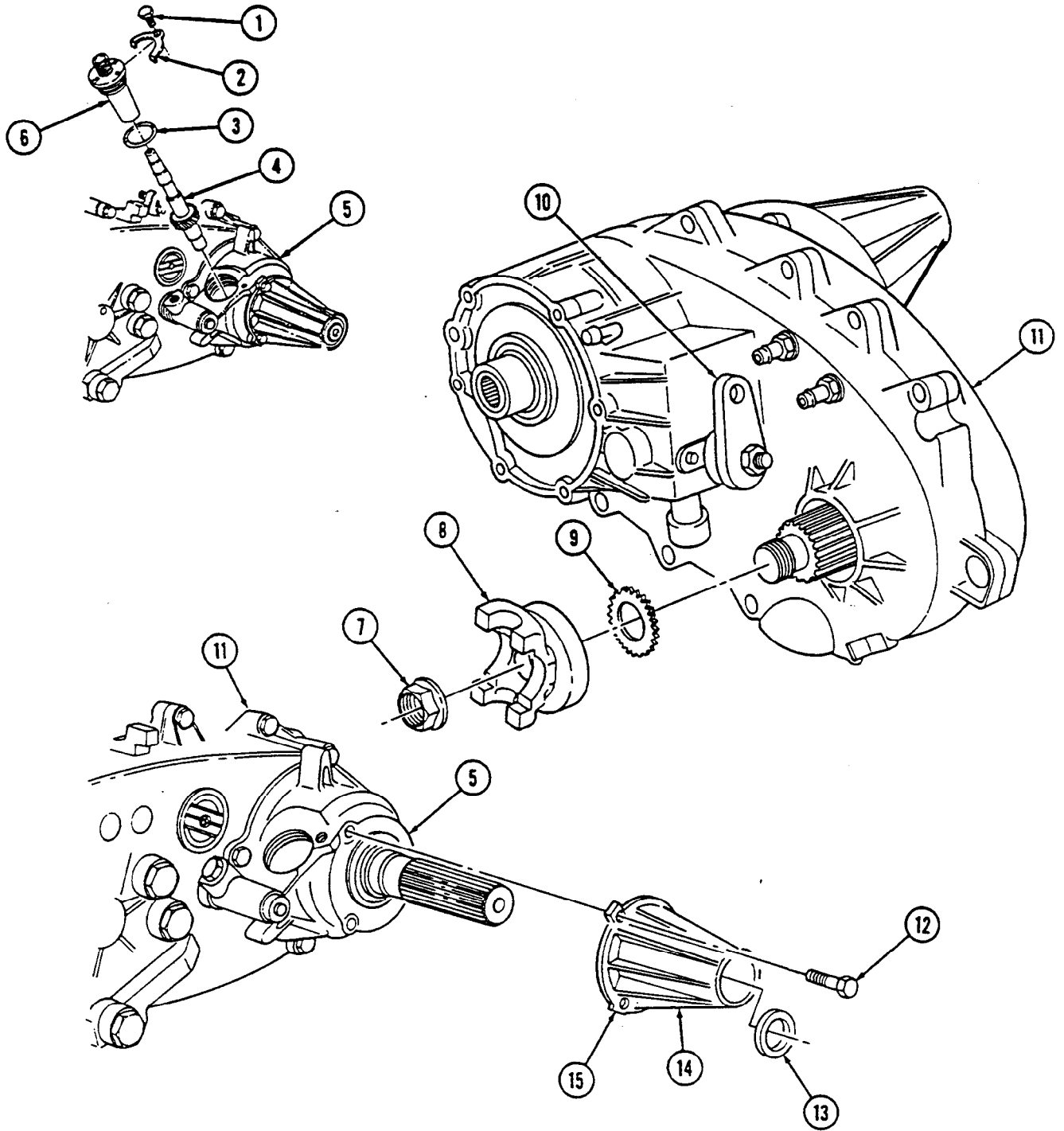
1. Remove capscrew (1), clamp (2), pinion adapter (6), and driven gear (4) from rear retainer (5).
2. Remove O-ring (3) from pinion adapter (6). Discard O-ring (3).
3. Remove nut (7), front output yoke (8), and lockwasher seal (9) from transfer case (11). Discard lockwasher seal (9).
4. Move shift range lever (10) to most rear position.
5. Remove three capscrews (12) from rear extension (14) and rear retainer (5).

CAUTION

Do not pry or wedge rear extension from rear retainer. Sealing surfaces could be damaged.

6. Use a soft-nosed hammer or mallet on screw hole bosses (15) on rear extension (14) to break sealing bead and remove rear extension (14) from rear retainer (5).
7. Remove rear output shaft seal (13) from rear extension (14). Discard rear output shaft seal (13).

29-3. TRANSFER CASE REPAIR (Cont'd)



29-3. TRANSFER CASE REPAIR (Cont'd)

8. Remove snapping (1) from mainshaft assembly (2).
9. Remove four capscrews (3) from rear retainer (4) and rear half-case (5).
10. Prying on tabs of rear retainer (4), remove rear retainer (4) from rear half-case (5) and mainshaft (2).
11. Remove two snaprings (6) and speedometer drive gear (7) from mainshaft assembly (2).
12. Remove two capscrews (10) and washers (11) from rear half-case (5) and front half-case (17).

NOTE

Mark positions of long screws for installation.

13. Remove two long screws (9) from front output end of rear half-case (5).
14. Remove seven screws (8) from rear half-case (5).

NOTE

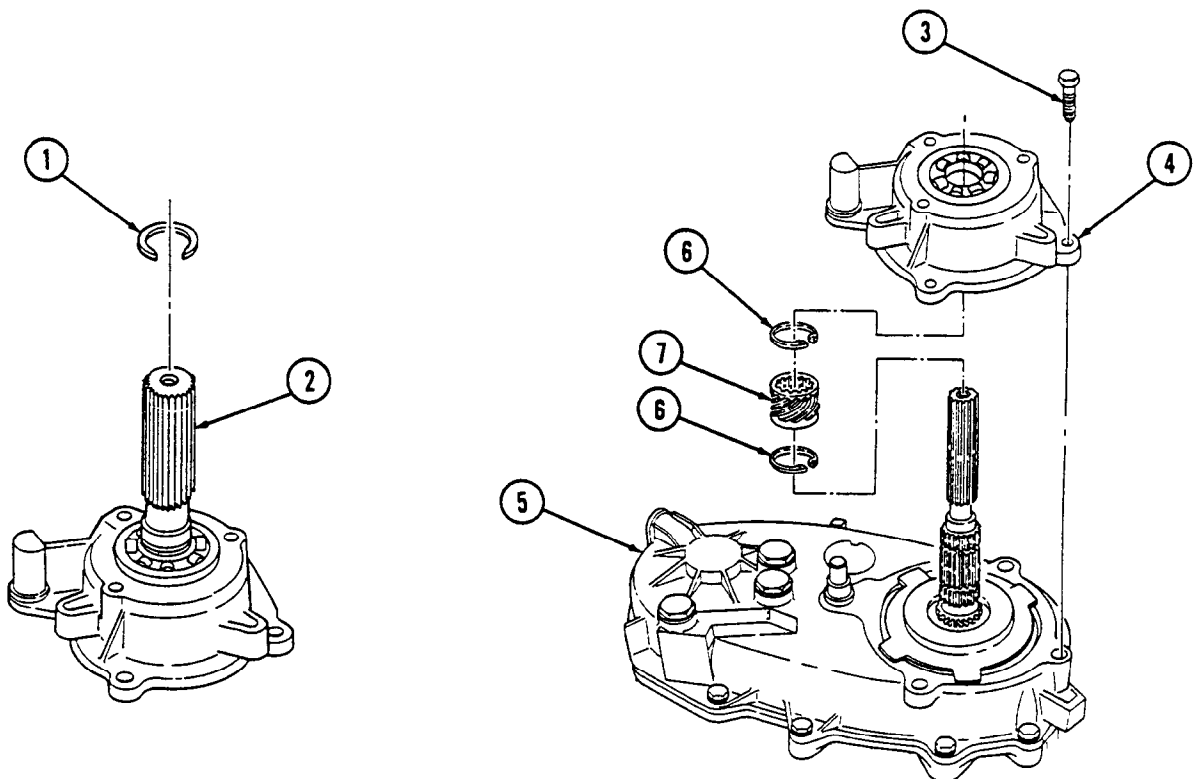
Use slots in half-cases when separating half-cases.

15. Pry and remove rear half-case (5) from front half-case (17). Lay rear half-case (5) on bench with oil pump (15) up.

CAUTION

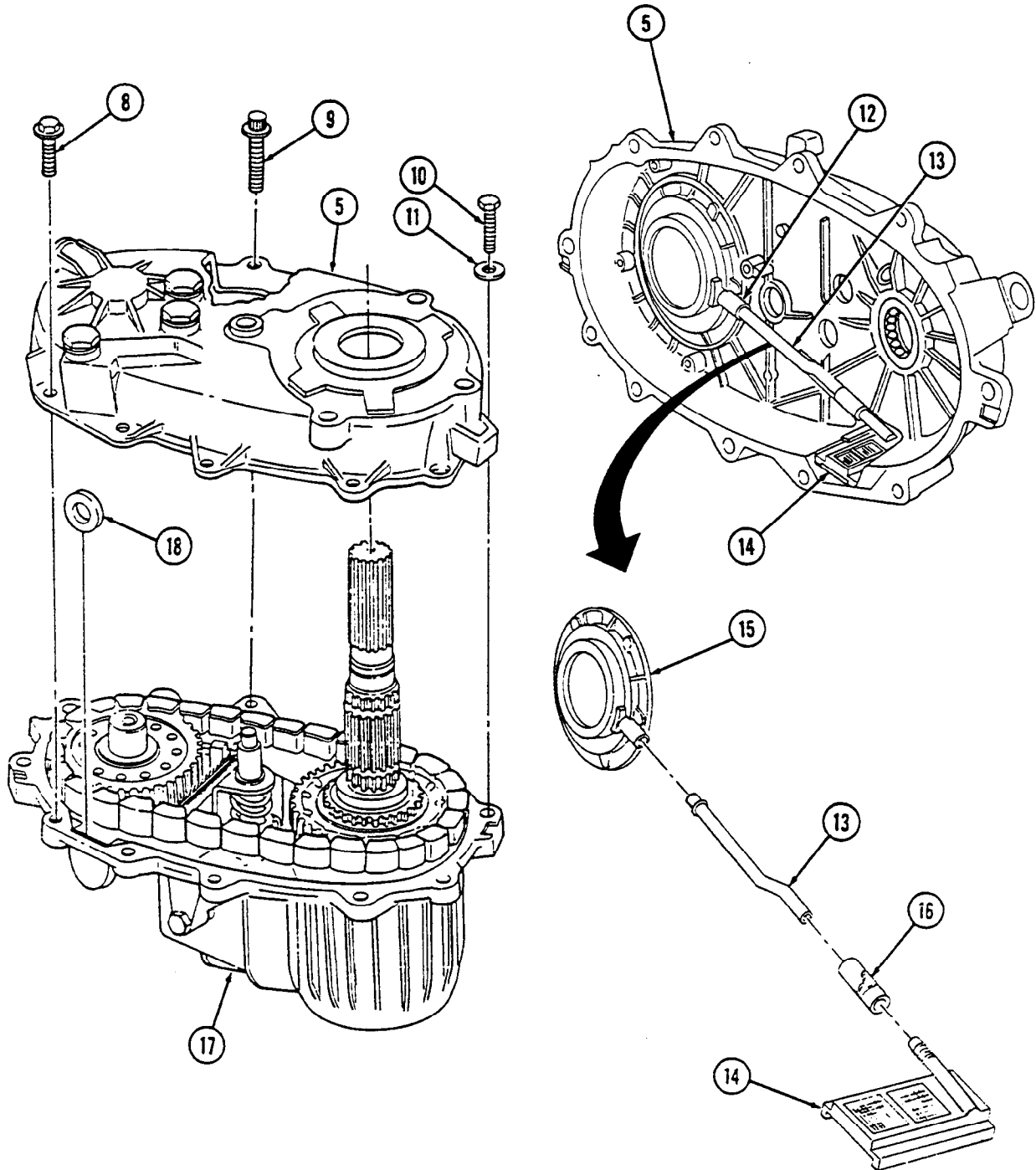
Mark position of oil pump to rear half-case before removal. Failure to do so may cause damage to equipment.

16. Rotate oil pickup tube (13) and oil screen (14) out of rear half-case (5) and pull pickup tube (13) out of oil pump inlet port (12).
17. Remove oil pump (15) from rear half-case (5).



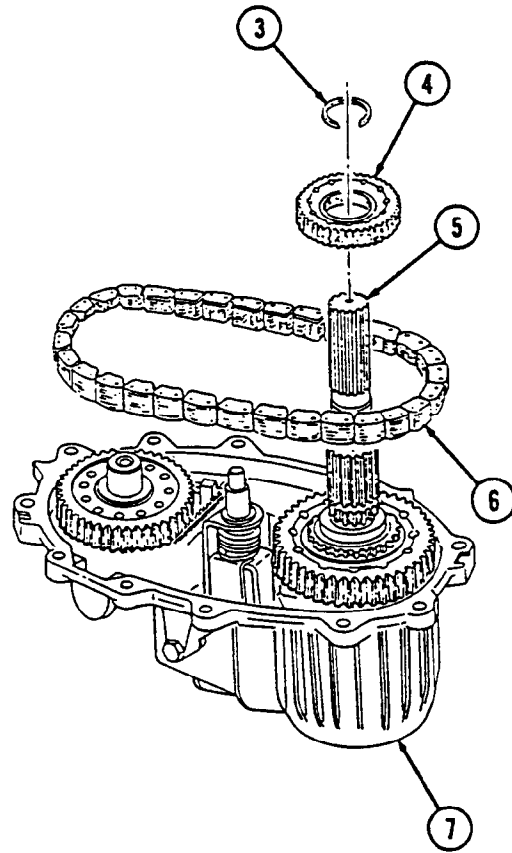
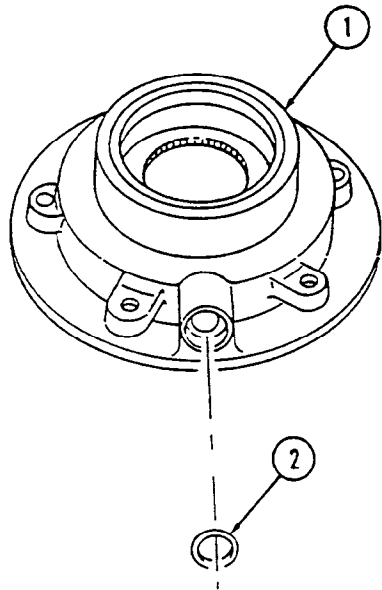
29-3. TRANSFER CASE REPAIR (Cont'd)

- 18. Remove oil screen (14) and pickup tube (13) from hose (16).
- 19. Remove magnetic pickup (18) from pocket in front half-case (17).



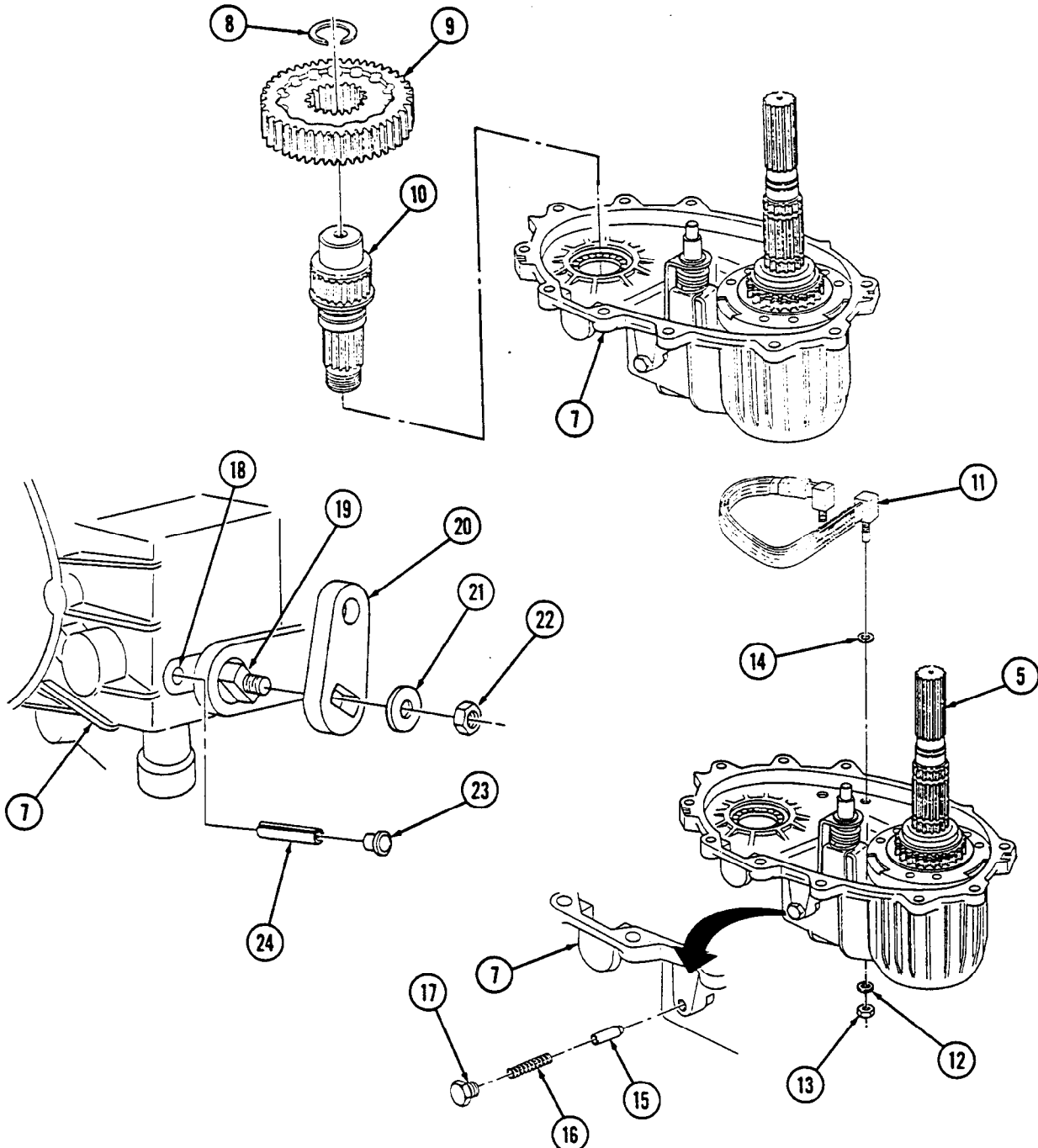
29-3. TRANSFER CASE REPAIR (Cont'd)

20. Remove oil tube seal (2) from oil pump (1). Discard oil tube seal (2).
21. Remove snapping (3) securing drive sprocket (4) on mainshaft assembly (5).
22. Remove drive sprocket (4) and drive chain (6) from front half-case (7).
23. Remove front output shaft (10) and driven gear (9) from front half-case (7).
24. Remove snapping (8) and driven gear (9) from front output shaft (10).



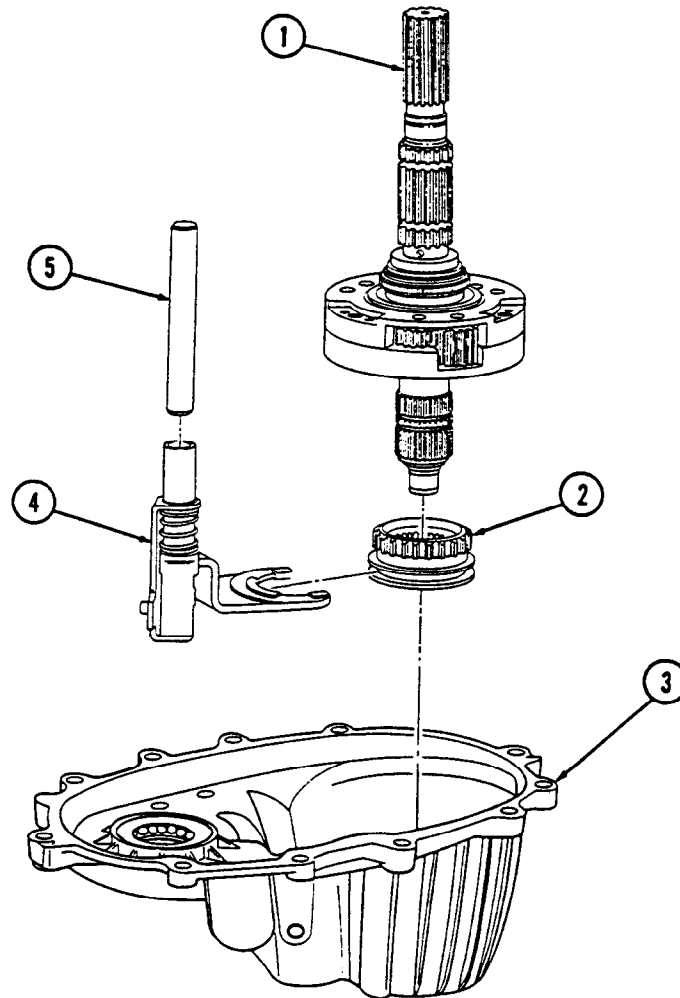
29-3. TRANSFER CASE REPAIR (Cont'd)

25. Remove nut (22), washer (21), and shift lever (20) from sector shaft (19).
26. Remove plug (23) from low-range fork access hole (18).
27. Using screw extractor in tapered drive pin (24), turn counterclockwise and withdraw tapered drive pin (24) from low-range fork access hole (18). Discard tapered drive pin (24).
28. Remove shifter detent plug (17), spring (16), and poppet (15) from front half-case (7).
29. Remove two nuts (13), washers (12), and oil cooler (11) from front half-case (7).
30. Remove two O-rings (14) from oil cooler (11). Discard O-rings (14).



29-3. TRANSFER CASE REPAIR (Cont'd)

31. Pull shift rail (5) out of mode shift fork assembly (4).
32. Remove mode shift fork assembly (4) and mainshaft assembly (1) out of front half-case (3) as a unit.
33. Remove mode shift fork assembly (4) from mode shift sleeve (2) on mainshaft assembly (1).
34. Remove mode shift sleeve (2) from mainshaft assembly (1).



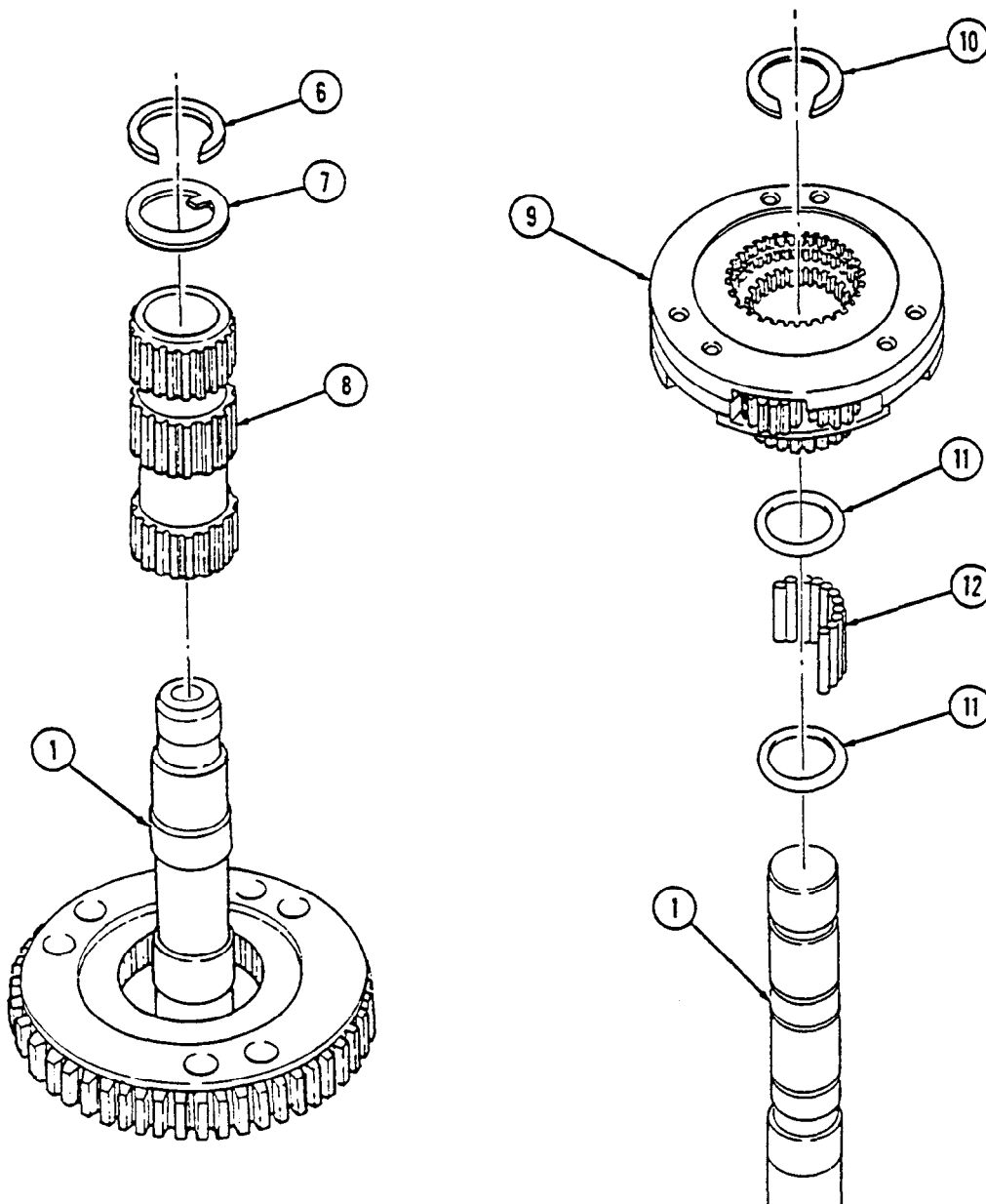
29-3. TRANSFER CASE REPAIR (Cont'd)

- 35. Remove snapping (6) and keyed thrust washer (7) from mainshaft (1).
- 36. Slide intermediate clutch shaft (8) off mainshaft (1).
- 37. Remove differential snapping (10) from mainshaft (1).

NOTE

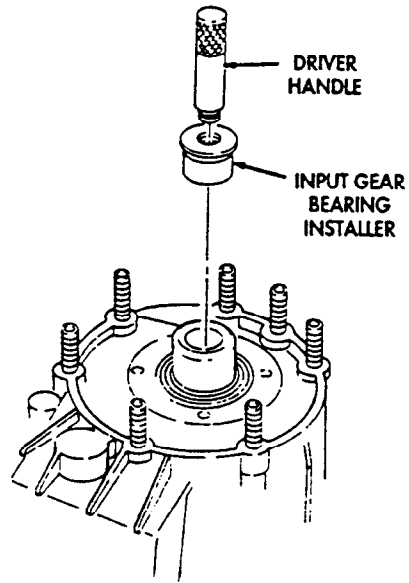
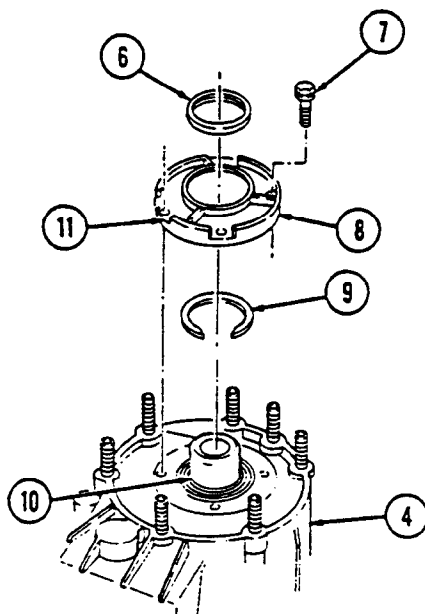
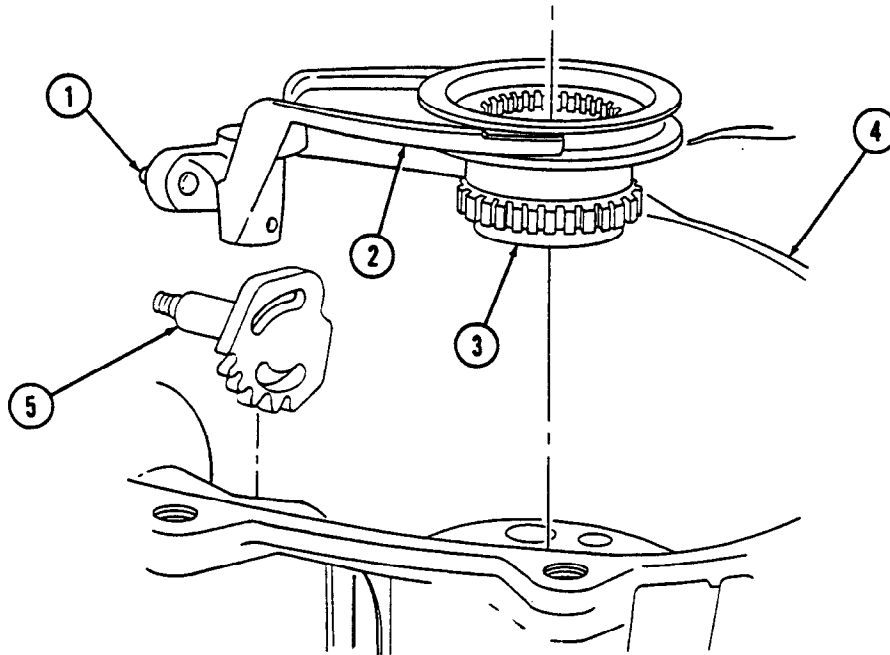
Needle bearings will fall free when differential is removed from mainshaft.

- 38. Remove differential assembly (9) from mainshaft (1).
- 39. Remove two thrust washers (11) and fifty-three needle bearings (12) from mainshaft (1).



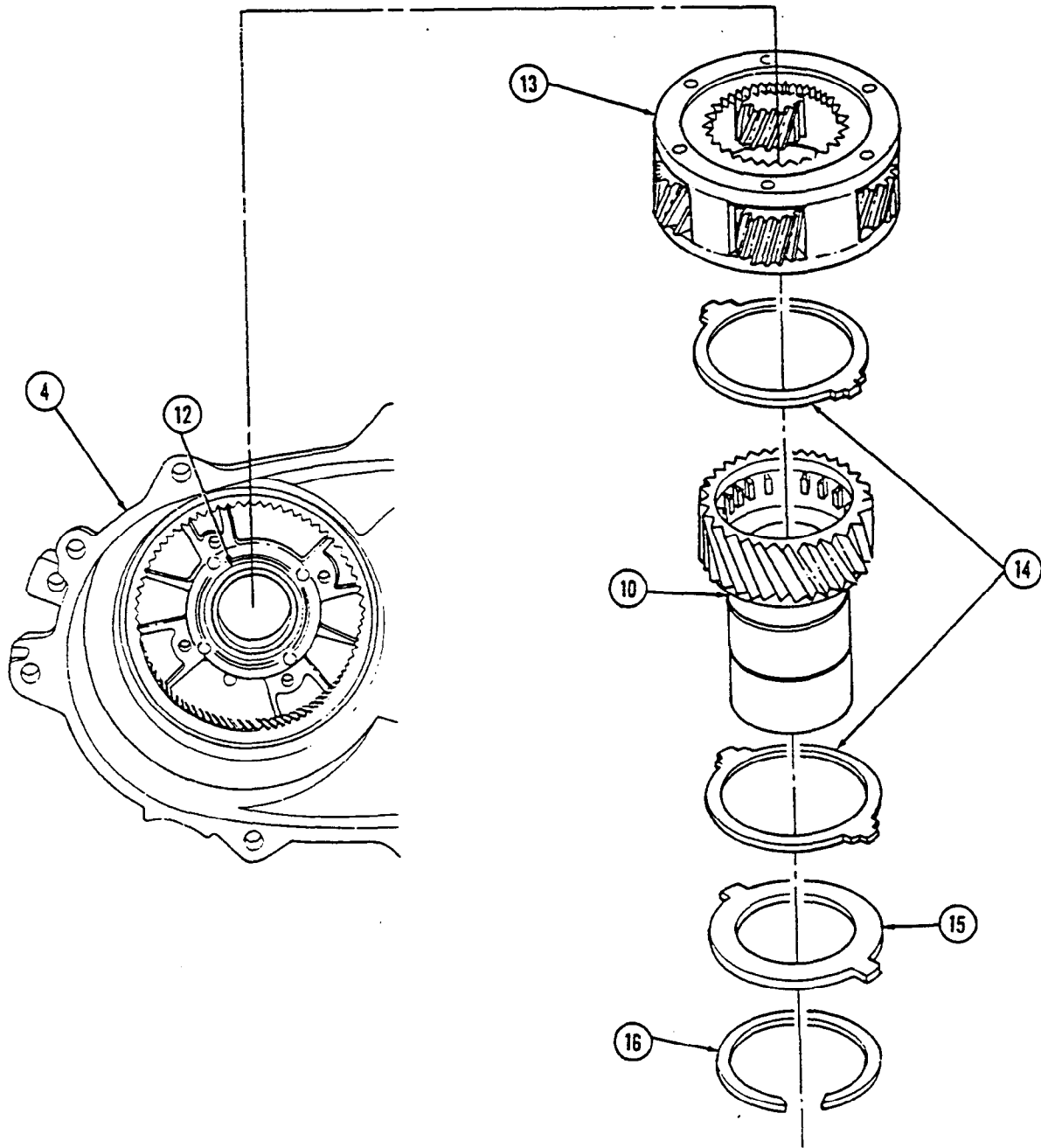
29-3. TRANSFER CASE REPAIR (Cont'd)

40. Twist range shift fork (2) and range clutch sleeve (3) to disengage pin (1) from shift sector (5) and remove range shift fork (2) and range clutch sleeve (3) from front half-case (4).
41. Remove shift sector (5) from front half-case (4).
42. Remove four screws (7) and bearing retainer (8) from front half-case (4). Pry on bearing retainer (8) at slots (11).
43. Remove input gear seal (6) from bearing retainer (8). Discard input gear seal (6).
44. Remove snapping (9) from input gear shaft (10).



29-3. TRANSFER CASE REPAIR (Cont'd)

45. Supporting front half-case (4), use driver handle and input gear bearing installer to press on input gear shaft (10) and remove input gear shaft (10) and low-range gear (13) from input bearing (12).
46. Remove snapping (16) from low-range gear (13).
47. Turn and remove retainer (15) from housing of low-range gear (13).
48. Remove two thrust washers (14) and input gear shaft (10) from low-range gear (13).



29-3. TRANSFER CASE REPAIR (Cont'd)

b. Cleaning

Clean all parts in accordance with para. 2-14.

c. Inspection and Repair

1. Inspect all parts in accordance with para. 2-15.
2. Repair all parts in accordance with para. 2-16.
3. Inspect front half-case (1) for cracks, nicks, burrs, blocked oil passages, and broken, missing, or damaged studs (7). Also check front input ball bearing (5) and front output ball bearing (4). Repair or replace damaged studs (7), remove burrs, and clear blocked oil passages. Replace front half-case (1) if cracked or broken at any machined surface. Remove and discard front output shaft seal (10). Replace front half-case (1) if annulus gear (2) is loose or damaged. Replace defective ball bearings as follows:

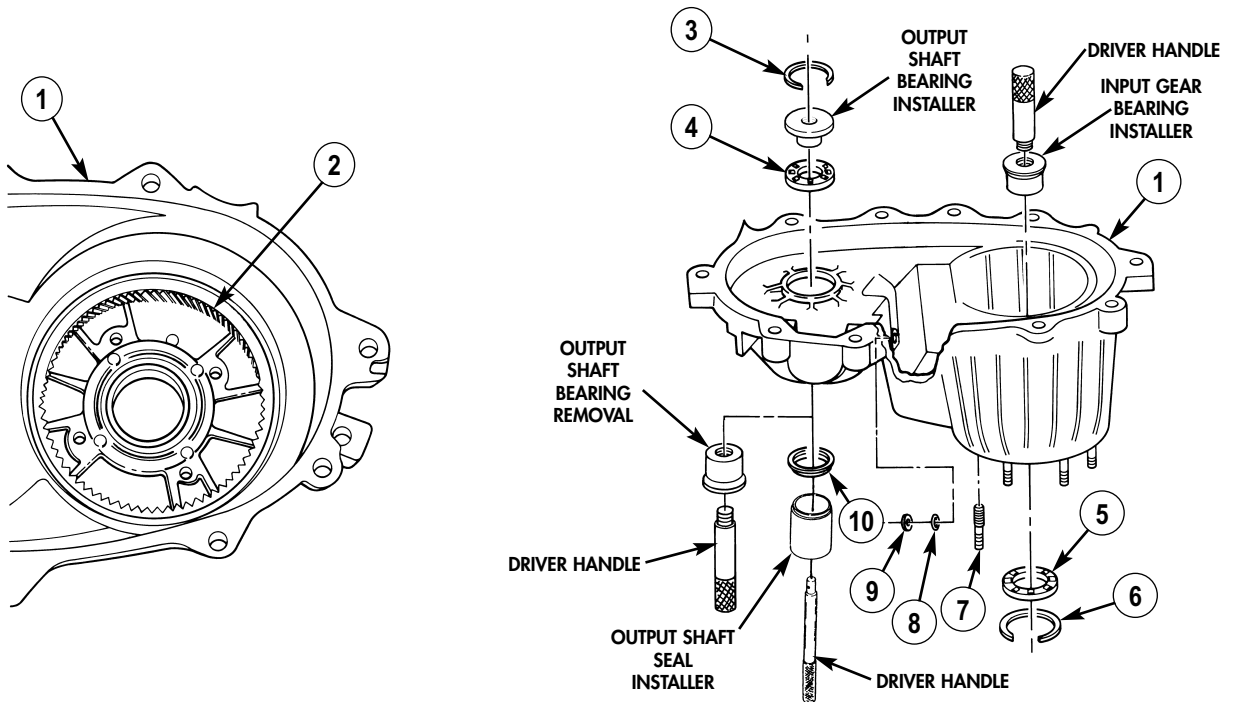
(a) Front output ball bearing (4).

- (1) Remove snapping (3) from front half-case (1).
- (2) Using driver handle, output shaft bearing remover, and output shaft bearing installer, remove and install ball bearing (4) in front half-case (1).
- (3) Install output shaft seal (10) in front half-case (1) with output shaft seal installer.

(b) Front input ball bearing (5).

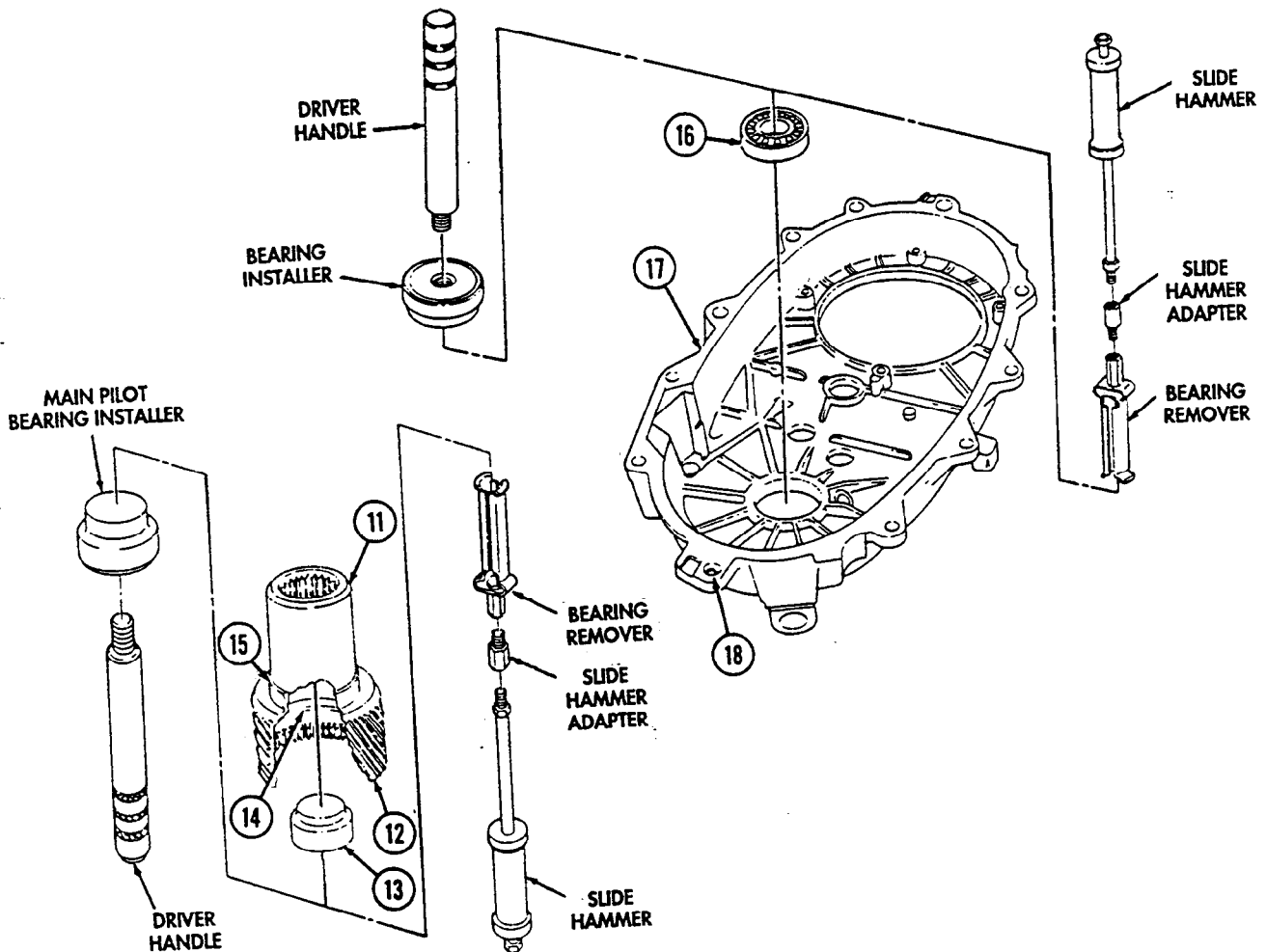
- (1) Using driver handle, input gear bearing installer, and arbor press, press ball bearing (5) out of front half-case (1).
- (2) Remove snapping (6) from ball bearing (5).
- (3) Install snapping (6) in ball bearing (5).
- (4) Using wooden block, seat ball bearing (5) in front half-case (1). Seat ball bearing (5) until snapping (6) is against front half-case (1).

4. Inspect retainer (9) and O-ring (8) for damage. Replace if damaged.



29-3. TRANSFER CASE REPAIR (Cont'd)

5. Inspect input gear (11) for breaks, cracks, broken or chipped gear teeth (12), scoring on sealing area (15), and damaged snapping groove (14). Inspect bearing (13). Replace input gear (11) if damaged. Replace bearing (13) as follows:
 - (a) Mount input gear (11) in soft-jawed vise, gear end up.
 - (b) Install bearing remover to remove bearing (13).
 - (c) Use slide hammer and slide hammer adapter to remove bearing (13) from input gear (11).
 - (d) Coat bearing (13) with transmission fluid and install in input gear (11) with driver handle and main pilot bearing installer.
6. Inspect rear half-case (17) for cracks, breaks, burrs, and plugged oil passages. Remove burrs. Replace rear half-case if cracked or broken. Inspect front output shaft rear bearing (16). Replace loose or damaged alignment retaining dowel (18). Replace front output shaft rear bearing (16) as follows:
 - (a) Using bearing remover, slide hammer and slide hammer adapter, remove bearing (16).
 - (b) Coat bearing (16) with transmission fluid.
 - (c) Using driver handle and bearing installer, install bearing (16) in rear half-case (17).



29-3. TRANSFER CASE REPAIR (Cont'd)

7. Inspect rear differential assembly (1).
 - (a) Mark front carrier (4) and rear carrier (3) cases for assembly.
 - (b) Remove six screws (2) from rear carrier (3) and turn rear carrier (3) over.
 - (c) Using slots (5), pry rear carrier (3) off front carrier (4).

NOTE

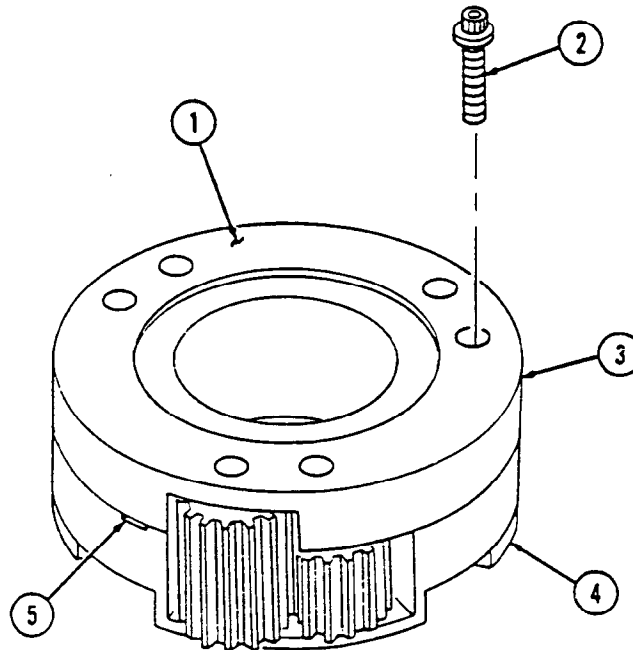
Needle bearings will fall free when removing short pinion gears.

- (d) Remove six pinion washers (6), three long pinion gears (7), six thrust washers (12), three short pinion gears (8), and fifty-four needle bearings (13) from pins (10) on front carrier (4).

NOTE

Record position of mainshaft gear, sprocket gear, and front carrier for assembly.

- (e) Remove mainshaft gear (9) and sprocket gear (11) from front carrier (4). Separate mainshaft gear (9) and sprocket gear (11).
- (f) Inspect front carrier (4) for cracks, damaged threads, broken or chipped gear teeth, and loose or damaged pins (10). Replace front carrier (4) if damaged.
- (g) Inspect rear carrier (3) for cracks and breaks. Replace rear carrier (3) if damaged.
- (h) Inspect short pinions (8) and long pinions (7) for cracks, chipped or broken gear teeth, and ridged or scored gear teeth. Replace three short pinions (8) and three long pinions (7) if any one is damaged.
- (i) Inspect thrust washers (12) and pinion washers (6) for breaks, cupping, and scoring. Replace all thrust and pinion washers (12) and (6) if any one is damaged.
- (j) Inspect mainshaft gear (9) and sprocket gear (11) for cracks, broken or chipped gear teeth, and cracks, gouges, or deep scoring on brass ring on bottom of mainshaft gear (9). Replace gear (9) or (11) if damaged.



29-3. TRANSFER CASE REPAIR (Cont'd)

CAUTION

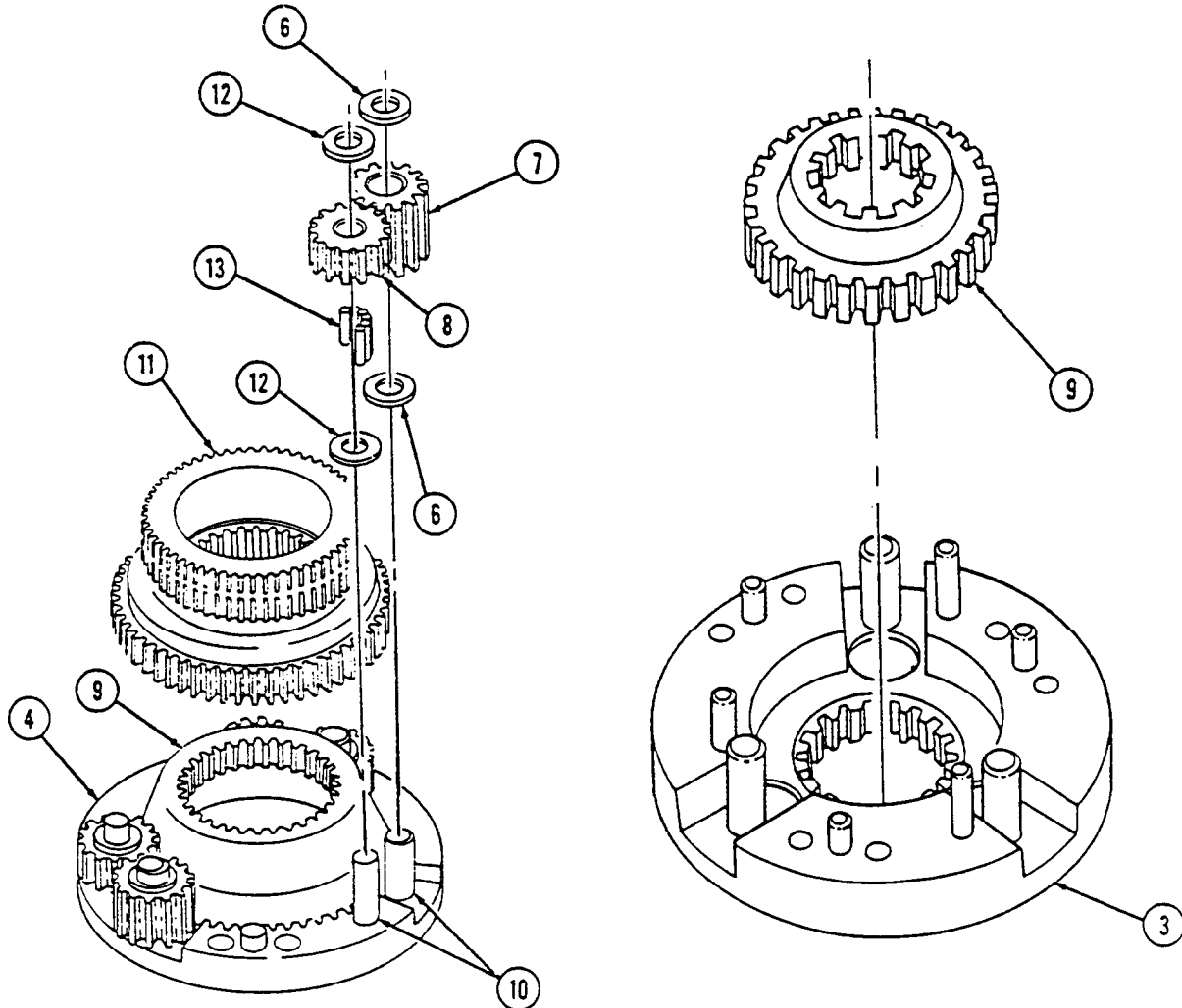
All transfer case parts must be lubricated with clean transmission fluid before assembly. Foreign material will cause transfer case damage.

- (k) Lay front carrier (4) on flat work table and place mainshaft gear (9) in rear carrier (3) with cone surface up.
- (l) Install sprocket gear (11) on mainshaft gear (9). Splined hub of mainshaft gear (9) must be up.

NOTE

Use petrolatum to hold needle bearings in place on pins.

- (m) Install three thrust washers (12), fifty-four needle bearings (13), three short pinion gears (8), and thrust washers (12) on pins (10).
- (n) Install three pinion washers (6), long pinion gears (7), and pinion washers (6) on pins (10).
- (o) Align index marks on front carrier (4) and rear carrier (3) and set rear carrier (3) over pins (10).
- (p) Install front carrier (4) and rear carrier (3) with six screws (2).



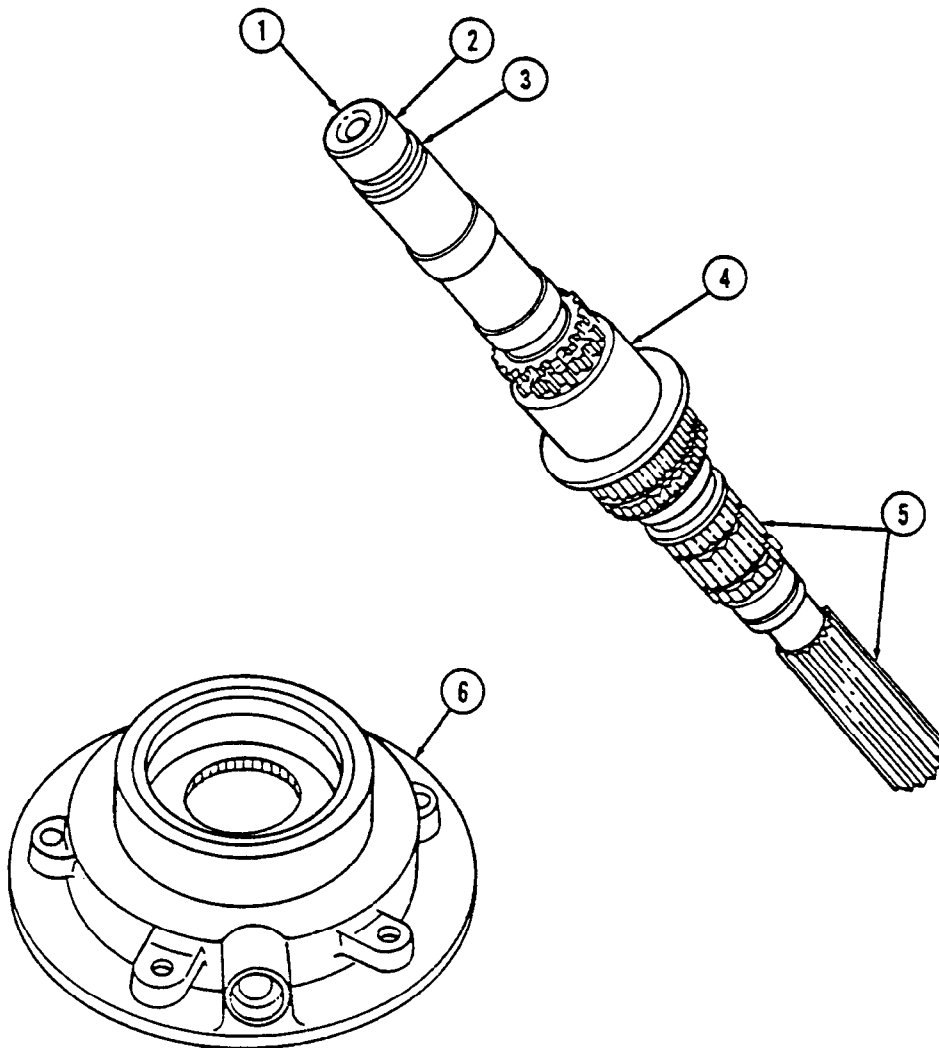
29-3. TRANSFER CASE REPAIR (Cont'd)

8. Inspect mainshaft (1) for cracks, breaks, scored bearing surfaces (2), chipped or broken splines (5), damaged lockring groove (3), and damaged gear teeth. Clean oil passages (4). Repair minor scoring and remove burrs on mainshaft (1). Replace mainshaft (1) if damaged.

NOTE

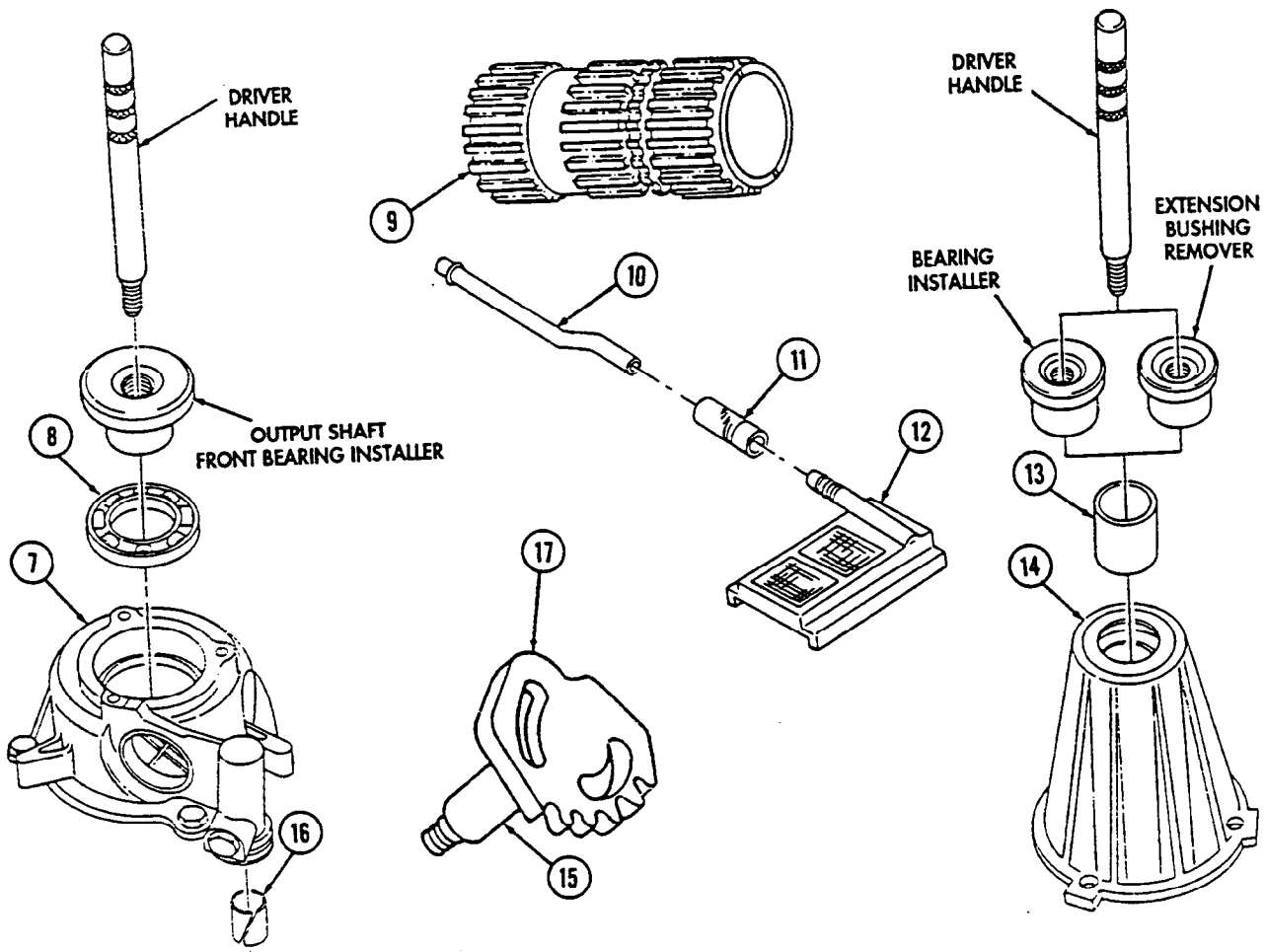
If any parts of oil pump fail inspection and cannot be repaired, replace oil pump.

9. Inspect oil pump (6) for cracks, breaks, scoring, and damaged bushing and threads. Replace oil pump (6) if any parts are damaged.



29-3. TRANSFER CASE REPAIR (Cont'd)

10. Inspect rear retainer (7) for cracks, breaks, damaged threads, and worn or damaged ball bearing (8). Repair damaged threads. Replace rear retainer (7) if cracked, broken, or threads unrepairable. Replace worn or damaged ball bearing (8). Replace loose or damaged alignment retainer dowel (16) if damaged.
 - (a) Use hammer and soft drift punch to remove ball bearing (8) from rear retainer (7).
 - (b) Seat ball bearing (8) in rear retainer (7) using driver handle and output shaft front bearing installer.
11. Inspect rear extension (14) for cracks, breaks, and worn or damaged bushing (13). Replace rear extension (14) if cracked or broken. Replace worn or damaged bushing (13) as follows:
 - (a) Remove defective bushing (13) using driver handle and extension bushing remover.
 - (b) Install bushing (13) in rear extension (14) using driver handle and bearing installer.
12. Inspect intermediate clutch shaft (9) for cracks, breaks, and bent or twisted splines. Replace intermediate clutch shaft (9) if damaged.
13. Inspect shift sector (17) for burrs, cracks, breaks, loose shaft (15), and damaged threads. Remove minor burrs and repair minor thread damage. Replace shift sector (17) if cracked, broken, or loose or damaged shaft (15).
14. Inspect oil screen (12), hose (11), and pickup tube (10). Clean oil screen (12) and inspect for holes. Replace oil screen (12) if damaged. Inspect tube (10), hose (11), and oil screen (12) for bends or cracks that would prevent sealing. Replace damaged parts.



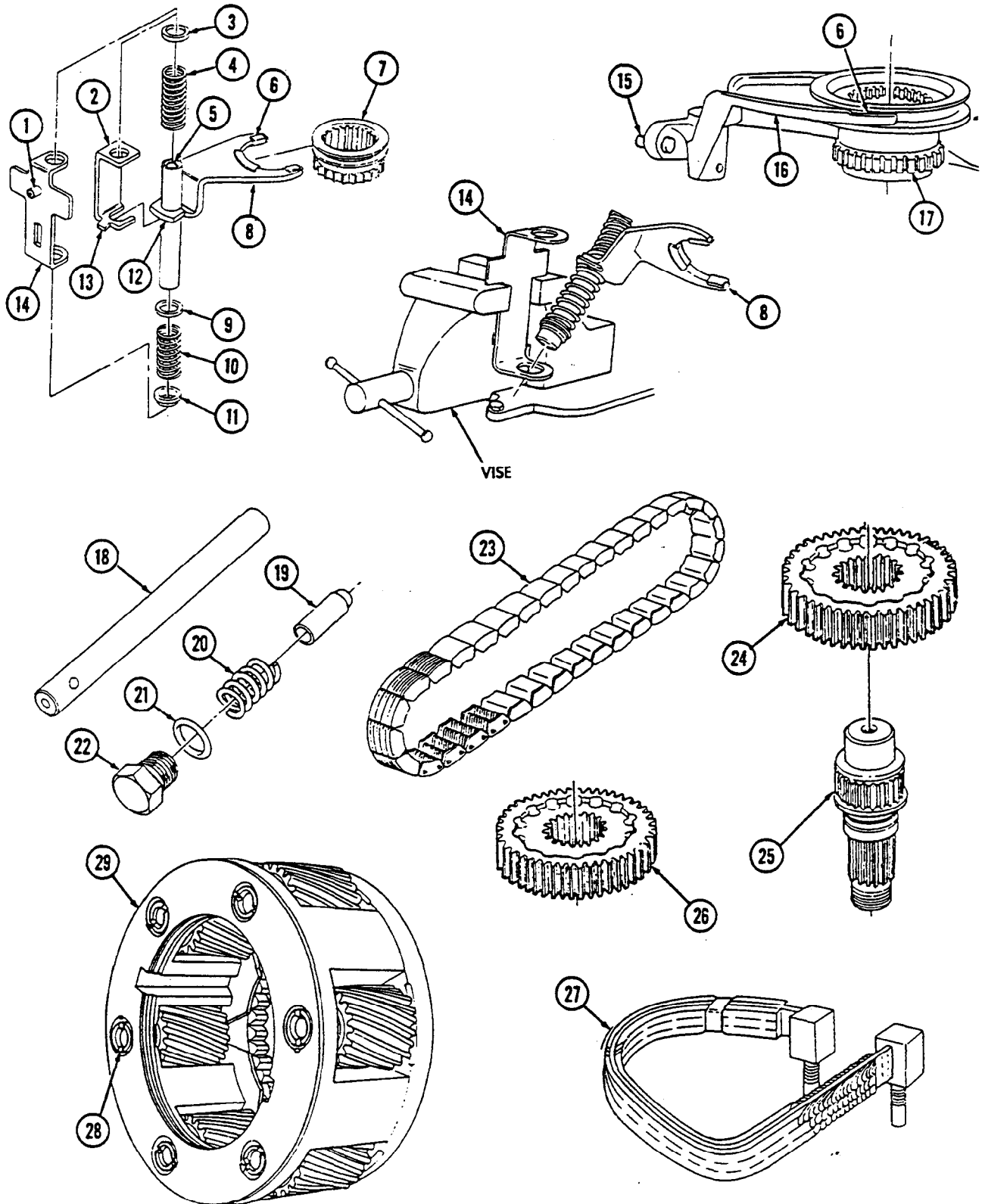
29-3. TRANSFER CASE REPAIR (Cont'd)
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15. Inspect range shift fork (16) for burrs, bends, and breaks. Remove burrs. Replace pads (6) if there is any wear. Replace range shift fork (16) if broken, cracked, loose pin (15) or damaged.
16. Inspect range clutch sleeve (17) and mode shift sleeve (7) for burrs, cracks, breaks, and damaged splines or gear teeth. Remove minor burrs. Replace range clutch sleeve (17) or mode shift sleeve (7) if damaged.
17. Inspect mode shift fork assembly (8) for cracks, breaks, bent brackets (2) and (14), and broken or deformed springs (4) and (10). If pads (6) are worn, replace pads (6). Replace bracket (14) if pin (1) is damaged. Mode shift fork assembly (8) must slide freely on shift rail (18) without excessive side free play. Inspect two bushings (5) for damage. Replace bushings (5) if damaged. If free play is excessive, replace mode shift fork assembly (8).
 - (a) Disassemble mode shift fork assembly (8) as follows:
 - (1) Position mode shift fork assembly (8) in vise with bracket (14) secured in vise.

NOTE

Mode shift fork assembly is under spring tension. Use care when compressing fork to release bracket.
 - (2) Press mode shift fork (8) down and tilt to free and remove mode shift fork assembly (8) from bracket (14).
 - (3) Remove bushing (11), spring (10), and thrust washer (9) from mode shift fork (8).
 - (4) Remove bracket (2), cup (3), and spring (4) from mode shift fork (8).
 - (5) Remove bracket (14) from vise.
 - (b) Assemble mode shift fork assembly (8) as follows:
 - (1) Install bracket (14) in vise.
 - (2) Install spring (4), cup (3), and bracket (2) on short end of mode shift fork (8). Ensure open end of bracket (2) is positioned under mode shift fork lip (12).
 - (3) Install thrust washer (9), spring (10), and bushing (11) on mode shift fork (8).
 - (4) Position mode shift fork assembly (8) on bracket (14).
 - (5) Press mode shift fork (8) down and forward until tab (13) on bracket (2) is seated in bracket (14).
 - (6) Remove mode shift fork assembly (8) from vise.
18. Inspect shift rail (18) for bends, cracks, and grooving. Replace shift rail (18) if damaged.
19. Inspect detent assembly for broken or kinked spring (20), broken or burred poppet (19), or damaged plug (22). Replace poppet spring seal (21) on plug (22). Replace plug (22), spring (20), or poppet (19) if damaged.
20. Inspect drive chain (23) for breaks, missing parts, kinks, and evidence of scratching on contact surfaces. Replace drive chain (23) if damaged.
21. Inspect drive sprocket (24) and driven gear (26) for cracks, breaks, bent or twisted splines, and broken or chipped gear teeth. Replace gears (24) or (26) if damaged.
22. Inspect front output shaft (25) for cracks, bent or twisted splines, damaged threads, and scored bearing and sealing surfaces. Minor scoring and thread damage is repairable. Replace front output shaft (25) if damaged.
23. Inspect low-range gear (29) for cracks, breaks, chipped or broken gear teeth, pinion side free play and smooth rotation. If front and rear carriers are loose, tighten screws (28); if still loose, replace low-range gear (29). For all other damage, replace low-range gear (29).
24. Inspect oil cooler (27) for bends, breaks, and leaks. Repair by straightening bent fins. Replace oil cooler (27) if damaged.

29-3. TRANSFER CASE REPAIR (Cont'd)



29-3. TRANSFER CASE REPAIR (Cont'd)

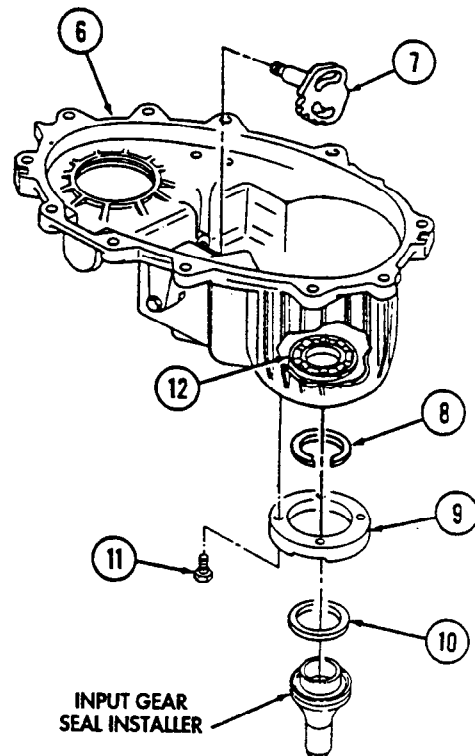
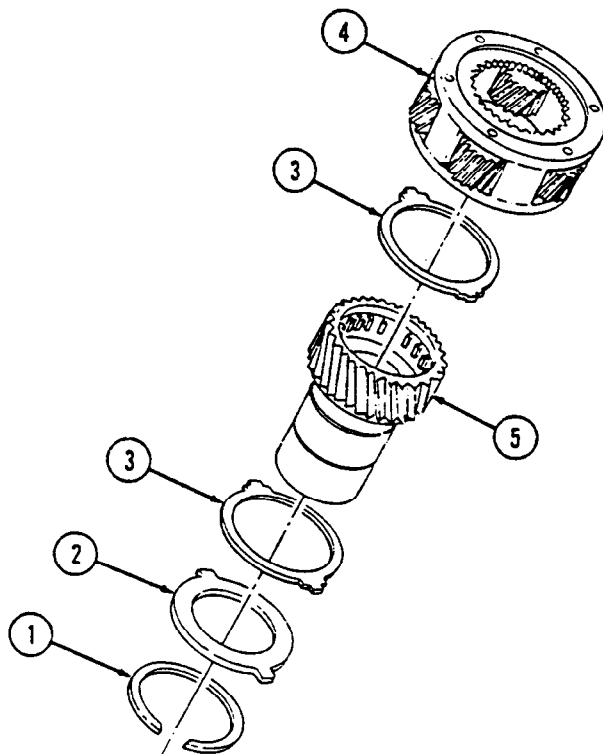
d. Assembly

1. For general assembly instructions, refer to para. 2-17.
2. Place thrust washer (3), input gear (5), thrust washer (3), and retainer (2) into low-range gear (4) with snapping (1). Make sure snapping (1) is fully seated in groove of low-range gear (4).

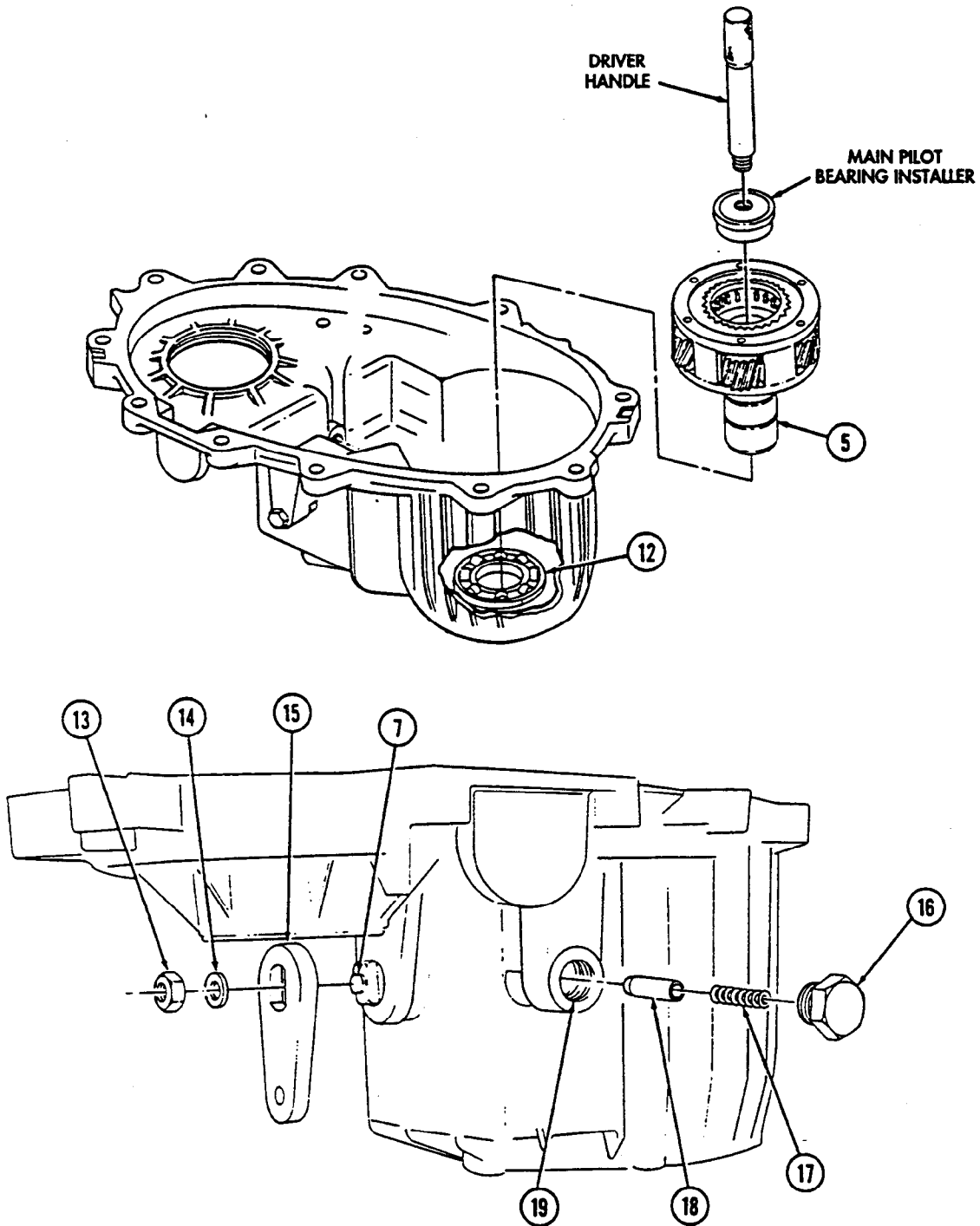
CAUTION

Use correct tool to press input gear into ball bearing. Pilot bearing could be moved out of position causing damage to equipment.

3. Using driver handle and main pilot bearing installer and supporting ball bearing (12), press shaft of input gear (5) into ball bearing (12). Snapping groove must be exposed beyond ball bearing (12).
4. Install snapping (8) in shaft of input gear (5).
5. Using input gear seal installer, install input gear seal (10) in bearing retainer (9).
6. Run a bead of sealer on contact surface of bearing retainer (9).
7. Install bearing retainer (9) on front half-case (6) with four screws (11). Tighten screws (11) to 12-20 lb-ft (16-27 N·m).
8. Install shift sector (7) in front half-case (6).
9. Install shift lever (15) on shift sector (7) with washer (14) and nut (13). Tighten nut (13) to 20-25 lb-ft (27-34 N·m).
10. Install poppet (18), spring (17), and shift detent plug (16) in bore (19). Tighten plug (16) to 12-18 lb-ft (16-24 N·m). Turn shift lever (15) so poppet (18) fits in teeth of shift sector (7).

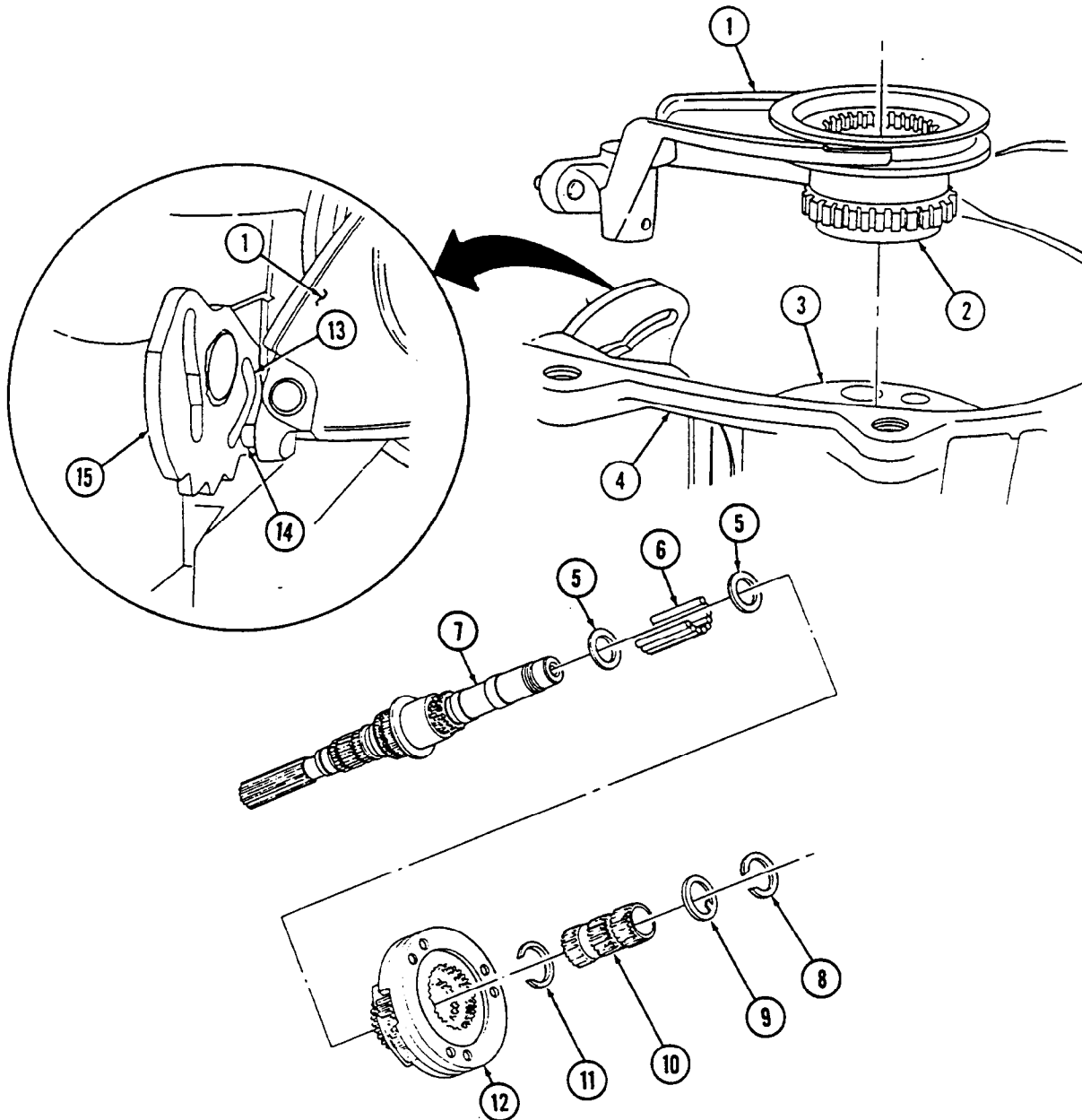


29-3. TRANSFER CASE REPAIR (Cont'd)



29-3. TRANSFER CASE REPAIR (Cont'd)

11. Position range shift fork (1) in range clutch sleeve (2).
12. Holding range shift fork (1) and range clutch sleeve (2) together, install range clutch sleeve (2) in input gear shaft (3) and pin (14) in angle slot (13) of shift sector (15). Move shift sector (15) as necessary to align fork (1).
13. Place thrust washer (5), fifty-three needle bearings (6), and thrust washer (5) on mainshaft (7). Use petrolatum to hold needle bearings (6) in place on mainshaft (7).
14. Carefully slide differential assembly (12) over mainshaft (7) and needle bearings (6) with snapping (11). Make sure that no needle bearings (6) are displaced.
15. Place intermediate clutch shaft (10) over mainshaft (7).
16. Position keyed thrust washer (9) over mainshaft (7) on intermediate clutch shaft (10) with snapping (8). Ensure snapping (8) seats in groove in mainshaft (7).

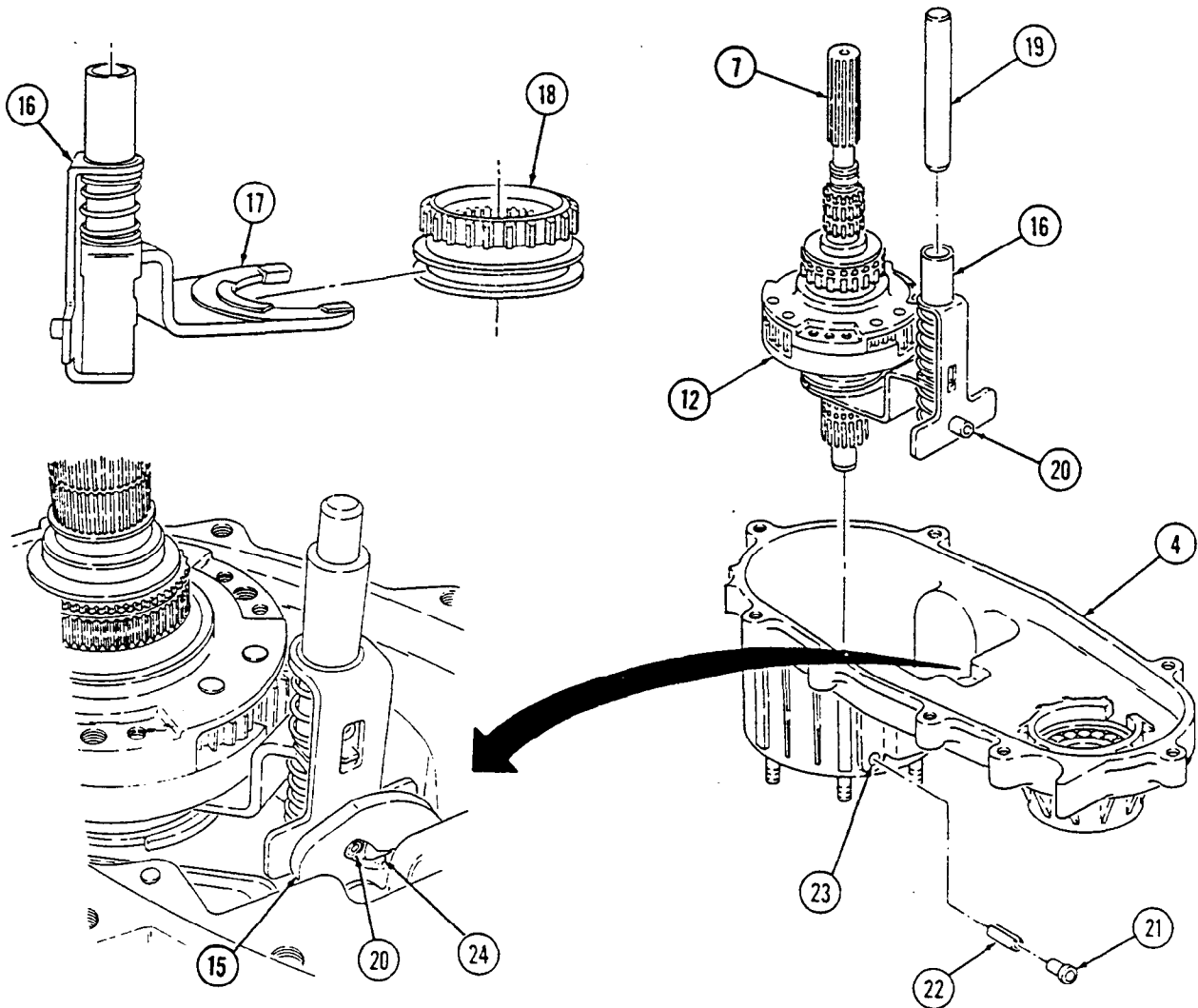


29-3. TRANSFER CASE REPAIR (Cont'd)

17. Slide mode shift sleeve (18) onto mode shift fork (17).
18. Slide mode shift fork assembly (16) over mainshaft assembly (7) and align with differential assembly (12).
19. Lifting on end of mainshaft assembly (7) and holding mode shift fork assembly (16) in place, set end of mainshaft assembly (7) into input gear in front half-case (4).
20. Carefully align pin (20) of mode fork (16) in long slot (24) of shift sector (15).
21. Align mode shift fork (16) and range shift fork (1) in front half-case (4) and insert shift rail (19) and seat in front half-case (4).

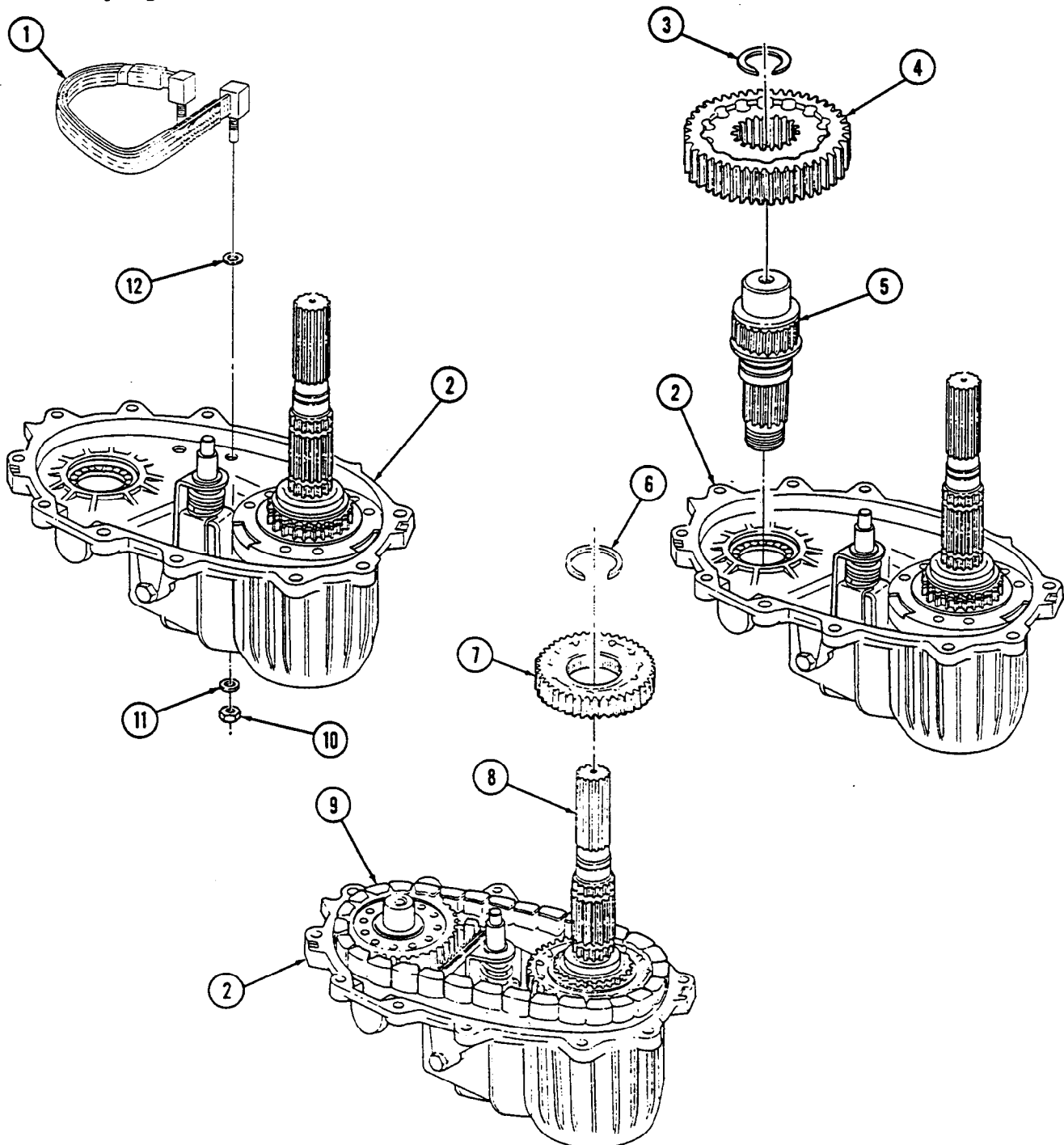
NOTE

- It may be necessary to use screw extractor to start tapered drive pin in range shift fork.
 - It may be necessary to remove shift lever to install tapered drive pin.
22. Align pin hole in range shift fork (1) and shift rail (19) with hole (23) in front half-case (4) and install tapered drive pin (22) in shift rail (19).
 23. Install plug (21) in front half-case (4).



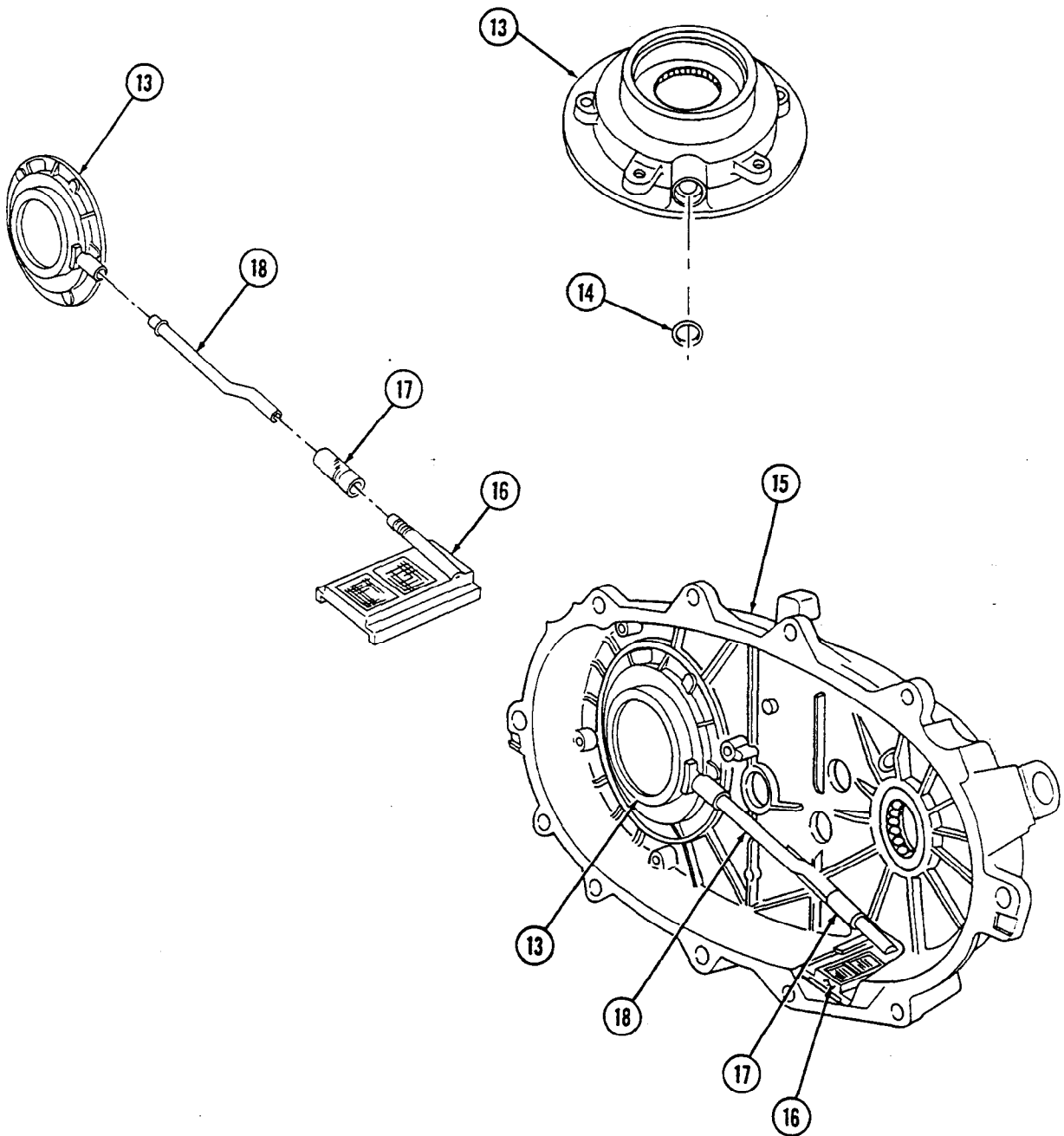
29-3. TRANSFER CASE REPAIR (Cont'd)

24. Install two O-rings (12) and oil cooler (1) in front half-case (2) with two washers (11) and nuts (10).
25. Install driven gear (4) on front output shaft (5) with snapping (3).
26. Install front output shaft (5) and driven gear (4) in front half-case (2).
27. Position drive chain (9) over mainshaft assembly (8) and driven gear (4).
28. Work drive sprocket (7) onto mainshaft assembly (8) and into drive chain (9) and mainshaft (8) with snapping (6).



29-3. TRANSFER CASE REPAIR (Cont'd)

29. Install oil tube seal (14) in pickup bore of front housing of oil pump (13).
30. Assemble oil screen (16), hose (17), and oil pickup tube (18).
31. Place oil pump (13) on rear half-case (15), insert pickup tube (18) into oil pump (13), and install oil screen (16) in rear half-case (15).



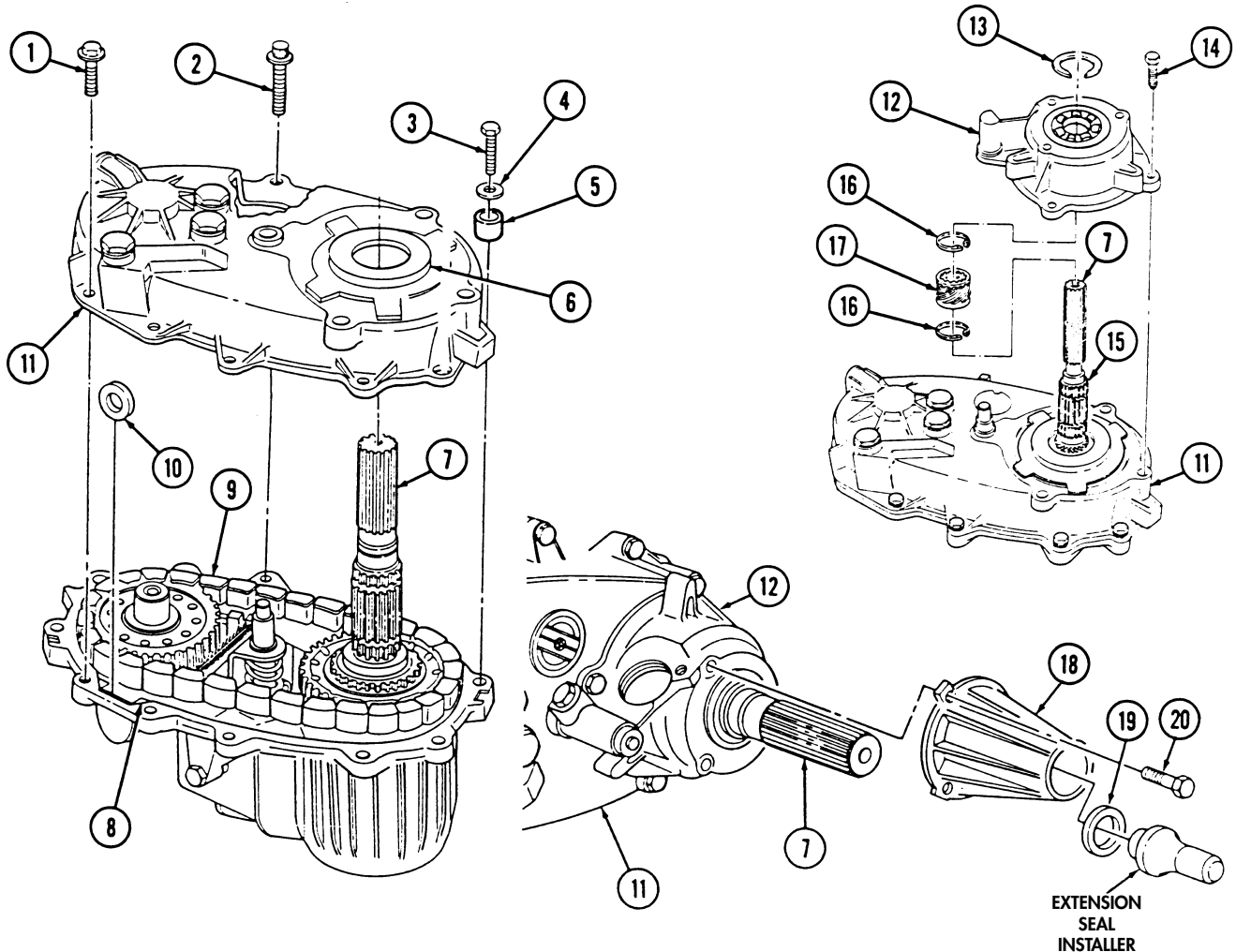
29-3. TRANSFER CASE REPAIR (Cont'd)

- 32. Install magnet pickup (10) in socket (8) in front half-case (9).
- 33. Install two alignment dowels (5) in rear half-case (11) if they were removed.

NOTE

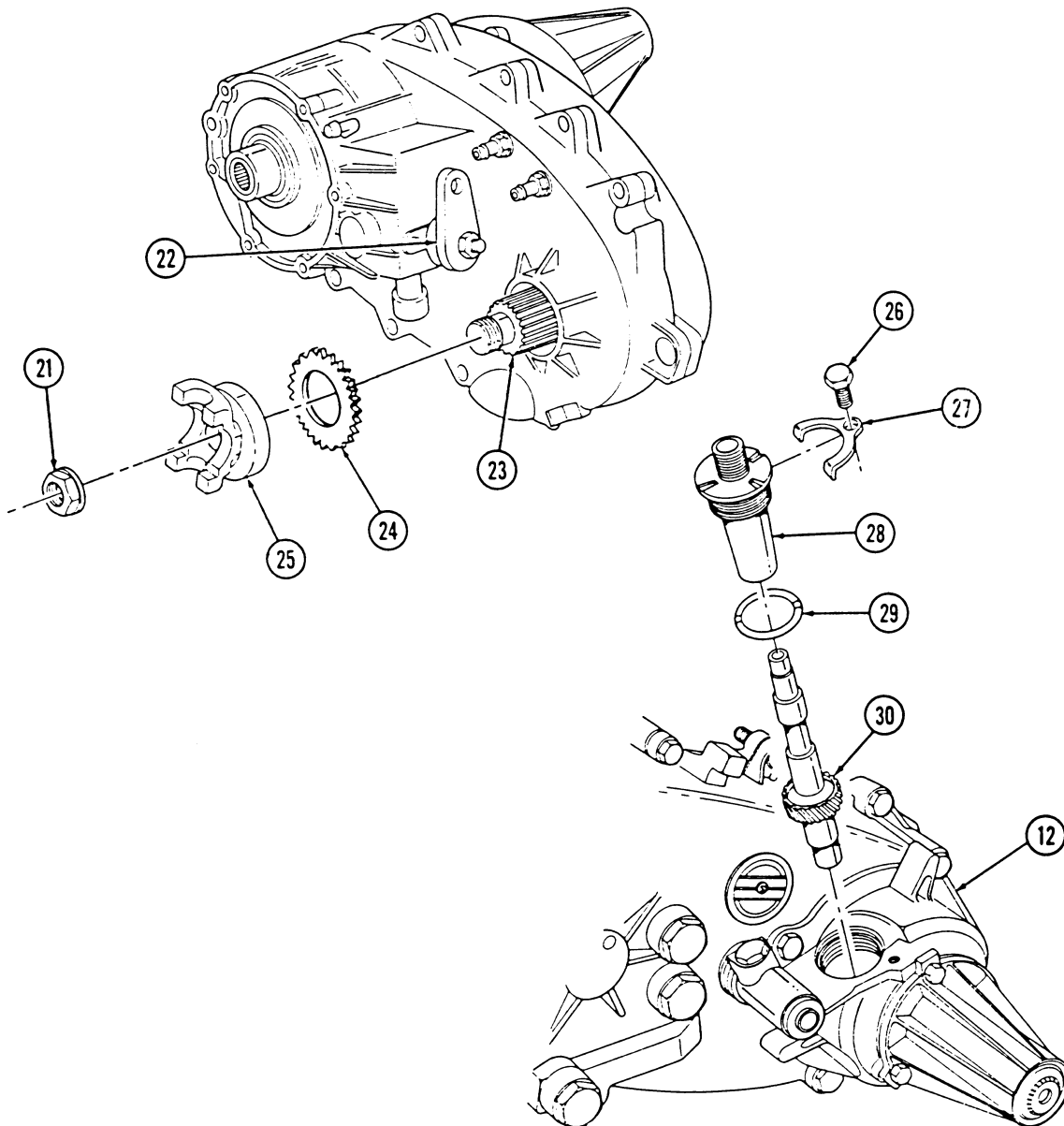
- Both front and rear contact surfaces must be clean, dry, and free of oil prior to application of silicone sealant. Oil spills may be wiped from transfer case with a nonpetroleum base cleaner. For proper bonding, half-cases should be assembled within five minutes after applying sealant, and all capscrews tightened within one hour after application of sealant.
- Ensure oil cooler is clear of transfer case housing during installation.

- 34. Run a 1/8-in. (3-mm) bead of sealer on mating flange surface of front half-case (9).
- 35. Position rear half-case (11) on front half-case (9) and install two washers (4) and capscrews (3) through alignment dowels (5) into front half-case (9). Turn mainshaft assembly (7) to align oil pump (6) gears.
- 36. Install two long screws (2) at front output shaft area and seven screws (1) in remaining holes in rear half-case (11). Tighten screws (3), (2), and (1) to 26-34 lb-ft (35-46 N·m).
- 37. Install speedometer drive gear (17) on main shaft (7) with two snaprings (16).



29-3. TRANSFER CASE REPAIR (Cont'd)

38. Run a 1/8-in. (3-mm) bead of sealer on sealing surface of rear retainer (12) and install on rear half-case (11) with four capscrews (14). Tighten capscrews (14) to 26-34 lb-ft (35-46 N·m).
39. Install snapping (13) on mainshaft assembly (7). Lift mainshaft (7) as necessary to clear groove (15) for snapping (13). Ensure snapping (13) is fully seated in groove (15).
40. Run a 1/8-in. (3-mm) bead of sealer on flange sealing surface of rear retainer (12).
41. Using extension housing seal installer, install rear output seal (19) on rear extension (18).
42. Install rear extension (18) on rear retainer (12) with three capscrews (20). Tighten capscrews (20) to 26-34 lb-ft (35-46 N·m).
43. Install front output yoke (25) on shaft (23) with lockwasher seal (24) and nut (21). Tighten nut (21) to 90-130 lb-ft (122-176 N·m).
44. Install driven gear (30), O-ring (29), and pinion adapter (28) in rear retainer (12) with clamp (27) and capscrew (26). Tighten capscrew (26) to 12-15 lb-in. (1.4-1.7 N·m).
45. Move shift range lever (22) to ensure transfer shifts into four detent positions. Turning shafts may be necessary to obtain full detent engagement.



FOLLOW-ON TASK: Install transfer case (para. 20-3).

CHAPTER 30 DIFFERENTIAL (GS) REPAIR

30-1. INTRODUCTION

This chapter contains maintenance instructions for disassembly and repair of propeller differential components at the general support maintenance level. Some subassemblies and parts must be removed before differential components can be accessed. They are referenced to other paragraphs in this manual.

30-2. DIFFERENTIAL REPAIR TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
30-3.	Differential Repair	30-2

30-3. DIFFERENTIAL REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Inspection d. Assembly |
|---|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Dial indicator (Appendix B, Item 113)
 Maintenance and repair shop equipment:
 automotive (Appendix B, Item 2)

Special Tools

Differential housing spreader
 (Appendix B, Item 101)
 Pinion setting gauge set (Appendix B, Item 106)
 Seal protector (Appendix B, Item 68)
 Rear bearing cup remover (Appendix B, Item 102)
 Front bearing cup remover (Appendix B, Item 103)
 Rear bearing cup installer (Appendix B, Item 104)
 Front bearing cup installer (Appendix B, Item 105)
 Yoke seal installer (Appendix B, Item 82)
 Driver handle (Appendix B, Item 60)
 Axle shaft and seal installer
 (Appendix B, Item 99)
 Two axle holding fixture adapters
 (Appendix B, Item 100)

Materials/Parts

Two seal washers (Appendix G, Item 422)
 Three locknuts (Appendix G, Item 161)
 Collapsible spacer (Appendix G, Item 447)
 Pinion seal (Appendix G, Item 407)
 Two output seals (Appendix G, Item 406)
 Lubricating oil (Appendix C, Item 43)
 RTV silicone sealant (Appendix C, Item 74)
 Four guide pins (Appendix D, Fig. 61)

Personnel Required

One mechanic
 One assistant

Manual References

TM 9-2320-387-24P

Equipment Condition

Differential removed (para. 21-5).

Maintenance Level

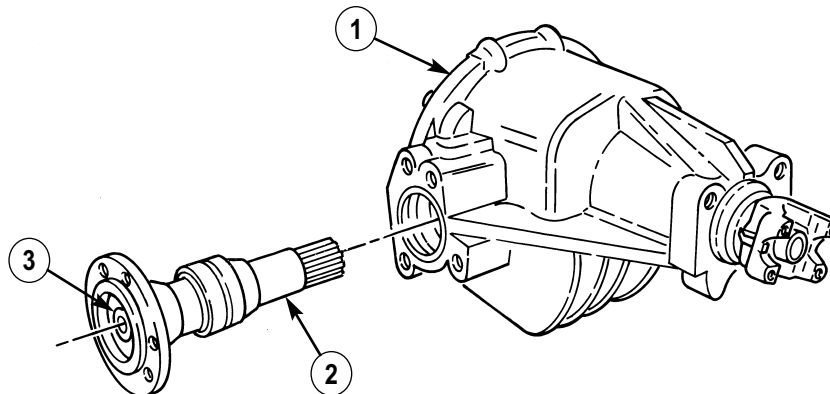
General support

NOTE

- Work area should be clean, well-ventilated, and free from blowing dirt and dust.
- Refer to axle differential housing identification part number, located on housing, before ordering any replacement parts.

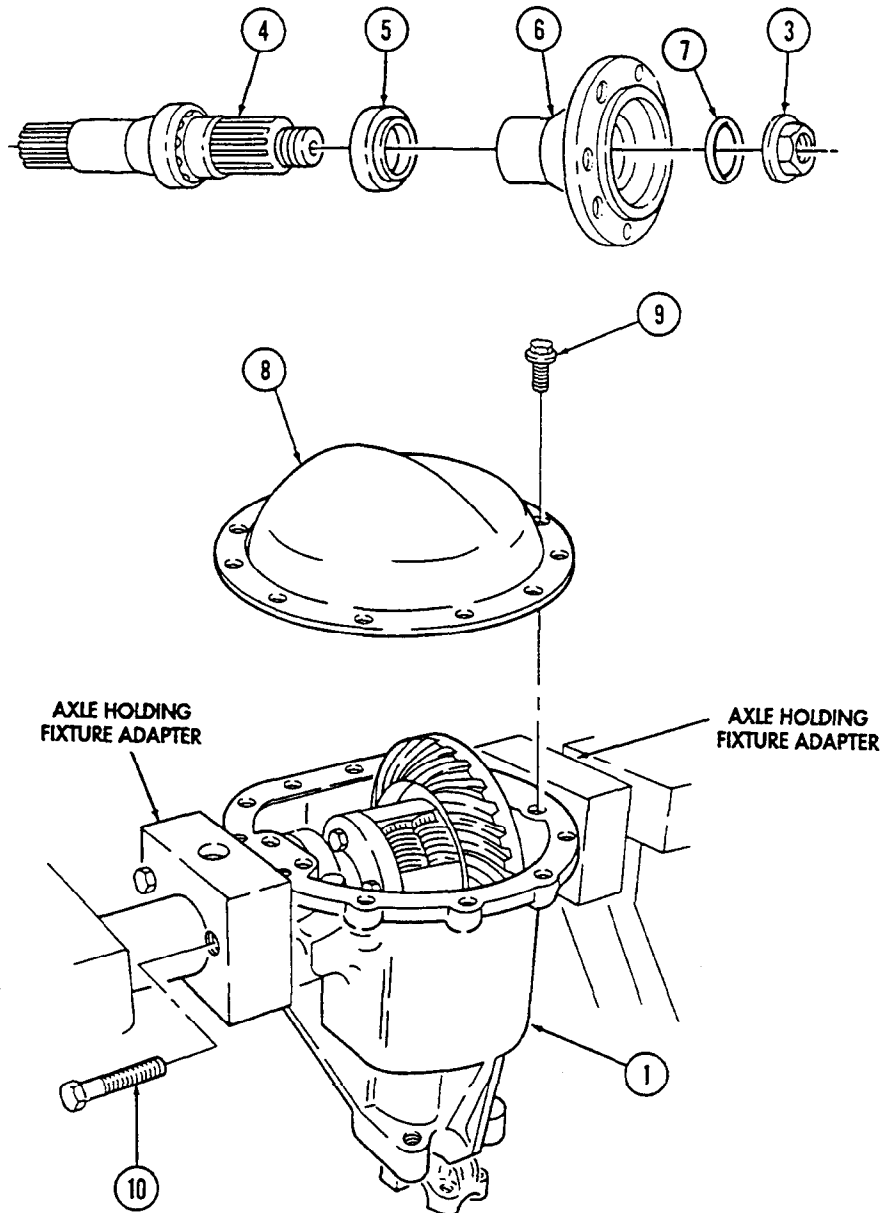
a. Disassembly

1. Loosen locknut (3) on output shaft assembly (2).
2. Using slide hammer, remove output shaft assembly (2) from differential housing (1).



30-3. DIFFERENTIAL REPAIR (Cont'd)

3. Remove locknut (3), seal washer (7), output flange (6), and output shaft seal (5) from output shaft (4). Discard seal washer (7), output shaft seal (5), and locknut (3).
4. Repeat steps 1 through 3 for opposite side.
5. Install two axle holding fixture adapters on housing (1) with four capscrews (10). Place housing (1) in holding stand.
6. Position housing (1) so differential cover (8) faces up. Remove twelve capscrews (9) and cover (8) from housing (1).



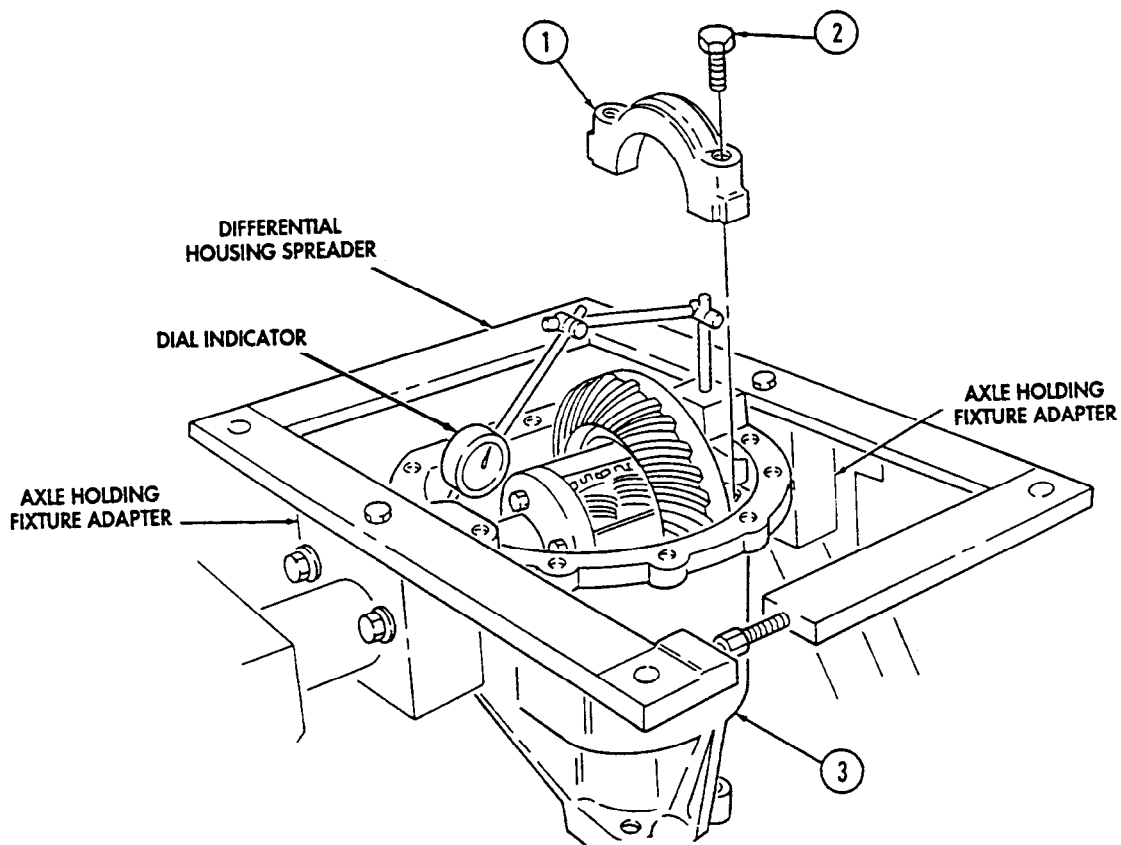
30-3. DIFFERENTIAL REPAIR (Cont'd)

7. Mark two bearing caps (1) and housing (3) for assembly and remove four capscrews (2) and two bearing caps (1) from housing (3).
8. Install differential housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing (3). Dial indicator must have preload setting of 0.020 in. (0.5 mm).

CAUTION

Over tightening of differential housing spreader will damage differential housing.

9. Spread housing (3) 0.010 in. (0.25 mm) and remove dial indicator.



30-3. DIFFERENTIAL REPAIR (Cont'd)

NOTE

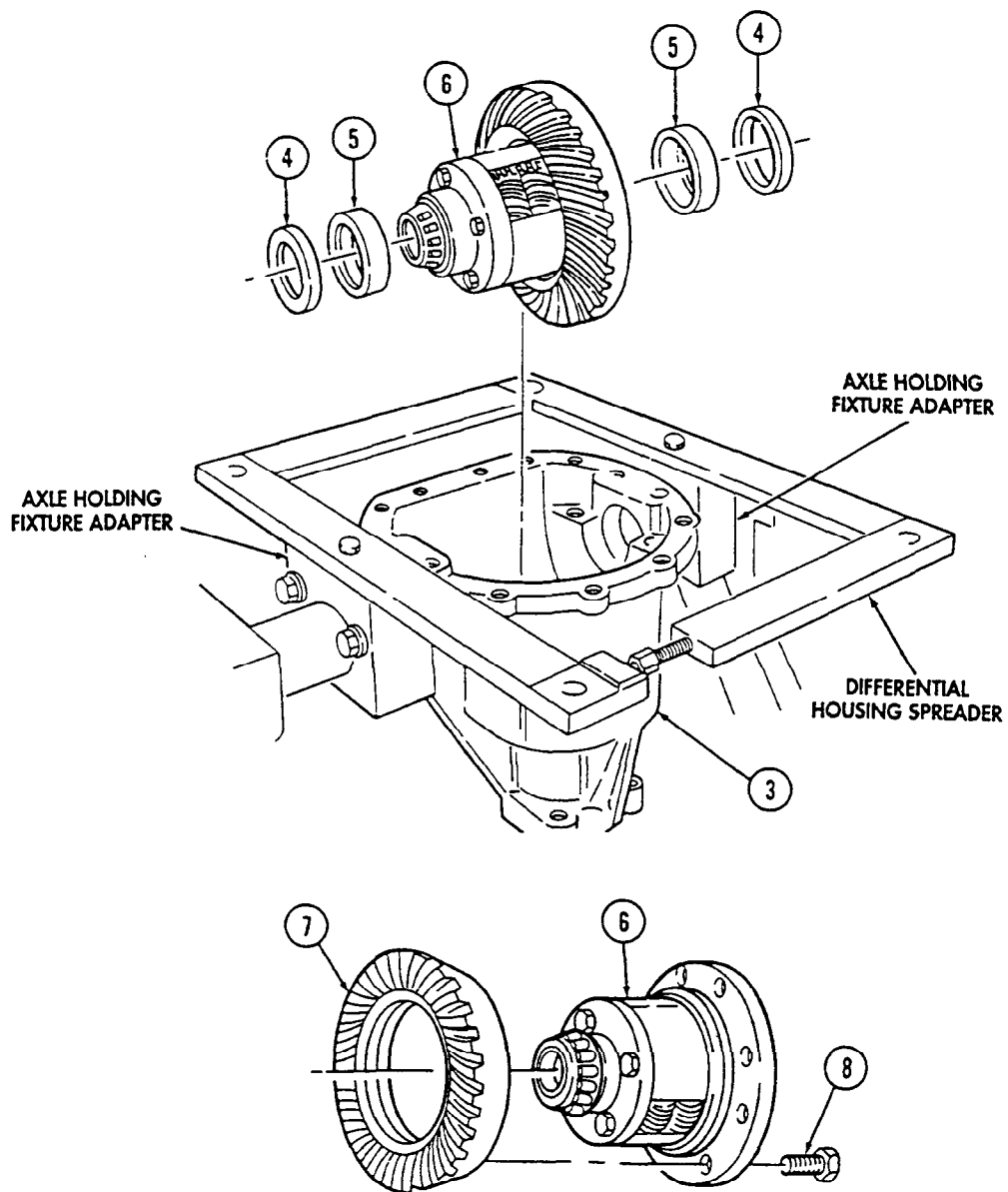
Tag bearing shims and bearing cups for assembly.

10. Remove differential case (6), two bearing cups (5), and shims (4) from housing (3).
11. Relieve pressure on housing spreader and remove from housing (3).

CAUTION

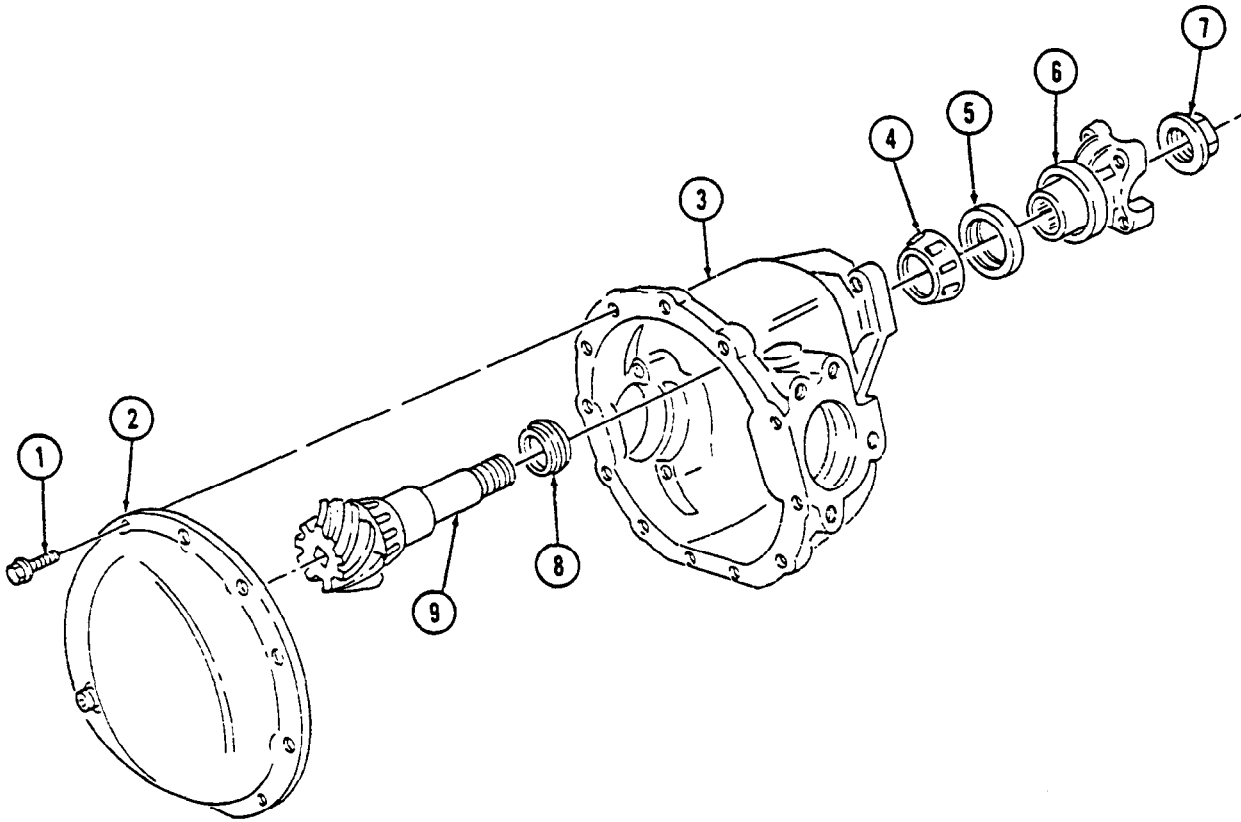
Do not chisel or wedge ring gear from differential case or damage may result.

12. Remove eight capscrews (8) and ring gear (7) from differential case (6).



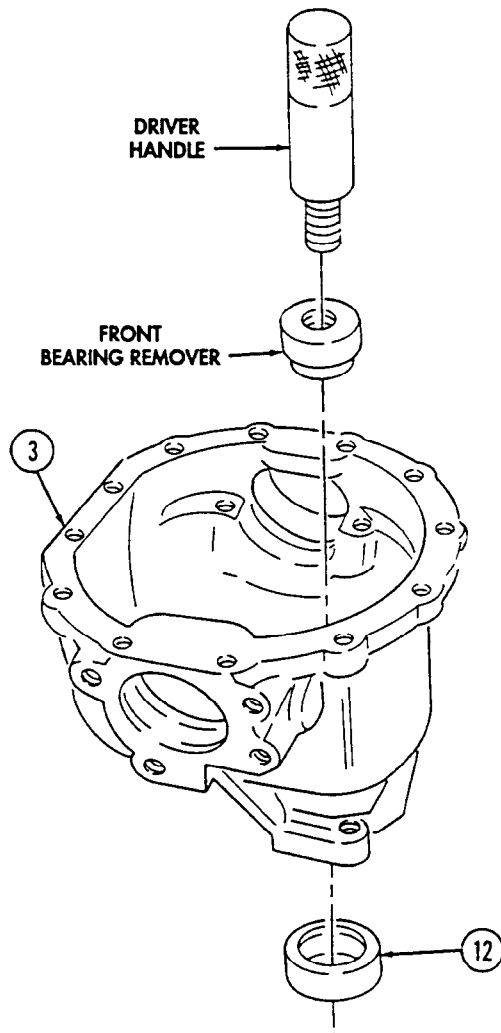
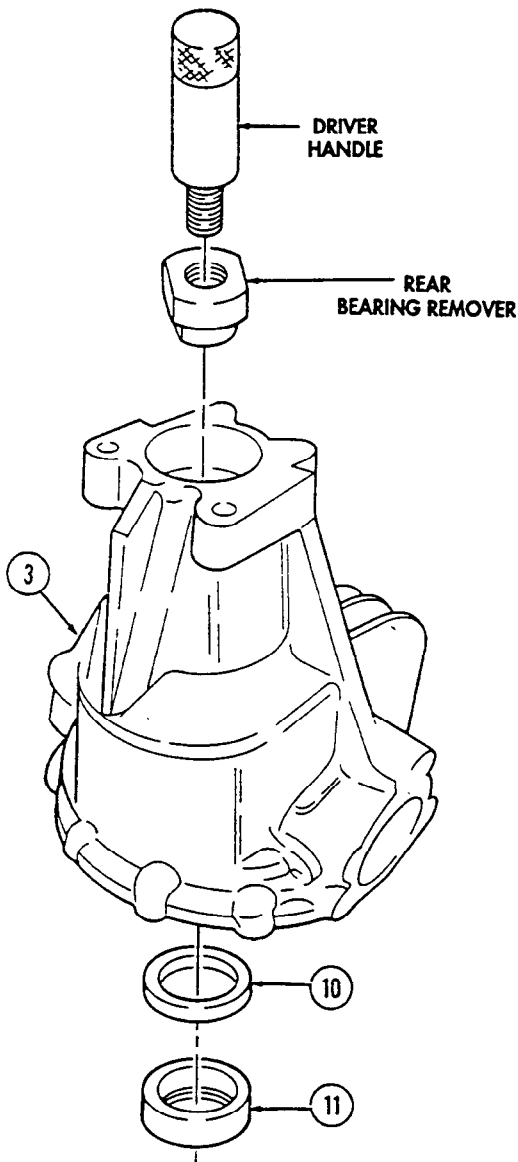
30-3. DIFFERENTIAL REPAIR (Cont'd)

13. Rotate housing (3) 90°. Install cover (2) on housing (3) with two capscrews (1).
14. Remove locknut (7) securing pinion yoke (6) to pinion gear (9). Discard locknut (7).
15. Remove pinion yoke (6) from pinion gear (9).
16. Drive pinion gear (9) out of front bearing (4).
17. Remove two capscrews (1), cover (2), pinion gear (9), and collapsible spacer (8) from housing (3). Discard collapsible spacer (8).
18. Remove pinion seal (5) and front bearing (4) from housing (3). Discard pinion seal (5).



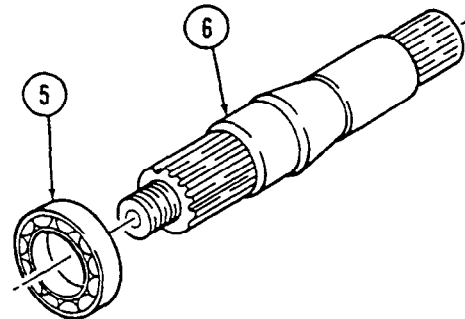
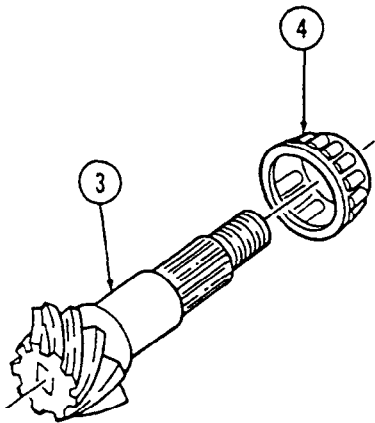
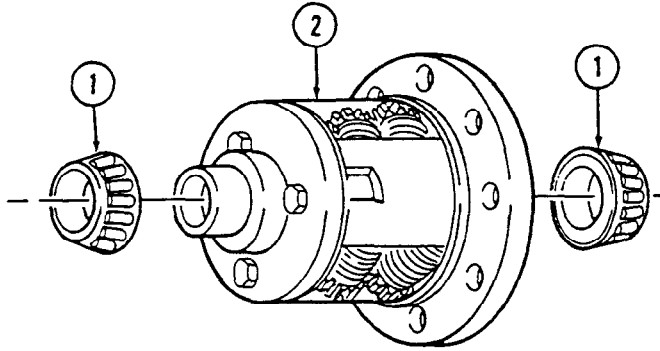
30-3. DIFFERENTIAL REPAIR (Cont'd)

19. Rotate front of housing (3) upward 90°. Using driver handle and rear bearing remover, remove rear bearing cup (11) and pinion depth shim (10) from housing (3).
20. Rotate housing (3) 180°. Using driver handle and front bearing remover, remove front bearing cup (12) from housing (3).



30-3. DIFFERENTIAL REPAIR (Cont'd)

21. Remove two differential side bearings (1) from differential case (2).
22. Remove rear bearing (4) from pinion gear (3).
23. Remove two bearings (5) from output shafts (6).



30-3. DIFFERENTIAL REPAIR (Cont'd)**b. Cleaning**

Clean all differential parts in accordance with para. 2-14.

c. Inspection**NOTE**

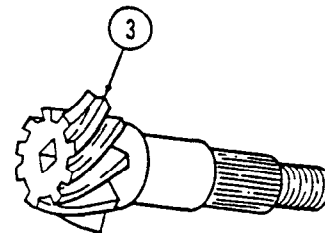
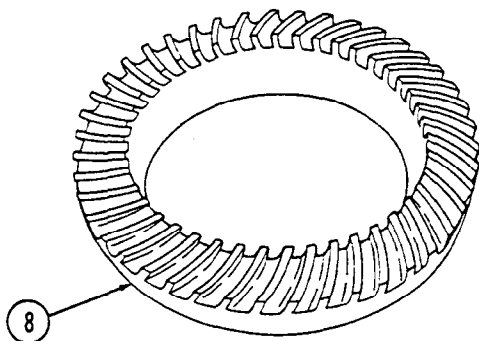
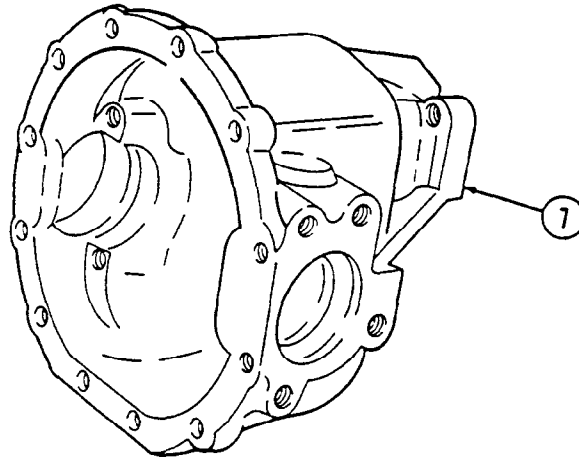
For general inspection instructions, refer to para. 2-15.

1. Inspect housing (7) and all threaded holes for damage. Repair any damaged threads with thread repair inserts. Replace differential if housing (7) is damaged.

NOTE

Ring and pinion gears must be replaced as matched set.

2. Inspect splines and gear teeth on pinion gear (3) and ring gear (8) for damage. Replace both pinion gear (3) and ring gear (8) if either are damaged.

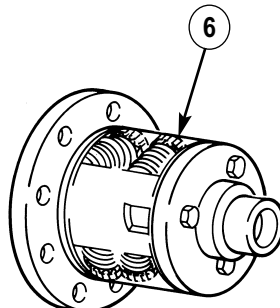
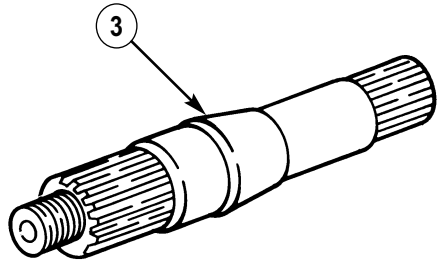
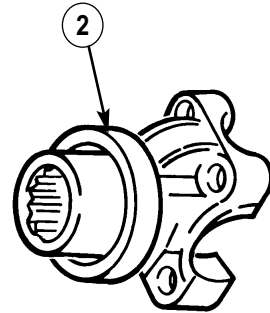
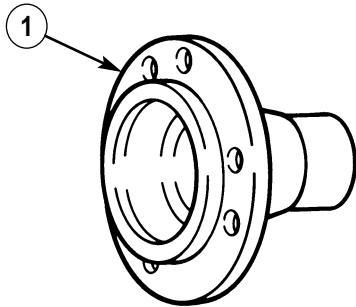


30-3. DIFFERENTIAL REPAIR (Cont'd)

NOTE

If rear pinion yoke is being replaced, a new slinger must be installed on new pinion yoke. Ensure slinger is seated against rear shoulder of yoke.

3. Inspect splines and sealing surfaces on output flanges (1), pinion yoke (2), and two output shafts (3) for damage. Replace if damaged.
4. Inspect all bearings (4) and bearing cups (5) for damage. Replace bearings (4) and bearing cups (5) in matched sets if either is damaged.
5. Inspect differential case (6) for damage. Replace if damaged.

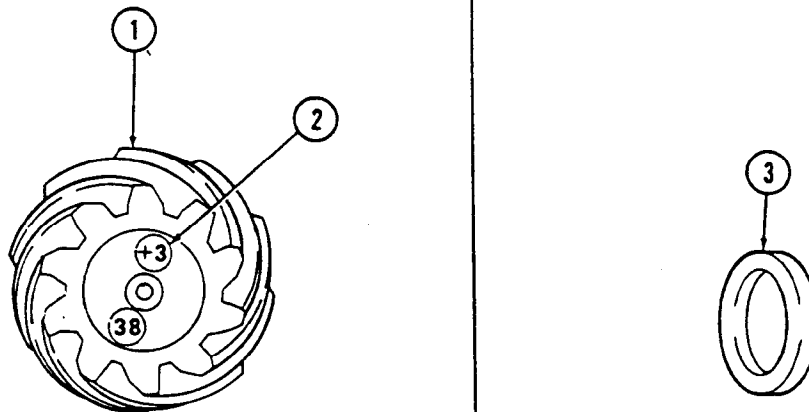


30-3. DIFFERENTIAL REPAIR (Cont'd)

d. Assembly

NOTE

- For general assembly instructions, refer to para. 2-17.
 - Pinion gear depth is the distance from end face of pinion to center line of output shafts. The dimension is controlled by shims between pinion gear rear bearing cup and differential housing. The pinion gear is etched with two identifying numbers: the first number identifies ring gear and pinion gear as a matched set; the second number represents pinion depth variance and is preceded by a plus (+) or minus (-), which represents the amount in thousandths the gear set varied from the standard setting of 2.547 in. (6.47 cm).
 - If using original gear set, use original pinion depth shim as a starter shim and proceed to step 4.
1. Measure thickness of original pinion depth shim (3) and record for reference.
 2. Check pinion depth variance numbers (2) marked on old and new pinion gears (1) and record for references.



30-3. DIFFERENTIAL REPAIR (Cont'd)

NOTE

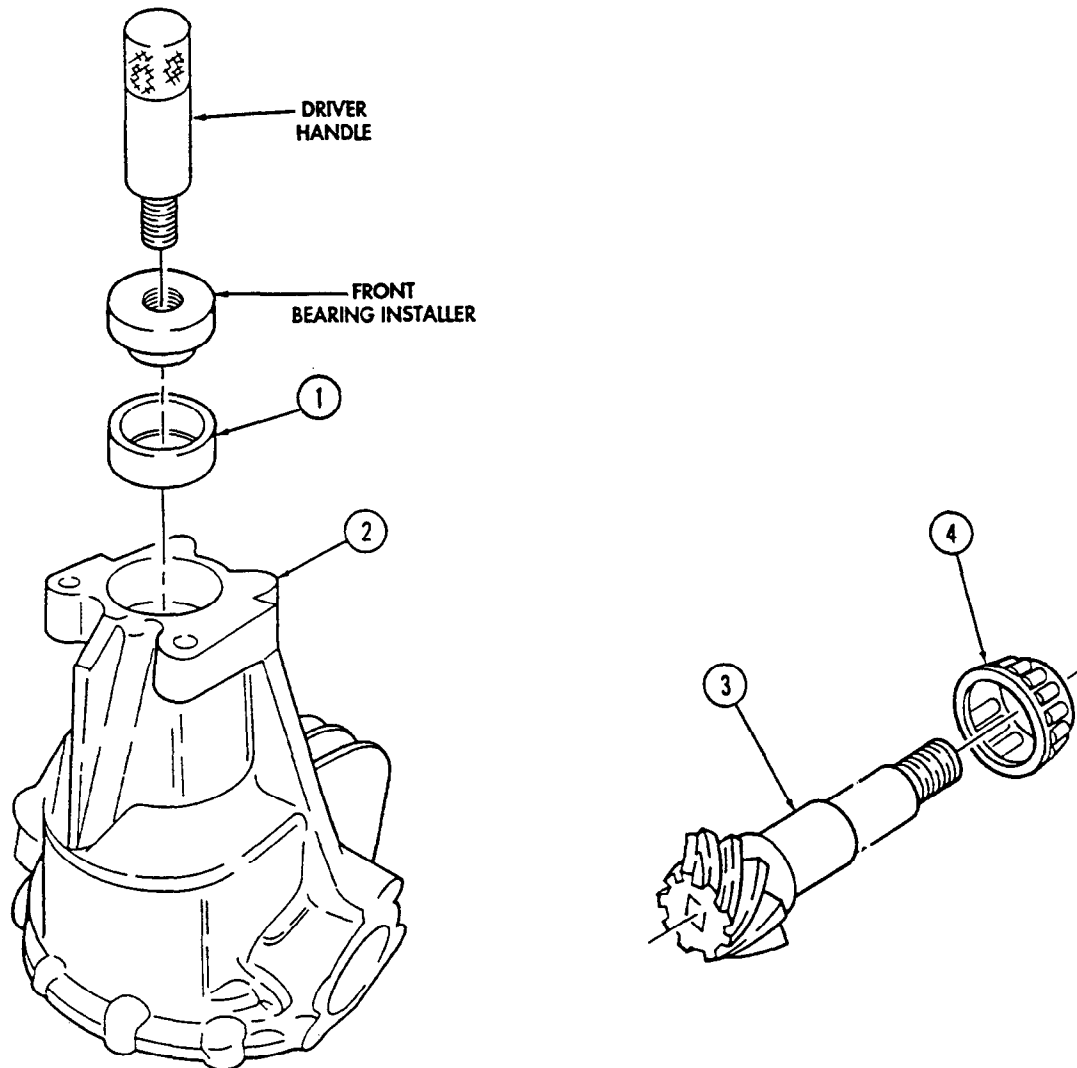
- If the old pinion is marked -3 and the new pinion is marked +2, the procedure would be as follows: Refer to Old Pinion Marking column at left side of table and locate -3. Then read to right, across table, until under +2 in New Pinion Marking column. Box where two columns intersect is amount of shim thickness change required. In this case, the number in the intersecting box is -0.005 in. (-0.13 mm), which represents the amount to be subtracted from the old shim thickness. If the box number had been a + figure, this amount would be added to the old shim thickness.
 - This table determines an initial shim thickness. The actual pinion depth measurement must be performed and final shim thickness adjusted as necessary.
 - Pinion shims are available from 0.084-0.111 in. (2.13-2.82 mm) in increments of 0.0005 in. (0.0127 mm).
3. Refer to Old and New Pinion Marking columns in table 30-1, Pinion Variance Table. Note on table where old and new pinion depth variances intersect to determine amount to be added or subtracted from original pinion depth shim for desired pinion depth starter shim.

Table 30-1. Pinion Variance Table (Inches).

OLD PINION MARKING	NEW PINION MARKING								
	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008

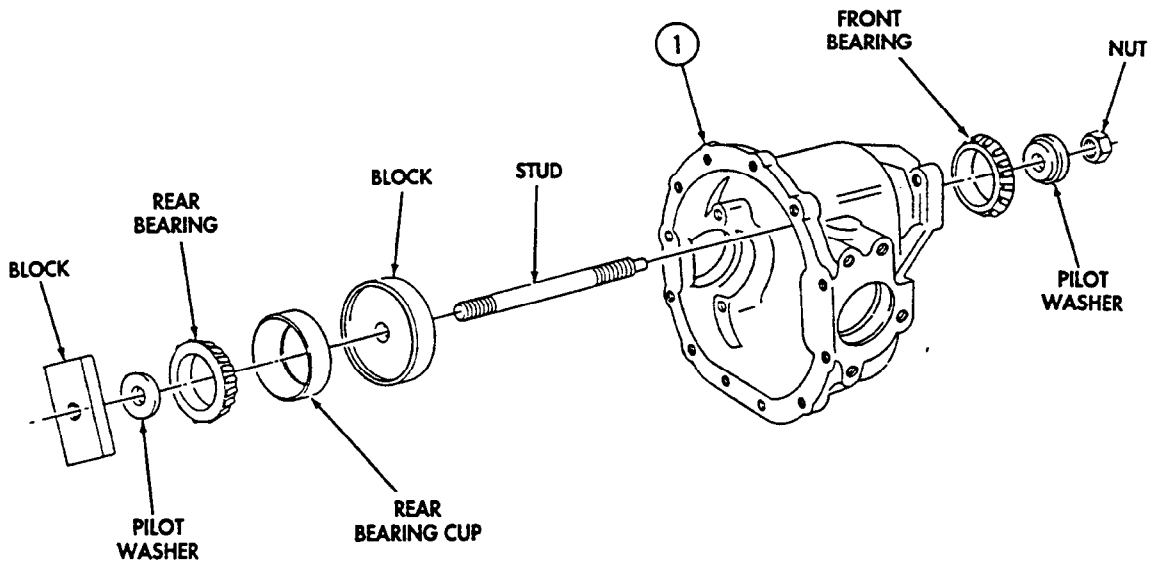
30-3. DIFFERENTIAL REPAIR (Cont'd)

4. Rotate housing (2) so front bearing cup bore faces up.
5. Lubricate outside diameter of front bearing cup (1) with lubricating oil. Using driver handle and front bearing installer, install cup (1) in housing (2).
6. Install rear bearing (4) on pinion gear (3).



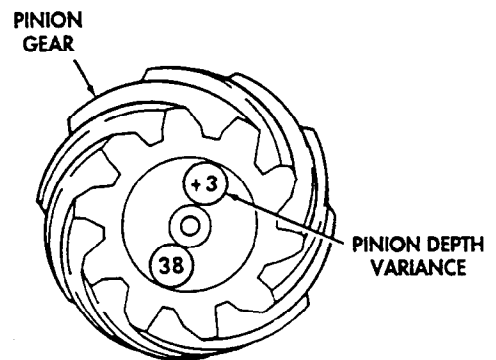
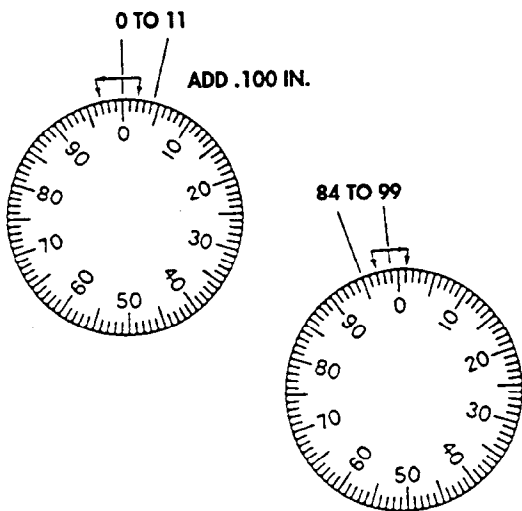
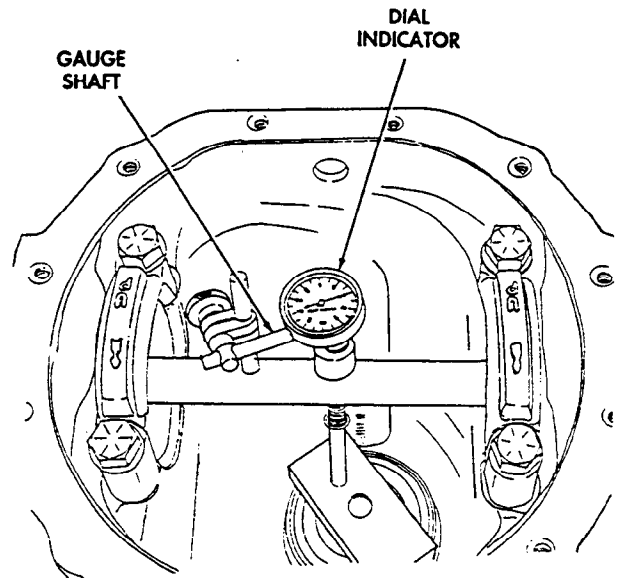
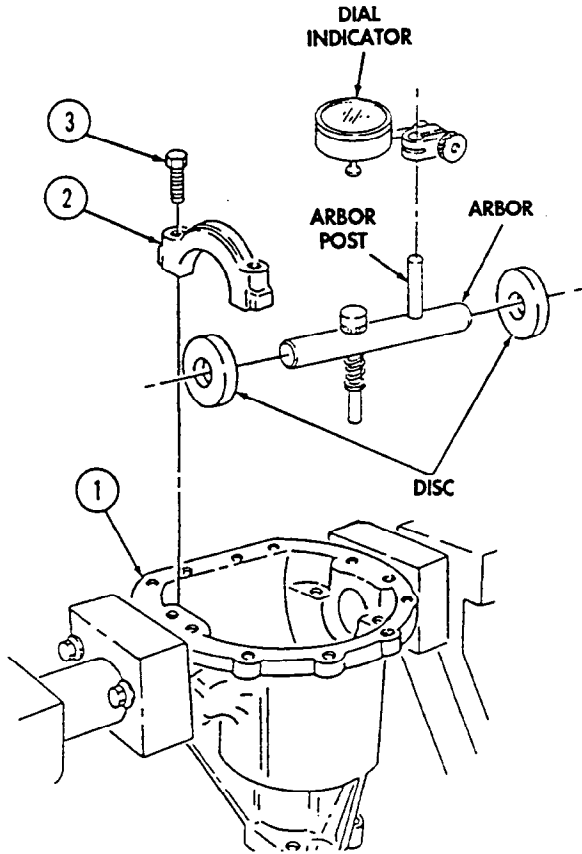
30-3. DIFFERENTIAL REPAIR (Cont'd)

7. Using pinion setting gauge set, install block, rear bearing cup, rear bearing, and pilot washer on stud and secure with block.
8. Position stud assembly in housing (1) and install with front bearing, pilot washer, and nut. Tighten nut to 10 lb-in. (1 N·m). Rotate assembly several revolutions to seat bearings and recheck torque.
9. Rotate front of housing downward 90°. Assemble arbor and two discs and install in housing.
10. Install two bearing caps (2) on housing (1) with four capscrews (3) and finger tighten capscrews (3).
11. Position arbor on block and install dial indicator on arbor post. Preload dial indicator until needle rotates approximately one full turn clockwise. Tighten dial indicator in this position and recheck.
12. Rotate gauge shaft slowly back and forth until dial indicator reads greatest deflection. At point of greatest deflection, set dial indicator to zero. Repeat rocking action of gauge shaft to verify gauge setting.
13. After zero setting is obtained, rotate gauge shaft until dial indicator plunger does not touch block.
14. Record dial indicator reading. Example: If the pointer moved counterclockwise and stopped between 0 and 11, add .100 in. to measurement for shim thickness. If the pointer moved counterclockwise and stopped between 99 and 84, correct shim thickness is indicated.
15. This reading indicates shim thickness that is required of a pinion that is etched with a zero (0) on pinion head. If pinion being installed has a plus (+) or minus (-) etching, then an adjustment of shim thickness is required. Example: If a pinion is etched +3, then .003 in. less shim thickness is required. Subtract .003 in. from the indicator reading. If a pinion is etched -3, then .003 in. more shim thickness is required. Add .003 in. to the indicator reading.
16. Remove dial indicator from arbor.
17. Remove four capscrews (3), two bearing caps (2), discs, and arbor from housing (1).



30-3. DIFFERENTIAL REPAIR (Cont'd)

18. Remove nut, pilot washer, front bearing, and stud assembly from housing (1).
19. Remove block, pilot washer, rear bearing, rear bearing cup, and block from stud.



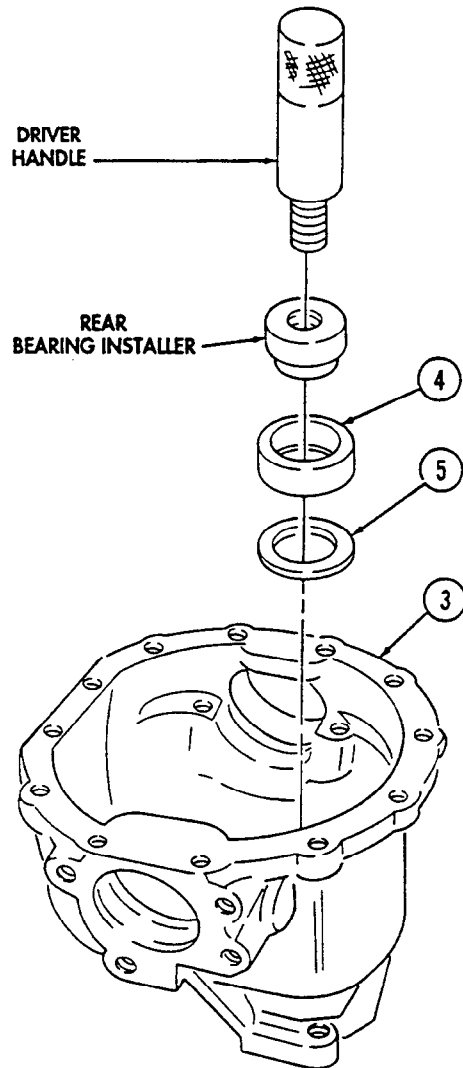
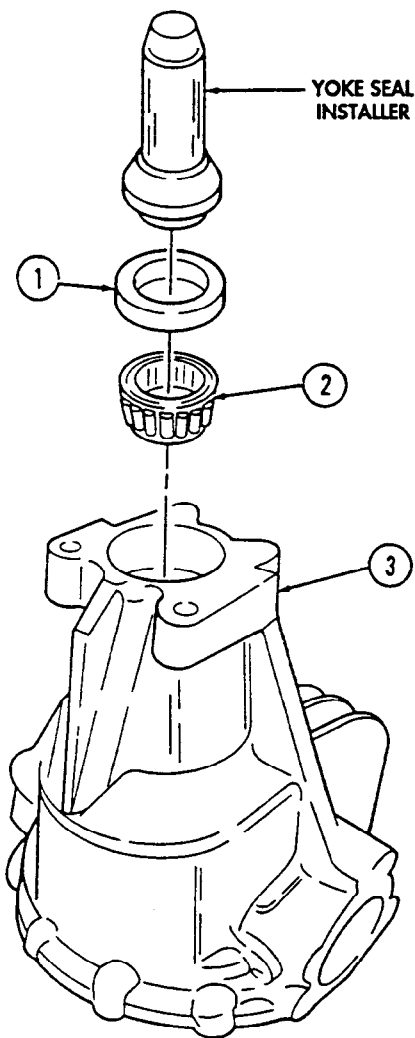
30-3. DIFFERENTIAL REPAIR (Cont'd)

20. Lubricate front bearing (2) and pinion seal (1) with lubricating oil. Using yoke seal installer, install front bearing (2) and pinion seal (1) in housing (3).
21. Rotate housing (3) 180°. Lubricate outside diameter of rear bearing cup (4) with lubricating oil.

NOTE

If pinion shim is beveled, ensure beveled side faces bottom of bearing cup bore.

22. Using driver handle and rear bearing installer, install correct thickness pinion shim (5) and rear bearing cup (4) in housing (3).



30-3. DIFFERENTIAL REPAIR (Cont'd)

23. Rotate housing (3) 90°. Lubricate rear bearing (6) with lubricating oil.

CAUTION

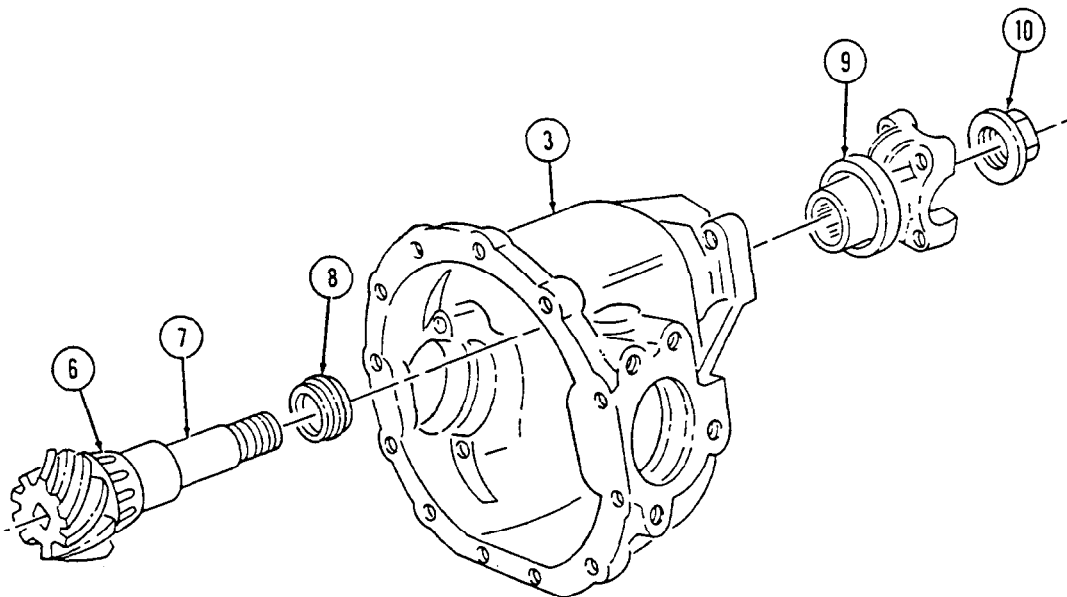
Collapsible spacer controls pinion bearing preload. Do not reuse old spacer or pinion bearing damage may result.

24. Install collapsible spacer (8) on pinion gear (7) and install pinion gear (7) in housing (3).
25. Install pinion yoke (9) on pinion gear (7) with locknut (10).

CAUTION

Do not exceed specified preload torque on pinion bearings. Do not loosen locknut to replace preload torque or pinion bearing damage may result. If specified torque is exceeded, remove pinion gear and replace collapsible spacer and locknut and adjust preload again.

26. Tighten locknut (10) only enough to remove end play and seat pinion bearings in housing (3). To seat bearings evenly, rotate pinion yoke (9) while tightening.
27. Measure torque required to rotate pinion gear (7). Correct pinion bearing preload torque is 17-25 lb-in. (2-3 N·m) with new bearings and 10-15 lb-in. (1-2 N·m) with used bearings.
28. Continue to tighten locknut (10) in small increments until pinion bearing preload torque meets specifications.



30-3. DIFFERENTIAL REPAIR (Cont'd)

29. Install two side bearings (1) on differential case (2).

NOTE

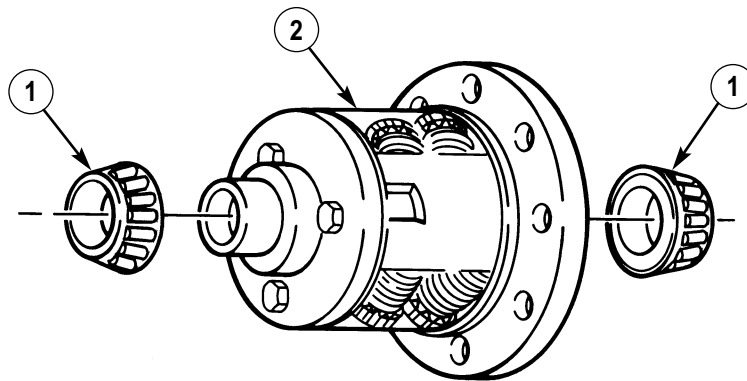
Side bearing shims are available in thicknesses from 0.077-0.117 in. (1.96-2.97 mm) in increments of 0.001 in. (.025 mm).

30. Rotate housing (7) downward 90°. Install two side bearing cups (4) and side bearing shims (3) on side bearings (1). Use 0.080 in. (2 mm) shims (3) as a starting point.
31. Install differential case (2), two bearing cups (4), and shims (3) in housing (7).
32. Install two bearing caps (5) and four capscrews (6) in housing (7). Snug capscrews (6).
33. Mount dial indicator on housing (7) and index indicator to read off ring gear mounting surface of differential case (2).
34. Pry between differential case (2) and bearing cap (5) on one side and zero indicator. Pry on opposite side to read end play.
35. Amount read on indicator is shim thickness that should be added to side bearing shims (3) to arrive at zero end play. Add necessary shims (3) and repeat procedure to ensure accuracy.
36. Tighten four capscrews (6) to 55-70 lb-ft (75-95 N·m).
37. Rotate differential case (2) and check runout. Runout should not exceed 0.002 in. (0.05 mm).
38. Remove dial indicator from housing (7).

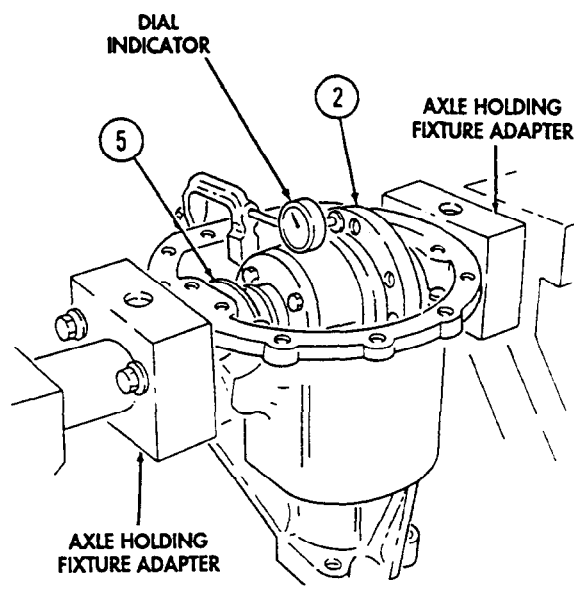
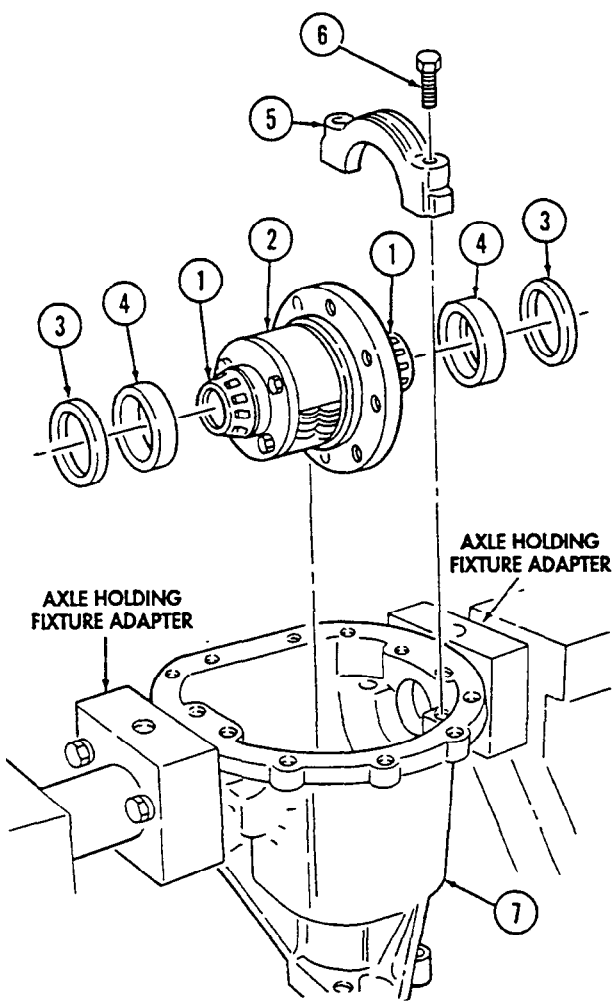
NOTE

Tag shims and bearing cups for assembly.

39. Remove four capscrews (6), two bearing caps (5), differential case (2), two bearing cups (4), and shims (3) from housing (7).



30-3. DIFFERENTIAL REPAIR (Cont'd)



30-3. DIFFERENTIAL REPAIR (Cont'd)

40. Install four guide pins in ring gear (2).
41. Support ring gear (2) with wood blocks in press.
42. Press differential case (3) on ring gear (2).
43. Remove four guide pins from ring gear (2).
44. Install ring gear (2) on differential case (3) with eight capscrews (1). Tighten capscrews (1) to 95-115 lb-ft (129-156 N·m).
45. Install two side bearing shims (4) previously used to eliminate differential case side play, side bearing cups (5), and differential case (3) in housing (8).
46. Install two bearing caps (6) on housing (8) with four capscrews (7). Tighten capscrews (7) to 55-70 lb-ft (75-95 N·m).
47. Attach dial indicator to housing (8) and index indicator to read off drive side of ring gear tooth (9) at a right angle.

NOTE

Backlash must be checked at four equally-spaced points on ring gear and must not vary more than 0.002 in. (0.51 mm) between four points checked.

48. Move ring gear (2) back and forth while holding pinion yoke (10) stationary. Note backlash registered on indicator.
49. Ring gear backlash should be 0.005-0.009 in. (0.13-0.23 mm) with 0.008 in. (0.20 mm) desired. If backlash must be adjusted, perform steps 50 through 53. If not, go to step 54.

NOTE

Tag shims and bearing cups for assembly.

50. Remove four capscrews (7), two bearing caps (6), bearing cups (5), shims (4), and differential case (3) from housing (8).

NOTE

The following example will explain the procedure for adjusting backlash: If side play was eliminated using 0.090 in. (2.29 mm) shims on each side, totaling 0.180 in. (4.57 mm), and backlash, when checked, is found to be 0.011 in. (0.28 mm), add 0.004 in. (0.10 mm) to shim on ring gear side and subtract 0.004 in. (0.10 mm) from shim on opposite side to correct backlash. This will result in 0.094 in. (2.39 mm) shim on ring gear side and 0.086 in. (2.18 mm) shim on other side. Backlash will be approximately 0.007 to 0.008 in. (0.18 to 0.20 mm). Total shim thickness remains 0.180 in. (4.57 mm).

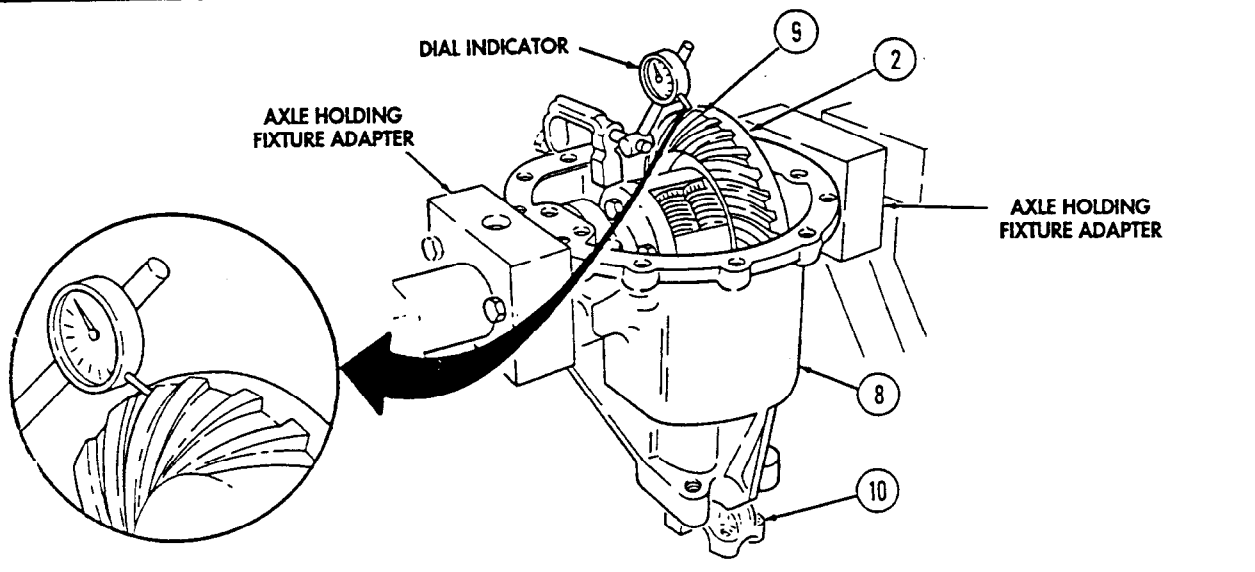
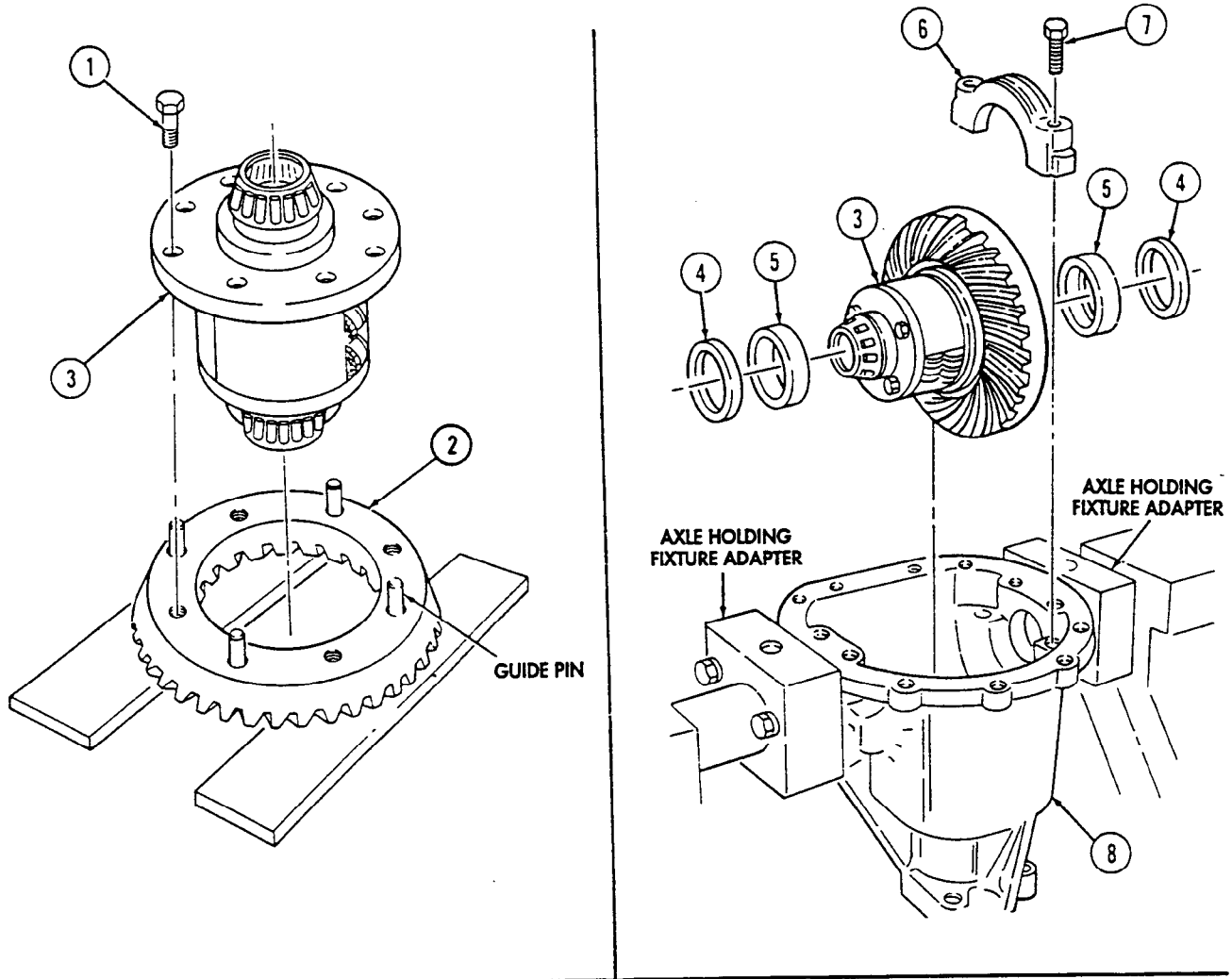
51. To increase backlash, install thinner shim (4) on ring gear side and thicker shim (4) on opposite side. To decrease backlash, install thicker shim (4) on ring gear side and thinner shim (4) on opposite side. Do not change total shim thickness.
52. Install two shims (4), bearing cups (5), differential case (3), and two bearing caps (6) on housing (8) with four capscrews (7). Tighten capscrews (7) to 55-70 lb-ft (75-95 N·m).
53. Mount dial indicator and recheck backlash. If necessary, repeat steps 50 through 53.

NOTE

Tag shims and bearing cups for assembly.

54. Remove four capscrews (7), two bearing caps (6), bearing cups (5), shims (4), and differential case (3) from housing (8).

30-3. DIFFERENTIAL REPAIR (Cont'd)



30-3. DIFFERENTIAL REPAIR (Cont'd)

55. Install differential housing spreader into holes in axle holding fixture adapters and install dial indicator to read from each end of housing (1). Indicator must have preload setting of 0.020 in. (0.51 mm).

CAUTION

Overspreading of differential housing spreader will damage housing.

56. Spread housing (1) 0.010 in. (0.25 mm) and remove dial indicator.

NOTE

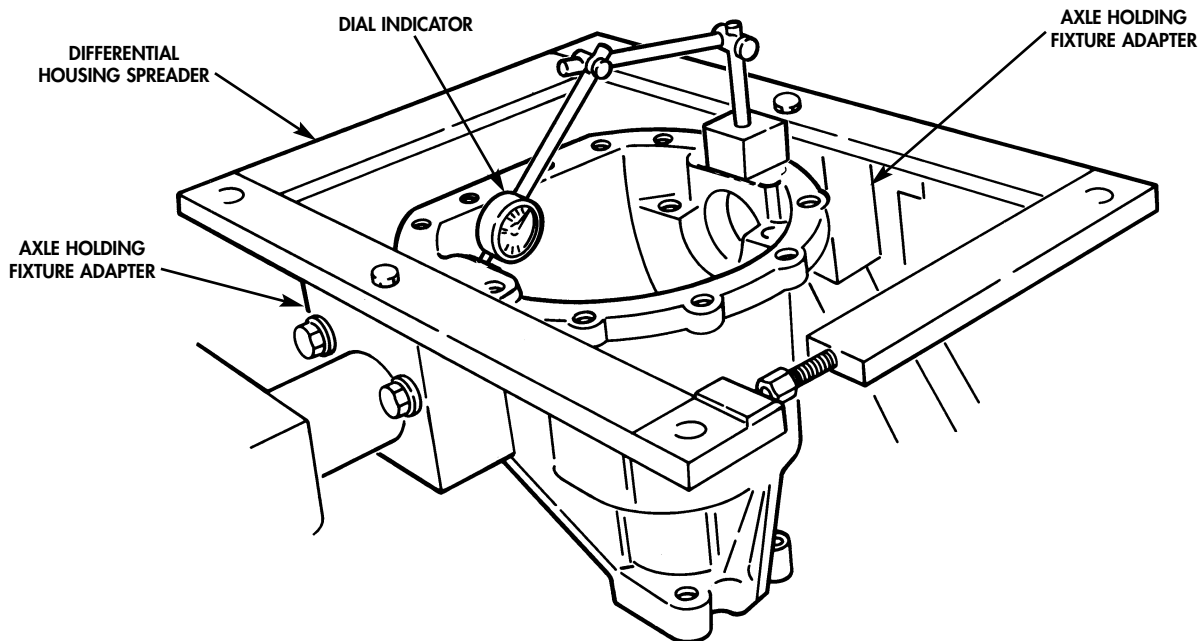
Differential bearings must be preloaded to compensate for heat and loads during operation.

57. Preload differential case side bearings (4) by increasing shim (2) thickness at each side of differential case (5) by 0.004 in. (0.10 mm) for a total bearing preload of 0.008 in. (0.20 mm).
58. Lubricate side bearings (4) with lubricating oil and install differential case (5), two bearing cups (3), shims (2), and bearing caps (6) in housing (1) with four capscrews (7).

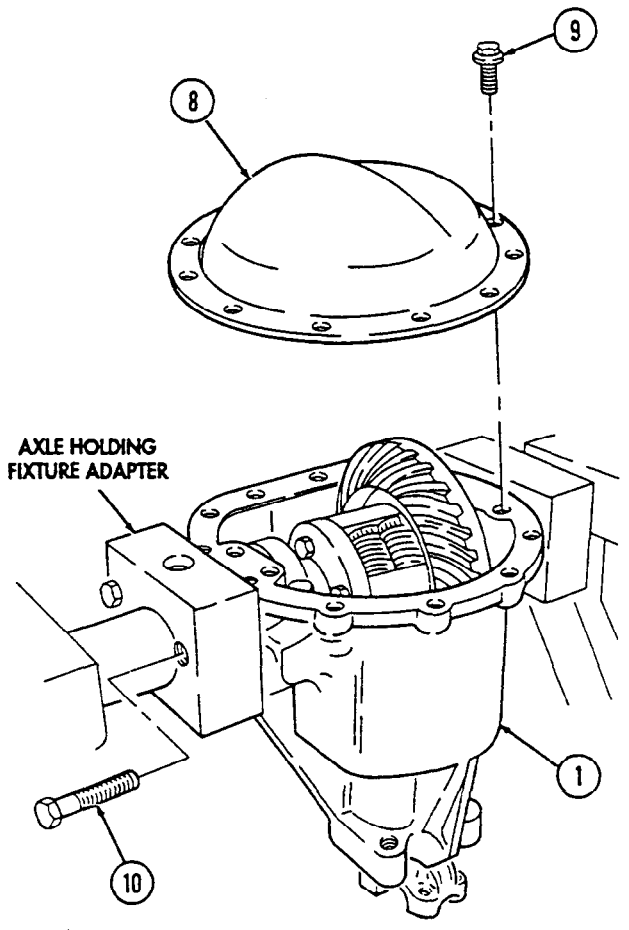
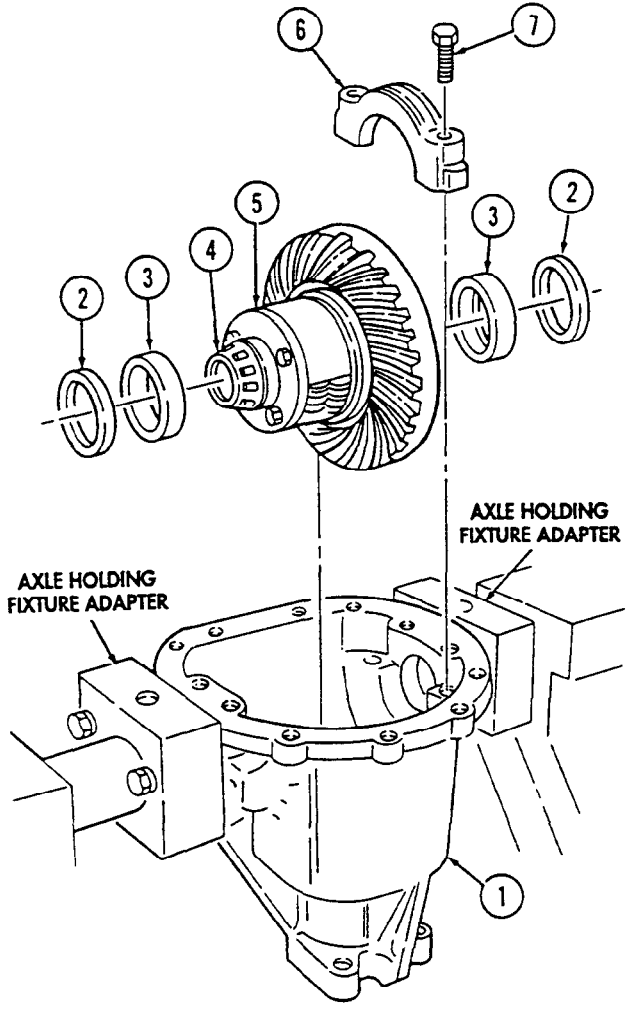
NOTE

Preloaded differential bearings may change backlash setting. Check and correct backlash if necessary.

59. Remove housing spreader and tighten four capscrews (7) to 55-70 lb-ft (75-95 N·m).
60. Apply silicone sealant to cover (8) sealing surface and install cover (8) on housing (1) with twelve capscrews (9). Tighten capscrews (9) to 16 lb-ft (22 N·m).
61. Remove housing (1) from holding fixture.
62. Remove four capscrews (10) and two axle holding fixture adapters from housing (1).

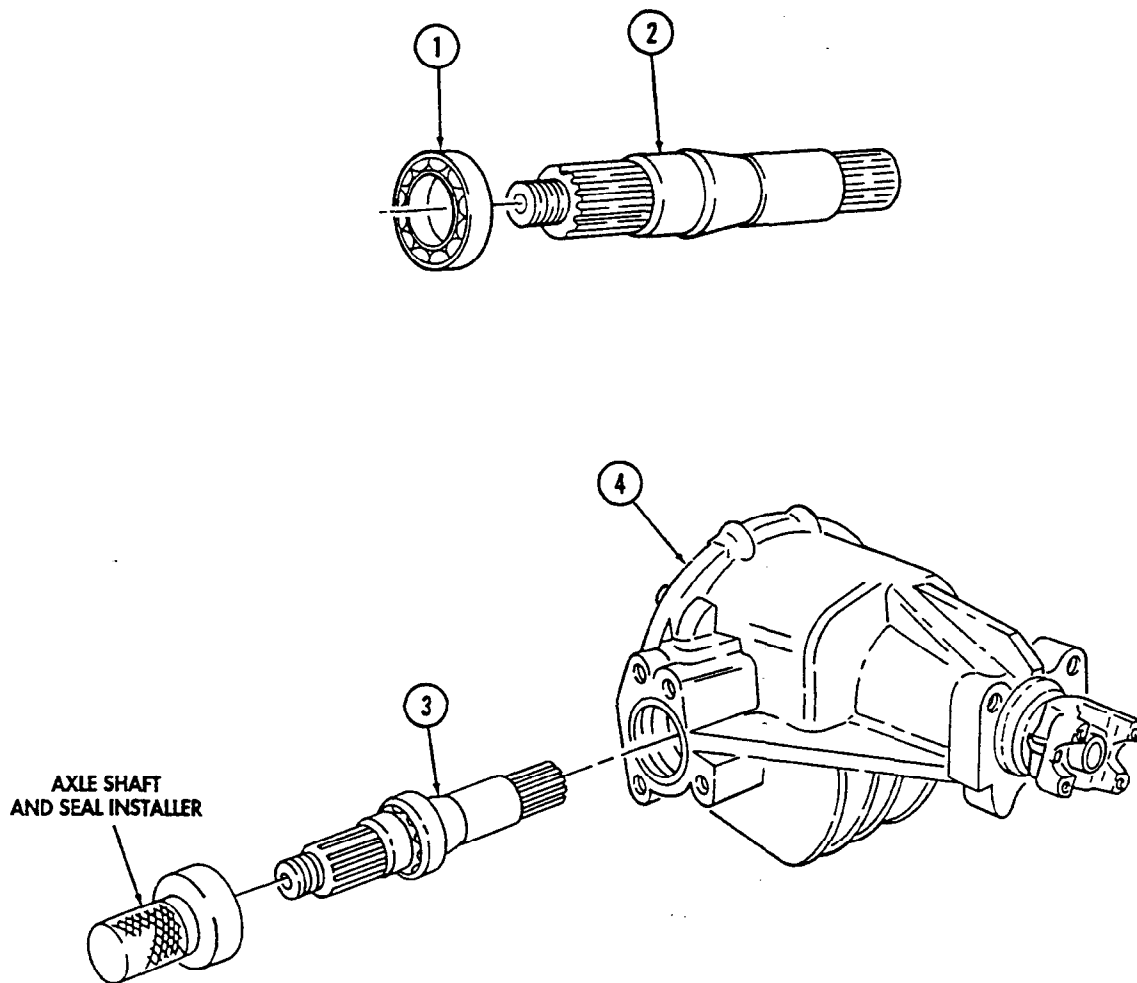


30-3. DIFFERENTIAL REPAIR (Cont'd)



30-3. DIFFERENTIAL REPAIR (Cont'd)

- 63. Using press, install output shaft bearings (1) on two output shafts (2).
- 64. Using axle shaft and seal installer, install two output shaft assemblies (3) into housing (4).



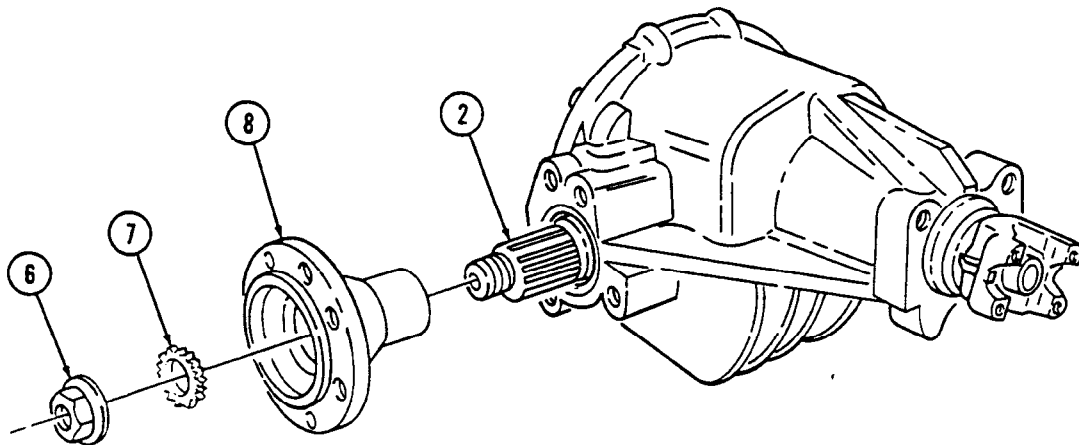
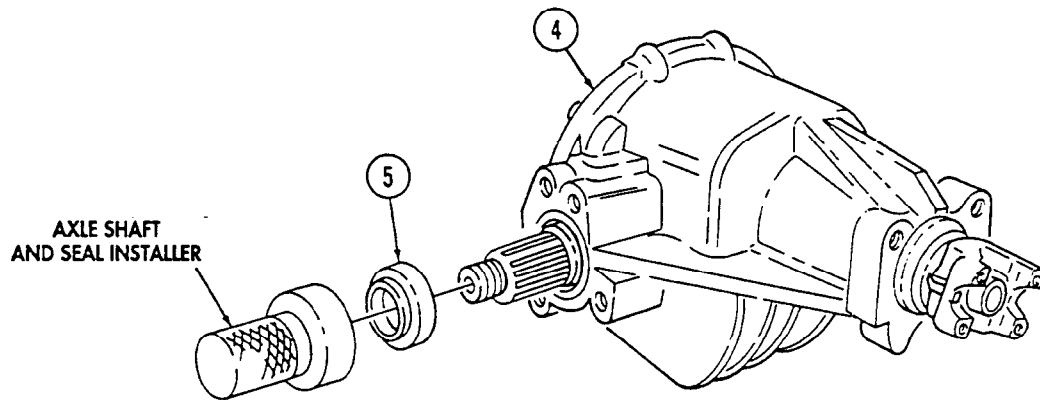
30-3. DIFFERENTIAL REPAIR (Cont'd)

65. Using axle shaft and seal installer, install two output shaft seals (5) in housing (4).
66. Using lubricating oil, lubricate sealing surface on two output flanges (8).

NOTE

Output shaft locknuts are torqued during differential installation.

67. Install two output flanges (8), seal washers (7), and locknuts (6) on output shafts (2). Tighten locknuts (6) fingertight.



FOLLOW-ON TASK: Install differential (para. 21-5).

CHAPTER 31 STEERING SYSTEM (GS) REPAIR

31-1. INTRODUCTION

This chapter contains maintenance instructions for repair of steering system components at the general support maintenance level. Some subassemblies and parts must be removed before steering system components can be accessed. They are referenced to other paragraphs in this manual.

31-2. STEERING SYSTEM REPAIR TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
31-3.	Steering Gear Repair	31-2

31-3. STEERING GEAR REPAIR

This task covers:

- | | |
|--|---|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning c. Housing Group Inspection and Repair d. Pitman Shaft Inspection and Repair | <ul style="list-style-type: none"> e. Rack Piston Group Inspection and Repair f. Valve and Adjuster Group Inspection and Repair g. Assembly h. Adjustment |
|--|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Special Tools

Adjuster plug bearing remover/installer
(Appendix B, Item 116)
Pitman shaft bearing remover/installer
(Appendix B, Item 117)
Spanner wrench (Appendix B, Item 118)
Rack piston arbor (Appendix B, Item 119)

Materials/Parts

Adjuster plug seal service kit
(Appendix G, Item 3)
Valve ring seal service kit
(Appendix G, Item 467)
Rack piston seal service kit
(Appendix G, Item 314)

Materials/Parts (Cont'd)

Pitman shaft seal service kit (Appendix G, Item 308)
Side cover seal service kit (Appendix G, Item 440)
Seal service kit (Appendix G, Item 403)
Crocus cloth (Appendix C, Item 22)
Grease (Appendix C, Item 35)
Hydraulic fluid (Appendix C, Item 37)

Manual References

TM 9-2320-387-24P
TM 9-214

Equipment Condition

Steering gear removed (para. 8-20).

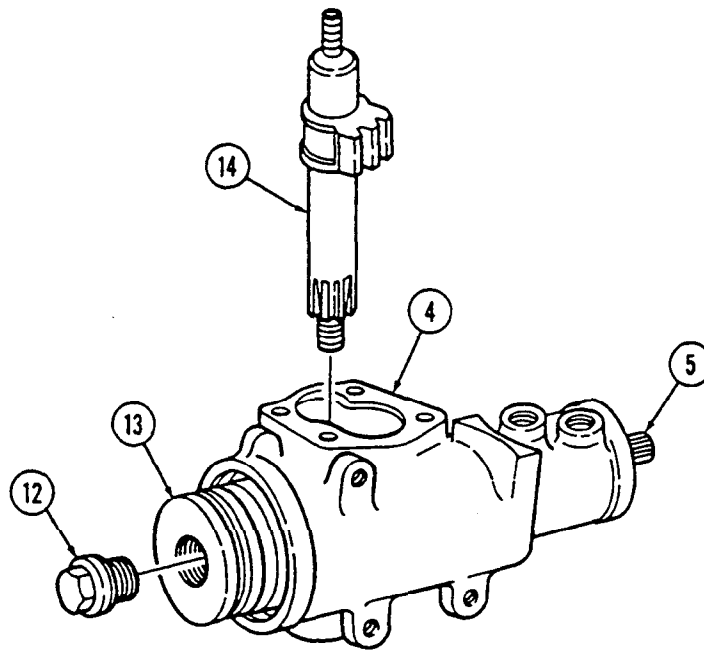
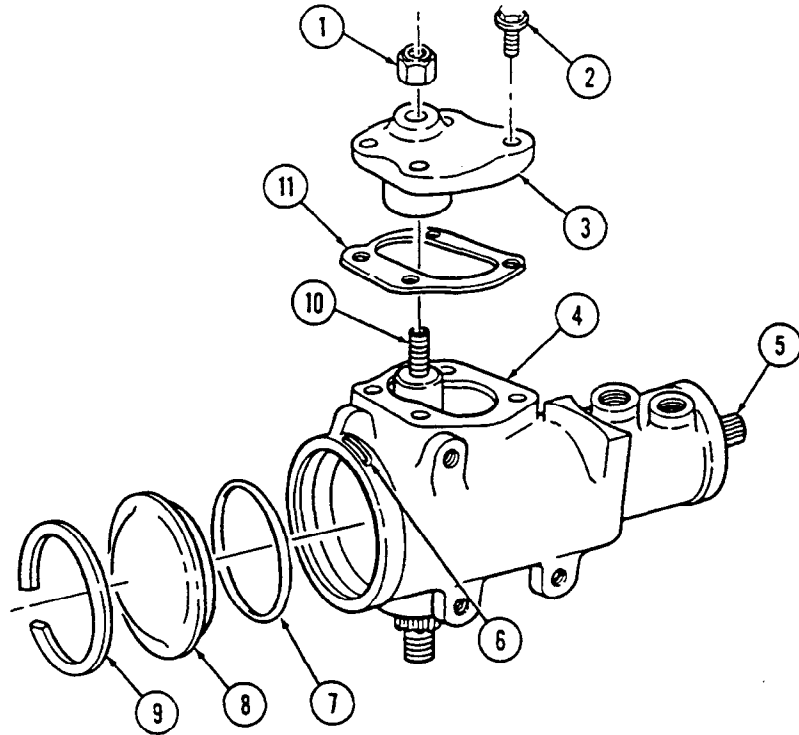
Maintenance Level

General support

a. Disassembly

1. Hold adjuster screw (10) and remove lash adjuster nut (1).
2. Remove four capscrews (2) from side cover (3) and housing (4).
3. Remove side cover (3) from adjuster screw (10).
4. Remove gasket (11) from side cover (3). Discard gasket (11).
5. Insert punch through access hole (6) and force out retaining ring (9). Discard retaining ring (9).
6. Rotate stub shaft (5) counterclockwise to force end plug (8) from housing (4).
7. Rotate stub shaft (5) clockwise and remove O-ring (7). Discard O-ring (7).
8. Remove plug (12) from rack piston (13).
9. Rotate stub shaft (5) to center and remove pitman shaft (14) from housing (4).

31-3. STEERING GEAR REPAIR (Cont'd)



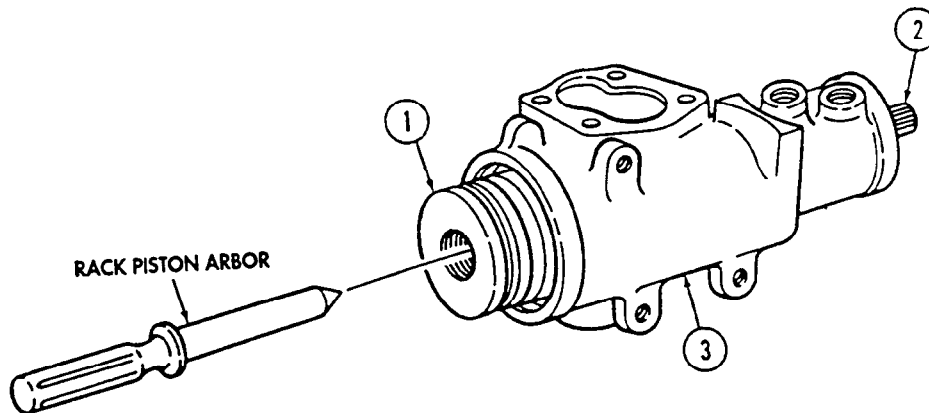
31-3. STEERING GEAR REPAIR (Cont'd)

10. Insert rack piston arbor in rack piston (1) and hold tightly while turning stub shaft (2) counter-clockwise.
11. Remove rack piston (1) and rack piston arbor from gear housing (3) together.
12. Remove nut (4) from adjuster plug (5).

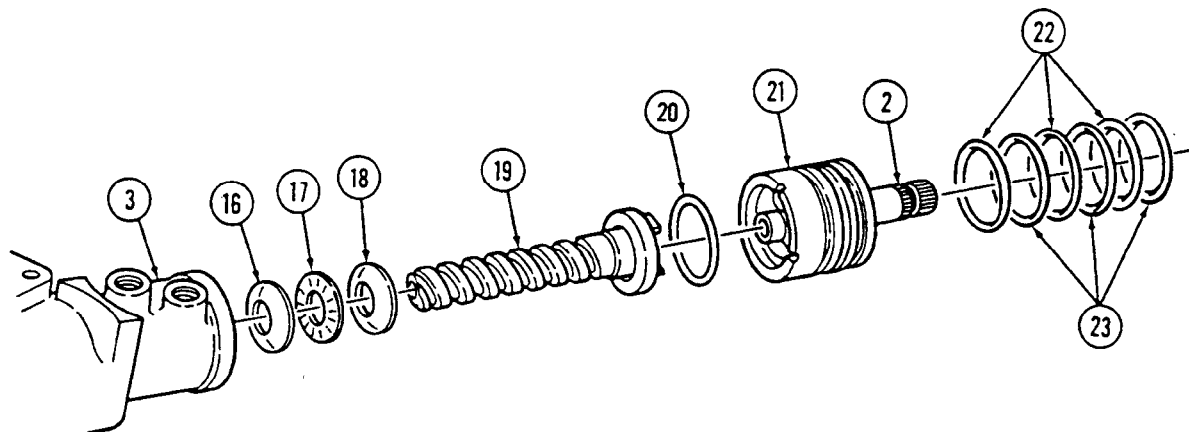
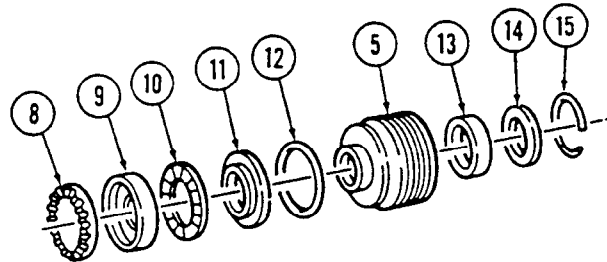
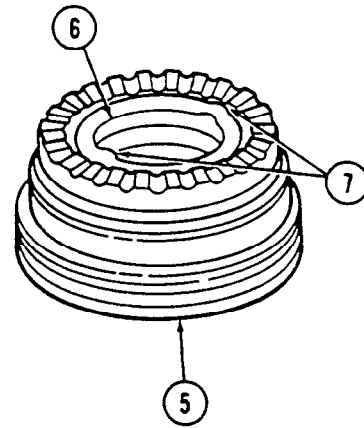
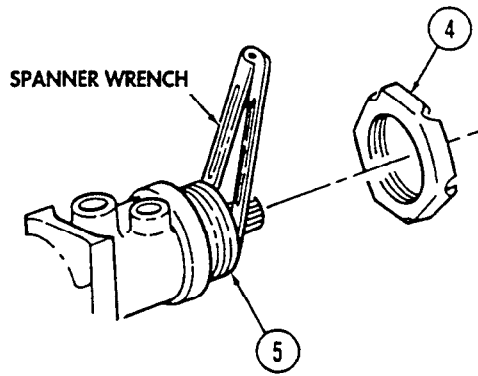
NOTE

Worm and valve may come out with adjuster plug. If so, separate adjuster from worm and valve.

13. Using spanner wrench, remove adjuster plug (5) from housing (3).
14. Pry off bearing retainer (6) at raised area (7).
15. Remove thrust bearing spacer (8), small bearing race (9), upper thrust bearing (10), and large bearing race (11) from plug (5).
16. Remove O-ring seal (12) from plug (5). Discard O-ring seal (12).
17. Remove retaining ring (15) from opposite side of adjuster plug (5). Discard retaining ring (15).
18. Remove stub shaft dust seal (14) and stub shaft oil seal (13) from plug (5). Discard seals (14) and (13).
19. Hold stub shaft (2) and remove valve (21) and worm shaft (19) together from housing (3).
20. Remove bearing race (16), lower thrust bearing (17), and bearing race (18) from worm shaft (19).
21. Clamp worm shaft (19) in soft-jawed vise and pull valve (21) from worm shaft (19).
22. Remove and discard three valve body Teflon rings (23) and O-ring seals (22) from valve body (21).
23. Remove stub shaft O-ring seal (20) from valve body (21). Discard O-ring seal (20).



31-3. STEERING GEAR REPAIR (Cont'd)



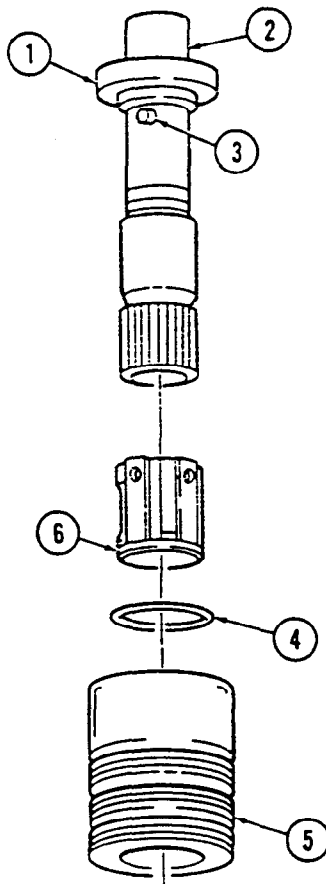
31-3. STEERING GEAR REPAIR (Cont'd)

- 24. Tap splined end of stub shaft (2) lightly on wood block until shaft cap (1) is free of valve body (5).
- 25. Pull shaft (2) outward 0.25 in. (6 mm).
- 26. Press spool valve locating pin (3) inward and remove stub shaft (2) from valve body (5).

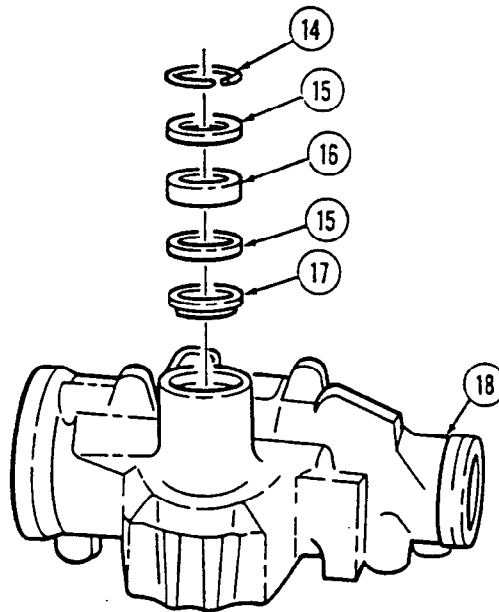
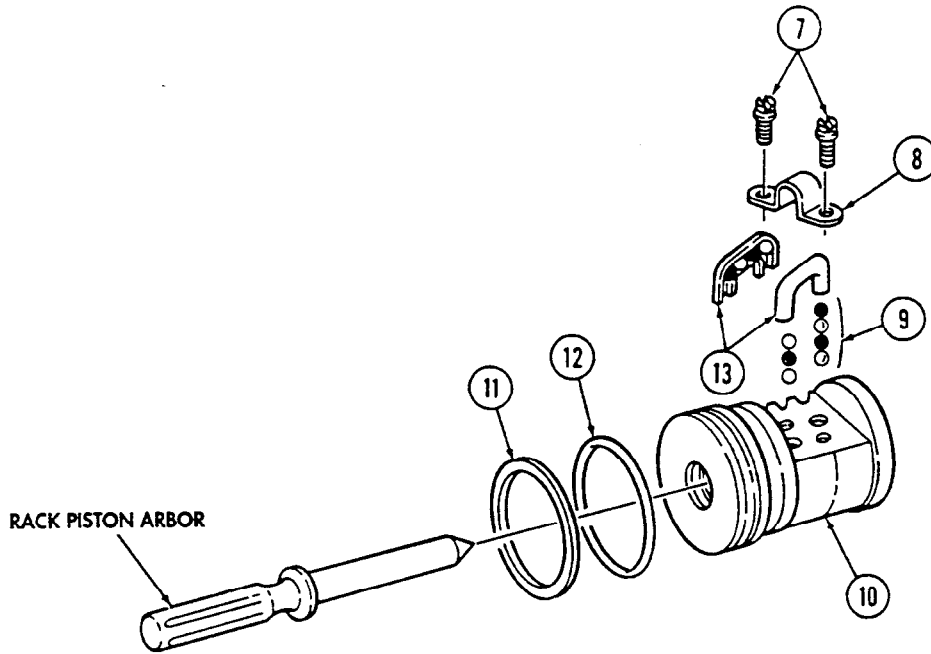
NOTE

Rotate spool to remove from valve.

- 27. Remove valve (6) from valve body (5).
- 28. Remove O-ring (4) from valve (6). Discard O-ring (4).
- 29. Remove two screw-assembled washers (7) and clamp (8) from rack piston (10).
- 30. Remove and separate two halves of guide (13).
- 31. Remove black and chrome bearing balls (9) from two halves of guide (13).
- 32. Tip rack piston (10) so remaining bearing balls (9) fall out. The total number of bearing balls (9) should be twenty-four (twelve black and twelve chrome-colored).
- 33. Remove rack piston arbor from rack piston (10).
- 34. Remove Teflon ring (11) and O-ring seal (12) from rack piston (10). Discard Teflon ring (11) and O-ring seal (12).
- 35. Remove pitman shaft retaining ring (14) from housing (18). Discard retaining ring (14).
- 36. Remove washer (15), double-lip seal (16), washer (15), and single-lip seal (17) from housing (18). Discard seals (16) and (17) and washers (15).



31-3. STEERING GEAR REPAIR (Cont'd)



31-3. STEERING GEAR REPAIR (Cont'd)

b. Cleaning

Clean all parts (para. 2-14).

c. Housing Group Inspection and Repair

1. Inspect housing (4) for breaks, cracks, chipped or broken retaining ring grooves (5) and (22), and damaged sealing surfaces. Replace steering gear if housing (4) is damaged.
2. Inspect housing (4) for crossed or stripped threads. Refer to paragraph 2-16 for thread repair. Replace steering gear if housing (4) threads cannot be repaired.

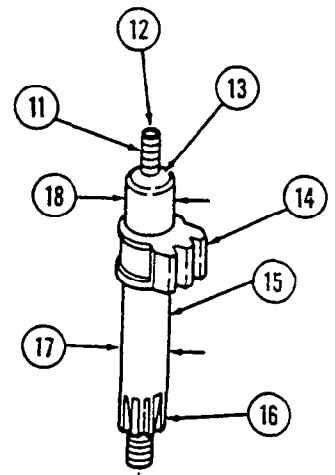
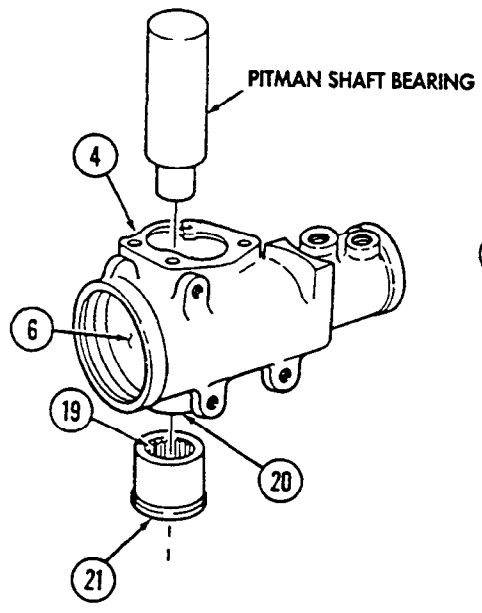
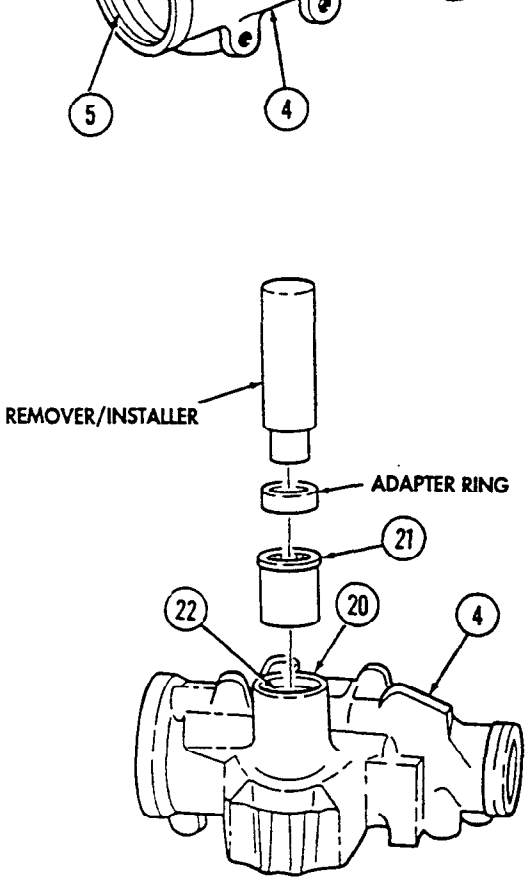
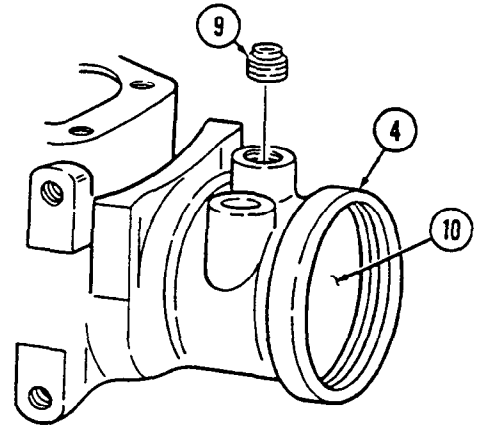
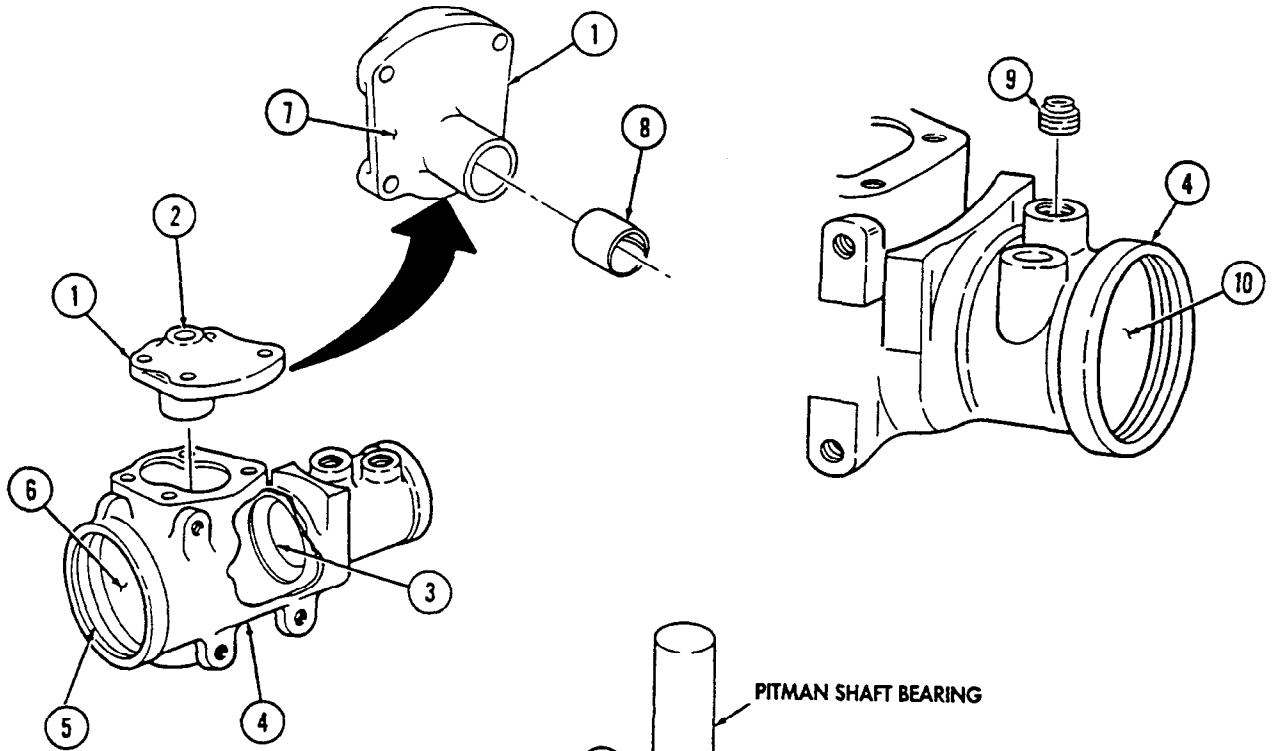
NOTE

- Rack piston bore has laser-hardened tracks on side of piston bore opposite pitman shaft cavity. These are not wear or scoring indicators.
 - Inspect pitman shaft bearing bore only if pitman shaft bearing is replaced (refer to steps 3 and 4).
3. Inspect pitman shaft needle bearing (21) for damage or wear (TM 9-214). Replace needle bearing (21) if damaged or inside diameter (I.D.) (19) is worn below 1.2510 in. (31.75 mm). If damaged or worn, replace needle bearing (21) as follows:
 - a. Using pitman shaft bearing remover/installer, remove bearing (21) from housing (4).
 - b. Lubricate bearing bore (20) and bearing (21) with hydraulic fluid.
 - c. Using pitman shaft bearing remover/installer and adapter ring, install bearing (21) until seated in housing (4).
 4. Inspect valve bore (10), rack piston bore (6), worm support bore (3), and pitman shaft bearing bore (20) for rust, pitting, scoring, galling, and wear. Wear limits for bore I.D. are: valve bore (10) 2.034 in. (51.66 mm), rack piston bore (6) 3.128 in. (79.45 mm), worm support bore (3) 1.040 in. (26.42 mm), and pitman shaft bearing bore (20) 1.766 in. (44.86 mm). Remove minor rust, pitting, and scoring with crocus cloth. If bore(s) do not meet specifications, or if there is other unreparable damage, replace steering gear.
 5. Inspect check valve (9) for freedom of movement. If damaged, replace check valve (9) as follows:
 - a. Pry check valve (9) out of housing (4) with a small screwdriver.
 - b. Lubricate housing (4) and check valve (9) with hydraulic fluid.
 - c. Install check valve (9) using 3/8 in. (9.53 mm) outside diameter (O.D.) tubing, 4 in. (10.16 cm) long.
 6. Inspect side cover (1) for breaks, cracks, stripped or crossed threads (2), warped or damaged sealing surface (7), and scored or worn bushing (8). Repair minor scoring and thread (2) damage. Replace side cover (1) if bushing (8) is worn through or loose in bore. Replace bushing (8) if I.D. is worn over 1.248 in. (31.70 mm).
 7. Inspect housing end plug (23) for breaks, cracks, and chipped edges. Replace housing end plug (23) if damaged.

d. Pitman Shaft Inspection and Repair

1. Inspect pitman shaft (15) for bends, breaks, chipped, cracked, or broken gear teeth (14), wear on bushing journal (18) or bearing journal (17), crossed or stripped threads, and bent or twisted splines (16). Bushing journal (18) minimum O.D. is 1.2468 in. (31.699 mm) and bearing journal (17) minimum O.D. is 1.2500 in. (31.750 mm). Repair minor thread damage. Replace pitman shaft (15) if worn or unreparable.
2. Inspect lash adjuster screw (11) for free rotation in shaft (15), tight retainer plug (13), crossed or stripped threads, and rounded hex-socket hole (12). Repair minor thread damage. Replace pitman shaft (15) if damaged.

31-3. STEERING GEAR REPAIR (Cont'd)



31-3. STEERING GEAR REPAIR (Cont'd)

e. Rack Piston Group Inspection and Repair

NOTE

If rack piston internal worm thread, worm thread, or ball bearings are broken, chipped, or moderately or badly scored, replace all three parts.

1. Inspect rack piston (7) for breaks, burrs, chipped seal grooves (8), crossed or stripped threads, cracked or broken gear teeth (3), and broken, chipped or scored internal worm thread. Repair minor burrs and scoring with fine mill file or crocus cloth. Repair minor thread damage. Replace rack piston (7) if gear teeth (3) are cracked or broken or other damage is unrepairable.
2. Inspect twenty-four ball bearings (6) for breaks, chipped surface, flats, and scoring. Minor scoring on ball bearings (6) is acceptable. Replace ball bearings (6) as a set if any one or more fails inspection (refer to note above).
3. Inspect ball bearing guides (2) for bends, dents, and breaks and clamp (5) for bends and breaks. Replace damaged parts.
4. Inspect screw-assembled washers (4) for crossed or stripped threads. Replace screw-assembled washers (4) if damaged.
5. Inspect rack piston plug (1) for burred or rounded hex-flats and stripped or crossed threads. Replace rack piston plug (1) if damaged.

f. Valve and Adjuster Group Inspection and Repair

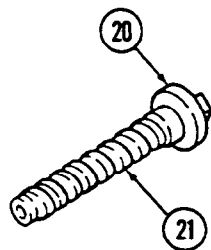
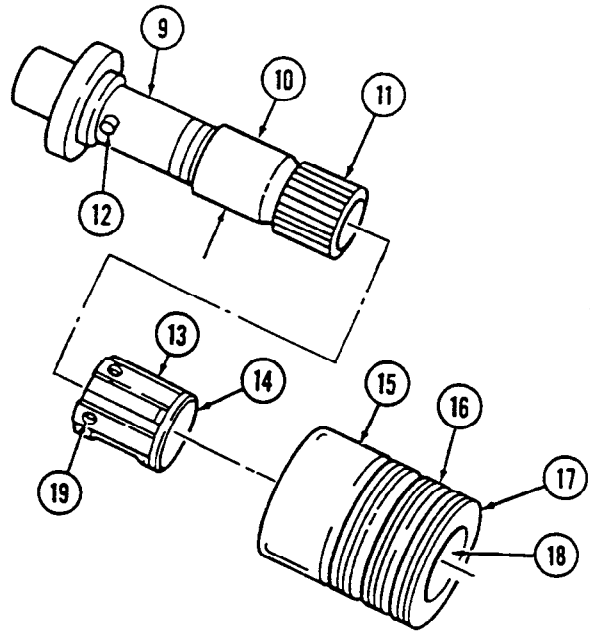
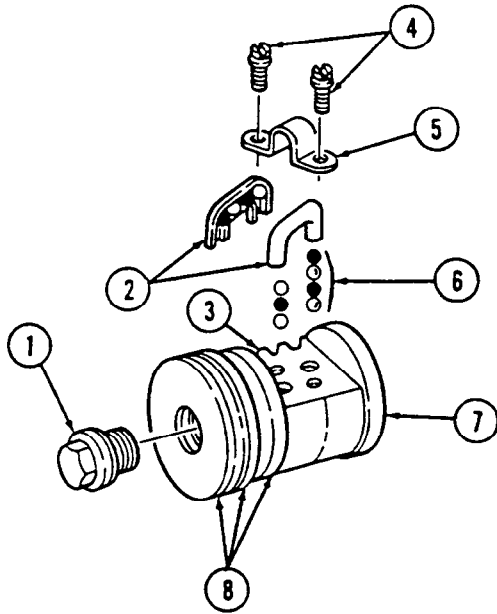
1. Inspect valve body (17) for burrs, chipped or broken seal ring grooves (16), scoring on inner bore (18), and wear. Repair minor burrs and scoring with crocus cloth. Valve body bore (18) maximum I.D. is 1.1557 in. (29.355 mm) and valve body (17) minimum O.D. (15) is 2.0150 in. (51.181 mm). Replace valve body (17) if worn or unrepairable.
2. Inspect valve (14) for burrs, cracks, blocked oil passages (19), chipped or cracked seal ring groove, scoring, and wear. Spool valve (14) minimum O.D. (13) is 1.152 in. (29.26 mm). Remove minor burrs and scoring with crocus cloth and clear blocked oil passages (19). Replace valve (14) if worn or unrepairable.
3. Inspect stub shaft (9) for bends, cracks, breaks, damaged pin (12), bent or twisted splines (11), and worn bearing journal (10). Bearing journal (10) minimum O.D. is 1.2495 in. (31.737 mm). Replace stub shaft (9) if worn or damaged.
4. Inspect worm shaft (20) for bends, breaks, burrs, chipped threads (21), and scoring. Remove minor burrs and scoring with fine mill file or crocus cloth. Replace worm shaft (20) if damage is unrepairable (refer to note before step e.1).
5. Inspect adjuster plug (22) for cracks, breaks, crossed or stripped threads, chipped retainer grooves, and seal ring surface. Replace plug (22) if damaged.
6. Inspect adjuster plug needle bearing (23) for damage (TM 9-214) and wear. Replace needle bearing (23) if damaged or I.D. is worn over 1.2505 in. (31.763 mm). If damaged or worn, replace needle bearing (23) as follows.
 - a. Using adjuster plug bearing remover/installer, remove bearing (23) from adjuster plug (22).
 - b. Lubricate adjuster plug (22) and bearing (23) with hydraulic fluid.
 - c. Using adjuster plug bearing remover/installer, install bearing (23) 0.625 in. (15.88 mm) deep in adjuster plug (22).

NOTE

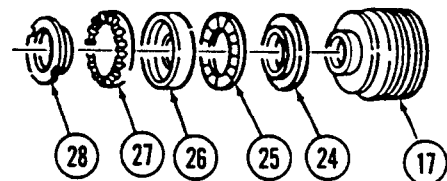
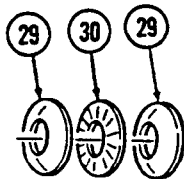
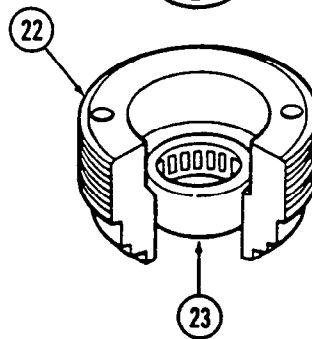
Outer edge of bearing is marked with identification number.

7. Inspect bearing retainer (24), thrust bearing spacer (25), small race (26), upper thrust bearing (27), and large race (28) for damage (TM 9-214). Replace all items if one item is damaged.
8. Inspect lower thrust bearing (30) and two races (29) for damage (TM 9-214). Replace all items if any one is damaged.

31-3. STEERING GEAR REPAIR (Cont'd)



ADJUSTER PLUG BEARING
REMOVER/INSTALLER



31-3. STEERING GEAR REPAIR (Cont'd)

g. Assembly

NOTE

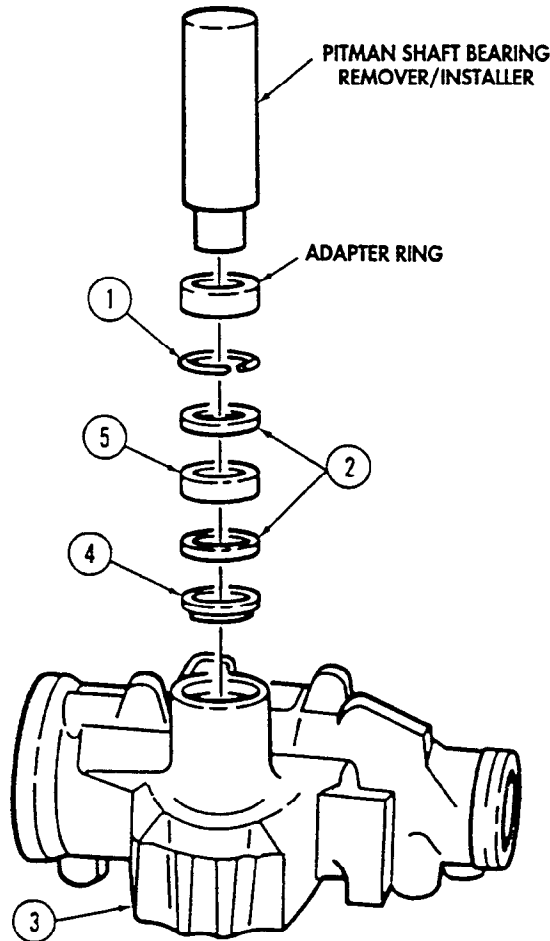
For general assembly instructions, refer to para. 2-17.

1. Using pitman shaft bearing remover/installer and adapter ring, install single-lip seal (4) and washer (2) in housing (3) only far enough to provide clearance for next seal (5) and washer (2).
2. Using pitman shaft bearing remover/installer and adapter ring, install double-lip seal (5) and washer (2) in housing (3) only far enough to provide clearance for retaining ring (1).
3. Install retaining ring (1) in housing (3).

NOTE

Soak Teflon ring in warm water to ease assembly.

4. Install O-ring seal (7) and Teflon ring (6) on rack piston (8).
5. Install worm shaft (9) in rack piston (8).
6. Align lower ball return guide hole (10) with worm shaft groove.
7. Alternately install eight black and eight chrome bearing balls (11) into lower guide hole (10) while rotating worm shaft (9) counterclockwise.

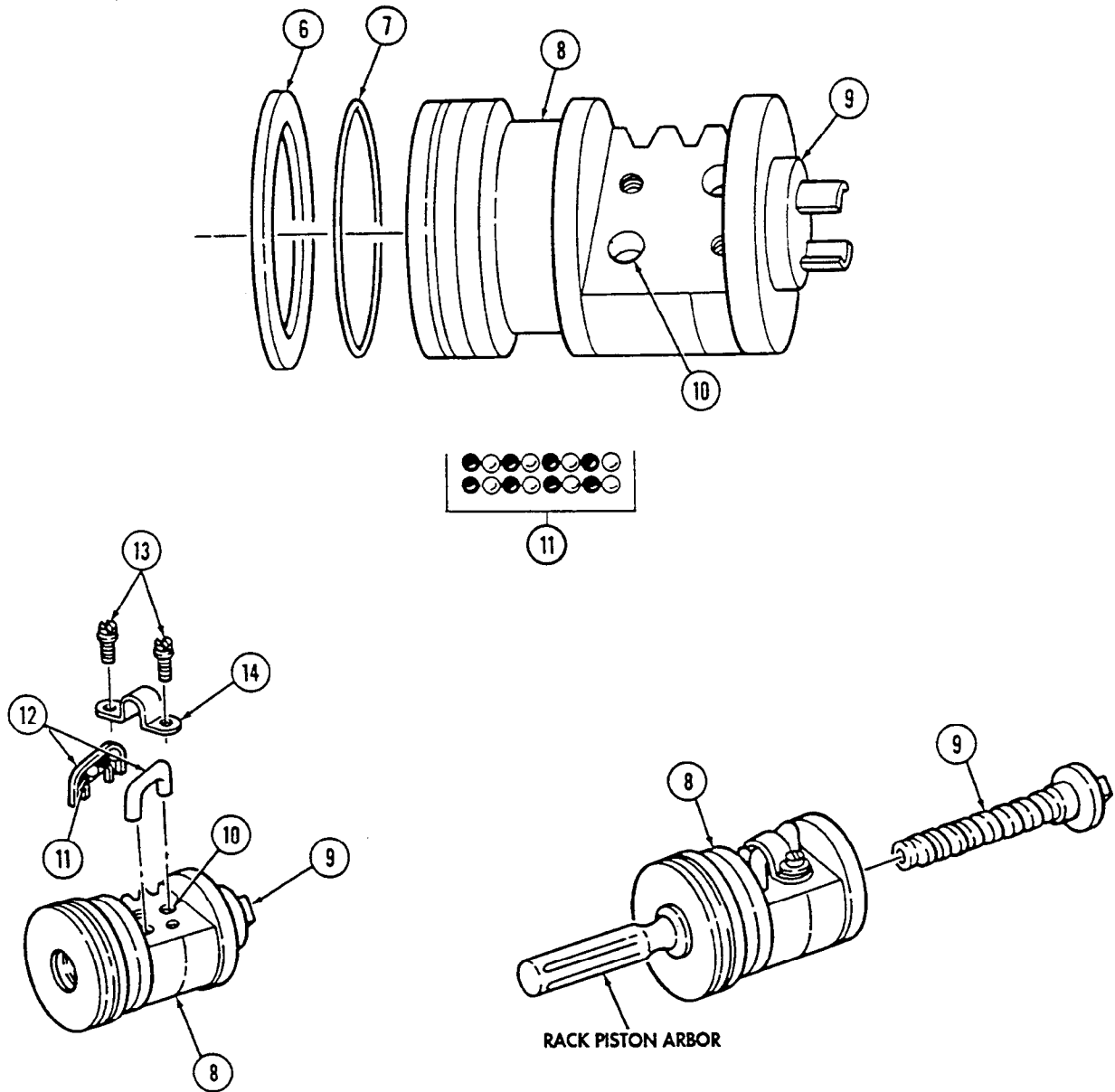


31-3. STEERING GEAR REPAIR (Cont'd)

NOTE

Keep bearing balls in alternating sequence when installing guide in rack piston. Ensure a total of 24 bearing balls are used.

8. Install eight remaining bearing balls (11) in guide (12) half and retain with grease.
9. Assemble both guide (12) halves together and install guide (12) in guide holes (10).
10. Install clamp (14) over guide (12) with two screw-assembled washers (13). Tighten screw-assembled washers (13) to 4 lb-ft (5 N·m).
11. Rotate worm shaft (9) clockwise until flush with rack piston (8).
12. Install rack piston arbor into rack piston (8) and hold firmly against worm shaft (9). Remove worm shaft (9).



31-3. STEERING GEAR REPAIR (Cont'd)

NOTE

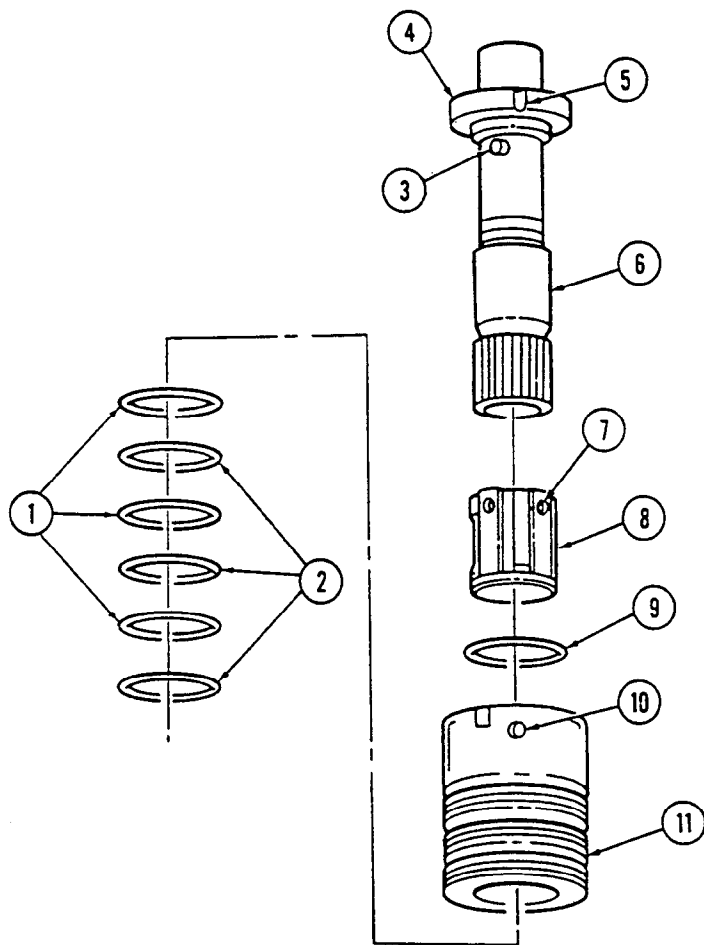
Soak Teflon rings in warm water to ease assembly.

- 13. Starting on inner seal ring groove, install O-ring seal (2) and a backup Teflon ring (1) on valve body (11).
- 14. Repeat step 13 in order from innermost seal ring groove and install two remaining O-rings (2) and Teflon rings (1) on valve body (11).

NOTE

Rotate valve spool to install in valve.

- 15. Install O-ring (9) on valve (8) and install valve (8) into valve body (11) until flush with notched end of valve body (11).
- 16. Install stub shaft (6) in valve (8) so pin (3) on stub shaft (6) engages hole (7) in valve (8).
- 17. Align notch (5) in stub shaft cap (4) with pin (10) in valve body (11) and press stub shaft (6) and valve (8) into valve body (11).



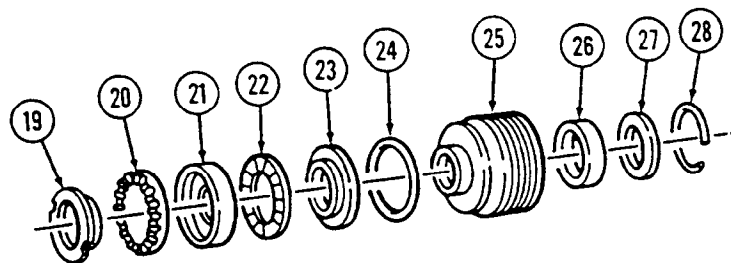
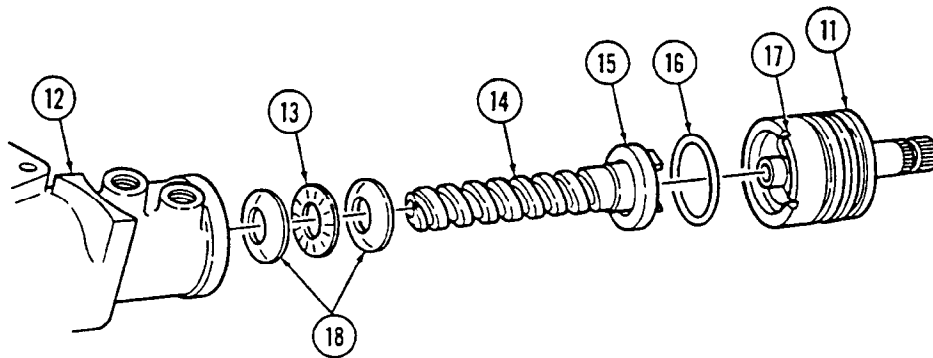
31-3. STEERING GEAR REPAIR (Cont'd)

18. Install O-ring (16) in valve body (11).
19. Insert worm shaft (14) into valve body (11).
20. Engage locating pin (15) on worm shaft (14) with slot (17) in valve body (11).

NOTE

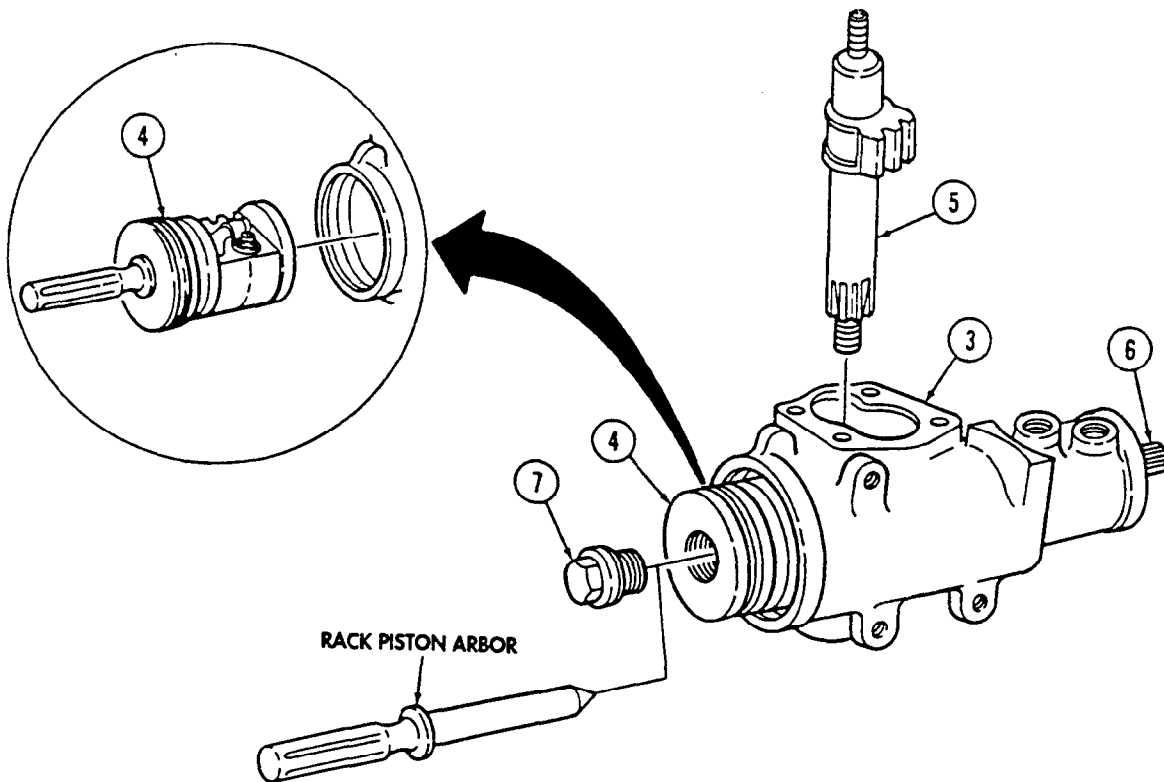
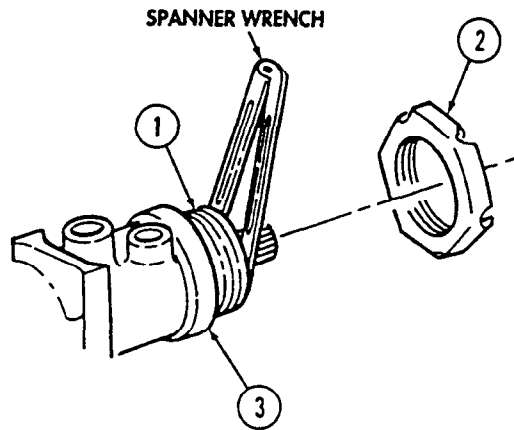
Coned surface of races face toward housing.

21. Install lower thrust bearing race (18), lower thrust bearing (13), and lower thrust bearing race (18) on worm shaft (14).
22. Install assembled valve body (11) and worm shaft (14) into housing (12).
23. Install O-ring seal (24), large upper bearing race (23), upper thrust bearing (22), small upper bearing race (21), thrust bearing spacer (20), and bearing retainer (19) on adjuster plug (25). Press retainer (19) onto adjuster plug (25) with a brass drift.
24. Install stub shaft oil seal (26) in adjuster plug (25). Install far enough to provide clearance for dust seal (27) and retaining ring (28).
25. Install stub shaft dust seal (27) and retaining ring (28) in adjuster plug (25).



31-3. STEERING GEAR REPAIR (Cont'd)

26. Using spanner wrench, install adjuster plug (1) in housing (3). Do not tighten.
27. Install locknut (2) over adjuster plug (1). Do not tighten.
28. Install rack piston (4) and rack piston arbor into gear housing (3). Ensure gear teeth on rack piston (4) align with gear teeth on pitman shaft (5).
29. Hold rack piston arbor tightly against rack piston (4) while turning stub shaft (6) clockwise. Remove rack piston arbor.
30. Install rack piston plug (7) into rack piston (4). Do not tighten.
31. Center rack piston (4) and install pitman shaft (5) in housing (3).
32. Tighten rack piston plug (7) to 75 lb-ft (102 N·m).



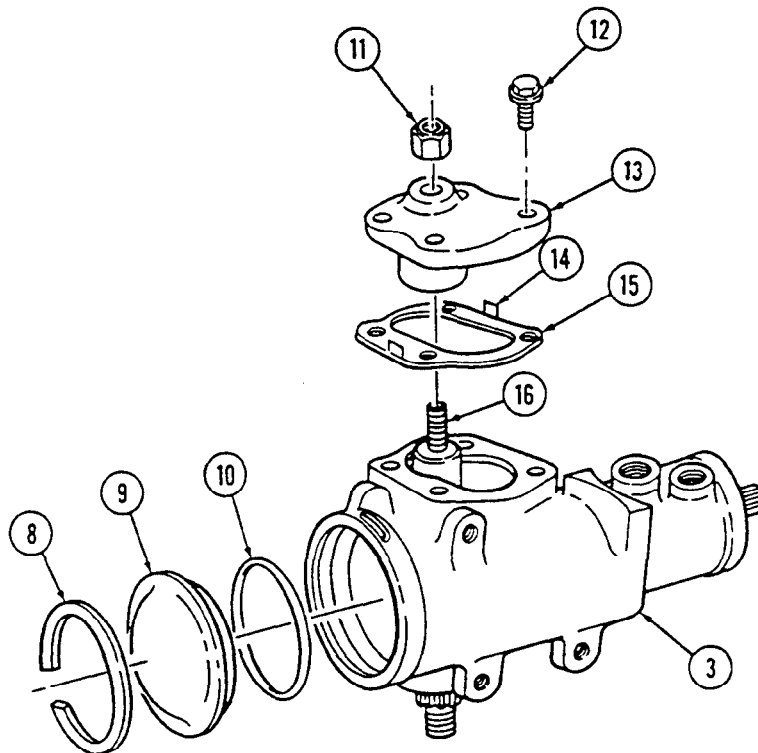
31-3. STEERING GEAR REPAIR (Cont'd)

33. Install housing end plug O-ring seal (10) and housing end plug (9) in housing (3).

NOTE

Opening in retaining ring should be located approximately 1 in. (25 mm) from access hole.

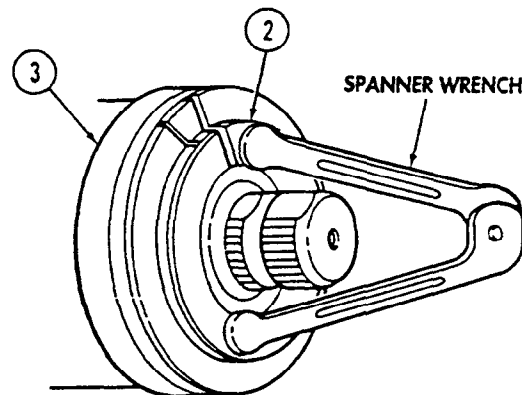
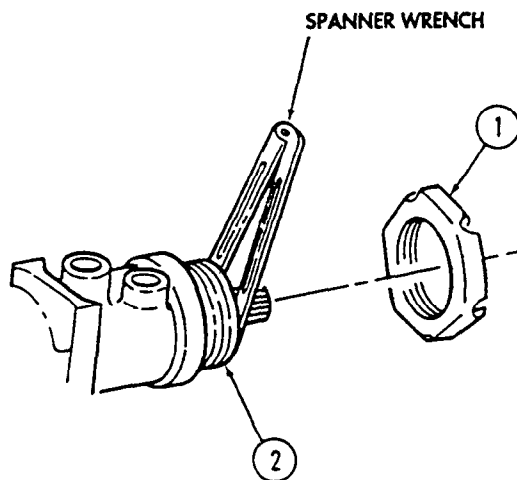
34. Install retaining ring (8) in housing (3).
35. Install side cover gasket (15) on side cover (13) by bending tabs (14) around side cover (13) edge.
36. Install side cover (13) onto adjuster screw (16).
37. Install four capscrews (12) on side cover (13). Tighten capscrews (12) to 40 lb-ft (54 N·m).
38. Install lash adjuster nut (11) on pitman shaft adjuster screw (16).



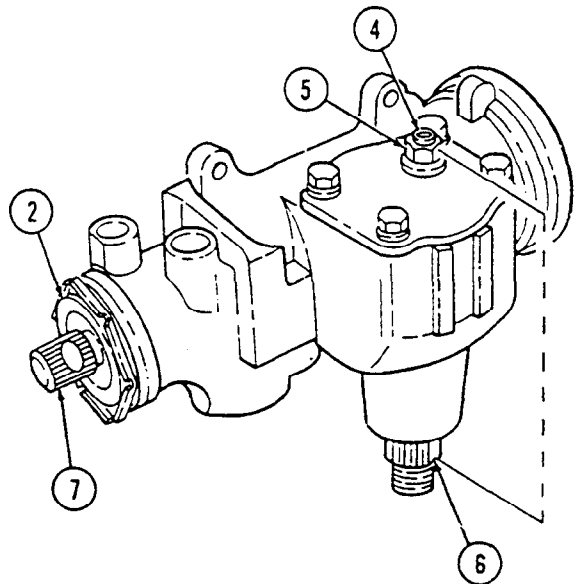
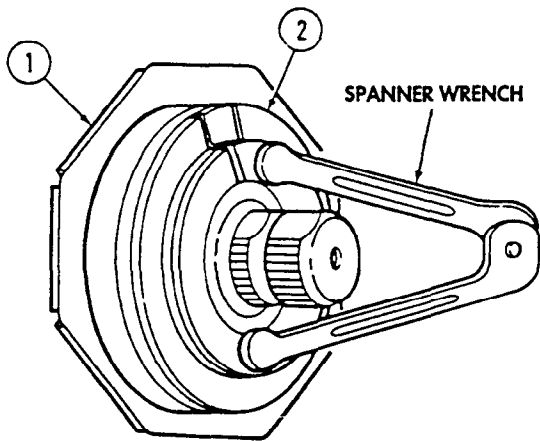
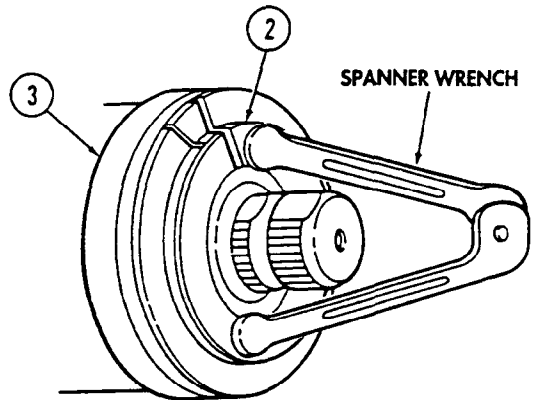
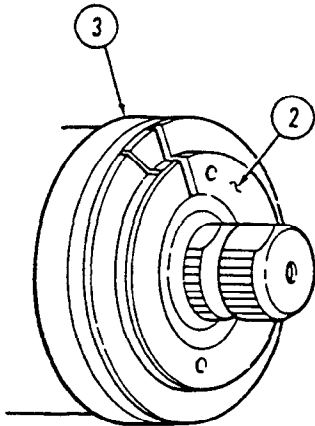
31-3. STEERING GEAR REPAIR (Cont'd)

h. Adjustment

1. For worm shaft bearing preload adjustment, remove locknut (1).
2. Using spanner wrench, tighten adjuster plug (2) clockwise until thrust bearing is firmly bottomed.
3. Match mark housing (3) and adjuster plug (2) face.
4. Measure back counterclockwise 0.5 in. (13 mm) and place second mark on housing (3).
5. Turn adjuster plug (2) counterclockwise until mark on face of adjuster plug (2) aligns with second mark on housing (3).
6. Install locknut (1) on adjuster plug (2).
7. Hold adjuster plug (2) using spanner wrench and tighten locknut (1).
8. Turn stub shaft (7) clockwise to stop, then back one-quarter turn.
9. Check torque required to turn stub shaft (7). Reading should be 4-10 lb-in. (0.5-1 N·m).
10. If reading is not correct, turn adjuster plug (2) in or out and repeat steps 7 through 9 until torque required to turn stub shaft (7) is 4-10 lb-in. (0.5-1 N·m).
11. For pitman shaft-over-center adjustment, loosen adjuster screw locknut (5).
12. Turn adjuster screw (4) counterclockwise until fully extended, then turn clockwise one full turn.
13. Rotate stub shaft (7) from stop to stop and count number of turns.
14. Back off stub shaft (7) one-half number of turns counted.
15. With gear centered, flat on stub shaft (7) will face upward and block tooth (6) should be in line with adjuster screw (4).
16. With gear at center of travel, check torque to turn stub shaft (7).
17. Turn adjuster screw (4) clockwise until torque to turn stub shaft (7) is 6-10 lb-in. (0.7-1 N·m) more than the reading obtained in step 16.
18. Hold adjuster screw (4) and tighten locknut (5) to 20 lb-ft (27 N·m).



31-3. STEERING GEAR REPAIR (Cont'd)



- FOLLOW-ON TASKS:
- Perform leak test (para. 23-4).
 - Install steering gear (para. 8-20).

CHAPTER 32

FRAME (GS) REPAIR

32-1. INTRODUCTION

This chapter contains maintenance instructions for repair of frame components at the general support maintenance level. Some subassemblies and parts must be removed before frame components can be accessed. They are referenced to other paragraphs in this manual.

32-2. GENERAL

Refer to TB 9-2300-247-40 for repair of frames used on the M1113/M1114 series vehicles. Refer to TM 9-2320-387-24P for authorized replacement parts used in frame repair.

32-3. FRAME REPAIR TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
32-4.	Frame Inspection and Repair	32-2
32-5.	Right Front Body Mount Bracket Replacement	32-11
32-6.	Right Intermediate Body Mount Bracket Replacement	32-12
32-7.	Left Intermediate Body Mount Bracket Replacement	32-13

32-4. FRAME INSPECTION AND REPAIR

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. General Information b. Powertrain Lift Sling Installation c. Inspection | <ul style="list-style-type: none"> d. Preparation and Materials e. Repair Procedures f. Powertrain Lift Sling Removal |
|--|--|

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Cotter pin (Appendix G, Item 27)
Powertrain lift sling (Appendix D, Figs. 72, 73)

Manual References

TB 750-98-23
TM 9-2320-387-10
TM 9-2320-387-24P
TM 9-237
TM 43-0139

Equipment Condition

- Vehicle mission equipment removed and stowed (TM 9-2320-387-10).
- Vehicle undercarriage clean and free of mud and debris (TM 9-2320-387-10).

General Safety Instructions

- When using power-driven equipment to straighten frames, all personnel must stand clear.
- Shim material must be under jackstands.
- Ensure shoulder bolts have a raised metal 10.9 material strength indicator on the head of the bolts.
- Do not bulk heat frame rails to remove bends and/or buckles.

Maintenance Level

General support

a. General Information

1. Frame rails are constructed by arc-welding two C-channels of preformed steel together to form a box-cross section.
2. Frame rails are internally reinforced at bolt hole locations by bushings or full cross-section spacers to prevent channels from collapsing from attaching load.

NOTE

Crossmembers and crossmember brackets must be replaced if damaged.

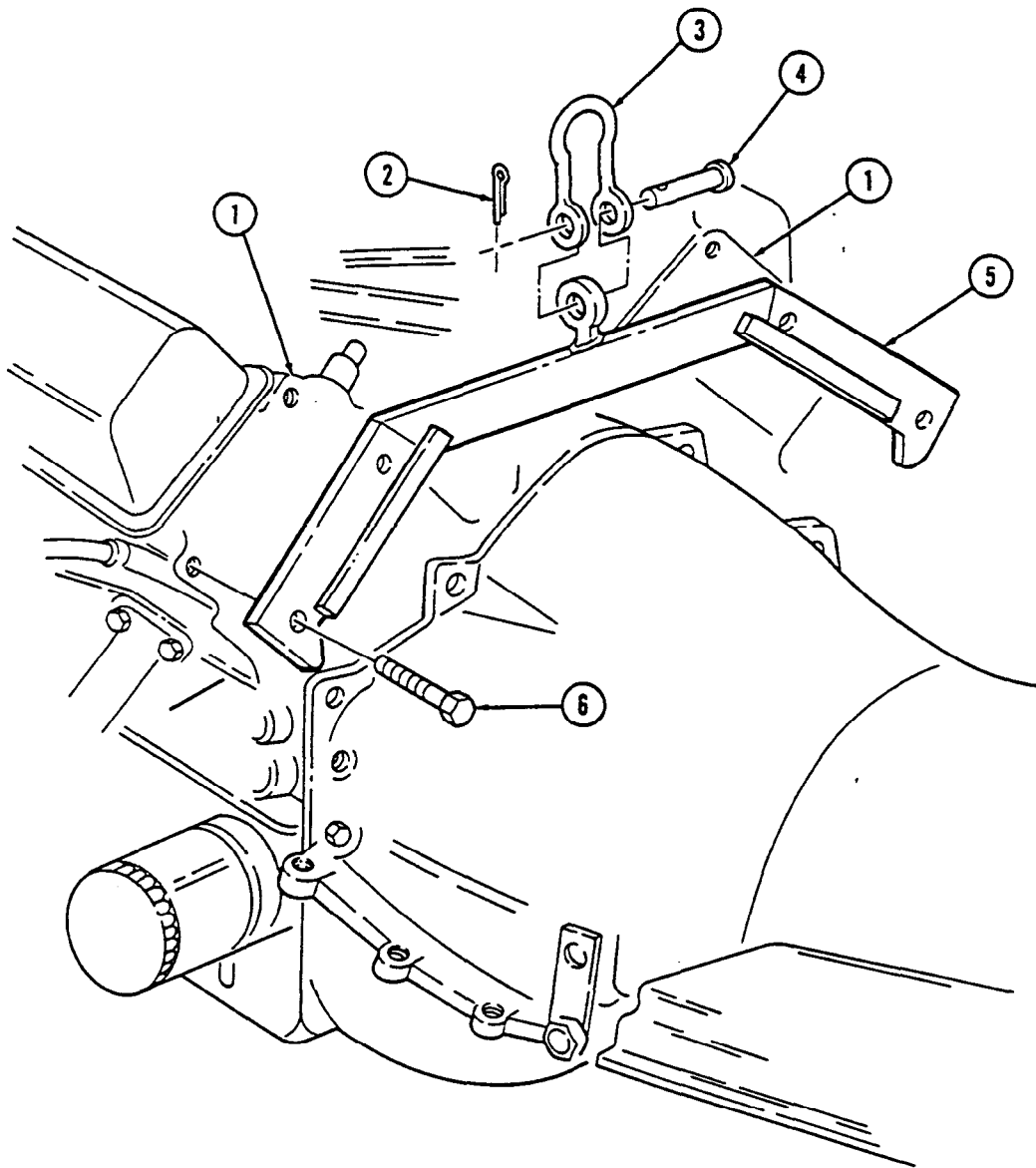
3. The frame is made by bolting two non-identical frame rails to crossmembers. Crossmembers are held to more stringent dimensional tolerances and must be replaced if damaged.
4. The type of repairs attempted will vary considerably depending on equipment, type of facilities, and skill of available personnel. Also the choice of procedures will be influenced by parts supply status and the operational situation.
5. Mechanical forces involved in frame straightening can lead to safety problems, which all personnel must constantly consider.
6. The removal of frame constraints (loosening of crossmember and bracket fastenings) is critical to allow enough freedom of movement when straightening frame.
7. The objective of a repair procedure is to return the vehicle to a mission-safe (operationally and mechanically) condition within a reasonable time and cost expenditure.
8. For ease of frame maintenance, use powertrain lift sling. (Refer to task b.)

32-4. FRAME INSPECTION AND REPAIR (Cont'd)

b. Powertrain Lift Sling Installation

WARNING

- To avoid possible injury to personnel and damage to equipment, ensure shoulder bolts have a raised metal 10.9 material strength indicator on the head of the bolts.
 - Rope lift slings are awkward and potentially hazardous to personnel and can cause damage to equipment. Replace rope lift sling with powertrain lift sling.
1. Install powertrain lift sling (5) on cylinder heads (1) with four shoulder bolts (P/N 11502788) (6).
 2. Install shackle (P/N NAS1042-14) (3) on powertrain lift sling (5) with pin (4) and cotter pin (2).



32-4. FRAME INSPECTION AND REPAIR (Cont'd)

c. Inspection

1. Visual inspection: This is the first and most critical step in deciding whether to repair or replace a damaged frame component. Factors to be noted in visual inspection:
 - (a) Transverse tears, cracks, and breaks that extend over one tangent or radius and into 5/32 in. (3.97 mm) of an associated tangent or radius must be replaced.
 - (b) Transverse tears, cracks, or breaks that extend over the tangent or radius can be repaired by welding and reinforcing, providing the crack does not extend into 5/32 in. (3.97 mm) of an associated tangent or radius.
 - (c) Tears, cracks, or breaks on the inside face of the frame rail that extend to within 3 in. (76.2 mm) of a bolted-on crossmember are unreparable, and frame rail must be replaced.
 - (d) Tears, cracks, or breaks that extend into a hole or from a hole in the frame rails must first have a dye penetrant test performed at the hole to determine if secondary cracks exist (refer to TM 9-237). The crack is unreparable if a secondary crack exists, and the frame rail must be replaced.
 - (e) Tears, cracks, or breaks that extend into a hole or from a hole that does not have any existing secondary cracks may be repaired by welding with the use of a pre-drilled reinforcement (dutchman/fishplate) (refer to task e.).
 - (f) Short longitudinal cracks (up to 6 in. (15.2 cm)) or split welds can be repaired by installing a reinforcement (dutchman/fishplate) and heli-arc welding.
 - (g) Twisted frame rails are unreparable; replace.
2. Measurements: Select a smooth, level surface with area 1-1/2 times the size of the vehicle.
 - (a) Vertical (or side view) measurement:
 - (1) Raise vehicle at four points until all four wheels are off the surface (para. 8-2).

WARNING

Shim material must be under jackstand. Do not use shims on top of jackstand. Vehicle could be knocked off jackstand, causing personnel injury or damage to equipment.

- (2) Measure height to bottom of frame near each jackstand. Place shim(s) under jackstands as necessary until all four heights are equal.

NOTE

Measurements must be taken at identical locations on left and right frame rails. Failure to do so will result in faulty indication.

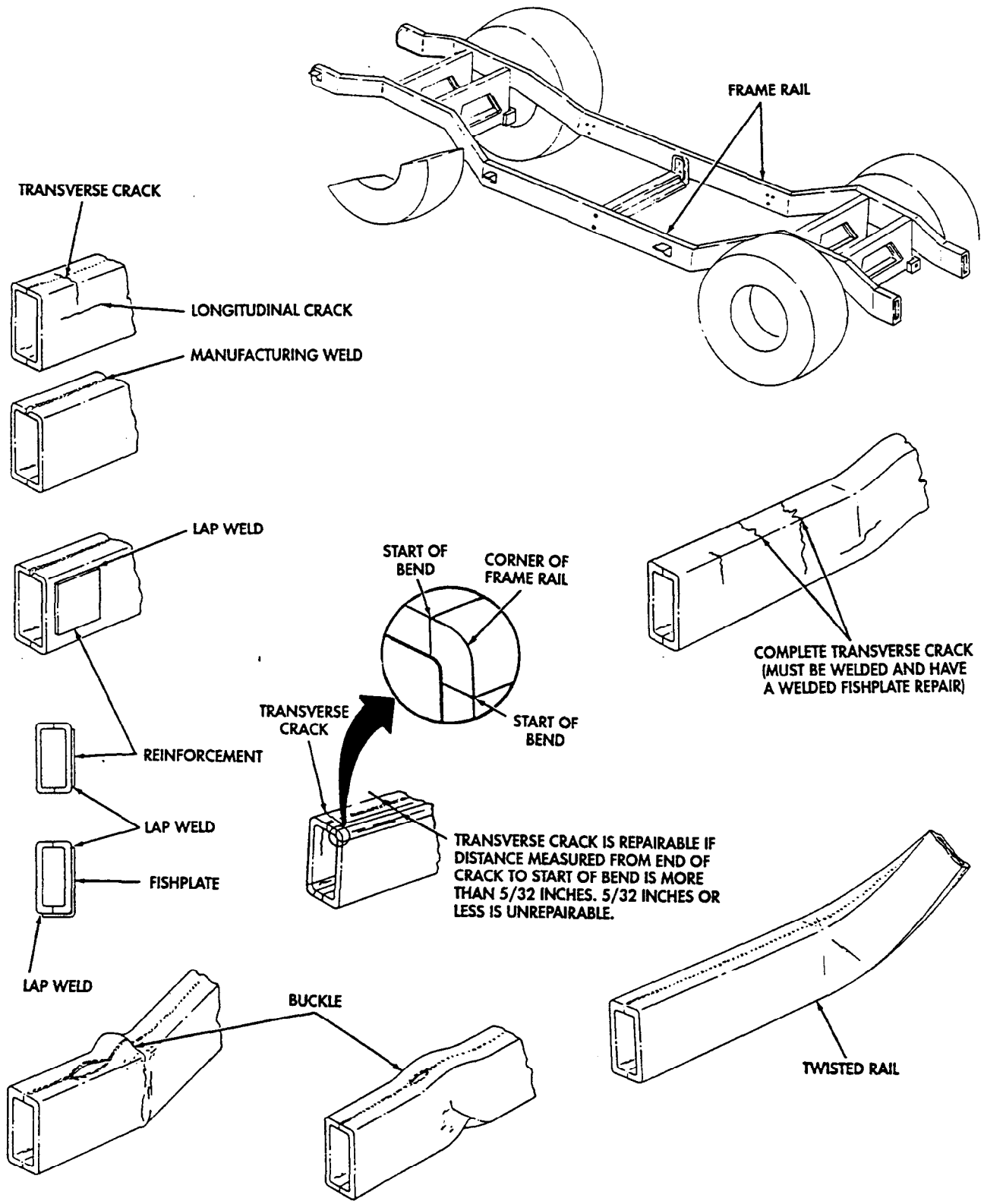
- (3) Select, measure, and record frame rail height at several different positions on either frame rail.
- (4) Measure and record frame rail height at corresponding points on opposite frame rail.
- (5) Right and left frame rail comparable points deviating more than 1/8 in. (3 mm) for each 2 ft (.6 m) linear distance indicate a vertically bent frame. Record deviations.

NOTE

If measured frame rails are out of tolerance, notify supervisor. If frame rails are verified to be out of tolerance, vehicle will be classified as unserviceable.

- (6) Lower vehicle from jackstands (para. 8-2).

32-4. FRAME INSPECTION AND REPAIR (Cont'd)



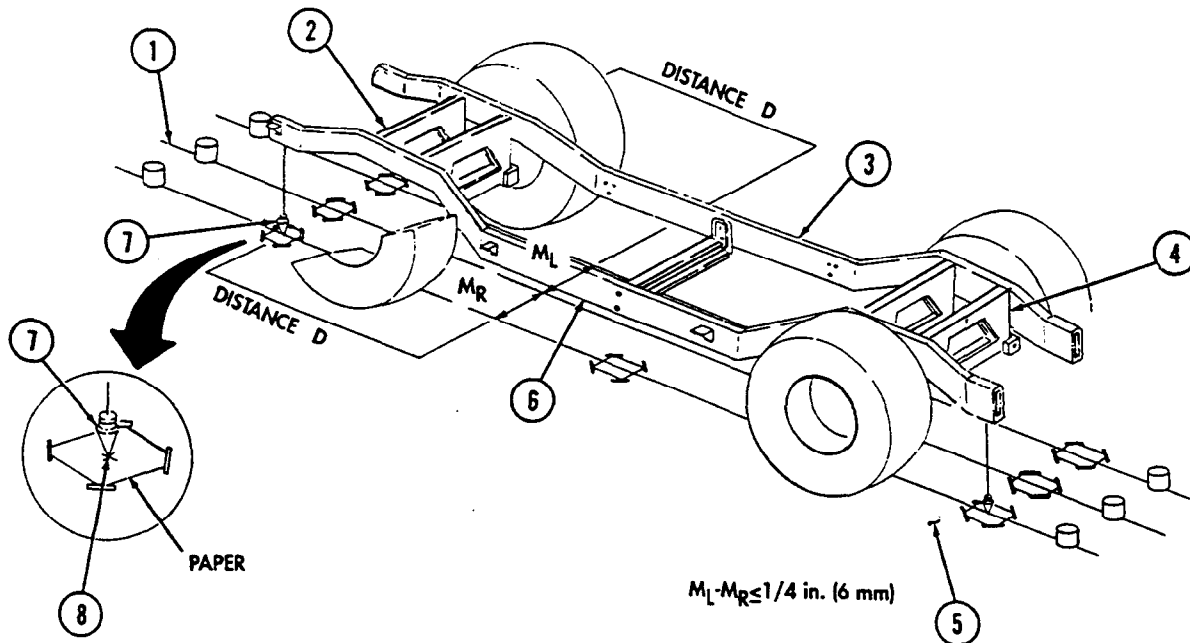
32-4. FRAME INSPECTION AND REPAIR (Cont'd)

(b) Horizontal (bowing) measurement.

- (1) Select a smooth, level surface and drive vehicle into position from a 12 ft (3.7 m) straight line of travel. Apply parking brake gently to bring vehicle to a stop. Chock wheels (TM 9-2320-387-10) and release parking brake.
- (2) Measure height of frame rails (3) and (6) at each end near center of crossmembers (2) and (4). If heights vary by more than 1/8-5/16 in. (3-8 mm), raise and install jackstands to bring frame to leveling tolerance (step 2a (1) and (2)).
- (3) Hold a string with plumb bob (7), as shown, along frame rail (6) at intersection of crossmember (2). Mark location (8) where plumb bob (7) stops moving. Repeat for other three corners of frame.

NOTE

- Strings used for horizontal bow measurement will remain in place until procedure 2(c), frame skew, is completed.
 - To ensure measurements are precise, string must be pulled tight and secured.
- (4) Stretch string tightly on ground (5) between front and rear plumb bob (7) marks under each frame rail (3) and (6).
 - (5) Measure front (2) and rearmost (4) crossmembers to determine center point. Drop a plumb bob (7) from these points to the ground. Mark location where plumb bob (7) stops moving.
 - (6) Stretch string tightly on ground (5) between front and rear plumb bob (7) marks under crossmembers (2) and (4) to determine centerline (1).
 - (7) Measure an equal distance (D) along right and left strings to select your measure points and measure from these right and left points to center string. Mark these points on string. The distance from right and left points to center string should be within 1/4 in. (6 mm) of being equal. If not, one frame rail is bowed. Repeat this procedure for several other points along frame. Record deviations.



32-4. FRAME INSPECTION AND REPAIR (Cont'd)

(c) Diagonal (skew) measurement.

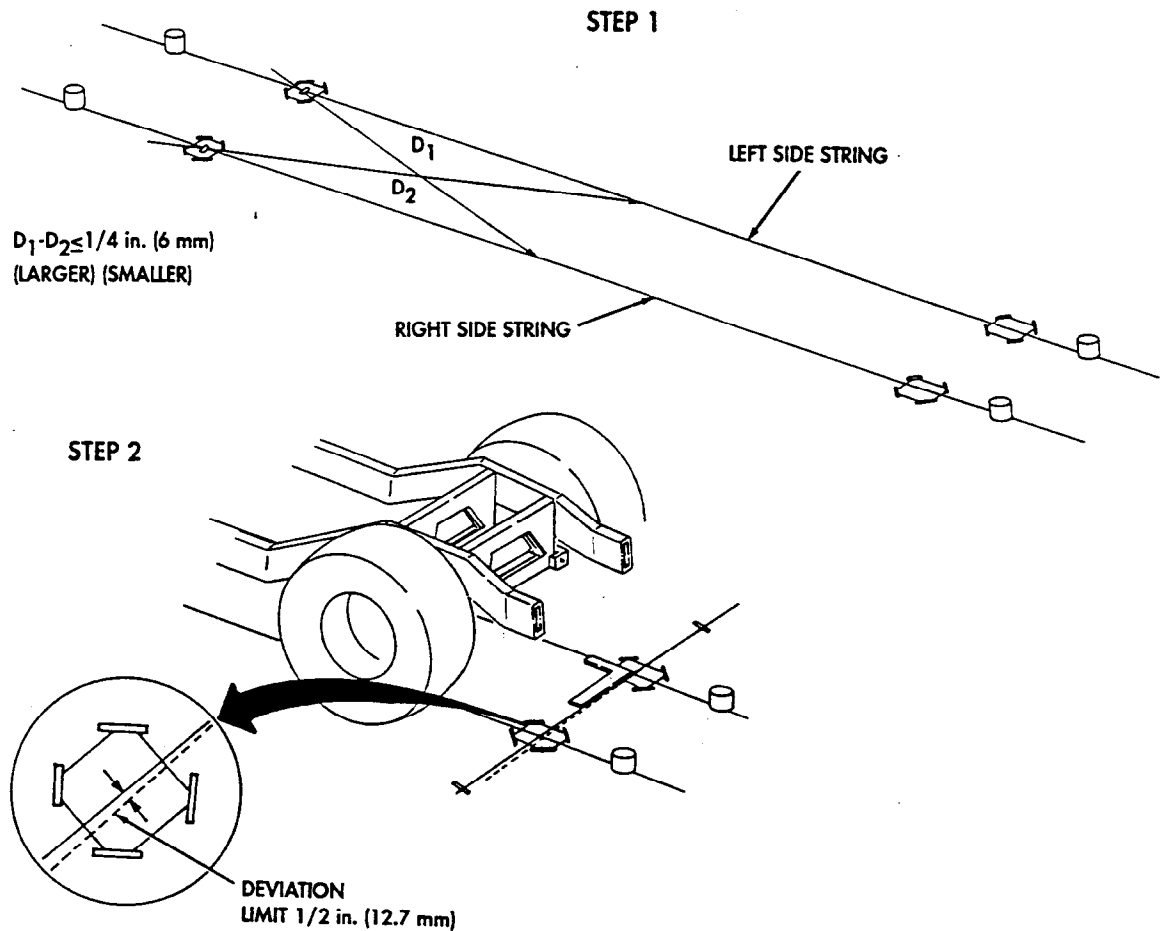
NOTE

The following two steps are alternate procedures to determine if frame rails are skewed.

- (1) Measure diagonally from one point on right or left string to adjacent point on opposite side string. Compare to the opposite diagonal measurement. If these two measurements differ by more than 1/4 in. (6 mm), the two frame rails are skewed. Repeat this procedure at other sets of four measuring points to confirm skew. Record deviations.
- (2) Position a string across two plumb bob points at corresponding (or end) points of frame rail string. Place a square with one leg coincident with frame rail string. Run a line or string along other side of square as far as opposite frame rail string. Measure deviation of end string and square side line at opposite frame rail string. Any deviation means the two frame rails are skewed and, consequently, the crossmembers are not at square angles to frame rails. A deviation of 1/2 in. (12.7 mm) makes a vehicle dog track and it is difficult to align wheels. Record deviations.

NOTE

If measured frame rails are out of tolerance, notify supervisor. If frame rails are verified to be out of tolerance, vehicle will be classified as unserviceable.



32-4. FRAME INSPECTION AND REPAIR (Cont'd)

- (d) Decisions as to whether or not to repair frame will be made in accordance to the following factors:
- (1) Provisions of TB 750-98-23 regarding time and materials versus replacement.
 - (2) Supply and operational considerations.
 - (3) Appropriate facilities available.
 - (4) Personnel skill levels.
 - (5) Influence of other collateral repairs that may be required to return the vehicle to a serviceable condition.
 - (6) Buckled frame rails with both vertical and horizontal bending are extremely difficult to repair; item should be replaced.
 - (7) Twisted frame rails generally are unrepairable; replace item.
 - (8) Frame rails that are bent upward, resulting in torn metal in bottom of rail, must be welded and have a welded-on fishplate repair. If fishplate would block mounting parts and bolt holes, replace frame rail.

d. Preparation and Materials

1. To perform a repair on the frame, a plan is needed due to the large variability of steps and methods to be employed. This plan is influenced by:
 - (a) Bending-type repair:
 - (1) Suitable vehicle restraints.
 - (2) Solid anchors for pulling or seating snatch blocks.
 - (3) Pulling (pushing) power source, either mechanical or hydraulic.
 - (b) Frame rail (and possibly one or more crossmembers) replacement requires a quantity of suitable blocking material.
 - (c) Patches, dutchman, fishplates, and reinforcements:
 - (1) Bulk steel plate of grade SAE 950 or equivalent (of equal or greater thickness).
 - (2) Scrap material of like metal from salvage or cannabilization.
 - (3) Heli-arc welding rods of type AWS A5.20 (E 707-1) or equivalent.
 - (d) In critical situations, 1/4-in. (6-mm) construction grade steel angle or plate may be used.
2. Based on factors of subtasks b and c, prepare a plan to return the vehicle to mission-serviceable status.

e. Repair Procedures

CAUTION

Bulk heating of frame rails to remove bends and buckles is not an approved procedure. The strength characteristics of the metal are affected. The repair may fail, causing damage to equipment.

NOTE

The repair or replacement procedure will vary with type(s) and location(s) of failure(s). For this reason, much of the repair work depends on skill of the mechanics, supply status, and operational situation. The removal/replacement of parts, bolts, and brackets affecting the repair are left to the discretion of the mechanics and will be governed by the instructions in this manual and repair parts manual.

32-4. FRAME INSPECTION AND REPAIR (Cont'd)

1. Transverse tears, cracks, and breaks repairs (all welding on frame) will use reinforcements (dutchman/fishplate), and be heli-arc type as given in TM 9-237, providing tears, cracks, or breaks are repairable (refer to task c.).
 - (a) Stop-drill crack with 1/8-in. (3-mm) drill hole.
 - (b) Vee-notch crack.
 - (c) Heli-arc weld crack with approved welding rod.
 - (d) Grind-weld flush to the surface of the rail.
 - (e) Install reinforcement (dutchman/fishplate) and lap-weld.
2. Welded reinforcements or fishplates will not be less than 6 in. (15.2 cm) in length along frame rail.
3. All puncture holes may be repaired as follows:
 - (a) Heli-arc weld fill holes.
 - (b) Grind-weld flush to surface.
 - (c) Install reinforcement (dutchman/fishplate) and lap-weld.
4. Bending repair:

WARNING

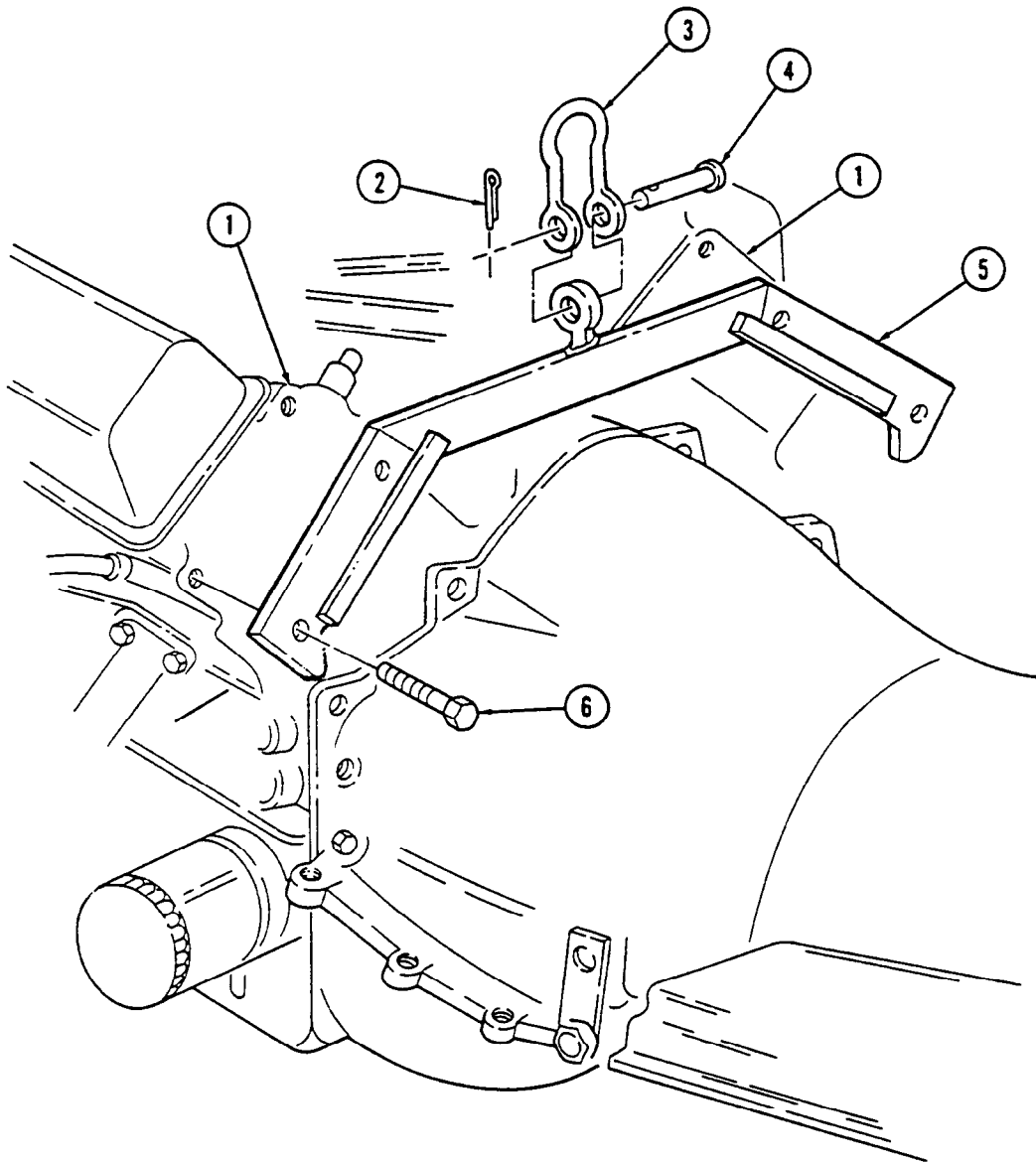
When performing frame rail straightening repairs accomplished with power-driven mechanical or hydraulic means, all personnel will stand clear of vehicle. Failure or malfunction of equipment may cause injury to personnel.

- (a) Do not attempt to repair a bend when:
 - (1) Buckling to a height of 1/4 in. (6 mm) on any one face of frame box is involved. If more than one face of frame box is involved with bending, replace part.
 - (2) Bending also includes more than very minor twisting.
 - (3) Part is bent in two directions, replace part.
 - (4) Bending involves a collapse of one or more faces of frame box at a suspension or body attachment point, replace part.
 - (b) When performing straightening repair with frame on vehicle:
 - (1) Use spreader plates or wood blocking to distribute chain force to avoid damage to frame box section.
 - (2) Be sure to loosen sufficient length of frame to allow frame force points to move without causing other damage.
 - (3) Restrain vehicle movement in both directions along line of force application.
 - (c) Vertical bends, except at end sections, require removal of frame rail or crossmember from vehicle. Straightening is done by using before and after dimensional measurements.
 - (d) Application of bulk heating to frame components is not authorized; metal properties are irreversibly degraded.
 - (e) At the conclusion of a bend repair, carefully inspect welds in vicinity of repair and area of force application. Any evidence of cracking or chipping of welds must be repaired. (Refer to step 1.)
 - (f) Spot-paint repaired areas using Chemical Agent Resistant Coating (CARC), following TM 43-0139, Painting Instructions for Field Use.
5. Front and rear wheel alignment checks (paras. 8-9 and 8-10) will be made after all frame repairs are completed.

32-4. FRAME INSPECTION AND REPAIR (Cont'd)

f. Powertrain Lift Sling Removal

1. Remove cotter pin (2), pin (4), and shackle (P/N NAS1042-14) (3) from powertrain lift sling (5).
2. Remove four shoulder bolts (P/N 11502788) (6) and powertrain lift sling (5) from cylinder heads (1).



32-5. RIGHT FRONT BODY MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Two locknuts (Appendix G, Item 121)

Manual References

TM 9-2320-387-24P

Equipment Condition

Right front body mount removed (para. 33-3).

Maintenance Level

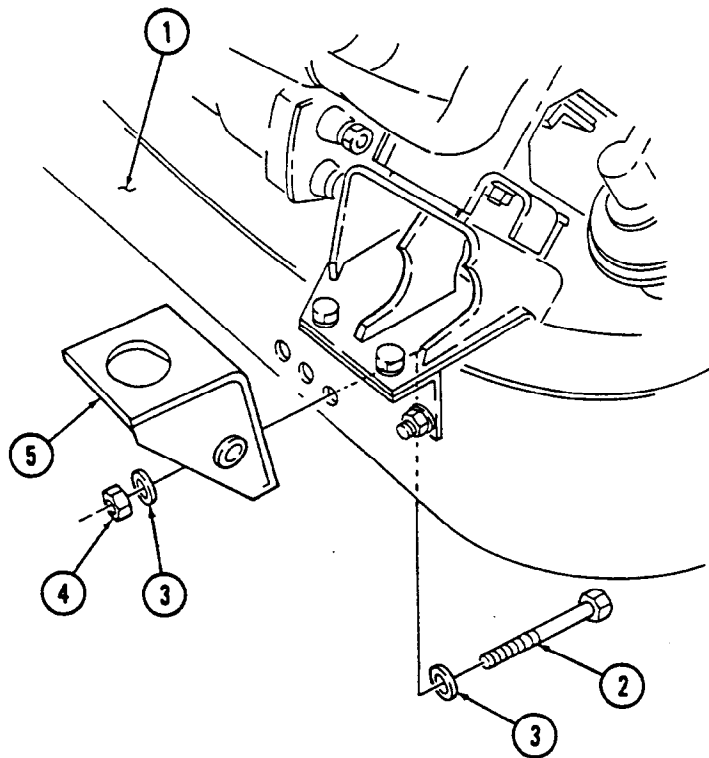
General support

a. Removal

Remove two locknuts (4), washers (3), capscrews (2), washers (3), and right front body mount bracket (5) from frame rail (1). Discard locknuts (4).

b. Installation

Install right front body mount bracket (5) on frame rail (1) with two washers (3), capscrews (2), washers (3), and locknuts (4). Tighten locknuts (4) to 90 lb-ft (122 N·m).



FOLLOW-ON TASK: Install right front body mount (para. 33-3).

32-6. RIGHT INTERMEDIATE BODY MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Equipment Condition

Right intermediate body mount removed
(para. 33-3).

Materials/Parts

Sealing compound (Appendix C, Item 71)

Maintenance Level

General support

Manual References

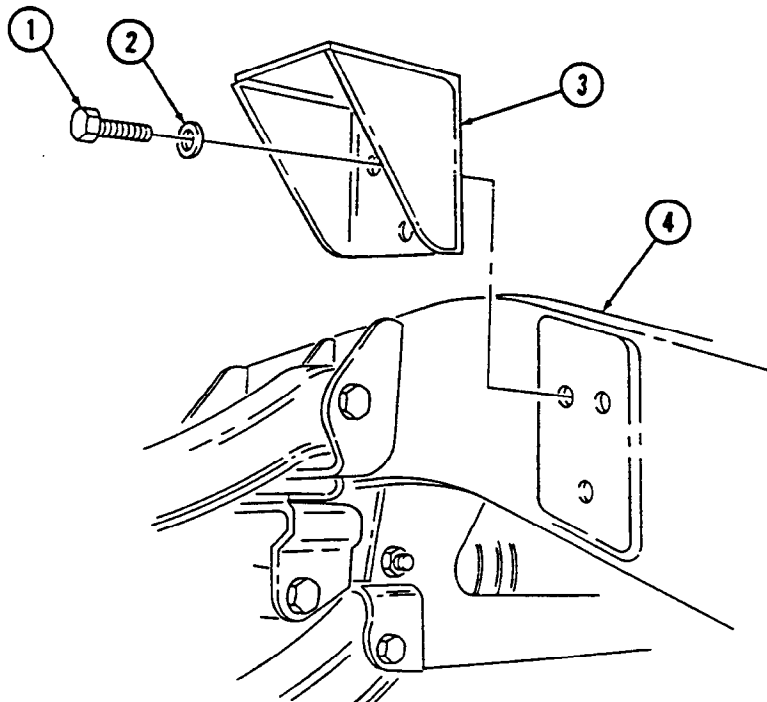
TM 9-2320-387-24P

a. Removal

Remove three capscrews (1), washers (2), and bracket (3) from frame rail (4).

b. Installation

Apply sealing compound to three capscrews (1) and install bracket (3) on frame rail (4) with three washers (2) and capscrews (1). Tighten capscrews (1) to 65-87 lb-ft (88-118 N·m).



FOLLOW-ON TASK: Install right intermediate body mount (para. 33-3).

32-7. LEFT INTERMEDIATE BODY MOUNT BRACKET REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Three locknuts (Appendix G, Item 121)

Manual References

TM 9-2320-387-24P

Equipment Condition

- Left intermediate body mount removed (para. 33-3).
- Tailpipe hanger removed (para. 3-53).

Maintenance Level

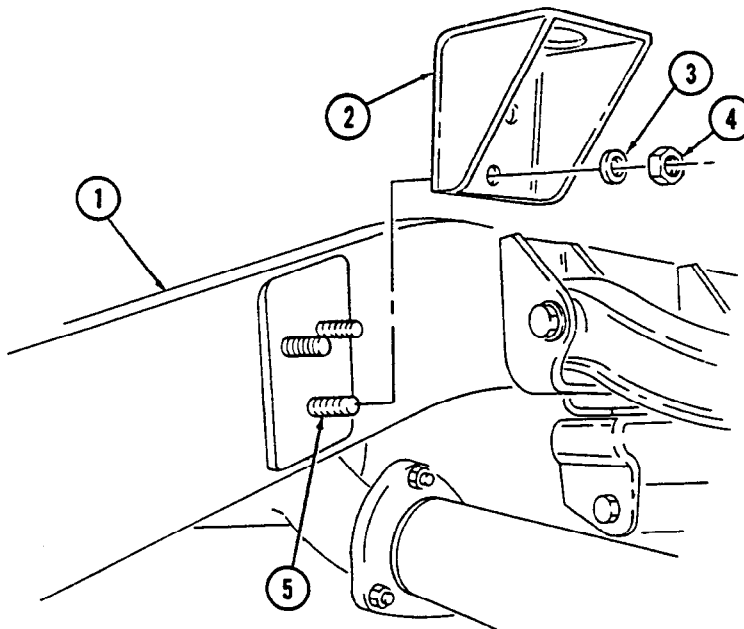
General support

a. Removal

Remove three locknuts (4), washers (3), and bracket (2) from frame rail (1). Discard locknuts (4).

b. Installation

Install bracket (2) on three capscrews (5) and frame rail (1) with three washers (3) and locknuts (4). Tighten locknuts (4) to 90 lb-ft (122 N·m).



- FOLLOW-ON TASKS:
- Install tailpipe hanger (para. 3-53).
 - Install left intermediate body mount (para. 33-3).

CHAPTER 33 BODY (GS) REPAIR

33-1. INTRODUCTION

This chapter contains maintenance instructions for repair of body components at the general support maintenance level. Some subassemblies and parts must be removed before body components can be accessed. They are referenced to other paragraphs in this manual.

Section I. BODY MAINTENANCE

33-2. BODY MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
33-3.	Body Mount Replacement	33-2

33-3. BODY MOUNT REPLACEMENT

This task covers:

a. Removal

b. Installation

INITIAL SETUP:

Tools

General mechanic's tool kit:
automotive (Appendix B, Item 1)

Materials/Parts

Locknut (Appendix G, Item 174)

Manual References

TM 9-2320-387-10
TM 9-2320-387-24P

Equipment Condition

- Hood raised and secured (front mounts only) (TM 9-2320-387-10).
- Left rear underbody armor removed (M1114 only) (para. 11-37).
- Right rear underbody armor removed (M1114 only) (para. 11-39).

Maintenance Level

General support

NOTE

- Replacement procedures for intermediate and rear body mounts are identical.
- On front body mounts, capscrew is inserted down through upper cushion.
- This procedure covers left intermediate body mount.

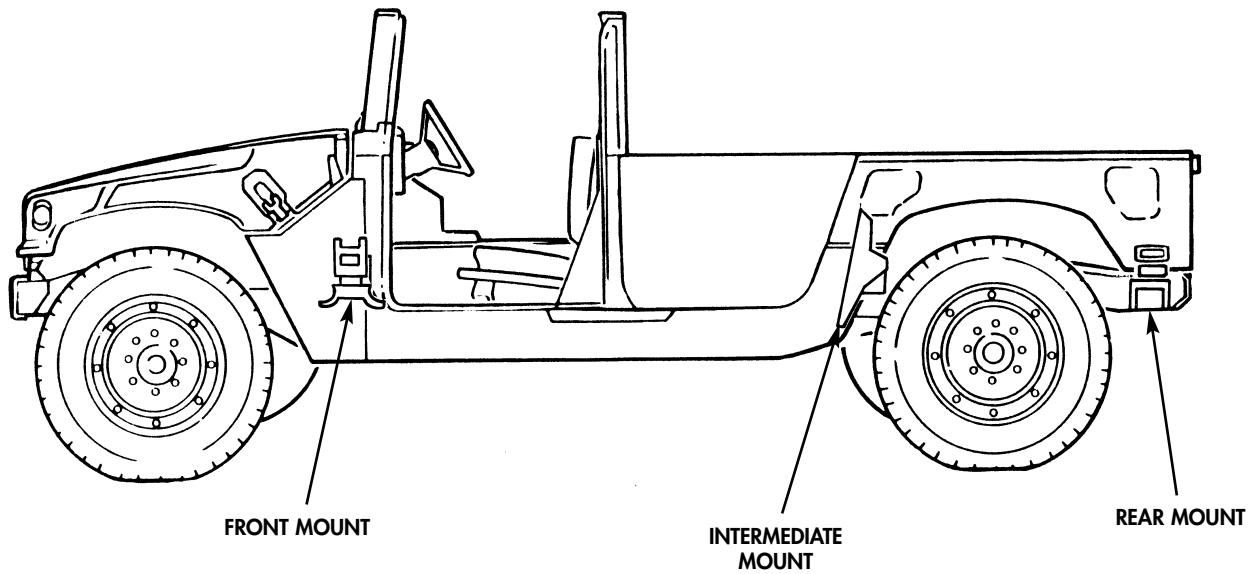
a. Removal

1. Remove locknut (2), washer (1), capscrew (7), washer (8), and spacer (9) from sleeve (4), upper cushion (5), lower cushion (10), body bracket (3), and frame bracket (6). Discard locknut (2).
2. Place jack under body reinforcements adjacent to body mount to be removed.
3. Raise body far enough to separate upper cushion (5) from lower cushion (10) and remove sleeve (4), upper cushion (5), and lower cushion (10).

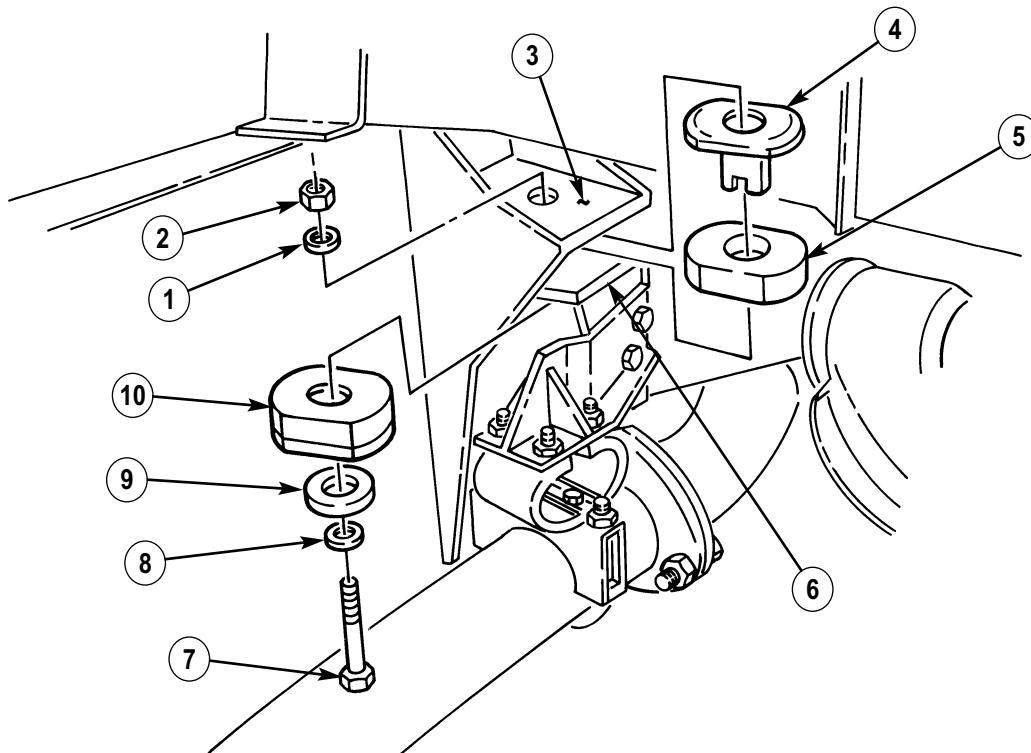
b. Installation

1. Install lower cushion (10), upper cushion (5), and sleeve (4) between body bracket (3) and frame bracket (6).
2. Lower body and align lower cushion (10), sleeve (4), upper cushion (5), and body bracket (3) and secure with spacer (9), washer (8), capscrew (7), washer (1), and locknut (2). Tighten locknut (2) to 90 lb-ft (122 N·m).

33-3. BODY MOUNT REPLACEMENT (Cont'd)



LEFT SIDE BODY MOUNT LOCATIONS



- FOLLOW-ON TASKS:**
- Lower and secure hood (front mounts only) (TM 9-2320-387-10).
 - Install right rear underbody armor (M1114 only) (para. 11-39).
 - Install left rear underbody armor (M1114 only) (para. 11-37).

Section II. BODY REPAIR

33-4. BODY REPAIR TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
33-5.	General	33-5
33-6.	Inspection	33-5
33-7.	Rivet Replacement	33-7
33-8.	Aluminum Repair	33-10
33-9.	Fiberglass Repair	33-16
33-10	Floor Panel Repair	33-18
33-11	Left Front Floor Panel Repair	33-19
33-12	Left Rear Floor Panel Repair	33-39
33-13	Right Front Floor Panel Repair	33-68
33-14	Right Rear Floor Panel Repair	33-88

33-5. GENERAL

a. The body is constructed of aluminum alloys that have been heat-treated to obtain high strength. Welding cannot be used to make body repairs. Heat generated in welding will reverse the heat treatment process and cause a great reduction in strength of material.

b. The hood and engine access cover are made of fiberglass (sheet molding compound). Cracks, splits, or holes may be repaired with a glass reinforced plastic laminate repair kit, MIL-R-19907C. (Refer to para. 33-9.)

c. Solid 3/16-in. diameter aluminum rivets are the primary method of joining body components. The rivet is inserted into a hole through two pieces of metal, and a second head is formed by manual or pneumatic impacting or by squeezing the rivet. A bucking bar is used to back up the rivet to form the rivet head. When making repairs, use blind rivets of the same size or oversize diameter with the appropriate grip length. Rivets 3/16-in. in diameter are identified in appendix F, table F-1. For other rivets that may be needed, the NSN for the rivet can be determined by cross-referencing the rivet part number to an NSN. To determine the proper rivet part number, the following part number breakdown is provided:

MS20600 – basic MS number

AD – indicates aluminum

6 – indicates rivet sleeve diameter in 1/32-in. increments ($6 \times 1/32 = 6/32 = 3/16$ -in.)

W – indicates serrated stem rivet

2 – indicates maximum grip length in 1/16-in. increments ($2 \times 1/16 = 2/16 = 1/8$ -in.)

d. Blind structural aluminum rivets of 3/16-in. diameter are used in applications where there is access from only one side of the part. Blind rivets are installed using a tool that pulls on the rivet stem causing a bulbed head to form on the back side of the part. Fastening is complete when stem breaks off. High strength is obtained in blind structural rivets by mechanically locking the remaining stem inside rivet body.

e. Steel pull-type lockbolt fasteners of 3/16-in. and 1/4-in. diameter are used where tension or high-shear loads exist. Lockbolts are two-piece unthreaded fasteners. One part is a high-strength, steel-headed, bolt-like part with serrations on its shank. The mating part is a collar which is swaged over the serrations causing the fastener to be locked in place.

f. To facilitate repairs to the body, it is acceptable to replace lockbolts and rivets with 3/16-in. AN3 series and 1/4-in. AN4 series bolts. Do not replace lockbolts with rivets. Standard threaded fasteners should not be used as these will quickly wear the aluminum structure. Bolt lengths should be chosen so that the cylindrical portion of the bolt is bearing on all members being joined. AN3 and AN4 series bolts are identified in appendix F, table F-3. Tighten all bolts to 70-75 lb-in. (8-8.5 N·m).

g. Fatigue strength of riveted joints and seams is increased by applying one part epoxy adhesive. This adhesive requires special material storage and metal preparation along with a low-temperature heat cycle for curing. Because of its impracticality in field repairs, epoxy adhesive will not be used. Where possible, extra rivets and thicker metal gauges should be used instead of adhesives. When making repairs, note epoxy applications. Parts may be difficult to separate, even after rivets are removed.

33-6. INSPECTION

a. **General.** The damaged area should be thoroughly cleaned and inspected to determine cause and extent of damage. Body parts should be inspected for holes, cracks, dents, distortion, or breaks. Fasteners should be inspected for breaks, stretching, looseness, cocked heads, or hole elongation. Seams, flanges, and joints should be inspected for straightness or local deformation as an indication that fasteners may have been stretched or holes elongated. It is possible for this to happen and fasteners still appear to be tight in their holes. In addition, make a thorough inspection of adjacent areas to determine if high loads have been transmitted from the damaged area to other areas. This can result in secondary damage in the form of distorted panels or seams, loosened or sheared fasteners, elongated fastener holes, and cracks.

b. **Classification.** After extent of damage has been determined, affected parts should be classified into one of the following categories:

- Negligible damage
- Damage repairable by patching
- Damage repairable by insertion
- Damage necessitating replacement of parts

33-6. INSPECTION (Cont'd)

1. Negligible damage: Minor dents, nicks, scores, cracks, and holes in body panels which are within or are brought within reasonable limits by a simple procedure, without extensive rework, are considered negligible damage. These defects should be considered more serious if located in main structural members such as body side rails, A-pillars, or floor crossmembers rather than in body panels such as cowls or rear wheelhouses. Deep wrinkles of undetermined origin in body panels should not be classed as negligible until the source of wrinkles has been investigated and positively identified. Damage other than small dents, holes, nicks, and scratches will require repair or replacement of the part. Refer to para. 33-8.f for repair of negligible damage.

(a) Negligible cracks. Isolated cracks less than 0.50 in. (1.27 cm) long may be classified as negligible cracks provided they are stop-drilled at each end to stop propagation.

(b) Negligible holes. Isolated holes no more than 0.50 in. (1.27 cm) diameter, after they are made round with smooth edges are classified as negligible holes, provided the distance from the edge of the hole to the nearest line of rivets exceeds the diameter of the hole.

(c) Negligible dents and distortion. Small dents and distorted areas may be classed as negligible if they can be repaired by hammering or bending without causing the material to crack. Heat may not be used for reforming.

2. Damage repairable by patching: Damage beyond negligible must be repaired, or the section replaced. Patches can often be applied over damaged body panels provided damaged area is first trimmed to remove sharp edges or notches which could cause the start of new cracks. The patch must then be sized to overlap the area to allow for attaching rivets. Refer to para. 33-8.g for repair by patching.

3. Damage repairable by insertion: In certain cases, patch repairs may not be desirable because of impracticality or because a flush surface is desired. In this case, damaged area must be cut away and a partial replacement of equivalent material inserted flush with adjacent areas and backed up with a doubler. Refer to para. 33-8.h for repair by insertion.

4. Damage necessitating replacement of parts: Parts too badly damaged for repair, or where replacement is easier than repair, fall into this category. Repair of welded assemblies such as body mounts are also in this category. Welded assemblies cannot be re-welded without destroying strength of the part and must be replaced.

c. **Rivet Failure.** Signs of rivet failure include tipped heads, looseness, and sometimes chipped or cracked paint. If heads are tipped in the same direction and rivets are loose in consecutive groups, the joint has undergone excessive load. Rivet heads which are tipped in different directions, and are not in groups may be improperly installed. With chipped or cracked paint, it may be necessary to remove paint to check true condition of rivets. Rivets subjected to critical loads but showing no distortion should be inspected if failure is suspected. The head should be drilled off, and the shank should be carefully punched out. Failure is indicated by notched rivet shank and misaligned holes. Flush rivets showing head slippage within the dimple or countersink indicate either sheet bearing or rivet shear failure and must be removed for inspection and replacement. If failure of rivets cannot be detected by visual inspection, the joint can be checked by drilling and punching out several rivets. If rivet shanks are notched, rivets should be replaced with next larger size rivets. If rivet holes show elongation due to local failure in tearing of the sheet, next larger size rivet must be used in replacement. Any deformation of the sheet around the rivet, tear-outs, or cracks between rivets usually indicates partially failed or damaged rivets. Complete repair of the joint will require replacement by next larger size rivets. Use the next .031 in. (0.79 mm) larger diameter rivet to obtain a tight joint when original hole has been enlarged. If original size rivet is installed, the rivet would not be able to carry its share of the shear load, and the joint would not meet its strength requirements.

d. **Lockbolt Failure.** Lockbolts are used to withstand tension loads and high-shear loads. These fasteners are installed in their holes with an interference fit. No looseness can be permitted. Lockbolts showing evidence of being stretched, broken, loose in their holes, or having heads that do not set flat against the surface must be replaced. Guidelines used in 33-6.c for detecting rivet failures also apply to lockbolts.

33-7. RIVET REPLACEMENT

NOTE

When removing rivets, care should be taken to not enlarge rivet hole as this would require use of an oversize or larger rivet for replacement.

a. Solid Rivet Removal.

1. File a flat surface on the manufactured head if accessible. It is always preferable to work on manufactured head rather than the one that is bucked over, since the former will always be more symmetrical about the shank.
2. Indent center of the filed surface with a center punch.
3. Drill through rivet head. Be sure to use a drill slightly smaller than diameter of rivet shank to avoid making rivet hole oversized.
4. Shear weakened rivet head off with a sharp chisel. For this operation, support back side of rivet and cut rivet head along direction of rivet line or panel edge. This will prevent distortion of the panel.
5. Firmly support the panel from the opposite side and drive out shank with a pin punch. If rivet is unduly tight because of swelling between sheets, drill rivet shank out with an undersize drill bit.

b. Blind Rivet Removal.

1. File a small flat space on rivet head.
2. Center punch the flat space. Support rivet backside, if possible.
3. Using a small drill bit about the size of rivet pin, drill off tapered end of pin which forms the lock.
4. Shear lock using a pin punch to drive out pin.
5. Pry out remainder of locking collar.
6. Using a drill bit slightly smaller than rivet shank, drill almost through rivet head.
7. Pry off rivet head with a pin punch.
8. Tap out rivet shank with a pin punch.

c. Lockbolt Removal.

1. Work from the head side of lockbolt, if accessible. File a small flat space on the head if rounded.
2. Center punch the head.
3. Using a hardened drill bit slightly smaller than lockbolt, drill through the head. In cases where lockbolts are too hard to be drilled with available drills, grind the head down using a cutoff wheel or carbide bit in a die grinder. When using grinder method, cut the head down until it is very thin, but do not grind it completely off or touch the body part with grinding tool.
4. Use a pin punch to pry off head or shear it off with a sharp chisel. Make sure the part is adequately supported while performing this step.
5. Drive lockbolt out of its hole with a pin punch. Care must be taken so that hole or part is not distorted.

NOTE

In cases where lockbolt head is inaccessible, the locking collar must be removed. It is best to remove collars by grinding or by splitting them axially with a sharp chisel.

33-7. RIVET REPLACEMENT (Cont'd)

d. Rivet Hole Drilling.

1. Center punch all new rivet locations. Center punch mark must be large enough to prevent drill bit from slipping out of position, yet it must not dent the surface of the material. To prevent denting, place a bucking bar behind material during punching.

2. Make sure drill bit is the correct size (tables 33-1 and 33-2) and point is properly ground. A no. 10 drill bit is used to install standard 3/16-in. blind rivets.

Table 33-1. Drill Sizes for Solid Shank Rivets.

RIVET DIAMETER (INCH)	DRILL SIZE	DRILL DIAMETER (INCH)
1/16	#51	0.0670
3/32	#41	0.0960
1/8	#30	0.1285
5/32	#21	0.1590
3/16	#10	0.1910
1/4	F	0.2570
5/16	P	0.3230
3/8	W	0.3860

Table 33-2. Drill Sizes for Blind Rivets.

NOMINAL DIAMETER (INCH)				OVERSIZE DIAMETER (INCH)			
RIVET DIAMETER	DRILL SIZE	MINIMUM	MAXIMUM	RIVET DIAMETER	DRILL SIZE	MINIMUM	MAXIMUM
1/8	#30	0.129	0.132	1/8	#27	0.143	0.146
5/32	#20	0.160	0.164	5/32	#16	0.176	0.180
3/16	#10	0.192	0.196	3/16	#5	0.205	0.209

3. Place drill bit in center mark for new rivet locations, or align drill bit with old hole when replacing old rivets with oversize rivets. When using a power drill, give the bit a few turns with fingers before starting motor. This will help assure that drill does not jump out of position when motor is started.

NOTE

- While drilling, hold drill at 90° angle to material surface. Avoid letting drill wobble, making oblong holes.
- Avoid excessive pressure. Let drill bit do the cutting.
- Do not push drill through material.

4. Remove all burrs with a metal countersink or file.

5. Clean away all drill chips. Care must be taken to assure that no chips are trapped between sheets of metal.

6. Apply sealing compound (appendix C, item 61) to hole and surrounding area.

33-7. RIVET REPLACEMENT (Cont'd)

e. Hole Countersinking.

NOTE

Some rivet installations in the body require that rivet head be flush with the material surface. In these instances, countersunk or flush-head rivets are used.

1. When using countersunk rivets, rivet holes must be countersunk with a tool having a 100° taper so rivet head will fit flush with surface.
2. When using a hand-operated countersink, the hole must be tried with a rivet so the recess will not be too deep or too shallow. It is best to use a countersink with a stop on it so depth of countersink can be controlled. Typical countersinking dimensions for blind rivets are shown in table 33-3. The minimum sheet thickness that can be machined for 100° countersink rivets is given in table 33-4.
3. Do not remove edge of hole on blind side of joint.

Table 33-3. Countersinking Dimensions for 100° Countersunk Blind Rivets.

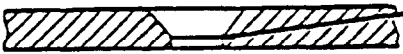
COUNTERSINKING DIMENSIONS (100°)		
← C →		
		0.10R. MIN.
RIVET DIAMETER (INCH)	C (INCH)	
	MINIMUM	MAXIMUM
1/8	0.222	0.228
5/32	0.283	0.289
3/16	0.350	0.356

Table 33-4. Minimum Sheet Gauge for 100° Machine Countersink.

RIVET SIZE (INCH)	3/32	1/8	5/32	3/16	1/4
GAUGE (INCH)	0.040	0.050	0.064	0.072	0.072

f. Blind Rivet Driving Practices and Precautions.

1. Rivets should be inspected for proper installation. The grip length of each rivet is marked on top of its head to provide positive identification. Use of proper grip length will produce a rivet installation where locking collar is flush with top surface of rivet head. Tolerance limit on flushness is 0.020 in. (0.5 mm).
2. For proper rivet installation, it is imperative that holes be properly prepared, tools be in good working order, and rivets properly applied. When problems occur, the source of trouble could be in any of these areas.

33-7. RIVET REPLACEMENT (Cont'd)

g. Blind Rivet Installation.

NOTE

- Prior to installing blind rivets, the hole must be prepared, and the parts aligned and clamped firmly in place. These steps are the same as for solid riveting operations (refer to para. 33-5.d). Proper drill sizes for standard and oversized blind rivets are given in table 33-2. Countersinking dimensions and minimum sheet gauge for countersunk blind rivets are shown in tables 33-3 and 33-4.
- It is very important that the proper length rivet is selected for each application. Rivet lengths are sized by the range of material thickness that the rivet will grip. Selecting the proper rivet length is critical because rivets can tolerate only 1/16-in. variation in material thickness for each particular rivet length. Rivet grip lengths are called out as a dash number at the end of the manufacturer's part number. Grip lengths are determined as shown in appendix F, table F-1.
- For double-dimpled sheets, add countersunk head height to material thickness.
- Use rivet installation tool kit, D-100-MIL-1, and puller head adapters, if required, for all blind rivets.

1. Insert rivet stem into pulling head of rivet gun or adapter.
2. Hold rivet gun in line with axis of rivet as accurately as possible.
3. Apply a steady, firm pressure against rivet head.
4. Squeeze handles of manual gun. The rivet clamping action will pull sheets together, seat rivet head, and break stem flush with head of rivet.

33-8. ALUMINUM REPAIR

CAUTION

Repairs should not be made on the body using welding or heat for forming. Heat will only weaken material and cause further problems.

a. Material. Aluminum material used for repair should be of the same alloy and temper as original, if possible. In general, 6061-T6 aluminum alloy should be used. Material thickness must be the same or thicker. This alloy will work well for flat repairs, but is not well suited to bending because it is quite hard and cracks easily when bent sharply. When bends must be made, use softer 6061-T4 aluminum alloy and increase material thickness by at least 50 percent. As a general rule of thumb, 6061-T4 alloy should be bent with a minimum bend radius of one to two times material thickness, whereas 6061-T6 alloy requires at least three times material thickness radius for bends. In all cases, bends should be closely inspected for cracks. A suitable method for avoiding cracks during bending is to obtain angles that are extruded from 6061-T6 alloy or use preformed angles for repairs. Bulk aluminum is identified in appendix F, table F-2.

b. Epoxy Adhesive. Where it is necessary to remove parts, note that epoxy adhesive is used in joints. Use care in parts removal to avoid unnecessary distortion. Parts should be separated by peeling them apart using a knife or chisel to start the peeling action. Before parts are reassembled, it will be necessary to remove any remaining cured epoxy from joints so parts will fit together with good, even contact. Use of epoxy requires special storage and application procedures which do not lend themselves to field repairs. For this reason, epoxy will not be used for repair. To compensate for the lack of epoxy, additional rivets should be used when making repairs to existing joints.

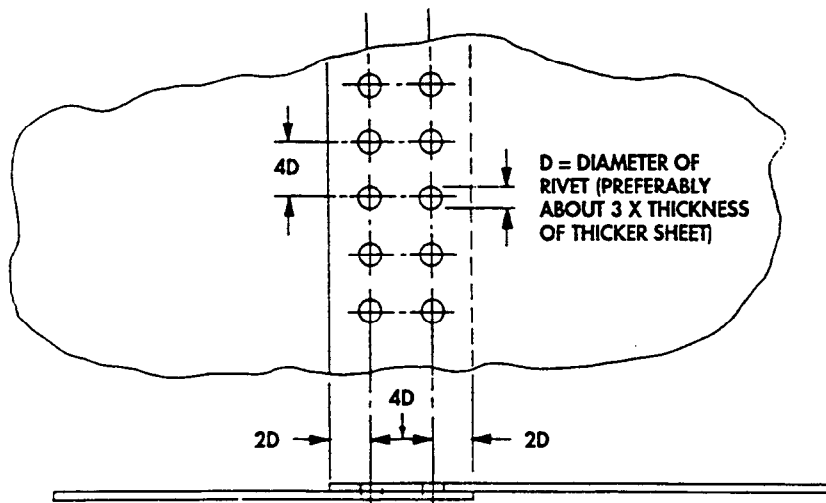
33-8. ALUMINUM REPAIR (Cont'd)

c. Rivet Patterns.

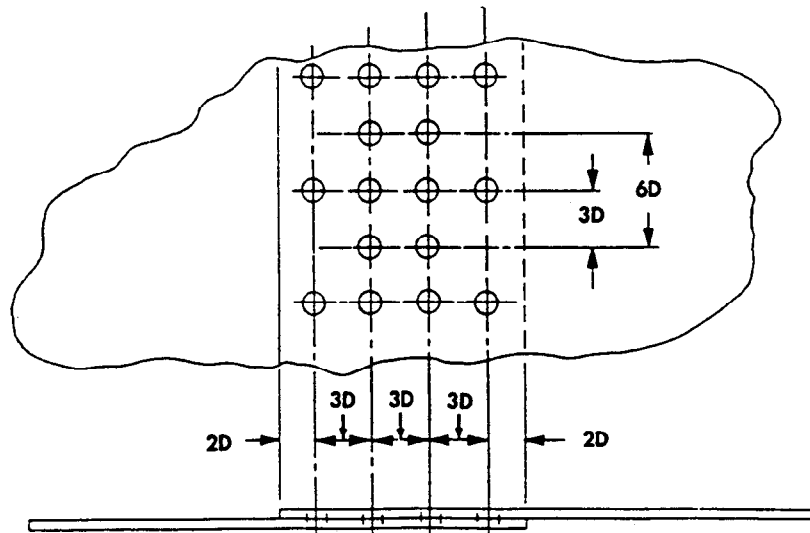
1. Rivet patterns are denoted by rivet spacing and rivet edge distance. Rivet edge distance is the distance from center of rivet to nearest edge of sheet. Rivet spacing is defined as the distance from center of rivet to center of adjacent rivet.

2. Required rivet spacing is determined by strength needed in the joint. A general feel for strength required can be obtained by inspecting rivet patterns in surrounding areas. Body repairs made using single rows of rivets should be performed using rivet spacing not greater than 1.5 in. (3.8 cm) and not less than 0.625 in. (15.9 mm). Use 1 in. rivet spacing as a general practice for repairs. Rivet spacing used in original construction may be greater due to additional strength obtained by using epoxy adhesive. Do not use rivet edge distances less than 0.375 in. (9.5 mm).

3. High-strength joints or large area patches may require use of double or multiple rows of rivets to obtain sufficient strength.



DOUBLE ROW RIVETING PATTERN



TRIPLE OR MULTIPLE ROW RIVETING PATTERN

33-8. ALUMINUM REPAIR (Cont'd)

4. Care must be taken to assure rivet hole patterns are transferred accurately in the case where a part with no holes is mated to one which already has rivet holes. Hole patterns may be transferred using one of the following methods:

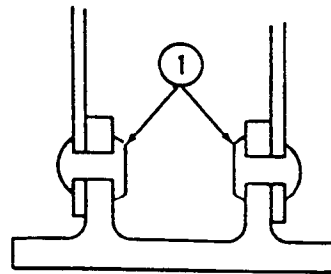
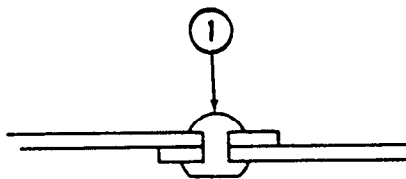
(a) Lay new part in place and use holes in mating part as a drill template. This requires that the new part be underneath the mating part. Care must be taken not to distort original holes.

(b) Use removed part as a drill template by clamping the old and new parts together. This requires that the parts nest flat and rivet flange be undistorted.

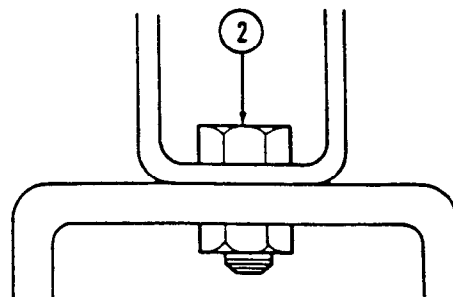
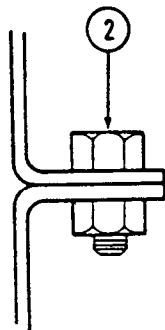
d. Joint Designs.

1. Loads are applied through a joint to fasteners that hold it together. These loads are applied to fasteners in the form of shear loads or tension loads. If load is perpendicular to axis of fasteners, the fastener is loaded in shear. The fastener is loaded in tension when load is along axis of fastener, causing a pull on each end of fastener.

2. Rivets (1) are designed to be loaded in shear. Do not create any new joints during repairs which cause rivets to be used in a tension application. Bolts (2) should be used for tension applications or substituted for rivets in very high-shear load applications.



RIVETS LOADED IN SHEAR



BOLTS REPLACING RIVETS LOADED IN TENSION

33-8. ALUMINUM REPAIR (Cont'd)

e. Repair Parts Preparation.

1. Repair parts or patches should be painted with epoxy primer before installation.
2. Apply sealing compound (appendix C, item 61) to mating surfaces to prevent corrosion.
3. Install insertion or patch as detailed in 33-8g and 33-8h.
4. Paint repaired area with epoxy primer.
5. Paint repaired area with polyurethane as required.

f. Repair of Negligible Damage.

1. Negligible cracks as defined in para. 33-6b are repaired by drilling a small hole at each end of crack to stop crack propagation. This is called stop-drilling. Table 33-5 gives proper drill sizes for stop-drilling cracks.
2. Negligible holes are repaired by rounding and smoothing edges of hole to alleviate stress risers caused by sharp notches.

CAUTION

Heat will never be used to re-form parts because it greatly reduces part strength.

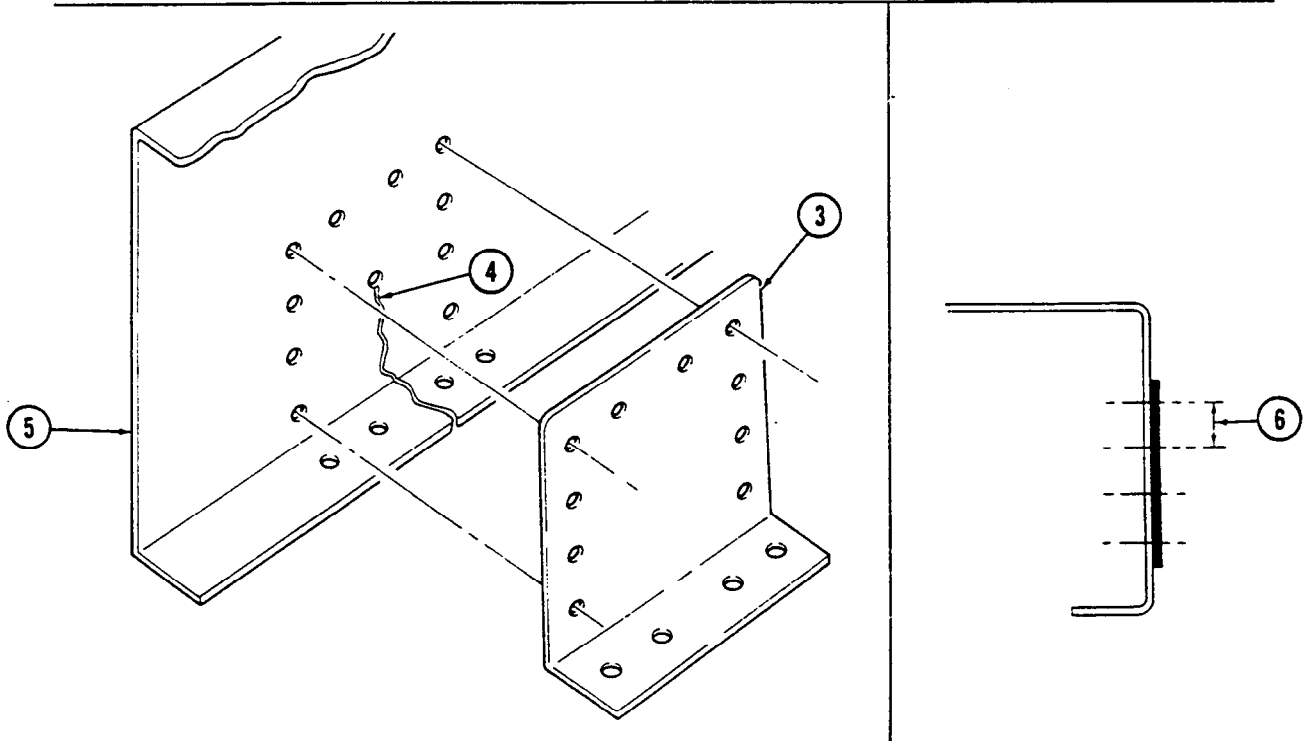
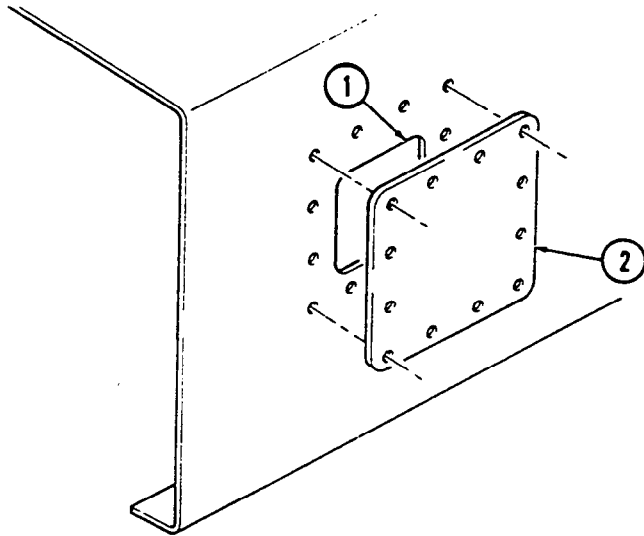
3. Small dents and distorted areas may be repaired by bending or hammering, as long as the operation does not cause materials to crack or tear. Sharp bends should not be attempted.

Table 33-5. Stop-Drill Sizes for Negligible Cracks.

SHEET THICKNESS (INCH)	MINIMUM STOP DRILL SIZE NO.
0-0.032	40
0.033 and thicker	30

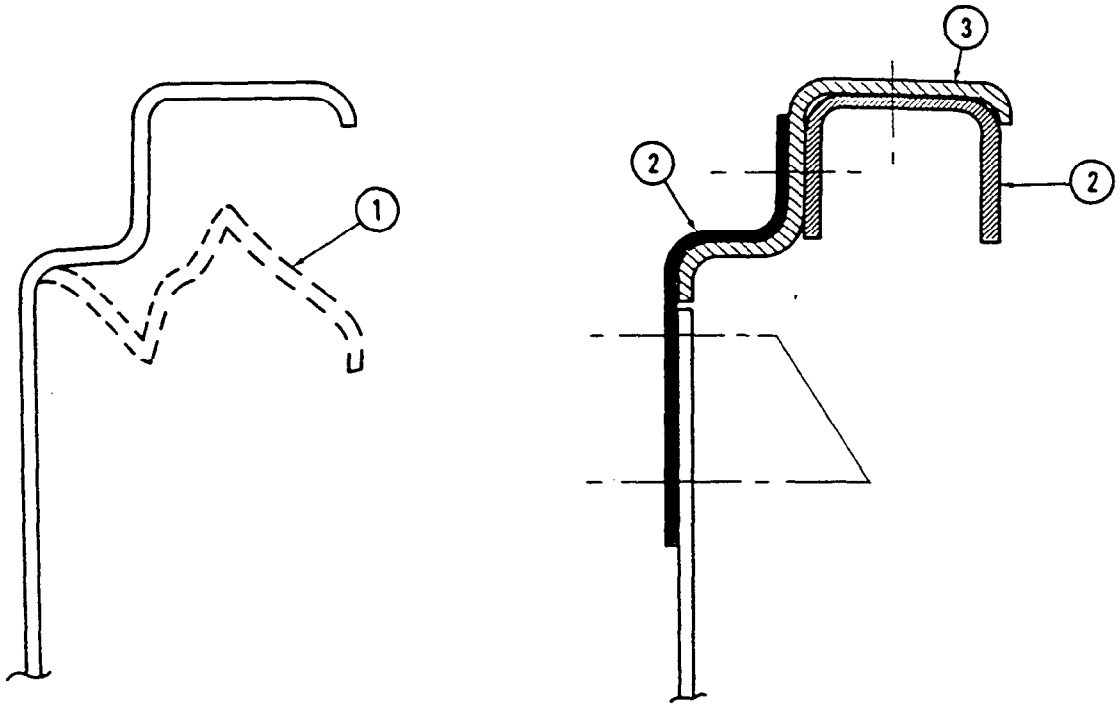
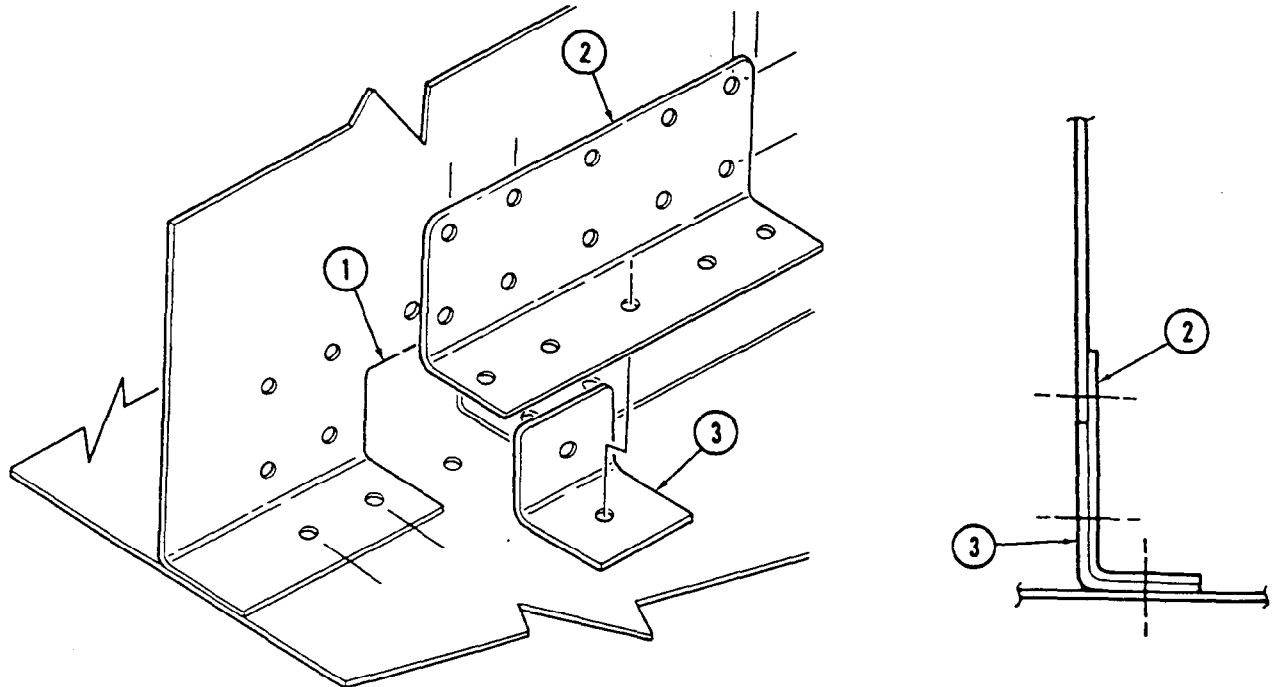
33-8. ALUMINUM REPAIR (Cont'd)

g. Repair by Patching. Most body panel damage that exceeds the limits of negligible damage may be repaired by patching. This procedure involves removal of damaged area (1) and application of a patch (2) to cover the area (1). The damaged area is prepared by removal of the damage followed by rounding or smoothing of all corners and edges. This helps to assure that cracks will not spread into undamaged areas. In the case of a large crack (4), it may be desirable to stop-drill the crack (4) rather than cut out a portion of the panel (5) or structural member. Repair is completed by applying a large overlapping patch (3) over the area that was damaged. The overlap must be sufficient to allow the observance of proper rivet edge distance (6) (para. 33-8c). Large areas of damage are best repaired using a patch that is attached with multiple rows of rivets (para. 33-8c).



33-8. ALUMINUM REPAIR (Cont'd)

h. Repair by Insertion. For damage that is larger or more severe than a crack or hole, it is often desirable to remove damaged area (1), insert a piece of material (3) into removed area and reinforce this with a doubler (2). This is termed repair by insertion. This method or repair is typically stronger and stiffer than an added patch.



33-9. FIBERGLASS REPAIR

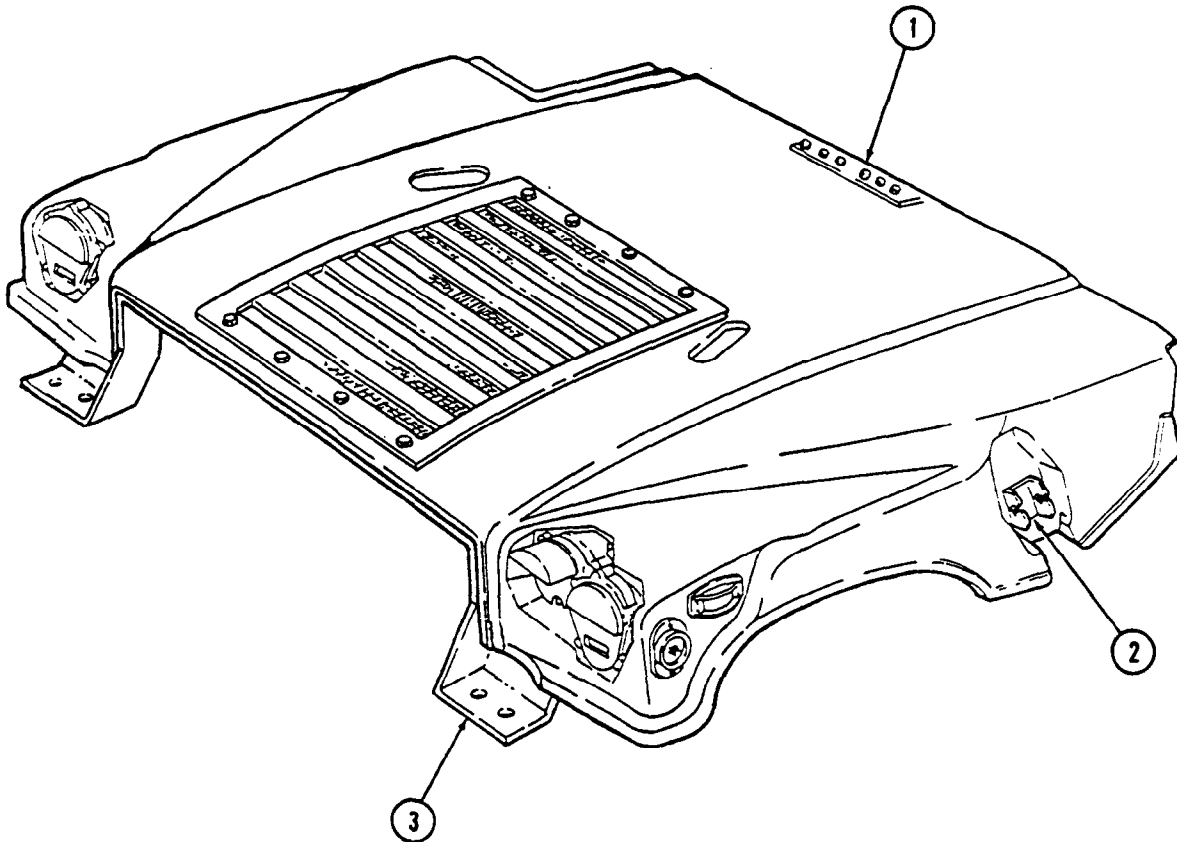
a. **General.** The hood and engine access cover are made of fiberglass (sheet molding compound). Cracks, splits, or holes may be repaired with a glass-reinforced plastic laminate repair kit, MIL-R-19907C, NSN 2090-00-372-6064.

b. **Inspection.**

NOTE

Hood surface has a thin layer of gel coat that may appear cracked in a spiderweb-like pattern due to hood flexing. No repair is required.

1. Examine cracks to determine if they are on the surface only, or are deep breaks into material thickness.
2. If filler material chips off at bonding flanges, appearing as cracked but not broken through, area need not be repaired.
3. If a total penetration crack greater than one inch exists in critical areas: such as hinges (3), latches (2), or hood stop (1) areas, repair immediately.
4. If total penetration cracks exist in non-critical areas, do not repair until size is greater than three inches.
5. If severe breaks develop in one area, remove fragmented material and use repair procedure for holes.



33-9. FIBERGLASS REPAIR (Cont'd)

c. Repair

NOTE

Complete, detailed procedures for fiberglass repair are provided with repair kit, MIL-R-19907C.

1. Repairing cracks or splits.

WARNING

When sanding fiberglass, personal protective equipment (respirator, goggles/shield, gloves, coveralls, etc.) must be used. Failure to do this may result in injury.

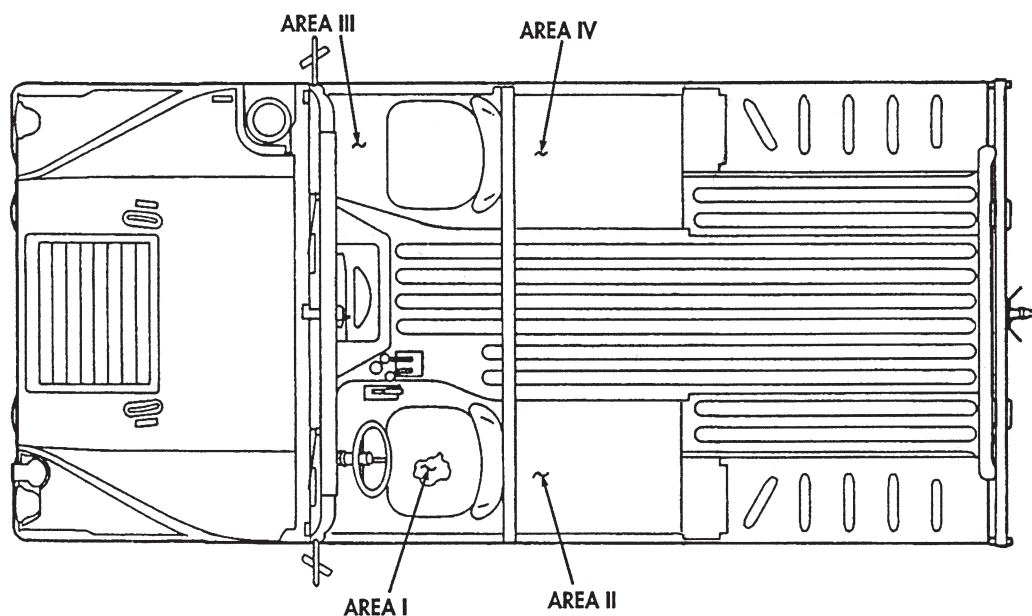
- (a) Using sandpaper, remove dirt and paint 3-4 in. (8-10 cm) around area of crack.
 - (b) Rough sand surface to which mat will be added; underside of surface if possible. Surface must be dry.
 - (c) Bevel edges of crack in a broad "V".
 - (d) Cut a piece of mat and apply to underside of surface with resin mixture. Extend patch beyond break about 2 in. (5 cm). Press patch firmly into place. Saturate patch with additional layer of resin and then allow 1 to 3 hours to cure.
 - (e) At the same time, cover top exposed surface with resin, allowing 1 to 3 hours to cure.
 - (f) For stressed areas, lightly sand first patch and add another patch layer, repeating steps 1.d and 1.e.
 - (g) Finish sand exposed surface.
 - (h) Prime and paint.
- #### 2. Repairing holes.
- (a) Remove damaged material. Bevel edges approximately 20° at outside edge of hole.
 - (b) Remove dirt and paint in area of hole extending away 3-4 in. (8-10 cm), using sandpaper.
 - (c) Rough sand top and underside of surface to which mats will be added.
 - (d) Cut two same sized pieces of fiberglass mat that will extend past edge of hole about 2 in. (5 cm).
 - (e) Coat both top and underside surface and saturate both pieces of mat with the resin mixture.
 - (f) When tacky, apply one mat to the inner surface and one to the outer surface. Press the two patches together.
 - (g) Allow 1 to 3 hours to cure. Additional coats of resin may be added if necessary for appearance purposes. Sand lightly between coats.
 - (h) Finish sand exposed surface.
 - (i) Prime and paint.

33-10. FLOOR PANEL REPAIR

The M1113 floor panels that are damaged can be repaired by using sheet metal sections cut to the required size and installed using the following procedures. Each repair section can be installed independent of each other. Refer to paras. 33-5 through 33-8 for general repair criteria, inserting rivets, drilling, and repair of aluminum.

The vehicle floor is divided into the four areas defined below.

- AREA I – Left Front Floor Panel. Refer to para. 33-11 for repair of this panel.
- AREA II – Left Rear Floor Panel. Refer to para. 33-12 for repair of this panel.
- AREA III – Right Front Floor Panel. Refer to para. 33-13 for repair of this panel.
- AREA IV – Right Rear Floor Panel. Refer to para. 33-14 for repair of this panel.



33-11. LEFT FRONT FLOOR PANEL REPAIR

This task covers:

- a. Left Front Insert Panel Fabrication
- b. Metal Strips Fabrication
- c. Left Front Floor Panel Removal
- d. Metal Strip A and Insert Panel Assembly
- e. Metal Strip C and Insert Panel Assembly
- f. Metal Strip D and Insert Panel Assembly
- g. Metal Strip B and Insert Panel Assembly
- h. Left Front Floor Panel and Insert Panel Drilling
- i. Insert Panel and Left Front Floor Panel Installation

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)
 Shop equipment, automotive maintenance and repair: field maintenance, wheeled vehicles, Post, Camp and Station, set A (Appendix B, Item 10)

Manual References

TM 9-2320-387-24P
 TM 43-0139

Materials/Parts

Eighty-eight rivets (Appendix G, Item 335)
 Twenty rivets (Appendix G, Item 347.2)
 Sheet metal (Appendix G, Item 439.1)
 Adhesive (Appendix C, Item 2.1)
 Adhesive sealant (Appendix C, Item 7.1)

Equipment Condition

- Fire extinguisher mount bracket removed (para. 10-53).
- Driver's seat assembly removed (para. 10-40).
- Left floor insulation removed (para 10-31).

Maintenance Level

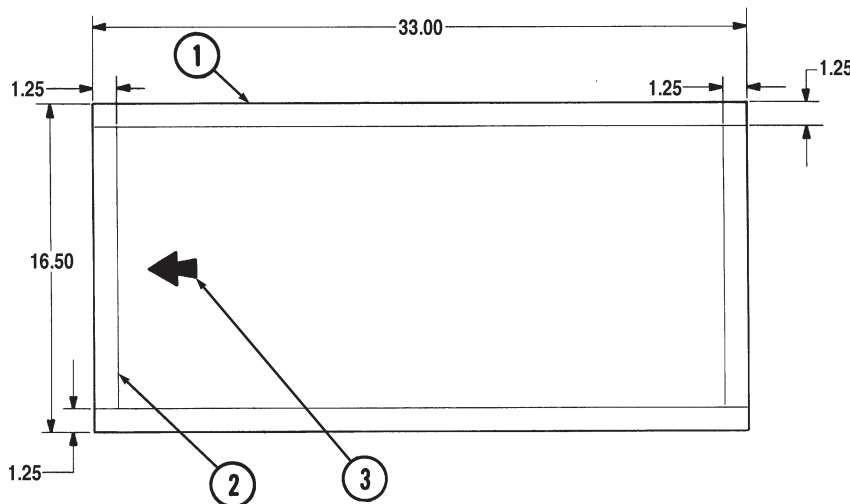
General Support

a. Left Front Insert Panel Fabrication

NOTE

All dimensions are in inches. For metric conversion, see chart.

1. Cut insert panel (1) from sheet metal as shown and mark four reference lines (2) and directional arrow (3) on insert panel (1).



METRIC CONVERSION	
1.25 IN.	31.75 MM
16.50 IN.	419.10 MM
33.00 IN.	838.20 MM

33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

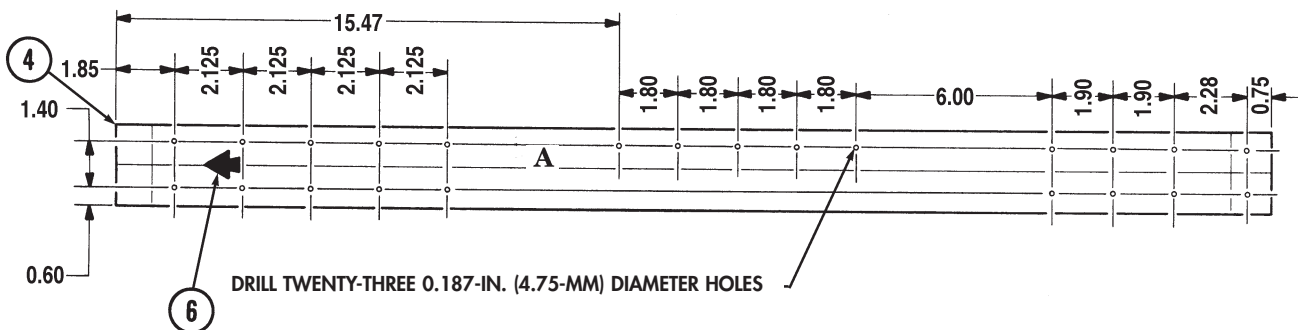
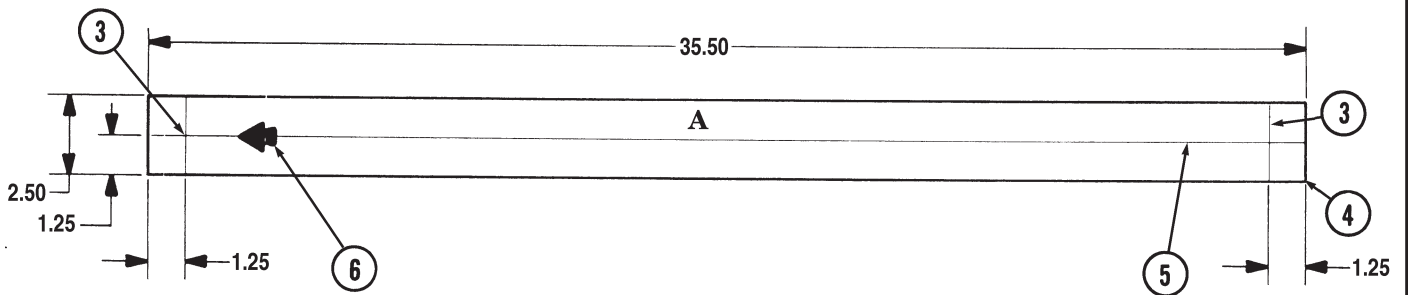
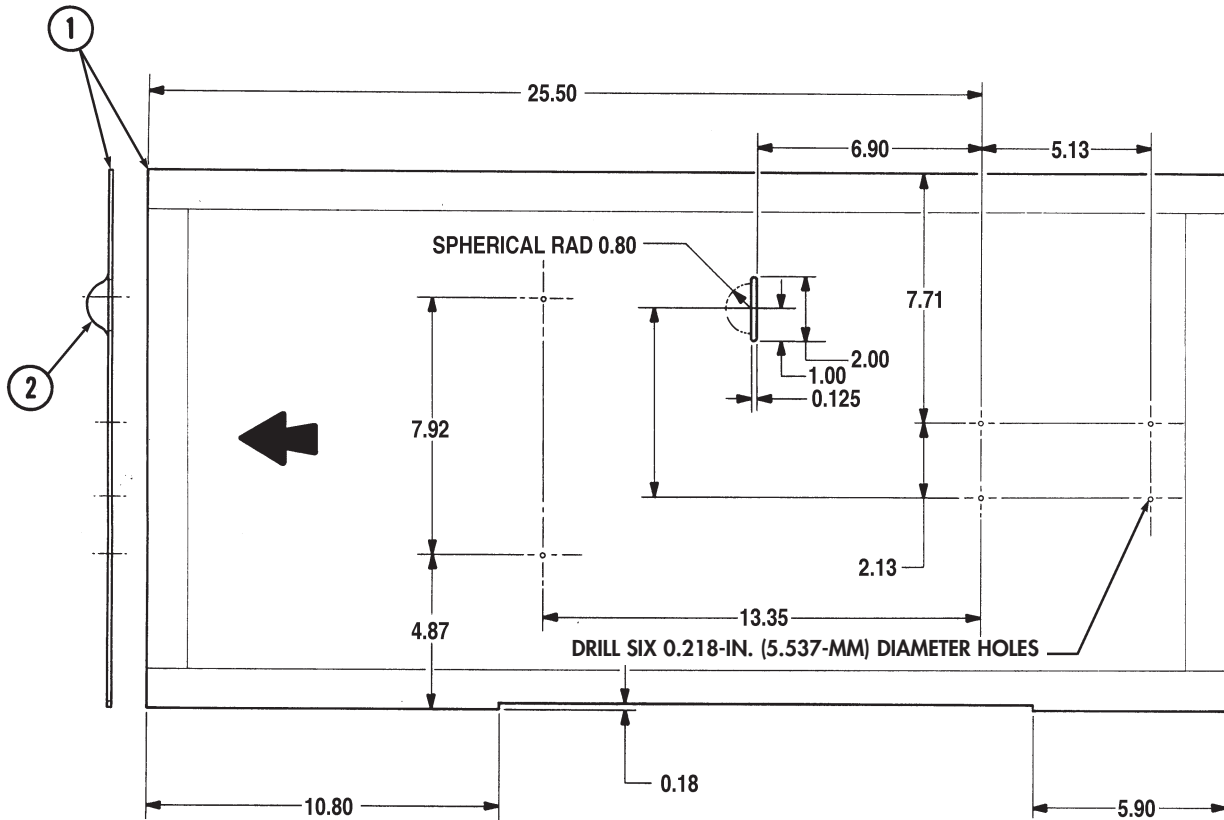
2. Locate, mark, and drill six 0.218-in. (5.537-mm) diameter holes through insert panel (1).
3. Fabricate drain hole (2) in insert panel (1).
4. Cut and remove 0.180-in. (4.572-mm) of material from insert panel (1), remove all burrs, and round sharp edges on insert panel (1).

b. Metal Strips Fabrication

1. Cut metal strip (4) from sheet metal and mark two reference lines (3), centerline (5), directional arrow (6), and letter A on metal strip (4).
2. Locate, mark, and drill twenty-three 0.187-in. (4.75-mm) diameter holes in metal strip A (4).

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.18 IN.	4.57 MM
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
1.00 IN.	25.40 MM
1.40 IN.	35.56 MM
1.80 IN.	45.72 MM
1.85 IN.	46.99 MM
1.90 IN.	48.26 MM
2.00 IN.	50.80 MM
2.125 IN.	53.98 MM
2.13 IN.	54.10 MM
2.28 IN.	57.91 MM
2.50 IN.	63.50 MM
4.87 IN.	123.70 MM
5.13 IN.	130.30 MM
5.90 IN.	149.86 MM
6.00 IN.	152.40 MM
6.90 IN.	175.26 MM
7.71 IN.	195.83 MM
7.92 IN.	201.17 MM
10.80 IN.	274.32 MM
15.47 IN.	392.94 MM
25.50 IN.	647.70 MM
35.50 IN.	901.70 MM

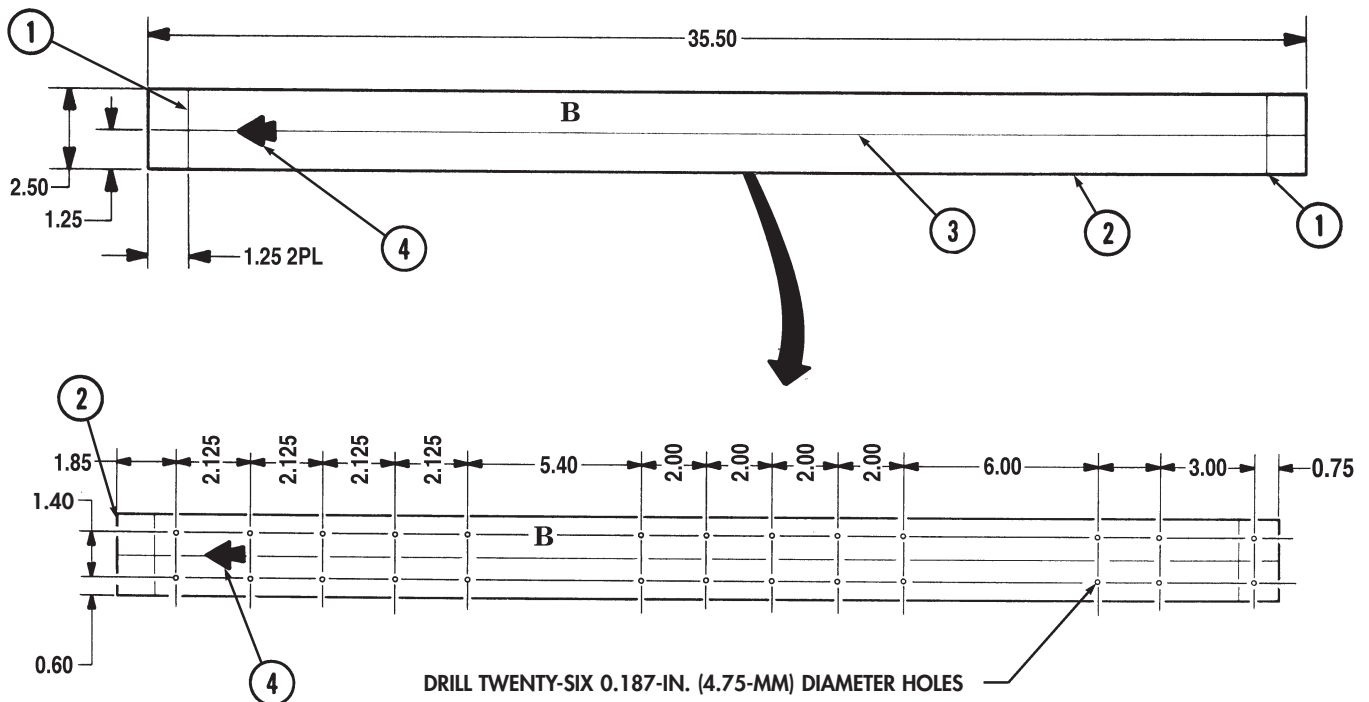
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

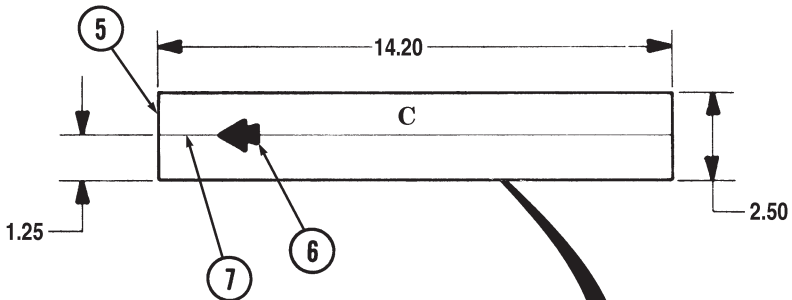
3. Cut metal strip (2) from sheet metal, and mark two reference lines (1), centerline (3), directional arrow (4), and letter B on metal strip (2).
4. Locate, mark, and drill twenty-six 0.187-in. (4.75-mm) diameter holes through metal strip B (2).
5. Cut two metal strips (5) from sheet metal, and mark centerlines (7), directional arrows (6), and letters C and D on metal strips (5).
6. Locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes through metal strip C (5).
7. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes through metal strip D (5).

METRIC CONVERSION	
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.85 IN.	46.99 MM
2.00 IN.	50.80 MM
2.125 IN.	53.98 MM
3.00 IN.	76.20 MM
5.40 IN.	137.16 MM
6.00 IN.	152.40 MM
35.50 IN.	901.70 MM

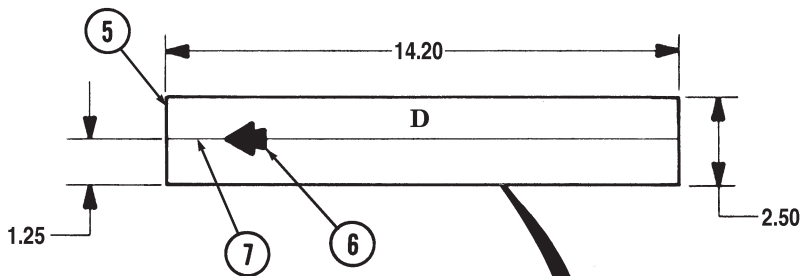
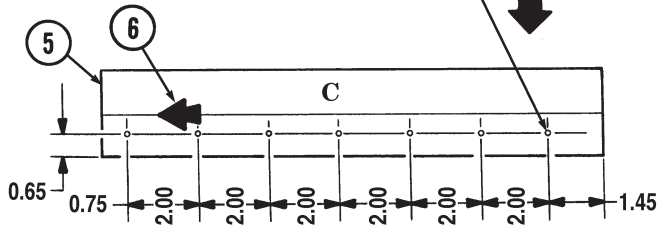


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

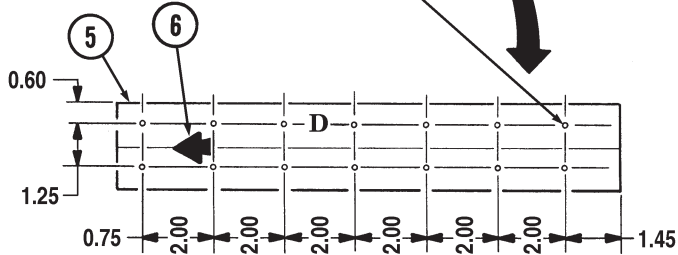
METRIC CONVERSION	
0.60 IN.	15.24 MM
0.65 IN.	16.51 MM
0.75 IN.	19.05 MM
1.25 IN.	31.75 MM
1.45 IN.	36.83 MM
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
14.20 IN.	360.68 MM



DRILL SEVEN 0.187-IN. (4.75-MM) DIAMETER HOLES



DRILL FOURTEEN 0.187-IN. (4.75-MM) DIAMETER HOLES



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

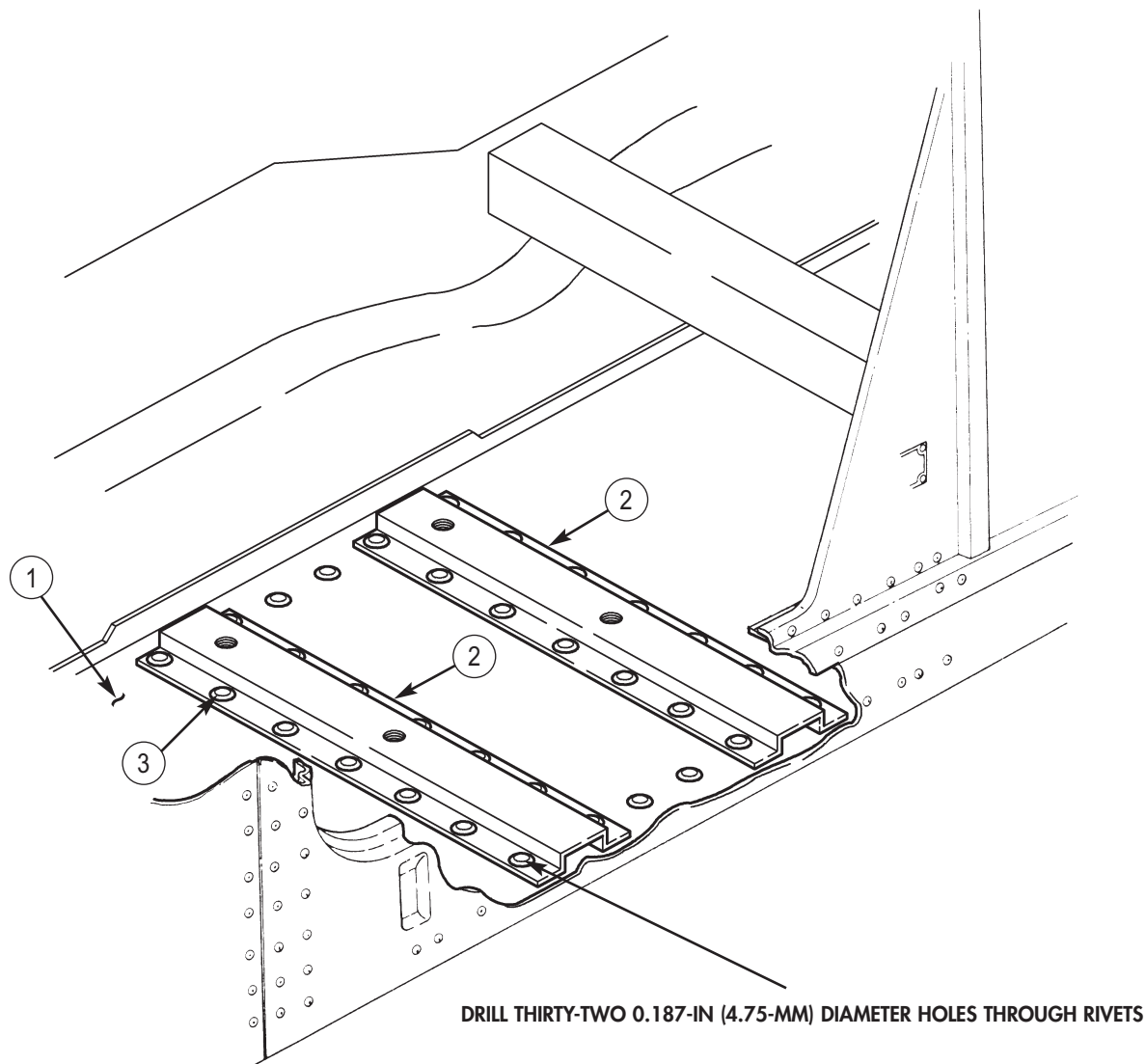
c. Left Front Floor Panel Removal

1. Using a 0.187-in. (4.75-mm) drill bit, remove thirty-two rivets (3) from left front seat supports (2) and left front floor panel (1).
2. Position insert panel (5), with arrow facing down and toward front of vehicle, to underside of left front floor panel (4) and align mount holes (6).
3. Using insert panel (5) as a template, scribe an outline (7) on left front floor panel (4).

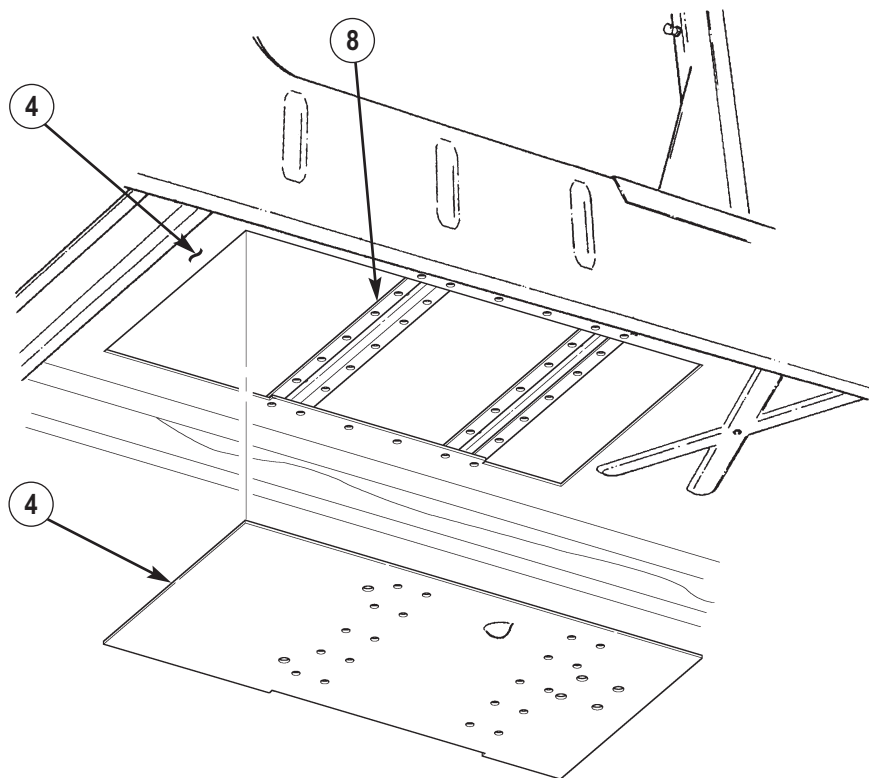
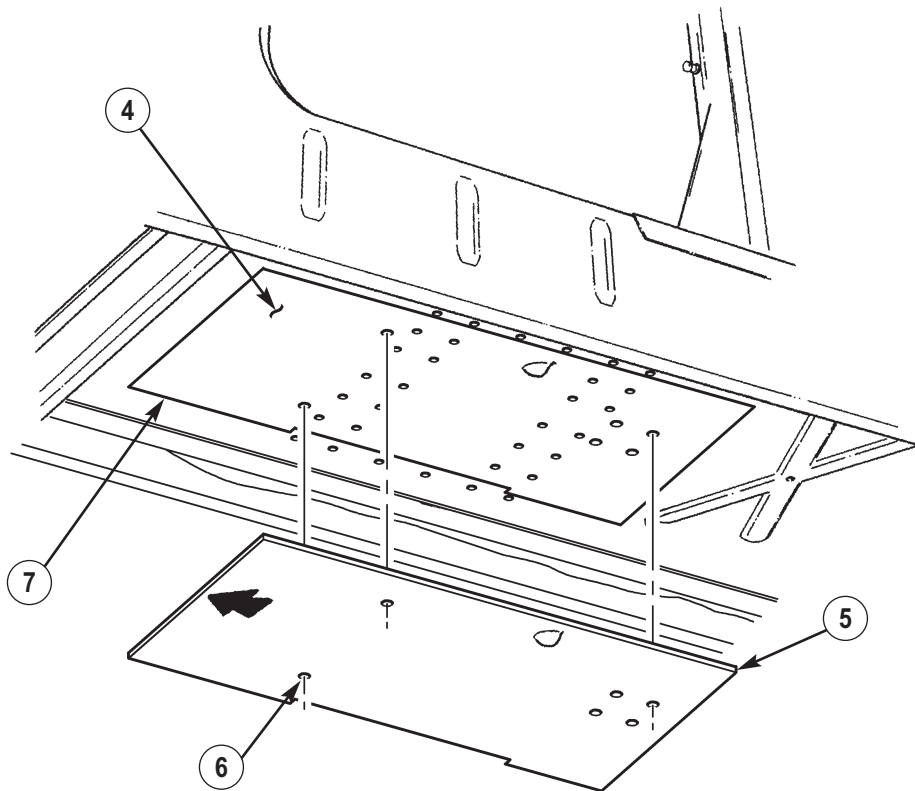
NOTE

Do not cut through front seat support when removing left front floor panel section.

4. Using scribed outline marked in step 3, cut and remove floor panel (4).
5. Remove sharp edges and burrs on left front floor panel (1).
6. Remove adhesive residue and clean left front seat support (8).



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

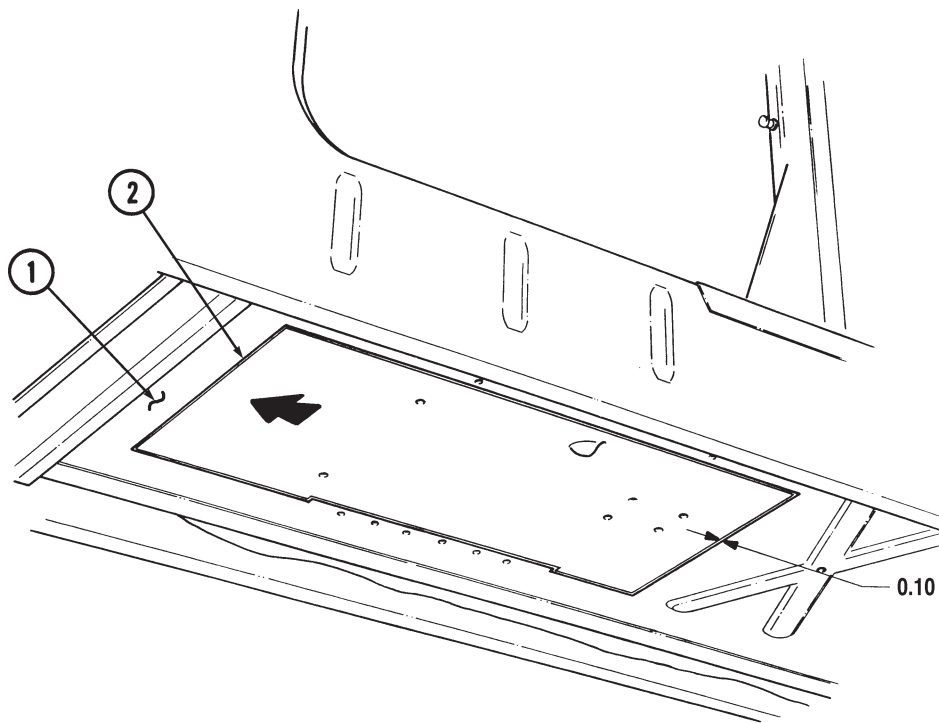


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

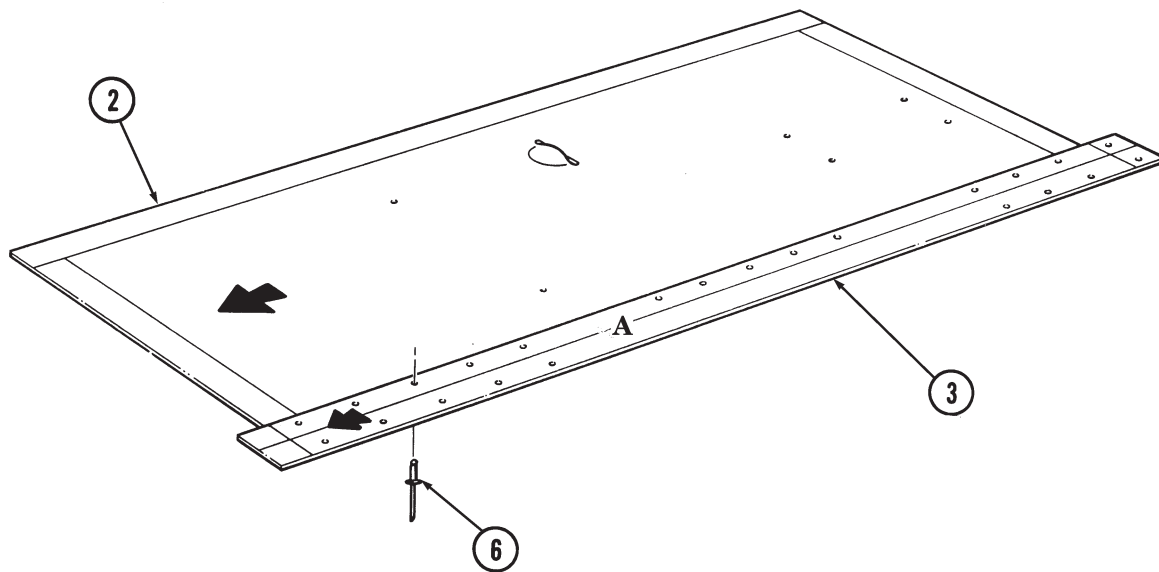
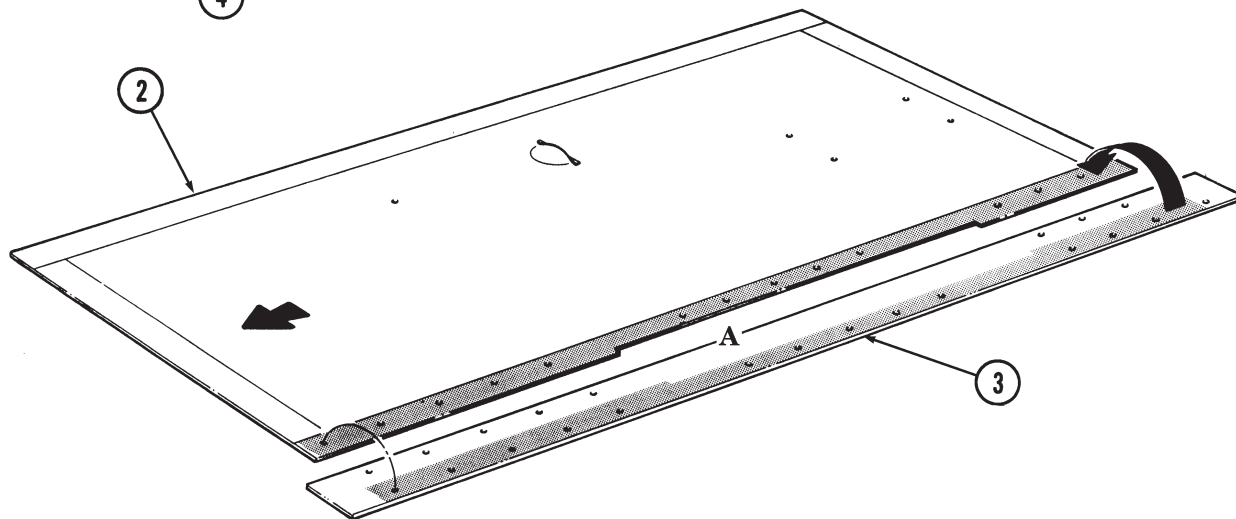
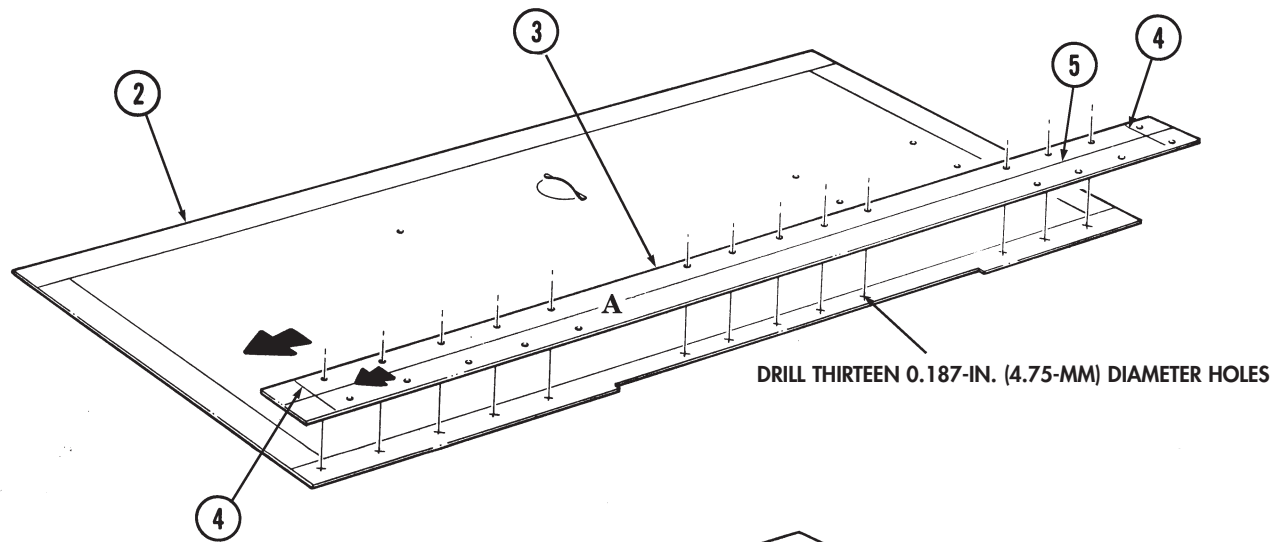
7. Position insert panel (2), with arrow facing down and toward front of vehicle, to underside of left front floor panel (1).
8. Obtain a minimum clearance of 0.10-in. (2.54-mm) between edges of insert panel (2) and left front floor panel (1).
9. Remove insert panel (2).

d. Metal Strip A and Insert Panel Assembly

1. Position metal strip A (3), with arrow facing up and left, on insert panel (2). Align reference lines (5) and (4) with edges of metal strip A (3).
2. Using metal strip A (3) as a template, locate, mark, and drill thirteen 0.187-in.(4.75-mm) diameter holes through insert panel (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip A (3).
4. Install metal strip A (3) on insert panel (2) with thirteen rivets (6).
5. Remove adhesive residue and clean edges of metal strip A (3) and insert panel (2).



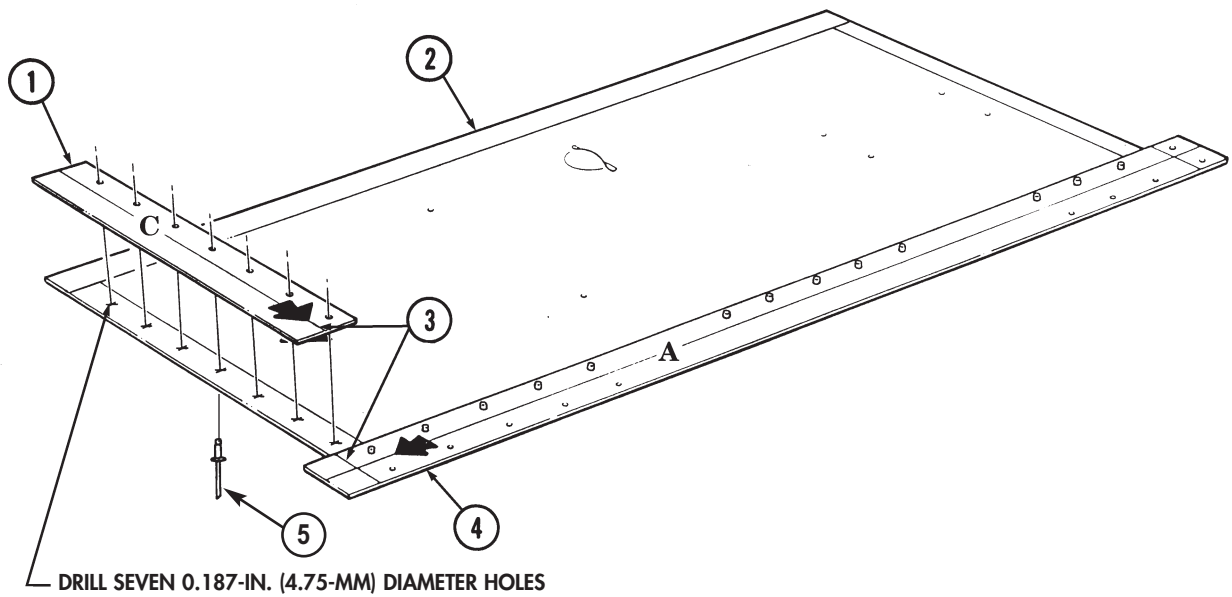
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)



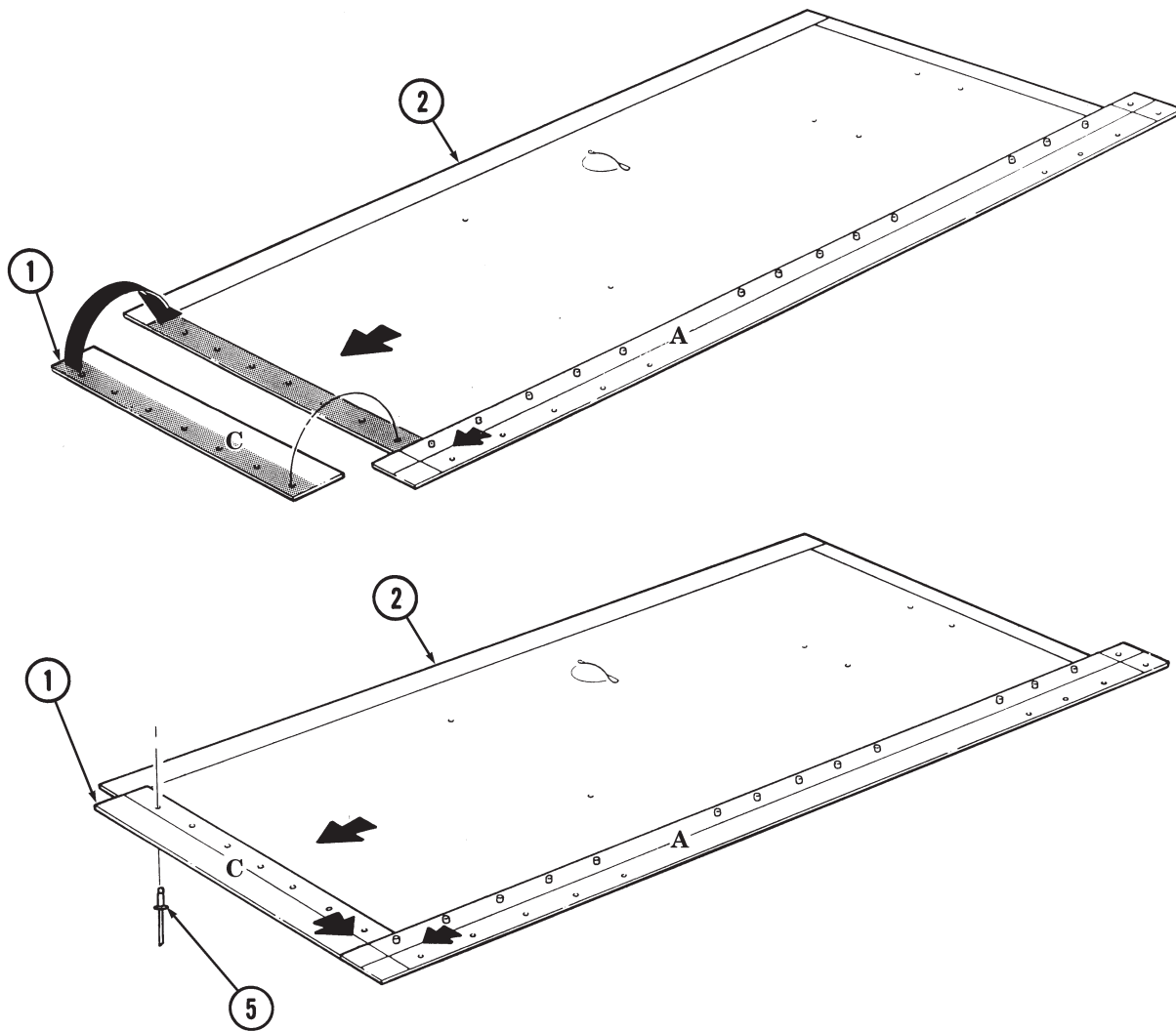
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

e. Metal Strip C and Insert Panel Assembly

1. Position metal strip C (1), with arrow facing up and toward metal strip A (4), on insert panel (2). Align reference lines (3).
2. Using metal strip C (1) as a template, locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes in insert panel (2). Remove metal strip C (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip C (1).
4. Position metal strip C (1) on insert panel (2) and install with seven rivets (5).
5. Remove any adhesive residue and clean edges of metal strip C (1) and insert panel (2).



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)



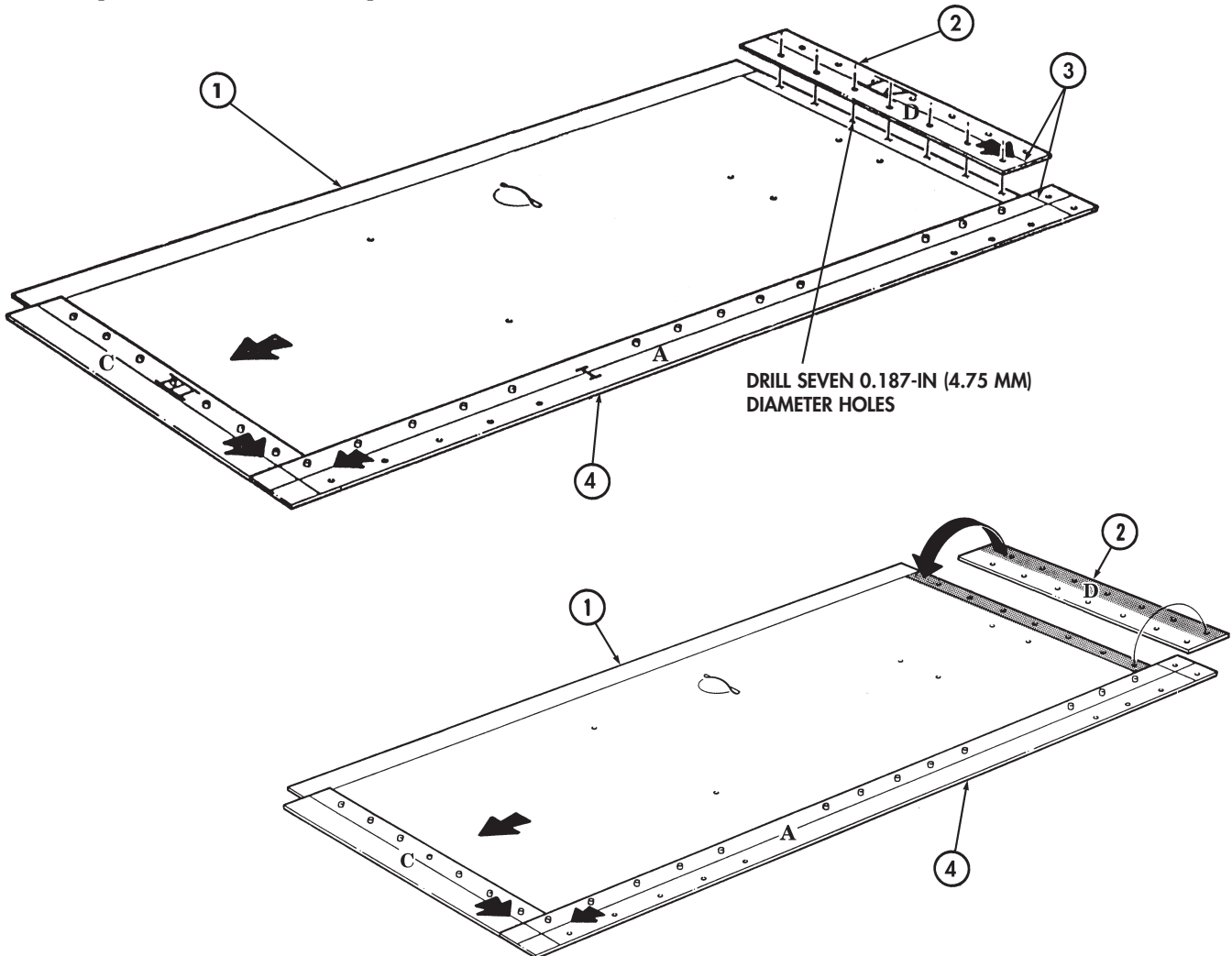
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

f. Metal Strip D and Insert Panel Assembly

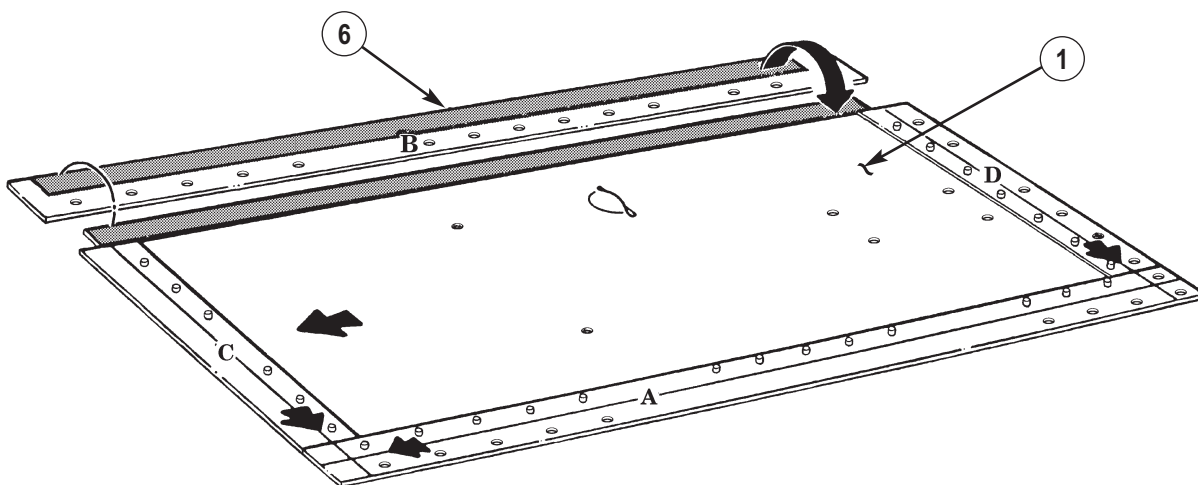
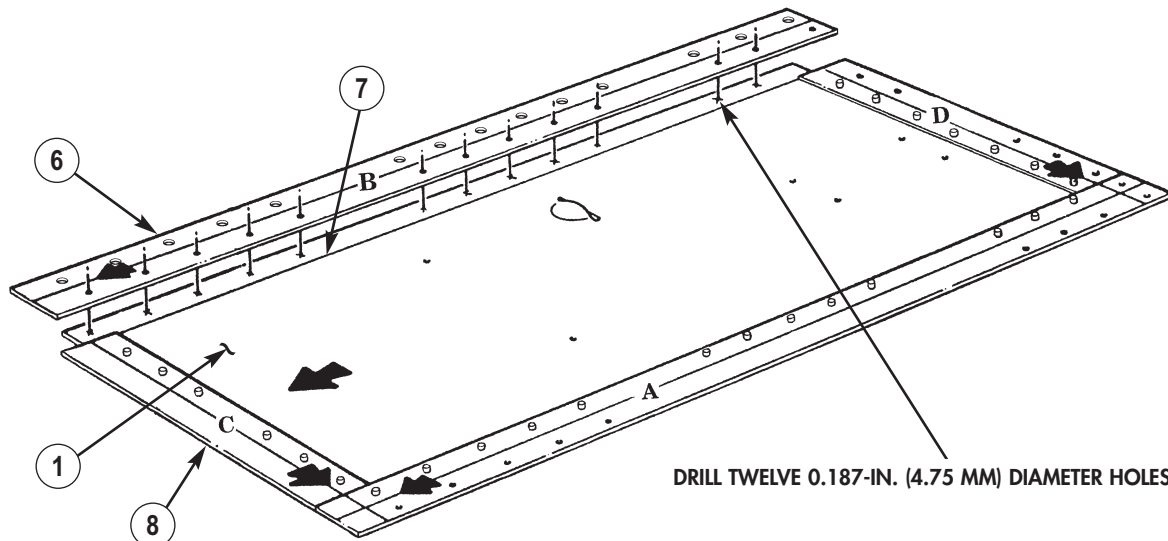
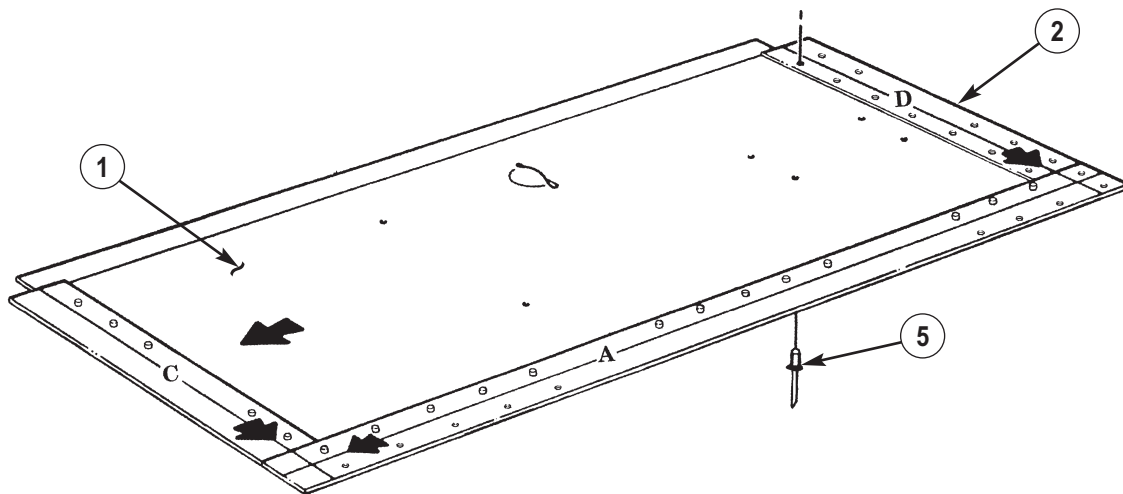
1. Position metal strip D (2), with arrow facing up and toward metal strip A (4), on insert panel (1). Align reference lines (3).
2. Using metal strip D (2) as a template, locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes through insert panel (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded mating surface of insert panel (1) and metal strip D (2).
4. Position metal strip D (2) on insert panel (1) and install with seven rivets (5).
5. Remove any adhesive residue and clean edges of metal strip D (2) and insert panel (1).

g. Metal Strip B and Insert Panel Assembly

1. Position metal strip B (6), with arrow facing up and toward metal strip C (8), on insert panel (1). Align reference line (7) with edge of metal strip B (6).
2. Using metal strip B (6) as a template, locate, mark, and drill twelve 0.187-in. (4.75-mm) diameter holes through insert panel (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip B (6).



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

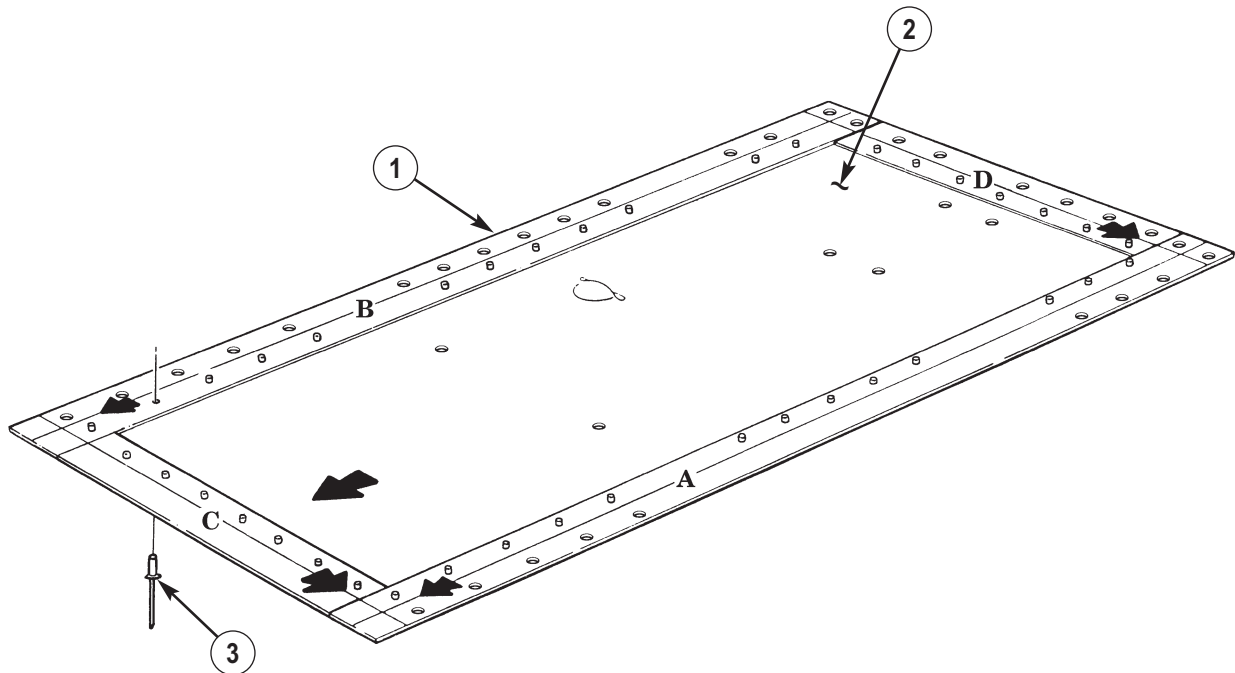


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

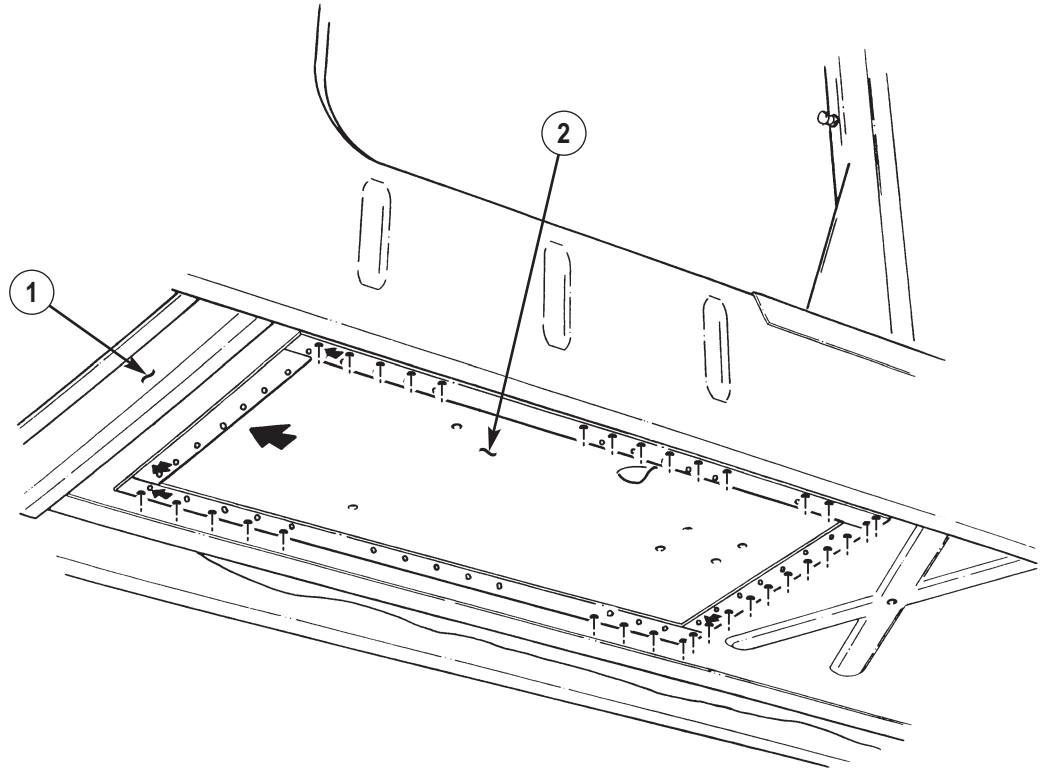
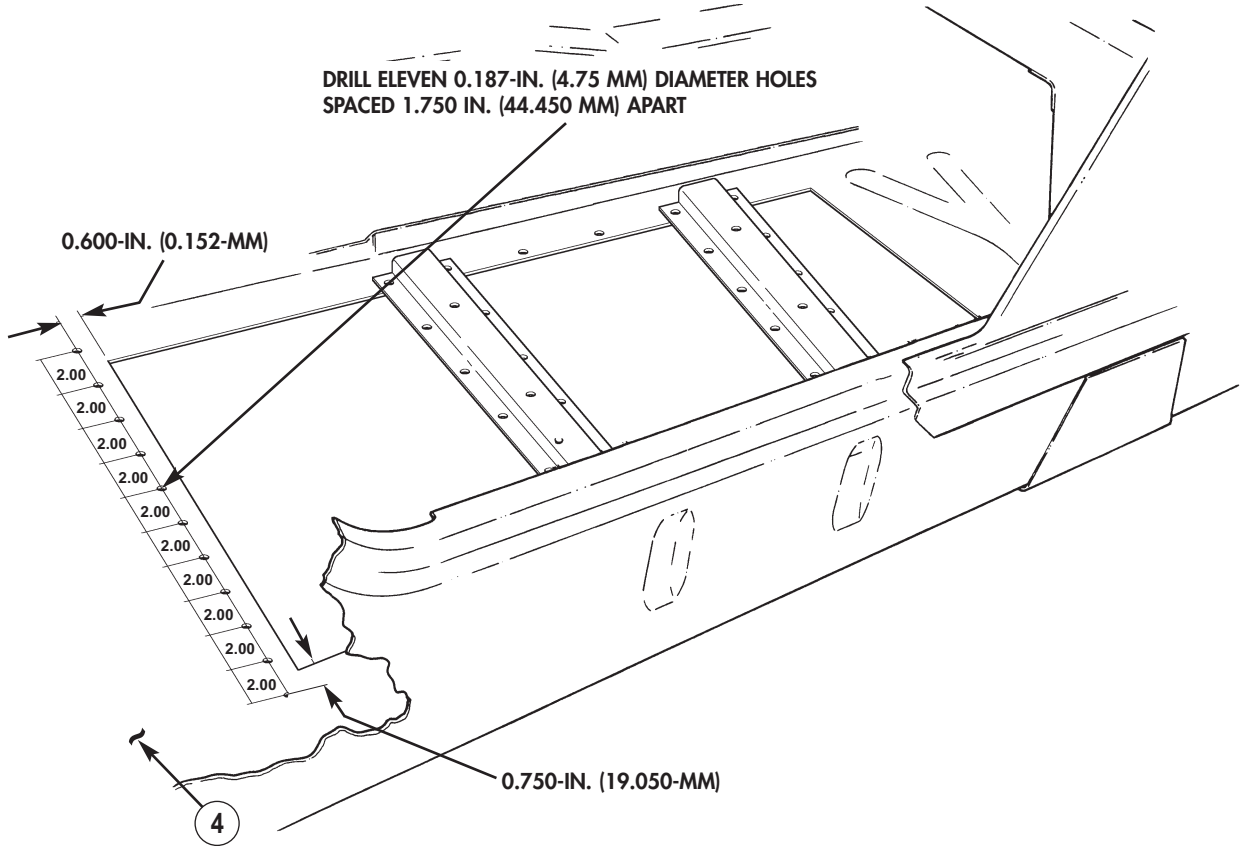
4. Position metal strip B (1) on insert panel (2) and install with twelve rivets (3).
5. Remove any adhesive residue and clean edges of metal strip B (1) and insert panel (2).

h. Left Front Floor Panel and Insert Panel Drilling

1. Locate, mark, and drill eleven 0.187-in. (4.75-mm) diameter holes through left front floor panel (4).
2. Position insert panel (2) on underside of left front floor panel (4), with arrow facing down and toward front of vehicle.

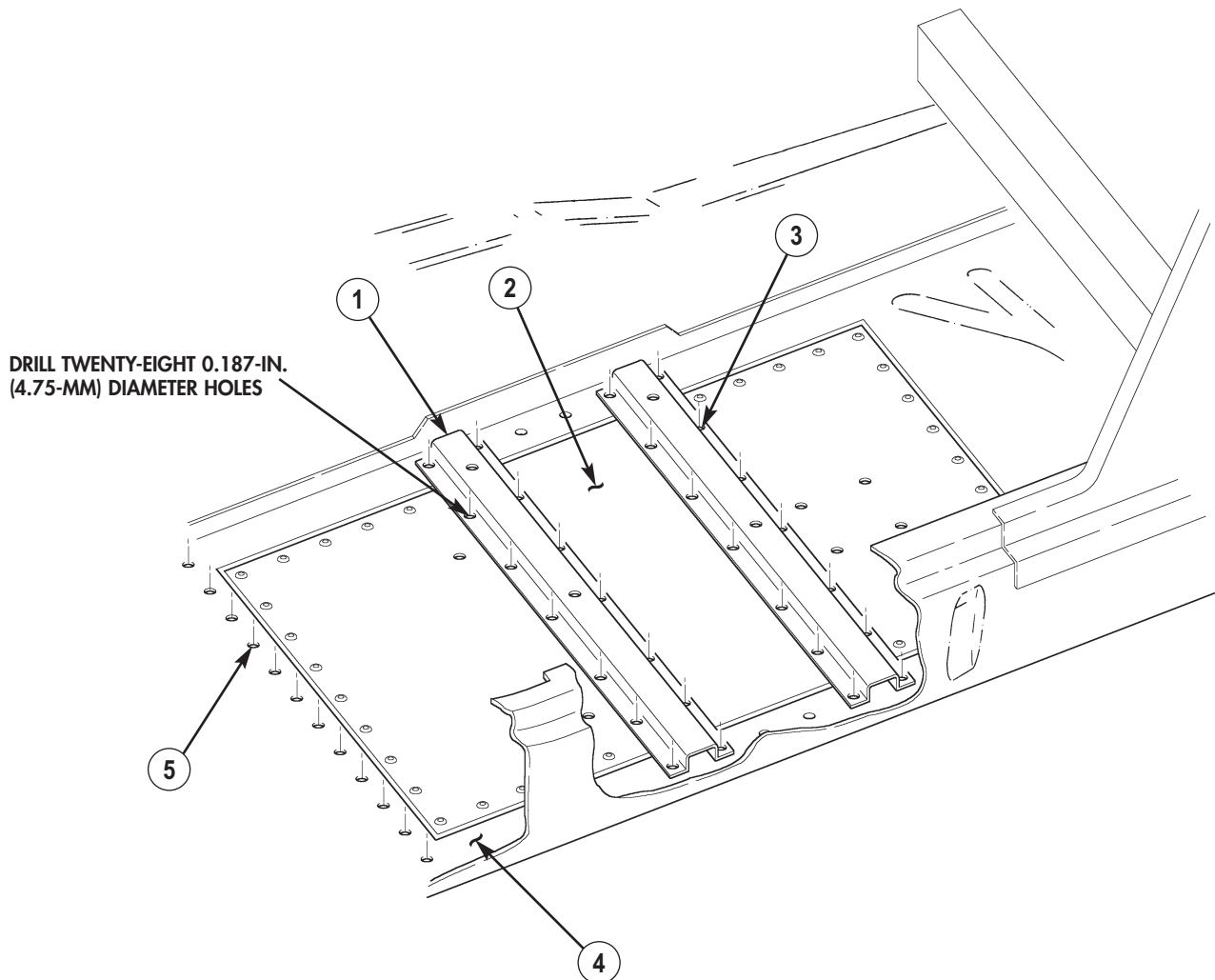


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

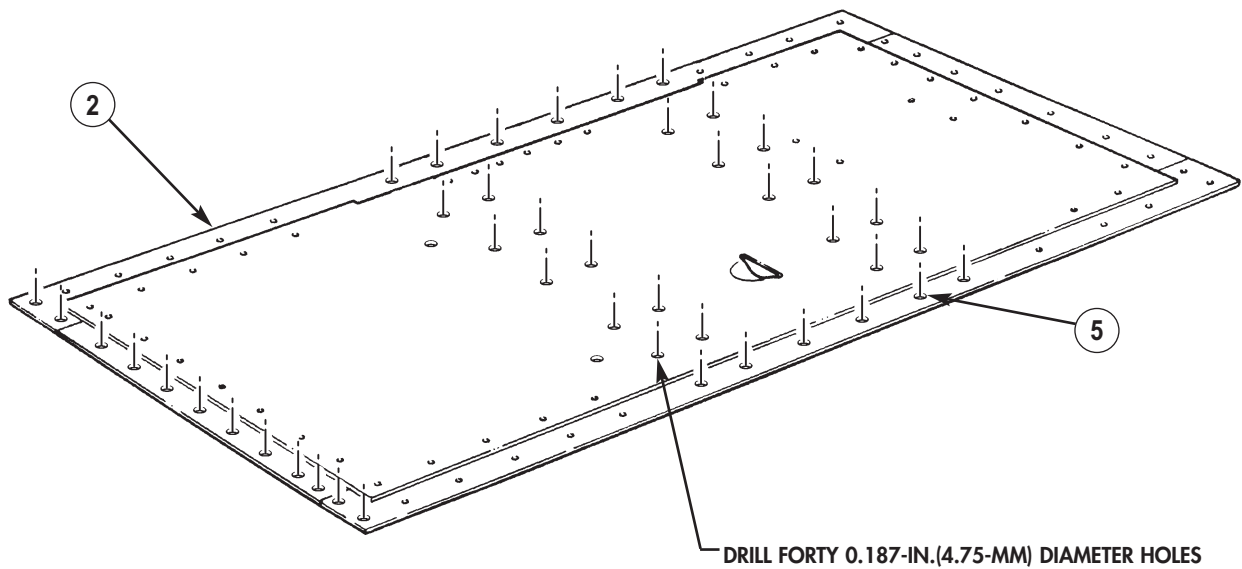
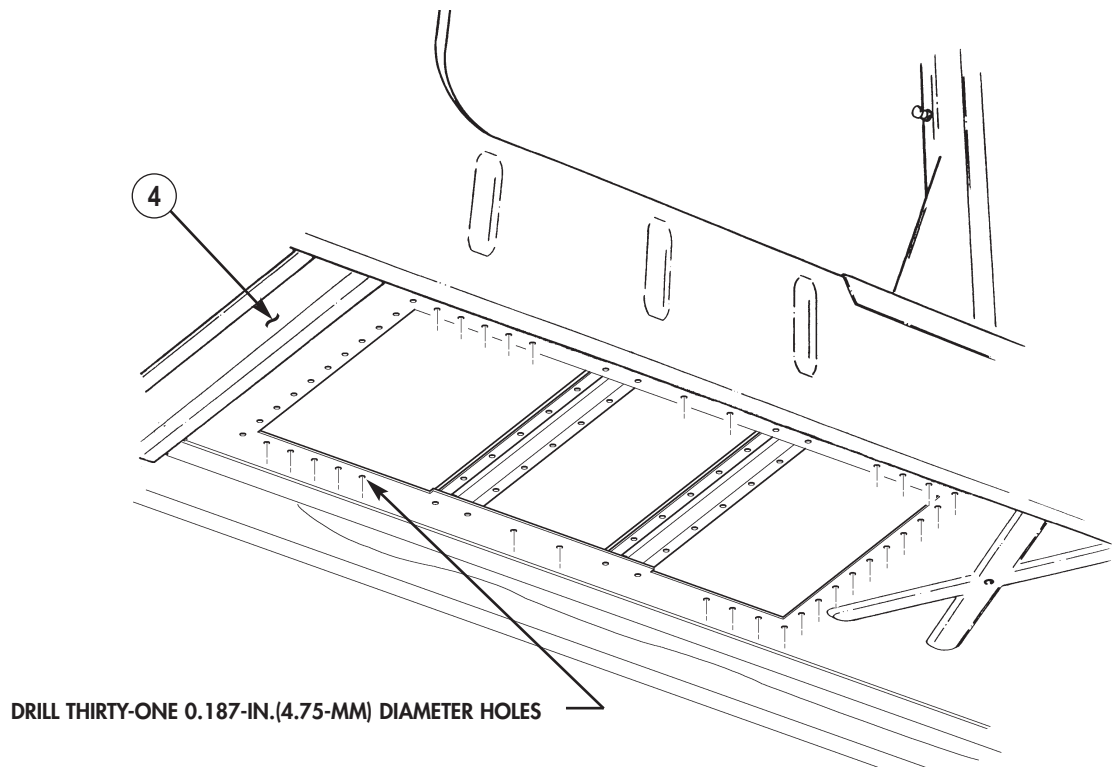


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

3. Using left front seat supports (1) as a template, locate and mark twenty-eight 0.187-in. (4.75-mm) diameter holes (3) on insert panel (2).
4. Using left front floor panel (4) as a template, mark twelve hole locations (5) on insert panel (2).
5. Using insert panel (2) as a template, mark thirty-one hole locations (5) on underside of left front floor panel (4). Remove insert panel (2).
6. Drill thirty-one 0.187-in. (4.75-mm) diameter holes marked in step 5 through underside of left front floor panel (4).
7. Drill forty 0.187-in. (4.75-mm) diameter holes marked in steps 3 and 4 through insert panel (2).



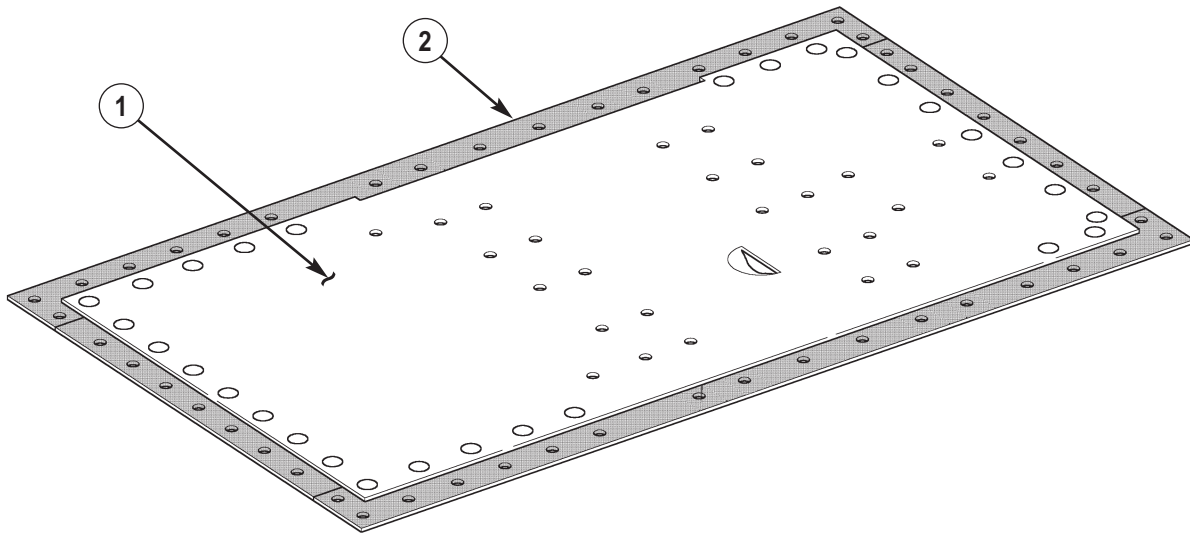
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)



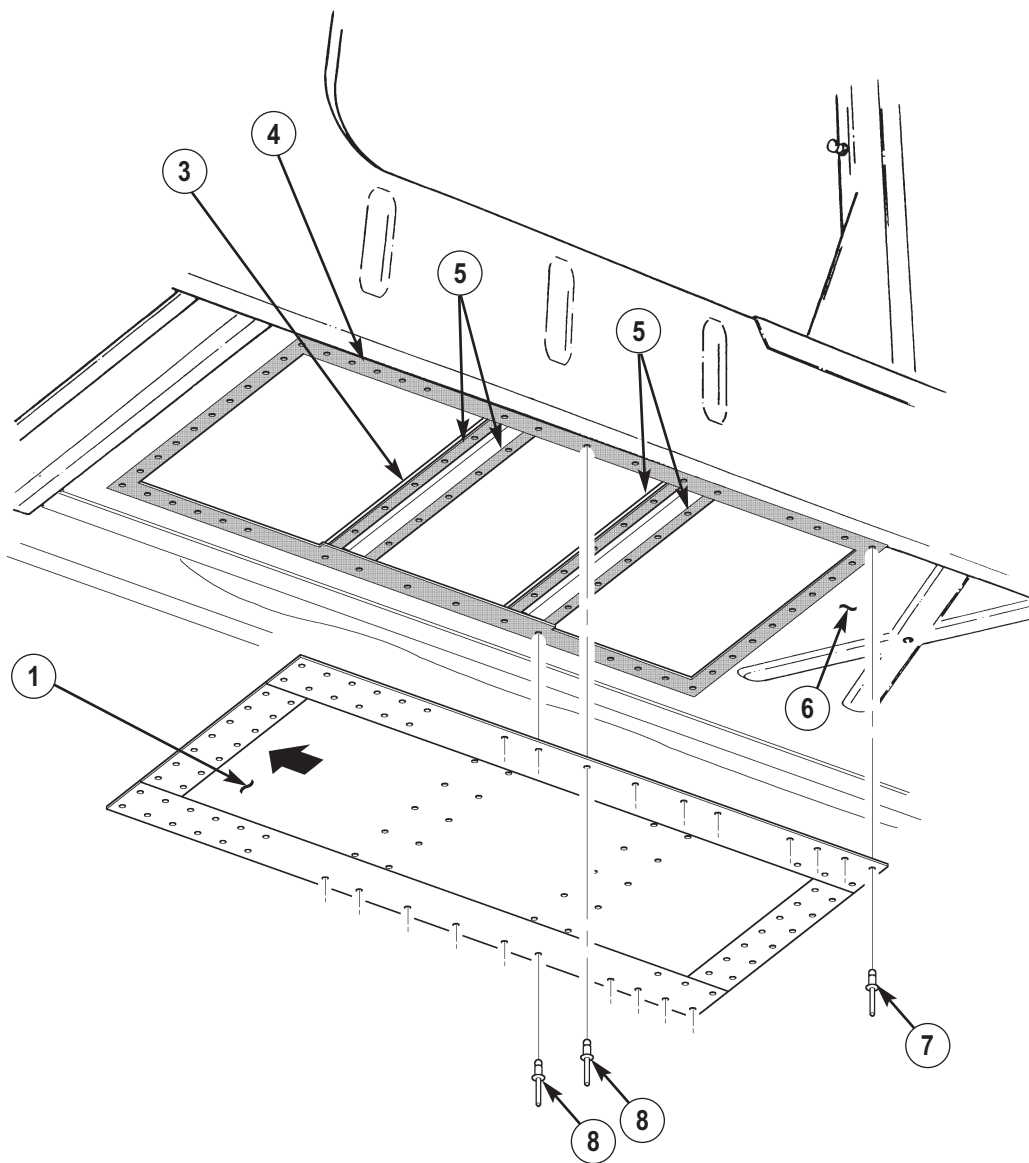
33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

i. Insert Panel and Left Front Floor Panel Installation

1. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to outer shaded area (2) of insert panel (1).
2. Apply adhesive sealant to inner shaded area (3) on underside of left front seat supports (5).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to inner shaded area (4) of left front panel (6) underside.
4. Position insert panel (1) to underside of left front floor panel (6), with arrow facing down and toward front of vehicle.
5. Install insert panel (1) on underside of left front floor panel (6) and left front seat support (5) with twelve rivets (8) and eight rivets (7).

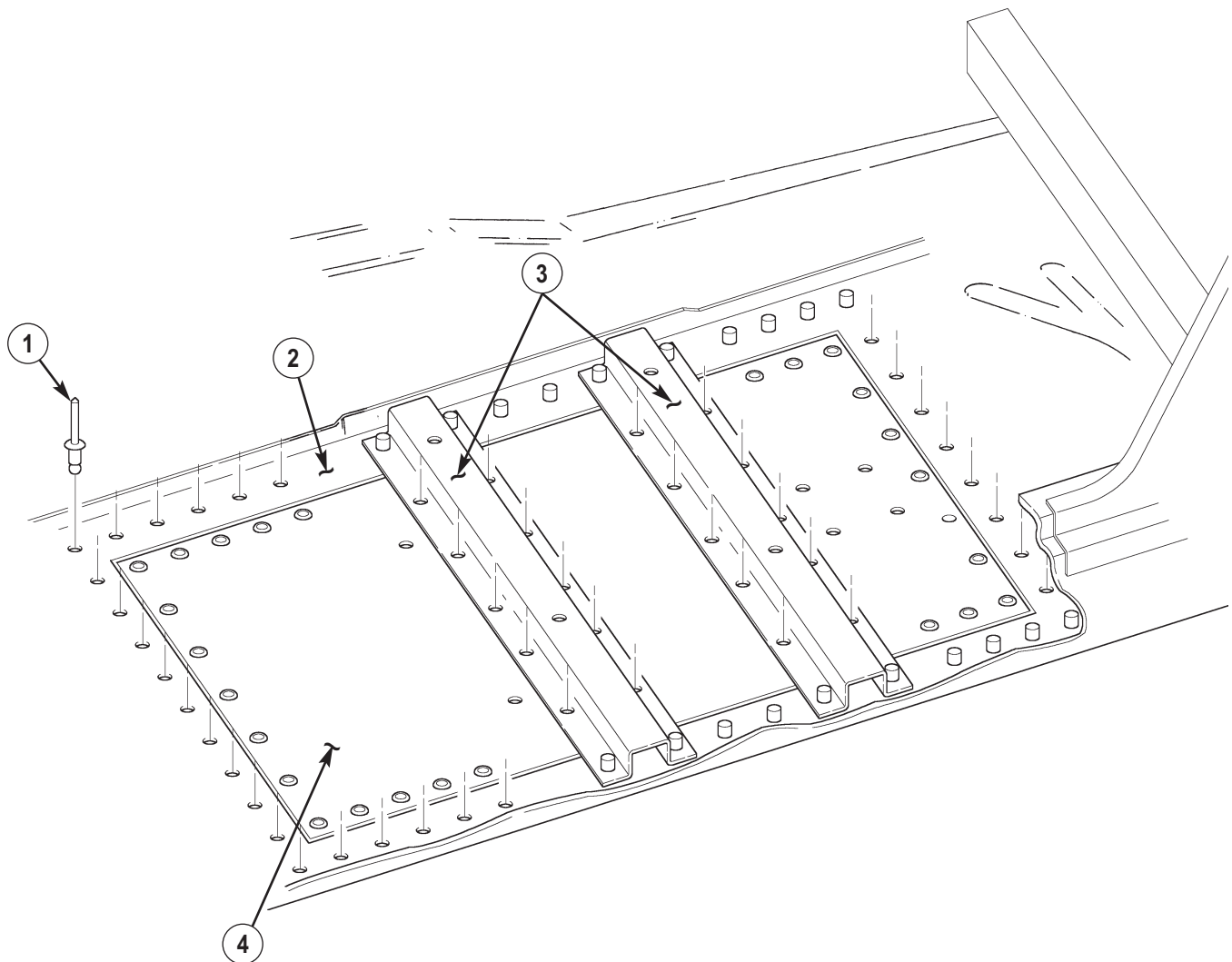


33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)



33-11. LEFT FRONT FLOOR PANEL REPAIR (Cont'd)

6. Secure insert panel (4) to left front seat supports (3) with twenty rivets (1).
7. Secure insert panel (4) to left front floor panel (2) with twenty-nine rivets (1).
8. Spot-paint insert panel (4), left front seat supports (3), and left front floor panel (2) (TM 43-0139).



- FOLLOW-ON TASKS:**
- Install left floor insulation (para. 10-31).
 - Install driver's seat assembly (para. 10-40).
 - Install fire extinguisher mount bracket (para. 10-53).

33-12. LEFT REAR FLOOR PANEL REPAIR

This Task Covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Left Rear Insert Panel Fabrication b. Reinforcement Strips Fabrication c. Metal Strips Fabrication d. Left Rear Floor Panel Removal e. Reinforcement Strip A and Insert Panel Assembly f. Reinforcement Strip B and Insert Panel Assembly | <ul style="list-style-type: none"> g. Metal Strip C and Insert Panel Assembly h. Metal Strip D and Insert Panel Assembly i. Metal Strip E and Insert Panel Assembly j. Metal Strip F and Insert Panel Assembly k. Left Rear Floor Panel and Insert Panel Drilling l. Insert Panel and Left Rear Floor Panel Insulation |
|---|--|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)
 Shop equipment, automotive maintenance
 and repair: field maintenance, wheeled
 vehicles, Post, Camp and Station, set A
 (Appendix B, Item 10)

Manual References

TM 9-2320-287-24P
 TM 43-0139

Materials/Parts

Ninety rivets (Appendix G, Item 335)
 Thirty-two rivets (Appendix G, Item 347.2)
 Adhesive (Appendix C, Item 2.1)
 Adhesive sealant (Appendix C, Item 7.1)
 Sheet metal (Appendix G, Item 439.1)

Equipment Condition

- Driver's seat assembly removed
 (para. 10-40).
- Transmission control model (TCM) removed
 (para. 4-45).
- Left floor insulation removed
 (para. 10-31).

Maintenance Level

General Support

33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

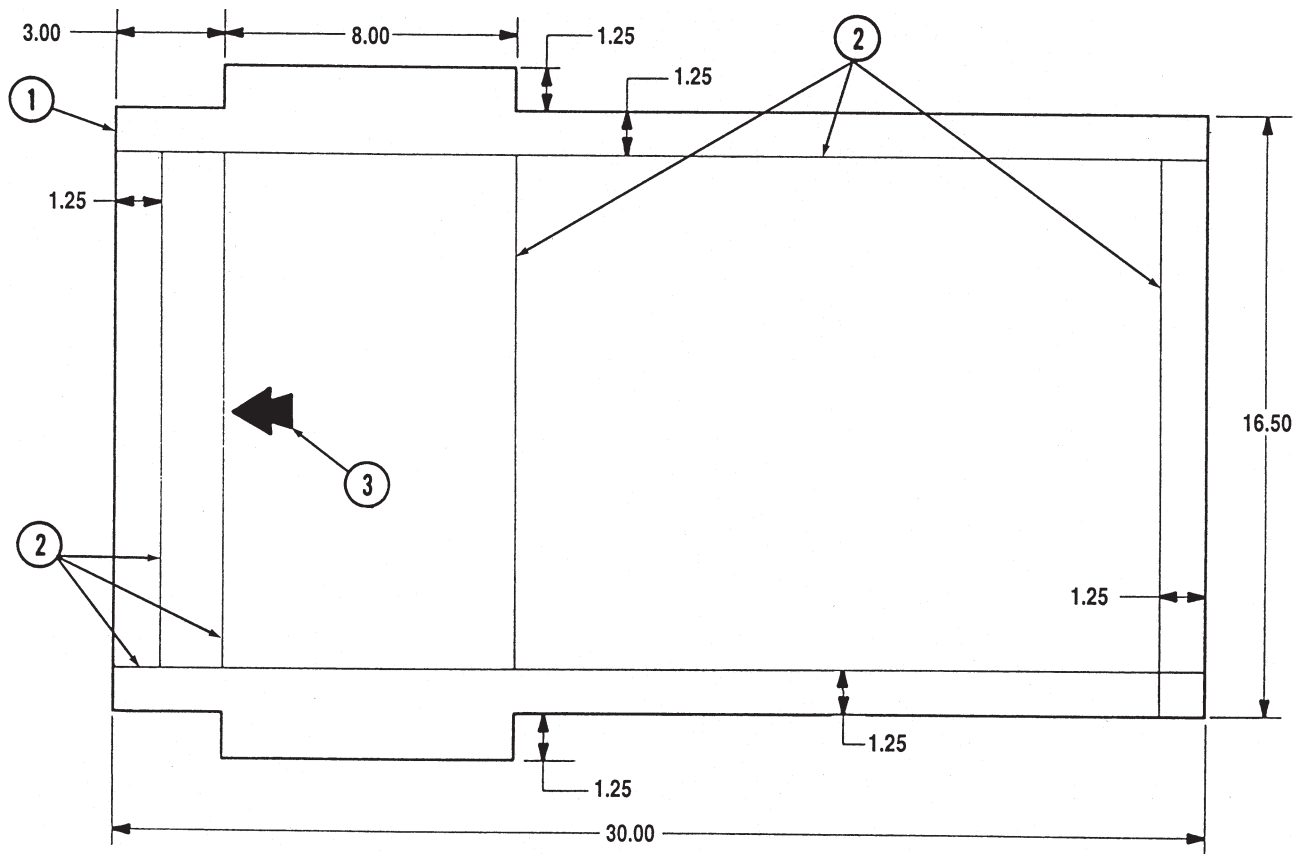
NOTE

All dimensions are in inches. For metric conversion, see chart.

a. Left Rear Insert Panel Fabrication

1. Cut insert panel (1) from sheet metal as shown, and mark six reference lines (2) and directional arrow (3) on insert panel (1).
2. Locate, mark, and drill two 0.312-in. (7.925-mm) diameter holes through insert panel (1).
3. Locate, mark, and drill a 1.000-in. (25.400-mm) diameter hole through insert panel (1).
4. Fabricate two drain holes (4) in insert panel (1).
5. Bend insert panel (1) 1.50-in. (38.10-mm).
6. Remove all burrs and round all sharp edges on insert panel (1).

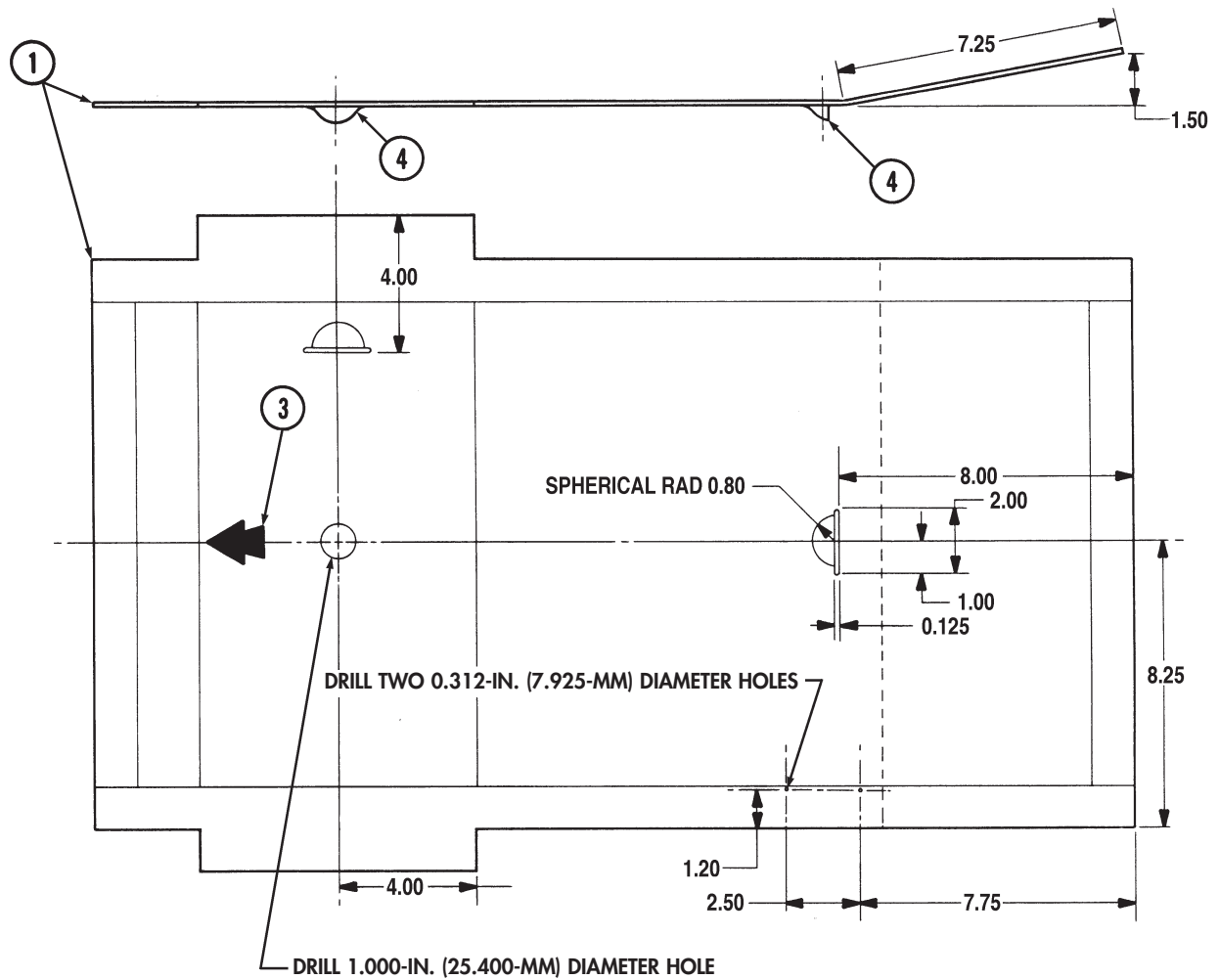
METRIC CONVERSION	
1.25 IN.	31.75 MM
3.00 IN.	76.20 MM
8.00 IN.	203.20 MM
16.50 IN.	419.10 MM
30.00 IN.	762.00 MM



33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.80 IN.	20.32 MM
1.00 IN.	25.40 MM
1.20 IN.	30.48 MM
1.50 IN.	38.10 MM

METRIC CONVERSION	
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
7.25 IN.	184.15 MM
7.75 IN.	196.85 MM
8.00 IN.	203.20 MM
8.25 IN.	209.55 MM

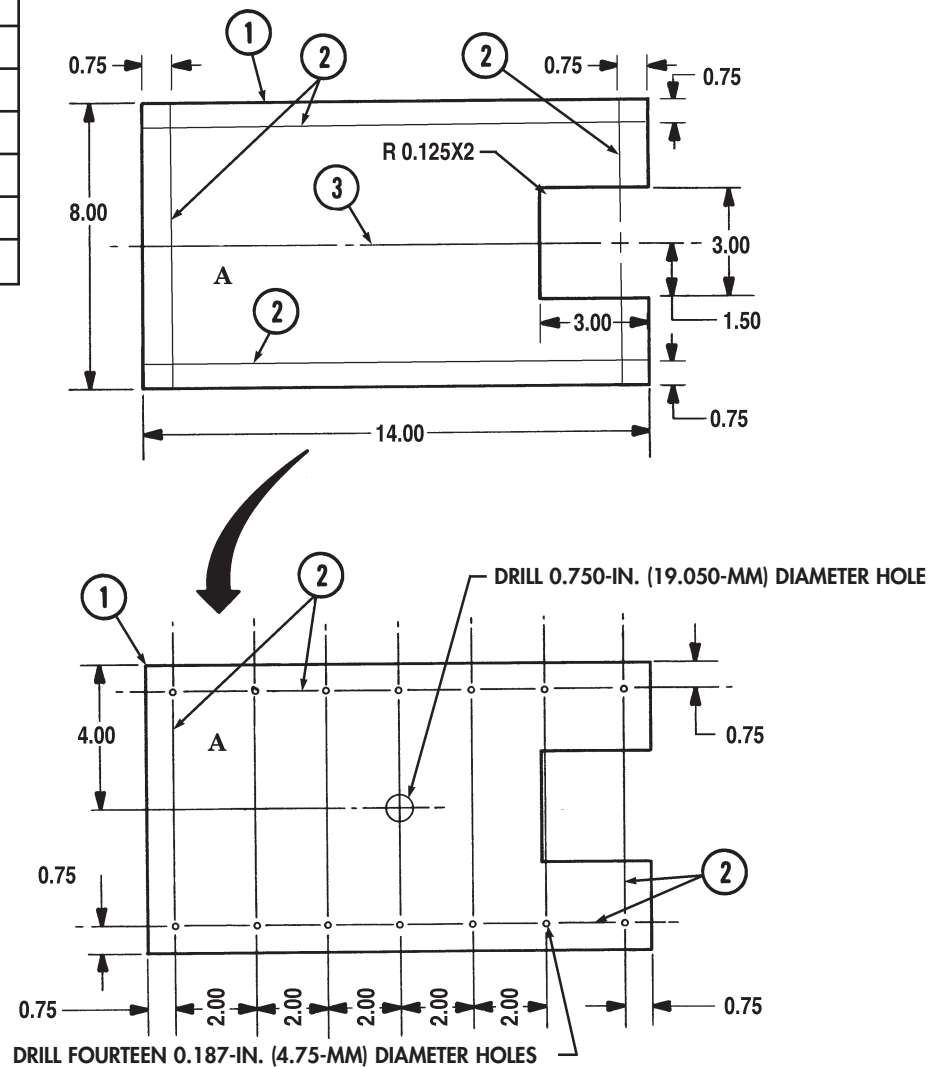


33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

b. Reinforcement Strips Fabrication

1. Cut reinforcement strip (1) from sheet metal, and mark four reference lines (2), centerline (3), and letter A on reinforcement strip (1).
2. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes and one 0.750-in. (19.05-mm) diameter hole through reinforcement strip A (1).
3. Remove all burrs and round all sharp edges on reinforcement strip A (1).

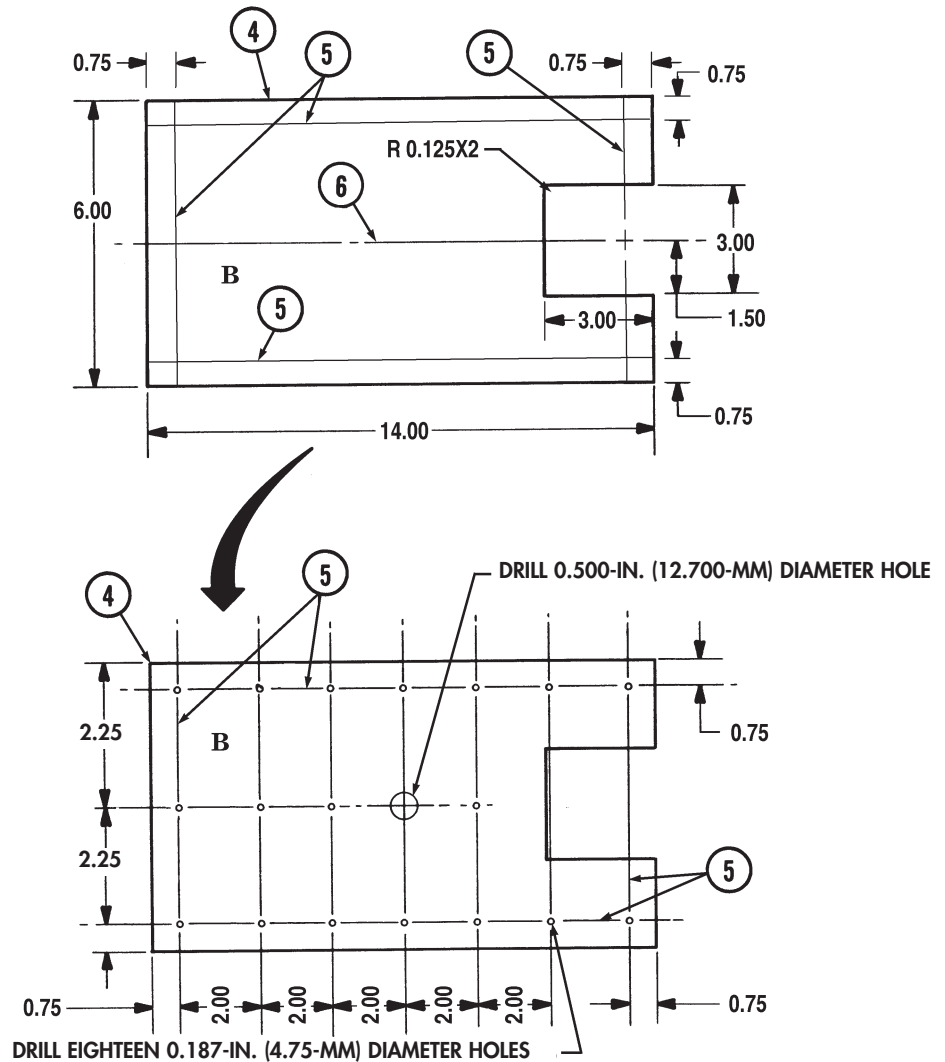
METRIC CONVERSION	
0.125 IN.	3.175 MM
0.75 IN.	19.05 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
3.00 IN.	76.20 MM
4.00 IN.	101.60 MM
8.00 IN.	203.20 MM
14.00 IN.	355.60 MM



33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

4. Cut reinforcement strip (4) from sheet metal, and mark four reference lines (5), centerline (6), and letter B on reinforcement strip (4).
5. Locate, mark, and drill eighteen 0.187-in. (4.75-mm) diameter holes and one 0.500-in. (12.700-mm) diameter hole through reinforcement strip B (4).
6. Remove all burrs and round all sharp edges of reinforcement strip B (4).

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.75 IN.	19.05 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
2.25 IN.	57.15 MM
3.00 IN.	76.20 MM
4.00 IN.	101.60 MM
6.00 IN.	152.40 MM
14.00 IN.	355.60 MM

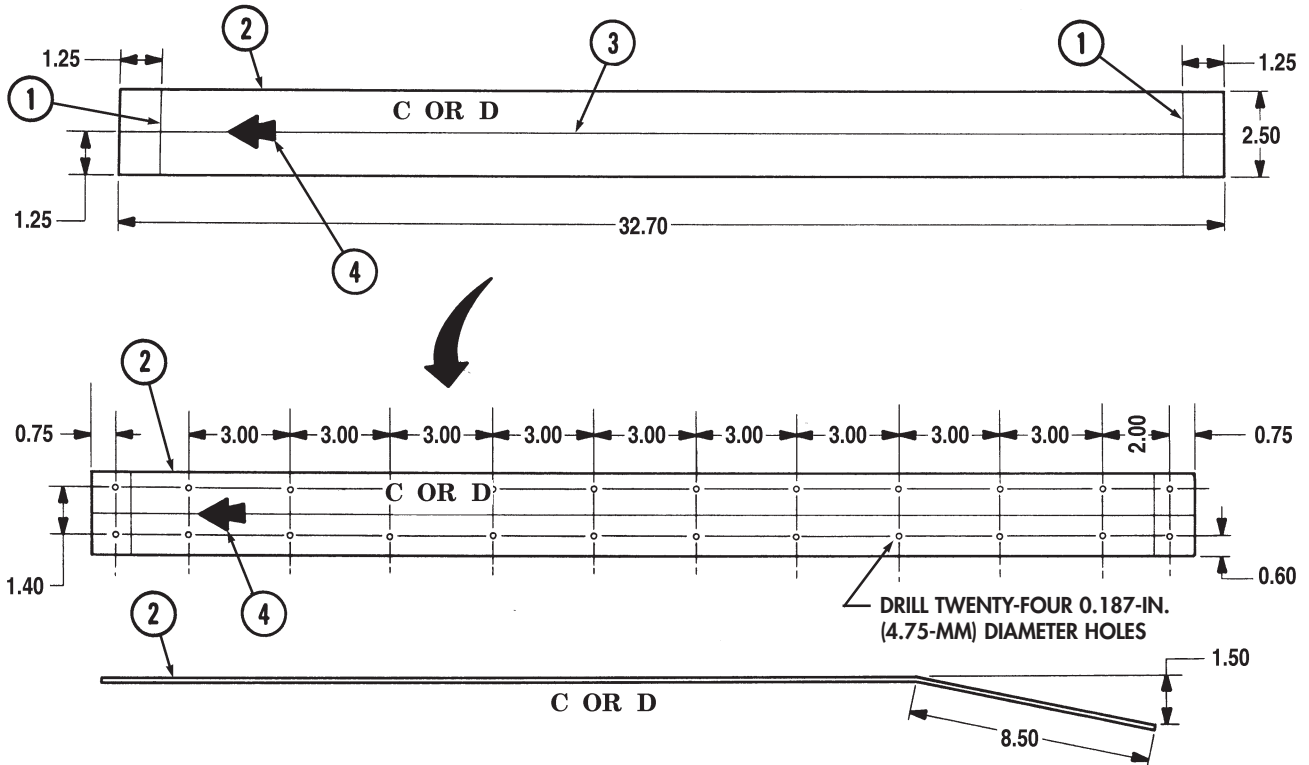


33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

c. Metal Strips Fabrication

1. Cut two metal strips (2) from sheet metal, and mark two reference lines (1), centerline (3), and directional arrow (4). Identify two metal strips (2) as C and D.
2. Locate, mark, and drill twenty-four 0.187-in. (4.75-mm) diameter holes through metal strips C and D (2).
3. Bend metal strips C and D (2) 1.50 in. (38.10-mm).

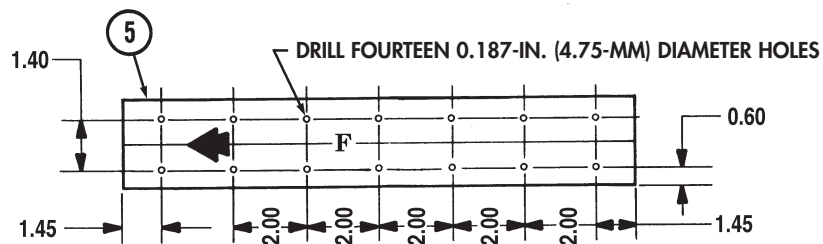
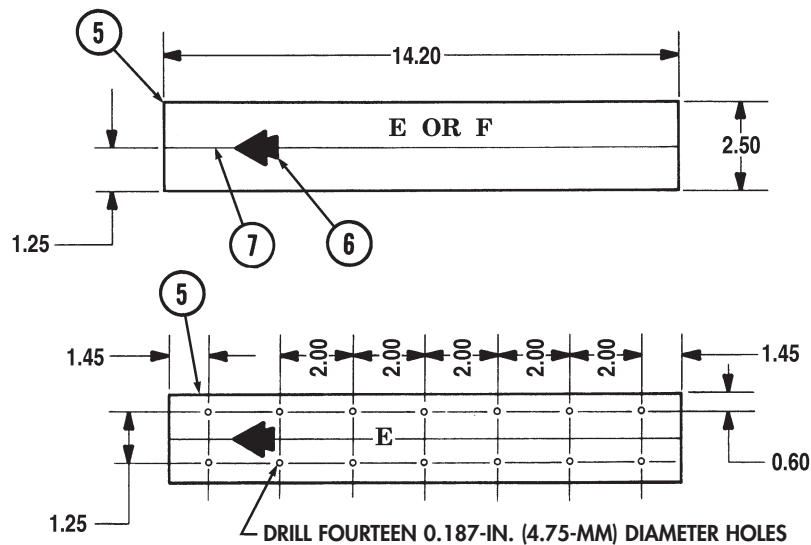
METRIC CONVERSION	
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
3.00 IN.	76.20 MM
8.50 IN.	215.90 MM
32.70 IN.	830.58 MM



33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

4. Cut two metal strips (5) from sheet metal, and mark centerline (7), and directional arrow (6). Identify metal strips (5) as E and F.
5. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes through metal strips E and F (5).

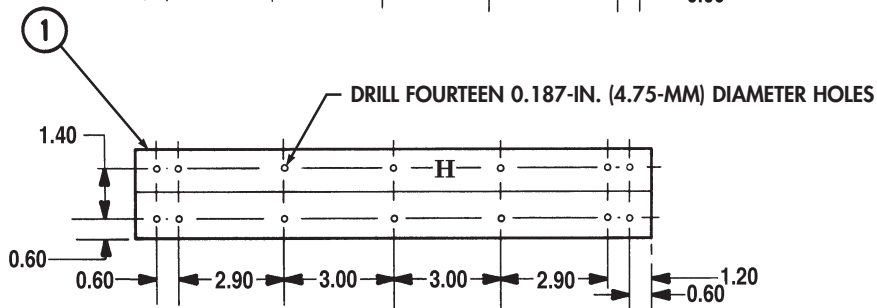
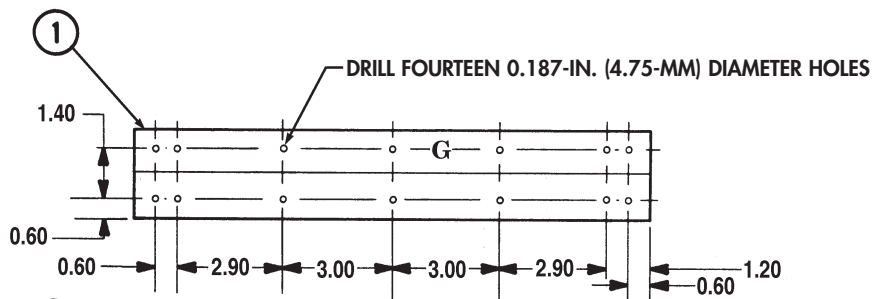
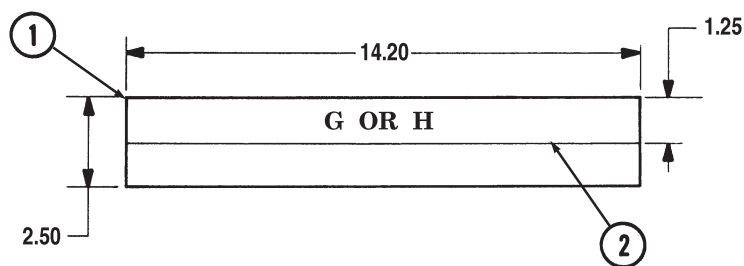
METRIC CONVERSION	
0.60 IN.	15.24 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.45 IN.	36.83 MM
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
14.20 IN.	360.68 MM



33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

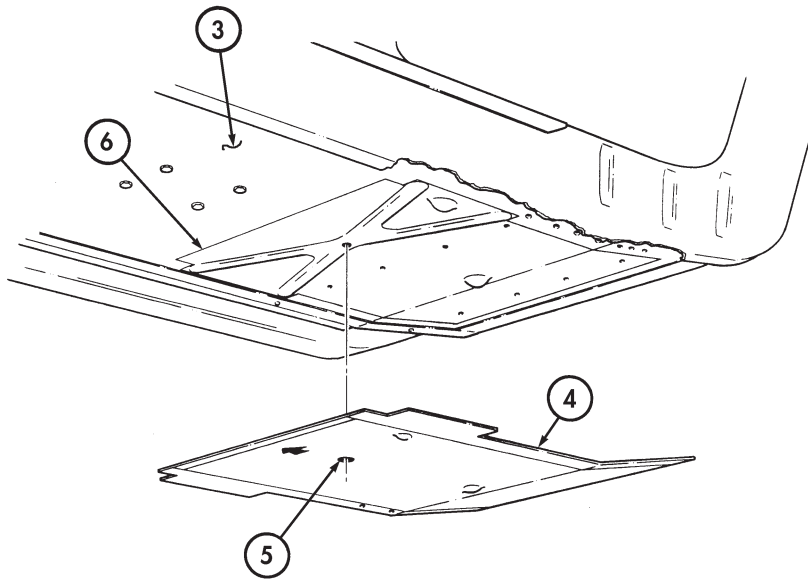
6. Cut two metal strips (1) from sheet metal, and mark centerline (2). Identify metal strips (1) as G and H.
7. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes through metal strips G and H (1).

METRIC CONVERSION	
0.60 IN.	15.24 MM
1.20 IN.	30.48 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
2.50 IN.	63.50 MM
2.90 IN.	73.66 MM
3.00 IN.	76.20 MM
14.20 IN.	360.68 MM



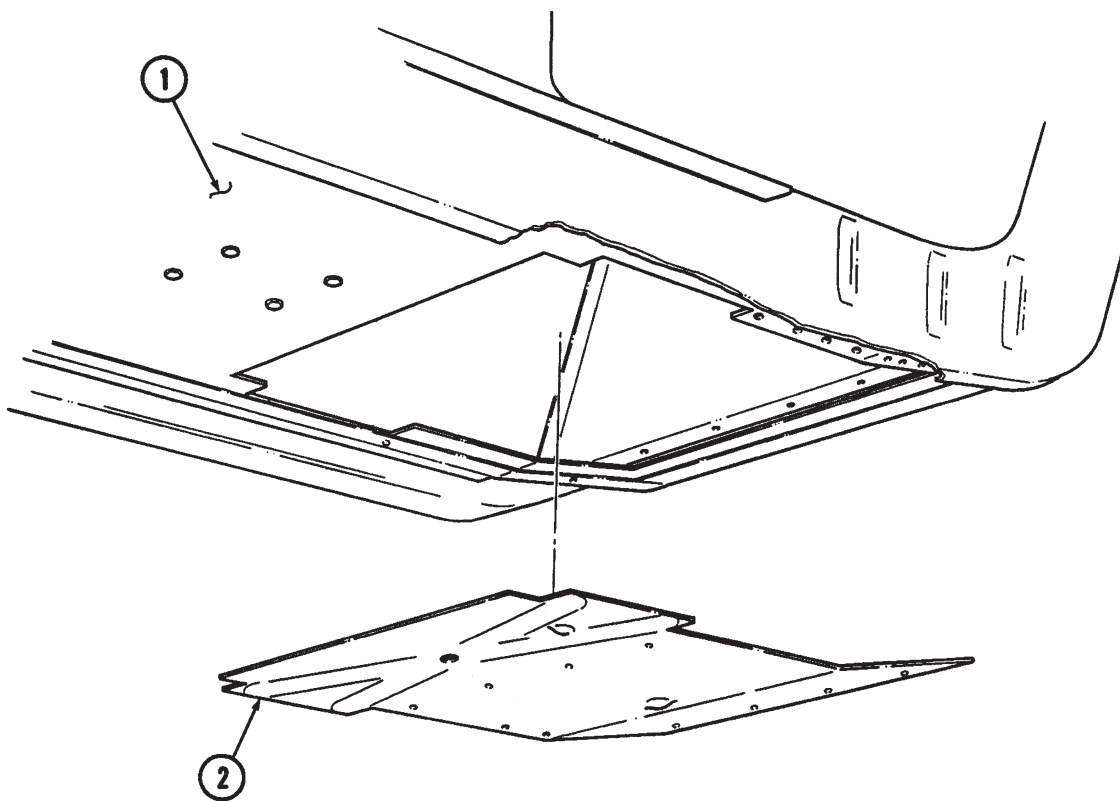
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)**d. Left Rear Floor Panel Removal**

1. Position insert panel (4), with arrow facing down and toward front of vehicle, to underside of left rear floor panel (3) and align mount hole (5).
2. Using insert panel (4) as a template, scribe outline (6) on left rear floor panel (3).

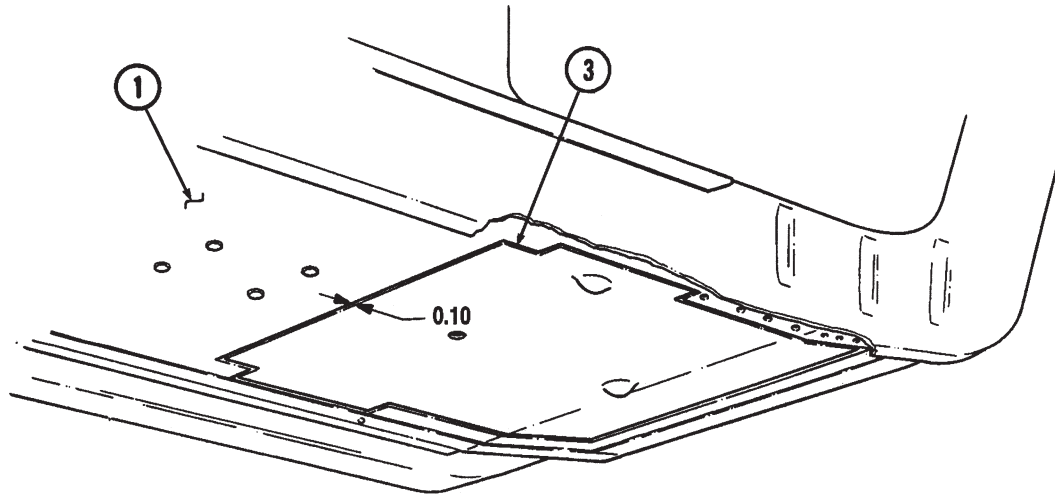


33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

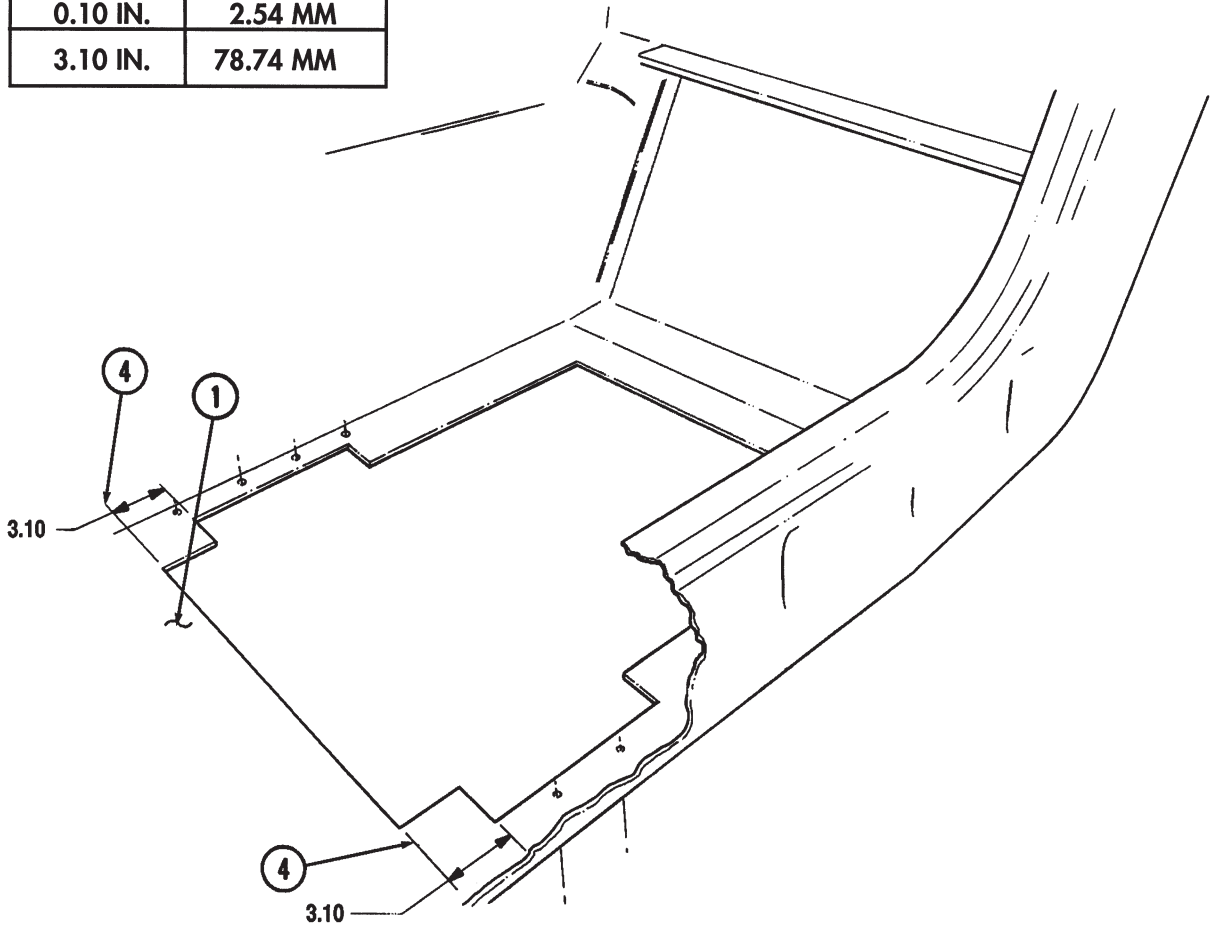
3. Using scribed outline marked in step 2, cut and remove floor panel (2) from left rear floor panel (1).
4. Remove sharp edges and burrs from left rear floor panel (1).
5. Position insert panel (3), with arrow facing down and toward front of vehicle, on underside of left rear floor panel (1).
6. Obtain a minimum clearance of 0.10-in. (2.54-mm) between edges of insert panel (3) and left rear floor panel (1).
7. Remove insert panel (3).
8. Locate and mark two reference lines (4) on left rear floor panel (1).



33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



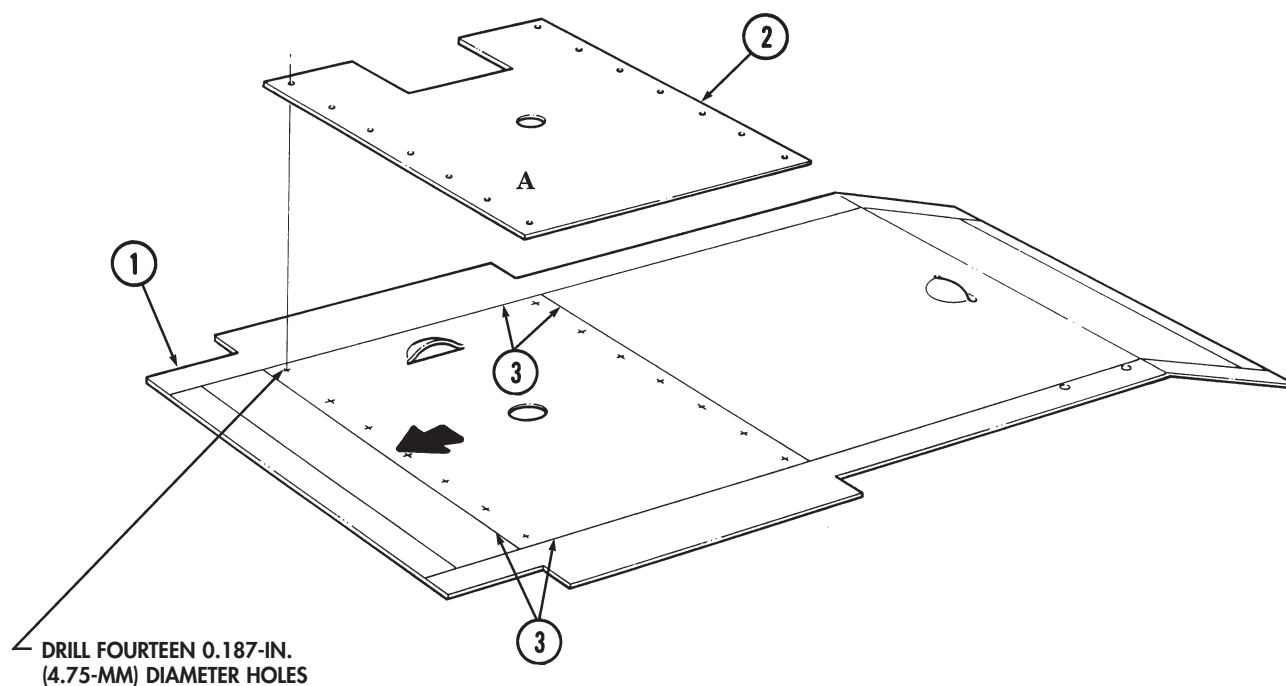
METRIC CONVERSION	
0.10 IN.	2.54 MM
3.10 IN.	78.74 MM



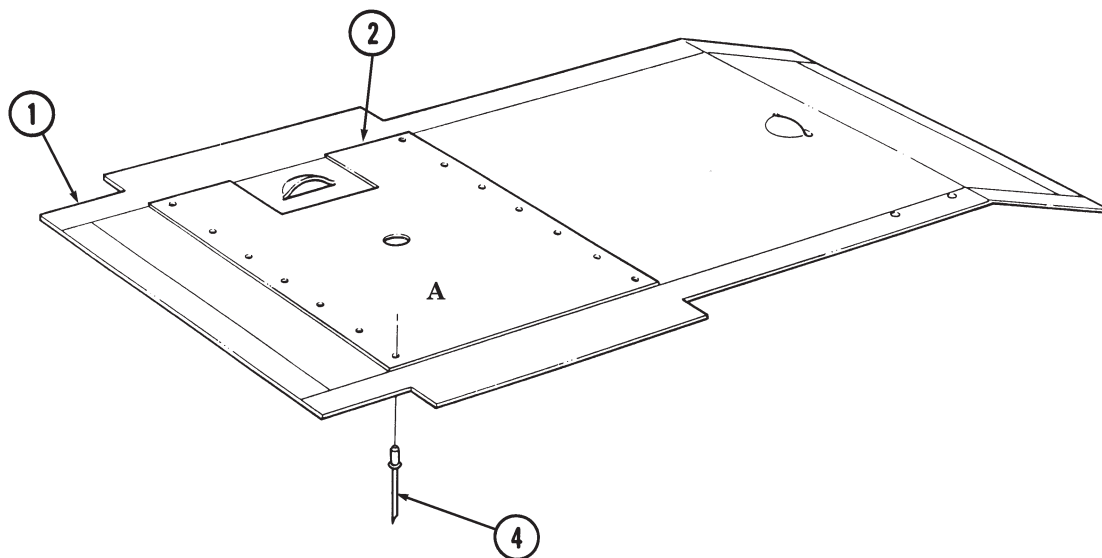
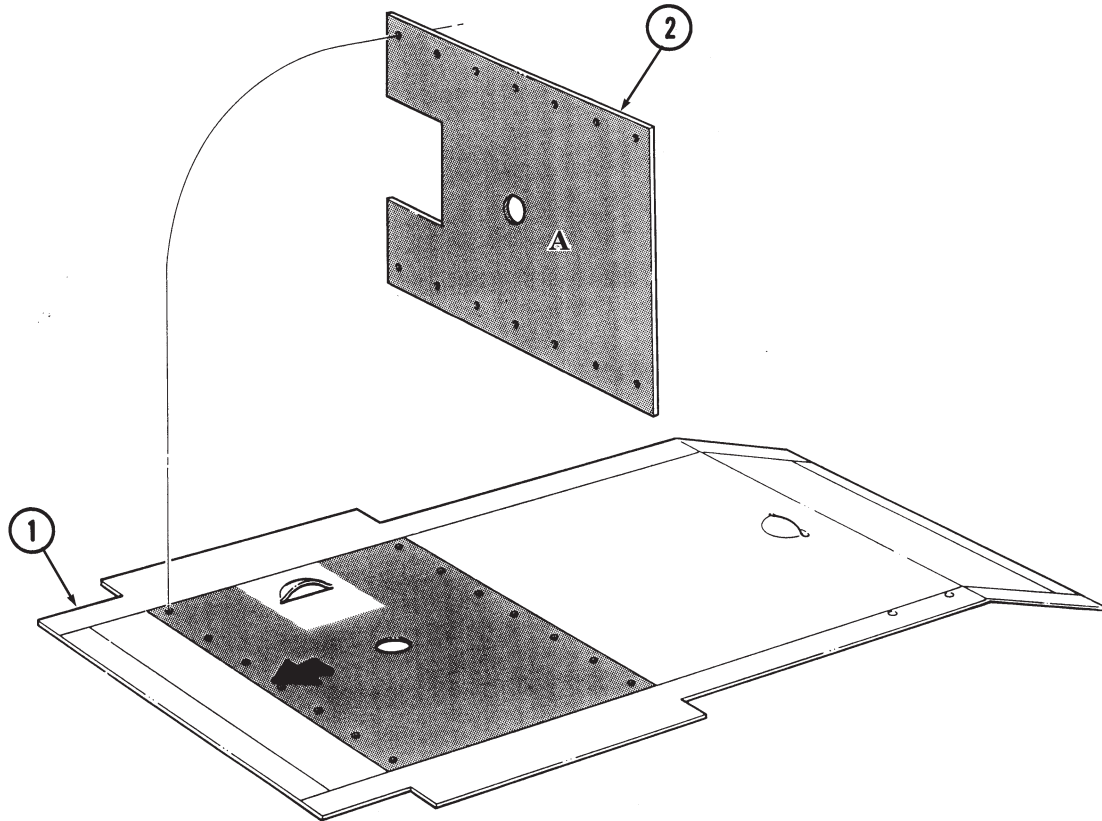
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

e. Reinforcement Strip A and Insert Panel Assembly

1. Position reinforcement strip A (2) on insert panel (1). Align reference lines (3) with edges of reinforcement strip A (2).
2. Using reinforcement strip A (2) as a template, locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes through insert panel (1). Remove reinforcement strip A (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surfaces of insert panel (1) and reinforcement strip A (2).
4. Position reinforcement strip A (2) on insert panel (1) and install with fourteen rivets (4).
5. Remove any adhesive residue and clean edges on reinforcement strip A (2) and insert panel (1).



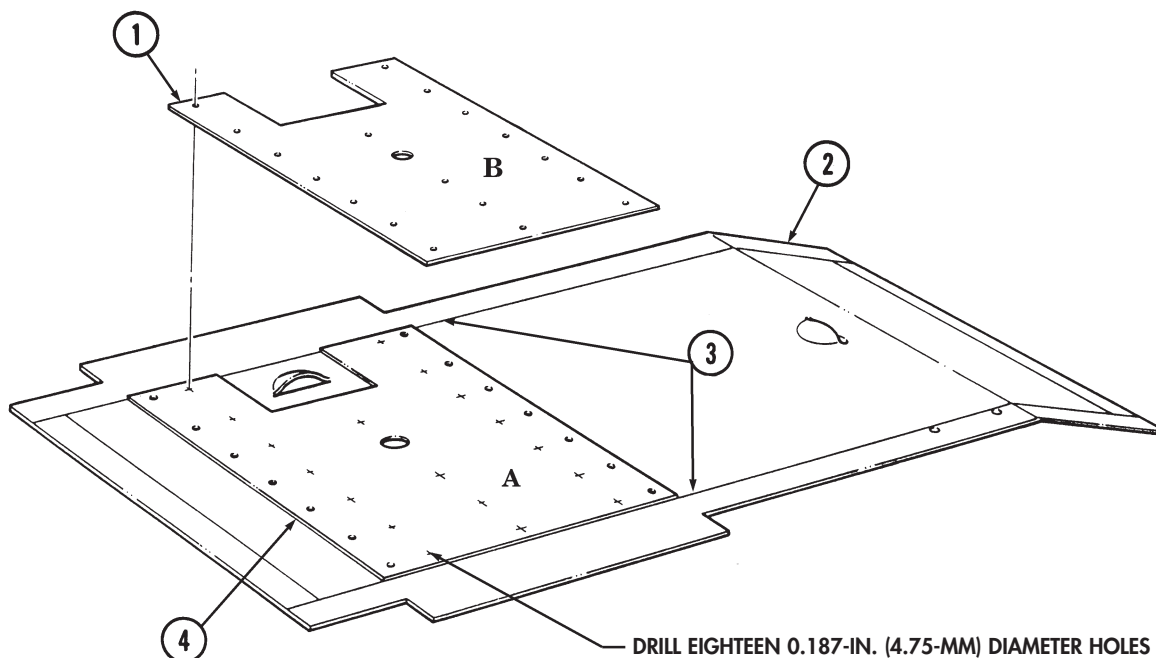
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



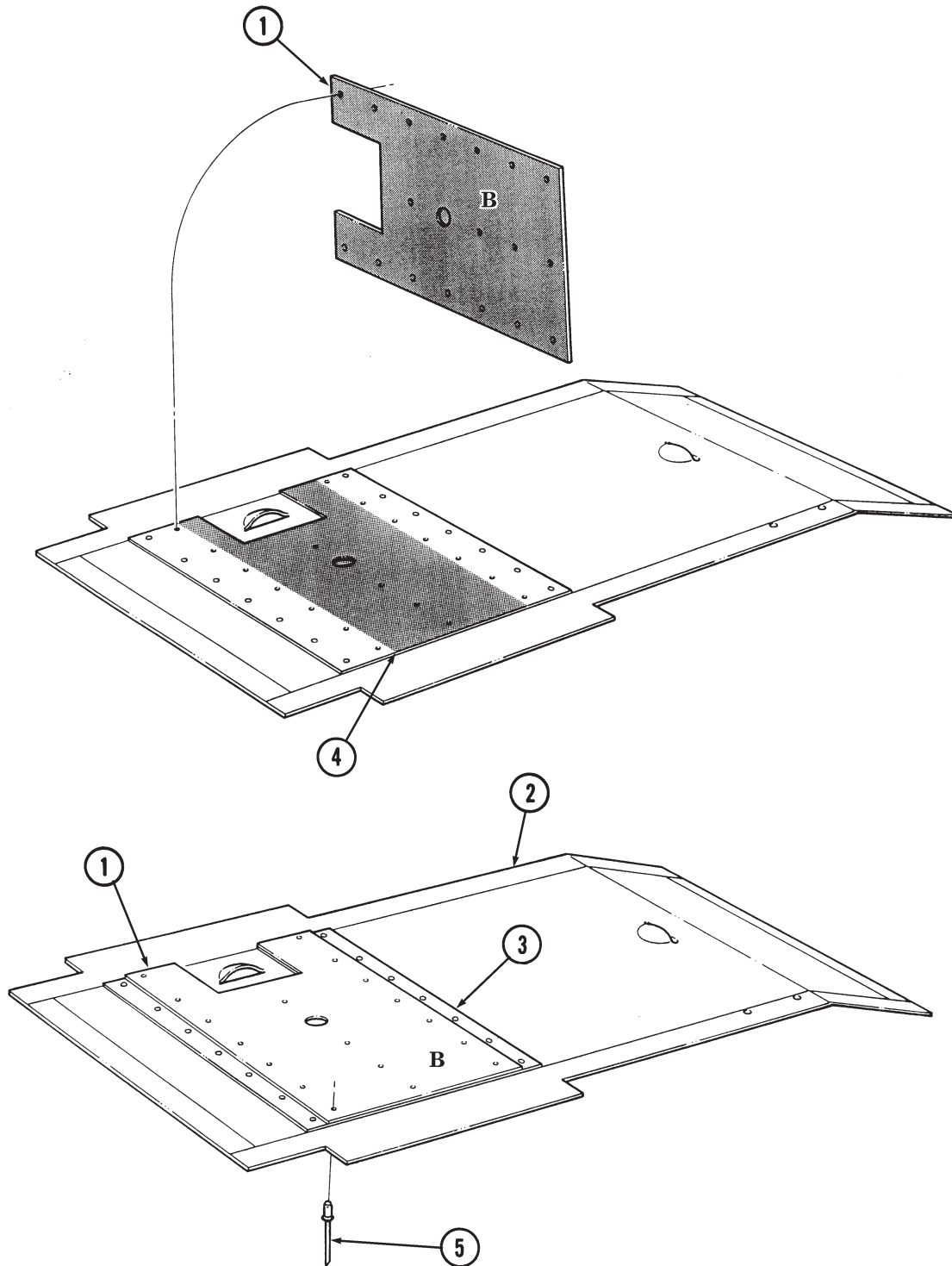
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

f. Reinforcement Strip B and Insert Panel Assembly

1. Position reinforcement strip B (1) on insert panel (2), and align reference lines (3) with edges of reinforcement strip B (1).
2. Using reinforcement strip B (1) as a template, locate, mark, and drill eighteen 0.187-in. (4.75-mm) diameter holes through reinforcement strip A (4) and insert panel (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of reinforcement strip A (4) and reinforcement strip B (1).
4. Position reinforcement strip B (1) on reinforcement strip A (4) and install with eighteen rivets (5).
5. Remove any adhesive residue and clean edges of reinforcement strip B (1), reinforcement strip A (4), and insert panel (2).



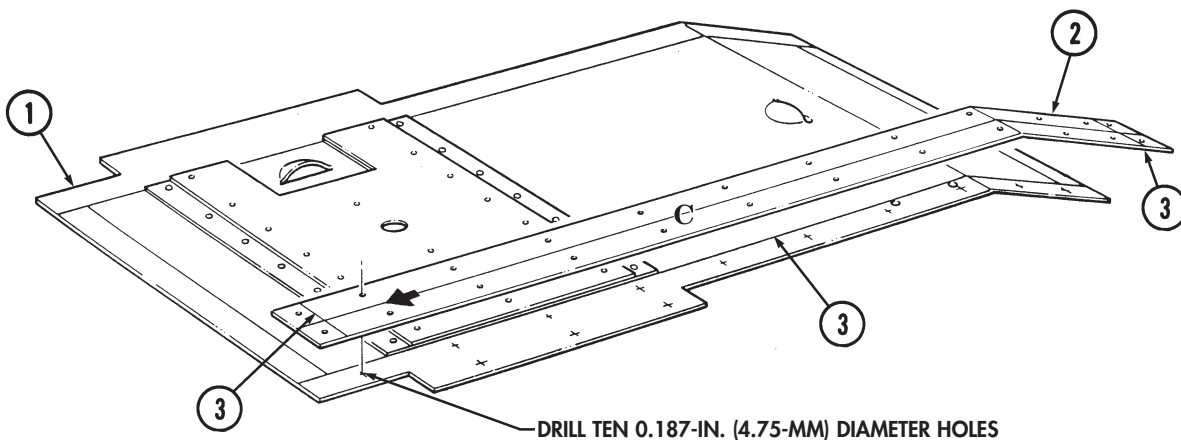
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



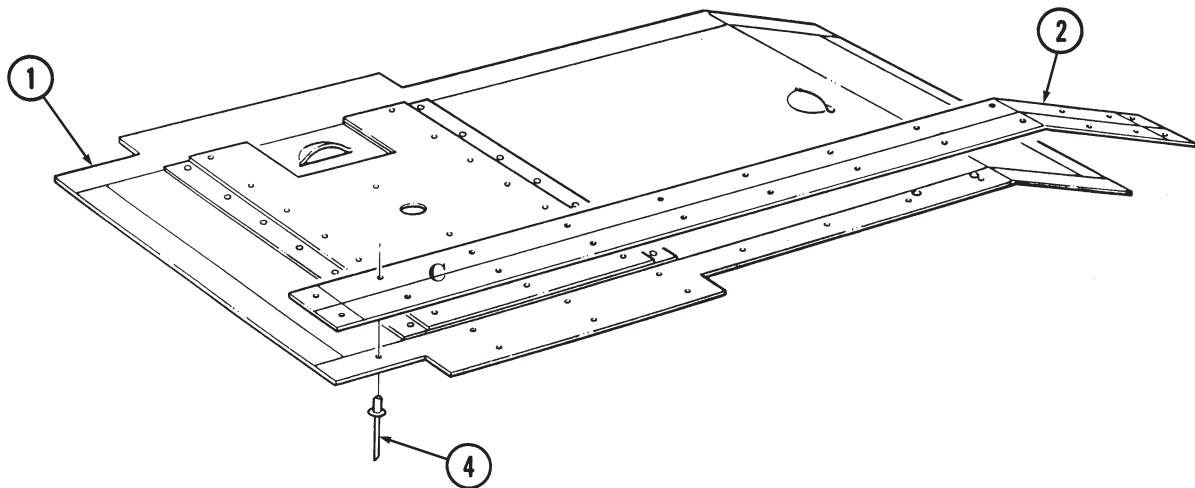
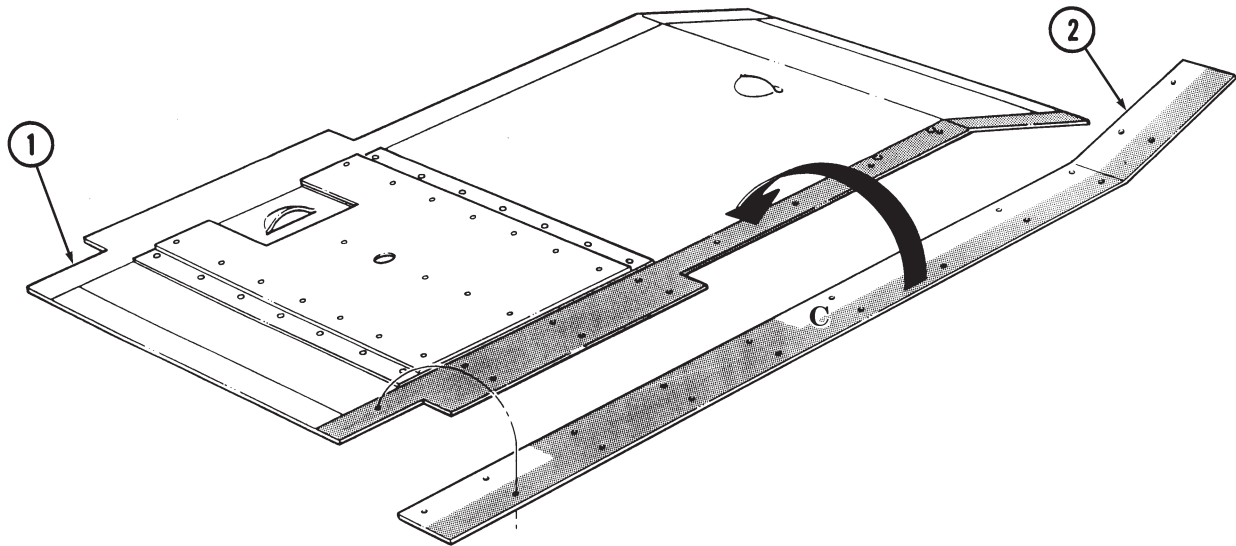
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

g. Metal Strip C and Insert Panel Assembly

1. Position metal strip C (2), with arrow facing up and toward left, on insert panel (1). Align reference lines (3) with edges of insert panel (1).
2. Using metal strip C (2) as a template, locate, mark, and drill ten 0.187-in. (4.75-mm) diameter holes through insert panel (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip C (2).
4. Position metal strip C (2) on insert panel (1) and install with ten rivets (4).
5. Remove any adhesive residue and clean edges on metal strip C (2) and insert panel (1).



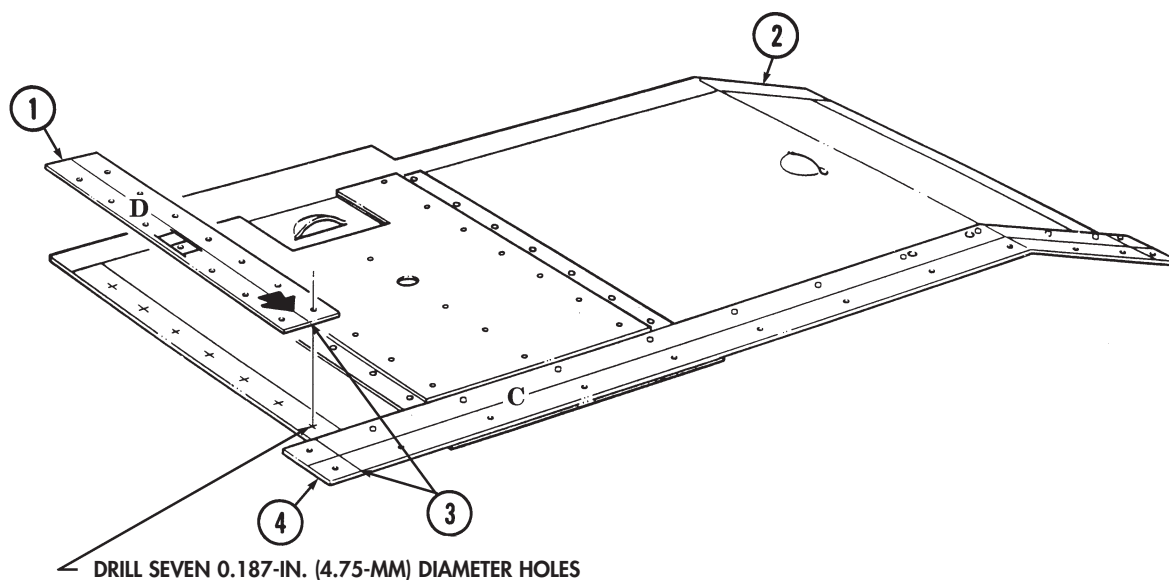
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



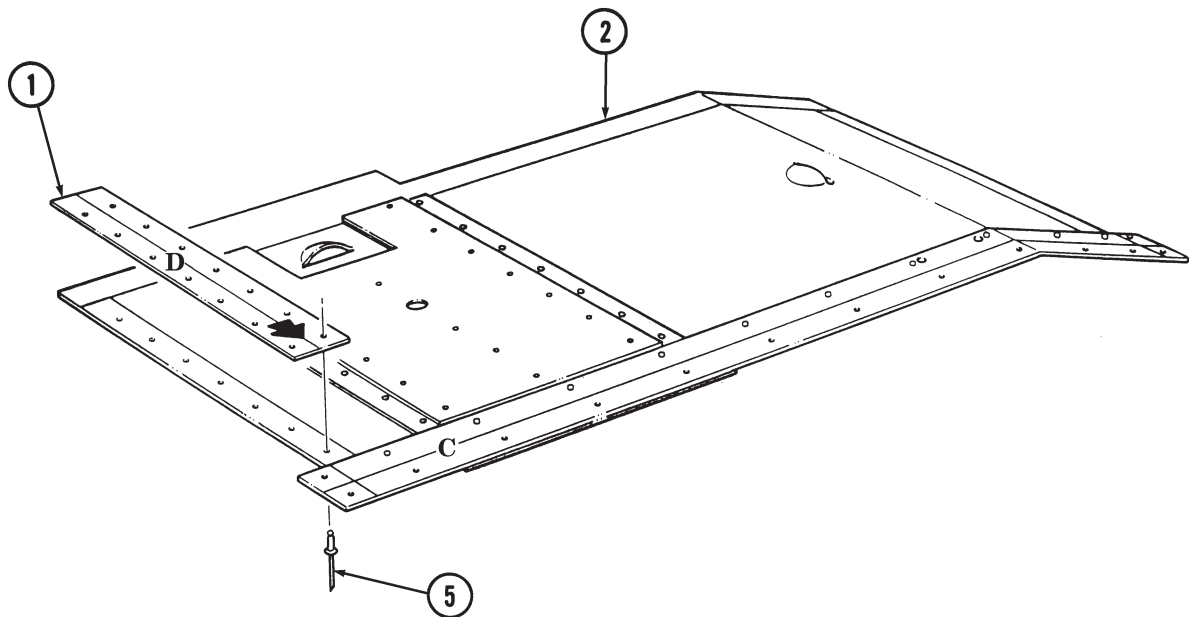
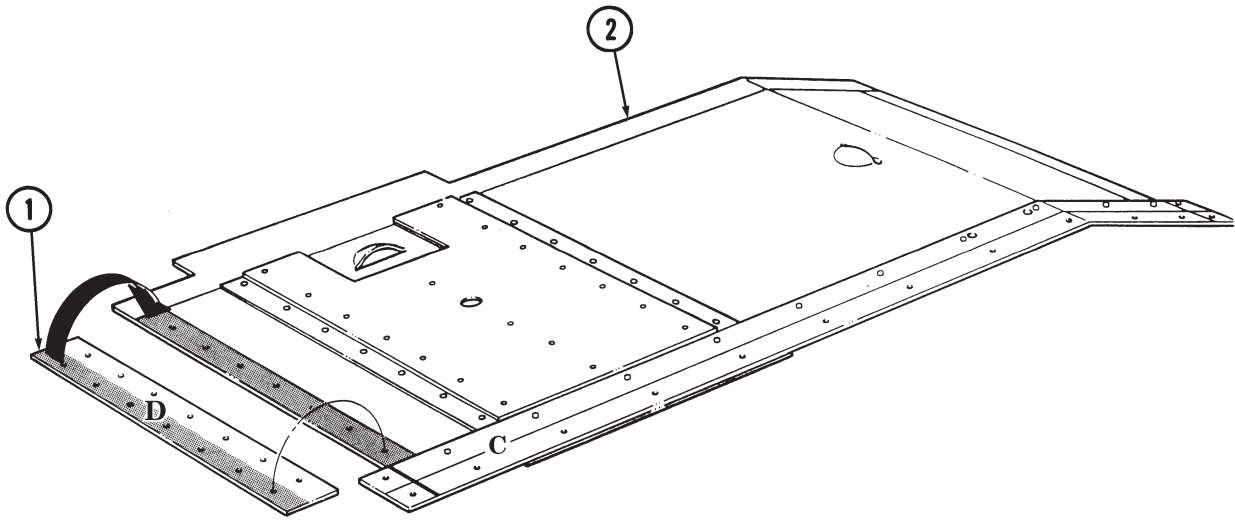
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

h. Metal Strip D and Insert Panel Assembly

1. Position metal strip D (1), with arrow facing up and toward metal strip C (4), on insert panel (2). Align reference lines (3).
2. Using metal strip D (1) as a template, locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes through insert panel (2). Remove metal strip D (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip D (1).
4. Position metal strip D (1) on insert panel (2) and install with seven rivets (5).
5. Remove any adhesive residue and clean edges on metal strip D (1) and insert panel (2).



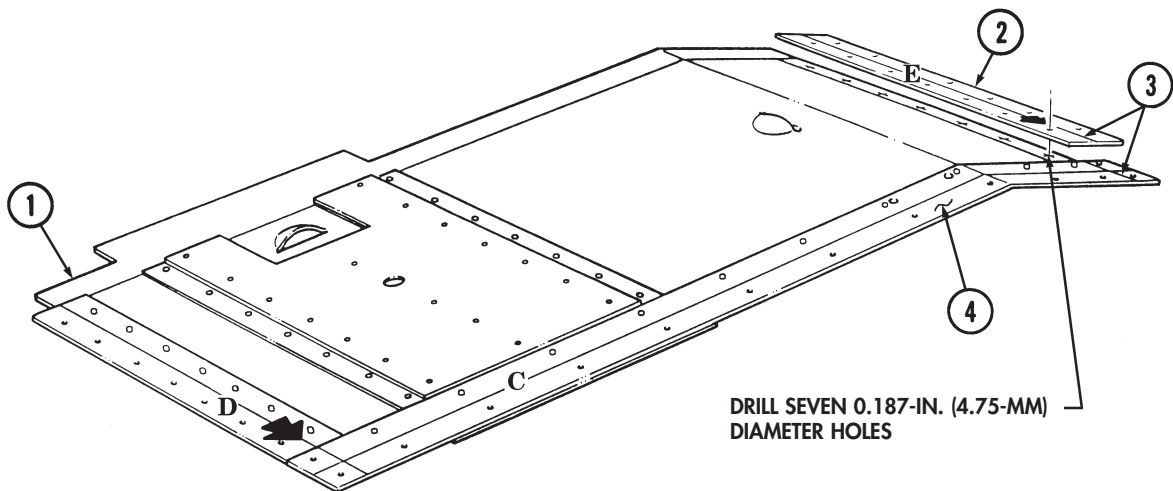
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



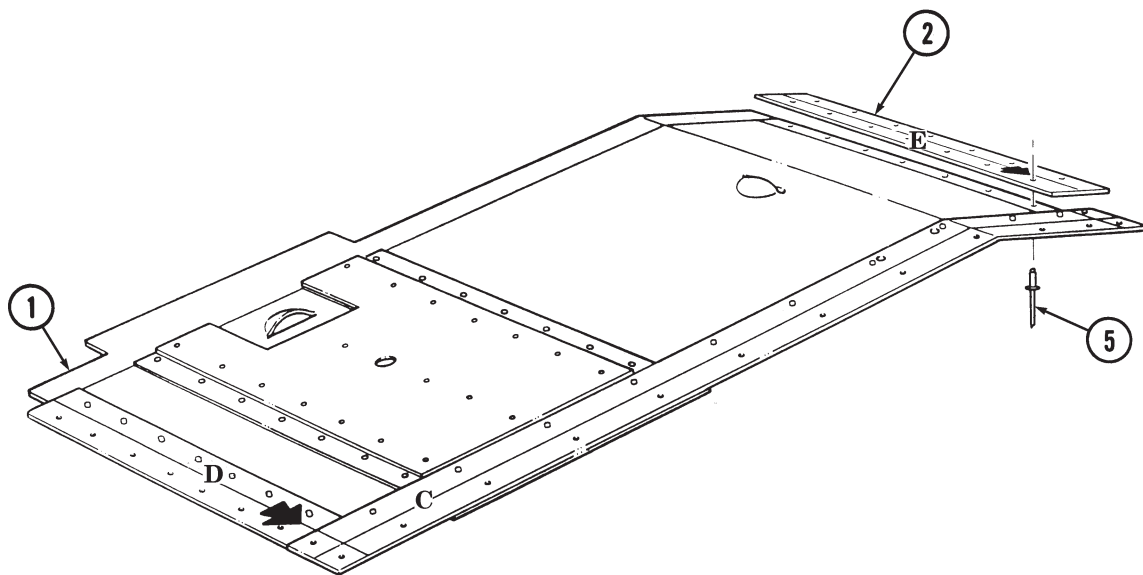
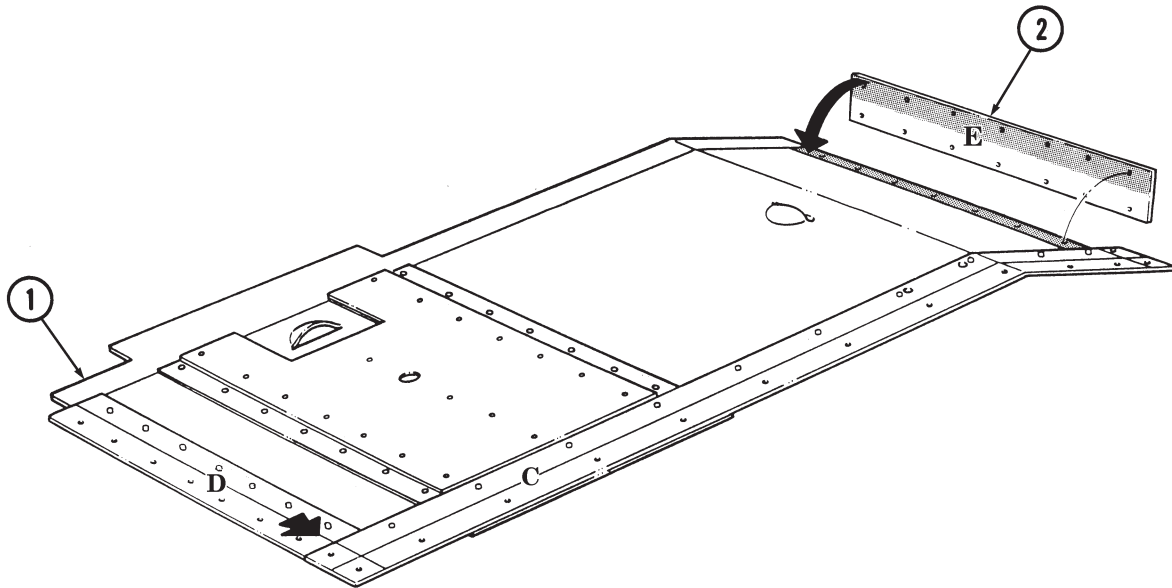
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

i. Metal Strip E and Insert Panel Assembly

1. Position metal strip E (2), with arrow facing up and toward metal strip C (4), on insert panel (1). Align reference lines (3).
2. Using metal strip E (2) as a template, locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes through insert panel (1). Remove metal strip E (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip E (2).
4. Position metal strip E (2) on insert panel (1) and install with seven rivets (5).
5. Remove any adhesive residue and clean edges on metal strip E (2) and insert panel (1).



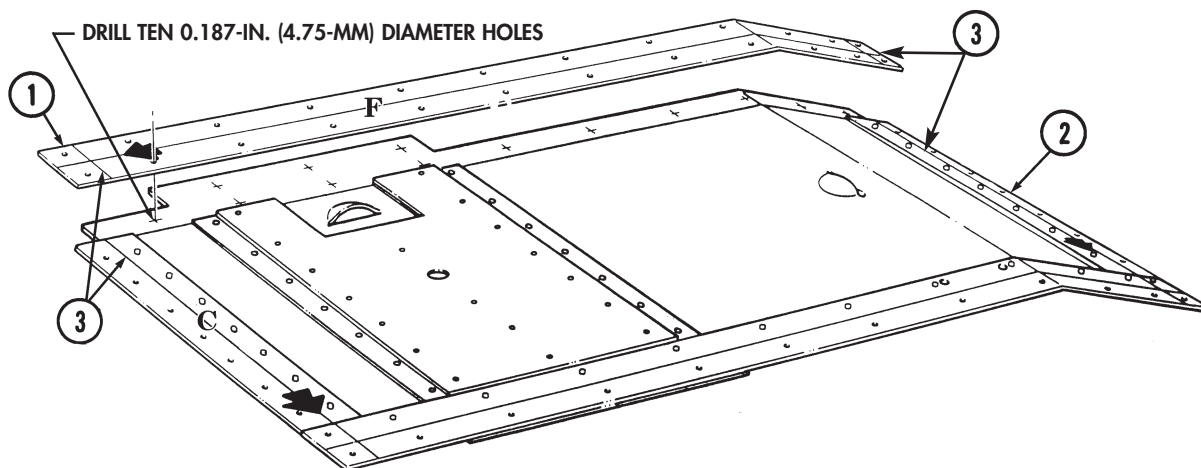
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



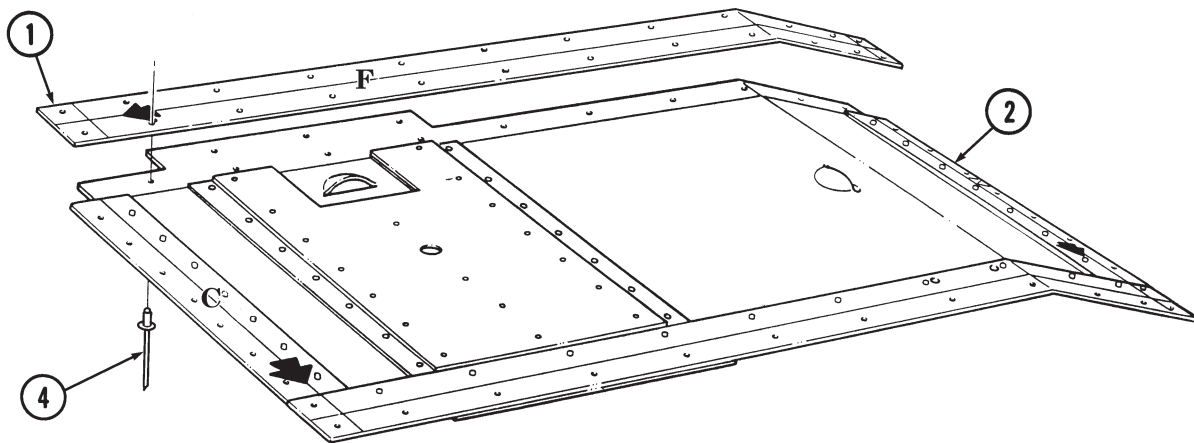
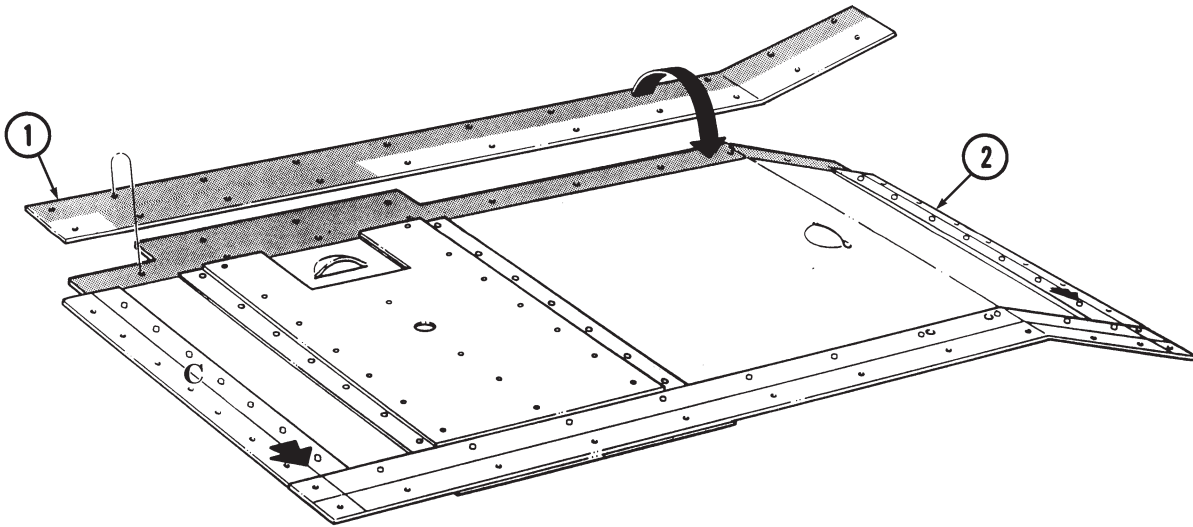
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

j. Metal Strip F and Insert Panel Assembly

1. Position metal strip F (1), with arrow facing up and toward metal strip C (3), on insert panel (2). Align reference lines (3).
2. Using metal strip F (1) as a template, locate, mark, and drill ten 0.187-in. (4.75-mm) diameter holes in insert panel (2). Remove metal strip F (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip F (1).
4. Position metal strip F (1) on insert panel (2) and install with ten rivets (4).
5. Remove any adhesive residue and clean edges on metal strip F (1) and insert panel (2).



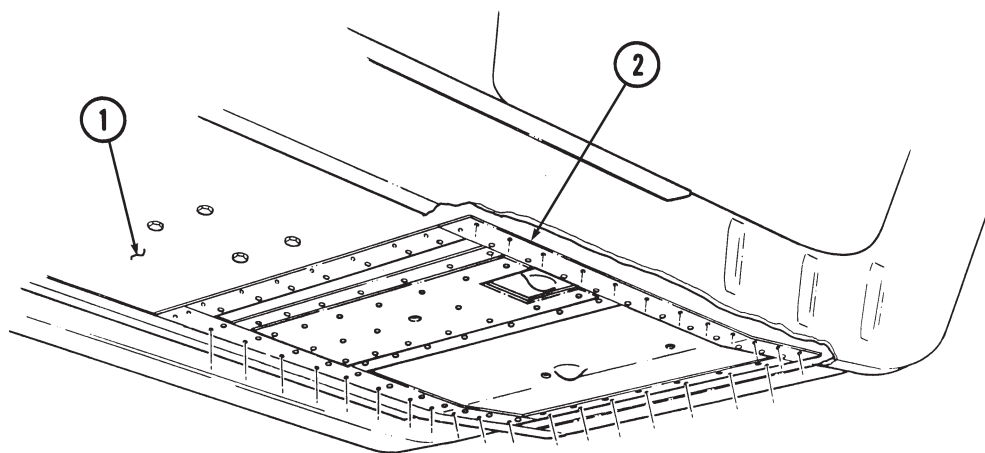
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



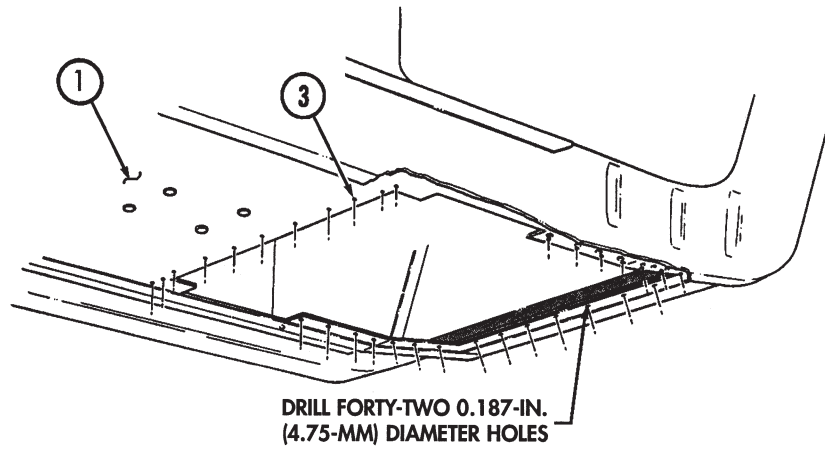
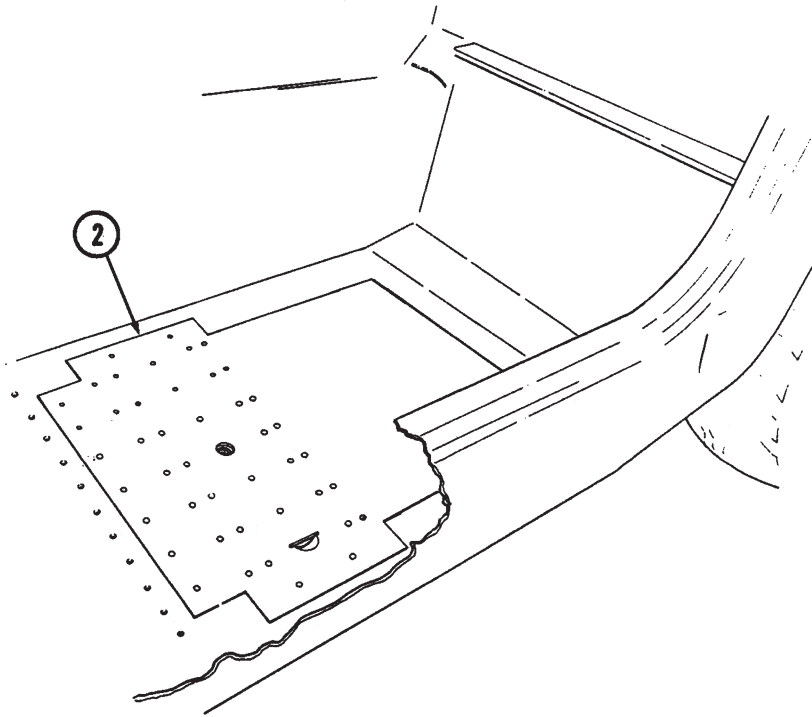
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

k. Left Rear Floor Panel and Insert Panel Drilling

1. Position insert panel (2) to underside of left rear floor panel (1).
2. Using insert panel (2) as a template, mark forty-two hole locations (3) on underside of left rear floor panel (1). Remove insert panel (2).
3. Drill forty-two 0.187-in. (4.75-mm) diameter holes through underside of left rear floor panel (1).



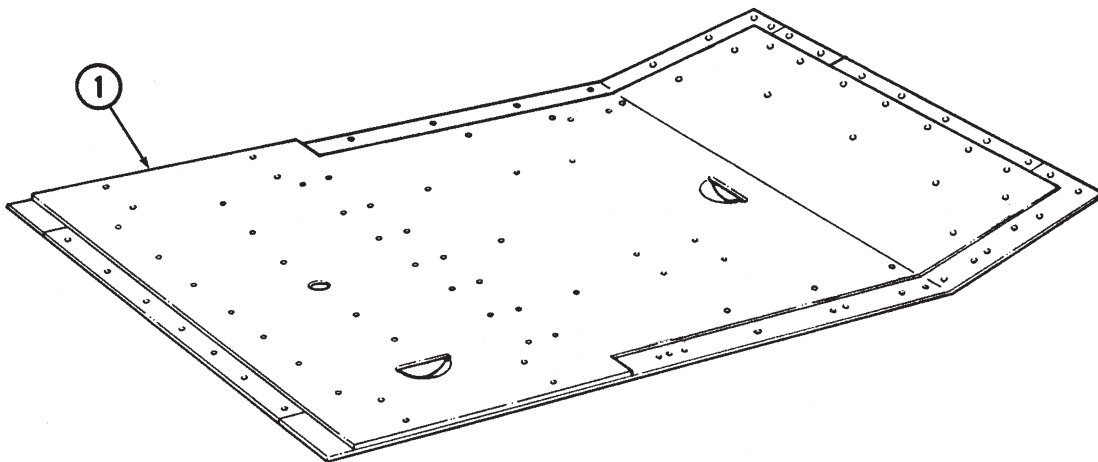
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



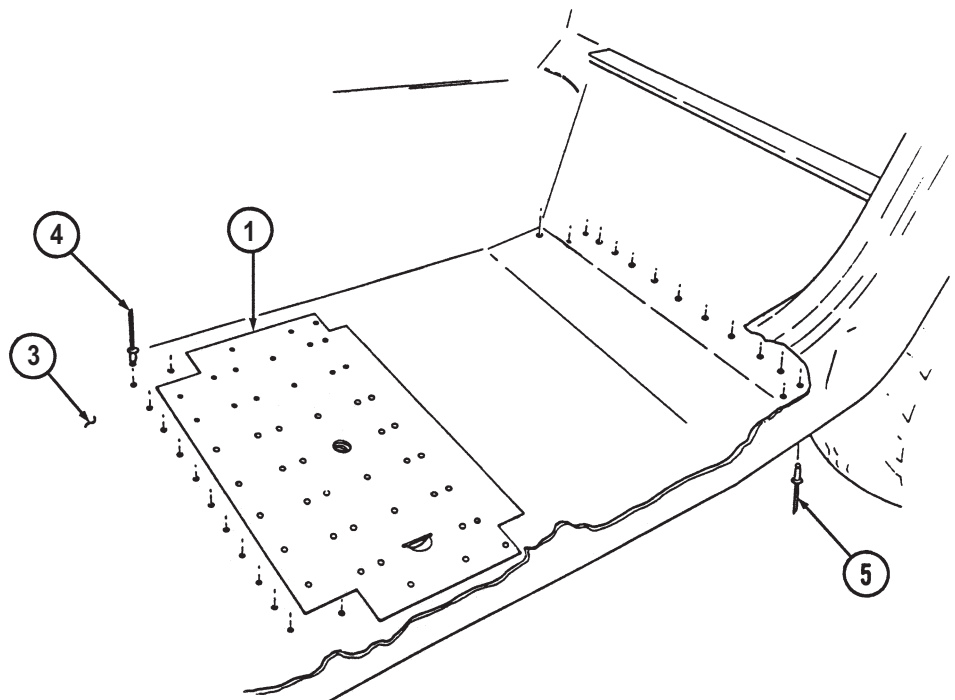
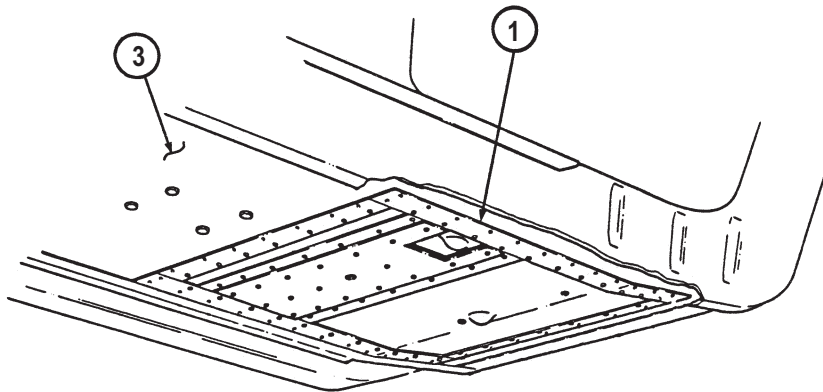
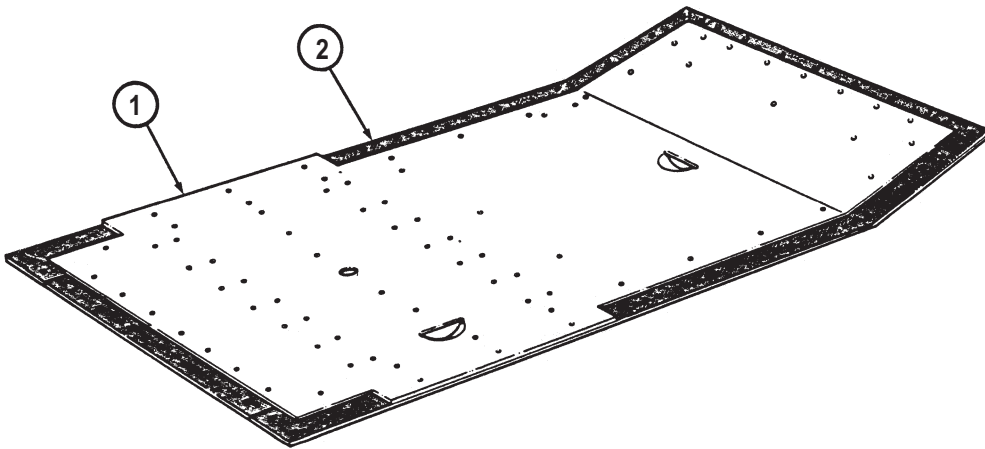
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

I. Insert Panel and Left Rear Floor Panel Installation

1. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to outer shaded area (2) of insert panel (1).
2. Position insert panel (1) to underside of left rear floor panel (3).
3. Secure insert panel (1) on left rear floor panel (3) with twenty-four rivets (5) and eighteen rivets (4).



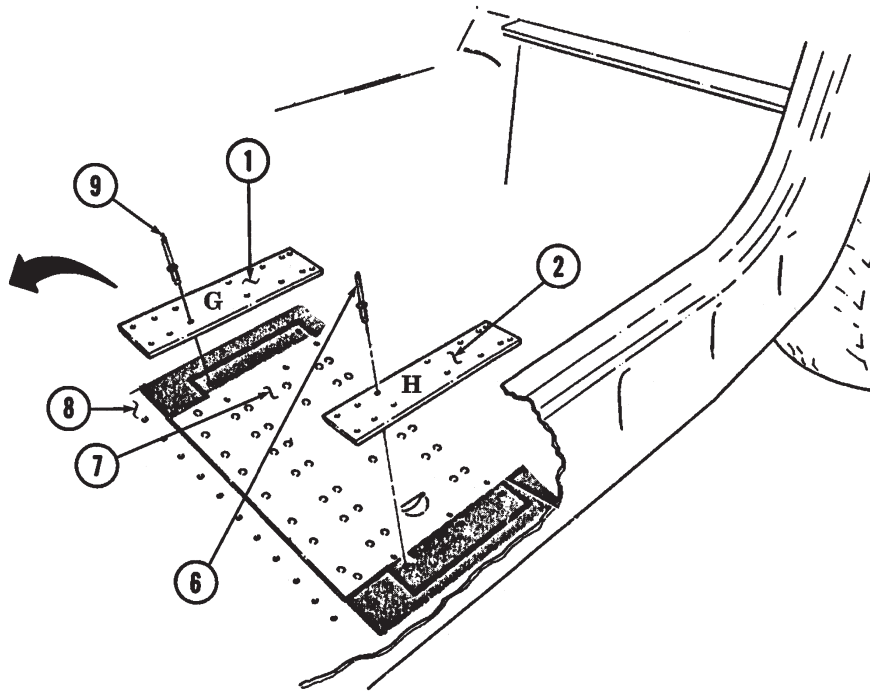
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



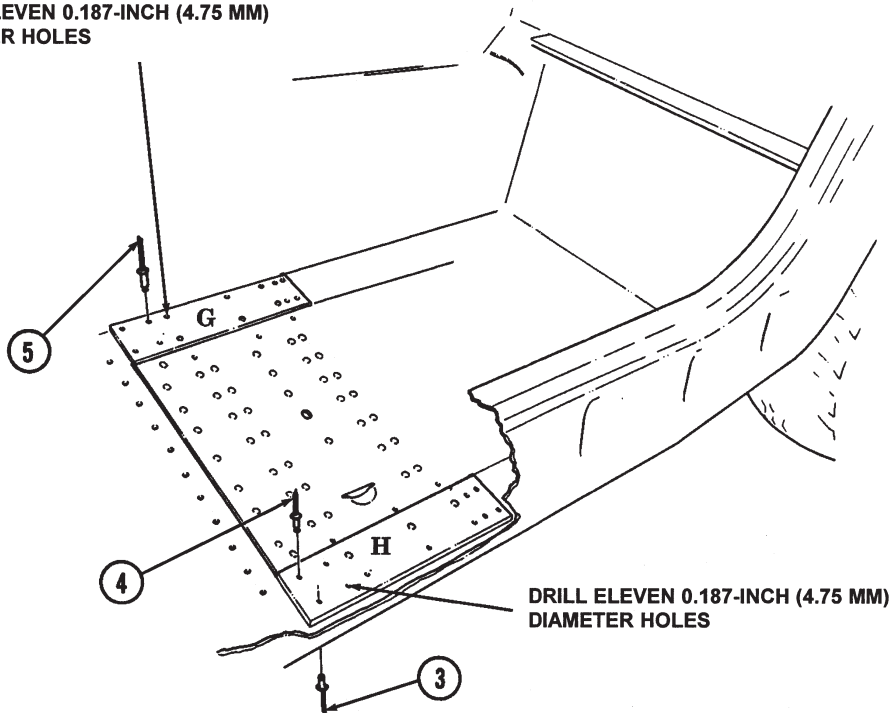
33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)

4. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to metal strip G (1).
5. Apply adhesive sealant to shaded area of left rear floor panel (8) and insert panel (7).
6. Position metal strip G (1) on left rear floor panel (8) and insert panel (7) and install three rivets (9).
7. Using metal strip G (1) as a template, locate and drill eleven 0.187-in. (4.75-mm) diameter holes through left rear floor panel (8) and insert panel (7).
8. Secure metal strip G (1) on left rear floor panel (8) and insert panel (7) with eleven rivets (5).
9. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to metal strip H (2).
10. Apply adhesive sealant to area shaded on left rear floor panel (8) and insert panel (7).
11. Position metal strip H (2) on left rear floor panel (8) and insert panel (7) and install three rivets (6).
12. Using metal strip H (2) as a template, locate, mark, and drill eleven 0.187-in. (4.75-mm) diameter holes through left rear floor panel (8) and insert panel (7).
13. Secure metal strip H (2) on left rear floor panel (8) and insert panel (7) with four rivets (4) and seven rivets (3).
14. Spot-paint insert panel (7) and left rear floor panel (8) (TM 43-0139).

33-12. LEFT REAR FLOOR PANEL REPAIR (Cont'd)



DRILL ELEVEN 0.187-INCH (4.75 MM)
DIAMETER HOLES



- FOLLOW-ON TASKS:
- Install left floor insulation (para. 10-31).
 - Install Transmission Control Module (TCM) (para. 4-45).
 - Install driver's seat assembly (para. 10-40).

33-13. RIGHT FRONT FLOOR PANEL REPAIR

This Task Covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Right Front Insert Panel Fabrication b. Metal Strips Fabrication c. Right Front Floor Panel Removal d. Metal Strip A and Insert Panel Assembly e. Metal Strip B and Insert Panel Assembly | <ul style="list-style-type: none"> f. Metal Strip C and Insert Panel Assembly g. Right Front Floor Panel and Battery Tray Drilling h. Right Front Floor Panel and Insert Panel Drilling i. Battery Tray Panel and Right Front Floor Panel Installation j. Insert Panel and Right Front Floor Panel Installation |
|--|--|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool set:
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)
 Shop equipment, automotive maintenance
 and repair: field maintenance, wheeled
 vehicles, Post, Camp and Station, set A
 (Appendix B, Item 10)

Manual References

TM 9-2320-387-24P
 TM 43-0139

Materials/Parts

Ninety-four rivets (Appendix G, Item 335)
 Fifteen rivets (Appendix G, Item 347.2)
 Adhesive (Appendix C, Item 2.1)
 Adhesive sealant (Appendix C, Item 7.1)
 Front battery holddown bracket
 (Appendix G, Item 9.1)
 Rear battery holddown bracket
 (Appendix G, Item 9.2)
 Battery tray panel (Appendix G, Item 465.2)
 Sheet metal (Appendix G, Item 439.1)

Equipment Condition

- Battery tray removed (para. 4-75).
- Right front floor insulation removed (para 10-32).

Maintenance Level

General Support

NOTE

All dimensions are in inches. For Metric conversion, see chart.

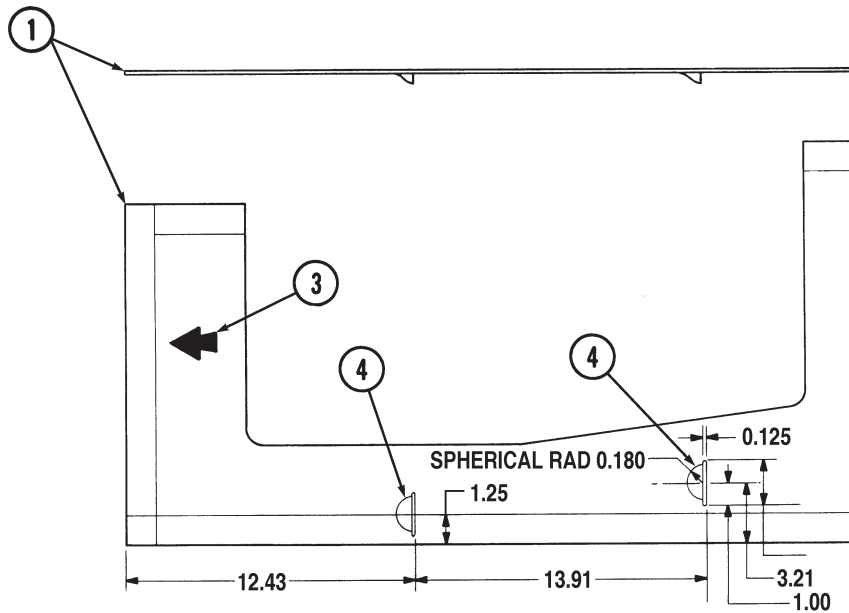
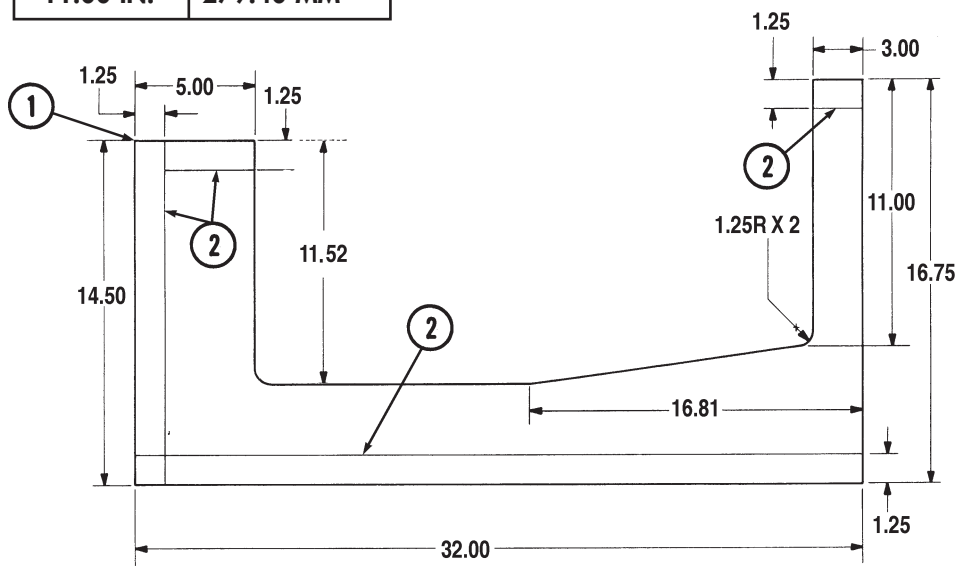
a. Right Front Insert Panel Fabrication

1. Cut insert panel (1) from sheet metal, and mark four reference lines (2) and directional arrow (3) on insert panel (1).
2. Fabricate two drain holes (4) in insert panel (1).
3. Remove all burrs and round all sharp edges of insert panel (1).

33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.180 IN.	4.572 MM
1.00 IN.	25.40 MM
1.25 IN.	31.75 MM
3.00 IN.	76.20 MM
3.21 IN.	81.53 MM
5.00 IN.	127.00 MM
11.00 IN.	279.40 MM

METRIC CONVERSION	
11.52 IN.	292.61 MM
12.43 IN.	315.72 MM
13.91 IN.	353.31 MM
14.50 IN.	368.30 MM
16.75 IN.	425.45 MM
16.81 IN.	426.97 MM
32.00 IN.	812.80 MM



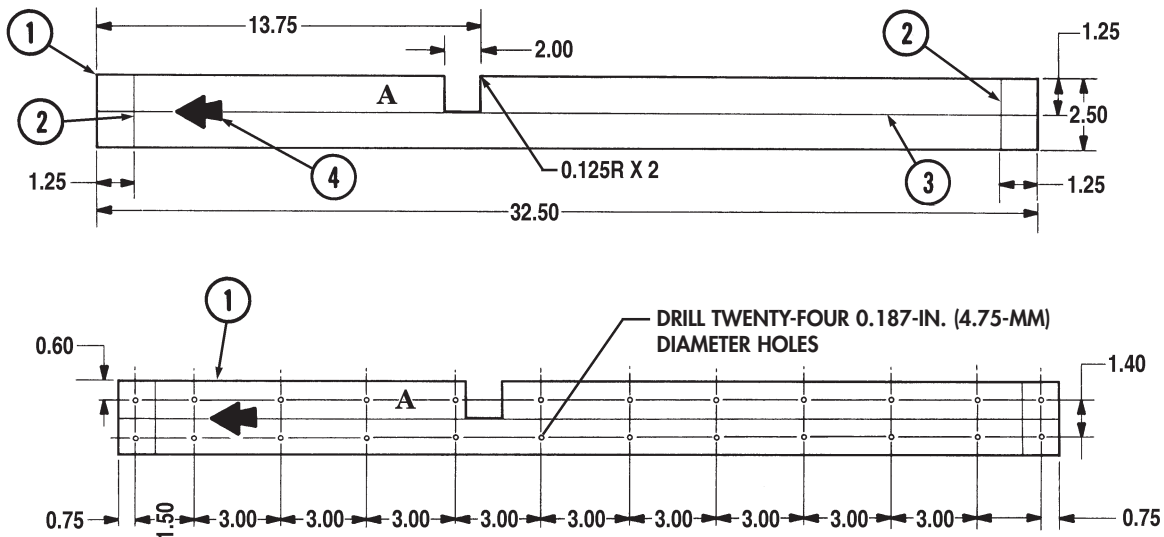
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

b. Metal Strips Fabrication

1. Cut metal strip (1) from sheet metal, and mark two reference lines (2), centerline (3), and directional arrow (4). Identify metal strip (1) as A.
2. Locate, mark, and drill twenty-four 0.187-in. (4.75-mm) diameter holes through metal strip A (1).
3. Cut metal strip (5) from sheet metal, and mark two centerlines (6), and directional arrow (7). Identify metal strip (5) as B.
4. Locate, mark, and drill twenty 0.187-in. (4.75-mm) diameter holes in metal strip B (5).
5. Cut metal strip (8) from sheet metal, and mark two centerlines (9) and directional arrow (10). Identify metal strip (8) as C.
6. Locate, mark, and drill eighteen 0.187-in. (4.75-mm) diameter holes through metal strip C (8).

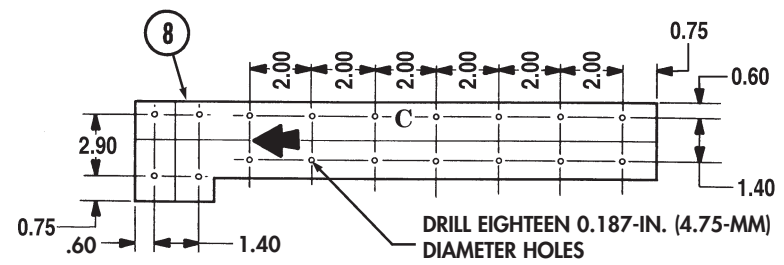
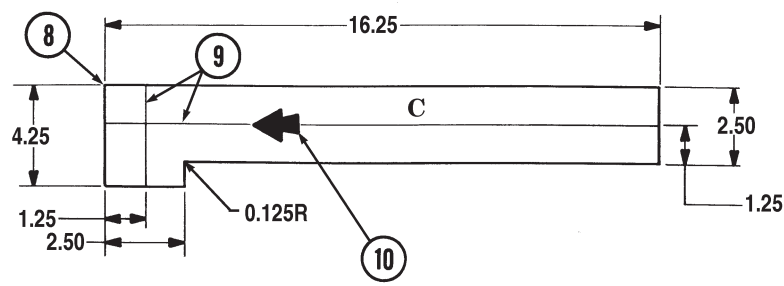
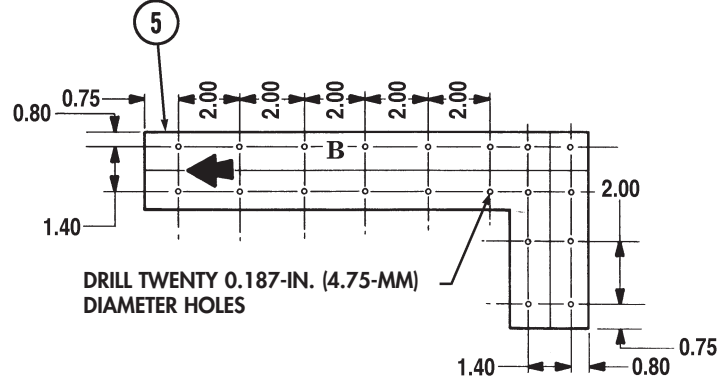
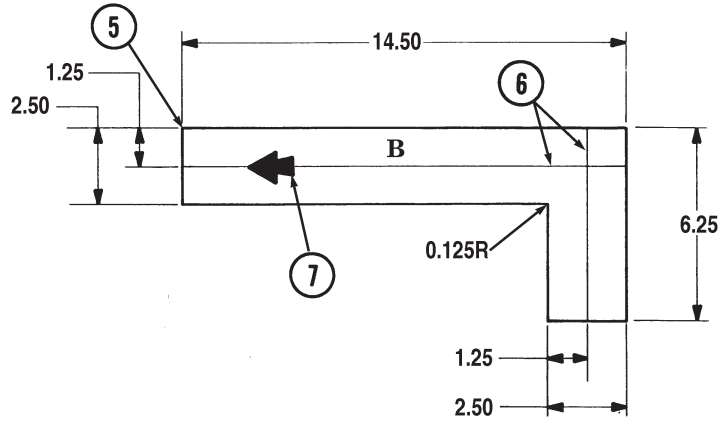
METRIC CONVERSION	
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.50 IN.	38.10 MM.

METRIC CONVERSION	
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
3.00 IN.	76.20 MM
13.75 IN.	349.25 MM
32.50 IN.	825.50 MM



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

METRIC CONVERSION	
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
0.80 IN.	20.32 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
2.90 IN.	73.66 MM
4.25 IN.	107.95 MM
6.25 IN.	158.75 MM
14.50 IN.	368.30 MM
16.25 IN.	412.75 MM



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

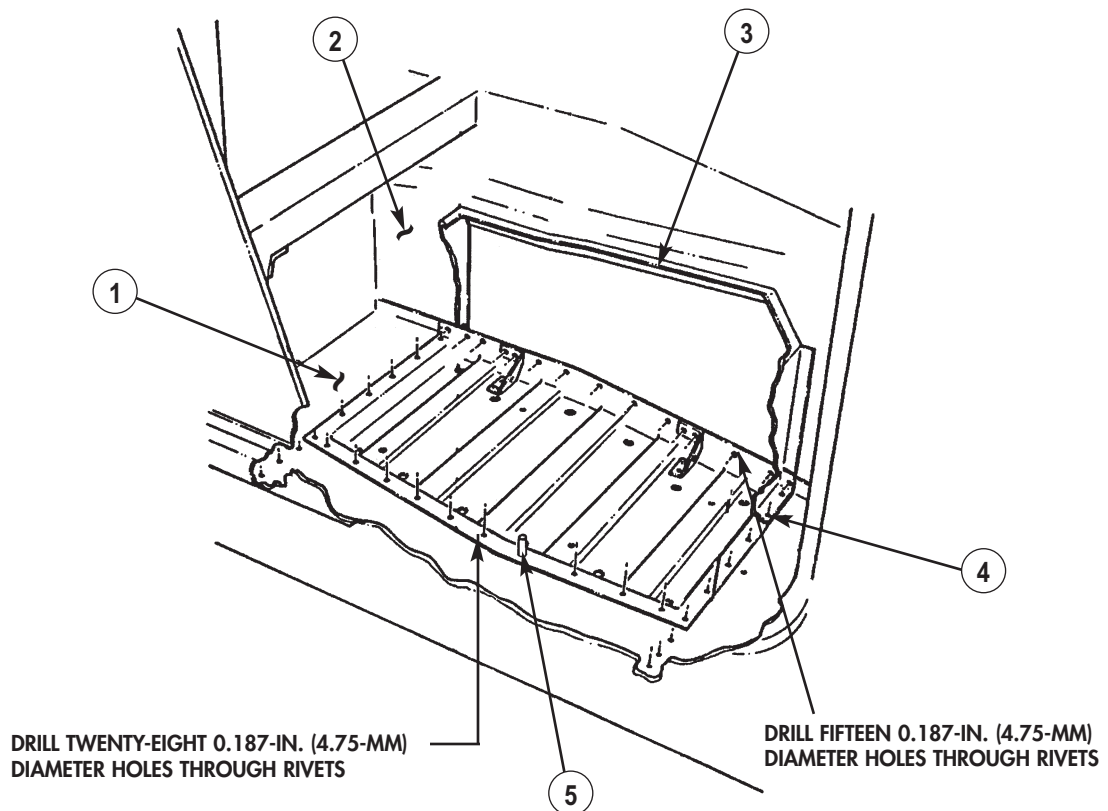
c. Right Front Floor Panel Removal

1. Using a 0.187-in. (4.75-mm) drill bit, remove twenty-eight rivets (5) from right front seat support (3), battery tray (4), and right front floor panel (1).
2. Using a 0.187-in. (4.75-mm) drill bit, remove fifteen rivets (5) from battery tray (4) and tunnel (2).
3. Position insert panel (6), with arrow facing down and toward front of vehicle, to underside of right front floor panel (1) and align to battery tray (4).
4. Using insert panel (6) as a template, scribe an outline (8) on right front floor panel (1).

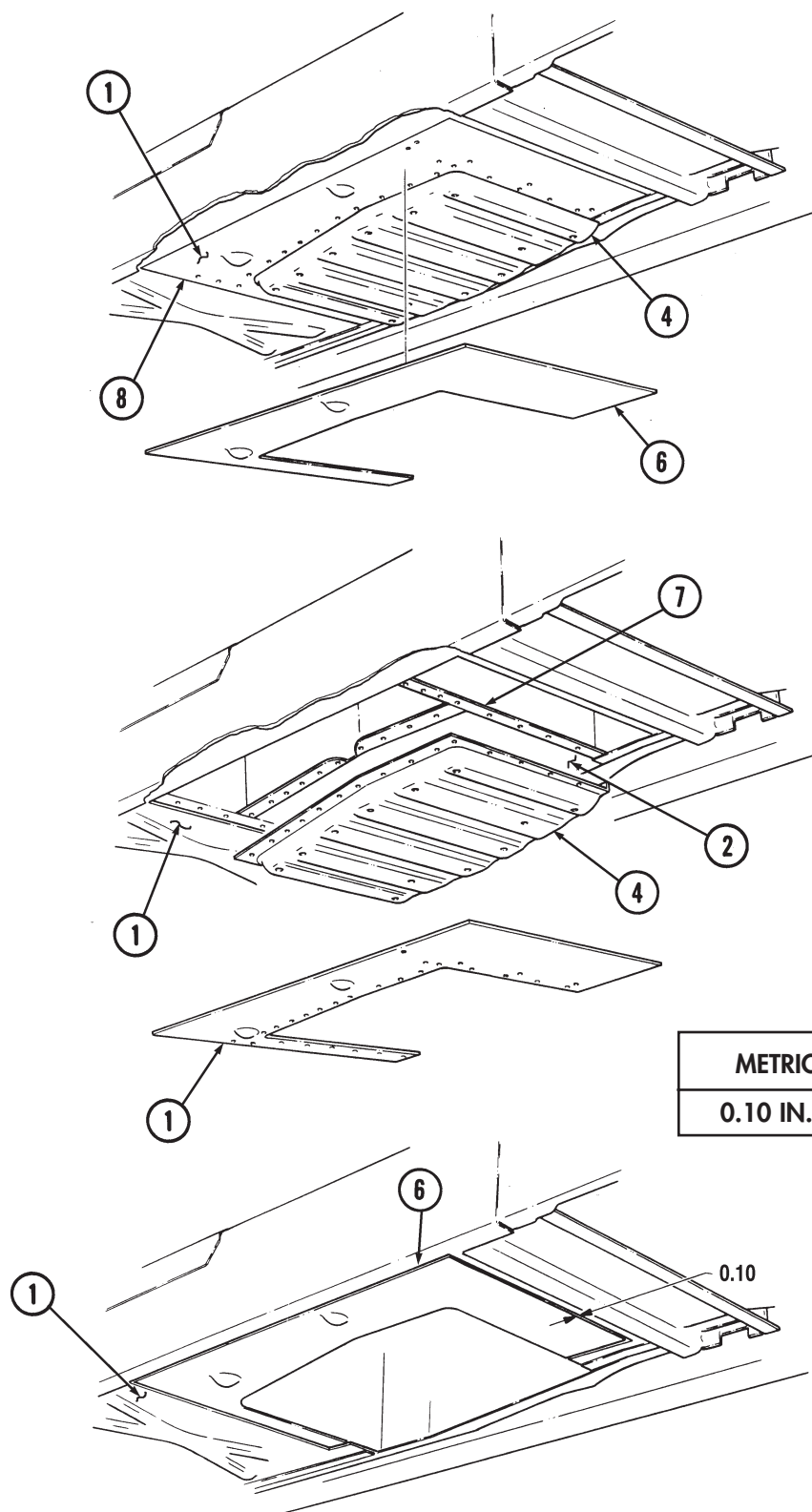
NOTE

Do not cut through front seat support when removing right front panel section.

5. Using scribed outline (8), cut and remove right front floor panel (1).
6. Remove battery tray (4).
7. Remove sharp edges and burrs on right front floor panel (1).
8. Remove any adhesive residue and clean left front seat support (7) and tunnel (2).
9. Position insert panel (6), with arrow facing down and toward front of vehicle, to underside of right front floor panel (1).
10. Obtain a minimum clearance of 0.10-in. (2.54-mm) between edges of insert panel (6) and right front floor panel (1).
11. Remove insert panel (6).



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

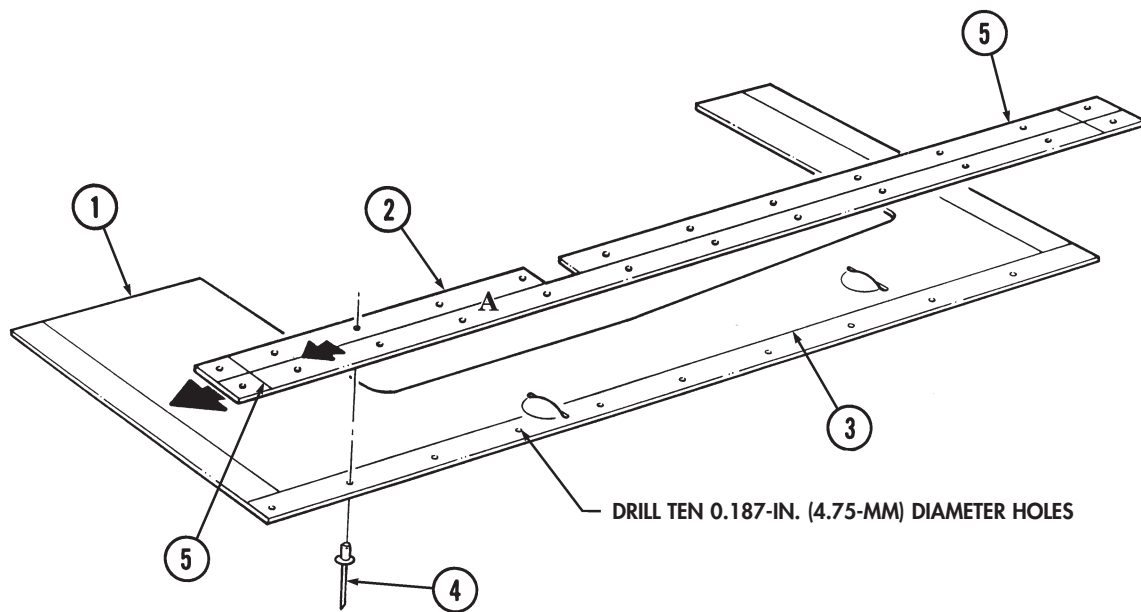


METRIC CONVERSION	
0.10 IN.	2.54 MM

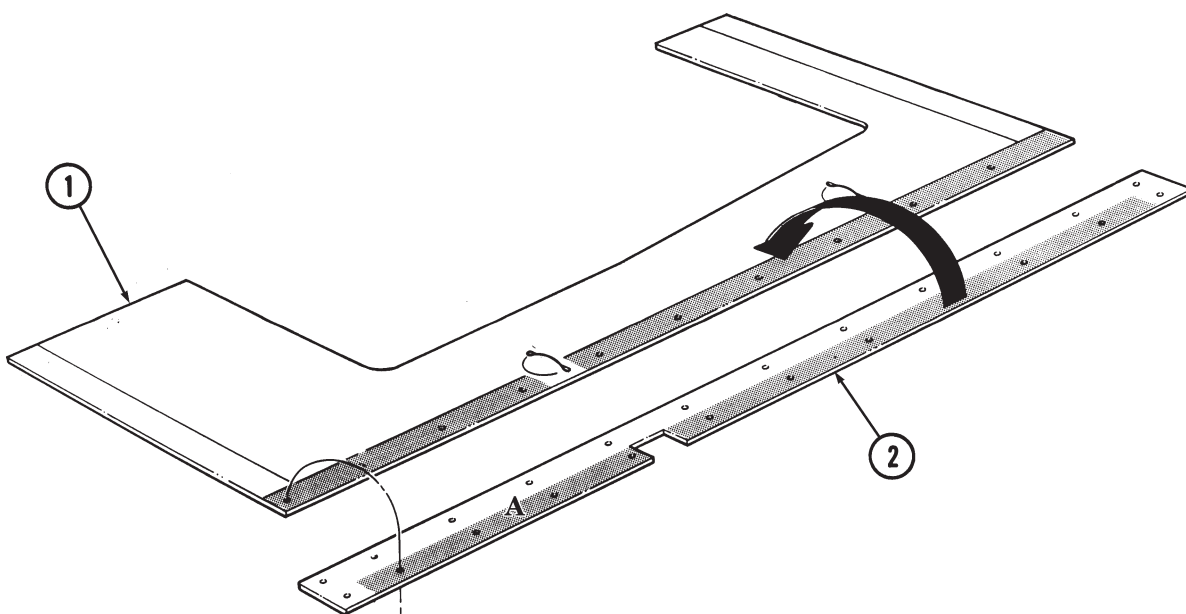
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

d. Metal Strip A and Insert Panel Assembly

1. Position metal strip A (2), with arrow facing up and toward left, on insert panel (1). Align reference line (3) with edge of metal strip A (2) and reference lines (5) with edge of insert panel (1).
2. Using metal strip A (2) as a template, locate, mark, and drill ten 0.187-in. (4.75-mm) diameter holes through insert panel (1). Remove metal strip A (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip A (2).
4. Position metal strip A (2) on insert panel (1) and install with ten rivets (4).
5. Remove any adhesive residue and clean edges of metal strip A (2) and insert panel (1).



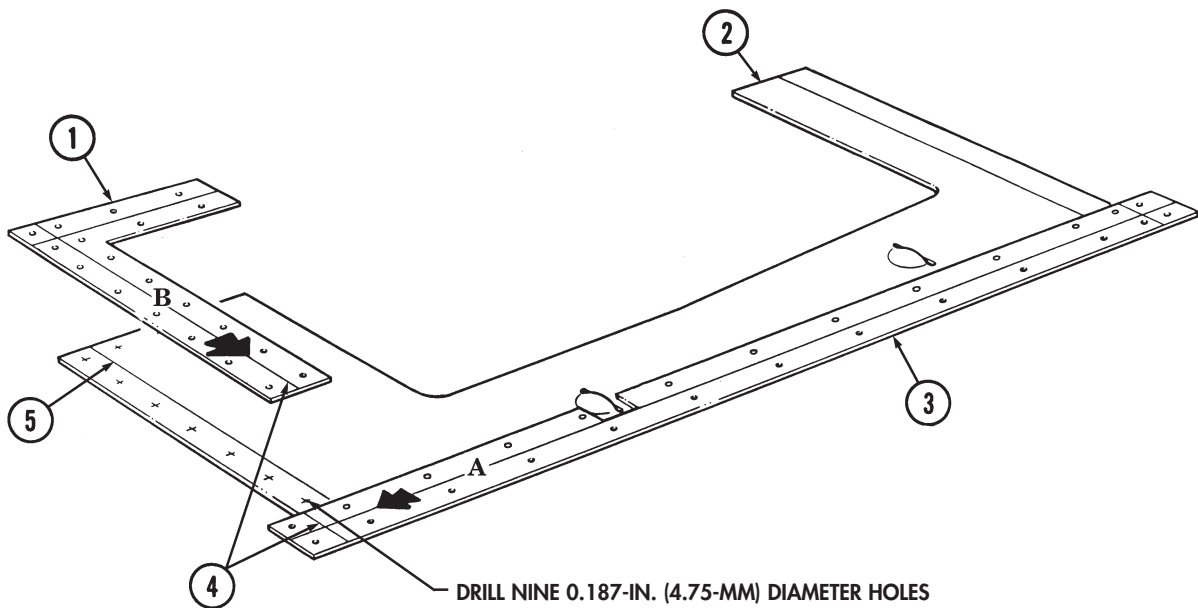
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)



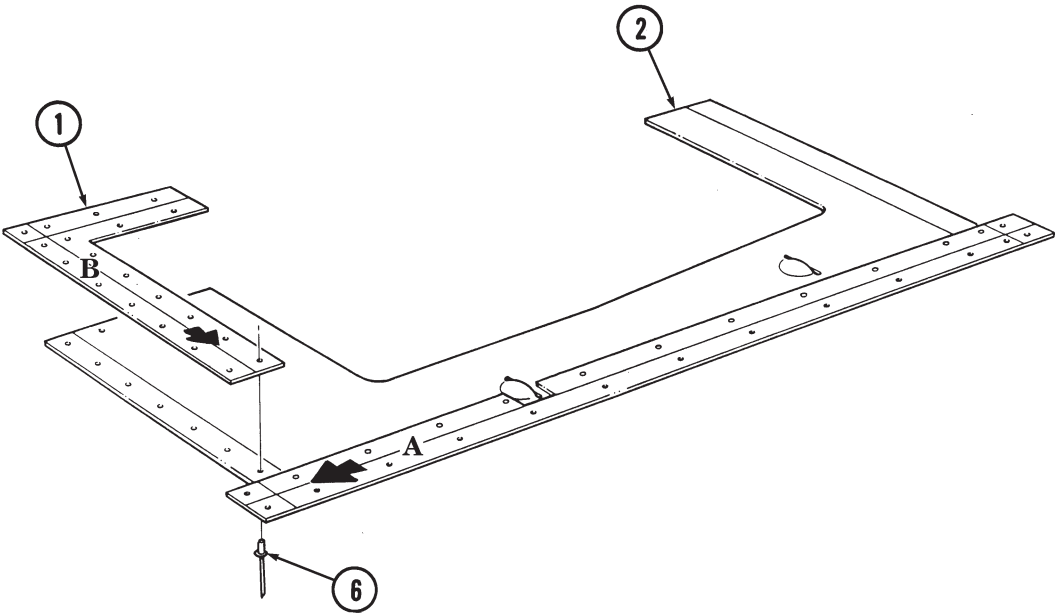
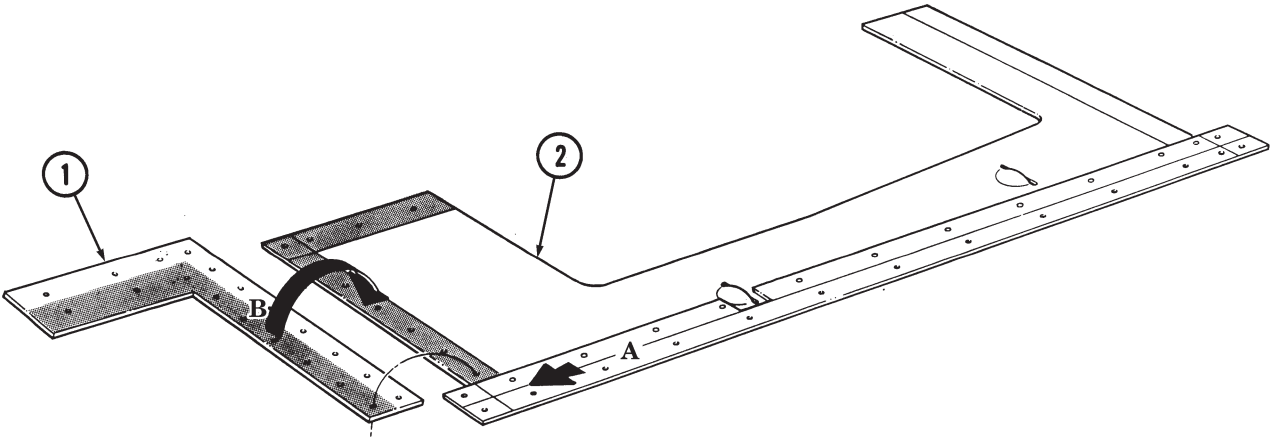
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

e. Metal Strip B and Insert Panel Assembly

1. Position metal strip B (1), with arrow facing up and toward metal strip A (3), on insert panel (2). Align reference lines (4) on metal strips A (3) and B (1) and line (5) with edge of metal strip B (1).
2. Using metal strip B (1) as a template, locate, mark, and drill nine 0.187-in. (4.75-mm) diameter holes through insert panel (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip B (1).
4. Position metal strip B (1) on insert panel (2) and install with nine rivets (6).
5. Remove any adhesive residue and clean edges of metal strip B (1) and insert panel (2).



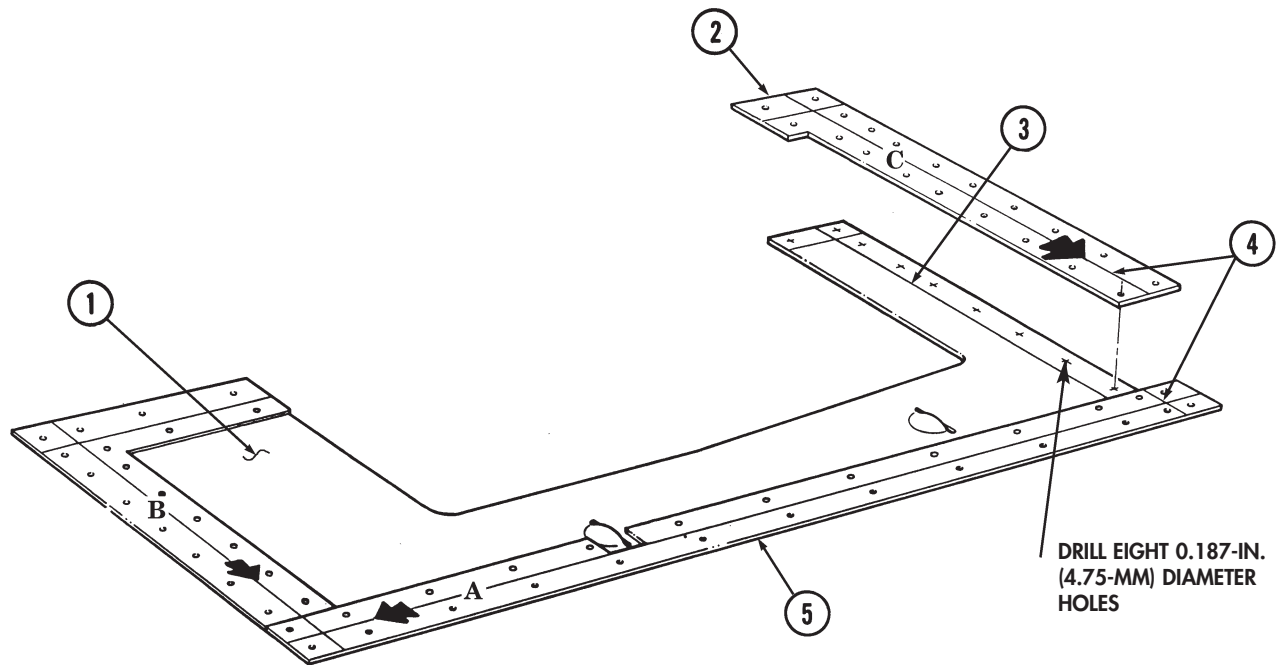
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)



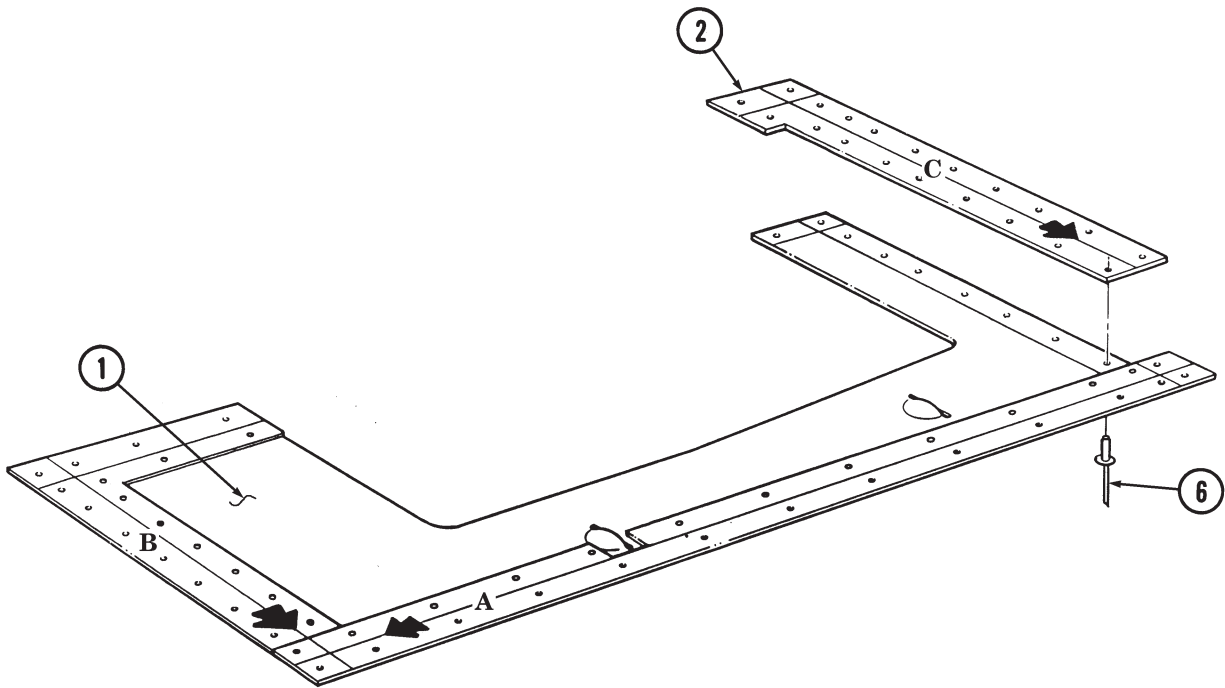
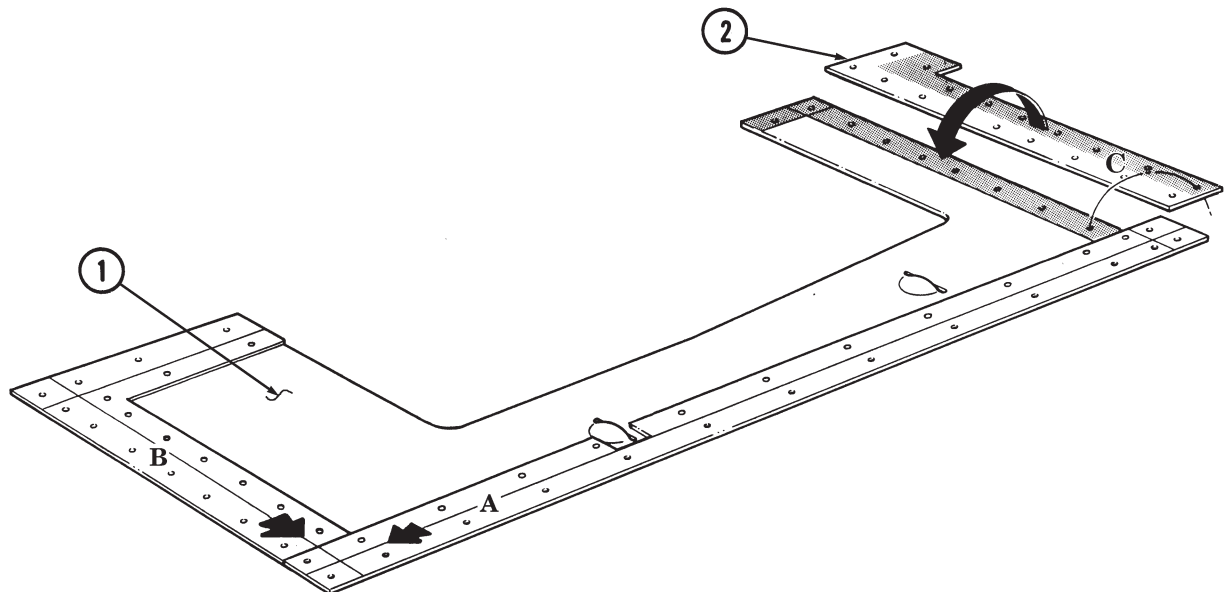
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

f. Metal Strip C and Insert Panel Assembly

1. Position metal strip C (2), with arrow facing up and toward metal strip A (5), on insert panel (1). Align reference lines (4) of metal strip A (5) and C (2) and line (3) with edge of metal strip C (2).
2. Using metal strip C (2) as a template, locate, mark, and drill eight 0.187-in. (4.75-mm) diameter holes through insert panel (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip C (2).
4. Position metal strip C (2) on insert panel (1) and install with eight rivets (6).
5. Remove any adhesive residue and clean edges of metal strip C (2) and insert panel (1).



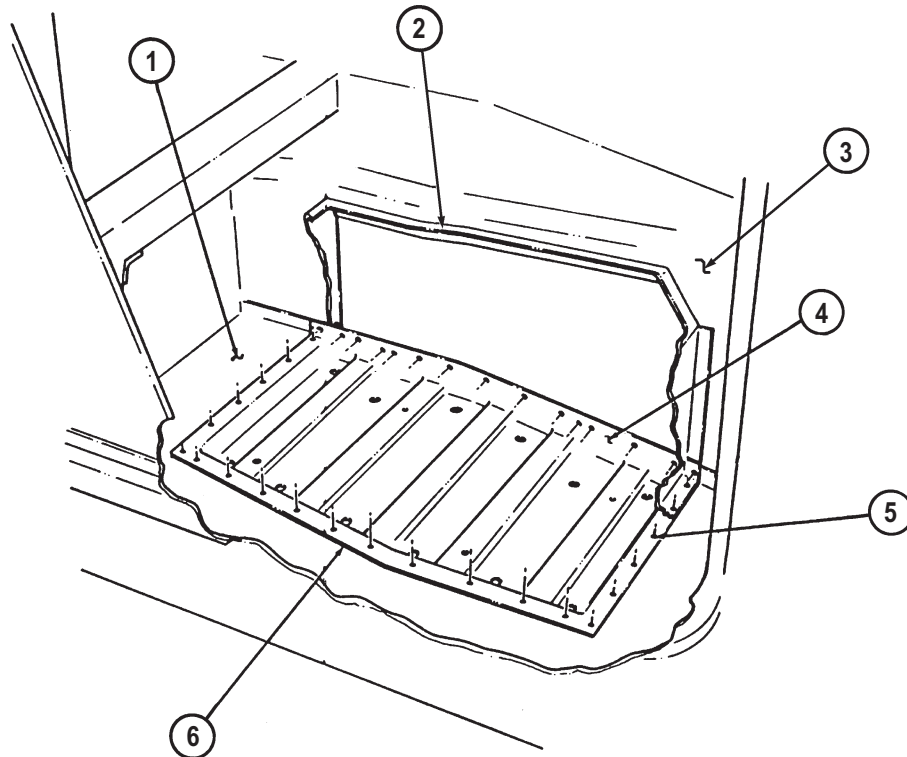
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

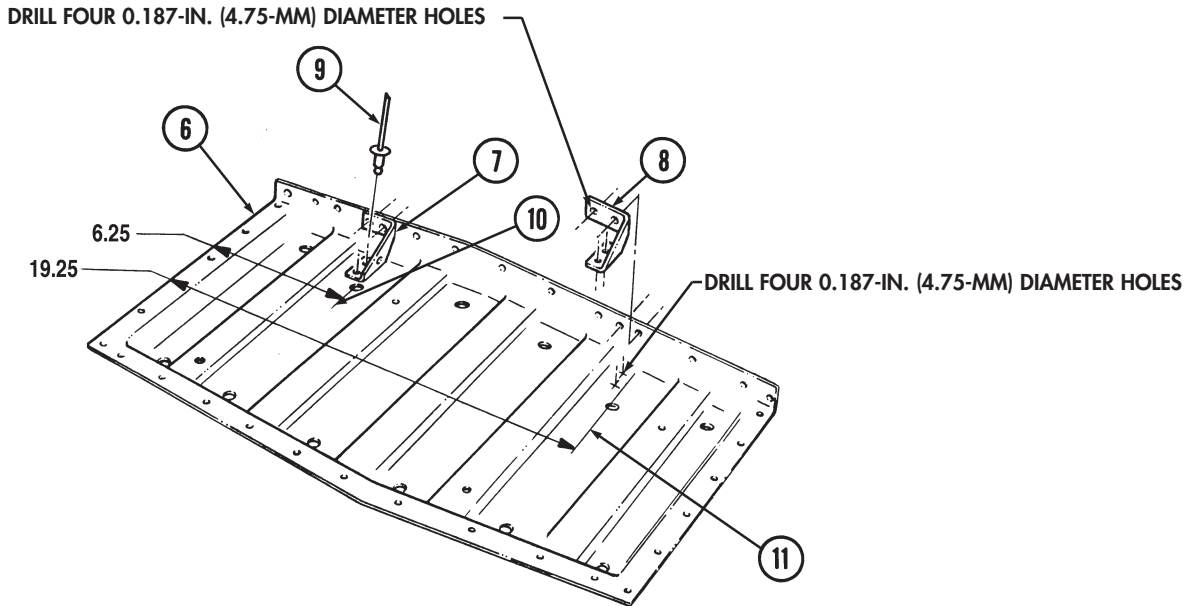
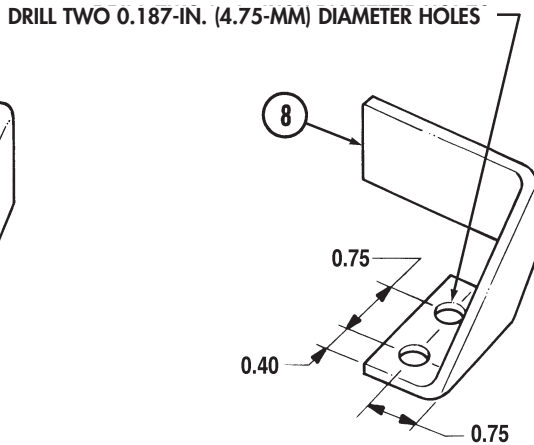
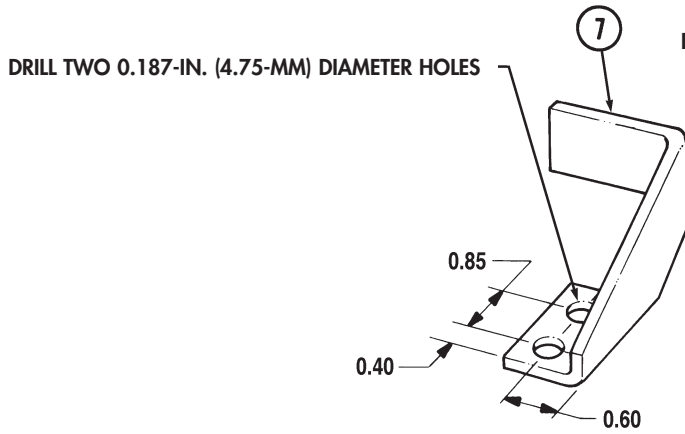
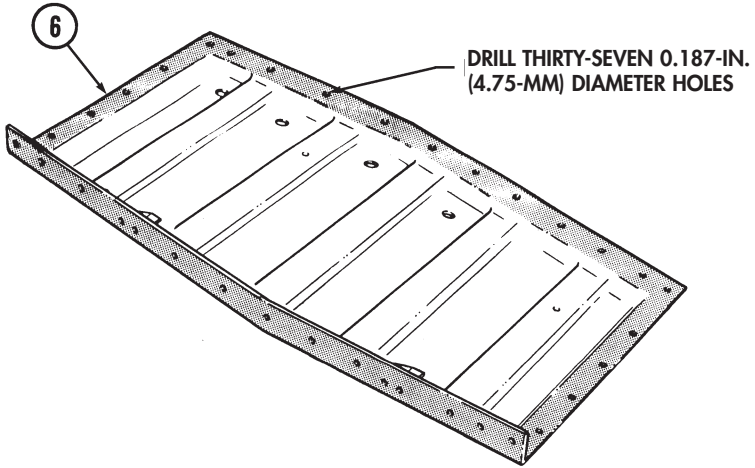
g. Right Front Floor Panel and Battery Tray Drilling

1. Position battery tray panel (6) on underside of right front floor panel (1), right front seat support (2), and tunnel (3).
2. Using right front seat support (2) as a template, mark twenty-two hole locations (5) on battery tray panel (6).
3. Using right tunnel (3) as a template, mark fifteen hole locations (4) on battery tray panel (6).
4. Drill thirty-seven 0.187-in. (4.75-mm) diameter holes, marked in steps 2 and 3, through battery tray panel (6).
5. Locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through holddown bracket (7).
6. Locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through holddown bracket (8).
7. Mark reference lines (10) and (11) on battery tray panel (6).
8. Position holddown bracket (8) to reference line (11) on battery tray panel (6).
9. Using holddown bracket (8) as a template, locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through battery tray panel (6).
10. Install holddown bracket (8) on battery tray panel (6) with two rivets (9).
11. Using battery tray panel (6) as a template, locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through holddown bracket (8).
12. Position holddown bracket (7) to reference line (10) on battery tray panel (6).
13. Using holddown bracket (7) as a template, locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through battery tray panel (6).
14. Install holddown bracket (7) on battery tray panel (6) with two rivets (9).
15. Using battery tray panel (6) as a template, locate, mark, and drill two 0.187-in. (4.75-mm) diameter holes through holddown bracket (7).



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

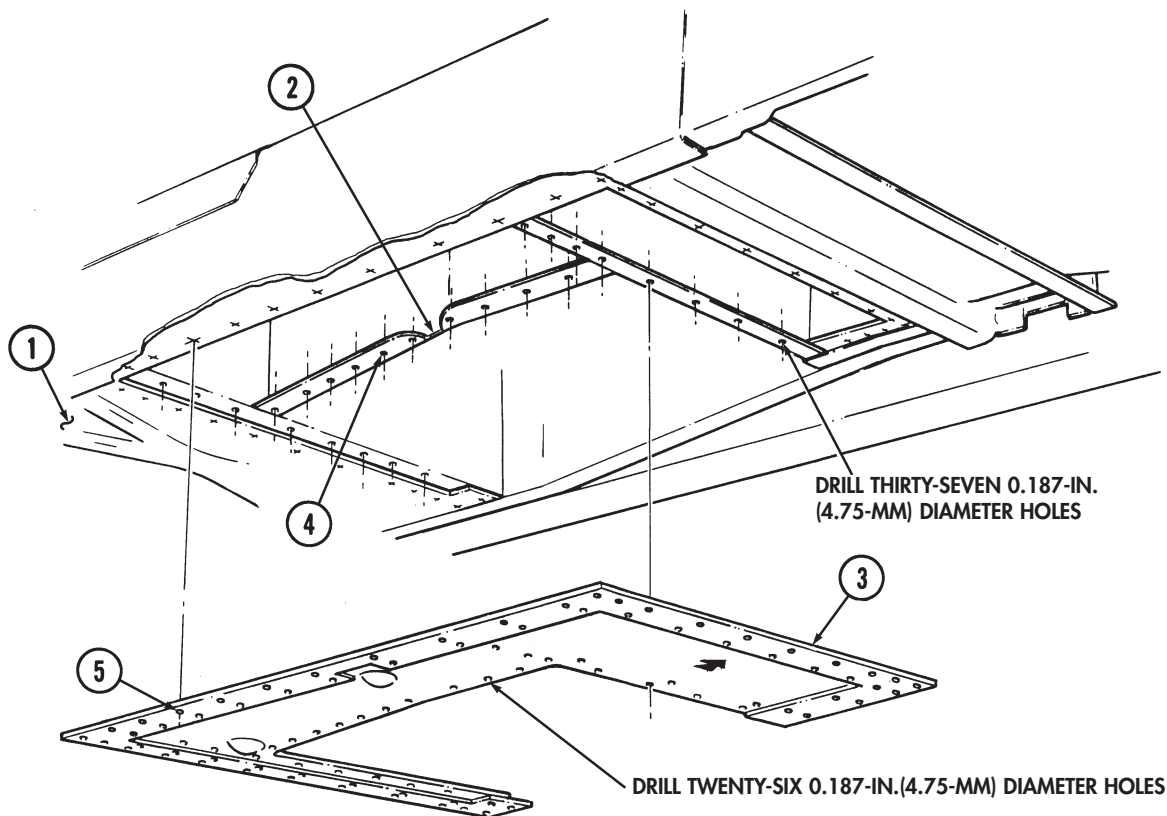
METRIC CONVERSION	
0.40 IN.	10.16 MM
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
0.85 IN.	21.59 MM
6.25 IN.	158.75 MM
19.25 IN.	488.95 MM



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

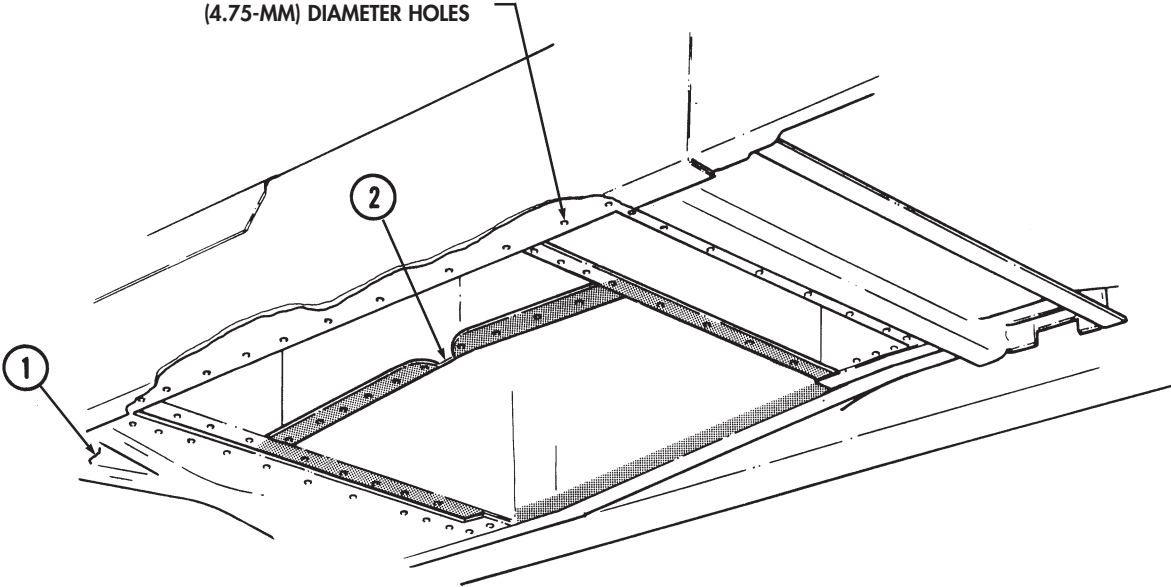
h. Right Front Floor Panel and Insert Panel Drilling

1. Position insert panel (3) on underside of right front floor panel (1) with arrow facing down and toward front of vehicle.
2. Using right front seat support (2) as a template, mark twenty-six hole locations (4) on insert panel (3).
3. Using insert panel (3) as a template, mark thirty-seven hole locations (5) on underside of right front floor panel (1).
4. Remove insert panel (3) from right front floor panel (1) and place on suitable work surface.
5. Drill thirty-seven 0.187-in. (4.75-mm) diameter holes, marked in step 3, through underside of right front floor panel (1).
6. Drill twenty-six 0.187-in. (4.75-mm) diameter holes, marked in step 2, through insert panel (3).

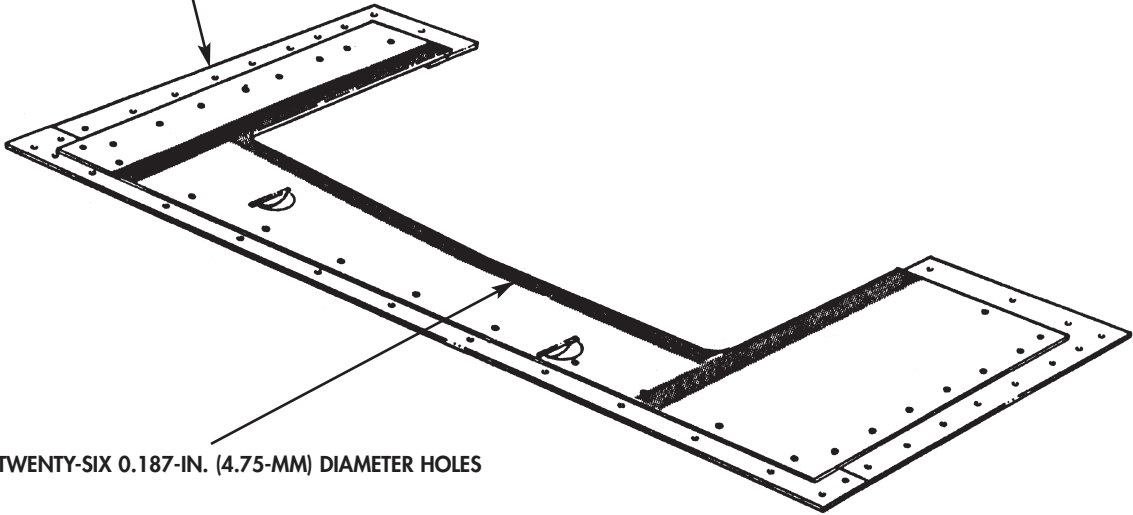


33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

DRILL THIRTY-SEVEN 0.187-IN.
(4.75-MM) DIAMETER HOLES



3

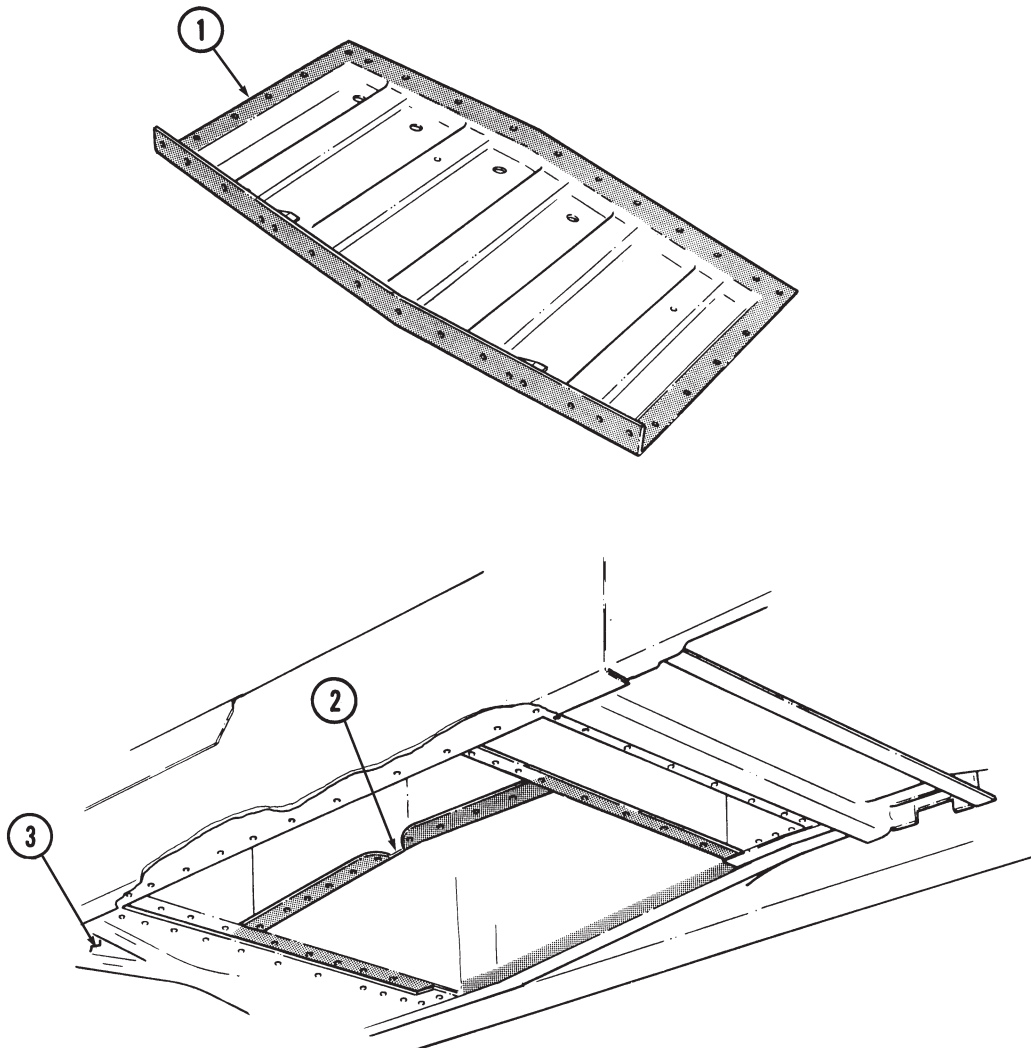


DRILL TWENTY-SIX 0.187-IN. (4.75-MM) DIAMETER HOLES

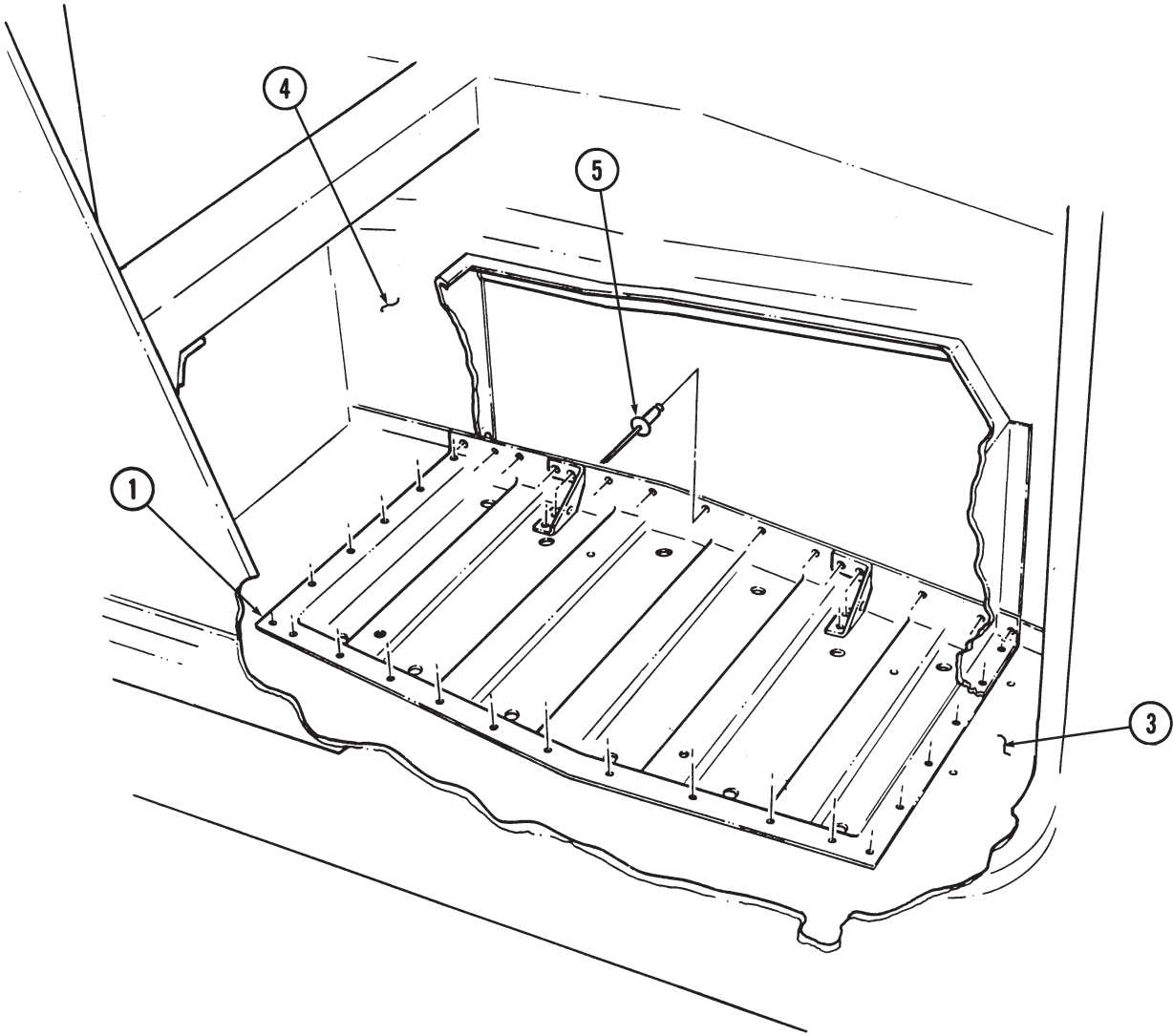
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

i. Battery Tray Panel and Right Front Floor Panel Installation

1. Place battery tray panel (1) on a suitable work surface.
2. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded area on battery tray panel (1).
3. Apply adhesive sealant to shaded area on underside of right front seat support (2).
4. Position battery tray panel (1) on underside of right front floor panel (3).
5. Install battery tray panel (1) on tunnel (4) with fifteen rivets (5).



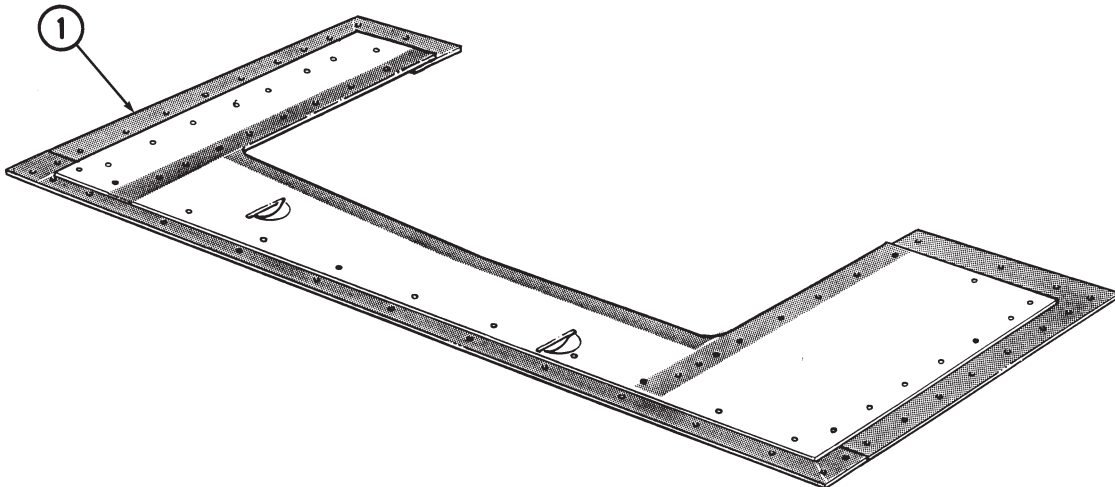
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)



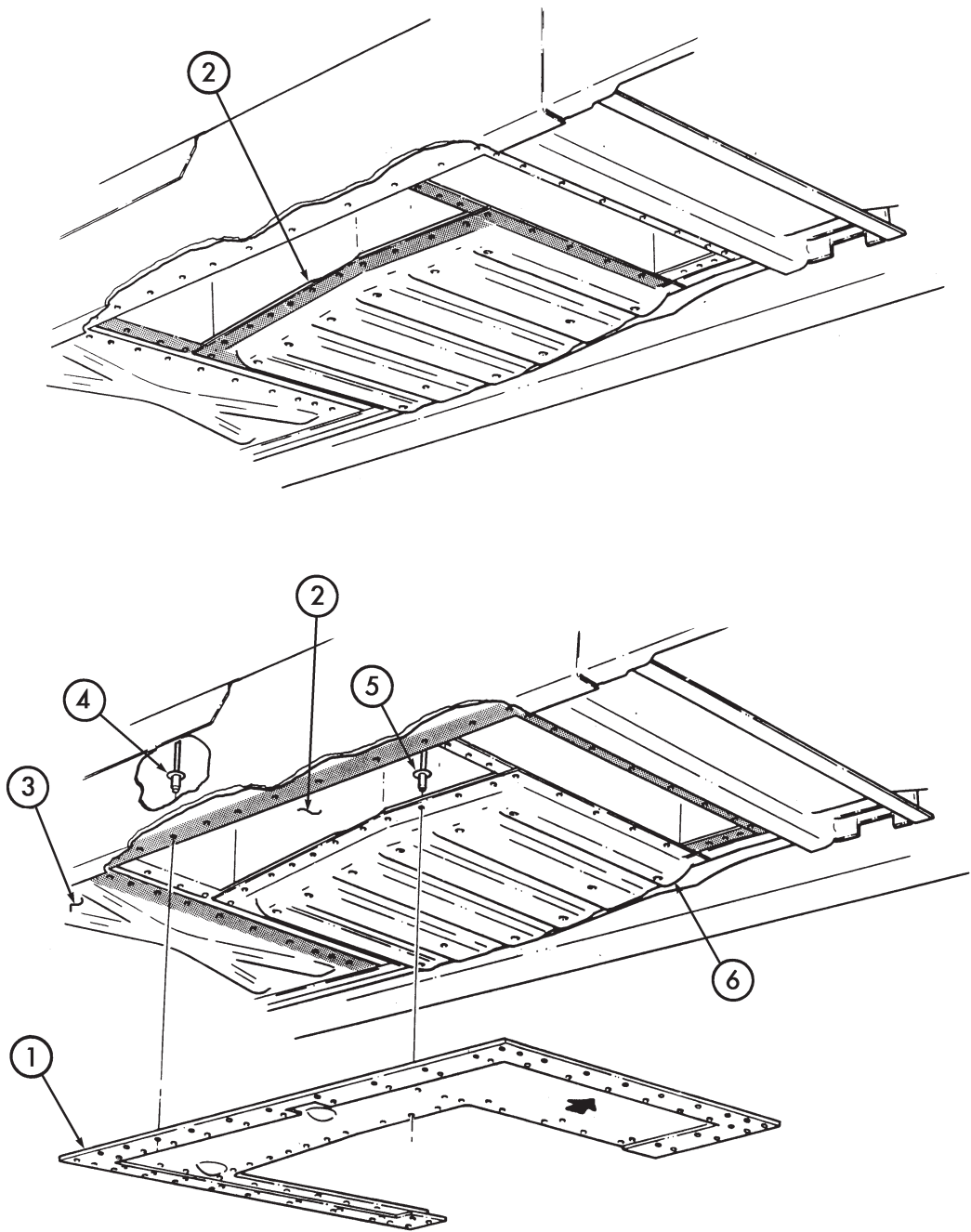
33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)

j. Insert Panel and Right Front Floor Panel Installation

1. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded area of insert panel (1).
2. Apply adhesive sealant to shaded area on underside of right front seat support (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded area on underside of right front panel (3).
4. Position insert panel (1) on underside of right front floor panel (3) with arrow facing down and toward front of vehicle.
5. Install insert panel (1) on right front seat support (2) and battery tray panel (6) with twenty-six rivets (5).
6. Secure insert panel (1) on right front floor panel (3) with thirty-seven rivets (4).
7. Spot-paint insert panel (1), battery tray panel (6), right front floor panel (3), and right front seat support (2). (Refer to TM 43-0139.)



33-13. RIGHT FRONT FLOOR PANEL REPAIR (Cont'd)



- FOLLOW-ON TASKS:
- Install right floor insulation (para. 10-32).
 - Install battery tray (para. 4-75).

33-14. RIGHT REAR FLOOR PANEL REPAIR

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Right Rear Insert Panel Fabrication b. Reinforcement Strips Fabrication c. Metal Strips Fabrication d. Right Rear Floor Panel Removal e. Reinforcement Strip A and Insert Panel Assembly f. Reinforcement Strip B and Insert Panel Assembly | <ul style="list-style-type: none"> g. Metal Strip C and Insert Panel Assembly h. Metal Strip E and Insert Panel Assembly i. Metal Strip D and Insert Panel Assembly j. Right Rear Floor Panel and Insert Panel Drilling k. Insert Panel and Right Rear Floor Panel Installation |
|---|--|

INITIAL SETUP:

Applicable Models

M1113

Tools

General mechanic's tool set
 automotive (Appendix B, Item 1)
 Riveter tool kit (Appendix B, Item 123)
 Shop equipment, automotive maintenance
 and repair: field maintenance, wheeled vehicles,
 Post, Camp and Station, set A (Appendix B,
 Item 10)

Manual References

TM 9-2320-387-24P
 TM 43-0139

Materials/Parts

Ninety-two rivets (Appendix G, Item 335)
 Thirty-two rivets (Appendix G, Item 347.2)
 Adhesive (Appendix C, Item 2.1)
 Adhesive sealant (Appendix C, Item 7.1)
 Sheet metal (Appendix G, Item 439.1)

Equipment Condition

Right rear floor insulation removed (para. 10-34).

Maintenance Level

General Support

NOTE

All dimensions are in inches. For Metric conversion, see chart.

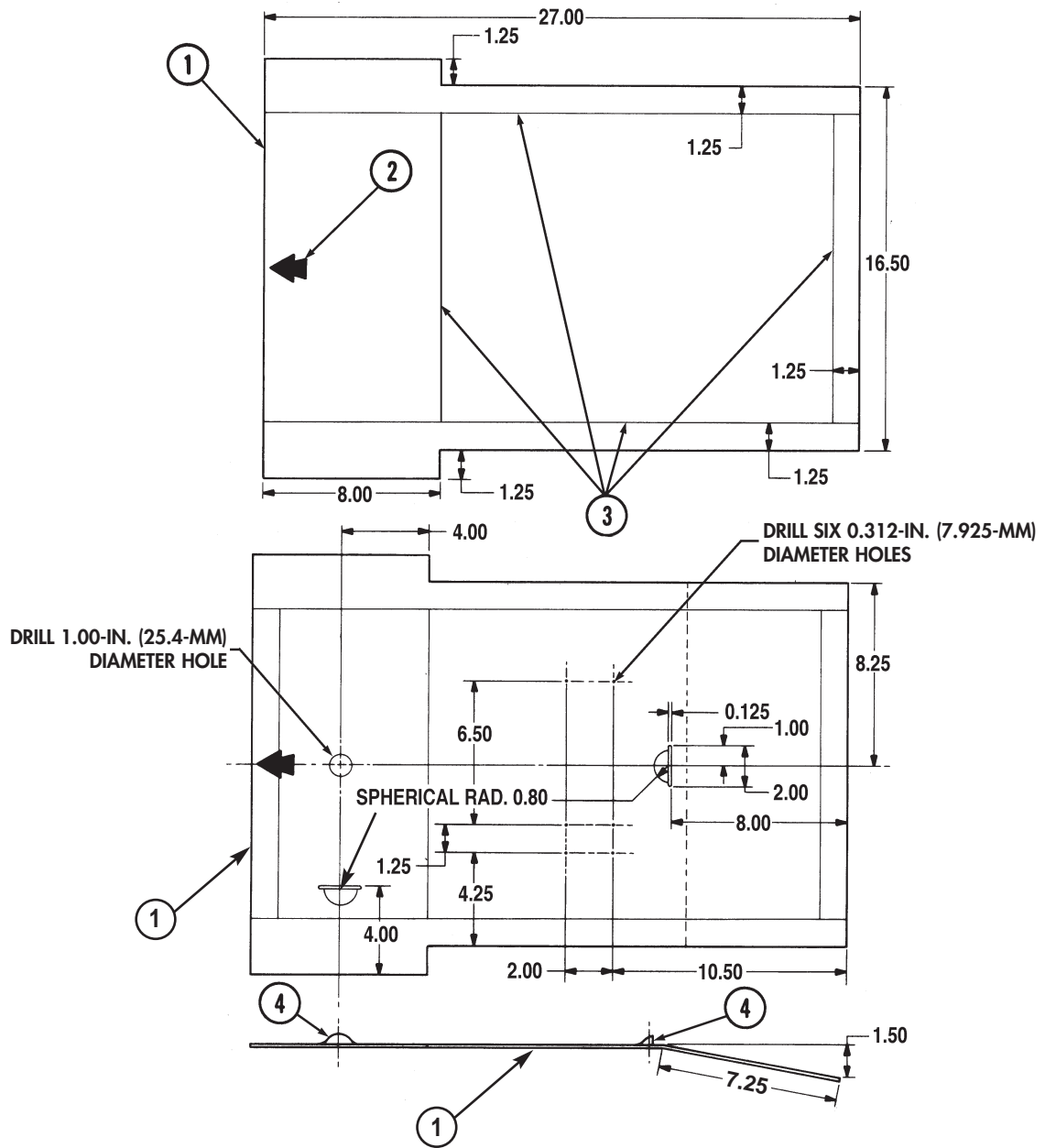
a. Right Rear Insert Panel Fabrication

1. Cut insert panel (1) from sheet metal, and mark four reference lines (3) and directional arrow (2) on insert panel (1).
2. Locate, mark, and drill six 0.312-in. (7.925-mm) diameter holes and one 1.00-in. (25.4-mm) diameter hole through insert panel (1).
3. Fabricate two drain holes (4) in insert panel (1).
4. Bend insert panel (1) 1.50-in. (38.10-mm).
5. Remove all burrs and round all sharp edges of insert panel (1).

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.80 IN.	20.32 MM
1.00 IN.	25.40 MM
1.25 IN.	31.75 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
4.00 IN.	101.60 MM
4.25 IN.	107.95 MM

METRIC CONVERSION	
6.50 IN.	165.10 MM
7.25 IN.	184.15 MM
8.00 IN.	203.20 MM
8.25 IN.	209.55 MM
10.50 IN.	266.70 MM
16.50 IN.	419.10 MM
27.00 IN.	685.80 MM

33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

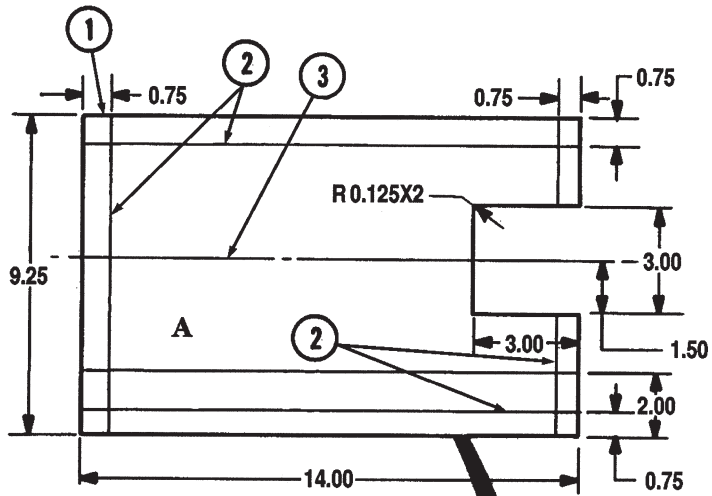


33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

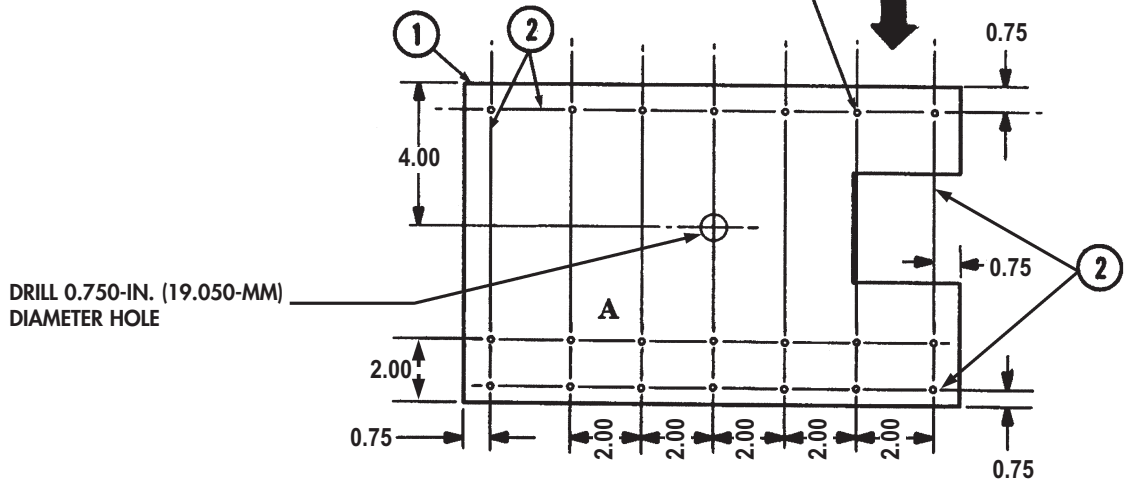
b. Reinforcement Strips Fabrication

1. Cut reinforcement strip (1) from sheet metal, and mark four reference lines (2), centerline (3), and identify as A on reinforcement strip (1).
2. Locate, mark, and drill twenty-one 0.187-in. (4.75-mm) diameter holes and a 0.750-in. (19.050-mm) diameter hole through reinforcement strip A (1).
3. Remove all burrs and round sharp edges of reinforcement strip A (1).
4. Cut reinforcement strip (4) from sheet metal, and mark four reference lines (5) and centerline (6). Identify reinforcement strip (1) as B.
5. Locate, mark, and drill eighteen 0.187-in. (4.75-mm) diameter holes and a 0.500-in. (12.700-mm) diameter hole through reinforcement strip B (4).
6. Remove all burrs and round sharp edges of reinforcement strip B (4).

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.75 IN.	19.05 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
3.00 IN.	76.20 MM
4.00 IN.	101.60 MM
9.25 IN.	234.95 MM
14.00 IN.	355.60 MM



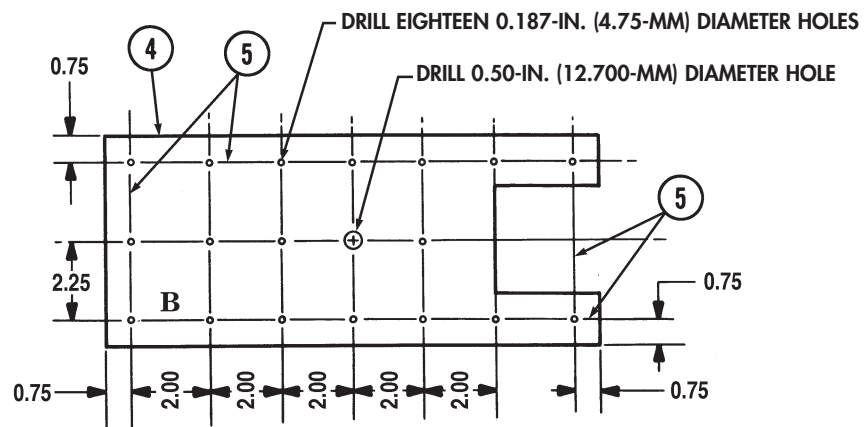
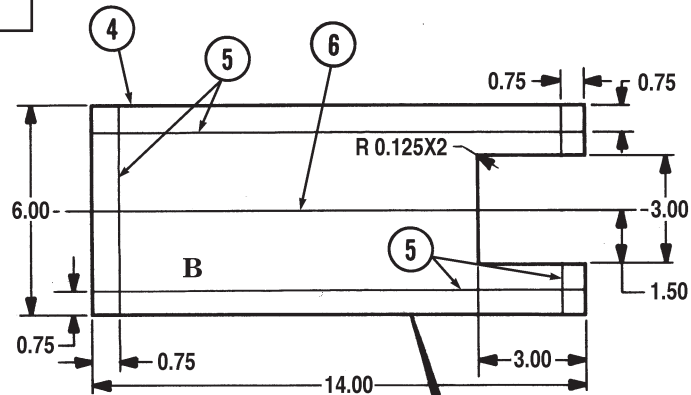
DRILL TWENTY-ONE 0.187-IN. (4.75-MM) DIAMETER HOLES



DRILL 0.750-IN. (19.050-MM) DIAMETER HOLE

33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

METRIC CONVERSION	
0.125 IN.	3.175 MM
0.75 IN.	19.05 MM
1.50 IN.	38.10 MM
2.00 IN.	50.80 MM
2.25 IN.	57.15 MM
3.50 IN.	76.20 MM
6.00 IN.	152.40 MM
14.00 IN.	355.60 MM



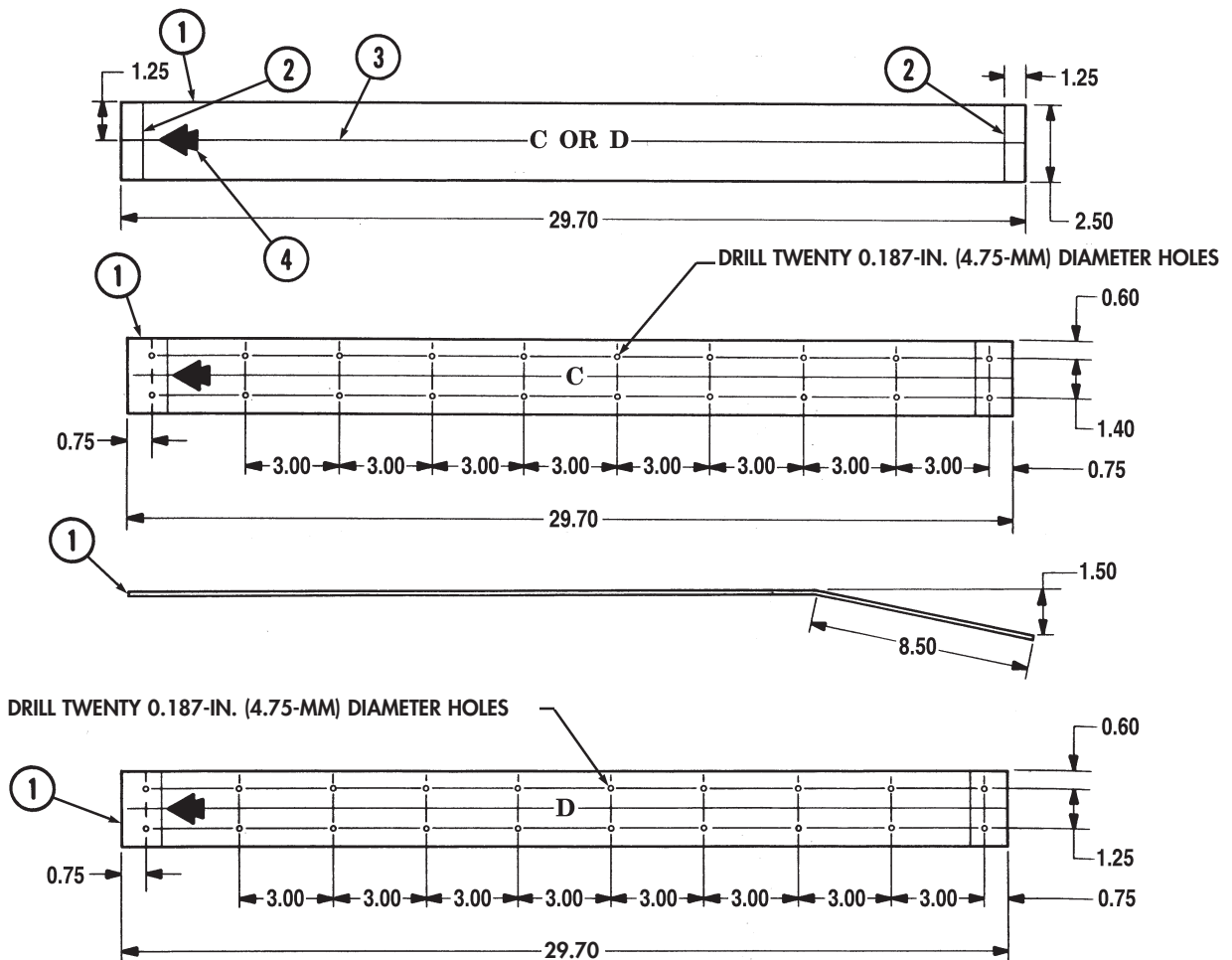
33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

c. Metal Strips Fabrication

1. Cut two metal strips (1) from sheet metal, and mark two reference lines (2), centerline (3), and directional arrow (4), and identify as metal strips C and D.
2. Locate, mark, and drill twenty 0.187-in. (4.75-mm) diameter holes through metal strip C (1).
3. Bend metal strip C (1) 1.50-in. (38.10-mm).
4. Locate, mark, and drill twenty 0.187-in. (4.75-mm) diameter holes through metal strip D (1).
5. Bend metal strip D (1) 1.50-in. (38.10-mm).

METRIC CONVERSION	
0.60 IN.	15.24 MM
0.75 IN.	19.05 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.50 IN.	38.10 MM

METRIC CONVERSION	
2.50 IN.	63.50 MM
3.50 IN.	76.20 MM
8.50 IN.	215.90 MM
29.70 IN.	754.38 MM

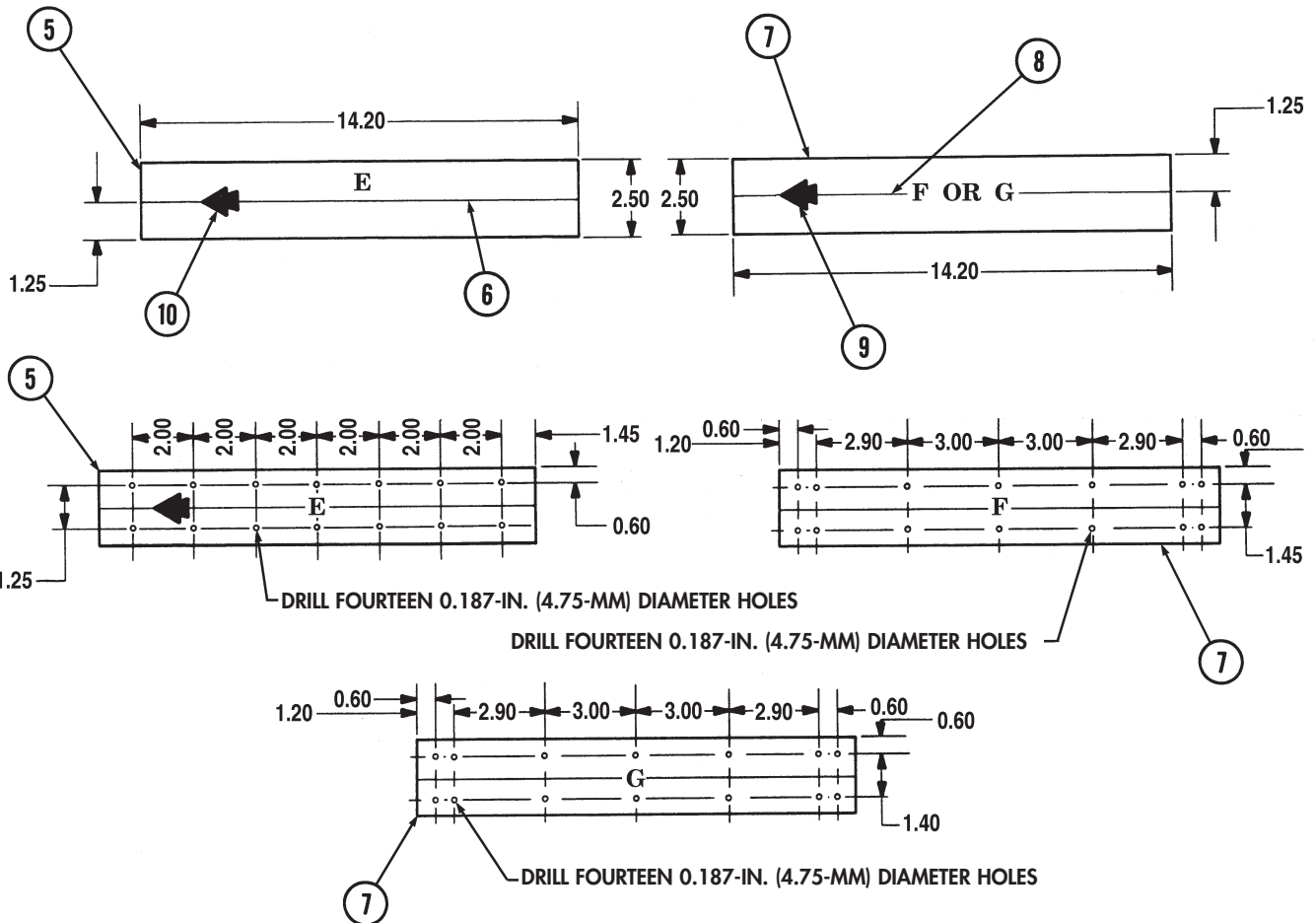


33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

6. Cut metal strip (5) from sheet metal, and mark center line (6) and directional arrow (10). Identify metal strip (5) as E.
7. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes in metal strip E (5).
8. Cut two metal strips (7) from sheet metal, and mark center line (8), and directional arrow (9). Identify metal strips (7) as F and G.
9. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes in metal strip F (7).
10. Locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes in metal strip G (7).

METRIC CONVERSION	
0.60 IN.	15.24 MM
1.20 IN.	30.48 MM
1.25 IN.	31.75 MM
1.40 IN.	35.56 MM
1.45 IN.	36.83 MM

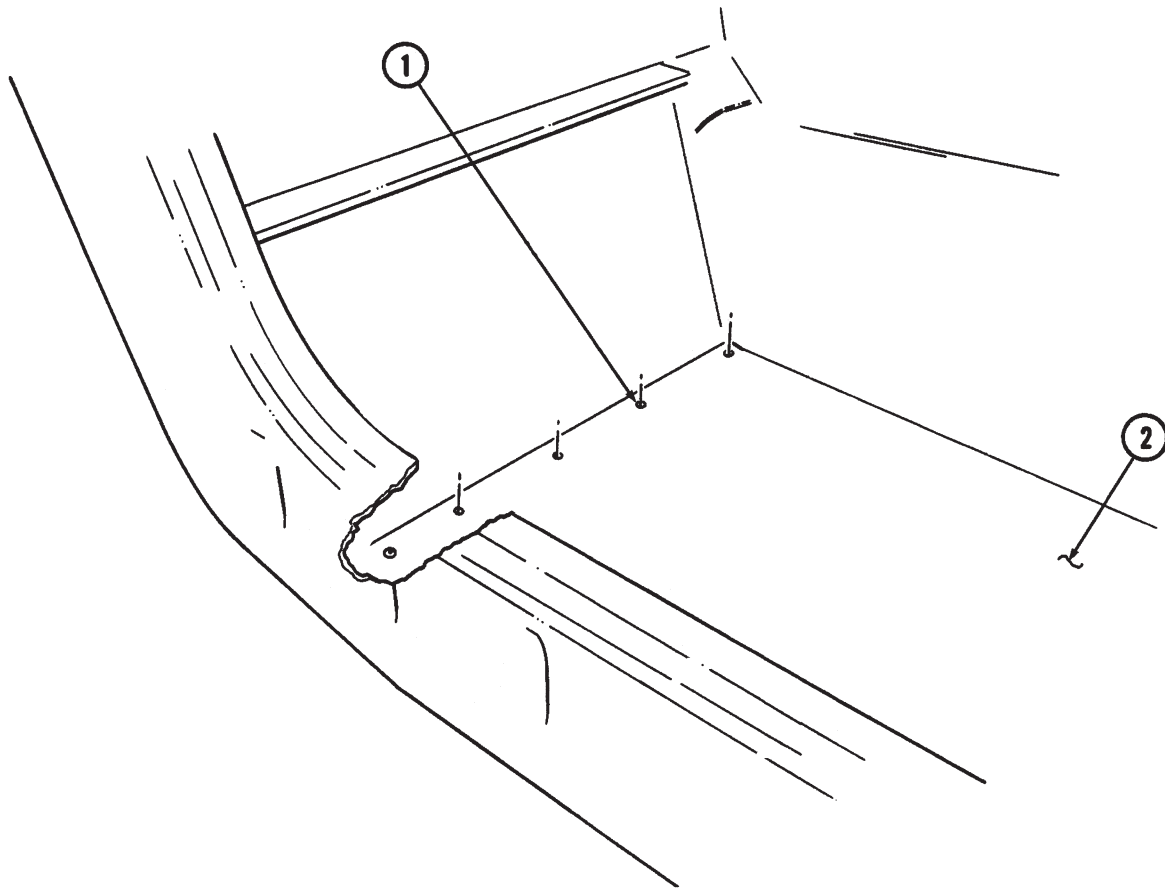
METRIC CONVERSION	
2.00 IN.	50.80 MM
2.50 IN.	63.50 MM
2.90 IN.	76.20 MM
3.00 IN.	35.56 MM
14.20 IN.	360.68 MM



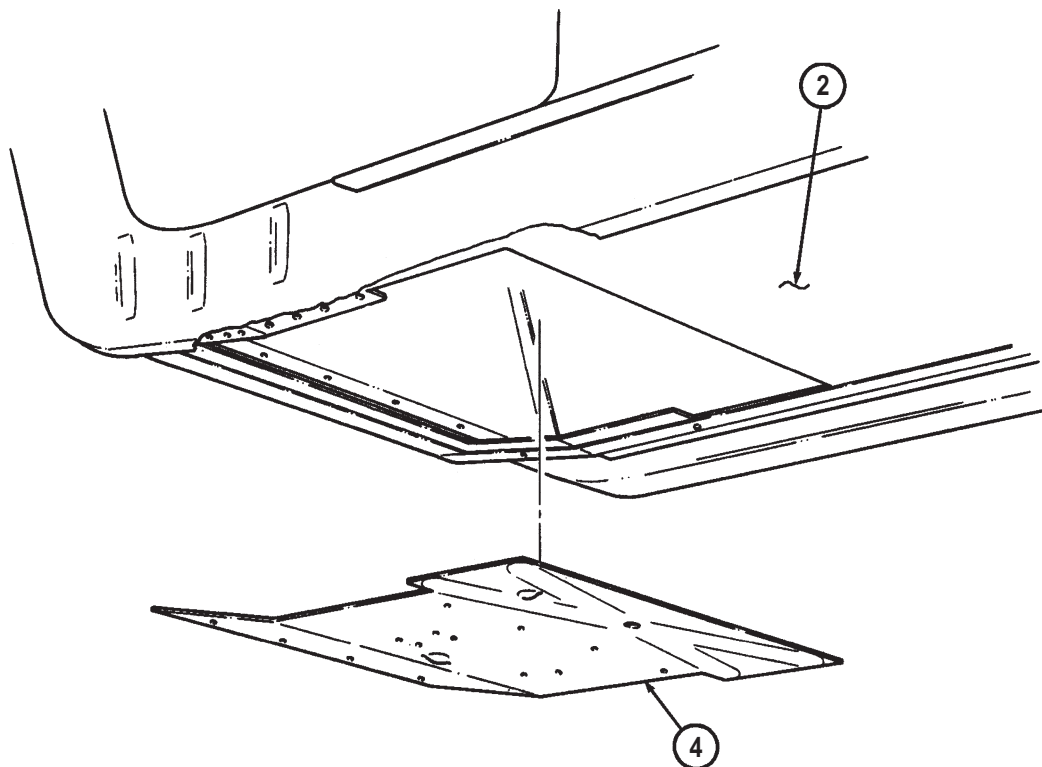
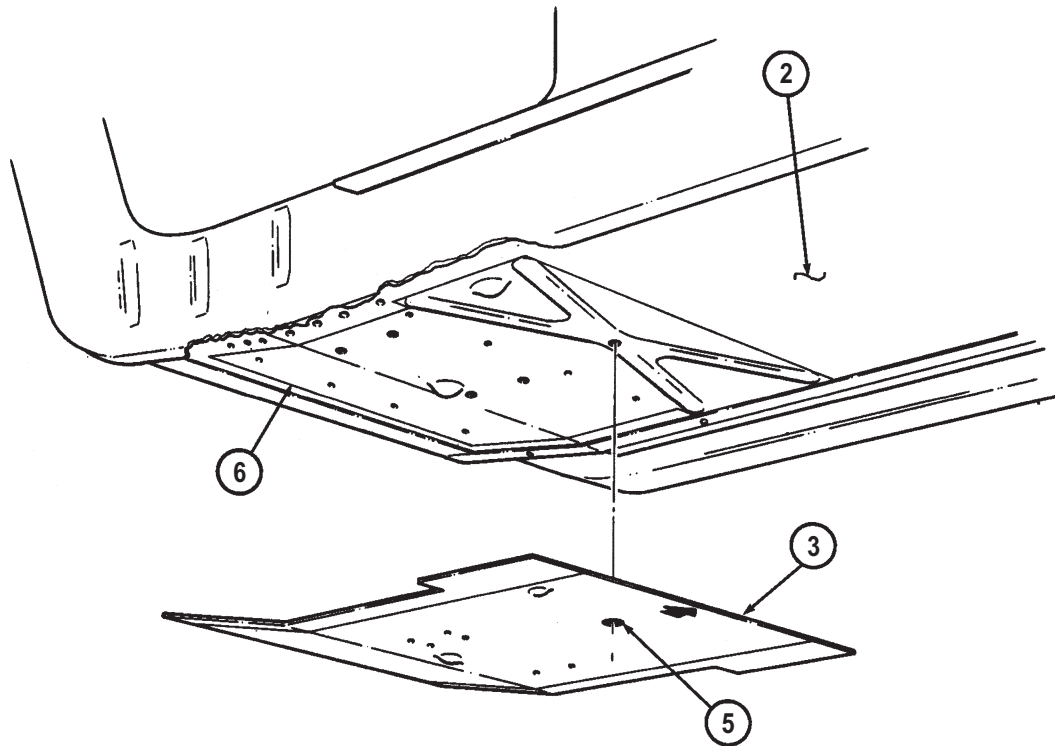
33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

d. Right Rear Floor Panel Removal

1. Using a 0.187-in. (4.75-mm) drill, remove nine rivets (1) from right rear floor panel (2).
2. Position insert panel (3), with arrow facing down and toward front of vehicle, on underside of right rear floor panel (2) and align mount hole (5) with hole in floor panel (2).
3. Using insert panel (3) as a template, scribe an outline (6) on right rear floor panel (2).
4. Using scribed outline marked in step 3 as a guide, cut and remove floor panel (4).
5. Remove sharp edges and burrs on floor panel (2).



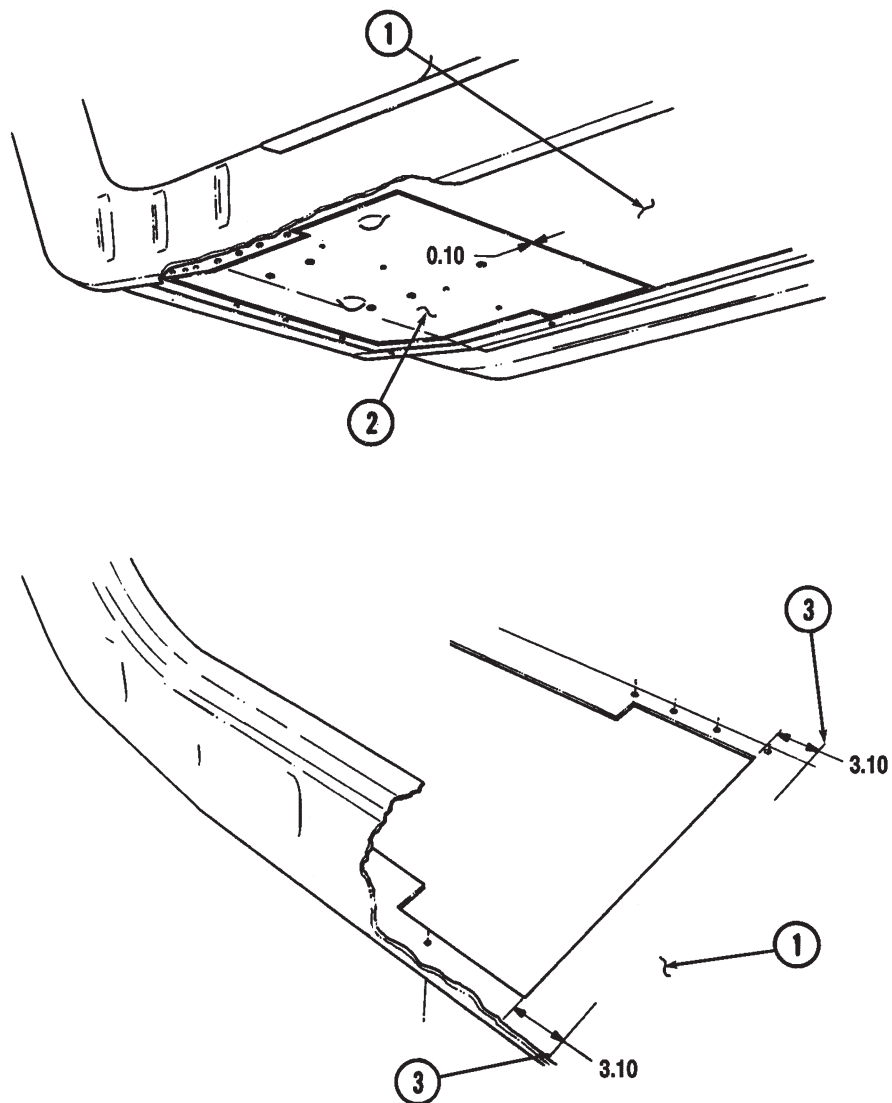
33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

6. Position insert panel (2), with arrow facing down and toward front of vehicle, on underside of right rear floor panel (1).
7. Obtain a minimum clearance of 0.10-in. (2.54-mm) between edges of insert panel (2) and right rear floor panel (1).
8. Remove insert panel (2).
9. Locate and mark four reference lines (3) on right rear floor panel (1).

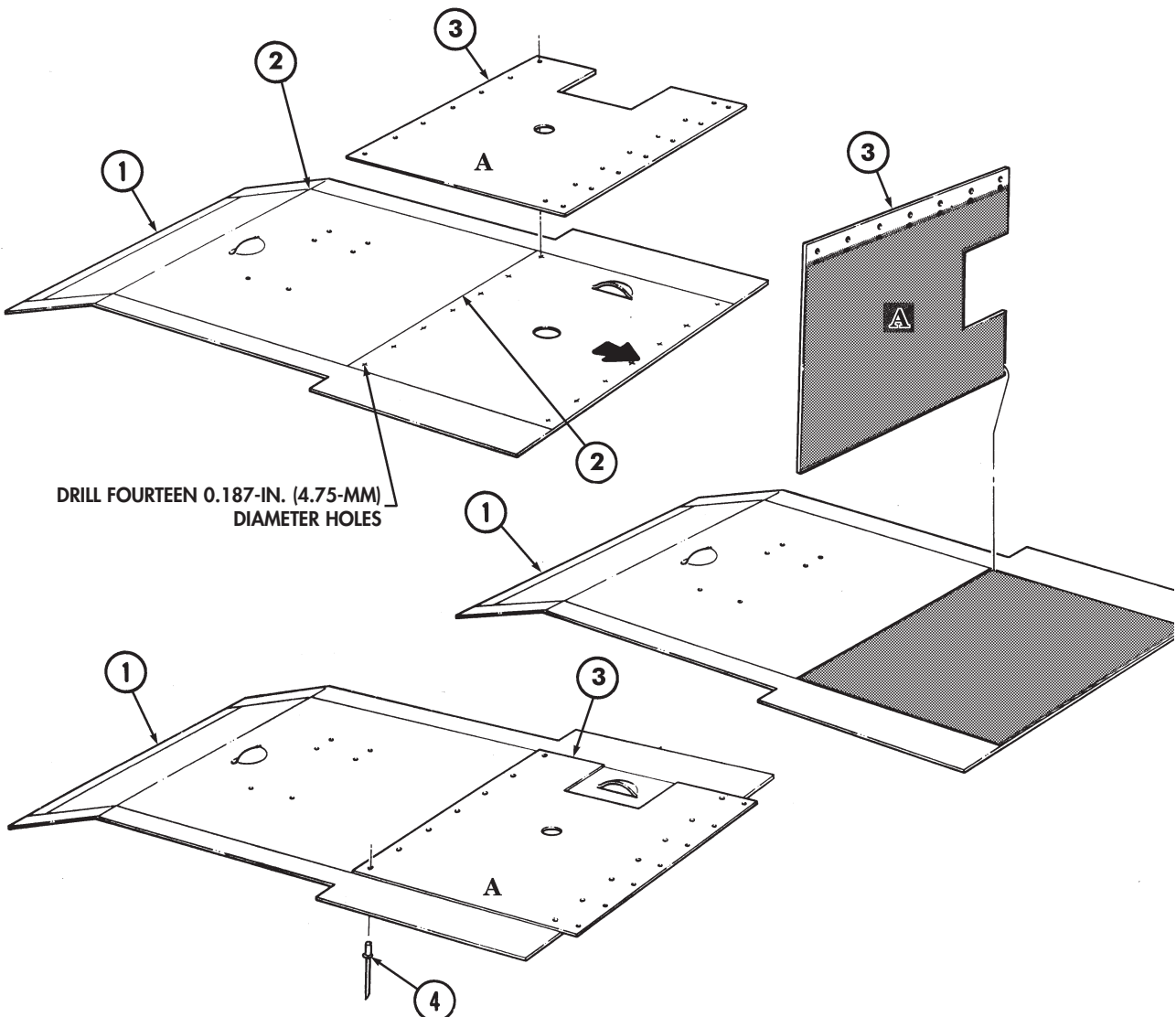
METRIC CONVERSION	
3.10 IN.	78.74 MM



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

e. Reinforcement Strip A and Insert Panel Assembly

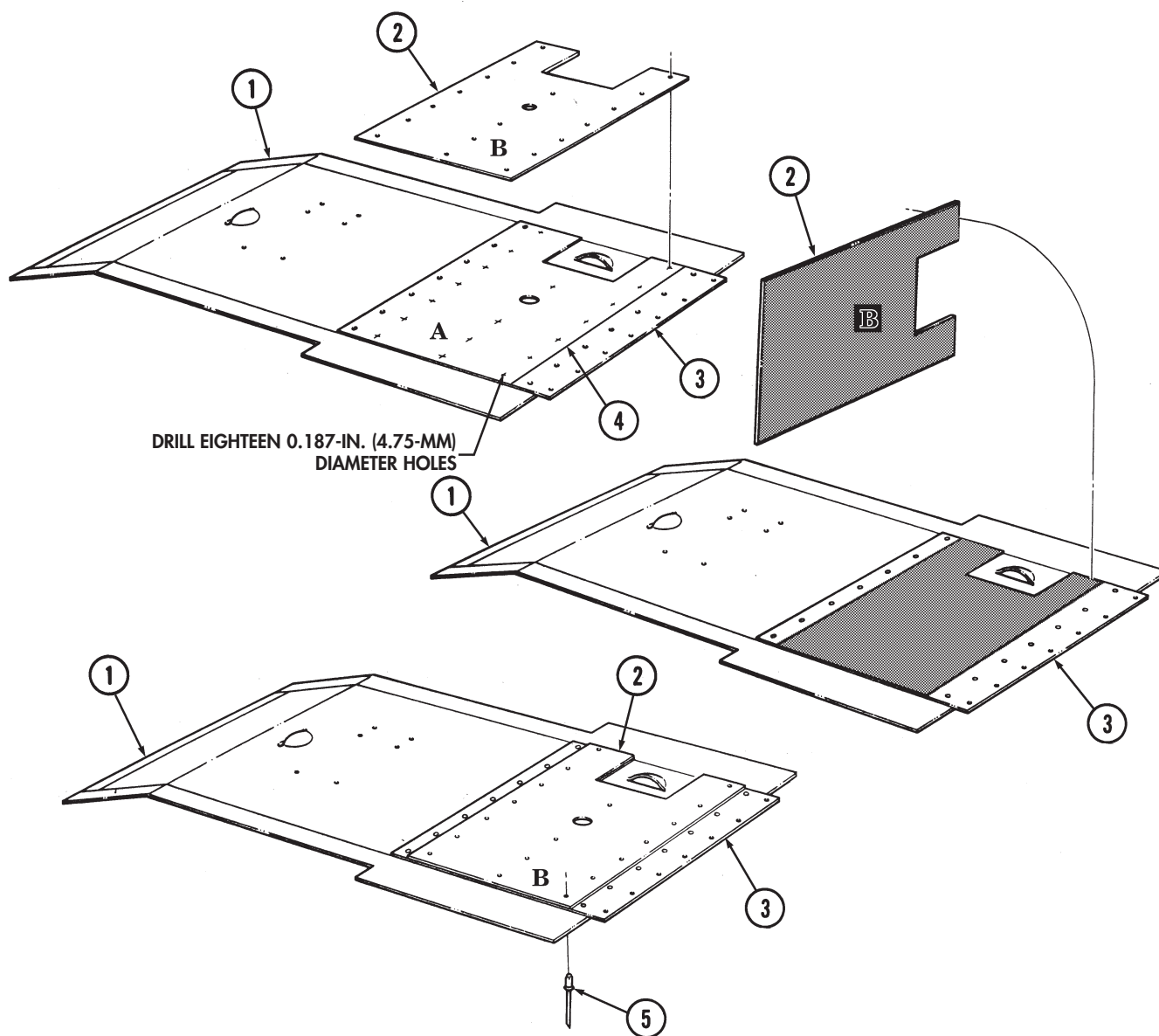
1. Position reinforcement strip A (3) on insert panel (1). Align reference lines (2) with edge of reinforcement strip A (3).
2. Using reinforcement strip A (3) as a template, locate, mark, and drill fourteen 0.187-in. (4.75-mm) diameter holes through insert panel (1). Remove reinforcement strip A (3).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and reinforcement strip A (3).
4. Position reinforcement strip A (3) on insert panel (1) and install with fourteen rivets (4).
5. Remove any adhesive residue and clean edges of reinforcement strip A (3) and insert panel (1).



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

f. Reinforcement Strip B and Insert Panel Assembly

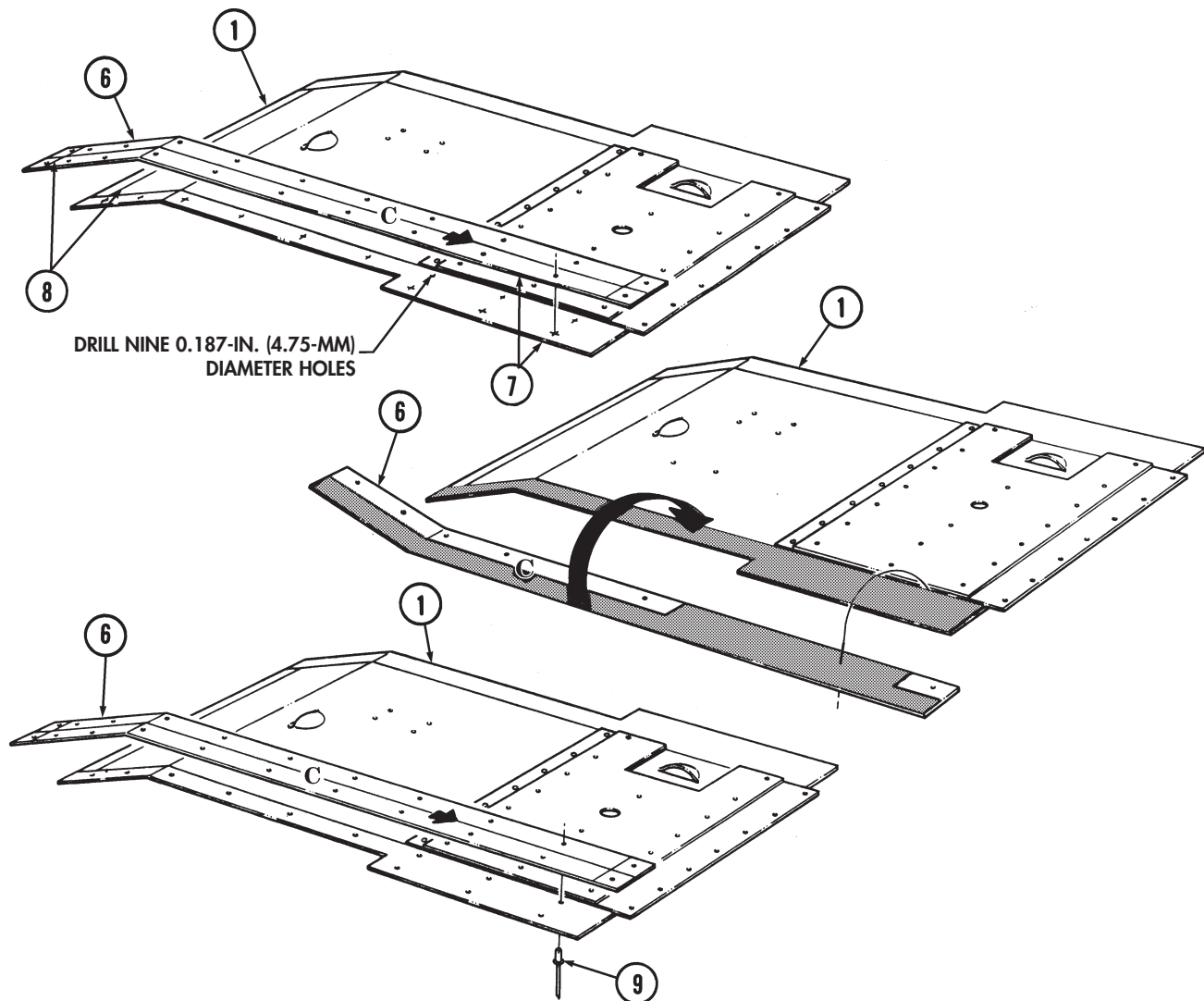
1. Position reinforcement strip B (2) on reinforcement strip A (3). Align between reference line (4) and side edge of reinforcement strip B (2).
2. Using reinforcement strip B (2) as a template, locate, mark, and drill eighteen 0.187-in. (4.75-mm) diameter holes in reinforcement strip A (3) and insert panel (1). Remove reinforcement strip B (2).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surfaces of reinforcement strip A (3) and reinforcement strip B (2).
4. Position reinforcement strip B (2) on reinforcement strip A (3) and install with eighteen rivets (5).
5. Remove any adhesive residue and clean edges of reinforcement B (2), reinforcement strip A (3), and insert panel (1).



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

g. Metal Strip C and Insert Panel Assembly

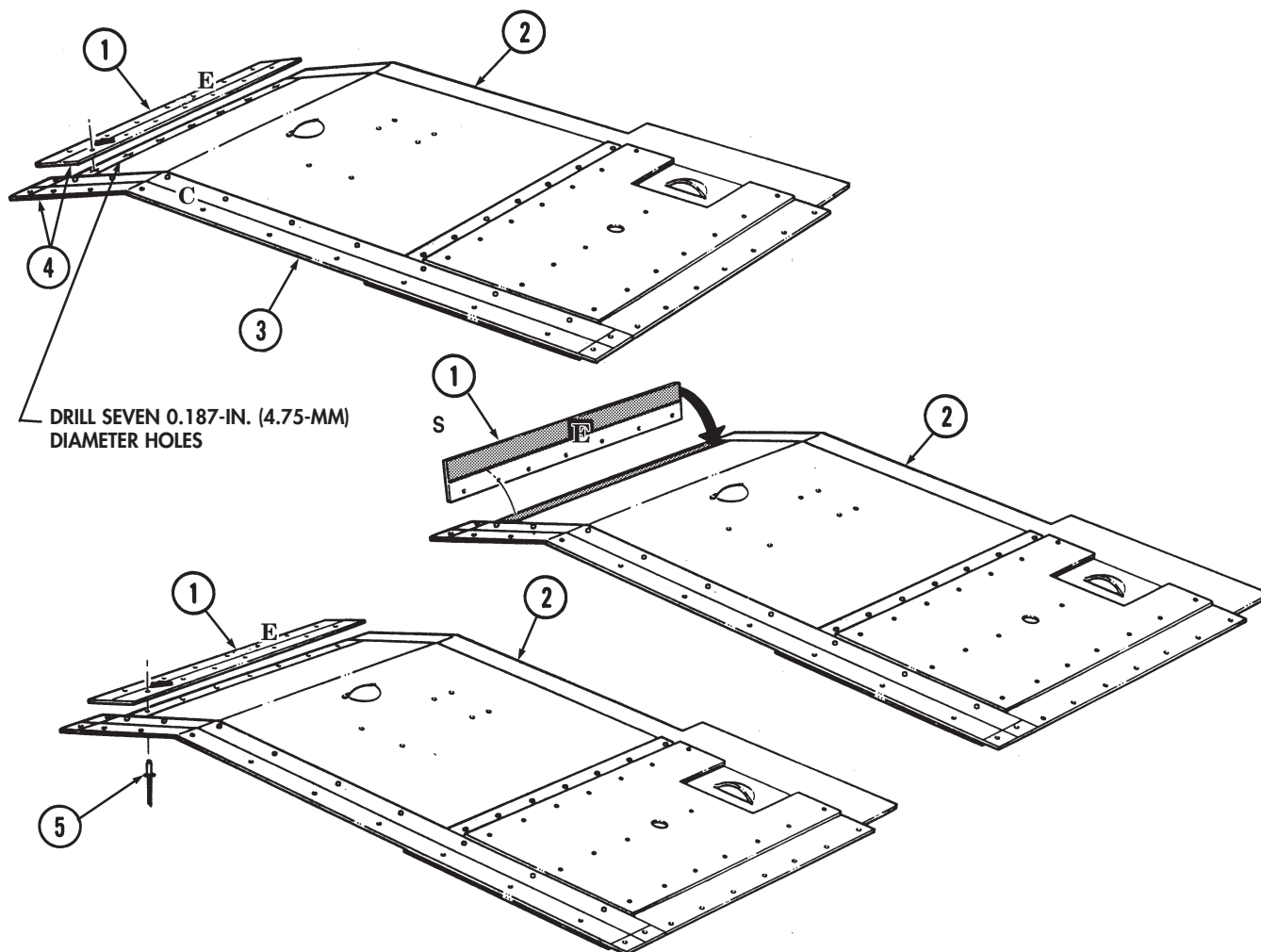
1. Position metal strip C (6) with arrow facing up and toward right on insert panel (1). Align reference lines (8) and insert panel edges (7).
2. Using metal strip C (6) as a template, locate, mark, and drill nine 0.187-in. (4.75-mm) diameter holes through insert panel (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (1) and metal strip C (6).
4. Position metal strip C (6) on insert panel (1) and install with nine rivets (9).
5. Remove any adhesive residue and clean edges of metal strip C (6) and insert panel (1).



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

h. Metal Strip E and Insert Panel Assembly

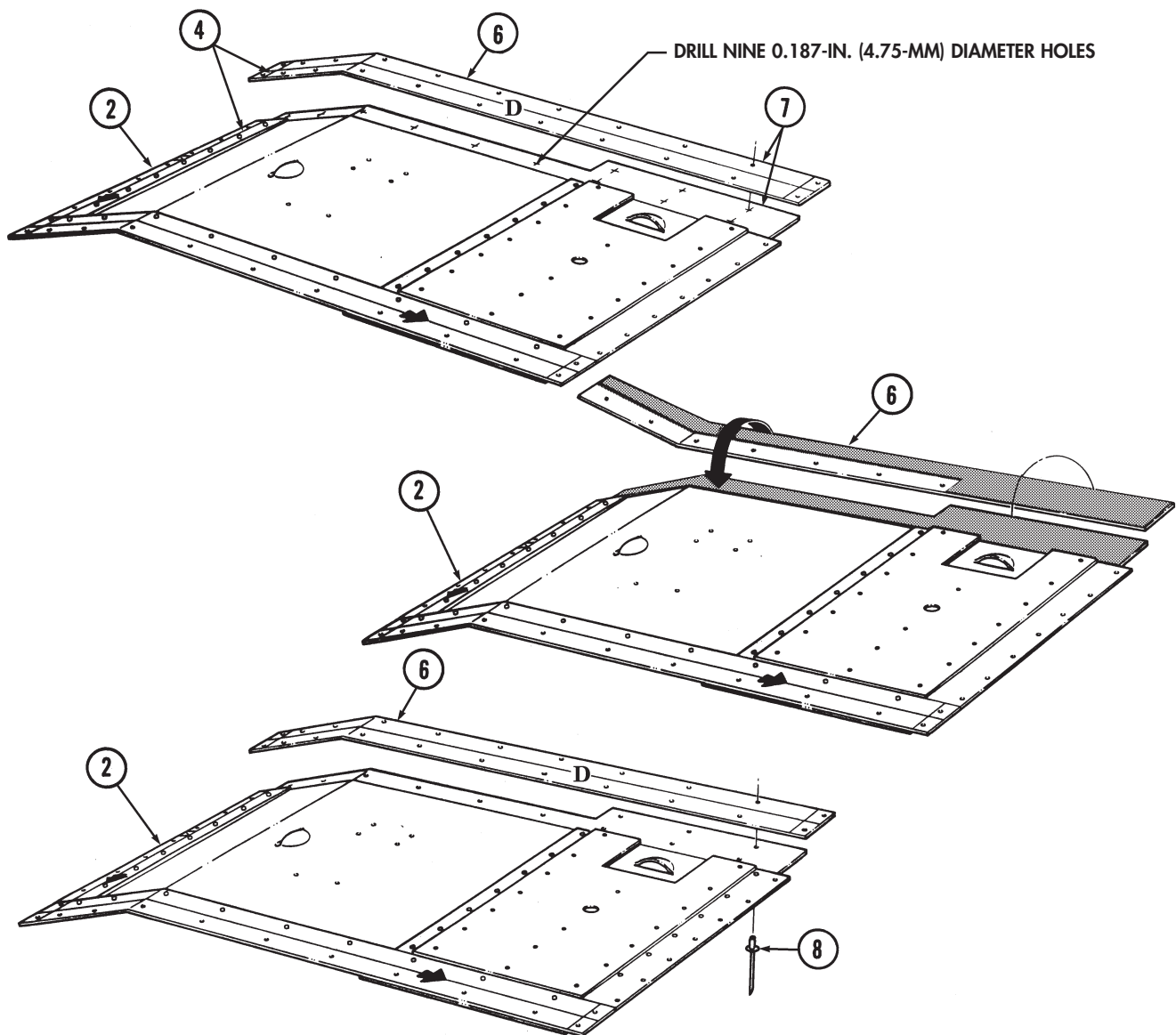
1. Position metal strip E (1), with arrow facing up and toward metal strip C (3), on insert panel (2) and align reference lines (4).
2. Using metal strip E (1) as a template, locate, mark, and drill seven 0.187-in. (4.75-mm) diameter holes through insert panel (2). Remove metal strip E (1).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip E (1).
4. Position metal strip E (1) on insert panel (2) and install with seven rivets (5).
5. Remove any adhesive residue and clean edges of metal strip E (1) and insert panel (2).



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

i. Metal Strip D and Insert Panel Assembly

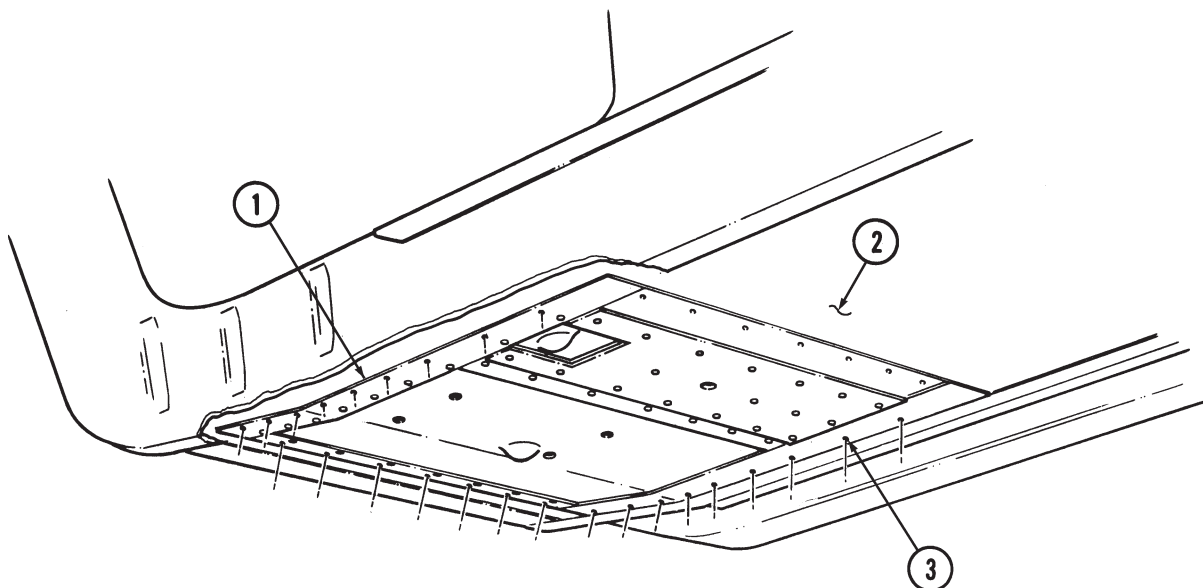
1. Position metal strip D (6), with arrow facing up and right, on insert panel (2). Align reference lines (4) and insert panel edges (7).
2. Using metal strip D (6) as a template, locate, mark, and drill nine 0.187-in. (4.75-mm) diameter holes through insert panel (2). Remove metal strip D (6).
3. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded surface of insert panel (2) and metal strip D (6).
4. Position metal strip D (6) on insert panel (2) and install with nine rivets (8).
5. Remove any adhesive residue and clean edges of metal strip D (6) and insert panel (2).



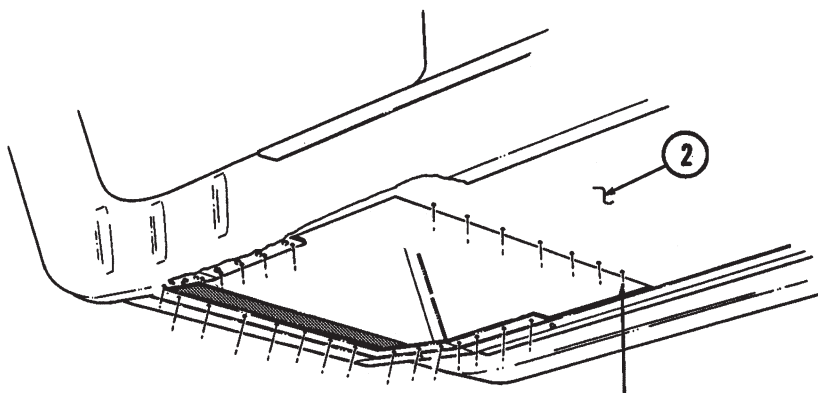
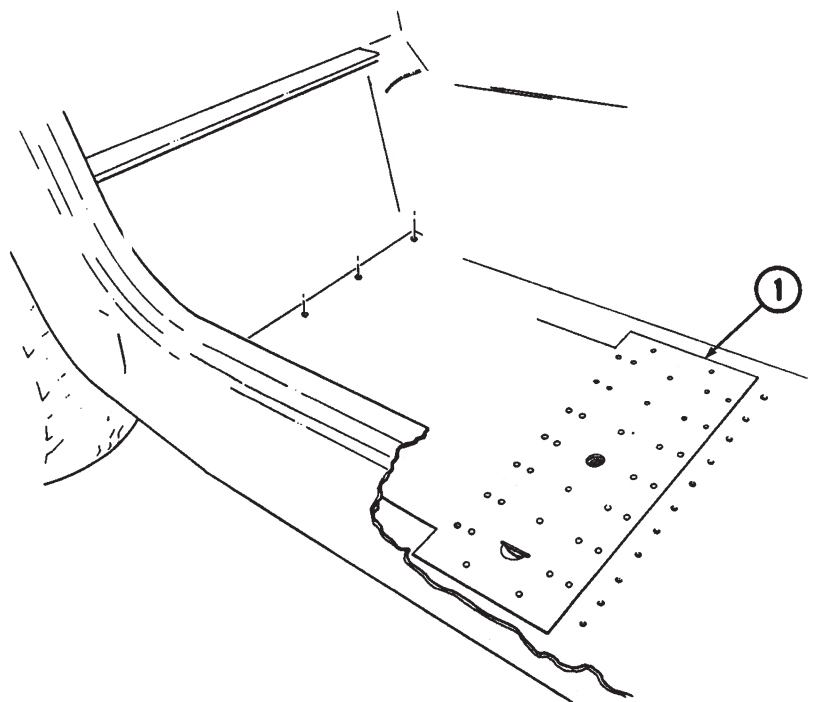
33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

j. Right Rear Floor Panel and Insert Panel Drilling

1. Position insert panel (1) on underside of right rear floor panel (2).
2. Using insert panel (1) as a template, mark thirty-eight hole locations (3) on underside of right rear floor panel (2). Remove insert panel (1).
3. Drill thirty-eight 0.187-in. (4.75-mm) diameter holes in underside of right rear floor panel (2).



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)



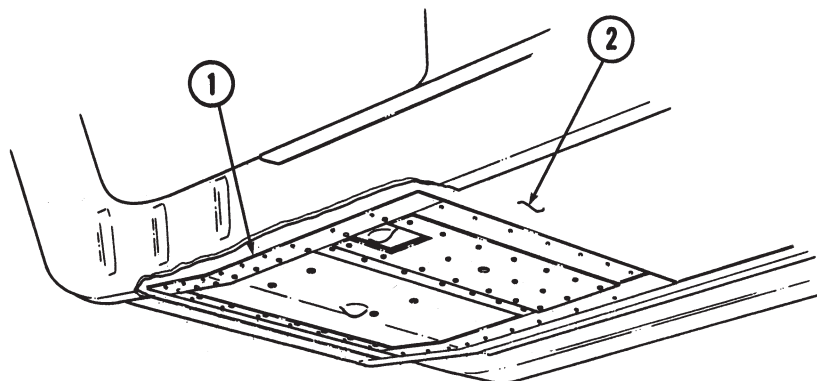
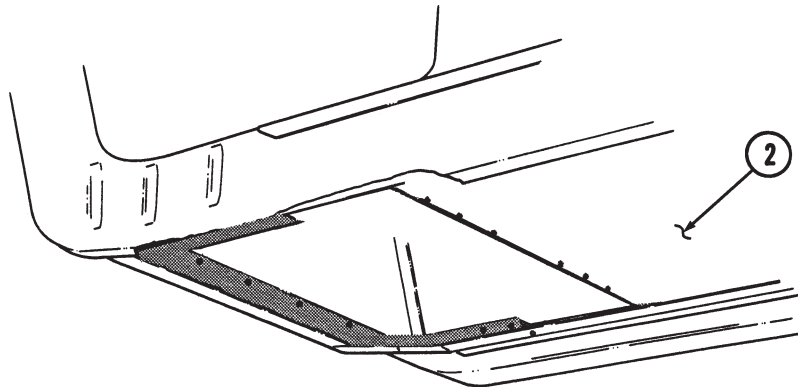
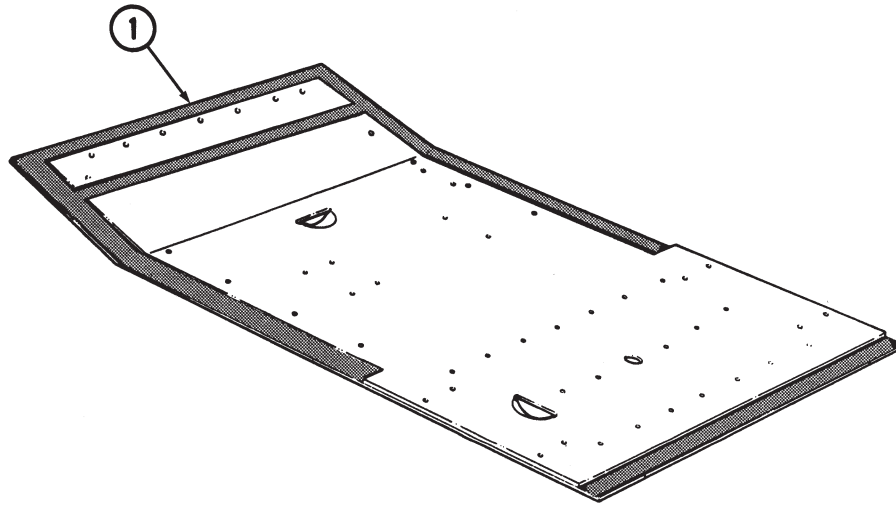
DRILL THIRTY-EIGHT 0.187-IN. (4.75-MM) DIAMETER HOLES

33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

k. Insert Panel and Right Rear Floor Panel Installation

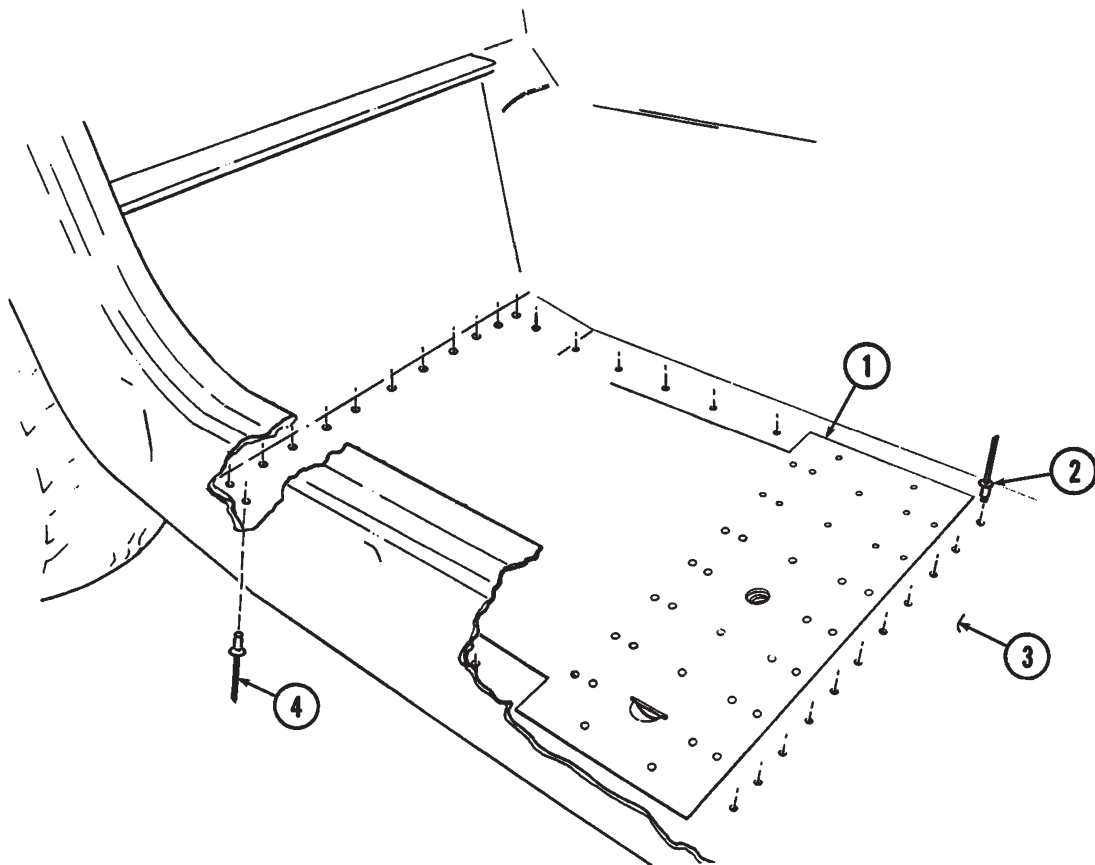
1. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded area of insert panel (1).
2. Apply adhesive sealant to shaded area on underside of right rear panel (2).
3. Position insert panel (1) on underside of right rear floor panel (2).

33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

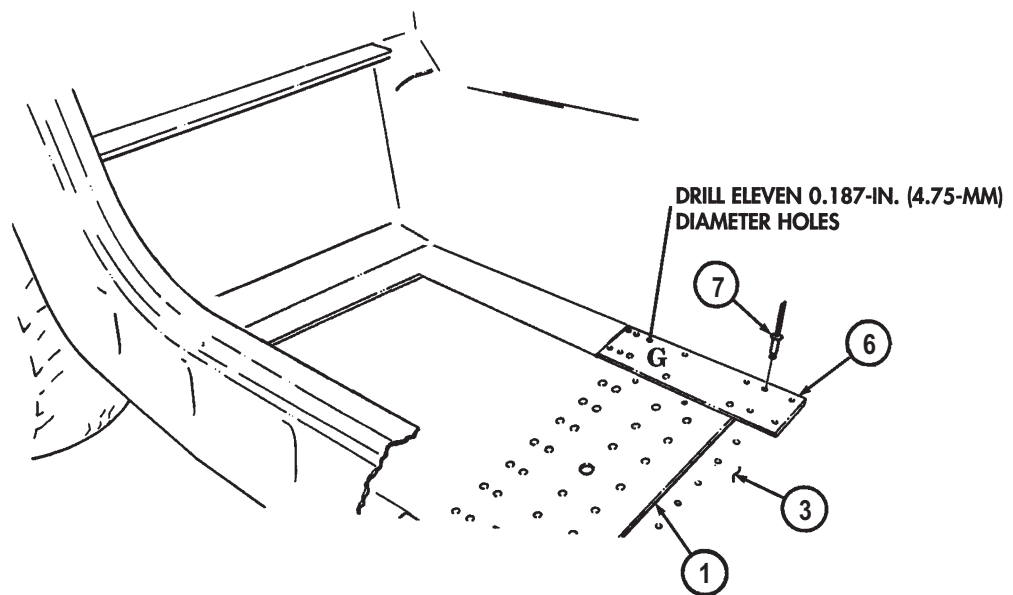
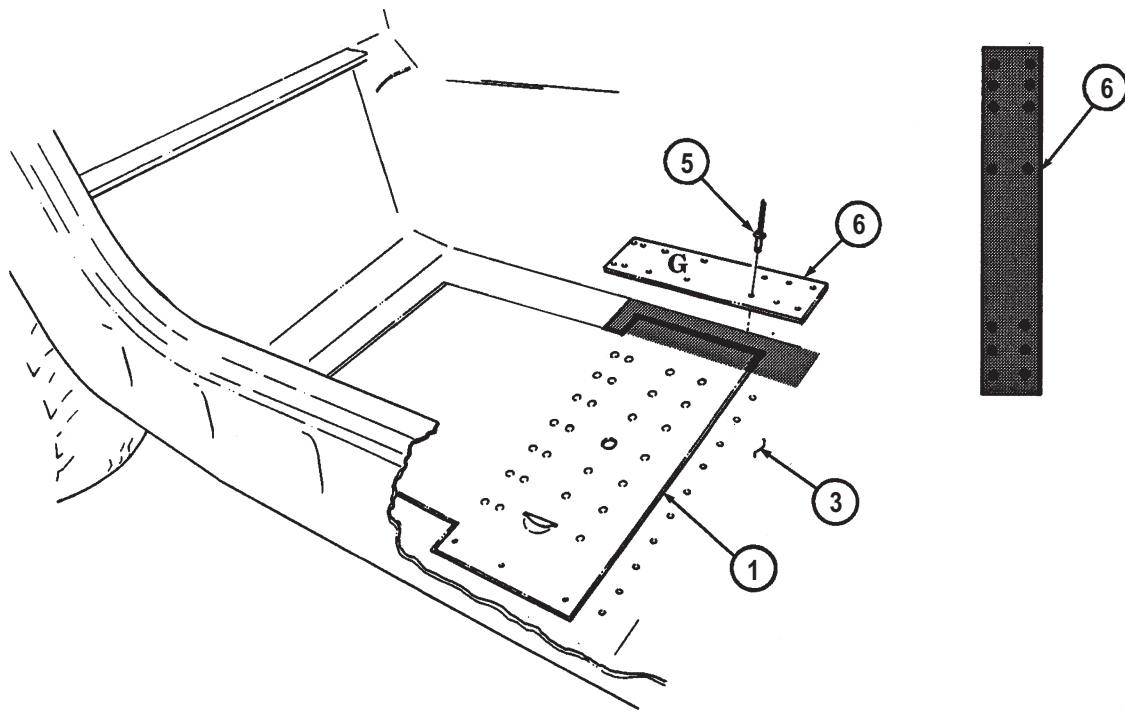


33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

4. Secure insert panel (1) on right rear floor panel (3) with twenty-three rivets (4) and fifteen rivets (2).
5. Apply approximately 0.125-in. (3.175-mm) thickness adhesive sealant to shaded area of metal strip G (6).
6. Apply adhesive sealant to shaded area of right rear floor panel (3) and insert panel (1).
7. Position metal strip G (6) on right rear floor panel (3) and insert panel (1) and install with three rivets (5).
8. Using metal strip G (6) as a template, locate, mark, and drill eleven 0.187-in. (4.75-mm) diameter holes through right rear floor panel (3) and insert panel (1).
9. Secure metal strip G (6) to insert panel (1) with eleven rivets (7).

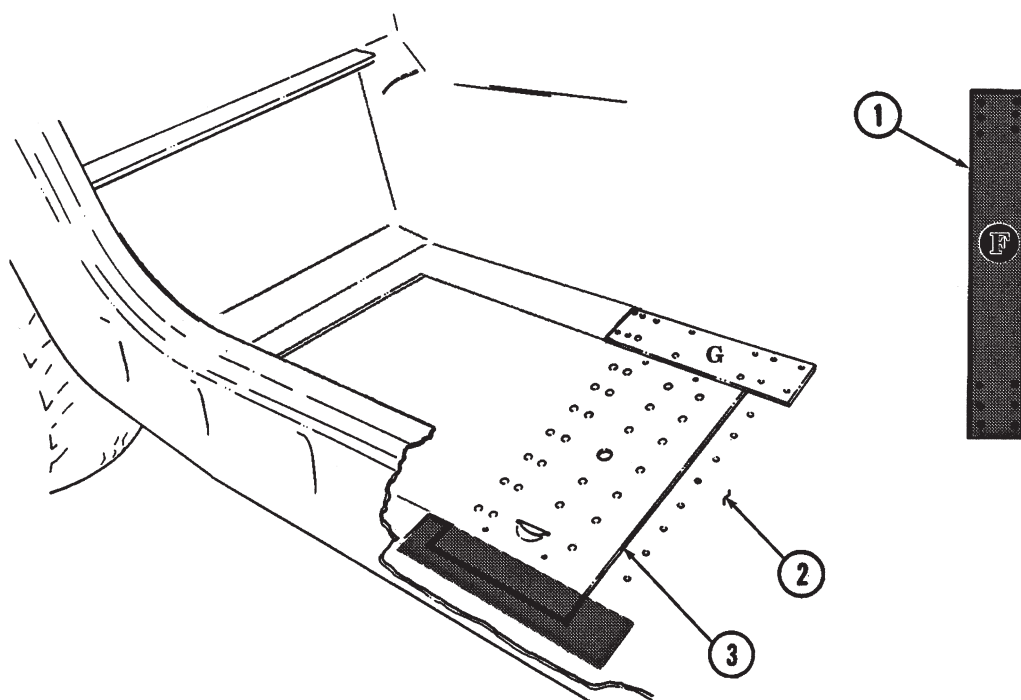


33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

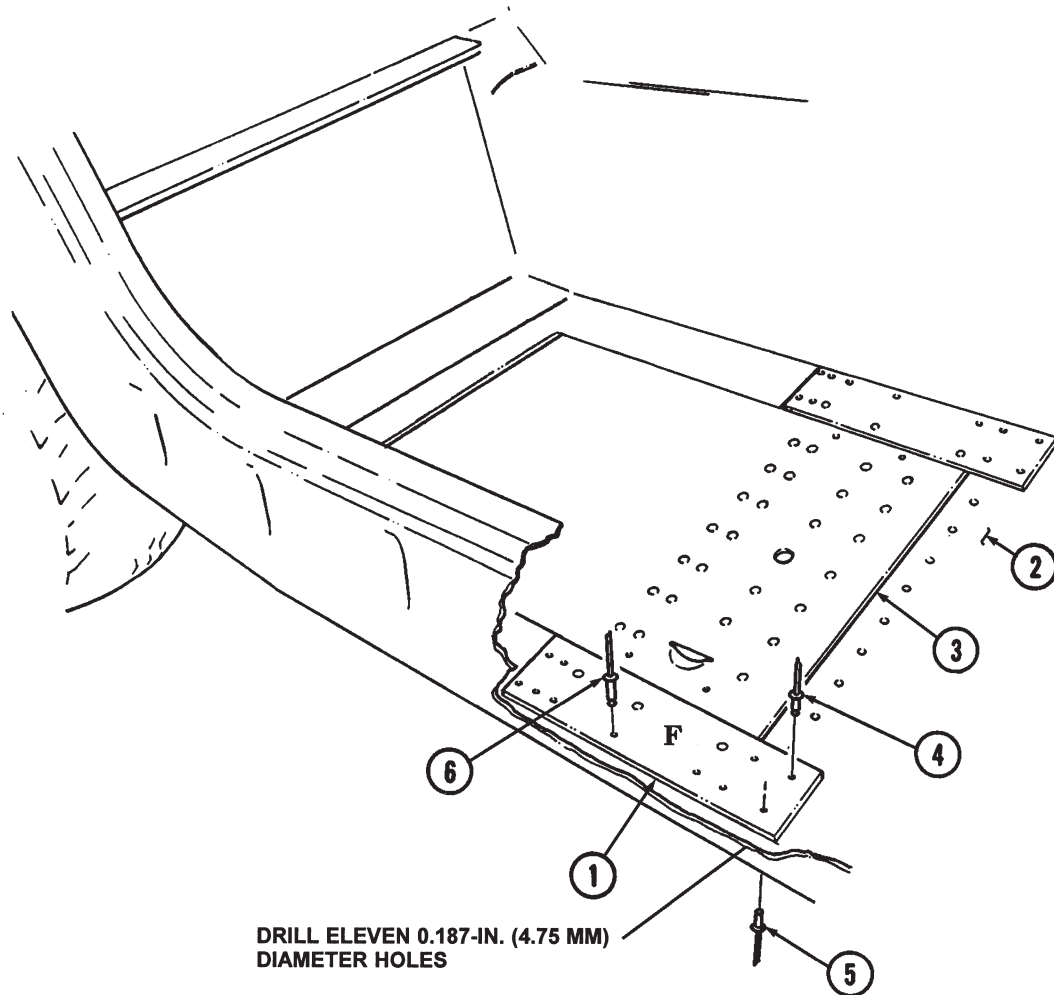


33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)

10. Apply approximately 0.125-in. (3.175-mm) thickness of adhesive sealant to shaded area of metal strip F (1).
11. Apply adhesive sealant to shaded area on right rear floor panel (2) and insert panel (3).
12. Position metal strip F (1) on right rear floor panel (2) and insert panel (3), and install metal strip F (1) on insert panel (3) with three rivets (6).
13. Using metal strip F (1) as a template, locate, mark, and drill eleven 0.187-in. (4.75-mm) diameter holes through right rear floor panel (2) and insert panel (3).
14. Secure metal strip F (1) to right rear floor panel (2) and insert panel (3) with four rivets (4).
15. Secure metal strip F (1) on insert panel (3) and right rear floor panel (2) with seven rivets (5).
16. Spot-paint insert panel (3) and right rear floor panel (2). (Refer to TM 43-0139.)



33-14. RIGHT REAR FLOOR PANEL REPAIR (Cont'd)



FOLLOW-ON TASK: Install right rear floor insulation (para. 10-34).

CHAPTER 34 SUSPENSION (GS) MAINTENANCE

34-1. INTRODUCTION

This chapter contains maintenance instructions for suspension system components at the general support maintenance level. Some subassemblies and parts must be removed before suspension system components can be accessed. They are referenced to other paragraphs of this manual.

34-2. SUSPENSION MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
34-3.	Suspension Alignment Instructions	34-1

34-3. SUSPENSION ALIGNMENT INSTRUCTIONS

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Caster and Camber Check b. Caster and Camber Adjustment | <ul style="list-style-type: none"> c. Toe Check and Adjustment |
|---|---|

INITIAL SETUP:

Tools

General mechanic's tool kit:
 automotive (Appendix B, Item 1)
 Alignment equipment, vehicle (Appendix B,
 Item 113.1)

Materials/Parts

Two locknuts (Appendix G, Item 174)

Manual References

TM 9-2320-387-10
 TM 9-2320-387-24P

Equipment Condition

Tires inflated to proper pressure
 (TM 9-2320-387-10).

Maintenance Level

General support

a. Caster and Camber Check

NOTE

- The alignment check will be made on a level surface, with front tires in the straight-ahead position. Vehicles will be checked at curb weight only.
 - Ensure M1113 models have S250 shelter installed before performing caster and camber checks.
 - Ensure M1114 models are at curb weight when performing caster and camber checks.
1. Check caster and compare to the specifications in table 34-1.
 2. Check camber and compare to the specifications in table 34-1.
 3. If either caster or camber does not meet specifications, go to task b, caster and camber adjustment.

34-3. SUSPENSION ALIGNMENT INSTRUCTIONS (Cont'd)

Table 34-1. Alignment Specifications.

MODEL	CAMBER		CASTER	
	FRONT	REAR	FRONT	REAR
M1113 (GVW)	0° (-2° to +2°)	.5° (-1° to +2°)	3° (0° to +4°)	N/A
M1114	0.5° (-2° to +2°)	1.3° (-1° to +2°)	2.3° (0° to +4°)	N/A

b. Caster and Camber Adjustment

NOTE

Caster and camber adjustments are basically the same for all four wheels. This procedure covers the right front wheel.

1. Remove wheel (para. 8-3).
2. Remove two locknuts (7), washers (2), capscrews (1), and washers (2) from upper control arm (8) and mounting brackets (3). Discard locknuts (7).
3. Loosen two capscrews (6) and four nuts (5) on two mounting brackets (3) and airlift brackets (4).

NOTE

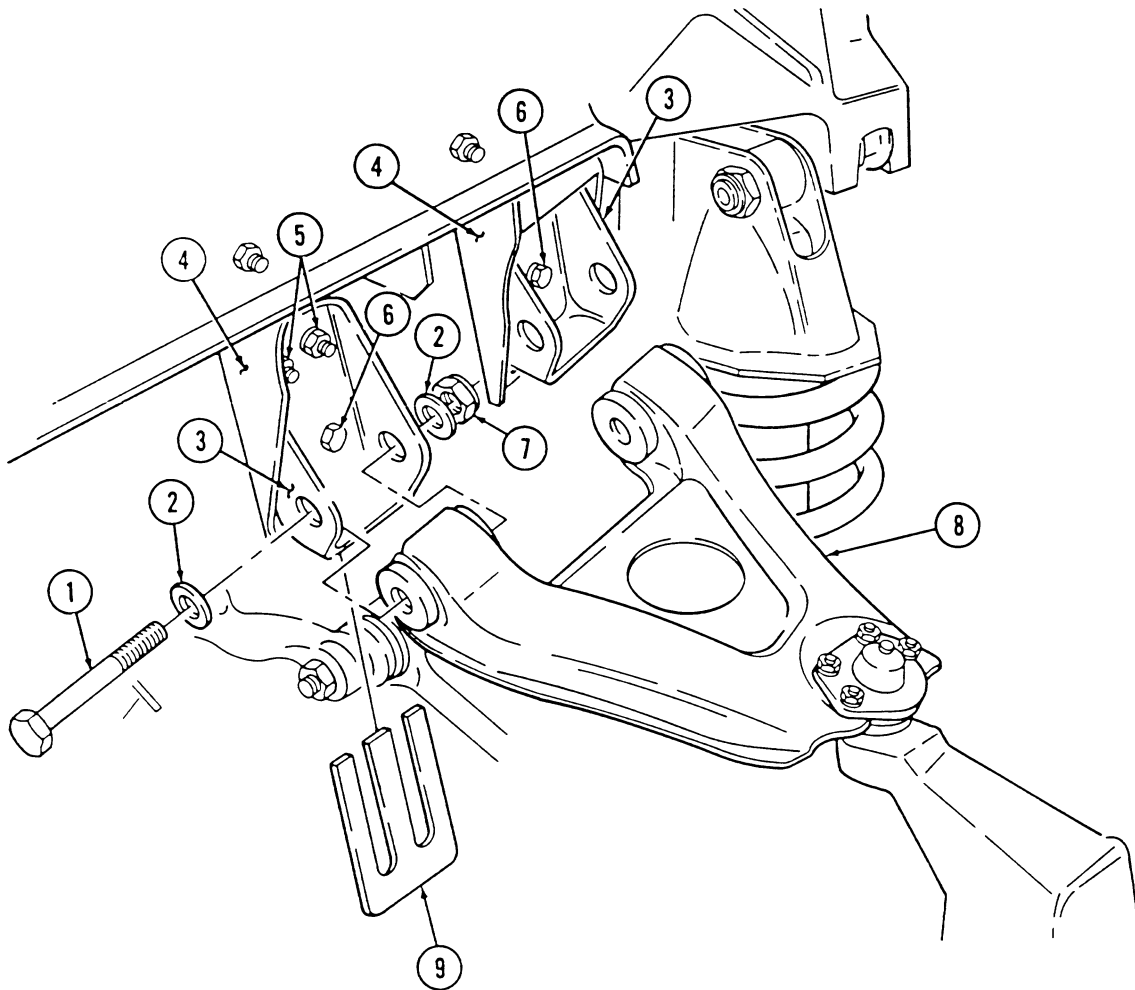
- When adjusting front and rear suspension camber, add or subtract shims as matched sets under both upper control arm mounting brackets.
 - Shims are available in 0.060-in. (1.52-mm) and 0.120-in. (3.05-mm) thicknesses.
4. Add or subtract shim(s) (9) as required to bring caster and/or camber within specifications (table 34-1). Suspension alignment change in relation to shim selection is shown in table 34-2.

Table 34-2. Suspension Alignment Change.

NOTE			
<ul style="list-style-type: none"> • Subtracting shims will affect caster/camber in the opposite direction as compared to adding shims. • For 0.06 in. (1.52 mm) shims, reduce the values in the table by half. • For larger changes, combinations of additions or subtractions will provide desired results. 			
FRONT SUSPENSION			
LOCATION	SHIM (one each)	CASTER	CAMBER
Front shim only	0.12 in. (3.05 mm)	+0.6°	+0.5°
	0.06 in. (1.52 mm)	+0.3°	+0.3°
Rear shim only	0.12 in. (3.05 mm)	-0.6°	0.0°
	0.06 in. (1.52 mm)	-0.3°	0.0°
Front and rear	0.12 in. (3.05 mm)	0.0°	+0.5°
	0.06 in. (1.52 mm)	0.0°	+0.3°
REAR SUSPENSION			
LOCATION	SHIM (one each)	CASTER	CAMBER
Front and rear shims	+0.12 in. (3.05 mm)	0.0°	+0.5°
	+0.06 in. (1.52 mm)	N/A	+0.5°

34-3. SUSPENSION ALIGNMENT INSTRUCTIONS (Cont'd)

5. Tighten two capscrews (6) and four nuts (5) on two airlift brackets (4) and mounting brackets (3). Tighten capscrews (6) and nuts (5) to 90 lb-ft (122 N·m).
6. Install upper control arm (8) on mounting brackets (3) with two washers (2), capscrews (1), washers (2), and locknuts (7). Tighten locknuts (7) to 260 lb-ft (353 N·m).
7. Install wheel (para. 8-3).
8. Go to task a, and repeat steps 1 through 3 for left front and rear wheels.



c. Toe Check and Adjustment

Check toe (para. 8-9 or 8-10) and adjust if necessary.

APPENDIX A REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals for use with this vehicle.

A-2. DEPARTMENT OF THE ARMY PAMPHLETS

Consolidated Index of Army Publications and Blank Forms DA Pam 25-30
 The Army Maintenance Management System (TAMMS) DA Pam 738-750

A-3. FORMS

Recommended Changes to Publications and Blank Forms DA Form 2028
 Recommended Changes to Equipment Technical Publications DA Form 2028-2
 Hand Receipt/Annex Number DA Form 2062
 Exchange Tag DA Form 2402
 Equipment Inspection and Maintenance Worksheet DA Form 2404
 Maintenance Request DA Form 2407
 Preventive Maintenance Schedule and Record DD Form 314
 Processing and Deprocessing Record for Shipment, Storage, and Issue of
 Vehicles and Spare Engines DD Form 1397
 Product Quality Deficiency Report SF Form 368

A-4. FIELD MANUALS

NBC Protection FM 3-4
 NBC Decontamination FM 3-5
 Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to -65°F) FM 9-207
 General Fabric Repair FM 10-16
 First Aid for Soldiers FM 21-11
 Manual for the Wheeled Vehicle Driver FM 21-305
 Browning Machine Gun Caliber .50 HB, M2 FM 23-65
 Machine Gun 7.62-MM, M60 FM 23-67
 Basic Cold Weather Manual FM 31-70
 Northern Operations FM 31-71
 Army Motor Transport Units and Operations FM 55-30
 Mountain Operations FM 90-6

A-5. MILITARY STANDARDS

Basic Issue Items for Military Vehicles, Carriages and Equipment,
 Preparation for Shipment and Storage MIL-B-12841
 Marking for Shipment and Storage MIL-STD-129
 Magnetic Particles Inspection MIL-STD-1949
 Inspection, Liquid Penetrant MIL-STD-6866
 Preparation for Shipment and Storage of Wheeled Vehicles MIL-V-62038

A-6. TECHNICAL MANUALS

Inspection, Care, and Maintenance of Antifriction Bearings..... TM 9-214
 Operator's Manual for Welding Theory and Application TM 9-237
 Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance
 Materiel and Related Materials (Including Chemicals) TM 9-247
 Operator's Manual for Truck, 4x4, M1113 and M1114 Models TM 9-2320-387-10
 Hand Receipt TM 9-2320-387-10-HR
 Unit, Direct Support, and General Support Maintenance Repair Parts and
 Special Tools List for Truck, 4x4, M1113 and M1114 Models TM 9-2320-387-24P
 Direct Support and General Support Maintenance: Engine, Diesel:
 8 Cylinder, Naturally Aspirated Fuel Injected, Water Cooled
 DDA Model 6.2 Liter (NSN 2815-01-231-3672) DDA Model 6.5 Liter
 (NSN 2815-01-410-9710) TM 9-2815-237-34
 Operator's, Unit, Direct Support, and General Support Maintenance Manual for
 Care, Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Tubes TM 9-2610-200-14
 Operator's and Organizational Maintenance Manual (Including
 Repair Parts and Special Tool Lists): Test Stand Automotive TM 9-4910-485-12
 Operator's and Organizational Maintenance Manual for Test Stand,
 Automotive Generator, Alternator Starter, and Associated Equipment..... TM 9-4910-663-12
 Operator's, Unit, Intermediate Direct Support, and General Support
 Maintenance Manual for Lead-Acid Storage Batteries TM 9-6140-200-14
 Painting Instructions for Army Materiel TM 43-0139
 Transportability Guidance..... TM 55-2320-280-14
 Administrative Storage of Equipment TM 740-90-1
 General Packaging Instructions for Field Units TM 746-10
 Procedures for Destruction of Tank-automotive Equipment to Prevent Enemy Use TM 750-244-6
 Cooling Systems: Tactical Vehicles TM 750-254

A-7. TECHNICAL BULLETINS

Solder and Soldering TB SIG 222
 Tactical Wheeled Vehicles: Repair of Frames TB 9-2300-247-40
 Security of Tactical Wheeled Vehicles TB 9-2300-422-20
 Equipment Improvement Report and Maintenance Digest TB 43-0001-39-1
 Use of Antifreeze Solutions, Antifreeze Extender, Cleaning Compounds, and
 Test Kit in Engine Cooling Systems TB 750-651
 Maintenance Expenditure Limits..... TB 750-98-23
 Calibration and Repair Requirements for the Maintenance of Army Materiel TB 43-180
 Corrosion Prevention and Control Including Rustproofing Procedures for
 Tactical Vehicles and Trailers TB 43-0213

A-8. ARMY REGULATIONS

The Army Integrated Publishing and Printing Program..... AR 25-30
 The Army Physical Security Program..... AR 190-13
 Security of Unclassified Army Properties AR 190-51
 Unit Status Reporting AR 220-1
 Identification and Distribution of DA Publications and Issue of Agency and
 Command Administrative Publications AR 310-2
 Dictionary of United States Army Terms AR 310-25
 Policy for Safeguarding and Controlling COMSEC Materiel AR 380-40
 Packaging of Materiel AR 700-15
 Army Materiel Maintenance Policy and Retail Maintenance Operations AR 750-1

APPENDIX B

MAINTENANCE ALLOCATION CHART (MAC)

Section I. INTRODUCTION

B-1. THE ARMY MAINTENANCE SYSTEM

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army maintenance system concept.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Unit – includes two subcolumns, C (operator/crew) and O (unit) maintenance.

Direct support – includes an F subcolumn.

General support – includes an H subcolumn.

Depot – includes a D subcolumn.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows:

a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition; i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. Replace is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications; i.e., DMWR. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/ miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column (1)-Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column (2)-Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column (3)-Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see para. B-2.)

d. Column (4)-Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number of complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time) troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

NOTE

When a complete replace or repair task performed at higher level maintenance includes lower level maintenance tasks (equipment condition/follow-on tasks), the lower level work time figures in the MAC must be added to the higher level work time shown in the MAC to determine the total to accomplish that maintenance function.

- C Operator or Crew
- O Unit maintenance
- F Direct support maintenance
- H General support maintenance
- D Depot maintenance

e. Column (5)-Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column (6)-Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

- a. **Column (1)-Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, section II, column 5.
- b. **Column (2)-Maintenance Category.** The lowest category of maintenance authorized to use the tool or test equipment.
- c. **Column (3)-Nomenclature.** Name or identification of the tool or test equipment.
- d. **Column (4)-National Stock Number.** The National stock number of the tool or test equipment.
- e. **Column (5)-Tool Number.** The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

- a. **Column (1)-Reference Code.** The code recorded in column 6, section II.
- b. **Column (2)-Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
01	ENGINE								
0100	Engine Assembly	Inspect Test Service Adjust Replace Repair	0.2	0.7	1.0			1,21,25 1,2 26,27 12,24,134 1,7,10,13,23, 24,28	G
	Overhaul				32.7	16.0	30.0	1,7,10,23, 28-32 136,137	
	Mount, Engine	Inspect Replace		0.1	1.6			2,133,134 1,2,24,133- 134,138	
0101	Cylinder Head	Replace Repair			3.0			1,6 1,6,8	
	Block, Cylinder	Repair				10.0		1,6-8	
0102	Crankshaft	Replace				4.0		1	
	Pulley, Crankshaft	Replace			0.5			1,6	
	Damper, Vibration	Replace			0.5			1,6	
	Bearings, Crankshaft	Replace				4.0		1	
	Oil Seals, Crankshaft, Front	Replace			2.0			1	
	Oil Seals, Crankshaft, Rear	Replace				2.0		1,6,29	
0103	Flywheel	Replace			3.5			1,6	
0104	Pistons, Connecting Rod								
	Rods, Connecting	Replace				8.0		1,6	
	Bearings, Connecting Rod	Replace				2.0		1,6	
	Pistons	Replace				8.0		1,6	
	Rings, Piston	Replace				7.0		1,6,10	
0105	Valves, Camshaft, and Timing System								
	Cover, Rocker Arm	Replace			1.0			1,6	
	Valves, Intake and Exhaust	Replace Repair				3.0 3.0		1,6 1,6,8	
	Rocker Arm Assembly	Replace			2.1			1,6	
	Springs, Valve	Test Replace			0.5 2.3			1,8 1,6	
	Rods, Push	Replace			3.0			1	
	Lifters	Replace			6.0			1,23	
	Gears and Chain, Timing	Replace			4.0			1,6,10	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
0106	Camshaft	Replace				4.0		1,6,10	
	Bearings, Camshaft	Replace				4.0		1,6,30	
	Engine Lubrication System								
	Pan, Oil	Replace		2.0				1,2	
	Pump, Oil	Replace			2.5			1,6	
	Filter, Oil	Replace		0.5				1,2	
	Dipstick and Tube	Replace		0.2				1,2,145	
	Oil Cooler Assembly	Inspect Replace Repair		0.1 0.5		1.0		1,2 1	
	Lines, Oil Cooler	Inspect Replace		0.2 1.8				1	
	Valve, Crankcase Depression Regulator	Inspect Test Service Replace		0.1 0.3 0.3 0.3				1 1,2	L
0108	Manifold, Intake	Replace				3.0		1,6	
	Manifold, Exhaust	Replace		3.0				1,6,135, 139,145	
	Crossover Intake	Replace				3.0		1,6	
03	FUEL SYSTEM								
0301	Injector Nozzle, Fuel	Test				0.5		1,9	
		Replace				0.7		1,6,32,118, 135,141	
0302	Lines, Injection Pump	Inspect		0.1					
		Replace				2.0		1,136,137	
0304	Pump, Injection	Inspect		0.1					
		Calibrate					A	1,9,42-47	A
		Replace				4.0		1,136	
		Repair				0.6	5.0	1,9,33-40, 147-150	O
0304	Fuel Pump	Test		0.3				1,2	
		Replace		1.0				1,2	
		Cleaner Assembly, Air	Inspect Service Replace	0.2 0.2	0.5 0.2			1 1	
0305	Horn, Air Induction	Inspect	0.1						
		Replace		0.3				1,2	
0306	Turbocharger Assembly	Replace				4.0		1,6	
0306	Lines and Fittings, Fuel	Inspect		0.2					
		Replace		3.2				1	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remark Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
0309	Tank, Fuel	Inspect Replace		0.1 2.6				1,2	B
	Filter Assembly, Fuel	Inspect Service Replace	0.1	0.1 0.5 0.5				1 1,2	
0311	Glow Plugs	Test Replace		0.3 0.7				2 1,2,144	
0312	Accelerator Linkage	Inspect Adjust Replace		0.2 0.2 0.8				1 1,2	
	Hand Throttle	Inspect Adjust Replace	0.1	0.1 0.2 0.5				1 1,2	
04	EXHAUST SYSTEM								
0401	Muffler	Inspect Replace		0.2 1.9				1,2	
	Exhaust Pipe	Inspect Replace		0.2 1.2				1,2	
	Tailpipe	Inspect Replace		0.2 0.5				1,2	
	05	COOLING SYSTEM							
0501	Radiator	Inspect Test Replace Repair	0.1	0.2 0.5 4.3		3.0		2,49 1,2 1	
	Surge Tank	Inspect Service Replace	0.1 0.1	0.5 0.6				1,2 1	C
0502	Shroud, Fan	Inspect Replace Repair		0.1 4.4 F				1,2	F,M
0503	Hoses, Lines, and Clamps	Inspect Replace	0.1	0.1 2.5				1	
	Thermostat	Test Replace		0.2 0.3				1,2	
0504	Pump, Water	Replace		3.5				1,6	
0505	Fan and Fan Drive	Inspect Replace Repair	0.1	0.1 1.0		4.7		1,2,150 1,6	
	Pulley, Water Pump Belt, Drive	Replace Inspect Replace		4.8 0.1 1.0				1,2,146 1,2	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
06	ELECTRICAL SYSTEM								
0601	Alternator	Inspect Test Adjust Replace Repair		0.2 0.3 1.1 0.3	1.2			2,155 1,2 1,2 9,50	
	Pulley, Alternator	Replace		1.2	4.0			1,2,157,	
0603	Starter	Inspect Test Replace Repair		0.2 0.3 1.9				2 1,2,134, 135,138 1,9,51	
0607	Instrument Panel				8.3				
	Switches	Replace		0.3				1	
	Instruments, Gauges	Inspect Replace	0.1	0.5				1	
	Circuit Breakers	Replace		0.5				1	
0608	Control, Directional Signal	Inspect Replace	0.1	0.3				1	
	Protective Control Box	Inspect Replace		0.1 0.3				1	
0609	Headlight	Inspect Adjust Replace	0.1	0.2 0.5				1,2 1	
	Lights, Composite, Front and Rear	Inspect Replace	0.1	0.1				1	
0610	Sending Units and Warning Switches	Test Replace		0.1 0.1				2 1	
0611	Horn Assembly	Inspect Test Replace	0.1	0.2 0.3				2 1	
	Switch, Horn	Test Replace		0.2 0.2				2 1	
0612	Battery	Inspect Test Service Replace	0.1	0.5 0.2 1.6				2 1 1	
	Cables, Battery	Inspect Replace Repair	0.2	0.8 0.5				1 1,2	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code	
			Unit		Direct Support	General Support	Depot			
			C	O	F	H	D			
0613	Wiring Harnesses Wiring Harness, Engine	Inspect		0.3						
		Replace			4.5			1,6		
		Repair		0.5				1,2,154		
	Wiring Harness, STE/ICE-R	Inspect		0.3						
		Replace			3.7			1,6		
		Repair		0.5				1,2,154		
	Wiring Harness, Body	Inspect		0.4						
		Replace				3.5		1,6		
		Repair		0.5				1,2,154		
	Wiring Harness, Hood	Inspect		0.2						
		Replace		1.0				1		
		Repair		0.5				1,2,154		
	07	TRANSMISSION								
	0705	Shift Control and Linkage	Inspect	0.1	0.2					
			Adjust		0.5				1	
Replace				1.5				1,2		
Throttle Position Sensor		Repair		1.0				1,2		
		Adjust		0.1				1,2		
Switch, Neutral Start		Replace		0.6				1,2		
		Replace		0.5				1		
0708		Torque Converter	Replace			3.3		1,2		
0710		Transmission Assembly	Inspect	0.1						
			Test			0.5			2,6,79,80,134	
	Service			0.2				1,2		
	Replace				5.8			1,6,133		
	Repair					4.0		1,6,57,62		
	Overhaul					13.5	1,6,10,57-81			
	Transmission Mount	Inspect		0.2						
Gear Unit	Replace		1.0				1,2			
	Repair					1.5	1,6,65			
0713	Forward Clutch	Replace					2.0	1,6,67-69		
		Repair					0.6	1,6,68,69		
	Direct Clutch	Replace					2.0	1,6,66-69		
		Repair					0.8	1,6,68,69		
	Intermediate Clutch	Replace					2.0	1,6,65		
		Repair					0.8	1,6,65		
	Fourth Clutch	Replace					2.0	1,6,66-69		
		Repair					0.8	1,6,67		

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
0714	Turbine Shaft and Overdrive Carrier	Replace Repair				2.0 0.8		1,6 1,6,66,68,71	
	Rear Servo	Replace Repair				1.0 0.3		1,6,73,74 1,6,73,74	
	Front Servo	Replace Repair				1.0 1.0		1,6 1,6	
	Band, Front and Rear Governor	Replace Inspect Replace			0.2 0.5	2.5		1,6 1,6	
	Control Valve	Replace Repair				1.3	1.0	1,6 1,6,10	
0721	Oil Pump, Transmission	Replace Repair				1.0 1.6		1,6,64,67 1,6,72	
	Seal, Oil Pump	Replace			0.3			1,6,61	
	Oil Filter, Transmission	Replace		1.5				1,2	
	Oil Cooler Lines	Inspect Replace		0.2 1.0				1	
08	TRANSFER								
0801	Transfer Case	Inspect Service Replace Repair		0.1 0.5	5.2		5.7	2 1,6,133 1,6,85-92, 94-96	P
		Overhaul					10.0	1,6,10,60, 94-96, 127	
		Seal, Oil, Input and Output Shaft	Replace		1.3				1,2,94-96
0803	Yokes, Front and Rear	Replace		1.2				1,2	
	Bearings, Output Shaft	Replace				3.0		1,2,60,82, 87,93	
	Gear, Speedometer Driven	Replace		0.5				1,2	
	Shift Control and Linkage	Inspect Adjust Replace Repair	0.1	0.2 0.5 1.0	1.0			1 1,2 1,2	D

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
09	PROPELLER SHAFTS	Repair			1.0			1,2	
0900	Shaft, Propeller, Front	Service		0.2				1,2	
		Replace		1.0				1,2	
		Repair		0.5		1.2		1,2,6,160	E
	Shaft, Propeller, Rear	Service		0.2				1,2	
		Replace		1.0				1,2	
		Repair		1.2				1,2,160	
	Joints, Universal	Inspect		0.1					
		Service		0.3				2	
		Replace		1.5				1,2,160	
10	FRONT AXLE								
1000	Halfshaft	Inspect		0.2					
		Replace		2.2				1,2	
		Repair		1.0				1,2	
1002	Differential Assembly	Inspect		0.1				1,2	
		Service		0.5				1,2	
		Replace			5.0			1,7,60,82, 99-106	
		Repair				10.2		1,7,10,60,82, 99-106	
		Overhaul					15.0	1,7,10,60,82, 99-106	
	Seal, Output Shaft, Differential	Replace			1.0			1,6,99	
	Seal, Pinion, Differential	Replace			0.3			1,6,82	
	Differential Cover	Replace		0.5				1,2	H
1004	Knuckle and Geared Hub	Inspect		0.1				1,2	
		Service		0.5				1,2,157	K
		Replace		2.0		1.2		1,2,6,60, 107-109	
		Repair						1,2,108	
	Bearing, Spindle, Geared Hub	Adjust		0.9				1,2,60,107,	
	Seal, Input, Geared Hub	Replace		2.0				1,2,60,107,	
	Seal, Spindle, Geared Hub	Replace		1.0				1,2,60,107, 108	I
	Steering Stop	Adjust		0.5				1,2	
		Replace		0.3				1,2	
	Upper Control Arm	Inspect		0.1			4.0	113.1	
		Adjust						1,2	
		Replace		1.0				1,2	
		Repair				1.0		1,2	
	Lower Control Arm	Inspect		0.1				1,2	
		Replace		2.6				1,2	
		Repair				1.0		1,2	

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
11 1100 1102	Ball Joint, Upper and Lower	Replace		0.6				1,2,110,135,140	
	REAR AXLE								
	Halfshaft	Inspect Replace Repair		0.2 1.8 1.0				1,2 1,2	
	Differential Assembly	Inspect Service Replace Repair		0.1 0.5	5.0	10.0		1,2 1,2 1,7,60,82,99-106	
		Overhaul					15.0	1,7,10,60,82,99-106	
	Seal, Output Shaft, Differential	Replace			1.0			1,6,99	
	Seal, Pinion, Differential	Replace			0.3			1,6,82	
	Differential Cover	Replace		0.5				1,2	H
	Knuckle and Geared Hub	Inspect Service Replace Repair		0.1 0.5 2.0	1.2			1,2 1,2,157 1,2,6,60,107-109	K
	Bearing, Spindle, Geared Hub	Adjust		0.9				1,2,108	
	Seal, Input, Geared Hub	Replace		2.0				1,2,60,107,	
Seal, Spindle, Geared Hub	Replace		1.0				1,2,60,107,108	I	
12 1201	Upper Control Arm	Inspect Adjust Replace Repair		0.1 1.0		4.0		113.1 1,2 1,2	
	Lower Control Arm	Inspect Replace Repair		0.1 2.6	1.0			1,2 1,2	
	Ball Joint, Upper and Lower	Replace		0.6				1,2,110,135,140	
	BRAKES								
	Parking Brake Lever	Adjust Replace	0.3	1.0				1,2	
	Dual Service/Parking Brake Cable, Right Rear	Adjust Replace		0.5 0.7				1,2 1,2	
	Dual Service/Parking Brake Cable, Left Rear	Adjust Replace		0.5 0.5				1,2 1,2	
	Dual Service/Parking Calipers, Rear	Inspect Replace	0.1	1.0				1,2,151	
	Dual Service/Parking Pads, Rear	Inspect Replace		0.2 1.0				1,2,151	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
1202	Service Brakes	Test	0.1						
	Calipers, Front and Rear	Replace Repair		1.0	0.5			1,2,141,151 1,6	
	Pads, Front and Rear	Inspect Replace		0.2 1.0				1,2,141	
	Rotor, Front and Rear	Inspect Replace Repair		0.1 1.2	1.5			1 1,2 1,6	
1204	Master Cylinder	Inspect Service Replace	0.1	0.2 0.5				2 1,2	
	Brake Lines	Inspect Replace		0.2 1.5				1	
	Proportioning Valve	Replace		0.6				1,2	
1205	Hydro-Booster	Replace		1.3				1,2	
1206	Pedal, Brake	Replace		1.0				1,2,135,142	
13	WHEELS AND TIRES								
1301	Front Wheel Toe-In	Align		0.5				1	
	Rear Wheel Toe-Out	Align		0.5				1	
1311	Wheel and Tire Assembly	Inspect	0.1	0.1					
		Service	0.2						
		Replace Repair	0.4	0.1 0.5				1,2 1,2,114	N
	Runflat Assembly	Replace		2.2				1,2,115, 143	J
14	STEERING								
1401	Mechanical Steering Wheel, Steering Column	Replace		0.7				1,2,159	
		Inspect		0.1					
		Replace		1.8				1,2	
	Intermediate Shaft, Steering	Service		0.2				2	
		Replace		0.5				1,2	
	Tie Rod Assembly	Inspect Service Adjust Replace		0.1 0.2 0.5 0.5				1,2 1,2,157 1,2,110	
Center Link	Inspect Replace		0.1 0.3				1,2,157		

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
1407	Pitman Arm	Inspect Replace		0.1 1.0				1,2,110, 157	
	Idler Arm	Inspect Replace		0.1 0.3				1,2,110	
	Gear, Power Steering	Inspect Replace Repair		0.2 0.5	3.7			1,2, 1,6,116-119	
1410	Pump, Power Steering	Inspect Test Service Replace Repair	0.1	0.1 0.5 0.2 1.0		1.0		1,2,120-122 1,2 1,2 1,6	
1411	Pulley, Power Steering Pump	Replace		0.5				1,2,121	
15	Hoses, Lines, and Fittings, Power Steering	Inspect Replace		0.2 1.0				1	
	FRAME								
	1501	Frame Assembly	Inspect Repair		0.5		F		1,5
1503	Crossmember, Transmission	Replace		2.0				1	
	Crossmember, Front, Brackets, and Supports	Inspect Replace Repair		0.2	4.5 2.0			1,6 1,5	
	Crossmember, Rear	Replace			2.0			1,2	
1503	Bumpers	Replace		0.5				1,2	
	Pintle, Towing	Inspect Service Replace Repair	0.1	0.1 1.0 0.2				1 1,2 1,2	
	16	SPRINGS AND SHOCK ABSORBERS							
1601	Springs	Inspect Replace		0.1 1.0				1,2	
1604	Absorbers, Shock	Inspect Replace	0.1	0.1 0.8				1,2,158	
1605	Rod, Stabilizer	Replace		1.5				1,2	
	Rod, Radius	Inspect Replace		0.1 1.0				1,2	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
18	BODY AND HOOD	Repair		0.5				1,2	
1801	Body	Inspect	0.1					1	
		Service		1.0				1,6	F
		Replace				F		1,2,5,123,124	F
		Repair				F			
	Hood	Inspect	0.1						
		Replace		1.3				1,2	
		Repair				F		1,5,6	F
	Cover, Engine Access	Inspect	0.1						
		Replace		0.1				1	
		Repair				F		1,5,123	F
	Door, Rear, Fixed	Inspect	0.1						
		Replace		0.2				1	
		Repair				F		1,5,123	F
	Door Assembly, Armor	Inspect	0.1						
		Replace		1.0				1,2	
	Door Handle and Latch, Armor	Inspect	0.1						
		Replace		0.8				1	
	Door Window, Armor	Inspect	0.1						
		Service	0.2	0.2					
		Replace		1.5				1	
	Footwell, Armor	Inspect	0.1						
		Replace		0.6				1	
	B-Beam Armor	Replace		0.5				1,2	
	Rear Partition Assembly	Inspect	0.1						
		Replace				2.0		1	
	Firewall Armor	Inspect	0.1						
		Replace		0.5				1,2	
	Side and Underbody Armor	Inspect	0.1						
		Replace		2.0				1	
	Turret Hatch Door	Inspect	0.1						
		Replace		0.2				1	
	Turret Pintle Mount	Replace		1.0				1	
	Turret Assembly	Inspect	0.1						
		Replace				1.5		1,2	
	Turret Frame	Replace				1.0		1,2	
	Door, Cargo Shell	Inspect	0.1						
		Adjust		0.3				2	
		Replace		1.0				1,2	
		Repair		F				1,2,123	F
	Gunner's Platform	Inspect	0.1						

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
1802	Tailgate	Replace		0.5				1	
		Inspect	0.1						
	Replace		0.4					1,2	
	Repair			1.0				1,5,123	
	Windshield Assembly, Folding	Inspect	0.1						
1806	Windshield Assembly, Armor	Replace		2.0		F		1,2	F
		Repair						1,5,6,123	
		Inspect	0.1						
1808	Windshield Glass, Armor	Replace				2.0		1,6	
		Repair				F		1,5,123	F
	Inspect	0.1							
	Replace		1.0					1	
	Seats	Inspect	0.1						
2001	Seatbelts	Replace		1.0				1,2	
		Repair		1.0				1,2	
		Inspect	0.1						
1808	Stowage Racks, Boxes, and Straps	Replace		0.8				1,2	
		Repair							
		Inspect	0.1						
2001	WINCH	Inspect							
		Replace							
		Repair							
		Service		0.2					
		Replace		0.6					1,2
		Repair			4.0				1,9,149
		Service		0.2					
		Replace		1.5					1,2
		Repair			4.0				1,9,149
		Inspect	0.5						
2001	Cable, Winch	Service		0.5				1	
		Replace		0.4				1,2	
		Inspect	0.1						
2001	Control Assembly, Winch	Replace		0.1				1,2	
		Inspect							
2201	BODY ACCESSORY ITEMS	Inspect	0.1						
		Service	0.5						
		Replace		0.5					1
		Repair			F			1,7	F
		Inspect	0.1						
2201	Cover, 2-Door Cab (M1113)	Service	0.1						
		Adjust	0.1						
		Replace		0.4					1,2
		Repair		0.2		F		1	
2201	Door, Front (M1113)	Replace						1,7	F
		Repair							
		Inspect	0.1						

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
2202	Motor, Windshield Wiper	Test		0.3				2	
		Replace		0.5				1,2	
	Arm Assembly, Wiper	Inspect	0.1						
		Replace		0.2				1	
	Linkage, Wiper	Replace		0.5				1	
	Motor and Reservoir Assembly, Washer	Test		0.2				2	
		Service		0.2				1	
		Replace		0.1				1,2	
	Nozzle, Washer	Replace		0.5				1	
	Mirror, Rearview	Inspect	0.1						
		Adjust	0.1						
		Replace		0.2				1,2	
	Reflectors	Replace		0.2				1	
	Ducting, Defroster and Heater	Replace		1.0				1	
Controls, Defroster and Heater	Replace		1.0				1		
Heater Assembly	Replace		1.4				1,2		
2210	Data Plates	Replace		0.5				1,123	
33	SPECIAL PURPOSE KITS								
3303	Engine/Crew Compartment Heater Kit	Install			8.0			1,6, 123-126	
	Pump and Lines, Fuel	Inspect	0.1	0.2					
		Replace		1.0				1,2	
	Pump, Water	Replace		0.5				1	
	Harness, Wiring	Replace		0.2				1	
	Inlet Pipe	Replace		0.2				1	
	Circuit Breaker	Replace		0.5				1	
	Heater	Inspect	0.1						
		Replace		0.2				1	
		Control, Heater	Replace		0.5				1
	Arctic 2-Man Crew Top Kit	Install			2.0			123	
	Arctic Cover, 2-Door Cab	Inspect	0.1						
		Replace		0.5				1	
		Repair			F			1,7	F
3305	Deep Water Fording Kit	Install		4.0				1,2	
	Snorkel, Intake and Exhaust	Inspect	0.2	0.2					
		Install	2.0						
		Replace		1.5				2	
	Venting	Inspect	0.1	0.1					
		Replace		1.0				1	

Section II. MAINTENANCE ALLOCATION CHART (Cont'd)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
3307	Communications Kit	Install Replace		3.0 F				1,2 1	F
	S250 Shelter Carrier (M1113)								
	Support, Shelter	Inspect Replace	0.1	2.0				1,2	
	Sling, Tiedown	Inspect Replace	0.1	0.3				1	
47	GAUGES (NON-ELECTRICAL)								
4701	Speedometer	Replace		0.2				1	
	Cable and Housing	Replace		0.5				1	
4702	Gauge, Air Restriction	Inspect Replace	0.1	0.1				1	
52	AIR CONDITIONER								
5203	Compressor, A/C	Replace			1.5			1,2	
	Air Conditioner System	Inspect Test Service	0.1 0.3		1.6			1,2,131, 127	
	Cover, Access Hole	Inspect Replace		0.1	0.5			1	
	Covers, Lines	Inspect Replace		0.1	0.5			1	
	Receiver Dryer	Replace			0.3			1	
5217	A/C Lines and Fittings	Inspect Replace		0.1	1.5			1,6	
	Harness and Cable	Replace			0.5			1	
	Relays	Replace			0.5			1	
	Condenser Assembly	Replace			1.6			1,2	
5241	Evaporator/Heater Assembly	Replace Repair			2.0 0.4			1,2 1,2	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	O	Tool Kit, General Mechanic's Automotive	5180-00-177-7033	
2	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common #1, Less Power	4910-00-754-0654	
3	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Supplemental #1, Less Power	4910-00-754-0653	
4	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common #2, Less Power	4910-00-754-0650	
5	O	Tool Kit, Body and Fender	5180-00-754-0643	
6	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	
7	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Supplemental #1, Less Power	4910-00-754-0706	
8	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Supplemental #2, Less Power	4910-00-754-0707	
9	F	Shop Equipment, Fuel and Electrical System Engine: Field Maintenance, Basic, Less Power	4940-00-754-0714	
10	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Wheeled Vehicles, Post, Camp and Station, Set A	4910-00-348-7696	
10.1	O	Special Tool Kit, Organizational	5180-01-387-5455	57K0267
11	O	Special Tool Kit, Organizational Supplemental	5180-01-410-8467	57K3219
12	F	Special Tool Kit, Direct Support	5180-01-389-7560	57K0268
12.1	H	Special Tool Kit, General Support Supplemental	5180-01-357-9692	57K0236
12.2	H	Special Tool Kit, General Support	5180-01-389-7561	57K0266
13	H	Special Tool Kit, General Support Supplemental	5180-01-408-7050	57K3218
14	O	Metric Wrench Set, 10-32-mm, Open End/Box End	5120-01-119-0010	B107.9TY3
15	O	Metric Socket Set, 6-26-mm, Std., 6 pt., 3/8-in. Drive	5120-01-117-3876	B107.7
16	F	Metric Socket Set, Std., 6 pt., 3/8-in. Drive, Deep Reach	5120-01-112-9543	B107.5
17	F	Metric Allen Wrench Kit	5120-01-046-5079	B18.32M

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (Cont'd)

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
18	F	Metric Tap and Die Kit	5136-01-119-0005	TDM99117
19	O	Universal Joint Bearing Kit	5120-01-210-4096	7057
		01 ENGINE		
20	F	Adapter, Compression Gauge	4910-01-238-2551	J 26999-30
21	F	Quick-Disconnect		J 25209
22	F	90° Elbow	4730-00-854-5837	MS51815
23	F	Remover, Hydraulic Valve Lifter	5120-01-209-6870	J 29834
24	F	Engine Lifting Sling	4910-01-193-7808	J 33139
25	F	Tester, Engine Compression	4910-01-355-7815	J 6692A
26	F	Gauge, Timing	4910-01-231-3671	MT95
27	F	Meter, Dynamic Timing	5180-01-186-3114	J 33127
28	F	Stand, Engine Repair	4910-00-506-0037	1725A
29	H	Installer, Crankshaft Rear Oil Seal	5120-01-422-0334	J 39084
30	H	Remover and Installer, Camshaft Bearings	5120-01-206-3818	J 35178
31	F	Pliers, Needle Nose, 90°	5120-01-367-4645	497ACP
		03 FUEL SYSTEM		
32	F	Remover, Fuel Injection Nozzle	5120-01-171-5233	J 29873
33	H	Installer, Drive Shaft Bearing	5120-01-208-7771	23805
34	H	Installer, Drive Shaft Seal	5120-01-208-7752	22727
35	H	Kit, Throttle and Shutoff Shaft Bushing	5180-01-189-0448	18411
36	H	Socket, Torx Drive, T27	5120-01-367-3534	FTX27A
37	H	Support, Governor Weight	5120-01-197-0236	16313
38	H	Wrench, End Cap	5120-01-207-5563	20548
39	H	Roller to Roller Setting Tool	5120-01-200-4526	19969
40	H	Fixture, Holding	5120-01-208-7753	23615
41	H	Mandrel, Pilot Tube	5120-01-208-1767	16314
42	H	Extractor, Delivery Valve Test Set, Calibration	5120-00-816-7859	26081
43	H	Linkage Gap Tool	5210-01-249-0370	23080
44	H	Indicator, Automatic Advance	5210-01-249-0368	23745
45	O	Block, Valve Gauge	4820-01-179-4869	J 33043
46	H	Protractor	6675-01-247-2286	22089
47	H	Gauge, Air Timing	5220-01-247-0361	23715

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (Cont'd)

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
48	F	Retaining Tool		J 26528
		05 COOLING SYSTEM		
49	O	Tester, Radiator	4910-01-018-4373	ST255A
		06 ELECTRICAL SYSTEM		
50	F	Socket, Torx	5120-01-227-3159	TLE60
51	O	Starter Pinion Core Shaft Nut Driver	9530-00-236-7723	
		9530-00-061-0463		
52	F	Carbon Pile	6110-00-038-0074	A 1705070
53	F	Armature Test Set		1231009
54	F	Puller	5120-00-595-9305	GGGP781
55	F	Switch	2920-00-789-0652	S0014932SA
56	F	Test Stand	4928-00-939-9489	667035
		07 TRANSMISSION		
57	H	Fixture, Transmission Holding	5120-01-198-7583	J 8763-B
58	H	Base, Transmission Holding Fixture	5120-01-144-4484	J 3289-20
59	H	Adapter, Slide Hammer, 3/8-16	5120-01-130-8865	J 6471-2
60	O	Driver Handle	5120-01-026-1666	C 4171
61	F	Installer, Oil Pump Seal	5120-01-176-1845	J 21359A
62	H	Adapter, Holding Tool, Use W/J 8763-02	5120-01-422-1326	J 38655
63	H	Adapter, Torque, 3/8-in.	5120-01-367-3536	FTX40A
64	H	Removal/Installer Tool, Oil Pump	5120-01-422-1308	J 37789-A
65	H	Installer/Remover, Gear Unit	5120-01-422-1300	J 38868-A
66	H	Alignment Tool, Intermediate, Clutch Pack	4910-01-209-0729	J 24396
67	H	Adapter, Clutch Compressor Spring, Use W/J 23327	5120-01-422-1329	J 38734
68	H	Seal Protectors, Forward Clutch Piston, Kit Includes J 38732-1 and J 21362	5120-01-422-1301	J 38732
69	H	Compressor, Clutch Spring	4910-01-178-0724	J 23327
70	H	Adapter, Compressor, Clutch Spring, Use W/J 23327	5120-01-410-8216	J 25018-A
71	H	Seal Piston and Housing, Fourth Clutch, Includes J 38731-1, J 38731-2, J 38731-3	5180-01-422-0138	J 38731
72	H	Installer/Sizer/Pusher, Turbine	5120-01-408-7051	J 38736

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (Cont'd)

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
73	H	Shaft Seal, Includes J 38736-1 thru J 38736-6 Installer/Sizer/Pusher, Oil Pump Seal Ring J 38739-1, J 38739-2, J 38739-3	5180-01-422-1294	J 38739
73.1	H	Center Support Thread Reamer		J39919
74	H	Gauge Pin, Band Apply, Use W/J 38737	5120-01-423-0032	J 21370-10
75	H	Tool, Pin Checking, Band Apply	5120-01-422-1313	J 38737
76	H	Bushing Service Set	5180-01-195-9777	J 21465-01
77	H	Reamer		J 39919-1
78	H	Gauge Pin, Center Support		J 39919-2
79	O	Jumper, Throttle Position Sensor Adjustment	6150-01-412-7774	12460120
80	O	Case, Transmission Diagnostic Cable	5120-01-408-8173	12460136
81	O	Diagnostic Switch Cable	6150-01-410-8215	12460137
		08 TRANSFER		
82	F	Installer, Yoke Seal	4910-01-179-5530	J 29162
83	H	Adapter, Slide Hammer	5120-01-391-5131	J 6471-8
84	O	Mirror, Inspection	5120-00-618-6902	71-510
85	H	Installer, Bushing Remover/Bearing	5120-01-357-3633	J 33826
86	H	Installer, Mainshaft Pilot Bearing	5120-01-389-9992	J 39636
87	H	Installer, Input Gear Seal	5120-01-357-3632	J 33831
88	H	Installer, Output Shaft Front Bearing	5120-01-357-3630	J 33833
89	H	Remover, Output Shaft Front Bearing		J33832
90	H	Installer, Output Shaft Seal	5120-01-227-1680	J 22661
91	H	Remover, Extension Housing Bushing	5120-01-357-3631	J 33839
92	H	Bearing Inserter	5120-01-357-9123	J 9276-3
93	H	Installer, Extension Housing Seal	5120-01-361-3101	J 33843
94	H	Installer, Bearing and Bushing	5120-01-185-7968	J 29174
95	O	Installer, Seal (Rear)		J 38869
96	O	Installer, Seal (Front)		6888
97	H	Remover, Universal Bearing and Bushing	5120-01-201-7857	J 29369
98	H	Screw Extractor Set	5120-00-610-1888	E 1020

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (Cont'd)

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
		10 AND 11 FRONT AND REAR AXLE		
99	F	Installer, Axle Shaft and Seal	5120-01-187-3659	J 33142
100	H	Adapters, Axle Holding Fixture	5120-01-218-8235	J 33149-A
101	H	Spreader, Differential Housing	4910-00-105-2823	W129B
102	H	Remover, Pinion Rear Bearing Cup	5120-01-185-7957	J 21786
103	H	Remover, Pinion Front Bearing Cup	5120-01-187-3660	J 21787
104	H	Installer, Pinion Rear Bearing Cup	5120-01-185-7962	J 8608
105	H	Installer, Pinion Front Bearing Cup	5120-01-185-7964	J 8611-01
106	H	Set, Pinion Setting Gauge	5180-01-363-8079	J 39524
107	O	Installer, Geared Hub Input Seal	5120-01-187-3607	J 33143
108	O	Wrench, Geared Hub Locknut	5120-01-185-7963	J 33144
109	O	Installer, Geared Hub Spindle Seal	5120-01-229-0842	J 35184
110	O	Pickle Fork	5120-00-880-4268	11595179
111	H	Arbor Press		AA51195
112	F	Blind Hole Puller Set	5120-00-140-3557	CG46
113	F	Dial Indicator	5210-00-277-8840	196A
113.1	H	Alignment Equipment, Vehicle	4910-01-154-1820	DFP 134
		13 WHEELS AND TIRES		
114	O	Bubble Balancer	4910-01-093-0167	MIL-B-45989
115	O	Runflat Compressor	5120-01-335-5847	J 39250 or 528236
		14 STEERING SYSTEM		
116	F	Remover and Installer, Adjuster Plug Bearing	5120-01-185-7965	J 6221
117	F	Remover and Installer, Pitman Shaft Bearing	5120-01-082-6447	J 6278
118	F	Wrench, Spanner	5120-01-082-6436	J 7624
119	F	Arbor, Rack Piston	5120-01-179-1032	J 21552
120	O	Analyzer, Power Steering	4910-01-185-7966	12342943
121	O	Installer, Power Steering Pump Pulley	4910-01-179-2517	J 25033-B
122	O	Adapter	5120-01-231-1709	J 33141
		18 BODY AND HOOD		
123	O	Tool Kit, Riveter	5180-01-201-4978	D-100-MIL-1
124	F	Puller, Head, Right Angle	5130-01-044-7196	H763-456
125	F	Puller, Head, Offset	5130-01-329-0509	H781-456

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (Cont'd)

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
126	F	Puller, Head, Straight	5130-01-104-5370	H749-456
		52 AIR CONDITIONER		
127	F	Tool Kit, Compressor	5180-01-267-2907	J 29642-C
128	F	Flushing Cylinder	4310-01-248-8460	ACT 71
129	F	Flush Gun	4910-00-357-1374	10351
130	F	Manifold Gauge Set	4130-01-032-2912	622-C
131	F	Tool Kit, Service Refrigeration Unit	5180-00-596-1474	
132	F	Vacuum Pump	4310-00-460-5237	3305
		MULTIPURPOSE TOOLS		
133	O	Adapter, Torque, 9/16-in.	5120-01-367-3582	SRES 18
134	O	Adapter, Torque, 3/4-in.	5120-01-367-3585	SRES 24
135	O	Adapter, Socket, 3/8-in. to 1/2-in. Drive	5120-00-240-8702	11655788-2
136	F	Crowfoot, 3/8-in. Drive, 16-mm	5120-01-242-8165	J 35159
137	F	Crowfoot, 3/8-in. Drive, 19-mm	5120-01-230-9421	J 35160
138	O	Crowfoot, 3/8-in. Drive, 5/8-in.	5120-00-184-8398	AN8506-4
139	O	Crowfoot, 3/8-in. Drive, 9/16-in.	5120-00-335-1094	FC 18A
140	O	Crowfoot, 3/8-in. Drive, 15/16-in.	5120-01-335-1100	FC-30A
141	O	Crowfoot, 3/8-in. Drive, 14-mm	5120-01-079-8023	J-35158
142	O	Crowfoot, 3/8-in. Drive, 7/8-in.	5120-01-335-1099	FC-28A
143	O	Crowfoot, 3/8-in. Drive, 11/16-in.	5120-01-335-1096	FC-22A
144	O	Socket, Deep Well, 12-pt., 3/8-in.	5120-00-277-1463	FVS121
145	O	Driver, Hex-Head, 8-mm	5120-01-053-4159	FAM8A
146	O	Driver, Hex-Head, 6-mm	5120-01-055-1308	FAM6A
147	O	Driver, Hex-Head, 1/8-in.	5120-00-516-4979	J 35171
148	F	Driver, Hex-Head, 5/32-in.	5120-01-367-3456	FA5A
149	O	Driver, Hex-Head, 1/4-in.	5120-00-596-8508	FA8A
150	O	Driver, Hex-Head, 5/16-in.	5120-00-367-3477	FA10B
151	O	Driver, Hex-Head, 7-mm	5120-00-105-4110	FAM 7
152	O	Driver, Hex-Head, 3/16-in.	5120-00-683-8597	FA6A
153	O	C-Clamp	5120-00-180-0908	A-A-429
154	O	Connector Repair Kit	5180-00-876-9336	7550526
155	O	Multimeter	6625-01-139-2512	AN/PSM-45
156	F	Micrometer	5210-00-554-7134	GGG-C-105
157	O	Puller, Mechanical	5120-01-011-7938	C-3894-A
158	O	Socket, 1-1/2-in. Drive 3/4-in.	5120-00-293-0094	47148
159	O	Puller, Steering Wheel	5120-00-620-0020	6200020
160	O	Vise Insert	5120-00-221-1506	404-4

Section IV. REMARKS

(1) REFERENCE CODE	(2) REMARKS
A	Calibration time will be established when support equipment requirements are identified.
B	Operator drains water from fuel filter assembly. All other service is performed at unit level.
C	Operator replenishes coolant. All other service is performed at unit level.
D	Operator inspects shift lever. All other inspections are performed at unit level.
E	Direct support maintenance repairs coupling shaft by replacing center bearing. All other repair is performed at unit level.
F	In this category, no specific times can be established. Time required for repair will depend on the extent of repair required for damaged components.
G	Simplified Test Equipment/Internal Combustion Engine-Reprogrammable (STE/ICE-R) testing times may vary depending on the type of tests being performed.
H	For vehicles with new brake adapters, P/N 10453002.
I	It is authorized to remove spindle to replace the seal. All other repair is performed at direct support level.
J	Runflat compressor must be used with rubber runflat.
K	If the puller kit is not available at unit level, it can be found in the GSA catalogue, Blind Hole Puller Set, NSN 5120-00-140-3557.
L	This tool can be found in the MCRL or GSA catalogue, Manometer, U-Tube, NSN 6685-00-857-4895.
M	Fan shroud repair is limited to repairs that can be made using fiberglass repair kit (appendix C, item 57). Only those repairs that can be made while the shroud is installed on the vehicle are authorized.
N	Operator can remove and replace wheel assembly, but must notify unit maintenance to tighten lug nuts to proper torque as soon as possible.
O	Direct support replaces fuel injection pump governor cover gasket, shut-off solenoid, and cold-advance solenoid.
P	Direct support can reseal transfer case and transfer case housing with silicone sealant, (RTV), NSN 6850-01-159-4844.

APPENDIX C EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists expendable/durable supplies and materials you will need to maintain the ECV series vehicles. These items are authorized by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to each entry in the listing and is referenced in Initial Setup of applicable tasks under the heading of Materials/Parts.

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C — Operator/Crew

O — Unit maintenance

F — Direct support maintenance

H — General support maintenance

c. Column (3) - National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item listing indicates the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by an alphabetical abbreviation (QT, GAL.). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	H		ACETONE, TECHNICAL: (81348) O-A-51	
		6810-00-223-2739	1 Pint Can	PT
2	O		ADHESIVE: plastic cement (04963) 1099	
		8040-01-126-1422	1 Quart Can	QT
2.1	O		ADHESIVE: 20251 (05972)	
		8040-01-154-0038	25 CC Can	CC
3	O		ADHESIVE: ethyl-2-cyanoacrylate, low-viscosity (80244) A-A-3097 TY2CL2	
		8040-00-826-3535	16 Ounce Bottle	OZ
3.1	F		ADHESIVE SEALANT: anaerobic MIL-S-46163, type II, grade N (05972) 24231 Loctite 242	
		8030-01-014-5869	50 millimeter	ML
4	O		ADHESIVE: silicone rubber, black (01139) RTV-103	
		8040-00-865-8991	12 Ounce Cartridge	OZ
5	O		ADHESIVE: synthetic, rubber GA100AJ1	
		8040-00-165-8614	1 Quart Can	QT
6	O		ADHESIVE: silicone rubber (81349) MIL-A-46146 Type 1	
		8040-00-938-1535	12 Ounce Cartridge	OZ
7	O		ADHESIVE: plumbing, solvent cement (81349) MIL-A-22010	
		8040-00-573-1502	1 Pint Container	PT
7.1	O		ADHESIVE: sealing compound (00333) M6325-11	
		8030-01-347-0964	11 Ounce Container	OZ
8	O		ADHESIVE: type II, class I (80244) A-A-3097 TY2CL1	
		8040-01-167-2613	4 Ounce Bottle	OZ
		8040-01-090-9320	1 Pint	PT
		8040-01-043-7537	1 Pound Container	LB

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
9	O	8040-01-215-3426	ADHESIVE: general trim, spray (04963) 051135 08080 24 Ounce Can	OZ
10	O	8040-00-118-2695	ADHESIVE: RTV silicone rubber, clear (71984) SILASTIC 738 RTV 3 Ounce Tube	OZ
11			Deleted	
12	O	8040-00-833-9563	ADHESIVE: silicone rubber, general purpose (80244) MIL-A-46106, type I 5 Ounce Tube	OZ
13	F	8040-00-078-9774	ADHESIVE: (71984) 732 RTV 6 Ounce Cartridge	OZ
14	C	6850-00-174-1806	ANTIFREEZE: arctic-type (81349) MIL-A-11755 55 Gallon Drum	GAL.
15	C	6850-00-181-7929	ANTIFREEZE: ethylene glycol, inhibited heavy-duty, single package (81349) MIL-A-46153 1 Gallon Container	GAL.
		6850-00-181-7933	5 Gallon Container	GAL.
16	O	8030-00-059-2761	ANTISEIZE COMPOUND: conductive (81349) MIL-A-907 1 Pound Can	LB
17	F	8030-00-753-4953	ANTISEIZE COMPOUND: mica-base (81349) MIL-A-13881 1 Pound Can	LB
18	C	9150-01-102-9455	BRAKE FLUID: silicone, automotive, all-weather, operational and preservative (81349) MIL-B-46176 1 Gallon Can	GAL.
		9150-01-123-3152	5 Gallon Can	GAL.
19	F	4910-00-779-6851	CALIBRATING FLUID: (33287) J-26400-5B 5 Gallon Drum	GAL.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
20	O	7510-00-223-6701	CHALK, MARKING (81348) SS-C-255 1 Gross	GR
21	O	6850-00-003-5295	CLEANING AND LUBRICATING COMPOUND: electrical (81349) MIL-C-83360 16 Ounce Can	OZ
22	F	5350-00-221-0872	CLOTH: abrasive, crocus (58536) A-A-1206 50 Sheet Package	SH
		5350-00-268-3116	50 Yard Roll	YD
23	F	8030-01-398-6809	COATING COMPOUND: plastic, waterproof (0B629) 11603 14 Ounce Can	OZ
24	F	4020-00-008-6037	CORD, FIBROUS: tying, neoprene (81349) MIL-Y-1140 668 Yard Tube	YD
25	C	7930-00-282-9699	DETERGENT: general purpose, liquid (81349) MIL-D-16791 1 Gallon Container	GAL.
26	C	6850-00-110-4498	DRYCLEANING SOLVENT: (81348) P-D-680, type II 1 Pint Can	PT
		6850-00-274-5421	5 Gallon Drum	GAL.
		6850-00-285-8011	55 Gallon Drum	GAL.
		6850-00-637-6135	Bulk	GAL.
27	C	9140-00-286-5295	FUEL OIL: diesel, regular, DF-2 (81348) VV-F-800 5 Gallon Can	GAL.
		9140-00-286-5296	55 Gallon Drum	GAL.
28	C	9140-00-286-5287	FUEL OIL: diesel, winter, DF-1 (81348) VV-F-800 5 Gallon Drum	GAL.
		9140-00-286-5288	55 Gallon Drum	GAL.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
29	C	9140-00-286-5282	FUEL OIL: diesel, arctic, DF-A (81348) VV-F-800 5 Gallon Can	GAL.
		9140-00-286-5284	55 Gallon Drum	GAL.
30	F	6830-00-281-3036	FLUSHING AGENT: R-111 (81348) BBF1421 200 Pound Drum	LB
		5210-00-640-6177	Box	BX
32	F	9150-00-181-7724	GREASE: aircraft, general purpose, wide, temperature range (81349) MIL-G-81322 8 Ounce Tube	OZ
		9150-00-944-8953	1 Pound Can	LB
		9150-00-145-0268	5 Pound Can	LB
		9150-00-935-5851	35 Pound Can	LB
33	F	9150-00-985-7246	GREASE: aircraft and instrument, gear and actuator screw (81349) MIL-G-23827 1-3/4 Pound Can	LB
		9150-00-935-1017	14 Ounce Cartridge	OZ
34	C	9150-01-197-7689	GREASE: automotive and artillery (81349) MIL-G-10924 6-1/2 Pound Can	LB
		9150-01-095-5512	GREASE: ball and roller bearing (73219) 18901 Case, 24/14 Ounce Cans	OZ
		9150-01-015-1542	GREASE: lithium base w/molybdenum disulfide (60218) LS 2267 14.5 Ounce Cartridge	OZ
37	C	9150-01-353-4799	HYDRAULIC FLUID: transmission or power steering (24617) Dexron® III 1 Quart Can	QT
		1950-01-114-9968	55 Gallon Drum	GAL.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
38	F	5970-00-186-6529	INSULATING COMPOUND: (76381) Scotchcase No. 10 Resin Kit	KT
39	F	5970-00-740-2971	INSULATION: (81349) MIL-I-23053	N/A
40	F	5970-00-583-0401	INSULATION VARNISH: (08800) 1201 1 Quart Can	QT
41	C	9150-01-035-5390	LUBRICATING OIL: gear, multipurpose, GO 80/90 (81349) MIL-L-2105 1 Quart Can	QT
		9150-01-035-5391	5 Gallon Drum	GAL.
42	C	9150-01-035-5392	LUBRICATING OIL: gear, multipurpose, GO 80/90 (81349) MIL-L-2105 1 Quart Can	QT
		9150-01-035-5393	5 Gallon Drum	GAL.
43	C	9150-00-402-4478	LUBRICATING OIL: internal combustion engine, arctic, OEA (81349) MIL-L-46167 1 Quart Can	QT
		9150-00-402-2372	5 Gallon Drum	GAL.
		9150-00-491-7197	55 Gallon Drum	GAL.
44	C	9150-00-189-6727	LUBRICATING OIL: internal combustion engine, tactical service, OE/HDO 10 (81349) MIL-L-2104 1 Quart Can	QT
		9150-00-186-6668	5 Gallon Can	GAL.
		9150-00-191-2772	55 Gallon Drum	GAL.
45	C	9150-00-186-6681	LUBRICATING OIL: internal combustion engine, tactical service, OE/HDO 30 (81349) MIL-L-2104 1 Quart Can	QT
		9150-00-188-9858	5 Gallon Drum	GAL.
		9150-00-189-6729	55 Gallon Drum	GAL.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
46	O		LUBRICATING OIL: general purpose, corrosion resistant and oxidation resistant (92895) PQRUSTPREVENTIVENO172	
		9150-00-185-0629	2 Ounce Can	OZ
		9150-00-273-2389	4 Ounce Can	OZ
47	C		LUBRICATING OIL: internal combustion engine, tactical service, OE/HDO 15/40 (81349) MIL-L-2104	
		9150-01-152-4117	1 Quart Can	QT
		9150-01-152-4118	5 Gallon Drum	GAL.
		9150-01-152-4119	55 Gallon Drum	GAL.
48	F		LUBRICATING OIL: refrigerant, compressor (2R128) ICEMATIC SW-68	
		9150-01-410-8972	1 Quart Can	QT
49	H		LUBRICANT: oil seal (87460) 22204	
		N/A	8 Ounce Bottle	OZ
50	F		METAL STRIP: hot-rolled finish (81346) ASTM A569	
		9515-00-204-3988	10 Ft Roll	FT
51	F		NITROGEN: (81348) BB-N-411	
		6830-01-124-3351	Cylinder	N/A
52	H		PETROLATUM: technical (81348) VV-P-236	
		9150-00-250-0926	1-3/4 Pound Can	LB
		9150-00-250-0933	7-1/2 Pound Can	LB
53	H		PIGMENT, PAINT PRODUCTS: ultramarine, blue (96906)	
		8010-00-060-6020	1/2 Pint Can	PT
54	F		PRIMER: Weld-through (81349) MIL-P-46105	
		8010-01-296-7851	1 Gallon Container	GAL.
55	C		RAG: wiping, cotton and cotton-synthetic (58536) A-A-531	
		7920-00-205-1711	50 Pound Bale	LB

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
56	F		REFRIGERANT R-134a (25827) HFC-134A	
		6830-01-370-6207	43 Pound Cylinder	LB
57	O		REPAIR KIT, Glass Reinforcement Plastic Laminate (81349) MIL-R-19907D	
		2090-00-372-6064	1 Kit	KT
58	O		SEALING COMPOUND: anaerobic gasket (05972) 51831	
		8030-01-374-3504	50 Milliliter Tube	ML
		8030-01-374-2338	300 Milliliter Cartridge	ML
59	O		SEALING COMPOUND: adhesive, elastomeric (00333) M6325-11OZ	
		8030-01-347-0964	11 Ounce Cartridge	OZ
60	O		SEALING COMPOUND: anaerobic, adhesive/sealant (05972) 272-40	
		8030-01-171-7628	50 CC Bottle	CC
61	O		SEALING COMPOUND: corrosion-resistant (81349) MIL-S-81733, type II	
		8030-00-009-5023	Kit	KT
62	O		SEALING COMPOUND: pipe, anaerobic, with Teflon (05972) 59231	
		8030-01-054-0740	50 Milliliter Tube	ML
63	O		SEALING COMPOUND: thread-locking, high-strength (80244) MIL-S-46163, type I, grade K	
		8030-00-148-9833	10 CC Bottle	CC
64	O		SEALING COMPOUND: thread-locking, medium-strength (80244) MIL-S-46163, type II, grade N	
		8030-01-025-1692	250 CC Bottle	CC
65	F		SEALING COMPOUND: gasket, non-hardening (80244) MIL-S-45180, type II	
		8030-00-291-1787	1 Pint Can	PT

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
66	F		SEALING COMPOUND: thread-locking, penetrating, anaerobic (80244) MIL-S-46163, type III, Grade R	
		8030-00-111-2763	10 CC Bottle	CC
67	H		SEALING COMPOUND: high-temperature cylindrical part bonding (05972) 62040	
		8030-01-268-5917	50 CC Bottle	CC
68	O		SEALING COMPOUND: windshield (04962) EC1103	
		8030-00-165-6547	1 Quart Can	QT
69	F		SEALING COMPOUND: type II, synthetic rubber (81349) MIL-S-12158	
		8030-00-159-8177	1 Quart Can	QT
70	O		SEALING COMPOUND: synthetic rubber (71984) 737RTV	
		8030-01-328-0574	3 Ounce Package	OZ
71	O		SEALING COMPOUND: anaerobic/Loctite 290 (81349) MIL-S-46163	
		8030-00-111-2762	50 CC Bottle	CC
72	F		SEALING COMPOUND: (71961) 6099	
		8030-01-392-3276	1 Gallon Can	GAL.
72.1	O		SEALING COMPOUND: (80244) MIL-S-46163 TY2GRM	
		8030-01-054-3968	50 CC Bottle	CC
73	F		SILICONE COMPOUND: thermal insulating (71984) DC 340	
		6850-01-137-8525	2 Ounce Tube	OZ
		6850-00-927-9461	5 Ounce Package	OZ
74	O		SILICONE COMPOUND: RTV (11862) 1052734	
		6850-01-159-4844	10-1/2 Ounce Tube	OZ
75	O		SILICONE COMPOUND: dielectric colloid, non-melting, heat-stable, NATO code no. S-736 (81349) MIL-S-8660	
		6850-00-880-7616	8 Ounce Tube	OZ
		6850-00-295-7685	10 Pound Can	LB

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Cont'd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
76	O	6810-00-264-6618 6810-00-290-5574	SODIUM BICARBONATE: technical (baking soda) (81348) O-S-576 1 Pound Box 100 Pound Bag	LB LB
77			DELETED	
78	O	7510-00-149-0732	TAPE: pressure-sensitive adhesive, polyester film, transparent, 1 in. wide, 2 mil thick (80063) SMA 597833-3 72 Yard Roll	YD
79	O	8315-01-115-7617	TAPE: hook and pile material (81349) MIL-F-21840 1 Yard Roll	YD
80	F	9320-01-244-0046	TAPE: (04963) Y-9485 1 Yard Roll	YD
81	H	8010-00-160-5787	THINNER, LACQUER: cellulose nitrate (58536) A-A-857 1 Gallon Can	GAL.
82			DELETED	
83	F	5350-00-242-4404	WOOL, METALLIC: type III, medium (58536) A-A-1043 1 Pound Package	LB

APPENDIX D ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

D-1. SCOPE

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at unit, direct support, and general support maintenance.

D-2. GENERAL

- a. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.
- b. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

Table D-1. Manufactured Items Part Number Index.

PART NO.	FIGURE NO.	PART NO.	FIGURE NO.	PART NO.	FIGURE NO.
M23053/4-303-0	D-1	5578876	D-36	5584373	D-34
M23053/4-303-2	D-1	5578877	D-36	5584383	D-14
M23053/4-304-2	D-2	5578878	D-36	5584707	D-20
RR-C-271-6	D-3	5578887	D-8	5584813	D-21
SF5575898	D-7	5578910	D-9	5584836	D-21
SF5585243	D-15	5578911	D-10	5584892	D-36
SF5585245	D-15	5578940	D-28	5584893	D-36
SF5585258	D-15	5578999	D-11	5588617-7.5	D-30
SF5589035	D-4	5579007	D-10	5588767	D-10
SF5589036	D-4	5579008	D-9	5589275	D-29
SF5589037	D-5	5579997	D-12	5590023	D-13
SF5590706	D-25	5581213	D-26	5590024	D-13
SF5591372	D-6	5581366	D-31	5590025	D-13
SF5591612	D-24	5582451	D-37	5591157	D-34
SF5592748	D-4	5582479	D-13	5591158	D-34
14066306	D-17	5582641	D-34	5591159	D-34
15847	D-35	5582642	D-34	5591161	D-34
15848	D-35	5582643	D-34	5591168	D-34
1775-826	D-16	5582645	D-34	5591180	D-14
23500024	D-10	5582646	D-34	5591210	D-33
23500084	D-18	5582648	D-14	5591253	D-34
5573534	D-32	5582649	D-14	5591482	D-34
5574986	D-20	5583183	D-13	5591483	D-34
5575468	D-23	5583855	D-14	5591681	D-14
5577552	D-32	5584173	D-34	5591707	D-34
5578874	D-36	5584188	D-27	5591937	D-13
5578875	D-36	5584372	D-14	5591938	D-13

Table D-1. Manufactured Items Part Number Index (Cont'd).

PART NO.	FIGURE NO.	PART NO.	FIGURE NO.	PART NO.	FIGURE NO.
5594083	D-33	N/A	D-58	QQS634	D-84
5594278	D-22	N/A	D-59	QQS634	D-85
5595995	D-22	N/A	D-60	QQS634	D-86
5598825	D-38	5992390	D-61	QQS630	D-87
5598826	D-38	5992391	D-62	QQS741	D-88
5598828	D-39	5992392	D-63	QQS741	D-89
5598829	D-40	5992393	D-64	QQS741	D-90
5598830	D-41	5992396	D-65	N/A	D-91
5598847	D-42	5992397	D-66	N/A	D-92
5740702	D-9	5992398	D-67	N/A	D-93
9439363	D-19	5992399	D-68	N/A	D-94
N/A	D-43	5992400	D-69	N/A	D-95
N/A	D-44	5992401	D-70	N/A	D-96
N/A	D-45	5992402	D-71	N/A	D-97
N/A	D-46	5992403	D-72	14066305	D-98
N/A	D-47	5992404	D-73	23500023	D-99
N/A	D-48	5992405	D-74	5598827	D-100
N/A	D-49	5992406	D-75	MT161A	D-101
N/A	D-50	N/A	D-76	15667	D-102
N/A	D-51	N/A	D-77	N/A	D-103
N/A	D-52	QQS634	D-78	N/A	D-104
N/A	D-53	QQ-A-200/18	D-79	N/A	D-105
N/A	D-54	QQ-A-200/18	D-80	N/A	D-106
N/A	D-55	N/A	D-81	N/A	D-107
N/A	D-56	N/A	D-82		
N/A	D-57	N/A	D-83		

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.470 in. (11.9 mm) INSIDE DIAMETER	INSULATION SLEEVING, HEAT SHRINK	MIL-I-23053

HEAT SHRINK INSULATION SLEEVING				
ITEM NO.	INSULATION PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	M23053/4-303-0	1-1/2	38.1	M23053/4-303-0 (81349)
2	M23053/4-303-2	1-1/2	38.1	M23053/4-303-2 (81349)

Figure D-1. Heat Shrink Insulation Sleevings.

INSTRUCTIONS:

Determine part number needed from RPSTL and cut insulation to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.940 in. (23.9 mm) INSIDE DIAMETER	INSULATION SLEEVING, HEAT SHRINK	MIL-I-23053

HEAT SHRINK INSULATION SLEEVING			
INSULATION PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
M23053/4-304-2	2	50.8	M23053/4-304-2 (81349)

Figure D-2. Heat Shrink Insulation Sleevings.

INSTRUCTIONS:

Cut insulation to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
10 LINKS	CHAIN, WELDLESS	RR-C-271, TYPE II, CLASS 2

TOWING PINTLE LOCK CHAIN		
CHAIN PART NUMBER	CUT LENGTH	MANUFACTURED FROM NSN
RR-C-271-6	6 LINKS	4010-00-129-3321

Figure D-3. Towing Pintle Lock Chain.

INSTRUCTIONS:

Cut chain to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
20 in. (508 mm) INSIDE DIAMETER	DUCTING, FLEX	ASTM D1149

DEFROSTER FLEX DUCTING				
ITEM NO.	DUCTING PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	SF5589035	37	939.8	FLX4001-16057600 (16632)
2	SF5589036	7	177.8	FLX4001-16057600 (16632)
3	SF5592748	19	482.6	FLX4001-16057600 (16632)

Figure D-4. Defroster Flex Ducting.

INSTRUCTIONS:

Determine ducting part number needed from RPSTL and cut ducting to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
1.5 in. (38.1 mm) INSIDE DIAMETER	DUCTING, FLEX	ASTM D1149

DEFROSTER FLEX DUCTING			
DUCTING PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
SF5589037	33-1/2	850.9	FLX4001-12057600 (16632)

Figure D-5. Defroster Flex Ducting.

INSTRUCTIONS:

Cut ducting to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
3.00 in. (76.2 mm) INSIDE DIAMETER	DUCTING, FLEX	ASTM D1149

DEFROSTER FLEX DUCTING			
DUCTING PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
SF5591372	8-1/2	215.9	FLX4001-24057600 (16632)

Figure D-6. Defroster Flex Ducting.

INSTRUCTIONS:

Cut ducting to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.200 in. (5.08 mm) HEIGHT 0.162 in. (4.115 mm) WIDTH 0.085 in. (2.16 mm) OPENING	GROMMET, NONMETALLIC	ASTM D-4066

BATTERY CABLE EDGE PROTECTOR			
EDGE PROTECTOR PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
SF5575898	3-7/8	98.4	5325-00-074-3301

Figure D-7. Battery Cable Edge Protector.

INSTRUCTIONS:

Cut edge protector to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.500 in. (12.7 mm) INSIDE DIAMETER 0.750 in. (19.05 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	GM-6147-M

FUEL CAN DRAIN HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
5578887	10-1/2	266.7	9436581 (11862)

Figure D-8. Fuel Can Drain Hose.

INSTRUCTIONS:

Cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.375 in. ± 0.016 in. (9.525 mm ± 0.406 mm) INSIDE DIAMETER 0.625 in. ± 0.023 in. (15.87 mm ± 0.584 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	GM-6165-M

FUEL SUPPLY HOSE				
ITEM NO.	HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5578910	6-1/2	165.1	4720-01-159-5796
2	5579008	2-13/16	71.4	4720-01-159-5796
3	5740702	10	254.0	4720-01-185-9473

Figure D-9. Fuel Supply Hose.

INSTRUCTIONS:

Determine hose part number needed from RPSTL and cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.250 in. ± 0.016 in. (6.35 mm ± 0.406 mm) INSIDE DIAMETER 0.500 in. ± 0.023 in. (12.7 mm ± 0.584 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	GM-6165-M

FUEL HOSE				
ITEM NO.	HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	23500024	22	558.8	4720-01-155-7784
2	5578911	9	228.6	4720-01-155-7784
3	5579007	2-13/16	71.4	4720-01-155-7784
4	5588767	26	660.4	4720-01-155-7784

Figure D-10. Fuel Hose.

INSTRUCTIONS:

Determine hose part number needed from RPSTL and cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.290 in. ± 0.040 in. (7.37 mm ± 1.0 mm) INSIDE DIAMETER	HOSE, NONMETALLIC	ASTM D2000

OVERFLOW HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5578999	3-7/8	98.4	4720-01-185-6673

Figure D-11. Overflow Hose.

INSTRUCTIONS:

Cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.62 in. (15.75 mm) INSIDE DIAMETER 0.94 in. (23.88 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	SAE 20R3, CLASS D-1

HEATER HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5579997	2-1/2	63.5	4720-00-241-4435

Figure D-12. Heater Hose.

INSTRUCTIONS:

Cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.367 in. ± 0.023 in. (9.322 mm ± 0.584 mm) INSIDE DIAMETER 0.656 in. ± 0.031 in. (16.66 mm ± 0.787 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	GM-6210-M

TRANSMISSION COOLING LINES CONNECTOR HOSES AND STEERING HYDRAULIC SYSTEM HOSES				
ITEM NO.	HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5582479	3	76.2	4720-01-186-2358
2	5583183	19	482.6	4720-01-186-2358
3	5590023	23	584.2	4720-01-186-2358
4	5590024	41	1,041.4	4720-01-297-0255
5	5590025	27	685.8	4720-01-271-6955
6	5591937	7-1/4	178.1	4720-01-186-2358
7	5591938	10	254.0	4720-01-186-2358

Figure D-13. Transmission Cooling Lines Connector Hoses and Steering Hydraulic System Hoses.

INSTRUCTIONS:

Determine hose part number needed from RPSTL and cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.250 in. (6.35 mm) INSIDE DIAMETER 0.500 in. (12.7 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	N/A

VENT LINE HOSE				
ITEM NO.	HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5582648	4	101.6	4720-00-289-9625
2	5582649	25	635.0	4720-01-325-0204
3	5583855	42	1,066.8	4720-00-289-9625
4	5584372	8	203.2	4720-00-289-9625
5	5584383	32	812.8	4720-00-289-9625
6	5591180	2	50.8	4720-00-289-9625
7	5591681	18	457.2	4720-00-289-9625

Figure D-14. Vent Line Hose.

INSTRUCTIONS:

Determine hose part number needed from RPSTL and cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.190 in. (4.83 mm) INSIDE DIAMETER	HOSE, NONMETALLIC	ASTM D1149

WINDSHIELD WASHER HOSE				
ITEM NO.	HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	SF5585243	16	406.4	846-50 (11288)
2	SF5585245	36	914.4	846-50 (11288)
3	SF5585258	27	685.8	846-50 (11288)

Figure D-15. Windshield Washer Hose.

INSTRUCTIONS:

Determine hose part number needed from RPSTL and cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.125 in. (3.175 mm) INSIDE DIAMETER 0.25 in. (6.35 mm) INSIDE DIAMETER	HOSE, NONMETALLIC	N/A

AIR RESTRICTION HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
1775-826	84	2,133.6	4720-01-188-3190

Figure D-16. Air Restriction Hose.

INSTRUCTIONS:

Cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.156 in. (3.96 mm) INSIDE DIAMETER 0.281 in. (7.137 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	N/A

FUEL DRAINBACK HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
14066306	7	177.8	4720-01-184-0432

Figure D-17. Fuel Drainback Hose.

INSTRUCTIONS:

Cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.750 in. (19.05 mm) INSIDE DIAMETER 1.00 in. (25.4 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	N/A

THERMOSTAT BYPASS HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
23500084	5	127.0	4720-01-845-9211

Figure D-18. Thermostat Bypass Hose.

INSTRUCTIONS:

Cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.25 in. (6.35 mm) INSIDE DIAMETER 0.50 in. (12.7 mm) OUTSIDE DIAMETER	HOSE, NONMETALLIC	GM-6163-M

FUEL DRAINBACK HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
9439363	7	177.8	4720-01-163-7833

Figure D-19. Fuel Drainback Hose.

INSTRUCTIONS:

Cut hose to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.280 in. (7.11 mm) WIDTH 0.370 in. (9.40 mm) HEIGHT	PAD, CUSHIONING	N/A

HANDLE EDGE PROTECTOR				
ITEM NO.	EDGE PROTECTOR PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5574986	5-11/16	144.5	2590-01-196-7281
2	5584707	8-7/8	225.4	2590-01-196-7281

Figure D-20. Handle Edge Protector.

INSTRUCTIONS:

Determine edge protector part number needed from RPSTL and cut edge protector to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.75 in. (19.05 mm) ± 0.09 in. (2.29 mm), SQUARE	RUBBER, NEOPRENE	N/A

FIXED DOOR SEAL				
ITEM NO.	SEAL PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	5584813	49-7/16	1,255.7	R-421-N (82942)
2	5584836	21-15/16	557.2	R-421-N (82942)

Figure D-21. Fixed Door Seal.

INSTRUCTIONS:

Determine seal part number needed from RPSTL and cut seal to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.56 in. (14.2 mm) WIDTH 1.00 in. (25.4 mm) HEIGHT	CHANNEL, NONMETALLIC	N/A

HANDLE EDGE PROTECTOR				
ITEM NO.	EDGE PROTECTOR PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	5594278	6-1/2	165.1	ZX-4295 (76385)
2	5595995	8-1/2	215.9	

Figure D-22. Handle Edge Protector.

INSTRUCTIONS:

Determine edge protector part number needed from RPSTL and cut edge protector to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.10 in. (2.54 mm) THICK	RUBBER STRIP	N/A

ANTI-NOISE PAD			
PAD PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5575468	1-1/2 x 1-3/16	38.1 x 30.2	5330-01-198-3521

Figure D-23. Anti-Noise Pad.

INSTRUCTIONS:

Cut pad to size shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.250 in. (6.35 mm) THICK 0.50 in. (12.7 mm) WIDTH	SEAL	ASTM D-1056 ASTM D-903

WINDSHIELD LOWER SEAL			
SEAL PART NUMBER	CUT LENGTH		MANUFACTURED PART NUMBER (CAGEC)
	IN.	MM	
SF5591612	83-1/2	2,120.9	68-412121-2 (82942)

Figure D-24. Windshield Lower Seal.

INSTRUCTIONS:

Cut seal to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.188 in. (4.775 mm) THICK 0.50 in. (12.7 mm) WIDTH	SEAL	ASTM D-1056 ASTM D-903

WINDSHIELD LOWER SEAL			
SEAL PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
SF5590706	80-1/2	2,044.7	68-412121-1 (82942)

Figure D-25. Windshield Lower Seal.

INSTRUCTIONS:

Cut seal to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
N/A	SEAL, RUBBER	N/A

RUBBER LOWER SEAL			
SEAL PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5581213	17-1/4	438.2	5330-01-288-7822

Figure D-26. Rubber Lower Seal.

INSTRUCTIONS:

Cut seal to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.520 in. (13.21 mm) THICK 1.136 in. (28.85 mm) WIDTH	SEAL, NONMETALLIC	ASTM D 1056

TRAY ASSEMBLY SEAL			
SEAL PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5584188	100	2,540.0	5330-01-202-8360

Figure D-27. Tray Assembly Seal.

INSTRUCTIONS:

Cut seal to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.50 in. (12.7 mm) INSIDE DIAMETER	CHAFE GUARD, SPIRAL WRAP	N/A

SPIRAL WRAP CHAFE GUARD			
GUARD PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
5578940	3	76.2	25FT2661-16P-120.00 (98441)

Figure D-28. Spiral Wrap Chafe Guard.

INSTRUCTIONS:

Cut chafe guard to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.25 in. (6.35 mm) THICK 0.50 in. (12.7 mm) WIDTH	STRIP FOAM, INSULATION	MIL-I-14511B

FOAM INSULATION STRIP			
INSULATION PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
	IN.	MM	
5589275	12	304.0	1C-025-02 (55674)

Figure D-29. Foam Insulation Strip.

INSTRUCTIONS:

Cut insulation strip to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.75 in. (19.05 mm) WIDE	TAPE, FILAMENT	N/A

FILAMENT TAPE			
TAPE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5588617-7.5	7-1/2	190.5	7510-00-802-8311

Figure D-30. Filament Tape.

INSTRUCTIONS:

Cut tape to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.75 in. (19.05 mm) WIDTH 0.045 in. (1.14 mm) THICK	TAPE, FOAM	N/A

FOAM TAPE			
TAPE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5581366	81-1/2	2,070.1	9320-01-155-2369

Figure D-31. Foam Tape.

INSTRUCTIONS:

Cut tape to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.375 in. (9.525 mm) INSIDE DIAMETER 0.50 in.(12.7 mm) OUTSIDE DIAMETER	TUBING, NONMETALLIC	SAE J844

FUEL SYSTEM VENT LINE				
ITEM NO.	VENT LINE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5573534	27	685.8	4720-01-003-6706
2	5577552	43	1,092.2	4720-01-003-6706

Figure D-32. Fuel System Vent Line.

INSTRUCTIONS:

Determine vent line part number needed from RPSTL and cut vent line to length shown.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.312 in. (7.925 mm) INSIDE DIAMETER 0.375 in. (9.525 mm) OUTSIDE DIAMETER	TUBING, NONMETALLIC	SAE J844

FUEL TANK VENT LINE				
ITEM NO.	VENT LINE PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)
		IN.	MM	
1	5591210	11	279.4	PFT-6B (87373)
2	5594083	91	2,311.4	PFT-6B (87373)

Figure D-33. Fuel Tank Vent Line.

INSTRUCTIONS:

Determine vent line part number needed from RPSTL and cut vent line to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.180 in. (4.52 mm) INSIDE DIAMETER 0.250 in. (6.35 mm) OUTSIDE DIAMETER	TUBING, NONMETALLIC	SAE J844, TYPE A

VENT LINE TUBE				
ITEM NO.	TUBE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5582641	4	101.6	4720-01-071-4042
2	5582642	11	279.4	4720-01-071-4042
3	5582643	15	381.0	4720-01-071-4042
4	5582645	24	609.6	4720-01-071-4042
5	5582646	32	812.8	4710-01-347-6368
6	5584173	8	203.2	4720-01-071-4042
7	5584373	26	660.4	4720-01-071-4042
8	5591157	40	1,016.0	4720-01-071-4042
9	5591158	35-1/2	901.7	4720-01-071-4042
10	5591159	7	177.8	4720-01-071-4042
11	5591161	10	254.0	4720-01-071-4042
12	5591168	64	1,625.6	4720-01-071-4042
13	5591253	41	1,041.1	4720-01-071-4042
14	5591482	12	304.8	4720-01-071-4042
15	5591483	14	355.6	4720-01-071-4042
16	5591707	70	1,778.0	4720-01-071-4042

Figure D-34. Vent Line Tube.

INSTRUCTIONS:

Determine tube part number needed from RPSTL and cut tube to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 GAUGE, TYPE 1, CLASS A	WIRE, ELECTRICAL	MIL-C-13486

WINCH BATTERY CABLE						
ITEM NO.	CABLE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN	END TERMINALS NSN	END INSULATORS PART NO. (CAGEC)
		IN.	MM			
1	15847	74	1,879.6	6145-00-538-8219	5940-00-520-2447 5940-00-197-3664	M23053/03-0 (CAGEC 81349)
2	15848	87-1/2	2,222.5	6145-00-538-8219	5940-00-520-2447 5940-00-197-3664	M23053/03-0 (CAGEC 81349)

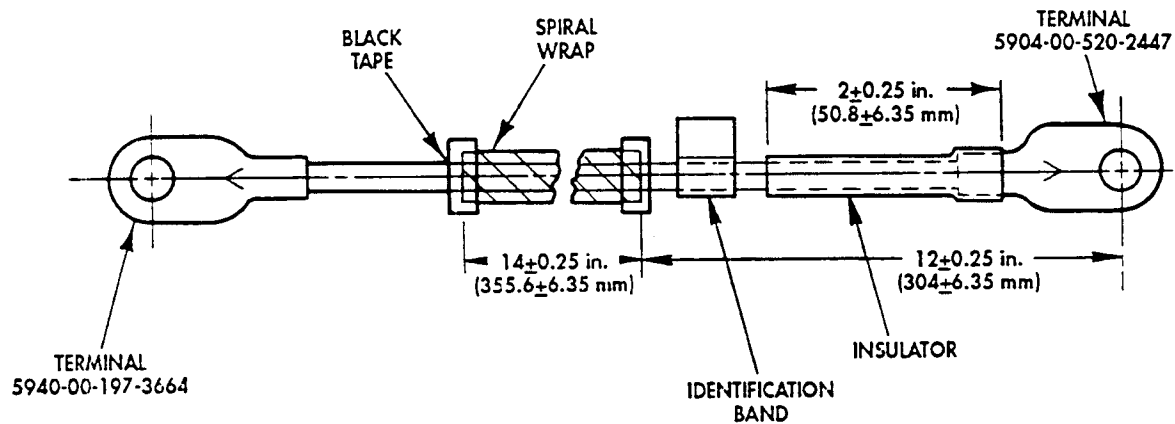


Figure D-35. Winch Battery Cable.

INSTRUCTIONS:

1. Determine cable part number needed from RPSTL and cut cable 6145-00-538-8219 to length as shown.
2. Select and solder proper end terminals to cable ends as shown. (Refer to TM 9-237 for soldering instructions.)
3. Install insulator as shown.
4. Cut 14-in. (355.6 mm) of spiral wrap from bulk 25 FT 40186 (CAGEC 17656) and install as shown. Spiral wrap is held in position with black tape at both ends.
5. Mark and install identification band using old cable as reference.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0 GAUGE	WIRE, ELECTRICAL	MIL-C-13486

BATTERY CABLE ASSEMBLY						
ITEM NO.	CABLE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN	END TERMINALS NSN	END INSULATORS NSN
		IN.	MM			
1	5578874	21	533.4	6145-00-705-6674	5940-00-705-6732 5940-00-705-6732	5970-01-174-9449
2	5578875	25	635.0	6145-00-705-6674	5940-00-735-5520 5940-00-705-6732	5970-01-174-9449
3	5578876	13	330.2	6145-00-705-6674	5940-00-705-6732 5940-00-705-6732	5970-01-174-9449
4	5578877	36	914.4	6145-00-705-6674	5940-00-735-5520 5940-00-705-6732	5970-01-174-9449
5	5578878	32	812.8	6145-00-705-6674	5940-00-705-6732 5940-00-705-6732	5970-01-174-9449
6	5584892	31	787.4	6145-00-705-6674	5940-00-735-5520 5940-00-735-5520	5970-01-174-9449
7	5584893	31	787.4	6145-00-705-6674	5940-00-735-5520 5940-00-705-6732	5970-01-174-9449

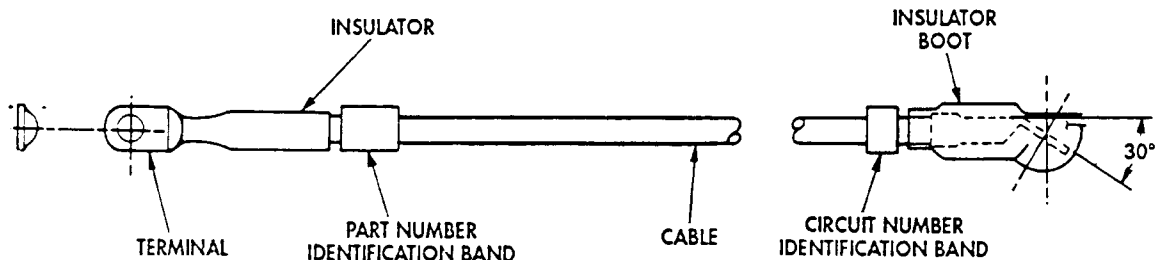


Figure D-36. Battery Cable Assembly.

INSTRUCTIONS:

1. Determine cable part number needed from RPSTL and cut cable 6154-00-705-6674 to length as shown.

NOTE

- Items 1, 4, 5, 6, and 7: flat of terminals to be 90° offset as shown without wire twist.
- Item 6: one terminal end is bent 30°.

2. Select and solder proper end terminals to cable ends as shown. (Refer to TM 9-237 for soldering instructions.)

NOTE

Insulator boot 5582481 is installed on 30° bent terminal end of item 6.

3. Select and install proper insulators as shown.
4. Mark and install circuit number identification band and part number identification band using old cable as reference.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0 GAUGE	WIRE, ELECTRICAL	MIL-C-13486

200-AMP ALTERNATOR CABLE ASSEMBLY					
CABLE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN	END TERMINAL NSN	END INSULATOR NSN
	IN.	MM			
5582451	58	1,473.2	6145-00-705-6674	5940-00-735-5520	5970-00-174-9449

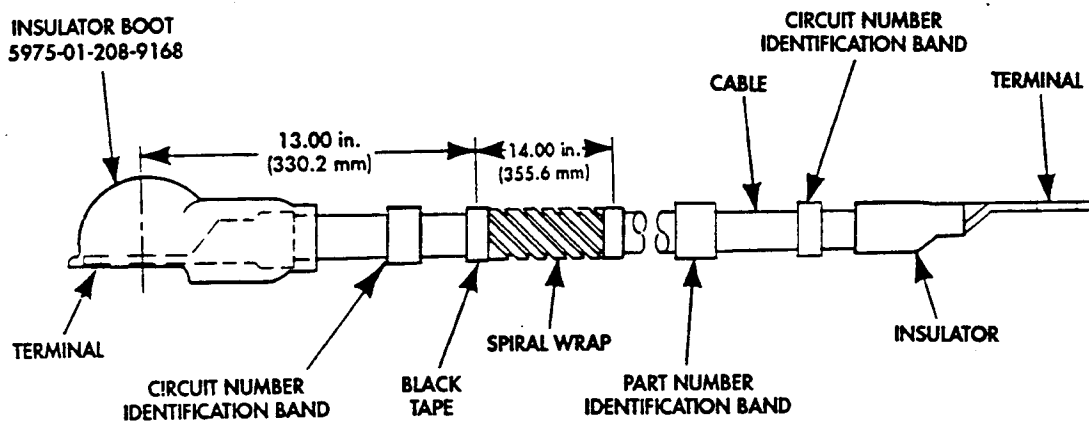


Figure D-37. 200-Amp Alternator Cable Assembly.

INSTRUCTIONS:

1. Cut cable to length as shown.
2. Cut 14-in. (355.6 mm) of spiral wrap from bulk 25 FT 40186 (CAGEC 17656) and install as shown. Secure spiral wrap in position with black tape at both ends.
3. Select and solder proper end terminals to cable ends as shown. Refer to TM 9-237 for soldering instructions.
4. Install insulator and insulator boot to cable ends as shown.
5. Mark and install identification bands using old cable as reference.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.250-in. (6.35 mm) DIAMETER 0.250-in. (6.35 mm) INSIDE DIAMETER 0.438-in. (11.125 mm) OUTSIDE DIAMETER	TUBE, METALLIC HOSE, NONMETALLIC	MIL-T-6845 MIL-H-13444

FUEL FILTER BLEEDER TOOL				
ITEM NO.	TOOL PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
		IN.	MM	
1	5598825	1-1/2	38.1	4710-00-825-5894
2	5598826	24	609.6	4720-00-542-3304

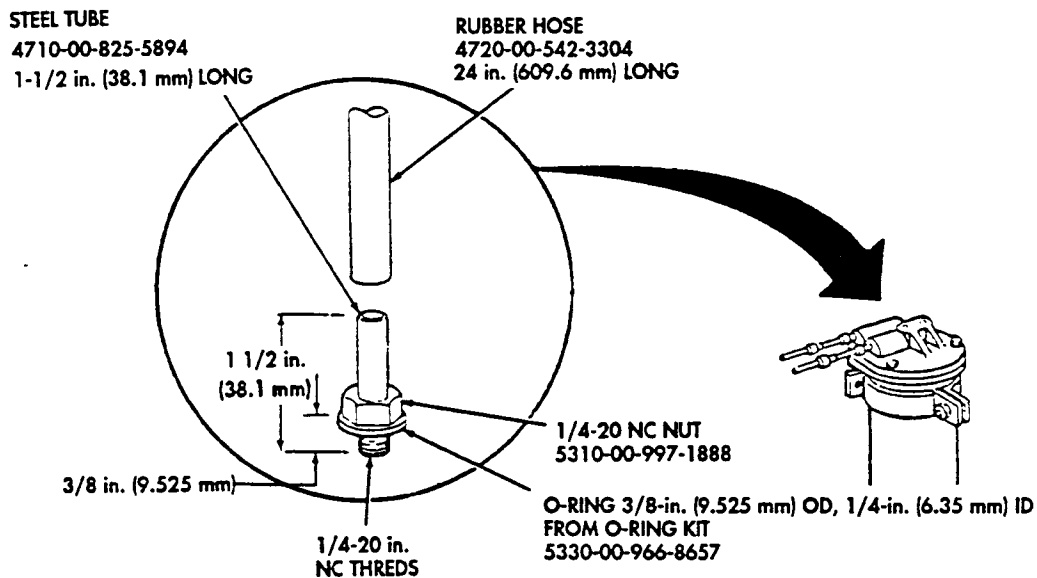


Figure D-38. Fuel Filter Bleeder Tool.

INSTRUCTIONS:

1. Cut steel tube, NSN 4710-00-825-5894, to length as shown.
2. Thread one end of the tube 5/8-in. (15.5 mm).
3. Install nut, NSN 5310-00-997-1888, and O-ring, NSN 5330-00-966-8657, on threaded end of tube.
4. Install 24-in. (609.6 mm) rubber hose, NSN 4720-00-542-3304, to the other end of the tube.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
12 x 4-ft (3.66 x 1.2 m) SHEET 0.060 in. (91.524 mm) THICK	ALUMINUM ALLOY TEMPER T-4	ASTM B 209-90

PROTECTIVE SHIELD		
PROTECTIVE SHIELD PART NUMBER	CUT TO SIZE	MANUFACTURED FROM NSN
5598828	AS SHOWN	9535-00-541-7194

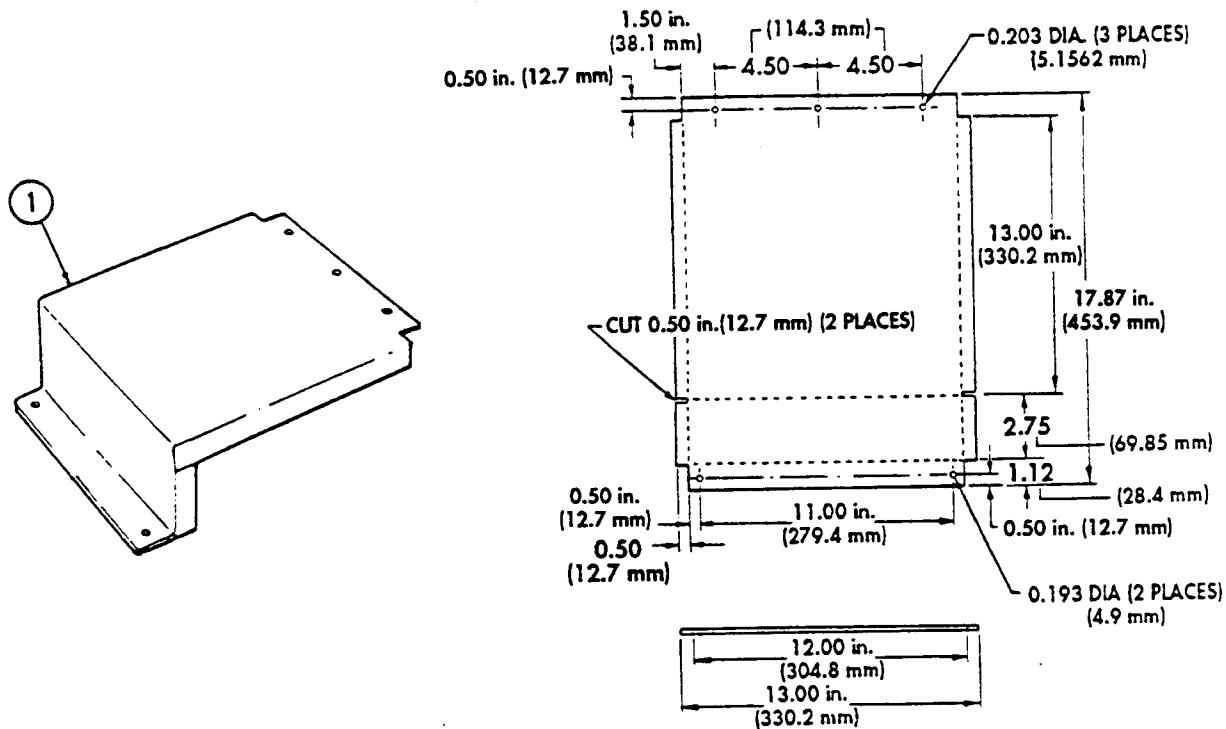


Figure D-39. Protective Shield.

INSTRUCTIONS:

1. Cut aluminum sheet metal to size as shown.
2. Locate, mark, and drill two 0.193-in. (4.902 mm) diameter holes in protective shield (1).
3. Locate, mark, and drill three 0.203-in. (5.156 mm) diameter holes in protective shield (1).
4. Make two 0.50-in. (12.7 mm) relief cuts in sides of protective shield (1).
5. Bend edges 90° along dotted lines on protective shield (1).
6. Paint protective shield (1) as required. Refer to TM 43-0139.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
4 x 8 ft (1.22 x 2.44 m) 0.750-in. (19.05 mm) THICK	PLYWOOD, SHEET	MIL-STD-731A

PROTECTIVE ENGINE COVER			
COVER PART NUMBER	CUT		MANUFACTURED FROM NSN
	IN.	MM	
5598829	34 x 60	863.6 x 1,524.0	N/A

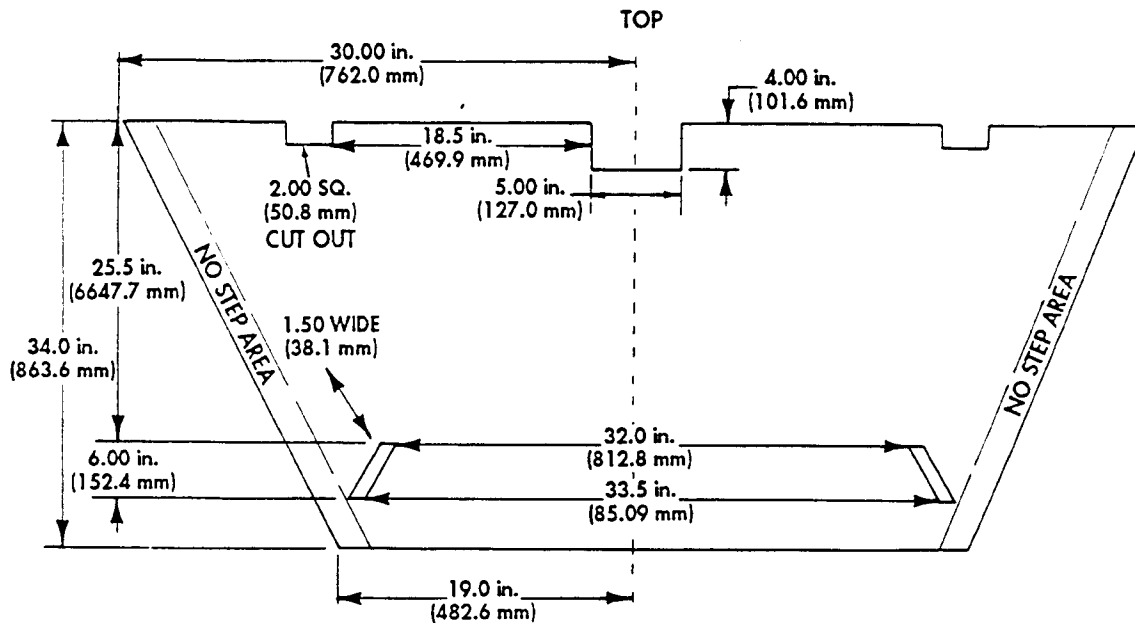


Figure D-40. Protective Engine Cover.

INSTRUCTIONS

1. Cut plywood to dimensions shown. If necessary, modify plywood for proper fit.
2. Paint cover and outline with yellow safety boarder, 4-in. (101.6 mm) wide on outside edges. Refer to TM 43-0139.
3. Stencil NO STEP AREA caution on outside edges.
4. Prior to installing protective engine cover, remove both plate covers and seals from airlift brackets.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
4 x 8 ft (1.22 x 2.44 m) 0.750-in. (19.05 mm) THICK	PLYWOOD, SHEET	MIL-STD-731A

COOLER FIN PROTECTIVE COVER			
COVER PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5598830	40 x 46-1/2	1,016. x 1,181.1	N/A

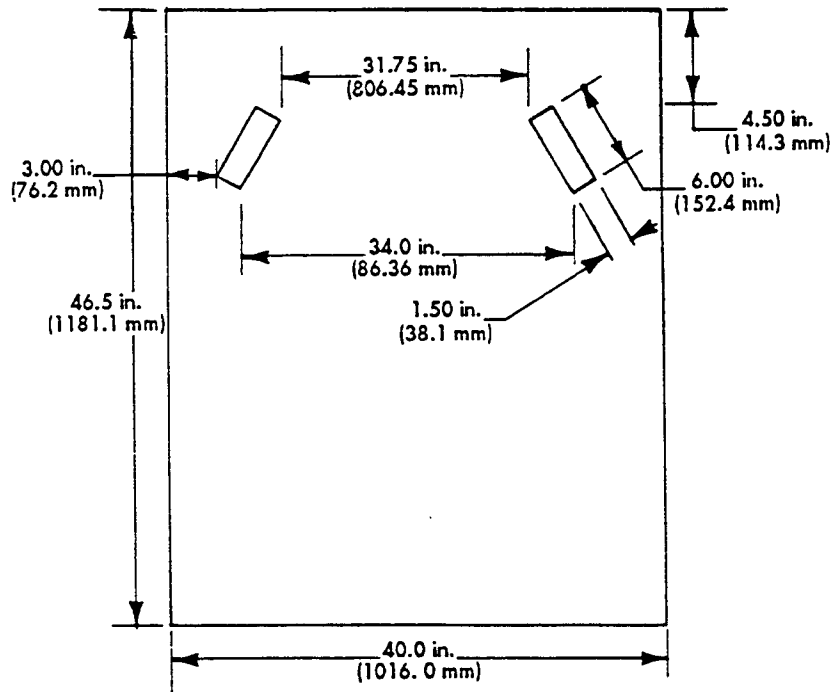


Figure D-41. Cooler Fin Protective Cover.

INSTRUCTIONS:

1. Cut plywood to dimensions shown. If necessary, modify plywood for proper fit.
2. Never use cover with engine running; engine damage may occur.
3. Stencil NO STEP caution on top of cover.
4. Prior to installing cooler fin protective cover, remove both plate covers and seals from airlift bracket.
5. Store flat or hang on wall to prevent warpage.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
N/A	STRAP WEBBING	N/A
N/A	THREAD	N/A

GRAB LOOP			
GRAB LOOP PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
5598847	12	304.8	8315-00-634-3304

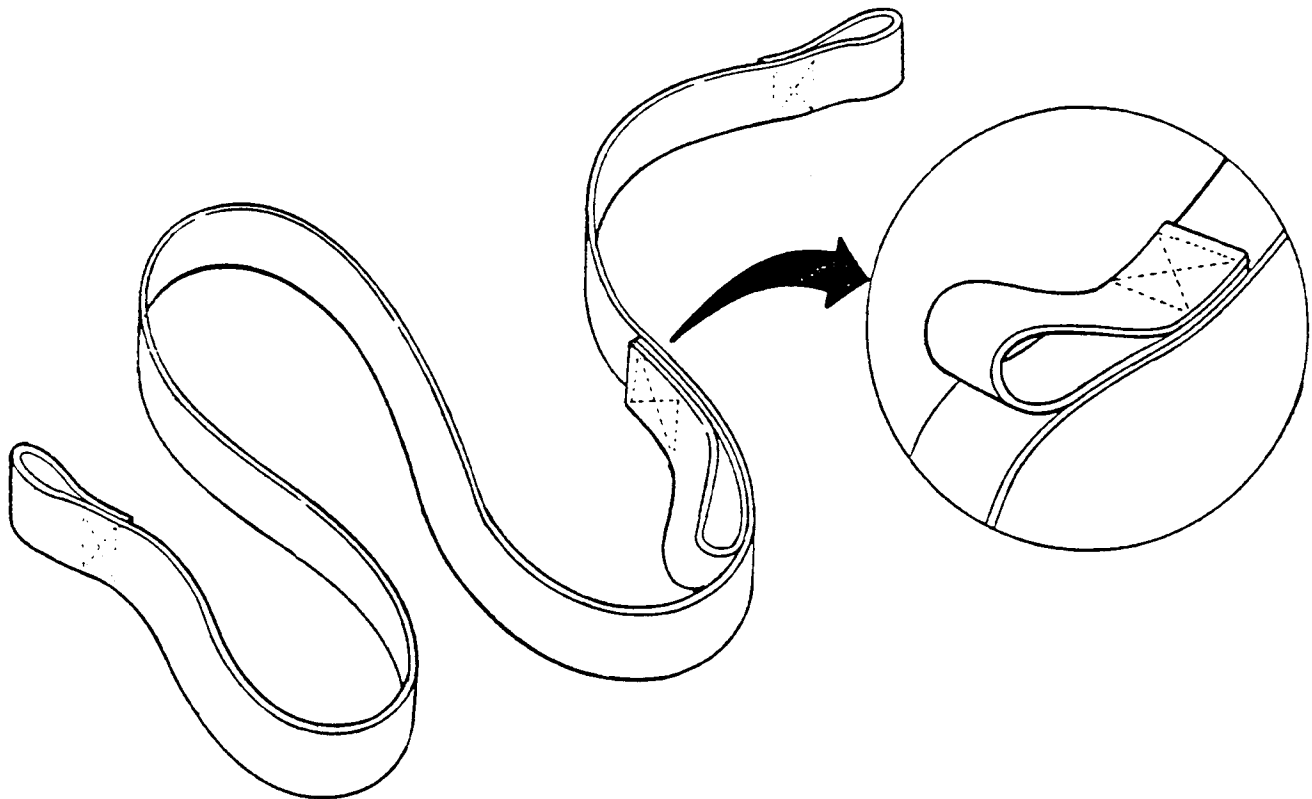


Figure D-42. Grab Loop.

INSTRUCTIONS:

1. Remove cargo shell door strap from vehicle. Refer to para. 11-23.
2. Position grab loop one-third of the way down strap. Fold strap into thirds and mark top fold.
3. Secure grab loop to strap with thread using box stitch and string. Refer to FM 10-16.
4. Install cargo shell door strap on vehicle with grab loop facing the rear. Refer to para. 11-23.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG N/A	WIRE, ELECTRICAL INSULATION SLEEVING	MIL-C-13486 MIL-I-23053/2

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
2	8	Electrical Wire: 48 in. (1,219.2 mm)	6145-00-152-6499
1	8	Insulation Sleeve: 2 in. (50.8 mm)	5970-01-815-1295
5	1	Receptacle	5935-00-738-8328
4	5	Tiedown Strap	5975-00-074-2072
3	8	Wire Marker	46F5981

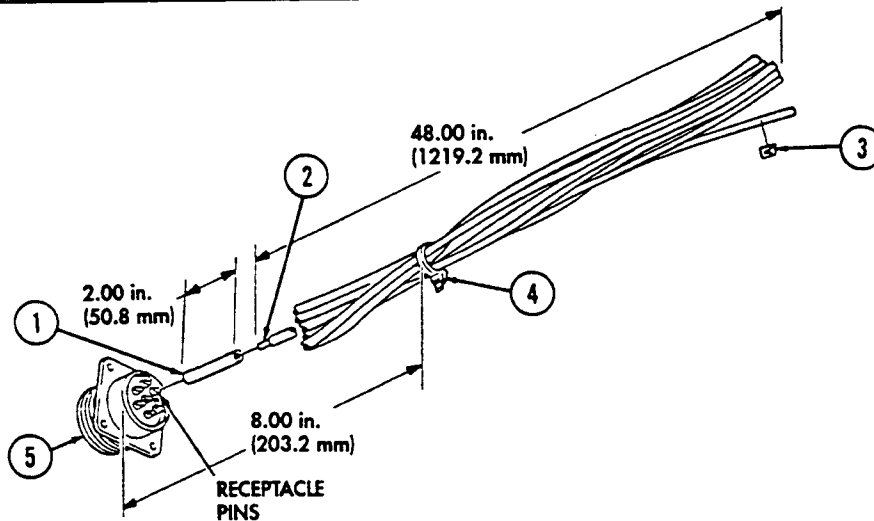


Figure D-43. Body Harness Receptacle Fabrication.

INSTRUCTIONS:

NOTE

When connecting electrical wire to connector pins on engine harness plug connector, use NSN 3439-00-133-1108 solder. (Refer to TB SIG-222 for soldering.)

1. Cut eight sections of wire (2) to length as shown.
2. Cut eight sections of insulation sleeving (1) as shown.
3. Position eight sections of insulation sleeving (1) on wires (2).
4. Connect eight sections of wire (2) to receptacle pins marked A, B, C, D, E, F, G, and H on receptacle (5). Place insulation sleeving (1) over wires (2) and receptacle pins and heat-shrink insulation sleeving (1) into position as shown.
5. Apply sealant NSN 8040-00-225-4918 to receptacle pins, wires, and sleeving.
6. Use wire markers (3) on eight sections of wire (2) to locate and mark wires. Secure eight sections of wire (2) with five tiedown straps (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG	WIRE, ELECTRICAL	MIL-C-13486

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
6	1	Coupling Nut	5310-00-655-9860
2	8	Electrical Wire: 48 in. (1,219.2 mm)	6145-00-152-6499
1	1	Grommet	5365-00-772-2322
5	1	Grommet Retaining Nut	5935-00-333-9414
7	1	Plug Shell Assembly	5935-00-686-2608
4	5	Tiedown Strap	5975-00-074-2072
3	8	Wire Marker	46F5981

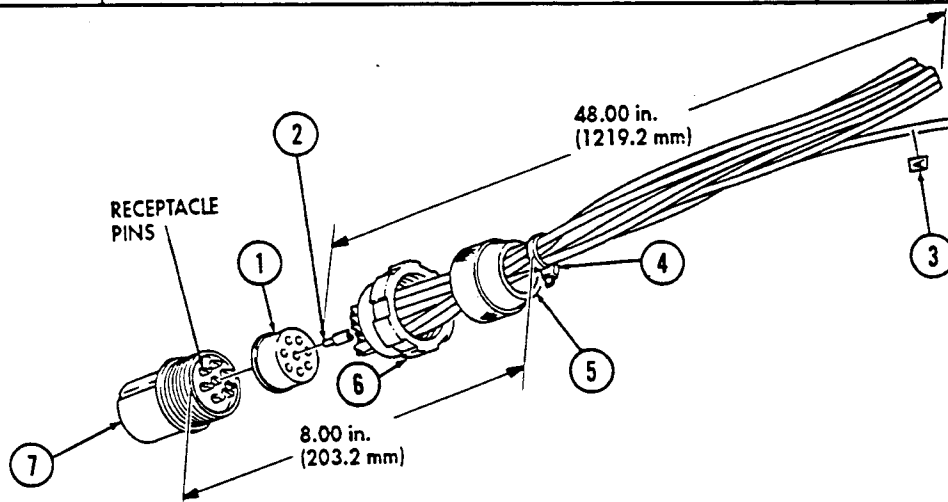


Figure D-44. Body Harness Connector Fabrication.

INSTRUCTIONS:

NOTE

When connecting electrical wires to connector pins on body harness connector, use NSN 3439-00-133-1108 solder. (Refer to TB SIG-222 for soldering.)

1. Cut eight sections of wire (2) to length as shown.
2. Place grommet retaining nut (5) over eight sections of wire (2).
3. Position eight sections of wire (2) in grommet (1).
4. Place coupling nut (6) over plug shell assembly (7).
5. Connect eight sections of wire (2) to receptacle pins marked A, B, C, D, E, F, G, and H on plug shell assembly (7).
6. Position grommet (1) in plug shell assembly (7) and secure with grommet retaining nut (5).
7. Use wire markers (3) on eight sections of wire (2) to locate and mark wires. Secure eight sections of wire (2) with five tiedown straps (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG	WIRE, ELECTRICAL	MIL-C-13486
14 AWG	WIRE, ELECTRICAL	MIL-C-13486/1
N/A	INSULATION SLEEVING	MIL-I-23053/2

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
5	1	Coupling Nut	5310-00-655-9860
2	6	Electrical Wire: 60 in. (1,524 mm)	6145-00-538-8222
6	3	Electrical Wire: 60 in. (1,524 mm)	6145-00-152-6499
7	3	Insulation Sleevings: 3 in. (76.2 mm)	5970-00-812-2967
1	1	Plug Connector	5935-01-173-7654
4	6	Tiedown Straps	5975-00-074-2072
3	9	Wire Marker	46F5981

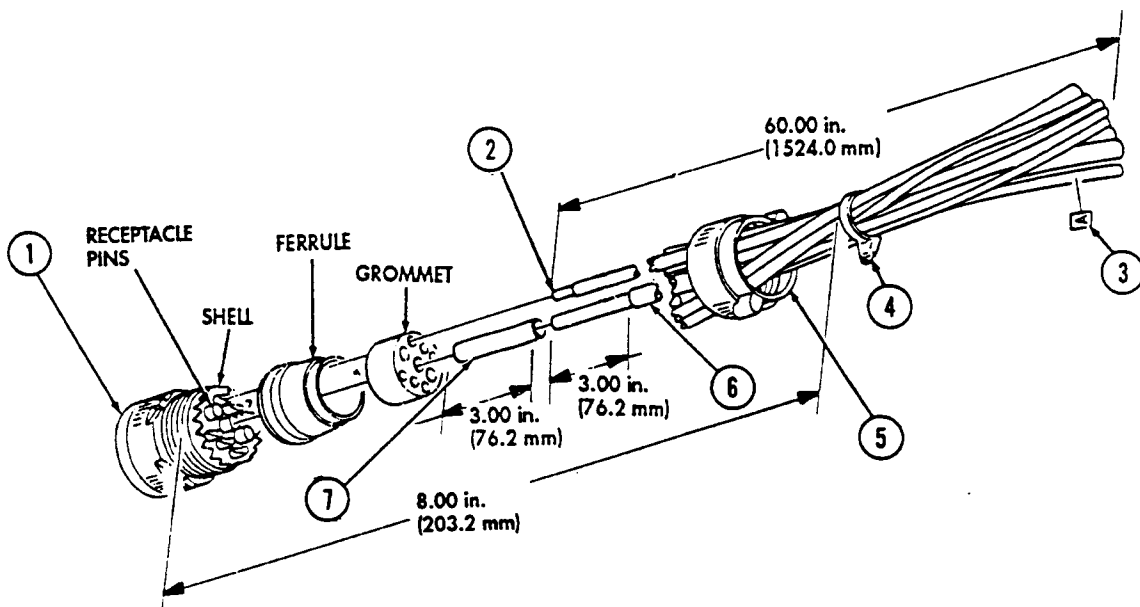


Figure D-45. Engine Harness Connector Fabrication.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)**INSTRUCTIONS:****NOTE**

When connecting electrical wire to connector pins on engine harness plug connector, use NSN 3439-00-133-1108 solder. (Refer to TB SIG-222 for soldering.)

1. Cut three sections of electrical wire (6) to length as shown.
2. Remove 3-in. (76.2 mm) section of electrical insulation from electrical wire (6).
3. Cut three sections of insulation sleeving (7) to length as shown.
4. Position three sections of insulation sleeving (7) over wires (6).
5. Using plug connector (1), disassemble shell, coupling nut (5), ferrule, and grommet.
6. Place coupling nut (5) and ferrule over three wires (6).
7. Place three wires (6) in holes marked D, E, and F in grommet.
8. Connect three wires (6) to receptacle pins marked D, E, and F on shell.
9. Cut six sections of electrical wire (2) to length as shown.
10. Place six wires (2) in coupling nut (5), ferrule, and holes marked A, B, C, G, H, and I on grommet.
11. Connect six wires (2) to receptacle pins marked A, B, C, G, H, and I on shell.
12. Position grommet and ferrule in shell and secure with coupling nut (5). Using three wires (6) with insulation, heat-shrink sleeving (7) in position.
13. Apply sealant NSN 8040-00-225-4918 to three wires (6) and insulation sleeving (7) on plug connector (1).
14. Using plug connector (1) and wire markers (3), locate and mark nine wires. Secure nine wires with six tiedown straps (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG	WIRE, ELECTRICAL	MIL-C-13486
14 AWG	WIRE, ELECTRICAL	MIL-C-13486/1
N/A	INSULATION SLEEVING	MIL-I-23053/2
N/A	INSULATION SLEEVING	MIL-I-23053/5

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
2	3	Electrical Wire: 60 in. (1,524 mm)	6145-00-538-8222
5	6	Electrical Wire: 60 in. (1,524 mm)	6145-00-152-6499
1	3	Insulation Sleeve: 1-1/2 in. (38.1 mm)	5970-00-812-2967
6	6	Insulation Sleeve: 1-1/2 in. (38.1 mm)	5970-00-815-1295
7	1	Receptacle Connector	5935-01-149-5163
4	6	Tiedown Strap	5975-00-074-2072
3	9	Wire Marker	46F5981

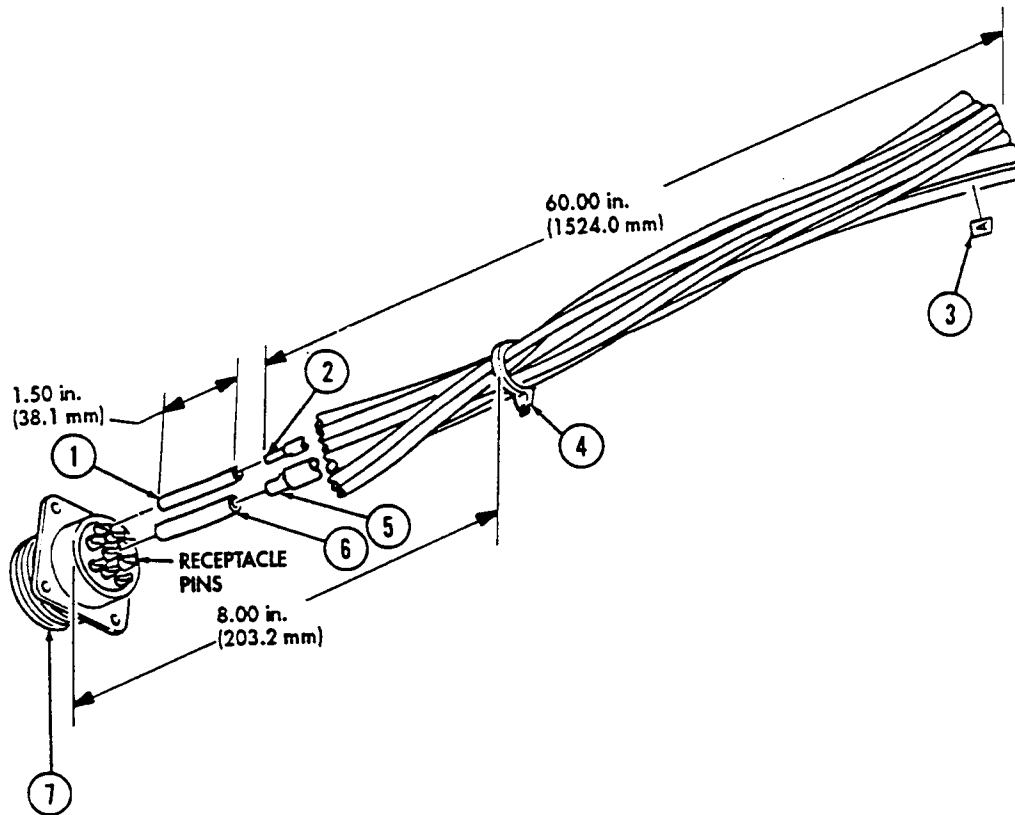


Figure D-46. Engine Harness Receptacle Fabrication.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)**INSTRUCTIONS:****NOTE**

When connecting electrical wire to connector pins on engine harness plug connector, use NSN 3439-00-133-1108 solder. (Refer to TB SIG-222 for soldering.)

1. Cut three sections of electrical wire (2) to length as shown.
2. Cut three sections insulation sleeving (1) to length as shown.
3. Position three sections of insulation sleeving (1) on wires (2).
4. Connect three wires (2) to receptacle pins marked D, E, and F on receptacle connector (7). Place insulation sleeving (1) over wires (2) and receptacle pins and heat-shrink insulation sleeving (1) into position.
5. Apply sealant NSN 8040-00-225-4918 to three wires (2) and insulation sleeving (1) on receptacle connector (7).
6. Cut six sections of electrical wire (5) to length as shown.
7. Cut six sections of insulation sleeving (6) to length as shown.
8. Position six sections of insulation sleeving (6) on wires (5).
9. Connect six wires (5) to receptacle pins marked A, B, C, G, H, and I on receptacle connector (7). Place electrical insulating sleeving (6) over wires (5) and receptacle pins and heat-shrink insulation sleeving (6) into position.
10. Use wire marker (3) on nine sections of wire to locate and mark wires. Secure wires with six tiedown straps (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
4	1	Mini-box (bottom section)	5999-00-971-8848
10	6	Non-metallic Bumper	5340-01-219-6733
11	6	Nut	5310-00-934-9753
8	6	Screw	5305-00-958-4353
9	6	Washer	5310-00-880-5976

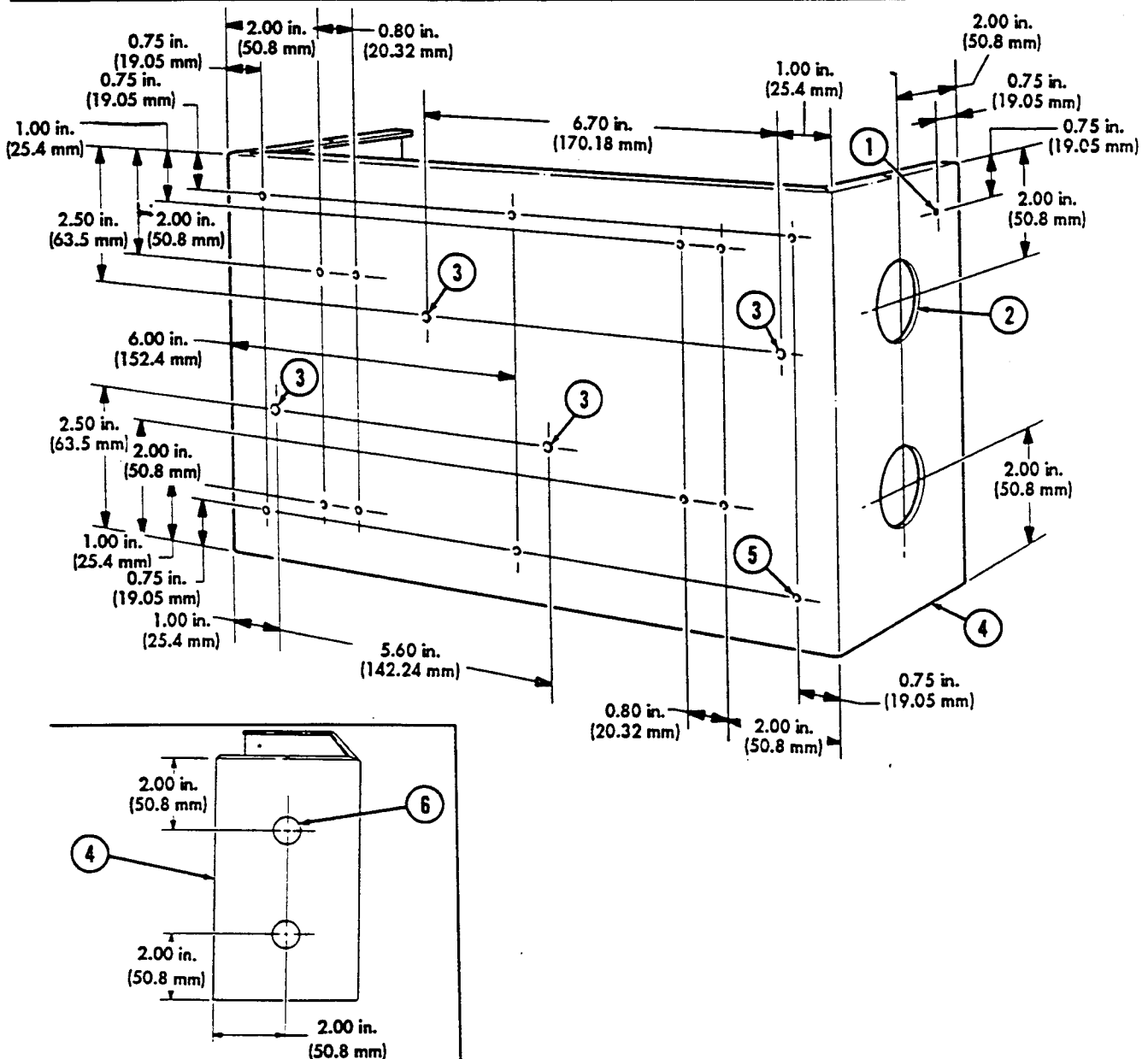


Figure D-47. Mini-box Bottom Section Drill Procedure.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

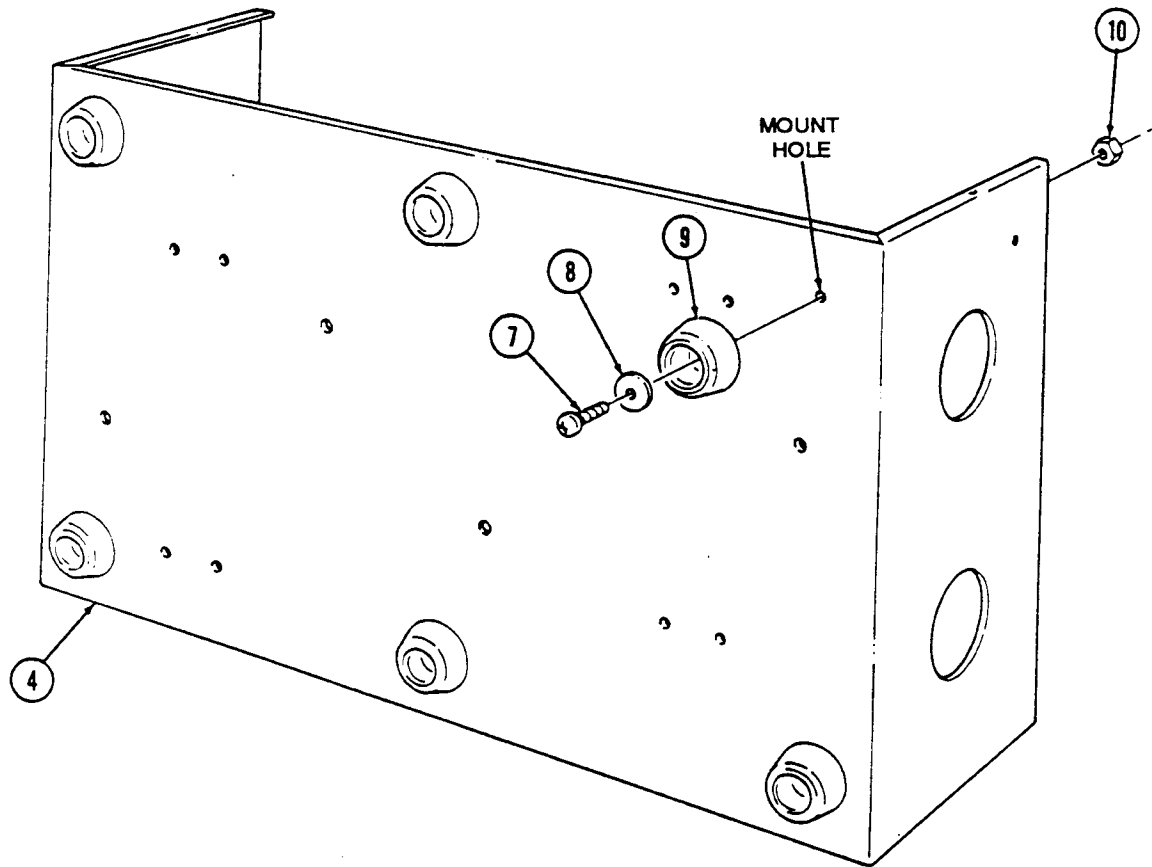


Figure D-47. Mini-box Bottom Section Drill Procedure (Cont'd).

INSTRUCTIONS:

1. Locate, mark, and drill 0.138-in. (3.51 mm) diameter hole (1) in mini-box bottom section (4) as shown.
2. Locate, mark, and drill two 1.250-in. (31.75 mm) diameter holes (2) in mini-box bottom section (4) as shown.
3. Locate, mark, and drill four 0.190-in. (4.83 mm) diameter holes (3) in mini-box bottom section (4) as shown.
4. Locate, mark, and drill fourteen 0.138-in. (3.51 mm) diameter holes (5) in mini-box bottom section (4) as shown.
5. Locate, mark, and drill two 0.750-in. (19.05 mm) diameter holes (6) in mini-box bottom section (4) as shown.
6. Install six non-metallic bumpers (9) on mount holes on mini-box bottom section (4) with washers (8), screws (7), and nuts (10) as shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
3 ft (.92 m)	CHANNEL	N/A

PRE-PUNCHED CHANNEL		
CHANNEL PART NUMBER	CUT LENGTH	MANUFACTURED FROM NSN
67	AS SHOWN	N/A

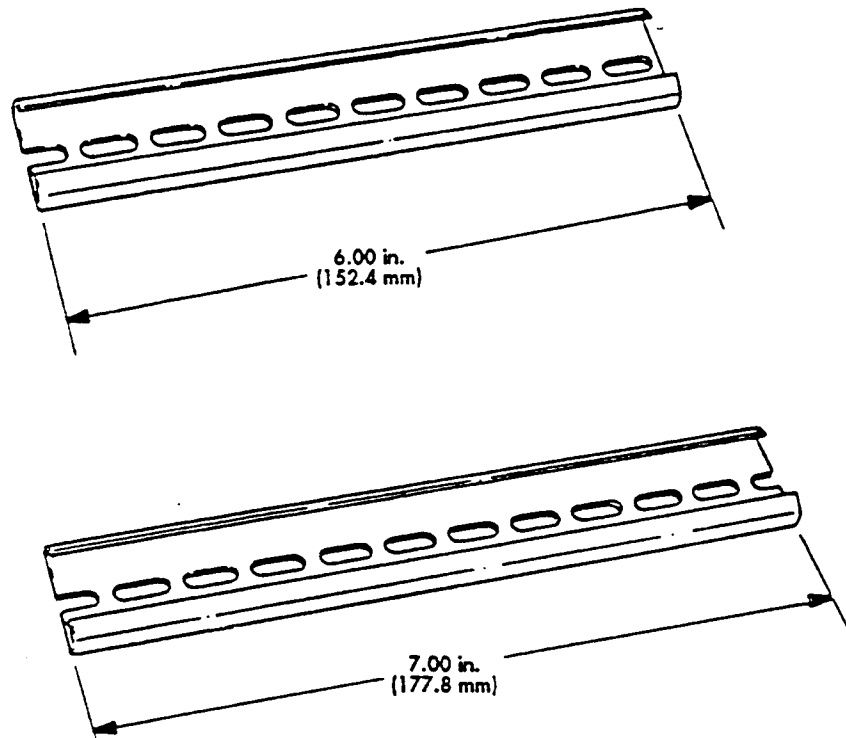


Figure D-48. Pre-punched Channel.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	PART NUMBER
1	1	Channel, Pre-punched: 7 in. (177.8 mm)	67
5	2	Channel Clamp	68
4	1	End Section	0630
3	3	Terminal Block	0624
2	6	Terminal Block	0621

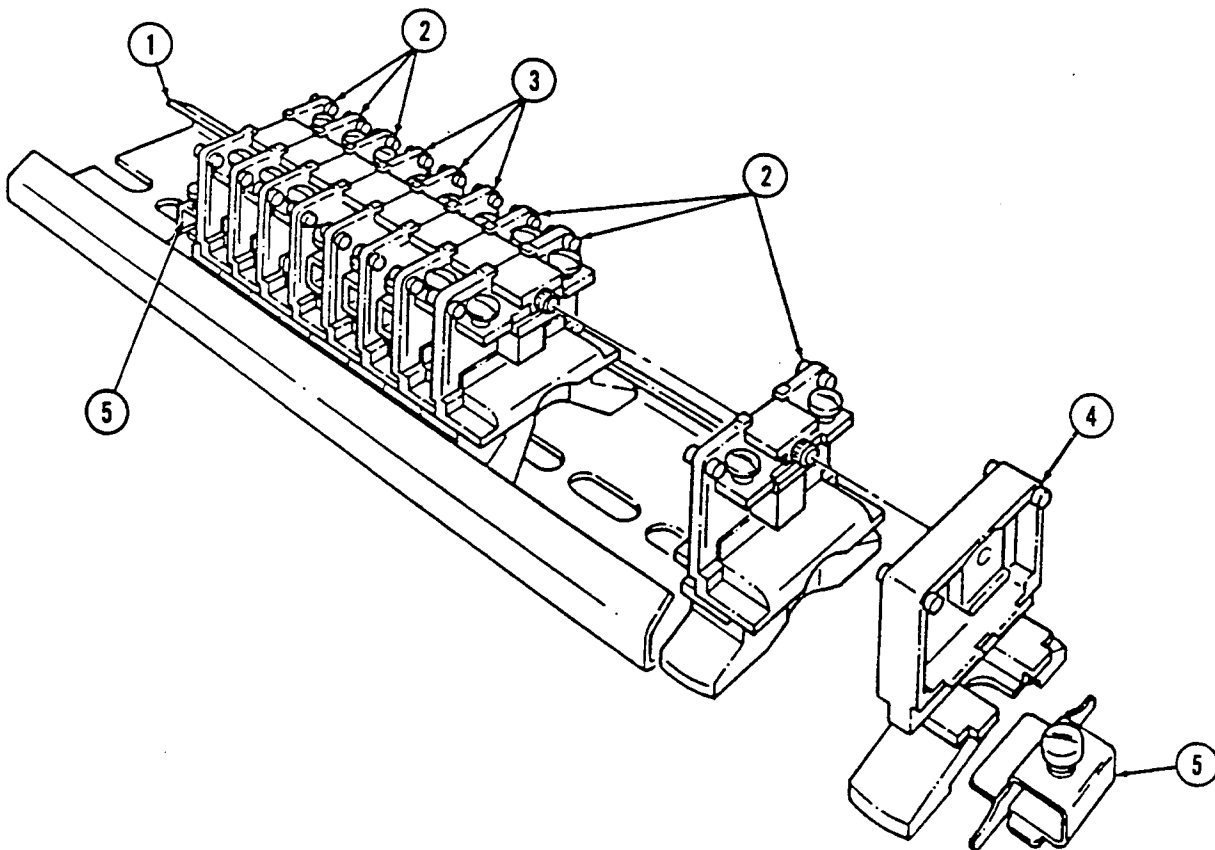


Figure D-49. Channel, 7.00-in. (177.8 mm) and Terminal Block Assembly.

ASSEMBLY INSTRUCTIONS:

Install three terminal blocks (2), terminal blocks (3), terminal blocks (2), and end section (4) on channel (1) with two channel clamps (5).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	PART NUMBER
1	1	Channel, Pre-punched: 6 in. (152.4 mm)	67
4	2	Channel Clamp	68
3	1	End Section	0630
2	8	Terminal Block	0621

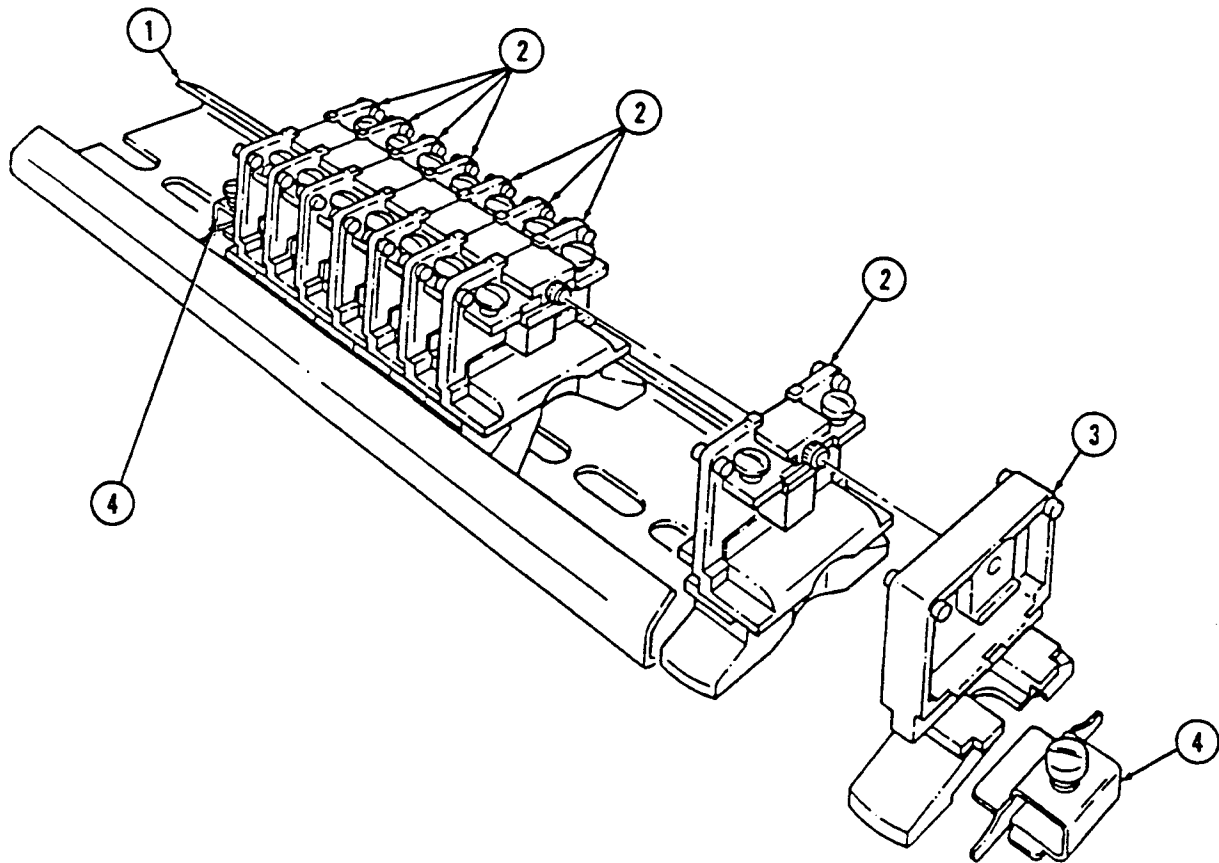


Figure 50. Channel, 6.00-in. (152.4 mm) and Terminal Block Assembly.

ASSEMBLY INSTRUCTIONS:

Install eight terminal blocks (2) and end section (3) on channel (1) with two channel clamps (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
2	4	Cable Tie Holder	MB4A
1	2	Grommet, Non-metallic	5325-00-270-8890
6	2	Grommet, Non-metallic	5325-00-309-7164
5	1	Mini-box (bottom section)	5999-00-971-8848
8	4	Nut	5310-00-934-9758
11	8	Nut	5310-00-934-9753
4	4	Screw	5305-00-984-6210
3	8	Screw	5305-00-958-4353
9	4	Washer	5310-00-883-9384
10	8	Washer	5310-00-880-5976
7	1	Wire Marker	46F5981

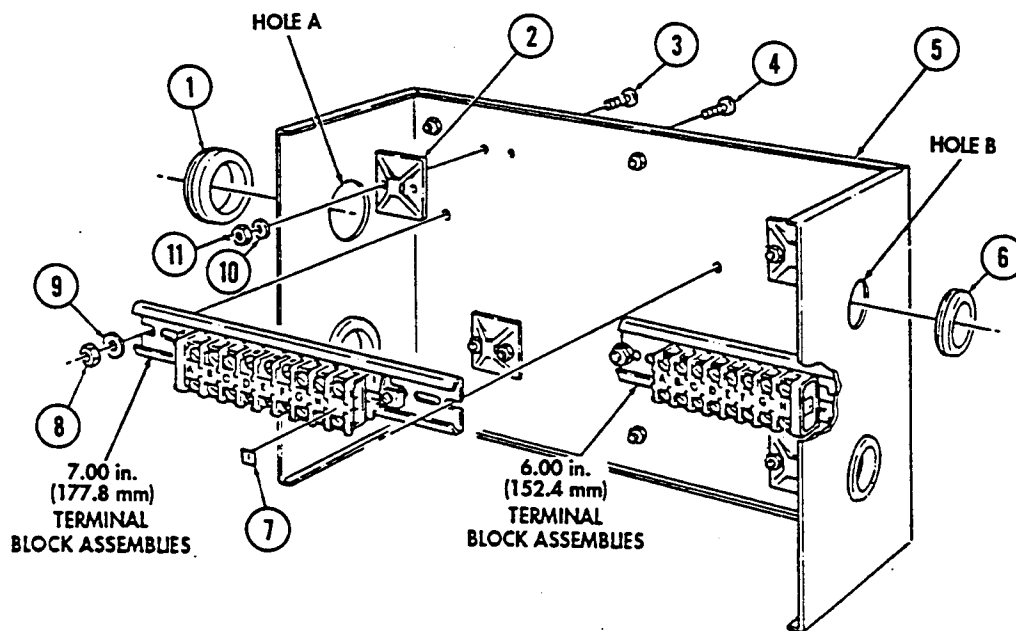


Figure 51. Terminal Block Assemblies and Cable Tie Holder Installation.

ASSEMBLY INSTRUCTIONS:

1. Using wire marker (7) and 6-in. (152.4 mm) and 7-in. (177.8 mm) terminal block assemblies, locate and mark sections as shown.
2. Install 6-in. (152.4 mm) and 7-in. (177.8 mm) terminal block assemblies in mini-box bottom section (5) with four screws (4), washers (9), and nuts (8).
3. Install four cable tie holders (2) in mini-box bottom section (5) with eight screws (3), washers (10), and nuts (11).
4. Install two non-metallic grommets (1) in holes A on mini-box bottom section (5).
5. Install two non-metallic grommets (6) in holes B on mini-box bottom section (5).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG	WIRE, ELECTRICAL	MIL-C-13486/1

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
2	14	Electrical Wire: 12 in. (304.8 mm)	6145-00-808-4849
1	16	Receptacle Pin	1-87756-6
5	1	Receptacle Plug	103308-3
4	11	Terminal Lug	5940-00-577-3807
3	14	Wire Marker	46F5981

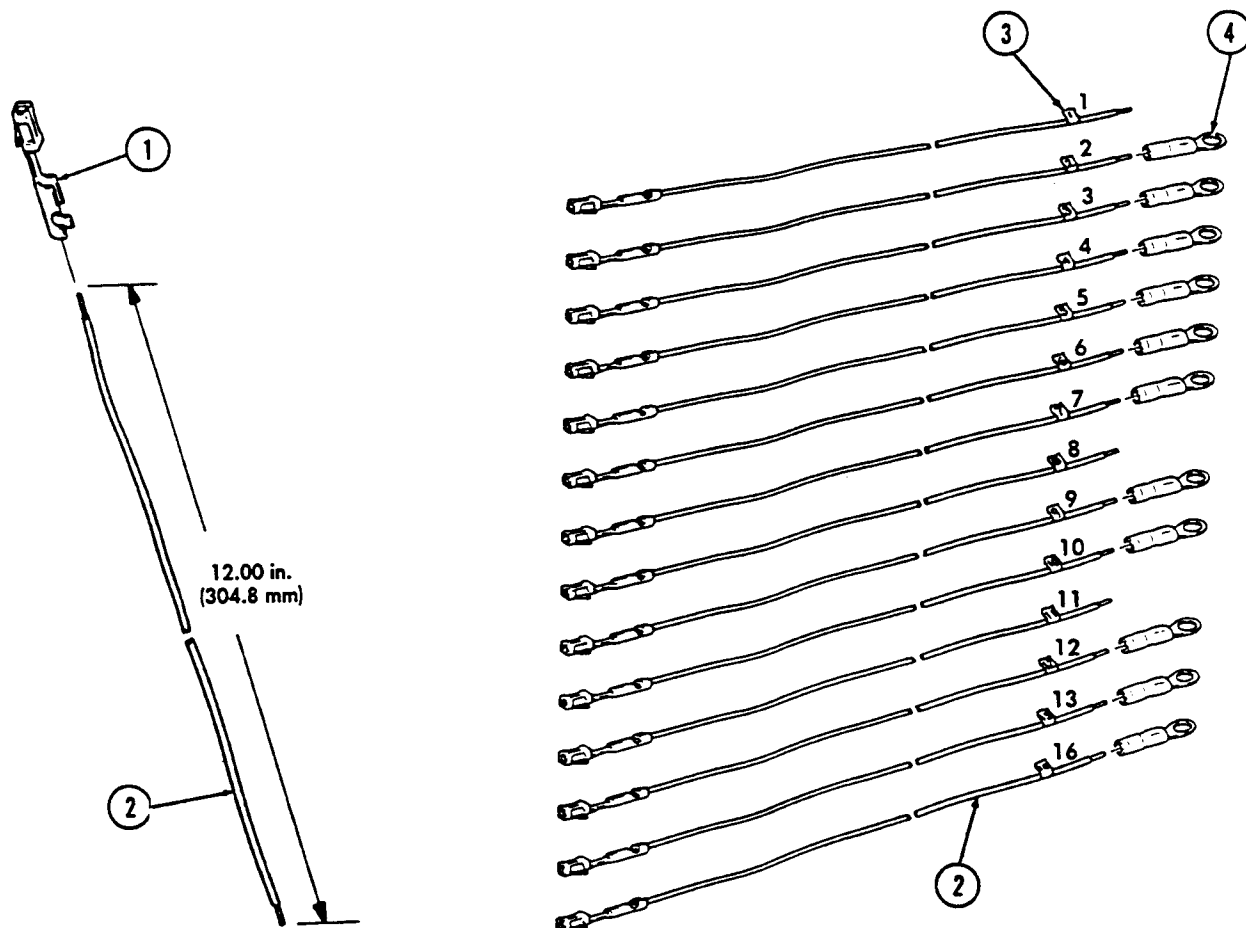


Figure D-52. Receptacle Plug and Pin Assemblies.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

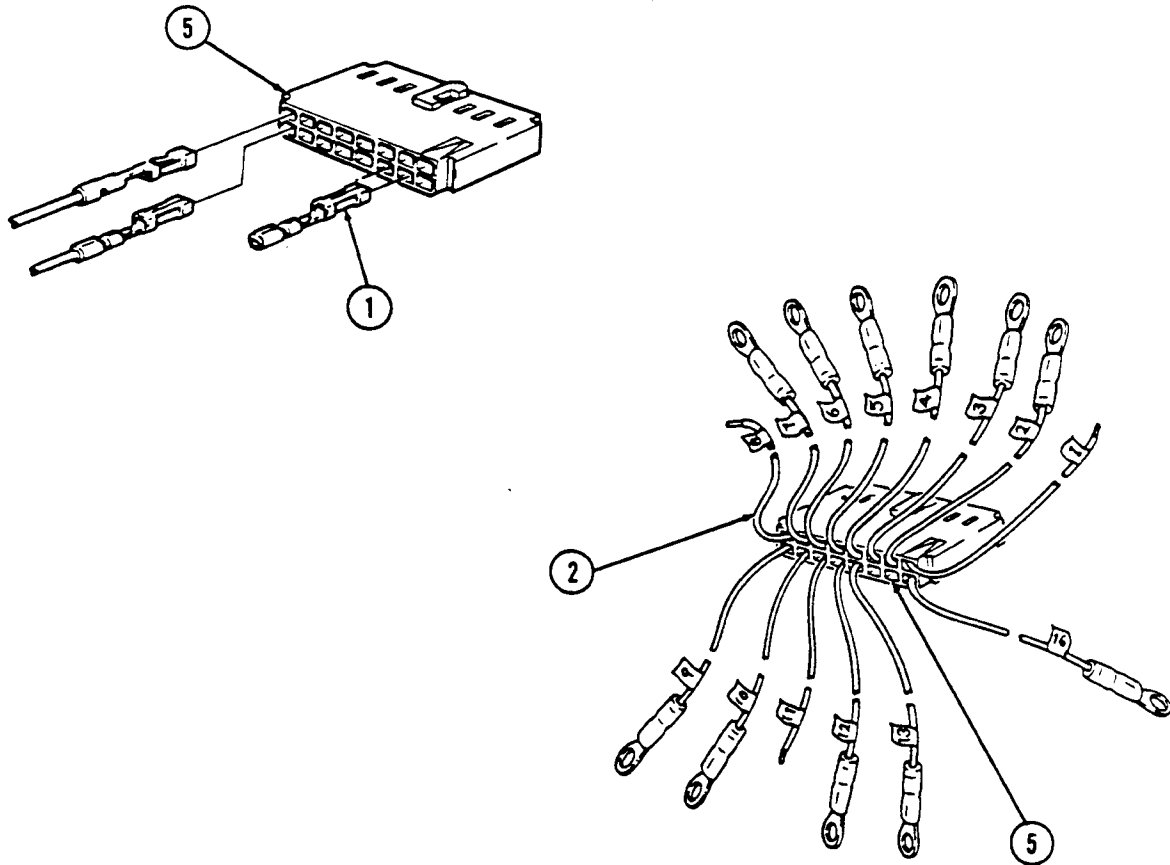


Figure D-52. Receptacle Plug and Pin Assemblies (Cont'd).

INSTRUCTIONS:

1. Cut fourteen sections of electrical wire (2) to length as shown.
2. Install fourteen receptacle pins (1) on wires (2) as shown.
3. Using fourteen wire markers, mark wires (2) with numbers 1 through 13 and 16 as shown.
4. Install eleven terminal lugs (4) on wires (2) marked 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, and 16 as shown.
5. Install two receptacle pins (1) (without wires) in slotted positions marked 14 and 15 on receptacle plug (5).
6. Install fourteen receptacle pins (1) (with wires connected) in slotted positions marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 16 on receptacle plug (5).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN
3	28	Terminal Lug	5940-00-283-5280

ASSEMBLY INSTRUCTIONS:

NOTE

- Ensure wire markers match letter identification for connector and receptacle harness assemblies.
- Trim excess wire to required length when installing wire and terminal lugs to terminal block assembly.

1. Route wires (5) from body harness receptacle (6) through grommet (7).
2. Install eight terminal lugs (3) on wires (5) from body harness receptacle (6).
3. Install wires (5) marked A, B, C, D, E, F, G, and H on body harness receptacle (6) to matching letters on terminal block assembly (4).
4. Route wires (10) from body harness connector (8) through grommet (9).
5. Install eight terminal lugs (3) on wires (10) from body harness connector (8).
6. Install wires (10) marked A, B, C, D, E, F, G, and H on body harness connector (8) to matching letters on terminal block assembly (4).
7. Route wires (13) on engine harness connector (14) through grommet (15).
8. Connect three wires (12) marked D, E, and F on engine harness connector (14) to matching letters on terminal block assembly (11). Do not tighten screws.
9. Install six terminal lugs (3) on wires (13) from engine harness connector (14)
10. Install wires (13) marked A, B, C, G, H, and I on engine harness connector (14) to matching letters on terminal block assembly (11).
11. Route wires (2) on engine harness receptacle (1) through grommet (16).
12. Connect three wires (12) marked D, E, and F on engine harness receptacle (1) to matching letters on terminal block assembly (11).
13. Install six terminal lugs (3) on wires (2) from engine harness receptacle (1).
14. Install wires (2) marked A, B, C, G, H, and I on engine harness receptacle (1) to matching letters on terminal block assembly (11).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

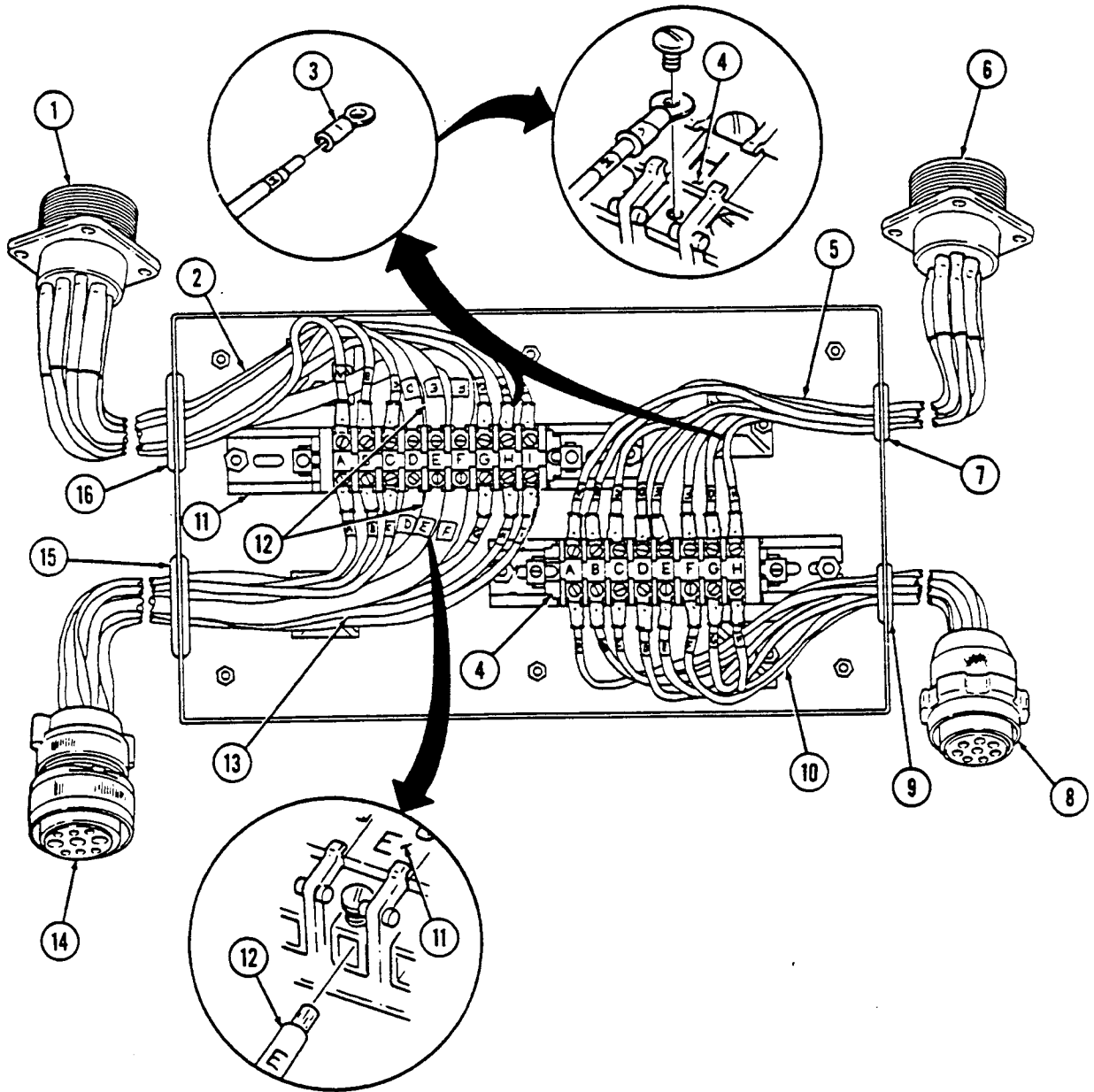


Figure D-53. Body, Engine Harness Connector, and Receptacle Installation.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS:

NOTE

- Ensure wire markers match letter identification for connector and receptacle harness assemblies.
- Trim excess wire to required length when installing wire and terminal lugs to terminal block assembly.

1. Connect wires (3) marked 2, 3, 4, 6, 7, and 16 on receptacle plug (4) to terminal strip (2) marked H, F, G, C, D, and B.
2. Connect wire (3) marked 13 on receptacle plug (4) to terminal strip (2) marked E.
3. Connect wires (5) marked 1, 8, 11 on receptacle plug (4) to terminal strip (1) marked E, F, D.
4. Connect wires (3) marked 5, 9, 10, and 12 on receptacle plug (4) to terminal strip (1) marked A, H, I, and G.

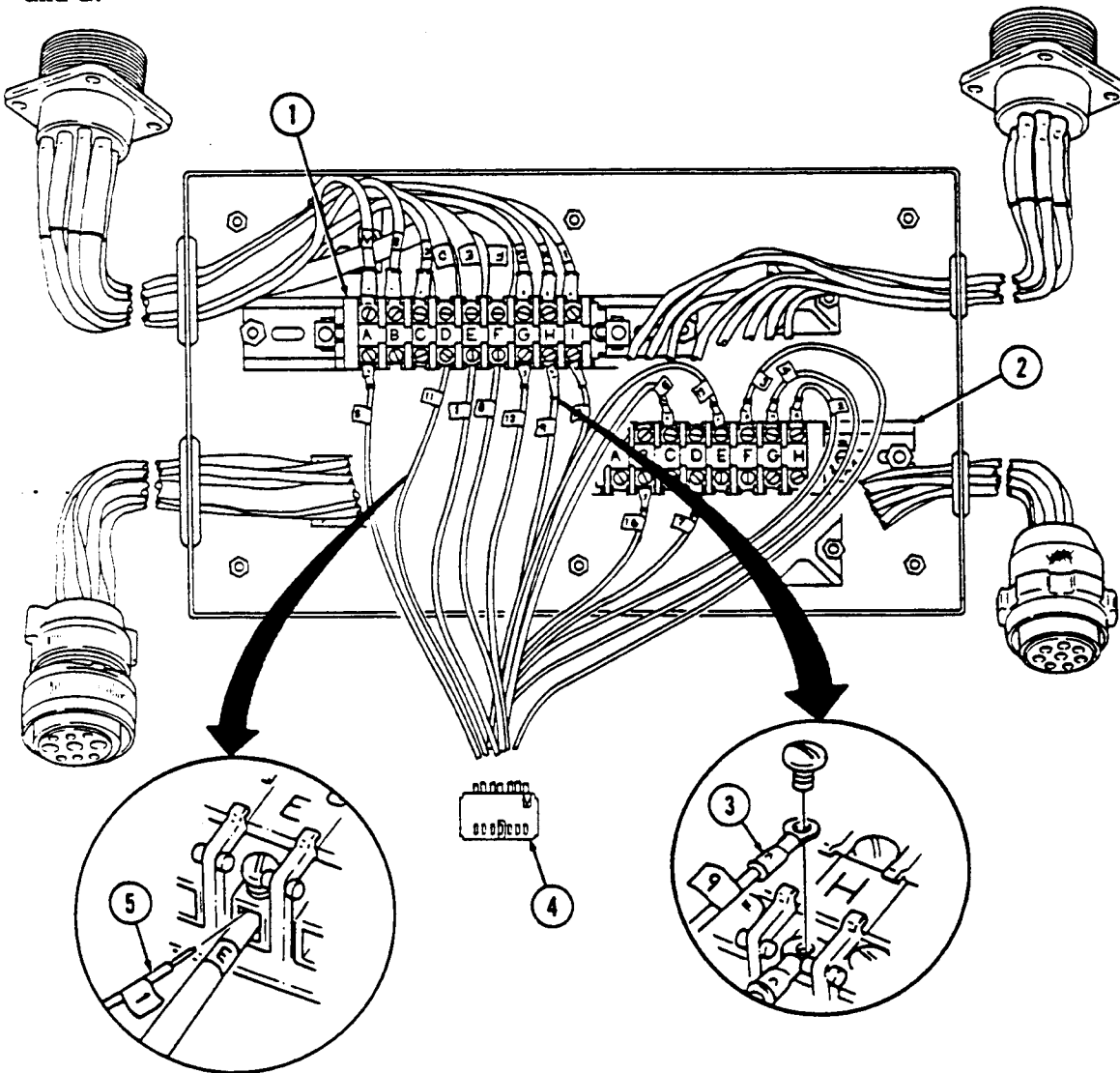


Figure D-54. Receptacle Plug Installation.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
5	2	Conduit Insulation: 48 in. (1,219.2 mm)	68240
13	2	Conduit Insulation: 54 in. (1,371.6 mm)	68243
9	4	Nut	5310-00-934-9758
4	2	Loop Clamp	5340-00-057-2904
12	2	Loop Clamp	5434-00-724-7038
3	4	Screw	5305-00-984-6210
6	AR	Tape	7510-00-802-8311
11	4	Tiedown Strap	5975-00-074-2072
8	4	Washer	5310-00-883-9384

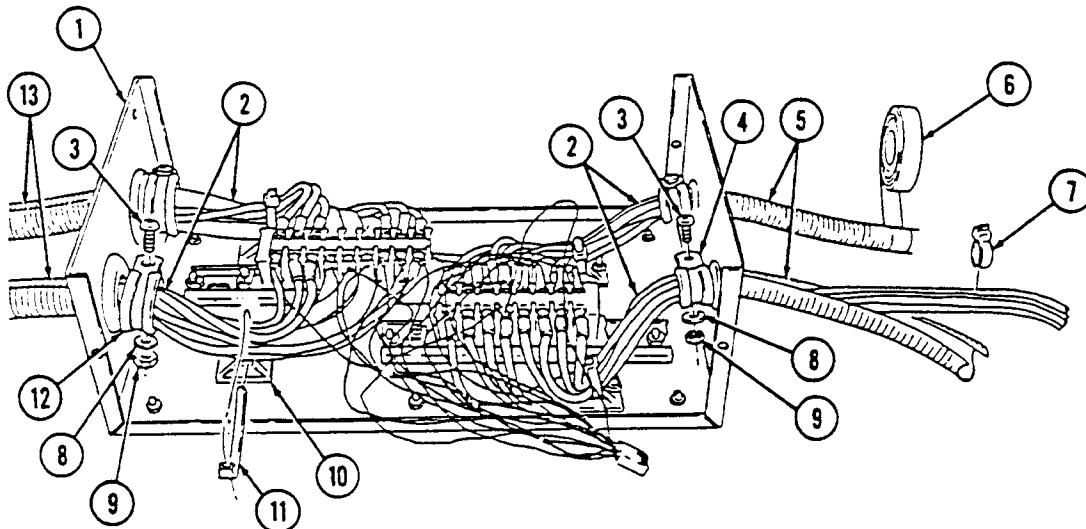


Figure D-55. Terminal Strip Installation.

ASSEMBLY INSTRUCTIONS:

1. Install four tiedown straps (11) in cable tie holders (10) and secure wires (2) to cable tie holders (10) with tiedown straps (11).
2. Install two loop clamps (4) on wires (2) of body harness connector and receptacle with screws (3), washers (8), and nuts (9).
3. Install two loop clamps (12) on wires (2) of engine harness connector and receptacle with screws (3), washers (8), and nuts (9).
4. Cut two 48-in. (1,219.2 mm) sections of conduit insulation (5).
5. Remove ten tiedown straps (7) from wires (2) of body harness connector and receptacle.
6. Position two sections of conduit insulation (5) over wires (2) of body harness connector and receptacle and secure with tape (6).
7. Cut two 54-in. (1,371.6 mm) sections of conduit insulation (13).
8. Remove twelve tiedown straps (7) from wires on engine harness connector and receptacle.
9. Position sections of conduit insulation (13) over wires (2) on engine harness connector and receptacle and secure with tape (6).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG N/A	WIRE, ELECTRICAL INSULATION SLEEVING	MIL-C-13486/1 MIL-I-23053/5

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN
1	5	Electrical Wire: 12 in. (304.8 mm)	6145-00-152-6499
3	5	Insulation Sleeving: 1 in. (25.4 mm)	5970-00-815-1295
2	5	Tip Jack	5935-00-683-7651

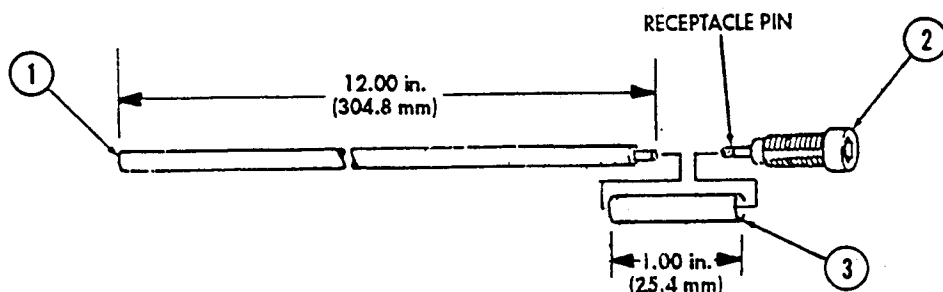


Figure D-56. Tip Jack Lead Assembly.

INSTRUCTIONS:

NOTE

When connecting electrical wire to receptacle pins on tip jacks, use NSN 3493-00-133-1108 solder. (Refer to TB SIG-222 for soldering.)

1. Cut wire (1) into five 12-in. (304.8 mm) sections as shown.
2. Cut insulation sleeving (3) into five 1-in. (25.4 mm) sections as shown.
3. Connect five wires (1) to receptacle pins on tip jacks (2).
4. Place insulation sleeving (3) over wires (1) and receptacle pins and heat-shrink insulation sleeving (3) into position.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

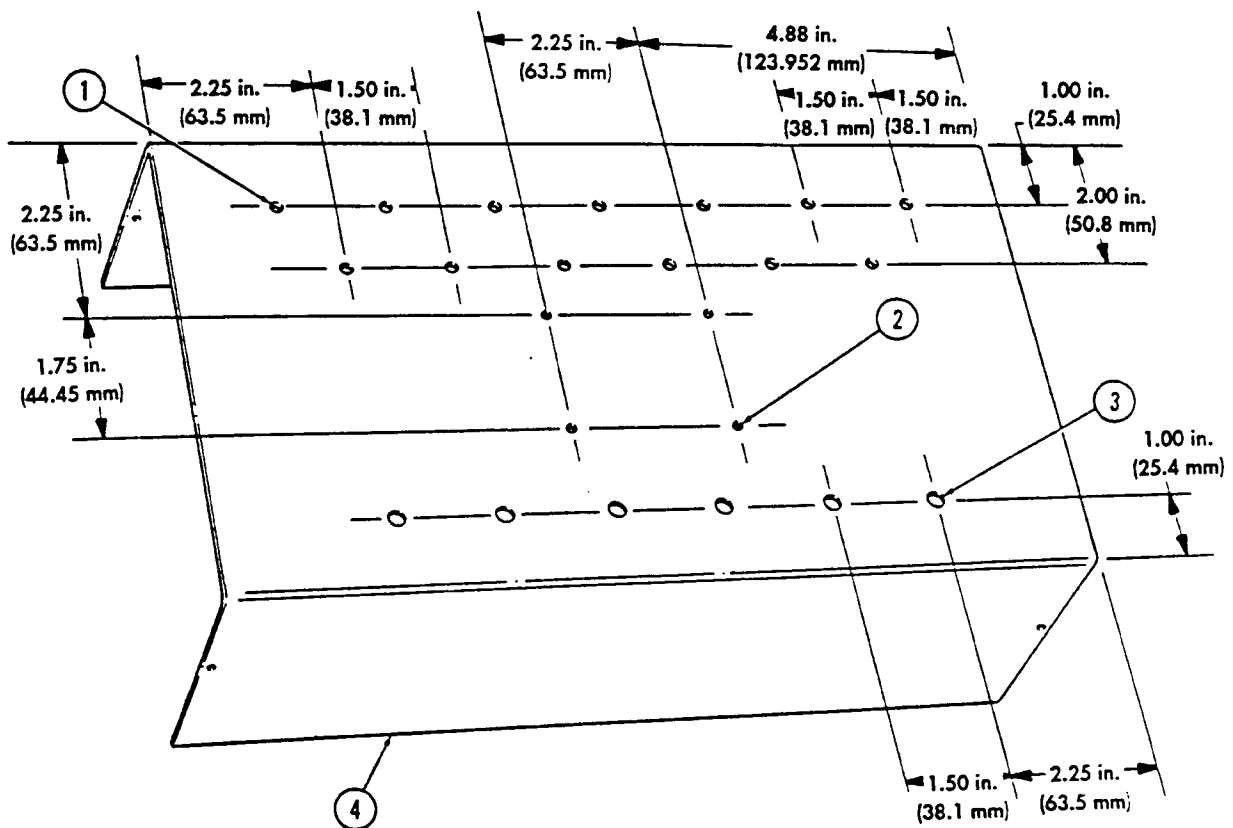


Figure D-57. Mini-box Top Section Drill Procedure.

INSTRUCTIONS:

1. Locate, mark, and drill thirteen 0.156-in. (3.962 mm) diameter holes (1) in mini-box top section (4).
2. Locate, mark, and drill six 0.205-in. (5.962 mm) diameter holes (3) in mini-box top section (4).
3. Locate, mark, and drill four 0.138-in. (3.505 mm) diameter holes (2) in mini-box top section (4).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN
	1	Data Mark Set	7510-01-040-7110
	1	Data Mark Set	7510-01-158-1037
13	25	Insulation Sleeving: 1 in. (25.4 mm)	5970-00-812-2974
2	13	Led	5980-01-288-0188
3	1	Mini-Box (top section)	5999-00-971-8848
7	5	Terminal Lug	5940-00-283-5280
10	1	Tip Jack	5935-00-683-7651
4	5	Tip Jack (assembled in figure D-56)	5935-00-683-7651

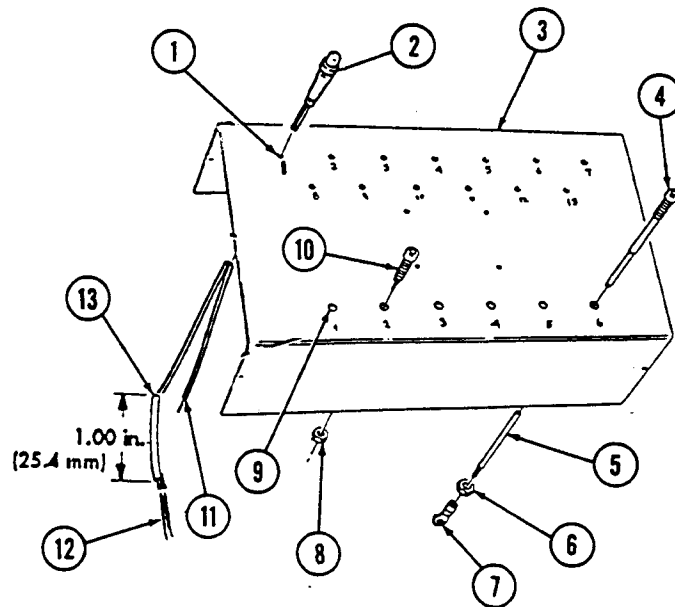


Figure D-57. Mini-box Top Section Drill Procedure (Cont'd).

INSTRUCTIONS (CONT'D):

4. Using data mark set, mark location of thirteen holes (1) on mini-box top section (3).
5. Using data mark set, mark location of six holes (9) on mini-box top section (3).
6. Install tip jack (10) and nut (8) in hole marked 2 on mini-box top section (3).
7. Install five tip jacks (4) with wires (5) and nuts (6) in holes marked 1, 3, 4, 5, and 6 on mini-box top section (3).
8. Install five terminal lugs (7) to wires (5) on tip jacks (4).
9. Install thirteen LEDs (2) in holes (1) marked 1 through 13 on mini-box top section (3).
10. Cut electrical insulation sleeving (13) into twenty-five sections as shown.
11. Place twelve sections of electrical insulation sleeving (13) over red (+) wires (11) marked 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 on LEDs (2).
12. Place thirteen sections of electrical insulation sleeving (13) over black (-) wires (12) marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 on LEDs (2).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
N/A	WIRE, ELECTRICAL	MIL-W-16878/4
N/A	PUNCH BOARD	64P44EP

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
2	31	Electrical Wire: 5 in. (127.0 mm)	6145-00-808-4849
1	1	Punch Board: 2 x 3 in. (50.8 x 76.2 mm)	64P44EP

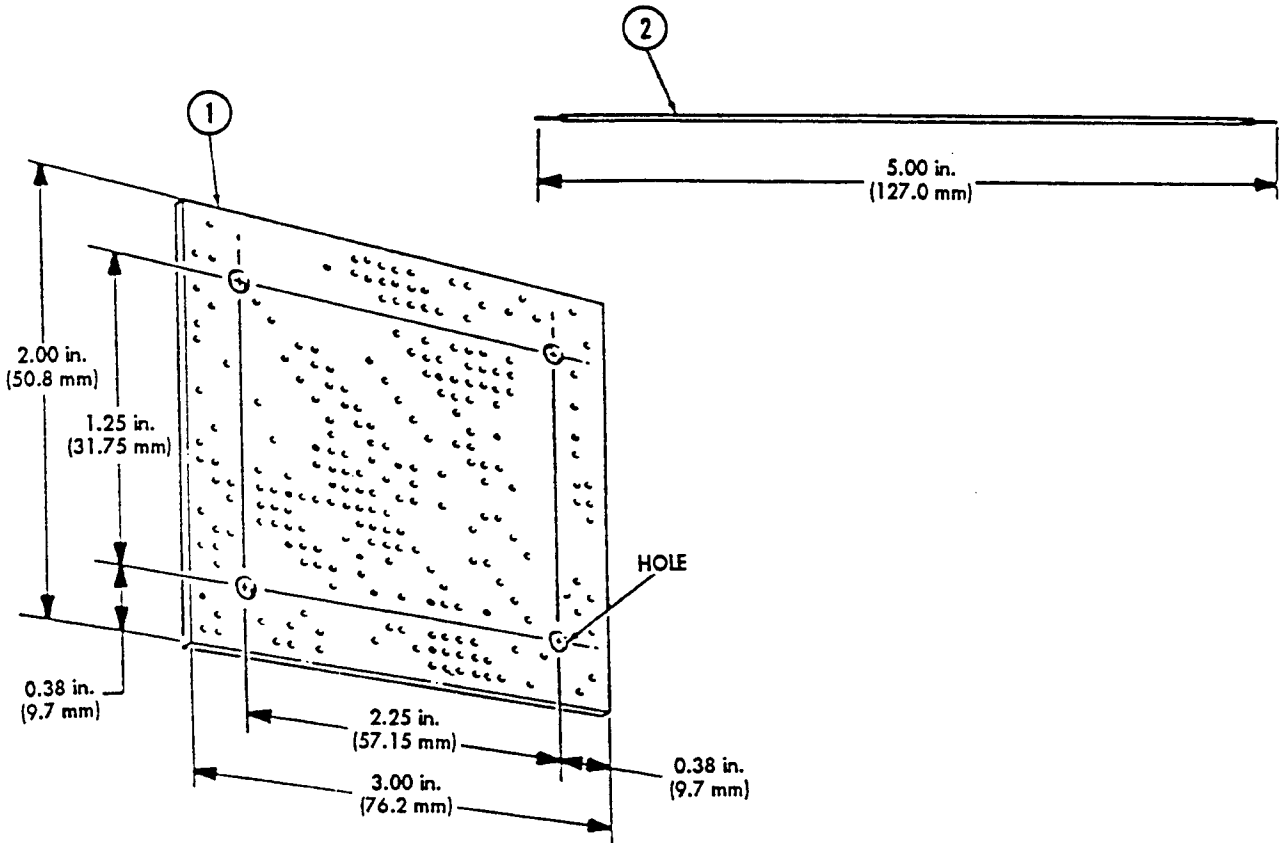


Figure D-58. Punch Board and Electrical Wire.

INSTRUCTIONS:

1. Cut punch board (1) to size as shown.
2. Locate, mark, and drill four 0.375-in. (9.5 mm) diameter holes in punch board (1) as shown.
3. Cut thirty-one 5-in. (127.0 mm) sections of electrical wire (2) as shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
7	1	Bussed Resistor Network	13F171
4-6	3	Diode	ECG125
3	1	Isolated Resistor Network	13F170
1	1	Plug Connector	5935-01-230-9304
2	1	Punch Board (fabricated in figure D-58)	64P44EP
31		Wire (cut in figure D-58)	

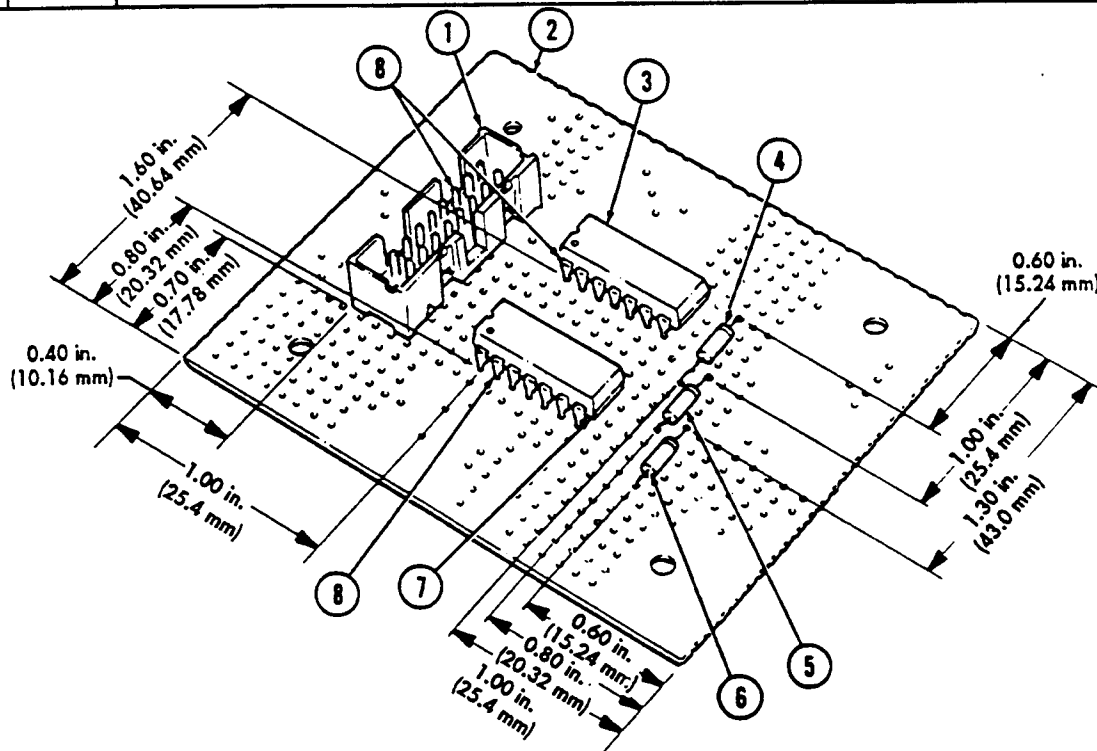


Figure D-59. Punch Board Assembly.

ASSEMBLY INSTRUCTIONS:

1. Install plug connector (1) on punch board (2).
2. Install fourteen wires to pins (8) marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 16 on plug connector (1).
3. Install insulated resistor network (3) on punch board (2).
4. Install six wires to pins (8) marked 1, 4, 7, 8, 11, and 14 on isolated resistor network (3).
5. Install bussed resistor network (7) on punch board (2).
6. Install eleven wires to pins (8) marked 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, and 14 on bussed resistor network (7).
7. Install three diodes (4), (5), (6), on punch board (2).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS:

1. Connect wire marked 6 on plug connector to banded end of diode R1.
2. Connect wire marked 14 on isolated resistor network to bandless end of diode R1.
3. Connect wire marked 7 on plug connector and wire marked 14 on bussed resistor network to banded end of diode R2.
4. Connect wire marked 13 on plug connector to bandless end of diode R3.
5. Connect wire marked 11 on isolated resistor network to bandless end of diode R2.
6. Connect wire marked 8 on isolated resistor network bandless end of diode R3.
7. Connect wire marked 1 on isolated resistor network to black (-) wire marked 6 on LED on mini-box top section.
8. Connect wire marked 4 on isolated resistor network to black (-) wire marked 7 on LED.
9. Connect wire marked 7 on isolated resistor network to black (-) wire marked 13 on LED.

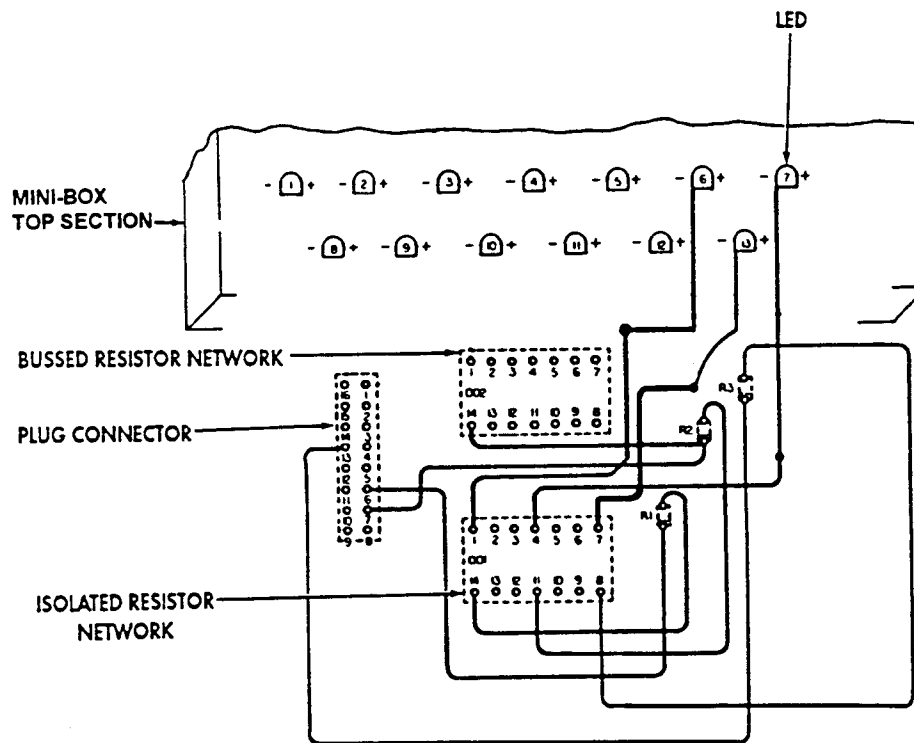


Figure D-60. Test Module Assembly.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS (CONT'D):

10. Connect wire marked 16 on plug connector to red (+) wire marked 13 on LED.
11. Connect wire marked 1 on plug connector to three red (+) wires marked 1, 6, and 7 on LED.
12. Connect wire marked 2 on plug connector to red (+) wire marked 2 on LED.
13. Connect wire marked 3 on plug connector to red (+) wire marked 3 on LED.
14. Connect wire marked 4 on plug connector to red (+) wire marked 4 on LED.
15. Connect wire marked 5 on plug connector to red (+) wire marked 5 on LED.

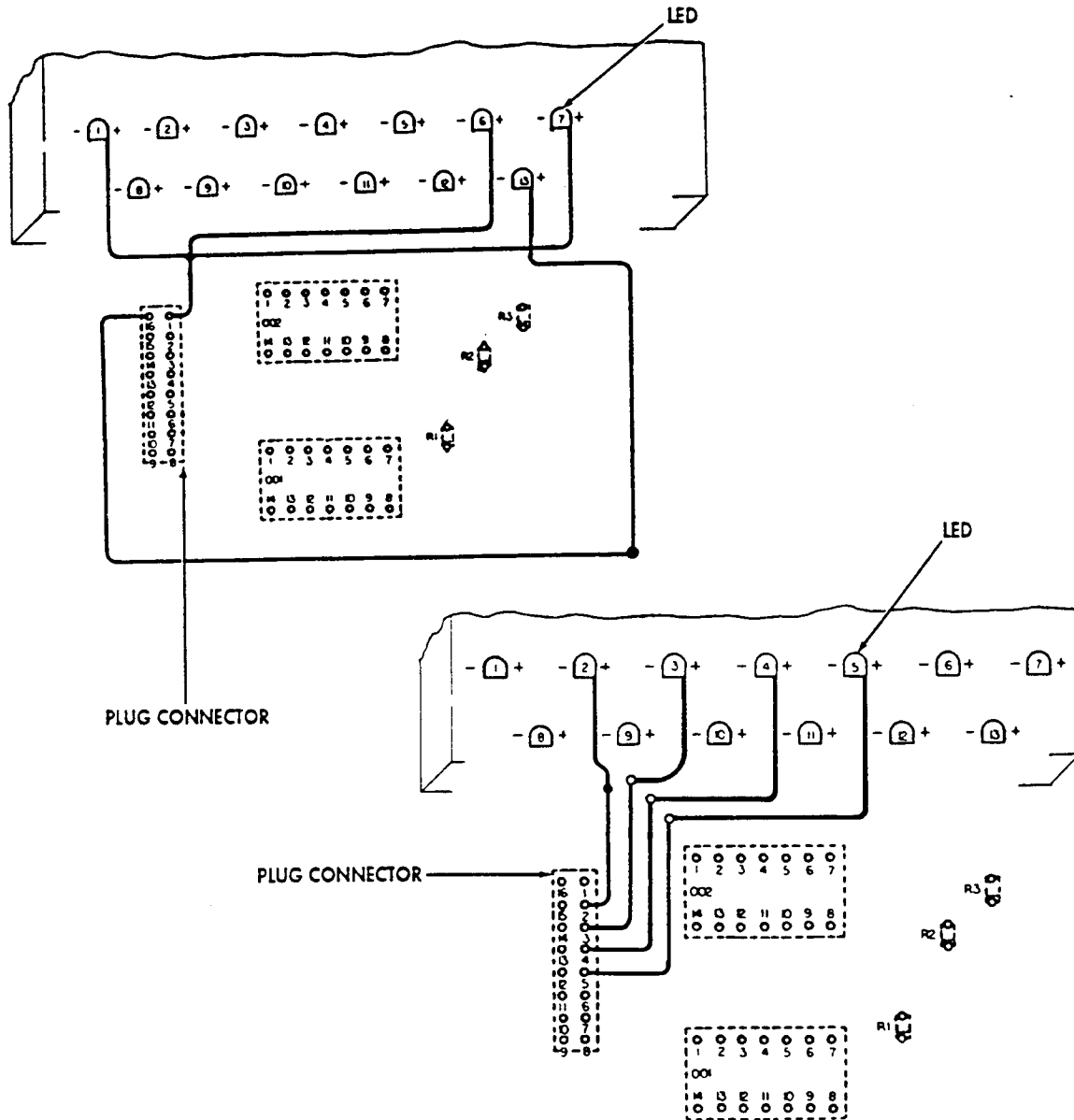


Figure D-60. Test Module Assembly (Cont'd).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS (CONT'D):

16. Connect wire marked 8 on plug connector to red (+) wire marked 8 on LED.
17. Connect wire marked 9 on plug connector to red (+) wire marked 9 on LED.
18. Connect wire marked 10 on plug connector to red (+) wire marked 10 on LED.
19. Connect wire marked 11 on plug connector to red (+) wire marked 11 on LED.
20. Connect wire marked 12 on plug connector to red (+) wire marked 12 on LED.

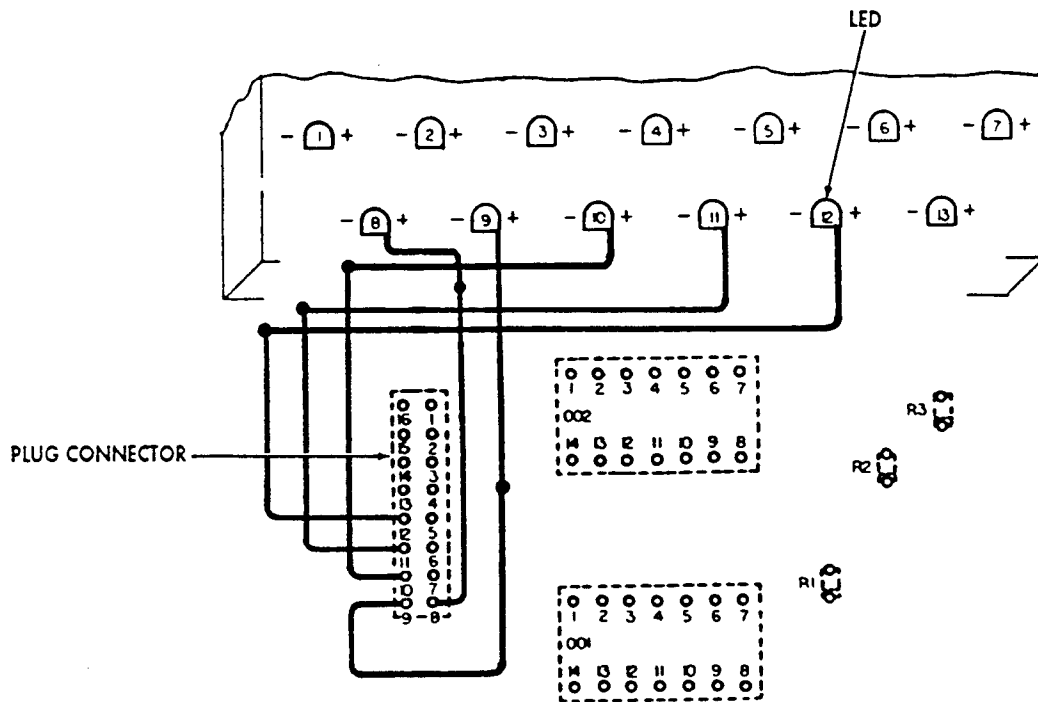


Figure D-60. Test Module Assembly (Cont'd).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS (CONT'D):

21. Connect wire marked 1 on bussed resistor network to black (-) wire marked 1 on LED.
22. Connect wire marked 2 on bussed resistor network to black (-) wire marked 2 on LED.
23. Connect wire marked 3 on bussed resistor network to black (-) wire marked 3 on LED.
24. Connect wire marked 4 on bussed resistor network to black (-) wire marked 4 on LED.
25. Connect wire marked 5 on bussed resistor network to black (-) wire marked 5 on LED.
26. Connect wire marked 8 on bussed resistor network to black (-) wire marked 8 on LED.
27. Connect wire marked 9 on bussed resistor network to black (-) wire marked 9 on LED.
28. Connect wire marked 10 on bussed resistor network to black (-) wire marked 10 on LED.
29. Connect wire marked 11 on bussed resistor network to black (-) wire marked 11 on LED.
30. Connect wire marked 12 on bussed resistor network to black (-) wire marked 12 on LED.

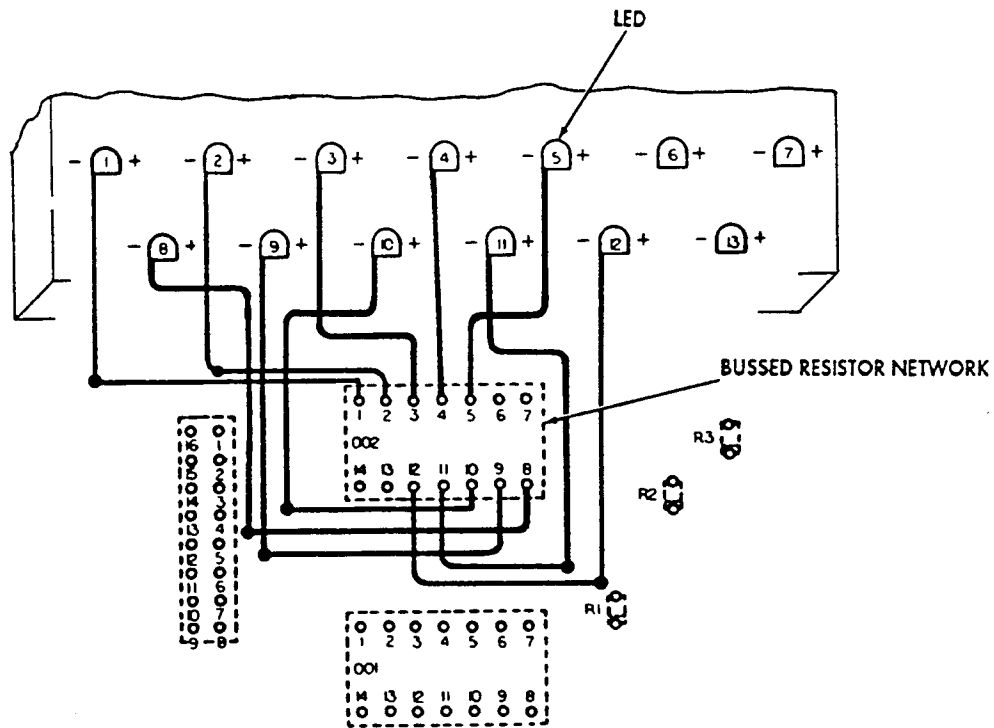


Figure D-60. Test Module Assembly (Cont'd).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN/PART NUMBER
3	25	Insulation Sleeving (install in figure D-57)	
9	4	Nut	5310-00-934-9753
4	4	Screw	5305-00-928-9021
2	4	Spacer	313-1437-024
8	4	Washer	5310-00-880-5976

ASSEMBLY INSTRUCTIONS (CONT'D):

31. Place electrical insulation sleeving (3) over wire (10) marked 1 on plug connector.
32. Place twenty-four sections of insulation sleeving (3) over connected wires (6) and (11) on LEDs (5) and heat-shrink into position.
33. Install four screws (4) in mount holes (12) on mini-box top section (1) and position four spacers (2) and punch board (7) on screws (4) and secure with four washers (8) and nuts (9).

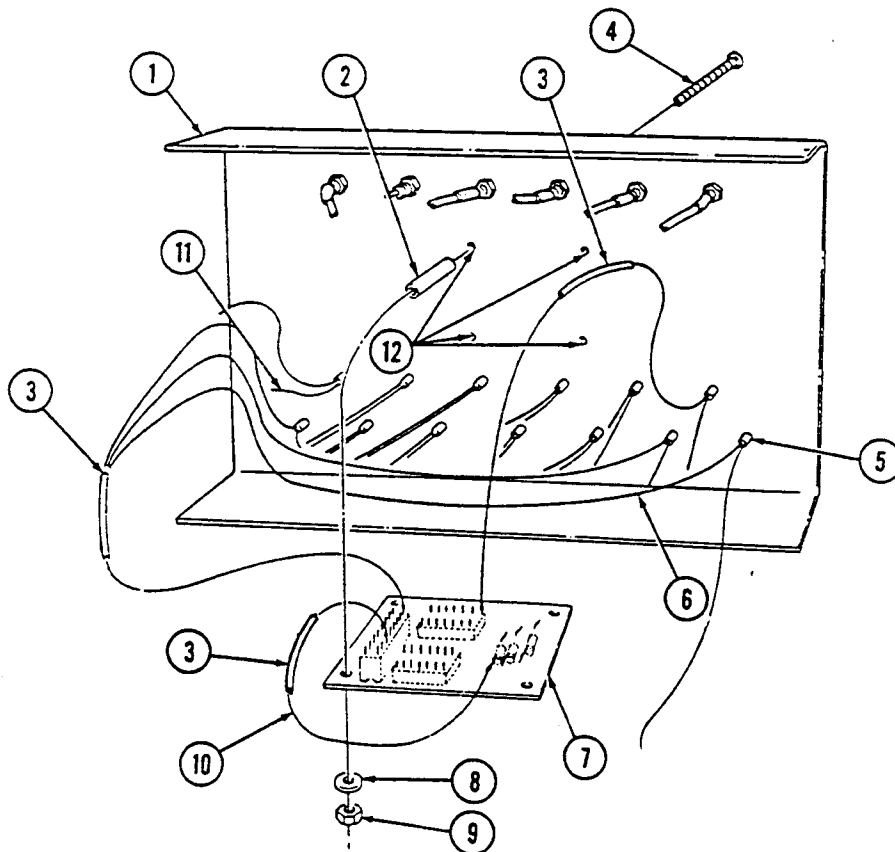


Figure D-60. Test Module Assembly (Cont'd).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
14 AWG	WIRE ELECTRICAL	MIL-C-13486/1

ITEM NO.	REQ'D	MATERIALS	
		DESCRIPTION	NSN
2	1	Electrical Wire: 12 in. (304.8 mm)	6145-00-808-4849
8	1	Nut	5310-00-934-9758
7	1	Screw	5305-00-984-6210
1	2	Terminal Lug	5940-00-577-3807
11	1	Washer	5310-00-883-9384

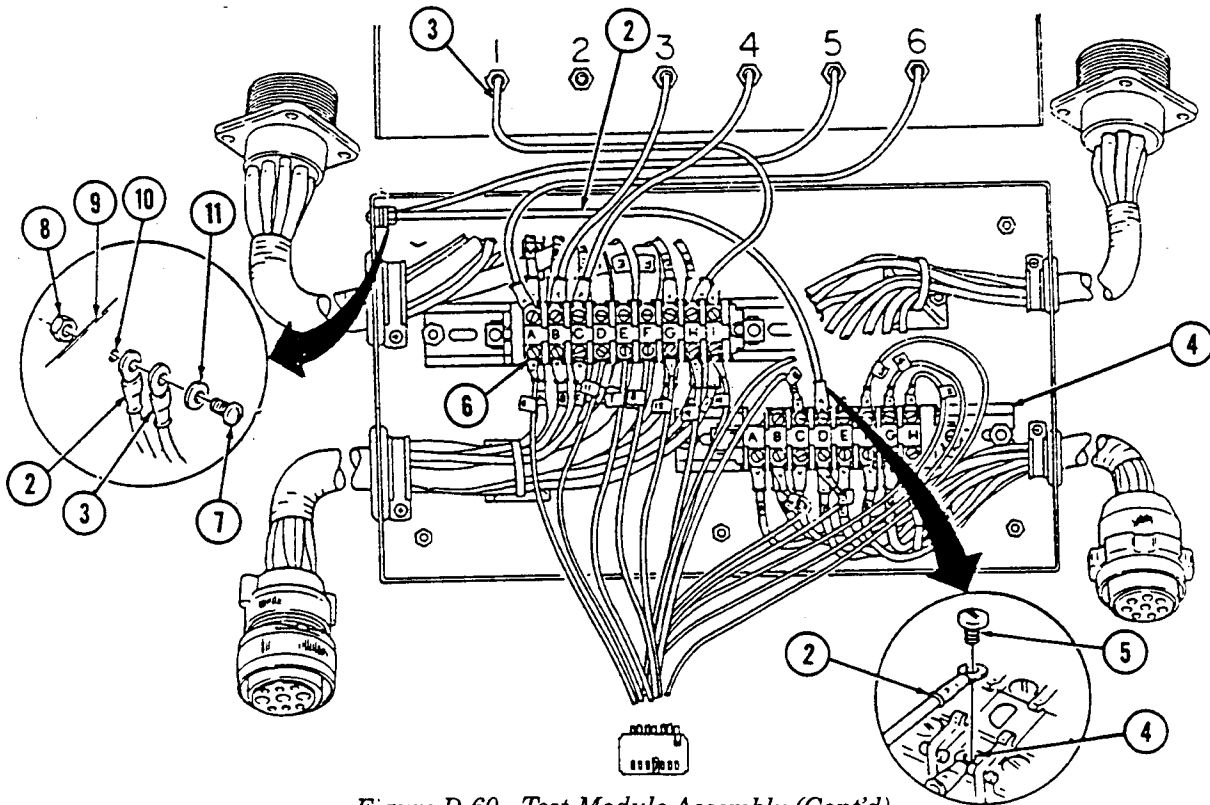
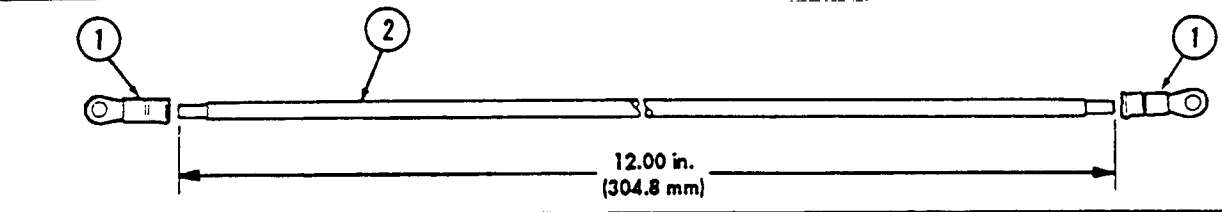


Figure D-60. Test Module Assembly (Cont'd).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS (CONT'D):

34. Cut electrical wire (2) to length as shown.
35. Connect two terminal lugs (1) on wire (2).
36. Install wire (2) and tip jack lead (3) marked 5 on mount hole (10) on mini-box bottom section (9) with screw (7), washer (11), and nut (8).
37. Connect wire (2) to terminal strip (4) marked D with screw (5).
38. Connect tip jack lead (3) marked 1 to terminal strip (6) marked H with screw (5).
39. Connect tip jack lead (3) marked 3 to terminal strip (6) marked B with screw (5).
40. Connect tip jack lead (3) marked 4 to terminal strip (6) marked C with screw (5).
41. Connect tip jack lead (3) marked 6 to terminal strip (6) marked A with screw (5).

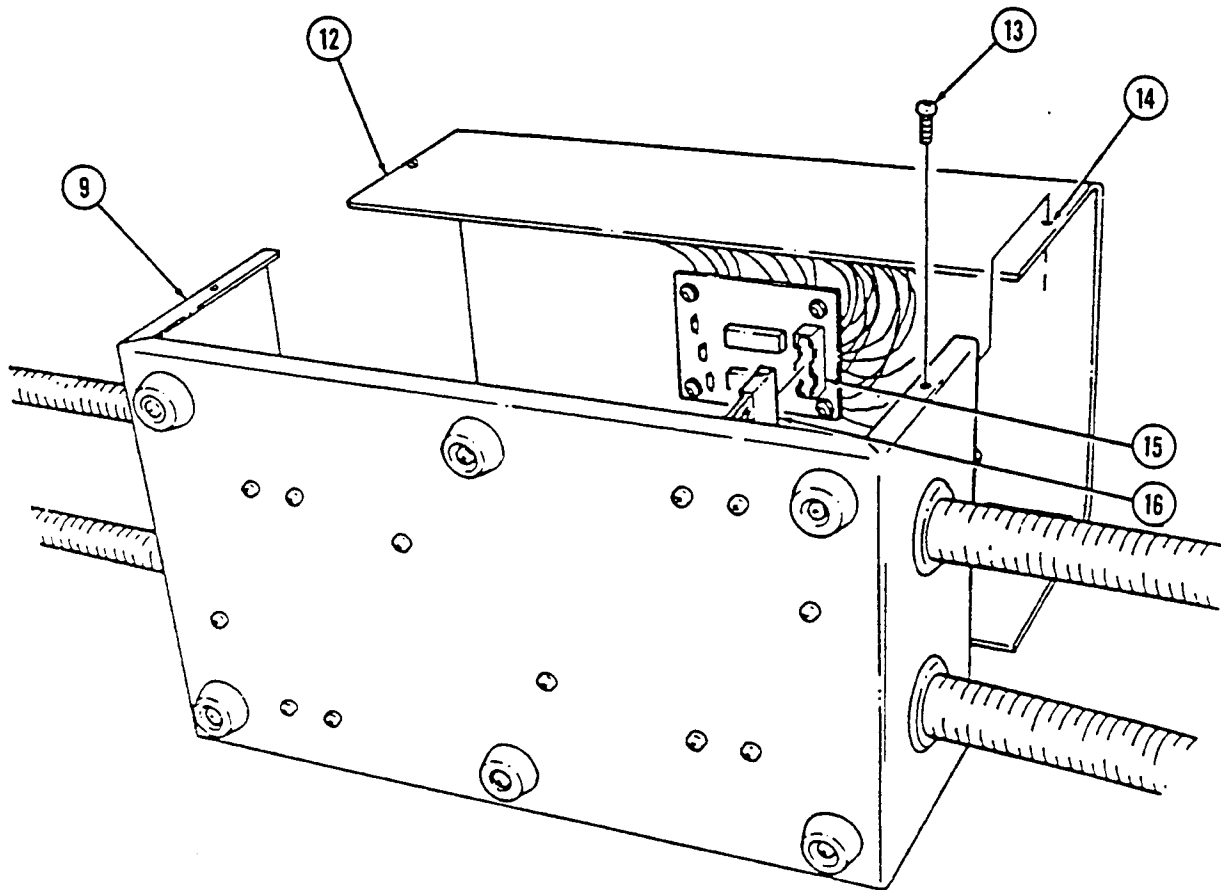


Figure D-60. Test Module Assembly (Cont'd).

42. Using existing drive pin, punch out four screw mount holes (14) in mini-box top section (12).
43. Install plug (16) and connector (15) as shown.
44. Install mini-box top (12) on bottom section (9) with four existing screws (13).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS

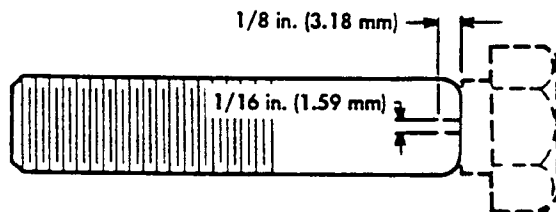


Figure D-61. Differential Guide Pin, 5992390.

INSTRUCTIONS:

1. Fabricate from screw, NSN 5305-00-709-8540.
 2. Cut off head of screw.
 3. Round off edge of non-threaded end as shown above.
 4. Cut a slit approximately 1/16-in. (1.59-mm) wide and 1/8-in. (3.18-mm) deep in non-threaded end as shown above.
 5. Remove any burrs after cutting.
-

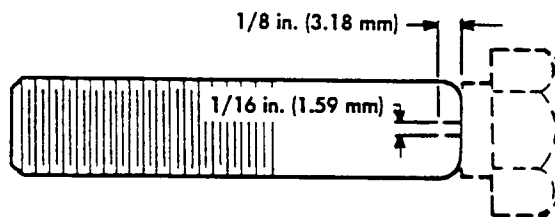


Figure D-62. Transmission Guide Pin, 5992391.

INSTRUCTIONS:

1. Fabricate from screw, NSN 5306-00-226-4833.
2. Cut off head of screw.
3. Round off edge of non-threaded end as shown above.
4. Cut a slit approximately 1/16-in. (1.59-mm) wide and 1/8-in. (3.18-mm) deep in non-threaded end as shown above.
5. Remove any burrs after cutting.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
3/8 in. x 3/8 in. (9.53 mm x 9.53 mm)	ALUMINUM	

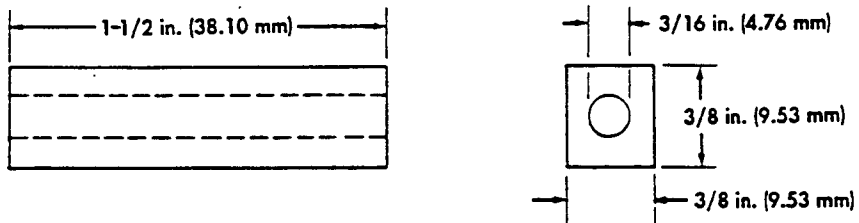


Figure D-63. Core Shaft Nut Tool, 5992392.

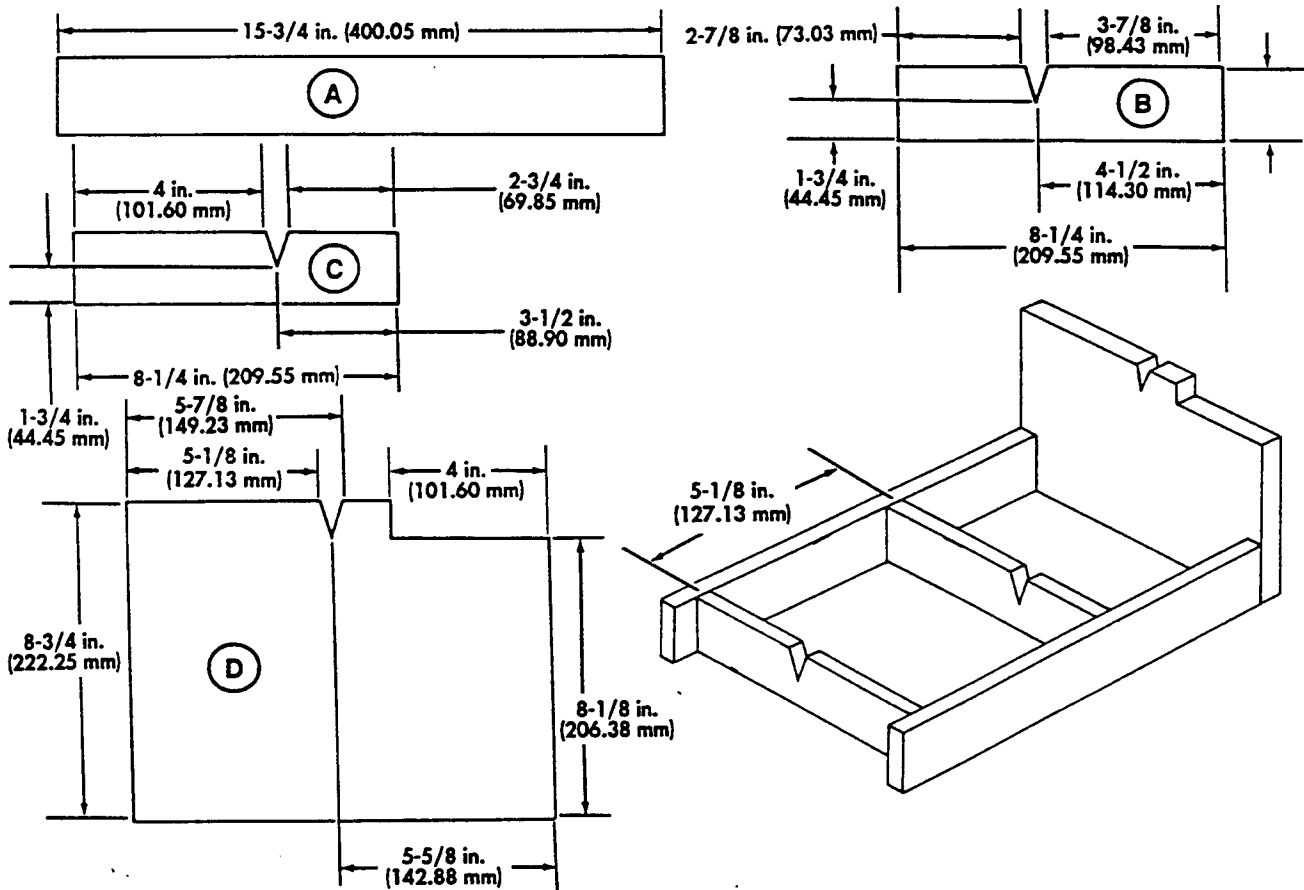
INSTRUCTIONS:

1. Cut to length from 3/8-in. (9.53-mm) square aluminum stock, NSN 9530-00-236-7723 or NSN 9530-00-061-0463.
2. Drill 3/16-in. (4.76-mm) hole through middle of stock.
3. Remove all burrs.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
2 x 4 (NOM) AND 2 x 12 (NOM)	WOOD	MMM-L-751

LUMBER, SOFTWOOD			NAILS (FF-N-105)		
PIECE	CUT LENGTH		MANUFACTURED FROM	SIZE	QTY
	IN.	MM			
A (2 EA)	15-3/4	400.05	2 x 4 (NOM)	12D	12 EA
B	8-1/4	209.55	2 x 4 (NOM)		
C	8-1/4	209.55	2 x 4 (NOM)		
D	8-3/4	222.25	2 x 12 (NOM)		



INSTRUCTIONS:

- Using NSN 5510-00-220-6146 lumber, cut four pieces of wood, A (two each), B, and C to length shown.
- Using NSN 5510-00-220-6250, cut one piece of wood, D, to length shown.
- Cut a VEE notch in pieces B, C, and D in locations shown.
- Cut a rectangular notch in piece D in location shown.
- Using two NSN 5310-00-753-3884 nails at each joint, assemble pieces A, B, C, and D as shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
10 x 12-ft (3.05 x 3.66-mm) (NOM) .50-in. (12.70-mm) THICK (NOM) 2.50-in. (63.50-mm) WIDE (NOM)	BAR, METAL	ASTM A108
8 x 12-ft (2.44 x 3.66-mm) (NOM) .3124-in. (7.93-mm) THICK (NOM) 6.00-in. (152.40-mm) WIDE (NOM)	BAR, METAL	ASTM A108
12-ft (3.66-mm) (NOM) .3760-in. (9.55-mm) THICK (NOM) 2.50-in. (63.50-mm) WIDE (NOM)	BAR, METAL	ASTM A108

POWERTRAIN LIFT SLING ASSEMBLY			
PIECE	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
A. LIFT SLING BEAM	14.50	368.30	9510-00-542-2484
B. LIFT HOOK	6.10	154.94	9510-00-542-2484
C. SLING REINFORCEMENT (2)	3.25	82.55	9510-00-596-3868
D. LEFT SIDE BRACKET REINFORCEMENT	7.35	186.69	9510-00-596-3868
E. RIGHT SIDE BRACKET REINFORCEMENT	7.38	187.45	9510-00-596-3868
F. LEFT SIDE BRACKET	9.60	243.84	9510-00-955-9277
G. RIGHT SIDE BRACKET	9.50	241.30	9510-00-955-9277

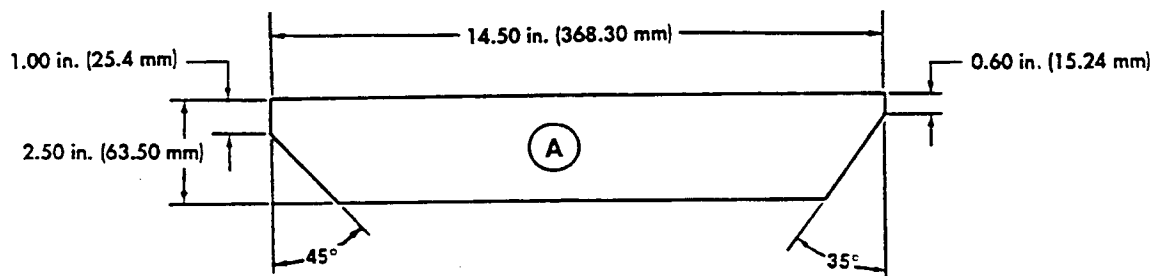


Figure D-65. Powertrain Lift Sling Beam, 5992396.

INSTRUCTIONS:

Using NSN 9510-00-542-2484 metal bar, fabricate lift sling beam A.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

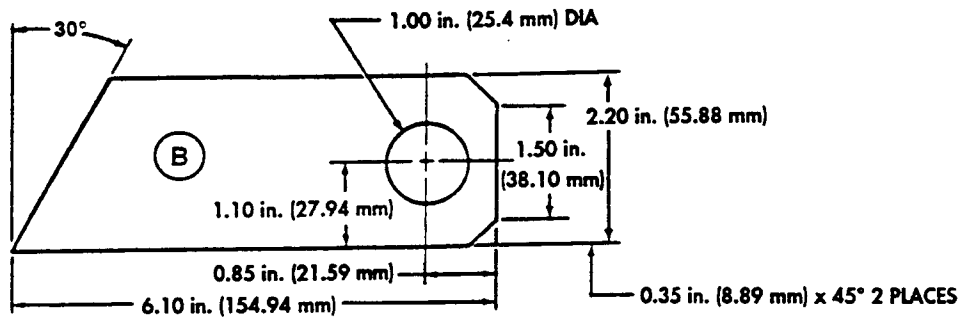


Figure D-66. Lift Hook, 5992397.

INSTRUCTIONS:

Using NSN 9510-00-542-2484 metal bar, fabricate lift hook B.

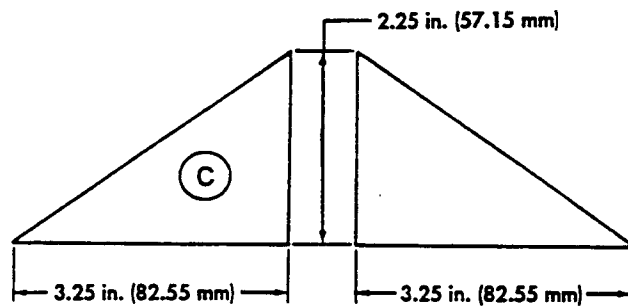


Figure D-67. Sling Reinforcement, 5992398.

INSTRUCTIONS:

Using NSN 9510-00-596-3868 metal bar, fabricate two sling reinforcements C.

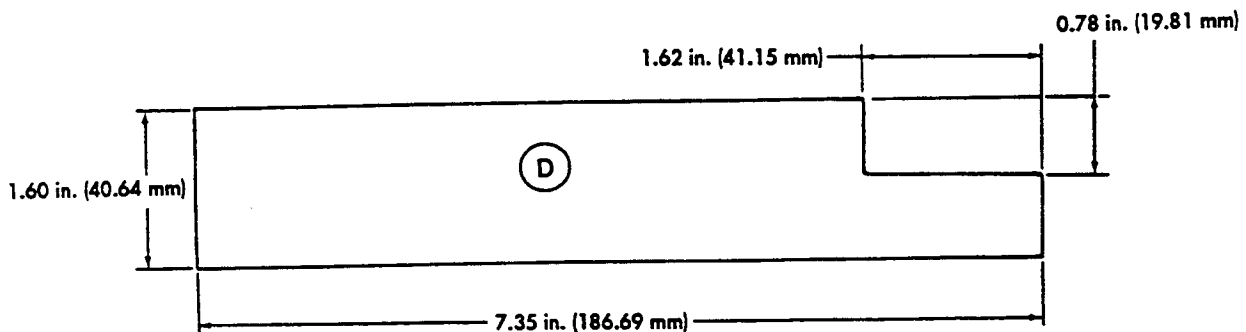


Figure D-68. Left Side Bracket Reinforcement, 5992399.

INSTRUCTIONS:

Using NSN 9510-00-596-3868 metal bar, fabricate left side bracket reinforcement D.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

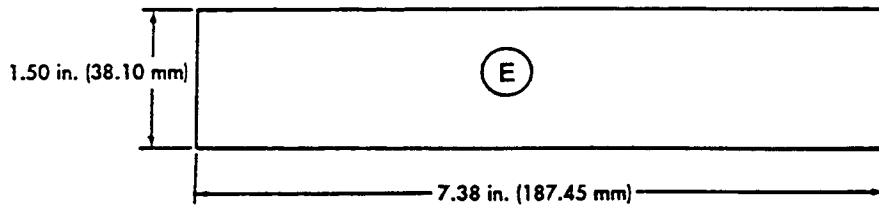


Figure D-69. Right Side Bracket Reinforcement, 5992400.

INSTRUCTIONS:

Using NSN 9510-00-596-3868 metal bar, fabricate right side bracket reinforcement E.

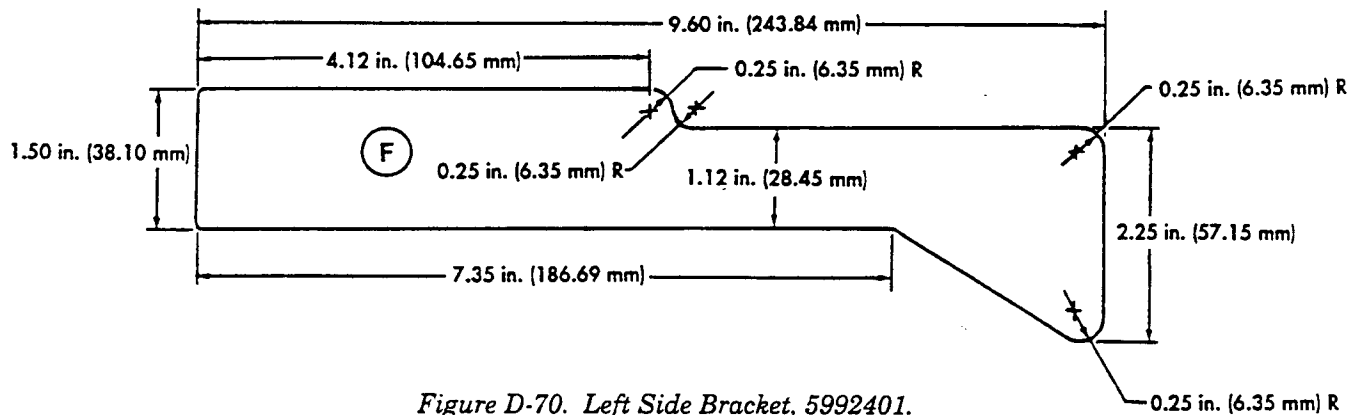


Figure D-70. Left Side Bracket, 5992401.

INSTRUCTIONS:

Using NSN 9510-00-955-9277 metal bar, fabricate left side bracket F.

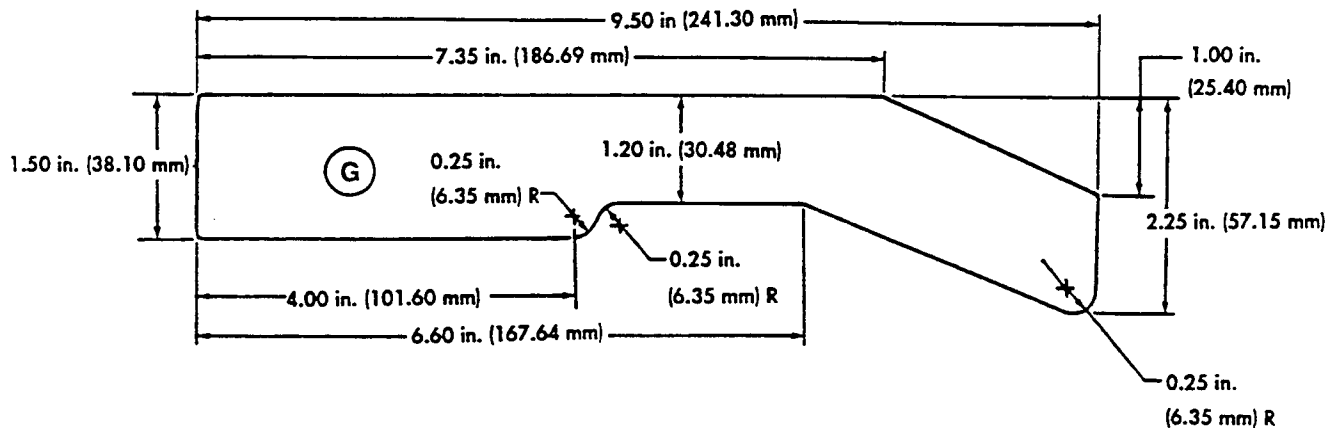


Figure D-71. Right Side Bracket, 5992402.

INSTRUCTIONS:

Using NSN 9510-00-955-9277 metal bar, fabricate right side bracket G.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS:

NOTE

Remove all burrs and sharp edges after each fabrication.

1. Position lift hook (3) on lift sling beam (2) and weld into place.
2. Position two sling reinforcements (1) and (4) on lift sling beam (2) and lift hook (3) and weld into place.
3. Position right side bracket (8) on lift sling beam (2) and weld into place.
4. Position right side bracket reinforcement (7) on lift sling beam (2) and right side bracket (8) and weld into place.
5. Position left side bracket (5) on lift sling beam (2) and weld into place.
6. Position left side bracket reinforcement (6) on lift sling beam (2) and left side bracket (5) and weld into place.
7. Locate, mark, and drill four 0.437-in. (11.10-mm) diameter holes through powertrain lift sling.
8. Paint powertrain lift sling (refer to TM 43-0139).
9. Complete load test for powertrain lift sling using a 1-ton (907.18-kg) weight.
10. Check powertrain lift sling for weld cracks by using a dye penetrant inspection method.

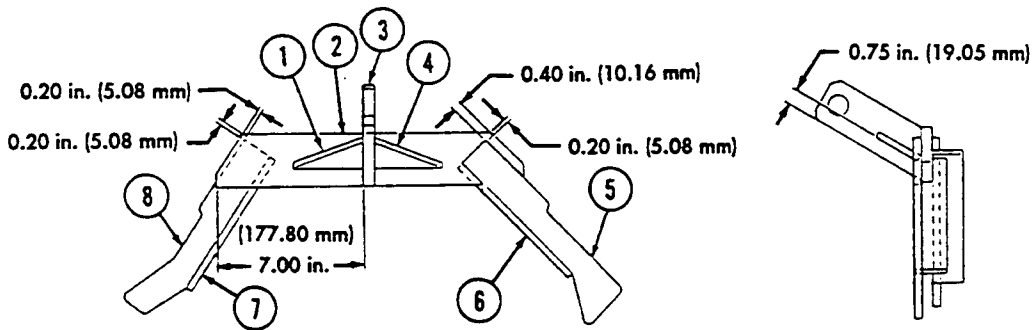


Figure D-72. Powertrain Lift Sling, 5992403.

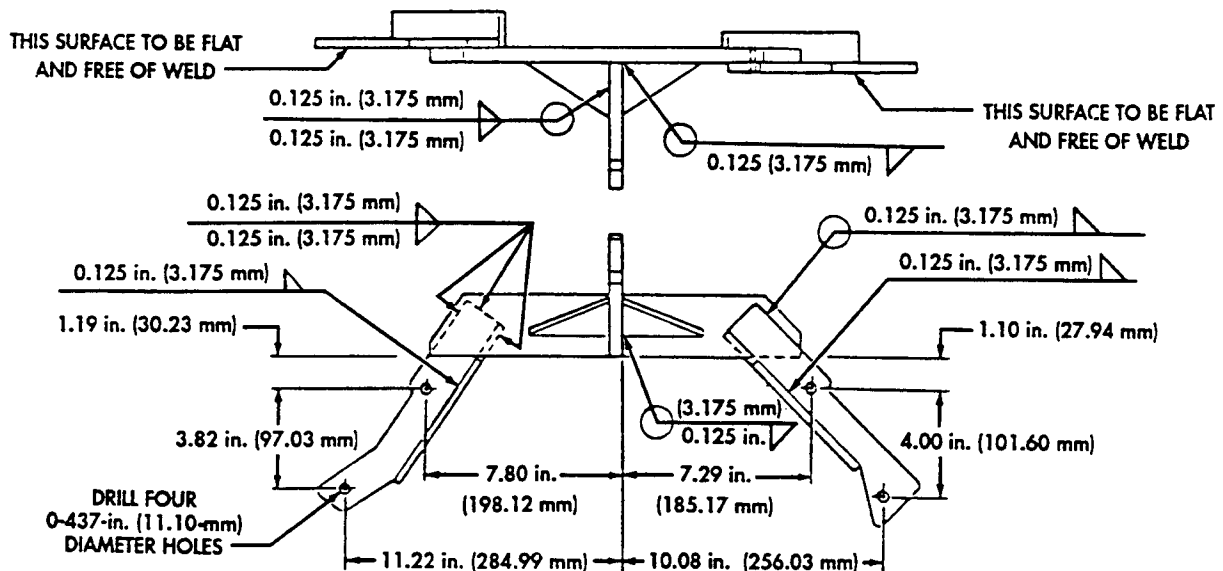


Figure D-73. Powertrain Lift Sling, 5992404.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

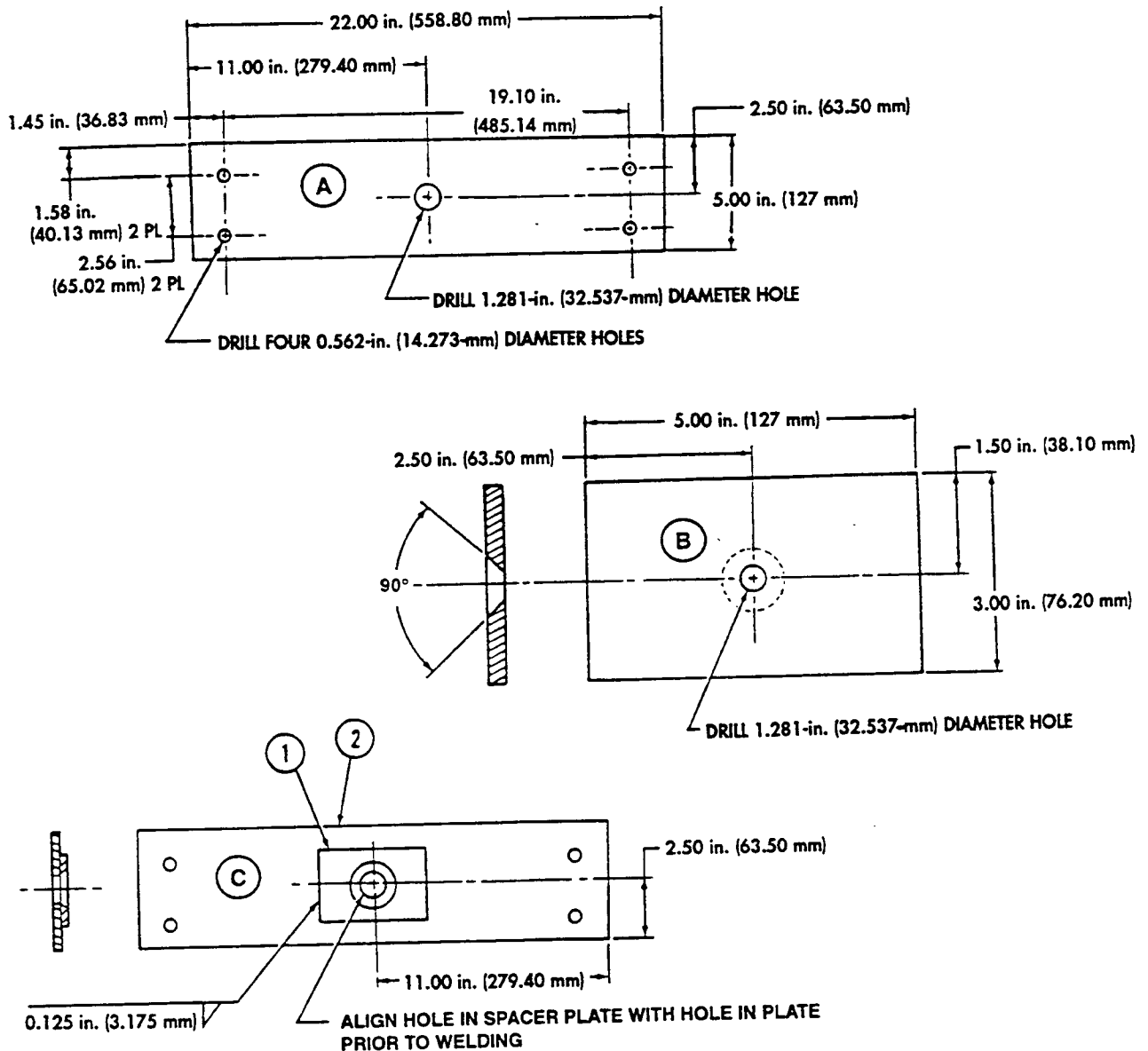


Figure D-74. Front Bumper Tow Pintle Plate Assembly (Front), 5992405.

INSTRUCTIONS:

NOTE

Remove all burrs and sharp edges after each fabrication.

1. Using NSN 9510-01-043-3616 metal bar, fabricate plate as shown in A.
2. Using NSN 9510-01-043-3616 metal bar, fabricate spacer plate as shown in B.
3. To fabricate front plate, position spacer plate (1) on plate (2) and weld into place as shown in C.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

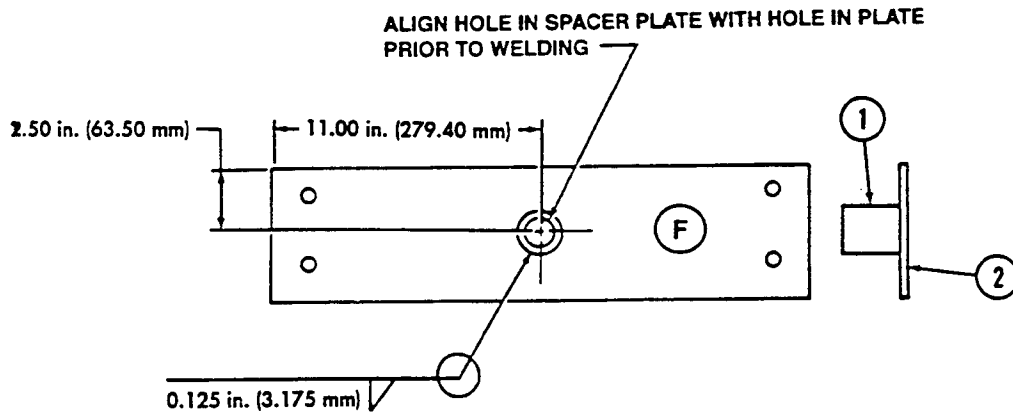
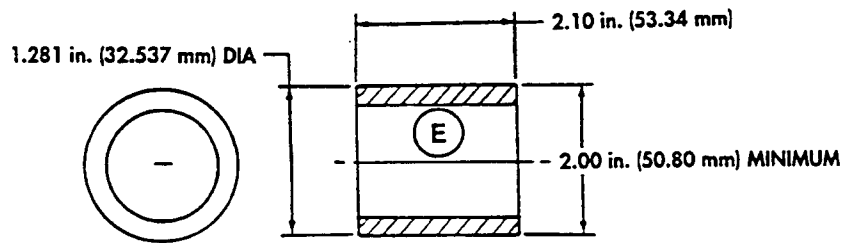
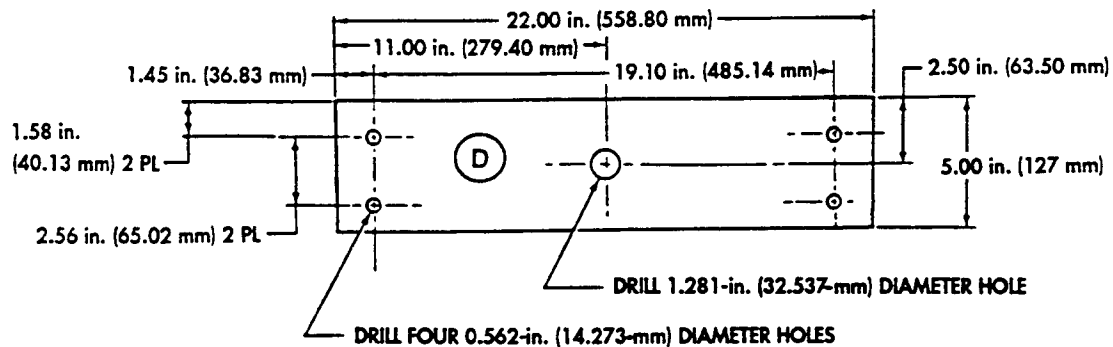


Figure D-75. Front Bumper Tow Pintle Plate Assembly (Back), 5992406.

INSTRUCTIONS:

NOTE

Remove all burrs and sharp edges after each fabrication.

1. Using NSN 9510-01-043-3616 metal bar, fabricate plate as shown in D.
2. Using NSN 9510-01-813-5343 metal bar, fabricate spacer tube as shown in E.
3. To fabricate back plate, position spacer tube (1) on plate (2) and weld into place as shown in F.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

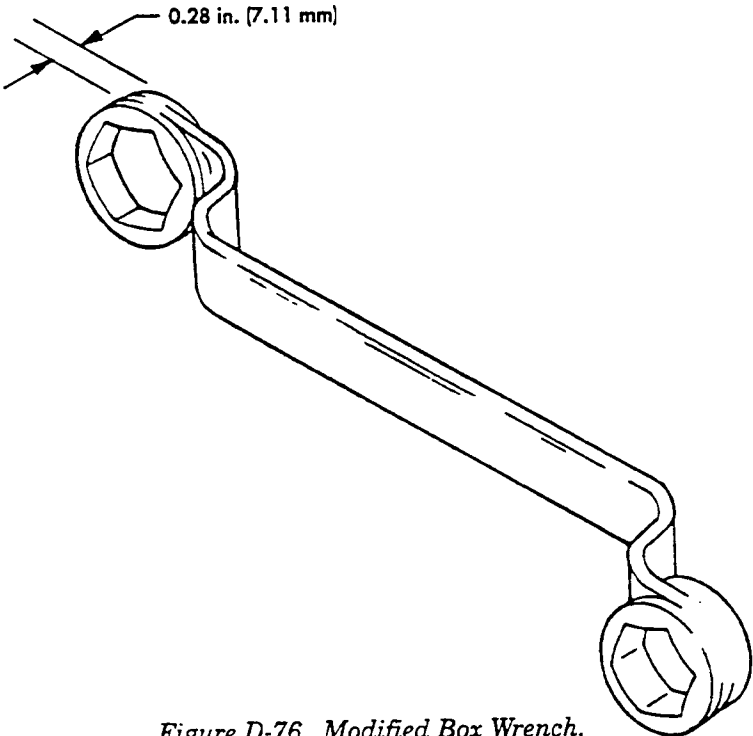


Figure D-76. Modified Box Wrench.

INSTRUCTIONS:

Modify a 1-in. (25.40-mm) box wrench by grinding it down to a thickness of 0.28 in. (7.11 mm).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
N/A	3/4- TO 1-HP ELECTRIC MOTOR W/ON-OFF SWITCH	N/A
N/A	PULLEY TO FIT MOTOR	N/A
N/A	DRIVEBELT	N/A
N/A	PRESSURE HOSE (CUT TO LENGTH) WITH QUICK-DISCONNECT	N/A
N/A	GUARD	N/A
N/A	DRAIN PAN	N/A
N/A	WIRE MESH	N/A

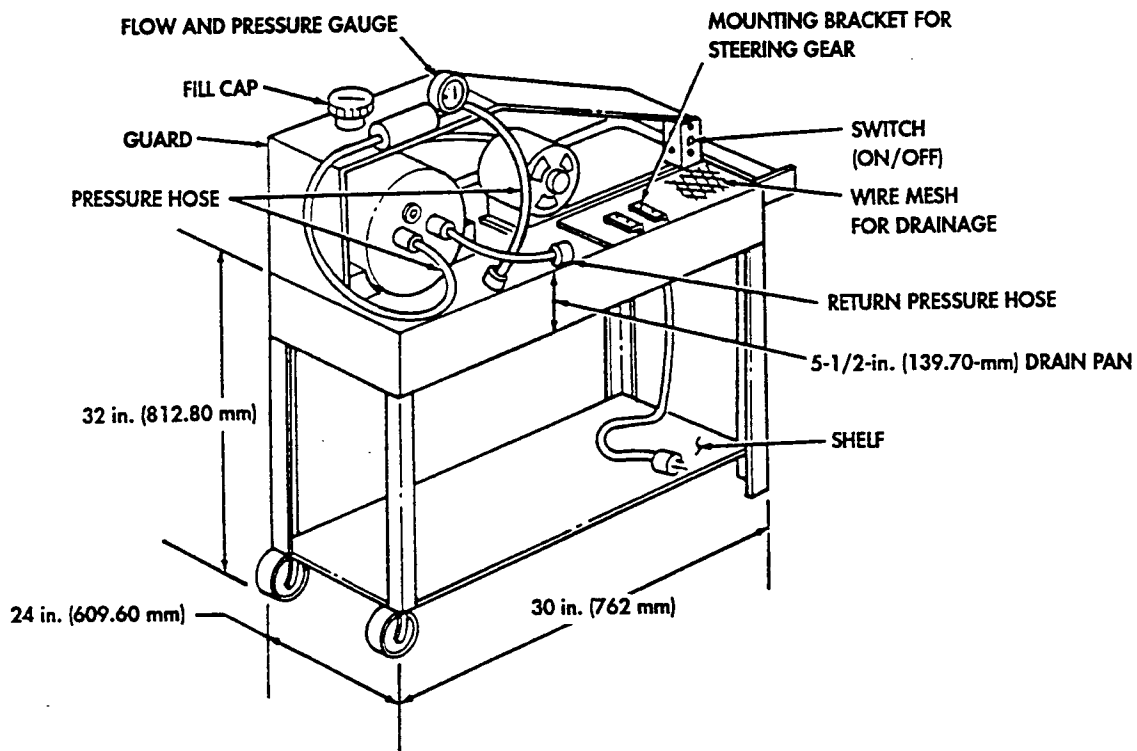


Figure D-77. Power Steering Pump and Steering Gear Test Stand.

INSTRUCTIONS:

NOTE

Materials and size depend upon availability.

1. Construct test stand using available materials and Figure D-77 as a guide.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
.375-in. (9.525-mm) THICK	BAR, METAL	ASTM A108
.188-in. (4.775-mm) THICK	ALUMINUM	QQ-A-200/18

POWERTRAIN LIFT SLING ASSEMBLY			
PIECE	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
A. SUPPORT HOOK (2)	14.50	368.30	9510-00-542-2484
A. SUPPORT HOOK (2)	12.00	304.80	9510-00-813-5322
B. BRACE (2)	14.00	355.60	9540-00-197-9865
C. BOTTOM SUPPORT	38.00	965.20	9540-00-197-9865

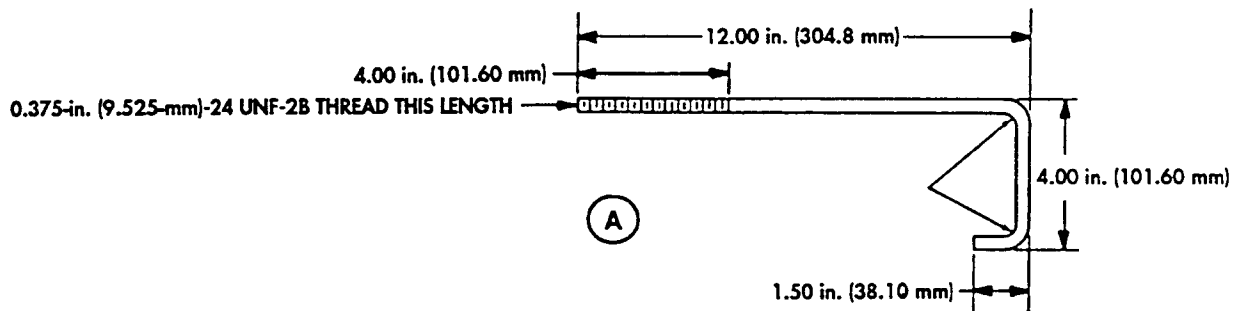


Figure D-78. Support Hook, QQS634.

INSTRUCTIONS:

Using NSN 9510-00-813-5322 metal bar, fabricate two support hooks A.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

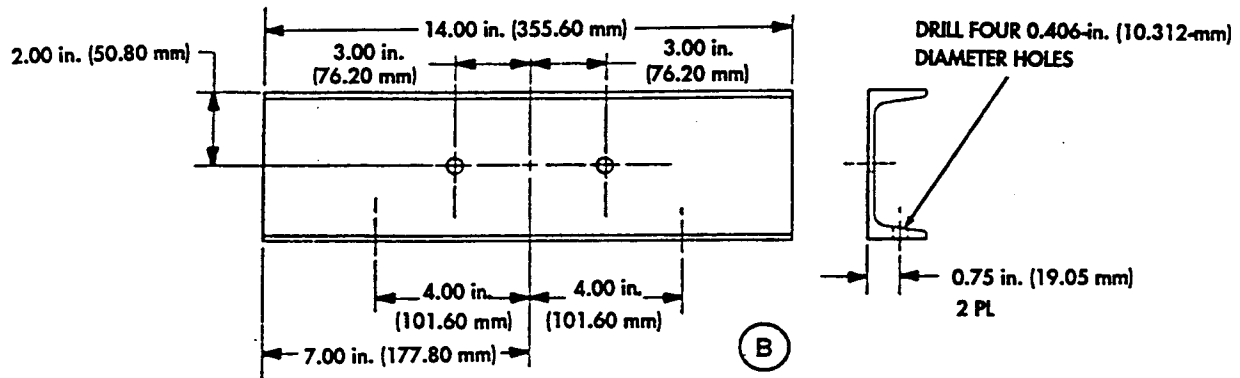


Figure D-79. Brace, QQ-A-200/18.

INSTRUCTIONS:

Using NSN 9540-00-197-9865 aluminum channel, fabricate two braces B.

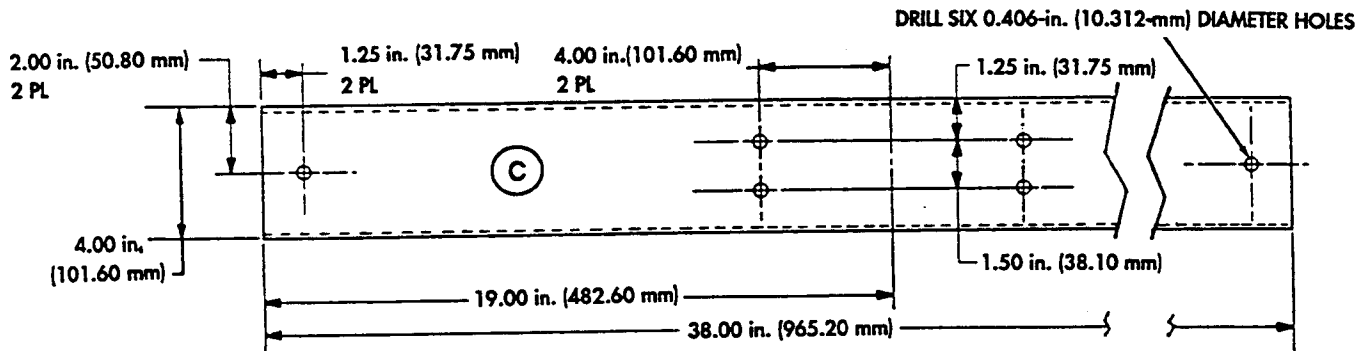


Figure D-80. Support, QQ-A-200/18.

INSTRUCTIONS:

Using NSN 9540-00-197-9865 aluminum channel, fabricate support C.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS:

1. Position two braces (1) on support (7) and install with six washers (2), capscrews (3), washers (2), and nuts (8).
2. Install two support hooks (4) on support (7) with four washers (5) and nuts (6).

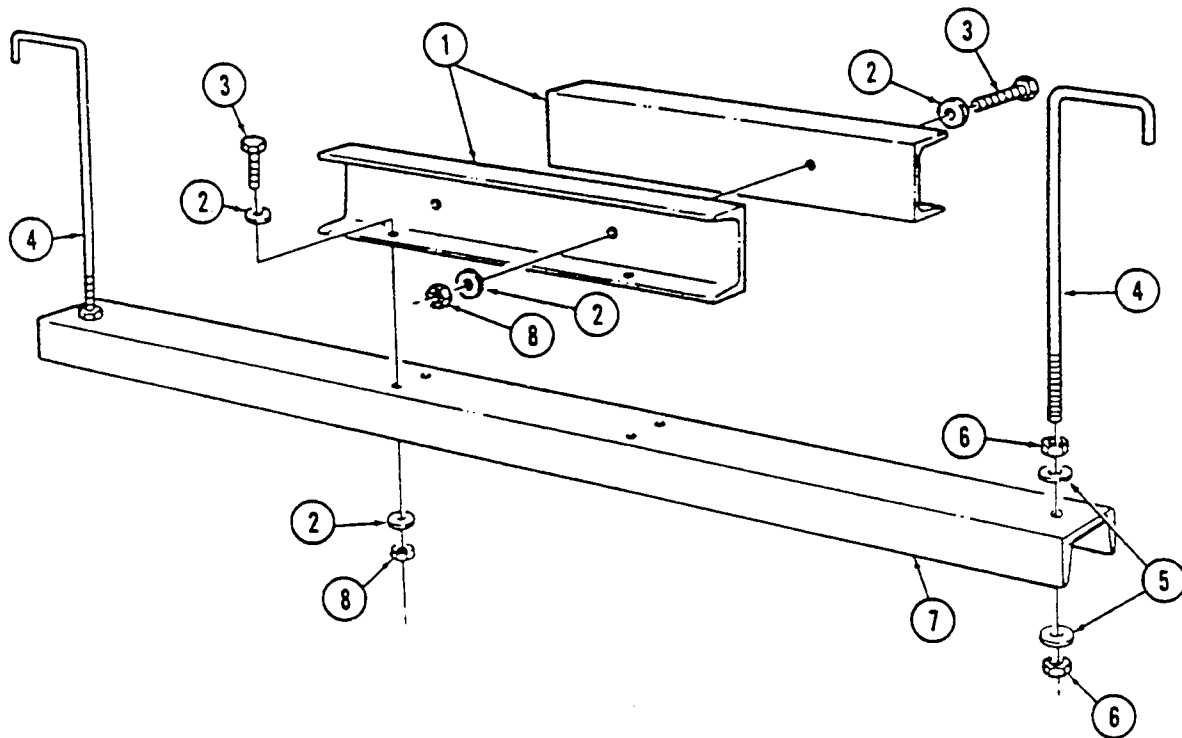


Figure D-81. Bottom Support Sling.

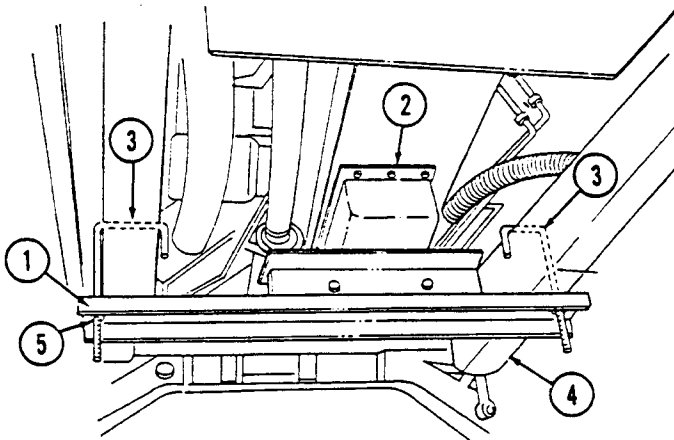
Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

INSTALLATION INSTRUCTIONS:

NOTE

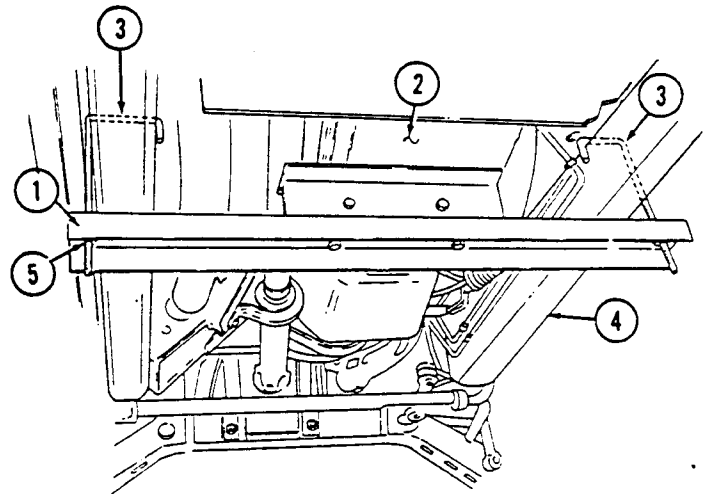
- Bottom support sling must be installed prior to engine or transmission removal.
- When performing step 1, ensure support hooks are positioned flat on frame rail to prevent damage to oil and vent lines. Ensure nuts on support hooks are adjusted evenly to keep from bending engine or transmission oil pan.

1. Position bottom support sling (1) under engine or transmission oil pan (2).
2. Slide support hooks (3) over frame rails (4) and hand-tighten four nuts (5) until support sling (1) is snug against oil pan (2). Tighten nuts (5) two more complete turns.



SLING SUPPORTING ENGINE

Figure D-82. Bottom Support.



SLING SUPPORTING TRANSMISSION

Figure D-83. Bottom Support.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
.125-in. (3.175-mm) THICK	BAR, METAL	ASTM A108
.125-in. (3.175-mm) THICK	BAR, METAL	ASTM A108
.125-in. (3.175-mm) THICK	BAR, METAL	ASTM A108
.155-in. (3.937-mm) THICK	STEEL, ANGLE	ASTM A575
.125-in. (3.175-mm) THICK	STEEL, ANGLE	ASTM A36
.125-in. (3.175-mm) THICK	STEEL, ANGLE	ASTM A36
.125-in. (3.175-mm) THICK	STEEL, ANGLE	ASTM A36
.250-in. (6.350-mm) DIAMETER	STEEL, CHAIN	RR-C-271
.250-in. (6.350-mm) DIAMETER	STEEL, CHAIN	RR-C-271

OVERHEAD SUPPORT SLING			
PIECE	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
A. ENGINE BRACKET (2)	3.50	88.90	9510-00-294-0986
B. L.H. TRANSMISSION BRACKET	8.10	205.74	9510-00-294-0986
C. R.H. TRANSMISSION BRACKET	8.10	205.74	9510-00-294-0986
D. A-FRAME BRACKET	8.0	203.2	9520-00-061-6507
E. CENTER SUPPORT BEAM	19.5	495.3	9520-00-277-4925
F. INNER FLOOR SUPPORT	5.0	127.0	9520-00-277-4925
G. OUTER FLOOR SUPPORT	10.0	254.0	9520-00-277-4925
H. ENGINE SUPPORT CHAIN	14.00	355.60	4010-00-174-4879
I. TRANSMISSION SUPPORT CHAIN	25.00	635.0	4010-00-174-4879

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

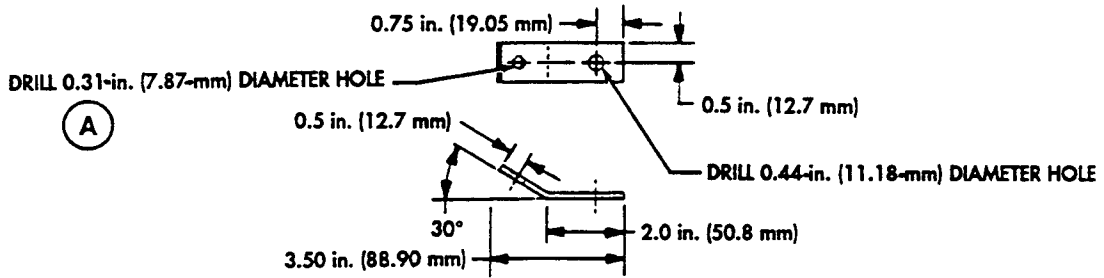


Figure D-84. Engine Bracket, QQS634.

INSTRUCTIONS:

Using NSN 9510-00-294-0986 metal bar, fabricate two engine brackets A.

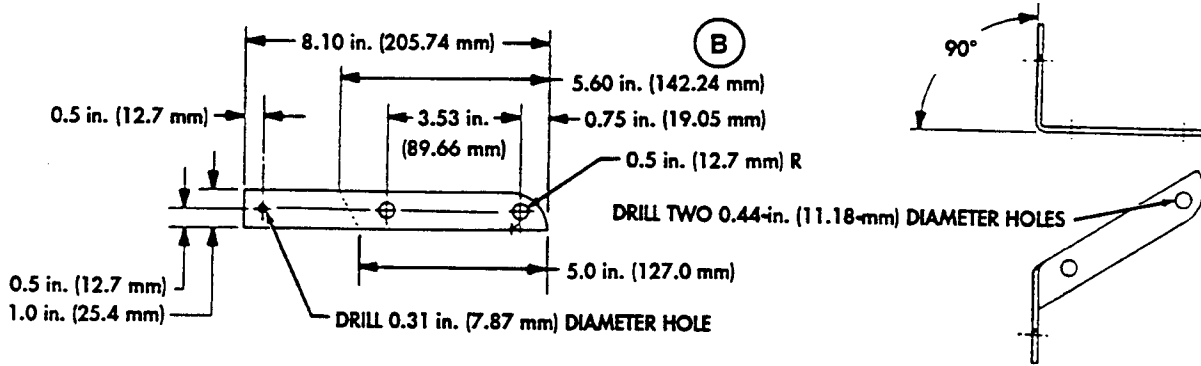


Figure D-85. L.H. Transmission Bracket, QQS634.

INSTRUCTIONS:

Using NSN 9510-00-294-0986 metal bar, fabricate L.H. transmission bracket B.

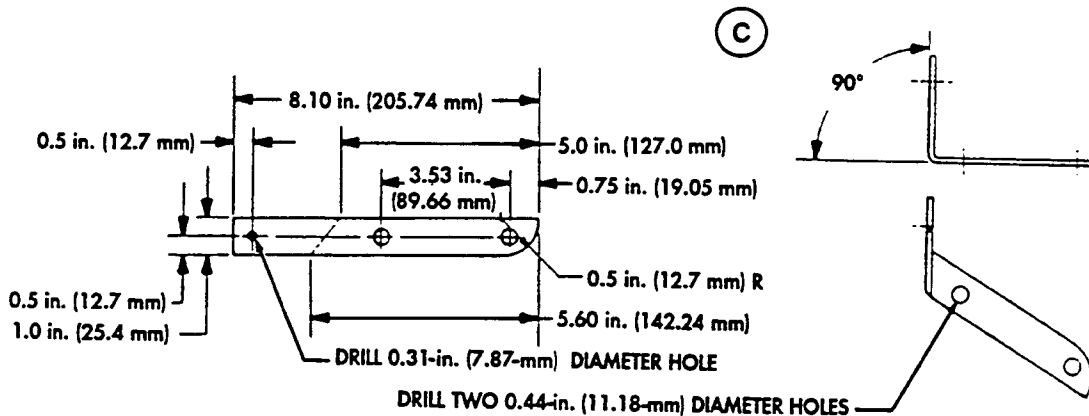


Figure D-86. R.H. Transmission Bracket, QQS634.

INSTRUCTIONS:

Using NSN 9510-00-294-0986 metal bar, fabricate R.H. transmission bracket C.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

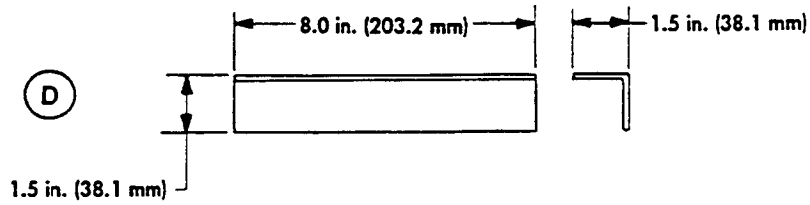


Figure D-87. A-Frame Bracket, QQS630.

INSTRUCTIONS:

Using NSN 9520-00-061-6507 steel angle, fabricate A-frame brace D.

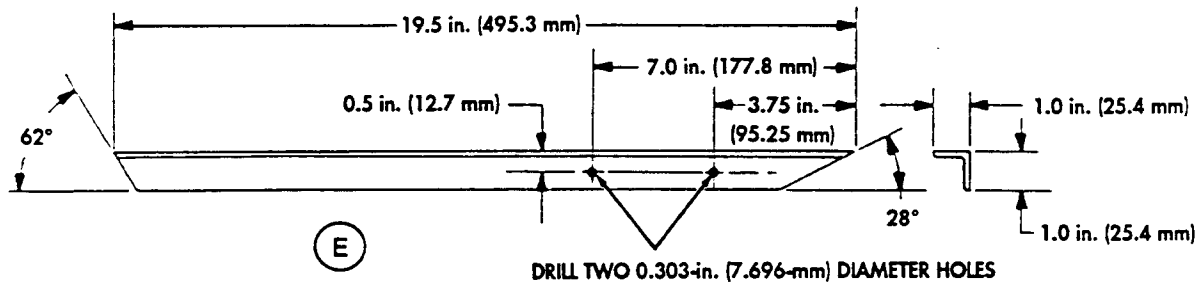


Figure D-88. Center Support Beam, QQS741.

INSTRUCTIONS:

Using NSN 9520-00-277-4925 steel angle, fabricate center support beam E.

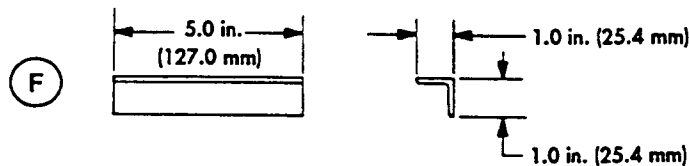


Figure D-89. Inner Floor Support, QQS741.

INSTRUCTIONS:

Using NSN 9520-00-277-4925 steel angle, fabricate inner floor support F.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

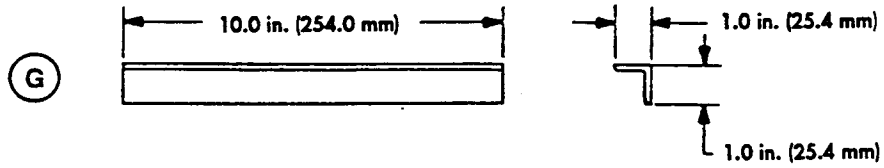


Figure D-90. Outer Floor Support, QQS741.

INSTRUCTIONS:

Using NSN 9520-00-277-4925 steel angle, fabricate outer floor support G.

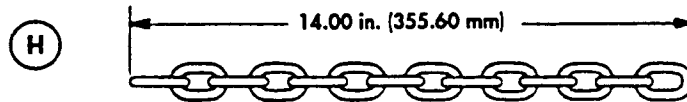


Figure D-91. Engine Support Chain.

INSTRUCTIONS:

Using NSN 4010-00-174-4879 steel chain, fabricate engine support chain H.

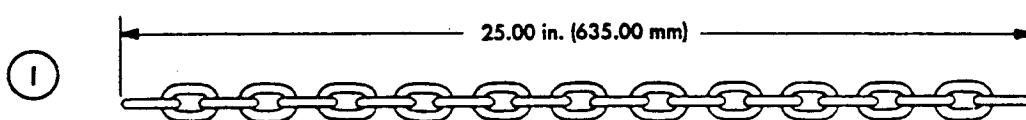


Figure D-92. Transmission Support Chain.

INSTRUCTIONS:

Using NSN 4010-00-174-4879 steel chain, fabricate transmission support chain I.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS:

NOTE

Remove all burrs and sharp edges after each fabrication.

1. Position outer floor support (4) on inner floor support (3) and weld into place.
2. Position center support beam (1) on inner floor support (3) and weld into place.
3. Position A-frame brace (2) on center support beam (1) and weld into place.

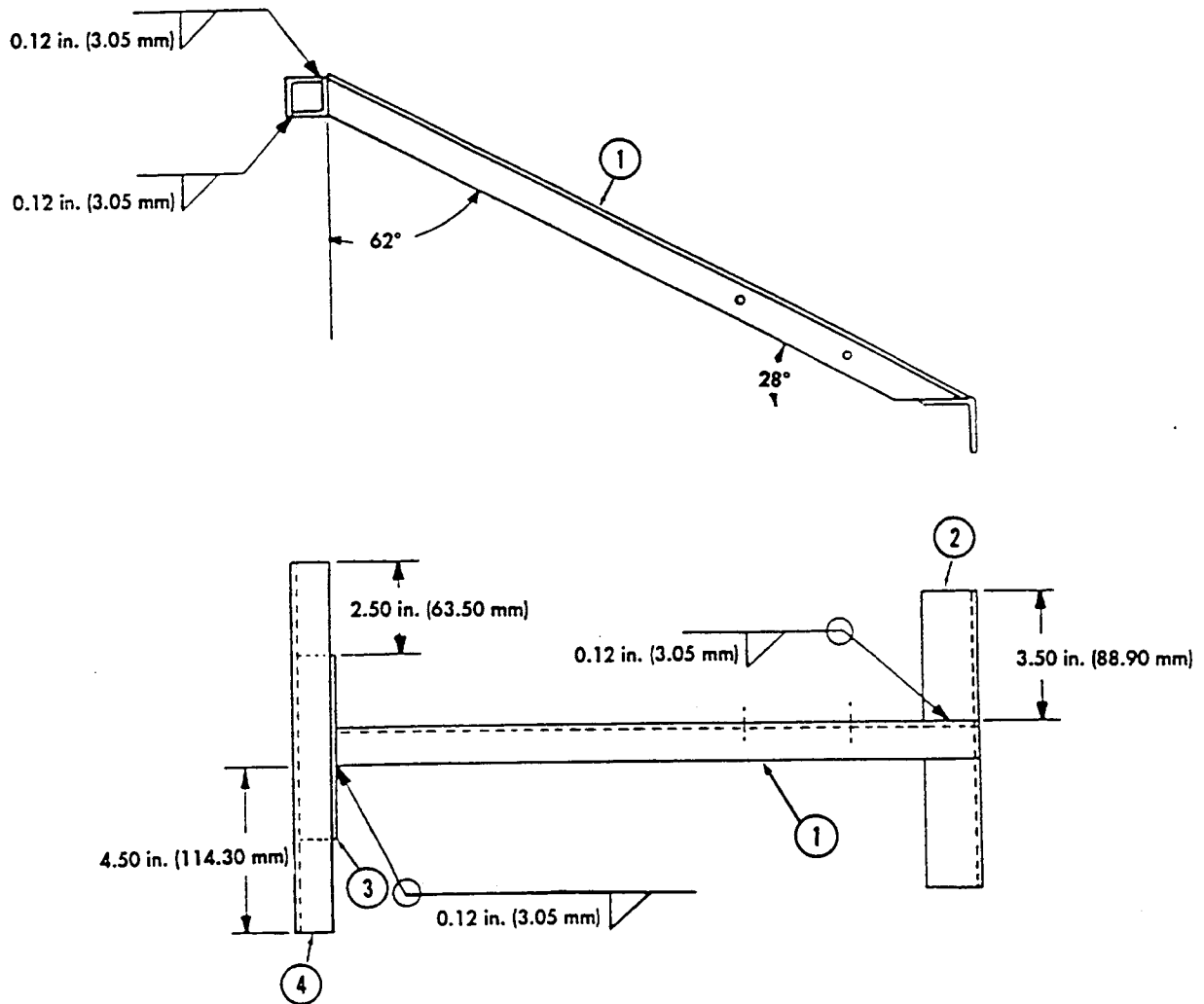


Figure D-93. Outer/Inner Floor Support.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

ASSEMBLY INSTRUCTIONS (Cont'd):

NOTE

- Remove all burrs and sharp edges after each fabrication.
- Perform step 4 if rigging overhead support sling for transmission use.
- Perform step 5 if rigging overhead support for engine use.

4. Position L.H. and R.H. transmission brackets (1) to the ends of support chain (14) and install two washers (3), capscrews (2), washers (3), and nuts (13).
5. Position two engine brackets (15) to the ends of support chain (14) and install two washers (3), capscrews (2), washers (3), and nuts (13).
6. Install eyebolts (4) and (6) in turnbuckle (5).

NOTE

- Perform steps 7 and 8 if rigging overhead support sling for transmission use.
- Perform steps 9 and 10 if rigging overhead support sling for engine use.

7. Position R.H. eyebolt (6) to hole (9) in overhead support sling (11) and install washer (8), capscrew (7), washer (8), and nut (12). Do not tighten nut (12) or use hole (10).
8. Using center link, install support chain (14) on L.H. eyebolt (4) with washer (3), capscrew (2), washer (3), and nut (13). Tighten nut (12).
9. Position R.H. eyebolt (6) to hole (10) in overhead support sling (11) and install washer (8), capscrew (7), washer (8), and nut (12). Do not tighten nut (12) or use hole (9).
10. Using center link, install support chain (14) on L.H. eyebolt (4) and install washer (3), capscrew (2), washer (3), and nut (13). Tighten nut (12).

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

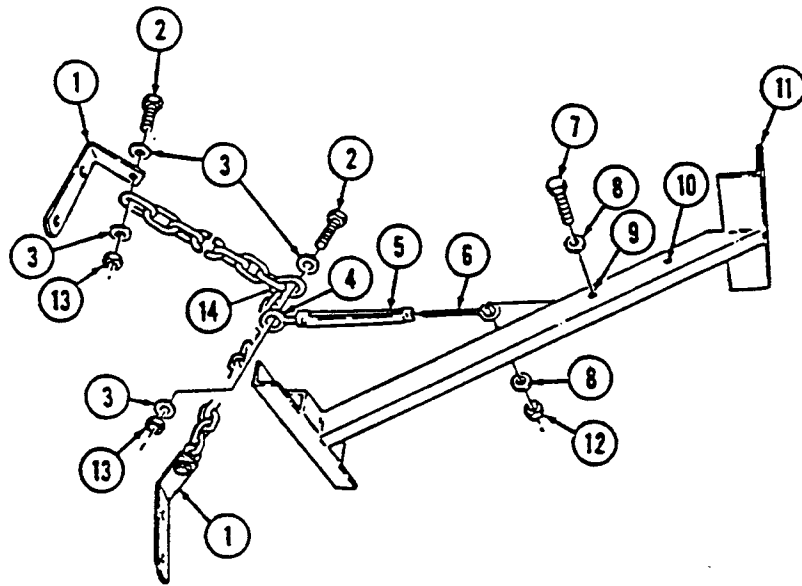


Figure D-94. Overhead Support Sling for Transmission.

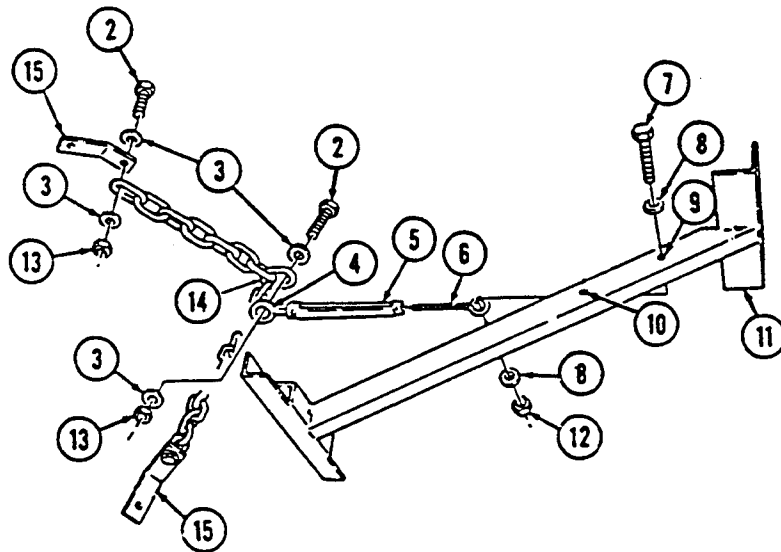


Figure D-95. Overhead Support Sling for Engine.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

INSTALLATION INSTRUCTIONS:

NOTE

- Perform engine removal procedures, para. 15-26, to a point prior to supporting transmission for engine removal.
- Perform steps 1 through 3 to secure transmission.

1. Position overhead support sling (2) on floor (3) and A-frame (1).

NOTE

- Use converter housing cover bolts to install transmission brackets on transmission housing.
- When performing step 2, it might be necessary to shift engine support chain link on L.H. eyebolt to adjust for securing transmission to transmission bracket.

2. Install transmission bracket (7) on transmission housing (4) with four washers (6) and capscrews (5).
3. Tighten turnbuckle (9) to remove slack from transmission chain (8).
4. Continue engine removal procedure; para. 15-26.

NOTE

- Perform transmission removal procedure, para. 19-3, to a point prior to supporting engine for transmission removal.
- Perform steps 5 through 8 to secure engine.

5. Position overhead support sling (2) on floor (3) and A-frame (1).

NOTE

- Use converter housing cover bolts and washers to install engine brackets on back of cylinder head.
- When performing step 6, it might be necessary to shift engine support chain link on L.H. eyebolt to adjust for securing engine cylinder head to engine bracket.

6. Install engine brackets (10) to engine cylinder head (11) with two existing washers (6) and capscrews (5).
7. Tighten turnbuckle (9) to remove slack from engine bracket chain (8).
8. Continue transmission removal procedure; para. 19-3.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

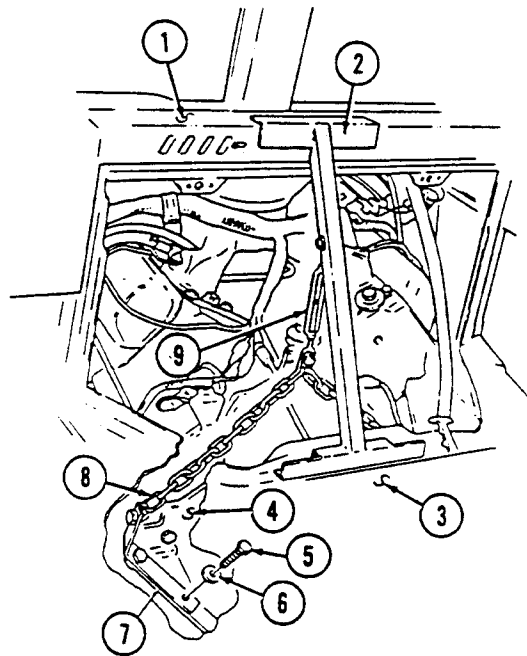


Figure D-96. Overhead Support Sling for Transmission.

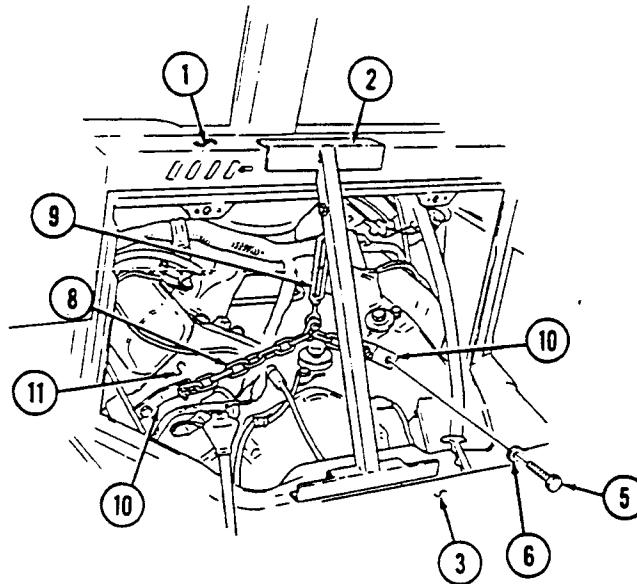


Figure D-97. Overhead Support Sling for Engine.

Section II ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK			
STOCK SIZE	DESCRIPTION		SPECIFICATION
0.156-in. (3.962-mm) INSIDE DIA. 0.281-in. (7.137-mm) OUTSIDE DIA.	HOSE, NONMETALLIC		N/A

FUEL DRAIN-BACK HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
14066305	7	177.8	4720-01-184-0433

Figure D-98. Fuel Drain-back Hose.

INSTRUCTIONS:

Cut hose to length shown.

MATERIAL BLOCK			
STOCK SIZE	DESCRIPTION		SPECIFICATION
0.359-0.391-in. (9.119-9.931-mm) INSIDE DIA. 0.648-0.602-in. (16.459-15.291-mm) OUTSIDE DIA.	HOSE, NONMETALLIC		GM-6165-M

FUEL SUPPLY HOSE			
HOSE PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	IN.	MM	
23500023	9-13/16	249.2	4720-01-159-5769

Figure D-99. Fuel Supply Hose.

INSTRUCTIONS:

Cut hose to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
N/A	SEAL, NOMETALLIC	N/A

PLASTIC SHEET		
PLASTIC SHEET PART NUMBER	CUT LENGTH	MANUFACTURED FROM NSN
5598827	AS REQUIRED	9330-00-618-7214

Figure D-100. Plastic Sheet.

INSTRUCTIONS:

Cut two pieces of plastic large enough to cover small hole or crack with enough to overlap about 1/4 in. (6.35 mm) around damaged area of window.

TURRET BEARING SEAL			
SEAL PART NUMBER	CUT LENGTH		MANUFACTURED FROM NSN
	FT	M	
MT161A	11	3.35	5330-01-282-2213

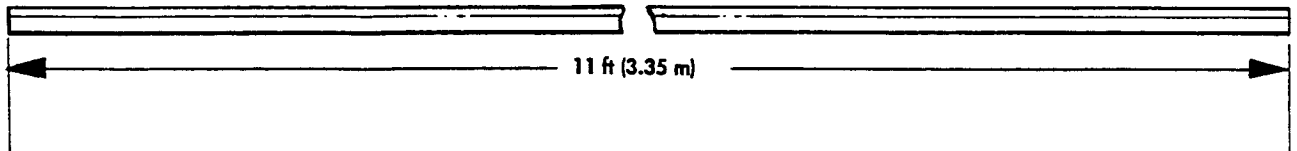


Figure D-101. Turret Bearing Seal.

INSTRUCTIONS:

Cut seal to length shown.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

WINCH WIRE ROPE ASSEMBLY						
ASSEMBLY PART NUMBER	CUT LENGTH		MANUFACTURED FROM PART NUMBER (CAGEC)	TERMINAL PART NUMBER (CAGEC)	CLAMP PART NUMBER (CAGEC)	THIMBLE PART NUMBER (CAGEC)
	IN.	MM				
15667	1200.0	365.8	21451 (27647)	16464 (27647)	MS16843-5 (27647)	SC-C-36424-6 (80063)

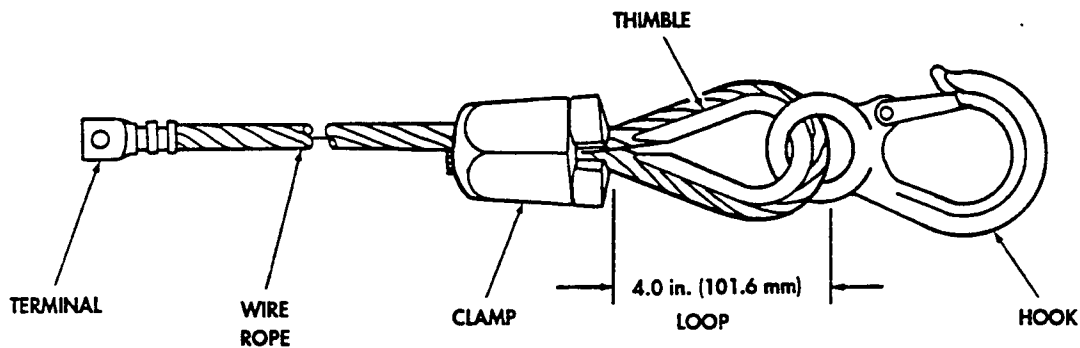


Figure D-102. Winch Wire Rope Assembly.

INSTRUCTIONS:

1. (a) Properly seize wire rope end before cutting. To seize wire rope end, follow these instructions:

NOTE

- Ensure each wrap is tight to the preceding wrap.
- Ensure the length of the seizing is not less than the diameter of the wire rope.

- (1) Wrap the seizing wire around the wire rope as tight as possible.
- (2) Twist the ends of the seizing together by hand counterclockwise so that the twist is near the middle of the seizing.

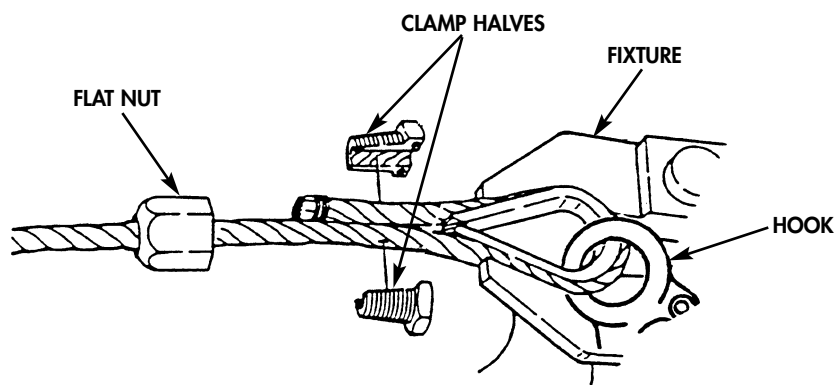
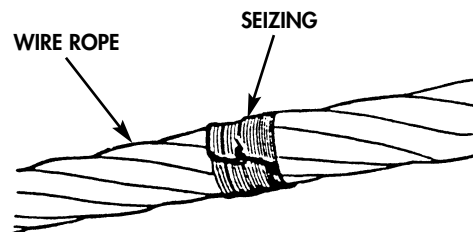
NOTE

Do not try to tighten the seizing by twisting.

- (3) Tighten the twist just enough to take up the slack.
 - (4) Tighten the seizing by prying the twist away from the axis of the wire rope.
 - (5) Tighten the twist again as described in step 3.
 - (6) Repeat the process until the seizing can not be pried away from the axis of the wire rope.
 - (7) Cut off wire ends and pound the twist into contact with the seizing.
- (b) Cut wire rope to length as shown and install part of clamp with nut on wire rope.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

2. Position rope after seizing in a suitable fixture to make a loop, leaving enough rope to wrap around thimble and enclose in clamp.
3. Thread wire rope through eyelid in hook, insert thimble and close jaws of fixture to enable rope to conform to groove of thimble.
4. Place one-half of clamp in position and adjust rope accordingly. The seized portion of the wire rope should equal one rope diameter and protrude entirely beyond the threaded end of the clamp half.
5. Install clamp nut. Holding both threaded halves in position, push the nut into both halves through the first two threads. Ensure proper alignment of both threaded halves and that there is no cross-threading.
6. Remove rope, clamp, and thimble while still connected.
7. Hold opposing flats of clamp halves in suitable fixture and properly lubricate exposed threads with high-viscosity lubricating oil.
8. Using a permanent marker, mark one flat nut to ensure the same opposing flats are checked before and after tightening the clamp.
9. Using calipers, measure 1/8 in. (3.16 mm) across the flat nut from the bottom and note measurement.
10. Check to ensure clamp halves are properly secured in fixture and tighten with appropriate wrench.
11. Using calipers, again take measurement of the same flat nut as was done before tightening of the nut. If the increment dilation is between 0.004 in. (.102 mm) and 0.007 in. (.178 mm), clamp is tight.
12. Using arbor press, crimp terminal to opposite end of wire rope.



Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.188-in. (4.775 mm) THICK	STRIP, METAL	ASTM A569

SHEET		
PART NUMBER	CUT TO SIZE (INCHES)	MANUFACTURED FROM NSN
N/A	AS SHOWN	9515-00-814-7316

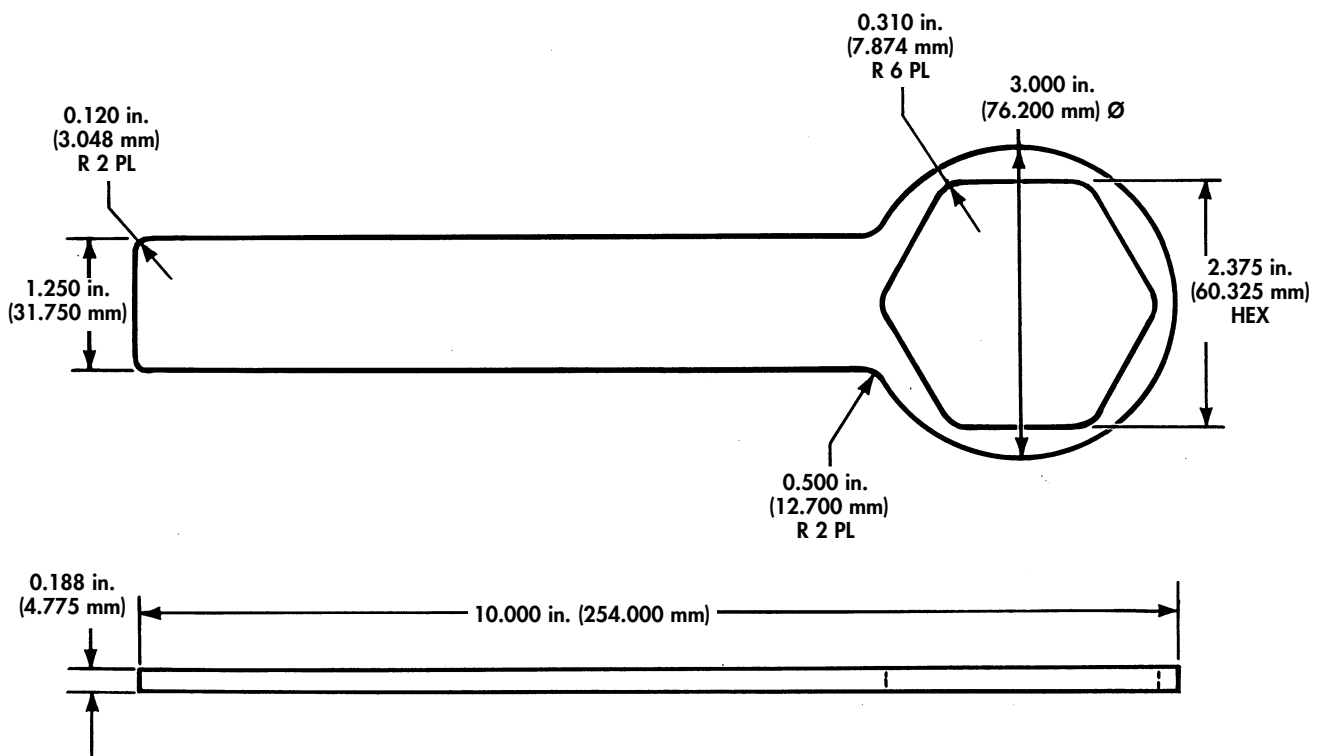


Figure D-103. Hex Wrench.

INSTRUCTIONS:

1. Cut one piece of metal strap to size as shown.
2. Remove all burrs and sharp edges.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.125-in. (3.175 mm) THICK 0.188-in. (4.775 mm) THICK	STRIP, METAL	ASTM A569

SHEET		
PART NUMBER	CUT TO SIZE (INCHES)	MANUFACTURED FROM NSN
N/A	AS SHOWN	9515-00-596-2044 9515-00-814-7316

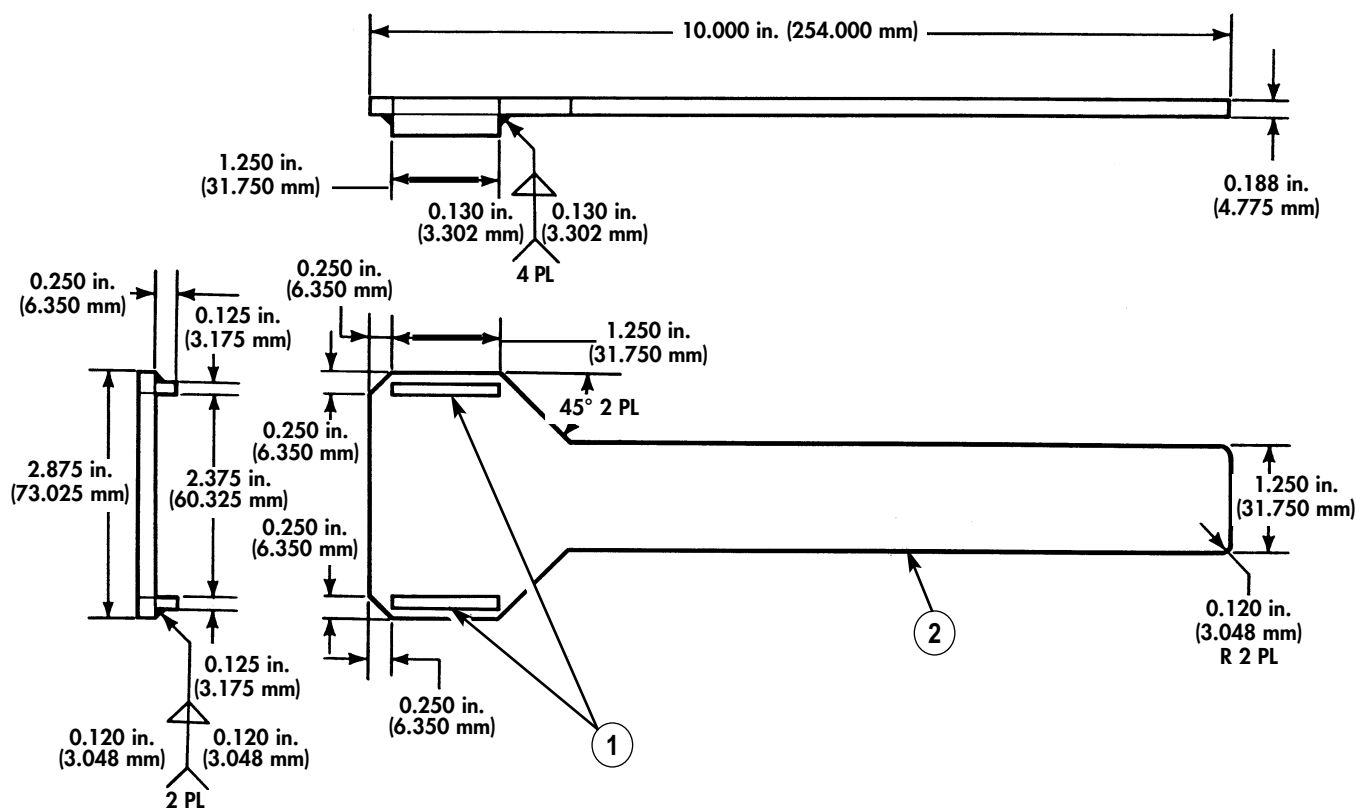


Figure D-104. Open End Wrench.

INSTRUCTIONS:

1. Using NSN 9515-00-814-7316 metal strip, cut one piece 0.188-in. (4.775-mm) thick to make handle (2) as shown.
2. Using NSN 9515-00-569-2044 metal strap, cut two pieces 0.125-in. (3.175-mm) thick to make two jaws (1) as shown.
3. Weld two jaws (1) to handle (2) as shown.
4. Remove all burrs and sharp edges.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.250-in. (6.350-mm) THICK	BAR, METAL	ASTM A569

SHEET		
PART NUMBER	CUT TO SIZE (INCHES)	MANUFACTURED FROM NSN
N/A	AS SHOWN	9510-00-813-4714

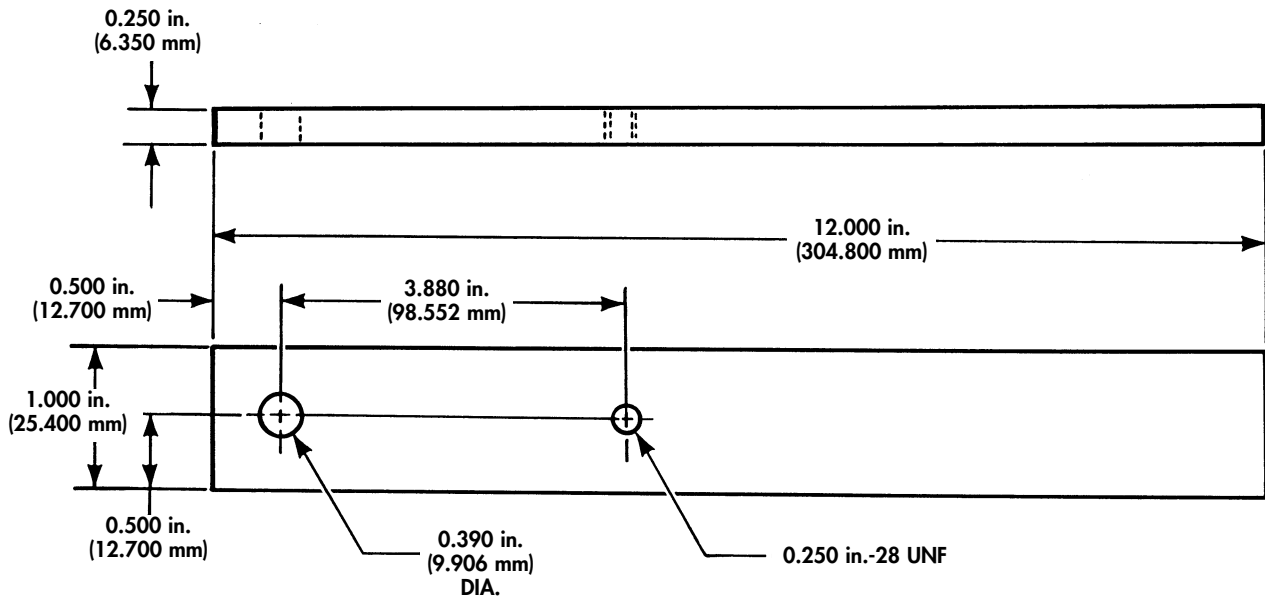


Figure D-105. Parking Brake Spring Tool.

INSTRUCTIONS:

1. Using NSN 9510-00-813-4714 metal bar, fabricate parking brake tool.
2. Remove all burrs and sharp edges.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)**ASSEMBLY INSTRUCTIONS:**

1. Position bar (2) across parking brake spring (4) and install on parking brake lever (5) using NSN 5305-00-725-2317 screw (1) and NSN 5310-00-761-0654 nut (6).
2. Install NSN 5305-00-068-0515 screw (3) in bar (2).
3. Remove parking brake spring (4) from parking brake lever (5) and caliper housing (7) by turning bar (2) clockwise.
4. Remove nut (6), screw (1), and bar (2) from parking brake lever (5).

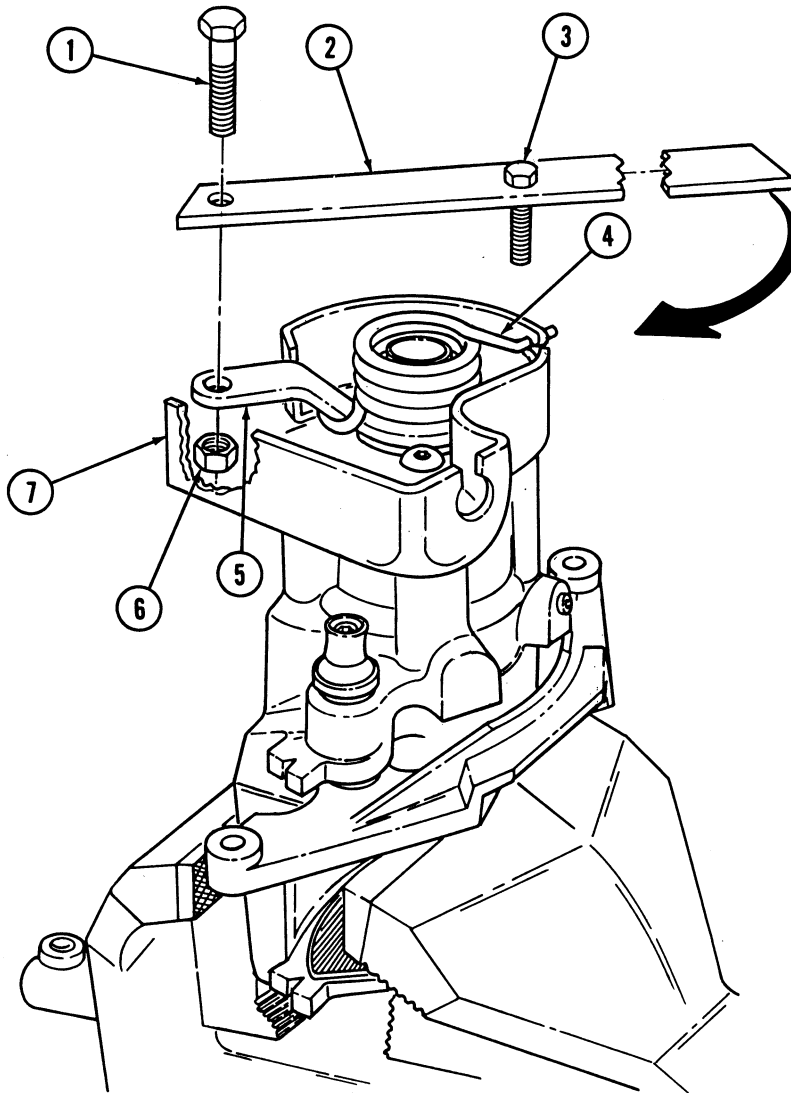


Figure D-106. Instructions for Parking Brake Spring Tool.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
0.125 X 2.570 X 3.500 in. (3.175 X 65.278 X 88.900 mm)	ALUMINUM FLAT SHEET	IAW ASTM B 209
0.125 X 0.750 X 24.000 in. (3.175 X 19.050 X 609.600 mm)	ALUMINUM RECTANGLE	IAW ASTM B 211

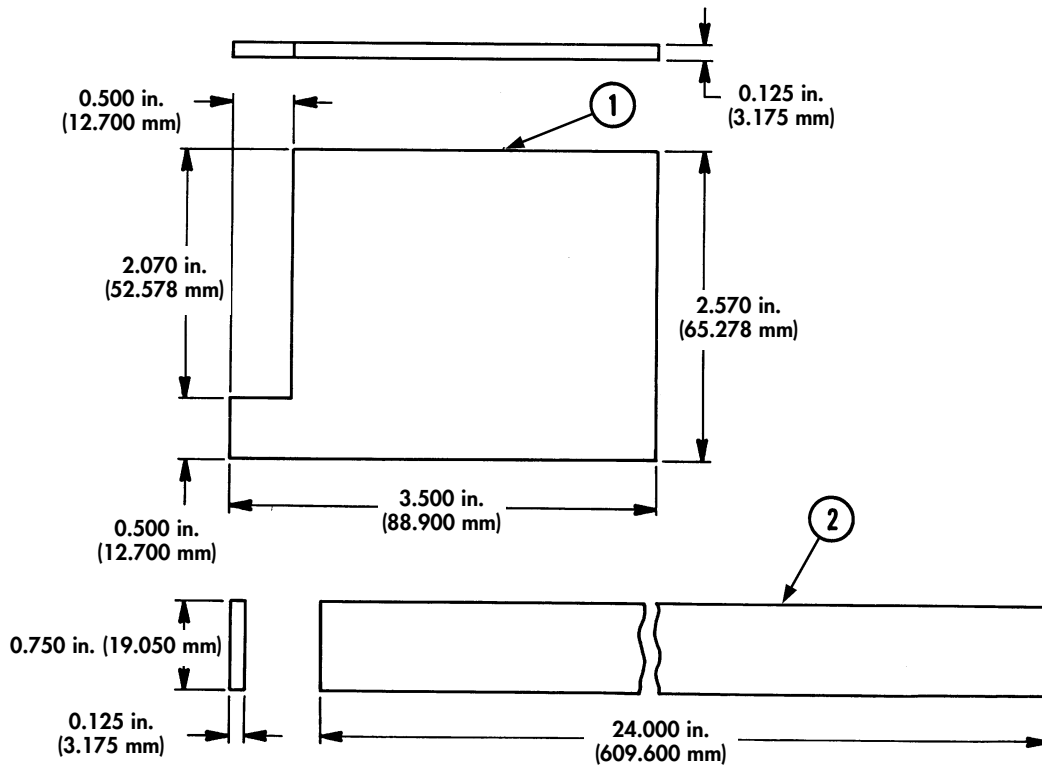


Figure D-107. Pulley Alignment Tool Fabrication.

INSTRUCTIONS:

NOTE

- Remove all burrs and sharp edges from aluminum sheet and rectangle.
- Pulley alignment tool can be assembled using nuts, bolts, rivets, or by welding.

1. Cut aluminum sheet (1) to size as shown.
2. Position aluminum rectangle (2) on top of aluminum sheet (1) as shown in figure D-107.

NOTE

Check all measurements before welding, riveting, or bolting pulley alignment tool together.

3. Assemble pulley alignment tool as shown in figure D-107.

Section II. ILLUSTRATED MANUFACTURING INSTRUCTIONS (Cont'd)

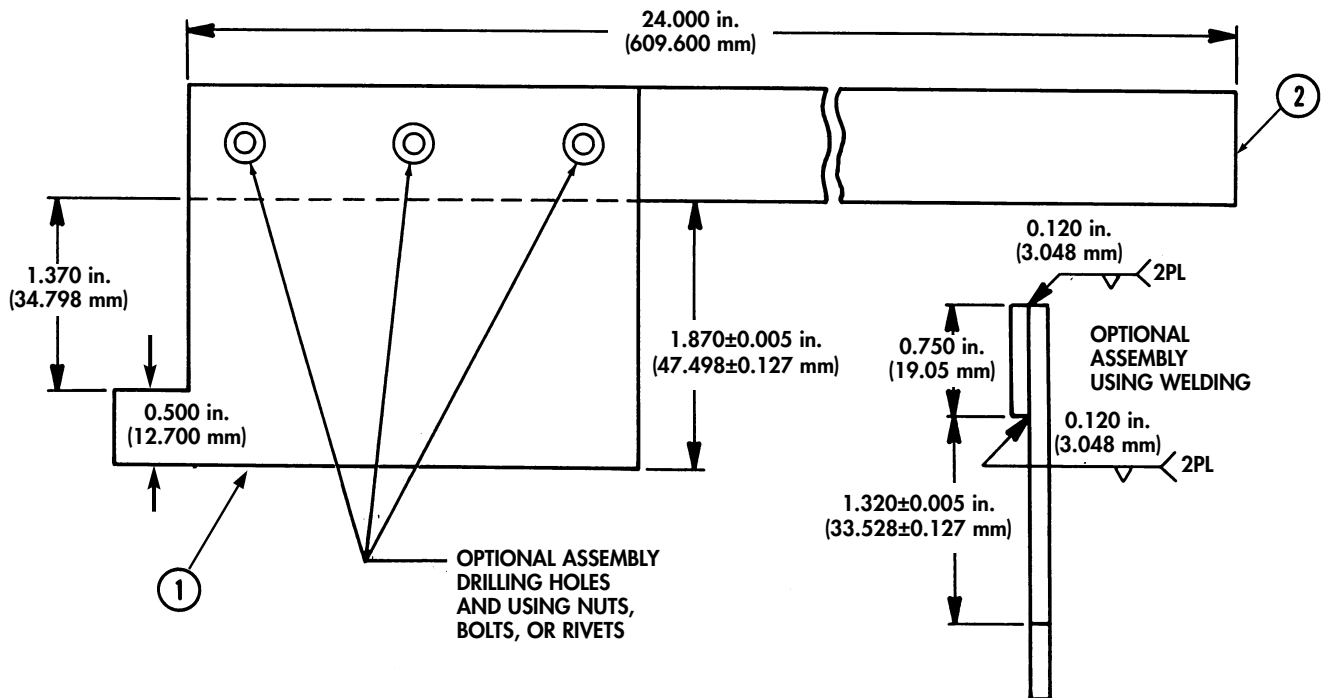


Figure D-107. Pulley Alignment Tool Fabrication (Cont'd).

APPENDIX E TORQUE LIMITS

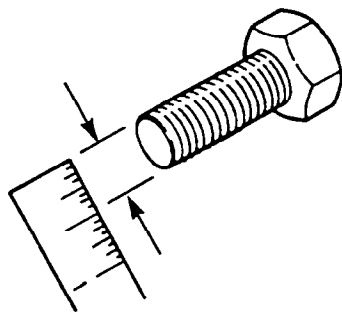
E-1. GENERAL

This section provides general torque limits for screws used on the ECV series vehicles. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket, then tighten it one more turn.

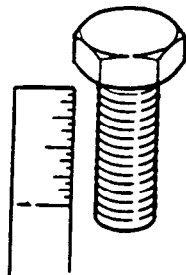
E-2. TORQUE LIMITS

Table E-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table E-2 lists wet torque limits. Wet torque limits are used on screws that have high-pressure lubricants applied to the threads. For metric fasteners, refer to table E-3 for torque limit requirements.

E-3. HOW TO USE TORQUE TABLE



- a. Measure the diameter of the screw you are installing.



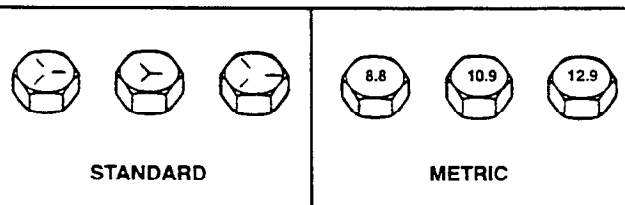
- b. Count the number of threads per inch.

- c. Under the heading **SIZE**, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).
- d. In the second column under **SIZE**, find the number of threads per inch that matches the number of threads you counted in step b.

CAPSCREW HEAD MARKINGS

Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).

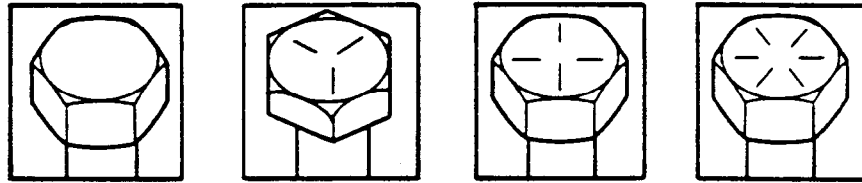
Metric screws are of three grades: 8.8, 10.9, and 12.9. Grades & Manufacturer's marks appear on the screw head.



- e. To find the grade screw you are installing, match the markings on the head to the correct picture of **CAPSCREW HEAD MARKINGS** on the torque table.
- f. Look down the column under the picture you found in step e. until you find the torque limit (in lb-ft or N-m) for the diameter and threads per inch of the screw.

Table E-1. Torque Limits for Dry Fasteners.

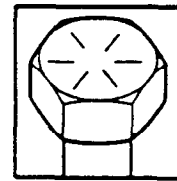
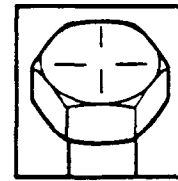
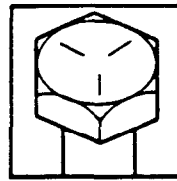
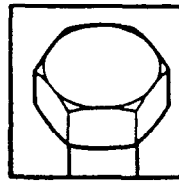
CAPSCREW HEAD MARKINGS



SIZE			TORQUE							
			SAE GRADE NO. 1 or 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	DIA. MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	5	6.78	8	10.85	10	13.56	12	16.27
1/4	28	6.35	6	8.14	10	13.56	—	—	14	18.98
5/16	18	7.94	11	14.92	17	23.05	19	25.76	24	32.54
5/16	24	7.94	13	17.63	19	25.76	—	—	27	36.61
3/8	16	9.53	18	24.41	31	42.04	34	46.10	44	59.66
3/8	24	9.53	20	27.12	35	47.46	—	—	49	66.44
7/16	14	11.11	28	37.97	49	66.44	55	74.58	70	94.92
7/16	20	11.11	30	40.68	55	74.58	—	—	78	105.77
1/2	13	12.70	39	52.88	75	101.70	85	115.26	105	142.38
1/2	20	12.70	41	55.60	85	115.26	—	—	120	162.72
9/16	12	14.29	51	69.16	110	149.16	120	162.72	155	210.18
9/16	18	14.29	55	74.58	120	162.72	—	—	170	230.52
5/8	11	15.88	63	85.43	150	203.40	167	226.45	210	284.76
5/8	18	15.88	95	128.82	170	230.52	—	—	240	325.44
3/4	10	19.05	105	142.38	270	366.12	280	379.68	375	508.50
3/4	16	19.05	115	155.94	295	400.02	—	—	420	569.52
7/8	9	22.23	160	216.96	395	535.62	440	596.64	605	820.38
7/8	14	22.23	175	237.30	435	589.86	—	—	675	915.30
1	8	25.40	235	318.66	590	800.04	660	894.96	910	1233.96
1	14	25.40	250	339.00	660	894.96	—	—	990	1342.44
1-1/8	—	28.58	—	—	800-880	1084.8-1193.3	—	—	1280-1440	1735.68-1952.64
1-1/4	—	31.75	—	—	—	—	—	—	1820-2000	2467.92-2712.00
1-3/8	—	34.93	—	—	1460-1680	1979.8-2278.1	—	—	2380-2720	3227.28-3688.32
1-1/2	—	38.10	—	—	1940-2200	2630.6-2983.2	—	—	3160-3560	4284.96-4827.36

Table E-2. Torque Limits for Wet Fasteners.

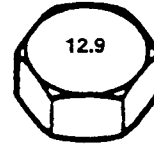
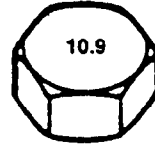
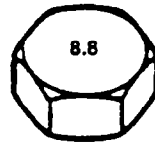
CAPSCREW HEAD MARKINGS



SIZE			TORQUE							
			SAE GRADE NO. 1 or 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	DIA. MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	4.5	6.1	7.2	9.76	9.0	12.20	10.8	14.64
1/4	28	6.35	5.4	7.32	9.0	12.20	—	—	12.6	17.09
5/16	18	7.94	9.9	13.42	15.3	20.75	17.1	23.19	21.6	29.29
5/16	24	7.94	11.7	15.87	17.1	23.19	—	—	24.3	32.95
3/8	16	9.53	16.2	21.97	27.9	37.83	30.6	41.49	39.6	53.70
3/8	24	9.53	18.0	24.41	31.5	42.71	—	—	44.1	59.80
7/16	14	11.11	25.2	34.17	44.1	59.80	49.5	67.12	63.0	85.43
7/16	20	11.11	27.0	36.61	49.5	67.12	—	—	70.2	95.19
1/2	13	12.70	35.1	47.60	67.5	91.53	76.5	103.73	94.5	128.14
1/2	20	12.70	36.9	50.04	76.5	103.73	—	—	108.0	146.45
9/16	12	14.29	45.9	62.24	99.0	134.24	108.0	146.45	139.5	189.16
9/16	18	14.29	49.5	67.12	108.0	146.45	—	—	153.0	207.47
5/8	11	15.88	56.7	76.89	135.0	183.06	150.3	203.81	189.0	256.28
5/8	18	15.88	85.5	115.94	153.0	207.47	—	—	216.0	292.90
3/4	10	19.05	94.5	128.14	243.0	329.51	252.0	341.71	337.5	457.65
3/4	16	19.05	103.5	140.35	265.5	360.02	—	—	378.0	512.57
7/8	9	22.23	144.0	195.26	355.5	482.06	396.0	536.98	544.5	738.34
7/8	14	22.23	157.5	213.57	391.5	530.87	—	—	607.5	823.77
1	8	25.40	211.5	286.79	531.0	720.04	594.0	805.46	819.0	1110.56
1	14	25.40	225.0	305.10	594.0	805.46	—	—	891.0	1208.20
1-1/8	—	28.58	—	—	720.0-792.0	976.32-1073.95	—	—	1152.0-1296.0	1562.11-1757.38
1-1/4	—	31.75	—	—	—	—	—	—	1637.99-1800.00	2221.11-2440.80
1-3/8	—	34.93	—	—	1314.0-1512.0	1781.78-2050.27	—	—	2142.0-2448.0	2904.55-3319.49
1-1/2	—	38.10	—	—	1746.0-1980.0	2367.58-2684.88	—	—	2844.0-3204.0	3856.46-4344.62

Table E-3. Torque Limits for Metric Fasteners.

CAPSCREW HEAD MARKINGS



SIZE	TORQUE	
	POUND FEET	NEWTON METERS
M6	7 - 11	9.49 - 14.92
M8	21 - 35	28.48 - 47.46
M10	45 - 65	61.02 - 88.14
M12	80 - 120	108.48 - 162.72
M14	130 - 190	176.28 - 257.64
M16	200 - 280	271.20 - 379.68
M20	400 - 520	542.40 - 705.12
M24	700 - 900	949.20 - 1220.40
M30	1400 - 1800	1898.40 - 2440.80
M36	2400 - 3000	3254.40 - 4068.00

APPENDIX E (Cont'd)

E-4. CONVERSION FORMULA

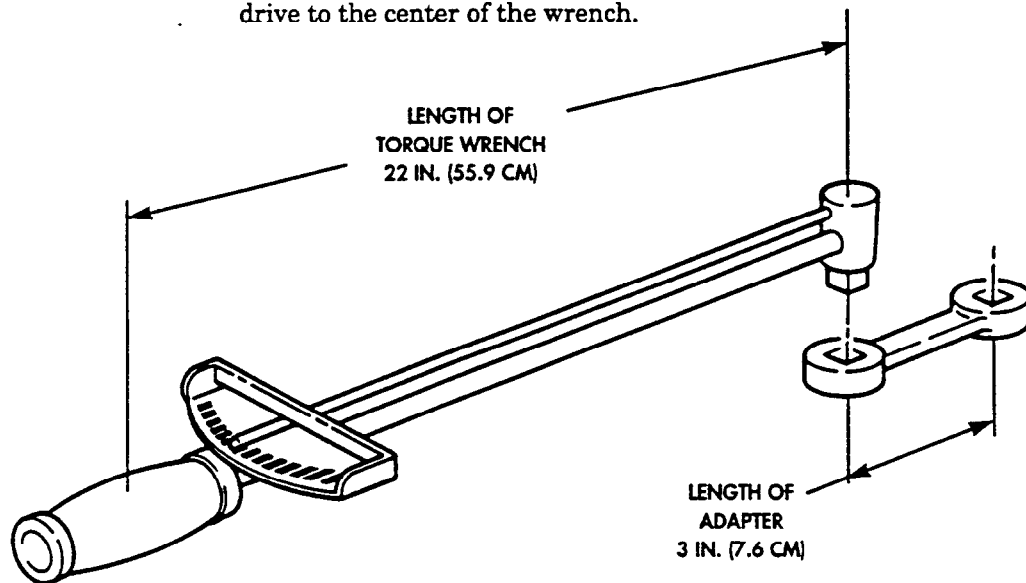
Corrected dial or scale readings are determined by the use of the following formula:

$$\text{Corrected reading} = \text{Required torque value} \div \frac{\text{Length of torque wrench} + \text{Length of adapter}}{\text{Length of torque wrench}}$$

NOTE

The length of the torque wrench is measured from the center of the handle to the center of the drive. The length of the adapter is measured from the center of the drive to the center of the wrench.

Example:



In this example, the torque wrench measures 22 in. (55.9 cm) and the adapter is 3 in. (7.6 cm). The required torque is 19 lb-ft (25.8 N·m)

$$\text{Corrected reading} = 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div \frac{22 \text{ in.} + 3 \text{ in. (55.9 cm} + 7.6 \text{ cm)}}{22 \text{ in. (55.9 cm)}}$$

$$\text{Corrected reading} = 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div \frac{25 \text{ in. (63.5 cm)}}{22 \text{ in. (55.9 cm)}}$$

$$\text{Corrected reading} = 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div 1.14$$

$$\text{Corrected reading} = 17 \text{ lb-ft (23.1 N}\cdot\text{m)}$$

APPENDIX F BODY REPAIR MATERIALS

F-1. SCOPE

This appendix is provided to facilitate identification of HMMWV body repair materials.

Table F-1. Rivet Grip Length Determination.

MATERIAL THICKNESS RANGE (INCH)		RIVET GRIP NO.	NSN
MINIMUM	MAXIMUM		
	1/16	1	5320-00-616-4350
	1/8	2	5320-00-584-1285
1/8	3/16	3	5320-00-582-3268
3/16	1/4	4	5320-00-582-3276
1/4	5/16	5	5320-00-582-3301
5/16	3/8	6	5320-00-582-3499
3/8	7/16	7	5320-00-813-4144
7/16	1/2	8	5320-00-616-4349
1/2	9/16	9	5320-00-753-3809
9/16	5/8	10	5320-00-821-1090
5/8	11/16	11	5320-00-639-2669
11/16	3/4	12	5320-00-996-9871

Table F-2. Bulk Aluminum NSNs.

NSN	TEMPER	THICKNESS (IN.)	WIDTH (IN.)	LENGTH (FT)
9535-00-250-6503	T-6	.050	36	8
9535-01-048-6208	T-6	.060	48	12
9535-00-250-6908	T-6	.080	48	12
9535-00-234-8717	T-6	.125	48	12
9535-00-232-1885	T-6	.125	48	8
9535-00-541-7194	T-4	.050	48	12
9535-00-232-7554	T-4	.080	48	12
9535-00-596-3784	T-4	.125	48	12
9535-00-188-1574	T-4	.187	48	12

Table F-3. AN3 and AN4 Series Bolts.

AN3 AND AN4 SERIES BOLTS						
AN3				AN4		
DASH NO.	GRIP LENGTH (IN.)	BOLT LENGTH (IN.)	NSN	GRIP LENGTH (IN.)	BOLT LENGTH (IN.)	NSN
7A	1/2	29/32	5306-00-151-0785	7/16	29/32	5306-00-515-8064
10A	5/8	1-1/32	5306-00-151-0784	9/16	1-1/32	5306-00-151-1424
11A	3/4	1-5/32	5306-00-685-3027	11/32	1-5/32	5306-00-151-1423
12A	7/8	1-9/32	5306-00-151-0782	13/16	1-9/32	5306-00-151-1422
13A	1	1-13/32	5306-00-151-0781	15/16	1-13/32	5306-00-151-1421
14A	1-1/8	1-17/32	5306-00-151-0780	1-1/16	1-17/32	5306-00-151-1420
15A	1-1/4	1-21/32	5306-00-151-0779	1-3/16	1-21/32	5306-00-151-1419
16A	1-3/8	1-25/32	5306-00-151-0778	1-5/16	1-25/32	5306-00-151-1418
17A	1-1/2	1-29/32	5306-00-151-0777	1-7/16	1-29/32	5306-00-151-1417
20A	1-5/8	2-1/32	5306-00-151-0776	1-9/16	1-1/32	5306-00-151-1416

Example:

PN AN3-7A is a 3/16-in. bolt, 29/32-in. long with a 1/2-in. grip length.

PN AN4-7A is a 1/4-in. bolt, 29/32-in. long with a 7/16-in. grip length.

The NSNs for washers and locknuts for use with the AN series bolts are:

<u>NOMENCLATURE</u>	<u>3/16-IN. NSN</u>	<u>1/4-IN. NSN</u>
Washer	5310-00-167-0812	5310-00-809-3078
Self-locking nut	5310-00-017-5108	5310-00-877-5796

APPENDIX G

MANDATORY REPLACEMENT PARTS

Section I. INTRODUCTION

G-1. SCOPE

This appendix lists mandatory replacement parts you will need to maintain ECV series vehicles.

G-2. EXPLANATION OF COLUMNS

- a. **Column (1) - Item Number.** This number is assigned to each entry in the listing and is referenced in the Initial Setup of applicable tasks under the heading of Materials/Parts.
- b. **Column (2) - Nomenclature.** Name or identification of the part.
- c. **Column (3) - Part Number.** The manufacturer's part number.
- d. **Column (4) - National/NATO Stock Number.** The national stock number of the part.

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
1	Access Cover Gasket	12338585	5330-01-194-0473
1.1	Adapter Fitting, Caliper	12339235	4730-01-184-6971
2	Adapter Seal	M83461/1-236	5330-01-183-0971
3	Adjuster Plug Seal Service Kit	7817725	2530-01-033-4237
3.1	AVK Fastener	4397050-049	
4	Balance Weights	5595966	6670-01-261-6844
5	Bearing, Roller	23101	3110-01-188-7682
6	Bearing Sleeve	12L18F	3120-00-485-1017
7	Bezel Screw	MS90725-7	5305-00-225-3840
8	Bolt	12340845-2	5306-01-263-8889
9	Boot Service Kit	57K0275 (fixed) 57K0274 (plunged)	2530-01-394-6168 2530-01-394-3748
9.1	Bracket, Battery Holddown, Front	12339904	5340-01-470-7135
9.2	Bracket, Battery Holddown, Rear	12339905	5340-01-470-7160
10	Brush Gasket	95461	5977-01-270-1466
11	Burner Repair Kit	G706055	4520-01-284-7099
12	Bushing	8623941	3120-01-166-3677
13	Bushing	15624	5365-01-358-4642
14	Bushing Sleeve	15093	3120-00-993-4152
15	Capscrew	9423557	5306-01-300-0420
16	Capscrew	MS35764-851	5306-01-203-2637
17	Capscrew	5589067	5306-01-204-2139
18	Capscrew	12341980	5306-01-276-1621
19	Capscrew	12340845-2	5306-01-263-8889
20	Capscrew	12340845-3	5306-01-270-5448
20.1	Capscrew	4397000-013	5306-01-433-9185
21	Center Parts Kit	CPL6R30	2520-00-352-2168
22	Clip	MS16633-1050	5365-00-442-5845
23	Clip	354-310300-00	5325-01-257-0001
23.1	Closed-Cell Foam Rubber	4668987-001	2540-01-474-8719
24	Copper Washer	5582366	5310-01-189-8476
24.1	Copper Washer	983-0062	
25	Clutch Accessory Kit	9103-9800	2520-01-289-3617
26	Core Parts Kit	90-816	2920-01-192-2959
27	Cotter Pin	10166	5315-01-284-9812
28	Cotter Pin	4397007-008	5315-01-433-8419
29	Cotter Pin	MS24665-134	5315-00-187-9070
30	Cotter Pin	MS24665-283	5315-00-842-3044
31	Cotter Pin	MS24665-285	5315-00-005-0442
32	Cotter Pin	137137	5315-00-013-7137

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
33	Cotter Pin	MS24665-351	5315-00-839-5821
34	Cotter Pin	MS24665-355	5315-00-012-0123
35	Cotter Pin	137195	5315-00-012-0123
36	Cotter Pin	PK379	5315-00-013-7171
37	Cotter Pin	MS24665-513	5315-00-239-8032
38	Cotter Pin	MS24665-628	5315-00-846-0126
39	Cotter Pin	MS24665-298	5315-00-234-1861
40	Cotter Pin	137185	5315-00-839-5822
41	Cotter Pin	MS24665-132	5315-00-839-2325
42	Cotter Pin	MS24665-319	5315-01-267-7570
43	Cotter Pin	137946	5315-00-187-9538
44	Cotter Pin	MS9245-71	5315-00-939-0835
45	Door Seal	R-451-N	5330-01-041-9721
46	Drive End Kit	90-2531	2920-01-168-4129
47	Drivescrew	MS21318-47	5305-00-253-5626
48	Dust Cap	5740723	5340-01-188-1017
49	End Plug Seal Service Kit	5740458	2530-01-034-1715
50	Fiber Washer	12500	5310-00-830-7825
51	Filter Assembly	8684221	2520-01-398-4589
51.1	Flat Washer	4397005-010	5310-01-435-7784
52	Fuel/Water Filter Element Kit	SA910044	4330-01-190-3579
53	Fuel Pump Gasket	9776705	5330-01-112-1533
54	Gasket	12338382	5330-01-246-1822
55	Gasket	12338339	5330-01-200-0466
56	Gasket	12338342	5330-01-189-9738
57	Gasket	12342104	5330-01-314-6781
58	Gasket	12342105	5330-01-315-1609
59	Gasket	10137490	5330-01-445-5459
60	Gasket	12554283	5330-01-379-4123
61	Gasket	7539072	5330-00-753-9072
62	Gasket	DC8226	5330-01-076-6172
63	Gasket	61-2028-01	5330-01-218-1196
64	Gasket	8655625	5330-01-148-7492
65	Gasket	5597942	5330-01-298-8126
66	Gasket	12341487	5330-01-272-7471
67	Gasket	12339414	5330-01-194-0472
68	Gasket	10137488	5330-01-149-0874
69	Gasket	12356789	5330-01-319-7302
70	Gasket	12339409	5330-01-184-6500

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
71	Gasket, Oil Pan	91598	5330-01-310-6780
72	Gasket	10137486	5330-01-150-5944
73	Gasket	10137492	5330-01-147-9808
74	Gasket	10149600	5330-01-367-2303
75	Gasket, Intake Manifold	10211661 (Upper) 10238889 (Lower)	5330-01-437-0545
76	Gasket, Turbo	12554979	5330-01-442-2876
77	Gasket	10948235	5330-00-089-0978
78	Gasket	13848	5330-01-211-0717
79	Gasket	14964	5330-01-306-7887
80	Gasket	14022649	5330-01-156-5147
81	Gasket	14025557	5330-01-150-1215
82	Gasket	14044976	5330-01-165-1356
83	Gasket	15589939	5330-00-640-9399
84	Gasket	5574856	5330-01-194-0472
85	Gasket	702903	5330-00-089-0978
86	Gasket	8623174	5330-01-150-5928
86.1	Gasket O-ring	12340395	5330-01-434-1151
87	Gasket, Oil Filter Adapter Bolt	5577933	5330-01-184-6500
88	Gasket Kit, Intake Manifold	15633464	5330-01-157-0856
89	Gasket, Adapter Plate	10108438	5330-00-830-1745
90	Gasket, Fuel Pump	10114141	5330-01-112-1533
91	Gasket, Governor Cover	27244	5330-01-234-2615
92	Gasket, Water Outlet	14028916	
93	Gasket, Servo Cover	8675728	5330-01-152-5941
94	Gasket	8623263	5330-00-001-1984
95	Gasket	8623561	5330-01-152-5942
96	Gasket, Oil Pump	8677782	5330-01-409-1665
97	Gasket, Valve Cover	91599	5330-01-372-0636
98	Gasket Kit	96768	5330-01-272-8337
99	Gasket Kit	8385-9611	5330-01-288-1307
100	Gasket Kit, Commutator End Head	MES-95S	5330-00-138-0251
101	Gasket Set	MFY-25S	5330-01-190-7510
102	Gasket Set	OS30442A	5330-01-310-6780
103	Gasket Set	SAT-32S	5330-01-190-7509
104	Gasket Set Kit	8689989	5330-01-398-3724
105	Hitch Pin	34403-35-1	5315-01-188-4490
106	Hex-Nut	5589268	5310-01-021-9027
107	Journal and Bearing Kit	5-213X	2520-01-189-2135

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
108	Lining, Friction	4026-38368-01	2930-01-189-8643
109	Locknut	M45913/4-4CG87	5310-00-061-4650
110	Locknut	MS21245-L10	5310-00-449-2381
111	Locknut	5593048 (front) 5592999 (rear)	5310-01-252-0481 5310-01-253-0058
112	Locknut	83320	5310-01-186-6930
113	Locknut	5593035	5310-01-255-2695
114	Locknut	MS27183-10	5310-00-809-4058
115	Locknut	MS51943-32	5310-00-935-9022
116	Locknut	MS51943-33	5310-00-814-0673
117	Locknut	M45913/4-8CG8Z	5310-00-061-4651
118	Locknut	INX59NTE1614	5310-01-192-5759
119	Locknut	89434	5310-01-198-7585
120	Locknut	NAS1408A6	5310-00-316-6513
121	Locknut	MS51943-39	5310-00-488-3889
122	Locknut	MS21245-8	5310-00-449-2376
123	Locknut	MS51967-6	5310-00-931-8167
124	Locknut	MS21044-N4	5310-00-877-5796
125	Locknut	MS35649-202	5310-00-934-9758
126	Locknut	5584711	5310-01-198-3487
127	Locknut	MS51943-34	5310-00-241-6658
128	Locknut	12339730	5310-01-254-4284
129	Locknut	5584710	5310-01-203-3217
130	Locknut	M45913/4-12CG8Z	5310-00-409-3333
131	Locknut	5591514	5310-01-217-0715
132	Locknut	5591513	5310-01-265-8968
133	Locknut	NAS1022-N08	5310-00-721-5447
134	Locknut	MS21083-N08	5310-00-941-6019
135	Locknut	MS21045-7	5310-00-274-9364
136	Locknut	MS21045-6	5310-00-982-4908
137	Locknut	5590556	5310-01-208-5252
138	Locknut	454748	5310-01-038-9579
139	Locknut	131245	5310-00-013-1245
140	Locknut	9411893	5310-00-251-4503
141	Locknut	8712289-4	5310-00-840-6222
142	Locknut	89325	5310-01-212-2215
143	Locknut	274209	5310-00-420-9713
144	Locknut	MS21044-N3	5310-00-877-5797
144.1	Locknut	MS21046-C4	5310-00-059-9265

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
145	Locknut	MS17829-4F	5310-00-483-8791
146	Locknut	192481	5310-01-058-3353
147	Locknut	190171	5310-00-774-9073
148	Locknut	9419454	5310-01-066-6759
149	Locknut	9419456	5310-01-318-5237
149.1	Locknut	9419475	
150	Locknut	272739	5310-01-317-8164
151	Locknut	190139	5310-00-088-0553
152	Locknut	MS51922-1	5310-00-088-1251
152.1	Locknut	12339501	5310-01-198-7585
152.2	Locknut	MS21044C3	5310-00-208-9255
153	Locknut	MS51922-9	5310-00-984-3806
153.1	Locknut	MS51943-46	5310-00-935-3569
154	Locknut	21NE-040	5310-01-133-7215
155	Locknut	9411507	5310-01-066-6759
156	Locknut	MS51943-35	5310-00-935-9021
157	Locknut	MS51967-18	5310-00-763-8919
158	Locknut	3029-01371-01	5310-01-194-0481
159	Locknut	11503750	5310-01-206-5479
160	Locknut	22FT832	5310-00-582-5765
161	Locknut	5579442	5310-01-175-0617
162	Locknut	6779	5310-01-213-4174
163	Locknut	706131	5310-01-287-6543
164	Locknut	8X-3439	
165	Locknut	MS20365-1032C	5310-00-282-0512
166	Locknut	4397020-001	5310-01-420-6627
167	Locknut	4397073-002	5310-01-437-3839
168	Locknut	4397020-003	
169	Locknut	4397064-005	5310-01-439-8177
170	Locknut	4397050-025	
171	Locknut	4397050-049	
172	Locknut	MS51943-36	5310-00-814-0672
173	Locknut	MS51988-8	5310-00-447-8774
174	Locknut	MS51967-45	5310-00-432-3760
175	Locknut	N9416	5310-01-348-8360
175.1	Locknut	N9092	5310-01-390-5105
175.2	Locknut	N9534	5310-01-439-9422
176	Locknut	N9099	5310-01-165-1312
177	Locknut	N9098	5310-01-225-0701

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
178	Locknut	4397064-001	
179	Locknut	9411507	5310-01-381-1471
180	Locknut	9422299	5310-01-150-4003
181	Locknut	4397064-003	5310-01439-8172
182	Locknut	4397064-014	
183	Locknut	4397068-003	5310-01-437-3836
184	Locknut	9418969	
185	Locknut	24617-190254	
186	Locknut	273802	5310-01-461-8049
186.1	Locknut	271172	5310-01-152-0598
186.2	Locknut	9422297	5310-01-126-9404
187	Locknut and Woodruff Key Kit	90-2188	5310-01-027-9392
188	Lockwasher	11582	5310-01-213-9964
189	Lockwasher	12049	5310-00-209-2947
190	Lockwasher	120382	5310-00-012-0382
190.1	Lockwasher	120383	5310-00-194-0743
191	Lockwasher	120380	5310-00-543-2705
192	Lockwasher	120423	5310-00-012-0423
193	Lockwasher	123153	5310-01-185-4672
194	Lockwasher	174916	5310-00-017-4916
195	Lockwasher	36895	5310-00-045-3299
196	Lockwasher	369993	6625-00-309-3481
197	Lockwasher	475005	5310-00-061-0004
198	Lockwasher	MS35333-38	5310-00-559-0070
199	Lockwasher	4397004-004	5310-01-417-7275
200	Lockwasher	4397004-005	5310-01-434-1385
201	Lockwasher	4397004-006	5310-01-433-0941
202	Lockwasher	4397004-007	5310-01-417-9942
202.1	Lockwasher	4397005-086	
203	Lockwasher	MS122031	5310-00-285-7037
204	Lockwasher	50010150	
205	Lockwasher	MS35338-46	5310-00-637-9541
206	Lockwasher	MS35338-45	5310-00-407-9566
207	Lockwasher	MS35338-44	5310-00-582-5965
208	Lockwasher	MS35338-42	5310-00-045-3299
209	Lockwasher	MS51415-9	5310-01-216-7390
210	Lockwasher	MS35338-43	5310-00-045-3296
211	Lockwasher	120217	5310-00-922-2017

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO.	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
212	Lockwasher	85031	5310-01-186-7066
213	Lockwasher	ERNA245	5310-00-584-5272
214	Lockwasher	2434	5310-00-775-5139
215	Lockwasher	MS35338-41	5310-00-045-4007
216	Lockwasher	MS45904-60	5310-00-080-9786
217	Lockwasher	MS35338-65	5310-00-011-5093
218	Lockwasher	5584462	5310-01-213-4185
219	Lockwasher	MS35338-50	5310-00-820-6653
220	Lockwasher	5592927	5310-01-253-8957
221	Lockwasher	MS35333-40	5310-00-550-1130
222	Lockwasher	MS45904-68	5310-00-889-2528
223	Lockwasher	MS35338-63	5310-00-274-8715
224	Lockwasher	MS35338-48	5310-00-584-5272
225	Lockwasher	MS35340-48	5310-00-834-7606
226	Lockwasher	MS51848-13	5310-01-016-9348
227	Lockwasher	AN8013-2	5310-00-167-0893
228	Lockwasher	202755	5310-01-270-2661
229	Lockwasher	MS35340-43	5310-00-721-7809
230	Lockwasher	36896	5310-01-162-9661
231	Lockwasher	N9018	5310-01-032-4827
231.1	Lockwasher	N9265	5310-01-136-4888
232	Lockwasher	N9459	5310-01-348-8393
233	Lockwasher	N9461	5310-01-348-8392
234	Lockwasher	N9015	5310-01-046-0186
235	Lockwasher	MS35338-47	5310-00-209-0965
236	Lockwasher	MS35335-33	5310-00-209-0786
237	Lockwasher	120214	5310-00-012-0214
238	Lockwasher	120384	5310-00-272-4113
238.1	Lockwasher	121841	5310-00-764-5694
239	Lockwasher	11500207	5310-01-206-7306
239.1	Lockwasher	11500206	
240	Lockwasher	5550554	5310-01-144-2779
240.1	Two-piece Lockwasher	6008029	5310-01-457-3292
241	Lubricant, Runflat	6004832	2640-01-419-6200
242	Mounting Plate Gasket	3705044	5330-00-830-1745
243	Nut	7063812	5310-00-126-3842
243.1	Nut	4397002-001	5310-01-417-8614
244	Nut and Lockwasher Assembly	5593033	5310-01-252-2999
245	Nut and Lockwasher Assembly	5593053	5310-01-251-0726

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
246	Nut and Lockwasher Assembly	5593413	5310-01-270-8189
247	Nut and Lockwasher Assembly	5592818	5310-01-253-8380
248	Nut and Lockwasher Assembly	AN365-1024A	5310-00-208-1918
249	Nut and Lockwasher Assembly	12339998-13	4931-01-202-8692
250	Nut and Lockwasher Assembly	271169	5310-00-124-9265
251	Nut and Lockwasher Assembly	11503750	5310-01-206-5479
252	Nut and Lockwasher Assembly	487283	5310-00-333-7341
253	Nylon Washer	5597347	5310-01-259-7554
254	Oil Filter	PH13	2940-00-082-6034
255	O-Ring	718768-23	5330-00-089-0998
256	O-Ring	11646803	5330-00-171-5828
256.1	O-Ring, Crossover	12456133	5331-01-472-8177
257	O-Ring, Cylinder	3018-01265-01	5330-01-192-8892
258	O-Ring	11646804	
258.1	O-Ring, Door Handle	MS28775-114	5331-00-618-0801
259	O-Ring, Oil Filter Adapter	MS28775-236	5330-00-815-1712
260	O-Ring, Oil Filter Adapter Bolt	MS28775-020	5330-00-585-7723
261	O-Ring	2-016 N674-7	5330-00-984-3750
261.1	O-Ring	224-05A	1560-00-875-6528
262	O-Ring Seal	15605	5330-00-494-2220
263	O-Ring	27607	5330-00-154-8353
264	O-Ring	3000442	1440-00-065-7620
265	O-Ring	33-00778	5331-01-419-7754
265.1	O-Ring	33-00779	5331-01-460-2442
266	O-Ring	300448	5330-01-061-3000
266.1	O-Ring	33-00781	5331-01-419-7755
267	O-Ring	33-00777	5331-01-420-1795
268	O-Ring	5740012	5330-00-451-0118
269	O-Ring	8642581	5340-01-291-5723
270	O-Ring	5740099	5330-01-174-8618
271	O-Ring	60198	5330-00-823-4881
272	O-Ring Seal	666-213-B46	5330-01-084-1200
273	O-Ring	4397059-016	5331-00-089-0998
274	O-Ring	718768-23	5330-00-089-0998
275	O-Ring	99514	5330-01-145-5376
276	O-Ring	MS9068-030	5330-00-052-5267
277	O-Ring	5741062	5330-01-209-7726
278	O-Ring Seal	8661760	5330-01-414-6607

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(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
279	O-Ring Seal	274244	5330-00-935-9136
280	O-Ring Seal	M83461/1-020	5330-01-107-4950
281	O-Ring Seal	60018	
282	O-Ring Seal	12267802	5330-01-080-3253
283	O-Ring Seal	2-113N497-70	5330-01-184-6492
284	O-Ring Seal	129	5330-01-195-8889
285	O-Ring Seal	12339498	5330-01-176-0923
286	O-Ring Seal	2-011N674-70	5330-00-580-6586
287	O-Ring Seal	12338998	5330-01-216-7392
288	O-Ring Seal	12342633	5330-01-335-8878
289	O-Ring Seal	10475299	
290	O-Ring Seal	8658110	5330-01-043-5572
291	O-Ring Seal	5740436	5330-01-157-1884
292	O-Ring, Insert	12342794	5330-01-346-3806
293	O-Ring, Pinion	XA-744Z	5330-00-137-3450
293.1	O-Ring, Square Cut	983-WH11-009	
293.2	O-Ring	983-110.01	
293.3	O-Ring, Drum End	983-AS5680357	
293.4	O-Ring	983-9537044DO	
293.5	O-Ring	WH11-105	
294	Oil Filter	8684221	
295	Packing	11639519-1	5330-00-463-0200
296	Packing	11639519-2	5330-00-462-0907
297	Pilot, Tube	27106	2910-01-210-6938
298	Pin, Spring	456369	5315-01-196-0277
299	Pin, Tapered Drive	91386	5315-00-576-0265
300	Pinion Stop and Snapping Kit	90-2841	2920-01-191-6534
301	Piston Seal, Center	8623102	2840-00-001-4903
302	Piston Seal, Inner	23015880	5330-01-146-6053
303	Piston Seal, Inner	8627627	5330-01-155-4383
304	Piston Seal, Inner	8675636	
305	Piston Seal, Outer	8623101	5330-00-001-4904
306	Piston Seal, Outer	8623143	5330-01-155-4382
307	Piston Seal, Outer	8675637	
308	Pitman Shaft Seal Service Kit	5740452	5330-01-096-9650
309	Plates, Clutch	8624101	5360-01-150-6091
310	Platenuts	MS51941-10	5310-01-025-6444
311	Plug	8620318	5340-01-150-4104

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(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
312	Pushnut	C183-012-4	5310-01-213-1333
313	Pushnut	J4001714-B	5310-01-188-6861
314	Rack Piston Seal Service Kit	5740462	3040-01-123-4942
314.1	Rear Brake Caliper Kit	57K3512	2530-01-455-9330
315	Ring, Retaining	15581	
316	Ring, Retaining	121-1	5365-00-598-1428
317	Ring, Retaining	23566	5365-01-188-0962
318	Retaining Ring	5100-62-S-ZD	5365-00-803-7305
319	Retaining Ring	5741098	5365-01-212-2403
320	Retaining Ring	MS16633-1050	5365-00-442-5845
321	Retaining Ring	A9036	5365-01-135-4290
322	Retaining Ring	11505885	5365-01-196-5631
323	Rivet	AD44BS	5320-01-023-2529
324	Rivet	BALM-6BP-14	5320-01-254-2283
325	Rivet	CR-213-4-2	5320-01-258-2576
326	Rivet	CR-3242-6-2	5320-01-033-8643
327	Rivet	CR-213-4-4	5320-01-220-0596
328	Rivet	M7885/2-4-4	5320-01-143-5079
329	Rivet	5593050	5320-01-254-4251
330	Rivet	MS20470AD6-12	5320-00-117-6856
331	Rivet	CR-213-6-8	5320-01-086-1144
332	Rivet	AD42BS	5320-00-899-0981
333	Rivet	CR3213-6-4	5320-01-136-1782
334	Rivet	MS20470AD6-7	5320-00-754-0992
335	Rivet	12339355-1	5320-01-271-6357
336	Rivet	5594056-7	5320-01-264-5978
337	Rivet	5597013	5320-01-272-7486
338	Rivet	MS20426-AD6-9	5320-00-117-7289
339	Rivet	MS20470AD6-10	5320-00-721-9062
340	Rivet	9401034	5320-01-272-8348
341	Rivet	CR-213-4-5	5320-01-259-7423
342	Rivet	M24243/3-B404	5320-01-011-9717
343	Rivet	M24243/1-A404	5320-01-023-2529
344	Rivet	M24243/1-A408	5320-00-850-3282
345	Rivet, 5/32-in. Blind	AB5-6	5320-00-850-3267
346	Rivet, 3/16-in. Blind	AB6-6	5320-00-962-4693
347	Rivet	M7885/6-6-05	5320-01-034-1884
347.1	Rivet	BACR15ET7-AD11	5320-01-264-5976
347.2	Rivet	12339355-2	5320-01-264-5978

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(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
347.3	Rivet	5597598	5320-01-275-1998
348	Rivet	M7885/2-6-03	5320-01-135-7319
349	Rivet, Protruding	4397042-022	5320-01-434-0758
350	Rivet, CSK	4397042-622	
351	Rivet, CSK	4398936-001	
352	Rivet, CSK	4668904-001	5320-01-427-9802
353	Rivet, CSK	4397044-021	5320-01-437-2768
354	Rivet	CR3243-6-3	5320-01-033-8638
355	Replaced by 336		
356	Rivet	CR3212-4-4	5320-01-136-3562
357	Rivet	M8885/2-6-4	
358	Rivet	M8885/242	
359	Rivet	M8885/364	
360	Rivet	4668929-001	
361	Rivnut	MS27130-A55	5310-00-810-0901
362	Rubber Washer	5577895	5310-01-185-7214
363	Rubber Washer	12339052	5310-01-185-7214
363.1	Rubber Washer	12447149	5310-01-465-9727
363.2	Rubber Washer	33-00778	5331-01-419-7754
364	Runflat Belt Repair Kit	J-39295	2530-01-338-3056
365	Runflat Belt Repair Kit	528240	4310-01-345-5723
366	Screw	MS51958-64	5305-00-059-3660
367	Screw	160046	5305-00-068-0508
368	Screw	MS51957-45	5305-00-054-6670
369	Screw-assembled Lockwasher	5593006	5305-01-256-0406
370	Screw-assembled Lockwasher	5593313	5305-01-254-2459
371	Screw-assembled Lockwasher	12340515	5305-01-215-5174
372	Screw and Lockwasher Assembly	423518	5305-00-638-0714
373	Seal	11646896	5330-00-173-8206
374	Seal	11646898	5310-01-281-2656
375	Seal	11646899	5330-01-273-2521
376	Seal	354944	5330-01-282-2214
377	Seal	4668948	5330-01-421-4967
378	Seal, Window	4668947	
379	Seal	12340103	5330-01-205-8607
380	Seal	8661893	5330-01-460-8987
381	Seal	8661894	5330-01-468-3604
382	Seal	8661639	5330-01-470-6543

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(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
383	Seal	8661647	
384	Seal	8657163	5330-01-251-1607
385	Seal, Center, Direct Clutch	8677584	
386	Seal, Inner	8677482	
387	Seal, Outer	8677583	
388	Seal, Center, Forward Clutch	8677582	
389	Seal, Drain Plug	27609	5330-01-133-2778
390	Seal, Inner	8677526	
391	Seal, Inner, Fourth Clutch	8661587	5330-01-414-4161
392	Seal, Outer	8661586	5330-01-414-4159
393	Seal, O-Ring	95483	5330-01-272-9071
394	Seal	95498	5330-01-270-3668
395	Seal	370003	
396	Seal	95512	5330-01-272-7454
397	Seal	95513	5330-01-272-5474
398	Seal	3860095 (Front) 23503969 (Rear)	5330-00-110-8437 5330-01-378-8577
399	Seal	8654710-1	
400	Seal, Door	4668918	5330-01-419-4425
401	Seal Ring	8661789	5331-01-462-7294
402	Seal Kit	5741908	2540-01-289-8330
403	Seal Service Kit	7848522	5330-01-044-0703
404	Seal, Input	29940-2106	5330-01-180-9099
405	Seal, Input	5740017	5330-01-168-3870
406	Seal, Output	46129-1	
407	Seal, Pinion	43085-2	
408	Seal, O-Ring	23016599	5330-00-001-1996
409	Seal, Poppet Spring	15715	
410	Seal, Front Output	5741514	5340-01-271-6455
411	Seal, Oil	8626916	5330-01-025-4212
412	Seal, Oil	5938609	5330-01-358-9532
413	Seal, Oil Pump	8661602	5330-01-379-1139
414	Seal, Oil Ring	8626356	5330-01-165-4333
415	Seal, Oil Ring	8675729	5330-01-409-1664
416	Seal, Oil Ring	17150	5330-01-309-8465
417	Seal, Rear Oil Pan	14022683	5330-01-150-7744
418	Seal, Rear Output	14095610	5330-01-147-9698
419	Seal, Rear Output	16104	
420	Seal, Oil Tube	16214	5330-00-477-2048

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(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
421	Seal, Kit, Washer	5740010	5310-01-148-2687
422	Seal, Washer	8626281	5310-01-150-5921
423	Seal, Washer	5939517	5331-01-084-1200
423.1	Seal, Washer	33-00811	5310-01-420-4522
423.2	Seal, Washer	33-00822	5310-01-419-5091
424	Seal	23502587	5330-01-378-8572
424.1	Seal	N9539	
425	Seal	29940-2094	5330-01-203-6551
426	Seal	5741141	5330-01-211-1343
427	Seal	12340585	5310-01-203-9187
428	Seal	12342886	5330-01-381-1810
429	Seal	12340088	5330-01-202-8360
430	Seal	7700242	5330-00-770-0242
431	Seal	12342343	5330-01-318-1998
432	Seal	12342344	5330-01-318-9780
433	Seal	12342345	5330-01-317-5393
434	Seal	12342248	5330-01-317-5392
435	Seal	MT161A	5330-01-282-2213
436	Seal, Washer	4210973	5310-01-260-4847
437	Seal	6002591	2520-01-175-7220
438	Seal, Turret	12446768	5330-01-448-9453
439	Service Brake Caliper Kit	11021	2530-01-179-7511
439.1	Sheet Metal	QQA250-11	9535-00-541-7194
440	Side Cover Seal Service Kit	5740448	2530-01-097-7659
441	Slip Ring End Kit	90-2532	2920-01-168-4130
442	Sound Dampener	5591150	2540-01-192-9716
443	Sound Dampener	5591149	2540-01-192-5948
444	Spacer Plate, 0.125-in. (3.2-mm)	5584299	5365-01-197-9383
445	Spacer Plate, 0.060-in. (1.5-mm)	12339379	5365-01-253-8980
446	Spacer Plate, Hinge	5584436	5365-01-201-4749
447	Spacer, Collapsible	5579445	5365-01-175-3593
448	Spacer, Detent	15686	5365-01-306-9955
449	Spring, Helical	28397	5360-01-318-1893
450	Spring Pin	MS16562-256	5315-00-844-3665
451	Spring Pin	NAS561C4-18	5315-00-559-7467
452	Spring Washer	7716721	5310-00-595-7486
453	Spring Washer	4004616	5310-01-189-8485
454	Spring	2-300.P5	5360-01-282-9316

Section II. MANDATORY REPLACEMENT PARTS (Cont'd)

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
455	Strap	AMA-95	2920-01-212-5816
456	Stud, Governor	23352	5307-01-188-9217
457	Thermaseal	12275161	2540-01-123-1218
458	Thrust Washer	13826	3120-01-306-3577
459	Thrust Washer and Spacer Kit	90-2840	3120-01-191-4637
460	Tiedown Strap	MS3367-7-9	5975-00-570-9598
461	Tiedown Strap	5972090	5340-01-205-5379
461.1	Tiedown Strap	01-02694	
462	Tiedown Strap	MS3367-3-0	5975-00-985-6630
463	Tiedown Strap	MS3367-1-0	5975-00-984-6582
464	Tiedown Strap	MS3367-5-0	5975-00-133-8687
465	Tiedown Strap	MS3367-3-9	5975-00-451-5001
465.1	Tiedown Strap	MS3367-1-9	5975-00-074-2072
465.2	Tray, Battery	12338765	6160-01-470-4172
466	Tubing, Fuel	SAE-J844	9330-01-139-3383
467	Valve Ring Seal Service Kit	5740499	2530-00-960-9363
468	Washer Kit	90-2837	2920-01-192-2956
469	Woodruff Key	106751	5315-00-012-4548
470	Woodruff Key	MS35756-8	5315-00-616-5526

APPENDIX H WIRING DIAGRAMS AND SCHEMATIC

H-1. GENERAL

This appendix contains wiring diagrams of special vehicle equipment and an overall vehicle electrical system schematic needed to maintain ECV series vehicles.

H-2. WIRING DIAGRAM AND SCHEMATIC INDEX

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FO-1.	Electrical System Wiring Diagram	H-3
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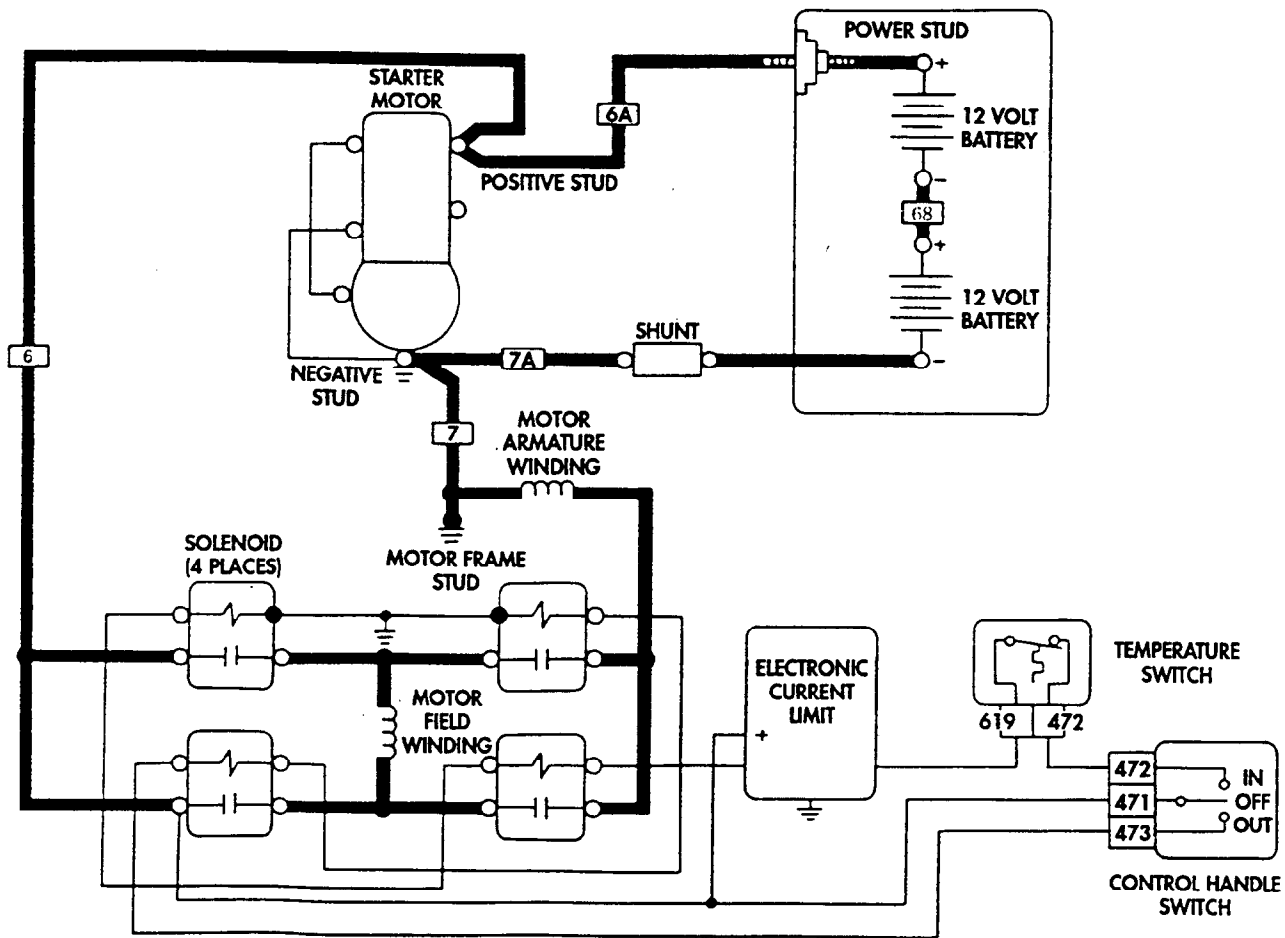
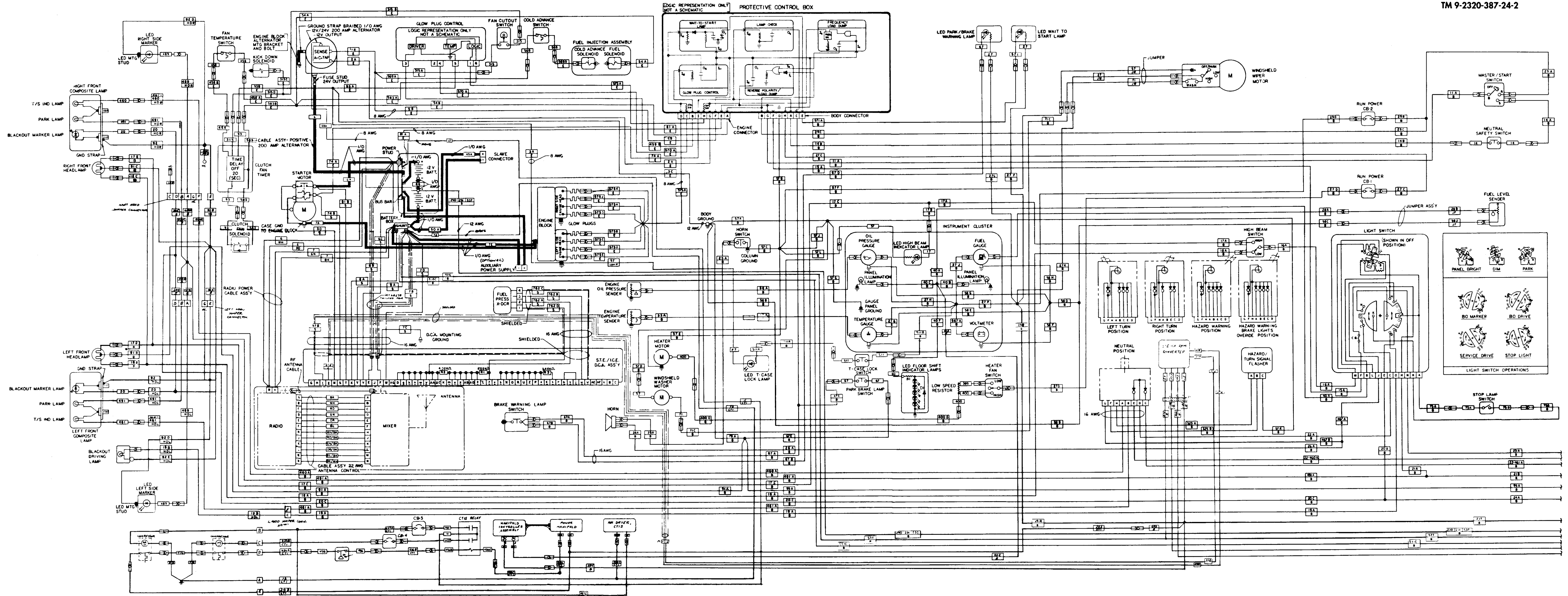


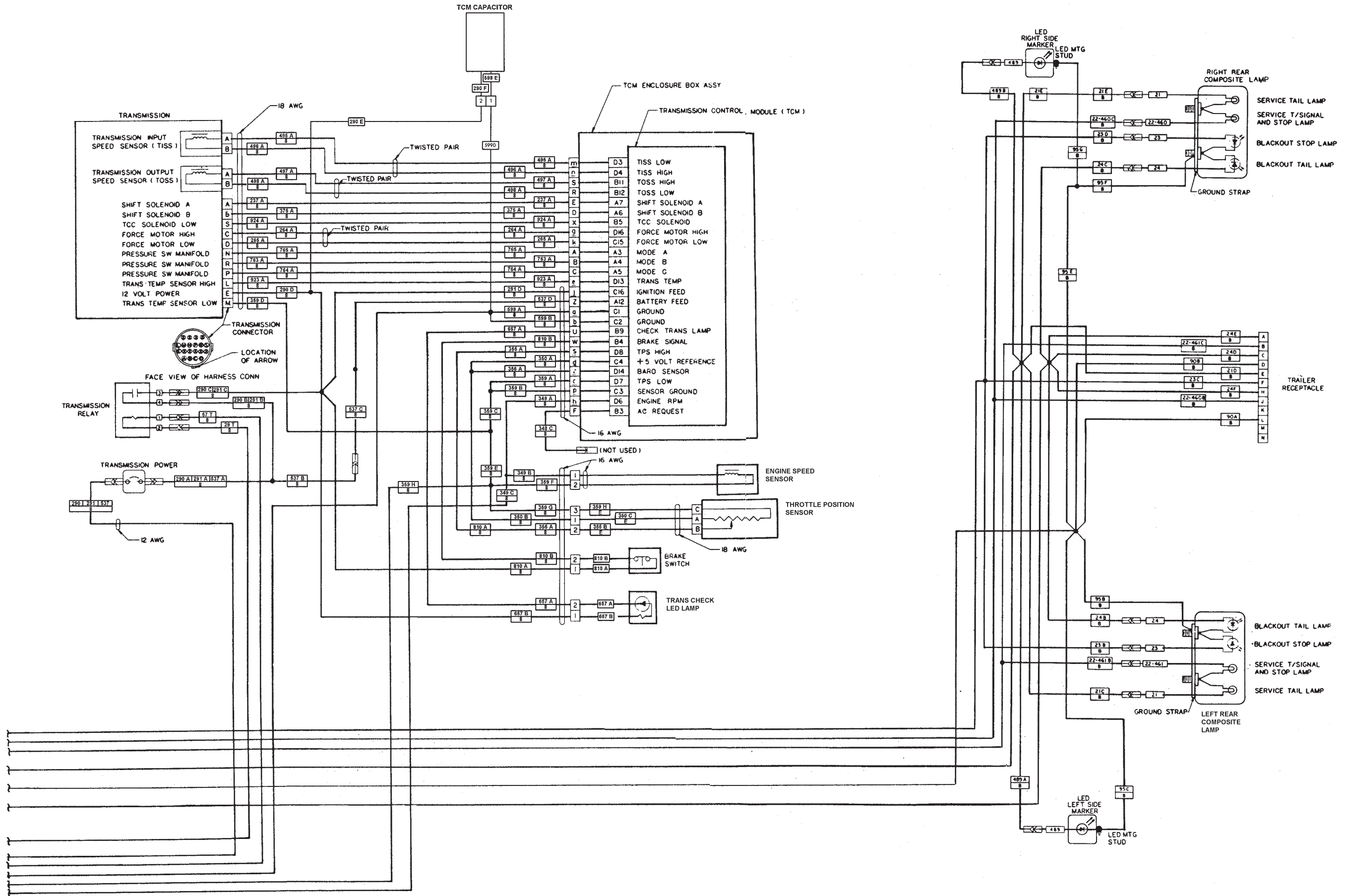
Figure H-1. Winch Wiring Diagram.

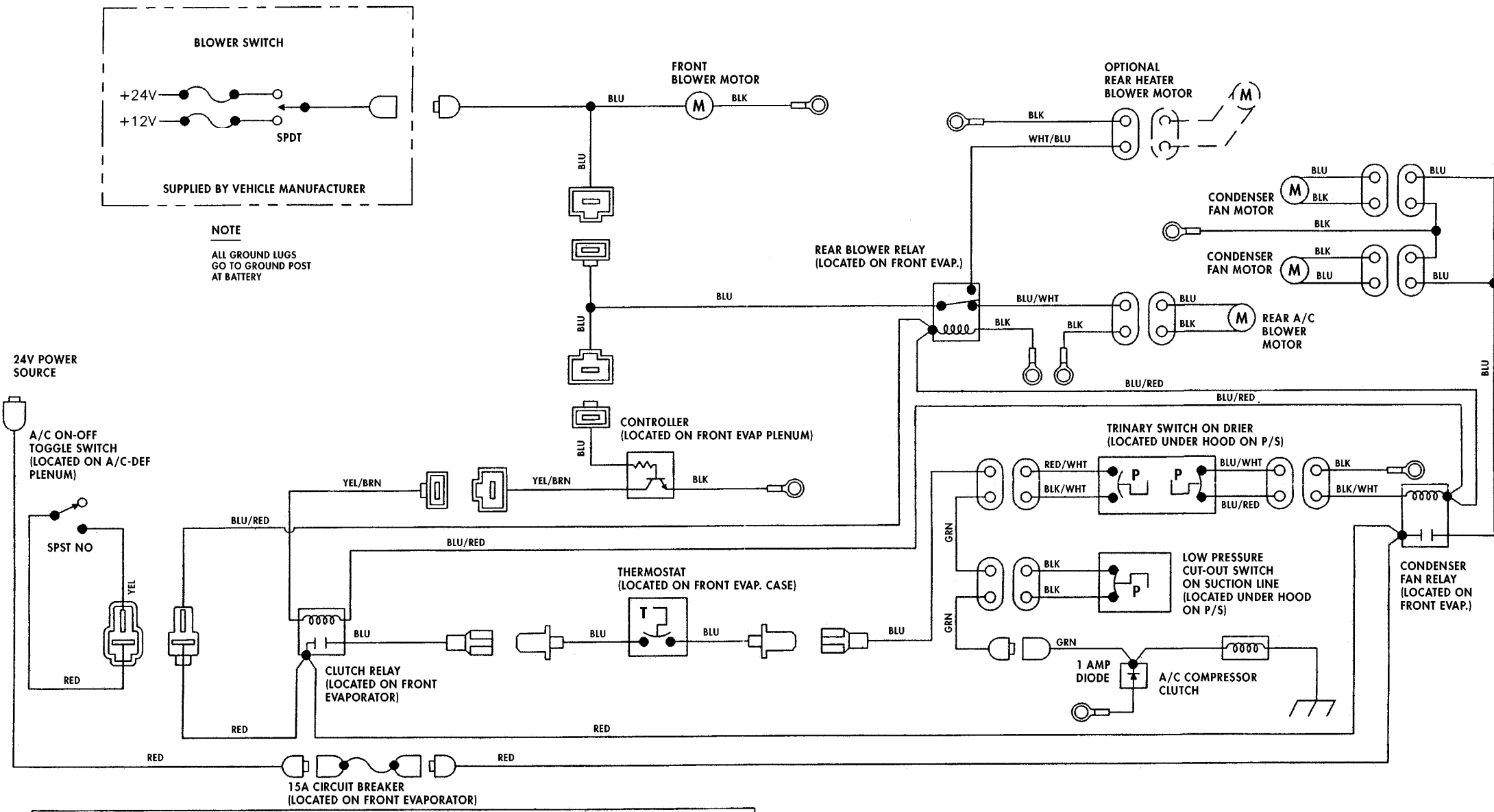
*Figure FO-1. Electrical System Wiring Diagram
(located at back of manual).*

*Figure FO-2. A/C Evaporator/Heater Electrical Schematic (M1114)
(located at back of manual)*









NOTE
ALL GROUND LUGS
GO TO GROUND POST
AT BATTERY

LEGEND:

2 PIN WEATHER PACK CONNECTOR	CONTROLLER	RELAY N.O. CONTACTS	RING TERMINAL GRD TO CHASSIS
MOLDED CONNECTOR	DIODE	MIL SPEC CONNECTOR	MOTOR
			INTERNAL CHASSIS GRD

NOTE:
THIS ILLUSTRATION IS A SCHEMATIC ONLY AND IS
MEANT TO SHOW POINT TO POINT CONNECTION.
THIS ILLUSTRATION DOES NOT SHOW PHYSICAL
LOCATION OF COMPONENTS OR ROUTING OF
CABLES.

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1	3-142.2	3-81				Example illustration of use of pulley alignment tool does not accurately show alignment of pulleys.	
2	5-27	5-11				The ring gear and torque converter, as illustrated, do not resemble the actual parts.	
SAMPLE							
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches
- 1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

- 1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
- 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
- 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

- 1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
- 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

- $5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
- 212° Fahrenheit is equivalent to 100° Celsius
- 90° Fahrenheit is equivalent to 32.2° Celsius
- 32° Fahrenheit is equivalent to 0° Celsius
- $9/5 ^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

WEIGHTS

- 1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1,000 Grams = 2.2 Lb
- 1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609
TO CHANGE		
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621

