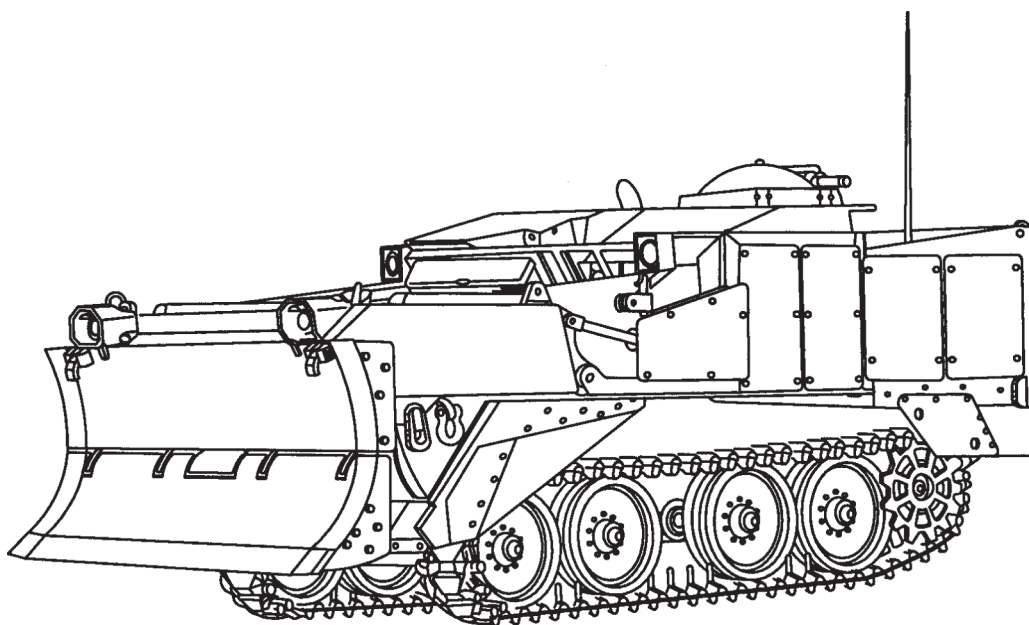


# **\*TM 5-2350-377-13&P**

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## **TECHNICAL MANUAL OPERATOR AND FIELD MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST SUPPORTING THE HYDRAULIC BLADE FOLDER-TRACK TENSIONER (HBF-TT) FOR**

### **ARMORED COMBAT EARTHMOVER (ACE), M9 NSN 2350-00-808-7100**



**\* SUPERSEDURE NOTICE** - TM 5-2350-377-13&P dated 30 June 2012 supersedes TM 5-2350-377-14&P dated 30 November 2007, including all changes.

**DISTRIBUTION STATEMENT A** - Approved for public release; distribution is unlimited.

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
30 JUNE 2012**



## WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within the technical manual.

### FIRST AID DATA

For information on first aid, refer to FM 4-25.11.

### EXPLANATION OF SAFETY WARNING ICONS



**EAR PROTECTION** - headphones over ears show that noise level will harm ears.



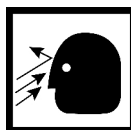
**ELECTRICAL** - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



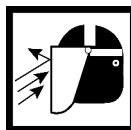
**ELECTRICAL** - electrical wire to hand with electricity symbol running through hand shows that shock hazard is present.



**FALLING PARTS** - arrow bouncing off human shoulder and head shows that falling parts present a danger to life or limb.



**FLYING PARTICLES** - arrows bouncing off face shows that particles flying through the air will harm face.



**FLYING PARTICLES** - arrows bouncing off face with face shield show that particles flying through the air will harm face.



**HEAVY OBJECT** - human figure stooping over heavy object shows physical injury potential from improper lifting technique.

## WARNING SUMMARY - Continued

### EXPLANATION OF SAFETY WARNING ICONS - Continued



**HEAVY PARTS** - hand with heavy object on top shows that heavy parts can crush and harm.



**HEAVY PARTS** - foot with heavy object on top shows that heavy parts can crush and harm.



**HEAVY PARTS** - heavy object on human figure shows that heavy parts present a danger to life or limb.



**HEAVY PARTS** - heavy object pinning human figure against wall shows that heavy, moving parts present a danger to life or limb.



**HELMET PROTECTION** - arrow bouncing off head with helmet shows that falling parts present a danger.



**HOT AREA** - hand over object radiating heat shows that part is hot and can burn.



**LASER LIGHT** - laser light hazard symbol indicates extreme danger for eyes from laser beams and reflections.



**MOVING PARTS** - human figure with arm caught between gears shows that the moving parts of the equipment present a danger to life or limb.



**MOVING PARTS** - hand with fingers caught between gears shows that the moving parts of the equipment present a danger to life or limb.



## WARNING SUMMARY - Continued

### EXPLANATION OF SAFETY WARNING ICONS - Continued



**MOVING PARTS** - hand with fingers caught between rollers shows that the moving parts of the equipment present a danger to life or limb.



**SHARP OBJECT** - pointed object in hand shows that a sharp object presents a danger to limb.



**SHARP OBJECT** - pointed object in hand shows that a sharp object presents a danger to limb.



**SHARP OBJECT** - pointed object in foot shows that a sharp object presents a danger to limb.



**SLICK FLOOR** - wavy line on floor with legs prone shows that slick floor presents a danger for falling.

### GENERAL SAFETY WARNINGS DESCRIPTION

#### WARNING



#### ELECTRICAL SYSTEM

When troubleshooting an electrical malfunction or performing electrical maintenance, ALWAYS disconnect intervehicular electrical cable from towing vehicle. Failure to do so may result in injury or death due to electric shock.

## WARNING SUMMARY - Continued

### GENERAL SAFETY WARNINGS DESCRIPTION - Continued

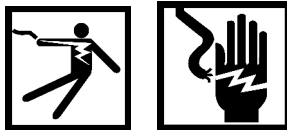
#### WARNING



#### HANDLING HEAVY COMPONENTS

Lifting devices must have a weight capacity greater than 2,944lb (1,337 kg).  
Do not stand or work under apron and dozer assembly unless apron lock pins are installed.  
Failure to comply may result in severe injury or death to personnel.

#### WARNING



Disconnect vehicle power (Battery) after determining the electrical malfunction or trouble shooting to make the repair. Failure to comply may result in severe injury or death to personnel.

#### WARNING



When folding blade, work on blade latches from side of vehicle only. Failure to comply may result in serious injury to personnel.

#### WARNING

Do not unfold blade while driving cross-country. Failure to comply may result in damage to equipment or injury to personnel.

#### WARNING

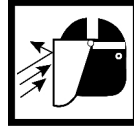


Do not work in front or near the blade and apron unless the dozer lockpins are installed.  
Failure to comply may result in severe injury to personnel or death.

## WARNING SUMMARY - Continued

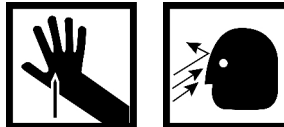
### GENERAL SAFETY WARNINGS DESCRIPTION - Continued

#### WARNING



Block track or roadwheels when parking brake is released, steer unit brake levers are disconnected, or when track is disconnected. Vehicle can roll causing damage to equipment, severe injury, or death to personnel.

#### WARNING



High pressure is present in the M9 ACE hydraulic system. Do not disconnect any hydraulic system component unless hydraulic system pressure has been relieved. After hydraulic system pressure has been relieved, wait at least four minutes before disconnecting any hose or fitting. Failure to comply may result in severe injury to personnel.

#### WARNING



Do not stand or work under apron and dozer assembly unless apron lockpins are installed. Failure to comply may result in severe injury or death to personnel.

#### WARNING



Do not lift apron and dozer assembly with dozer blade installed unless dozer lockpins are installed. Failure to comply may result in severe injury or death to personnel.

## WARNING SUMMARY - Continued

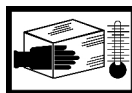
### EXPLANATION OF HAZARDOUS MATERIALS ICONS AND DESCRIPTIONS



**BIOLOGICAL** - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



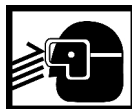
**CHEMICAL** - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



**CRYOGENIC** - hand in block of ice shows that the material is extremely cold and can injure human skin or tissue.



**EXPLOSION** - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.



**EYE PROTECTION** - person with goggles shows that the material will injure the eyes.



**FIRE** - flame shows that a material may ignite and cause burns.



**POISON** - skull and crossbones shows that a material is poisonous or is a danger to life.



**RADIATION** - three circular wedges shows that the material emits radioactive energy and can injure human tissue.

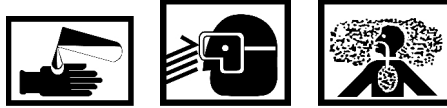


**VAPOR** - human figure in a cloud shows that material vapors present a danger to life or health.

## WARNING SUMMARY - Continued

### HAZARDOUS MATERIALS DESCRIPTIONS

#### WARNING



#### ADHESIVES

Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use only in a well-ventilated area. If adhesive gets in eyes, try to keep eyes open; flush them with water for 15 minutes and get immediate medical attention.

#### WARNING



#### COMPRESSED AIR

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

#### WARNING



#### CLEANING SOLVENT HAZARDS

Cleaning solvent is combustible. Wear protective goggles and gloves; use only in a 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 cleaning solvent; the flashpoint is 144°F (62°C). Failure to follow this warning may result in injury or death to personnel. A fire extinguisher will be kept nearby when the solvent is used.

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 them with water and get immediate medical attention.

When cleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.

## **WARNING SUMMARY - Continued**

### **HAZARDOUS MATERIALS DESCRIPTIONS - Continued**

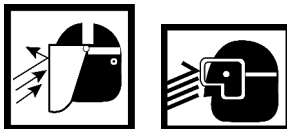
#### **WARNING**



#### **USING UNAUTHORIZED CLEANING METHODS**

Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment.

#### **WARNING**



#### **WIRE BRUSH**

Wear face shield or goggles for eye protection when using wire brush. Failure to comply may result in injury to personnel.

## LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: TM 5-2350-377-13&P dated 30 June 2012 supersedes TM 5-2350-377-14&P dated 30 November 2007, including all changes. Zero in the "Change No." column indicates an original page or work package.

Date of issue for the original manual is:

Original 30 June 2012

**TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 50 AND TOTAL NUMBER OF WORK PACKAGES IS 72 CONSISTING OF THE FOLLOWING:**

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WP 0072 (2 pages)	0	Back Cover	0
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HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 JUNE 2012

TECHNICAL MANUAL  
OPERATOR AND FIELD MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST  
SUPPORTING THE HYDRAULIC BLADE FOLDER-TRACK TENSIONER  
(HBF-TT)  
FOR  
  
ARMORED COMBAT EARTHMOVER (ACE), M9  
NSN 2350-00-808-7100

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## HOW TO USE THIS MANUAL

This manual is designed to help you operate and maintain the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for the Armored Combat Earthmover (ACE), M9. Listed below are special features which have been included to make it easier to locate and use the information you need.

### WARNINGS, CAUTIONS, AND NOTES

Read all WARNINGS, CAUTIONS, and NOTES before performing any procedure.

Warnings, cautions, notes, subject headings, and other essential information are printed in **BOLD** type, making them easier to see.

### GENERAL INFORMATION

This manual is divided into CHAPTERS and WORK PACKAGES. For a specific Chapter or Work Package, refer to the TABLE OF CONTENTS.

- The TABLE OF CONTENTS lists the titles of each Chapter and Work Package.
- CHAPTER 1 provides General Information, Equipment Description, and Theory of Operation.
- CHAPTER 2 provides the Operator Instructions.
- CHAPTER 3 provides Troubleshooting Procedures.
- CHAPTER 4 provides Operator PMCS Introduction and Operator PMCS Maintenance Instructions.
- CHAPTER 5 provides Field PMCS Introduction and Field PMCS Maintenance Instructions.
- CHAPTER 6 provides Maintenance Instructions.
- CHAPTER 7 provides Parts Information.
- CHAPTER 8 provides Supporting Information. The Supporting Information includes tables listing **References** used in this manual, a Maintenance Allocation Chart (**MAC**), Components of End Items (**COEI**) and Basic Issue Items (**BII**), Additional Authorization Items (**AAL**), a listing of **Expendable and Durable Items**, and a listing of **Tools** used in this manual.

This manual also provides text that works in conjunction with illustrations showing:

- Components, controls, and indicators.
- How to operate the vehicle and its components.
- How to remove, install, and maintain components.
- How to clean and inspect vehicle components.

The illustrations throughout this manual contain numerical callouts pointing to various components mentioned in the procedural steps. Replacement parts must be discarded after removal and replaced with a new part, which is listed in the Materials/Parts section located at the beginning of the task in the Initial Setup.

Prior to performing any maintenance functions on the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for the M9 ACE, ALWAYS do the following:

- Read and follow all WARNINGS in all work packages.
- Read the Safety Summary.
- Read the Equipment Description and Data located in Chapter 1.
- Read completely through the maintenance procedure to familiarize yourself with the procedure and the affected parts before beginning work.

## HOW TO USE THIS MANUAL - Continued

### GENERAL INFORMATION - Continued

The troubleshooting section is set up either by how a physical problem is occurring or how an active or stored trouble code is read from a diagnostic tool. Following a prescribed flow path through making decisions will lead you to a solution to remedy the problem. RPSTL (found in the Parts Information chapter) is to be used to help find needed parts for procurement. The RPSTL lists and authorizes spares and repair parts; special tools; special Test, Measurement, and Diagnostic Equipment (TMDE); and other special support equipment required for performance of maintenance on the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for the M9 ACE. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the Source, Maintenance, and Recoverability (SMR) codes.

### METRIC SYSTEM

The equipment described herein contains metric components and requires metric, common, and special tools. Therefore, metric units and English units will be used throughout this publication. An English-to-Metric conversion table is included as the last page of this manual inside the back cover.

## **CHAPTER 1**

# **GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION**



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## **OPERATOR MAINTENANCE GENERAL INFORMATION**

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### **SCOPE**

This Operator and Field Maintenance manual describes the operation and Field Maintenance for the M9 ACE with Hydraulic Blade Folder and Track Tensioner (HBF-TT). The M9 ACE is a combat earthmover intended for battlefield preparation. This manual also includes the repair parts and special tools for the M9 ACE.

### **MAINTENANCE FORMS, RECORDS, AND REPORTS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

### **REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

If your M9 ACE needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. If you have Internet access, the easiest and fastest way to report problems or suggestions is to follow the instructions and links below:

For ALL non-Aviation/Missile Warranty, EIR and PQDRs must be submitted through the Web Product Quality Deficiency Reporting (PQDR) site. The Web PQDR site is: <http://www.nslcptsmh.csd.disa.mil/webpqdr/webpqdr.htm>. New accounts can be established at the following address: <http://www.nslcptsmh.csd.disa.mil/accessforms/uarform.htm>.

You may also submit your information using an SF 368 (Product Quality Deficiency Report). You can send your SF 368 using e-mail, regular mail, or fax using the addresses/fax numbers specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual. We will send you a reply.

### **CORROSION PREVENTION AND CONTROL (CPC)**

Corrosion prevention and control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items. Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking. Plastics, composites, and rubber can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

SF Form 368, Product Quality Deficiency Report should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

### **OZONE DEPLETING SUBSTANCES (ODS)**

The continued use of Ozone Depleting Substances (ODS) has been prohibited by Executive Order 12856 of 3 August 1993. The use of ODS in the Army IETMs is prohibited. A listing of these substances will be provided by the acquiring activity.

### **DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-6.

## PREPARATION FOR STORAGE OR SHIPMENT

For procedures on preparation for storage or shipment, refer to PREPARATION FOR SHIPMENT/TRANSPORTABILITY DATA (TM 55-2350-262-10).

## LIST OF ABBREVIATIONS/ACRONYMS

The following abbreviations/acronyms are used in this manual.

<u>Term</u>	<u>Definition</u>
AAL	Additional Authorization List
ACE	Armored Combat Earthmover
A/R	As Required
ASTM	American Society for Testing and Materials
BE	Bale
BII	Basic Issue Items
BOI	Basis of Issue
BX	Box
°C	Centigrade/Celsius
CA	Cartridge
CAGEC	Commercial and Government Entity Code
cm	Centimeter(s)
CN	Can, Container
COEI	Components Of End Item
CONUS	Continental United States
CPC	Corrosion Prevention and Control
CTA	Common Table of Allowance
cu in.	Cubic Inch(es)
cu yd	Cubic Yard
DF	Diesel Fuel
DR	Drum
EA	Each
EMP	Electromagnetic Pulse
°F	Fahrenheit
FGC	Functional Group Code
FL	Flat
FO	Foldout
FP	Foldout Page
ft	Foot/Feet
gal.	Gallon(s)
HBF-TT	Hydraulic Blade Folder-Track Tensioner
HCI	Hardness Critical Item
HD	Hundred
IETM	Interactive Electronic Technical Manual
ILLUS	Illustration
in.	Inch(es)
JTA	Joint Technical Architecture
kg	Kilogram
km	Kilometer(s)
km/h	Kilometers per Hour
kPa	Kilopascals
KT	Kit
L	Liter(s)
lb	Pound(s)
lb-ft	Pound-Feet

**LIST OF ABBREVIATIONS/ACRONYMS - Continued**

<b><u>Term</u></b>	<b><u>Definition</u></b>
lb-in	Pound Inches
m	Meter(s)
m <sup>3</sup>	Cubic Meter(s)
MAC	Maintenance Allocation Chart
mi	Mile(s)
min.	Minimum
min.	Minute(s)
mm	Millimeter(s)
mph	Miles per Hour
MWO	Modification Work Order
MTOE	Modification Table of Organization and Equipment
N-m	Newton Meter
NIIN	National Item Identification Number
NPT	National Pipe Thread
NSN	National Stock Number
OCONUS	Outside the Continental United States
ODS	Ozone Depleting Substances
P/N	Part Number
PQDR	Product Quality Deficiency Report
PG	Package
PMCS	Preventive Maintenance Checks and Services
PR	Pair
psi	Pounds per Square Inch
qt	Quart
qts	Quarts
QTY	Quantity
RO	Roll
rpm	Revolutions per Minute
RPSTL	Repair Parts and Special Tools List
SAE	Society of Automotive Engineers
SL	Spool
SMR	Source, Maintenance and Recoverability
SRA	Special Repair Activity
t	Metric Ton(s)
TDA	Table of Distribution and Allowance
TB	Technical Bulletin
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TU	Tube
TULSA	TACOM Unique Logistics Support Applications
U/I	Unit of Issue
UOC	Useable On Code
UUT	Unit Under Test
UV	Ultra Violet
V	Variable (in column 7 of RPSTL only)
VDC	Volts Direct Current
WCA	Warranty Claim Action
WP	Work Package

**SAFETY, CARE, AND HANDLING**

For information on general safety precautions and regulations, review the warning summary at the front of this manual. Observe all warnings and cautions that appear in the maintenance procedures.

**END OF WORK PACKAGE**



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## OPERATOR MAINTENANCE EQUIPMENT DESCRIPTION AND DATA

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### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

1. The M9 ACE with Hydraulic Blade Folder-Track Tensioner (HBF-TT) is designed to fold the blade and adjust the tracks from the operator's compartment.
2. The M9 ACE with HBF-TT is equipped with the following:
  - A blade folder system that is operated from the operator's compartment.
  - A track tensioning system that is operated from the operator's compartment.

### LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

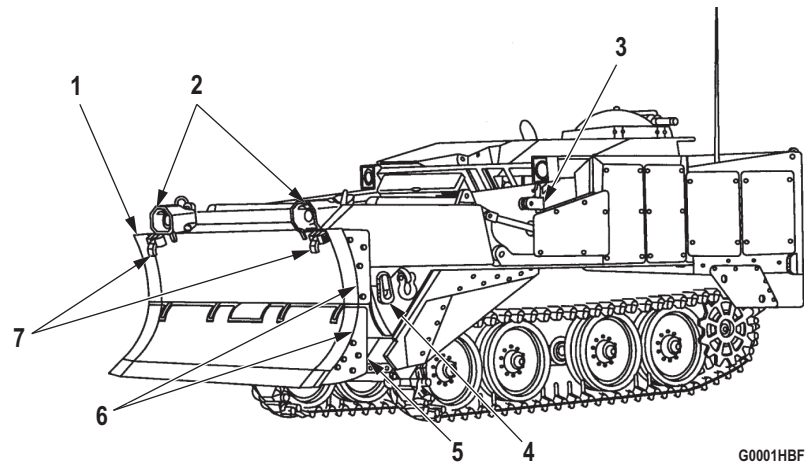
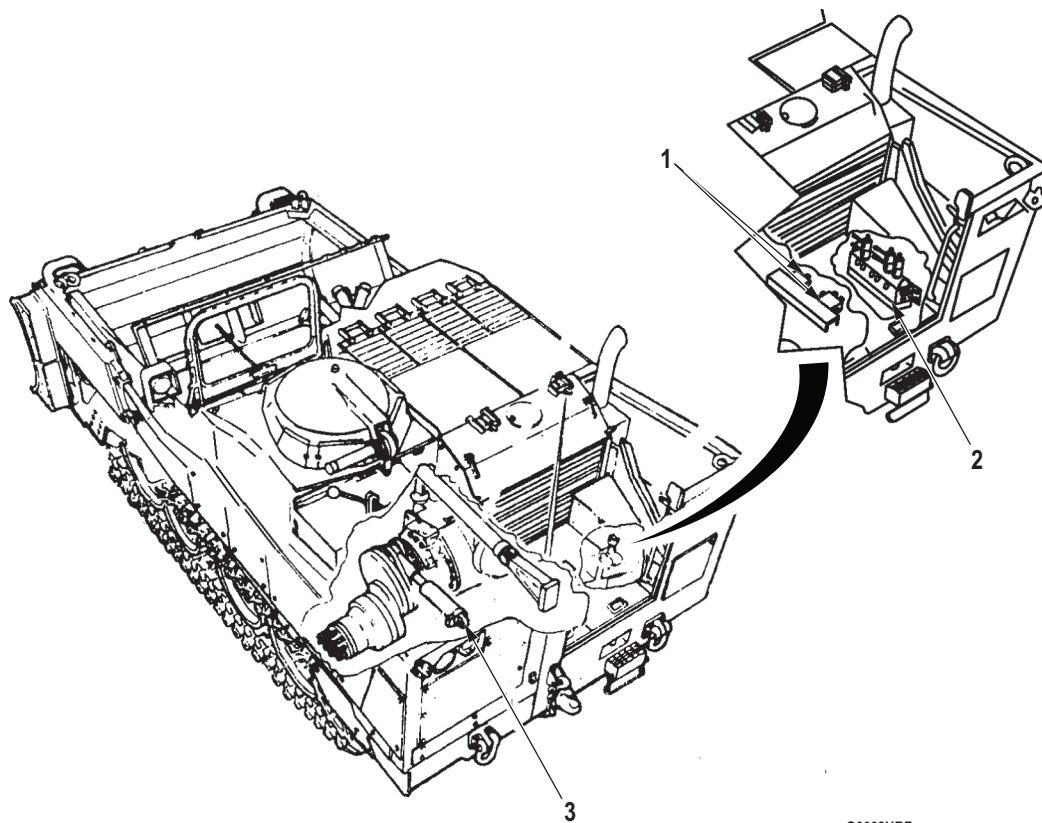


Figure 1. Major Components Front.

1. APRON AND DOZER ASSEMBLY (Figure 1, Item 1). Used for earthmoving operations. Can be raised, or lowered to load and unload material or cargo.
2. HEADLIGHTS (Figure 1, Item 2). Provide light for night driving. Include blackout and infrared lights.
3. UPPER APRON LOCKPINS (Figure 1, Item 3). Lock apron and dozer assembly in raised position as a safety precaution during maintenance.
4. LOWER APRON LOCKPINS (Figure 1, Item 4). Lock apron and dozer assembly to hull during digging procedures.
5. DOZER BLADE LOCKS (Figure 1, Item 5). Means of locking dozer blade in DOWN position for digging with reusable pin assembly, modified latch, and steel latch block.
6. APRON AND DOZER EXTENSIONS (Figure 1, Item 6). Provide a larger working surface for apron and dozer. May be removed for transporting vehicle.
7. DOZER BLADE LATCHES (Figure 1, Item 7). Reusable pin assembly locks dozer blade in folded position during long motor marches and cross-country driving.

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued



G0002HBF

*Figure 2. Major Components Rear.*

1. FLOW AND CONTROL VALVES (Figure 2, Item 1). Provides hydraulic fluid for track adjusting and track adjusting cylinders.
2. TRACK AND BLADE MANIFOLD (Figure 2, Item 2). Provides hydraulic adjustment for track adjusting and track adjusting cylinders.
3. TRACK ADJUSTING CYLINDER (Figure 2, Item 3). Moves adjusting flange of final drive before and after to adjust track tension (one on each side).

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

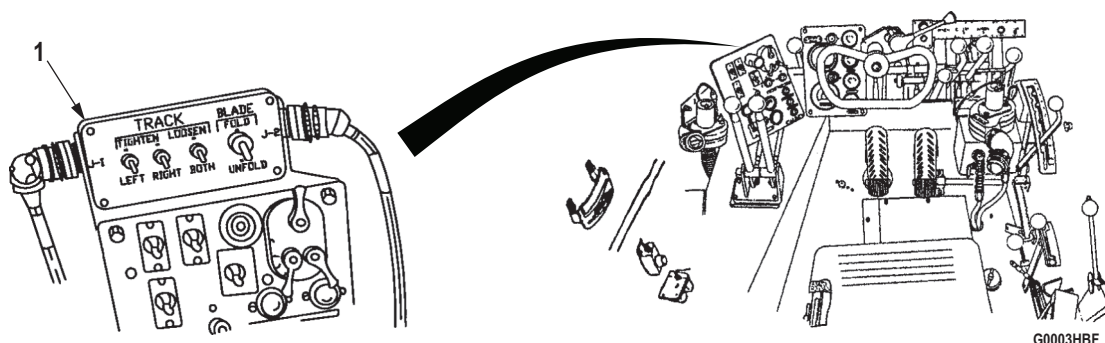


Figure 3. Major Components Operator's Compartment.

1. TRACK AND BLADE CONTROL PANEL (Figure 3, Item 1). Provides capability of adjustment of track tension and raise and lower dozer blade from within the operator's compartment.

## LOCATION AND CONTENTS OF DATA PLATES

1. Refer to TM 5-2350-262-20, Data Plates Replacement, for the location and contents of all data plates.
2. Maintain data plates so that all information remains legible. If any data plate is missing or no longer legible, notify Field Maintenance.

## EQUIPMENT DATA

### M9 ACE with HBF-TT

Table 1. General.

Weight (net)	39,000 lb (17,706 kg)
Weight (gross)	57,000 lb (25,878 kg)
Length	20 ft 5 in. (622 cm)
Length (dozer blade folded)	20 ft 3 in. (617 cm)
Height	8 ft 9 in. (267 cm)
Width (extensions installed)	10 ft 5 in. (318 cm)
Width (extensions removed)	9 ft 2 in. (279 cm)
Ground Clearance SPRUNG (engine running)	13 in. (33 cm)
Ground Clearance UNSPRUNG	Variable
Ground Pressure	9.5 psi (67 kPa)
Bridge Classification	17 tons (15 t)

**M9 ACE with HBF-TT - Continued****Table 2. Land Performance.**

Maximum Speed	30 mph (48 km/h)
Cruising Range (secondary roads)	230 mi (370 km)
Grade Ascending Ability - with 18,000 lb (8,172 kg) in bowl	60%
Grade Descending Ability - with 18,000 lb (8,172 kg) in bowl	60%
Gradeability - with 4,000 lb (1,816 kg) in bowl	30%
Gradeability (curb weight)	20%
Trench Depth	5 ft 2 in. (157 cm)
Vertical Wall	1 ft 6 in. (46 cm)
Tilt Dozing	5 degrees
Side Slope Limit (curb weight)	20%
Side Slope Limit (with 4,000 lb (1,816 kg)) load	30%
Side Slope Limit (with 18,000 lb (8,172 kg)) load	40%
Drawbar Pull	31,000 lb (14,074 kg)
Bowl Capacity	8.7 cu yd (6.7 m <sup>3</sup> )
Fording Depth	36 in. (91 cm)
Turning Radius (geared steer mode)	45 ft (14 m)
Turning Radius (clutch brake mode)	Pivots
Angle of Departure (maximum) SPRUNG	27 degree grade
Angle of Approach (maximum)	29 degree grade

**M9 ACE with HBF-TT - Continued****Table 3. Capacities.**

Fuel Tank	134 gal (507 L)
Fuel Type:	Diesel oil, 40 cetane, VV-F-800
Regular Grade (DF-2)	Above +10°F (-12°C)
Winter Grade (DF-1)	Below +10°F (-12°C) to above -20°F (-29°C)
Arctic Grade (DF-A)	Below -20°F (-29°C)
Aviation Turbine (JP8)	Above -60°F (-51°C)
Engine Oil, Refill	30 qt w/o filters (28 L)
	34 qt w/ filters (32.2 L)
Engine Coolant:	
Refill	94 qt (89 L)
Radiator Capacity	79 qt (75 L)
Final Drive (each)	9 qt (8.5 L)
Hydraulic Oil Tank:	
Dry	128 qt (121 L)
Refill	108 qt (102 L)
Return Line Filter	4 qt (3.8 L)
Winch	4 qt (3.8 L)

**Table 4. Engine.**

Manufacturer	Cummins Engine Company, Inc.
Model	V903C
Displacement	903 cu in. (14.8 L)
Type	8-cylinder, 4-cycle diesel
Horsepower (@2,600 rpm)	295 (220 kw)

**M9 ACE with HBF-TT - Continued****Table 5. Transmission.**

Manufacturer	Clark Equipment Co.
Model	13.5 HR 3610-2
Type	Torque converter
Shift Selection	Manual
Shift Ranges	6 forward, 2 reverse

**Table 6. Steer Unit.**

Manufacturer	Twin Disc Inc.
Type	Hydraulic with gears and clutches
Modes	Geared steer and clutch brake

**Table 7. Winch (35,000 lb (15,890 kg)).**

Manufacturer	Lake Shore
Type	Planetary
Wire Rope Length	165 ft ± 2 ft (50 m ± 0.6 m)
Wire Rope Diameter	3/4 in. (19.1 mm)
Line Pull	35,000 lb ± 1,500 lb (15,890 kg ± 681 kg)
Spooling Rate (Low Range)	8.5 ft/min (2.6 mi/min) min.
Spooling Rate (High Range)	36 ft/min (11 mi/min) max.
Winch Motor:	
Type	Gear, Geroter or Vane

**END OF WORK PACKAGE**

## OPERATOR MAINTENANCE THEORY OF OPERATION

### SCOPE

This section contains information relative to the principles of operation for the M9 ACE with Hydraulic Blade Folder and Track Tensioner (HBF-TT). The general functional description of the vehicle and the HBF-TT system is contained in this section. Maintenance personnel should be familiar with the principles of operation of these systems before working on or troubleshooting this system. A more thorough understanding of the hydraulic system and electrical system can be obtained by referring to TM 5-2350-262-20, Vehicle Wiring Diagram and TM 5-2350-262-20, Vehicle Hydraulic Schematic.

### SUSPENSION SYSTEM

The suspension system consists of tracks, roadwheels, arms, drive sprockets, rotary actuators, and bump stops. The suspension system components used in the HBF-TT system are described below.

### TRACK ADJUSTING CYLINDERS

The track adjusting cylinders (Figure 1) control the track tension. The track adjusting cylinders (Figure 1) can be controlled by a control lever in the operator's compartment.

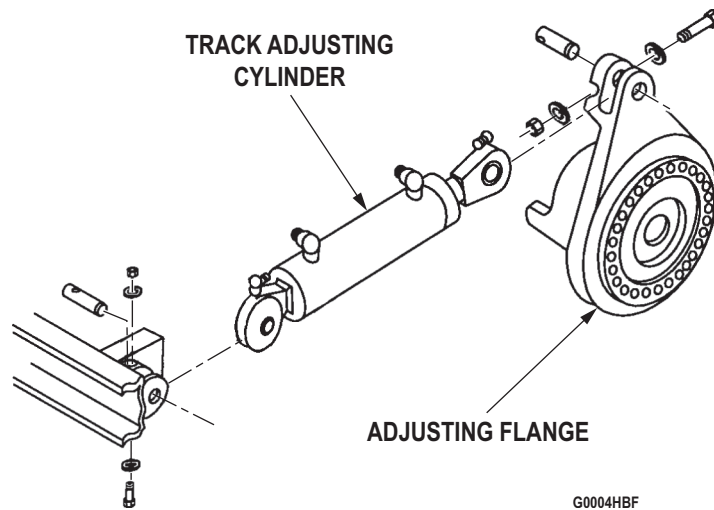


Figure 1. Track Adjusting Cylinders.

## TRACKS AND ROADWHEELS

The tracks (Figure 2), drive sprockets, and roadwheels (Figure 2) are of conventional design. Track tension is adjusted with cylinders attached to the adjusting flanges of the final drive units. The track tension is controlled by a control lever in the operator's compartment.

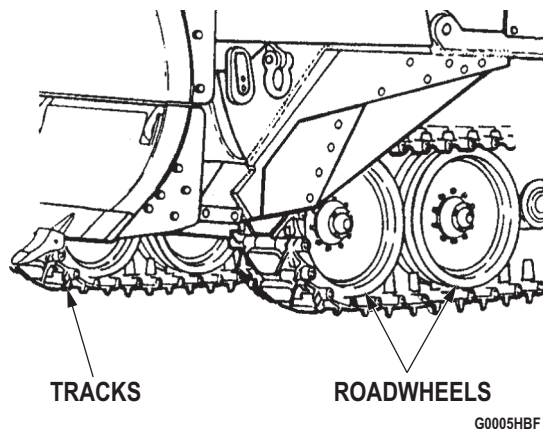


Figure 2. Tracks and Roadwheels.

## EARTHMOVING COMPONENTS

### APRON AND DOZER ASSEMBLY

The apron and dozer assembly (Figure 3) is raised or lowered by the two apron cylinders, one on each side of the vehicle. These cylinders are controlled by a control lever in the operator's compartment. The dozer blade can be folded and unfolded by a control lever in the operator's compartment.

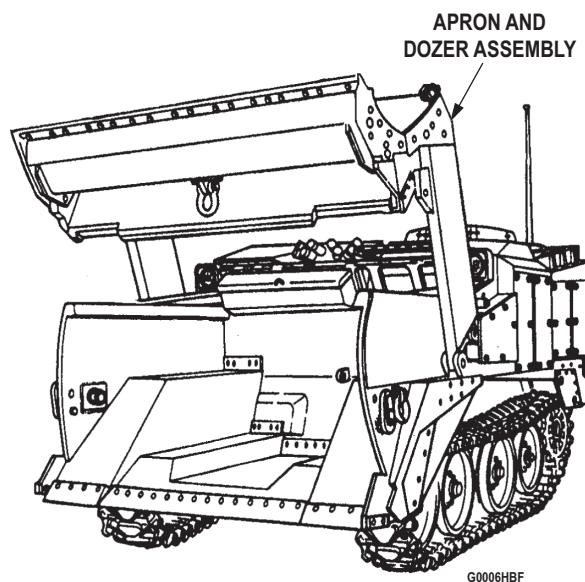


Figure 3. Apron and Dozer Assembly.



## HYDRAULIC SYSTEM

### HYDRAULIC MANIFOLD OPERATION

The hydraulic manifold on the track and blade manifold (Figure 4) is activated by the hydraulic linkages from the operator's compartment and they, in turn, activate the hydraulic functions of the HBF-TT system.

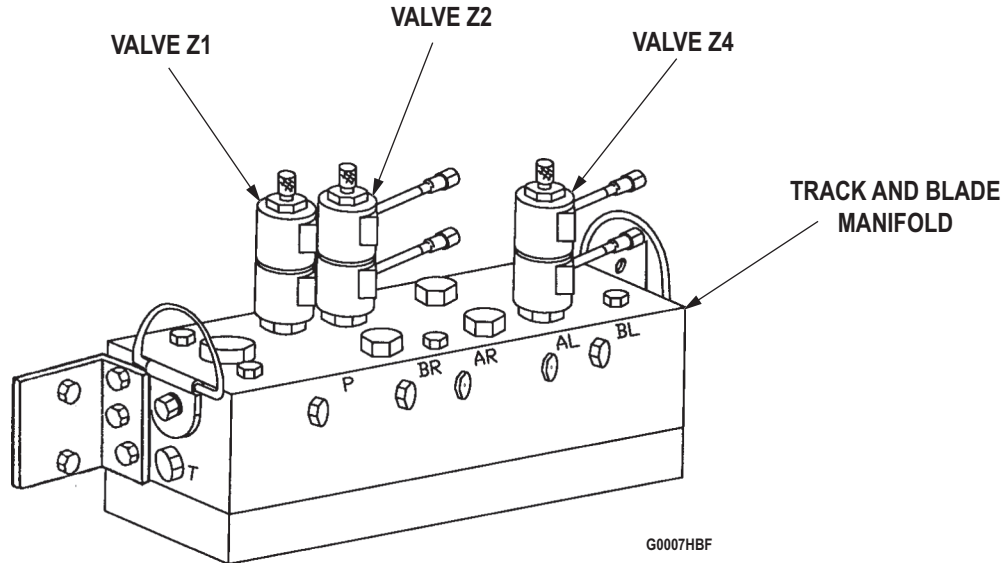


Figure 4. Hydraulic Manifold Operation.

### TIGHTEN AND LOOSEN TRACK TENSION ADJUSTMENT

Valves Z1 and Z2, on the back top of the manifold, actuate circuits and tighten and loosen left and right side track tension.

### FOLD OR UNFOLD DOZER BLADE

Valve Z4, on the front top of the manifold, actuates circuits and folds or unfolds dozer blade.

### END OF WORK PACKAGE



## **CHAPTER 2**

### **OPERATOR INSTRUCTIONS**



## OPERATOR MAINTENANCE

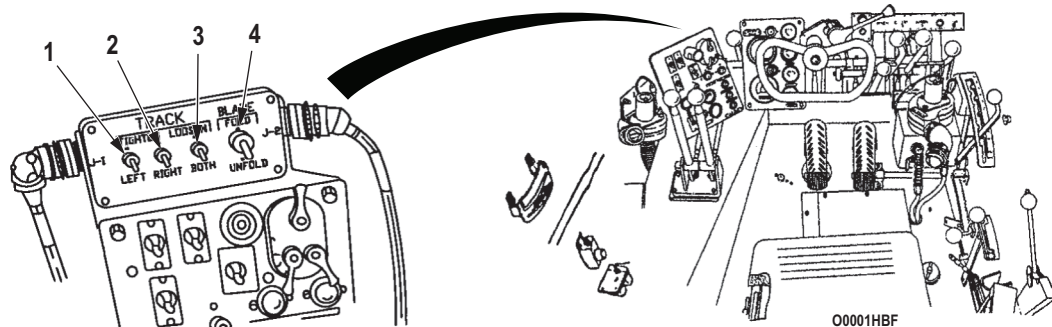
### DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

This section shows the location and function of all M9 ACE with Hydraulic Blade Folder-Track Tensioner (HBF-TT) controls and indicators. Review this section thoroughly before operating the vehicle.

#### CONTROLS AND INDICATORS

##### M9 ACE HBF-TT CONTROLS

**Table 1. Controls and Indicators.**



*Figure 1. Controls and Indicators.*

Key	Control/Indicator	Function
1	Left Track Adjustment TIGHTEN Switch	Mounted over switch panel, provides operator ability to hydraulically adjust track adjusting cylinder on left side of vehicle.
2	Right Track Adjustment TIGHTEN Switch	Mounted over switch panel, provides operator ability to hydraulically adjust track adjusting cylinder on right side of vehicle.
3	Left and Right Track Adjustment LOOSEN Switch	Mounted over switch panel, provides operator ability to hydraulically loosen right and left track adjusting cylinders on vehicle.
4	Dozer Blade Adjustment RAISE/ LOWER Switch	Mounted over switch panel, provides operator ability to hydraulically fold and unfold dozer blade on vehicle.

**END OF WORK PACKAGE**



---

## OPERATOR MAINTENANCE OPERATION UNDER USUAL CONDITIONS - FOLDING DOZER BLADE

---

### INITIAL SETUP:

#### Personnel Required

Combat Engineer, 21B

#### References

TM 5-2350-262-10

WP 0018

---

### GENERAL

1. This section contains instructions for safely operating the M9 ACE under usual conditions. Unusual conditions are defined and described in TM 5-2350-262-10.
2. Before operating a new or reconditioned M9 ACE, make sure Field Maintenance services the vehicle.
3. Perform all "After" PMCS listed in Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018) before operating the M9 ACE to make sure that all adjustments and checks are completed.
4. Review all towing instructions in towing vehicle manual to prepare for coupling and uncoupling operations.

### FOLDING DOZER BLADE

#### WARNING



Do not work in front or near the blade and apron unless the dozer lockpins are installed. Failure to comply may result in serious injury or death to personnel.

1. Start the engine (TM 5-2350-262-10) and allow it to warm up for three to five minutes.
2. Place SPRUNG/UNSPRUNG control lever (Figure 1, Item 1) in SPRUNG position.

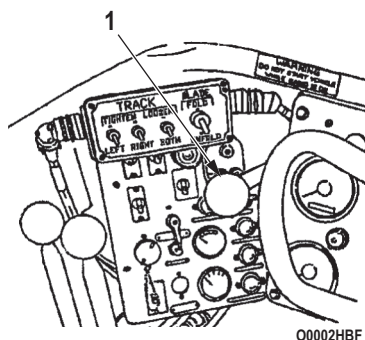


Figure 1. Folding Dozer Blade.

**FOLDING DOZER BLADE - Continued****CAUTION**

Remove clips and dozer lockpins before folding the blade to prevent damage to the equipment.

3. Remove pin assembly (Figure 2, Item 6) and dozer blade latch (Figure 2, Item 1) from each side of apron (Figure 2, Item 4).
4. Remove two clips (Figure 2, Item 3), then pull out two dozer blade lockpins (Figure 2, Item 2).
5. Secure dozer blade (Figure 2, Item 5) by installing dozer blade latch (Figure 2, Item 1) in forward position, with pin assembly (Figure 2, Item 6) on each side of apron (Figure 2, Item 4) in middle hole.
6. Install two dozer blade lockpins (Figure 2, Item 2) in dozer blade (Figure 2, Item 5), and secure dozer lockpins (Figure 2, Item 2) with two clips (Figure 2, Item 3).

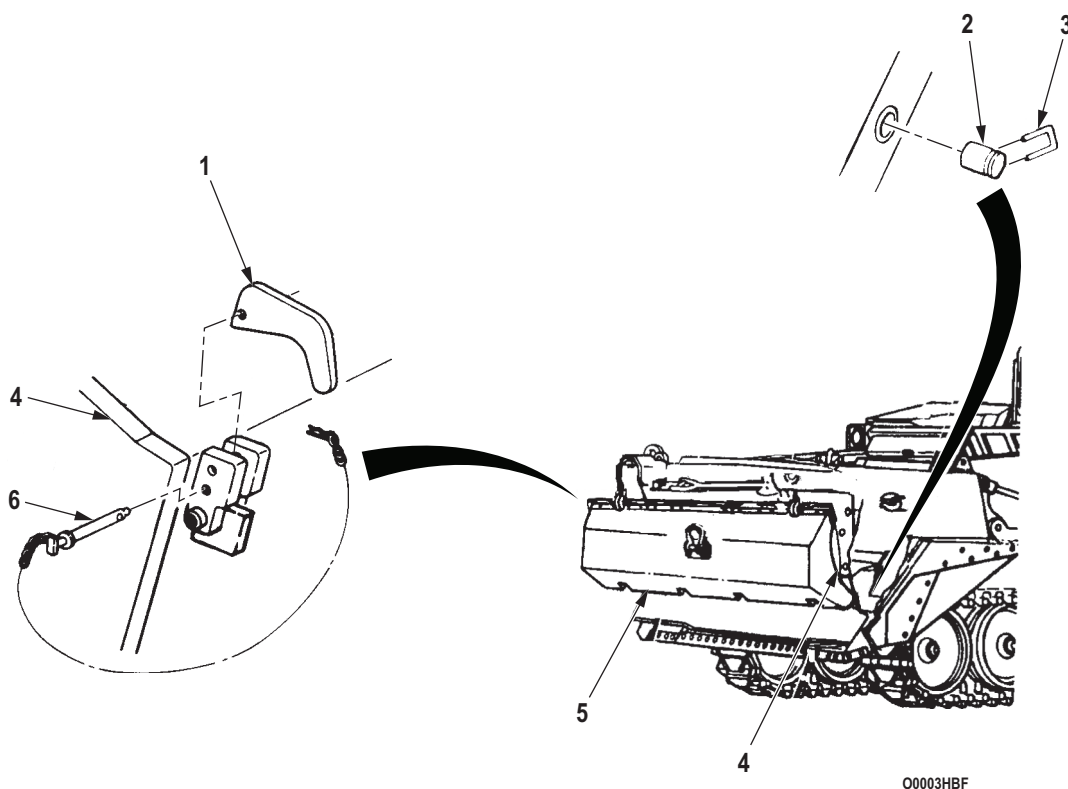


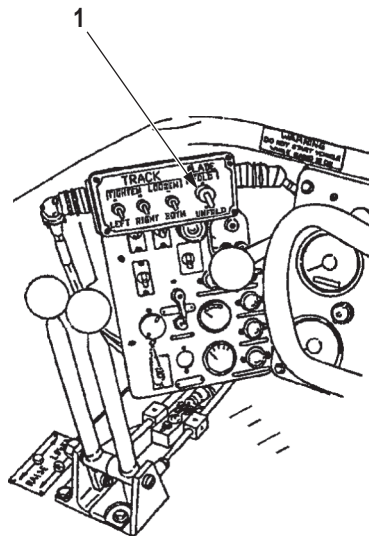
Figure 2. Folding Dozer Blade.



**FOLDING DOZER BLADE - Continued****CAUTION**

Do not release the blade fold/unfold switch unless the blade is completely folded (or unfolded for dozing).

7. Located on the control box, pull blade fold/unfold switch (Figure 3, Item 1) out of locked position and push it up and hold to fold the blade.



O0004HBF

Figure 3. Folding Dozer Blade.

**END OF TASK****END OF WORK PACKAGE**



---

## OPERATOR MAINTENANCE OPERATION UNDER USUAL CONDITIONS - UNFOLDING DOZER BLADE

---

### INITIAL SETUP:

#### Personnel Required

Combat Engineer, 21B

#### References

TM 5-2350-262-10

WP 0018

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### GENERAL

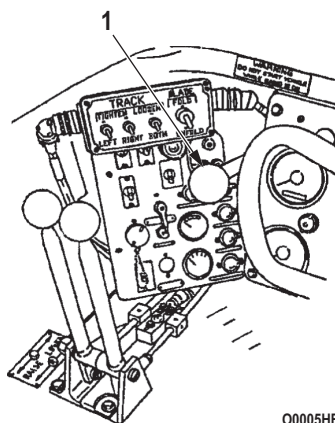
1. This section contains instructions for safely operating the Hydraulic Blade Folder and Track Tensioner (HBF-TT) under usual conditions. Unusual conditions are defined and described in TM 5-2350-262-10.
2. Before operating a new or reconditioned M9 ACE, make sure Field Maintenance services the vehicle.
3. Perform all "After" PMCS listed in Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018) before operating the M9 ACE to make sure that all adjustments and checks are completed.
4. Review all towing instructions in towing vehicle manual to prepare for coupling and uncoupling operations.

### UNFOLDING DOZER BLADE

#### WARNING

Do not unfold blade while driving crosscountry. Failure to comply may result in damage to equipment or injury to personnel.

1. Start the engine (TM 5-2350-262-10) and allow it to warm up for 3 to 5 minutes.
2. Place SPRUNG/UNSPRUNG control lever (Figure 1, Item 1) in SPRUNG position.



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Figure 1. Unfolding Dozer Blade.

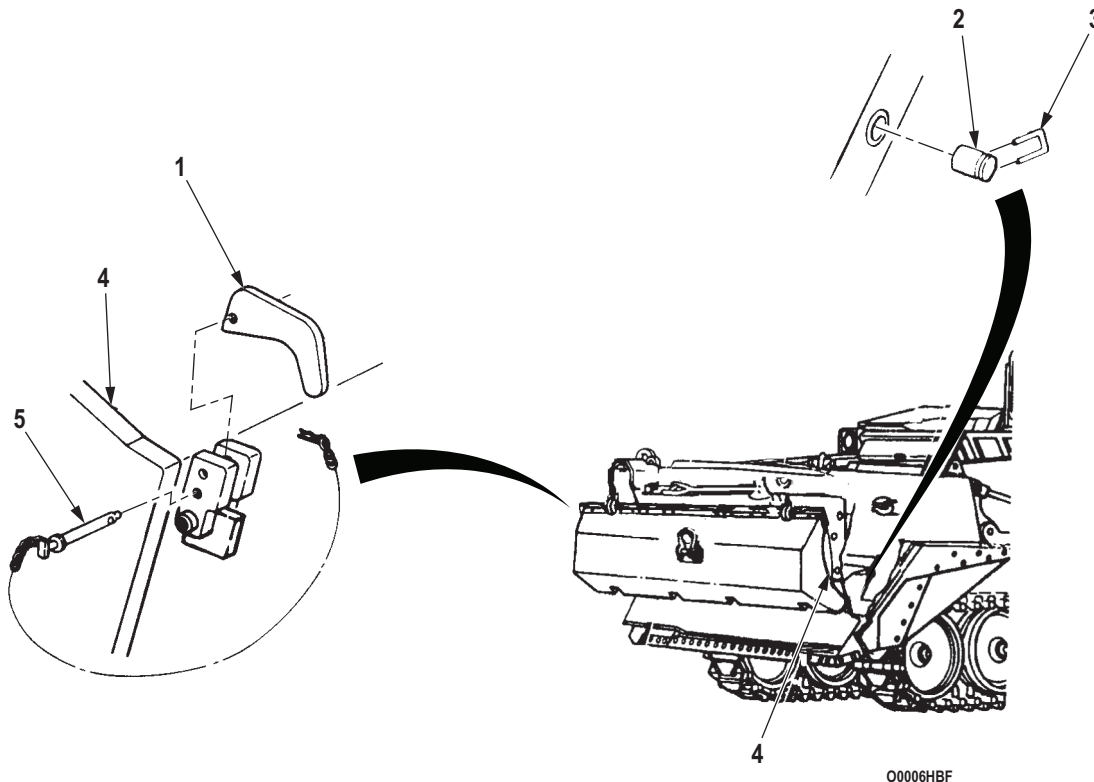
**UNFOLDING DOZER BLADE - Continued****WARNING**

When unfolding dozer blade, work on blade latches from side of vehicle only. Failure to comply may result in serious injury to personnel.

**CAUTION**

Remove clips, dozer lockpins, and blade latch before unfolding the blade to prevent damage to equipment.

3. Remove two clips (Figure 2, Item 3). Pull out two dozer lockpins (Figure 2, Item 2). Remove pin assembly (Figure 2, Item 5) and blade latch (Figure 2, Item 1) from each side of apron (Figure 2, Item 4).



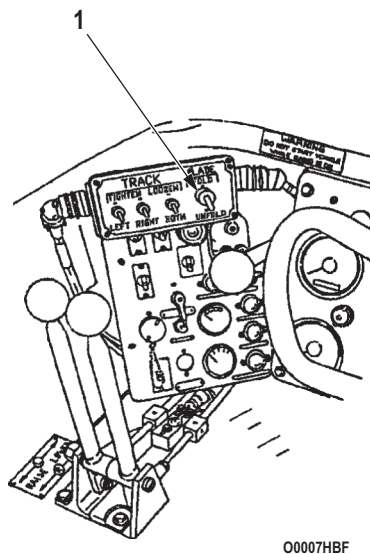
0006HBF

Figure 2. Unfolding Dozer Blade.

**UNFOLDING DOZER BLADE - Continued****CAUTION**

Do not release the blade fold/unfold switch unless the blade is completely folded or unfolded.

4. On control box, pull blade fold/unfold switch (Figure 3, Item 1) out of locked position and push it down and hold to unfold the blade.



O0007HBF

Figure 3. Unfolding Dozer Blade.

**UNFOLDING DOZER BLADE - Continued**

5. Install two dozer blade lockpins (Figure 4, Item 2) and two clips (Figure 4, Item 3).
6. Install blade latch (Figure 4, Item 1), facing rearward, with pin assembly (Figure 4, Item 5) on each side of apron (Figure 4, Item 4).

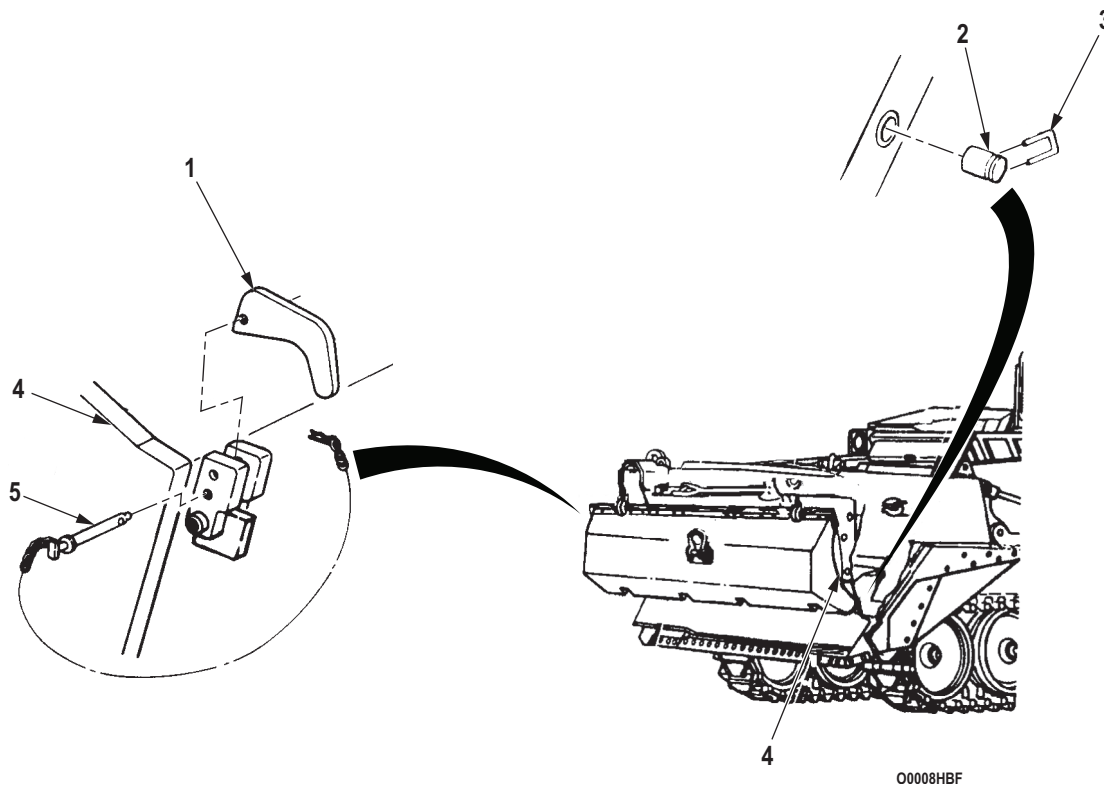


Figure 4. Unfolding Dozer Blade.

**END OF TASK**

**END OF WORK PACKAGE**

---

## OPERATOR MAINTENANCE OPERATION UNDER USUAL CONDITIONS - TRACK TENSION ADJUSTMENT

---

### INITIAL SETUP:

#### Tools and Special Tools

Rule, Steel, Machinist's (TM 10-2350-262-10)

#### References

TM 5-2350-262-10

WP 0018

#### Personnel Required

Combat Engineer, 21B

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### GENERAL

1. This section contains instructions for safely operating the M9 ACE under usual conditions. Unusual conditions are defined and described in TM 5-2350-262-10.
2. Before operating a new or reconditioned M9 ACE, make sure Field Maintenance services the vehicle.
3. Perform all "After" PMCS listed in Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018) before operating the M9 ACE to make sure that all adjustments and checks are completed.
4. Review all towing instructions in towing vehicle manual to prepare for coupling and uncoupling operations.

### TRACK TENSION ADJUSTMENT

#### NOTE

- Ensure that bowl is empty before adjusting track tension. Optimum track adjustment is when the track is in the tightest possible condition which still allows the vehicle to be lowered to the digging position.
  - It is normal to have short delays during lowering and raising while the Hydraulic Blade Folder-Track Tensioner (HBF-TT) track adjusting components function.
1. Start engine (TM 5-2350-262-10).
  2. Place SPRUNG/UNSPRUNG control lever (Figure 1, Item 1) in SPRUNG position and allow suspension system to stabilize.

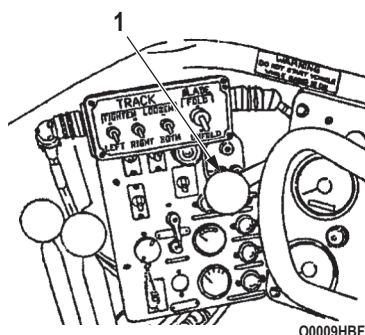


Figure 1. Track Tension Adjustment.

**TRACK TENSION ADJUSTMENT - Continued**

3. Adjust the hard throttle so engine idles at 750-850 rpm to maintain hydraulic pressure. Allow engine to idle for five minutes so that the vehicle will settle into a constant position.

**NOTE**

Every time the tracks are loosened by track loosening switch, adjust tension in both tracks one at a time using the steps listed below.

4. Move track loosening switch (Figure 2, Item 1) momentarily (two to three seconds) to loosen both tracks. Vehicle will move slightly as track adjust cylinders retract.

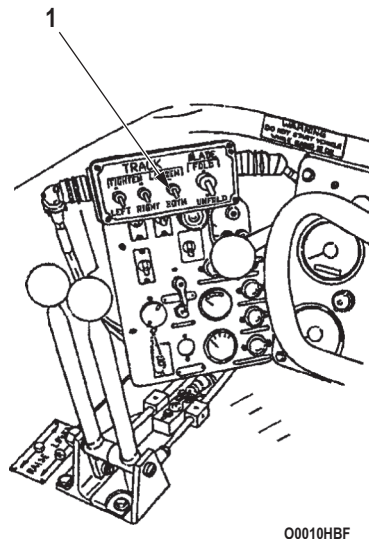


Figure 2. Track Tension Adjustment.

**NOTE**

Record measurement from middle of top of No. 4 roadwheel to track.

5. Dismount vehicle and inspect track. The track should just touch the top of No. 3 roadwheel, and should be 1-1/4 to 2 inches (3.2 to 5.1 cm) above the top of No. 4 roadwheel (Figure 3).

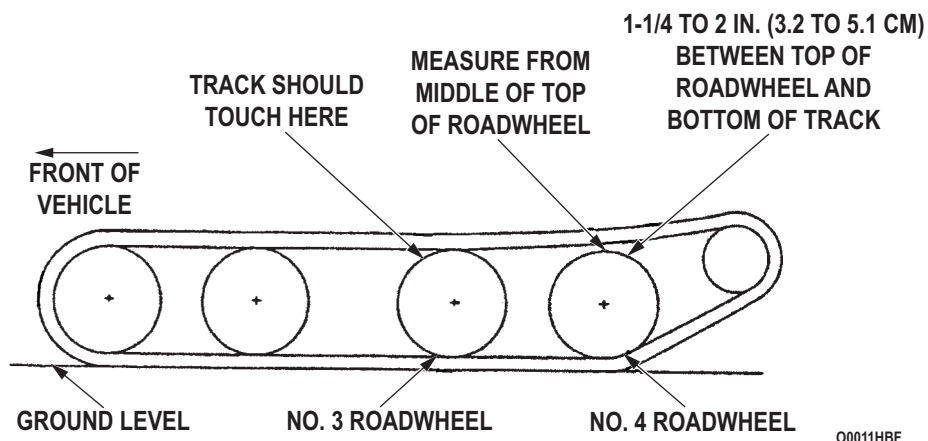


Figure 3. Track Tension Adjustment.



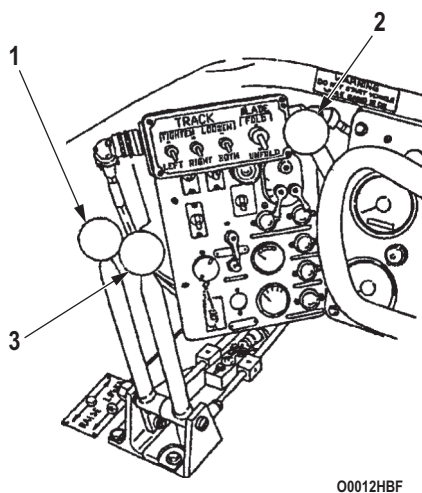
**TRACK TENSION ADJUSTMENT - Continued**

6. If the track is more than 2 inches (5.1 cm) above the top of No. 4 roadwheel, loosen the track by moving the track loosening switch.
7. If the track is less than 1-1/4 inches (3.2 cm) from the top of No. 4 roadwheel, tighten the track as necessary by moving that side track tensioning switch. This operation will tighten that side track only.
8. Repeat Steps (5) through (7) for track on the other side. Repeat operation until both tracks have a gap 1-1/4 to 2 inches above the top of No. 4 roadwheel.
9. Move vehicle slightly forward to remove any slack in left and right tracks from behind the sprocket.
10. Place SPRUNG/UNSPRUNG control lever (Figure 4, Item 2) in UNSPRUNG mode.

**NOTE**

Suspension control levers must remain in the LOWER position throughout Step (11). If levers are returned to the neutral position before completion of step, Step (11) must be repeated.

11. Push left (Figure 4, Item 1) and right (Figure 4, Item 3) suspension control levers forward to LOWER position and hold for 10 to 12 seconds. (Observe front of vehicle begins to lower, but MAY not completely drop to the ground.) If front of vehicle does not contact the ground, follow Steps (4) through (9).
12. Return suspension control levers (Figure 4, Items 1 and 3) to neutral position.
13. Pull both left (Figure 4, Item 1) and right (Figure 4, Item 3) suspension control levers rearward to RAISE position and level the vehicle. (Vehicle hull will stop momentarily while track adjusting cylinders function.)

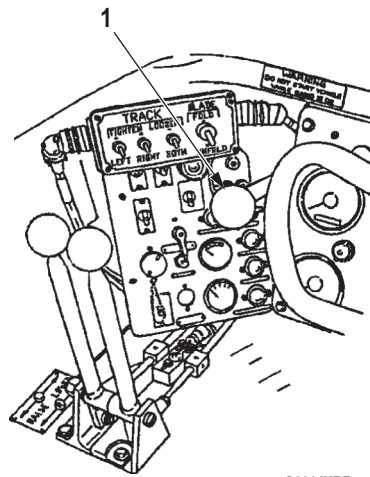


00012HBF

Figure 4. Track Tension Adjustment.

**TRACK TENSION ADJUSTMENT - Continued**

14. Place SPRUNG/UNSPRUNG control lever (Figure 5, Item 1) in SPRUNG mode. Proceed with mission.



00014HBF

*Figure 5. Track Tension Adjustment.*

15. If unable to correctly adjust track tension, notify Field Maintenance.

**END OF TASK****END OF WORK PACKAGE**

**OPERATOR MAINTENANCE  
OPERATION UNDER UNUSUAL CONDITIONS**

---

**INITIAL SETUP:****Personnel Required**

Combat Engineer, 21B

**References**TM 5-2350-262-10

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For special instructions for operating and servicing the M9 ACE with HBF-TT under unusual conditions, refer to TM 5-2350-262-10.

**END OF TASK****END OF WORK PACKAGE**



## **CHAPTER 3**

# **TROUBLESHOOTING PROCEDURES**



---

## FIELD MAINTENANCE TROUBLESHOOTING INTRODUCTION

---

### GENERAL

1. This work package provides information for identifying and correcting malfunctions that may develop while operating your M9 ACE.
2. The Troubleshooting Malfunctions/Symptom Index lists common malfunctions that may occur and refers you to the proper page for a troubleshooting procedure.
3. If you are unsure of the location of an item mentioned in troubleshooting, refer to Troubleshooting Malfunctions/Symptom Index (WP 0010) or to the maintenance task in this manual where the item is replaced.
4. Before performing troubleshooting, read and follow all safety instructions found in the Warning Summary at the beginning of this manual.
5. This section cannot list all the malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the corrective action listed, notify your supervisor.
6. When troubleshooting a malfunction:
  - Locate the symptom or symptoms in the Troubleshooting Malfunctions/Symptom Index that best describe the malfunction.
  - Turn the page where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: STEP, CONDITION/INDICATION, and DECISION. The malfunctions, tests or inspections, and corrective actions are indented to line up under the appropriate heading.
  - Perform each step in the order listed until the malfunction is corrected. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

### EXPLANATION OF COLUMNS

Explanations of the columns in the troubleshooting are as follows:

1. **STEP.** A visual or operational indication that something is wrong with the M9 ACE.
2. **CONDITION/INDICATION.** A procedure to isolate the problem in a component or system.
3. **DECISION.** A procedure to correct the problem.

### END OF WORK PACKAGE





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**FIELD MAINTENANCE  
TROUBLESHOOTING MALFUNCTIONS/SYMPTOM INDEX**

---

<b><u>Malfunction/Symptom</u></b>	<b><u>Troubleshooting Procedure</u></b>
1. HEADLIGHTS DO NOT OPERATE .....	WP 0011
2. TRACK (LEFT OR RIGHT) WILL NOT TIGHTEN OR LOOSEN, HBF-TT SYSTEM (ELECTRICAL) .....	WP 0012
3. TRACK (LEFT OR RIGHT) WILL NOT TIGHTEN OR LOOSEN, TRACK ADJUSTING CYLINDER .....	WP 0013
4. FRONT CORNER (LEFT OR RIGHT) DOES NOT RAISE OR LOWER IN UNSPRUNG MODE, TRACK ADJUSTING CYLINDER .....	WP 0014
5. LEFT OR RIGHT TRACK ADJUSTING CYLINDERS WILL NOT EXTEND AFTER SUSPENSION CONTROL LEVERS ARE RETURNED TO NEUTRAL .....	WP 0015
6. BLADE WILL NOT FOLD OR UNFOLD IN SPRUNG MODE .....	WP 0016

**END OF WORK PACKAGE**



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**FIELD MAINTENANCE  
TROUBLESHOOTING PROCEDURES - HEADLIGHTS DO NOT OPERATE**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Multimeter (WP 0071, Table 1, Item 3)

**References (cont.)**

WP 0030  
WP 0033

**Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

Set master power switch to OFF  
(TM 5-2350-262-10)

**References**

WP 0018

---

**TROUBLESHOOTING PROCEDURE****ELECTRICAL SYSTEM****NOTE**

- Wherever the word "lubricate" appears, see Operator Preventive Maintenance Checks and Service (PMCS) (WP 0018).
- Malfunctions, test or inspections, and corrective actions are listed/indented according to the heading at the top of each page.
- This procedure applies to either headlight.

## ELECTRICAL SYSTEM - Continued

### STEP

1. Check headlight wiring harness for a minimum 24 VDC at socket C (Figure 1, Item 6) and D (Figure 1, Item 5).
  - a. Turn vehicle MASTER switch ON and turn light switch to SER DRIVE.
  - b. Remove headlight (Figure 1, Item 1) from headlight base (Figure 1, Item 3) and disconnect headlight connector (Figure 1, Item 2) from headlight harness (Figure 1, Item 4).

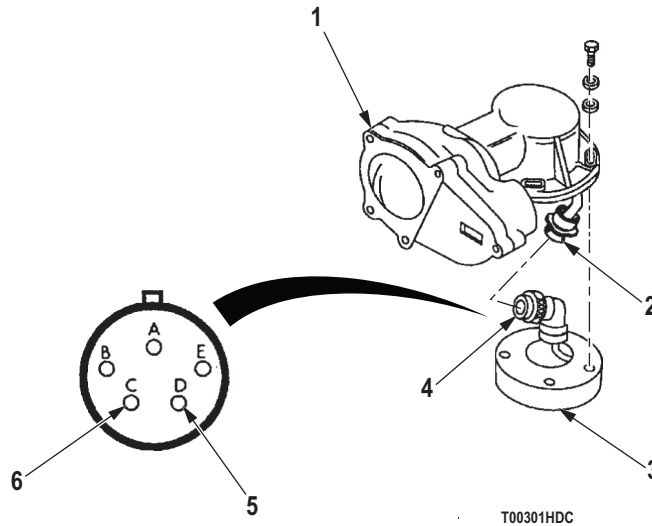


Figure 1. Headlight Wire Harness Connector.

### CONDITION/INDICATION

Are 24 VDC present at socket C and D?

### DECISION

YES - If minimum 24 VDC is present at either circuit C or D, go to Step (2).  
 NO - If no voltage is present at both circuits C and D, refer to vehicle electrical wiring diagram, control wiring harness and rear wiring harness, and troubleshoot circuits 17 and 18.

### STEP

2. Check for ground continuity.  
 Check for ground continuity between ground lead of headlight harness and vehicle ground.

### CONDITION/INDICATION

Is there continuity to ground?

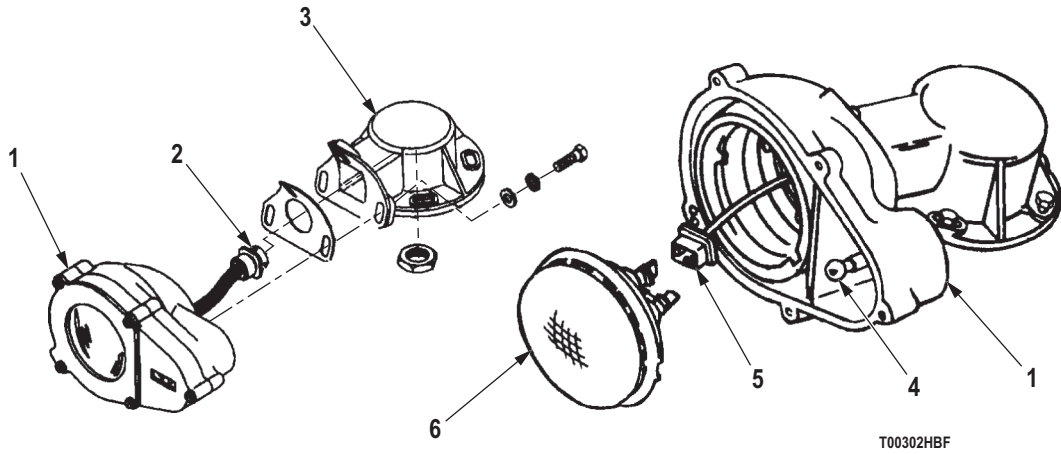
### DECISION

YES - If continuity is indicated, go to Step (3).  
 NO - If an open circuit is indicated, check for loose or missing hardware and dirt or paint. Tighten or replace missing hardware, and clean surface where ground lead is connected.

# **ELECTRICAL SYSTEM - Continued**

## **STEP**

3. Check headlight plug and headlight connector for continuity.
  - a. Remove lamp (Figure 2, Item 6) and blackout bulb (Figure 2, Item 4) from body (Figure 2, Item 1).
  - b. Disconnect plug J2 (Figure 2, Item 5) from lamp (Figure 2, Item 6) and remove blackout bulb (Figure 2, Item 4).
  - c. Remove connector J1 (Figure 2, Item 2) and body (Figure 2, Item 1) from base (Figure 2, Item 3).
  - d. Check for continuity between contacts on plug J2 (Figure 2, Item 5) and connector J1 (Figure 2, Item 2).
  - e. Connections for lamp are listed in Table 1 and blackout bulb connections are listed in Table 2.



*Figure 2. Headlight Connectors.*

**Table 1. Headlight Connector Pinout.**

	J1	J2
Low Beam	C	2
High Beam	D	1
Ground	A	3

**Table 2. Blackout Marker Connector Pinout.**

	J1	J2
BO Marker	B	Contact
Ground	A	Body

**ELECTRICAL SYSTEM - Continued****CONDITION/INDICATION**

Is continuity present between headlight plug and headlight connector?

**DECISION**

YES - If continuity is present between all circuits, replace the faulty incandescent lamps (WP 0033).

NO - If continuity is not present on any of the circuits, replace headlight body (WP 0030).

**END OF WORK PACKAGE**

---

**FIELD MAINTENANCE**  
**TROUBLESHOOTING PROCEDURES - TRACK (LEFT OR RIGHT) WILL NOT TIGHTEN OR LOOSEN, HBF-TT**  
**SYSTEM (ELECTRICAL)**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Multimeter (WP 0071, Table 1, Item 3)

**References (cont.)**

WP 0027  
WP 0028

**Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

Set master power switch to OFF  
(TM 5-2350-262-10)

**References**

WP 0018

---

**TROUBLESHOOTING PROCEDURE****ELECTRICAL SYSTEM****WARNING**

24 volts DC is present in the M9 ACE electrical system. Do not connect measuring instruments with master switch on or connect measuring instruments incorrectly. Failure to comply could damage vehicle electric equipment, measuring instruments, or injure personnel.

**NOTE**

- Wherever the word "lubricate" appears, see Operator Preventive Maintenance Checks and Service (PMCS) (WP 0018).
- Malfunctions, test or inspections, and corrective actions are listed/indented according to the heading at the top of each page.
- There is one ground for the system. For VOLTAGE TEST, leave master switch off, until ready to take meter reading. For CONTINUITY TEST, leave master switch off to take meter reading.

**ELECTRICAL SYSTEM - Continued****STEP**

1. Check for ground continuity.
  - a. Disconnect control box power harness (Figure 1, Item 4) from control box (Figure 1, Item 2).
  - b. Check for ground continuity from socket E (Figure 1, Item 1) to ground (Figure 1, Item 3) behind instrument panel.

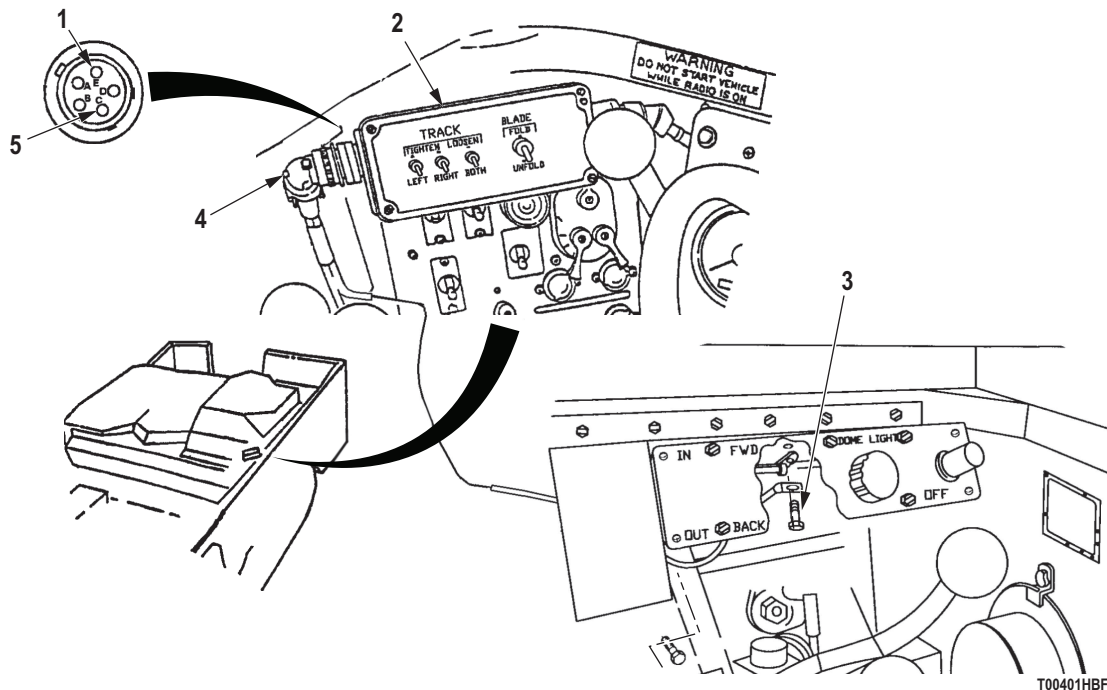


Figure 1. Control Box Power Harness.

**CONDITION/INDICATION**

Is continuity present?

**DECISION**

YES - If continuity is indicated, go to Step (2).

NO - If an open circuit is indicated, replace control box wiring harness (WP 0027). Verify that problem is solved.

**STEP**

2. Check control box power wiring harness for a minimum of 24 VDC at socket C.
  - a. Using volt meter with negative lead in socket E (Figure 1, Item 1) and positive lead in socket C (Figure 1, Item 5), turn on master switch.
  - b. Turn master switch off.

**CONDITION/INDICATION**

Are 24 VDC present at socket C?



**ELECTRICAL SYSTEM - Continued****DECISION**

- YES - If minimum 24 VDC is present, go to Step (5).  
 NO - If no voltage is present at socket C, go to Step (3).

**STEP**

3. Check control wiring harness circuit 450 for a minimum of 24 VDC at circuit 450.
- Disconnect control wiring harness connector (Figure 2, Item 2) behind panel.
  - Connect negative lead of VOM to socket E (Figure 2, Item 1) of control box power wiring harness (Figure 2, Item 3) and connect positive lead to connector (Figure 2, Item 2).

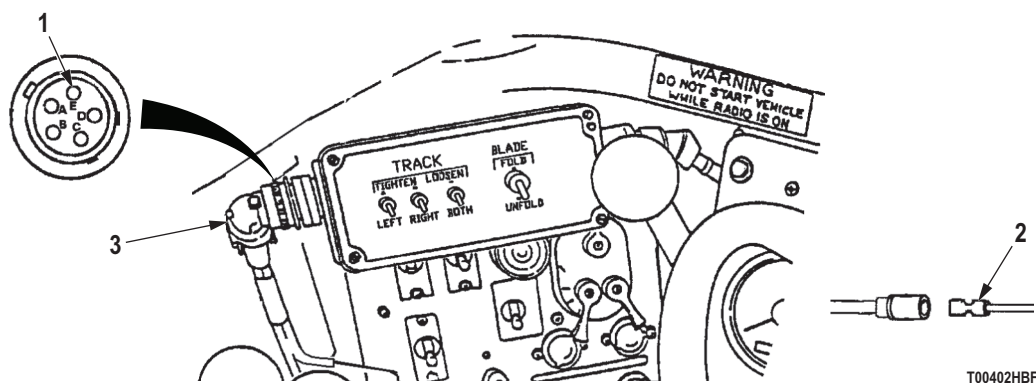


Figure 2. Control Wire Harness.

- Turn on master switch.
- Turn master power off.
- If no voltage is present at connector, reconnect connector to control box power wiring harness.

**CONDITION/INDICATION**

Are 24 VDC present at control wiring harness connector?

**DECISION**

- YES - If minimum 24 VDC is present, replace control box power wiring harness (WP 0027). Verify problem is solved.  
 NO - If no voltage is present at connector, go to Step (4).

**STEP**

4. Check control wiring harness for a minimum of 24 VDC at circuit 450.
- Refer to vehicle electrical system wiring diagram (FO-1) and control wiring harness (FO-2 & FO-3)

**CONDITION/INDICATION**

Is a minimum of 24 VDC for circuit 450 at control wiring harness?

**DECISION**

- NO - Troubleshoot circuit 450.  
 YES - Go to Step (5).

# ELECTRICAL SYSTEM - Continued

## STEP

5. Check manifold wiring harness and hydraulic valve solenoids for continuity.
  - a. Disconnect manifold wiring harness (Figure 3, Item 1) from control box (Figure 3, Item 4).
  - b. Check continuity between all wiring harness connector pins (Figure 3, Item 2) at connector (Figure 3, Item 3). This will also check continuity of the appropriate valve solenoids.
  - c. Refer to Table 1 for lead locations.
  - d. If continuity is indicated, reconnect manifold wiring harness (Figure 3, Item 1) to control box (Figure 3, Item 4).

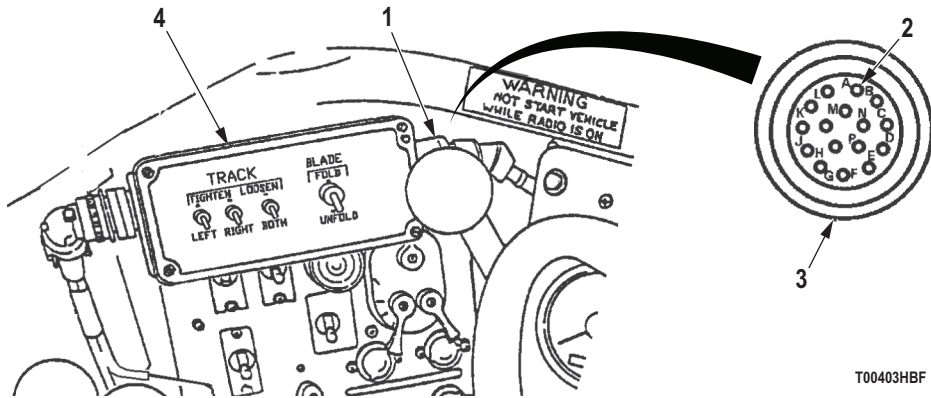


Figure 3. Manifold Wiring Harness Connector.

Table 1. Manifold Wiring Harness Connector.

HARNESS CONNECTOR PIN	HARNESS CONNECTOR PIN	SOLENOID PLUG PINS
L	A	Z1U
L	B	Z1L
L	C	Z2U
L	D	Z2L
M	G	Z4U
M	H	Z4L

## CONDITION/INDICATION

Is continuity present across manifold wiring harness?

## DECISION

YES - If continuity is indicated, go to Step (7).  
NO - If an open circuit is indicated, go to Step (6).

## ELECTRICAL SYSTEM - Continued

### STEP

6. Check valve solenoid for continuity.
  - a. Disconnect manifold wiring harness (Figure 4, Item 2) from solenoid connector (Figure 4, Item 1) (typical).
  - b. Connect positive lead to pin (Figure 4, Item 3) and negative lead to socket (Figure 4, Item 4).
  - c. If continuity is indicated, reconnect manifold wiring harness connector (Figure 4, Item 2) to solenoid connector (Figure 4, Item 1).

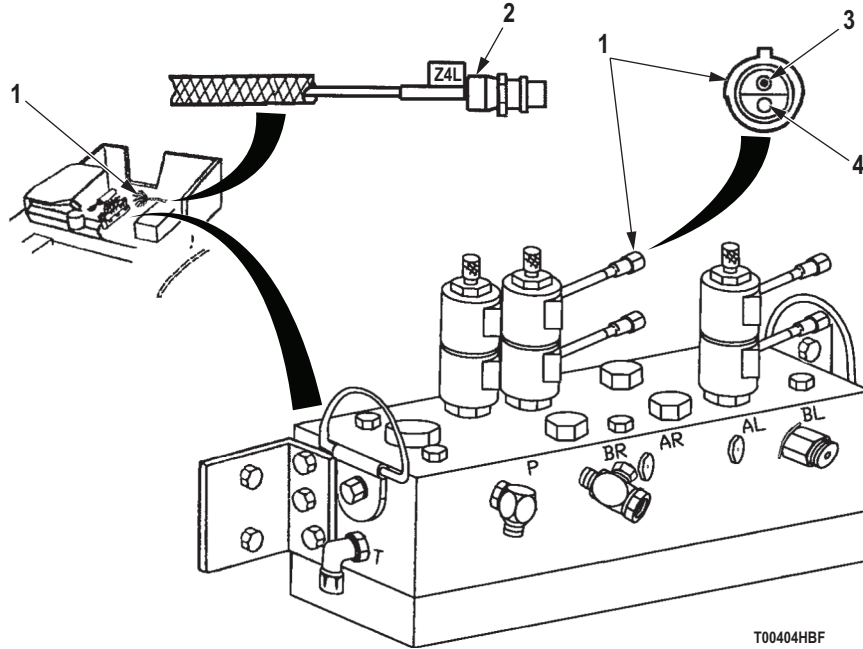


Figure 4. Valve Solenoid.

### CONDITION/INDICATION

Is continuity present at valve solenoid?

### DECISION

YES - If continuity is indicated, go to Step (7).

NO - If an open circuit is indicated, replace appropriate valve solenoid. Verify that problem is solved.

## ELECTRICAL SYSTEM - Continued

### STEP

7. Check control box for continuity.
  - a. Remove connector J-1 (Figure 5, Item 3) and connector J-2 (Figure 5, Item 2) from each end on control box (Figure 5, Item 1).
  - b. Check continuity between connector pins on connectors J1 (Figure 5, Item 3) and J2 (Figure 5, Item 2).

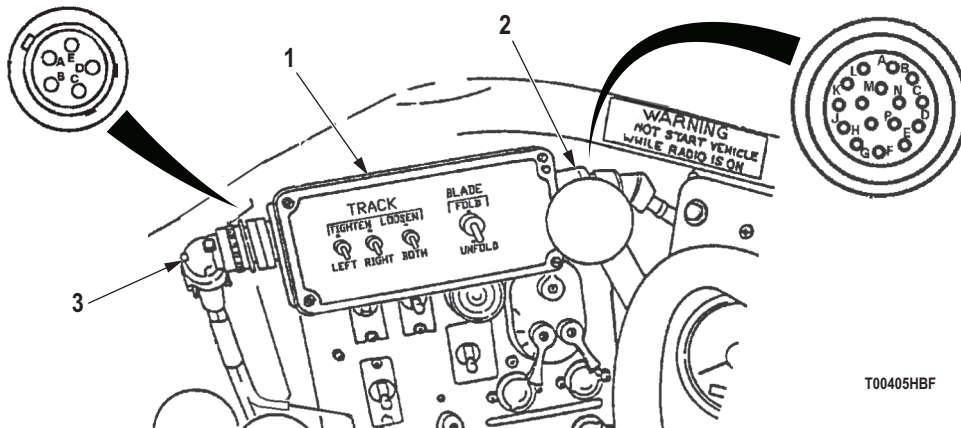


Figure 5. Control Box.

- c. Refer to Tables 2 through 5 for lead locations.

Table 2. Control Box Connector Pins.

POSITIVE LEAD		NEGATIVE LEAD	
J-1 (3)	J-2 (2)	J-1 (3)	J-2 (2)
C		D	L
E			M
	A		C
	L		M

### CONDITION/INDICATION

Is continuity present across control box?

### DECISION

YES - If continuity is indicated, go to Step (8).

NO - If an open circuit is indicated, replace control box wiring harness (WP 0027). Verify problem is solved.

## ELECTRICAL SYSTEM - Continued

### STEP

8. Check control box for continuity.
  - a. Push left side track tensioning switch (Figure 6, Item 1) up.
  - b. Check continuity between connector pins on connectors J1 (Figure 6, Item 3) and J2 (Figure 6, Item 2).
  - c. Refer to Table 3 for lead locations.
  - d. Release left side track tensioning switch (Figure 6, Item 1).

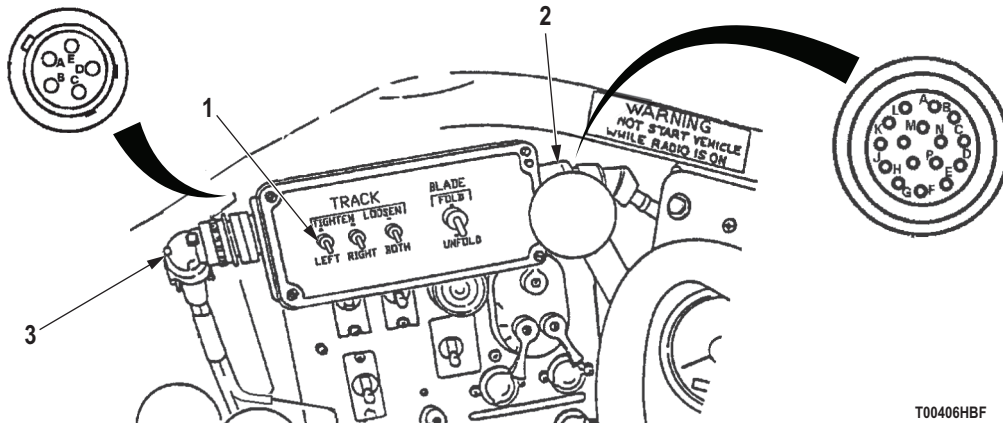


Figure 6. Control Box Connectors J-1 and J-2.

Table 3. Control Box Left Side Tension Switch.

POSITIVE LEAD		NEGATIVE LEAD	
J-1 (4)	J-2 (3)	J-1 (4)	J-2 (3)
C			D
D			D

### CONDITION/INDICATION

Is continuity present at left side track tensioning switch?

### DECISION

YES - If continuity is indicated, go to Step (9).

NO - If an open circuit is indicated, replace control box wiring harness (WP 0027). Verify problem is solved.

**ELECTRICAL SYSTEM - Continued****STEP**

9. Check control box for continuity.
  - a. Push right side track tensioning switch (Figure 7, Item 4) up.
  - b. Check continuity between connector pins on connectors J-1 (Figure 7, Item 3) and J-2 (Figure 7, Item 2).
  - c. Release right side track tensioning switch (Figure 7, Item 4).
  - d. Refer to Table 4 for lead locations.

**Table 4. Control Box Right Side Tension Switch.**

POSITIVE LEAD		NEGATIVE LEAD	
J-1 (4)	J-2 (3)	J-1 (4)	J-2 (3)
C			D
D			D

**CONDITION/INDICATION**

Is continuity present at right side track tensioning switch?

**DECISION**

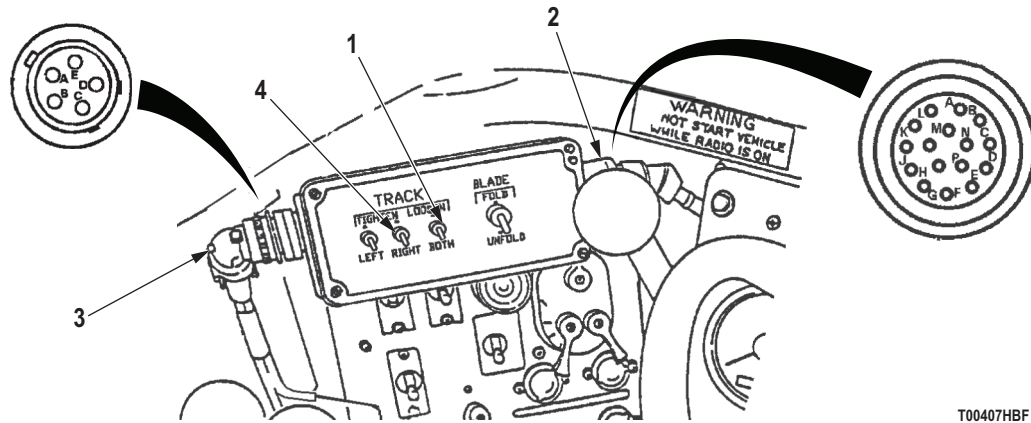
YES - If continuity is indicated, go to Step (10).

NO - If an open circuit is indicated, replace control box (WP 0028). Verify problem is solved.

**STEP**

10. Check control box for continuity.
  - a. Push track loosening switch (Figure 7, Item 1) up.
  - b. Check continuity between connector pins on connectors J1 (Figure 7, Item 3) and J2 (Figure 7, Item 2).
  - c. Refer to Table 5 for lead locations.
  - d. Release the track loosening switch (Figure 7, Item 1).

## ELECTRICAL SYSTEM - Continued



T00407HBF

Figure 7. Track Loosening Switch.

Table 5. Control Box Track Loosening Switch.

POSITIVE LEAD		NEGATIVE LEAD	
J-1 (3)	J-2 (2)	J-1 (3)	J-2 (2)
C			A
C			C
D			A
C			C

**CONDITION/INDICATION**

Is continuity present at track loosening switch?

**DECISION**

YES - If continuity is indicated, go to Step (11).

NO - If an open circuit is indicated, replace control box wiring harness (WP 0027). Verify problem is solved.

**ELECTRICAL SYSTEM - Continued****STEP**

11. Check control box wiring harness for continuity.

- a. Remove four screws (Figure 8, Item 1) from top of control box (Figure 8, Item 6) and disconnect connector (Figure 8, Item 5) from connector (Figure 8, Item 4).
- b. Check continuity between control box wiring harness connector pins (Figure 8, Item 4) and switch connector pins (Figure 8, Item 3).
- c. Refer to Table 6 for lead locations.
- d. Release the track loosening switch (Figure 8, Item 2).

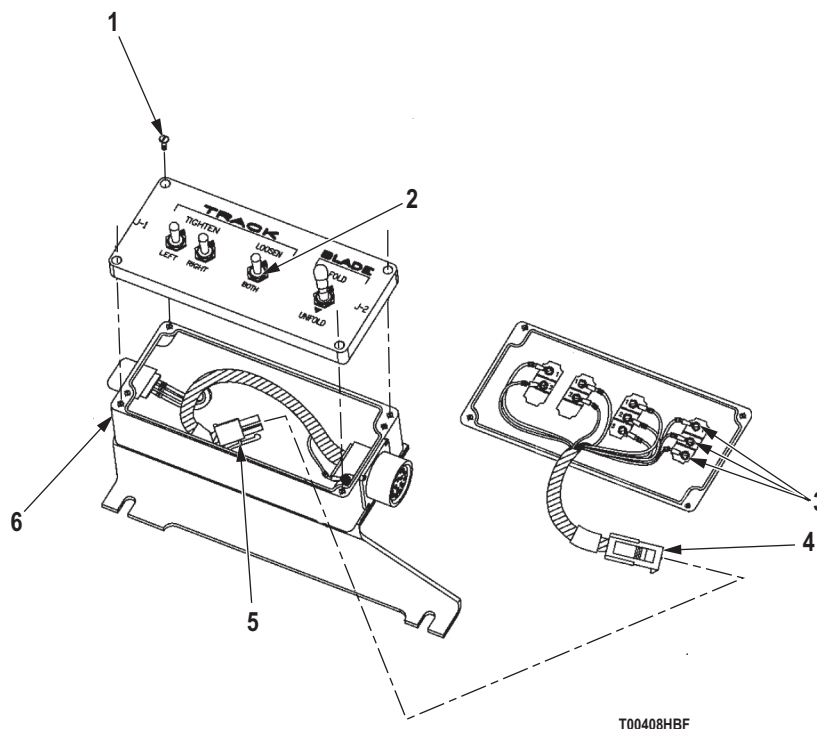


Figure 8. Track Loosening Switch.



**ELECTRICAL SYSTEM - Continued****Table 6. Control Box Switch Tests.**

POSITIVE LEAD	NEGATIVE LEAD
PIN 1	PIN 3
PIN 1	SW 3 TER 1
PIN 2	SW 2 TER 1
PIN 3	SW 3 TER 1
PIN 4	SW 1 TER 1
PIN 5	SW 4 TER 3
PIN 6	SW 4 TER 1
PIN 7	PIN 8
PIN 9	PIN 10
PIN 9	SW1 TER 2
PIN 9	SW2 TER 2
PIN 9	SW3 TER 2
PIN 9	SW4 TER 2

**CONDITION/INDICATION**

Is continuity present across control box wiring harness?

**DECISION**

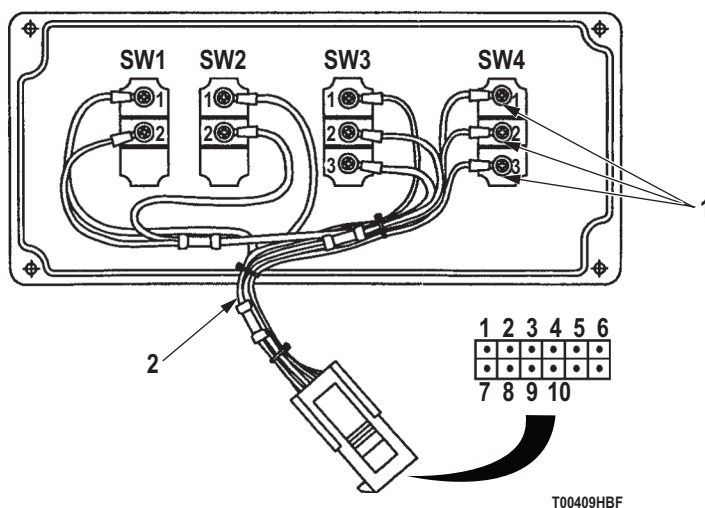
YES - If continuity is indicated, go to Step (12).

NO - If an open circuit is indicated, replace control box wiring harness (WP 0027). Verify problem is solved.

**ELECTRICAL SYSTEM - Continued****STEP**

12. Check control box switches for continuity.

- a. Remove control box wiring harness (Figure 9, Item 2) from switch connector pins (Figure 9, Item 1).



*Figure 9. Control Box Wiring Harness.*

- b. Check continuity between switch connector pins.
- c. Refer to Table 7 for lead locations.

**ELECTRICAL SYSTEM - Continued****Table 7. Control Box Switch Test.**

SW1	ON/OFF	POSITIVE	NEGATIVE	CONTINUITY STATUS
SW1	OFF	TER1	TER2	NO
SW1	ON	TER1	TER2	YES
SW2	OFF	TER1	TER2	NO
SW2	ON	TER1	TER2	YES
SW3	OFF	TER1	TER2	NO
SW3	OFF	TER1	TER3	NO
SW3	OFF	TER2	TER3	YES
SW3	ON	TER1	TER2	YES
SW3	ON	TER2	TER3	NO
SW4	OFF	TER1	TER2	NO
SW4	OFF	TER1	TER3	NO
SW4	OFF	TER2	TER3	NO
SW4	ON (UP)	TER1	TER2	YES
SW4	ON (UP)	TER1	TER3	NO
SW4	ON (UP)	TER2	TER3	NO
SW4	ON (DOWN)	TER1	TER2	NO
SW4	ON (DOWN)	TER1	TER3	NO
SW4	ON (DOWN)	TER2	TER3	YES

**CONDITION/INDICATION**

Is continuity present across control box switches?

**DECISION**

YES - If continuity is indicated, go to Step (13).

NO - If an open circuit is indicated, replace appropriate control box switch (WP 0028). Verify problem is solved.

**ELECTRICAL SYSTEM - Continued****STEP**

13. Check control box wiring harness for continuity.

- a. Check continuity between connector ends (Figure 10, Items 1 and 2) on control box (Figure 10, Item 5) and control box wiring harness connector ends (Figure 10, Item 3).

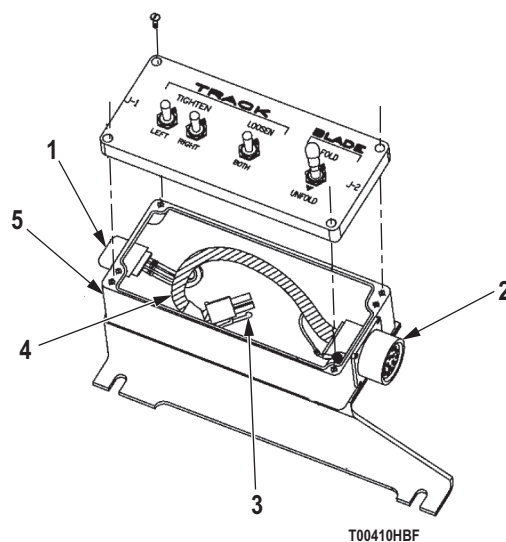


Figure 10. Control Box Wiring Harness.

- b. Refer to Table 8 for lead locations.

**ELECTRICAL SYSTEM - Continued****Table 8. Control Box Switch Tests.**

POSITIVE LEAD	NEGATIVE LEAD
SOCKET 1	J-2 SOCKET A
SOCKET 2	J-2 SOCKET B
SOCKET 3	J-2 SOCKET C
SOCKET 4	J-2 SOCKET D
SOCKET 5	J-2 SOCKET G
SOCKET 6	J-2 SOCKET H
SOCKET 7	J-2 SOCKET M
SOCKET 8	J-2 SOCKET L
SOCKET 8	J-1 PIN E
SOCKET 9	J-1 PIN C
SOCKET 10	J-1 PIN D
J-2 SOCKET L	J-1 PIN E

**CONDITION/INDICATION**

Is continuity present across control box wiring harness?

**DECISION**

YES - If continuity is indicated, control box wiring harness (Figure 10, Item 4) is good.

NO - If an open circuit is indicated, replace control box wiring harness (Figure 9, Item 2) (WP 0027). Verify problem is solved.

**END OF WORK PACKAGE**



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**FIELD MAINTENANCE**  
**TROUBLESHOOTING PROCEDURES - TRACK (LEFT OR RIGHT) WILL NOT TIGHTEN OR LOOSEN, TRACK**  
**ADJUSTING CYLINDER**

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**INITIAL SETUP:**

**Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Chain Assembly (WP 0071, Table 1, Item 2)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)

**References (cont.)**

TM 5-2350-262-10  
WP 0008  
WP 0012  
WP 0018  
WP 0042  
WP 0045

**Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

Hydraulic pressure relieved (TM 5-2350-262-20)

**References**

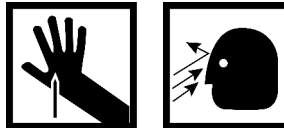
FO-1

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**TROUBLESHOOTING PROCEDURE**

**HYDRAULIC INSTALLATION**

**WARNING**



High pressure is present in the M9 ACE hydraulic system. Do not disconnect any hydraulic system component unless hydraulic system pressure has been relieved. Ensure each of the hydraulic control levers is moved several times through all positions, and the hydraulic tank dipstick is slowly loosened to relieve pressure. Failure to comply may result in severe injury to personnel.

## HYDRAULIC INSTALLATION - Continued

### NOTE

- This work package contains information on locating faults and causes of malfunctions that may develop in the M9 ACE with HBF-TT system. An alphabetical listing of symptoms is provided, as well as a symptom index.
- Before you begin troubleshooting, make sure the defect is real. If possible, talk to the operator or mechanic that reported the problem. Look for any other problems that could cause the system or component to malfunction, such as a switch or lever in the wrong position. Refer to Operation Under Unusual Conditions (WP 0008) for correct operating procedures. Check fluid levels as shown in TM 5-2350-262-10.
- Many faults can be located by a good visual inspection. Look for leaks, loose or corroded connections, damaged controls, and loose or damaged linkages.
- For specific hydraulic troubleshooting symptoms not found in this manual, refer to TM 5-2350-262-20.
- When working on the hydraulic system, follow the general hydraulic system repair methods and refer to the general hydraulic system troubleshooting procedures.
- When trying to isolate a fault, review the past maintenance record on the affected vehicle. Although it doesn't happen often, an incomplete or poorly performed maintenance task may lead to another problem.
- Wherever the word "lubricate" appears, see Operator Preventive Maintenance Checks and Service (PMCS) (WP 0018).
- Malfunctions, tests or inspections, and corrective actions are listed/indented according to the heading at the top of each page.
- Track adjustment is provided by hydraulic pressure from the compensating pump and controlled by electric current tapped at the UNSPRUNG switch. In the SPRUNG or UNSPRUNG mode, hydraulic pressure is delivered to the track and blade manifold from line 9 and returned through line 7 at the left manifold.
- Use these procedures to troubleshoot either left or right track adjusting cylinder. The hydraulic valves are equipped with manual operators which can be used to check the hydraulic portion of the system. If everything functions by the manual hydraulic operators, the problem will be in electric circuit (refer to FO-1).

### STEP

1. Perform spool and poppet valve checks.

### NOTE

To test spool valve, extend and retract track adjusting cylinders. Track adjusting cylinders can be extended individually but cannot be retracted individually. However, they can be retracted simultaneously.

- a. Have assistant start engine.
- b. To extend left cylinder, depress manual override spool valve Z2 (Figure 1, Item 2).
- c. To extend right cylinder, depress manual override spool valve Z1 (Figure 1, Item 1).
- d. To retract both cylinders, lift manual override spool valves Z1 (Figure 1, Item 1) and Z2 (Figure 1, Item 2) simultaneously.
- e. Stop engine; relieve hydraulic pressure.



## HYDRAULIC INSTALLATION - Continued

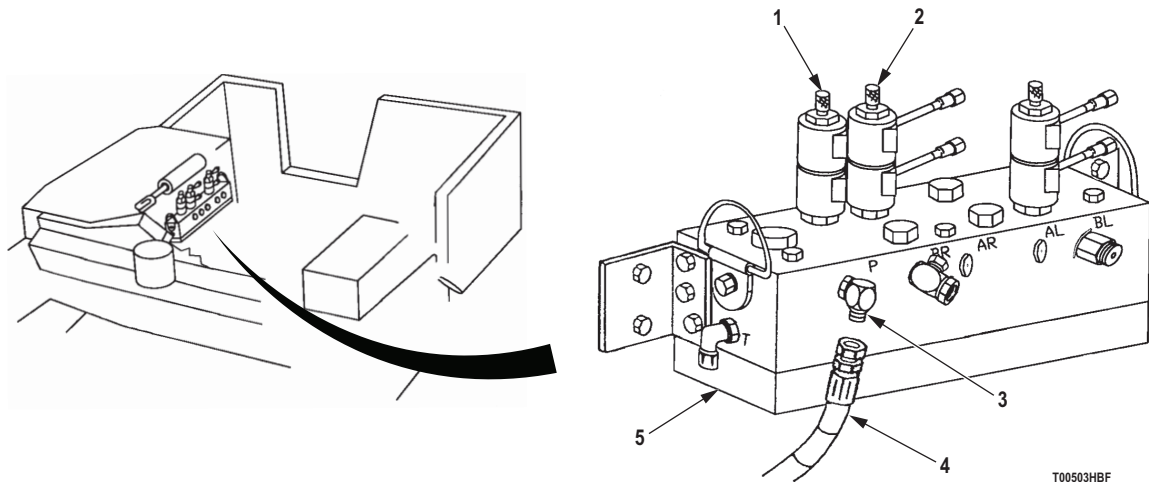


Figure 1. Oil Flow Test.

### CONDITION/INDICATION

Do track adjusting cylinders extend and retract?

### DECISION

YES - Go to Track (Left or Right) Will Not Tighten or Loosen, HBF-TT System (Electrical) (WP 0012).

NO - Go to Step (2).

### STEP

2. Perform oil flow test.

### NOTE

Have suitable container ready to catch oil.

- a. Disconnect HYDR-MAN-IN-9 hose (Figure 1, Item 4) from elbow (Figure 1, Item 3) at port P on track and blade manifold (Figure 1, Item 5). Cap elbow (Figure 1, Item 3).
- b. While holding open end of hose (Figure 1, Item 4) in suitable container, have assistant start engine.
- c. Stop engine; relieve hydraulic pressure. Connect hose (Figure 1, Item 4) to elbow (Figure 1, Item 3).

### CONDITION/INDICATION

Does oil flow freely?

### DECISION

YES - If oil flows freely, replace inoperative spool valve Z1 or Z2 (WP 0045). Verify problem is solved.

NO - If oil does not flow freely, go to Step (3).

**HYDRAULIC INSTALLATION - Continued****STEP**

3. Perform hose blockage test.

**NOTE**

Have suitable container ready to catch oil.

- Disconnect HYDR-MAN-IN-9 hose (Figure 2, Item 2) from tee (Figure 2, Item 1) at port 9 (Figure 2, Item 4) on LHMN (Figure 2, Item 5). Plug pressure hose (Figure 2, Item 2). Add short hose (Figure 2, Item 3) to tee (Figure 2, Item 1).
- While holding open end of hose (Figure 2, Item 3) in container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 2, Item 3).
- Stop engine; relieve hydraulic pressure. Disconnect hose (Figure 2, Item 3) from tee (Figure 2, Item 1) and connect HYDR-MAN-IN-9 hose (Figure 2, Item 2) to tee (Figure 2, Item 1).

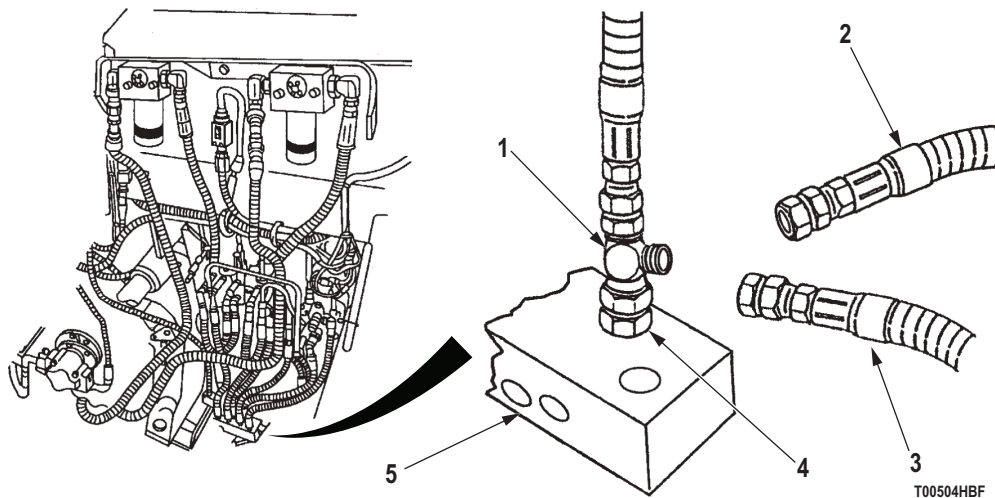


Figure 2. Hose Test.

**CONDITION/INDICATION**

Is hose blocked?

**DECISION**

YES - Clear blockage or replace hose (WP 0042). Verify problem is solved.  
NO - Verify problem with operator.

**END OF WORK PACKAGE**

---

**FIELD MAINTENANCE**  
**TROUBLESHOOTING PROCEDURES - FRONT CORNER (LEFT OR RIGHT) DOES NOT RAISE OR LOWER IN**  
**UNSPRUNG MODE, TRACK ADJUSTING CYLINDER**

---

**INITIAL SETUP:**

**Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)

**Personnel Required**

Construction Equipment Repairer, 91L (Two)

**References (cont.)**

TM 5-2350-262-10  
WP 0008  
WP 0012  
WP 0018  
WP 0042  
WP 0045

**References**

FO-1

**Equipment Condition**

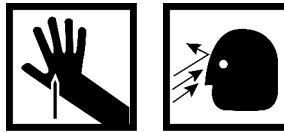
Hydraulic pressure relieved (TM 5-2350-262-20)

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**TROUBLESHOOTING PROCEDURE**

**HYDRAULIC INSTALLATION**

**WARNING**



High pressure is present in the M9 ACE hydraulic system. Do not disconnect any hydraulic system component unless hydraulic system pressure has been relieved. Ensure each of the hydraulic control levers is moved several times through all positions, and the hydraulic tank dipstick is slowly loosened to relieve pressure. Failure to comply may result in severe injury to personnel.

**HYDRAULIC INSTALLATION - Continued****NOTE**

- This work package contains information on locating faults and causes of malfunctions that may develop in the M9 ACE with HBF-TT system. An alphabetical listing of symptoms is provided, as well as a symptom index.
- Before you begin troubleshooting, make sure the defect is real. If possible, talk to the operator or mechanic that reported the problem. Look for any other problems that could cause the system or component to malfunction, such as a switch or lever in the wrong position. Refer to Operation Under Unusual Conditions (WP 0008) for correct operating procedures. Check fluid levels as shown in TM 5-2350-262-10.
- Many faults can be located by a good visual inspection. Look for leaks, loose or corroded connections, damaged controls, and loose or damaged linkages.
- For specific hydraulic troubleshooting symptoms not found in this manual, refer to TM 5-2350-262-20.
- When working on the hydraulic system, follow the general hydraulic system repair methods and refer to the general hydraulic system troubleshooting procedures.
- When trying to isolate a fault, review the past maintenance record on the affected vehicle. Although it doesn't happen often, an incomplete or poorly performed maintenance task may lead to another problem.
- Wherever the word "lubricate" appears, see Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018).
- Malfunctions, test or inspections, and corrective actions are listed/indented according to the heading at the top of each page.
- Track adjustment is provided by hydraulic pressure from the compensating pump and controlled by electric current tapped at the UNSPRUNG switch. In the SPRUNG or UNSPRUNG mode, hydraulic pressure is delivered to the track and blade manifold from line 9 and returned through line 7 at the left manifold.
- Use these procedures to troubleshoot either left or right track adjusting cylinder. The hydraulic valves are equipped with manual operators which can be used to check the hydraulic portion of the system. If everything functions by the manual hydraulic operators, the problem will be in electric circuit (refer to FO-1).

**STEP**

1. Perform spool and poppet valve checks.

**NOTE**

The track adjusting cylinders must be retracted to raise or lower front corner(s). To test spool valve, extend and retract track adjusting cylinders.

- a. Have assistant start engine.
- b. To extend left cylinder, depress manual override spool valve Z2 (Figure 1, Item 2).
- c. To extend right cylinder, depress manual override spool valve Z1 (Figure 3, Item 1).
- d. To retract both cylinders, lift manual override spool valves Z2 (Figure 1, Item 2) and Z1 (Figure 1, Item 1) simultaneously.
- e. Stop engine; relieve hydraulic pressure.

## HYDRAULIC INSTALLATION - Continued

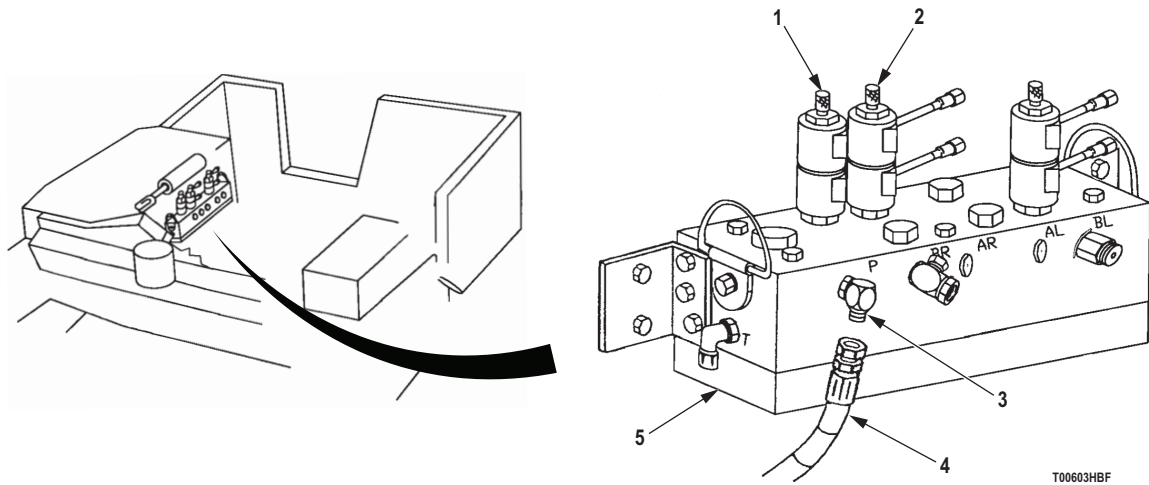


Figure 1. Track Adjusting Cylinders Manifold.

### CONDITION/INDICATION

Do track adjusting cylinders extend or retract?

### DECISION

YES - Go to Track (Left or Right) Will Not Tighten or Loosen, HBF-TT System (Electrical) (WP 0012).

NO - Go to Step (2).

### STEP

2. Perform oil flow test.

### NOTE

Have suitable container ready to catch oil.

- a. Disconnect HYDR-MAN-IN-9 hose (Figure 1, Item 4) from elbow (Figure 1, Item 3) at port P on track and blade manifold (Figure 1, Item 5). Cap elbow (Figure 1, Item 3).
- b. While holding open end of hose (Figure 1, Item 4) in container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 1, Item 4).
- c. Stop engine; relieve hydraulic pressure. Connect hose (Figure 1, Item 4) to elbow (Figure 1, Item 3).

### CONDITION/INDICATION

Does oil flow freely?

### DECISION

YES - Replace inoperative spool valve Z1 or Z2 (WP 0045). Verify problem is solved.

NO - Go to Step (3).

**HYDRAULIC INSTALLATION - Continued****STEP**

3. Perform hose blockage test.

**NOTE**

Have suitable container ready to catch oil.

- a. Disconnect HYDR-MAN-IN-9 hose (Figure 2, Item 2) from tee (Figure 2, Item 1) at port 9 (Figure 2, Item 4) on LHMANN (Figure 2, Item 5). Plug pressure hose (Figure 2, Item 2), and add short hose (Figure 2, Item 3) to tee (Figure 2, Item 1).
- b. While holding open end of hose (Figure 2, Item 3) in suitable container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 2, Item 3).
- c. Stop engine; relieve hydraulic pressure. Disconnect hose (Figure 2, Item 3) from tee (Figure 2, Item 1) and connect HYDR-MAN-IN-9 hose (Figure 2, Item 2) to tee (Figure 2, Item 1).

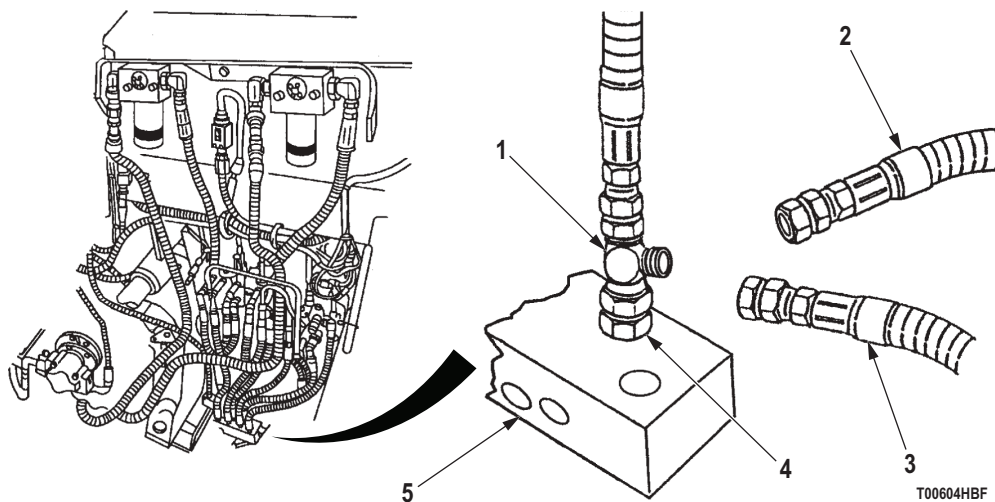


Figure 2. Hose Test.

**CONDITION/INDICATION**

Is hose blocked?

**DECISION**

YES - Clear blockage or replace hose (WP 0042). Verify problem is solved.  
NO - Verify problem with operator.

**END OF WORK PACKAGE**

---

**FIELD MAINTENANCE**  
**TROUBLESHOOTING PROCEDURES - LEFT OR RIGHT TRACK ADJUSTING CYLINDERS WILL NOT EXTEND**  
**AFTER SUSPENSION CONTROL LEVERS ARE RETURNED TO NEUTRAL**

---

**INITIAL SETUP:**

**Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)

**References (cont.)**

TM 5-2350-262-10  
WP 0008  
WP 0012  
WP 0018  
WP 0042  
WP 0045

**Personnel Required**

Construction Equipment Repairer, 91L (Two)

**References**

FO-1

**Equipment Condition**

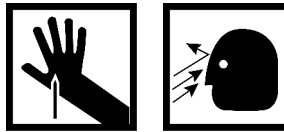
Hydraulic pressure relieved (TM 5-2350-262-20)

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**TROUBLESHOOTING PROCEDURE**

**HYDRAULIC INSTALLATION**

**WARNING**



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**HYDRAULIC INSTALLATION - Continued****NOTE**

- This work package contains information on locating faults and causes of malfunctions that may develop in the M9 ACE with HBF-TT system. An alphabetical listing of symptoms is provided, as well as a symptom index.
- Before you begin troubleshooting, make sure the defect is real. If possible, talk to the operator or mechanic that reported the problem. Look for any other problems that could cause the system or component to malfunction, such as a switch or lever in the wrong position. Refer to Operation Under Unusual Conditions (WP 0008) for correct operating procedures. Check fluid levels as shown in TM 5-2350-262-10.
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- Use these procedures to troubleshoot either left or right track adjusting cylinder. The hydraulic valves are equipped with manual operators which can be used to check the hydraulic portion of the system. If everything functions by the manual hydraulic operators, the problem will be in electric circuit (refer to FO-1).

**STEP**

1. Perform spool and poppet valve checks.

**NOTE**

To test spool valve, extend and retract track adjusting cylinders. Track adjusting cylinders can be extended individually but cannot be retracted individually. However, they can be retracted simultaneously.

- a. To test spool valve, retract and extend track adjusting cylinders.
- b. Have assistant start engine.
- c. To retract left cylinder, lift manual override spool valve Z2 (Figure 1, Item 2).
- d. To retract right cylinder, lift manual override spool valve Z1 (Figure 1, Item 1).
- e. To extend both cylinders, depress manual override spool valves Z1 (Figure 1, Item 1) and Z2 (Figure 1, Item 2) simultaneously.



**HYDRAULIC INSTALLATION - Continued**

- f. Stop engine; relieve hydraulic pressure.

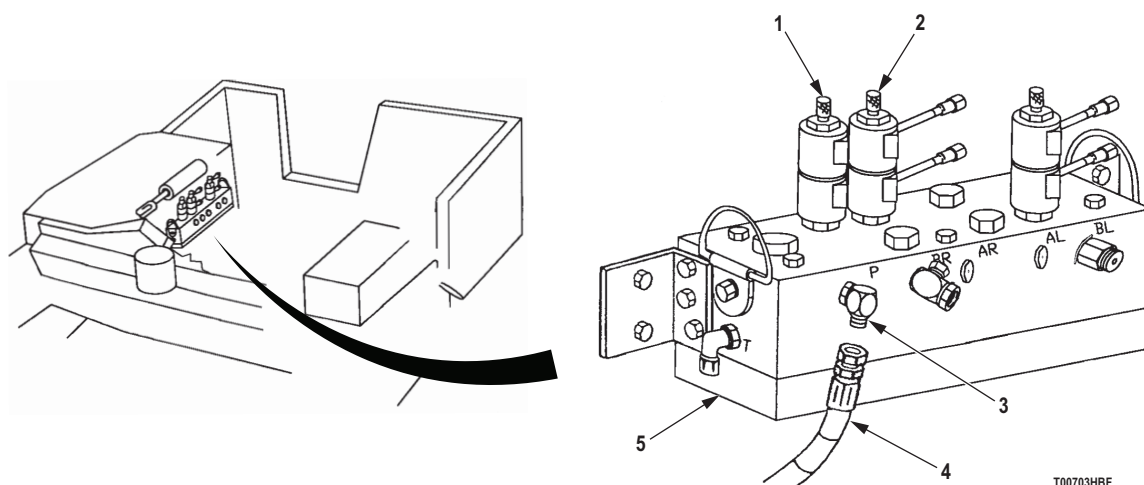


Figure 1. Track Adjusting Cylinders Manifold.

**CONDITION/INDICATION**

Do track adjusting cylinders extend or retract?

**DECISION**

- YES - Go to Track (Left or Right) Will Not Tighten or Loosen, HBF-TT (Electrical) (WP 0012).  
 NO - Go to Step (2).

**STEP**

2. Perform oil flow test.

**NOTE**

Have suitable container ready to catch oil.

- Disconnect HYDR-MAN-IN-9 hose (Figure 1, Item 4) from elbow (Figure 1, Item 3) at port P on track and blade manifold (Figure 1, Item 5). Cap elbow (Figure 1, Item 3).
- While holding open end of hose (Figure 1, Item 4) in suitable container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 1, Item 4).
- Stop engine; relieve hydraulic pressure. Connect hose (Figure 1, Item 4) to elbow (Figure 1, Item 3).

**CONDITION/INDICATION**

Is there a free flow of oil?

**DECISION**

- YES - Replace spool valve Z2 or Z1 (WP 0045). Verify problem is solved.  
 NO - Go to Step (3).

**HYDRAULIC INSTALLATION - Continued****STEP**

3. Check hose for blockage.

**NOTE**

Have suitable container ready to catch oil.

- Disconnect HYDR-MAN-IN-9 hose (Figure 2, Item 2) from tee (Figure 2, Item 1) at port 9 (Figure 2, Item 4) on LHMANN (Figure 2, Item 5). Plug pressure hose (Figure 2, Item 2), and add short hose (Figure 2, Item 3) to tee (Figure 2, Item 1).
- While holding open end of hose (Figure 2, Item 3) in suitable container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 2, Item 3).
- Stop engine; relieve hydraulic pressure. Disconnect hose (Figure 2, Item 3) from tee (Figure 2, Item 1) and connect HYDR-MAN-IN-9 hose (Figure 2, Item 2) to tee (Figure 2, Item 1).

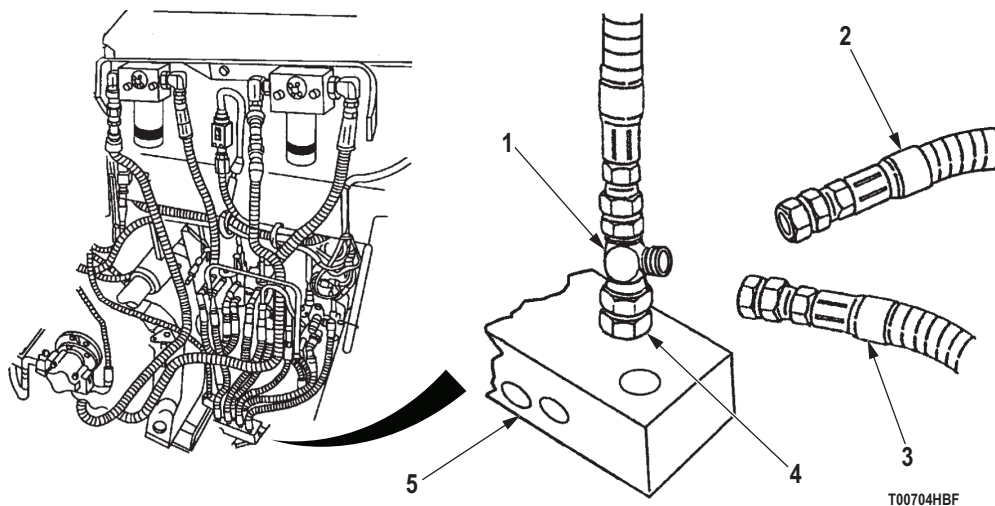


Figure 2. Hose Test.

**CONDITION/INDICATION**

Is hose blocked?

**DECISION**

YES - Clear blockage or replace hose (WP 0042). Verify problem is solved.  
NO - Verify problem with operator.

**END OF WORK PACKAGE**

## FIELD MAINTENANCE

### TROUBLESHOOTING PROCEDURES - BLADE WILL NOT FOLD OR UNFOLD IN SPRUNG MODE

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)

##### References (cont.)

WP 0008  
WP 0012  
WP 0018  
WP 0042  
WP 0045

##### Personnel Required

Construction Equipment Repairer, 91L (Two)

##### Equipment Condition

Hydraulic pressure relieved (TM 5-2350-262-20)

##### References

TM 5-2350-262-10

## TROUBLESHOOTING PROCEDURE

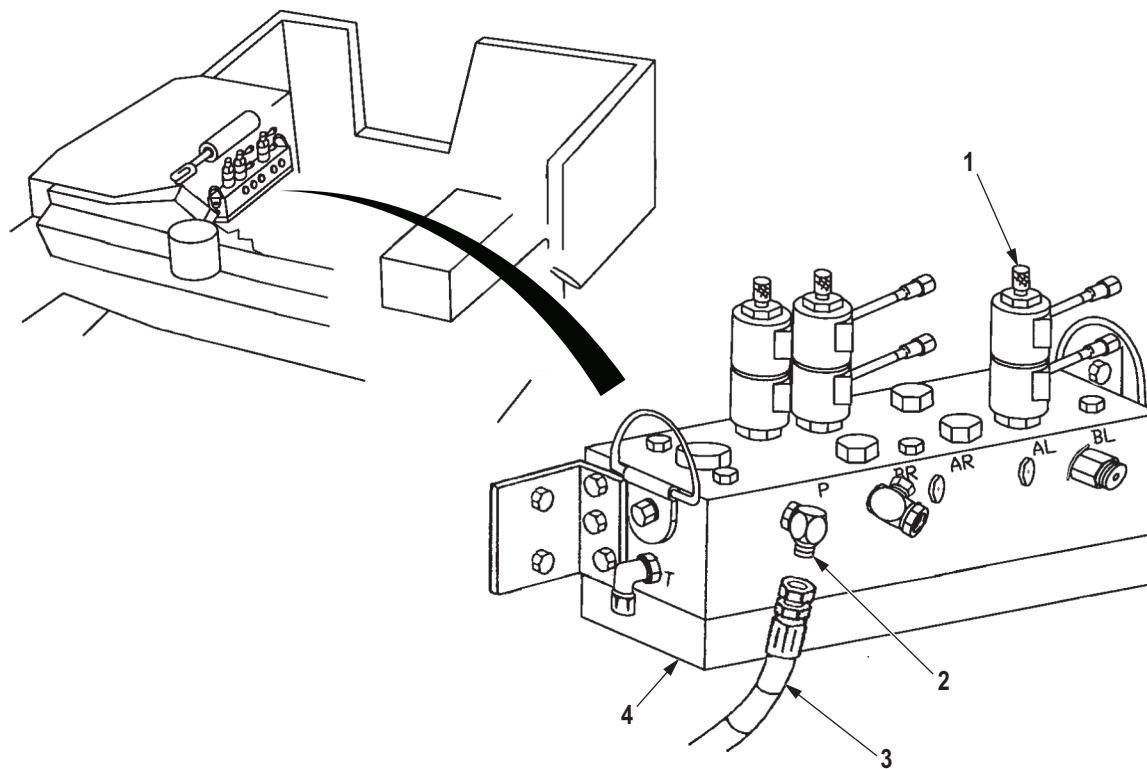
### HYDRAULIC INSTALLATION

#### NOTE

- This work package contains information on locating faults and causes of malfunctions that may develop in the M9 ACE with HBF-TT system. An alphabetical listing of symptoms is provided, as well as a symptom index.
- Before you begin troubleshooting, make sure the defect is real. If possible, talk to the operator or mechanic that reported the problem. Look for any other problems that could cause the system or component to malfunction, such as a switch or lever in the wrong position. Refer to Operation Under Unusual Conditions (WP 0008) for correct operating procedures. Check fluid levels as shown in TM 5-2350-262-10.
- Many faults can be located by a good visual inspection. Look for leaks, loose or corroded connections, damaged controls, and loose or damaged linkages.
- For specific hydraulic troubleshooting symptoms not found in this manual, refer to TM 5-2350-262-20.
- When working on the hydraulic system, follow the general hydraulic system repair methods and refer to the general hydraulic system troubleshooting procedures.
- When trying to isolate a fault, review the past maintenance record on the affected vehicle. Although it doesn't happen often, an incomplete or poorly performed maintenance task may lead to another problem.
- Wherever the word "lubricate" appears, see Operator Preventive Maintenance Checks and Service (PMCS) (WP 0018).
- Malfunctions, test or inspections, and corrective actions are listed/indented according to the heading at the top of each page.
- No attempt should be made to fold or unfold blade in UNSPRUNG mode.

**HYDRAULIC INSTALLATION - Continued****STEP**

1. Perform spool valve checks.
  - a. To test spool valve, fold and unfold blade in SPRUNG mode.
  - b. Have assistant start engine.
  - c. Have blade in folded position; to unfold blade, lift manual override spool valve Z4 (Figure 1, Item 1).
  - d. Have blade in unfolded position; to fold blade, depress manual override spool valve Z4 (Figure 1, Item 1).
  - e. Stop engine; relieve hydraulic pressure.



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*Figure 1. Test Spool Valve.***CONDITION/INDICATION**

Does blade fold or unfold?

**DECISION**

- YES - Go to Track (Left or Right) Will Not Tighten or Loosen, HBF-TT (Electrical) (WP 0012).  
NO - Go to Step (2).

**HYDRAULIC INSTALLATION - Continued****STEP**

2. Perform oil flow test.

**NOTE**

Have suitable container ready to catch oil.

- a. Disconnect HYDR-MAN-IN-9 hose (Figure 1, Item 3) from elbow (Figure 1, Item 2) at port P on track and blade manifold (Figure 1, Item 4). Cap elbow (Figure 1, Item 2).
- b. While holding open end of hose (Figure 1, Item 3) in suitable container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 1, Item 3).
- c. Stop engine; relieve hydraulic pressure. Connect hose (Figure 1, Item 3) to elbow (Figure 1, Item 2).

**CONDITION/INDICATION**

Is there free flow of oil?

**DECISION**

YES - Replace spool valve X2 (WP 0045). Verify problem is solved.  
NO - Go to Step (3).

**HYDRAULIC INSTALLATION - Continued****STEP**

3. Check hose for blockage.

**NOTE**

Have suitable container ready to catch oil.

- a. Disconnect HYDR-MAN-IN-9 hose (Figure 2, Item 2) from tee (Figure 2, Item 1) at port 9 (Figure 2, Item 4) on LHMAN (Figure 2, Item 5). Plug pressure hose (Figure 2, Item 2). Add short hose (Figure 2, Item 3) to tee (Figure 2, Item 1).
- b. While holding open end of hose (Figure 2, Item 3) in suitable container, have assistant start engine. Check for free flow of hydraulic oil from hose (Figure 2, Item 3).
- c. Stop engine; relieve hydraulic pressure. Disconnect hose (Figure 2, Item 3) from tee (Figure 2, Item 1) and connect HYDR-MAN-IN-9 hose (Figure 2, Item 2) to tee (Figure 2, Item 1).

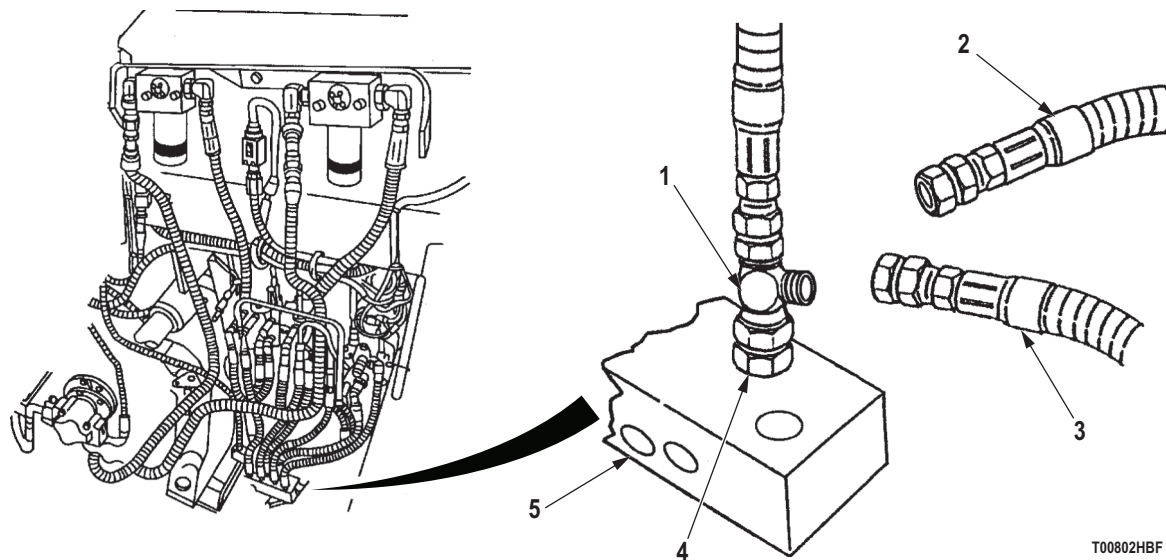


Figure 2. Hose Test.

**CONDITION/INDICATION**

Is hose blocked?

**DECISION**

YES - Clear blockage or replace hose (WP 0042). Verify problem is solved.  
NO - Verify problem with operator.

**END OF WORK PACKAGE**

**CHAPTER 4**

**OPERATOR**

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

**MAINTENANCE INSTRUCTIONS**





## OPERATOR MAINTENANCE OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

### GENERAL

1. To ensure that the M9 ACE is ready for operation at all times, it must be inspected on a regular basis so that defects may be found before they result in serious equipment damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator/crew.
2. While performing PMCS, read and follow all safety instructions found in the warning summary at the front of this manual. Keep in mind all WARNINGS and CAUTIONS.

### SERVICE INTERVALS

Perform Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018) at the following intervals:

1. Perform "After" PMCS right after operating the M9 ACE.
2. Perform "Weekly" PMCS once each week.
3. Perform "Quarterly" PMCS once every three months.

### REPORTING REPAIRS

All defects that the operator cannot fix must be reported on DA Form 2404 or DA Form 5988-E immediately after completing PMCS. If a serious problem is found, IMMEDIATELY report it to your supervisor.

### LEAKAGE DEFINITIONS

1. It is important to know how fluid leakage affects the status of the M9 ACE. The following are types/classes of leakage an operator must know to determine whether the M9 ACE is mission capable. Learn these leakage definitions. When in doubt, notify your supervisor.
  - a. Class I: Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
  - b. Class II: Leakage great enough to form drops, but not great enough to cause drops to drip from item being inspected.
  - c. Class III: Leakage of fluid great enough to form drops that fall from the item being inspected.

### NOTE

- Equipment operation is allowable with minor leakage (Class I or Class II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor. When operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS.
  - Class III leaks should be reported to your supervisor, or Field Maintenance.
2. Equipment operation is allowed with minor (Class I or II) leakage. Fluid levels in an item/system affected with such leakage must be checked more frequently than required in PMCS. When in doubt, notify your supervisor.
  3. Report Class III leaks IMMEDIATELY to your supervisor or Field Maintenance.

## GENERAL PMCS PROCEDURES

1. Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use solvent cleaning compound on all metal surfaces. Use hand dishwashing compound and water on rubber, plastic, and painted surfaces.
2. While performing specific PMCS procedures, inspect the following components:
  - a. **Bolts, Nuts, and Screws.** Make sure they are not loose, missing, bent, or broken. Report loose or missing bolts, nuts, and screws to Field Maintenance.
  - b. **Welds.** Inspect for gaps where parts are welded together. Check for loose or chipped paint, rust, and cracks. Report bad welds to Field Maintenance.
  - c. **Electric Conduit, Wires, or Connectors.** Inspect for cracked or broken conduit insulation, bare wires, and loose or broken connectors. Report loose connections and faulty wiring to Field Maintenance.
  - d. **Hoses, Lines, Clamps, and Fittings.** Inspect for wear, damage, and leaks. Make sure that clamps and fittings are tight. Report any damage, leaks, or loose fittings to Field Maintenance.
3. Check to see that components are adequately lubricated in accordance with Operator PMCS (WP 0018).

## SPECIFIC PMCS PROCEDURES

1. Operator PMCS is provided in Operator Preventive Maintenance Checks and Services (PMCS) (WP 0018). Always perform PMCS in the order listed. Once PMCS procedures become routine, spotting problems will become much easier.
2. Before performing PMCS, read all checks required for the applicable interval and prepare all tools needed for the task. Have several clean rags ready for use. Perform ALL inspections at the applicable interval.
3. If any problems are discovered through PMCS, perform the appropriate troubleshooting task (WP 0010). If any component or system is not serviceable or if any service does not correct the problem, notify your supervisor.
4. Explanation of the column headings in Operator PMCS (WP 0018) are as follows:
  - a. **Item No.** The item number column of your PMCS table is to be used for reference. When completing DA Form 2404, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.
  - b. **Interval.** This column of your PMCS table tells you when to do certain checks or services.
  - c. **Item To Be Checked or Serviced.** This column of your PMCS table provides the location and the item to be checked or serviced.
  - d. **Procedure.** This column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions. If you do not have the tools or if the procedure tells you to, have Field Maintenance do the work.
  - e. **Not Fully Mission Capable If.** This column tells you when and why your equipment cannot be used.

## END OF WORK PACKAGE

**OPERATOR MAINTENANCE  
OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

**INITIAL SETUP:****Materials/Parts**

Grease, Automotive and Artillery (GAA)  
(WP 0070, Table 1, Item 13, 14, 15, 16, 17)  
Lubricating Oil, General Purpose  
(WP 0070, Table 1, Item 21, 22)  
Lubricating Oil, General Purpose  
(WP 0070, Table 1, Item 23, 24)

**Personnel Required**

Combat Engineer, 21B

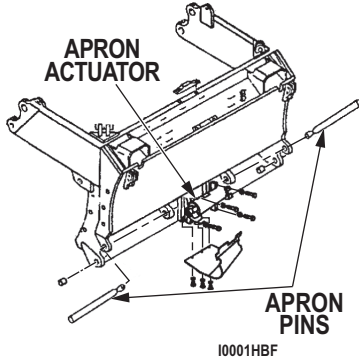
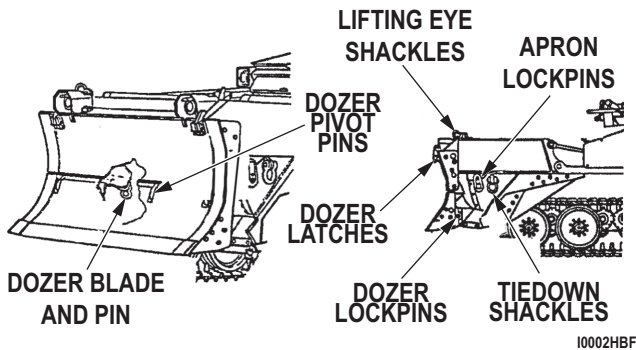
**References**

WP 0007

**Table 1. Operator Preventive Maintenance Checks and Services (PMCS).**

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			<p style="text-align: center;"><b>NOTE</b></p> <p>Perform "Weekly" as well as "Before" PMCS if you are the assigned operator but have not operated the M9 ACE since the last Weekly PMCS.</p>	
1	After	Track Tension/ HBF-TT Adjuster	Check track tension (WP 0007). Adjust track tension as needed (WP 0007).	<p>Track is loose or cannot be adjusted. Track adjuster cylinder bent, broken, or damaged.</p> <p>HBF-TT track adjuster(s) or track and blade manifold assembly Class III leak.</p>
2	After	Exterior and Interior Vehicle Lights	Check that headlights, taillights, blackout lights, floodlights, and dome light operate correctly and are not damaged.	
3	Weekly	Apron Actuator	Lubricate fittings with Grease, Automotive and Artillery (GAA).	

**Table 1. Operator Preventive Maintenance Checks and Services (PMCS) - Continued.**

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
4	Weekly	Apron Pin (Figure 1)	Lubricate pins with GAA.	
 <p style="text-align: center;">Figure 1. Apron Pin.</p>				
5	Quarterly	Apron	Check lifting eye and tiedown shackles for damage. Lubricate with General Purpose Lubricating Oil.	
6	Quarterly	Dozer Blade (Figure 2)	Check latched and lockpins for damage. Lubricate with General Purpose Lubricating Oil.	
 <p style="text-align: center;">Figure 2. Dozer Blade.</p>				

**PMCS MANDATORY REPLACEMENT PARTS**

There are no mandatory replacement parts for these PMCS procedures.

**END OF TASK**

**END OF WORK PACKAGE**

**CHAPTER 5**

**FIELD**

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

**MAINTENANCE INSTRUCTIONS**



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## FIELD MAINTENANCE

### FIELD PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

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#### GENERAL

1. To ensure that the M9 ACE is ready for operation at all times, it must be inspected systematically so that defects can be detected and corrected before they result in serious damage or failure. Field Preventive Maintenance Checks and Services (PMCS) (WP 0020) contains a listing of preventive maintenance checks and services to be performed by Field Maintenance personnel.
2. While performing PMCS, read and follow all safety instructions found in the warning summary at the front of this manual. Keep in mind all WARNINGS and CAUTIONS.

#### SERVICE INTERVALS

The Field PMCS procedures (WP 0020) are "Semiannual" and should be performed once every six months.

#### REPORTING REPAIRS

Report all defects and corrective actions on DA Form 2404 or DA Form 5988-E. If a serious problem is found, report it to your supervisor immediately.

#### GENERAL PMCS PROCEDURES

1. Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use cleaning solvent on all metal surfaces. Use dishwashing compound and water on rubber, plastic, and painted surfaces.
2. While performing PMCS, inspect the following components:
  - a. **Bolts, Nuts, and Screws.** Make sure they are not loose, missing, bent, or broken. Tighten any that are loose.
  - b. **Welds.** Inspect for gaps where parts are welded together. Report bad welds to your supervisor.
  - c. **Electrical Wires or Connectors.** Inspect for cracked or broken insulation, bare wires, and loose or broken connectors. Make repairs or replace as required.
  - d. **Hoses, Lines, and Fittings.** Inspect for wear, damage, and leaks. Make sure clamps and fittings are tight. If a leak originates from a loose fitting or connector, tighten it. If a component is broken or worn out, correct problem as authorized by the Maintenance Allocation Chart (MAC). If not authorized, report it to your supervisor.

#### SPECIFIC PMCS PROCEDURES

1. Field PMCS procedures are listed in Field Preventive Maintenance Checks and Services (PMCS) (WP 0020). Always perform PMCS in the order listed. Once your routine becomes a habit, anything that is not right can be spotted in a minute. If anything wrong is discovered through PMCS, perform the appropriate troubleshooting task (WP 0010). If any component or system is not serviceable or if a given service does not correct the problem, notify your supervisor.
2. Before performing Field PMCS (WP 0020), read all the checks required and prepare tools needed to make all checks. Have several clean rags handy. Perform ALL inspections at interval.

**SPECIFIC PMCS PROCEDURES - Continued**

3. Explanation of the column headings in Field PMCS (WP 0020) are as follows:
- a. **Item No.** The item number column of your PMCS table is to be used for reference. When completing DA Form 2404, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.
  - b. **Interval.** This column of your PMCS table tells you when to do a certain check or service.
  - c. **Location, Item to Check/Service.** This column of your PMCS table provides the location and the item to be checked or serviced.
  - d. **Procedure.** This column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions.
  - e. **Not Fully Mission Capable If.** Information in this column tells you what faults will keep the equipment from being capable of performing its mission. If PMCS reveals faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failures.

**END OF WORK PACKAGE**



**FIELD MAINTENANCE  
FIELD PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

**INITIAL SETUP:****Personnel Required**

Construction Equipment Repairer, 91L

**References**

WP 0018

**Table 1. Field Preventive Maintenance Checks and Services (PMCS).**

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			<b>NOTE</b> Perform Operator PMCS (WP 0018) prior to or along with Field PMCS.	
1	Semi-annually	Track Adjusting Cylinders	Check cylinders for cracks, leaks, and loose or missing hardware.	Class III leaks, or damaged.
2	Semi-annually	Track Adjusting Hydraulic Manifold	Check manifold assembly for cracks, leaks, or loose or missing hardware.	Class III leaks, or damaged.

**PMCS MANDATORY REPLACEMENT PARTS**

There are no mandatory replacement parts for these PMCS procedures.

**END OF TASK****END OF WORK PACKAGE**



## **CHAPTER 6**

### **MAINTENANCE INSTRUCTIONS**



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**FIELD MAINTENANCE  
SERVICE UPON RECEIPT**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

**Personnel Required**

Construction Equipment Repairer, 91L

**Materials/Parts**

Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)  
Gloves, Chemical and Oil Protective  
(WP 0070, Table 1, Item 11)  
Goggles, Industrial  
(WP 0070, Table 1, Item 12)  
Rag, Wiping (WP 0070, Table 1, Item 25)

**References**

DA Form 2407  
DA PAM 750-8  
DD Form 314  
DD Form 1397  
WP 0018  
WP 0020  
WP 0052

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**GENERAL**

When a new, used, or reconditioned M9 ACE is received, determine whether it has been properly prepared for service and is capable of performing its mission. Follow the Preventive Maintenance Checks and Service (PMCS) instructions in Operator PMCS (WP 0018) and Field PMCS (WP 0020).

**INSPECTION INSTRUCTIONS**

1. Refer to DD Form 1397 for procedures on unpacking the M9 ACE.
2. Remove all straps, plywood, tape, seals, and wrappings.

**WARNING**

Cleaning solvent is combustible. Wear protective goggles and gloves; use only in a 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 cleaning solvent; the flashpoint is 144°F (62°C). Failure to follow this warning may result in injury or death to personnel. A fire extinguisher will be kept nearby when the solvent is used.

3. Remove rust preventive compound from coated exterior parts of the HBF-TT using cleaning solvent and rags.
4. Inspect the M9 ACE for any damage incurred during shipment. Check also to see if the equipment has been modified.
5. Check the equipment against the packing list to ensure that the shipment is complete. Report any discrepancies in accordance with instructions in DA PAM 750-8.

**END OF TASK**

**SERVICING INSTRUCTIONS**

1. Perform all Operator PMCS (WP 0018) and Field PMCS (WP 0020). Schedule the next PMCS for both Operator and Field on DD Form 314.
2. Lubricate all lubrication points as described in Lubrication Instructions (WP 0052), regardless of interval.
3. Report any problems on DA Form 2407.

**END OF TASK****END OF WORK PACKAGE**

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**FIELD MAINTENANCE  
APRON WIRING HARNESS REPLACEMENT**

---

**INITIAL SETUP:****Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

LH headlight assembly removed (WP 0030)

**References**

TB 43-0001-39 Series

TM 5-2350-262-20

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**GENERAL****NOTE**

Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Repair task.

Reference TM 5-2350-262-20, Apron Wiring Harness Replacement, for removal and installation procedures for apron wiring harness.

**END OF TASK****FOLLOW-ON MAINTENANCE**

Install LH headlight assembly (WP 0030).

**END OF TASK****END OF WORK PACKAGE**





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**FIELD MAINTENANCE  
HEADLIGHT WIRING HARNESS REPLACEMENT**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)  
Stand, Vehicle (WP 0071, Table 1, Item 6)

**Personnel Required**

Construction Equipment Repairer, 91L

**References**

TB 43-0001-39

**Materials/Parts**

Washer, Lock (WP 0058, Figure 16, Item 4)  
Qty: 1

**Equipment Condition**

LH and RH headlight assembly removed  
(WP 0030)

---

**REMOVAL****NOTE**

- Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Repair task.
  - Tag all electrical leads prior to removal for installation.
1. Remove nut (Figure 1, Item 6), lockwasher (Figure 1, Item 5), flat washer (Figure 1, Item 7), and hose clamp (Figure 1, Item 8) from headlight wiring harness (Figure 1, Item 2) and apron stud (Figure 1, Item 9). Discard lockwasher.
  2. Disconnect headlight wiring harness (Figure 1, Item 2) from apron wiring harness (Figure 1, Item 3) at terminals.
  3. Disconnect two headlight wiring harness (Figure 1, Item 2) terminals from two apron mercury switch terminals (Figure 1, Item 1).
  4. Remove headlight wiring harness from four braces (Figure 1, Item 10) inside apron (Figure 1, Item 4) back wall.
  5. Remove headlight wiring harness (Figure 1, Item 2) from apron (Figure 1, Item 4).

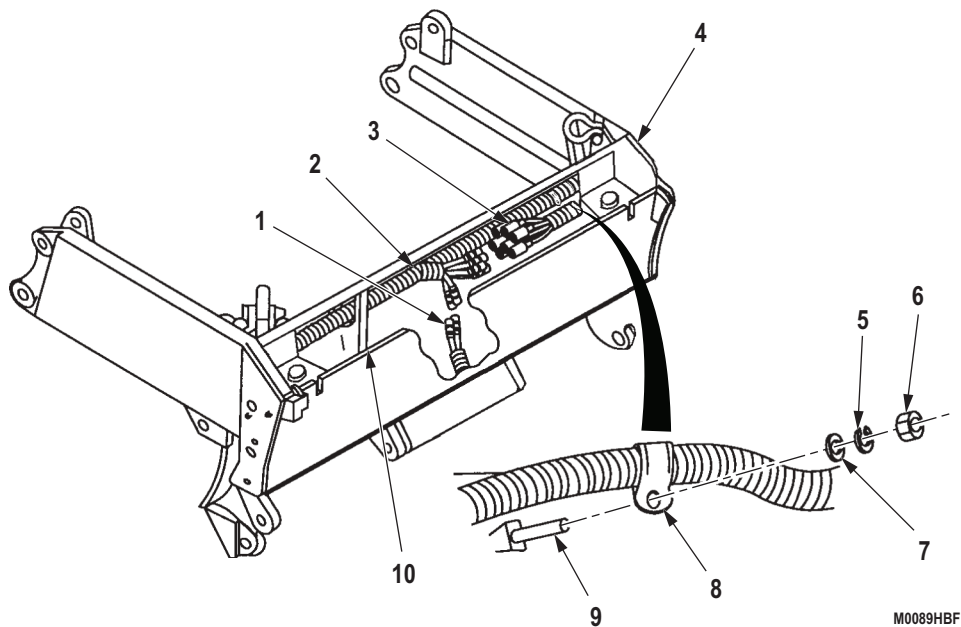
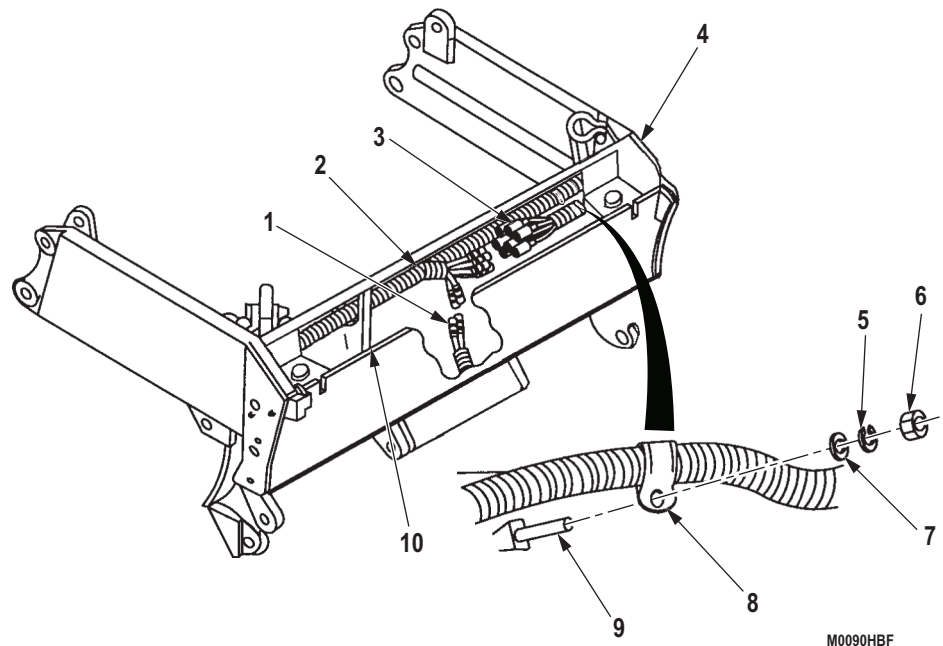


Figure 1. Headlight Wiring Harness Removal.

**END OF TASK**

**INSTALLATION**

1. Route headlight wiring harness (Figure 2, Item 2) through openings in top of four braces (Figure 2, Item 10) inside apron (Figure 2, Item 4) back wall, starting from left headlight to right headlight.
2. Install nut (Figure 2, Item 6), new lockwasher (Figure 2, Item 5), flat washer (Figure 2, Item 7), and hose clamp (Figure 2, Item 8) to headlight wiring harness and apron stud (Figure 2, Item 9).
3. Connect two apron wiring harness (Figure 2, Item 2) terminals to two apron mercury switch terminals (Figure 2, Item 1).
4. Connect headlight wiring harness (Figure 2, Item 2) to apron wiring harness (Figure 2, Item 3) at terminals.



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Figure 2. Headlight Wiring Harness Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

Install LH and RH headlight assembly (WP 0030).

**END OF TASK****END OF WORK PACKAGE**



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## FIELD MAINTENANCE

### BLADE FOLDING WIRING HARNESS REPLACEMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Stand, Vehicle  
(WP 0071, Table 1, Item 6)

##### References

TB 43-0001-39

##### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

##### Personnel Required

Construction Equipment Repairer, 91L

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#### REMOVAL

#### NOTE

Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Repair task.

1. Remove bilge pump light lead #450 (Figure 1, Item 2) from blade folder harness lead #515 (Figure 1, Item 1).
2. Remove blade folder harness lead #514 (Figure 1, Item 5) from control box power harness (Figure 1, Item 3) leads.
3. Remove hull wiring harness leads (Figure 1, Item 6) from blade folder harness (Figure 1, Item 7) leads.
4. Remove blade folding wiring harness (Figure 1, Item 8) from hull (Figure 1, Item 4).

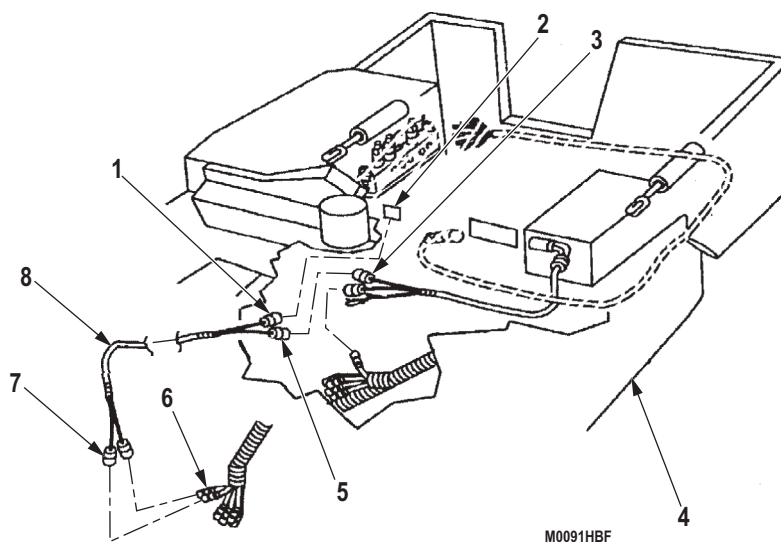


Figure 1. Blade Folder Wiring Harness Removal.

#### END OF TASK

**INSTALLATION**

1. Connect hull wiring harness leads (Figure 2, Item 5) to blade folder harness (Figure 2, Item 6), matching lead numbers.
2. Route blade folder harness through opening on lower left side into operator's compartment behind ejector panel.
3. Route control box power harness (Figure 2, Item 7) behind ejector panel.
4. Connect blade folder harness lead #514 (Figure 2, Item 4) to control box power harness (Figure 2, Item 3).
5. Connect bilge pump light lead #450 (Figure 2, Item 2) to blade folder harness lead #515 (Figure 2, Item 1).

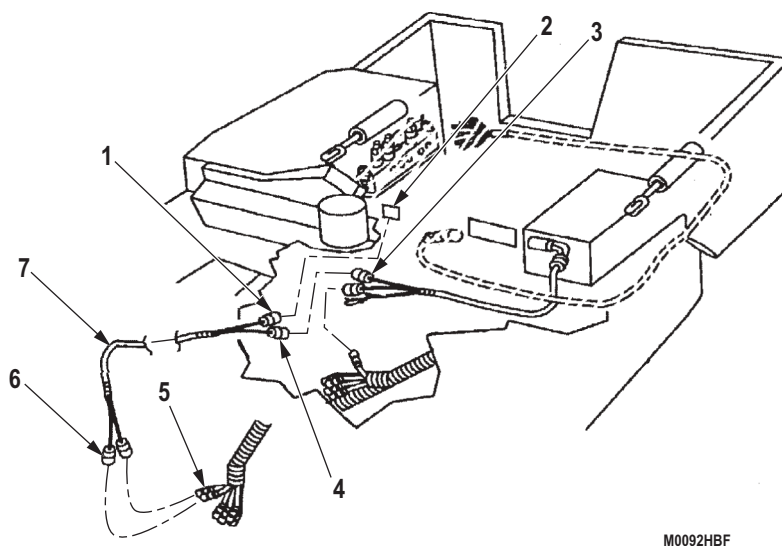


Figure 2. Blade Folder Wiring Harness Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

## FIELD MAINTENANCE CONTROL BOX POWER WIRING HARNESS REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)

#### References

TB 43-0001-39

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

#### Personnel Required

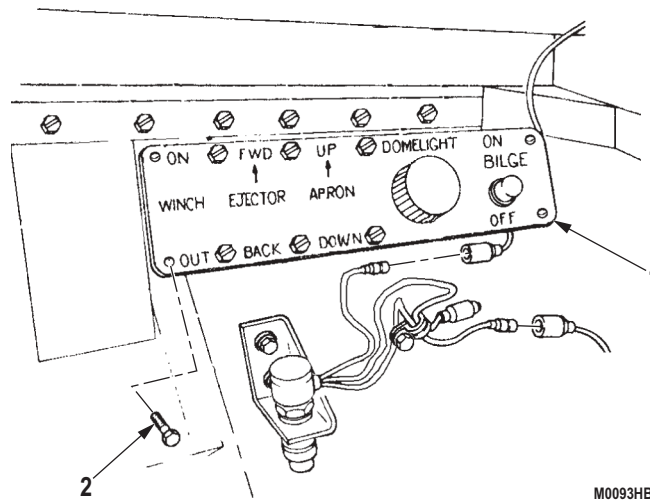
Construction Equipment Repairer, 91L

### REMOVAL

#### NOTE

Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Repair task.

1. Remove four screws (Figure 1, Item 2) on ejector panel (Figure 1, Item 1) and move panel downward, retaining screws for future use.



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Figure 1. Control Box Power Wiring Harness Removal.

**REMOVAL - Continued**

2. Remove screw (Figure 2, Item 3) and control box power harness ground terminal (Figure 2, Item 5) from bilge pump light ground (Figure 2, Item 1).
3. Install ejector panel (Figure 2, Item 4) to hull with four screws (Figure 2, Item 2) retained from Step (1).

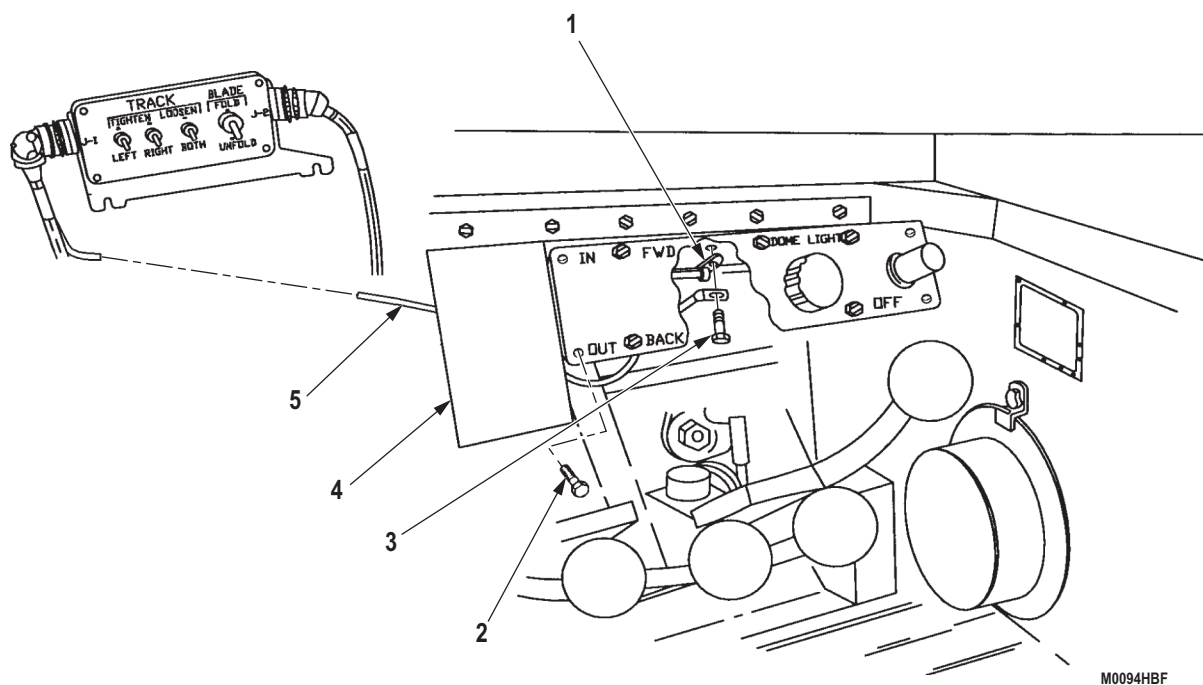


Figure 2. Control Box Power Wiring Harness Removal.



**REMOVAL - Continued**

4. Disconnect control harness lead #450 (Figure 3, Item 4) from control box power harness lead (Figure 3, Item 3).
5. Disconnect blade folder harness lead #514 (Figure 3, Item 5) from control box power harness lead (Figure 3, Item 1).
6. Remove control box power harness (Figure 3, Item 2) from behind ejector panel (Figure 1, Item 1).

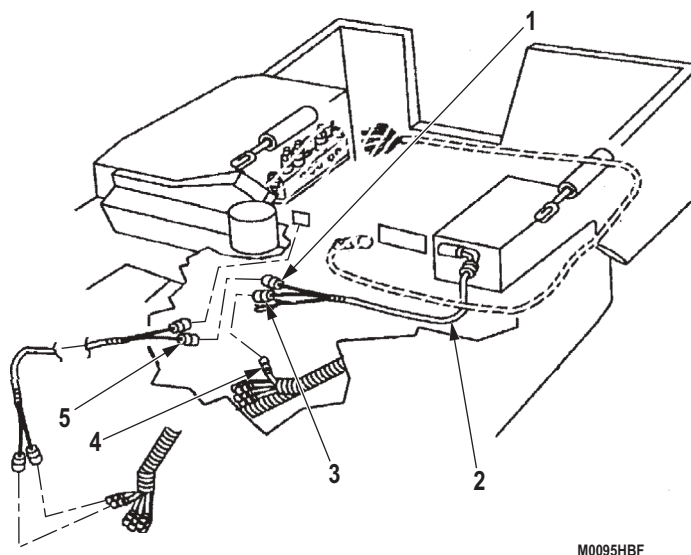


Figure 3. Control Box Power Wiring Harness Removal.

7. Disconnect control box power harness connector (Figure 4, Item 1) from track and blade control box (Figure 4, Item 2).

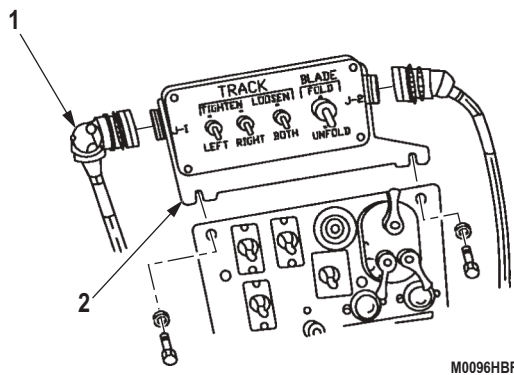


Figure 4. Control Box Power Wiring Harness Removal.

**END OF TASK**

**INSTALLATION**

1. Install control box power harness connector (Figure 5, Item 1) on track and blade control box (Figure 5, Item 2).

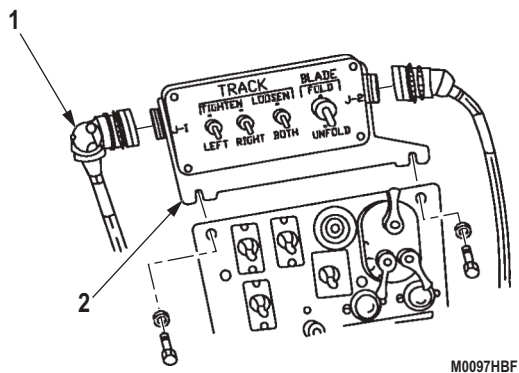


Figure 5. Control Box Power Wiring Harness Installation.

2. Remove four screws (Figure 6, Item 2) from ejector panel (Figure 6, Item 1) and move panel downward, retaining screws for future use.

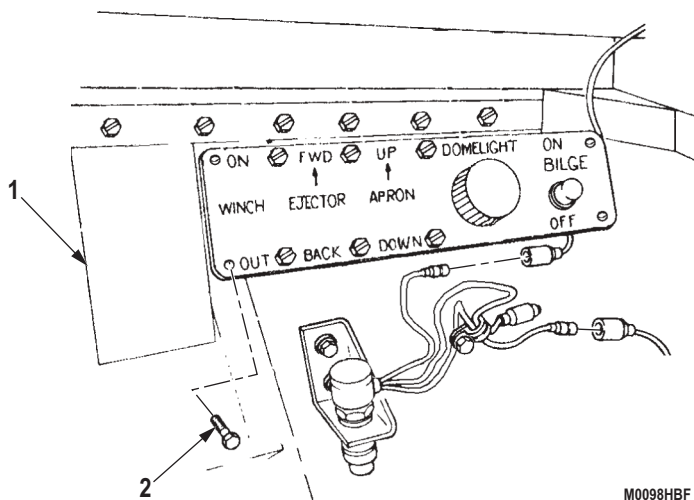
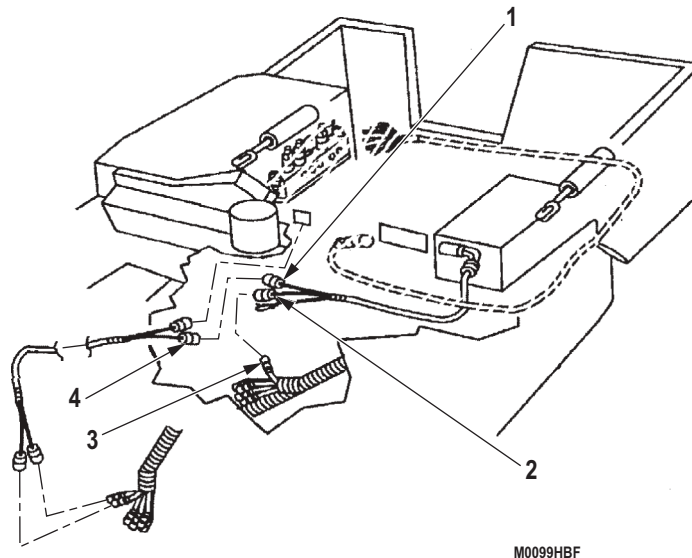


Figure 6. Control Box Power Wiring Harness Installation.

**INSTALLATION - Continued**

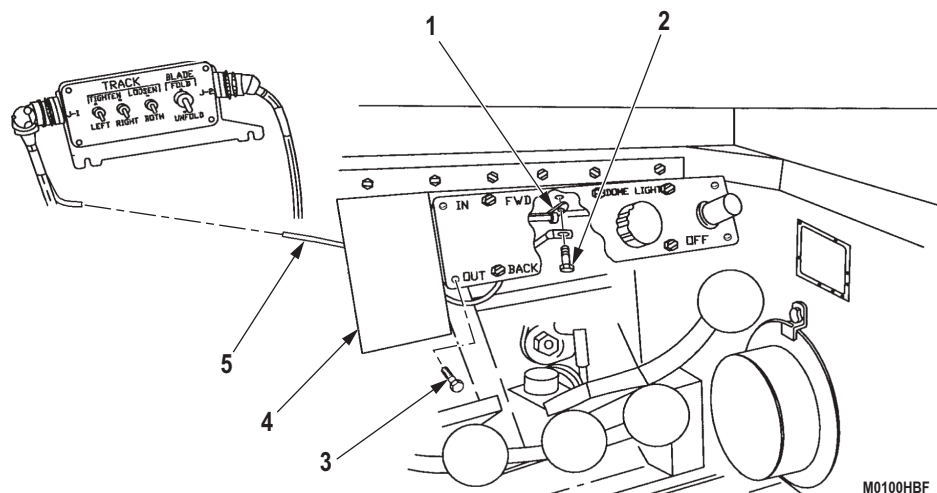
3. Connect blade folder harness lead #514 (Figure 7, Item 4) to control box power harness lead (Figure 7, Item 1).
4. Connect control harness lead #450 (Figure 7, Item 3) to control box power harness lead (Figure 7, Item 2).



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*Figure 7. Control Box Power Wiring Harness Installation.*

5. Install control box power harness ground terminal (Figure 8, Item 5) with bilge pump light ground (Figure 8, Item 1) with screw (Figure 8, Item 2).
6. Install ejector panel (Figure 8, Item 4) to hull with four screws (Figure 8, Item 3) retained from Step (2).



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*Figure 8. Control Box Power Wiring Harness Installation.*

**END OF TASK**

**FOLLOW-ON MAINTENANCE**

Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

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## FIELD MAINTENANCE MANIFOLD WIRING HARNESS REPLACEMENT

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### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)

#### References

TB 43-0001-39

#### Equipment Condition

Front vehicle blocked (TM 5-2350-262-20)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

#### Personnel Required

Construction Equipment Repairer, 91L

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### REMOVAL

#### NOTE

Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Repair task.

1. Remove manifold harness connectors (Figure 1, Item 3) from solenoids at ports Z1, Z2, and Z4 (Figure 1, Item 2) on manifold (Figure 1, Item 1).

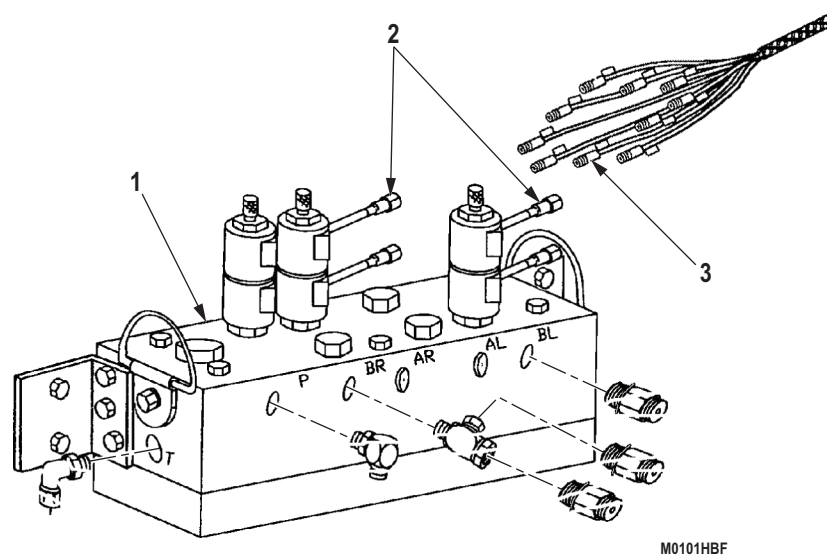


Figure 1. Manifold Wiring Harness Removal.

**REMOVAL - Continued**

2. Remove manifold harness connector (Figure 2, Item 2) from track and blade control box (Figure 2, Item 1).

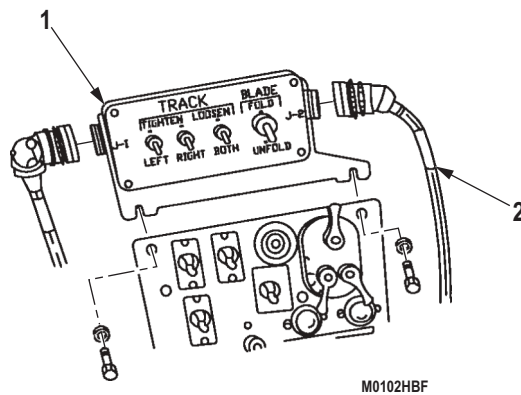


Figure 2. Manifold Wiring Harness Removal.

**END OF TASK****INSTALLATION**

1. Install manifold harness connector (Figure 3, Item 2) on track and blade control box (Figure 3, Item 1).

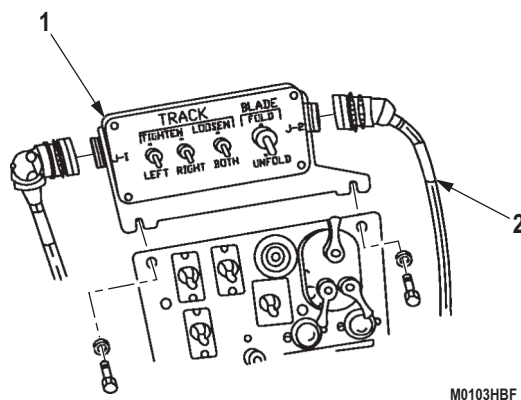
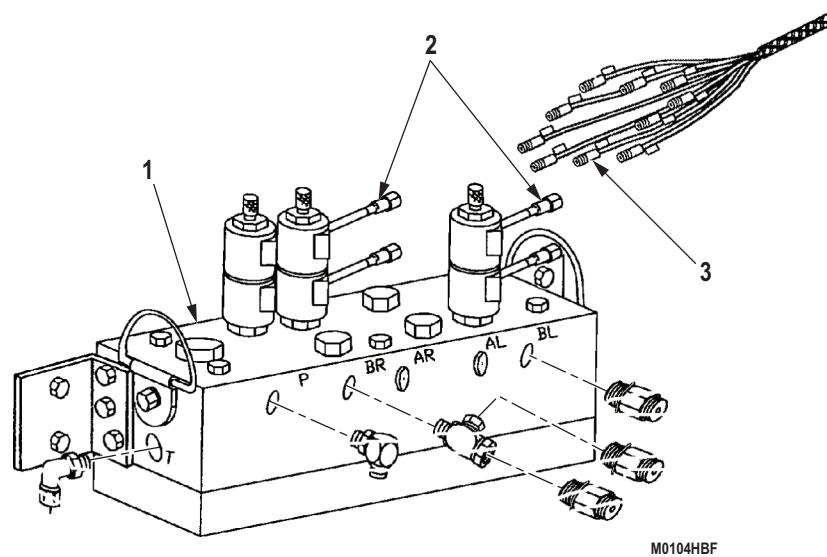


Figure 3. Manifold Wiring Harness Installation.

**INSTALLATION - Continued**

2. Route manifold harness through hull and attach connectors (Figure 4, Item 3) to solenoids at ports Z1, Z2, and Z4 (Figure 4, Item 2) on manifold (Figure 4, Item 1).



*Figure 4. Manifold Wiring Harness Connectors Installation.*

**END OF TASK**

**FOLLOW-ON MAINTENANCE**

Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK**

**END OF WORK PACKAGE**





## FIELD MAINTENANCE CONTROL BOX WIRING HARNESS REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)

#### References

TB 43-0001-39 Series

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

#### Personnel Required

Construction Equipment Repairer, 91L

### REMOVAL

#### NOTE

Refer to TB 43-0001-39 Series for all wiring harnesses not shown for Replacement task.

1. Remove four screws (Figure 1, Item 1) and cover (Figure 1, Item 2) from body assembly (Figure 1, Item 9) and retain for future use.
2. Disconnect connector (Figure 1, Item 4) on control box harness (Figure 1, Item 5) from connector (Figure 1, Item 7) on control box harness (Figure 1, Item 8).
3. Remove control box harness connector (Figure 1, Item 6) and control box connector (Figure 1, Item 10) from control box assembly (Figure 1, Item 9).
4. Remove ten screws (Figure 1, Item 3) and control box harness contacts (Figure 1, Item 5) from cover (Figure 1, Item 2) and retain screws for future use.

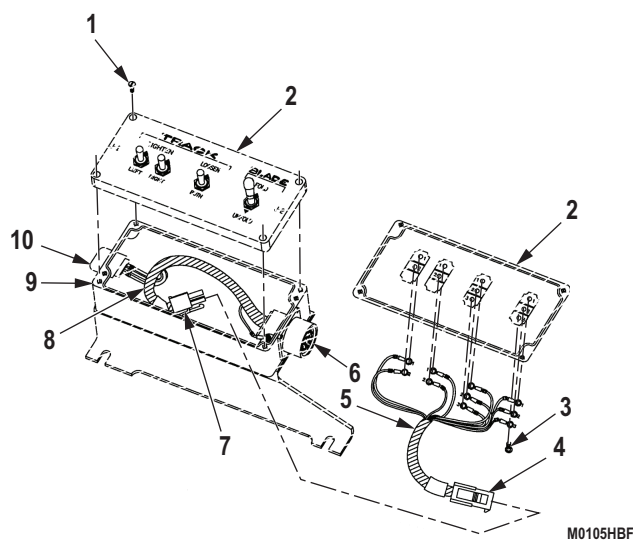


Figure 1. Control Box Harnesses Removal.

### END OF TASK

## INSTALLATION

1. Install ten screws (Figure 2, Item 3) and control box harness contacts (Figure 2, Item 5) to cover (Figure 2, Item 2).
2. Install control box harness connector (Figure 2, Item 6) and control box connector (Figure 2, Item 10) on control box assembly (Figure 2, Item 9).
3. Install connector (Figure 2, Item 4) on control box harness (Figure 2, Item 5) to connector (Figure 2, Item 7) on control box harness (Figure 2, Item 8).
4. Install four screws (Figure 2, Item 1) and cover (Figure 2, Item 2) to control box assembly (Figure 2, Item 9).

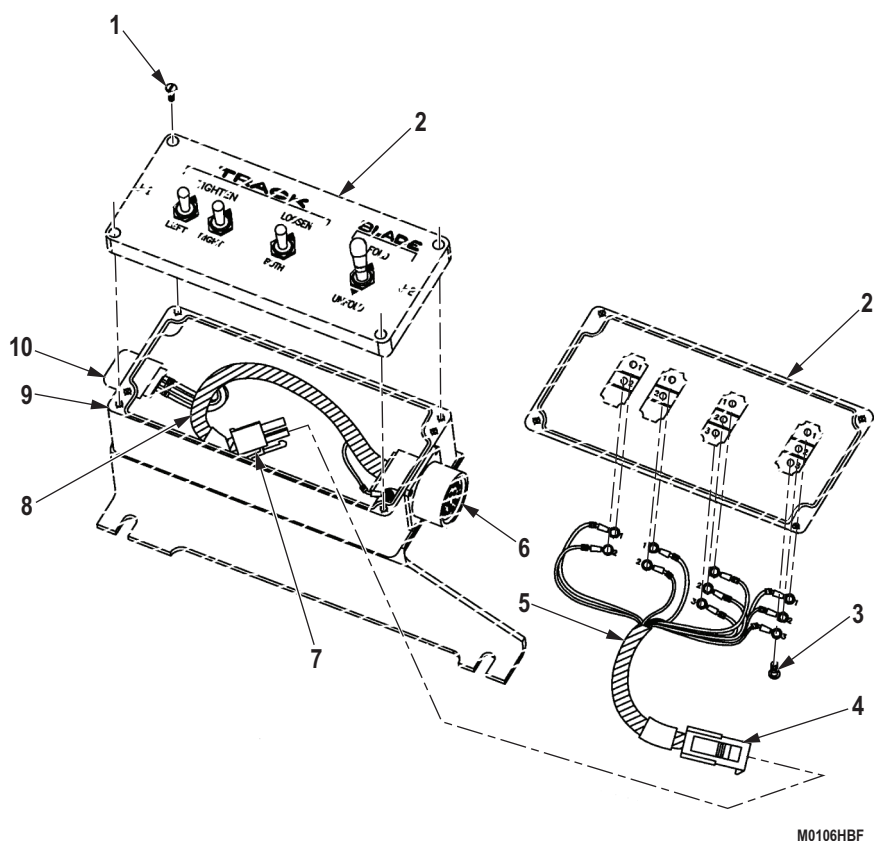


Figure 2. Control Box Harnesses Installation.

**END OF TASK**

## FOLLOW-ON MAINTENANCE

Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK**

**END OF WORK PACKAGE**

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## FIELD MAINTENANCE TRACK AND BLADE CONTROL BOX REPAIR

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### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

#### Personnel Required

Construction Equipment Repairer, 91L

#### References

WP 0025

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### DISASSEMBLY

1. Remove two screws (Figure 1, Item 4) and flat washers (Figure 1, Item 5) on instrument panel (Figure 1, Item 6) and slide track and blade control box (Figure 1, Item 2) from behind instrument panel (Figure 1, Item 6).
2. Remove manifold harness connector (Figure 1, Item 3) from track and blade control box (Figure 1, Item 2).
3. Remove control box power harness connector (Figure 1, Item 1) from track and blade control box (Figure 1, Item 2).

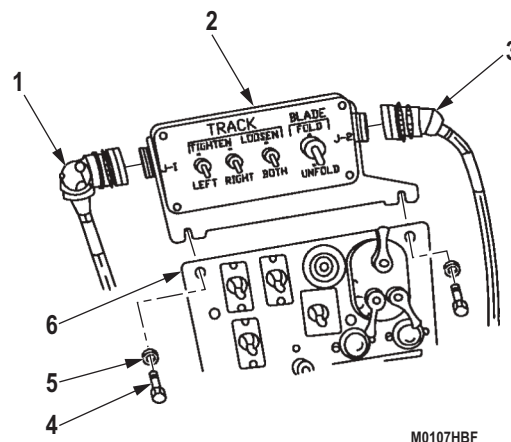


Figure 1. Control Box Disassembly.

**DISASSEMBLY - Continued**

4. Remove four screws (Figure 2, Item 1) and cover (Figure 2, Item 3) from control box (Figure 2, Item 7).
5. Refer to Control Box Power Wiring Harness Replacement (WP 0025) to remove control box wiring harnesses (Figure 2, Items 6 and 8) inside control box (Figure 2, Item 7).
6. Remove four jam nuts (Figure 2, Item 4), washers (Figure 2, Item 5), and switches (Figure 2, Item 2) from cover (Figure 2, Item 3).

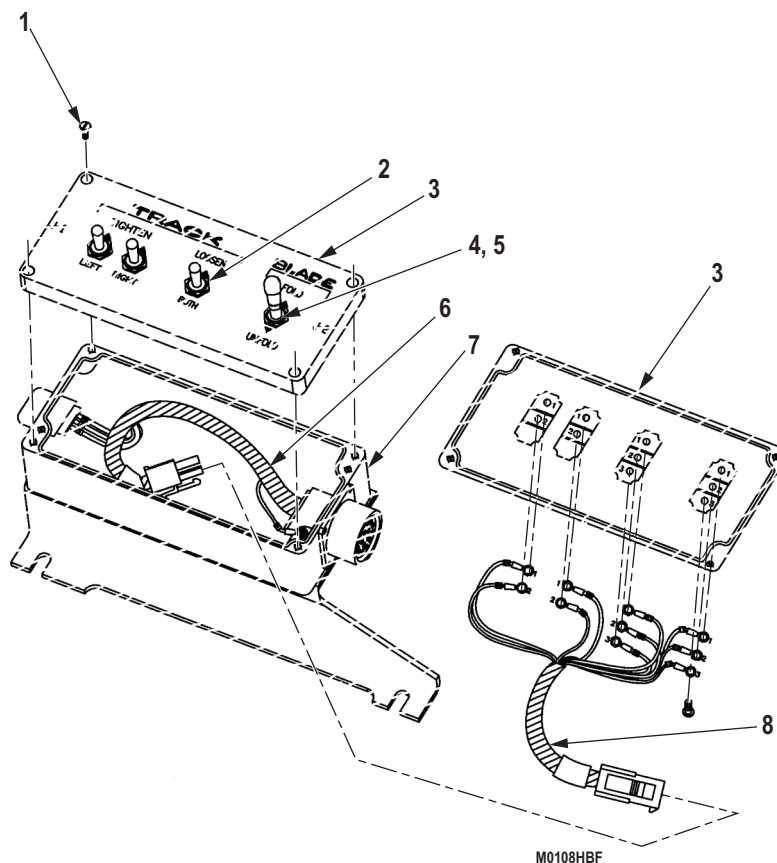


Figure 2. Control Box Disassembly.

**END OF TASK**

**ASSEMBLY**

1. Install four jam nuts (Figure 3, Item 4), washers (Figure 3, Item 5), and switches (Figure 3, Item 2) on cover (Figure 3, Item 3).
2. Refer to Control Box Power Wiring Harness Replacement (WP 0025) to install control box wiring harnesses (Figure 3, Items 6 and 8) inside control box (Figure 3, Item 7).
3. Install cover (Figure 3, Item 3) onto control box (Figure 3, Item 7) with four screws (Figure 3, Item 1).

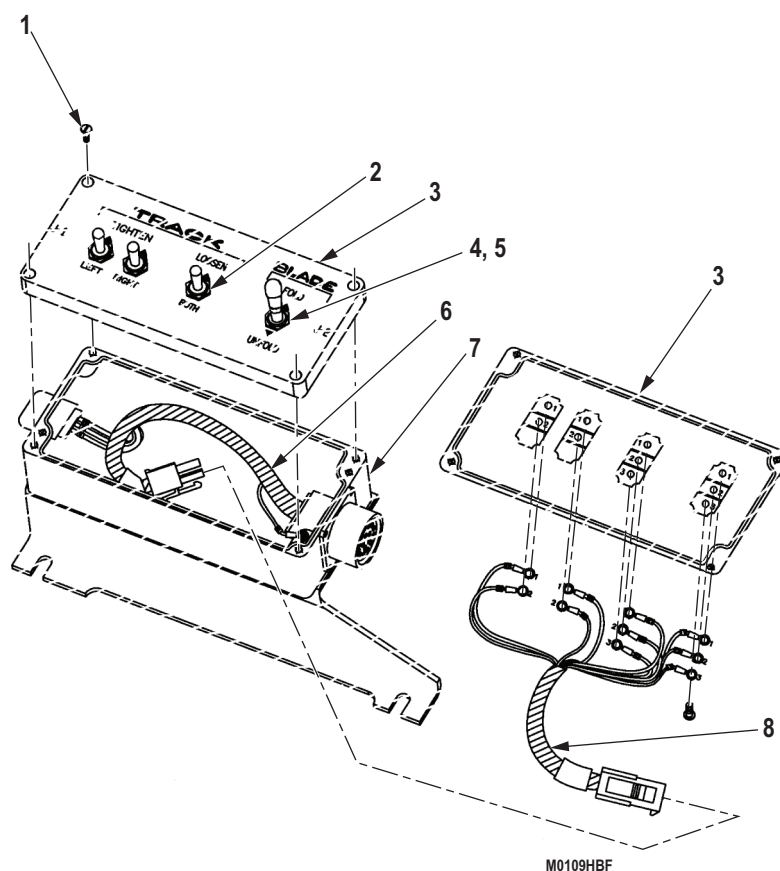


Figure 3. Control Box Assembly.

**ASSEMBLY - Continued**

4. Install control box power harness connector (Figure 4, Item 1) to track and blade control box (Figure 4, Item 2).
5. Install manifold harness connector (Figure 4, Item 3) to track and blade control box (Figure 4, Item 2).
6. Slide track and blade control box (Figure 4, Item 2) behind instrument panel (Figure 4, Item 6) and install two screws (Figure 4, Item 4) and flat washers (Figure 4, Item 5) on instrument panel (Figure 4, Item 6).

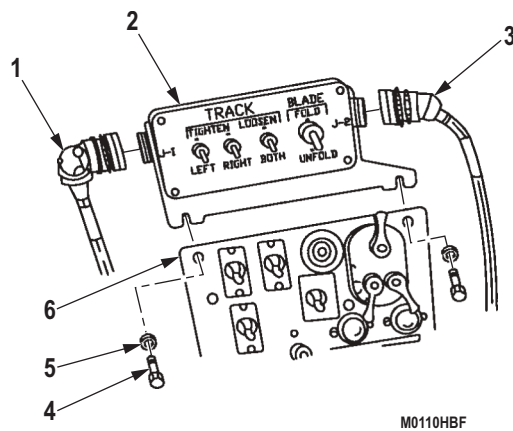


Figure 4. Control Box Assembly.

**END OF TASK****FOLLOW-ON MAINTENANCE**

Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

---

## FIELD MAINTENANCE

### TRACK AND BLADE CONTROL BOX REPLACEMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

##### Equipment Condition

Battery box open (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)

##### Personnel Required

Construction Equipment Repairer, 91L

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#### REMOVAL

1. Remove control box power harness connector (Figure 1, Item 1) from track and blade control box (Figure 1, Item 2).
2. Remove manifold harness connector (Figure 1, Item 3) from track and blade control box (Figure 1, Item 2).
3. Remove two screws (Figure 1, Item 6) and two washers (Figure 1, Item 5) from instrument panel (Figure 1, Item 4).
4. Slide track and blade control box (Figure 1, Item 2) upward from behind instrument panel (Figure 1, Item 4).

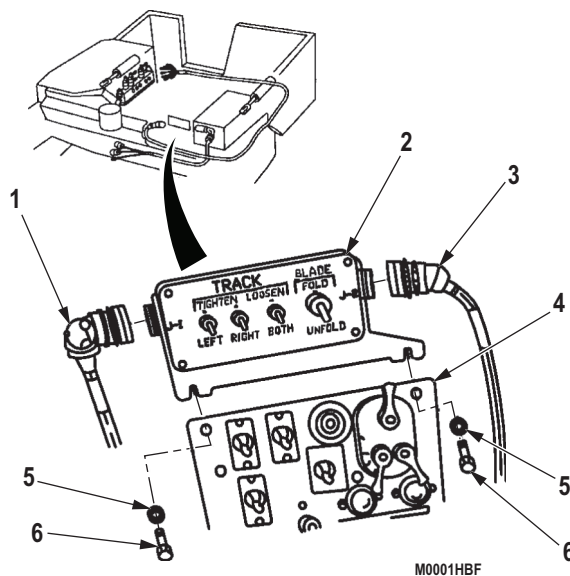


Figure 1. Track and Blade Control Box Removal.

#### END OF TASK

**INSTALLATION**

1. Slide track and blade control box (Figure 2, Item 2) behind instrument panel (Figure 2, Item 4) and install two washers (Figure 2, Item 5) and two screws (Figure 2, Item 6).
2. Install manifold harness connector (Figure 2, Item 3) on track and blade control box (Figure 2, Item 2).
3. Install control box power harness connector (Figure 2, Item 1) on track and blade control box (Figure 2, Item 2).

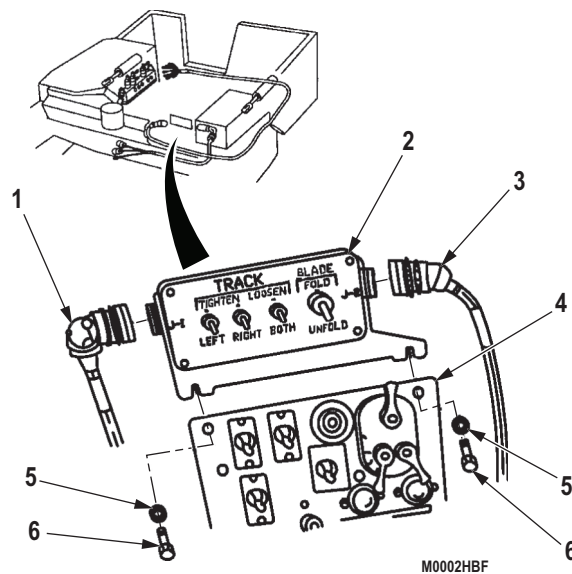


Figure 2. Track and Blade Control Box Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Connect negative battery cables (TM 5-2350-262-20).
2. Close battery box (TM 5-2350-262-10).

**END OF TASK****END OF WORK PACKAGE**



## FIELD MAINTENANCE HEADLIGHT ASSEMBLY REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Wrench, Torque, Click, Ratcheting, 3/8 in. Drive  
(75 ft-lb) (WP 0071, Table 1, Item 13)

#### Equipment Condition (cont.)

Hydraulic pressure relieved (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)

### REMOVAL

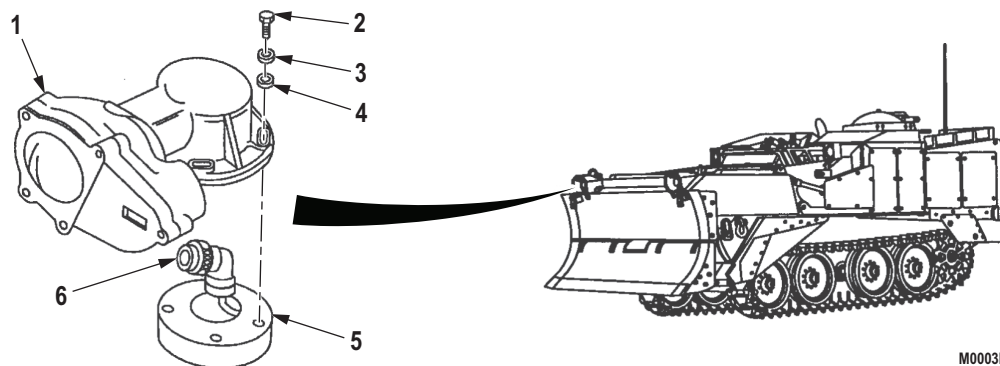
#### CAUTION

Do not turn or twist headlight during installation. Turning or twisting headlight can damage headlight wiring harness.

#### NOTE

Installation procedures for the headlight are the same for both sides of the vehicle. The right side is shown here.

1. Remove four bolts (Figure 1, Item 2), washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4) from headlight (Figure 1, Item 1) and apron (Figure 1, Item 5).
2. Carefully lift headlight (Figure 1, Item 1) a few inches from apron (Figure 1, Item 5) to get at connector (Figure 1, Item 6).
3. Disconnect connector (Figure 1, Item 6) and pull away from headlight (Figure 1, Item 1).



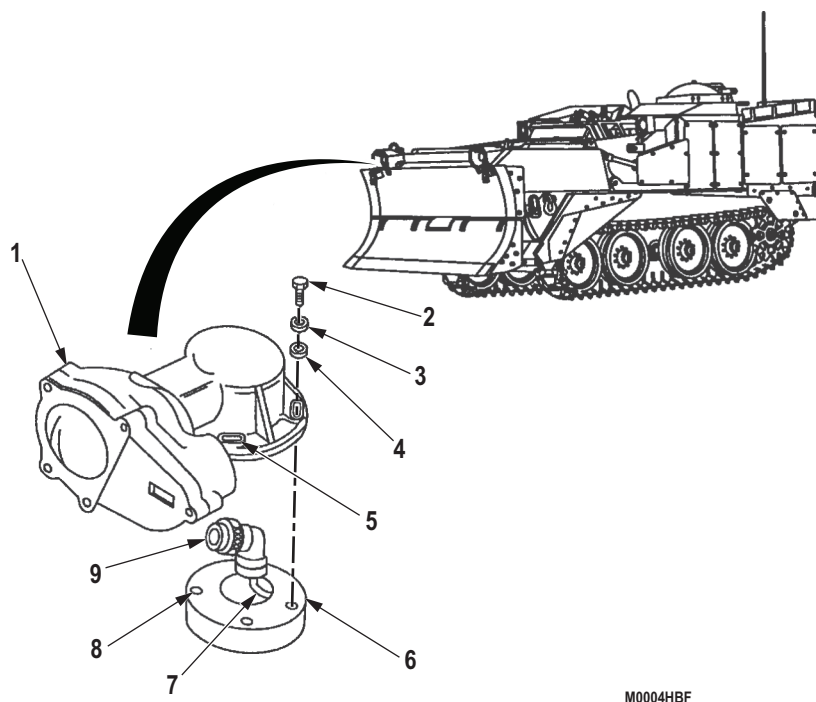
M0003HBF

Figure 1. Headlight Removal.

### END OF TASK

**INSTALLATION**

1. Install connector (Figure 2, Item 9) on headlight (Figure 2, Item 1).
2. Align four holes (Figure 2, Item 5) in headlight (Figure 2, Item 1) with holes (Figure 2, Item 8) on apron (Figure 2, Item 6). Make sure cable (Figure 2, Item 7) is in groove in headlight (Figure 2, Item 1).
3. Attach headlight (Figure 2, Item 1) with four bolts (Figure 2, Item 2), washers (Figure 2, Item 3), and flat washers (Figure 2, Item 4) to apron (Figure 2, Item 6). Torque screws between 40 to 45 lb-ft (54 to 65 N·m).



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*Figure 2. Headlight Installation.***END OF TASK****FOLLOW-ON MAINTENANCE**

1. Connect negative battery cable (TM 5-2350-262-20).
2. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

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## FIELD MAINTENANCE

### HEADLIGHT PLATE SPACER, LIGHT LENS, AND GASKET REPLACEMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Stand, Vehicle (WP 0071, Table 1, Item 6)

##### Equipment Condition (cont.)

Hydraulic pressure relieved (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)

##### Personnel Required

Construction Equipment Repairer, 91L

##### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)

---

#### REMOVAL

##### NOTE

Screws are captive to spacer and stay on spacer.

1. Loosen four screws (Figure 1, Item 5) on plate spacer (Figure 1, Item 6) and remove plate spacer (Figure 1, Item 6) from headlight (Figure 1, Item 2).
2. Place screwdriver in slot (Figure 1, Item 1) and pry out gasket (Figure 1, Item 3) together with lens (Figure 1, Item 4) from headlight (Figure 1, Item 2).

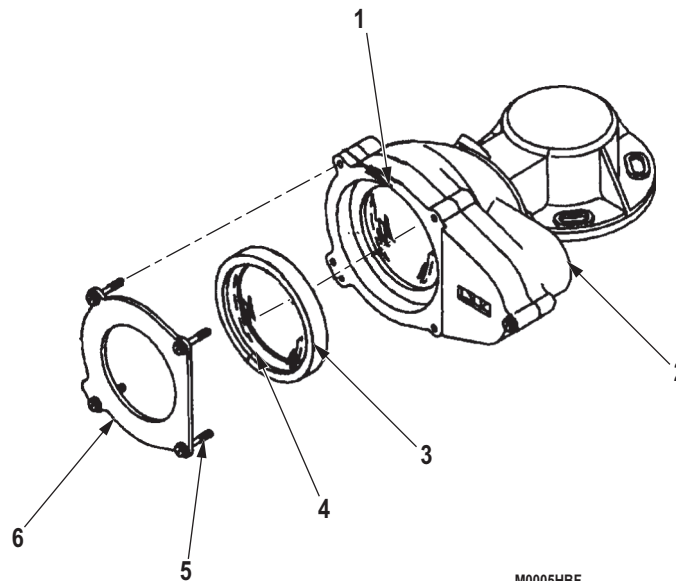


Figure 1. Headlight Plate Spacer Removal.

**REMOVAL - Continued**

3. Roll back edge of gasket (Figure 2, Item 2) and remove lens (Figure 2, Item 1) from groove in gasket (Figure 2, Item 2).

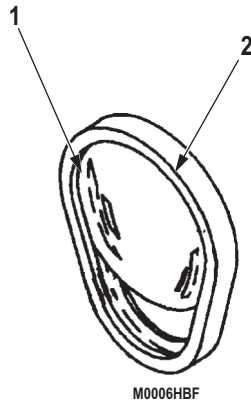


Figure 2. Headlight Gasket Removal.

**END OF TASK****INSTALLATION**

1. Put thicker edge (Figure 3, Item 1) of gasket (Figure 3, Item 2) toward outside edge (Figure 3, Item 3) of lens (Figure 3, Item 4). Push lens (Figure 3, Item 4) in gasket (Figure 3, Item 5).

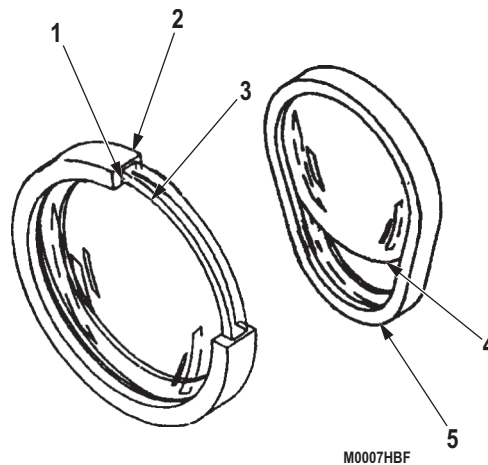


Figure 3. Headlight Gasket Installation.

**INSTALLATION - Continued**

2. With thick side of gasket (Figure 4, Item 3) facing forward, put gasket (Figure 4, Item 3) and lens (Figure 4, Item 4) all the way in lens holder (Figure 4, Item 2) until they seat firmly.
3. Put plate spacer (Figure 4, Item 6) on holder (Figure 4, Item 2). Install four captive screws (Figure 4, Item 5) on headlight (Figure 4, Item 1).

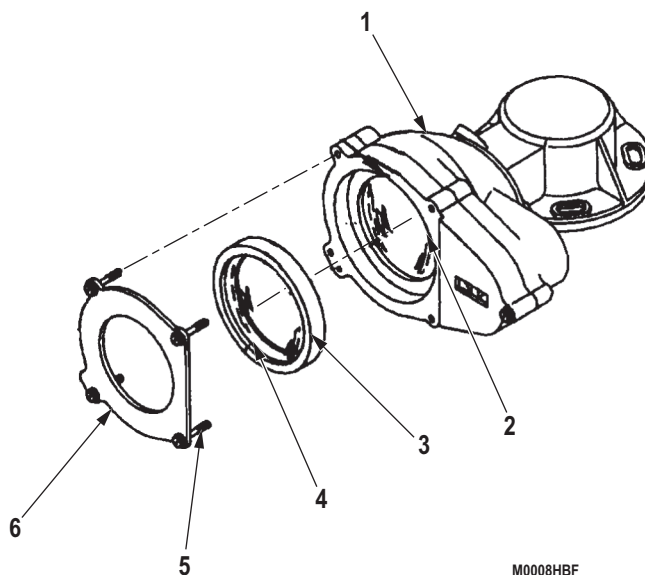


Figure 4. Headlight Plate Spacer Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Connect negative battery cable (TM 5-2350-262-20).
2. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**



## FIELD MAINTENANCE

### HEADLIGHT LENS HOLDER AND LIGHT FILTER, LIGHT LENS, AND RUBBER ROUND SEAL REPLACEMENT

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

##### Materials/Parts

Adhesive (WP 0070, Table 1, Item 2)  
Brush, Acid, Swabbing  
(WP 0070, Table 1, Item 4)  
Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)  
Gloves, Chemical and Oil Protective  
(WP 0070, Table 1, Item 11)  
Goggles, Industrial (WP 0070, Table 1, Item 12)  
Rag, Wiping (WP 0070, Table 1, Item 25)

##### Materials/Parts (cont.)

Rubber Round Seal (Nonmetallic)  
(WP 0055, Figure 10, Item 10) Qty: 1  
Rubber Round Section  
(WP 0055, Figure 10, Item 15) Qty: 1

##### Personnel Required

Construction Equipment Repairer, 91L

##### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic pressure relieved (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)

#### REMOVAL

#### NOTE

Screws are captive to holder and stay on holder.

1. Unscrew five screws (Figure 1, Item 3) on holder (Figure 1, Item 2).
2. Remove holder (Figure 1, Item 2) from body (Figure 1, Item 1). Pull out rubber round seal (Figure 1, Item 4) from holder (Figure 1, Item 2). Discard rubber round seal.

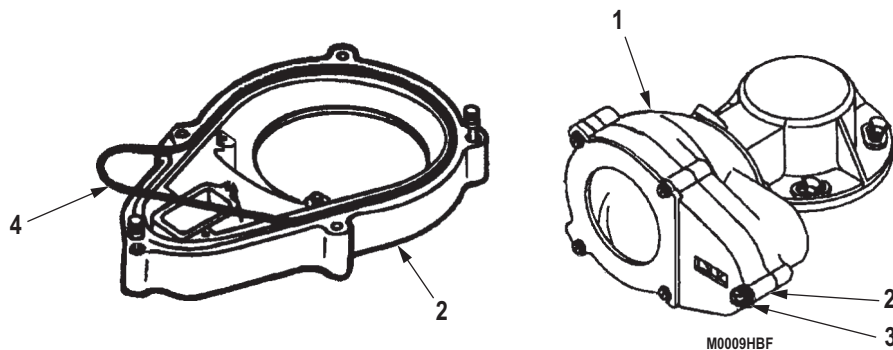


Figure 1. Headlight Rubber Round Seal Removal.

**REMOVAL - Continued**

3. Remove three screws (Figure 2, Item 2) from plate (Figure 2, Item 3).
4. Remove plate (Figure 2, Item 3), filter (Figure 2, Item 1), lens (Figure 2, Item 6), and seal (Figure 2, Item 4) from holder (Figure 2, Item 5). Discard seal.

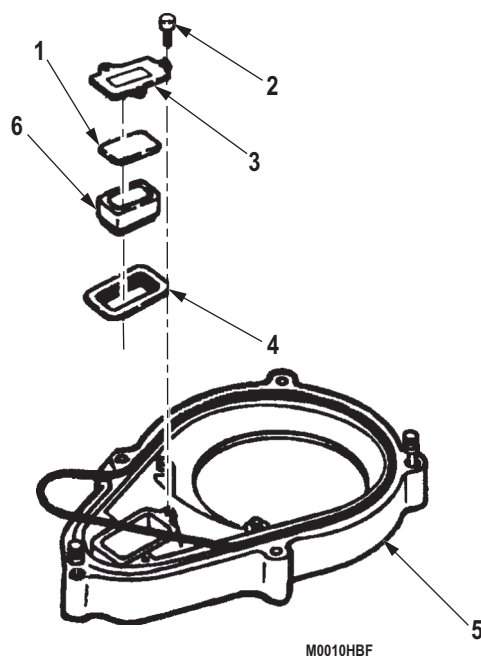


Figure 2. Headlight Lens Holder Removal.

**END OF TASK**



## INSTALLATION

### WARNING

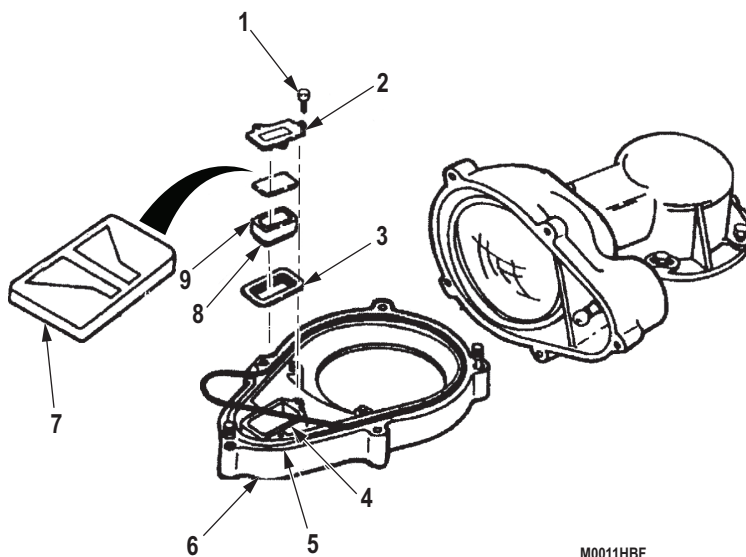


- Cleaning solvent is combustible. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using cleaning solvent; the flashpoint is 144°F (62°C). Failure to follow this warning may result in injury or death to personnel. A fire extinguisher will be kept nearby when the solvent is used.
  - 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 them with water and get immediate medical attention.
  - When cleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.
1. Clean rubber round section groove (Figure 3, Item 5) in holder (Figure 3, Item 6) with solvent and rag.
  2. Put front lip (Figure 3, Item 8) of lens (Figure 3, Item 9) in inside groove of new seal (Figure 3, Item 3).
  3. Put lens (Figure 3, Item 9) with seal (Figure 3, Item 3) in lens and filter holder (Figure 3, Item 4). Make sure lens (Figure 3, Item 9) and seal (Figure 3, Item 3) are seated firmly in holder (Figure 3, Item 4).

### NOTE

Put filter on lens so wide ends of markings face up when holder is installed on body.

4. Lay painted side of filter (Figure 3, Item 7) on top of lens (Figure 3, Item 8).
5. Put plate (Figure 3, Item 2) on top of filter (Figure 3, Item 7). Install three screws (Figure 3, Item 1) in plate (Figure 3, Item 2) and holder (Figure 3, Item 4).



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Figure 3. Headlight Light Filter Installation.

## INSTALLATION - Continued

6. Install new rubber round section (Figure 4, Item 1) in groove (Figure 4, Item 7) of holder (Figure 4, Item 2). Ends of rubber round section (Figure 4, Item 1) should overlap.
7. Cut ends of rubber round section (Figure 4, Item 1) at an angle where they meet in groove (Figure 4, Item 7). Remove rubber round section (Figure 4, Item 1).
8. Apply adhesive in groove (Figure 4, Item 7) with brush. Put rubber round section (Figure 4, Item 1) in groove (Figure 4, Item 7) so ends overlap where they are cut.
9. Put plate spacer (Figure 4, Item 5) on holder (Figure 4, Item 2). Install four screws (Figure 4, Item 4) on body (Figure 4, Item 3).
10. Put holder (Figure 4, Item 2) on body (Figure 4, Item 3). Loosely install five screws (Figure 4, Item 4).
11. Align four holes (Figure 4, Item 5) in holder (Figure 4, Item 2) with mounting lugs (Figure 4, Item 6) on body (Figure 4, Item 3). Tighten five screws (Figure 4, Item 4).

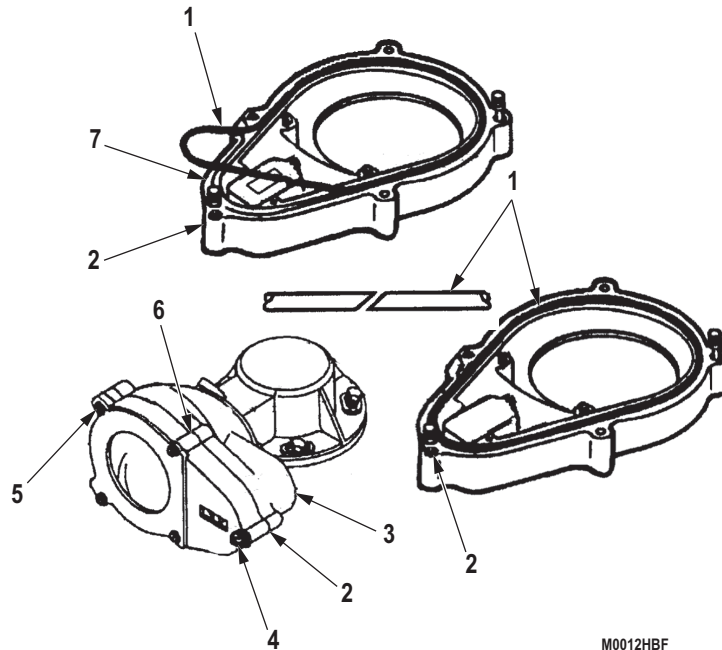


Figure 4. Headlight Round Rubber Seal Installation.

## END OF TASK

## FOLLOW-ON MAINTENANCE

1. Connect negative battery cable (TM 5-2350-262-20).
2. Unblock front of vehicle (TM 5-2350-262-20).

## END OF TASK

## END OF WORK PACKAGE

---

## FIELD MAINTENANCE HEADLIGHT INCANDESCENT LAMP REPLACEMENT

---

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Stand, Vehicle (WP 0071, Table 1, Item 6)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition (cont.)

Negative battery cables disconnected  
(TM 5-2350-262-20)  
Hydraulic pressure relieved (TM 5-2350-262-20)  
Headlight lens holder and light filter, light lens, and  
rubber round seal removed (WP 0032)

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)

---

### REMOVAL

1. Remove five screws (Figure 1, Item 5) from headlight cover (Figure 1, Item 1) and remove cover.
2. Roll front edge of headlight mount (Figure 1, Item 2) toward back of lamp (Figure 1, Item 4).
3. Pull out lamp (Figure 1, Item 4) from headlight mount (Figure 1, Item 2). Pull off connector plug (Figure 1, Item 3) from lamp (Figure 1, Item 4).

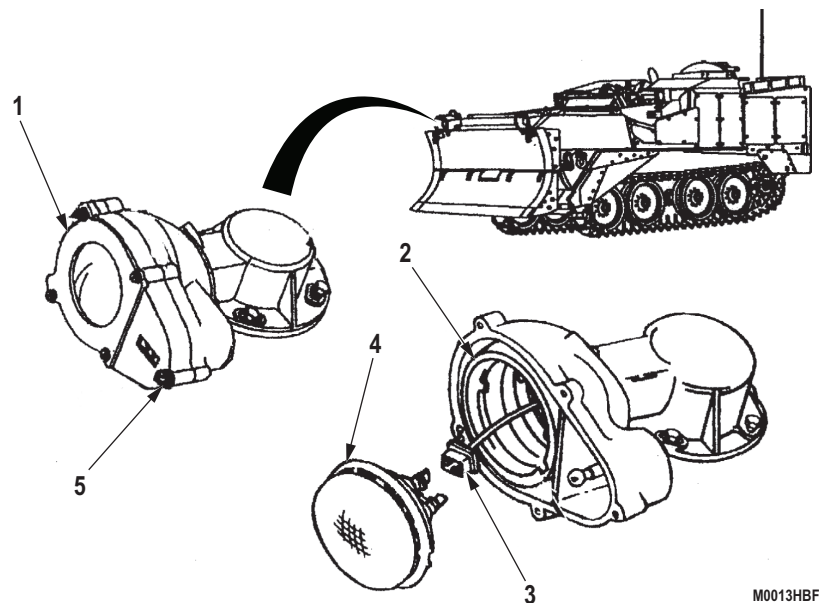


Figure 1. Headlight Incandescent Lamp Removal.

### END OF TASK

**INSTALLATION**

1. Push plug (Figure 2, Item 4) on back of lamp (Figure 2, Item 6).
2. Place right side of lamp (Figure 2, Item 6) in headlight mount (Figure 2, Item 2). Align tab (Figure 2, Item 5) with slot (Figure 2, Item 3). Align edge of headlight mount (Figure 2, Item 2). Start lamp (Figure 2, Item 6) under edge of headlight mount (Figure 2, Item 2). Work rest of headlight mount (Figure 2, Item 2) around lamp (Figure 2, Item 6) with screwdriver. Make sure lamp (Figure 2, Item 6) is straight in headlight mount (Figure 2, Item 2).
3. Install cover (Figure 2, Item 1) to headlight mount (Figure 2, Item 2) and secure with five screws (Figure 2, Item 7).

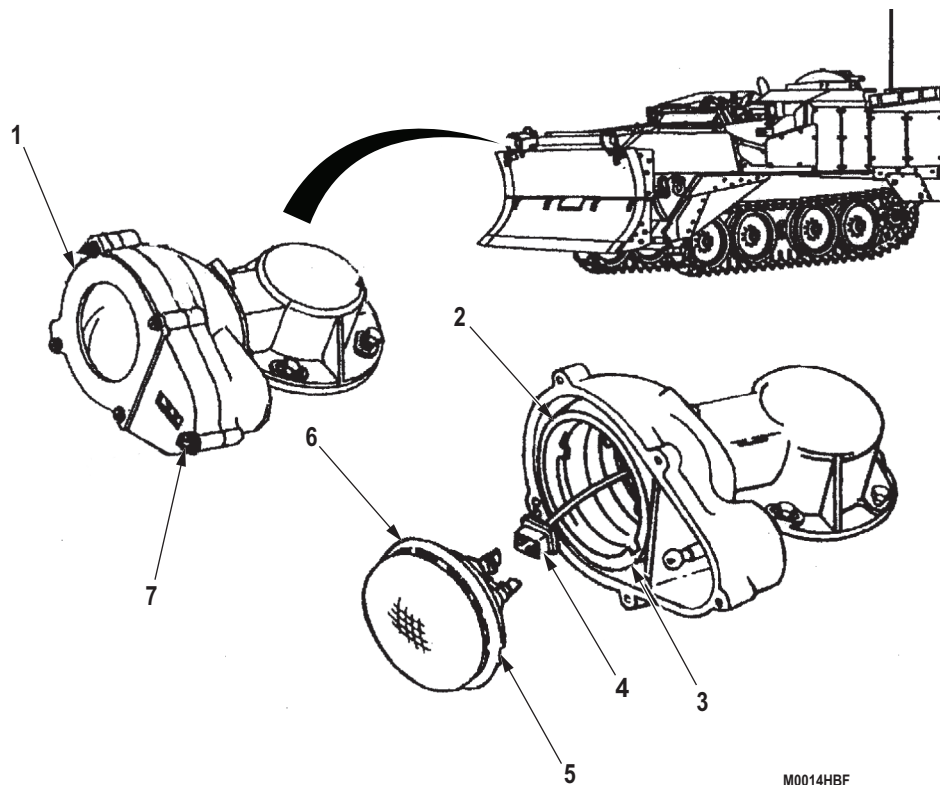


Figure 2. Headlight Incandescent Lamp Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install left or right headlight lens holder and light filter, light lens, and rubber round seal (WP 0032).
2. Connect negative battery cable (TM 5-2350-262-20).
3. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

---

## FIELD MAINTENANCE HEADLIGHT MOUNT REPLACEMENT

---

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Stand, Vehicle (WP 0071, Table 1, Item 6)  
Wrench, Torque, Dial, 1/4 in. Drive (30 in-lb)  
(WP 0071, Table 1, Item 14)

#### Materials/Parts

Washer, Lock (WP 0055, Figure 10, Item 6)  
Qty: 3

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)  
Hydraulic pressure relieved (TM 5-2350-262-20)  
Headlight incandescent lamp removed (WP 0033)

---

### REMOVAL

#### NOTE

Use this task to replace left or right side headlight mount. Right side headlight mount is shown.

1. Remove five screws (Figure 1, Item 5) from headlight cover (Figure 1, Item 6). Remove cover.
2. Remove three screws (Figure 1, Item 1) and lockwashers (Figure 1, Item 2) from body (Figure 1, Item 3). Discard lockwashers.
3. Pull out headlight mount (Figure 1, Item 4) from body (Figure 1, Item 3).

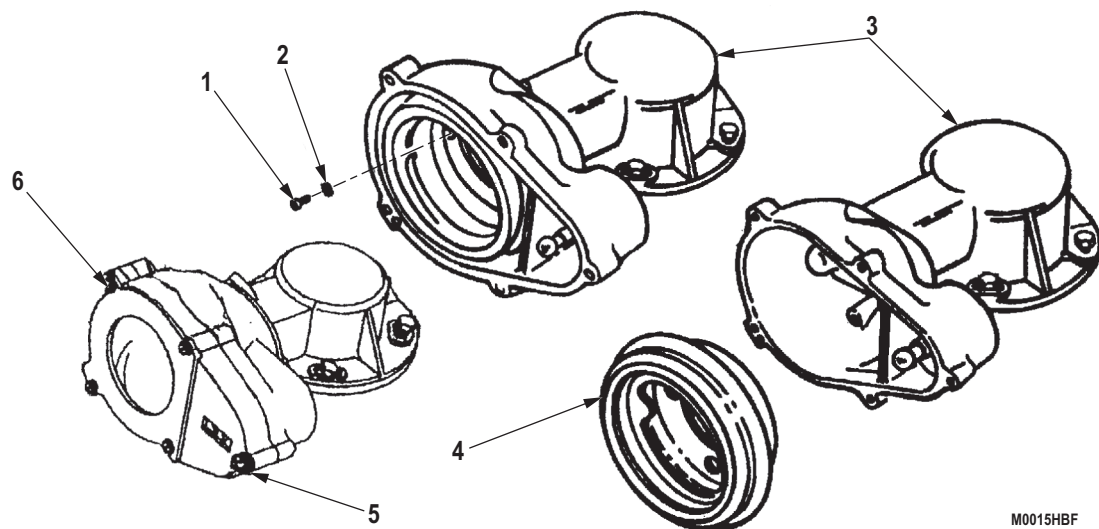


Figure 1. Headlight Mount Removal.

### END OF TASK

**INSTALLATION**

1. Put cable (Figure 2, Item 5) through middle of headlight mount (Figure 2, Item 4). Make sure that cable (Figure 2, Item 5) is not pinched between headlight mount (Figure 2, Item 4) and body (Figure 2, Item 3).
2. Put headlight mount (Figure 2, Item 4) in body (Figure 2, Item 3) and align three screw holes in headlight mount (Figure 2, Item 4) and body (Figure 2, Item 3).
3. Install three screws (Figure 2, Item 1) and new lockwashers (Figure 2, Item 2) and torque between 25-29 lb-in (2.8-3.3 N·m).

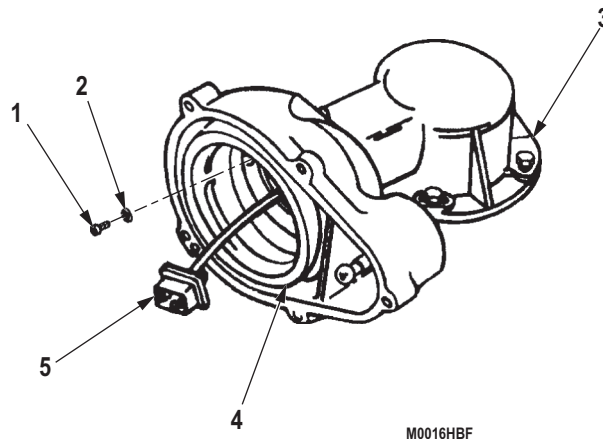


Figure 2. Headlight Mount Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install left or right headlight incandescent lamp (WP 0033).
2. Connect negative battery cable (TM 5-2350-262-20).
3. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

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**FIELD MAINTENANCE  
HEADLIGHT SUPPORT REPLACEMENT**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Stand, Vehicle (WP 0071, Table 1, Item 6)

**Materials/Parts (cont.)**

Gasket (WP 0055, Figure 10, Item 26) Qty: 1  
Washer, Lock (WP 0055, Figure 10, Item 23)  
Qty: 3

**Materials/Parts**

Adhesive (WP 0070, Table 1, Item 2)  
Brush, Acid, Swabbing  
(WP 0070, Table 1, Item 4)  
Brush, Wire (WP 0070, Table 1, Item 5)  
Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)  
Gloves, Chemical and Oil Protective  
(WP 0070, Table 1, Item 11)  
Goggles, Industrial (WP 0070, Table 1, Item 12)  
Rag, Wiping (WP 0070, Table 1, Item 25)

**Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

Front of vehicle blocked (TM 5-2350-262-20)  
Hydraulic pressure relieved (TM 5-2350-262-20)  
Negative battery cables disconnected  
(TM 5-2350-262-20)  
Headlight assembly removed (WP 0030)

---

**REMOVAL****NOTE**

Use this task to replace left or right support. Right support is shown.

1. Remove jam nut (Figure 1, Item 9) from receptacle connector (Figure 1, Item 2) and support (Figure 1, Item 8).
2. Remove three screws (Figure 1, Item 5), lockwashers (Figure 1, Item 6) and washers (Figure 1, Item 7) from support (Figure 1, Item 8) and headlight body (Figure 1, Item 1). Discard lockwashers.
3. Gently take support (Figure 1, Item 8) off body (Figure 1, Item 1) while pushing connector (Figure 1, Item 2) through hole (Figure 1, Item 4) in support (Figure 1, Item 8).
4. Remove gasket (Figure 1, Item 3) from support (Figure 1, Item 8) and body (Figure 1, Item 1). Discard gasket.

**WARNING**

- Cleaning solvent is combustible. Wear protective goggles and gloves; use only in a 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 cleaning solvent; the flashpoint is 144°F (62°C). Failure to follow this warning may result in injury or death to personnel. A fire extinguisher will be kept nearby when the solvent is used.
  - 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 them with water and get immediate medical attention.
  - When cleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.
5. Clean off any gasket material from body (Figure 1, Item 1) with solvent, wire brush, and rag.

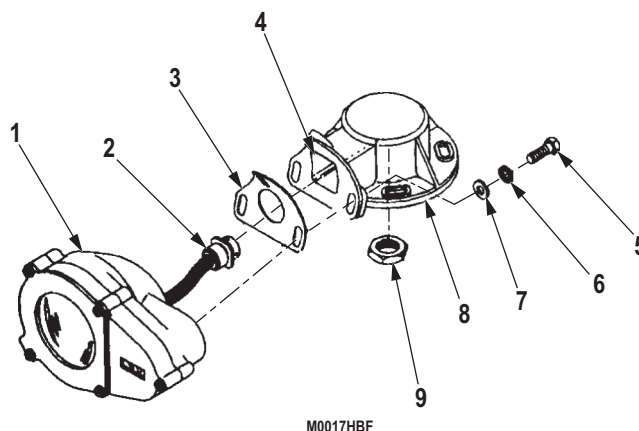


Figure 1. Headlight Support Removal.

**END OF TASK**



**INSTALLATION**

1. Apply sealant adhesive on new gasket (Figure 2, Item 3) with acid swabbing brush. Position gasket (Figure 2, Item 3) on support (Figure 2, Item 8).
2. Feed connector (Figure 2, Item 2) through hole (Figure 2, Item 4) in support (Figure 2, Item 8). Install jam nut (Figure 2, Item 9) to connector (Figure 2, Item 2).
3. Position body (Figure 2, Item 1) on support (Figure 2, Item 8). Install three screws (Figure 2, Item 5), new lockwashers (Figure 2, Item 6), and washers (Figure 2, Item 7) to support (Figure 2, Item 8) and body (Figure 2, Item 1).

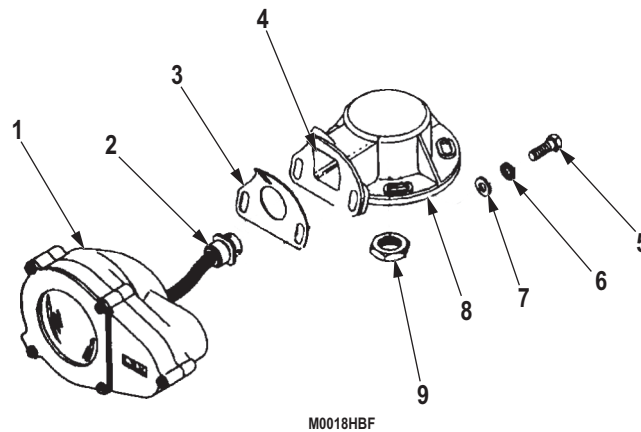


Figure 2. Headlight Support Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install left or right headlight assembly (WP 0030).
2. Connect negative battery cable (TM 5-2350-262-20).
3. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**



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**FIELD MAINTENANCE**  
**APRON AND DOZER ASSEMBLY REPLACEMENT AND REPAIR**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Chain Assembly (WP 0071, Table 1, Item 2)  
Lifting Device, Minimum Capacity 2,994 lb  
(1337 kg)  
Wood Blocks  
Wrench, Torque, Click, Ratcheting, 3/8 in.  
Drive (75 ft-lb) (WP 0071, Table 1, Item 13)  
Wrench, Torque, 3/4 in. Drive, Ratcheting  
(250 ft-lb) (WP 0071, Table 1, Item 12)  
Wrench, Torque, 1/2 in. Drive, Ratcheting  
(600 ft-lb) (WP 0071, Table 1, Item 11)

**Materials/Parts**

Adhesive (WP 0070, Table 1, Item 1)  
Grease, Automotive and Artillery (GAA)  
(WP 0070, Table 1, Item 13, 14, 15, 16, 17)  
Lubricating Oil, Engine  
(WP 0070, Table 1, Item 18, 19, 20)  
Sealing Compound (WP 0070, Table 1, Item 26)  
Bolt, Machine (WP 0057, Figure 12, Item 15)  
Qty: 6  
Bolt, Machine (WP 0057, Figure 12, Item 8)  
Qty: 6

**Materials/Parts (cont.)**

Nut, Self-Locking (WP 0057, Figure 12, Item 45)  
Qty: 7  
Nut, Self-Locking (WP 0057, Figure 12, Item 19)  
Qty: 2  
Nut, Self-Locking (WP 0057, Figure 12, Item 27)  
Qty: 2  
Washer, Lock (WP 0057, Figure 12, Item 11)  
Qty: 4

**Personnel Required**

Construction Equipment Repairer, 91L (Two)

**References**

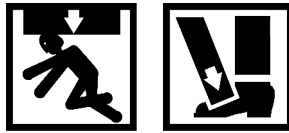
TM 9-237  
WP 0030  
WP 0037

**Equipment Condition**

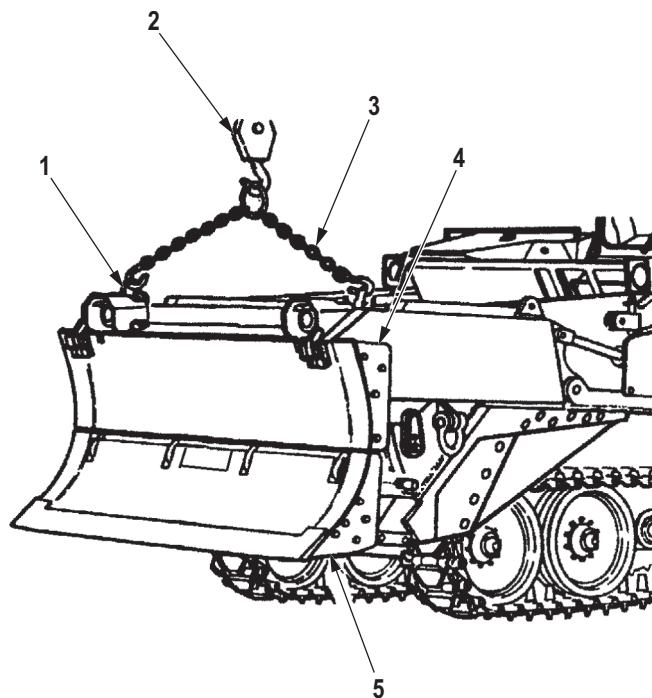
Front of vehicle blocked (TM 5-2350-262-20)  
Apron cylinder armor removed  
(TM 5-2350-262-20)

## REMOVAL

## WARNING



- Lifting device must have a weight capacity greater than 2,944 lb (1,337 kg).
  - Do not stand or work under apron and dozer assembly unless apron lockpins are installed. Failure to comply may result in severe injury or death to personnel.
1. Fold and lock dozer blade into travel mode before connecting chain (Figure 1, Item 3) and lifting device (Figure 1, Item 2) to lifting eye shackles (Figure 1, Item 1) of apron and dozer assembly (Figure 1, Item 4). Raise apron and dozer assembly about 6 in. (15 cm) and support with blocks under dozer blade (Figure 1, Item 5).



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*Figure 1. Support Blocks Removal.*

**REMOVAL - Continued****WARNING**

Do not lift apron and dozer assembly with dozer blade installed unless dozer lockpins are installed. Failure to comply may result in severe injury or death to personnel.

**NOTE**

Ensure lower apron lockpins are in the stowed position.

2. If dozer blade (Figure 2, Item 1) has not been removed, connect a chain between lifting device and shackle (Figure 2, Item 2) at back side of dozer blade (Figure 2, Item 1). Tighten chain enough to remove slack.

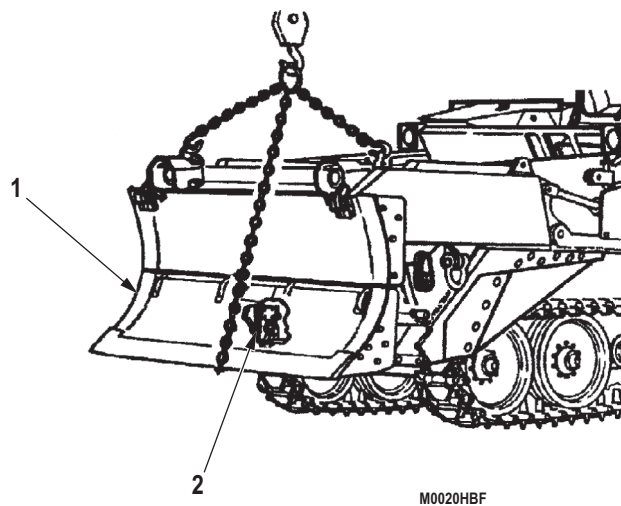
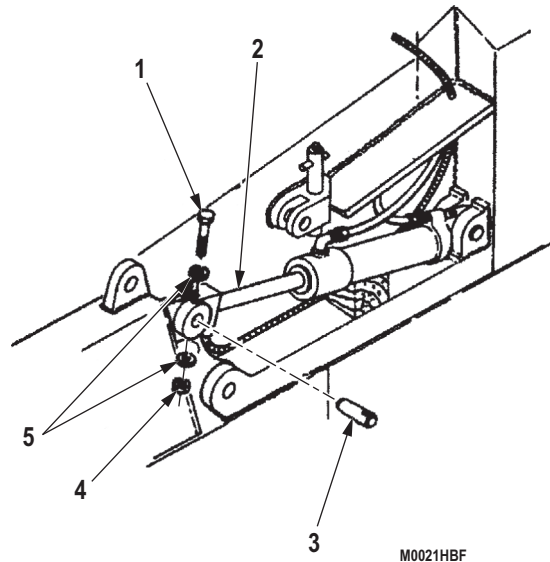


Figure 2. Blade Removal.

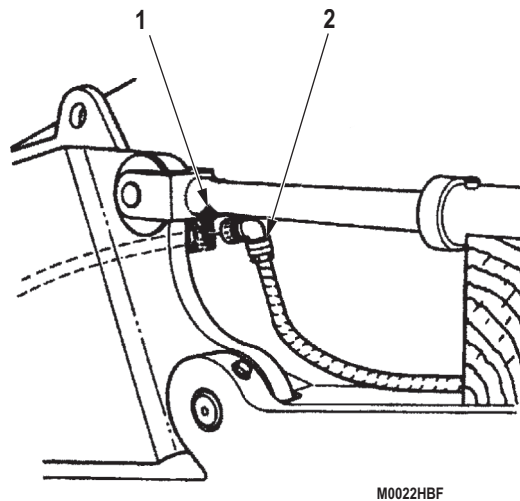
**REMOVAL - Continued**

3. Support apron hydraulic cylinders (Figure 3, Item 2) with blocks, and remove screw (Figure 3, Item 1), nut (Figure 3, Item 4), two washers (Figure 3, Item 5), and pin (Figure 3, Item 3) from each side of vehicle.



*Figure 3. Hydraulic Cylinders Removal.*

4. Disconnect headlight intermediate wiring harness cannon plug (Figure 4, Item 2) from apron wiring harness receptacle (Figure 4, Item 1) on left side of vehicle.



*Figure 4. Intermediate Headlight Wiring Harness Removal.*

**REMOVAL - Continued**

5. Remove locknut (Figure 5, Item 4), screw (Figure 5, Item 2), and pivot pin (Figure 5, Item 3) from each side of vehicle. Discard locknuts.

**WARNING**

Personnel must stand clear during lifting operations. A swinging or shifting load may result in injury to personnel.

6. Lift apron and dozer assembly (Figure 5, Item 1) up and away from vehicle. Place apron and dozer assembly (Figure 5, Item 1) on blocks on level surface.

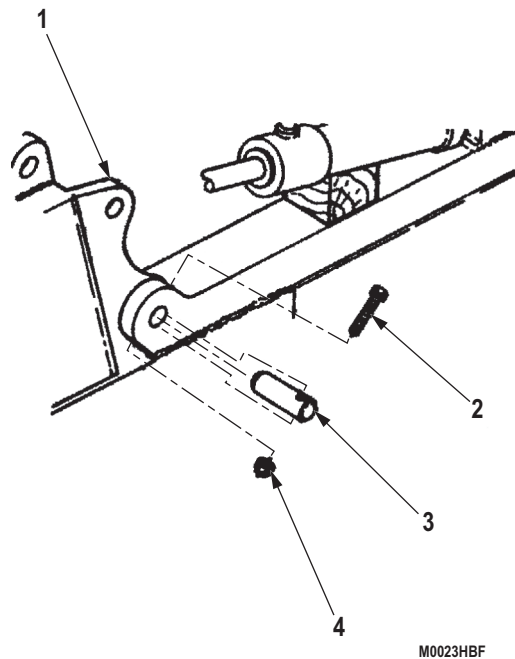


Figure 5. *Lifting Apron and Dozer Assembly Removal.*

**END OF TASK**

**DISASSEMBLY****NOTE**

- If complete disassembly of the apron and dozer assembly is necessary, follow Steps (1) through (6).
- For disassembly of the apron and dozer assembly, follow Steps (7) through (13).

1. Disassemble headlight assembly (WP 0030).
2. Disassemble cutting edges:

**WARNING**

Do not work under vehicle unless hull is blocked and apron lockpins are installed. Failure to comply may result in severe injury or death to personnel.

- a. Loosen two hex nuts (Figure 6, Item 10) on screws (Figure 6, Item 1) at dozer cutting edge (Figure 6, Item 4).
- b. Remove sixteen nuts (Figure 6, Item 13), washers (Figure 6, Item 2), and screws (Figure 6, Item 3) from dozer cutting edge (Figure 6, Item 4) and dozer blade (Figure 6, Item 5).
- c. Loosen four hex nuts (Figure 6, Item 8) on screws (Figure 6, Item 11) at dozer extension end bit (Figure 6, Item 9).
- d. Unfold dozer blade (Figure 6, Item 5).
- e. Remove two hex nuts (Figure 6, Item 10), washers (Figure 6, Item 12), screws (Figure 6, Item 1), and dozer cutting edge (Figure 6, Item 4) from dozer blade (Figure 6, Item 5).
- f. Remove four hex nuts (Figure 6, Item 8), washers (Figure 6, Item 7), screws (Figure 6, Item 11), and dozer extension end bit (Figure 6, Item 9) from dozer extension (Figure 6, Item 6).



## DISASSEMBLY - Continued

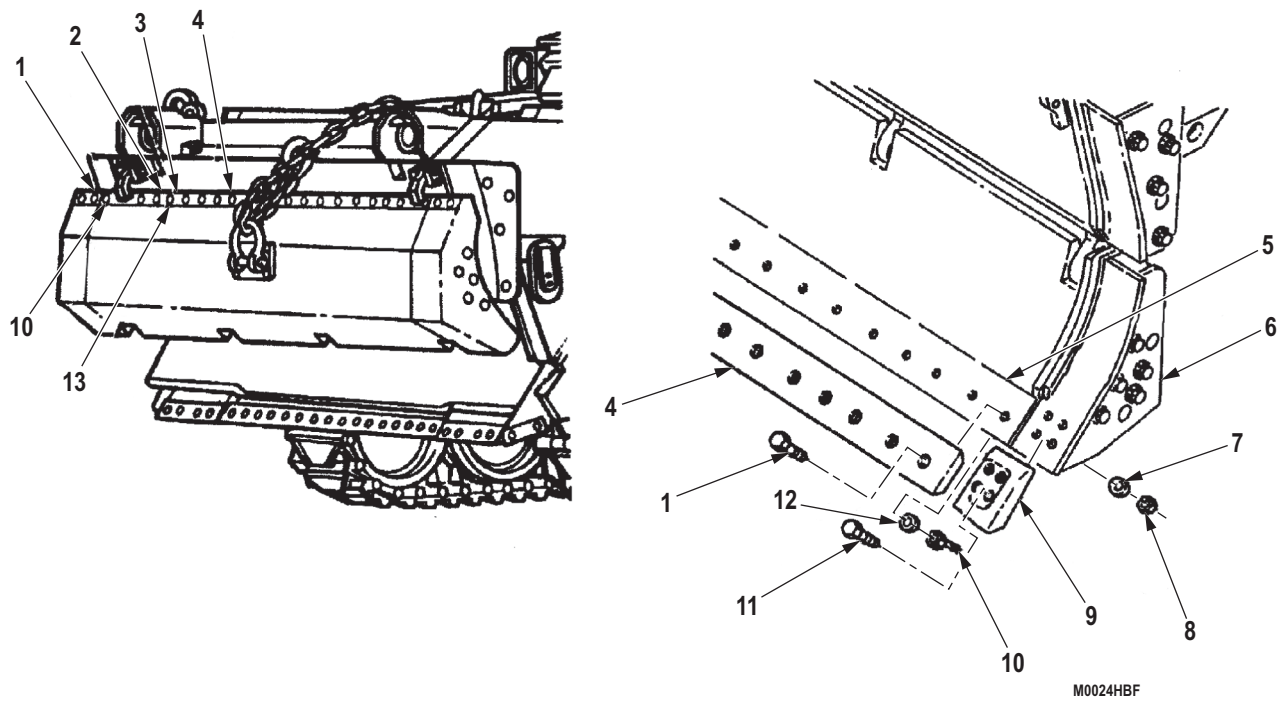
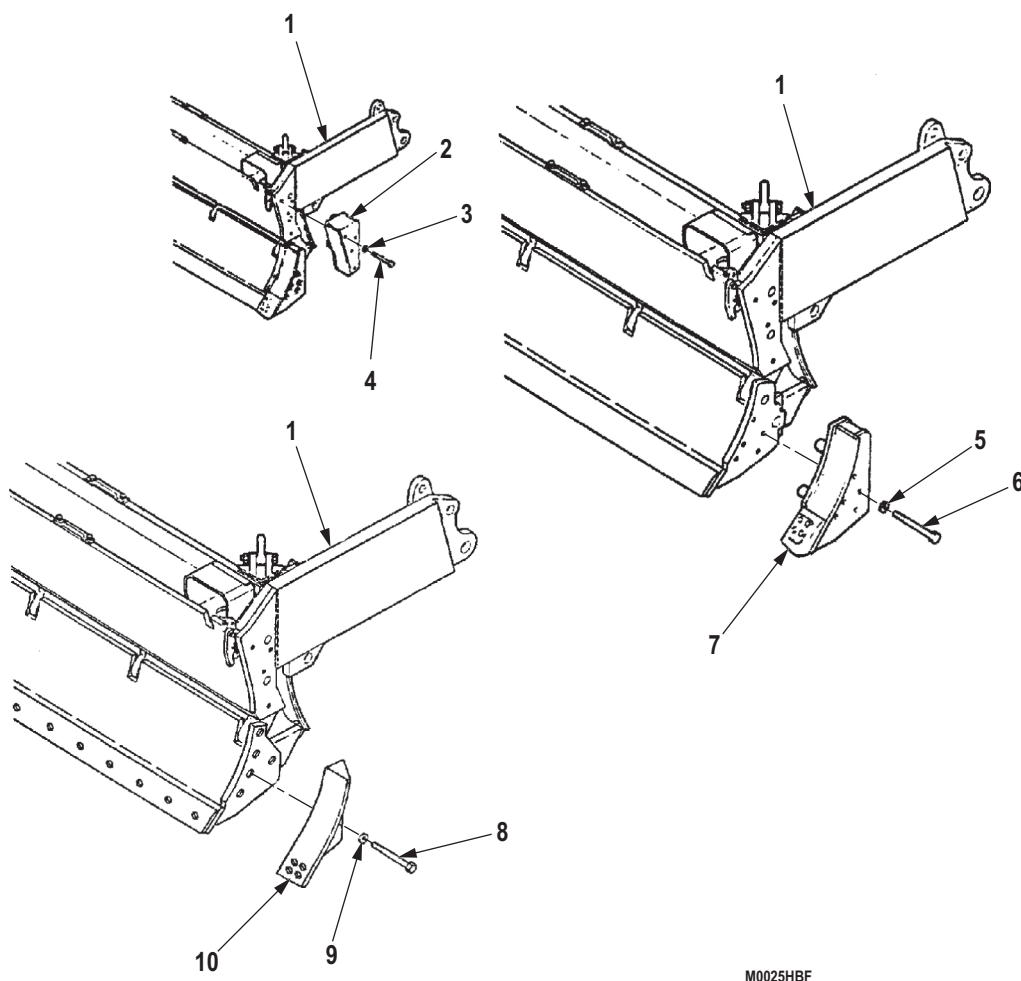


Figure 6. Cutting Edges Disassembly.

**DISASSEMBLY - Continued**

## 3. Disassemble extensions:

- a. Remove four screws (Figure 7, Item 4), washers (Figure 7, Item 3), and apron extension (Figure 7, Item 2) from each side of apron and dozer assembly (Figure 7, Item 1). Pry or hammer extension (Figure 7, Item 2) to loosen from each side of apron and dozer assembly (Figure 7, Item 1).
- b. Remove five screws (Figure 7, Item 6), washers (Figure 7, Item 5), and dozer extension (Figure 7, Item 7) from each side of apron and dozer assembly (Figure 7, Item 1). Pry or hammer to loosen extension (Figure 7, Item 7) from each side of apron and dozer assembly (Figure 7, Item 1).
- c. Remove three screws (Figure 7, Item 8), washers (Figure 7, Item 9), and dozer extension (Figure 7, Item 10) from each side of apron and dozer assembly (Figure 7, Item 1). Pry or hammer to loosen extension (Figure 7, Item 10) from apron and dozer assembly (Figure 7, Item 1).

*Figure 7. Extension Disassembly.*

**DISASSEMBLY - Continued**

4. Disassemble apron wear plates and side seals:

Remove twenty-one screws (Figure 8, Item 3), two wear plates (Figure 8, Item 2), and wear plate (Figure 8, Item 4) from apron (Figure 8, Item 1).

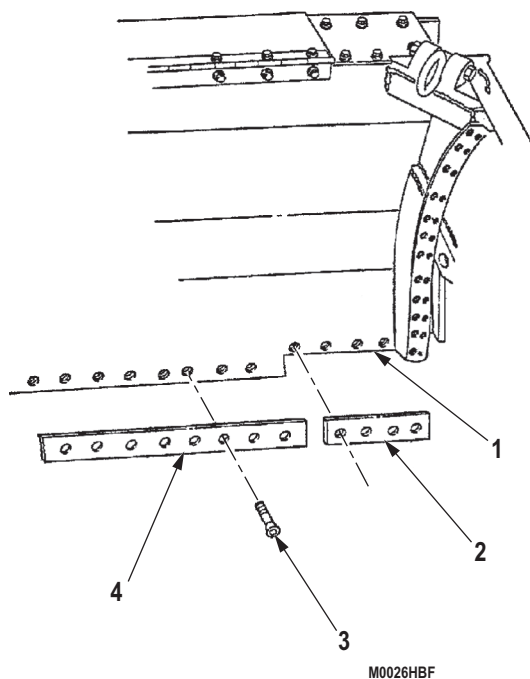
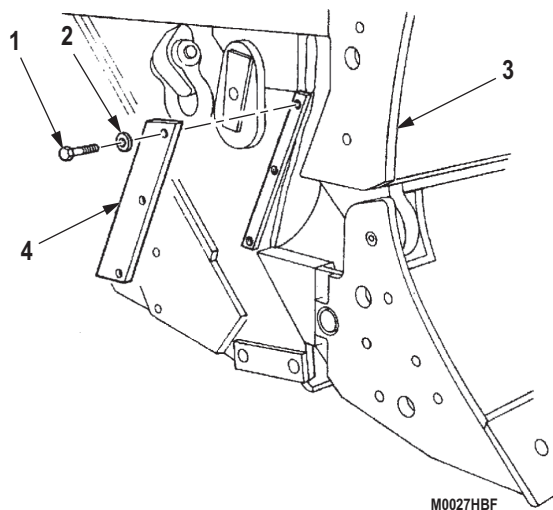


Figure 8. Apron Wear Plates and Side Seals.

**DISASSEMBLY - Continued**

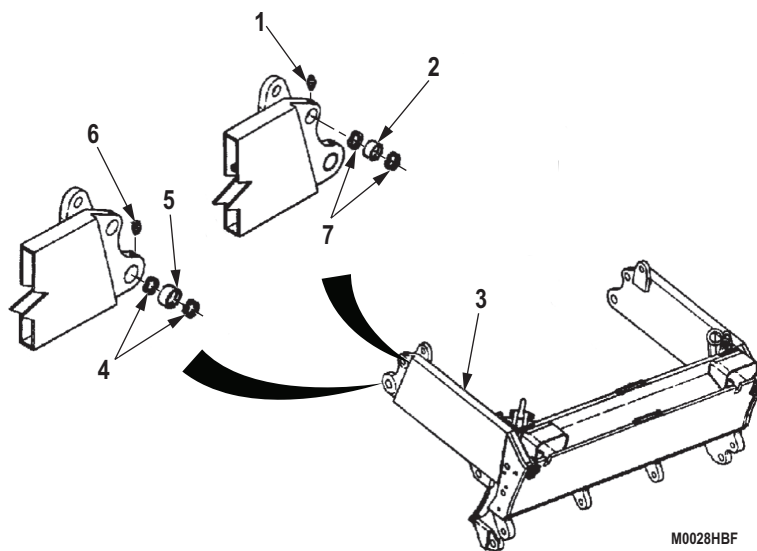
## 5. Disassemble apron strips:

Remove three machine bolts (Figure 9, Item 1), washers (Figure 9, Item 2), and apron strip (Figure 9, Item 4) from apron and dozer assembly (Figure 9, Item 3). Discard machine bolts.



*Figure 9. Apron Strip Disassembly.*

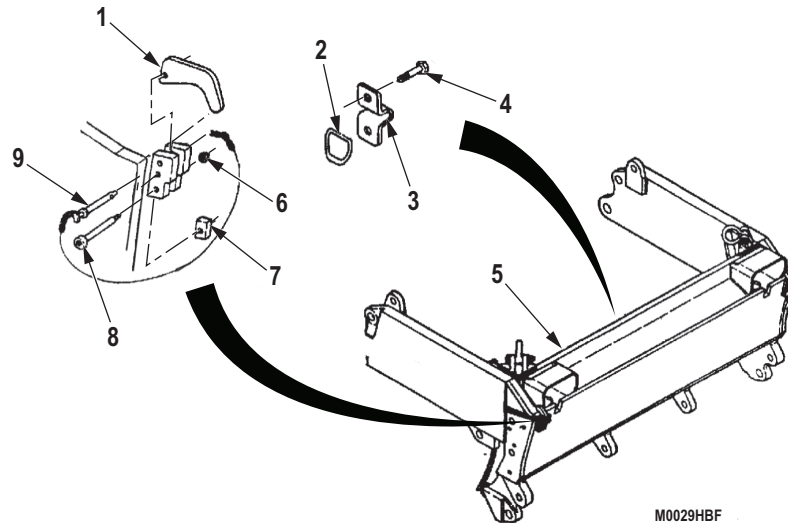
6. Disassemble dozer blade (WP 0037).
7. Remove two retaining rings (Figure 10, Item 7), bearing (Figure 10, Item 2), and lubrication fitting (Figure 10, Item 1) from each side of apron (Figure 10, Item 3).
8. Remove two retaining rings (Figure 10, Item 4), bearing (Figure 10, Item 5), and lubrication fitting (Figure 10, Item 6) from each side of apron (Figure 10, Item 3).



*Figure 10. Apron Retaining Rings Disassembly.*

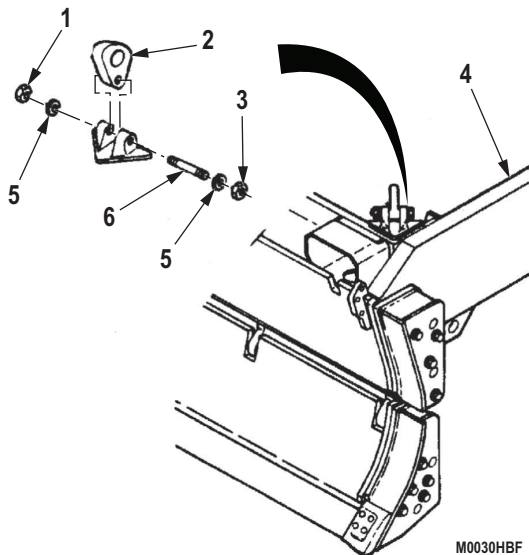
**DISASSEMBLY - Continued**

9. Remove locknut (Figure 11, Item 6), screw (Figure 11, Item 8), and stop (Figure 11, Item 7) from each side of apron (Figure 11, Item 5). Discard locknut.
10. Remove lockpin assembly (Figure 11, Item 9) and latch (Figure 11, Item 1) from each side of apron (Figure 11, Item 5).
11. Remove six machine bolts (Figure 11, Item 4), three straps (Figure 11, Item 3), and three rings (Figure 11, Item 2) from rear of apron (Figure 11, Item 5). Discard machine bolts.



*Figure 11. Apron Disassembly.*

12. Remove locknut (Figure 12, Item 1), nut (Figure 12, Item 3), two washers (Figure 12, Item 5), stud (Figure 12, Item 6), and lifting eye shackle (Figure 12, Item 2) from each side of apron (Figure 12, Item 4). Discard locknut.



*Figure 12. Lifting Eye and Apron Disassembly.*

**DISASSEMBLY - Continued****NOTE**

Dozer blade must be removed from apron (WP 0037) before replacing bushings.

13. Using hammer and drift, drive out two outer bushings (Figure 13, Item 2) and two inner bushings (Figure 13, Item 3) from apron (Figure 13, Item 1).

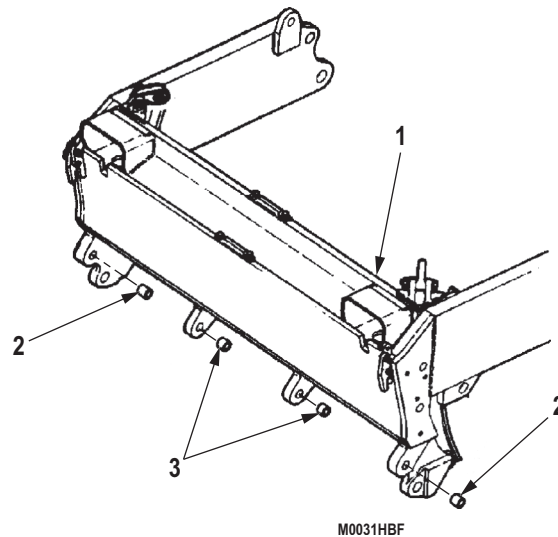


Figure 13. Inner Bushings from Apron Disassembly.

**END OF TASK****REPAIR**

1. Repair apron and dozer assembly by replacing damaged or worn parts and by using general repair methods. If authorized, weld (TM 9-237) and straighten.
2. Bond rubber pad (Figure 14, Item 1) to plate (Figure 14, Item 2) with adhesive.

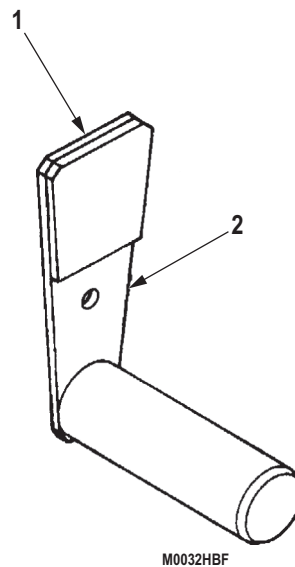
**REPAIR - Continued**

Figure 14. Rubber Pad and Plate Repair.

**END OF TASK****ASSEMBLY**

1. Using hammer and soft drift or wood dowel, install two outer bushings (Figure 15, Item 1) and two inner bushings (Figure 15, Item 2) on apron (Figure 15, Item 3). Coat inside of bushings (Figure 15, Items 1 and 2) with Grease, Automotive and Artillery (GAA).

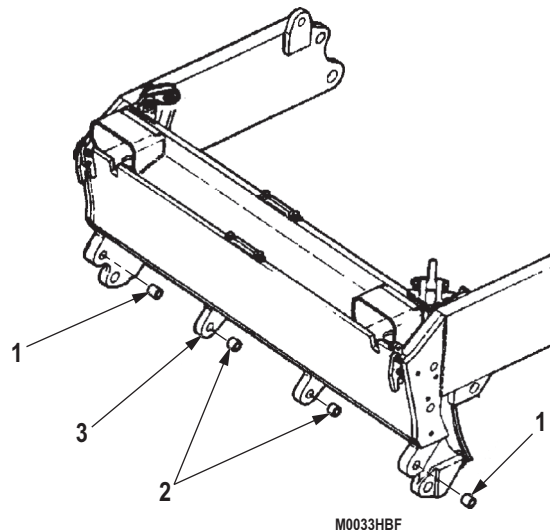


Figure 15. Installation of Bushings onto Apron Assembly.

**ASSEMBLY - Continued**

2. Install two bushings (Figure 16, Item 2), four retaining rings (Figure 16, Item 3), and two lubrication fittings (Figure 16, Item 1) on each side of apron (Figure 16, Item 7). Coat inside of bearings (Figure 16, Item 2) with grease and apply grease to lubrication fittings (Figure 16, Item 1).

**NOTE**

Step (3) should be performed only if plugs are missing.

3. Coat threads of two plugs (Figure 16, Item 14) with sealing compound, and install two plugs (Figure 16, Item 14) on apron (Figure 16, Item 7).

**NOTE**

- If ripper blade is to be folded, perform Step (4).
  - If ripper blade is unfolded, perform Step (5).
4. Install latch (Figure 16, Item 8) on each side of apron (Figure 16, Item 7) with pin assembly (Figure 16, Item 13) and linchpin (Figure 16, Item 9).
  5. Install latch (Figure 16, Item 8) (facing in) on each side of apron (Figure 16, Item 7) with pin assembly (Figure 16, Item 13) and linchpin (Figure 16, Item 9).

**NOTE**

- For ripper blade application, install stop with words "ripper blade" facing out.
  - For cutting edge application, install stop with words "standard blade" facing out.
6. Install stop (Figure 16, Item 11) on each side of apron (Figure 16, Item 7) with screw (Figure 16, Item 12) and locknut (Figure 16, Item 10).
  7. Install three rings (Figure 16, Item 6) on rear of apron (Figure 16, Item 7) with three straps (Figure 16, Item 5) and six new machine bolts (Figure 16, Item 4).



## ASSEMBLY - Continued

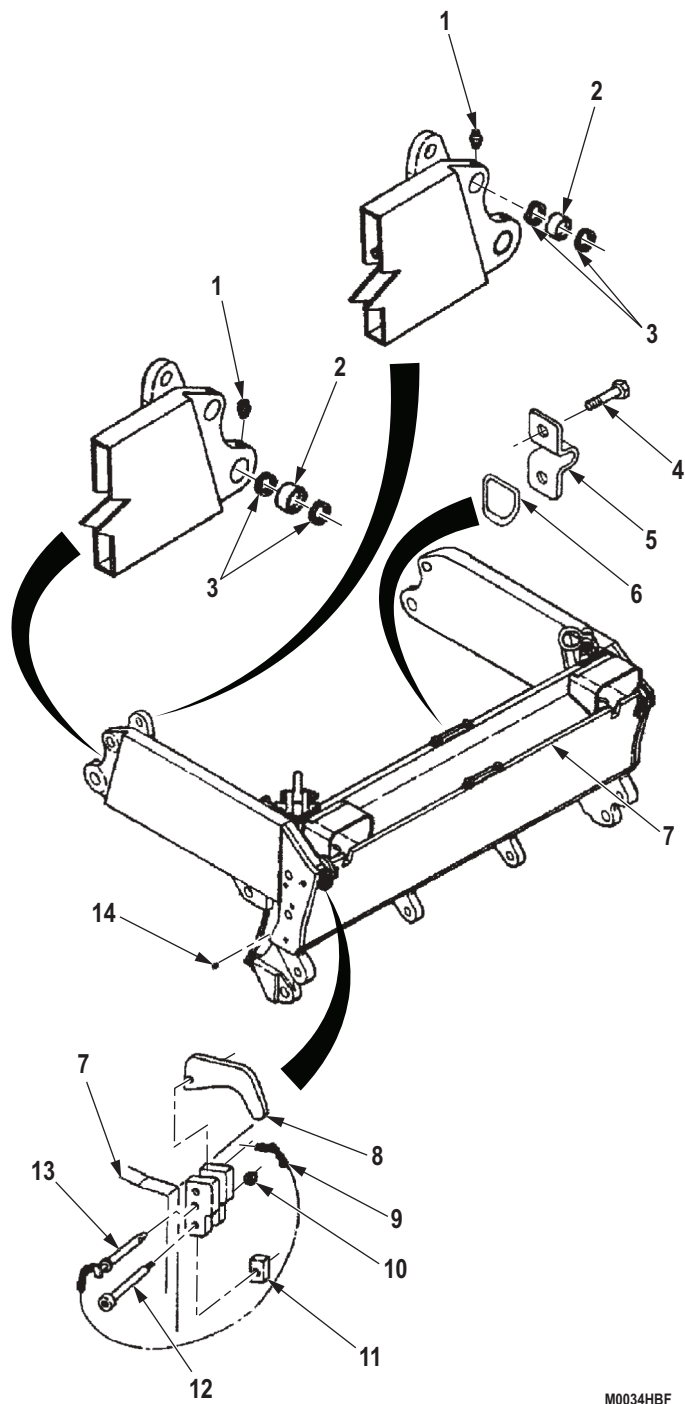


Figure 16. Ripper Blade and Apron Assembly.

## ASSEMBLY - Continued

8. Coat short threaded end of two studs (Figure 17, Item 5) with sealing compound, and install washer (Figure 17, Item 3) and nut (Figure 17, Item 4) on each stud (Figure 17, Item 5).
9. Install lift eye shackle (Figure 17, Item 2) on each side of apron (Figure 17, Item 1) with studs (Figure 17, Item 5) from outboard side of bracket.
10. Coat long threaded end of two studs (Figure 17, Item 5) with engine lubricating oil and install washer (Figure 17, Item 6) and new locknut (Figure 17, Item 7) on each stud (Figure 17, Item 5). Tighten locknuts (Figure 17, Item 7) to 83-91 lb-ft (113-123 N·m).

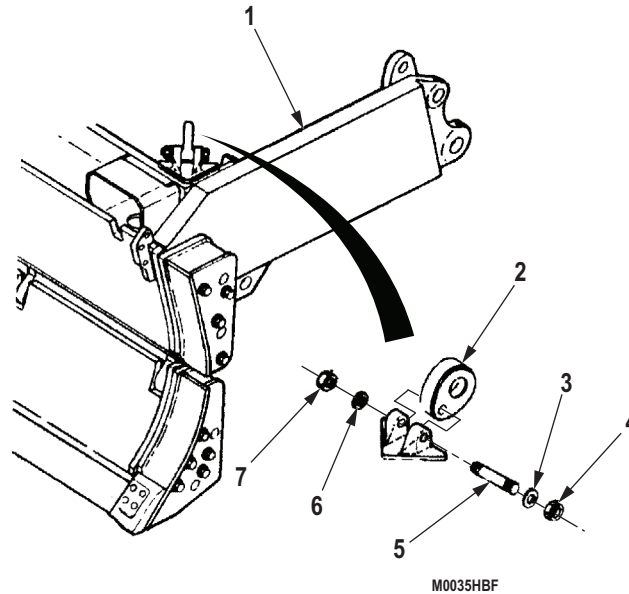


Figure 17. Installation of Studs onto Apron Assembly.

### NOTE

Refer to the following pages and install the components and assemblies on the apron and dozer assembly.

11. Assemble headlight assembly (WP 0030).
12. Assemble cutting edges:

### NOTE

Coat threads of screws with lubricating oil prior to installation.

- a. Install dozer extension end bit (Figure 18, Item 5) on dozer extension (Figure 18, Item 2) with four screws (Figure 18, Item 11), washers (Figure 18, Item 3), and new locknuts (Figure 18, Item 4).
- b. Install dozer cutting edge (Figure 18, Item 13) on dozer blade (Figure 18, Item 1) with screw (Figure 18, Item 12), washer (Figure 18, Item 10), and new locknut (Figure 18, Item 9) on each end.
- c. Fold dozer blade (Figure 18, Item 1).
- d. Install sixteen screws (Figure 18, Item 8), washers (Figure 18, Item 7), and new locknuts (Figure 18, Item 6) on dozer cutting edge (Figure 18, Item 13) and dozer blade (Figure 18, Item 1).
- e. Tighten locknuts (Figure 18, Items 4, 6, and 9) to 280 lb-ft (379 N·m).

## ASSEMBLY - Continued

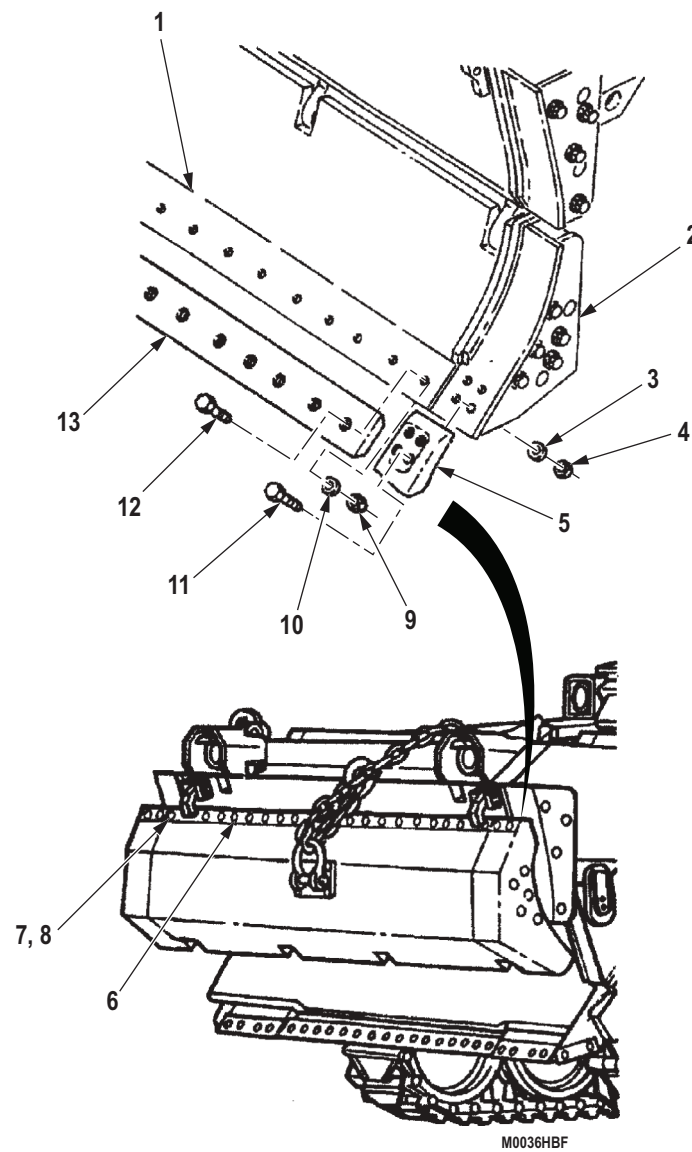


Figure 18. Cutting Edges Assembly.

**ASSEMBLY - Continued**

## 13. Assemble extensions:

**NOTE**

New production vehicles are equipped with a steel dozer blade and dozer blade extension. Go to Step (c) for steel dozer blade extensions.

- a. Align dowels (Figure 19, Item 2) with holes in each side of apron and dozer assembly (Figure 19, Item 1). Seat apron extensions (Figure 19, Item 3) and dozer extensions (Figure 19, Item 4) with hammer and wood block.

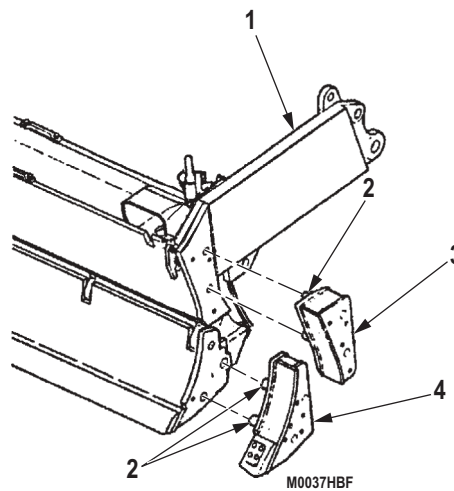
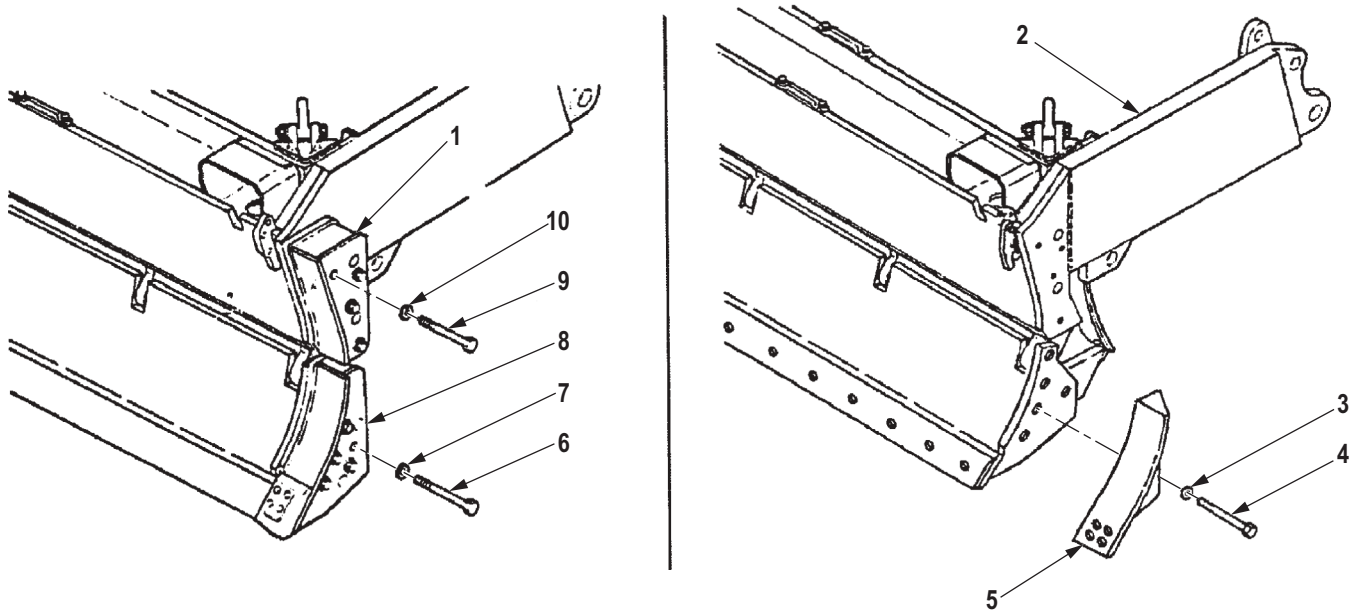


Figure 19. Apron and Dozer Extensions Assembly.

**ASSEMBLY - Continued****NOTE**

Apply lubricating oil to threads of screws prior to installation.

- b. Install four washers (Figure 20, Item 10) and screws (Figure 20, Item 9) in each apron extension (Figure 20, Item 1); install five washers (Figure 20, Item 7) and screws (Figure 20, Item 6) in each dozer extension (Figure 20, Item 8). Tighten screws (Figure 20, Items 6 and 9) to 240 lb-ft (325 N·m).
- c. Align dozer extension (Figure 20, Item 5) with apron and dozer assembly (Figure 20, Item 2) and secure with three new lockwashers (Figure 20, Item 3) and screws (Figure 20, Item 4). Tighten screws (Figure 20, Item 4) to 280 lb-ft (380 N·m).



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Figure 20. Alignment of Apron and Dozer Assembly.

**ASSEMBLY - Continued**

14. Assemble apron wear plates and side seals:

**NOTE**

Apply lubricating oil to threads of screws prior to installation.

Install two wear plates (Figure 21, Item 2) and wear plate (Figure 21, Item 4) on apron (Figure 21, Item 1) with twenty-one screws (Figure 21, Item 3).

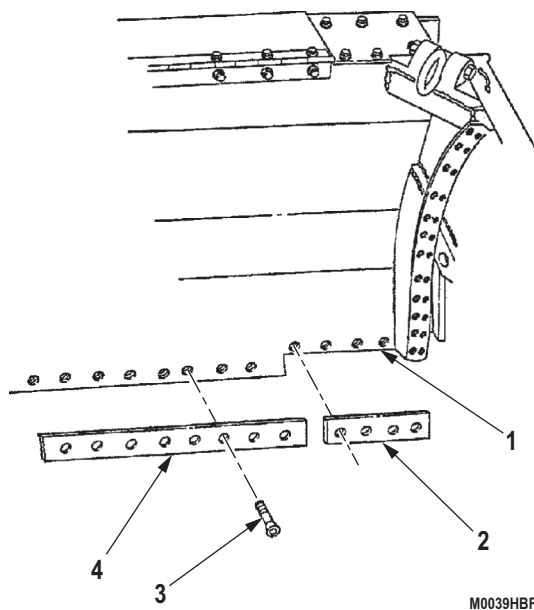


Figure 21. Apron Wear Plates and Side Seals Assembly.

**ASSEMBLY - Continued**

15. Assemble apron strips:

**NOTE**

Apply lubricating oil to threads of screws prior to installation.

- a. Install apron strip (Figure 22, Item 4) on apron and dozer assembly (Figure 22, Item 3) with three washers (Figure 22, Item 2) and new machine bolts (Figure 22, Item 1).
- b. Tighten machine bolts (Figure 22, Item 1) to 39-41 lb-ft (53-56 N·m).

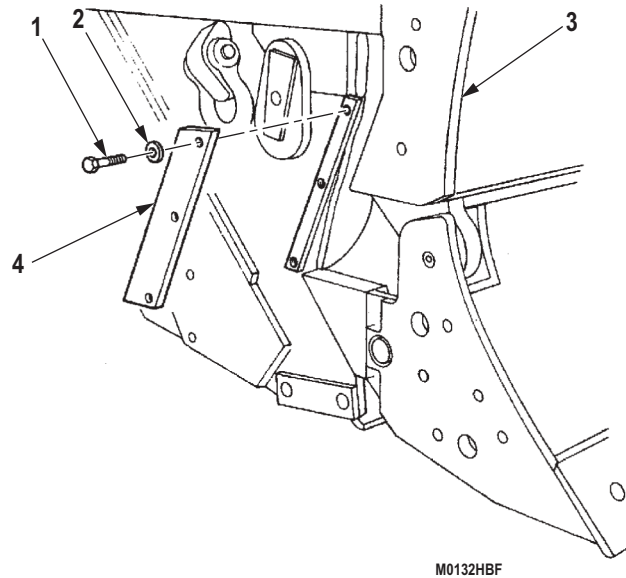


Figure 22. Apron Strips Assembly.

16. Assemble dozer blade (WP 0037).

**END OF TASK**

## INSTALLATION

## WARNING



- Do not stand or work under apron and dozer assembly unless apron lockpins are installed. Failure to comply may result in severe injury or death to personnel.
  - Do not lift apron and dozer assembly with dozer blade installed unless dozer lockpins are installed. Failure to comply may result in severe injury or death to personnel.
  - Lifting device must have a weight capacity greater than 2,944 lb (1,337 kg).
  - Personnel must stand clear during lifting operations. A swinging or shifting load may result in injury to personnel.
1. Connect chain (Figure 23, Item 2) and lifting device (Figure 23, Item 3) to lifting eye shackles (Figure 23, Item 1) of apron and dozer assembly (Figure 23, Item 4). If dozer blade (Figure 23, Item 5) is installed, connect a chain between lifting device and shackle (Figure 23, Item 6) at back side of dozer blade (Figure 23, Item 5). Tighten chain enough to remove slack.
  2. Lift apron and dozer assembly (Figure 23, Item 4) and position on vehicle.

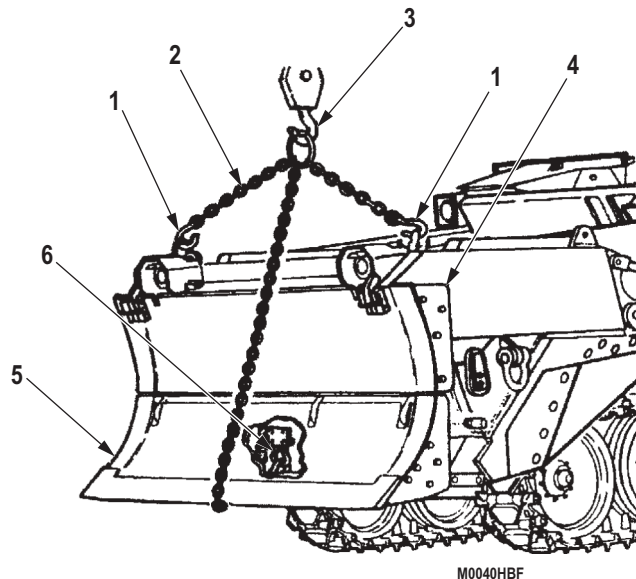


Figure 23. Apron and Dozer Assembly Installation.



## INSTALLATION - Continued

3. Coat two pivot pins (Figure 24, Item 3) with grease and install apron (Figure 24, Item 1) on hull with two pivot pins (Figure 24, Item 3).

### NOTE

Apply lubricating oil to threads of screws prior to installation.

4. Secure two pivot pins (Figure 24, Item 3) to hull with screws (Figure 24, Item 2) and new locknuts (Figure 24, Item 4). Tighten screws (Figure 24, Item 2) to 28-32 lb-ft (38-43 N·m).

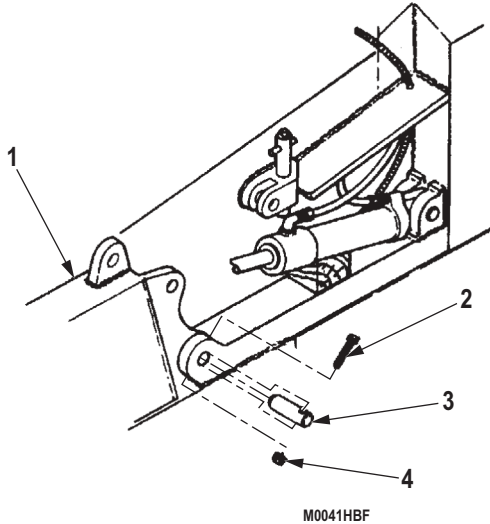


Figure 24. Installation of Apron onto Hull.

5. Coat apron hydraulic cylinder pins (Figure 25, Item 3) with grease and install two cylinders (Figure 25, Item 2) on apron (Figure 25, Item 6) with pins (Figure 25, Item 3), screws (Figure 25, Item 1), four washers (Figure 25, Item 5), and two nuts (Figure 25, Item 4). Remove chains from shackles. Remove blocks.

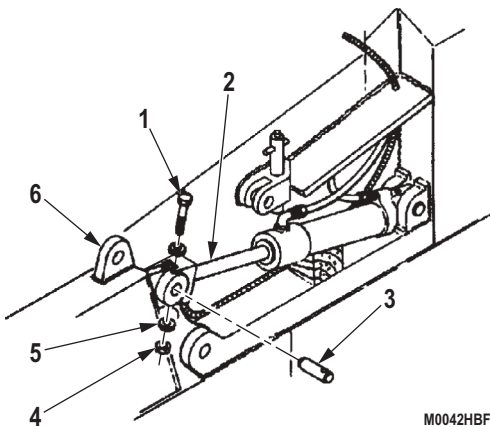


Figure 25. Hydraulic Cylinders Installation.

**INSTALLATION - Continued**

6. Connect headlight intermediate wiring harness cannon plug (Figure 26, Item 1) to apron wiring harness receptacle (Figure 26, Item 2).

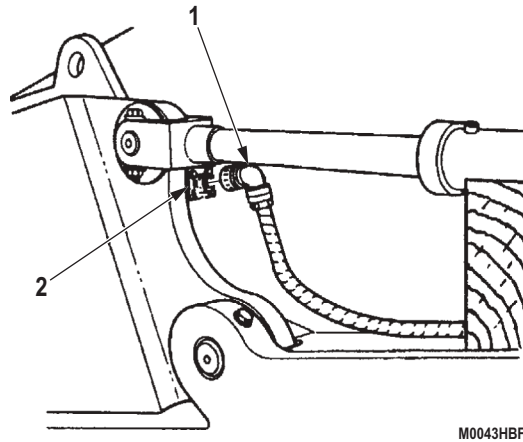


Figure 26. Headlight Intermediate Wiring Harness and Apron Wiring Harness Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install apron cylinder armor (TM 5-2350-262-20).
2. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**

## FIELD MAINTENANCE DOZER BLADE REPLACEMENT AND REPAIR

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Bolt, Eye (WP 0071, Table 1, Item 1)  
Chain Assembly (WP 0071, Table 1, Item 2)  
Lifting Device, Minimum Capacity 1,000 lb (454 kg)

#### Materials/Parts

Grease, Automotive and Artillery (GAA)  
(WP 0070, Table 1, Item 13, 14, 15, 16, 17)

#### Materials/Parts (cont.)

Nut, Self-Locking (WP 0057, Figure 12, Item 52)  
Qty: 2  
Washer, Lock (WP 0057, Figure 12, Item 54)  
Qty: 4

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

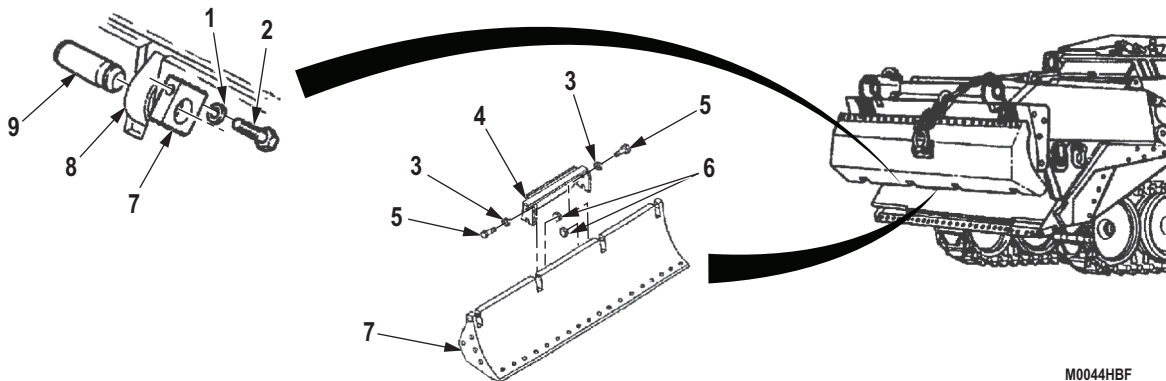
Front of vehicle blocked (TM 5-2350-262-20)  
Dozer blade folded (WP 0005)  
Dozer cutting edge removed or dozer blade  
extensions removed (TM 5-2350-262-20)

### REMOVAL

### NOTE

New production vehicles are equipped with a steel dozer blade which includes a cut-out and cover at top rear of dozer blade. Perform Step (1) if removing cover.

1. Remove two screws (Figure 1, Item 5), washers (Figure 1, Item 3), locknuts (Figure 1, Item 6), and cover (Figure 1, Item 4) from dozer blade (Figure 1, Item 7). Discard locknuts.
2. Remove two screws (Figure 1, Item 2) and washers (Figure 1, Item 1) from dozer blade (Figure 1, Item 7) and two inner pivot pins (Figure 1, Item 9).
3. Using hammer and brass drift, remove two inner pivot pins (Figure 1, Item 9) from dozer blade (Figure 1, Item 7) and apron (Figure 1, Item 8).



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Figure 1. Inner Pivot Pins Removal.

**REMOVAL - Continued****WARNING**

Lifting device must have a weight capacity greater than 585 lb (266 kg). Ensure dozer blade is securely supported before removing outer pivot pins. Failure to comply may result in severe injury to personnel.

4. Remove pin assembly (Figure 2, Item 3) and latch (Figure 2, Item 2) from each side of apron (Figure 2, Item 1).

**NOTE**

Supports for dozer blade should be about 18 in. (46 cm) high.

5. Remove screw (Figure 2, Item 7) and washer (Figure 2, Item 6) from both outer pivot pins (Figure 2, Item 4). Remove hull support blocks (Figure 2, Item 9) and lower dozer blade (Figure 2, Item 8) on support.
6. Use eyebolt (Figure 2, Item 5) to pull both outer pivot pins (Figure 2, Item 4). Remove dozer blade (Figure 2, Item 8) from apron (Figure 2, Item 1).

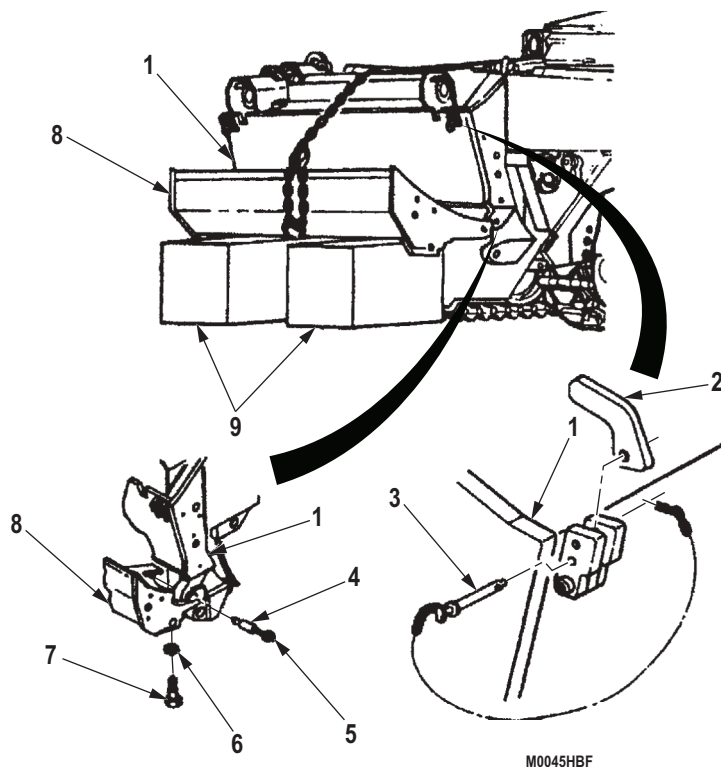


Figure 2. Outer Pivot Pins Removal.

**END OF TASK**

**DISASSEMBLY**

1. Remove four screws (Figure 3, Item 3), lockwashers (Figure 3, Item 2), and shackle (Figure 3, Item 4) from dozer blade (Figure 3, Item 5). Discard lockwashers.
2. Using hammer and soft drift, drive out eight bushings (Figure 3, Item 1) from inner and outer pivot points of dozer blade (Figure 3, Item 5).

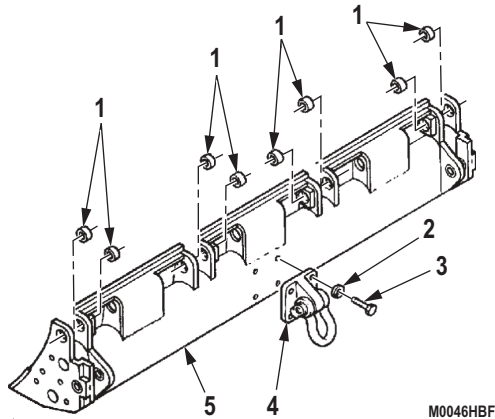


Figure 3. Shackle and Dozer Blade Disassembly.

**END OF TASK****ASSEMBLY**

1. Install eight bushings (Figure 4, Item 1) on inner and outer pivot points of dozer blade (Figure 4, Item 5).
2. Install shackle (Figure 4, Item 4) on dozer blade (Figure 4, Item 5) with four new lockwashers (Figure 4, Item 2) and screws (Figure 4, Item 3).

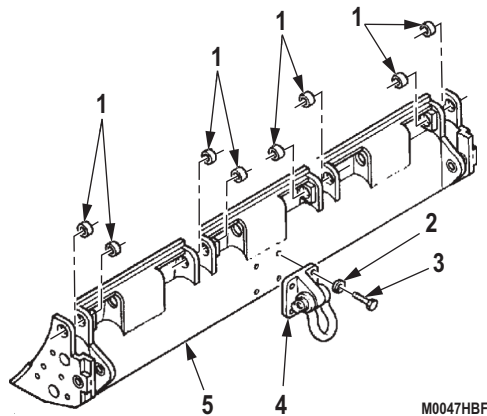


Figure 4. Shackle and Dozer Blade Assembly.

**END OF TASK**

## INSTALLATION

### NOTE

- New production vehicles are equipped with a steel dozer blade which includes a cut-out and cover at top rear of dozer blade. Perform Step (1) if installing cover.
- Install bushings on all pivot points of apron and dozer assembly if installing new dozer blade.

1. Connect chain (Figure 5, Item 2) to dozer blade (Figure 5, Item 5). Connect lifting device (Figure 5, Item 3) to chain (Figure 5, Item 2) and take up slack.

### WARNING



- Lifting device must have a weight capacity greater than 585 lb (266 kg). Ensure dozer blade is securely supported before installing outer pivot pins. Failure to comply may result in severe injury to personnel.
  - Personnel must stand clear during lifting operations. A swinging or shifting load may result in injury to personnel.
2. Place dozer blade (Figure 5, Item 5) on supports (Figure 5, Item 6) in front of vehicle, and align pivot points (Figure 5, Item 4) of apron (Figure 5, Item 1) and dozer blade (Figure 5, Item 5).

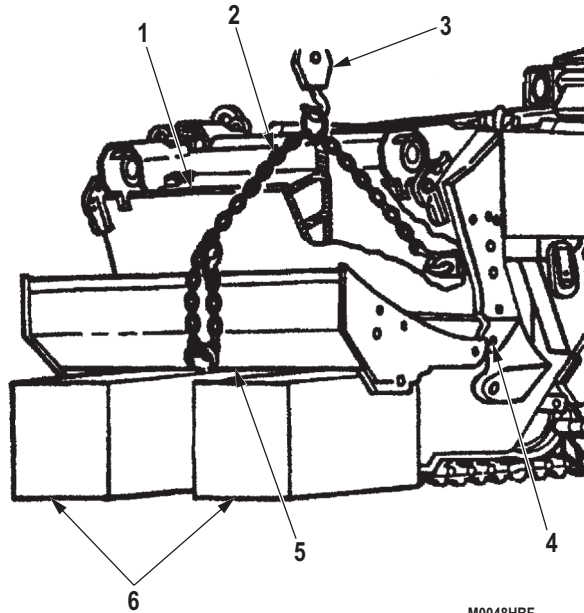
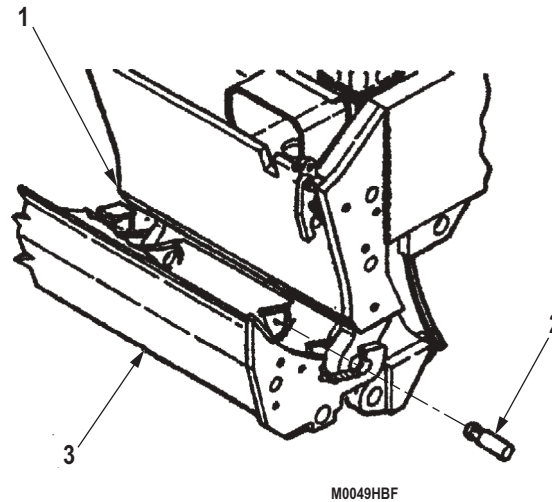


Figure 5. Pivot Points Installation.

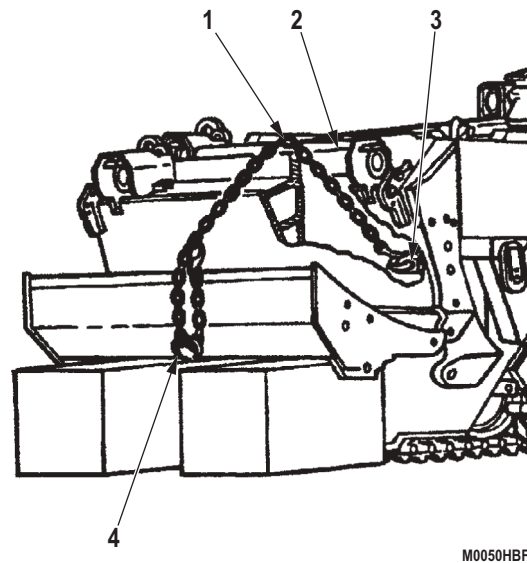
**INSTALLATION - Continued**

3. Coat two outer pivot pins (Figure 6, Item 2) with grease and install dozer blade (Figure 6, Item 3) on apron (Figure 6, Item 1) with outer pivot pins (Figure 6, Item 2).
4. Remove lifting device and chain.



*Figure 6. Dozer Blade Installation.*

5. Move ejector (Figure 7, Item 2) forward, and connect chain (Figure 7, Item 1) between shackle (Figure 7, Item 4) and eye (Figure 7, Item 3) on ejector (Figure 7, Item 2).



*Figure 7. Chain Connection.*

**INSTALLATION - Continued**

6. Retract ejector (Figure 8, Item 2) until dozer blade (Figure 8, Item 4) is folded against apron (Figure 8, Item 3).
7. Install pin assembly (Figure 8, Item 8) and latch (Figure 8, Item 1) on each side of apron (Figure 8, Item 3) and dozer blade (Figure 8, Item 4).
8. Install two washers (Figure 8, Item 7) and screws (Figure 8, Item 6) on dozer blade (Figure 8, Item 4) and outer pivot pins (Figure 8, Item 5).

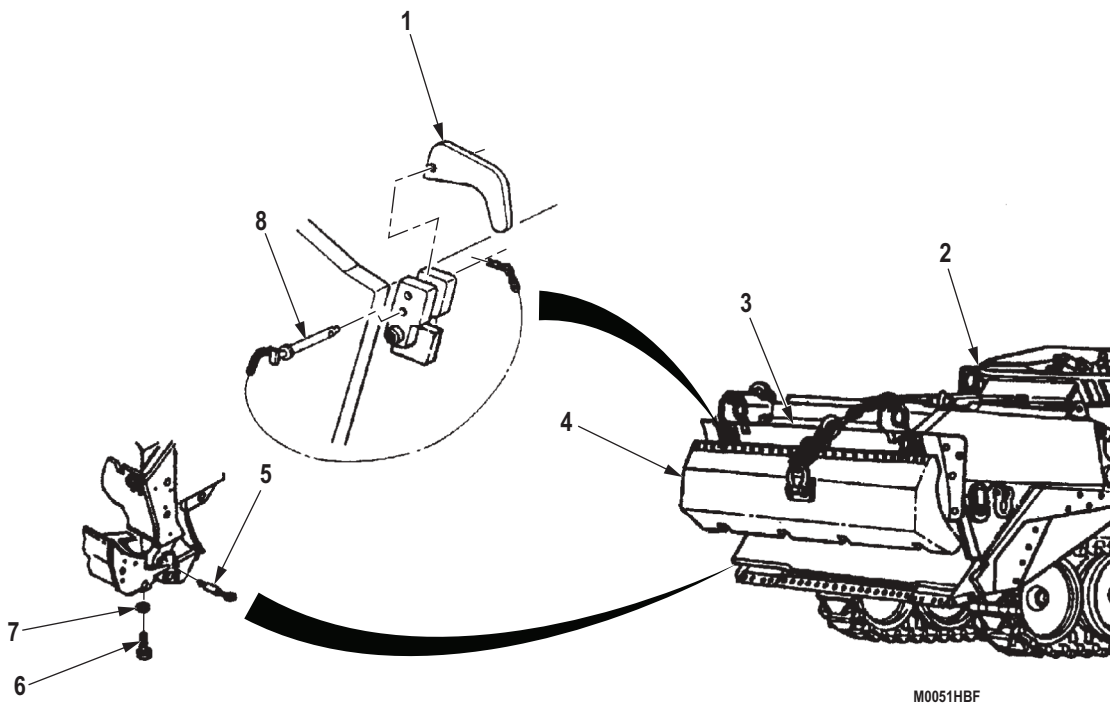
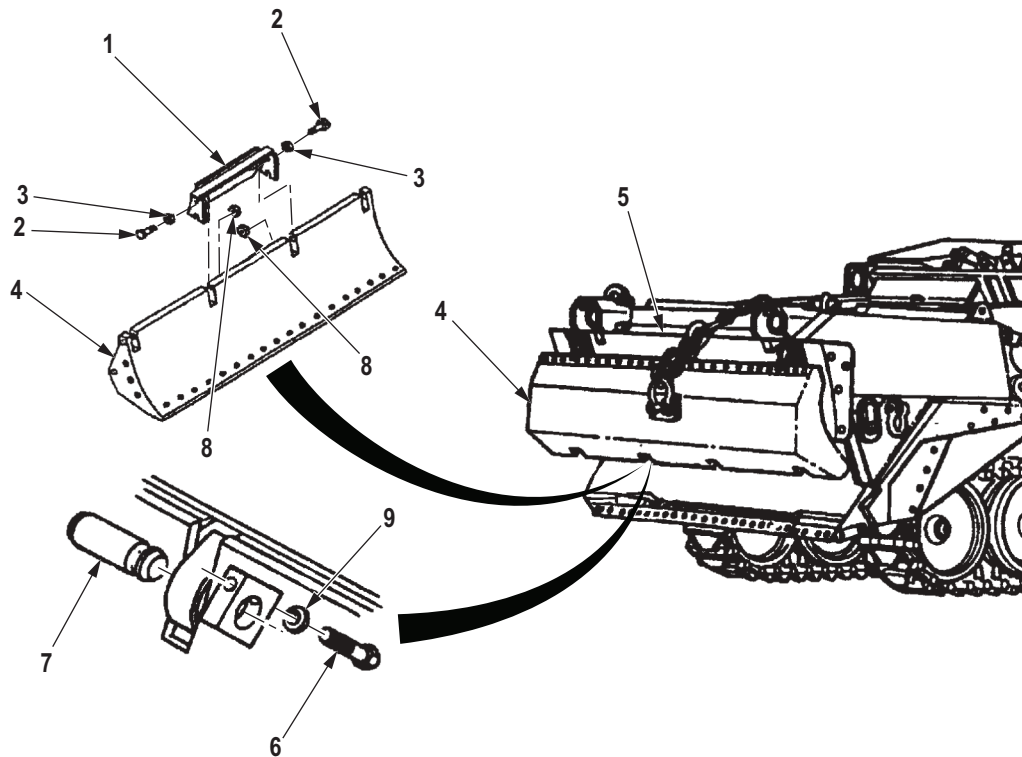


Figure 8. Dozer Blade and Pin Assembly Installation.



**INSTALLATION - Continued**

9. Coat two inner pivot pins (Figure 9, Item 7) with grease and install inner pivot pins (Figure 9, Item 7) on apron (Figure 9, Item 5) and dozer blade (Figure 9, Item 4) with two washers (Figure 9, Item 9) and screws (Figure 9, Item 6).
10. Align cover (Figure 9, Item 1) on dozer blade (Figure 9, Item 4) and secure with two screws (Figure 9, Item 2), washers (Figure 9, Item 3), and new locknuts (Figure 9, Item 8).



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*Figure 9. Inner Pivot Pins Installation.***END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install dozer blade extensions or dozer cutting edge (TM 5-2350-262-20).
2. Unblock front of vehicle (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**



## FIELD MAINTENANCE ACTUATOR ASSEMBLY REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

Dozer blade removed (WP 0037)

#### Materials/Parts

Washer, Lock (WP 0057, Figure 12, Item 33)

Qty: 3

Washer, Lock (WP 0057, Figure 12, Item 30)

Qty: 4

### REMOVAL

1. Remove three bolts (Figure 1, Item 7), lockwashers (Figure 1, Item 6), and cover (Figure 1, Item 5) from apron (Figure 1, Item 1). Discard lockwashers.
2. Remove four bolts (Figure 1, Item 4), lockwashers (Figure 1, Item 3), and actuator (Figure 1, Item 2) from apron (Figure 1, Item 1). Discard lockwashers.

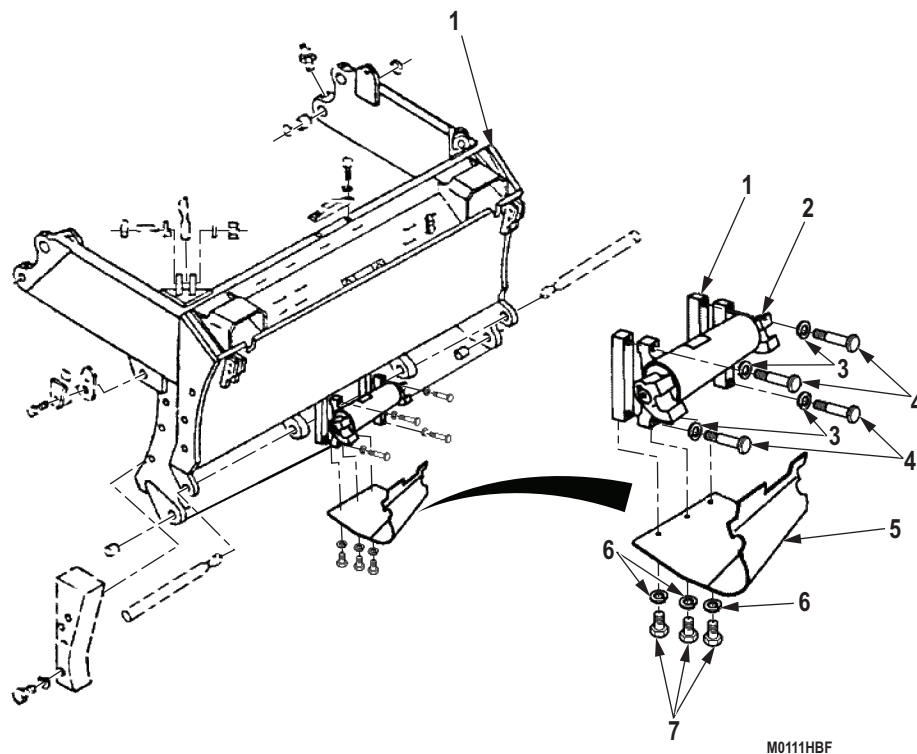


Figure 1. Apron Actuator Removal.

END OF TASK

**INSTALLATION**

1. Install four bolts (Figure 2, Item 4), new lockwashers (Figure 2, Item 3), and actuator (Figure 2, Item 2) to apron (Figure 2, Item 1).
2. Install three bolts (Figure 2, Item 7), new lockwashers (Figure 2, Item 6), and cover (Figure 2, Item 5) to apron (Figure 2, Item 1).

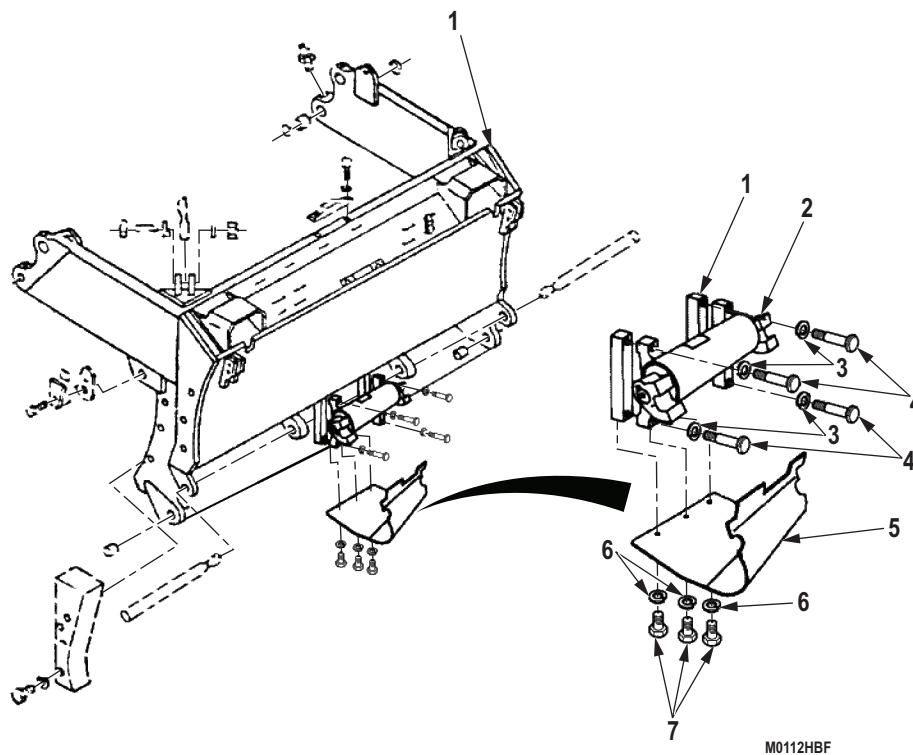


Figure 2. Apron Actuator Installation.

**END OF TASK**

**FOLLOW-ON MAINTENANCE**

Install dozer blade (WP 0037).

**END OF TASK**

**END OF WORK PACKAGE**

## FIELD MAINTENANCE HYDRAULIC VALVES REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Wrench Set, Crowfoot (WP 0071, Table 1, Item 9)  
Wrench Set, Open End  
(WP 0071, Table 1, Item 10)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

Hydraulic pressure relieved (TM 5-2350-262-20)  
Right, center, and left rear floor plates removed  
(TM 5-2350-262-10)  
Hydraulic hoses removed (WP 0042)

#### Materials/Parts

Washer, Lock (WP 0058, Figure 13, Item 8)  
Qty: 2

### REMOVAL

### CAUTION

Be ready to secure valves located under brackets when removing fastening hardware. Failure to do so may cause damage to equipment.

1. Flow valve removal:
  - a. Remove screw (Figure 1, Item 2), two flat washers (Figure 1, Item 5), nut (Figure 1, Item 6), two pins (Figure 1, Item 1), and flow valve bodies (Figure 1, Item 3) from bracket (Figure 1, Item 4).

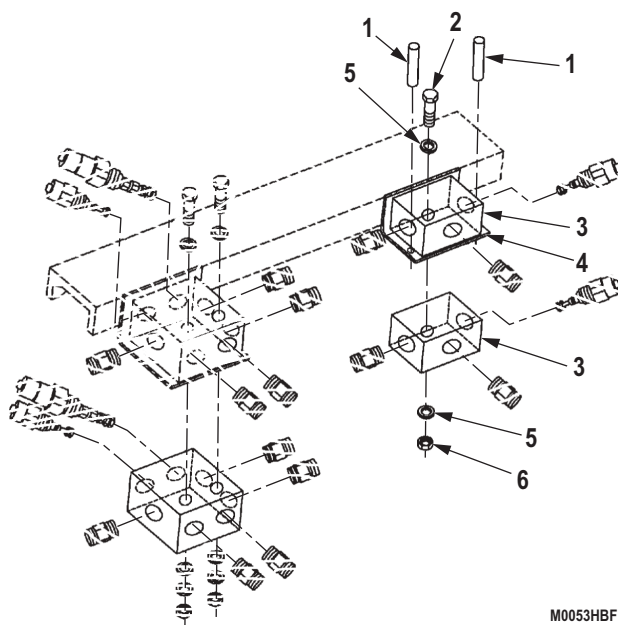


Figure 1. Flow Valve Bodies Removal.

**REMOVAL - Continued**

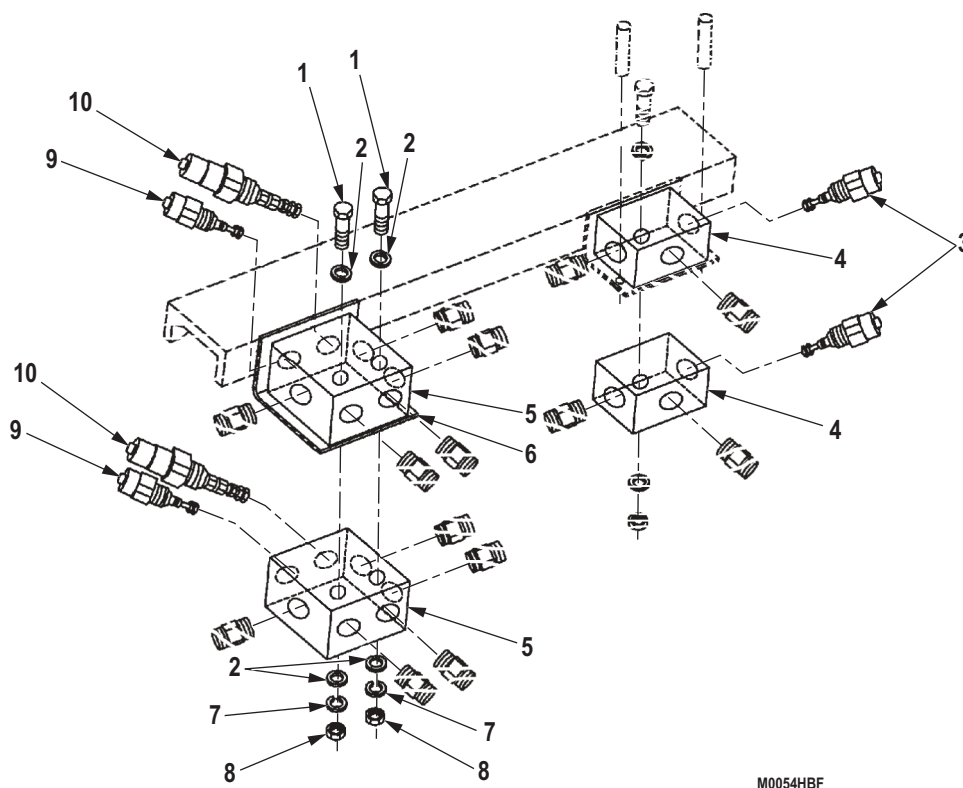
- b. Remove flow valve (Figure 2, Item 3) from each valve body (Figure 2, Item 4).

**CAUTION**

Be ready to secure valves located under brackets when removing fastening hardware. Failure to do so may cause damage to equipment.

2. Holding valve removal:

- a. Remove two screws (Figure 2, Item 1), four flat washers (Figure 2, Item 2), two lockwashers (Figure 2, Item 7), nuts (Figure 2, Item 8), and valve bodies (Figure 2, Item 5) from bracket (Figure 2, Item 6). Discard lockwashers.
- b. Remove valve (Figure 2, Item 10) and check valve (Figure 2, Item 9) from each holding valve body (Figure 2, Item 5).



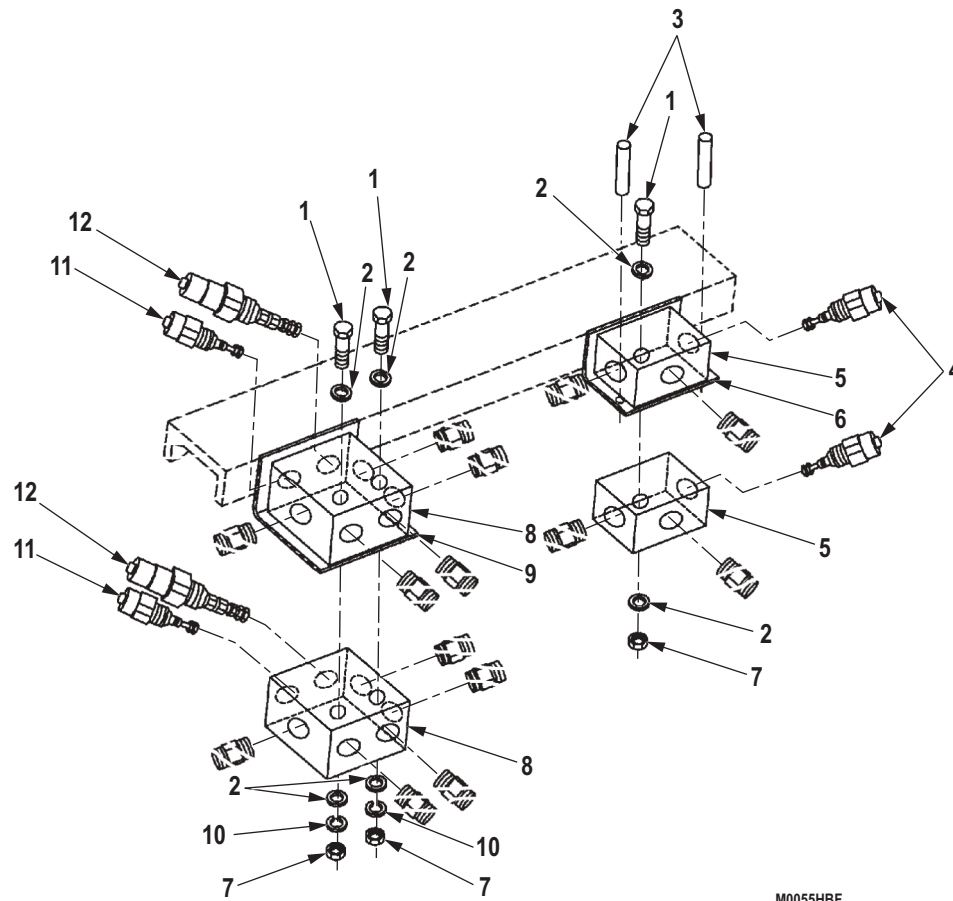
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Figure 2. Flow Valves Removal.

**END OF TASK**

## INSTALLATION

1. Flow valve installation:
  - a. Install two flow valves (Figure 3, Item 4) to valve bodies (Figure 3, Item 5).
  - b. Secure two flow valve bodies (Figure 3, Item 4) with screw (Figure 3, Item 1), two flat washers (Figure 3, Item 2), and nut (Figure 3, Item 7) to bracket (Figure 3, Item 6).
  - c. Secure two pins (Figure 3, Item 3) on either side of valve bodies (Figure 3, Item 5).
2. Holding valve installation:
  - a. Install two valves (Figure 3, Item 12) next to port 4 on valve bodies (Figure 3, Item 8).
  - b. Install two check valves (Figure 3, Item 11) next to valves (Figure 3, Item 12) on valve bodies (Figure 3, Item 8).
  - c. Secure two valve bodies (Figure 3, Item 8) with two screws (Figure 3, Item 1), four flat washers (Figure 3, Item 2), two new lockwashers (Figure 3, Item 10), and nuts (Figure 3, Item 7) to bracket (Figure 3, Item 9).



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Figure 3. Flow Valves Installation.

END OF TASK

**FOLLOW-ON MAINTENANCE**

1. Install hydraulic hoses (WP 0042).
2. Install right, center, and left rear floor plates (TM 5-2350-262-10).

**END OF TASK****END OF WORK PACKAGE**



## FIELD MAINTENANCE HYDRAULIC FITTINGS REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Wrench Set, Crowfoot (WP 0071, Table 1, Item 9)  
Wrench Set, Open End  
(WP 0071, Table 1, Item 10)

#### Equipment Condition (cont.)

Right, center, and left rear floor plates removed  
(TM 5-2350-262-10)  
Hydraulic hoses removed (WP 0042)

#### Personnel Required

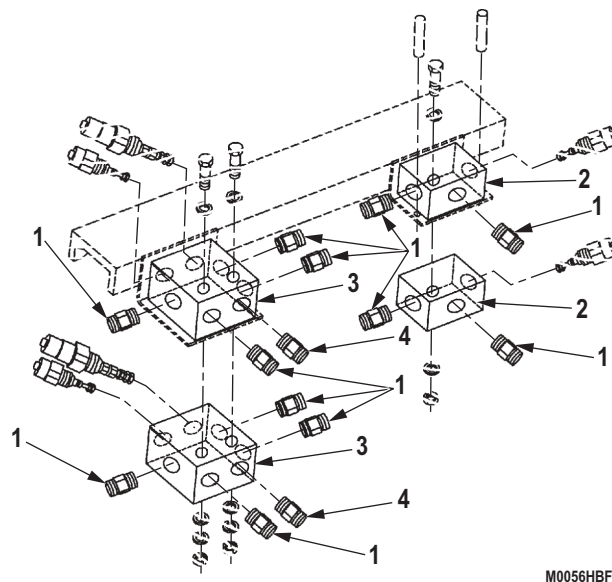
Construction Equipment Repairer, 91L

#### Equipment Condition

Hydraulic pressure relieved (TM 5-2350-262-20)

### REMOVAL

1. Remove two straight adapters (Figure 1, Item 4) on ports 1A on top and bottom valve bodies (Figure 1, Item 3).
2. Remove twelve straight adapters (Figure 1, Item 1) on remaining valve ports on valve bodies (Figure 1, Items 2 and 3).



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Figure 1. Flow Valves Removal.

### END OF TASK

**INSTALLATION**

1. Install two straight adapters (Figure 2, Item 4) on ports 1A on top and bottom valve bodies (Figure 2, Item 3).
2. Install twelve straight adapters (Figure 2, Item 1) on remaining valve body ports on valve bodies (Figure 2, Items 2 and 3).

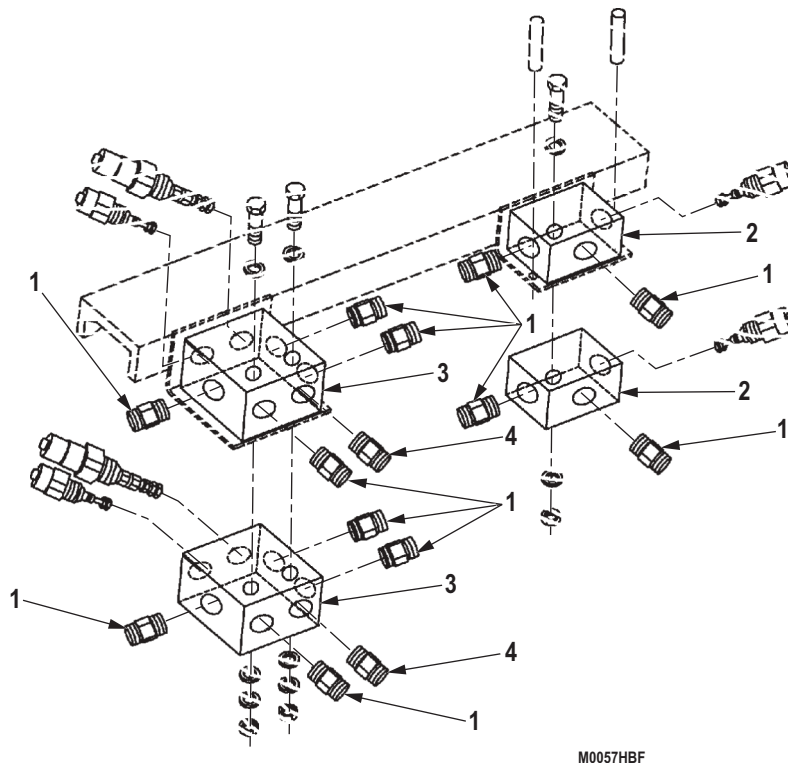


Figure 2. Flow Valves Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install hydraulic hoses (WP 0042).
2. Install right, center, and left rear floor plates (TM 5-2350-262-10).

**END OF TASK****END OF WORK PACKAGE**

---

**FIELD MAINTENANCE**  
**HYDRAULIC INTERMEDIATE MANIFOLD AND FITTINGS REPLACEMENT (LEFT SIDE)**

---

**INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)  
Wrench Set, Crowfoot  
(WP 0071, Table 1, Item 9)

**Materials/Parts**

Lubricating Oil, Engine OE/HDO-10  
(WP 0070, Table 1, Item 18, 19, 20)

**Materials/Parts (cont.)**

Bolt, Machine (WP 0059, Figure 18, Item 1)  
Qty: 6  
O-ring (WP 0059, Figure 17) Qty: 20

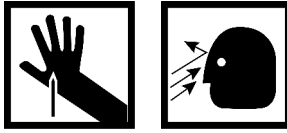
**Personnel Required**

Construction Equipment Repairer, 91L

**Equipment Condition**

Ejector forward (TM 5-2350-262-10)  
Hydraulic pressure relieved (TM 5-2350-262-20)  
Hull access covers removed (TM 5-2350-262-20)

---

**REMOVAL (LEFT SIDE)****WARNING**

High pressure is present in the M9 ACE hydraulic system. Do not disconnect any hydraulic system component unless hydraulic system pressure has been relieved. Ensure each of the hydraulic control levers is moved several times through all positions, and the hydraulic tank dipstick is slowly loosened to relieve pressure. Failure to comply may result in severe injury to personnel.

**CAUTION**

Cap or plug all ports and ends of hoses and tubes to prevent contamination of hydraulic oil. Failure to comply may result in damage to equipment.

**NOTE**

- Removal procedures for right side of manifold, reference TM 5-2350-262-20, Hydraulic Intermediate Manifolds and Fittings Replacement, Removal (Right Side). Procedures below are for left side only.
- Use two wrenches when disconnecting hydraulic lines from fittings.
- Tag all hoses and tubes prior to removal, for installation.

1. Disconnect five valve bank hoses (Figure 1, Item 14) from adapters (Figure 1, Item 13).
2. Disconnect two HBF-TT track adjusting hoses (Figure 1, Item 5) from tee (Figure 1, Item 3) and elbow (Figure 1, Item 7).
3. Disconnect two valve bank hoses (Figure 1, Item 4) from tee (Figure 1, Item 3) and tee (Figure 1, Item 6).
4. Remove reducer (Figure 1, Item 8) from tee (Figure 1, Item 6).
5. Remove tee (Figure 1, Item 3) and tee (Figure 1, Item 6) from adapters (Figure 1, Item 9).
6. Disconnect five tubes (Figure 1, Item 11) from four adapters (Figure 1, Item 12) and elbow (Figure 1, Item 10) at front of manifold (Figure 1, Item 2).
7. From hull access opening, disconnect four tubes (Figure 1, Item 1) from tee (Figure 1, Item 17), and fitting (Figure 1, Item 18) at rear of manifold (Figure 1, Item 2). Disconnect hose (Figure 1, Item 16) from adapter (Figure 1, Item 15).

## REMOVAL (LEFT SIDE) - Continued

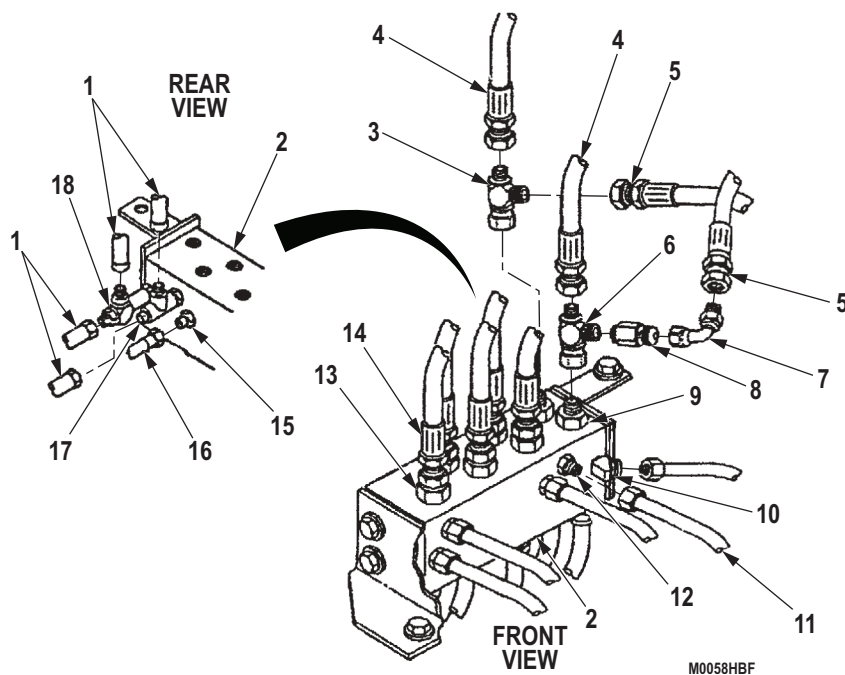


Figure 1. Intermediate Manifold Removal.

**CAUTION**

Do not bend tubes. If necessary, remove tubes from vehicle to avoid bending them. Failure to comply may result in damage to equipment.

8. From hull access opening, remove two screws (Figure 2, Item 2), washers (Figure 2, Item 3), and retaining strap (Figure 2, Item 4) from five tubes (Figure 2, Item 1) and hull.

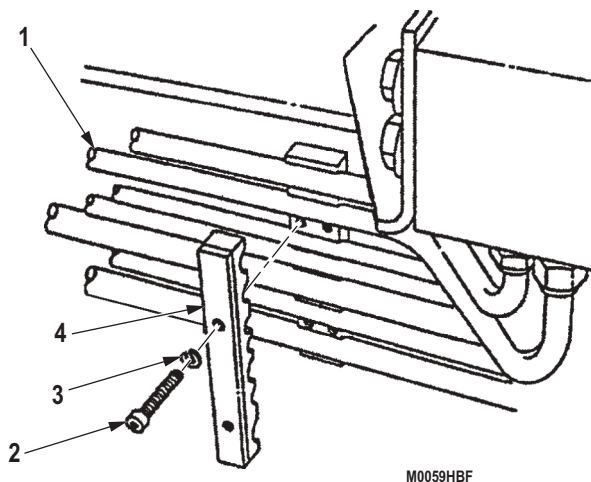
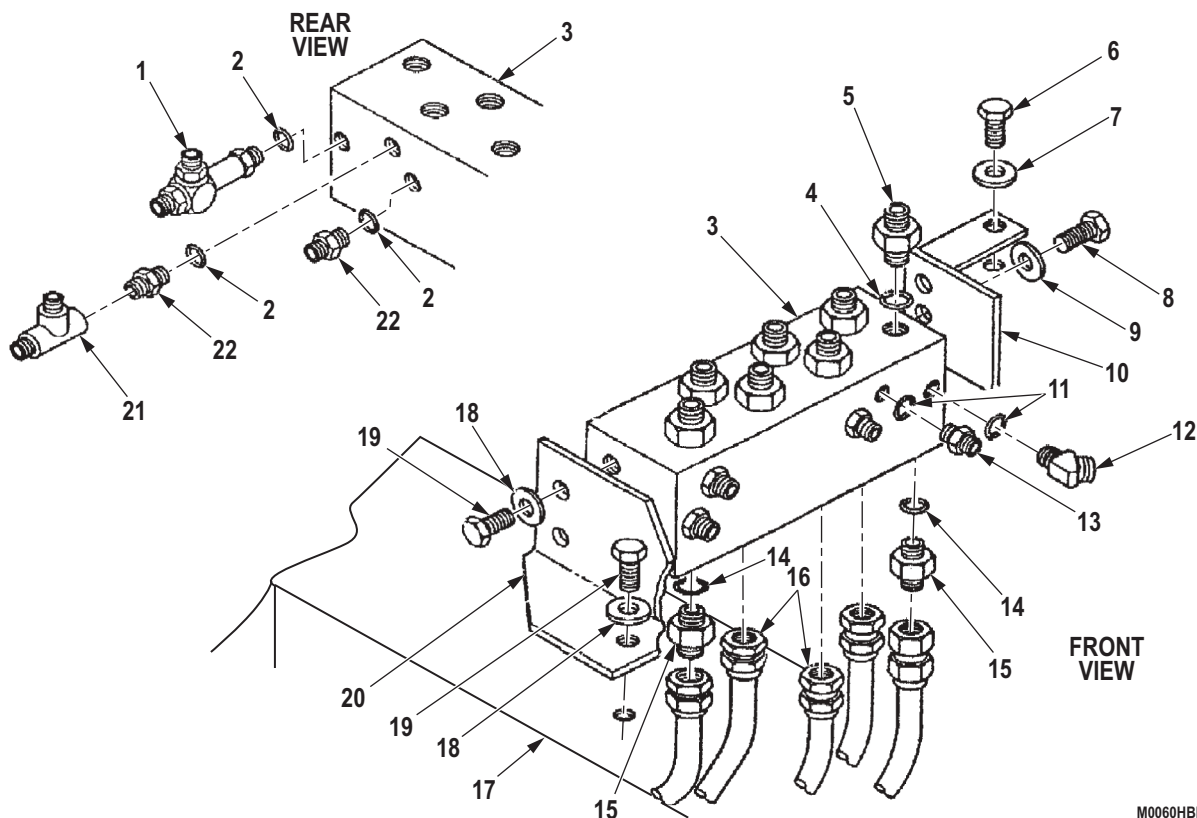


Figure 2. Manifold Tubes Removal.

**REMOVAL (LEFT SIDE) - Continued**

9. From hull (Figure 3, Item 17) access opening, disconnect five tubes (Figure 3, Item 16) from five adapters (Figure 3, Item 15) at bottom of manifold.
10. Remove three machine bolts (Figure 3, Item 19), washers (Figure 3, Item 18), and bracket (Figure 3, Item 20) from manifold (Figure 3, Item 3) and hull (Figure 3, Item 17). Discard machine bolts.
11. Remove machine bolt (Figure 3, Item 6) and washer (Figure 3, Item 7) from bracket (Figure 3, Item 10) and hull (Figure 3, Item 17). Discard machine bolt.
12. Remove two machine bolts (Figure 3, Item 8), washers (Figure 3, Item 9), and bracket (Figure 3, Item 10) from manifold. Discard machine bolts.
13. Remove seven adapters (Figure 3, Item 5) and O-rings (Figure 3, Item 4) from top of manifold (Figure 3, Item 13). Discard O-rings.
14. Remove four adapters (Figure 3, Item 13), elbow (Figure 3, Item 12), and five O-rings (Figure 3, Item 11) from front of manifold (Figure 3, Item 3). Discard O-rings.
15. Remove five adapters (Figure 3, Item 15) and O-rings (Figure 3, Item 14) from bottom of manifold (Figure 3, Item 3). Discard O-rings.
16. Remove tee (Figure 3, Item 21), two adapters (Figure 3, Item 22), fitting (Figure 3, Item 1), and three O-rings (Figure 3, Item 2) from rear of manifold (Figure 3, Item 3). Discard O-rings.



M0060HBF

Figure 3. Manifold Tubes Removal.

**END OF TASK**

**INSTALLATION (LEFT SIDE)****NOTE**

- Installation procedures for right side manifold, reference TM 5-2350-262-20, Hydraulic Intermediate Manifolds and Fittings Replacement, Installation (Right Side). Procedures below are for left side only.
  - Class III leaks can occur if hydraulic lines and fittings are improperly installed or not fully serviceable. Refer to TM 5-2350-262-20, when replacing or repairing hydraulic system components. Always inspect system lines, fittings, and packings for serviceability before installation.
  - Do not tighten fittings until alignment with tube is checked.
  - Use two wrenches when connecting hydraulic lines to fittings.
  - Apply lubricating oil to packings prior to installation.
1. Install five new O-rings (Figure 4, Item 9) on five adapters (Figure 4, Item 8) and install adapters on bottom of manifold (Figure 4, Item 2).
  2. Install three new O-rings (Figure 4, Item 1) on two adapters (Figure 4, Item 10) and fitting (Figure 4, Item 12) and install adapters (Figure 4, Item 10), fitting (Figure 4, Item 12), and tee (Figure 4, Item 11) on rear of manifold (Figure 4, Item 2).
  3. Install five new O-rings (Figure 4, Item 5) on four adapters (Figure 4, Item 7) and elbow (Figure 4, Item 6), and install adapters (Figure 4, Item 7) and elbow (Figure 4, Item 6) on front of manifold.
  4. Install seven new O-rings (Figure 4, Item 4) on seven adapters (Figure 4, Item 3) and install adapters on top of manifold (Figure 4, Item 2).

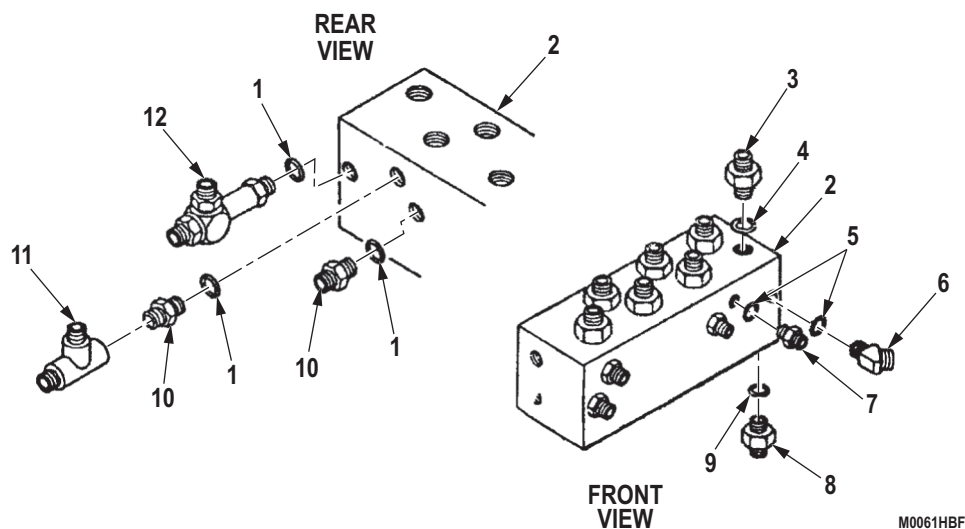


Figure 4. Manifold Tubes Installation.

**INSTALLATION (LEFT SIDE) - Continued**

5. Install left bracket (Figure 5, Item 10) on manifold (Figure 5, Item 24) with two washers (Figure 5, Item 12) and new machine bolts (Figure 5, Item 11).
6. Install right side of bracket (Figure 5, Item 19) on manifold (Figure 5, Item 24) with two washers (Figure 5, Item 9) and new machine bolts (Figure 5, Item 8).
7. Install manifold (Figure 5, Item 24) on hull (Figure 5, Item 18) with two washers (Figure 5, Item 9) and new machine bolts (Figure 5, Item 11). Do not tighten machine bolts.
8. Connect five tubes (Figure 5, Item 14) to four adapters (Figure 5, Item 15) and elbow (Figure 5, Item 13) at front of manifold (Figure 5, Item 24).
9. Connect five tubes (Figure 5, Item 17) to five adapters (Figure 5, Item 16) at bottom of manifold (Figure 5, Item 24).
10. Connect four tubes (Figure 5, Item 22) to tee (Figure 5, Item 23) and fitting (Figure 5, Item 21).
11. Connect hose (Figure 5, Item 20) to adapter (Figure 5, Item 25) at rear of manifold (Figure 5, Item 24).
12. Install tee (Figure 5, Item 1) and tee (Figure 5, Item 6) on adapters (Figure 5, Item 7).
13. Install reducer (Figure 5, Item 5) on tee (Figure 5, Item 6).
14. Connect two valve bank hoses (Figure 5, Item 2) on top of tee (Figure 5, Item 1) and tee (Figure 5, Item 6).
15. Connect elbow (Figure 5, Item 4) to reducer (Figure 5, Item 5).
16. Connect track and blade track adjuster hose (Figure 5, Item 3) to elbow (Figure 5, Item 4).
17. Connect track and blade track adjuster hose (Figure 5, Item 3) to tee (Figure 5, Item 1).
18. Connect five remaining hoses (Figure 5, Item 2) to remaining adapters (Figure 5, Item 7) on top of manifold (Figure 5, Item 24).



## INSTALLATION (LEFT SIDE) - Continued

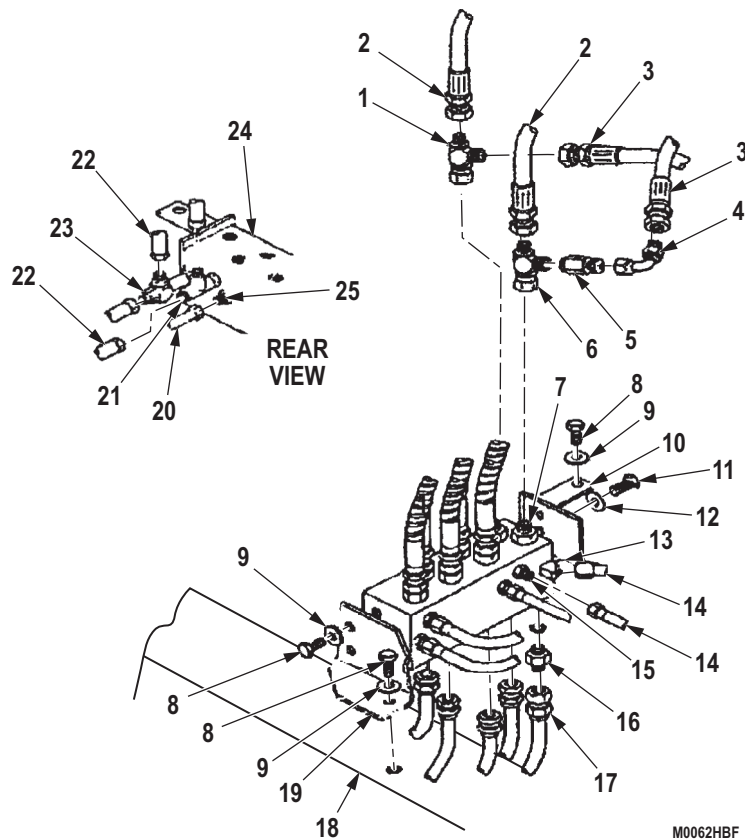


Figure 5. Manifold Tubes Installation.

19. From hull access opening, secure seven tubes (Figure 6, Item 1) to hull with retaining strap (Figure 6, Item 4), two washers (Figure 6, Item 3), and screws (Figure 6, Item 2).

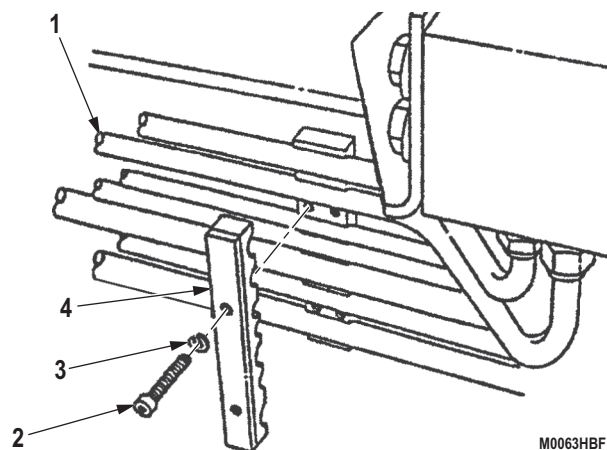


Figure 6. Manifold Tubes Installation.

END OF TASK

**FOLLOW-ON MAINTENANCE**

1. Install hull access covers (TM 5-2350-262-20).
2. Service hydraulic tank (TM 5-2350-262-20).
3. Retract ejector (TM 5-2350-262-10).

**END OF TASK****END OF WORK PACKAGE**

## FIELD MAINTENANCE HYDRAULIC HOSES REPLACEMENT

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Wrench Set, Crowfoot  
(WP 0071, Table 1, Item 9)  
Wrench Set, Open End  
(WP 0071, Table 1, Item 10)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Equipment Condition

Hydraulic pressure relieved (TM 5-2350-262-20)  
Hull access covers removed (TM 5-2350-262-20)  
Floor support removed (TM 5-2350-262-20)

#### Materials/Parts

Washer, Lock (WP 0058, Figure 16, Item 4)  
Qty: 3

### REMOVAL

1. Remove screw (Figure 1, Item 2), lockwasher (Figure 1, Item 1), flat washer (Figure 1, Item 3), and two clamps (Figure 1, Item 4) from boss (Figure 1, Item 5) that secures apron hoses (Figure 1, Item 6) to hull. Discard lockwasher.
2. Disconnect top blade folder hose (Figure 1, Item 7) from apron hose (Figure 1, Item 6) at quick-disconnect fittings.
3. Disconnect bottom blade folder hose (Figure 1, Item 7) from apron hose (Figure 1, Item 6) at quick-disconnect fittings.

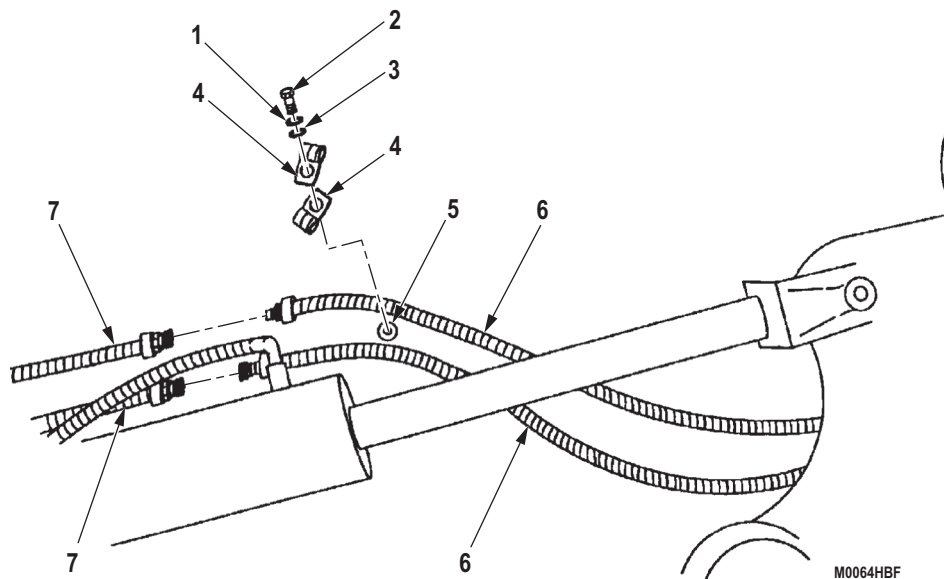
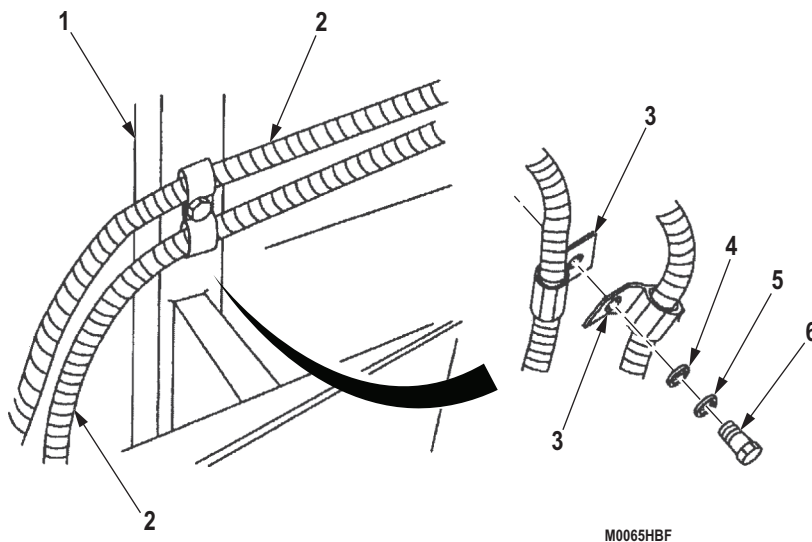


Figure 1. Blade Folder and Apron Hoses Removal.

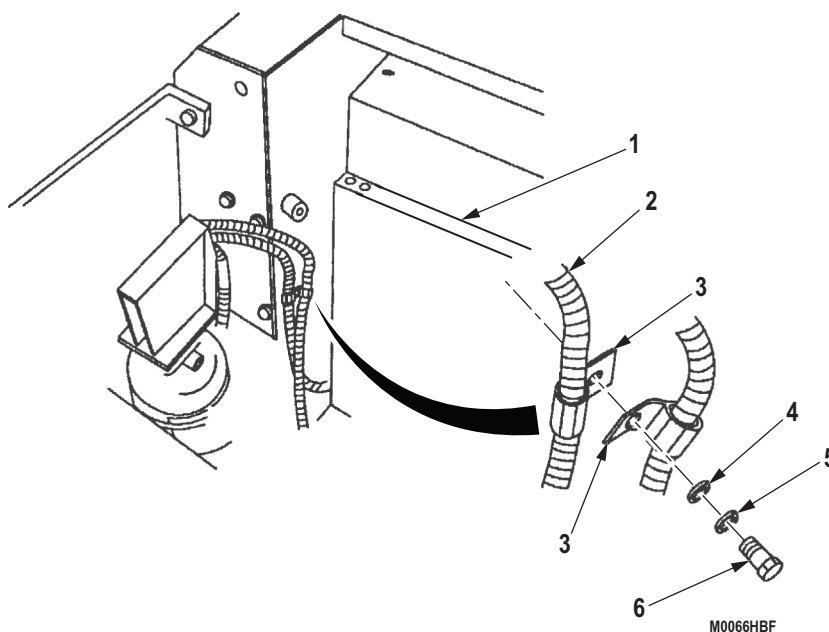
**REMOVAL - Continued**

4. Remove screw (Figure 2, Item 6), lockwasher (Figure 2, Item 5), flat washer (Figure 2, Item 4), and two clamps (Figure 2, Item 3) on blade folder hoses (Figure 2, Item 2) on hull member (Figure 2, Item 1). Discard lockwasher.



*Figure 2. Blade Folder Hose Clamps Removal.*

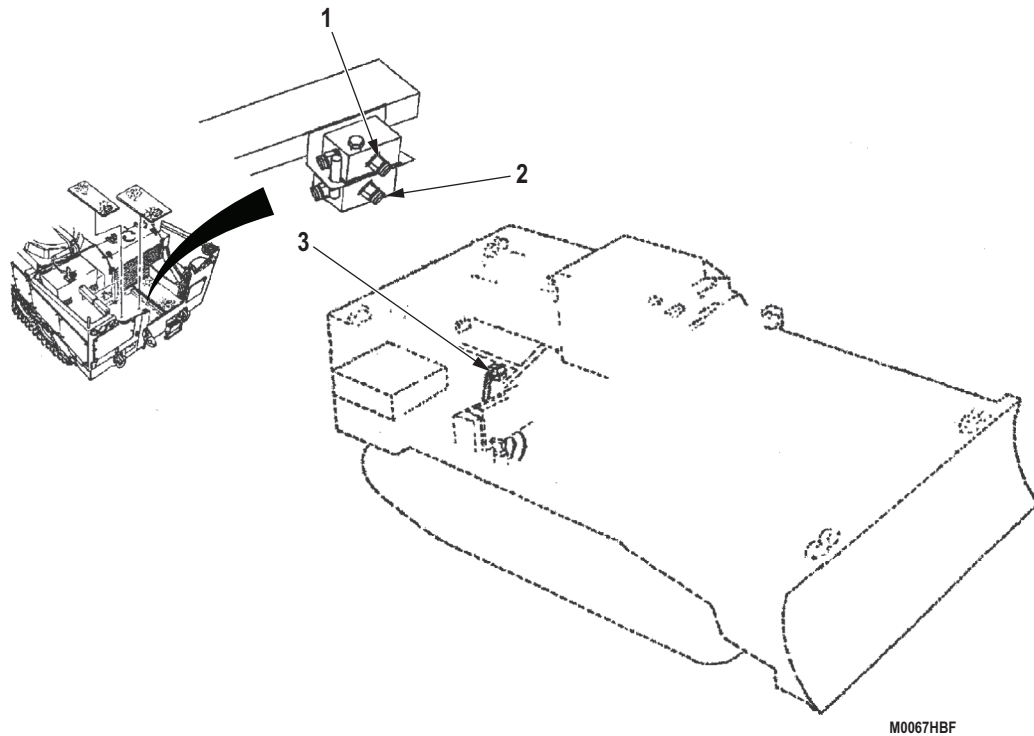
5. Remove screw (Figure 3, Item 6), lockwasher (Figure 3, Item 5), flat washer (Figure 3, Item 4), and two clamps (Figure 3, Item 3) on apron hoses (Figure 3, Item 2) on hull plate (Figure 3, Item 1). Discard lockwasher.



*Figure 3. Blade Folder Hose Clamps on Hull Plate Removal.*

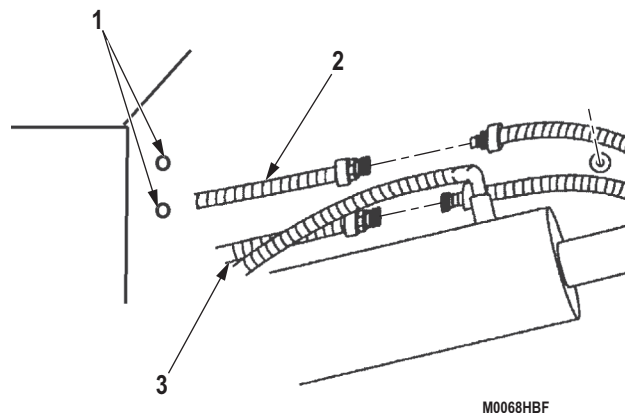
**REMOVAL - Continued**

6. Disconnect blade folder hose (Figure 4, Item 3) from top flow valve (Figure 4, Item 1) on port 2.
7. Disconnect blade folder hose (Figure 4, Item 3) from bottom flow valve (Figure 4, Item 2) on port 2.



*Figure 4. Blade Folder Hoses and Flow Valves Removal.*

8. Remove blade folder hose (Figure 5, Items 2 and 3) from hull by pulling them out access holes (Figure 5, Item 1).



*Figure 5. Blade Folder Hoses Removal.*

**END OF TASK**

**INSTALLATION**

1. Install two blade folder hoses (Figure 6, Item 3) to top and bottom flow valves of port 2 (Figure 6, Items 1 and 2) and route under radiator and up in front of radiator next to muffler plate.

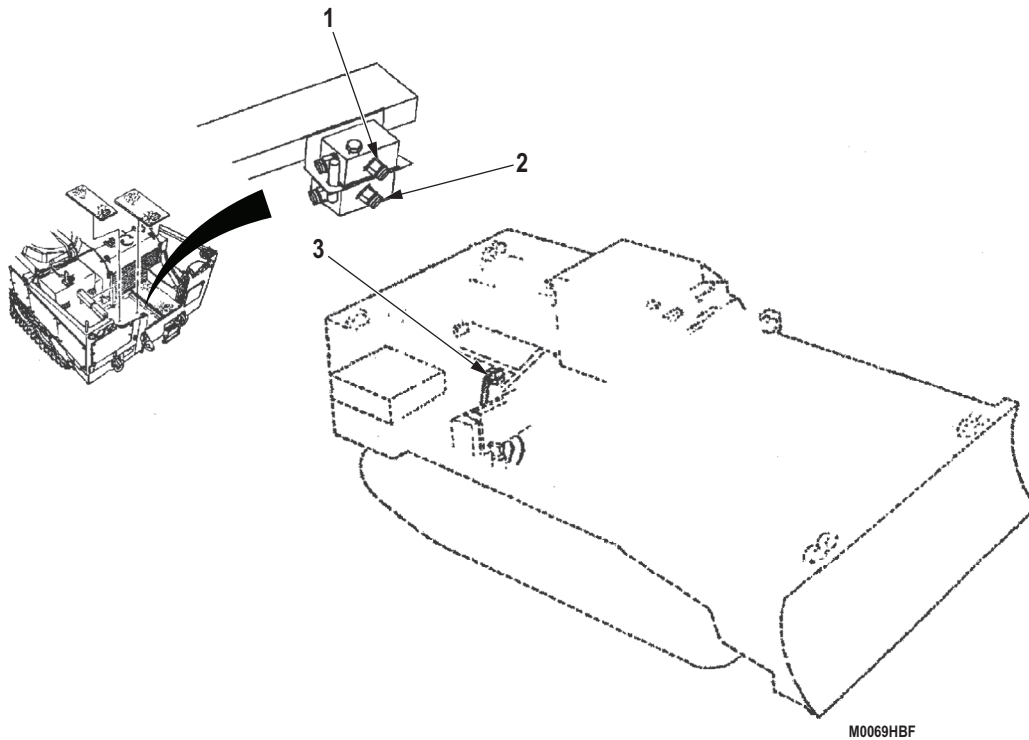
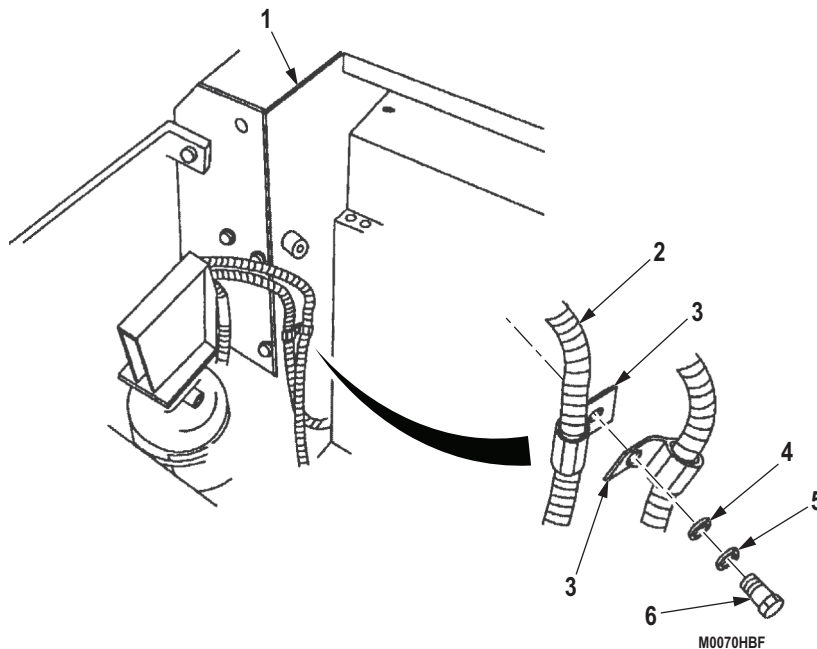


Figure 6. Blade Folder Hoses and Flow Valves Installation.

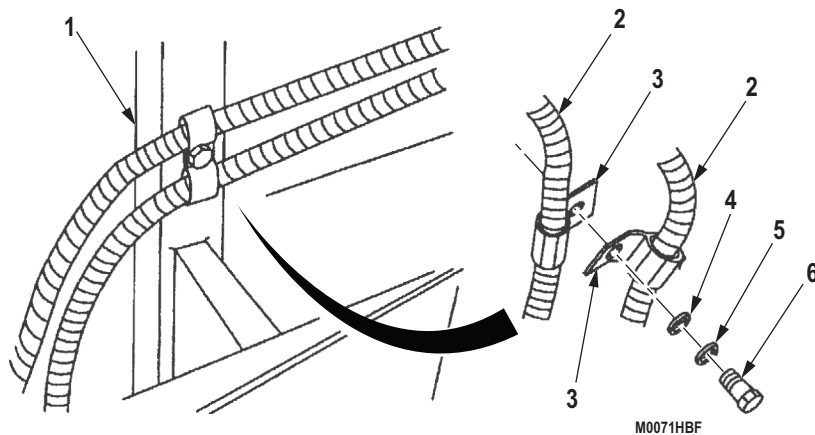
**INSTALLATION - Continued**

2. Secure two blade folder hoses (Figure 7, Item 2) with two clamps (Figure 7, Item 3), one flat washer (Figure 7, Item 4), new lockwasher (Figure 7, Item 5), and screw (Figure 7, Item 6) to hole on hull plate (Figure 7, Item 1) next to right side fire extinguisher.



*Figure 7. Blade Folder Hose Clamps Installation.*

3. Secure two blade folder hoses (Figure 8, Item 2) with two clamps (Figure 8, Item 3), one flat washer (Figure 8, Item 4), new lockwasher (Figure 8, Item 5), and screw (Figure 8, Item 6) to hole on hull member (Figure 8, Item 1).



*Figure 8. Blade Folder Hose Clamps Installation.*

**INSTALLATION - Continued****NOTE**

Be sure to install blade folder hose, from top flow valve, port 2, through top access hole in hull and to top apron hose.

4. Route two blade folder hoses (Figure 9, Item 10) from inside to outside vehicle through access holes in hull as shown in (Figure 9, Item 11).
5. Install adapter and O-ring (Figure 9, Item 9) and quick-disconnect coupler (Figure 9, Item 12) to blade folder hose (Figure 9, Item 10).
6. Install adapter O-ring (Figure 9, Item 9) and quick-disconnect coupler (Figure 9, Item 8) to blade folder hose (Figure 9, Item 10).
7. Connect blade folder hose (Figure 9, Item 10) to apron hose (Figure 9, Item 13) from top hole on apron (Figure 9, Item 6).
8. Connect blade folder hose (Figure 9, Item 10) to apron hose (Figure 9, Item 7) from bottom hole on apron (Figure 9, Item 6).

**NOTE**

Make sure apron hoses have minimum slack between clamps and apron when apron is in down position.

9. Secure apron hoses (Figure 9, Items 7 and 13) with two clamps (Figure 9, Item 4), one flat washer (Figure 9, Item 3), new lockwasher (Figure 9, Item 2), and screw (Figure 9, Item 1) to boss (Figure 9, Item 5).

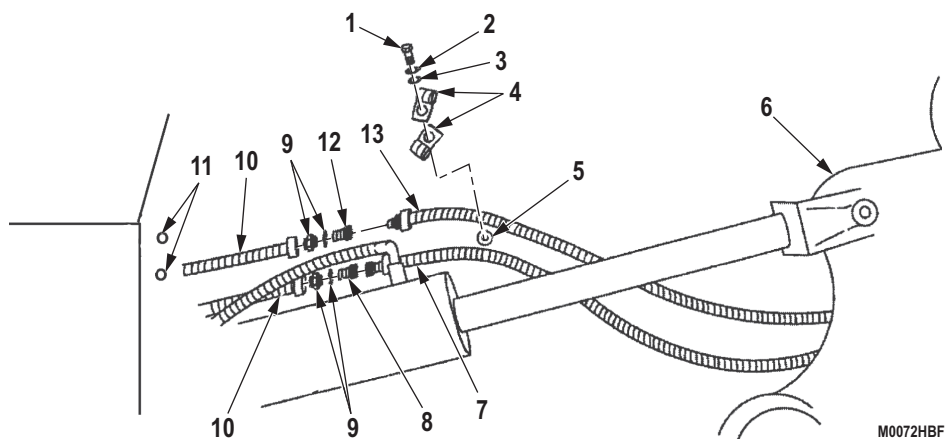


Figure 9. Blade Folder and Apron Hoses Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install floor support (TM 5-2350-262-20).
2. Install hull access covers (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**



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## FIELD MAINTENANCE

### TRACK ADJUSTING CYLINDER ASSEMBLY REPLACEMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)  
Wrench, Torque, Click, Ratcheting, 3/8 in. Drive  
(75 ft-lb) (WP 0071, Table 1, Item 13)

##### Materials/Parts

Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)  
Grease, Automotive and Artillery (GAA)  
(WP 0070, Table 1, Item 13, 14, 15, 16, 17)  
Lubricating Oil, Engine  
(WP 0070, Table 1, Item 18, 19, 20)

##### Materials/Parts (cont.)

Nut, Self-Locking (WP 0056, Figure 11, Item 15)  
Qty: 1  
Nut, Self-Locking (WP 0060, Figure 20, Item 1)  
Qty: 4

##### Personnel Required

Construction Equipment Repairer, 91L

##### Equipment Condition

Right, center, and left rear floor plates removed  
(TM 5-2350-262-10)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

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#### REMOVAL

1. Remove locknut (Figure 1, Item 4), washer (Figure 1, Item 3), and rear fuel tank strap (Figure 1, Item 1) from hull (Figure 1, Item 2). Discard locknut.

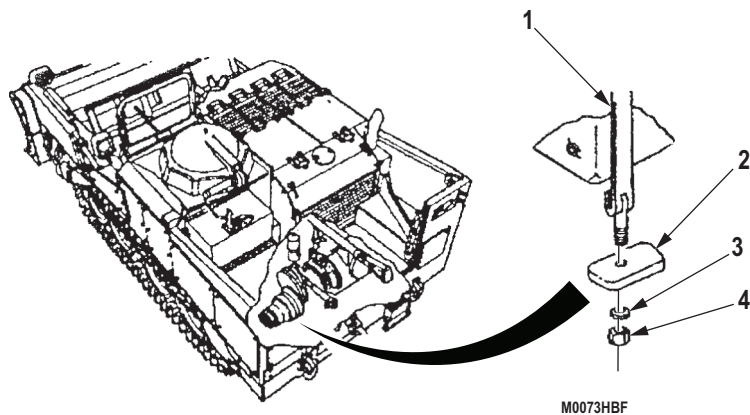


Figure 1. Rear Fuel Tank Strap Removal.

**REMOVAL - Continued****NOTE**

There is an additional clamp on left hydraulic track adjusting cylinder.

2. Remove screw (Figure 2, Item 6), washers (Figure 2, Item 4), locknut (Figure 2, Item 3), and pin (Figure 2, Item 5). Disconnect rod end (Figure 2, Item 2) of hydraulic track adjusting cylinder (Figure 2, Item 1) from final drive adjusting flange (Figure 2, Item 7). Discard locknut.

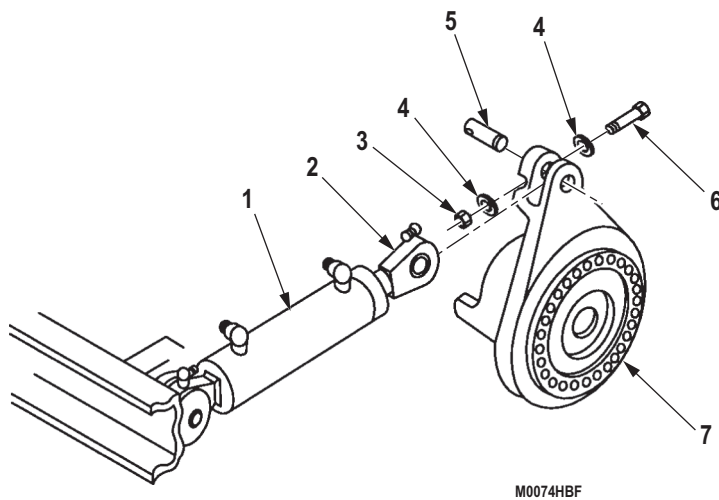


Figure 2. Final Drive Adjusting Flange Removal.

**NOTE**

Screw must be removed from bottom when connecting fixed end of cylinder to hull.

3. Remove screw (Figure 3, Item 6), washers (Figure 3, Item 3), locknut (Figure 3, Item 2), pin (Figure 3, Item 1), and fixed end of track adjusting cylinder (Figure 3, Item 4) from hull mounting bracket (Figure 3, Item 5). Discard locknut.

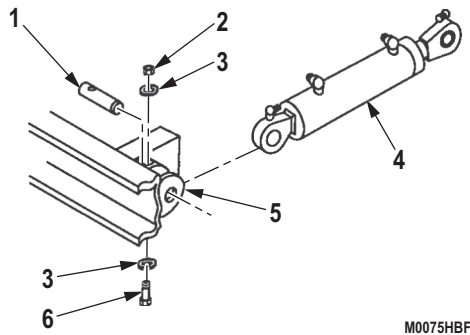


Figure 3. Track Adjusting Cylinder Rod End Removal.

**END OF TASK**

## INSTALLATION

### NOTE

Steps 1 through 5 apply to both cylinders.

1. If new cylinder, install lubrication fitting (Figure 4, Item 1) and plug (Figure 4, Item 7) on fixed end of hydraulic track adjusting cylinder (Figure 4, Item 6), so that lubrication fitting (Figure 4, Item 1) faces forward and ports (Figure 4, Items 4 and 5) face upward.
2. If new cylinder, remove plug (Figure 4, Item 3) and install lubrication fitting (Figure 4, Item 2) on rod end of hydraulic track adjusting cylinder (Figure 4, Item 6) so that lubrication fitting (Figure 4, Item 2) faces rearward.

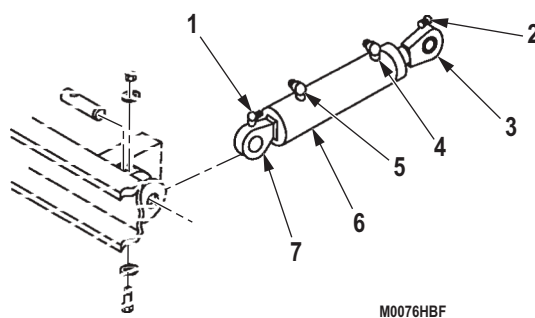


Figure 4. Track Adjusting Cylinder Installation.

### NOTE

Coat threads of screw and nut with engine lubricating oil prior to installation.

Screw must be inserted from bottom when connecting fixed end of cylinder to hull.

3. With ports (Figure 5, Items 4 and 6) pointing up, connect fixed end of hydraulic track adjusting cylinder (Figure 5, Item 5) to hull mounting bracket (Figure 5, Item 7) with pin (Figure 5, Item 1), washer (Figure 5, Item 3) screw (Figure 5, Item 8), washer (Figure 5, Item 3), and new locknut (Figure 5, Item 2).

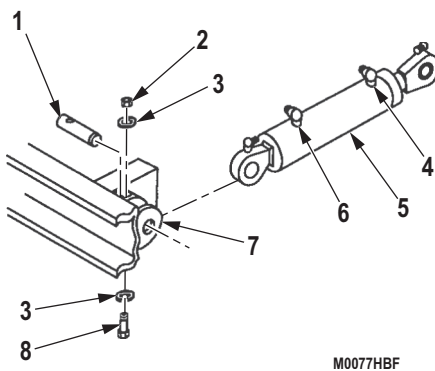


Figure 5. Track Adjusting Cylinder Rod End Installation.

## INSTALLATION - Continued

## NOTE

- There is an additional clamp on left hydraulic track adjusting cylinder.
  - Coat threads of screw and nut with lubricating oil prior to installation.
4. Connect rod end (Figure 6, Item 2) of hydraulic track adjusting cylinder (Figure 6, Item 1) to final drive adjusting flange (Figure 6, Item 7) with pin (Figure 6, Item 5), washer (Figure 6, Item 4), screw (Figure 6, Item 6), washer (Figure 6, Item 4), and new locknut (Figure 6, Item 3).

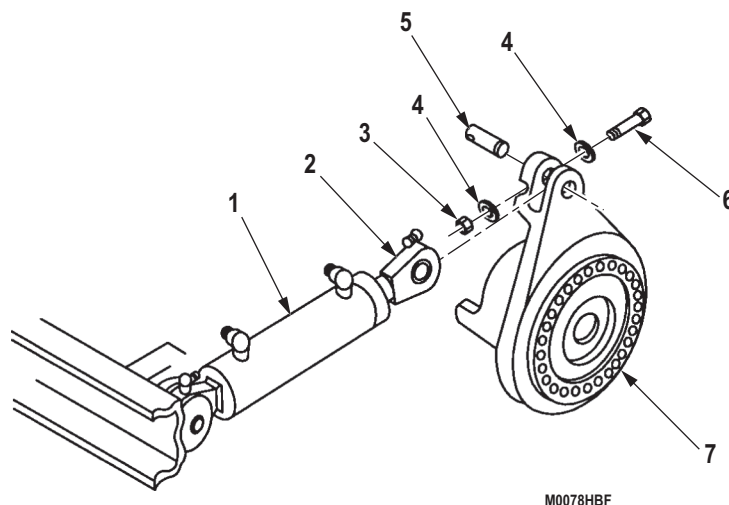


Figure 6. Final Drive Adjusting Flange Installation.

5. Tighten locknuts (Figure 7, Item 2) to 19 to 31 lb-ft (25.8 to 42 N·m).
6. Lubricate bearings (Figure 7, Item 4) with Grease, Automotive and Arillery (GAA) at lubrication fittings (Figure 7, Items 1 and 3).

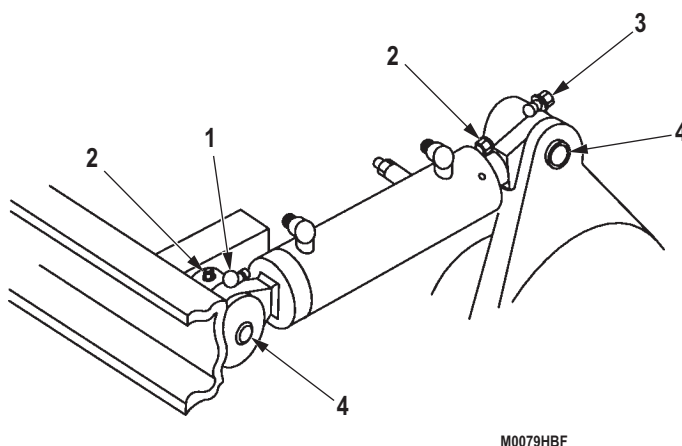
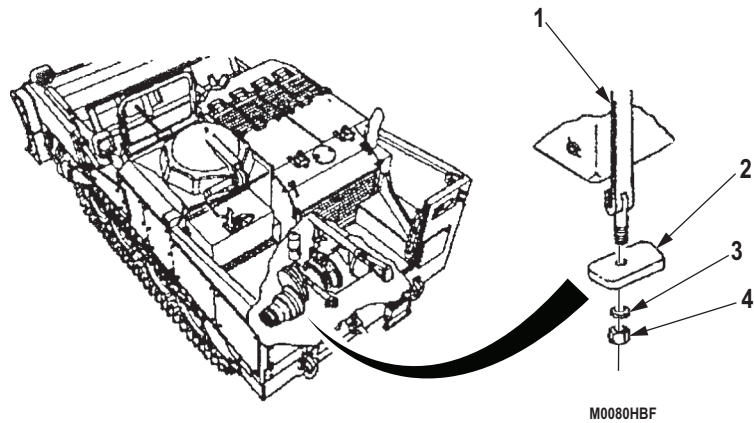


Figure 7. Track Adjusting Cylinder Locknuts Installation.

**INSTALLATION - Continued**

7. Connect rear fuel tank strap (Figure 8, Item 1) to hull (Figure 8, Item 2) with washer (Figure 8, Item 3) and new locknut (Figure 8, Item 4).



*Figure 8. Rear Fuel Tank Strap Installation.*

**END OF TASK**

**FOLLOW-ON MAINTENANCE**

Install right, center, and left rear floor plates (TM 5-2350-262-10).

**END OF TASK**

**END OF WORK PACKAGE**



## FIELD MAINTENANCE

### TRACK AND BLADE MANIFOLD ASSEMBLY REPLACEMENT

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Chain Assembly (WP 0071, Table 1, Item 2)  
Shop Equipment, Field Basic  
(WP 0071, Table 1, Item 5)

##### Equipment Condition (cont.)

Track and blade manifold assembly removed  
(WP 0045)  
Hydraulic system pressure relieved  
(TM 5-2350-262-20)

##### Personnel Required

Construction Equipment Repairer, 91L

##### Equipment Condition

Front of vehicle blocked (TM 5-2350-262-20)

#### REMOVAL

1. Remove six bolts (Figure 1, Item 1) and washers (Figure 1, Item 2) from plate (Figure 1, Item 4) and track and blade manifold (Figure 1, Item 3).
2. Remove plate (Figure 1, Item 4) from track and blade manifold (Figure 1, Item 3).

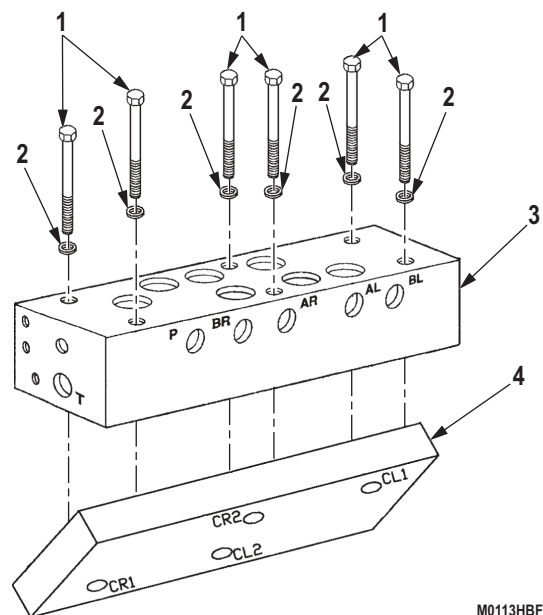


Figure 1. Manifold and Plate Removal.

#### END OF TASK

**INSTALLATION**

1. Line up six holes in track and blade manifold (Figure 2, Item 3) with holes in plate (Figure 2, Item 4).
2. Install six bolts (Figure 2, Item 1) and washers (Figure 2, Item 2) and join manifold (Figure 2, Item 3) to plate (Figure 2, Item 4).

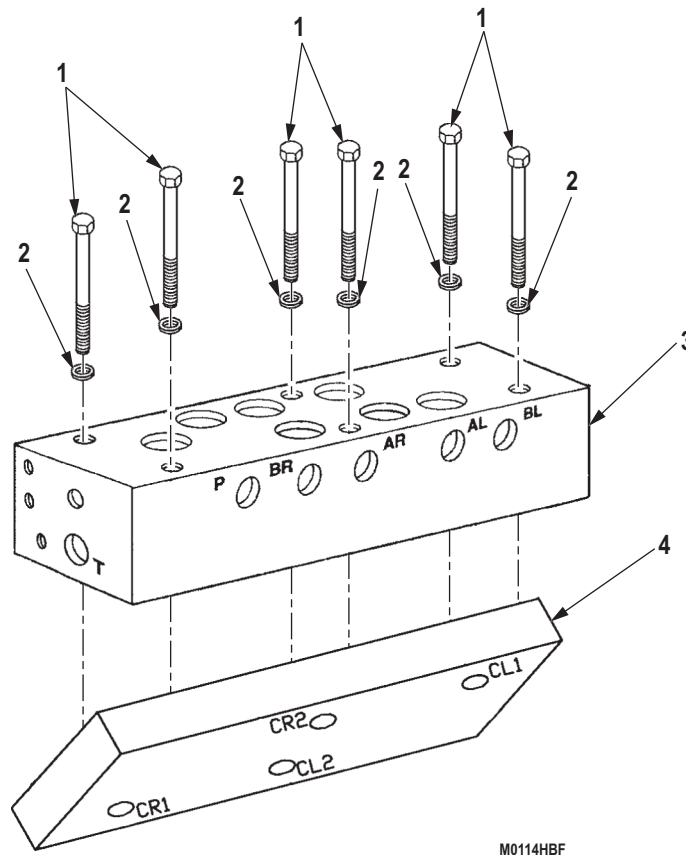


Figure 2. Manifold and Plate Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install track and blade manifold assembly (WP 0045).
2. Remove blocking (TM 5-2350-262-20).

**END OF TASK****END OF WORK PACKAGE**



## FIELD MAINTENANCE

### TRACK AND BLADE MANIFOLD ASSEMBLY FITTINGS REPLACEMENT

#### INITIAL SETUP:

##### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)  
Parts Kit, Hydraulic (WP 0071, Table 1, Item 4)

##### Personnel Required

Construction Equipment Repairer, 91L

##### Equipment Condition

Right, center, and left rear floor plates removed  
(TM 5-2350-262-10)  
Hydraulic system pressure relieved  
(TM 2350-262-20)  
Hydraulic hoses removed (WP 0042)

##### Materials/Parts

Lubricating Oil, Engine OE/HDO-10  
(WP 0070, Table 1, Item 18, 19, 20)  
Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)

#### REMOVAL

1. Remove ten control box power harness connectors (Figure 1, Item 2) from coil connectors (Figure 1, Item 1).
2. Remove tee (Figure 1, Item 7), reducer (Figure 1, Item 8), and tee (Figure 1, Item 9) from elbow (Figure 1, Item 6) on track and blade manifold (Figure 1, Item 3), port T.
3. Remove elbow (Figure 1, Item 6) from track and blade manifold (Figure 1, Item 3), port P.
4. Remove two straight adapters (Figure 1, Item 4) from tee (Figure 1, Item 5).
5. Remove tee (Figure 1, Item 5) from track and blade manifold (Figure 1, Item 3), port BR.
6. Remove straight adapter (Figure 1, Item 4) from track and blade manifold (Figure 1, Item 3), port BL.

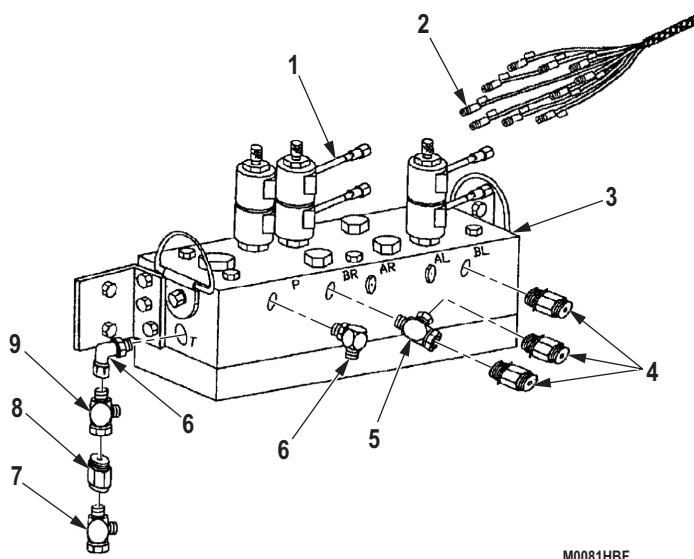
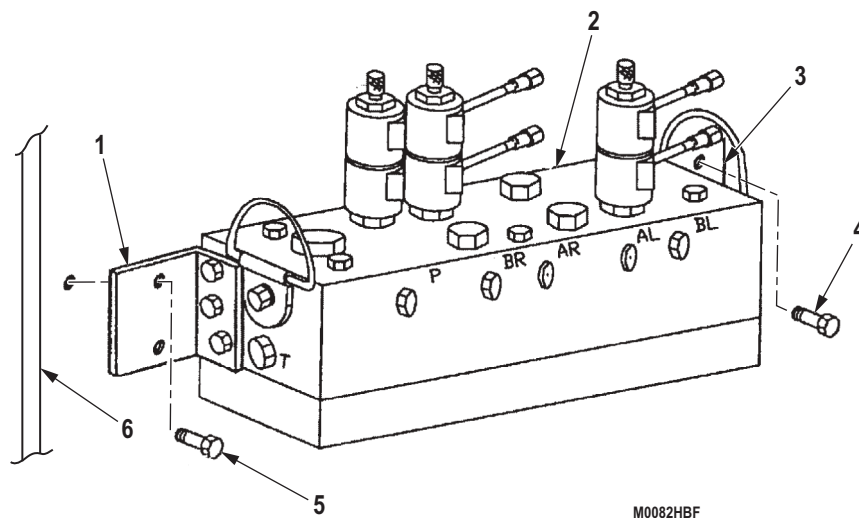


Figure 1. Track and Blade Manifold Removal.

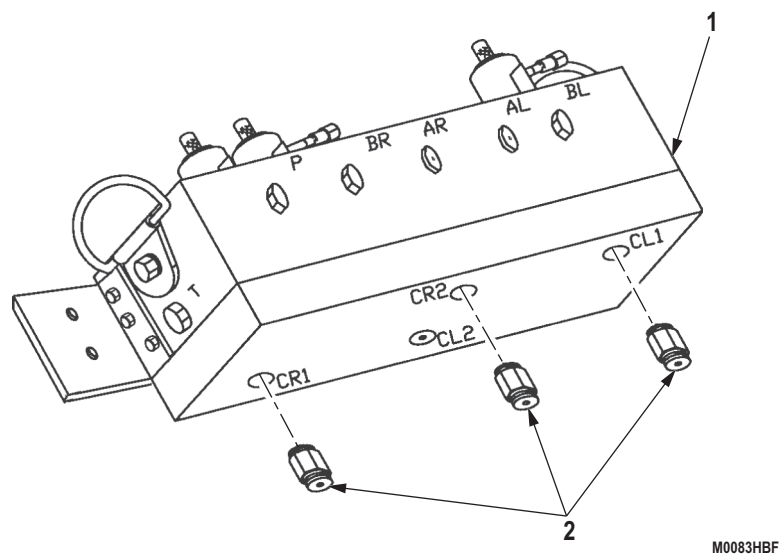
**REMOVAL - Continued**

7. Use suitable lifting device to support track and blade manifold (Figure 2, Item 2) and remove two screws (Figure 2, Item 5) from front manifold mount (Figure 2, Item 1) and hull (Figure 2, Item 6).
8. Remove two screws (Figure 2, Item 4) from rear manifold mount (Figure 2, Item 3) and hull (Figure 2, Item 6).



*Figure 2. Track and Blade Manifold Removal.*

9. Remove three straight adapters (Figure 3, Item 2) from track and blade manifold bottom (Figure 3, Item 1) at ports CR1, CR2, and CL1.



*Figure 3. Track and Blade Manifold Removal.*

**REMOVAL - Continued**

10. Remove two screws (Figure 4, Item 6), flat washers (Figure 4, Item 7), and tie downs (Figure 4, Item 1) from track and blade manifold assembly (Figure 4, Item 4).
11. Remove six screws (Figure 4, Item 2), rear manifold mount (Figure 4, Item 3), and front manifold mount (Figure 4, Item 5) from track and blade manifold assembly (Figure 4, Item 4).

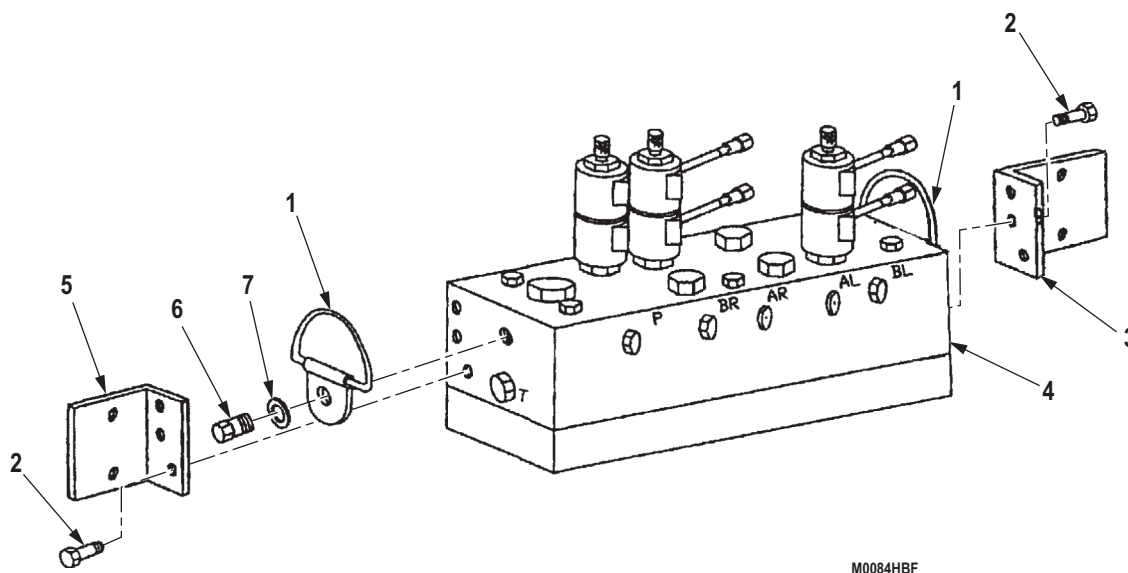
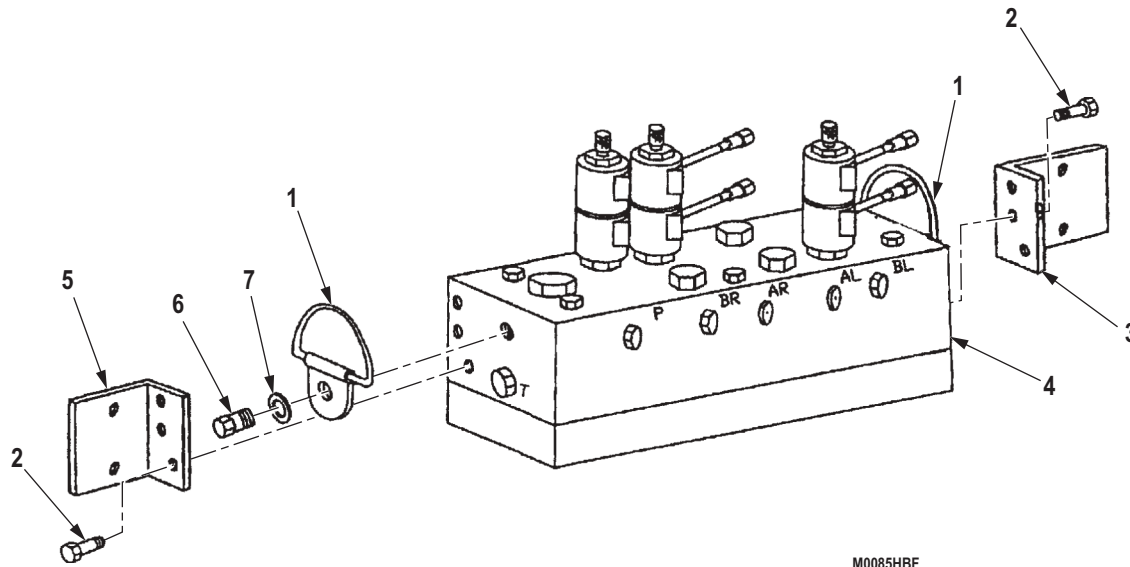


Figure 4. Track and Blade Manifold Removal.

**END OF TASK**

**INSTALLATION**

1. Install two tie downs (Figure 5, Item 1), flat washers (Figure 5, Item 7), and screws (Figure 5, Item 6) to track and blade manifold mount assembly (Figure 5, Item 4). Torque to 45 to 50 lb-ft (61 to 68 N·m).
2. Install rear manifold mount (Figure 5, Item 3), front manifold mount (Figure 5, Item 5), and six screws (Figure 5, Item 2) to track and blade manifold assembly (Figure 5, Item 4).



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*Figure 5. Track and Blade Manifold Installation.*

**INSTALLATION - Continued**

3. Install three straight adapters (Figure 6, Item 2) on track and blade manifold bottom (Figure 6, Item 1), ports CR1, CR2, and CL1.

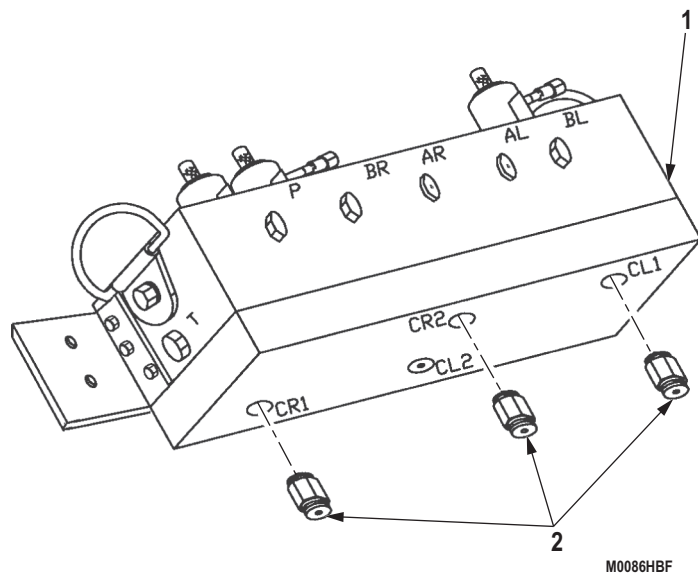


Figure 6. Track and Blade Manifold Installation.

4. Use suitable lifting device to lift front manifold mount (Figure 7, Item 5), rear manifold mount (Figure 7, Item 2), and track and blade manifold (Figure 7, Item 1) to hole in hull wall (Figure 7, Item 4) and attach with four screws (Figure 2, Item 3).

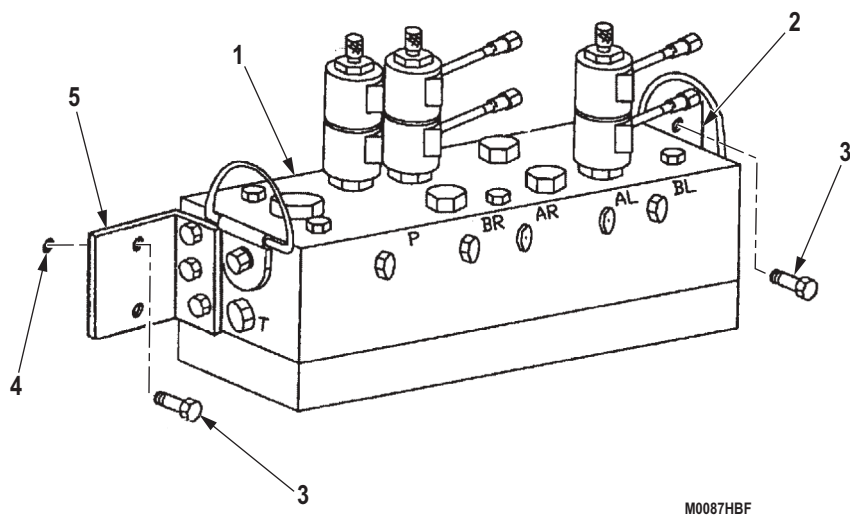
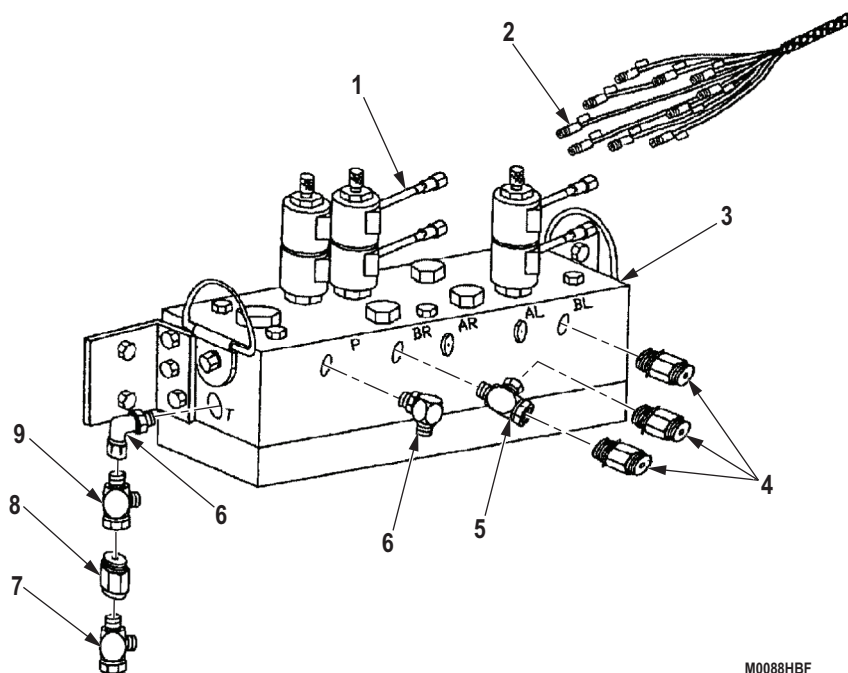


Figure 7. Track and Blade Manifold Installation.

**INSTALLATION - Continued**

5. Install elbow (Figure 8, Item 6) to track and blade manifold (Figure 8, Item 3), port T.
6. Install tee (Figure 8, Item 7), reducer (Figure 8, Item 8), and tee (Figure 8, Item 9) to elbow (Figure 8, Item 6) on track and blade manifold (Figure 8, Item 3), port T.
7. Install elbow (Figure 8, Item 6) to track and blade manifold (Figure 8, Item 3), port P.
8. Install tee (Figure 8, Item 5) to track and blade manifold (Figure 8, Item 3), port BR.
9. Install two straight adapters (Figure 8, Item 4) to tee (Figure 8, Item 5).
10. Install straight adapter (Figure 8, Item 4) to track and blade manifold (Figure 8, Item 3), port BL.
11. Install ten control box power harness wiring harness connectors (Figure 8, Item 1) to ten coil connectors (Figure 8, Item 2).



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Figure 8. Track and Blade Manifold Installation.

**END OF TASK****FOLLOW-ON MAINTENANCE**

1. Install hydraulic hoses (WP 0042).
2. Install right, center, and left rear floor plates (TM 5-2350-262-10).

**END OF TASK****END OF WORK PACKAGE**

---

## FIELD MAINTENANCE GENERAL REPAIR AND CLEANING METHODS

---

### INITIAL SETUP:

#### Materials/Parts

Cleaning Compound, Solvent  
(WP 0070, Table 1, Item 6)  
Cloth, Crocus  
(WP 0070, Table 1, Item 9)  
Dishwashing Compound, Hand  
(WP 0070, Table 1, Item 10)  
Rag, Wiping (WP 0070, Table 1, Item 25)

#### Personnel Required

Construction Equipment Repairer, 91L

#### References

TM 9-214  
TM 9-237  
WP 0051

---

## FIELD MAINTENANCE PROCEDURES

### GENERAL

1. These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain your M9 ACE. You should read and understand these practices and methods before performing any maintenance tasks.
2. Before beginning a task, find out how much repair, modification, or replacement is needed to fix the equipment as described in this manual. Sometimes the reason for equipment failure can be seen right away, and complete teardown is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged or broken parts.
3. The following "Initial Setup" information applies to all procedures:  

Resources are not listed unless they apply to the procedure.
4. All tags and forms attached to equipment must be checked to learn the reason for removal from service. Modification Work Orders (MWOs) and Technical Bulletins (TBs) must also be checked for equipment changes and updates.
5. In some cases, a part may be damaged by removal. If the part appears to be good and other parts behind it are not defective, leave it on and continue with the procedure. Here are a few simple rules:
  - a. Do not remove dowel pins or studs unless loose, bent, broken, or otherwise damaged.
  - b. Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind them, pull bearings and bushings out carefully.
  - c. Replace all gaskets, seals, and preformed packings.

**WORK SAFETY**

1. Observe all WARNINGS and CAUTIONs. Always use power tools carefully.
2. Protect yourself against injury. Wear protective gear, such as safety goggles or lenses, safety shoes, rubber apron, or gloves.
3. When lifting heavy parts, have someone help you. Make sure that lifting/jacking equipment is working properly, is suitable for the assigned task, and is secure against slipping.

**END OF TASK****CLEANING INSTRUCTIONS****WARNING**

Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel or damage equipment.

**General**

Cleaning instructions will be the same for a majority of parts and components that make up the M9 ACE. The following should apply to all cleaning, inspection, repair, and assembly operations:

1. Clean all parts before inspection, after repair, and before assembly.
2. Keep hands free of grease, which can collect dust, dirt, and grit.
3. After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled.

**Steam Cleaning**

1. Before steam cleaning exterior of M9 ACE, protect all electrical equipment that could be damaged by steam or moisture.
2. Place disassembled parts in a suitable container to steam clean. Parts that are subject to rust should be dried and lightly oiled after cleaning.

**Castings, Forgings, and Machined Metal Parts****WARNING**

Cleaning solvent is combustible. Wear protective goggles and gloves; use only in a 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 cleaning solvent; the flashpoint is 144°F (62°C). Failure to follow this warning may result in injury or death to personnel. A fire extinguisher will be kept nearby when the solvent is used.



**Castings, Forgings, and Machined Metal Parts - Continued**

1. Clean inner and outer surfaces with cleaning compound solvent.
2. Remove grease and accumulated deposits with a stiff bristle brush.

**WARNING**

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

3. Clear out all threaded holes with compressed air to remove dirt and cleaning fluids.

**Oil Seals, Electrical Cables, and Flexible Hoses**

Wash electrical cables and flexible hoses with solution of water and dishwashing compound and wipe dry with clean rags.

**Bearings**

Clean bearings in accordance with TM 9-214.

**END OF TASK****INSPECTION INSTRUCTIONS****NOTE**

All damaged areas should be marked for repair or replacement.

1. All components and parts must be carefully checked to determine if they are serviceable for reuse, can be repaired, or must be scrapped.
2. Inspect drilled and tapped (threaded) holes for the following:
  - a. In or around holes—wear, distortion, cracks, and any other damage.
  - b. Threaded areas—wear, distortion (stretching) and evidence of cross-threading.
3. Inspect metal lines, flexible lines (hoses), and metal fittings for the following:
  - a. Metal lines—sharp kinks, cracks, bad bends, and dents.
  - b. Flexible lines—fraying, evidence of leakage, and loose metal fittings or connectors.
  - c. Metal fittings and connectors—thread damage and worn or rounded hex heads.
4. Inspect castings, forgings, and machined metal parts for the following:
  - a. Machine surfaces—nicks, burrs, raised metal, wear, and other damage.
  - b. Inner and outer surfaces—breaks and cracks.
5. With solution of dishwashing compound and water, inspect air lines, fittings, and connectors for leaks by coating fittings and connections. No leakage is permissible.

## **INSPECTION INSTRUCTIONS - Continued**

6. Inspect bearings in accordance with TM 9-214.

### **END OF TASK**

## **REPAIR INSTRUCTIONS**

1. Any repair procedure peculiar to a specific part or component is covered in the section or paragraph relating to that item. After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.
2. Repair casting, forgings, and machined metal parts according to the following instructions:
  - a. Refer to TM 9-237 for instructions on repairing minor cracked castings or forgings.
  - b. Repair minor damage to machined surfaces with a fine mill file or abrasive cloth dipped in cleaning compound solvent.
  - c. Replace any deeply nicked machined surface that could affect the assembly operation.
  - d. Repair minor damage to threaded capscrew holes with thread tap of same size, to prevent cutting oversize.
3. Refer to General Hydraulic System Repair Methods (WP 0051) for maintenance on metal lines, flexible lines (hoses), and metal fittings.

### **END OF TASK**

## **TAGGING WIRES AND HOSES**

1. As soon as first wire or hose is disconnected, write the number "1" on two tags. Secure one tag to wire or hose and other tag to terminal, nipple, or fitting. After disconnecting second wire or hose, write the number "2" on two tags. Secure one tag to wire or hose and second tag to terminal, nipple, or fitting. Do the same for all wires and hoses.
2. Note which numbers you used, in pencil, on art in this manual. This will help you to retag properly when you remove tags from some parts to perform cleaning and maintenance work.
3. Remove all tags when finished.

### **END OF TASK**

## **END OF WORK PACKAGE**

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## FIELD MAINTENANCE BLOCKING/UNBLOCKING THE HULL

---

### INITIAL SETUP:

#### Tools and Special Tools

Stand, Vehicle (WP 0071, Table 1, Item 6)

#### References

TM 5-2350-262-10

#### Personnel Required

Construction Equipment Repairer, 91L (Two)

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### BLOCKING/UNBLOCKING THE HULL

To block vehicle, start the engine (TM 5-2350-262-10) and place the SPRUNG/UNSPRUNG control lever (Figure 1, Item 2) in UNSPRUNG. Position both suspension control levers (Figure 1, Item 1) to lower front end fully. When rear of vehicle reaches its highest position, have assistant place support stands (Figure 1, Item 3) under both front corners of hull. Before shutting off engine (TM 5-2350-262-10), position ejector about midway in bowl. Reverse procedure to unblock hull.

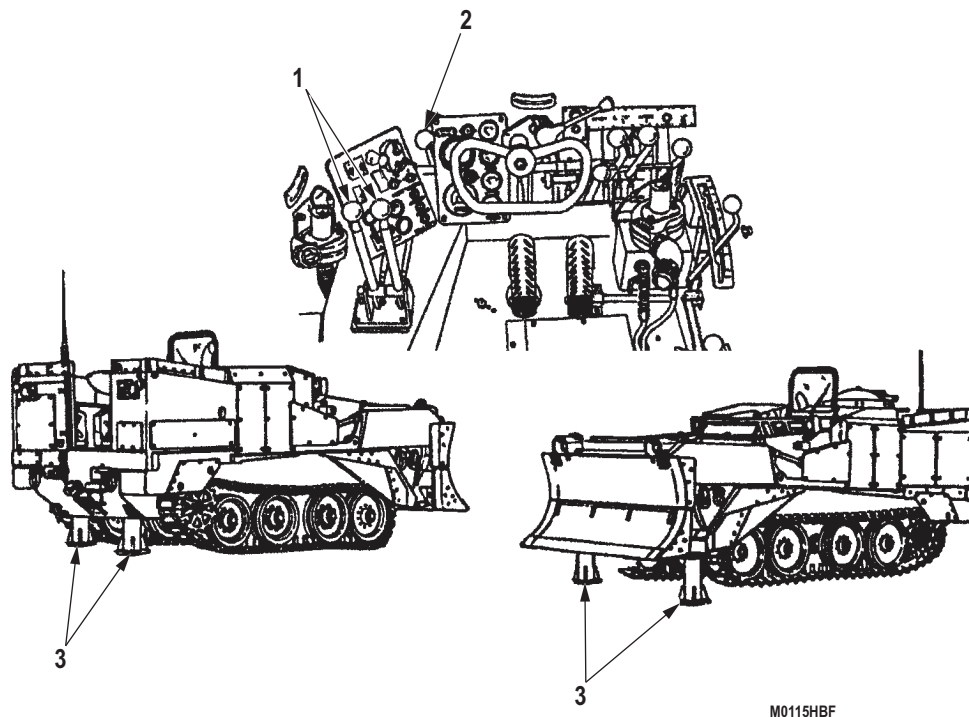


Figure 1. Blocking/Unblocking the Hull.

END OF TASK

END OF WORK PACKAGE



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## FIELD MAINTENANCE BLOCKING TRACK OR ROADWHEELS

---

### INITIAL SETUP:

#### Materials/Parts

Suitable Blocks

#### References

TM 5-2350-262-10

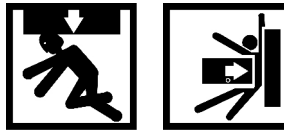
#### Personnel Required

Construction Equipment Repairer, 91L

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### BLOCKING TRACK OR ROADWHEELS

#### WARNING



Block track or roadwheels when parking brake is released, steer unit brake levers are disconnected, or when track is disconnected. Vehicle can roll causing damage to equipment, severe injury, or death to personnel.

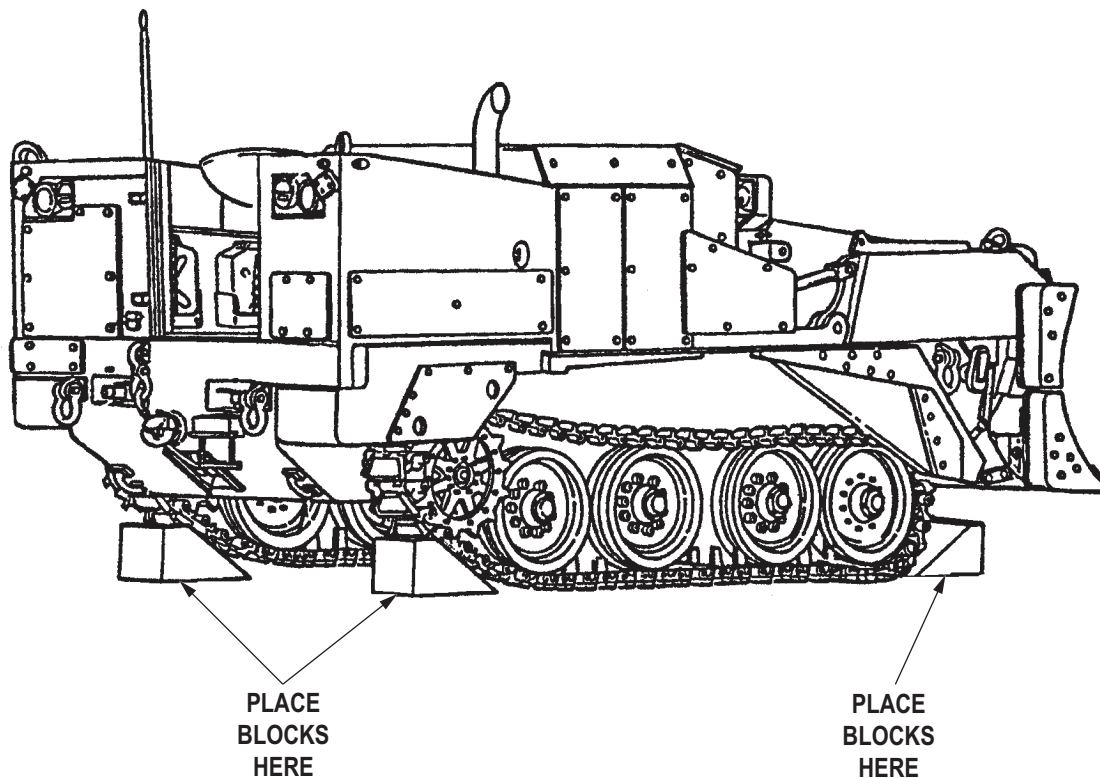
#### NOTE

If blocks are not available, use timbers 12 to 18 inches high (30 to 46 cm).

1. Stop vehicle on hard, level surface. Stop engine (TM 5-2350-262-10).

**BLOCKING TRACK OR ROADWHEELS - Continued**

2. Place blocks or suitable material in front of track at No. 1 roadwheel and between drive sprocket and No. 4 roadwheel on each side of vehicle. If track is disconnected, place blocks or suitable material directly against No. 1 and No. 4 roadwheels on each side of vehicle (Figure 1).



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*Figure 1. Blocking Track or Roadwheels.*

**END OF TASK****END OF WORK PACKAGE**

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## FIELD MAINTENANCE WIRING HARNESS AND CABLE REPAIR

---

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

#### References

TB SIG 222

#### Personnel Required

Construction Equipment Repairer, 91L

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### WIRING HARNESS AND CABLE REPAIR

This work package contains instructions on repair of wiring harnesses and cables (leads). Repair of wiring harnesses and cables consists of replacement of defective connectors, shells, and terminals, or taping cut or worn insulation and exposed wire conductors. This work package shows exploded views of typical harness and cable connectors used on the vehicle and give procedures for disassembly and assembly of connectors. When soldering required, procedures in TB SIG 222 must be followed. If multiple pin connectors are disassembled, tag or label all wires and cables to ensure that correct connections are made at time of assembly.

## TYPICAL PANEL MOUNTING RECEPTACLE

### DISASSEMBLY

1. Remove nut from shell assembly and slide back on cable (Figure 1).
2. Push grommet back on cable (Figure 1).
3. Push contacts out through rear of insert with pin extractor (Figure 1).
4. Push insert out through rear of shell (Figure 1).
5. Unsolder cable leads from contacts (Figure 1).
6. Remove grommet and nut from cable (Figure 1).

### ASSEMBLY

1. Slide nut over cable (Figure 1).
2. Slide grommet over cable leads (Figure 1).
3. Strip cable insulation equal to depth of solder wells of contacts (Figure 1).
4. Insert cable into solder wells of contacts and solder (Figure 1).
5. Push insert into shell from rear until seated. Groove in insert must be aligned with guide in shell to ensure proper fit (Figure 1).
6. Push contacts into insert from rear until seated (Figure 1).
7. Push grommet down cable and over solder wells of contacts (Figure 1).
8. Install nut on shell assembly (Figure 1).

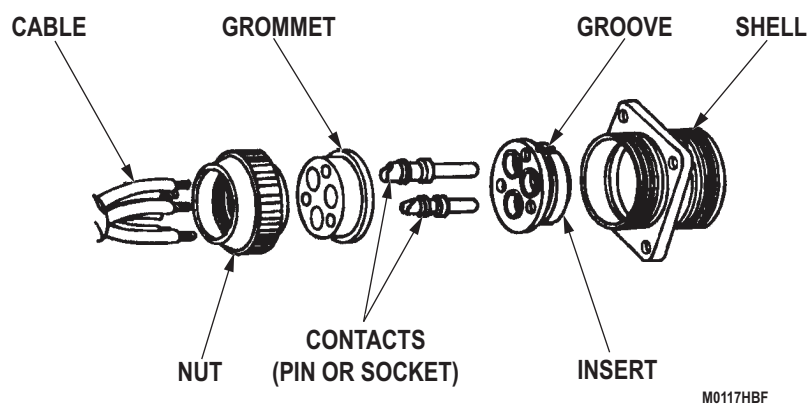


Figure 1. Panel Mount Receptacle Repair.

END OF TASK



## TYPICAL PLUG

### DISASSEMBLY

1. Remove nut from shell assembly and slide back on cable (Figure 2).
2. Slide grommet back on cable (Figure 2).
3. Push contacts out through rear of insert with pin extractor (Figure 2).
4. Push insert through rear of shell (Figure 2).
5. Unsolder cable from contacts (Figure 2).
6. Remove coupling nut, grommet, and nut from cable (Figure 2).

### ASSEMBLY

1. Slide nut over cable (Figure 2).
2. Slide grommet over cable leads (Figure 2).
3. Strip cable insulation equal to depth of solder wells of contacts (Figure 2).
4. Insert cable into solder wells of contacts and solder (Figure 2).
5. Push insert into shell from rear until seated. Groove in insert must be aligned with guide in shell to ensure proper fit (Figure 2).
6. Push contacts into insert from rear until seated (Figure 2).
7. Slide coupling nut onto shell assembly (Figure 2).
8. Push grommet down cable and over solder wells of contacts (Figure 2).
9. Install nut on shell assembly (Figure 2).

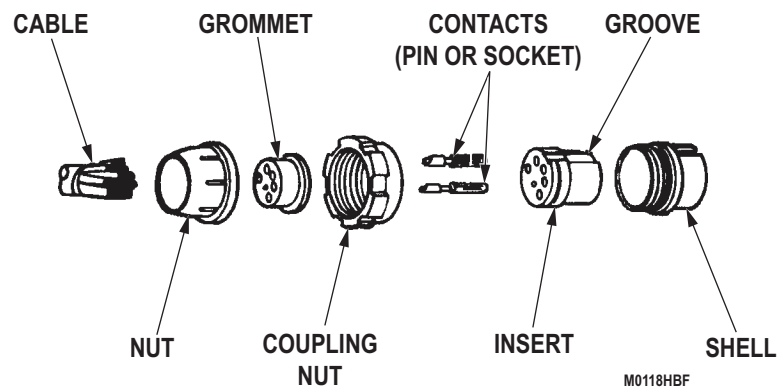


Figure 2. Plug Repair.

END OF TASK

**TERMINAL-TYPE CABLE CONNECTORS REPLACEMENT**

1. Strip cable insulation equal to depth of terminal wall (Figure 3).
2. Slide insulator over cable (Figure 3).
3. Insert cable into terminal well and crimp (Figure 3).
4. Slide insulator over crimped end of terminal (Figure 3).

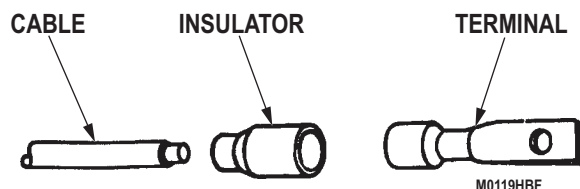


Figure 3. Terminal-type Cable Connector.

**END OF TASK****MALE CABLE CONNECTOR REPLACEMENT**

1. Strip cable insulation equal to depth of ferrule well (Figure 4).
2. Slide shell over cable and remove C-washer (Figure 4).
3. Insert cable into ferrule and crimp (Figure 4).
4. Place C-washer over cable at crimped junction and slide shell over C-washer and ferrule (Figure 4).

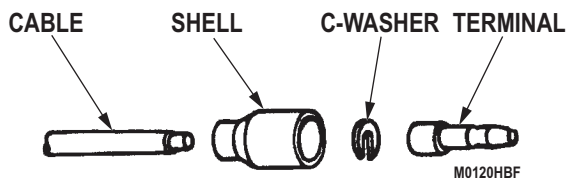


Figure 4. Male Cable Connector.

**END OF TASK**

**FEMALE CABLE CONNECTOR (WITH WASHER) REPLACEMENT**

1. Strip cable insulation approximately 1/8 inch (3 mm) (Figure 5).
2. Slide shell and washer over cable (Figure 5).
3. Place cable into cylindrical end of terminal and crimp (Figure 5).
4. Slide shell and washer over terminal (Figure 5).

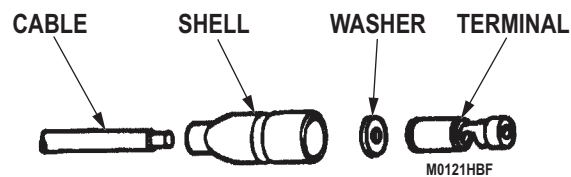


Figure 5. Female Cable Connector with Washer.

**END OF TASK****FEMALE CABLE CONNECTOR (WITH SLEEVE) REPLACEMENT**

1. Strip cable insulation approximately 1/8 inch (3 mm) (Figure 6).
2. Slide shell and sleeve over cable (Figure 6).
3. Insert cable in cylindrical end of terminal and crimp (Figure 6).
4. Slide shell and sleeve over terminal (Figure 6).

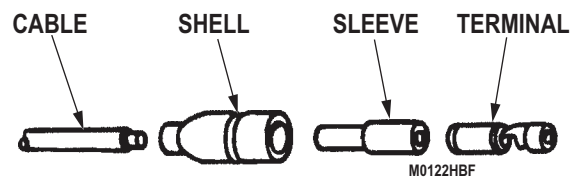


Figure 6. Female Cable Connector with Sleeve.

**END OF TASK****END OF WORK PACKAGE**



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## FIELD MAINTENANCE RELIEVING AIR PRESSURE

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### INITIAL SETUP:

#### Personnel Required

Construction Equipment Repairer, 91L

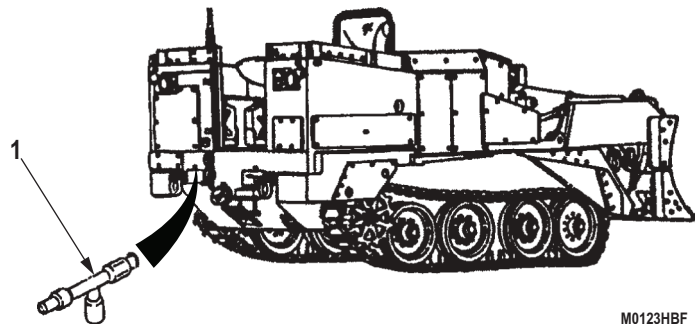
#### References

TM 5-2350-262-10

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### RELIEVING AIR PRESSURE

Stop engine (TM 5-2350-262-10). Press air valve (Figure 1, Item 1) at rear of vehicle and hold open (pressed in) until no air can be heard escaping from the air valve (Figure 1, Item 1).



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*Figure 1. Air Valve.*

**END OF TASK**

**END OF WORK PACKAGE**



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## FIELD MAINTENANCE GENERAL HYDRAULIC SYSTEM REPAIR METHODS

---

### INITIAL SETUP:

#### Tools and Special Tools

Tool Kit, General Mechanic's: Automotive  
(WP 0071, Table 1, Item 7)

#### Personnel Required

Construction Equipment Repairer, 91L

#### Materials/Parts

Lubricating Oil, Engine  
(WP 0070, Table 1, Item 18, 19, 20)

#### References

TM 5-2350-262-10  
MIL-F-18866D

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### GENERAL HYDRAULIC SYSTEM REPAIR METHODS

This work package contains repair methods for hydraulic system. If special repair methods or procedures are required for the hydraulic system components or parts, specific repair instructions are included in the individual maintenance tasks.

#### WARNING



- High pressure is present in the M9 ACE hydraulic system. Do not disconnect any hydraulic system component unless hydraulic system pressure has been relieved. After hydraulic system pressure has been relieved, wait at least four minutes before disconnecting any hose or fitting. Failure to comply may result in severe injury to personnel.
- Spilled hydraulic oil is very slippery. Use caution when entering or working in bowl area. Wipe up any spilled oil immediately. Failure to comply may result in severe injury to personnel.

**GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued****CAUTION**

- ALWAYS clean around fittings before disconnecting or connecting hoses or fittings. Ensure area is clean before installing hydraulic components. Failure to comply may result in damage to equipment.
- Cover, cap, or plug all openings, ports, and tube or hose endings when disconnected. Failure to comply may result in damage to equipment.
- Ensure fittings are connected to fittings of the same design or damage to equipment may result. Connecting unlike fittings may not damage threads, but is not a guarantee that the connection will not leak.
- Fittings must be installed and tightened. If a fitting cannot be tightened, it may be cross-threaded or have damaged threads. Failure to comply may result in damage to equipment. Use wrench only for final tightening.
- Do not use TEFLON tape as a sealer on any fittings. It can separate from the fittings and cause control valves, relief valves, and actuators to become contaminated and fail. Failure to comply may result in damage to equipment.
- It is possible to connect a male national pipe thread (NPT) to female straight thread, but the fitting will leak. Learn to recognize the very slight taper which an NPT has (see illustration below). Do not attempt to connect NPT and female straight threads. Failure to comply may result in damage to equipment.
- Do not attempt to use the parts of the flare fitting and the flareless fitting with each other. The connection will leak.
- Use caution when connecting NPTs. If overtightened, the female pipe thread will split. If a connection leaks, disconnect and apply thread sealant. Reconnect the threads and snug up with wrench. Failure to comply may result in damage to equipment.
- Do not apply sealant to the first threads of NPT fittings. If sealant enters the hydraulic system, it may cause components to fail.
- Use caution when installing preformed packings. Sharp threads can nick the packing, causing connection to leak. Failure to comply may result in damage to equipment. If fitting leaks, check packing for nicks or cuts and replace if necessary.
- Do not overtighten a flareless connection. Observe torque values at end of work package. Overtightening can cause leakage, requiring replacement of entire tube assembly.
- When connecting a hose to a fitting, ALWAYS USE TWO WRENCHES. Use one wrench to turn the swivel nut onto the fittings, and use another wrench to keep the fitting from rotating.

**RELIEVING HYDRAULIC PRESSURE****NOTE**

The following information is provided to familiarize personnel with the various types of hydraulic fittings. Refer to this section and the warnings and cautions on the previous page when working on hydraulic systems.

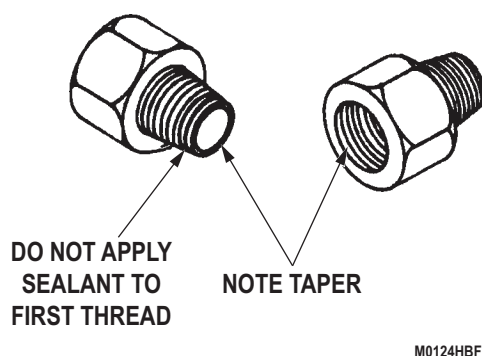
1. Refer to TM 5-2350-262-10.



**GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued****RELIEVING HYDRAULIC PRESSURE - Continued****CAUTION**

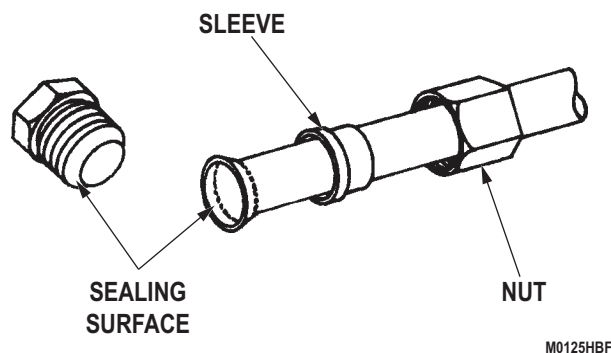
Do not apply sealant to the first threads of fittings. If sealant enters into the hydraulic system, it may cause components to fail.

2. National Pipe Thread (NPT). This thread is commonly found in hydraulic systems. It differs from other fittings in that it is tapered. In order to obtain a proper seal with this thread, you must use a sealant. The sealant should be applied to the male fitting (Figure 1). Torque value guide in this work package, is NOT to be used.



*Figure 1. National Pipe Thread (NPT).*

3. 37-Degree Flare. The 37-degree flare termination has a male straight thread that mates with a female straight thread. The sealing surface for this termination is the angled nose at the end of the male fitting. This nose mates with a similar surface in the female 37-degree flare fitting (Figure 2). These sealing surfaces must be free of nicks and scratches in order to seal properly. If nicked or scratched, item must be replaced. For torque requirements, see guide at end of work package.



*Figure 2. 37-Degree Flare.*

## GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued

### RELIEVING HYDRAULIC PRESSURE - Continued

#### CAUTION

Packing must be seated fully into groove and not on threads. Failure to comply may damage packing, resulting in damage to equipment.

4. O-ring (preformed packing) Boss. This termination also has a straight thread. The seal for this termination is a performed packing that fits at the top of the threads on the male fitting. This packing is squeezed into the extra space at the top of the threads of the female fitting and seals the connection (Figure 3). The installed packing must be free of nicks and cuts to seal properly. If packing is nicked or cut, it must be replaced.

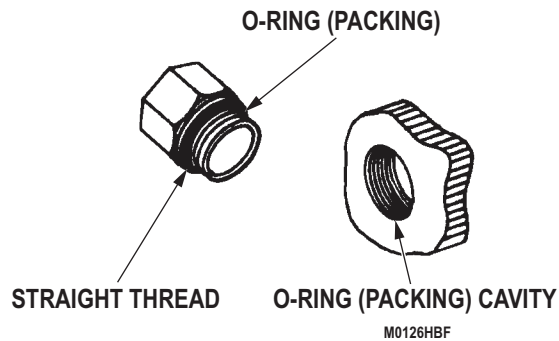


Figure 3. O-ring (Preformed Packing) Boss.

5. Flareless. This fitting also uses a straight thread. The female fitting contains a ferrule that mates with a cavity in the male fitting (Figure 4). Use recommended torque values to tighten nut, see guide at end of work package. If this fitting is over torqued, the ferrule will be deformed and the fitting will leak.

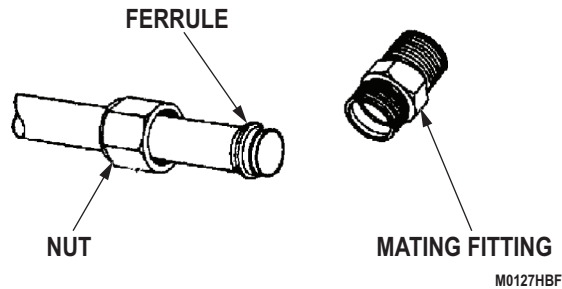
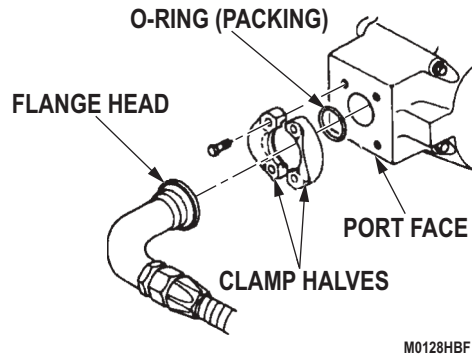


Figure 4. Flareless.

**GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued****RELIEVING HYDRAULIC PRESSURE - Continued****CAUTION**

Nicks, cuts, or scratches are cause for parts replacement or repair. Failure to comply may result in damage to equipment.

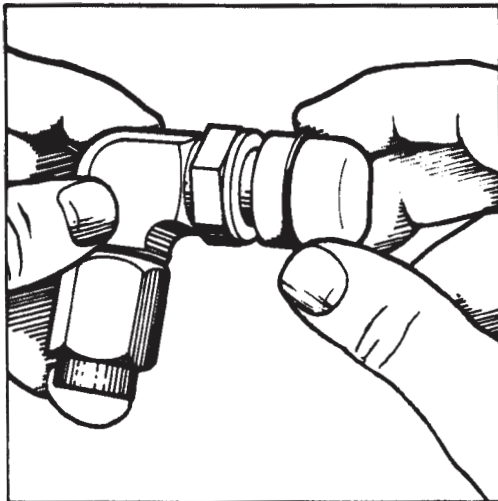
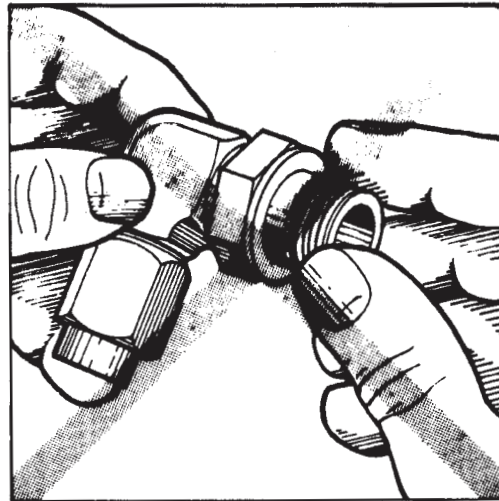
6. 4-bolt Split Flange. The 4-bolt split flange has a flange head that is clamped to a smooth face. The flange head uses a performed packing that is squeezed between the head and the face (Figure 5). The face and end of flange head must be free of nicks and scratches to seal properly. The packing must also be free of nicks or cuts or the connection will leak.



*Figure 5. 4-Bolt Split Flange.*

**GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued****INSTALLATION PACKINGS (O-RINGS)**

1. Before installing a new packing, inspect the threads and packing seat (cavity) for nicks, cracks, and distortion. Replace any damaged components.
2. Ensure the packing is the correct type and size.
3. Before installation, lubricate the new packing with engine lubricating oil.
4. While installing the packing, always protect it from cuts or nicks. Do not install packing directly over threads (Figure 6). If available, install packing over the plastic or rubber thread guard that is supplied with new fittings. If no thread guard is available, protect the packing by wrapping the fitting threads with heavy, smooth, lint-free paper. See the illustrations below.
5. If a backup washer is used with the packing, it must be free of cuts, nicks, or distortion. An unserviceable backup washer can cause the packing to distort or rupture when hydraulic pressure is applied and result in a serious oil leak.
6. After the packing is installed, inspect it for damage and replace it again if necessary. Also, ensure it is not twisted or distorted.

**CORRECT METHOD****INCORRECT METHOD**

M0129HBF

*Figure 6. O-ring Installation.*

## GENERAL HYDRAULIC SYSTEM REPAIR METHODS - Continued

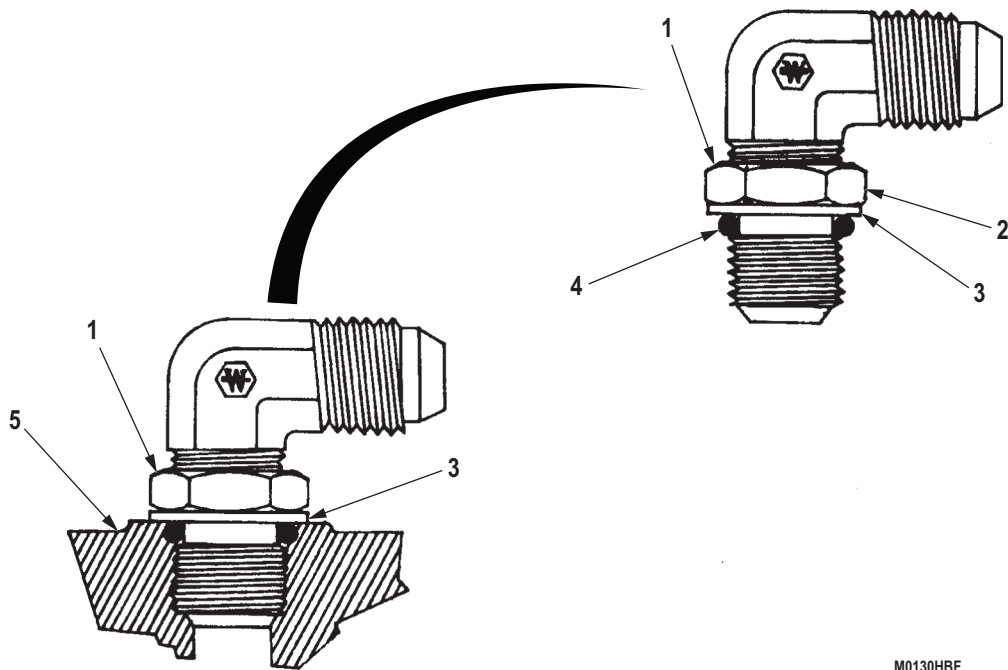
### INSTALLATION OF ADJUSTABLE FITTINGS

1. Lubricate packing (O-ring) (Figure 7, Item 4) with lubricating oil (OE/HDO-10).

#### CAUTION

Packing must be located fully in groove and not on threads, or packing will be damaged, resulting in damage to equipment.

2. Gently push backup washer (Figure 7, Item 3) and packing (Figure 7, Item 4) all the way into groove (Figure 7, Item 2).
3. Turn locknut (Figure 7, Item 1) down until it just contacts the backup washer (Figure 7, Item 3).
4. Install fitting, by hand, into boss (Figure 7, Item 5) until the backup washer (Figure 7, Item 3) contacts the face of the boss (Figure 7, Item 5).
5. Position the fitting to the desired position by backing it out (counterclockwise) to 1 full turn. Hold the fitting in the desired position and tighten locknut (Figure 7, Item 1) with a wrench.
6. Assemble tube to fitting after fitting is properly positioned and tightened.



M0130HBF

Figure 7. Adjustable Fittings.

END OF TASK

## GENERAL QUICK-DISCONNECT REPAIR METHODS

The hydraulic, pneumatic, and fuel systems on the M9 ACE with the HBF-TT use quick-disconnects on many hoses. All are similar. A faulty or damaged quick-disconnect can obstruct flow through the affected hose. To disassemble and assemble a damaged or leaking quick-disconnect, use the following procedures.

### DISASSEMBLY

#### NOTE

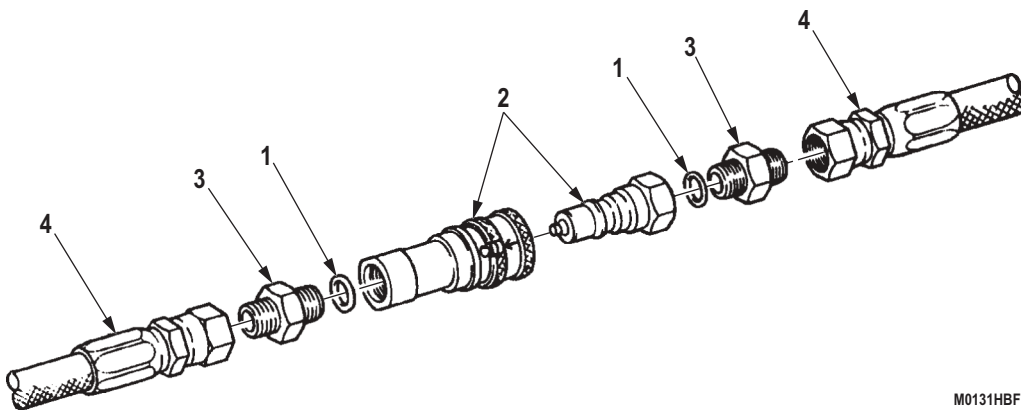
Use two wrenches to disassemble and assemble quick-disconnects.

1. Remove adapters (Figure 8, Item 3) from hoses (Figure 8, Item 4).
2. Remove adapters (Figure 8, Item 3) and packings (Figure 8, Item 1) from quick-disconnect coupling halves (Figure 8, Item 2). Discard packings.
3. Separate quick-disconnect coupling halves (Figure 8, Item 2) by aligning arrow on collar and pulling collar.

### END OF TASK

### ASSEMBLY

1. Coat packings (Figure 8, Item 1) with engine lubricating oil.
2. Install packings (Figure 8, Item 1) and adapters (Figure 8, Item 3) in quick-disconnect coupling halves (Figure 8, Item 2).
3. Install adapters (Figure 8, Item 3) in hoses (Figure 8, Item 4).
4. Connect quick-disconnect coupling halves (Figure 8, Item 2) by aligning arrow on collar and pushing together.



M0131HBF

Figure 8. Quick Disconnect.

**ASSEMBLY - Continued****CAUTION**

Do not use table for assembly of NPT fittings. Overtightening will damage fittings.

**Table 1. Torque Value Guide for Hydraulic Fittings.**

<b>Size</b>	<b>Torque in Pound-Inches</b>	<b>Torque in Pound-Feet</b>	<b>Torque in Newton-Meters</b>
-1 (5/16-24 Thread)	36-48	3-4	4-5
-3 (3/8-24 Thread)	84-96	7-8	4-5
-4 (7/16-20 Thread)	132-144	11-12	15-16
-5 (1/2-20 Thread)	180-192	15-16	20-22
-6 (9/16-18 Thread)	264-300	22-25	30-34
-8 (3/4-16 Thread)	444-492	37-41	50-56
-10 (7/8-14 Thread)	648-696	54-58	73-79
-12 (1-1/16-12 Thread)	900-996	75-83	102-113
-14 (1-3/16-12 Thread)	1044-1200	87-100	118-136
-16 (1-5/16-12 Thread)	1200-1392	100-116	136-157
-20 (1 5/8-12 Thread)	1896-2100	158-175	214-237
-24 (1-7/8-12 Thread)	2700-3000	225-250	305-339
-32 (2-1/2-12 Thread)	3966-4500	333-375	452-509
<b>Note 1.</b> Torquing requirements are extracted from MIL-F-18866D, Table III.			
<b>Note 2.</b> Torque to be used on hose fittings, tube fittings, straight fittings, and SAE/AN ports.			

**END OF TASK****END OF WORK PACKAGE**





## FIELD MAINTENANCE LUBRICATION INSTRUCTIONS

### INITIAL SETUP:

#### Personnel Required

Construction Equipment Repairer, 91L

KEY				
LUBRICANTS	CAPACITIES	EXPECTED TEMPERATURES		
		+32°F and above (0°C and above)	-10° to 40°F (-23° to 4°C)	0° to -65°F (-18° to -54°C)
(MIL-L-G18458) GREASE, WIRE ROPE		MIL-G-18458		
Winch Cable and Drum				
FUEL REQUIREMENTS		TEMPERATURE LIMITS (VV-F-800)		
Grade DF-2 Fuel		For use above +10°F (-12°C)*		
Grade DF-1**		For use below +10°F (-12°C) to above -20°F (-29°C)		
Grade DF-A		For use below -20°F (-29°C)		
Grade JP8		For use above -60°F (-51°C)		
* Usage temperature may vary dependent on the cloud point of the actual DF-2 fuel being supplied in the geographical area.				
** DF-1 is not normally procured in CONUS or OCONUS. Refineries will blend DF-2 with kerosene to meet temperature requirements of DF-1.				
INTERVALS				
D-Daily		S-Semiannually (6 months) or 200 hours of operation, whichever occurs first.		
M-Monthly or 33 hours of operation, whichever occurs first.		A-Annually (12 months) or 400 hours of operation, whichever occurs first.		

Q-Quarterly  
(3 months) or 100 hours of operation,  
whichever occurs first.

OC-On-condition.

TOTAL MAN-HOURS		TOTAL MAN-HOURS	
INTERVAL MAN-HOURS		INTERVAL MAN-HOURS	
D	0.3	S	2.8
M	1.0	A	4.5
Q	3.7	OC	1.0

KEY					
LUBRICANTS		CAPACITIES	EXPECTED TEMPERATURES		
			+32°F and above (0°C and above)	-10° to 40°F (-23° to 4°C)	0° to -65°F (-18° to -54°C)
OE/HDO MIL-PRF-2104  OEA MIL-PRF-46167	LUBRICATING OIL, Internal Combustion Engine Tactical Service		OE/HDO-30	OE/HDO-10	CEA
	LUBRICATING OIL, Internal Combustion Engine Arctic				
	Engine Crankcase add 4 additional qts (3.8 L) for filters	Refill 22 qts (20.8 L) Dry 30 qts (28.4 L)			
	Winch 35,000 LB (15,890 kg)	4.0 qts (3.8 L)	OE/HDO-10	OE/HDO-10	CEA
	Transmission Steer Unit, Transfer Case Oil Cooler and Lines	Refill 50 qts (47.3 L) Dry 78 qts (73.8 L)			
	Hydraulic Tank	Refill 108 qts (102.2 L)			

KEY					
GO MIL- PRF-2105		Dry	128 qts (121.1 L)		
	Hydraulic Tank Return Line Filter		4 qts (3.8 L)		
	LUBRICATING OIL Gear, Multi-Purpose				
	Final Drives (2)		2 gal. Each (7.6 L)		
			GO-80/90		
GAA MIL- PRF-10924	GREASE, Automotive and Artillery			GAA	
	Roadwheel Hub Bearing				
GMD MIL- G-21164	Molybdenum Disulfide			GMD	
	Hatch Hinge Assembly				
	Prop Shaft				
PL (Medium) MIL- PRF-3150	LUBRICATING OIL			PL-M Medium	PL-S Special
PL (Special) MIL- PRF-32033	Oil Can Points				
GENERAL NOTE 1		If OEA lubricant is required to meet the temperature ranges specified in key. OEA is to be used in all places where OE/HDO-10 is specified.			
GENERAL NOTE 2		The use of OE/HDO 15W-40 in lieu of OE/HDO-30 is authorized. The OE/HDO 15W-40 can be used at all temperatures above +5°F (-15°C) for all components except the transmission, transfer case, steer unit, and final drives.			

END OF WORK PACKAGE



## FIELD MAINTENANCE TORQUE LIMITS

### TORQUE VALUES

Use the torque values listed in the maintenance procedures, if they are given. When no torque values are given in the maintenance procedures, refer to the torque value guide in this work package for fasteners, or the hydraulic fitting torque value guide in General Hydraulic System Repair Methods (WP 0051) for hydraulic hoses, tubes, and fillings.

*Table 1. Torque Limits for Dry Fasteners.*

SHANK SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLI-METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	5-6	6.8-8.13	9-11	12.2-14.9	12-15	16.3-20.3
5/16	7.94	10-12	13.6-16.3	17-20.5	23.1-27.8	24-29	32.5-39.3
3/8	9.53	20-23	27.1-31.2	35-42	47.5-57.0	45-54	61.0-73.2
7/16	11.11	30-35	40.7-47.5	54-64	73.2-86.8	70-84	94.9-113.9
1/2	12.70	45-52	61.0-70.5	80-96	108.5-130.2	110-132	149.2-179.0
9/16	14.29	65-75	88.1-101.7	110-132	149.2-179.0	160-192	217.0-260.4
5/8	15.88	95-105	128.8-142.4	150-180	203.4-244.1	220-264	298.3-358.0
3/4	19.05	150-185	203.4-250.8	270-324	366.1-439.3	380-456	515.3-618.3
7/8	22.23	160-200	216.9-271.2	400-480	542.4-650.9	600-720	813.6-976.3
1	25.40	250-300	339-406.8	580-696	786.5-943.8	900-1080	1220.4-1464.5
1-1/8	25.58	-	-	800-880	1084.8-1193.3	1280-1440	1735.7-1952.6
1-1/4	31.75	-	-	1120-1240	1518.7-1681.4	1820-2000	2467.9-2712.0
1-3/8	34.93	-	-	1460-1680	1979.8-2278.1	2380-2720	3227.3-3688.3
1-1/2	38.10	-	-	1940-2200	2630.6-2983.2	3160-3560	4285.0-4827.4

**Table 2. Torque Limits for Wet Fasteners.**

SHANK SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLI-METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	4.5-5.5	6.1-7.5	8-10	10.8-13.6	11-13.5	14.9-18.3
5/16	7.94	9-11	12.2-14.9	15-18.5	20.3-25.1	21.5-26	29.2-35.3
3/8	9.53	18-20.5	24.4-27.8	31.5-38	42.7-51.5	40.5-48.5	55-65.8
7/16	11.11	27-31.5	36.6-42.7	48.5-57.5	65.8-78.0	63-75.5	85.4-102.4
1/2	12.70	40.5-47	54.9-63.7	72-86.5	97.6-117.3	99-119	134.2-161.4
9/16	14.29	58.5-67.5	79.3-91.5	99-119	134.2-161.4	144-173	195.3-234.6
5/8	15.88	85.5-94.5	115.9-128.1	135-162	183.1-219.7	198-237.5	268.5-322.1
3/4	19.05	135-166.5	183.6-225.8	243-291.5	329.5-395.3	342-410	463.8-556
7/8	22.23	144-180	195.3-244.1	360-432	488.2-585.8	540-648	732.2-878.7
1	25.40	225-270	305.1-366.1	522-626	707.8-848.9	810-972	1098.4-1318.0
1-1/8	25.58	-	-	720-792	976.3-1074.0	1152-1296	1562.1-1757.4
1-1/4	31.75	-	-	1008-1116	1366.8-1513.3	1638-1800	2221.1-2440.8
1-3/8	34.93	-	-	1314-1512	1781.8-2050.3	2142-2448	2904.6-3319.5
1-1/2	38.10	-	-	1746-1980	2367.6-2684.9	2844-3204	3856.5-4344.6

**END OF TASK****END OF WORK PACKAGE**

## **CHAPTER 7**

### **PARTS INFORMATION**





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## FIELD MAINTENANCE

### REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

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#### SCOPE

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of Operator and Field Maintenance of the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for the M9 ACE. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

#### GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. **Repair Parts List Work Packages.** Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work packages. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.
2. **Special Tools List Work Packages.** Work packages containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.
3. **Cross-Reference Indexes Work Packages.** There are two cross-reference indexes work packages in this RPSTL: the National Stock Number (NSN) Index work package, and the Part Number (P/N) Index work package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index work package refers you to the figure and item number.

#### EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

**ITEM NO. (Column (1)).** Indicates the number used to identify items called out in the illustration.

**SMR CODE (Column (2)).** The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout. This entry may be subdivided into 4 subentries, one for each service.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

**Table 1. SMR Code Explanation.**

<u>SOURCE CODE</u>	<u>MAINTENANCE CODE</u>	<u>RECOVERABILITY CODE</u>
XX	XX	X
1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair* on the item.
		5th position: Who determines disposition action on unserviceable items.

\*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

**Source Code.** The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

**Table 2. Source Code First and Second Position.**

<u>SOURCE CODE</u>	<u>APPLICATION/EXPLANATION</u>
PA	
PB	
PC	
PD	
PE	
PF	
PG	
PH	
PR	
PZ	
	<b>NOTE</b>
	Items coded PC are subject to deterioration.
	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the third position of the SMR code.
KD	
KF	
KB	
	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.
MF-Made at field	
MH-Made at below sustainment level	
ML-Made at SRA	
MD-Made at depot	
	Items with these codes are not to be requisitioned/requested individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

**Table 2. Source Code First and Second Position - Continued.**

<u>SOURCE CODE</u>	<u>APPLICATION/EXPLANATION</u>
AF-Assembled by field AH-Assembled by below depot sustainment level AL-Assembled by SRA AD-Assembled by depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XB	If an item is not available from salvage, order it using the CAGEC and part number.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's part number.
XD	Item is not stocked. Order an XD-coded item through local purchase or normal supply channels using the CAGEC and part number given, if no NSN is available.

### NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

**Maintenance Code.** Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

**Third Position.** The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following levels of maintenance:

**Table 3. Maintenance Code Third Position.**

<u>MAINTENANCE CODE</u>	<u>APPLICATION/EXPLANATION</u>
F-	Field Maintenance can remove, replace, and use the item.
H-	Below Depot Sustainment maintenance can remove, replace, and use the item.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

**Table 3. Maintenance Code Third Position - Continued.**

<u>MAINTENANCE CODE</u>	<u>APPLICATION/EXPLANATION</u>
L-	Specialized repair activity can remove, replace, and use the item.
Z-	Item is not authorized to be removed, replaced, or used at any maintenance level.
D-	Depot can remove, replace, and use the item.

### NOTE

Army may use C in the third position. However, for joint service publications, Army will use O.

**Fourth Position.** The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

### NOTE

Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

**Table 4. Maintenance Code Fourth Position.**

<u>MAINTENANCE CODE</u>	<u>APPLICATION/EXPLANATION</u>
F-	Field is the lowest level that can do complete repair of the item.
H-	Below Depot Sustainment is the lowest level that can do complete repair of the item.
L-	Specialized repair activity (SRA) is the lowest level that can do complete repair of the item.
D-	Depot is the lowest level that can do complete repair of the item.
Z-	Nonreparable. No repair is authorized.
B-	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

**Recoverability Code.** Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

**Table 5. Recoverability Code Fifth Position.**

<b><u>RECOVERABILITY CODE</u></b>	<b><u>APPLICATION/EXPLANATION</u></b>
Z-	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of SMR Code.
F-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the field level.
H-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the below depot sustainment level.
D-	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
L-	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A-	Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

**NSN (Column (3)).** The NSN for the item is listed in this column.

**CAGEC (Column (4)).** The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

**PART NUMBER (Column (5)).** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

### NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the number listed.

**DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)).** This column includes the following information:

1. The federal item name, and when required, a minimum description to identify the item.
2. Part numbers of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.
4. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list work packages.

**QTY (Column (7)).** The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

## EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

**1. National Stock Number (NSN) Index Work Package.** NSN's in this index are listed in National Item Identification Number (NIIN) sequence.

**STOCK NUMBER Column.** This column lists the NSN in NIIN sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

For example, if the NSN is 5385-01-574-1476, the NIIN is 01-574-1476.

**FIG. Column.** This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list work packages.

**ITEM Column.** The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

**2. Part Number (P/N) Index Work Package.** Part numbers in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

**PART NUMBER Column.** Indicates the part number assigned to the item.

**FIG. Column.** This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.

**ITEM Column.** The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

## SPECIAL INFORMATION

**Fabrication Instructions.** Bulk materials required to manufacture items are listed in the bulk material functional group of this RPSTL. Part numbers for bulk material are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in Illustrated List of Manufactured Items.

**Index Numbers.** Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN/Part Number (P/N) Index work packages and the bulk material list in the repair parts list work package.

## HOW TO LOCATE REPAIR PARTS

### 1. When NSNs or Part Numbers Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

### 2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

**HOW TO LOCATE REPAIR PARTS - Continued****3. When Part Number is Known.**

First. If you have the part number and not the NSN, look in the PART NUMBER column of the part number index work package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list work package.

**END OF WORK PACKAGE**

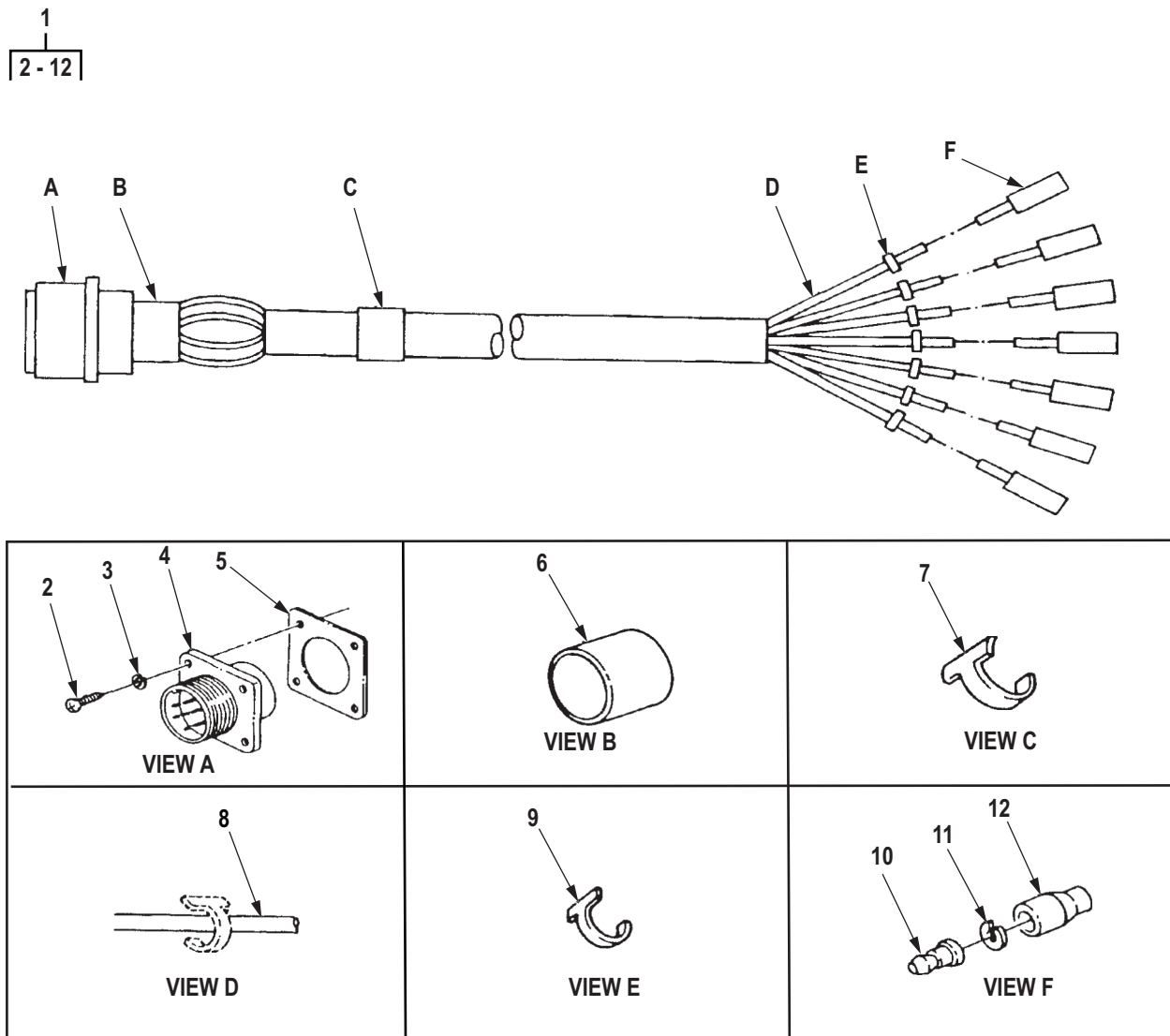




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FIELD MAINTENANCE  
GROUP AJ01 ELECTRICAL SYSTEM

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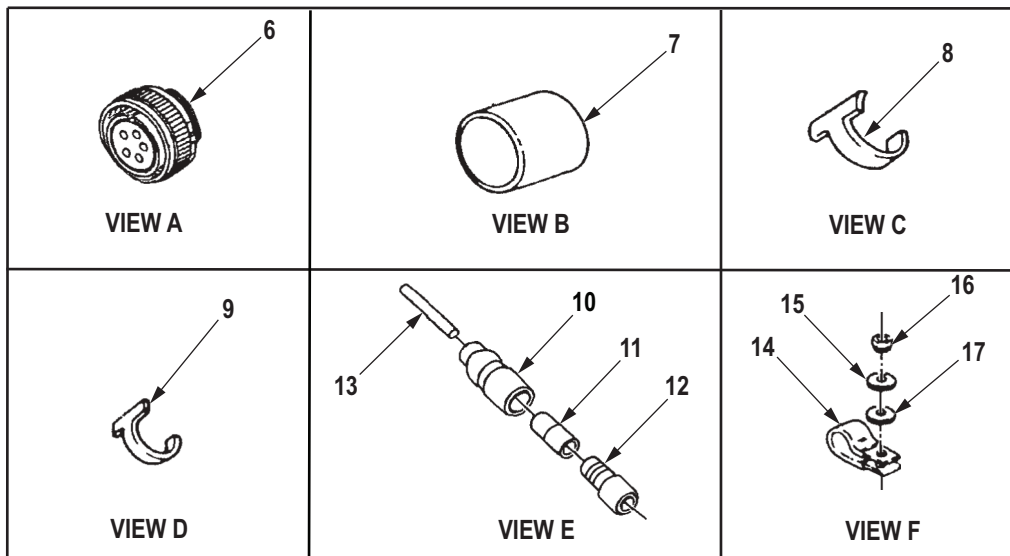
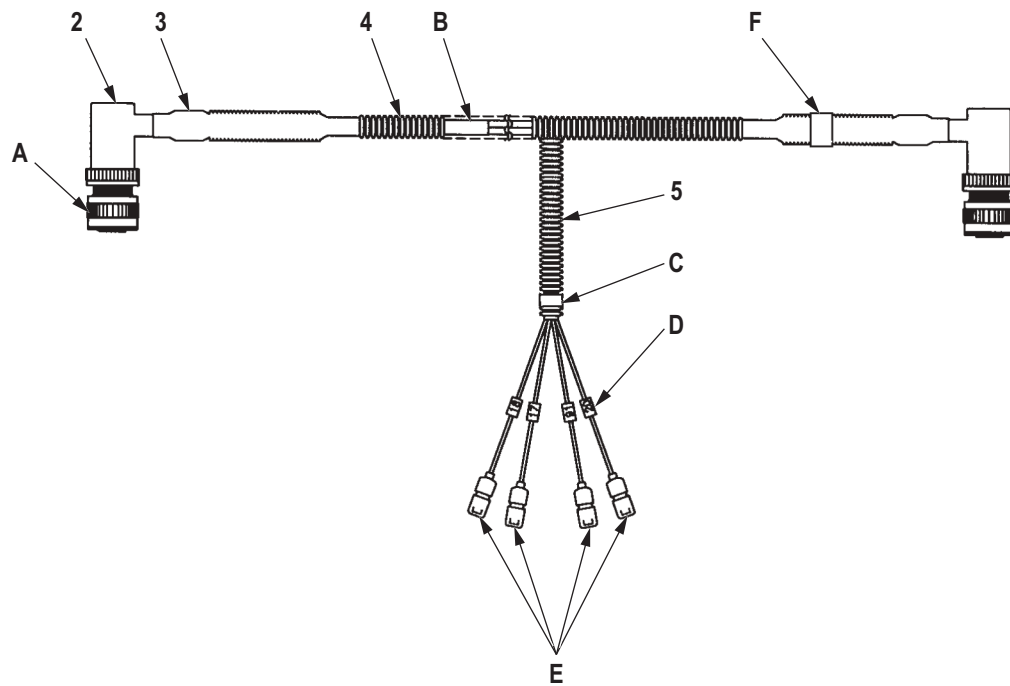
R0001T77

Figure 1. Apron Wiring Harness.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 1. APRON WIRING HARNESS.</b>						
1	PAFFF	5995-01-182-1321	97403	13214E2064	WIRING HARNESS,BRAN.....	1
2	PAFZZ	5305-00-889-2997	80205	MS35206-215	. SCREW,MACHINE.....	4
3	PAFZZ	5310-00-543-2410	80205	MS35338-40	. WASHER,LOCK.....	4
4	PAFZZ	5935-01-213-6433	96906	MS3452W20-15P	. CONNECTOR,RECEPTACL.....	1
5	PAFZZ	5330-01-193-0208	19207	13214E2582	. GASKET.....	1
6	MFFZZ		81343	M23053/1-201-0AR	. INSULATION SLEEVING MAKE FROM INSULATION SLEEVING, ELECTRICAL, P/N M23053/1-201-0, LENGTH AR.....	1
7	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	1
8	MFFZZ		81349	M13486/1-5AR	. WIRE,ELECTRICAL MAKE FROM WIRE, ELECTRICAL, P/N M13486/1-5, LENGTH A/R.....	1
9	PAFZZ	9905-00-935-3863	81349	MIL-B-43436/4-1	. BAND,MARKER.....	14
10	PAFZA	5999-00-057-2929	58536	AA52536-2	. CONTACT,ELECTRICAL.....	7
11	PAFZZ	5310-00-833-8567	19207	8338567	. WASHER,SLOTTED.....	7
12	PAFZZ	5935-00-572-9180	19207	8338566	. SHELL,ELECTRICAL CO.....	7

END OF FIGURE

1  
[ 2 - 17 ]

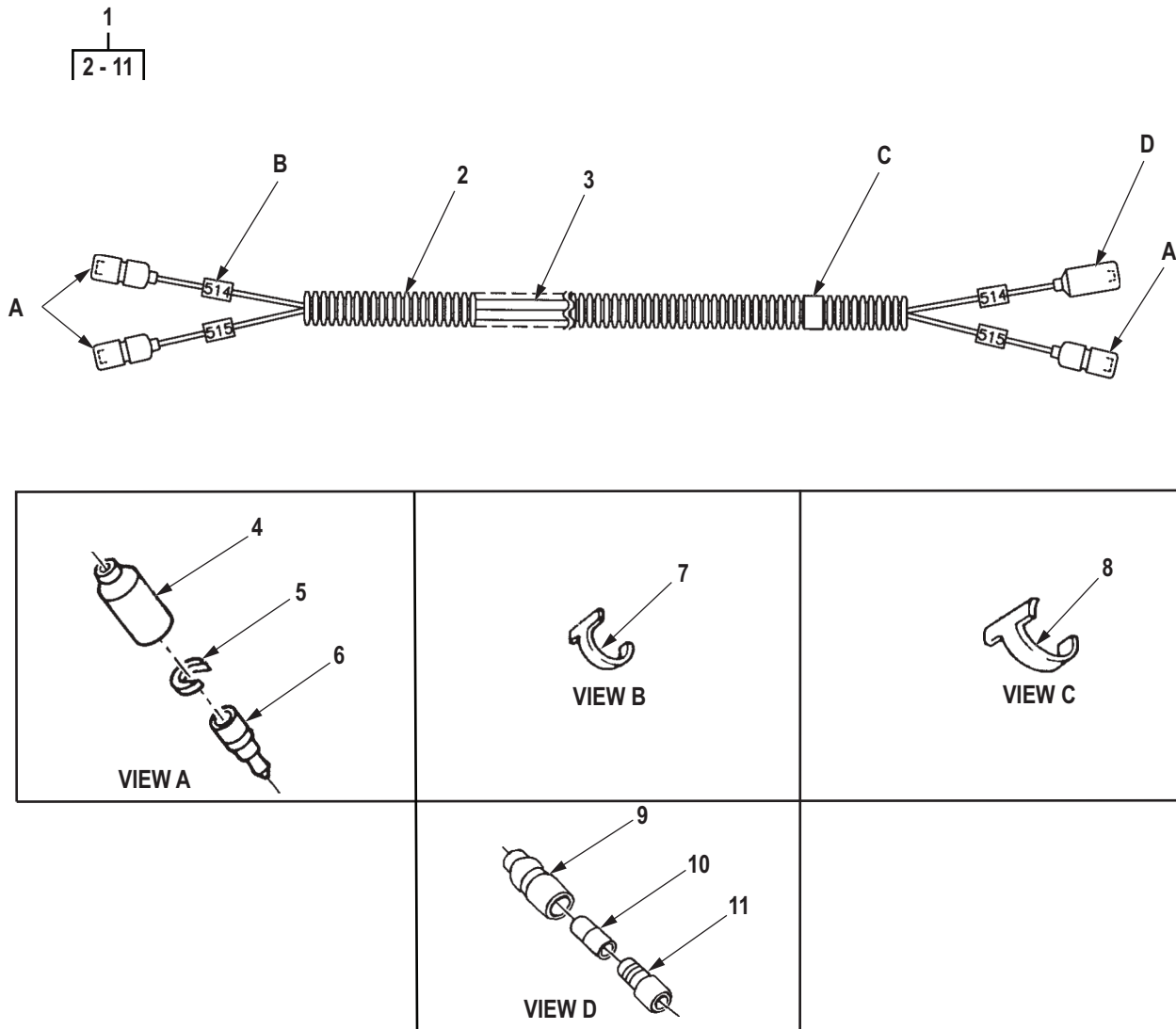


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Figure 2. Headlight Wiring Harness and Mounting Hardware.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 2. HEADLIGHT WIRING HARNESS AND MOUNTING HARDWARE.</b>						
1	PAFFF	5995-01-529-2108	076M6	12491606	WIRING HARNESS,BRAN.....	1
2	PAFZZ	4920-01-553-0753	06090	TXR54B90-1408AI	. ADAPTER,AIRCRAFT,MA.....	2
3	PAFZZ	2530-01-424-7729	06090	202C621-50-0	. BOOT,VEHICULAR COMP.....	2
4	PAFZZ	4720-01-423-2962	19207	12420924-005	. TUBING,NONMETALLIC.....	1
5	PAFZZ	4720-01-421-9723	77060	R-68235	. TUBING,NONMETALLIC.....	1
6	PAFZZ	5935-01-109-7525	96906	MS3475W14-5S	. CONNECTOR,PLUG,ELEC.....	2
7	MFFZZ		81343	M23053/1-105-0	. INSULATION SLEEVE MAKE FROM INSULATION SLEEVING,ELECTRICAL,P/N M23053/1-105-0, LENGTH A/R.....	1
8	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	2
9	PAFZZ	9905-00-935-3863	81349	MIL-B-43436/4-1	. BAND,MARKER.....	4
10	PAFZZ	5935-00-833-8561	19207	8338561	. SHELL,ELECTRICAL CO.....	4
11	PAFZZ	5940-00-399-6676	19207	8338564	. TERMINAL SET,QUICKD.....	4
12	PAFZZ	5970-00-833-8562	77060	5297052	. INSULATOR,BUSHING.....	4
13	MFFZZ		81349	M13486/1-5AR	. WIRE,ELECTRICAL MAKE FROM WIRE,ELECTRICAL,P/N M13486/1-5,LENGTH A/R.....	1
14	PAFZZ	5340-00-854-6729	96906	MS21333-103	. CLAMP,LOOP.....	1
15	PAFZZ	5310-00-582-5965	80205	MS35338-44	. WASHER,LOCK (HBFTT AREA HEADLIGHT WIRING HARNESS ).....	1
16	PAFZZ	5310-00-250-9477	65597	930000-0204	. NUT,PLAIN,HEXAGON.....	1
17	PAFZZ	5310-00-809-4058	96906	MS27183-10	. WASHER,FLAT (USED HEADLIGHT WIRING HARNESS (GP: A ).....	1

END OF FIGURE



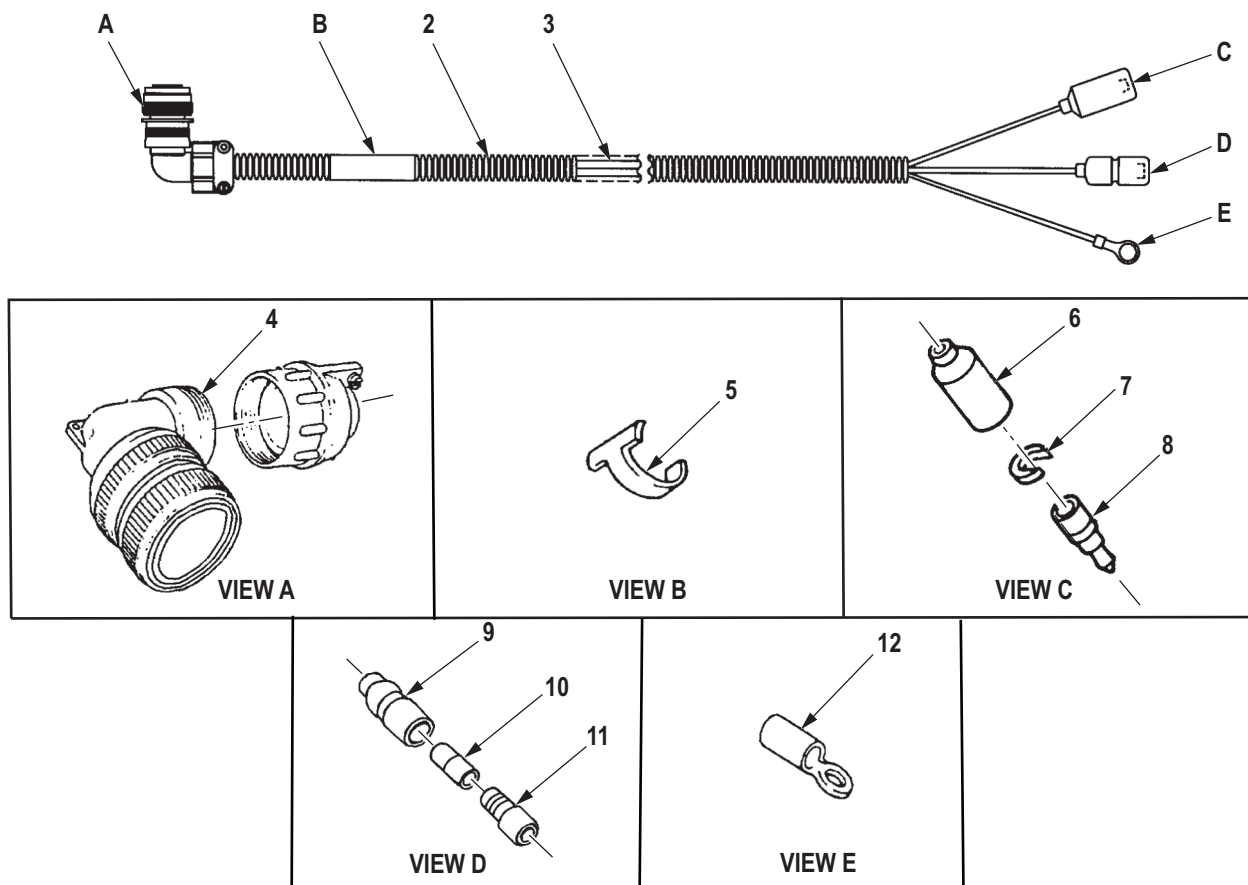
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Figure 3. Blade Folding Wiring Harness.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 3. BLADE FOLDING WIRING HARNESS.</b>						
1	PAFFF	5995-01-529-1535	19207	12491607	WIRING HARNESS,BRAN.....	1
2	PAFZZ	4720-01-421-9723	77060	R-68235	. TUBING,NONMETALLIC.....	1
3	MFFZZ		81349	M13486/1-5AR	. WIRE,ELECTRICAL MAKE FROM WIRE,ELECTRICAL,P/N M13486/1-5,LENGTH A/R.....	1
4	PAFZZ	5935-00-572-9180	19207	8338566	. SHELL,ELECTRICAL CO.....	1
5	PAFZZ	5310-00-833-8567	19207	8338567	. WASHER,SLOTTED.....	1
6	PAFZA	5999-00-057-2929	58536	AA52536-2	. CONTACT,ELECTRICAL.....	1
7	PAFZZ	9905-00-935-3863	81349	MIL-B-43436/4-1	. BAND,MARKER.....	4
8	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	2
9	PAFZZ	5935-00-833-8561	19207	8338561	. SHELL,ELECTRICAL CO.....	3
10	PAFZZ	5940-00-399-6676	19207	8338564	. TERMINAL SET,QUICKD.....	3
11	PAFZZ	5970-00-833-8562	77060	5297052	. INSULATOR,BUSHING.....	3

**END OF FIGURE**

1  
2-12



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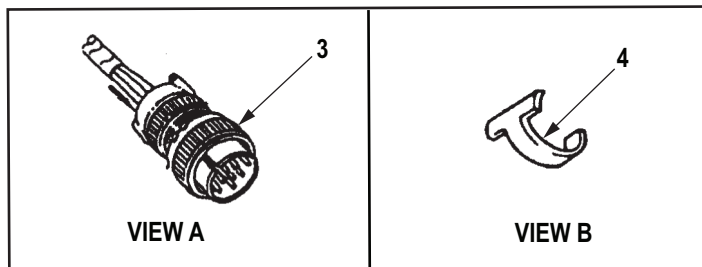
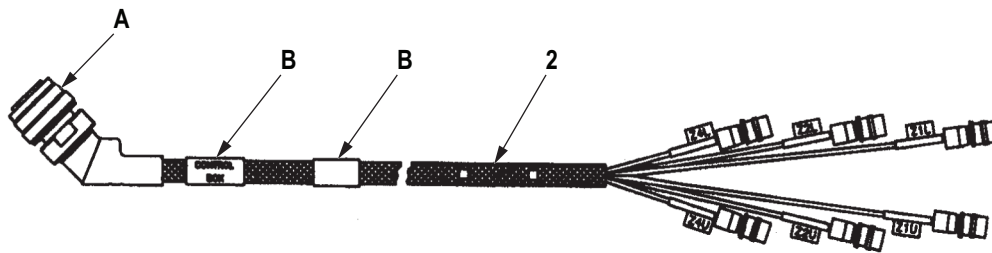
Figure 4. Control Box Power Wiring Harness.



(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 4. CONTROL BOX POWER WIRING HARNESS.</b>						
1	PAFFF	5975-01-529-1565	19207	12491618	BOX CONNECTOR,ELECT.....	1
2	PAFZZ	4720-01-421-9723	77060	R-68235	. TUBING,NONMETALLIC.....	1
3	MFFZZ		81349	M13486/1-5AR	. WIRE,ELECTRICAL MAKE FROM WIRE,ELECTRICAL,P/N M13486/1-5,LENGTH A/R.....	1
4	PAFZZ	5935-01-092-1035	96906	MS3476W14-5S	. CONNECTOR,PLUG,ELEC.....	1
5	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	1
6	PAFZZ	5935-00-572-9180	19207	8338566	. SHELL,ELECTRICAL CO.....	1
7	PAFZZ	5310-00-833-8567	19207	8338567	. WASHER,SLOTTED.....	1
8	PAFZA	5999-00-057-2929	58536	AA52536-2	. CONTACT,ELECTRICAL.....	1
9	PAFZZ	5935-00-833-8561	19207	8338561	. SHELL,ELECTRICAL CO.....	1
10	PAFZZ	5940-00-399-6676	19207	8338564	. TERMINAL SET,QUICKD.....	1
11	PAFZZ	5970-00-833-8562	77060	5297052	. INSULATOR,BUSHING.....	1
12	PAFZZ	5940-00-143-4794	14726	XR5109	. TERMINAL,LUG.....	1

END OF FIGURE

1  
2 - 4



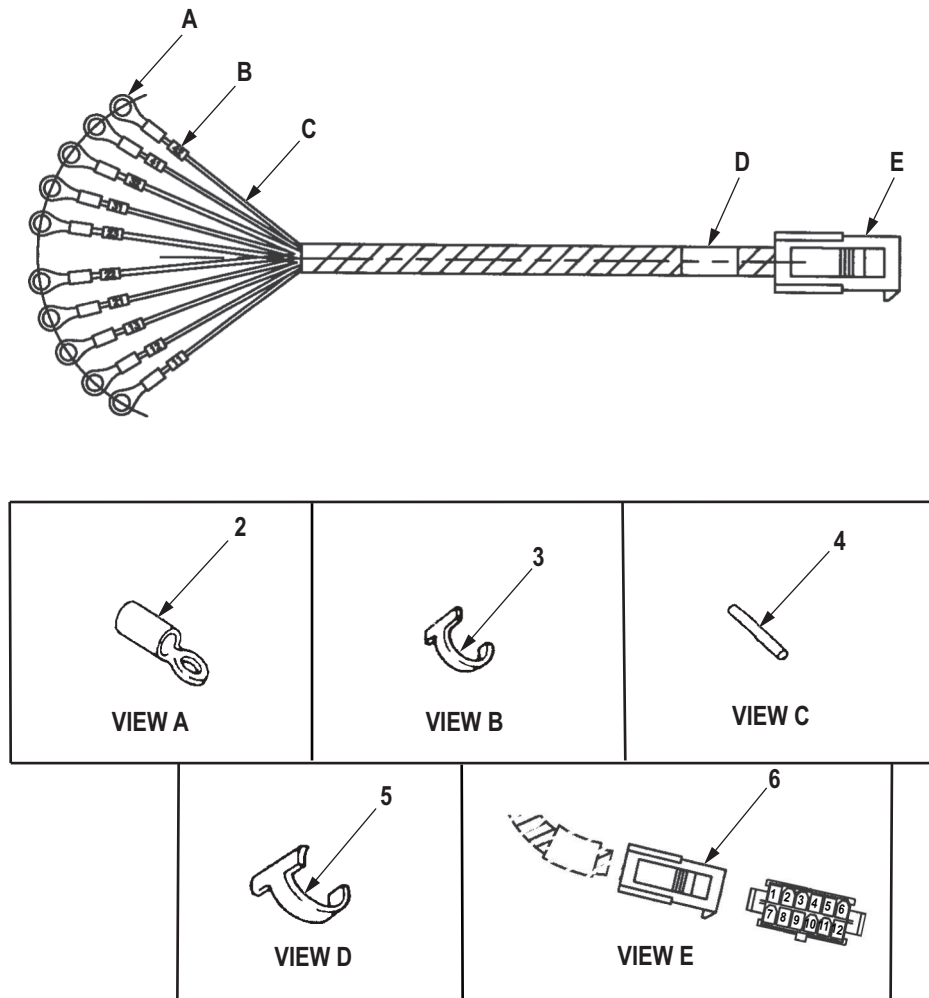
R0005T77

Figure 5. Manifold Wiring Harness.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 5. MANIFOLD WIRING HARNESS.</b>						
1	PAFFF	6150-01-529-2140	19207	12491622	WIRING HARNESS,BRAN.....	1
2	PAFZZ	8310-01-061-7137	96214	803073-1	. YARN.....	1
3	PAFZZ	5935-01-109-7518	96906	MS3476W20-16P	. CONNECTOR,PLUG,ELEC.....	1
4	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	8

**END OF FIGURE**

1  
2-6

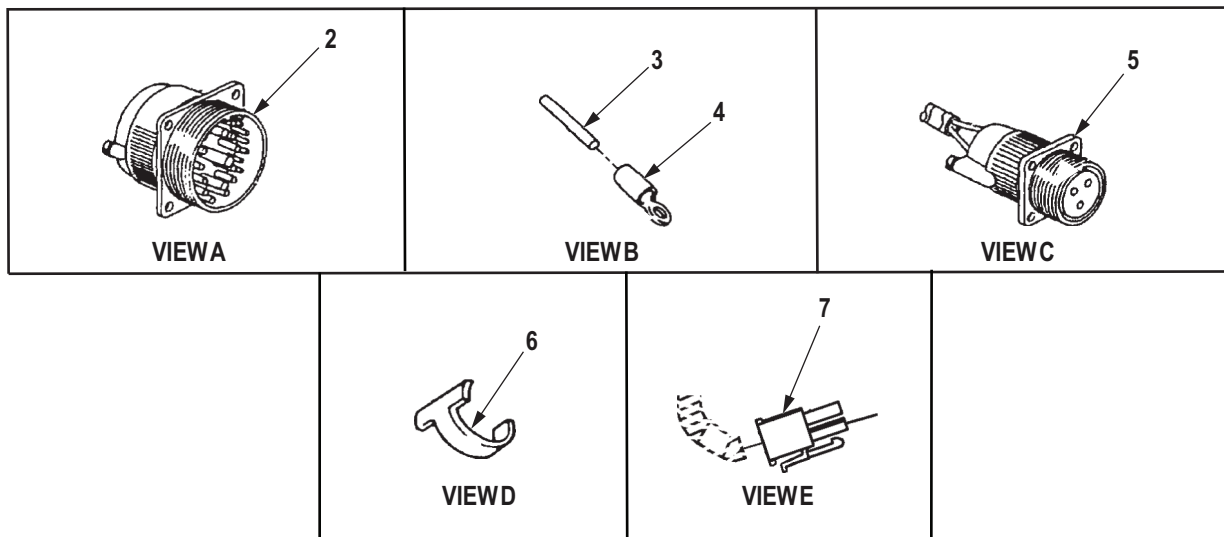
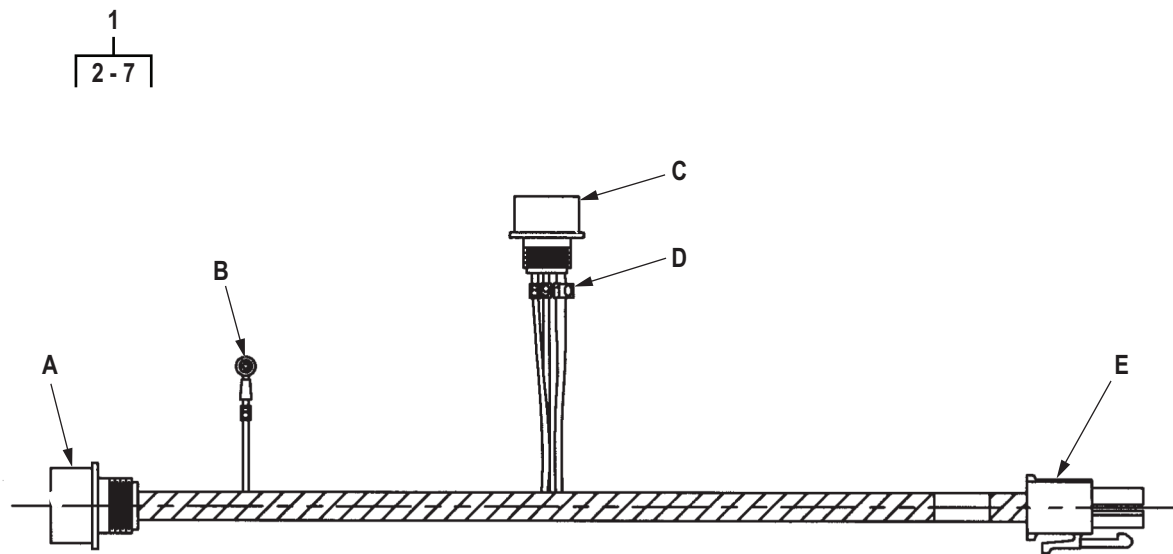


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Figure 6. Control Box Wiring Harness.(12491623)

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 6. CONTROL BOX WIRING HARNESS.(12491623)</b>						
1	PAFFF	6150-01-529-0116	19207	12491623	WIRING HARNESS,BRAN.....	1
2	PAFZZ	5940-00-813-0698	81343	MS25036-101	. TERMINAL,LUG.....	10
3	PAFZZ	9905-00-935-3863	81349	MIL-B-43436/4-1	. BAND,MARKER.....	10
4	MFFZZ		81349	M22759/16-20-9AR	. WIRE,ELECTRICAL MAKE FROM WIRE, P/N M22759/16-20-9.....	1
5	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	1
6	PAFZZ	5935-01-506-0573	27264	39-01-2121	. CONNECTOR,PLUG,ELEC.....	1

**END OF FIGURE**

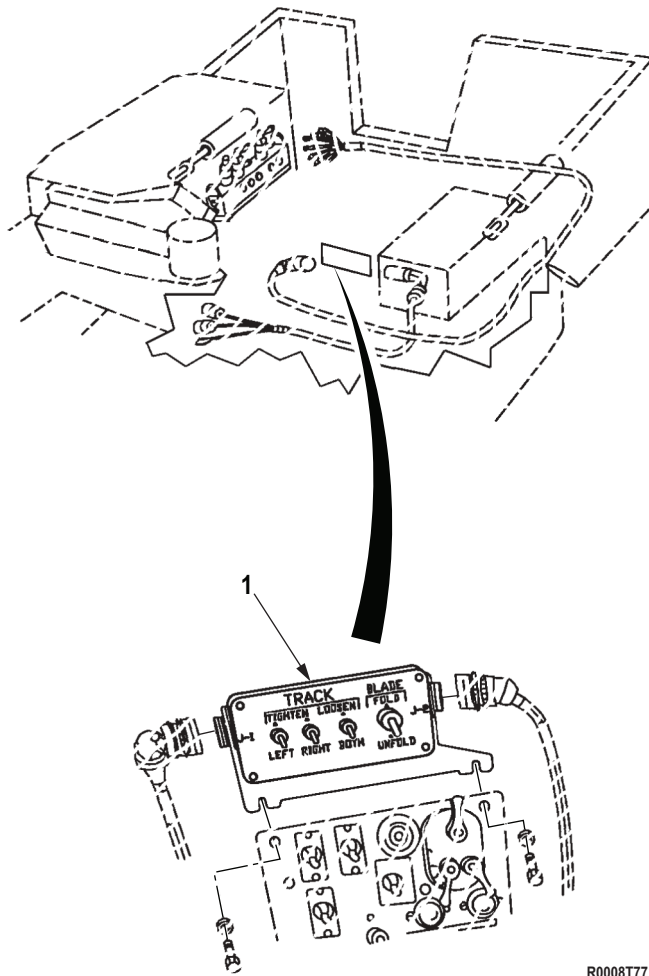


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Figure 7. Control Box Wiring Harness.(12491624)

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 7. CONTROL BOX WIRING HARNESS.(12491624)</b>						
1	PAFFF	6150-01-529-0111	19207	12491624	WIRING HARNESS,BRAN.....	1
2	PAFZZ	5935-01-076-9462	96906	MS3476W20-16S	. CONNECTOR,PLUG,ELEC.....	1
3	MFFZZ		81349	M22759/16-20-9AR	. WIRE,ELECTRICAL MAKE FROM WIRE P/N M22759/16-20-9.....	1
4	PAFZZ	5940-00-813-0698	81343	MS25036-101	. TERMINAL,LUG.....	1
5	PAFZZ	5935-01-119-2830	96906	MS3470W14-5P	. CONNECTOR,RECEPTACL.....	1
6	PAFZZ	9905-00-893-3570	81349	M43436/1-3	. BAND,MARKER.....	1
7	PAFZZ	5935-01-461-5996	30003	3418AS6402	. CONNECTOR,RECEPTACL.....	1

**END OF FIGURE**



R0008T77

Figure 8. Track and Blade Control Box.



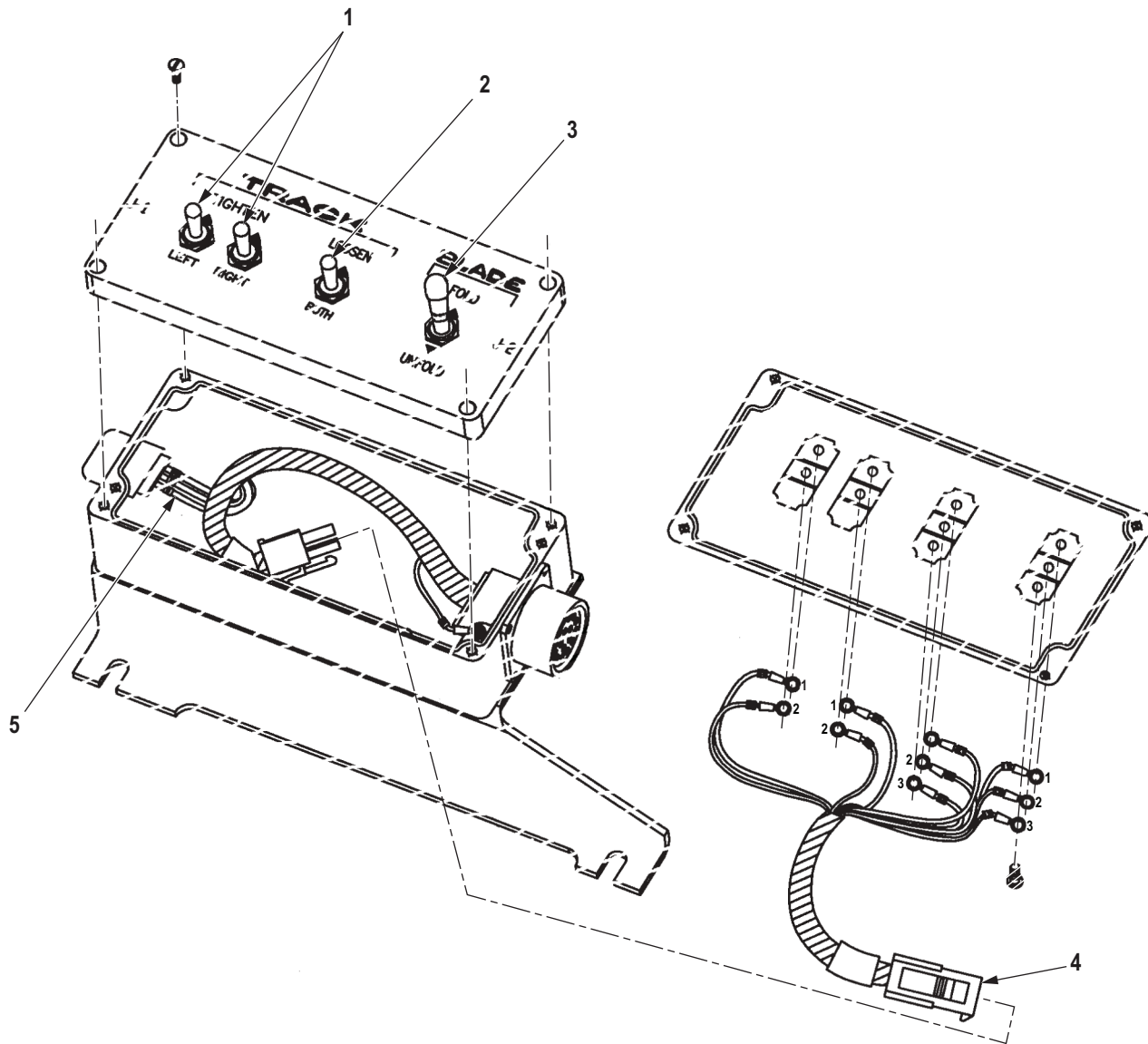
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
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GROUP AJ01 ELECTRICAL SYSTEM.

FIG. 8. TRACK AND BLADE CONTROL  
BOX.

1	PAFFF	5975-01-529-0044	19207	12491619	BOX CONNECTOR,ELECT ELECTRICAL BOX.....	1
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END OF FIGURE

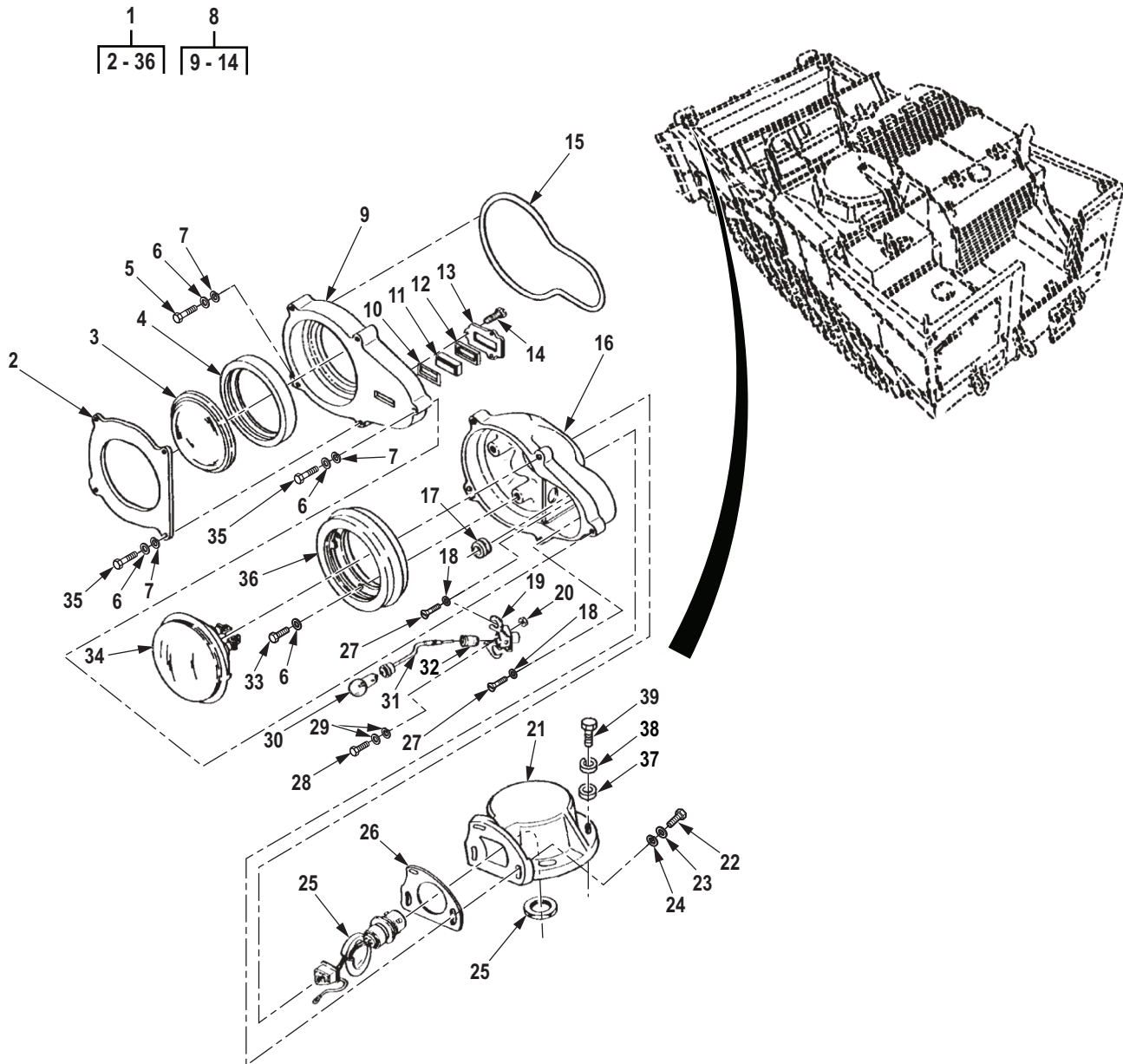


R0009777

Figure 9. Track and Blade Control Box Cable.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 9. TRACK AND BLADE CONTROL BOX CABLE.</b>						
1	PAFZZ	5930-00-683-1626	96906	MS24523-30	SWITCH,TOGGLE.....	2
2	PAFZZ	5930-00-683-1629	96906	MS24523-23	SWITCH,TOGGLE.....	1
3	PAFZZ	5930-00-845-0177	96906	MS24658-27E	SWITCH,TOGGLE.....	1
4	PAFFF	6150-01-529-0116	19207	12491623	WIRING HARNESS,BRAN.....	1
5	PAFFF	6150-01-529-0111	19207	12491624	WIRING HARNESS,BRAN.....	1

**END OF FIGURE**



R0010T77

Figure 10. Headlight Assembly.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AJ01 ELECTRICAL SYSTEM.</b>						
<b>FIG. 10. HEADLIGHT ASSEMBLY.</b>						
1	PAFFF	6240-01-179-1061	19207	12312192	LAMP, INCANDESCENT.....	2
2	PAFZZ	5365-01-080-3291	19207	12287284	. SPACER, PLATE.....	1
3	PAFZZ	6220-00-557-8229	19207	7962266	. LENS, LIGHT.....	1
4	PCFZZ	5330-01-091-1657	19207	12281848	. PACKING, PREFORMED.....	1
5	PAFZZ	5305-01-113-3587	19207	12287561-2	. SCREW, EXTERNALLY RE.....	3
6	PAFZZ	5310-00-543-5933	80205	MS35333-73	. WASHER, LOCK.....	9
7	PAFZZ	5310-00-685-3744	88041	AN960C8	. WASHER, FLAT.....	6
8	PAFFF	6220-01-083-5673	19207	12287285	. HEADLIGHT ASSEMBLY.....	1
9	XAFZZ		19207	12287286	. . COVER, HEADLIGHT.....	1
10	PAFZZ	5330-00-771-6570	19207	7716570	. . SEAL, NONMETALLIC RO.....	1
11	PAFZZ	6220-00-771-6580	21450	7716580	. . LENS, LIGHT.....	1
12	PAFZZ	6220-00-893-3558	18873	HM122	. . FILTER, LIGHT, CLEARA.....	1
13	PAFZZ	6220-01-115-1547	19207	12287283	. . BRACKET, LIGHT RETEN.....	1
14	PAFZZ	5305-01-088-6826	80063	SM-D-766931-33	. . SCREW, MACHINE.....	3
15	MFFZZ		19207	11676794-AR	. RUBBER ROUND SECTIO MAKE FROM RUBBER, P/N 11676794.....	1
16	XAFZZ		19207	12287288	. HEADLIGHT, BODY.....	1
17	PAFZZ	5325-00-641-2792	96906	MS35489-60	. GROMMET, NONMETALLIC.....	1
18	PCFZZ	5325-00-623-0928	56161	10511558	. GROMMET, NONMETALLIC.....	2
19	PAFZZ	6250-00-741-5451	19207	8741651	. LAMPHOLDER.....	1
20	PAFZZ	5310-00-934-9761	80205	MS35649-264	. NUT, PLAIN, HEXAGON.....	1
21	PAFZZ	6250-01-179-1062	19207	12312191	. BRACE, LAMPHOLDER.....	1
22	PAFZZ	5305-01-384-0620	19207	12387149-1	. SCREW, CAP, HEXAGON H.....	3
23	PAFZZ	5310-00-264-1340	96906	MS35333-77	. WASHER, LOCK.....	3
24	PAFZZ	5310-01-368-8068	19207	12347656-3	. WASHER, FLAT.....	3
25	PAFZZ	5995-01-080-3262	19207	12281850	. LEAD ASSEMBLY, ELECT.....	1
26	PAFZZ	5330-01-080-3255	19207	12287708	. GASKET.....	1
27	PAFZZ	5305-01-080-3287	19207	12281838	. SCREW, SHOULDER.....	2
28	PAFZZ	5305-01-357-8161	96906	MS51849-33C	. SCREW, MACHINE.....	1
29	PAFZZ	5310-01-145-4564	06602	21C116-06	. WASHER, LOCK.....	2
30	PAFZZ	6240-00-019-0877	58536	AA52463-A08	. LAMP, INCANDESCENT.....	1
31	PAFZZ	6150-01-083-5520	19207	12281849	. LEAD, ELECTRICAL.....	1
32	PAFZZ	5360-01-078-7661	19207	11639534	. SPRING, HELICAL, COMP.....	1

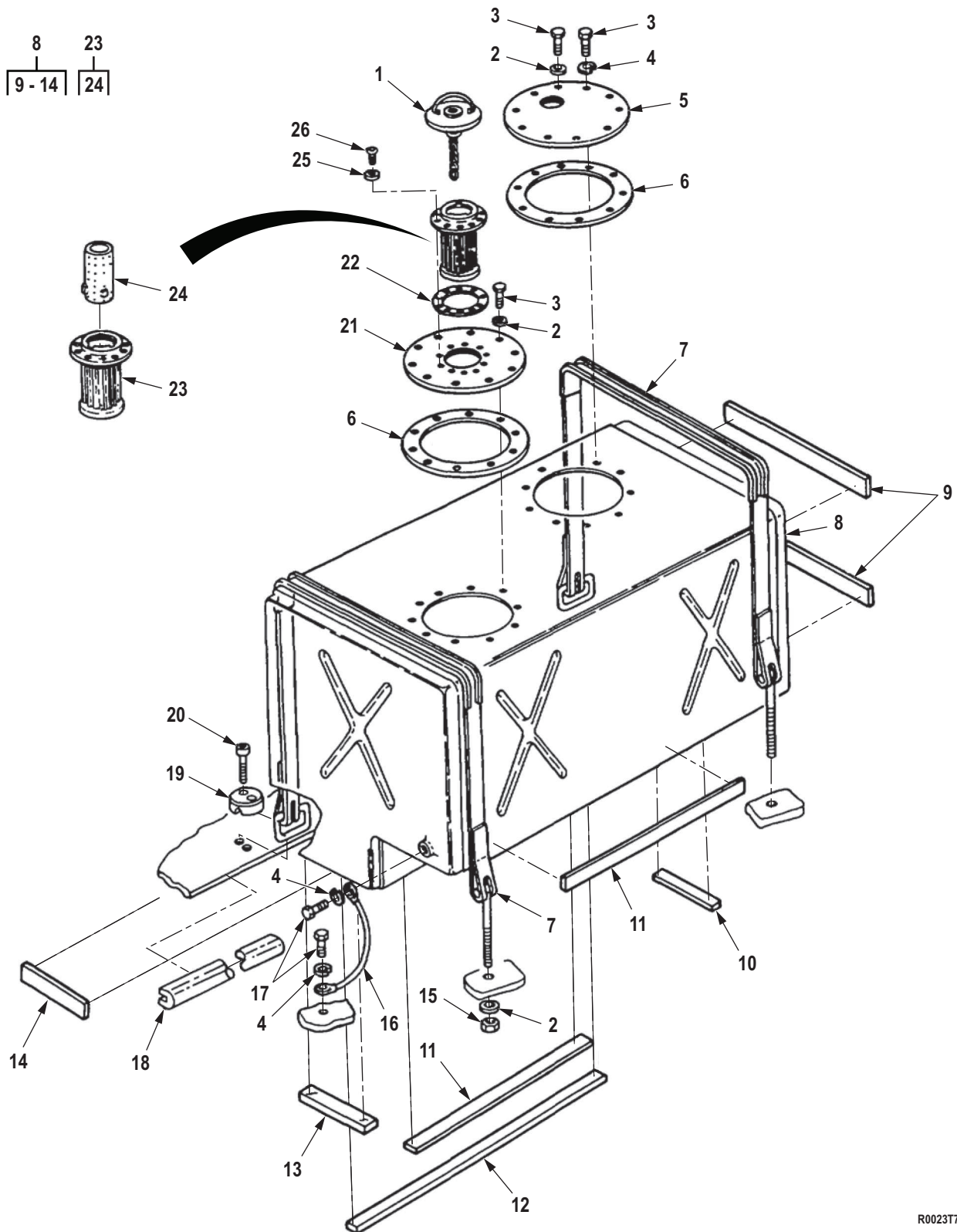
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
33	PAFZZ	5305-01-342-5174	96906	MS51849-74C	. SCREW,MACHINE.....	3
34	PAFZZ	6240-00-368-4972	96906	MS18003-4811	. LAMP,INCANDESCENT.....	1
35	PAFZZ	5306-01-083-5536	19207	12287561-1	. BOLT,EXTERNALLY REL.....	5
36	PAFZZ	6220-01-138-0911	19207	12312054	. MOUNT,HEADLIGHT SHO.....	1
37	PAFZZ	5310-01-379-0007	19207	12387327-20	WASHER,FLAT.....	8
38	PAFZZ	5310-01-381-9948	19207	12387327-22	WASHER,FLAT.....	8
39	PAFZZ	5305-01-384-3438	80204	B18231B10030NF	SCREW,CAP,HEXAGON H.....	8

END OF FIGURE

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FIELD MAINTENANCE  
GROUP AM01 FUEL SYSTEM

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Figure 11. Fuel Tank Assembly and Related Parts.

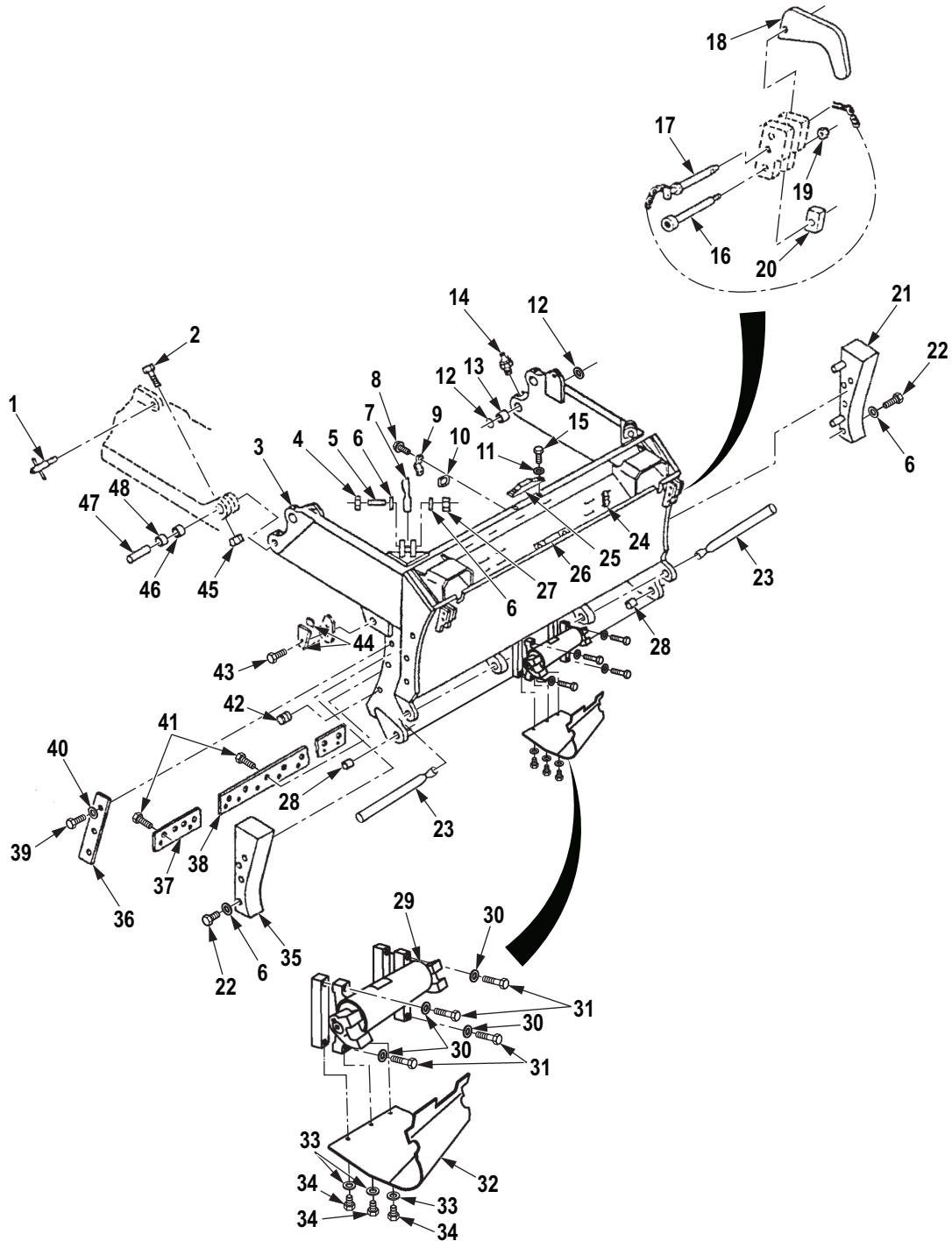


(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AM01 FUEL SYSTEM.</b>						
<b>FIG. 11. FUEL TANK ASSEMBLY AND RELATED PARTS.</b>						
1	PAFZZ	2590-00-798-4056	96906	MS51300-1	CAP,FILLER OPENING.....	1
2	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT (USED IN FUEL TANK ASSY/RELATED PARTS.....	21
3	PAFZZ	5306-01-112-8681	80204	B1821BH038C125L	BOLT,MACHINE (USED IN FUEL TANK/RELATED PARTS.GP:AM ).....	20
4	PAFZZ	5310-00-627-6128	96906	MS35335-35	WASHER,LOCK.....	3
5	PFFZZ	5340-01-171-0110	19207	12334923	COVER,ACCESS.....	1
6	PAFZZ	5330-01-179-9494	19207	12332465	GASKET.....	2
7	PAFZZ	5340-01-170-9947	97403	13214E1997	BAND,RETAINING FUEL TANK MOUNTING.....	2
8	PAFFF	2910-01-171-0070	19207	12325866	TANK,FUEL,ENGINE.....	1
9	PAFZZ	9320-01-176-8612	19207	12325817	. RUBBER STRIP PART OF P/N 12325866.....	2
10	PAFZZ	9320-01-176-9178	19207	12325815	. RUBBER STRIP PART OF P/N 12325866.....	1
11	PAFZZ	9320-01-176-8611	19207	12325812	. RUBBER STRIP PART OF P/N 12325866.....	2
12	PAFZZ	9320-01-186-9781	19207	12325813	. PAD,RUBBER PART OF P/N 12325866.....	1
13	PAFZZ	9320-01-176-9177	19207	12325814	. RUBBER STRIP PART OF P/N 12325866.....	1
14	PAFZZ	9320-01-176-9179	19207	12325816	. . . . . RUBBER STRIP PART OF P/N 12325866.....	1
15	PAFZZ	5310-00-483-8790	80205	MS17829-6C	NUT,SELF-LOCKING,HE.....	2
16	PAFZZ	5995-01-178-5723	97403	13211E9533	LEAD,ELECTRICAL GROUND.....	1
17	PAFZZ	5305-00-802-2764	45152	2013HX1	SCREW,CAP,HEXAGON H.....	2
18	PAFZZ	5330-01-298-9689	19207	12352329-1	SEAL,NONMETALLIC SP.....	1
19	PFFZZ	2910-01-180-2991	97403	13214E2003	PAD,ANCHOR.....	2
20	PAFZZ	5305-00-978-9395	96906	MS16997-100	SCREW,CAP,SOCKET HE.....	4
21	PFFZZ	5340-01-171-0109	19207	12325860	COVER,ACCESS.....	1
22	PAFZZ	5330-01-178-3361	19207	12325859	GASKET.....	1
23	PAFFZ	2590-01-222-8364	19207	12325858	FILLER NECK,VEHICUL.....	1
24	PAFZZ	2590-00-752-9138	96906	MS90908-1	. FILLER NECK,VEHICUL PART OF P/N 12325858.....	1
25	PAFZZ	5310-00-809-8546	96906	MS27183-8	WASHER,FLAT.....	10

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
26	PAFZZ	5305-00-984-6212	80205	MS35206-265	SCREW,MACHINE.....	10

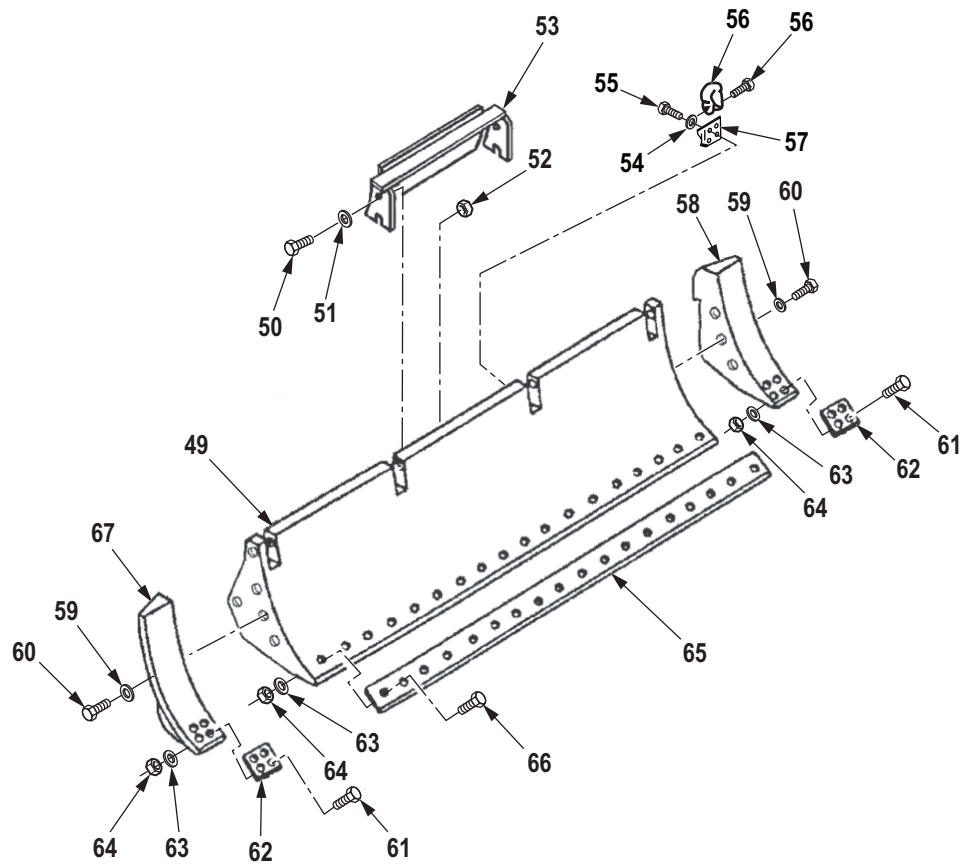
END OF FIGURE

FIELD MAINTENANCE  
GROUP AP01 HULL ASSEMBLY



R0011T77

Figure 12. Apron Dozer and Blade Assembly. (Sheet 1 of 2)



R0012T77

Figure 12. Apron Dozer and Blade Assembly. (Sheet 2 of 2)

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AP01 HULL ASSEMBLY.</b>						
<b>FIG. 12. APRON DOZER AND BLADE ASSEMBLY.</b>						
1	PAFZZ	5315-01-386-0443	19207	12412098	PIN,STRAIGHT,HEADED.....	2
2	PAFZZ	5305-01-195-1594	97403	13204E2945	SCREW,CAP,HEXAGON H.....	2
3	PBFHD	3830-01-496-4440	31969	1826	APRON NEW DESIGN STEEL.....	1
4	PAFZZ	5310-00-891-3426	96906	MS35691-73	NUT,PLAIN,HEXAGON 1.00"X8 UNC-2B R.H. GRADE 8.....	2
5	PAFZZ	5307-01-230-8845	19207	12355497	STUD,PLAIN.....	2
6	PAFZZ	5310-00-809-8541	96906	MS27183-27	WASHER,FLAT (USED IN HULL ASSY)APRON DOZER/BLADE/GP:AP.....	22
7	PFFZZ	2510-01-220-6378	19207	12355496	EYE,SUSPENSION.....	2
8	PAFZZ	5306-01-229-9592	80204	B1821BH038C044L	BOLT,MACHINE.....	6
9	PAFZZ	5340-00-678-6574	07878	65B3732	STRAP,RETAINING.....	3
10	PAFZZ	1670-00-588-6272	98897	353512-1	TIE DOWN,CARGO,AIRC.....	3
11	PAFZZ	5310-00-637-9541	81718	H2525M	WASHER,LOCK.....	4
12	PAFZZ	5325-00-943-5353	81349	M2742630176B	RING,RETAINING.....	4
13	PAFZZ	3120-00-808-2171	51588	B32L	BEARING,PLAIN,SELF-.....	2
14	PAFZZ	4730-00-050-4208	78500	1199N1860	FITTING,LUBRICATION (USED IN HULL)APRON/BLADE ASSY/GPAP.....	2
15	PAFZZ	5306-01-112-8681	80204	B1821BH038C125L	BOLT,MACHINE (USED IN HULL)APRON DOZER/BLADE ASSY/GP:A.....	4
16	PAFZZ	5305-00-307-1592	80205	MS51975-35	SCREW,SHOULDER.....	2
17	PAFZZ	5315-01-373-8796	19207	12412088	PIN,STRAIGHT,HEADED.....	2
18	PAFZZ	5340-01-374-2334	19207	12412086	BAR,LATCH.....	2
19	PAFZZ	5310-00-087-4652	81349	M45913/1-6CG5C	NUT,SELF-LOCKING,HE.....	2
20	PAFZZ	5340-01-374-5674	19207	12412087	STOP,MECHANICAL.....	2
21	PAFZZ	2590-01-185-0169	97403	13214E2482	EXTENSION ASSEMBLY.....	1
22	PAFZZ	5305-01-194-3001	97403	13211E8616	SCREW,CAP,HEXAGON H.....	18
23	PAFZZ	3040-01-541-7341	31969	M2945-019	SHAFT,STRAIGHT.....	2
24	PAFZZ	5340-01-182-9023	97403	13214E2360-3	STRAP,WEBBING.....	8
25	PAFZZ	2590-01-184-4778	97403	13214E2412	GUIDE,CHAIN.....	2
26	PAFZZ	9510-01-541-8566	19207	12502193	BAR,METAL.....	2
27	PAFZZ	5310-00-811-1377	81349	M45913/1-16CG5C	NUT,SELF-LOCKING,HE.....	2
28	PAFZZ	3120-01-264-6006	19207	12357158-2	BUSHING,SLEEVE.....	2
29	PAFZZ	3040-01-542-1907	31969	M2715	CYLINDER ASSEMBLY,A.....	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
30	PAFZZ	5310-01-339-6531	80205	MS35338-51	WASHER,LOCK.....	4
31	PAFZZ	5305-00-947-4354	80204	B1821BH075C300N	SCREW,CAP,HEXAGON H.....	4
32	PAFZZ	5340-01-541-5445	31969	M2945-018-1	GUARD,VALVE ACTUATO.....	1
33	PAFZZ	5310-00-637-9541	81718	H2525M	WASHER,LOCK.....	3
34	PAFZZ	5305-00-543-4372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON H.....	3
35	PAFZZ	2590-01-182-8768	97403	13214E2481	EXTENSION ASSEMBLY.....	1
36	PAFZZ	5365-01-183-2770	19207	12325738	SPACER,PLATE.....	2
37	PAFZZ	5340-01-273-8821	97403	13214E2403	PLATE,MOUNTING.....	2
38	PAFZZ	2590-01-187-0904	97403	13214E2515	BLADE,BULLDOZER,EAR.....	1
39	PAFZZ	5306-01-112-8681	80204	B1821BH038C125L	BOLT,MACHINE.....	6
40	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT.....	6
41	PAFZZ	5305-00-052-2234	80205	MS24667-76	SCREW,CAP,SOCKET HE.....	21
42	PAFZZ	4730-00-429-0516	81348	WW-P-471ACBAAG	PLUG,PIPE.....	2
43	PAFZZ	5305-00-942-2196	80204	B1821BH038C100D	SCREW,CAP,HEXAGON H.....	2
44	PAFZZ	5315-01-184-4785	97403	13214E2664	PIN ASSEMBLY,APRON.....	2
45	PAFZZ	5310-00-595-7421	80205	MS17829-8C	NUT,SELF-LOCKING,HE.....	2
46	PAFZZ	3120-01-195-7988	19207	13204E2864	BUSHING,SLEEVE.....	2
47	PAFZZ	5315-01-184-4842	97403	13204E2943	PIN,STRAIGHT,HEADLE.....	2
48	PAFZZ	3120-01-184-4859	97403	13204E2944	BUSHING,SLEEVE.....	2
49	PFFZA	3830-01-472-7506	31969	115M2091	BLADE,BULLDOZER,EAR STEEL.....	1
50	PAFZZ	5305-00-071-2067	80204	B1821BH050C125N	SCREW,CAP,HEXAGON H USED ON STEEL BLADE LOWER BLADE ACTUATOR.....	2
51	PAFZZ	5310-00-809-5998	96906	MS27183-18	WASHER,FLAT (USED IN HULL ASSY)APRON,DOZER/BLADE/GPAP.....	2
52	PAFZZ	5310-00-225-6993	81349	M45913/1-8CG5C	NUT,SELF-LOCKING,HE (USED HULL ASSY)APRON/BLADE/GP:AP.....	2
53	PAFZZ	5340-01-491-6900	31969	115M2091-01	PLATE,MOUNTING STEEL BLADE.....	1
54	PAFZZ	5310-00-584-7889	26916	004-003005-062	WASHER,LOCK.....	4
55	PAFZZ	5305-00-925-7635	80204	B1821BH100C250N	SCREW,CAP,HEXAGON H.....	4
56	PAFZZ	4030-01-182-8931	19207	12355445	SHACKLE.....	1
57	PAFZZ	2540-01-279-1013	19207	12357409	BRACKET,TOW HOOK.....	1
58	PAFZZ	5340-01-491-7578	31969	M2705	BRACKET,MOUNTING L/H, STEEL.....	1
59	PAFZZ	5310-00-809-8541	96906	MS27183-27	WASHER,FLAT (USED IN HULL ASSY)APRON DOZER/BLADE/GP:AP.....	6
60	PAFZZ	5305-01-487-2938	80204	B1821BH100C1000 N	SCREW,CAP,HEXAGON H.....	6

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
61	PAFZZ	5306-01-491-9986	19207	12335260-2	BOLT,SQUARE NECK USED ON END BIT FOR STEEL BLADE.....	4
62	PAFZZ	5365-01-491-5061	31969	CE140801	SPACER,PLATE L.H. AND R.H. FOR STEEL BLADE.....	2
63	PAFZZ	5310-00-877-7527	19200	10910174-8	WASHER,FLAT (USED IN HULL ASSY) APRON DOZER/BLADE/GP:AP.....	22
64	PAFZZ	5310-00-838-1702	96906	MS35691-57	NUT,PLAIN,HEXAGON.....	22
65	PAFZZ	3830-01-184-4977	97403	13211E8643	CUTTING EDGE,MOLDBO USED ON BOTH STEEL AND ALUM BLADE.....	1
66	PAFZZ	5306-01-491-9984	19207	12335260-1	BOLT,SQUARE NECK BOLT SIZE 3/4-10 UNC BY 2IN LG FOR STEEL BLADE.....	6
67	PAFZZ	5340-01-491-7584	31969	M2704	BRACKET,MOUNTING (USED HULL ASSY)APRON/BLADE GPAP/ R/H STEEL.....	1

END OF FIGURE

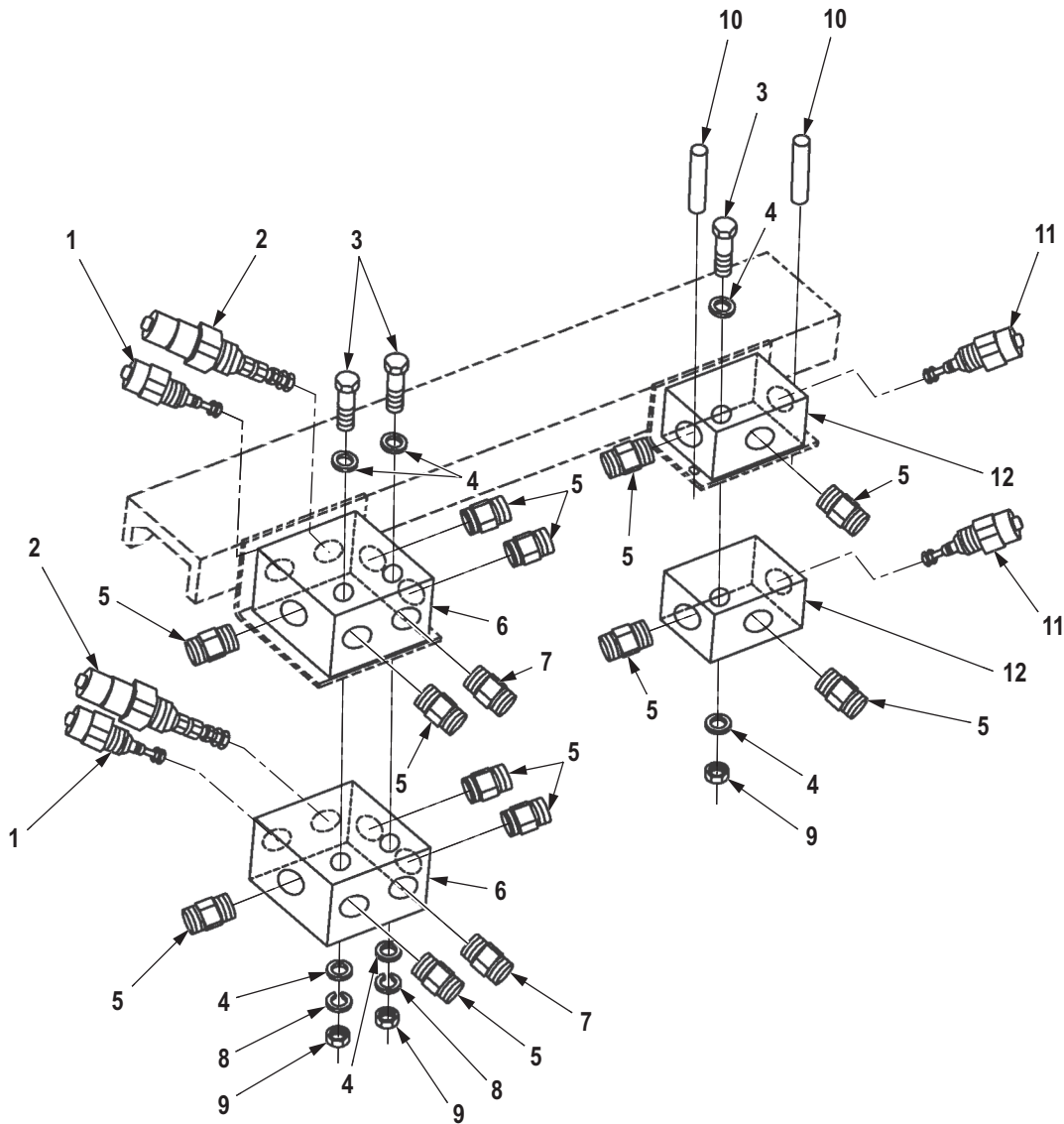




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**FIELD MAINTENANCE  
GROUP AR01 HYDRAULIC SYSTEM**

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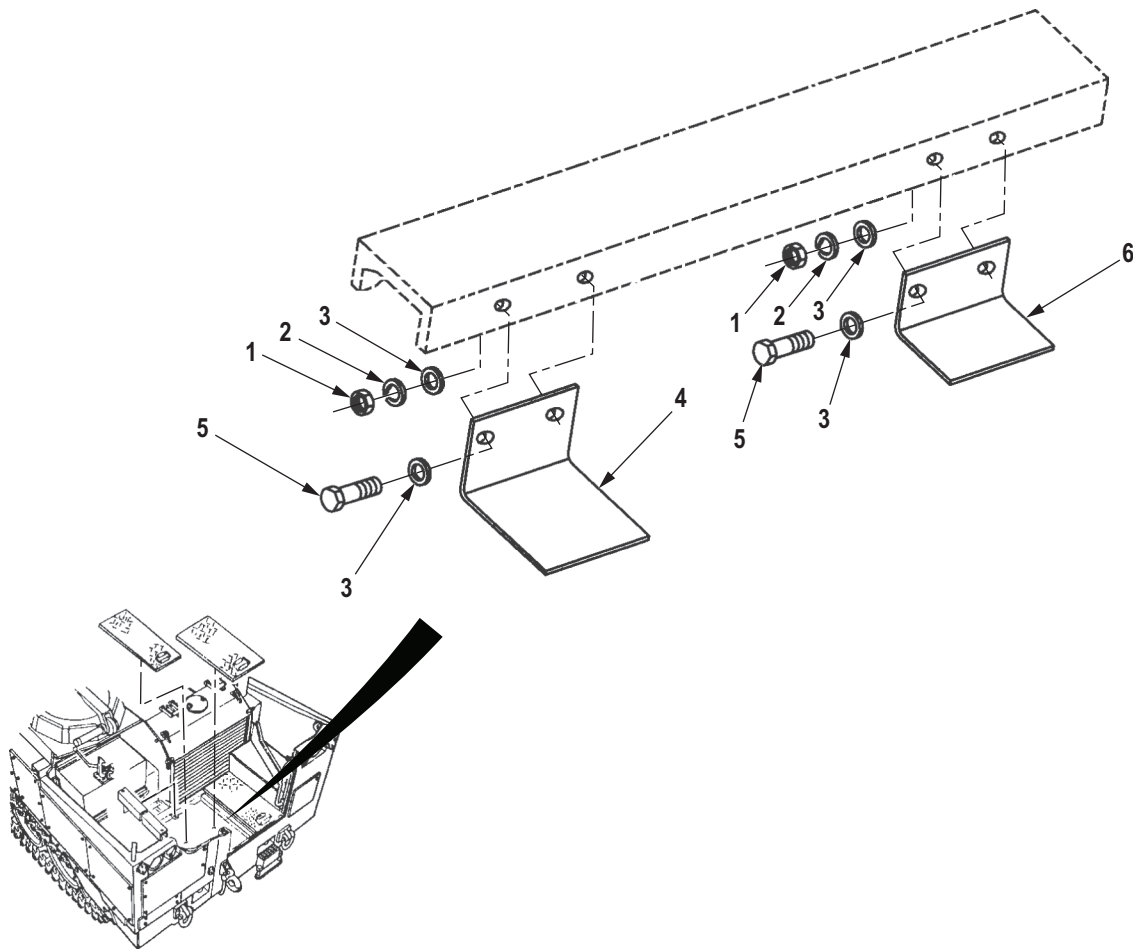


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Figure 13. Hydraulic Valves and Fittings.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR01 HYDRAULIC SYSTEM.</b>						
<b>FIG. 13. HYDRAULIC VALVES AND FITTINGS.</b>						
1	PAFZZ	4820-01-329-1661	54035	CBCG LCN	VALVE,CHECK.....	2
2	PAFZZ	4810-01-525-1114	54035	CWCG-LGN	VALVE,LINEAR,DIRECT.....	2
3	PAFZZ	5306-01-195-9819	80204	B1821BH031C350L	BOLT,MACHINE.....	3
4	PAFZZ	5310-00-081-4219	96906	MS27183-12	WASHER,FLAT.....	10
5	PAFZZ	4730-00-258-1864	96906	MS51525B4-6	ADAPTER,STRAIGHT,TU.....	12
6	PAFZZ	4730-01-525-1015	54035	XPI/S	MANIFOLD,HYDRAULICS.....	2
7	PAFZZ	4730-00-491-9576	96906	MS51525A6	ADAPTER,STRAIGHT,TU.....	2
8	PAFZZ	5310-00-407-9566	80205	MS35338-45	WASHER,LOCK.....	2
9	PAFZZ	5310-00-829-9981	96906	MS35649-2312	NUT,PLAIN,HEXAGON.....	3
10	PAFZZ	5315-00-834-0745	96906	MS16555-631	PIN,STRAIGHT,HEADLE.....	2
11	PAFZZ	4810-01-525-1077	54035	FCCB LAV (2.0 GPM)	VALVE,FLOW CONTROL.....	2
12	PAFZZ	4730-01-525-1012	54035	GAI/S	MANIFOLD,HYDRAULICS.....	2

**END OF FIGURE**

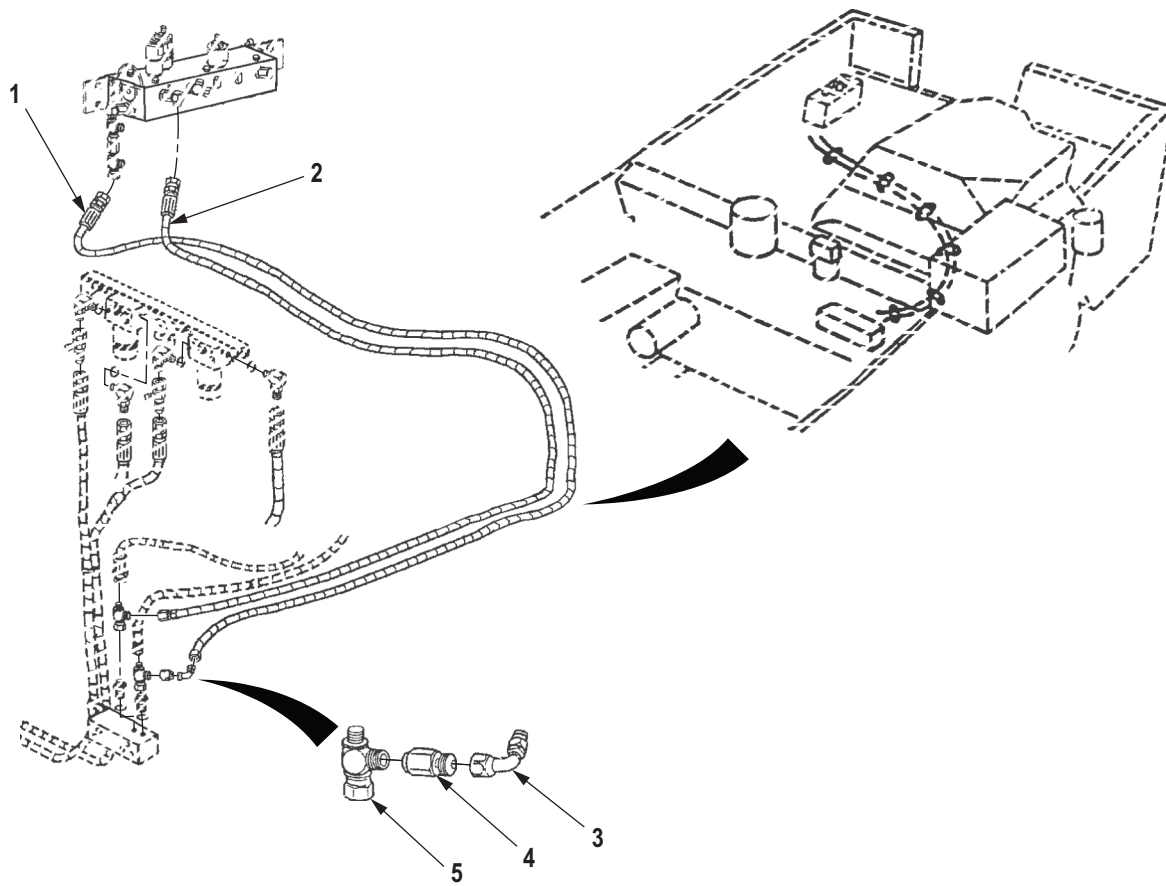


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Figure 14. Hydraulic Valves Bracket.

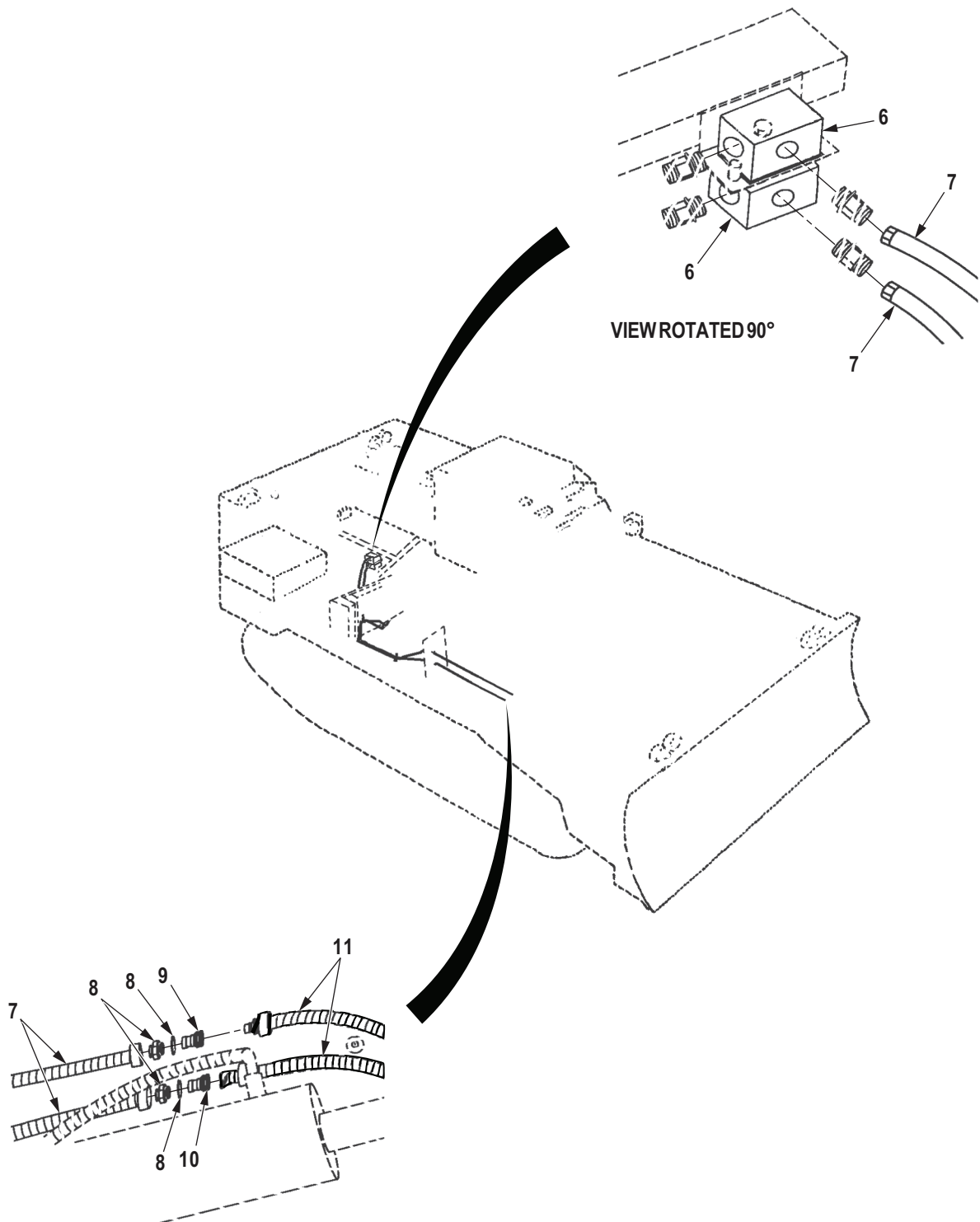
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR01 HYDRAULIC SYSTEM.</b>						
<b>FIG. 14. HYDRAULIC VALVES BRACKET.</b>						
1	PAFZZ	5310-00-477-6768	80205	MS35649-2384	NUT,PLAIN,HEXAGON.....	4
2	PAFZZ	5310-00-637-9541	81718	H2525M	WASHER,LOCK.....	4
3	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT.....	8
4	PAFZZ	5340-01-529-1586	19207	12491620	BRACKET,ANGLE.....	1
5	PAFZZ	5305-00-543-4372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON H.....	4
6	PAFZZ	5340-01-529-1580	19207	12491614	BRACKET,ANGLE.....	1

**END OF FIGURE**



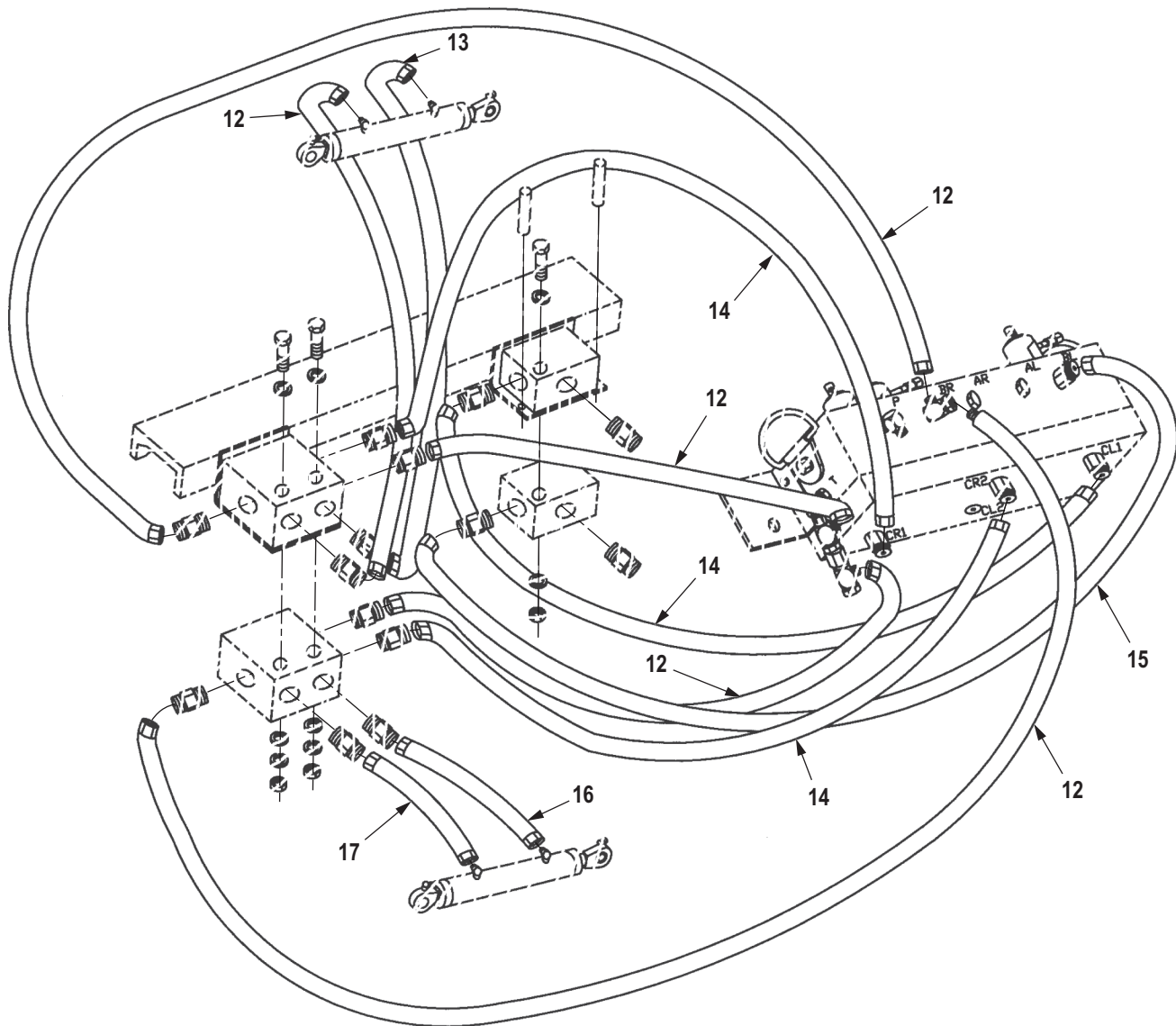
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Figure 15. Hydraulic Hoses and Fittings. (Sheet 1 of 3)



R0016T77

Figure 15. Hydraulic Hoses and Fittings. (Sheet 2 of 3)



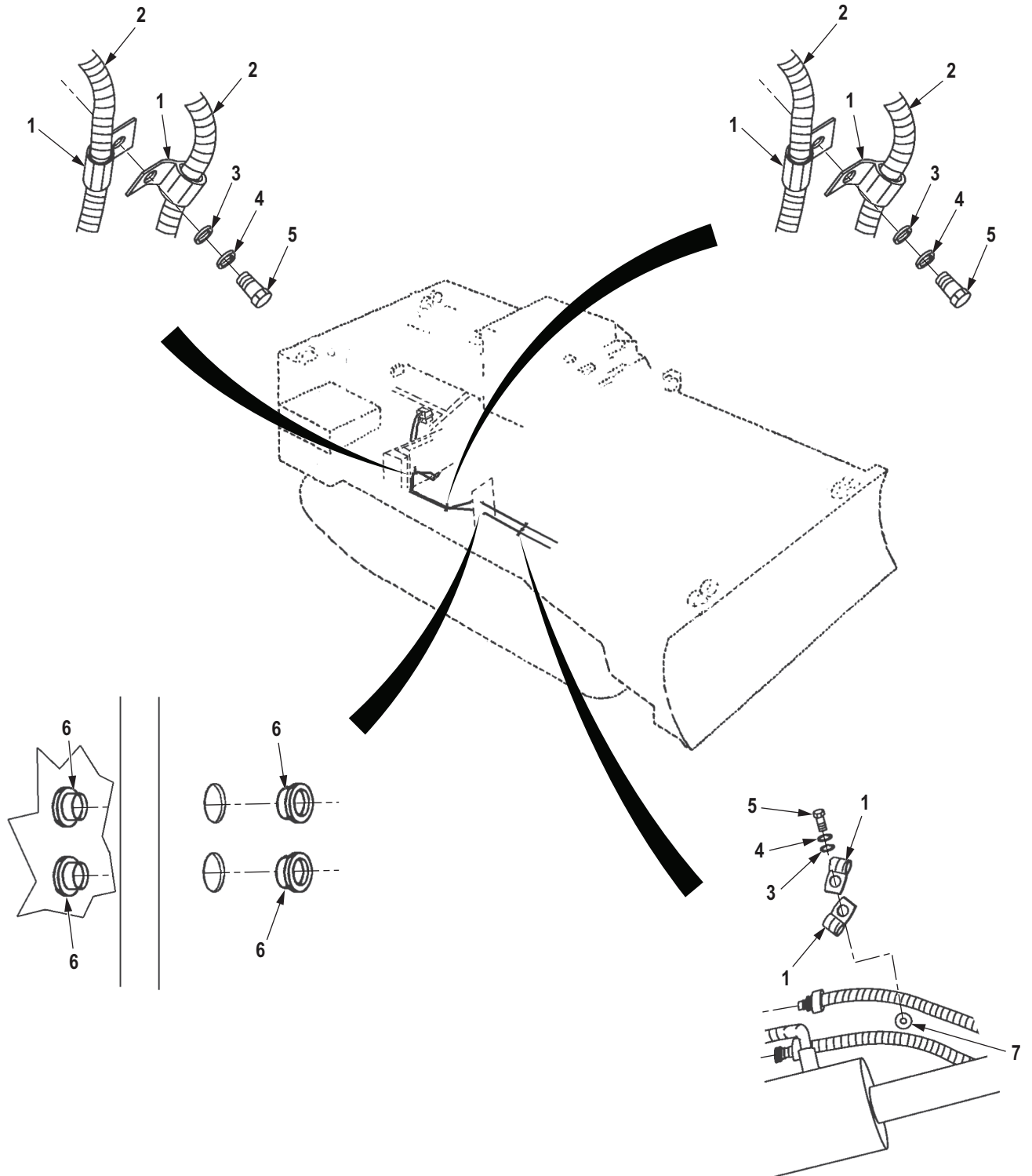
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Figure 15. Hydraulic Hoses and Fittings. (Sheet 3 of 3)



(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR01 HYDRAULIC SYSTEM.</b>						
<b>FIG. 15. HYDRAULIC HOSES AND FITTINGS.</b>						
1	PAFZZ	4720-01-455-4173	19207	13214E2457-15	HOSE ASSEMBLY,NONME L/H MAIN HYD MANIFOLD TOP 7 TO TRACK ADJUSTER MANIFOLDPORT T, 130 INCHES LONG.....	1
2	PAFZZ	4720-01-455-5065	19207	13214E2457-16	HOSE ASSEMBLY,NONME L/H MAIN HYD MANIFOLD TOP 9 TO TRACK ADJUSTER MANIFOLDPORT "P", 130 INCHES LONG.....	1
3	PAFZZ	4730-01-195-3805	01276	500454-8S	ELBOW,TUBE 90 DEGREE.....	1
4	PAFZZ	4730-00-491-4983	81343	SAE J514 8-8-8 070432CA	TEE,TUBE L/H MAIN HYD MANIFOLD TOP 9.....	1
5	PAFZZ	4730-01-024-0915	96906	MS51523A10	TEE,TUBE L/H MAIN HYD MANIFOLD, TOP 7.....	1
6	PAFZZ	4730-01-525-1012	54035	GAI/S	MANIFOLD,HYDRAULICS.....	2
7	PAFZZ	4720-01-529-3766	19207	12491616-4	HOSE ASSEMBLY,NONME.....	2
8	PAFZZ	4730-00-258-1864	96906	MS51525B4-6	ADAPTER,STRAIGHT,TU.....	2
9	PAFZZ	4730-01-494-8226	97111	H2-62-T6	COUPLING HALF,QUICK.....	1
10	PAFZZ	4730-01-245-7605	73992	2-K-6	COUPLING HALF,QUICK (USED IN HYD ASSY(HOSES/FITTINGS/AR.....	1
11	PAFZZ		19207	12491616-7	HOSE ASSEMBLY,NONME.....	2
12	PAFZZ	4720-01-529-3331	19207	12491616-1	HOSE ASSEMBLY,NONME.....	5
13	PAFZZ	4720-01-529-3770	19207	12491616-5	HOSE ASSEMBLY,NONME.....	1
14	PAFZZ	4720-01-529-3332	19207	12491616-2	HOSE ASSEMBLY,NONME.....	3
15	PAFZZ	4720-01-529-3329	19207	12491615	HOSE ASSEMBLY,NONME.....	1
16	PAFZZ	4720-01-529-3774	19207	12491616-6	HOSE ASSEMBLY,NONME.....	1
17	PAFZZ	4720-01-529-3335	19207	12491616-3	HOSE ASSEMBLY,NONME.....	1

END OF FIGURE



R0018T77

Figure 16. Blade Folding Hose.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR01 HYDRAULIC SYSTEM.</b>						
<b>FIG. 16. BLADE FOLDING HOSE.</b>						
1	PAFZZ	5340-00-985-6690	01276	900729-3	CLAMP,LOOP.....	6
2	PAFZZ	4720-01-529-3766	19207	12491616-4	HOSE ASSEMBLY,NONME.....	2
3	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT.....	3
4	PAFZZ	5310-00-637-9541	81718	H2525M	WASHER,LOCK.....	3
5	PAFZZ	5305-00-543-4372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON H.....	3
6	PAFZZ	5325-00-174-9325	96906	MS35489-107	GROMMET,NONMETALLIC.....	4
7	PAFZZ	5310-01-529-3803	19207	12352658	NUT BLANK.....	1

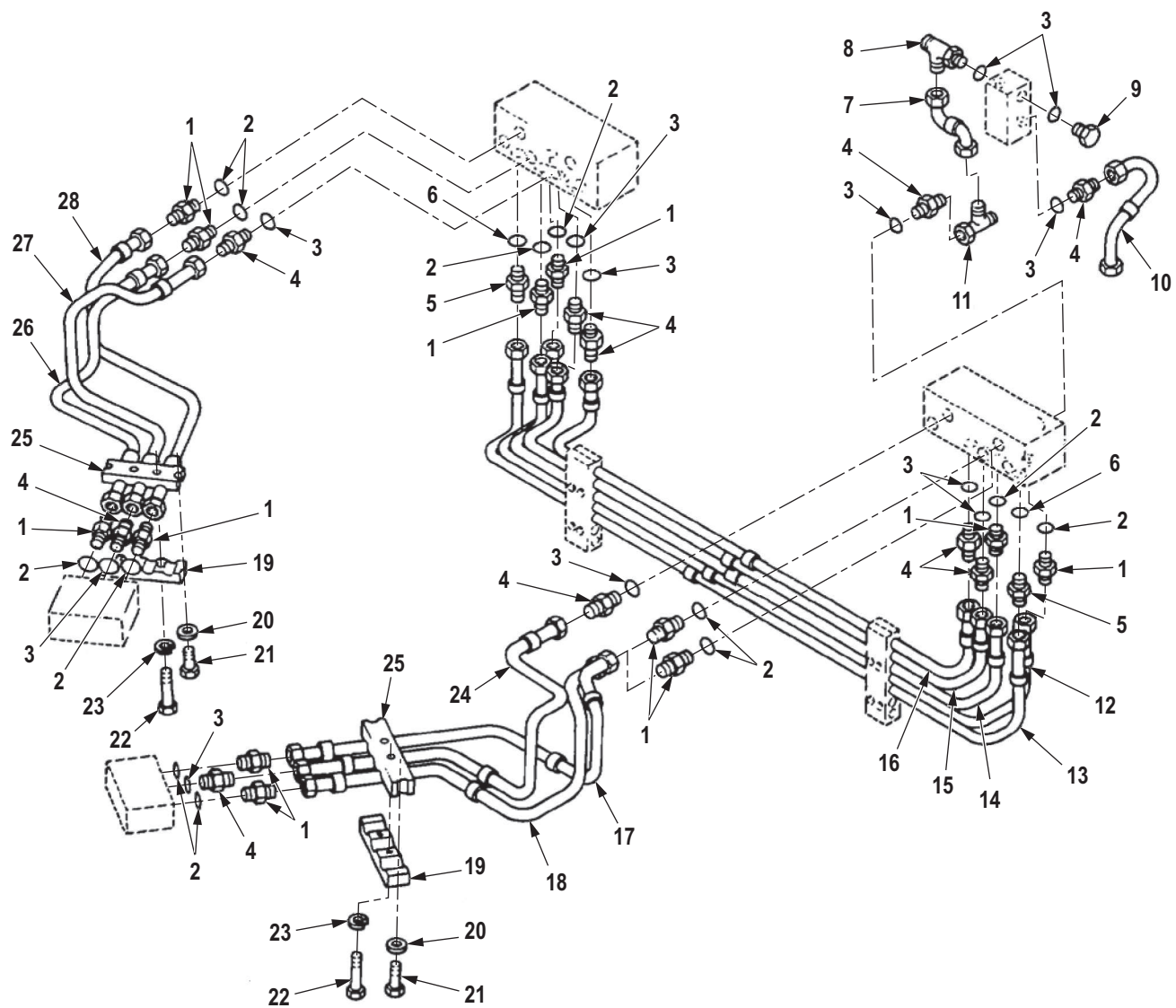
**END OF FIGURE**



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**FIELD MAINTENANCE  
GROUP AR02 HYDRAULIC INSTALLATION**

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R0024T77

Figure 17. Hydraulic Tubes and Fittings.

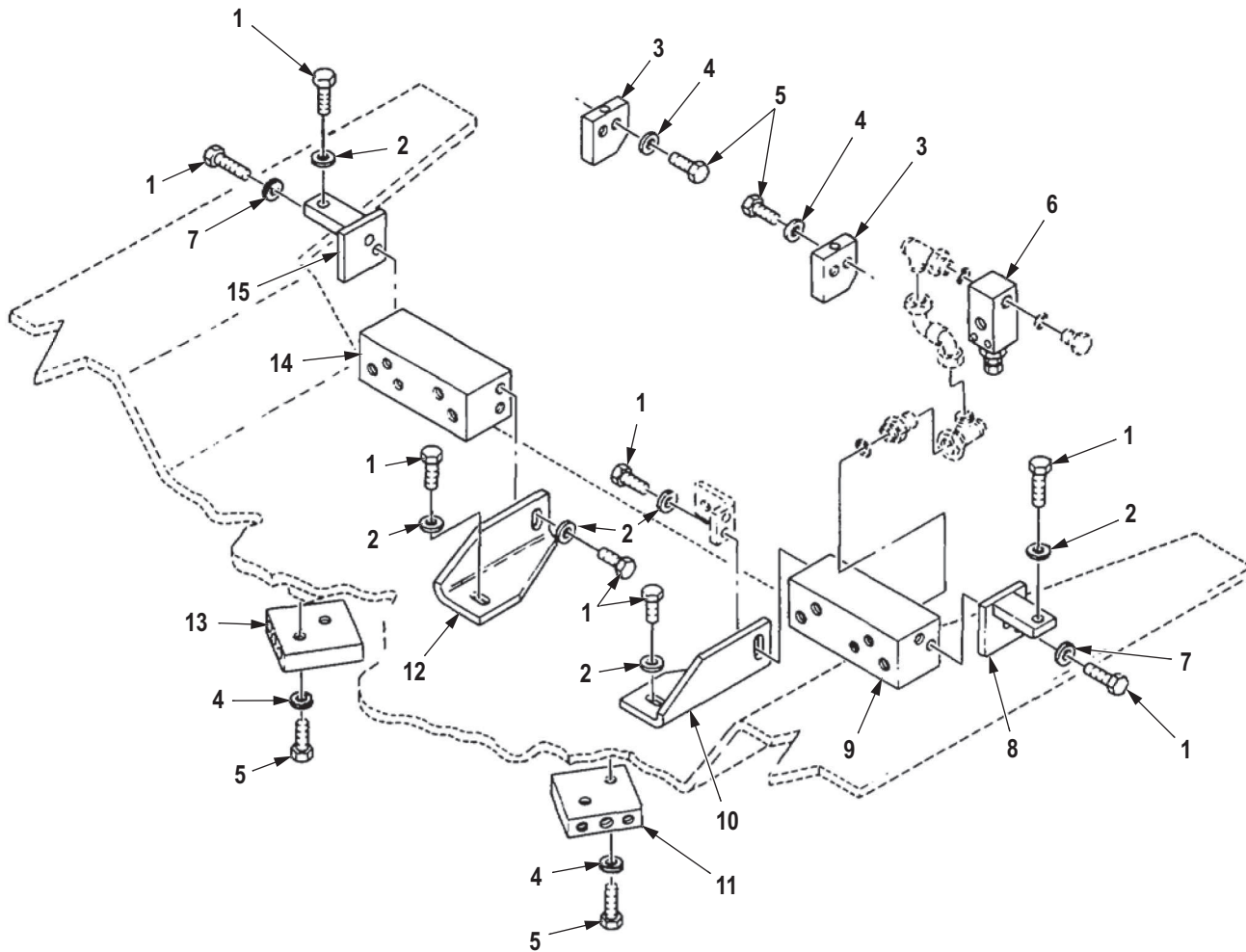
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR02 HYDRAULIC INSTALLATION.</b>						
<b>FIG. 17. HYDRAULIC TUBES AND FITTINGS.</b>						
1	PAFZZ	4730-00-491-9576	96906	MS51525A6	ADAPTER,STRAIGHT,TU (USED IN HYD ASSY/FITTINGS/PART GPAR.....	12
2	PCFZZ	5331-00-804-5695	81343	MS28778-6	O-RING (USED IN HYD ASSY) FYD FITTING/ PARTS / GP:AR.....	12
3	PCFZZ	5331-00-808-0794	81343	MS28778-8	O-RING (USED IN HYD ASSY) HYD TUBES/FITTINGS/ GP: AR).....	12
4	PAFZZ	4730-01-156-4835	96906	MS51525A8	ADAPTER,STRAIGHT,TU (USED IN HYD ASSY/FITTINGS/PART GPAR.....	10
5	PAFZZ	4820-01-536-6135	09990	BVHP-08-SSS-1NG	VALVE,REGULATING,FL.....	2
6	PCFZZ	5331-00-108-5691	81343	MS28778-10	O-RING (USED IN HYD ASSY)HYD TUBES/FITTINGS / GP:AR.....	10
7	PAFZZ	4710-01-219-7917	19207	12332101	TUBE ASSEMBLY,METAL.....	1
8	PAFZZ	4730-00-226-6902	96906	MS51530A8S	TEE,TUBE TO BOSS.....	1
9	PAFZZ	5365-00-674-6831	96906	MS51840-26	PLUG,MACHINE THREAD.....	1
10	PAFZZ	4710-01-179-7632	97403	13214E2842	TUBE ASSEMBLY,METAL.....	1
11	PAFZZ	4730-00-491-4983	81343	SAE J514 8-8-8 070432CA	TEE,TUBE.....	2
12	PAFZZ	4710-01-192-8521	97403	13211E8879	TUBE ASSEMBLY,METAL.....	1
13	PAFZZ	4710-01-192-9816	97403	13211E8877	TUBE ASSEMBLY,METAL.....	1
14	PAFZZ	4710-01-192-9817	97403	13211E8878	TUBE ASSEMBLY,METAL.....	1
15	PAFZZ	4710-01-192-9815	97403	13211E8876	TUBE ASSEMBLY,METAL.....	1
16	PAFZZ	4710-01-347-9756	19207	12379472	TUBE ASSEMBLY,METAL.....	1
17	PAFZZ	4710-01-179-7621	97403	13214E2753	TUBE ASSEMBLY,METAL.....	1
18	PAFZZ	4710-01-179-7619	97403	13214E2751	TUBE ASSEMBLY,METAL.....	1
19	PAFZZ	5340-01-181-6137	97403	13214E1971	STRAP,RETAINING.....	2
20	PAFZZ	5310-00-809-4058	96906	MS27183-10	WASHER,FLAT.....	4
21	PAFZZ	5306-01-203-6433	80204	B1821BH025C138L	BOLT,MACHINE.....	4
22	PAFZZ	5305-00-914-3819	80205	MS51975-10	SCREW,SHOULDER.....	4
23	PAFZZ	5310-00-167-0721	80205	MS35333-41	WASHER,LOCK.....	4
24	PAFZZ	4710-01-179-7623	97403	13214E2755	TUBE ASSEMBLY,METAL.....	1
25	PFFZZ	5340-01-180-5562	97403	13214E1984	BRACKET,HYDRAULIC-T.....	2
26	PAFZZ	4710-01-179-7618	97403	13214E2750	TUBE ASSEMBLY,METAL.....	1
27	PAFZZ	4710-01-179-7622	97403	13214E2754	TUBE ASSEMBLY,METAL.....	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
28	PAFZZ	4710-01-179-7620	19207	13214E2752	TUBE ASSEMBLY,METAL.....	1

END OF FIGURE







R0025T77

Figure 18. Hydraulic Manifolds and Mounting Parts.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP AR02 HYDRAULIC INSTALLATION.</b>						
<b>FIG. 18. HYDRAULIC MANIFOLDS AND MOUNTING PARTS.</b>						
1	PAFZZ	5306-01-196-0442	80204	B1821BH050C113L	BOLT,MACHINE.....	12
2	PAFZZ	5310-00-809-5998	96906	MS27183-18	WASHER,FLAT (USED IN HYD ASSY)MANIFOLDS/PART/GP:AR.....	8
3	PFFZZ	4730-01-194-0196	97403	13214E1974	MANIFOLD,HYDRAULICS.....	2
4	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT (USED IN HYD ASSY/HYD MANIFOLD/PARTS.GP:AR).....	8
5	PAFZZ	5306-01-194-0591	80204	B1821BH038C200L	BOLT,MACHINE.....	8
6	PAFZZ	4820-01-158-4066	8Z296	1A30-01-V-8S-E-D	VALVE,RELIEF,PRESSU.....	1
7	PAFZZ	5310-00-151-5572	80205	NAS1149C0863B	WASHER,FLAT.....	4
8	PFFZZ	5340-01-181-6159	97403	13214E2728	BRACKET,ANGLE.....	1
9	PAFZZ	4730-01-180-8600	97403	13214E2765	MANIFOLD,HYDRAULICS.....	1
10	PFFZZ	5340-01-195-5914	97403	13214E2764	BRACKET,ANGLE.....	1
11	PAFZZ	4730-01-180-8605	97403	13214E2736-1	MANIFOLD,HYDRAULIC.....	1
12	PFFZZ	5340-01-195-5915	97403	13214E2763	BRACKET,ANGLE.....	1
13	PAFZZ	4730-01-180-8606	97403	13214E2736-2	MANIFOLD,HYDRAULIC.....	1
14	PAFZZ	4730-01-180-8607	97403	13214E2766	MANIFOLD,HYDRAULICS.....	1
15	PFFZZ	5340-01-182-8987	97403	13214E2717	BRACKET,ANGLE.....	1

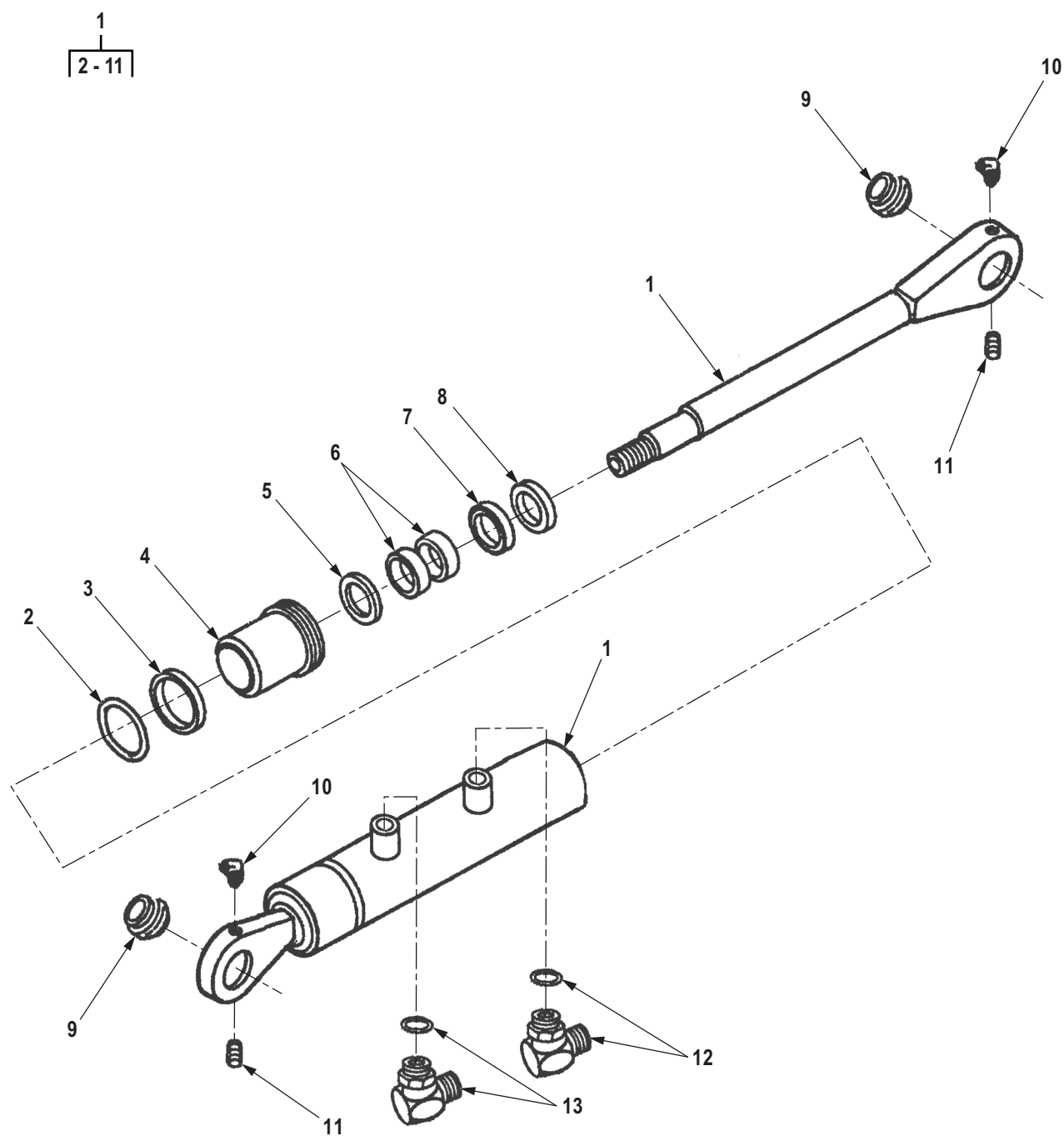
**END OF FIGURE**



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**FIELD MAINTENANCE  
GROUP A301 SUSPENSION INSTALLATION**

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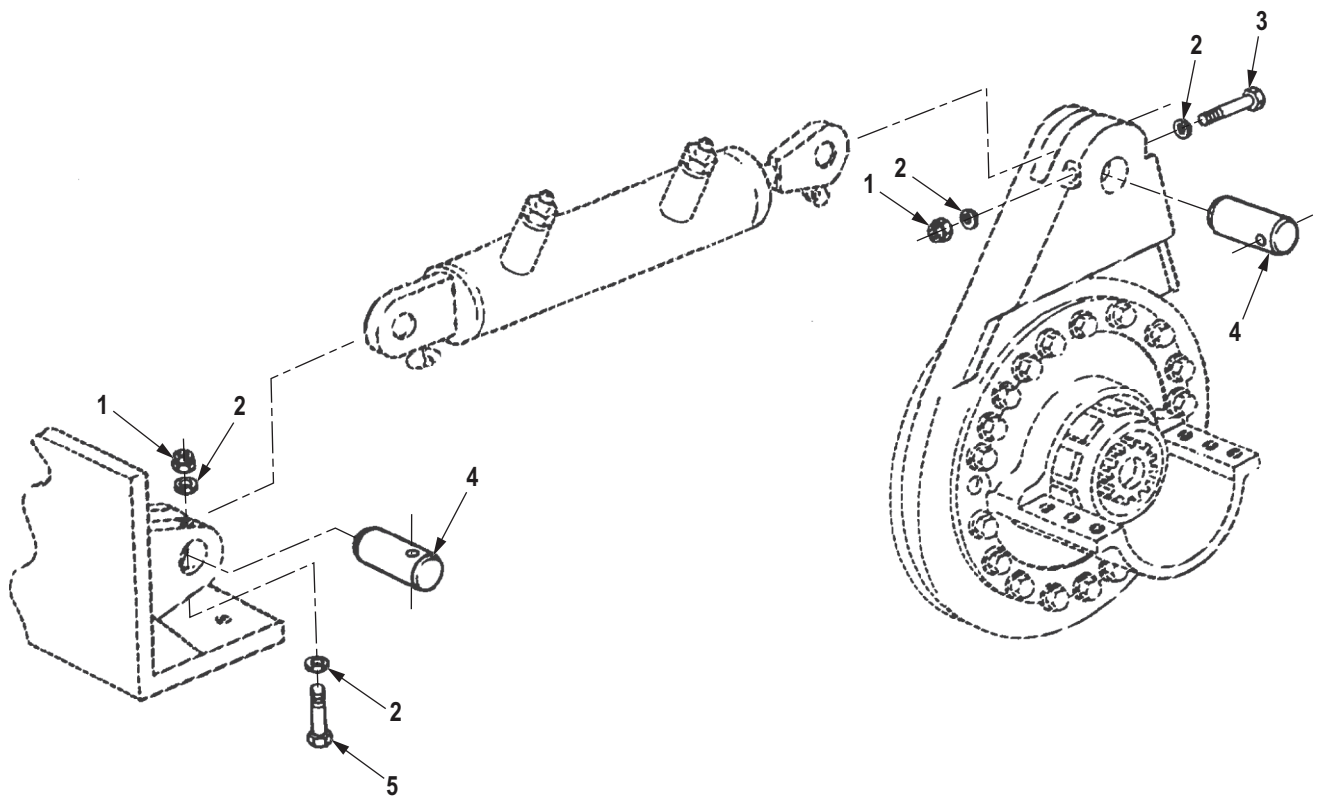


R0019T77

Figure 19. Track Adjusting Cylinder Assembly.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP A301 SUSPENSION INSTALLATION.</b>						
<b>FIG. 19. TRACK ADJUSTING CYLINDER ASSEMBLY.</b>						
1	PAFFF	3040-01-446-7606	19207	12466272	CYLINDER ASSEMBLY,A HYDRAULIC, AUTO ADJUSTING. (NEW PRODUCTION).....	2
2	PCFZZ	5330-01-160-4349	81343	M83461/1-336	. PACKING,PREFORMED PART OF KIT P/N 12335044-2.....	1
3	KFFZZ	5330-00-171-6764	96906	MS28782-39	. RETAINER,PACKING PART OF KIT P/N 12335044-2.....	1
4	XAFZZ		62259	B107278-1	. HEAD.....	1
5	PAFZZ	5330-01-183-6826	19207	12335304-1	. RING,BUFFER PART OF KIT P/ N 12335044-2.....	1
6	KFFZZ		19207	12335305-2	. RING,WEAR PART OF KIT P/N 12335044-2.....	2
7	PAFZZ	5330-01-183-6826	19207	12335044-2	. PARTS KIT,SEAL REPL.....	1
8	PAFZZ	5330-01-095-3860	75160	U46283	. SEAL,PLAIN ENCASED PART OF KIT P/N 12335044-2.....	1
9	PAFZZ	3120-00-587-4781	17773	11177524-1	. BEARING,PLAIN,SELF-.....	2
10	PAFZZ	4730-00-172-0034	81343	AS15003-6-P	. FITTING,LUBRICATION.....	2
11	PAFZZ	4730-00-018-9566	58536	A-A-59616ACABCA	. PLUG,PIPE.....	2
12	PAFFZ	4730-01-242-4510	81343	4-6 070220CA	ELBOW,TUBE TO BOSS.....	2
13	PAFFZ	4730-00-143-3941	96906	MS51527A6	ELBOW,TUBE TO BOSS.....	2

END OF FIGURE



R0020T77

Figure 20. Track Adjusting Cylinder.



(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP A301 SUSPENSION INSTALLATION.</b>						
<b>FIG. 20. TRACK ADJUSTING CYLINDER.</b>						
1	PAFZZ	5310-00-483-8790	80205	MS17829-6C	NUT,SELF-LOCKING,HE (USED HYD ASSY)TRACK ADJ CYL/GPAR.....	4
2	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT.....	8
3	PAFZZ	5305-00-964-0503	80204	B1821BH038C500N	SCREW,CAP,HEXAGON H NEW PRODUCTION.....	2
4	PAFZZ	5315-01-180-8641	19207	13211E8634	PIN,STRAIGHT,HEADLE.....	4
5	PAFZZ	5305-00-269-3225	80205	MS90725-75	SCREW,CAP,HEXAGON H.....	2

**END OF FIGURE**

1  
2 - 14

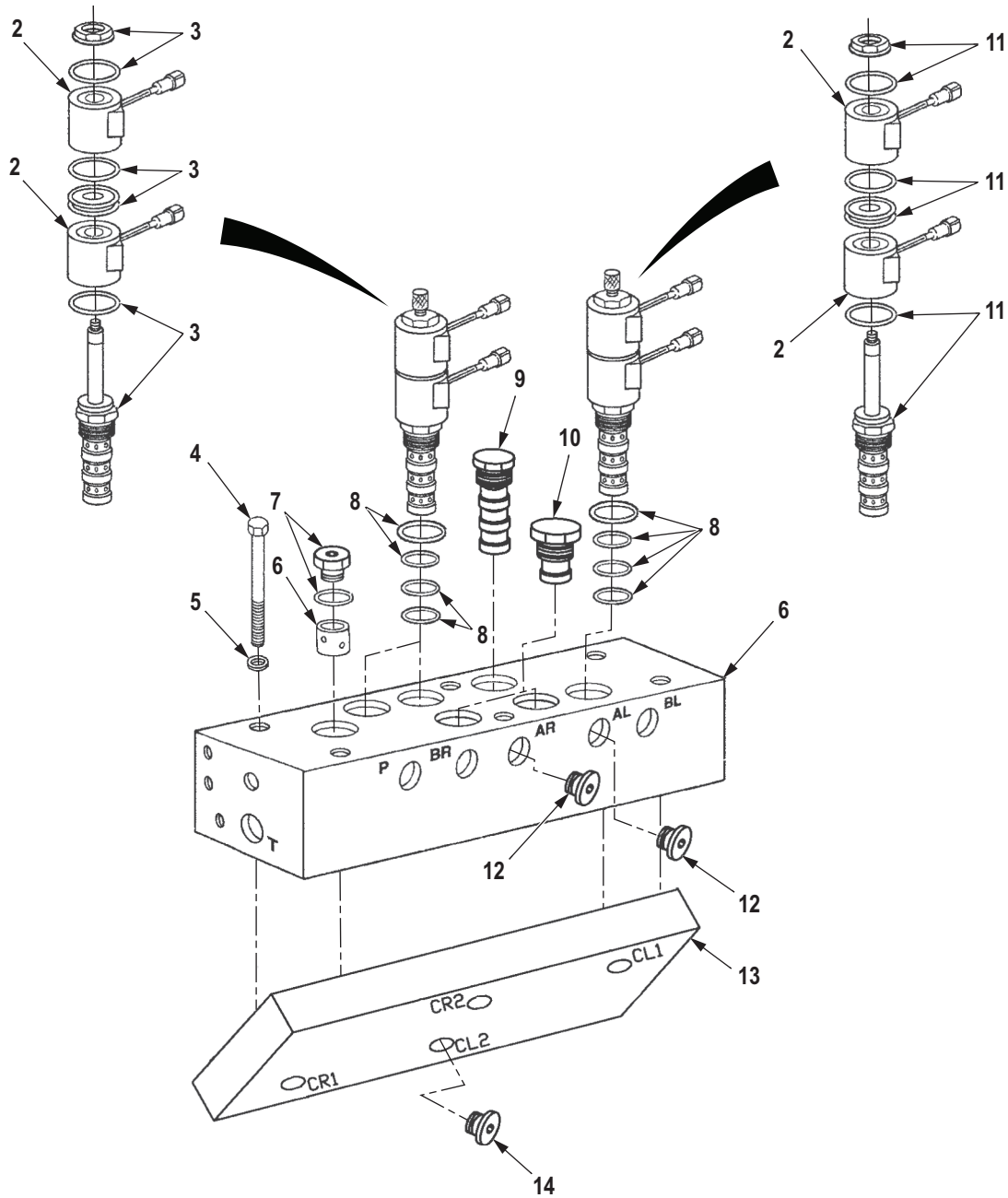
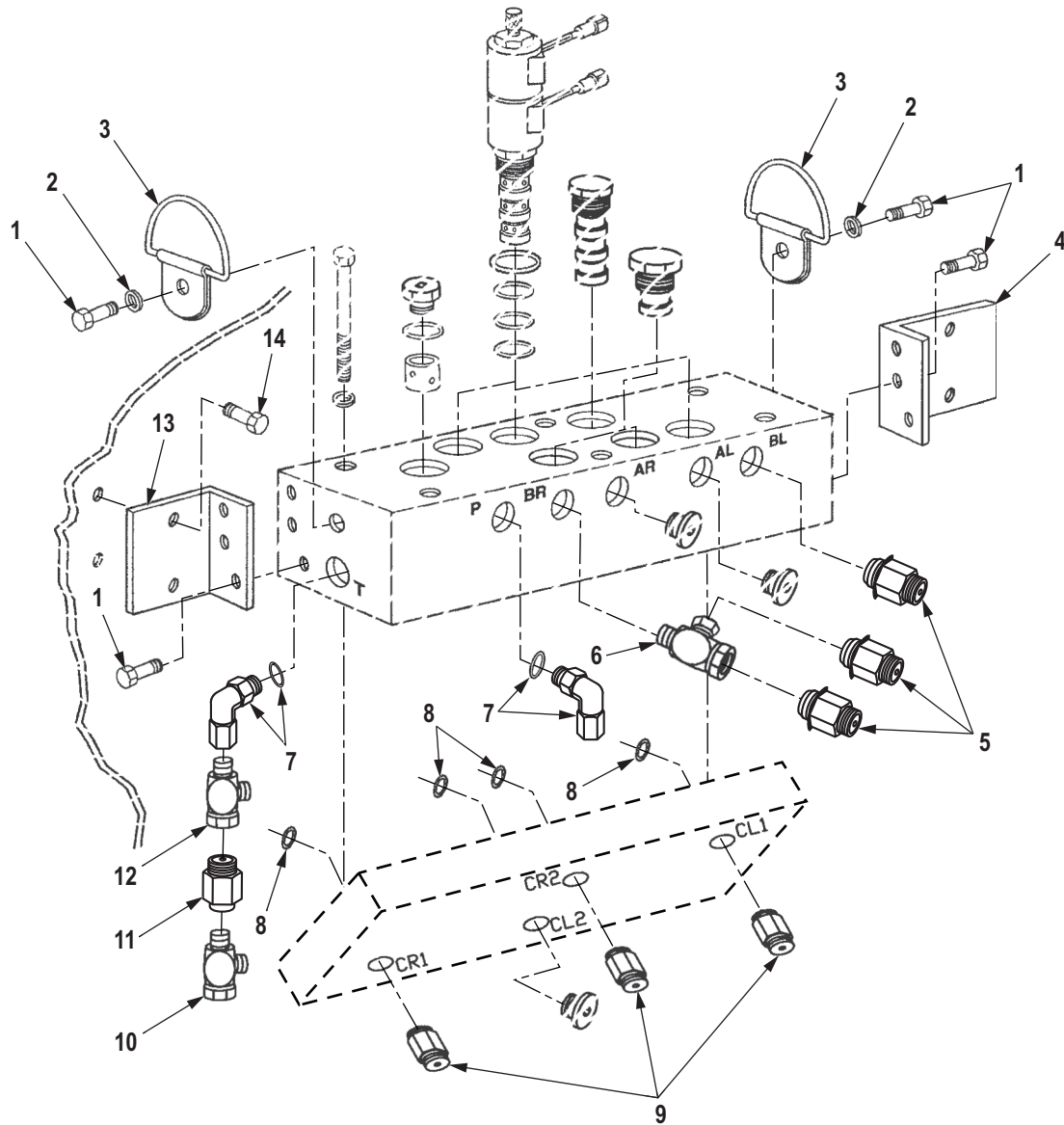


Figure 21. Track and Blade Manifold Assembly.

R0021T77

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP A301 SUSPENSION INSTALLATION.</b>						
<b>FIG. 21. TRACK AND BLADE MANIFOLD ASSEMBLY.</b>						
1	PAFFZ	4730-01-529-2099	19207	12491612	MANIFOLD, HYDRAULICS.....	1
2	PAFZZ	5950-01-472-7835	005K6	6309802	. COIL, ELECTRICAL.....	2
3	PAFZZ	4810-01-525-1156	005K6	SV08-47DM-0-N-0	. VALVE, SOLENOID.....	2
4	PAFZZ	5305-00-269-4528	80204	B1821BH038F425N	. SCREW, CAP, HEXAGON H.....	6
5	PAFZZ	5310-00-080-6004	96906	MS27183-14	. WASHER, FLAT.....	6
6	PAFZZ	4730-01-446-7819	5T142	97-221	. MANIFOLD ASSEMBLY, H.....	1
7	PAFZZ	5365-01-217-4133	01276	900598-8S	. PLUG, MACHINE THREAD WITH O-RING.....	1
8	PAFZA	5330-01-462-9882	0BHP2	SK-08-4P-MMM	. PARTS KIT, SEAL REPL O- RINGS FOR 4 WAY VALVE.....	4
9	PAFZZ	5340-01-525-1049	005K6	CP08-40-N	. PLUG ASSEMBLY, SEALI.....	1
10	PAFZZ	5340-01-525-1041	005K6	CP08-20-N	. PLUG ASSEMBLY, SEALI.....	2
11	PAFZZ	4810-01-463-1795	005K6	SV-08-47CM-0-N-00	. VALVE, SOLENOID.....	1
12	PAFZZ	5365-01-525-1176	30780	6 HP5ON	. PLUG, MACHINE THREAD.....	2
13	PAFZZ	5340-01-541-8263	19207	12491613	. PLATE, MOUNTING.....	1
14	PAFZZ	5365-01-042-9079	30780	4 HP5ON-S	. PLUG, MACHINE THREAD.....	1

END OF FIGURE



R0022T77

Figure 22. Track and Blade Manifold.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
<b>GROUP A301 SUSPENSION INSTALLATION.</b>						
<b>FIG. 22. TRACK AND BLADE MANIFOLD.</b>						
1	PAFZZ	5305-00-543-4372	80204	B1821BH038C075N	SCREW,CAP,HEXAGON H.....	8
2	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER,FLAT.....	2
3	PAFZZ	3990-01-314-8393	19207	12342077	TIE DOWN,CARGO,VEHI.....	2
4	PAFZZ	5340-01-487-7145	19207	12466282	BRACKET,ANGLE REAR.....	1
5	PAFZZ	4730-00-258-1864	96906	MS51525B4-6	ADAPTER,STRAIGHT,TU.....	3
6	PAFZZ	4730-01-525-1065	30780	6 AOG5JG5	TEE,TUBE.....	1
7	PAFFZ	4730-00-822-5609	96906	MS51527A8	ELBOW,TUBE TO BOSS 90 DEGREE WITH O-RING, PORT P.....	2
8	PCFZZ	5331-01-090-2741	81343	MS28775-109	O-RING.....	4
9	PAFZZ	4730-01-007-5232	81343	SAE J514 4-4 070120S	ADAPTER,STRAIGHT,TU.....	3
10	PAFZZ	4730-00-491-4983	81343	SAE J514 8-8-8 070432CA	TEE,TUBE.....	1
11	PAFZZ	4730-00-647-3343	81343	8-4 070123CA	REDUCER,TUBE.....	1
12	PAFZZ	4730-00-808-6668	96906	MS51523B4	TEE,TUBE.....	1
13	PAFZZ	5340-01-487-7139	19207	12466281	BRACKET,ANGLE FRONT.....	1
14	PAFZZ	5305-00-068-0510	05047	B1821BH038C100N	SCREW,CAP,HEXAGON H (USED IN HYD ASSY)TRACK/BLADE MANIF/AP.....	4

END OF FIGURE



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FIELD MAINTENANCE  
GROUP 9401 KITS

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# **FIGURE ILLUSTRATION NOT REQUIRED**

Figure KITS.



(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 9401 KITS.						
FIG. KITS.						
1	PAFZZ	5330-01-183-6826	19207	12335044-2	PARTS KIT,SEAL REPL.....	1
END OF FIGURE						



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FIELD MAINTENANCE  
GROUP 9501 BULK

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# **FIGURE ILLUSTRATION NOT REQUIRED**

Figure BULK.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 9501 BULK.						
FIG. BULK.						
1	PCFZZ	5970-01-085-3431	81343	M23053/1-201-0	INSULATION SLEEVING.....	1
2	PAFZZ	6145-00-152-6499	81349	M13486/1-5	WIRE,ELECTRICAL.....	1

END OF FIGURE



**FIELD MAINTENANCE  
NATIONAL STOCK NUMBER INDEX**

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-00-018-9566	19	11		17	11
6240-00-019-0877	10	30		22	10
4730-00-050-4208	12	14	4730-00-491-9576	13	7
5305-00-052-2234	12	41		17	1
5999-00-057-2929	1	10	5310-00-543-2410	1	3
	3	6	5305-00-543-4372	12	34
	4	8		14	5
5305-00-068-0510	22	14		16	5
5305-00-071-2067	12	50		22	1
5310-00-080-6004	11	2	5310-00-543-5933	10	6
	12	40	6220-00-557-8229	10	3
	14	3	5935-00-572-9180	1	12
	16	3		3	4
	18	4		4	6
	20	2	5310-00-582-5965	2	15
	21	5	5310-00-584-7889	12	54
	22	2	3120-00-587-4781	19	9
5310-00-081-4219	13	4	1670-00-588-6272	12	10
5310-00-087-4652	12	19	5310-00-595-7421	12	45
5331-00-108-5691	17	6	5325-00-623-0928	10	18
4730-00-143-3941	19	13	5310-00-627-6128	11	4
5940-00-143-4794	4	12	5310-00-637-9541	12	11
5310-00-151-5572	18	7		12	33
6145-00-152-6499	BULK	2		14	2
5310-00-167-0721	17	23		16	4
5330-00-171-6764	19	3	5325-00-641-2792	10	17
4730-00-172-0034	19	10	4730-00-647-3343	22	11
5325-00-174-9325	16	6	5365-00-674-6831	17	9
5310-00-225-6993	12	52	5340-00-678-6574	12	9
4730-00-226-6902	17	8	5930-00-683-1626	9	1
5310-00-250-9477	2	16	5930-00-683-1629	9	2
4730-00-258-1864	13	5	5310-00-685-3744	10	7
	15	8	6250-00-741-5451	10	19
	22	5	2590-00-752-9138	11	24
5310-00-264-1340	10	23	5330-00-771-6570	10	10
5305-00-269-3225	20	5	6220-00-771-6580	10	11
5305-00-269-4528	21	4	2590-00-798-4056	11	1
5305-00-307-1592	12	16	5305-00-802-2764	11	17
6240-00-368-4972	10	34	5331-00-804-5695	17	2
5940-00-399-6676	2	11	5331-00-808-0794	17	3
	3	10	3120-00-808-2171	12	13
	4	10	4730-00-808-6668	22	12
5310-00-407-9566	13	8	5310-00-809-4058	2	17
4730-00-429-0516	12	42		17	20
5310-00-477-6768	14	1	5310-00-809-5998	12	51
5310-00-483-8790	11	15		18	2
	20	1	5310-00-809-8541	12	6
4730-00-491-4983	15	4		12	59

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-809-8546	11	25	5365-01-080-3291	10	2
5310-00-811-1377	12	27	6150-01-083-5520	10	31
5940-00-813-0698	6	2	5306-01-083-5536	10	35
	7	4	6220-01-083-5673	10	8
4730-00-822-5609	22	7	5970-01-085-3431	BULK	1
5310-00-829-9981	13	9	5305-01-088-6826	10	14
5935-00-833-8561	2	10	5331-01-090-2741	22	8
	3	9	5330-01-091-1657	10	4
	4	9	5935-01-092-1035	4	4
5970-00-833-8562	2	12	5330-01-095-3860	19	8
	3	11	5935-01-109-7518	5	3
	4	11	5935-01-109-7525	2	6
5310-00-833-8567	1	11	5306-01-112-8681	11	3
	3	5		12	15
	4	7		12	39
5315-00-834-0745	13	10	5305-01-113-3587	10	5
5310-00-838-1702	12	64	6220-01-115-1547	10	13
5930-00-845-0177	9	3	5935-01-119-2830	7	5
5340-00-854-6729	2	14	6220-01-138-0911	10	36
5310-00-877-7527	12	63	5310-01-145-4564	10	29
5305-00-889-2997	1	2	4730-01-156-4835	17	4
5310-00-891-3426	12	4	4820-01-158-4066	18	6
6220-00-893-3558	10	12	5330-01-160-4349	19	2
9905-00-893-3570	1	7	5340-01-170-9947	11	7
	2	8	2910-01-171-0070	11	8
	3	8	5340-01-171-0109	11	21
	4	5	5340-01-171-0110	11	5
	5	4	9320-01-176-8611	11	11
	6	5	9320-01-176-8612	11	9
	7	6	9320-01-176-9177	11	13
5305-00-914-3819	17	22	9320-01-176-9178	11	10
5305-00-925-7635	12	55	9320-01-176-9179	11	14
5310-00-934-9761	10	20	5330-01-178-3361	11	22
9905-00-935-3863	1	9	5995-01-178-5723	11	16
	2	9	6240-01-179-1061	10	1
	3	7	6250-01-179-1062	10	21
	6	3	4710-01-179-7618	17	26
5305-00-942-2196	12	43	4710-01-179-7619	17	18
5325-00-943-5353	12	12	4710-01-179-7620	17	28
5305-00-947-4354	12	31	4710-01-179-7621	17	17
5305-00-964-0503	20	3	4710-01-179-7622	17	27
5305-00-978-9395	11	20	4710-01-179-7623	17	24
5305-00-984-6212	11	26	4710-01-179-7632	17	10
5340-00-985-6690	16	1	5330-01-179-9494	11	6
4730-01-007-5232	22	9	2910-01-180-2991	11	19
4730-01-024-0915	15	5	5340-01-180-5562	17	25
5365-01-042-9079	21	14	4730-01-180-8600	18	9
8310-01-061-7137	5	2	4730-01-180-8605	18	11
5935-01-076-9462	7	2	4730-01-180-8606	18	13
5360-01-078-7661	10	32	4730-01-180-8607	18	14
5330-01-080-3255	10	26	5315-01-180-8641	20	4
5995-01-080-3262	10	25	5340-01-181-6137	17	19
5305-01-080-3287	10	27	5340-01-181-6159	18	8



STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5995-01-182-1321	1	1	5315-01-373-8796	12	17
2590-01-182-8768	12	35	5340-01-374-2334	12	18
4030-01-182-8931	12	56	5340-01-374-5674	12	20
5340-01-182-8987	18	15	5310-01-379-0007	10	37
5340-01-182-9023	12	24	5310-01-381-9948	10	38
5365-01-183-2770	12	36	5305-01-384-0620	10	22
5330-01-183-6826	19	5	5305-01-384-3438	10	39
	19	7	5315-01-386-0443	12	1
	KITS	1	4720-01-421-9723	2	5
2590-01-184-4778	12	25		3	2
5315-01-184-4785	12	44		4	2
5315-01-184-4842	12	47	4720-01-423-2962	2	4
3120-01-184-4859	12	48	2530-01-424-7729	2	3
3830-01-184-4977	12	65	3040-01-446-7606	19	1
2590-01-185-0169	12	21	4730-01-446-7819	21	6
9320-01-186-9781	11	12	4720-01-455-4173	15	1
2590-01-187-0904	12	38	4720-01-455-5065	15	2
4710-01-192-8521	17	12	5935-01-461-5996	7	7
4710-01-192-9815	17	15	5330-01-462-9882	21	8
4710-01-192-9816	17	13	4810-01-463-1795	21	11
4710-01-192-9817	17	14	3830-01-472-7506	12	49
5330-01-193-0208	1	5	5950-01-472-7835	21	2
4730-01-194-0196	18	3	5305-01-487-2938	12	60
5306-01-194-0591	18	5	5340-01-487-7139	22	13
5305-01-194-3001	12	22	5340-01-487-7145	22	4
5305-01-195-1594	12	2	5365-01-491-5061	12	62
4730-01-195-3805	15	3	5340-01-491-6900	12	53
5340-01-195-5914	18	10	5340-01-491-7578	12	58
5340-01-195-5915	18	12	5340-01-491-7584	12	67
3120-01-195-7988	12	46	5306-01-491-9984	12	66
5306-01-195-9819	13	3	5306-01-491-9986	12	61
5306-01-196-0442	18	1	4730-01-494-8226	15	9
5306-01-203-6433	17	21	3830-01-496-4440	12	3
5935-01-213-6433	1	4	5935-01-506-0573	6	6
5365-01-217-4133	21	7	4730-01-525-1012	13	12
4710-01-219-7917	17	7		15	6
2510-01-220-6378	12	7	4730-01-525-1015	13	6
2590-01-222-8364	11	23	5340-01-525-1041	21	10
5306-01-229-9592	12	8	5340-01-525-1049	21	9
5307-01-230-8845	12	5	4730-01-525-1065	22	6
4730-01-242-4510	19	12	4810-01-525-1077	13	11
4730-01-245-7605	15	10	4810-01-525-1114	13	2
3120-01-264-6006	12	28	4810-01-525-1156	21	3
5340-01-273-8821	12	37	5365-01-525-1176	21	12
2540-01-279-1013	12	57	5975-01-529-0044	8	1
5330-01-298-9689	11	18	6150-01-529-0111	7	1
3990-01-314-8393	22	3		9	5
4820-01-329-1661	13	1	6150-01-529-0116	6	1
5310-01-339-6531	12	30		9	4
5305-01-342-5174	10	33	5995-01-529-1535	3	1
4710-01-347-9756	17	16	5975-01-529-1565	4	1
5305-01-357-8161	10	28	5340-01-529-1580	14	6
5310-01-368-8068	10	24	5340-01-529-1586	14	4

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-01-529-2099	21	1	4720-01-529-3774	15	16
5995-01-529-2108	2	1	5310-01-529-3803	16	7
6150-01-529-2140	5	1	4820-01-536-6135	17	5
4720-01-529-3329	15	15	5340-01-541-5445	12	32
4720-01-529-3331	15	12	3040-01-541-7341	12	23
4720-01-529-3332	15	14	5340-01-541-8263	21	13
4720-01-529-3335	15	17	9510-01-541-8566	12	26
4720-01-529-3766	15	7	3040-01-542-1907	12	29
	16	2	4920-01-553-0753	2	2
4720-01-529-3770	15	13			

END OF WORK PACKAGE

# FIELD MAINTENANCE PART NUMBER INDEX

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
A-A-59616ACABCA	19	11		3	3
AA52463-A08	10	30		4	3
AA52536-2	1	10	M22759/16-20-9AR	6	4
	3	6		7	3
	4	8	M23053/1-105-0	2	7
AN960C8	10	7	M23053/1-201-0	BULK	1
AS15003-6-P	19	10	M23053/1-201-0AR	1	6
B107278-1	19	4	M2704	12	67
B1821BH025C138L	17	21	M2705	12	58
B1821BH031C350L	13	3	M2715	12	29
B1821BH038C044L	12	8	M2742630176B	12	12
B1821BH038C075N	12	34	M2945-018-1	12	32
	14	5	M2945-019	12	23
	16	5	M43436/1-3	1	7
	22	1		2	8
B1821BH038C100D	12	43		3	8
B1821BH038C100N	22	14		4	5
B1821BH038C125L	11	3		5	4
	12	15		6	5
	12	39		7	6
B1821BH038C200L	18	5	M45913/1-16CG5C	12	27
B1821BH038C500N	20	3	M45913/1-6CG5C	12	19
B1821BH038F425N	21	4	M45913/1-8CG5C	12	52
B1821BH050C113L	18	1	M83461/1-336	19	2
B1821BH050C125N	12	50	MIL-B-43436/4-1	1	9
B1821BH075C300N	12	31		2	9
B1821BH100C1000N	12	60		3	7
B1821BH100C250N	12	55		6	3
B18231B10030NF	10	39	MS16555-631	13	10
B32L	12	13	MS16997-100	11	20
BVHP-08-SSS-1NG	17	5	MS17829-6C	11	15
CBCG LCN	13	1		20	1
CE140801	12	62	MS17829-8C	12	45
CP08-20-N	21	10	MS18003-4811	10	34
CP08-40-N	21	9	MS21333-103	2	14
CWCG-LGN	13	2	MS24523-23	9	2
FCCB LAV (2.0 GPM)	13	11	MS24523-30	9	1
GAI/S	13	12	MS24658-27E	9	3
	15	6	MS24667-76	12	41
H2-62-T6	15	9	MS25036-101	6	2
H2525M	12	11		7	4
	12	33	MS27183-10	2	17
	14	2		17	20
	16	4	MS27183-12	13	4
HM122	10	12	MS27183-14	11	2
M13486/1-5	BULK	2		12	40
M13486/1-5AR	1	8		14	3
	2	13		16	3

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
	18	4	MS51975-35	12	16
	20	2	MS90725-75	20	5
	21	5	MS90908-1	11	24
	22	2	NAS1149C0863B	18	7
MS27183-18	12	51	R-68235	2	5
	18	2		3	2
MS27183-27	12	6		4	2
	12	59	SAE J514 4-4 070120S	22	9
MS27183-8	11	25	SAE J514 8-8-8 070432CA	15	4
MS28775-109	22	8		17	11
MS28778-10	17	6		22	10
MS28778-6	17	2	SK-08-4P-MMM	21	8
MS28778-8	17	3	SM-D-766931-33	10	14
MS28782-39	19	3	SV-08-47CM-0-N-00	21	11
MS3452W20-15P	1	4	SV08-47DM-0-N-0	21	3
MS3470W14-5P	7	5	TXR54B90-1408AI	2	2
MS3475W14-5S	2	6	U46283	19	8
MS3476W14-5S	4	4	WW-P-471ACBAAG	12	42
MS3476W20-16P	5	3	XPI/S	13	6
MS3476W20-16S	7	2	XR5109	4	12
MS35206-215	1	2	004-003005-062	12	54
MS35206-265	11	26	10511558	10	18
MS35333-41	17	23	10910174-8	12	63
MS35333-73	10	6	11177524-1	19	9
MS35333-77	10	23	115M2091	12	49
MS35335-35	11	4	115M2091-01	12	53
MS35338-40	1	3	11639534	10	32
MS35338-44	2	15	11676794-AR	10	15
MS35338-45	13	8	1199N1860	12	14
MS35338-51	12	30	12281838	10	27
MS35489-107	16	6	12281848	10	4
MS35489-60	10	17	12281849	10	31
MS35649-2312	13	9	12281850	10	25
MS35649-2384	14	1	12287283	10	13
MS35649-264	10	20	12287284	10	2
MS35691-57	12	64	12287285	10	8
MS35691-73	12	4	12287286	10	9
MS51300-1	11	1	12287288	10	16
MS51523A10	15	5	12287561-1	10	35
MS51523B4	22	12	12287561-2	10	5
MS51525A6	13	7	12287708	10	26
	17	1	12312054	10	36
MS51525A8	17	4	12312191	10	21
MS51525B4-6	13	5	12312192	10	1
	15	8	12325738	12	36
	22	5	12325812	11	11
MS51527A6	19	13	12325813	11	12
MS51527A8	22	7	12325814	11	13
MS51530A8S	17	8	12325815	11	10
MS51840-26	17	9	12325816	11	14
MS51849-33C	10	28	12325817	11	9
MS51849-74C	10	33	12325858	11	23
MS51975-10	17	22	12325859	11	22

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
12325860	11	21		9	5
12325866	11	8	12502193	12	26
12332101	17	7	13204E2864	12	46
12332465	11	6	13204E2943	12	47
12334923	11	5	13204E2944	12	48
12335044-2	19	7	13204E2945	12	2
	KITS	1	13211E8616	12	22
12335260-1	12	66	13211E8634	20	4
12335260-2	12	61	13211E8643	12	65
12335304-1	19	5	13211E8876	17	15
12335305-2	19	6	13211E8877	17	13
12342077	22	3	13211E8878	17	14
12347656-3	10	24	13211E8879	17	12
12352329-1	11	18	13211E9533	11	16
12352658	16	7	13214E1971	17	19
12355445	12	56	13214E1974	18	3
12355496	12	7	13214E1984	17	25
12355497	12	5	13214E1997	11	7
12357158-2	12	28	13214E2003	11	19
12357409	12	57	13214E2064	1	1
12379472	17	16	13214E2360-3	12	24
12387149-1	10	22	13214E2403	12	37
12387327-20	10	37	13214E2412	12	25
12387327-22	10	38	13214E2457-15	15	1
12412086	12	18	13214E2457-16	15	2
12412087	12	20	13214E2481	12	35
12412088	12	17	13214E2482	12	21
12412098	12	1	13214E2515	12	38
12420924-005	2	4	13214E2582	1	5
12466272	19	1	13214E2664	12	44
12466281	22	13	13214E2717	18	15
12466282	22	4	13214E2728	18	8
12491606	2	1	13214E2736-1	18	11
12491607	3	1	13214E2736-2	18	13
12491612	21	1	13214E2750	17	26
12491613	21	13	13214E2751	17	18
12491614	14	6	13214E2752	17	28
12491615	15	15	13214E2753	17	17
12491616-1	15	12	13214E2754	17	27
12491616-2	15	14	13214E2755	17	24
12491616-3	15	17	13214E2763	18	12
12491616-4	15	7	13214E2764	18	10
	16	2	13214E2765	18	9
12491616-5	15	13	13214E2766	18	14
12491616-6	15	16	13214E2842	17	10
12491616-7	15	11	1826	12	3
12491618	4	1	1A30-01-V-8S-E-D	18	6
12491619	8	1	2-K-6	15	10
12491620	14	4	2013HX1	11	17
12491622	5	1	202C621-50-0	2	3
12491623	6	1	21C116-06	10	29
	9	4	3418AS6402	7	7
12491624	7	1	353512-1	12	10

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
39-01-2121	6	6		3	9
4 HP5ON-S	21	14		4	9
4-6 070220CA	19	12	8338564	2	11
500454-8S	15	3		3	10
5297052	2	12		4	10
	3	11	8338566	1	12
	4	11		3	4
6 AOG5JG5	22	6		4	6
6 HP5ON	21	12	8338567	1	11
6309802	21	2		3	5
65B3732	12	9		4	7
7716570	10	10	8741651	10	19
7716580	10	11	900598-8S	21	7
7962266	10	3	900729-3	16	1
8-4 070123CA	22	11	930000-0204	2	16
803073-1	5	2	97-221	21	6
8338561	2	10			

END OF WORK PACKAGE

## **CHAPTER 8**

### **SUPPORTING INFORMATION**





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## OPERATOR MAINTENANCE REFERENCES

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### SCOPE

This work package lists all forms, manuals, bulletins, and other publications referenced in this manual and which apply to the operation, field, direct support, and general support maintenance of the M9 ACE applicable to the material covered in this technical manual. DA PAM 25-30, *Consolidated Index of Army Publications and Blank Forms*, should be consulted frequently for latest changes or revisions and for new publications relevant to material covered in this technical manual.

### FIELD MANUALS

FM 4-25.11 First Aid for Soldiers

### FORMS

Refer to DA PAM 750-8, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms.

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
DA Form 5988-E	Maintenance Request Register (EGA)
DD Form 1397	Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines
DD Form 314	Preventive Maintenance Schedule and Record
SF Form 368	Product Quality Deficiency Report

### OTHER PUBLICATIONS

CTA 50-909	Field and Garrison Furnishings and Equipment
CTA 50-970	Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items)
CTA 8-100	Army Medical Department Expendable/Durable Items
MIL-F-18866D	Fittings, Hydraulic Tube, Flared, 37 Degree and Flareless, Steel

**PAMPHLETS AND BULLETINS**

DA PAM 25-30

Consolidated Index of Army Publications and Blank Forms

DA PAM 750-8

The Army Maintenance Management System (TAMMS)  
Users Manual**TECHNICAL MANUALS**

TB 43-0001-39 Series

Equipment Improvement Report and Maintenance Digest  
(U.S. Army Tank-Automotive and Armaments Command)  
Tank and Automotive Equipment

TB SIG 222

Solder and Soldering

TM 5-2350-262 Series

Armored Combat Earthmover (ACE), M9

TM 750-244-6

Procedures for Destruction of Tank-automotive Equipment to  
Prevent Enemy Use

TM 9-214

Inspection Care and Maintenance of Antifriction Bearings

TM 9-237

Operator's Manual for Welding Theory and Application

**END OF WORK PACKAGE**

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## FIELD MAINTENANCE MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION

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### The Army Maintenance System MAC

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

This MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field - includes two subcolumns, Crew (C) and Maintainer (F)

Sustainment - includes two subcolumns, Below Depot (H) and Depot (D)

The maintenance to be performed at field and sustainment levels is described as follows:

1. **Crew maintenance.** The responsibility of using organization to perform maintenance on its assigned equipment. It normally consists of inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies. The replace function for this level of maintenance is indicated by the letter "C" in the third position of the SMR code. A "C" appearing in the fourth position of the SMR code indicates complete repair is possible at the crew maintenance level.
2. **Maintainer maintenance.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "F" appearing in the third position of the SMR code. An "F" appearing in the fourth position of the SMR code indicates complete repair is possible at the Field Maintenance level. Items are returned to the user after maintenance is performed at this level.
3. **Below depot sustainment.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "H" appearing in the third position of the SMR code. An "H" appearing in the fourth position of the SMR code indicates complete repair is possible at the below depot sustainment maintenance level. Items are returned to the supply system after maintenance is performed at this level.
4. **Depot sustainment.** Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "D" or "K" appearing in the third position of the SMR code. Depot sustainment maintenance can be performed by either depot personnel or contractor personnel. A "D" or "K" appearing in the fourth position of the SMR code indicates complete repair is possible at the depot sustainment maintenance level. Items are returned to the supply systems after maintenance is performed at this level.

The tools and test equipment requirements table (immediately following the MAC) lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks table (immediately following the tools and test equipment requirements) contains supplemental instructions and explanatory notes for a particular maintenance function.

## The Army Maintenance System MAC - Continued

Maintenance functions are limited to and defined as follows:

1. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel) this includes scheduled inspection and gauging and evaluation of cannon tubes.
2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. **Service.** Operations required periodically to keep an item in proper operation condition; e.g., to clean (includes decontamination, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:
  - a. **Unpack.** To remove from packing box for service or when required for the performance of maintenance operations.
  - b. **Repack.** To return item to packing box after service and other maintenance operations.
  - c. **Clean.** To rid the item of contamination.
  - d. **Touch up.** To spot paint scratched or blistered surfaces.
  - e. **Mark.** To restore obliterated identification.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurements. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. **Paint (ammunition only).** To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.
9. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
10. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

## The Army Maintenance System MAC - Continued

### NOTE

The following definitions are applicable to the "repair" maintenance function:

Services: Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

11. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
12. **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 material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

### EXPLANATION OF COLUMNS IN THE MAC

Maintenance functions are limited to and defined as follows:

**Column (1) Group Number.** Column (1) lists Functional Group Code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

**Column (2) Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

**Column (3) Maintenance Function.** Column (3) lists the functions to be performed on the item listed in column (2). (For a detailed explanation of these functions refer to "Maintenance Functions" outlined above).

**Column (4) Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function carries at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

**The Army Maintenance System MAC - Continued**Field:

C Crew maintenance  
F Maintainer maintenance

Sustainment:

L Specialized Repair Activity (SRA)  
H Below depot maintenance  
D Depot maintenance

**NOTE**

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

**Column (5) Tools and Equipment Reference Code.** Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

**Column (6) Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

**Explanation of Columns in the Tools and Test Equipment Requirements**

**Column (1) - Tool or Test Equipment Reference Code.** The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

**Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**Column (3) - Nomenclature.** Name or identification of the tool or test equipment.

**Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.

**Column (5) - Tool Number.** The manufacturer's part number.

**Explanation of Columns in the Remarks**

**Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.

**Column (2) - Remarks.** This column lists information pertinent to the maintenance functions being performed as indicated in the MAC.

**END OF WORK PACKAGE**

**FIELD MAINTENANCE  
STANDARD TWO-LEVEL MAC**

**Table 1. Maintenance Allocation Chart (MAC).**

(1)  GROUP NUMBER	(2)  COMPONENT/ ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4)  MAINTENANCE LEVEL				(5)  TOOLS AND EQUIPMENT REFERENCE CODE	(6)  REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
AJ01	ELECTRICAL SYSTEM							
AJ01-01	APRON WIRING HARNESS	Repair		1.0			3, 6	A, E
		Replace		2.0			3, 6	A
AJ01-02	HEADLIGHT WIRING HARNESS (STEEL)	Repair		1.0			3, 6	A, E
		Replace		2.9			3, 6	A, E
AJ01-03	BLADE FOLDING WIRING HARNESS	Repair		1.0			3, 6	A, E
		Replace		2.5			3, 6	A, E
AJ01-04	CONTROL BOX POWER WIRING HARNESS	Repair		0.3			3, 6	A, E
		Replace		0.4			3, 6	A, E
AJ01-05	MANIFOLD WIRING HARNESS	Repair		1.0			3, 6	A, E
		Replace		2.5			3, 6	A, E
AJ01-06	CONTROL BOX WIRING HARNESS (12491623)	Repair		0.3			3, 6	A, E
		Replace		0.4			3, 6	A, E

**Table 1. Maintenance Allocation Chart (MAC) - Continued.**

(1)  GROUP NUMBER	(2)  COMPONENT/ ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4)  MAINTENANCE LEVEL				(5)  TOOLS AND EQUIPMENT REFERENCE CODE	(6)  REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
AJ01-07	CONTROL BOX WIRING HARNESS (12491624)	Repair		0.3			3, 6	A, E
		Replace		0.4			3, 6	A, D
AJ01-08	TRACK AND BLADE CONTROL BOX	Repair		1.0			6	A
		Replace		2.0			6	A
AJ01-09	HEADLIGHT ASSEMBLY, STEEL APRON	Replace		0.9			6	A
AJ01-10	HEADLIGHT PLATE SPACER LIGHT LENS, AND GASKET, STEEL APRON	Replace		0.3			5, 6	A
AJ01-11	HEADLIGHT LENS HOLDER AND LIGHT FILTER, LIGHT LENS, AND RUBBER SEAL, STEEL APRON	Replace		0.5			6	A
AJ01-12	HEADLIGHT INCANDES- CENT LAMP, STEEL APRON	Replace		0.5			5, 6	A
AJ01-13	HEADLIGHT MOUNT, STEEL APRON	Replace		0.9			4, 5, 6	A



**Table 1. Maintenance Allocation Chart (MAC) - Continued.**

(1)  GROUP NUMBER	(2)  COMPONENT/ ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4)  MAINTENANCE LEVEL				(5)  TOOLS AND EQUIPMENT REFERENCE CODE	(6)  REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
AJ01-14	HEADLIGHT COVER, STEEL APRON	Replace		0.2			5, 6	A
AJ01-15	HEADLIGHT SUPPORT, STEEL APRON	Replace		0.7			5, 6	A
AP01	HULL ASSEMBLY							
AP01-01	APRON AND DOZER ASSEMBLY, STEEL APRON	Replace		1.6			2, 4, 6	A
AP01-02	APRON STEEL	Repair		2.0			2, 4, 5, 6	A, F
AP01-03	DOZER BLADE	Repair		2.6			1, 4, 6	A, C
		Replace		1.8			1, 4, 6	A, F
AP01-04	ACTUATOR ASSEMBLY	Replace		2.8			4, 6	A, B
		Repair		1.0			4, 6	A, B
AR01	HYDRAULIC SYSTEM							
AR01-01	HYDRAULIC VALVES	Replace		1.7			6, 7, 8	A, B
AR01-02	HYDRAULIC FITTINGS	Replace		1.4			6, 7, 8	A, B
AR01-03	HYDRAULIC HOSES	Replace		1.0			4, 6, 7, 8	A, B
AR01-04	BLADE FOLDING HOSES	Replace		0.7			6, 7, 8	A, B

**Table 1. Maintenance Allocation Chart (MAC) - Continued.**

(1)  GROUP NUMBER	(2)  COMPONENT/ ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4)  MAINTENANCE LEVEL				(5)  TOOLS AND EQUIPMENT REFERENCE CODE	(6)  REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
A301	SUSPENSION INSTALLA- TION							
A301-01	TRACK ADJUSTING CYLINDER ASSEMBLY	Replace		1.5			4, 6	A, B
A301-03	TRACK AND BLADE MANIFOLD ASSEMBLY	Replace		2.8			2, 4, 6	A, B, F
		Rebuild			3.8		3, 4	

**Table 2. Tools and Test Equipment.**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F	BOLT, EYE	5306-00-050-0347	MS51937-5
2	C	CHAIN ASSEMBLY	4010-01-185-0406	13211E9331
3	F	SHOP EQUIP., FIELD BASIC	4910-00-754-0705	SC4910-95CLA31
4	F	STANDARD AUTOMOTIVE TOOL SET (SATS)	4910-01-490-6453	SC 4910-95-A81
5	F	STAND, VEHICLE	2590-01-228-5802	12355345
6	F	TOOL KIT, GENERAL MECHANIC'S	5180-01-548-7634	PD484
7	F	WRENCH SET, CROWFOOT	5120-01-302-4387	5705566
8	F	WRENCH SET, OPEN END	5120-01-301-5783	5705565

**Table 3. Remarks.**

REMARK CODE	REMARKS
A	Check for proper operation
B	Inspect for leaks, unusual noises
C	Repair by straightening, welding, and/or soldering
D	Inspect for loose connections, frayed, or broken wires
E	Inspect for frayed, broken strands
F	Lift capability required

**END OF WORK PACKAGE**



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**FIELD MAINTENANCE  
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS**

---

**SCOPE**

This work package lists COEI and BII for the Hydraulic Blade Folder - Track Tensioner (HBF-TT) for the M9 ACE to help you inventory items for safe and efficient operation of the equipment.

**GENERAL**

The COEI and BII information is divided into the following lists:

**Components of End Item (COEI).** This list is for information purposes only and is not authority to requisition replacements. These items are part of the HBF-TT. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

**Basic Issue Items (BII).** These essential items are required to place the HBF-TT in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the HBF-TT during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

**Explanation of Columns in the COEI and BII List**

**Column (1) Illus Number.** Gives you the number of the item illustrated.

**Column (2) National Stock Number (NSN).** Identifies the stock number of the item to be used for requisitioning purposes.

**Column (3) Description, Part Number/(CAGEC).** Identifies the Federal item name (in all capital letters) followed by a minimum description where needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

**Column (4) Usable On Code.** When applicable, gives you a code if the item you need is not the same for different models of equipment.

**Column (5) U/I.** Unit of Issue (U/I) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

**Column (6) Qty Rqr.** Indicates the quantity required.

The M9 ACE HBF-TT does not currently have any assigned components of end item or basic issue items.

*Table 1. Components of End Item List.*

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS NUMBER	NATIONAL STOCK NUMBER (NSN)	DESCRIPTION, PART NUMBER/ (CAGEC)	USABLE ON CODE	U/I	QTY RQR
		NONE			

*Table 2. Basic Issue Items List.*

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS NUMBER	NATIONAL STOCK NUMBER (NSN)	DESCRIPTION, PART NUMBER/ (CAGEC)	USABLE ON CODE	U/I	QTY RQR
		NONE			

END OF WORK PACKAGE

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**FIELD MAINTENANCE  
ADDITIONAL AUTHORIZATION LIST (AAL)**

---

**INTRODUCTION****Scope**

This work package lists additional items authorized for the support of the Hydraulic Blade Folder - Track Tensioner (HBF-TT) for the M9 ACE.

**General**

This list identifies items that do not have to accompany the HBF-TT and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

**Explanation of Columns in the AAL**

**Column (1) National Stock Number (NSN).** Identifies the stock number of the item to be used for requisitioning purposes.

**Column (2) Description, Part Number/(CAGEC).** Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

**Column (3) Usable On Code.** When applicable, gives you a code if the item you need is not the same for different models of equipment.

**Column (4) U/I.** Unit of Issue (U/I) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

**Column (5) Qty Recm.** Indicates the quantity recommended.

The M9 ACE HBF-TT does not currently have any additional authorization list items.

**Table 1. Additional Authorization List.**

(1) NATIONAL STOCK NUMBER (NSN)	(2) DESCRIPTION, PART NUMBER/ (CAGEC)	(3) USABLE ON CODE	(4) U/I	(5) QTY RECM
	NONE			

**END OF WORK PACKAGE**





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## FIELD MAINTENANCE EXPENDABLE AND DURABLE ITEMS LIST

---

### INTRODUCTION

#### Scope

This work package lists expendable and durable items that you will need to operate and maintain the Hydraulic Blade Folder-Track Tensioner (HBF-TT). This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), CTA 50-909, Field and Garrison Furnishings and Equipment or CTA 8-100, Army Medical Department Expendable/Durable Items.

#### Explanation of Columns in the Expendable/Durable Items List

**Column (1) Item No.** This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Use brake fluid (WP 0098, Item 5)).

**Column (2) Level.** This column identifies the lowest level of maintenance that requires the listed item (F = Maintainer or ASB).

**Column (3) National Stock Number (NSN).** This is the NSN assigned to the item, which you can use to requisition it.

**Column (4) Item Name, Description, Part Number/(CAGEC).** This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

**Column (5) U/I.** Unit of Issue (U/I) code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

**Table 1. Expendable and Durable Items List.**

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/ (CAGEC)	(5) U/I
<b>Adhesive</b>				
1	F	8040-00-118-2695	Adhesive, 3-Ounce Tube MIL-A-46146 (81349)	KT
2	F	8040-00-157-8677	Adhesive, 6-Ounce Tube MMM-A-134 (81348)	CA
3	F	8040-00-938-1535	Adhesive, 12-Ounce Tube MIL-A-46146 (81349)	KT
<b>Brush, Acid, Swabbing</b>				
4	F	7520-00-223-8000	Brush, Acid, Swabbing 70107 (45606)	EA
<b>Brush, Wire</b>				
5	F	7920-00-291-5815	Brush, Wire 7920-00-291-5815 (83421)	EA
<b>Cleaning Compound, Solvent</b>				
6	F	7930-01-330-0187	Cleaning Compound, Solvent, 1-Quart Can 61432 (66724)	BX
7	F	7930-01-328-5960	Cleaning Compound, Solvent, 1-Gallon Can PF01 (66724)	BX
8	F	7930-01-328-2030	Cleaning Compound, Solvent, 5-Gallon Can PF05 (66724)	CN
<b>Cloth, Crocus</b>				
9	F	5350-00-221-0872	Cloth, Crocus, 50 Sheets ANSI B74.18 (80204)	PG
<b>Dishwashing Compound, Hand</b>				
10	F	7930-00-899-9534	Dishwashing Compound, Hand, 5-Gallon Can 1064012 (83421)	CN
<b>Gloves, Chemical and Oil Protective</b>				
11	F	8415-01-013-7384	Gloves, Chemical and Oil Protective MIL-G-87066 (81349)	PR
<b>Goggles, Industrial</b>				
12	F	4240-00-190-6432	Goggles, Industrial ANSIZ87.1-1989 (80204)	PR

**Table 1. Expendable and Durable Items List - Continued.**

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/ (CAGEC)	(5) U/I
<b>Grease, Automotive and Artillery (GAA)</b>				
13	F	9150-01-197-7688	Grease, Automotive and Artillery (GAA), 2.25-Ounce Tube M-10924-A (81349)	TU
14	F	9150-01-197-7693	Grease, Automotive and Artillery (GAA), 14-Ounce Tube M-10924-B (81349)	CA
15	F	9150-01-197-7690	Grease, Automotive and Artillery (GAA), 1.75-Pound Can M-10924-C (81349)	CN
16	F	9150-01-197-7689	Grease, Automotive and Artillery (GAA), 6.5-Pound Can M-10924-D (81349)	CN
17	F	9150-01-197-7692	Grease, Automotive and Artillery (GAA), 35-Pound Can M-10924-E (81349)	CN
<b>Lubricating Oil, Engine</b>				
18	F	9150-00-189-6727	Lubricating Oil, Engine OE/HDO-10, 1-Quart Can M2104-1-10W (81349)	QT
19	F	9150-00-186-6668	Lubricating Oil, Engine OE/HDO-10, 5-Gallon Can M2104-3-10W (81349)	CN
20	F	9150-00-191-2772	Lubricating Oil, Engine OE/HDO-10, 55-Gallon Drum M2104-4-10W (81349)	DR
<b>Lubricating Oil, General Purpose</b>				
21	F	9150-00-231-2361	Lubricating Oil, General Purpose 1-Quart Can MIL-PRF-3150 (81349)	QT
22	F	9150-00-231-2356	Lubricating Oil, General Purpose 5-Gallon Can MIL-PRF-3150 (81349)	CN
<b>Lubricating Oil, General Purpose</b>				
23	F	9150-00-231-6689	Lubricating Oil, General Purpose 1-Quart Can MIL-PRF-32033 (81349)	QT
24	F	9150-00-231-9062	Lubricating Oil, General Purpose 5-Gallon Can MIL-PRF-32033 (81349)	CN
<b>Rag, Wiping</b>				
25	F	7920-00-205-1711	Rag, Wiping, 50-Pound Bale 7920-00-205-1711 (80244)	BE

*Table 1. Expendable and Durable Items List - Continued.*

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/ (CAGEC)	(5) U/I
<b>Sealing Compound</b>				
26	F	8030-01-299-1762	Sealing Compound, 3.35-Ounce Tube 81724 (1PBQ8)	TU
<b>Strap, Tiedown, Electrical</b>				
27	F	5975-00-074-2072	Strap, Tiedown, Electrical, Bundle MS3367-1-9 (81343)	BD
28	F	5975-00-451-5001	Strap, Tiedown, Electrical, Bundle MS3367-3-9 (81343)	BD
<b>Tape, Electrical</b>				
29	F	5970-00-644-2636	Tape, Electrical, 1 Roll-108 Feet 88 1-2INBLACK (75037)	RO
<b>Wire, Non-Electrical</b>				
30	F	9505-00-555-8648	Wire, Non-Electrical, 1 Spool ASTM A580 (81346)	SL

**END OF WORK PACKAGE**

## FIELD MAINTENANCE TOOL IDENTIFICATION LIST

### INTRODUCTION

#### Scope

This work package lists all common tools and supplements and special tools/fixtures needed to maintain the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for the M9 ACE.

Most PM-SKOT products have lifetime warranties and replacement capabilities and are supported worldwide through PM-SKOT. The PM-SKOT implemented a Web-based tool replacement and warranty program in May 2005 for tools authorized in SKO. User may access the online program by first accessing the PM-SKOT Web site at <https://pmskot.army.mil> and clicking on the Tool Replacement/Warranty banner.

#### Explanation of Columns in the Tool Identification List

**Column (1) Item No.** This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Extractor (WP 0090, Item 32)).

**Column (2) Item Name.** This column lists the item by noun nomenclature and other descriptive features (e.g., Gage, belt tension).

**Column (3) National Stock Number (NSN).** This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.

**Column (4) Part Number/(CAGEC).** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.

**Column (5) Reference.** This column identifies the authorizing supply catalog or RPSTL for items listed in this work package.

**Table 1. Tool Identification List.**

(1)	(2)	(3)	(4)	(5)
ITEM NO.	ITEM NAME	NATIONAL STOCK NUMBER (NSN)	PART NUMBER /(CAGEC)	REFERENCE
1	Bolt, Eye	5306-00-050-0347	MS51937-5 (96906)	
2	Chain Assembly	4010-01-185-0406	13211E9331 (97403)	
3	Multimeter	-	KTC S0252 (00NS2)	SATS SC 4910-95- A81
4	Parts Kit, Hydraulic	2590-01-216-8646	5705562 (19207)	TM 5-2350-262-24P

**Table 1. Tool Identification List - Continued.**

(1)	(2)	(3)	(4)	(5)
ITEM NO.	ITEM NAME	NATIONAL STOCK NUMBER (NSN)	PART NUMBER /(CAGEC)	REFERENCE
5	Shop Equipment, Field Basic	4910-00-754-0705	SC4910-95CL A31 (19204)	SATS SC4910-95CLA31
6	Stand, Vehicle	2590-01-228-5802	12355345 (19207)	
7	Tool Kit, General Mechanic's: Automotive	5180-01-548-7634	PD484 (19200)	SATS SC 5480-90- CL-N26
8	Tool Set, Standard Automotive, Base	4910-01-490-6453	SC 4910-95- A81 (59678)	
9	Wrench Set, Crowfoot	5120-01-302-4387	5705566 (19207)	
10	Wrench Set, Open End	5120-01-301-5783	5705565 (19207)	
11	Wrench, Torque, 1/2 in. Drive, Ratcheting (250 ft-lb)	-	KTC S0991	SATS SC 4910-95- A81
12	Wrench, Torque, 3/4 in. Drive, Ratcheting (600 ft-lb)	-	KTC S0988	SATS SC 4910-95- A81
13	Wrench, Torque, Click, Ratcheting, 3/8 in. Drive (75 ft-lb)	-	KTC S0989	SATS SC 4910-95- A81
14	Wrench, Torque, Dial, 1/4 in. Drive (30 in-lb)	-	KTC S0986	SATS SC 4910-95- A81
15	Wrench, Torque, Dial, 3/8 in. Drive (300 in-lb)	-	KTC S0987 (00NS2)	SATS SC 4910-95- A81

**END OF WORK PACKAGE**

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**FIELD MAINTENANCE  
DIAGRAMS**

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**DIAGRAMS**

The following diagrams are for the HBF-TT for the M9 ACE:

- Electrical Schematic MWO, M9 ACE. (FO-1)
- Wiring Harness, Control Box (Sheet 1 of 2). (FO-2)
- Wiring Harness, Control Box (Sheet 2 of 2). (FO-3)

**END OF WORK PACKAGE**





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<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA.						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE <i>Date you filled out this form.</i>
<b>TO</b> (Forward to proponent of publication or form) (Include ZIP Code) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000						<b>FROM</b> (Activity and location) (Include ZIP Code) <i>Your mailing address</i>	
<b>PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER <i>TM Number</i>						DATE <i>Date of the TM</i>	TITLE <i>Title of the TM</i>
ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)	
	0007-3					<i>Figure 2, Item 9 should show a lockwasher. Currently shows a flat washer.</i>	
	0018-2					<i>Cleaning and inspection, Step 6, reference to governor support pin (14) is wrong reference. Reference should be change to (12).</i>	
<h1>SAMPLE</h1>							
TYPED NAME, GRADE OR TITLE  <i>Your Name</i>					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION  <i>Your Phone Number</i>		SIGNATURE  <i>Your Signature</i>

<b>TO</b> (Forward direct to addressee listed in publication) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000				<b>FROM</b> (Activity and location) (Include ZIP Code)  <i>Your Address</i>				<b>DATE</b>  <i>Date you filled out this form</i>	
<b>PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>									
PUBLICATION NUMBER <i>TM Number</i>				DATE <i>Date of the TM</i>		TITLE <i>Title of the TM</i>			
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION	
<div>SAMPLE</div>									
<b>PART III – REMARKS</b> (Any general remarks, or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)									
TYPED NAME, GRADE OR TITLE <i>Your Name</i>				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION <i>Your Phone Number</i>		SIGNATURE <i>Your Signature</i>			

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	<b>DATE</b>
<b>TO</b> (Forward to proponent of publication or form) (Include ZIP Code) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000						<b>FROM</b> (Activity and location) (Include ZIP Code)	
<b>PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER TM 5-2350-377-13&P						DATE 30 June 2012	TITLE Operator and Field Maintenance Manual Including RPSTL Supporting the Hydraulic Blade Folder-Track Tensioner (HBF-TT) for Armored Combat Earthmover (ACE), M9
	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON	
TYPED NAME, GRADE OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE

<b>TO</b> <i>(Forward direct to addressee listed in publication)</i> U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 6501 E. 11 Mile Road, Warren, MI 48397-5000				<b>FROM</b> <i>(Activity and location) (Include ZIP Code)</i>			<b>DATE</b>	
<b>PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>								
PUBLICATION/FORM NUMBER TM 5-2350-377-13&P				DATE 30 June 2012		TITLE Operator and Field Maintenance Manual Including RPSTL Supporting the Hydraulic Blade Folder- Track Tensioner (HBF-TT) for Armored Combat Earthmover (ACE), M9		
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<b>PART III – REMARKS</b> <i>(Any general remarks, or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE	



<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b>  For use of this form, see AR 25-30; the proponent agency is OAASA						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		<b>DATE</b>	
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By Order of the Secretary of the Army:

Official:

  
JOYCE E. MORROW  
*Administrative Assistant to the  
Secretary of the Army*

RAYMOND T. ODIERNO  
*General, United States Army  
Chief of Staff*

1214216

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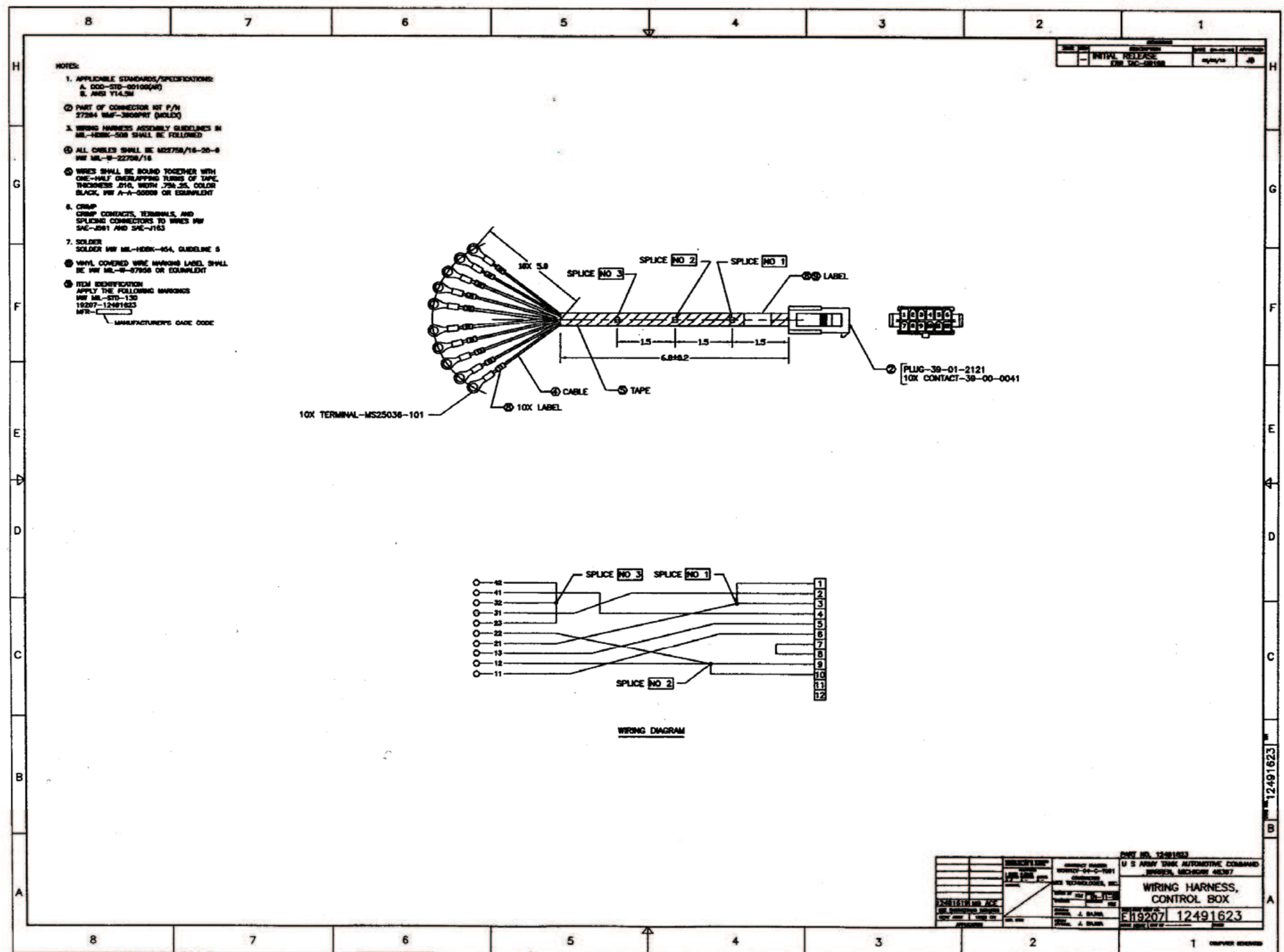
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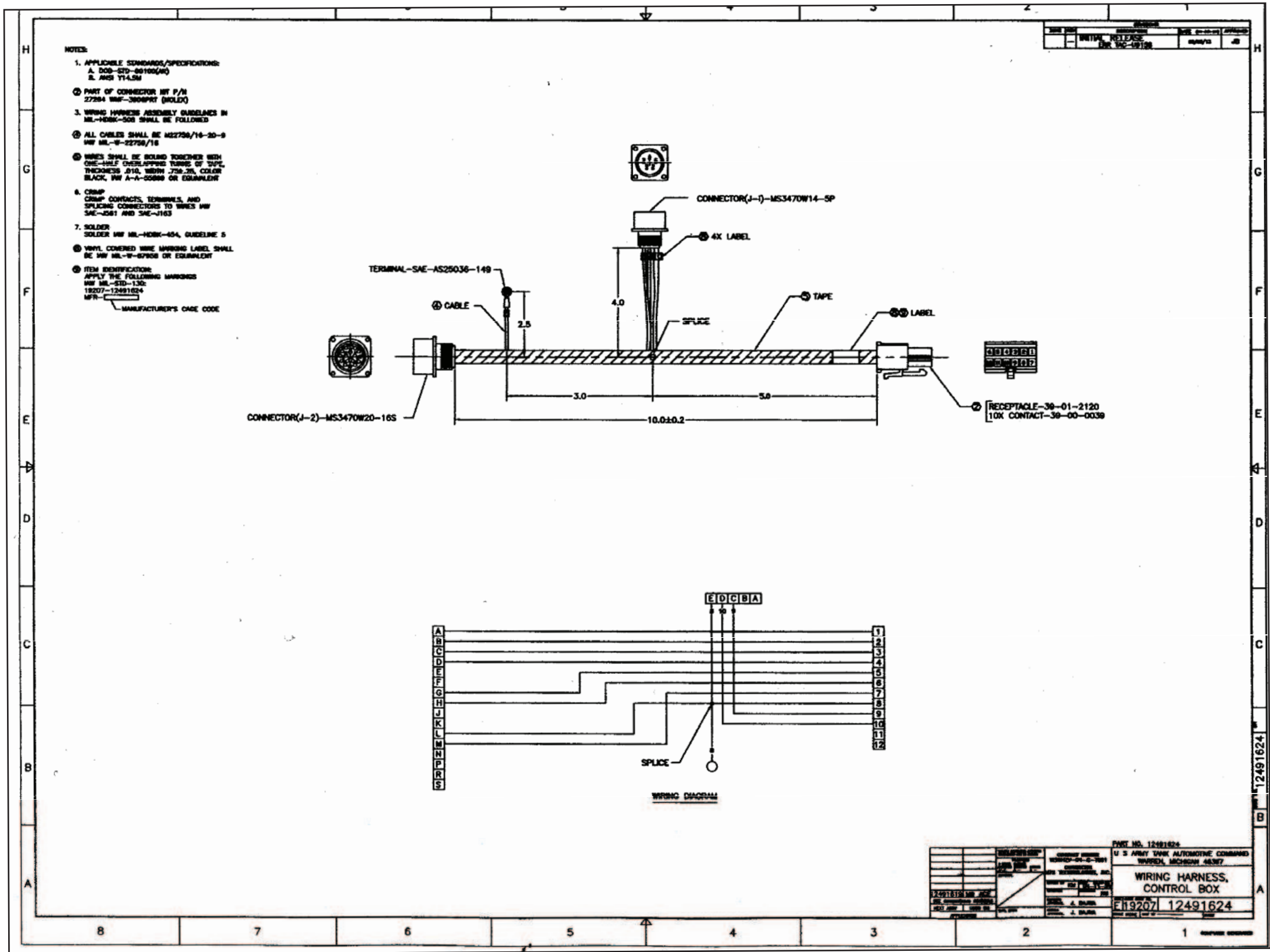






D0002HBF





D0003HBF



## 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 Short 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=0.386 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

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212°Fahrenheit is equivalent to 100°Celsius  
 90°Fahrenheit is equivalent to 32.2°Celsius  
 32°Fahrenheit is equivalent to 0°Celsius  
 $9/5 (^{\circ}\text{C} + 32) = ^{\circ}\text{F}$

### APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches . . . . .	Centimeters . . . . .	2.540
Feet . . . . .	Meters . . . . .	0.305
Yards . . . . .	Meters . . . . .	0.914
Miles . . . . .	Kilometers . . . . .	1.609
Square Inches . . . . .	Square Centimeters . . . . .	6.451
Square Feet . . . . .	Square Meters . . . . .	0.093
Square Yards . . . . .	Square Meters . . . . .	0.836
Square Miles . . . . .	Square Kilometers . . . . .	2.590
Acres . . . . .	Square Hectometers . . . . .	0.405
Cubic Feet . . . . .	Cubic Meters . . . . .	0.028
Cubic Yards . . . . .	Cubic Meters . . . . .	0.765
Fluid Ounces . . . . .	Milliliters . . . . .	29.573
Pints . . . . .	Liters . . . . .	0.473
Quarts . . . . .	Liters . . . . .	0.946
Gallons . . . . .	Liters . . . . .	3.785
Ounces . . . . .	Grams . . . . .	28.349
Pounds . . . . .	Kilograms . . . . .	0.454
Short Tons . . . . .	Metric Tons . . . . .	0.907
Pound-Feet . . . . .	Newton-Meters . . . . .	1.356
Pounds/Sq Inch . . . . .	Kilopascals . . . . .	6.895
Miles per Gallon . . . . .	Kilometers per Liter . . . . .	0.425
Miles per Hour . . . . .	Kilometers per Hour . . . . .	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters . . . . .	Inches . . . . .	0.394
Meters . . . . .	Feet . . . . .	3.280
Meters . . . . .	Yards . . . . .	1.094
Kilometers . . . . .	Miles . . . . .	0.621
Sq Centimeters . . . . .	Square Inches . . . . .	0.155
Square Meters . . . . .	Square Feet . . . . .	10.764
Square Meters . . . . .	Square Yards . . . . .	1.196
Square Kilometers . . . . .	Square Miles . . . . .	0.386
Sq Hectometers . . . . .	Acres . . . . .	2.471
Cubic Meters . . . . .	Cubic Feet . . . . .	35.315
Cubic Meters . . . . .	Cubic Yards . . . . .	1.308
Milliliters . . . . .	Fluid Ounces . . . . .	0.034
Liters . . . . .	Pints . . . . .	2.113
Liters . . . . .	Quarts . . . . .	1.057
Liters . . . . .	Gallons . . . . .	0.264
Grams . . . . .	Ounces . . . . .	0.035
Kilograms . . . . .	Pounds . . . . .	2.205
Metric Tons . . . . .	Short Tons . . . . .	1.102
Newton-Meters . . . . .	Pound-Feet . . . . .	0.738
Kilopascals . . . . .	Pounds per Sq Inch . . . . .	0.145
Km per Liter . . . . .	Miles per Gallon . . . . .	2.354
Km per Hour . . . . .	Miles per Hour . . . . .	0.621

