TECHNICAL MANUAL MAINTENANCE INSTRUCTIONS ORGANIZATIONAL MAINTENANCE

M977 SERIES 8 x 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH M978	2320-01-097-0249
TRUCK,TANK, FUEL,WITHOUT WINCH M978	2320-01-100-7672
TRUCK,TRACTOR,WITH WINCH,WITHOUT CRANE M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH M985E1	2320-01-194-7031

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

TABLE OF CONTENTS PAGE I

BODY ACCESSORY
MAINTENANCE
PAGE 18-1

HYDRAULIC SYSTEM
MAINTENANCE
PAGE 19-1

ARCTIC KIT MAINTENANCE

PAGE 20-1

ARMAMENT EQUIPMENT MAINTENANCE

PAGE 21-1

NON-ELECTRICAL GAGE MAINTENANCE

PAGE 22-1

FILTER-SEPARATOR MAINTENANCE PAGE 23-1

RADIO KIT MAINTENANCE

PAGE 24-1

M978 TANKER
MAINTENANCE

PAGE 25-1

CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL EQUIPMENT MAINTENANCE PAGE 26-1

M983 AUXILIARY
ELECTRICAL POWER
SYSTEM MAINTENANCE
PAGE 27-1

APPENDIX B
MAINTENANCE ALLOCATION
CHART
PAGE B-1

ALPHABETICAL INDEX

PAGE INDEX 1

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 15 December 1998

TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL MAINTENANCE

M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977 TRUCK, CARGO, WITHOUT WINCH, M977 TRUCK, TANK, FUEL, WITH WINCH, M978 TRUCK, TANK, FUEL, WITHOUT WINCH, M978 TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983 TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983 TRUCK, WRECKER-RECOVERY, M984 TRUCK, WRECKER-RECOVERY, M984E1 TRUCK, CARGO, WITH WINCH, M985 TRUCK, CARGO, WITHOUT WINCH, M985 TRUCK, CARGO, WITHOUT WINCH, M985E1 TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-097-0260 2320-01-099-6426 2320-01-097-0249 2320-01-100-7672 2320-01-097-0247 2320-01-097-0248 2320-01-195-7641 2320-01-097-0261 2320-01-100-7673 2320-01-194-7032 2320-01-194-7031

Approved for public release; distribution is unlimited.

TM 9-2320-279-20-3, 8 April 1987, 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. Minor changes to illustrations are indicated by a miniature pointing hand.
- 4. Illustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration.
- 5. Changes on cover are: Removed VOLUME NO. 3 and added distribution statement.

Remove Pages	Insert Pages
c/(d blank)	c thru e/(f blank)
i thru iv	i thru iv
18-1 thru 18-4	18-1 thru 18-4
none	18-4.1/(18-4.2 blank)
18-5 thru 18-8	18-5 thru 18-8

Remove Pages **Insert Pages** 18-12.1/18.2 blank) none 18-17 thru 18-20 18-17 thru 18-20 none 18-8.1 and 18-8.2 18-9 and 18-10 18-9 and 18-10 none 18-10.1/(18-10.2 blank) 18-11 and 18-12 18-11 and 18-12 none 18-24.1 thru 18-24.3/(18-24.4 blank) 18-31 thru 18-34 18-31 thru 18-34 18-37 and 18-38 18-37 and 18-38 18-73 thru 18-78 18-73 thru 18-78 19-1 and 19-2 19-1 and 19-2 19-7 thru 19-10 19-7 thru 19-10 19-10.1/(19-10.2 blank) none 19-11 and 19-12 19-11 and 19-12 19-29 thru 19-32 19-29 thru 19-32 none 19-32.1/(19-32.2 blank) 19-33 and 19-34 19-33 and 19-34 19-39 thru 19-42 19-39 thru 19-42 19-49 and 19-50 19-49 and 19-50 19-53 thru 19-60 19-53 thru 19-60 19-65 thru 19-70 19-65 thru 19-70 19-75 thru 19-78 19-75 thru 19-78 22-5 and 22-6 22-5 and 22-6 23-1 thru 23-6 23-1 thru 23-6 none 23-6.1 thru 23-6.5/(23-6.6 blank) 23-7 thru 23-22 23-7 thru 23-39/(23-40 blank) 25-1 thru 25-4 25-1 thru 25-4 25-27 thru 25-30 25-27 thru 25-30 25-129 thru 25-132 25-129 thru 25-132 25-145 and 25-146 25-145 and 25-146 25-169/(25-170 blank) 25-169 thru 25-174 A-1 and A-2 A-1 and A-2 B-1 thru B-15 B-1 thru B-15 B-19 thru B-24 B-19 thru B-24 B-24.1/(B-24.2 blank) none B-25 thru B-27 B-25 thru B-27

C-1 thru C-5/(C-6 blank) C-1 thru C-6.1/(C-6.2 blank)

F-1 thru F-6
none
F-6.1/(F-6.2 blank)
F-7 thru F-14
Pone
F-14 1/(F-14.2 blance)
F-14 thru F-6
F-14 1/(F-14.2 blance)
F-14 1/(F-14.2 blance)
F-14 1/(F-14.2 blance)

none F-14.1/(F-14.2 blank)
F-15 thru F-24 F-15 thru F-24
none F-24.1/(F-24.2 blank)
F-25 thru F-28 F-25 thru F-28

F-31 thru F-31/(F-32 blank) F-31 thru F-33/(F-34 blank)

Remove Pages	Insert Pages
FP-1/(FP-2 blank)	FP-1/(FP-2 blank)
none	FP-2.1/(FP-2.2 blank)
none	FP-2.3/(FP-2.4 blank)
none	FP-14.1/(FP-14.2 blank)
none	FP-14.3/(FP-14.4 blank)
none	FP-14.5/(FP-14.6 blank)
FP-15/(FP-16 blank)	FP-15/(FP-16 blank)
thru FP-27/(FP-28 blank)	thru FP-27/(FP-28 blank)
DA 2028 sample F & B	DA 2028 sample F & B
DA 2028 F & B	DA 2028 F & B
DA 2028 F & B	DA 2028 F & B
DA 2028 F & B	DA 2028 F & B
Cover	Cover

File this change sheet in front of the publication for reference purposes.

DENNIS J. REIMER General, **United States Army** Chief of Staff

Official

Administrative Assistant to the Secretary of the Army 05648

 $\begin{array}{lll} \textbf{DISTRIBUTION:} & \text{To be distributed in accordance with the Initial Distribution} \\ \text{Number (IDN) 300266, requirements for TM 9-2320-279-20-3.} \end{array}$

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 20 April 1993

TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL MAINTENANCE

M977 SERIES, 8X8 HEAVY EXPANDED MOBILITY
TACTICAL TRUCKS (HEMTT)

MODEL NSN

TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0250
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

TM 9-2320-279-20-3 dated 8 April 1987, is changed as follows:

- 1.Remove old pages and Insert new pages as indicated below.
- 2. New or changed information is indicated by a vertical bar in the margin of the page.
- 3. Minor changes to illustrations are indicated by a miniature pointing hand.
- 4. Illlustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration identification number.
- 5. Changes to diagrams or schematics are indicated by screening.

RemovePagesInsert Pagesi thru iVi thru iV20-1 thru 20-3820-1 thru 20-29/(20-30 blank)20-30 thru 20-68none25-163 and 25-16425-163 and 25-164B-21 and B-22B-21 and B-22B-25 thru B-28B-25 thru B-28

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

Remove Pages

Insert Pages

C-1 thru C-5/(C-6 blank)

C-1 thru C-5/(C-6 blank)

F-1 thru F-10

F-1 thru F-10

F-13 thru F-18 F-21 thru F-24 F-13 thru F-18

none

F-21 thru F-24

Index 1 thru Index 6

F-31/(F-32 blank) Index 1 thru Index 6

FP-1/(FP-2 blank)

FP-1/(FP-2 blank)

File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN General, United States Army Chief of Staff

Official:

MILTON H. HAMILTON Administrative Assistant to the

Mitter H. Hamilton

Secretary of the Army

04048

Distribution:

To be distributed in accordance with DA Form 12-38-E, Block 0266, requirements for TM 9-2320-279-20-3.

CHANGE

HEADQUARTERS

DEPARTMENT OF THE ARMY

NO. 1

Washington, D.C., 31 October 1988

MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL

M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH M977 TRUCK, CARGO, WITHOUT WINCH M977 TRUCK, TANK, FUEL, WITH WINCH M978 TRUCK, TANK, FUEL, WITHOUT WINCH M978	2320-01-097-0260 2320-01-099-6426 2320-01-097-0249 2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE M983 TRUCK, TRACTOR, WITH WINCH,	2320-01-097-0247
WITH CRANE M983 TRUCK, WRECKER-RECOVERY M984 TRUCK, WRECKER-RECOVERY M984E1 TRUCK, CARGO, WITH WINCH M985 TRUCK, CARGO, WITHOUT WINCH M985 TRUCK, CARGO WITH WINCH M985E1 TRUCK, CARGO, WITHOUT WINCH M985E1	2320-01-099-6421 2320-01-097-0248 2320-01-195-7641 2320-01-097-0261 2320-01-100-7673 2320-01-194-7032 2320-01-194-7031

TM g-2320-279-20-3, 8 April 1987, 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.

Remove Pages Insert Pages

i through iv i through iv F-1 through F-30 Index 5 and 6 Index 5 and 6

File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO General, United States Army Chief of Staff

Official:

WILLIAM J. MEEHAN II Brigadier General, United States Army The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38-R, Unit Maintenance requirements for Truck, Cargo, **10-ton,** 8x8, Heavy Expanded Mobility Tactical Truck, **HEMTT,** M977, M978, M983, M984, **M985.**

CARBON MONOXIDE (EXHAUST GAS) CAN CAUSE DEATH.

Carbon monoxide is without color or smell, but can cause death. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure, Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation. Precautions must be followed to ensure crew safety when the personnel heater or engine of any vehicle is operated for any purpose.

- DO NOT operate personnel heater or engine of vehicle in a closed place without proper ventilation.
- 2. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment covers removed unless necessary for maintenance purposes.
- 3. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected crew to fresh air and keep warm. DO NOT PERMIT PHYSICAL EXERCISE. If necessary, give artificial respiration and get immediate medical attention. For artificial respiration, refer to FM 21-11.
- 4. BE AWARE that the gas particulate filter unit or the field protection mask for nuclear-biological-chemical protection WILL NOT offer safety from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing, To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

WARNING

Never use the parking brake for normal braking or wheels will lock up causing severe skid. Skidding vehicle could result in serious injury or death.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

WARNING

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

The radiator is very hot and pressurized during vehicle operation. Let radiator cool before removing cap. Failure to do so can result in serious burns.

WARNING

The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

WARNING

Do not use trailer brakes as parking brake. Trailer brakes may not hold a loaded vehicle and trailer on a grade. A runaway vehicle may cause severe personal injury or death.

WARNING

Always use seatbelts when operating vehicle. Failure to use seatbelt can result in serious injury in case of accident.

WARNING

Avoid quick, jerking, winch operation. Keep other personnel well away from vehicles involved in winching operations. A snapped cable or shifting load can cause serious injury or death.

WARNING

Always wear heavy gloves when handling winch cables. Never let cable run through hands; frayed cables can cut. Never operate winch with less than five wraps-of cable on winch drum.

WARNING

If operating crane under powerlines, do not allow vehicle to contact high-voltage connections. Death on contact can result. If possible, keep one hand away from equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING

When working inside the vehicle with power off, be sure to ground every capacitor likely to hold a dangerous voltage potential.

WARNING

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment.

WARNING

Be careful when working on or with electrical equipment. Do not be misled by the term "low voltage". Voltages as low as 50 volts may cause death. For artificial respiration, refer to FM 21-11.

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

WARNING

Brake shoes may be coated with dust. Breathing this dust may be harmful to your health. Do not use compressed air to clean brake shoes. Wear a filter mask approved for use against brake dust. Failure to comply may result in injury or death to personnel.

WARNING

Starting fluid is toxic and flammable. Do not store in cab and do not breathe fumes. Do not puncture or burn containers. Dispose of container following manufacturer's recommendations on the container.

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, and gloves.

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel can experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with TM 10-277. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation-area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with TM 3-220 and local SOP.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

WARNING

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

WARNING

Do not check tire pressure before referring to TM 9-2320-279-10 for proper tire pressure checking procedure. Personal injury or death could result.

When inflating tires mounted on the vehicle, all personnel must remain out of trajectory of the side ring and lockring as shown by the areas indicated. Failure to follow proper procedures may result in serious injury or death to personnel.

WARNING

During pressure tests, ensure air pressure is drained to 0 psi (0 kPa) before taking off any components. If pressure is not released, plates or line could blow off and harm personnel. Do not drain air from tank with any part of body in air spray path. Skin embolisms and/or debris in eyes can occur from released pressure.

WARNING

Always completely deflate tire by removing valve core from valve stem before attempting demounting operation. After air has finished exhausting from valve stem, carefully run a piece of wire through valve stem to ensure it is not plugged and tire is completely deflated. Failure to comply may result in injury to personnel.

WARNING

High air pressure may be released from valve stem when valve core is removed. Stay clear of valve stem after core is removed. Ensure all personnel wear suitable eye protection. Failure to comply may result in injury to personnel.

WARNING

Stand clear of trajectory area during deflation or personal injury or death may result.

WARNING

Lockring is under tension. If lockring breaks loose it could cause injury to personnel. Keep hands and fingers away from lockring when removing.

WARNING

When lockring snaps into position it could pinch hands and fingers. Do not allow hands or fingers to get between lockring and lockring groove when installing lockring or injury to personnel may result.

WARNING

Raised notch on lockring must face away from wheel or lockring will not seat properly in lockring groove causing lockring to unseat possibly causing injury to personnel.

WARNING

Cracked, broken, bent or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated or damage or personal injury or death may result.

WARNING

No heat shall be applied to a multi-piece wheel or wheel component or damage or injury or death may result.

WARNING

Lockring must be fully seated in lockring groove around the entire circumference or lockring could unseat during tire inflation causing serious injury to personnel.

If gap is greater than 3/8 in. (9.5 mm), reposition or replace lockring, or injury or death to personnel may result. Destroy defective lockring so it cannot be reused.

WARNING

Failure to place wheel/tire assembly in safety cage prior to initial inflation could result in serious injury or death to personnel.

WARNING

When a wheel/tire is in a restraining device, do not rest or lean any part of body or equipment on or against the restraining device, or injury or death could result.

WARNING

While changing tires or while performing tire maintenance, stay out of the trajectory as shown by the area indicated. Failure to follow proper procedures may result in injury or death to personnel.

WARNING

Improperly seated lockrings and side rings may blow off at any time. Never attempt to seat a lockring or side ring during or after inflation. Failure to comply may result in serious injury or death.

WARNING

When inflating tires, always use an inflation hose with an in-line gage and a clip-on chuck. The gage and valve must be mounted a minimum of 10 feet (3.10 m) away from air chuck.

WARNING

All personnel must remain a minimum of 10 feet (3.10 m) away from tire and not in possible path of lockring or side ring. Failure to comply may result in serious injury or death.

WARNING

Do not inflate above 3 psi (21 kPa) or personal injury or death may result.

WARNING

Never inflate tires over 40 psi (276 kPa) to seat tire beads. If beads do not seat, deflate, demount, and check the tire/rim parts. Relubricate and remount tire. Serious injury or death could result if these procedures are not followed.

WARNING

If gap in lockring is greater than 3/8 in. (9.5 mm), deflate wheel/tire assembly by removing valve core, then replace lockring, or serious injury or death to personnel may result. Destroy defective lockring so it cannot be reused.

TECHNICAL MANUAL

HEADQUARTERS DEPARTMENT OF THE ARMY

No. 9-2320-279-20-3

Washington, DC, 8 April 1987

MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL MAINTENANCE

M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977 TRUCK, CARGO, WITHOUT WINCH, M977 TRUCK, TANK, FUEL, WITH WINCH, M978 TRUCK, TANK, FUEL, WITHOUT WINCH, M978 TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983 TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983 TRUCK, WRECKER-RECOVERY, M984 TRUCK, WRECKER-RECOVERY, M984E1 TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0260 2320-01-099-6426 2320-01-097-0249 2320-01-100-7672 2320-01-097-0247 2320-01-099-6421 2320-01-097-0248 2320-01-195-7641 2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985 TRUCK, CARGO, WITH WINCH, M985E1 TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-100-7673 2320-01-194-7032 2320-01-194-7031
The critical, williams, with the critical control cont	

Approved for public release; distribution is unlimited.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this Technical Manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail a letter or your DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. You can also provide information to TACOM via datafax or e-mail. TACOM's datafax number is: DSN 793-0726 or (309) 782-0726. E-mail address: amsta-ac-nml@ria-emhl.army.mil

M983 with crane and M985E1 without winch are no longer in the fleet. Ignore all references to these vehicles. The M984E1 and M984A1 are the same vehicle. All references to M984E1 shall be interpreted as the M984A1 model.

TABLE OF CONTENTS

		1 age
CHAPTER 18	BODY ACCESSORY ITEMS	18-1
Section I	Introduction	18-1
	Windshield Wiper/Washer Maintenance	18-2
Section III	Safety Accessories	18-30
Section IV	Fuel Hoses, Nozzles, and Control Valves	18-30
Section V	Heater and Defroster	18-38

Dago

TABLE OF CONTENTS (CONT)

Chapter 19	HYDRAULIC SYSTEM MAINTENANCE	19-1
Section I	Introduction	19-1
Section II	Hydraulic Hand Pump	19-1
Section III	Hydraulic Control Valves	19-2
Section IV	Hydraulic Lines and Fluid Filter	19-5
CHAPTER 20	ARCTIC KIT MAINTENANCE	20-1
Section I	Introduction	20-1
Section II	Arctic Heater Kit	.20-1
Section III	Deleted	
CHAPTER 21	ARMAMENT EQUIPMENT MAINTENANCE	21-1
G .: I	Introduction	21 1
Section I Section II	Armament.	21-1
Section II	Armanien	21-1
CHAPTER 22	NON-ELECTRICAL GAGE MAINTENANCE	22-1
Section I	Introduction	22-1
Section II	Gages	22-1
CHAPTER 23	FILTER-SEPARATOR MAINTENANCE	23-1
Section I	Introduction	.23-1
Section II	Filter-Separator	23-1
CHAPTER 24	DADIO MITALA ADVITENZA NOTE	24.1
CHAPTER 24	RADIO KIT MAINTENANCE	24-1
Section I	Introduction	. 24-1
Section II	Radio Kit	24-1
CHAPTER 25	M978 TANKER MAINTENANCE	25-1
Section I	Introduction	25-1
Section II	Service and Inspection .	25-2
Section III	Tubing, Pumps, and Air Eliminator	25-14
Section IV	Piping and Valves	
CHAPTER 26	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT MAINTENANCE	26-1
Section I	Introduction	26-1
Section II	Chemical, Biological, and Radiological Equipment	26-1
CHAPTER 27	M983 AUXILIARY ELECTRICAL POWER SYSTEM MAINTENANCE	27-1
Section I	Introduction	27-1
Section II	Auxiliary Electrical Power System	
Section 11	Auxiliary Licerteal Tower System	
APPENDIXES		
A	REFERENCES	
В	MAINTENANCE ALLOCATION CHART.	B-1
C	EXPENDABLE SUPPLIES AND MATERIALS	
D	PREPARATION FOR TOWING	D - 1
E	TORQUE LIMITS	
F	ILLUSTRATED LIST OF MANUFACTURED ITEMS	F-1
INDEX		Index

LIST OF ILLUSTRATIONS

Figure	Title	Pa
19-1	Typical Hydraulic Line Brackets · · · · ·	19-
19-2	Hydraulic Lines-M977, M985 Without Winch	19-
19-3	Hydraulic LinesM977, M985 With Winch	19-
19-4	Hydraulic Lines-M983 With Crane	19-
19-5	Hydraulic Lines-M983 Without Crane	19
19-6	Hydraulic Lines-M978 With Winch	19-
19-7	Hydraulic Lines-M978 Without Winch	19
19-8	Hydraulic Lines-M985El Without Winch	19-
19-9	Hydraulic Lines-M985El With Winch	19
19-10	HydraulicLines-M984	19
19-11	HydraulicLines-M984E1	19
25-1	Tanker External Components	25
25-2	Tanker Filter and Manual Dispensing Components	25
25-2 25-3	Tanker Dispensing Valve	25
25-4	Tanker Loading and Servicing Components	25
		25
25-5	Tanker Module Tubing	25
25-6	Tanker Piping Prockets	25
25-7	Tanker Piping Brackets	F-
F-1	Cable Assembly	F-
F-2	Chains	F-
F-3	Wire Assembly	F-
F-4	HoseAssembly	F-
F-5	Seal, Nonmetallic	F-
F-6	LoomsandSleeving	F-
F-7	StrapLiner	F-
F-8	Seal sand weatherstrip	F-
F-9	Tubing	F-
F-10	Gasket Strip	F-
F-11	Cord Assembly	F.
F-12	Quickedge Molding	F.
F-13	Fasteners	F.
F-14	Roof Tape	F.
F-15	1350860W Wire Harness Assembly	F.
F-16	1354460W Wire Harness Assembly	F.
F-17	1353360W Wire Assembly · · · · · · · · · · · · · · · · · · ·	F
F-18	138560W Wire Assembly	F.
F-19	Block,Battery Spacer	F.
F-20	Coated Cloth	
F-21	Four Inch Camlock Test Cover	F
FO-1	Electrical Schematic	F
FO-2	AirSchematic	FI
FO-2.1	Air Schematic	Fl
FO-3	Hydraulic Schematic	. F
	LIST OF TABLES	
NI 1.	Title	F
Numbe		1
19-1	Hydraulic Line Index for M977, M985 Without Winch	1
19-2	Hydraulic Line Index for M977, M984 With Winch	1
19-3	Hydraulic Line Index for M983 With Crane	
19-4	Hydraulic Line Index for M983 Without Crane	1
19-5	Hydraulic Line Index for M978 With Crane	1
19-6	Hydraulic Line Index for M978 Without Crane	1
		1
	Hydraulic Line Index for M985E1 Without Winch	
19-7 19-8	Hydraulic Line Index for M985E1 Without Winch	1 1

TM 9-2320-279-20-3

LIST OF TABLES (CONT)

r Title	Page
Hydraulic Line Index for M984E1	19-70
TankerModuleTubing	25-16
Tanker Piping	25-54
Cable and Cable Assemblies	F-10
Chains	F-11
Wire and Wire Assemblies	F-13
HoseandHoseAssemblies	F-16
Seal	F-19
LoomsandSleeving	F-20
StrapLiner	F-21
Seals and Weatherstrip	F-21
Tubing	F-22
Gasket Strip	F-26
Cord and Cord Assemblies	F-26
Quickedge Molding	F-27
Fasteners	F-27
RoofTape	F-28
M1977-CBT Components	F-33
	Hydraulic Line Index for M984E1 TankerModuleTubing Tanker Piping Cable and Cable Assemblies Chains Wire and Wire Assemblies HoseandHoseAssemblies Seal LoomsandSleeving StrapLiner Seals and Weatherstrip Tubing Gasket Strip Cord and Cord Assemblies Quickedge Molding Fasteners RoofTape

CHAPTER 18 BODY ACCESSORY MAINTENANCE

Contents	Para	Page
General	18-1	18-1
Windshield Wiper Blade and Arm Removal/Installation	18-2	18-2
Windshield Wiper Motor Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-3	18-3
Windshield Wiper Reservoir, Hoses, and Nozzles Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-4	18-8
Windshield Washer Assembly Repair (Model A) · · · · · · · · · · · · · · · · · ·	18-5	18-12
Windshield Washer Assembly Repair (Model B) · · · · · · · · · · · · · · · · · ·	18-5.1	18-12.1
Air Horn Control Valve Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-6	18-13
Air Horn Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-7	18-15
Windshield Washer Control Valve Removal/Installation	18-8	18-17
Left and Right Windshield Wiper Control Valve Removal/Installation	18-9	18-19
Mirror Assembly Removal/Installation	18-10	18-21
Side Mirror Bracket Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-11	18-22
		18-24.1
Red Reflector and Bracket Removal/Installation ······	18-12	18-25
Amber Reflectors Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-13	18-28
Fuel Nozzle Assembly Removal/Installation (M978) · · · · · · · · · · · · · · · · · · ·	18-14	18-30
Fuel Transfer Hose Removal/Installation (M978) · · · · · · · · · · · · · · · · · · ·	18-15	18-32
HAV HAND ACTUATED CONTROL VALVE and Airhose Assembly		
	18-16	18-34
Heater Hose Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-17	18-38
Heater Control Valve Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-18	18-41
Heater Resistor Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-19	18-44
Heater Motor and Coil Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-20	18-48
Heater Assembly Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-21	18-56
Cab Air Vent Box and Screen Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-22	18-60
Heater Control Cable Assembly Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-23	18-64
Defroster Control Cable Removal/Installation · · · · · · · · · · · · · · · · · · ·	18-24	18-68
Air Control Knob and Cable Assembly Removal/Installation	18-25	18-71
Defroster Hoses Removal/Installation	18-26	18-74

Section I. INTRODUCTION

18-1. GENERAL. This chapter contains maintenance instructions for removing, replacing, and installing accessory components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. WINDSHIELD WIPER/WASHER MAINTENANCE

Body Accessory Maintenance Instructions

18-2. WINDSHIELD WIPER BLADE AND ARM REMOVAL/INSTALLATION. This task covers: a. Removal b. Installation INITIAL SETUP Models All References None

Test Equipment None

Special Tools None

Supplies None

Personnel Required
MOS 63S. Heavy wheel vehicle mechanic

TM or Para Condition Description
TM 9-2320-279-10 Shut off engine.

Special Environmental Conditions
None

General Safety Instructions

Equipment Condition

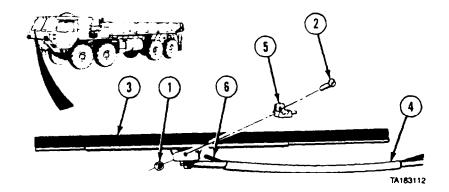
None

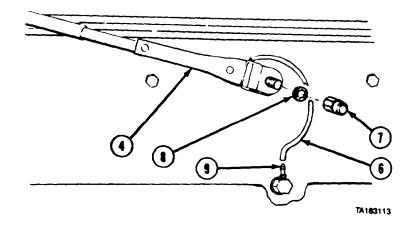
a. Removal.

NOTE

Removal procedure is the same for both wipers.

- (1) Remove locknut (1) and screw (2).
- (2) Remove blade (3) from wiper arm (4).
- (3) Remove nozzle (5) from hose (6).
- (4) Remove nut (7) and lockwasher (8).
- (5) Disconnect hose (6) from nipple (9).
- (6) Remove wiper arm (4).
- (7) Remove hose (6) from wiper arm (4).





(2)

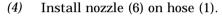
3

b. Installation

NOTE

Installation procedure is the same for both wipers.

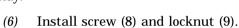
- (1) Install hose (1) in wiper arm (2).
- Install wiper arm (2) with lockwasher (3) and nut (4). Tighten nut to 90 to 110 in-lb (10.2 to 12.4 Nom).
- (3) Connect hose (1) to nipple (5).



(5) Install wiper blade (7) and nozzle (6) on wiper arm (2).

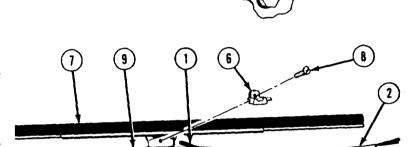


Do not overtighten locknut. Tighten locknut enough to allow for movement of blade in bracket without excessive play.



Follow-On Maintenance. Check operation of wiper arm (TM 9-2320-279-10).

END OF TASK



[5]

18-3.	WINDSHIELD	WIPER	MOTOR	REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Adhesive-Sealant, silicone RTV, general

purpose, Item 4, Appendix C

Compound, sealing, pipe thread, Item 18,

Appendix C

Tag, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

Condition Description TM or Para

TM 9-2320-279-10 Shut off engine. TM 9-2320-279-10 Air system drained.

Windshield wiper blade and Para 18-2

arm removed. Para 7-91 Batteries disconnected.

Para 7-19 Instrument panel removed

(left windshield wiper motor

only).

Special Environmental Conditions

None

General Safety Instructions

None

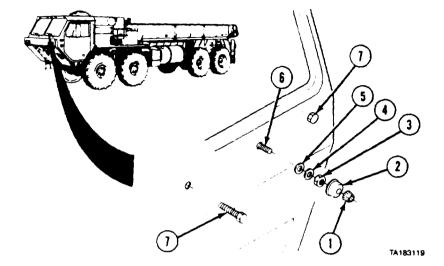
18-3. WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION (CONT).

a. Removal.

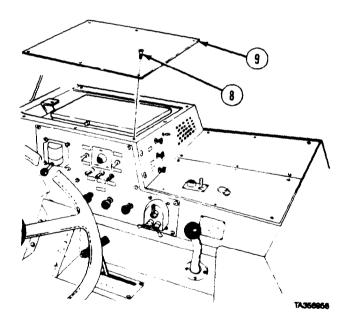
NOTE

Roth windshield wipers are removed in a similar manner.

- (1) Remove splined drive cone (1), rubber boot (2), nut (3), washer (4), and seal washer (5) from wiper motor shaft (6).
- (2) Remove two screws (7).



(3) Remove eight screws (8) and heater cover (9).

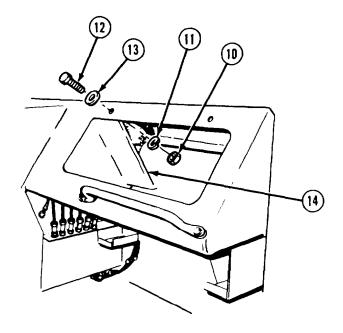


M978 Tanker Maintenance Instructions (Cont)

NOTE

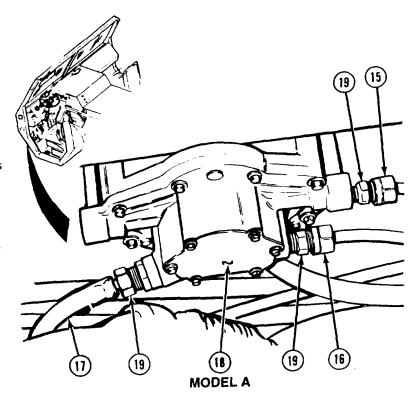
Do step (4) for right windshield wiper motor only.

(4) Remove nut (10), lockwasher (11), screw (12), and washer (13) to remove defroster tube guard (14).



NOTE

- Tag and mark hoses before removal. There are different markings on the Model B motor. PK is the same as Park and IN is the same as Run.
- There are two kinds of wiper motors. Model A has two hoses on the right side. Model B has hoses on the bottom. Both are removed the same way. If a Model A motor must be replaced with a Model B motor, then the control valve must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.
- Air hoses for Model A may not be long enough for Model B. If hoses are not long enough, refer to Appendix F and TM 9-2320-279-24P for proper identification of parts.



- *(5)* Disconnect airhoses (15 and 16) and rubber hose (17) from motor (18).
- Remove motor (18). *(6)*
- (7) Mark location of three fittings (19) and remove three fittings from motor (18).

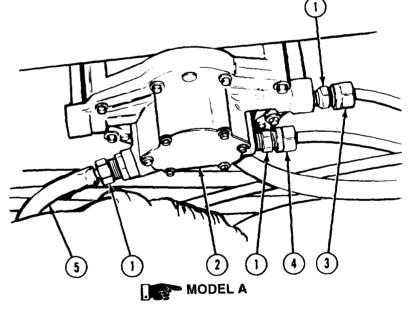
b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

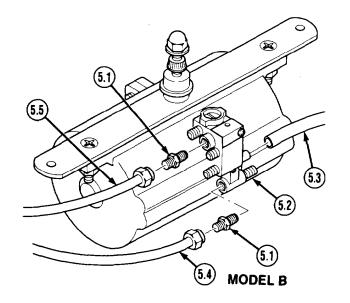
NOTE

- There are two kinds of wiper motors. Model A has two hoses on the right side.
 Model B has hoses on the bottom. Both are removed the same way. If a Model A
 motor must be replaced with a Model B motor, then the control valve must be
 changed also. Refer to TM 9-2320-279-24P for proper identification of parts.
- Air hoses for Model A may not be long enough for Model B. If hoses are not long enough refer to Appendix F and TM 9-2320-279-24P for proper identification of parts.
- Do steps (1) through (3) for Model A. Do steps (3.1) through (3.3) for Model B.
- (1) Coat threads of fittings (1) with pipe thread sealing compound and install fittings in motor (2).
- (2) Position motor (2).
- (3) Connect air hoses (3 and 4) and rubber hose (5) to motor (2).



18-3. WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION (CONT).

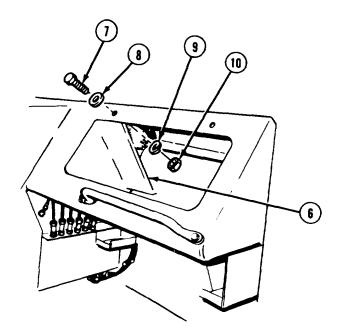
- (3.1) Coat threads of fittings (5.1) with pipe thread sealing compound and install fittings in motor (5.2).
- (3.2) Connect rubber hose (5.3) and air hoses (5.4) and (5.5) to motor (5.2).
- (3.3) Position motor (5.2).

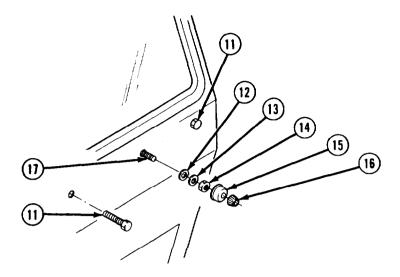


NOTE

Do step (4) for right windshield wiper motor only.

(4) Install defroster tube guard (6) with screw (7), washer (8), lockwasher (9), and nut (10).

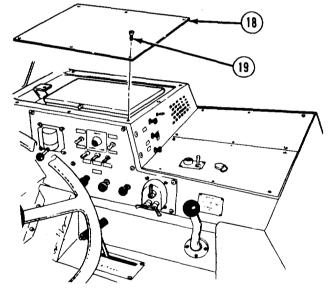




- (5) Attach motor to vehicle with two screws (11) and apply adhesive-sealant.
- (6) Install seal washer (12), washer (13), and nut (14). Tighten nut to 140 to 180 in-lb. (15.8 to 20.34 N•m).
- (7) Install rubber boot (15) and splined drive cone (16) on motor shaft (17).
- (8) Install heater cover (18) with eight screws (19).

c. Follow-on Maintenance.

- (1) Install windshield wiper blade and arm (para 18-20).
- (2) Install instrument panel (para 7-19) (left windshield wiper motor only).
- (3) Connect batteries (para 7-91).
- (4) Start engine and build up air pressure to 90 psi (621 kPa) (TM 9-2320-279-10).
- (5) Operate wipers and check connections for air leaks.



18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

Special Environmental Conditions

INITIAL SETUP

None

Models
All
References
None

Test Equipment Equipment Condition

None TM or Para Condition Description
Special Tools Para 7-91 Batteries disconnected.

None

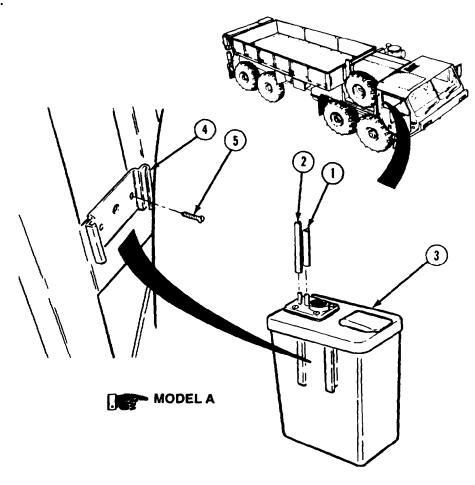
Supplies

Tag, identification, Item 48, Appendix C

Personnel Required General Safety Instructions

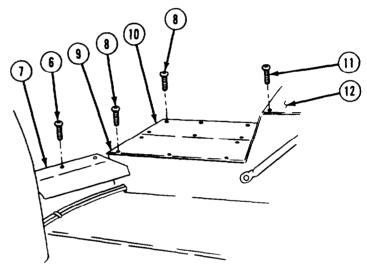
MOS 63S, Heavy wheel vehicle mechanic (2) None

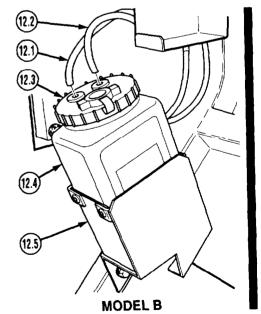
a. Removal.



NOTE

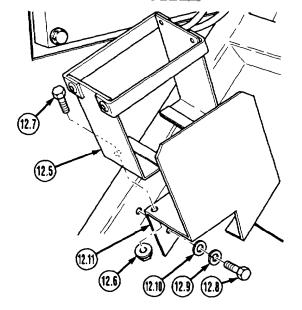
- The Model B windshield washer reservoir is mounted under the dash on the left side of the passenger seat. If a Model A reservoir must be replaced by a Model B reservoir, the control valve must be replaced and the hoses rerouted in front of heater and around to control valve.
- · Tag and mark hoses before removal.
- For Model A, do steps (1) through (7).
- For Model B, do steps (7.1) through (7.4).
- (1) Remove air hose (1) and fluid hose (2) from top of reservoir (3).
- (2) Remove reservoir (3) from bracket (4).
- (3) Remove two screws (5) and bracket (4).
- (4) Remove three screws (6) and hose cover panel (7).
- (5) Remove 11 screws (8) from right heater compartment cover (9) and left heater compartment cover (10).
- (6) Remove right heater compartment cover (9) and left heater compartment cover (10).
- (7) Remove eight screws (11) and heater compartment cover (12).
- (7.1) Remove fluid hose (12.1) and air hose (12.2) from top of reservoir (12.3)..
- (7.2) Remove reservoir (12.4) from bracket (12.5).



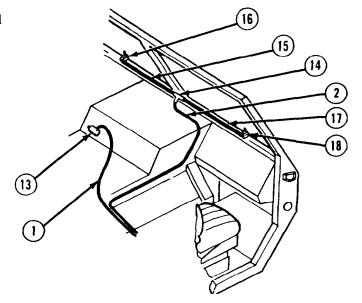


18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES REMOVAVINSTALLATION (CONT).

- (7.3) Remove three locknuts (12.6), three screws (12.7), and bracket (12.5).
- (7.4) Remove two screws (12.8), two lockwashers (12.9), two washers (12.10), and bracket (12.11).



- Remove air hose (1) from washer control valve (13).
- Remove fluid hose (2) from **(9)**
- T-fitting (14). Remove hose (15) from T-fitting (14) (10)and left nozzle (16).
- Remove hose (17) from T-fitting (14) (11)and right nozzle (18).

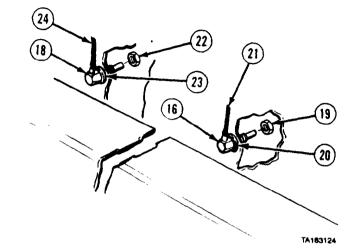


18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES REMOVAL/INSTALLATION (CONT).

CAUTION

Use care when removing nozzles. Excessive force may damage nozzle.

- (12) Soldier A holds left nozzle (16) in place while Soldier B removes nut (19) from left nozzle.
- (13) Remove left nozzle (16) and gasket (20). Remove hose (21) from left nozzle.
- (14) Soldier A holds right nozzle (18) in place while Soldier B removes nut (22) from right nozzle.
- (15) Remove right nozzle (18) and gasket (23). Remove hose (31) from right nozzle.

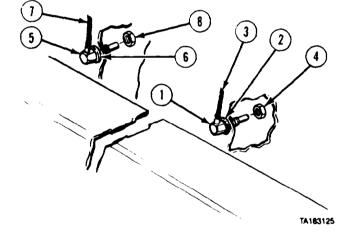


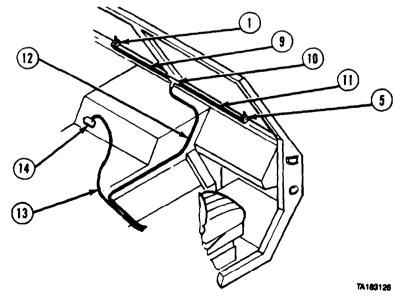
b. Installation.

CAUTION

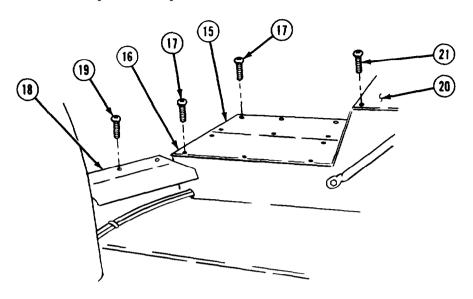
Use care when installing nozzle. Excessive Text may damage nozzle.

- (1) Soldier A installs left nozzle (I), gasket (a), and hose (3).
- (1) Soldier A holds left nozzle (1) in place while Soldier B installs nut (a) on left nozzle.
- (3) Soldier A installs right nozzle (5), gasket (6) and hose (7).
- (4) Soldier A holds right nozzle (5) in place while Soldier B installs nut (8) on right nozzle.
- (5) Install hose (9) on T-fitting (10) and left nozzle (1).
- (b) Install hose (11) on T-fitting (10) and right nozzle (5).
- (7) Install fluid hose (12) on T-fitting (10).
- (8) Install airhose (13) on washer control valve (14).





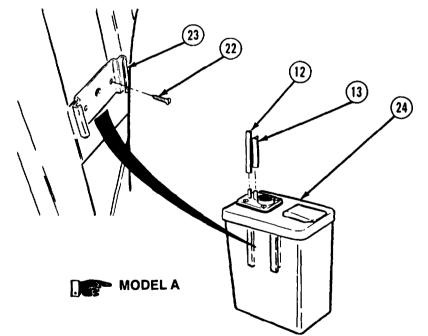
Body Accessory Maintenance Instructions (Cont)



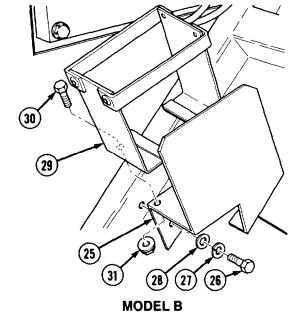
NOTE

For Model A do steps (9) thru (14). For Model B do steps (15) thru (18).

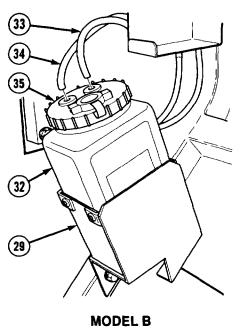
- (9) Install left heater compartment cover (15) and right heater compartment cover (16) with 11 screws (17).
- (10) Install hose cover panel (18) with three screws (19).
- (11) Install heater compartment cover (20) with eight screws (21).
- (12) Install two screws (22) and bracket (23).
- (13) Install reservoir (24) in bracket (23).
- (14) Install air hose (13) and fluid hose (12) on reservoir (24).



- (15) Install bracket (25) with two screws (26), two lockwashers (27), and two washers (28).
- (16) Install bracket (29) with three screws (30) and three locknuts (31).



- (17) Install reservoir (32) in bracket (29).
- (18) Install air hose (33) and fluid hose (34) on top (35) of reservoir (32).



c. Follow-on Maintenance.

- (1) Fill washer reservoir with windshield washer fluid (LO 9-2320-279-12).
- (2) Connect batteries (para 7-91).
- (3) Check operation of windshield washer (TM 9-2320-279-10).

18-5. WINDSHIELD WASHER ASSEMBLY REPAIR (MODEL A).

This task covers:

a. Disassembly

b. Cleaning/Inspection

c. Assembly

d. Follow-on Maintenance

INITIAL SETUP

None

Models
All
None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Tools Para 18-4 Windshield washer assembly

(removed and empty) on clean

work surface.

Supplies Special Environmental Conditions

None None

Personnel Required General Safety Instructions

MOS 63S, Heavy wheel vehicle mechanic None

a. Disassembly.

- (1) Remove washer cover (1) from washer jar (2).
- (2) Remove pump (3), two hoses (4), and hose (5).
- (3) Remove gaskets (6 and 7).

b. Cleaning/Inspection.

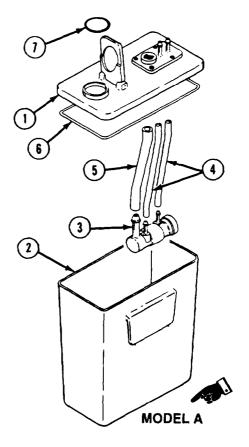
- (1) Using water, rinse sediment from bottom of washer jar and from pump screen.
- (2) Inspect to make sure hoses are not cracked or plugged and that hoses fit firmly on cover and pump.
- (3) Inspect cover and washer jar for cracks and other damage.
- (4) Inspect for damaged or missing sections of gaskets.

c. Assembly.

- (1) Install gaskets (6 and 7) in washer cover (1).
- (2) Install two hoses (4) and hose (5) to washer cover (1) and pump (3).
- (3) Install pump (3).
- (4) Install washer cover (1) on washer jar (2).

d. Follow-on Maintenance.

- (1) Install and fill windshield washer assembly with fluid (para 18-4).
- (2) Check operation of windshield washer (TM 9-2320-279-10).



18-5.1 WINDSHIELD WASHER ASSEMBLY REPAIR (MODEL B).

This task covers:

a. Disassembly

b. Cleaning/Inspection

c. Assembly

d. Follow-on Maintenance

INITIAL SETUP

None

Models References All None

Test Equipment Equipment Condition

Condition Description None TM or Para

Windshield washer assembly Para 18-4 Special Tools

(removed and empty) on clean

work surface.

Special Environmental Conditions Supplies

None None

General Safety Instructions Personnel Required

None MOS 63S, Heavy wheel vehicle mechanic

Disassembly.

- (1) Remove washer cover (1) from washer jar (2).
- (2) Remove pump (3), two hoses (4 and 5), and two connectors (6).
- (3)Remove two grommets (7) and umbrella valve (8) from cover (9).

b. Cleaning/Inspection.

- Using water, rinse sediment from bottom of (1) washer iar and from pump screen.
- (2)Inspect to make sure hoses are not cracked or plugged and that hoses fit firmly on cover and
- (3) Inspect cover and washer jar for cracks and other damage.
- **(4)** Inspect for damaged or missing sections of gaskets.

c. Assembly.

- Install umbrella valve (8), two grommets (7), and hoses (4) and (5) into cover (9).
- (2)Install pump (3) and two connectors (6) on hoses (4) and (5).
- Install washer cover (1) on washer jar (2).

d. Follow-on Maintenance.

- Install and fill windshield washer assembly with fluid (para 18-4).
- Check operation of windshield washer (TM 9-2320-279-10).

Section III. SAFETY ACCESSORIES

18-6. AIR HORN CONTROL VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18, Appendix C

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Air system drained.

Special Environmental Conditions

None

General Safety Instructions

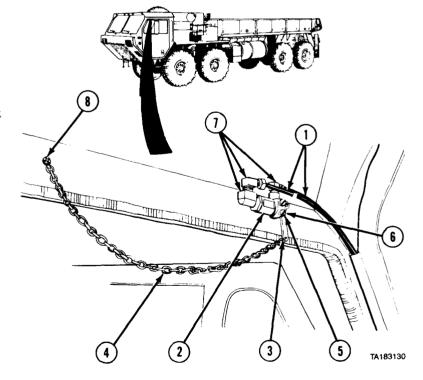
None

a. Removal.

NOTE

Tag and mark air lines before removal.

- (1) Disconnect two air lines (1) from valve (2).
- (2) Spread link (3) and disconnect chain (4) from valve (2).
- (3) Remove two screws (5) and lockwashers (6) and remove valve (2).
- (4) Remove fittings (7) from valve (2).
- (5) Remove screw (8) and chain (4).

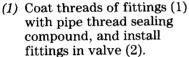


18-6. AIR HORN CONTROL VALVE REMOVAL/INSTALLATION (CONT).

b. Installation.

WARNING

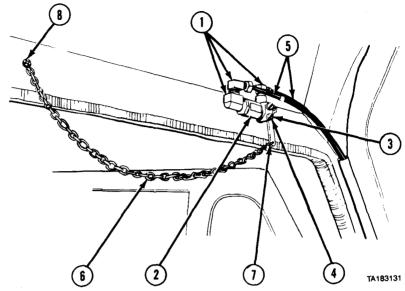
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (2) Install valve (2) with two lockwashers (3) and screws (4).
- (3) Connect two air lines (5) to valve (2).
- (4) Attach chain (6) to valve (2) and close link (7).
- (5) Position chain (6) and install screw (8).

c. Follow-on Maintenance.

- (1) Start engine and build-up system air pressure to 90 psi (621 kPa) (TM 9-2320-279-10).
- (2) Check horn operation.
- (3) Check connections for leaks.
- (4) Shut off engine (TM 9-2320-279-10).



18-7. AIR HORN REMOVAL/INSTALLATION.

This task covers:

a. Removal b. Installation c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Air system drained.

Para 14-5

Skid plate grille removed.

Special Environmental Conditions

None

General Safety Instructions

None

18-7. AIR HORN REMOVAL/INSTALLATION (CONT).

a. Removal.

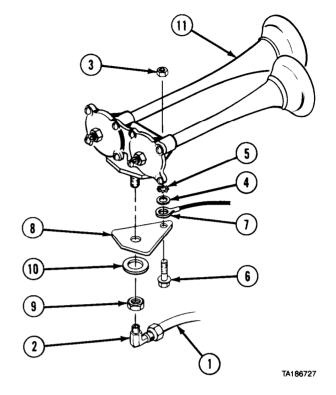
- (1) Disconnect air line (1) from fitting (2). Remove fitting.
- (2) Remove nut (3), washer (4), lockwasher (5), and screw (6) to remove ground wire (7) from bracket (8).
- (3) Remove nut (9) and washer (10). Remove horn (11) from bracket (8).

b. Installation.

- (1) Install horn (11) on bracket (8) with washer (10) and nut (9).
- (2) Connect ground wire (7) to bracket (8) with lockwasher (5), screw (6), washer (4), and nut (3).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



- (3) Coat threads of fitting (2) with pipe thread sealing compound, and install fitting in horn (11).
- (4) Connect air line (1) to fitting (2).

c. Follow-on Maintenance.

- (1) Start engine and build up system air pressure to 90 psi (620 kPa) (TM 9-2320-279-10).
- (2) Check horn operation.
- (3) Check connections for leaks.
- (4) Shut off engine (TM 9-2320-279-10).
- (5) Install skid plate grille (para 14-5).

18-8.	WINDSHIELD	WASHER	CONTROL	VALVE	REMOVAL/INSTALLATION.
This task	covers:				

a. Removal c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models
All
References
None

Test Equipment Equipment Condition

None
TM or Para
Condition Description
TM 9-2320-279-10 Shut off engine.
Special Tools

Page 7-01
Batteries disconnected

None Para 7-91 Batteries disconnected.
TM 9-2320-279-10 Air system drained.

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Tag, identification, Item 48, Appendix C

Special Environmental Conditions

None

General Safety Instructions

Personnel Required None MOS 638. Heavy wheel vehicle mechanic

NOTE

There are two kinds of washer control valves. Model A is used with the washer reservoir mounted behind the passenger seat. Model B is used with the washer mounted under the dash. If a Model A control valve must be replaced with a Model B control valve, the washer reservoirs must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.

18-8. WINDSHIELD WASHER CONTROL VALVE REMOVAL/INSTALLATION (CONT).

a. Removal.

(1) Remove eight screws (1) and panel (2).

NOTE

Tag and mark air lines before removal.

- (2) Disconnect air lines (3 and 4) from windshield washer control valve (5).
- (3) Loosen screw (6) and remove knob (7).

NOTE

There are two models of windshield washer control valves. Model A has no lockwasher. Model B uses a lockwasher. Do step (4) for Model A. Do step (4.1) for Model 8.

- (4) Remove nut (8) and pull windshield washer control valve (5) out of panel (2).
- (4.1) Remove nut (8) and lockwasher (8.1) and pull windshield washer control valve (5) out of panel (2).
- (5) Remove elbow (9) from windshield washer control valve (5).

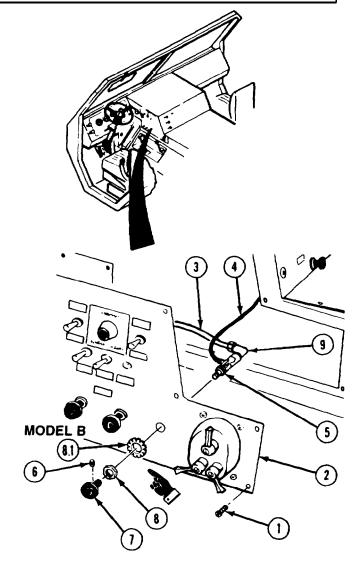
b. Installation

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

There are two kinds of washer control valves. Model A is used with the washer reservoir mounted behind the passenger seat. Model B is used with the washer mounted under the dash. If a Model A control valve must be replaced with a Model B control valve, the washer reservoirs must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.



(1) Coat threads of elbow (9) with pipe thread sealing compound and install elbow in windshield washer control valve (5).

NOTE

Do step (2) for Model A. Do step (2.1) for Model B.

- (2) Position windshield washer control valve (5) in panel (2). Install and tighten nut (8).
- (2.1) Install windshield washer control valve (5) in panel (2) with lockwasher (8.1) and nut (8).
- (3) Install knob (7) on windshield washer control valve (5) and tighten screw (6).

- (4) Connect air lines (3 and 4).
- (5) Install panel (2).
- (6) Install and tighten eight screws (1).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine and build up air pressure (TM 9-2320-279-10).
- (3) Check for air leaks.
- (4) Check operation of windshield washer control valve (TM 9-2320-279-10).
- (5) Shut off engine (TM 9-2320-279-10).

END OF TASK

18-9. LEFT AND RIGHT WINDSHIELD WINSTALLATION.	IPER CONTROL VALVE REMOVAU			
This task covers:				
a. Removal	c. Follow-on Maintenance			
b. Installation				
INITIAL SETUP				
Models All	References None			
Test Equipment None	Equipment Condition TM or Para Condition Description TM 9-2320-279-10 Shut off engine.			
Special Tools	Para 7-91 Batteries disconnected.			
None	TM 9-2320-279-10 Air system drained.			
Supplies Compound, sealing, pipe thread, Item 18, Appendix C Tags, identification, Item 48, Appendix C	Special Environmental Conditions None			
Personnel Required MOS 63S. Heavy wheel vehicle mechanic	General Safety Instructions None			

NOTE

There are two kinds of washer control valves. Model A pulls out to start wipers. Model B turns clockwise to start wipers. If a Model A control valve must be replaced with a Model B control valve, the wiper motor for that valve and some fittings must be replaced also. Refer to TM 9-2320-279-24P for proper identification of parts.

18.9. LEFT AND RIGHT WINDSHIELD WIPER CONTROL REMOVAL/INSTALLATION (CONT).

a. Removal.

- (1) Remove screws (1) and remove side panel (2).
- (2) Loosen screw (3) and remove knob (4).
- (3) Remove nut (5), wiper valve (6) and lockwasher (7) from side panel (2).

NOTE

Tag and mark air lines before removal.

- (4) Disconnect three air lines (8, 9, and 10).
- (5) Remove elbows (11, 12, and 13) from wiper valve (6).

b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

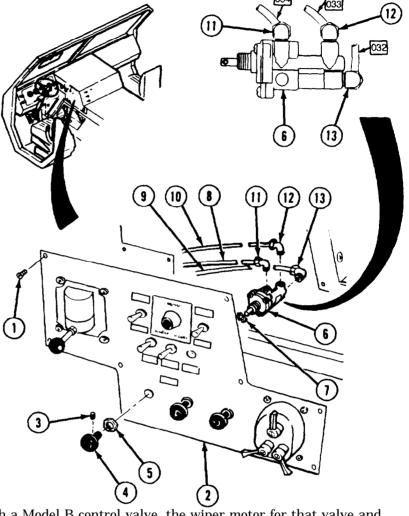
There are two kinds of washer control valves. Model A pulls out to start wipers. Model B turns clockwise to start wipers. If a Model

A control valve must be replaced with a Model B control valve, the wiper motor for that valve and some fittings must be replaced also. Refer to TM 9-2302-279-24P for proper identification of parts.

- (1) Coat threads of elbows (13, 12, and 11) with pipe thread sealing compound and install elbows in wiper valve (6).
- (2) Connect air lines (10, 9, and 8).
- (3) Install wiper valve (6) and lockwasher (7) through side panel (2). Install and tighten nut (5).
- (4) Install knob (4) and tighten screw (3).
- (5) Position side panel (2) with all wires behind panel.
- (6) Install screws (1).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine and build up air pressure (TM 9-2320-279-10).
- (3) Check for leaks.
- (4) Check operation of wiper valve (TM 9-2320-279-10).
- (5) Shut off engine (TM 9-2320-279-10).



18-10. MIRROR ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.

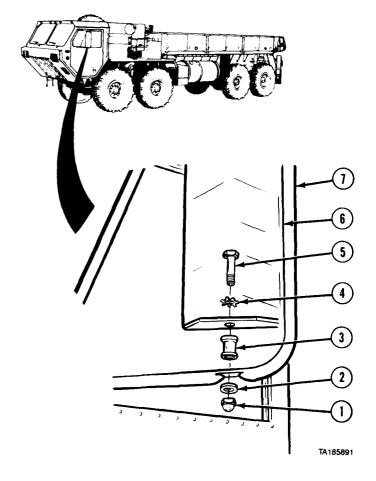
NOTE

Both side mirrors are removed and installed in the same manner.

- (1) Remove two locknuts (1), lockwashers (2), spacers (3), lockwashers (4), and screws (5).
- (2) Remove mirror (6) from bracket (7).

b. Installation.

- (1) Position mirror (6) on bracket (7).
- (2) Install two screws (5), lockwashers (4), spacers (3), lockwashers (2), and locknuts (1).
- c. Follow-on Maintenance. None.



18-11. SIDE MIRROR BRACKET REMOVAL/INSTALLATION.

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

Para 18-10 Mirror assembly removed.

Special Environmental Conditions

None

General Safety Instructions

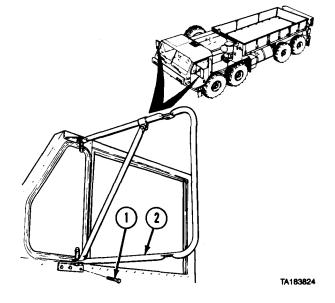
None

a. Removal.

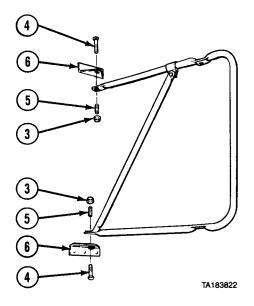
NOTE

Both side mirror brackets are removed in a similar manner.

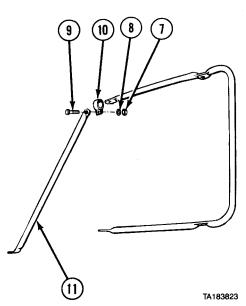
(1) Remove six screws (1) and bracket assembly (2).



(2) Remove two nuts (3), screws (4), springs (5), and mounting brackets (6).



(3) Remove nut (7), lockwasher (8), screw (9), clamp (10), and crossbar (11).

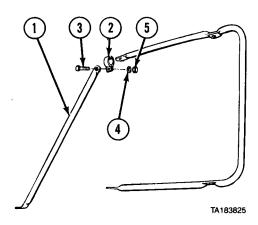


b. Installation.

NOTE

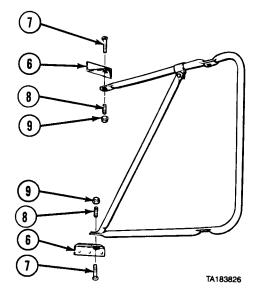
Both side mirror brackets are installed in a similar manner.

(1) Install crossbar (1) and clamp (2) with screw (3), lockwasher (4), and nut (5).



18-11. SIDE MIRROR BRACKET REMOVAL/INSTALLATION (CONT).

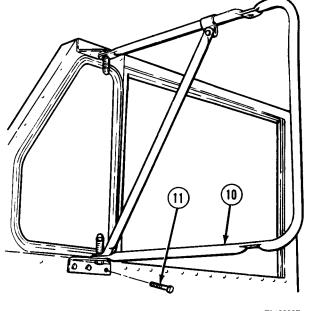
(2) Install two mounting brackets (6) with two screws (7), springs (8), and nuts (9).



(3) Install bracket assembly (10) with six screws (11).

c. Follow-on Maintenance.

- (1) Install mirror assembly (para 18-10).(2) Adjust mirror (TM 9-2320-279-10).



18-11.1 MIRROR EXTENSION ASSEMBLY REMOVAL/INSTALLATION (M984E1 AND M1977-CBT ONLY).

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models

M984E1, M1977-CBT

Test Equipment

None

Special Tools None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

Special Environmental Conditions

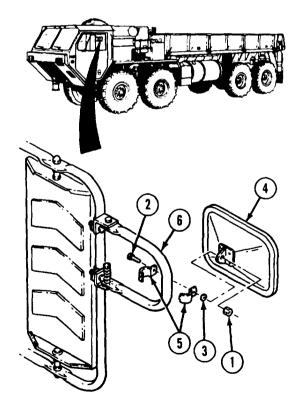
None

General Safety Instructions

None

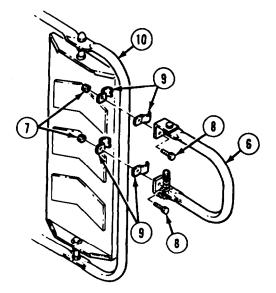
a. Removal

(1) Remove locknut (1), screw (2), washer (3), mirror (4), and two clamps (5) from bracket (6).

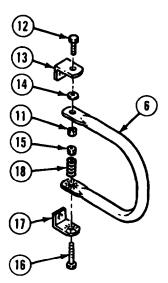


18-11.1. MIRROR EXTENSION ASSEMBLY REMOVAL/INSTALLATION (M984E1 AND M1977-CBT ONLY) (CONT).

(2) Remove two locknuts (7), screws (8), four clamps (9), and bracket (6) from rear view mirror bracket (10).



- (3) Remove locknut (11), screw (12), mounting bracket (13), and washer (14) from mirror bracket (6).
- (4) Remove locknut (15), screw (16), mounting bracket (17), and adjusting spring (18) from mirror bracket (6).

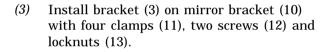


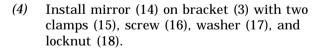
b. Installation.

NOTE

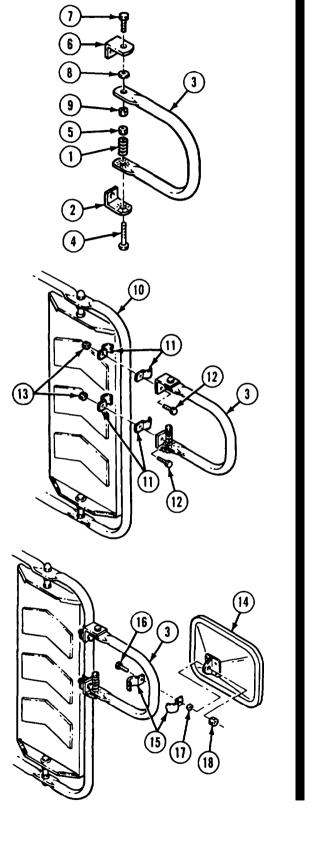
Mirror extension assembly is installed on driver's side.

- (1) Install adjusting spring (1) and mounting bracket (2) on mirror bracket (3) with screw (4) and locknut (5).
- (2) Install mounting bracket (6) on mirror bracket (3) with screw (7), washer (8), and locknut (9).





c. Follow-on Maintenance. None.



18-12. RED REFLECTOR AND BRACKET REMOVAL/INSTALLATION.

This task covers:

- a. Removal (M977, M985)
- b. Installation (M977, M985)
- c. Removal (M978)
- d. Installation (M978)
- e. Removal (M983)
- f. Installation (M983)

- g. Removal (M984)
- h. Installation (M984)
- i. Removal (M984E1)
- j. Installation (M984E1)
- k. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10

Shut off engine. Para 7-66

Side and back clearance lights removed (M984).

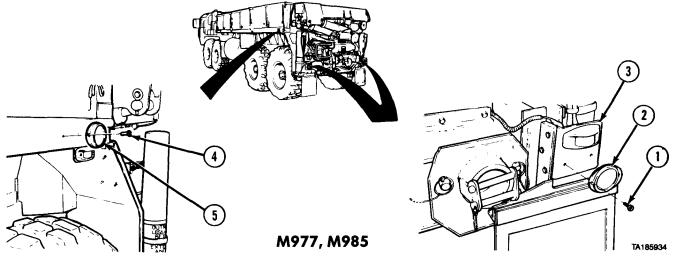
 $Special\ Environmental\ Conditions$

None

General Safety Instructions

None

a. Removal (M977, M985).



NOTE

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right reflectors are removed and installed the same way.
- (1) Remove two screws (1) and red reflector (2) from bracket (3).
- (2) Remove two screws (4) and red reflector (5).

b. Installation (M977, M985).

- (1) Install red reflector (2) on bracket (3) with two screws (1).
- (2) Install red reflector (5) with two screws (4).

18-12. RED REFLECTOR AND BRACKET REMOVAL/INSTALLATION (CONT).

c. Removal (M978).

NOTE

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right rear and side reflectors are removed and installed the same way.
 - (1) Remove two screws (1), lockwashers (2), and nuts (3).
 - (2) Remove red reflector (4).
 - (3) Remove two screws (5), lockwashers (6), and nuts (7).
 - (4) Remove red reflector (8).

d. Installation (M978).

- (1) Position red reflector (8).
- (2) Install two screws (5), lockwashers (6), and nuts (7).
- (3) Position red reflector (4).
- (4) Install two screws (1), lockwashers (2), and nuts (3).

e. Removal (M983).

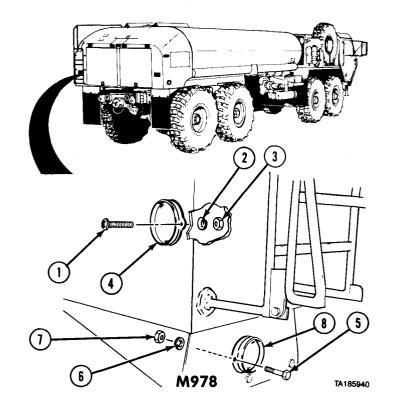
NOTE

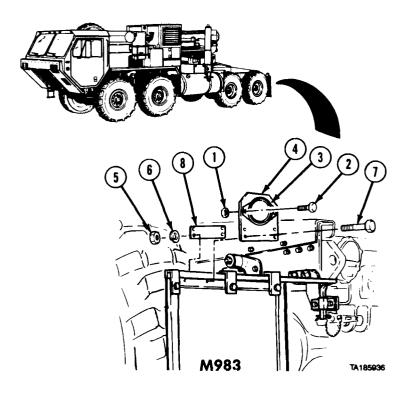
Left and right red reflectors and brackets are removed and installed the same way.

- (1) Remove two locknuts (1) and screws (2).
- (2) Remove red reflector (3) from bracket (4).
- (3) Remove four nuts (5), lockwashers (6), and screws (7).
- (4) Remove retainer plate (8) and bracket (4).

f. Installation (M983).

- (1) Install bracket (4) and retainer plate (8) with four screws (7), lockwashers (6), and nuts (5).
- (2) Position red reflector (3) on bracket (4).
- (3) Install two screws (2) and locknuts (1).





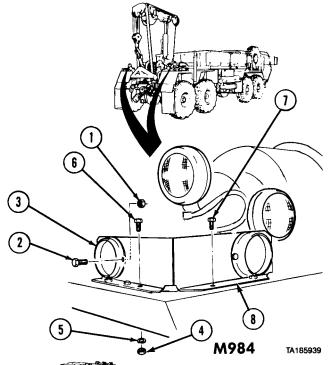
g. Removal (M984).

NOTE

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right rear and side reflectors and bracket are removed and installed the same way.
 - (1) Remove two locknuts (1) and screws (2).
 - (2) Remove red reflector (3).
 - (3) Remove three nuts (4), lockwashers (5), and screws (6).
 - (4) Remove two screws (7) and bracket (8).

h. Installation (M984).

- (1) Install bracket (8) with two screws (7).
- (2) Install three screws (6), lockwashers (5), and nuts (4).
- (3) Install red reflector (3) with two screws (2) and locknuts (1).



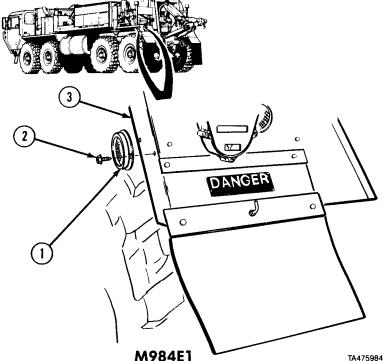
i. Removal (M984E1).

NOTE

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right rear and side reflector are removed and installed the same way.

Remove two screws (1) and red reflector (2) from fender (3).

j. Installation (M984E1). Install red reflector (2) on fender (3) with two screws (1).



k. Follow-on Maintenance. Install side and back clearance lights (M984) (para 7-66).

18-13. AMBER REFLECTORS REMOVAL/INSTALLATION. This task covers: a. Removal c. Follow-on Maintenance b. Installation **INITIAL SETUP** Models References All None Test Equipment Equipment Condition None TM or Para $Condition\ Description$ Special Tools TM 9-2320-279-10 Shut off engine. None Special Environmental Conditions Supplies None None General Safety Instructions

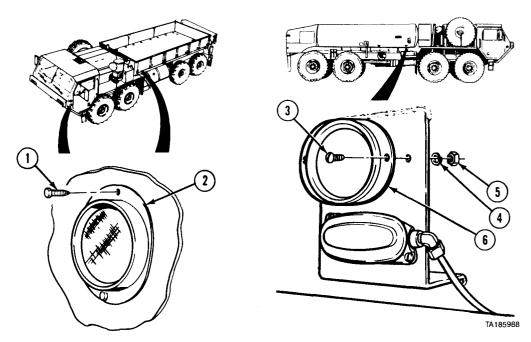
None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

18-13. AMBER REFLECTORS REMOVAL/INSTALLATION (CONT).

a. Removal.



NOTE

All vehicles have two amber reflectors on sides of cab. M977, M978, and M985 also have two amber reflectors on middle of vehicle.

- (1) Remove two screws (1) from reflector (2).
- (2) Remove reflector (2).

NOTE

Do steps (3) and (4) to remove middle reflectors on M978.

- (3) Remove two screws (3), lockwashers (4), and nuts (5) from reflector (6).
- (4) Remove reflector (6).

b. Installation.

- (1) Position reflector (2).
- (2) Install two screws (1).

NOTE

Do steps (3) and (4) to install middle reflectors on M978.

- (3) Position reflector (6).
- (4) Install two screws (3), lockwashers (4), and nuts (5).
- c. Follow-on Maintenance. None.

Section IV. FUEL HOSES, NOZZLES, AND CONTROL VALVES

18-14. FUEL NOZZLE ASSEMBLY REMOVAL/INSTALLATION (M978).

This task covers:

a. Removal b. Installation c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Nozzle removed from fuel

transfer hose.

TM 9-2320-279-10 Drain fuel hose.

Special Environmental Conditions

None

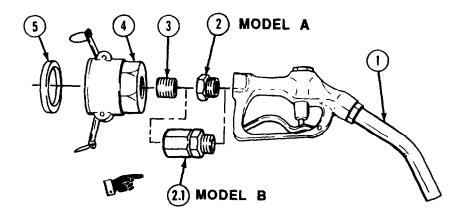
General Safety Instructions

None

a. Removal

NOTE

- There are two types of fuel nozzle assemblies. Model B does not have a bushing.
- Perform steps (1) and (2) for Model A. Perform steps (3) and (4) for Model B.



- (1) Remove fuel nozzle assembly (1) from bushing (2).
- (2) Remove bushing (2), pipe nipple (3), coupling (4), and gasket (5).
- (3) Remove fuel nozzle assembly (1) from swivel (2.1).
- (4) Remove swivel (2.1), pipe nipple (3), coupling (4), and gasket (5).

b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

Perform steps (1) through (3) for Model A. Perform steps (4) through (6) for Model B.

- (1) Apply pipe thread sealing compound to threads of pipe nipple (3) and bushing (2).
- (2) Install bushing (21, pipe nipple (3), coupling (4), and gasket (5).
- (3) Install fuel nozzle assembly (1) on bushing (2).
- (4) Apply pipe thread sealing compound to threads of pipe nipple (3).
- (5) Install swivel (2.1), pipe nipple (3), coupling (4), and gasket (5).
- (6) Install fuel nozzle assembly (1) on swivel (2.1).

c. Follow-on Maintenance.

- (1) Install nozzle on transfer hose (TM 9-2320-279-10).
- (2) Check operation of nozzle (TM 9-2320-279-10).

18-15. FUEL TRANSFER HOSE REMOVAL/INSTALLATION (M978).

This task covers:

b. Installation

a. Removal

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Pump module rear access

doors open.

Special Environmental Conditions

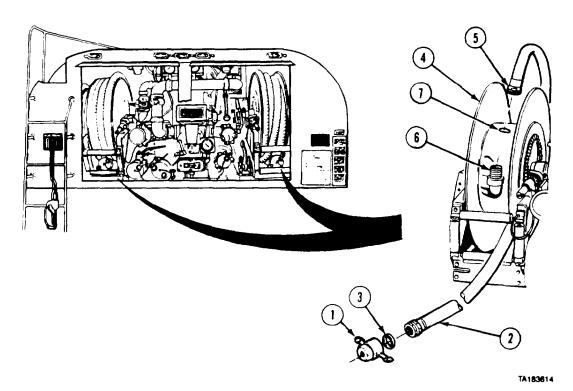
None

General Safety instructions

No smoking, flame. sparks. and hot or glowing objects within 50 ft (15 m) of fuel hose reel.

18-15. FUEL TRANSFER HOSE REMOVAL/INSTALLATION (M978) (CONT).

a. Removal.



NOTE

Both fuel transfer hoses are removed and installed the same way.

- (1) Remove cap (1) from hose (2).
- (2) Remove gasket (3) from cap (1).
- (3) Unwind hose (2) from fuel hose reel (4) and drain hose.
- (4) Using chain wrench. unscrew hose fitting (5) from nipple (6).
- (5) Remove gasket (7) from hose fitting (5).

b. Installation.

- (1) Install gasket (7) in hose fitting (5).
- (2) Using chain wrench, install hose fitting (5) on nipple (6).
- (3) Rewind hose (2) on fuel hose reel (4).
- (4) Install gasket (3) in cap (1).
- (5) Install cap (1) on hose (2).
- c. Follow-on Maintenance. Close pump module rear access doors (TM 9-2320-279-10).

8-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/REPAIR/INSTALLATION (M978)

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Solvent, drycleaning, Item 47, Appendix C

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 HA. HAND ACTUATED

CONTROL VALVE hose

unwound from reel.

TM 9-2320-279-10 Air system drained.

TM 9-2320-279-10 Pump module rear access

doors opened.

Para 16-48 Left side access panel

removed.

 $Special\ Environmental\ Conditions$

None

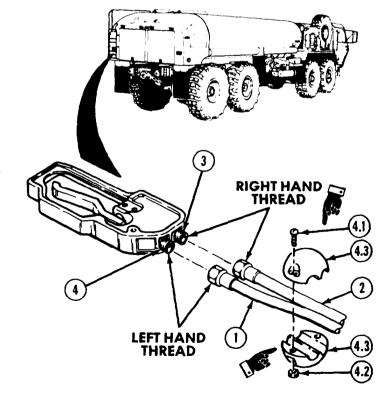
General Safety Instructions

No smoking, flames, sparks, hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal

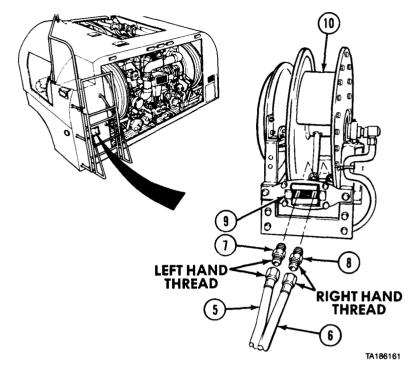
NOTE

- Tag and mark hoses and fittings before removal.
- Trucks with ball stop, perform steps (1) and (1.1). Trucks without ball stop, perform step (1).
- (1) Disconnect two hoses (1 and 2) from two coupling fittings (3 and 4).
- (1.1) Remove two screws (4.1), nuts (4.2), and ball stop (4.3).



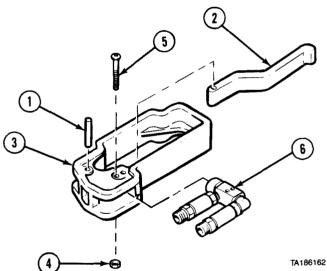
18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/REPAIR/INSTALLATION (M978) (CONT).

- (2) Disconnect two airhoses (5 and 6) from coupling fittings (7 and 8).
- (3) Remove airhoses (5 and 6) from roller guide (9).
- (4) Remove coupling fittings (7 and 8) from air hose reel (10).

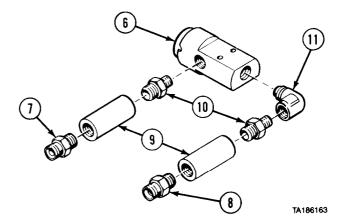


b. Disassembly.

- (1) Remove pin (1) and lever (2) from handle (3).
- (2) Remove two locknuts (4), screws (5), and air valve (6).



(3) Remove two coupling fittings (7 and 8), sleeves (9), adapters (10), and elbow (11) from air valve (6).



c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(1) Clean all metal parts with dry cleaning solvent.

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, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
- (4) Inspect springs for cracks and distortion.
- (5) Replace damaged parts.

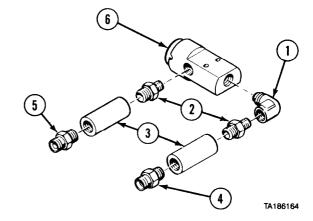
d. Assembly.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

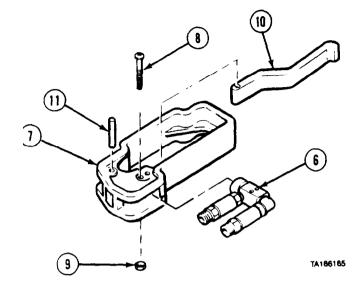
Apply pipe thread sealing compound to all connections.



(1) Install elbow (1), two adapters (2), sleeves (3), and coupling fittings (4 and 5) in air valve (6).

18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/REPAIR/INSTALLATION (M978) (CONT).

- (2) Install air valve (6) in handle (7) with two screws (8) and locknuts (9).
- (3) Install lever (10) in handle (7) with pin (11).



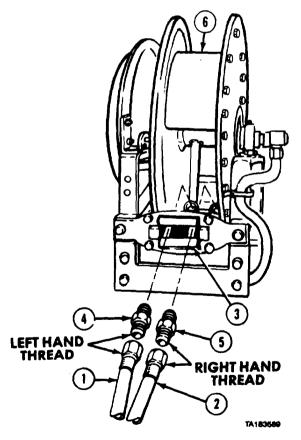
e. Installation.

(1) Insert airhoses (1 and 2) through roller guide (3).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. 'lb avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive. solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (2) Apply pipe thread sealing compound to threads of coupling fittings (4 and 5) and install in air hose reel (6).
- (3) Connect airhoses (1 and 2) to air hose reel (6).



(10)

LEFT HAND

THREAD

g)

RIGHT HAND

THREAD

18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/INSTALLATION (CONT).

NOTE

Trucks with ball stop, perform steps (3.1) and (4). Trucks without ball stop perform step (4).

- (3.1) Install ball stop (6.1) approximately 2.5 inches (6.35 cm) from hose end with two screws (6.2) and nuts (6.3).
- (4) Connect air hoses (7 and 8) to coupling fittings (9 and 10).

f. Follow-on Maintenance.

- (1) Start engine and build up air pressure (TM 9-2320-279-10).
- (2) Check control valve assembly for leaks.
- (3) Check operation of HAV HAND ACTUATED CONTROL VALVE (TM 9-2320-279-10).
- (4) Check HAV HAND ACTUATED CONTROL VALVE air hose for leaks.
- (5) Rewind HAV HAND ACTUATED CONTROL VALVE air hose on air hose reel (TM 9-2320-279-10).
- (6) Install pump module left side access panel (para 16-48).
- (7) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK

Section V. HEATER AND DEFROSTER

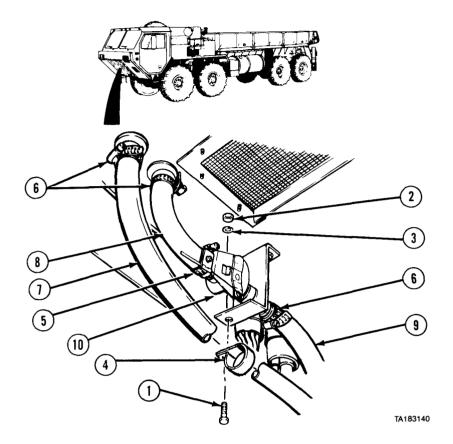
18-17. HEATER HOSE REMOVAL/INSTALLATION.						
This task covers:						
a. Removal	c. Follow-on Maintenance					
b. Installation						
INITIAL SETUP						
Models	References					
All	None					
Test Equipment	Equipment Condition					
None	TM or Para Condition Description TM 9-2320-279-10 Shut off engine.					
Special Tools	Para 6-2 Cooling system drained.					
None	3 1					
Supplies	Special Environmental Conditions					
Tags, identification, Item 48, Appendix C	None					
Ties, cable, plastic, Item 52, Appendix C						
Personnel Required	General Safety Instructions					
MOS 63S, Heavy wheel vehicle mechanic	None					

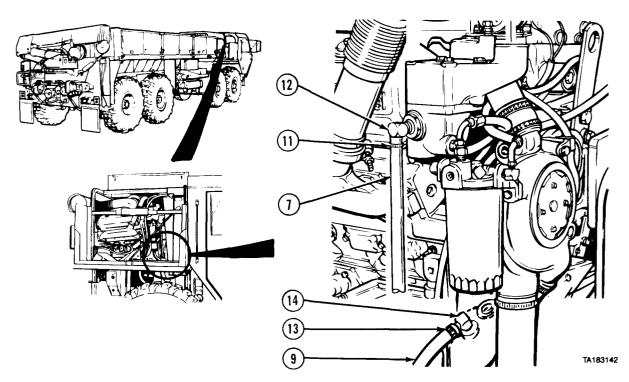
18-17. HEATER HOSE REMOVAL/INSTALLATION (CONT).

a. Removal.

NOTE

- Tag, mark, and note routing of hoses before removal.
- Cut plastic cable ties as necessary.
 - (1) Remove screw (1), nut (2), and lockwasher (3) from clamp (4).
 - (2) Loosen hose clamp (5) and three hose clamps (6).
 - (3) Remove return hose (7) and elbow hose (8).
 - (4) Remove feed hose (9) from valve (10).
 - (5) Remove hose clamps (5 and 6) from hoses (7, 8, and 9).





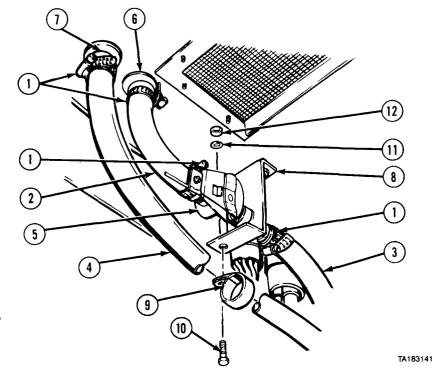
- (6) Loosen hose clamp (11). Remove return hose (7) from elbow (12) and remove hose clamp.
- (7) Loosen hose clamp (13). Remove feed hose (9) from elbow (14).
- (8) Remove hoses (7 and 9).

b. Installation.

NOTE

Heater hoses should be routed as noted in removal.

- (1) Install hose clamps (1) on hoses (2, 3, and 4).
- (2) Install elbow hose (2) on valve (5) and heater inlet tube (6). Tighten clamps (1) on elbow hose.
- (3) Install one end of feed hose (3) to valve (5) and tighten clamp (1) on feed hose.
- (4) Install return hose (4) to heater return tube (7) and tighten clamp (1) on return hose.
- (5) Install hose (4) to bracket (8) with clamp (9), screw (10), lockwasher (11), and nut (12).



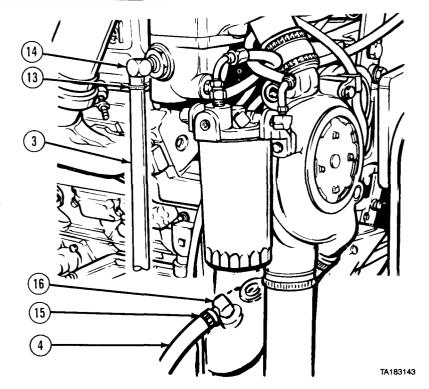
18-17. HEATER HOSE REMOVAL/INSTALLATION (CONT).

- (6) Install end of feed hose (3) and clamp (13) to elbow (14). Tighten clamp.
- (7) Install end of return hose (4) and clamp (15) to elbow (16). Tighten clamp.
- (8) Install plastic cable ties to support feed hose (3) and return hose (4).

c. Follow-on Maintenance.

- (1) Fill cooling system (para 6-2).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of heater.
- (4) Check heater hoses for leaks.
- (5) Shut off engine (TM 9-2320-279-10).

END OF TASK



18-18. HEATER CONTROL VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

None

Equipment Condition

Condition Description

TM or Para

TM 9-2320-279-10 Shut off engine.

Para 6-2

Para 16-11

Cooling system drained. Heater compartment cover

removed.

Special Environmental Conditions

None

General Safety Instructions

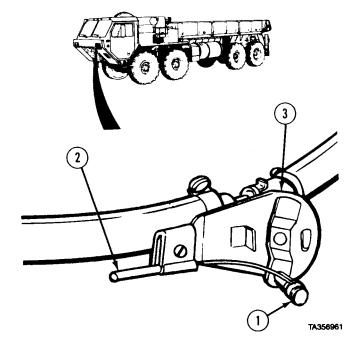
None

a. Removal.

NOTE

Step (1) will be done behind grille.

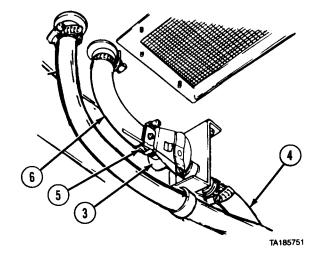
(1) Remove looped end (1) of control cable (2) from control valve (3).



NOTE

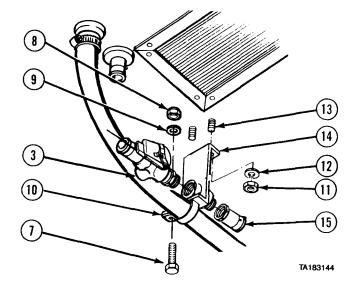
Tag and mark hoses before removal.

- (2) Remove feeder hose (4) from control valve (3).
- (3) Loosen clamp (5) and remove elbow hose (6) from control valve (3).



18-18. HEATER CONTROL VALVE REMOVAL/INSTALLATION (CONT).

- (4) Remove screw (7), nut (8), and lockwasher (9) from clamp (10).
- (5) Soldier A removes two nuts (11) and lockwashers (12) while Soldier B holds screws (13) inside heater compartment.
- (6) Remove control valve (3) and bracket assembly (14).
- (7) Remove control valve (3) from bracket assembly (14).
- (8) Remove fitting (15) from bracket assembly (14).

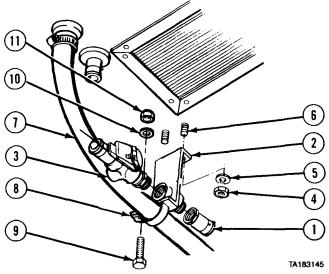


b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

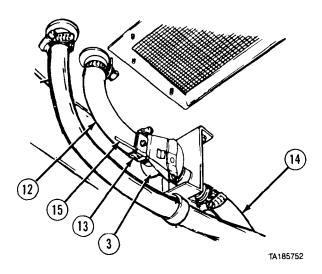
- (1) Coat threads of fitting (1) with pipe thread sealing compound and install fitting on bracket assembly (2).
- (2) Coat threads of control valve (3) with pipe thread sealing compound and install control valve on bracket assembly (2).
- (3) Soldier A installs control valve (3) and bracket assembly (2) with two nuts (4) and lockwashers (5) while Soldier B holds screws (6) inside heater compartment.
- (4) Install hose (7) to bracket assembly (2) with clamp (8), screw (9), lockwasher (10), and nut (11).



- (5) Install elbow hose (12) to control valve (3) and tighten clamp (13).
- (6) Connect feeder hose (14) to control valve (3).
- (7) Connect control cable (15) to control valve (3).

c. Follow-on Maintenance.

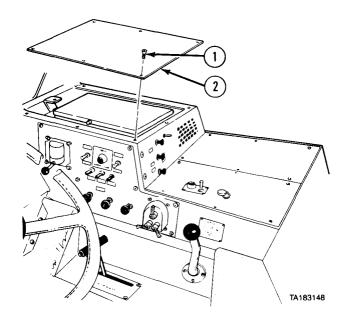
- (1) Fill cooling system (para 6-2).
- (2) Install heater compartment cover (para 16-11).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check for warm air out of heater.
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).



18-19. HEATER RESISTOR REMOVAL/INSTALLATION.						
This task covers:						
a. Removal b. Installation	c. Follow-on Maintenance					
INITIAL SETUP						
Models	References					
All	None					
Test Equipment	$Equipment\ Condition$					
None	TM or Para	$Condition\ Description$				
Special Tools	Para 7-91	Batteries disconnected.				
None	$Special\ Environmental\ Conditions$					
Supplies	None					
None	General Safety Instructions					
Personnel Required	None					
MOS 63S, Heavy wheel vehicle mechanic						

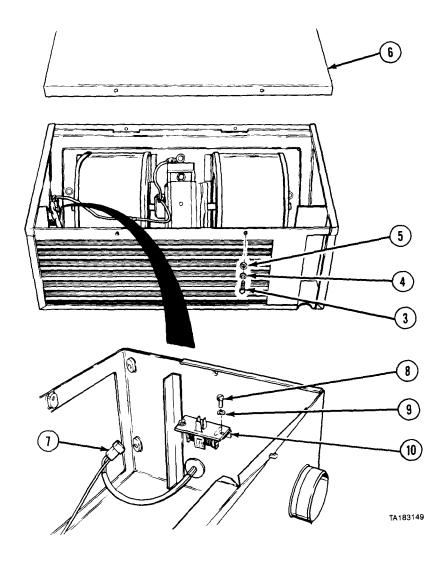
18-19. HEATER RESISTOR REMOVAL/INSTALLATION (CONT).

a. Removal.



(1) Remove eight screws (1) and heater compartment cover (2).

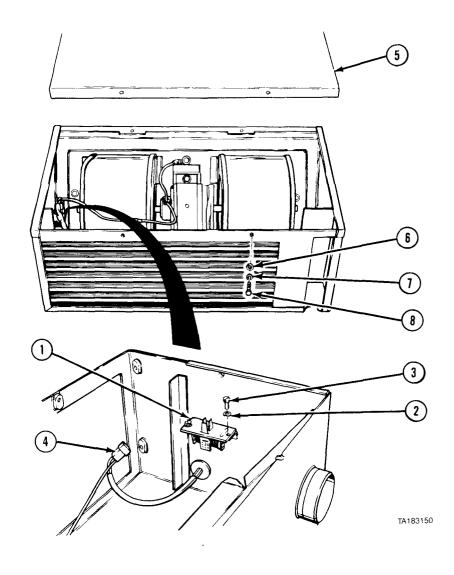
Body Accessory Maintenance Instructions (Cont)



- (2) Remove six screws (3), lockwashers (4), and washers (5). Remove top heater cover (6).
- (3) Disconnect wire connector (7).
 (4) Remove two screws (8) and washers (9).
 (5) Remove heater resistor (10).

18-19. HEATER RESISTOR REMOVAL/INSTALLATION (CONT).

b. Installation.



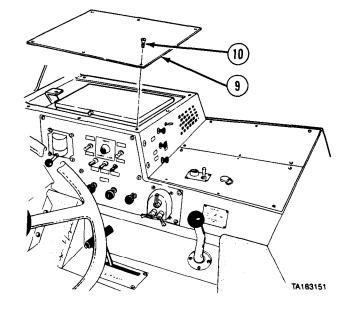
- (1) Install heater resistor (1) with two washers (2) and screws (3).
- (2) Install wire connector (4).
- (3) Install top heater cover (5) with six washers (6), lockwashers (7), and screws (8).

(4) Install heater compartment cover (9) with eight screws (10).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Check operation of heater (TM 9-2320-279-10).

END OF TASK



18-20.	HEATER	MOTOR	AND	COIL	REMO'	VAL	/INSTALLATION.	

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models References
All None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Tools
None Para 7-91 Batteries disconnected.
Para 6-2 Cooling system drained.

Supplies Special Environmental Conditions

Tags, identification, Item 48, Appendix C None

Personnel Required General Safety Instructions

MOS 63S, Heavy wheel vehicle mechanic None

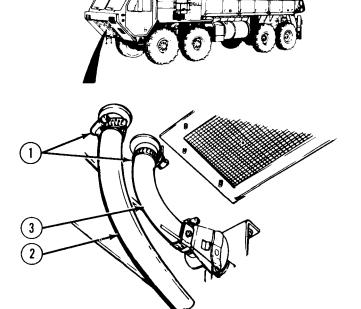
18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).

a. Removal.

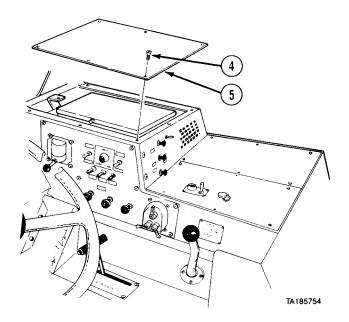
NOTE

Tag and mark wires and hoses before removal.

- (1) Loosen hose clamps (1).
- (2) Remove return hose (2) and elbow hose (3).

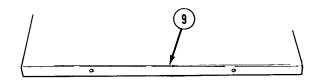


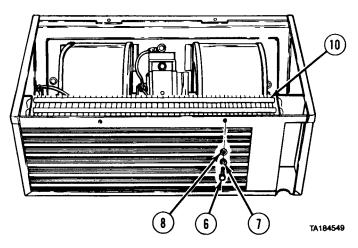
(3) Remove eight screws (4) and heater compartment cover (5).



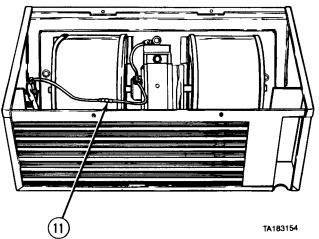
TA185749

- (4) Remove six screws (6), lockwashers (7), and washers (8). Remove heater cover (9).
- (5) Lift heater coil (10) out of heater housing.



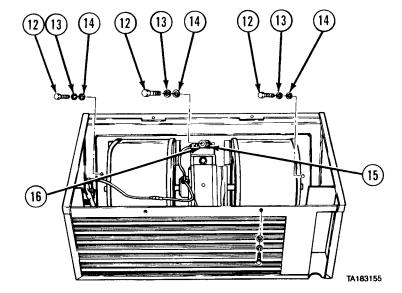


(6) Disconnect motor lead wire (11).

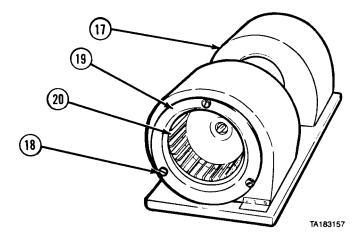


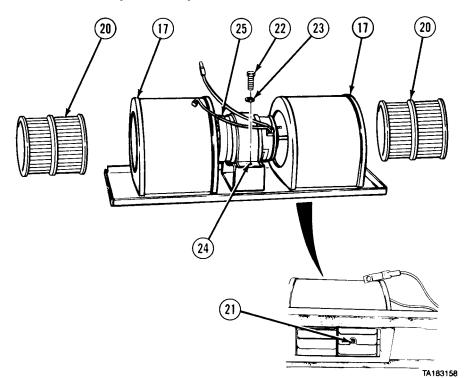
18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).

(7) Remove three screws (12), lockwashers (13), and washers (14). Lockwashers (15) and ground wire (16) will come free.



- (8) Lift out blower assembly housing (17) from heater housing.
- (9) Remove six screws (18) and two foils (19) from blower assembly housing (17).
- (10) Matchmark location of blower wheels (20).





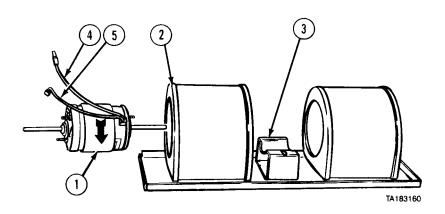
- (11) Loosen two screws (21).
- (12) Remove blower wheels (20) from blower assembly housing (17).

NOTE

Note direction of rotation arrow on motor.

(13) Remove screw (22), washer (23), and motor strap (24). Remove motor (25) through blower assembly housing (17).

b. Installation.

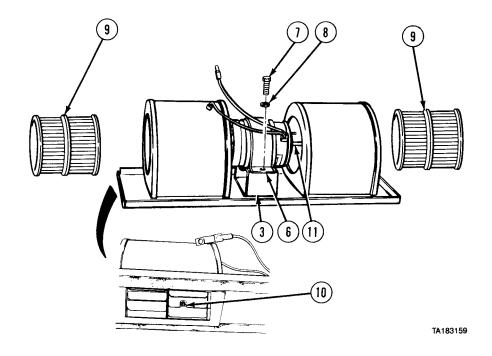


NOTE

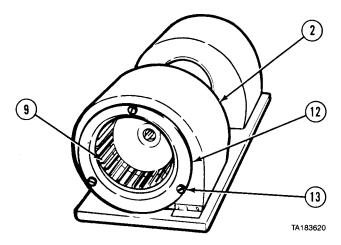
Note direction of rotation arrow on motor.

(1) Install motor (1) through blower assembly housing (2). Seat motor in mount (3) with ground wire (4) and motor lead wire (5) on top.

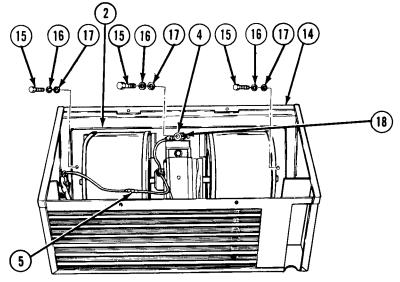
18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).



- (2) Hook motor strap (6) into notch in mount (3) and install screw (7) and washer (8). Tighten only enough to hold parts together.
- (3) Install blower wheels (9). Tighten two screws (10) to lock blower wheels on motor shaft (11).
- (4) Spin blower wheels (9) to be sure wheels turn freely.
- (5) Tighten screw (7).
- (6) Install two foils (12) on blower assembly housing (2) with six screws (13). Spin blower wheels (9) to make sure they turn freely.

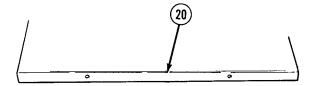


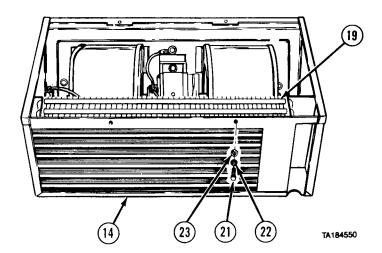
- (7) Install blower assembly housing (2) in heater housing (14) with three screws (15), lockwashers (16), and washers (17). Install lockwasher (18) and ground wire (4) with middle screw.
- (8) Connect motor lead wire (5).



TA183156

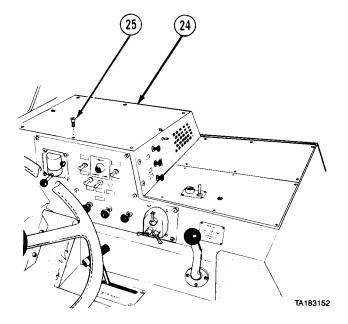
- (9) Lower heater coil (19) straight down into heater housing (14).
- (10) Install heater cover (20) with six screws (21), lockwashers (22), and washers (23).





18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).

(11) Install heater compartment cover (24) with eight screws (25).

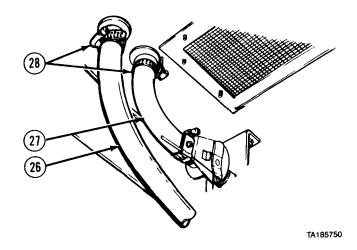


- (12) Install return hose (26) and elbow hose (27).
- (13) Tighten hose clamps (28).

c. Follow-on Maintenance.

- (1) Fill cooling system (para 6-2).(2) Check for leaks.
- (3) Connect batteries (para 7-91).
- (4) Check operation of heater (TM 9-2320-279-10).

END OF TASK



18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

 $\mathit{Test}\ \mathit{Equipment}$

None

Special Tools

None

Supplies

Ties, cable, plastic, Item 52, Appendix C

 $Personnel\ Required$

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

Para 6-2 Cooling system drained. Para 7-91 Batteries disconnected.

Special Environmental Conditions

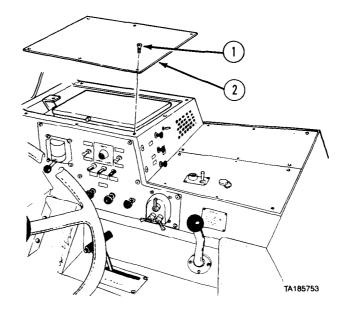
None

General Safety Instructions

None

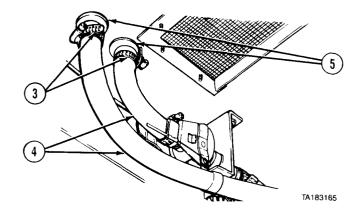
a. Removal.

(1) Remove eight screws (1) and heater cover (2).



18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION (CONT).

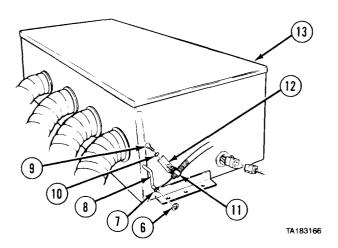
- (2) Loosen clamps (3).
- (3) Disconnect heater hoses (4) from flanges (5).



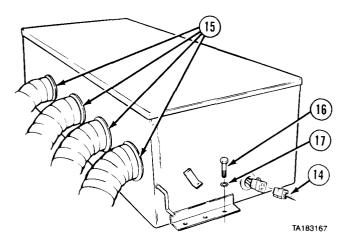
NOTE

Steps (4) through (8) will be done from left side of heater.

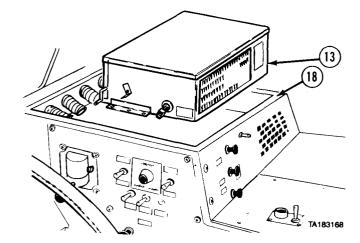
- (4) Remove retainer (6) and pull looped end of defrost control cable (7) off defroster control arm (8).
- (5) Remove screw (9) and lockwasher (10). Remove clamp (11) from anchor bracket (12) on heater case (13).



- (6) Disconnect electrical connector (14).
- (7) Disconnect four heater ducts (15).
- (8) Remove six screws (16) and lockwashers (17).

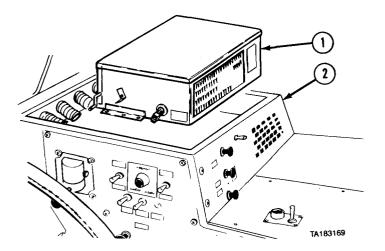


(9) Remove heater case (13) from heater compartment (18).

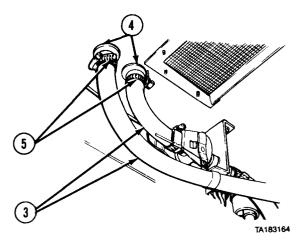


b. Installation.

(1) Position heater case (1) in heater compartment (2).

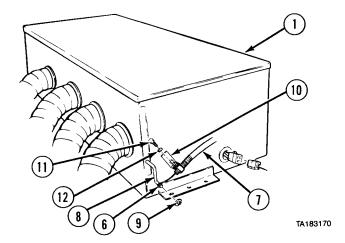


(2) Install heater hoses (3) on flanges (4) with clamps (5).



18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION (CONT).

(3) Connect looped end (6) of defrost control cable (7) to defroster control arm (8) and install retainer (9). Anchor defrost control cable to side of heater case (1) with clamp (10), screw (11), and lockwasher (12).

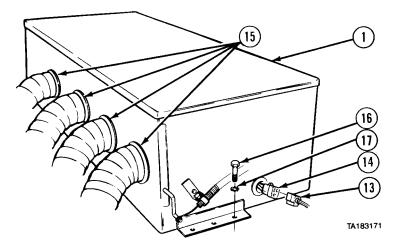


- (4) Connect electrical connector (13) in plug (14).
- (5) Connect four heater ducts (15).

NOTE

Plastic cable ties are installed as needed.

(6) Install six screws (16) and lockwashers (17) to attach heater case (1) to heater compartment.

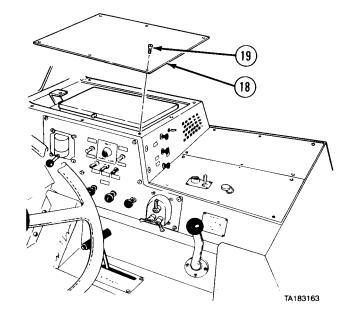


(7) Install heater compartment cover (18) and eight screws (19).

c. Follow-on Maintenance.

- (1) Fill cooling system (para 6-2).
- (2) Connect batteries (para 7-91).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check operation of heater (TM 9-2320-279-10).
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).

END OF TASK



18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Adhesive-sealant, silicone, Item 4, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

None

Equipment Condition

TM or Para

 $Condition\ Description$

Para 7-91

Batteries disconnected.

Para 18-21

Heater assembly removed.

 $Special\ Environmental\ Conditions$

None

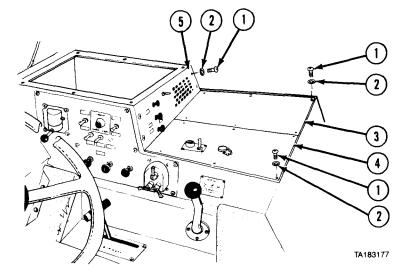
General Safety Instructions

None

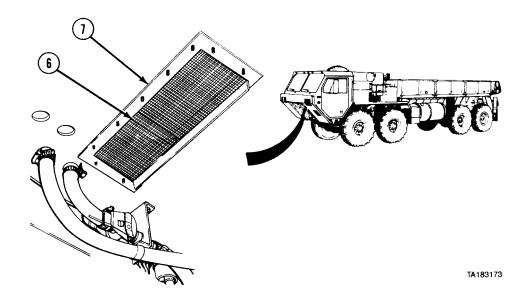
a. Removal.

(1) Remove 15 screws (1) and lockwashers (2).

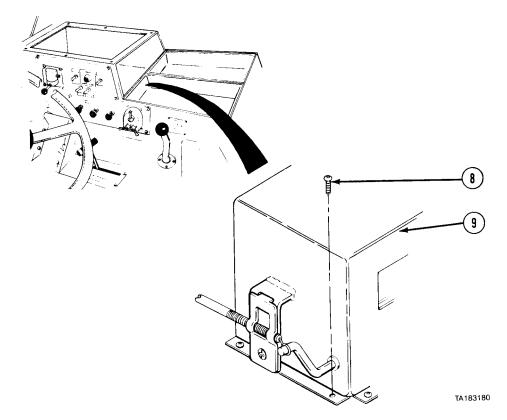
(2) Remove panels (3, 4, and 5).



18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION (CONT).

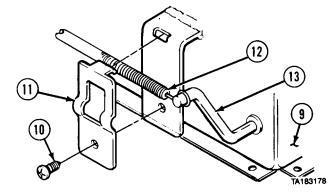


(3) Soldier A holds and removes screen (6) and bracket (7) while Soldier B does step (4).

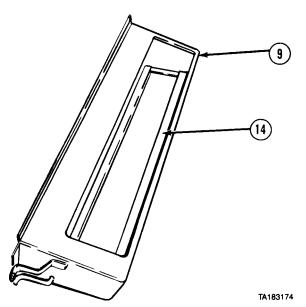


(4) Remove 14 screws (8) from cab air vent box (9).

- (5) Remove screw (10) and cable bracket (11).
- (6) Remove cable end (12) from lever (13).
- (7) Remove cab air vent box (9).



(8) Remove two-piece seal (14) from cab air vent box (9).

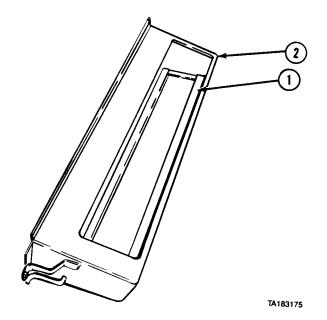


b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(1) Install two-piece seal (1) in cab air vent box (2) using silicone sealant.

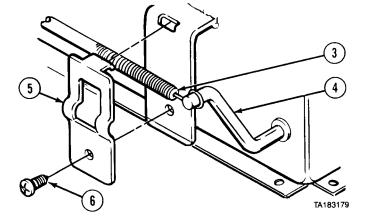


18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION (CONT).

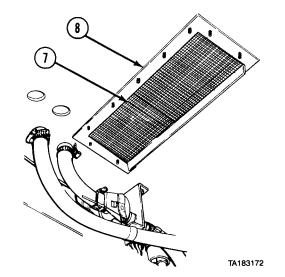
NOTE

Door will be in closed position for proper adjustment.

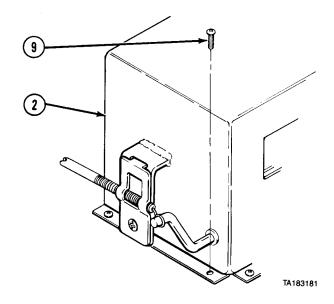
- (2) Install cable end (3) on lever (4).
- (3) Install cable bracket (5) with screw (6).



(4) Soldier A holds screen (7) and bracket (8) while Soldier B does step (5).



(5) Install cab air vent box (2) with 14 screws (9).

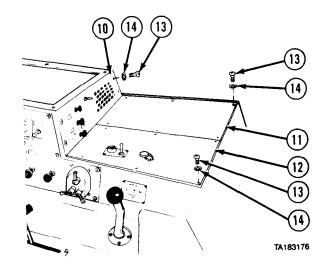


(6) Install panels (10, 11, and 12) with 15 screws (13) and lockwashers (14).

c. Follow-on Maintenance.

- (1) Install heater assembly (para 18-21).
- (2) Connect batteries (para 7-91).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check operation of heater (TM 9-2320-279-10).
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).

END OF TASK



18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Ties, cable, plastic, Item 52, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Para 7-91

Condition Description Batteries disconnected.

 $Special\ Environmental\ Conditions$

None

General Safety Instructions

None

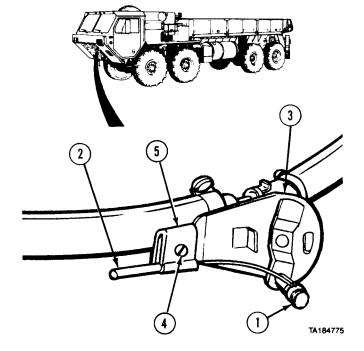
18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).

a. Removal.

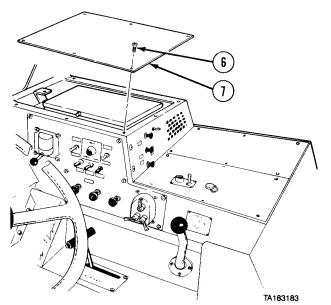
NOTE

Step (1) will be done behind grille.

- (1) Remove looped end (1) of control cable (2) from heater control valve (3).
- (2) Loosen screw (4) to loosen retainer (5) and free control cable (2).
- (3) Pull control cable (2) from retainer (5).



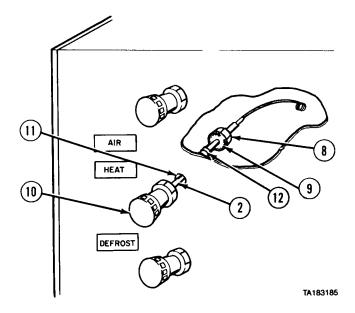
(4) Remove eight screws (6) and heater compartment cover (7).



NOTE

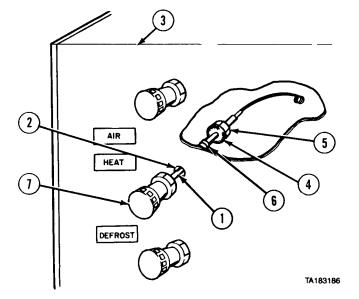
Cut plastic cable ties as required.

- (5) Remove jamnut (8) and lockwasher (9) from threads on control cable (2).
- (6) Remove control cable (2), lockwasher (9), and jamnut (8) by pulling control knob (10) from mounting hole (11) and grommet (12).



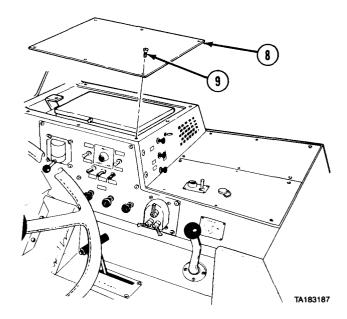
b. Installation.

- (1) Install control cable (1) through mounting hole (2) in heater compartment (3).
- (2) Install lockwasher (4) and jamnut (5) on control cable (1) in heater compartment (3).
- (3) Install control cable (1) through
- grommet (6) in heater compartment (3). (4) Tighten jamnut (5) and lockwasher (4) to install control knob (7) in heater compartment (3) mounting hole (2).



18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).

(5) Install heater compartment cover (8) with eight screws (9).



NOTE

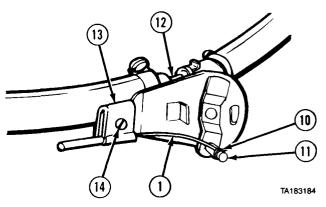
Replace plastic cable ties as required.

- (6) Install looped end (10) of control cable (1) on shaft (11) of heater control valve (12).
- (7) Place control cable (1) in retainer (13) and tighten screw (14).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of heater control (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).

END OF TASK



18-24. DEFROSTER CONTROL CABLE REMOVAL/INSTALLATION.

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

 $Condition\ Description$

Para 7-91

Batteries disconnected.

 $Special\ Environmental\ Conditions$

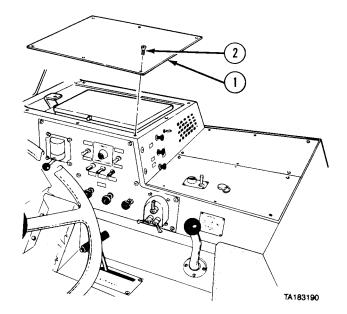
None

General Safety Instructions

None

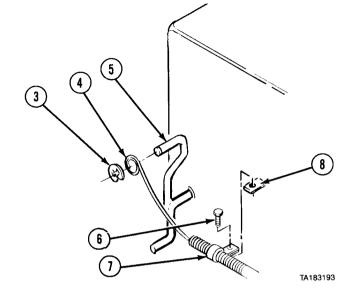
a. Removal.

(1) Remove eight screws (1) and heater compartment cover (2).

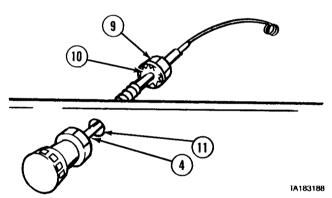


18-24. DEFROSTER CONTROL CABLE REMOVAL/INSTALLATION (CONT).

- (2) Remove retainer (3) and pull looped end of defroster control cable (4) off defroster control arm (5).
- (3) Remove screw (6) and clamp (7) from anchor bracket (8).
- (4) Remove clamp (7) from defroster control cable (4).

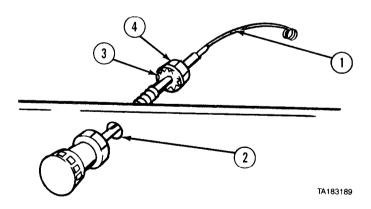


- (5) Remove jamnut (9) and lockwasher (10).
- (6) Remove defroster control cable (4) from mounting hole (11).

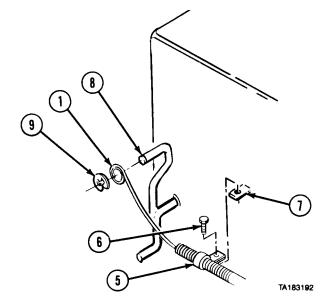


b. Installation.

- (1) Install looped end of defroster control cable (1) through mounting hole (2).
- (2) Install lockwasher (3) and jamnut (4) on defroster control cable (1).



- (3) Install clamp (5) with screw (6) on anchor bracket (7).
- (4) Install looped end of defroster control cable (1) on defroster control arm (8).
- (5) Install retainer (9) on defroster control arm (8).

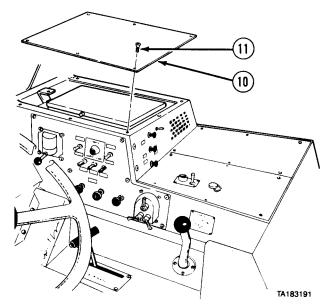


(6) Install heater compartment cover (10) with eight screws (11).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of defroster control (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).

END OF TASK



18-25. AIR CONTROL KNOB AND CABLE ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

 $Equipment\ Condition$

TM or Para Condition Description
Para 7-91 Batteries disconnected.

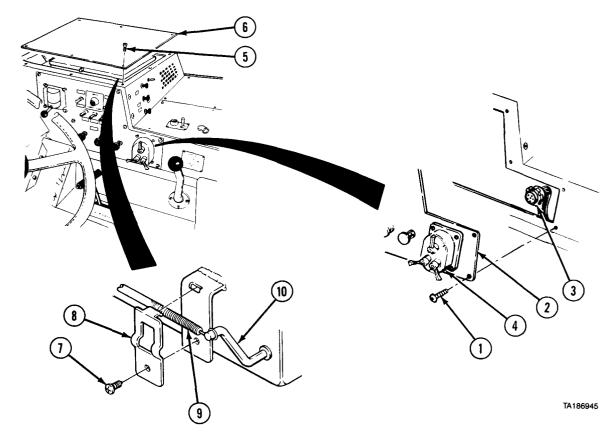
Special Environmental Conditions

None

General Safety Instructions

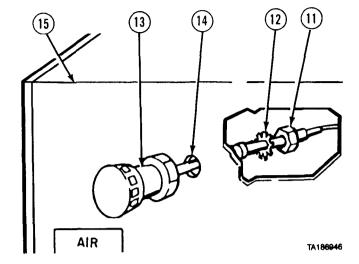
None

a. Removal.



- (1) Remove eight screws (1) and panel (2).
- (2) Disconnect plug (3) from main switch (4).
- (3) Remove eight screws (5) and heater compartment cover (6).
- (4) Remove screw (7) and clip (8) to free air control cable (9).
- (5) Remove looped end of air control cable (9) from control lever (10).

- (6) Remove jamnut (11) and lockwasher (12) from air control knob and cable assembly (13).
- (7) Remove air control knob and cable assembly (13) from mounting hole (14) in panel (15).

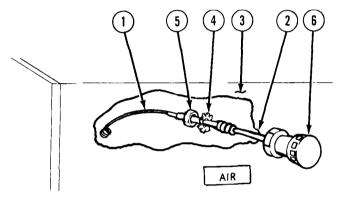


b. Installation.

NOTE

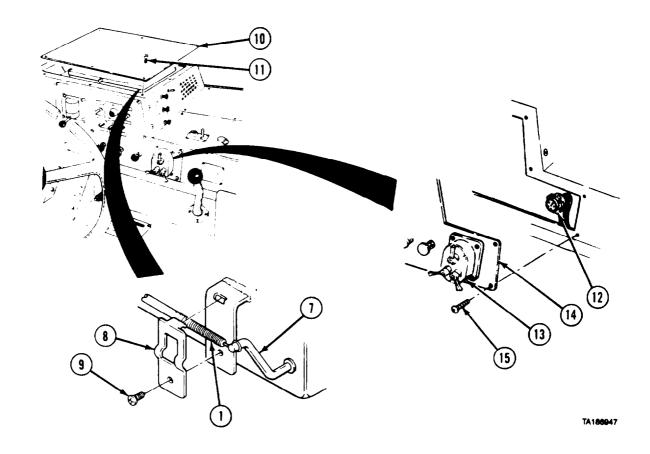
Close air intake manually.

- (1) Install looped end of air control cable (1) through mounting hole (2) in panel (3).
- (2) Slide lockwasher (4) and jamnut (5) on air control cable (1). Thread jamnut (5) on air control knob (6).
- (3) Tighten nut (5) to lock air control knob (6) on panel (3).



TA183197

18-25. AIR CONTROL KNOB AND CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).



- (4) Install looped end of air control cable (1) on control lever (7).
- (5) Place clip (8) over air control cable (1) and install screw (9).
- (6) Install heater compartment cover (10) with eight screws (11).
- (7) Connect plug (12) to main switch (13).
- (8) Install panel (14) with eight screws (15).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Check operation of air control (TM 9-2320-279-10).

END OF TASK

18-26. DEFROSTER HOSES REMOVAL/INSTALLATION.

This task covers:

a. Removal

c. Follow-on Maintenance

INITIAL SETUP

b. Installation

Models All

References None

Test Equipment

None

Equipment Condition TM or Para

Special Tools

None

Condition Description Batteries disconnected.

Special Environmental Conditions None

Para 7-91

Supplies

General Safety Instructions

Ties, cable, plastic, Item 52, Appendix C Adhesive, Item 3.2, Appendix C

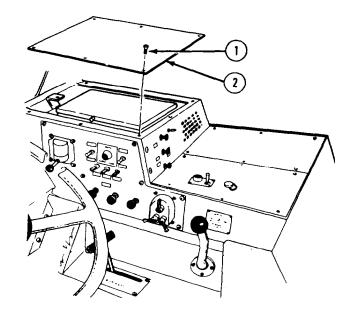
None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

Removal a.

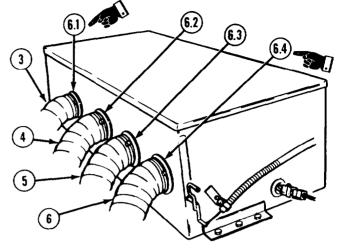
Remove eight screws (1) and heater compartment cover (2).



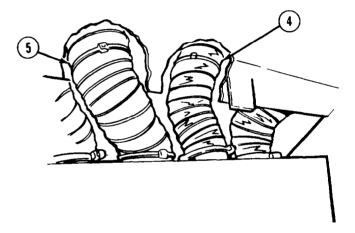
NOTE

Cut plastic cable ties as needed.

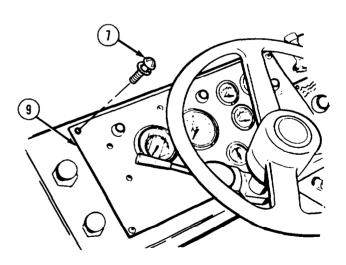
(2) Disconnect four hoses (3, 4, 5, and 6) from heater flanges (6.1, 6.2, 6.3, and 6.4).



(3) Remove two hoses (4 and 5).

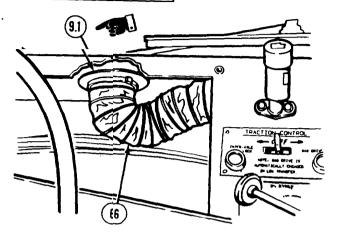


(4) Remove six screws (7) from instrument panel (9). Move instrument panel aside.

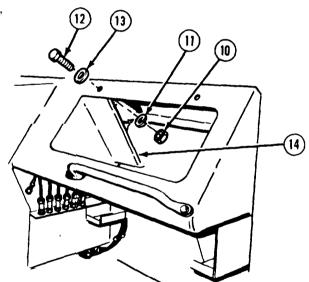


18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT).

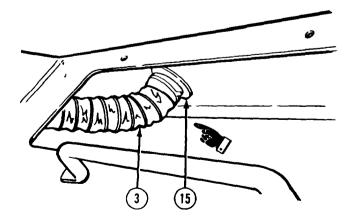
(5) Remove defroster hose (6) from flange (9.1).



(6) Remove nut (10), lockwasher (11), screw (12), washer (13), and defroster hose guard (14).



(7) Remove defroster hose (3) from flange (15).



b. Installation.

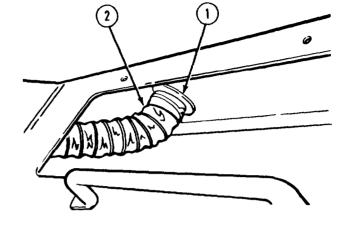
WARNING

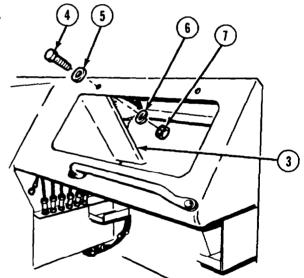
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open tire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

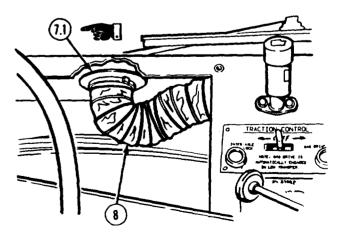
Coat flanges with light coat of adhesive and fasten hoses with plastic cable ties as needed.

- (1) Coat lip of flange (1) with adhesive and install defroster hose (2) on flange.
- (2) Install defroster hose guard (3) with screw (4, washer (5), lockwasher (6), and nut (7).





(3) Coat lip of flange (7.1) with adhesive and install defroster hose (8) on flange.

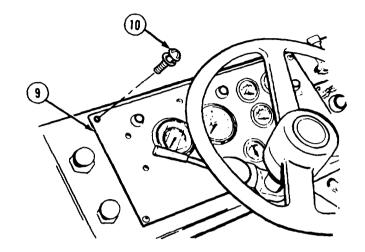


18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT)

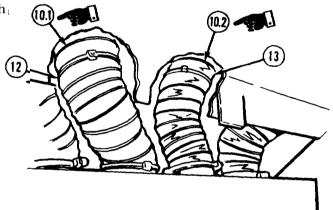
(4) Install instrument panel (9) with six screws (10).

WARNING

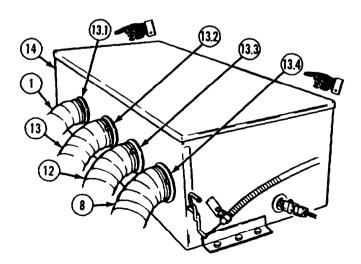
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



(5) Coat lips of two flanges (10.1 and 10.2) with adhesive and install two hoses (12 and 13).



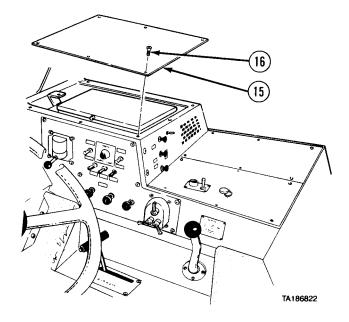
(6) Coat lips of four heater flanges (13.1, 13.2, 13.3, and 13.4) with adhesive and install four hoses (1, 8, 12, and 13) on flanges.



18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT).

- (7) Install heater compartment cover (15) with eight screws (16).
- **c. Follow-on Maintenance.** Connect batteries (para 7-91).

END OF TASK



CHAPTER 19 HYDRAULIC SYSTEMS MAINTENANCE

Contents	Para	Page
General	19-1	19-1
Hydraulic Hand Pump Removal/Installation (M983)	19-2	19-2
Self-Recovery Winch Control Lever Removal/Installation		19-5
	19-4	19-7
	19-5	19-10.1
	19-6	19-12
	19-7	19-14
Control Valve Bracket Removal/Installation	19-8	19-19
Winch and Auxiliary Hydraulic Relief Valves Removal/Installation (M983, M984)	19-9	19-20
Winch and Auxiliary Hydraulic Relief Valve Bracket Removal/Installation		
(M983,M984)	19-10	19-25
Heavy-Duty Selector Valve and Mounting Bracket Removal/Installation (M984)		19-26
Primary Pump Hydraulic Motor Control Valve, Bracket, and Cable Bracket		
	19-12	19-30
	19-12.1	19-34
	19-12.2	19-36
Selector Valve Removal/Installation	19-13	19-39
Selector Valve Removal/Installation (M983)	19-14	19-41
Primary Pump Hydraulic Motor Control Cable and Mount		
Removal/Installation/Adjustment (M978)	19-15	19-46
Hydraulic Lines and Brackets Removal/Installation	19-16	19-49
Crane Hydraulic Fluid Filter Assembly and Mounting Bracket Removal/Repair/		
Installation (M977, M984E1, M985)	19-17	19-74

Section I. INTRODUCTION

19-1. GENERAL. This chapter contains maintenance instructions for removing, replacing, repairing, and installing hydraulic system components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. HYDRAULIC HAND PUMP

Hydraulic System Maintenance Instructions

19-2. HYDRAULIC HAND PUMP REMOVAL/INSTALLATION (M983).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M983

Test Equipment

None

Special Tools

None

Supplies

 $Compound, \ sealing. \ pipe \ thread. \ Item \ 18.$

Appendix C

Tags, identification. Item 48. Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic system drained.

Special Environmental Conditions

None

General Safety Instructions

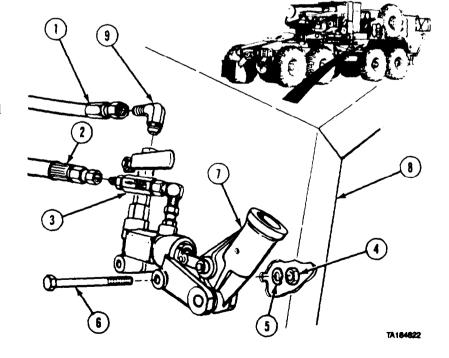
None

a. Removal.

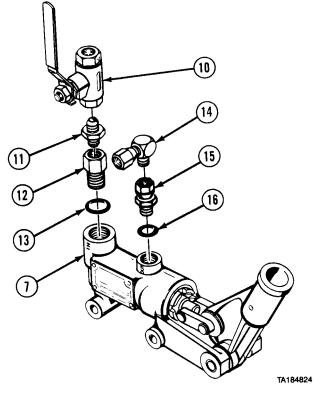
NOTE

Tag and mark hoses before removal.

- (1) Disconnect two hoses (1 and 2).
- (2) Note direction of arrow and remove check valve (3).
- (3) Remove two nuts (4), lockwashers (5), screws (6). and hydraulic hand pump (7) from fender (8).
- (4) Remove elbow (9).



- (5) Remove ball valve (10), nipple (11), adapter (12), and preformed packing (13).
- (6) Remove elbow (14), adapter (15), and preformed packing (16) from hydraulic hand pump (7).

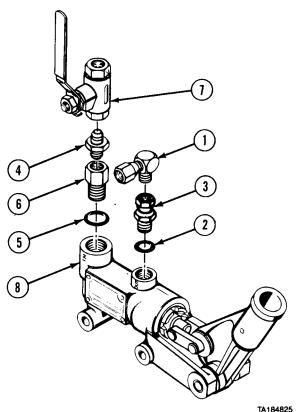


b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Coat threads of elbow (1) with pipe thread sealing compound. Install preformed packing (2), adapter (3), and elbow (1). Do not tighten.
- (2) Coat threads of nipple (4) with pipe thread sealing compound. Install preformed packing (5), adapter (6), nipple (4), and ball valve (7) on hydraulic hand pump (8).



19-2. HYDRAULIC HAND PUMP REMOVAL/INSTALLATION (M983) (CONT).

WARNING

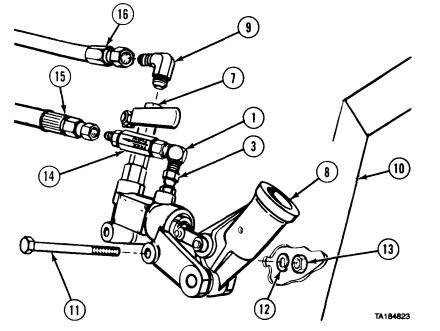
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (3) Coat threads of elbow (9) with pipe thread sealing compound and install in ball valve (7).
- (4) Position hydraulic hand pump (8) on fender (10).
 Install hydraulic hand pump with two screws (11), lockwashers (12), and nuts (13).
- (5) Install check valve (14) and tighten adapter (3) and elbow (1) so that check valve clears ball valve (7).
- (6) Install two hoses (15 and 16).

c. Follow-on Maintenance.

- (1) Fill hydraulic system (LO 9-2320-279-12).
- (2) Check hydraulic hand pump operation (TM 9-2320-279-10).

END OF TASK



Section III. HYDRAULIC CONTROL VALVES

19-3. SELF-RECOVERY WINCH CONTROL LEVER REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All (with self-recovery winch)

Test Equipment

None

Special Tools

None

None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

None

Equipment Condition

TM or Para Con

 $Condition\ Description$

TM 9-2320-279-10 Shut off engine.

Para 14-5 Skid plate grille removed.

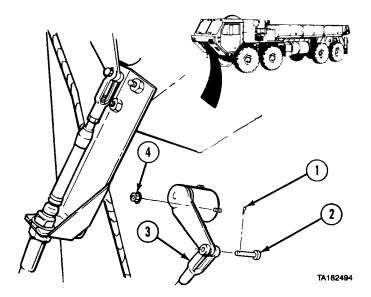
 $Special\ Environmental\ Conditions$

None

General Safety Instructions

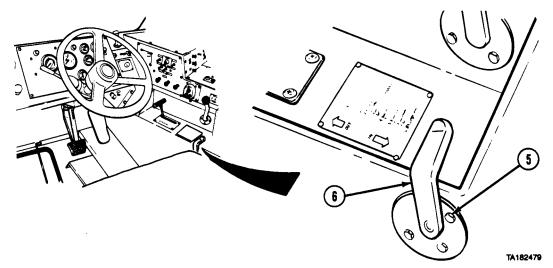
None

a. Removal.



- (1) Remove cotter pin (1) from yoke pin (2).
- (2) Remove yoke pin (2) from yoke (3).
- (3) Soldier A holds assembly in place in cab while Soldier B removes three nuts (4).

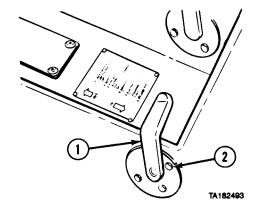
19-3. SELF-RECOVERY WINCH CONTROL LEVER REMOVAL/INSTALLATION (CONT).



- (4) Remove three screws (5).
- (5) Remove shift lever assembly (6) from cab.

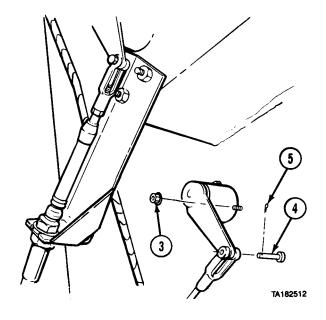
b. Installation.

- (1) Install shift lever assembly (1) through mounting plate and cab wall.
- (2) Install three screws (2) through cab wall.



- (3) Install and tighten three nuts (3).
- (4) Insert yoke pin (4) and cotter pin (5).
- **c. Follow-on Maintenance.** Install skid plate grille (para 14-5).

END OF TASK



19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION.

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Solvent, dry cleaning, Item 47, Appendix C Compound. sealing, pipe thread. Item 18.

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description TM 9-2320-279-10 Shut off engine.

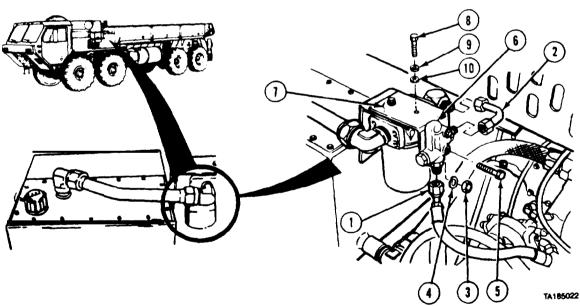
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.



- (1) Disconnect hose (1). (2) Remove tube (2).
- (3) Remove two nuts (3), lockwashers (4), screws (5), and pressure relief valve (6) from bracket (7).
- (4) Remove two Screws (8), lockwashers (9), washers (10), and bracket (7).

19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

b. Disassembly.

NOTE

Heat may be required to remove two plugs,

- (1) Remove two plugs (1) from hydraulic relief valve (2).
- (2) Remove plug (3) and preformed packing (4).
- (3) Remove two adapters (5) and preformed packings (6).

WARNING

Wear safety glasses when removing retaining rings to prevent injury or blindness.

NOTE

M1977-CBT has a different control valve which is removed and installed the same way. Refer to TM 9-2320-279-24P for proper identification of parts.

(4) Hold control valve (7) through port (8) and remove retaining ring (9).

WARNING

Spring is under pressure. Release control valve slowly or personal injury may result from flying parts.

(5) Remove control valve (7) and spring (10) from hydraulic relief valve (2).

c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(1) Clean metal parts in drycleaning solvent.

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, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

d. Assembly.

WARNING

Wear safety glasses when installing retaining rings to prevent injury or blindness.

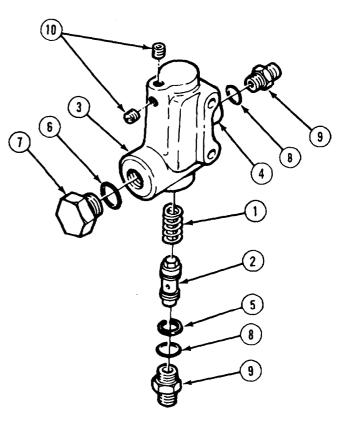
NOTE

M1977-CBT has a different control valve which is removed and installed the same way. Refer to TM 9-2320-279-24P for proper indentification of parts.

- (1) Install spring (1) and control valve (2) in hydraulic relief valve (3).
- (2) Hold control valve (2) through port (4) and install retaining ring (5).
- (3) Install preformed packing (6) and plug (7).
- (4) Install two preformed packings (8) on adapters (9) and install adapters in hydraulic relief valve (3).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



(5) Coat threads of two plugs (10) with pipe thread sealing compound and install in hydraulic relief valve (3).

19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

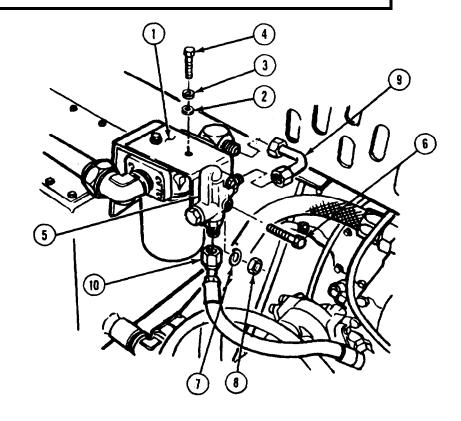
e. Installation.

- (1) Install bracket (1) with two washers (2), lockwashers (3), and screws (4).
- (2) Install relief valve (5) on bracket (1) with two screws (6), lockwashers (7), and nuts (8).
- (3) Install tube (9).
- (4) Connect hose (10).

f. Follow-on Maintenance.

- (1) Start engine TM 9-2320-279-10).
- (2) Check for leaks.
- (3) Shut off engine TM 9-2320-279-10).

END OF TASK



19-5. FLOW PRIORITY VALVE REMOVAL/INSTALLATION (M978, M984, M1977-CBT).

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

None

Models References M978, M984, M1977-CBT None

Test Equipment Equipment Condition

None TM or Para Condition Description

LO 9-2320-279-12 Hydraulic reservoir drained.

Special Tools Para 16-34 Stowage box removed

(M978).

Para 7-91 Batteries disconnected.

Supplies

Tags, identification, Item 48, Appendix C

Special Environmental Conditions

None

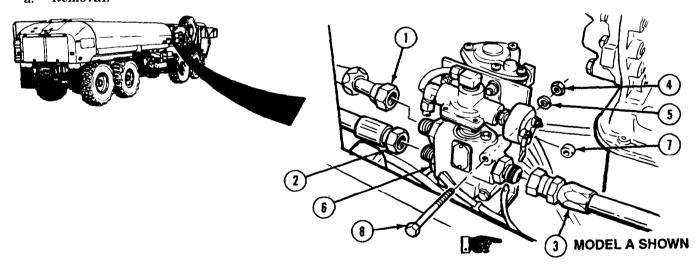
Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

General Safety Instructions

None

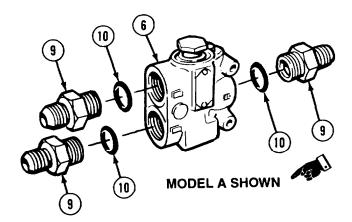
a. Removal.



NOTE

- There are two kinds of valves. Model A uses spacers and 3 in. (76 mm) mounting screws. Model B does not use spacers and has 2 in. (51 mm) mounting screws. Both valves are removed the same way.
- · Spacers are mounted between valve and bracket on Model A only.
- Tag and mark hoses before removal.
- (1) Disconnect three hoses (1, 2, and 3).
- (2) Remove two nuts (4), lockwashers (5), valve (6), two spacers (7), and screws (8).

(3) Remove three adapters (9) and preformed packings (10) from valve (6).

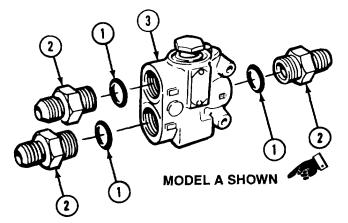


b. Installation.

NOTE

There are two kinds of valves. Model A uses spacers and 3 in. (76 mm) mounting screws. Model B does not use spacers and has 2 in. (51 mm) mounting screws. Both valves are removed the same way.

(1) Install three preformed packings (1) and adapters (2) in valve (3).

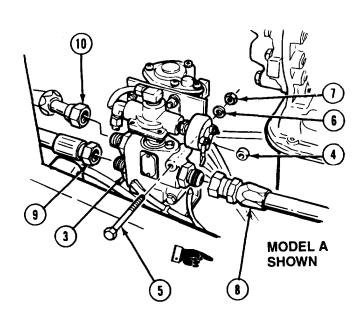


NOTE

Spacers mount between valve and bracket on Model A only.

- (2) Install valve (3) and two spacers (4) with two screws (5), lockwashers (6), and nuts (7).
- (3) Connect three hoses (8, 9, and 10).
- c. Follow-on Maintenance.
 - (1) Fill hydraulic reservoir (LO 9-2320-279-121.
 - (2) Check connections for leaks.
 - (3) Install stowage box (M978) (para 16-34).
 - (4) Connect batteries (para 7-91).





19-6. CONTROL VALVE CABLE AND BRACKETS REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All (with self-recovery winch)

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut of engine.

Special Environmental Conditions

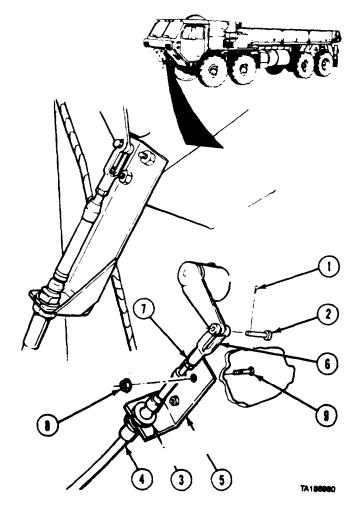
None

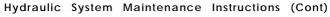
General Safety Instructions

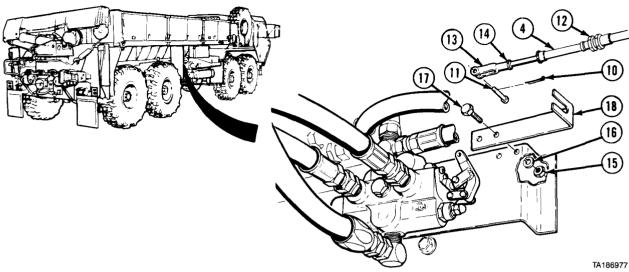
None

a. Removal.

- (1) Remove cotter pin (1) and yoke pin (2).
- (2) Loosen nut (2) and remove cable (3) from bracket (5).
- (3) Remove yoke (6) and nut (7).
- (4) Soldier A removes two nuts (8) and bracket (5) while Soldier B holds two screws (9).



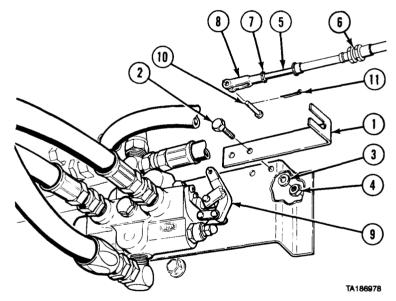




- (5) Remove cotter pin (10) and yoke pin (11).
- (6) Loosen nut (12) and remove cable (4).
- (7) Remove yoke (13) and nut (14).
- (8) Remove two nuts (15), lockwashers (16), screws (17), and bracket (18).

b. Installation.

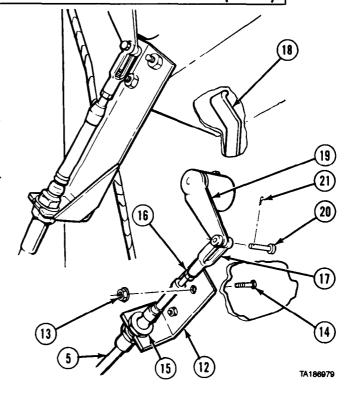
- (1) Install bracket (1) with two screws (2), lockwashers (3), and nuts (4).
- (2) Install cable (5) and nut (6). Tighten nut.
- (3) Install nut (7) and yoke (8).
- (4) Adjust yoke (8) to aline with linkage (9) and tighten nut (7).
- (5) Install yoke pin (10) and cotter pin (11).



19-6. CONTROL VALVE CABLE AND BRACKETS REMOVAL/INSTALLATION (CONT).

- (6) Soldier A installs bracket (12) with two nuts (13) while Soldier B installs two screws (14).
- (7) Install cable (5) and nut (15). Tighten nut.
- (8) Install nut (16) and yoke (17).
- (9) Soldier A holds upper shift lever (18) in center position while Soldier B adjusts yoke (17) to aline with lower shift lever (19) and tightens nut (16).
- (10) Install yoke pin (20) and cotter pin (21).
- **c.** Follow-on Maintenance. Check operation of winch (TM 9-2320-279-10).

END OF TASK



19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All (with self-recovery winch)

Test Equipment

None

Special Tools

None

Supplies

Tags, identification, Item 48, Appendix C Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained.

Special Environmental Conditions

None

General Safety Instructions

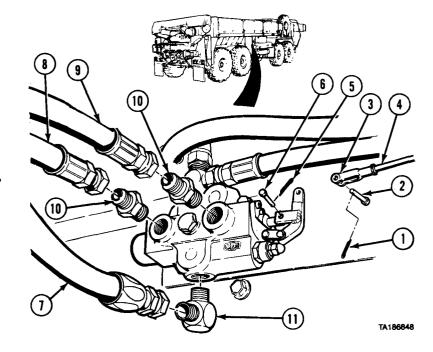
None

a. Removal.

NOTE

Tag and mark hoses before removal.

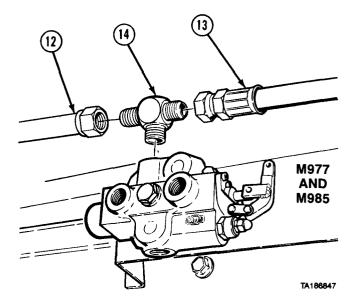
- (1) Remove cotter pin (1) and yoke pin (2). Move yoke (3) and cable (4) out of way.
- (2) Remove cotter pin (5) and pin (6).
- (3) Disconnect three hoses (7, 8, and 9).
- (4) Remove two adapters (10).
- (5) Remove elbow (11).



NOTE

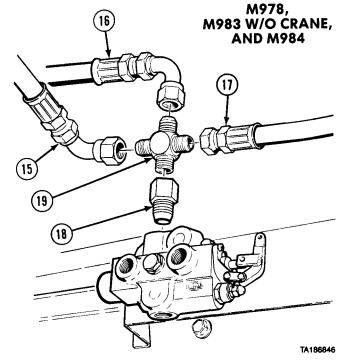
There are different combinations of hoses and fittings for each vehicle. Do steps (6) and (7) for models M977 and M985. Do steps (8) and (9) for models M978, M983 w/o crane, and M984. Do steps (10) and (11) for model M983 w/crane.

- (6) Disconnect tube (12) and hose (13).
- (7) Remove fitting (14).

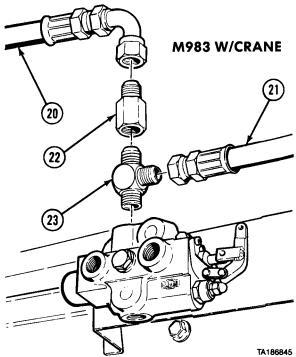


19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION (CONT).

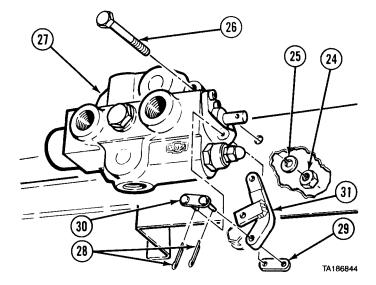
- (8) Disconnect three hoses (15, 16, and 17).
- (9) Remove adapter (18) and fitting (19).



- (10) Disconnect two hoses (20 and 21).
- (11) Remove adapter (22) and fitting (23).

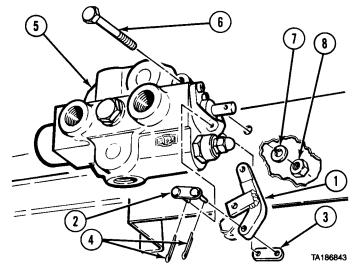


- (12) Remove three nuts (24), lockwashers (25), screws (26), and control valve (27).
- (13) Remove two cotter pins (28), plate (29), link (30), and lever (31).



b. Installation.

- (1) Install lever (1), link (2), and plate (3) with two cotter pins (4).
- (2) Install control valve (5) with three screws (6), lockwashers (7), and nuts (8).



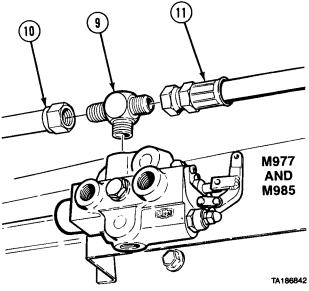
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

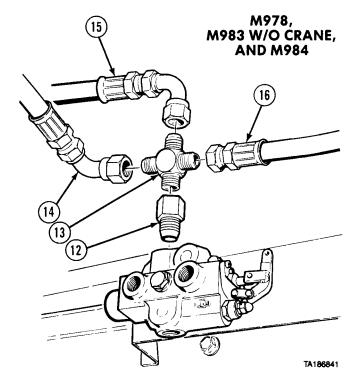
Do steps (3) and (4) for models M977 and M985. Do steps (5) and (6) for models M978, M983 w/o crane, and M984. Do steps (7) and (8) for model M983 w/crane.

- (3) Apply pipe thread sealing compound and install fitting (9).
- (4) Connect hose (10) and tube (11).

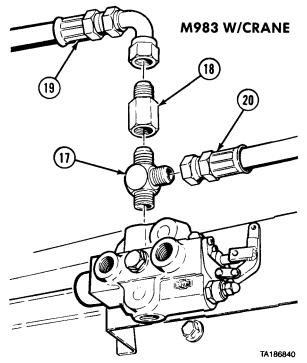


19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION (CONT).

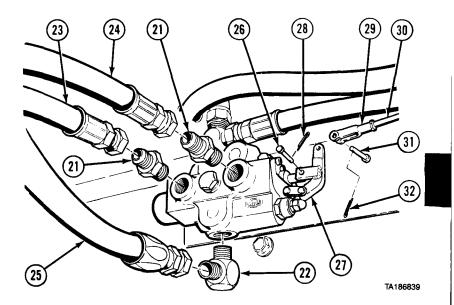
- (5) Apply pipe thread sealing compound and install adapter (12) and fitting (13).
- (6) Connect three hoses (14, 15, and 16).



- (7) Apply pipe thread sealing compound and install fitting (17) and adapter (18).
- (8) Connect two hoses (19 and 20).



- (9) Apply pipe thread sealing compound and install two adapters (21).
- (10) Apply pipe thread sealing compound and install elbow (22).
- (11) Connect three hoses (23, 24, and 25).
- (12) Install pin (26) into lever (27) with cotter pin (28).
- (13) Secure yoke (29) and cable (30) with yoke pin (31) and cotter pin (32).



c. Follow-on Maintenance.

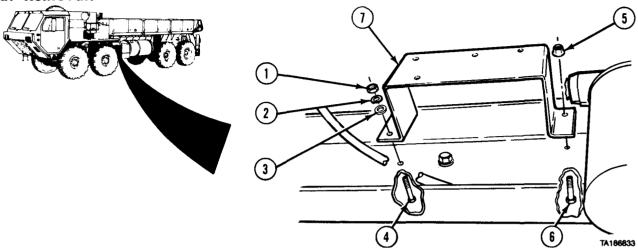
- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check operation of winch (TM 9-2320-279-10).

END OF TASK

19-8. CONTROL VALVE BRACKET REMOVAL/INSTALLATION.								
This task covers: a. Removal b. Installation	c. Follow-on Maintenance							
INITIAL SETUP								
Models All (with self-recovery winch)	<i>References</i> None							
Test Equipment None	Equipment Condition TM or Para Condition Description							
Special Tools None	Para 19-7 Special Environm	Control valve removed.						
Supplies None	None General Safety In.							
Personnel Required MOS 63S, Heavy wheel vehicle mechanic	None							

19-8. CONTROL VALVE BRACKET REMOVAL/INSTALLATION (CONT).

a. Removal.



- (1) Remove two nuts (1), lockwashers (2), washers (3), and screws (4).
- (2) Remove locknut (5), screw (6), and bracket (7).

b. Installation.

- (1) Install bracket (7) with two screws (4), washers (3), lockwashers (2), and nuts (1).
- (2) Install screw (6) and locknut (5).
- c. Follow-on Maintenance. Install control valve (para 19-7).

END OF TASK

19-9.	WINCH AND AU	JXILIARY	HYDRAULIC	RELIEF V	VALVES I	REMOVAL/IN:	STALLATION
	(M983, M984).						

This task covers:

a. Removal (M983 without crane)

b. Installation (M983 without crane)

c. Removal (M984)

d. Installation (M984)

e. Follow-on Maintenance

INITIAL SETUP

Models

M983 without crane, M984

Test Equipment

None

Special Tools

None

Supplies

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

LO 9-2320-279-12

Hydraulic reservoir drained.

Para 17-12

Heavy-duty winch hydraulic

tubes removed (M984).

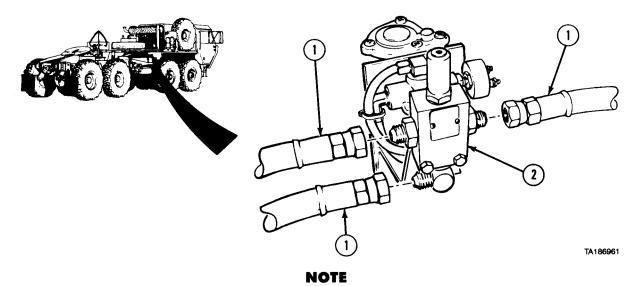
Special Environmental Conditions

None

General Safety Instructions

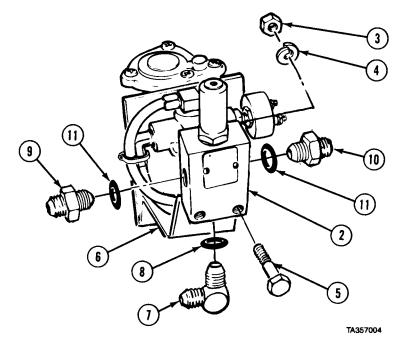
None

a. Removal (M983 Without Crane).



Tag and mark hoses, fittings, and elbows before removal.

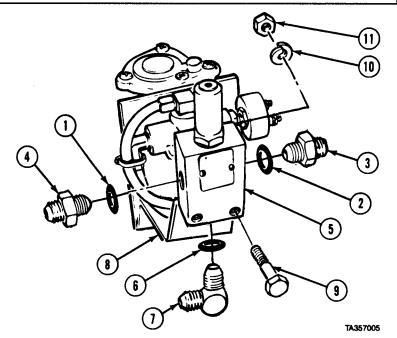
- (1) Disconnect three hydraulic hoses (1) from relief valve body (2).
- (2) Remove two nuts (3), lockwashers (4), and screws (5) from relief valve body (2).
- (3) Remove relief valve body (2) from bracket (6).
- (4) Remove elbow (7) and preformed packing (8).
- (5) Remove fittings (9 and 10) and two preformed packings (11).



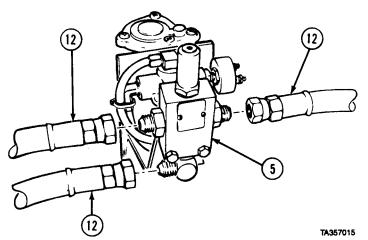
19-9. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVES REMOVAL/INSTALLATION (M983, M984) (CONT).

b. Installation (M983 Without Crane).

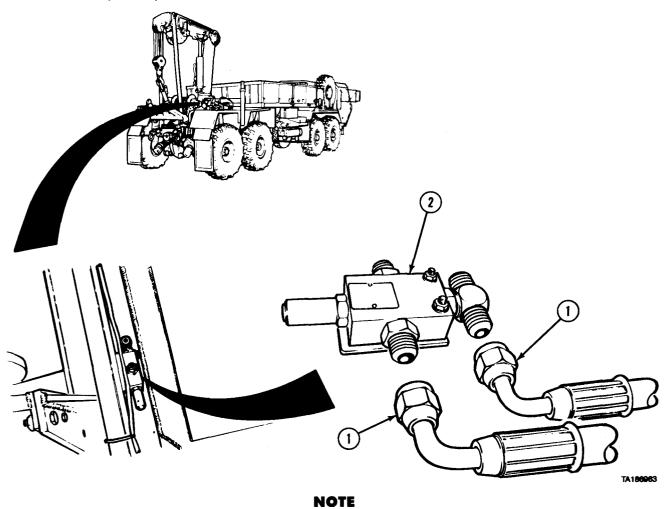
- (1) Coat preformed packings (1 and 2) with oil and install on fittings (3 and 4).
- (2) Install fittings (3 and 4) on relief valve body (5).
- (3) Coat preformed packing (6) with oil and install on elbow (7).
- (4) Install elbow (7) on relief valve body (5).
- (5) Install relief valve body (5) on bracket (8) with two screws (9), lockwashers (10), and nuts (11).



(6) Connect three hydraulic hoses (12) to relief valve body (5).



c. Removal (M984).

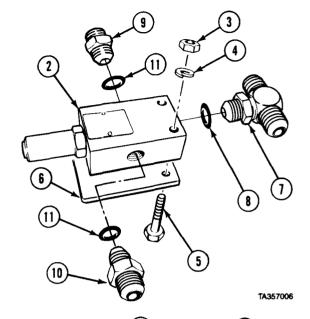


Tag and mark hoses and fittings before removal.

(1) Disconnect two hydraulic hoses (1) from relief valve body (2).

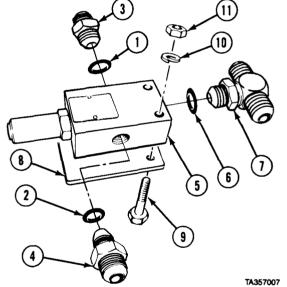
19-9. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVES REMOVAL/INSTALLATION (M983, M984) (CONT).

- (2) Remove two nuts (3), lockwashers (4), and screws (5) from relief valve body (2).
- (3) Remove relief valve body (2) from bracket (6).
- (4) Remove tee (7) and performed packing (8).
- (5) Remove fittings (9 and 10) and two preformed packings (11).



d. Installation (M984).

- (1) Coat preformed packings (1 and 2) with oil and install on fittings (3 and 4).
- (2) Install fittings (3 and 4) on relief valve body (5).
- (3) Coat preformed packing (6) with oil and intall on elbow (7).
- (4) Install elbow (7) on relief valve body (5).
- (5) Install relief valve body (5) on bracket (8) with two screws (9), lockwashers (10), and nuts (11).

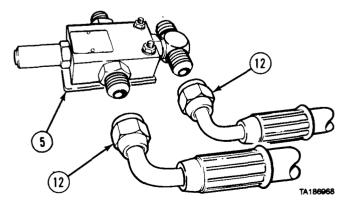


(6) Connect two hydraulic hoses (12) to relief valve body (5).

e. Follow-on Maintenance.

- (1) Install heavy-duty winch hydraulic tubes (M984) (para 17-12).
- (2) Fill hydraulic reservoir (LO 9-2320-279-12).

END OF TASK



19-10. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVE BRACKET REMOVAL/INSTALLATION (M983, M984).

This task covers:

a. Removal (M983 without crane)

b. Installation (M983 without crane)

c. Removal (M984)

d. Installation (M984)

e. Follow-on Maintenance

INITIAL SETUP

Models

M983 without crane, M984

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description
Winch and auxiliary

Para 19-9 Winch a

hydraulics relief valves

removed.

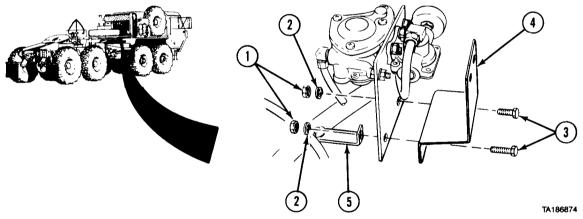
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal (M983 Without Crane).



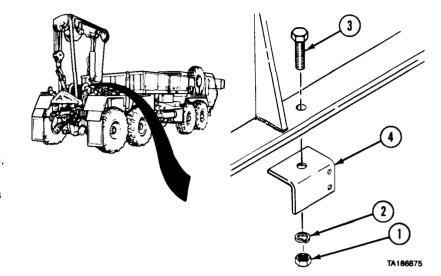
- (1) Remove two nuts (1), lockwashers (2), and screws (3) from auxiliary hydraulics relief valve bracket (4).
- (2) Remove auxiliary hydraulics relief valve bracket (4) and brace (5).
- **b.** Installation (M983 Without Crane). Install auxiliary hydraulics relief valve bracket (4) and brace (5) with two screws (3), lockwashers (2), and nuts (1).

19-10. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVE BRACKET REMOVAL/INSTALLATION (M983, M984) (CONT).

c. Removal (M984).

- (1) Remove nut (1), lockwasher (2), and screw (3) from winch relief valve bracket (4).
- (2) Remove winch relief valve bracket (4).
- **d.** Installation (M984). Install winch relief valve bracket (4) with screw (3), lockwasher (2), and nut (1).
- **e.** Follow-on Maintenance. Install winch and auxiliary hydraulics relief valves (para 19-9).

END OF TASK



19-11. HEAVY-DUTY SELECTOR VALVE AND MOUNTING BRACKET REMOVAL/INSTALLATION (M984).

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M984

Test Equipment

None

Special Tools

None

Supplies

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained.

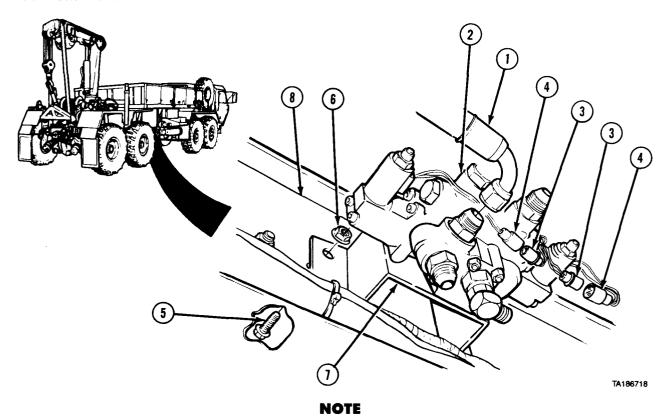
Special Environmental Conditions

None

General Safety Instructions

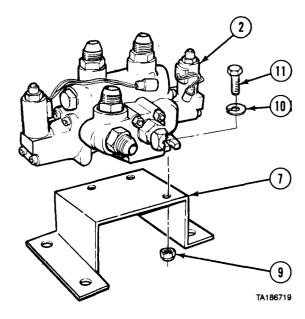
None

a. Removal.



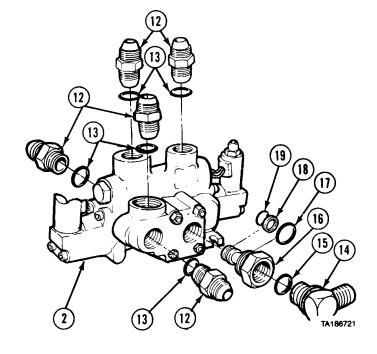
Tag and mark lines, wires, and fittings before removal.

- (1) Disconnect six hydraulic lines (1) from selector valve (2).
- (2) Disconnect two wires (3) from two connectors (4).
- (3) Soldier A holds four screws (5) while Soldier B removes four nuts (6), selector valve (2), and mounting bracket (7) from frame (8).
- (4) Remove three nuts (9), lockwashers (10), screws (11), and mounting bracket (7) from selector valve (2).



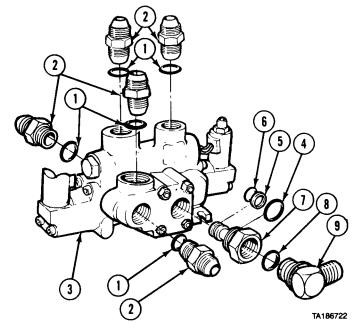
19-11. HEAVY-DUTY SELECTOR VALVE AND MOUNTING BRACKET REMOVAL/INSTALLATION (M984) (CONT).

- (5) Remove five fittings (12) from selector valve (2).
- (6) Remove five preformed packings (13) from fittings (12).
- (7) Remove elbow (14) and preformed packing (15).
- (8) Remove adapter (16), preformed packing (17), backup ring (18), and preformed packings (19).

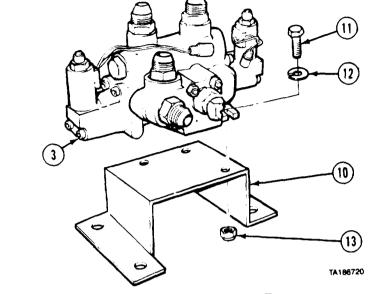


b. Installation.

- (1) Install five preformed packings (1) on fittings (2).
- (2) Install five fittings (2) in selector valve (3).
- (3) Install preformed packing (4), backup ring (5), and preformed packing (6) on adapter (7).
- (4) Install adapter (7), preformed packing (8), and elbow (9) in selector valve (3).

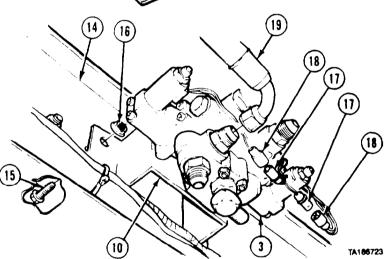


(5) Install mounting bracket (10) on valve (3) with three screws (11). lockwashers (12), and nuts (13).



- (6) Soldier A installs selector valve (3) and mounting bracket (10) on frame (11) with four screws (15) while Soldier B tightens four nuts (16).
- (7) Connect two wires (17) to two connectors (18).
- (8) Connect six hydraulic lines (19) to selector valve (3).
- *c. Follow-on Maintenance.* Fill hydraulic reservoir (LO 9-2320-279-12).

END OF TASK



9-12. PRIMARY PUMP HYDRAULIC MOTOR CONTROL VALVE, BRACKET, AND CABLE BRACKET REMOVAL/INSTALLATION (M978).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

Oil, lubricating, Item 32, Appendix C Tags, identification, Item 47, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-12 Hydraulic reservoir drained.

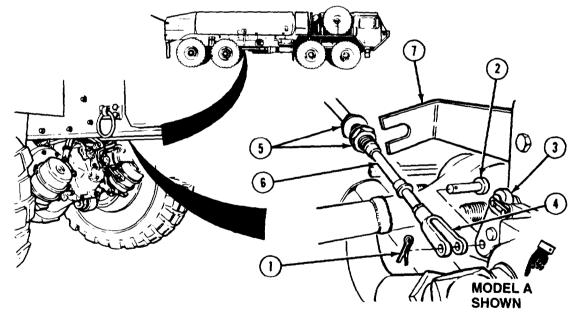
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.



NOTE

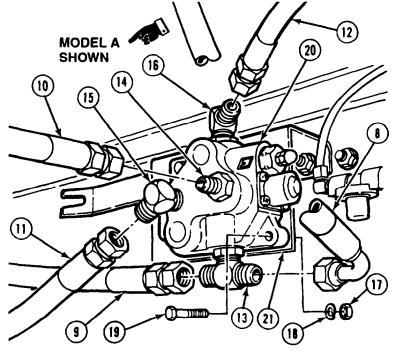
There are two kinds of control valves. Model A has the top mounting screw on the left side of the top elbow. Model B has the top mounting screw on the right side of the top elbow. Both valves are removed the same way. However, if one type of valve must be replaced by the other type, the mounting bracket, valve lever, clevis pin, and cotter pin must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.

- (1) Remove cotter pin (1) and pin (2) from valve lever (3) and clevis (4).
- (2) Loosen two nuts (5). Remove control cable (6) from cable bracket (7).

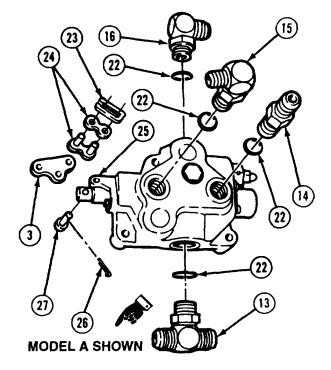
NOTE

Tag and mark hose and fittings before removal.

- (3) Remove five hose assemblies (8, 9, 10, 11, and 12) from tee (13), adapter (14), elbow (15), and elbow (16).
- (4) Remove three nuts (17), lockwashers (18), screws (19), and control valve (20) from valve bracket (21).

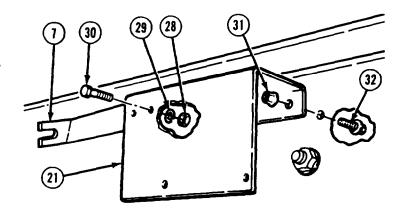


- (5) Remove tee (13), adapter (14), elbow (15), elbow (16), and four preformed packings (22) from control valve (20).
- (6) Remove clip (23) from link assembly (24). Remove link assembly from bracket (25) and valve lever (3).
- (7) Remove cotter pin (26), pin (27), and valve lever (3).



19-12. PRIMARY PUMP HYDRAULIC MOTOR CONTROL VALVE BRACKET, AND CABLE BRACKET REMOVAL/INSTALLATION (M978) (CONT)

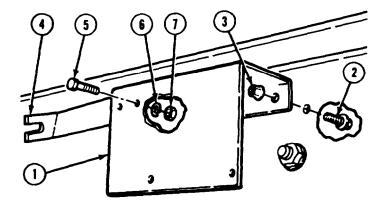
- Remove two nuts (28), (8) lockwashers (29), screws (30), and cable bracket (7).
- (9) Remove two nuts (31), screws (32), and valve bracket (21).



b. Installation

of the top elbow. Model B has the top mounting screw on the right side of the top elbow. Both valves are installed the same way. However, if one type of valve is replaced by the other type, the mounting bracket, valve lever, clevis pin, and cotter pin must be replaced also. Refer to TM 9-2320-279-24P for proper identification of parts.

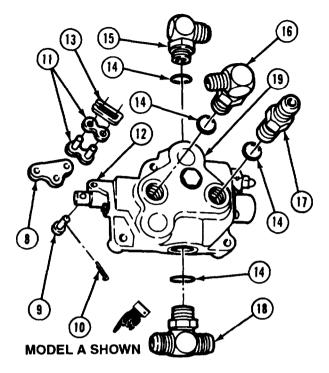
- Install valve bracket (1), two screws (2), and nuts (3).
- Install cable bracket (4), two screws (5), lockwashers (6), and nuts (7).



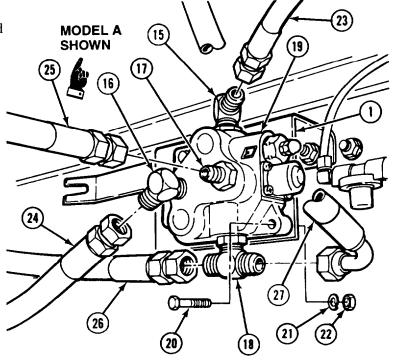
NOTE

Pin can be installed in bracket and valve lever from either direction.

- (3) Install valve lever (8), pin (9), and cotter pin (10).
- (4) Install link assembly (11) on bracket (12) and valve lever (8). Install clip (13) on link assembly (11).
- (5) Lubricate and install four preformed packings (14) on elbow (15), elbow (16), adapter (17), and tee (18).
- (6) Install elbow (15), elbow (16), adapter (17), and tee (18) on control valve (19).



- (7) Install control valve (19), three screws (20), lockwashers (21), and nuts (22) on valve bracket (1).
- (8) Install five hose assemblies (23, 24, 25, 26, and 27) on elbow (15), elbow (16), adapter (17), and tee (18).



NOTE

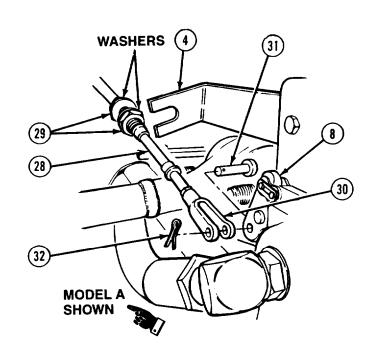
When installing control cable, make sure washers are on each side of bracket before tightening nuts.

- (9) Install control cable (28) on cable bracket (4). Tighten two nuts (29).
- (10) Install clevis (30), pin (31), and cotter pin (32) on valve lever (8).

c. Follow-on Maintenance.

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Adjust primary pump hydraulic motor control cable (para 19-14).

END OF TASK



19-12.1. RETRIEVER CONTROL VALVE LEVERS REMOVAL/INSTALLATION (M984E1).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance.

INITIAL SETUP

Models

M984E1

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

Special Environmental Conditions

None

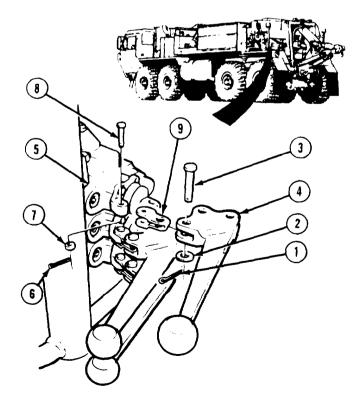
General Safety Instructions

None

a. Removal.

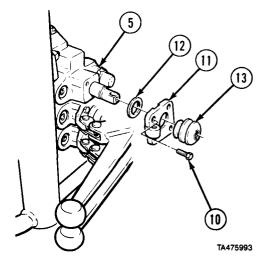
NOTE

- All levers, linkages, and filters are removed the same way.
- Start removal with top lever.
 - (1) Remove two cotter pins (1), washers (2), pins (3), and lever (4) from valve (5).
 - (2) Remove cotter pin (6), washer (7), pin (8), and linkage (9) from valve (5).



TA475992

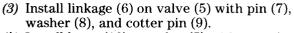
- (3) Remove two screws (10), retainer (11), and filter (12) from valve (5).
- (4) Remove dust cap (13) from retainer (11).



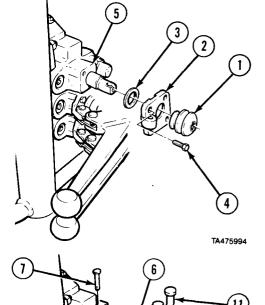
b. Installation.

NOTE

- All levers, linkages, and filters are installed the same way.
- Start installation with bottom lever.
 - (1) Install dust cap (1) in retainer (2).
 - (2) Install filter (3) and retainer (2) with two screws (4) on valve (5).



(4) Install lever (10) on valve (5) with two pins (11), washers (12), and cotter pins (13).





c. Follow-on Maintenance. None.

END OF TASK

TA475995

19-12.2. RETRIEVER CONTROL ASSEMBLY REMOVAL/INSTALLATION (M984E1).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M984E1

Test Equipment

None

Special Tools

None

Supplies

Oil, lubricating, Item 32, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Work lamp and cord removed

from brackets.

Para 19-12.1 Valve levers removed.

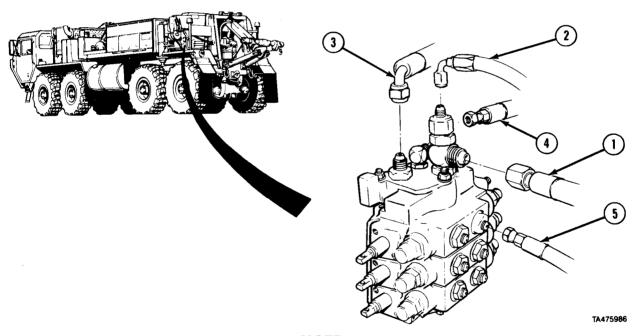
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.

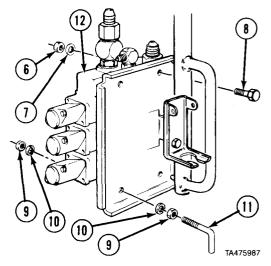


NOTE

Tag and mark hoses and fittings before removing.

- (1) Remove four hoses (1, 2, 3 and 4).
- (2) Remove six hoses (5).

- (3) Remove two nuts (6), lockwashers (7), and screws (8).
- (4) Remove two nuts (9), lockwashers (10), hooks (11), and retriever control assembly (12).
- (5) Remove two lockwashers (10) and nuts (9) from hooks (11).



NOTE

Nut on stud may hve to be loosened in order to provide clearance to remove elbow.

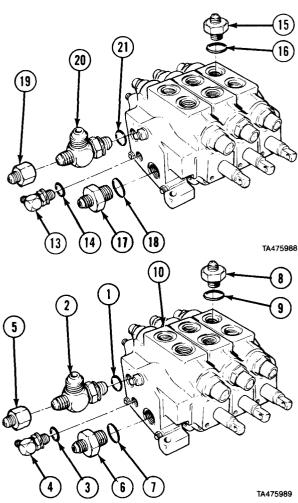
- (6) Remove elbow (13) and preformed packing (14).
- (7) Remove six fittings (15) and preformed packings (16).
- (8) Remove fitting (17) and preformed packing (18).
- (9) Remove adapter (19).
- (10) Remove fitting (20) and preformed packing (21).

b. Installation.

- (1) Install preformed packing (1) and fitting (2).
- (2) Install preformed packing (3) and elbow (4).
- (3) Install adapter (5) on fitting (4).
- (4) Install fitting (6) and preformed packing (7).
- (5) Install six fittings (8) and preformed packings (9) on retriever control assembly (10).

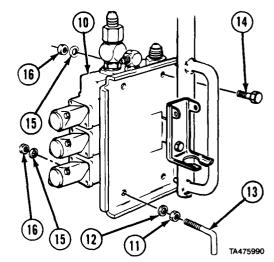
NOTE

Tighten nut on stud if loose.

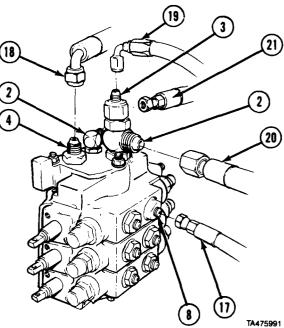


19-12.2. RETRIEVER CONTROL ASSEMBLY REMOVAL/INSTALLATION (M984E1) (CONT).

- (6) Install two nuts (11) and lockwashers (12) on two hooks (13).
- (7) Install retriever control assembly (10), two hooks (13), screws (14), four lockwashers (15), and nuts (16).



- (8) Install six hoses (17) on fittings (8).
- (9) Install three hoses (18, 19 and 20) on fittings (2 and 4).
- (10) Install hose (21) on elbow (2).



c. Follow-on Maintenance.

- (1) Install valve levers (para 19-12.1)
- (2) Install work lamp and cord on bracket (TM 9-2320-279-10).
- (3) Start engine, engage PTO. Check for leaks and check operation of retrieval system (TM 9-2320-279-10).

END OF TASK

19-13. SELECTOR VALVE REMOVAL/INSTALLATION

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Mode Is

M977 with winch M978 with winch M983 without crane M985 with winch

Test Equipment

None

Special Tools None

Supplies

Oil, lubricating, Item 33, Appendix C Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description TM 9-2320-279-10 Shut off engine. LO 9-2320-279-12 Hydraulic reservoir drained.

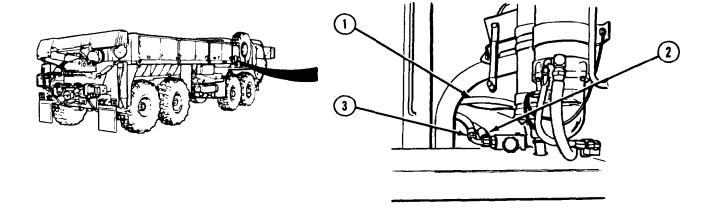
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.



NOTE

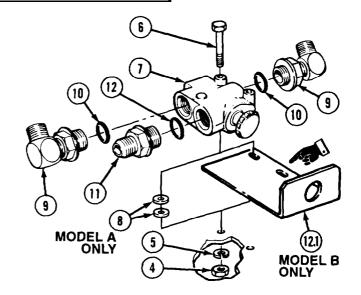
- There are two kinds of selector valves. Model A is approximately 2 in. (51 mm) thick at the mounting holes. Model B is approximately 1 in. (25 mm) thick at the mounting holes. Both are removed the same way.
- Tag and mark lines before removal.
- (1) Disconnect hydraulic lines (1, 2, and 3).

19-13. SELECTOR VALVE REMOVAL/INSTALLATION (CONT).

(2) Remove two nuts (4) and lockwashers (5).

NOTE

- Trucks with guard perform steps (3.1), (4), and (5). Trucks without guard perform steps (3), (4), and (5).
- Washers are used on Model A only without guard.
- (3) Remove two screws (6), selector valve (7), and four washers (8).
- (3.1) Remove two screws (6), selector valve (7), and guard (12.1).
- (4) Remove two elbows (9) and preformed packings (10).
- (5) Remove adapter (11) and preformed packings (12).



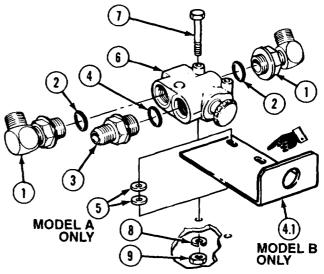
b. Installation.

(1) Install two elbows (1) and preformed packings (2).

NOTE

Trucks with guard, perform steps (2), (2.1), (4), and (5). Trucks without guard perform steps (2), (3), (4), and (5).

- (2) Install adapter (3) and preformed packing (4).
- (2.1) Install guard (4.1), selector valve (6), and two screws (7).



NOTE

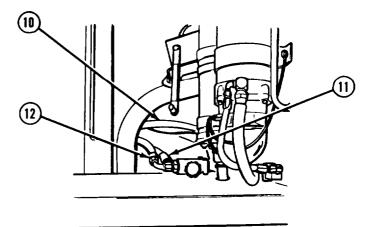
- On trucks without guard mount washers between fender and selector valve.
- Washers are used on Model A only without guard.
- There are two kinds of selector valves. Model A is approximately 2 in. (51 mm) thick at mounting holes, Model B is approximately 1 in, (25 mm) thick at mounting holes. Both are installed the same way.
- (3) Install four washers (5), selector valve (6), and two screws (7).
- (4) Install two lockwashers (8) and nuts (9).

(5) Install hydraulic lines (10, 11, and 12).

c. Follow-on Maintenance

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check hydraulic connections for leaks.
- (3) Check operation of selector valve (TM 9-2320-279-10).

END OF TASK



19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983).

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly

- d. Installation
- e. Follow-on Maintenance

INITIAL SETUP

Models

M983 with crane

Test Equipment

None

Special Tools

None

Supplies

Oil, lubricating, Item 33, Appendix C Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained.

Special Environmental Conditions

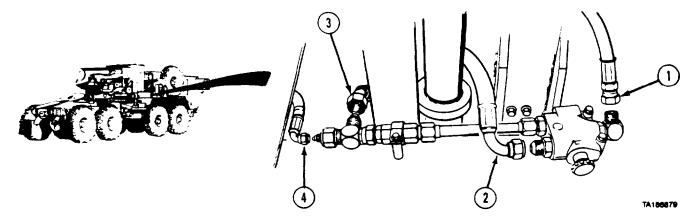
None

General Safety Instructions

None

19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983) (CONT).

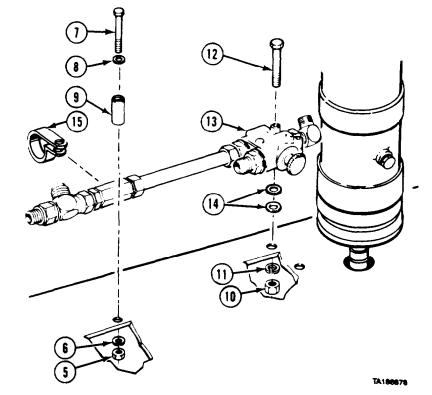
a. Removal.

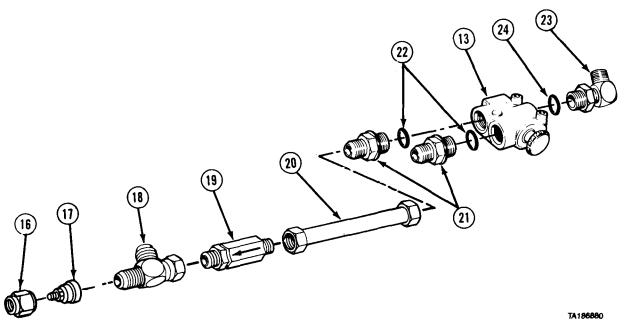


NOTE

Tag and mark lines before removal

- (1) Disconnect hydraulic lines (1, 2, 3, and 4).
- (2) Remove nut (5), lockwasher (6), screw (7), washer (8), and spacer (9).
- (3) Remove two nuts (10). lockwashers (11), screws (12), selector valve (13), and four washers (14).
- (4) Remove clamp (15).





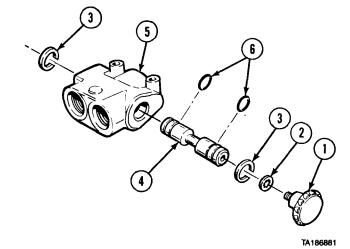
- (5) Remove adapter (16), reducer (17), and tee (18).
- (6) Note direction of arrow and remove check valve (19).
- (7) Remove tube (20), two adapters (21), and preformed packings (22) from selector valve (13).
- (8) Remove elbow (23) and preformed packing (24).

b. Disassembly.

- (1) Remove knob (1) and lockwasher (2).
- (2) Remove two retaining rings (3).
- (3) Remove spool (4) from valve body (5).
- (4) Remove two preformed packings (6).

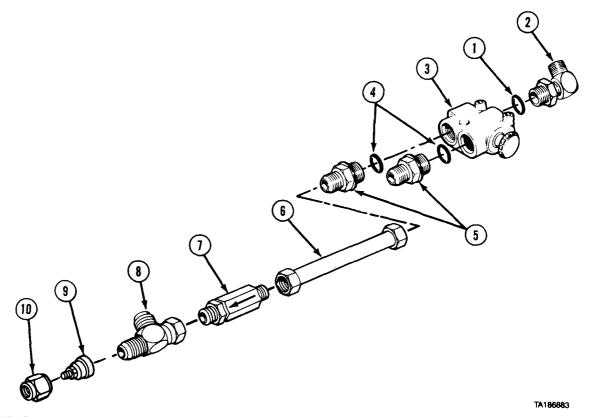
c. Assembly.

- (1) Install two preformed packings (6).
- (2) Lubricate spool (4) with oil and install spool in valve body (5).
- (3) Install two retaining rings (3).
- (4) Install knob (1) and lockwasher (2).



19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983) (CONT).

d. Installation.



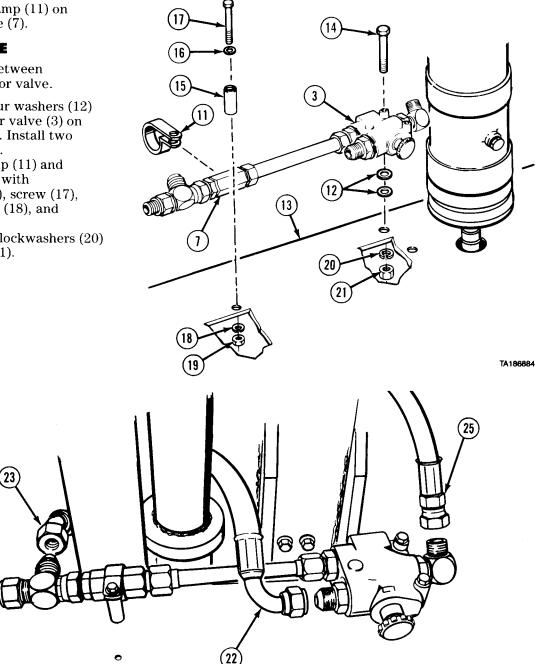
- (1) Install preformed packing (1) and elbow (2) in selector valve (3).
- (2) Install two preformed packings (4) and adapters (5) in selector valve (3).
- (3) Install tube (6), check valve (7), tee (8), reducer (9), and adapter (10).

(4) Position clamp (11) on check valve (7).

NOTE

Washers mount between fender and selector valve.

- (5) Position four washers (12) and selector valve (3) on fender (13). Install two screws (14).
- (6) Install clamp (11) and spacer (15) with washer (16), screw (17), lockwasher (18), and nut (19).
- (7) Install two lockwashers (20) and nuts (21).



(8) Install hydraulic lines (22, 23, 24, and 25).

e. Follow-on Maintenance.

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check hydraulic connections for leaks.

END OF TASK

TA186885

19-15. PRIMARY PUMP HYDRAULIC MOTOR CONTROL CABLE AND MOUNT REMOVAL/INSTALLATION/ADJUSTMENT (M978).

This task covers:

a. Removal

b. Installation

c. Adjustment

d. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

Ties, cable, plastic, Item 52, Appendix C

Personnel Required

MOS 63W, Wheel vehicle repairer

References

None

Equipment Condition

TM or Para Condition Description
TM 9-2320-279-10 Pump module rear access

doors opened.

Special Environmental Conditions

None

General Safety Instructions

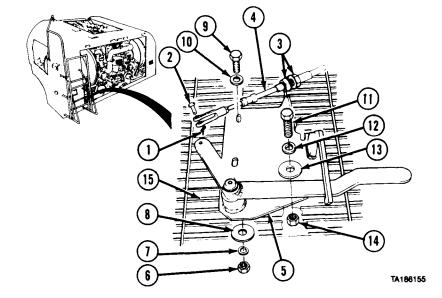
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

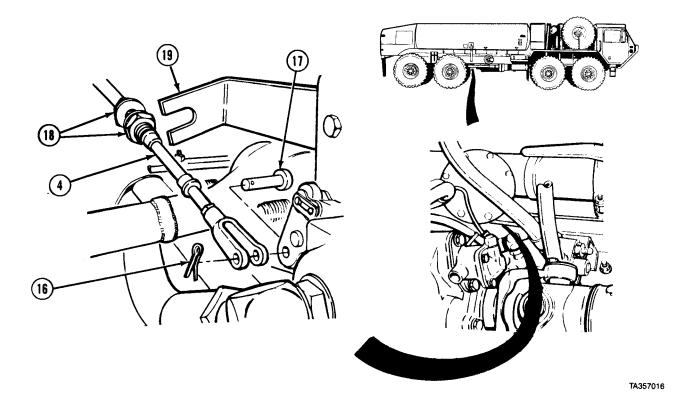
a. Removal.

NOTE

Mark position of shift mount.

- (1) Remove cotter pin (1) and pin (2).
- (2) Loosen two nuts (3) and remove shift cable (4) from shift mount (5).
- (3) Remove two nuts (6), lockwashers (7), washers (8), screws (9), and washers (10).
- (4) Remove screw (11), lockwasher (12), washer (13), and locknut (14).
- (5) Remove shift mount (5) from grating (15).





NOTE

Remove all plastic cable ties as necessary.

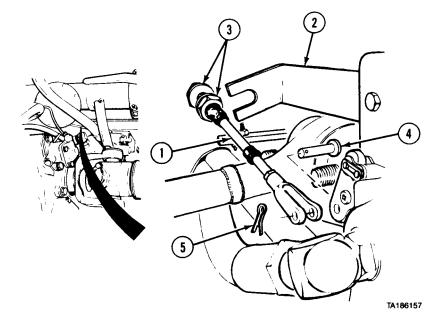
- (6) Remove cotter pin (16) and pin (17).
- (7) Loosen two nuts (18).
- (8) Remove shift cable (4) from bracket (19).

b. Installation.

NOTE

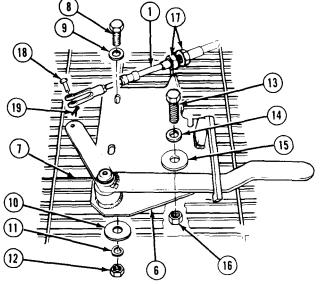
Install plastic cable ties as needed.

- (1) Install shift cable (1) in bracket (2) and tighten two nuts (3).
- (2) Install pin (4) and cotter pin (5).



19-15. PRIMARY PUMP HYDRAULIC MOTOR CONTROL CABLE AND MOUNT REMOVAL/INSTALLATION/ADJUSTMENT (M978) (CONT).

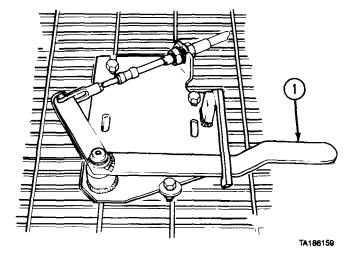
- (3) Install shift mount (6) on grating (7) with two screws (8), washers (9), washers (10), lockwashers (11), and nuts (12).
- (4) Install screw (13), lockwasher (14), washer (15), and locknut (16).
- (5) Install shift cable (1) in shift mount (6) and tighten two nuts (17).
- (6) Install shift cable (1) with pin (18) and cotter pin (19).



TA186158

c. Adjustment.

(1) Make sure shift lever (1) is in disengaged position.

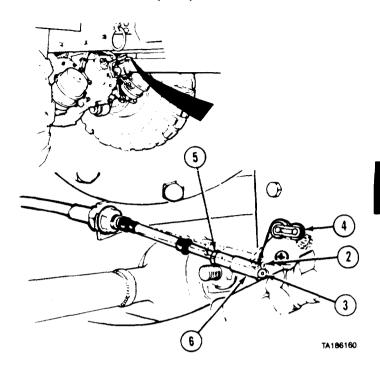


- (2) Remove cotter pin (2) and pin (3).
- (3) Check that control lever (3) is full forward to disengaged position. If so, do step (8). If not, do steps (4) through (8).
- (4) Move control lever (4) full forward to disengaged position.
- (5) Loosen locknut (5).
- (6) Adjust clevis (6) so holes in clevis aline with hole in control lever (4).
- (7) Tighten locknut (5).
- (8) Install control lever (4) with pin (3) and cotter pin (2).

d. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check that pump engages and disengages when shift lever is moved.
- (3) Close rear module doors (TM 9-2320-279-10).

END OF TASK



Section IV. HYDRAULIC LINES AND FLUID FILTER

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION.

This task covers:

- a. Typical Hydraulic Coupling Removal
- b. Typical Hydraulic Coupling Installation
- c. Typical Clip, Clamp, and Bracket Removal
- d. Typical Clip. Clamp, and Bracket Installation
- e. Hydraulic Lines
- f. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Tags, identification, Item 48, Appendix C Ties, cable, plastic, Item 52, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained

(only when replacing reservoir lines).

Special Environmental Conditions

None

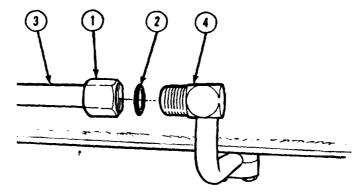
General Safety Instructions

None

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

- This procedure only shows location of vehicle hydraulic lines. It will never be necessary to remove all hydraulic lines at once.
- Refer to subparagraph e. for locations of specific hydraulic lines. Line numbers shown are from Hydraulic Schematic FO-3, located at the end of this manual.



- All hydraulic lines are connected with compression fittings. Some fittings will not have preformed packings. Fitting from which hydraulic line is being removed or installed can be an elbow, tee, or adapter on a valve or other hydraulic component or hydraulic line. All compression fittings are removed and installed the same way. Elbow is shown.
- Some hoses have coated cloth to prevent chafing damage to hose.
- Tag and mark position of all hydraulic lines.
- Cut plastic cable ties as necessary,

a. Typical Hydraulic Coupling Removal.

Loosen fitting (1). Remove preformed packing (2) and hose (3) from elbow (4).

b. Typical Hydraulic Coupling Installation.

Install preformed packing (2) and connect hose (3) on elbow (4) with fitting (1).

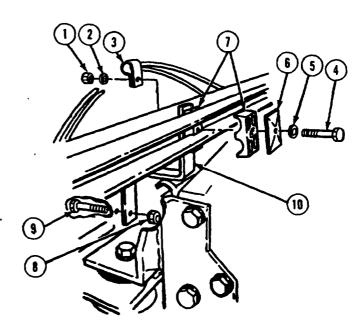
c. Typical Clip, Clamp, and Bracket Removal.

NOTE

- All clips, clamps, and brackets are removed and installed the same way.
- Mark position of brackets.
- (1) Remove locknut (1), washer (2), and cushion clip (3).
- (2) Remove screw (4), washer (5), plate (6), and two clamps (7).
- (3) Remove nuts (8), screws (9), and bracket (10).

d. Typical Clip, Clamp, and Bracket Installation.

- (1) Install bracket (10), screws (9), and nuts (8).
- (2) Install two clamps (7), plate (6), washer (5), and screw (4).
- (3) Install cushion clip (3), washer (2), and locknut (1).



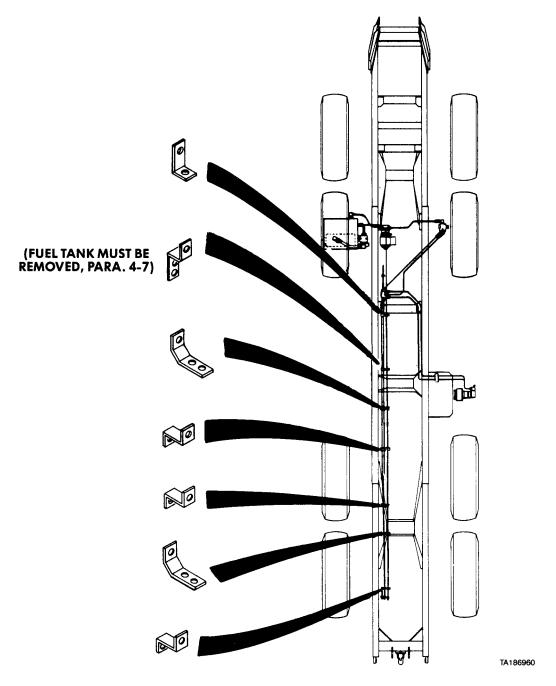


Figure 19-1. Typical Hydraulic Line Brackets.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

e. Hydraulic Lines.

NOTE

Refer to Figure 19-2 for component location.

Table 19-1. Hydraulic Line Index For M977, M985 Without Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	High Pressure Filter (3)
928	PTO Pump Tee (2)	Relief Valve (4)
902	High Pressure Filter (3)	Hydraulic Line Connector (5)
902A	Hydraulic Line Connector (5)	Hydraulic Line Connector (Top) (6)
902B	Hydraulic Line Connector (Top) (6)	Quick Disconnect (Bottom) (7)
883	Quick Disconnect (Top) (7)	Hydraulic Line Connector (Bottom) (6)
883A	Hydraulic Line Connector (Bottom) (6)	Hydraulic Line Connector (5)
883B	Hydraulic Line Connector (5)	Manifold Block (8)
883C	Manifold Block (8)	Return Line Filter (9)
277	Manifold Block (8)	Steering Pump (10)
278	Steering Pump (10)	Hydraulic Reservoir (1)
301	Steering Pump (10)	Main Gear (11)
302	Manifold Block (8)	Secondary Gear (2)

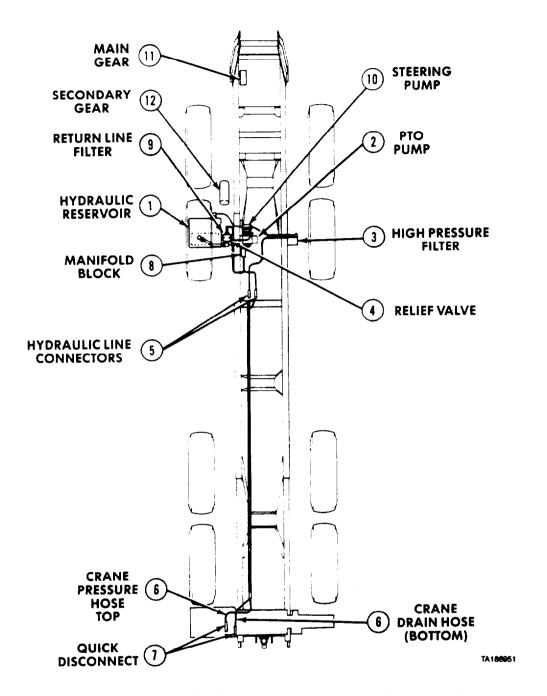


Figure 19-2. Hydraulic Lines - M977, M985 Without Winch.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-3 for component location.

Table 19-2. Hydraulic Line Index For M977, M985 With Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	High Pressure Filter (3)
928	PTO Pump Tee (2)	Relief Valve (4)
936	High Pressure Filter (3)	Selector Valve (5)
899	Selector Valve (5)	S.R.W. Control Valve (6)
900	S.R.W. Control Valve (B) Port (6)	Winch Motor Bulkhead Connector (7)
900A	Winch Motor Bulkhead Connector (7)	Winch Motor Valve (Bottom) (8)
900	S.R.W. Control Valve (A) Port (6)	Winch Motor Bulkhead Connector (7)
900A	Winch Motor Bulkhead Connector (7)	Winch Motor Valve (Top) (8)
277	Manifold Block (9)	Steering Pump (10)
278	Steering Pump (10)	Hydraulic Reservoir (1)
301	Steering Pump (10)	Main Gear (11)
302	Manifold Block (9)	Secondary Gear (12)
902	Selector Valve (5)	Hydraulic Line Connector (13)
902A	Hydraulic Line Connector (13)	Crane Pressure Hose (14)
902B	Crane Pressure Hose (14)	Quick Disconnect (Top) (15)
883	Quick Disconnect (Bottom) (15)	Crane Return Hose (16)
883A	Crane Drain Hose (16)	S.R.W. Control Valve Tee (6)
883B	S.R.W. Control Valve Tee (6)	Manifold Block (9)
883C	Manifold Block (9)	Return Line Filter (17)

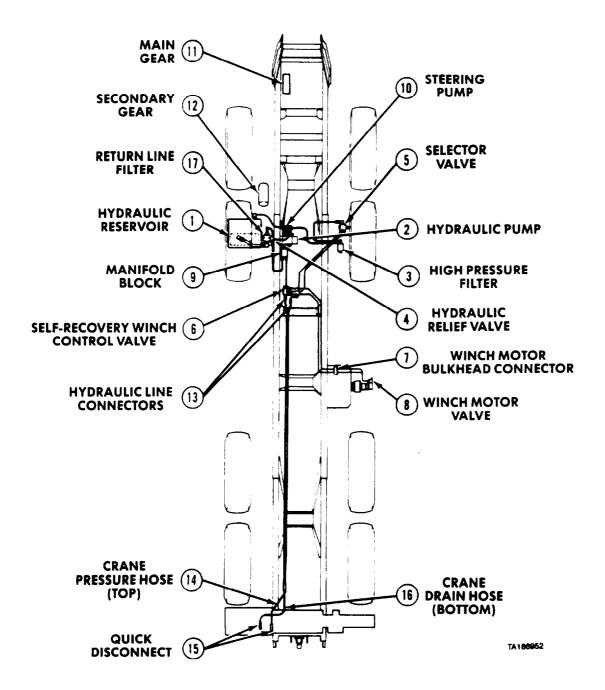


figure 19-3. Hydraulic Lines - M977, M985 With Winch.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-4 for component location.

Table 19-3. Hydraulic Line Index For M983 With Crane

Line No.	From	То
278	Hydraulic Pump Reservoir (1)	PTO Pump (2)
278	Hydraulic Reservoir (1)	Steering Pump (10)
278A	Hydraulic Reservoir (1)	Hand Pump (9)
496	PTO Pump (2)	Selector Valve (3)
928	PTO Pump (2)	Relief Valve (7)
899	Selector Valve (3)	S.R.W. Control Valve (4)
900	S.R.W. Control Valve (B) Port (4)	Winch Motor Bulkhead Connector (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Bottom) (6)
900	S.R.W. Control Valve (A) Port (4)	Winch Motor Bulkhead Connector (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Top) (6)
902	Selector Valve (3)	Crane Connection (A) (Supply) (8)
902A	Selector Valve (3)	Hand Pump (9)
301	Steering Pump (10)	Main Gear (11)
277	Steering Pump (10)	Manifold Block (12)
302	Manifold Block (12)	Secondary Gear (13)
883	Relief Valve (7)	Return Line Filter (14)
883A	Return Line Filter (14)	Manifold Block (12)
883B	Manifold Block (12)	S.R.W. Control Valve (4)
883C	S.R.W. Control Valve (4)	Crane Connection (B) (Return) (15)
883D	Crane Connection (Cl (16)	Hydraulic Reservoir (1)

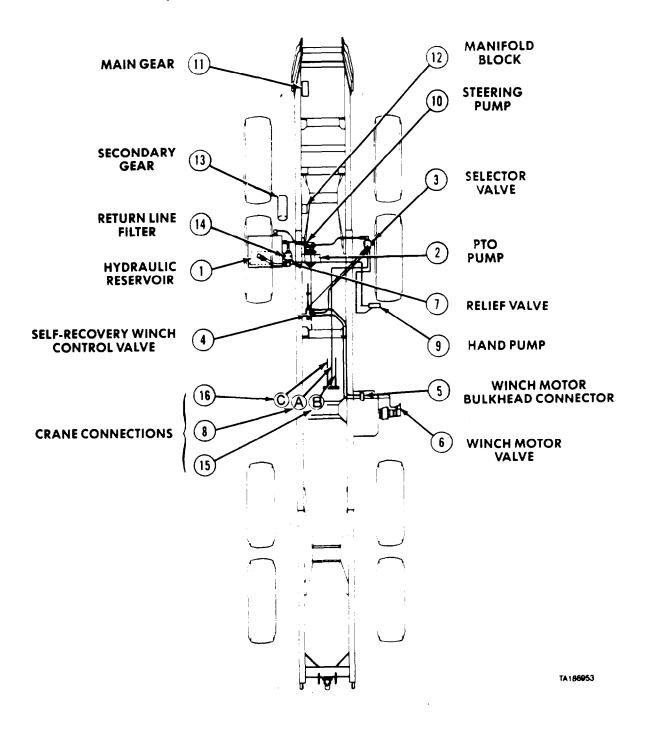


Figure 19-4. Hydraulic Lines - M983 With Crane.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-5 for component location.

Table 19-4. Hydraulic Line Index For M983 Without Crane

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (1)	Selector Valve (3)
928	PTO Pump Tee (1)	Relief Valve (7)
899	Selector Valve (3)	S.R.W. Control Valve (4)
900	S.R.W. Control Valve (B) Port (4)	Winch Motor Bulkhead Connector (Inner) (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Bottom) (6)
900	S.R.W. Control Valve (A) Port (4)	Winch Motor Bulkhead Connector (Outer) (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Top) (6)
902	Selector Valve (3)	Auxiliary Hydraulics Relief Valve (8)
906	Auxiliary Hydraulics Relief Valve (8)	Auxiliary Hydraulics Bulkhead Connector (Inner) (9)
907	S.R.W. Control Valve (OUT) (5)	Auxiliary Hydraulics Bulkhead Connector (Outer) (9)
278	Hydraulic Reservoir (1)	Steering Pump (10)
301	Steering Pump (10)	Main Gear (11)
277	Steering Pump (10)	Manifold Block (12)
302	Manifold Block (12)	Secondary Gear (13)
883	Relief Valve (7)	Return Line Filter (14)
883A	Return Line Filter (14)	Manifold Block (12)
883B	Manifold Block (12)	S.R.W. Control Valve (4)
883C	S.R.W. Control Valve (4)	Relief Valve (8)

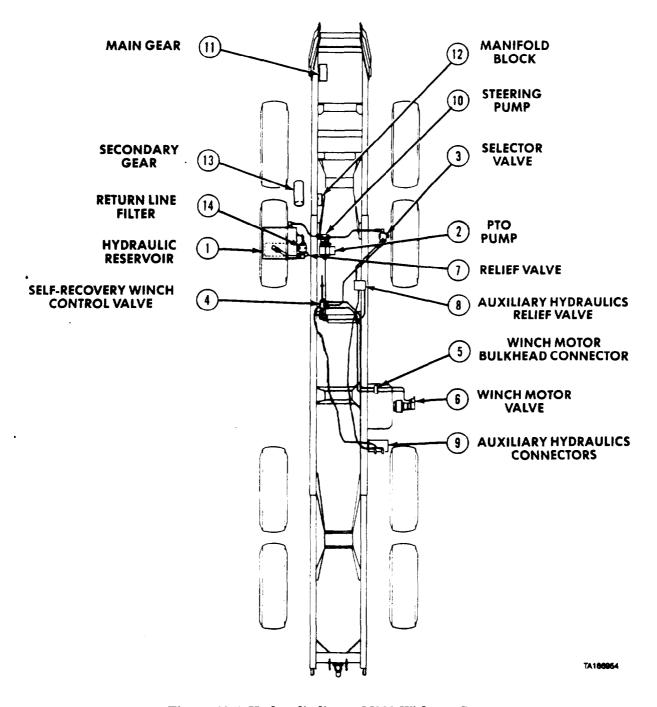


Figure 19-5. Hydraulic lines - M983 Without Crane.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-6 for component location.

Table 19-5. Hydraulic Line Index For M978 With Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
902	Selector Valve (3)	Tanker Control Valve (4)
905	Selector Valve (3)	Priority Flow Valve (5)
928	PTO Pump Tee (2)	Relief Valve (6)
903	Tanker Control Valve (B) Port (4)	Fuel Pump (7)
904	Tanker Control Valve Tee (4)	Fuel Pump (7)
906	Tanker Control Valve (A) Port (4)	Auxiliary Hydraulic Bulkhead Connector (Supply) (8)
907	Tanker Control Valve Tee (4)	Auxiliary Hydraulic Bulkhead Connector (Return) (8)
899	S.R.W. Control Valve (IN) Port (9)	Priority Flow Valve (5)
900	S.R.W. Control Valve (B) Port (9)	Winch Motor Bulkhead Connector (10)
900A	Winch Motor Bulkhead Connector (10)	Winch Motor Valve (Bottom) (11)
900	S.R.W. Control Valve (A) Port (9)	Winch Motor Bulkhead Connector (10)
900A	Winch Motor Bulkhead Connector (10)	Winch Motor Valve Top (11)
278	Hydraulic Reservoir (1)	Steering Pump (12)
301	Steering Pump (12)	Main Gear (13)
277	Steering Pump (12)	Manifold Block (14)
302	Manifold Block (14)	Secondary Gear (15)
883	Relief Valve (6)	Return Line Filter (16)
883A	Return Line Filter (16)	Manifold Block (14)
883B	S.R.W. Control Valve (OUT) Tee (9)	Fuel Pump Tee (7)
883C	S.R.W. Control Valve (OUT) Tee (9)	Manifold Block (14)
883D	S.R.W. Control Valve (OUT) Tee (9)	Priority Flow Valve (5)
8833	Fuel Pump (7)	Hydraulic Reservoir (1)

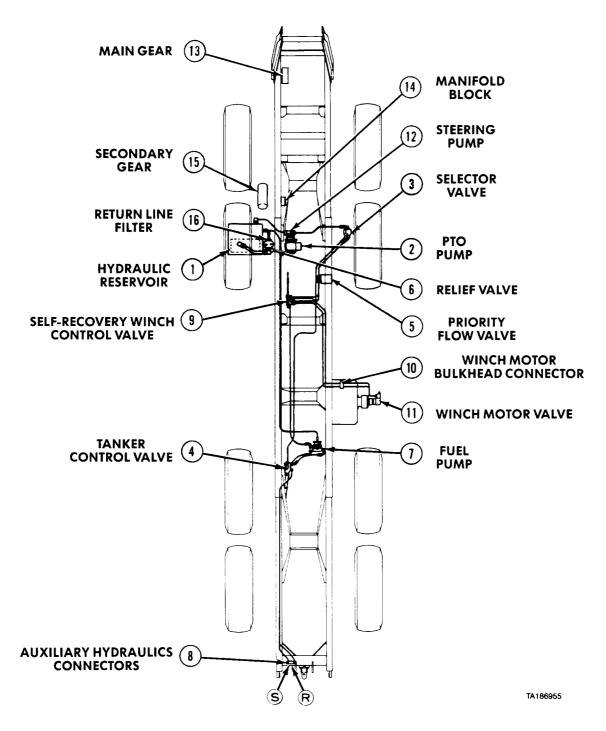


Figure 19-6. Hydraulic Lines - M978 With Winch.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-7 for component location.

Table 19-6. Hydraulic Line Index For M978 Without Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
902	PTO Pump (1)	Tanker Control Valve (3)
928	PTO Pump Tee (1)	Relief Valve (4)
903	Tanker Control Valve (B) Port (3)	Fuel Pump (5)
904	Tanker Control Valve Tee (3)	Fuel Pump (5)
906	Tanker Control Valve (A) Port (3)	Auxiliary Hydraulic Bulkhead Connector (Supply) (S) (6)
907	Tanker Control Valve Tee (3)	Auxiliary Hydraulic Bulkhead Connector (Return) (R) (6)
883A	Manifold Block (7)	Return Line Filter (8)
883B	Fuel Pump (5)	Hydraulic Reservoir (2)

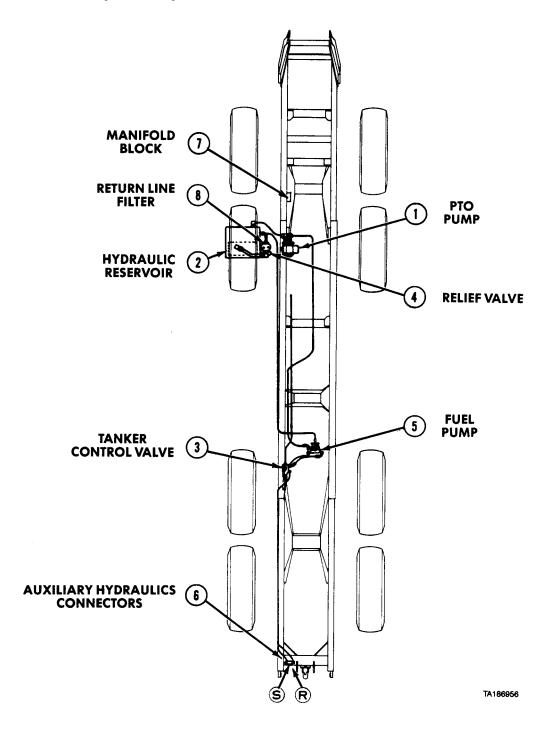


Figure 19-7. Hydraulic Lines Index - M978 Without Winch.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-8 for component location.

Table 19-7. Hydraulic Line Index For M985E1 Without Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
928	PTO Pump (2)	Relief Valve (3)
902	PTO Pump (2)	Hydraulic Line Connector (4)
902A	Hydraulic Line Connector (4)	Hydraulic Line Connector (Top) (5)
902B	Hydraulic Line Connector (Bottom) (5)	Quick Disconnect (Top) (6)
883	Quick Disconnect (Top) (6)	Hydraulic Line Connector (Bottom) (5)
883A	Hydraulic Line Connector (Bottom) (5)	Hydraulic Line Connector (4)
883B	Hydraulic Line Connector (4)	Manifold Block (7)
883C	Manifold Block (7)	Return Line Filter (8)
883D	Return Line Filter (8)	Relief Valve (3)
277	Manifold Block (7)	Steering Pump (9)
301	Steering Pump (9)	Manifold Block (7)
302	Manifold Block (7)	Secondary Gear (10)
883	PTO Pump (2)	Quick Disconnect (6)

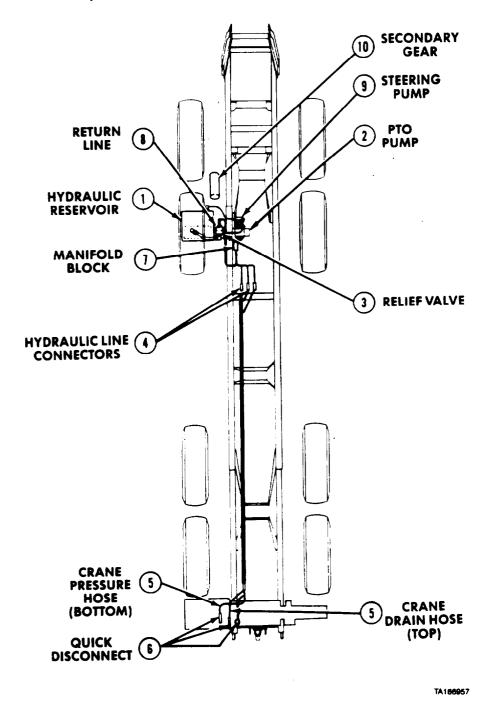


Figure 19-8. Hydraulic lines - M985E1 Without Winch.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT)

NOTE

Refer to Figure 19-9 for component location.

Table 19-8. Hydraulic Line Index For M985E1 With Winch

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
928	PTO Pump Tee (2)	Relief Valve (4)
899	Selector Valve (3)	S.R.W. Control Valve (5)
900	S.R.W. Control Valve (B) Port (5)	Winch Motor Bulkhead Connector (6)
900A	Winch Motor Bulkhead Connector (6)	Winch Motor Valve (Bottom) (7)
900	S.R.W. Control Valve (A) Port (5)	Winch Motor Bulkhead Connector (6)
900A	Winch Motor Bulkhead Connector (6)	Winch Motor Valve (Top) (7)
277	Manifold Block (8)	Steering Pump (9)
302	Manifold Block (8)	Secondary Gear (10)
902	Selector Valve (3)	Hydraulic Line Connector (11)
902A	Hydraulic Line Connector (11)	Crane Pressure Hose (12)
902B	Crane Pressure Hose (12)	Quick Disconnect (Top) (13)
883	Quick Disconnect (Bottom) (13)	Crane Drain Hose (14)
883A	Crane Drain Hose (14)	S.R.W. Control Valve Tee (5)
883B	S.R.W. Control Valve Tee (5)	Manifold Block (8)
883C	Manifold Block (8)	Return Line Filter (15)
833D	Return Line Filter (15)	Relief Valve (4)

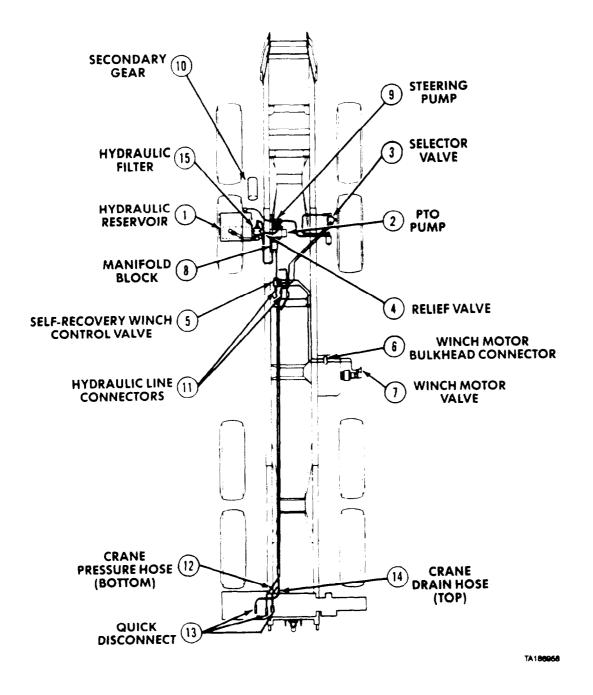


Figure 19-9. Hydraulic Lines - M985E1 With Winch.

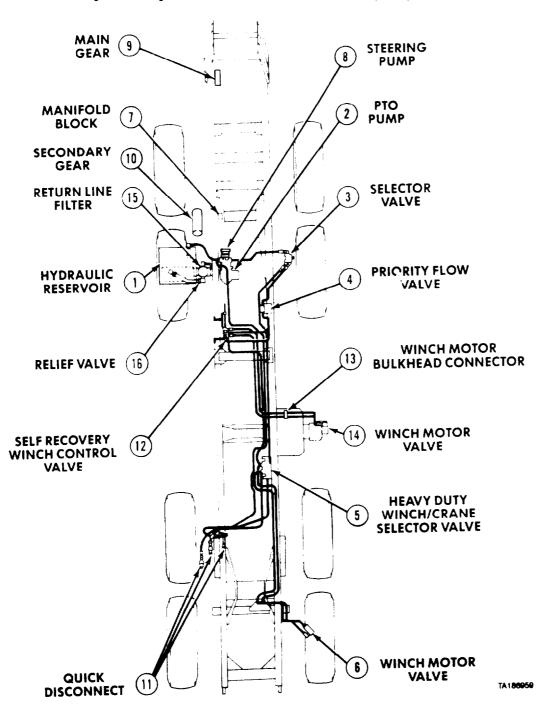
19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT)

NOTE

Refer to Figure 19-10 for component location.

Table 19-9. Hydraulic Line Index For M984

Line No.	From	То
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
928	PTO Pump Tee (2)	Hydraulic Relief Valve (4)
900	S.R.W. Control Valve (B) Port (2)	Winch Motor Bulkhead Connector (Inner) (13)
900A	S.R.W. Control Valve (A) Port (12)	Winch Motor Valve (Bottom) (14)
900	Winch Motor Bulkhead Connector (13)	Winch Motor Bulkhead Connector (Outer) (13)
900A	Winch Motor Bulkhead Connector (13)	Winch Motor Valve (Top) (14)
883	Manifold Block (7)	Return Line Filter (15)
883A	Return Line Filter (15)	Relief Valve (16)
883B	Manifold Block (7)	S.R.W. Control Valve (12)
883C	S.K.W. Control Valve (12)	Priority Flow Valve (4)
883D	S.R.W. Control Valve (12)	H.D.W./Crane Control Valve (5)
883E	H.D.W./Crane Control Valve (5)	Quick Disconnect (11)
883F	PTO Pump (2)	Quick Disconnect (11)
902	Selector Valve (3)	H.D.W./Crane Control Valve (5)
905	Selector Valve (3)	Priority Flow Valve (4)
903	H.D.W. 'Crane Control Valve (5)	H.D. Winch Motor Valve (Elbow) (6)
904	H.D.W./Crane Control Valve (5)	H.D. Winch Motor Valve (Side) (6)
277	Manifold Block (7)	Steering Pump (8)
301	Steering Pump (8)	Main Gear (9)
302	Main Gear (9)	Secondary Gear (10)
902	H.D.W./Crane Control Valve (5)	Quick Disconnect (11)



Hydraulic System Maintenance Instructions (Cont)

Figure 19-10. Hydraulic Lines M984.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-11 for component location.

Table 19-10. Hydraulic Line Index For M984E1

Line No.	From	То
278	Hydraulic Reservoir (1)	Winch/Crane Pump (2)
918	Hydraulic Reservoir (1)	H.D. Winch Drain (3)
496	Winch/Crane Pump Inlet (4)	H.D. Winch Manifold Valve (5) (P3)
906	Winch/Crane Pump Outlet (6)	H.D. Winch Manifold Valve (5) (P4)
666	Steering Tensioner Manifold Valve (7)	Fairlead Tensioner Motor (8)
773	Hydraulic Reservoir Filter (9)	STeering/Tensioner Manifold Valve (7)
497	Hydraulic Reservoir Filter (9)	H.D. Winch Manifold Valve (5)
883	Hydraulic Reservoir Filter (9)	Crane (10)
302	Hydraulic Reservoir Filter (9)	Secondary Gear (11)
301	Steering/Tensioner Manifold Valve (7)	Main Gear (12)
941	Steering/Tensioner Pump (13)	Steering/Tensioner Manifold Valve (7)
928	Steering/Tensioner Pump (13)	Steering/Tensioner Manifold Valve (7)
278	Hydraulic Reservoir (1)	Steering/Tensioner Pump (13)
900	S.R.W. Control Valve (B) (Port) (14)	Winch Motor Bulkhead Connector (15)
900A	Winch Motor Bulkhead Connector (15)	Winch Motor Valve (Bottom) (16)
900	S.R.W. Control Valve (A) Port (17)	Winch Motor Bulkhead Connector (15)
900A	Winch Motor Bulkhead Connector (15)	Winch Motor Valve (Top) (18)
899	H.D. Winch Manifold Valve (5)	S.R.W. Control Valve (Inlet) (19)
777	H.D. Winch Manifold Valve (5)	S.R.W. Control Valve (Outlet) (20)
049	H.D. Winch Manifold Valve (5)	Steering/Tensioner Manifold Valve (7)
527	H.D. Winch Manifold Valve (5) (Pilot Drain)	H.D. Winch Drain (21)
903	H.D. Winch Outlet (22)	H.D. Winch Manifold Valve (5) (G6)
904	H.D. Winch Control Valve (5) G7)	H.D. Winch Inlet (23)
878	Main Gear (12)	Secondary Gear (11)
319	Main Gear (12)	Secondary Gear (11)
877	Main Gear (12)	Secondary Gear (11)

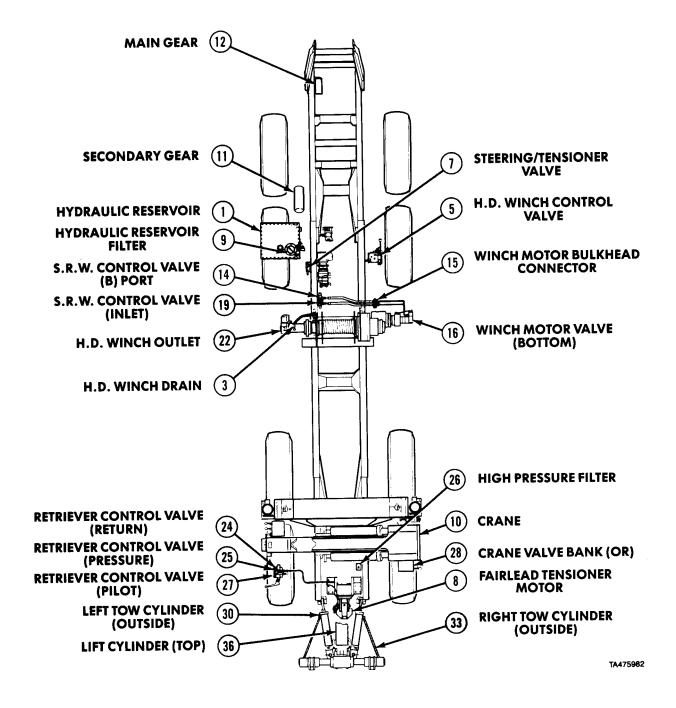


Figure 19-11. Hydraulic Lines - M984E1 Sheet 1 of 2.

19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).

NOTE

Refer to Figure 19-11 for component location.

Table 19-10. Hydraulic Line Index For M984E1 (Cont)

Line No.	From	То
907	Retriever Control Valve (Return) (24)	Tee to Line 883
942	Retriever Control Valve (Return) (24)	Fairlead Tensioner Motor (8)
936	Retriever Control Valve (Pressure) (25)	High Pressure Filter (26)
939	Retriever Control Valve (Pilot) (27)	Crane Valve Bank (OR) (28)
786	Retriever Control Valve (1) (29)	Left Tow Cylinder (Outside) (30)
787	Retriever Control Valve (1) (29)	Left Tow Cylinder (Inside) (31)
7 84	Retriever Control Valve (2) (32)	Right Tow Cylinder (Outside) (33)
785	Retriever Control Valve (2) (32)	Right Tow Cylinder (Inside) (34)
506	Retriever Control Valve (3) (35)	Lift Cylinder (Top) (36)
507	Retriever Control Valve (3) (35)	Lift Cylinder (Bottom) (37)
902	High Pressure Filter (26)	Crane (10)
935	H.D. Winch Control Valve (5)	High Pressure Filter (26)

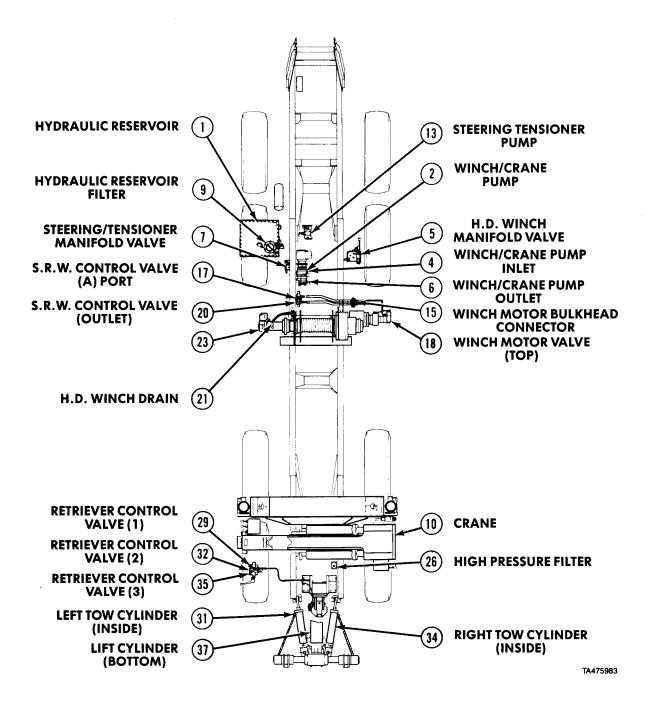


Figure 19-11. Hydraulic Lines - M984E1 Sheet 2 of 2.

f. Follow-on Maintenance.

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check hydraulic lines for leaks.

19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (M977, M984E1, M985).

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models

M977, M984E1, M985

Test Equipment

None

Special Tools

None

Supplies

Solvent, dry cleaning, Item 47, Appendix C Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Shut off engine.

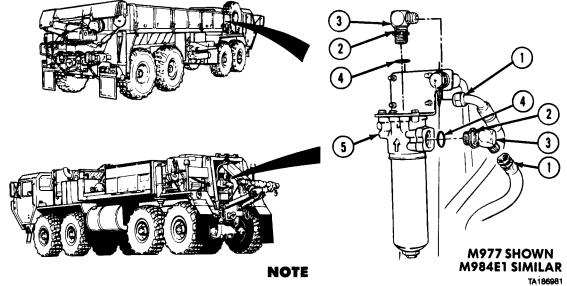
Special Environmental Conditions

None

General Safety Instructions

None

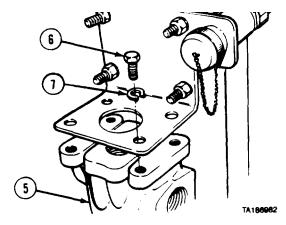
a. Removal.



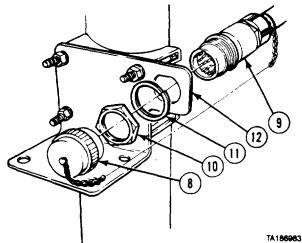
Tag and mark hoses and fittings before removal.

- (1) Disconnect two hoses (1).
- (2) Loosen two nuts (2). Remove two fittings (3) and preformed packings (4) from hydraulic fluid filter (5).

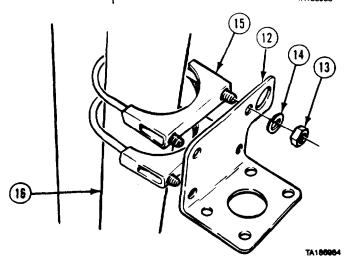
(3) Remove four screws (6), lockwashers (7), and hydraulic fluid filter (5).



- (4) Remove protective cap (8) from remote control connector (9).
- (5) Remove nut (10), lockwasher (11), and remote control cable connector (9) from mounting bracket (12).



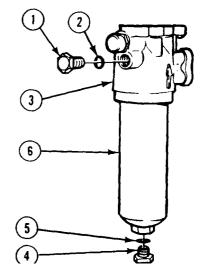
- (6) Remove four nuts (13). lockwashers (14). and mounting bracket (12) from two clamps (15).
- (7) Remove two clamps (15) from tire davit (16).



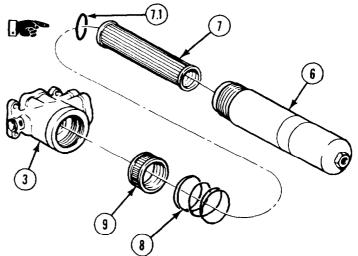
19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (CONT).

b. Disassembly.

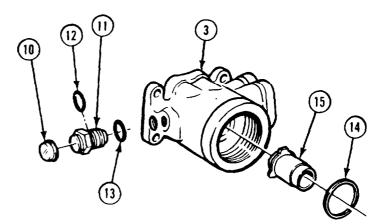
- (1) Remove bleed plug (1) and preformed packing (2) from head (3).
- (2) Remove bleed plug (4) and preformed packing (5) from bowl (6). Drain fluid.
- (3) Remove bowl (6) from head (3).



- (4) Remove filter (7) and preformed packing (7.1) from bowl (6).
- (5) Remove spring (8) and filter (9) from head (3).



- (6) Remove cover (10) and differential pressure device (11) from head (3).
- (7) Remove preformed packings (12) and 13) from differential pressure device (11).
- (8) Remove retaining ring (14) and valve (15) from head (3).



c. Cleaning/Inspection.

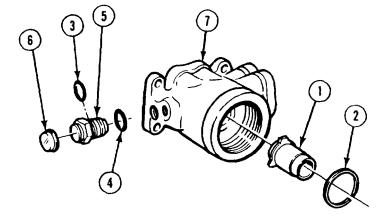
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in drycleaning solvent
- (2) Inspect each part for damage.
- (3) Replace damaged parts.

d. Assembly.

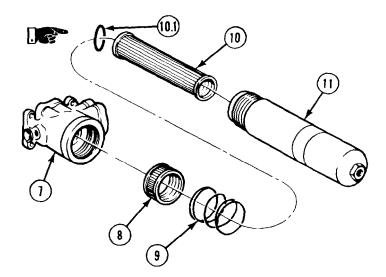
- (1) Install valve (1) with retaining ring (2).
- (2) Install preformed packings (3 and 4) on differential pressure device (5).
- (3) Install differential pressure device (5) and cover (6) in head (7).



NOTE

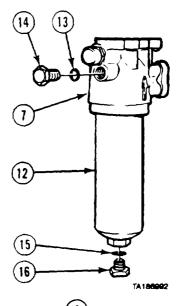
Side with seal faces up.

- (4) Install filter (8) and spring (9) in head (7).
- (5) Install filter (10) and preformed packing (10.1) in bowl (11).
- (6) Install bowl (11) in head (7) and tighten to 15 lb-ft (20 $N \bullet m$).



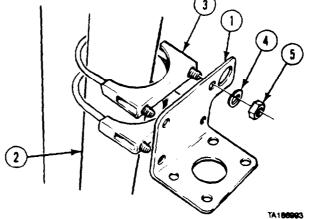
19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (M977, M984E1, M985) (CONT).

- (7) Install preformed packing (13) and bleed plug (14) in head (7).
- (8) Install preformed packing (15) and bleed plug (16) in bowl (12).

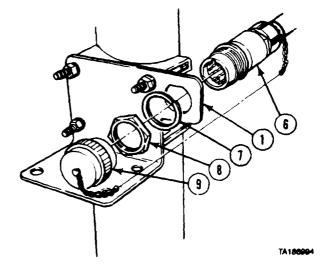


e. Installation.

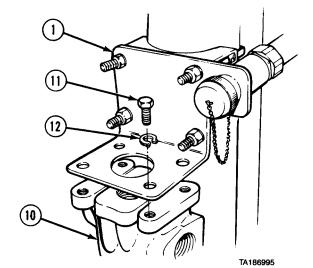
- (1) Install mounting bracket (1) on tire davit (2) with two clamps (3).
- (2) Install four lockwashers (4) and nuts (5) on two clamps (3). Do not tighten.



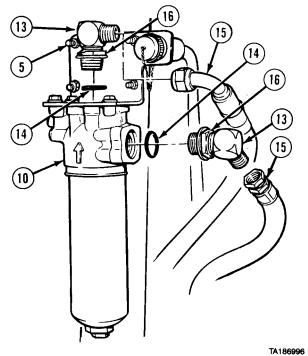
- (3) Install remote control connector (6) on mounting bracket (1) with lockwasher (7) and nut (8).
- (4) Install protective cap (9) on remote control connector (6).



(5) Install hydraulic fluid filter (10) on mounting bracket (1) with four screws (11) and lockwashers (12).



- (6) Install two hydraulic hose fittings (13) on hydraulic fluid filter (10) with two preformed packings (14).
- (7) Connect two hydraulic hoses (15) to fittings (13). Tighten nuts (16) on fittings.
- (8) Tighten four nuts (5).



f. Follow-on Maintenance. Operate crane and check connections and filter for leaks (TM 9-2320-279-10).

END OF TASK

CHAPTER 20 ARCTIC KIT MAINTENANCE

Contents	Para	Page
General	20-1	20-1
Arctic Heater Kit Removal/Installation	20-2	20-1

Section I. INTRODUCTION

20-1 GENERAL. This chapter contains maintenance instructions for removing and installing the arctic kit authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. ARCTIC HEATER KIT

Arctic Heater Kit Maintenance Instructions

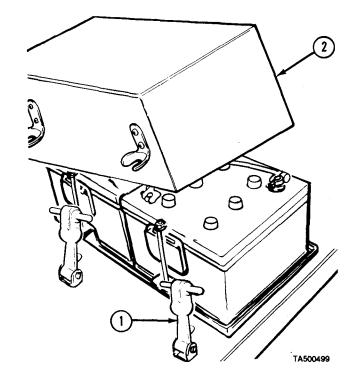
This task covers:		
a. Removalb. Installationc. Follow-on	Maintenance	
INITIAL SETUP		
Models	References	
All	None	
Test Equipment	Equipment Condition	
None	TM or Para	Condition Description
	TM 9-2320-279-10	Shut off engine.
Special Tools	TM 9-2320-279-10	Spare tire removed.
None	TM 9-2320-279-10	Engine cover open.
	TM 9-2320-279-10	Engine side panels
Supplies		removed.
Tags, identification, Item 48, Appendix C	Para 6-2	Radiator and engine
Compound, sealing, pipe thread, Item 18,		block drained.
Appendix C	Para 7-92	Battery box removed.
Ties, cable, plastic, Item 52, Appendix C		·
Adhesive, Item 3.1, Appendix C	Special Environmental Conditions	
Adhesive, Item 3.3, Appendix C	None	
Personnel Required	General Safety Instruction	ıs
MOS 63S, Wheel vehicle mechanic (2)	None	

20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

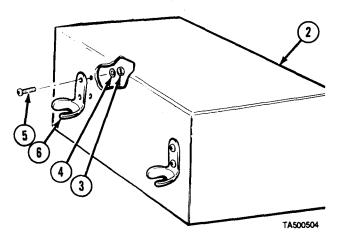
a. Removal.

NOTE

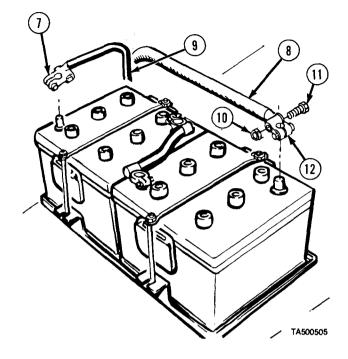
- This procedure covers removal of complete arctic heater kit. If not necessary to remove complete kit, remove only items necessary to complete task.
- Tag and mark all wires and cables before removal.
- Cut plastic cable ties as required.
- (1) Loosen three rubber hood hooks (1) and remove battery box cover (2).



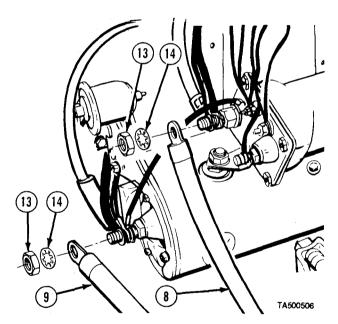
(2) Remove six locknuts (3), washers (4), screws (5), and three hood brackets (6) from battery box cover (2).



- (3) Loosen two nuts (7).
- (4) Remove two cables (8) and (9).
- (5) Remove two nuts (10), screws (11), and terminals (12) from cables (8) and (9).

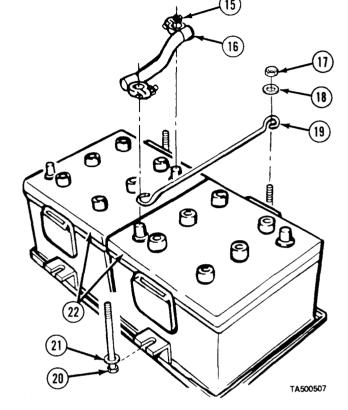


- (6) Remove two nuts (13) and lockwashers (14).
- (7) Remove two cables (8) and (9).

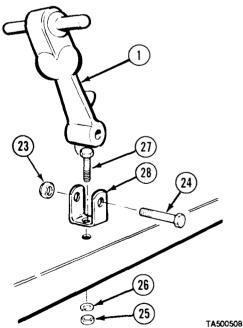


20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

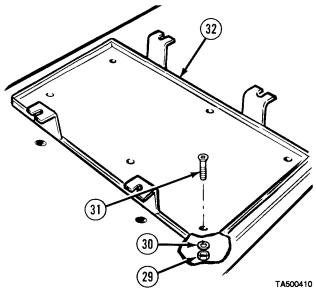
- (8) Loosen two nuts (15) and remove jumper cable (16).
- (9) Remove four locknuts (17), washers (18), and two holddowns (19).
- (10) Remove four screws (20) and washers (21).
- (11) Note position and remove two batteries (22).



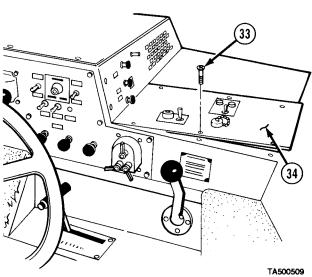
- (12) Remove three locknuts (23), screws (24), and rubber hooks (1).
- (13) Remove three nuts (25), lockwashers (26), screws (27), and hook brackets (28).



(14) Remove six locknuts (29), washers (30), screws (31), and battery box (32).

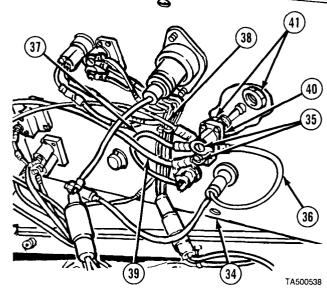


(15) Remove six screws (33) and lift heater compartment cover (34).

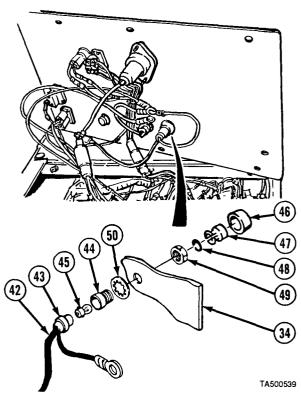


20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

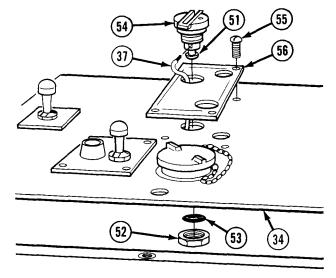
- (16) Remove two screws (35) and disconnect four wires (36 thru 39) from coolant pump switch (40).
- (17) Remove nut (41) and coolant pump switch (40) from heater compartment cover (34).
- (18) Remove remaining nut (41).



- (19) Cut ground wire (42), allowing enough length to connect ground wire at installation.
- (20) Pull indicator light socket (43) out of housing (44).
- (21) Remove lamp (45) from indicator light socket (43).
- (22) Remove shield (46).
- (23) Remove lens (47) from housing (44). Remove force ring (48) from lens.
- (24) Remove nut (49), housing (44), and lockwasher (50) from heater compartment cover (34).

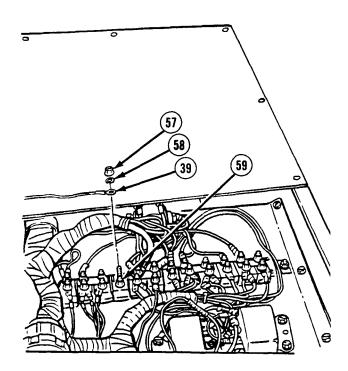


- (25) Loosen screw (51) and remove wire (37).(26) Remove nut (52), washer (53), and receptacle (54).
- (27) Remove four screws (55) and data plate (56) from heater compartment cover (34).



TA500411

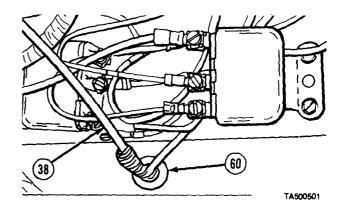
(28) Remove nut (57), lockwasher (58), and wire (39) from circuit breaker (59).



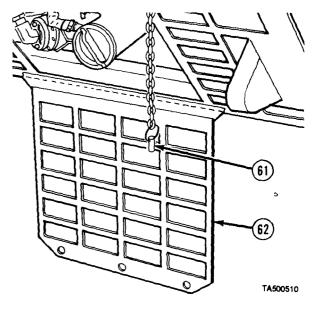
TA500500

20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

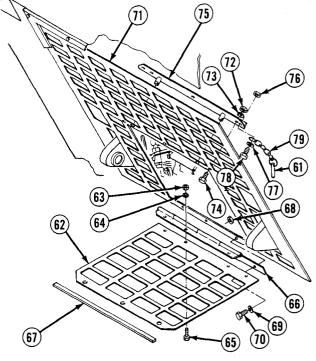
(29) Push wire (38) through hole (60).



(30) Remove two pins (61) and open door (62).

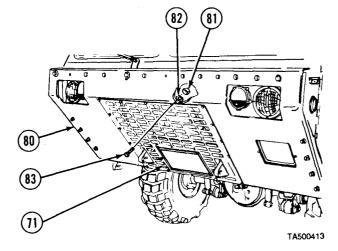


- (31) Remove four nuts (63), lockwashers (64), screws (65) and door (62) from hinge (66).
- (32) If damaged, remove rubber strip (67) from door (62).
- (33) Remove three locknuts (68), washers (69), screws (70), and hinge (66) from skid plate grille (71).
- (34) Remove three nuts (72), lockwashers (73), screws (74), and stiffener (75).
- (35) Remove two locknuts (76), washers (77), screws (78), and chains (79).
- (36) Remove two pins (61) from chains (79).



TA500412

- (37) While Soldier A holds skid plate grille (71) to skid plate (80), Soldier A removes 13 locknuts (81), washers (82), and screws (83).
- (38) Soldier A and Soldier B removes skid plate grille (71).



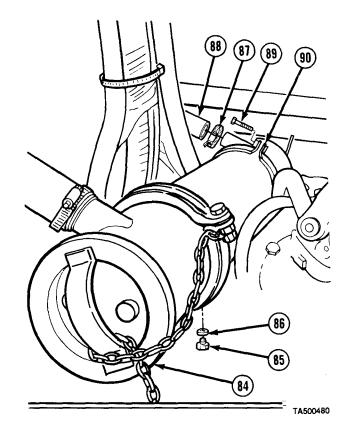
20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

(39) Remove water jacket (84) as follows:

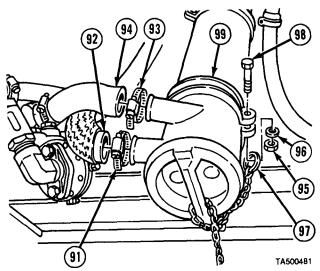
WARNING

Water jacket and drain plug may be very hot if arctic heater has been operating. Do not touch hot drain plug or water jacket or personal injury may result.

- (a) Position five gallon (18.93 liter) drain pan under water jacket (84).
- (b) Remove drain plug (85) and washer (86) and allow fluid to drain from water jacket (84).
- (c) Loosen clamp (87) and remove hose (88) from water jacket (84).
- (d) Remove screw (89) and loosen clamp (90).



- (e) Loosen clamp (91) and remove exhaust pipe (92) from water jacket (84).
- (f) Loosen clamp (93) and remove hose (94) from water jacket (84).
- (g) Remove nut (95), washer (96), and safety chain (97).
- (h) Remove screw (98) and loosen clamp (99).
- (i) Remove water jacket (84) from two clamps (90) and (99).

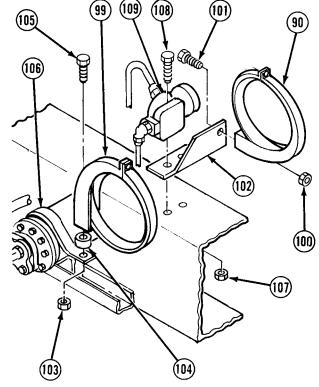


- (40) Remove nut (100), screw (101), and clamp (90) from bracket (102).
- (41) Remove nut (103), spacer (104), screw (105), and clamp (99) from bracket (106).

NOTE

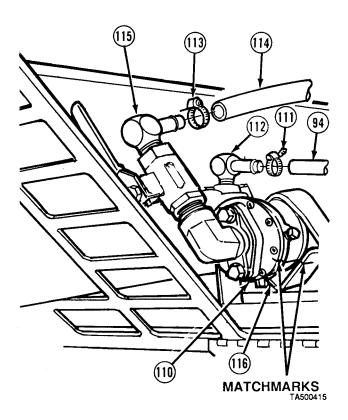
Quick release valve is mounted to bracket only on model M984A1.

(42) Remove two nuts (107), screws (108), quick release valve (109), and bracket (102).



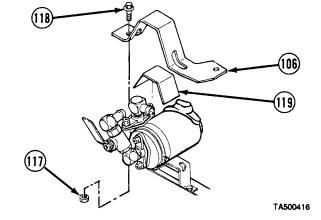
TA500414

- (43) Remove coolant pump (110) as follows:
 - (a) Loosen clamp (111) and remove hose (94) from elbow (112).
 - (b) Loosen clamp (113) and remove hose (114) from elbow (115).
 - (c) Matchmark coolant pump (110) and bracket (116).

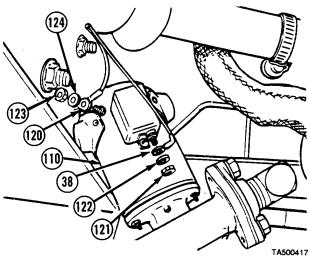


20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

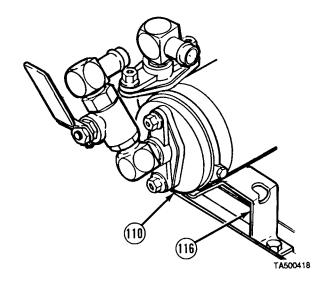
- (d) Remove two nuts (117), screws (118), and bracket (106).
- (e) If damaged remove rubber (119) from bracket (106).



- (f) Pull outward on coolant pump (110) until wires (38) and (120) are accessible.
- (g) Remove nut (121), lockwasher (122), and wire (38) from coolant pump (110).
- (h) Remove nut (123), lockwasher (124) and wire (120) from coolant pump (110).

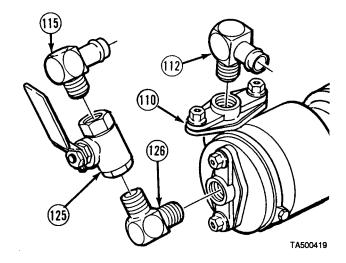


(i) Remove coolant pump (110) from bracket (116).

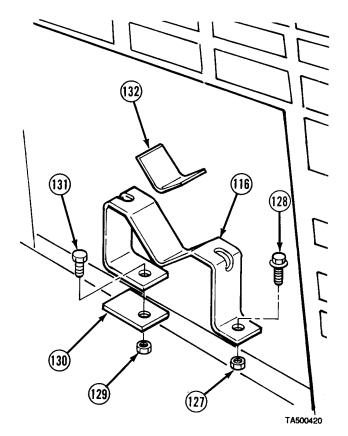


20-12

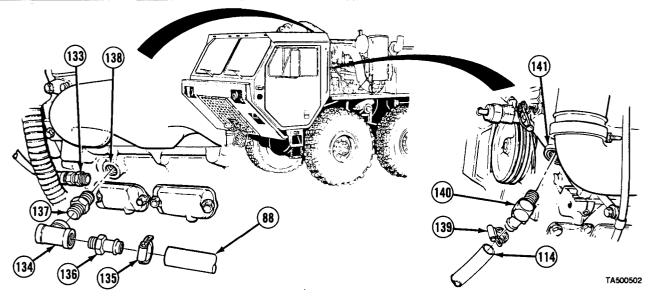
- (44) Remove elbow (112) from coolant pump (110).
- (45) Remove elbow (115), valve (125), and elbow (126) from coolant pump (110).



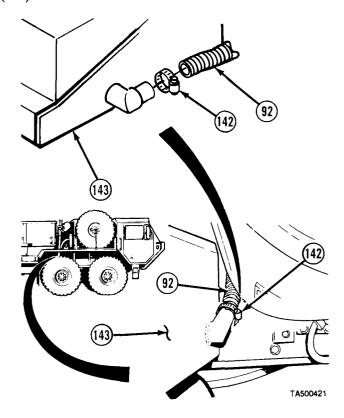
- (46) Remove nut (127) and screw (128) from bracket (116).
- (47) Remove nut (129), plate (130), screw (131), and bracket (116).
- (48) If damaged remove rubber (132) from bracket (116).



20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).



- (49) Remove hose (133) from tee (134).
- (50) Loosen clamp (135) and remove hose (88) from adapter (136).
- (51) Remove adapter (136) from tee (134).
- (52) Remove tee (134) and nipple (137) from engine block (138).
- (53) Loosen clamp (139) and remove hose (114) from adapter (140).
- (54) Remove adapter (140) from thermostat housing (141).
- (55) Loosen clamp (142) and remove exhaust pipe (92) from battery box (143) and remove exhaust pipe from vehicle.



NOTE

Do steps (56) and (57) only if complete arctic heater kit is to be removed.

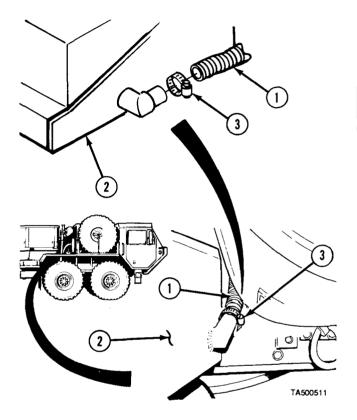
- (56) Remove alternator belt set (para 6-15).
- (57) Remove fan belt set (para 6-17).

b. Installation.

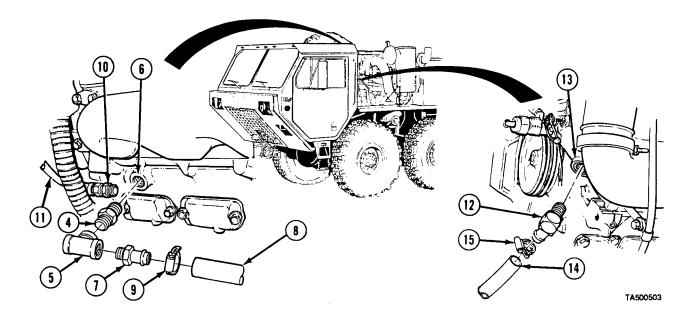
NOTE

This procedure covers installation of complete arctic heater kit. If complete kit was not removed, do only steps necessary to complete task.

- (1) Install fan belt set (para 6-17).
- (2) Install alternator belt set (para 6-15).
- (3) Install exhaust pipe (1) within frame rail and attach to battery box (2) with clamp (3).



20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (4) Apply pipe thread sealing compound to threads of nipple (4) and install nipple and tee (5) in engine block (6).
- (5) Apply pipe thread sealing compound to threads of adapter (7) and install in tee (5).
- (6) Install hose (8) on adapter (7) with clamp (9).
- (7) Apply pipe thread sealing compound to threads of adapter (10), in hose (11), and install adapter in tee (5).
- (8) Apply pipe thread sealing compound to threads of adapter (12) and install in thermostat housing (13).
- (9) Install hose (14) on adapter (12) with clamp (15).

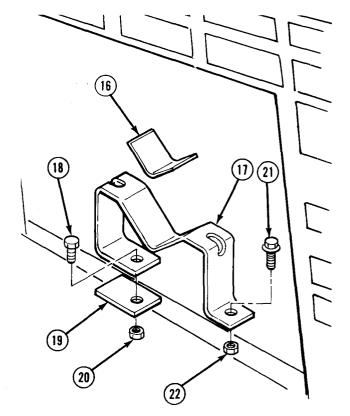
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

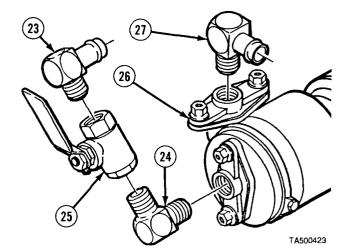
Ensure that surface of bracket is clean.

- (11) If removed, apply adhesive (item 3.1, Appendix C) to rubber (16) and install on bracket (17). Apply hand pressure until adhesive sets.
- (12) Install bracket (17) with screw (18), plate (19), and nut (20).
- (13) Install screw (21) and nut (22).



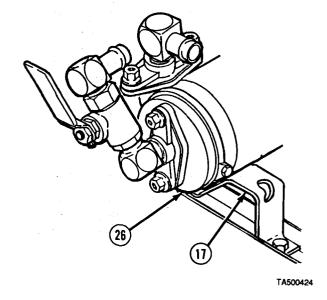
TA500422

- (14) Apply pipe thread sealing compound to threads of elbows (23) and (24).
- (15) Install elbow (23), valve (25) and elbow (24) in coolant pump (26).
- (16) Apply pipe thread sealing compound to threads of elbow (27) and install in coolant pump (26).

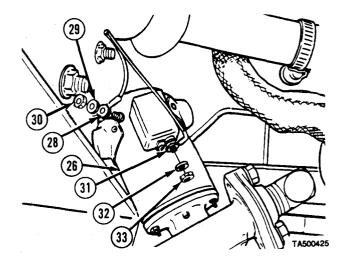


20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

- (17) Install coolant pump (26) as follows:
 - (a) Position coolant pump (26) on bracket (17).



- (b) Install wire (28) on coolant pump (26) with lockwasher (29) and nut (30).
- (c) Install wire (31) on coolant pump (26) with lockwasher (32) and nut (33).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

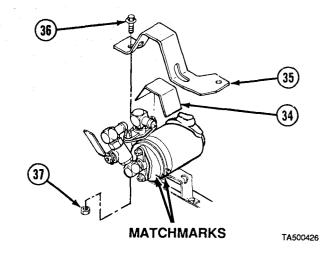
Ensure that surface of bracket is clean.

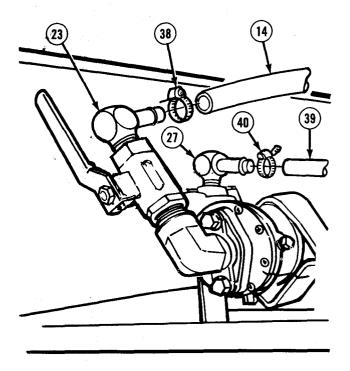
(d) If removed, apply adhesive (item 3.1, Appendix C) to rubber (34) and install on bracket (35). Apply hand pressure until adhesive sets.

NOTE

Ensure matchmarks on coolant pump and bracket are alined.

- (e) Install bracket (35) with two screws (36) and nuts (37).
- (f) Install hose (14) on elbow (23) with clamp (38).
- (g) Install hose (39) on elbow (27) with clamp (40).





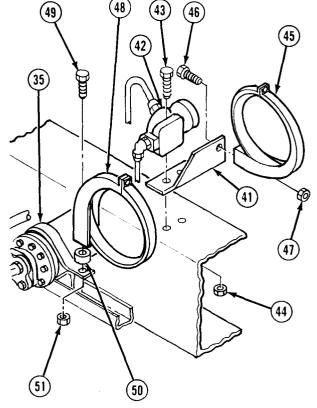
TA500427

20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

NOTE

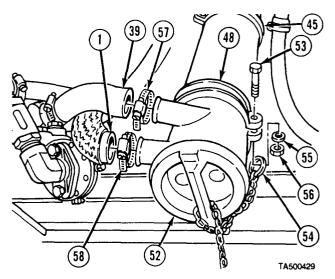
Quick release valve is mounted to bracket only on model M984A1.

- (18) Install bracket (41) and quick release valve (42) with two screws (43) and nuts (44).
- (19) Install clamp (45) on bracket (41) with screw (46) and nut (47).
- (20) Install clamp (48) on bracket (35) with screw (49), spacer (50), and nut (51).

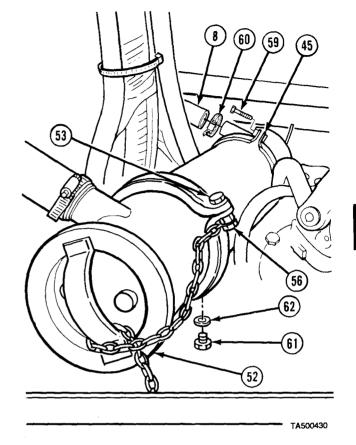


TA500428

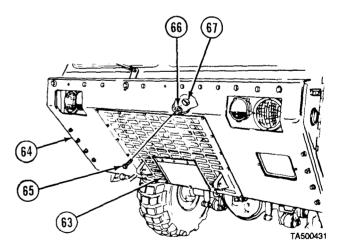
- (21) Install water jacket (52) as follows:
 - (a) Position water jacket (52) in two clamps (45) and (48).
 - (b) Install screw (53) in clamp (48). Do not tighten screw.
 - (c) Install safety chain (54) on screw (53) with washer (55) and nut (56). Do not tighten nut.
 - (d) Install hose (39) on water jacket (52) with clamp (57).
 - (e) Install exhaust pipe (1) on water jacket (52) with clamp (58).



- (f) Install screw (59) in clamp (45). Do not tighten screw.
- (g) Install hose (8) on water jacket (52) with clamp (60).
- (h) Tighten screws (53), (59), and nut (56).
- (i) Install drain plug (61) with washer (62) in water jacket (52).



- (22) Soldier A and Soldier B position skid plate grille (63) on skid plate (64).
- (23) While Soldier A holds skid plate grille (63) in position, Soldier B installs 13 screws (65), washers (66), and locknuts (67).



20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

- (24) Install two pins (68) on chains (69).
- (25) Install two chains (69) on stiffener (70) with two screws (71), washers (72), and locknuts (73).
- (26) Install stiffener (70) with three screws (74), lockwashers (75), and nuts (76).
- (27) Install hinge (77) on skid plate grille (63) with three screws (78), washers (79), and locknuts (80).

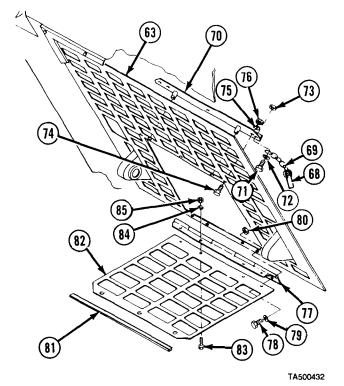
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

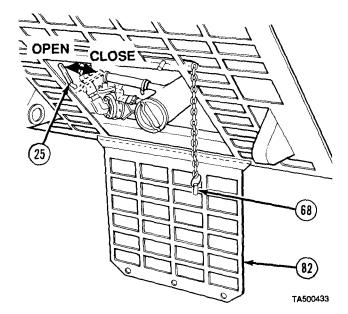
NOTE

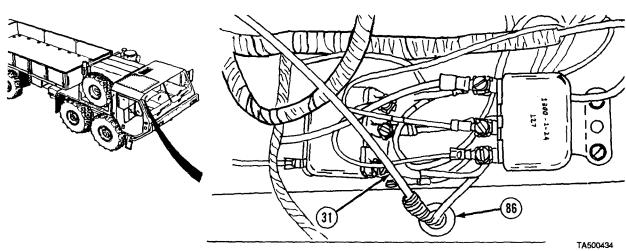
Ensure that rubber mounting surface of door is clean.

- (28) If removed, apply adhesive (item 3.3, Appendix C) to rubber (81) and install on door (82). Apply hand pressure until adhesive sets.
- (29) Install door (82) on hinge (77) with four screws (83), lockwashers (84), and nuts (85).



- (30) Close valve (25).(31) Close door (82) and secure with two pins (68).

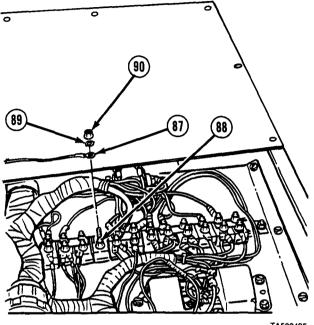




(32) Push wire (31) up through hole (86).

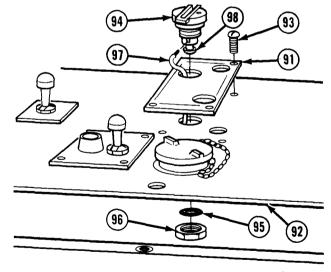
20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

(33) Install wire (87) on circuit breaker (88) with lockwasher (89) and nut (90).



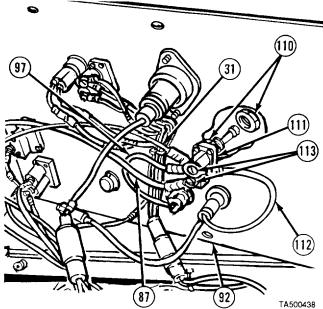
TA500435

- (34) Install data plate (91) on heater compartment cover (92) with four screws (93).
- (35) Install receptacle (94) with washer (95) and nut (96).
- (36) Install wire (97) in receptacle (94) and tighten screw (98).



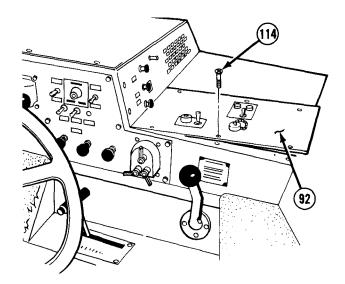
TA500436

- (37) Install lockwasher (99) on housing (100) and insert housing in heater compartment cover (92). Secure with nut (101).
- (38) Install force ring (102) in lens (103) and install lens in housing (100).
- (39) Install shield (104).
- (40) Install lamp (105) in indicator light socket (106).
- (41) Attach ground wire (107) to ground wire (108) with electrical butt connector (109).
- (42) Install indicator light socket (106) in housing (100).
- (43) Install nut (110) on coolant pump switch (111).
- (44) Install coolant pump switch (111) in heater compartment cover (92) with remaining nut (110).
- (45) Install three wires (31), (97), and (112) on output side of coolant pump switch (111) with screw (113).
- (46) Install wire (87) on input side of coolant pump switch (111) with remaining screw (113).



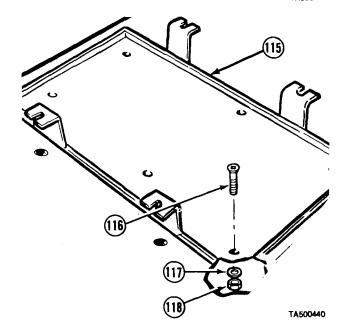
20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

(47) Install heater compartment cover (92) with six screws (114).

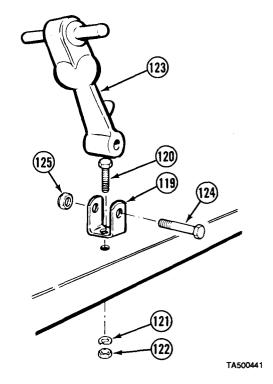


TA500439

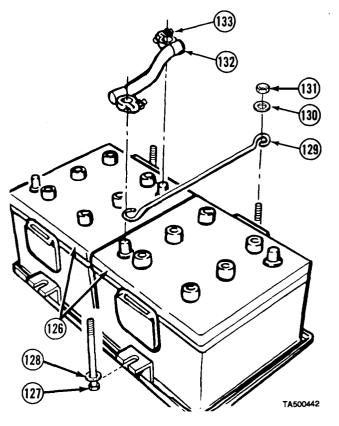
(48) Install battery box (115) with six screws (116), washers (117), and locknuts (118).



- (49) Install three hook brackets (119) with screws (120), lockwashers (121), and nuts (122).
- (50) Install three rubber hooks (123) with screws (124) and locknuts (125).

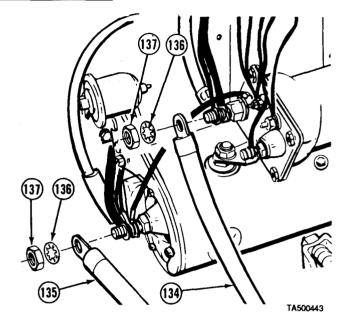


- (51) Install two batteries (126).
- (52) Install four screws (127) and washers (128).
- (53) Install two holddowns (129) with four washers (130) and locknuts (131).
- (54) Install jumper cable (132) and tighten two nuts (133).

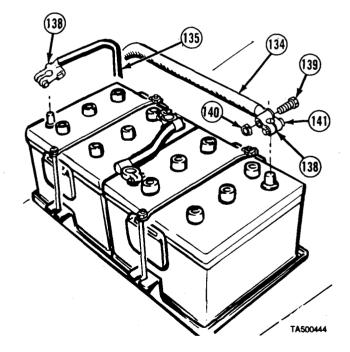


20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

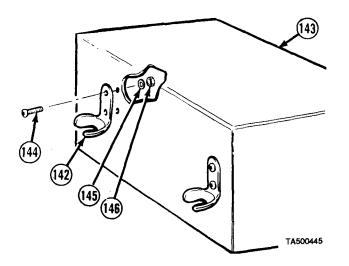
(55) Install two cables (134) and (135) with lockwashers (136) and nuts (137).



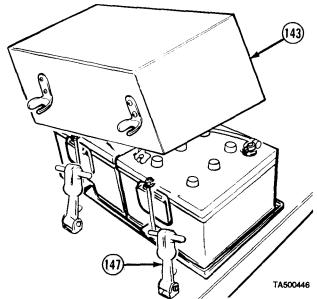
- (56) Install terminals (138) on cables (134) and (135) with screws (139) and nuts (140).
- (57) Install two cables (134) and (135) and tighten nuts (141).



(58) Install three hood brackets (142) on battery box cover (143) with six screws (144), washers (145), and locknuts (146).



(59) Install battery box cover (143) with three rubber hood hooks (147).

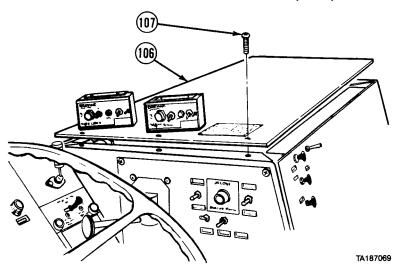


c. Follow-on Maintenance.

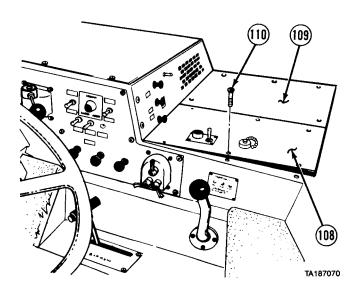
- (1) Install battery box (para 7-92).
- (2) Fill cooling system (para 6-2).
- (3) Install engine side panels (TM 9-2320-279-10).
- (4) Close engine cover (TM 9-2320-279-10).
- (5) Stow spare tire (TM 9-2320-279-10).

END OF TASK

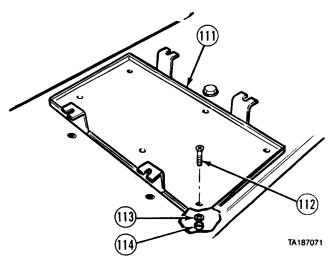
All data on pages 20-30 thru 20-68, section III, deleted.



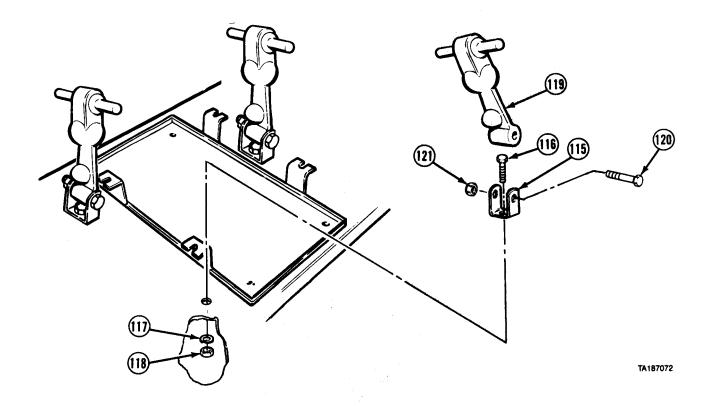
- (49) Install heater compartment cover (106) with eight screws (107).
- (50) Install two heater compartment covers (108 and 109) with 11 screws (110).



(51) Install battery box (111) with six screws (112), washers (113), and locknuts (114).

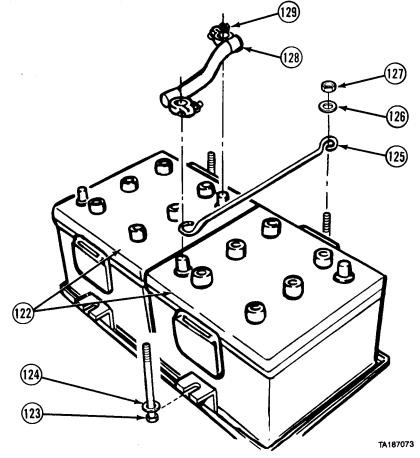


20-2. ENGINE ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

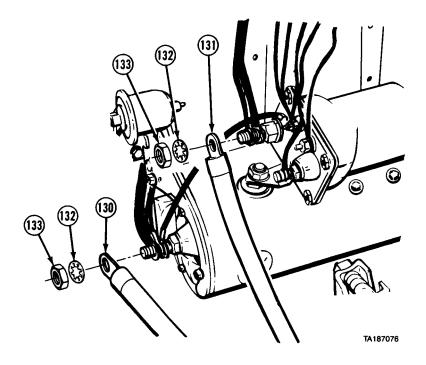


- (52) Install three hook brackets (115) with three screws (116), lockwashers (117), and nuts (118).
- (53) Install three rubber hood hooks (119) with three screws (120) and locknuts (121).

- (54) Install two batteries (122).
- (55) Install four screws (123)
- and washers (124). (56) Install two holddowns (125) with four washers (126) and locknuts (127).
- (57) Install jumper cable (128) and tighten two nuts (129).

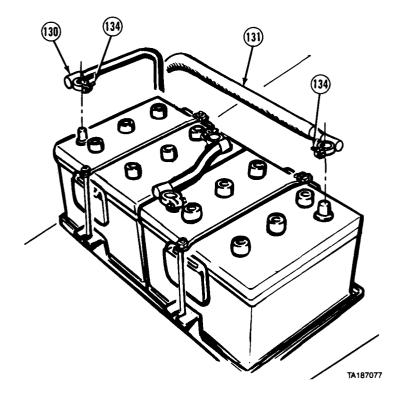


(58) Install two cables (130 and 131) with two lockwashers (132) and nuts (133).

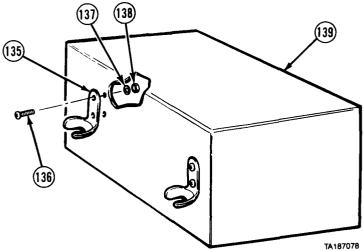


20-2. ENGINE ARCTIC HEATER KIT REMOVAL/INSTALLATION (CONT).

(59) Install two cables (130 and 131) and tighten two nuts (134).



(60) Install three hood brackets (135) with six screws (136), washers (137), and locknuts (138) on battery box cover (139).

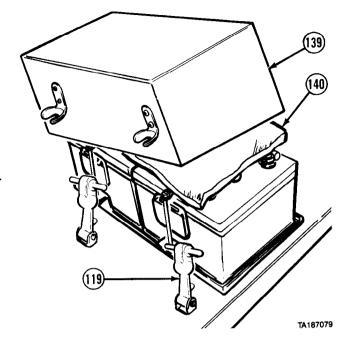


- (61) Install insulation (140).
- (62) Install battery box cover (139) with rubber hood hooks (119).

c. Follow-on Maintenance.

- (1) Fill cooling system (para 6-2).
- (2) Install battery box (para 7-92).
- (3) Connect batteries (para 7-91).
- (4) Stow spare tire (TM 9-2320-279-10).
- (5) Install engine side panels (TM 9-2320-279-10).
- (6) Close engine cover (TM 9-2320-279-10).
- (7) Check position of engine arctic heater (TM 9-2320-279-10).

END OF TASK



20-3. ENGINE ARCTIC HEATER KIT IGNITER REMOVAL/INSTALLATION.

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

TM 9-2320-279-10 Spare tire removed.

TM 9-2320-279-10 Engine cover open.

TM 9-2320-279-10 Engine side panel removed.

Condition Description

Para 7-91 Batteries disconnected.

 $Special\ Environmental\ Conditions$

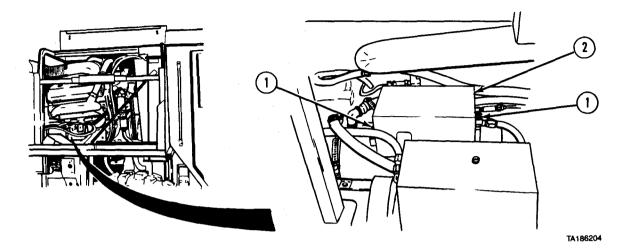
None

General Safety Instructions

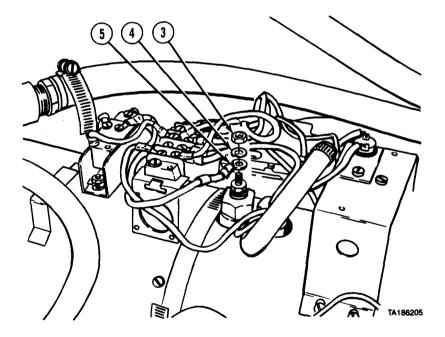
None

20-3. ENGINE ARCTIC HEATER KIT IGNITER REMOVAL/INSTALLATION (CONT).

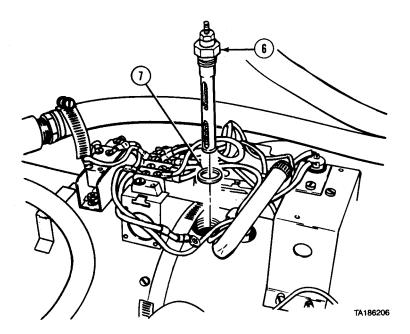
a. Removal.



- (1) Loosen two screws (1) and remove cover (2).
- (2) Remove nut (3), lockwasher (4), and wire (5).

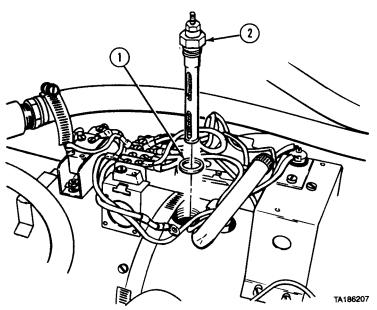


(3) Remove igniter (6) and gasket (7).



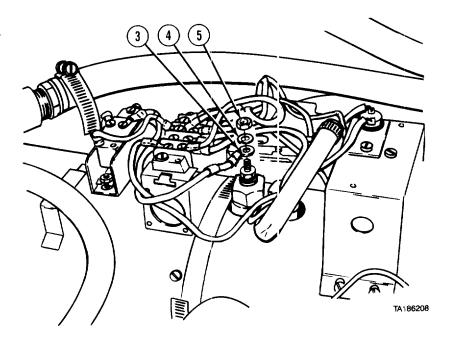
b. Installation.

(1) Install gasket (1) and igniter (2).



20-3. ENGINE ARCTIC HEATER KIT IGNITER REMOVAL/INSTALLATION (CONT).

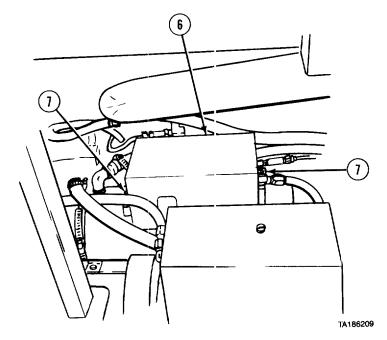
(2) Install wire (3) with lockwasher (4) and nut (5).



(3) Install cover (6) and tighten two screws (7).

c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine (TM 9-2320-279-10).
- (3) Check operation of engine arctic heater (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).
- (5) Install engine side panel (TM 9-2320-279-10).
- (6) Close engine cover (TM 9-2320-279-10).
- (7) Stow spare tire (TM 9-2320-279-10).



CHAPTER 21 ARMAMENT EQUIPMENT MAINTENANCE

Contents	Para	Page
General	21-1	21-1
Machine Gun Ring Removal/Installation	21-2	21-1
Machine Gun Ring Front Support Removal/Installation	21-3	21-3
Machine Gun Ring Rear Support Removal/Installation	21-4	21-4
Operator's Platform Support Removal/Installation	21-5	21-5
Rifle Mounting Kit Removal/Installation	21-6	21-7

Section I. INTRODUCTION

21-1. GENERAL. This chapter contains maintenance instructions for removing, replacing, and installing armament equipment components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

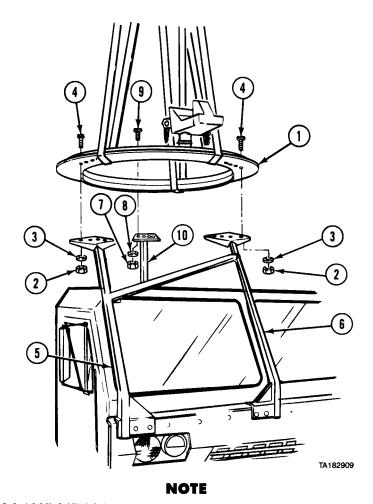
Section II. ARMAMENT

Armament Equipment Maintenance Instructions

21-2. MACHINE GUN RING REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation	c. Follow-on Mainte	nance
INITIAL SETUP		
Models All	<i>References</i> TM 9-1005-245-14	
Test Equipment None	Equipment Conditio TM or Para	n Condition Description
Special Tools None	TM 9-2320-279-10 Special Environmen	Shut off engine.
Supplies None	None General Safety Instr	
Personnel Required MOS 63S, Heavy wheel vehicle mechanic	None	

21-2. MACHINE GUN RING REMOVAL/INSTALLATION (CONT).

a. Removal.



Refer to TM 9-1005-245-14 for further information on the machine gun ring.

- (1) Support machine gun ring (1) with suitable lifting device.
- (2) Remove eight nuts (2), washers (3), and screws (4) from machine gun ring (1) and front supports (5 and 6).
- (3) Remove four locknuts (7), washers (8), and screws (9) from machine gun ring (1) and rear support (10).
- (4) Remove machine gun ring (1).

b. Installation.

- (1) Using suitable lifting device, position machine gun ring (1) on supports (5, 6, and 10).
- (2) Install eight screws (4), washers (3), and nuts (2) in machine gun ring (1) and front supports (5 and 6). Do not tighten.
- (3) Install four screws (9), washers (8), and locknuts (7) in machine gun ring (1) and rear support (10).
- (4) Tighten screws (4 and 9) and nuts (2 and 7).
- c. Follow-on Maintenance. None.

21-3. MACHINE GUN RING FRONT SUPPORT REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para (

Condition Description

TM 9-2320-279-10 Shut off engine.

Para 21-2 Machine gun ring removed.

Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.

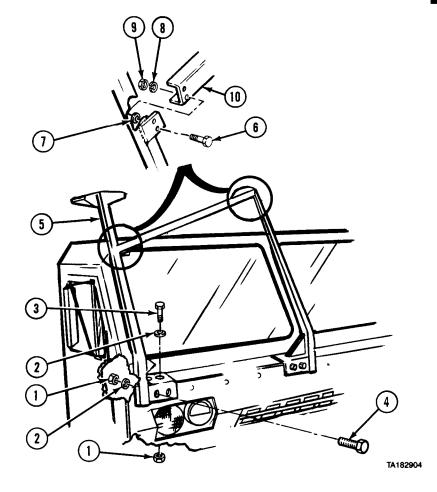
- (1) Remove six nuts (1), washers (2), four screws (3), and four screws (4).
- (2) Remove front support (5).
- (3) Remove four screws (6), washers (7), lockwashers (8), and nuts (9).
- (4) Remove front support channel (10).

b. Installation.

- (1) Install front support channel (10) with four screws (6), washers (7), lockwashers (8), and nuts (9).
- (2) Using suitable lifting device, position support assembly (5).
- (3) Install support assembly (5) with four screws (3), four screws (4), six washers (2), and six nuts (1).

c. Follow-on Maintenance.

Install machine gun ring (para 21-2).



21-4. MACHINE GUN RING REAR SUPPORT REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Spare tire removed.

Para 21-2 Machine gun ring removed.

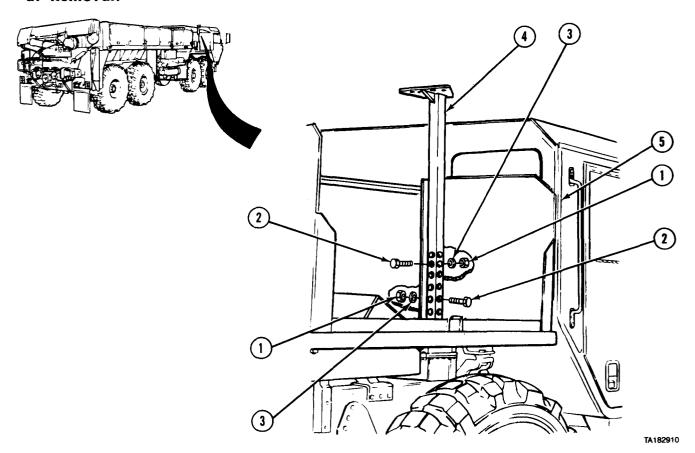
Special Environmental Conditions

None

General Safety Instructions

None

a. Removal.



- (1) Remove 12 nuts (1), screws (2), and washers (3).
- (2) Remove machine gun ring rear support (4) from tire carrier (5).

b. Installation.

- (1) Position machine gun ring rear support (4) on tire carrier (5).
- (2) Install machine gun ring rear support (4) with 12 screws (2), washers (3), and nuts (1).

c. Follow-on Maintenance.

- (1) Install machine gun ring (para 21-2).
- (2) Stow spare tire (TM 9-2320-279-10).

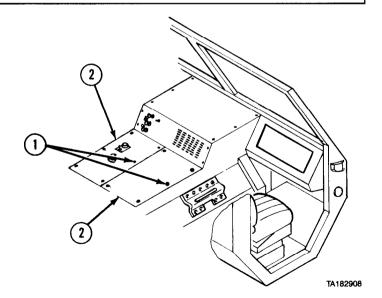
END OF TASK

21-5. OPERATOR'S PLATFORM SUPPORT REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance	
INITIAL SETUP		
Models All	References None	
Test Equipment	$Equipment\ Condition$	
None Special Tools	TM or Para Condition Description TM 9-2320-279-10 Shut off engine.	
None	$Special\ Environmental\ Conditions$	
Supplies	None	
None	General Safety Instructions	
Personnel Required	None	

a. Removal.

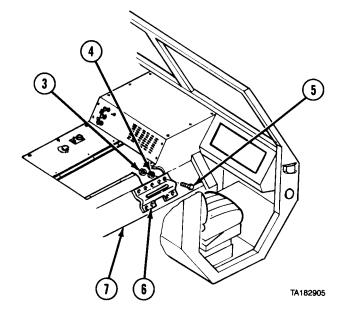
(1) Remove eight screws (1) and remove right heater compartment cover (2).

MOS 63S, Heavy wheel vehicle mechanic



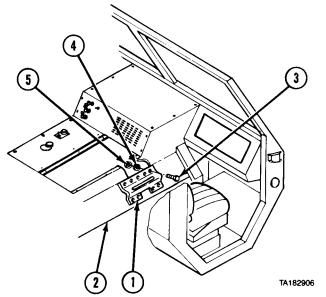
21-5. OPERATOR'S PLATFORM SUPPORT REMOVAL/INSTALLATION (CONT).

(2) Remove five nuts (3), washers (4), and screws (5). Remove operator's platform support (6) from cab bulkhead (7).



b. Installation.

(1) Install operator's platform support (1) on cab bulkhead (2) with five screws (3), washers (4), and nuts (5).

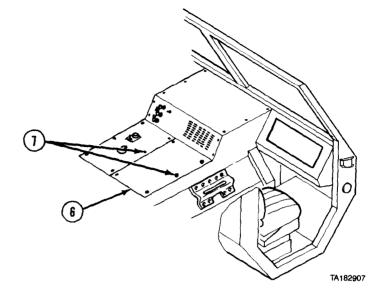


- (2) Install right heater compartment cover (6) with eight screws (7).
- c. Follow-on Maintenance. None.

END OF TASK

 $Personnel\ Required$

MOS 63S, Heavy wheel vehicle mechanic



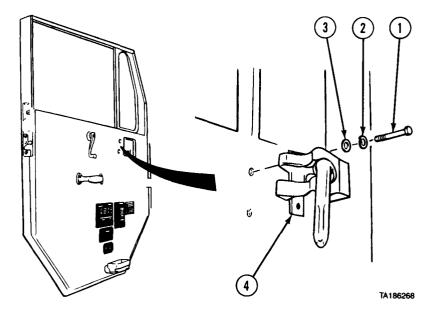
21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION.	
This task covers: a. Removal b. Installation	c. Follow-on Maintenance
INITIAL SETUP	
Models All	References None
Test Equipment None Special Tools	Equipment Condition TM or Para Condition Description TM 9-2320-279-10 Shut off engine.
None Supplies None	Special Environmental Conditions None General Safety Instructions

None

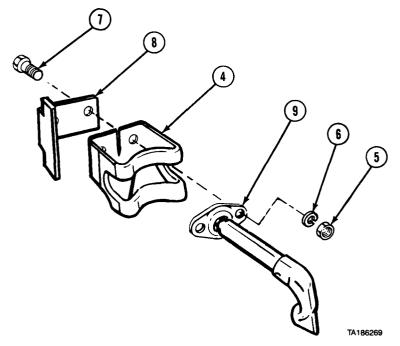
21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION (CONT).

a. Removal.

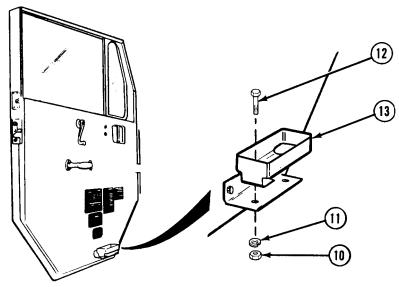
(1) Remove two screws (1), lockwashers (2), washers (3), and catch mount (4).



(2) Remove two nuts (5), lockwashers (6), screws (7), bracket (8), and rifle catch (9) from catch mount (4).

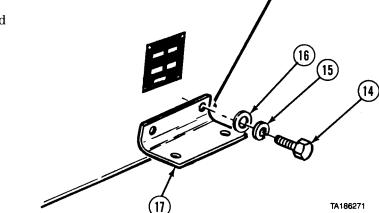


(3) Remove two nuts (10), lockwashers (11), screws (12), and support (13).



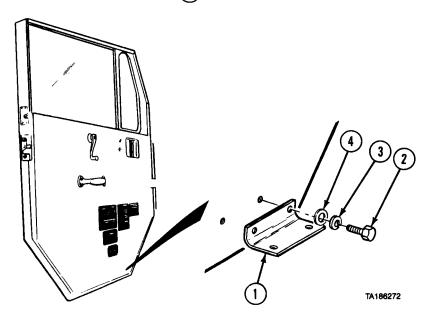
TA186270

(4) Remove two screws (14), lockwashers (15), washers (16), and bracket (17).



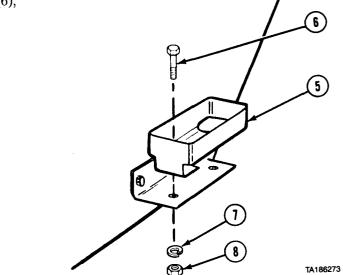
b. Installation.

(1) Install bracket (1) with two screws (2), lockwashers (3), and washers (4).

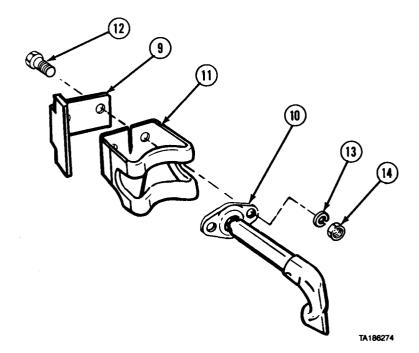


21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION (CONT).

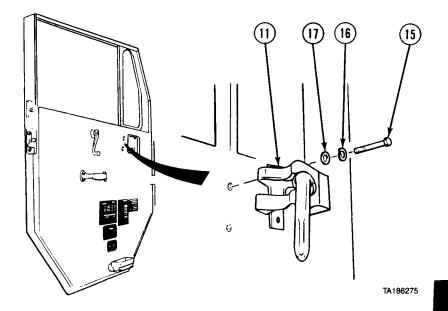
(2) Install support (5) with two screws (6), lockwashers (7), and nuts (8).



(3) Install bracket (9) and rifle catch (10) on catch mount (11) with two screws (12), lockwashers (13), and nuts (14).



- (4) Install catch mount (11) with two screws (15), lockwashers (16), and washers (17).
- **c.** Follow-on Maintenance. None.



CHAPTER 22 NON-ELECTRICAL GAGE MAINTENANCE

Contents	Para	
General	22-1	22-1
Air Pressure Gage Removal/Installation	22-2	22-1
DLPG DISCHARGE PRESSURE GAGE Removal/Installation (M978)	22-3	22-3
VNPG VENTURI/NOZZLE PRESSURE GAGE Removal/Installation (M978)	22-4	22-4
DPG DIFFERENTIAL PRESSURE GAGE Removal/Installation (M979)	22-5	22-5
DPG_DIFFERENTIAL_PRESSURE_GAGE_Mounting_Bracket_Removal/Installation_(M978).		

Section I. INTRODUCTION

22-1. GENERAL. This chapter contains maintenance instructions for removing and installing non-electrical gage components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

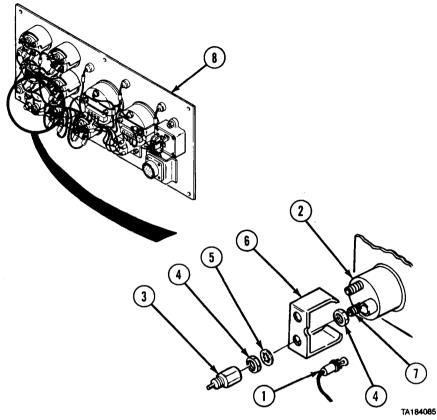
Section II. GAGES

Non-Electrical Gage Maintenance Instructions

22-2. AIR PRESSURE GAGE REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance	
INITIAL SETUP		
Models All	<i>References</i> None	
Test Equipment None Special Tools None Supplies	Equipment Condition TM or Para TM 9-2320-279-10 Para 7-91 Para 7-19	Condition Description Shut off engine. Batteries disconnected. Instrument panel removed.
Compound, sealing, pipe thread, Item 18, Appendix C	Special Environmental Conditions None	
Personnel Required MOS 63S, Heavy wheel vehicle mechanic	General Safety Instr None	uctions

22-2. AIR PRESSURE GAGE REMOVAL/INSTALLATION (CONT).

a. Removal.



- (1) Pull light socket (1) from air pressure gage (2).
- (2) Tag, mark, and remove two connectors (3), nuts (4), lockwashers (5), and bracket (6) from tubes (7).
- (3) Remove air pressure gage (2) from instrument panel (8).

b. Installation.

- (1) Install air pressure gage (2) through instrument panel (8).
- (2) Place bracket (6) over air pressure gage (2) and install two nuts (4) and lockwashers (5).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (3) Apply pipe thread sealing compound to threads of tubes (7).
- (4) Install two connectors (3).
- (5) Install light socket (1) in air pressure gage (2).

c. Follow-on Maintenance.

- (1) Install instrument panel (para 7-19).
- (2) Connect batteries (para 7-91)
- (3) Start engine and build up air pressure (TM 9-2320-279-10).
- (4) Check connections for leaks.
- (5) Shut off engine (TM 9-2320-279-10).

22-3. DLPG DISCHARGE LINE PRESSURE GAGE REMOVAL/INSTALLATION (M978).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Pump module rear access

doors opened.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal. Remove DLPG DISCHARGE LINE PRESSURE GAGE (1) from tube (2).

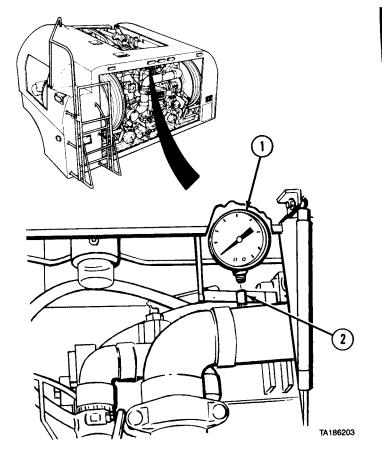
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

b. Installation. Coat threads of DLPG DISCHARGE LINE PRESSURE GAGE (1) with pipe thread sealing compound and install in tube (2).

c. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check DLPG DISCHARGE LINE PRESSURE GAGE for leaks and proper operation.
- (3) Close pump module rear access doors (TM 9-2320-279-10).



22-4. VNPG VENTURI/NOZZLE PRESSURE GAGE REMOVAL/INSTALLATION (M978).

This task covers:

a. Removal

c. Follow-on Maintenance b. Installation

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para $Condition\ Description$ TM 9-2320-279-10 Pump module right rear

access door opened.

TA186110

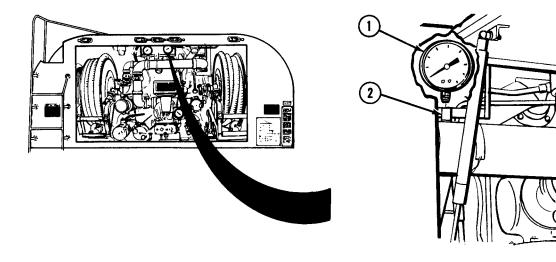
 $Special\ Environmental\ Conditions$

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.



a. Removal. Remove VNPG VENTURI/NOZZLE PRESSURE GAGE (1) from tube (2).

WARNING

Adhesives. solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent. or sealing compound gets on skin or clothing, wash immediately with soap and water.

- **b. Installation.** Coat threads of VNPG VENTURI/NOZZLE PRESSURE GAGE (1) with pipe thread sealing compound and install in tube (2).
 - c. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check VNPG VENTURI/NOZZLE PRESSURE GAGE for leaks and proper operation.
 - (3) Close pump module rear access door (TM 9-2320-279-10).

22-5. DPG DIFFERENTIAL PRESSURE GAGE REMOVAL/INSTALLATION (M978).		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance	
INITIAL SETUP		
Models M978	References None	
Test Equipmen t None Special Tools None	Equipment Condition TM or Para Condition Description TM 9-2320-279-10 Pump module rear access doors opened.	
Supplies Compound. sealing, pipe thread, Item 18, Appendix C Personnel Required MOS 63S. Heavy wheel vehicle mechanic	Special Environmental Condition None General Safety Conditions No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.	

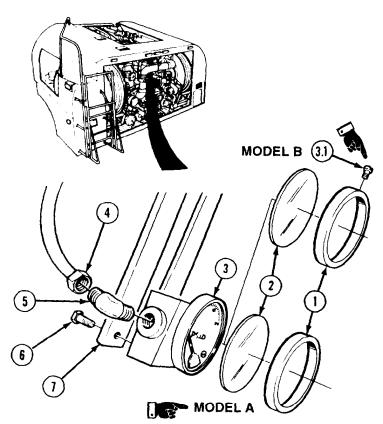
22-5. DPG DIFERENTIAL PRESSURE GAGE REMOVAL/INSTALLATION (M978)

a. Removal.

NOTE

There are two types of gages. Model A bezel has no securing screws; Model B has two screws to secure bezel to gage. Do step (1) for Model A. Do step (1.1) for Model B.

- (1) Remove bezel (1) and lens (2) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (1.1) Remove two screws (3.1), bezel (l), and lens (2) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (2) Disconnect two tubes (4) from elbows (5) on each side of DPG DIFFERENTIAL PRESSURE GAGE (3).
- (3) Remove two elbows (5) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (4) Remove two screws (6) from bracket (7) and remove DPG DIFFERENTIAL PRESSURE GAGE (3).



b. Installation.

NOTE

There are two types of gages. Model A bezel has no securing screws; Model B has two screws to secure bezel to gage. Do step (1) for Model A. Do step (1.1) for Model B.

- (1) Install lens (2) in bezel (1) and install on DPG DIFFERENTIAL PRESSURE GAGE (3).
- (1.1) Install lens (2) in bezel (1) and install on DPG DIFFERENTIAL PRESSURE GAGE (3) with two screws (3.1).
- (2) Install DPG DIFFERENTIAL PRESSURE GAGE (3) on bracket (7) with two screws (6).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (3) Apply pipe thread sealing compound and install two elbows (5) in DPG DIFFERENTIAL PRESSURE GAGE (3).
- (4) Connect two tubes (4) to elbow (5).

C. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check DPG DIFFERENTIAL PRESSURE GAGE for leaks and proper operation
- (3) Close pump module rear access doors (TM 9-2320-279-10).

22-6. DPG DIFFERENTIAL PRESSURE GAGE MOUNTING BRACKET REMOVAL/INSTALLATION (M978).

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

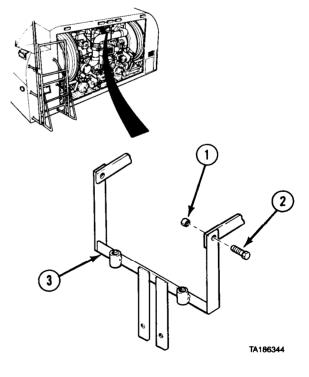
INITIAL SETUP

Models	Equipment Condition		
M978	TM or Para	Condition Description	
Test Equipment	TM 9-2320-279-10	Pump module rear access	
None		doors opened.	
Special Tools	Para 22-3	DLPG DISCHARGE LINE	
None	Para 22-4	PRESSURE GAGE removed. VNPG VENTURI/NOZZLE	
Sumbian		PRESSURE GAGE removed.	
Supplies	Para 22-5	DPG DIFFERENTIAL	
None		PRESSURE GAGE removed.	
Personnel Required	Para 25-4	DPG differential pressure	
MOS 63S, Heavy wheel vehicle mechanic		gage tubing right side and	
, •		left side removed.	
References None	Special Environmental Conditions		
	None		
	General Safety Instr	uctions	
		e, sparks, and hot or glowing ft (15 m) of vehicle.	

- **a. Removal.** Remove two locknuts (1), screws (2), and mounting bracket (3) from pump module.
- **b.** *Installation.* Install mounting bracket (3) in pump module with two screws (2) and locknuts (1).

c. Follow-on Maintenance.

- (1) Install DPG DIFFERENTIAL PRESSURE GAGE (para 22-5).
- (2) Install VNPG VENTURI/NOZZLE PRESSURE GAGE (para 22-4).
- (3) Install DLPG DISCHARGE LINE PRESSURE GAGE (para 22-3).
- (4) Install DPG differential pressure gage tubing, right side and left side (para 25-4).
- (5) Close pump module rear access doors (TM 9-2320-279-10).



CHAPTER 23 FILTER-SEPARATOR MAINTENANCE

Contents	Para	Page
General	23-1	23-1
V15 DRAIN VALVE Removal/Installation (M978) · · · · · · · · · · · · · · · · · · ·	23-2	23-1
Filter-Separator Elements Removal/Installation (M978) (Model A)	23-3	23-4
Filter-Separator Elements Removal/Installation (M978) (Model B)	23-3.1	23-6.2
Filter-Separator Removal/Repair/Installation (M978) (Model A)		23-8
Filter-Separator Removal/Repair/Installation (M978) (Model B)		23-23

Section I. INTRODUCTION

23-1. GENERAL. This chapter contains maintenance instructions for removing, repairing, and installing filter-separator components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. FILTER-SEPARATOR

Filter-Separator Maintenance Instructions

23-2. V15 DRAIN VALVE REMOVAI/INST	CALLATION (M978).
This task covers: a. Removal	c. Follow-on Maintenance
b . Installation	
INITIAL SETUP	
Models	References
M978	N o n e
Test Equipment	Equipment Condition
None	TM or Para Condition Description TM 9-2320-279-10 Pump module rear access
Special Too1s	doors opened.
None	Special Environmental Conditions
Supplies	None
Compound, sealing, pipe thread, Item 18,	General Safcty Instructions
Appendix C	No smoking, flame, sparks, and hot or glow-
Personnel Required	ing objects within 50 ft (15 m) of vehicle.
MOS 63S, Heavy wheel vehicle mechanic	
-	

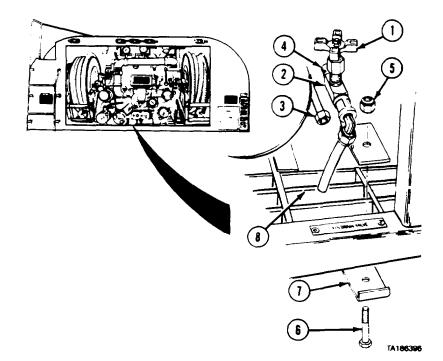
23-2. V15 DRAIN VALVE REMOVAL/INSTALLATION (M978) (CONT)

a. Removal.

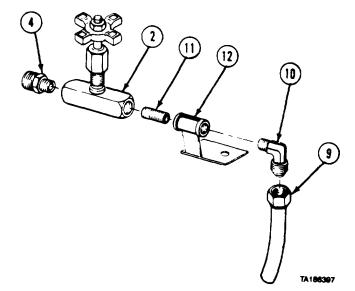
NOTE

Fuel-separator may contain 20 to 30 gallons (76 to 114 L) of

- (1) Turn knob (1) counterclockwise to open V15 DRAIN VALVE (2). Let fuel drain.
- (2) When fuel stops draining, disconnect tube (3) from adapter (1).
- (3) Remove locknut (5), screw (6). and bracket (7).
- (4) Remove V-15 DRAIN VALVE (2) from grating (8)



- (5) Remove adapter (4) from V15 DRAIN VALVE (2).
- (6) Remove tube (9) and elbow (10).
- (7) Remove V15 DRAIN VALVE (2) and pipe nipple (11) from bracket (12).

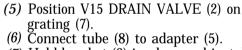


b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

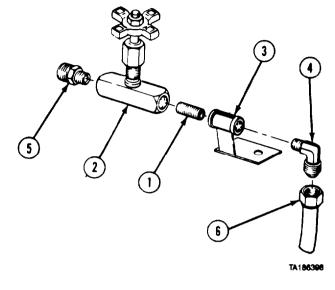
- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install V15 DRAIN VALVE (2) and bracket (3).
- (2) Apply pipe thread sealing compound to pipe threads of elbow (4) and install on bracket (3).
- (3) Apply pipe thread sealing compound to pipe threads of adapter (5) and install in V15 DRAIN VALVE (2).
- (4) Install tube (6) on elbow (1).

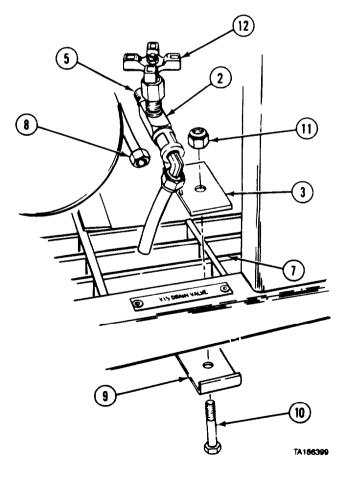


- (7) Hold bracket (3) in place and install with bracket (9), screw (10), and locknut (11).
- (8) Turn V15 DRAIN VALVE handle (12) clockwise to closed position.

c. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Turn V15 DRAIN VALVE handle counterclockwise to open position and check that fuel drains.
- (3) Turn VI5 DRAIN VALVE handle clockwise to closed position.
- (4) Check that fuel stops draining and there are no leaks.
- (5) Close pump module rear doors (TM 9-2320-279-10).





23-3. FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978) (MODEL A).

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

TEST Equipment

None

Special Tools

None

Supplies

None None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Filter-separator drained.

TM 9-2320-279-10 Pump module top access door

opened.

Para 25-36 VT VENTURI assembly

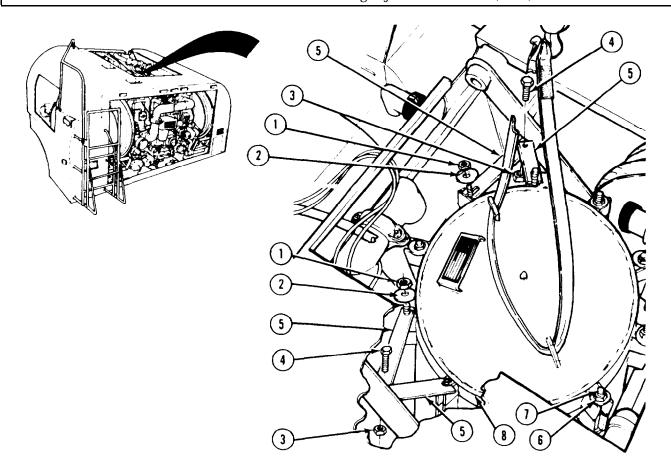
removed.

Special Environmental Conditions

None

General Safety Instructions

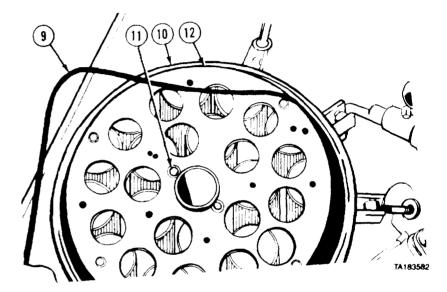
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.



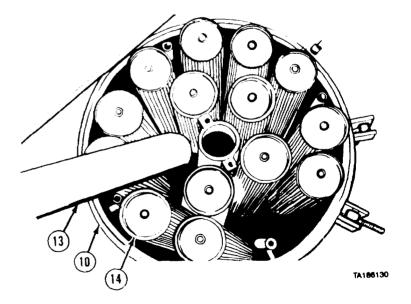
a. Removal.

NOTE

- The first six nuts are to remove the braces.
- · Mark position of cover
- (1) Remove four nuts (1) and washers (2).
- (2) Loosen two nuts (3) and screws (4) and move four braces (5) out of way.
- (3) Loosen six nuts (6) and push eyebolts (7) away from cover (8).
- (4) Using suitable lifting device, remove cover (8).
- (5) Remove preformed packing (9) from filter-separator tank (10).
- (6) Remove six screws (11) from retaining plate (12).
- (7) Remove retaining plate (12) from filter-separator tank (10).



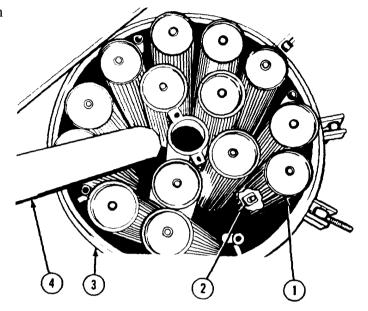
- (8) Remove 15 canisters (13) from filter-separator tank (10).
- (9) Remove 15 elements (14) from filter-separator tank (10).



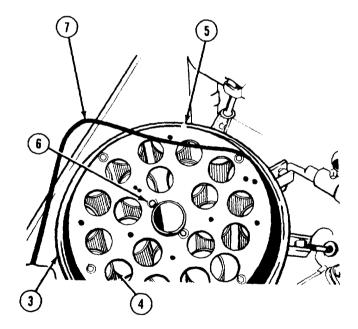
23-3. FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978) (MODEL A) (CONT).

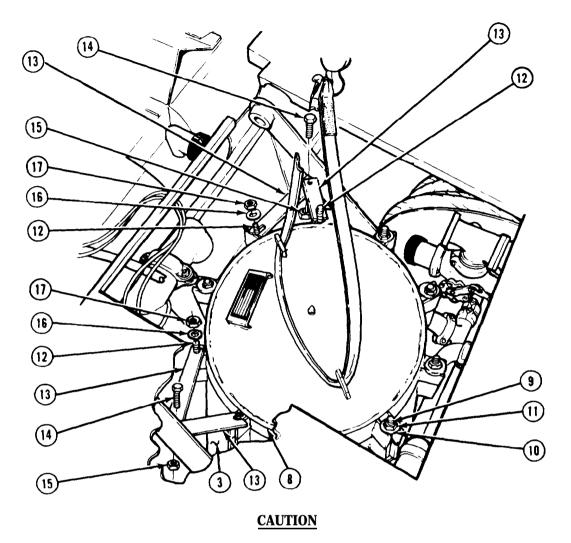
b. Installation.

- (1) Install 15 elements (1) over studs (2) in filter-separator tank (3).
- (2) Install 15 canisters (4) over elements (1).



- (3) Position retaining plate (5) over canisters (4).
- (4) Install retaining plate (5) with six screws (6).
- (5) Install preformed packing (7) around top edge of filter-separator tank (3).





Filter-Separator Maintenance Instructions (Cont)

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (6) Using suitable lifting device, position cover (8) on filter-separator tank (3).
- Push six eyebolts (9) in slots on edge of cover (8) so washers (10) and nuts (11) are on top of
- (8)
- Position four eyebolts (12) in slots on edge of cover (8). position four brackets (13) on four eyebolts (12) and tighten two screws (14) and nuts (15) (9)
- Install, but do not tighten, four washers (16) and nuts (17). (10)
- Tighten 10 nuts (11 and 17) to 75 lb-ft (102 N•m). (11)

c. Follow-on Maintenance.

- Install VT VENTURI assembly (para 25-36). (1)
- Recirculate fuel (TM 9-2320-279-10). (2)
- (3) Check filter-separator for leaks.
- (4) Close pump module top access door (TM 9-2320-279-10).

23-3.1 FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978) (MODEL B).

This task covers:

a. Removal

b. Cleaning/Inspection

c. Installation

d. Follow-on Maintenance

INITIAL SETUP

Models

M978

TEST Equipment

None

Special Tools

None

Supplies

Oil, fuel, diesel DF-2 regular, Item 27,

Appendix C

Petrolatum, technical, Item 41.1,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Filter-separator drained.

TM 9-2320-279-10 Pump module top access door

opened.

Para 25-36 VT VENTURI assembly

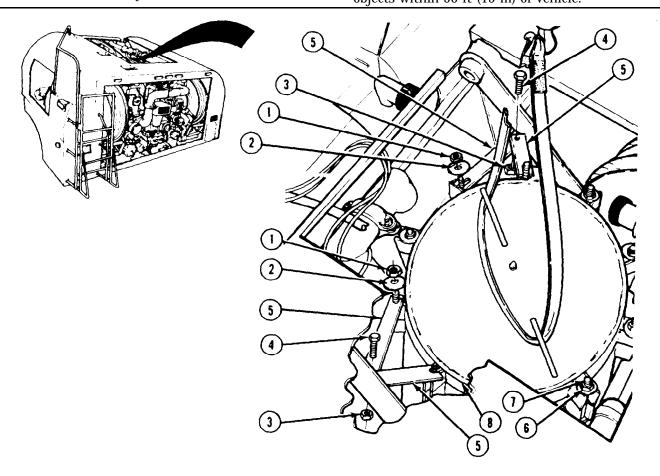
removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.



a. Removal.

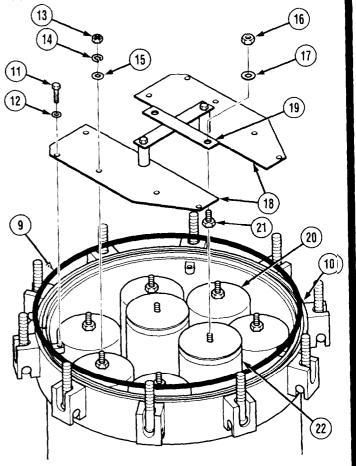
NOTE

- The first six nuts are to remove the braces.
- Mark position of cover.
- (1) Remove four nuts (1) and washers (2).
- (2) Loosen two nuts (3) and screws (4), and move four braces (5) out of way.
- (3) Loosen six nuts (6) and push eyebolts (7) away from cover (8).
- (4) Using suitable lifting device, remove cover (8).
- (5) Remove preformed packing (9) from filter-separator tank (10).
- (6) Remove four screws (11) and lockwashers (12).
- (7) Remove six nuts (13), lockwashers (14), and washers (15).
- (8) Remove two nuts (16) and washers (17).
- (9) Remove retainers (18) with locator (19).

NOTE

Coalescer elements are threaded onto filter-separator tank.

- (10) Remove six coalescer elements (20) from filter-separator tank (10).
- (11) Remove two seal nuts (21) and separator canisters (22) from filter-separator tank (10).



23-3.1 FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978) (MODEL B) (CONT).

b. Cleaning/Inspection.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open tire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

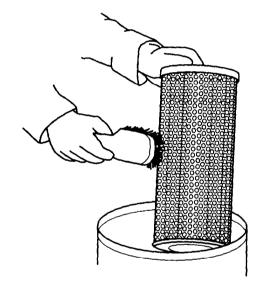
CAUTION

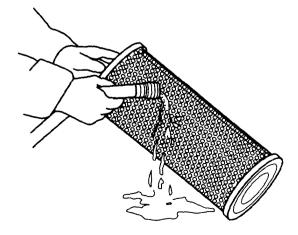
Do not handle separator or coalescer elements with bare hands. Any contaminant, including dirt or oil from hands, will deactivate elements.

- (1) To clean fuel-separator element, submerge element in clean fuel and gently scrub entire screen surface with soft cloth or soft bristle brush.
- (2) Hold separator element by endcaps and visually inspect entire screen surface for any nicks, cuts, or flaws. If element is noticeably flawed, replace element.

NOTE

- Cleaned and inspected element should be tested for its ability to repel water before it is reinstalled.
- If water beads and rolls off screen surface during test, element can be reused.
- If water adheres to and wets any part of screen surface during test, element should be recleaned (step (1)) and retested (step (3)). If element fails test, replace element.
- (3) To test separator element, hold element at any angle by endcaps, and gradually pour water over entire screen surface.
- (4) When separator element passes inspection and test, rinse element thoroughly in clean fuel to remove any traces of water. Allow separator element to air dry before reinstalling it.



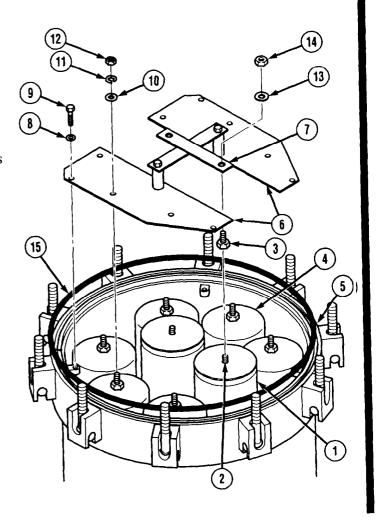


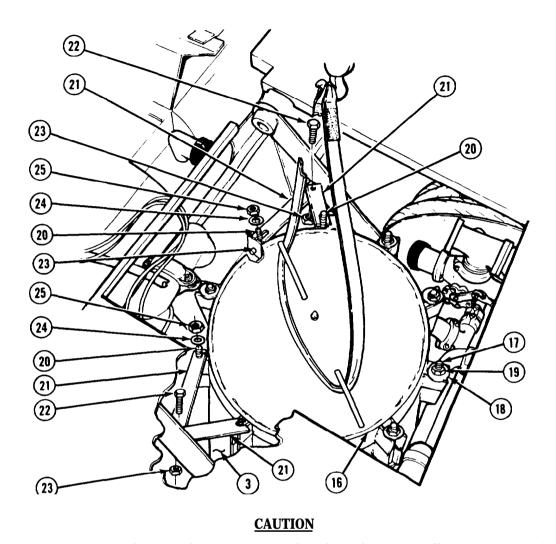
c. Installation.

CAUTION

Do not handle separator canister or coalescer element with bare hands. Any contaminants, including dirt or oil from hands, will deactivate elements.

- (1) Install two separator canisters (1) on rods (2) with seal nuts (3). Tighten nuts to 5 lb-ft (6.78 N•m).
- (2) Lightly coat threads of six coalescer elements with petrolatum before installation.
- (3) Install six coalescer elements (4) in filter-separator tank (5). Tighten elements to 30 lb-ft (40.68 N•m).
- (4) Install retainers (6) with locator (7) in filter-separator tank (5).
- (5) Install four washers (8) and screws (9).
- (6) Install six washers (l0), lockwashers (11), and nuts (12).
- (7) Install two washers (13) and nuts (14).
- (8) Install preformed packing (15) around top edge of filter-separator tank (5).





Filter-Separator Maintenance Instructions (Cont)

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (9) Using suitable lifting device, position cover (16) on filter-separator tank (5).
- (10) Push six eyebolts (17) in slots on edge of cover (16) so washers (18) and nuts (19) are on top of
- (11) Position four eyebolts (20) in slots on edge of cover (16).
- (12) position four brackets (21) on four eyebolts (20) and tighten two screws (22) and nuts (23).
- (13) Install, but do not tighten, four washers (24) and nuts (25).
- (14) Tighten 10 nuts (19 and 25) to 105 lb-ft (142 N•m).

d. Follow-on Maintenance.

- (1) Install VT VENTURI assembly (para 25-36).
- (2) Recirculate fuel (TM 9-2320-279-10).
- (3) Check filter-separator for leaks.
- (4) Close pump module top access door (TM 9-2320-279-10).

END OF TASK

23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A).

This task covers:

d. Assembly a. Removal e. Installation b. Disassembly

c. Cleaning/Inspection f. Follow-on Maintenance

INITIAL SETUP

Models Equipment Condition TM or Para Condition Description M978 Para 25-3 Tank drained. Test Equipment TM 9-2320-279-10 Pull V-6 FUEL/DEFUEL None VALVE handle down. TM 9-2320-279-10 Fuel-separator drained. Special Tools TM 9-2320-279-10 Pump module top and None rear access doors opened. **Supplies** Pump module right side Para 16-48 Solvent, drycleaning, Item 47, Appendix C access panel removed. Tags, identification, Item 48, Appendix C Para 16-50 Pump module top door piston removed. Compound, sealing, pipe thread, Item 18, Appendix C V9 CHECK VALVE Para 25-23 removed. Personnel Required Para 25-33 Eductor assembly removed.

MOS 63S, Heavy wheel vehicle mechanic (2)

References None

Special Environmental Conditions

None

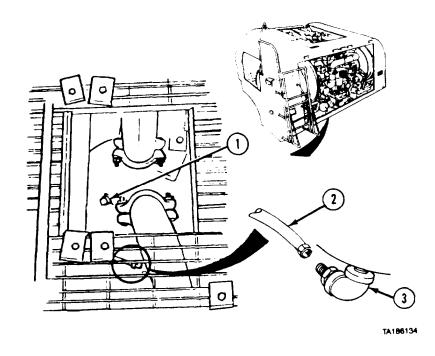
General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

WARNING

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death. keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



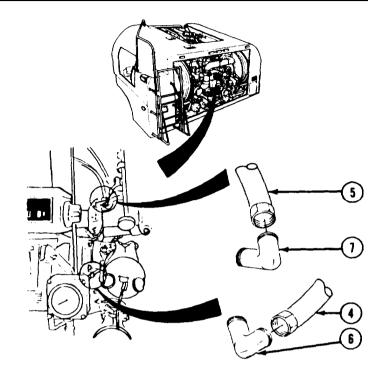
NOTE

Tag and mark all tubes, hoses, and brackets before removal.

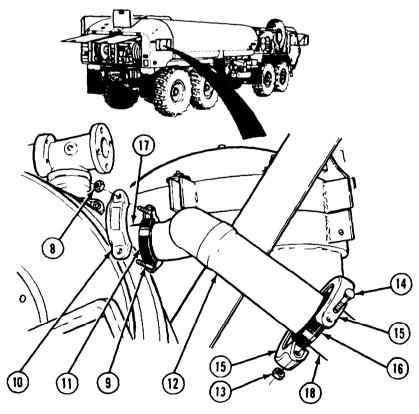
- (1) Remove filter-separator drainplug (1) and drain fuel. When all fuel is drained, coat threads of filter-separator drainplug with pipe thread sealing compound and install.
- (2) Disconnect tube (2) from elbow (3).

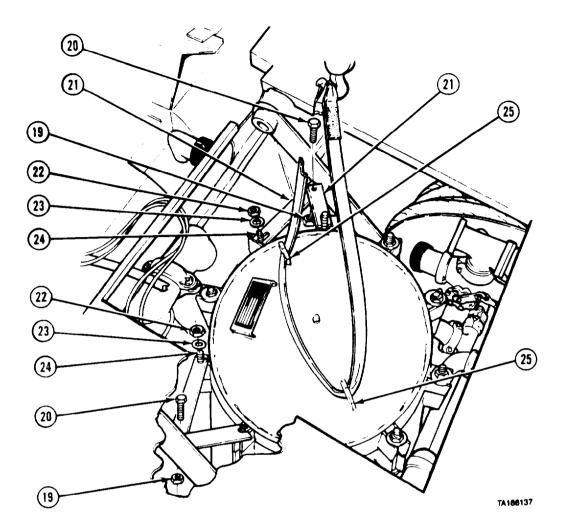
23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).

(3) Disconnect two tubes (4 and 5) from elbows (6 and 7).



- (4) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).
- (5) Slide coupling gasket (11) on pipe (12).
- (6) Remove two nuts (13), screws (14), and coupling halves (15) from coupling gasket (16).
- (7) Slide coupling gasket (16) on pipe (12) and remove pipe from two pipes (17 and 18). Remove coupling gaskets.



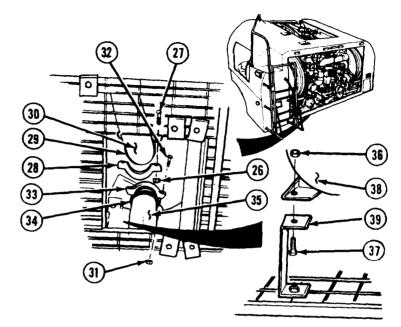


Filter-Separator Maintenance Instructions (Cont)

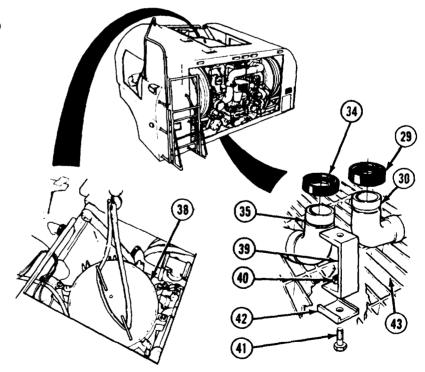
- (8) Remove two locknuts (19) and screws (20) from four brackets (21). (9) Remove four locknuts (22), washers (23), and brackets (21) from eyebolts (24). (10) Install four washers (23) and locknuts (22) on eyebolts (24). (11) Attach suitable lifting device to filter-separator cover lifting eyes (25).

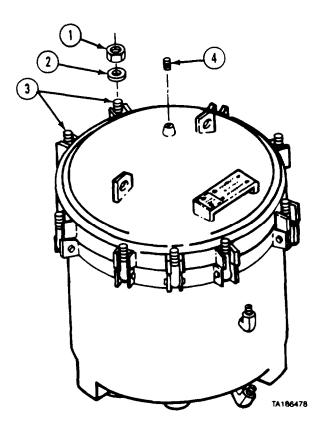
23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).

- (12) Remove two nuts (26), screws (27), and coupling halves (28). Slide coupling gasket (29) on pipe (30).
- (13) Remove two nuts (31), screws (32), and coupling halves (33). Slide coupling gasket (34) on pipe (35).
- (14) Soldier A removes three locknuts (36) while Soldier B holds and removes screws (37) from filter-separator (38) and three brackets (39).



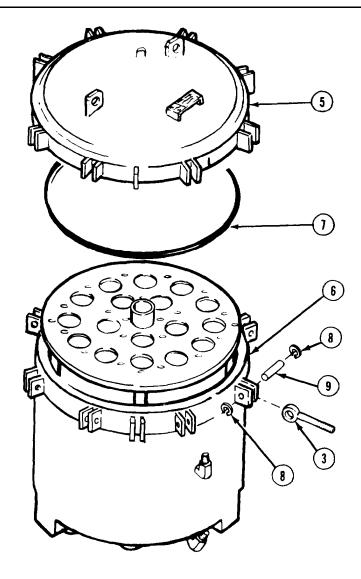
- (15) Soldier A guides
 filter-separator (38) from top
 access opening of pump
 module while Soldier B
 operates suitable lifting
 device.
- (16) Remove three locknuts (40), screws (41), brackets (42), and brackets (39) from grating (43).
- (17) Remove two coupling gaskets (29 and 34) from pipes (30 and 35).





- b. Disassembly.(1) Remove 10 nuts (1) and washers (2) from eyebolts (3).(2) Push down eyebolts (3).(3) Remove pipe plug (4).

23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).



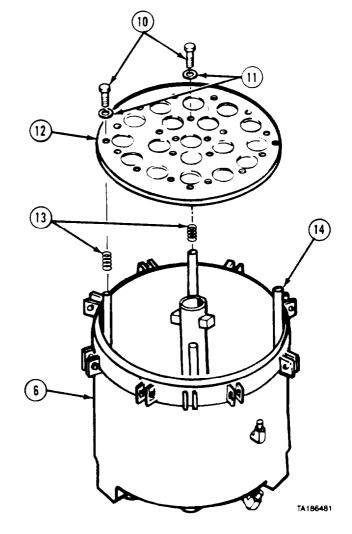
- (4) Using suitable lifting device, remove cover (5) from filter-separator tank (6)
- (5) Remove preformed packing (7) from filter-separator tank (6).

WARNING

Wear safety glasses when removing retaining rings to prevent injury or blindness.

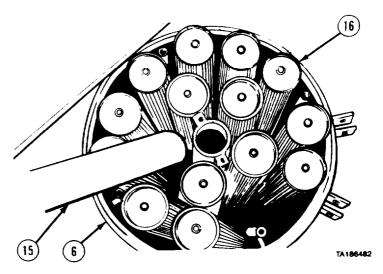
- (6) Remove two retaining rings (8) from each of 10 pins (9).
- (7) Remove 10 pins (9) and eyebolts (3) from filter-separator tank (6).

- (8) Remove six screws (10) and washers (11) from retaining plate (12).
 (9) Remove retaining plate (12) from filter-separator tank (6).
 (10) Remove six coil inserts (13) from pipes (14).



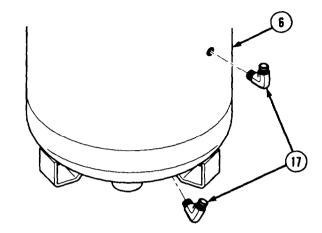
- (11) Remove 15 canisters (15) from
- filter-separator tank (6).

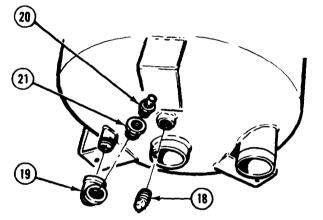
 (12) Remove 15 elements (16) from filter-separator tank (6).



23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).

- (13) Remove two elbows (17) from side of filter-separator tank (6).
- (14) Remove pipe plug (18) and elbow (19) from bottom of filter-separator tank (6).
- (15) Remove fitting (20) and bushing (21) from elbow (19).





c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(1) Clean all metal parts with drycleaning solvent.

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, and gloves.

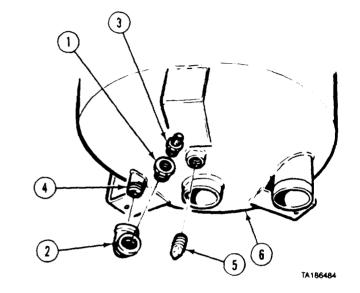
- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

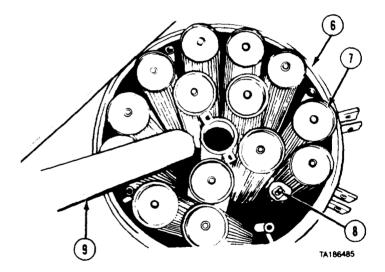
d. Assembly.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound to bushing (1) and install in elbow (2).
- (2) Apply pipe thread sealing compound to fitting (3) and install in bushing (1).
- (3) Apply pipe thread sealing compound to pipe (4) and install elbow (2).
- (4) Apply pipe thread sealing compound to threads of pipe plug (5) and install in bottom of filter-separator tank (6).
- (5) Install 15 elements (7) over studs (8) in filter-separator tank (6).
- (6) Install 15 canisters (9) over elements (7).





23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).

WARNING

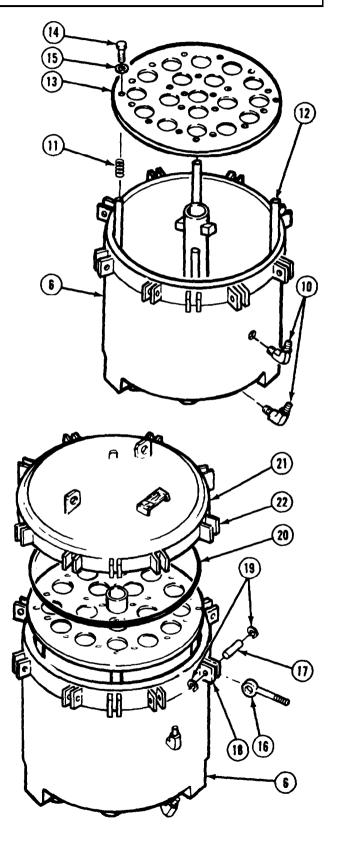
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (7) Apply pipe thread sealing compound to threads of two elbows (10) and install two elbows in side of filter-separator tank (6).
- (8) Apply pipe thread sealing compound to threads of six coil inserts (11) and install in pipes (12).
- (9) Install retaining plate (13) on filter-separator tank (6) with six screws (14) and washers (15).
- (10) Position 10 eyebolts (16), and install pins (17) through eyebolts and brackets (18).
- (11) Install two retaining rings (19) in each of 10 pins (17).
- (12) Install preformed packing (20) on top edge of filter-separator tank (6).

CAUTION

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

(13) Aline cover (21) on filter-separator tank (6) so brackets (22) are alined with brackets (18).



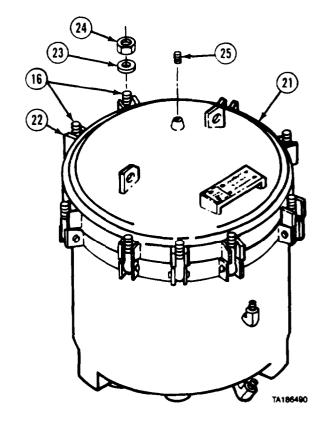


- (14) Push 10 eyebolts (16) up in brackets (22).
- (15) Install 10 washers (23) and nuts (24). Tighten to 7.5 lb-ft (102 N•m).

WARNING

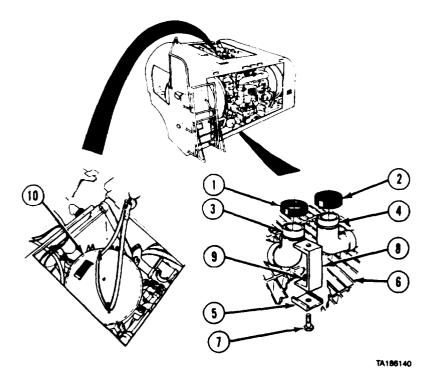
Adhesives, solvents. and sealing compounds can burn easily. can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(16) Apply pipe thread sealing compound to threads of plug (25) and install in cover (21).

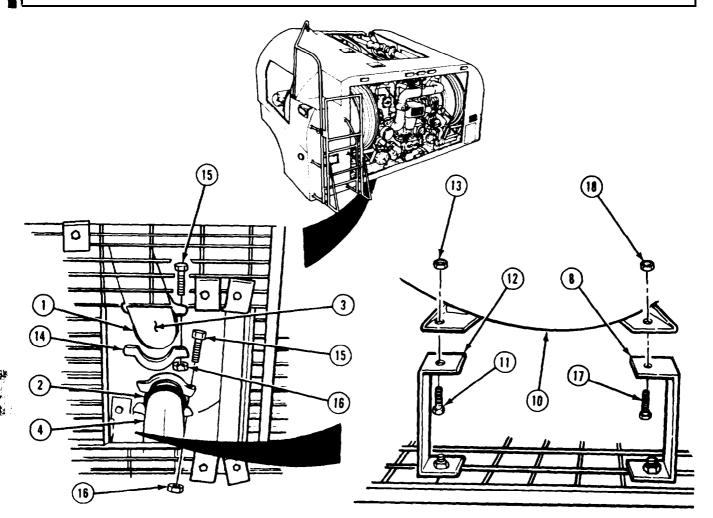


e. Installation.

- (1) Install two coupling gaskets (1 and 2) on two pipes (3 and 4).
- (2) Install three brackets (5) on grating (6) with three screws (7), brackets (8), and locknuts (9).
- (3) Soldier A guides filter-separator (10) in through top access opening of pump module while Soldier B operates suitable lifting device.



23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).



(4) Soldier A installs and holds screw (11) in filter-separator (10) and bracket (12) while Soldier B installs but does not tighten locknut (13).

NOTE

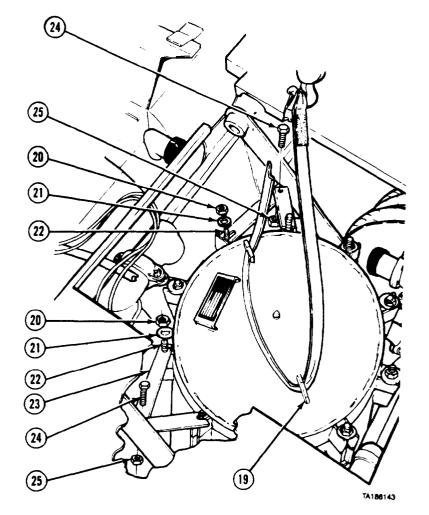
- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or out of position, piping connections will leak.
- (5) Aline two pipes (3 and 4) with openings in filter-separator (10) and install two coupling gaskets (1 and 2).

NOTE

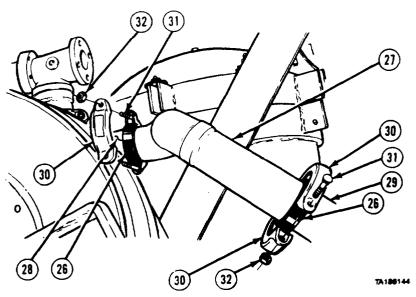
Next coupling or clamp may have to be loosened before installation.

- (6) Install four coupling halves (14) on two coupling gaskets (1 and 2) with four screws (15) and nuts (16).
- (7) Soldier A installs and holds two screws (17) in filter-separator (10) and brackets (8) while Soldier B installs two locknuts (18).
- (8) Soldier A holds screw (11) while Soldier B tightens locknut (13).

- (9) Remove suitable lifting device from filter-separator cover lifting eyes (19).
- (10) Remove four locknuts (20) and washers (21) from evebolts (22).
- (11) Install four brackets (23), washers (21), and locknuts (20) on eyebolts (22). Do not tighten.
- (12) Install two screws (24) and locknuts (25) in four brackets (23).
- (13) Tighten four locknuts (20) to 75 lb-ft (102 N•m).

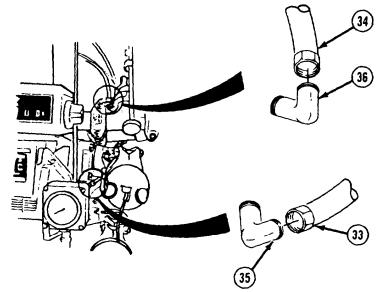


- (14) Slide two coupling gaskets (26) on pipe (27) and position pipe against pipe (28) and pipe (29).
- (15) Position coupling gasket over ends of pipe (28) and pipe (29).
- (16) Install four coupling halves (30) on two coupling gaskets (26) with four screws (31) and nuts (32).



23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A) (CONT).

(17) Connect two tubes (33 and 34) on elbows (35 and 36).

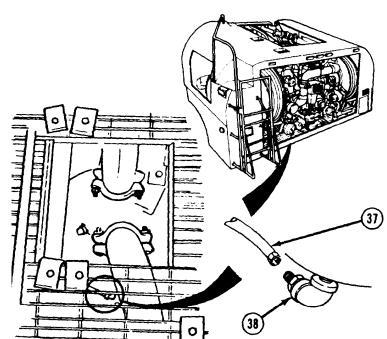


(18) Connect tube (37) on elbow (38).

f. Follow-on Maintenance.

- (1) Install V9 CHECK VALVE (para 25-23).
- (2) Install eductor (para 25-33).
- (3) Load tank (TM 9-2320-279-10).
- (4) Recirculate fuel (TM 9-2320-279-10).
- (5) Check filter-separator and piping for leaks.
- (6) Install pump module top access door piston (para 16-50).
- (7) Install pump module right side access panel (para 16-48).
- (8) Close pump module top and rear access doors (TM 9-2320-279-10).





23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)

This task cover	rc.
-----------------	-----

a. Removal	d. Assembly
b. Disassembly	e. Installation

c. Cleaning/Inspection f. Follow-on Maintenance

INITIAL SETUP

Models	Equipment Condition	1
M978	TM or Para	Condition Description
	Para 25-3	Tank drained.
Test Equipment	TM 9-2320-279-10	Pull V-6 FUEL/DEFUEL
None		VALVE handle down.
Special Tools	TM 9-2320-279-10	Fuel-separator drained.
None	TM 9-2320-279-10	Pump module top and
None		rear access doors opened.
Supplies	Para 16-48	Pump module right side
Oil, fuel, diesel DF-2 regular, Item 27,		access panel removed.
Appendix C	Para 16-50	Pump module top door
Compound, sealing, pipe thread, Item 18,		piston removed.
Appendix C	Para 25-23	V9 CHECK VALVE
Petrolatum, technical, Item 41.1,		removed.
Appendix C	Para 25-33	Eductor assembly
Solvent, drycleaning, Item 47, Appendix C		removed.
Tags, identification, Item 48, Appendix C	Special Environment	tal Conditions

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References None

General Safety Instructions

None

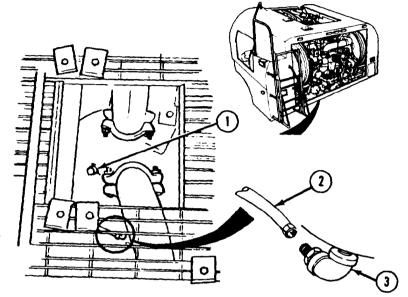
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

a. Removal.

WARNING

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water.
 Wash fuel off skin with soap and water as soon as possible after contact.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

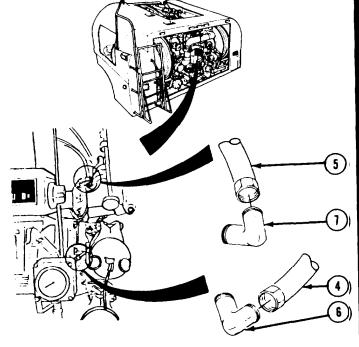


NOTE

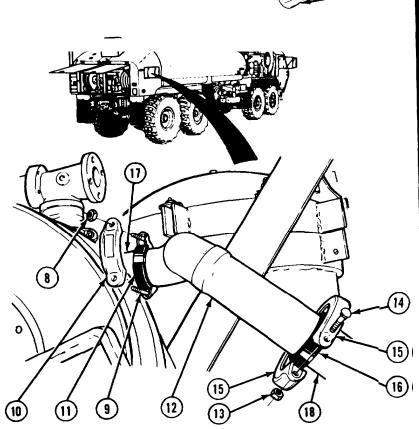
Tag and mark all tubes, hoses, and brackets before removal.

- (1) Remove filter-separator drain plug (1) and drain fuel. When all fuel is drained, coat threads of filter-separator drain plug with pipe thread sealing compound and install.
- (2) Disconnect tube (2) from elbow (3).

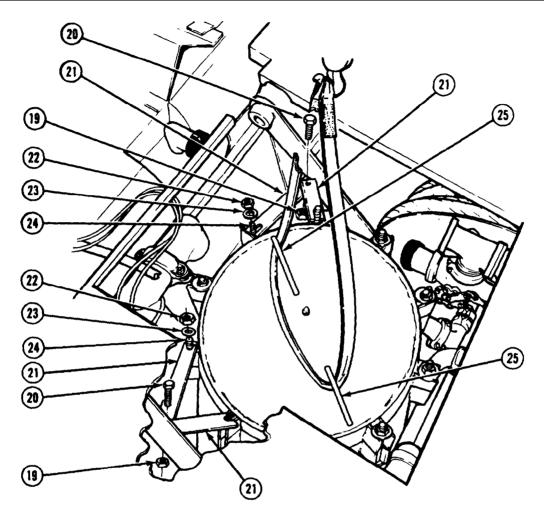
(3) Disconnect two tubes (4 and 5) from elbows (6 and 7).



- (4) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).
- gasket (11).
 (5) Slide coupling gasket (11) on pipe (12).
- (6) Remove two nuts (13), screws (14), and coupling halves (15) from coupling gasket (16).
- (7) Slide coupling gasket (16) on pipe (12) and remove pipe from two pipes (17 and 18). Remove coupling gaskets.

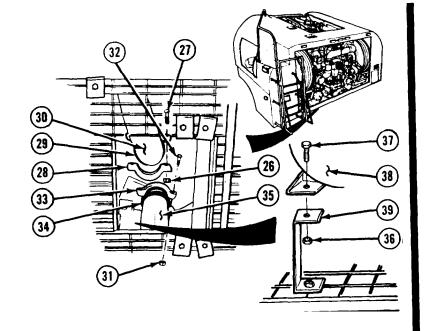


23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).



- (8) Remove two locknuts (19) and screws (20) from four brackets (21).
- (9) Remove four nuts (22), washers (23), and braces (21) from tee screws (24).
- (10) Install four washers (23), and nuts (22) on tee screws (24).
- (11) Attach suitable lifting device to filter-separator cover (25).

- (12) Remove two nuts (26), screws (27), and coupling halves (28). Slide coupling gasket (29) on pipe (30).
- (13) Remove two nuts (31), screws (32), and coupling halves (33). Slide coupling gasket (34) on pipe (35).
- (14) Soldier A removes three locknuts (36) while Soldier B holds and removes screws (37) from filter-separator (38) and three brackets (39).

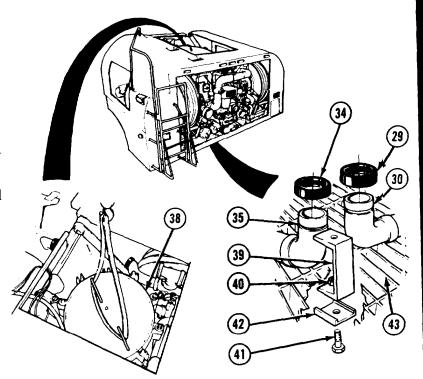


(15) Soldier A guides filter-separator (38) from top access opening of pump module while Soldier B operates suitable lifting device.

NOTE

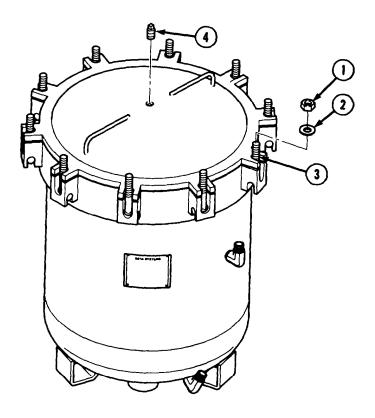
Mark position of brackets on grating.

- (16) Remove three locknuts (40), screws (41), brackets (42), and brackets (39) from grating (43).
- (17) Remove two coupling gaskets (29 and 34) from pipes (30 and 35).



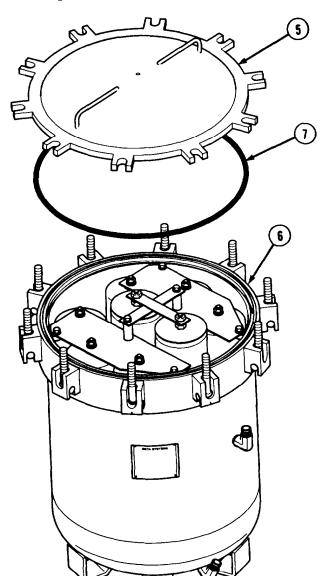
23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

b. Disassembly.



NOTE Mark position of cover.

- Remove 10 nuts (1) and washers (2) from tee screws (3). Push down tee screws. Remove pipe plug (4).
- (1) (2)

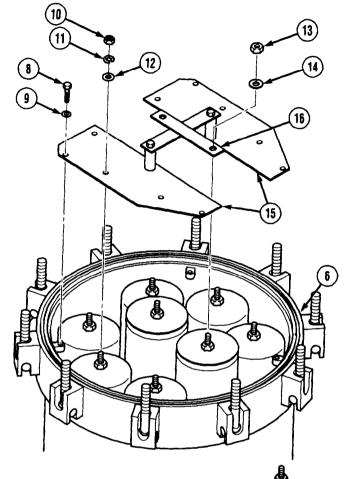


Filter-Separator Maintenance Instructions (Cont)

- (3) Using suitable lifting device, remove cover (5) from filter-separator tank (6).
- (4) Remove preformed packing (7) from filter-separator tank (6).

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

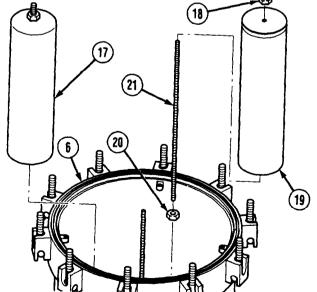
- (5) Remove four screws (8) and lockwashers (9).
- (6) Remove six nuts (10), lockwashers (11), and washers (12).
- (7) Remove two nuts (13) and washers (14).
- (8) Remove retainers (15) with locator (16).



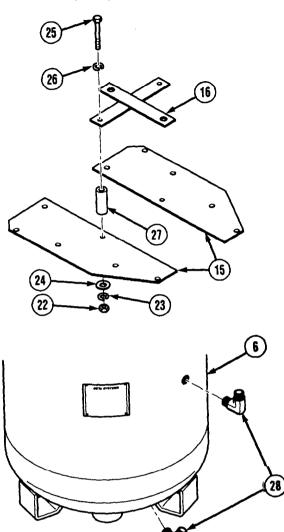
NOTE

Coalescer elements are threaded onto filter-separator tank.

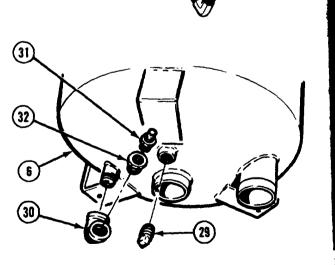
- (9) Remove six coalescer elements (17) from filter-separator tank (6).
- (10) Remove two seal nuts (18) and separator canisters (19) from filter-separator tank (6).
- (11) Loosen two nuts (20) and remove two rods (21).
- (12) Remove two nuts (20) from rods (21).



(13) Remove two nuts (22), lockwashers (23), washers (24) screws (25), lockwashers (26), locator (16), and two spacers (27) from retainers (15).

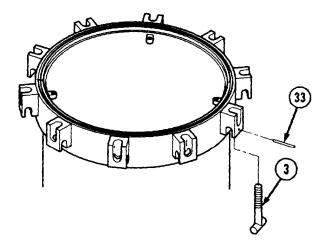


- (14) Remove two elbows (28) from side of filter-separator tank (6).
- (15) Remove pipe plug (29) and elbow (30) from bottom of filter-separator tank (6).
- (16) Remove fitting (31) and bushing (32) from elbow (30).



23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

(17) Remove ten roll pins (33) and tee screws (3).



c. Cleaning/Inspection.

WARNING

Fuel is very flammable and can explode easily. Ib avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

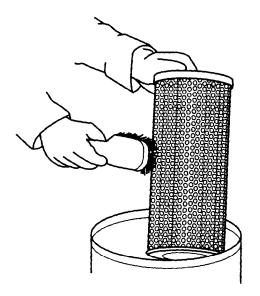
CAUTION

Do not handle separator or coalescer elements with bare hands. Any contaminant, including dirt or oil from hands, will deactivate elements.

- (1) To clean fuel-separator element, submerge element in clean fuel and gently scrub entire screen surface with soft cloth or soft bristle brush.
- (2) Hold separator element by endcaps and visually inspect entire screen surface for any nicks, cuts, or flaws. If element is noticeably flawed, replace element.

NOTE

- Cleaned and inspected element should be tested for its ability to repel water before it is reinstalled.
- If water beads and rolls off screen surface during test, element can be reused.
- If water adheres to and wets any part of screen surface during test, element should be recleaned (step (1)) and retested (step (3)). If element fails test, replace element.
- (3) To test separator element, hold element at any angle by endcaps, and gradually pour water over entire screen surface.

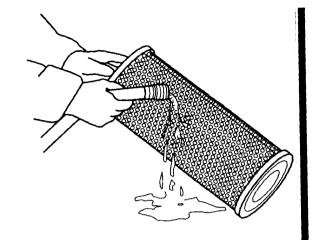


(4) When separator element passes inspection and test, rinse element thoroughly in clean fuel to remove any traces of water. Allow separator element to air dry before reinstalling it.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(5) Clean all metal parts with drycleaning solvent.



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, and gloves.

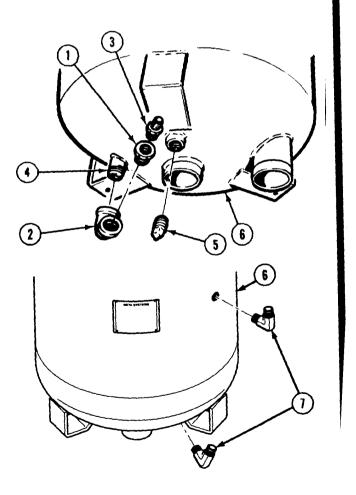
- (6) Dry metal parts with compressed air.
- (7) Inspect each part for damage.
- (8) Replace damaged parts.

d. Assembly.

WARNING

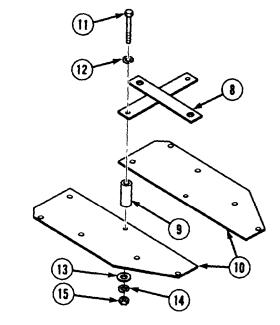
Adhesives, solvents, and sealing compound can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open tire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound to bushing (1) and install in elbow (2).
- (2) Apply pipe thread sealing compound to fitting (3) and install in bushing (1).
- (3) Apply pipe thread sealing compound to pipe (4) and install elbow (2).
- (4) Apply pipe thread sealing compound to threads of pipe plug (5) and install in bottom of filter-separator tank (6).
- (5) Apply pipe thread sealing compound to threads of two elbows (7) and install in filter-separator tank (6).



23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

(6) Install locator (8) and two spacers (9) on two retainers (10) with two screws (11), lockwashers (12), washers (13), lockwashers (14), and nuts (15).

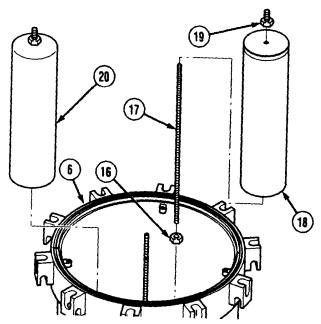


- (7) Install two nuts (16) on two rods (17).
- (8) Install rods (17) in filter-separator tank (6) and tighten nuts (16).

CAUTION

Do not handle separator canister or coalescer element with bare hands. Any contaminants, including dirt or oil from hands, will deactivate elements.

- (9) Install two separator canisters (18) in filter-separator tank (6) with two seal nuts (19). Tighten seal nuts to 5 lb-ft (6.78 N•m).
- (10) Install six coalescer elements (20) in filter-separator tank (6). Tighten coalescer element to 30 lb-ft (40.68 N•m).

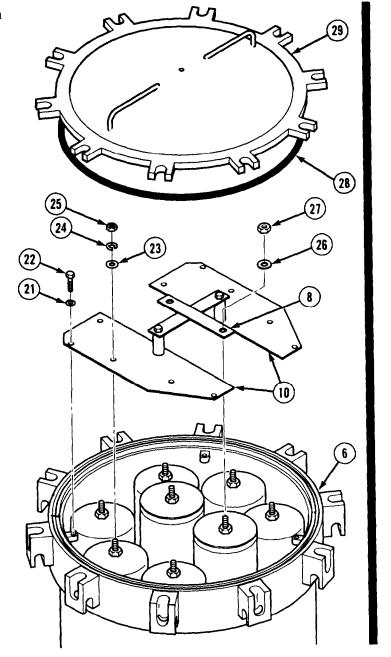


- (11) Install retainers (10) with locator (8) in filter-separator tank (6).
- (12) Install four washers (21) and screws (22).
- (13) Install six washers (23), lockwashers (24), and nuts (25).
- (14) Install two washers (26) and nuts (27).
- (15) Install preformed packing (28) around edge of filter-separator tank (6).

CAUTION

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

(16) Aline cover (29) on filter-separator tank (6).



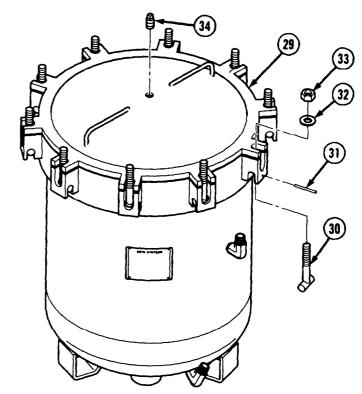
23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

(17) Install ten tee screws (30), roll pins (31), washers (32), and nuts (33). Tighten to 105 lb-ft (142 N•m).

WARNING

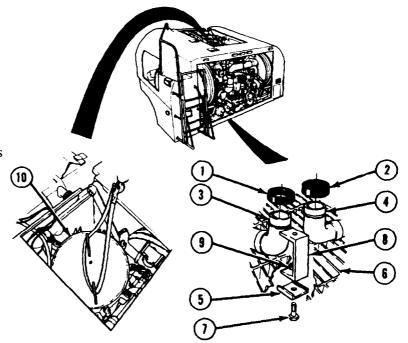
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

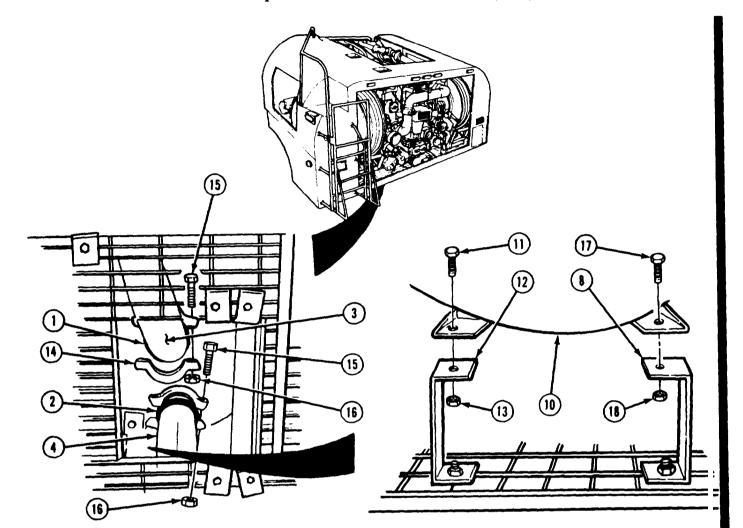
(18) Apply pipe thread sealing compound to threads of plug (34) and install in cover (29).



e. Installation.

- (1) Install two coupling gaskets (1 and 2) on two pipes (3 and 4).
- (2) Install three brackets (5) on grating (6) with three screws (7), brackets (8), and locknuts (9).
- (3) Soldier A guides filter-separator (10) in through top access opening of pump module while Soldier B operates suitable lifting device.





(4) Soldier A installs and holds screw (11) in filter-separator (10) and bracket (12) while Soldier B installs but does not tighten locknut (13).

NOTE

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or out of position, piping connections will leak.
- (5) Aline two pipes (3 and 4) with openings in filter-separator (10) and install two coupling gaskets (1 and 2).

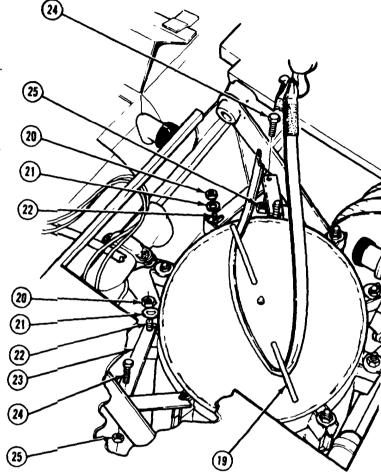
NOTE

Next coupling or clamp may have to be loosened before installation.

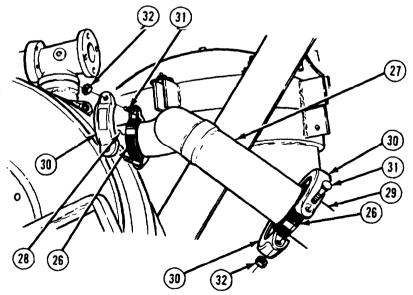
- (6) Install four coupling halves (14) on two coupling gaskets (1 and 2) with four screws (15) and nuts (16).
- (7) Soldier A installs and holds two screws (17) in filter-separator (10) and brackets (8) while Soldier B installs two locknuts (18).
- (8) Soldier A holds screw (11) while Soldier B tightens locknut (13).

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B) (CONT).

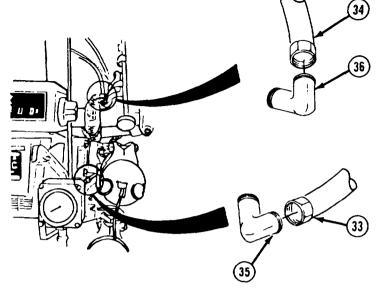
- (9) Remove suitable lifting device from filter-separator cover lifting eyes (19).
- (10) Remove four nuts (20) and washers (21) from tee screws (22).
- (11) Install four brackets (23), washers (21), and nuts (20) on tee screws (22). Do not tighten.
- (12) Install two screws (24) and locknuts (25) in four brackets (23).
- (13) Tighten four nuts (20) to 75 lb-ft (102 N•m).



- (14) Slide two coupling gaskets (26) on pipe (27) and position pipe against pipe (28) and pipe (29).
- (15) Position coupling gaskets over ends of pipe (28) and pipe (29).
- (16) Install four coupling halves (30) on two coupling gaskets (26) with four screws (31) and nuts (32).



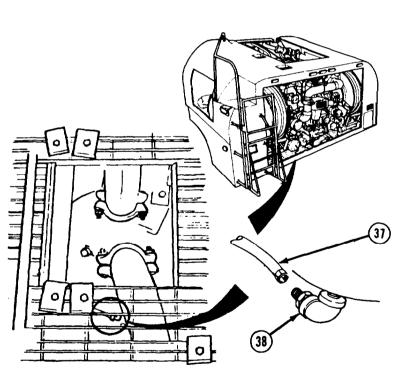
(17) Connect two tubes (33 and 34) on elbows (35 and 36).



(18) Connect tube (37) on elbow (38).

f. Follow-on Maintenance.

- (1) Install V9 CHECK VALVE (para 25-23).
- (2) Install eductor (para 25-33).
- (3) Load tank (TM 9-2320-279-10).
- (4) Recirculate fuel (TM 9-2320-279-10).
- (5) Check filter-separator and piping for leaks.
- (6) Install pump module top access door piston (para 16-50).
- (7) Install pump module right side access panel (para 16-48).
- (8) Close pump module top and rear access doors (TM 9-2320-279-10).



END OF TASK

CHAPTER 24 RADIO KIT MAINTENANCE

Contents	Para	Page
General	24-1	24-1
Radio Kit Removal/Installation	24-2	24-1

Section I. INTRODUCTION

24-1. GENERAL. This chapter contains maintenance instructions for removing and installing radio kit components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. RADIO KIT

Radio Kit Maintenance Instructions

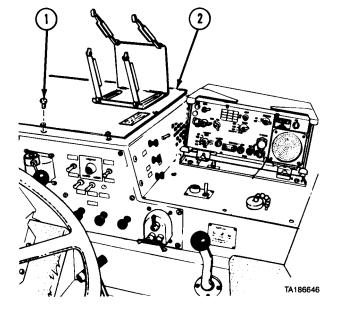
24-2. RADIO KIT REMOVAL/INSTALLATION.	
This task covers: a. Removal b. Installation	c. Follow-on Maintenance
INITIAL SETUP	
Models	References None
All Test Equipment	Equipment Condition
None	TM or Para Condition Description
Special Tools None	TM 9-2320-279-10 Shut off engine. TM 9-2320-279-10 Spare tire removed.
Supplies Tags, identification, Item 48, Appendix C Ties, cable, plastic, Item 52, Appendix C	Para 7-91 Batteries disconnected. Special Environmental Conditions None
Personnel Required MOS 63S, Heavy wheel vehicle mechanic	General Safety Instructions None

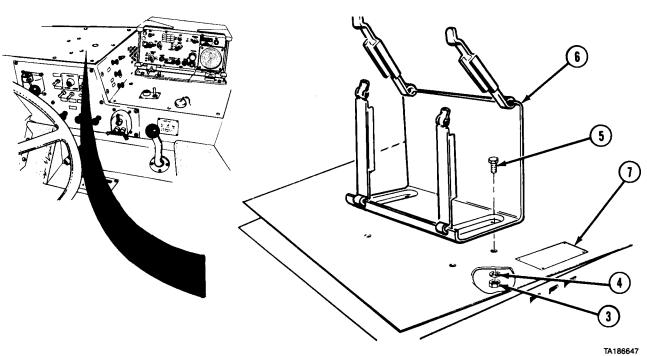
Radio Kit Maintenance Instructions (Cont)

24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).

a. Removal.

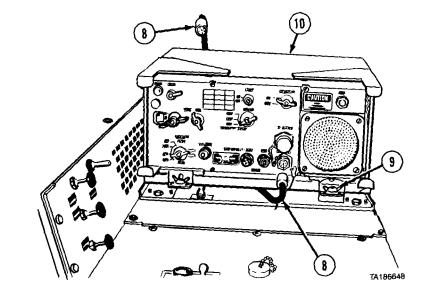
(1) Remove eight screws (1) and lift heater compartment cover (2).



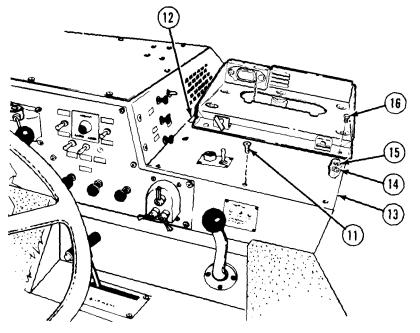


- (2) Remove four nuts (3), lockwashers (4), screws (5), and security unit mount (6).
- (3) Remove data plate (7).

(4) Tag, mark, and disconnect two antenna leads (8).
 (5) Loosen two thumbscrews (9) and remove radio (10).



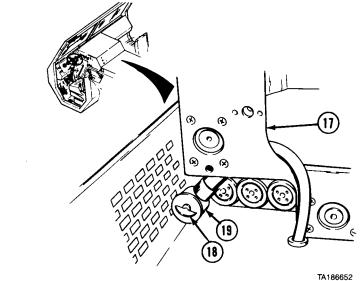
- (6) Remove 11 screws (11) and two heater compartment covers (12 and 13).
 (7) Remove five nuts (14), lockwashers (15), and screws (16).



TA186650

24-2. RADIO KIT REMOVAL/INSTALLATION (CONT)

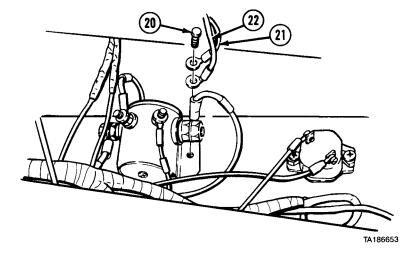
- (8) Lift radio mount (17), pull up handle (18), and disconnect connector (19).
- (9) Remove radio mount (17).



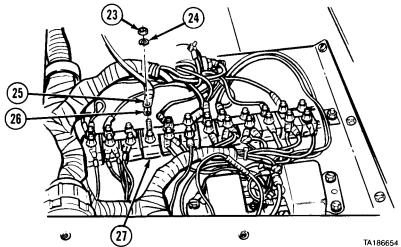
NOTE

Tag and mark all wires before disconnecting or removing.

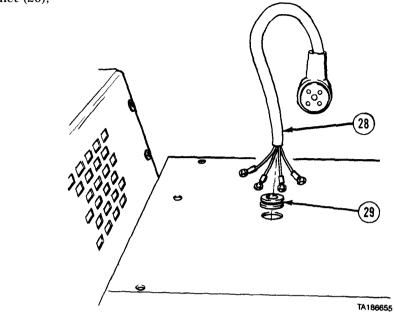
(10) Remove screw (20), black ground wire (21), and green ground wire (22).



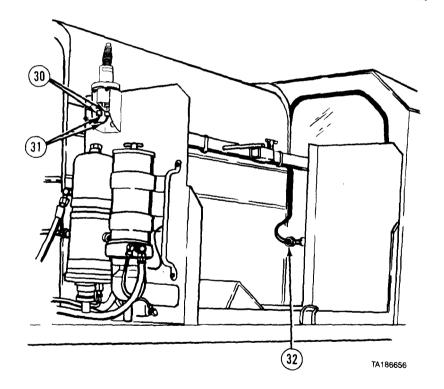
(11) Remove nut (23), lockwasher (24), red wire (25), and white wire (26) from circuit breaker No. 4 (27).



(12) Pull cable (28) up through grommet (29), Remove grommet.

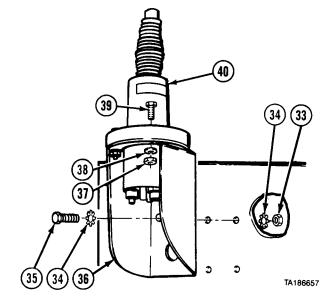


- (13) Disconnect two
- connectors (30).
 (14) Cut plastic cable ties and pull two cables (31) through grommet (32). Remove grommet.



24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).

- (15) Remove four nuts (33), eight lockwashers (34), four screws (35), and antenna mount (36).
- (16) Remove four nuts (37), lockwashers (38), screws (39), and antenna (40).

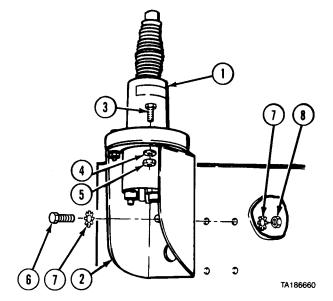


b. Installation.

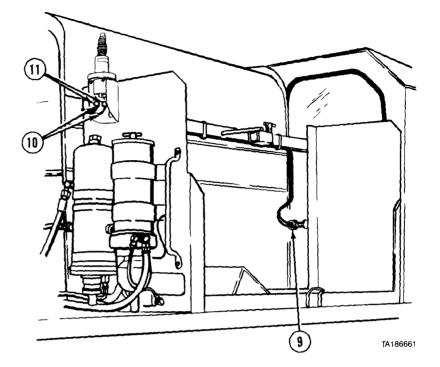
NOTE

Use plastic cable ties as needed.

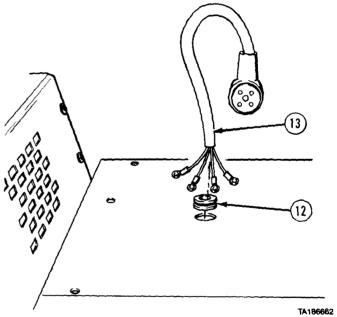
- (1) Install antenna (1) to antenna mount (2) with four screws (3), lockwashers (4), and nuts (5).
- (2) Install antenna mount (2) with four screws (6), eight lockwashers (7), and four nuts (8).



- (3) Install grommet (9). Pull two cables (10) through grommet.
 (4) Connect two connectors (11) and install cables (10).

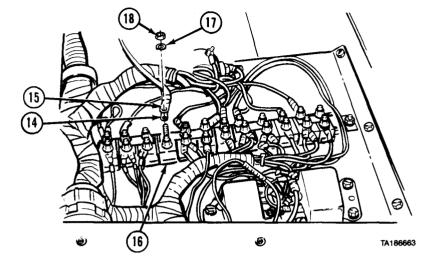


(5) Install grommet (12). Push cable (13) down through grommet.

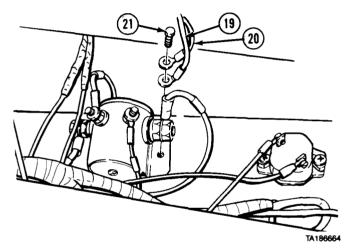


24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).

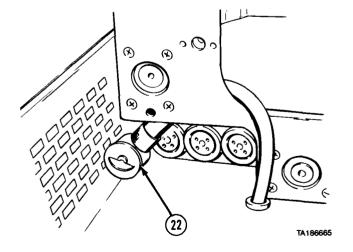
(6) Install white wire (14) and red wire (15) to circuit breaker No. 4 (16) with lockwasher (17) and nut (18).



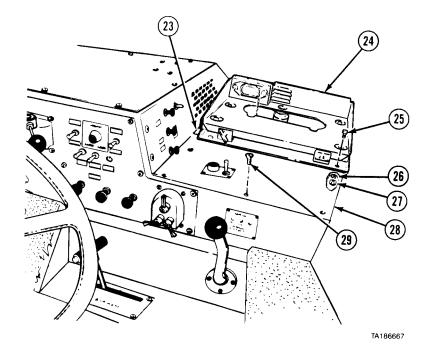
(7) Install green ground wire (19) and black ground wire (20) with screw (21).



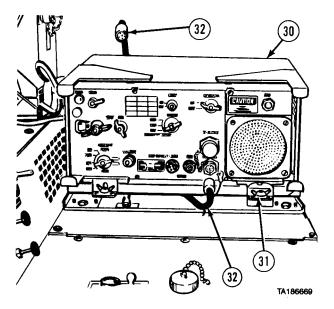
(8) Connect connector (22).



- (9) Lift heater compartment cover (23) and install mount (24) with five screws (25), lockwashers (26), and nuts (27).
- (10) Install two heater compartment covers (23 and 28) with 11 screws (29).



- (11) Install radio (30) and tighten two thumbscrews (31).
- (12) Connect two antenna leads (32).



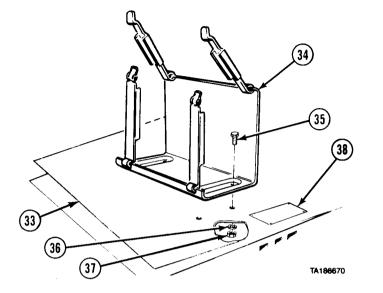
24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).

- (13) Lift heater compartment cover (33) and install security unit mount (34) with four screws (35), lockwashers (36), and nuts (37).
- (14) Install data plate (38).
- (15) Install eight screws (39) in heater compartment cover (33).

c. Follow-on Maintenance.

- (1) Complete radio kit installation (TM 11-5820-498-12).
- (2) Connect batteries (para 7-91).
- (3) Stow spare tire (TM 9-2320-279-10).

END OF TASK



CHAPTER 25 M978 TANKER MAINTENANCE

Contents	Para	Page
General	25-1	25-1
General Maintenance Instructions	25-2	25-2
2500 Gallon Tank/Drain	25-3	25-6
Tanker Tubing Removal/Installation	25-4	25-14
Primary Pump Hydraulic Motor Removal/Installation	25-5	25-19
Primary Pump Removal/Installation	25-6	25-25
AUXILĬARY PUMP Removal/Installation	25-7	25-34
Flowmeter Strainer Assembly Removal/Installation	25-8	25-39
AE AIR ELIMINATOR Removal/Installation	25-9	25-44
AE AIR ELIMINATOR Check Valve Removal/Installation	25-10	25-47
Tanker Piping Removal/Installation	25-11	25-50
V1 Emergency Valve Removal/Installation	25-12	25-62
V1 Emergency Valve Cable Removal/Installation	25-13	25-68
Emergency Shut-off Cable Removal/Installation	25-14	25-70
Emergency Shut-off Cable Removal/Installation	25-15	25-74
V2 Bottom Load Adapter Removal/Installation	25-16	25-81
V3 Suction Line Valve Removal/Installation	25-17	25-83
V4 Relief Valve Removal/Installation/Adjustment	25-18	25-86
V5 Air Actuated Flow Valve and Flange Couplings Removal/Installation	25-19	25-91
V6 FUEL/DEFUEL CONTROL VALVE Control Rod Removal/Installation	25-20	25-96
V6 FUEL/DEFUEL CONTROL VALVE Removal/Installation	25-21	25-99
V7/V8 REEL VALVES Removal/Installation	25-22	25-106
V9 CHECK VALVE Removal/Repair/Installation	25-23	25-109
V10 B. L. Bottom Load VALVE Removal/Installation	2 3-24	25-115
V11 FLOW VALVE (REG) Removal/Installation	25-25	25-118
V12 Bottom Load PRECHECK VALVE Removal/Installation	25-26	25-121
V13 Vent Valve and Push Rod Removal/Installation/Adjustment	25-27	25-124
V14 Pilot Valve Assembly Removal/Installation	25-28	25-129
V16 AUXILIARY PUMP CHECK VALVE Removal/Repair/Installation	23-29	25-131
V17 CRAVITY VAI VF Removal/Installation	25-30	25-137
V18 BULK DELIVERY VALVE Removal/Installation	25-31	25-141
V 19 Jet Level Sensor Removal/Installation	23-32	25-144
ED EDUCTOR Assembly Removal/Repair/Installation	25-33	25-146
Flow Limiting Valve Removal/Installation	25-34	25-150
SP SAMPLING PROBE Valve Removal/Installation	. 25-35	25-152
VT VENTURI Assembly Removal/Repair/Installation	25-36	25-155
Tank Fuel Strainer Removal/Repair/Installation	25-37	25-161
Cap and Cable Removal/Installation	25-38	25-166
Drop Tube Removal/Installation	25-39	25-170
Hose Reel Crank Stowage Hardware Removal/Installation	25-40	25-172
Vapor Recovery Test	25-41	25-173

Section I. INTRODUCTION

25-1. GENERAL. This chapter contains the M978 tanker fuel handling components removal and installation procedures for organizational maintenance. Major components covered in this chapter include:

- piping and tubingpumps and pump motors
- valves

The subassemblies and parts which must be removed before the fuel handling components can be removed are referenced to other paragraphs in this manual.

Section II. SERVICE AND INSPECTION

M978 Tanker Maintenance Instructions

25-2. GENERAL MAINTENANCE INSTRUCTIONS.

a. Refer to Figures 25-1 through 25-4 to identify M1978 tanker components before beginning any work.

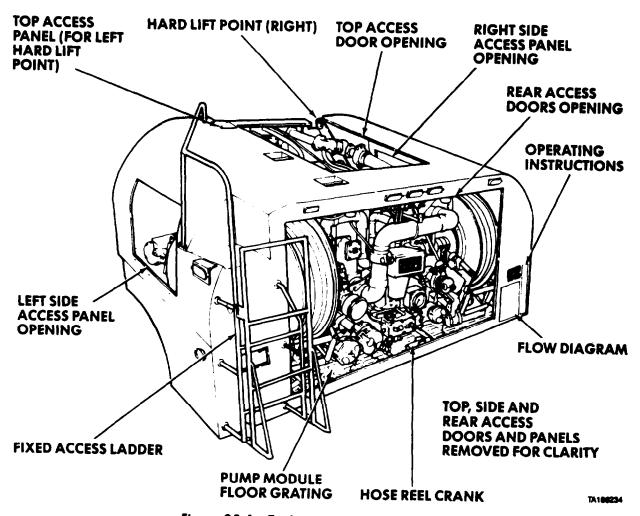


Figure 25-1. Tanker External Components.

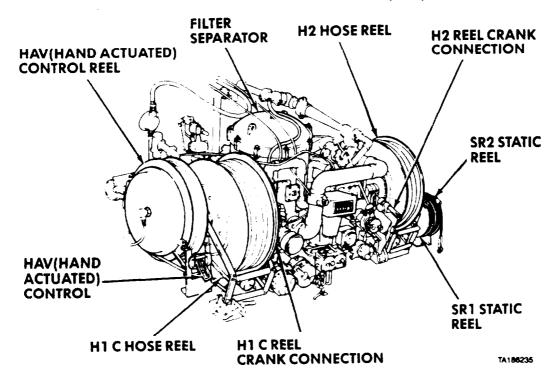


Figure 25-2. Tanker Filter and Manual Dispensing Components.

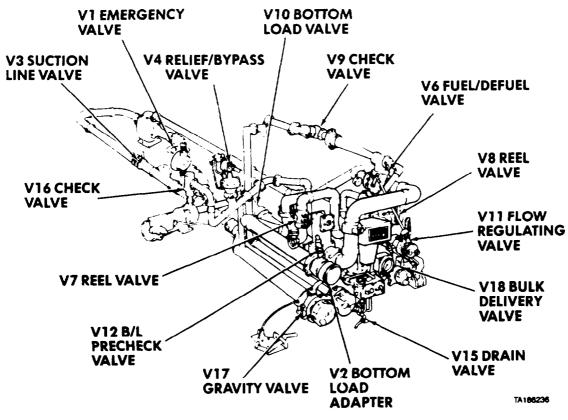


Figure 25-3. Tanker Dispensing Valves.

25-2. GENERAL MAINTENANCE INSTALLATION (CONT). PRIMARY **VT VENTURI ED EDUCTOR PUMP** FM FLOWMETER LINE **FUEL/DEFUEL** STRAINER D BULK RECEPTACLE **METERED** MC MANUAL CONTROL **AUXILIARY EMERGENCY** PUMP VALVE LEVER C BULK RECEPTACLE **AE AIR FLOW LIMITING ELIMINATOR/ VALVE, V5 AIR STRAINER ACTUATOR VR VAPOR PUMP** RECOVERY **ENGAGEMENT** SAMPLING RECEPTACLE LEVER **B GRAVITY**

Figure 25-4. Tanker Loading and Servicing Components.

PROBE

b. Follow these maintenance practices when working on the M978 tanker and components

RECEPTACLE

WARNING

- To prevent explosion and fire, no smoking, flames, sparks, and glowing or hot objects are allowed within 50 ft (15 m) of vehicle.
- Eye protection is required during all grinding operation.
- (1) Tag and mark shims, connectors, wires, tubes, conduit, hoses, and pipes before disconnecting. Matchmark position of clamps, brackets, fittings, components, and subassemblies before removal. Identify similar parts to ensure correct assembly and installation.
- (2) Use suitable container to catch fuel when removing hoses, tubes, fittings, pipes, and components.
- (3) Drain air system before removing air-actuated components and subassemblies.

CAUTION

Do not use tape to close off fuel openings. Sticky surface of tape will mix with and contaminate fuel.

(4) When a component is removed from vehicle, cover open ends of pipes, valves, and other components. Cover open ends with caps or plugs to prevent contaminants from entering fuel circuit.

- (5) Handle and store removed components carefully.
- (6) To ease assembly, lay out parts in the order they are removed during disassembly.
- (7) Plumbing tags are attached with wire, screws, or rivets. Do not remove or replace plumbing tags unless missing or damaged.
- (8) Inspect parts as removed, for breaks, dents, cracks, surface defects or other damage. Turn in defective parts. Set aside good parts for later use.
- (9) When unpacking items, remove all packing material (barrier paper, tape, plastic bags, and protective caps).
- (10) Replace all gaskets, packings, and seals removed during repair. Replace all lockwire, lockwashers, and cotter pins at time of assembly.
- (11) Replace broken, worn, or burned electrical wiring.
- (12) Replace broken, frayed, crimped, or soft flexible hoses. Replace stripped or damaged fittings. Replace entire connected flexible hose if fittings are damaged. Hose clamps should not crimp hoses.
- (13) Replace screws, nuts, or fittings with damaged threads. Inspect tapped holes for thread damage. If cross-threaded, retap hole for next oversize screw or stud. If retapping will weaken part, replace part.
- (14) Reshape elongated mounting holes by drilling oversize to receive bushing with required inner diameter. Stake bushing in place with center punch.
- (15) When installing studs, use proper driver. Before driving stud, inspect hole for chips. Blow out foreign matter, coat thread with film of antiseize compound, and start stud by hand.
- (16) Remove protective grease coatings from new parts before installation.
- (17) Lubricate all preformed packings with a thin coat of oil before installation.
- (18) To install preformed packing, stretch packing and place into position. Rotate component on flat surface and uniformly press packing into position.
- (19) Remove all traces of old gasket and sealant before installing new gasket. During installation, coat both sides of gasket with adhesive-sealant.
- (20) When replacing coupling gaskets, lubricate with a thin coat of grease before installation.
- (21) Use suitable lifting device, jack, or other aid when lifting the heavier components.
- c. Follow these cleaning instructions when working on tanker components.

WARNING

- Adhesives, solvents, and sealing compounds can burn easily, and give off
 harmful vapors, and are harmful to skin and clothing. To avoid injury or death,
 keep away from open fire and use in well-ventilated area. If adhesive, solvent,
 or sealing compound gets on skin or clothing, wash immediately with soap and
 water.
- Compressed air used for cleaning and drying purposes will be reduced to 30 psi and used only with adequate chip guarding and personal protection equipment, goggles, shield, and gloves.
- (1) Soak parts in solvent, and wash away deposits by slushing or spraying. When necessary, brush with oval paint brush moistened in solvent. Use jet of dry compressed air to dry parts, except bearings, after cleaning. Bearings must drip dry.
- (2) Do not use wire brushes, abrasive wheels, or compounds to clean parts, unless specifically approved in the detailed instructions.
- (3) Do not clean rubber parts in dry cleaning solvent. Wipe clean with a clean, dry, lint-free cloth. (4) Electrical parts, such as coils, junction blocks, and switches, should not be soaked or sprayed with cleaning solutions. Clean parts with a clean lint-free cloth moistened with dry cleaning solvent.
- d. Follow these inspection instructions when working on the tanker and tanker components.
 - (1) Inspect all surfaces in contact with gaskets, coupling gaskets, or seals for nicks, burrs, or scratches which might damage new seal during assembly. Remove any defects before assembly.

25-2. GENERAL MAINTENANCE INSTRUCTIONS (CONT).

- (2) Inspect all hose surfaces for damaged material. Check for breaks caused by sharp kinks or contact with other parts of vehicle. Inspect fitting threads for damage. Replace defective parts. Check for leaks after assembly and during initial vehicle operation period.
- (3) Inspect wiring harnesses for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts.
- (4) Visually inspect all castings and weldments for cracks.

25-3. 2500 GALLON TANK/DRAIN.

This task covers:

- a. Drain 2500 gallon tank.
- b. Follow-on Maintenance.

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para

Condition Description

TM 9-2320-279-10 Vehicle system air pressure

built up to 100 psi (690 kPa)

TM 9-2320-279-10 Fuel pumped from 2500 gallon tank.

TM 9-2320-279-10 Tanker prepared for operation.

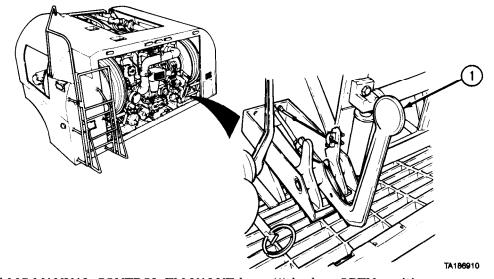
Special Environmental Conditions

None

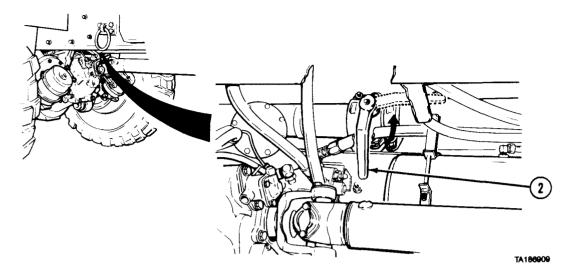
General Safety Instructions

No smoking, flame, sparks and hot or glowing objects within 50 ft (15 m) of vehicle.

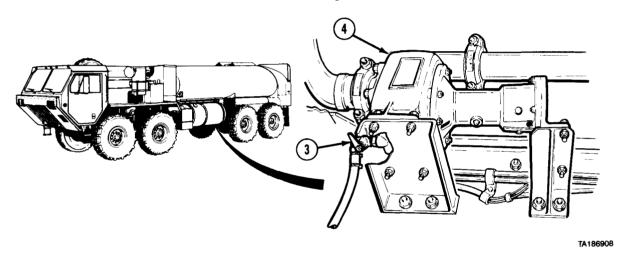
a. Drain 2500 Gallon Tank.



(1) Pull MC MANUAL CONTROL EM VALVE lever (1) back to OPEN position.



(2) Set V3 suction line valve handle (2) to OPEN position.

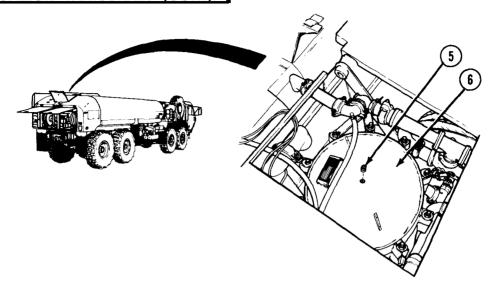


NOTE

Primary pump and piping may contain approximately 50 to 60 gallons (190 to 230 liters) of fuel. Dispose of all drained fuel in accordance with unit standard operating procedures.

(3) Open drain valve (3) in primary pump (4) to drain fuel from piping.

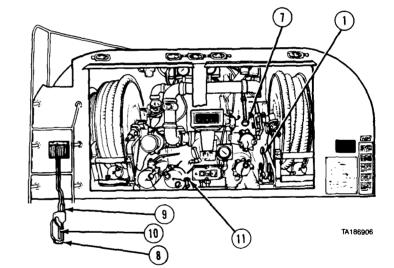
25-3. 2500 GALLON TANK/DRAIN (CONT).



- (4) Remove plug (5) from filter-separator cover (6).
- (5) Pull out on V6 FUEL/DEFUEL CONTROL VALVE handle (7).
- (6) Remove HAV HAND ACTUATED CONTROL VALVE (8) and hoses (9) from pump module.

NOTE

- Filter-separator may contain 20 to 30 gallons (75 to 115 liters) of fuel.
- HAV HAND ACTUATED CONTROL VALVE lever must be squeezed through step (25) for fuel to drain.
 - (7) Squeeze and hold lever (10).
 - (8) Open V15 DRAIN VALVE (11).
 - (9) Remove filter-separator elements (para 23-3).



NOTE

Continue with step (10) after fuel stops draining from primary pump and filter-separator.

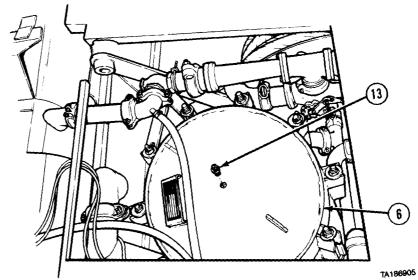
- (10) Close V15 DRAIN VALVE (11).
- (11) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to CLOSE position.

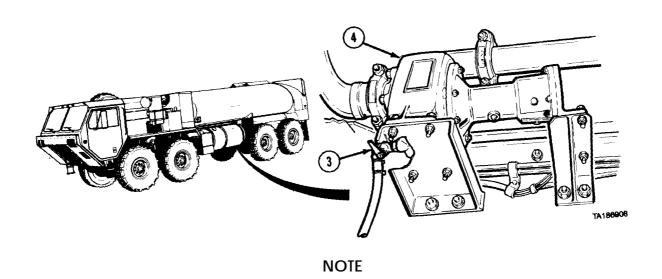
(12) Install adapter fitting (13) in filter-separator cover (6).

CAUTION

Do not exceed 50 psi (345 kPa) in filter-separator. Damage to equipment may result.

(13) Apply compressed air to adapter fitting (13) and pressurize filter-separator to 10 to 50 psi (69 to 345 kPa).





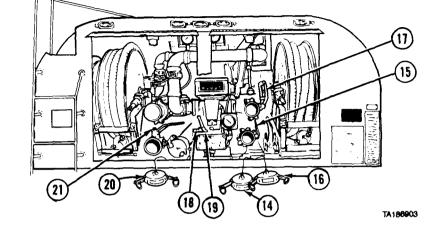
Continue with step (14) after fuel stops draining from primary pump. (14) Close drain valve (3) on primary pump (4).

25-3. 2500 GALLON TANK/DRAIN (CONT).

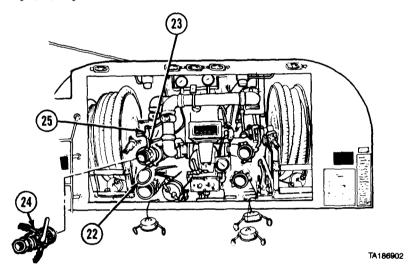
WARNING

Fuel in piping is under pressure and may spray when caps are removed or valves are opened, causing personal injury. Remove caps and open valves slowly.

- (15) Remove cap (14), open V18 BULK DELIVERY valve (15), and drain fuel.
- (16) Remove cap (16), open V11 FLOW VALVE (REG) (17), and drain fuel.
- (17) Remove cap (18), open SP SAMPLING PROBE (19), and drain fuel.



(18) Remove cap (20), open V17 GRAVITY VALVE (21), and drain fuel.



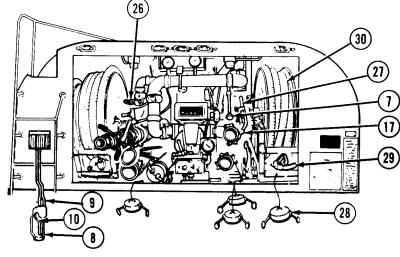
- (19) Remove dust cap (22) from V2 bottom load adapter (23) and install D1 adapter (24).
- (20) Open V12 bottom load CHECK VALVE (25), D1 adapter (24), and drain fuel.

(21) Open V7 REEL VALVE (26) and V8 REEL VALVE (27).

NOTE

Do steps (22) and (23) for left and right fuel service hoses.

- (22) Remove cap (28) and install fuel service nozzle (29).
- (23) Squeeze lever on fuel service nozzle (29) and drain fuel from hose (30). Release lever.
- (24) Push in on V6
 FUEL/DEFUEL CONTROL
 VALVE handle (7) and drain
 fuel from V11 FLOW VALVE
 (REG) (17).



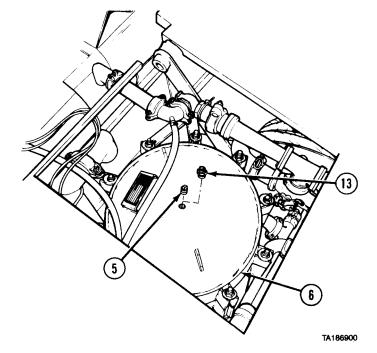
TA186901

- (25) Pull out on V6 FUEL/DEFUEL CONTROL VALVE handle (7) after fuel stops draining.
- (26) Release lever (10). Rewind hoses (9) and HAV HAND ACTUATED CONTROL VALVE (8) in pump module.
- (27) Discontinue compressed air and remove adapter fitting (13) from filter-separator cover (6).

WARNING

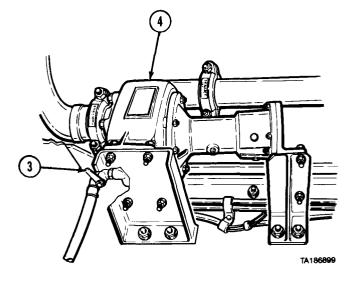
Adhesives, solvents, and sealing compounds can burn easily, and give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(28) Apply pipe thread sealing compound to threads of plug (5) and install in filter-separator cover (6).



25-3. 2500 GALLON TANK/DRAIN (CONT).

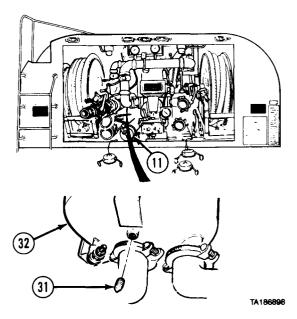
(29) Open drain valve (3) on primary pump (4) and drain remaining fuel.

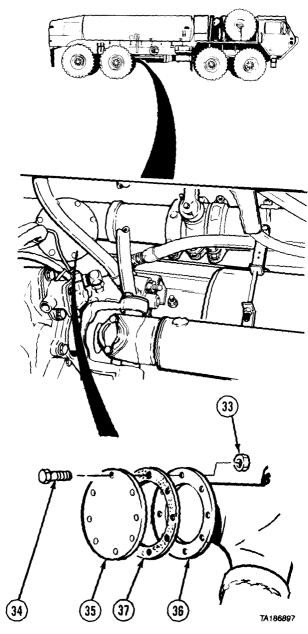


WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (30) Open V15 DRAIN VALVE (11) and drain remaining fuel.
- (31) Remove plug (31) from bottom of filter-separator (32) and drain remaining fuel.
- (32) Coat threads with pipe thread sealing compound and install plug (31) in bottom of filter-separator (32) when fuel stops draining.





- (33.) Remove eight nuts (33) and screws (34) from cover (35) and tank fuel strainer (36). (34) Remove cover (35) and gasket (37) from tank fuel strainer (36) and let fuel drain. (35) Coat both sides of gasket (37) with adhesive-sealant and position gasket and cover (35) on tank fuel strainer (36).
- (36) Install eight screws (34) and nuts (33).
- b. Follow-on Maintenance. None.

END OF TASK

Section III. TUBING, PUMPS, AND AIR ELIMINATOR

25-4. TANKER TUBING REMOVAL/INSTALLATION. This task covers:

Compound, sealing, pipe thread, Item 18,

a. Typical Tubing Removal b. Typical Tubing Installation c. Tubing Removal/Installation d. Follow-on Maintenance.

INITIAL SETUP

None

Equipment Condition Models

M978 TM or Para Condition Description Test Equipment TM 9-2320-279-10 Pump module top and rear

access doors opened (as needed).

Special Tools Para 16-48 Pump module left and right None

side access panels removed.

Supplies Special Environmental Conditions

None

Appendix C General Safety Instructions

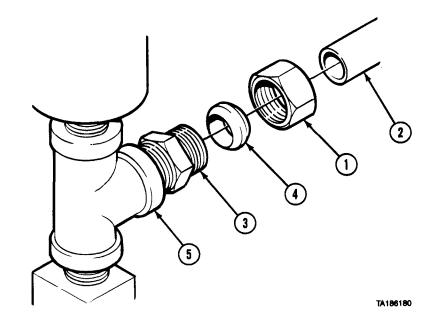
Personnel Required No smoking, flame, sparks, hot or glowing MOS 63S, Heavy wheel vehicle mechanic objects within 50 ft (15 m) of vehicle.

References None

a. Typical Tubing Removal.

NOTE

- This procedure is for reference only to show location of M978 tanker tubing. It will never be necessary to remove all the tubing at once. Refer to 25-4.c for location of specific tubing sections,
- All tubing on the M978
 Tanker is connected with compression fittings, except tube from V9 CHECK
 VALVE to AE AIR
 ELIMINATOR, which uses hose clamps.
- Fitting from which tubing is being removed or installed can be an elbow or adapter on a gage, valve, or other plumbing component. All compression fittings are removed and installed the same way. Adapter is shown.



- Tag and mark tubing before removal.
 - (1) Remove nut (1) and tube (2) from adapter (3).
 - (2) Remove compression ring (4) from tube (2).
 - (3) Remove adapter (3) from component (5).

b. Typical Tubing Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Coat threads of adapter (3) with pipe thread sealing compound and install in component (5).
- (2) Position nut (1) on tube (2) and install compression ring (4).
- (3) Install nut (1) and tube (2) on adapter (3).

c. *Tubing Removal/Installation*. Refer to Table 25-1 and Figure 25-5 for location of specific tubing sections.

Table 25-1. Tanker Module Tubing.

Index No.	From	То	Refer To Figure
1	DLPG DISCHARGE LINE PRESSURE GAGE (A)	V16 AUXILIARY PUMP CHECK VALVE (B)	25-5
2	VNPG VENTURI/NOZZLE PRESSURE GAGE (C)	VT VENTURI (not shown)	25-5
3	DPG DIFFERENTIAL PRESSURE GAGE (right side) (D)	Filter-Separator (E)	25-5
4	DPG DIFFERENTIAL PRESSURE GAGE (left side) (D)	Filter-Separator (E)	25-5
5	Filter-Separator (E)	V15 DRAIN VALVE (F)	25-5
6	V15 DRAIN VALVE (F)	(Floor)	25-5
7	V12 Bottom Load PRECHECK VALVE (Top) (G)	Tank (not shown - removed for clarity)	
8	V12 Bottom Load PRECHECK VALVE (Bottom) (G)	Tank (not shown - removed for clarity)	
9	AUXILIARY PUMP (H)	AE AIR ELIMINATOR (I)	25-5
10	V9 CHECK VALVE (J)	AE AIR ELIMINATOR (I)	25-5

VENTURI/NOZZLE **RIGHT SIDE** V16 CHECK VALVE PRESSURE GAGE TO **DIFFERENTIAL** TO DLPG DISCHARGE **PRESSURE GAGE VT VENTURI** PRESSURE GAGE TO FILTER-SEPARATOR **TUBING TUBING** (2)C В D

M978 Tanker Maintenance Instructions (Cont)

TA186182

LEFT SIDE DIFFERENTIAL

PRESSURE GAGE TO

FUEL SEPARATOR

Figure 25-5. Tanker Module Tubing (Sheet 1 of 2).

FILTER-SEPARATOR TO

V15 DRAIN VALVE TUBE

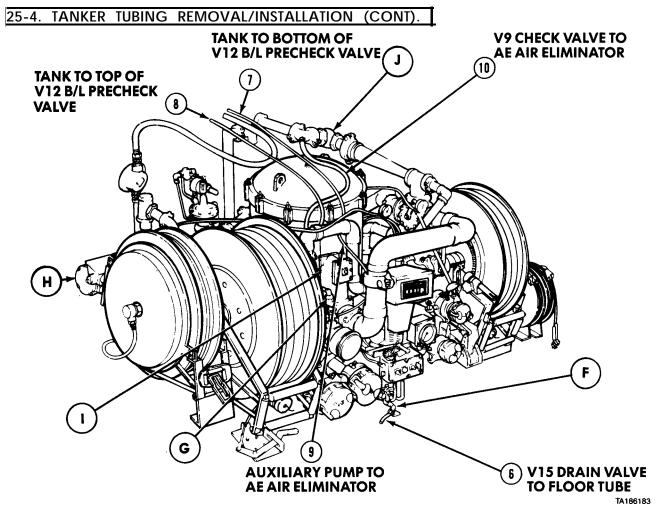


Figure 25-5. Tanker Module Tubing (Sheet 2 of 2).

- d. Follow-on Maintenance.
 - (1) Inspect tubing for leaks.
 - (2) Install pump module top side access panels (para 16-50).
 - (3) Close pump module top and rear access doors (TM 9-2320-279-10).

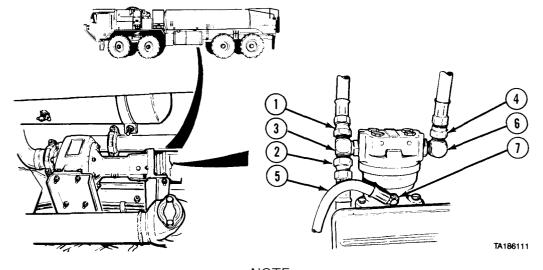
END OF TASK

25-5. PRIMARY MOTOR REMOVAL/INSTALLATION. PUMP HYDRAULIC This task covers: a. Removal c. Follow-on Maintenance b. Installation INITIAL SETUP Models References M978 None Test Equipment Equipment Condition None TM or Para Condition Description Special Tools None None Special Environmental Conditions Supplies None Compound, sealing, pipe thread, Item 18, General Safety Instructions Appendix C No smoking, flame, sparks, and hot or glowing Tags, identification, Item 48, Appendix C objects within 50 ft (15 m) of vehicle.

a. Removal.

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic



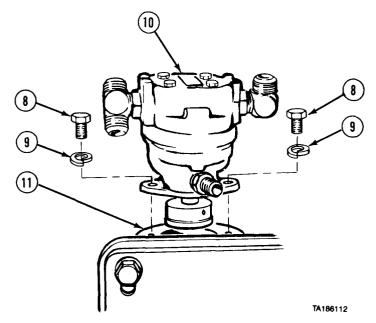
NOTE

Tag and mark lines and fittings before removal.

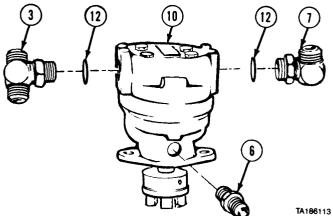
- (1) Disconnect two hydraulic lines (1 and 2) from tee (3).
- (2) Disconnect two hydraulic lines (4 and 5) from adapter (6) and elbow (7).

25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT).

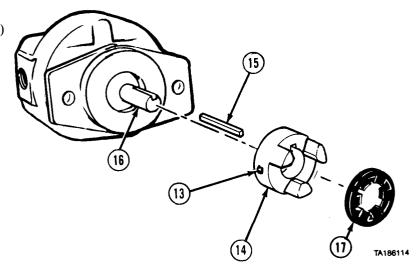
(3) Remove two screws (8), lockwashers (9), and motor (10) from pump (11).

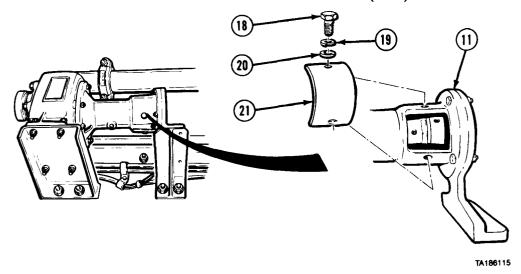


- (4) Remove tee (3), adapter (6), and elbow (7) from motor (10).
- (5) Remove two preformed packings (12).

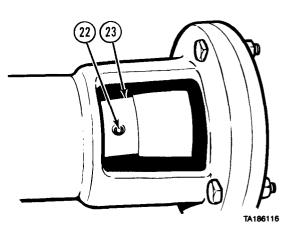


- (6) Loosen setscrew (13).
- (7) Remove rear coupling half (14) and key (15) from shaft (16).
- (8) Remove rubber coupling (17) from rear coupling half (14),



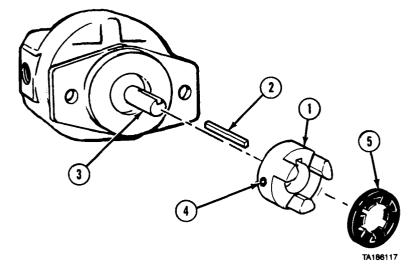


- (9) Remove two screws (18), lockwashers (19), washers (20), and cover (21) from pump (11).
- (10) Loosen setscrew (22) and remove front coupling $half\ (23)$.



b. Installation.

- (1) Install rear coupling half (1) and key (2) on motor shaft (3) but do not tighten setscrew (4).
- (2) Install rubber coupling (5) in rear coupling half (1).



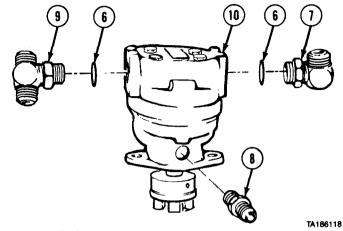
25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT).

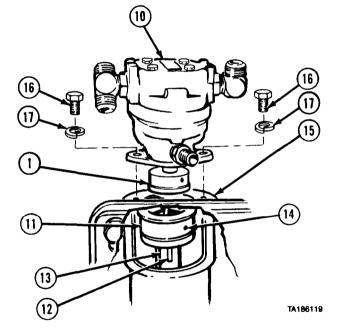
(3) Install two preformed packings (6).

WARNING

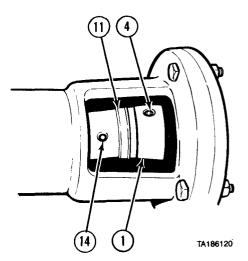
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (4) Coat threads of elbow (7) with pipe thread sealing compound.
- (5) Install elbow (7), adapter (8), and tee (9) in motor (10).
- (6) Install front coupling half (11) and key (12) on pump shaft (13) but do not tighten setscrew (14).
- (7) Aline coupling halves (1 and 11) and install motor (10) on pump (15) with two screws (16) and lockwashers (17).

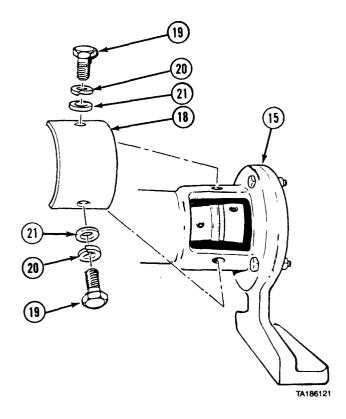




(8) Hold coupling halves (1 and 11) together and tighten setscrews (14 and 4).



(9) Install cover (18) on pump (15) with two screws (19), lockwashers (20), and washers (21).



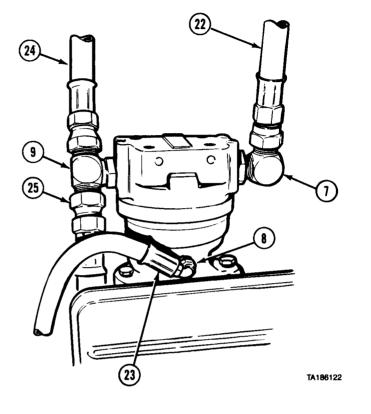
25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT).

- (10) Install two hydraulic lines (22 and 23) on elbow (7) and adapter (8).
- (11) Install two hydraulic lines (24 and 25) on tee (9).

c. Follow-on Maintenance.

- (1) Prepare tanker for operation (TM 9-2320-279-10).
- (2) Recirculate fuel (TM 9-2320-279-10).
- (3) Inspect hydraulic motor for leaks.

END OF TASK



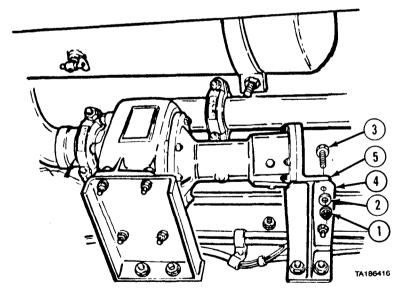
25-6. PRIMARY PUMP REMOVAL/INSTALLAT	ION.		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance		
INITIAL SETUP	D. C		
Models M978	References None		
Test Equipment	Equipment Condition		
None Special Tools	<i>TM or Para</i> Para 25-3	Condition Description Tank drained.	
None	Para 9-9	Propeller shaft between transfer case and third axle	
Supplies Adhesive-sealant, silicone, Item 4, Appendix C Compound, sealing, pipe thread, Item 18,	Para 25-5	removed. Primary pump hydraulic motor removed.	
Appendix C Grease, automotive and artillery, Item 23, Appendix C	Special Environmental Conditions None		
Personnel Required MOS 63S, Heavy wheel vehicle mechanic (2)	General Safety Instructions No smoking, flame, sparks, and glowing or hot objects within 50 ft (15 m) of vehicle.		

a. Removal.

NOTE

Pump is located inside right frame rail in front of No. 3 axle. Pump area is shown with crossmember removed for clarity.

(1) Remove two locknuts (1), washers (2), and screws (3) from rear mount (4) and pump (5).

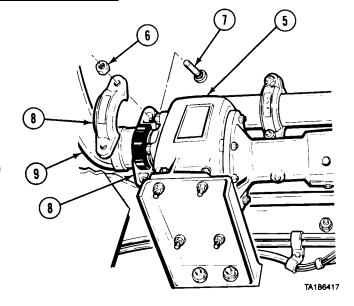


25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

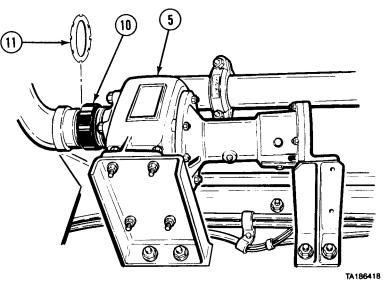
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

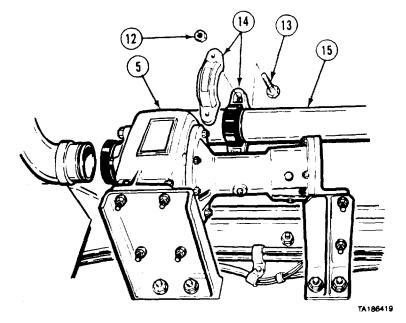
(2) Remove two nuts (6), screws (7), and coupling halves (8) from suction pipe (9) and pump (5).



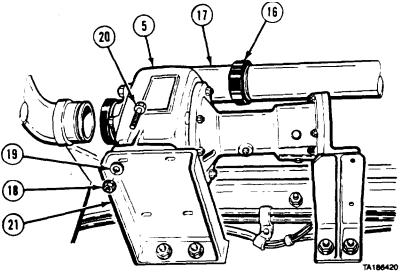
- (3) Push coupling gasket (10) onto pump (5).
- (4) Remove reducer (11) from coupling gasket (10).



Remove two nuts (12). screws (13). and coupling halves (14) from discharge pipe (15) and pump (5).



- (6) Push coupling gasket (16) back onto discharge elbow (17).
 (7) When fuel has stopped draining, remove four locknuts (18). washers (19). and screws (20) from front nump mount (21) and pump mount (21) and pump (5).

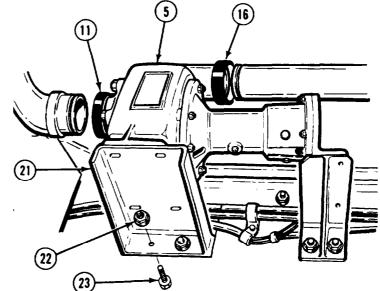


25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

WARNING

Pump is heavy and may cause, severe injury if it slips or is dropped while being moved.

- (8) Support pump (5).
- (9) Remove four locknuts (22) and screws (23) from front pump mount (21).
- (10) Remove mount (21).
- (11) Soldier A and Soldier B remove pump (5) from vehicle.
- (12) Remove coupling gaskets (11 and 16).

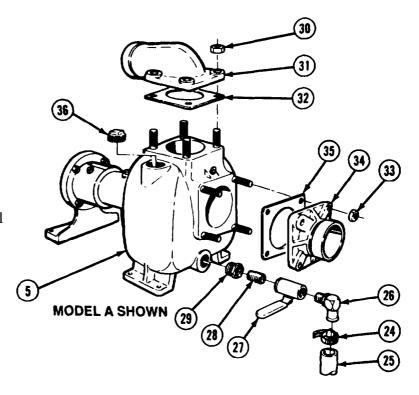


- (13) Remove clamp (24) and hose (25).
- (14) Remove fitting (26), drain valve (27), nipple (28), and bushing (29) from pump (5).

NOTE

There are two models of primary pump. Model A pump does not include discharge elbow and suction flange. Model B pump is supplied with discharge elbow and suction flange installed. Do steps (15) and (16) if replacing pump with Model A pump. Skip steps (15) and (16) and go to step (17) if replacing pump with Model B pump.

- (15) Remove four nuts (30), discharge elbow (31), and gasket (32).
- (16) Remove four nuts (33), suction flange (34), and gasket (35).
- (17) Remove fill plug (36).

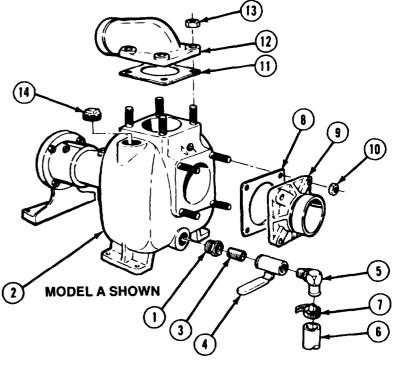


c. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound and install bushing (1) in pump (2).
- (2) Apply pipe thread sealing compound to both ends of nipple (3) and install in bushing (1).
- (3) Install drain valve (4) on nipple (3).
- (4) Apply pipe thread sealing compound and install fitting (5) on drain valve (4).
- (5) Install hose (6) on fitting (5) with clamp (7). Close drain valve (4).



NOTE

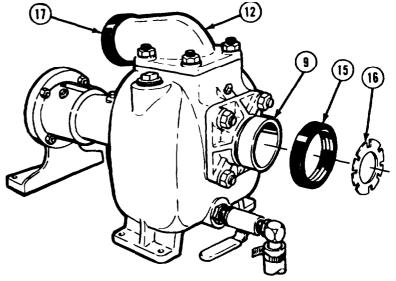
There are two models of primary pump. Model A pump does not include discharge elbow and suction flange. Model B pump is supplied with discharge elbow and suction flange installed. Do steps (6) through (9) if installing Model A pump. Skip steps (6) through (9) and continue with step (10) if installing Model B pump.

- (6) Apply silicone adhesive-sealant and install gasket (8) on pump (2).
- (7) Install suction flange (9) with four nuts (10). Tighten nuts to 34 lb-ft (46 N•m).
- (8) Apply silicone adhesive-sealant and install gasket (11) on pump (2).
- (9) Install discharge elbow (12) with four nuts (13). Tighten nuts to 34 lb-ft (46 N•m).
- (10) Fill pump (2) with one-half gallon clean fuel of same type as in tanker. Install fill plug (14.

CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (11) Install coupling gasket (15) and reducer (16) on suction flange (9).
- (12) Install coupling gasket (17) on discharge elbow (12).

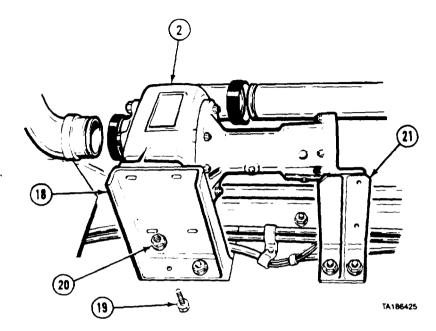


25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

WARNING

Pump is heavy and may cause severe injury if it slips or is dropped while being installed.

- (13) Support pump (2) in position under tank.(14) Install front pump
- (14) Install front pump mount (181 with four screws (19) and locknuts (20) level with rear pump mount (21).

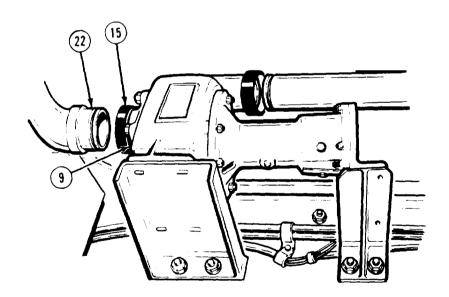


CAUTION

Do not tear or damage coupling gasket during installation. If coupling gasket is damaged, piping connections will leak.

NOTE

- Apply light coat of grease to coupling gasket.
- Loosen pipe connector at next connection
- (15) Postition coupling gasket (15) on suction flange (9) and suction pipe (22).

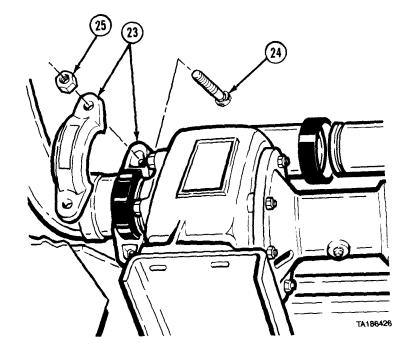


TA186427

CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

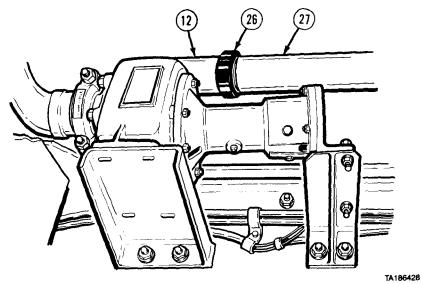
(16) Install two coupling halves (23) with screws (24) and nuts (25).



NOTE

Loosen pipe connector at next connection.

(17) Position coupling gasket (26) over ends of discharge elbow (12) and discharge pipe (27).

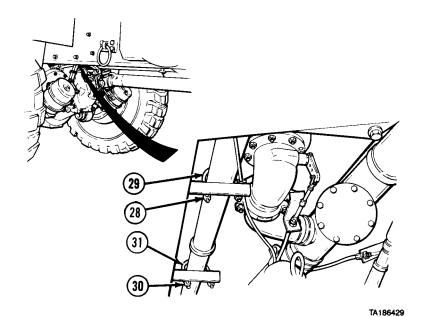


25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

NOTE

If discharge pipe can be alined with pump discharge elbow, continue with step (22). If not, continue with step (18).

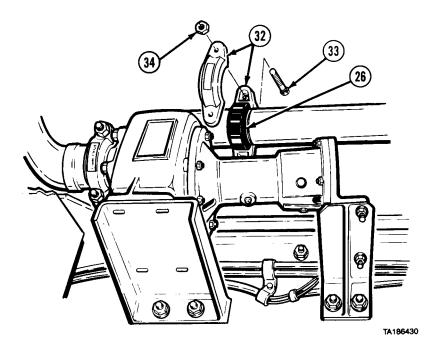
- (18) Loosen two nuts (28) and discharge pipe U-bolt (29).
- (19) Loosen two nuts (30) and discharge pipe U-bolt (31).



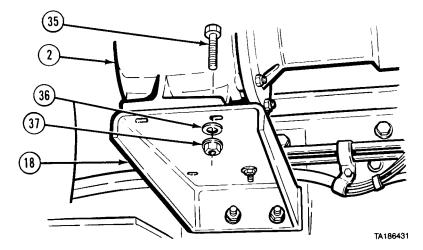
CAUTION

Do not tear or otherwise damage coupling gasket during installation. If coupling gasket is damaged, piping connections will leak.

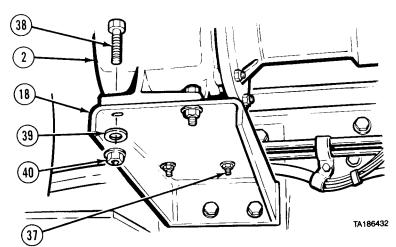
(20) Install two coupling halves (32) on coupling gasket (26) with two screws (33) and nuts (34).



(21) Install two rear screws (35), washers (36), and locknuts (37) on pump (2) and front pump mount (18). Do not tighten.



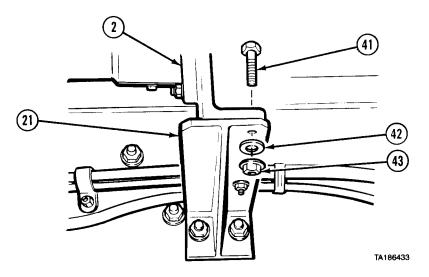
- (22) Install two front screws (38), washers (39), and locknuts (40) on pump (2) and front pump mount (18). Tighten to 34 lb-ft (46 N·m).
- (23) Tighten two rear locknuts (37) in front pump mount (18) to 34 lb-ft (46 N·m).



CAUTION

Pump must be mounted flat or it will twist when tightening new mounting bolts, causing pump damage and leakage.

- (24) Shim pump (2) with shims on rear pump mount (21) so pump is level.
- (25) Install two screws (41), washers (42), and locknuts (43) on pump (2) and rear pump mount (21). Tighten to 34 lb-ft (46 N·m).

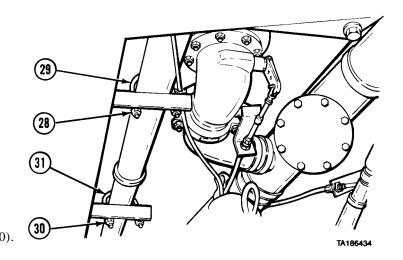


25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

NOTE

If discharge pipe U-bolts were not loosened, skip steps (26) and (27).

- (26) Tighten two nuts (28) on discharge pipe U-bolt (29).
- (27) Tighten two nuts (30) on discharge pipe U-bolt (31).
- c. Follow-on Maintenance.
 - (1) Install primary pump hydraulic motor (para 25-5).
 - (2) Install propeller shaft between transfer case and third axles (para 9-9).
 - (3) Prepare tanker for operation (TM 9-2320-279-10).
 - (4) Recirculate fuel (TM 9-2320-279-10).
 - (5) Inspect primary pump for leaks.



END OF TASK

25-7. AUXILIARY PUMP REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

Para 7-48 Auxiliary pump junction box

removed.

Para 25-4 AUXILIARY PUMP to AE

AIR ELIMINATOR tubing

removed.

Special Environmental Conditions

None

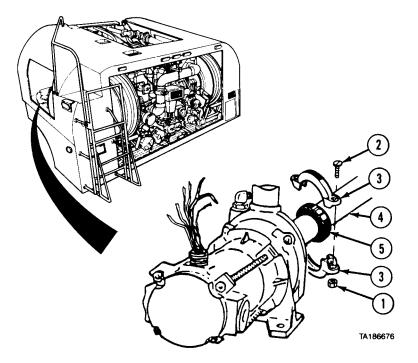
General Safety Instructions

No smoking, flame, sparks, and hot or glowing

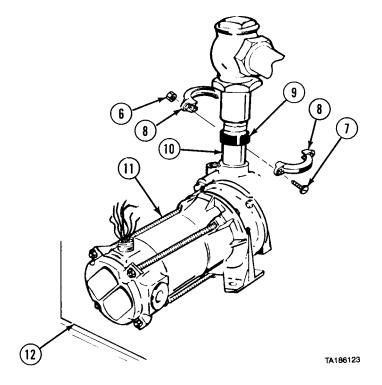
objects within 50 ft (15 m) of vehicle.

a. Removal.

- (1) Remove two nuts (1), screws (2), and coupling
- halves (3) from pipe (4).
 (2) Push coupling gasket (5) on pipe (4).



- (3) Remove two nuts (6), screws (7),
- (3) Remove two nuts (6), screws (7), and coupling halves (8).
 (4) Push coupling gasket (9) on pipe (10).
 (5) Remove AUXILIARY PUMP (11)
- from wheel well (12).

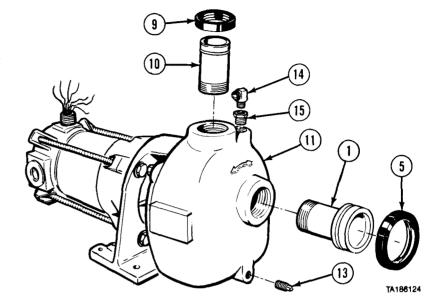


25-7. AUXILIARY PUMP REMOVAL/INSTALLATION (CONT).

- (6) Remove two coupling gaskets (5 and 9).
- (7) Remove drain plug (13) and drain all fuel from AUXILIARY PUMP (11).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



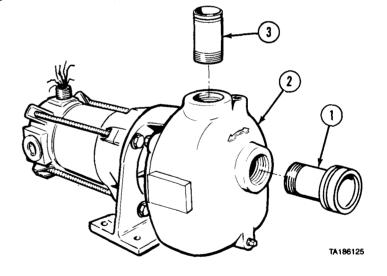
- (8) Coat threads of drain plug (13) with pipe thread sealing compound and install drain plug.
- (9) Remove inlet pipe (1) and outlet pipe (10).
- (10) Remove elbow (14) and adapter (15).

b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

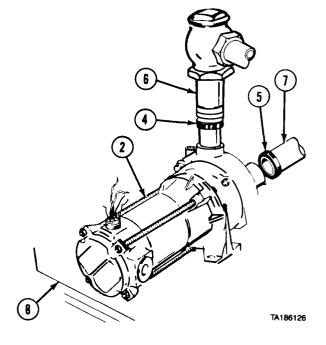
- (1) Coat threads of inlet pipe (1) with pipe thread sealing compound and install inlet pipe in AUXILIARY PUMP (2).
- (2) Coat threads of outlet pipe (3) with pipe thread sealing compound and install outlet pipe in AUXILIARY PUMP (2).



NOTE

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

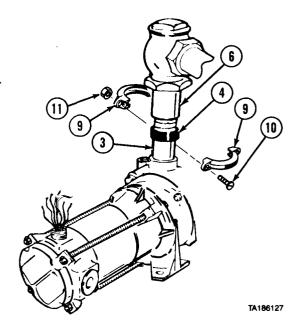
- (3) Install two coupling gaskets (4 and 5) on pipes (6 and 7).
- (4) Position AUXILIARY PUMP (2) on wheel well (8).



NOTE

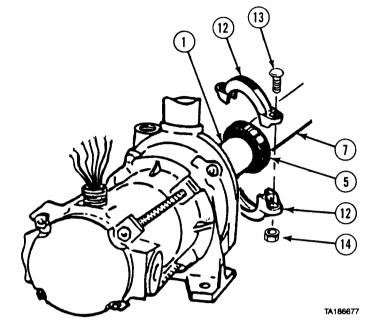
Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Position coupling gasket (4) over connections of pipes (3 and 6).
- (6) Install two coupling halves (9) with two screws (10) and nuts (11).



25-7. AUXILIARY PUMP REMOVAL/INSTALLATION (CONT).

- (7) Position coupling gasket (5) over connections of pipes (1 and 7).
- (8) Install two coupling halves (12) with two screws (13) and nuts (14).



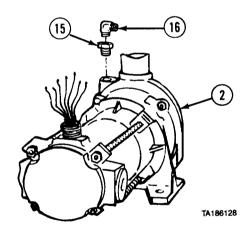
(9) Fill AUXILIARY PUMP (2) with clean fuel of same type as in tanker.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (10) Coat threads of adapter (15) and elbow (16) with pipe thread sealing compound and install adapter and elbow in AUXILIARY PUMP (2).
- c. Follow-on Maintenance.
 - (1) Install auxiliary pump junction box (para 7-48).
 - (2) Install AUXILIARY PUMP to AE AIR ELIMINATOR tubing (para 25-4).
 - (3) Perform fuel servicing using AUXILIARY PUMP (TM 9-2320-279-10).
 - (4) Inspect AUXILIARY PUMP for leakage and proper operation.

END OF TASK



25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models References
M978 None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Tools
None
Para 25-9
AE AIR ELIMINATOR removed.

Supplies Special Environmental Conditions

Adhesive-sealant, silicone, Item 4, Appendix C None

Personnel Required General Safety Instructions

MOS 63S, Heavy wheel vehicle mechanic No smoking, flame, sparks, and hot or glowing

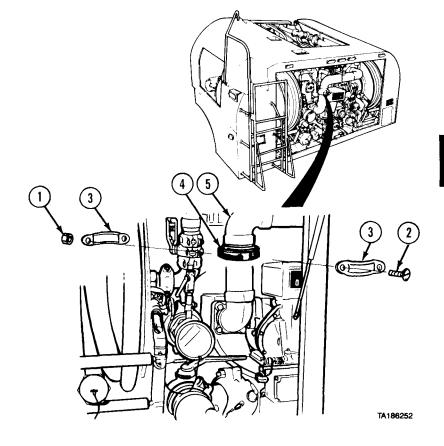
objects within 50 ft (15 m) of vehicle.

a. Removal.

WARNING

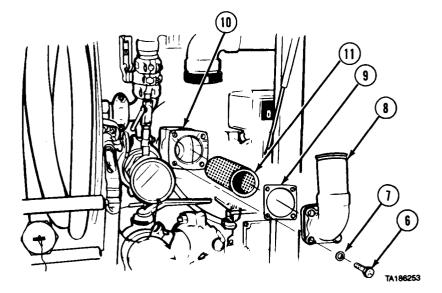
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on pipe (5).

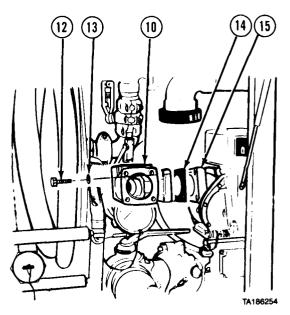


25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION (CONT).

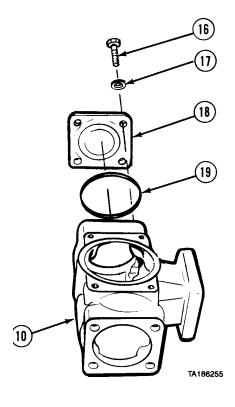
- (3) Remove four screws (6), washers (7), elbow (8), and gasket (9) from strainer housing (10).
- (4) Remove strainer (11).



(5) Remove four screws (12), washers (13), strainer housing (10), and gasket (14) from meter (15).

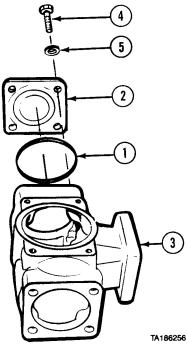


(6) Remove four screws (16), washers (17), cover (18), and preformed packing (19) from strainer housing (10).



- b. Installation.

 - (1) Install preformed packing (1) on cover (2).
 (2) Install cover (2) on strainer housing (3) with four screws (4) and washers (5).

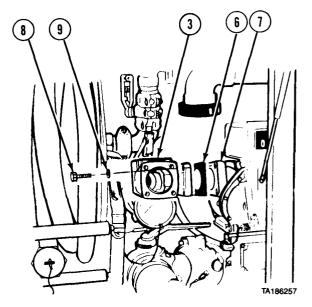


25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION (CONT).

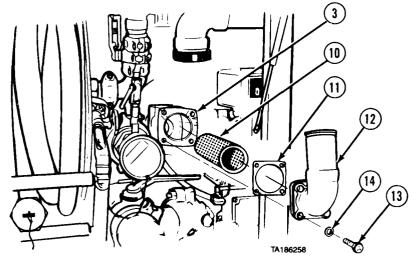
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(3) Apply silicone adhesive-sealant on gasket (6) and install gasket and housing (3) on meter (7) with four screws (8) and washers (9).



- (4) Install strainer (10) in strainer housing (3).
- (5) Apply silicone adhesive-sealant on gasket (11) and install gasket and elbow (12) on housing (3) with four screws (13) and washers (14).
- (6) Do not tighten screws (13).



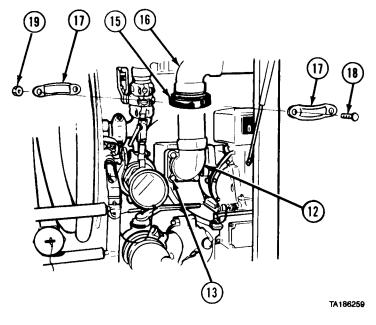
NOTE

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
- Loosen all clamps and next coupling on attaching pipe.
 - (7) Position coupling gasket (15) over connections of pipe (16) and elbow (12).
 - (8) Install two coupling halves (17) with two screws (18) and nuts (19).
 - (9) Tighten screws (13).

c. Follow-on Maintenance.

- (1) Install AE AIR ELIMINATOR (para 25-9).
- (2) Recirculate fuel (TM 9-2320-279-10).
- (3) Inspect flowmeter strainer assembly and piping connections for leaks.

END OF TASK



25-9. AE AIR ELIMINATOR REMOVAL/INSTALLATION.

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description
TM 9-2320-279-10 Pump module rear access

doors opened.

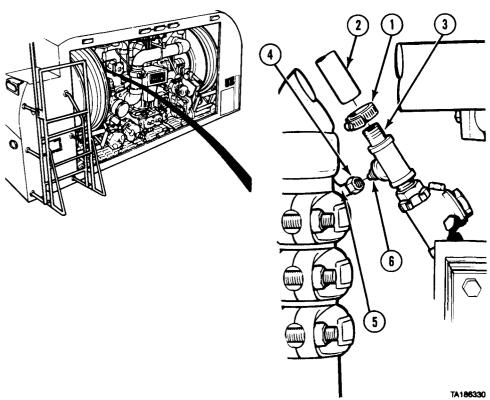
Special Environmental Conditions

None

General Safety Instructions

No smoking, fuel, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

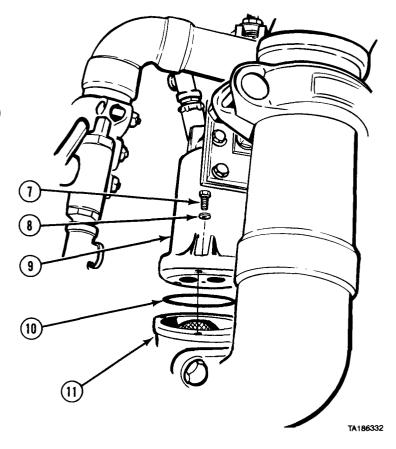


- (1) Loosen clamp (1) and remove tube (2) from pipe nipple (3). Remove clamp.
- (2) Loosen nut (4) and remove tube (5) from adapter (6).

NOTE

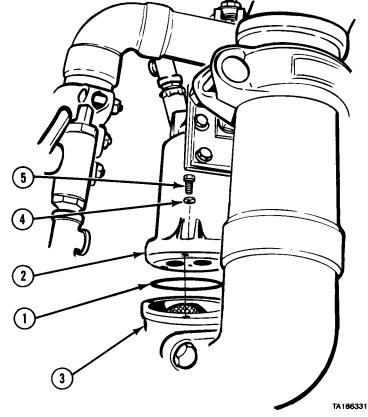
Mark position of AE AIR ELIMINATOR.

- (3) Remove four screws (7) and washers (8).
- (4) Remove AE AIR ELIMINATOR (9) and gasket (10) from strainer (11).



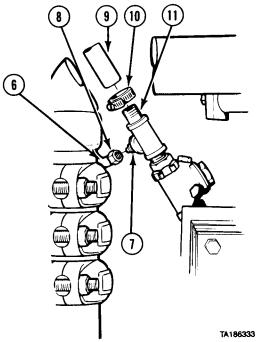
25-9. AE AIR ELIMINATOR REMOVAL/INSTALLATION (CONT).

- b. Installation.
 - (1) Position gasket (1) and AE AIR ELIMINATOR (2) on strainer (3).
 - (2) Install four washers (4) and screws (5).



- (3) Connect tube (6) on adapter (7) and tighten nut (8).
- (4) Install tube (9) and clamp (10) on pipe nipple (11). Tighten clamp.
- c. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check AE AIR ELIMINATOR for leaks.
 - (3) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



25-10. AE AIR ELIMINATOR CHECK VALVE REMOVAL/INSTALLATION.

This task covers:

b. Installation

a. Removal

c. Follow-on Maintenance

INITIAL SETUP

Models References M978 None

Test Equipment **Equipment Condition**

None TM or Para

Condition Description Special Tools AE AIR ELIMINATOR Para 25-9 removed. None

Special Environmental Conditions Supplies

None Compound, sealing, pipe thread, Item 18, Appendix C General Safety Instructions

Personnel Required No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

a. Removal.

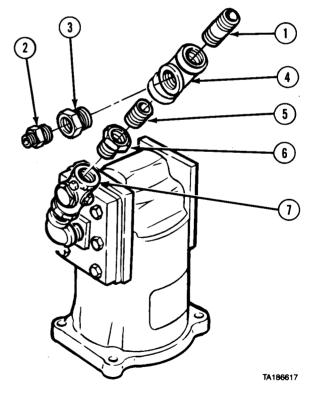
NOTE

MOS 63S, Heavy wheel vehicle mechanic

Mark position of fittings before removal.

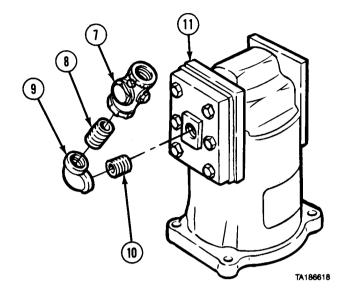
(1) Remove pipe nipple (1), adapter (2), and reducer bushing (3) from tee fitting (4).

(2) Remove tee fitting (4), pipe nipple (5), and reducer bushing (6) from check valve (7).



25-10. AE AIR ELIMINATOR CHECK VALVE REMOVAL/INSTALLATION (CONT).

(3) Remove check valve (7), pipe nipple (8), elbow (9), and pipe nipple (10) from AE AIR ELIMINATOR (11).

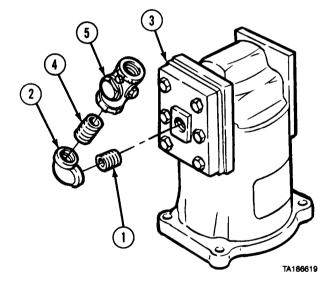


b. Installation.

WARNING

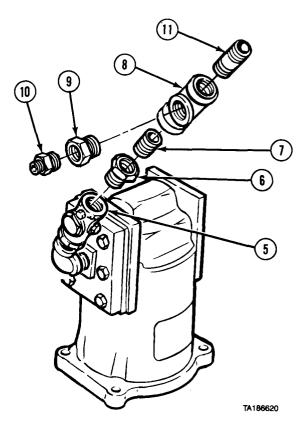
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install pipe nipple and elbow (2) on AE AIR ELIMINATOR (3).
- (2) Apply pipe thread sealing compound to threads of pipe nipple (4) and install pipe nipple and check valve (5) on elbow (2).



- (3) Apply pipe thread sealing compound to threads of reducer bushing (6) and install on check valve (5).
- (4) Apply pipe thread sealing compound to threads of pipe nipple (7) and install on reducer bushing (6).
- (5) Install tee fitting (8) on pipe nipple (7).
- (6) Apply pipe thread sealing compound to threads of reducer bushing (9), adapter (10), and pipe nipple (11) and install in tee fitting (8).
- c. Follow-on Maintenance.
 - (1) Install AE AIR ELIMINATOR (para 25-9).
 - (2) Recirculate fuel (TM 9-2320-279-10).
 - (3) Check AE AIR ELIMINATOR check valve for leaks and proper operation.

END OF TASK



Section IV. PIPING AND VALVES

25-11. TANKER PIPING REMOVAL/INSTALLATION.

This task covers:

- a. Typical Pipe Coupling and Coupling Gasket Removal
- b. Typical Pipe Coupling and Coupling Gasket Installation
- c. Typical Clamp and Bracket Removal
- d. Typical Clamp and Bracket Installation
- e. Tanker Piping
- f. Tanker Piping Brackets
- g. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Grease, automotive and artillery, Item 23, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

TM 9-2320-279-10 Pump module top and rear

access doors opened.

Para 16-48 Pump module left and right

side access panels removed.

Special Environmental Conditions

None

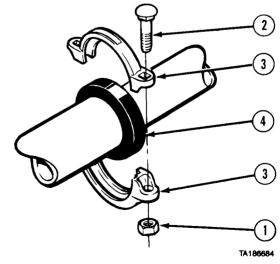
General Safety Instructions

No smoking, flame, sparks, hot or glowing objects within 50 ft (15 m) of vehicle.

a. Typical Pipe Coupling and Coupling Gasket Removal.

NOTE

- This procedure is for reference only to show location of M978 tanker piping. It will never be necessary to remove all the piping at one time. Refer to 25-11.e for locations of specific piping sections.
- All piping sections on the M978 tanker are joined with pipe couplings. Five sizes of standard couplings and two sizes of reducing couplings are used: 1-1/4-inch, 2-inch, 3-inch, 4-inch, and 4-1/2-inch standard couplings, and 4 x 3-inch, 3 x 2-inch reducing couplings.
- All standard and reducing couplings are removed the same way. Reducing coupling is shown.
- Read paragraph 25-2.b before removing piping, valves, adapters, and couplings.
 - (1) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).

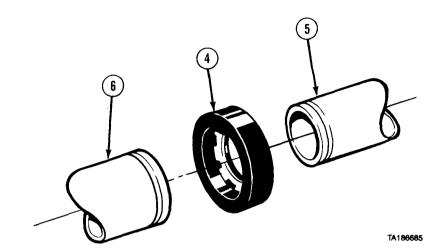


CAUTION

One pipe from which coupling gasket is being removed must be removed to prevent damage to coupling gasket. If coupling gasket is damaged, piping connection will leak.

NOTE

- Component from which coupling gasket is being removed can be a pipe, valve, or adapter. Pipe is shown.
- Remove component easiest to get to. Refer to paragraph 25-11.e for piping. For valve or adapter refer to specific removal/installation task.



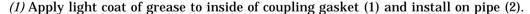
- (2) Push coupling gasket (4) onto pipe (5) and remove pipe (6).
- (3) Remove coupling gasket (4) from pipe (5).
- b. Typical Pipe Coupling and Coupling Gasket Installation.

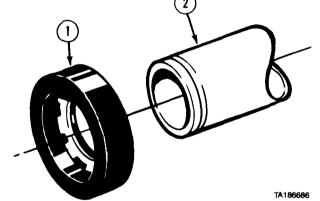
CAUTION

Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

NOTE

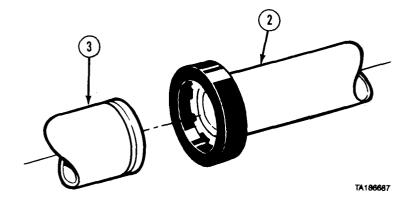
- All standard and reducing couplings are installed the same way. Reducing coupling is shown.
- Component on which coupling gasket is being installed can be a pipe, valve, or adapter. Pipe is shown.
- Install component easiest to get to. Refer to paragraph 25-11.e for piping. For valve or adapter, refer to specific removal/installation task.





25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT)

(2) Position pipe (3) against pipe (2).

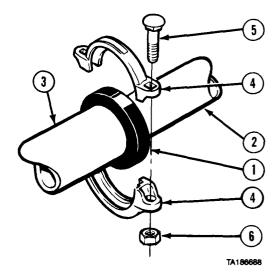


(3) Position coupling gasket (1) over connection of two pipes (2 and 3).

CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

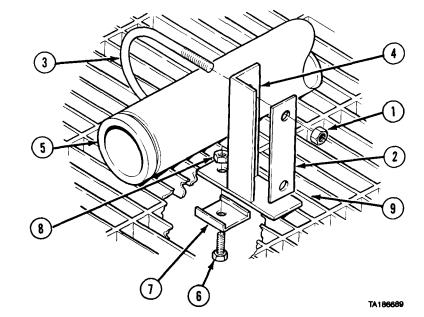
(4) Install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).



c. Typical Clamp and Bracket Removal.

NOTE

- Some piping sections on the M978 tanker are held in place by brackets and clamps. Brackets on pump module grating are installed with screws, mounting brackets, and locknuts. Brackets installed on sheet metal, hard lift points, and frame are weldments and not removable.
- All clamps and non-weldment brackets are removed the same way and, depending on location, may require two soldiers to remove.
- Mark position of clamps and brackets before removal.



- (1) Remove two locknuts (1), plate (2), and U-bolt (3) from bracket (4) and pipe (5).
- (2) Remove screw (6), mounting bracket (7), locknut (8), and bracket (4) from grating (9)
- d. Typical Clamp and Bracket Installation.

NOTE

All clamps and non-weldment brackets are installed the same way.

- (1) Install bracket (4) on grating (9) with screw (6), mounting bracket (7), and locknut (8).
- (2) Install pipe (5) on bracket (4) with U-bolt (3), plate (2), and two locknuts (1).

25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

e. Tanker Piping.

NOTE

Refer to Table 25-2 and Figure 25-6 for location of specific piping sections.

Table 25-2. Tanker Piping

Pipe No.	From	То	Refer To Figure	Equipment Condition TM Or Para	Condition Description
				Para 25-30	V17 GRAVITY VALVE Removed
				Para 23-4	Filter-Separator Removed
2	Gravity Discharge Piping (C)	AUXILIARY PUMP (D)/V4 Bypass/Pressure Relief Valve (E)	25-6		
3	V1 Emergency Valve (F)	Line Strainer (G)/V3 Suction Line Valve (H)	25-6	TM 9-2320-279-10 TM 9-2320-279-10	V3 Suction Valve Closed MC MANUAL CONTROL EM VALVE Lever full Forward, Down, and Closed
4	V3 Suction Line Valve (H)	Primary Pump (I)	25-6	TM 9-2320-279-l0 TM 9-2320-279-l0	V3 Suction Valve Closed MC MANUAL CONTROL EM VALVE Lever Full Forward, Down, and Closed
5	Primary Pump (I)	Flow Limiting Valve (J)	25-6	Para 23-4	Filter-Separator Removed
6	Flow Limiting Valve Piping (K)	V4 Bypass/Pressure Relief Valve (E)/V16 AUXILIARY PUMP CHECK VALVE (L)	25-6	Para 23-4	Filter-Separator Removed
7	V16 AUXILIARY PUMP CHECK VALVE (L)	AUXILIARY PUMP (D)	25-6	Para 25-29	V16 AUXILIARY PUMP CHECK VALVE Removed
8	Flow Limiting Valve (J)	Filter-Separator (Not Shown, Removed for Clarity)	25-6	Para 23-4	Filter-Separator Removed
9	Filter-Separator (Not Shown, Removed for Clarity)	V6 FUEL/DEFUEL CONTROL VALVE (M)	25-6	Para 23-4	Filter-Separator Removed

Table 25-2. Tanker Piping (Cont)

Pipe No.	From	To	Refer To Figure	Equipment Condition TM Or Para	Condition Description
10	V6 FUEL/DEFUEL CONTROL VALVE (M)	ED EDUCTOR (N)	25-6	IWI OI Tala	Condition Description
11	ED EDUCTOR (N)	V9 CHECK VALVE (O)	25-6		
12	V9 CHECK VALVE (O)	Tank (Not Shown, Removed for Clarity)	25-6	Para 25-23	V9 CHECK VALVE to Air Eliminator Piping Removed
13	V6 FUEL/DEFUEL CONTROL VALVE (M)	AE AIR ELIMINATOR/Strainer Assembly (P)	25-6		
14	Flow Meter (Q)	VT VENTURI Assembly (R)/V11 FLOW VALVE (REG) (S)	25-6	Para 25-25	V11 FLOW VALVE (REG) Removed
15	VT VENTURI Assembly (R)	V7, V8 REEL VALVES (T)(U)	25-6		
16	V7 REEL VALVE (T)	H1 REEL (Not Shown, Removed for Clarity)	25-6		
17	VR Vapor Recovery Piping (V)		25-6	Para 25-30	V17 GRAVITY VALVE Removed
				Para 23-4	Filter-Separator Removed
18	V2 Bottom Load Adapter (W)/V12 Bottom Load PRECHECK VALVE (X)	V2 Bottom Load Valve (Y)	25-6	Para 23-4	Filter-Separator Removed
	(*2)			Para 25-16	V2 Bottom Load
				Para 25-26	Adapter Removed V12 Bottom Load PRECHECK VALVE Removed

25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

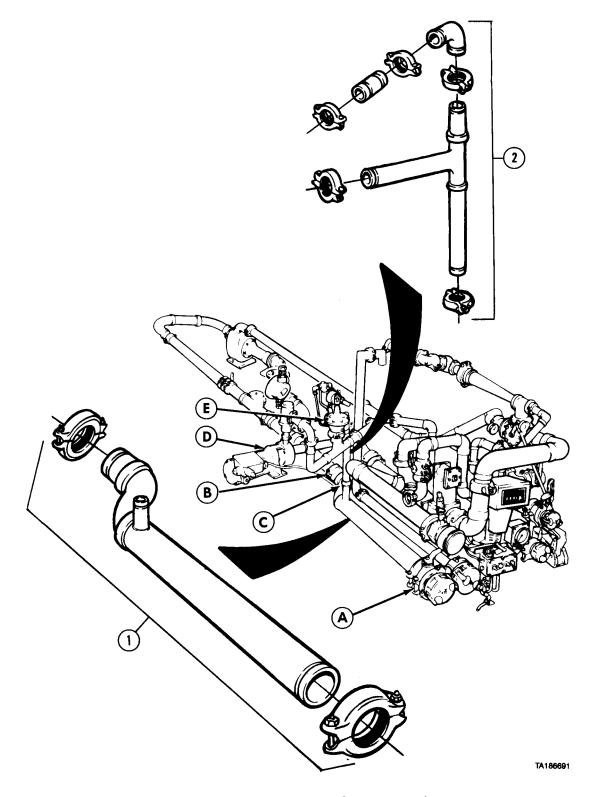


Figure 25-6. Tanker Piping (Sheet 1 of 5).

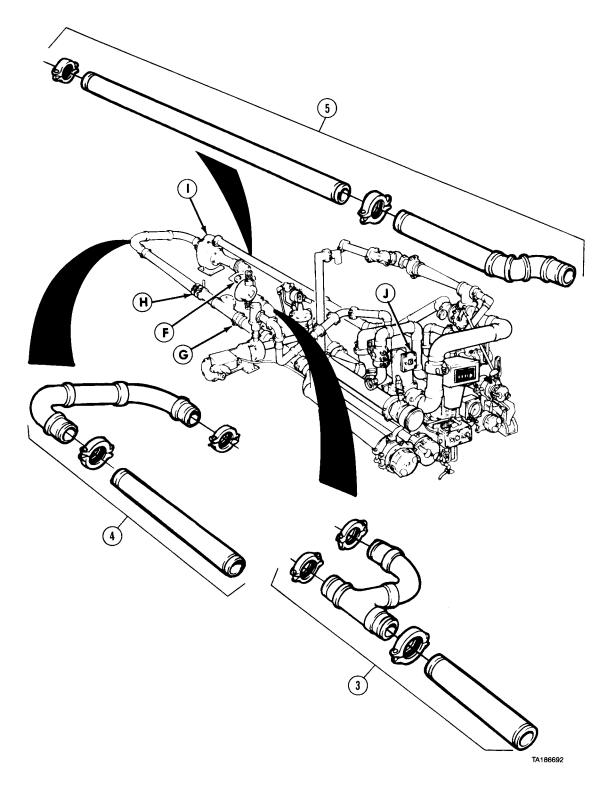


Figure 25-6. Tanker Piping (Sheet 2 of 5).

25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

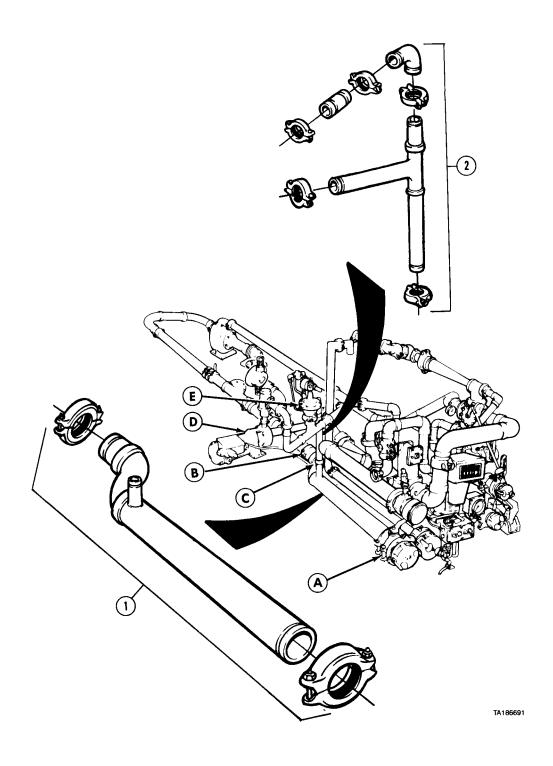


Figure 25-6. Tanker Piping (Sheet 3 of 5).

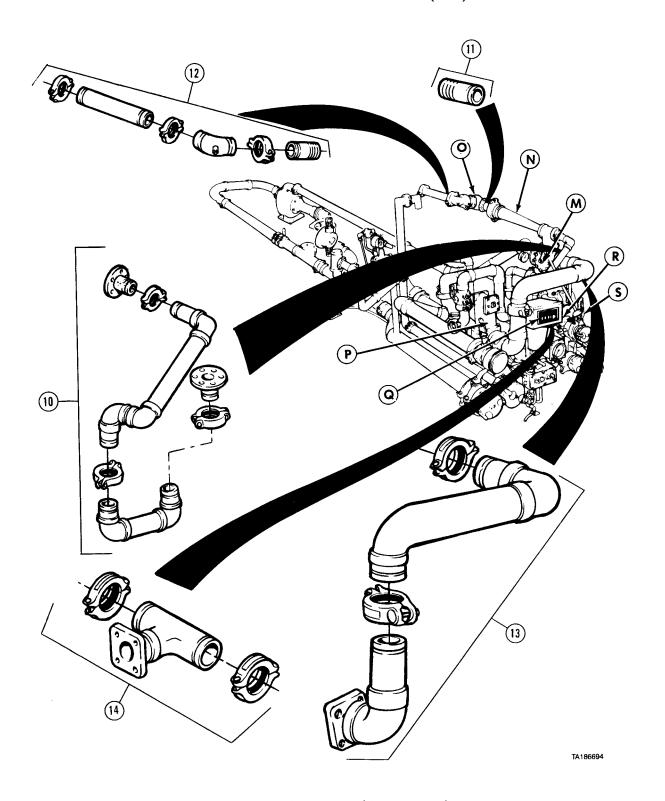
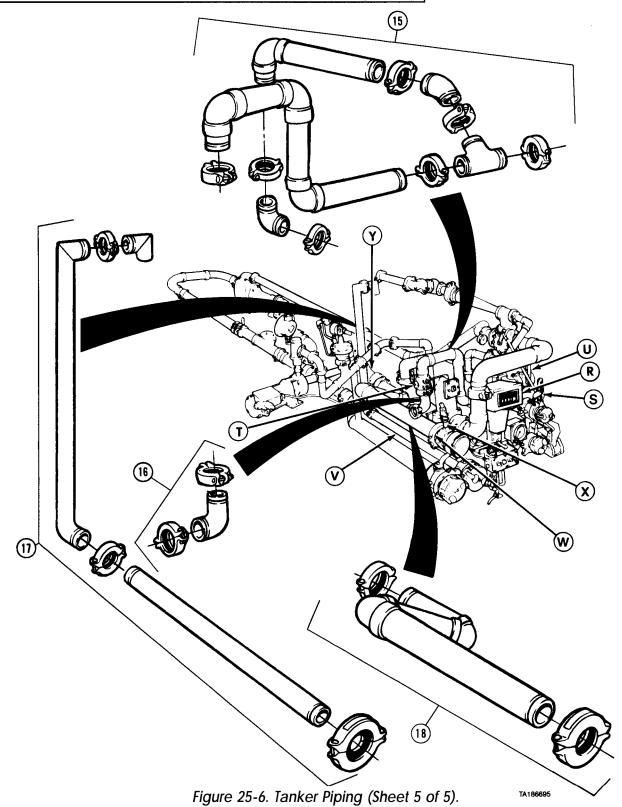


Figure 25-6. Tanker Piping (Sheet 4 of 5).

25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT),



f. Tanker Piping Brackets. Refer to Figure 25-7 for location of specific tanker piping brackets.

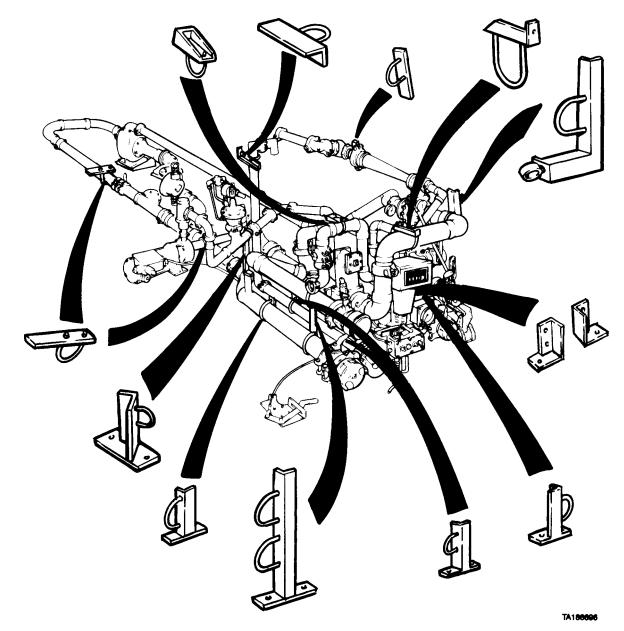


Figure 25-7. Tanker Piping Brackets.

- g. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Inspect piping connections for leaks.
 - (3) Close pump module top and rear access doors (TM 9-2320-279-10).
 - (4) Install pump module top and side access panels (para 16-48).

END OF TASK

25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment Equipment Condition

None TM or Para Condition Description

References

None

Special Tools Para 25-3 Tank drained.
None Special Environmental Conditions

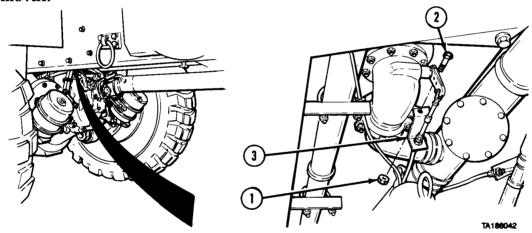
Supplies None

Adhesive-sealant, silicone, Item 4, Appendix C General Safety Instructions

Personnel Required No smoking, flame, sparks, and hot or glowing

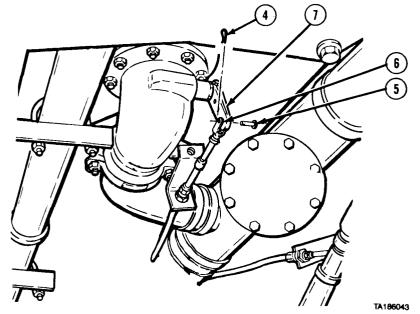
MOS 63S, Heavy wheel vehicle mechanic objects within 50 ft (15 m) of vehicle.

a. Removal.



(1) Remove nut (1) and screw (2) from bracket (3).

- (2) Remove cotter pin (4).
- (3) Remove pin (5) and disconnect clevis (6) from lever (7).

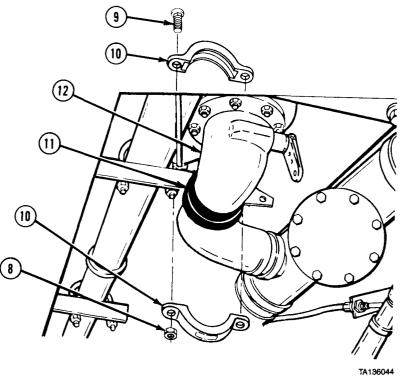


(4) Remove two nuts (8), screws (9), and coupling halves (10).

WARNING

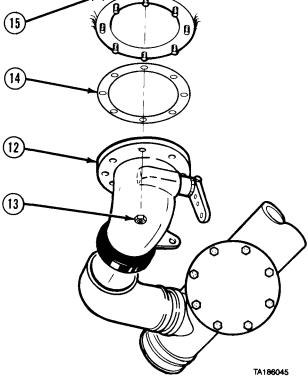
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

(5) Push coupling gasket (11) on V1 emergency valve (12).

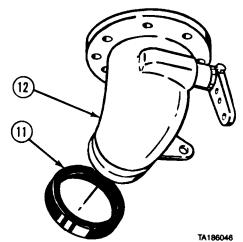


25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION (CONT).

(6) Remove eight nuts (13), V1 emergency valve (12), and gasket (14) from tank (15).



(7) Remove coupling gasket (11) from V1 emergency valve (12).

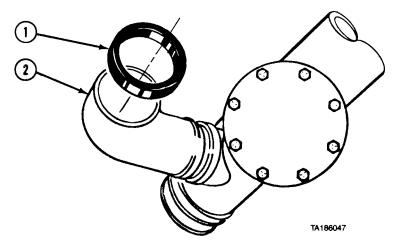


b. Installation.

CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

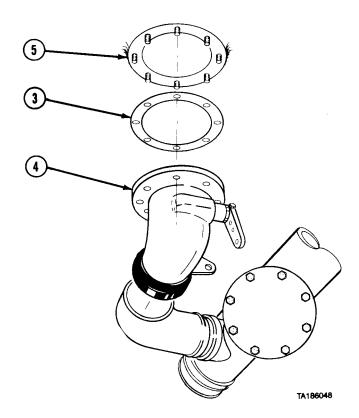
(1) Install coupling gasket (1) on pipe (2).



WARNING

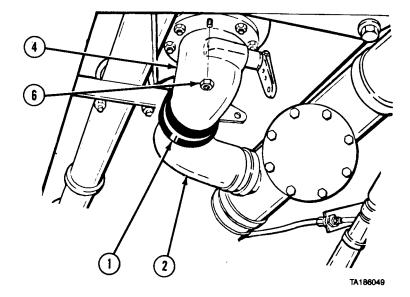
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(2) Apply silicone adhesive-sealant on gasket (3) and install gasket and V1 emergency valve (4) on bottom of tank (5).



25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION (CONT).

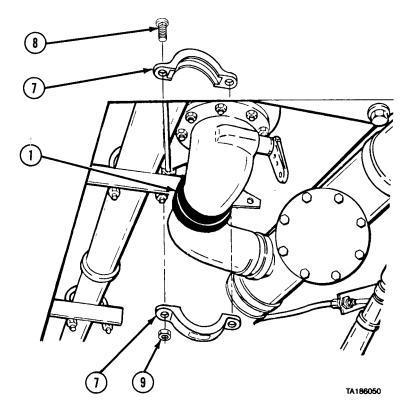
- (3) Position coupling gasket (1) over connection of V1 emergency valve (4) and pipe (2).
- (4) Install eight nuts (6).



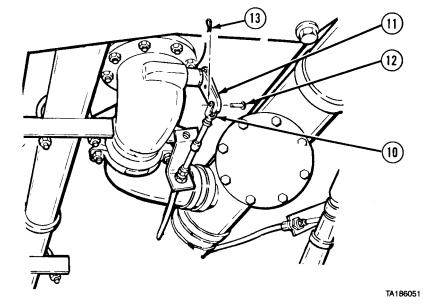
CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

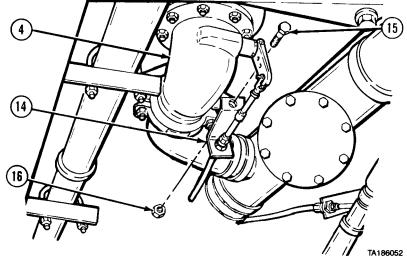
(5) Install two coupling halves (7) on coupling gasket (1) with two screws (8) and nuts (9).



- (6) Position clevis (10) on lever (11) so hole through clevis alines with bottom hole in lever.
- (7) Install pin (12) through clevis (10) and lever (11).
- (8) Install cotter pin (13).



- (9) Aline holes in bracket (14) and V1 emergency valve (4).
- (10) Install screw (15) and nut (16).
- c. Follow-on Maintenance.
 - (1) Adjust emergency valve actuator assembly (para 25-15).
 - (2) Prepare tanker for operation (TM 9-2320-279-10).
 - (3) Fill tank by bottom loading (TM 9-2320-279-10).
 - (4) Recirculate fuel (TM 9-2320-279-10).
 - (5) Check V1 emergency valve for leaks and proper operation.



END OF TASK

25-13. V1 EMERGENCY VALVE CABLE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description
TM 9-2320-279-10 Pump module rear access doors opened.

Special Environmental Conditions

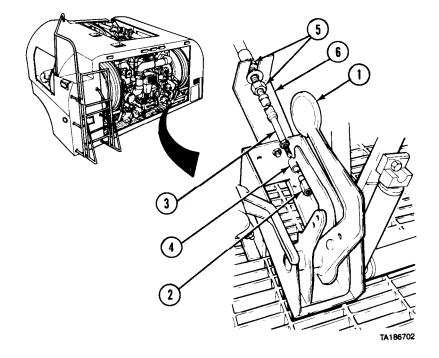
None

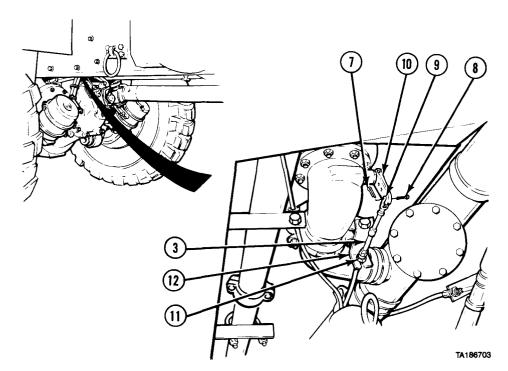
General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.
- (2) Remove nut (2) and cable (3) from offset link (4).
- (3) Loosen two nuts (5) and remove cable (3) from bracket (6).

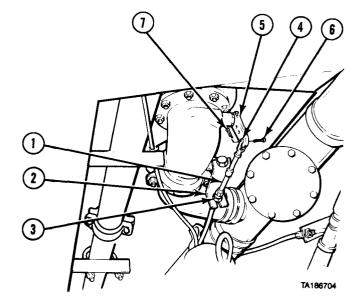




- (4) Remove cotter pin (7) and pin (8) from clevis (9) and lever (10).
- (5) Loosen two nuts (11) and remove cable (3) from bracket (12).

b. Installation.

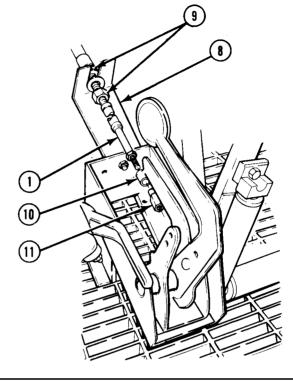
- (1) Install cable (1) in bracket (2) and tighten two nuts (3).
- (2) Install clevis (4) in lever (5) with pin (6) and cotter pin (7).



25-13. V1 EMERGENCY VALVE CABLE REMOVAL/INSTALLATION (CONT).

- (3) Install cable (1) in bracket (8) and tighten two nuts (9).
- (4) Install cable (1) in offset link (10) with nut (11).
- c. Follow-on Maintenance.
 - (1) Adjust emergency valve actuator assembly (para 25-15).
 - (2) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies
None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Pump module rear doors

open.

Special Environmental Conditions

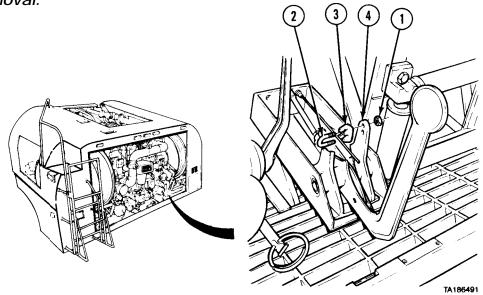
None

General Safety Instructions

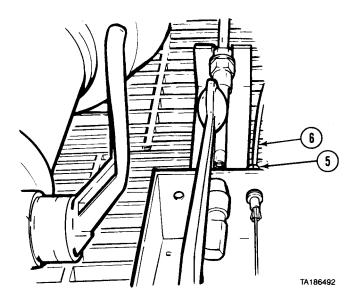
No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

a. Removal.

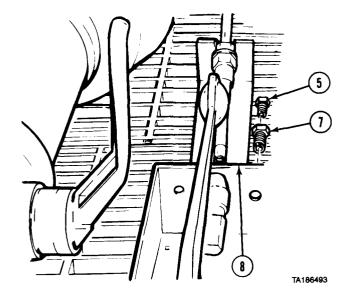


- (1) Remove two nuts (1), U-bolt (2), and clamp (3) from trip bar (4).
- (2) Loosen nut (5) and remove cable (6).

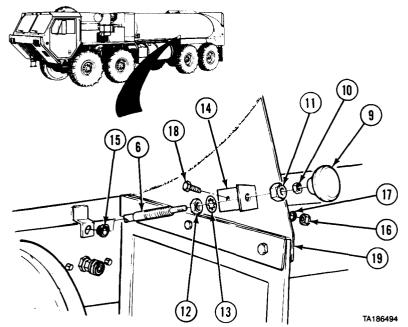


25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION (CONT).

(3) Remove nut (5) and fitting (7) from frame (8).

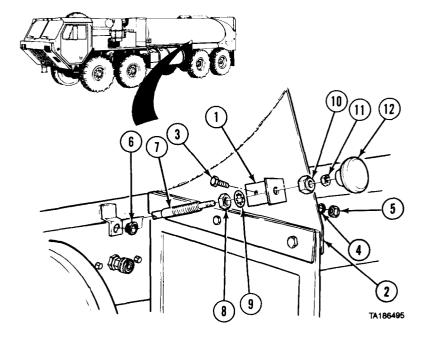


- (4) Remove knob (9), jamnut (10), and nut (11) from cable (6).
- (5) Remove cable (6), jamnut (12), and lockwasher (13) from bracket (14).
- (6) Remove cable (6) and grommet (15) from vehicle.
- (7) Remove two locknuts (16), washers (17), screws (18), and bracket (14) from mud flap bracket (19).

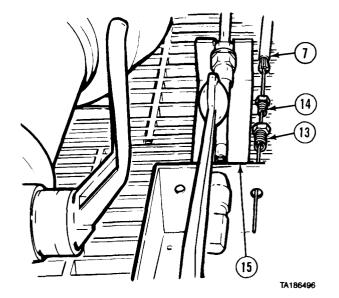


b. Installation.

- (1) Install bracket (1) on mud flap bracket (2) with two screws (3), washers (4), and locknuts (5).
- (2) Install grommet (6) and position cable (7).
- (3) Install jamnut (8) and lockwasher (9) on cable (7) and position cable in bracket (1).
- (4) Install nut (10) and jamnut (11). Tighten nuts (8 and 10).
- (5) Install knob (12) and tighten jamnut (11) against knob.
- (6) Push in knob (12).



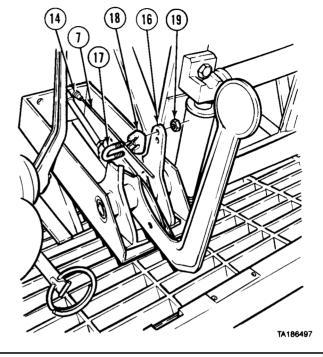
- (7) Install fitting (13) and nut (14) in frame (15). Do not tighten fitting.
- (8) Install cable (7) through nut (14) and fitting (13).



25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION (CONT).

- (9) Tighten nut (14).
- (10) Connect cable (7) to trip bar (16) with U-bolt (17), clamp (18), and two nuts (19).
- c. Follow-on Maintenance.
 - (1) Adjust cable (para 25-15).
 - (2) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT.

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Adjustment

g. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

Solvent, dry cleaning, Item 47, Appendix C Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Tanker module rear access

doors open.

Special Environmental Conditions

None

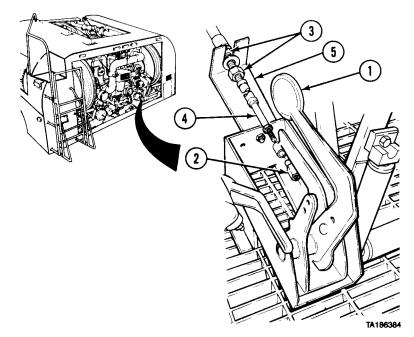
General Safety Instructions

No smoking, flame, sparks, and hot or glowing

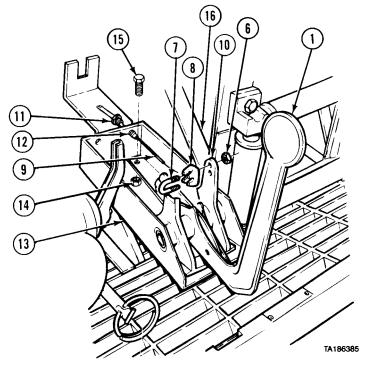
objects within 50 ft (15 m) of vehicle.

a. Removal.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.
- (2) Remove nut (2).
- (3) Loosen two nuts (3) and remove cable (4) from bracket (5).



- (4) Pull MC MANUAL CONTROL EM VALVE lever (1) back to open position.
- (5) Remove two nuts (6), U-bolt (7), and clamp (8) from cable (9) and trip bar (10).
- (6) Loosen nut (11) and remove fitting (12) and cable (9) from emergency valve actuator (13).
- (7) Remove two locknuts (14), screws (15), and emergency valve actuator assembly (13) from hose reel frame (16).



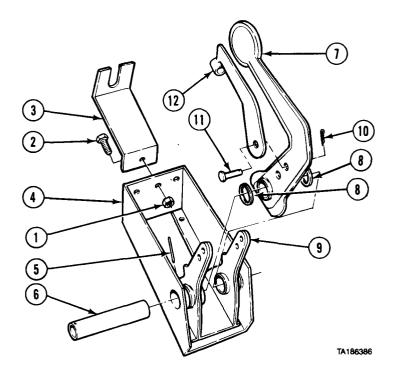
25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).

- b. Disassembly.
 - (1) Remove locknut (1), screw (2), and bracket (3) from frame (4).
 - (2) Remove spring pin (5), shaft (6), lever (7), two spacers (8), and trip bar (9) from frame (4).
 - (3) Remove cotter pin (10), pin (11), and offset link (12) from lever (7).
- c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

(1) Clean all metal parts with dry cleaning solvent.



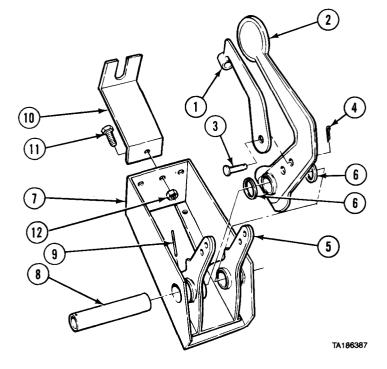
WARNING

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, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

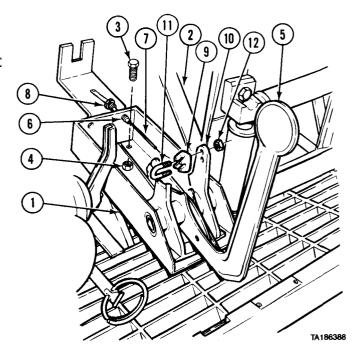
d. Assembly.

- (1) Install offset link (1) in lever (2) with pin (3) and cotter pin (4).
- (2) Install trip bar (5), two spacers (6), and lever (2) in frame (7) with shaft (8) and spring pin (9).
- (3) Install bracket (10) on frame (7) with screw (11) and locknut (12)



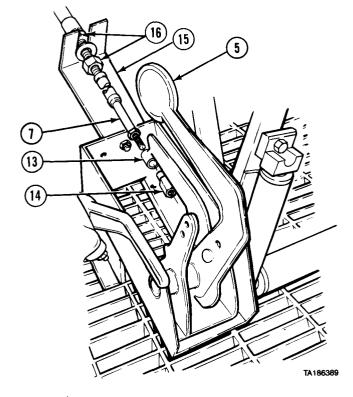
e. Installation.

- (1) Install emergency valve actuator assembly (1) on hose reel frame (2) with two screws (3) and locknuts (4).
- (2) Pull MC MANUAL CONTROL EM VALVE lever (5) back.
- (3) Install fitting (6), cable (7), and emergency valve actuator assembly (1) and tighten nut (8).
- (4) Install clamp (9) and cable (7) on trip bar (10) with U-bolt (11) and two nuts (12).



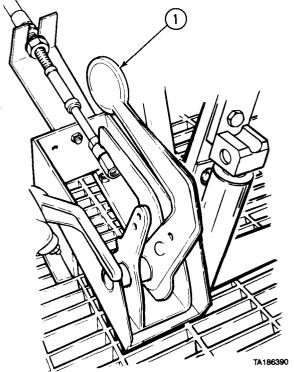
25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).

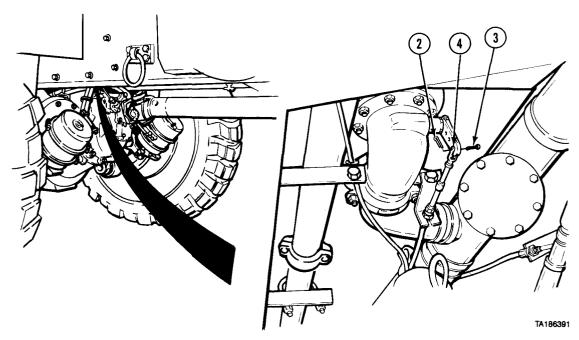
- (5) Push MC MANUAL CONTROL EM
- VALVE lever (5) forward. (6) Install cable (7) in offset link (13) with nut (14).
- (7) Position cable (7) in bracket (15) and tighten two nuts (16).



f. Adjustment.

(1) Make sure MC MANUAL CONTROL EM VALVE lever (1) is all the way forward.



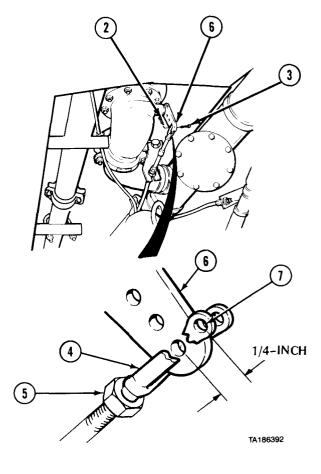


- (2) Remove cotter pin (2) and pin (3) from clevis (4).
- (3) Loosen locknut (5).

NOTE

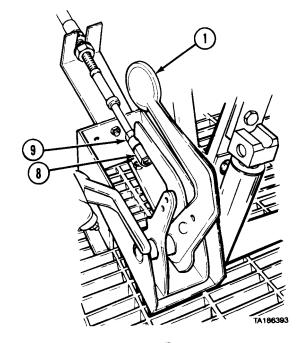
When lever is disconnected from clevis there will be free play in lever. There will be 1/4 in. (6.35 mm) free play in lever after adjustment is made.

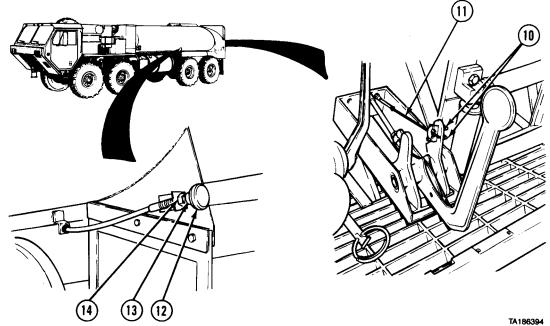
- (4) Push lever (6) toward rear of vehicle to remove free play and hold.
- (5) Adjust clevis (4) in or out until center of hole (7) is 1/4 in. (6.35 mm) past center of hole in lever (6).
- (6) Move lever (6) to rear to aline with hole in clevis (4).
- (7) Install pin (3) and cotter pin (2).
- (8) Tighten locknut (5).



25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).

- (9) Pull MC MANUAL CONTROL EM VALVE lever (1) back.
- (10) If handle snaps forward, loosen nut (8) until handle does not snap forward then tighten jamnut (9).





- (11) Make sure knob (12) and nut (13) are tight against nut (14).
- (12) Loosen two nuts (10), pull cable (11) back tight, and tighten two nuts.
- g. Follow-on Maintenance. Close tanker module rear access doors (TM 9-2320-279-10).

END OF TASK

25-16. V2 BOTTOM LOAD ADAPTER REMOVAL/INSTALLATION.

This task covers:

a. Removal c. Follow-on Maintenance

b. Installation

INITIAL SETUP

None

Models References
M978 None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Tools Para 25-26 V12 bottom load PRECHECK

VALVE removed.

Supplies Special Environmental Conditions

None None

Personnel Required General Safety Instructions

MOS 63S, Heavy wheel vehicle mechanic No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

25-16. V2 BOTTOM LOAD ADAPTER REMOVAL/INSTALLATION (CONT).

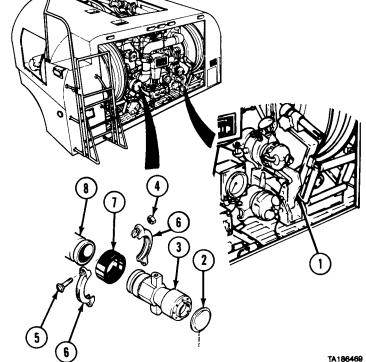
a. Removal.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.
- (2) Remove dust cap (2) from V2 bottom load adapter (3).
- (3) Remove two nuts (4), screws (5), and coupling halves (6).
- (4) Remove V2 bottom load adapter (3) and coupling gasket (7) from pipe (8).

b. Installation.

CAUTION

- Do not tear or otherwise damage coupling gaskets during installation.
 If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.



- (1) Install coupling gasket (7) on pipe (8).
- (2) Position V2 bottom load adapter (3) on pipe (8).
- (3) Install coupling gasket (7) on V2 bottom load adapter (3).
- (4) Install two coupling halves (6) on coupling gasket (7) with two screws (5) and nuts (4).
- (5) Install dust cap (2).
- c. Follow-on Maintenance.
 - (1) Install V12 bottom load PRECHECK VALVE (para 25-26).
 - (2) Perform fuel tank bottom loading (TM 9-2320-279-10).
 - (3) Check V2 bottom load adapter for leaks.

END OF TASK

25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models References M978 None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Too1s Para 25-3 Tank drained.

None Special Environmental Conditions

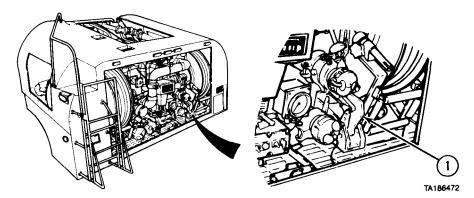
None Special Environmental Conditions
Supplies None

None None Concre

Personnel Required Safety Instructions
No smoking, flame, sparks, and hot or glowing

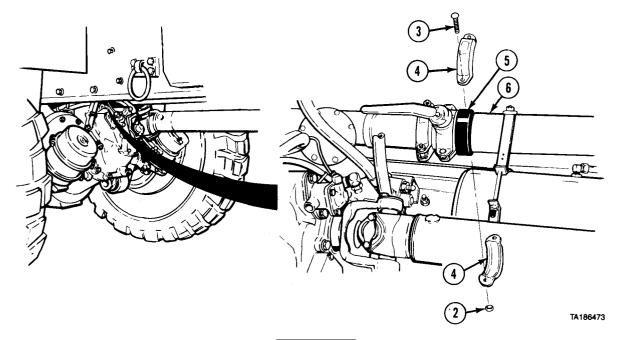
MOS 63S, Heavy wheel vehicle mechanic objects within 50 ft (15 m) of vehicle.

a. Removal.



(1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.

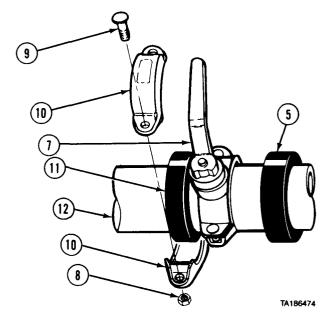
25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION (CONT).



WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

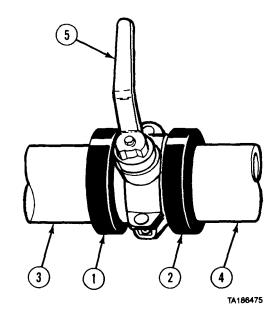
- (2) Remove two nuts (2), screws (3), and coupling halves (4).
- (3) Push coupling gasket (5) onto pipe (6).
- (4) Hold V3 suction valve (7) in place and remove two nuts (8), screws (9), and coupling halves (10).
- (5) Hold V3 suction valve (7) in place and push coupling gasket (11) onto pipe (12).
- (6) Remove V3 suction valve (7).
- (7) Remove coupling gaskets (5 and 11).



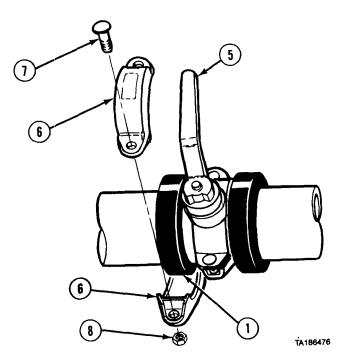
b. Installation.

CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
 - (1) Install coupling gaskets (1 and 2) on pipes (3 and 4).
 - (2) Hold V3 suction line valve (5) in place and position coupling gaskets (1 and 2) over connections of valve and pipes (3 and 4).



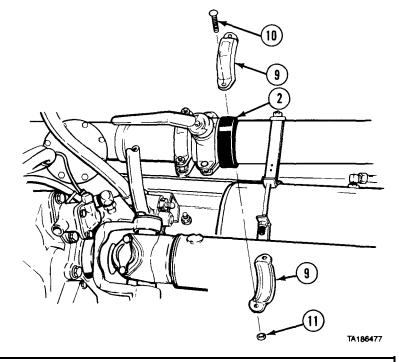
(3) Hold V3 suction line valve (5) in place and install two coupling halves (6) on coupling gasket (1) with two screws (7) and nuts (8).



25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION (CONT).

- (4) Install two coupling halves (9) on coupling gasket (2) with two screws (10) and nuts (11).
- c. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check V3 suction line valve for leaks and proper operation (TM 9-2320-279-10).

END OF TASK



25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT.

This task covers:

a. Removal

b. Installation

c. Adjustment

d. Follow-on Maintenance

INITIAL SETUP

Models

M978
Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References None Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Pump module rear access

doors opened.

Para 16-48 Pump module left side access

panel removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing

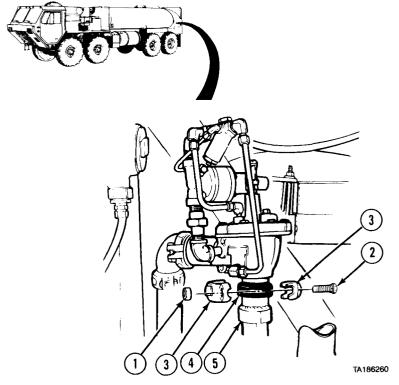
objects within 50 ft (15 m) of vehicle.

a. Removal.

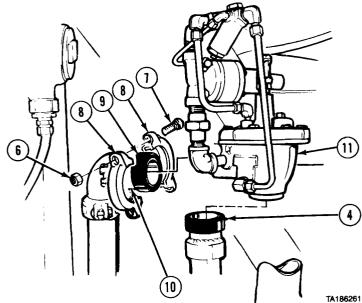
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Slide coupling gasket (4) on pipe (5).



- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Slide coupling gasket (9) on pipe (10) and remove V4 relief valve (11).
- (5) Remove two coupling gaskets (4 and 9).



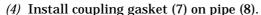
25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

b. Installation.

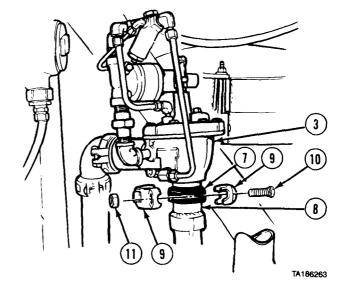
CAUTION

- Do not tear or otherwise damage coupling gaskets during installation.
 If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
 - (1) Install coupling gasket (1) on pipe (2).
 - (2) Position V4 relief valve (3) on pipe (2) and install coupling gasket (1) over end of valve.





- (5) Position V4 relief valve (3) on pipe (8) and install coupling gasket (7) over end of valve.
- (6) Install two coupling halves (9) over coupling gasket (7) with two screws (10) and nuts (11).



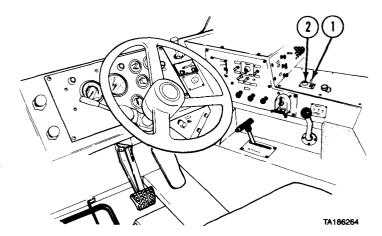
TA186262

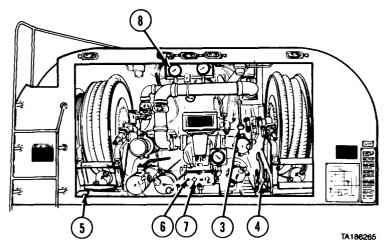
c. Adjustment.

NOTE

Tank must contain at least 1000 gallons of fuel before doing adjustment procedure.

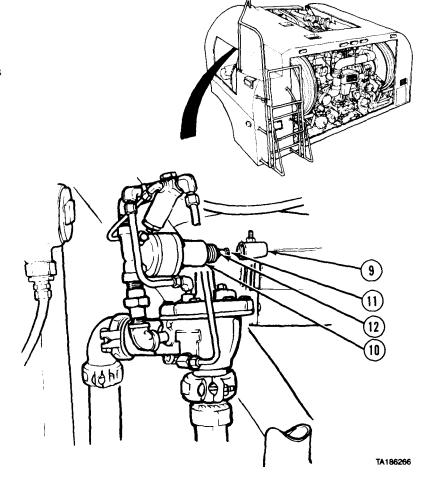
- (1) Check tanker fuel level (TM 9-2320-279-10).
- (2) Start engine (TM 9-2320-279-10).
- (3) Set PTO ENGAGE switch (1) to ON position. Check that indicator light (2) comes on.
- (4) Push in V6 FUEL/DEFUEL CONTROL VALVE control rod (3).
- (5) Pull back MC MANUAL CONTROL EM VALVE lever (4).
- (6) Push PUMP ENGAGEMENT LEVER (5) forward.
- (7) Set TC/THROTTLE CONTROL switch (6) up to ON position.
- (8) Press HI/HIGH IDLE switch (7).
- (9) Read discharge line pressure gage (8). Gage should read 55 psi (379 kPa). If gage does not read 55 psi (379 kPa), do steps (10) through (20).



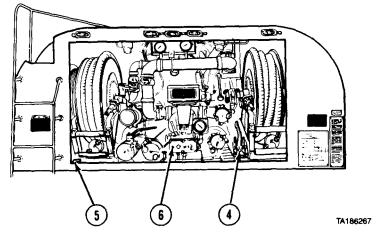


25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

- (10) Remove cap (9) from control assembly (10).
- (11) Hold screw (11) and loosen nut (12).
- (12) If Soldier A gets reading less than 55 psi (379 kPa), Soldier B turns screw (11) clockwise until reading is 55 psi (379 kPa).
- (13) If Soldier A gets reading of more than 55 psi (379 kPa), Soldier B turns screw (11) counterclockwise until reading is 55 psi (379 kPa).
- (14) Hold screw (11) and tighten nut (12).
- (15) Install cap (9) on control assembly (10).

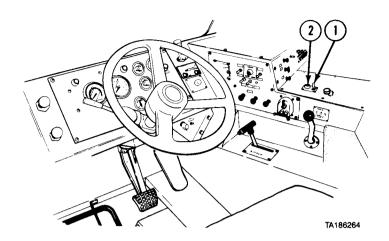


- (16) Set TC/THROTTLE CONTROL switch (6) down to OFF position.
- (17) Pull back on PUMP ENGAGEMENT LEVER (5) until locked.
- (18) Push MC MANUAL CONTROL EM VALVE lever (4) forward.



- (19) Set PTO ENGAGE switch (1) to OFF position. Check that indicator light (2) goes out.
- (20) Shut off engine (TM 9-2320-279-10).
- d. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check V4 relief valve for leaks.
 - (3) Install pump module left side access panel (para 16-48).
 - (4) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

None

Models Equipment Condition

M978 TM or Para Condition Description
Test Equipment TM 9-2320-279-10 Air system drained.

None TM 9-2320-279-10 Pump module top access

door opened.

Special Tools
None
Para 16-48
Pump module right side access panel removed.

Supplies Para 23-4 Filter-separator removed.
None Special Environmental Conditions

Personnel Required None

MOS 63S, Heavy wheel vehicle mechanic (2) General Safety Instructions

References
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS REMOVAL/INSTALLATION (CONT).

a. Removal.

NOTE

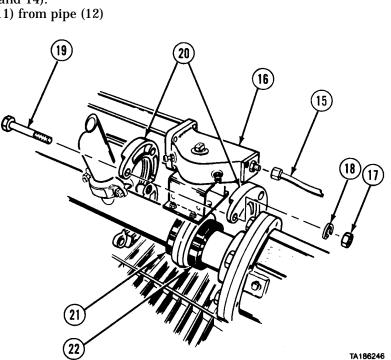
This task is performed from inside module.

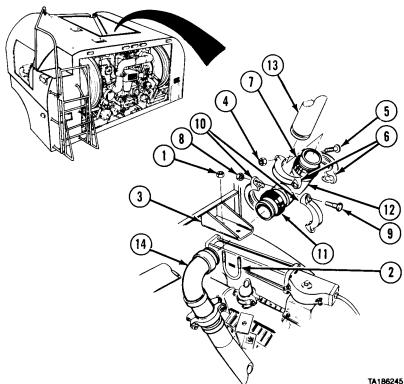
(1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

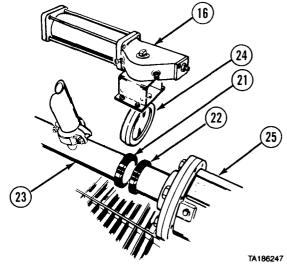
- (2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).
- (3) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).
- (4) Push coupling gasket (7 and 11) on pipe (12).
- (5) Remove pipe (12) from pipes (13 and 14).
- (6) Remove coupling gaskets (7 and 11) from pipe (12)
- (7) Disconnect air hose (15) from pneumatic actuator (16).
- (8) Remove four nuts (17), lockwashers (18), screws (19), and two flange coupling halves (20) from two flange coupling gaskets (21 and 22).





NOTE

- Soldier B works from inside module right side access opening.
- Matchmark position of pneumatic actuator before removal.
 - (9) Soldier A pushes pipe (23) toward front of vehicle while Soldier B removes V5 air actuated flow valve (24) and pneumatic actuator (16).
- (10) Remove two flange coupling gaskets (21 and 22) from pipe (23) and valve (25).



b. Installation.

CAUTION

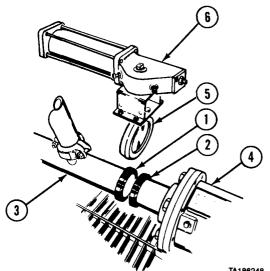
 Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, connections will leak.

NOTE

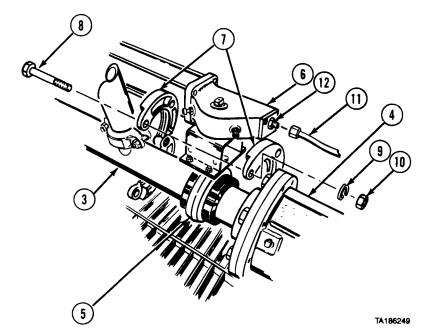
Soldier B works from inside module right side access opening. Be sure pneumatic actuator is alined to matchmarks.

- (1) Position two flange coupling gaskets (1 and 2) on pipe (3) and valve (4).
- (2) Soldier A pushes pipe (3) toward front of vehicle while Soldier B positions V5 air actuated flow valve (5) and pneumatic actuator (6) between pipe and valve (4).

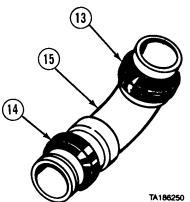


25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS REMOVAL/INSTALLATION (CONT).

- (3) Soldier A installs two flange coupling halves (7) with four screws (8), lockwashers (9), and nuts (10) on pipe (3) and valve (4) while Soldier B supports V5 air actuated flow valve (5).
- (4) Install airhose (11) on connector (12).

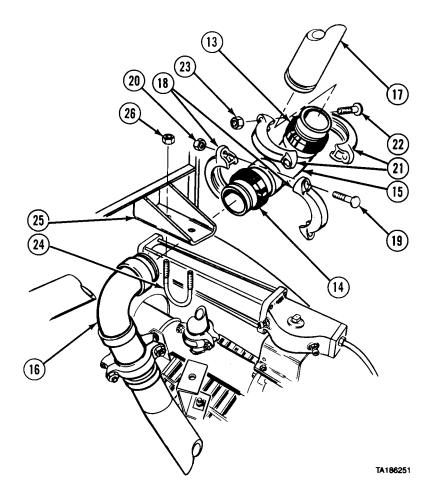


(5) Install two coupling gaskets (13 and 14) on pipe (15).



- (6) Position pipe (15) between pipes (16 and 17).
- (7) Position coupling gasket (14) so that ends of pipes (15 and 16) are covered.
- (8) Position coupling gasket (13) so that ends of pipes (15 and 17) are covered.
- (9) Install two coupling halves (18) with two screws (19) and nuts (20).
- (10) Install two coupling halves (21) with two screws (22) and nuts (23).
- (11) Install U-bolt (24) in bracket (25) with two locknuts (26).
- c. Follow-on Maintenance.
 - (1) Install filter-separator (para 23-4).
 - (2) Start engine and build up air supply (TM 9-2320-279-10).
 - (3) Inspect V5 air actuated flow valve for leaks and proper operation.
 - (4) Perform unfiltered bulk unloading (TM 9-2320-279-10).
 - (5) Install pump module right side access panel (para 16-48).
 - (6) Pump module top access door closed (TM 9-2320-279-10).

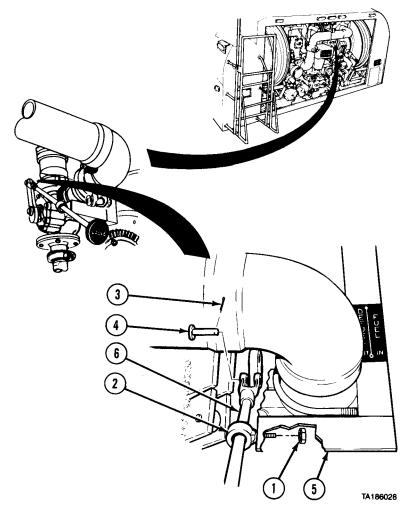
END OF TASK



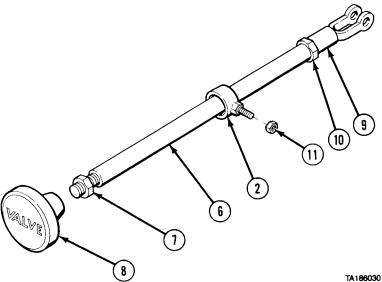
25-20. V6 FUEL/DEFUEL CONTROL VAL	VE CONTROL ROD REMOVAL/INSTALLATION.
This task covers: a. Removal b. Installation	c. Follow-on Maintenance
INITIAL SETUP Models	Equipment Condition
M978 Test Equipment None Special Tools	TM or Para Condition Description TM 9-2320-279-10 Shut off engine. TM 9-2320-279-10 Pump module rear access doors opened.
None Supplies	Special Environmental Conditions None
None Personnel Required	General Safety Instructions No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.
MOS 63S, Heavy wheel vehicle mechanic References None	

a. Removal.

- (1) Remove locknut (1) from control rod guide (2).
- (2) Remove cotter pin (3) and pin (4).
- (3) Pull control rod guide (2) from bracket (5) and remove V6 FUEL/DEFUEL CONTROL VALVE control rod (6).

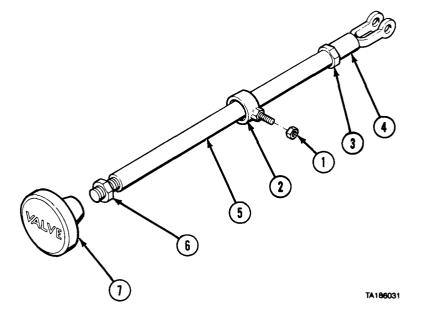


- (4) Loosen jamnut (7) and remove knob (8) and control rod guide (2) from V6 FUEL/DEFUEL CONTROL VALVE control rod (6). Remove jamnut.
- (5) Remove clevis (9) and jamnut (10) from V6
 FUEL/DEFUEL CONTROL VALVE control rod (6).
- (6) Remove nut (11) from control rod guide (2).

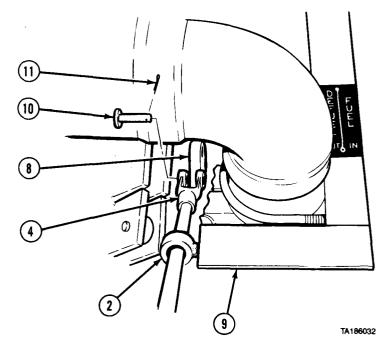


25-20. V6 FUEL/DEFUEL CONTROL VALVE CONTROL ROD REMOVAL/INSTALLATION (CONT)

- b. Installation.
 - (1) Install nut (1) on control rod guide (2).
 - (2) Install jamnut (3) and clevis (4) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
 - (3) Slide control rod guide (2) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
 - (4) Install jamnut (6) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
 - (5) Install knob (7) and tighten jamnut (6) against knob.

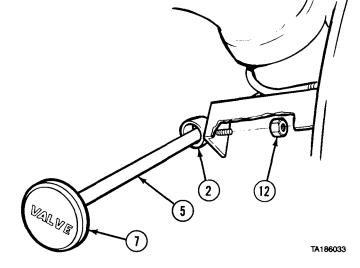


- (6) Position clevis (4) on handle (8) and position control rod guide (2) in bracket (9).
- (7) Install pin (10) and cotter pin (11) through clevis (4) and handle (8).



- (8) Install locknut (12) on control rod guide (2).
- (9) Push in and pull out knob (7) to check operation of V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
- c. Follow-on Maintenance. Close pump module rear doors (TM 9-2320-279-10).

END OF TASK



25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Equipment Condition Models

M978 TM or Para Condition Description Test Equipment TM 9-2320-279-10 Pump module rear access

doors opened. None

V6 FUÊL/DEFUEL

Para 25-20 Special Tools

CONTROL VALVE control rod None

removed.

TM 9-2320-279-10 Right side access panel Supplies

removed. None

Special Environmental Conditions Personnel Required

None MOS 63S, Heavy wheel vehicle mechanic (2)

General Safety Instructions References

No smoking, flame, sparks, and hot or glowing None

objects within 50 ft (15 m) of vehicle.

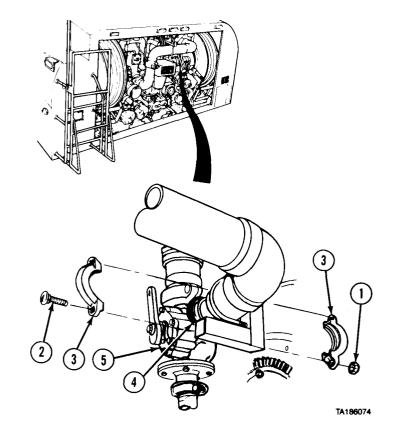
25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT).

a. Removal.

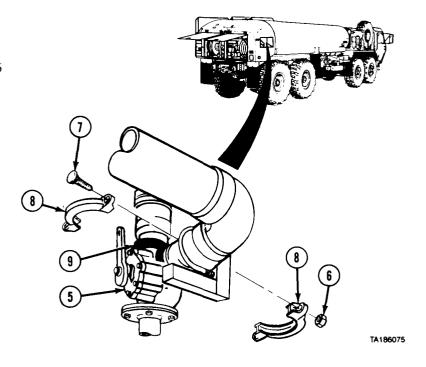
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

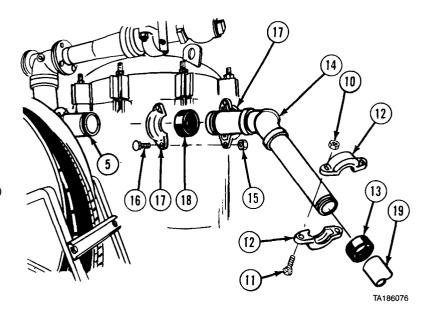
- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on V6 FUEL/DEFUEL CONTROL VALVE (5).



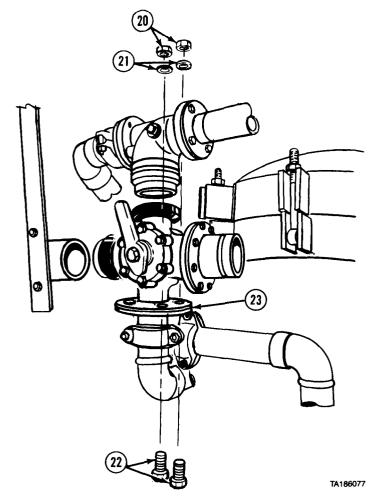
- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Slide coupling gasket (9) on V6 FUEL/DEFUEL CONTROL VALVE (5).



- (5) Remove two nuts (10), screws (11), and coupling halves (12).
- (6) Push coupling gasket (13) on pipe (14).
- (7) Remove two nuts (15), screws (16), and coupling halves (17).
- (8) Push coupling gasket (18) on pipe (14).
- (9) Remove pipe (14) and coupling gaskets (13 and 18) from V6 FUEL/DEFUEL CONTROL VALVE (5) and pipe (19).

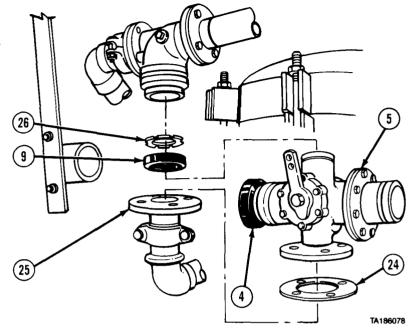


(10) Remove four locknuts (20), washers (21), and screws (22) from flange (23).



25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT).

- (11) Remove V6 FUEL/DEFUEL CONTROL VALVE (5) and gasket (24) from flange (25).
- (12) Remove two coupling gaskets (4 and 9) from V6 FUEL/DEFUEL CONTROL VALVE (5).
- (13) Remove reducer (26) from coupling gasket (9).

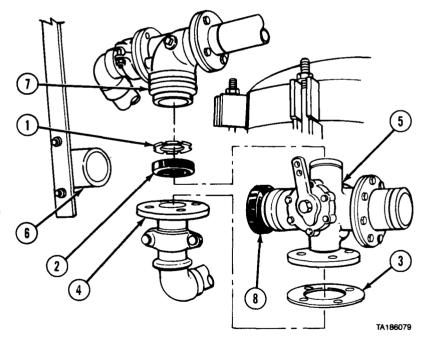


b. Installation.

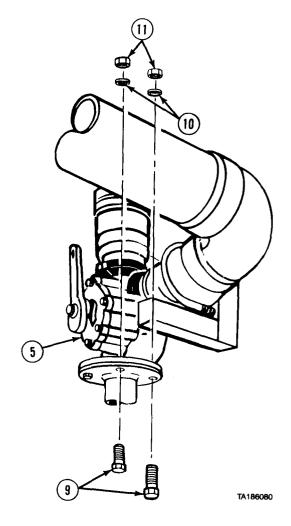
CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (1) Install reducer (1) in coupling gasket (2).
- (2) Install gasket (3) on flange (4).
- (3) Soldier B holds V6
 FUEL/DEFUEL CONTROL
 VALVE (5) in position on
 pipe (6), flange (4), and
 eductor assembly (7) while
 Soldier A installs coupling
 gaskets (2 and 8) over
 pipes.



(4) Soldier B holds V6 FUEL/DEFUEL CONTROL VALVE (5) while Soldier A installs four screws (9), washers (10), and locknuts (11). Do not tighten.

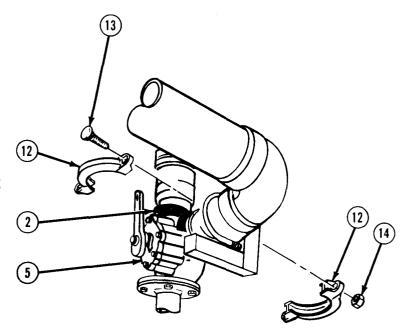


25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT).

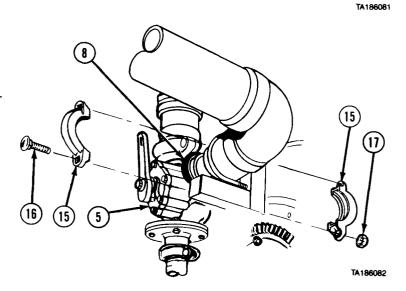
CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

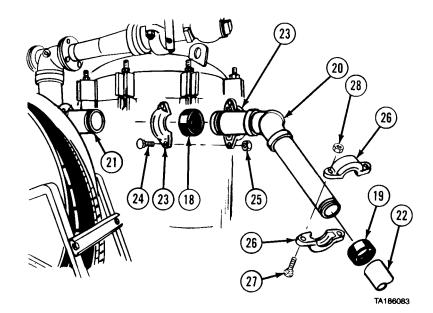
(5) Soldier B holds V6
FUEL/DEFUEL CONTROL
VALVE (5) in position while
Soldier A installs two coupling
halves (12), screws (13), and
nuts (14) over coupling
gasket (2).



(6) Soldier A holds V6 FUEL/DEFUEL CONTROL VALVE (5) in position while Soldier B installs two coupling halves (15), screws (16), and nuts (17) on coupling gasket (8).

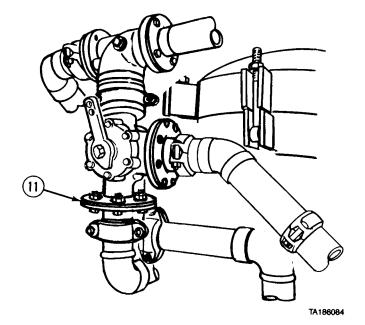


- (7) Slide coupling gaskets (18 and 19) on pipe (20).
- (8) Soldier A holds pipe (20) in position while Soldier B installs coupling gaskets (18 and 19) over pipe (21) and pipe (22).
- (9) Soldier A holds pipe (20) in position while Soldier B installs two coupling halves (23), screws (24), and nuts (25) on coupling gasket (18).
- (10) Soldier A holds pipe (20) in position while Soldier B installs two coupling halves (26), screws (27), and nuts (28) on coupling gasket (19).



- (11) Tighten four locknuts (11).
- c. Follow-on Maintenance.
 - (1) Install V6 FUEL/DEFUEL CONTROL VALVE control rod (para 25-20).
 - (2) Perform fuel servicing (TM 9-2320-279-10).
 - (3) Check V6 FUEL/DEFUEL CONTROL VALVE for leaks.
 - (4) Close pump module rear access doors (TM 9-2320-279-10).
 - (5) Install right side access panel (TM 9-2320-279-10).

END OF TASK



25-22. V7/V8 REEL VALVES REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Pump module rear access doors opened.

Special Environmental Conditions

None

General Safety Instructions

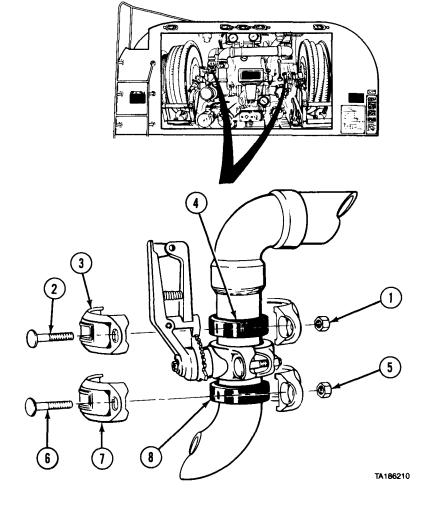
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

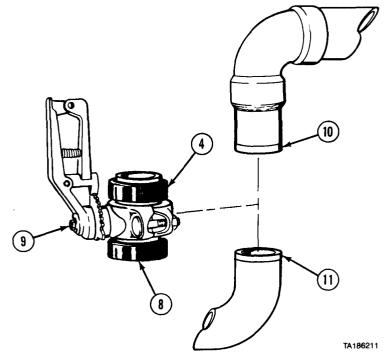
NOTE

Steps are the same to remove either V7 or V8 REEL VALVE. V7 REEL VALVE is shown.

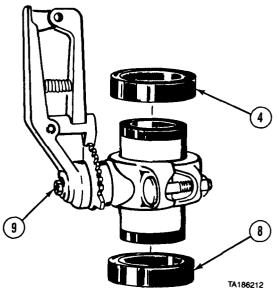
- (1) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).
- (2) Remove two nuts (5), screws (6), and coupling halves (7) from coupling gasket (8).



(3) Push coupling gaskets (4 and 8) on REEL VALVE (9) and remove REEL VALVE from pipes (10 and 11).



(4) Remove coupling gaskets (4 and 8) from REEL VALVE (9).



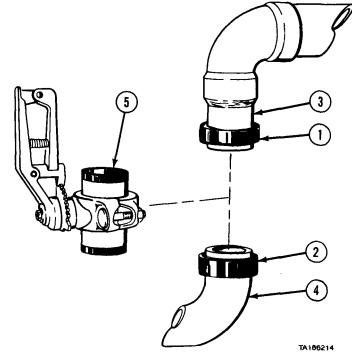
25-22. V7/V8 REEL VALVES REMOVAL/INSTALLATION (CONT).

b. Installation.

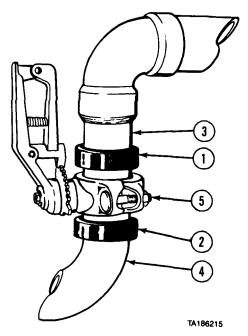
CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (1) Install two coupling gaskets (1 and 2) on pipes (3 and 4).
- (2) Position REEL VALVE (5) between pipes (3 and 4).



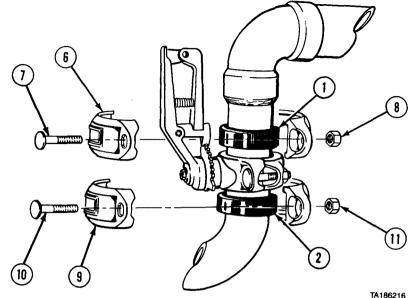
(3) Hold REEL VALVE (5) in place and position coupling gaskets (1 and 2) over connection of REEL VALVE and pipes (3 and 4).



CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position. piping connections will leak.

- (4) Install two coupling halves (6) on coupling gasket (1) with screws (7) and nuts (8).
- (5) Install two coupling halves (9) on coupling gasket (2) with screws (10) and nuts (11).
- c. Follow-on Maintenance.
 - (1) Perform fuel servicing (TM 9-2320-279-10).
 - (2) Check V7 or V8 REEL VALVE connections for leaks.
 - (3) Close pump module rear access doors (TM 9-2320-279-10).



END OF TASK

25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION.

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation f. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Oil, lubricating, Item 32, Appendix C Solvent, dry cleaning, Item 47, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description TM 9-2320-279-10 Pump module top access

door opened.

Special Environmental Conditions

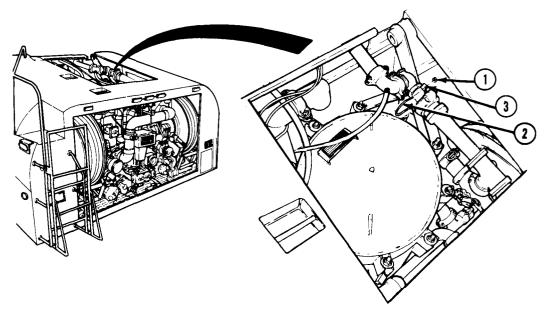
None

General Safety Instructions

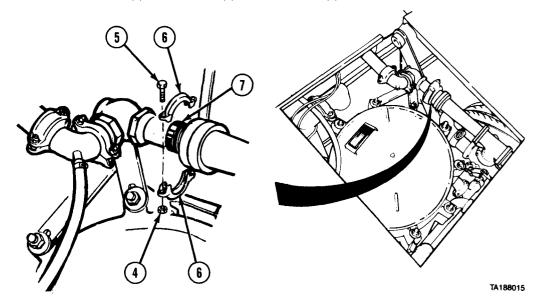
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

a. Removal.

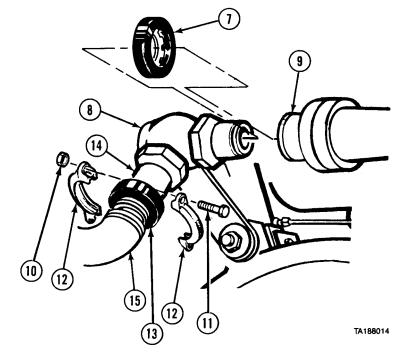


(1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

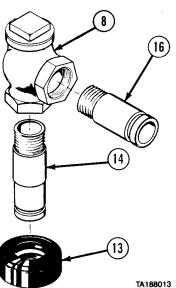


(2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).

- (3) Remove coupling gasket (7) from V9 CHECK VALVE (8) and eductor (9).
- (4) Hold V9 CHECK VALVE (8) in place and remove two nuts (10), screws (11), and coupling halves (12).
 (5) Hold V9 CHECK VALVE (8) in
- place and push coupling gasket (13) on pipe nipple (14). (6) Remove V9 CHECK VALVE (8)
- from pipe (15).



(7) Remove coupling gasket (13) and two pipe nipples (14 and 16) from V9 CHECK VALVE (8).



25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

- b. Disassembly.
 - (1) Remove cap (1) and spring (2) from valve body (3).
 - (2) Remove spring (2) from cap (1).
 - (3) Remove disk assembly (4) from bearing (5).
 - (4) Remove bearing (5) from valve body (3).
- c. Cleaning/Inspection.

WARNING

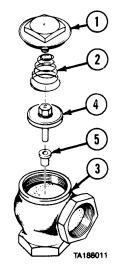
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

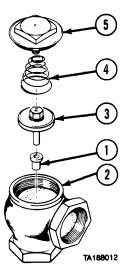
(1) Clean all metal parts with dry cleaning solvent.

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, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
- (4) Inspect spring for cracks and distortion.
- (5) Replace damaged parts.
- d. Assembly.
 - (1) Lubricate bearing (1) with oil and install in valve body (2).
 - (2) Install disk assembly (3) in bearing (1).
 - (3) Install spring (4) on cap (5).
 - (4) Install cap (5) on valve body (2).



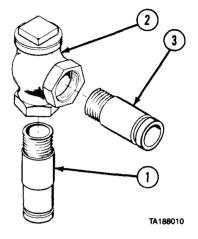


e. Installation

WARNING

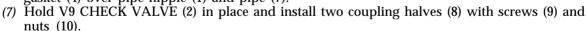
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

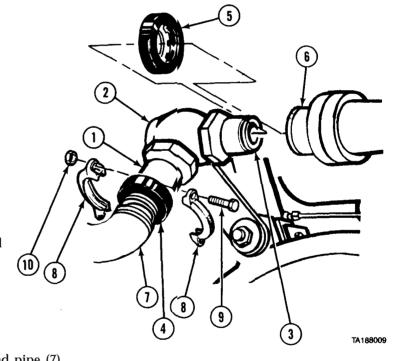
- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install on V9 CHECK VALVE (2).
- (2) Apply pipe thread sealing compound to threads of pipe nipple (3) and install on V9 CHECK VALVE (2).



CAUTION

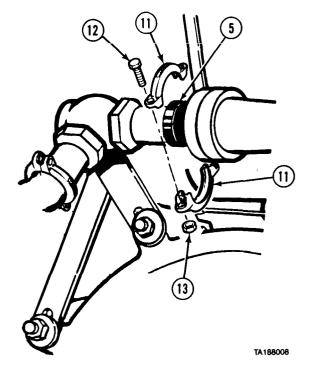
- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
 - (3) Install coupling gasket (4) on pipe nipple (1).
 - (4) Install coupling gasket (5) on end of eductor (6).
 - (5) Hold V9 CHECK VALVE (2) in place and position coupling gasket (5) over pipe nipple (3) and end of eductor (6).
 - (6) Hold V9 CHECK VALVE (2) in place and position coupling gasket (4) over pipe nipple (1) and pipe (7).





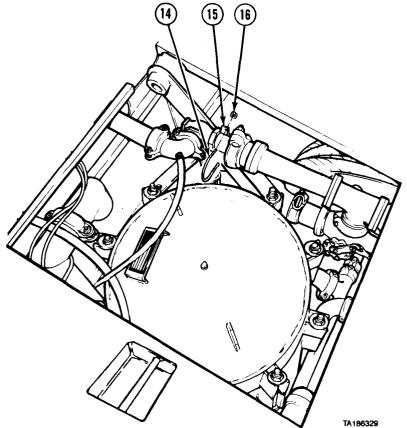
25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

(8) Install two coupling halves (11) on coupling gasket (5) with screws (12) and nuts (13).



- (9) Install U-bolt (14) in bracket (15) with two locknuts (16).
- f. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check V9 CHECK VALVE for leaks.
 - (3) Close pump module top access door (TM 9-2320-279-10).

END OF TASK



25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

FM 10-71

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

Para 25-28 V14 pilot valve assembly

removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and

follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

a. Removal.

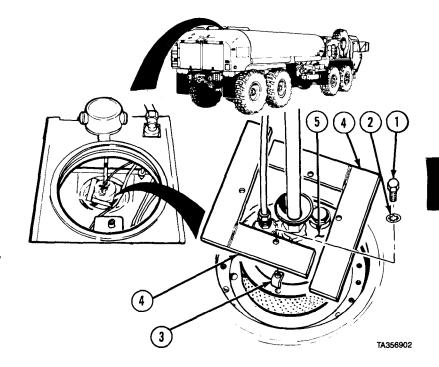
WARNING

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

NOTE

Soldier A works from inside tank. Soldier B works from under tank.

- (1) Remove four screws (1), lockwashers (2), retainers (3), and two deflection plates (4) from V10 bottom load valve (5).
- (2) Install four retainers (3) with four screws (1) and lockwashers (2).



25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION (CONT).

NOTE

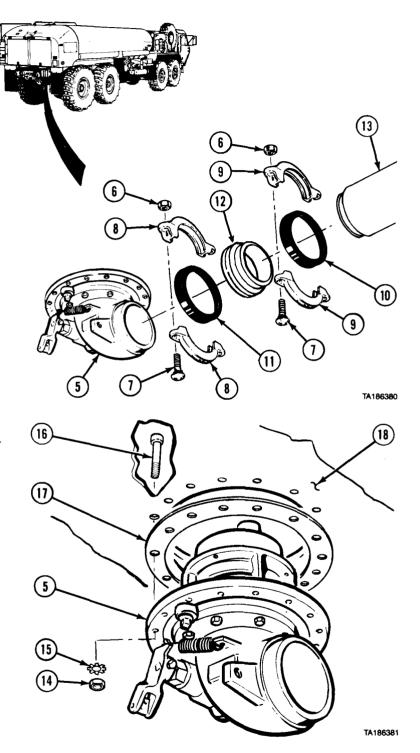
Mark position of V10 bottom load valve before removal.

(3) Soldier B removes four nuts (6), screws (7), and coupling halves (8 and 9).

WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (4) Soldier B removes two coupling gaskets (10 and 11) and pipe (12) from V10 bottom load valve (5) and pipe (13).
- (5) Soldier B removes 16 nuts (14) and lockwashers (15) while Soldier A removes screws (16).
- (6) Remove V10 bottom load valve (5) and gasket (17) from tank (18).



b. Installation.

(1) Install gasket (1) on V10 bottom load valve (2).

WARNING

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

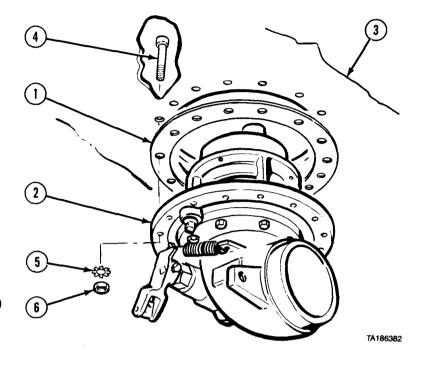
NOTE

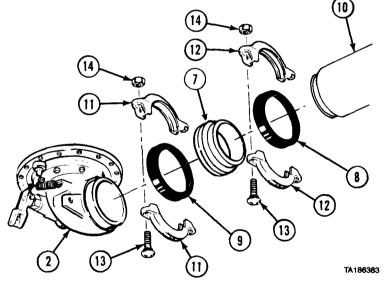
Soldier A works from inside tank. Soldier B works from under tank.

- (2) Position V10 bottom load valve (2) on tank (3).
- (3) Soldier A installs 16 screws (4) while Soldier B installs 16 lockwashers (5) and nuts (6).

CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
 - (4) Install pipe (7) and two coupling gaskets (8 and 9) on V10 bottom load valve (2) and pipe (10).
 - (5) Install four coupling halves (11 and 12) with four screws (13) and nuts (14).

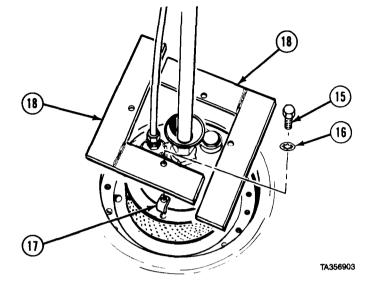




25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION (CONT).

- (6) Remove four screws (15) and lockwashers (16) from retainers (17).
- (7) Install two deflection plates (18) with four screws (15) and lockwashers (16).
- c. Follow-on Maintenance.
 - (1) Adjust V13 vent valve push rod (para 25-27).
 - (2) Install V14 pilot valve assembly (para 25-28).
 - (3) Perform bottom loading (TM 9-2320-279-10).
 - (4) Check V10 bottom load valve for leaks.

END OF TASK



25-25. V11 FLOW VALVE (REG) REMOVAL/INSTALLATION.

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies
None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

TM 9-2320-279-10 Pump module rear access

doors opened.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

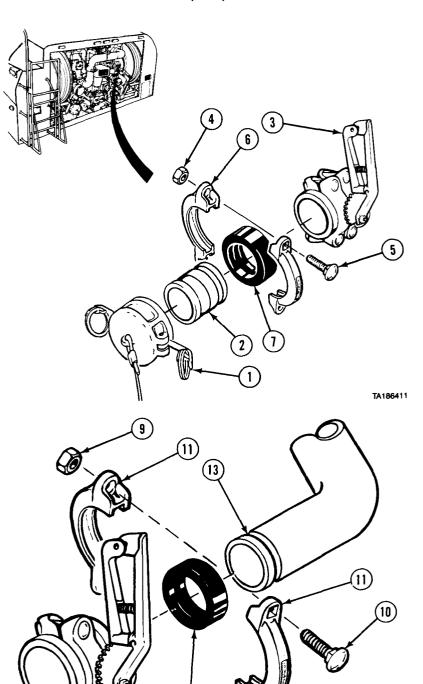
a. Removal.

(1) Remove dust cap (1) from adapter (2).

WARNING

To prevent fuel from coming in contact with eyes and skin, stand clear when opening valve. Fuel will drain when valve is opened. Contact with fuel can irritate eyes and skin.

- (2) Move valve handle (3) down to open position.
- (3) Move handle (3) up to close position after draining fuel.
- (4) Hold adapter (2) in place and remove two nuts (4), screws (5), and coupling halves (6).
- (5) Remove adapter (2) and coupling gasket (7).
- (6) Hold V11 FLOW VALVE (REG) (8) in place and remove two nuts (9), screws (10), and coupling halves (11) from coupling gasket (12).
- (7) Remove V11 FLOW VALVE (REG) (8) and coupling gasket (12) from pipe (13).



8

TA186412

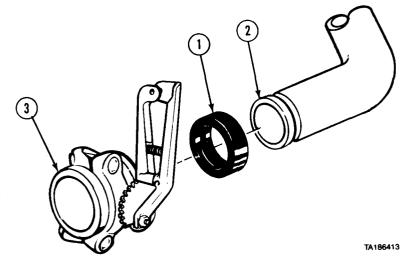
25-25. V11 FLOW VALVE (REG) REMOVAL/INSTALLATION (CONT).

b. Installation.

CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

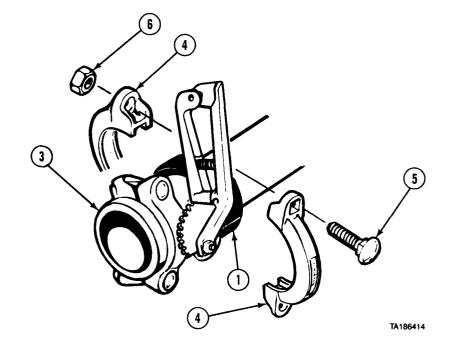
- (1) Install coupling gasket (1) on pipe (2).
- (2) Position V11 FLOW VALVE (REG) (3) against pipe (2) and install coupling gasket (1) over ends of valve and pipe.



CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

(3) Hold V11 FLOW VALVE (REG) (3) in place and install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).



CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (4) Install coupling gasket (7) on V11 FLOW VALVE (REG) (3).
- (5) Position adapter (8) against V11 FLOW VALVE (REG) (3) and install coupling gasket (7) over ends of valve and adapter.
- (6) Hold adapter (8) in place and install two coupling halves (9) with screws (10) and nuts (11).
- (7) Make sure valve handle (12) is set to closed position.
- (8) Install dust cap (13).
- c. Follow-on Maintenance.
 - (1) Perform filtered bulk unloading (TM 9-2320-279-10).
 - (2) Check V11 FLOW VALVE (REG) for leaks.

Compound, sealing, pipe thread, Item 18,

MOS 63S, Heavy wheel vehicle mechanic

(3) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK

Appendix C

Personnel Required

$ \begin{array}{cccc} & & & & & & & & & \\ & & & & & & & & \\ & & & &$	
)
13 8 7 9 TAI	86415

25-26.	V12	BOTTOM	LOAD	PRECHECK	VALVE	REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation					c	c. Follow-on Maintenance		
INITIAL SETUP								
Model	s				R	References		
M978						None		
Test Equipme		nent			E	Equipment Condition		
Nor	ne					TM or Para Condition Description		
Special Tool		S				TM 9-2320-279-10 Pump module rear access		
Nor	ıe					doors opened.		
Supplies			Special Environmental Conditions					

None

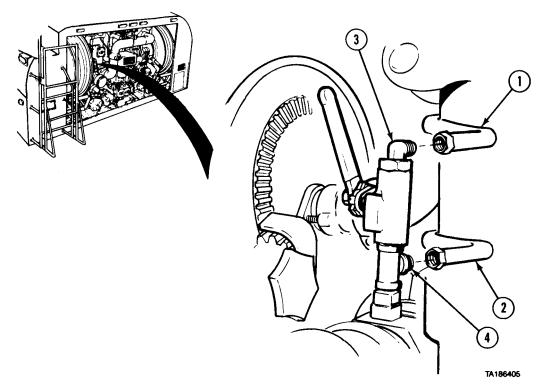
General Safety Instructions

No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

25-26. V12 BOTTOM LOAD PRECHECK VALVE REMOVAL/INSTALLATION (CONT).

a. Removal.

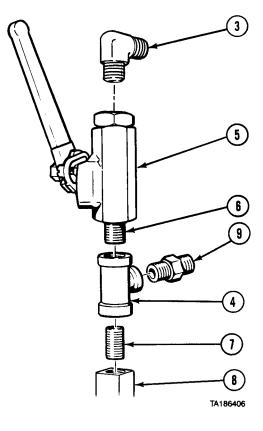


NOTE

Tag and mark tubes and fittings before removal.

(1) Remove two tubes (1 and 2) from elbow (3) and tee (4).

- (2) Remove V12 bottom load PRECHECK VALVE (5) and pipe nipple (6).
- (3) Remove tee (4) and pipe nipple (7) from V2 bottom load adapter (8).
- (4) Remove adapter (9) from tee (4).
- (5) Remove elbow (3) and pipe nipple (6) from V12 bottom load PRECHECK VALVE (5).

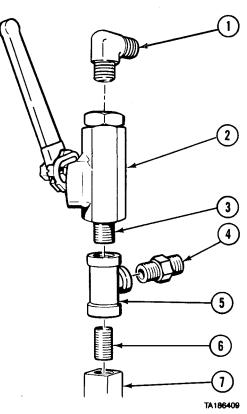


b. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

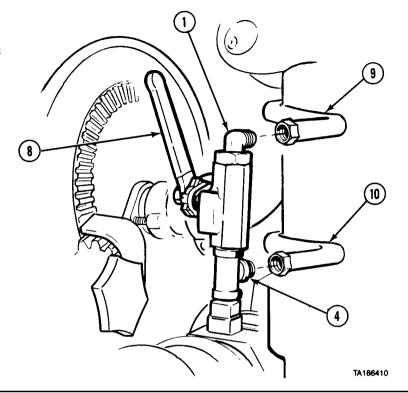
- (1) Coat threads of elbow (1) with pipe thread sealing compound and install in V12 bottom load PRECHECK VALVE (2).
- (2) Coat threads of pipe nipple (3) with pipe thread sealing compound and install in V12 bottom load PRECHECK VALVE (2).
- (3) Install adapter (4) in tee (5).
- (4) Coat threads of pipe nipple (6) with pipe thread sealing compound and install pipe nipple and tee (5) in V2 bottom load adapter (7).
- (5) Coat threads of pipe nipple (3) with pipe thread sealing compound and install in tee (5).



25-26. V12 BOTTOM LOAD PRECHECK VALVE REMOVAL/INSTALLATION (CONT).

- (6) Move handle (8) to down position.
- (7) Install two tubes (9 and 10) on elbow (1) and adapter (4).
- c. Follow-on Maintenance.
 - (1) Perform bottom loading (TM 9-2320-279-10).
 - (2) Check V12 bottom load PRECHECK VALVE for leaks.
 - (3) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT.

This task covers:

- a. Removal
- b. Installation

- c. Push Rod Adjustment
- d. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Adhesive-sealant, silicone, Item 4, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

FM 10-71

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

Para 16-49 Tank filler lid removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within $50\ \text{ft}\ (15\ \text{m})$ of vehicle. Read and

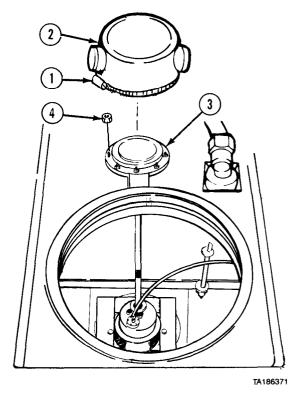
follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

a. Removal.

NOTE

Mark position of vent cover.

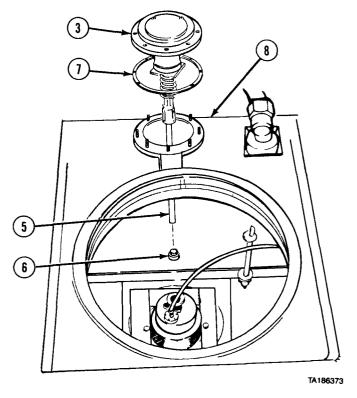
- (1) Loosen clamp (1) and remove vent cover (2) from V13 vent valve (3).
- (2) Remove eight nuts (4) from V13 vent valve (3).



NOTE

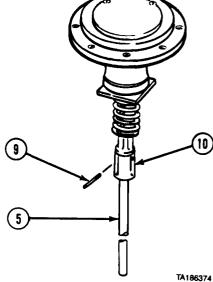
Mark position of V13 vent valve.

- (3) Remove push rod (5) and plug (6) from V13 vent valve (3).
- (4) Remove V13 vent valve (3) and gasket (7) from tank (8).

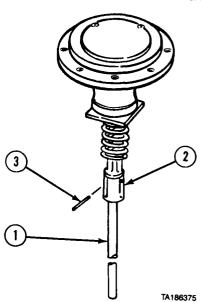


25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

- (5) Remove pin (9) from socket (10).
- (6) Remove push rod (5) from socket (10).



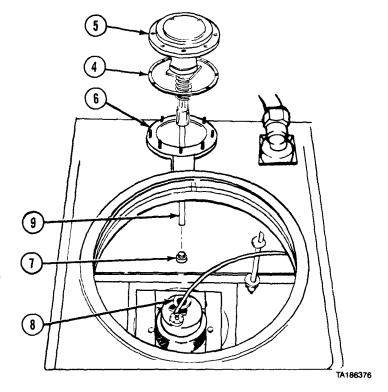
- **b.** Installation.
 - (1) Install push rod (1) in socket (2).
 - (2) Install pin (3) in socket (2).



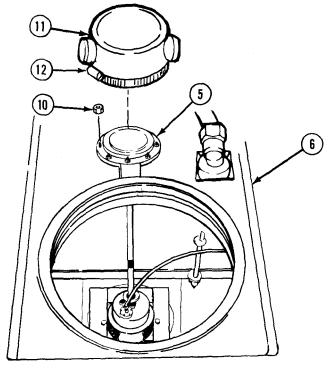
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (9) Coat gasket (4) with silicone adhesive-sealant and position with V13 vent valve (5) on tank (6).
- (4) Install plug (7) in valve (8) with large end down.
- (5) Pull up push rod (9) and position in valve (8).



- (6) Install V13 vent valve (5) on tank (6) with eight nuts (10).
- (7) Install vent cover (11) on V13 vent valve (5) and tighten clamp (12).



TA186378

25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

c. Push Rod Adjustment.

- (1) Move push rod (1) up and down.

 Measure movement on pin (2).

 Movement must be 1/16 to 1/8 in. (2 to 3 mm).
- (2) Loosen jamnut (3).

NOTE

Plug-in valve may come out with push rod.

(3) Pull up and remove push rod (1) from valve (4).

NOTE

One turn of push rod is 1/16 in. (2 mm).

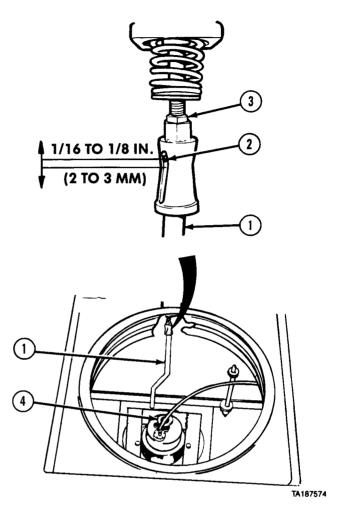
(4) Turn push rod (1) clockwise to decrease measurement, or counterclockwise to increase measurement.

NOTE

Make sure push rod seats firmly on plug-in valve.

- (5) Install push rod (1) in valve (4). Repeat step (1).
- (6) Tighten jamnut (3) when adjustment is finished.
- d. Follow-on Maintenance.
 - (1) Perform bottom loading (TM 9-2320-279-10).
 - (2) Check V13 vent valve for proper operation (air should escape while bottom loading).
 - (3) Install tank filler lid (para 16-49).

(3) Install tank filler lid (par



25-28. VI4 PILOT VALVE ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

a. Removal

c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

FM 10-71

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

Para 16-49 Tank filler lid removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and

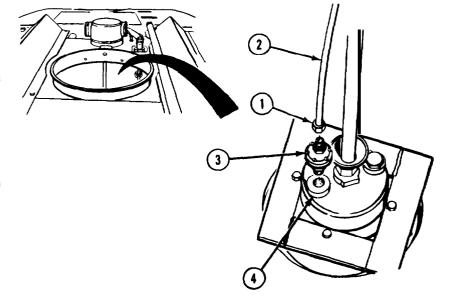
follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

a. Removal.

WARNING

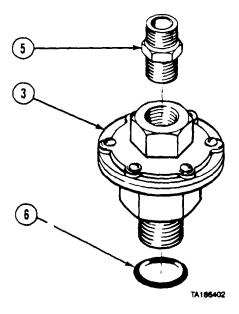
Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

- (1) Loosen nut (1) and disconnect tube (2).
- (2) Remove V14 pilot valve (3) from V10 bottom load valve (4).



25-28. V14 PILOT VALVE ASSEMBLY REMOVAL/INSTALIATION (CONT).

- (3) Remove fitting (5) from V14 pilot valve assembly (3)
- (4) Remove preformed packing (6).

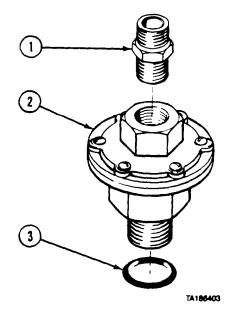


b. Instllation.

WARNING

Adhesives. solvents, and sealing compounds can burn easily, can give off harmful vapors. and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent. or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound to threads of fitting (1) and install in V14 pilot valve assembly (2).
- (2) Install preformed packing (3).



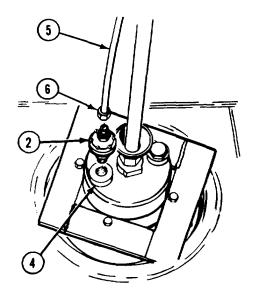
WARNING

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors in the M978 tanker are flammable and may cause injury or death.

- (3) Install V14 pilot valve assembly (2) in V10 bottom load valve (4).
- (4) Connect tube (5) and tighten nut (6).

c. Follow-on Maintenance.

- (1) Prepare tanker for operation (TM 9-2320-279-10).
- (2) Perform bottom loading (TM 9-2320-279-10).
- (3) Check that fuel flow stops when V12 bottom load PRECHECK VALVE is open and continues when valve is closed (TM 9-2320-279-10).
- (4) Install tank filler lid (para 16-49).



END OF TASK

25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION.

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Oil, lubricating, Item 32, Appendix C Solvent, drycleaning, Item 47, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description Para 16-48 Pump module left side

access panel removed.

Special Environmental Conditions

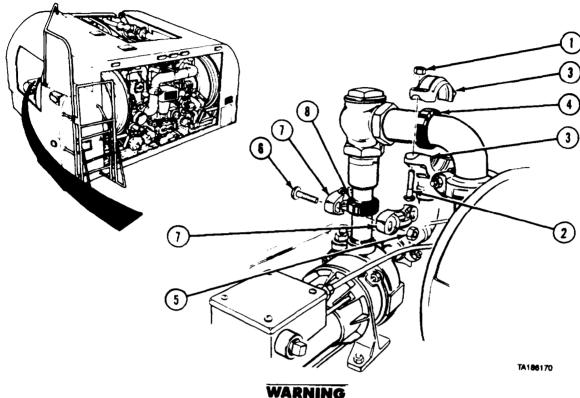
None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

a. Removal.



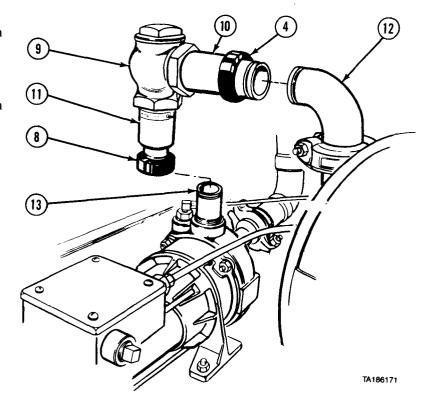
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

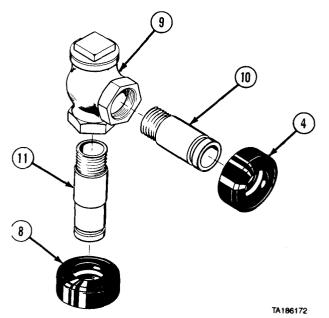
- (1) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).
- (2) Remove two nuts (5), screws (6) and coupling halves (7) from coupling gasket (8).

- (3) Hold V16 AUXILIARY PUMP CHECK VALVE (9) in place and push coupling gasket (4) onto pipe nipple (10).
- nipple (10).

 (4) Hold V16 AUXILIARY
 PUMP CHECK VALVE (9) in place and push coupling gasket (8) onto pipe adapter (11).
- (5) Remove V16 AUXILIARY PUMP CHECK VALVE (9) from elbow (12) and pipe (13).



- (6) Remove two coupling gaskets (4 and 8).
- (7) Remove pipe nipple (10) and pipe adapter (11) from V16 AUXILIARY PUMP CHECK VALVE (9).

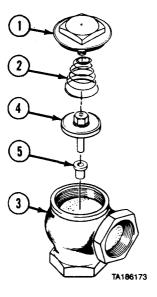


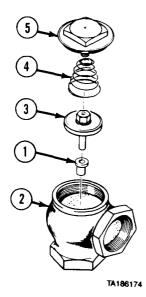
25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

- b. Disassembly.
 - (1) Remove cap (1) and spring (2) from valve body (3).
 - (2) Remove spring (2) from cap (1).
 - (3) Remove disk assembly (4) from bearing (5).
 - (4) Remove bearing (5) from valve body (3).
- c. Cleaning/Inspection.

WARNING

- Adhesives, solvents, and sealing compounds can burn easily, can give
 off harmful vapors, and are harmful to skin and clothing. To avoid
 injury or death, keep away from open fire and use in well-ventilated
 area. If adhesive, solvent, or sealing compound gets on skin or
 clothing, wash immediately with soap and water.
- 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, and gloves.
 - (1) Clean all metal parts with dry cleaning solvent.
 - (2) Dry metal parts with compressed air.
 - (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
 - (4) Inspect spring for cracks and distortion.
 - (5) Replace damaged parts.
- d. Assembly.
 - (1) Lubricate bearing (1) with oil and install in valve body (2).
 - (2) Install disk assembly (3) in bearing (1).
 - (3) Install spring (4) on cap (5).
 - (4) Install cap (5) on valve body (2).



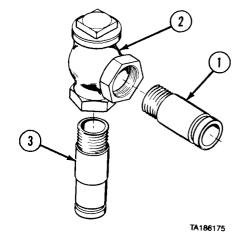


e. Installation.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

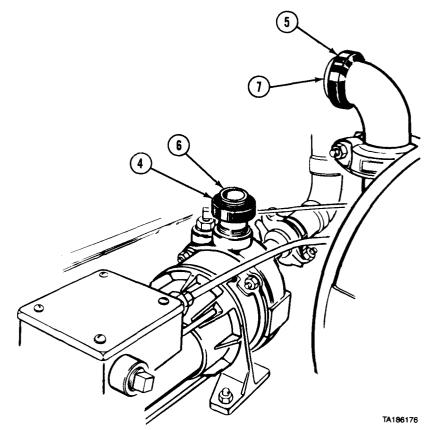
- (1) Coat threads of pipe nipple (1) with pipe thread sealing compound and install on V16 AUXILIARY PUMP CHECK VALVE (2).
- (2) Coat threads of pipe adapter (3) with pipe thread sealing compound and install on V16 AUXILIARY PUMP CHECK VALVE (2).



CAUTION

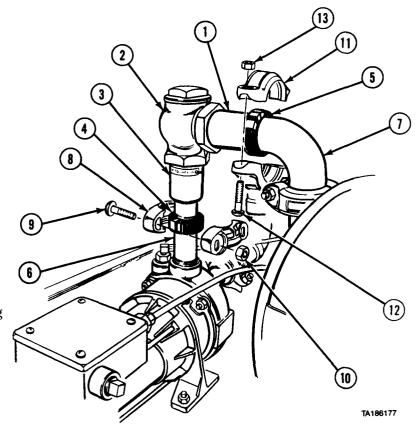
Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

(3) Install two coupling gaskets (4 and 5) on pipe (6) and elbow (7).



25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).

- (4) Hold V16 AUXILIARY PUMP CHECK VALVE (2) in place and position coupling gasket (4) over connection of pipe adapter (3) and pipe (6).
- (5) Install two coupling halves (8) on coupling gasket (4) with two screws (9) and nuts (10).
- (6) Position coupling gasket (5) over connection of pipe nipple (1) and elbow (7).
- (7) Install two coupling halves (11) on coupling gasket (5) with two screws (12) and nuts (13).
- f. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Perform fuel servicing using auxiliary pump (TM 9-2320-279-10).
 - (3) Check V16 AUXILIARY PUMP CHECK VALVE for leaks.
 - (4) Install pump module left side access panel (para 16-48).



END OF TASK

25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models References M978 None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Tools Para 25-3 Tank drained.

None Special Environmental Conditions

Supplies None

None General Safety Instructions

Personnel Required No smoking, flame, sparks, and hot or glowing

MOS 63S, Heavy wheel vehicle mechanic objects within 50 ft (15 m) of vehicle.

25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION (CONT).

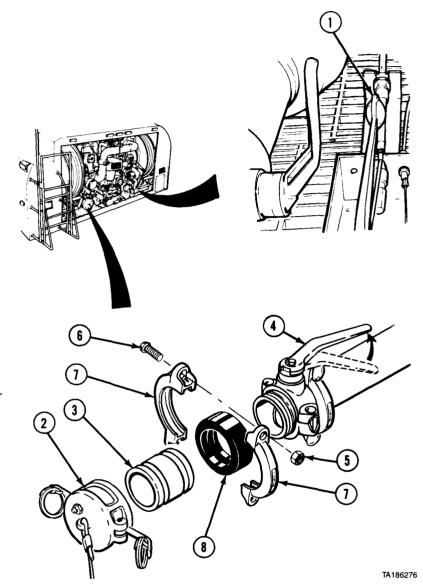
a. Removal.

(1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.

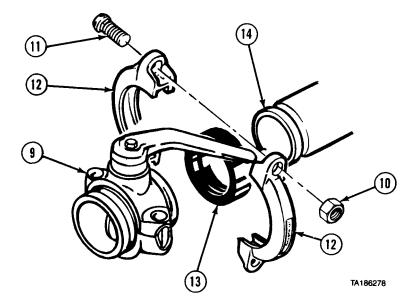
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove dust cap (2) from adapter (3).
- (3) Move handle (4) to OPEN position.
- (4) When fuel stops draining, close handle (4), hold adapter (3) in place, and remove two nuts (5), screws (6), and coupling halves (7).
- (5) Remove adapter (3).
- (6) Remove coupling gasket (8).



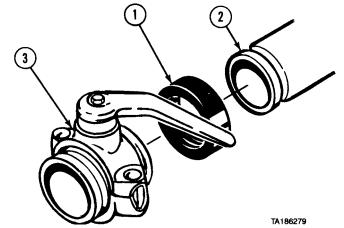
- (7) Hold V17 GRAVITY VALVE (9) in place and remove two nuts (10), screws (11), and coupling halves (12).
- (8) Remove V17 GRAVITY VALVE (9) and coupling gasket (13) from pipe (14).



- b. Installation.
 - (1) Install coupling gasket (1) on pipe (2).
 - (2) Position V17 GRAVITY VALVE (3) on pipe (2).

CAUTION

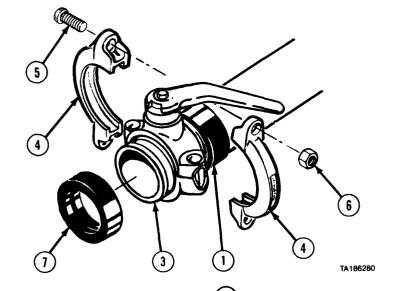
- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.



(3) Hold V17 GRAVITY VALVE (3) in place and position coupling gasket (1) over connection of valve and pipe (2).

25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION (CONT).

- (4) Hold V17 GRAVITY VALVE (3) in place and install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).
- (5) Install coupling gasket (7) on V17 GRAVITY VALVE (3).



TA186281

- (6) Hold adapter (8) in place and position coupling gasket (7) on connection of adapter and V17 GRAVITY VALVE (3).
- (7) Hold adapter (8) in place and install two coupling halves (9) on coupling gasket (7) with two screws (10) and nuts (11).
- (8) Install dust cap (12) on adapter (8).
- c. Follow-on Maintenance.
 - (1) Perform unfiltered gravity bulk unloading (TM 9-2320-279-10).
 - (2) Check V17 GRAVITY VALVE for leaks
 - (3) Close pump module rear access doors (TM 9-2320-279-10).



25-31. V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION.

This task covers:

a. Removal c. Follow-on Maintenance

b. Installation

INITIAL SETUP

Supplies

Models References
M978 None

Test Equipment Equipment Condition

None TM or Para Condition Description

Special Too1s Para 25-3 Tank drained.

None TM 9-2320-279-10 Pump module rear access

doors opened.

None Special Environmental Conditions

None

Personnel Required
MOS 63S, Heavy wheel vehicle mechanic
General Safety Instructions

No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

25-31 . V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION (CONT).

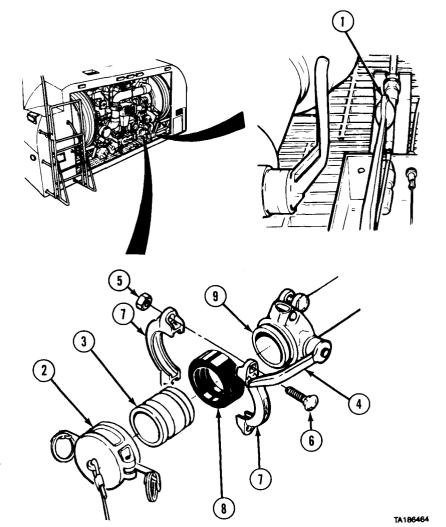
a. Removal.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.
- (2) Remove dust cap (2) from adapter (3).

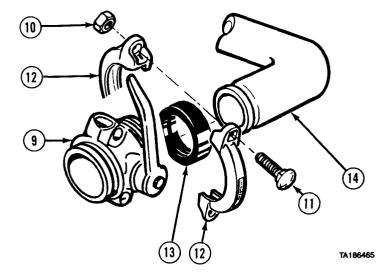
WARNING

Fuel may drain from piping when valve is opened and coupling removed. Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (3) Set valve handle (4) down to open position.
- (4) When fuel stops draining, close handle (4), hold adapter (3) in place, and remove two nuts (5), screws (6), and coupling halves (7).
- (5) Remove adapter (3).
- (6) Remove coupling gasket (8) from V18 BULK DELIVERY VALVE (9).



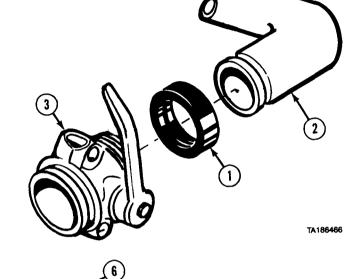
- (7) Hold V18 BULK DELIVERY VALVE (9) in place and remove two nuts (10), screws (11), and coupling halves (12).
- (8) Remove V18 BULK DELIVERY VALVE (9) and coupling gasket (13) from pipe (14).

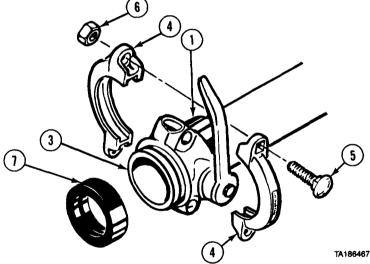


b. Installation.

CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
 - (1) Install coupling gasket (1) on pipe (2).
 - (2) Position V18 BULK DELIVERY VALVE (3) on pipe (2).
 - (3) Hold V18 BULK DELIVERY VALVE (3) in place and position coupling gasket (1) over connection of valve and pipe (2).
 - (4) Hold V18 BULK DELIVERY VALVE (3) in place and install two coupling halves (4) on coupling gasket (1) with screws (5) and nuts (6).
 - (5) Install coupling gasket (7) on V18 BULK DELIVERY VALVE (3).

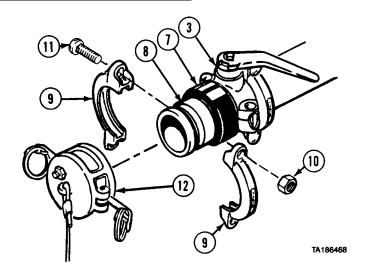




25-31. V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION (CONT).

- (6) Hold adapter (8) in place and position coupling gasket (7) on connection of adapter and V18 BULK DELIVERY VALVE (3).
- (7) Hold adapter (8) in place and install two coupling halves (9) on coupling gasket (7) with screws (10) and nuts (11).
- (8) Install dust cap (12) on adapter (8).
- c. Follow-on Maintenance.
 - (1) Perform unfiltered bulk unloading (TM 9-2320-279-10).
 - (2) Check V18 BULK DELIVERY VALVE for leaks.
 - (3) Close pump module rear doors (TM 9-2320-279-10).





25-32. V19 JET LEVEL SENSOR REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18, Appendix C

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

FM 10-71

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

Para 16-49 Tank filler lid removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and follow all safety precautions in

TM 9-2320-279-10 and FM 10-71.

a. Removal

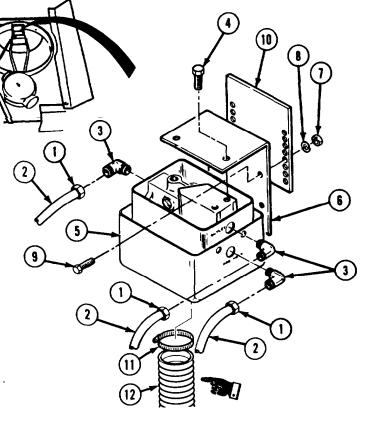
WARNING

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

NOTE

Tag and mark hoses, elbows, and fittings before removal.

- (1) Loosen three nuts (1) and remove hoses (2) from elbows (3).
- (2) Remove two screws (4) and V19 jet level sensor (5) from bracket (6).
- (3) Remove two nuts (7), lockwashers (8), screws (9), and bracket (6) from tank bracket (10).
- (4) Remove three elbows (3) from V19 jet level sensor (5).
- (5) Remove clamp (11) and drop tube (12) from bottom of V19 jet level sensor (5)...



b. Installation.

(1) Install drop tube (12) end clamp (11) on bottom of V19 jet level sensor (5).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. lb avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1.1) Apply pipe thread sealing compound to threads of three elbows (3) and install in VI9 jet level sensor (5).
- (2) Install bracket (6) on tank bracket (10) with two screws (9), lockwashers (8), and nuts (7).
- (3) Install V19 jet level sensor (5) on bracket (6) with two screws (4).
- (4) Install three hoses (2) on elbows (3). Tighten three nuts (1).

c. Follow-on Maintenance.

- (1) Install tank filler lid (para 16-49).
- (2) Perform bottom loading (TM 9-2320-279-10).
- (3) Check that fuel flow stops when V12 bottom load PRECHECK VALVE is open and continues when valve is closed (TM 9-2320-279-10).

25-33. ED EDUCTOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION.

This task covers:

a. Removal

b. Disassembly

c. Cleaning Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound. sealing, pipe thread. Item 18,

Appendix C

Adhesive-sealant, silicone, Item 4, Appendix C Solvent. dry cleaning, Item 47. Appendix C

Personnel Required

MOS. 63S, Heavy wheel vehicle mechanic (2)

References

None

Equipment Condition

TM or Para (TM 9-2320-279-10 F

Condition Description

Pump module top and rear

access doors opened.

Special Environmental Conditions

None

General Safety Instructions

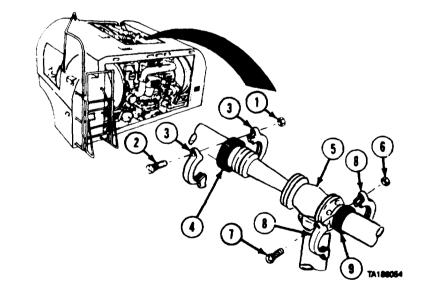
No smoking, flame, sparks. and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

WARNING

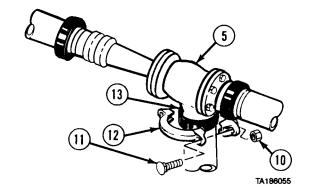
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (l), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on ED EDUCTOR assembly (5).
- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Push coupling gasket (9) on ED EDUCTOR assembly (5).

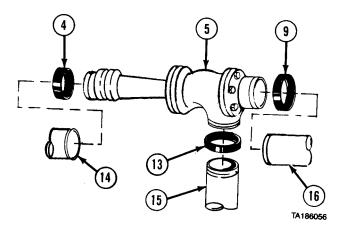


- (5) Remove two nuts (10), screws (11), and
- coupling halves (12).

 (6) Push coupling gasket (13) on ED EDUCTOR assembly (5).



- (7) Remove ED EDUCTOR assembly (5) from three pipes (14, 15, and 16). (8) Remove coupling gaskets (4, 9, and 13).



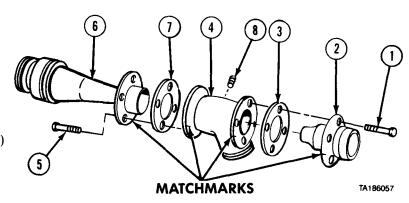
25-33. ED EDUCTOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).

b. Disassembly.

NOTE

Matchmark before disassembly.

- (1) Remove four screws (1), nozzle (2), and gasket (3) from ED EDUCTOR (4).
- (2) Remove four screws (5), venturi (6), and gasket (7) from ED EDUCTOR (4).
- (3) Remove pipe plug (8).
- c. Cleaning/Inspection.



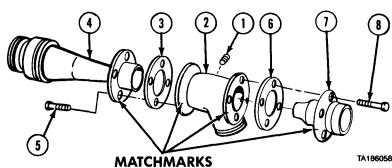
WARNING

- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- 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, and gloves.
- (1) Dry metal parts with compressed air.
- (2) Inspect each part for damage.
- (3) Replace damaged parts.

d. Assembly.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

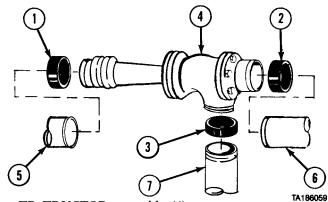


- (1) Apply pipe thread sealing compound to threads of pipe plug (1) and install in ED EDUCTOR (2).
- (2) Apply silicone adhesive-sealant to gasket (3) and install gasket and venturi (4) on ED EDUCTOR (2) with four screws (5).
- (3) Apply silicone adhesive-sealant to gasket (6) and install gasket and nozzle (7) to ED EDUCTOR (2) with four screws (8).

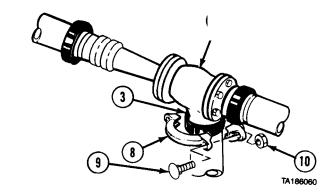
e. Installation.

CAUTION

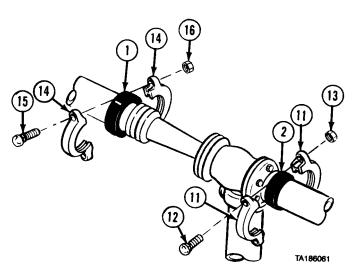
- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.



- (1) Install three coupling gaskets (1, 2, and 3) on ED EDUCTOR assembly (4).
- (2) Soldier A installs coupling gaskets (1, 2, and 3) over three pipes (5, 6, and 7) while Soldier B holds ED EDUCTOR assembly (4) in position.
- (3) Soldier A installs two coupling halves (8) on coupling gasket (3) with screws (9) and nuts (10) while Soldier B holds ED EDUCTOR assembly (4) in position.



- (4) Install two coupling halves (11) on coupling gasket (2) with two screws (12) and nuts (13).
- (5) Install two coupling halves (14) on coupling gasket (1) with two screws (15) and nuts (16).
- f. Follow-on Maintenance.
 - (1) Recirculate fuel (TM 9-2320-279-10).
 - (2) Check ED EDUCTOR assembly for leaks.
 - (3) Close top and rear pump module access doors (TM 9-2320-279-10).



25-34. FLOW LIMITING VALVE REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance	
INITIAL SETUP	Equipment Cond	lition
Models	Equipment Condition	
M978	TM or Para	Condition Description
Test Equipment	Para 25-31	V18 BULK DELIVERY
None		VALVE removed.
Special Tools	Para 23-4	Filter-separator removed.
None	Para 25-11	Flow limiting valve to filter-separator pipe
Supplies None	Para 25-19	removed. V5 air actuated flow valve removed.
Personnel Required MOS 63S, Heavy wheel vehicle mechanic	Special Environmental Conditions None	
References	General Safety Instruction	
None	No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.	

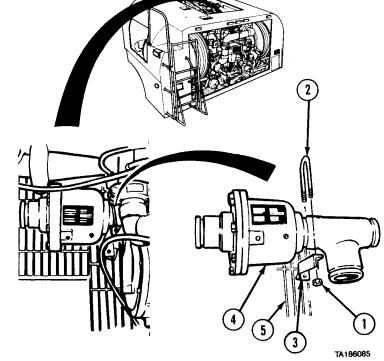
a. Removal.

(1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove flow limiting valve (4) from grating (5) and drain fuel.
- b. Installation.
 - (1) Position flow limiting valve (4) against bracket (3) on grating (5).
 - (2) Install flow limiting valve (4) with U-bolt (2) and two locknuts (1).



- c. Follow-on Maintenance.
 - (1) Install V5 air actuated flow valve (para 25-19).
 - (2) Install flow limiting valve to filter-separator piping (para 25-11).
 - (3) Install filter-separator (para 23-4).
 - (4) Install V18 BULK DELIVERY VALVE (para 25-31).
 - (5) Perform unfiltered bulk unloading (TM 9-2320-279-10).
 - (6) Check flow limiting valve for leaks.

25-35. SP SAMPLING PROBE VALVE REMOVAL/INSTALLATION.

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Compound, sealing, pipe thread, Item 18,

Appendix C

Tags, identification, Item 48, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description
TM 9-2320-279-10 Pump module rear access

doors opened.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

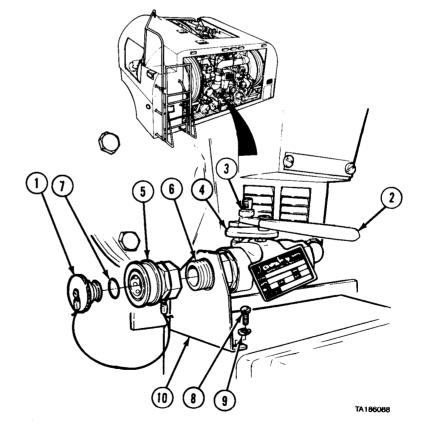
a. Removal.

(1) Remove end cap (1).

WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

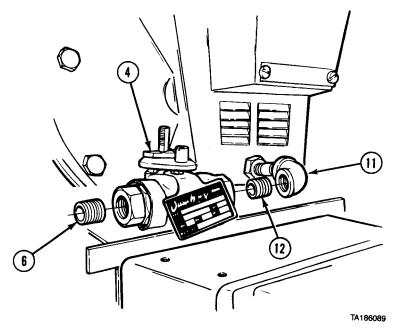
- (2) Set valve handle (2) to open position and drain fuel.
- (3) When fuel stops draining, close valve handle (2).
- (4) Remove nut (3) and handle (2) from SP SAMPLING PROBE (4).
- (5) Remove coupling (5) from pipe nipple (6).
- (6) Remove preformed packing (7) from cap (1).
- (7) Remove two screws (8), lockwashers (9), and bracket (10).



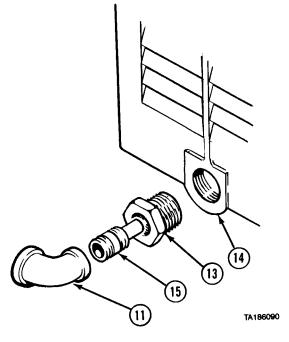
NOTE

Tag and mark fittings before removal.

- (8) Remove SP SAMPLING PROBE (4) from elbow (11).
- (9) Remove two pipe nipples (6 and 12) from SP SAMPLING PROBE (4).



- (10) Remove reducer bushing (13) from flowmeter (14).
- (11) Remove elbow (11) and pipe nipple (15) from reducer bushing (13).



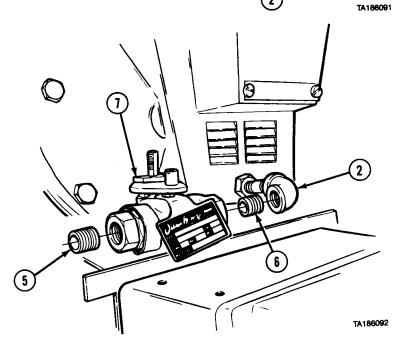
25-35. SP SAMPLING PROBE VALVE REMOVAL/INSTALLATION (CONT).

b. Installation.

WARNING

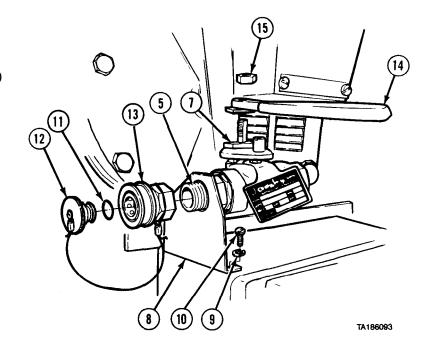
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply pipe thread sealing compound on threads of pipe nipple (1) and install in elbow (2).
- (2) Install nipple (1) and elbow (2) in reducer bushing (3).
- (3) Apply pipe thread sealing compound on threads of reducer bushing (3) and install in flowmeter (4).
- (4) Apply pipe thread sealing compound on threads of two pipe nipples (5 and 6) and install in SP SAMPLING PROBE (7).
- (5) Install pipe nipple (6) in elbow (2).



(3)

- (6) Position bracket (8) on pipe nipple (5) and install two lockwashers (9) and screws (10).
- (7) Install preformed packing (11) on cap (12) and cap on coupling (13).
- (8) Install coupling (13) on pipe nipple (5).
- (9) Install handle (14) and nut (15) on SP SAMPLING PROBE (7).
- c. Follow-on Maintenance.
 - (1) Check operation of SP SAMPLING PROBE valve (TM 9-2320-279-10).
 - (2) Check SP SAMPLING PROBE valve for leaks.
 - (3) Close pump module rear access doors (TM 9-2320-279-10).



END OF TASK

25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION.

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning/Inspection

- d. Assembly
- e. Installation
- f. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

Solvent, dry cleaning, Item 47, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description
Para 16-48 Pump module right side

access panel removed.

Special Environmental Conditions

None

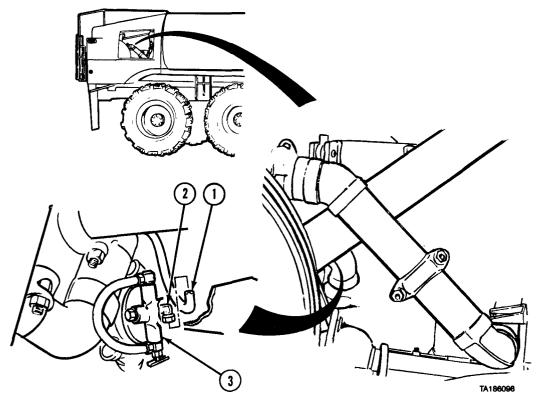
General Safety Instructions

No smoking, flame, sparks, and hot or glowing

objects within 50 ft (15 m) of vehicle.

25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).

a. Removal.

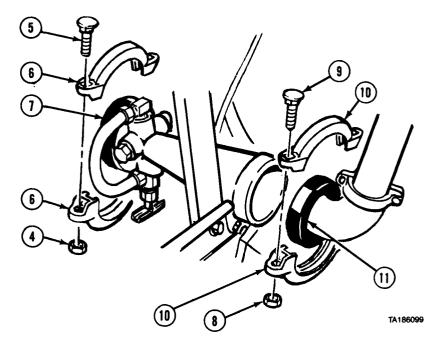


(1) Disconnect tube (1) from elbow (2) on VT VENTURI assembly (3).

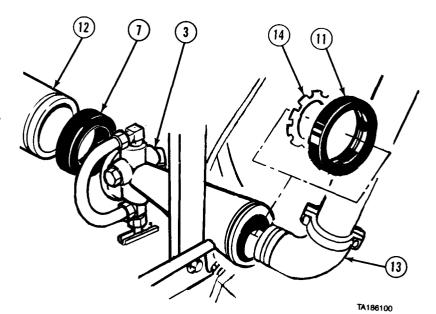
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).
- (3) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).



- (4) Push two coupling gaskets (7 and 11) onto end of VT VENTURI assembly (3).
- (5) Remove VT VENTURI assembly (3) from two pipes (12 and 13).
- (6) Remove coupling gaskets (7 and 11) and reducer (14) from VT VENTURI assembly (3).

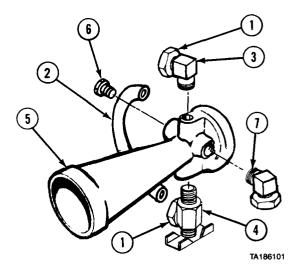


- b. Disassembly.
 - (1) Loosen two nuts (1) and remove tube (2) from elbow (3) and needle valve (4).
 - (2) Remove needle valve (4) from VT VENTURI assembly (5).
 - (3) Remove plug (6) and two elbows (3 and 7) from VT VENTURI assembly (5).
- c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all metal parts for damage.
- (3) Replace damaged parts.



25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).

d. Assembly.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

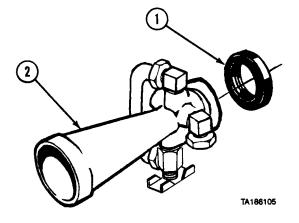
- (1) Coat threads of two elbows (1 and 2) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (2) Coat threads of pipe plug (4) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (3) Coat threads of needle valve (5) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (4) Install tube (6) on elbow (2) and needle valve (5).

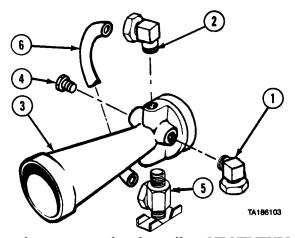
e. Installation.

CAUTION

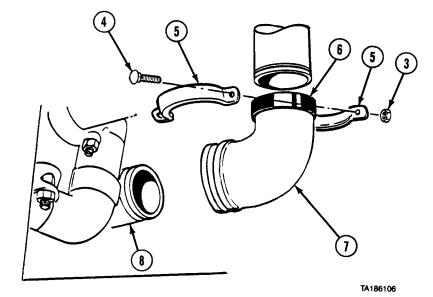
Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

(1) Install coupling gasket (1) on VT VENTURI assembly (2).





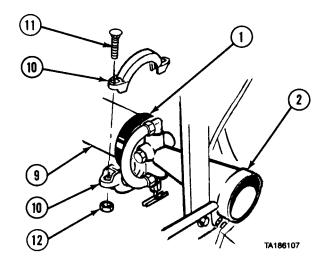
- (2) Remove two nuts (3), screws (4), and coupling halves (5) from coupling gasket (6).
- (3) Push coupling gasket (6) on pipe (7).
- (4) Remove pipe (7) from pipe (8).



CAUTION

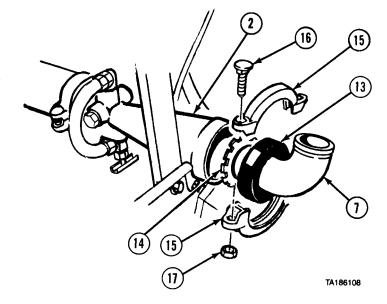
Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Position coupling gasket (1) over connection of pipe (9) and VT VENTURI assembly (2).
- (6) Install two coupling halves (10), screws (11), and nuts (12) on coupling gasket (1).



25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).

- (7) Position coupling gasket (13) and reducer (14) on pipe (7) and VT VENTURI assembly (2).
- (8) Install two coupling halves (15) with two screws (16) and nuts (17).

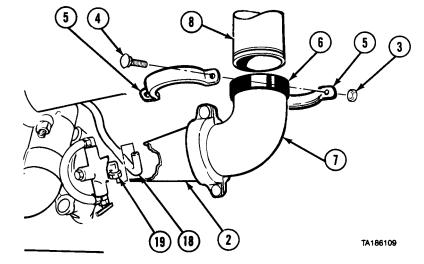


(9) Install tube (18) on elbow (19).

CAUTION

Do not pinch or pull coupling gaskets off-center during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (10) Position coupling gasket (6) on pipe (7) and pipe (8).
- (11) Install two coupling halves (5) on coupling gasket (6) with two screws (4) and nuts (3).



f. Follow-on Maintenance.

- (1) Perform fuel servicing (TM 9-2320-279-10).
- (2) Check VT VENTURI assembly for leaks.
- (3) Install pump module right side access panel (para 16-48).

25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION.

This task covers:

a. Removal

b. Disassembly

c. Cleaning/Inspection

d. Assembly

e. Installation

f. Follow-on Maintenance

INITIAL SETUP

Models M978

Test Equipment

None

Special Tools

None

Supplies

Adhesive-sealant, silicone, Item 4, Appendix C Solvent, dry cleaning, Item 47, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

Para 25-3 Tank drained.

Special Environmental Conditions

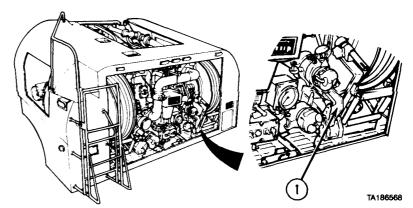
None

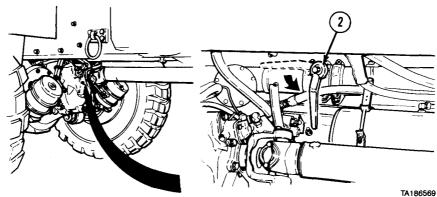
General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Removal.

(1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.





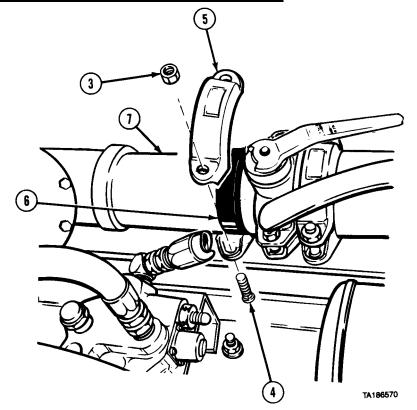
(2) Move V3 suction line valve handle (2) to CLOSE position.

25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION (CONT).

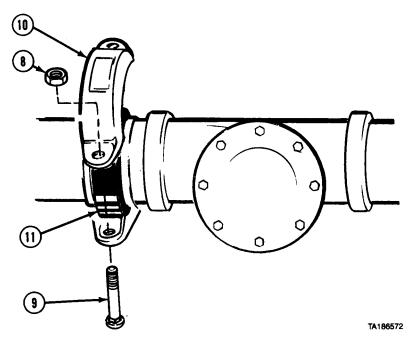
WARNING

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

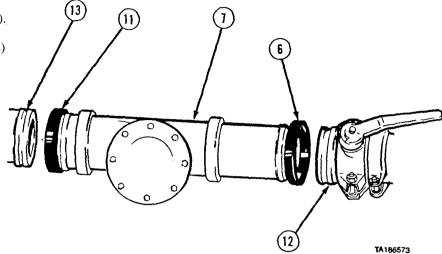
- (3) Remove two nuts (3), screws (4), and coupling halves (5) from coupling gasket (6).
- (4) Push coupling gasket (6) on end of strainer pipe (7).



(5) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).



- (6) Push coupling gasket (11) on end of strainer pipe (7).
- (7) Remove strainer pipe (7) from V3 suction valve (12) and pipe (13).
- (8) Remove two coupling gaskets (6 and 11) from strainer pipe (7).

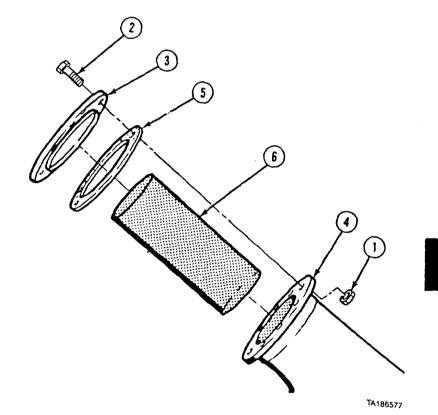


- b. Disassembly.
 - (1) Remove eight nuts (1) and screws (2) from cover (3) and strainer (4).
 - (2) Remove cover (3) and gasket (5) from strainer (4).
 - (3) Remove basket (6) from strainer (4).
- c. Cleaning/Inspection.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in weII-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all metal parts for cracked welds or other damage.
- (3) Inspect threaded parts for damage.
- (4) Replace damaged parts.



25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION (CONT)

d. Assembly.

(1) Install basket (1) in strainer (2).

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

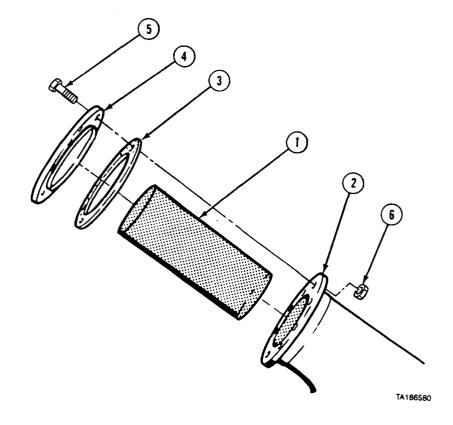
- (2) Apply adhesive-sealant to both sides of gasket (3) and position gasket on strainer (2).
- (3) Position cover (4) on gasket (3) and strainer (2).
- (4) Install eight screws (5) and nuts (6) in cover (4) and strainer (2). Tighten screws to 10 lb-ft (14 N·m).

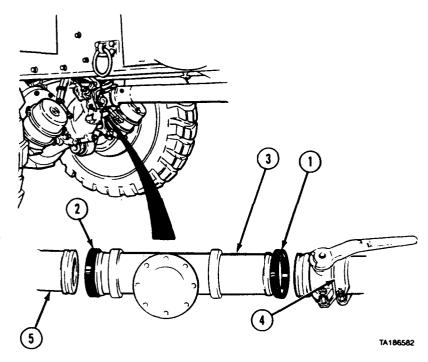
e. Installation.

NOTE

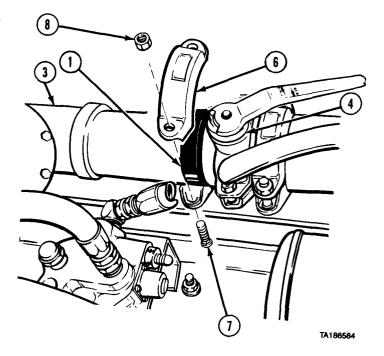
Do not tear or otherwise damage coupling gaskets during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (1) Position two coupling gaskets (1 and 2) on ends of strainer (3).
- (2) Position strainer (3) between V3 suction line valve (4) and pipe (5).





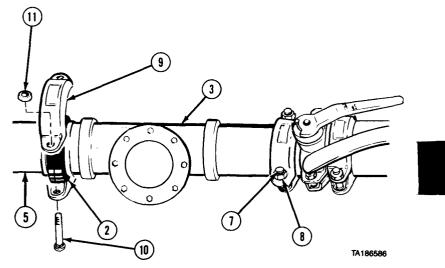
- (3) Push coupling gasket (1) on end of V3 suction line valve (4) so that ends of strainer (3) and V3 suction line valve are covered.
- (4) Install two coupling halves (6) on coupling gasket (1) with two screws (7) and nuts (8). Do not tighten.



CAUTION

Do not pinch or pull coupling gaskets off-center during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Push coupling gasket (2) on end of pipe (5) so that ends of strainer (3) and pipe are covered.
- (6) Install two coupling halves (9) on coupling gasket (2) with two screws (10) and nuts (11). Do not tighten.
- (7) Alternately tighten screws (7 and 10) and nuts (8 and 11).
- f. Follow-on Maintenance.
 - (1) Prepare tanker for operation (TM 9-2320-279-10).
 - (2) Recirculate fuel (TM 9-2320-279-10).
 - (3) Check line strainer assembly for leaks.



25-38. CAP AND CABLE REMOVAL/INSTALLATION.		
This task covers: a. Removal b. Installation	c. Follow-on Maintenance	
INITIAL SETUP		
Models M978	References None	
Test Equipment None	Equipment Condition	
	TM or Para Condition Description	
Special Tools None	TM 9-2320-279-10 Pump module rear doors opened.	
Supplies	Special Environmental Conditions None	
None		
Personnel Required	General Safety Instructions No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.	
MOS 63S, Heavy wheel vehicle mechanic		

a. Removal.

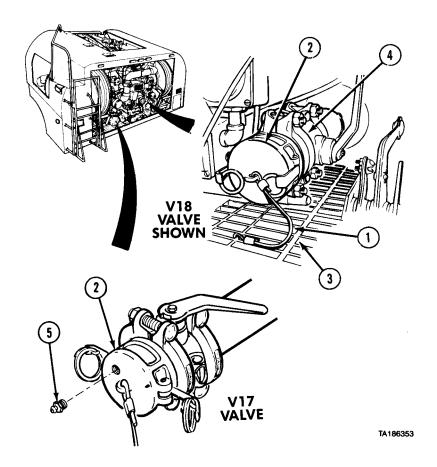
WARNING

- Make sure V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, and V11 FLOW VALVE are closed before removing caps. Spilled fuel from open valves can cause serious fires and death or injury to personnel.
- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

NOTE

Dust caps and cables on V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, V11 FLOW VALVE, two servicing hoses, and vapor recovery system are removed the same way.

- (1) Remove cable (1) from cap (2) and grating (3).
- (2) Remove cap (2) from valve (4).



NOTE

Do step (3) for V17 GRAVITY VALVE dust cap only.

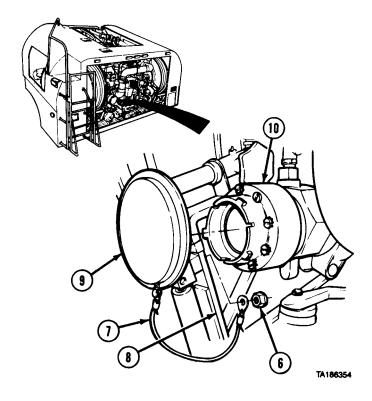
(3) Remove vacuum release (5) from cap (2).

25-38. CAP AND CABLE REMOVAL/INSTALLATION (CONT).

NOTE

Do steps (4) and (5) for V2 bottom load adapter dust cap only.

- (4) Remove locknut (6) and cable (7) from H1 REEL mount (8).
- (5) Remove cap (9) from V2 bottom load adapter (10).

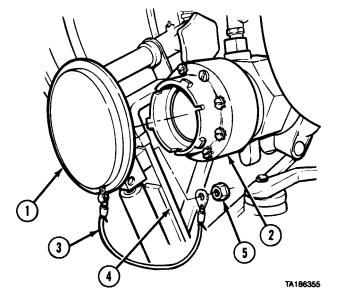


b. Installation.

NOTE

Do steps (1) and (2) for V2 bottom load adapter dust cap only.

- (1) Install cap (1) on V2 bottom load adapter (2).
- (2) Install cable (3) on H1 REEL mount (4) with locknut (5).



NOTE

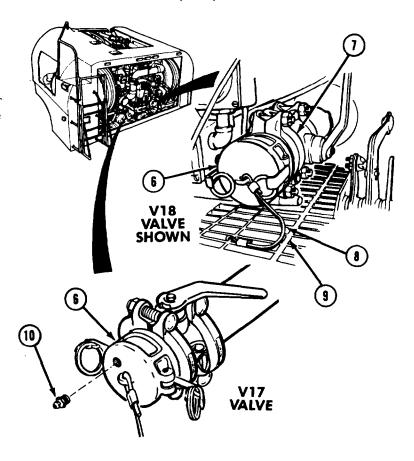
Dust caps and cables for V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, V11 FLOW VALVE, two servicing hoses, and vapor recovery system are install the same way.

- (3) Install cap (6) on valve (7).
- (4) Install cable (8) on cap (6) and grating (9).

NOTE

Do step (5) for V17 GRAVITY VALVE dust cap only.

- (5) Install vacuum release (10) in cap (6).
- *c. Follow-on Maintenance.* Close pump module rear doors (TM 9-2320-279-10).



25-39. DROP TUBE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Inspection

d. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

None

Special Tools

None

Supplies

Grease, Item 23.2, Appendix ${\bf C}$

Locking compound, Item 16.1, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description
Para 16-49 Condition Description
Tank filler lid removed.

Special Environmental Conditions

None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of ve-

hicle.

WARNING

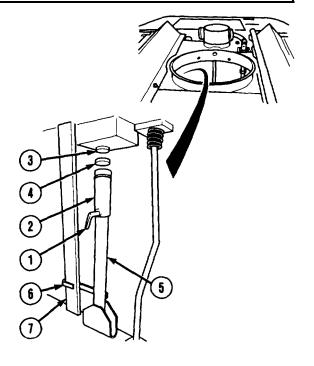
- Before entering tank, be certain to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.
- No smoking, flame, sparks, or hot or glowing objects within 50 ft (15 m) of vehicle.

NOTE

Some tanks have pipes permanently welded. On some tanks the pipe is removable.

a. Removal.

- (1) Loosen setscrew (1).
- (2) Loosen end fitting (2) until it does not contact return port (3).
- (3) Remove and discard seal (4).
- (4) Position tube (5) to unhook bracket (6) from tank brace (7).
- (5) Remove drop tube (5).



b. Installation.

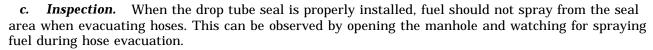
NOTE

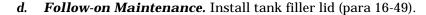
- On some tanks, there is no pipe extending from the return port. On these tanks, install seal into end fitting.
- Some tanks have pipes permanently welded. On some tanks the pipe is removable.
- (1) Apply grease to seal (1) and install over return port (2).
- (2) Position drop tube (3) inside tank (4) so hook bracket (5) is around brace (6).

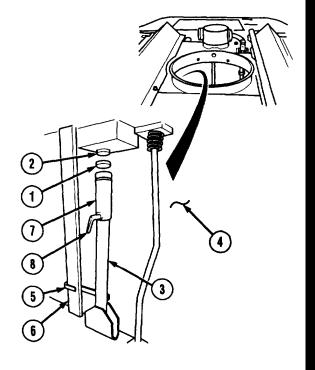
CAUTION

Do not overtighten end fitting or seal damage will result.

- (3) Turn end-fitting (7), first by hand, then using a pipe wrench until seal (1) is squeezed out between return port (2) and end-fitting (7).
- (4) Apply thread locking compound to set screw threads (8) and tighten.







25-40. HOSE REEL CRANK STOWAGE HARDWARE REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Models M978

Test Equipment None

Special Tools None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Pam Condition Description

None

Special Environmental Conditions

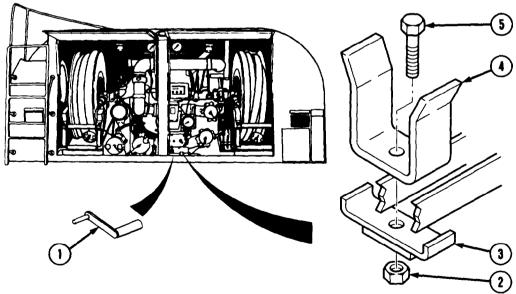
None

General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within $50\ \text{ft}\ (15\ \text{m})$ of

vehicle.

a. Removal.



- (1) Remove hose reel crank (1) from stowage.
- (2) Remove nut (2), mending plate (3), clip (4), and bolt (5).

b. Installation

- (1) Install clip (4) and mending plate (3) with bolt (5) and nut (2).
- (2) Install hose reel crank (1) in stowage.

M978 Tanker Maintenance Instructions (Cont)

25-41. VAPOR RECOVERY TEST

This task covers:

a. Test Setup

b. Test Operating Procedure

c. Test Cleanup

d. Follow-on Maintenance

INITIAL SETUP

Models

M978

Test Equipment

Manometer

Air Regulator (0-3 psi Maximum Range)

Four' in. Camlock Test Cover

(Drilled and tapped for 3/4-in. tee fitting)

Vapor Recovery Kit

(Eastern Technologies, P/N 45D016)

Supplies

Ties, cable, plastic, Item 52, Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

California Air Resources Board Certification and Test Procedures for Vapor Recovery Systems of

Gasoline Delivery Tanks.

Equipment Condition

TM or Para Condition Description Tank and piping drained. Para 25-3 Filter separator drained. Para 23-4

Special Environmental Conditions

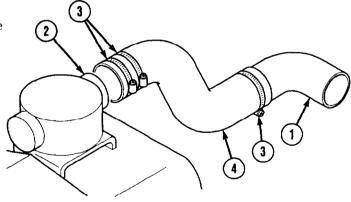
None

General Safety Instructions

No smoking, flame, sparks and hot or glowing objects within 50 ft (15 m) of vehicle.

a. Test Setup.

- Install vapor recovery kit as follows:
 - Adjust 90-degree elbow (1) on vapor recovery pipe in rear module forward towards top vent valve boot.
 - (b) Install 3.5-in. metal connector (2) into boot opening.
 - Slide three clamps (3) over (c) connector and boot.
 - (d) Install molded rubber vapor tube (4) onto 90-degree elbow and 3.5 in. metal connector.
 - (e) Position and tighten three clamps (3).
- Install 4 in. camlock cover (5), prefitted (2) with manometer and air regulator, to end of vapor recovery pipe (rear module).



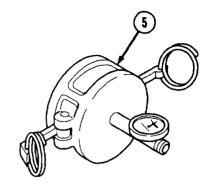
M978 Tanker Maintenance Instructions (Cont)

2541. VAPOR RECOVERY TEST (CONT).

- (3) Place V6 fuel-defuel valve in "fuel" position.
- (4) Locate V10 bottom load valve beneath tank. Turn and hold lever open, thus opening top vent valve. Secure lever in open position using tiewraps or wire.

CAUTION

Do not allow more than 3 psi pressure in M978 tank. Damage to tank may result.



NOTE

The V10 bottom load valve lever shall be released after completion of first part of test operating procedure.

b. Test Operating Procedure. Refer to test operating procedure documented in: CERTIFICATION AND TEST PROCEDURES FOR VAPOR RECOVERY SYSTEMS OF FUEL DELIVERY TANKS.

c. Test Cleanup.

WARNING

During pressure tests, ensure air pressure is drained to 0 psi (0 kPa) before taking off any components. If pressure is not released, plates or line could blow off and harm personnel. Do not drain air from tank with any part of body in air spray path. Skin embolisms and/or debris in eyes can occur from released pressure.

- (1) Reduce tank pressure to atmosphere pressure at 4 in. camlock test cover (5).
- (2) Remove 4 in. camlock test cover (5) and reinstall quick disconnect cap.
- (3) Remove vapor recovery test kit and reposition 90-degree elbow to original position.
- d. Follow-on Maintenance. None.

END OF TASK

CHAPTER 26 CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT MAINTENANCE

Contents	Para	Page
General	26-1	26-1
M-8 Chemical Alarm Kit Removal/Installation	26-2	26-1
M-13 Decontamination Unit Removal/Installation	26-3	26-11
Gas Particulate Filter Unit (GPFU) Removal/Installation	26-4	26-14

Section I. INTRODUCTION

26-1. GENERAL. This chapter contains maintenance instructions for removing and installing chemical, biological, and radiological (CBR) components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

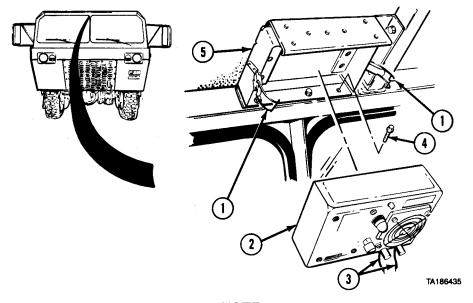
Section II. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT

Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions

26-2. M-8 CHEMICAL ALARM KIT REMOVA	L/INSTALLATION.
This task covers: a. Removal b. Installation	c. Follow-on Maintenance
INITIAL SETUP	
Models All	References TM 3-6665-225-12
Test Equipment	Equipment Condition
None	TM or Para Condition Description
Special Tools	Para 7-91 Batteries disconnected.
None	Special Environmental Conditions
Supplies	None
Tags, identification, Item 48, Appendix C	General Safety Instructions
Personnel Required	None
MOS 63S, Heavy wheel vehicle mechanic	

26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT)

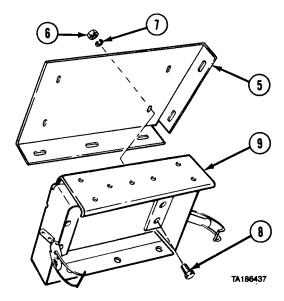
a. Removal.



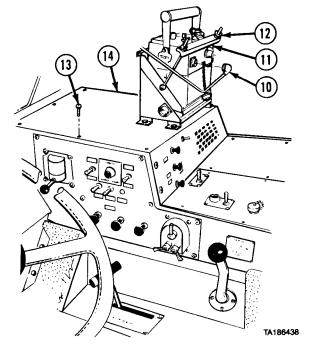
NOTE

Refer to TM 3-6665-225-12 for further information on the M-8 chemical alarm.

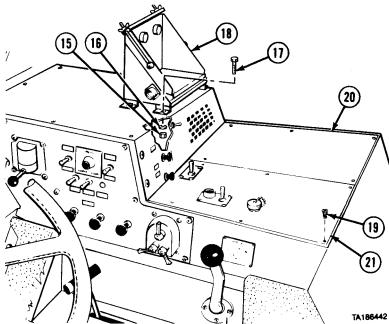
- (1) Loosen two clamps (1) and remove alarm (2).
- (2) Disconnect two wires (3) from alarm (2).
- (3) Remove five screws (4) and bracket (5).
- (4) Remove four nuts (6), lockwashers (7), screws (8), and hanger (9) from bracket (5).



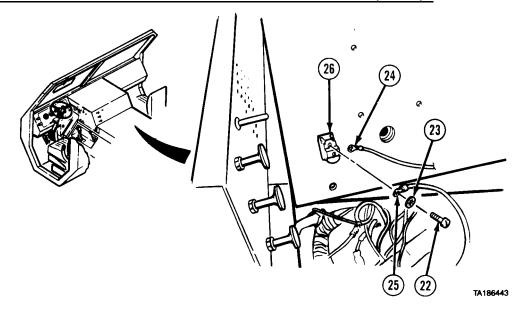
- (5) Disconnect connector (10) from detector (11).(6) Loosen two wingnuts (12) and remove
- detector (11).
- (7) Remove eight screws (13) and lift heater compartment cover (14).



- (8) Remove four nuts (15), lockwashers (16), screws (17), and detector mount (18).
- (9) Remove 11 screws (19) and lift heater compartment covers (20 and 21).



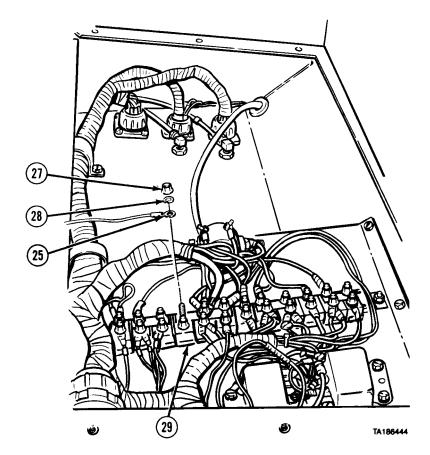
26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).



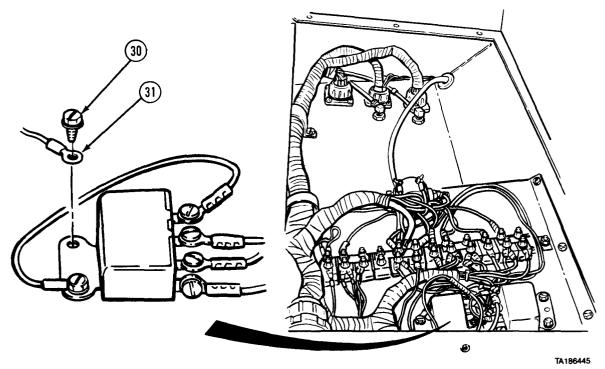
NOTE

Tag and mark wires before disconnecting.

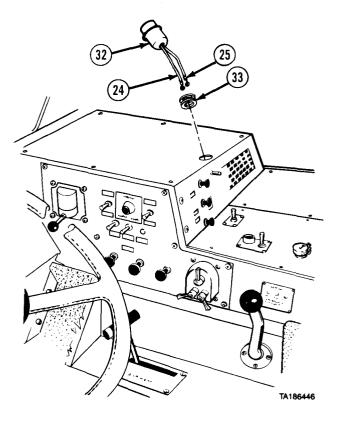
- (10) Remove two screws (22) and lockwashers (23). Disconnect wire (24) and ground wire (25) from switch (26).
- (11) Remove nut (27) and lockwasher (28). Remove ground wire (25) from circuit breaker No. 4 (29).





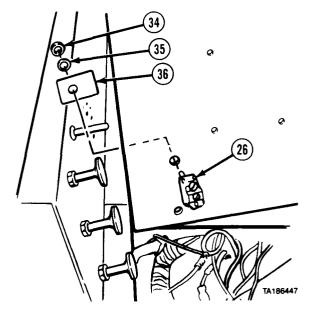


- (12) Remove screw (30) and ground wire (31).
- (13) Pull connector (32), wire (24), and ground wire (25) through grommet (33). (14) Remove grommet (33).

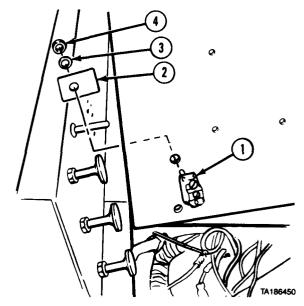


26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).

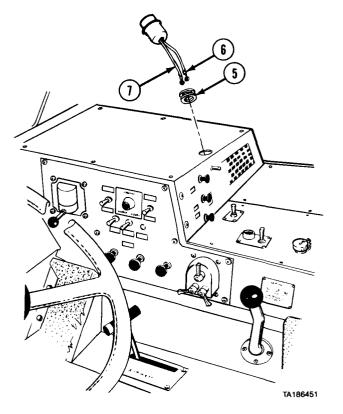
(15) Remove nut (34), washer (35), data plate (36), and switch (26).



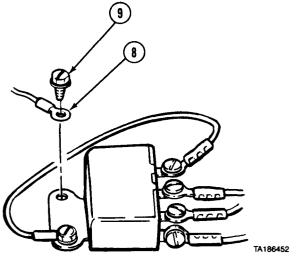
b. Installation. (1) Install switch (1) and data plate (2) with washer (3) and nut (4).



- (2) Install grommet (5).(3) Install ground wire (6) and wire (7) through grommet (5).

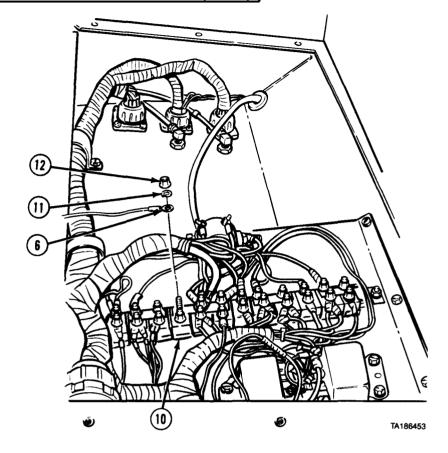


(4) Install ground wire (8) with screw (9).

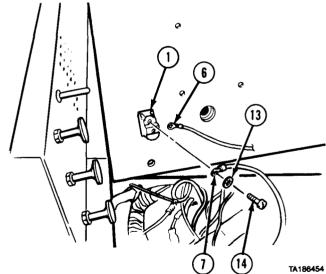


26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).

(5) Install ground wire (6) on circuit breaker No. 4 (10) with lockwasher (11) and nut (12).

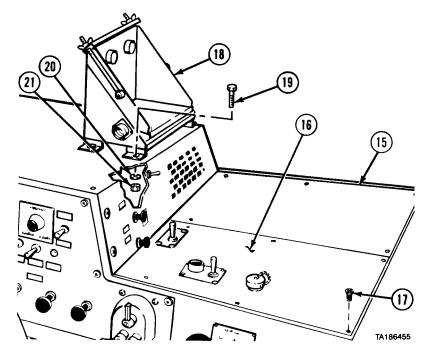


(6) Install ground wire (6) and wire (7) on switch (1) with two lockwashers (13) and screws (14).



- (7) Install two heater compartment covers (15 and 16) with 11 screws (17)
- and 16) with 11 screws (17).

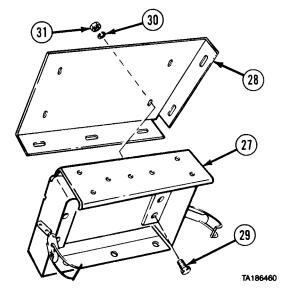
 (8) Install detector mount (18) with four screws (19), lockwashers (20), and nuts (21).



- (9) Install heater compartment cover (22) with eight screws (23).
- (10) Install detector (24) and tighten two wingnuts (25).
- (11) Connect connector (26) to detector (24).

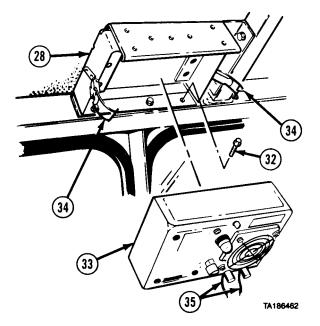
26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).

(12) Install hanger (27) on bracket (28) with four screws (29), lockwashers (30), and nuts (31).



- (13) Install bracket (28) with five screws (32).
- (14) Install alarm (33) and tighten two clamps (34).
- (15) Connect two wires (35) to alarm (33).
- c. Follow-on Maintenance.
 - (1) Complete chemical alarm installation (TM 3-6665-225-12).
 - (2) Connect batteries (para 7-91).

END OF TASK



26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION. This task covers: a. Removal c. Follow-on Maintenance b. Installation INITIAL SETUP Models References All TM 3-4230-214-12&P Equipment Condition Test Equipment None TM or Para Condition Description Special Tools TM 9-2320-279-10 Shut off engine. None Special Environmental Conditions Supplies None None General Safety Instructions Personnel Required None

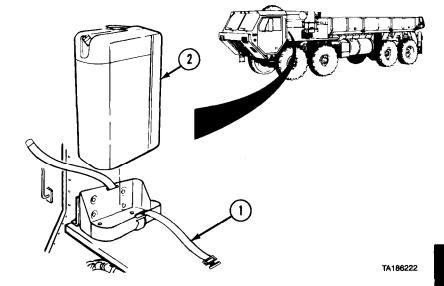
a. Removal.

NOTE

MOS 63S, Heavy wheel vehicle mechanic

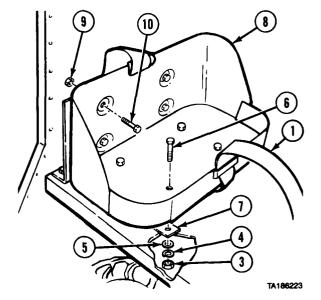
Refer to TM 3-4230-214-12&P for further information on the M-13 decontamination unit.

(1) Loosen strap (1) and remove decontamination unit (2).

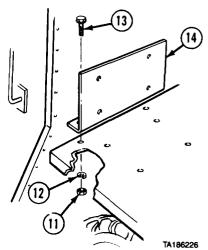


26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION (CONT).

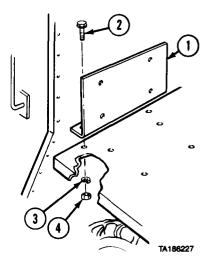
- (2) Remove four nuts (3), lockwashers (4), washers (5), screws (6), and two spacers (7) from carrier (8).
- (3) Remove four nuts (9), screws (10), and carrier (8).
- (4) Remove strap (1) from carrier (8).



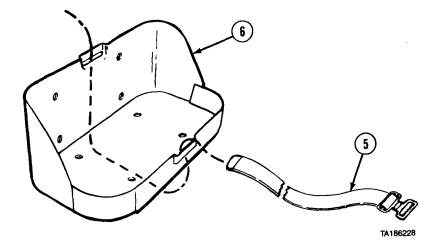
(5) Remove two nuts (11), lockwashers (12), screws (13), and bracket (14).



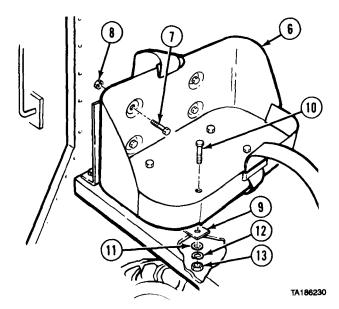
- b. Installation.
 - (1) Install bracket (1) with two screws (2), lockwashers (3), and nuts (4).



(2) Install strap (5) through carrier (6).



- (3) Install carrier (6) with four screws (7), and nuts (8). Do not tighten.(4) Install two spacers (9), four screws (10),
- (4) Install two spacers (9), four screws (10), washers (11), lockwashers (12), and nuts (13).
- (5) Tighten screws (7 and 10).

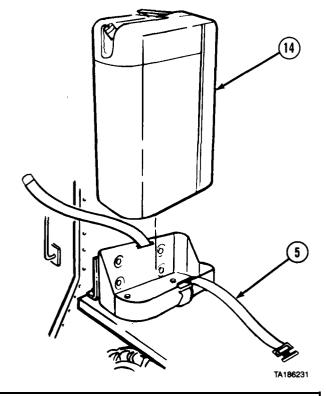


26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION (CONT).

(6) Install decontamination unit (14) and tighten strap (5).

c. Follow-on Maintenance. None.

END OF TASK



26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION.

This task covers:

a. Removal

b. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models

All

Test Equipment

None

Special Tools

None

Supplies

Tags, identification, Item 48, Appendix C Compound, sealing, pipe thread, Item 18,

Appendix C

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

References

TM 3-220 TM 10-277 **Equipment Condition**

TM or Para

Condition Description

Para 7-91

Batteries disconnected.

Special Environmental Conditions

Contaminated filters shall be placed in double-lined plastic bags, moved swiftly away from worksite, temporarily stored, and disposed of in accordance with local SOP.

Decontamination operations shall be performed according to TM 3-220.

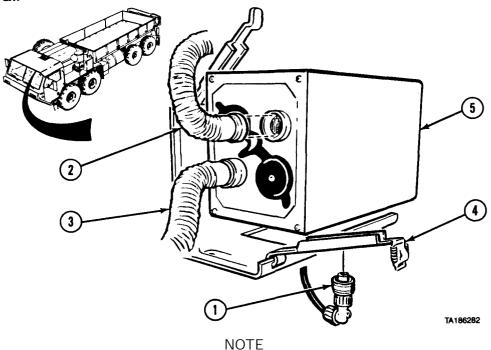
General Safety Instructions

After nuclear, biological, or chemical exposure of vehicle, air filter shall be handled with extreme caution. Wear protective clothing during this operation (TM 10-277).

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with TM 10-277. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure radiation prior to filter removal to determine extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with TM 3-220 and local SOP.

a. Removal.

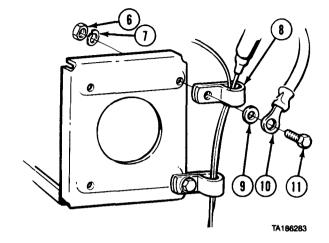


Tag and mark connectors, hoses, and wires before removal.

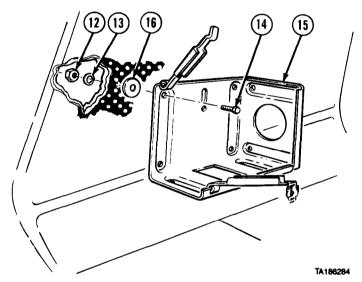
- (1) Disconnect connector (1).
- (2) Disconnect hoses (2 and 3).
- (3) Loosen clamp (4) and remove filter (5).

26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).

(4) Remove two nuts (6), lockwashers (7), cushion clip (8), washers (9), ground wire (10), and two screws (11).



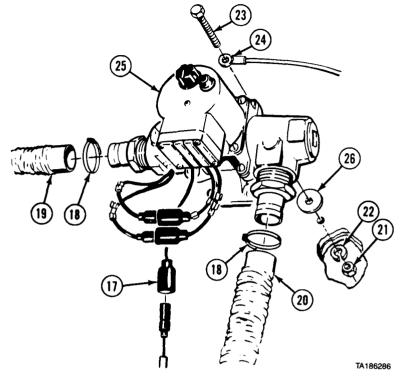
(5) Soldier A removes four nuts (12) and lockwashers (13) while Soldier B holds and removes four screws (14), bracket (15), and four washers (16).



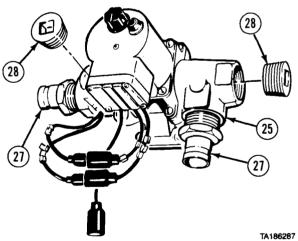
NOTE

Right and left heaters are removed in a similar manner.

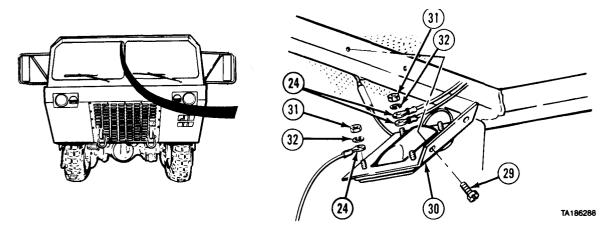
- (6) Disconnect wire (17).
- (7) Loosen two clamps (18). Remove hoses (19 and 20). Remove clamps.
- (8) Soldier A removes four nuts (21) and lockwashers (22) while Soldier B holds and removes four screws (23), ground wire (24), heater (25), and four washers (26).



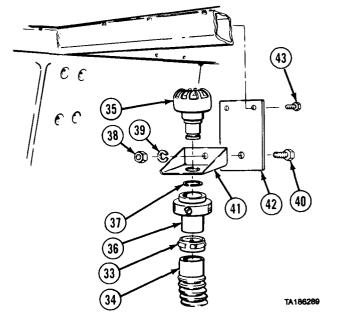
- (9) Remove two fittings (27) from heater (25).
- (10) Remove two plugs (28).



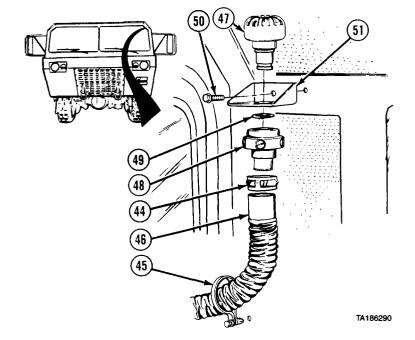
26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT)



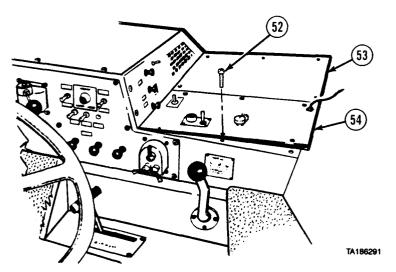
- (11) Remove two screws (29) and domelight bracket (30).
- (12) Remove two nuts (31) and lockwashers (32). Remove three ground wires (24).
- (13) Loosen clamp (33) and remove hose (34). Remove clamp.
- (14) Remove valve (35), connector (36), and retaining ring (37).
- (15) Remove nut (38), lockwasher (39), screw (40), and hanger (41) from bracket (42).
- (16) Remove two screws (43) and bracket (42).



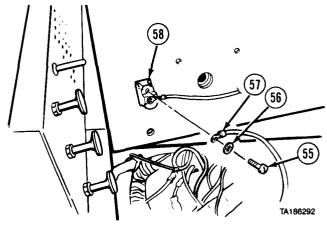
- (17) Loosen clamp (44) and remove clip (45) and hose (46). Remove clamp.
- (18) Remove valve (47), connector (48), and retaining ring (49).
- (19) Remove screw (50) and hanger (51).



(20) Remove 11 screws (52) and lift heater compartment covers (53 and 54).

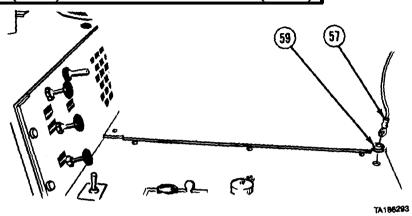


- (21) Remove screw (55) and lockwasher (56).
- (22) Remove wire (57) from gas particulate switch (58).

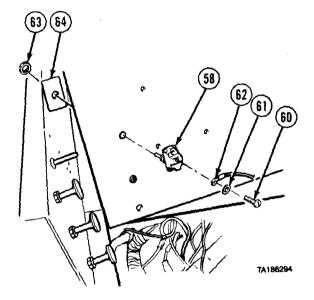


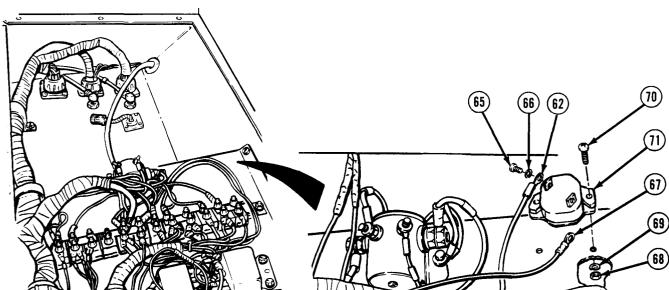
26-4. Gas particulate filter unit (GPFU) removal/installation (CONT).

(23) Pull wire (57) through grommet (59) and remove grommet.

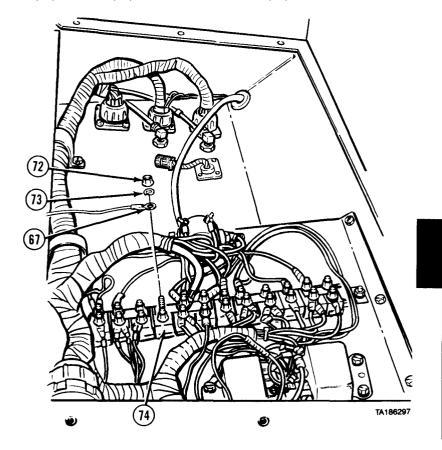


- (24) Remove screw (60), lockwasher (61), and wire (62) from gas particulate switch (58). (25) Remove nut (63), data plate (64), and gas
- particulate switch (58).



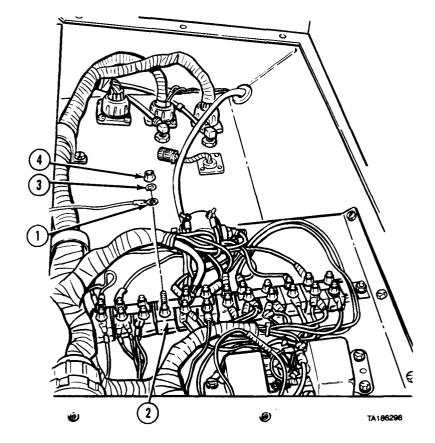


- (26) Remove two screws (65), lockwashers (66), and two wires (62 and 67).
- (27) Remove two nuts (68), lockwashers (69), screws (70), and circuit breaker (71).
- (28) Remove nut (72), lockwasher (73), and wire (67) from circuit breaker No. 4 (74).

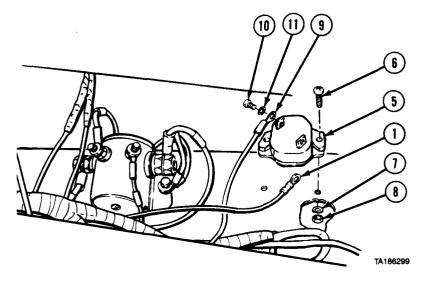


26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).

- b. Installation.
 - (1) Install wire (1) on circuit breaker No. 4 (2) with lockwasher (3) and nut (4).

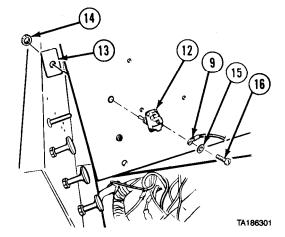


- (2) Install circuit breaker (5) with two screws (6), lockwashers (7), and nuts (8).
- (3) Install wires (1 and 9) with two screws (10) and lockwashers (11).

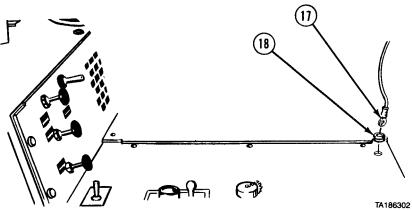


(4) Install gas particulate switch (12) and data plate (13) with nut (14).

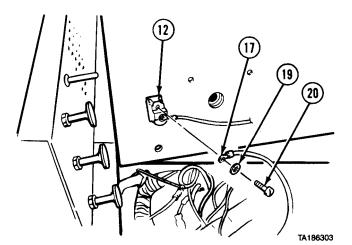
(5) Install wire (9) on gas particulate switch (12) with lockwasher (15) and screw (16).



(6) Pull wire (17) through grommet (18). Install grommet.

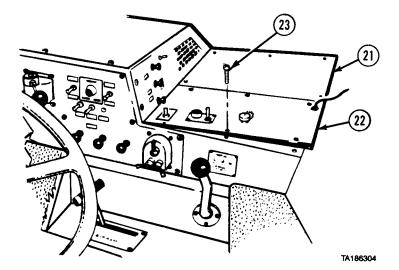


(7) Install wire (17) on gas particulate switch (12) with lockwasher (19) and screw (20).

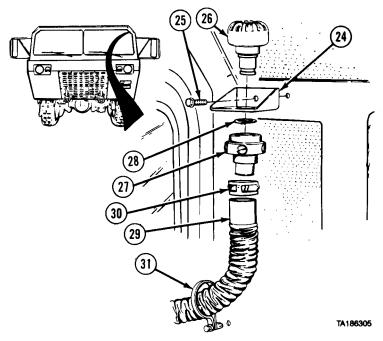


26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).

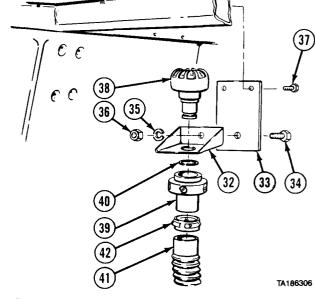
(8) Install heater compartment covers (21 and 22) with 11 screws (23).



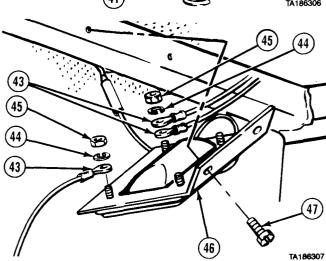
- (9) Install hanger (24) with screw (25).
- (10) Install valve (26) and connector (27) with retaining ring (28).
- (11) Install hose (29) with clamp (30) and clip (31).



- (12) Install hanger (32) on bracket (33) with screw (34), lockwasher (35), and nut (36).
- (13) Install bracket (33) with two screws (37).
- (14) Install valve (38) and connector (39) with retaining ring (40).
- (15) Install hose (41) with clamp (42).



- (16) Install three ground wires (43) with two lockwashers (44) and nuts (45).
- (17) Install domelight bracket (46) with two screws (47).



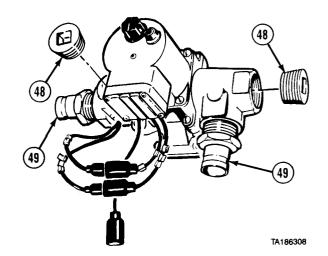
WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

NOTE

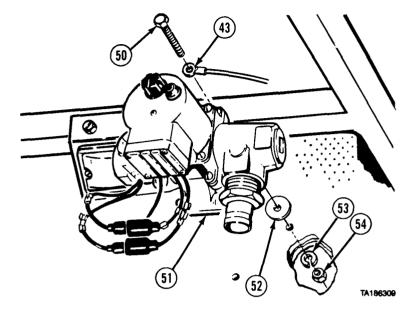
Right and left heaters are installed in a similar manner.

- (18) Apply pipe thread sealing compound and install two plugs (48).
- (19) Apply pipe thread sealing compound and install two fittings (49).

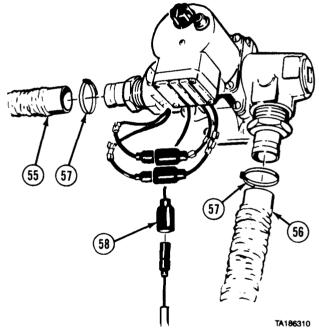


26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).

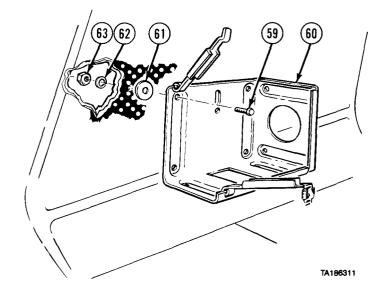
(20) Soldier A installs and holds four screws (50), ground wire (43), heater (51), and four washers (52) while Soldier B installs four lockwashers (53) and nuts (54).



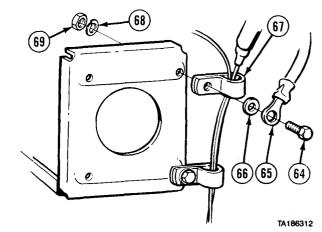
- (21) Install hoses (55 and 56) with two clamps (57).
- (22) Connect wire (58).



(23) Soldier A installs and holds four screws (59), bracket (60), and four washers (61) while Soldier B installs four lockwashers (62) and nuts (63).

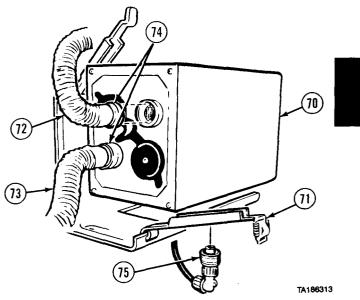


(24) Install two screws (64), ground wire (65), two washers (66), cushion clip (67), lockwashers (68), and nuts (69).



- (25) Install filter (70) and tighten clamp (71).
- (26) Connect hoses (72 and 73) and tighten two clamps (74).
- (27) Connect connector (75).
- c. Follow-on Maintenance.
 - (1) Connect batteries (para 7-91).
 - (2) Check operation of gas particulate filter unit (TM 9-2320-279-10).

END OF TASK



CHAPTER 27 M983 AUXILIARY ELECTRICAL POWER SYSTEM MAINTENANCE

Contents	Para	Page
General	27-1	27-1
Generator Set Removal/Installation (M983)	27-2	27-1
Power Distribution Box and Bracket Removal/Installation (M983)	27-3	27-3

Section I. INTRODUCTION

27-1. GENERAL. This chapter contains maintenance instructions for removing and installing auxiliary electrical power system components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

Section II. AUXILIARY ELECTRICAL POWER SYSTEM

M983 Auxiliary Electrical Power System Maintenance Instructions

27-2. GENERATOR SET REMOVAL/INSTALLAT	ION (M983).
This task covers: a. Removal b. Installation	c. Follow-on Maintenance
INITIAL SETUP	
Models M983	References TM 5-6115-465-12
Test Equipment	Equipment Condition
None	TM or Para Condition Description
Special Tools None	TM 9-2320-279-10 Shut off engine. Para 14-11 Guardrail assembly removed.
Supplies	Para 27-3 Power distribution box removed.
None Personnel Required	Special Environmental Conditions None
MOS 63S, Heavy wheel vehicle mechanic (2)	General Safety Instructions None

M983 Auxiliary Electrical Power System Maintenance Instructions (Cont)

27-2. GENERATOR SET REMOVAL/INSTALLATION (M983) (CONT).

a. Removal.

NOTE

Refer to TM 5-6115-465-12 for further information on the generator set.

- (1) Attach sling and suitable lifting device to generator (1).
- (2) Remove eight nuts (2) and screws (3).

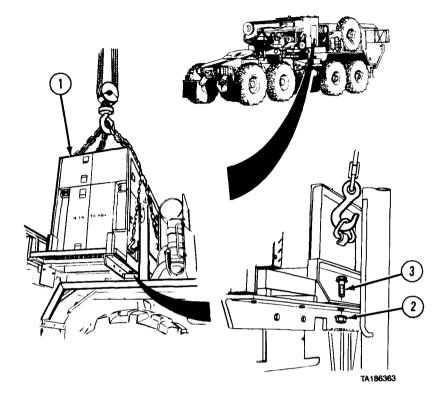
WARNING

Keep out from under heavy equipment. Falling equipment can cause serious injury or death.

- (3) Soldier A guides generator (1) from vehicle to work area while Soldier B operates lifting device.
- (4) Disconnect sling and lifting device.

b. Installation.

(1) Attach sling and suitable lifting device to generator (1).



WARNING

Keep out from heavy equipment. Falling equipment can cause serious injury or death.

- (2) Soldier A guides generator (1) to vehicle in position shown while Soldier B operates lifting device.
- (3) Install eight screws (3) and nuts (2).
- (4) Disconnect sling and lifting device.
- c. Follow-on Maintenance.
 - (1) Install guardrail assembly (para 14-11).
 - (2) Install power distribution box (para 27-3).

END OF TASK

M983 Auxiliary Electrical Power System Maintenance Instructions (Cont)

27-3. POWER DISTRIBUTION BOX AND BRACKET REMOVAL/INSTALLATION (M983).

This task covers:

a. Removalb. Installation

c. Follow-on Maintenance

INITIAL SETUP

Models M983

Test Equipment

None

Special Tools

None

Supplies None

Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

References

None

Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

TM 5-6115-465-12 Power distribution box

disconnected from generator.

Special Environmental Conditions

None

General Safety Instructions

None

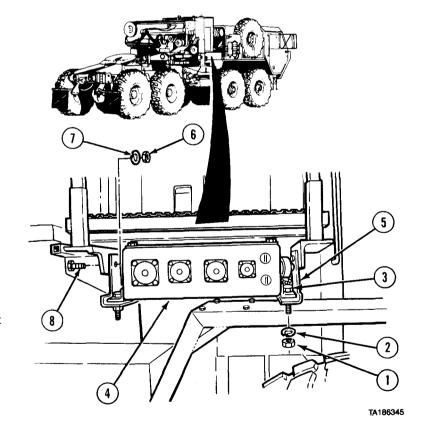
a. Removal.

- (1) Remove eight nuts (1), lockwashers (2), and screws (3).
- (2) Remove power distribution box (4) from power distribution box brackets (5).

NOTE

Both sides of power distribution box brackets are removed and installed the same way.

- (3) Remove two nuts (6), lockwashers (7), and screws (8).
- (4) Remove power distribution box bracket (5).
- b. Installation.
 - (1) Position power distribution box bracket (5).
 - (2) Install power distribution box bracket (5) with two screws (8), lockwashers (7), and nuts (6).
 - (3) Install power distribution box (4) on power distribution box brackets (5).
 - (4) Install eight screws (3), lockwashers (2), and nuts (1).



c. Follow-on Maintenance. Connect power distribution box to generator (TM 5-6115-465-12).

END OF TASK

APPENDIX A REFERENCES

A-1. SCOPE This appendix lists all forms, field manuals, technical manuals, and other pureferenced in this manual. Also, those publications that should be consulted for additional informative operations are listed.	
A-2. PUBLICATION INDEXES. The following indexes should be consulted frequently for latest change sions and for new publications relating to material covered in this technical manual.	es or revi-
Consolidated Index of Army Publications and Blank Forms	m 310-1

A-3.FORMS The following forms pertain to this manual. Refer to DA Pamphlet 310-1 for index of blank

Equipment Inspection and Maintenance Worksheet (DA Form 2404).

Maintenance Beguest (DA Form 2407).

Recommended Changes to DA Publication and Blank Forms (DA Form 2028,2028-2).

Refer to TM 38-750, The Army Maintenance Management Systems (TAMMS), for instructions for the use of maintenance forms pertaining to this material.

A-4. OTHER PUBLICATIONS. The following publications contain information pertinent to the M977 series vehicles and associated equipment.

First Aid for SoldiersFM 21-11

a. Safety.

forms.

Safety Inspection and Testing of Lifting Devices	TB 43-0142
Security of Tactical Wheeled Vehicles	
b. Vehicle Operation.	
Operator's Manual, M977 Series Vehicles	
Army Motor Transport Units and Operations	FM 55-30
Manual for the Wheeled Vehicle Driver	FM 21-305
Vehicle Recovery Operations	FM 20-22
Deepwater Fording of Ordnance Material	TM 9-238
Petroleum Tank Vehicle Operations	FM 10-71
c. Cold Weather Operation and Maintenance.	
Basic Cold Weather Manual	FM 31-70
Northern Operations	
Operations and Maintenance of Ordnance Material in Extreme Cold Weather (0 degrees to	
-65 degrees F)	FM9-207
d. Maintenance and Repair.	
Lubrication Order for M977 Series Vehicles	. LO 9-2320-279-12
Organizational Repair Parts and Special Tools List for M977 Series Vehicles	

Direct Support and General Support Maintenance Repair Parts and Special Tools List

Operator's, Unit, Direct Support, and General Support Maintenance Manual for Care,

Direct Support and General Support Maintenance with Repair Parts and Special

References (Cont)

A-4. OTHER PUBLICATIONS (CONT)

Repair of Tents. Canvas. and Webbing
Description, Use, Bonding Techniques, and Properties of Adhesives
Metal Body Repair and Related Operations
Welding Theory and Application
Inspection, Care, and Maintenance of Antifriction Bearings
Ordnance Tracked and Wheeled Vehicle Hull and Chassis Wiring, Repair of
Care and Use of Handtools and Measuring Tools
Charging System Troubleshooting (The Easy Way)
for Lead-Acid Storage Batteries
Rigging
e. Decontamination.
Chemical, Biological, and Radiological (CBR) Decontamination
f. Maintenance of Auxiliary Equipment and Special Purpose Kits.
Operator, Organizational. Direct Support, and General Support Maintenance Manual
Including Repair Parts and Special Tools List for Machine Gun Mounts
Operator and Organizational Maintenance Manual Including Repair Parts and
Special Tools List for Decontamination Apparatus
Operator and Organizational Maintenance Manual Generator Set
LO 5-6115-465-12
g. General.
Hand Receipt Manual for M977 Series Vehicles
Procedures for Destruction of Tank-Automotive Equipment to Prevent Use
Camouflage
h. Warranty.
Warranty Technical Bulletin for M977 Series Vehicles

APPENDIX B MAINTENANCE ALLOCATION CHART FOR

M977 SERIES VEHICLES

Section I. INTRODUCTION

- **B-1. GENERAL** This Maintenance Allocation Chart designates responsibility for performance of maintenance repair functions at specified maintenance levels.
 - a. Section I is a general explanation and definition of terms.
- **b.** Section II shows the maintenance level responsible and estimated work measurement time for specific functions.
- **c.** Section III lists common tool sets and the special tools. test and support equipment required for each maintenance function shown in Section II.
 - d. Section IV lists the remarks referenced in Section II.

B-2. EXPLANATION OF COLUMNS IN SECTION II.

- **a.** Column 1, Group number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.
- **b.** Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies. and modules for which maintenance is authorized.
- c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 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 or category of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of man-hours specified by the "work time" figure represents the average time, required to restore an item (assembly, subassembly, component. module. end item. or system) to a senviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting 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 chart. This figure does not include any time for performance of preliminary tasks listed elsewhere in the MAC e.g., removal of engine under repair of fuel pump when the engine is listed separately in the MAC. The symbol designations for the various maintenance categories remain as follows:
 - C Operator/Crew
 - O Organizational Maintenance
 - F Direct Support Maintenance
 - H General Support Maintenance
- **e.** Column 5, Tools and Equipment. Column 5 specifies the code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated functions.
 - f. Column 6, Remarks. Column 6 references any amplifying remarks.

Maintenance Allocation Chart (Cont)

B-3. The maintenance functions are defined as follows:

- a. **Inspect.** To closely and critically examine (e.g., sight, sound, or feel) an item to detect errors, flaws, wear, etc., and to determine its condition and serviceability by comparing its physical/mechanical/electrical characteristics within established standards.
- **b. Test.** To verify serviceability and detect incipient failure by measuring the mechanical 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 (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- **d. Adjust.** To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.
- **e. Aline.** 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 comparison of two instruments, one of which is a certified standard of know accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- **g. Install.** The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) for an unserviceable counterpart.
- **h. Repair.** The application of maintenance services (inspect, test, service, adjust, aline, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), item, or system.
- i. *Overhaul*, That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.
- *j. 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.
- k. Replace. To remove an unserviceable item and install a serviceable counterpart in its place.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group	(2)	(3) Maintenance	M	aintena	(4) ance Le	vel	(5) Tools &	(6)
Number	Component Assemby	Function	С	0	F	Н	Equipment	Remarks
01	ENGINE							
0100	Engine Assembly	Inspect Service Replace Repair	0.4	1.0	16.0	65.4	3 3, 5 3, 4, 5, 8, 10, 50, 51, 124, 139, 140	
0101	Engine Block	Replace Repair				37.7 3.0	3,5 5, 11, 12, 13, 14,15	
	Cylinder Head	Replace Repair			6.8	5.0	3, 5, 17, 18, 19 3, 5, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	
0102	Crankshaft and Main Bearing Crankshaft Pulley Crankshaft Cover/Front Seal	Replace Repair Replace Replace			0.8 4.5	6.8	3,5 3,5,121 3,5 3,5	
0103	Flywheel Housing and Rear Oil Seal	Replace			1.8		3, 5, 31, 31.1, 32, 32.1, 32.2, 33, 56, 122	
	Flexplate Assembly	Replace			3.0		3 ,5	
0104	Piston and Connecting Rod	Replace				4.4	3, 5, 34, 35, 36, 38,42	
0105	Rocker Cover and Gasket Rocker Arm Cam Follower/Push Rod Vibration Damper Camshaft Assembly Cam Follower Idler Gear	Repair Replace Repair Replace Repair Replace Replace Replace Replace Repair Repair Repair Repair		0.3 0.3	1.5 1.0 2.0	2.4 7.8 0.5 1.0 3.0 0.5	3, 5, 37, 39, 46 6 6 5, 19 5 3, 5 3, 5 3, 5, 40, 41 5 5 3, 5 5, 70	
0106	Oil Filter Oil Cooler Assembly Oil Pan/Gasket Oil Pump Oil Pressure Regulator/Relief Valve	Replace Replace Replace Replace Repair Replace Repair		0.9 3.0	4.0 11.4 0.2 0.2	2.0	6 16 3, 5 3, 5 5 3, 5 5 3, 5	

TM 9-2320-279-20-3

(1) Group	(2)	Maintenance	(4) Maintenance Level			vel	Tools &	(6)
Number	Component Assembly	Function	С	0	F	H	Equipment	Remarks
0108	Exhaust Manifold	Replace			1.0		3, 5	
0109	Water Pump Drive Gear Blower Accessory Drive Hub Blower Drive Support	Replace Replace Repair Replace Repair			0.5 1.0 0.8 1.2	1.6	3,5 3, 5 3, 5 3, 5 3, 5	
0112	Oil Pump Drive Gear Engine Brake Retarder Retarder Buffer Switch Assembly	Replace Adjust Replace Repair Adjust Replace			0.9 1.8 1.4 0.5 1.2	2.0	3, 5 3, 5, 60 3.5 5, 60, 61 5	
03	FUEL SYSTEM	Inspect		0.2				
0301	Fuel Injector	Adjust Test Replace Repair			0.5 1.8	1.5	47, 47.1 62, 64 4.5 5, 62, 63, 64, 65,	
	Injector Rack Control Lever	Adjust			1.0		66, 67, 68, 69 5	
0302	Fuel Pump	Replace Repair			1.3 1.0		5 3, 5, 55	
0304	Air Cleaner Assembly Air Restriction Assembly Air Filter Element Intake Ducting	Replace Inspect Replace Service Replace Replace	0.1	1.0 0.3 0.3 0.3			6 6 6 6	
0305	Blower Assembly	Replace Repair			2.0	8.0	3, 5, 57 3, 5, 42, 43, 57, 143, 144	
	Turbocharger Air Inlet Adapter	Replace Repair Replace			2.0 1.5	4.0	3, 5 5, 56, 123, 131 5	
0306	Fuel Tank Fuel Lines and Fittings Fuel Strainer	Replace Replace Service	0.1	2.0			2, 6 6	A
0308	Governor Governor Cover	Adjust Replace Repair Replace Repair			1.0 1.0 2.5 1.2 1.1		5, 59 3, 5 3, 5, 59 3, 5 3, 5	

(1) Group	(2)	 Maintenance	 Mai	(4) ntenan) ice Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
0308	Variable Low Speed Limiting Governor	Replace			1.0		5	
	Engine Stop Solenoid	Adjust		1.0			5	
	Throttle Delay	Replace Adjust Replace			1.0 0.4 0.4		5 3, 48, 49 5	
	Throttle Air Cylinder Injector Control Tube	Repair Replace Replace			0.5 0.5 0.3		5 3, 5 3, 54	
0309	Fuel Water Separator	Inspect Service Replace Repair	0.1	0.3 0.5 0.5			6 6 6	
0311	Ether Starting Aid	Inspect Replace	0.1	0.3			6	
0312	Throttle Treadle Valve	Test Replace Repair		0.2 0.8	0.5		1, 6 6 3, 5	
04	EXHAUST SYSTEM	Inspect	0.1					
0401	Muffler Assembly	Replace		2.0			6	
05	COOLING SYSTEM	Inspect Service	0.1	0.7			2, 6	
0501	Radiator	Test Replace Repair		4.0	0.2 2.6		2, 6 3, 5	
0502	Radiator Baffles Fan Shroud	Replace Replace		1.0 2.2			2 6	
0503	Thermostats Cooling System Hoses and Tubes	Replace Replace		1.0			2, 52, 53 6	A
	Aftercooler	Replace			0.9		5, 12	
0504	Water Pump	Replace Repair			1.3 0.5		3, 5 3, 5, 44, 132	
0505	Fan	Inspect Replace	0.1	1.5			6	
	Fan Clutch	Replace Repair		1.0	2.0		6 3, 5, 45, 46	
	Fan Belts	Inspect Adjust Replace	0.1	0.6 1.2			6, 16 6	
	Pulleys	Inspect Replace	0.1	1.0			6	

TM 9-2320-279-20-3

(1) Group	(2)	(3) Maintenance	Mai	(4 ntenai) nce Le	vei	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
06	ELECTRICAL							
0601	Alternator	Test Replace Repair		0.3 1.7	1.9		2 2 3, 5	
	Alternator Belts	Inspect Adjust Replace	0.1	0.6 0.7			6, 16 6	
	Voltage Regulator	Adjust Replace		0.3 0.1			2, 6 6	
0603	Starter Motor	Test Replace Repair		0.3 1.9	4.0		1 2, 6 5	
	Starter Solenoid	Replace			1.0		5	
	Starter Relay	Replace		0.2			6	
	Ignition Relay	Replace		0.2			6	
0606	High Idle Assembly (MY77, M985)	Replace Repair		1.2 0.4			6 6	
	High Idle Wire Harness (M977, M985)	Replace Repair		0.8	*		6 6, 9	A, C
	High Idle Assembly (M983)	Replace		1.2			6	
	High Idle Wire Harness (M983)	Replace Repair		1.0	*		6 6, 9	A, C
0607	Dash Panel	Inspect Replace	0.1	0.5			6	,
	Dash Panel Wire Harness	Replace		2.5			6	
	Circuit Breaker	Replace		0.3			6	
	Speedometer/Odometer	Replace		0.4			6	
	Tachometer/Hourmeter	Replace		0.4			6	
	Switches	Replace		0.2			6	
	Gages	Inspect Replace	0.1	0.5			6	
	Neutral Interlock Switch	Replace		0.5			6	
	Warning Buzzer	Inspect Replace	0.1	0.5			6	
0608	Main Junction Box (M978)	Replace Repair		1.5 0.4			6 6	
	Auxiliary Pump Junction Box (M978)	Replace Repair		$\begin{array}{c} 0.6 \\ 0.4 \end{array}$			6 6	
	Control Junction Box (M978)	Replace Repair		1.0 1.0			6 6	

Group Number	Component Assembly				nce Lev		Tools &	(6)
0608	<u>.</u>	Function	С	0	F	Н	Equipment	Remarks
	Control Box (M984E1)	Replace Repair		0.8 1.1			6 6	
	Junction Box (M983)	Replace Repair		2.0 1.0			6 6	
	Crane Wiring (M977, M985, M984E1)	Replace Repair		*	*		5 6, 9	A A, C
	Neutral Safety Switch	Adjust Replace		0.3 0.6			6 2, 6	
	Turn Signal Switch	Replace		0.5			6	
0609	Headlamp Assembly	Inspect Adjust Replace	0.1	0.5 0.2			6 6	
	Lights	Inspect Replace	0.1	0.2			6	
,	Work Lamps	Replace Repair		$0.3 \\ 0.3$			6 6	
:	strobe Light (M984E1)	Replace Repair		0.5 0.5			6 6	
0610	Fuel Level Sensor	Replace		0.5			2, 6	
;	Sending Units	Replace		0.5			6	
]	Fuel Restriction Sensor	Replace		0.3			6	
0611	Electric Horn	Replace		0.2			6	
]	Horn Relay	Replace		0.3			6	
0612	Batteries	Inspect Test Service Replace	0.1	0.3 0.3 1.0			2 2, 6 2, 6	
	Battery Box	Inspect Replace	0.1	1.4			2, 6	
0613	Engine Wiring Harness	Test Replace Repair			6.0		3, 5 3, 5 5, 9	B D A
,	Cab Wiring Harness	Test Replace Repair			12.0		3, 5 3, 5, 102 5, 9	B D A, C
,	Chassis Wiring Harness	Test Replace Repair			4.0		3, 5 3, 5, 102 5, 9	B D A, C
	Chassis/Engine Wiring Harness	Replace Repair		4.0	*		6 6, 9	D A, C

TM 9-2320-279-20-3

(1) Group	(2)	(3) Maintenance	Maintenance				(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	н	Equipment	Remarks
0613	Inter-vehicle Harness STE/ICE Wiring Harness	Test Replace Repair Test Replace Repair		* 0.1 * *	2.0		2, 6 3 2, 6 2, 6 6 2, 6	B D A B
07	Trailer Electrical Connector TRANSMISSION	Inspect Replace	1.1	0.5			6	
0705	Shift Cable Transmission Shift Control	Adjust Replace Replace Repair		0.4 1.1 0.6	1.5		6 6 2.6 3, 5	
0708	Torque Converter Stator Torque Converter Pump Torque Converter Housing Flywheel Assembly	Replace Repair Replace Repair Replace Replace Replace			1.0	2.0 0.5 2.5 0.5 1.0 2.0	2, 5 3, 5, 81 3, 5, 82, 83 3, 5 3, 5, 122, 133, 134 3, 5 3, 5, 80 *	
0710	Transmission Assembly	Repair Inspect Test Service Replace Repair	0.1	0.8	0.5 0.9 16.0	20.4	3, 5 6 3, 5 3, 5, 8, 79, 89, 124	
	Gear Unit and Main Shaft Forward Clutch	Replace Repair Replace Repair				0.5 4.0 0.3 3.5	3, 5, 74 3, 5, 72, 73, 73.1, 75 3, 5, 88 3, 5, 84, 85, 86, 87	
	Rear cover	Replace Repair				1.3 1.8	3, 5	
0713	Center Support and Second Clutch Fourth Clutch First Clutch Third Clutch and Center Support Housing	Replace Repair Replace Repair Replace Replace Repair				0.5 1.0 0.6 2.5 1.0 1.0	3, 5, 84 3, 5, 71, 91, 92	

_(1)	(2)	(3) Maintenance	Ma	(4) intenan	ce Lev	el	Tools &	(6)
Group Number	Component Assembly	Function	С	0	F	H	Equipment	Remarks
0714	Control Valve Body	Replace Repair			1.8	3.3	3, 5 3, 5	
	Lockup Cutoff Valve Body	Replace Repair				1.5 0.5	3, 5 3, 5	
	Governor	Replace			0.4		3, 5	
0721	Filter Element	Replace		0.2			2	
08	TRANSFER CASE							
0801	Transfer Case	Inspect Service Replace Repair	0.1	0.3	3.0	3, 5	6 3, 5 3, 5	
	Oil Seals	Inspect Replace	0.1	0.2			3	
	Top Input Shaft Assembly	Repair				1.0	3, 5	
	Center Shaft Assembly	Repair				1.0	3, 5	
	Lower Rear Output Shaft Assembly	Repair				1.0	3, 5	
	Lower Front Output Shaft Assembly	Repair				1.0	3, 5	
	Upper Shift Rod Assembly	Repair				0.5	3, 5	
	Lower Shift Rod Assembly	Repair				0.5	3, 5	
0803	Differential Air Chamber	Replace Repair			0.5 0.3		5 5	
	Traction Control Valve	Replace Repair		1.0	0.5		6 5	
	2-Speed Shift	Adjust		0.8			6	
	Cable	Replace		1.0			6	
0804	Lube Pump	Replace Repair			0.5	0.5	3 3	
	Breather	Inspect Replace	0.1	0.2			6	
09	PROPELLER SHAFTS							
0900	Propeller Shafts and Universal Joints	Inspect Service Replace	0.2	0.1 0.6			2, 6 2, 6	
10	FRONT AXLE							
1000	Forward and Intermediate Axles	Inspect Service Replace	0.1	0.5	3.9		6 3, 5	

(1) Group	(2)	(3) Maintenance	Mai	(4 ntenan) ice Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
1000	Axle Shafts Axle Breather	Replace Repair Inspect Service Replace	0.1	0.2 0.1	2.0 0.5		5 3, 5 6 6	
1002	Differential Carrier	Replace Repair		0.1	2.0	5.0	5, 104 3, 4, 5, 8, 56, 104, 125	
	Differential Carrier Cover Axle No. 2	Replace Repair			3.0 1.0		3, 5, 105 3, 5, 56, 105, 125	
	Input, Output, Yoke/Oil Seals	Replace			0.6		2, 5, 104, 105	
1004	Ball Socket Ball and Bushing Trunnion Bearings	Replace Replace Inspect Replace		0.4	3.2 1.8 1.0		3, 5 3, 5 3, 5	
11	REAR AXLE	Replace			1.0		3, 3	
1100	Intermediate and Rear Axles	Inspect Aline Service	0.1	0.5	2.0		3, 5 6	
	Axle Shafts Axle Breather	Replace Replace Inspect Service Replace	0.1	0.4 0.2 0.1	3.0		3, 5 6 6 6	
1102	Differential Carrier	Replace Repair				2.0 5.0	5 3, 4, 5, 8, 56, 125	
	Differential Carrier Cover Axle No. 3 Input, Output, Yoke/Oil Seals	Replace Repair Replace			3.0 1.0 0.6		5 5 3, 5, 10, 105	
12	BRAKE SYSTEMS							
1202	Brakes Brake Shoes (Front)	Inspect Adjust Replace	0.2	0.3 1.4			6 6	
	Brake Shoes (Rear)	Repair Replace Repair		1.0	1.0		5 2, 6 5	
	Camshaft and Slack Adjuster	Replace		2.4	1.0		6	

(1) Group	(2)	(3) Maintenance	 Mai	(4 ntenar) ice Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
1208	Brake Chamber (Front)	Replace		0.4			6 2, 6	
	Brake Chamber (Rear)	Repair Replace Repair		0.4 0.5	0.5		6 2, 6	
	Brake Treadle Valve	Replace Repair		1.7	0.3		6 5, 2	
	Brake Relay Valve	Replace Repair		0.6	0.8		6 5	
	Air Dryer	Inspect Service Replace	0.1	0.5 0.6	0.7		6 6	
	Spring Brake Control Valve Parking Brake Valve	Repair Replace Repair Replace		1.0 0.3 0.3	0.4		6 6 5 6 5	
	Front Service Brake Control Valve (M984E1) Air Reservoirs/Valves Air Lines and Fittings	Repair Replace Replace Replace		0.8	0.7		6 6	A A
1209	Air Compressor	Inspect Replace	0.1	0.7	3.5		2, 6 5, 128, 129	
	Air Governor	Repair Adjust Replace Repair		0.2 0.3	0.3		6 6 5	
1211	Trailer Connections	Inspect Replace Repair	0.1	0.1 0.3			6 6	
	Tractor Protection Valve	Replace Repair		0.3	0.5		6 5	
	Trailer Hand Brake Control Valve Trailer Air Supply Valve	Replace Repair Replace		0.6	0.6		6 5 6	
4.0		Repair		0.0	0.6		5	
13 1311	WHEELS Wheels with Tires	Inspect Replace Repair	0.1 0.4				2, 6, 7, 135, 136	A
	Hub, Wheel Bearings and Studs	Service Replace		1.0 2.0			137 2, 6, 93, 114, 114.1, 115, 116, 117, 118	

(1) Group	(2)	(3) Maintenance	Mai	(4 ntenar) ice Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
	Brake Drum	Inspect Replace		1.0	0.2		6	
14	STEERING SYSTEM	Inspect Service Adjust	0.2	0.5	3.0		2 3, 5	
1401	Steering Wheel Steering Column Drag Link (Each)	Replace Replace Inspect Replace Repair		0.6 0.1 1.0 0.5	0.9		2, 6 5 2, 6 2, 6	
1401	Tie rod	Inspect Replace Repair		0.1 0.2 0.5			2, 6 2, 6	
	Pitman Arm Intergear Link	Inspect Replace Inspect		0.1	3.5		5	
	90° Gear Box	Replace Replace Repair		0.1	2.5 1.5 3.0		5 5 3, 5	
1407	Steering Gear	Inspect Adjust Replace Repair		0.1	0.5 2.6 2.0		5 3, 5 3, 5	
	Slave Steering gear Steering/Tensioner Pump (M984E1)	Inspect Replace Repair Replace Repair		0.1	1.4 2.0 1.6		3, 5 3, 5	
1411	Steering System Lines and Fittings	Replace		•	2.5		3, 5	A
1413	Hydraulic Reservoir	Inspect Replace	0.1	1.0			2, 6	
1 5	Hydraulic Filter	Replace		0.2			6	
15 1501	FRAME Frame Assembly	Inspect	0.1					
	Cab Support, Rear Cab Support, Front Radiator Support Engine Supports Transmission Supports Front Crossmember Tandem Crossmember	Repair Replace Replace Replace Replace Replace Replace		1.2	3.0 3.0 3.0 2.0 3.0 6.0	*	3, 4, 5 2 3, 5 3, 5 3, 5 3, 5 3, 4, 5 3, 4, 5	A

(1) Group	(2)	(3) Maintenance	M	aintena	(4) ance Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
1501	Intermediate Crossmembers	Replace			5.0		3, 4, 5	
	Skid Plate	Replace		1.0			6	
	Rear Decking Assembly (M983)	Replace		0.4			6	
	Fifth Wheel Ramp Assembly (M983)	Inspect Service	0.1 0.1					
	Transfer Case Support Assembly	Replace Replace		0.4	3.0		6 3, 5	
	Generator Mount (M983)	Replace		2.5			2, 6	
	Right Side and Rear Catwalk (M983)	Replace		0.5			2	
1503	Pintle Hook	Inspect Service	0.1	0.1			2	
		Replace		0.4			2	
	Self-Guided Coupler	Inspect	0.1	0.4				
	(M1977-CBT)	Service		0.1			2 2	
		Replace		1.0	1.5			
		Repair		0.0	1.5		3, 5	
	Retriever Cross-Tube	Replace		0.8			3, 5	
	Assembly (M984E1)	Panlaga			1.8		3, 5 3, 5	
	Retriever Lift Cylinder (M984E1)	Replace Repair			1.0	2.5	3, 5	
	Retriever Tow Cylinder	Replace			1.0	۵.0	3, 5	
	(M984E1)	Repair			1.0	1.5	3, 5	
1504		1 -	0.1				0, 0	
1504	Tire Davit Winch	Inspect Service	0.1	0.1			6	
		Replace		0.7			6	
		Repair		0.7			6	
4700	E:61 H/I 1 (14000)	_	0.1	0.7				
1506	Fifth Wheel (M983)	Inspect Service	0.1 0.3					
		Replace	0.5	1.0			2, 6	
		Repair		1.0		3.0	3, 5, 112, 113	
16	SPRINGS AND SHOCK ABSORBERS	перап				0.0	, 0, 112, 110	
		_		0.4				
1601	Spring and Saddle Assembly	Inspect Replace Repair		0.1	4.0	2.5	3, 5 3, 5	
1604	Shock Absorber and	Inspect		0.1				
	Bushings	Replace		0.3	4.0		6	
1605	Front Equalizer Beam (All Models)	Replace Repair			4.0 1.5		3, 5 3, 95, 96, 100, 101	
	l			l		I	101	1 1

(1) Group	(2)	(3) Maintenance	м	aintena	(4) ance Le	vel	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
1605	Rear Equalizer Beam (M977, M978, M983)	Replace Repair			4.0 1.5		3, 5 3, 95, 96, 100, 101	
	Rear Equalizer Beam (M984, M985)	Replace Repair			4.0 1.5		3, 5 3, 95, 96, 97, 98	
	Rear Equalizer Beam (M984E1)	Replace Repair			4.0 1.5		3, 5 3, 99	
	Torque Rod	Inspect Replace		0.1 1.0			2, 6 2	
	Lateral Torque Rod	Inspect Replace		0.1	1.3		2 3, 5	
18	CAB AND BODY							
1801	Cab Door	Inspect Service Replace Adjust Replace	0.1 0.1	0.3		4.0	3, 5	
	Engine Cover	Repair Replace		2.5 0.2			2, 6 6	
1802	Cab Glass Rear Window Glass Windshield Glass Fenders Splash Guards Mud Flaps	Inspect Replace Replace Replace Replace Replace	0.1	0.5 0.2 0.5	0.5 0.8		5 5 6 2, 6 2, 6	
1806	Seat Assembly	Replace Repair		0.3 0.5			6 6	
	Sun Visor	Replace		0.1			6	
1808	Stowage Box Stowage Box (M984E1) Fuel Can Stowage Box (M978)	Replace Replace Replace		0.4 1.0 0.8			2, 6 6 6	
	Hose Stowage Tube (M978)	Replace		0.8			6	
	Fuel Hose Reel (M978)	Replace Repair		0.4	1.5		2, 6 3, 5	
	Control Reel (Air) (M978)	Replace Repair		0.8	0.8		2, 6 3, 5	
	Static Reel (M978)	Replace Repair		0.3	0.8		2, 5 3, 5	
1810	Cargo Body (M977, M985)	Replace			4.0		3, 5	
	Cargo Body (M984)	Replace			3.0		3, 5, 119	

(1) Group	(2)	(3) Maintenance					(5) Tools &	(6)
Number	Component Assembly				Н	Equipment	Remarks	
1810	Cargo Tie Downs Equipment Body (M984E1)	Replace Replace		0.2 1.0			6 6	
1811	M978 Tanker Body	Replace Repair				5.0	3, 5 5, 7	A
	Manhole Cover	Replace Repair		1.0		2.0	3, 5 3, 5	A
	Tanker Module	Replace Repair Test			0.8	4.0	5, 102 3, 5 141, 142	A
	Module Access Door	Replace Repair		0.5	* 0.8		2, 6 5	A
20	Tank Vent WINCH, CRANE, AND PTO	Replace			0.8		3, 5	
2001	Self-Recovery Winch	Inspect Service Replace	0.1	0.3 1.5			5	,
	Self-Recovery Winch Hydraulic Motor Self-Recovery Winch Counterbalance Valve Self-Recovery Winch Brake Self-Recovery Winch	Repair Replace Repair Replace Repair Replace Repair Inspect	0.1		1.5 1.0 1.0	1.0 1.0 1.0	3, 5 5 5 5 5 5 5 5 5, 8	L
	Cable Self-Recovery Winch Cable Tensioner Self-Recovery Winch Cable Guide	Service Replace Replace Repair Replace Repair	0.3	0.8 1.2 0.4 0.3 0.8			6 6 6 6	
	Heavy-Duty Winch	Inspect Service Replace Repair	0.1	0.3	0.8	3.0	5 3, 5, 126 5	
	Heavy-Duty Winch Hydraulic Motor Heavy-Duty Winch Counterbalance Valve Heavy-Duty Winch Brake	Replace Repair Replace Repair Replace Repair			1.0 1.0 2.5 2.0	2.5	5 5 5 5 3, 5, 8	L
	Heavy-Duty Winch Cable	Inspect Service Replace	0.1 0.3	0.8			6	

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	Mai C	(4 ntenar O) nce Le F	vel H	(5) Tools & Equipment	(6) Remarks
2001	Fairlead, Tensioner Assembly (M984E1)	Adjust Replace Repair	0.2		1.0		5 3, 5	
	Heavy-Duty Winch Fairlead Motor (M984E1)	Replace Repair			1.1 1.5		5 5, 7	
	Heavy-Duty Winch Cable Sheave (M984E1)	Replace			1.5		3, 5	
	Heavy-Duty Winch Cable Roller (M984E1)	Replace Repair		1.1 1.0			2, 6 2, 6	
	M977, M985, M984E1 Cranes	Inspect Service Replace Repair	0.1	0.5	8.0	*	2, 6 3, 5 3, 4, 5, 8	A
	Hoist	Inspect Service Replace Repair	0.1	0.3	3.0	16.0	6 3, 5 3, 5	
	Hoist Drive Control Valve	Replace Repair			0.5 1.0		3, 5 3, 5	
	Moist Drive Motor	Replace Repair			1.5 4.0		3, 5 3, 5	
	Hoist Brake	Replace Repair			1.0 3.5		3, 5 3, 5	
	Hoist Cable	Inspect Service Replace	0.1	0.3 0.5			6	
	Crane Hook Block	Replace Repair		0.3 0.5			6 2, 6	
	Hydrualic Pipes, Tubes, Hoses and Fittings	Replace			*		5	A
	Turntable	Replace			6.0		3, 5	
	Swing Drive	Replace Repair			1.2 1.0		3, 5 3, 5	
	Swing Drive Motor	Replace Repair			0.7 1.2		3, 5 3, 5	
	Swing Drive Brake	Replace Repair			1.0 1.0		3, 5 3, 4, 5	
	Boom	Replace Repair			2.0		3, 5 3, 5	A
	Erection Cylinders	Replace Repair			1.5	1.5	3, 5 3, 5	

(1) Group Number	(2)	(3) Maintenance	Mai	4) ntenar		/el	(5) Tools &	(6)
	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
2001	Lift Cylinders	Replace Repair			1.5	1.0	3, 5 3, 5	
	Extension	Replace Repair			2.0	1.5	$3, 5 \\ 3, 5$	
	Crane Control Valve	Replace Repair			2.0	*	$3, 5 \\ 3, 5$	A
	Outrigger Control Valve	Replace Repair			1.2	1.5	3, 5 3, 5	
	Crane Accumulator	Replace Repair			$\begin{array}{c} 0.3 \\ 0.5 \end{array}$		$3, 5 \\ 3, 5$	
	Crane Solenoid Valve	Replace			0.5		3, 5	
	Mast	Replace			3.5		3, 5	
	Remote Control	Replace Repair		$\begin{array}{c} 0.1 \\ 0.6 \end{array}$			6 6	
	Remote Control Cable	Replace Repair		0.1			6 6	A
	Tension Cylinder Assembly (M84E1)	Replace Repair			1.3	1.0	$3, 5 \\ 3, 5$	
	M983 Crane	Inspect Service Replace Repair	0.1	0.9	8.0	*	2, 6 3, 5, 106, 107 3, 4, 5, 8, 109, 111	A
	Hoist	Inspect Replace Repair	0.1		3.0	16.0	3, 5 3, 5	
	Hoist Check Valves	Test Replace			$0.3 \\ 0.5$		3, 109, 111 3, 5	
	Hoist Drive Unit	Replace Repair			1.5	4.0	$3, 5 \\ 3, 5$	
	Hoist Cable	Inspect Service Replace	0.1	$0.3 \\ 0.5$			6 2, 6	
	Crane Hook Block	Replace Repair		$0.3 \\ 0.5$			6	
	Hydraulic Pipes, Tubes, Hoses and Fittings	Replace			*		5, 108	A
	Crane Base	Replace				6.0	3, 5	
	Hose Reel	Replace Repair			1.0	1.5	$3, 5 \\ 3, 5$	
	Unfolding Cylinders	Replace Repair			1.5	2.0	3, 5 $3, 5$	

(1) Group	(2)	(3) Maintenance		(4) Maintenance Level			(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	H	Equipment	Remarks
2001	Inner Boom Cylinders	Replace Repair			2.0	2.0	3, 5 3, 5	
	Boom Extensions 1 and 2 Cylinders	Replace Repair			1.0	2.5	3, 5 3, 5	
	Boom Extensions 3 and 4 Cylinders	Replace Repair			6.0	6.0	3, 5 3, 5	
	Extension Back Pressure Valves	Replace Repair			$0.5 \\ 0.6$		3, 5 3, 5	
	Extension No. 1	Replace			2.0		3, 5	
	Extension No. 2 and No. 3	Replace			2.5		3, 5	
	Extension No. 4	Replace			2.0		3, 5	
	Boom Unit	Replace			2.0		3, 5	
	Beam	Replace			2.5		3, 5, 106, 107	
	Slewing Plate and Bearing	Replace			1.5		5, 7	
	Slewing Housing and Pistons	Replace			2.5		3, 5	
	Three Point Bridge and Trunnion	Replace			2.5		3, 5, 106	
	Overload Cell	Replace			2.0		3, 5	
	Crane Power Distribution Box	Test Replace Repair			1.0	* 4.0	3, 5, 130 3, 5	В
	Remote Control	Inspect Adjust Replace Repair	0.1	0.1	1.0 1.0		5 2, 6 5	
	Remote Control Cable	Replace Repair		0.1	2.0		6 2, 6	A
	System Relief Valve	Replace			0.5		3, 5	
	Main Control Valve	Replace Repair			$0.7 \\ 2.0$		3, 5, 108, 110 3, 5	
	Overload Protection Valve	Test Adjust Replace			$1.5 \\ 0.5$		3, 5 5 3, 5	В
	Motor Proportional Control	Adjust				0.3	5	
2004	Power Take-Off	Replace Repair		2.0	2.5		$2, 6 \\ 3, 5$	
	PTO Solenoid	Replace		0.6			6	

1			(5)	(6)				
(1)	(2)	(3) Maintenance	Ma	(4) aintena	nce Lev	vel	Tools &	
Group Number	Component Assembly	Function	C	O	F	Н	Equipment	Remarks
2004	PTO Hydraulic Pump	Replace Repair		1.0	2.0		2, 6 3, 5	
	PTO Hydraulic Pump	Replace Repair		1.2	2.5		2, 6 3, 5	
2006	(M984E1) Outrigger Jack (M977,	Replace Repair			1.0	1.0	3, 5 3, 5	
	M985) Outrigger Jack (M983)	Replace		1.0	1.0		2, 6 3, 5	
	Outrigger Jack (M984E1)	Repair Replace			1.2	1.0	3, 5 3, 5	
	Outrigger Extension	Repair Replace			3.0	1.0	3, 5 3, 5	
	Cylinder (M977, M985) Outrigger Beam (M977,	Repair Replace			2.0	1.0	3, 5	
	M985, M984E1) Outrigger Hydraulic	Replace			*		5	A
	Lines and Fittings Outrigger Control Valve	Replace			1.0		3, 5	
		Repair Replace			1.0 1.5		3, 5 3, 5	
	Outrigger Extension Cylinder (M984E1)	Repair				1.0	3, 5	
22	BODY ACCESSORY ITEMS	Replace		0.6			6	
2202	Windshield Wiper Motor	Replace		0.2			6	
	Windshield Wiper Arm Windshield Wiper	Replace		0.3			6	
	Control Valve	Replace		0.3			6	
	Mirror Air Horn	Replace		0.3			6	
	Air Horn Control Valve	Replace		0.5			6	
	Heater	Replace Repair		1.5 1.0			6	
	Heater Control Cables	Replace		0.6			6	
	Heater Motor and Core	Replace		0.5			6	
	Heater Hoses and Fittings (Each)	Replace		0.5			6	
	Heater Control Valve	Replace		1.0			6	
	Cab Air Vent Box and Screen	Replace		0.5				
	Fuel Transfer Hose	Replace		0.4			2, 6	
	(M978) Vent Hose (M978)	Replace		0.2			6	

(2)	(3) Maintenance	Mai	(4) ntenan	ce Le	vel	(5) Tools &	(6)
Component Assembly	Function	С	0	F	Н	Equipment	Remarks
Fuel Nozzle (M978)	Replace Repair		0.3	0.8		6 5	
Static Discharge Cable M978) Air Actuated Valve and Air Hose (M978)	Replace Repair Replace		0.3	0.4		6 6 6	
Data Plates	Replace		0.2			2, 6	
HYDRAULIC COMPONENTS							
Hydraulic Hand Pump M983)	Replace Repair		0.8	0.5		6 5	
Main Hydraulic Relief Valve Pressure Relief Valve M983) Pressure Relief Valve M984) Self-Recovery Winch Control Valve Self-Recovery Winch Selector Valve Fuel Pump Control Valve M978) Heavy-Duty Winch Manifold (M984E1) Retriever Control Valve (M984E1) Steering/Tensioner Manifold	Replace Repair		1.1 0.7 0.6 0.6 0.8 0.5 0.5 1.0 1.2	0.5 0.5 0.5 0.8	1.1	2, 6 6 2, 6 5 2, 6 5 6 5 6 6 6 5 2, 6 2, 6 6 3, 5 3, 5 3, 5	
Return Line Filter/Mounting Pressure Line Filter/Mounting (M977, M985, M984E1) Hydraulic Lines and Fittings	Replace Replace Repair Replace		0.6 0.6 0.3			6 6 2, 6 2, 6	A
AUXILIARY GENERATOR							
Generator Set (M983)	Inspect Replace Repair	0.3	0.5			6	F
		Set (M983) Inspect Replace	Set (M983) Inspect Replace 0.3	Set (M983) Inspect Replace 0.3 0.5	Set (M983) Inspect Replace 0.3 0.5	Set (M983) Inspect Replace 0.3 0.5	Set (M983) Inspect Replace 0.3 6

(1) Group	(2)	(3) Maintenance Function	(4) Maintenance Level			vei	(5) Tools & Equipment	(6) Remarks
Num- ber	Component Assembly	runction	С	0	F	Н	Equipment	nemarks
2967	Generator Power Distribution Box (M983) Replace Repair SPECIAL PURPOSE KITS			6	G			
33	SPECIAL PURPOSE KITS							
3301	Reusable Containers	Service Repair			0.2	1.0	5 5	
3303	Arctic Heater Kit Coolant Pump	Inspect Install Replace Replace Repair	0.2	4.5 0.5	4.5 0.5		3, 5 2, 6 2, 6 5	В
	Wiring Harness Arctic Battery Box	Test Test Replace Repair Replace		0.3	*		3, 5 3, 5 3, 5 2, 6	B A, C
	Front Arctic Brake Chamber Rear Arctic Brake Chamber	Repair Replace Repair Replace Repair		0.4 0.4 0.5	0.5		2, 6 6 6 6 3.5	A
34	ARMAMENT EQUIPMENT	l						
3401	Machine Gun Mounting Kit Machine Gun Ring Rifle Mount	Inspect Install Replace Install Replace	0.1	1.0	2.0		3, 5 2, 6 3, 5 6	
47	NON-ELECTRIC GAGES	•						
4702	Air Pressure Gage M978 Fuel Pressure Gage	Inspect Replace Inspect	0.1	0.2			6	
	M978 Pressure Differential Gage M978 Fuel Gage	Replace Inspect Replace Inspect Replace	0.1	0.2 0.2 0.2			6 6	
56	FILTERS, SEPARATORS, AND PURIFIERS							
5600	Filter Separator (M978)	Service Replace Repair		0.8 7.8 1.3			6 2, 6 2, 6	

(1) Group	(2)	(3) Maintenance	Mai	4) intenar) nce Le	vei	(5) Tools &	(6)
Number	Component Assembly	Function	С	0	F	Н	Equipment	Remarks
68	RADIO KIT							
6809	Radio	Inspect Install Replace Repair	0.1	1.5	2.0		3, 5 6	Н
72	DISPENSING COMPONENTS (M978)							
7202	Primary Pump Primary Pump Hydraulic	Inspect Service Replace Repair Adjust	0.3	1.0 2.0 0.5		1.1	6 5 3, 5 6	
	Motor Control Cable and Mount	Replace		0.5			6	
	Primary Pump Hydraulic Motor Auxiliary Pump	Replace Repair		2.0	3.0		6 3, 5	
	Flow Meter	Replace Repair Replace		1.0	0.6	2.0	2, 6 3, 5 3, 5	
	Flow Meter Strainer	Repair Service Replace		0.4 0.5		4.0	3, 5 6 2, 6	
7203	Fuel/Defuel Control Valve Lever	Replace		0.5			6	
	Emergency Valve	Replace Repair			0.6 0.3		3, 5 3, 5	
	Emergency Shutoff Cable Bottom Load Valve Adapter Air Eliminator	Replace Replace Repair Replace		1.0 0.8 0.6	1.0		2, 6 2, 6 3, 5 2, 6	
	Eductor & Gaskets Tanker Valves	Repair Replace Replace Repair		0.5	0.2		3, 5 2, 6 6 3, 5, 127	A A
	Line Strainer Assembly	Service Replace		0.4 0.6			6 6	
	Air Eliminator Check Valve	Replace		1.0			6	
	Venturi Assembly Pump Module Piping	Replace		2.4			6	A
	Fuel Level Sensor Tanker Piping	Replace Replace Replace		0.5			6	A

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level C O F I H			vel H	(5) Tools & Equipment	(6) Remarks
91	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT							
9111	Gas Particulate Filter Unit	Inspect Install Replace Repair	0.2	2.2	2.0		3, 5 6	I
9120	M-3 Decontamination Unit	Inspect Install Replace Repair	0.2	0.5	1.0		3, 5 6	J
9131	M-8 Chemical Alarm	Inspect Install Replace Repair	0.2	1.8	2.3		3, 5 6	K

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
1	0	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2, Less Power	4910-00-754-0650	
2	0	Shop Equipment, Automotive Maintenance and Repair: Oganizational Maintenance, Common No. 1, Less Power	4910-00-754-0654	
3	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic Less Power	4910-00-754-0705	
4	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance Supplemental Set No. 2, Less Power	4910-00-754-0707	
5	F	Tool Kit, Master Mechanics	5180-00-699-5273	
6	O	Tool Kit, General Mechanics; Automotive	5180-00-177-7033	
7	0	Shop Equipment, Lubrication and Tire Servicing, Mounting	4940-00-209-6231	

Tools and Test Equipment Requirements (Cont)

Eq	ol or Test uipment ef Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
	8	F	Shop Equipment, Machine Shop: Field Maintenance Basic, Less Power	3470-00-754-0708	
	9	F	Tool Kit, Automotive Fuel and Electrical System Repair	4910-00-754-0655	
	10	F	Engine Stand Adapter Plate	4910-00-146-9324	J33850/J8601-0
	11	Н	Core Plug Remover/Installer	5120-01-130-8864	J23019
	12	Н	Water Inlet, Adapter Remove/Installer	5120-01-048-2180	J25275
	13	Н	Cylinder Checking Gage	5120-01-070-4543	J5347-B
	14	Н	Cylinder Liner Depth Gage	5210-01-174-4498	J24898
	15	Н	Cylinder Block Test Kit		2SK737
	16	О	Gage, Belt Tensioner	6635-01-093-3710	J23600
	17	F	Cylinder Head Guide Stud Set	4910-01-162-3630	J24748
	18	F	Cylinder Head Lifting Fixture	4910-00-456-7620	J22062-01
	19	F	Fuel Line Wrench	5120-00-019-5232	J8932-B
	20	Н	Cylinder Head Test Fixture	4910-01-158-3985	J28454
	21	Н	Injector Tube Reconditioning Tool Set	2910-01-146-9619	J22525-B
	22	Н	Cylinder Liner Depth Gage	5210-00-023-4798	J22273-01
	23	Н	Protrusion Gage	4910-01-167-4281	J25521
	24	Н	Installer Valve Bridge Guide	5120-00-999-8616	J7482
	25	Н	Remover, Valve Guide	5120-00-733-8880	J6569
	26	Н	Installer, Valve Guide	5120-00-999-8617	J21520
	27	Н	Valve Seat Insert Installer	5120-01-048-3118	J24357
	28	Н	Valve Seat Collet	5120-01-048-1379	J23479-33
	29	Н	Puller Assembly	5120-01-048-1382	J23479-35
	30	Н	Water Nozzle Installer	5120-01-048-3119	J24857-A
	31	F	Stud Set Alinement	5120-00-629-9781	J1927-01
	31.1		Stud Set Alinement		J25002
	32	F	Seal Installer, Flywheel Housing	4910-01-176-4230	J21112-B
	32.1	F	Oversize Seal Installer		J35686
	32.2	F	Handle		J3154-1
	33	F	Crankshaft Rear Oil Seal Expander	5120-00-336-0445	J4239
	34	Н	Cylinder Liner Remover Assembly	4910-01-158-3982	J24563-A
	35	Н	Cylinder Liner Holddown Clamps	4910-01-158-3984	J24565-02
	36	Н	Piston Pin Retaining Tool	5120-00-127-7757	J23762-A
	37	Н	Piston Crown ID Gage	5120-01-130-8869	J25397

Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number	
38	Н	Piston Groove Gage	5220-01-028-1109	J24599	
39	H	Leak Detector Set	5210-01-061-4253	J23987-01	
40	H	Camshaft Gear Puller	5120-00-219-8397	J1902-01	
41	Н	Camshaft Gear and Water Pump Pully Remover	5120-00-733-8890	J7932	
42	Н	Piston Feeler Gage Set Part of Kit J5438-01	5120-00-671-2275	J3174-02	
43	Н	Blower Service Set	5120-00-936-4376	J6270-F	
44	F	Water Pump Drive Gear Installer	5120-01-033-8902	J25257	
45	F	Fan Drive Overhaul Tool	4910-01-163-1340	3-462-902-24460	
46	F	Feeler Gage 0.001	5210-01-119-7601	FB310B	
47	F	Injector Timing Gage	5110-01-160-2614	J34610	
47.1	F	Injector Timing Gage		J34192	
48	F	Throttle Delay Cylinder Gage Pin	5210-01-138-7558	J25558	
49	F	Throttle Delay Cylinder Gage	5120-01-138-7559	J255560	
50	F	Turbocharger Inlet Shield	4910-01-127-7952	J26554-A	
51	F	Cylinder Compression Gage Package	4910-01-148-1236	J7334-04	
52	0	Thermostat Seal Installer	5120-00-977-5579	J8550	
53	О	Handle, Thermos Seal Installer	5120-00-977-5578	J7079-2	
54	F	1/4" Drive 12 pt 1/4" Socket	5120-00-189-8609	819158	
55	F	Fuel Pump Tool Set	5180-00-219-8407	J1508-E	
56	Н	Magnetic Base Dial Indicator	5120-00-402-9619	J7872	
57	F	Blower Shaft Alinement Tool	5120-01-048-3122	J33001/J24619	
58	Н	Polishing Stick	5120-00-402-9626	J22964	
59	F	Governor Gap Gage 0.200	5210-01-048-6532	J23478	
60	F	Feeler Gage		007958	
61	F	Solenoid Wrench	5120-01-163-1349	011494	
62	Н	Injector Rack and Freeness Tester	4910-00-950-3119	J22396	
63	Н	Needle Valve Lift Gage	5310-00-937-7285	J9462-02	
64	Н	Injector Test Fixture	4940-01-148-7876	J23010	
65	Н	Injector Tip Concentricity Gage	5210-00-990-3327	J5119	
66	Н	Injector Service Set	5180-01-038-0251	J23435-02	
67	Н	Brass Wire Brush	5130-00-937-7281	J7944	ĺ
68	Н	Injector Body Reamer	5110-00-937-7628	J21089	
69	Н	Lapping Block Set	3460-00-937-5521	J22090-A	1

Tools and Test Equipment Requirements (Cont)

Fool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
70	Н	Idler Gear Holding Fixture	5180-01-167-4285	15K900
71	Н	Gage Retaining Ring Selector	4910-01-158-3999	J24208-15
72	Н	Gun Gear Reaming Set	5110-01-150-9755	J28489
73	Н	Bushing Installer	4910-01-158-3986	J24201
73.1	Н	Bushing Installer		J25458-3
74	Н	Main Shaft Lifting Bracket	5120-01-115-1157	J24196
75	Н	Bushing Swaging Tool	4910-01-158-3970	J26997-A
76	F	Lock Socket	5120-01-170-6709	L883
77	F	Transmission Oil Seal Installer	5120-01-048-3125	J24202-1A
78	Н	Ouput Shaft Bushing Installer	5120-01-115-9174	J24203

Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment	Maintenance Category	Nomenclature	National/ Nato	Tool Number
Ref Code	0 (Stock Number	
79	Н	Transmission Holding Fixture	5120-01-115-1165	J24310
80	Н	Flywheel Lifting Bracket	5120-01-116-6049	J24365
81	Н	Stator Roller Holder	5120-01-115-1158	J24218-2
82	Н	Ring Bearing Installer	5120-01-054-4054	J24447
83	F	Drive Handle	5120-01-054-4048	J24202-4
84	Н	Clutch Spring Compressor	5120-01-048-3129	J24204
85	Н	Collector, Ring Installer and Staking Set	5120-01-048-3124	J24200
86	Н	Forward Clutch Piston Inner Seal Protector	5120-01-048-2157	J24216-01
87	Н	PTO Gear Removing Fixture	4910-01-158-3969	J26899
88	Н	Fourth Clutch Alinement Fixture	5120-01-115-1156	J24221
89	Н	Mainshaft Oil Seal Remover and Installer	5120-01-115-1161	J26282
90	Н	Swaging Tool	4910-01-168-9543	J28525-1
91	Н	Sleeve Compressor	4910-01-158-4000	J24208-2
92	Н	Compressor Center Support	4910-01-158-3972	J24208-3
93	0	Wheel Bearing Wrench		409GX
94	F	Torque Adapter	5120-01-173-6252	SRES20
95	F	Adapter	4910-01-186-3125	Y-855A
96	F	Adapter/Clamp	4910-01-186-2132	Y-856/42052
97	F	Adapter	4910-01-158-3941	Y-861
98	F	Adapter	4910-01-162-7012	Y-862
99	F	Center End Bushing Service Set	4910-01-168-1435	Y-840A/1763
100	F	Adapter	4910-01-186-3128	Y-852
101	F	Adapter	4910-01-16-3126	Y-853
102	О	Insert Removal Tool	5120-01-158-4707	114010
103		Deleted		
104	F	Socket, 2-1/4 inch	5120-01-171-7613	2BF878
105	F	Socket, 2-7/8 inch		2BF707
106	F	Socket, 2-3/16 inch	5120-01-213-9278	2BG264
107	F	Socket, 1-13/16 inch	5120-01-214-6616	2BG262
108	F	Formed Socket	4910-01-158-3998	390 1530
109	F	Measure Box	5910-01-157-3570	996 8709
110	F	Wrench, Crowfoot 24 mm	5120-01-108-6646	FCOM24
111	F	Adapter		309-1597
112	Н	Tester, Lock, 2 inch	4910-01-157-3571	TFTLN-1000
113	Н	Tester, Lock, 3-1/2 inch	4910-01-157-3572	TFTLN-1500

Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment	Maintenance Category	Nomenclature	National/ Nato	Tool Number
Ref Code	Category		Stock Number	1
114	0	Handle, Seal Installer		RD296
114.1	О	Adapter, Seal Installer		RD289
114.2	О	Adapter, Seal Installer		RD305
115	О	Adapter, Seal Installer		RD291
116	О	Adapter, Seal Installer		RD414
116.1	О	Adapter, Pilot		RD415
117	О	Installer, Seal		H-A08-LR460-
1				AG336
118	О	Installer, Wear Ring		ADDP336
119	F	Driver, Torx Head	5120-01-214-8705	FTX30A2
120	F	Air Pressure Gage 30 PSI		
121		Remover, Bearing Shell		2BG624
122	Н	Eyes, Lifting		2BH944
123	Н	Pliers, Retaining Ring		2BH945
124	Н	Engine Stand	4910-00-808-3372	J6837-C/J29109
125	Н	Spring Scale		J8129
126	Н	Detent Ball Compression Tool		IPP161
127	F	Compression Tool	5120-01-167-4319	2SK886
128	F	Unloader Bore Bushing Removal Tool	5120-01-173-7092	2BF829
129	F	Air Compressor Cylinder Head Removal Tool	4910-01-162-3632	2AH762
130	F	Diagnostic Tool	3950-01-164-1880	500-392-01
131	Н	Turbocharger Holding Fixture		2SK742
132	F	Remover, Water Pump Seal	4910-01-158-3979	J22150-B
133	Н	Pitot Tube Guide Pins	4910-01-162-3637	J6889-1
134	Н	Front Support Needle Bearing Installer	5120-01-115-1160	J24197
135	0	Tire Iron		T23B
136	0	Tire Iron		T48A
137	0	Tire Iron		T52
138	F	Puller Tool		24702
139	0	Manometer, 12-0-12	6685-00-150-5172	J7333-6
140	0	Manometer Tubing	4710-00-146-9636	J8639-2
141	0	Vapor Recovery Kit		45D016
142	0	Air Regulator 0-3 PSI		
143	Н	Seal Installer	4910-01-299-9289	J35787-2
144	Н	Spacer Installer	4910-01-296-9936	
145	0	Socket, 3-1/4	5120-01-144-5331	

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	No specific times established. Times required for replacement or repair will depend on extent of work required.
В	No specific times established. Time required for test will depend on the extent of testing required.
С	In the "O" category repair is limited to splicing of wires, taping of the harness or wires, and the replacement of wire ends.
D	At the "F" level the entire wire harness is replaced.
E	In the "F" level repair of the cylinder block consists of replacement of block plugs, air box covers, and air box drain tubes.
F	Repair of the generator set is covered in TM 5-6115-465-12.
G	Repair of the power distribution box is covered in TM-(TBD).
Н	Repair of the radio is covered in TM 11-5820-498-12.
I	Repair of the gas particulate filter is covered in TM-(TBD).
J	Repair of the M-13 decontamination unit is covered in TM 3-4230-214-12&P.
K	Repair of the M-8 chemical alarm is covered in TM 3-6665-225-12.
L	Replacement of winch components is performed at Direct Support.

APPENDIX C EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists expendable supplies and materials needed to operate and maintain M977 Series Vehicles. These items are authorized by CTA 50-970. This appendix includes expendable items (except Medical, Class V, Repair Parts, and Heraldic Items) and consumable materials.

C-2. EXPLANATION OF COLUMNS.

- a. Column (1) Item Number. This number is assigned to the entry in the listing and is referenced in the Initial Setup under "Supplies" to identify the material (e.g., "Oil, lubricating, Item 28, Appendix C").
- **b.** Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item.
 - C Operator/Crew
 - O Organizational 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 the national stock number to request or requisition the item.
- **d.** Column (4) Description. Indicates the federal item name and, if required, a description to identify the item. Where applicable, the last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.
- **e. Column (5)** Unit of Measure (U/'/U'. Indicates the measure used in preforming the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy the requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
1	С	8040-00-181-7761	Adhesive No. 4500 (FSCM 08853) (OTC P/N 30456 AX)	
2	О		Adhesive No. 1099-L (FSCM 04963) (OTC P/N EE 39597)	
2.1	0	8040-00-838-4981	Adhesive No. 405 (FSCM 23577) (OTC P/N 1579200) (45152)	
3	O	8040-01-152-8104	Adhesive No. PL 200 (OTC P/N 1322080)	
3.1	0	8040-01-321-1254	Adhesive No. 409 (No. 40945) (FSCM 05972) (OTC P/N 1586850), 20 gm tube	gm
3.2	0		Adhesive P/N 1300 (FSCM 28712) (OTC P/N 32167AX), 5 oz tube	0Z
3.3	0	8040-01-235-5435	Adhesive No. 1711 (FSCM 04963) (OTC P/N 1482140), 5 oz tube	0Z

((1)	(2)	(3)	(4)	(5)
			National		
	tem		Stock		
Nu	mber	Level	Number	Description	U/M
	4	0	3040-00-995-0590	Adhesive-Sealant, Silicon RTV, General Purpose (MIL-A-46106A)	
4	4.1	О	3040-00-118-2695	Adhesive-Sealant, RTV, Non Corrosive (MIL-A-46146) (FSCM 01139) (RTV 162)	
4	4.2	0	3040-00-938-6860	Adhesive Spray (FSCM 04963) (OTC P/N 1537350)	
	5	0		Antifreeze, Permanent, Ethylene Glycol, Inhibited (MIL-A-46153)	
			3850-00-181-7929	1-gal can	gl
			6850-00-181-7933	5-gal drum	gl
			6850-00-181-7940	55-gal drum	gl
	6			Antifreeze, Arctic Type (MIL-A-11755)	8-
1			6850-00-243-1992	1-gal can	gl
			6850-00-174-1806	55-gal drum	gl
	7	0		Cement, General Purpose, Synthetic Base (MIL-C-4003)	O
	8	0	7510-00-164-8893	Chalk	
	9	0		Clips, Wire, Plastic	
	9.1	O		Coating, Protective, P/N 1412020	
	10	0	8030-00-597-5367	Compound, Antisieze, High Temperature (MIL-A-907)	
	11	0	6850-00-598-7328	Compound, Cleaning, Conditioner and Inhibitor for Engine Cooling System (MIL-C-10597)	
			6850-00-598-7328	Package, Consisting of:	ea
				a. Cleaner, Part 1, Oxalic Acid.	
				b. Cleaner, Part 2, Aluminum Chloride.	
				c. Sodium Silicate Conditioner.	
				d. Alkaline Conditioner.	
				e. Inhibitor.	
				f. Instruction Sheet.	
	12			Compound, Cleaning P-C-435A	
	12.1	0		Compound, Corrosion Preventive (MIL-C-62218A) (05238) (P/N 2085B)	
	12.2	0		Compound, Corrosion Preventive (FSCM 45152) (OTC P/N 1388330), 8 oz can	0Z
	13	F	5970-00-166-5697	Compound, Insulating, Electrical, Embedding (MIL-C-47233)	
1	14	F	5350-00-193-7227	Compound, Lapping and Grinding A-A-1203	
	15	F		Compound, Polishing K-M J23028	
	16	F		Compound, Retaining (MIL-R-46082)	
			8030-00-181-7603	50-cc	cc
			8030-00-181-7529	250-cc	cc
1	16.1	0		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type I, Grade K	

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
17	0		•	
			Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type I, Grade L	
17.1	0		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade N	
		8030-01-804-5392	10 ml bottle	ml
		8030-01-014-5869	50 ml bottle	ml
		8030-01-025-1696	250 ml bottle	ml
17.2	О		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade O	
17.3	0		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade R	
18	0	8030-01-054-0740	Compound, Sealing, Pipe Thread PS/T92-31 (FSCM 05972) (OTC P/N 702350-X)	
18.1	0		Compound, Sealing, Pipe Thread (FSCM 05972)	
			(No. 56707) (Loctite 567), 6 ml tube	ml
		8030-01-166-0675	(No. 56747) (Loctite 567), 50 ml tube	ml
18.2	0	8030-01-026-1538	(No. 56765) (Loctite 567), 250 ml tube Compound, Sealing, Pipe Thread 56941 (FSCM 05972) (OTC P/N 56437AX)	ml cc
19	0		Connector, Electrical, Butt 34072 (FSCM 04618)	
20			Detergent, Painted Surface, Powder, PC 731A, Type II	
21	F		Dye, Prussian Blue	
22	0		Enamel, Alkyd, Camouflage, Black (for stenciling) (MIL-E-52192B)	
		8010-00-111-8005	1-gal can	gl
0.0		8010-00-111-8356	5-gal can	gl
23	С	9150-00-190-0905	Grease, Automotive and Artillery GA4 (MIL-G-10924)	0.77
		9150-00-065-0029 9150-00-935-1017	2-1/4-oz tube	0Z
		9150-00-935-1017	14-oz cartridge 1-lb can	oz lb
		9150-00-190-0904	5-lb can	lb
		9150-00-190-0907	35-lb can	lb
		9150-00-530-7369	120-lb can	lb
23.1	О	2200 00 000 1000	Grease, Electrical (45152) 1388330	
23.2	Ö	6505-00-133-8025	Grease, White (92469) Vaseline	
23.3	0		Hardener, Epoxy, High Solids (MIL-P-53022) Type II (09225) (P/N 4489 CEH)	
23.4	0		Hardener, Epoxy, High Solids (MIL-P-53022) Type II (09225) (P/N 3119CEH)	

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
23.5	0		Inhibitor, Corrosion, Liquid Cooling System (89524) (P/N NALCOOL 2000)	
		6850-01-085-4717	1-pt can	pt
		6850-01-085-4718	64-oz bottle	0Z
		6850-01-085-4719	5-gal can	gl
		6850-01-087-4045	15-gal drum	gl
		6850-01-086-3438	55-gal drum	gl
24	0		Lockwire	
24.1	О		Lubricant, Tire and Rim	
		2640-00-256-5526	1-qt can	qt
		2640-00-256-5527	1-gal can	gl
		2640-00-256-5529	(5) 1-gal containers in a carton	gl
25	F	6810-00-281-6929	Methyl Ethyl Ketone TT-M-261 (MIL-T-27602)	
26	С		Oil, Fuel, Diesel DF-1 Winter (VV-F-800)	
		9140-00-286-5286	Bulk	gl
		9140-00-286-5287	5-gal can	gl
		9140-00-286-5288	55-gal drum, 16 gage	gl
		9140-00-286-5289	55-gal drum, 18 gage	gl
27	С		Oil, Fuel, Diesel DF-2 Regular (VV-F-800)	
		9140-00-286-5294	Bulk	gl
		9140-00-286-5295	5-gal can	gl
		9140-00-286-5296	55-gal drum, 16 gage	gl
		9140-00-286-5297	55-gal drum, 18 gage	gl
28	С		Oil, Lubricating, Gear GO 85/140 (MIL-L-2105)	
		9150-01-035-5395	5-gal can	gl
0.0	<u> </u>	9150-01-035-5396	55-gal drum	gl
29	С	04.50.04.005.5000	Oil, Lubricating, Gear GO 75 (MIL-L-2105)	
		9150-01-035-5390	1-qt can	qt
		9150-01-035-5391	5-gal drum	gl
0.0			55-gal drum	gl
30	С	0150 00 005 0405	Oil, Lubricating OE/HDO 10 (MIL-L-2104)	
		9150-00-265-9425	1-qt can	qt
		9150-00-265-9428	5-gal drum	gl
		9150-00-265-9429	55-gal drum, 16 gage	gl
0.1		9150-00-265-9430	55-gal drum, 18 gage	gl
31	C C		Oil, Lubricating, OE/HDO 20 (SAE 20)	
32		0150 00 005 0400	Oil, Lubricating, OE/HDO 30 (SAE 30) (MIL-L-2104)	
		9150-00-265-9433	1-qt can	qt
		9150-00-265-9435	5-gal drum	gl
		9150-00-265-9436	55-gal drum, 16 gage	gl
		9150-00-265-9437	55-gal drum, 18 gage	gl

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
32.1	С		Oil, Lubricating, OE/HDO 40 (SAE 40) (MIL-L-2104)	
02.1		9150-00-189-6730	1-qt can	qt
		9150-00-188-9862	55-gal drum	gl
33	С	9150-01-152-4117	Oil, Lubricating, Internal Combustion Engine, Tactical Service (MIL-L-2104) (OE/HDO 15W/40) 1-qt can	qt
34	C		Oil, Lubricating, OEA Ice, Subzero (MIL-L-4667)	
		9150-00-402-4478	1-qt can	qt
		9150-00-402-2372	5-gal drum	gl
		9150-00-402-7197	55-gal drum, 16 gage	gl
35	0		Oil, Preservative (MIL-O-6083)	O
36	0		Oil, Preservative (MIL-C-8188)	
37	F		Oil, Test, Fuel Injector DDA/Kent-Moore No. J26400	
38	0		Paint, Polyurethane, Chemical Agent Resistant Coating CARC No. 383 Green (MIL-C-46168B)	
		8010-01-141-2411	1-qt can A	qt
		8010-01-128-6958	1-gal can A	gl
		8010-01-131-6257	4-gal can A	gl
39	О		Paint, Polyurethane (Catalyst Component) (MIL-C-46168B)	O
		8010-01-141-2411	1/2-pt can B	pt
		8010-01-128-6858	1-qt can B	qt
39.1	0	8010-01-131-6257	1-gal can B Paint, Polyurethane, Chemical Agent Resistant Coating (CARC) Black (MIL-C-46168B)	gl
			1-qt kit	kt
			1-gal kit	kt
39.2	О		5-gal kit Paint, Polyurethane, Chemical Agent Resistant Coating (CARC) Brown 383 (MIL-C-46168B) 511X303	kt
		8010-01-160-6744	1-qt kit	kt
			1-gal kit	kt
			5-gal kit	kt
39.3	О		Paint, Polyurethane (Resin Component), Chemical Agent Resistant Coating (CARC) Tan No. 686A (MIL-C-46168) Color No. 33446 (09225) (P/N 8609TUA-GD)	
		8010-01-260-0910	1-qt kit	kt
		8010-01-260-0909	1-gal kit	kt
		8010-01-260-0908	5-gal kit	kt

	(1)	(2)	(3)	(4)	(5)
	Item Number	Level	National Stock Number	Description	U/M
	39.4	0		Paint, Single Component, Chemical Agent Resistant Coating (CARC) Brown No. 383 (MIL-C-53039) Color No. 30051 (09225) (P/N 8606TUA-2K)	
			8010-01-229-7543 8010-01-229-7544 8010-01-229-7545	1-qt can 1-gal kit 5-gal kit	qt kt kt
	40	0	5350-00-221-0884 5350-00-271-7930	Paper, Abrasive, Garnet (Emery Cloth) P-P-121 80-grit 180-grit	
	41	О	5350-00-619-9166 5350-00-224-7207 5350-00-578-8378	Paper, Abrasive, Silicon Carbide, Waterproof P-P-101 80-grit 240-grit 400-grit	
	41.1	0	9150-00-250-0933	Petrolatum, Technical (Petroleum Jelly) (VV-P-236)	lb
	42	0		Primer, Epoxy (Red, Glyptol Enamel) (Resin Component) (MIL-P-52192B)	
	43	0		Primer, Epoxy (Catalyst Component) (MIL-P-52192B)	
	43.1	0		Primer, Epoxy, High Solids Chemical Agent Resistant Coating (CARC) Off White (MIL-P-53022) Type II (09225) (P/N 4488WEP3)	
	43.2	0		Primer, Epoxy, High Solids, White (MIL-P-53022) Type II (09225) (P/N 3118WEJ-RM)	
•	44	0		Rust Preventive MIL-C-16173 Texaco Type "L", (OTC! P/N 19AS436)	ea
			8030-00-062-5866 8030-00-231-2345 8030-00-244-1293 8030-00-244-1294	1-qt can 5-gal drum 55-gal drum, 16 gage 55-gal drum, 18 gage	qt gl gl gl
	44.1 45	О	0000 00 211 1201	Shim, Body P/N 60901AX Soap Chips, P-5-579	ea
	45.1	О		Sealant No. Sikaflex 201 (FSCM 45152) (OTC P/N 1414680)	gl
	45.2 46 47	0 0 0		Shrink, Heat 603314-4 (04618) Solder, Resin Flux Core ASTM B 284-79 Solvent, Drycleaning SD (P-D-680)	
	- '		6850-00-664-5685	1-qt can	qt
	48	0	6850-00-281-1985 8135-00-178-9200	1-gal can Tags, Identification (MILT-12755)	gl
	49	F	8030-00-889-3534 8030-00-889-3535	Tape, Antiseize, Tetrafluoroethylene (MIL-T-27730)	
	50	0	5970-00-644-3167	Tape, Insulation, Electrical (MIL-T-50886)	

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
51	0		Thinner, Aliphatic, Polyurethane Coating (MIL-T-81772)	
		8010-00-181-8080	1-gal	g1
		8010-00-181-8079	5-gal	g1
		8010-00-280-1751	55-gal	g1
52	0		Ties, Cable, Plastic (MIL-S-29190)	
52.1	Ο	8030-00-946-6158	Treatment, Corrosion (MIL-C-23411)	
53	F		Tubing, Heat Shrinkable (MIL-T-47051)	
54	0		Walkway Compound Nonslip (MIL-W-5044)	
54.1	0	7930-00-985-6750	Wax, Automobile 14-oz can	0Z

APPENDIX D PREPARATION FOR TOWING

D- 1. SCOPE. This appendix covers preparing an M977 series vehicle for towing from the front.

D-2. PREPARATION FOR TOWING.

This task covers:

a. Preparation for towing.

b. Axle restraining chain removal.

c. Follow-on Maintenance

INITIAL SETUP

Models Equipment Condition

All TM or Para Condition Description

Test Equipment TM 9-2320-279-10 Shut off engine.

None
Para 9-9
Propeller shaft between transfer case and No. 3 axle removed.

None Special Environmental Conditions

Supplies None

None General Safety Instructions

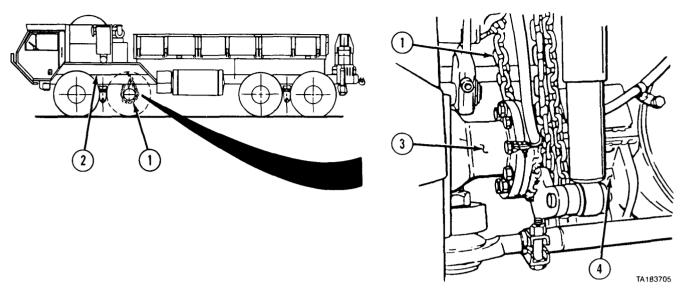
Personnel Required None

MOS 63S, Heavy wheel vehicle mechanic

References None

Preparation for Towing (Cont)

D-2. PREPARATION FOR TOWING (ÇONT).



CAUTION

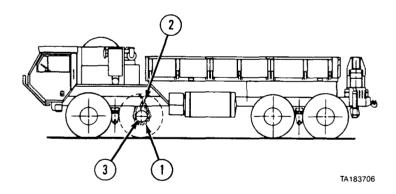
When installing axle restraint chains, route chains so hoses or lines are not between frame and chain or axle and chain. Damage to equipment may result.

NOTE

Axles should be restrained with chains on both sides of vehicle.

- a. Preparation for Towing. Route axle restraint chains (1) over frame rail (2) and around axle (3) beside walking beam (4). Hook chains.
- b. Axle Restraining Chain Removal. Remove axle restraining chains (1) from around frame rails (2) and axles (3) and stow.
- c. Follow-on Maintenance. Install propeller shaft between transfer case and axle No. 3 (para 9-9).

END OF TASK

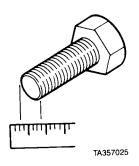


APPENDIX E TORQUE LIMITS

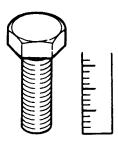
<u>E- 1. GENERAL</u> This section provides general torque limits for screws used on the M977 series vehicles. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not 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 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.

<u>E-2. TORQUE LIMITS</u> 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. Table E-3 lists torque limits for the M983 (HIAB) crane.

E-3. HOW TO USE TORQUE TABLE:



(1) Measure the diameter of the screw you are installing.



(2) Count the number of threads per

- (3) 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).
- (4) In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in step (2). (Not required for metric screws.)

CAPSCREW HEAD MARKINGS

Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).

STANDARD

Metric screws are of three grades: 8.8, 10.9, and 12.9.

Grades & Manufacturer's marks appear on the screw head.

Metric screws are of three grades: 8.8, 10.9, and 12.9.

Grades & Manufacturer's marks appear on the screw head.

METRIC

TA357028

- (5) 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.
- (6) Look down the column under the picture you found in step (5) until you find the torque limit (in lb-ft or N⋅m) for the diameter and threads per inch of the screw you are installing.

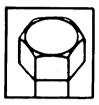
Torque Limits (Cont)

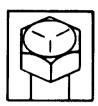
Table E-1. Torque Limits for Dry Fasteners

CAPSCREW HEAD MARKINGS



Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).









TA3570

						TORQUE				
	SIZE			RADE). 2		GRADE D. 5		RADE 6 or 7		RADE). 8
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	5	7	8	11	10	14	12	1
1/4	28	6.35	6	9	10	14	12	16	14	19
5/16	18	7.94	11	15	17	23	21	28	25	34
5/16	24	7.94	12	16	19	26	24	33	25	34
3/8	16	9.53	20	27	30	41	40	54	45	61
3/8	24	9.53	23	31	35	47	45	61	50	68
7/16	14	11.11	30	41	50	68	60	81	70	95
7/16	20		35	47	55	75	70	95	80	108
1/2	13	12.70	50	68	75	102	95	129	110	149
1/2	20		55	75	90	122	100	136	120	1
9/16	12	14.29	65	88	110	149	135	183	150	203
9/16	18		75	102	120	163	150	203	170	23
5/8	11	15.88	90	122	150	203	190	258	220	298
5/8	18		100	136	180	244	210	285	240	325
3/4	10	19.05	160	217	260	353	320	434	380	515
3/4	16		180	244	300	407	360	488	420	597
7/8	9	22.23	140	190	400	542	520	705	600	814
7/8	14		155	210	440	597	580	786	660	895
1	8	25.40	220	298	580	786	800	1085	900	1220
1	12		240	325	640	868	860	1166	1000	1356
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1736
1-1/8	12		340	461	880	1193	1260	1709	1440	1953
1-1/4	7	31.75	420	570	1120	1519	1580	2142	1820	2468
1-1/4	12		460	624	1240	1681	1760	2387	2000	2712
1	6	34.93	560	759	1460	1980	2080	2820	2380	3227
1-3/8	12		640	868	1680	2278	2380	3227	2720	3688
1-1/2	6	38.10	740	1	1940	2631	2780	3770	3160	4285
1-1/2	12		840	1139	2200	2983	3100	4204	3560	4827

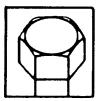
Torque Limits (Cont)

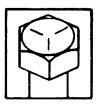
Table E-2. Torque Limits for Wet Fasteners

CAPSCREW HEAD MARKINGS



Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).









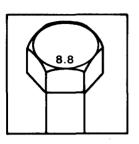
TA 25702

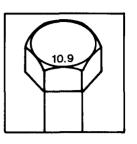
(3-111	ie).									TA357027
						TORQUE				
	SIZE			GRADE O. 2		GRADE O. 5		RADE 6 or 7		GRADE O. 8
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	4	6	6	8	8	11	9	12
1/4	28	6.35	5	7	7	9	9	12	10	14
5/16	18	7.94	8	11	13	18	1	22	18	24
5/16	24	7.94	9	12	14	19	18	24	20	27
3/8	16	9.53	15	20	23	31	30	41	35	47
3/8	24	9.53	17	23	25	34	30	41	35	47
7/16	14	11.11	24	33	35	47	45	61	55	75
7/16	20		25	34	40	54	50	68	60	81
1/2	13	12.70	35	47	55	75	70	95	80	108
1	20		40	54	65	88	80	108	90	122
9/16	12	14.29	50	68	80	108	100	136	110	149
9/16	18		55	75	90	122	110	149	130	176
5/8	11	15.88	70	95	110	149	140	190	170	231
5/8	18		80	108	130	176	160	217	180	244
3/4	10	19.05	120	163	200	271	240	325	280	380
3/4	16		140	190	220	298	280	380	320	434
7/8	9	22.23	110	149	300	407	400	542	460	624
7/8	14		120	1	320	434	440	597	500	678
1	8	25.40	1	217	440	597	600	814	680	922
1	12		170	231	480	651	660	895	740	1003
1-1/8	7	25.58	220	298	600	814	840	1139	960	1302
1-1/8	12		260	353	660	895	940	1275	1080	1464
1-1/4	7	31.75	320	434	840	1139	1100	1492	1	1
1-1/4	12		360	488	920	1248	1320	1790	1500	2034
1	6	34.93	420	570	1100	1492	1	2115	1780	2414
1	12		460	624	1	1709	1780	2414	2040	2766
1-1/2	6	38.10	560	760	1460	1980	2080	2820	2360	3200
1-1	12		620	841	1640	2224	2320	3146	2660	3607

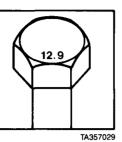
Torque Limits (Cont)

Table E-3. Dry Torque Limits for M983 Crane (Metric)

CAPSCREW HEAD MARKINGS







				TORQ	UE		
SIZE		METRIC GRADE 8.8		METRIC GRADE 10.9		METRIC GRADE 12.9	
DIA INCHES	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
.157	4	2	3	3	4	4	5
.197	5	4	5	6	8	7	9
.237	6	7	9	10	14	11	15
.276	7	11	15	16	22	20	27
.315	8	18	24	25	34	29	39
.394	10	32	43	47	64	58	79
.473	12	58	79	83	113	100	136
.552	14	94	127	133	180	159	216
.630	16	144	195	196	266	235	319
.709	18	190	258	269	365	323	438
.788	20	260	353	366	496	440	597
.867	22	368	499	520	705	678	919
.946	24	470	637	664	900	794	1077
1.064	27	707	959	996	1351	1235	1
1.182	30	967	1311	1357	1840	1	2210

APPENDIX F ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational maintenance.

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.

All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

Section II. MANUFACTURED ITEMS PART NUMBER INDEX

Part No.	Description	Fig. No.
M13486/12-1/120	Cable	F-1
104190B	Chain	F-2
110966A6W	Wire Assembly	F-3
118160A42	Seal, Nonmetallic	F-5
118160A48	Seal, Nonmetallic	F-5
118160A5	Seal, Nonmetallic	F-5
118160A51	Seal, Nonmetallic	F-5
118160A54	Seal, Nonmetallic	F-5
118971A90U	Hose Assembly	F-4
119348A100	Loom, Protective	F-6
119348A110	Sleeving, Textile	F-6
119348A72	Loom, Protective	F-6
119622A134	Loom, Protective	F-6
119622A16	Loom, Protective	F-6
119622A290	Sleeving, Textile	F-6
119622A4	Loom, Protective	F-6
119622A52	Loom, Protective	F-6
119622A6	Sleeving, Textile	F-6
119784A102U	Hose Assembly	F-4
119784A105U	Hose Assembly	F-4
120025A152	Sleeving, Insulation	F-6
120025A197	Loom, Protective	F-6
120025A59	Conduit, Nonmetallic	F-6
1244FX11	Wire	F-3
1244FX114	Cable, Low Tension	F-1
1244FX12	Wire, Low Tension	F-3
1244EX17	Cable, Low Tension	F-3
1244FX18	Cable, Low Tension	F-1
1244Fx19	Wire	F-3
1244FX20	Wire	F-3

TM 9-2320-279-20-3

Part No.	Description	Fig. No.
1244FX210	Cable, Low Tension	F-1
1244FX24	Cable, Low Tension	F-1
1244FX28	Wire	F-3
1244FX3	Cable, Low Tension	F-1
1244FX40	Cable, Low Tension	F-1
1244FX5	Wire	F-3
1244FX6	Cable, Low Tension	F-1
1244Fx8	Wire, Low Tension	F-3
1244FX9	Wire	F-3
124623A53	Liner, Strap	F-7
125865A160	Seal, Door	F-8
125865A52	Seal	F-8
125865A53	Seal, Door	F-8
1324230	Cable, Battery	F-1
1324240	Cable, Battery	F-1
1324250	Cable, Battery	F-1
1332080U75	Hose Assembly	F-4
1332080U91	Hose Assembly	F-4
1338990U57	Hose Assembly	F-4
1341010	Hose	F-4
1341020	Hose	F-4
1341030	Hose	F-4
1341070	Hose	F-4
1341080	Hose	F-4
134141A4W	Wire Assembly	F-3
134141A6W	Wire Assembly	F-3
134141A7W	Wire Assembly	F-3
1341850	Chain	F-2
1343280	Hose	F-4
1343990-3	Sleeving, Insulation	F-6
1344500	Block, Battery Spacer	F-19
1350860W	Harness, Wire Assembly	F-15
1353360W	Wire Assembly	F-17
1353720U	Cable, Battery	F-1
1354460U	Harness, Wire Assembly	F-16
1356520	Tubing, Flexible	F-9
1358560W	Wire Assembly	F-18
1370550	Hose	F-4
1370560	Hose	F-4
1378050	Chain	F-2
1383550	Cable Assembly	F-1
1394510-10	Chain	F-2
1394510-12	Chain	F-2
1394510-20	Chain	F-2
1394510-26	Chain	F-2
1394510-36	Chain	F-2
1394510-84	Chain	F-2
1398190	Gasket, Strip	F-10
1408180U	Cord Assembly	F-11
1433240U	Hose Assembly	F-4

Part No.	Description	Fig. No.
1454210	Cable, Battery	F-1
1454220	Cable, Battery	F-1
1458530	Chain	F-2
1465020W14	Wire Assembly	F-3
1465020W20	Wire Assembly	F-3
1467160-8	Channel	F-5
1467170-4	Molding	F-12
1467170-8	Quickedge	F-12
1478600-2	Sleeving, Insulation	F-6
1487200-46	Sleeve	F-6
1519710	Fastener	F-13
1519720	Fastener	F-13
1531960	Cable, Battery	F-1
1531970	Cable, Battery	F-1
159	Chain	F-2
1605150-57	Tubing, Nylon	F-9
1605160-14	Tubing, Nylon	F-9
1605160-38	Tubing, Nylon	F-9
1605160-48	Tubing, Nylon	F-9
1605160-50	Tubing, Nylon	F-9
1605160-52	Tubing, Nylon	F-9
1605160-53	Tubing, Nylon	F-9
1605160-60	Tubing, Nylon	F-9
1605170-18	Tubing, Nylon	F-9
1605260-48	Tubing, Nylon	F-9
1605270-101	Tubing, Nylon	F-9
1605270-114	Tubing, Nylon	F-9
1605270-157	Tubing, Nylon	F-9
1605270-56	Tubing, Nylon	F-9
1605270-60	Tubing, Nylon	F-9
1605270-8	Tubing, Nylon	F-9
1605270-88	Tubing, Nylon	F-9
1605290-10	Tubing, Nylon	F-9
1605300-100	Tubing, Nylon	F-9
1605300-101	Tubing, Nylon	F-9
1605300-14	Tubing, Nylon	F-9
1605300-160	Tubing, Nylon	F-9
1605300-192	Tubing, Nylon	F-9
1605300-199	Tubing, Nylon	F-9
1605300-71	Tubing, Nylon	F-9
1605300-72	'Tubing, Nylon	F-9
1656490-100	Tubing, Nylon	F-9
1656490-104	Tubing, Nylon	F-9
1656490-111	Tubing, Nylon	F-9
1656490-12	Tubing, Nylon	F-9
1656490-17	Tubing, Nylon	F-9

Part No.	Description	Fig. No.
1656490-231	Tubing, Nylon	F-9
1656490-50	Tubing, Nylon	F-9
1656490-67	Tubing, Nylon	F-9
1656490-77	Tubing, Nylon	F-9
1656490-78	Tubing, Nylon	F-9
1656500-16	Tubing, Nylon	F-9
1656500-18	Tubing, Nylon	F-9
1656500-192	Tubing, Nylon	F-9
1656500-258	Tubing, Nylon	F-9
1656500-35	Tubing, Nylon	F-9
1656500-42	Tubing, Nylon	F-9
1656500-68	Tubing, Nylon	F-9
1656500-77	Tubing, Nylon	F-9
1771670	Cloth, Coated	F-20
1927FX13	Cable, Low Tension	F-1
1927FX14	Cable, Low Tension	F-1
1927FX140	Wire, Electrical	F-3
1927FX16	Wire	F-3
1927FX18	Wire	F-3
1927FX19	Wire	F-3
1927FX21	Wire	F-3
1927FX22	Wire	F-3
1927FX23	Cable, Low Tension	F-1
1927FX24	Wire	F-3
1927FX4	Cable, Low Tension	F-1
1927FX5	Cable, Low Tension	F-1
1927FX55	Wire	F-3
1927FX6	Cable, Low Tension	F-1
1927Fx7	Wire	F-3
1927FX8	Cable, Low Tension	F-1
1927FX9	Wire	F-3
1948970-164	Tubing, Nylon	F-9
19998FX4W	Wire Assembly	F-3
19998FX6W	Wire Assembly Wire Assembly	F-3
2AD977	Hose, Overflow	F-4
2AT188	Hose	F-4
2DD51	Hose	F-4
2DD51 2DD52	Hose	F-4 F-4
2DD52 2DD53	Hose	F-4 F-4
2DD53 2DD54	Hose Hose	F-4 F-4
21021FX4	Hose	F-4 F-4
223-8	Hose	F-4 F-4
223-8 23319FX11	Tubing, Nylon	F-4 F-9
23319FX11 23319FX125	ũ ů	F-9 F-9
	Tubing, Nylon	
23319FX172	Tubing, Nylon	F-9
23319FX175	Tubing, Nylon	F-9
23319FX198	Tubing, Nylon	F-9

Part No.	Description	Fig. No.
23319FX199	Tubing, Nylon	F-9
23319FX203	Tubing, Nylon	F-9
23319FX214	Tubing, Nylon	F-9
23319FX215	Tubing, Nylon	F-9
23319FX227	Tubing, Nylon	F-9
23319FX23	Tubing, Nylon	F-9
23319FX230	Tubing, Nylon	F-9
23319FX235	Tubing, Nylon	F-9
23319FX242	Tubing, Nylon	F-9
23319FX252	Tubing, Nylon	F-9
23319FX259	Tubing, Nylon	F-9
23319FX260	Tubing, Nylon	F-9
23319FX35	Tubing, Nylon	F-9
23319FX359	Tubing, Nylon	F-9
23319FX362	Tubing, Nylon	F-9
23319FX37	Tubing, Nylon (for Model B wiper motor P/N GS-2850 use 37 inch hose)	F-9
23319FX375	Tubing, Nylon	F-9
23319FX38	Tubing, Nylon (for Model B wiper motor P/N GS-2850 use 38 inch hose)	F-9
99910EV41	•	F-9
23319FX41	Tubing, Nylon	F-9
23319FX51	Tubing, Nylon Hose	F-4
23319FX70	Tubing, Nylon	F-9
23319FX75 23323FX112	Tubing, Nylon	F-9
23323FX112 23323FX116	Tubing, Nylon	F-9
23323FX110 23323FX155	Tubing, Nylon	F-9
23323FX159	Tubing, Nylon	F-9
23323FX135 23323FX175	Tubing, Nylon	F-9
23323FX179	Tubing, Nylon	F-9
23323FX173 23323FX191	Tubing, Nylon	F-9
23323FX191 23323FX194	Tubing, Nylon	F-9
23323FX194 23323FX195	Tubing, Nylon	F-9
23323FX201	Tubing, Nylon	F-9
23323FX203	Tubing, Nylon	F-9
23323FX204	Tubing, Nylon	F-9
23323FX231	Tubing, Nylon	F-9
23323FX242	Tubing, Nylon	F-9
23323FX251	Tubing, Nylon	F-9
23323FX266	Tubing, Nylon	F-9
23323FX271	Tubing, Nylon	F-9
23323FX285	Tubing, Nylon	F-9
23323FX301	Tubing, Nylon	F-9
23323FX320	Tubing, Nylon	F-9
23323FX35	Tubing, Nylon	F-9
23323FX42	Tubing, Nylon	F-9

TM 9-2320-279-20-3

Part No.	Description	Fig. No.
23323FX43	Tubing, Nylon	F-9
23323FX48	Tubing, Nylon	F-9
23323FX51	Tubing, Nylon	F-9
23323FX92	Tubing, Nylon	F-9
23323FX93	Tubing, Nylon	F-9
23854FX96	Cord	F-11
26578AX16	Seal	F-8
26927AX26	Weatherstrip, Belt	F-8
26947BX10	Molding, Quickedge	F-12
26947BX19	Molding, Quickedge	F-12
26947BX4	Molding, Quickedge	F-12
26947BX5	Molding, Quickedge	F-12
26987AX130	Tape, Roof	F-14
2794HX5	Hose, Push-On	F-4
3013503	Hose Assembly	F-4
3013504	Hose Assembly	F-4
3013505	Hose Assembly	F-4
3013506	Hose Assembly	F-4
3013507	Hose Assembly	F-4
3013508	Hose Assembly	F-4
3013509	Hose Assembly	F-4
3013510	Hose Assembly	F-4
3013511	Hose Assembly	F-4
3013512	Hose Assembly	F-4
3013513	Hose Assembly	F-4
3013514	Hose Assembly	F-4
3013515	Hose Assembly	F-4
3013516	Hose Assembly	F-4
3013517	Hose Assembly	F-4
3013519	Hose Assembly	F-4
3013520	Hose Assembly	F-4
3013521	Hose Assembly	F-4
3013522	Hose Assembly	F-4
3013523	Hose Assembly	F-4
3013524	Hose Assembly	F-4
3013525	Hose Assembly	F-4
3013526	Hose Assembly	F-4
3013527	Hose Assembly	F-4
3013528	Hose Assembly	F-4
3013530	Hose Assemb.y	F-4
3013531	. Hose Assembly	F-4
3013532	Hose Assembly	F-4
3013534	Hose Assembly	F-4
3013538	Hose Assembly	F-4
3013552	Hose Assembly	F-4
3013553	Hose Assembly	F-4
3013554	Hose Assembly	F-4
3013556	Hose Assembly	F-4
3013557	Hose Assembly	F-4
3013559	Hose Assembly	F-4

Part No.	Description	Fig. No
3013560	Hose Assembly	F-4
3013561	Hose Assembly	F-4
3013562	Hose Assembly	F-4
3013563	Hose Assembly	F-4
3013564	Hose Assembly	F-4
3013565	Hose Assembly	F-4
3013621	Tubing, Nylon	F-9
3013625	Tubing, Nylon	F-9
3013627	Tubing, Nylon	F-9
3013678	Tubing, Nylon	F-9
3013680	Tubing, Nylon	F-9
3013682	Tubing, Nylon	F-9
3013707	Tubing, Nylon	F-9
3013719	Tubing, Nylon	F-9
3013721	Tubing, Nylon	F-9
3013723	Tubing, Nylon	F-9
3013724	Tubing, Nylon	F-9
3013725	Tubing, Nylon	F-9
3013729	Tubing, Nylon	F-9
3013723	Tubing, Nylon	F-9
3013733	Tubing, Nylon	F-9
3013735	Tubing, Nylon	F-9
3014522	Wire Assembly	F-3
3014523	Wire Assembly	F-3
3014524	Wire Assembly	F-3
3014525	Wire Assembly Wire Assembly	F-3
3014526	Wire Assembly Wire Assembly	F-3
3014527	Wire Assembly Wire Assembly	F-3
3014529	Wire Assembly Wire Assembly	F-3
3014530	Wire Assembly Wire Assembly	F-3
3014531	Wire Assembly	F-3
3014532	Wire Assembly	F-3
3014533	Wire Assembly	F-3
3014534	Wire Assembly	F-3
3014535	Wire Assembly	F-3
3014536	Wire Assembly	F-3
3014539	Wire Assembly Wire Assembly	F-3
3014550	Wire Assembly	F-3
3014552	Lead, Electrical	F-3
3014553	Wire Assembly	F-3
3014554	Wire Assembly	F-3
3014554	Wire Assembly Wire Assembly	F-3
3014560	Wire Assembly Wire Assembly	F-3
3014586	Wire Assembly Wire Assembly	F-3
3014586	Wire Assembly Wire Assembly	F-4
	Wire Assembly Wire Assembly	F-3
3014607 3014608	Wire Assembly Wire Assembly	F-3
	Hose Assembly	F-4
3014613 31270AX41	Tubing, Nylon	F-9
31271AX103	Tubing, Nylon Tubing, Nylon	F-9

Part No.	Description	Fig. No.
31271AX131	Tubing, Nylon	F-9
31271AX134	Tubing, Nylon	F-9
31271AX137	Tubing, Nylon	F-9
31271AX170	Tubing, Nylon	F-9
31271AX200	Tubing, Nylon	F-9
31271AX202	Tubing, Nylon	F-9
31271AX227	Tubing, Nylon	F-9
31271AX40	Tubing, Nylon	F-9
31271AX72	Tubing, Nylon	F-9
31271AX89	Tubing, Nylon	F-9
32690AX56U	Hose Assembly	F-4
32850AX14	Hose, Defroster	F-4
32850AX16	Hose, Defroster	F-4
32850AX30	Hose, Heat	F-4
32850AX36	Hose, Defroster	F-4
32850AX51	Hose, Heat	F-4
33296AX-04RL	Hose Assembly	F-4
3487FX12W	Wire Assembly	F-3
3487FX16W	Wire Assembly	F-3
3487FX4W	Wire Assembly	F-3
3506FX4W	Wire Assembly	F-3
3506FX6W	Wire Assembly	F-3
35633AX60U	Cable	F-1
3609FX100W	Wire Assembly	F-3
3609FX3W	Wire Assembly	F-3
3639FX4W	Wire	F-3
3639FXBW	Wire	F-3
3681FX15U	Wire Assembly	F-3
4TC23	Rubber, Flat	F-12
40AW168-048	Hose	F-4
40AW168-070	Hose	F-4
40AW168-23	Hose	F-4
40AW168-25	Hose	F-4
40AW168-34	Hose	F-4
4126FX7W	Wire Assembly	F-3
45A073-P1	Tubing, Nonmetallic	F-9
45A073-P2	Tubing, Nonmetallic	F-9
45A073-P3	Tubing, Nonmetallic	F-9
45A078-P1	Tubing, Nonmetallic	F-9
45A080-P1	Tubing, Nonmetallic	F-9
45A080-P2	Tubing, Nonmetallic	F-9
45A080-P3	Tubing, Nonmetallic	F-9

Part No.	Description	Fig. No.
45A083-P1	Tube, Metallic	F-9
45A084-P1	Tube, Metallic	F-9
45A091-P1	Tube, Metallic	F-9
45A092-P1	Tube, Metallic	F-9
45A093-P1	Tube, Metallic	F-9
45A094-P1	Tube, Metallic	F-9
45A095-P1	Tube, Metallic	F-9
45A102-P1	Tube, Metallic	F-9
45A103-P1	Tube, Metallic	F-9
45A104-P1	Tube, Metallic	F-9
45A215-P1	Tubing, Nonmetallic	F-9
45A230-P3	Tubing, Nonmetallic	F-9
45A230-P5	Tube, Metallic	F-9
45A243-P4	Hose	F-4
45A286-P3	Tubing, Nonmetallic	F-9
45A286-P5	Tubing, Nonmetallic	F-9
45A330-P1	Tubing, Nonmetallic	F-9
45A331-P1	Tubing, Nonmetallic	F-9
45A338-P1	Tubing, Nonmetallic	F-9
45A339-P1	Tubing, Nonmetallic	F-9
45D001-P1	Wire	F-3
45D001-P10	Wire	F-3
45D001-P11	Wire	F-3
45D001-P12	Wire	F-3
45D001-P13	Wire	F-3
45D001-P14	Wire	F-3
45D001-P15	Wire	F-3
45D001-P2	Wire	F-3
45D001-P20	Wire	F-3
45D001-P21	Wire	F-3
45D001-P22	Wire	F-3
45D001-P23	Wire	F-3
45D001-P24	Wire	F-3
45D001-P25	Wire	F-3
45D001-P26	Wire	F-3
45D001-P27	Wire	F-3
45D001-P28	Wire	F-3
45D001-P29	Wire	F-3
45D001-P3	Wire	F-3
45D001-P30	Wire	F-3
45D001-P31	Wire	F-3
45D001-P32	Wire	F-3
45D001-P33	Wire	F-3
45D001-P34	Wire	F-3
45D001-P35	Wire	F-3
45D001-P36	Wire	F-3
45D001-P37	Wire	F-3
45D001-P38	Wire	F-3
46D001-P39	Wire	F-3
46D001-P40	Wire	F-3

Part No.	Description	Fig. No.
45D001-P41	Wire	F-3
45D001-P42	Wire	F-3
45D001-P43	Wire	F-3
45D001-P44	Wire	F-3
45D001-P45	Wire	F-3
45D001-P46	Wire	F-3
45D001-P47	Wire	F-3
45D001-P48	Wire	F-3
45D001-P49	Wire	F-3
45D001-P5	Wire	F-3
45D001-P59	Wire	F-3
45D001-P6	Wire	F-3
45D001-P61	Wire	F-3
45D001-P62	Wire	F-3
45D001-P63	Wire	F-3
45D001-P64	Wire	F-3
45D001-P7	Wire	F-3
45D001-P70	Wire	F-3
45D001-P8	Wire	F-3
45D001-P9	Wire	F-3
46754AX100U	Hose Assembly	F-3 F-4
46754AX87U	Hose Assembly	F-4
47369AX134U	Hose Assembly	F-4
47371AX14U	Hose Assembly	F-4
47371AX58U	Hose Assembly	F-4
47555AX12U	Hose Assembly	F-4
47554AX64U	Hose Assembly	F-4
47554AX67U	Hose Assembly	F-4
47554AX69U	Hose Assembly	F-4
47554AX75U	Hose Assembly	F-4
47554AX81U	Hose Assembly	F-4
47554AX87U	Hose Assembly	F-4
50543AX4W	Wire Assembly	F-3
50543AX6W	Wire Assembly	F-3
50543AX72W	Wire Assembly	F-3
5129157	Hose	F-4
5129157	Hose	F-4
54057-1	Heat Shrink	F-9

Manufactured	Items	(Cont)

Part No.	Description	Fig. No.
59745AX55	Strip, Locking	F-5
59747AX55	Channel, Locking	F-5
60264AX12U	Hose Assembly	F-4
60264AX18U	Hose Assembly	F-4
60580AX58	Hose, Vent	F-4
61340AX48U	Cable	F-1
62289AX26U	Hose Assembly	F-4
65058AX12	Hose	F-4
65058AX24	Hose	F-4
66341AX6	Hose	F-4
69390AX65U	Hose Assembly	F-4
69390AX67U	Hose Assembly	F-4
69390AX69U	Hose Assembly	F-4
69390AX79U	Hose Assembly	F-4
69390AX81U	Hose Assembly	F-4
75014-32-7-10	Chain, Pin	F-2
7720853-6-7/8	Wire	F-3
91431	Hose	F-4

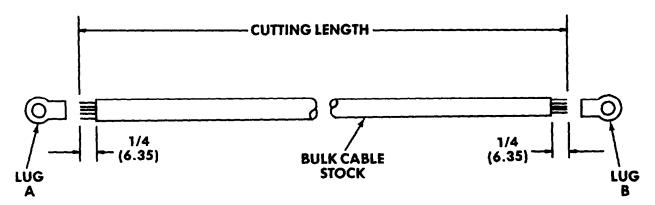


Figure F-1. Cable Assembly

- 1. Fabricate from bulk cable stock listed in table F-1.
- 2. Using wire cutters cut cable to length required in table F-1.
- 3. For cable assemblies, strip ends of cable 1/4 inch (6.35 mm).
- 4. Crimp required lugs listed in table F-1 to ends of cable.
- 5. Dimensions are in inches (mm).

Table F-1. Cables and Cable Assemblies

Cable/Assembly Part Number	Bulk Cable Part Number	Cutoff length Inches (mm)	Lug A	Lug B
			33043 33043 33043 29707 33043 601307-1 33043 33043 33043 33043	MS20659-122 MS20659-122 MS75004-1 33043 MS75004- 1 MS20659-122 MS20659-122 321877 321877
1927FX 14 1927FX23 1927FX4 1927FX5' 1927FX6 1927FX8 35633AX60U 61340AX48U	1927FX 1927FX 1927FX 1927FX 1927FX 1927FX 1262HX 1262HX	14 (355.6) 23 (584.2) 4 (101.6) 5 (127.0) 6 (152.4) 8 (203.2) 60 (1524.0) 48 (1219.2)	33043 33043	MS20659-122 MS20659-122

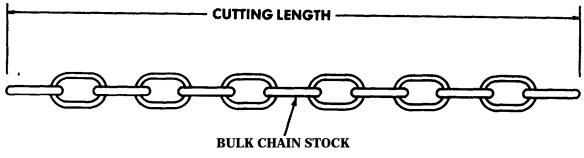


Figure F-2. Chains

- 1. Fabricate from bulk chain stock listed in table F-2.
- 2. Using hacksaw or suitable cutting device, cut chain to length required in table F-2.

Table F-2. Chains

Chain/Assembly Part Number	Bulk Chain Part Number	Cutoff Length Inches (mm)
104190B	75014-32	17 (431.8)
1341850	70105-32	4 (101.6)
1341850	70105-32	6 (152.4)
1318050	C43974	3 (76.2)
1354510-10	031-0424	10 (254.0)
1394510-12	031-0424	12 (304.8)
1394510-20	031-0424	20 (508.0)
1394510-26	031-0424	26 (660.4)
1394510-36	031-0424	36 (914.4)
1394510-84	031-0424	84 (2133.6)
1458530	75014-32	8 (203.2)
159	42C14856-305	7 (177.8)
75014-32-7-10	75014-32-7	10 (254.0)

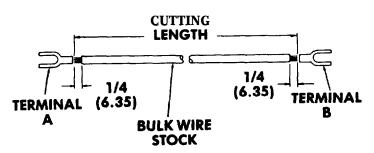


Figure F-3. Wire Assembly

- 1. Fabricate from bulk wire stock listed in table F-3.
- 2. Use wire cutters cut wire to length required in table F-3.
- 3. For wire assemblies strip ends of wire 1/4 inch (6.35mm).
 - Crimp required lugs or terminals onto ends of wire.

Dimensions are in inches (mm).

Table F-3. Wire and Wire Assemblies

4.

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
110966A6W	R-64951	6 (152.4)	Terminal DV14-250F1	Lug 55039-4
1244FX11	1244FX	11 (279.4)		
1244FX12	1927FX	12 (304.8)		
1244FX19	1244FX	19 (482.6)		
1244FX20	1244FX	20 (508.0)		
1244FX5	1927FX	5 (127.0)		
1244FX8	1244FX	8 (203.2)		
1244FX9	1927FX	9 (228.6)		
1313910W6	1927FX	6 (152.4)	Terminal DV14-250F1	Terminal C-50-501
1324080W4	10516FX	4 (101.6)	Lug MS20659-111	Lug MS25036-125
1324080W6	10516FX	6 (152.4)	Lug MS20659-111	Lug MS25036-125
1328110W	R-64951	45 (1143.0)	Terminal 3055	Contact 112532
134141A4W	1927FX	4 (101.6)	Lug MS25036-106	Lug MS25036-106
134141A6W	1927FX	6 (152.4)	Lug MS25036-106	Lug MS25036-106
134141A7W	1927FX	7 (177.8)	Lug MS25036-106	Lug MS25036-106
1465020W14	1927FX	14 (355.6)	Terminal 154818-3	Lug MS25036-106
1465020W20	1927FX	20 (508.0)	Terminal 154718-3	Lug MS25036-106
1927FX140	1927FX	140 (3556.0)		
1927FX16	1927FX	16 (406.4)		
1927FX18	1927FX	18 (457.2)		
1927FX19	1927FX	19 (482.6)		
1927FX20	1927FX	20 (508.0)		
1927FX21	1927FX	21 (533.4)		
1927FX22	1927FX	22 (558.8)		
1927FX24	1927FX	24 (609.6)		
1927FX55	1927FX	55 (1397.0)		
1927FX7	1927FX	7 (177.8)		
1927FX9	1927FX	9 (228.6)		
19998FX4W	1927FX	4 (101.6)	Lug 34158	Terminal 41450
19998FX6W	1927FX	6 (152.4)	Lug 34158	Terminal 41450

Table F-3. Wire and Wire Assemblies (Cont)

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
3014522	10516FX	20 (508.0)	Lug MS20659-132	Lug MS25036-125
3014523	1245FX	10 (254.0)	Lug MS25036-113	Lug 55013-8
3014524	1245FX	5 (127.0)	Lug MS25036-113	Lug 55013-8
3014525	10516FX	28 (711.2)	Lug MS20659-111	Lug MS20659-145
3014526	10516FX	16 (406.4)	Lug MS20659-111	Lug MS20659-145
3014527	1927FX	14 (355.6)	Terminal C19303-3203	Lug 55006-6
3014528	R-64951	16 (406.4)	Quick Disc DV14-250FI	Lug 34163
3014529	1245FX	20 (508.0)	Lug 55013-8	Lug 55031-8
3014530	1245FX	10 (254.0)	Lug 55013-8	Lug 55031-8
3014531	1245FX	21 (533.4)	Lug 55013-8	Lug 55031-8
3014532	1927FX	9 (228.6)	Contact 165429-1	
3014533	1927FX	6 (152.4)	Lug 320861	Lug 55006-6
3014535	10516FX	20 (508.0)	Lug MS20659-145	Lug MS25036-125
3014536	10516FX	16 (406.4)	Lug MS20659-111	Lug MS20659-132
3014550	1927FX	21 (533.4)	Lug 55006-6	Lug 55039-2
3014551	1927FX	4 (101.6)	Lug MS25036-108	Lug 55039-2
3014552	1927FX	4 (101.6)	Lug 55039-2	Lug 55006-6
3014553	1927FX	27 (685.8)	Lug 31903	Lug 55039-2
3014554	1927FX	24 (609.6)	Terminal 2965142	
3014555	R-64951	7 (177.0)		
3014560	1927FX	6 (152.4)	Lug 55006-6	Lug 55006-6
3014561	1927FX	10 (254.0)	Lug 55006-6	Lug 55006-6
3014562 3014563	1927FX	6 (152.4)	Lug MS25036-108	Lug MS25036-108
3014584				
3014586	4127FX	39 (990.6)	Lug 55013-9	Lug MS25036-113
3014587	10516FX	35 (889.0)	Lug MS20659-132	Lug MS20659-145
3487FX12W	1244FX	12 (304.8)	Lug 55006-6	Lug 55006-6
	1244FX 1244FX	16 (406.4)	Lug 55006-6	Lug 55006-6
3487FX16W		18 (457.2)	Lug 34161	Lug 34161
3487FX18W	1244FX 1244FX	52 (1320.8)	Lug 34161	Lug 34161
3487FX52W			0	O
3487FX4W 3506FX4W	1244FX 1927FX	4 (101.6) 4 (101.6)	Lug 55006-6	Lug 55006-6
0000111111		6 (152.4)	Lug 55006-6 Lug 55006-6	Terminal 41450
3506FX6W	1927FX 1244FX	6 (152.4)	Lug 34161	Terrimiai 41430
3514FX6W		18 (457.2)	Lug 34161	Lug 34164
3582FXl8W 3609FX100W	1244FX 1927FX	100 (2540.0)	Lug 55006-6	Lug 55006-6
		3 (76.2)	Lug 55006-6	Lug 55006-6
3609FX3W 3609FX72W	1927FX	72 (1828.8)	Lug 55006-6	Lug 55006-6
	1927FX		Lug 55006-6	Lug 55039-2
3639FX4W	1244FX	4 (101.6)	_	_
3639FX8W 3681FX15U	1244FX	8 (203.2)	Lug 55006-6	Lug 55039-2
	1245FX	15 (381.0)	Lug 55013-8	Lug MC25026 114
4126FX7W 45D001-P1	4127FX	7 (177.8)	Lug 55013-8	Lug MS25036-114
45D001-P1 45D001-P10	R-59095	24 (609.6) 65 (1651.0)		
42D001-L10	R-59118	05 (1051.0)	ļ	<u> </u>

Table F-3. Wire and Wire Assemblies (Cont)

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length inches (mm)	Terminal A	Terminal B
45D001-P11	R-59118	66 (1676.4)		
45D001-P12	R-59118	35 (889.0)		
45D001-P13	R-59118	44 (1117.6)		
45D001-P14	R-59118	27 (685.8)		
45D001-P15	R-59118	48 (1219.2)		
45D001-P2	R-59095	72 (1828.8)		
45D001-P20	R-59118	24 (609.6)		
45D001-P21	R-59118	180 (4572.0)		
45D001-P22	R-59118	66 (1676.4)		
45D001-P23	R-59118	84 (2133.6)		
45D001-P24	R-59120	40 (1016.0)		
45D001-P25	R-59120	65 (1651.0)		
45D001-P26	R-59120	6 (152.4)		
45D001-P27	R-59097	40 (1016.0)		

Tab/e F-3. Wire and Wire Assemblies (Cont)

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length inches (mm)	Terminal A	Terminal B
45D001-P28	R-59097	65 (1651.0)		
45D001-P29	R-59097	6 (152.4)		
45D001-P3	R-59095	90 (2286.0)		
45D001-P30	R-59122	96 (2438.4)		
45D001-P31	R-59122	65 (1651.0)		
45D001-P32	R-59122	6 (152.4)		
45D001-P33	R-59120	24 (609.6)		
45D001-P34	R-59120	65 (1651.0)		
45D001-P35	R-59116	96 (2438.4)		
45D001-P36	R-59116	65 (1651.0)		
45D001-P37	R-59116	6 (152.4)		
45D001-P38	R-59116	96 (2438.4)		
45D001-P39	R-59097	65 (1651.0)		
45D001-P40	R-59122	24 (609.6)		
45D001-P41	R-59096	96 (2438.4)		
45D001-P42	R-59096	65 (1651.0)		
45D001-P43	R-59096	24 (609.6)		
45D001-P44	R-59122	6 (152.4)		
45D001-P45	R-59122	6 (152.4)		
45D001-P46	R-59116	6 (152.4)		
45D001-P48	R-59120	6 (152.4)		
45D001-P49	R-59126	6 (152.4)		
45D001-P5	R-59070	40 (1016.0)		
45D001-P59	R-59118	12 (304.8)		
45D001-P6	R-59070	65 (1651.0)		
45D001-P60	R-59118	35 (889.0)		
45D001-P61	R-59118	25 (635.0)		
45D001-P62	R-59118	12 (304.8)		
45D001-P63	R-59116	6 (152.4)		
45D001-P64	R-59097	6 (152.4)		
45D001-P7	R-59070	66 (1676.4)		
45D001-P70	R-59116	6 (152.4)		
45D001-P8	R-59070	44 (1117.6)		
45D001-P9	R-59118	40 (1016.0)		I . MG07000 440
4802FX39W	4127FX	39 (990.6)	Lug 55013-8	Lug MS25036-113
50543AX4W	1927FX	4 (101.6)	Lug 55006-6	Terminal DV14-250F1
50543AX6W	1927FX	6 (152.4)	Lug 55006-6	Terminal DV14-250F1
50543AX72W	1927FX	72 (1828.8)	Lug 55006-6	Lug 55006-6
59032AX35W	10516FX	35 (889.0)	Lug MS20659-132	Lug MS20659-145
7720853-6-7/8	M13486-1-5	6.87 (174.6)		

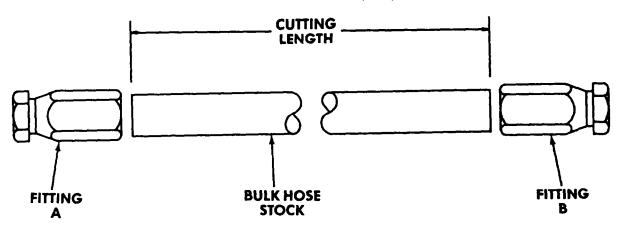


Figure F-4. Hose Assembly

- 1. Fabricate from bulk hose stock listed in table F-4.
- 2. Using fine tooth hacksaw or suitable cutting device cut hose to length required in table F-4.
- 3. For hose assemblies, place fitting A in vise and screw hose counterclockwise until hose bottoms in fitting. Back off 1/4 turn.
- 4. Place fitting B in vise and screw hose counterclockwise until hose bottoms. Back off 1/4 turn.
- 5. Dimensions are in inches (mm).

Table F-4. Hose and Hose Assemblies

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
107732A49U	152512RL	49 (1244.6)	Adapter 4741-12B	
109972A10U	FC300-04AQPRL	10 (254.0)	Adapter 4411-4S	Adapter 4411-4S
109972A20U	FC300-04AQPRL	20 (508.0)	Adapter 4411-4S	Adapter 4411-4S
109972A24U	FC300-04AQPRL	24 (609.6)	Adapter 441-4S	Adapter 4411-4S
109973A18U	FC300-04AQPRL	18 (457.2)	Elbow 190296-4S	Adapter 4411-4S
109974A21U	FC300-06RL	21 (533.4)	Adapter 4411-6S	Elbow 190261-6S
109974A70U	FC300-06RL	70 (1778.0)	Adapter 4411-6S	Elbow 190261-6S
109974A72U	FC300-06RL	72 (1828.8)	Adapter 4411-6S	Elbow 190261-6S
109980A35U	2781-12-RL	35 (889.0)	Adapter 4411-16S	Adapter 4411-16S
118971A90U	FC350-08RL	90 (2286.0)	Elbow 190296-8S	Adapter 4411-8S
119784A102U	FC350-08RL	102 (2590.8)	Elbow 190297-8S	Adapter 4411-8S
119784A105U	FC350-08RL	105 (2667.0)	Elbow 190297-8S	Adapter 4411-8S
1332080U75	FC350-08RL	75 (1905.0)	Elbow 190297-8S	Elbow 190297-8S
1332080U91	FC350-08RL	91 (2311.4)	Elbow 190297-8S	Elbow 190297-8S
1338990U57	FC350-04RL	57 (1447.8)	Elbow 190296-4S	Elbow 190296-4S
1340800U29	FC350-24	17 (431.8)	Adapter 4411-24S	Adapter 4411-24S
1341010	M62217/1-48	5 (127.0)		
1341020	70-255	4.5 (114.3)		
1341030	M62217/1-10	101 (2565.4)		
1341070	70-038	17 (431.8)		
1341080	70-100	39 (990.6)		
1343280	M62217/1-10	74 (1879.6)		
1370550	70-075 x 36	7.5 (109.5)		
1370560	70-075 x 36	30.5 (774.7)		
1433240U	FC300-16	38 (965.2)	Adapter 448-16S	Elbow 190261-16S

Tab/e F-4. Hose and Hose Assemblies (cont)

Hose Assembly	Bulk Hose	Cutoff Length	Fitting	Fitting
Part Number	Part Number	Inches (mm)	A	В
21021FX4	2556-6-RL	4 (101.6)		
23319FX70	4246-0410	70 (1778.0)		
2794HX5	L-81	5 (127.0)		
2AD977	200-01	61 (1549.4)		
2AT188	FC184-06	25 (635.0)		
2DD51	FC184-06	13 (330.2)		
2DD52	FC184-06	26 (660.4)		
2DD53	FC184-06	8.5 (215.9)		
2DD54	FC184-06	16 (406.4)		
3013512	FC300-16		Adapter 4411-16S	Elbow 190261-16S
3013513	FC300-12	35 (889.0)	Elbow 190261-12S	Elbow 19061-12S
3013514	FC300-04AQPRL	53 (1346.2)	Elbow 190296-4S	Elbow 190296-4S
3013515	FC350-04RL	46 (1168.4)	Elbow 190296-4S	Elbow 190296-4S
3013516	FC350-04RL	32 (812.8)	Elbow 190296-4S	Elbow 190296-4S
3013517	FC350-24	29 (736.6)	Adapter 4411-24S	Adapter 4411-24S
3013518	FC350-24	29 (736.6)	Adapter 411-24S	Adapter 411-24S
3013519	FC300-06RL	13 (330.2)	Elbow 190261-6S	Adapter 108391A
3013520	FC300-10	68 (1727.2)	Elbow 190296-10S	Elbow 190295-10S
3013521	FC300-16	24 (609.6)	Adapter 4411-16S	Elbow 190265-16S
3013522	FC350-24	29 (736.6)	Elbow 4779-24S	Adapter 4411-24S
3013523	FC300-20	73 (1854.2)	Adapter 4411-20S	Elbow 190261-20S
3013524	FC300-20	60 (1524.0)	Elbow 190261-20S	Adapter 4411-20S
3013525	FC300-06RL	76 (1930.4)	Elbow 190261-6S	Elbow 190261-6S
3013526	FC350-24	17 (431.8)	Elbow 4777-24S	Adapter 4411-24S
3013527	2575-4RL	122 (3098.8)	Adapter 4797-4B	Adapter 4797-4B
3013528	1503-16-RL	93 (2362.2)	Adapter 94-4411-16	Adapter 94-4411-16
3013530	1503-16-RL	55 (1397.0)	Adapter 94-4411-16	Adapter 94-4411-16
3013531	1503-16-RL	37 (939.8)	Adapter 94-4411-16	Adapter 94-4411-16
3013532	FC186-12	40 (1016.0)	Adapter 63-190600-12	Adapter 63-190600-12
3013533	FC350-12	134 (3403.6)	Adapter 4411-12S	Adapter 4411-12S
3013534	FC350-12RL	89 (2260.6)	Adapter 4411-12S	Adapter 4411-12S
3013535	FC350-04RL	8 (203.2)	Adapter 4401-4S	Adapter 4401-4S
3013536	FC350-04RL	5 (127)	Adapter 4401-4S	Adapter 4401-4S
3013537	FC350-04RL	10 (254)	Adapter 401-4S	Adapter 401-4S
3013538	FC350-04RL	5 (127.0)	Adapter 4401-4S	Adapter 4401-4S
3013552	FC350-10RL	19 (482.6)	Adapter 4411-10S	Adapter 4411-10S
3013553	1503-5-RL	17 (431.8)	Adapter MS24587-5	Adapter MS24587-5
3013554	FC350-04RL	19 (482.6)	Adapter 4411-4S	Adapter 4411-4S
3013555	FC350-06 RL	26 (660.4)	Adapter 4411-6S	Elbow 190261-6S
3013556	2556-6-RL	193 (4902.2)	Adapter 4739-6	Adapter 4739-6
3013557	FC350-04RL	156 (3962.4)	Adapter 4411-4S	Elbow 190296-4S
3013558	FC350-04L	38 (965.2)	Adapter 4411-4S	Elbow 190296-4S
3013559	FC350-04RL	95 (2413.0)	Adapter 4411-4S	Elbow 190296-4S
3013560	FC350-04RL	19 (482.6)	Adapter 4411-4S	Elbow 190296-4S
3013561	FC350-04RL	50 (1270.0)	Adapter 4411-4S	Elbow 190296-4S
3013562	FC350-04RL	88 (2235.2)	Adapter 4411-4S	Elbow 190296-4S

Tab/e F-4. Hose and Hose Assemblies (cont)

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
3013563	2556-10-RL	158 (4013.2)	Adapter 4797-10B	Adapter 4797-10B
3013564	2556-10-RL	64 (1625.6)	Adapter 4797-10	Adapter 4797-10
3013565	2556-10-RL	24 (609.6)	Adapter 4797-10	Adapter 4797-10
3013679	4246-0410	70 (1778)		
3014613	FC300-12	43 (1092.2)	Elbow 190261-128	Adapter 4411-128
12690AX56U	1503-16-RL	56 (1422.4)	Adapter 94-4411-16	Adapter 94-4411-16
12850AX14	22020	14 (355.6)		
12850AX16	22020	16 (406.4)		
12850AX30	22020	30 (762.0)		
12850AX36	22020	36 (914.4)		
12850AX51	22020	51 (1295.4)		
13296AX38U	FC350-04RL	38 (965.2)	Adapter 4411-4S	Adapter 4411-4S
40AW168-116	846-50	109 (2768.6)		
40AW168-140	846-50	140 (3556.0)		
40AW168-23	846-50	23 (584.2)		
40AW168-25	846-50	25 (635.0)		
40AW 168-34	846-50	34 (863.6)		
45A243-P4	592	60 ft (18.3m)		
46754AX100U	FC350-06RL	100 (2540.0)	Adapter 4401-6S	Adapter 4401-6S
46754AX87U	FC350-06RL	87 (2209.8)	Adapter 4401-6S	Adapter 4401-6S
17369AX134U	FC350-12	134 (3403.6)	Adapter 4411-12S	Adapter 4411-12S
47371AX14U	FC350-04RL	14 (355.6)	Adapter 4401-4S	Adapter 4401-4S
47371AX58U 47554AX12U	FC350-04RL FC350-06RL	12 (304.8)	Adapter 4401-4S Adapter 4411-6S	Adapter 4401-4S
47554AX64U	FC350-06RL	64 (1625.6)	Adapter 4411-6S	Adapter 4411-6S Adapter 4411-6S
	FC350-06RL	67 (1701.8)	•	Adapter 4411-6S
47554AX67U 47554AX69U	FC350-06RL	69 (1752.6)	Adapter 4411-6S Adapter 4411-6S	Adapter 4411-6S
47554AX75U	FC350-06RL	75 (1905.0)	Adapter 4411-6S	Adapter 4411-6S
47554AX81U	FC350-06RL	81 (2057.4)	Adapter 4411-6S	Adapter 4411-6S
47554AX87U	FC350-06RL	87 (2209.8)	Adapter 4411-6S	Adapter 4411-6S
5129157	223-8	12.25 (311.2)	Mapter 4411-05	Adapter 4411 05
5129157	223-8	27 (685.8)		
30264AX12U	FC350-04RL	12 (304.8)	Adapter 4411-4S	Adapter 4411-4S
30264AX18U	FC350-04RL	18 (457.2)	Adapter 4411-4S	Adapter 4411-4S
30264AX19U	FC350-04RL	(107.2)	Adapter 4411-4S	Elbow 190296-4S
50580AX58	2575-4RL	58 (1473.2)	Tradpter 1111 15	
55058AX12	2575-4RL	12 (304.8)		
35058AX24	2575-4RL	24 (609.6)		
66341AX6	2556-10-RL	6 (152.4)		
69390AX65U	FC350-08RL	65 (1651.0)	Adapter 4411-8S	Adapter 4411-8S
69390AX67U	FC350-08RL	67 (1701.8)	Adapter 4411-8S	Adapter 4411-8S
69390AX69U	FC350-08RL	69 (1752.6)	Adapter 4411-8S	Adapter 4411-8S
69390AX79U	FC350-08RL	79 (2006.6)	Adapter 4411-8S	Adapter 4411-8S
69390AX81U	FC350-08RL	81 (2057.4)	Adapter 4411-8S	Adapter 4411-8S
91431	846-50	7.25 (184.2)		

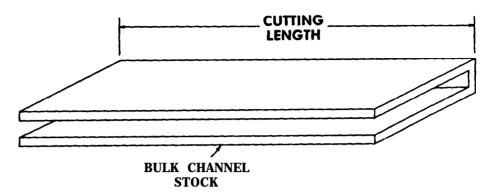


Figure F-5. Seal, Nonmetallic

- 1. Fabricate from bulk seal stock listed in table F-5.
- 2. Using suitable cutting tool cut seal to length required in table F-5.
- 3. Dimensions are in inches (mm).

Tab/e F-5. Seal

Seal Part Number	Seal Bulk Part Number	Cutoff Length Inches (mm)
118160A42	K2284CF118160A	42 (1066.8)
118160A48	K2284CF118160A	48 (1219.2)
118160A5	118160A	5 (127.0)
118160A51	118160A	51 (1295.4)
118160A54	118160A	54 (1371.6)
1467160-8	75000343	8 (203.2)
4TC23	4TC	23 (584.2)
59745AX55	AS-1597	55 (1397.0)
59747AX55	3509-R	55 (1397.0)

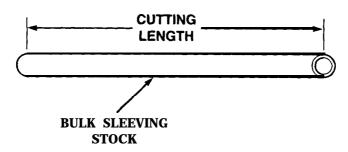


Figure F-6. Looms and Sleeving

- 1. Fabricate from bulk stock listed in table F-6.
- 2. Using suitable cutting tool cut to length required in table F-6.
- 3. Dimensions are in inches (mm).

Table F-6. Looms and Sleeving

Loom/Sleeving Part Number	Bulk Part Number	Cutoff Length Inches (mm)
119348A100	6749001	100 (2540.0)
119348A110	6749001	110 (2794.0)
119348A72	6749001	72 (1828.8)
119622A134	6753001	134 (3403.6)
119622A16	6753001	16 (406.4)
119622A290	6753001	290 (7366.0)
119622A4	6753001	4 (101.6)
119622A52	6753001	52 (1320.8)
119622A6	6753001	6 (152.4)
120025A	120025A	152 (3860.8)
120025A	120025A	197 (5003.8)
120025A	120025A	59 (1498.6)
1343990-3	6753001	3 (76.2)
1478600-2	M23053/5-106-0	2 (50.8)
1487200-46	FD425-32	46 (1168.4)

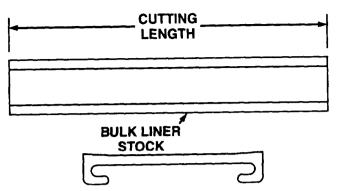


Figure F-7. Strap Liner

- 1. Fabricate from bulk stock listed in table F-7.
- 2. Using suitable cutting tool cut to length required in table F-7.
- 3. Dimensions are in inches (mm).

Table F-7. Strap Liner

Liner	Bulk Liner	Cutoff Length
Part Number	Part Number	Inches (mm)
124623A53	124623A	53 (1346.2)

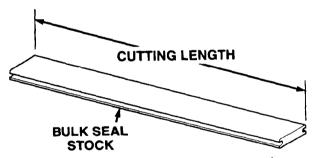


Figure F-8. Seals end Weatherstrip

- 1. Fabricate from bulk stock listed in table F-8.
- 2. Using suitable cutting tool cut to length required in table F-8 .
- 3. Dimensions are in inches (mm).

Table F-8. Seals and Weatherstrip

Seal Part Number	Bulk Seal Part Number	Cutoff Length Inches (mm)
125865A160	75001366	160 (4064.0)
125865A52	75001366	52 (1320.8)
125865A53	75001366	53 (1346.2)
1398190	NE-71A	4.5 (114.3)
26578AX16	X195	16 (406.4)
26927AX26	29627AX	26 (660.4)

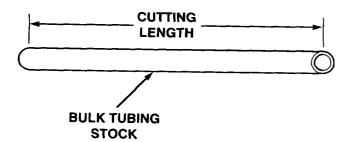


Figure F-9. Tubing

- 1. Fabricate from bulk stock listed in table F-9.
- 2. Using suitable cutting tool cut to length required in table F-9.
- 3. Dimensions are in inches (mm).

Table F-9. Tubing

Tube Part Number		
1356520	Flexible/5241K57	60 (1524.0)
1605150-57	PFT-8B-RED	57 (1447.8)
1605160-14	PFT-6B-RED	14 (355.6)
1605160-14	PFT-6B-RED	38 (965.2)
	PFT-6B-RED	48 (1219.2)
1605160-48	PFT-6B-RED	50 (1270.0)
1605160-50	PFT-6B-RED	52 (1320.8)
1605160-52	PFT-6B-RED	53 (1346.2)
1605160-53	PFT-6B-RED	60 (1524.0)
1605160-60	PFT-4A-RED	18 (457.2)
1605170-18	PFT-4A-GRN	48 (1219.2)
1605260-48	PFT-6B-GRN	101 (2565.4)
1605270-101	PFT-6B-GRN	114 (2895.6)
1605270-114	PFT-6B-GRN	157 (3987.8)
1605270-157	PFT-6B-GRN	56 (1422.4)
1605270-56	PFT-6B-GRN	60 (1524.0)
1605270-60	PFT-6B-GRN	8 (203.2)
1605270-8	PFT-6B-GRN	88 (2235.2)
1605270-88	PFT-4A-YEL	10 (254.0)
1605290-10	PFT-6B-YEL	100 (2540.0)
1605300-100	PFT-6B-YEL	101 (2565.4)
1605300-101	PFT-6B-YEL	14 (355.6)
1605300-14	PFT-6B-YEL	160 (4064.0)
1605300-160	PFT-6B-YEL	192 (4876.8)
1605300-192	PFT-6B-YEL	199 (5054.6)
1605300-199 1605300-71	PFT-6B-YEL	71 (1803.4)
1605300-71	PFT-6B-YEL	72 (1828.8)
1656490-100	PFT-10B-RED	100 (2540.0)
1656490-104	PFT-10B-RED	104 (2641.6)
1656490-111	PFT-10B-RED	111 (2819.4)
1656490-12	PFT-10B-RED	12 (304.8)

Tab/e F-9. Tubing

Tube		
Part Number	Description/Part Number	Inches (mm)
1656490-17	PFT-10B-RED	17 (431.8)
1656490-231	PFT-10B-RED	231 (5867.4)
1656490-50	PFT-10B-RED	50 (1270.0)
1656490-67	PFT-10B-RED	67 (1701.8)
1656490-77	PFT-10B-RED	77 (1955.8)
1656490-78	PFT-10B-RED	78 (1981.2)
1656500-16	PFT-10B-GRN	16 (406.4)
1656500-18	PFT-10B-GRN	18 (457.2)
1656500-192	PFT-10B-GRN	192 (4876.8)
1656500-258	PFT-10B-GRN	258 (6553.2)
1656500-35	PFT-10B-GRN	35 (889.0)
1656500-42	PFT-10B-GRN	42 (1066.8)
1656500-68	PFT-10B-GRN	68 (1727.2)
1656500-77	PFT-10B-GRN	77 (1955.8)
1948970-164	PFT-10B-YEL	164 (4165.6)
23319FX125	4246-0410	125 (3175.0)
23319FX172	4246-0410	172 (4368.8)
23319FX175	4246-0410	175 (4445.0)
23319FX198	4246-0410	198 (5029.2)
23319FX203	4246-0410	203 (5156.2)
23319FX214	4246-0410	214 (5435.6)
23319FX216	4246-0410	216 (5486.4)
23319FX227	4246-0410	227 (5765.8)
23319FX23	4246-0410	23 (584.2)
23319FX230	4246-0410	230 (5842.0)
23319FX235	4246-0410	235 (5969.0)
23319FX242	4246-0410	242 (6146.8)
23319FX251	4246-0410	251 (6375.4)
23319FX252	4246-0410	252 (6400.8)
23319FX259	4246-0410	259 (6578.6)
23319FX260	4246-0410	260 (6604.0)
23319FX35	4246-0410	35 (889.0)
23319FX37	4246-0410	37 (939.8)
23319FX38	4246-0410	38 (965.2)
23319FX359	4246-0410	359 (9118.6)
23319FX362	4246-0410	362 (9194.8)
23319FX51	4246-0410	51 (1295.4)
23319FX75	4246-0410	75 (1905.0)

Table F-9. Tubing

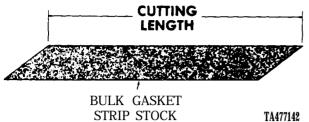
Tube Part Number		
23323FX100	3250-061	101 (2565.4)
23323FX101	3250-061	112 (2844.8)
23323FX112	3250-061	114(2895.6)
23323FX114	3250-061	116 (2946.4)
23323FX116	3250-061	155 (3937.0)
23323FX155	3250-061	159 (4038.6)
23323FX159	3250-061	175 (4445.0)
23323FX175	3250-061	179 (4546.6)
23323FX179	3250-061	173 (4343.0)
23323FX191	3250-061	192 (4876.8)
23323FX192	3250-061	194 (4927.6)
23323FX194	3250-061	195 (4953.0)
23323FX195	3250-061	199 (5054.6)
23323FX199	3250-061	· · · · · · · · · · · · · · · · · · ·
23323FX199 23323FX201	3250-061	201 (5105.4)
23323FX203	3250-061	203 (5156.2)
23323FX203 23323FX204	3250-061	204 (5181.6) 231 (5867.4)
23323FX204 23323FX231	3250-061	` ,
23323FX231 23323FX242	3250-061	242 (6146.8)
	3250-061	251 (6375.4)
23323FX251	3250-061	266 (6756.4)
23323FX266	3250-061	271 (6883.4)
23323FX271	3250-061	285 (7239.0)
23323FX285	3250-061	301 (7645.4)
23323FX301	3250-061	320 (8128.0)
23323FX320	3250-061	35 (889.0)
23323FX35	3250-061	42 (1066.8)
23323FX42 23323FX43		43 (1092.2)
23323FX48	3250-061	48 (1219.2)
	3250-061	51 (1295.4)
23323FX51	3250-061	92 (2336.8)
23323FX92 23323FX93	3250-061	93 (2362.2)
3013616	3250-061	68 (1727.2)
3013617	3250-101	18 (457.2)
3013618	3250-101	42 (1066.8)
3013619	3250-101	16 (406.4)
3013620	3250-101	35 (889)
3013624	3250-101	37 (939.8)
3013625	4246-0410	33 (838.2)
3013626	4246-0410	38 (965.2)
3013627	4246-0410	14 (355.6)
3013628	4246-0410	41(1041.4)
3013678	4246-0410	8 (203.2)
3013680	4246-0410	12 (304.8)
3013681	4246-0410 4246-0410	75 (1905)
	764U-0410	73 (1903)

Table F-9. Tubing

Tube	Bulk Tube	Cutoff Length
Part Number	Description/Part Number	Inches (mm)
3013682	4246-0410	5 (127.0)
3013683	4246-0410	23 (584.2)
3013684	4246-0410	125(3175)
3013685	3250-081	57 (1447.8)
3013686	3250-061	14 (355.6)
3013687	3250-061	50 (1270)
3013688	3250-061	60 (1524)
3013689	3250-061	53 (1346.2)
3013690	FC350-08	52 (1320.8)
3013691	4246-0410	18 (457.2)
3013705	4246-0410	48(1219.2)
3013706	3250-061	60 (1524)
3013707	3250-061	8 (203.2)
3013707	3250-061	56 (1422.4)
3013709	4246-0410	10 (254)
3013710	3250-61	14 (355.6)
3013710	3250-61	72 (1828.8)
3013711	3250-61	71(1803.4)
3013712	3250-101	111 (2819.4)
3013714	3250-101	100(2540)
3013714	3250-101	12 (304.8)
3013716	3250-101	67 (1701.8)
3013717	3250-101	78(1981.2)
3013717	3250-101	50 (1270)
3013719	Nylon/3250-101	17 (431.8)
3013713	Nylon/3250-101	104 (2641.6)
3013721	3250-061	74(1879.6)
3013723	3250-061	21(533.4)
3013724	3250-061	80 (2032.0)
3013726	3250-061	21 (533.4)
3013729	3250-061	74(1879.6)
3013730	3250-061	40 (1016.0)
3013731	3250-061	53 (1346.2)
3013733	3250-061	59 (1498.6)
3013734	3250-061	59 (1498.6)
3013734	3250-061	46 (1168.4)
3013736	3250-081	41(1041.4)
31270AX44	Nylon/3250-081	44 (1117.6)
31270AX44 31270AX60	Nylon/3250-081	60 (1524.0)
31271AX103	Nylon/3250-101	103 (2616.2)

Table F-9. Tubing

Tube Part Number	Bulk Tube Description/Part Number	Cutoff Length Inches (mm)
31271AX131	Nylon/3250-101	131 (3327.4)
31271AX134	Nylon/3250-101	134 (3403.6)
31271AX137	Nylon/3250-101	137 (3479.8)
31271AX170	Nylon/3250-101	170 (4318.0)
31271AX200	Nylon/3250-101	200 (5080.0)
31271A2C202	Nylon/3250-101	202 (5130.8)
31271AX227	Nylon/3250-101	227 (5765.8)
31271AX231	Nylon/3250-101	231 (5867.4)
31271AX40	Nylon/3250-101	40 (1016.0)
31271AX72	Nylon/3250-101	72 (1828.8)
31271AX89	Nylon/3250-101	89 (2260.6)
45A073-P1	Non-metallic/66-P	172 (4368.8)
45A073-P2	Non-metallic/66-P	48 (1219.2)
45A073-P3	Non-metallic/66-P	72 (1828.8)
45A078-P1	Non-metallic/88-P	84 (2133.6)
45A080-P1	Non-metsllic/88-P	12 (304.8)
45A080-P2	Non-metallic/88-P	40 (1016.0)
45A080-P3	Non-metallic/88-P	16 (406.4)
45A083-P1	Metallic/66-P	45.5 (1155.7)
45A084-P1	Metallic/ALT-6	74 (1879.6)
45A091-P1	Metallic/ALT-6	16 (406.4)
45A092-P1	Metallic/ALT-6	23 (584.2)
45A093-P1	Metallic/ALT-6	10.5 (266.7)
45A094-P1	Metallic/ALT-6	36 (914.4)
45A095-P1	Metallic/ALT-6	44 (1117.6)
45A102-P1	Metallic/ALT-6	24 (609.6)
45A103-P1	Metallic/ALT-6	16 (406.4)
45A104-P1	Metallic/ALT-6	31 (787.4)
45A215-P1	Non-metallic/66-SN	11 (279.4)
45A230-P3	Non-metallic/66-SN	43 (1092.2)
45A230-P5	Metallic/2575-4RL	2 (50.8)
45A286-P3	Non-metallic/66-SN	96 (2438.4)
45A286-P5	Non-metallic/66-SN	38 (965.2)
45A330-P1	Non-metallic/66-SN	21 (533.4)
45A331-P1	Non-metalliJ66-SN 34 (863.6)	
45A338-P1	Non-metallic/66-SN 36 (914.4)	
45A339-P1	Non-metallic/66-SN	46 (1168.4)
54057-1	Heat shrink/54057-3	3 (96.2)



- 1. Fabricate from bulk stock listed in table F-10.
- 2. Using knife or suitable cutting tool cut to length required in table F-10.
- 3. Dimensions are in inches (mm).

Figure F-10. Gasket Strip

Table F-10. Gasket Strip

Gasket Strip	Bulk Gasket	Cutoff Length
Part Number	Part Number	Inches (mm)
1398190	NE-71A	4.5 (114.3)
26927AX26	26927AX	26 (660.4)

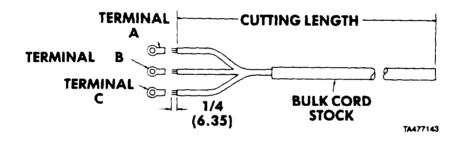


Figure F- 11. Cord Assembly

- 1. Fabricate from bulk cord stock listed in table F- 11.
- 2. Using suitable cutting tool cut to length required in table F-l 1.
- 3. For cord assembly, strip one end of cord so that wires are exposed.
- 4. Strip wire ends 1/4 in. (6.35 mm).
- 5. Crimp required lugs listed in table F-11 onto ends of cord.
- 6. Dimensions are in inches (mm).

Table F-11. Cord and Cord Assemblies

Cord/Assembly	Bulk Cord	Cutoff Length	Terminal	Terminal	Terminal
Part Number	Part Number	Inches (mm)	A	B	C
23854FX96 1408180U	23854FX 23854FX	SS(2438.4) 305(7747.0)	M525036-106	M525036-106	M525036-106

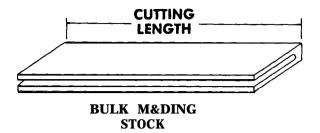


Figure F-12. Quickedge Molding

- 1. Fabricate from bulk molding stock listed in table F-12.
- 2. Using knife or suitable cutting tool cut to length required in table F-12.
- 3. Dimensions are in inches (mm).

Table F-12. Quickedge Molding

Molding	Bulk Liner	Cutoff Length
Part Number	Part Number	Inches (mm)
1467170-4	75000349	4 (101.6)
1467170-8	7000349	8 (203.2)
26947BX10	75000317	10 (254.0)
26947BX19	75000317	19 (482.6)
26947BX4	75000317	4 (101.6)

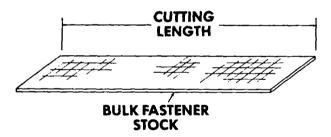


Figure F-13. Fastener

Fabricate from bulk stock listed in table F-13. Using suitable cutting tool cut to length required in table F-13. Dimensions are in inches (mm).

Table F-13. Fasteners

Fastener	Bulk Fastener	Cutoff Length
Part Number	Part Number	Inches (mm)
1519710	SJ-3542	5.25 (133.4)
1519720	SJ-3541	11.38 (289.0)

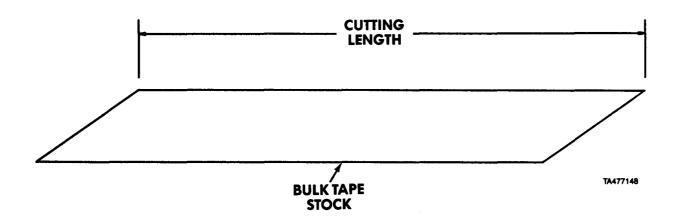


Figure F-14. Roof Tape

- Fabricate from bulk tape stock listed in table F-14.
 Using knife or suitable cutting tool cut to length required in table F-14.
 Dimensions are in inches (mm).

Table F-14. Roof Tape

Roof Tape	Bulk Tape	Cutoff Length
Part Number	Part Number	Inches (mm)
26987AX130	4508 X 3/4	130 (3302.0)

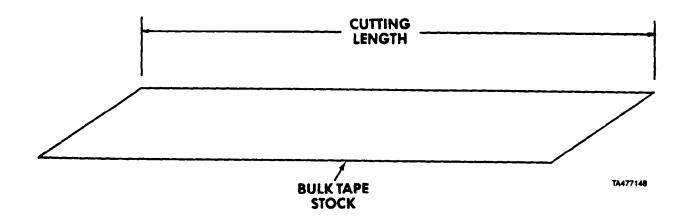


Figure F-14. Roof Tape

- Fabricate from bulk tape stock listed in table F- 14.
 Using knife or suitable cutting tool cut to length required in table F-14.
 Dimensions are in inches (mm).

Table F-14. Roof Tape

Roof Tape	Bulk Tape	Cutoff length
Part Number	Part Number	Inches (mm)
26987AX130	4508 x 3/4	130 (3302.0)

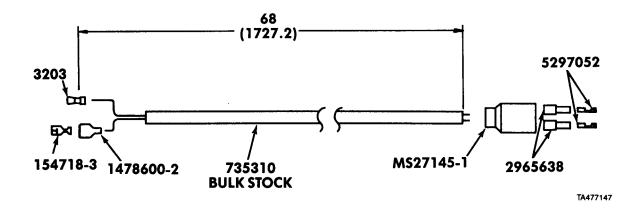
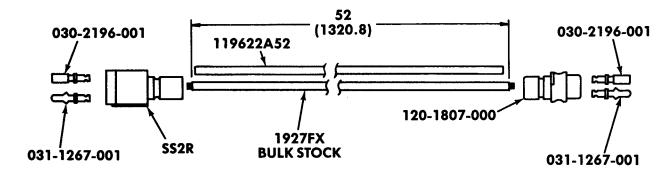


Figure F-15. 1350860W Wire Harness Assembly

- 1. Fabricate from 1927FX bulk stock.
- 2. Using wire cutters cut to 52 inches (1320.8 mm).
- 3. Strip ends of wire 1/4 in. (6.35 mm).
- 4. Crimp connectors SS2R and 120-1807-000 to ends of wire (figure F-15).
- 5. Attach terminals 031-1267-001 and 030-1296-001 to connectors.
- 6. Dimensions are in inches (mm).



TA477146

Figure F-16. 1354460W Wire Harness Assembly

- 1. Fabricate from 735310 bulk stock.
- 2. Using wire cutters cut to 68 inches (1727.2 mm).
- 3. Strip ends of wire 1/4 inch (6.35 mm).
- 4. Attach terminals 3203 and 154718-3 and sleeving 1478600-2 to wire strands (figure F-16).
- 5. Crimp connector MS27145-1 to end of wire.
- 6. Attach terminals 2965638 and bushings 5297052 to connector.
- 7. Dimensions are in inches (mm).

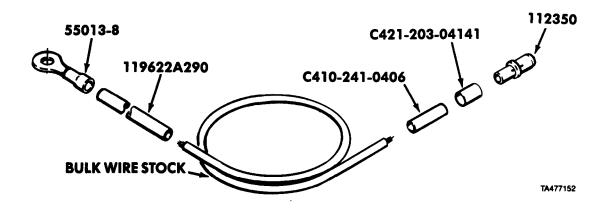


Figure F-17. 1353360W Wire Assembly

- 1. Fabricate from 4127-F bulk wire.
- 2. Using wire cutters cut wire to 60 inches (1524 mm).
- 3. Strip both ends of wire 1/4 inch (6.35 mm).
- 4. Cut 119622A290 sleeving to 59.5 inches (1511 mm) and slide over wire.
- 5. Crimp 55013-8 lug terminal onto end of wire.
- 6. Attach C410-241-0406 rubber bushing and C421-203-04141 sleeve bushing to end of wire.
- 7. Attach 112350 electrical contact of end of wire.
- 8. Dimensions are in inches (mm).

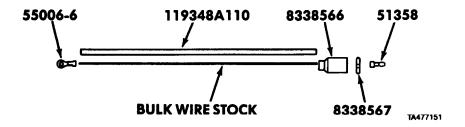


Figure 18. 1358560W Wire Assembly

- 1. Fabricate from 1927FX bulk wire.
- 2. Using wire cutters cut wire to 60 inches (1524 mm).
- 3. Strip both ends of wire 1/4 inch (6.35 mm).
- 4. Cut 119348A110 sleeving to 59.5 inches (1511 mm) and slide over wire.
- 5. Crimp 55006-6 lug terminal onto end of wire.
- 6. Attach 8338560 electrical shell to end of wire.
- 7. Install 8338567 slotted washer and 51358 electrical contact to shell.
- 8. Dimensions are in inches (mm).

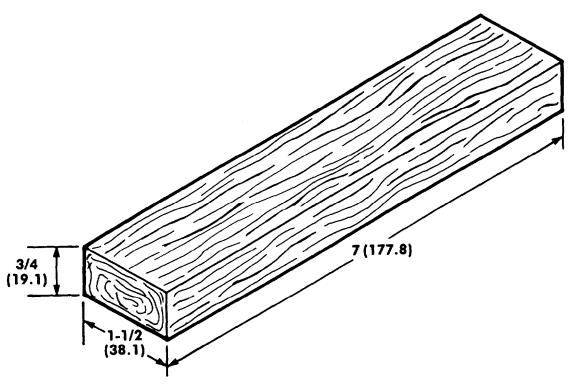


Figure F-19. Block, Battery Spacer

- 1. Fabricate from MML751 lumber stock.
- 2. Using saw and standard planing machine, cut stock to 3/4 (19.1) by 1-1/2 (38.1) by 7 (177.8).
- 3. All dimensions are in inches (mm).

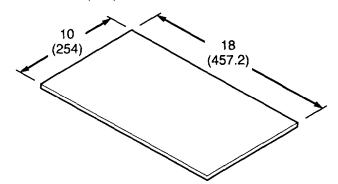


Figure F-20. Coated Cloth

- 1. Fabricate from 0.003 thick Buna-N nylon fabric.
- 2. Dimensions are in inches (mm).

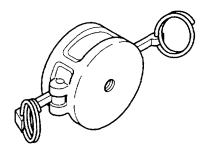


Figure F-21. Four Inch Camlock Test Cover

- 1. Fabricate from quick disconnect cap, P/N MS27028-17.
- 2. Drill and tap for 3/4 inch tee fitting.

Table F-15. M1977-CBT Components

The maintenance tasks and Maintenance Allocation Chart (MAC) group listed below contain specific information about the M1977-CBT (Common Bridge Transport).

TITLE	PARAGRAPH/APPENDIX
Muffler Assembly Removal/Installation	5-2
Side Panel Switches Removal/Installation	7-39
Battery Box and NATO Connector Removal/Repair/Installation	7-92
Self-Guided Coupler Removal/Repair/Installation (M1977-CBT Only)	14-15.1.1
Tire Carrier Removal/Installation	14-16
Left Front Fender Removal/Installation	16-14
Right Front Fender Removal/Installation	16-15
Stowage Box Removal/Installation (M977, M985, M1977-CBT)	16-33
Front Cable Guide Removal/Repair/Installation	17-4
Mirror Extension Assembly Removal/Installation (M98E1 and M1977-CBT Only)	18-11.1
Hydraulic Relief Valve Removal/Repair/Installation	19-4
Flow Priority Valve Removal/Installation	19-5
Maintenance Allocation Chart (Group No. 1503)	Appendix B

INDEX

Subject	Paragraph, Figure, Table
Subject	Number
A Actuator assembly, emergency valve (M978) removal/repair/installation/adjustment	25-15 25-16
Adjustment	
Emergency valve actuator (M978).	25-15
Primary pump hydraulic motor control cable and mount (M978)	19-15
Push rod (M978)	25-27
Air actuated flow valve and flange couplings, V5 (M978) removal/installation	25-18 25-19
Air control knob and cable assembly removal/installation	18-25
AIR ELIMINATOR, AE (M978) removal/installation	25-9
AIR ELIMINATOR check valve, AE (M978) removal/installation	25-10
Air horn removal/installation	18-7
Air horn control valve removal/installation	18-6
Air pressure gage removal/installation	22-2
Air vent box and screen, cab removal/installation	18-22
Airhose assembly and HAV HAND ACTUATED CONTROL VALVE (M978)	
Removal/Repair/Installation	18-16
Alarm, M-8 chemical, kit removal/installation	26-2
Amber reflectors removal/installation	18-13
Arctic heater kit, engine removal/installation	20-2 20-3
Arctic heater kit igniter, engine removal/installation	18-2
Armament equipment maintenance	21-1
Auxiliary electrical power system maintenance (M983)	27-1
Auxiliary equipment and special purpose kits, maintenance references	A-4
Auxiliary hydraulics relief valve, winch and (M983 without crane and M984)	
Removal/Installation	19-9
Auxiliary hydraulics relief valve bracket, winch and (M983 without crane and M984)	
Removal/Installation	19-10
Auxiliary pump (M978) removal/installation	25-7
AUXILIARY PUMP CHECK VALVE, V16 (M978) removal/repair/installation	25-29
Axle restraining chain removal	D-2
B	10.2
Blade and arm, windshield wiper removal/installation	
Body accessory maintenance.	18-1
Bottom load adapter, V2 (M978) removal/installation	
Bottom load PRECHECK VALVE, V12 (M978) removal/installation	25-26
Bottom load valve, V10 (M978) removal/installation	25-24
Box and screen, cab air vent removal/installation	18-22
Box, power distribution, and bracket (M983) removal/installation	27-3
Bracket and red reflector (M977, M978, M983, M984, M985) removal/installation	18-12
Removal/Installation	19-12
Bracket, control valve, self-recovery winch removal/installation	19-8
Bracket, mounting and heavy-duty selector valve (M984) removal/installation	19-11
Bracket, mounting, crane hydraulic fluid filter assembly (M977, M985)	
Removal/Repair/Installation	19-17
Bracket, mounting, DPG DIFFERENTIAL PRESSURE GAGE (M978) removal/installation	22-6
Bracket, power distribution box (M983) removal/installation	27-3

INDEX (CONT)	
Subject	Paragraph, Figure, Table Number
•	
Bracket, primary pump hydraulic motor control valve, and cable bracket (M978) Removal/Installation	19-12
Bracket, side mirror removal/installation	18-11 25-11
Bracket, winch and auxiliary hydraulics relief valve (M983 without crane and M984) Removal/Installation	19-10
Brackets and hydraulic lines Removal/Installation (brackets)	19-16
Removal/Installation (hydraulic couplings)	19-16
Replacement (lines)	19-16 19-6
Brackets, tanker piping (M978)	25-11
BULK DELIVERY VALVE, V18 (M978) removal/installation	25-31
C	
Cab air vent box and screen removal/installation	18-22
Cab heater assembly removal/installation	18-21
Cable and brackets, control valve removal/installation	19-6 25-38
Cable and cap (M978) removal/installation	18-25
Cable assembly, heater control removal/installation	18-23
Cable bracket, primary pump hydraulic motor control valve, bracket, and (M979) Removal/Installation	19-12
Cable, control, and mount, primary pump hydraulic motor (M978)	
Removal/Installation/Adjustment	19-15
Cable, control valve, and brackets, self-recovery winch removal/installation	19-6
Cable, defroster control removal/installation	18-24
Cable, emergency shut-off (M978) removal/installation	25-14 25-13
Cable, V1 emergency valve (M978) removal/installation	25-38
Cap and cable removal/installation	25-10
CHECK VALVE, V9 (M978) removal/repair/installation	
CHECK VALVE, V16 AUXILIARY PUMP (M978) removal/repair/installation	
Chemical alarm, M-8 removal/installation	
Clamp and bracket, typical (M978) removal/installation	
Coil and heater motor removal/installation	
Cold weather operation and maintenance references	A-4
Removal/Installation/Adjustment	19-15
Control cable assembly, heater removal/installation	
Control cable, defroster removal/installation	
Control knob and cable assembly, air removal/installation	
Control lever, self-recovery winch removal/installation	
Control rod, V6 (FUEL/DEFUEL CONTROL VALVE removal/installation	
Control valve, air horn removal/installation	16-0
Removal/Installation	19-12
Control valve bracket, self-recovery winch removal/installation	
Control valve cable and brackets, self-recovery winch removal/installation	
CONTROL VALVE control rod, V6 FUEL/DEFEL removal/installation	25-20
Control valve, heater removal/installation	18-18
Control valve levers, retriever (M984E1) removal/installation	
Control valve, retriever (M984E1) removal/installation	
Control valve, self-recovery winch removal/installation	19-7

Subject	Paragraph, Figure, Table Number
CONTROL VALVE, HAV HAND ACTUATED, and air-hose assembly	
Removal/Repair/Installation	18-16
Control valve, V6 FUEL/DEFUEL removal/installation	25-21
Control valve, windshield washer removal/installation	18-8
Control valve, windshield wiper, left and right removal/installation	
Coupling, typical pipe, and coupling gasket (M978) removal/installation	
Couplings, flange, and V5 air actuated flow valve (M978) removal/installation	
Crane hand pump (M983) removal/installation	
Crane hydraulic fluid filter assembly and mounting bracket (M977, M985)	
Removal/Repair/Installation	19-17
D	
Decontamination references	
Decontamination unit, M-13 removal/installation	26-3
Defroster control cable removal/installation	
Defroster hoses removal/installation	
DEFUEL/FUEL CONTROL VALVE control rod, V6 (M978) removal/installation	
DEFUEL/FUEL CONTROL VALVE, V6 (M978) removal/installation	
DELIVERY VALVE, V18, BULK removal/installation	
DIFFERENTIAL PRESSURE GAGE, DPG (M978) removal/installation	
DIFFERENTIAL PRESSURE GAGE mounting bracket, DPG (M978) removal/installation	
DISCHARGE LINE PRESSURE GAGE DLPG (M978) removal/installation	
Distribution box, power, and bracket (M983) removal/installation	
DPG, DIFFERENTIAL PRESSURE GAGE (M978) removal/installation	
DPG, DIFFERENTIAL PRESSURE GAGE mounting bracket (M978) removal/installation	
Drain 2500 gallon tank (M978)	
DRAIN VALVE, V15 (M978) removal/installation	
ED EDUCTOR assembly (M978) removal/repair/installation	25-33
Electrical power system maintenance, M983 auxiliary	27-1
Elements, filter-separator (M978) removal/installation	
ELIMINATOR, AE AIR (M978) removal/installation	25-9
ELIMINATOR, AE AIR, check valve (M978) removal/installation	
Emergency shut-off cable (M978) removal/installation	25-14
Emergency valve actuator assembly (M978) removal/repair/installation/adjustment	
Emergency valve cable, V1 (M978) removal/installation	
Emergency valve, V1 (M978) removal/installation	
Engine arctic heater kit removal/installation	
Engine arctic heater kit igniter removal/installation	
Equipment, armament	C-1
F	C-1
Filter assembly and mounting bracket, crane hydraulic fluid (M977, M985)	
Removal/Repair/Installation.	. 19-17
Filter-separator (M978) removal/repair/installation	
Filter-separator elements (M978) removal/installation	
Filter-separator maintenance	
Filter unit, gas particulate removal/installation	
Flange couplings and V5 air actuated flow valve (M978) removal/installation	
Flow priority valve (M978) removal/installation	
Flow priority valve (M978) removal/installation	
Flow valve, air actuated, V5, and flange couplings (M978) removal/installation	
Flowmeter strainer assembly (M978) removal/installation	
110 mileter strainer assembly (111/10) removal/mountation	25 0

Subject	Paragraph, Figure, Tabl Number
Fluid filter assembly and mounting bracket, crane hydraulic (M977, M985)	
Removal/Repair/Installation	19-17
Forms, reference	A-3
Front support, machine gun ring removal/installation	21-3
FUEL/DEFUEL CONTROL VALVE control rod, V6, (M978) removal/installation	25-20
FUEL/DEFUEL VALVE, V6 (M978) removal/installation	25-21
Fuel nozzle assembly (M978) removal/installation	18-14
Fuel strainer, tank (M978) removal/repair/installation	25-37
Fuel transfer hose (M978) removal/installation	18-15
Fuel transfer hose (M978) removal/installation	
Gage, air pressure removal/installation	22-2
GAGE, DLPG DISCHARGE LINE PRESSURE (M978)	22-3
GAGE, DPG DIFFERENTIAL PRESSURE (M978) removal/installation	22-5
GAGE, DPG DIFFERENTIAL PRESSURE, mounting bracket (M978) removal/installation	22-6
Gage, non-electrical maintenance	22-1
GAGE, VNPG VENTURI/NOZZLE PRESSURE (M978) removal/installation	22-4
Gas particulate filter unit removal/installation	26-4
Gasket, coupling, and typical pipe coupling removal/installation	25-11
Generator set (M983) removal/installation	27-2
GRAVITY VALVE, V17 (M978) removal/installation	25-30
Gun ring front support, machine removal/installation	21-3
Gun ring, machine removal/installation	21-2
Gun ring rear support, machine removal/installation	21-4
Hand pump, hydraulic (M983) removal/installation	19-2
Removal/Repair/Installation	18-16
Heater assembly, cab removal/installation	
Heater controllable assembly removal/installation	18-23
Heater control valve removal/installation	
Heater, engine arctic kit removal/installation	
Heater, engine arctic kit igniter removal/installation	
Heater hose removal/installation	18-17
Heater motor and coil removal/installation	
Heater resistor removal/installation	
Heavy-duty selector valve and mounting bracket (M984) removal/installation	
Horn, air removal/installation	
Horn, air, control valve removal/installation	18-15
Hose, fuel transfer (M978) removal/installation	10 17
Hose, heater removal/installation.	18-4
Hoses and nozzles, windshield washer reservoir removal/installation	18-26
Hoses, defroster removal/installation	10 20
Removal/Repair/Installation	19-17
Hydraulic hand pump (M983) removal/installation	19-2
Hydraulic lines and brackets	
Removal/Installation (brackets)	19-16
Removal/Installation (hydraulic couplings)	10.11
Replacement (lines)	10.11
Hydraulic motor control cable and mount, primary pump (M978)	-
Removal/Installation/Adjustment	19-15

	Paragraph, Figure, Table
Subject	Number
Hydraulic motor control valve, bracket, and cable bracket, primary pump (M978) Removal/Installation	19-12
Hydraulic motor, primary pump (M978) removal/installation	25-5
Removal/Installation	19-10
Hydraulic relief valve, self-recovery winch removal/repair/installation	19-4
Hydraulic relief valve, winch and auxiliary (M983 without crane and M984)	
Removal/Installation	19-9
Hydraulic system maintenance	19-1
Igniter, engine arctic heater kit removal/installation	20-3
Jet level sensor, V19 (M978) removal/installation	25-32
Kit, arctic, maintenance	20-1
Kit, engine arctic heater removal/installation	20-2
Kit, gas particulate filter unit removal/installation	26-4
Kit, generator set (M983) removal/installation	27-2
Kit igniter, engine arctic heater removal/installation	20-3
Kit, M-8 chemical alarm removal/installation	26-2
Kit, M-13 decontamination unit removal/installation	26-3
Kit, maintenance, arctic	20-1
Kit, maintenance, radio	24-2
Kit, power distribution box and bracket (M983) removal/installation	27-3
Kit, radio	24.1
Maintenance	24-1 24-2
Removal/Installation	24-2 21-6
Knob and cable assembly, air control removal/installation	
	10 23
Left and right windshield wiper control valve removal/installation	18-9
Level sensor, V19 jet (M978) removal/installation	25-32
Lever, self-recovery winch control	19-3
Limits, torque, Appendix E	E-1
Line, DLPG DISCHARGE, PRESSURE GAGE (M978) removal/installation	
Line valve, suction, V3 (M978) removal/installation	
Lines, hydraulic replacement	19-16
M-8 Chemical alarm removal/installation	26-2
M-13 Decontamination unit removal/installation	
Machine gun ring removal/installation	21-2
Machine gun ring front support removal/installation	21-3
Machine gun ring rear support removal/installation	21-4
Maintenance allocation chart (MAC), Appendix B	
Maintenance and repair references	
Maintenance functions	
Metric torque limits (M983 crane).	E-3
Mirror assembly removal/installation	
Mirror bracket, side removal/installation.	
Motor and coil, heater removal/installation.	

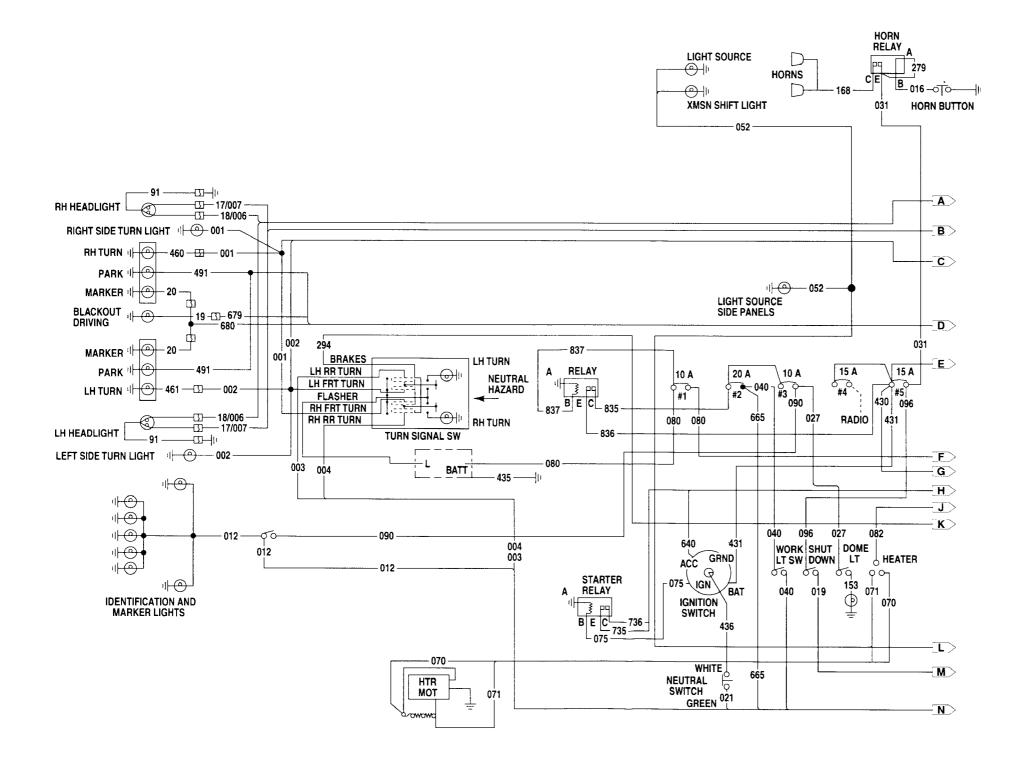
Subject	Figure, Table Number
Motor, hydraulic, primary pump (M978) removal/installation	25-5
Motor, hydraulic, primary pump, control cable and mount (M978) removal/installation Motor, hydraulic, primary pump, control valve, bracket, and cable bracket (M978)	
Removal/Installation	19-12
Motor, windshield wiper removal/installation	
Mount and control cable, primary pump hydraulic motor (M978) Removal/Installation/Adjusment	
Mounting bracket, crane hydraulic fluid filter assembly (M977, M985)	
Removal/Repair/Installation	
Mounting bracket, DPG DIFFERENTIAL PRESSURE GAGE (M978) removal/installation	
Mounting bracket, heavy-duty selector vale (M984) removal/installation	
Mounting kit, rifle removal/installation	
Non-electrical gage maintenance	22-1
Nozzle assembly, fuel (M978) removal/installation	
NOZZLE, VENTURI PRESSURE GAGE (M978) removal/installation	
Nozzles and hoses, windshield washer reservoir removal/installation	
Operator's platform support removal/installation	21-5
Particulate filter unit, gas removal/installation	26-4
Pilot valve assembly, V14 (M978) removal/installation	25-28
Pipe coupling and coupling gasket, typical (M978) removal/installation	
Piping brackets, tanker (M978)	25-7
Piping, tanker (M978)	25-11
Platform support, operator's removal/installation	
Power distribution box and bracket (M983) removal/installation	
Power system maintenance, M983 auxiliary electrical	
PRECHECK VALVE, V12 bottom load (M978) removal/installation	
Preparation for towing	
Pressure gage, air removal/installation	
PRESSURE GAGE, DLPG DISCHARGE LINE (M978) removal/installation	
PRESSURE GAGE, DPG DIFFERENTIAL (M978) removal/installation	
PRESSURE GAGE mounting bracket, DPG DIFFERENTIAL (M978) removal/installation	
PRESSURE GAGE, VNPG VENTURI/NOZZLE (M978) removal/installation	
Primary pump (M978) removal/installation	
Primary pump hydraulic motor (M978) removal/installation	
Removal/Installation/Adjustment	19-15
Removal/Installation	19-12
Priority flow valve (M978, M984) removal/installation	19-5
PROBE valve, SAMPLING, SP (M978) removal/installation	25-35
Cold weather operation and maintenance	A-4
Decontamination	
General	
Maintenance and repair	
Maintenance of auxiliary equipment and special purpose kits	
Safety	
Vehicle operation	A-4

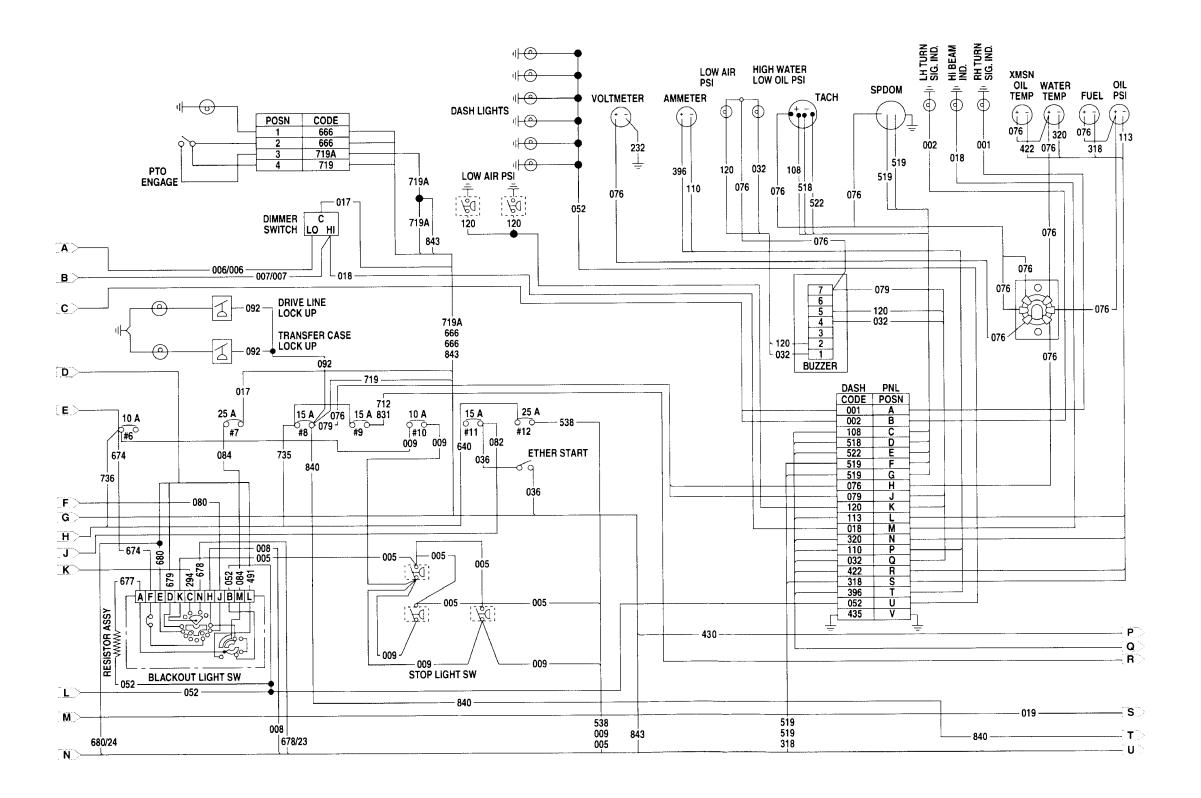
Subject	Paragraph, Figure, Table Number
•	r Girib oi
Publication references (cont)	A 4
Warranty	
PUMP, AUXILIARY (M978) removal/installation	
PUMP, AUXILIARY, CHECK VALVE, V16 (M978) removal/repair/installation	
Pump, hand, hydraulic (M983) removal/installation	
Pump, primary (M978) removal/installation	
Pump, primary, hydraulic motor (M978) removal/installation	
Push rod and vent valve, V13 (M978) removal/installation/ adjustment	25-27
Radio kit maintenance	24.1
Radio kit removal/installation	
Rear support, machine gun ring removal/installation	
Red reflector and bracket (M977, M978, M983, M984, M985) removal/installation	
REEL VALVES, V7/V8 (M978) removal/installation	
References, Appendix A	
Reflector and bracket, red (M977, M978, M983, M984, M985) removal/installation	
Reflectors, amber removal/installation	18-13
Relief valve bracket, winch and auxiliary hydraulic (M983 without crane and M984)	10.10
Removal/Installation	
Relief valve, hydraulic, self-recovery winch removal/repair/installation	
Relief valve, V4 (M978) removal/installation/adjustment	25-18
Relief valve, winch and auxiliary hydraulics (M983 without crane and M984)	10.0
Removal/Installation	
Reservoir, hoses and nozzles, windshield washer removal/installation	
Resistor, heater removal/installation	
Retriever control assembly (M984El) removal/installation	
Retriever control valve levers (M984El) removal/installation	
Rifle mounting kit removal/installation	
Right and left windshield wiper control valve removal/installation	
Ring, machine gun removal/installation	
Ring, machine gun, front support removal/installation	
Ring, machine gun, rear support removal/installation	
Rod, control, V6 FUEL/DEFUEL CONTROL VALVE (M978) removal/installation	25-20
Rod push, and V13 vent valve (M978) removal/installation/adjustment	25-27
S	A 4
Safety references	A-4
SAMPLING PROBE valve, SP (M978) removal/installation	25-35 18-22
Screen, cab air vent box removal/installation	
Selector valve removal/repair/installation	
Selector valve (M983) removal/installation/repair	
Selector valve and mounting bracket, heavy-duty (M984) removal/installation	
Self-recovery winch control lever removal/installation	
Self-recovery winch control valve removal/installation	
Self-recovery winch control valve bracket removal/installation	
Self-recovery winch control valve cable and brackets removal/installation	
Sensor, jet level, V19 (M978) removal/installation	
Separator elements, filter (M978) removal/installation	
Separator, filter (M978) removal/repair/installation	
Separator, filter, maintenance	
Set, generator (M83) removal/installation	
Shut-off cable, emergency (M978) removal/installation	
Side mirror bracket removal/installation	
SP SAMPLING PROBE valve (M978) removal/installation	. 25-35

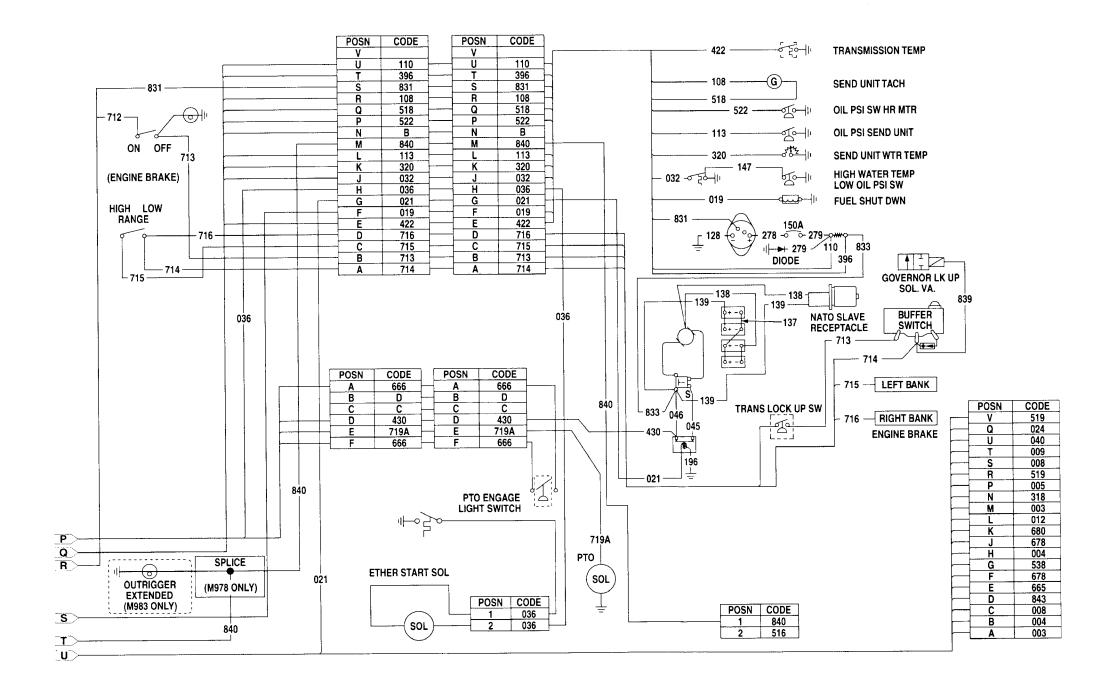
Subject	Paragraph, Figure, Table Number
Special tool and test equipment list	B-1
Strainer assembly, flowmeter (M978) removal/installation	
Strainer, fuel, tank (M978) removal/repair/installation	
Suction line valve, V3 (M978) removal/installation	
Supplies, expendable and materials list	
Support, machine gun ring front removal/installation	
Support, machine gun ring rear removal/installation	
Support, operator's platform removal/installation	21-5
Tank, 2500 gallon, drain (M978)	25-3
Tanker (M978) maintenance.	
Tanker fuel strainer (M978) removal/repair/installation	
Tanker piping (M978)	
Tanker piping	Т 25-2
Tanker piping	
Tanker piping brackets	
Typical clamp and bracket removal/installation	
Typical pipe coupling and coupling gasket removal/installation	25-11
Tanker piping brackets (M978)	
Tanker tubing (M978)	1 25 /
Tubing removal/installation	25-4
Typical tubing removal/installation	
Tool and test equipment list	
Torque limits, Appendix E	
How to use torque tables	
Table E-1 (dry fasteners)	
Table E-2 (wet fasteners)	
Table E-3 (metric, M983 crane)	
Towing, preparation	
Transfer hose, fuel (M978) removal/installation	
Tubing (M978) removal/installation	
Tubing, typical (M978) removal/installation	
Typical clamp and bracket (M978) removal/installation	25-11
Typical pipe coupling and coupling gasket (M978) removal/installation	25-11
Typical tubing (M978) removal/installation	25-4
V1 emergency valve (M978) removal/installation	25-12
V1 emergency valve cable (M978) removal/installation	25-13
V2 bottom load adapter (M978) removal/installation	
V3 suction line valve (M978) removal/installation	
V4 relief valve (M978) removal/installation/adjustment	
V5 air actuated flow valve and flange couplings (M978) removal/installation	
V6 FUEL/DEFUEL CONTROL VALVE (M978) removal/installation	
V6 FUEL/DEFUEL CONTROL VALVE (M978) removal/installation	
V7/V8 REEL VALVES (M978) removal/installation	
V9 CHECK VALVE (M978) removal/repair/installation	
V10 bottom load valve (M978) removal/installation	
V11 FLOW VALVE (REG) (M978) removal/installation	
V12 bottom load PRECHECK VALVE (M978) removal/installation	
V12 vent valve and push rod (M978) removal/installation/adjustment	
V14 pilot valve assembly (M978) removal/installation	
V14 phot varve assembly (M978) removal/installation	
V16 AUXILIARY PUMP CHECK VALVE (M978) removal/installation	
- 1 - 0 - 1 - 0 - 1 - 1 - 1 - 1 - 1 - 1	

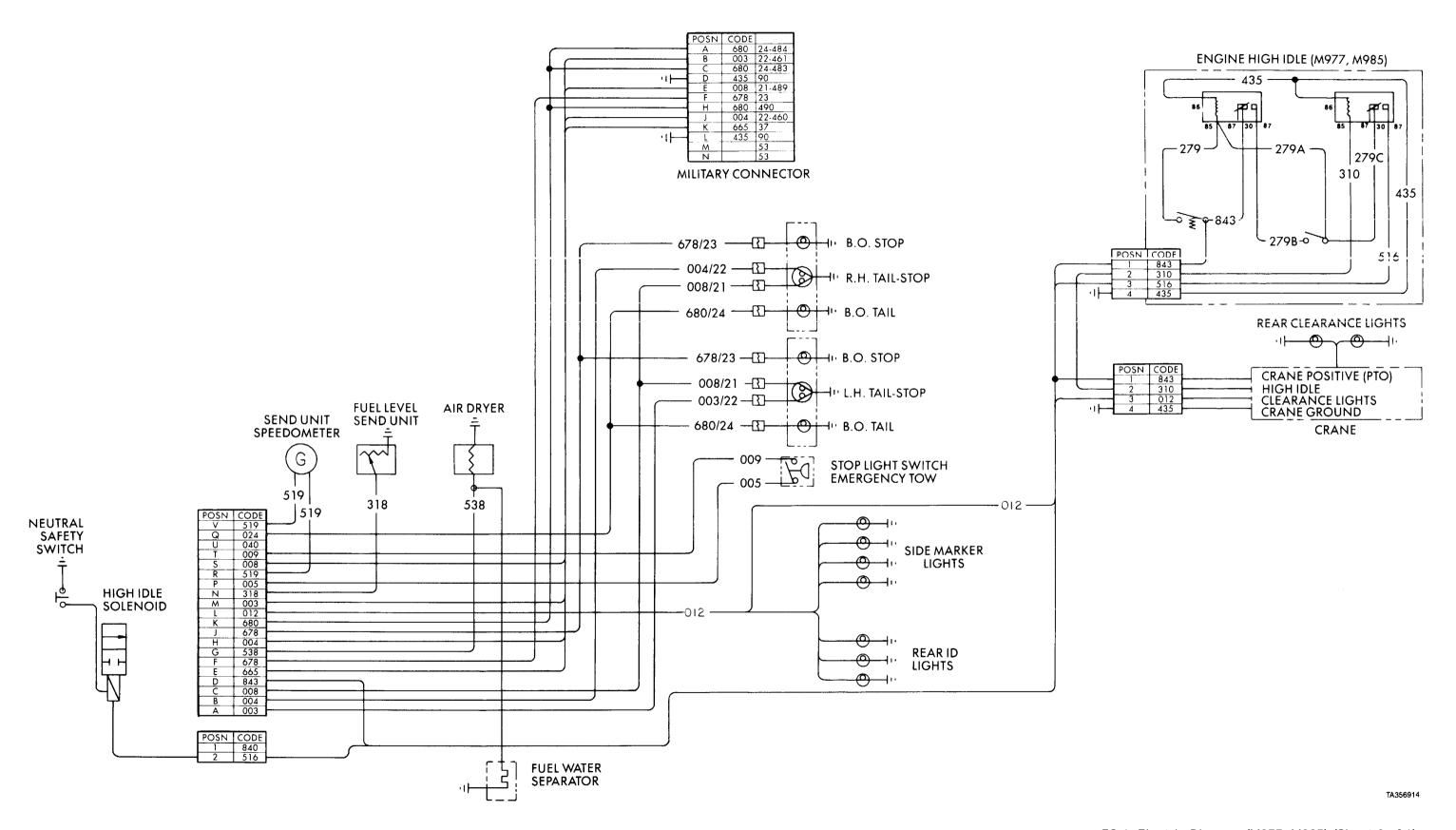
Subject	Paragraph, Figure, Table Number
V17 GRAVITY VALVE (M978) removal/installation	25-30
V18 BULK DELIVERY VALVE (M978) removal/installation	
V19 jet level sensor (M978) removal/installation	
Valve, air horn control removal/installation	
Valve assembly, V14 pilot (M978) removal/installation	
VALVE, AUXILIARY PUMP CHECK, V16 (M978) removal/repair/installation	
VALVE, bottom load PRECHECK, V12 (M978) removal/installation	
Valve, bottom load, V10 (M978) removal/installation	
Valve bracket, winch and auxiliary hydraulic relief (M983 without crane and M984)	23-24
Removal/Installation	19-10
VALVE, BULK DELIVERY, V18 (M978) removal/installation	
Valve cable, control, and brackets, self-recovery winch removal/installation	
Valve cable, V1 emergency (M978) removal/installation	
Valve, check, AE AIR ELIMINATOR (M978) removal/installation	
VALVE, CHECK, V9 (M978) removal/repair/installation	
Valve, control, bracket, self-recovery winch removal/installation	
Valve, CONTROL, FUEL/DEFUEL, V6 (M978) removal/installation	
VALVE, control rod, V6 FUEL/DEFUEL CONTROL (M978) removal/installation	
Valve, control, retriever (M984E1) removal/installation	
Valve, control, self-recovery winch removal/installation	
VALVE, DRAIN, V15 (M978) removal/installation	
Valve, emergency, actuator assembly (M978) removal/repair/installation/adjustment	
Valve, emergency, V1 (M978) removal/installation	
Valve, flow limiting (M978) removal/installation	
Valve, flow priority (M978, M984) removal/installation	
VALVE, FLOW, (REG), V11 (M978) removal/installation.	
Valve, flow, V5 air actuated, and flange couplings (M978) removal/installation	
VALVE, HAV HAND ACTUATED CONTROL and airhose assembly (M978)	25-17
Removal/Repair/Installation	18-16
Valve, heater control removal/installation	
Valve, heavy-duty selector, and mounting bracket (M984) removal/installation	
Valve, hydraulic relief, self-recovery winch removal/repair/installation	
VALVE, PRECHECK, bottom load, V 12 (M978) removal/installation	
Valve, relief, V4 (M978) removal/installation/adjustment	
Valve, selector removal/repair/installation	
Valve, selector (M983) removal/repair/installation	
Valve, SP SAMPLING PROBE (M978) removal/installation	
Valve, suction line, V3 (M978) removal/installation	25-17
Valve, V1 emergency (M978) removal/installation	
Valve, V3 suction line (M978) removal/installation	25-17
Valve, V4 relief (M978) removal/installation/adjustment	
VALVE, V6 FUEL/DEFUEL CONTROL (M978) removal/installation	25-21
VALVE, V9 CHECK (M978) removal/repair/installation	25-23
Valve, V10 bottom load (M978) removal/installation	
VALVE, V11 FLOW (REG), (M978) removal/installation	25-24 25-25
VALVE, V11 PEOW (REG), (M978) removal/installation	
VALVE, V15, BRAIN (M978) TEHIOVAR/IIISTAIIAUOII	25-29
VALVE, V16, AUXILIARY FUMP CHECK (M978) removal/repair/installation	25-29 25-30
VALVE, V17, GRAVITT (M978) Tellioval/installation	25-31
Valve, virs, BULK DELIVERY (M9/8) removal/installation	43-31
Removal/Installation	19-9
Valve, windshield washer control removal/installation	19-9 18-8
Valve, windshield wiper control, left and right removal/installation	
THE TOTAL TERM OF THE WINDOW CONTROL OF THE HEALT TOTAL VALUE AND AND THE TRANSPORTER TO THE TRANSPORT OF THE TOTAL VALUE AND THE TRANSPORTER TO THE TRANSPORT OF THE TOTAL VALUE AND THE TRANSPORTER TO THE TRANSPORT OF THE TOTAL VALUE AND THE TRANSPORT OF THE TOTAL VALUE AND THE TOTAL V	10-7

VALVES, V7/V8 REEL (M978) removal/installation. Vehicle operation references. Vent, and push rod V13 (M978) removal/installation/ adjustment. 25-Vent box and screen, cab air removal/installation Vent valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment 25-Vent Valve and push rod, V13 (M978) removal/installation/ adjustment	graph, , Table nber
Vehicle operation references.A-4Vent, and push rod V13 (M978) removal/installation/ adjustment.25-Vent box and screen, cab air removal/installation18-Vent valve and push rod, V13 (M978) removal/installation/ adjustment25-VENTURI assembly, VT (M978) removal/repair/installation25-	22
Vent, and push rod V13 (M978) removal/installation/ adjustment.25-Vent box and screen, cab air removal/installation18-Vent valve and push rod, V13 (M978) removal/installation/ adjustment25-VENTURI assembly, VT (M978) removal/repair/installation25-	
Vent box and screen, cab air removal/installation 18- Vent valve and push rod, V13 (M978) removal/installation/ adjustment 25- VENTURI assembly, VT (M978) removal/repair/installation 25-	27
Vent valve and push rod, V13 (M978) removal/installation/ adjustment	22
VENTURI assembly, VT (M978) removal/repair/installation	27
	36
VENTURI/NOZZLE PRESSURE GAGE VNPG (M978) removal/installation	4
VT VENTURI assembly (M978) removal/repair/installation	36
W	
Washer assembly, windshield, repair	5
Washer control valve, windshield, removal/installation	3
Washer reservoir, hoses, and nozzles, windshield removal/installation	4
Winch and auxiliary hydraulic relief valve (M983 without crane and M984)	
Removal/Installation	9
Winch and auxiliary hydraulic relief valve bracket (M983 without crane and M984)	
	-10
Winch control lever, self-recovery removal/installation	3
Windshield washer assembly repair	5
Windshield washer control valve removal/installation.	8
Windshield washer reservoir, hoses, and nozzles removal/installation	4
Windshield wiper blade and arm removal/installation	2
Windshield wiper control valve, left and right removal/installation	
Windshield wiper motor removal/installation 18-	

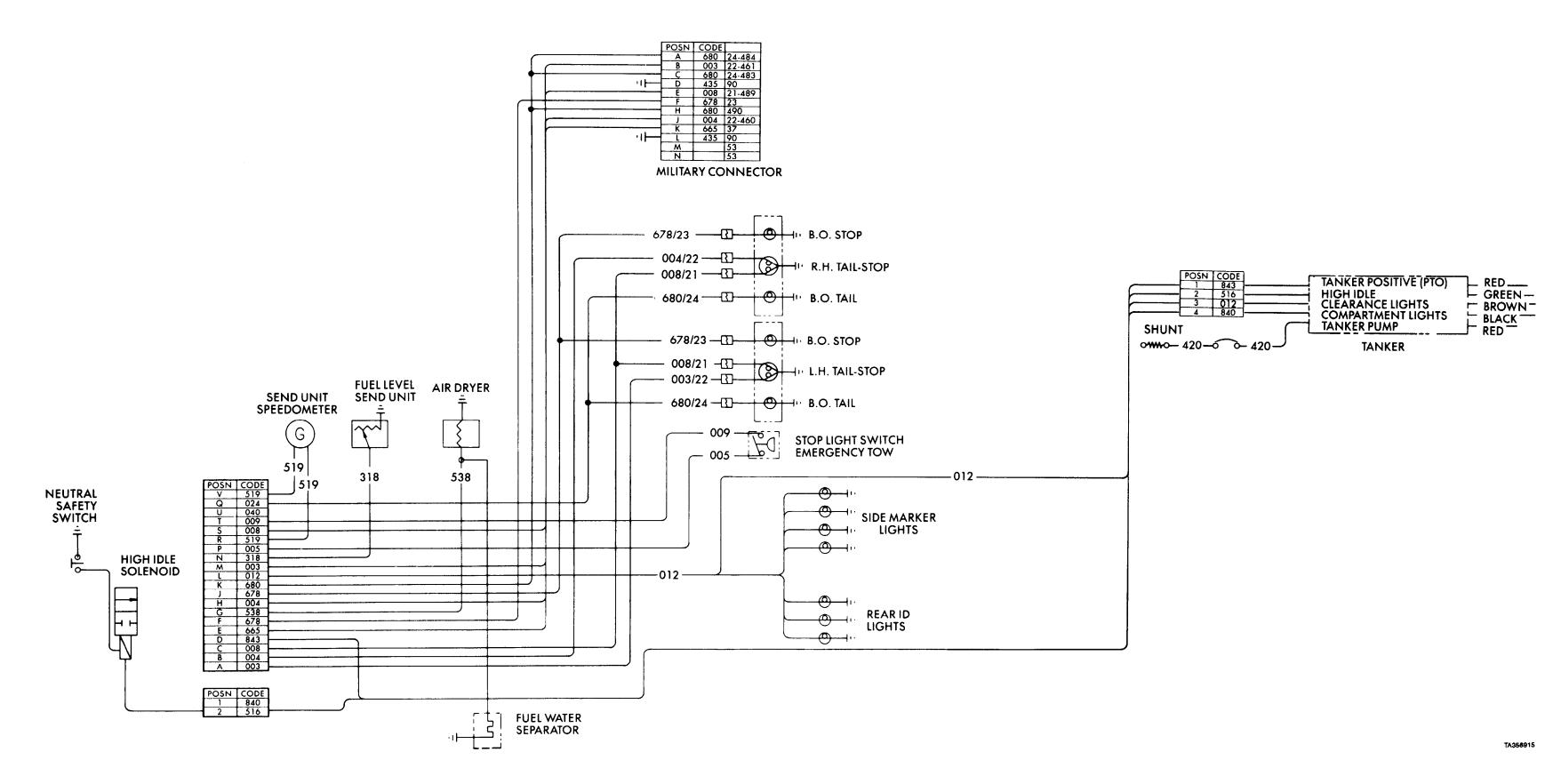






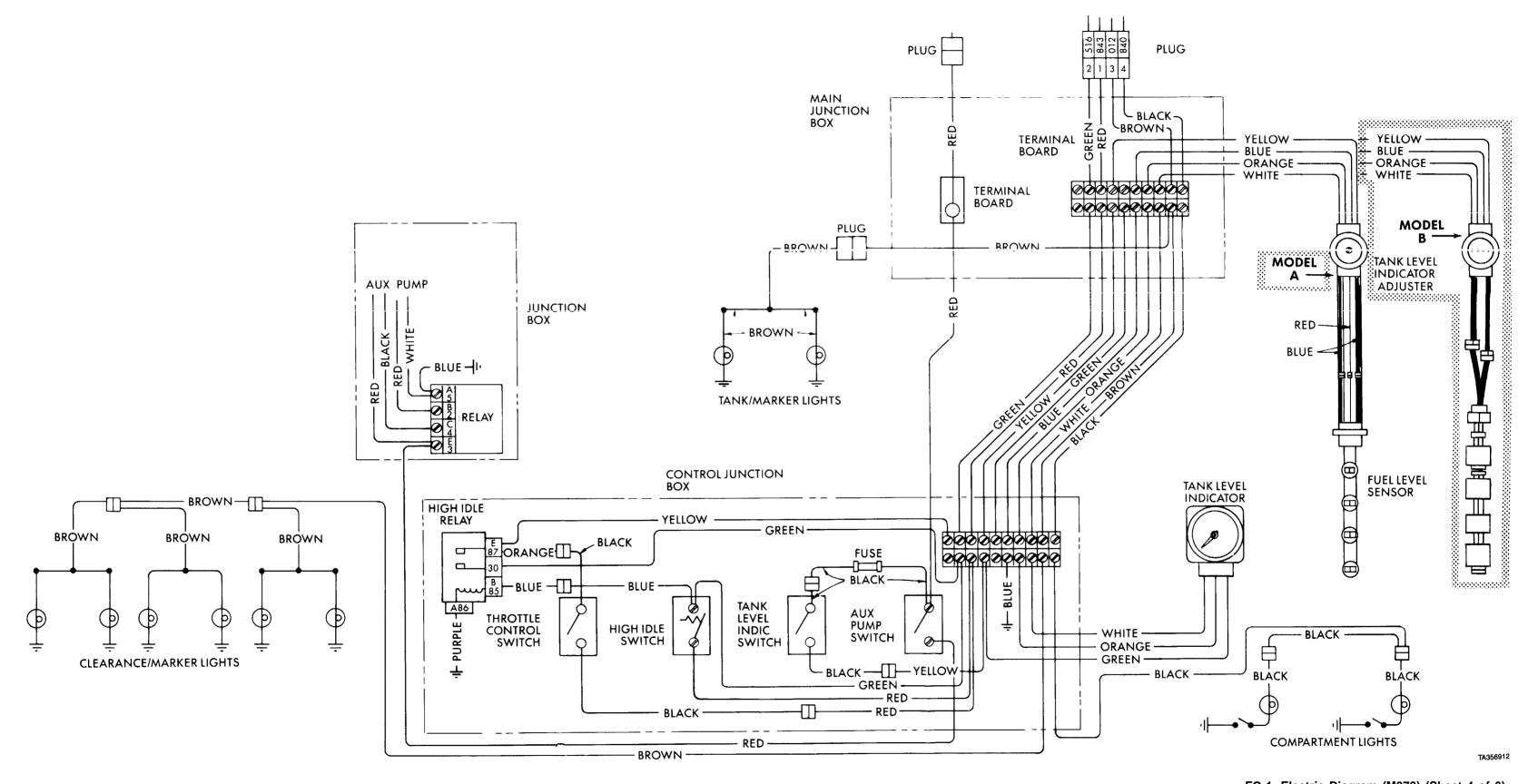


FO-1. Electric Diagram (M977, M985) (Sheet 2 of 6).



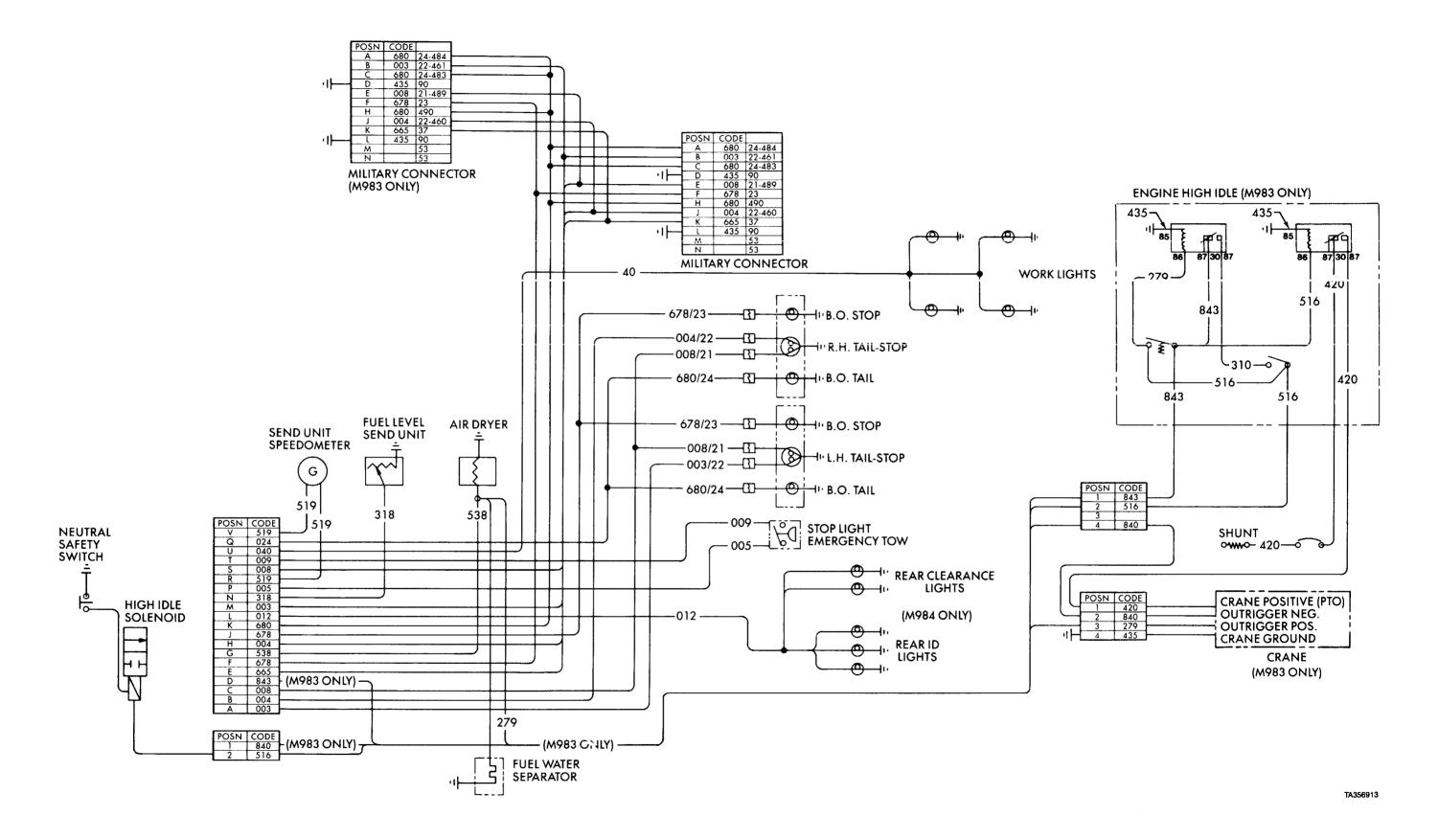
FO-1. Electric Diagram (M978) (Sheet 3 of 6).

FP-5/(FP-6 blank)



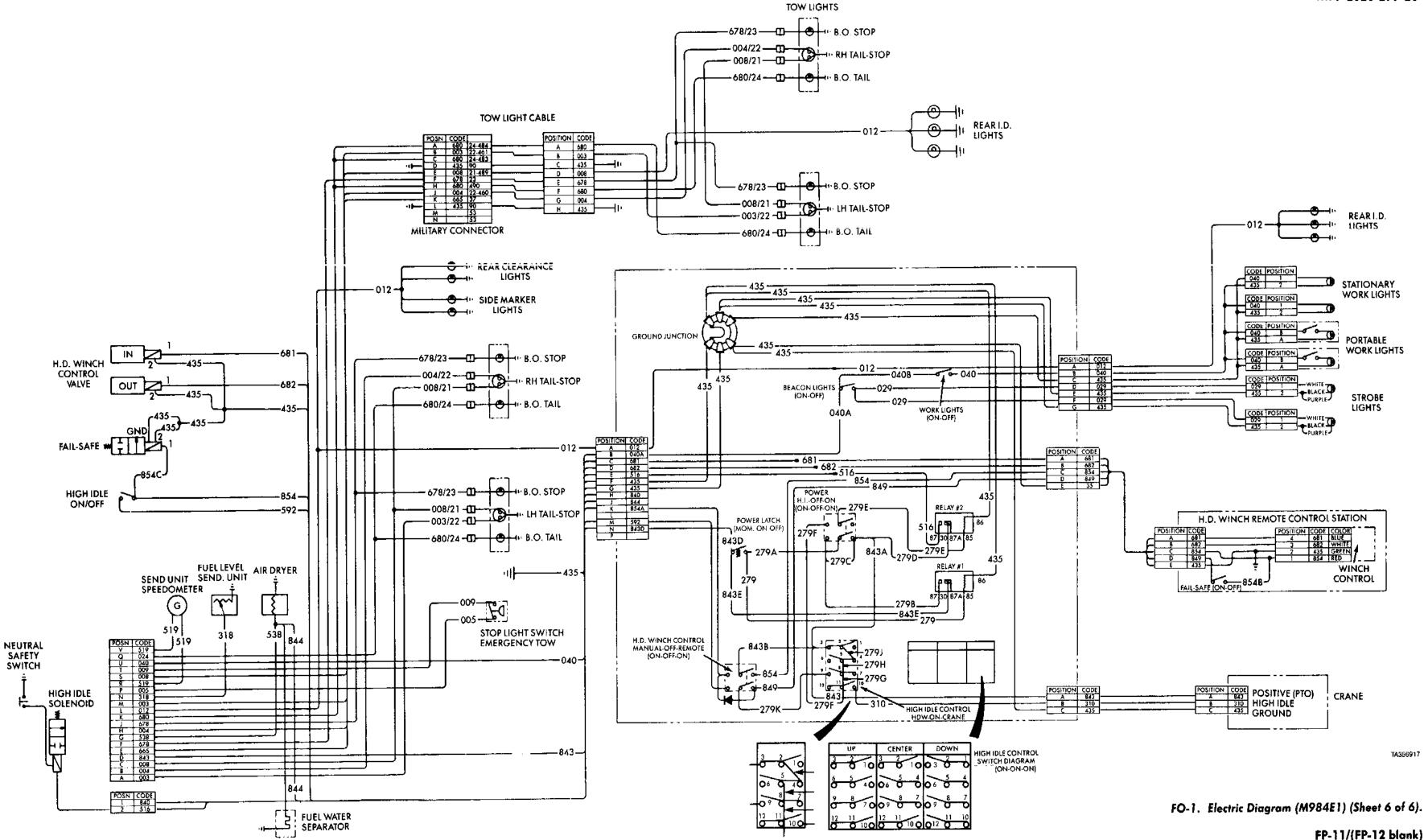
FO-1. Electric Diagram (M978) (Sheet 4 of 6).

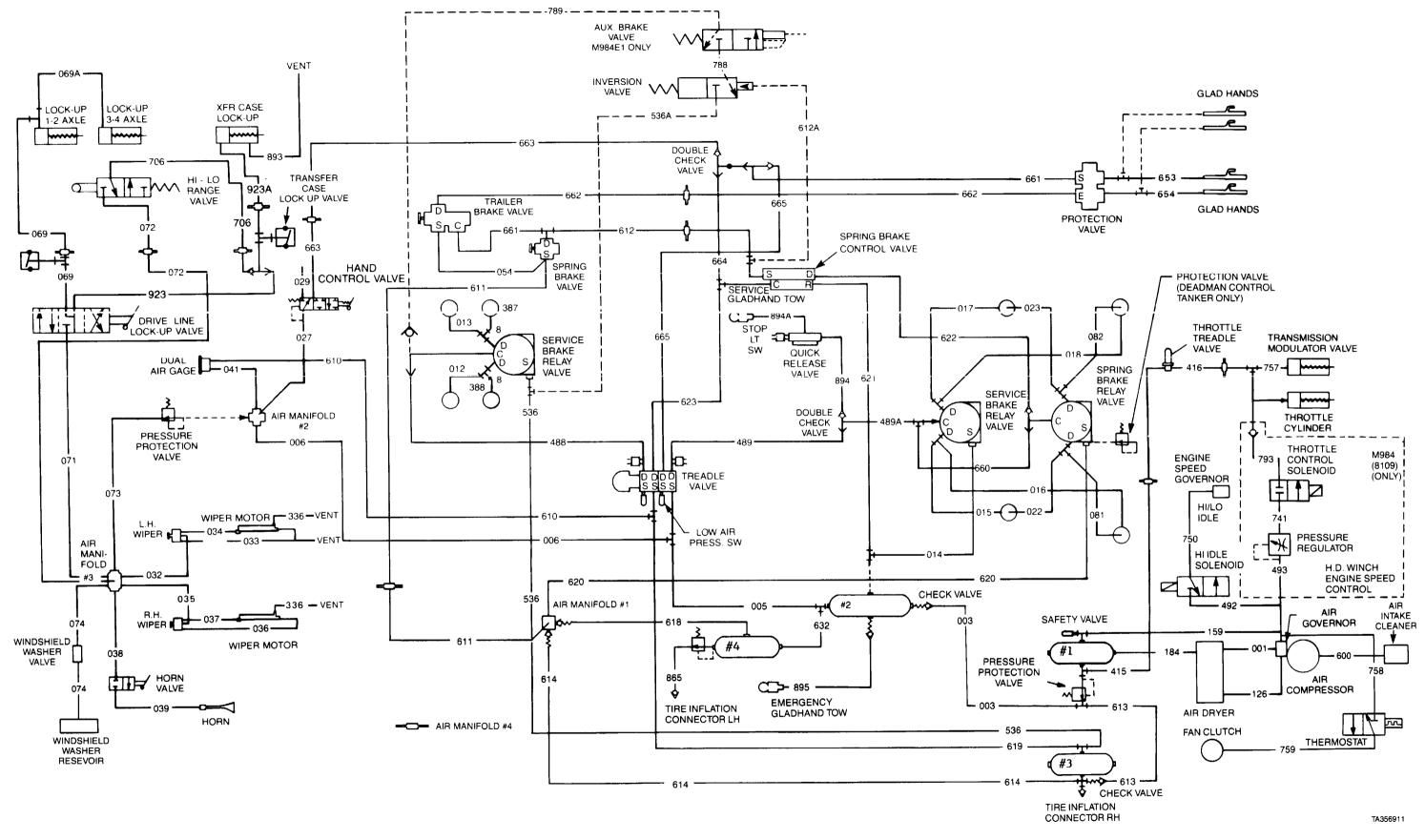
FP-7/(FP-8 blank)



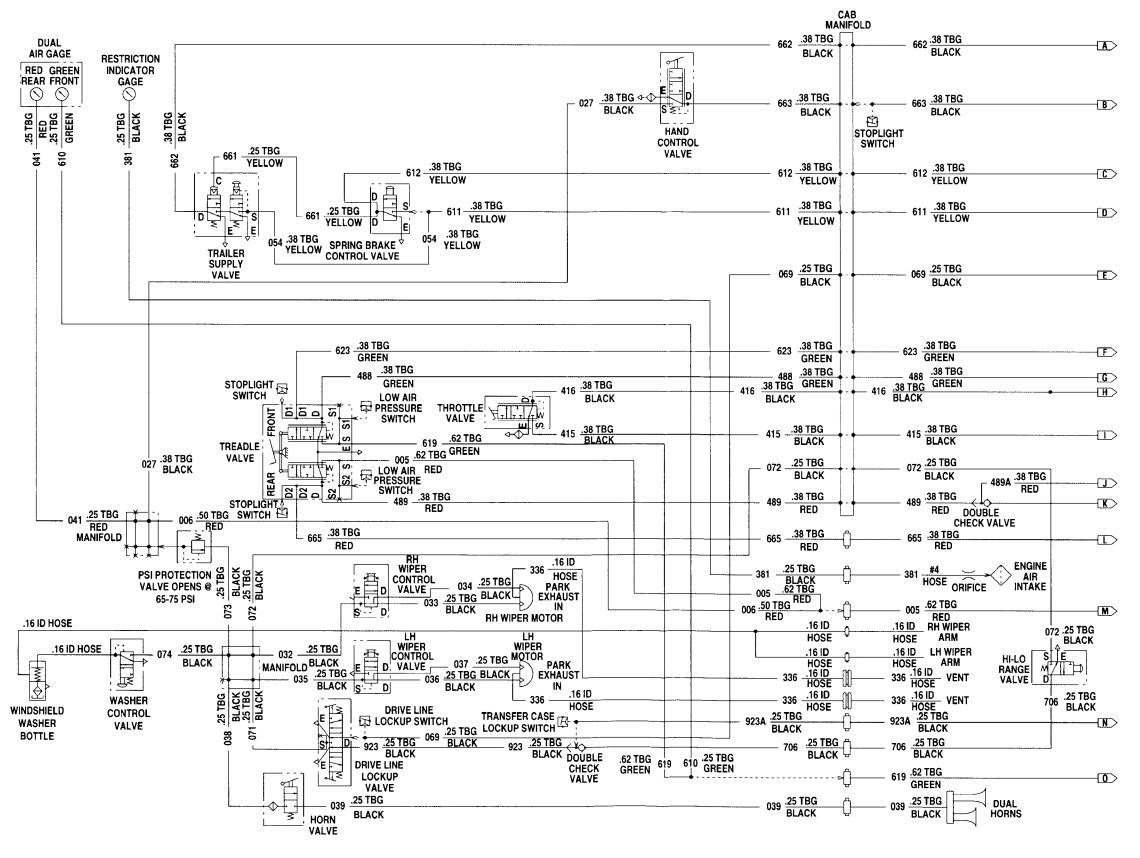
FO-1. Electric Diagram (M983, M984) (Sheet 5 of 6).

FP-9/(FP-10 blank)

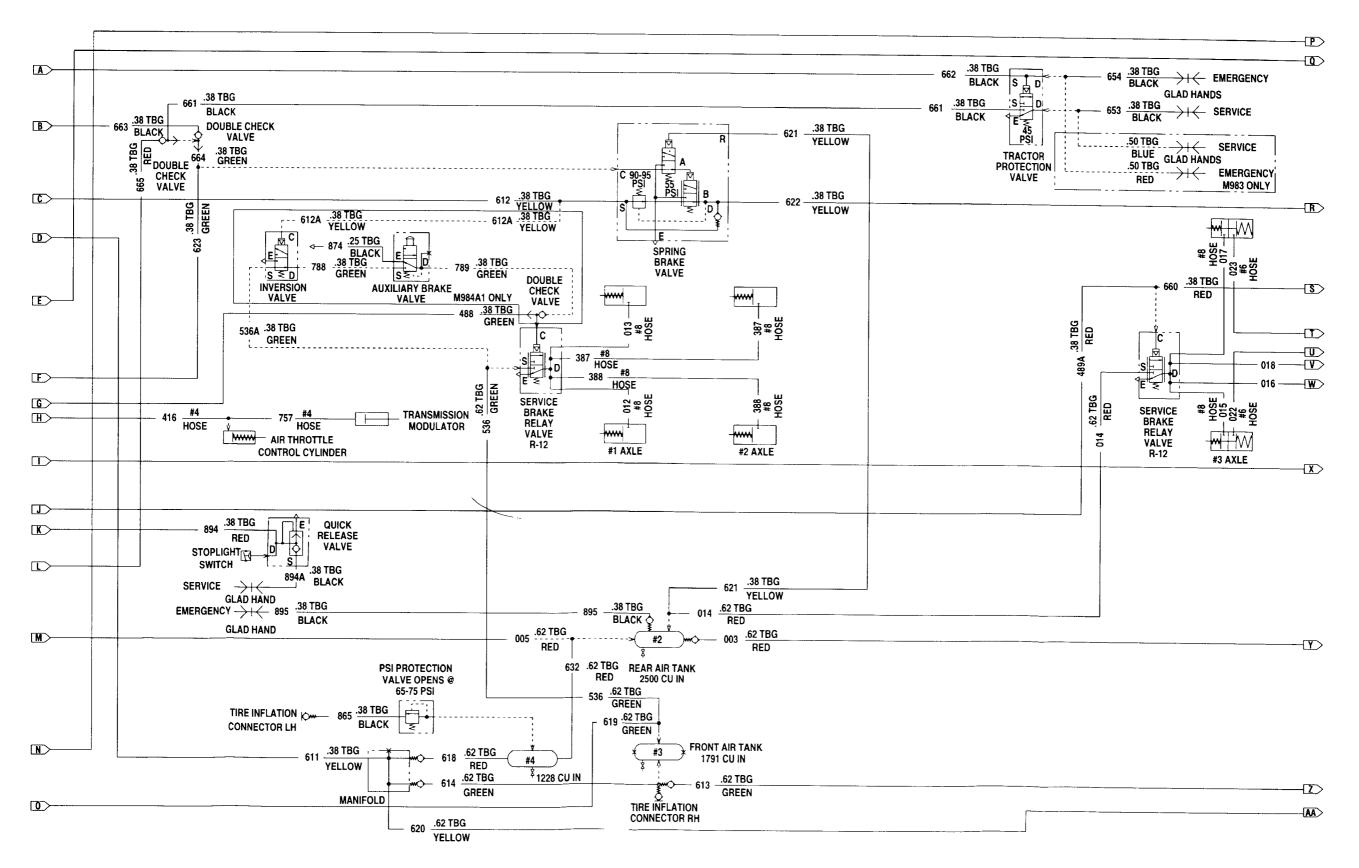


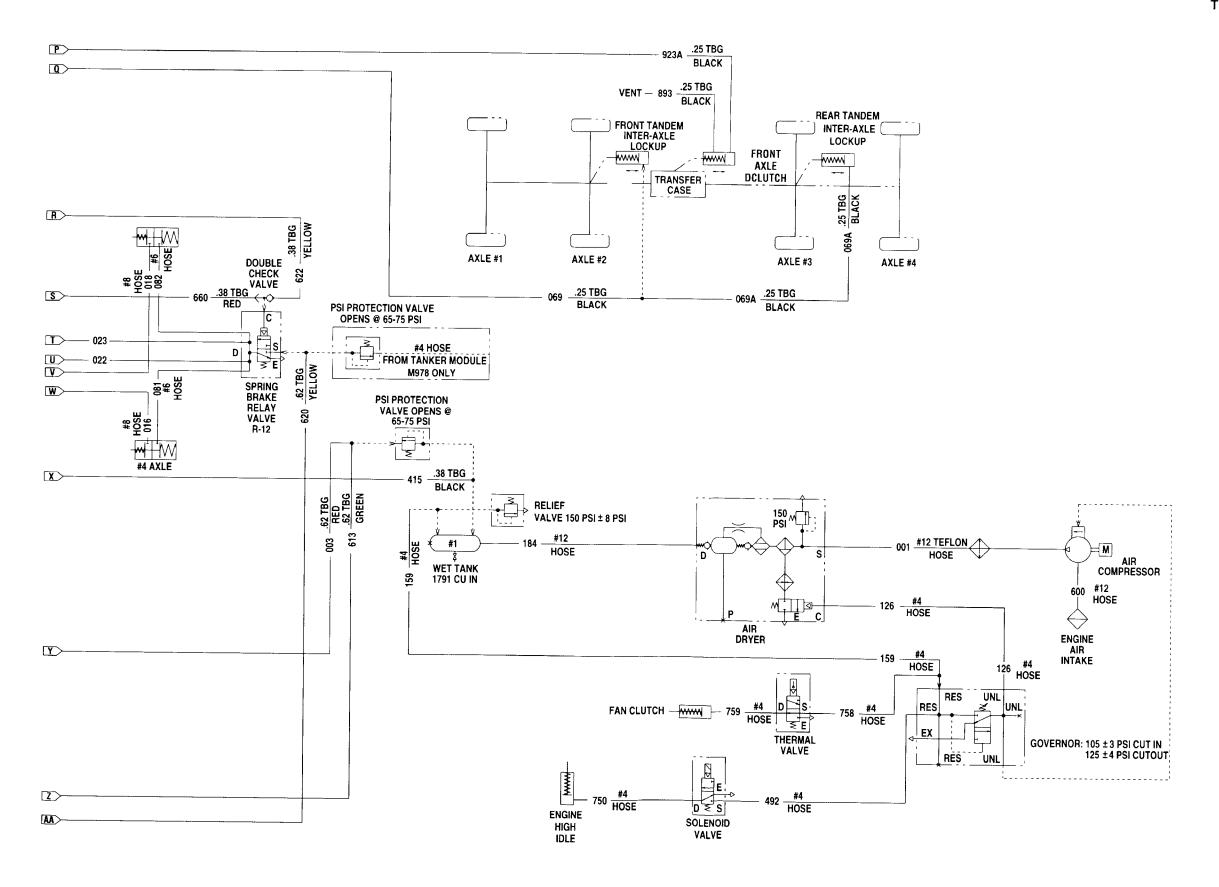


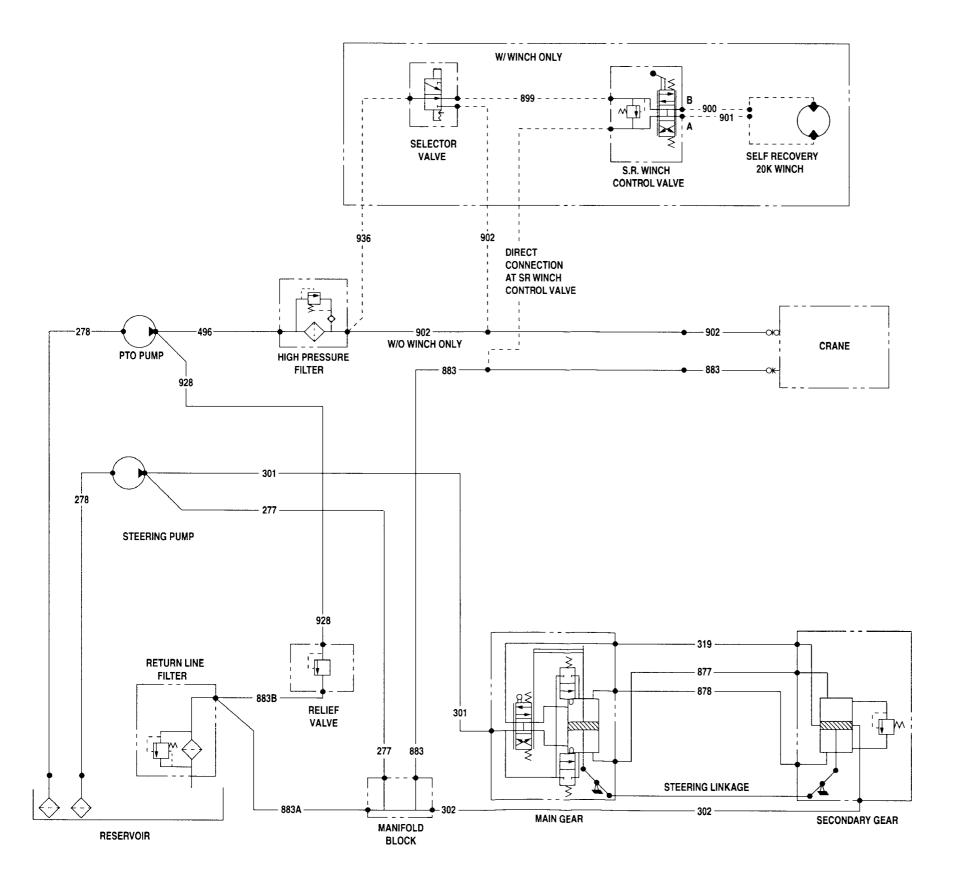
FO-2. Air Schematic. FP-13/(FP-14 blank)



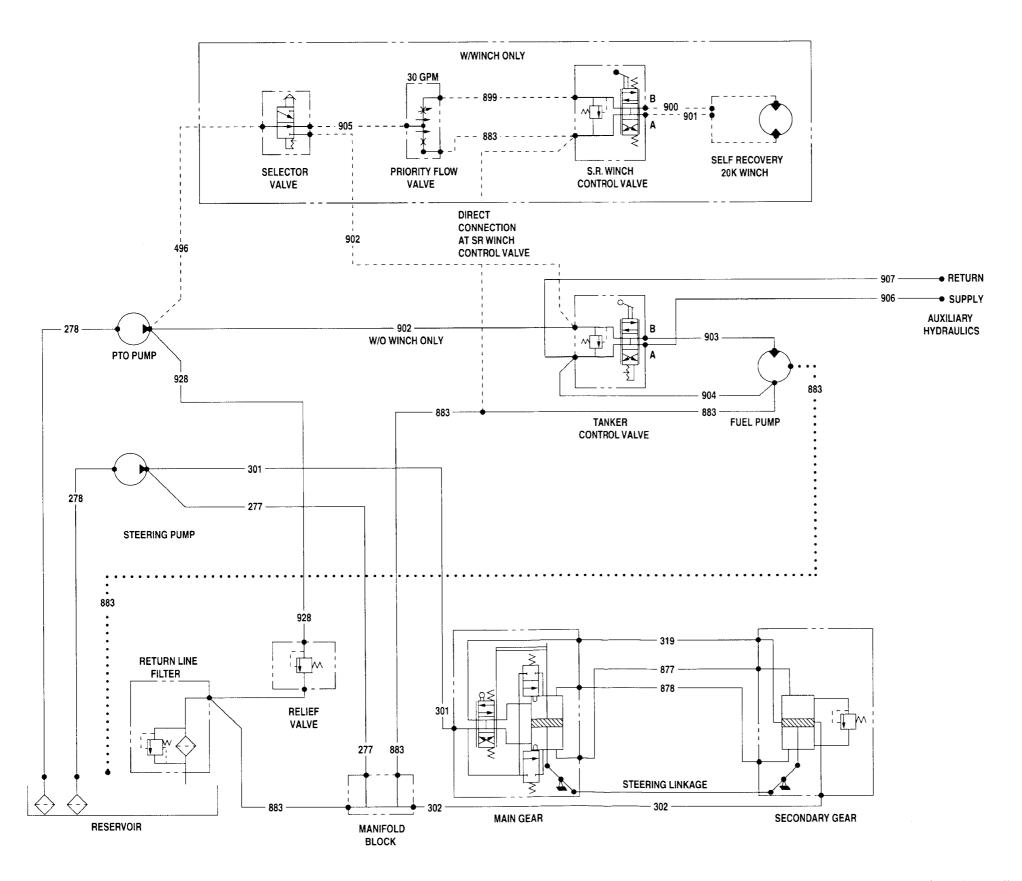
FO-2.1 Air Schematic (Sheet 1 of 3). Change 3 FP-14.1/(FP-14.2 blank)



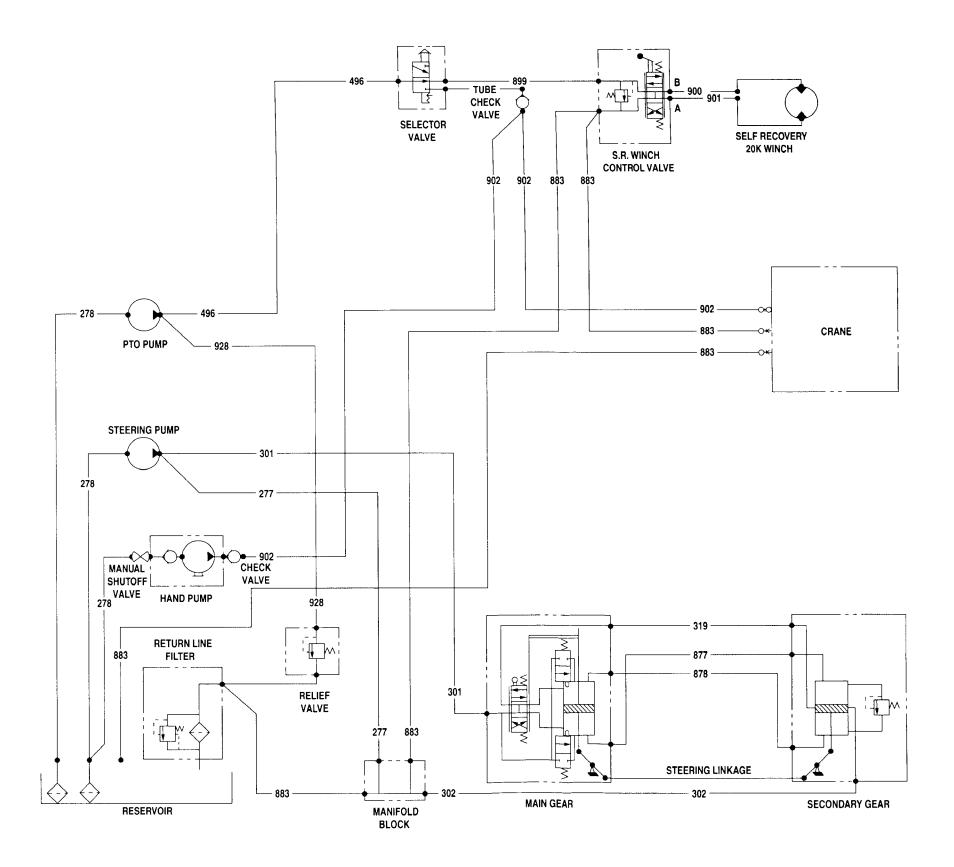


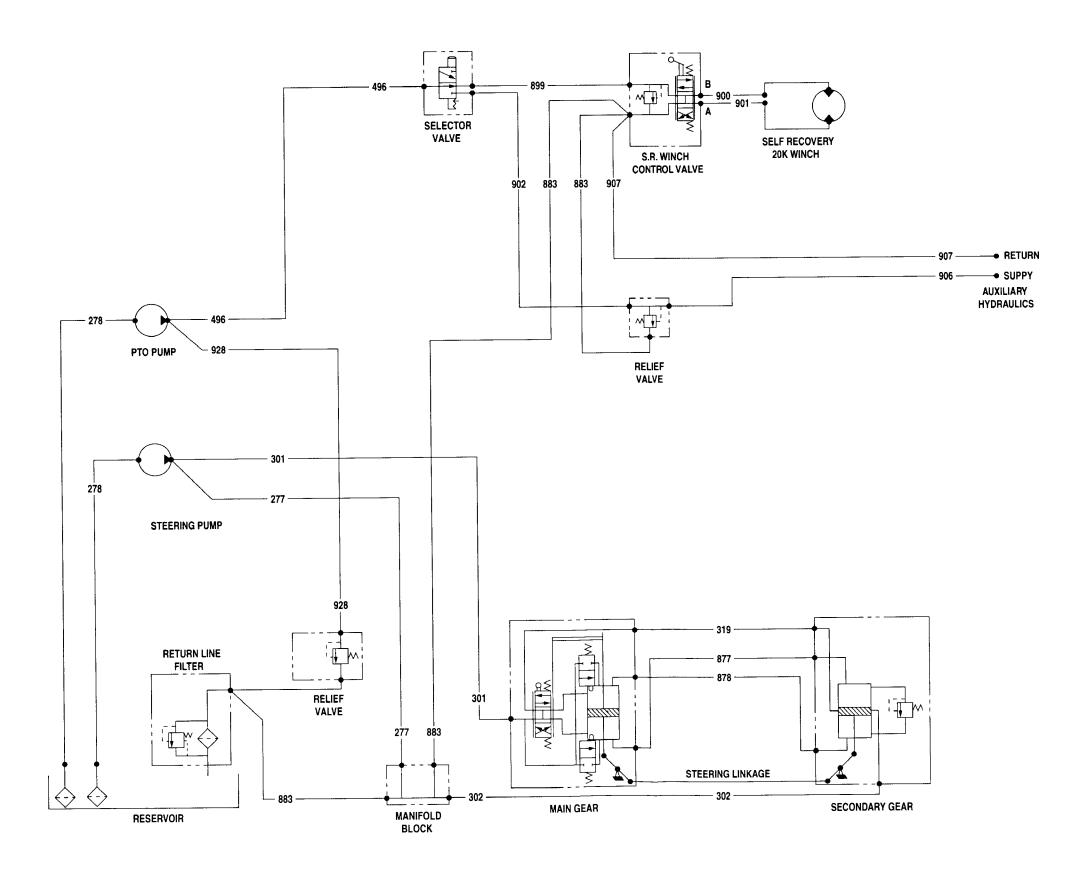


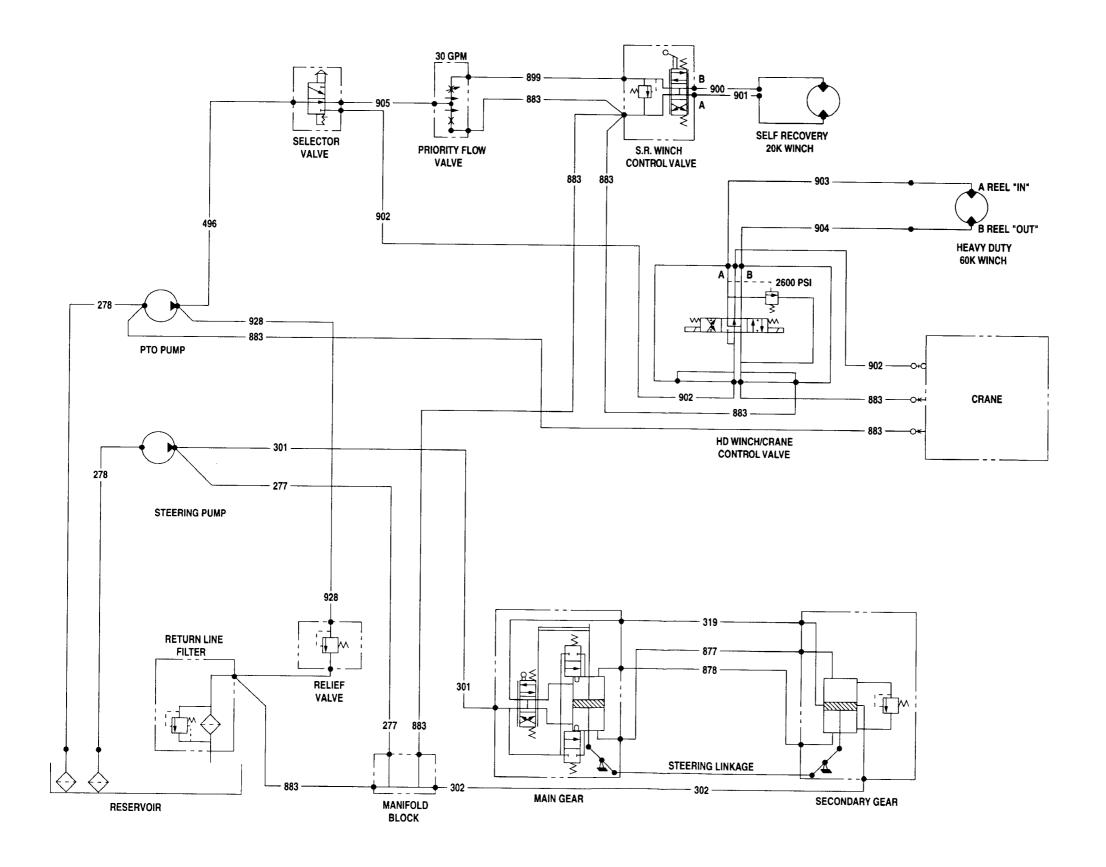
FO-3. Hydraulic Schematic (M977, M985) (Sheet 1 of 7). Change 3 FP-15/(FP-16 blank)

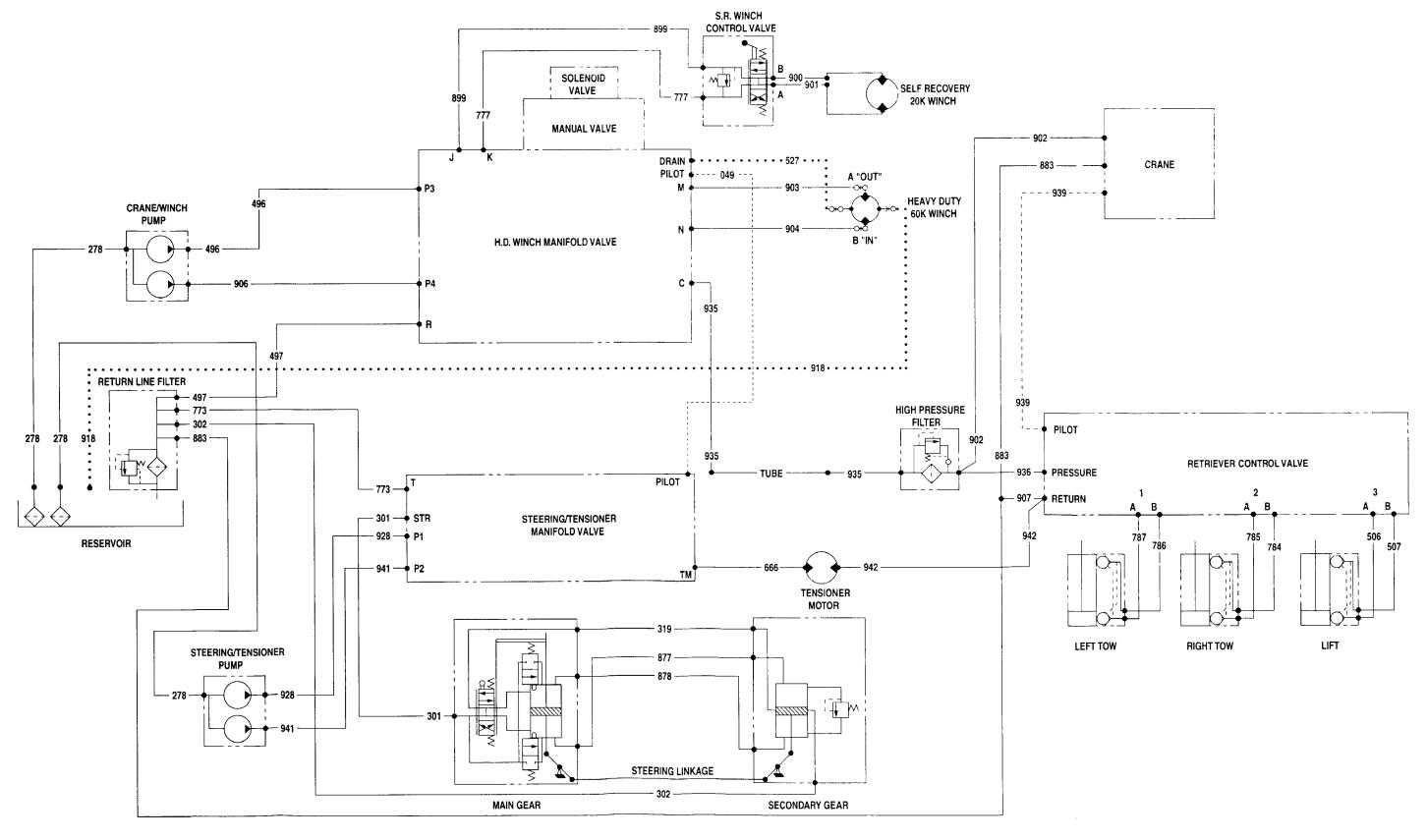


FO-3. Hydraulic Schematic (M978) (Sheet 2 of 7). Change 3 FP-17/(FP-18 blank)

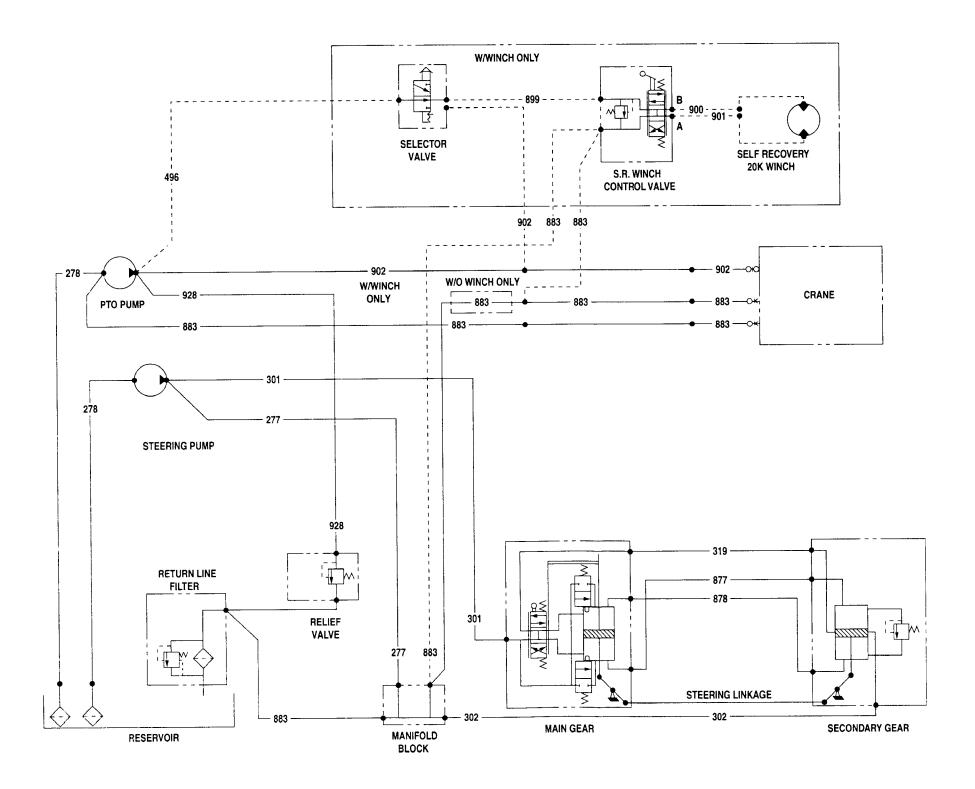








FO-3. Hydraulic Schematic (M984E1) (Sheet 6 of 7). Change 3 FP-25/(FP-26 blank)



By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR. General, United States Army Chief of Staff

Official:

R.L. DILWORTH

Brigadier General, United States Army The Adjutant General

Distribution

To be distributed in accordance with DA Form 12-38, Unit requirements for 10-ton 8x8 Heavy Expanded Mobility Tactical Truck, HEMTT, M977, M983, M984, M985.

RECOMMENDED CHANGES TO EQUIPMENT PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

THEN - JOT DOWN THE INFO
ON THIS FORM---TEAR OUT THIS
PAGE---FOLD IT----AND DROP IT
IN THE MAIL!

FROM: (IMPRINT YOUR UNIT'S COMPLETE ADDRESS)

HQ & HQ CO. 46TH TRANS, BN. FT. CARSON, CO

DATE SENT:

5 JAN., 1997

PUB	UC.	AT	ON	NUMBER
TAA	•	21	220	270-20

PUBLICATION DATE
7 APRIL 1987

PUBLICATION TITLE

ORGANIZATIONAL MAINTENANCE MANUAL
M977 Series Vehicles

1M 9-2	320-279	-20			, APRIL 1907	M977 Series Vehicles
BE EXACTPINPOINT WHERE IT IS			IN THIS SPACE, TELL WHAT IS WRONG			
PAGE NO.	PARA- GRAPH	FIGURE NO.	TABLE NO.	AND WH	AT SHOULD BE DONE A	OUT IT:
2-66	nA	nA	2-9	Step.	r (2) says:	
				•	Lheck water t werheating.	emperature gage for pump
}		}		Ster	(2) should	say:
				0		emperature gage for engine
					10	
				1	2////	•
			1		Mr	
	1	>	115	}> '		
	1	1	DV			

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

ALBERT RAND, SSG, 226-5644

SIGN HERE:

Albert Rand

DA FORM 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S. IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

1	RECOMMENDED CHANGES TO EQUIPMENT PUBLICATIONS							
1	7							WRONG WITH THIS PUBLICATION? (IMPRINT YOUR UNIT'S COMPLETE ADDRESS)
	2			ON THIS F	AATI DIK	THE INFO AR OUT THIS ID DROP IT	DATE S	ENT:
1	1 1						J	
֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	PUBLICATION NUMBER TM 9-2320-279-20-3					PUBLICATION 8 April 1		PUBLICATION TITLE ORGANIZATIONAL MAINTENANCE MANUAL M977 Series Vehicles
, f	BE EXA	CTPINPO	DINT WHE	E IT IS	IN THIS S	PACE, TELL WI	IAT IS W	RONG
 	PAGE NO.			AND WHAT SHOULD BE DON			ABOUT Π:	
1								
ברי ברי הוא					j			
-				} { }				
1	PRINTED	NAME, G	RADE OR 1	ITLE, AND	TELEPHO	NE NUMBER	SIG	ON HERE:

DA FORM 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S. IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY



OFFICAL BUSINESS

BUSINESS REPLY MAIL

FIRST CLASS

BRM PERMIT NO. 82

ROCK ISLAND, IL

POSTAGE WILL BE PAID BY ROCK ISLAND ARSENAL

Director
Armament and Chemical Acquisition
and Logistics Activity
ATTN: AMSTA-AC-NML
Rock Island, IL 61201-9948

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

TEAR ALONG PERFORATED LINE



THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches 1 Meter= 100 Centimeters = 1000 Millimeters = 39.37 Inches

1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces

1 Kilogram =1000 Grams = 2.2 Lb

1 Metric Ton =1000 Kilograms =1 Megagram =1.1 Sharr Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces 1 Liter= 1000 Milliliters = 33.82 Fluid Ounces

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 = 3.386 Sq. Miles

CUBIC MEASURE

1 Cu Centimeter =1000 Cu Millimeters = 0.06 Cu inches 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

 $5.9(^{\circ}F - 32) = ^{\circ}C$

212° Fahrenheit is equivalent to 100° Celsius 90° Fahrenheit is equivalent to 32.2° Celsius 32° Fahrenheit is equivalent to 0° Celsius 9 5 C° + 32 = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	<u>TO</u>	MULTIPLY BY
Inches	Centimeters	2.540
	Meters	
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
	Square Meters	
Square Miles	Square Kilometers.	
	Square Hectometers	
	Cubic Meters	
	Cubic Meters	
Fluid Ounces	Milliliters	
	Liters	
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	
	Metric Tons	
Pound-Feet	Newton-Meters	1.356
	Inch Kilopascals	
Miles per Gallon.	Kilometers per Lite	er 0.425
Miles per Hour	Kilometers per Hour	r 1.609

TO CHANGE	<u>10</u>	MULTIPLY BY
Centimeters	Inches	0.394
Meters		
Meters	Yards	1.094
Kilometers	Miles	0.521
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	
Kilograms	Pounds	
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square I	nch . 0.145
Kilometers per Liter		
Kilometers per Hour	Miles per Hour	0.621



TA184454