*TM 5-3805-248-23-1

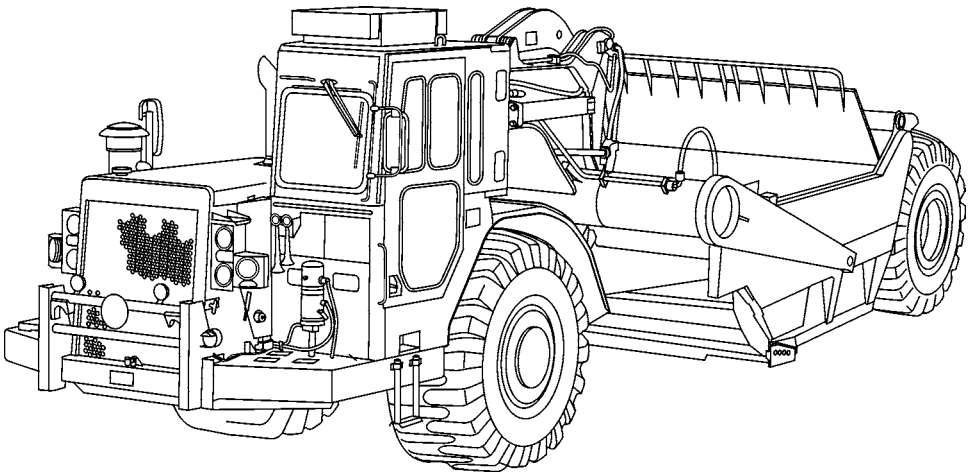
TECHNICAL MANUAL

Unit and Direct Support Maintenance

FOR

SCRAPER, EARTH MOVING, MOTORIZED, DIESEL ENGINE DRIVEN

MODEL 621B
(NSN 3805-01-153-1854) (EIC: EH3)



SUPERSEDURE NOTICE - This manual supersedes TM 5-3805-248-14&P-2 and TM 5-3805-248-14&P-3, dated 19 August 1985

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HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 2006

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.

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.

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.

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

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

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

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

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

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

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

HYDRAULIC FLUID PRESSURE - hydraulic fluid spraying human figure shows that fluid escaping under great pressure can cause injury or death to personnel.

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

RADIOACTIVE - identifies a material that emits radioactive energy and can injure human tissue or organs.

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

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

FOR INFORMATION ON FIRST AID, REFER TO FM 4-25.11.

WARNING

CARBON MONOXIDE (EXHAUST GASES) CAN KILL!

- Carbon monoxide is a colorless, odorless, deadly poison which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.
- Carbon monoxide occurs in exhaust fumes of internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure safety of personnel when engine of tractor is operated.

1. DO NOT operate engine in enclosed areas.
2. DO NOT idle engine without adequate ventilation.
3. DO NOT drive with inspection plates or cover plates removed.
4. BE ALERT for exhaust poisoning symptoms. They are:
   - Headache
   - Dizziness
   - Sleepiness
   - Loss of muscular control
5. If you see another person with exhaust poisoning symptoms:
   - Remove person from area.
   - Expose to fresh air.
   - Keep person warm.
   - Do not permit physical exercise.
   - Administer cardiopulmonary resuscitation (CPR), if necessary.
   - Notify a medic.
6. BE AWARE. The field protective mask for nuclear-biological-chemical (NBC) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation!

WARNING

BATTERIES

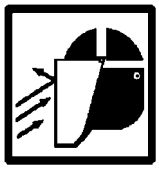
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or serious injury to personnel.

a. **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.

b. **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.

c. **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.

d. **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.



WARNING

COMPRESSED AIR

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.

WARNING

DRY CLEANING SOLVENT

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.

WARNING

ETHER COLD START SYSTEM

Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if ether is inhaled or causes eye irritation.

Failure to follow this warning may cause death or serious injury to personnel.

WARNING

FUEL HANDLING

- DO NOT smoke or permit any open flame in area of machine while you are servicing diesel fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury to personnel or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.
- Operating personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing.

WARNING

HAZARDOUS WASTE DISPOSAL

When servicing this machine, performing maintenance, or disposing of materials such as engine coolant, hydraulic fluid, lubricants, battery acids or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845.

WARNING

HEARING PROTECTION

Hearing protection is required when operating machine or when within 23 feet of machine when it is operating. Failure to wear hearing protection may result in hearing loss.

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WARNING

NBC EXPOSURE

- If NBC exposure is suspected, personnel wearing protective equipment should handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel.

To order this NBC decal use:

National Stock Number (NSN) - 7690-01-114-3702
Part Number (PN) - 12296626
Commercial and Government Entity Code (CAGEC) - 19207

WARNING

OPERATION SAFETY

- Use caution and maintain three-point contact at all times when mounting and dismounting machine, to avoid injury to personnel.
- DO NOT allow riders on machine. Failure to follow this warning may result in serious injury or death to personnel.
- DO NOT operate machine unless seat belt has been fastened. Failure to follow this warning may result in serious injury or death, in the event of an accident.
- BE ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before starting engine, moving machine or lowering or raising scraper bowl. Failure to follow this warning may result in serious injury or death to personnel or damage to equipment.
- Never leave the operator’s position without applying the parking brake. Failure to follow this warning may result in death to injury to personnel or damage to equipment.
- Never use starting fluid or spray to aid in starting the engine, other than the on-board ether cold start system. Failure to follow this warning may result in death or injury to personnel or damage to equipment.
- Always use a ground guide when driving machine up or down ramps in preparation for highway or marine. Failure to use a ground guide may result in death or injury to personnel or damage to equipment.
- When loaded and traveling across a hillside, reduce speed significantly BEFORE turning uphill. Failure to do so may cause machine to roll over, resulting in injury or death to personnel.

Do NOT operate machine if parking brake was applied due to a malfunction of airbrake system or parking brake. Correct any problem before attempting to operate machine. Personal injury or death can result from a brake malfunction.

WARNING

PREPARATION FOR TRANSPORT

- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause death or injury to personnel.
- Always use a ground guide when moving machine during preparation for transport procedures (driving up and down ramps or onto rail flatcars). Failure to use a ground guide may result in death or injury to personnel or damage to equipment.
- Use assistance and handle windshield with caution to ensure it does not become damaged. Failure to do so may damage windshield or cause personnel injury from cut glass if windshield breaks.
- Use extreme caution when climbing on ladder. Failure to exercise caution may result in a fall, causing injury to personnel.

WARNING

PRESSURIZED COOLING SYSTEM

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury.

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WARNING

SLAVE STARTING

- When slave starting tractor, use NATO slave cable that DOES NOT have loose or missing insulation.
- DO NOT proceed if suitable cable is not available.
- DO NOT use civilian-type jumper cables.
- DO NOT allow disabled and booster machines to come in contact with each other at any time during slave starting.

WARNING

TIRES

- Operating machine with underinflated or defective tire may lead to tire failure and loss of traction or control. Damage to equipment or injury to personnel may result.
- If tire pressure is 0 psi (0 kPa) do NOT inflate. Notify Unit Maintenance.
- Use a self-inflating chuck and stand at a distance behind tire when inflating tire. Failure to do so could result in injury or death to personnel.

WARNING

WORK SAFETY

- Lifting cables, chains, hooks, and slings used for lifting machine must be in good condition and of suitable capacity. Failure to follow this warning may result in injury or death to personnel and damage to equipment.

- Improper use of lifting equipment and improper attachment of cables to machine can result in serious personnel injury and equipment damage. Observe all standard rules of safety.
- Ensure engine compartment access door is securely supported in open position. Failure to do so could cause door to slam shut, causing serious injury to personnel.

- Hitch and steering movement can reduce clearances suddenly and cause personnel injury. Always stop engine BEFORE working in area of hitch link.
- Configuration changes to cutting edge should NEVER be attempted without first securing the bowl by blocking it so that it is firmly supported. Failure to follow this warning may cause injury to personnel.

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 15 February 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 66 AND TOTAL NUMBER OF WORK PACKAGES IS 263 CONSISTING OF THE FOLLOWING:

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A/(B Blank)	0
i to xii	0
WP 0001 00 to 0256 00	0
WP 0333 00 to 0339 00	0
Index-1 to Index-27/(Index-28 Blank)	0

* Zero in this column indicates an original page or work package.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 15 February 2006

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FOR

SCRAPER, EARTH MOVING, MOTORIZED, DIESEL ENGINE DRIVEN MODEL 621B (NSN 3805-01-153-1854) (EIC: EH3)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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HOW TO USE THIS MANUAL

INTRODUCTION

1. This manual is designed to help you operate the scraper and perform operator troubleshooting and maintenance on the equipment.
2. This manual is written in work package format:
    a. Chapters divide the manual into major categories of information.
    b. Each chapter is divided into work packages, which are identified by a 6-digit number (e.g. 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The work package page number (e.g. 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
    c. If a Change Package is issued to this manual, added work packages use the 5^{th} and 6^{th} digits of their number to indicate new material. For instance, work packages inserted between WP 0001 00 and WP 0002 00 are numbered WP 0001 01, WP 0001 02, etc.
3. Due to the size of this manual, it is separated into two volumes:
    a. The first volume (TM 5-3805-248-23-1) consists of Chapters 1 through 3 (through WP 0256 00).
    b. The second volume (TM 5-3805-248-23-2) contains Chapters 4 through 6.
    c. Both volumes will have Chapter 5, *Supporting Information,* for reference purposes.
4. Scan through this manual to become familiar with its organization and contents before attempting to operate or maintain the equipment.

CONTENTS OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of this manual. Become familiar with these warnings before operating or performing operator troubleshooting or maintenance on the scraper.
2. A *Table of Contents*, located in the front of the manual, lists all chapters and work packages in the publication.
    a. The Table of Contents also provides *Reporting Errors and Recommending Improvements* information and DA Form 2028 addresses, for the submittal of corrections to this manual.
    b. If you cannot find what you are looking for in the Table of Contents, refer to the alphabetical *Index* at the back of the manual.
3. Chapter 1, *Introductory Information with Theory of Information*, provides general information on the manual and the equipment.
4. Chapter 2, *Troubleshooting Procedures*. WP 0008 00 is a *Troubleshooting Symptom Index*. If the machine malfunctions, this index should always be consulted to locate the appropriate troubleshooting procedure.
5. Chapter 3 deals with *Unit Field Maintenance:* Major areas covered are *Preventive Maintenance Checks and Services (PMCS)* and operator level maintenance tasks.
6. Chapter 4, consists of *Direct Support Field Maintenance.*
7. Chapter 5 includes *Supporting Information: Illustrated List of Manufactured Items; Torque Limits; References; Maintenance Allocation Chart (MAC) Introduction*; *Maintenance Allocation Chart (MAC)*; and *Expendable and Durable Items List.*
8. Chapter 6 consists of *General Support/Depot or Sustainment Maintenance.*

FEATURES OF THIS MANUAL

1. WARNINGs, CAUTIONs, NOTEs, subject headings, and other important information are highlighted in **BOLD** print as a visual aid.

WARNING

A WARNING indicates a hazard that may result in death or serious injury.

CAUTION

A CAUTION is a reminder of safety practices or directs attention to practices that may result in damage to equipment.

NOTE

A NOTE is a statement containing information that will make the procedures easier to perform.

2. Statements and words of particular interest may be printed in CAPITAL LETTERS for emphasis.
3. Within a procedural step, reference may be made to another work package in this manual or to another manual. These references indicate where you should look for more complete information.

   If you are told: “If red band is showing, service air cleaner as soon as possible (WP 0015 00)”, go to Work Package 0015 00 in this manual for instructions on servicing the air cleaner.
4. Illustrations are placed after, and as close to, the procedural steps to which they apply. Callouts placed on the art may be text or numbers, or both; whichever method is easier for the soldier.
5. Numbers located at lower right corner of art (e.g. 394-001; 394-002, etc.) are art control numbers and are used for tracking purposes. Disregard these numbers.
6. Technical instructions include metric units as well as standard units. For your reference, a *Metric Conversion Chart* is located on the inside back cover of the manual.

NOTE

If at any time you are unsure how to use this manual or you cannot locate the information you need, notify your supervisor.

CHAPTER 1
INTRODUCTORY INFORMATION WITH THEORY OF OPERATION

GENERAL INFORMATION 0001 00

SCOPE

1. **Type of Manual.** This manual is for use in performing unit and direct support level maintenance on the 621B Scraper.
2. **Equipment Name and Model Number.** Scraper, Earth Moving, Motorized Diesel Engine Driven, Model 621B.
3. **Purpose of Equipment.** The 621B Scraper is used to self-load, haul, dump and spread material in worldwide earthmoving and construction projects by U.S. Army forces in engineer troop support.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for the equipment will be those prescribed by DA PAM 738-750, *Functional User's Manual for The Army Maintenance Management System (TAMMS*), as contained in the Maintenance Management Update.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS)

If your scraper needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF Form 368 *(Product Quality Deficiency Report)*. Mail it to us at: Commander, U.S. Army Tank-Automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, Illinois 61299-7630. We'll send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

1. 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.
2. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling or breaking of these materials may be a corrosion problem. If a corrosion problem is identified, it can be reported using SF Form 368 *(Product Quality Deficiency Report)*. Use of key words such as "corrosion," "rust," "deterioration" or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 738-750.

OZONE DEPLETING SUBSTANCES

No ozone depleting substances are used in maintenance of 621B Scraper.

DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-3.

PREPARATION FOR STORAGE OR SHIPMENT

For preparation for storage or shipment procedures, refer to WP 0333 00.

LIST OF ABBREVIATIONS/ACRONYMS

NOTE

Refer to ASME Y14.38-1999 for standard abbreviations.

ABBREVIATION/ACRONYMS	DEFINITION
AAL	Additional Authorization List
TDC	Top Dead Center
BII	Basic Issue Items
C	Centigrade or Celsius
CID	Cubic Inch Displacement
cm	Centimeter
COEI	Components of End Item
F	Fahrenheit
ft	Feet
gal	Gallon
GCWR	Gross Combination Weight Rating
GVWR	Gross Vehicle Weight Rating
hp	Horse Power
IAW	In Accordance With
in.	Inch
ISO	International Organization for Standardization
kg	Kilogram
km	Kilometer
kPa	Kilopascal
kph	Kilometers per Hour
kW	Kilowatt
l	Liter
lb	Pound
lb-ft	Pound Foot
LC	Load Center
lph	Liters per Hour
m	Meter
mm	Millimeter
mph	Miles per Hour
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological and Chemical
Nm	Newton Meter
PMCS	Preventive Maintenance Checks and Services
psi	Pounds per Square Inch
ROPS/FOPS	Rollover Protective Structure/Falling Object Protective Structure
RPM	Revolutions per Minute
yd	Yard

END OF WORK PACKAGE

EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

1. **Characteristics.**

   a. The 621B Scraper provides the Army with the capability to efficiently build roads, airstrips and other engineering assets in a wide variety of geographic, environmental and tactical situations.

   b. The scraper self-loads, hauls, dumps and spreads material, thereby providing grading capability from start to finish of a job.

2. **Capabilities and Features.**

NOTE

Refer to *Equipment Data* at the end of this work package for machine dimensions, weights, fluid capacities and other miscellaneous equipment data.

   a. The scraper consists of two sections: front tractor section and rear scraper section.

   b. Commercial trailers, trains or marine vessels can also transport the scraper.

   c. The tractor front section has the following capabilities and features:

      (1) Caterpillar 3406 turbocharged diesel engine with six in-line cylinders, generating 330 horsepower @ 1,900 RPM

      (2) Integral ether cold start for engine startup down to -25°F (-32°C)

      (3) Caterpillar semi-automatic powershift, transmission with eight forward speeds and one reverse

      (4) Operator’s cab with adjustable seat

      (5) Front full-floating drive axle with outboard planetary final drives

      (6) Differential lock control to reduce wheel slippage when high traction is required

      (7) Articulated frame steering with two double-acting steering cylinders

      (8) Oil sampling valves for engine, transmission and hydraulic systems

      (9) NATO slave receptacle

      (10) Mounting provisions for M16 rifle inside cab and portable fire extinguisher

   d. The scraper rear section has the following capabilities and features:

      (1) Non-drive axle

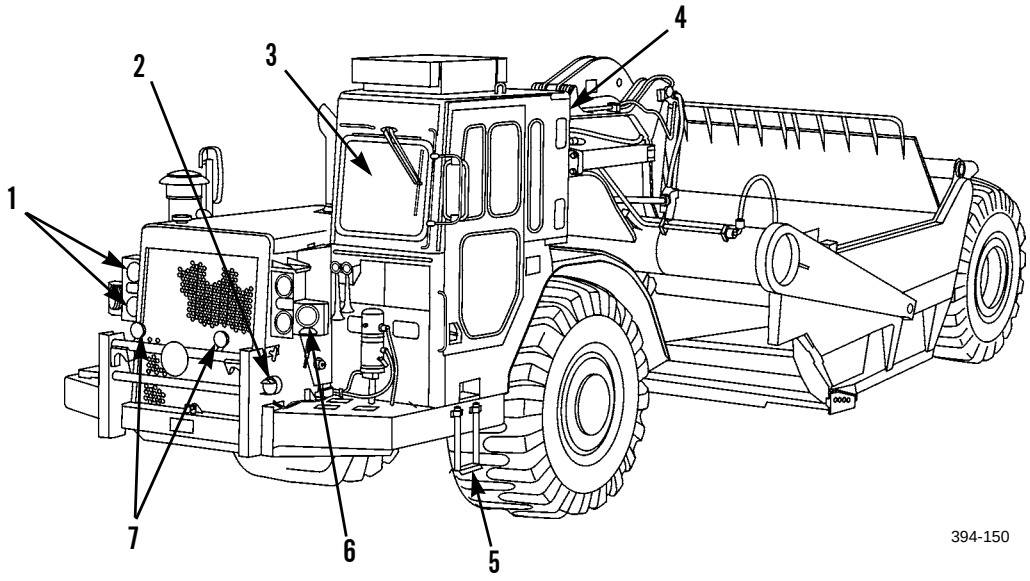
      (2) Elevating open bowl with a rated load of 40,000 lb and 14 yd^3 (10.7 m^3)

      (3) Interchangeable and reversible cutting edges

      (4) Ejector for rapid unloading

EQUIPMENT DESCRIPTION AND DATA - CONTINUED **0002 00**

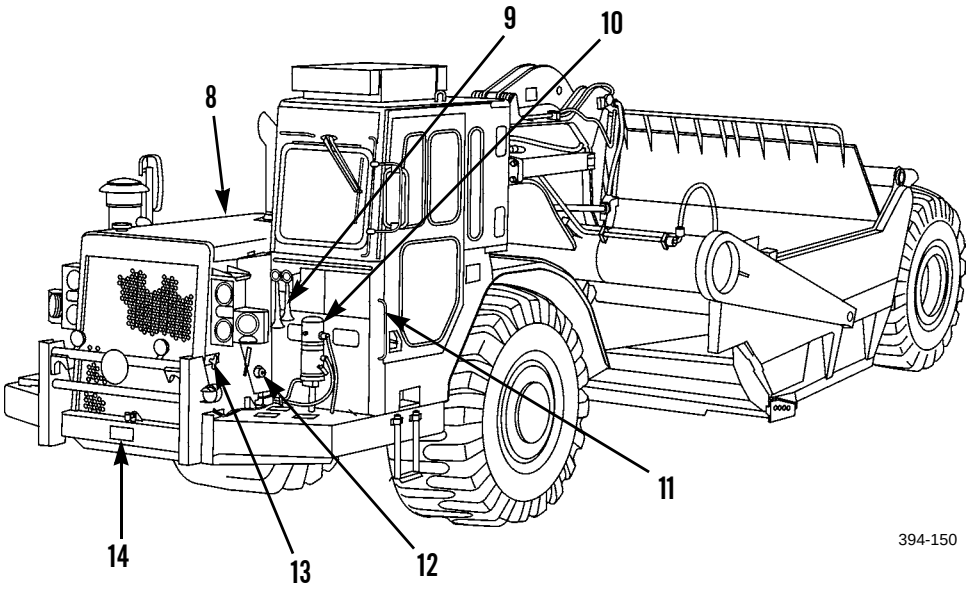
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



KEY	COMPONENT	DESCRIPTION
1	Service Headlights	Top pair of lights are high beam. Bottom are low beam.
2	Blackout Drive Light	Used when operating in blackout mode.
3	Windshield	Protects operator from inclement weather. Includes windshield wipers.
4	Cab	Enclosure contains operator's seat and all driving and scraper controls.
5	Step	Provide access to cab.
6	Worklight	Provide additional light when needed.
7	Parking/Turn Signal Lights	Serve as parking lights and flash to indicate direction machine is turning.

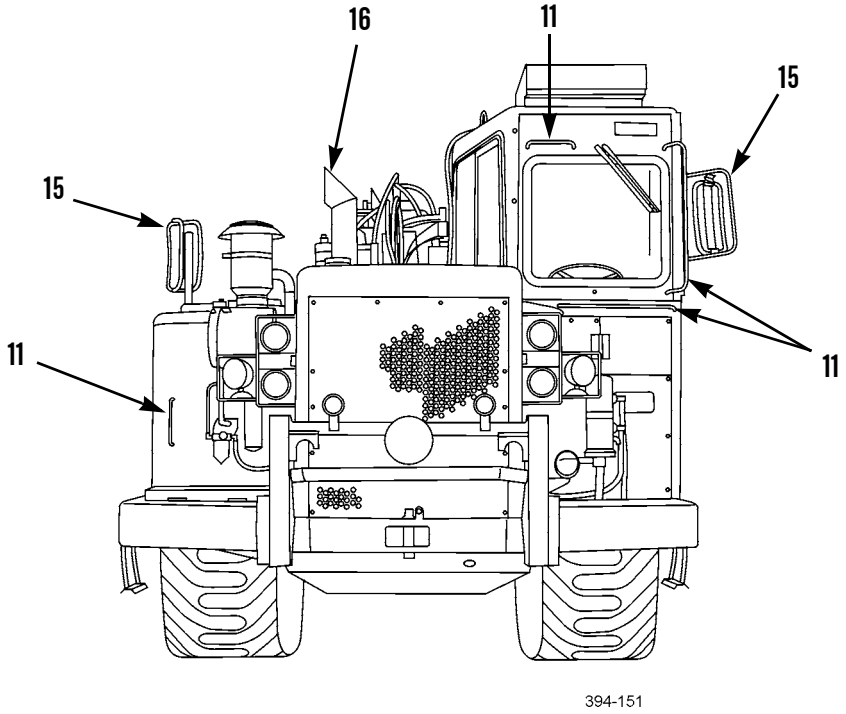
EQUIPMENT DESCRIPTION AND DATA - CONTINUED **0002 00**

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



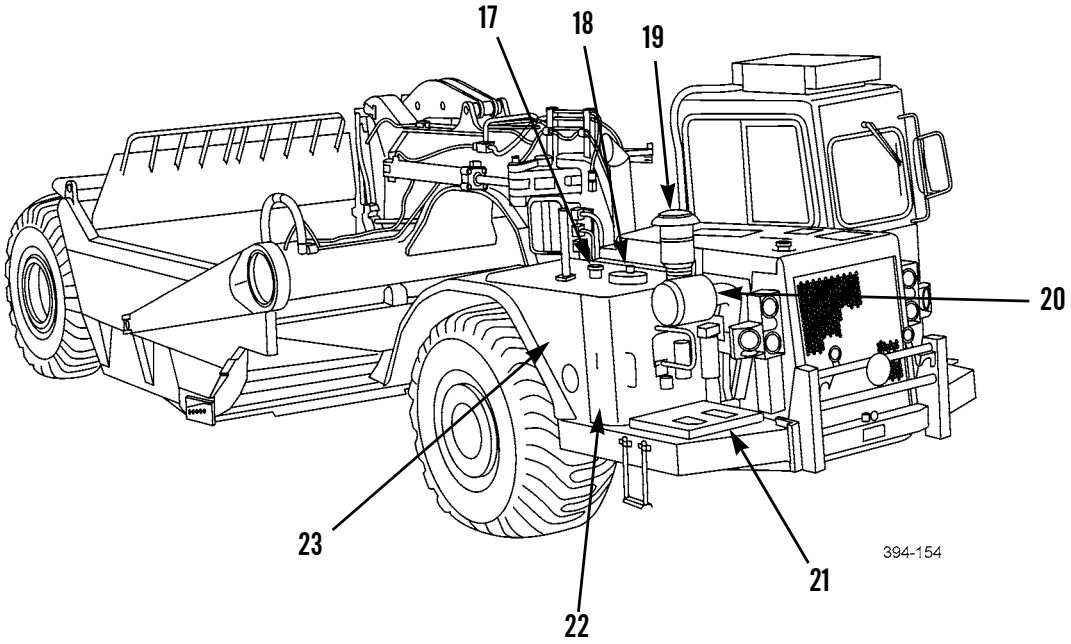
KEY	COMPONENT	DESCRIPTION
8	Engine Access Cover	Provides access to engine compartment.
9	Airhorn	Sounds by pressing horn switch inside operator compartment.
10	Air Dryer Assembly	Removes moisture from air system.
11	Grabhandle	Provides a handhold for personnel climbing on machine.
12	NATO Slave Receptacle	Provides connection point for NATO slave cable to slave start machine.
13	Emergency Fuel Shutoff	Provides alternate method to shut down engine in the event of an emergency.
14	Recovery Lug	Provides attachment point for recovery.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



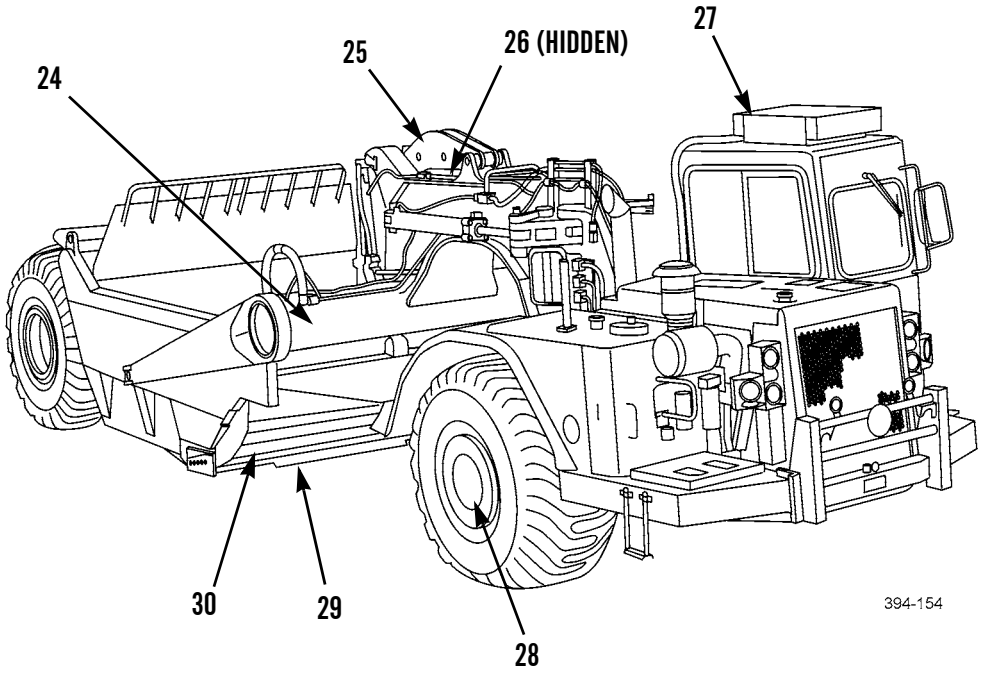
KEY	COMPONENT	DESCRIPTION
11	Grabhandles	Provide a handhold for personnel climbing on machine.
15	Side Mirrors	Provide operator with a view to rear and side of machine.
16	Exhaust Stack	Directs exhaust away from machine.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



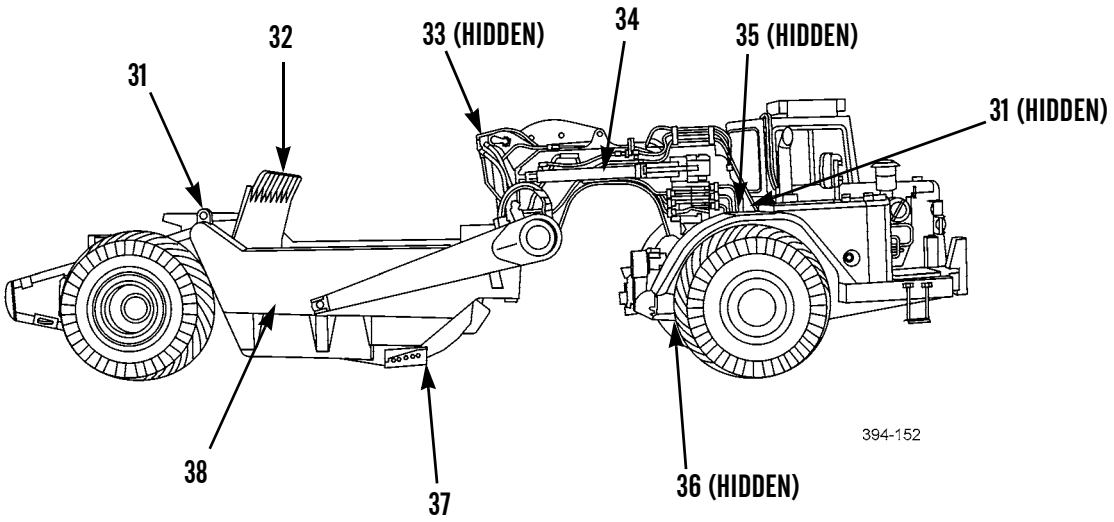
KEY	COMPONENT	DESCRIPTION
17	Fuel Tank Fill Cap	Provides a means to fill fuel tank. Contains dipstick for fuel level check.
18	Hydraulic Reservoir Fill Cap	Provides a means to fill the hydraulic reservoir.
19	Engine Air Precleaner	Removes debris from incoming air to engine.
20	Engine Air Filter	Houses primary and secondary engine air filters.
21	Battery Compartment	Enclosure provides access to batteries for service.
22	Hydraulic Reservoir	Stores hydraulic fluid used in machine hydraulic systems. Contains sight gage for fluid level check.
23	Engine Fuel Tank	Stores fuel used by the engine.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



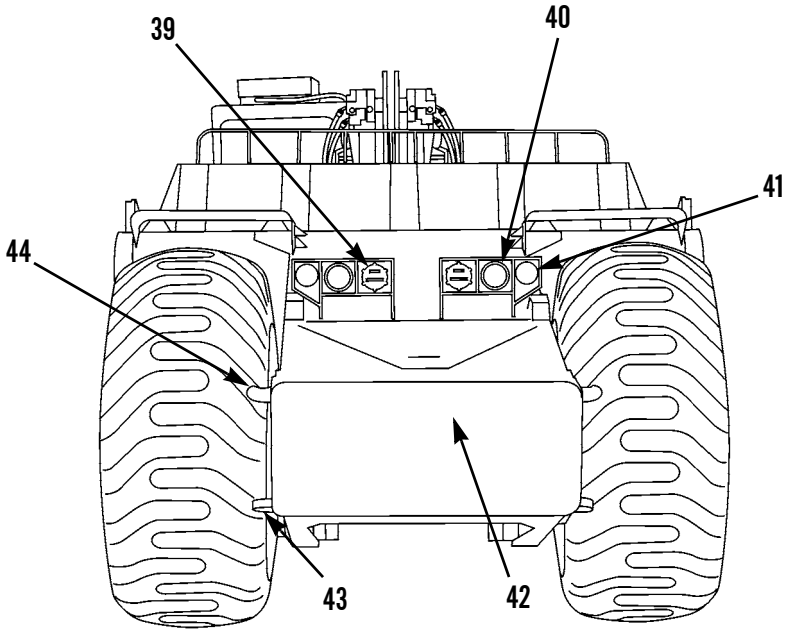
KEY	COMPONENT	DESCRIPTION
24	Draft Frame	Joins tractor hitch and scraper bowl.
25	Apron Lifting Arm	Raises and lowers apron as applied by the apron lift cylinder.
26	Apron Lift Cylinder	Raises and lowers apron assembly.
27	Heating and Ventilation Unit	Provides heating and ventilation to operator cab.
28	Planetary Wheel Ends	Provides power for front driving axle.
29	Bowl Cutting Edge	Leading edge at bottom of bowl floor. Three types of cutting edges can be configured depending on soil type and depth of cut desired: straight edge (low penetration/finishing operations), and stinger edge (center cutting edge extended - medium penetration).
30	Apron	Raises for unloading/spreading operations and lowers for hauling operations.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



KEY	COMPONENT	DESCRIPTION
31	Sling Points	Attachment point for overhead slinging.
32	Ejector	Moves forward to push load from bowl during unloading/spreading operations.
33	Bowl Lift Cylinders	Two hydraulic cylinders for raising and lowering bowl.
34	Steering Cylinder	Two hydraulic cylinders provide for 90-degree right or left turns with articulated frame steering system.
35	Hitch	Joins tractor to draft frame.
36	Front Tiedown	Provides for tiedown of machine.
37	Router Bits	Protect outer edge of bowl during scraping operations.
38	Bowl	High strength steel construction with wide cutting edge to maximize speed and efficiency. Capacity 14-18 yards.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



KEY	COMPONENT	DESCRIPTION
39	Blackout Marker Lights	Used when operating in blackout mode.
40	Service Stop/Tail Lights	Serve as a brake light and service light.
41	Parking/Turn Signals	Serve as parking lights and flash to indicate direction machine is turning.
42	Push Block	Used by push tractor to assist machine with traction through adverse terrain.
43	Tiedown Points	Provide for tiedown of machine.
44	Recovery Hooks	Provide for recovery.

EQUIPMENT DATA

Overall:

Length (Tractor and Scraper)	41.6 ft (12.7 m)
Width (Tractor and Scraper)	11.33 ft (3.45 m)
Wheelbase (Tractor and Scraper)	25.33 ft (7.7 m)
Height:	
Cab	10.92 ft (3.33 m)
Scraper	11.92 ft (3.63 m)
Weight (Empty):	
Tractor and Scraper	63,940 lb (29,003 kg)
Weight (Loaded):	
Tractor and Scraper	111,940 lb (50,775 kg)
Maximum Travel Speed	31 mph (49.8 kph)
Turning Width, Curb-to-Curb	36.5 ft (11.13 m)

Tractor:

Engine:	
Manufacturer	Caterpillar Inc.
Model	3406
Horsepower	330 hp (246 kw)
Engine RPM	2309 (high idle); 840 (low idle)
Cylinders	6
Displacement	893 CID (14.6 l)
Weight	1874 lb (851 kg)
Fuel System	Direct injection
Cooling System, Thermostat Completely Open	197°F (92°C)
Transmission:	
Manufacturer	Caterpillar Inc.
Type	8 speeds forward, 1 reverse
Range Selection	Powershift, semi-automatic
Final Drive:	
Manufacturer	Caterpillar Inc.
Type	Planetary/outboard
Axle	Full-floating
Brakes:	
Service	Air-actuated, cam-operated, Expanding shoe-type
Parking	Spring actuated, drum
Tires (Tractor):	
Size	29.5R29
Inflation	60 psi (413 kPa)

EQUIPMENT DATA - CONTINUED

Tractors - Continued

Steering:	
Type	Two double-acting hydraulic cylinders
Turning Radius	18.25 ft (5.6 m)
Capacities:	
Fuel Tank	135 gal. (511 l)
Cooling System	20 gal. (75.7 l)
Front Axle Differential and Final Drive	42 gal. (159 l)
Hydraulic System	29 gal. (110 l)
Engine Crankcase	9 gal. (34 l)
Transmission with Retarder	27 gal. (102 l)
Electrical System:	
Batteries:	
Quantity	2
Voltage	12 volts
System Voltage	24 volts

Scraper:

Tires (Scraper):	
Size	29.5R29
Inflation	40 psi (276 kPa)
Capacity	20.0 yd^3 (15.3 m^3)
Width of Cut	9.92 ft (3 m)
Maximum Depth of Cut	13.4 in. (34.00 cm)
Maximum Depth of Spread	18 in. (45.7 cm)

EQUIPMENT DATA - CONTINUED

Safety, Care and Handling

1. Proper repair is important to the personal safety of the maintenance technician and to the safe and reliable operation of the 621B Scraper. This manual outlines basic recommended procedures, some of which require special tools, devices or work methods. Although not necessarily complete, a list of warnings is provided at the front of this manual.
2. Improper repair procedures can be dangerous and may cause INJURY.
3. READ AND UNDERSTAND ALL SAFETY WARNINGS BEFORE PERFORMING REPAIRS ON THIS MACHINE.
4. Basic safety cautions are listed before the procedures to which they apply. Warning labels have also been put on the machine to provide instructions and identify specific hazards, which if not heeded, may cause INJURY or death. These labels identify hazards during repair, but there is no way to label the machine against all such hazards. Warnings in the service manual and on the machine are identified by the word WARNING.
5. Operations that may result in machine damage are identified by labels on the machine and are noted in this manual by the word CAUTION. Every possible hazard cannot be anticipated. If you use a procedure, tool, device or work method not specifically recommended, ensure that it is safe for you and others. Make sure that the machine will not be damaged or made unsafe by the procedure you choose.

WARNING

Do not lift heavy components by hand. Use a lifting device and follow the recommendations in the manufacturer's manual. Provide adequate support and use assistance during procedure. Use lifting tools as shown in illustrations to get the correct balance of the component you lift. This makes your work safer at all times. Lower it onto blocks or stands. Make sure the component rests solidly. A sudden fall can cause an accident.

6. When jacking up the machine, be sure to block the wheels at front and rear. Always place earthmoving equipment (bowl and apron) in lowered position when parking machine to prevent possible injury to personnel and to prevent needless stress on hydraulic and mechanical components.

END OF WORK PACKAGE

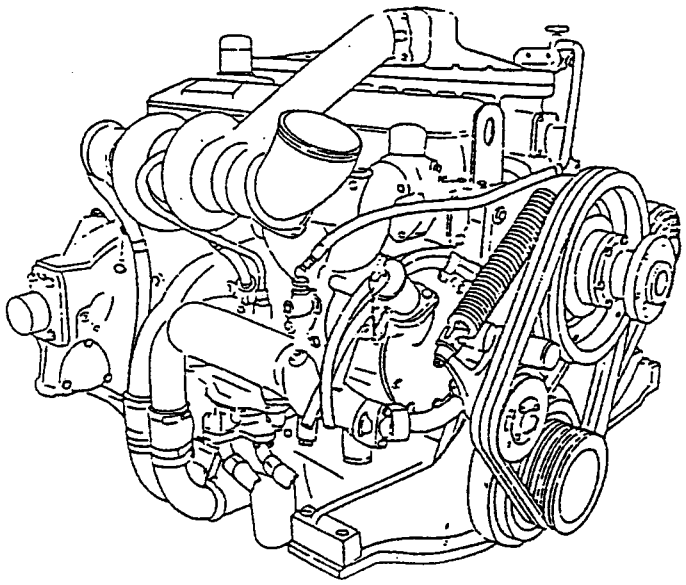
THEORY OF OPERATION 0003 00

INTRODUCTION

1. This work package explains how the systems and components of the machine work together. A functional description is provided for each major component and system.
2. The 621B Scraper is a wheeled machine used for the transport, self-load and self-unload of varying types of soils for use in construction of roadways and fill areas. Power is by a Caterpillar in-line, six-cylinder, direct-injected, turbocharged diesel engine. The low and extra-wide scraper bowl operates by high-speed hydraulics, with cutting edge near center of bowl for minimum material travel. A power-closing apron with ejector allows positive materials placement. The 621B Scraper is capable of full 90-degree left or right articulated steering. Cantilever-mounted wheel assemblies are equipped with 28 ply rating (earthmover-rock tread service) tires. Sound-suppressed ROPS cab has insulation, heater and windows for all-weather operation. Air-cushioned seat provides additional operator comfort.

ENGINE

The scraper is equipped with a Caterpillar 3406 turbocharged, direct-injected, valve-in-head, in-line six cylinder diesel engine. Parallel manifold porting is used with two intake and two exhaust valves per cylinder. An ether injector is connected to the air intake manifold system to assist in cold weather starting. An engine oil sampling valve, located at front-right side of engine, next to oil fill access, is supplied for sampling engine oil condition. Refer to LO 5-3805-248-12 and TB 43-0210 for oil sampling instructions.



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FUEL SYSTEM

1. **Fuel Tank.** The fuel tank, which has a 135-gallon capacity, is mounted on the tractor portion of the 621B Scraper, on the right side of engine compartment. Fuel level is indicated by dipstick located inside fuel cap.

2. **Fuel Pump.** The fuel pump is mechanically driven by the engine and provides a low pressure fuel supply to the fuel injection pump housing.

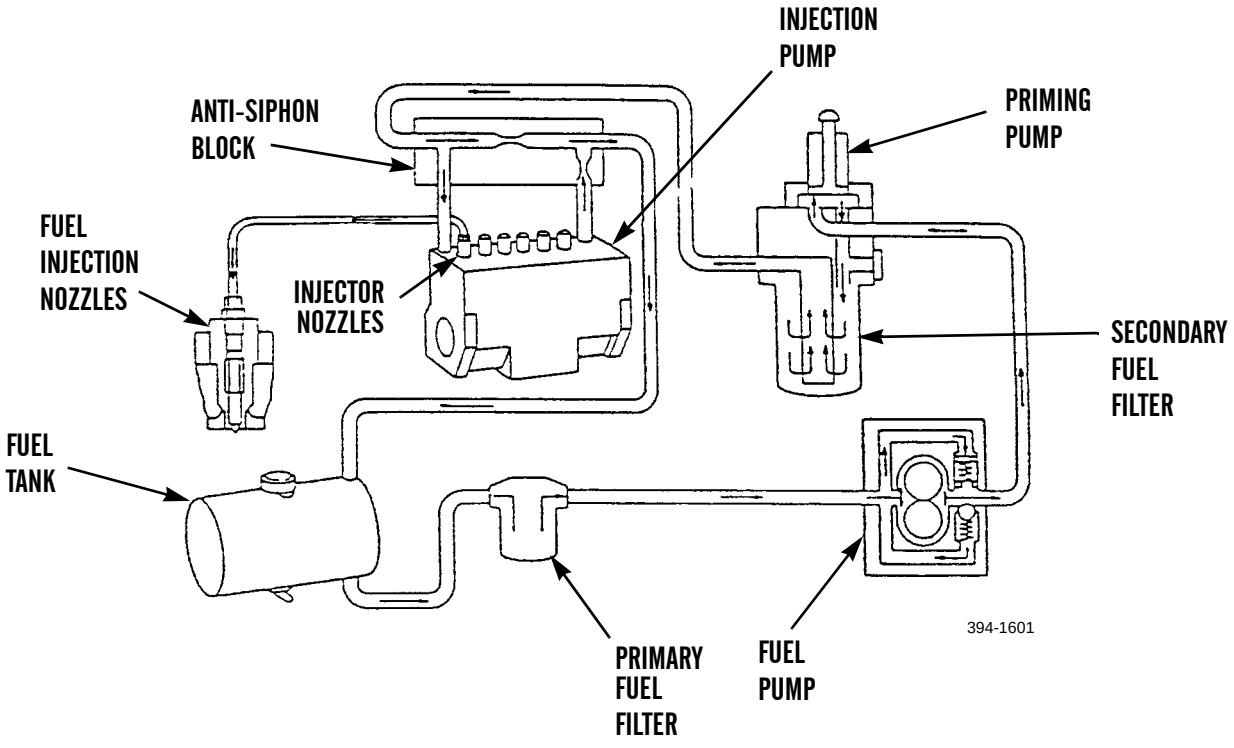
3. **Fuel Filters (Primary and Secondary).** The fuel is pulled through the primary fuel filter to fuel pump and passed along under low pressure to the secondary fuel filter.

4. **Priming Pump.** The priming pump, part of the primary fuel filter housing, is used for bleeding the fuel lines after replacement of fuel filter elements. This pump must not be used while the engine is running. The pump has a locking position which disables it under normal conditions.

5. **Anti-Siphon Block.** The anti-siphon block ensures the injection pumps a positive head of fuel pressure while in operation and eliminates the possibility of over-pressurizing the low pressure lines. When the 621B Scraper is off, it eliminates the siphon effect on the fuel lines, which would cause a no-fuel and no-start condition.

6. **Injection Pump Plungers.** Six injection pump plungers and lifters are internally cam-actuated and mounted in the injection pump housing. The injection pump plungers are scroll type, with fuel quantity being controlled by a turning, calibrated plunger.

7. **Fuel Injection Nozzles.** Six fuel injection nozzles are installed in direct injection adapters mounted in the cylinder head. These injection nozzles are connected to the injection pump-plungers, where fuel is time-injected under high pressure with a specific fuel pattern for good combustion in the cylinders.



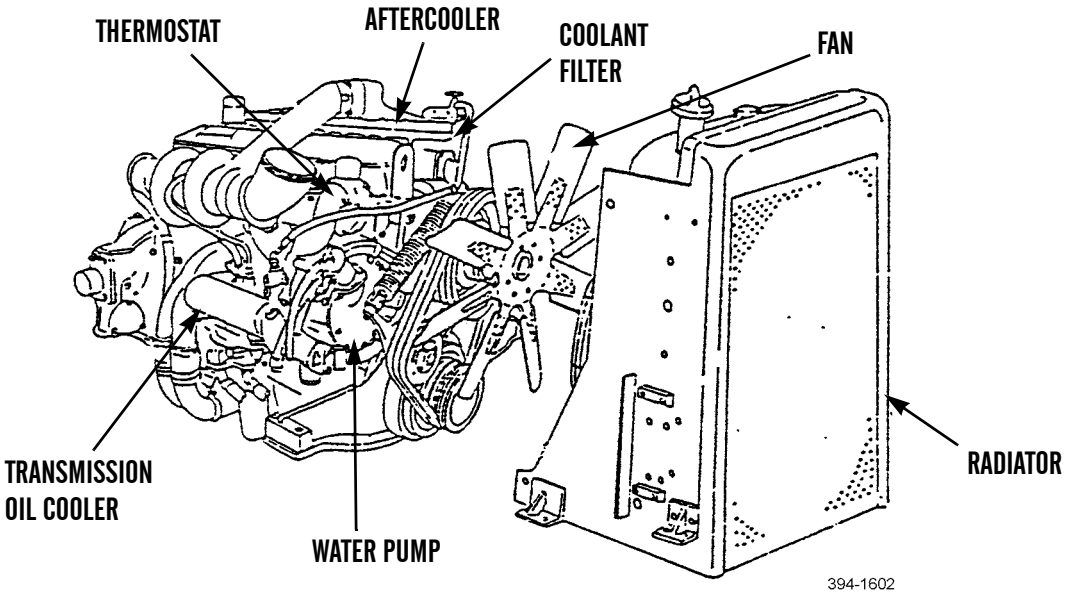
THEORY OF OPERATION - CONTINUED 0003 00

EXHAUST SYSTEM

The exhaust system consists of a muffler and exhaust pipe that reduces noise and direct gases away from the operator.

COOLING SYSTEM

1. **Radiator.** A liquid-to-air radiator operates as part of a closed, pressurized cooling system. It is mounted immediately in front of the engine and protected by structural steel and grill work, allowing cooling air circulation.
2. **Water Pump.** Cooling liquid is circulated by the gear-driven water pump mounted on the front of the engine.
3. **Coolant Filter.** A spin-on coolant filter is mounted on the front-left side of the engine. As coolant circulates through this element, the corrosion inhibitor mixes in to protect the system and engine.
4. **Aftercooler.** An aftercooler (air-to-liquid), installed in place of an inlet manifold, lowers the temperature of the inlet air coming from the compressor outlet of the turbocharger to approximately 200°F (93°C). Coolant from the aftercooler comes from the front bonnet on the oil cooler.
5. **Transmission Oil Cooler.** Provides additional stabilization of oil temperature in the transmission. Cooler (liquid-to-liquid) is mounted on the right side of engine, dissipating heat through the engine cooling system.
6. **Fan.** The fan assembly is mounted on the front of the engine. Fan is double V-belt driven.
7. **Thermostat.** A water thermostat, mounted on the front of cylinder head, stabilizes engine operating temperature, opening when hot, 197°F (92°C) and closing when cool.



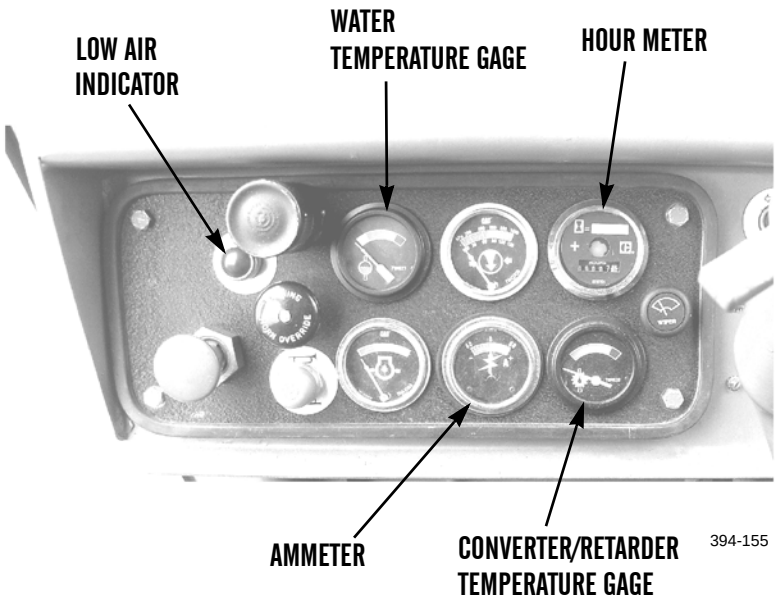
ELECTRICAL SYSTEM

The electrical system has three separate circuits: charging, starting and low amperage. The batteries, circuit breakers, ammeter, cables and wires are common to each of these circuits.

The charging circuit operates when the engine is running. The alternator generates electricity for the charging circuit. A voltage regulator in the circuit controls the electrical output to keep the batteries at full charge. The starting circuit is in operation only when the start switch is activated.

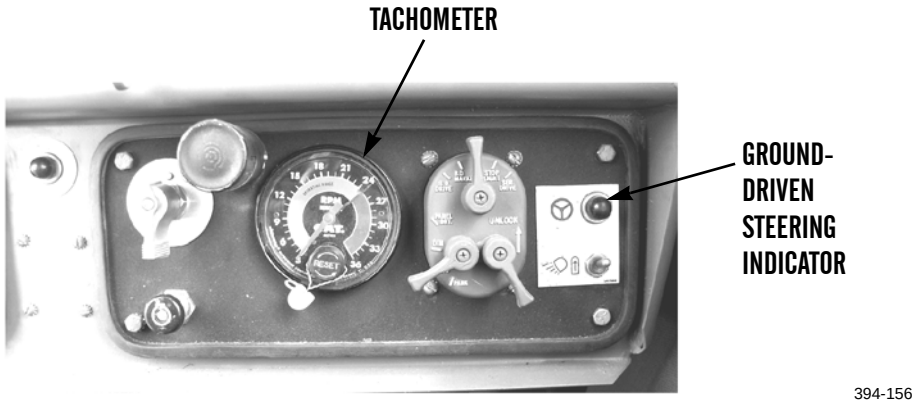
The low amperage circuit and charging circuit are both connected through the ammeter. The starting circuit is not connected through the ammeter.

1. **Alternator.** Fifty ampere rating, fan cooled, brushless, negative ground.
2. **Starter Motor.** The starter is a 24-volt DC, series-wound electric motor, with externally mounted solenoid.
3. **Lights.** Four headlights, two side worklights and two turn signals are mounted at front of machine. A single blackout light is mounted below headlight cluster on front-left side of machine. One worklight is mounted on rear of tractor portion allowing lighting to bowl/apron cutting edge. Two stop/tail lights, two blackout stop/tail lights and two turn signals are mounted at rear of the scraper above push block. Lighting sequences are controlled from operator compartment instrument panel. A floor-mounted dimmer switch is also located in operator compartment.
4. **Batteries.** Two 12-volt, 220-ampere hour batteries wired in series, give 24 volts DC to the electrical system.
5. **Instrument Panel.**
   a. Instrument panel gages and indicators.
      (1) Low air indicator. Indicates low air pressure in air system.
      (2) Water temperature gage. Indicates engine operating temperature. Electrically connected to sending unit mounted on engine.
      (3) Hour meter. Indicates number of hours engine is registering oil pressure (time running).
      (4) Ammeter. Indicates rate of charge from alternator.
      (5) Converter retarder temperature gage. Indicates temperature of oil in hydraulic retarder.



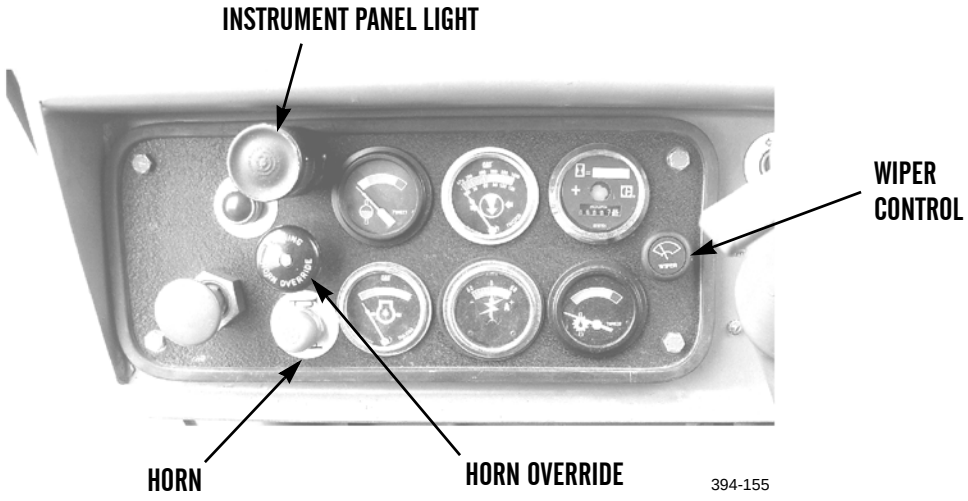
ELECTRICAL SYSTEM - CONTINUED

(6) Tachometer. Indicates engine RPM for best shift times.
(7) Ground-driven steering indicator. Signals activation/operation of ground-driven steering pump, indicating engine or steering pump failure.



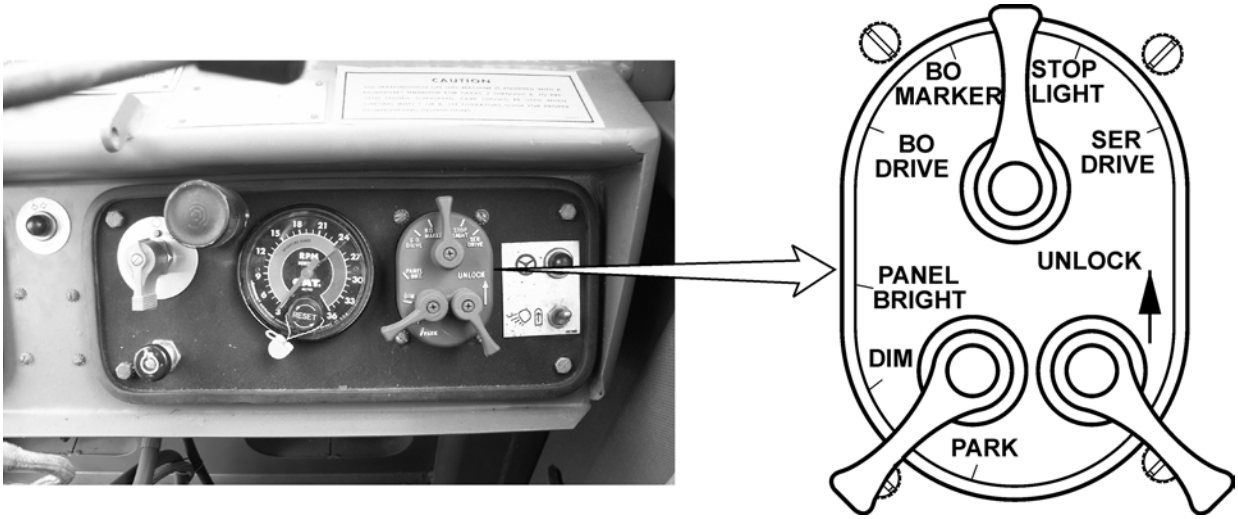
b. Instrument panel switches and lights.

(1) Horn button. Manual activation. Electrically opens a solenoid valve, which operates air-actuated horns.
(2) Horn override. Electrical override for low air pressure warning horn.
(3) Instrument panel light. Illuminates instrument panel.
(4) Wiper control. Controls operation of windshield wiper.



ELECTRICAL SYSTEM - CONTINUED

(5) Start switch. Energizes start circuit and operates starter.
(6) Ether start switch. Energizes solenoid for injecting ether starting fluid to assist starting machine in cold weather.
(7) Instrument panel light. Illuminates instrument panel instruments.
(8) Side worklight switch. Energizes side worklights.
(9) Machine light switch assembly.
(10) Main switch. Five-position switch. Mechanical lock lever must be held in the UNLOCK position before moving the main switch lever.
   (a) BLACKOUT MARKER position. Blackout tail lamps on. Blackout stop lamps will light when brakes are applied.
   (b) BLACKOUT DRIVE position. Blackout tail lamps and blackout driving lamp on. Blackout stop lamp will light when brakes are applied.
   (c) OFF position. All lamps off. Auxiliary switch disabled. Horn and back-up alarm will not sound.
   (d) STOP LIGHT position. Service stop lamps light when brake is applied.
   (e) SER DRIVE position. Service tail lamp on. Rear worklight on. Service stop lamp will light when brakes are applied. Front worklights will light when worklight switch is activated.



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ELECTRICAL SYSTEM - CONTINUED

NOTE

Disconnect switch must be in the ON position for the machine light switch assembly to operate.

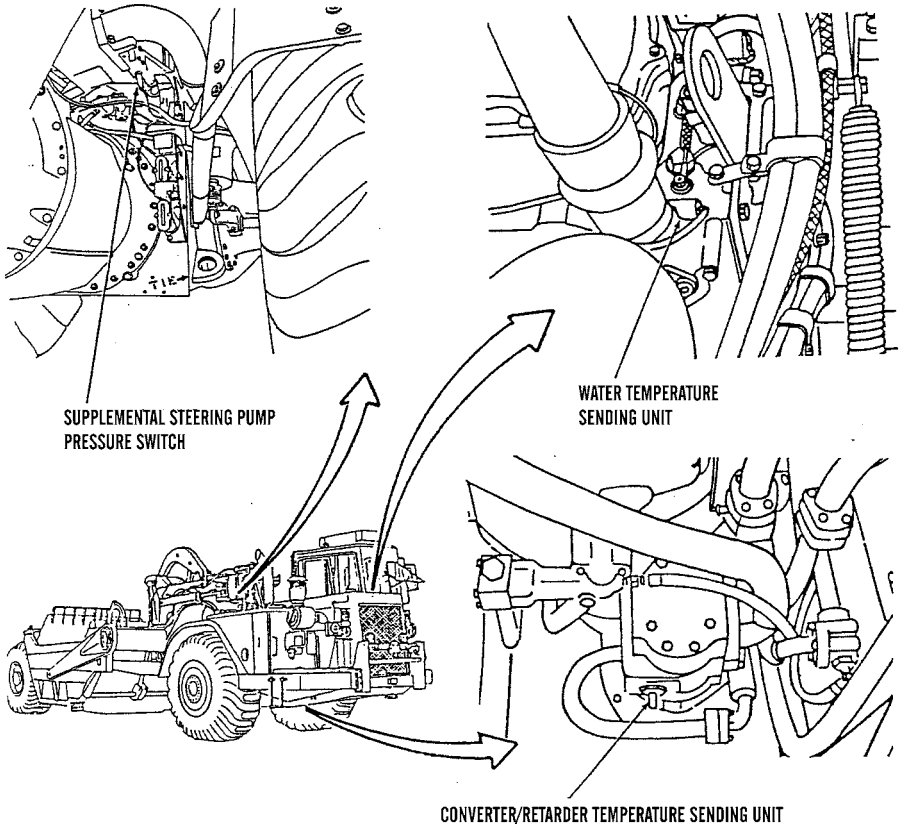
(11) Auxiliary switch. Four-position switch.
- (a) PANEL BRIGHT position. Instrument panel lamps brightly on.
- (b) DIM position. Instrument panel lamps dimly on.
- (c) OFF position. Instrument panel lamps off. Service or blackout tail lamps off.
- (d) PARK position. Instrument panel lamps dimly on. Service tail lamps on (main switch in SERVICE DRIVE position). Blackout tail lamps on (main switch in BLACKOUT DRIVE position or BLACK-OUT MARKER position).

NOTE

Main switch must be in any position other than OFF for auxiliary switch to operate.

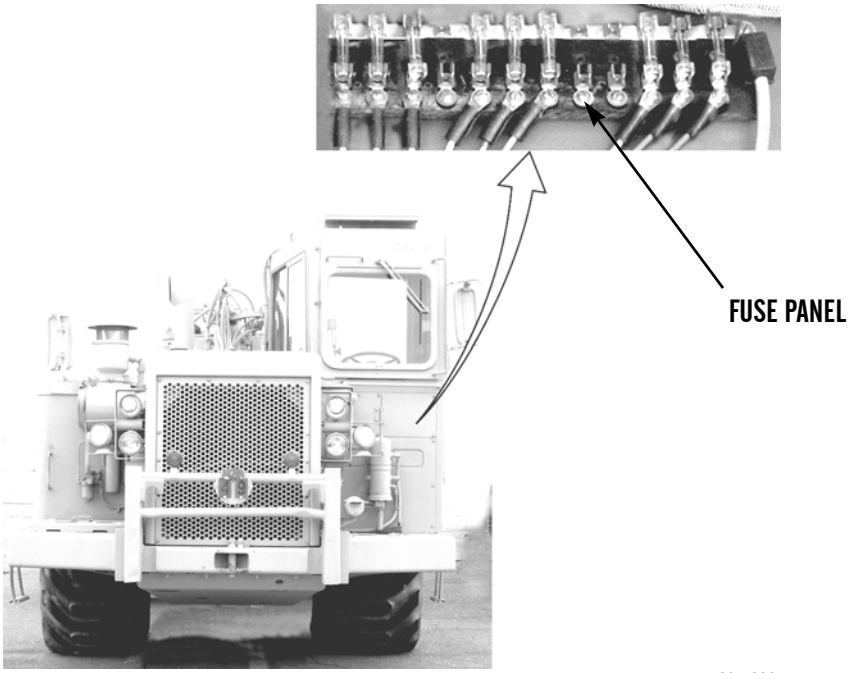
(12) Mechanical lock. Spring-loaded, two-position switch.
- (a) LOCK position (unmarked). Prevents movement of main switch.
- (b) UNLOCK position. Enables movement of main switch. Hold lever in UNLOCK position and move main switch to desired position.

6. **Sending Units.** Relay changes in machine condition to instruments. Include converter/retarder temperature (located on coolant line beneath engine), water temperature (located on front top of engine head) and ground-driven steering pump pressure indicator (located at inlet check valve of main pump on front of transmission transfer case).



ELECTRICAL SYSTEM - CONTINUED

7. **Fuse Panel.** Contains 12 fuses. Protects individual wiring circuits. Located behind instrument panel, accessible from front of cab.



8. **Main Circuit Breaker.** Protects entire electrical system from overload. Ampere rated, located in the front bottom-right corner of the operator compartment.

9. **Disconnect Switch.** Located between transmission control lever and right side of operator compartment, in front of hydraulic control levers. Disconnects batteries from electrical system.

10. **Air Dryer Heater.** Located on air dryer at front of vehicle. Thermostatically controlled to maintain above-freezing temperatures for evacuation of moisture from air system. The 60 watt, 24-volt DC heater and thermostat assembly has an operating range between 50°F and 85°F.

TRANSMISSION

Eight-speed, semi-automatic, power-shift.

1. **Selection of Gears.** Selection is manual for all gears. Shifting is automatic for third through eighth gear. In reverse, first and second gears, the flow of power is from the engine to the torque converter, to the transmission, to the differential and on to the final drive. In third through eighth gears, the torque converter is coupled so power flows directly to the transmission.

2. **Transmission Oil Quality.** Oil can be checked with the sampling valve. This is located at the left rear of the transmission, next to the left brake actuator.

3. **Foot-Operated Hold Control Valve.** When engaged, prevents shifting up or down.

4. **Foot-Operated Differential Lock Pedal.** When engaged, prevents either wheel from slipping during travel on slippery terrain.

DRIVESHAFT

The driveshaft transmits power from the diesel engine flywheel through the case and frame to the input of the transmission. It is accessible by removal of the plate on the transmission.

FRONT AXLE

The front axles transmit power from the final drive to the wheels of the tractor.

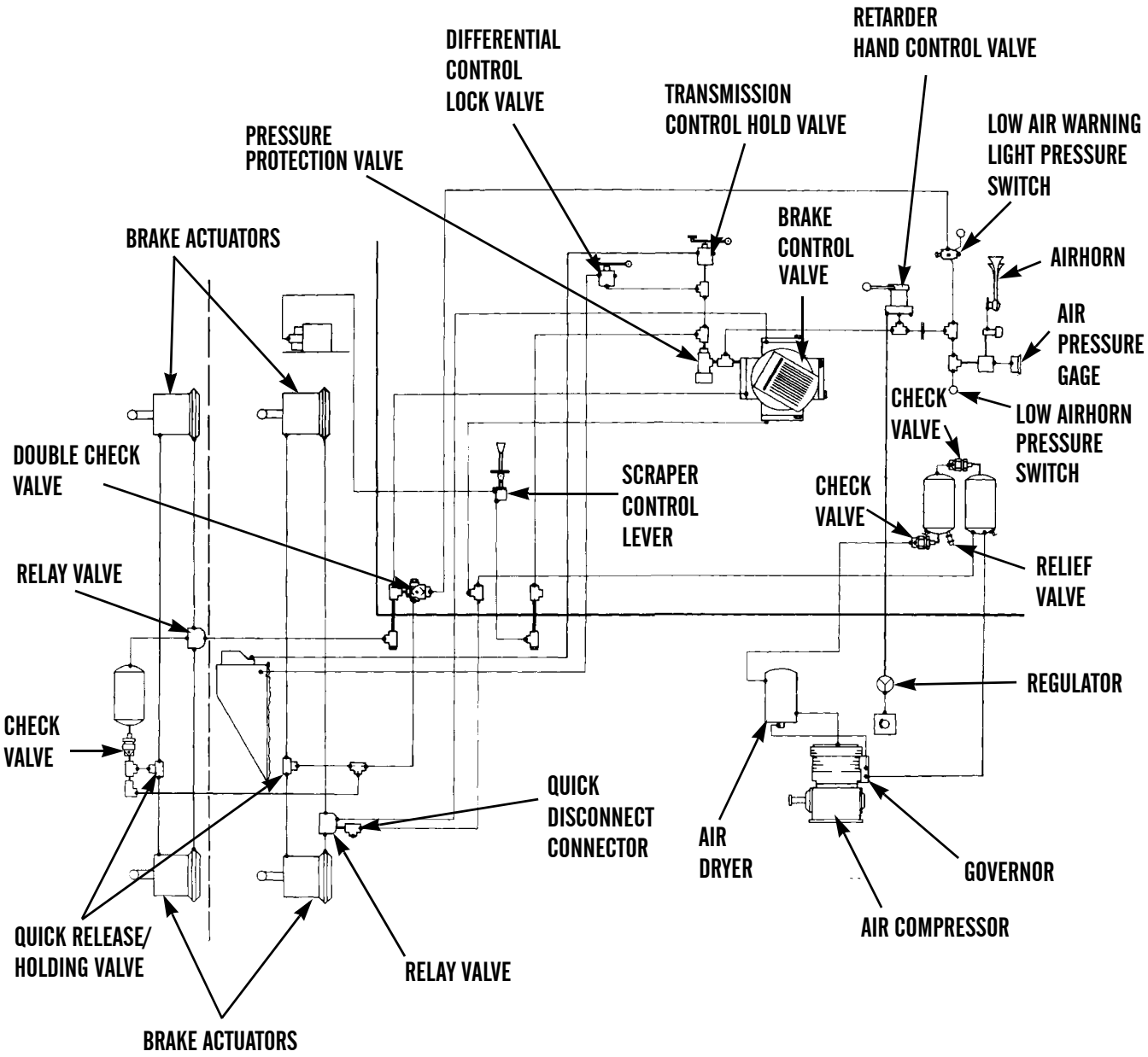
1. **Planetary Gear System.** Reduces RPM and multiplies torque for increased power at the drive wheels.
2. **Free-Floating Axles.** Both axles are free-floating and independently removable.

REAR AXLE

The rear axle is made up of two wheel/axle assemblies bolted to the scraper bowl frame. The assemblies run on tapered roller bearings in constantly lubricated compartments.

AIR SYSTEM

1. **General.** The air system consists of an engine-driven air compressor, three air tanks, and related lines, hoses and valves. The system provides the required air to operate the machine's service and parking brakes, differential lock, transmission hold, hold control and airhorn.



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AIR SYSTEM - CONTINUED

2. **Air Compressor.** The engine runs a two-cylinder air compressor directly off the timing gears. The engine water pump moves coolant through the air compressor when the engine is running. Lubrication for the air compressor bearings is provided by the engine oil pump.
3. **Governor.** The governor keeps the air pressure in the air reservoirs constant. When the engine is started, the compressor runs until the reservoir pressure is at the cutout setting of approximately 122 psi (841 kPa). At the cutout setting, air pressure moves the governor piston, letting air go through the governor to the unloading valves in the compressor. Air pressure holds the unloading valves open to stop the delivery of air from the compressor. When the air pressure in the system is at the cut-in setting of approximately 101 psi (696 kPa), the force of the governor spring moves the governor piston, stopping the air flow to the unloading valves. The unloading valves close and the compressor again sends air to the reservoirs.
4. **Relief Valve.** The relief valve, mounted on one of the tractor reservoirs, protects the entire system in the event of governor failure. This valve will open at approximately 150 psi (1,034 kPa).
5. **Relay Valve.** The relay valve for the brakes controls the flow of air from the reservoir to the brakes.
6. **Quick Release/Holding Valves.** The quick release/holding valves release the air from the tractor brake actuators. Each valve has three positions. In the OPERATE position, pressurized air goes through the valve into the brake actuators. In the HOLD position, pressurized air is held in the brake actuators. In the RELEASE position, air in the brake actuators is released through an exhaust passage. This quick release/holding valve ensures that the parking/emergency brake does not partially engage during service brake operation.
7. **Double Check Valves.** Each double check valve lets air from only one of the two inlet passages go through the outlet passage to the brake actuators. When air goes through one inlet passage, a shuttle cock moves against the other inlet passage to stop the flow of air. This double check valve is used as an anti-compounding valve to ensure that the service brake and the parking/ emergency brake cannot be operated at the same time.
8. **Retarder Hand Control Valve.** The retarder hand control valve controls the braking capacity of the retarder by releasing pressurized air to the hydraulic control valve at a specific rate. In the released position, no pressurized air is sent to the hydraulic control valve. As the handle for the control valve is moved toward the operator, the braking capacity of the retarder increases. The control valve controls the pressure of the air between approximately 27 and 80 psi (186 and 552 kPa).
9. **Regulator for Retarder Control Valve.** The regulator for the retarder control valve is in the air line to the hydraulic control valve for the retarder. It controls the air pressure from the retarder control valve to the maximum of 65 psi (448 kPa).
10. **Pressure Protection Valve.** All air flow from the service brake circuit to the accessory air circuit must go through the pressure protection valve. Air will not go through the valve until the pressure at the supply passage is 75 psi (517 kPa). This ensures pressure for braking.
11. **Differential Control Lock Valve.** The control valve for the differential lock controls the supply of air to the piston in the differential lock and to the control passage of the pilot valve.
12. **Transmission Control Valve.** The hold control valve controls the supply of air to the hydraulic control valve in the transmission, preventing automatic shifting.
13. **Brake Actuator.** The brake actuators receive pressurized air from this brake control valve. These actuators turn air pressure into mechanical force. They apply braking action to the wheels in direct proportion to the air pressure.
14. **Brake Control Valve.** The brake control valve located in the operator compartment directly controls brake actuation. When the brake control valve is opened, air is directed through a metered orifice to the double check valves, then to the quick release valves, and finally to the tractor-portion brake actuators.

    The air is also sent to valves on the scraper-portion. Upon actuation, the valves open to supply pressurized air to the scraper-portion brake actuators. The scraper brakes operate before the tractor brakes, due to the metered orifice in the air line.

AIR SYSTEM - CONTINUED

15. **Air Dryer.** The air dryer is used to remove moisture and foreign material from the compressed air before it gets to the air reservoir. Desiccant beads, used in the drying bed, clean and dry the air.

The air dryer is installed vertically in the air line between the air compressor and the first air reservoir. It is mounted on the front of exterior cab.

16. **Apron Control Valve.** The apron control valve is linked to the bowl control lever at the operator compartment. When the bowl lever is moved forward, this valve routes air pressure to the apron control spool and simultaneously closes apron while bowl is being lifted.

17. **Quick Disconnect Connector.** The quick disconnect connector provides easy access to the air system. This is used to attach an air hose for tire inflation.

BRAKE SYSTEM

The brake system consists of three separate operating systems.

1. **Service Brakes.** All-wheel, air-activated, drum brakes with floating-type linings and cam actuators. Operation is achieved by a foot-operated treadle valve in the operator compartment.

2. **Parking/Emergency Brakes.** The parking/emergency brakes operate all wheels using the same actuators as the service brakes. A spring override actuates brakes in the event of low air pressure or broken air lines. This override is deactivated when the system air pressure is above 60 psi. A warning horn sounds in operator compartment when system air pressure falls below 65 psi.

3. **Retarder.** A hydraulic retarder is used to assist in braking action. When activated, it reduces forward motion and eliminates excessive use of the brakes.

   The retarder housing and retarder control valve are fastened to the flywheel housing of the engine.

   The operation of the retarder is similar to that of a torque converter. The rotor, fastened to a drive gear, throws oil against the stationary vanes of the stator. This creates resistance, which works to slow the driveshaft and brake the machine. The oil flow to the retarder is controlled by the air retarder valve on the steering column.

WHEELS

The entire vehicle operates on steel-belted, heavy-duty, construction-grade tires seated on wheel assemblies. The wheel assemblies have sealed, liquid-filled cooling compartments that assist in cooling during heavy braking.

STEERING SYSTEM

The steering system is divided into two separate, yet shared systems: 1) primary steering, and 2) emergency/supplemental steering. The primary steering system shares the main hydraulic circuit with the cylinders for the bowl, ejector and apron systems. Power is provided by a two-stage implement and hydraulic pump. The emergency/supplemental steering system is powered by a separate, ground-driven hydraulic pump. Both systems operate from a common reservoir.

1. **Primary Steering.** With engine running, hydraulic power for steering is provided by one stage of the implement and steering hydraulic pump.

2. **Supplemental Steering.** Supplemental steering is an emergency back-up system that enables the operator to safely steer the machine to a stop with engine off or in case of hydraulic pump failure. The supplemental steering pump is a two-section pump that is mounted on the front differential case and frame. The supplemental steering pump is driven by the ring gear of the differential as the wheels turn.

STEERING SYSTEM - CONTINUED

3. **System Description.** When the steering wheel is turned, the worm in the gear nut moves. One end of control arm is in a groove near the bottom of the worm shaft. The worm moves the control arm, which in turn moves the valve spool into turn position RIGHT or LEFT. The oil from the pump is routed by the steering control valve to the rod end of one steering cylinder and the head end of the opposite steering cylinder, causing the machine to articulate. As the steering cylinders turn the machine, the rod is moved out of the follow-up cylinder (sender). This movement of the piston sends oil to the rod end of follow-up cylinder (receiver). The operator stops turning the steering wheel when the machine is at the amount of turn desired. When movement of steering wheel is stopped, the worm also stops turning. The moving steering cylinders and follow-up cylinders do not stop until the steering control arm moves gear the sector, which moves gear nut and worm down. When the worm shaft is moved down, steering control on the end of the worm shaft moves valve spool to the HOLD position. This stops the flow of pump oil to the steering cylinders, and the machine stops articulation at the amount of turn desired.

4. **Components.**

   a. **Follow-Up Cylinder (Sender).** Sends signal pressure feedback to the follow-up cylinder (receiver). This cylinder is mounted on the left side of the articulation steering arms.

   b. **Bleed Valves.** Used for removal of air from the follow-up cylinders. Located at rod end of follow-up cylinder (sender).

   c. **Relief Valve.** Prevents over pressurization of rod end of follow-up cylinder. Located on rod end of follow-up cylinder (sender).

   d. **Follow-up Cylinder Receiver.** Receives feedback hydraulic pressure from the follow-up cylinder (sender). This cylinder is located beneath the floor plate of the operator compartment.

   e. **Diverter Valve.** Mounted on the supplemental steering pump. Acts as a flow control valve. When the machine ground speed is above 15 mph (approximately), output hydraulic fluid from the large section of supplemental steering pump is redirected back to the input of the pump. Below 15 mph (approximately), the output from both pump sections, large and small, is directed into the steering control valve.

   f. **Gear Sector.** Mounted in the steering gearbox at the lower end of the steering column. This gear receives movement from the gear nut via the worm and transmits action to the steering control arm.

   g. **Worm.** Part of the steering column assembly. Mounted in the steering gearbox, it receives turning motion from the steering wheel.

   h. **Gear Nut.** Part of the steering gearbox. This gear nut rides on the worm, transferring rotary motion (steering wheel turning) into lever movement. The gear nut works with the gear sector to move the steering control arm.

   i. **Steering Control Arm.** Connected to the output lever on the steering gear box, and to the follow-up cylinder (receiver). This control arm is used on the servo-feedback for steering.

   j. **Steering Control.** Connected to an arm that is indexed on the lower portion of the steering worm shaft. When the steering wheel is rotated left or right, the worm shaft moves slightly up or down. This movement is transmitted through the arm to the control arm, which is connected to the valve pool.

   k. **Check Valve.** Allows oil from the supplemental steering pump to pass, but will not allow oil flow in a reverse direction from the implement pump into the supplemental steering pump. In the event of supplemental steering pump failure, the check valve seals off the supplemental steering pump system from the system hydraulics. Then, only pump oil from the implement pump system is channeled to the steering system.

   l. **Steering Cylinder, Left Side.** Receives hydraulic pressure for either extension or retraction. It causes the machine to articulate left or right. This cylinder is mounted on the left side of the hitch and steering arrangement.

   m. **Relief Valve (Main).** The system relief valve is mounted in the steering control valve. This valve prevents over pressurization of the major components. It is set at 2,250 psi (15,513 kPa).

STEERING SYSTEM - CONTINUED

n. **Steering Control Valve.** Located on the left side of the tractor, next to the scraper control valve. It is mechanically connected to the steering control lever through the valve spool. There are three positions of the valve spool: left turn, right turn and hold. When the steering wheel is held stationary, the valve spool is in hold position, and pump oil in the steering control valve is routed back to the hydraulic tank. When the steering wheel is moved either left or right, initiating a turn, hydraulic fluid is routed by the valve spool to steering cylinders, causing machine articulation.

o. **Steering Cylinder, Right Side.** Receives hydraulic pressure for either extension or retraction. It causes the machine to articulate left or right. This cylinder is mounted on the right side of the hitch and steering arrangement.

p. **Pressure Reducing Valve.** Used to produce a positive oil pressure supply from the implement pump to the follow-up cylinder system. Oil under pressure from the implement pump is connected to the input of this valve and sent out under lower pressure to the follow-up system. Excess oil pressure is relieved at 60 psi and returned to the hydraulic tank.

q. **Check Valve.** Allows oil from the implement pump to pass, but will not allow oil flow in a reverse direction from the supplemental steering pump into the implement pump. In the event of engine failure or pump failure, this check valve seals off the implement hydraulic circuit and channels all fluid from the supplemental steering pump into the steering control valve.

FRAME, TOWING ATTACHMENTS AND DRAWBARS

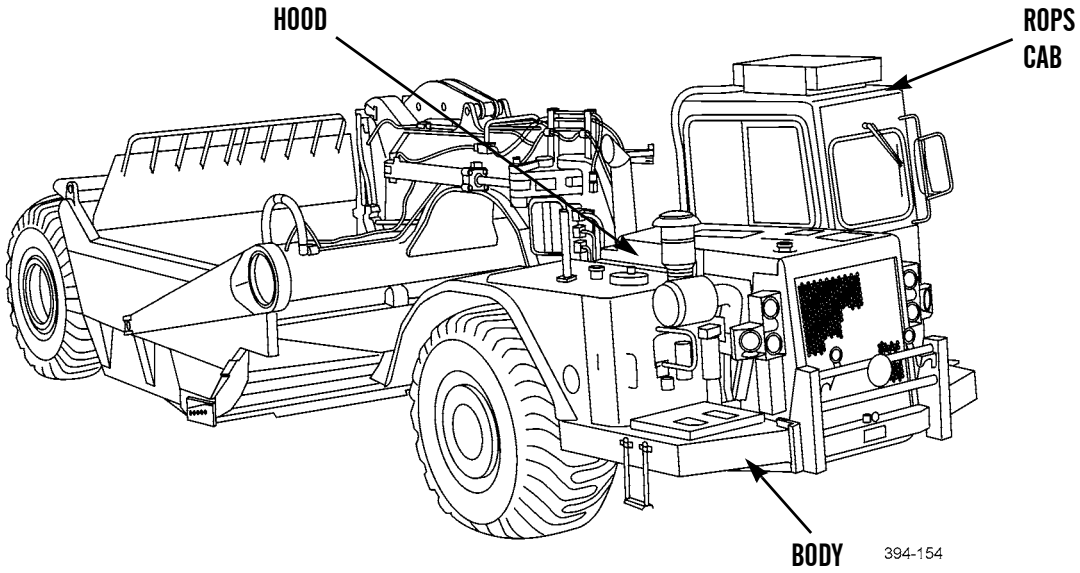
1. **Frame.** The 621B Scraper is designed with reinforced box-section construction and built with extensive use of high-tensile-strength steel.

2. **Recovery Attachments.**

   a. Tractor portion. Removable tow pin is located at front of machine, in center of front bumper.

   b. Scraper portion. Tow hooks are located on both sides of bowl frame push block. Used for emergency towing.

BODY, CAB, HOOD AND ROLLOVER PROTECTIVE STRUCTURE (ROPS)



1. **Body.** Constructed of heavy-duty steel. Consists of tractor (leading portion) and scraper (trailing portion). On the body are front and rear fenders, protective panels and a cab.
2. **ROPS Cab.** Includes both the Rollover Protective Structure (ROPS) and the operator compartment. The ROPS protects the operator in the event of a tip-over by supporting the weight of the machine. The operator compartment contains all controls and components necessary for operation of the machine. Doors, windows and panels are mounted on the ROPS cab to provide for all-weather operation.
3. **Hood.** Constructed of heavy-duty steel. It protects the engine compartment from debris.

ACCESSORY ITEMS

1. **Mirrors.** One rearview mirror mounted in operator compartment. Two side-view mirrors mounted outside of operator compartment, one on each side of hood.
2. **Heater.** Mounted on roof of ROPS. Heat supplied by engine coolant. Electric fans circulate air.
3. **Seat.** Bucket-type hydraulic suspension seat. Adjustable for height, forward/backward location and firmness of side. Automatically adjusts for operator weight.
4. **Wiper.** One electric wiper mounted on front windshield.
5. **Horn.** Air-operated. Mounted on front exterior of ROPS.
6. **Defroster Fan.** One electric fan mounted inside operator compartment at rear of cab.

HYDRAULIC SYSTEM

There are two pumps for the hydraulic system: implement and steering, and supplemental steering. The implement and steering pump is powered through the transmission and is located on the upper-right front of the transfer case. This is a double-section, vane-type pump. Rotation is clockwise (viewed from drive end). Rated output at 1,900 RPM: 56 gpm flow @ 2,250 psi (15,513 kPa) for the steering section, and 74 gpm flow @ 2,000 psi (13,790 kPa) for implement controls.

During normal operations a gear-type pump (supplemental steering pump), located beneath engine on front of case and frame, adds to the volume of flow in implement hydraulics. Since this pump is ground-driven by forward motion of machine, the amount of oil it adds is directly proportional to machine speed. If the implement/steering pump loses drive power, then the supplemental steering pump supplies hydraulics for operation of steering only. This allows the machine, in motion, to be steered safely to a stop.

1. **Hydraulic Reservoir.** Located on the right side of engine compartment, directly in front of the fuel tank. The reservoir stores system hydraulic fluid for use by system components. Capacity is 29 gallons (110 L).

2. **Filter.** Located and mounted in the hydraulic reservoir. Receives hydraulic fluid at relief dump pressure, filters it, then returns it to the system hydraulic reservoir. The filter has a built-in bypass valve. If the filter is full of dirt, and oil can not easily pass through the element, there is an increase in the pressure of the oil. This opens the bypass valve, relieving back pressure and preventing collapse of the element. Bypass also serves to allow oil to flow when temperatures are cold and oil is thick.

3. **Control Valve.** A spool-operated, spring-centered, differential-pressure bank valve is located near the left side and on top of the differential housing. Each of the separate control features (bowl, apron and ejector) have a separate spool. The control levers for the scraper are on the right side of the operator seat. Rods and levers are used to connect the control levers to the valve spools in the control valve. When one of the three implement valves is moved, fluid is circulated to the respective implement. When all control levers are in the hold position, the fluid circulates through the control valve then returns to the hydraulic tank.

   Pressurized hydraulic fluid is directed to the separate systems by the control levers. Valve spools and internal porting direct fluids to the necessary-outlets for positive control of hydraulic pressure. An internal relief valve keeps hydraulic pressures from exceeding system capabilities.

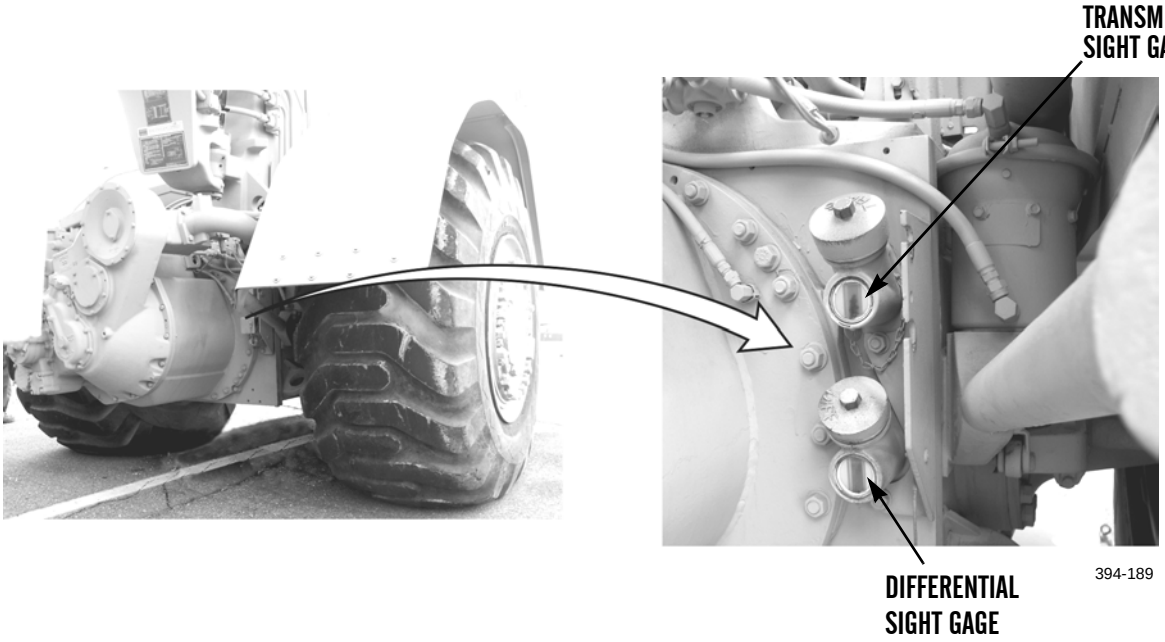
4. **Cylinders.** Receive hydraulic fluid and convert pressure into mechanical force to either extend or retract the mechanical linkages.

5. **Quick Drop and Check Valves.** Mounted on bowl cylinders. Check valves operate by pilot signal pressure from control valve. When activated, the check valves open to release pressurized fluid from the rod-end of the bowl cylinders. This joins the flow from the hydraulic pump into the head-end of the cylinders. The additional flow through the cylinders speeds up the lowering of the bowl.

6. **Sequence Valve.** This is a pressure relief valve for the rod end of the apron cylinder. This valve is mechanically set to a relief pressure of 1,000 psi (6,895 kPa).

   Due to the operating characteristics of the apron, relief pressure must be variable according to position. In its lowest position, against the bowl stops, the relief pressure is at 1,000 psi. As the bowl is raised with the apron in the closed position, mechanical linkages increase closure pressures on the apron. These pressures are variable with respect to apron/bowl position. Tapped from bowl raise control valve pressures, a feedback pressure is sent to the sequence valve piston. This pressure increases the mechanical relief pressure setting to a maximum of approximately 2,272 psi (15,665 kPa), affording system components protection with increased pressure closing capabilities.

GAGES (NON-ELECTRICAL)



1. **Differential Fluid Sight Gage.** Used to observe fluid level in differential. Location is at right rear of tractor portion of machine.
2. **Transmission Fluid Sight Gage.** Used to observe fluid level in transmission assembly. Location is at right rear of tractor portion of machine.
3. **Hydraulic Fluid Level Sight Gage.** Located on the right side of the engine compartment.
4. **Air Cleaner Service Indicator.** Located on the outlet side of the air cleaner system, immediately after the air cleaner compartment.
5. **Air Pressure Gage.** Indicates operating pressure available for air system.
6. **Oil Pressure Gage.** Indicates oil pressure from engine oil pump to lubrication system in engine.

EARTHMOVING EQUIPMENT COMPONENTS

The scraper system is controlled hydraulically from the operator station. It performs the scraping, loading, transporting and ejecting of material. Bowl, apron and ejector can be individually controlled, or the bowl and apron can be controlled together.

1. **Bowl.** The bowl uses two double-acting cylinders. Bowl control lever has raise, hold, power-down and quick-drop positions. When the control lever is in the hold position, the quick-drop and check valves mounted on the bowl cylinders are locked. This isolates the hydraulic circuit from the stress of the bowl.
2. **Apron.** The apron opens and closes the scraper bowl. It uses one double-acting cylinder with a multiplier linkage that controls the force, speed and length of travel. Apron lever has open, hold, positive-close and float positions. Closure force is regulated by a relief valve to protect the apron and bowl. Circuit pressure is controlled by a sequence relief valve.
3. **Ejector.** The ejector accepts loading, or forcibly unloads material. It is powered by a single double-acting cylinder. Ejector lever has forward, hold and return positions with automatic kick-out included on return.
4. **Draft Frame Assembly.** The draft frame assembly serves a twofold purpose. It is the main point of attachment for the apron cylinder, bowl lower-raise cylinders, coupling of bowl assembly to the tractor, and routing for hydraulic-electric lines. Secondly, it is the junction where all steering is accomplished through movement of articulation cylinders. At this junction, bowl assembly and tractor are allowed to yaw while traversing rough terrains.

END OF WORK PACKAGE

CHAPTER 2
TROUBLESHOOTING PROCEDURES

TROUBLESHOOTING INTRODUCTION 0004 00

INTRODUCTION

1. Troubleshooting procedures in this chapter contain information you need to fault locate malfunctions on the 621B Scraper and its components.
2. Troubleshooting procedures are located as follows:
   a. WP 0009 00 and WP 0013 00 through WP 0015 00 contain mechanical troubleshooting procedures.
   b. WP 0010 00 through WP 0012 00 contain electrical troubleshooting procedures.
3. A *Troubleshooting Symptom Index* in WP 0008 00 is provided to aid in locating a malfunction or symptom and directs you to the appropriate troubleshooting procedure in WP 0009 00.
4. Troubleshooting procedures in this manual cannot provide all the answers or correct all malfunctions encountered. However, these procedures are an organized step-by-step approach to a problem, which directs tests and inspections toward the source of the problem and its successful resolution.
5. If a malfunction is not listed in the *Troubleshooting Symptom Index* in WP 0008 00, or stated tests or inspections and corrective actions do not correct the problem, notify your supervisor.
6. Before performing troubleshooting, read and follow all safety instructions found in the Warning Summary at the front of this manual.

PRELIMINARY TROUBLESHOOTING PROCEDURES

1. Before starting any specific troubleshooting procedures, perform the following:

NOTE

Fluid leaks are classified as either Class I, Class II or Class III.

Class I: Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II: Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.

Class III: Leakage of fluid great enough to form drops that fall from item being checked/inspected.

Before starting any specific troubleshooting procedures, perform the following:

   a. Visually check for ruptured oil hoses or tubes and for Class II or Class III leaks.
   b. Check for mechanical jamming or binding caused by rocks or other foreign matter.
   c. Check fluid levels in subject area and service as required (WP 0019 00 and WP 0020 00).
2. Ensure all applicable Operator Troubleshooting has been performed before proceeding.

EXPLANATION OF TROUBLESHOOTING TABLE COLUMNS

The columns in troubleshooting WP 0006 00 through WP 0015 00 are defined as follows:

1. **MALFUNCTION.** Indicates fault that has occurred in system/equipment.
2. **TEST OR INSPECTION.** Indicates test or inspection to be performed to isolate probable cause for fault symptom.
3. **CORRECTIVE ACTION.** Indicates procedure to correct the problem.

ELECTRICAL TROUBLESHOOTING - GENERAL INFORMATION

NOTE

Refer to *Electrical General Maintenance Instructions* (WP 0018 00) for instructions on using a multimeter to check for continuity or shorts and to perform voltage checks.

1. Analyze the symptoms and conditions and determine the most likely cause for the problem, then troubleshoot that circuit first. The more information you have concerning the problem, the easier it will be to troubleshoot.
2. Isolate to the subsystem level (in cases where more than one subsystem is involved); next, isolate the problem to a single circuit within the subsystem; then, isolate the problem to the faulty component using the *Troubleshooting Symptom Index* (WP 0008 00).
3. Frayed, broken, loose or corroded wiring is a common source of problems in any electrical circuit. Always make a visual inspection before starting detailed troubleshooting. Observe in particular contacts to ground. Components with case grounds can be especially troublesome.

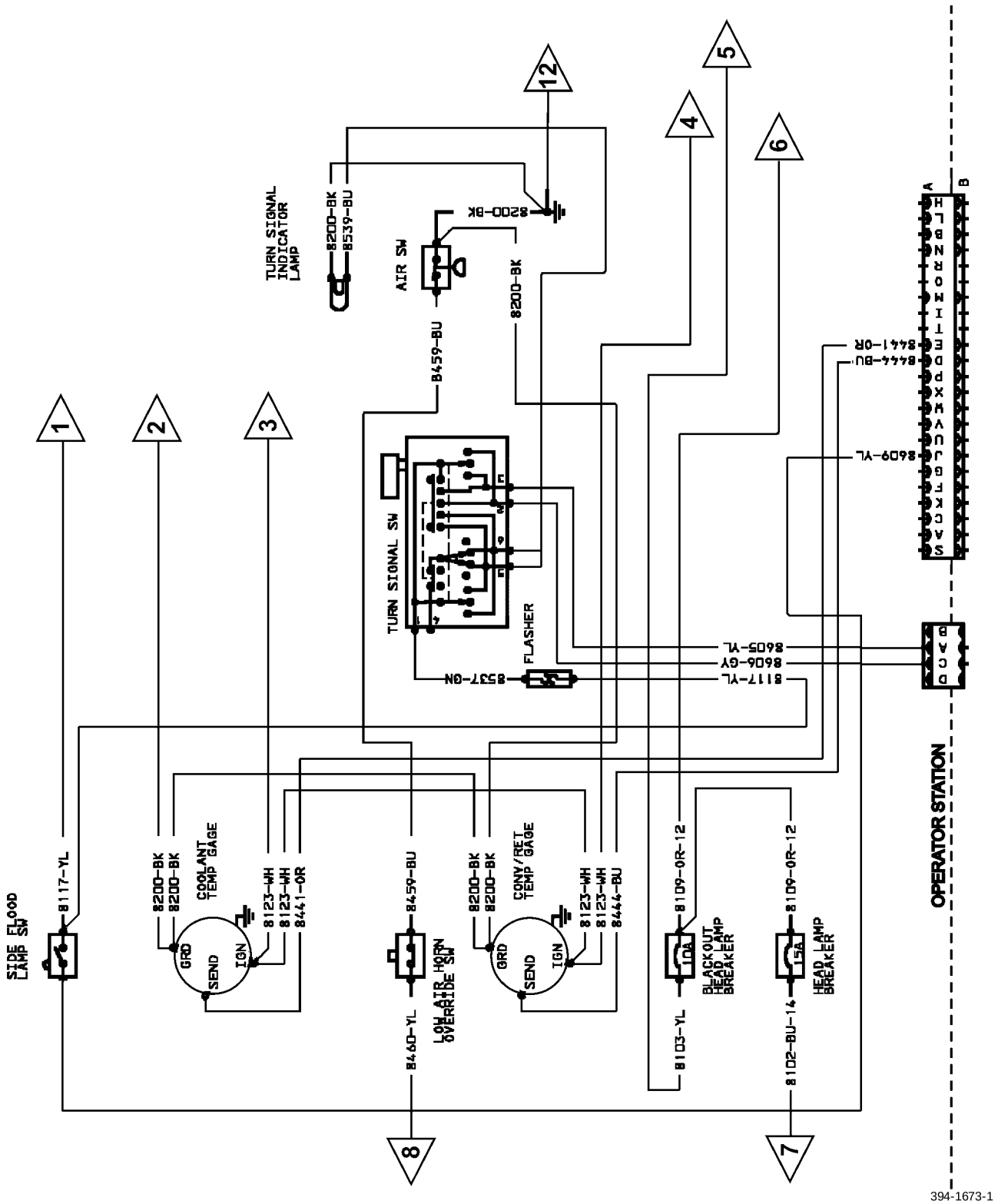
CAUTION

When making continuity checks, ensure the test equipment is isolated from power source.

4. Most checks made are voltage checks. Pay particular attention to voltages being checked in procedures. This equipment is a 24 volt system. Instructions prior to the step instruct to disconnect at test point from the potential malfunctioning component. Once the check has been made, either repair the component or go to the referenced step. If going to another step, reconnect connection or do as otherwise instructed, such as install jumper wires using jumper wire kit. When ready to make the prescribed check, apply power to the circuit (if required). A helper may be required if the switch or power source is out of reach. Release the power function prior to power going on, to avoid damage to equipment.

END OF WORK PACKAGE

ELECTRICAL SYSTEM SCHEMATIC 0005 00



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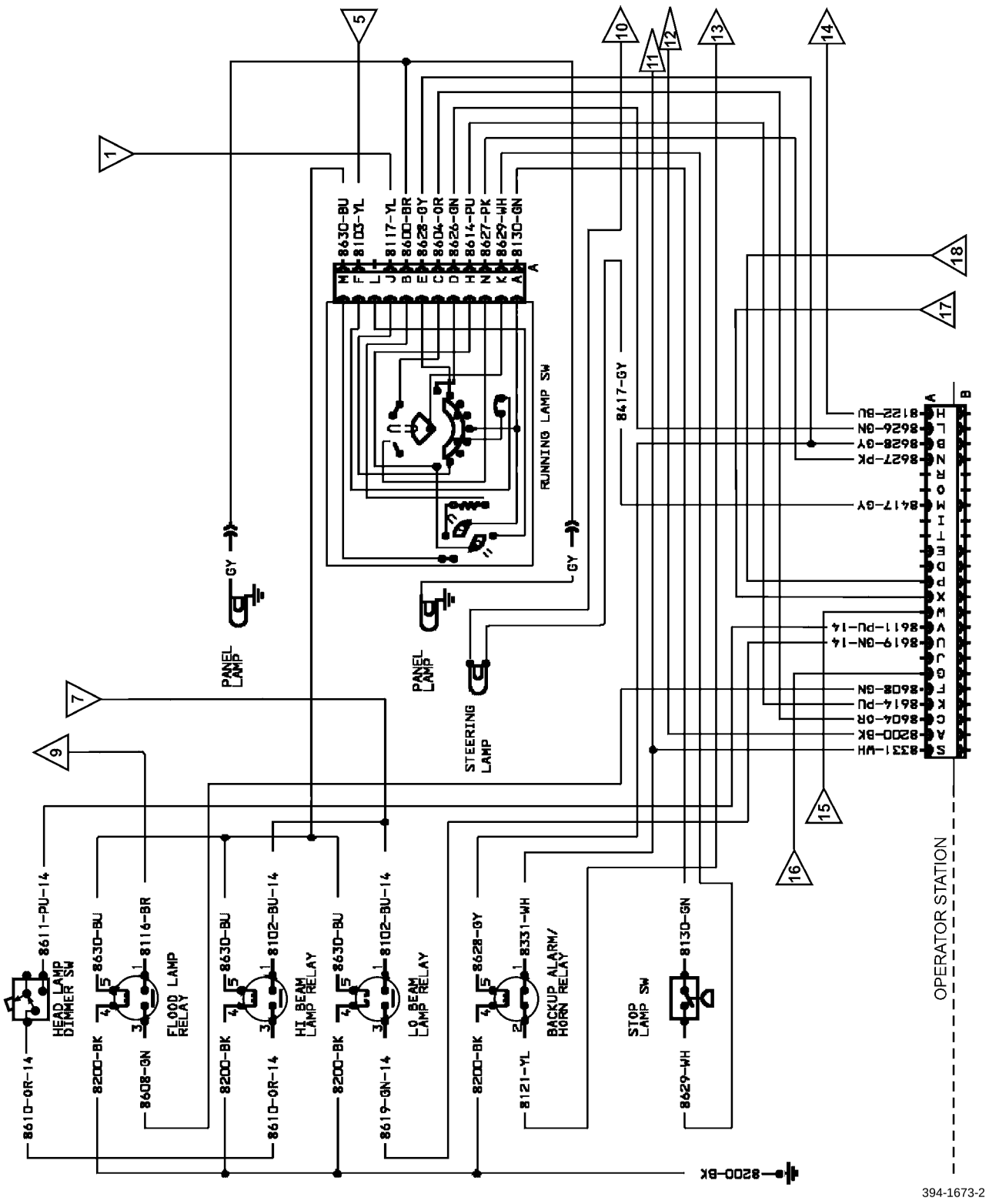

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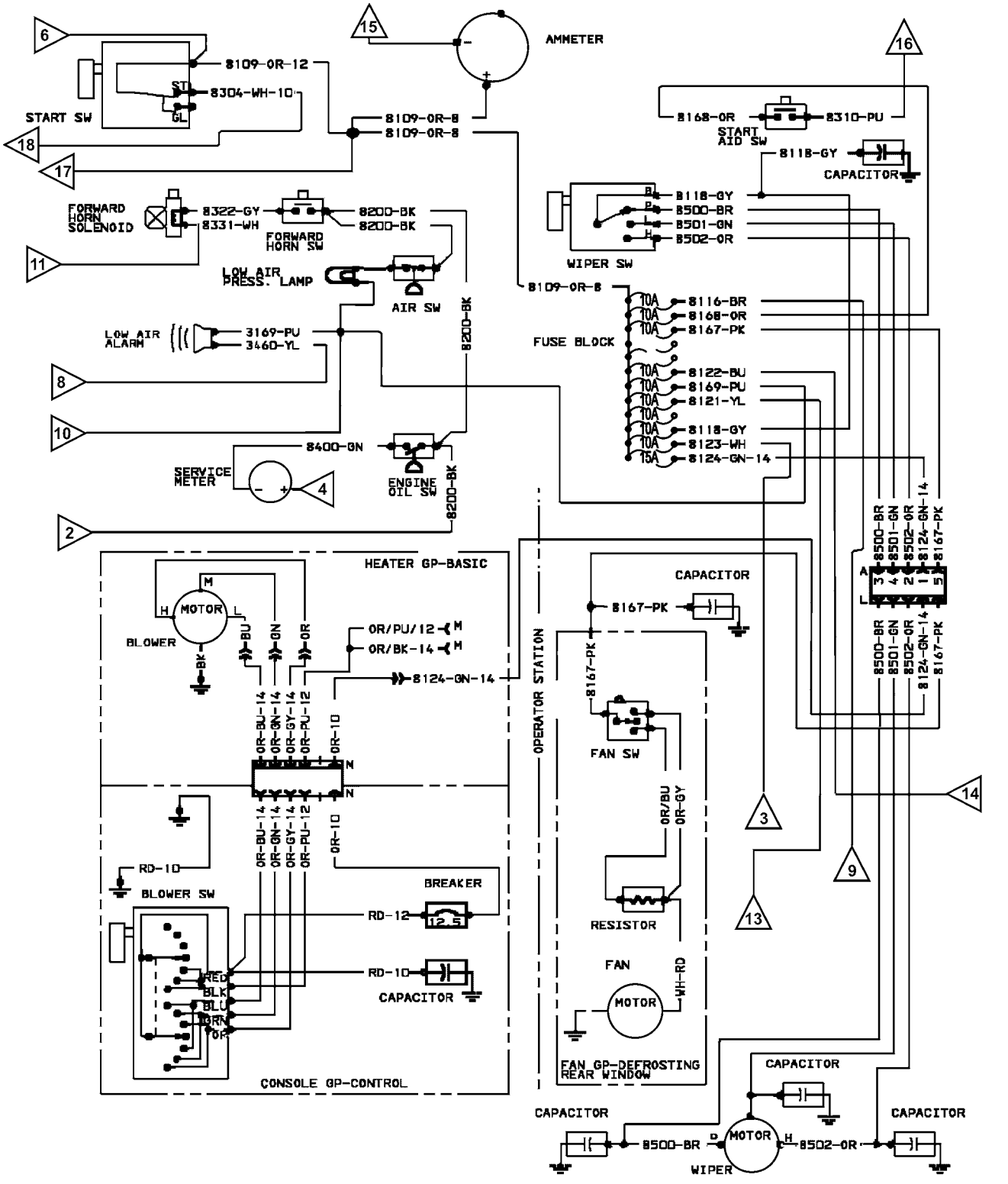

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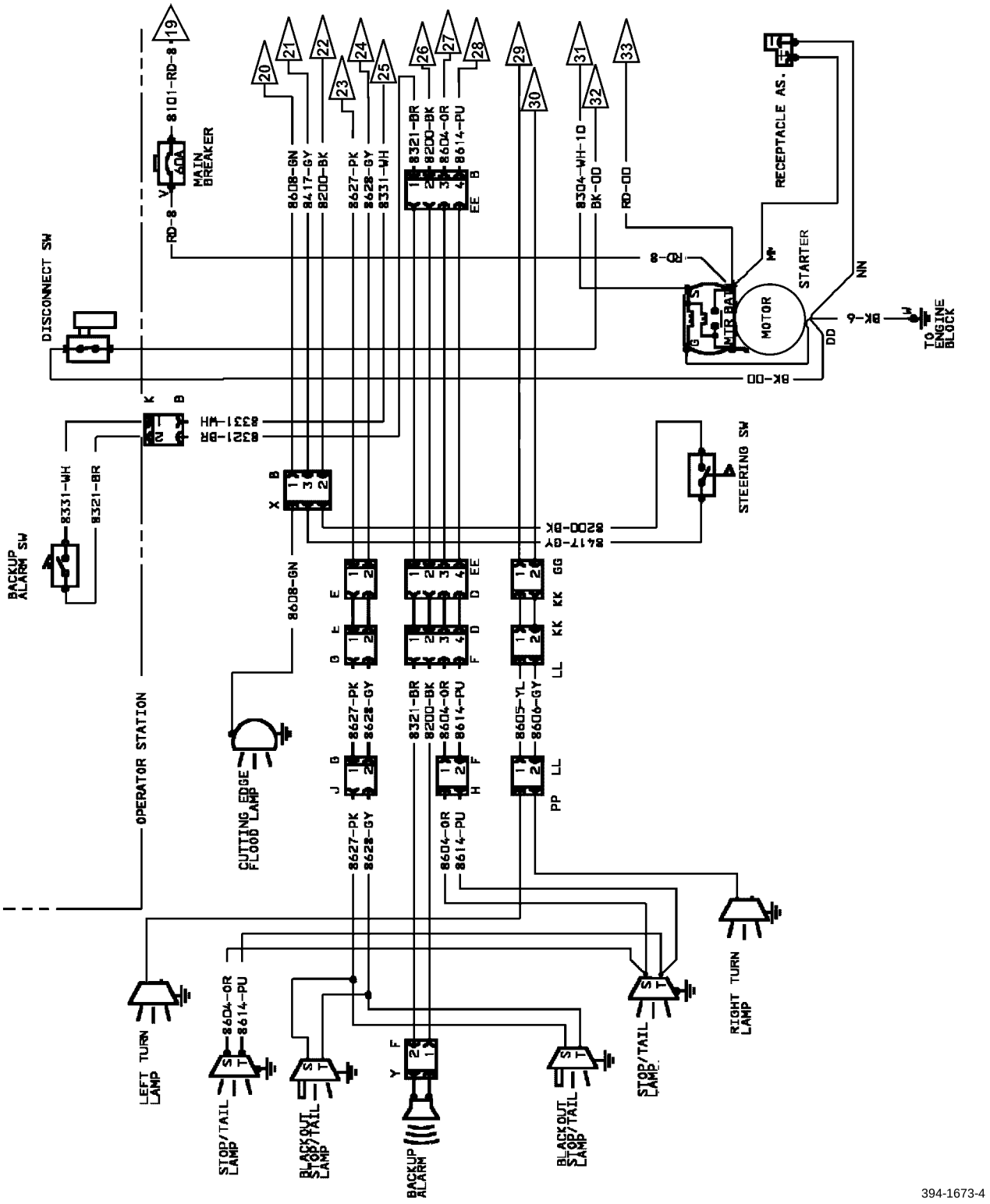

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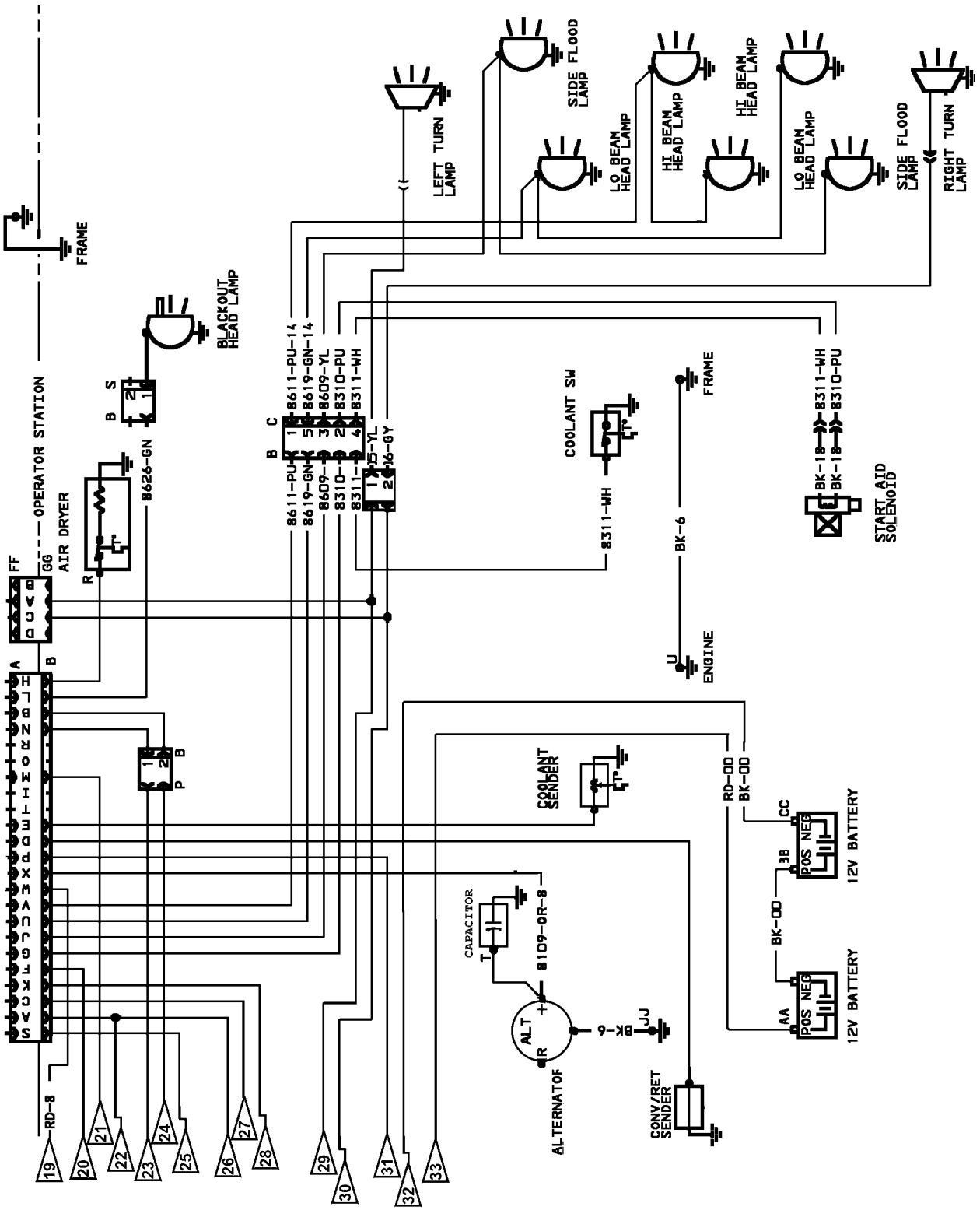

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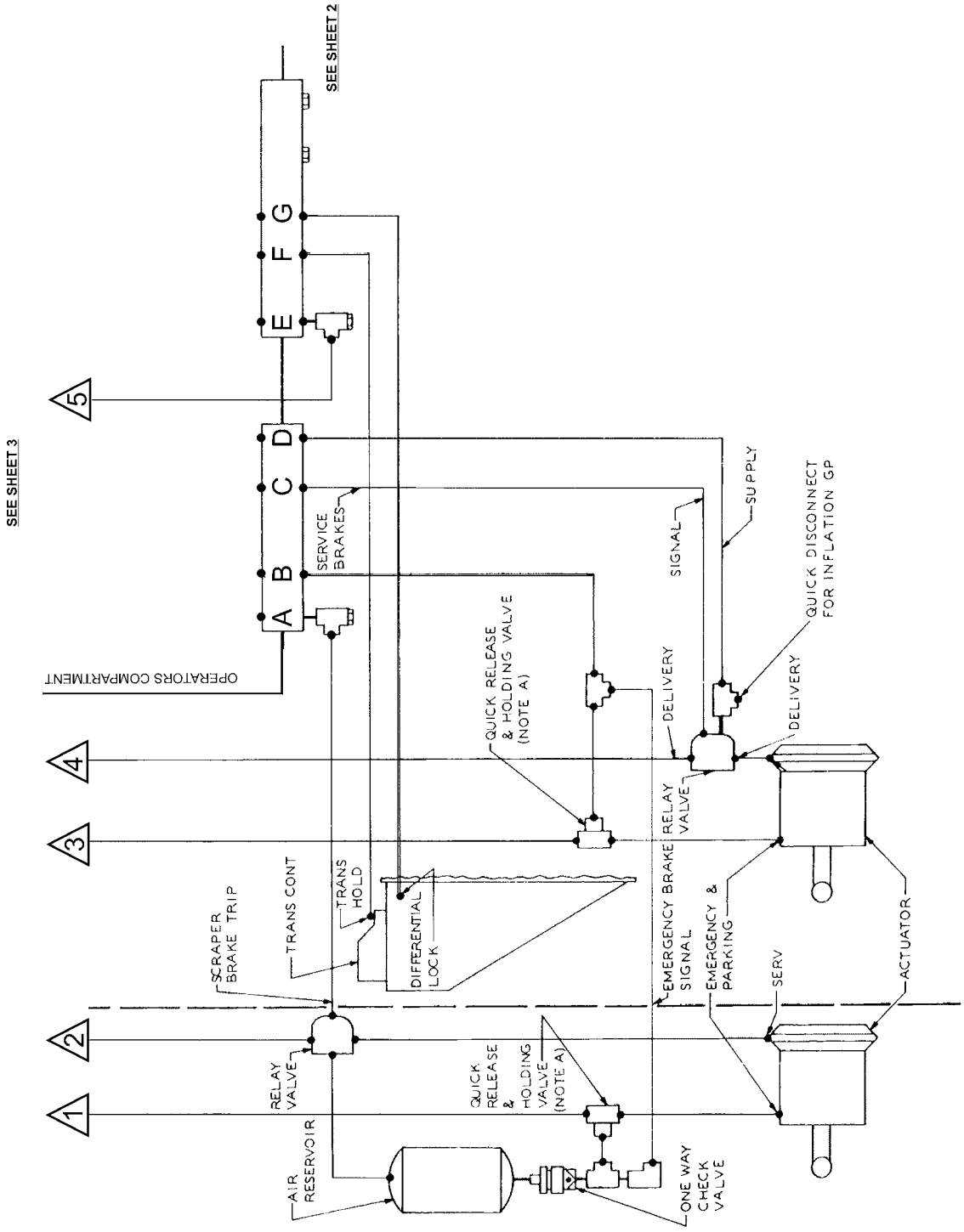
END OF WORK PACKAGE

AIR SYSTEM SCHEMATIC 0006 00

AIR SYSTEM SCHEMATIC - CONTINUED 0006 00



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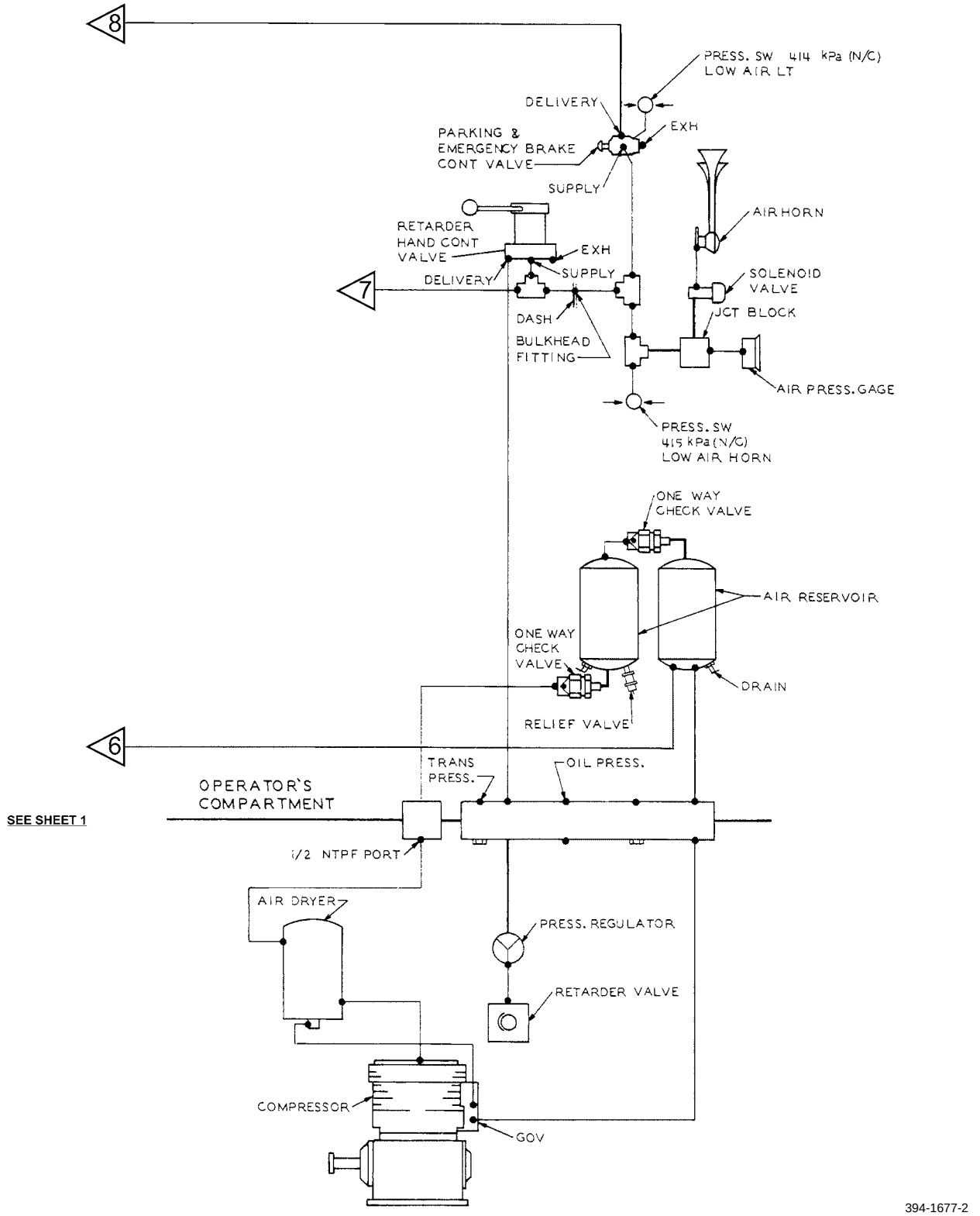
AIR SYSTEM SCHEMATIC - CONTINUED 0006 00



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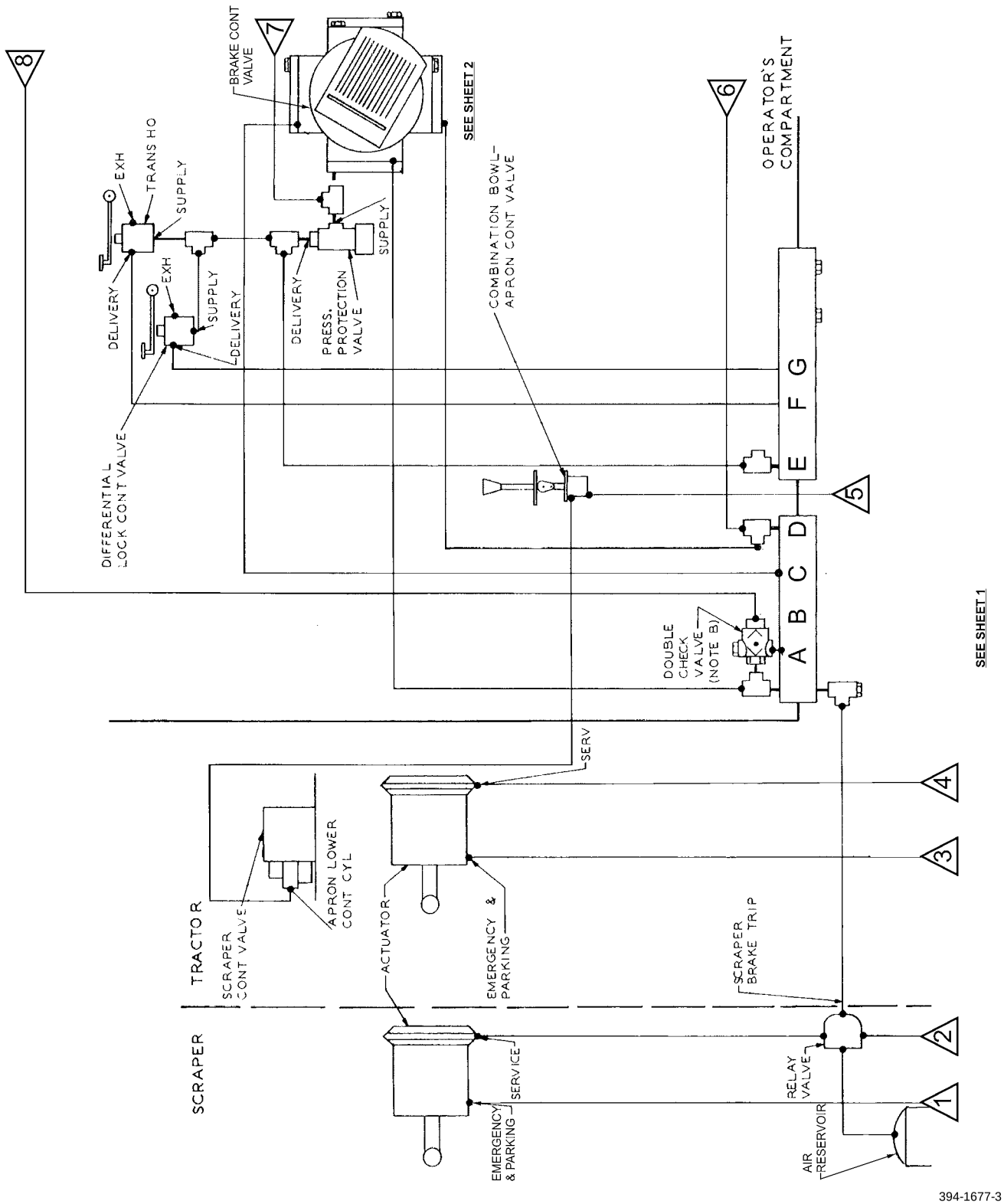

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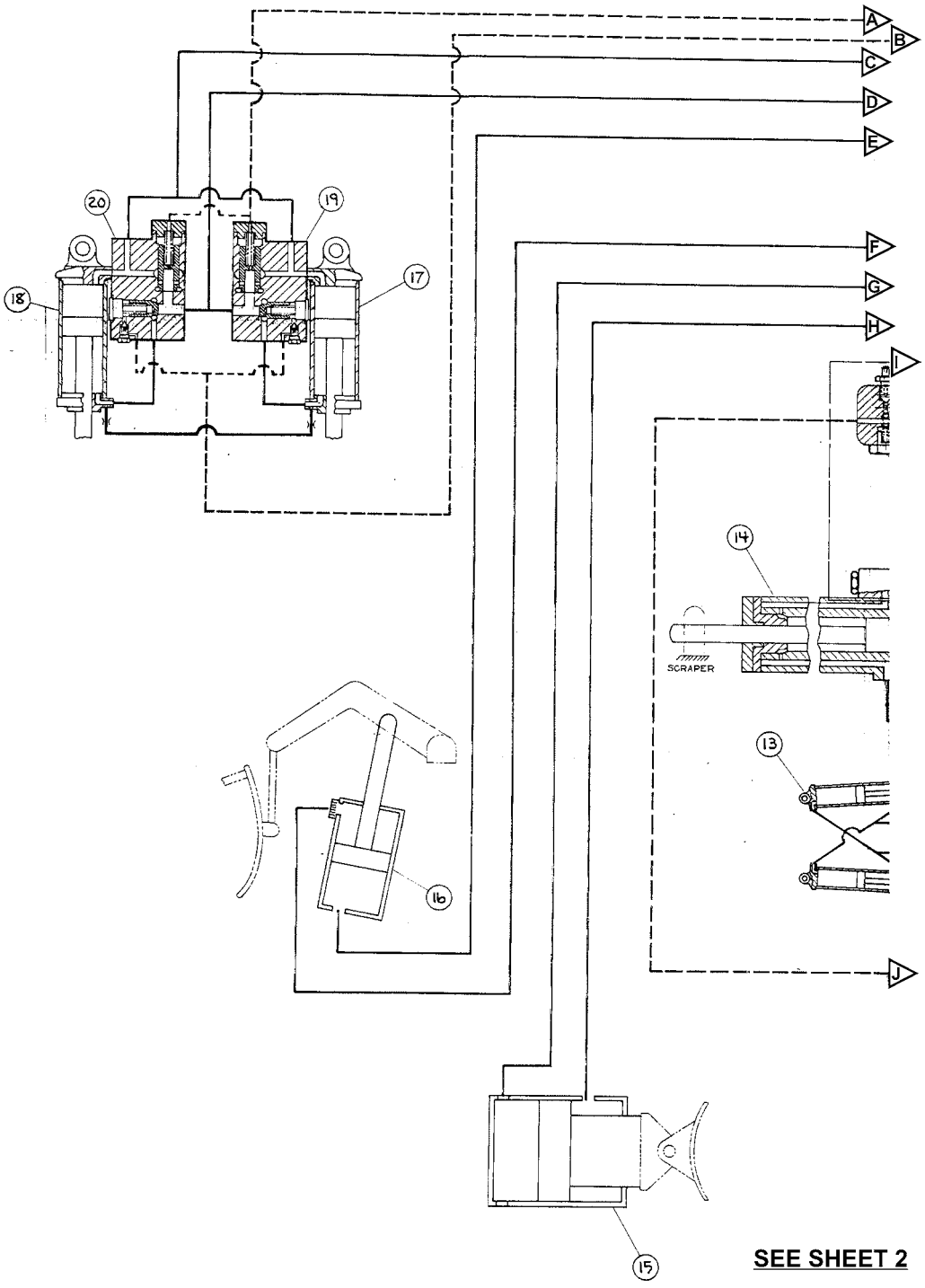
END OF WORK PACKAGE

HYDRAULIC SYSTEM SCHEMATIC 0007 00

NOT	ITEM.	NAME
	1	VALVE -CONTROL
	2	VALVE -SEQUENCE
	3	PUMP -REAR
	4	VALVE -CONTROL
	5	PUMP -VANE
	6	VALVE -PRESSURE REDUCING
	7	FILTER
	8	TANK
	9	VALVE -CHECK
	10	VALVE -CHECK
	11	VALVE -STR
	12	CYL -RECEIVER
	13	CYL -STEERING
	14	CYL -SENDER
	15	CYL -EJECTOR
	16	CYL -APRON
	17	CYL -BOWL
	8	CYL -BOWL
	19	VALVE -CHECK
	20	VALVE -CHECK



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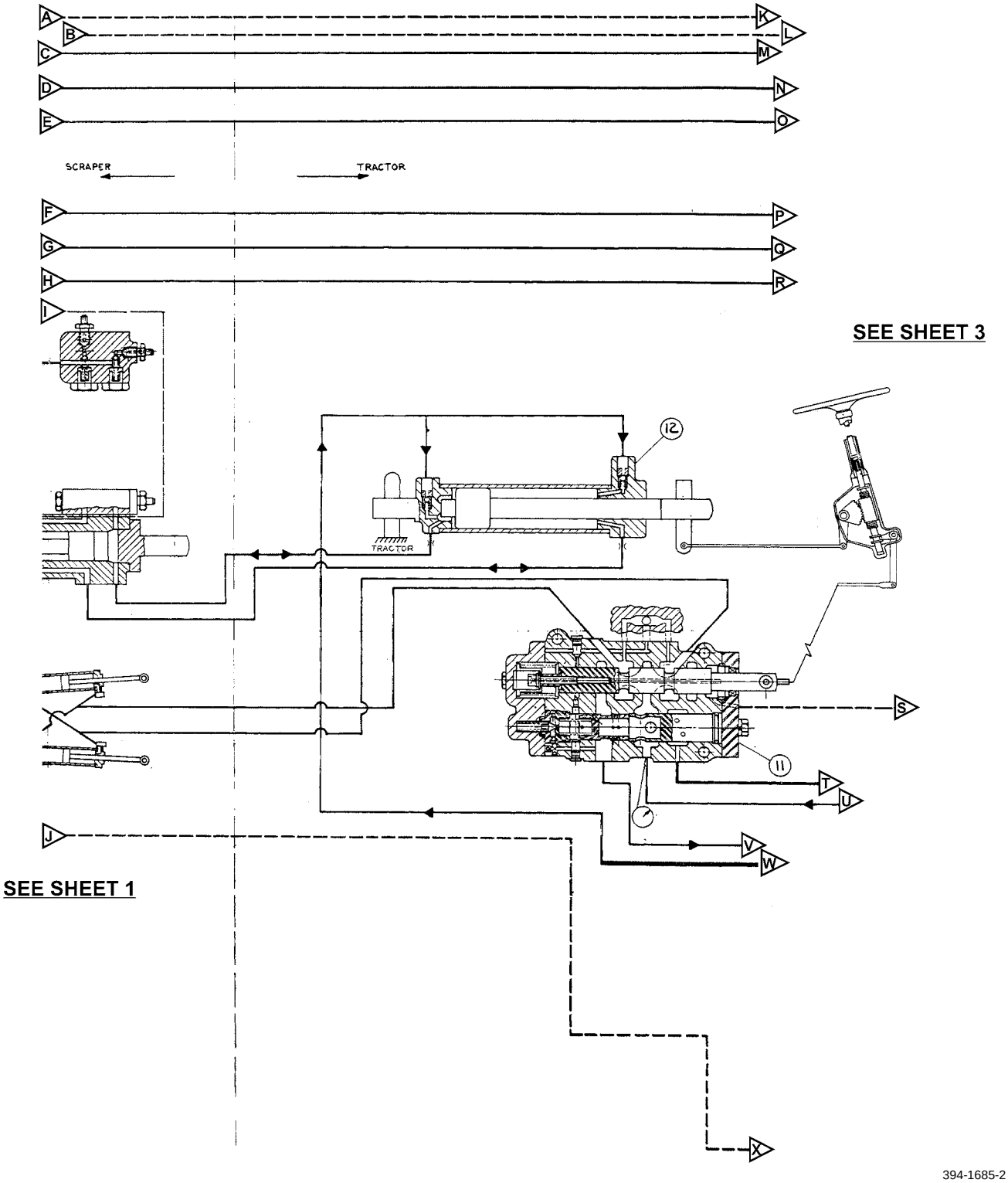

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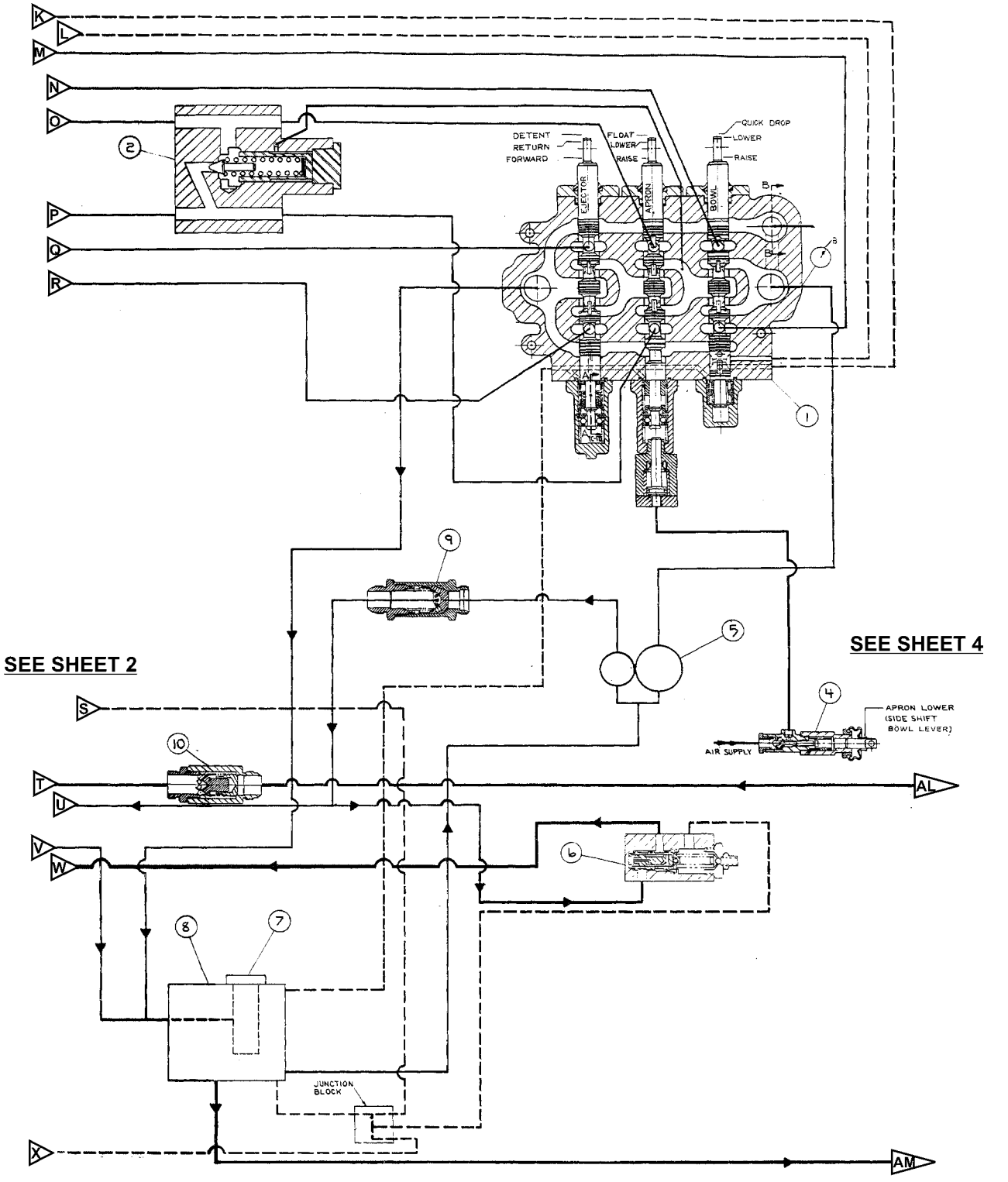

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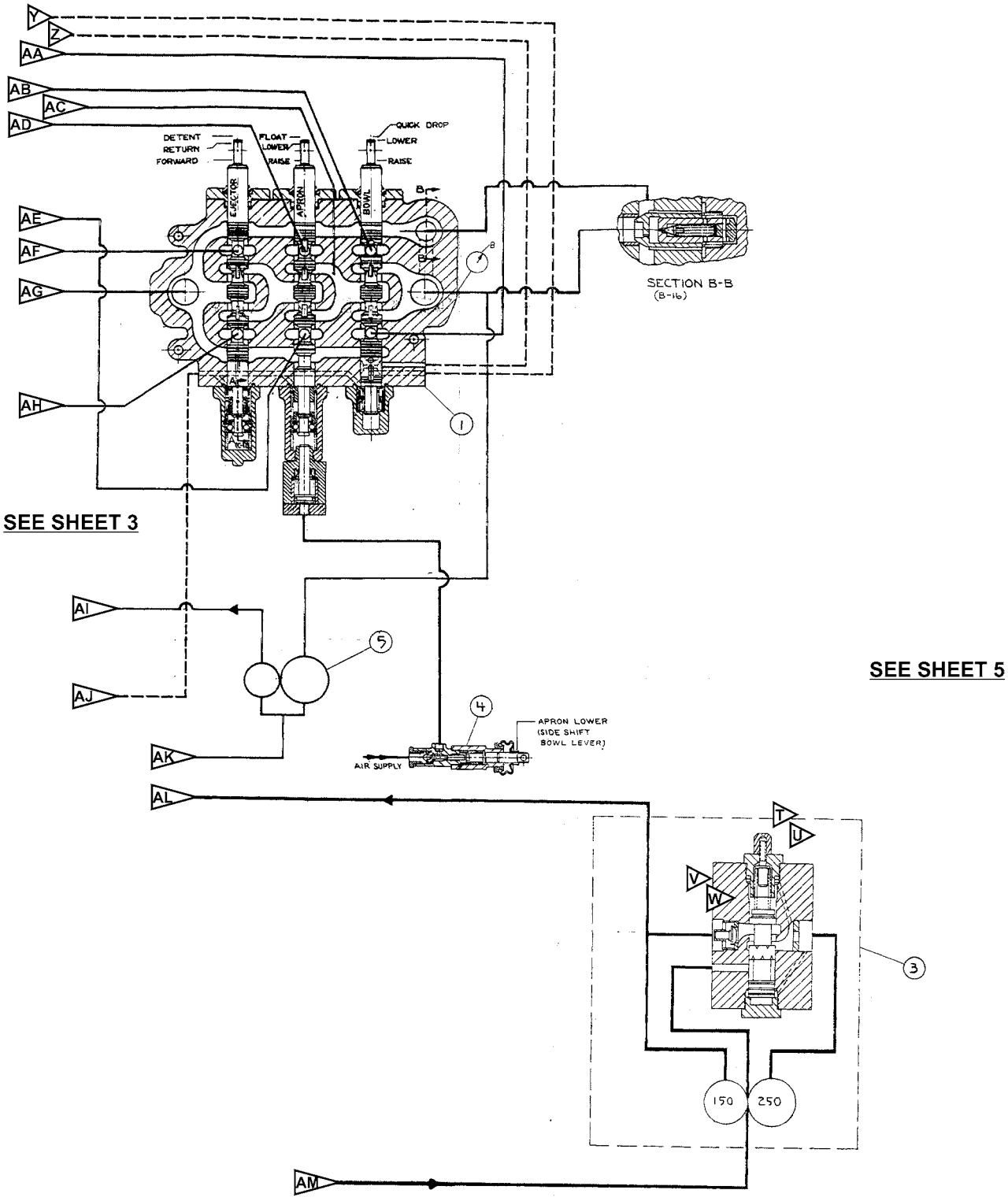

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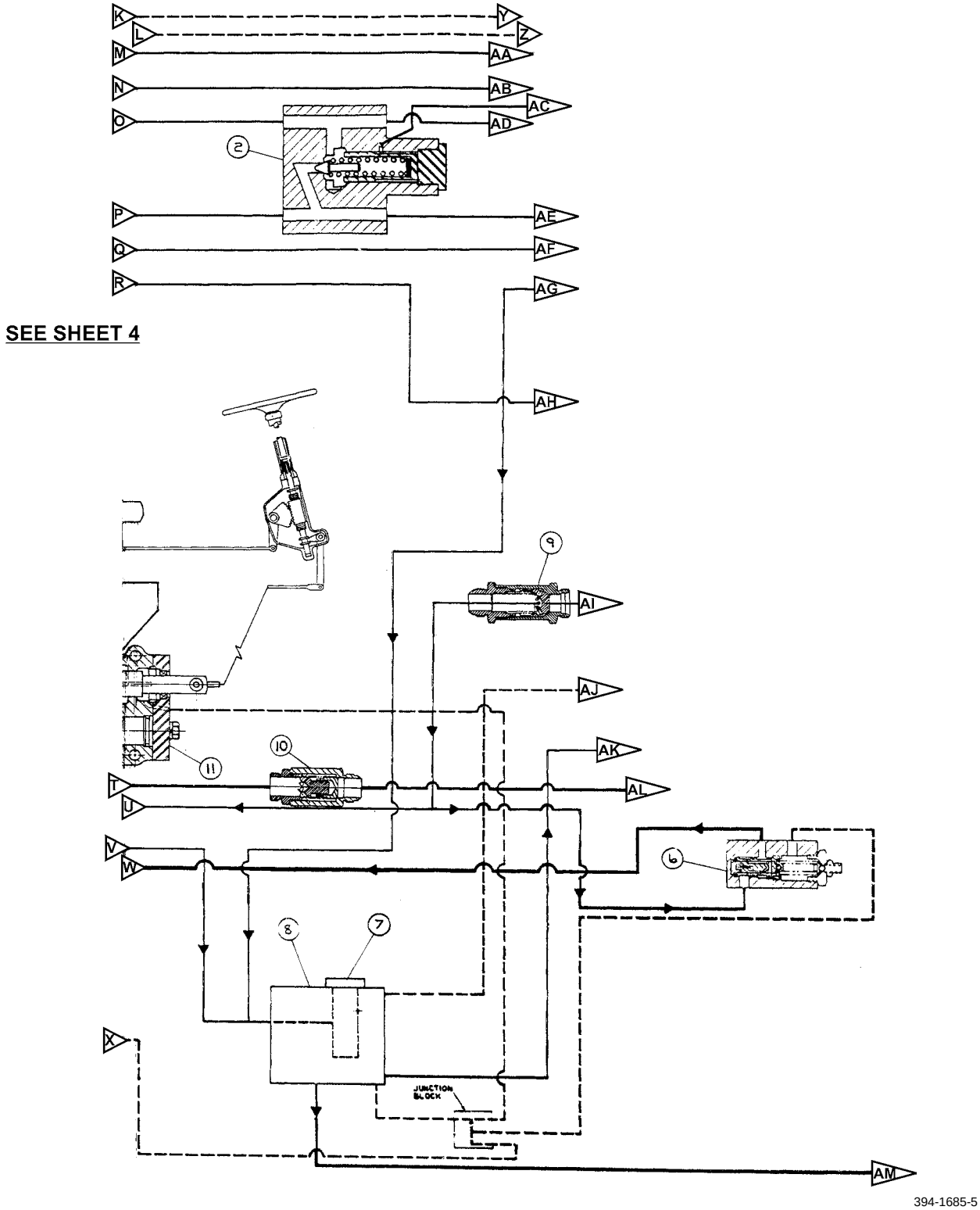

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END OF WORK PACKAGE

TROUBLESHOOTING SYMPTOM INDEX 0008 00

The following indices are included in this work package:

- Electrical Troubleshooting Symptom Index
- Mechanical Troubleshooting Symptom Index

Malfunction/Symptom **Troubleshooting Procedure Page**

ENGINE, EXAHUST AND COOLING SYSTEM

1. Engine Will Not Crank. . . . 0009 00-1
2. Engine Cranks, but Will Not Start. . . . 0009 00-2
3. Engine Cranks Slowly, Hard to Start. . . . 0009 00-3
4. Engine Starting Motor Operates, Does Not Engage Flywheel Ring Gear. . . . 0009 00-3
5. Engine Misfires or Runs Rough. . . . 0009 00-4
6. Engine Starts but Fails to Keep Running. . . . 0009 00-5
7. Poor Acceleration and/or Lack of Power. . . . 0009 00-7
8. Engine Speed Unstable or Surges at All Speeds. . . . 0009 00-9
9. Excessive Engine Vibration. . . . 0009 00-10
10. Engine Knocks (Fuel Knock). . . . 0009 00-11
11. Engine Knocks (Excessive Mechanical Noise). . . . 0009 00-12
12. Excessive Noise from Valve Mechanism (Clicking Sound). . . . 0009 00-12
13. Excessive Oil Consumption. . . . 0009 00-13
14. Low Oil Pressure. . . . 0009 00-14
15. Black or Gray Exhaust Smoke During Normal Operation. . . . 0009 00-15
16. White or Blue Exhaust Smoke. . . . 0009 00-15
17. Excessive Fuel Consumption. . . . 0009 00-17
18. Coolant in Engine Oil or Engine Lubricating Oil in Cooling system. . . . 0009 00-18
19. Engine Oil at Exhaust. . . . 0009 00-18
20. Engine Cranks but Will Not Start in Cold Weather. . . . 0009 00-19
21. Temperature Too High. . . . 0009 00-19
22. Excessive Noise. . . . 0009 00-19
23. Engine Overheats. . . . 0009 00-20
24. Engine Never Reaches Normal Operating Temperature. . . . 0009 00-20
25. Loss of Coolant. . . . 0009 00-21
26. Heater Fan Operates, but No Heat Comes from Heater. . . . 0009 00-21

BATTERY, STARTING AND CHARGING SYSTEM

1. Electrolyte Is Boiling or Excessive Use of Water. . . . 0010 00-1
2. Specific Gravity Will Not Increase to 1.240 Under Charge (Maintainable Batteries Only). . . . 0010 00-2
3. Engine Will Not Crank. . . . 0010 00-2
4. All Tractor Electrical Systems Inoperative. . . . 0010 00-4
5. Starting Motor Inoperative. . . . 0010 00-5
6. Engine Cranks Slowly. . . . 0010 00-11
7. Batteries Run Down in Service. . . . 0010 00-17
8. No Alternator Output. . . . 0010 00-17
9. Alternator Output Low (Ammeter Reading in Red Zone). . . . 0010 00-19
10. Alternator Charge Too High (Ammeter in High Green Zone). . . . 0010 00-20

Malfunction/Symptom **Troubleshooting Procedure Page**

ELECTRICAL ACCESSORIES

1. Backup Alarm, Defroster, Windshield Wiper, Heater Motor, Floodlamp Backup Alarm, Low Air Alarm/Light and Ether Starting Aid Are All Inoperative. 0011 00-1
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative). 0011 00-1
3. Air Dryer Heater Is Inoperative. 0011 00-7
4. Low Air Pressure Warning Light Always on (Air Pressure OK). 0011 00-10
5. Supplemental Steering Warning Lamp Always On (Hydraulic Pressure OK). 0011 00-11
6. Hour Meter Is Inoperative.. . . . . 0011 00-11
7. Converter/Retarder Temperature Gage Is Inoperative. 0011 00-13
8. Coolant Temperature Gage Is Inoperative. 0011 00-16
9. Horn Is Inoperative. 0011 00-19
10. Backup Alarm Is Inoperative. 0011 00-23
11. Windshield Wiper Is Inoperative. 0011 00-28
12. Heater Blower Is Inoperative. 0011 00-33
13. Defroster Is Inoperative. 0011 00-37

LIGHTING SYSTEM

1. All Lights Are Inoperative. 0012 00-1
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END OF WORK PACKAGE

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MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Engine Will Not Crank.	1. Check starting and charging system.	1. Refer to *Electrical Troubleshooting*. 2. Go to Test 2.
	WARNING DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.	
	2. Check for seized components.	
	a. Remove drive shaft (WP 0293 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace transmission (WP 0286 00). 2. If engine still won't turn, go to Step b.
	b. Remove fuel injection pump (WP 0273 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace fuel injection pump (WP 0273 00). 2. If engine still won't turn, go to Step c.
	c. Remove fuel pump drive (WP 0279 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace fuel pump drive (WP 0279 00). 2. If engine still won't turn, go to Step d.
	d. Remove water pump (WP 0052 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace water pump (WP 0052 00). 2. If engine still won't turn, go to Step e.
	e. Remove air compressor (WP 0167 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace air compressor (WP 0167 00). 2. If engine still won't turn, go to Step f.
	f. Remove fan drive (WP 0282 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace fan drive (WP 0282 00) 2. If engine still won't turn, go to Step g.

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MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Engine Will Not Crank - Continued.	g. Remove alternator belt (WP 0056 00) and attempt to bar over engine (WP 0028 00).	1. If engine turns, replace alternator (WP 0055 00) 2. If engine still won't turn, go to Test 3.
	3. Check engine for seizure. a. With fuel injection nozzles removed, try to turn crankshaft manually.	
	b. If crankshaft will not rotate, engine has internal damage.	Replace engine assembly (WP 0257 00).
2. Engine Cranks, but Will Not Start.	**WARNING** DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.	
	1. Verify with operator that correct fuel was used.	1. If incorrect fuel was put in, perform following tasks: a. Drain fuel system (WP 0034 00). b. Replace fuel filters (WP 0037 00 and WP 0038 00). c. Fill fuel tank with correct fuel (TM 5-3805-248-10). 2. If correct fuel was used, go to Test 2.
	2. Check fuel for water or contamination.	
	a. Open draincock (WP 0034 00) and drain fuel into clean glass container. If container is 1/4 full of water, or if dirt is evident, fuel is contaminated.	1. Drain fuel tank (WP 0034 00) completely. 2. Replace fuel filters (WP 0037 00 or WP 0038 00). 3. Fill fuel tank with correct grade of clean fuel (TM 5-3805-248-10). 4. If fuel is not contaminated, go to Step b.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks, but Will Not Start - Continued.	b. Disconnect fuel lines and check for obstruction (WP 0030 00 and WP 0035 00).	1. Clean lines with compressed air and reconnect (WP 0030 00 and WP 0035 00). 2. Replace fuel filters (WP 0037 00 and WP 0038 00). 3. Go to Test 3.
	3. Inspect fuel lines and connections for leaks, obstructions and damage.	1. If a leak is at a connection, tighten. 2. If a leak results from cracked, split or damaged tubing, replace tubing (WP 0030 00 and WP 0035 00). 3. If fuel lines are OK, go to Test 4.
	4. Check fuel injection timing (WP 0273 00).	1. Adjust fuel injection timing (WP 0273 00). 2. Go to Test 5.
	5. Check for slipping fuel injection pump drive. Remove small cover from fuel pump drive. Crank engine and look to see if shaft rotates.	If shaft does not rotate, remove small cover from timing gear cover and tighten accessory drive gear retaining nut. If tightening corrects slipping condition, time fuel injection pump (WP 0273 00).
3. Engine Cranks Slowly, Hard to Start.	1. In cold weather, make sure proper engine oil is being used (WP 0020 00).	1. Change oil (WP 0022 00). 2. If problem still exists, go to Test 2.
	2. Check starting/charging circuits. Refer to *Electrical Troubleshooting* (WP 0011 00).	If starting/charging system OK, go to Test 3.
	3. Check the ether starting aid. Refer to *Electrical Troubleshooting* (WP 0011 00).	
4. Engine Starting Motor Operates, Does Not Engage Flywheel Ring Gear.	Check for broken or damaged flywheel teeth or starter drive.	
	a. Remove starting motor (WP 0057 00) and inspect starter drive for damaged teeth.	1. If defective replace starter (WP 0057 00). 2. If starting motor is OK, go to Step b.
	b. Manually turn engine and inspect flywheel ring gear teeth through starting motor opening in flywheel housing (WP 0028 00).	If defective replace flywheel assembly (WP 0261 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Engine Misfires or Runs Rough.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check air cleaner for air restriction.	Inspect air cleaner for restrictions. Clean air inlet and replace or clean air cleaner filter elements (WP 0031 00).
	2. Check fuel for contamination by opening draincock (WP 0034 00) and draining fuel into clean glass container. If container is 1/4 full of water, or if dirt is evident, fuel is contaminated.	1. Drain fuel tank (WP 0034 00) completely. 2. Replace fuel filters (WP 0037 00 or WP 0038 00). 3. Fill fuel tank with correct grade of clean fuel (TM 5-3805-248-10). 4. If fuel is not contaminated, go to Test 3.
	3. Disconnect fuel lines (WP 0030 00 and WP 0035 00) and check for obstruction.	1. Clean lines with compressed air and reconnect (WP 0030 00 and WP 0035 00). 2. Replace fuel filters (WP 0037 00 and WP 0038 00). 3. Go to Test 4.
	4. Inspect fuel lines and connections for leaks, obstructions and damage.	1. If a leak is at a connection, tighten. 2. If a leak results from cracked, split or damaged tubing, replace tubing (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 5.
	5. Check fuel injection lines for air.	1. Bleed air from fuel injection lines by performing cylinder balance test (WP 0029 00). 2. Go to Test 6.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Engine Misfires or Runs Rough - Continued.	6. Check valve clearance.	1. Adjust valve clearance (WP 0265 00). 2. Go to Test 7.
	7. Check for worn, bent or broken push rod (WP 0265 00).	1. Replace push rod(s) (WP 0265 00). 2. If push rods are OK, go to Test 8.
	8. Check fuel injection timing (WP 0274 00).	1. Adjust timing (WP 0274 00). 2. Go to Test 9.
	9. Check fuel pressure at fuel injector housing inlet. Pressure must be at least 30 psi (207 kPa).	1. If fuel pressure is below 30 psi (207 kPa), replace primary fuel filter (WP 0038 00). 2. If fuel pressure is STILL below 30 psi (207 kPa), replace fuel transfer pump (WP 0275 00). 3. If pressure is OK, go to Test 10.
	10. Perform cylinder balance test (WP 0027 00).	1. If fuel pressure at suspect cylinder fuel injection nozzle appears to be equal to pressure at all other fuel injection nozzles, replace fuel injection pump as necessary (WP 0273 00). 2. If pressures are not equal, remove blockage from nozzle-to-pump fuel line or replace nozzle for suspect cylinder (WP 0272 00). 3. Go to Test 11.
	11. Remove cylinder head and inspect cylinder walls, pistons, valves and valve lifters (WP 0259 00).	Replace damaged components as necessary. Refer to appropriate work package.
6. Engine Starts but Fails to Keep Running.	**WARNING** DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.	
	1. Check air cleaner for air restriction.	1. Clean air inlet and service air cleaner filter elements (WP 0031 00). 2. If no restriction is found, go to Test 2.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Starts but Fails to Keep Running - Continued.	2. Check fuel for contamination.	
	a. Open draincock (WP 0034 00) and drain into clean glass container. If container is 1/4 full of water, or if dirt is evident, fuel is contaminated.	1. Drain fuel tank (WP 0034 00) completely. 2. Replace fuel filters (WP 0037 00 or WP 0038 00). 3. Fill fuel tank with correct grade of clean fuel (TM 5-3805-248-10). 4. If fuel is not contaminated, go to Step b.
	b. Disconnect fuel lines (WP 0030 00 and WP 0035 00) and check for obstruction.	1. Clean lines with compressed air and reconnect (WP 0030 00 and WP 0035 00). 2. Replace fuel filters (WP 0037 00 and WP 0038 00). 3. Go to Test 3.
	3. Inspect fuel lines and connections for leaks, obstructions and damage.	1. If a leak is at a connection, tighten. 2. If a leak results from cracked, split or damaged tubing, replace tubing (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 4.
	4. Check engine low idle speed.	1. Adjust governor low idle RPM (WP 0274 00). 2. If idle speed is OK, go to Test 5.
	5. Perform cylinder balance test (WP 0029 00).	1. Replace nozzle for suspect cylinder (WP 0272 00). 2. Go to Test 6.
	6. Check for defective or leaking fuel injection pump(s).	1. Replace pump(s) (WP 0273 00). 2. Replace transfer pump (WP 0275 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Poor Acceleration and/or Lack of Power.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury. • Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.	
	1. Check with operator to determine if fuel tank was filled with correct fuel.	1. If incorrect fuel was put in, perform following tasks: a. Drain fuel system (WP 0034 00). b. Replace fuel filters (WP 0037 00 and WP 0038 00). c. Fill fuel tank with correct fuel (TM 5-3805-248-10). 2. If correct fuel was used, go to Test 2.
	2. Check air cleaner for air restriction (WP 0031 00).	1. Clean air inlet and service air cleaner filter elements (WP 0031 00). 2. If no restriction was found, go to Test 3.
	3. Inspect for full governor linkage travel.	1. Adjust governor linkage travel (WP 0280 00). 2. If travel is OK, go to Test 3.
	4. Disconnect fuel lines (WP 0030 00 and WP 0035 00) and check for obstruction.	1. Clean lines with compressed air and reconnect (WP 0030 00 and WP 0035 00). 2. Replace fuel filters (WP 0037 00 and WP 0038 00). 3. Go to Test 5.
	5. Inspect fuel lines and connections for leaks, obstructions and damage.	1. If leak is at a connection, tighten. 2. If a leak results from cracked, split or damaged tubing, replace tubing (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 6.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Poor Acceleration and/or Lack of Power - Continued.	6. Check exhaust system for restrictions.	1. Remove restrictions and/or replace exhaust system part(s) (WP 0041 00). 2. If exhaust is OK, go to Test 7.
	7. Perform cylinder balance test (WP 0029 00).	1. If fuel pressure at suspect cylinder fuel injection nozzle appears to be equal to pressure at all other fuel injection nozzles, replace fuel injection pump as necessary (WP 0273 00). 2. If pressures are not equal, remove blockage from nozzle-to-pump fuel line or replace nozzle for suspect cylinder (WP 0272 00). 3. If pressures are OK, go to Test 8.
	8. Check fuel injection timing (WP 0274 00).	1. Adjust timing (WP 0274 00). 2. Go to Test 9.
	9. Check fuel pressure at fuel injector housing inlet. Pressure must be at least 30 psi (207 kPa).	1. If fuel pressure is below 30 psi (207 kPa), replace primary fuel filter (WP 0038 00). 2. If fuel pressure is STILL below 30 psi (207 kPa), replace fuel transfer pump (WP 0275 00). 3. If pressure is OK, go to Test 10.
	10. Check valve clearance.	1. Adjust valve clearance (WP 0265 00). 2. If problem still exists, replace turbocharger (WP 0276 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Engine Speed Unstable or Surges at All Speds.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury. • Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.	
	1. Disconnect fuel lines (WP 0030 00 and WP 0035 00) and check for obstruction.	1. Clean lines with compressed air or sturdy wire and reconnect (WP 0030 00 and WP 0035 00). 2. Replace fuel filters (WP 0037 00 and WP 0038 00). 3. Go to Test 2.
	2. Inspect fuel lines and connections for leaks, obstructions and damage.	1. If a leak is at a connection, tighten. 2. If a leak results from cracked, split or damaged tubing, replace tubing (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 3.
	3. Inspect governor linkage for proper operation and adjustment.	If linkage does not operate properly or is not correctly adjusted, make necessary adjustment (WP 0280 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Excessive Engine Vibration.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Perform cylinder balance test (WP 0029 00).	1. Replace defective nozzle (WP 0272 00). 2. If nozzle is operating properly, replace fuel injection pump (WP 0273 00). 3. Go to Test 2.
	2. Check for loose or damaged crankshaft pulley or vibration damper.	1. Tighten crankshaft pulley or vibration damper (WP 0260 00). 2. Replace damaged crankshaft pulley or vibration damper (WP 0260 00). 3. Go to Test 3.
	3. Check fan blade balance. a. Loosen or remove fan belts (WP 0053 00).	
	b. Operate engine at RPM where vibration occurred.	1. If vibration is not noticeable, replace fan drive assembly (WP 0282 00). 2. If vibration is noticeable, go to Test 4.
	4. Inspect for loose engine mounting supports.	1. If supports are loose because of wear or damage, replace support(s) (WP 0258 00). 2. If mounting supports are not damaged or worn, but are loose, tighten mounting bolts (WP 0258 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Engine Knocks (Fuel Knock).	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check with operator to determine if fuel tank was filled with correct fuel.	1. If incorrect fuel was put in, perform following tasks: a. Drain fuel system (WP 0034 00). b. Replace fuel filters (WP 0037 00 and WP 0038 00). c. Fill fuel tank with correct fuel (TM 5-3805-248-10). 2. If correct fuel was used, go to Test 2.
	2. Check fuel injection lines for air.	1. Bleed air from fuel injection lines by performing cylinder balance test (WP 0029 00). 2. Go to Test 3.
	3. Perform cylinder balance test (WP 0029 00).	1. Replace defective nozzle (WP 0272 00). 2. If nozzle is operating properly, replace fuel injection pump for that cylinder (WP 0273 00). 3. Go to Test 4.
	4. Check fuel injection timing (WP 0274 00).	Adjust timing, if necessary (WP 0274 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Engine Knocks (Excessive Mechanical Noise).	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	Engine has internal damage.	Replace engine assembly (WP 0257 00).
12. Excessive Noise from Valve Mechanism (Clicking Sound).	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check valve clearance.	1. Adjust valves (WP 0265 00). 2. Go to Test 2.
	2. Inspect valve mechanism.	1. Replace damaged components (WP 0263 00). 2. Go to Test 3.
	3. Remove valve cover (WP 0021 00). Check lubrication flow at valve mechanism.	If there is no flow, clean and inspect valve mechanisms (WP 0265 00).
	4. Check valve springs and locks. Damaged or worn locks can cause valve to fall into cylinder, resulting in serious engine damage.	If damage is noted, replace cylinder head assembly (WP 0259 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
13. Excessive Oil Consumption.	**WARNING** Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check oil level gage for overfilling.	1. If oil level gage indicates excessive oil, drain crankcase to safe operating level (WP 0022 00). 2. If oil level is OK, go to Test 2.
	2. Check for external oil leaks. a. Wipe off edges of valve cover, oil pan, oil filter, turbocharger, engine oil cooler and other external engine surfaces.	
	b. Start engine and check for leaks.	1. Tighten nuts, screws, lines and fittings, and oil filter. 2. If no leaks are found, go to Test 3.
	3. Check engine oil temperature (TM 5-3805-248-10).	1. If temperature is too high, replace oil cooler (WP 0269 00). 2. If oil temperature is normal, go to Test 4.
	4. Check for oil leakage at turbocharger to inlet manifold connection.	1. If leakage is noted, replace turbocharger (WP 0276 00). 2. If no leaks are found, go to Test 5.
	5. Remove valve cover (WP 0021 00). Check for excessive oil and missing plugs in each end of rocker shaft (WP 0349 00).	1. Replace rocker shaft if plug(s) missing (WP 0349 00). 2. If problem still exists, replace engine assembly (WP 0257 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
14. Low Oil Pressure.	**WARNING** • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury. • Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.	
	1. Check oil lines for cracks, splits, leaks, damage and obstructions.	1. Tighten loose fittings and connections. 2. Replace oil lines that are cracked, split or damaged (WP 0027 00). 3. Clear clogged or obstructed lines with compressed air. 4. Go to Test 2.
	2. Inspect oil filter for leaks or blockage.	1. Tighten oil filter (WP 0022 00). 2. If leaking continues, service oil filter (WP 0035 00). 3. If oil filter is OK, go to Test 3.
	3. Check for fuel in engine oil.	1. Drain engine lubricating oil, install new oil filter and refill crankcase (WP 0035 00). 2. Go to Test 4.
	4. Substitute a known good gage for the suspected oil pressure gage (WP 0249 00).	1. If oil pressure is normal, gage was at fault. 2. If oil pressure is still low, go to Test 5.
	5. Inspect lubrication oil pump.	Replace oil pump (WP 0267 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
15. Black or Gray Exhaust Smoke During Normal Operation.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check air cleaner for air restriction (WP 0031 00).	1. Clean air inlet and service air cleaner filter elements (WP 0031 00). 2. If no restriction found, go to Test 2.
	2. Check for fuel in engine lubricating oil. If fuel is present, perform cylinder balance test (WP 0029 00).	1. Replace defective fuel injection nozzles (WP 0272 00). 2. Drain engine lubricating oil, install new oil filter and refill crankcase (WP 0022 00). 3. If fuel is not present, go to Test 3.
	3. Check turbocharger for proper operation.	1. Replace turbocharger if damaged (WP 0276 00). 2. If turbocharger is OK, go to Test 4.
	4. Check fuel injection timing (WP 0274 00).	Adjust timing (WP 0274 00).
16. White or Blue Exhaust Smoke.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check for coolant in engine oil.	1. If coolant is present, replace cylinder head gasket (WP 0259 00). 2. If no coolant in engine oil, go to Test 2.

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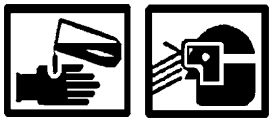
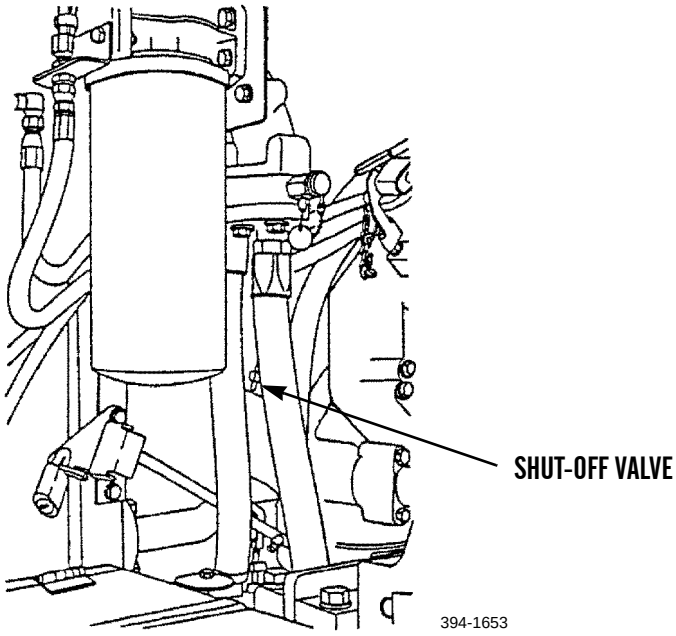
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
16. White or Blue Exhaust Smoke - Continued.	2. Check for dirty or contaminated engine oil.	1. Change engine oil and filter (WP 0022 00). 2. Go to Test 3.
	3. If white smoke is present and engine runs rough, inspect fuel lines and connections for leaks, obstructions and damage.	1. If a leak is at a connection, tighten. 2. Replace damaged fuel lines (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 4.
	4. Check dipstick for overfilling.	1. If dipstick indicates excessive oil, drain crankcase to safe operating level (WP 0022 00). 2. If oil level OK, go to Test 5.
	5. Check for fuel in engine oil.	1. Drain engine lubricating oil, install new oil filter and refill crankcase (WP 0022 00). 2. If oil is OK, go to Test 6.
	6. Check for rough running.	1. See *Malfunction 5*. 2. If running OK, go to Test 7.
	7. Check fuel injection timing (WP 0274 00).	1. Adjust timing (WP 0274 00). 2. Go to Test 8.
	8. Inspect air inlet manifold for oil.	1. If oil not is present, replace turbocharger (WP 0276 00). 2. If oil is not present, go to Test 9.
	9. Clean and inspect valve mechanisms (WP 0265 00), and adjust (WP 0266 00).	1. Replace damaged parts including cylinder head as necessary. 2. If problem still exists, replace engine assembly (WP 0257 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
17. Excessive Fuel Consumption.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check air cleaner for air restriction.	Clean air inlet and service air cleaner filter elements (WP 0031 00).
	2. Inspect fuel lines and connections for leaks.	1. Tighten any loose connections. 2. Replace leaking or damaged fuel lines and connections (WP 0030 00 and WP 0035 00). 3. If lines are OK, go to Test 3.
	3. Check for fuel in engine lubricating oil.	1. Drain engine lubricating oil, install new oil filter and refill crankcase (WP 0022 00). 2. If no fuel in oil, go to Test 4.
	4. Perform cylinder balance test (WP 0029 00).	1. If fuel pressure at suspect cylinder fuel injection nozzle appears to be equal to pressure at all other fuel injection nozzles, replace fuel injection pump as necessary (WP 0273 00). 2. If pressures are not equal, remove blockage from nozzle-to-pump fuel line or replace nozzle for suspect cylinder (WP 0272 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
18. Coolant in Engine Oil or Engine Lubricating Oil in Cooling system.	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel. • Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Inspect cylinder head and gasket (WP 0259 00).	1. Replace cylinder head, if damaged (WP 0259 00). 2. If cylinder head is not defective, install new cylinder head gasket and spacer plate (WP 0259 00). 3. Go to Test 2.
	2. Check for leaking coolant or oil from block area.	1. If leaking or damaged, replace engine assembly (WP 0257 00). 2. If no leak is present, go to Test 3.
	3. Inspect oil cooler (WP 0269 00).	Replace engine oil cooler (WP 0269 00).
19. Engine Oil at Exhaust.	**WARNING** Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check for contaminated or overfilled engine oil.	1. If oil is contaminated or overfull, change engine oil (WP 0022 00). 2. If oil is OK, go to Test 2.
	2. Check for damaged cylinder head (WP 0269 00).	1. If damaged, replace cylinder head (WP 0269 00). 2. If problem still exists, replace turbocharger (WP 0276 00). 3. If problem still exists, replace engine assembly (WP 0257 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ETHER START SYSTEM		
20. Engine Cranks but Will Not Start in Cold Weather.	 **WARNING** Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if ether is inhaled or causes eye irritation. Failure to follow this warning may cause injury or death.	
	1. Check ether cylinder by removing from valve. Shake cylinder and listen for liquid splashing inside.	1. Replace cylinder if empty (WP 0039 00). 2. If cylinder is NOT empty, go to Test 2.
	2. Check starting aid Electrical System.	1. Refer to *Electrical Troubleshooting* (WP 0011 00). 2. If Electrical system is OK, go to Test 3.
	3. Check starting aid valve tube assembly for damage. a. Disconnect both ends of tube assembly.	
	b. Inspect tube assembly for kinks, holes and damaged fittings.	1. If tube assembly is not damaged, replace starting aid valve (WP 0039 00). 2. Replace damaged tube assembly (WP 0039 00).
EXHAUST SYSTEM		
21. Temperature Too High.	**WARNING** Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	Check for obstruction at exhaust stack outlet.	Remove any obstruction.
22. Excessive Noise.	Check for loose or broken exhaust pipe connections, faulty muffler or missing clamps.	Replace broken elbows, clamps or muffler if defective (WP 0041 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	COOLING SYSTEM	
23. Engine Overheats.	**WARNING** Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Check radiator for airflow obstructions.	Remove obstructions from radiator.
	2. Inspect fan and fan belt condition.	1. If fan is found bent or defective, replace fan (WP 0282 00). 2. Tighten fan belt. If fan belt is found frayed or cut, replace fan belt(s) (WP 0053 00). 3. If fan belt(s) won't adjust properly, replace belt tensioner (WP 0054 00).
	3. Test engine coolant temperature gage.	Refer to *Electrical Troubleshooting* (WP 0011 00).
	4. Inspect all hoses, fittings, water pump, and sending units.	Repair any leaks or replace any damaged parts.
	5. Check thermostat opening temperature (WP 0046 00).	1. Replace thermostat as needed (WP 0046 00). 2. Flush cooling system (WP 0042 00). 3. If problem still exists, replace water pump. 4. If problem still exists, check cylinder block, and cylinder head, for leaks or breaks.
24. Engine Never Reaches Normal Operating Temperature.	**WARNING** Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.	
	1. Test engine coolant temperature gage (WP 0011 00).	If vehicle gage indicates incorrect reading, replace temperature gage (WP 0034 00).
	2. Check thermostat (WP 0046 00).	1. Replace thermostat if required (WP 0046 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
25. Loss of Coolant.	1. Use a pressure tester to inspect cooling system for leaks.	Repair any leaks. If damaged, replace cylinder head and/or spacer plate and gaskets (WP 0259 00).
	2. Check cylinder head and spacer plate for defective gaskets. Also inspect cylinder head and spacer plate (WP 0259 00).	
	3. Visually check for cracked cylinder liners or block.	If damaged, replace cylinder head or engine assembly (WP 0257 00).
	a. Remove cylinder head (WP 0259 00).	
	b. Visually inspect cylinder head and block.	
26. Heater Fan Operates, but No Heat Comes from Heater.	1. Check for shut flow control valve to heater assembly.	Open flow control valve to heater assembly.
		
	2. Inspect all heater hoses from engine compartment to heater.	If leaking, ruptured or broken, replace.
	3. Check thermostat (WP 0046 00).	1. Replace thermostat as needed (WP 0046 00). 2. Flush cooling system (WP 0042 00).

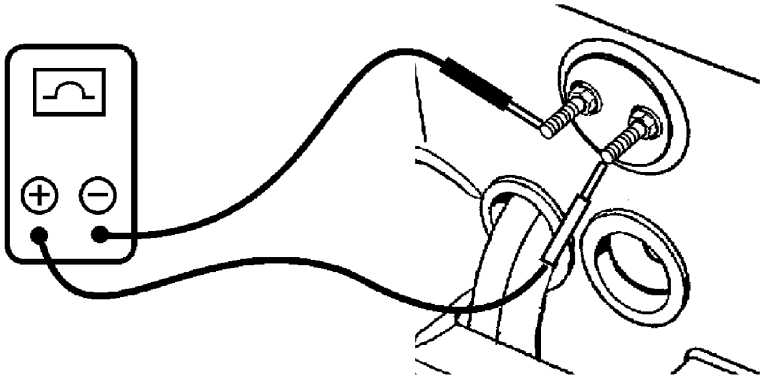
END OF WORK PACKAGE

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	WARNING • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** • The following tests require two mechanics – one at control and the other at component you are checking. • For detailed electrical diagram, refer to WP 0005 00.	
1. Electrolyte Is Boiling or Excessive Use of Water.	1. Check for physical damage to batteries or evidence of a leak.	1. If damaged, replace battery (WP 0103 00). 2. If batteries don't appear to be damaged, go to Test 2.
	2. For maintainable batteries, check electrolyte specific gravity. Refer to TM 9-6140-200-14.	1. If specific gravity is 1.225-1.235, recharge battery. Refer to TM 9-6140-200-14. 2. If specific gravity is OK or battery is maintenance free, go to Test 3.
	3. Check charging voltage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter red lead to orange wire on alternator. d. Connect black lead to ground. e. Operate engine (TM 5-3805-248-10).	
	f. Voltage range is 26.6 - 28.3 volts.	1. If not within specified range, replace alternator (WP 0055 00). 2. If voltage is in range, go to Test 4.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Specific Gravity Will Not Increase to 1.240 Under Charge (Maintainable Batteries Only).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	Check rate of charging. Place battery on charge, ensuring that cells are gassing freely. Maintain charge rate slightly below heavy gassing.	If specific gravity does not recover to 1.240 in 25 hours of charging, replace battery (WP 0103 00). Refer to TM 9-6140-200-14.
3. Engine Will Not Crank.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Inspect batteries. a. Visually inspect batteries for cracks, leaks and corroded or broken terminal posts.	1. Replace any cracked, leaking, corroded or broken batteries or batteries with loose or broken terminal posts (WP 0103 00). Refer to TM 9-6140-200-14. 2. Clean corroded terminal posts.

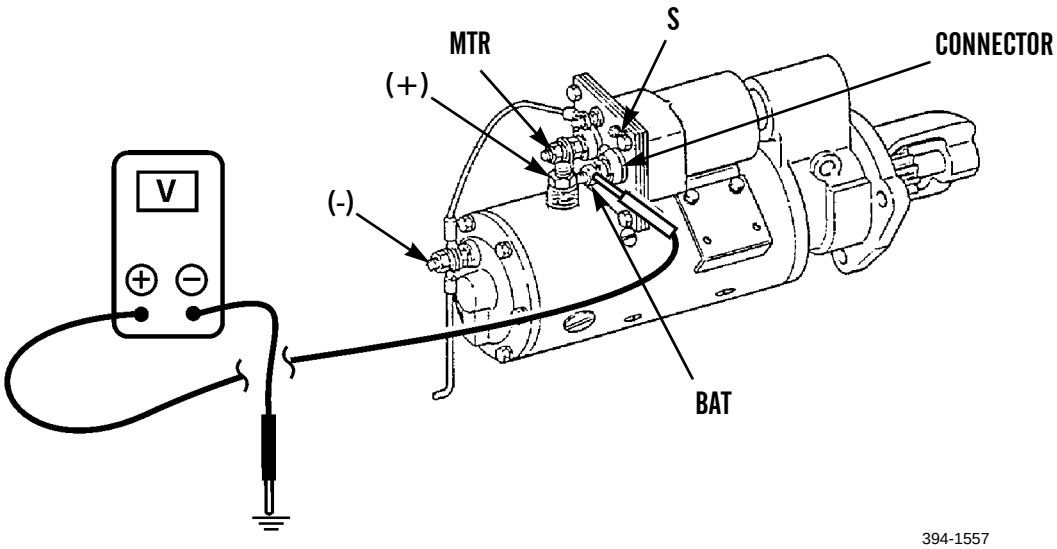
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Engine Will Not Crank - Continued.	b. Check for loose, broken or worn terminals and cables.	1. Tighten any loose terminal or cable (WP 0103 00). 2. Replace any terminal or cable that is broken or worn (WP 0104 00).
	NOTE Perform Steps c and d for maintainable batteries only.	
	c. Check electrolyte level in each battery cell (TM 9-6410-200-10).	1. If needed, fill each cell to fill ring with distilled water. 2. If level of water is OK, go to Step d.
	d. Perform specific gravity test (TM 9-6410-200-14). Batteries must test 1.240 or greater, temperature corrected, and each cell in battery must test within 25 points of others.	1. Charge all batteries not meeting requirements and recheck specific gravity. 2. If 25-point variation still exists, replace battery (WP 0103 00). 3. If specific gravity is OK, go to Step e.
	WARNING Touch terminal connections one at a time; never touch both terminals at once. Be sure not to be grounded to machine when checking. Failure to do so may cause serious personal injury or death.	
	e. Attempt to crank engine 15 seconds. Place battery disconnect switch in OFF position (TM 5-3805-248-10) and check battery terminal connections.	1. Tighten all loose connections at batteries. 2. Tighten all ground wires including back of starting motor. 3. Tighten battery positive wire at starter solenoid. 4. If connections OK, go to Test 2.
	2. Load test batteries.	1. If voltage drops below range specification in TM 9-6140-200-14, recharge batteries and repeat Test 2. 2. If problem still exists, replace battery(s) (WP 0103 00).
	a. Remove batteries (WP 0103 00). b. Load test batteries individually (TM 9-6140-200-14).	
	3. Test starting motor. Go to *Malfunction* 5.	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. All Tractor Electrical Systems Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Test battery disconnect switch for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect negative battery cable from battery (WP 0104 00). c. Disconnect cables from battery disconnect switch (WP 0074 00). d. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). e. Connect multimeter between battery disconnect switch terminals.	

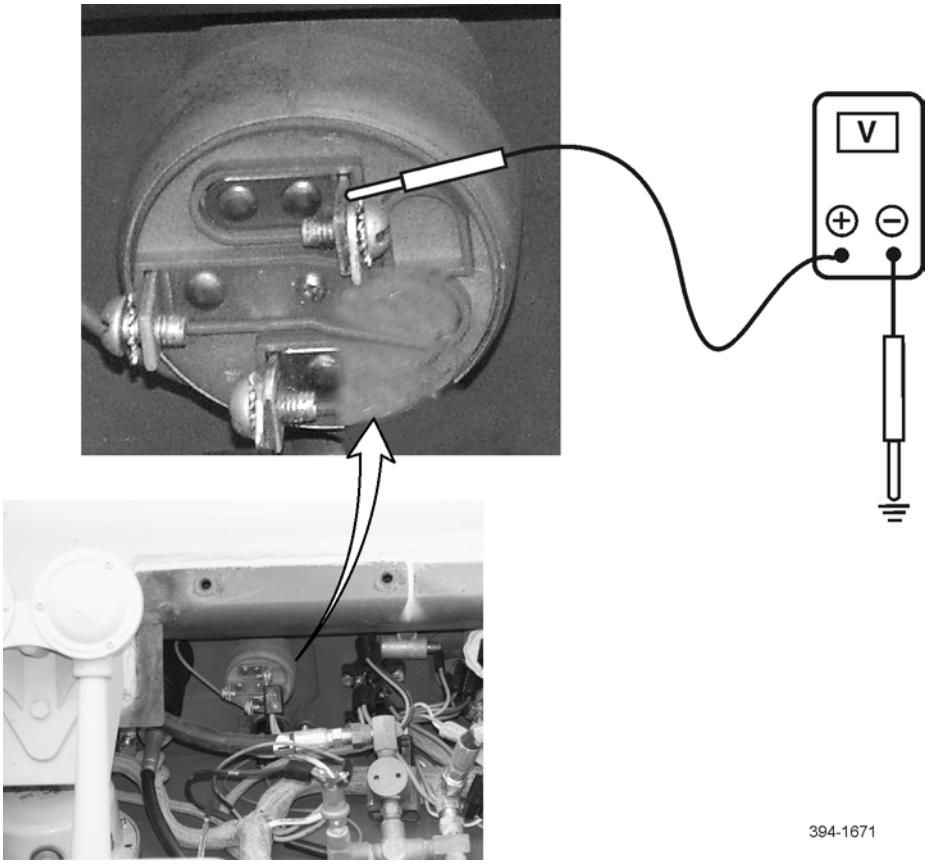


394-1556

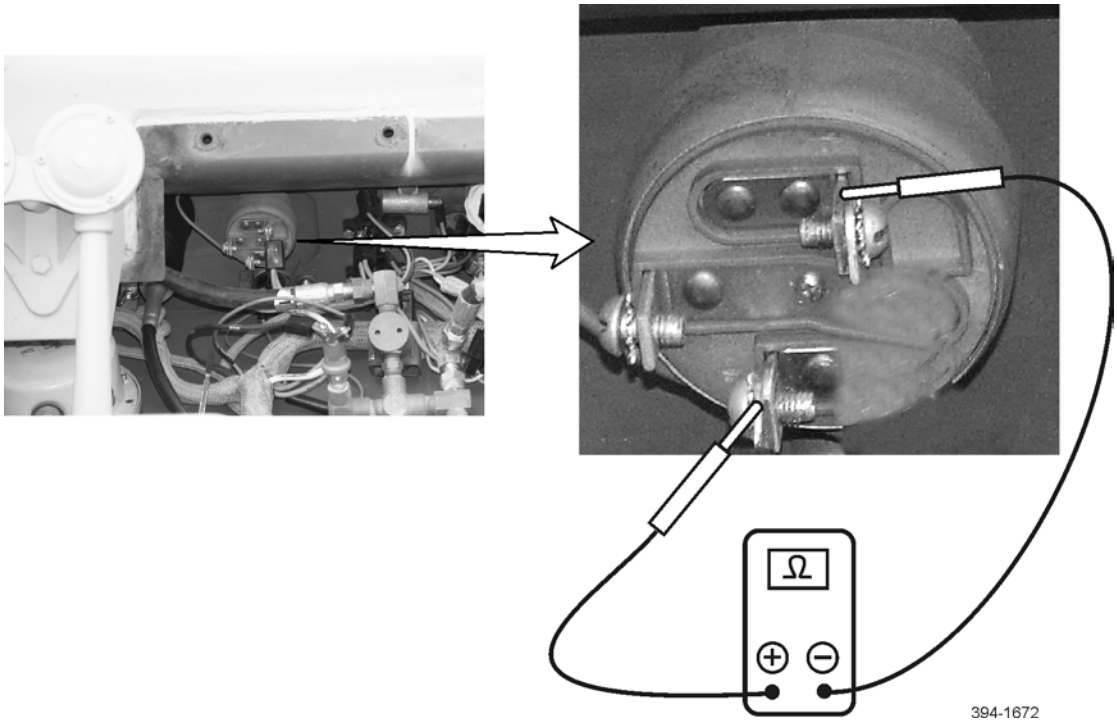
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. All Tractor Electrical Systems Inoperative - Continued.	f. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, replace battery disconnect switch (WP 0074 00). 2. If continuity is indicated, go to Test 2.
	2. Check connection of battery cables and condition of terminals. Make sure cables are correctly connected to batteries, starter and chassis ground (WP 0103 00).	1. Clean and/or reconnect battery cables if necessary. 2. If connections are OK, go to *Malfunction 3*.
5. Starting Motor Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	NOTE For detailed electrical diagram, refer to WP 0005 00.	
	1. Check solenoid operation.	
	a. Place battery disconnect switch in ON position (TM 5-3805-248-10). Turn start switch fully clockwise and listen for starter solenoid to energize.	1. If click of starter solenoid energizing is heard, go to Step b. 2. If click of solenoid is not heard, go to Test 2.
	b. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	c. Inspect starting motor-to-solenoid L-connector (WP 0018 00).	1. If broken, replace connector (WP 0057 00). 2. If connector OK, go to Step d.
	d. Inspect and clean ground connections on back of starter and tighten nut.	If starter is still inoperative, replace starting motor (WP 0103 00).

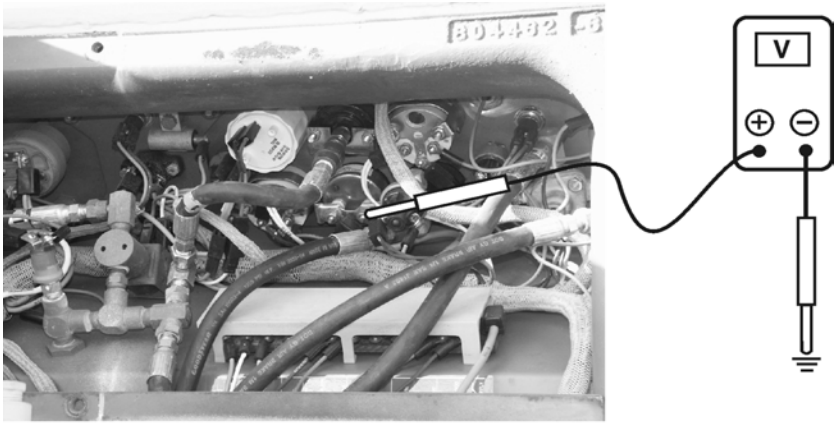
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Starting Motor Inoperative - Continued.	2. Test starter circuit source voltage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to "BAT" terminal on solenoid and multimeter negative lead to chassis ground.	
	 394-1557	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is indicated, go to Test 3. 2. If battery voltage is not indicated, go to Step e.
	e. Check battery connections. Go to *Malfunction 4*.	1. Repair or replace cable(s) between battery and starting motor (WP 0018 00). 2. If connection OK, go to Step f.
	f. Test battery disconnect switch.	1. Go to *Malfunction* 4. 2. If battery disconnect switch OK, replace starting motor (WP 0057 00).

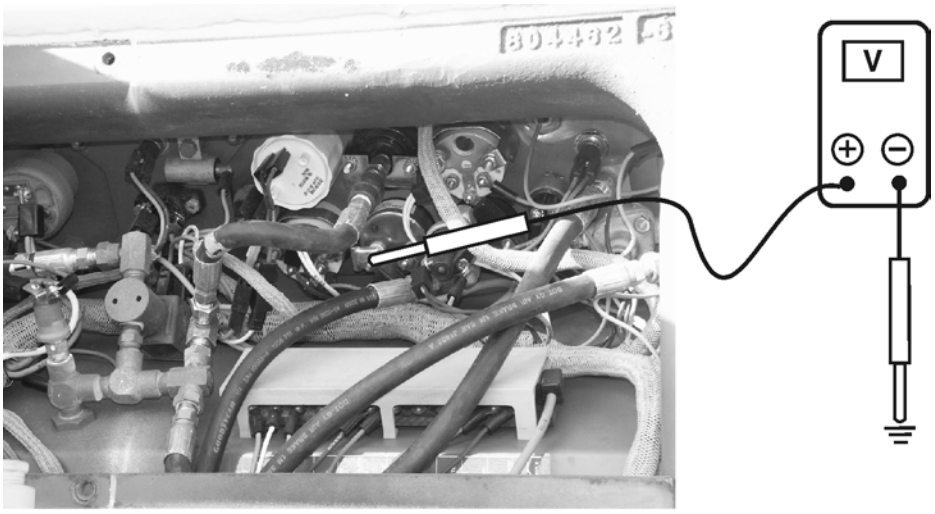
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Starting Motor Inoperative - Continued.	3. Test voltage to start switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to orange wire on start switch and multimeter negative lead to chassis ground.	



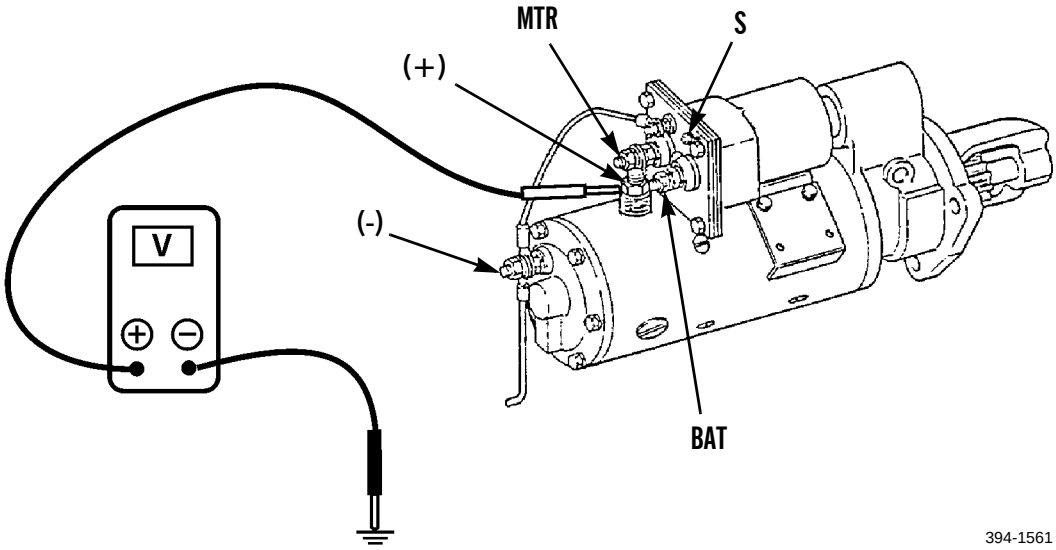
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Starting Motor Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading. 4. Test engine start switch for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect all wires from engine start switch (WP 0068 00). c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter as shown.	1. If battery voltage is indicated, go to Test 4. 2. If battery voltage is not indicated, go to Test 5.

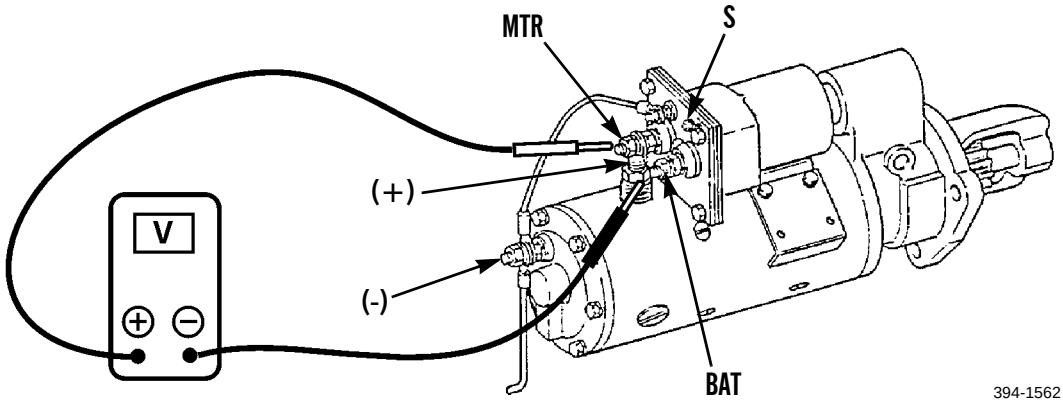


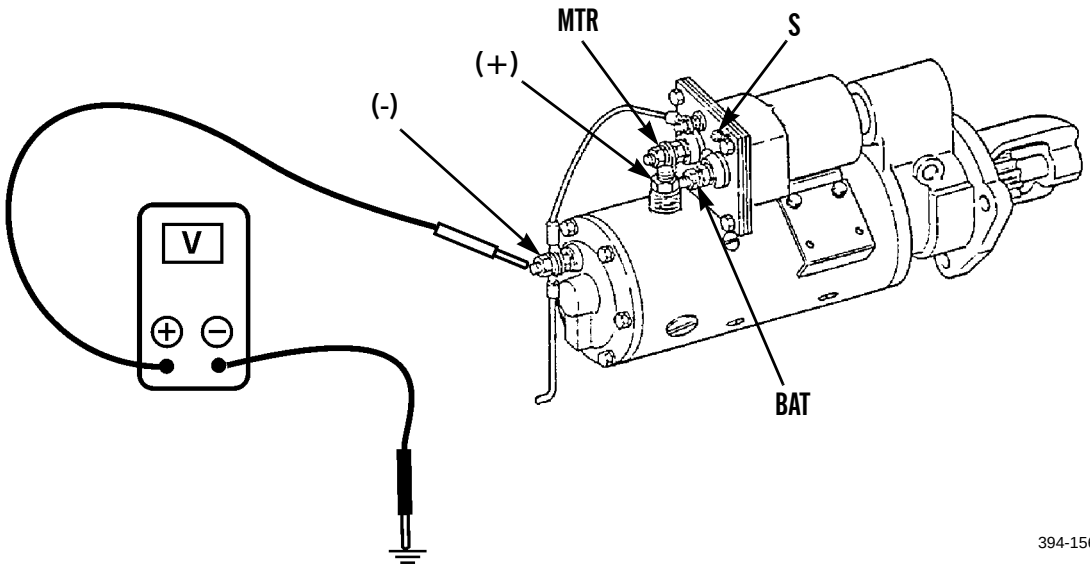
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Starting Motor Inoperative - Continued.	e. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	
	f. Turn start switch fully clockwise.	1. If continuity is indicated, repair open circuit between engine start switch and starting motor (WP 0018 00). 2. If continuity is indicated and wiring is OK, replace starting motor (WP 0057 00). 3. If continuity is not indicated, replace engine start switch (WP 0068 00).
	5. Test for voltage to ammeter. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to red wire on back of ammeter and multimeter negative lead to chassis ground.	
	 394-1621	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If voltage is indicated, go to Test 6. 2. If voltage is not indicated, repair open circuit between ammeter and starting motor (WP 0018 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Starting Motor Inoperative - Continued.	6. Test for voltage from ammeter. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to orange wire on back of ammeter and multimeter negative lead to chassis ground.	
	 394-1620	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If voltage is indicated, repair open circuit between ammeter and start switch. 2. If voltage is not indicated, replace ammeter (WP 0059 00).

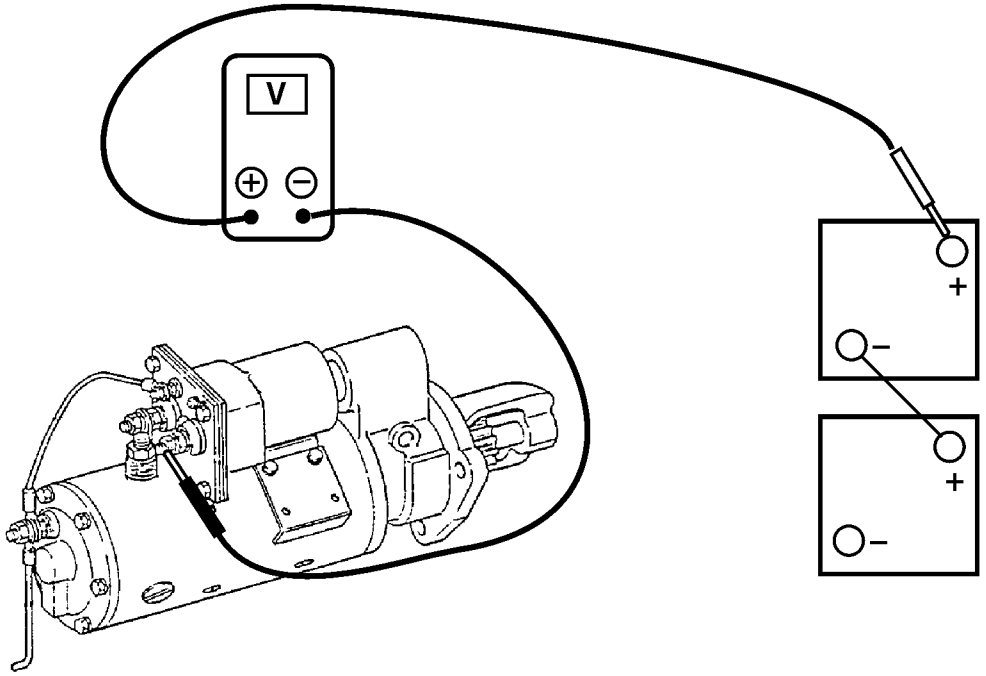
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	NOTE For detailed electrical diagram, refer to WP 0005 00.	
	1. Check batteries for overheating. a. Pull accelerator pedal past detent to prevent engine from starting and crank engine for 15 seconds (TM 5-3805-248-10).	
	WARNING Touch terminal connections one at a time; never touch both terminals at once. Be sure not to be grounded to machine when checking. Failure to follow these instructions may cause injury or death.	
	b. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	c. Feel battery terminal connections.	1. If battery terminal(s) are hot, clean corroded connection(s) and tighten all loose connections at batteries, ground and starter. 2. If problem still exists, go to Test 2.
	2. Test specific gravity for each maintainable battery. Go to Table 6, *Malfunction 1*, and perform Test 1.	1. Correct as indicated in *Malfunction 1*. 2. If problem still exists, go to Test 3.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly. Continued.	3. Test starting motor voltage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to positive terminal on starting motor and negative multimeter lead to chassis ground.	
	 394-1561	
	d. Pull accelerator pedal past detent to prevent engine from starting. Crank engine and observe voltage reading on meter. Voltage should not go below 22 volts (TM 5-3805-248-10).	1. If voltage is low, place battery disconnect switch in OFF position (TM 5-3805-248-10). Clean and tighten starting motor terminal connections. 2. If problem still exists, go to Test 4.
	4. Perform voltage drop test on starting motor-to-solenoid connector (WP 0018 00). a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter negative lead to "+" terminal on starting motor and multimeter positive lead to MTR terminal on solenoid.	

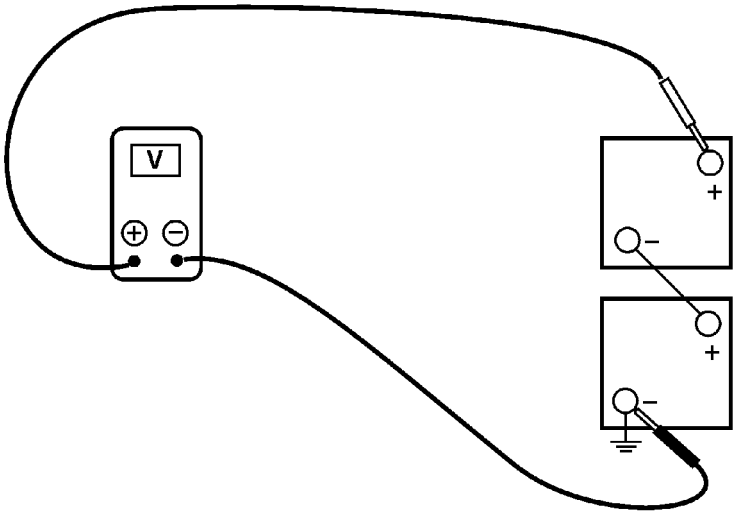
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly. Continued.		
		
	d. Pull accelerator pedal past detent to prevent engine from starting, and crank engine and observe meter (TM 5-3805-248-10).	1. If voltage reading exceeds 0.1 volt, place battery disconnect switch in OFF position (TM 5-3805-248-10). Clean and tighten or replace starting motor-to-solenoid connections. 2. If problem still exists, go to Test 5.
	5. Perform voltage drop test on solenoid contactors (WP 0250 00). a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to solenoid BAT terminal and multimeter negative lead to solenoid MTR terminal.	
	d. Pull accelerator pedal detent to prevent engine from starting and crank engine and observe meter (TM 5-3805-248-10).	1. If voltage reading is 0.4 volts or below, replace starting motor (WP 0057 00). 2. If problem still exists, go to Test 6.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly. Continued.	6. Test negative cable voltage drop from batteries to starting motor (WP 0018 00). a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to negative terminal on starting motor and multimeter negative lead to chassis ground.	
	 394-1564	
	d. Pull accelerator pedal past detent to prevent engine from starting and crank engine and observe meter (TM 5-3805-248-10).	1. If voltage exceeds 0.4 volts, clean and tighten cable connections at batteries, starting motor and chassis ground points. 2. If problem still exists, go to Test 7.
	7. Test positive cable voltage drop from batteries to solenoid. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	

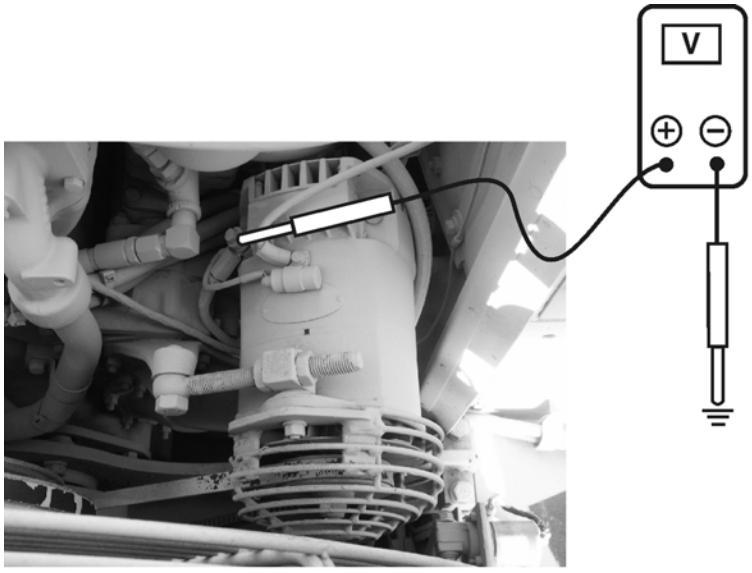
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly. Continued.	c. Connect multimeter positive lead to battery positive terminal and multimeter negative lead to solenoid BAT terminal.	



394-1565

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Engine Cranks Slowly. Continued.	d. Pull accelerator pedal past detent to prevent engine from starting and crank engine and observe multimeter (TM 5-3805-248-10). e. Connect multimeter lead directly across battery terminals as shown.	1. If voltage exceeds 0.4 volts, clean and tighten cable connections at batteries, starting motor and chassis ground points. 2. If problem still exists, go to Step e.
	 394-1566	
	f. Pull accelerator pedal past detent to prevent engine from starting and crank engine for approximately 30 seconds. Observe multimeter reading after cranking has stopped.	1. If voltage is not 20 volts or more, go to *Malfunction 2*. 2. If voltage is satisfactory, replace starting motor (WP 0057 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Batteries Run Down in Service.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	1. Check for loose, broken or missing alternator belts.	1. Adjust loose belts (WP 0056 00). 2. Replace broken or missing belts (WP 0056 00). 3. If belts OK, go to Test 2. Correct as indicated in *Malfunction 1*.
	2. Test charging voltage. Go to *Malfunction 1*.	
8. No Alternator Output.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	1. Check for loose, broken or missing alternator belts.	1. Adjust loose belts (WP 0056 00). 2. Replace broken or missing belts (WP 0056 00). 3. If belts OK, go to Test 2.
	2. Test alternator circuit voltage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. No Alternator Output - Continued.	c. Connect multimeter positive lead to orange wire on alternator positive terminal and multimeter negative lead to chassis ground.	
	 394-1567	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair or replace alternator-to-ammeter wiring (WP 0018 00). 2. If battery voltage is indicated, go to Test 3.
	3. Check alternator ground for continuity (WP 0018 00).	1. If no continuity is indicated, repair ground (WP 0018 00). 2. If continuity is indicated, replace alternator (WP 0055 00).

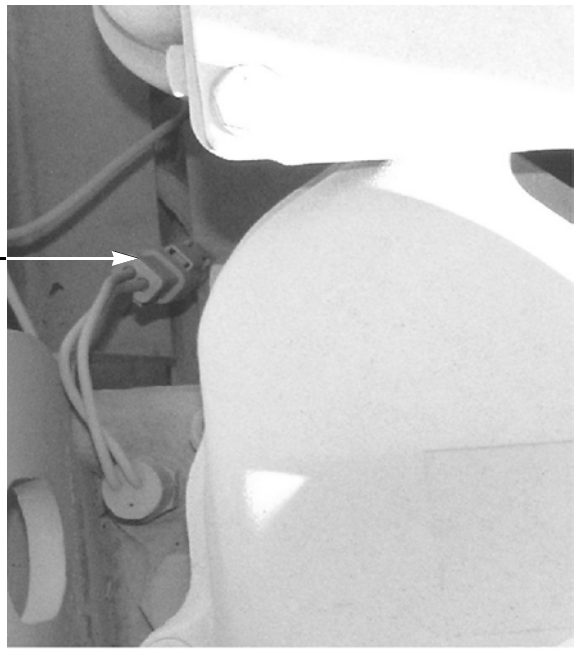
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Alternator Output Low (Ammeter Reading in Red Zone).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check for loose, broken or missing alternator belts. 2. Test charging voltage. Go to *Malfunction* 1.	1. Adjust loose belts (WP 0056 00). 2. Replace broken or missing belts (WP 0056 00). 3. If problem still exists, go to Test 2. Correct as indicated in *Malfunction 1*.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Alternator Charge Too High (Ammeter in High Green Zone).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Test charging voltage. Go to *Malfunction 1*. 2. Check alternator for overheating. a. Run engine for approximately 10 minutes.	
	WARNING Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury. b. With engine off, check alternator for high temperature by holding hand near alternator. c. Start engine.	If alternator is hot, place battery disconnect switch in OFF position (TM 5-3805-248-10) and allow alternator to cool. If ammeter returns to high green zone, and alternator heats up again, replace alternator (WP 0056 00).

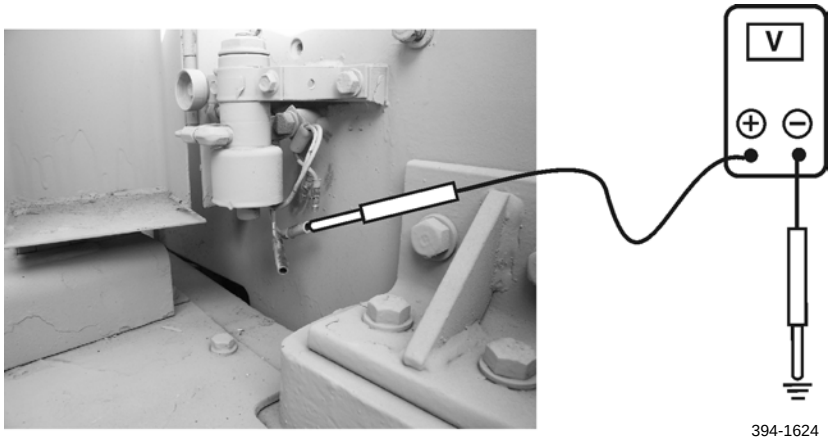
END OF WORK PACKAGE

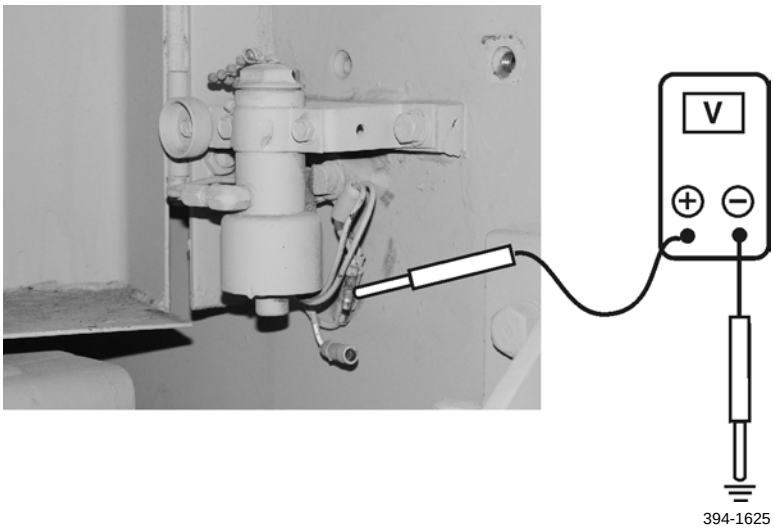
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Backup Alarm, Defroster, Windshield Wiper, Heater Motor, Floodlamp Back-Up Alarm, Low Air Alarm/ Light and Ether Starting Aid Are All Inoperative	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** • For detailed electrical diagram, refer to WP 0005 00. • The first things that should be done prior to any of following checks is to reset main circuit breaker. Press red button to reset. • If problem still exists after these checks, proceed to appropriate troubleshooting section for each individual component. 1. Verify that machine starts (TM 5-3805-248-10).	1. If machine starts, repair open circuit between fuse box and ammeter. 2. If machine does not start, go to Malfunction 3.
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative).	**WARNING** • Ether is extremely flammable and toxic. DO NOT smoke and make sure you are in a well ventilated area away from heat, open flames, or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if either is inhaled or causes eye irritation. Failure to follow this warning may cause injury or death. • Ether canister must be removed prior to testing. Failure to follow this warning could result in injury or death. 1. Check to see if there is ether in cylinder.	1. If empty, replace cylinder (WP 0039 00). 2. If ether cylinder is OK, go to Test 2.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative) - Continued.	2. Bypass ether start sender switch. **NOTE** Engine must be cooler than 100°F (38°C) for this test. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect ether start sender switch. c. Using a jumper wire, connect one end to ether start sender switch harness and other end to chassis ground.	

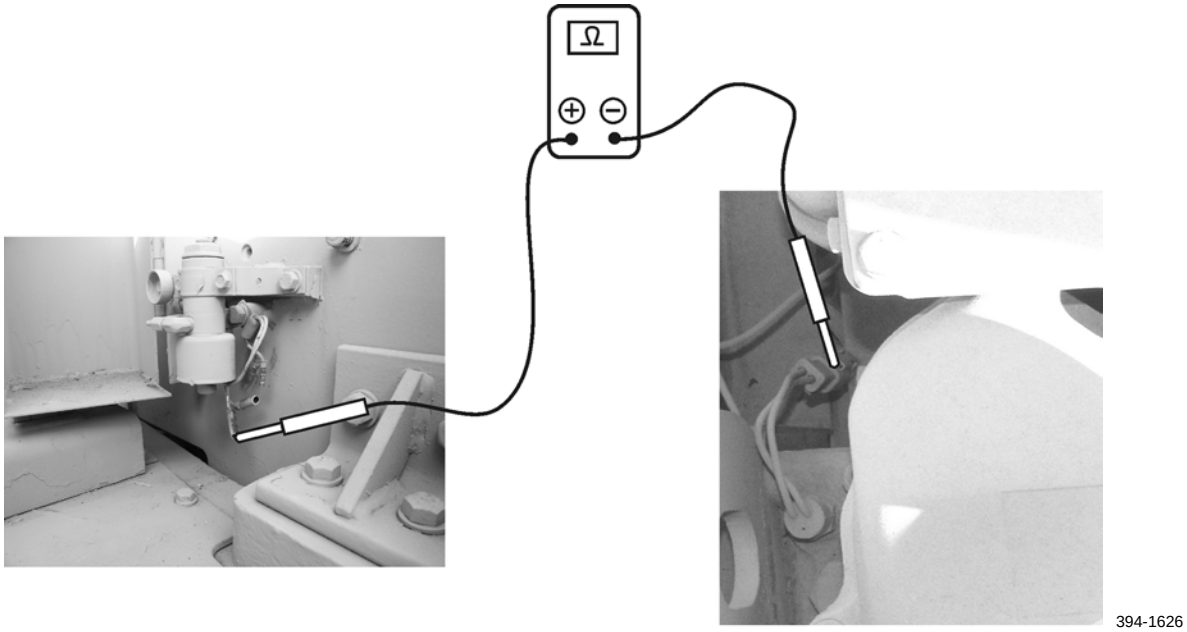


394-1623

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative) - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	
	e. Press ether start switch (TM 5-3805-248-10).	1. If starting aid operates, replace ether start sender switch (WP 0098 00). 2. If problem still exists, go to Test 3.
	3. Check for voltage at solenoid valve. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect solenoid valve. c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter positive lead to purple wire (harness side) and multimeter negative lead to chassis ground.	
	 394-1624	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	

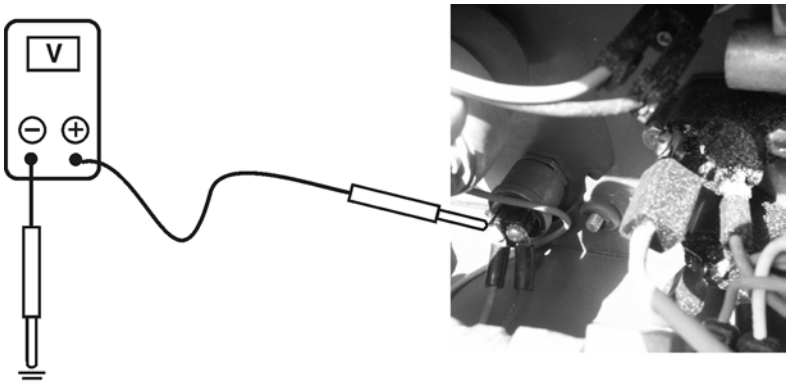
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative) - Continued.	f. Observe multimeter while pressing ether starting aid switch.	1. If voltage is present, reconnect purple wire and go to Step g. 2. If no voltage present, go to Test 5.
	g. Connect multimeter positive lead to white wire (solenoid side) and multimeter negative lead to chassis ground.	1. If voltage is present, go to Test 4. 2. If no voltage is present, replace ether solenoid valve (WP 0039 00).
	 394-1625	
	4. Check for continuity to ether start sender switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range.	
	c. Connect multimeter positive lead to white wire at solenoid valve (harness side) and multimeter negative lead to white wire at ether start sender switch (harness side).	1. If continuity is indicated, replace ether solenoid valve (WP 0039 00). 2. If no continuity is indicated, repair open circuit white wire (WP 0018 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks But Fails To Start In Cold Weather (Ether Starting Aid Inoperative) - Continued.		



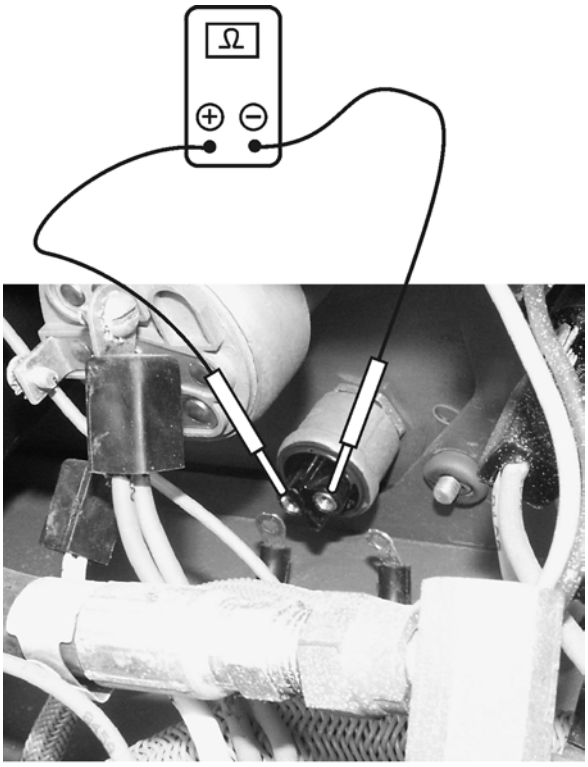
394-1626

5. Check for voltage to ether start switch.
   a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).
   b. Set multimeter to appropriate voltage range (WP 0018 00).
   c. Connect multimeter positive lead to orange wire (harness side) and multimeter negative lead to chassis ground.



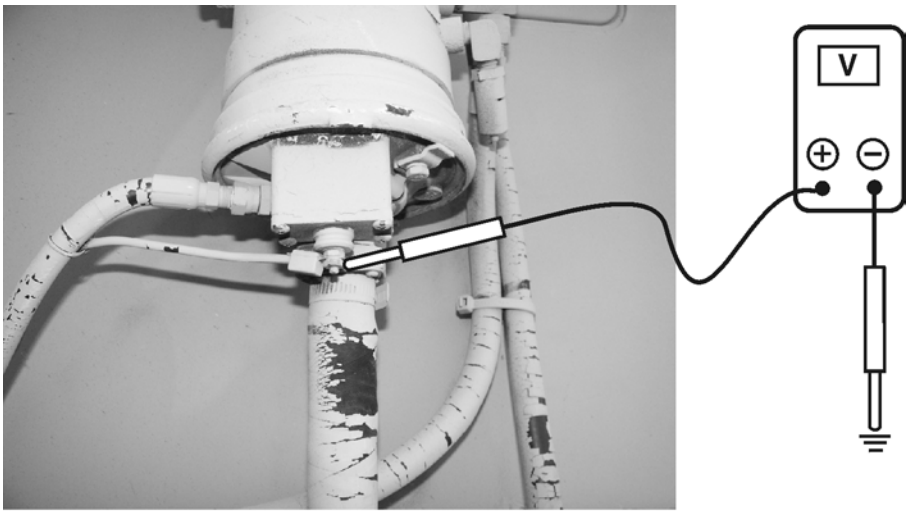
394-1627

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative) - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10). 6. Test ether start switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm range (WP 0018 00). c. Disconnect ether start switch electrical connectors (WP 0062 00). d. Connect multimeter positive lead to terminal that purple wire was removed from (switch side) and multimeter negative lead to terminal that orange wire was removed from (switch side).	1. If battery voltage is present, go to Test 6. 2. If no voltage is present, repair open circuit between fuse number 2 and ether start switch.



394-1628

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Engine Cranks but Fails to Start in Cold Weather (Ether Starting Aid Inoperative) - Continued.	e. Observe multimeter while pressing ether start switch.	1. If continuity is indicated, repair open circuit between ether start switch and ether solenoid valve (WP 0018 00). 2. If no continuity is indicated, replace ether start switch (WP 0062 00). 3. If problem still exists, go to *Engine Troubleshooting* (WP 0009 00).
3. Air Dryer Heater Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Inspect fuse #6 on reverse side of instrument panel.	1. If fuse is blown, replace (WP 0075 00). 2. If fuse blows again, check for short to ground between fuse box and air dryer and repair as necessary (WP 0018 00). 3. If wiring is OK, replace air dryer (WP 0152 00). 4. If fuse is OK, go to Test 2.

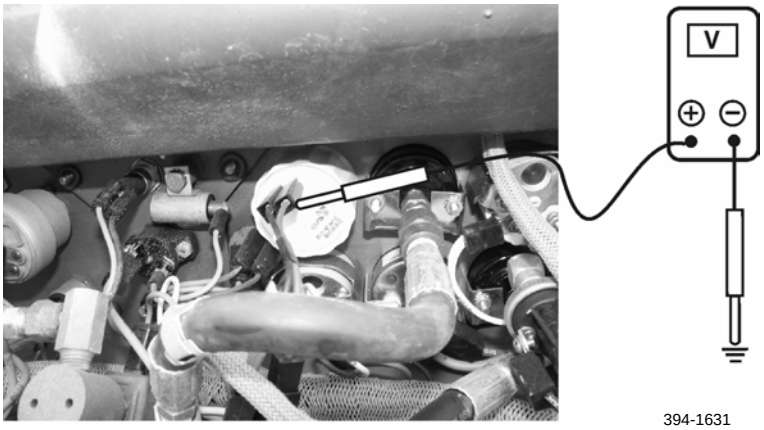
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Air Dryer Heater Is Inoperative - Continued.	2. Check for voltage at air dryer. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to terminal on air dryer and multimeter negative lead to chassis ground.	
	 394-1629	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is present, replace air dryer (WP 0152 00). 2. If no voltage is present, go to Test 3.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Air Dryer Heater Is Inoperative - Continued.	3. Check for voltage to air dryer harness. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Locate and disconnect spade connector (beneath alternator). c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter positive lead to harness side of connector and multimeter black lead to chassis ground.	
	 394-1630	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If voltage is present, replace wire from male spade connector to air dryer (WP 0116 00). 2. If no voltage is present, repair wire from fuse panel to female spade connector (WP 0018 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Low Air Pressure Warning Light Always on (Air Pressure OK).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Disconnect low air pressure warning lamp switch (WP 0094 00).	1. If light goes out, replace low air pressure warning lamp switch (WP 0094 00). 2. If light stays on, repair short to ground between low air pressure warning lamp switch and low air pressure warning lamp.

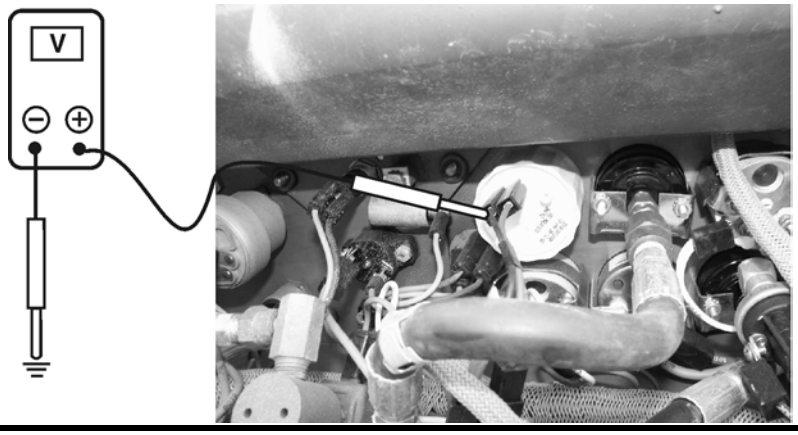
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Supplemental Steering Warning Lamp Always On (Hydraulic Pressure OK).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Disconnect supplemental steering pump switch electrical connections (WP 0364 00).	1. If light goes out, replace supplemental steering pump switch (WP 0364 00). 2. If light stays on, repair short to ground between supplemental steering pump switch and supplemental steering pump warning lamp.
6. Hour Meter Is Inoperative.	1. Verify correct operation of coolant temperature gage and converter/ retarder temperature gage. 2. Check for voltage to hour meter. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	1. If either one inoperative, service those items first. Refer to appropriate *Malfunction*. 2. If both OK, go to Test 2.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Hour Meter Is Inoperative - Continued.	c. Connect multimeter positive lead to red wire on hour meter and multimeter negative lead to chassis ground.	



394-1631

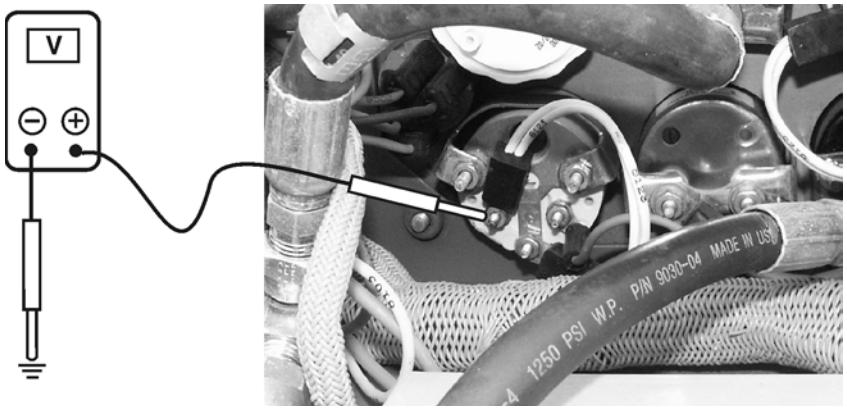
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	1. If battery voltage is not indicated, repair open circuit between converter/retarder temperature gage and servicemeter (WP 0018 00). 2. If battery voltage is indicated, go to Test 3.
	3. Check for voltage to hour meter switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to green wire on hour meter switch and multimeter negative lead to chassis ground.	



394-1632

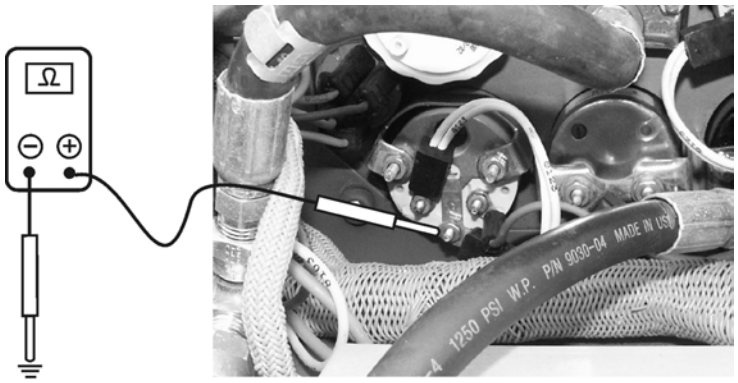
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Hour Meter Is Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	1. If battery voltage is indicated, replace hour meter switch (WP 0085 00). 2. If battery voltage is not indicated, repair open circuit between hour meter and hour meter switch, or between hour meter switch and coolant temperature gage (WP 0018 00). 3. If problem still exists, replace hour meter.
7. Converter/Retarder Temperature Gage Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Verify correct operation of coolant temperature gage. 2. Check for voltage to converter/ retarder temperature gage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	If coolant temperature gage is inoperative, service it first. Go to *Malfunction 18.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Converter/Retarder Temperature Gage Is Inoperative - Continued.	c. Connect multimeter positive lead to white wire on converter/retarder temperature gage and multimeter negative lead to chassis ground.	



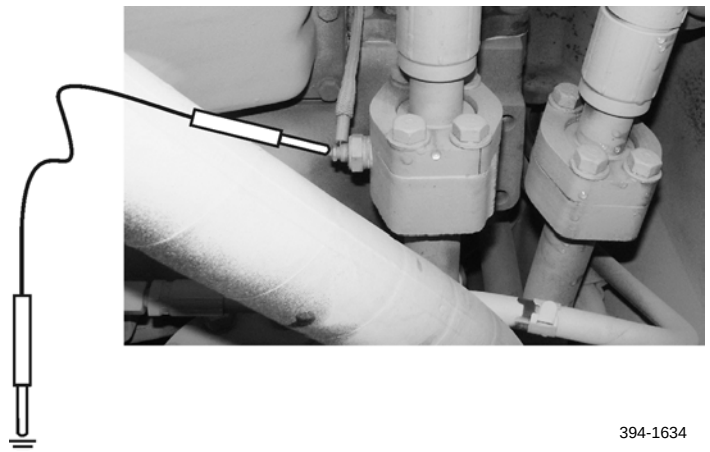
394-1633

	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	1. If battery voltage is not indicated, repair open circuit between coolant temperature gage and converter/retarder temperature gage (WP 0018 00). 2. If battery voltage is indicated, go to Test 3.
	3. Check for continuity to ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Connect multimeter positive lead to black wire on converter/retarder temperature gage (harness side) and multimeter negative lead to chassis ground.	



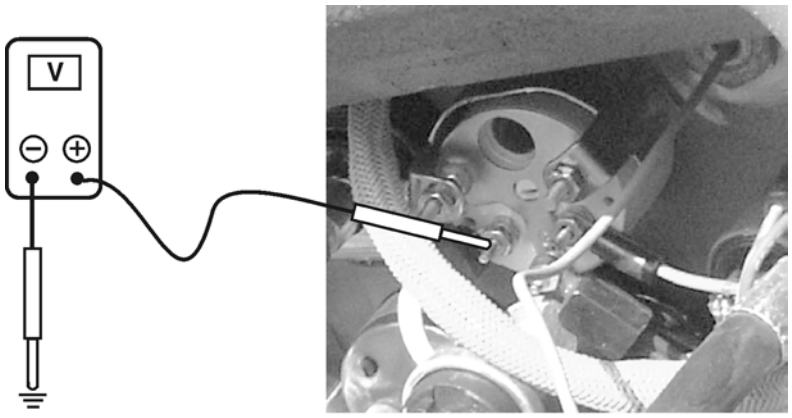
394-1634

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Converter/Retarder Temperature Gage Is Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	1. If no continuity is indicated, repair open circuit between converter/retarder temperature gage and ground (WP 0018 00). 2. If continuity is indicated, go to Test 4.
	4. Bypass converter/retarder temperature switch. **NOTE** Make sure engine is not hot. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	b. Jumper converter/retarder temperature switch electrical connector to chassis ground while observing converter/retarder temperature gage.	1. If converter/retarder temperature gage indicates max reading, replace converter/retarder temperature switch (WP 0093 00). 2. If converter/retarder temperature gage does not move, replace converter/retarder temperature gage (WP 0058 00).
	c. Place battery disconnect switch in ON position (TM 5-3805-248-10).	
	d. Jumper converter/retarder temperature switch electrical connector to chassis ground while observing converter/retarder temperature gage.	1. If converter/retarder temperature gage indicates max reading, replace converter/retarder temperature switch (WP 0093 00). 2. If converter/retarder temperature gage does not move, replace converter/retarder temperature gage (WP 0058 00).

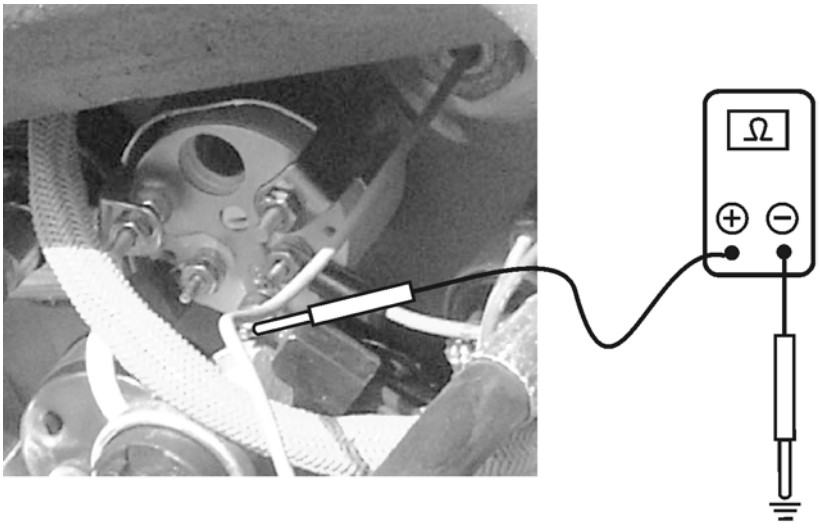


394-1634

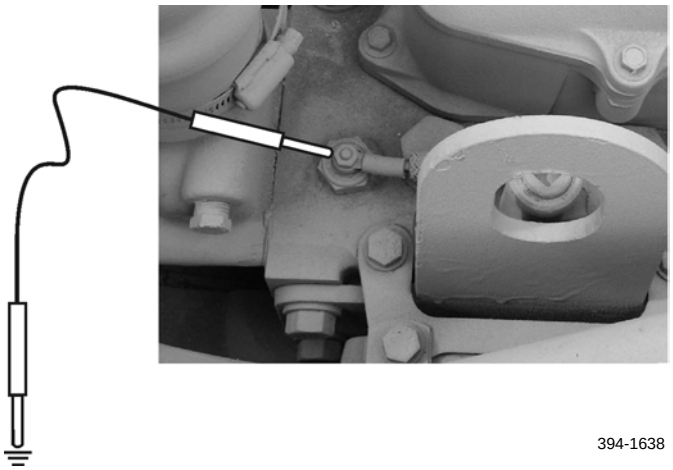
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Coolant Temperature Gage Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check for voltage to coolant temperature gage. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to white wire on coolant temperature gage and multimeter negative lead to chassis ground.	



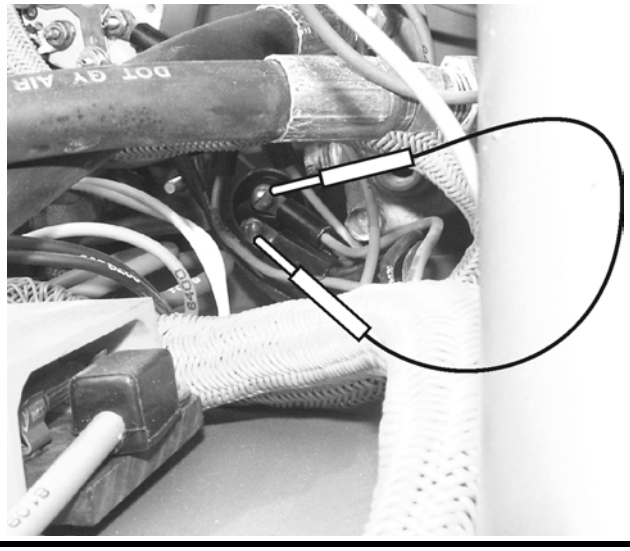
394-1634

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Coolant Temperature Gage Is Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	1. If battery voltage is not indicated, repair open circuit between coolant temperature gage and fuse box (WP 0018 00). 2. If battery voltage is indicated, go to Test 2.
	2. Check for continuity to ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect coolant temperature gage electrical connections (WP 0069 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). d. Connect multimeter positive lead to black wire from coolant temperature gage (harness side) and multimeter negative lead to chassis ground.	
	 394-1637	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10) and observe multimeter reading.	If no continuity is indicated, repair open circuit between coolant temperature gage and converter/retarder temperature gage (WP 0018 00).

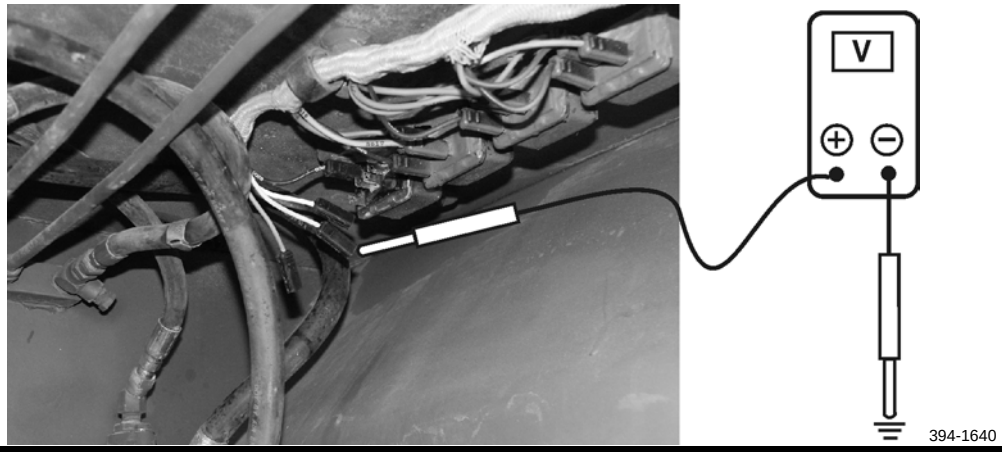
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Coolant Temperature Gage Is Inoperative - Continued.	f. Reconnect coolant temperature gage electrical connections (WP 0069 00). 3. Bypass water temperature sending unit. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Place battery disconnect switch in ON position (TM 5-3805-248-10). c. Use a jumper wire to touch water temperature sending unit electrical connector to chassis ground while observing coolant temperature gage.	If no continuity is indicated, go to Test 3. 1. If coolant temperature gage is all way into red, replace water temperature sending unit (WP 0093 00). 2. If coolant temperature gage does not move, replace coolant temperature gage (WP 0058 00).

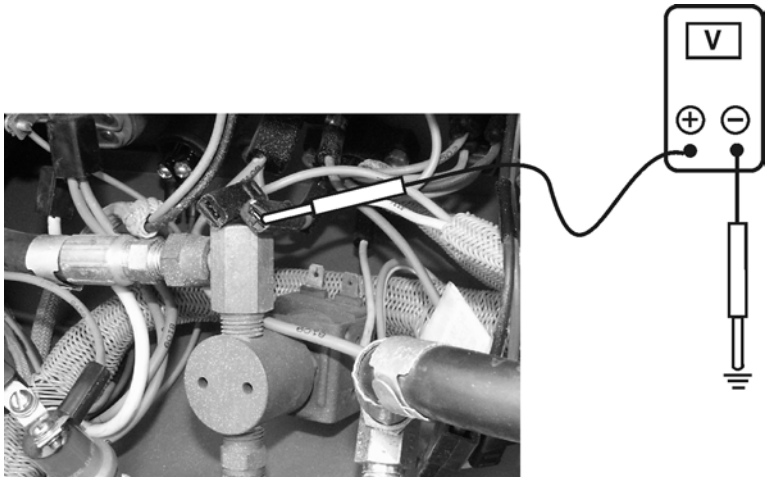


394-1638

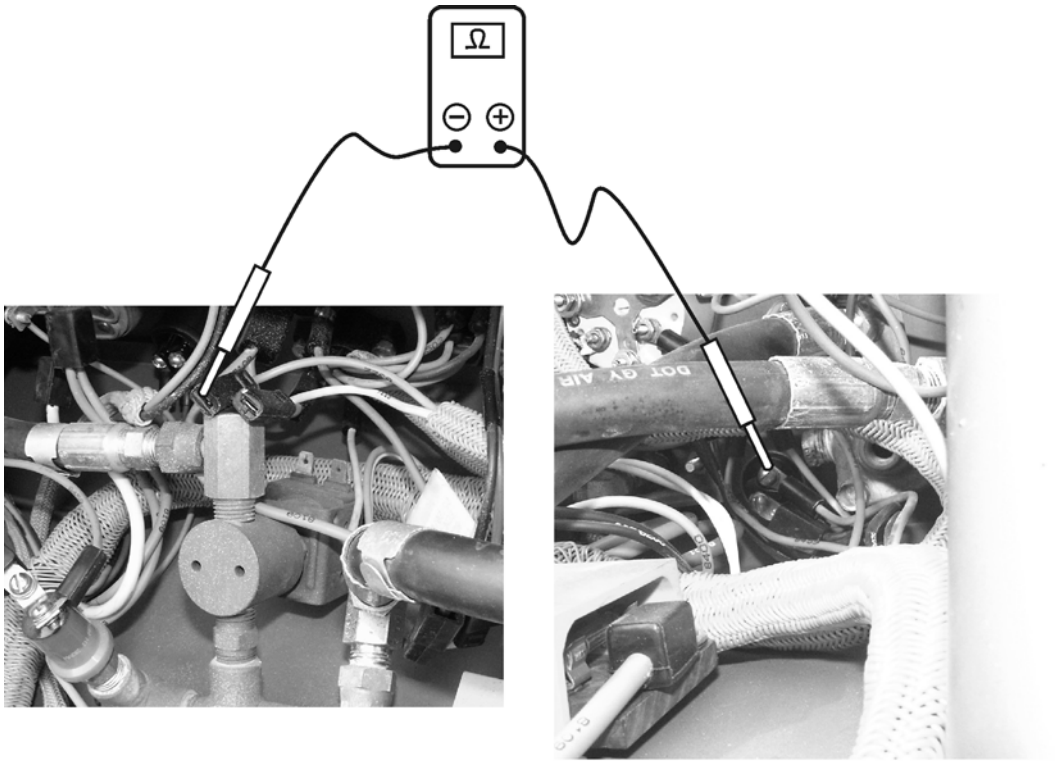
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Horn Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	NOTE For detailed electrical diagram, refer to WP 0005 00.	
	1. Check for air supply to air horn.	Go to *Brakes System Troubleshooting* (WP 0014 00).
	2. Make sure black out lights are not on continuously with light switch in OFF position. 3. Bypass horn switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Connect a jumper wire between two terminals of horn switch.	If blackout lights are on, go to *Malfunction 29,* otherwise go to Test 3.
	 394-1639	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Horn Is Inoperative - Continued.	c. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If horn sounds, replace switch (WP 0066 00). 2. If horn doesn't sound, leave jumper wire connected and go to Test 4.
	4. Bypass backup alarm/horn relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	NOTE Tag connectors before disconnecting to ensure proper connection.	
	b. Disconnect backup alarm/horn relay electrical connections (WP 0078 00). c. Connect a jumper wire between white wire of relay (harness side) and other end to yellow wire of relay (harness side).	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If horn sounds, replace relay (WP 0078 00). 2. If horn doesn't sound, leave jumper wire connected and go to Test 5.
	5. Check for voltage to backup alarm/ horn relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to yellow wire of backup alarm/horn relay (harness side) and meter negative lead to chassis ground.	

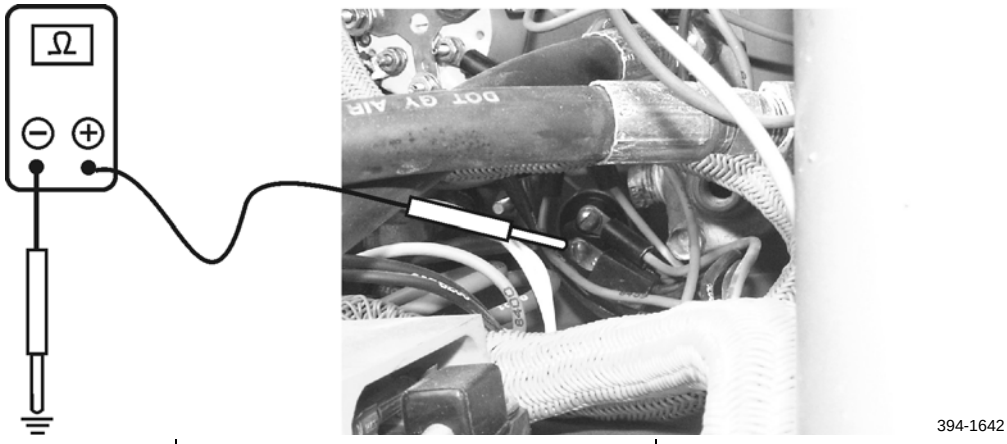


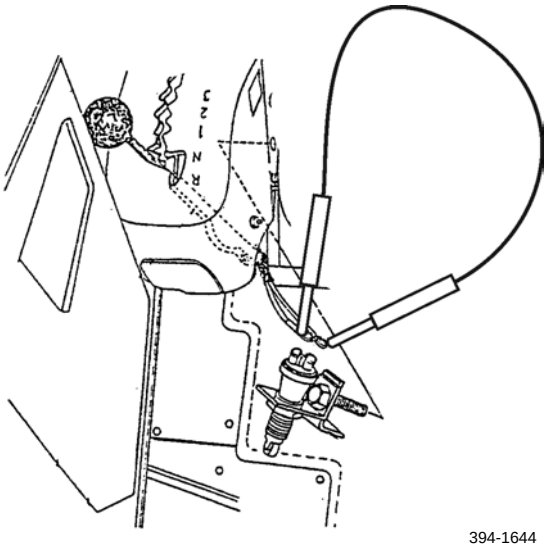
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Horn Is Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between backup alarm/horn relay and fuse box (WP 0018 00). 2. If battery voltage is indicated, go to Test 6.
	6. Check for voltage to horn solenoid. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Disconnect horn solenoid electrical connections (WP 0219 00). d. Connect multimeter positive lead to white wire of horn solenoid (harness side) and meter negative lead to chassis ground.	
	 394-1641	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between horn solenoid and backup alarm\horn relay (WP 0018 00). 2. If battery voltage is indicated, go to Test 7.
	7. Check for continuity between horn switch and horn solenoid. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	

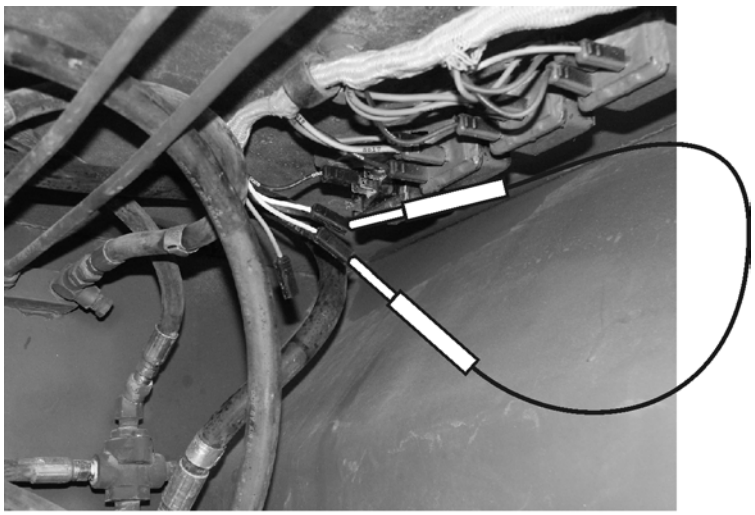
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Horn Is Inoperative - Continued.	b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect horn solenoid electrical connections (WP 0219 00). d. Connect multimeter positive lead to gray wire of horn solenoid (harness side) and meter negative lead to gray wire of horn switch (harness side).	1. If continuity is not indicated, repair open circuit between horn solenoid and horn switch (WP 0018 00). 2. If continuity is indicated, go to Test 8.
	8. Check for continuity between horn switch and ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	

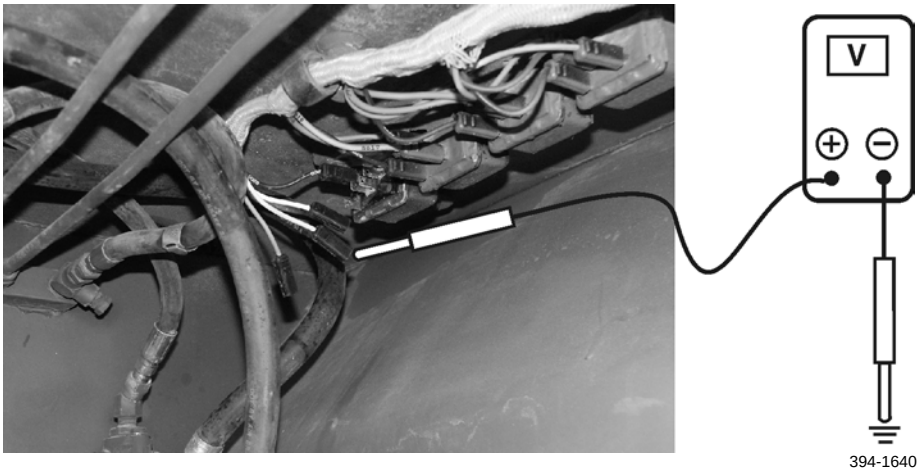


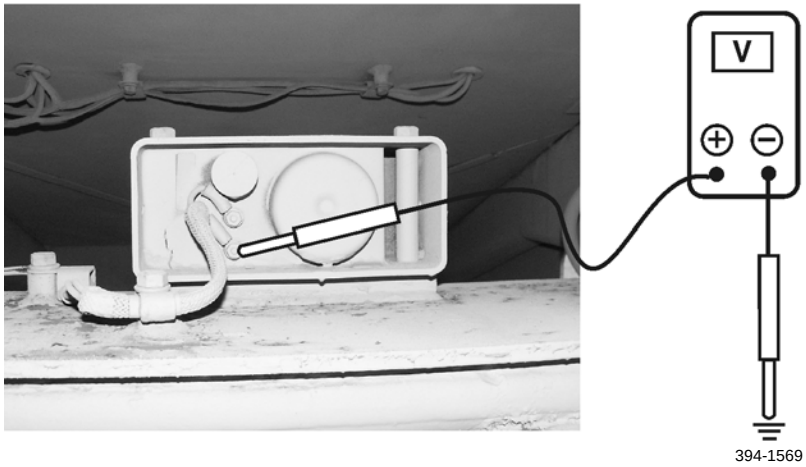
394-1643

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Horn Is Inoperative - Continued.	b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Connect multimeter positive lead to black wire of horn solenoid (harness side) and multimeter negative lead to chassis ground.	
		
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, repair open circuit between horn switch and ground (WP 0018 00). 2. If continuity is indicated, replace horn switch (WP 0066 00). 3. If problem still exists, replace horn solenoid (WP 0219 00).
10. Backup Alarm Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Make sure blackout lights are not on continuously with light switch in OFF position.	1. If blackout lights are on continuously, go to *Malfunction* 29. 2. If blackout lights are operating correctly, go to Test 2.

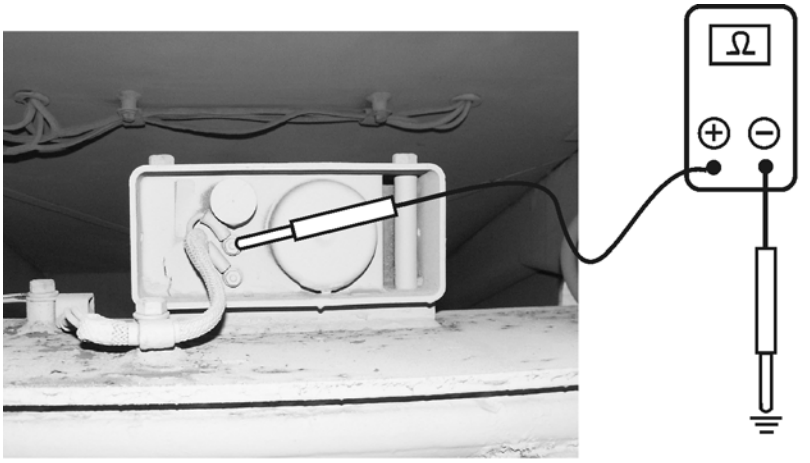
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Back-Up Alarm Is Inoperative - Continued.	2. Bypass backup alarm switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect backup alarm switch electrical connections (WP 0101 00). c. Connect a jumper wire between both backup alarm switch leads to each other (harness side).	
	 394-1644	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10). 3. Bypass backup alarm/horn relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	1. If alarm sounds, replace switch (WP 0101 00). 2. If alarm does not sound, leave jumper wire connected and go to Test 3.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Back-Up Alarm Is Inoperative - Continued.	b. Disconnect backup alarm relay electrical connections (WP 0078 00). c. Using a jumper wire, connect one end to white lead of relay (harness side) and other end to yellow lead of relay (harness side).	
	 394-1645	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If alarm sounds, replace relay (WP 0078 00). 2. If alarm doesn't sound, leave jumper wire connected and go to Test 4.
	4. Check for voltage to backup alarm relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Back-up Alarm Is Inoperative - Continued.	c. Connect multimeter positive lead to yellow wire of backup alarm relay (harness side) and multimeter negative lead to chassis ground.	
	 394-1640	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between fuse box and backup alarm relay (WP 0018 00). 2. If battery voltage is indicated, go to Test 5.
	5. Check for voltage to backup alarm switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to white wire on backup alarm switch (harness side) and multimeter negative lead to chassis ground.	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between backup alarm switch and backup alarm relay (WP 0018 00). 2. If battery voltage is indicated, go to Test 6.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Back-up Alarm Is Inoperative - Continued.	6. Check for voltage to backup alarm. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to black wire on backup alarm (harness side) and multimeter negative lead to chassis ground.	
		
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between backup alarm and backup alarm switch (WP 0018 00). 2. If battery voltage is indicated, go to Test 7.
	7. Check backup alarm ground circuit. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Connect multimeter positive lead to black and pink wire on backup alarm and multimeter negative lead to chassis ground.	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Back-up Alarm Is Inoperative - Continued.	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, repair open circuit between backup alarm and ground (WP 0018 00). 2. If continuity is indicated, replace backup alarm (WP 0100 00).



394-1570

11. Windshield Wiper Is Inoperative.

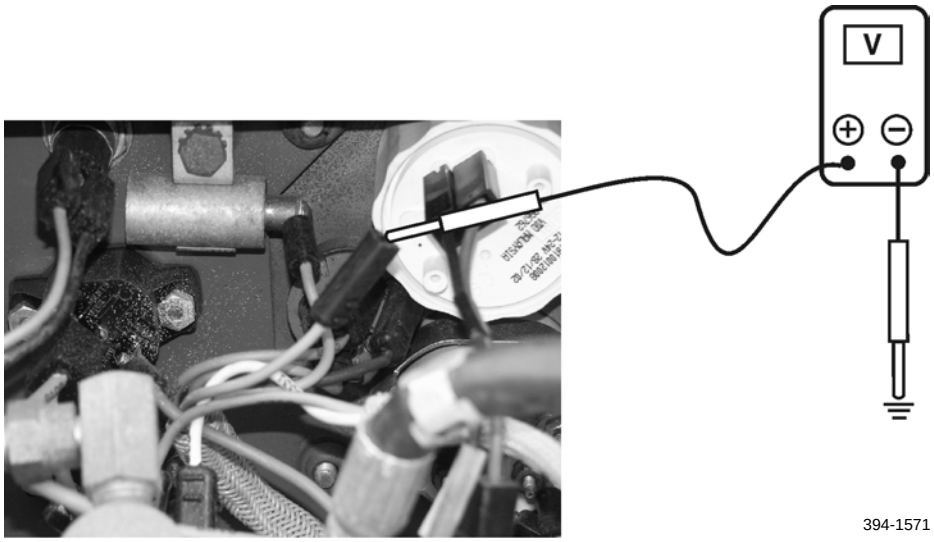
WARNING

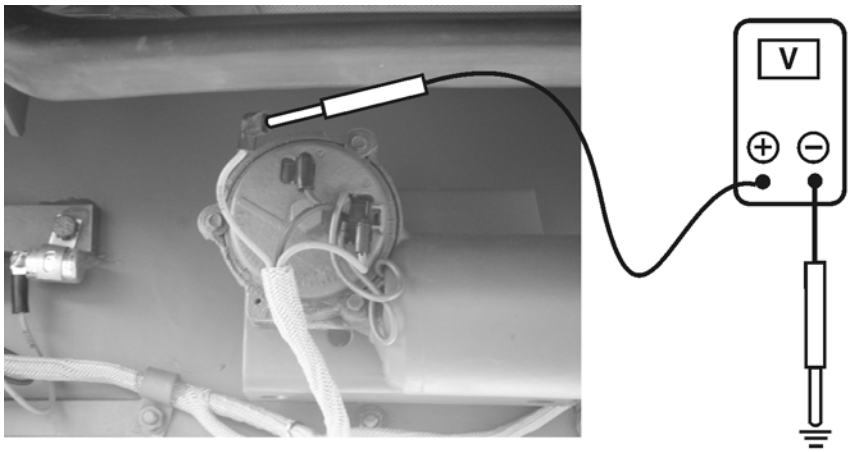
- Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death.
- Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.
- Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.

NOTE

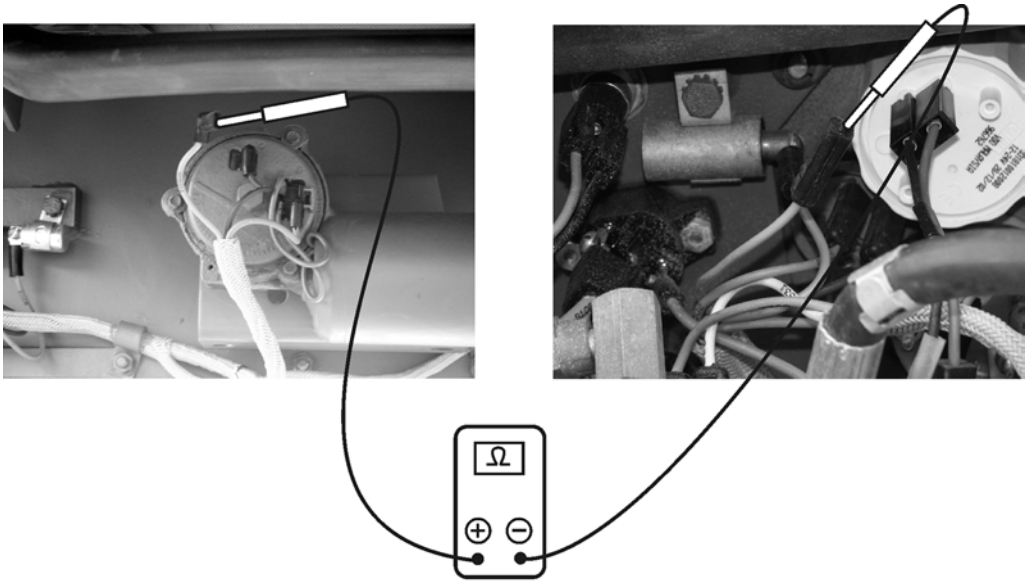
For detailed electrical diagram, refer to WP 0005 00.

1. Determine which speed(s) problem occurs in.	1. If inoperative in low and high speeds, go to Test 2. 2. If inoperative in low speed only, go to Test 4.

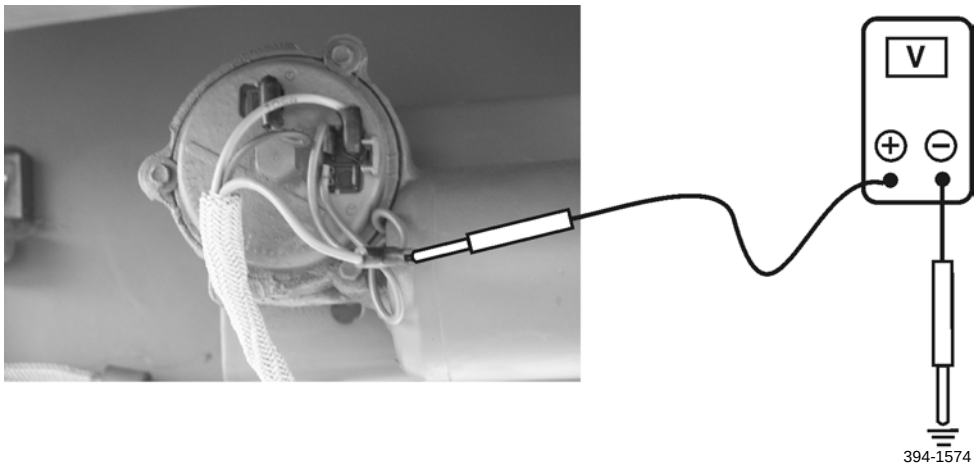
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Windshield Wiper Is Inoperative - Continued.		3. If inoperative in high speed only, go to Test 6.
	2. Check for voltage to wiper switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Disconnect wiper switch assembly gray lead (WP 0063 00). d. Connect multimeter positive lead to gray wire of wiper switch (harness side) and multimeter negative lead to chassis ground.	
	 394-1571	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between fuse box and wiper switch (WP 0018 00). 2. If battery voltage is indicated, make sure wiper motor has a good chassis ground (WP 0018 00). 3. If problem still exists and battery voltage is indicated, replace wiper switch (WP 0063 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Windshield Wiper Is Inoperative - Continued.	3. Check for voltage to wiper motor low speed terminal. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Place wiper switch in low position (TM 5-3805-248-10). d. Disconnect wiper motor green wire (WP 0217 00). e. Connect multimeter positive lead to wiper motor green wire (harness side) and multimeter negative lead to chassis ground.	
	 394-1572	
	f. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, go to Test 4. 2. If battery voltage is indicated, replace wiper motor assembly (WP 0217 00).

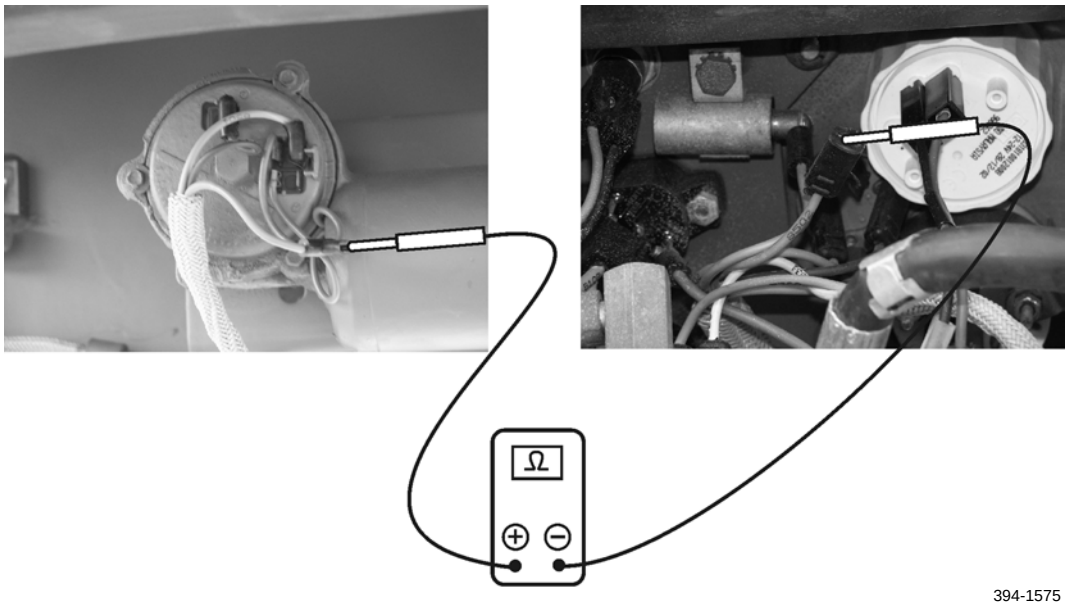
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Windshield Wiper Is Inoperative - Continued.	4. Check low speed circuit for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect wiper motor switch electrical connections (WP 0063 00). d. Connect multimeter positive lead to wiper motor green wire (harness side) and multimeter negative lead to wiper motor switch green wire (harness side).	1. If continuity is not indicated, repair open circuit between wiper motor and wiper switch (WP 0018 00). 2. If continuity is indicated, replace wiper switch (WP 0063 00).
	5. Check for voltage to wiper motor high speed terminal. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00).	



394-1573

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Windshield Wiper Is Inoperative - Continued.	c. Place wiper switch in high position. d. Disconnect wiper motor orange wire (WP 0217 00). e. Connect multimeter positive lead to wiper motor orange wire (harness side) and multimeter negative lead to chassis ground.	
		
	f. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, go to Test 6. 2. If battery voltage is indicated, replace wiper motor assembly (WP 0217 00).
	6. Check high speed circuit for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect wiper motor switch electrical connections (WP 0063 00).	
	d. Connect multimeter positive lead to wiper motor orange wire (harness side) and multimeter negative lead to wiper motor switch orange wire (harness side).	1. If continuity is not indicated, repair open circuit between wiper motor and wiper switch (WP 0018 00). 2. If continuity is indicated, replace wiper switch (WP 0063 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Windshield Wiper Is Inoperative - Continued.		



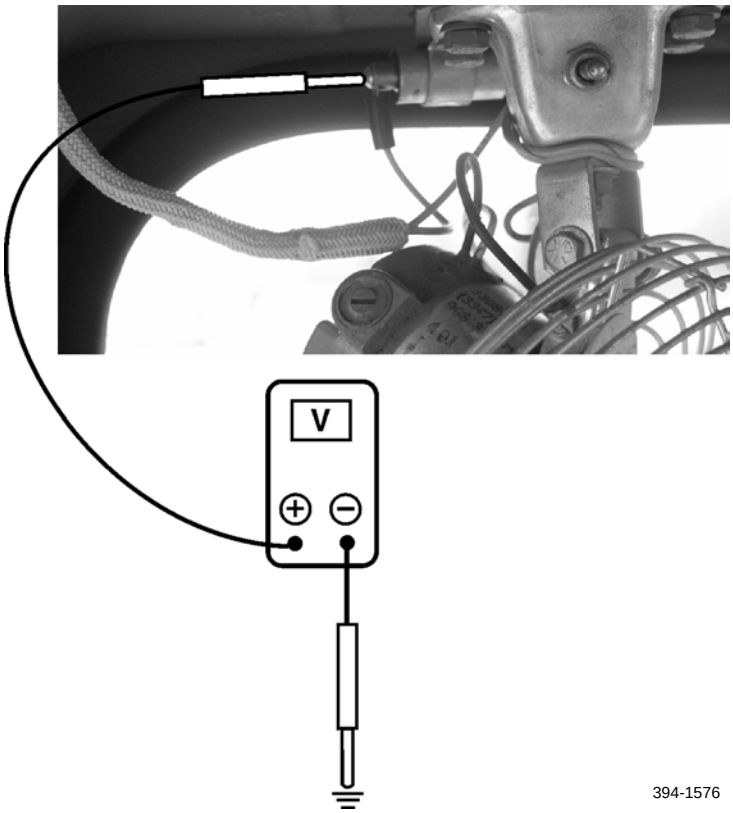
12. Heater Blower Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Determine which speed(s) problem occurs in.	1. If inoperative in all speeds, go to Test 2. 2. If inoperative in low speed only, go to Test 3.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Heater Blower Is Inoperative - Continued.		3. If inoperative in medium speed only, go to Test 5. 4. If inoperative in high speed only, go to Test 7.
	2. Check for voltage to heater switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Disconnect heater switch assembly electrical connections (WP 0222 00). d. Connect multimeter positive lead to red wire of heater switch (harness side) and multimeter negative lead to chassis ground. e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between fuse box and heater switch (WP 0018 00). 2. If wiring is OK and battery voltage is not indicated, replace heater circuit breaker (WP 0222 00). 3. If battery voltage is indicated, make sure blower motor ground is OK (WP 0018 00). 4. If battery voltage is indicated and ground is OK, replace heater switch (WP 0222 00).
	3. Check for continuity to heater blower low speed terminal. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect heater blower and switch electrical connections (WP 0319 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Heater Blower Is Inoperative - Continued.	d. Connect multimeter positive lead to orange and blue wire of heater blower (harness side) and multimeter negative lead to orange and blue lead of heater switch (harness side).	1. If continuity is not indicated, repair open circuit between blower and switch (WP 0018 00). 2. If continuity is indicated, go to Test 4.
	4. Check switch low speed contacts for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Place heater switch in low position.	
	d. Connect multimeter positive lead to heater switch red wire (switch side) and multimeter negative lead to heater switch blue wire (switch side).	1. If continuity is not indicated, replace heater switch. (WP 0222 00). 2. If continuity is indicated, replace heater blower (WP 0319 00).
	5. Check for continuity to heater blower medium speed terminal. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect heater blower and switch electrical connections (WP 0319 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	
	d. Connect multimeter positive lead to orange/green wire of heater blower (harness side) and meter negative lead to orange/green wire of heater switch (harness side).	1. If continuity is not indicated, repair open circuit between blower and switch (WP 0018 00). 2. If continuity is indicated, go to Test 6.

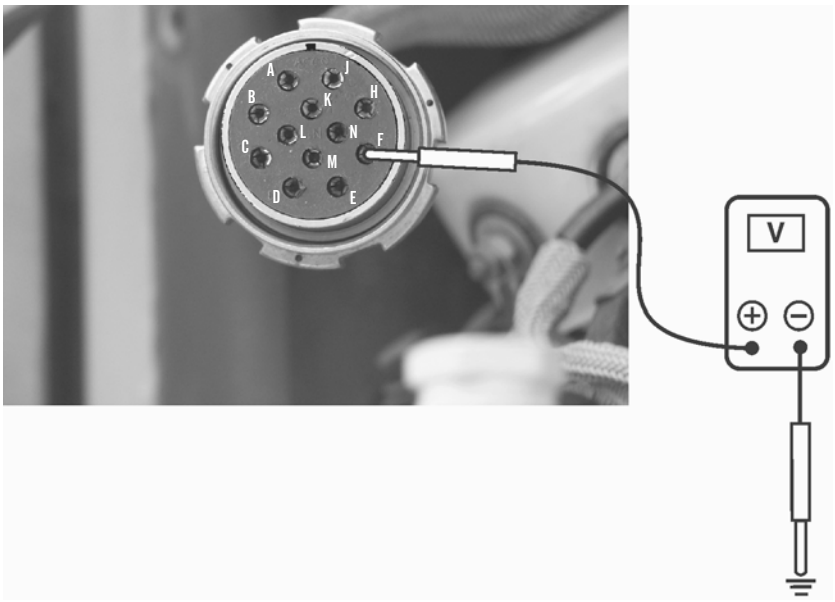
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Heater Blower Is Inoperative - Continued.	6. Check switch medium speed contacts for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Place heater switch in medium position (TM 5-3805-248-10). d. Connect multimeter positive lead to heater switch red terminal (switch side) and multimeter negative lead to heater switch green wire (switch side).	1. If continuity is not indicated, replace heater switch (WP 0222 00). 2. If continuity is indicated, replace heater blower (WP 0319 00).
	7. Check for continuity to heater blower high speed terminal. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect heater blower electrical connections (WP 0319 00). d. Place heater switch in high position (TM 5-3805-248-10). e. Connect multimeter positive lead to orange/purple wire of heater blower (harness side) and multimeter negative lead to orange/purple wire of heater switch (harness side).	1. If battery voltage is not indicated, go to Test 8. 2. If battery voltage is indicated, replace heater blower assembly (WP 0217 00).

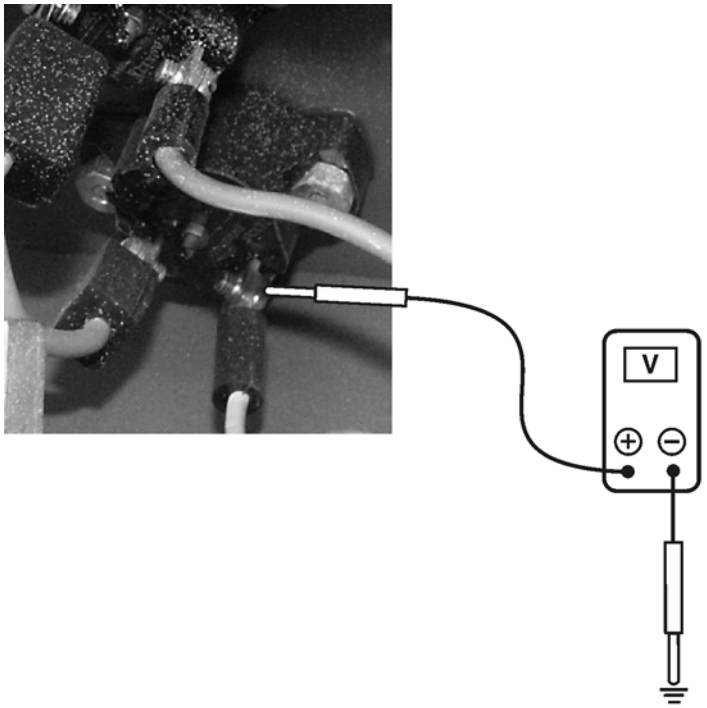
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Heater Blower Is Inoperative - Continued.	8. Check switch high speed contacts for continuity. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect heater blower switch electrical connections (WP 0222 00). d. Connect multimeter positive lead to heater switch red wire (switch side) and multimeter negative lead to heater switch purple wire (switch side).	1. If continuity is not indicated, replace heater switch (WP 0222 00). 2. If continuity is indicated, replace blower (WP 0319 00).
13. Defroster Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check for voltage to defroster fan. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	

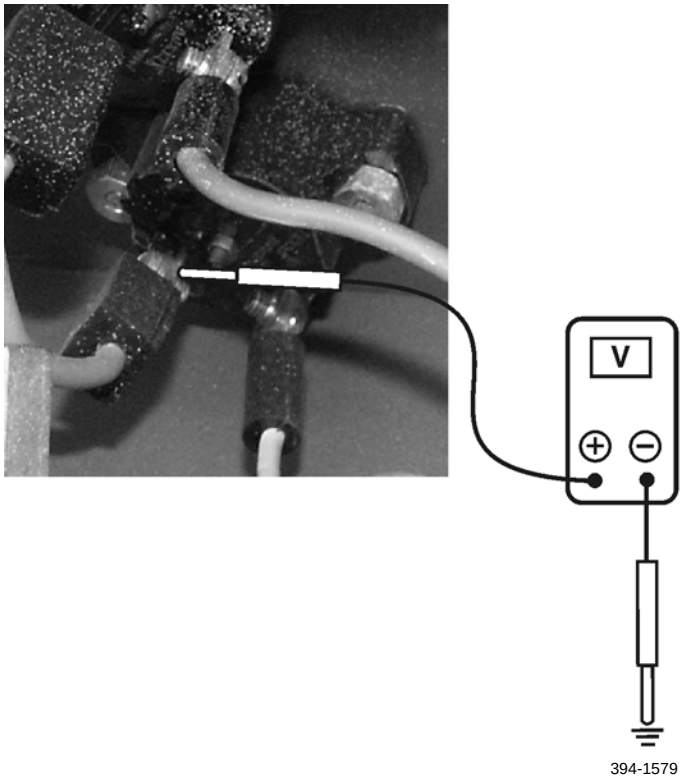
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
13. Defroster Is Inoperative - Continued.	b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to pink wire of defroster fan capacitor and multimeter negative lead to chassis ground.	
		
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between fuse box and defroster fan (WP 0221 00). 2. If battery voltage is indicated, make sure blower motor ground is OK (WP 0018 00). 3. If battery voltage is indicated and ground is OK, replace defroster fan assembly (WP 0221 00).

END OF WORK PACKAGE

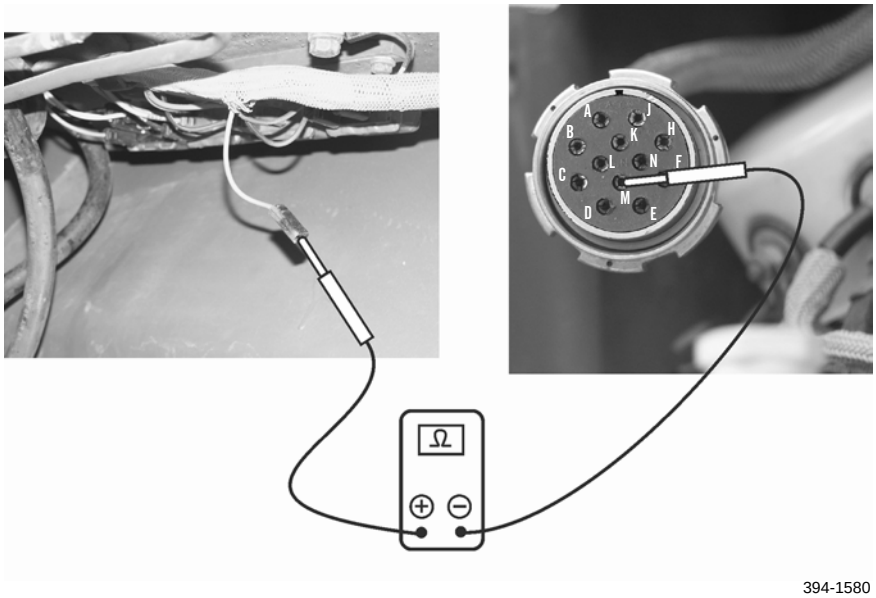
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. All Lights Are Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check for voltage to light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect light switch electrical connections (WP 0067 00).	

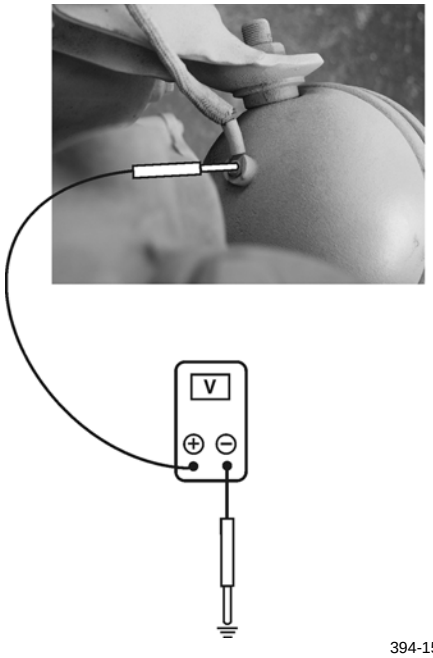
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. All Lights Are Inoperative - Continued.	c. Connect multimeter positive lead to harness side of connector “F” terminal and multimeter negative lead to chassis ground.	
		
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If voltage is available, replace light switch (WP 0067 00). 2. If no voltage indicated, go to Test 2.

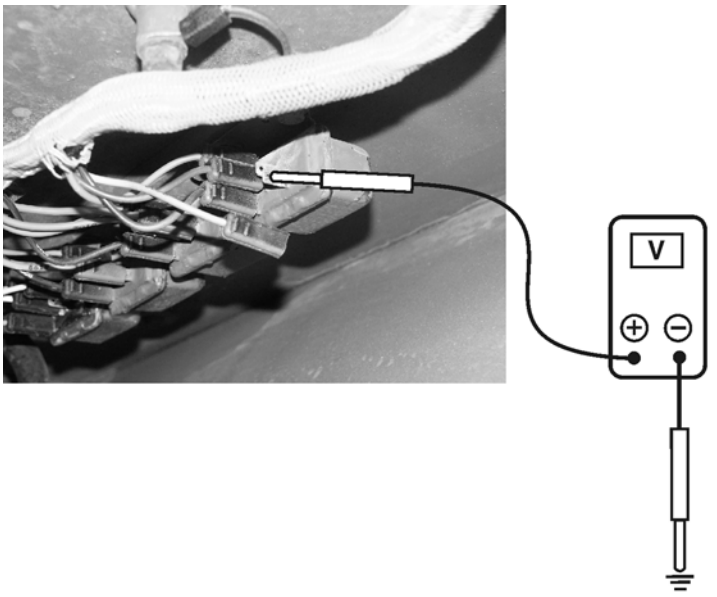
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. All Lights Are Inoperative - Continued.	2. Check for voltage from circuit breaker. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Connect multimeter positive lead to yellow wire terminal of instrument panel circuit breaker and multimeter negative lead to chassis ground.	1. If voltage is present, repair open circuit in wire between light switch and circuit breaker (WP 0018 00). 2. If no voltage is present, go to Test 3.
	 394-1578	
	3. Check for voltage to circuit breaker. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	

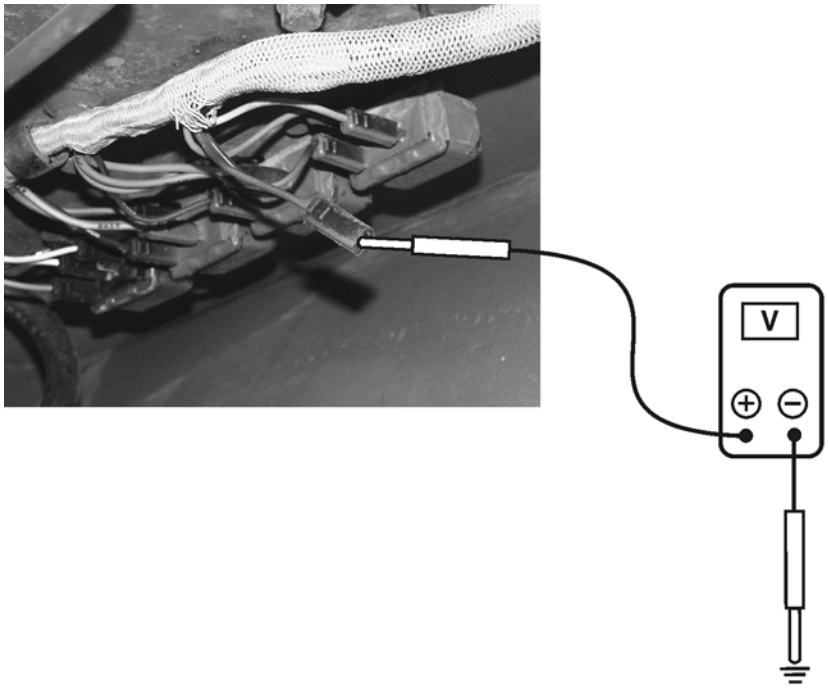
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. All Lights Are Inoperative - Continued.	b. Connect multimeter positive lead to orange wire of circuit breaker and negative lead to chassis ground.	1. If voltage is present, reset breaker and repeat Test 3. 2. If problem still exists, replace instrument panel circuit breaker (WP 0070 00). 3. If no voltage is present, go to Test 4.
	 394-1579	
	4. Verify that engine starts (TM 5-3805-248-10).	1. If engine starts, repair open circuit in wire between start switch and circuit breaker (WP 0018 00). 2. If engine does not start, go to *Malfunction* 5.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Cutting-Edge Worklight, Low Beams and High Beams Are All Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check if back-up alarm is inoperative also. 2. Check for continuity between relay and light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect blue wire from either high beam or low beam relay (WP 0078 00). d. Disconnect light switch electrical connections (WP 0067 00).	1. If back-up alarm, cutting-edge worklight, low beams and high beams are all inoperative, repair ground circuit for relays located under operator compartment (WP 0018 00). 2. If cutting-edge worklight, low beams and high beams are all inoperative, but back-up alarm operates correctly, go to Test 2.

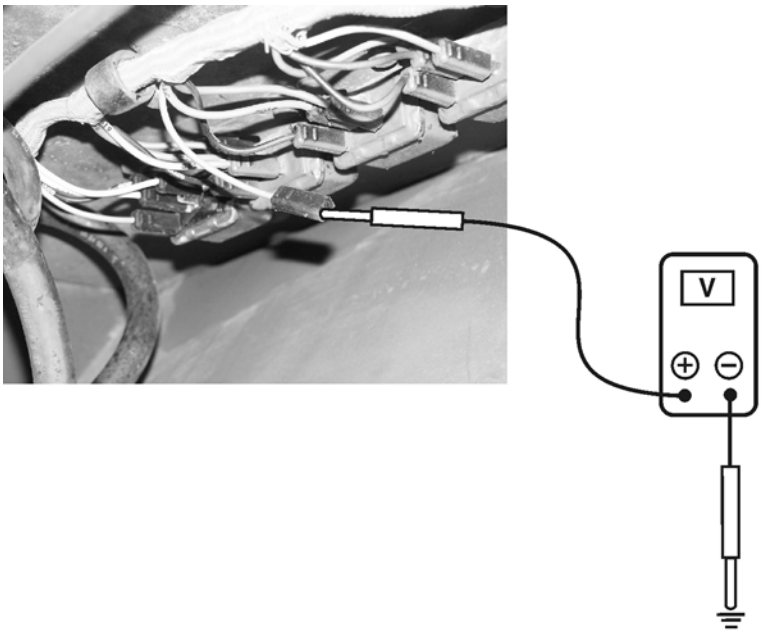
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Cutting Edge Worklight, Low Beams and High Beams Are All Inoperative - Continued.	e. Connect multimeter positive lead to blue wire of relay (harness side) and multimeter negative lead to blue wire of light switch (harness side).	1. If continuity is indicated, replace light switch (WP 0067 00). 2. If continuity is not indicated, repair open circuit between relay and light switch (WP 0018 00).
	 394-1580	
3. Cutting Edge Worklight Is Inoperative.	1. Verify that all other lights operate correctly (TM 5-3805-248-10). 2. Check for voltage to cutting edge worklight. a. Set multimeter to appropriate voltage range (WP 0018 00).	1. If all lights are inoperative, go to *Malfunction 24*. 2. If cutting edge worklight, low beams and high beams are all inoperative, go to *Malfunction* 25. 3. If cutting edge worklight only is inoperative, go to Test 2.

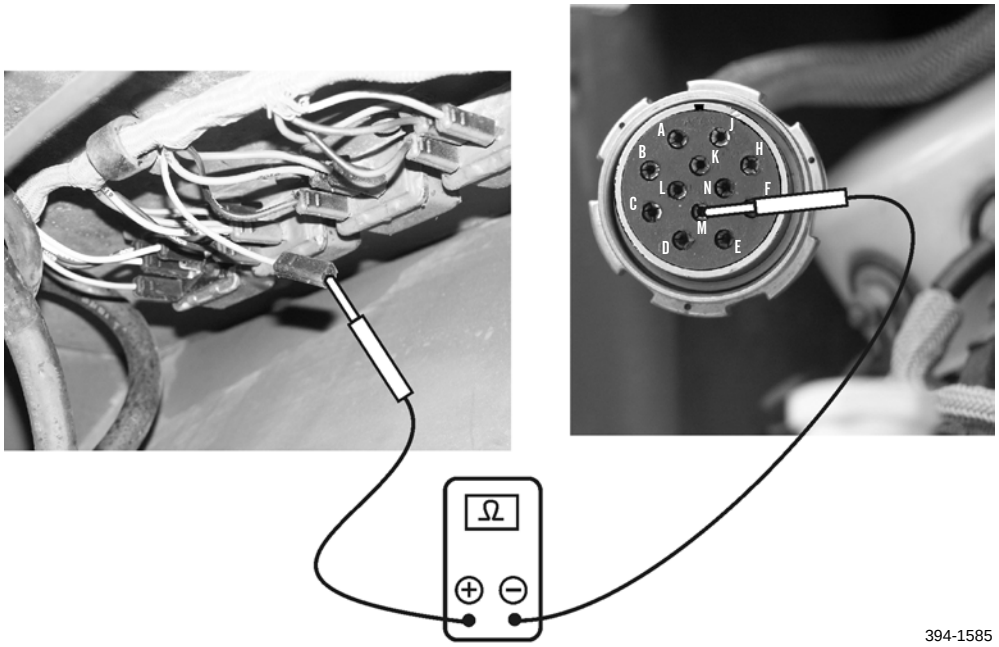
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Cutting Edge Worklight Is Inoperative - Continued.	b. Connect multimeter positive lead to wire on cutting edge worklight and multimeter negative lead to chassis ground.	
	 394-1581	
	c. Place battery disconnect switch in ON position (TM 5-3805-248-10). d. Place light switch in SER DRIVE position.	1. If battery voltage is indicated, replace cutting edge worklight (WP 0086 00). 2. If battery voltage is not indicated, go to Test 3.
	3. Check for voltage from cutting edge worklight relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect green wire from cutting edge worklight relay (WP 0078 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Cutting Edge Worklight Is Inoperative - Continued.	c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter positive lead to terminal on cutting edge worklight relay that green wire was removed from (relay side) and multimeter negative lead to chassis ground.	
	 394-1582	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10). f. Place light switch in SER DRIVE position.	1. If battery voltage is indicated, repair open circuit between cutting edge worklight and cutting edge worklight relay (WP 0018 00). 2. If battery voltage is not indicated, go to Test 4.
	4. Check for voltage to cutting edge worklight relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	

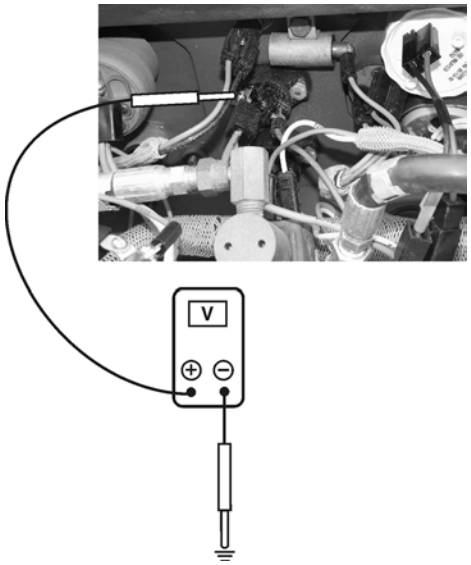
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Cutting Edge Worklight Is Inoperative - Continued.	b. Disconnect brown wire from cutting edge worklight relay (WP 0078 00). c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter positive lead to brown wire of cutting edge worklight relay and multimeter negative lead to chassis ground.	
	 394-1583	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10). f. Place light switch in SER DRIVE position.	1. If battery voltage is indicated, replace cutting edge worklight relay (WP 0078 00). 2. If battery voltage is not indicated, replace open circuit between relay and fuse box (WP 0018 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Headlights Are All Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Check if back-up alarm and cutting-edge worklight are inoperative also.	1. If back-up alarm, cutting-edge worklight, low beams and high beams are all inoperative, repair ground circuit for relays located under operator compartment (WP 0018 00). 2. If only headlights are inoperative, go to Test 2.
	2. Check for voltage to headlight relay. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect blue wire from headlight relay (WP 0078 00). c. Set multimeter to appropriate voltage range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Headlights Are All Inoperative - Continued.	d. Connect multimeter positive lead to blue wire from headlight relay (harness side) and multimeter negative lead to chassis ground.	
	 394-1584	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	
	f. Place light switch in SER DRIVE position.	1. If battery voltage is indicated, go to Test 3. 2. If battery voltage is not indicated, go to Step g.
	g. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	h. Disconnect light switch electrical connections (WP 0067 00).	
	i. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	

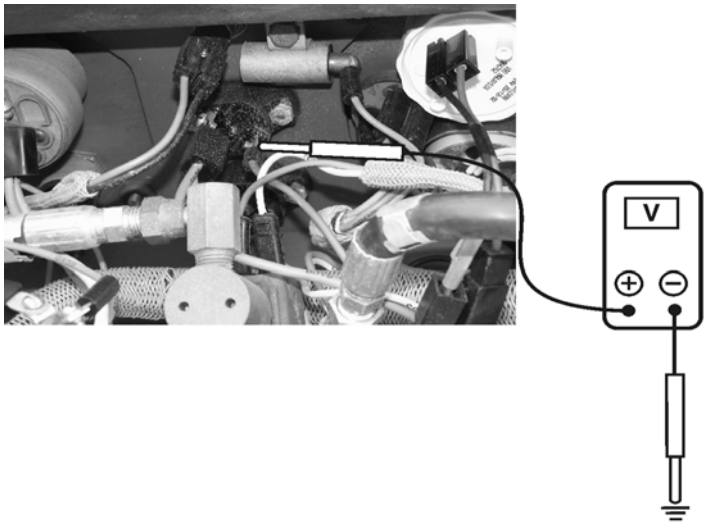
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Headlights Are All Inoperative - Continued.	j. Connect multimeter positive lead to blue wire from headlight relay (harness side) and multimeter negative lead to blue wire from light switch.	1. If continuity is indicated, replace light switch (WP 0067 00). 2. If continuity is not indicated, repair open circuit between light switch and relay (WP 0018 00).
		
	3. Check for voltage to headlight breaker. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to orange wire on headlight breaker (harness side) and multimeter negative lead to chassis ground. d. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is indicated, repair open circuit between high beam/low beam relays and headlamp breaker (WP 0018 00). 2. If battery voltage is not indicated, go to Step e.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Headlights Are All Inoperative - Continued.		



394-1586

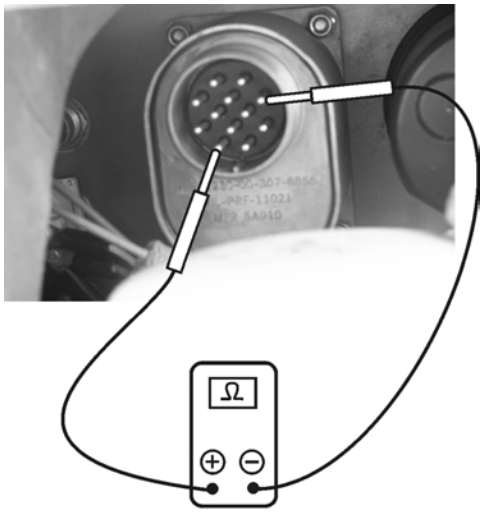
	e. Connect multimeter positive lead to blue wire on headlight breaker (harness side) and multimeter negative lead to chassis ground.	1. If battery voltage is indicated, replace headlamp breaker (WP 0070 00). 2. If battery voltage is not indicated, repair open circuit between engine start switch and headlamp breaker (WP 0018 00).



394-1587

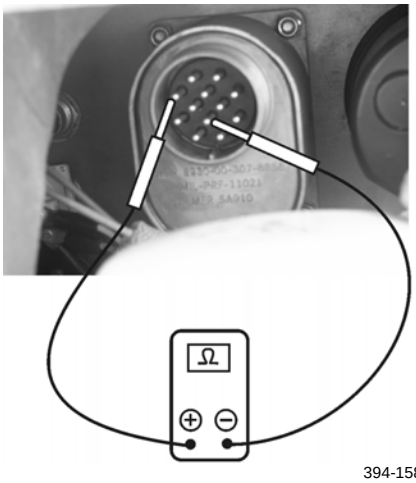
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Determine whether both stoplamps and tail lights are inoperative. 2. Check light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect light switch electrical connections (WP 0067 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	1. If only tail lights are inoperative, go to Test 6. 2. If only stoplamps are inoperative, go to Test 2. 3. If both stoplamps and tail lights are inoperative, replace light switch (WP 0067 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative - Continued.	d. Connect multimeter positive lead to "F" terminal on light switch (switch side) and multimeter negative lead to "A" terminal on light switch (switch side).	

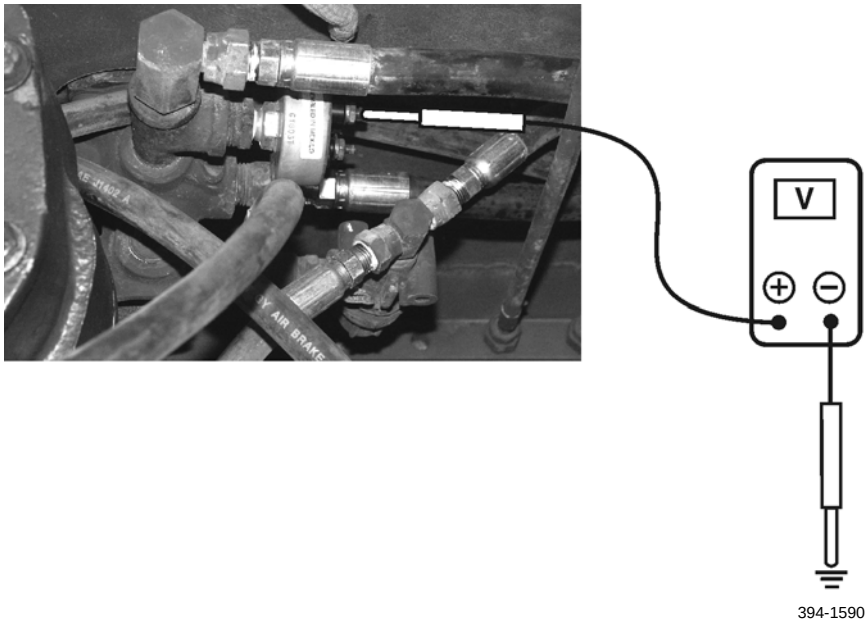


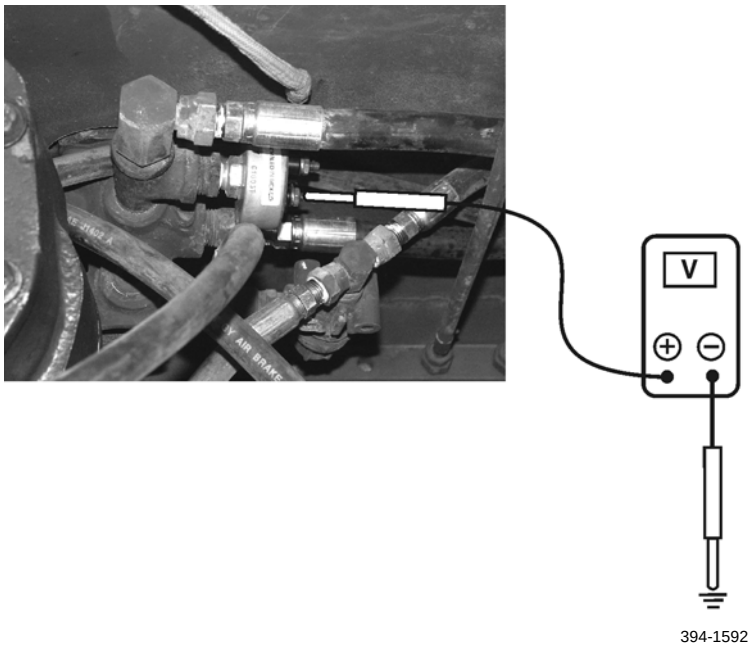
394-1588

e. Place light switch in ser drive position.	1. If continuity is not indicated, replace light switch (WP 0067 00). 2. If continuity is indicated, go to Test f.
f. Connect multimeter positive lead to "K" terminal on light switch (switch side) and multimeter negative lead to "C" terminal on light switch (switch side). g. Reconnect light switch electrical connections (WP 0067 00).	1. If continuity is not indicated, replace light switch (WP 0067 00). 2. If continuity is indicated, go to Test 3.

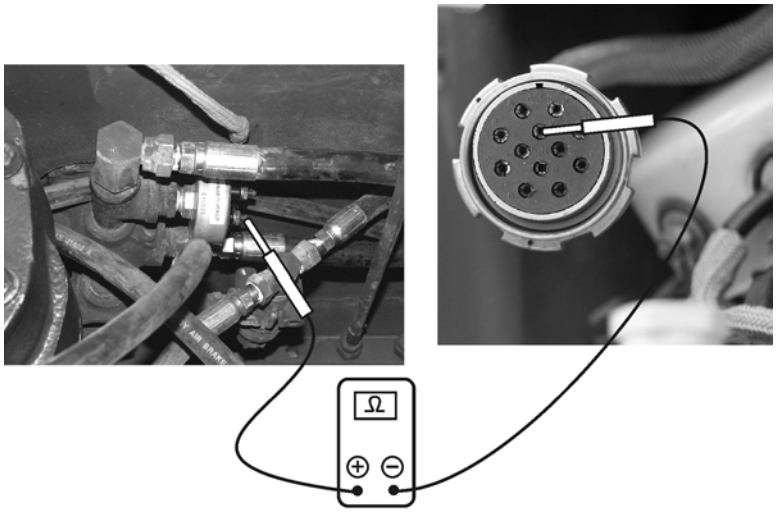


394-1589

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative - Continued.	3. Check for voltage to stoplamp switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate voltage range (WP 0018 00). c. Connect multimeter positive lead to green wire of stoplamp switch and multimeter negative lead to chassis ground.	
	 394-1590	
	d. Place battery disconnect switch in ON position (TM 5-3805-248-10). e. Place light switch in SER DRIVE position.	1. If battery voltage is not indicated, repair open circuit between stoplamp switch and light switch (WP 0018 00). 2. If battery voltage is indicated, go to Test 4.

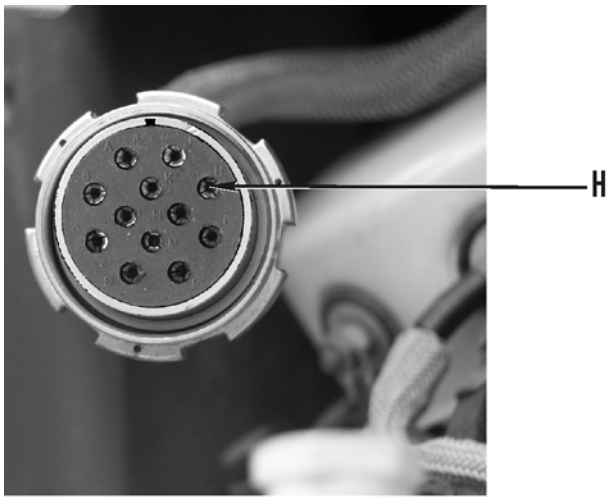
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative - Continued.	4. Check for voltage from stoplamp switch.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Place battery disconnect switch in OFF position (TM 5-3805-248-10).	
	c. Set multimeter to appropriate voltage range (WP 0018 00).	
	d. Connect multimeter positive lead to white wire of stoplamp switch and multimeter negative lead to chassis ground.	
	 394-1592	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	
	f. Place light switch in SER DRIVE position; apply and hold brake pedal.	1. If battery voltage is not indicated, replace stoplamp switch (WP 0096 00). 2. If battery voltage is indicated, go to Test 5.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative - Continued.	5. Check for continuity from stoplamp switch to light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect light switch electrical connections (WP 0067 00). d. Disconnect stoplamp switch electrical connections (WP 0096 00). e. Connect multimeter positive lead to white wire of stoplamp switch and multimeter negative lead to light switch terminal “K” (harness side).	1. If continuity is not indicated, repair open circuit between stoplamp switch and light switch (WP 0018 00) 2. If continuity is indicated, repair open circuit between stoplamps and light switch (WP 0018 00).



394-1591

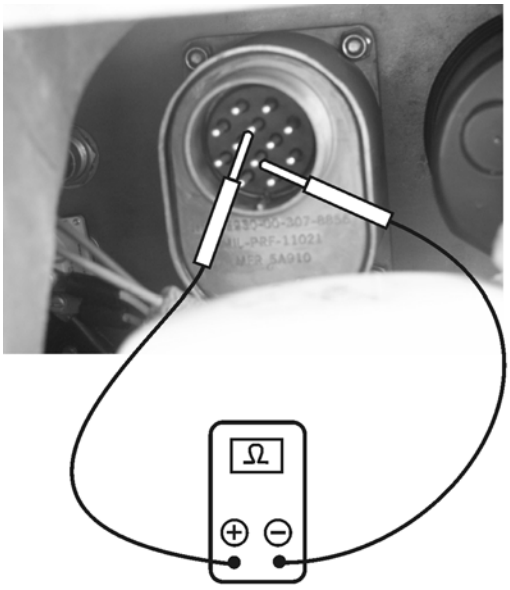
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Service Stop/Tail Lights Are Inoperative - Continued.	6. Check for continuity from light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect stoplamp electrical connections (WP 0087 00). d. Connect multimeter positive lead to purple wire of taillamp and multimeter negative lead to "H" terminal of light switch (harness side).	1. If continuity is not indicated, repair open circuit between light switch and tail lights (WP 0018 00). 2. If continuity is indicated, replace light switch (WP 0067 00).

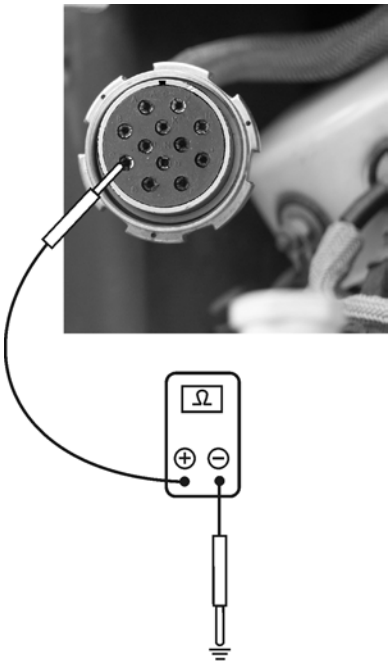


394-1593

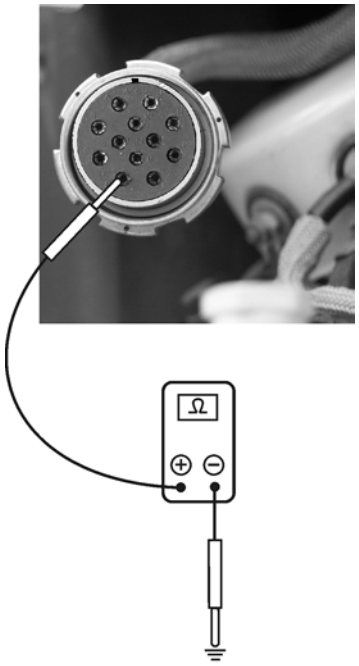
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Blackout Stoplamps Are On Continuously.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** • For detailed electrical diagram, refer to WP 0005 00. • Light switch should be in OFF position. • Battery disconnect switch should be in ON position. 1. Check circuitry between blackout lamps, light switch and back-up alarm relay for short to power (WP 0018 00).	1. If short to power exists, repair circuit in question (WP 0018 00). 2. If circuitry OK, replace light switch (WP 0067 00).

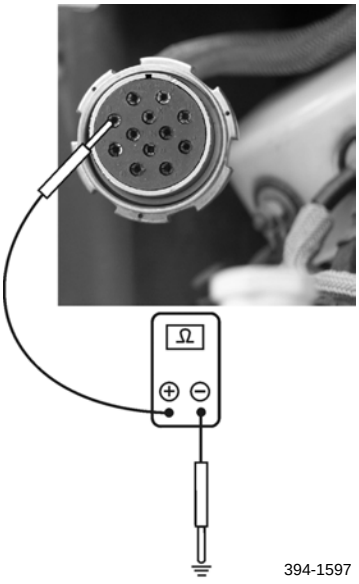
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Blackout Stoplamps/Tail Lights Are Inoperative (Service Stoplights Operate Correctly).	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Determine whether both blackout stoplamps and blackout tail lights are inoperative. 2. Check light switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect light switch electrical connections (WP 0067 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00).	1. If service stoplamps are inoperative, service them first. 2. If only blackout tail lights are inoperative, go to Test 6. 3. If only blackout stoplamps are inoperative, go to Test 2. 4. If both blackout stoplamps and blackout tail lights are inoperative, replace light switch (WP 0067 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Blackout Stoplamps/Tail Lights Are Inoperative (Service Stoplights Operate Correctly) - Continued.	d. Connect multimeter positive lead to "K" terminal on light switch (switch side) and multimeter negative lead to "N" terminal on light switch (switch side).	
	 394-1594	
	e. Place light switch in blackout drive position.	1. If continuity is not indicated, replace light switch (WP 0067 00). 2. If continuity is indicated, repair open circuit between blackout stoplamps and light switch.

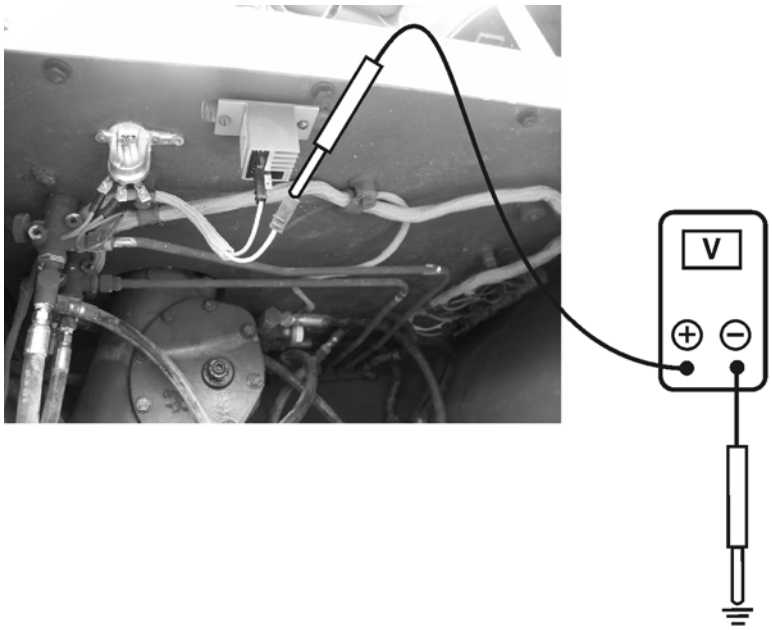
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Blackout Stoplamps/Tail Lights Are Inoperative (Service Stoplights Operate Correctly) - Continued.	3. Check blackout tail lights for continuity to ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect light switch electrical connectors (WP 0067 00). d. Connect multimeter positive lead to "E" terminal of light switch (harness side) and multimeter negative lead to chassis ground.	1. If continuity is not indicated, repair open circuit between blackout tail lights and light switch (WP 0018 00). 2. If continuity is indicated, replace light switch (WP 0067 00).
	 394-1595	

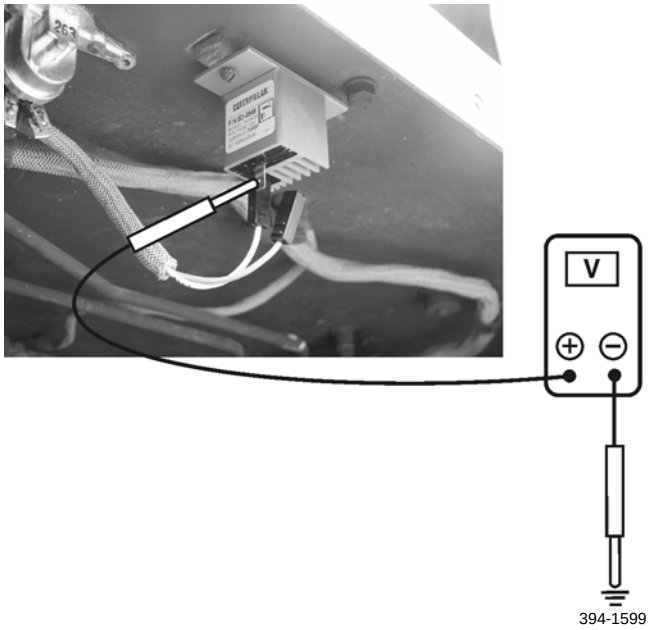
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Blackout Drive Lamp Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00.	
	1. Make sure electrical connections, including blackout drive lamp chassis ground, have good continuity (WP 0018 00).	1. Clean and tighten as necessary. 2. If continuity is indicated, go to Test 2.
	2. Check blackout drive lamp assembly. a. Replace blackout drive lamp bulb assembly with a known good one (WP 0082 00).	1. If light operates correctly, blackout drive lamp bulb assembly was faulty. 2. If light still doesn't operate correctly, go to Test 3.
	3. Check blackout drive lamp for continuity to ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect light switch electrical connectors (WP 0067 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Blackout Drive Lamp Is Inoperative - Continued.	d. Connect multimeter positive lead to "D" terminal of light switch (harness side) and multimeter negative lead to chassis ground.	
	 394-1596	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, repair open circuit between blackout drive lamp and light switch (WP 0018 00). 2. If continuity is indicated, replace light switch (WP 0067 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Panel Lamp Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. **NOTE** For detailed electrical diagram, refer to WP 0005 00. 1. Check panel lamp for continuity to ground. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). c. Disconnect light switch electrical connectors (WP 0067 00). d. Connect multimeter positive lead to “B” terminal of light switch and multimeter negative lead to chassis ground.  394-1597	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. Panel Lamp Is Inoperative - Continued.	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, repair open circuit between panel lamps and light switch (WP 0018 00). 2. If continuity is indicated, replace light switch (WP 0067 00).
10. Turn Signals Are Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	NOTE For detailed electrical diagram, refer to WP 0005 00.	
	1. Check turn signal operation (TM 5-3805-248-10).	1. If lights are on but will not flash, replace flasher (WP 0081 00). 2. If both side turn signals are inoperative, go to Test 2. 3. If one side turn signal is inoperative, go to Test 5.
	2. Check for voltage to flasher. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect flasher electrical connections (WP 0081 00). c. Set multimeter to appropriate voltage range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Turn Signals Are Inoperative - Continued.	d. Connect multimeter positive lead to yellow wire of flasher (harness side) and multimeter negative lead to chassis ground.	
	 394-1598	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between flasher and side worklight switch (WP 0018 00). 2. If battery voltage is indicated, go to Test 3.
	3. Check for voltage from flasher. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Reconnect flasher yellow wire (WP 0081 00). c. Set multimeter to appropriate voltage range (WP 0018 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Turn Signals Are Inoperative - Continued.	d. Connect multimeter positive lead to green wire of flasher (flasher side) and meter negative lead to chassis ground.	
		
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, replace flasher (WP 0081 00). 2. If battery voltage is indicated, go to Test 4.
	f. Reconnect flasher green wire (WP 0081 00).	
	4. Check for voltage to turn signal switch. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect turn signal switch electrical connection (WP 0080 00). c. Set multimeter to appropriate voltage range (WP 0018 00). d. Connect multimeter positive lead to green wire of turn signal switch (harness side) and multimeter negative lead to chassis ground.	
	e. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If battery voltage is not indicated, repair open circuit between flasher and turn signal switch (WP 0018 00). 2. If battery voltage is indicated, replace turn signal switch (WP 0080 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Turn Signals Are Inoperative - Continued.	5. Check for continuity to turn signal lamps. a. Place battery disconnect switch in OFF position (TM 5-3805-248-10). b. Disconnect turn signal switch electrical connection (WP 0080 00). c. Set multimeter to appropriate ohm (Ω) range (WP 0018 00). d. Connect multimeter positive lead to yellow wire of turn signal switch (harness side) and then to gray wire of turn signal switch (harness side). e. Connect meter negative lead to chassis ground.	
	f. Place battery disconnect switch in ON position (TM 5-3805-248-10).	1. If continuity is not indicated, repair open circuit between turn signal switch and turn signal lamps (WP 0018 00). 2. If continuity voltage is indicated, replace turn signal switch (WP 0081 00).
11. One Lamp Is Inoperative.	**WARNING** • Remove all jewelry, watch, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may cause injury or death. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death. • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.	
	NOTE For detailed electrical diagram, refer to WP 0005 00.	
	1. Check for voltage at inoperative lamp (WP 0018 00).	1. If battery voltage is not indicated, repair circuit in question (WP 0018 00). 2. If battery voltage is indicated, go to Test 2.
	2. Make sure lamp has good continuity to ground.	1. If continuity is not indicated, repair circuit in question or clean ground connections (WP 0018 00). 2. If continuity is indicated, replace lamp/bulb. Refer to appropriate work package.

END OF WORK PACKAGE

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Transmission Overheating According to the Converter/Retarder Gage.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check with operator to confirm that machine was not operated close to stall speed or retarder was not used excessively.	1. If machine was not operated correctly, explain correct operation to operator. 2. If machine has been operated correctly, go to Test 2.
	2. Check converter/retarder gage system. Refer to Electrical Accessories Troubleshooting (WP 0011 00).	1. If gage system is not operating correctly correct IAW (WP 0011 00). 2. If gage system is operating correctly, go to Test 3.
	3. Check magnetic strainer.	1. Replace magnetic strainer if necessary (WP 0130 00). 2. If strainer is OK, go to Test 4.
	4. Check transmission oil filter for cloggs or restriction (WP 0129 00).	1. Replace transmission oil filter if necessary. 2. If filter is OK, go to Test 5.
	5. Check torque converter oil cooler for cloggs or restriction by removing and blowing air through it (WP 0134 00).	1. Replace oil cooler if air does not pass through it. 2. If oil cooler is OK, replace transmission (WP 0286 00).
2. Transmission Shifter Lever Does Not Move.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check control linkage for improper adjustment or damage (WP 0125 00).	1. If control linkage is not adjusted properly, or is damaged or defective, adjust or replace. 2. If problem still exists, replace transmission (WP 0286 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Transmission Shifts Slowly.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check control linkage for improper adjustment or damage (WP 0125 00).	Adjust or replace control linkage if not adjusted properly, or if damaged or defective.
	2. Check control group shift pressure (WP 0365 00).	1. Adjust or replace control group if not operating properly (WP 0364 00 and WP 0365 00). 2. If problem still exists, replace transmission (WP 0286 00).
4. Transmission Shifts Roughly.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check shift control linkage for improper adjustment or damage (WP 0125 00).	1. Adjust or replace shift control linkage as necessary. 2. If problem still exists, go to Test 2.
	2. Check primary setting of transmission relief valve (WP 0365 00).	If primary setting of relief valve is not correct, perform adjustment procedure or replace (WP 0364 00 and WP 0365 00).
	3. Check load piston and valve springs by replacing pressure and selector valve (WP 0364 00).	If problem still exists, replace transmission (WP 0286 00).
5. Transmission Does Not Operate in Any Speed or Will Not Engage.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	Check control linkage for improper adjustment or damage (WP 0125 00).	1. Adjust or replace control linkage as necessary (WP 0125 00). 2. If problem still exists, replace transmission (WP 0286 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Machine Moves in Neutral.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	Check control linkage for improper adjustment or damage (WP 0125 00).	1. If control linkage is not adjusted properly, or is damaged or defective, adjust or replace (WP 0125 00). 2. If problem still exists, replace transmission (WP 0286 00).
7. Transmission Is Inoperative in One or More Speed(s).	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check shift control cable for damage or improper adjustment (WP 0125 00).	1. Adjust or replace linkage as necessary. 2. If problem still exists, replace transmission (WP 0286 00).
8. When Changing Gears, the Transmission Stays in a Previous Gear.	**NOTE** Differential and transmission oil level, leaking lines or components, missing detents and physical damage to linkages should all be corrected prior to performing any diagnostics.	
	1. Check shift points adjustment (WP 0285 00).	1. Adjust as necessary. 2. If problem still exists, go to Test 2.
	2. Check transmission hold. Refer to Air System Troubleshooting (WP 0014 00).	1. Correct IAW (WP 0014 00). 2. If problem still exists, replace transmission (WP 0286 00).
9. Loss of Lubricant.	Check differential breather for leaks or damage (WP 0143 00).	Replace differential breather, if necessary (WP 0143 00).
10. Continuous Axle of Wheel Noise.	**WARNING** Chock wheels of machine to prevent rolling, shifting or slipping while raising machine from ground. Failure to follow this procedure may cause injury.	
	1. Check for defective wheel bearings (WP 0302 00 and WP 0303 00).	Replace wheel bearings, if necessary (WP 0302 00 and WP 0303 00).

END OF WORK PACKAGE

BRAKE SYSTEM TROUBLESHOOTING PROCEDURES 0014 00

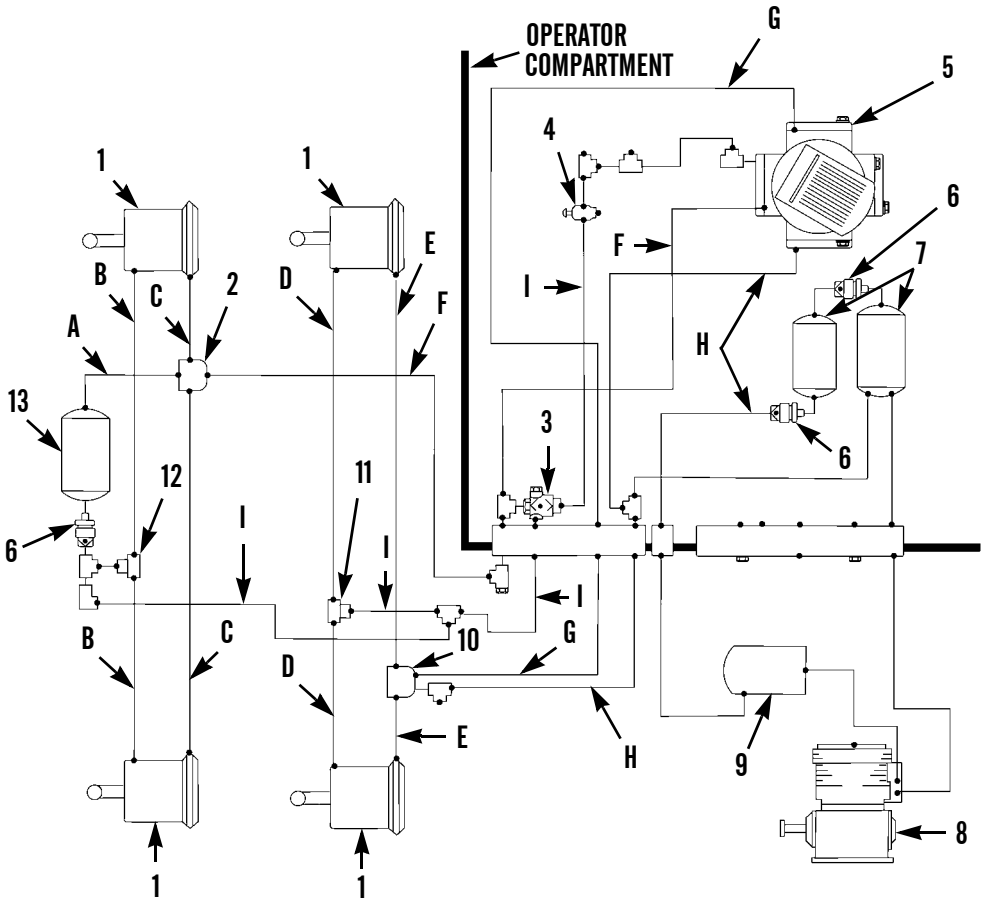
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

WARNING

- Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.
- Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.

NOTE

- The following tests require two personnel – one at control and the other at component you are checking.
- For detailed diagram of air system, refer to WP 0006 00.
- If problem occurs in cold weather only, see *Electrical System Troubleshooting Procedures, Malfunction 12*.



1. Brake Actuator
2. Scraper Air Brake Relay Valve
3. Double Check Valve
4. Park and Emergency Valve
5. Brake Control Valve
6. Check Valve
7. Tractor Air Tank
8. Air Compressor
9. Air Dryer
10. Tractor Air Brake Relay Valve
11. Tractor Quick Release and Holding Valve
12. Scraper Quick Release and Holding Valve
13. Scraper Air Tank

A. Scraper Service Brake supply line
B. Scraper Park and Emergency Brake Delivery Line
C. Scraper Service Brake Delivery Line
D. Tractor Park and Emergency Brake Delivery Line
E. Tractor Service Brake Delivery Line
F. Scraper Brake signal Line
G. Tractor Brake signal Line
H. Tractor supply lines
I. Parking and Emergency brake supply lines

394-1545

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Service Brakes Do Not Apply.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check for brake actuator movement.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	1. If brake actuator(s) move, inspect brakes for broken, disconnected or damaged parts.
	c. While applying brakes, check for movement at all brake actuators.	2. Adjust actuators travel to 2.5 in. (6.4 cm) (WP 0169 00). 3. If problem still exists, go to Test 2.
	NOTE • If all brakes will not engage, go to Step 7. • If both front brakes only or both rear brakes only will not engage, go to Step 3. • If one or more brakes will not engage, go to Step 2.	
	2. Check for leak in service brake delivery line(s).	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Release park and emergency brakes (TM 5-3805-248-10).	
	d. Apply and hold brakes. Listen for air leak in line(s) between air brake relay valve(s) and actuator(s) that do not move.	If leak exists, replace service brake delivery line(s) (WP 0162 00 and WP 0166 00). If problem still exists, go to Test 2.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Service Brakes Do Not Apply - Continued.	3. Check for restriction in service brake delivery line(s). a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10). c. Release park and emergency brakes (TM 5-3805-248-10). d. Loosen service brake delivery line(s) at actuator(s) that does not move (WP 0151 00). e. Apply and hold brakes. Make sure air is rushing out from loose fitting.	1. If no air is released, there is a restriction. Unblock or replace service brake delivery line(s) (WP 0162 00 and WP 0166 00). 2. If problem still exists, replace brake actuator(s) in question (WP 0151 00).
	4. Check for restriction in service brake supply line. a. Release park and emergency brakes (TM 5-3805-248-10). b. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). c. Shut down engine (TM 5-3805-248-10).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Service Brakes Do Not Apply - Continued.	d. Loosen service brake supply line at relay valve (WP 0159 00 and WP 0160 00).	1. If no air is released, there is a restriction. Unblock or replace scraper service brake supply line (WP 0165 00) or tractor service brake supply line between operator compartment and air brake relay valve (WP 0163 00). 2. If problem still exists, go to Test 5.
	5. Check for leak in brake signal line(s). a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10). c. Release park and emergency brakes (TM 5-3805-248-10).	
	d. Apply and hold brakes. Listen for air leak brake signal line(s).	1. If leak exists, replace leaking brake signal line(s) (WP 0161 00 and WP 0163 00). 2. If problem still exists, go to Test 6.
	6. Check for restriction in brake signal line. a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10). c. Release park and emergency brakes (TM 5-3805-248-10). d. Loosen brake signal line at air brake relay valve (WP 0159 00 and WP 0160 00).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Service Brakes Do Not Apply - Continued.	e. Apply and hold brakes. Make sure air is rushing out from loose fitting.	1. If no air is released, there is a restriction. Unblock or replace brake signal line(s) (WP 0161 00 and WP 0163 00). 2. If both front brakes or both rear brakes still won't engage, replace air brake relay valve (WP 0159 00 and WP 0160 00). 3. If both front brakes or both rear brakes still won't engage, replace brake control valve (WP 0155 00).
	7. Make sure park and emergency brakes release at normal operating pressure (TM 5-3805-248-10).	1. If park and emergency brakes release, replace brake control valve (WP 0155 00). 2. If park and emergency brakes do not release, go to *Malfunction 4*.
2. Service Brakes Do Not Release.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Verify park/emergency brakes disengage.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction* 7.
	b. Shut down engine (TM 5-3805-248-10).	
	c. While watching for actuator movement, release park and emergency brakes (TM 5-3805-248-10).	If any of four actuators do not move, go to *Malfunction* 4. If all actuators move, go to Test 2.
	2. Verify which brakes do not release.	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Service Brakes Do Not Release - Continued.	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Release parking brakes (TM 5-3805-248-10).	
	d. While watching for actuator movement, apply and release service brakes (TM 5-3805-248-10).	1. If both front brakes only or both rear brakes only will not release, go to Test 4. 2. If one or more brakes will not release, go to Test 3.
	3. Inspect brakes for broken or damaged parts.	1. Replace or repair brake components as necessary (WP 0147 00 through WP 0150 00). 2. Adjust actuators travel to 2.5 in. (63.5 cm) (WP 0151 00). 3. Go to Test 6.
	4. Check air brake relay valve(s).	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Apply and release brakes.	
	d. Air should blast out quickly from air brake relay valve(s) exhaust port.	1. If air escapes slowly or does not exhaust from air brake relay valve(s) at all, replace air brake relay valve(s) (WP 0159 00 and WP 0160 00). 2. If problem still exists in both rear brakes only, go to Test 5. 3. If problem still exists in both front brakes only, go to Test 6.

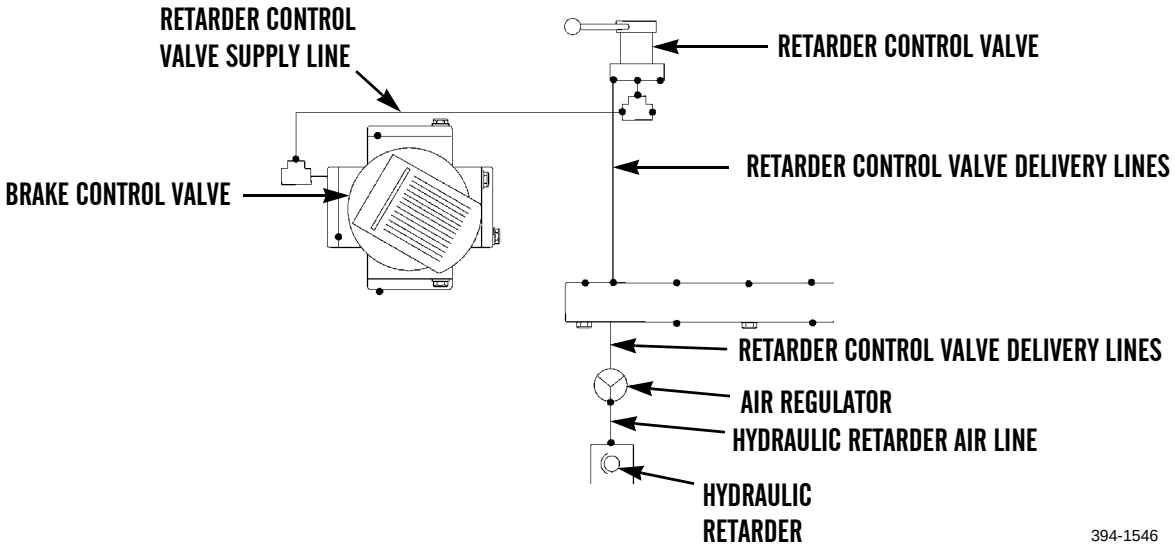
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Service Brakes Do Not Release - Continued.	5. Test double check valve.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Release park and emergency brakes (TM 5-3805-248-10).	
	NOTE Do not apply brakes.	
	d. Disconnect brake signal line at scraper air brake relay valve (WP 0160 00).	1. If air leaks out from disconnected line, replace double check valve (WP 0158 00). 2. If no air leaks out, go to Test 7.
	6. Test brake control valve.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen or disconnect signal line at tractor air brake relay valve (WP 0159 00).	
	NOTE Do not apply brakes.	
	d. Loosen or disconnect signal line from double check valve under operator compartment (WP 0159 00).	1. If air leaks out from either of disconnected lines, replace brake control valve (WP 0155 00). 2. If no air leaks out, replace brake actuator for brake(s) in question (WP 0151 00)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Parking/Emergency Brakes Do Not Engage.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Verify service brakes operate.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If pressure doesn't build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	c. While watching for actuator movement, apply and release service brakes (TM 5-3805-248-10).	1. If any of four actuators do not move, go to *Malfunction 1*. 2. If all actuators move, go to Test 2.
	2. Verify park and emergency brake operation.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. While watching for actuator movement, apply and release park and emergency brakes (TM 5-3805-248-10).	1. If one or more (not all) actuators do not move, go to Test 3. 2. If all four actuators do not move, go to Test 5.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Parking/Emergency Brakes Do Not Engage - Continued.	3. Listen for a quick blast of air escaping from quick release and holding valve(s) while applying park and emergency brakes.	1. If air escapes slowly out or does not exhaust from quick release and holding valve(s) at all, replace quick release and holding valve(s) (WP 0156 00 and WP 0157 00). 2. If air escapes normally, go to Test 4.
	4. Inspect brakes for broken, disconnected or damaged parts.	1. Replace or repair brakes as necessary (WP 0147 00 through WP 0150 00). 2. Adjust actuators travel to 2.5 in. (63.5 cm) (WP 0169 00). 3. If problem still exists, replace actuator(s) for brake(s) in question (WP 0151 00).
	5. Check for stuck park and emergency valve by disconnecting park and emergency brake delivery line from actuator (WP 0151 00).	If park and emergency brakes engage, replace park and emergency valve (WP 0145 00).
4. Park/Emergency Brakes Do Not Release.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Run engine to allow air pressure to reach a minimum of 60 psi (414 kPa).	If air pressure does not build, go to *Malfunction 7*.
	2. Verify park and emergency brake operation. a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10).	
	c. While watching for actuator movement, apply and release park and emergency brakes (TM 5-3805-248-10).	1. If one or more (not all) actuators do not move, go to Step 3. 2. If all four actuators do not move, go to Step 4.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Park/Emergency Brakes Do Not Release - Continued.	3. Inspect brakes for broken, disconnected or damaged parts.	1. Replace or repair brakes as necessary (WP 0147 00 through WP 0150 00). 2. Adjust actuators travel to 2.5 in. (63.5 cm) (WP 0151 00). 3. There may be a restriction in park and emergency brake delivery line(s) between brake actuator(s) and quick release holding valve(s). Remove blockage. 4. If problem still exists, replace actuator(s) for brake(s) in question (WP 0151 00).
	4. Check for air leak at quick release holding valves.	If leak exists, replace quick release holding valves (WP 0156 00 and WP 0157 00).
	5. Check for restriction in park and emergency brake delivery lines.	1. Unblock park and emergency brake delivery lines. 2. If problem still exists, replace stuck park and emergency valve (WP 0145 00). 3. If problem still exists, replace double check valve (WP 0158 00).

RETARDER SYSTEM

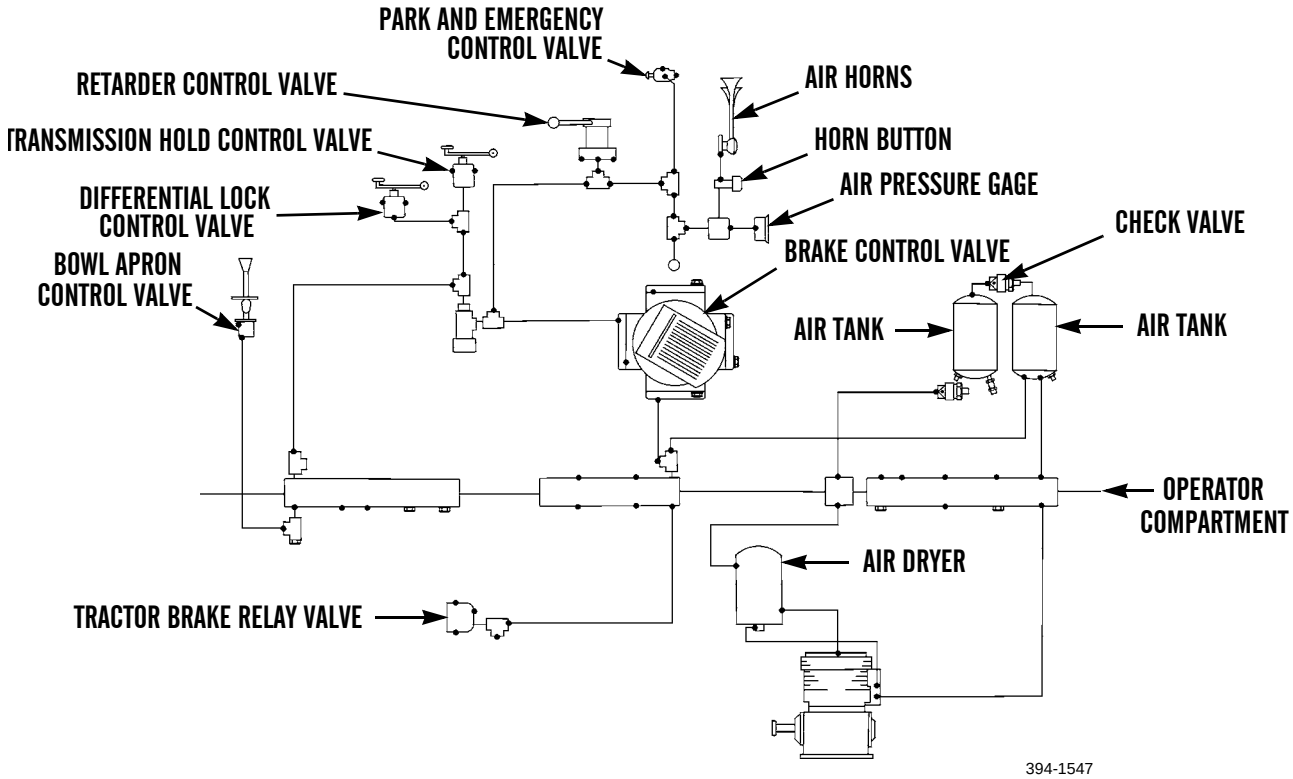


MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Retarder Does Not Engage.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check for air pressure to supply port of retarder control valve.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen retarder control valve supply line at retarder control valve and listen for air escaping (WP 0292 00).	1. If no air escapes, replace retarder control valve supply line (WP 0141 00). 2. If still no air escapes, replace brake control valve (WP 0155 00). 3. If air escapes, go to Test 2.
	2. Check for air pressure to retarder valve delivery line.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen retarder control valve delivery line at retarder control valve.	
	d. Actuate retarder control valve and listen for air escaping.	1. If no air escapes, replace retarder control valve (WP 0292 00). 2. If air escapes, go to Test 3.
	3. Check for air pressure at air regulator.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Retarder Does Not Engage - Continued.	b. Shut down engine (TM 5-3805-248-10). c. Loosen retarder control valve delivery line at air regulator (WP 0141 00).	
	d. While listening for air escaping, actuate retarder control valve.	1. If no air escapes, replace retarder control valve delivery line(s) (WP 0141 00). 2. If air escapes, go to Test 4.
	4. Check for air pressure at air hydraulic retarder.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10). c. Loosen hydraulic retarder air line at hydraulic retarder (WP 0289 00).	
	d. While listening for air escaping, actuate retarder control valve.	1. If no air escapes, replace hydraulic retarder air line (WP 0141 00). 2. If problem still exists, replace air regulator (WP 0141 00). 3. Replace hydraulic retarder (WP 0289 00).
6. Retarder Does Not Release.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check for proper retarder control valve action.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	c. Operate retarder hand control and listen for evidence of exhausting air (TM 5-3805-248-10).	1. If air does not exhaust, replace retarder control valve (WP 0292 00). 2. If air exhausts, go to Test 2.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Retarder Does Not Release - Continued.	2. Check hydraulic retarder. a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Shut down engine (TM 5-3805-248-10). c. Engage retarder control valve and release (TM 5-3805-248-10). d. Loosen hydraulic retarder air line.	1. If hydraulic retarder disengages, remove restriction from retarder control valve delivery lines and/or hydraulic retarder air line (WP 0141 00). 2. If hydraulic retarder does not disengage, replace hydraulic retarder (WP 0292 00).

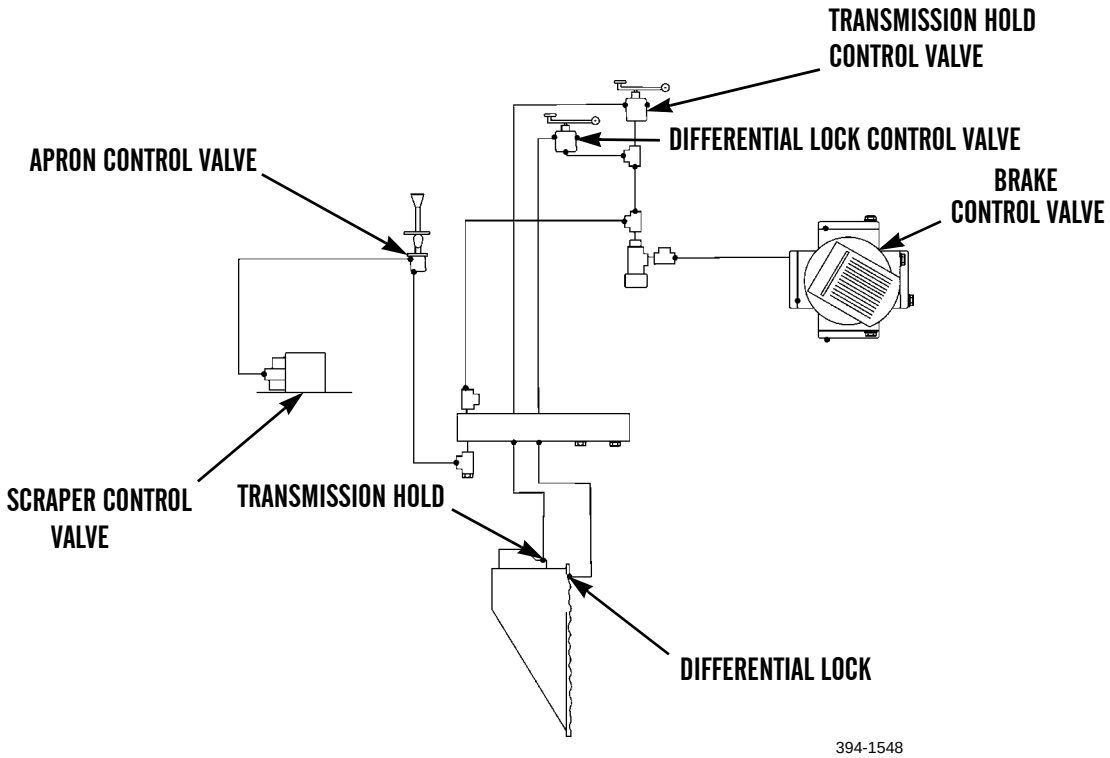
AIR SYSTEM



MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Air System Low Air Pressure.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check for broken or damaged air line(s).	1. Replace broken or damaged air line(s). 2. If lines are OK, go to Test 2.
	2. Listen for escaping air around machine at valves and fittings.	1. Replace or tighten valve or connection found to be leaking. 2. If valves and fittings are OK, go to Test 3.
	3. Listen for escaping air at air tanks and air dryer.	1. Replace air tank(s) or air dryer (WP 0152 00 through WP 0154 00). 2. If air tanks and dryer are OK, go to Test 4.
	4. Check governor adjustment.	1. If governor requires adjustment, or is damaged, service or replace (WP 0168 00). 2. Replace air compressor (WP 0167 00).
8. Air System High Air Pressure.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check governor adjustment.	1. Adjust or replace governor if damaged (WP 0168 00). 2. If problem still exists, go to Test 2.
	2. Check for faulty governor. a. While listening to air compressor, load and unload compressor by repeatedly stepping on brake pedal.	

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Air System High Air Pressure - Continued.	b. Governor is defective if it is unusually hot or air compressor does not unload.	1. Replace governor if defective (WP 0168 00). 2. If governor is OK, go to Test 3.
	3. Check unloader valves in cylinder head.	If unloader valves are damaged or defective, replace (WP 0377 00).
9. Oil in Air Reservoirs.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	Check for oil in air tanks.	Replace air compressor if oil is present in air reservoir (WP 0167 00).
10. Compressor Runs Hot.	1. Check air system for leaks.	Go to *Malfunction* 7.

HOLD PEDALS AND APRON CONTROL SYSTEM



MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. Transmission Hold Does Not Engage.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check adjustment of transmission hold valve pedal.	1. Adjust if needed (WP 0139 00). 2. If problem still exists, go to Test 2.
	2. Check for air supply to transmission hold valve inlet.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen air inlet line at transmission and listen for air.	
	d. Apply transmission hold pedal.	1. Repair transmission if air pressure is present at inlet (WP 0364 00). 2. If air pressure is not present at inlet, go to Test 3.
	3. Check transmission hold control valve assembly.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen air inlet line at transmission hold control valve and listen for air.	If air pressure is present at transmission hold control valve, replace transmission hold control valve (WP 0174 00).
	4. Check transmission hold pedal adjustment.	If transmission hold pedal requires adjustment, perform adjustment procedure (WP 0139 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Transmission Hold Does Not Release.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check transmission hold control valve assembly.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen air inlet line at transmission and listen for air.	
	d. Do not apply hold pedal.	1. If air pressure is present at transmission, replace transmission hold control valve (WP 0174 00). 2. If air pressure is not present at transmission, go to Test 2.
	2. Check transmission shift pedal adjustment.	If transmission shift pedal requires adjustment, perform adjustment procedure (WP 0139 00).
13. Apron Does Not Operate Correctly When Bowl Control Lever Is Pushed Forward.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check bowl control valve.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
13. Apron Does Not Operate Correctly When Bowl Control Lever Is Pushed Forward - Continued.	b. Shut down engine (TM 5-3805-248-10). c. Loosen air inlet line at bowl control valve and listen for air (WP 0237 00).	
	d. Push bowl control lever forward.	If air pressure is present at bowl control valve, replace bowl control valve (WP 0174 00).
	2. Check apron control valve.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	
	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen air inlet line at apron control valve and listen for air (WP 0330 00).	1. If air pressure is present at apron control valve, replace apron control valve (WP 0325 00). 2. If air pressure is not present at apron control valve, remove restriction from air line.
14. Differential Lock Does Not Engage.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check adjustment of differential lock pedal (WP 0171 00).	Adjust if necessary (WP 0171 00).
	2. Check for air supply to differential lock.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
14. Differential Lock Does Not Engage - Continued.	b. Shut down engine (TM 5-3805-248-10).	
	c. Loosen air inlet line at differential and listen for air (WP 0325 00).	
	d. Apply differential lock pedal.	1. If air pressure is present at differential, replace differential (WP 0295 00). 2. If air pressure is not present at differential, replace differential lock control valve (WP 0173 00). 3. If air pressure is not present at differential, remove restriction from air line.
15. Differential Lock Does Not Release.	**WARNING** • Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury. • Make sure wheels are chocked and bowl is lowered to ground for all tests. Failure to do so may cause injury or death.	
	1. Check differential lock pedal adjustment.	1. If differential lock pedal requires adjustment, perform adjustment procedure (WP 0171 00). 2. If problem still exists, go to Test 2.
	2. Check for air supply to differential lock.	
	a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10).	If air pressure does not build, go to *Malfunction 7*.
	b. Shut down engine (TM 5-3805-248-10).	
	NOTE Do not apply differential lock pedal.	
	c. Loosen air inlet line at differential and listen for air (WP 0325 00).	1. If air pressure is present at differential, replace differential lock control valve (WP 0173 00). 2. If air pressure is not present at differential, replace differential (WP 0295 00).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
16. Airhorn Is Inoperative	1. Check operation of brakes.	1. If parking or service brakes do not operate correctly, service them first. 2. If parking and service brakes operate correctly, go to Test 2.
	2. Verify low air pressure warning horn stops sounding when air pressure reaches normal.	1. If warning horn always sounds, remove the restriction or replace line and/or fitting between the bulk head fitting and the low air horn pressure switch. 2. If warning horn operates correctly, go to Test 3.
	3. Check air pressure from air horn solenoid valve. a. Run engine and allow air pressure to reach normal operating range (TM 5-3805-248-10). b. Loosen air line at solenoid valve (WP 0219 00).	
	c. Press airhorn switch (TM 5-3805-248-10) and listen for air escaping at line.	1. If no air escapes, go to *Electrical Troubleshooting*. 2. If air escapes, replace airhorn solenoid line (WP 0219 00). 3. If problem still exist, replace horn (WP 0218 00).

END OF WORK PACKAGE

Table 1. Steering System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Difficult Steering.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check for proper brake adjustments.	Adjust brakes (WP 0149 00).
	2. Check hydraulic reservoir fluid level in sight gage. If low, fill to proper level (TM 5-3805-248-10).	1. Fill reservoir if low. 2. If fluid level is OK, go to Test 3.
	3. Check for leaks in cylinders, hoses, lines and fittings.	1. Replace defective cylinders, hoses, lines and fittings (WP 0180 00). 2. If no leaks are present, go to Test 4.
	4. Check for obstructions and binding of steering linkage.	1. Remove any obstructions. Adjust binding steering linkage (WP 0179 00). 2. If linkage is OK, go to Test 5.
	5. Check for activated differential lock pedal or parking/emergency brake.	1. If differential lock pedal or parking/emergency brake is activated, release (TM 5-3805-248-10). 2. If differential lock is not activated, go to Test 6.
	6. Check relief valve.	1. If relief valve opens at a low oil pressure or is damaged, replace (WP 0312 00). 2. Go to Test 7.
	7. Check pilot valve of relief valve.	1. Replace pilot valve if closed, damaged or defective (WP 0312 00). 2. If valve is OK, go to Test 8.
	8. Check movement of flow control valve in steering control valve.	1. If flow control valve sticks, or is damaged or defective, replace (WP 0312 00).

Table 1. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Difficult Steering - Continued.	9. Check movement of flow control valve in steering control valve.	1. If flow control valve sticks, or is damaged or defective, replace (WP 0312 00). 2. Go to Test 9.
	10. Check implement valve.	1. Replace implement pump if worn, damaged or defective (WP 0322 00). 2. If valve is OK, go to Test 10.
	11. Check follow-up cylinder relief valve and check valves (WP 0308 00 and WP 0309 00).	1. Replace relief valves or check valves, if damaged or defective (WP 0309 00 and WP 0310 00). 2. If valves are OK, go to Test 11.
	12. Check valve spool on steering control valve.	1. If valve spool requires adjustment, adjust (WP 0312 00). 2. If valve spool is damaged or defective, replace (WP 0312 00).
2. Difficulty Changing Directions.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	Check follow-up cylinder relief valve and check valves (WP 0308 00 and WP 0309 00).	If relief valves or check valves leak or are damaged or defective, replace (WP 0309 00 and WP 0310 00).

Table 1. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Slow Steering Response.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check for leaks in cylinders, hoses, lines and fittings.	Replace defective cylinders, hoses, lines and fittings (WP 0180 00).
	2. Check seal on piston in steering cylinder.	1. If seal is damaged or defective, replace (WP 0308 00). 2. If problem still exists, go to Test 3.
	3. Check relief valve (WP 0312 00).	1. Replace relief valve if opens at a low oil pressure, or is damaged or defective (WP 0322 00). 2. If valve OK, go to Test 4.
	4. Check implement pump.	1. If implement pump is worn, damaged or defective, replace (WP 0322 00). 2. If problem still exists, perform steering flow meter tee tests (WP 0306 00).

Table 1. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Slow Turning in One Direction Only.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check steering linkage to control valve for binding or loose steering linkage.	Adjust binding or loose steering linkage (WP 0175 00).
	2. Check valve spool on steering control valve.	1. If valve spool moves too slowly in one direction, adjust (WP 0312 00).

Table 1. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Machine Turns Slightly When Steering Wheel Is Stationary.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check valve spool in steering control valve (WP 0312 00).	1. If valve spool requires adjustment, adjust (WP 0312 00). 2. If valve spool is damaged or defective, replace (WP 0312 00). 3. If valve is OK, go to Test 2.
	2. Check follow-up cylinder relief valve and check valves (WP 0308 00 and WP 0309 00).	If relief valves or check valves leak or are damaged, replace (WP 0309 00 and WP 0310 00).

Table 1. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Implement Pump Makes Noise, Cylinder Rods Do Not Move Smoothly and Air Bubbles in Oil.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check relief valve (WP 0312 00).	1. If relief valve opens at a low oil pressure or is damaged or defective, replace (WP 0312 00). 2. If valve is OK, go to Test 2.
	2. Check implement pump (WP 0312 00).	1. If implement pump is worn, damaged or defective, replace (WP 0322 00). 2. If pump is OK, go to Test 3.
	3. Check follow-up cylinder relief valve and check valves (WP 0308 00 and WP 0309 00).	1. If relief valves or check valves leak or are damaged or defective, replace (WP 0309 00 and WP 0310 00). 2. If valve is OK, go to Test 4.
	4. Check seal on piston in steering cylinder.	1. If seal is damaged or defective, replace (WP 0308 00). 2. If seal is OK, go to Test 5.
	5. Check relief valve (WP 0312 00).	1. Replace relief valve if opens at a low oil pressure or is damaged or defective (WP 0322 00). 2. If valve is OK, go to Test 6.
	6. Check implement pump.	1. If implement pump is worn, damaged or defective, replace (WP 0322 00). 2. If problem still exists, perform steering flow meter tee test (WP 0306 00).

Table 2. Hydraulic System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Noisy Bowl Operation.	Check bowl alignment with draft frame.	Maximum dimension for bowl shim plates is 0.23 in. (5.84 mm) on either side (WP 00239 00).
2. Noisy Ejector Operation.	1. Check for broken, dragging or out-of-adjustment guide rollers.	Replace or adjust guide rollers as necessary (WP 0331 00).
	2. Check if carrier rollers are broken or out of adjustment.	Replace or adjust carrier rollers as necessary (WP 0329 00 through WP 0330 00).
	3. Check ejector assembly.	If ejector is damaged, replace (WP 0328 00).
3. Noisy Apron Operation.	Check apron assembly.	If apron assembly is damaged, replace (WP 0386 00).
4. Hydraulic Implement Pump Makes Noise.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check for leaks in hydraulic suction hoses causing aeration of hydraulic oil.	1. If damaged, replace hose(s) (WP 0233 00). 2. If hoses are OK, go to Test 2.
	2. Perform hydraulic system flow meter tee tests (WP 0321 00).	1. Correct as indicated in (WP 0321 00). 2. If problem still exists, replace hydraulic implement pump (WP 0322 00).

Table 2. Hydraulic System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Irregular Apron, Ejector and/or Bowl Movement (Not Smooth).	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check ejector and guide rollers for damage.	1. If damaged, replace rollers (WP 0328 00 through WP 0331 00). 2. If rollers are OK, go to Test 2.
	2. Check all hydraulic lines and fittings for leaks, kinks or other damage.	1. If damaged, replace lines and fittings (WP 0232 00 through WP 0241 00). 2. If lines and fittings are OK, go to Test 3.
	3. Check for leaks at ejector, bowl and apron cylinders.	1. If damaged, replace hydraulic cylinder(s) (WP 0242 00 through WP 0244 00). 2. If cylinder(s) are OK, go to Test 4.
	4. Check for leaks in hydraulic suction hoses causing aeration of hydraulic oil.	1. If damaged, replace hose(s) (WP 0233 00). 2. If hoses are OK, go to Test 5.
	5. Check control linkages for free movement and full travel of control valve spools.	1. If required, adjust linkages to achieve full travel of scraper control valve spools (WP 0325 00). 2. If linkage is binding or damaged, replace (WP 0325 00). 3. If problem still exists, go to Test 6.
	6. Perform hydraulic system flow meter tee tests (WP 0321 00).	1. Correct as indicated in WP 0321 00. 2. If problem still exists, replace hydraulic implement pump (WP 0322 00).

Table 2. Hydraulic System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Hydraulic System Slow to Respond.	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Check for leaks in hydraulic suction hoses causing aeration of hydraulic oil.	1. If damaged, replace hose(s) (WP 0233 00). 2. If hoses are OK, go to Test 3.
	2. Check for leaks at ejector, bowl and apron cylinders.	1. If damaged, replace hydraulic cylinder(s) (WP 0242 00 through WP 0244 00). 2. If cylinder(s) are OK, go to Test 3.
	3. Perform hydraulic system flow meter tee tests (WP 0321 00).	1. Correct as indicated in WP 0321 00. 2. If problem still exists, replace hydraulic implement pump (WP 0322 00).
7. Hydraulic Oil Is Overheating (Indicated by Blown Oil Seals, Decreased Life of Components).	**WARNING** • Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death. • At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so may cause injury. • Hydraulic oil is slippery and can cause falls. To avoid injury, wipe up spilled oil with rags.	
	1. Perform hydraulic system tests (WP 0321 00).	Adjust or repair affected component(s) as directed by test results (WP 0321 00).

Table 3. Non-Electrical Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
Tachometer Does Not Work or Indicates Erratically.	1. Check inner drive cable for rotation.	
	a. Disconnect tachometer drive cable at tachometer only (WP 0248 00).	
	b. Start engine (TM 5-3805-248-10). Inner drive cable should rotate.	1. If inner drive cable does rotate, replace tachometer (WP 0247 00). 2. If inner cable rotates, go to Test 2.
	2. Check inner drive cable for separation.	
	a. Disconnect tachometer drive cable at tachometer drive (WP 0248 00).	
	b. Hold one end of inner drive cable and pull on other end. Inner drive cable should not separate.	1. If inner drive cable does separate, replace tachometer drive cable (WP 0248 00). 2. If cable does not separate, go to Test 3.
	3. Check both ends of inner drive cable for rotation. Rotate one end of inner drive cable. Other end should rotate.	If both ends of inner drive cable do not rotate, replace tachometer drive cable (WP 0248 00).

END OF WORK PACKAGE

CHAPTER 3
UNIT FIELD MAINTENANCE

SERVICE UPON RECEIPT AND GENERAL MAINTENANCE INFORMATION 0016 00

THIS WORK PACKAGE COVERS

Handling New Equipment

Servicing New Equipment

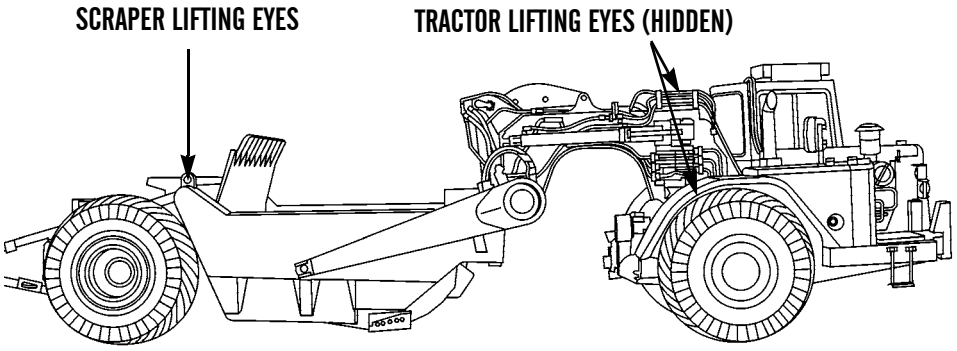
Initial Checkout/Adjustment

HANDLING NEW EQUIPMENT

NOTE

The 621B Scraper is shipped unboxed and mobile, with tiedowns at front and rear axles.

1. Remove blocking from front, rear and sides of 621B Scraper.
2. Remove tiedowns. Remove tape, paper and other packing materials. Remove ejector shipping cable from 621B Scraper.
3. If loading dock does not have a permanent drive on ramp or if no set-up ramp is available, the 621B Scraper must be unloaded using a crane.



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HANDLING NEW EQUIPMENT - CONTINUED

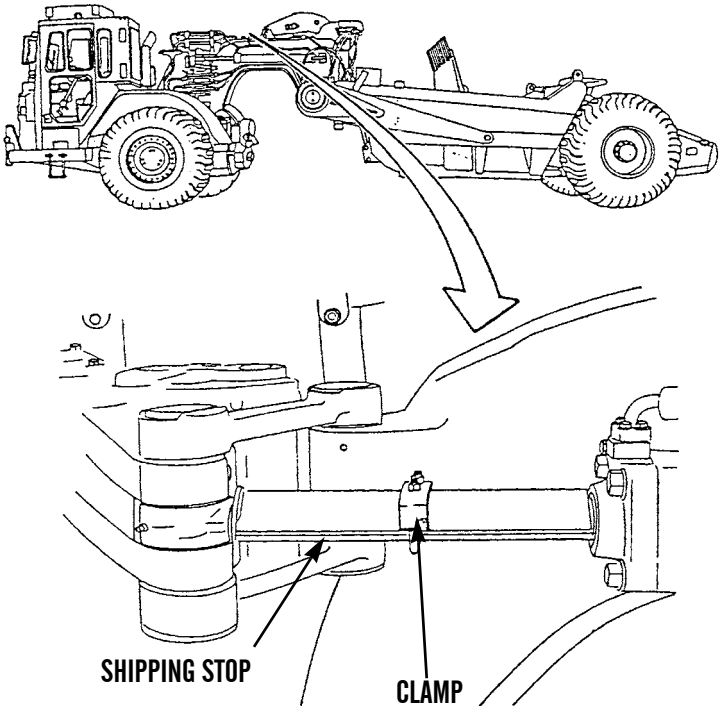
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

- Weight of tractor portion of 621B Scraper is 44,000 lb (19,960 kg). Weight of scraper portion is 25,000 lb (11,340 kg).
- When hooking up cables or slings, 22-25 ft (6.7-7.7 m) long spreader bars are recommended between the front and rear cables.

4. Remove clamps and shipping stops on steering portion cylinder rods.



5. Walk around 621B Scraper. Look for chipped paint, loose bolts, and obvious damage. Inspect hoses, lines, fittings, electrical wiring and other items.
6. Connect batteries (WP 010300).
7. Perform preventive maintenance checks and services (PMCS) (WP 0019 00 and WP 0020 00).
8. Enter operator compartment. Check controls. Neutralize hydraulic levers. Put transmission lever in Neutral (N) and lock.
9. Energize electrical system with master switch.
10. Depress accelerator pedal past detent.
11. Operate engine. Observe oil pressure reading on gage. Allow air pressure to build to a minimum of 60 psi (414 kPa).

HANDLING NEW EQUIPMENT - CONTINUED

WARNING

When exiting operator compartment, do not grab or turn steering wheel. 621B Scraper will articulate.

12. Exit operator compartment. Walk around and look for leaking hydraulic fittings and/or damaged hoses.
13. Enter operator compartment. Raise bowl assembly.
14. Engage transmission in forward or reverse and check parking brake holding capacity (TM 5-3805-248-10).
15. Check steering. Gently turn wheel and see if 621B Scraper articulates.
16. Release parking brake.
17. Drive 621B Scraper.

SERVICING NEW EQUIPMENT

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove preservative compounds from metal surfaces with cleaning solvent.
2. Clean all dust and dirt from seat, instrument panel, wiring, engine, radiator and other parts.
3. Lubricate 621B Scraper in accordance with PMCS (WP 0019 00 and WP 0020 00).

INITIAL CHECKOUT/ADJUSTMENT

1. Inspect equipment for damage from shipping. If equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report. Refer to DA PAM 700-3 for instructions on preparation of DD Form 6.
2. Check equipment against packing slip. Look for damage and check to see if 621B Scraper has been modified. Report damage or modifications in accordance with DA-PAM 738-750.
3. Inspect air cleaner service indicator (TM 5-3805-248-10).
4. Check instrument panel and gages for damage. Test for correct operation (TM 5-3805-248-10).
5. Inspect fuse box for broken or faulty fuses (TM 5-3805-248-10).
6. Check control levers for breaks or bends.
7. Inspect engine accessories, fan, air compressor and alternator for secure mounting, loose connections or loose belts.
8. Inspect wiring for loose connections, damaged insulation and/or broken wires.
9. Check that all drain plugs are securely tightened.
10. Fill all fluids to correct level (TM 5-3805-248-10).

END OF WORK PACKAGE

NOTE

Refer to WP 0018 00 for *Electrical General Maintenance Instructions*.

SCOPE

These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain the 621B Scraper. You should read and understand these practices and methods before starting maintenance tasks on the machine.

WORK SAFETY

1. Before starting a task, think about the risks and hazards to your safety as well as others. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron or gloves. Protect yourself against injury.
2. Observe all WARNINGs and CAUTIONs.
3. When lifting heavy parts, have someone help you. Ensure that lifting equipment is working properly, that it is appropriate for the task assigned, of sufficient load capacity and secured against slipping.
4. Always use power tools carefully.
5. Before beginning a procedure, ensure that the following conditions have been observed, unless otherwise specified:
   a. Machine must be parked on level ground with implements lowered to the ground.
   b. Transmission must be in N (Neutral) with transmission lock lever in locked position.
   c. Engine must be off.
   d. Components that are hot at operating temperatures (i.e., cooling, exhaust and hydraulic systems) must cool down before they are removed.
   e. Components must, however, be at operating temperature to be tested.
   f. Battery disconnect switch must be in OFF position and batteries disconnected when performing electrical system maintenance.
   g. Hydraulic system pressure must be relieved before disconnecting any hydraulic system line or fitting. Refer to *Relieving Hydraulic System Pressure*, below.

RELIEVING HYDRAULIC SYSTEM PRESSURE

WARNING

DO NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,238 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury or death.

1. Lower all machine implements to the ground.
2. Shut down engine.
3. Move all control levers through all operating positions. Return levers to HOLD position.
4. Slowly loosen filler cap and allow any pressure to escape.

GENERAL INFORMATION

1. Refer to torque limits (WP 0335 00) for appropriate torque specifications of fasteners. Unless directed otherwise, always tighten fasteners when installing them.
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 the equipment only as far as necessary to repair or replace damaged or broken parts.
3. All tags and forms attached to the equipment must be checked to learn the reason for removal from service. Check all Modification Work Orders (MWOs) and Technical Bulletins (TBs) for equipment changes and updates.
4. 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 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 pull out bearings or bushings unless damaged. If you must access parts behind them, pull out bearings or bushings carefully.
   c. Replace all gaskets, seals, O-rings, cotter pins, spring pins, self-locking nuts and lockwashers.

CLEANING INSTRUCTIONS

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, It may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Improper cleaning methods and use of unauthorized solvent cleaning compound may injure personnel and damage equipment. Refer to TM 9-247 for correct information.
- Fire extinguishers should be placed nearby when using solvent cleaning compound.
- Cloths or rags saturated with solvent cleaning compound must be disposed of IAW authorized facilities' procedures.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. **General.**
   a. Cleaning instructions will be the same for the majority of parts and components.
   b. The importance of cleaning must be thoroughly understood by maintenance personnel. Great care and effort are required in cleaning. Dirt and foreign material are a constant threat to satisfactory maintenance. The following should apply to all cleaning, inspection, repair and assembly operations.

CLEANING INSTRUCTIONS - CONTINUED

(1) Clean all parts before inspection, after repair and before assembly.

(2) Hands should be kept free of accumulation of grease, which can collect dust, dirt or 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.

2. **External Engine Cleaning.**

   a. Protect all electrical equipment that could be damaged by the steam or moisture before steam cleaning.

   b. Cover all openings before steam cleaning.

   c. After cleaning, dry and apply a light coat of oil (Item 32, WP 0339 00) to all parts subject to rust.

   d. Clear out all tapped (threaded) holes with compressed air to remove dirt and solvent cleaning compound.

3. **Cleaning Disassembled Parts.**

   a. Place all disassembled parts in wire baskets for cleaning.

   b. Dry and cover all cleaned parts.

   c. Place parts on or in “racks” and hold for inspection or repair.

   d. All parts subject to rusting must be lightly oiled and wrapped.

   e. Keep all related parts and components together. Do not mix parts.

4. **Castings.**

   a. Clean inner and outer surfaces of castings and all areas subject to grease and oil with solvent cleaning compound (Item 8, WP 0339 00).

   b. Use a stiff brush to remove sludge and gum deposits.

   c. Clear out all tapped (threaded) holes with compressed air to remove dirt and solvent cleaning compound.

5. **Oil Passages.** Particular attention must be given to all oil passages in castings and machined parts. Oil passages must be clean and free of any obstructions.

   a. Clean passages with wire probes to break up any sludge or gum deposits.

   b. Wash passages by flushing with solvent cleaning compound (Item 8, WP 0339 00).

   c. Dry passages with compressed air.

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

CAUTION

Washing oil seals, electrical cables and flexible hoses with solvent cleaning compound or mineral spirits will cause serious damage or destroy the material.

   a. Wash electrical cables and flexible hoses with a mild solution of detergent (Item 13, WP 0339 00) and water and wipe dry.

   b. Oil seals are generally damaged during removal; cleaning will not be necessary since new seals will be used in assembly.

7. **Bearings.** Refer to TM 9-214 for complete instructions.

8. **Machined Surfaces.**

   a. Clean machined surfaces with solvent cleaning compound (Item 8, WP 0339 00).

   b. Dry surfaces with compressed air.

CLEANING INSTRUCTIONS - CONTINUED

9. **Mated Surfaces.**
   a. Use a wire brush and solvent cleaning compound (Item 8, WP 0339 00)
   b. Lightly coat with oil (Item 32, WP 0339 00) and wrap all parts subject to rust before storing.
10. **Rusted Surfaces.** Use a wire brush and emery cloth to clean all rusted surfaces.
11. **Oil-Bathed Internal Parts.** Wipe oil-bathed internal parts clean with a lint-free cloth.
12. **Air-Actuated Internal Parts.** Wash air-actuated internal parts clean with a lint-free cloth.
13. **Externally Exposed Parts.** Wash externally exposed parts with detergent (Item 13, WP 0339 00) and water. Rinse thoroughly and air dry.

INSPECTION INSTRUCTIONS

1. **General.** All components and parts must be carefully checked to determine if they are serviceable for reuse, if they can be repaired or if they must be scrapped.
2. **Drilled and Tapped (Threaded) Holes.**
   a. Inspect for wear, distortion (stretching), cracks or any other damage in or around holes.
   b. Inspect threaded areas for wear, distortion or evidence of cross-threading.
   c. Mark all damaged areas for repair or replacement.
3. **Metal Lines, Flexible Lines (Hoses) and Fittings.**
   a. Inspect lines for sharp kinks, cracks, bends or dents.
   b. Inspect flexible lines for fraying, evidence of leakage or loose fittings or connectors.
   c. Check all fittings and connectors for thread damage. Check for hex heads that are worn or rounded by poorly fitting wrenches.
   d. Mark all damaged material for repair or replacement.
4. **Castings.**
   a. Use a magnifying glass and strong light to inspect all ferrous and nonferrous castings for cracks.
   b. Particularly check areas around studs, pipe plugs, threaded inserts and sharp corners. Replace all cracked castings.
   c. Inspect machined surfaces for nicks, burrs or raised metal. Mark damaged areas for repair or replacement.
   d. Inspect all pipe plugs, pipe plug openings, screws and screw openings for damaged or stripped threads.
   e. Check all gasket mating surfaces, flanges on housings and supports for warpage with a straightedge or surface plate. Inspect mating flanges for discoloration that may indicate persistent oil leakage.
5. **Bearings.** Refer to TM 9-214 for inspection of bearings. Damaged bearings must be replaced.
6. **Studs, Bolts and Screws.** Replace if threads are damaged, bent, loose or stretched.
7. **Gears.**

NOTE

When gear teeth wear limits are not established, good judgment is required to determine if gear replacement is necessary.

   a. Use a magnifying glass and strong light to inspect all gears for cracks. No cracks are permissible.
   b. Inspect gear teeth for wear, sharp fins, burrs and galled or pitted surfaces.
   c. Check keyway slots for wear or damage. If keyways are worn, damaged or elongated, replace gear.

INSPECTION INSTRUCTIONS - CONTINUED

8. **Bushing and Bushing-Type Bearings.**

   a. Check all bushings and bushing-type bearings for secure fit, evidence of overheating, wear, burrs, nicks and out-of-round condition. Replace as necessary.

   b. Check for dirt in lubrication holes or grooves. Holes and grooves must be clean and free from damage.

9. **Oil Seals.** Oil seals are mandatory replacement items.

10. **Core Hole Expansion Plugs.** Inspect for leakage. Replace plugs when leakage is present.

11. **Machine Tooled Parts.** Inspect for cracks, breaks, elongated holes, wear and chips. Replace any damaged parts.

12. **Machined Surfaces.** Inspect for cracks, evidence of wear, galled or pitted surface, burrs, nicks and scratches.

13. **Mated Surfaces.** Inspect for remains of old gasket, seal, secure fit, pitting and evidence of leakage.

14. **Rusted Surfaces.** Inspect for pitting, holes and severe damage.

15. **Oil-Bathed Internal Parts.** Inspect for cracks, nicks, burrs, evidence of overheating and wear.

16. **Air-Actuated Internal Parts.** Inspect for cracks, nicks, burrs, evidence of overheating and wear.

17. **Externally Exposed Parts.** Inspect for breaks, cracks, rust damage and wear.

18. **Springs.** Inspect for broken, collapsed and twisted coils.

REPAIR INSTRUCTIONS

1. **General.**

   a. Any repair procedure peculiar to a specific part or component is covered in the work package relating to that item.

CAUTION

Repaired items must be thoroughly cleaned to remove metal chips and abrasives to prevent them from entering working parts of the machine.

   b. After repair, clean all parts thoroughly to prevent dirt, metal chips or other foreign material from entering any working parts.

2. **Castings.**

   a. Only minor repairs to machined surfaces, flanges and gasket mating surfaces are permitted. Use the following methods to remove minor nicks, burrs and scratches:

      (1) File with a fine-mill file.

      (2) Rub with an emery cloth dipped in solvent cleaning compound.

      (3) Lap across a surface plate.

   b. Remachining of machined surfaces to repair damage, warpage or uneven surfaces is not permitted. Replace castings.

   c. Repair damaged threaded pipe plug or screw threads with a tap. Repair oversize holes with threaded inserts.

REPAIR INSTRUCTIONS - CONTINUED

3. **Studs.**
   a. Repair minor thread damage with a thread die.
   b. Replace studs having stripped or damaged threads as outlined below:
      (1) Remove using a stud remover. Back studs out slowly to avoid heat buildup and seizure that can cause stud to break off.

CAUTION

Refer to TM 9-233 to avoid damage to castings if welding method is used.

      (2) If studs break off too short to use a stud remover, use a stud extractor to remove or use welding method: weld bar stock or a nut to stud and remove with a wrench.
      (3) Install replacement stud slowly to prevent heat buildup and snapping off.
4. **Gears.**
   a. Use pliers to remove gears.
   b. Only minor repairs to gears are permitted. Remove minor nicks, burrs or scratches on gear teeth with:
      (1) Fine mill file.
      (2) Emery cloth dipped in solvent cleaning compound (Item 8, WP 0339 00).
5. **Bushings and Bushing Type Bearings.** When bushings and bushing type bearings seize to a shaft and spin in the bore, associated parts must also be replaced.
6. **Oil Seals.**
   a. Remove oil seals by pressing or prying out, being careful not to damage casting or adapter bore.
   b. Note orientation of seal to ensure correct installation.
   c. Always install new seal in bore using proper seal installation tool.
7. **Painting.** Upon installation, restored parts must be painted IAW TB 43-0209.
8. Complete disassembly is not always necessary to make a repair. Exercise good judgment to keep disassembly and assembly to a minimum.
9. Repair or replace unserviceable parts and hardware. Always replace packings, gaskets and seals with new parts.
10. Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with abrasive grade compound.
11. Remove corrosion or rust with crocus or emery cloth. Use the method that will not damage the surface being cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces. Ensure critical dimensions are not altered when using crocus cloth.
12. Repair damaged threads with a thread chaser or die.
13. When welding is authorized, procedures in TM 9-327 must be followed. Welds must be inspected for cracks.
14. Bearings should be inspected and maintained following procedures in TM 9-214.
15. Clean electrical ground contacts with emery cloth. Make sure ground connections are tight.
16. Repair chafed, broken or damaged electrical wiring with insulation tape, electrical, specification MIL-HH-1-595. When soldering is required, procedures in TB SIG-222 must be followed.
17. After locating the malfunction and repairing the component, test it for proper function.

LUBRICATION INSTRUCTIONS

NOTE

Refer to TM 5-3508-248-10 and to PMCS (WP 0019 00 and WP 0020 00) for detailed, illustrated instructions on proper lubrication. The following are some general practices to remember:

1. Use the correct lubricant.
2. Keep lubricants clean.
3. Clean all fittings prior to lubrication.
4. Lubricate clean disassembled and new parts to prevent rust.

MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, as contained in the Maintenance Management Update.

LUBRICATION

Keep a light coat of lubricating oil (PL - medium or PL - special) on parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required by PMCS (WP 0020 00).

AIR INDUCTION SYSTEM MAINTENANCE

When working on the air induction system, always keep in mind that the system's function is to provide the engine with clean air. Always protect the engine against severe damage from dirt, dust and foreign objects. Do everything you can to keep dirt out of the system. The following maintenance practices must be followed anytime you are working on the air induction system.

1. Never start the engine without the air induction system completely installed.
2. Always protect the system when it is disassembled by closing off all ducts leading to the engine with heavy paper and tape.
3. Take off paper and tape and wipe all dirt out of the system before reassembling.
4. Always make sure seals are airtight and in top condition. Replace any seals that are cracked, split, torn or hardened.
5. Clean all hydraulic connections and mating parts with cleaning compound and rags when taking them off. If available, use compressed air to clean fittings.
6. Before taking off any hydraulic hoses, tubes, electrical wires harnesses or cables, tag them to show location. Tagging saves time and avoids errors. Remove tags after parts are installed.
7. Keep a container under tubes, hoses and fittings even after fluid has been drained.

HYDRAULIC SYSTEM MAINTENANCE

WARNING

Hydraulic fluid may be absorbed through the skin. If hydraulic fluid gets on your skin, thoroughly wash it off with soap and water as soon as possible.

- Always wear safety glasses when working on the hydraulic system. If hydraulic fluid gets in your eyes, you can be blinded.
- Hot equipment can burn you. Wait until hydraulic tubes and hoses are cool enough to touch before you start work.
- Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

1. Before taking off any hydraulic hoses, tubes or electrical harnesses, tag them to show location. Tagging saves time and avoids errors. Remove tags after parts are installed.

WARNING

Wipe up spilled fluids immediately with rags. Hydraulic fluid is slippery.

2. Put a rag under all connections to catch spilled fluids before you disconnect them.
3. Unscrew connections with two wrenches. Use one wrench to unscrew the connection and the other wrench to hold the fitting or line to keep it from twisting. Make sure any old sealing compound or tape is removed.
4. Cap or plug all open hydraulic tubes, lines or fittings when you disconnect them. This will keep dirt and dust out of the hydraulic system and will also stop fluid from siphoning through hoses and tubes. Do not take off caps or plugs until you are ready to connect the system.
5. Cover large openings or ports with cardboard, sheets of plastic or masking tape.

HYDRAULIC SYSTEM MAINTENANCE - CONTINUED

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, It may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Improper cleaning methods and use of unauthorized solvent cleaning compound may injure personnel and damage equipment. Refer to TM 9-247 for correct information.
- Fire extinguishers should be placed nearby when using solvent cleaning compound.
- Cloths or rags saturated with solvent cleaning compound must be disposed of IAW authorized facilities' procedures.
- Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may cause injury to personnel.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

6. Clean up all spills and leaks with rags. When gasket is taken off, clean area with solvent cleaning compound P-D680 and rags.
7. Inspect tube and hose nuts and fittings for bad threads. Replace bad nuts and fittings.
8. Take protective caps or plugs off all tubes, lines, fittings, receptacles and connectors before they are installed.
9. Make sure connection points and insides of all tubes, lines and fittings are clean before installing them.

WARNING

Sealing compound and solvent burn easily and can give off harmful vapors. To avoid injury, keep away from open fire and use in a well-ventilated area.

10. Before you put connection points together again, wipe off openings with solvent cleaning compound P-D-680 and a clean rag. If sealing compound was used around connection points, make sure it is removed.
11. Put a light coat of lubricant, same as lubricant in system being worked on, on all preformed packings before installing packing.

WARNING

Lubricating oil MIL-L-23699 or MIL-L-7808 can cause skin rash. If oil gets on skin or clothing, wash with soap and water.

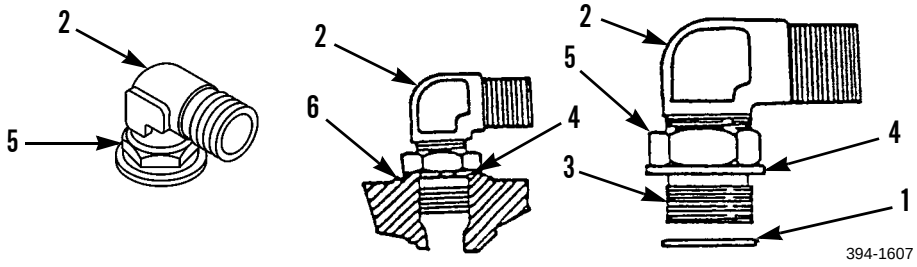
12. Put clean lubricating oil on all threads, except pipe (tapered) threads, before you screw parts together.
13. Always screw on and tighten tubes, hoses and fittings by hand to ensure they are not cross-threaded. Tighten with two wrenches whenever possible until you feel solid resistance, then tighten 1/4 turn more.

HYDRAULIC SYSTEM MAINTENANCE - CONTINUED

CAUTION

Ensure no hose is twisted, stretched or kinked. Hoses that are twisted or kinked can close off flow through the system and lead to component failure.

14. Screw on both tube nuts with your fingers to position tubing and clamps correctly before tightening tube nuts.
15. Put anti-seizing tape MIL-T-27730 on pipe (tapered) threads. Do not put tape on first two threads.
16. Operate the system being worked on and check the system for leaks at all connections that were loosened. If a connection leaks, unscrew one full turn, then tighten. If it is still leaking, replace leaking parts.
17. Always look carefully at equipment for likely signs of trouble while doing routine work. If hydraulic oil is leaking down on harnesses and connectors, repair the leak at once. Tie down any harness that is free to move and rub against metal. If you look for possible trouble spots and make repairs at once, you can cut down on repair time and extra work.
18. Installing adjustable fittings.
    a. Put a light coat of lubricant, same as lubricant in system being worked on, on packing (1). Slide packing on fitting (2) so that packing is seated in groove against washer (4) as far as it will go.
    b. Turn locknut (5) clockwise until it touches washer (4).
    c. Screw fitting (2) into boss (6) until washer (4) touches boss.
    d. Turn fitting (2) counterclockwise, up to one full turn, until desired position is reached.
    e. Whenever possible, hold fitting (2) in position with one wrench and tighten locknut (5) clockwise with other wrench.



1. The following are general practices regarding the use of tools:
    a. Always use the proper tool kit and tools for the procedure being performed.
    b. Ensure that tools are clean and lubricated to reduce wear and to prevent rust.
    c. Keep track of tools. Do not be careless with them.
    d. Return tools to toolbox when finished with repair or maintenance.
    e. Return toolboxes and tools to tool storage when not in use.
    f. Inventory tools before and after each use.
2. Some maintenance tasks may require special or fabricated tools. The “Initial Setup” of the procedure will specify any special or fabricated tools needed to perform that procedure. Use these special tools only for the maintenance procedures for which they are designed or called out. If you are unfamiliar with a required tool, see your supervisor.

TAGGING WIRES AND HOSES

1. Use marker tags (Item 42, WP 0339 00) to identify all electrical wires; fuel, oil, coolant, and hydraulic lines; and any other parts that may be hard to identify or replace later. Fasten tags to parts during removal by wrapping wire fasteners around or through parts and twisting ends together. Position tags to be out of the way during cleaning, inspection and repair. Mark tags with a pencil, pen or marker.

TAGGING WIRES AND HOSES - CONTINUED

2. Whenever possible, identify electrical wires with the number of the terminal or wire to which it connects. If no markings can be found, tag both wires or wire and terminal, and use the same identifying mark for both. If you cannot tag a wire because it must fit through a small hole or you cannot reach it, write down the description of the wire and the point to which it connects, or draw a simple diagram on paper. Be sure to write down enough information so you will be able to properly connect the wires during assembly. If you need to identify a loose wire, look for identifying number near end of the wire, stamped on a permanent metal tag. Compare the number to wire numbers on the appropriate electrical schematic.
3. Identify fuel, oil, coolant and hydraulic lines when you are taking off more than one line at the same time. Mark tags with points to which lines and hoses must be connected. If it is not obvious which end of a line goes where, tag each end of the line.
4. Identify and tag other parts by name and installed location as required.

LINES AND PORTS

To keep dirt from contaminating fluid systems when removing and installing fuel, oil, coolant and hydraulic lines, perform the following steps:

a. Clean fittings and surrounding area before disconnecting lines.

b. Cover, cap, plug (Item 6, WP 0339 00) or tape lines and ports after disconnecting lines. When these materials are not available, use plastic bags and rubber bands, clean rags (Item 33, WP 0381 00) or other similar materials to prevent dirt from entering system.

c. Ensure that new and used parts are clean before installing.

d. Replace all clamps and tiedown straps.

e. DO NOT remove cover, cap, plug or tape from lines and ports until just before installing lines.

FLUID DISPOSAL

WARNING

- When servicing this vehicle, performing maintenance, or disposing of materials such as engine coolant, hydraulic fluid, lubricants, battery acids or batteries, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845.
- Dispose of contaminated drained fluids IAW the Standard Operating Procedures (SOP) of your unit.

END OF WORK PACKAGE

ELECTRICAL GENERAL MAINTENANCE INSTRUCTIONS 0018 00

THIS WORK PACKAGE COVERS

Electrical System Components and Wiring
Multiple-Pin Connector Repair
Receptacle Connector Repair
Waterproof Connector Repair
Military Connector Repair
Ring Terminal Repair
Splicing Wires
Electrical Ground Points
Multimeter Usage
Relay Inspection and Test

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, field maintenance, (Item 104, WP 0338 00)

Materials/Parts

Cloth, abrasive, emery, fine (Item 9, WP 0339 00)

Detergent, general purpose (Item 13, WP 0339 00)

Materials/Parts - Continued

Grease, electrically conductive (Item 21, WP 0339 00)

Insulating sleeving (Item 23, WP 0339 00)

Insulating varnish, electrical (Item 24, WP 0339 00)

Solder, lead-tin alloy (Item 40, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

ELECTRICAL SYSTEM COMPONENTS AND WIRING

The electrical system can be damaged by broken, bent, pushed-in or dirty pins and contacts or connectors and receptacles mated with the wrong equipment or harnesses. Harnesses improperly routed can also cause damage to the electrical system. The following practices must be followed anytime you work on electrical systems.

1. **Tagging Electrical Wires.**
   a. Look at part or wire to see if it has numbers, letters or an identification band. Each cable or each harness should have an identification band. If the identification band is missing or unreadable, tag each cable end termination before taking out the harness.
   b. Write numbers or letters on tags with pencil. Fasten tag on wire, terminal or part by twisting wire ends. Remove tag after part or wire is installed. If you cannot tag a wire because it must fit through a small hole or because you cannot reach it, write down the wire location and terminating point on paper.
   c. After installing a harness, take off any tags that were put on harness cables.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

2. **Cleaning Electrical Components.**

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

CAUTION

Do not use a wire brush or any metal tool to remove corrosion from a connector shell, receptacle or pin. This could scratch the surface plating and cause corrosion in the metal below.

a. Clean off oil, grease and any dirt from cable harnesses and parts other than connectors with solvent cleaning compound and non-metallic brush or lint-free cloth. Be sure to cover clean parts with dust caps, plugs or lint-free cloths.

b. Wipe up wet or damp places. Take steps to keep water away from electrical components.

c. Dry the connector and receptacle to be cleaned either in open air or with air heat gun.

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

d. Remove any corrosion and other contaminants inside the connector or receptacle with solvent cleaning compound on a pipe cleaner, acid swabbing brush or cotton swab. Remove external corrosion by scrubbing with aluminum abrasive material.

e. Put about one ounce of solvent cleaning compound for each connector being cleaned, in an applicator bottle. Wash the connector shell and pins with compound. Hold connector with openings for pins (sockets) pointed slightly downward, when possible, while spraying compound into socket openings. This will rinse away loose corrosion products, dirt and other contaminants.

f. Wipe away any excess spray with a lint-free cloth.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

WARNING

Before removing any component of electrical system, ensure VEHICLE MASTER POWER switch is set to OFF. You can get electrical burns if power is on.

g. Clean dirt, grease, dust and old compounds off cable harnesses and parts by dipping them into container filled with cleaning compound. Shake parts in compound or wipe them clean in lint-free cloth. Clean dirt, grease and dust from recessed areas with acid-swabbing brush or lint-free cloth. Dry components completely with low pressure, 25 to 30 psi (172-207 kPa), dry compressed air or with a clean, lint-free cloth.

h. Remove rust from parts other than connector parts by scraping, wire brushing or both. If rust damage is too great or is on small thin parts that would be weakened by rust, you may need to replace the part. Find the cause of the rust and correct the problem.

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

i. Threaded holes in metal must be thoroughly clean when sealing compounds are used to lock screws in place. Take off old preservative or sealing compounds from threads with tap and tap wrench. Blow loose particles out of holes with compressed air, then clean threads with solvent cleaning compound and brush. Let holes dry before putting in screws.

3. **Replacing Electrical Wiring or Components.**

a. Always look carefully at equipment for likely signs of trouble while doing routine work. Tie down any harness that is free to move and rub against metal. If you look for possible trouble spots and make repairs at once, you can cut down on repair time and extra work. Replace any harness or harness wires that have splits, tears or worn spots. If troubleshooting isolates a broken harness, replace that harness.

b. Replace broken or torn instrument or gage lenses.

c. Replace damaged or cross-threaded screws and nuts. Check for torn or stretched gaskets and leaks.

d. Replace any burned-out lamps or fuses. If you cannot replace a lamp or fuse right away, tag it and go back to it later.

e. Tighten all loose parts. Use correct torque values when tightening screws and nuts. Straighten bent parts where possible and check for cracks. Replace all missing parts.

f. Ensure ground points in electrical system are kept clean, free of corrosion and tight.

g. Check mountings, parts and shafts for proper alignment.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

4. **Removing Electrical Connectors.**

WARNING

Before removing any component of electrical system, ensure VEHICLE MASTER POWER switch is set to OFF. You can get electrical burns if power is on.

CAUTION

Do not use pliers without plastic jaw inserts on electrical connectors. Unprotected pliers will damage the outer plating of the connector. This will expose the metal beneath and cause corrosion.

a. Dry the outside surface of electrical connectors and receptacles with a lint-free cloth before loosening them for disassembly. Moisture can be present from rain, snow, washing or dew.

b. If connectors cannot be removed by hand, use conduit-style, slip-joint pliers with plastic jaw inserts to loosen them. Finish removal by hand. Straighten any bent contacts with long, round-nosed pliers. When installing connectors on larger harnesses, use assistance to align the mating ends of the cable. Ensure that contacts and keyways line up. Tighten twist-snap-type connectors until a click is heard. Tighten screw-on-type connectors until ratchet noise is heard to indicate that connectors are tight.

c. Put a protective cap or cover over any electrical connector that is left uncovered. Cover connectors on any item being moved to or from the vehicle. Take off covers when connectors are put back.

d. Look at connectors for broken, missing or pushed-in contacts before making any connections. If a connector is bad, repair it.

e. Tighten connectors by hand whenever tools are not called out.

5. **Cleaning Electrical Connectors.**

a. Use gun-type electric heater or open air to dry connector and receptacle.

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

CAUTION

Do not use wire brush or any metal tool to remove corrosion from connector, receptacle or pin. These items could scratch the surface of the connector, expose metal and cause corrosion.

b. Clean internal corrosion and other contamination from the connector or receptacle with solvent cleaning compound. Clean external corrosion by scrubbing with abrasive mat.

c. Rinse away loose corrosion, dirt and other contamination from the connector and pins with solvent cleaning compound. Hold connector pointed slightly downward, if possible, while spraying solvent cleaning compound into socket openings.

d. Wipe excess spray with a lint-free cloth.

e. Perform steps 2 through 4 again, if necessary, to remove corrosion.

f. Threaded holes in metal must be thoroughly clean when sealing compounds are used to lock screws in place. Clean old sealing compound out of threads with tap and tap wrench. Blow loose particles out of holes with compressed air and clean threads with cleaning compound MIL-C-81302 and acid-swabbing brush. Let holes dry before putting in screws.

g. When cleaning and inspecting ground points, take off ground contact from mounting point. Clean ground point bolt, nut and contact with cleaning compound MIL-C-81302 and acid-swabbing brush. If corrosion is present, clean with wire brush and abrasive cloth. Look at all parts for cracks, looseness or stripped threads. Replace damaged or cross-threaded screws and nuts. Check for torn or stretched gaskets and leaks. Turn in bad parts. Be sure to tighten all nuts when mounting ground contacts.

h. Rub corrosion off connector contacts and other parts with pencil eraser. Remove rust by scraping, wire brushing or both. If rust damage is too great or on small thin parts that would be weakened by rust, you may need to replace the part. Find the cause of the rust and correct the problem.

6. **Inspecting Connectors.**

a. Disconnect the electrical connector to be inspected.

NOTE

Use a good light source to look at electrical contacts.

b. Look for white powdery or granular material anywhere on the outer or inner surfaces of the connector and receptacle. Look at the male and female sockets for signs of blue-green discoloration at the base of the pins or sockets. Clean off surface corrosion before assembling. Electrical contacts corroded badly enough to destroy the outer metal coating should be replaced. Any part corroded badly enough to weaken it should be replaced.

c. Look for bent, broken, missing or pushed-in contacts. Straighten bent pins with long, round-nosed pliers. Other damage should be repaired or parts replaced.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

7. **Preserving Connectors.**

WARNING

Water-displacing corrosion-preventive compound vapors can be harmful to eyes and lungs. To avoid harm, keep the corrosion preventive away from heat, wear protective goggles and use in a well-ventilated area.

CAUTION

Use water-displacing corrosion-preventive compound, Type III, Class 2 only, on internal connector surfaces.

a. Where possible, hold connectors with opening pointing slightly downward. Spray an even, thin film of compound over the male pin area of the connector and into the female socket openings.

CAUTION

Use water-displacing corrosion-preventive compound, Type I only, on external connector surfaces.

b. After preserving connectors internally, assemble connectors. Wipe the outer surface of the connector shell with a lint-free cloth dampened with cleaning compound. Spray a thin coating of water-displacing corrosion preventive compound, Type I, on all external surfaces of the connector set. Ensure the area where the connector set comes together is completely covered.

c. Wipe away excess spray with a lint-free cloth.

8. **Soldering Techniques.**

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

a. Solder connections must be bright and clean before soldering. Remove dirt and grease from connections with solvent cleaning compound and small, stiff fiber brush.

b. Solder must be non-acid type. Rosin flux can be used.

c. All wires, parts and soldering iron must be pretinned for good connection and maximum transfer of heat.

d. Clean all solder joints with acid-swabbing brush and cleaning compound after soldering to obtain a clean, bright surface.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

9. **Crimping Wires.**

   a. Cut off and discard broken, bent or discolored contacts with diagonal cutting pliers. Discard bad contacts. Use thermal wire stripper to strip insulation off wires.

   b. Position contact crimping tool with color band toward rear. Put bare wire into contact and squeeze crimping tool. Take crimped contact out of tool and check crimp by looking into inspection hole. You must be able to see end of bare wire.

10. **Installing Insulation Sleeving.**

   a. Insulation sleeving should be twice the diameter of the part over which it will be shrunk. Slide insulation over wire and terminal. Hold portable heat gun 4-5 inches (10-13 cm) away from insulation and apply heat for 30 seconds. Take heat gun away as soon as insulation forms to shape of wire and terminal. Let insulation cool for 30 seconds before handling.

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

   b. When replacing wires, cut insulation sleeving off terminals of wire to be replaced. Unsolder wire or cut if crimped. When soldering wires, hold the bare wire near the soldering point with long, round-nosed pliers. Pliers act as a heat sink, preventing heat damage to electrical and electronic components. Cut new wire to desired length and slide new insulation over ends of wire. Use thermal wire stripper to push insulation back and strip insulation off wiring. Solder or crimp wire to end terminal. Clean soldered joint with acid-swabbing brush and solvent cleaning compound. Slide insulation over connection. Shrink insulation with heat gun.

11. **Applying Preservatives to Electrical Connectors.**

WARNING

Water-displacing corrosion-preventive compound vapors can be harmful to eyes and lungs. To avoid injury, keep the corrosion preventive away from heat, wear protective goggles and use in a well-ventilated area.

CAUTION

There are two types of water-displacing corrosion-preventive compounds. Care must be used to apply the correct compound. Failure to do so can cause loss of continuity or moisture protection.

   a. Pin contacts: Spray an even, thin coat of compound over male pin area of connector.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

b. Socket contacts: Hold connector with openings pointed slightly downward, if possible. Spray compound into socket openings. Wipe off any excess compound with a lint-free cloth.

CAUTION

Do not use water-displacing corrosion-preventive compound on the external surface of an electrical connector. Compound is too light and will not give the protection needed to keep moisture out of the connector.

c. External surfaces: Spray a thin coat of water-displacing corrosion-preventive compound on all external surfaces of the clean connector set. Make sure the area where the connector set comes together is completely covered.

12. **Installing Electrical Connectors.**

a. Look at connectors for broken, missing or pushed-in contact before making any connections. If connector is bad, notify supervisor.

b. When installing connectors on large harnesses, use an assistant to help align the mating ends of the cable. Ensure contacts and key washers line up. Tighten twist-snap-type connectors until a click is heard. Tighten screw-on-type connectors until the connector is tight. Tighten ratchet-type connectors until colored aligning marks line up.

c. Tighten connectors by hand only.

d. Wipe the outer surface of the connector with a lint-free cloth dampened with cleaning compound.

13. **Connecting and Disconnecting Connectors.**

a. Look for broken, bent or missing pins when disconnecting or connecting receptacles and connectors. If you find any bent pins, tell your supervisor. Look at harnesses for cuts, kinks or torn or burned insulation. If insulation is bad, replace harness.

b. If connectors cannot be removed by hand, use conduit-style, slip-joint pliers with plastic jaw inserts to remove them. When installing connectors on larger harnesses, use an assistant to help align the mating ends of the cable. Ensure pins and keyways line up. Tighten twist-snap-type connectors by hand only until a click is heard. Tighten the screw-on-type connectors by hand only until the connector is tight.

c. Put protective caps and plugs on all connectors when they are removed to keep pins from being damaged and to keep out dirt, dust or grease. When connectors are being put on, take off all caps and plugs.

14. **Harness Routing.**

a. Before removing harnesses that require being placed over and under components during installation, identify the routing to ensure proper installation.

b. If harness routing can be reached, route and tag twine where harness branches are laying before pulling harness out of place for removal.

c. If harness routing cannot be reached, tie twine to ends of harness branches. Twine should be longer than harness. Pull harness out until twine can be tagged and untied from harness branches.

d. Install harness either by feeding harness branches through where twine was placed or by tying tagged twine to matting harness branch and pulling harness into place with twine. Remove twine.

e. Ensure routed harness and branches are not twisted or sticking up where they can rub the opposite frame when the machine is being articulated.

f. Routed harness and branches should not be lying loose against any rough surface that could cause chafing. Use additional tiedown straps as required to keep harness in position.

g. If it is necessary to articulate the machine to remove or install wiring harnesses, ensure harnesses are clear of moving parts that could damage harnesses or equipment.

ELECTRICAL SYSTEM COMPONENTS AND WIRING - CONTINUED

h. Do not tighten clamps or install tiedown straps on replaced harnesses until entire harness is installed and positioned.

15. **System Testing.**

After you install a harness, always test the harness by operating the system it is in.

16. **Anti-Chafing Sleeves.**

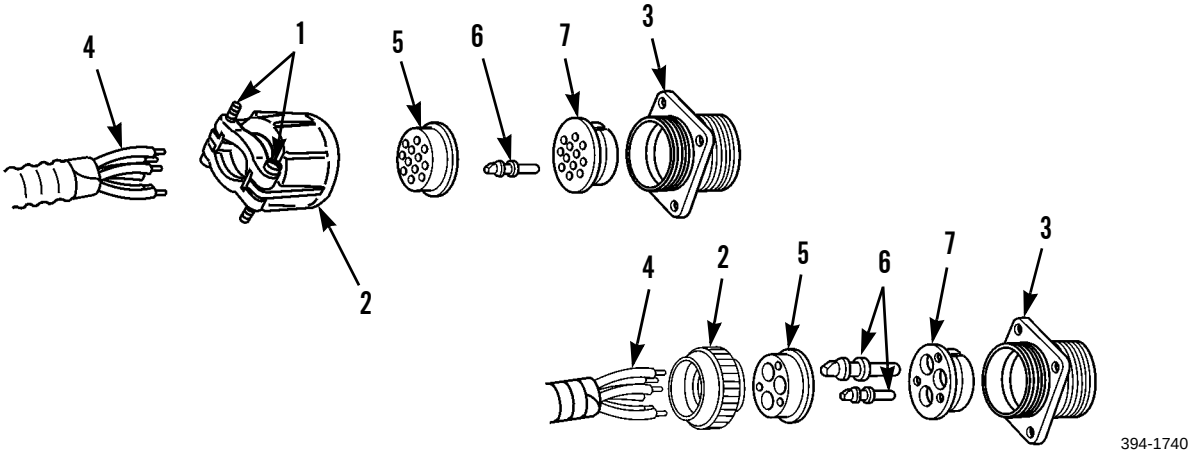
Make sure all tubes, hoses and metal-braided electrical cables are protected against chafing (rubbing) on one another. If they cannot be repositioned, install anti-chafing sleeves in the area where rubbing could occur. In areas where tiedown straps are used to hold metal-braided electrical cables to tubes or hoses, anti-chafing sleeves will be used as required.

MULTIPLE-PIN CONNECTOR REPAIR

NOTE

- Use electrically conductive grease on unprotected (exposed to weather) electrical connectors before connections are made.
- Use electrical insulating varnish on all electrical connections that are mounted outside of machine and are exposed to harsh weather and/or spray from the ground.
- Tag and mark position of wires in electrical connector to ensure correct installation.

1. If repairing a trailer electrical connector, loosen two screws (1) on nut (2).
2. Unscrew nut (2) from shell (3) and slide nut back over wires (4).
3. Push grommet (5) back on wires (4).
4. Using pin extractor, push pins (6) out through rear of insert (7).
5. Push insert (7) out through rear of shell (3).
6. Unsolder wires (4) from pin(s) (6). Discard pin(s).
7. Position wires (4) into solder wells of new pins (6) and solder.
8. Push insert (7) into shell (3) from rear until seated. Groove in insert must be aligned with guide in shell to ensure proper fit.
9. Push pins (6) into insert (7) from rear until seated.
10. Push grommet (5) down wires (4) and over solder wells of pins (6).
11. Install nut (2) on shell (3).
12. If repairing a trailer electrical connector, tighten two screws (1).



394-1740

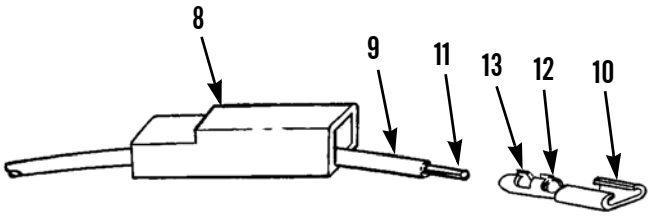
RECEPTACLE CONNECTOR REPAIR

1. While releasing locking tab through front of connector (8), push wire (9) and receptacle (10) through front of connector.
2. If defective, remove receptacle (10) from wire (9) by cutting through wire just behind receptacle. Discard receptacle.

NOTE

Perform steps 3 through 6 only if receptacle was removed.

3. Slide connector (8) back on wire (9).
4. Strip insulation of wire (9) to expose ¼ in. (6 mm) length of metal strands (11).
5. Securely crimp tabs (12) of new receptacle (10) over metal strands (11).
6. Crimp tabs (13) of receptacle (10) over insulation of wire (9).
7. Slide connector (8) forward over receptacle (10) until locking tab of receptacle snaps into place.



394-1741

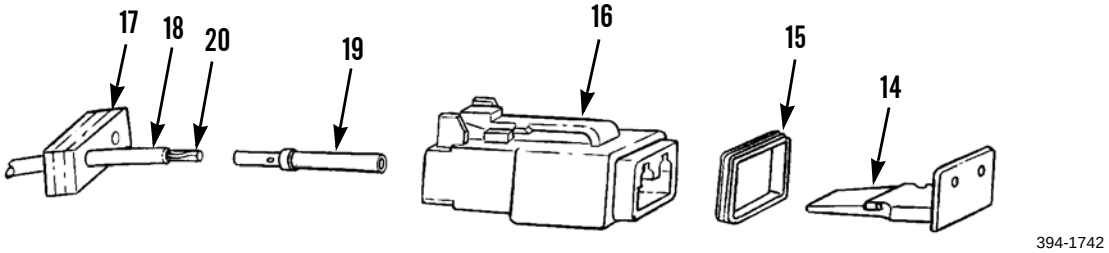
WATERPROOF CONNECTOR REPAIR

1. Remove end cover (14) and gasket (15) from front of connector (16).
2. Remove seal (17) from rear of connector (16) and slide seal back on wire (18).

NOTE

Perform the following steps for each wire of connector.

3. While releasing locking tab through front of connector (16), remove wire (18) and pin (19) through rear of connector.
4. If defective, remove pin (19) from wire (18) by cutting just behind pin. Discard pin.



394-1742

NOTE

Perform steps 5 through 8 only if pin was removed.

5. Strip insulation of wire (18) to expose ¼ in. (6 mm) length of metal strands (20).
6. Insert metal strands (20) of wire (18) fully into rear of new pin (19).
7. Securely crimp pin (19) to metal strands (20) of wire (18).
8. Push pin (19) into rear of connector (16) until fully seated.
9. Install seal (17) on rear of connector (16).
10. Install gasket (15) and end cover (14) on front of connector (16).

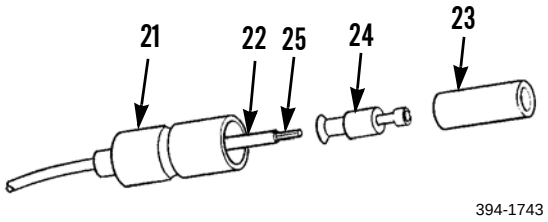
MILITARY CONNECTOR REPAIR

1. Slide shell (21) back on wire (22) to expose sleeve (23).
2. Remove sleeve (23) from terminal (24) by pulling sleeve forward.
3. If defective, remove terminal (24) from wire (22) by cutting through wire just behind terminal. Discard terminal.

NOTE

Perform steps 4 through 6 only if terminal was removed.

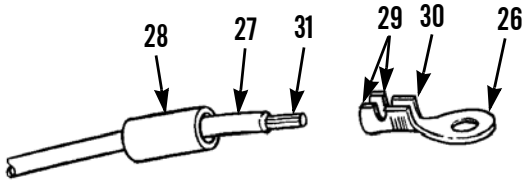
4. Strip insulation of wire (22) to expose length of metal strands (25) equal to depth of new terminal (24).
5. Securely crimp new terminal (24) to metal strands (25) of wire (22).
6. Install sleeve (23) to terminal (24) by pushing sleeve over front of terminal until fully seated.
7. Slide shell (21) up wire (22) and over sleeve (23).



394-1743

RING TERMINAL REPAIR

1. Remove ring terminal (26) from wire (27) by cutting through wire just behind heat shrink tubing (28). Discard terminal.
2. Cut new heat shrink tubing (28) to length sufficient to cover tabs (29 and 30) of ring terminal (26) and ¼ in. (6 mm) of wire (27).
3. Slide heat shrink tubing (28) back on wire (27).
4. Strip insulation of wire (27) to expose proper length of metal strands (31).
5. Securely crimp tabs (30) of new ring terminal (26) over metal strands (31).
6. Crimp tabs (29) of ring terminal (26) over insulation of wire (27).
7. Slide heat shrink tubing (28) over two tabs (29) of ring terminal (26).
8. Using heat gun, apply heat to heat shrink tubing (28) until tubing snugly conforms to ring terminal (26) and insulation of wire (27).



394-1744

SPLICING WIRES

NOTE

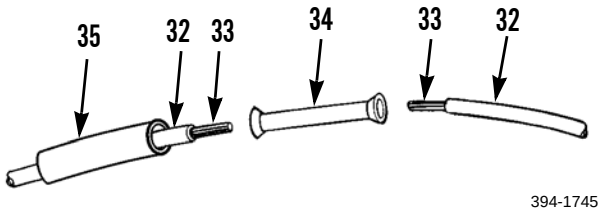
The selection of crimping tool and type of splice connectors is optional. High quality splice connectors can be expected to last the life of the machine.

1. Inspect each end of wire (32). Trim back insulation and metal strands (33) of wire as necessary to ensure integrity of wire.
2. Strip each end of wire (32) to expose length of metal strands (33) to suit type of splice connector (34) used.

NOTE

Perform steps 3 and 4 at each end of splice connector.

3. Insert metal strands (33) of wire (32) fully into splice connector (34).
4. Cut length of insulation sleeving (35) at least 3/4 in. (19 mm) longer than length of splice connector (34) and slide insulation sleeving over one wire (32).
5. Securely crimp splice connector (34) to metal strands (33) of wire (32).
6. Center insulation sleeving (35) over splice connector (34) and use heat gun to shrink insulation sleeving.



ELECTRICAL GROUND POINTS

WARNING

Although battery disconnect switch must be ON to test electrical circuit voltage, turn battery disconnect switch to OFF before performing resistance tests or replacing parts. Failure to follow this warning may result in injury to personnel and damage to parts or equipment.

Many electrical problems are the result of poor ground connections. Ensure that ground connections are good by performing the following steps:

1. Remove screw, lockwasher, nut, etc. connecting ground wire terminal to machine ground point.
2. If necessary, clean mounting hardware, wire terminal and ground point with detergent and a scrub brush.
3. Remove any rust or corrosion from ground point with a wire brush and abrasive cloth.
4. Replace defective mounting hardware and wire terminal as necessary.
5. Install wire terminal to ground point with screw, lockwasher, nut, etc. and tighten securely.

MULTIMETER USAGE

1. **General.** A multimeter is used to troubleshoot the electrical system of the machine. The multimeter ohms scale is used to test for continuity, shorts and resistance. The multimeter voltmeter scale is used to test voltage levels at any point in the electrical system.
2. **Continuity Tests.** Continuity tests are performed to check for breaks in a circuit (such as a fuse, switch, light bulb connector or electrical wiring).

MULTIMETER USAGE - CONTINUED

NOTE

If readout will not zero properly, replace batteries and repeat zeroing procedure. If readout will not zero after batteries have been replaced, notify your supervisor.

a. **Zero Multimeter.**

(1) Set multimeter to ON.

(2) Select OHMS.

(3) Select LOWEST VOLTAGE/OHMS scale.

(4) Touch black and red probes together and check for a zero indication on digital readout.

b. **Testing for Continuity.**

WARNING

Before performing a continuity test, always place battery disconnect switch in OFF position and disconnect circuit to be tested. Failure to follow this warning may result in injury to personnel and damage to multimeter.

(1) Zero multimeter.

(2) Connect black and red probes to both terminals of circuit being tested.

(3) Observe readout and interpret results as follows:

(a) If readout indicates any numeric value, circuit has continuity.

(b) If readout does not indicate any numeric value, or value is over the limits of the meter, circuit is open.

c. **Testing for Shorts.** A short (or short circuit) occurs when two circuits that should not be connected have continuity with each other. A short also occurs when a circuit that should not touch ground has continuity with ground.

WARNING

Before performing a continuity test, always place battery disconnect switch in OFF position and disconnect circuit to be tested. Failure to follow this warning may result in injury to personnel and damage to multimeter.

(1) Zero multimeter.

(2) Connect black probe to one pin and red probe to either ground or another pin.

(3) Observe readout and interpret results as follows:

(a) If readout indicates any numeric value above 0 (zero) but less than the meter’s limits, circuits are shorted or circuit is grounded, if testing to ground.

(b) If readout does not indicate a numeric value or value does not change when connected to circuit(s) in question, circuits are not shorted.

(c) If readout jumps or flickers, circuits are shorted or grounded intermittently.

MULTIMETER USAGE - CONTINUED

d. **Testing for Resistance.** Allowable resistance readings depend on circuit being tested. Refer to the particular section in this manual dealing with that circuit or component for allowable readings.

WARNING

Before performing a continuity test, always place battery disconnect switch in OFF position and disconnect circuit to be tested. Failure to follow this warning may result in injury to personnel and damage to multimeter.

(1) Zero multimeter.

(2) Select OHMS.

(3) Select lowest VOLTAGE/OHMS range. If test specifies ohms range, select required range.

(4) Connect black and red probes across circuit to be tested.

(5) Observe readout and interpret results as circuit resistance.

3. **Voltage Tests.**

a. **Measuring DC Voltage.**

(1) Set multimeter to ON.

(2) Select lowest possible DC VOLTAGE range that is still higher than voltage to be measured.

(3) Connect red probe to positive (+) pin and black probe to negative (-) pin.

(4) Observe readout and interpret results as DC voltage in circuit being tested.

b. **Measuring DC Voltage Drop.**

NOTE

Voltage drop is defined as the amount of voltage loss that occurs through all or part of a circuit due to resistance.

(1) Set multimeter to ON.

(2) Select lowest possible DC VOLTAGE range that is still higher than voltage to be measured.

(3) Connect red probe to test location closest to positive (+) side. Connect probe to test location closest to ground.

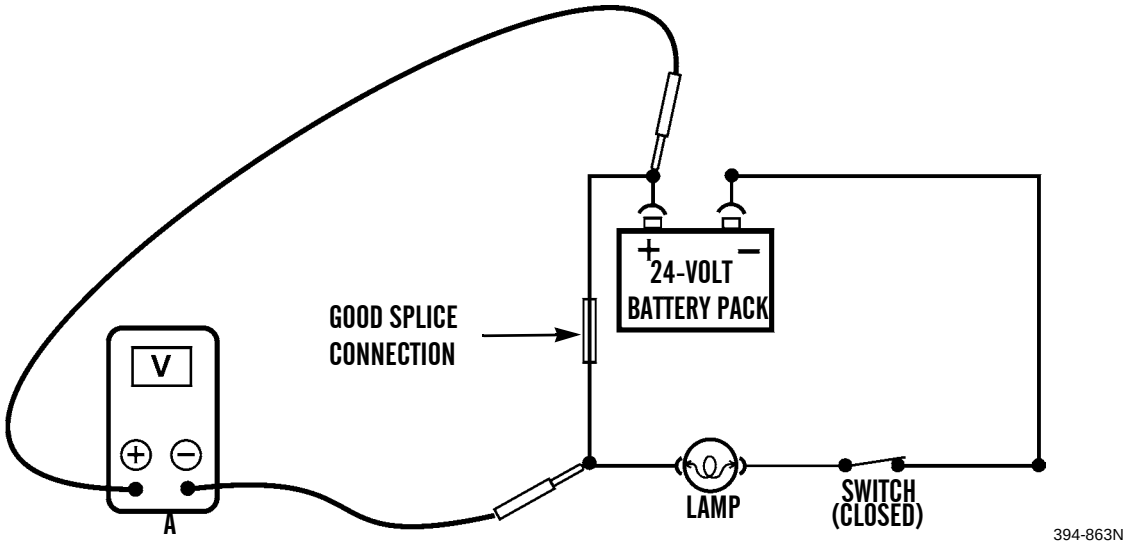
(4) Observe readout and interpret results as DC voltage in circuit being tested.

MULTIMETER USAGE - CONTINUED

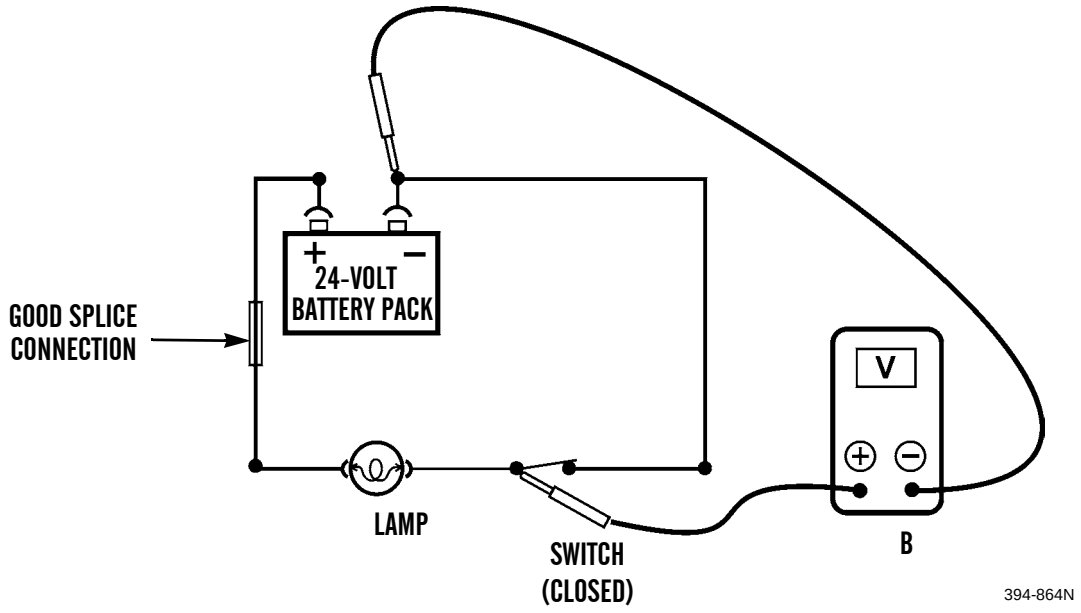
c. **DC Voltage Drop Examples.**

(1) Good Voltage Drop.

(a) Multimeter "A" is used to measure voltage drop across a good splice connection. Voltage reading at multimeter "A" should be low (about 0.1 volt). This means that resistance across this splice is low, resulting in low voltage drop.

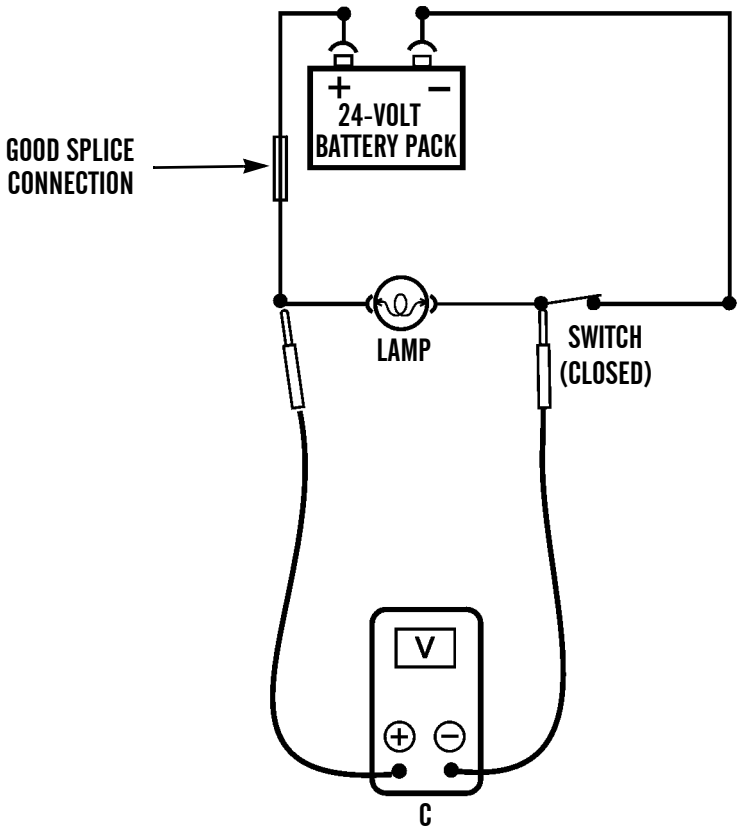


(b) Multimeter "B" is used to measure voltage drop across a closed switch. Voltage reading at multimeter "B" also should be low (about 0.1 volt). This means that resistance across this switch is low, resulting in low voltage drop.



MULTIMETER USAGE - CONTINUED

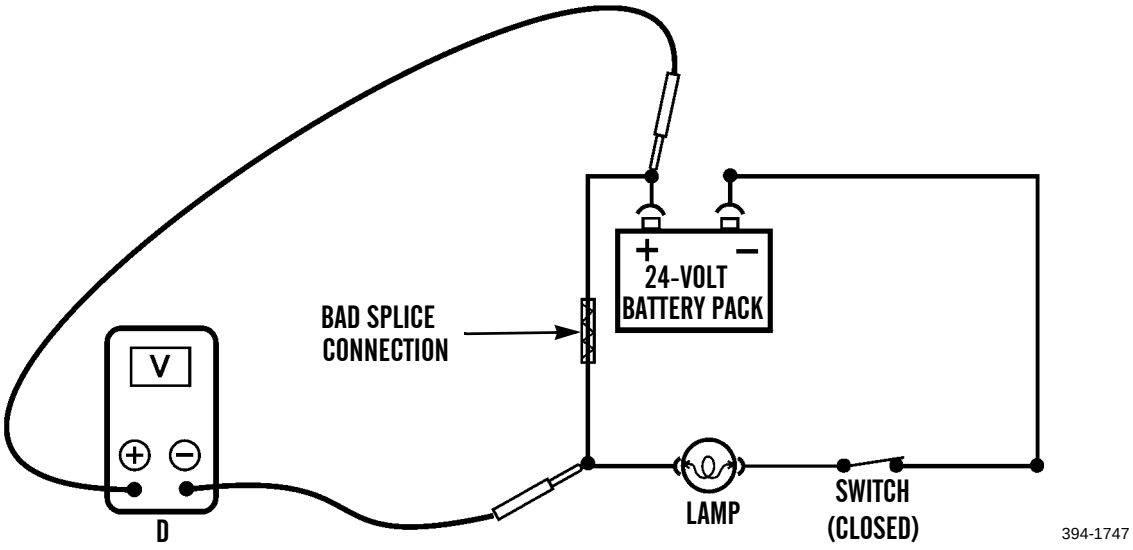
(c) Multimeter “C” is used to measure voltage drop across a load, in this case a lamp. If voltages at multimeters “A” and “B” are 0.1 volt each, voltage reading at multimeter “C” will equal 23.8 volts. This is because the sum of all voltage drops in a circuit is equal to the source voltage.



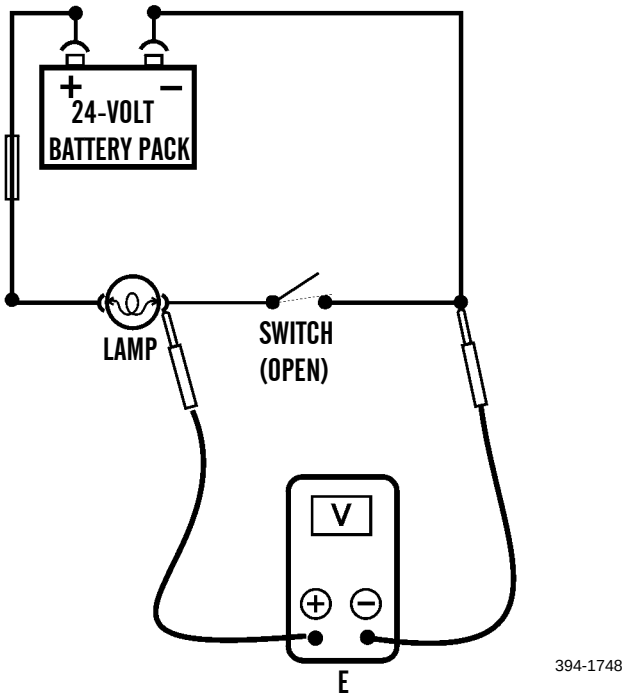
MULTIMETER USAGE - CONTINUED

(2) Bad Voltage Drop.

(a) Multimeter “D” is used to measure voltage drop across a bad splice connection. The voltage reading at multimeter “D” is high (for example 7 volts). This means the resistance across this splice is high, resulting in high voltage drop. This would cause lamp to be dimly lit when switch is closed.



(b) Multimeter “E” is used to measure voltage drop across an open circuit, in this case an open switch. This could also be used to demonstrate the reading in a circuit with a broken wire. The voltage reading at multimeter “E” will be approximately 24 volts. This means that an open circuit or an open switch has infinite resistance, causing all voltage to be lost.



RELAY INSPECTION AND TEST

1. **Inspecting Relays.**
   a. Check for bent or damaged pins.
   b. Check for burned or damaged relay case.
2. **Testing Relays.**

NOTE

When testing relays, always refer to circuit diagram printed or stamped on relay case.

   a. Use a multimeter to check for continuity across relay coil.
   b. Use a multimeter to check open or closed contacts within relay.

END OF WORK PACKAGE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION 0019 00

GENERAL

1. To ensure that the 621B Scraper is ready for operation at all times, it must be lubricated and inspected on a regular basis so that defects may be found before they result in damage, equipment failure or injury.
2. The *KEY* in this work package lists the types, amounts, and temperature ranges of the lubricants required for specified intervals.
3. Lubrication Charts at the end of this work package show all lubrication points.
4. Table 1 in WP 0020 00 contains systematic instructions on lubrications, inspections, adjustments, and corrections to be performed by Unit Maintenance to keep the 621B Scraper in good operating condition and ready for its primary mission.
5. Tables 2 through 7 after scraper PMCS list mandatory replacement parts, by interval, for the scraper.
6. For information on Corrosion Prevention and Control (CPC), refer to WP 0001 00.

EXPLANATION OF TABLE ENTRIES

1. **Item Number (Item No.) Column.** Numbers in this column are for reference. When completing DA Form 2404 or DA Form 5988-E (*Equipment Inspection and Maintenance Worksheet*), include the item number for the check/service indicating a fault. Item numbers also appear in the order you must perform checks and services for the interval listed.
2. **Interval Column.** This column tells you when you must perform the procedure in the procedure column. Intervals are based on calender dates or hours.
   a. *Semiannual* procedures must be done once every six months.
   b. *Annual* procedures must be done once each year.
3. **Man-Hours Column.** This column indicates man-hours required to complete prescribed lubrication service.
4. **Item to Check/Service Column.** This column identifies the item to be checked or serviced.

NOTE

The WARNINGs and CAUTIONs appearing in your PMCS table should always be observed. WARNINGs and CAUTIONs appear before applicable procedures. These WARNINGs and CAUTIONs must be observed to prevent serious injury to yourself and others or to prevent the equipment from being damaged.

5. **Procedure Column.** This column gives the procedure you must perform to check or service the item listed in the Item to Check/Service column, to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.
6. **Not Fully Mission Capable If: Column.** Information in this column tells you what fault will keep your equipment from being capable of performing its primary mission. If you perform check/service procedures that show faults listed in this column, the equipment is not mission-capable. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

GENERAL LUBRICATION PROCEDURES

NOTE

- Lubrication instructions contained in this PMCS are mandatory.
- Refer to TM 5-3805-248-10 for Operator Maintenance level lubrication.
- Dashed leader lines used in illustrations of lubrication points indicate that lubrication is required on both sides of the equipment.

1. Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, such as high or low temperatures or exposure to sand or dust, lubricants should always be changed more frequently. Lubricants that have become contaminated will be changed regardless of interval. When in doubt, notify your supervisor.

WARNING

When servicing this machine, performing maintenance, or disposing of materials such as engine coolant, hydraulic fluid, lubricants, battery acids or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845.

2. Ensure that all fluids drained as a result of lubrication or maintenance are collected in a container and disposed of in accordance with local policy and ordinances. Clean up any spills immediately.
3. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.
4. Maintain a good record of all lubrication performed and report any problem noted during lubrication. Refer to DA PAM 738-750 for maintenance forms and procedures to record and report any findings.

WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.

5. Keep all external parts of equipment not requiring lubrication free of lubricants. Before lubrication, wipe lubrication fittings with a clean rag (Item 35, WP 0339 00) and solvent cleaning compound (Item 8, WP 0339 00). After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.
6. Refer to FM 9-207 for lubrication instructions in cold weather.
7. Refer to AR 70-12 for use of standardized fuels and lubricants.
8. Engine, transmission, and hydraulic system oil filters shall be changed when:
   a. They are known to be contaminated or clogged
   b. At prescribed hardtime intervals

GENERAL LUBRICATION PROCEDURES - CONTINUED

9. Engine oil, hydraulic oil, and transmission fluid must be sampled initially at 50 hours or 90 days of operation as prescribed by DA PAM 738-750.

10. For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (i.e., longer-than-usual operating hours, extended idling periods or extreme dust).

GENERAL PMCS PROCEDURES

1. Always perform PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry. If any deficiency is discovered, perform the appropriate troubleshooting task in Chapter 2 of this manual. If any component or system is not serviceable, or if the given service does not correct the deficiency, notify your supervisor.

2. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all tools needed to make all checks. Have several clean rags (Item 35, WP 0339 00) handy. Perform ALL inspections at the applicable interval.

   a. **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use detergent (Item 13, WP 0339 00) and water when you clean.

   b. **Rust and Corrosion.** Check metal parts for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of lubricating oil (Item 30, 31 or 33, WP 0339 00). Report it to your supervisor.

   c. **Bolts, Nuts and Screws.** Check bolts, nuts and screws for obvious looseness, missing, bent or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal or rust around bolt heads. If you find one you think is loose, tighten it.

   d. **Welds.** Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.

   e. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.

   f. **Hydraulic Hoses and Lines.** Look for wear, damage and signs of leaks. Ensure that clamps and fittings are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, correct it if authorized by the Maintenance Allocation Chart (WP 0338 00). If not authorized, notify your supervisor.

   g. **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your machine. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your machine. Learn and be familiar with them, and remember – when in doubt, notify your supervisor.

Leakage Definitions for PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from item being checked/inspected.

CAUTION

Operation is allowable with Class I and Class II leakage. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with Class I or Class II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to vehicle and/or components.

PMCS INITIAL SETUP

1. **General.** This paragraph lists tools, materials, and personnel required for PMCS and lubrication.
2. **Tools (WP 0338 00).**
   a. Common no. 1 shop set
   b. Common no. 2 shop set
   c. General mechanic's tool kit
3. **Materials (WP 0339 00).**
   a. Antifreeze
   b. AOAP sampling kit
   c. Cleaning compound, solvent
   d. Cloth, abrasive, emery, fine
   e. Detergent
   f. Grease, GAA
   g. Insulating varnish, electrical
   h. Lubricating oil, OE/HDO 10W/30
   i. Lubricating oil, OE/HDO 15W/40
   j. Lubricating oil, OE, HDO 30
   k. Lubricating oil, OEA
   l. Lubricating oil, GO 85W/140
   m. Lubricating oil, GO 80W/90
   n. Lubricating oil, GO 75
   o. Petrolatum
   p. Rags
4. **Personnel.**
   a. Driver/Operator
   b. Unit Maintenance Mechanic

- KEY -

LUBRICANT/ COMPONENT	REFILL CAPACITY	EXPECTED TEMPERATURES*			INTERVALS
		+6°F to +122°F (-14°C to +50°C)	-4°F to +50°F (-20°C to +10°C)	-25°F to +32°F (-4°C to 0°C)	
OE/HDO Lubricating Oil, ICE, Tactical					**D - Daily W - Weekly M - Monthly Q - Quarterly S - Semi-Annually A - Annual**
OEA Lubricating Oil, ICE, Arctic					
Engine Crankcase	9 Gal. (34 L)	See Chart A			
Oil Can Points	As Reqd	See Chart A			
Transmission	27 Gal. (102 L)	See Chart B			
Hydraulic System	29 Gal. (110 L) System Capacity	See Chart C			
GO Lubricating Oil, Gear, Multipurpose					
GAA Grease, Automotive and Artillery					
Hitch Steering Linkage		All Temperatures			
ANTIFREEZE Ethylene Glycol, Inhibited, Heavy Duty					
ANTIFREEZE Ethylene Glycol, Arctic Grade					
Engine Radiator	20 Gal. (76 L) System Capacity	See Chart D			
*** For arctic operation, refer to FM 9-207.**					

CHART A—ENGINE AND OIL CAN POINTS

Lubricant	EXPECTED TEMPERATURES																			
°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																		
OEA	Lubricating Oil, ICE, Arctic																		
OE/HDO 15W/40								—	—	—	—	—	—	—	—	—	—	—	—
OE/HDO 5W/40							—	—	—	—	—	—	—	—	—	—	—	—	—
OEA						—	—	—	—	—	—								

CHART B—TRANSMISSION

Lubricant	EXPECTED TEMPERATURES																			
°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																		
OEA	Lubricating Oil, ICE, Arctic																		
OE/HDO 40												—	—	—	—	—	—	—	
OE/HDO 30											—	—	—	—	—	—			
OE/HDO 10*								—	—	—	—	—							
OEA *							—	—	—	—	—	—	—						

*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

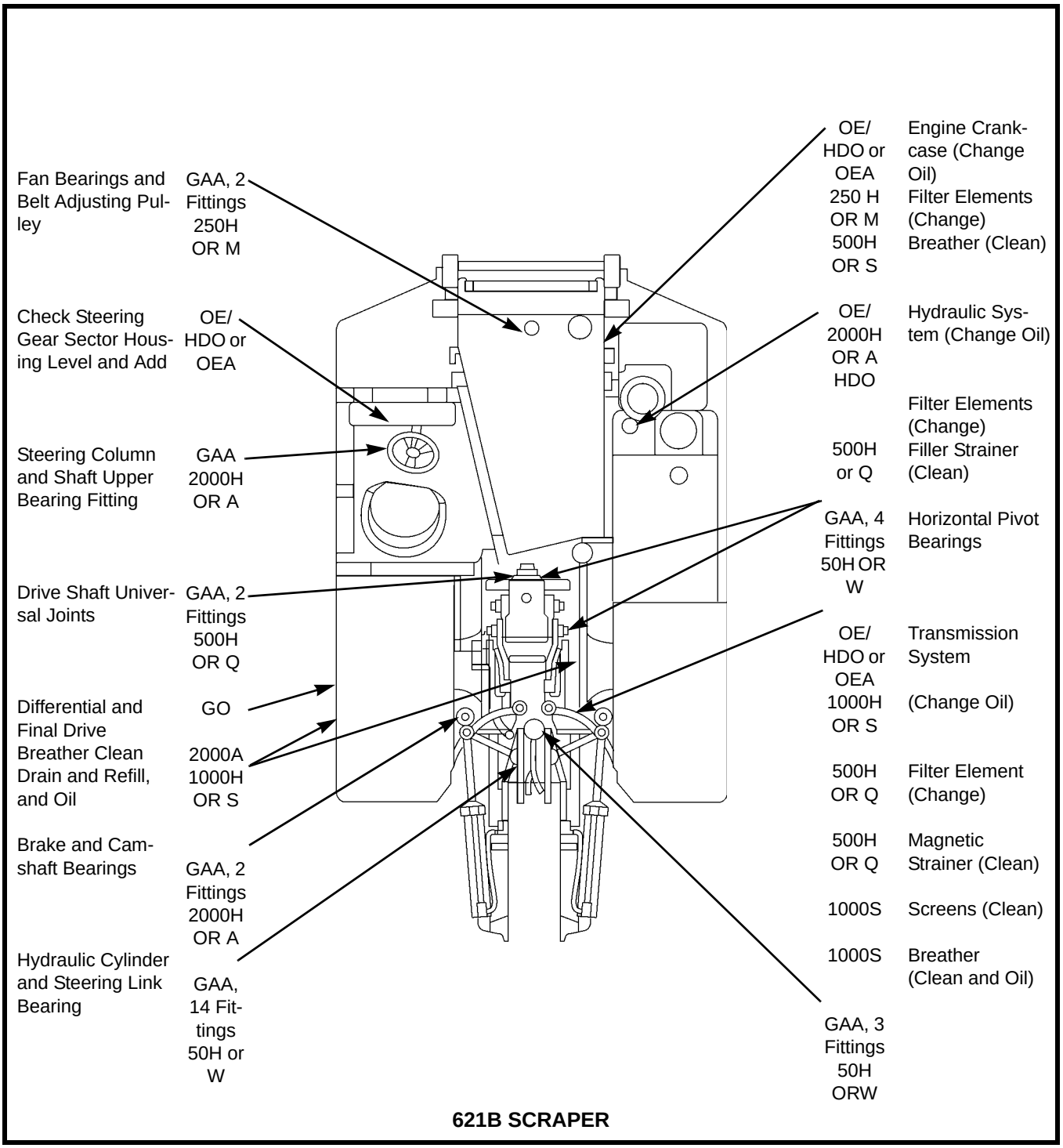
CHART C—HYDRAULIC RESERVOIR

Lubricant	EXPECTED TEMPERATURES																			
°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																		
OEA	Lubricating Oil, ICE, Arctic																		
5W/40							—	—	—	—	—	—	—	—	—	—	—	—	—
OEA*						—	—	—	—	—	—	—	—	—	—	—	—	—	—

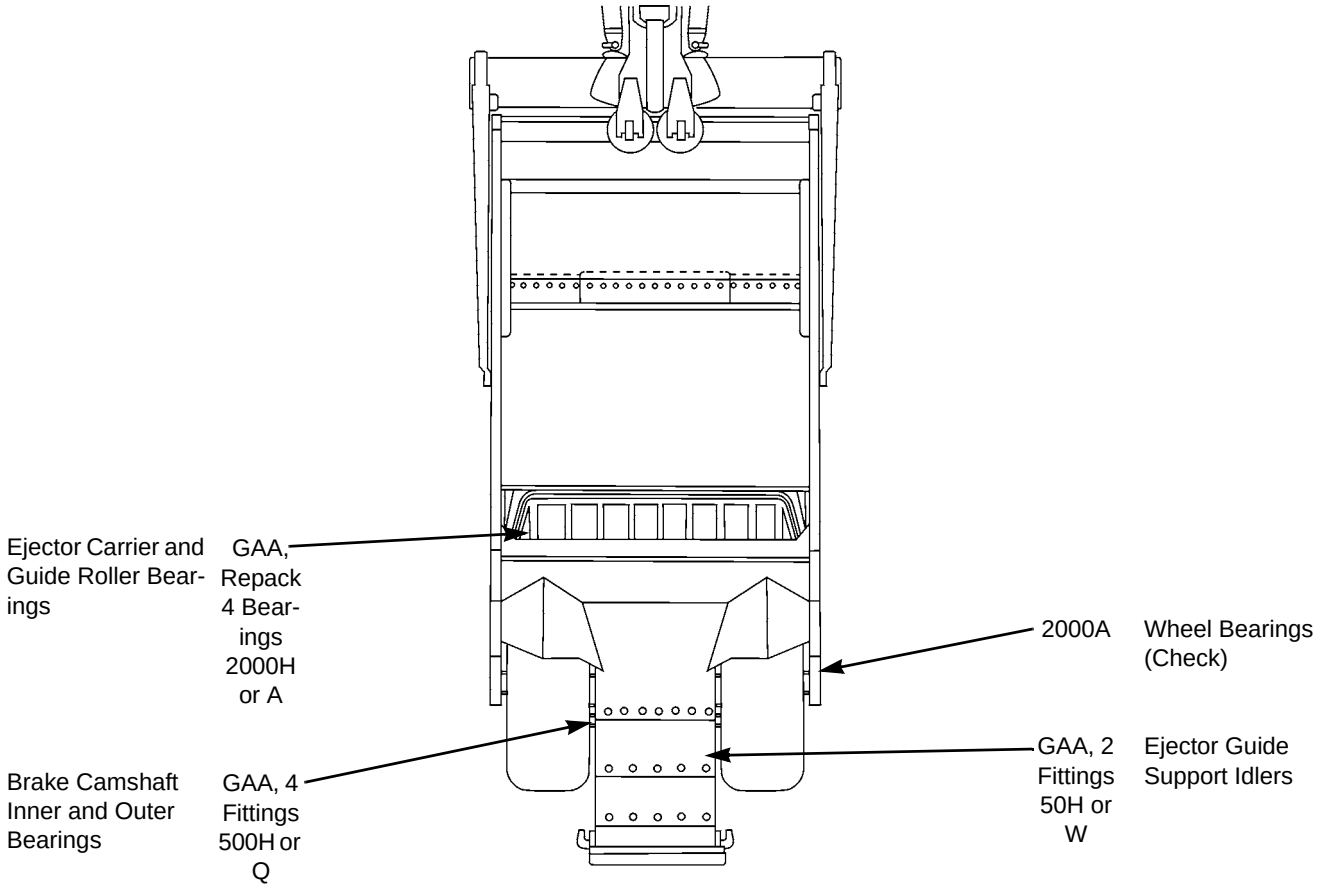
*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

CHART D—ANTIFREEZE

Lubricant	EXPECTED TEMPERATURES																					
	°F	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-68	-62	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
ANTIFREEZE	Antifreeze, Ethylene Glycol, Inhibited, Heavy Duty																					
ANTIFREEZE	Antifreeze, Arctic Grade																					
Antifreeze							—	—	—	—	—											
Antifreeze,Arctic Grade			—	—	—	—																



621B SCRAPER



621B SCRAPER

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				NOTE • Review all WARNINGs, CAUTIONs, and NOTEs before performing PMCS on the 621B Scraper. • Unless otherwise indicated, perform all lubrication and preventive maintenance with machine parked on level ground, parking brake applied, transmission in N (Neutral) and locked, scraper bowl lowered to the ground, and engine shut down. • Perform Operator PMCS prior to or in conjunction with Unit PMCS if: a. There is a delay between daily operation of the machine and Unit PMCS. b. The regular operator is not assisting.	
				WARNING Never disconnect any charging system circuit or battery when engine is running. A spark could cause an explosion from the flammable vapor mixture of hydrogen and oxygen released from the electrolyte in the battery. Failure to follow this warning could result in personnel injury.	
1	**50 Hours or Semi-Annually**		**Batteries**	Check electrolyte level and specific gravity on maintainable batteries, and perform battery load test on all batteries (TM 9-6140-200-14).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
2	250 Hours or Semi-Annually		Belts	Inspect all belts for wear and looseness and adjust (WP 0051 00).	
3	250 Hours or Semi-Annually		Engine Oil	Change engine oil and filter (WP 0022 00).	
4	250 Hours or Semi-Annually		Cooling System	Change coolant filter (WP 0050 00). ***SELECTION OF PROPER FILTER:*** Alternate between use of *precharge* filter and *maintenance* filter. In other words, if a precharge filter is removed, install a maintenance filter, and visa versa.	
5	250 Hours or Semi-Annually		Brakes	Adjust brakes (WP 0149 00).	
6	500 Hours or Semi-Annually		Crankcase Breather	Clean breather (WP 0023 00). **WARNING** Hot oil can cause burns. The hydraulic tank is hot and under pressure when at operating temperature. Remove the fill cap ONLY when the engine is stopped and the cap is cool enough to touch with your hand. Remove the fill cap slowly to relieve pressure.	
7	500 Hours or Semi-Annually		Hydraulic Tank	a. Inspect tank for leaks, broken fittings, cracked welds or missing parts and replace or repair as necessary (WP 0245 00). b. Change filters (WP 0208 00). c. Clean fill strainer (WP 0231 00).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
8	500 Hours or Semi-Annually		Transmission	a. Change filter (WP 0129 00). b. Clean magnetic strainer (WP 0130 00).	
9	500 Hours or Semi-Annually		Fuel System	a. Disassemble, clean and inspect fuel filler cap assembly (WP 0034 00). b. Clean and inspect magnetic strainer (WP 0034 00). c. Disassemble, clean and inspect primary fuel filter assembly (WP 0038 00). d. Replace secondary filter (WP 0037 00).	
10	Semi-Annually		Air Cleaner	a. Replace or clean elements as necessary (WP 0031 00). b. Inspect and reset indicator (WP 0251 00).	
11	Semi-Annually		Fuel Injection Lines and Fittings	Inspect fuel injection pump line and fittings for looseness and leaks. Replace as necessary (WP 0009 00). **WARNING** The cooling system is pressurized. Removal of radiator cap when machine is at normal operating temperature may result in personal injury. Wear proper protection.	
12	Semi-Annually		Cooling Lines and Fittings	Inspect cooling lines, connections, hoses and clamps for looseness, leaks cracks, or wear (WP 0050 00, WP 0047 00, WP 0048 00 and WP 0049 00).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
13	Semi-Annually		Alternator	Inspect for loose electrical connections and unusual noise or bearing play. Replace alternator as necessary (WP 0055 00).	
14	Semi-Annually		Starter	Inspect for bad connection, damaged wiring, loose electrical connections or evidence of burning. Replace starting motor assembly as necessary (WP 0057 00).	
15	Semi-Annually		Hydraulic Control Valves	Inspect valves and linkage. Look for bent levers and control arms and worn bushings (WP 0325 00).	
16	Semi-Annually		Torque Converter Oil Cooler	Inspect for leaks or damage. Replace as necessary (WP 0134 00).	
17	Semi-Annually		Torque Converter Oil Cooler Lines and Fittings	Inspect for scuffing, strain, wear, leaks or loose fittings. Tighten loose fittings. Replace as necessary (WP 0137 00).	
18	Semi-Annually		Tires	**WARNING** • Explosions of air-inflated earth moving tires can be a result of heat-induced gas combustion inside the tires. The heat generated by welding or heating rim components, external fire or excessive use of brakes can result in gaseous combustion. A tire explosion is much more violent than a blowout. The explosion can propel the tire, rim and final drive components as far as 1,500 ft (460 m) or more. Both the force of the explosion and flying debris can cause injury or damage to equipment. All personnel should be aware of this danger and the actions to take to minimize the risk (TM 5-3805-248-10). • Improper use of inflation equipment can result in tire blowout or rim failure. a. Check for adequate tread and replace if tread depth is insufficient (WP 0302 00 and WP 0303 00). b. Check for proper inflation of 60 psi (276 kPa) for tractor 40 psi (414 kPa) for scraper.	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
19	**1000 Hours or Semi-Annually**		**Air Dryer**	Replace desiccant (WP 0301 00).	
20	**1000 Hours or Semi-Annually**		**ROPS**	Re-torque bolts to 545 lb-ft (739 Nm) (WP 0203 00).	
21	**1000 Hours or Semi-Annually**		**Transmis-sion**	a. Change oil (WP 0128 00). b. Clean screens (WP 0131 00 and WP 0133 00). c. Clean transmission breather (WP 0132 00).	
22	**1000 Hours or Semi-Annually**		**Differential**	Clean breather or replace as necessary (WP 0143 00).	
23	**2000 Hours or Annually**		**Valve Lash Adjustment**	Adjust valve lash (WP 0265 00).	
24	**2000 Hours or Annually**		**Cooling Sys-tem**	Change coolant filter (WP 0042 00).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

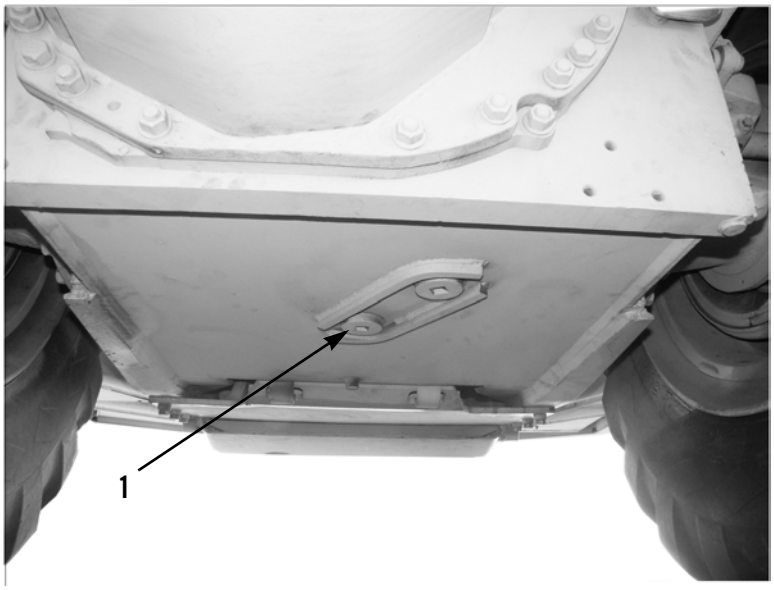
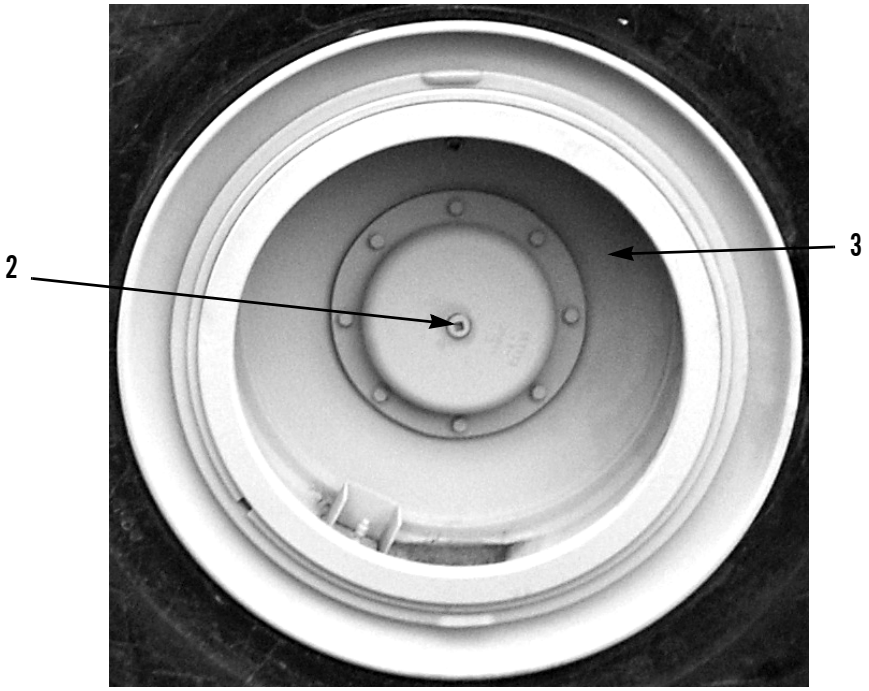
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
25	2000 Hours or Semi-Annually		Differential and Final Drive	**NOTE** Use a container to catch any draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up. Drain and refill differential and final drive oil: a. Remove plug (1) from bottom of machine. b. Allow differential to drain completely. c. Install plug (1) in bottom of machine.	
				 394-1539	
				d. Drain and refill final drives (WP 0144 00). e. Refill differential (TM 5-3805-248-10).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

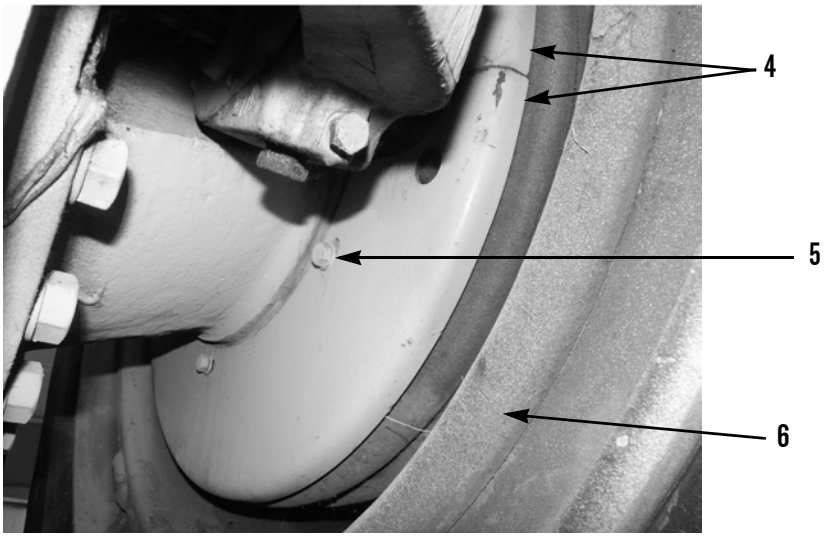
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
26	**2000 Hour or Annually**		**Wheel Bearings**	Inspect oil level: a. Remove fill plug (2) from wheel (3). b. Ensure that oil level reaches bottom of fill plug (2) hole. Add oil if required. c. Install fill plug (2) on wheel (3).	



394-1538

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
27	**2000 Hours or Annually**		**Brakes**	a. Remove six bolts (5) from upper and lower brake shields (4). b. Remove the upper and lower brake shields at each tractor and scraper wheel (6).	



394-1537

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

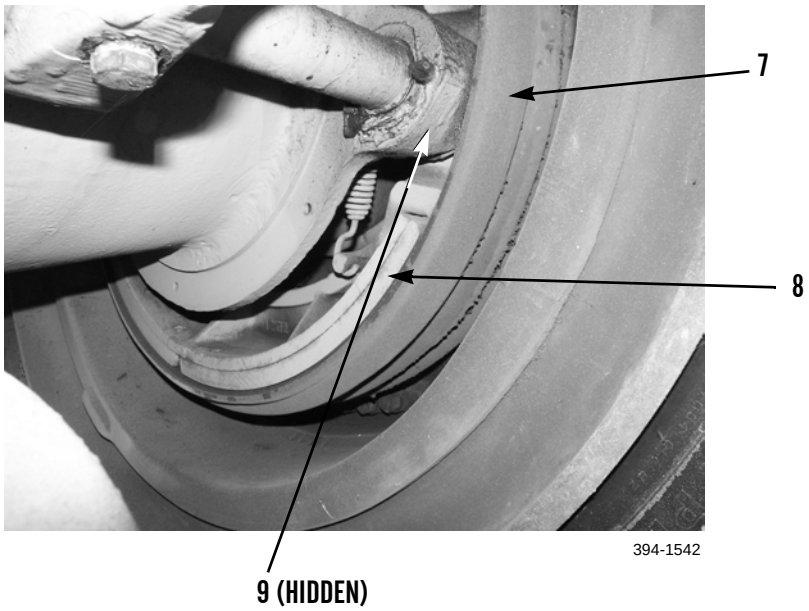
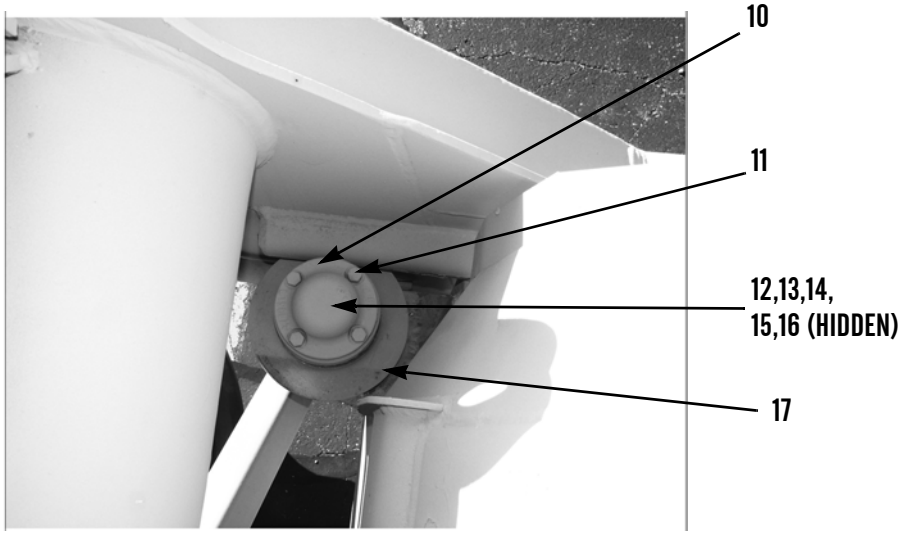
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
27 (Cont.)	**2000 Hours or Annually**		**Brakes - Continued**	c. Inspect the brake drums (7), linings (8) and cams (9) for wear or damage. d. If excessive wear on the brake drums (7) or linings (8) exists, or the brake cam (9) cannot be adjusted, replace as necessary (WP 0147 00 through WP 0150 00).	
					
28	**2000 Hours or Annually**		**Steering Gear**	Check oil level (WP 0176 00). **NOTE** Oil level should reach bottom of the plug opening.	
29	**2000 Hours or Annually**		**Hydraulic Tank**	a. Drain and refill hydraulic tank (WP 0229 00). b. Clean filler strainer (WP 0210 00). c. Inspect hydraulic hoses (WP 0211 00). d. Change filter elements (WP 0229 00).	

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION: ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
30	**2000 Hours or Annually**		**Ejector Guide Rollers**	Repack guide bearings: a. Remove four bolts (11) and cap (10) from the roller (17). b. Remove the nut (12), lock (13) and washer (14) from the shaft (15). Discard lock. c. Remove the upper bearing (16) from the shaft (15). d. Pack cavity between bearings with grease. Pack the upper bearing (16) with grease. e. Install upper bearing (16), washer (14), new lock (13) and nut (12) on shaft (15). f. Tighten nut (12) until roller (17) locks. Then back nut off 1/6 of a turn. Roller should turn freely without end play. g. Crimp the new lock (13) against the nut. h. Pack cap (10) with grease and install cap and four bolts (11).	



394-1540

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
31	**2000 Hours or Annually**		**Ejector Carrier Rollers**	Repack carrier bearings: a. Raise ejector (WP 0329 00). b. Remove four bolts (25) and cap (18) from the roller (24). c. Remove the nut (19), lock (20) and washer (21) from the shaft (22). Discard lock. d. Remove the outer bearing (23) from the shaft (22). e. Pack cavity between bearings with grease. Pack the outer bearing (23) with grease. f. Install upper bearing (23), washer (21), new lock (20) and nut (19) on shaft (22). g. Tighten nut (19) until roller (24) locks. Then back nut off 1/6 of a turn. Roller should turn freely without end play. h. Pack cap (18) with grease and install cap and four bolts (25).	

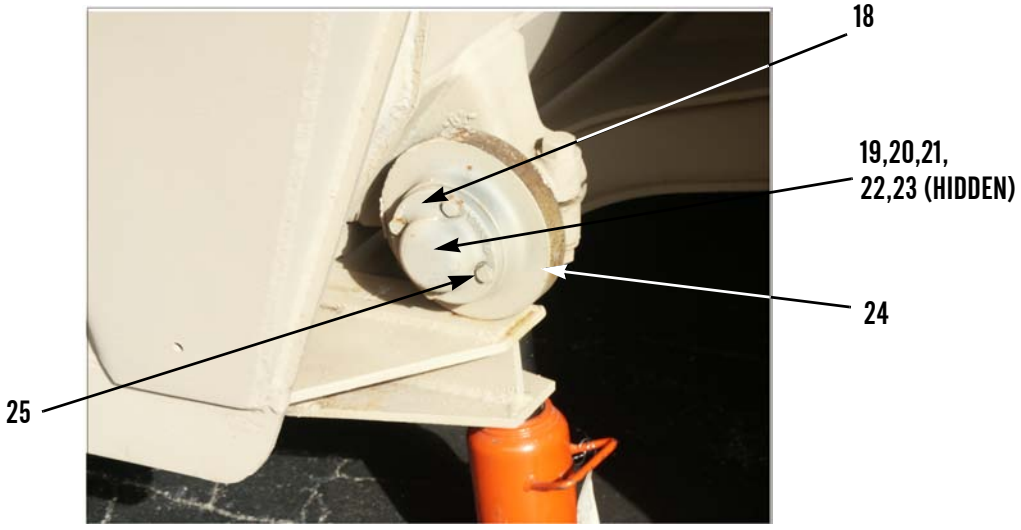
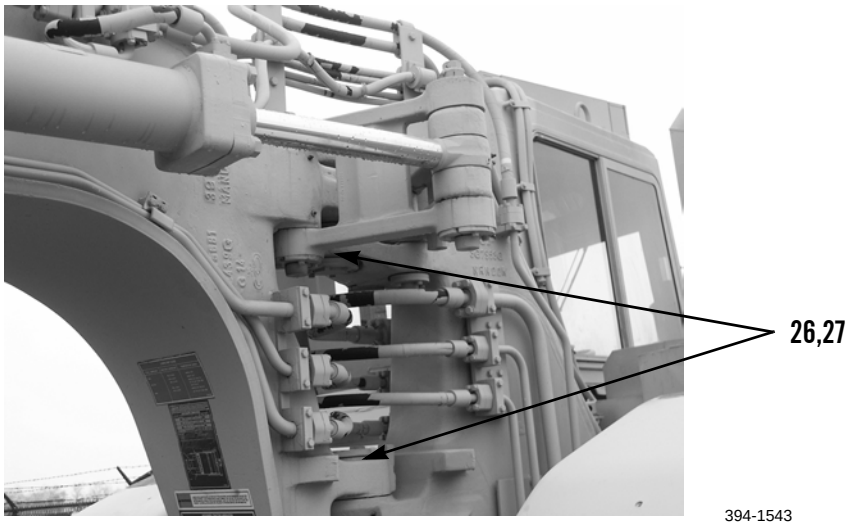
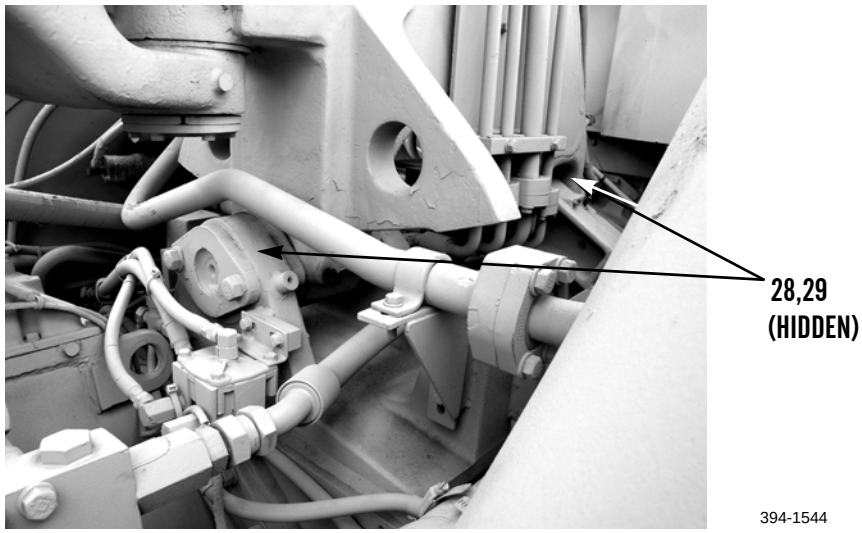


Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 621B Scraper - Continued.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
32	**2000 Hours or Annually**		**Hitch Pins**	a. Inspect the kingbolt pins (26) and bearings (27) for wear.	
				 394-1543	
				b. Inspect the horizontal pivot pins (28) and bearings (29) for wear.	
				 394-1544	
33	**2000 Hours or Annually**		**Seat**	Clean seat screen (WP 0214 00).	

END OF WORK PACKAGE

VALVE COVER AND BASE REPLACEMENT 0021 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Compound, gasket forming, silicone (Item 12, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Adapter

Plug

Seal (4)

Equipment Condition

Muffler and inlet manifold pipe removed (WP 0041 00)

Breather element removed (WP 0023 00)

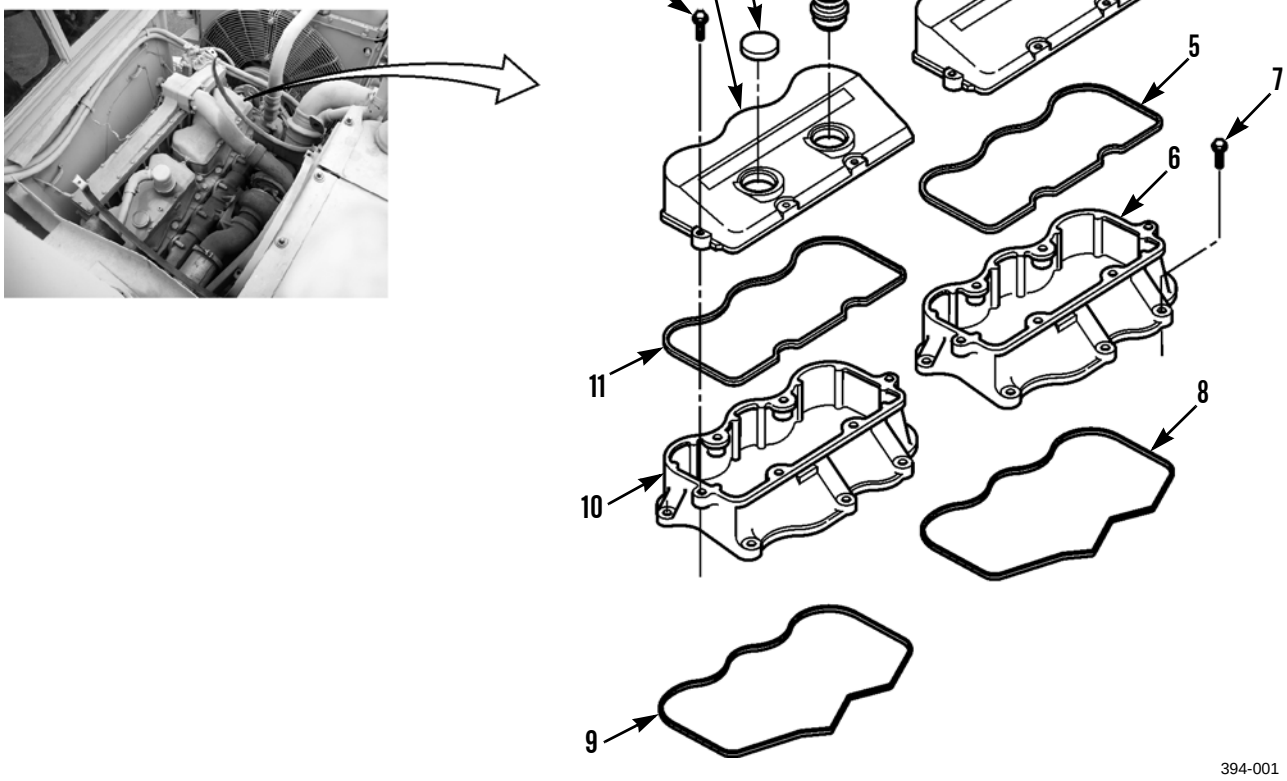
REMOVAL

1. Remove twelve bolts (12) from valve covers (1 and 4).
2. Remove valve covers (1 and 4) and seals (5 and 11) from top of valve cover bases (6 and 10). Discard seals.
3. Remove remaining fourteen bolts (7) from valve cover bases (6 and 10).
4. Remove valve cover bases (6 and 10) and seals (8 and 9) from cylinder head. Discard seals.

NOTE

Only perform the following steps if plug or adapter are damaged and/or require replacement.

5. Punch out and remove plug (2). Discard plug.
6. Punch out and remove adapter (3). Discard adapter.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Thoroughly clean all mating surfaces.
2. Clean all parts with solvent and ensure that they are free of seal material, dirt and oil.
3. Dry parts with compressed air.
4. Visually inspect parts for cracks, heat deterioration or other damage. Replace damaged parts as necessary.

INSTALLATION

1. If removed, install new adapter (3).
2. If removed, install new plug (2).
3. Cut two 57-1/4 in. (145.4 cm) lengths from bulk seal for new valve cover base seals (8 and 9). Apply silicone compound and install seals in valve cover bases (6 and 10).
4. Install valve cover bases (6 and 10) on cylinder head.
5. Install fourteen bolts (7) and tighten to 10 lb-ft (14 Nm).
6. Cut two 56-3/4 in. (144.2 cm) lengths from bulk seal for new valve cover seals (5 and 11). Apply silicone compound and install seals in valve covers (1 and 4).
7. Install valves cover (1 and 4) on valve cover bases (6 and 10).
8. Install twelve bolts (12). Tighten bolts to 10 lb-ft (14 Nm).
9. Install muffler and inlet manifold pipe (WP 0041 00).
10. Install breather element (WP 0023 00).

END OF WORK PACKAGE

ENGINE OIL AND OIL FILTER ELEMENT REPLACEMENT 0022 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Oil, lubricating (Item 30, 31 or 33, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Filter element, fluid

References

WP 0019 00

Equipment Condition

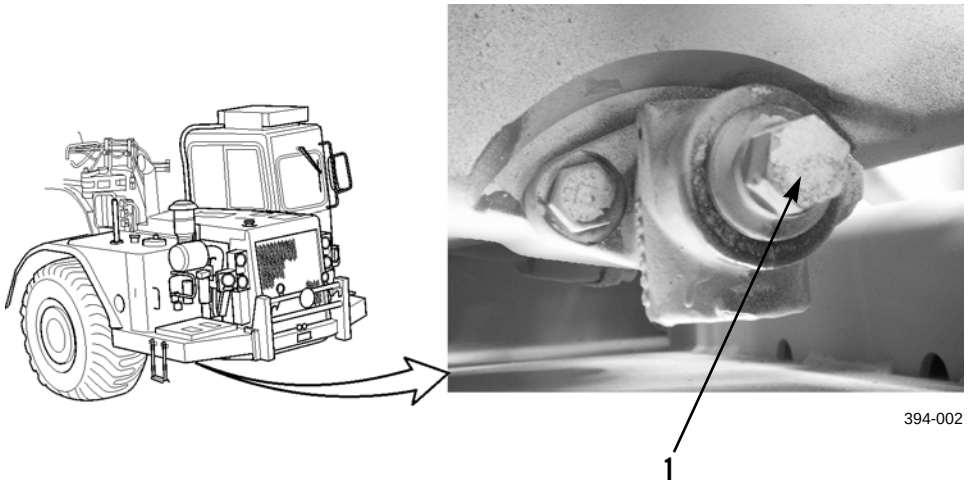
Right side engine compartment access door removed (WP 0190 00)

REMOVAL

NOTE

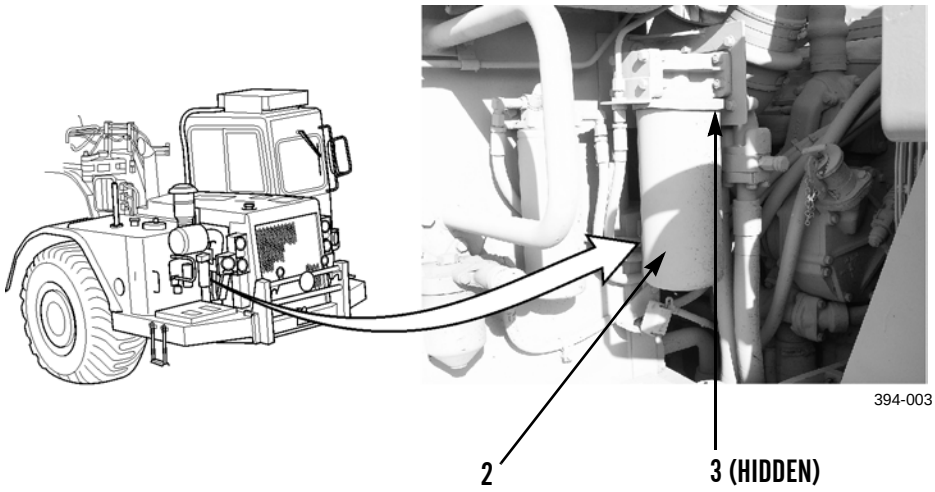
- Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Crankcase capacity is approximately 9 gal. (34 L).
- Access to crankcase drain valve is through the front most opening on right side of crankcase guard.

1. Open crankcase drain valve (1) and allow oil to drain completely. Close valve.



REMOVAL - CONTINUED

2. Remove oil filter element (2) from front, right side of engine compartment. Discard oil filter element.



INSTALLATION

1. Apply a light coat of clean lubricating oil to gasket of new filter (2).
2. Install new oil filter element (2). Tighten by hand an additional 3/4 turn after gasket (3) comes in contact with base.
3. Refill engine oil to “L” mark on the low idle side of gage. Refer to *PMCS Introduction* (WP 0019 00) for proper grade of oil for expected temperature range.
4. Start engine and run at low idle (TM 5-3805-248-10).
5. Recheck oil level and ensure level is in crosshatched area between the “L” and “F” marks on low idle side of gage.
6. Stop engine (TM 5-3805-248-10).
7. Check for leaks around filter and oil drain valve areas.
8. Install right side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

CRANKCASE BREATHER REPLACEMENT 0023 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Detergent, general purpose, liquid (Item 13, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed

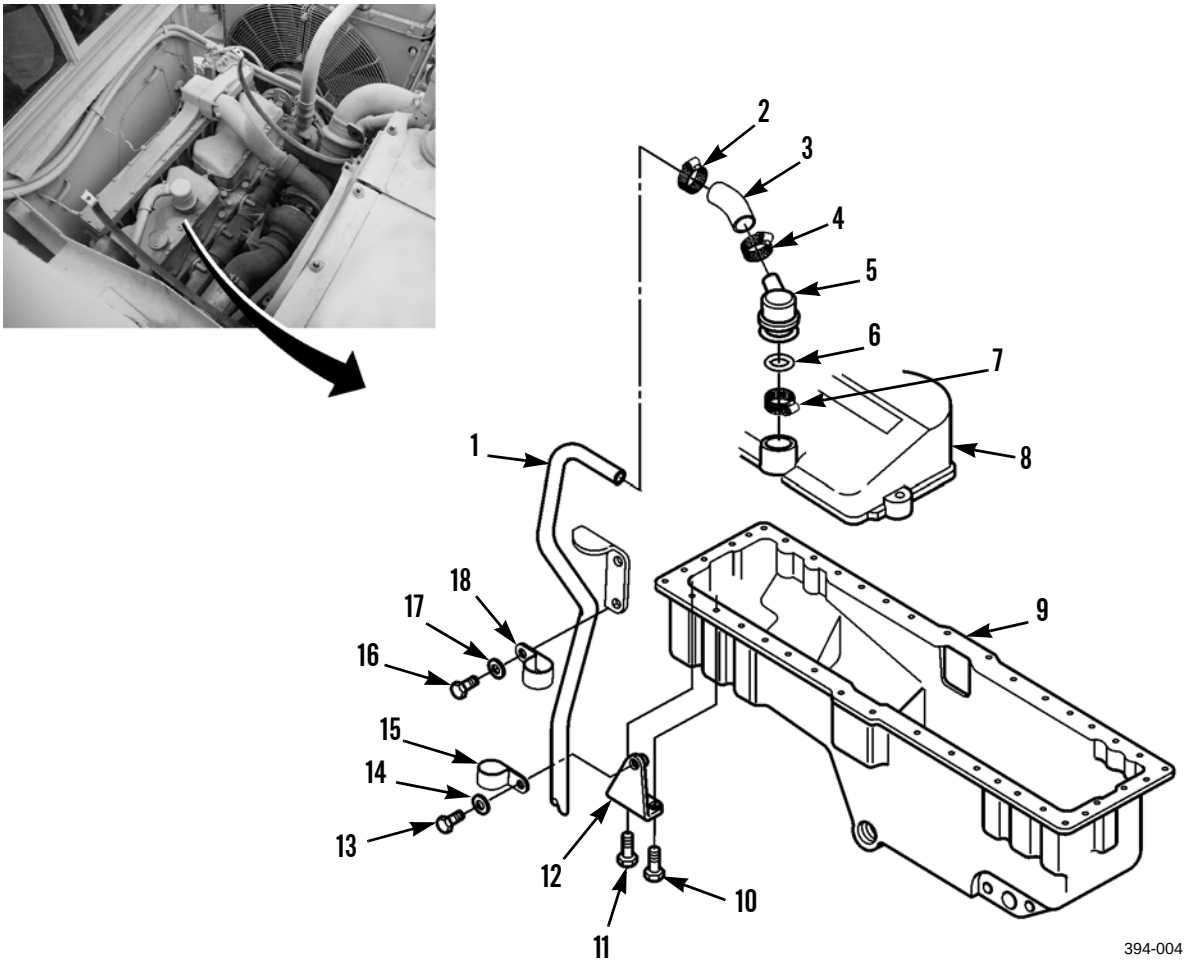
Equipment Condition

Hood removed (WP 0189 00)

Crankcase guards removed (WP 0201 00)

REMOVAL

1. Remove bolt (13), washer (14) and clip (15) from bracket assembly (12).
2. Remove bolts (10 and 11) and bracket assembly (12) from oil pan (9).
3. Remove bolt (16), washer (17) and clip (18).
4. Loosen clamp (7) from top of rear valve cover (8).
5. Remove tube (1).



REMOVAL - CONTINUED

CAUTION

Wipe area clean around all connections to be opened during removal. Cap oil lines and plug openings after removing lines. Contamination of engine lubrication system could result in premature failure.

NOTE

Tag lines and hoses prior to removal to ensure correct installation.

6. Remove clamps (2 and 4) and hose (3).
7. Loosen clamp (7).
8. Remove breather assembly (5).
9. Remove clamp (7).
10. Remove and discard preformed packing (6) from breather assembly (5).

CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all plastic and rubber parts with detergent.
2. Clean all other parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new preformed packing (6) in breather assembly (5) on top of rear valve cover (8).
2. Install clamp (7) and breather assembly (5).
3. Install hose (3) and clamps (2 and 4). Do not tighten clamp (2).
4. Install tube (1).
5. Install clip (18), washer (17) and bolt (16).
6. Install bracket assembly (12) and two bolts (10 and 11) on oil pan (9).
7. Install clip (15), washer (14) and bolt (13) to bracket assembly (12).
8. Tighten clamp (2).
9. Install hood (WP 0189 00).
10. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

ENGINE OIL GAGE AND GUIDE ASSEMBLY REPLACEMENT 0024 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

Equipment Condition

Right side engine compartment access door removed (WP 0190 00)

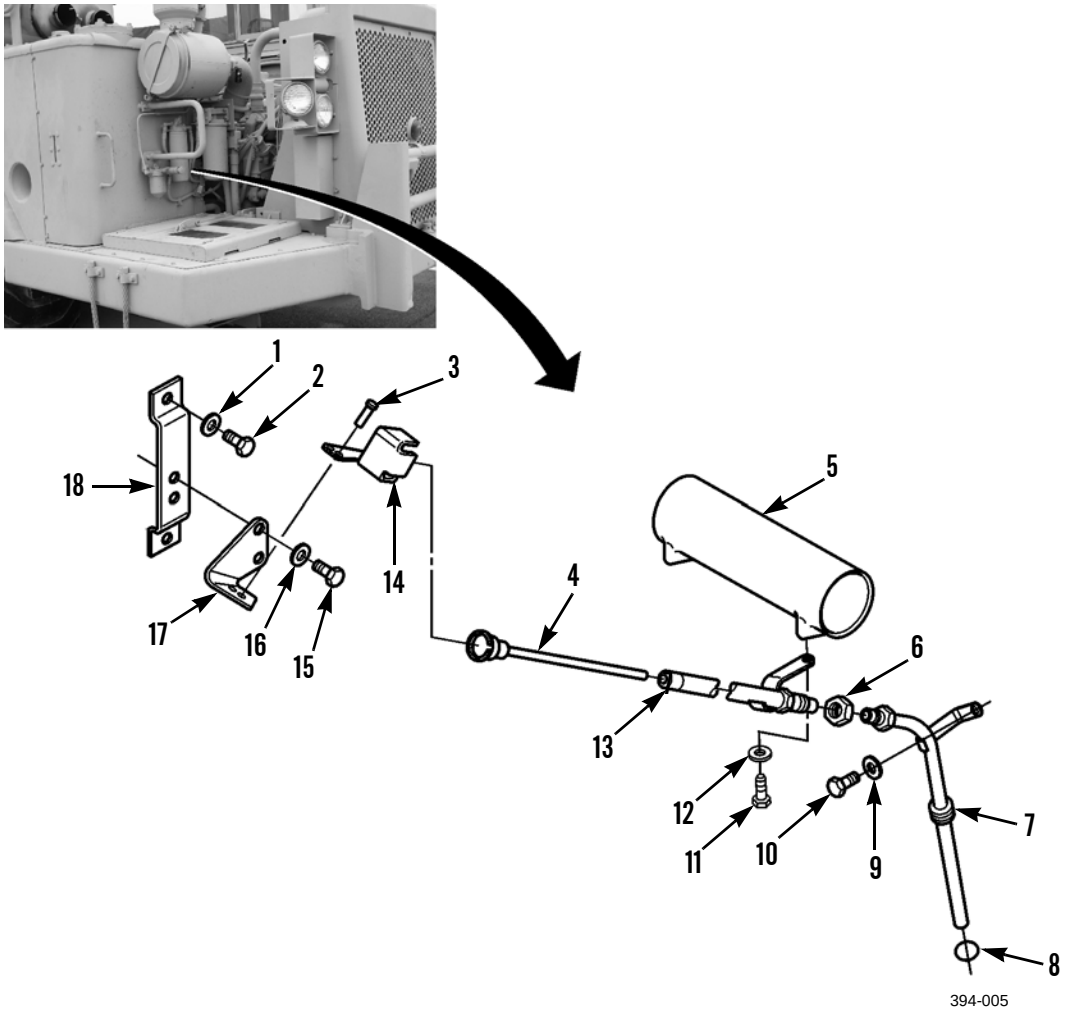
REMOVAL

1. Swing hasp (14) open.
2. Remove gage (4).
3. Remove two bolts (15), washers (16) and hasp assembly (14) with bracket (17) attached.
4. Remove two bolts (2), washers (1) and plate (18).
5. Remove bolt (11) and washer (12) from oil cooler (5).
6. Loosen union (6).
7. Remove guide assembly (13) and union (6).
8. Remove bolt (10), washer (9) and guide assembly (7).
9. Remove and discard preformed packing (8).

NOTE

Perform step 10 only if hasp assembly is damaged.

10. If necessary, remove rivet (3) and hasp (14) from bracket (17). Discard rivet.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install hasp (14) on bracket (17).
2. If removed, install new rivet (3).
3. Install new preformed packing (8).
4. Install guide assembly (7), washer (9) and bolt (10).
5. Install union (6) on guide assembly (7).
6. Install guide assembly (13), washer (12) and bolt (11).
7. Tighten union (6).
8. Install plate (18), two washers (1) and bolts (2).
9. Install hasp assembly (14), two washers (16) and bolts (15).
10. Install gage (4).
11. Install right side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

OIL FILLER TUBE ASSEMBLY REPLACEMENT 0025 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

Equipment Condition

Right side engine compartment access door removed (WP 0190 00)

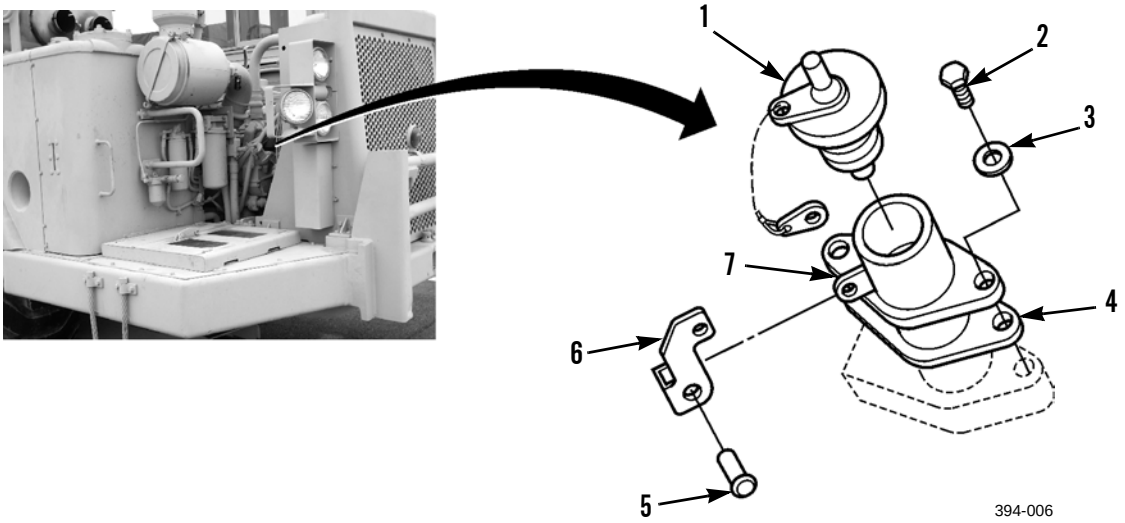
REMOVAL

1. Remove oil filler cap (1) from tube assembly (7).
2. Remove two bolts (2), washers (3), tube (7) and gasket (4). Discard gasket.

NOTE

Perform step 3 only if hasp is damaged.

3. If necessary, remove rivet (5) and hasp (6). Discard rivet.



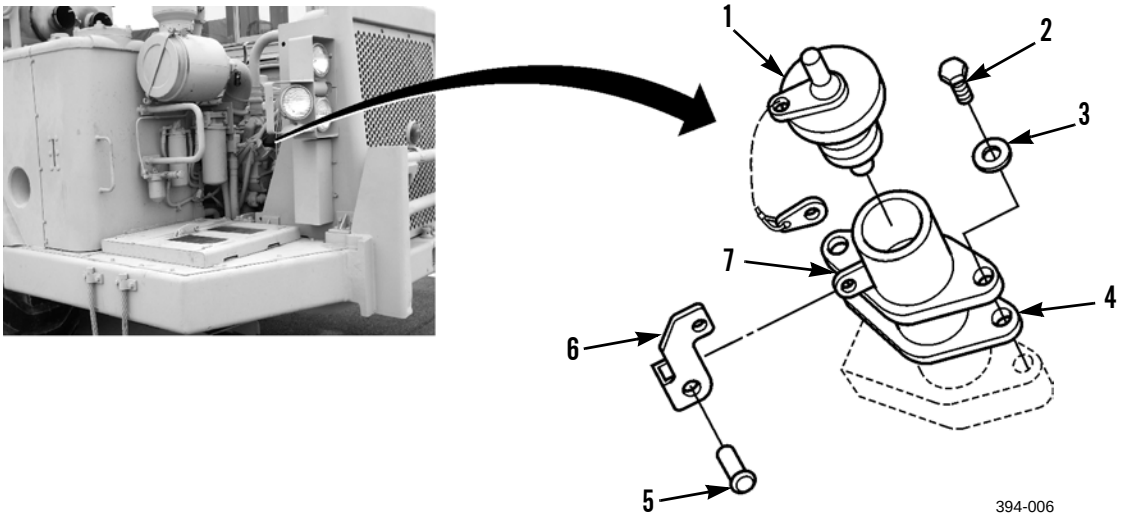
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install hasp (6) and new rivet (5).
2. Install new gasket (4).
3. Install tube (7), two washers (3) and bolts (2).
4. Install cap (1) on tube assembly (7).



5. Install right side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

ENGINE OIL FILTER BASE MAINTENANCE 0026 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Compound, gasket forming, silicone (Item 12, WP 0339 00)

Oil, lubricating (Item 30, 31 or 33, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket (2)

Packing, preformed (10)

Seal (2)

References

WP 0020 00

Equipment Condition

Oil filter removed (WP 0022 00)

Engine oil gage removed (WP 0024 00)

Coolant drained (WP 0042 00)

Crankcase guards removed (WP 0201 00)

Right side engine compartment access door removed (WP 0190 00)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap oil lines and plug openings after removing lines. Contamination of engine lubrication system could result in premature failure.

NOTE

- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

REMOVAL - CONTINUED

1. Remove eight bolts (33), washers (34) and four flange halves (35) from adapter (37).
2. Disconnect hose assemblies (30 and 32).
3. Remove and discard two preformed packings (36).
4. Loosen nut (8) on tube assembly (7).
5. Disconnect tube assembly (7) from oil filter adapter (18) assembly.
6. Remove two bolts (26) and bolt (27) to disconnect filter base (2) assembly from oil cooler (5).
7. Remove two bolts (1 and 6) to disconnect filter base (2) assembly from cylinder block.
8. Remove two bolts (38).
9. Separate filter base (2) from oil cooler (5).
10. Remove filter base (2) assembly.
11. Remove and discard two seals (3) and two seals (4).

DISASSEMBLY

1. Remove connector (9) and preformed packing (10). Discard preformed packing.
2. Remove plug (14), preformed packing (12 and 13), plug (15) and preformed packing (16) from adapter (18). Discard preformed packings.
3. Remove bolts (11 and 17), adapter (18) and preformed packing (19). Discard preformed packing.
4. Remove two plugs (41) and preformed packings (42). Discard preformed packings.
5. Remove two bolts (31).
6. Separate adapter (37) from filter base (2).
7. Remove and discard preformed packings (28 and 29).
8. Remove stud (39) from filter base (2).

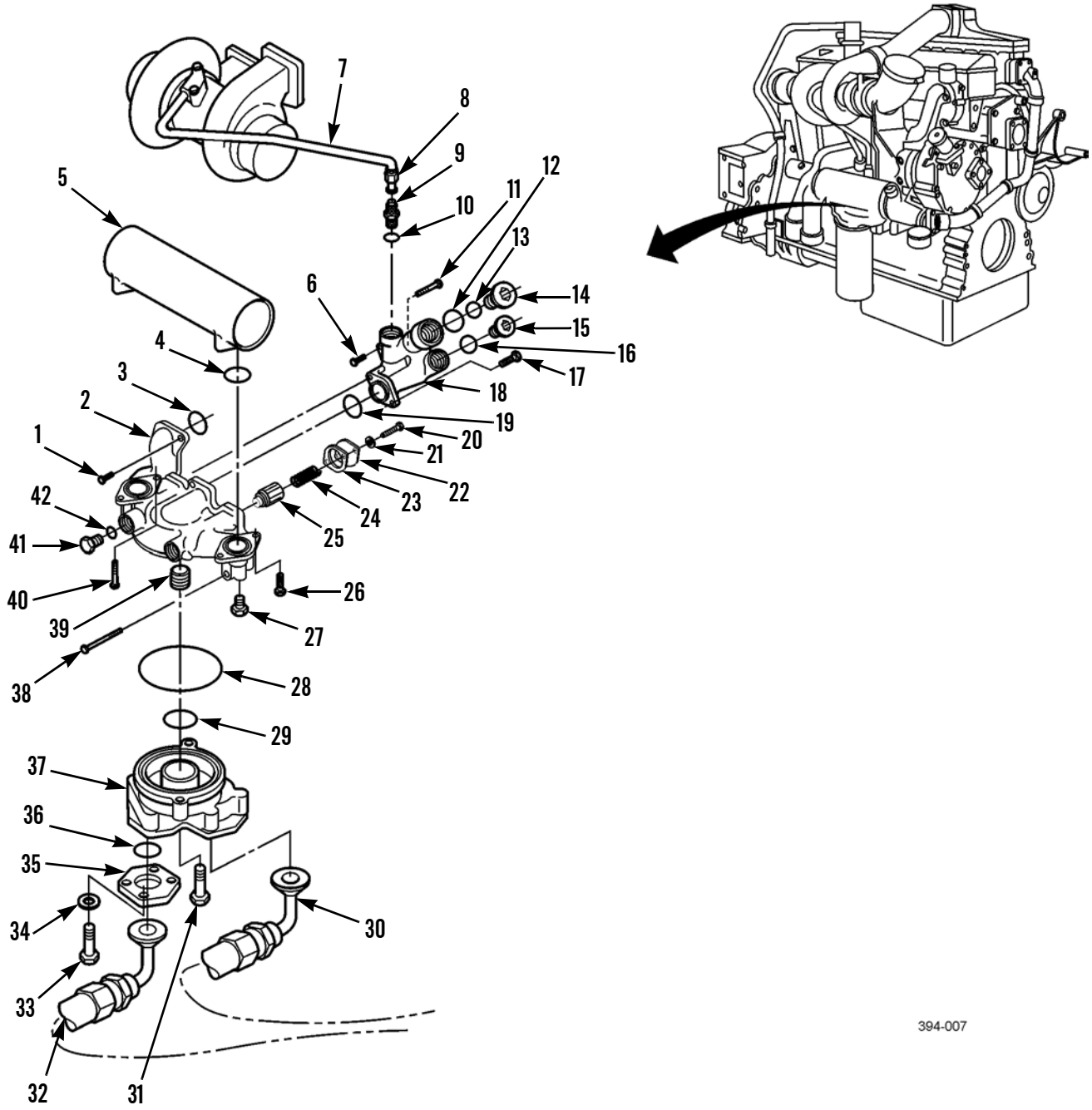
WARNING

Covers hold springs under compression. Wear eye protection and use care when removing springs. Failure to do so may result in injury.

9. Loosen four bolts (20), to relieve tension on two springs (24).
10. Remove four bolts (20), washers (21), two covers (22), gaskets (23), springs (24) and plungers (25) from filter base (2). Discard two gaskets. Remove all gasket material from mating surfaces.
11. Remove pipe plug (27) from filter base (2).

ENGINE OIL FILTER BASE MAINTENANCE - CONTINUED **0026 00**

REMOVAL - CONTINUED



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

ASSEMBLY

NOTE

Lightly coat all new seals and preformed packing with clean oil prior to installation.

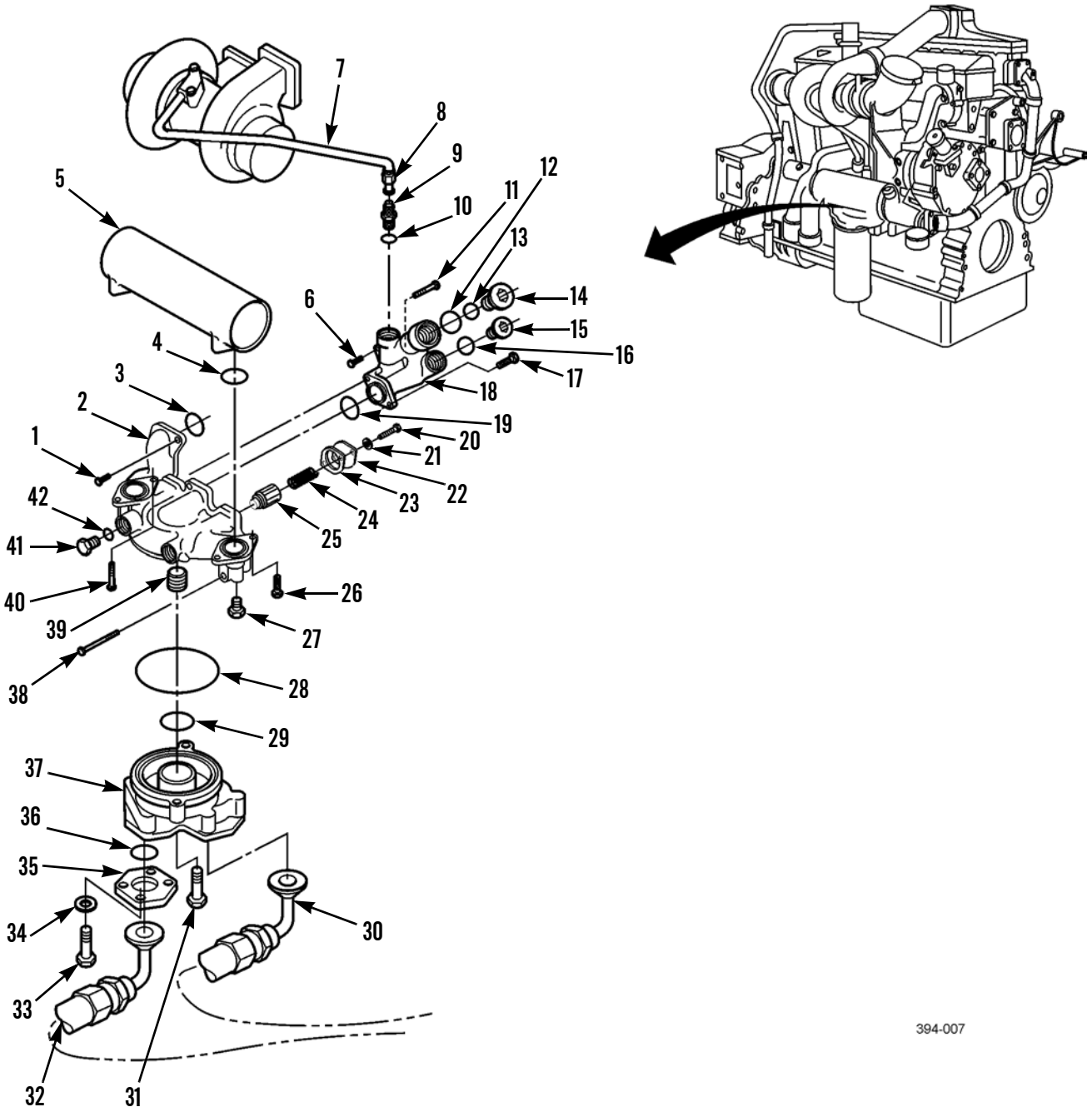
1. Use clean oil to lubricate two plungers (25).
2. Install pipe plug (27) in filter base (2).
3. Install two plungers (25), springs (24), new gaskets (23), covers (22), four washers (21) and bolts (20) on filter base (2).
4. Apply silicone compound to half of threads on stud (39).
5. Install stud (39). Torque stud to 62 lb-ft (84 Nm).
6. Install new preformed packings (28 and 29).
7. Install adapter (37) on filter base (2).
8. Install two bolts (31).
9. Install two new preformed packings (42) and plugs (41).
10. Install new preformed packing (19) in groove of adapter (18).
11. Install adapter (18) on filter base (2).
12. Install bolts (11 and 17).
13. Install new preformed packing (16), plug (15), new preformed packings (12 and 13) and plug (14).
14. Install new preformed packing (10) and connector (9).

INSTALLATION

1. Install two new seals (3) and two new seals (4) in grooves of filter base (2).
2. Install filter base (2) and ensure it is seated properly with oil cooler (5).
3. Install two bolts (1), two bolts (6) and two bolts (38) loosely.
4. Install bolt (40) and two bolts (26).
5. Tighten bolts (1), bolts (6) and bolts (38).
6. Connect tube assembly (7) on oil filter adapter (18).
7. Tighten nut (8).
8. Install two new preformed packings (36) on hose assemblies (30 and 32).

INSTALLATION - CONTINUED

9. Install hose assemblies (30 and 32) and four flange halves (35) on adapter (37).
10. Install eight washers (34) and bolts (33).



INSTALLATION - CONTINUED

11. Refill coolant (WP 0042 00).
12. Install oil filter (WP 0022 00).
13. Refill engine oil to proper level. Refer to PMCS (WP 0020 00).
14. Start engine (TM 5-3805-248-10). Run engine for a few minutes.
15. Stop engine (TM 5-3805-248-10).
16. Inspect engine oil filter base and check for leaks.
17. Install engine oil gage (WP 0024 00).
18. Install crankcase guards (WP 0201 00).
19. Install right side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

OIL FILTER LINES AND FITTINGS REPLACEMENT 0027 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Gasket (2)

Packing, preformed (3)

Equipment Condition

Engine oil drained (WP 0022 00)

Oil lines disconnected from oil filter base (WP 0026 00)

Fuel line and holddown bracket removed from oil filter head (WP 0035 00).

REMOVAL

CAUTION

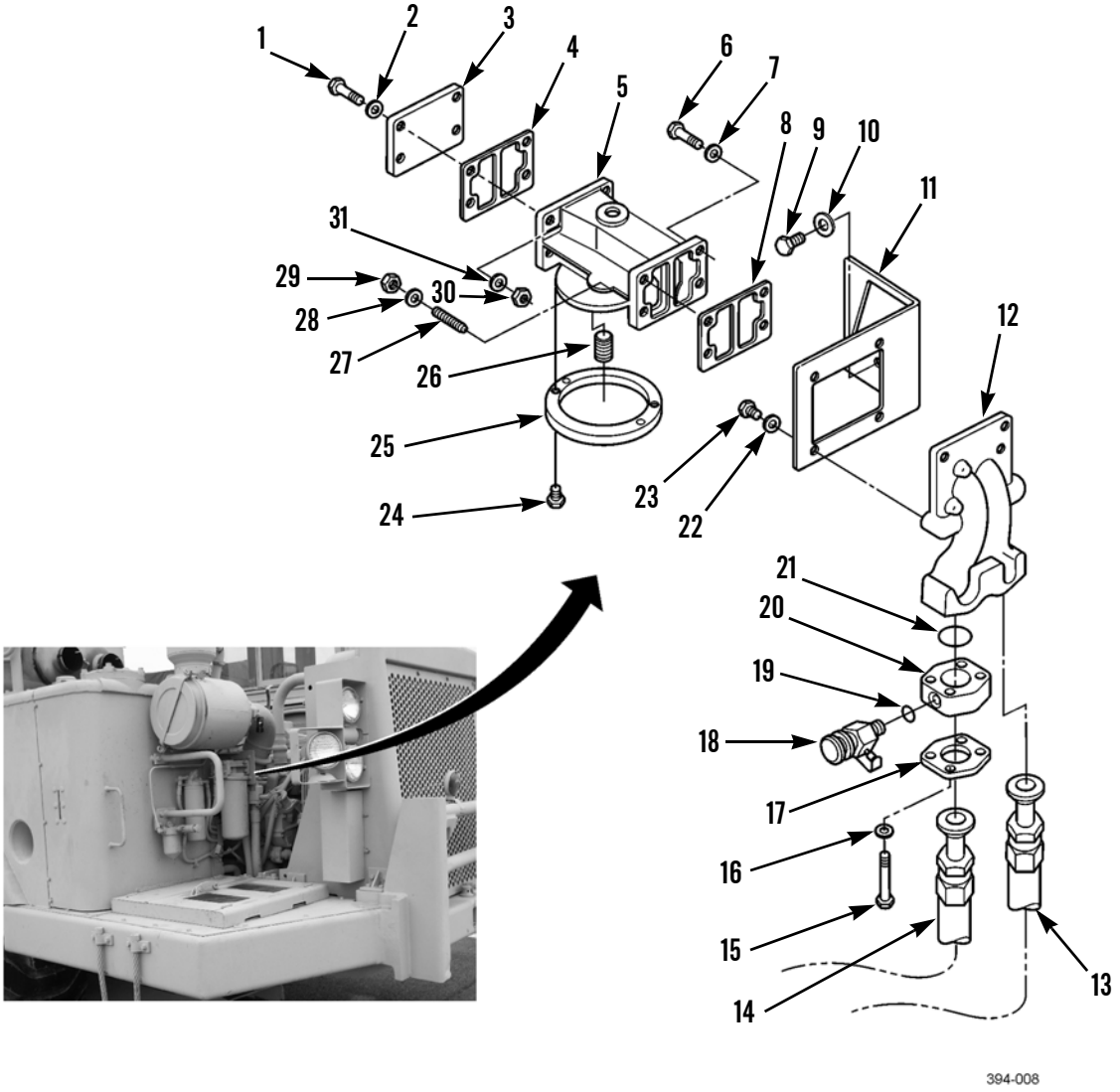
Wipe area clean around all connections to be opened during removal and disassembly. Cap oil lines and plug openings after removing lines. Contamination of engine lubrication system could result in premature failure.

NOTE

- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove valve assembly (18) and preformed packing (19). Discard preformed packing.
2. Remove eight bolts (15), washers (16) and four flange halves (17).
3. Disconnect hoses (13 and 14).
4. Remove two adapters (20) and preformed packings (21) from oil filter adapter (12). Discard preformed packings.
5. Remove hoses (13 and 14).
6. Remove two nuts (29) and washers (28).
7. Remove two bolts (6), washers (7), oil filter head (5) and gasket (8) from oil filter adapter. Discard gasket.
8. Remove four nuts (30), washers (31), bolts (1), washers (2), access cover (3) and gasket (4) from oil filter head (5). Discard gasket.
9. Remove two screws (24) and shield (25) from filter head (5).
10. Remove stud (26) from oil filter head (5).
11. Remove four bolts (23), washers (22) and oil filter adapter (12) from bracket (11).
12. Remove two studs (27) from oil filter adapter (12).
13. Remove two bolts (9), washers (10) and bracket (11).

REMOVAL - CONTINUED



CLEANING AND INSPECTION

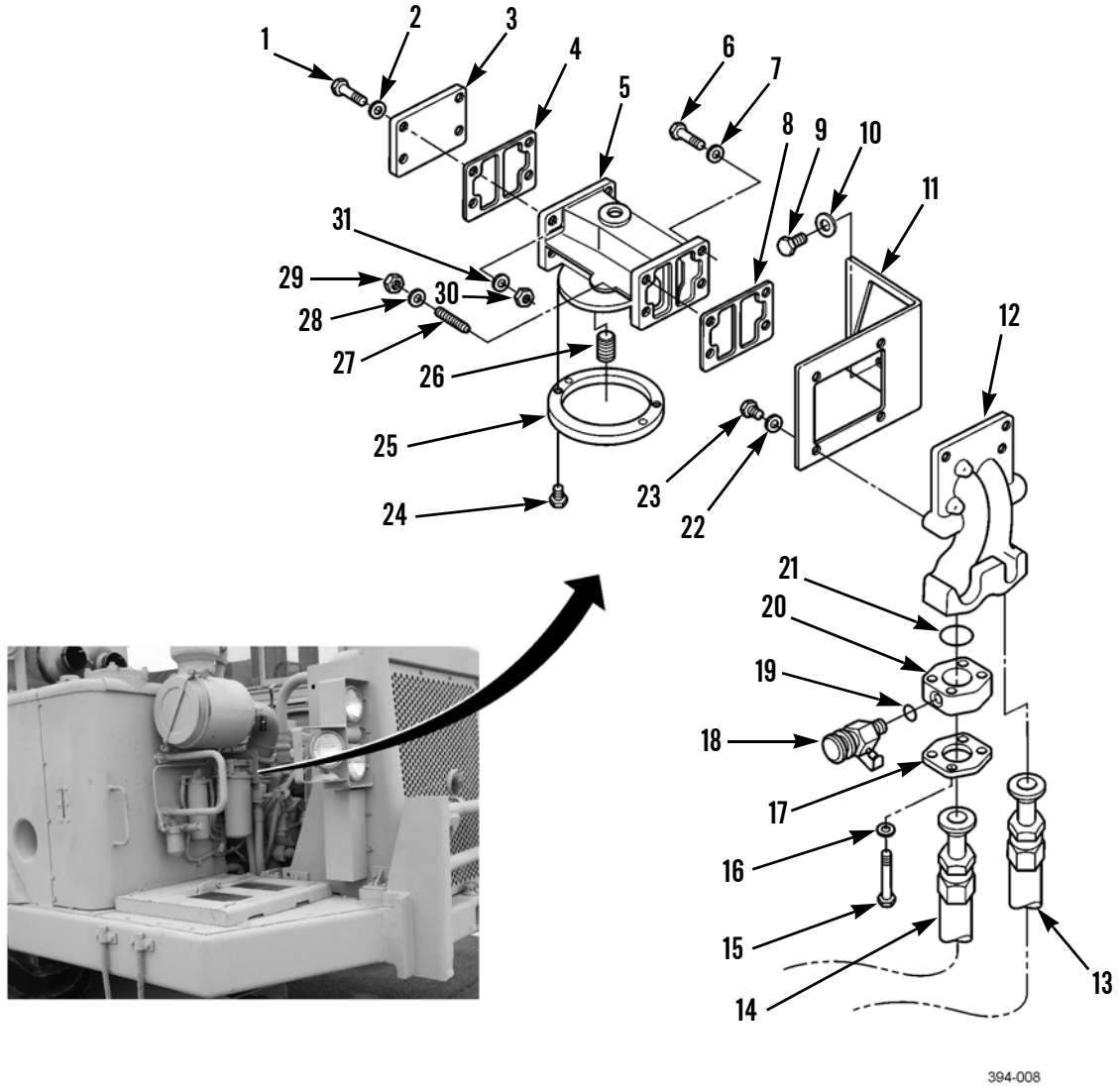
- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket material from all mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install bracket (11), two bolts (9) and washers (10).
2. Install two studs (27) on oil filter adapter (12).
3. Install oil filter adapter (12), four bolts (23) and washers (22) on bracket (11).
4. Install stud (26) in oil filter head (5).
5. Install shield (25) and two screws (24) on filter head (5).
6. Install new gasket (4), access cover (3), bolts (1), washers (2), washers (31) and four nuts (30) on oil filter head (5).
7. Install new gasket (8), oil filter head (5), washers (7) and two bolts (6) on oil filter adapter (12).
8. Install two washers (28) and nuts (29).
9. Install hoses (13 and 14) on machine.
10. Connect oil lines to oil filter base (WP 0026 00).
11. Install two new preformed packings (21) and adapters (20).
12. Connect hoses (13 and 14) to oil filter adapter (12).
13. Install four flange halves (17), eight washers (16) and bolts (15).
14. Install new preformed packing (19) and valve assembly (18).

INSTALLATION - CONTINUED



15. Install fuel line and holddown bracket on front of oil filter head (WP 0035 00).
16. Fill engine oil (WP 0022 00).
17. Check for leaks around oil filter lines and fittings.

END OF WORK PACKAGE

BARRING ENGINE OVER 0028 00

THIS WORK PACKAGE COVERS

Barring Engine Over

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Pinion turning tool (Item 67, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Gasket

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

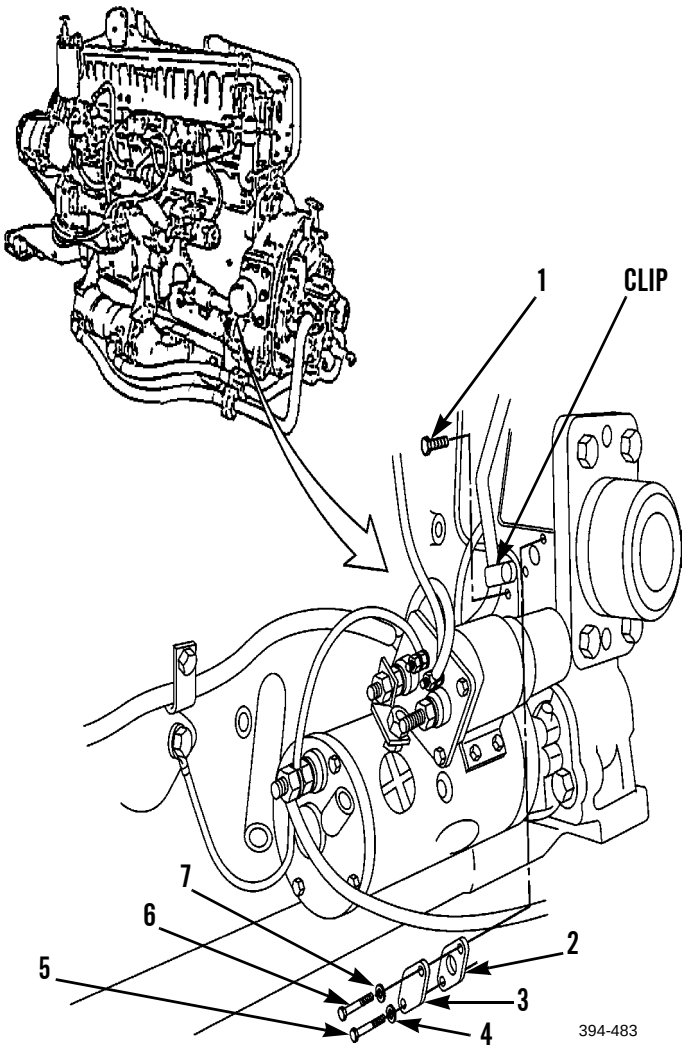
Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

BARRING ENGINE OVER

1. Remove timing bolt (5), washer (4) and clip from left side of flywheel housing. Leave clip attached to harness.
2. Remove bolt (6), washer (7), cover (3) and gasket (2). Discard gasket.
3. Remove plug (1).



4. Install engine turning tool through left side of flywheel housing until shoulder of engine turning tool is against flywheel housing. Engine pinion turning tool engages ring gear on flywheel housing.
5. Insert 1/2 in. (13 mm) ratchet in engine turning tool.

NOTE

When direction of engine rotation is specified, engine is viewed from rear.

6. Rotate 1/2 in. ratchet counterclockwise on engine.
7. Install plug (1) in flywheel housing.
8. Position new gasket (2) and cover (3) on flywheel housing.
9. Install washer (7) and bolt (6).
10. Install clip, washer (4) and timing bolt (5)

END OF WORK PACKAGE

CYLINDER BALANCE TEST 0029 00

THIS WORK PACKAGE COVERS

Testing

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

References

WP 0009 00

WARNING

- Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.
- Eye protection must be worn when performing this test procedure. Failure to take precautions could cause injury.
- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

CAUTION

- Use caution to ensure fuel system does not become contaminated. Keep work area clean. Contamination of fuel system could result in premature failure.
- Utilize line wrenches for removal of injector lines to avoid damage to fittings and connectors.

NOTE

- Use a container to catch any fuel that may drain from system. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.
- This on-vehicle test can be performed to find cylinder that is misfiring and causing erratic engine idle and black exhaust smoke.

TESTING

1. While running engine at an RPM that makes symptom most evident, loosen fuel line nut at a fuel injection nozzle. This will stop flow of fuel to that cylinder.
2. Listen for a change in engine idle speed or for idle to become more erratic.
   a. If change occurs, tighten fuel line and go to step 3.
   b. If no change occurs, this cylinder is misfiring.
3. Repeat steps 1 and 2 for each injector to be tested.
4. Record results of test and return to troubleshooting, if required (WP 0009 00).

END OF WORK PACKAGE

FUEL INJECTION LINES REPLACEMENT 0030 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (2)

References

WP 0040 00

WP 0041 00

WP 0189 00

TM 5-3805-248-10

Equipment Condition

Valve covers and valve cover bases removed (WP 0021 00)

WARNING

- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

REMOVAL

CAUTION

- Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.
- The fuel injection nozzles can be permanently damaged by twisting if only one wrench is used to loosen the fuel line nuts. Use one wrench to hold the nozzle and another to loosen the nut.
- Use two line wrenches to loosen fuel lines. Failure to do so may result in damage to lines.

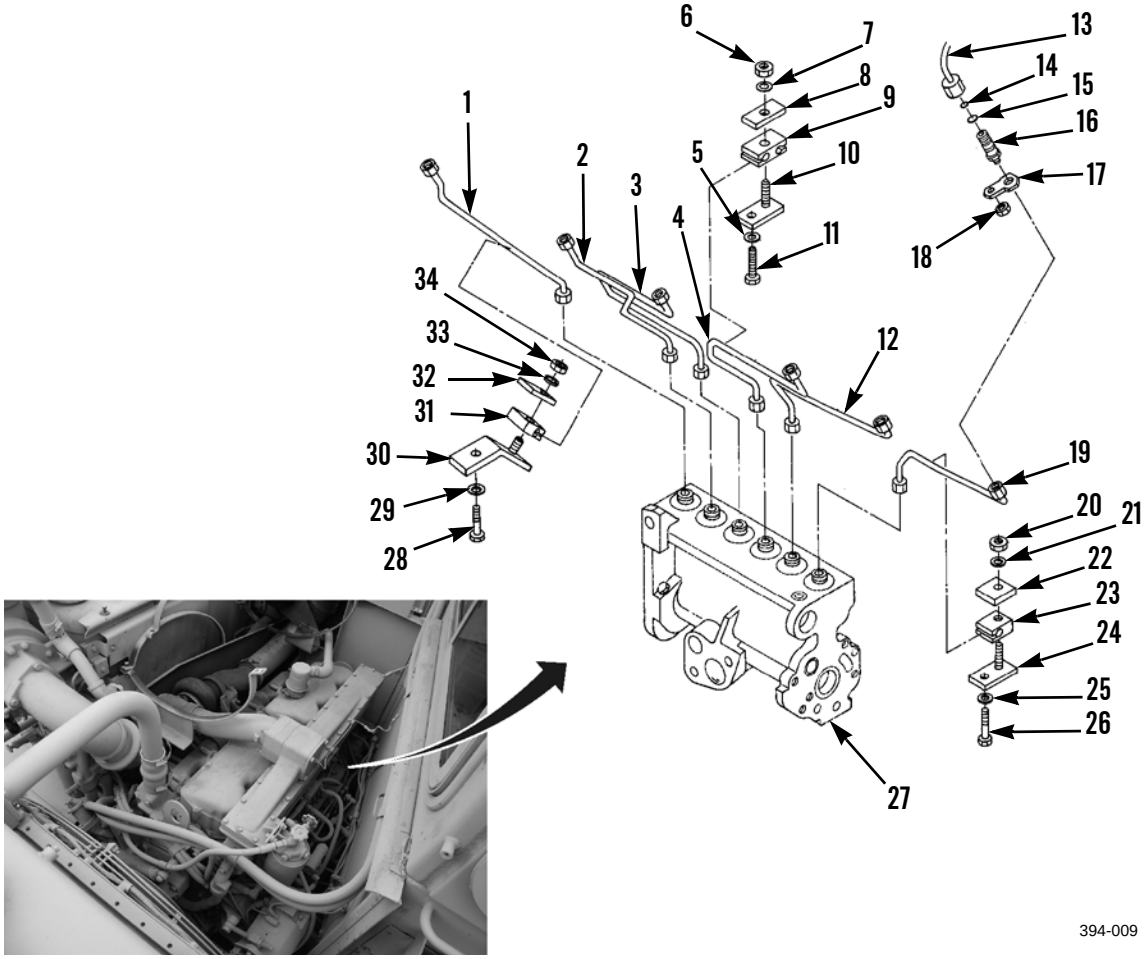
FUEL INJECTION LINES REPLACEMENT - CONTINUED 0030 00

REMOVAL - CONTINUED

NOTE

- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.
- Mark the exact location of mounting hardware and clamp prior to removal to aid in installation.

1. Slowly loosen nuts on fuel injector lines (1, 2, 3, 4, 12 and 19) at injector pump (27).
2. Disconnect fuel injector lines (1, 2, 3, 4, 12 and 19) from six adapters (16) and from injector pump (27).
3. Remove nut (34), washer (33), strip (32) and damper (31) from fuel injector line (1) and supporting bracket (30).
4. Remove bolt (28), washer (29) and supporting bracket (30).
5. Remove two nuts (6), washers (7), strips (8) and dampers (9).
6. Remove two bolts (11), washers (5) and strips (10).
7. Remove nut (20), washer (21), strip (22) and damper (23).
8. Remove bolt (26), washer (25) and strip (24).
9. Remove six nuts (18) and adapter locks (17) from fuel injector tube assemblies (13).



REMOVAL - CONTINUED

10. Remove fuel injector lines (1, 2, 3, 4, 12 and 19).
11. Disconnect six fuel injector tube assemblies (13) from six adapters (16) and remove adapters (16) and preformed packings (14 and 15) from fuel injector tube assemblies (13). Discard preformed packings.

CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent cleaning compound.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

WARNING

If fuel line mounting hardware is not installed in its exact location, vibration can cause fuel lines to break and cause injury or damage to the machine.

CAUTION

- The adapters must be turned so that the cross-drilled portion of the bleed hole points downward. If this hole points upward, it can become plugged. A plugged bleed hole allows fuel to enter the engine and dilute the oil if the internal fuel line leaks.
- The fuel injection nozzles can be permanently damaged by twisting if only one wrench is used to tighten the fuel line nuts. Use one wrench to hold the nozzle and another to tighten the nut.
- Use two line wrenches when tightening fuel lines. Failure to do so may result in damage to lines.

1. Install new preformed packings (14 and 15) and six adapters (16) on fuel injector tube assemblies (13) and tighten.
2. Install six adapter locks (17) and nuts (18) on fuel injector tube assemblies (13).
3. Install fuel injector lines (1, 2, 3, 4, 12 and 19) and connect loosely to six adapters (17).
4. Install strip (24), washer (25) and bolt (26).
5. Install damper (23), strip (22), washer (21) and nut (20).
6. Install two strips (10), washers (5) and bolts (11).

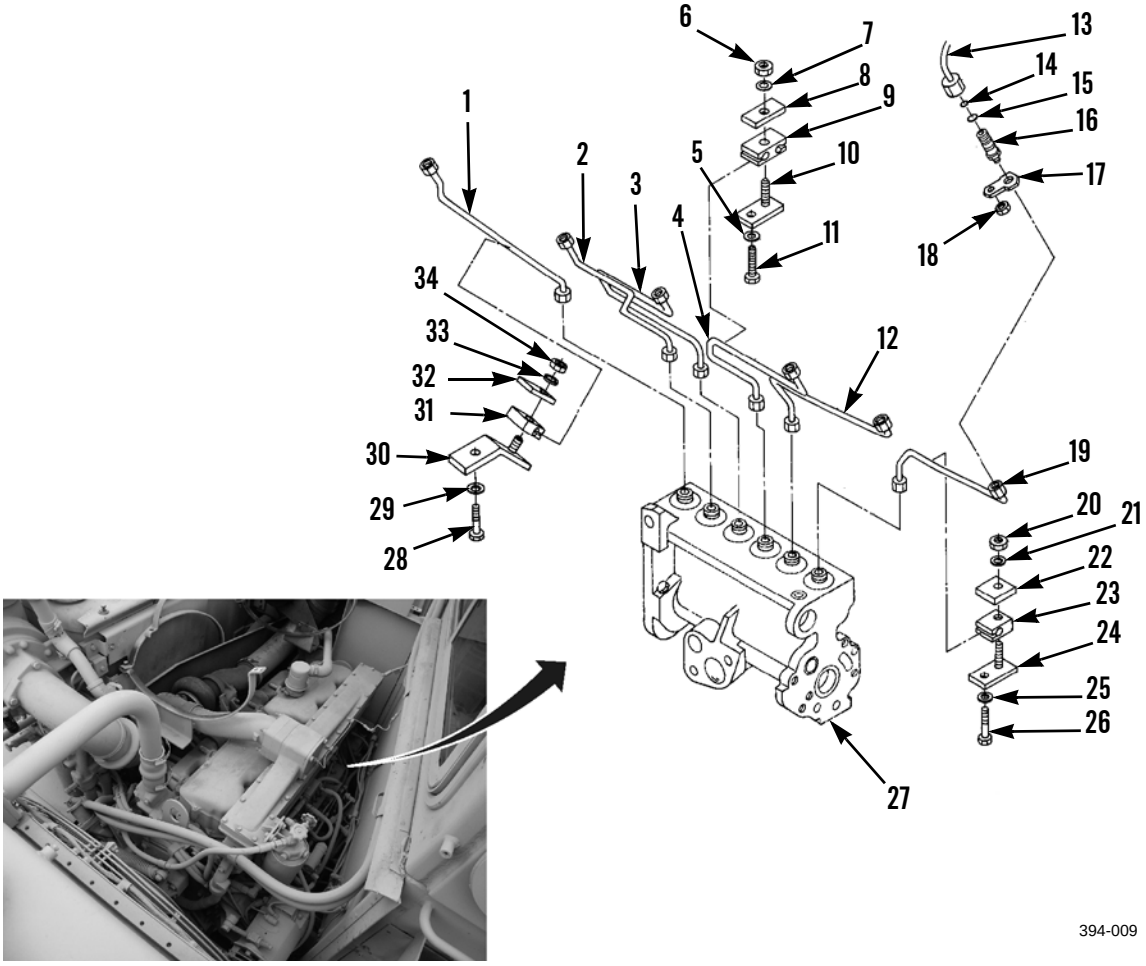
INSTALLATION - CONTINUED

7. Install two dampers (9), strips (8), washers (7) and nuts (6).
8. Install bracket (30), washer (29) and bolt (28).
9. Install damper (31), strip (32), washer (33) and nut (34).

CAUTION

Use two wrenches when tightening fuel injector lines on nozzles. Hold nozzle with one wrench to prevent it from turning. Use other wrench to connect line. Failure to do so may damage equipment.

10. Connect fuel injector lines (1, 2, 3, 4, 12 and 19) to fuel injector pump and tighten both ends of each line.



11. Install valve covers and valve cover bases (WP 0021 00).
12. Install muffler (WP 0041 00).
13. Prime the fuel system (WP 0040 00).
14. Install hood (WP 0189 00).
15. Start engine (TM 5-3805-248-10).
16. Check fuel injector lines for leaks.

END OF WORK PACKAGE

AIR CLEANER ASSEMBLY REPLACEMENT 0031 00

THIS WORK PACKAGE COVERS

Filter Elements: Removal, Installation

Air Cleaner Assembly: Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (3)

Equipment Condition

Dust ejector hose disconnected from air cleaner (WP 0032 00)

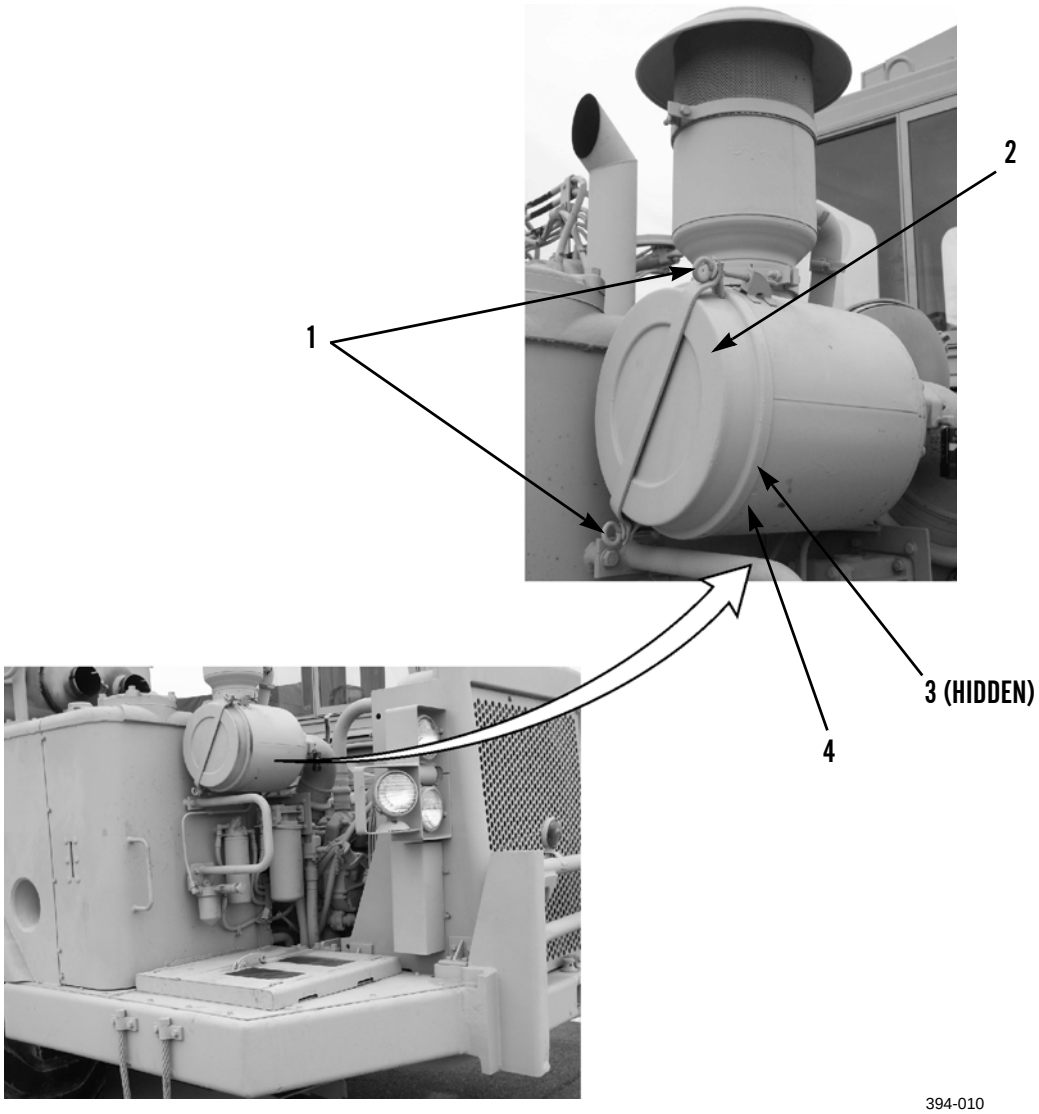
- If NBC exposure is suspected, personnel wearing protective equipment should handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel.

NOTE

- When removing the filter elements, check sealing surfaces on elements for dirt on clean side. This exposes possible filtration problems such as damaged canisters, incorrect element fit, or the need for cleaning and/or repair of gasket surfaces.
- The secondary air filter element is typically changed at the time of the third primary element change. After the primary filter is removed, be sure there is no dirt in the filter housing before removing the secondary element. If the secondary element is difficult to remove, it may indicate bottom of secondary element is sticking to filter housing. Be sure to check gasket contacts area of the filter housing for stuck or torn gasket. This area must be clean and free of gasket material to prevent an air leak path past secondary filter.

FILTER ELEMENTS REMOVAL

1. Loosen two eye bolts (1) and remove cover (2) from filter housing (4).
2. If damaged, remove gasket (3) from cover (2). Discard gasket.



FILTER ELEMENTS REMOVAL - CONTINUED

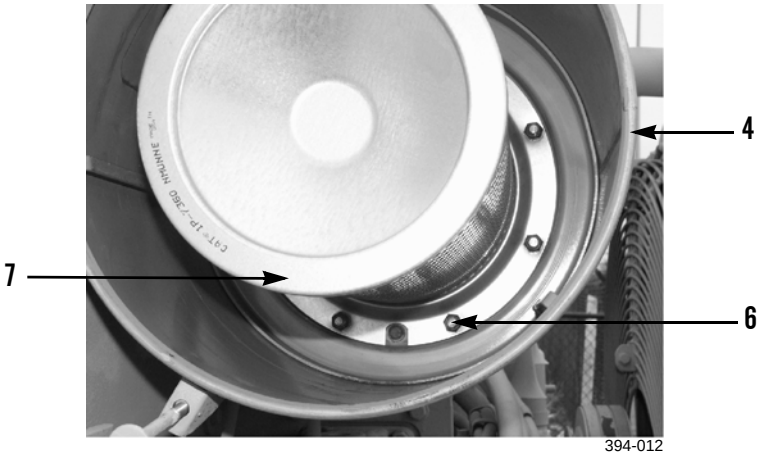
3. Remove primary filter element (5) from filter housing (4).

394-011

4. Remove eight nuts (6) and secondary filter element (7) from studs inside filter housing (4).

FILTER ELEMENTS INSTALLATION

1. Install secondary filter element (7) and eight nuts (6) on studs inside filter housing (4).

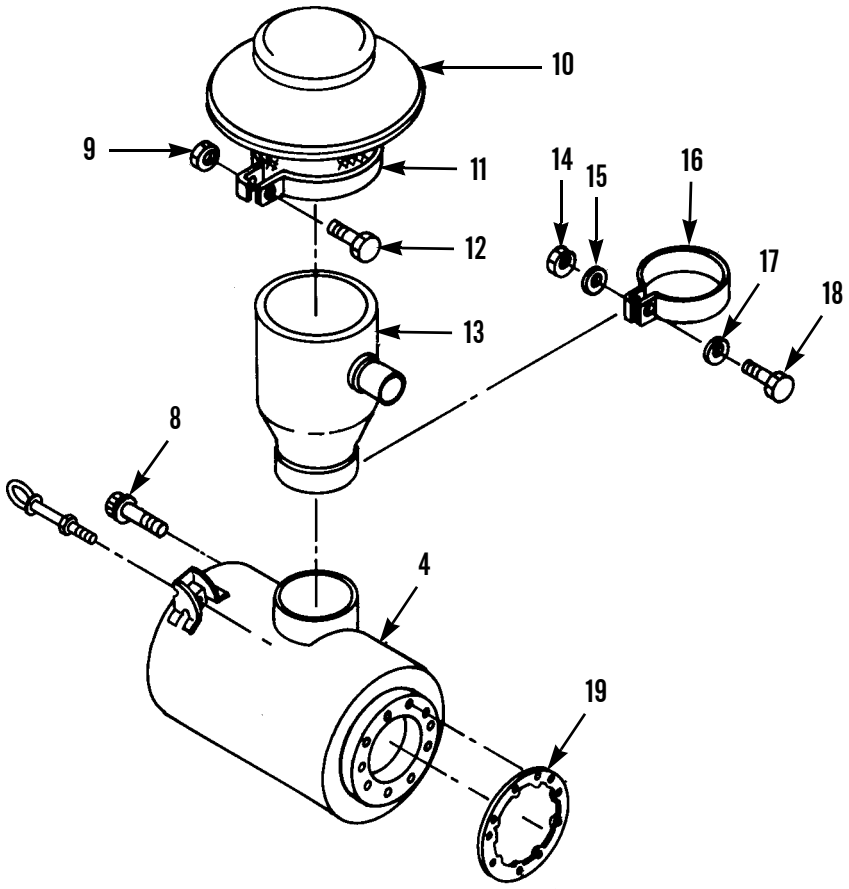


394-012

2. Install primary filter element (5) in filter housing (4) assembly.
3. If required, install new gasket (3) in cover (2).
4. Install cover (2) on filter housing (4) and tighten two eye bolts (1).

AIR CLEANER ASSEMBLY REMOVAL

1. Remove air filter elements. Refer to *Filter Elements Removal* in this work package.
2. Remove two capscrews (8), slide filter housing (4) off studs and remove filter housing from engine.
3. Remove and discard gasket (19).
4. Remove nut (14) washer (15), bolt (18) washer (17) and separate precleaner (13) assembly from filter housing (4).
5. Remove clamp (16).
6. Remove nut (9) and bolt (12) and separate hood assembly (10) from precleaner (13).
7. Remove clamp (11).



394-013

AIR CLEANER ASSEMBLY CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

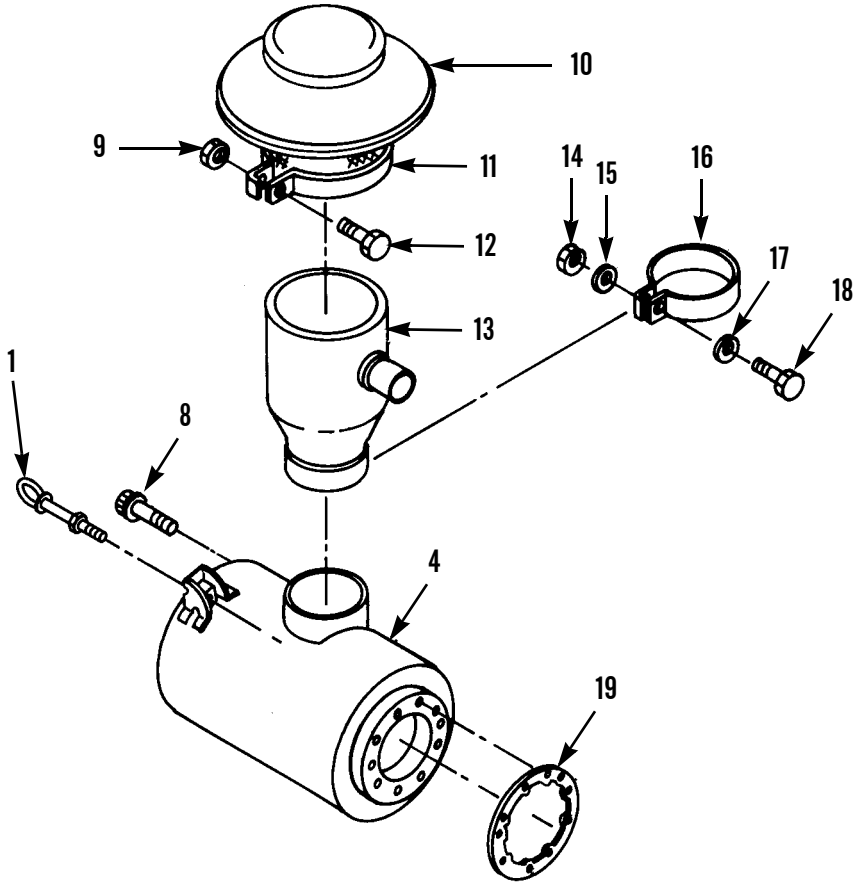
NOTE

When removing the filter elements, always check the sealing surfaces on the elements for dirt on the clean side. This will reveal possible filtration problems such as damaged canisters, incorrect element fit, or the need for cleaning and/or repair of gasket surfaces.

1. Remove all gasket material from mounting surfaces.
2. Clean metal all parts EXCEPT filter elements with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

AIR CLEANER ASSEMBLY INSTALLATION

1. Install clamp (11) on hood (10).
2. Install hood (10) on precleaner (13).
3. Install nut (9) and bolt (12) in clamp (11).
4. Install clamp (16) on precleaner (13).
5. Install precleaner (13) assembly on filter housing (4).
6. Install washer (17), bolt (18), washer (15) and nut (14) in clamp (16).
7. Install new gasket (19), slide filter housing (4) on studs and install two capscrews (8).
8. Loosely install two eye bolts (1).



394-013

9. Install dust ejector hose to air cleaner (WP 0032 00).
10. Install air filter elements. Refer to *Filter Elements Installation* in this work package.

END OF WORK PACKAGE

DUST EJECTOR AND INLET PIPING AND MOUNTING MAINTENANCE 0032 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent, general purpose (Item 13, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket

Lockwasher (7)

References

WP 0031 00

WP 0251 00

TM 5-3805-248-10

Equipment Condition

Hood removed (WP 0189 00)

Air cleaner service indicator removed (WP 0251 00)

REMOVAL

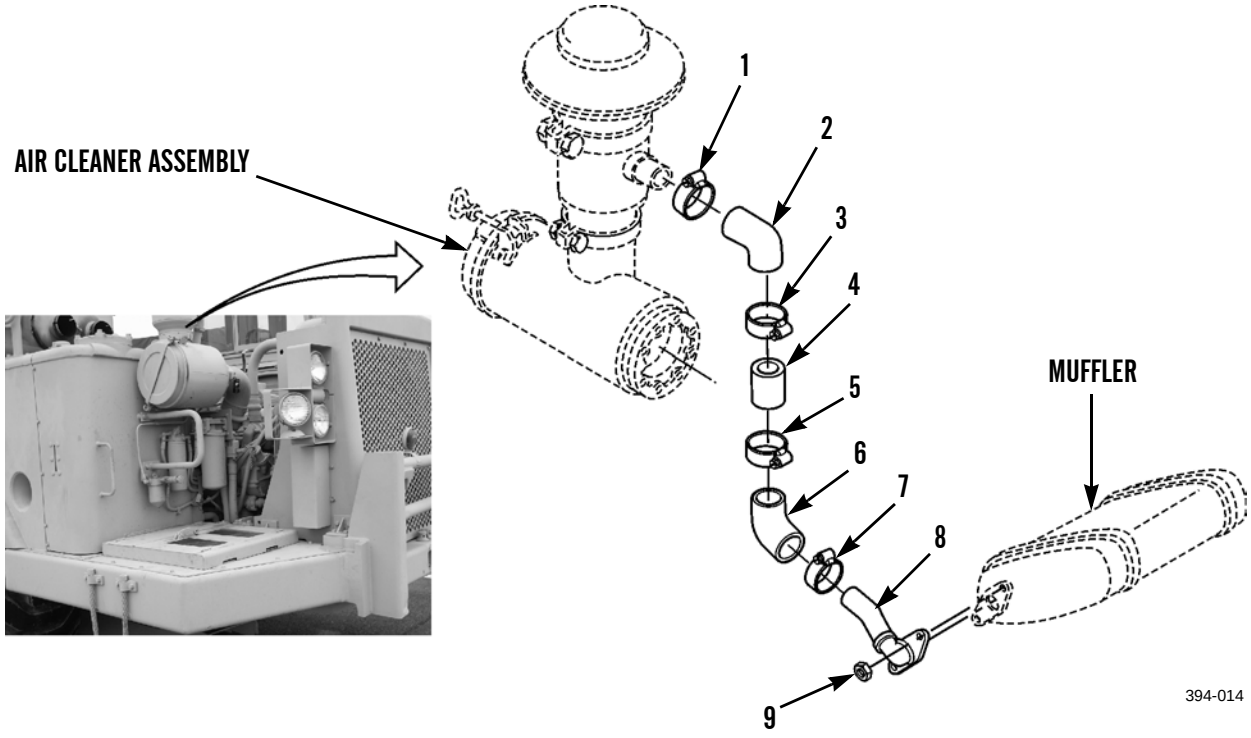
CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap hoses and plug openings after removing. Debris falling into turbocharger could result in premature failure.

NOTE

Tag lines prior to removal to ensure correct installation.

1. Loosen clamp (1) and disconnect hose (2) from air cleaner assembly.
2. Remove air cleaner assembly (WP 0031 00).
3. Remove clamp (1) from hose (2).
4. Loosen clamps (3 and 5) and remove tube (4) from hoses (2 and 6).
5. Remove clamps (3 and 5).
6. Loosen clamp (7) and remove hose (6) from tube (8).
7. Remove clamp (7).
8. Remove two nuts (9) and tube (8) from muffler assembly.

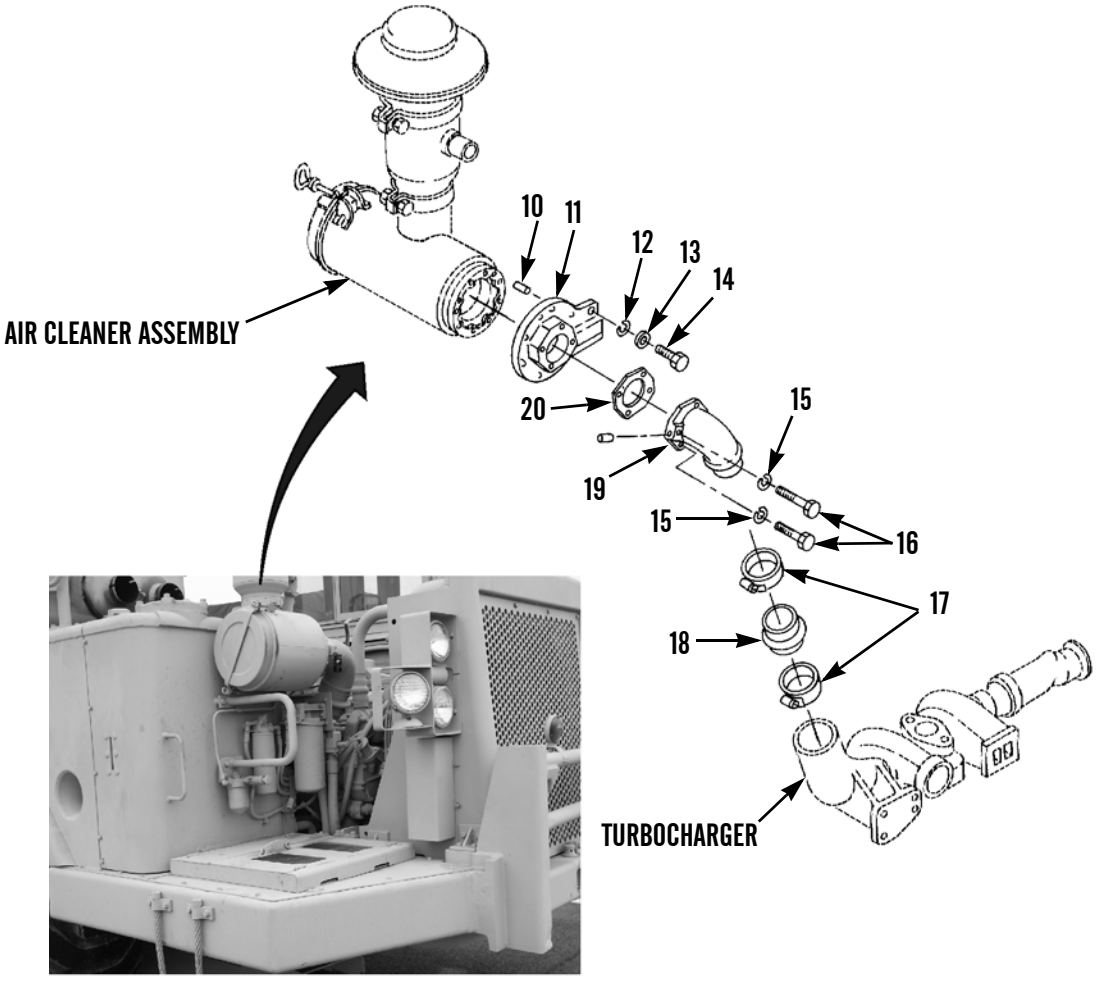


REMOVAL - CONTINUED

NOTE

Only perform step 9 if the studs are damaged.

9. Remove eight studs (10) from support (11).
10. Loosen two clamps (17).
11. Remove three bolts (14), washers (13) and lockwashers (12). Discard lockwashers.
12. Remove four bolts (16), lockwashers (15), support (11), gasket (20) and pipe (19). Discard gasket and lockwashers.
13. Remove clamps (17) and hose (18) from turbocharger.



394-015

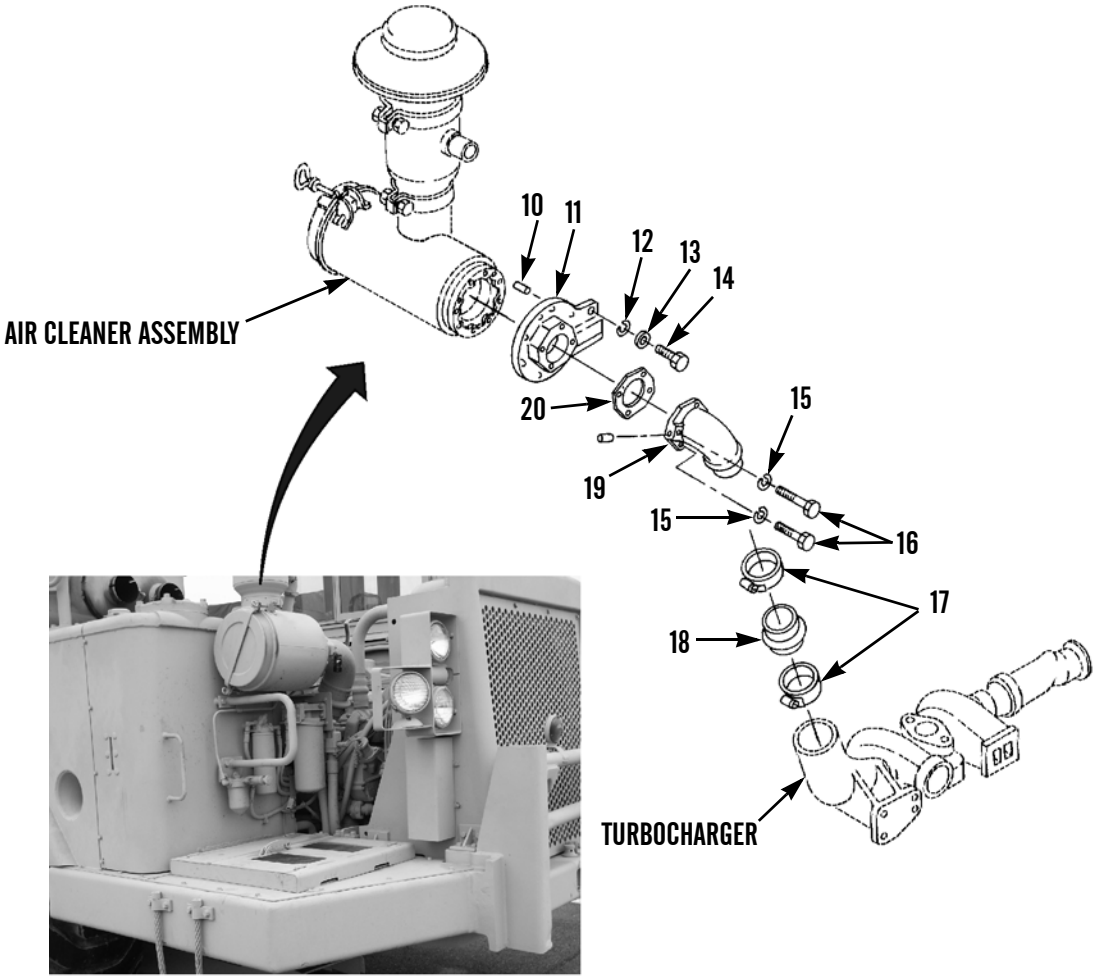
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

INSTALLATION

1. Remove all gasket material from mounting surfaces.
2. Clean all metal parts with solvent.
3. Clean all rubber or plastic parts with detergent.
4. Dry all parts with compressed air.
5. Inspect all parts for damage and replace as necessary.
1. Loosely install clamps (17) on hose (18) and install hose on turbocharger.
2. Install support (11) three new lockwashers (12), washers (13) and bolts (14).
3. Install new gasket (20), pipe (19), four new lockwashers (15) and bolts (16).
4. If removed, install eight new studs (10) in support (11) and torque to 20 lb-ft (27 Nm).

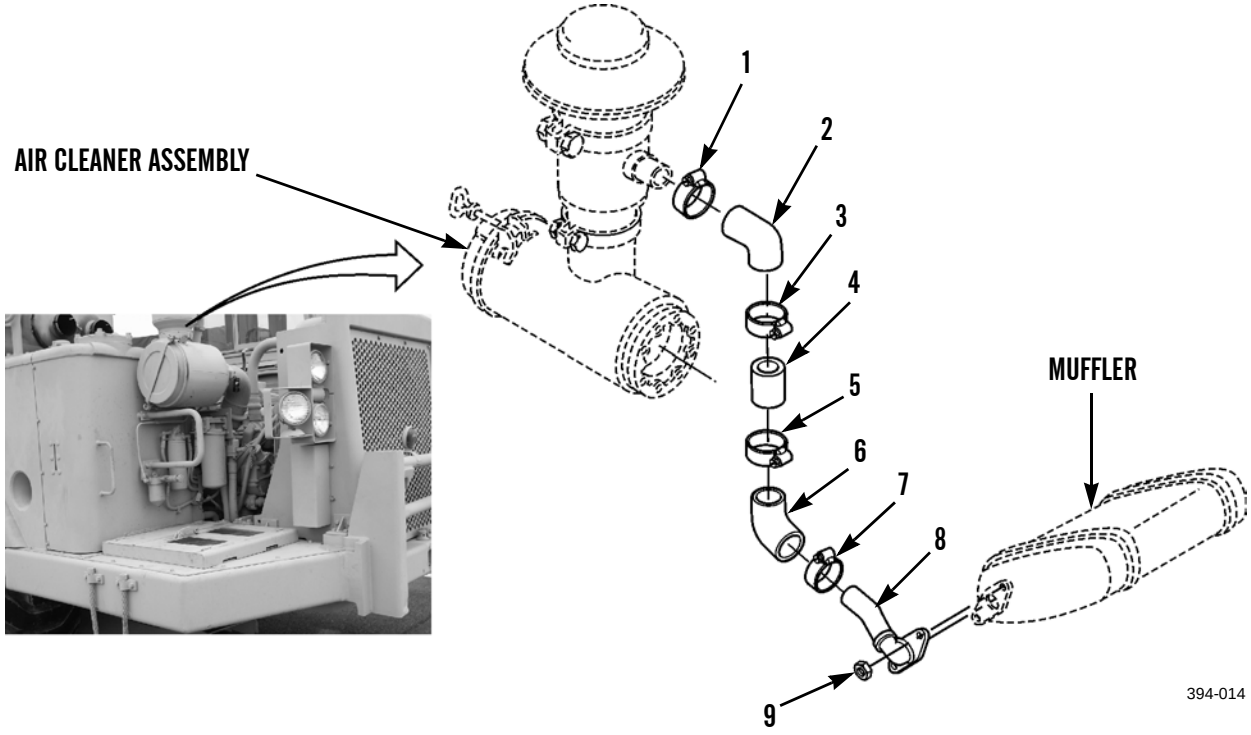
INSTALLATION - CONTINUED



394-015

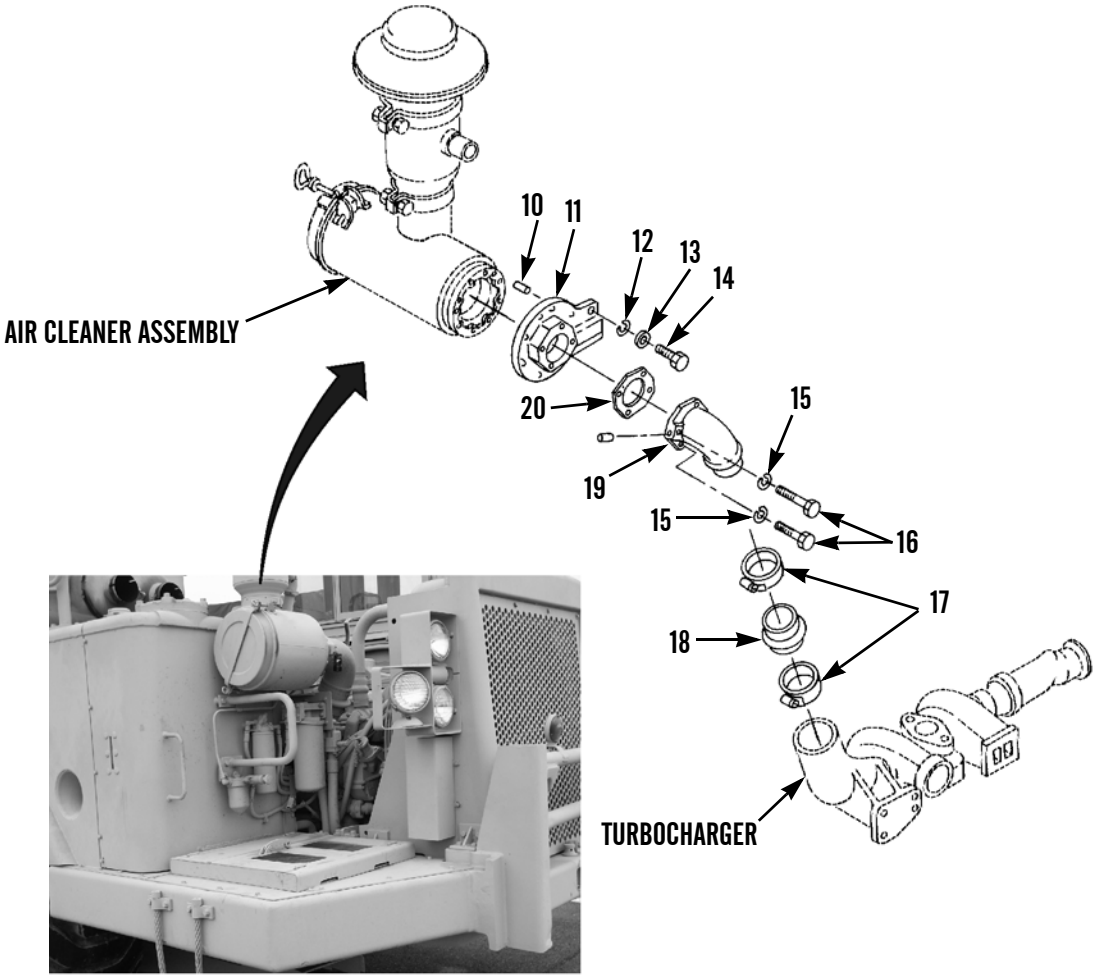
INSTALLATION - CONTINUED

5. Install tube (8) and two nuts (9) on muffler assembly.
6. Loosely install clamp (7) and hose (6) on tube (8).
7. Loosely install clamp (5) and tube (4) in hose (6).
8. Install tube clamp (3), hose (2) and clamp (1).
9. Install air cleaner assembly (WP 0031 00).



INSTALLATION - CONTINUED

10. Connect hose (2) to air cleaner assembly and tighten clamps (1, 3, 5, 7 and 17).



11. Install air cleaner service indicator (WP 0251 00).
12. Operate machine and check for exhaust system leaks (TM 5-3805-248-10).
13. Install hood (WP 0189 00).

END OF WORK PACKAGE

TURBOCHARGER AIR LINES REPLACEMENT 0033 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 30, 31 or 33, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed (4)

Equipment Condition

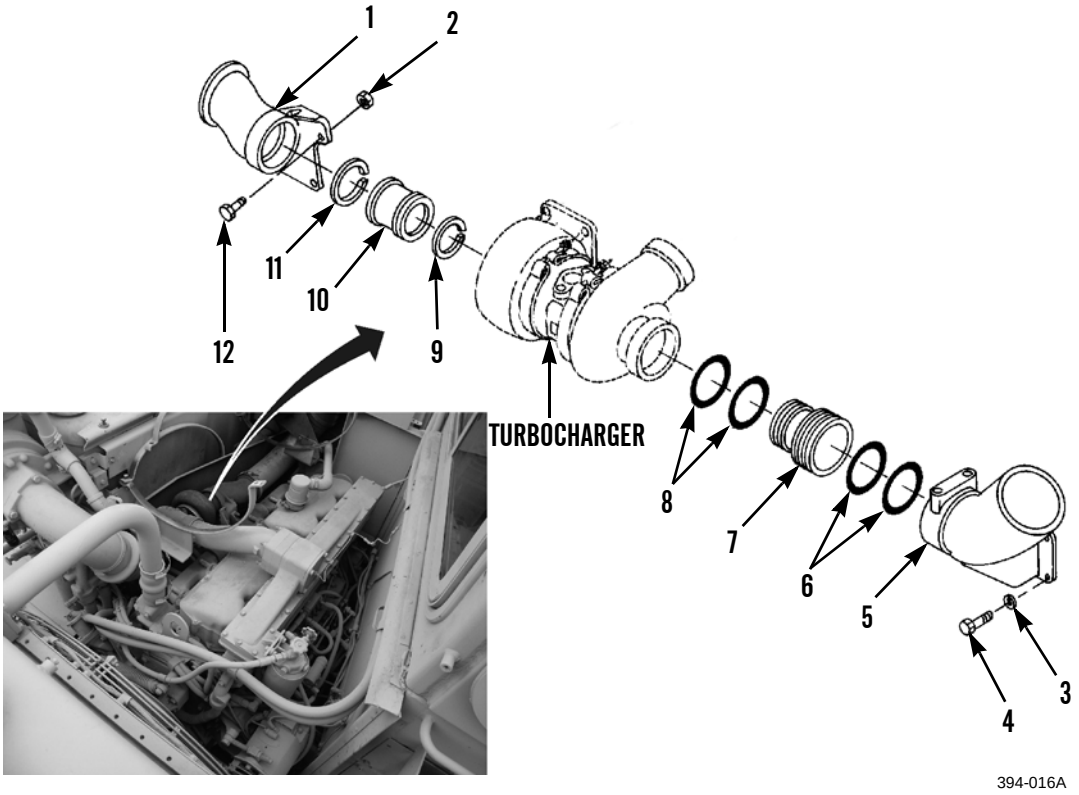
Muffler removed (WP 0041 00)

WARNING

Hot metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts. Failure to follow this warning may cause injury.

REMOVAL

1. Remove two bolts (4), washers (3) and elbow (5).
2. Remove pipe (7), two preformed packings (6) and preformed packings (8). Discard preformed packings.
3. Remove two nuts (2), bolts (12) and pipe (1).
4. Remove coupling (10).
5. Remove retaining rings (9 and 11) from coupling (10).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install rings (9 and 11) on coupling (10).
2. Install coupling (10) in turbocharger.
3. Install pipe (1), two bolts (12) and nuts (2).
4. Install four new preformed packings (6 and 8) on grooves of pipe (2). Use clean lubricating oil to lightly lubricate outer faces of preformed packings.
5. Install pipe (7) in turbocharger.
6. Install elbow (5), two washers (3) and bolts (4).
7. Install muffler (WP 0041 00).

END OF WORK PACKAGE

FUEL TANK AND CAP ASSEMBLY MAINTENANCE 0034 00

THIS WORK PACKAGE COVERS

Draining Fuel Tank, Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Bracket, link (Item 9, WP 0338 00)

Lifting device, 750-lb minimum capacity

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Eyebolts, forged, 3/8-16NC

Element (2)

Gasket (2)

Personnel Required

Two

Equipment Condition

NOTE

To drain fuel tank and remove cap, perform the following five steps:

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine OFF (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

NOTE

To remove fuel tank, perform the following five steps:

Fuel lines disconnected from fuel tank (WP 0035 00)

Battery box removed (WP 0105 00)

Right fender removed (WP 0204 00)

Right rearview mirror removed (WP 0220 00)

Hydraulic tank removed (WP 0245 00)

WARNING

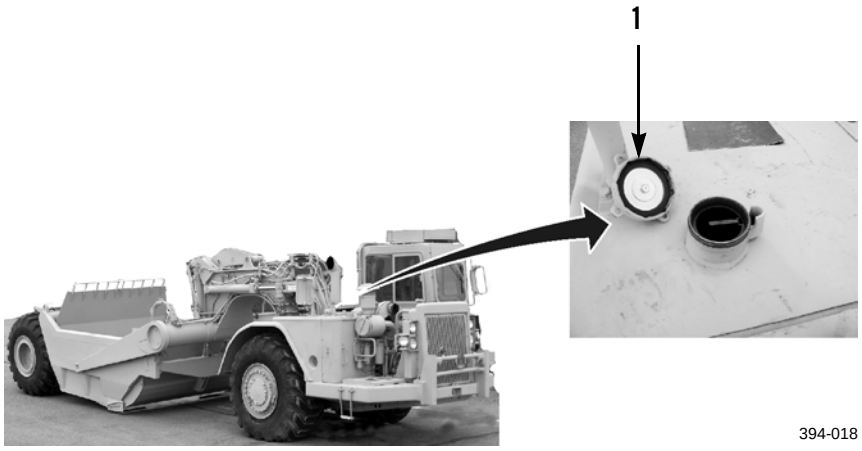
- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

DRAINING FUEL TANK

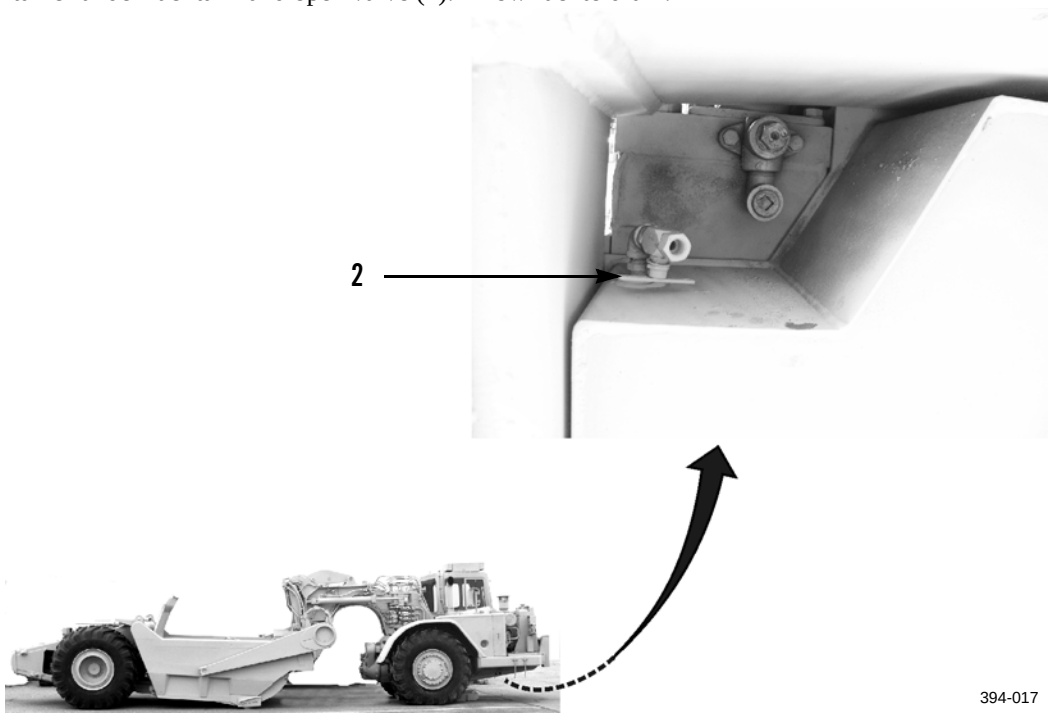
NOTE

Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove fuel cap (1).



2. Place container under fuel tank and open valve (2). Allow fuel to drain.



3. Close valve.

REMOVAL

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

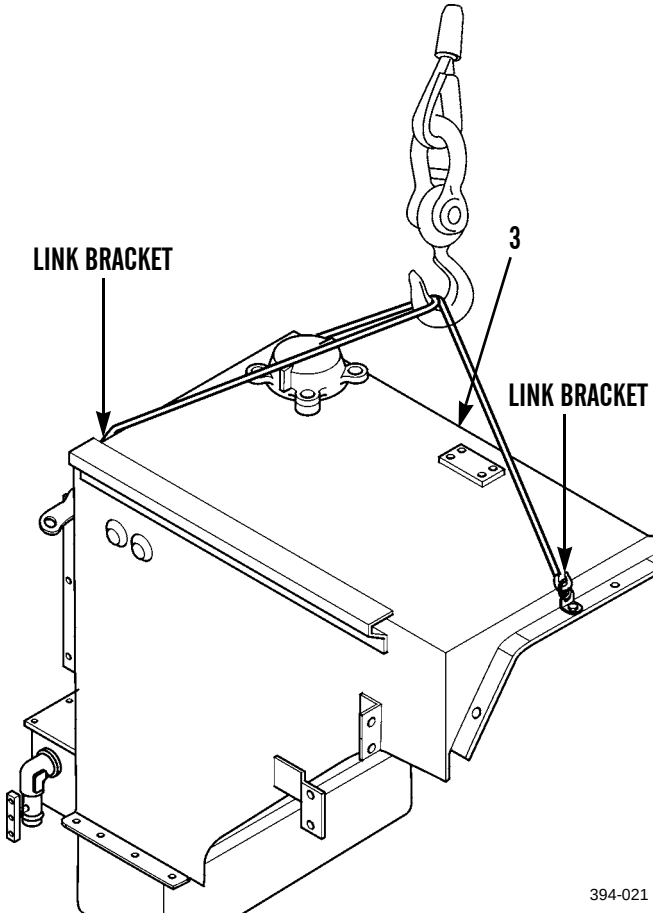
CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.

NOTE

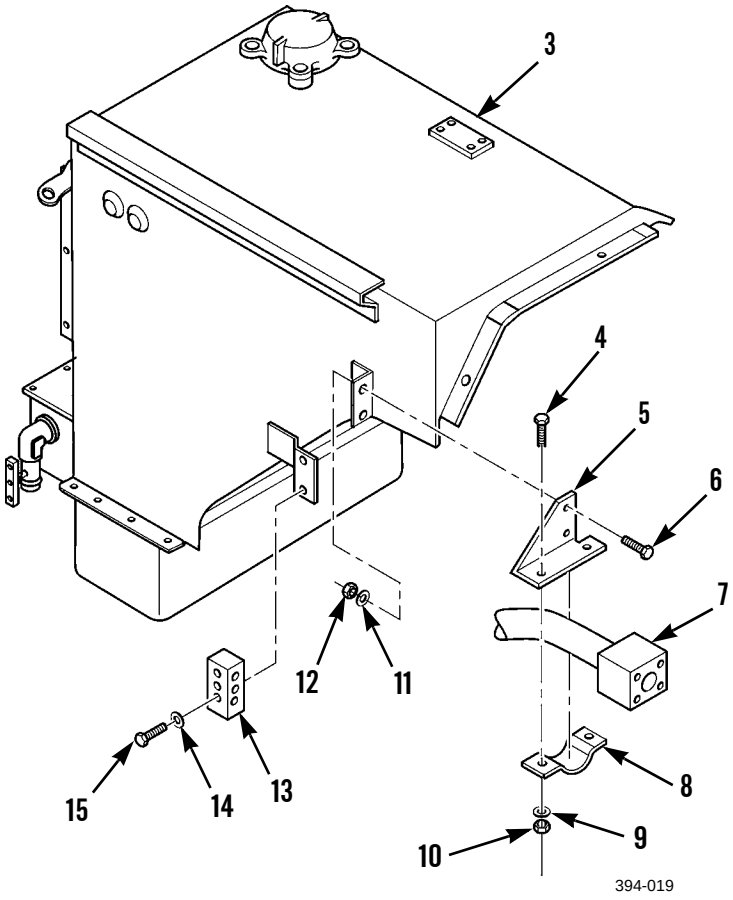
- Fuel tank assembly must be drained before performing this procedure.
- Tag lines prior to removal to ensure correct installation.

1. Drain fuel tank. Refer to *Draining Fuel Tank* in this work package.
2. Install three link brackets on top of fuel tank assembly (3).
3. Attach lifting device to three link brackets.



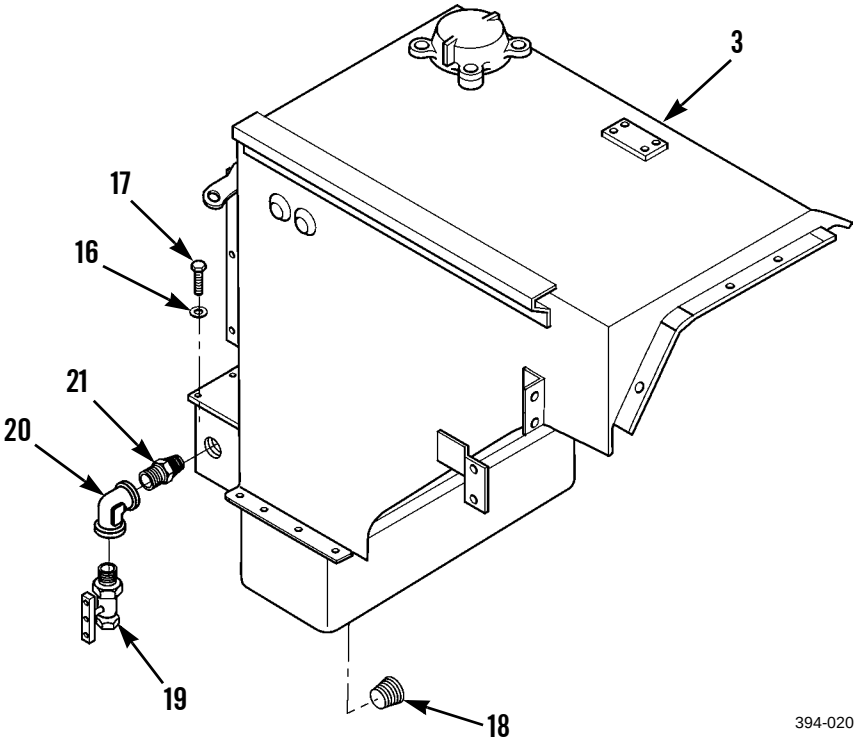
REMOVAL - CONTINUED

4. Remove two nuts (10), washers (9), bracket (8) and two bolts (4) from upper and lower weldments on fuel tank assembly (3).
5. Remove two nuts (12), washers (11), bolts (6) and bracket (5) from hose assembly (7).
6. Remove two bolts (15), washers (14) and tube holddown assembly (13).



REMOVAL - CONTINUED

7. Remove plug (18) from right front of fuel tank assembly (3).
8. Remove valve (19), elbow (20) and nipple (21) from left front of fuel tank assembly (3).
9. Remove bolts (17) and washers (16) from base plate of fuel tank assembly (3).



REMOVAL - CONTINUED

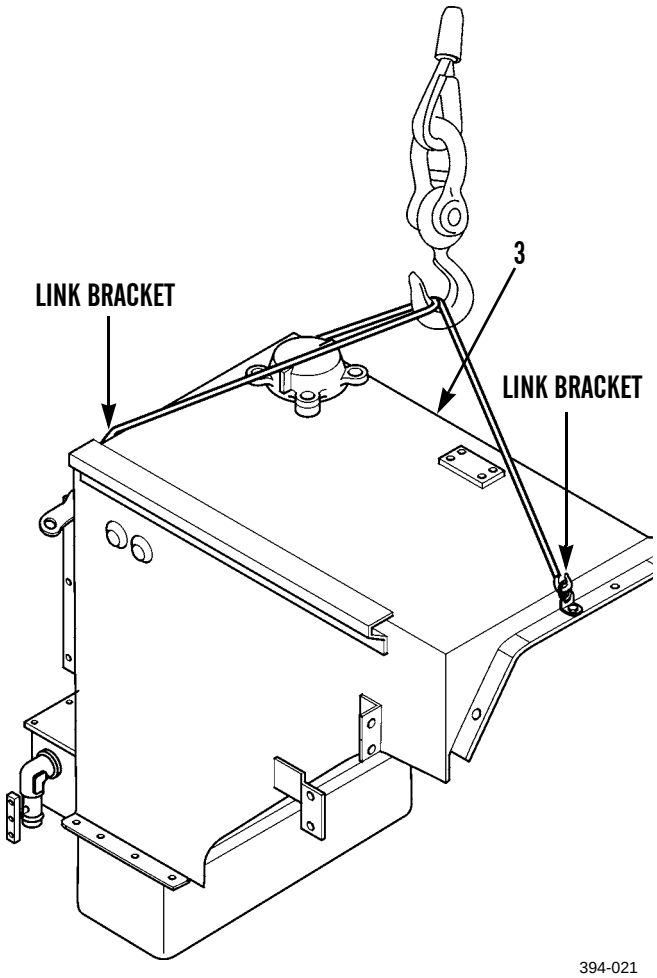
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause in injury or death.

NOTE

Weight of empty fuel tank assembly is 500 lb (227 kg).

10. Remove fuel tank (3).
11. Remove lifting device and link brackets.



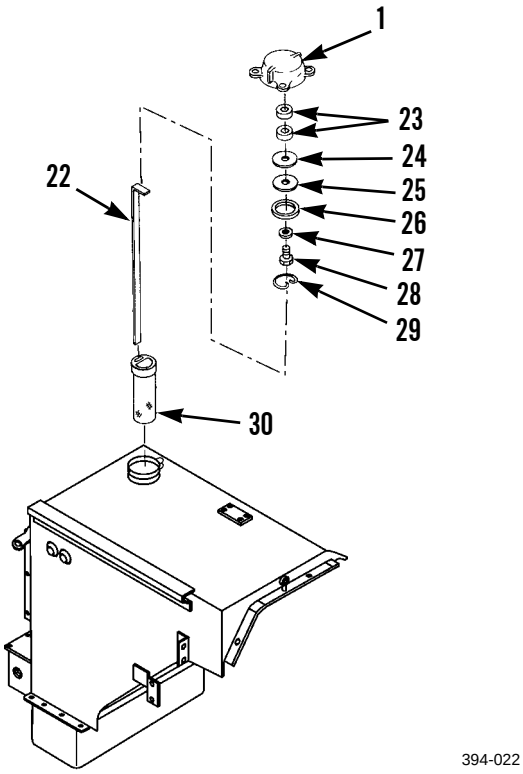
394-021

DISASSEMBLY

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

Remove cap (1), plunger (22), retaining ring (29), strainer (30), screw (28), washer (27), gasket (26), baffle (25), gasket (24) and two elements (23). Discard gaskets and two elements.



394-022

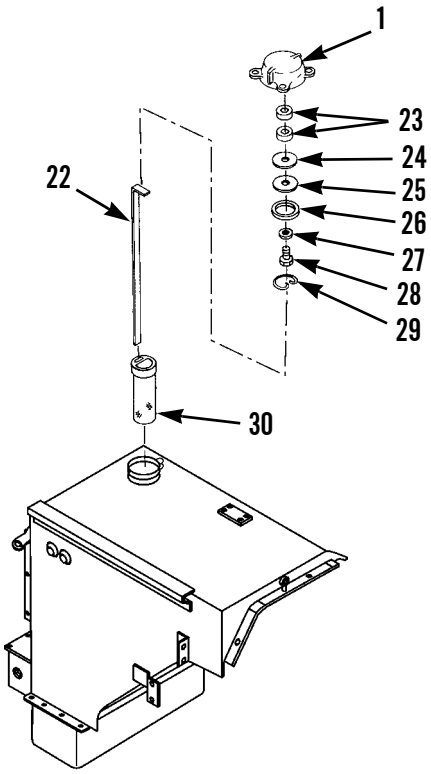
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

ASSEMBLY

Install two new elements (23), new gasket (24), baffle (25), new gasket (26), washer (27), screw (28), strainer (30), retaining ring (29), plunger (22) and cap (1).



394-022

INSTALLATION

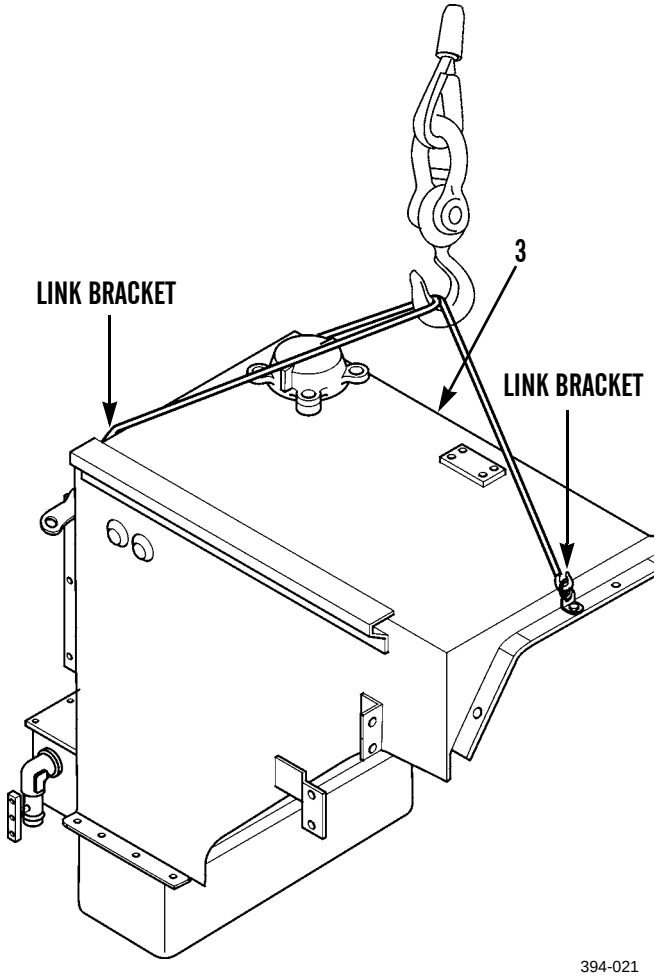
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of empty fuel tank assembly is 500 lb (227 kg).

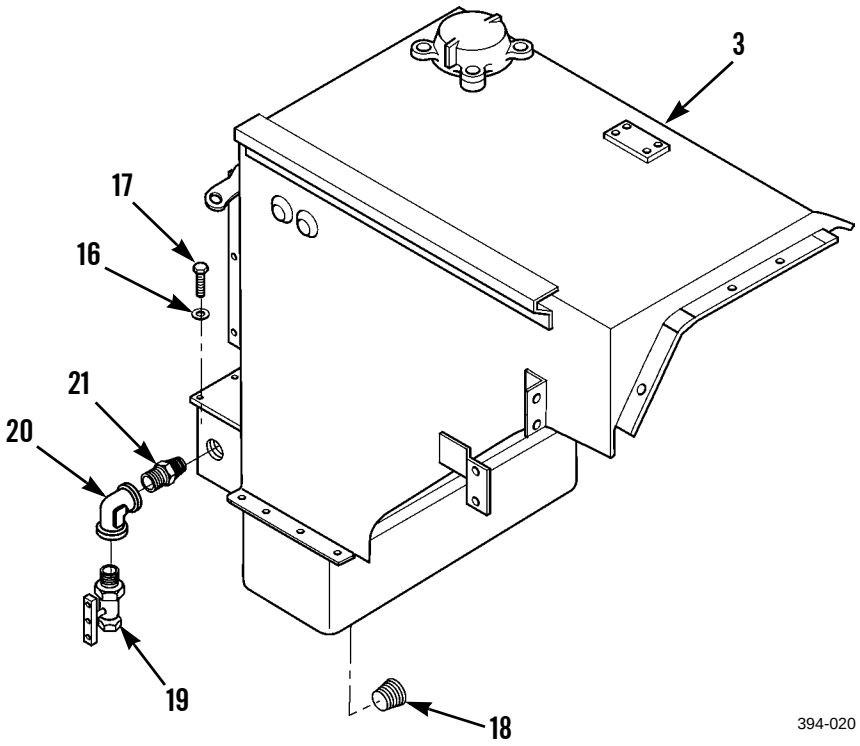
1. Install three link brackets to fuel tank assembly (3).
2. Attach lifting device to three link brackets.
3. Position fuel tank assembly (3) on machine.



394-021

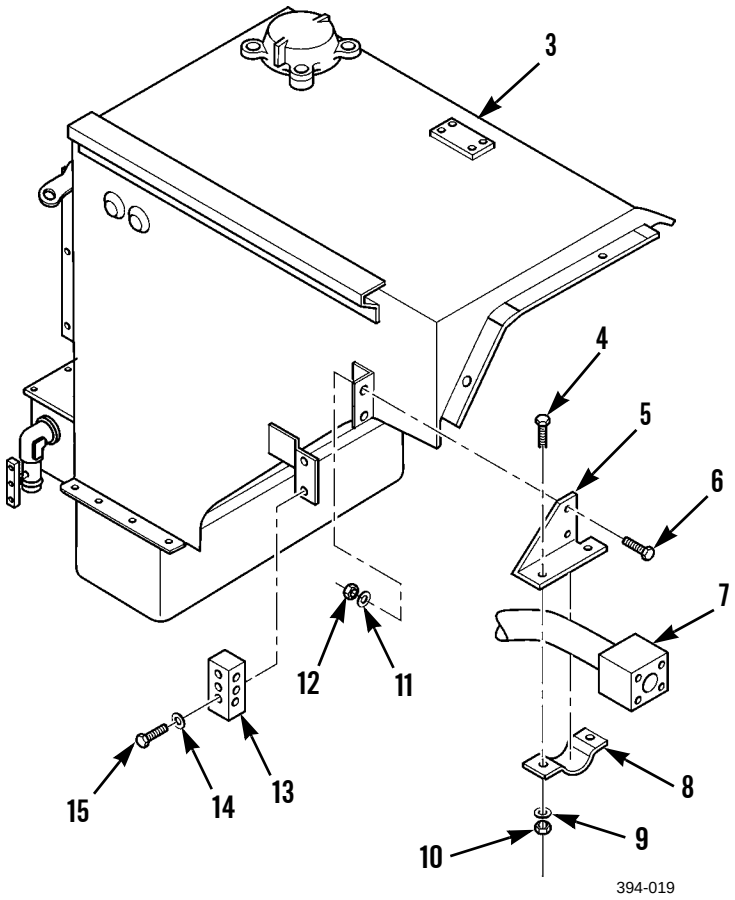
INSTALLATION - CONTINUED

4. Install washers (16) and bolts (17) on base plate of fuel tank assembly (3).
5. Remove lifting device and link brackets.
6. Install nipple (21), elbow (20) and valve (19) on left front of fuel tank assembly (3).
7. Install plug (18) on right front of fuel tank assembly (3).



INSTALLATION - CONTINUED

8. Install tube hold-down assembly (13), two washers (14) and bolts (15).
9. Position hose assembly (7) and install bracket (5), two bolts (6), washers (11) and nuts (12) on upper and lower weldments on middle of fuel tank assembly (3).
10. Install two bolts (4), bracket (8), two washers (9) and nuts (10).



11. Connect fuel lines to fuel tank (WP 0035 00).
12. Refill fuel tank assembly (TM 5-3805-248-10).
13. Install hydraulic tank (WP 0245 00).
14. Operate machine and check for fuel system leaks (TM 5-3805-248-10).
15. Install right fender (WP 0204 00).
16. Install right rearview mirror (WP 0220 00).
17. Install battery box (WP 0105 00).

END OF WORK PACKAGE

FUEL LINES REPLACEMENT 0035 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (11)

Strap (2)

References

WP 0040 00

TM 5-3805-248-10

Equipment Condition

Hood removed (WP 0189 00)

WARNING

- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

REMOVAL

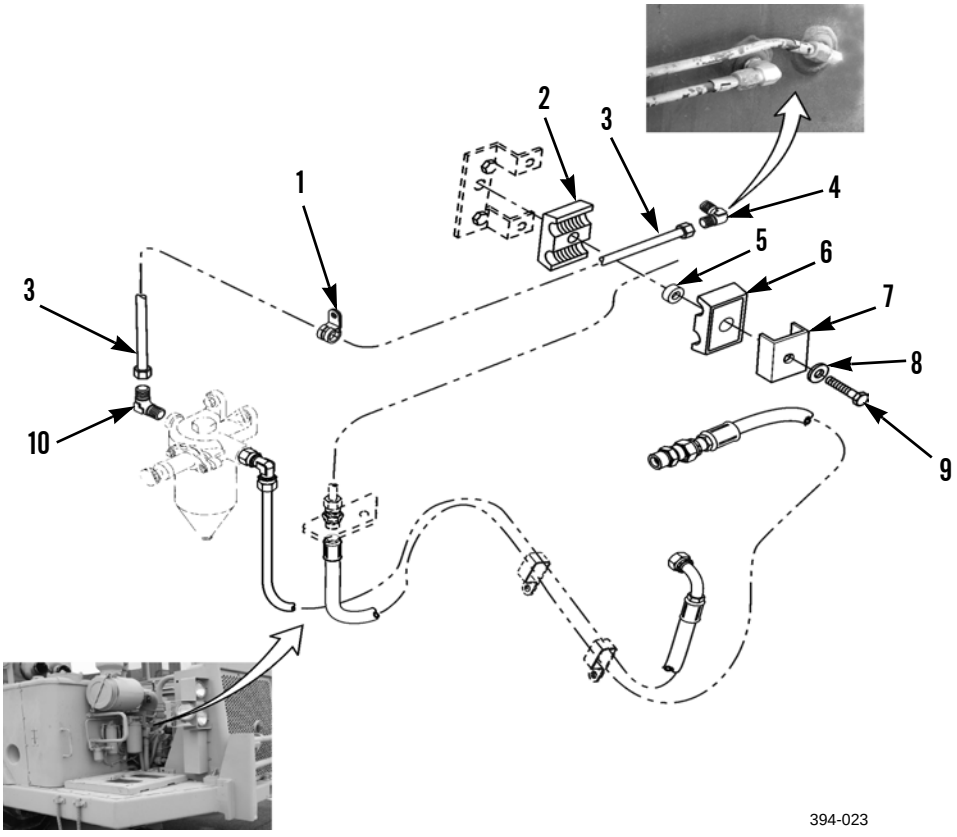
CAUTION

- Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.
- Use two line wrenches to loosen fuel lines. Failure to do so may result in damage to fuel lines.

NOTE

- Use a container to capture any fuel which may drain from lines. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.
- All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

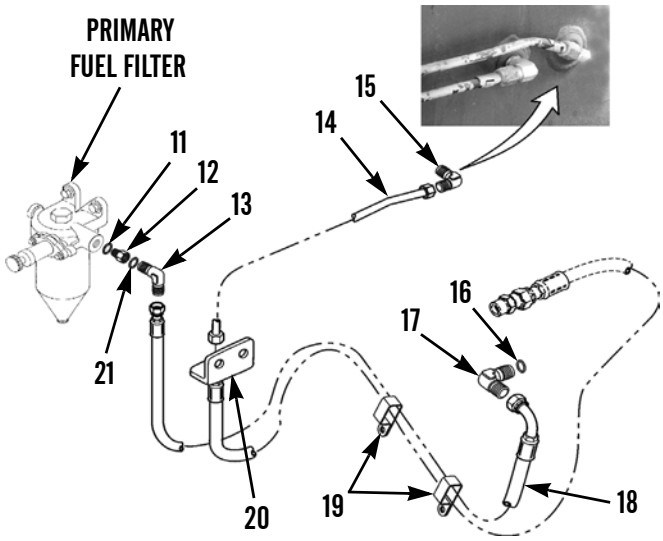
1. Remove clip (1).
2. Remove bolt (9), washer (8), plate (7), clamp (6), spacer (5) and clamp (2).
3. Disconnect tube assembly (3) from elbow (10).
4. Remove elbow (10) from primary fuel filter.
5. Remove tube assembly (3) from elbow (4).
6. Remove elbow (4) from fuel tank.



FUEL LINES REPLACEMENT - CONTINUED 0035 00

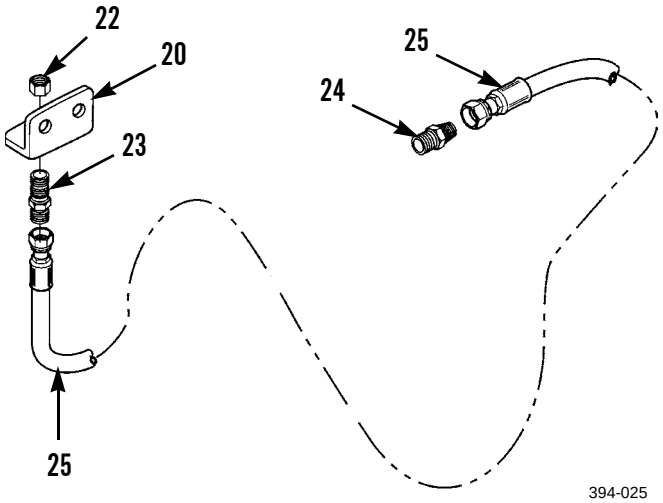
REMOVAL - CONTINUED

7. Disconnect tube assembly (14) at elbow (15).
8. Remove elbow (15) from fuel tank assembly.
9. Remove tube assembly (14) from bracket (20).
10. Remove two clips (19).
11. Disconnect hose assembly (18) from elbow (17) at fuel transfer pump.
12. Remove elbow (17) and preformed packing (16). Discard preformed packing.
13. Remove hose assembly (18) from elbow (13) at primary fuel filter.
14. Remove elbow (13), preformed packing (21), adapter (12) and preformed packing (11). Discard preformed packings.



394-024

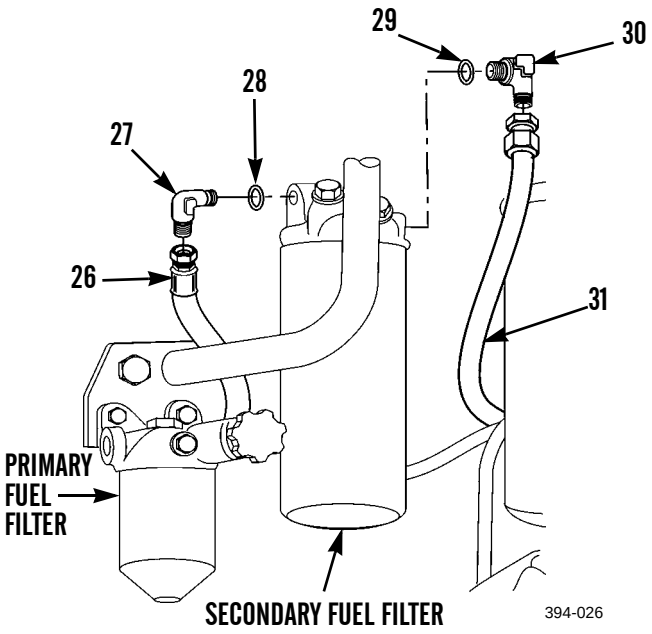
15. Disconnect hose assembly (25) from connector (24).
16. Remove connector (24).
17. Remove hose assembly (25) from union (23).
18. Remove locknut (22) and union (23) from bracket (20).



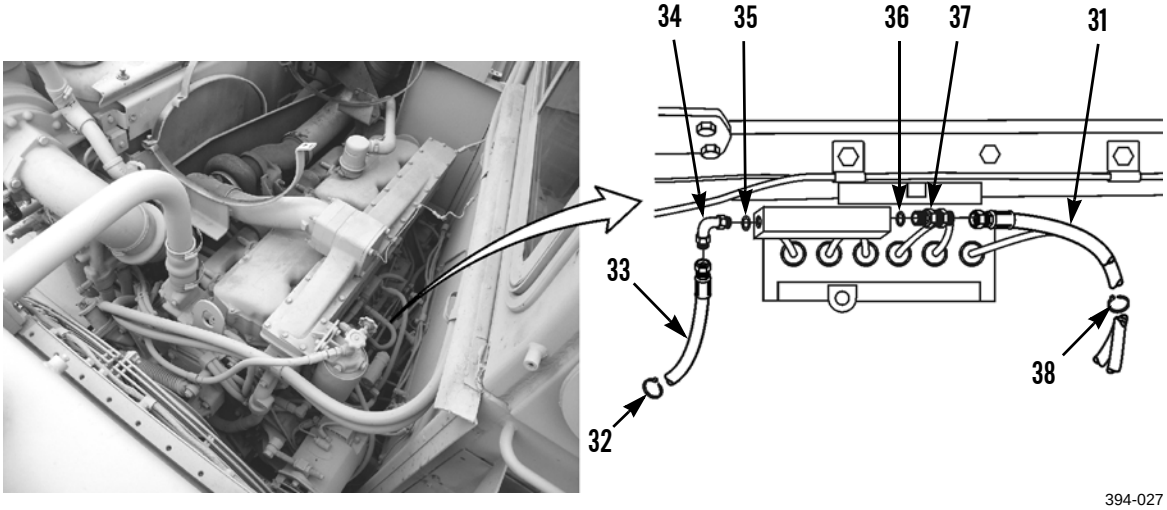
394-025

REMOVAL - CONTINUED

19. Disconnect hoses (31 and 26) from elbows (27 and 30).
20. Remove elbows (27 and 30) and preformed packings (28 and 29) from secondary fuel filter base. Discard preformed packings.

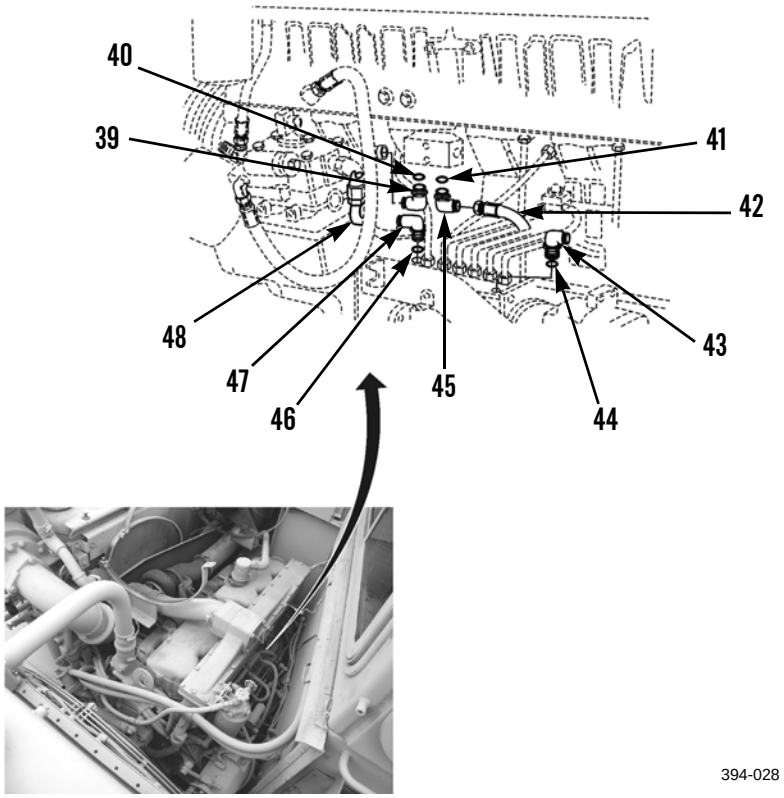


21. Cut and discard straps (32 and 38).
22. Remove hose (31) connector (37) and hose (33) from elbow (34) and on block above fuel injection pump.
23. Remove elbow (34), connector (37) and preformed packings (35 and 36). Discard preformed packings.



REMOVAL - CONTINUED

24. Disconnect hoses (42 and 48) from elbows (45 and 39).
25. Remove elbows (45 and 39) and preformed packings (40 and 41). Discard preformed packings.
26. Remove hoses (42 and 48) from elbows (47 and 43).
27. Remove elbows (47 and 43) and preformed packings (44 and 46) from fuel injection pump. Discard preformed packings.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

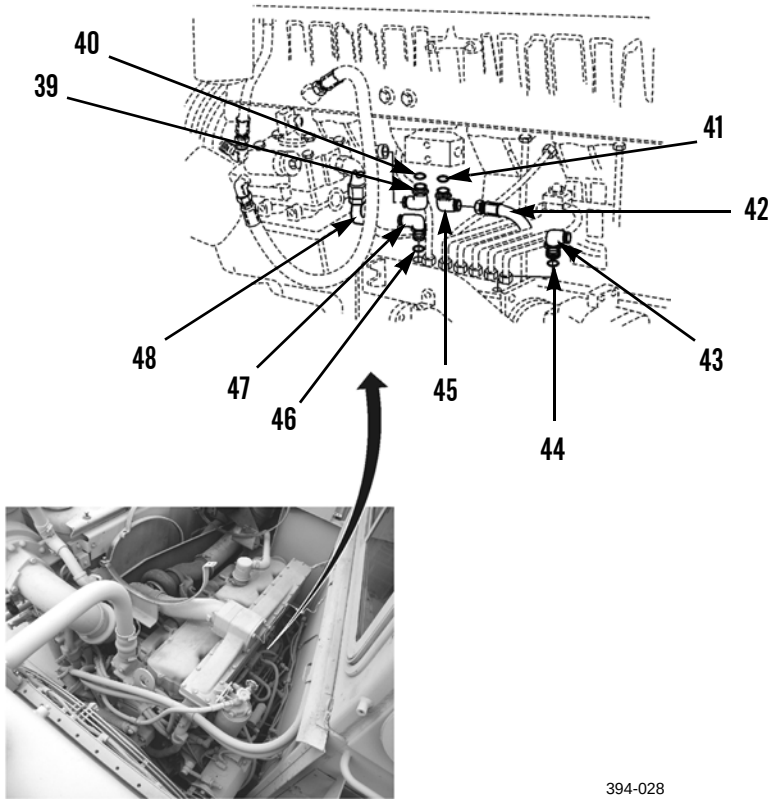
1. Clean all parts with solvent cleaning compound.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

CAUTION

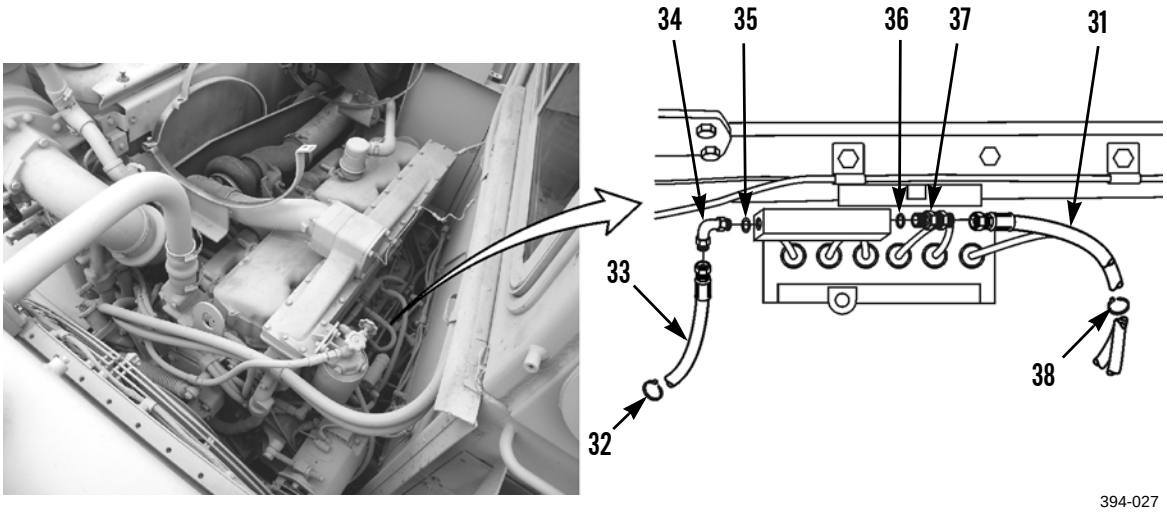
- Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.
- Use two line wrenches to loosen fuel lines. Failure to do so may result in damage to fuel lines.

1. Install new preformed packings (44 and 46) and elbows (47 and 43) to fuel injection pump.
2. Install hoses (42 and 48) on elbows (47 and 43).
3. Install new preformed packings (40 and 41) and elbows (45 and 39) on block.
4. Connect hoses (42 and 48) on elbows (45 and 39).

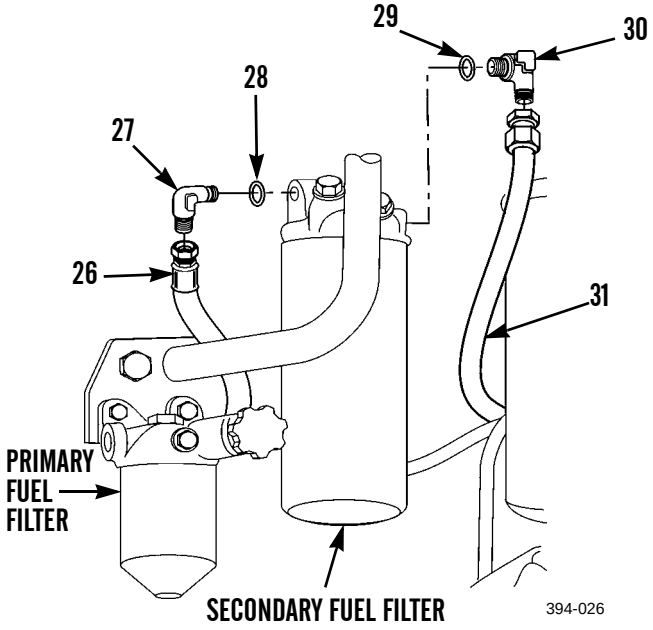


INSTALLATION - CONTINUED

5. Install new preformed packings (35 and 36), connector (37) and elbow (34).
6. Install hoses (31 and 26) on connector (37) and elbow (34).
7. Install new straps (32 and 38).

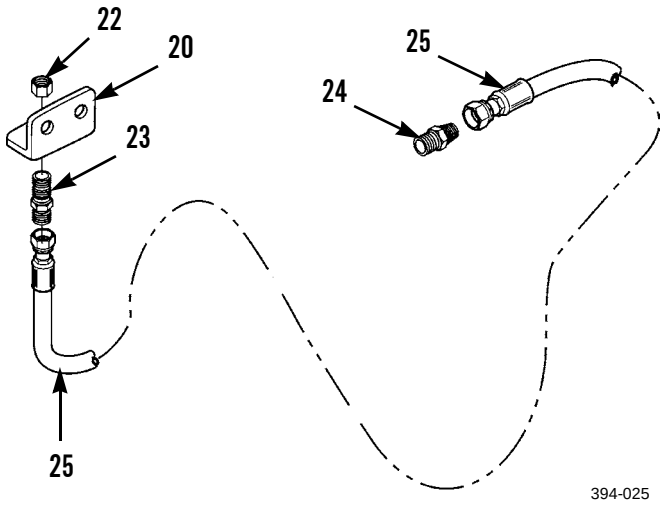


8. Install new preformed packings (28 and 29) and elbows (27 and 30) to secondary fuel filter base.
9. Connect hoses (31 and 26) to elbows (27 and 30).

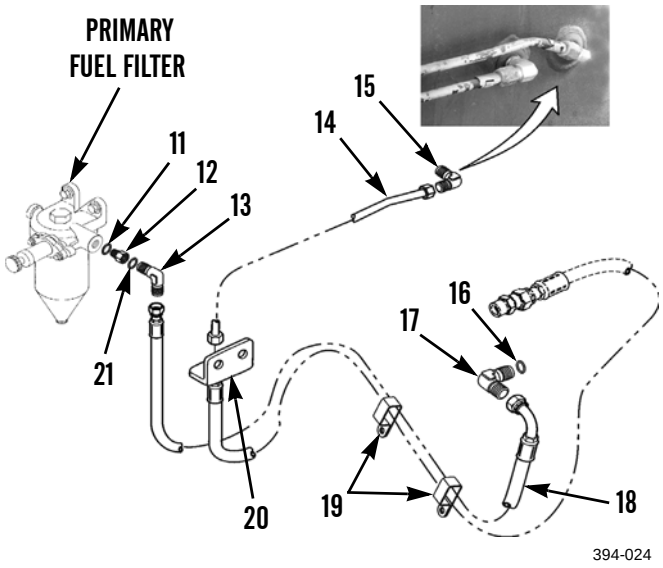


INSTALLATION - CONTINUED

10. Install union (23) and locknut (22) on bracket (20).
11. Install hose assembly (25) on union (23).
12. Install connector (24) in hose assembly (25).



13. Install new preformed packing (11), adapter (12), new preformed packing (21) and elbow (13) to primary fuel filter base.
14. Install hose assembly (18) on elbow (13) at elbow (13).
15. Install new preformed packing (16) and elbow (17) on fuel transfer pump.
16. Connect hose assembly (18) to elbow (17).
17. Install two clips (19).
18. Install tube assembly (14) on bracket (20).
19. Install elbow (15) on side of fuel tank assembly.
20. Connect tube assembly (14) to elbow (15).



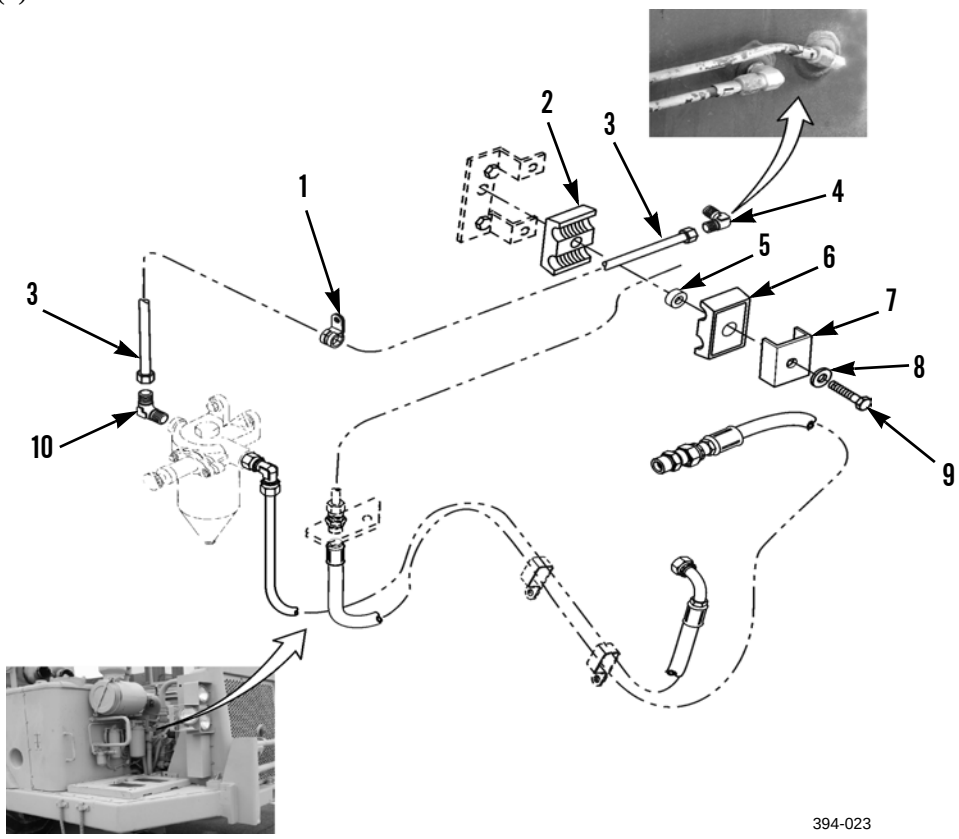
INSTALLATION - CONTINUED

21. Install elbow (4) on fuel tank.
22. Install tube assembly (3) on elbow (4).
23. Install elbow (10) on primary fuel filter.
24. Connect tube assembly (3) to elbow (10).

NOTE

Ensure lines are properly positioned in clamp.

25. Install clamp (2), spacer (5), clamp (6), plate (7), washer (8) and bolt (9).
26. Install clip (1) on machine.



27. Refill fuel tank assembly (TM 5-3805-248-10).
28. Prime fuel system (WP 0040 00).
29. Operate engine and check fuel lines for leaks (TM 5-3805-248-10).
30. Install hood (WP 0189 00).

END OF WORK PACKAGE

EMERGENCY FUEL SHUT-OFF REPLACEMENT 0036 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Cotter pin

Equipment Condition

Radiator guard removed (WP 0188 00)

Hood removed (WP 0189 00)

Front crankcase guard removed (WP 0201 00)

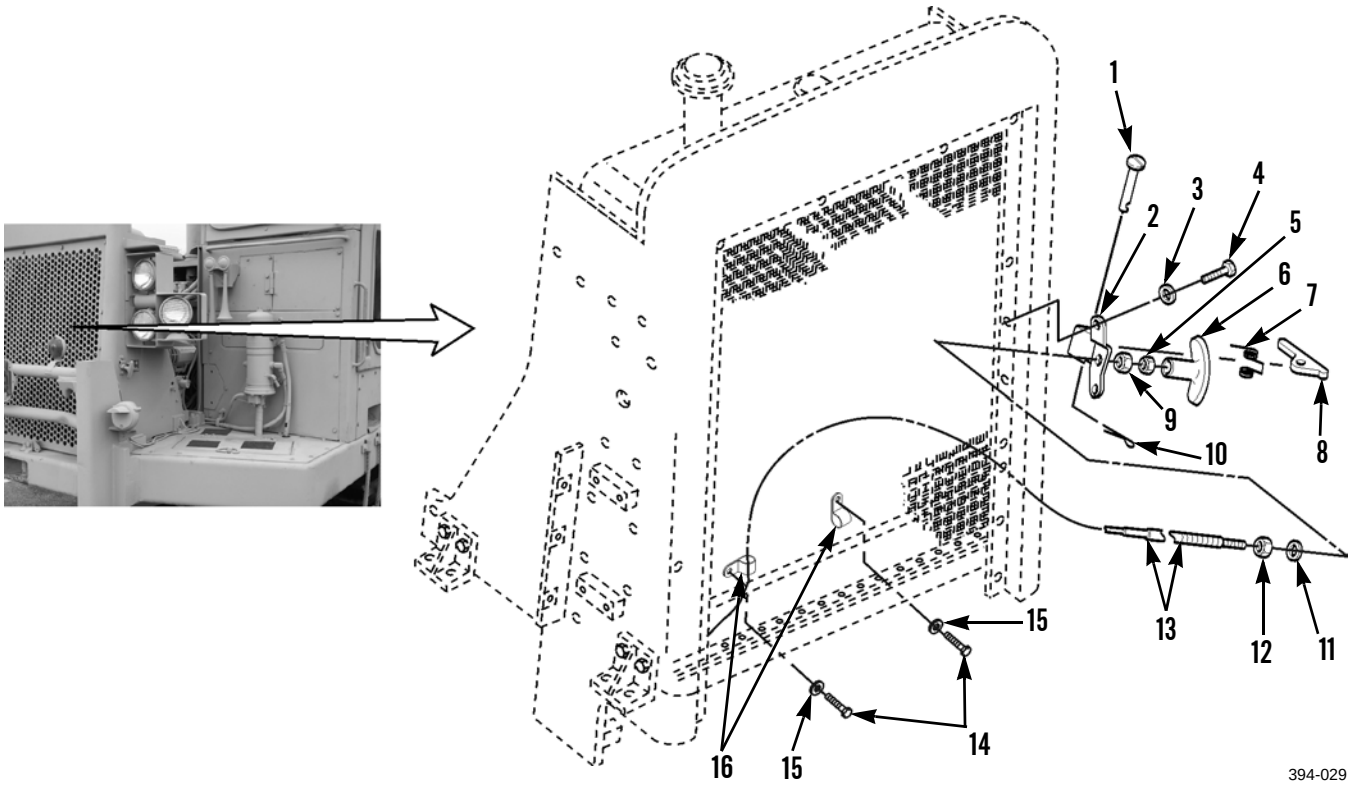
REMOVAL

1. Remove handle (6) by rotating counterclockwise.
2. Remove nut (5) and jam nut (9).

NOTE

Tag cables prior to removal to ensure correct installation.

3. Remove washer (11) and nut (12) from cable assembly (13).
4. Disconnect cable assembly (13) from bracket (2).
5. Remove two bolts (4), washers (3), cotter pin (10), pin (1), lock (8), spring (7) and bracket (2). Discard cotter pin.
6. Remove two bolts (14), washers (15) and clips (16).



REMOVAL - CONTINUED

7. Remove bolt (22), washer (21) and spacer (20).
8. Remove nut (23), plate (25) and two washers (24).
9. Remove nut (26) from cable assembly (13).
10. Remove cable assembly (19).
11. Remove bolt (29), washer (28) and clip (27).
12. Remove two bolts (18) and washers (17).
13. Loosen nuts (30) to remove cable assembly (13) from bracket (31).
14. Remove bolt (33), two washers (32) and bracket (31).
15. Remove bolt (34), washer (35), two nuts (38), clip (36), and bracket (37).
16. Remove cable assembly (13)

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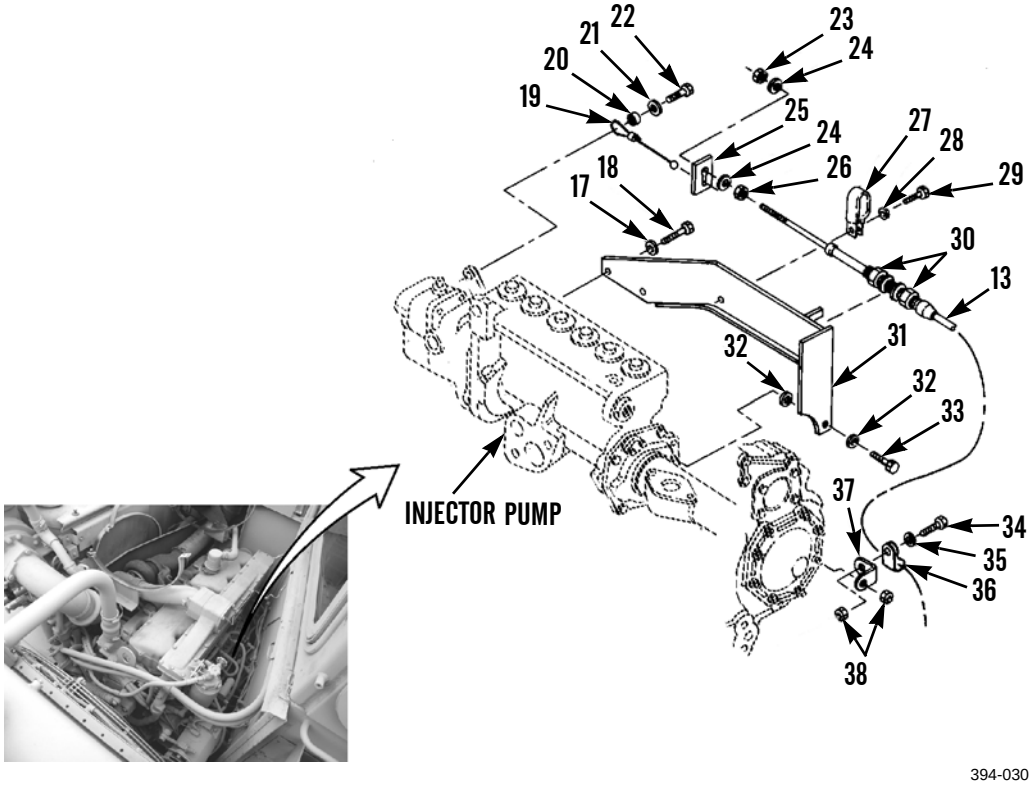


CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

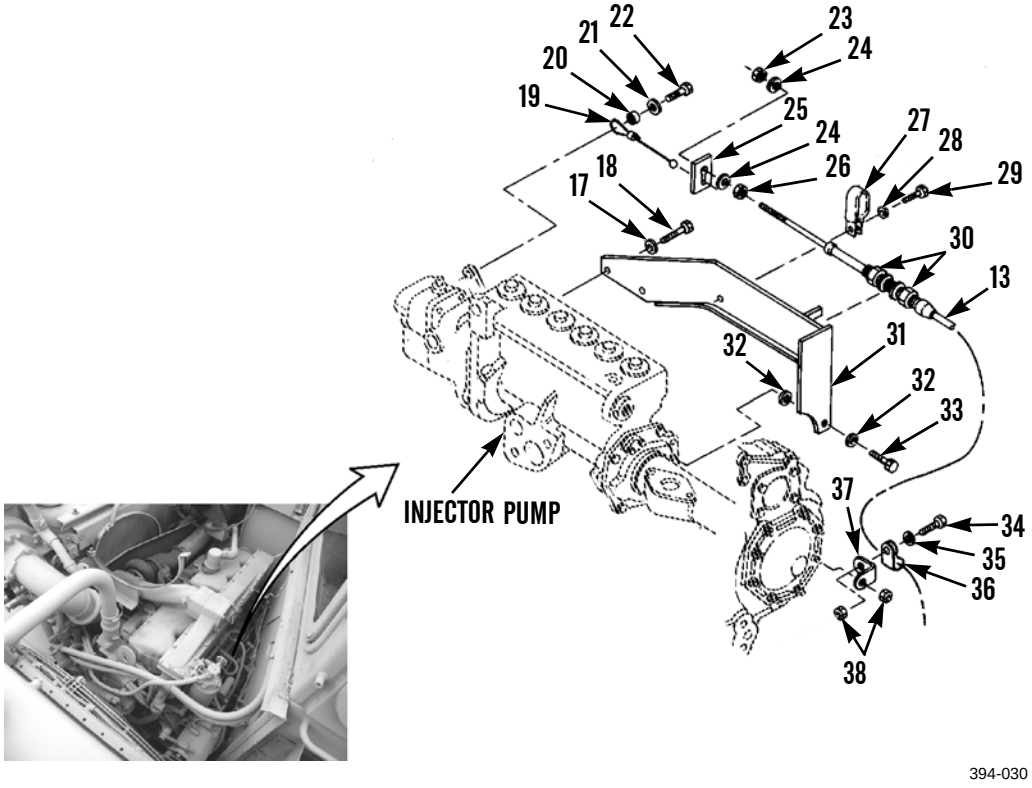
1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install cable assembly (13).
2. Install bracket (37) with one nut (38) and install clip (36), with washer (35), bolt (34) and other nut (38).
3. Install bracket (31), two washers (32) and bolt (33).
4. Install cable assembly (13) on bracket (31) and tighten nuts (30).
5. Install two washers (17) and bolts (18).
6. Install clip (27), washer (28) and bolt (29).
7. Install cable assembly (19) in plate (25).

EMERGENCY FUEL SHUT-OFF REPLACEMENT - CONTINUED **0036 00**

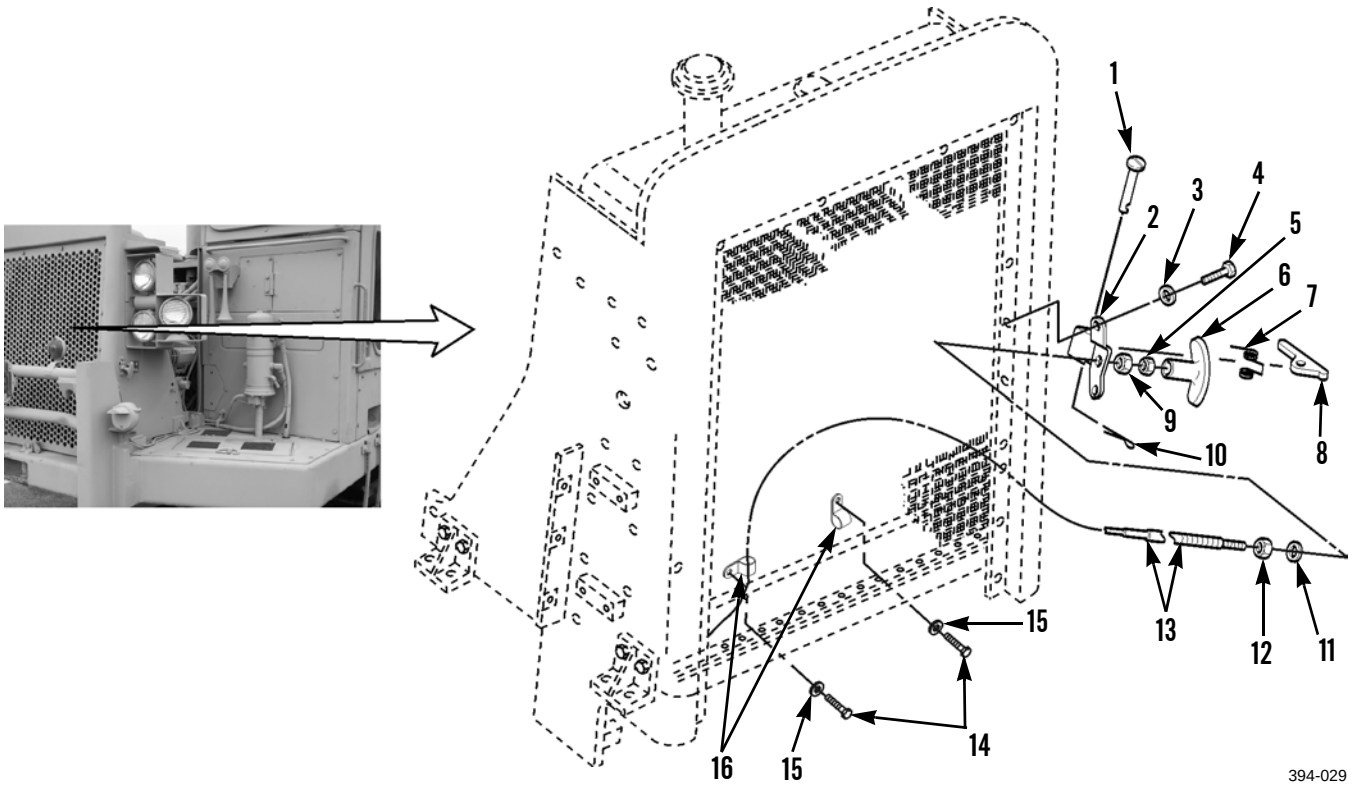
INSTALLATION - CONTINUED



EMERGENCY FUEL SHUT-OFF REPLACEMENT - CONTINUED 0036 00

INSTALLATION - CONTINUED

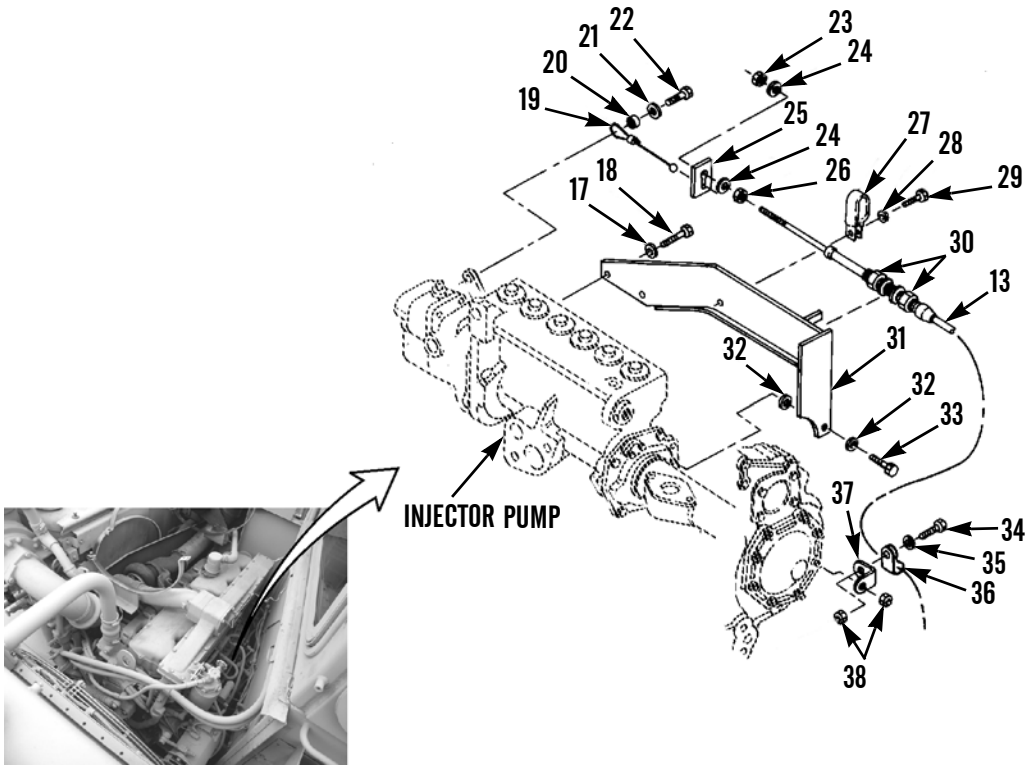
8. Install nut (26), one washer (24), plate (25) other washer (24) and nut (23) on cable assembly (13).
9. Install cable (19), spacer (20), washer (21) and bolt (22) on injector pump.
10. Install two clips (16), washers (15) and bolts (14).



11. Install bracket (2), two washers (3), bolts (4), spring (7), lock (8), pin (1) and new cotter pin (10).
12. Install nut (12) and washer (11) on cable (13).
13. Connect cable assembly (13) to bracket (2).

INSTALLATION - CONTINUED

14. Install locknut (9), nut (5), and handle (6) on cable (13).



ASSEMBLY

1. Press accelerator pedal to full throttle position. Secure by placing wood block on accelerator pedal.
2. Adjust nut (12) and two nuts (30) of cable assembly (13) and nut (26) on left side of engine so that all slack is taken out of cable at handle (6). Do not tighten.
3. Release accelerator pedal by removing wood block.
4. Pull handle (6) to engine shut-off position.
5. Check governor lever on engine to be sure that lever reaches engine shut-off position when handle (6) is pulled.
6. Repeat steps 1 through 5, if necessary, for proper operation of emergency shut-off cable.
7. Torque nuts (12 and 30) of cable assembly (13) to 28 lb-ft (38 Nm).
8. Torque nut (26) to 6 lb-ft (8 Nm).

ASSEMBLY - CONTINUED

WARNING

Machine is not to be returned to service until an operational engine-on check is made by qualified personnel. This check is to determine that the engine stops when the emergency shut-off cable handle is pulled and that the engine governor operates properly under normal operating conditions. Failure to follow this procedure may cause injury.

9. Install radiator guard (WP 0188 00).
10. Install hood (WP 0189 00).
11. Install front crankcase guard (WP 0201 00).

END OF WORK PACKAGE

SECONDARY FUEL FILTER AND BASE REPLACEMENT 0037 00

THIS WORK PACKAGE COVERS

Filter Element: Removal, Installation

Filter Base: Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning Compound, solvent (Item 8, WP 0339 00)

Fuel (Item 14 or 15, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

References

WP 0035 00

WP 0040 00

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine OFF (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

For filter base only: Secondary fuel filter removed (WP 0037 00)

FILTER ELEMENT REMOVAL

WARNING

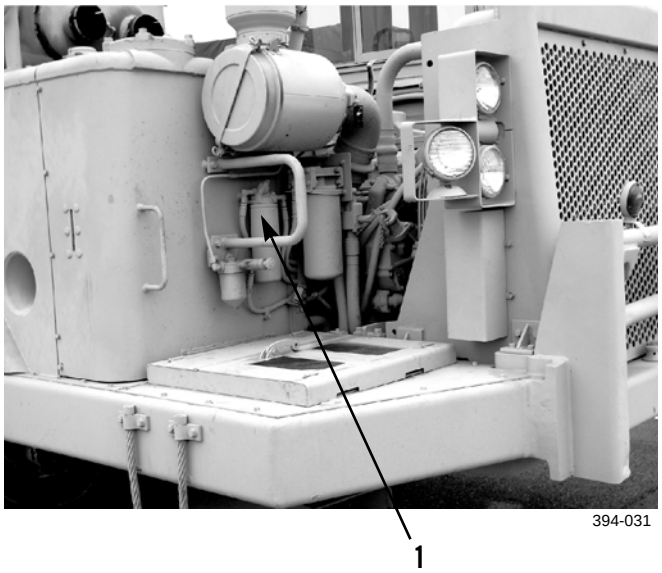
- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

FILTER ELEMENT REMOVAL - CONTINUED

NOTE

Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.

Remove and discard secondary fuel filter (1).



FILTER ELEMENT INSTALLATION

1. Lubricate new filter seal with clean diesel fuel.

CAUTION

Do not overtighten new filter. Failure to follow this procedure may cause equipment damage.

2. Install new secondary fuel filter (1) by hand. Rotate clockwise until seal contacts base, then rotate one additional full turn to seal.
3. Prime fuel system (WP 0040 00).
4. Place battery disconnect switch in ON position (TM 5-3805-248-10).
5. Start engine (TM 5-3805-248-10). Remain in cab with engine running. Have assistant check for leaks between secondary fuel filter and base.
6. Shut down engine (TM 5-3805-248-10).

FILTER BASE REMOVAL

NOTE

- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.

CAUTION

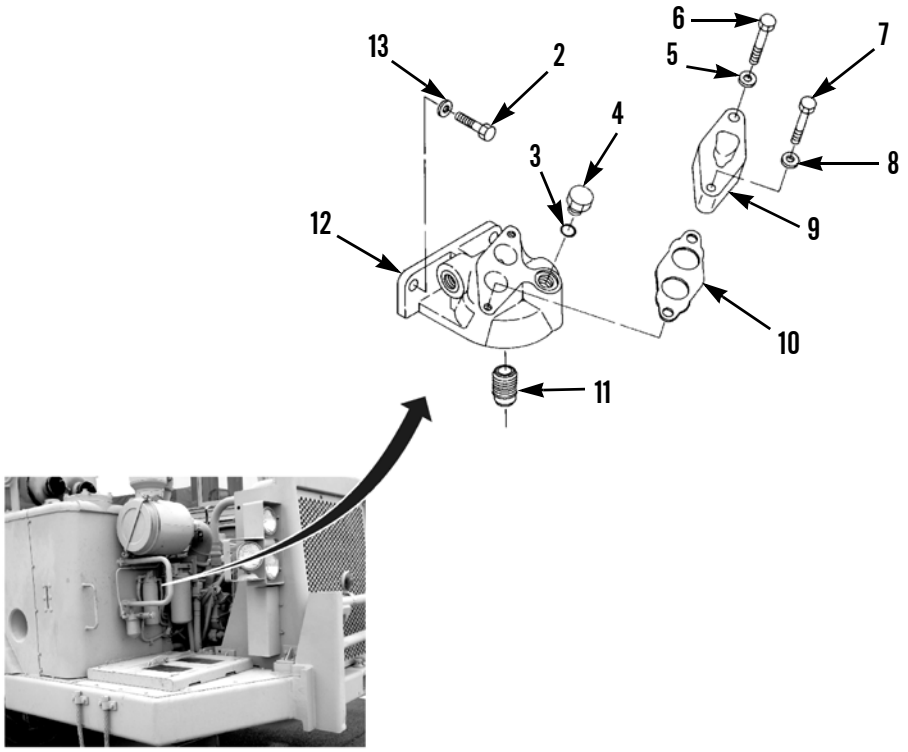
Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.

1. Disconnect lines from secondary fuel filter base (WP 0035 00).
2. Remove two bolts (2), washers (13) and base (12) from front of hydraulic tank.

NOTE

Remove stud only if inspection indicates replacement is necessary.

3. If stud (11) is damaged, remove and discard stud.
4. Remove bolts (6 and 7) and washers (5 and 8).
5. Remove cover (9) and gasket (10). Discard gasket.
6. Remove plug (4) and preformed packing (3). Discard preformed packing.



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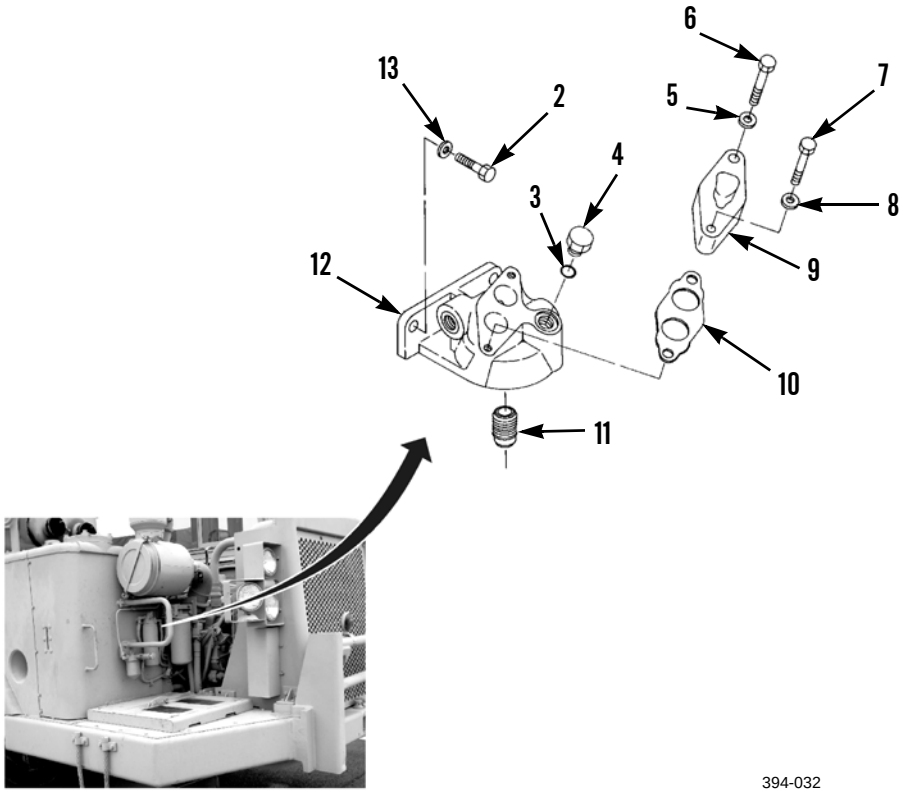
FILTER BASE CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective eye protection.



FILTER BASE CLEANING AND INSPECTION - CONTINUED

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

FILTER BASE INSTALLATION

1. If removed, install new stud (11) in base (12).
2. Lubricate new preformed packing (3) with clean fuel.
3. Install new preformed packing (3) and plug (4) in base (12).
4. Install new gasket (10), cover (9), washers (5 and 8) and bolts (6 and 7).
5. Install base (12), two washers (13) and bolts (2).
6. Connect secondary fuel lines (WP 0035 00).
7. Install secondary fuel filter (WP 0037 00).
8. Operate machine and check for fuel system leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

PRIMARY FUEL FILTER AND BASE MAINTENANCE 0038 00

THIS WORK PACKAGE COVERS

Filter Base: Removal, Cleaning and Inspection, Installation

Filter Element: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket

Packing, preformed (2)

Equipment Condition

Filter Base Only:

Fuel priming pump removed (WP 0040 00)

Filter Element Only:

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine OFF (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

CAUTION

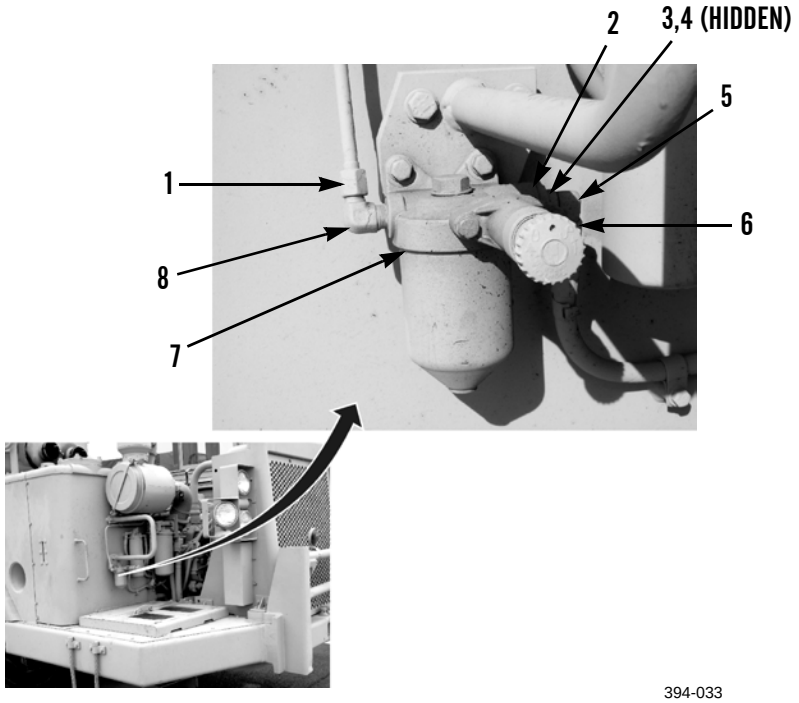
- Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.
- Use two line wrenches to loosen or tighten fuel lines. Failure to do so may result in damage to machine.

FILTER BASE REMOVAL

NOTE

- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Disconnect tube assembly (1) at elbow (8).
2. Remove elbow (8) from base (7).
3. Disconnect hose assembly (6) at elbow (5).
4. Remove elbow (5), preformed packing (4), adapter (3) and gasket (2). Discard preformed packing and gasket.



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FILTER BASE REMOVAL - CONTINUED

5. Remove two bolts (9), washers (10) and base (7) assembly.
6. If necessary, remove filter element from base. Refer to *Filter Element Removal* in this work package.

FILTER ELEMENT REMOVAL

1. Remove bolt (11), washer (12), lock ring (13) and base (7).
2. Remove preformed packing (14) from case (15). Discard preformed packing.
3. Remove element (19), retaining ring (18), retainer (17) and spring (16) from case (15).

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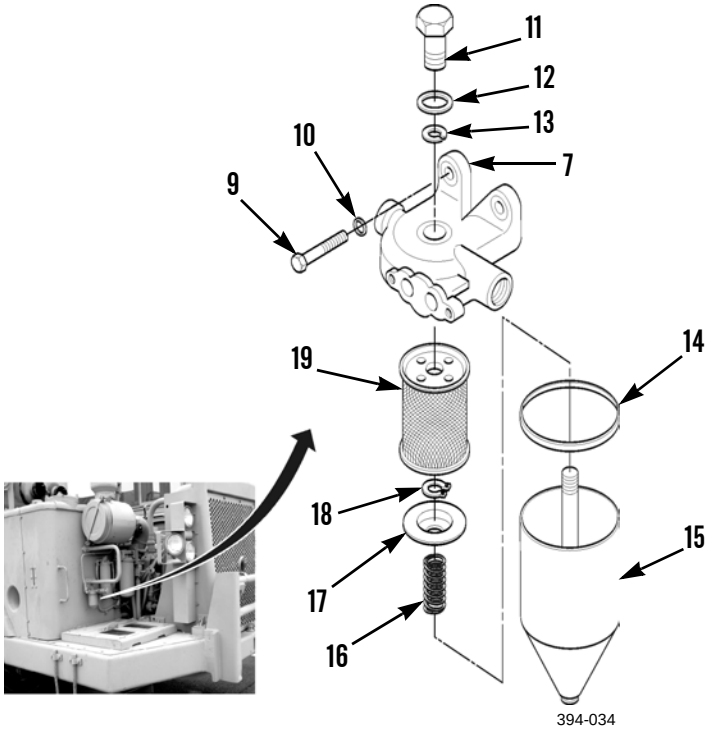


FILTER BASE CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove gasket material from all mating surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

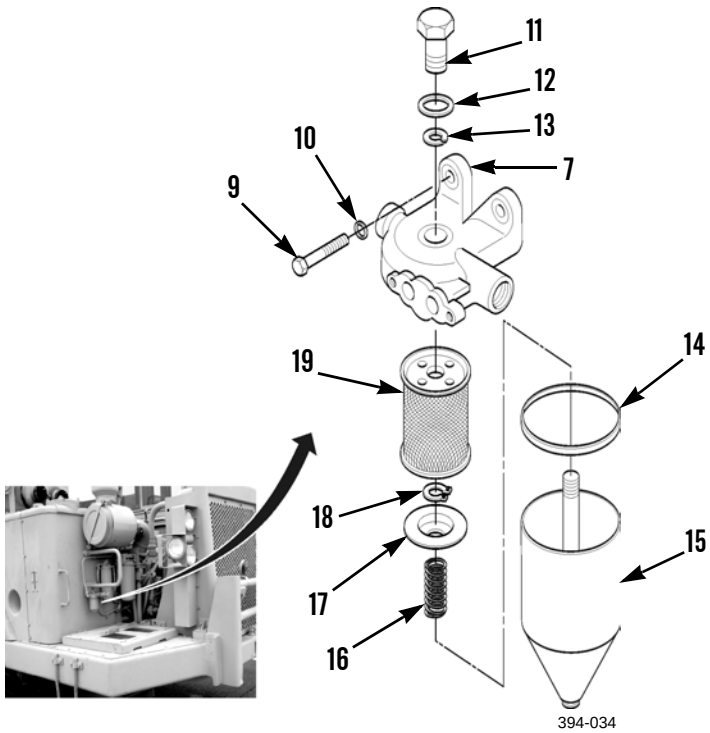
FILTER ELEMENT INSTALLATION

1. Install spring (16), retainer (17), retaining ring (18) and element (19) in case (15).

NOTE

Lightly coat new preformed packing with clean fuel prior to installation.

2. Install new preformed packing (14) in case (15).
3. Install case (15) assembly on base (7).
4. Install lock ring (13), washer (12) and bolt (11) in base (7).



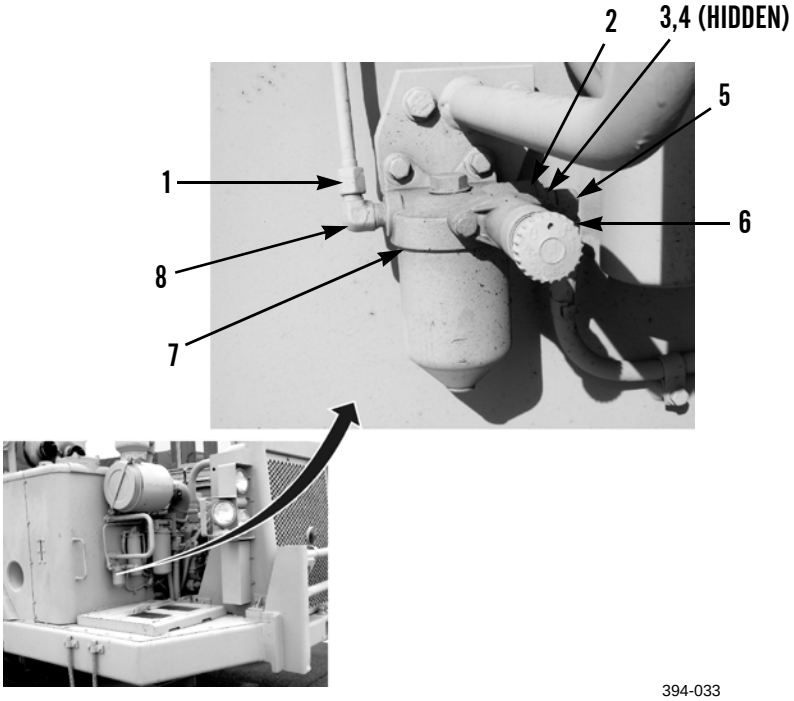
FILTER BASE INSTALLATION

1. If removed, install filter element. Refer to *Filter Element Installation* in this work package.
2. Install base (7) assembly.
3. Install two washers (10) and bolts (9).

NOTE

Lightly coat new gasket and preformed packing with clean fuel prior to installation.

4. Install new gasket (2), adapter (3), new preformed packing (4) and elbow (5) on base (7).
5. Connect hose assembly (6) at elbow (5).
6. Install elbow (8) on base (7).
7. Connect tube assembly (1) at elbow (8).



394-033

8. Install fuel priming pump (WP 0040 00).
9. Operate machine and check for fuel system leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

ETHER INJECTOR CYLINDER AND LINES REPLACEMENT 0039 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine OFF (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

- Ether is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if ether is inhaled or causes eye irritation. Failure to follow this warning may cause injury or death.
- Dispose of ether canister IAW local policy and ordinances.

REMOVAL

CAUTION

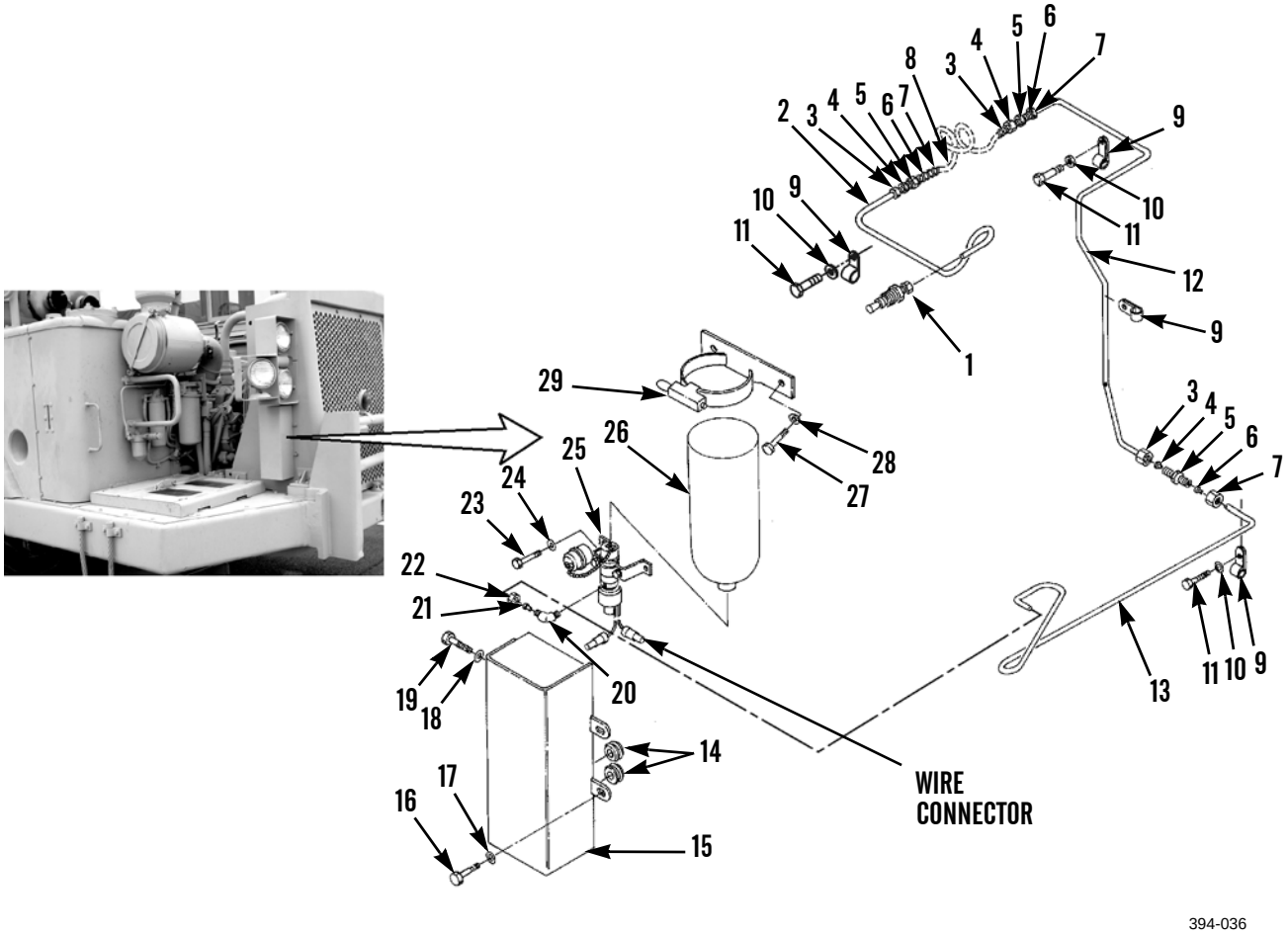
- Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.
- Use two line wrenches to loosen ether lines. Failure to do so may result in damage to machine.

REMOVAL - CONTINUED

NOTE

Tag all lines and wire connectors prior to removal to ensure correct installation.

1. Remove two bolts (16) and washers (17).
2. Remove three bolts (19), six washers (18) and ether cover (15).
3. Loosen clamp assembly (29) by rotating wing nut counterclockwise.
4. Remove ether starting aid cylinder (26) from start valve assembly (25).
5. Remove two bolts (27), washers (28) and cylinder clamp assembly (29).
6. Remove nut (22), sleeve (21) and elbow (20) from tube assembly (13).
7. Disconnect start valve (25) wire connectors.
8. Remove two bolts (23), washers (24) and start valve (25).



REMOVAL - CONTINUED

9. Remove three bolts (11), washers (10) and four clips (9).
10. Remove three nuts (3), nuts (7) and unions (5).
11. Remove three sleeves (4) and sleeves (6).
12. Remove two grommets (14).
13. Remove tube assembly (13).
14. Remove tube assemblies (8 and 12).
15. Remove atomizer (1) and tube assembly (2).

CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

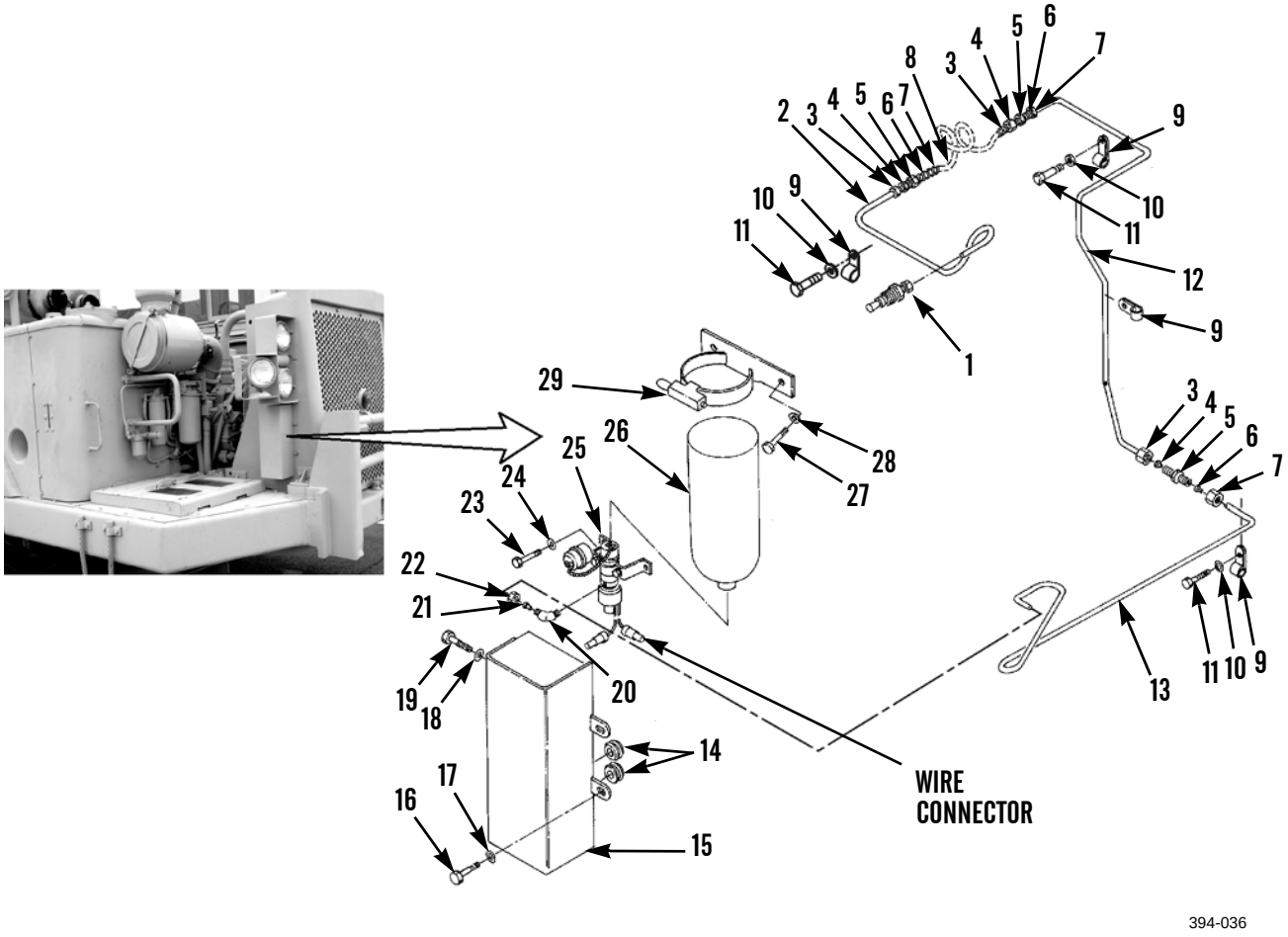
CAUTION

Use two line wrenches to tighten ether lines.

1. Install atomizer (1) in such a manner that the mark on the hex head is parallel with the centerline of the engine.
2. Install tube assembly (2).
3. Install tube assemblies (8 and 12).
4. Install tube assembly (13).
5. Install two grommets (14).
6. Install three sleeves (4) and sleeves (6), three unions (5), three nuts (3) and nuts (7).
7. Install four clips (9), washers (10) and three bolts (11).
8. Install start valve (25), two washers (24) and bolts (23).
9. Install elbow (20), sleeve (21) and nut (22) on tube assembly (13).

INSTALLATION - CONTINUED

10. Install cylinder clamp assembly (29), two bolts (27) and washers (28).
11. Install ether starting aid cylinder (26) on valve assembly (25).
12. Tighten clamp assembly (29) by rotating wing nut clockwise.
13. Install ether cover (15) six washers (18), and three bolts (19).
14. Connect valve assembly (25) wire connectors.
15. Install two washers (17) and bolts (16) on ether box (15).
16. Verify correct operation of ether starting aid. (TM 5-3805-248-10).



END OF WORK PACKAGE

FUEL PRIMING PUMP REPLACEMENT 0040 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Priming the Fuel System

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

References

WP 0030 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine OFF (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death.

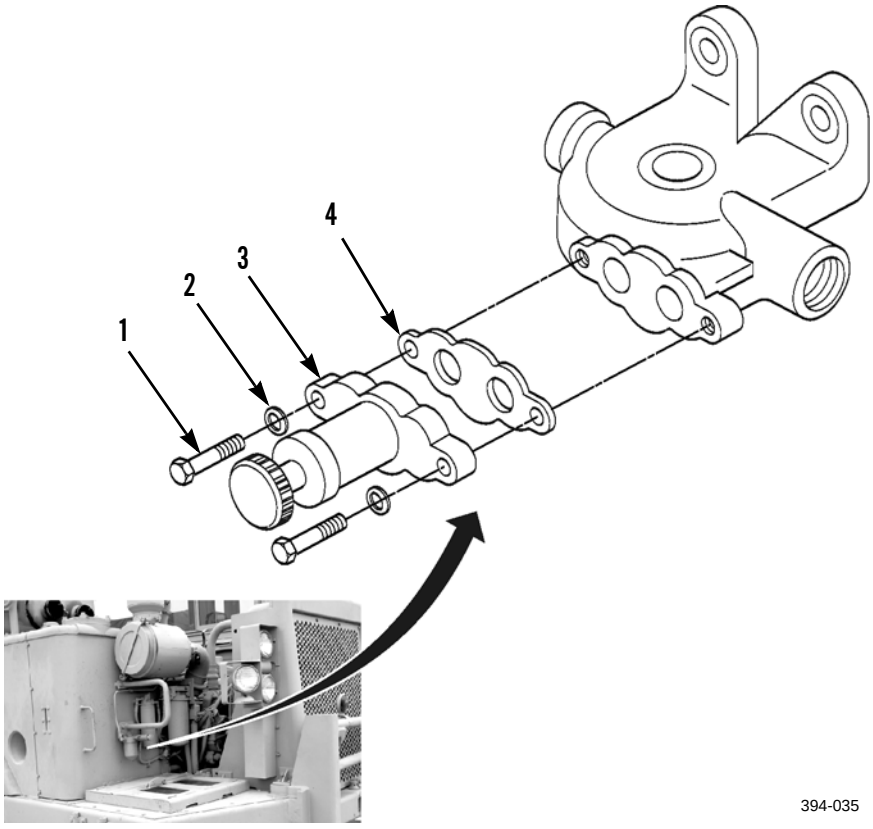
FUEL PRIMING PUMP REPLACEMENT - CONTINUED 0040 00

REMOVAL

NOTE

Use a container to capture draining fuel. Dispose of fuel IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove two bolts (1), washers (2), pump assembly (3) and gasket (4) from filter base. Discard gasket.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective eye protection.

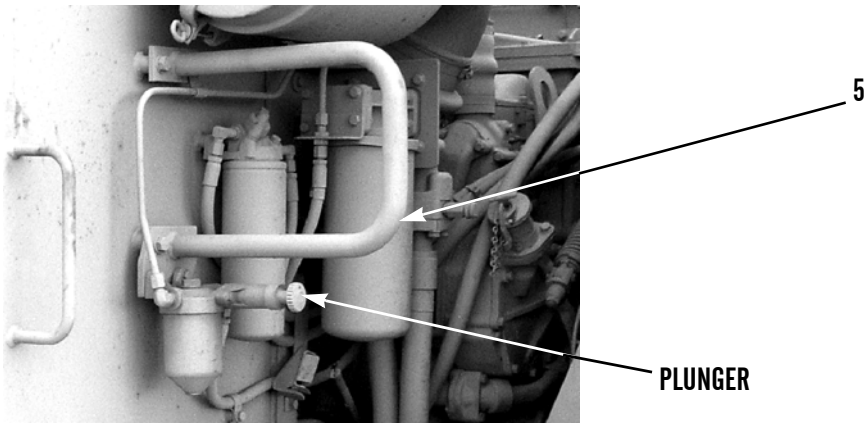
1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Position new gasket (4).
2. Install pump assembly (3), two washers (2) and bolts (1).
3. Operate pump and check for fuel system leaks (TM 5-3805-248-10).

PRIMING THE FUEL SYSTEM

1. Pull accelerator pedal past the detent (TM 5-3805-248-10).
2. Loosen nut (5) at outlet of secondary fuel filter.



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3. Unlock the priming pump plunger and pump until fuel flows free of air bubbles.
4. Tighten nut (5).
5. If removing air from fuel injection lines, if necessary, loosen nuts on fuel injection lines at pump (WP 00030 00).
6. Move accelerator to low idle position (out of stopped detent). Crank engine with starting motor (TM 5-3805-248-10).
7. When fuel flows from lines free of air, tighten injection lines (WP 0030 00).

END OF WORK PACKAGE

MUFFLER, TUBE AND PIPE REPLACEMENT 0041 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Lifting device, 160 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Hood removed (WP 0189 00)

REMOVAL

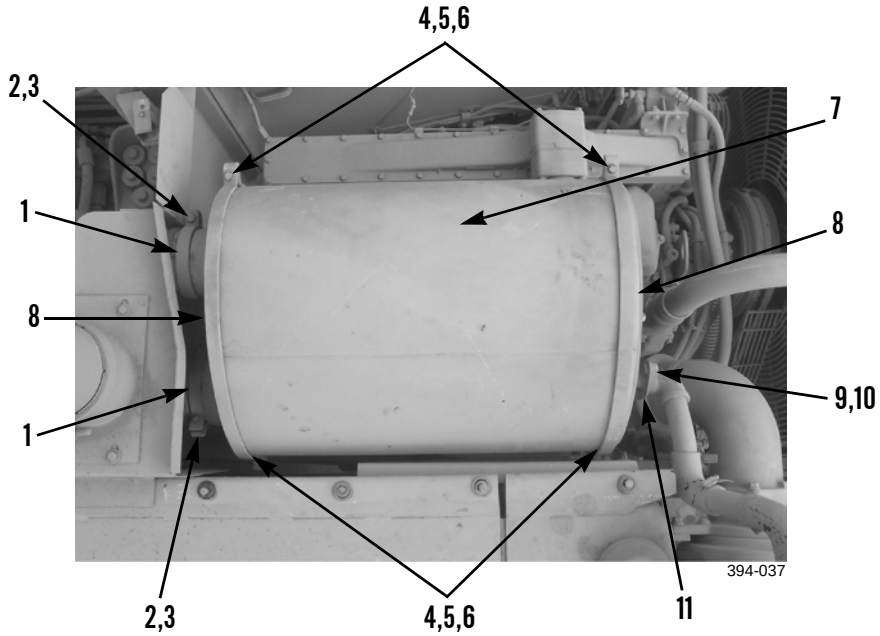
- Allow engine to cool off before you perform maintenance on muffler, exhaust pipe, exhaust manifold or turbocharger. Hot metal parts can cause severe burns. Wear eye, glove and skin protection when working with heated parts. Failure to follow this warning may cause injury or death.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

1. Remove two bolts (9) and washers (10) to disconnect flange (11) from muffler (7).
2. Loosen bolt (2) on both clamps (1).
3. Attach lifting device to muffler (7).
4. Remove four bolts (4), nuts (6) and eight washers (5) from both straps (8).

NOTE

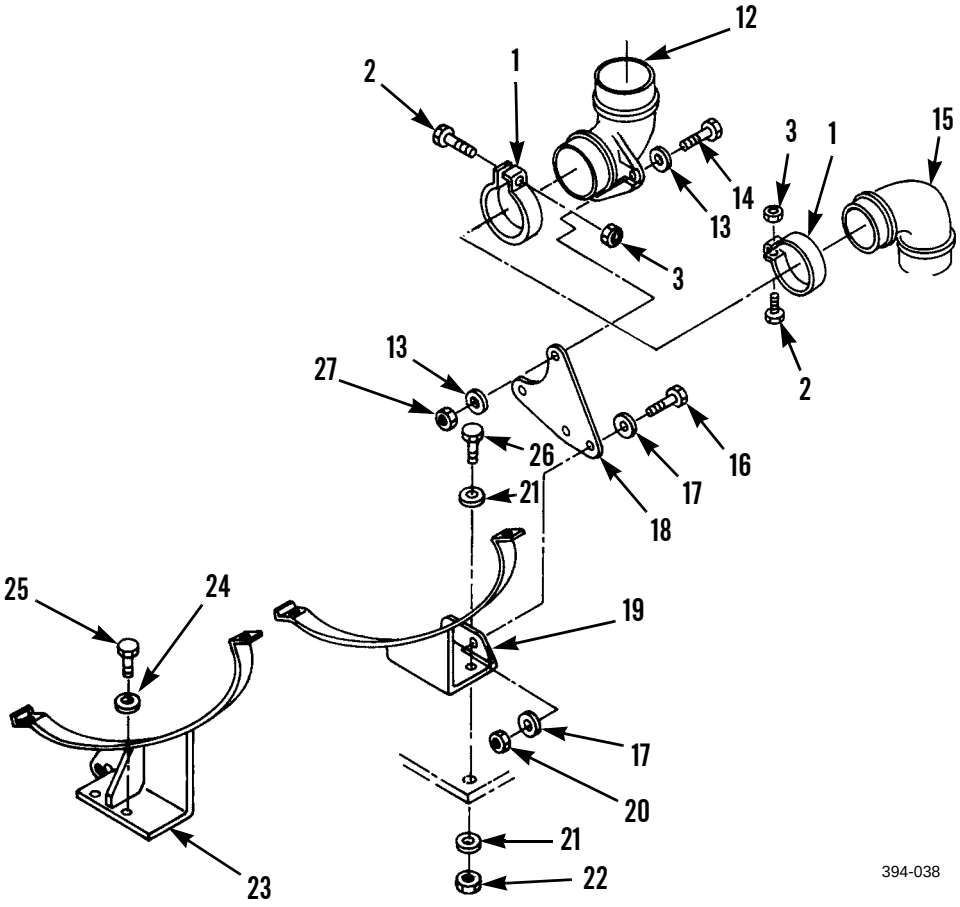
Weight of muffler is 110 lb (50 kg).

5. Remove two straps (8).
6. Use lifting device to slide muffler off of elbows (12 and 15) and lift muffler out of the engine compartment.



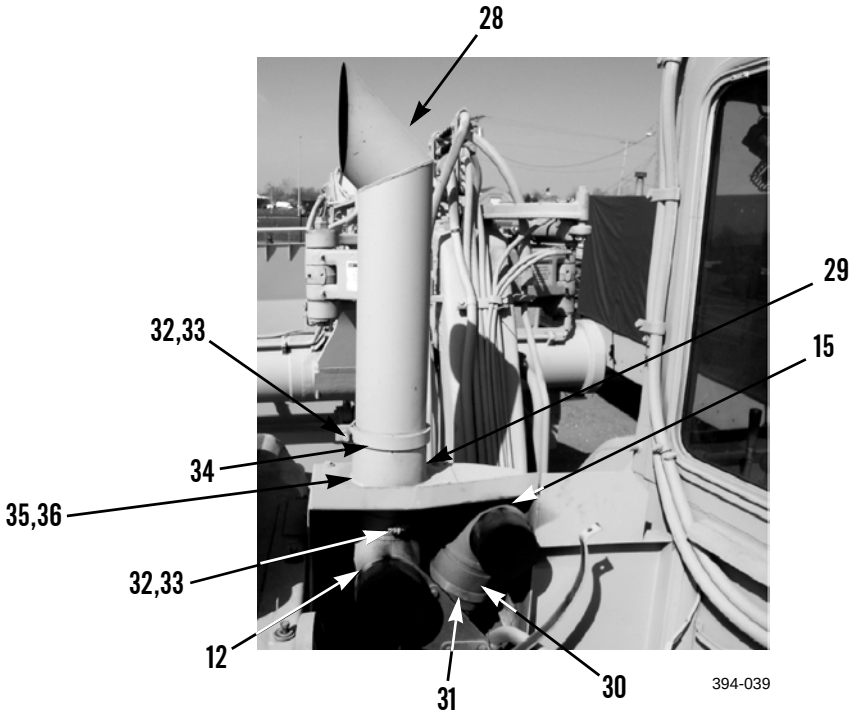
REMOVAL - CONTINUED

7. Remove two clamps (1) from elbows (12 and 15) and if necessary, remove two nuts (3) and bolts (2).
8. Remove two bolts (14), nuts (27) and four washers (13) from elbow (12).
9. Remove two bolts (16), nuts (20), four washers (17) and plate (18) from bracket (19).
10. Remove two bolts (26), nuts (22), four washers (21) and bracket (19).
11. Remove two bolts (25), washers (24) and bracket (23).



REMOVAL - CONTINUED

12. Loosen two bolts (32) on both clamps (34) and remove exhaust pipe (28).
13. Remove four bolts (35), washers (36) and flange assembly (29).
14. Remove elbow (12) and two clamps (34).
15. If necessary, remove bolt (32) and nut (33) from both clamps (34).
16. Loosen clamp (31) and remove elbow (15), adapter (30) and clamp (31).

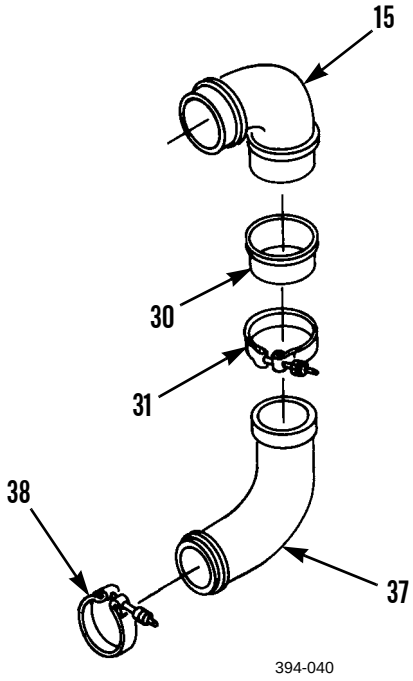


REMOVAL - CONTINUED

17. Loosen clamp (38) and remove elbow (37) and clamp.

INSTALLATION

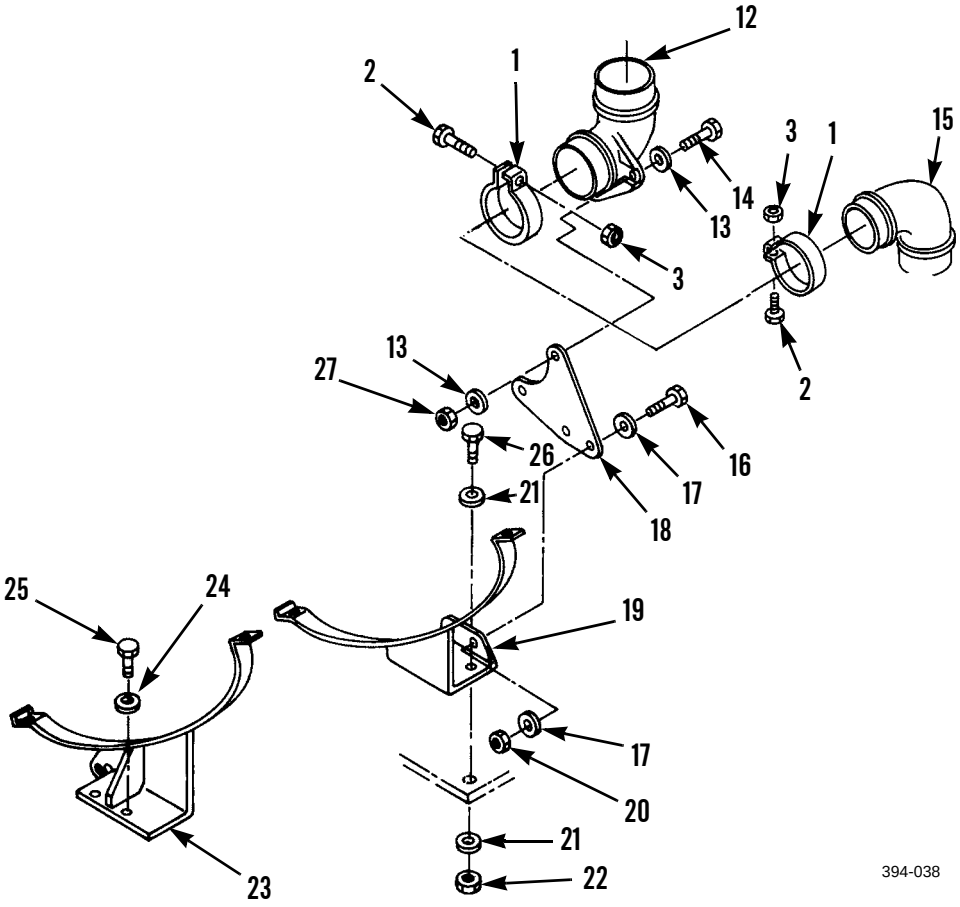
1. Loosely install clamp (38) and elbow (37).



2. Loosely install clamp (31), adapter (30) and elbow (15).
3. Tighten clamps (31 and 38).
4. If removed, loosely install bolt (32) and nut (33) on both clamps (34).
5. Install flange assembly (29).
6. Install two clamps (34) and elbow (12).
7. Install four washers (36) and bolts (35) in flange assembly (29).
8. Install exhaust pipe (28) and tighten two bolts (32) on both clamps (34).

INSTALLATION - CONTINUED

9. Install bracket (23), washers (24) and two bolts (25).
10. Install bracket (19), two bolts (26), four washers (21), and nuts (22).
11. Install plate (18), two bolts (16), four washers (17) and nuts (20).
12. Install two bolts (14), four washers (13) and nuts (27) in elbow (12).
13. Install two clamps (1) on elbows (12 and 15) and if removed, loosely install two bolts (2) and nuts (3).



INSTALLATION - CONTINUED

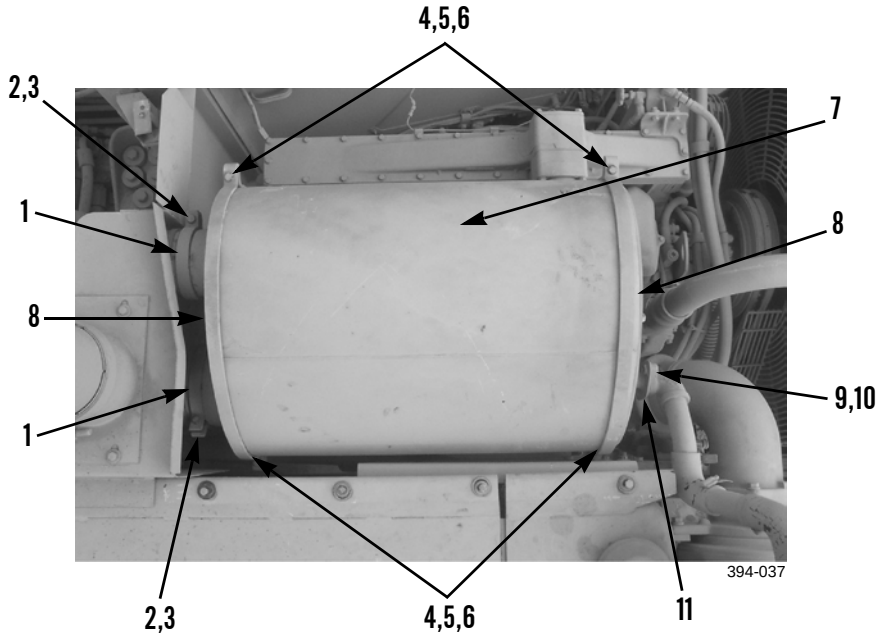
WARNING

- Allow engine to cool off before you perform maintenance on muffler, exhaust pipe, exhaust manifold or turbocharger. Hot metal parts can cause severe burns. Wear eye, glove and skin protection when working with heated parts. Failure to follow this warning may cause injury or death.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of muffler is 110 lb (50 kg).

14. Attach lifting device to muffler (7).
15. Lift muffler into engine compartment and slide muffler onto elbows (12 and 15).
16. Install two straps (8).
17. Install four bolts (4), eight washers (5) and nut (6) in both straps (8).
18. Tighten two bolts (2) on clamps (1).
19. Connect flange (11) to muffler (7) and install two washers (10) and bolts (9).



20. Operate engine and check for exhaust leaks (TM 5-3805-248-10).
21. Install hood (WP 0189 00).

END OF WORK PACKAGE

CHANGING COOLANT 0042 00

THIS WORK PACKAGE COVERS

Draining, Flushing, Refilling

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze (Item 4 or 5, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

References

WP 0043 00

WP 0050 00

TB 750-651

TM 5-3805-248-10

Equipment Condition

Crankcase guard removed (WP 0201 00)

DRAINING

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

DRAINING - CONTINUED

NOTE

- Cooling system capacity is 20 gallons.
- Use a container to capture draining coolant. Dispose of coolant IAW local policy and ordinances.

1. Loosen and remove radiator fill cap (1) on radiator (WP 0043 00).
2. Open radiator to drain valve (2) and drain coolant.

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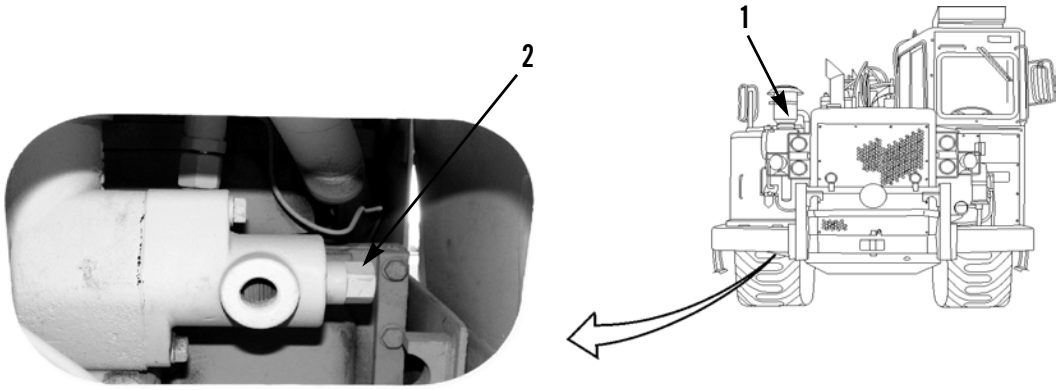
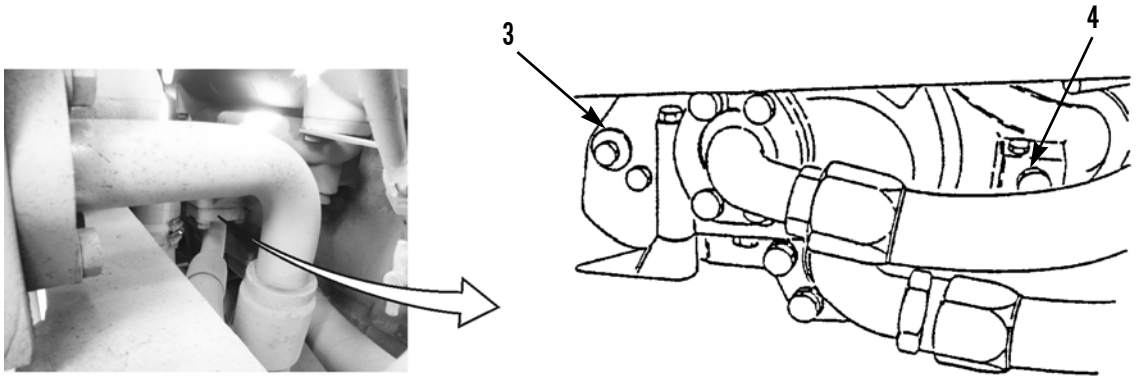


394-041

3. Remove engine oil cooler drain plugs (3 and 4) and drain coolant.



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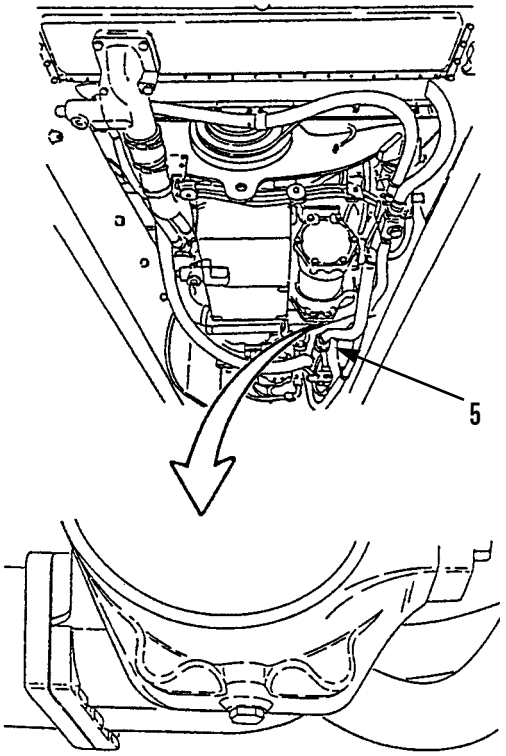
DRAINING - CONTINUED

4. Remove retarder oil cooler drain plug (5) and drain coolant.



394-043

FLUSHING

1. Flush system with clean water. DO NOT run engine while flushing.
2. Repeat flushing until draining water is clear.

REFILLING

1. Install retarder oil cooler drain plug (5).
2. Install engine oil cooler drain plugs (3 and 4).
3. Close radiator drain valve (2).
4. Replace coolant filter with precharge element (WP 0050 00).

REFILLING - CONTINUED

NOTE

To avoid air locks, add coolant slowly at five gallons or less per minute.

5. Fill radiator with 50/50 mix of water and antifreeze (TB 750-651).
6. Start engine (TM 5-3805-248-10).

WARNING

Wear effective eye, glove and skin protection when adding coolant while engine is running. Failure to do so may cause injury.

7. Add coolant to radiator to cover the low level plate.
8. Run engine for approximately 10 minutes.
9. Inspect coolant level in radiator. Add coolant as required.
10. Install radiator fill cap (1) (WP 0043 00).
11. Check for cooling system leaks (TM 5-3805-248-10).
12. Shut down engine (TM 5-3805-248-10).
13. Install crankcase guard (WP 0201 00).

END OF WORK PACKAGE

RADIATOR CAP MAINTENANCE 0043 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.

REMOVAL - CONTINUED

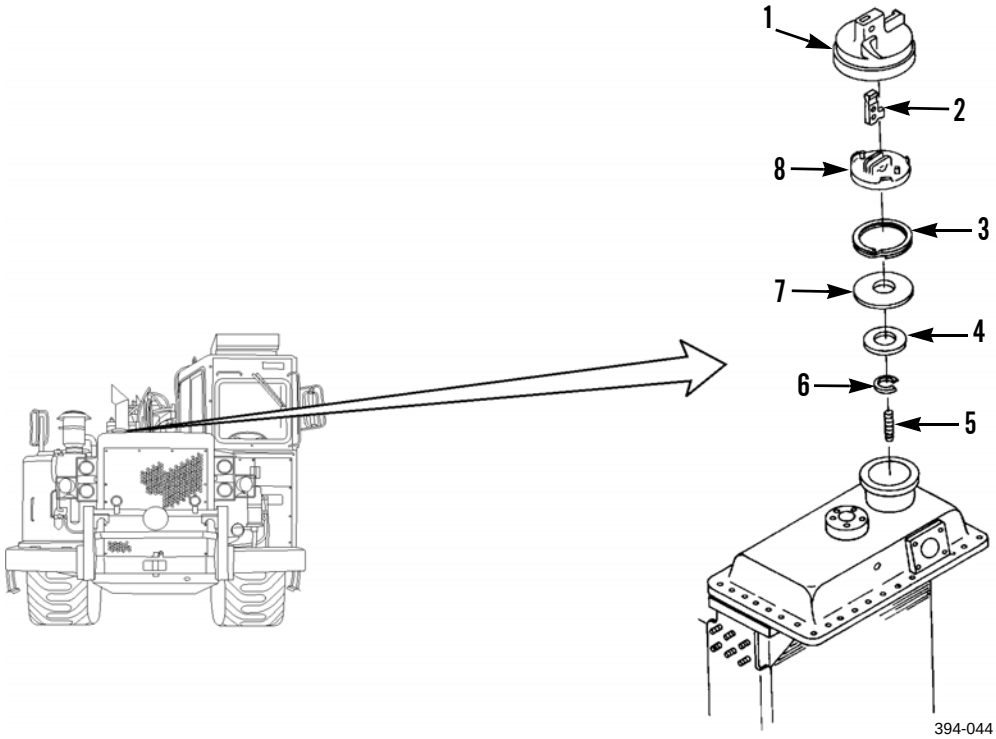
NOTE

Remove the radiator fill cap slowly to relieve pressure.

Remove radiator fill cap (1) assembly.

DISASSEMBLY

1. Remove ring (6), retainer (4) and gasket (7) from cap (8). Discard gasket. Remove all gasket material from mounting surfaces.
2. Remove ring (3), cap (8) and tang (2) from cover (1).
3. If damaged, remove stud (5) from radiator.



CLEANING AND INSPECTION

Wipe all parts clean, inspect for damage and replace as necessary.

ASSEMBLY

1. If removed, install stud (5) on radiator. Torque stud (5) to 40 lb-ft (54 Nm).
2. Install tang (2), cap (8) and ring (3) on cover (1).
3. Install new gasket (7), retainer (4) and ring (6) on cap (8).

INSTALLATION

Install radiator fill cap (1) as an assembly.

END OF WORK PACKAGE

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING MAINTENANCE 0044 00

THIS WORK PACKAGE COVERS

Relief Valve: Removal, Installation

Radiator Assembly, Support Assembly and Mounting: Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113 WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket (5)

Lifting device, 1500 lb minimum capacity

Packing, preformed (2)

Wood blocks, 4 in. x 4 in. x 4 in.

Personnel Required

Two

Equipment Condition

For relief valve removal only:

Hood removed (WP 0189 00)

For radiator assembly, support assembly and mounting removal only:

Transmission drained (WP 0128 00)

Emergency fuel shut-off removed (WP 0036 00)

Ether injector cylinder and lines removed (WP 0039 00)

Muffler removed (WP 0041 00)

Coolant drained (WP 0042 00)

Radiator fan shield assembly removed (WP 0045 00)

Worklights removed (WP 0083 00)

High beam headlight removed (WP 0084 00)

Low beam headlight removed (WP 0084 00)

Machine headlight harness removed (WP 0018 00)

Front bumper removed (WP 0185 00)

RELIEF VALVE REMOVAL

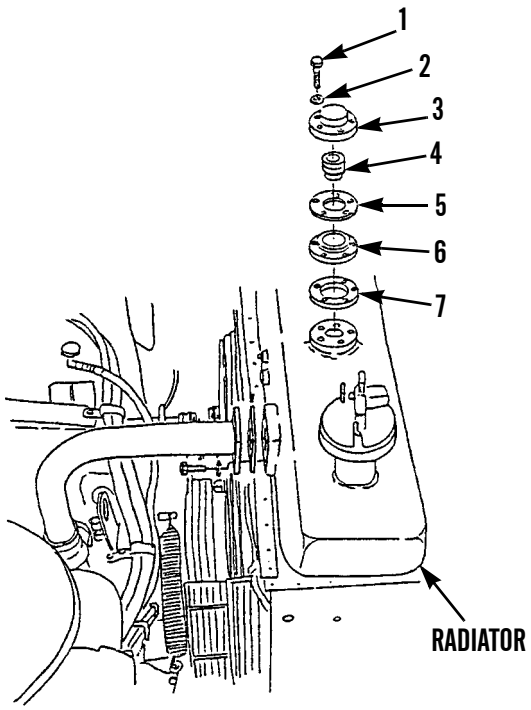
WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.

CAUTION

Wipe area clean around all connections to be opened during removal. Plug openings after removing lines. Contamination of cooling system could result in premature failure.

1. Remove five bolts (1) and washers (2).
2. Remove cover (3).
3. Remove valve assembly (4).
4. Remove and discard gasket (5).
5. Remove plate (6).
6. Remove and discard gasket (7).



394-045

RELIEF VALVE INSTALLATION

NOTE

Align holes during installation in the following steps.

1. Install new gasket (7), plate (6) and new gasket (5) at top of radiator.
2. Install valve assembly (4) and cover (3).
3. Install five washers (2) and bolts (1).
4. Inspect coolant level in radiator and add as required (WP 0042 00).

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING REMOVAL

WARNING

- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

CAUTION

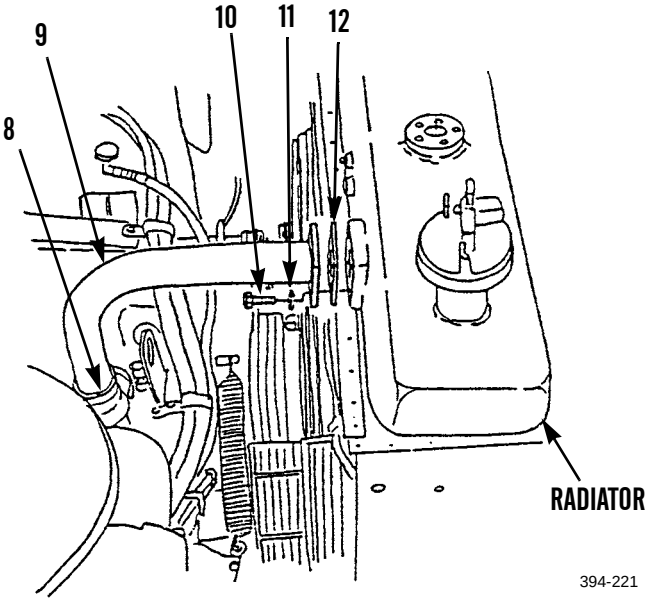
Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

NOTE

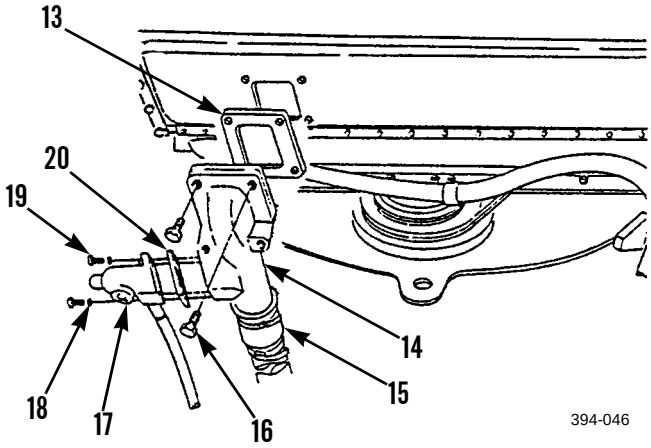
- Tag lines prior to removal to ensure correct installation.
- Use a container to capture draining coolant. Dispose of coolant IAW local policy and ordinances. Ensure all spills are cleaned up.

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING REMOVAL - CONTINUED

1. Loosen clamp (8) from tube (9).
2. Remove four bolts (10) and washers (11).
3. Rotate tube assembly (9) counterclockwise away from radiator.
4. Remove and discard gasket (12).

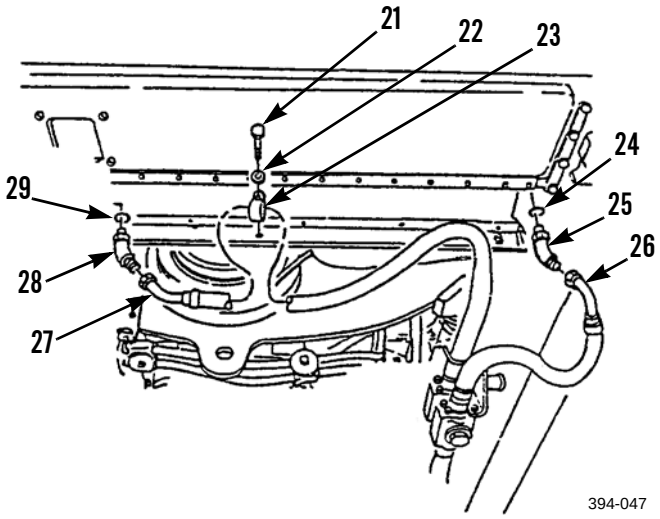


5. Loosen clamp (15).
6. Remove four bolts (16).
7. Remove two bolts (19) and washers (18).
8. Disconnect adapter (17) from elbow (14) and rotate elbow away from radiator.
9. Remove and discard gasket (20).
10. Remove and discard gasket (13).



RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING REMOVAL - CONTINUED

11. Disconnect hoses (26 and 27).
12. Remove elbows (25 and 28).
13. Remove and discard preformed packings (24 and 29).
14. Remove bolt (21), washer (22) and clip (23).



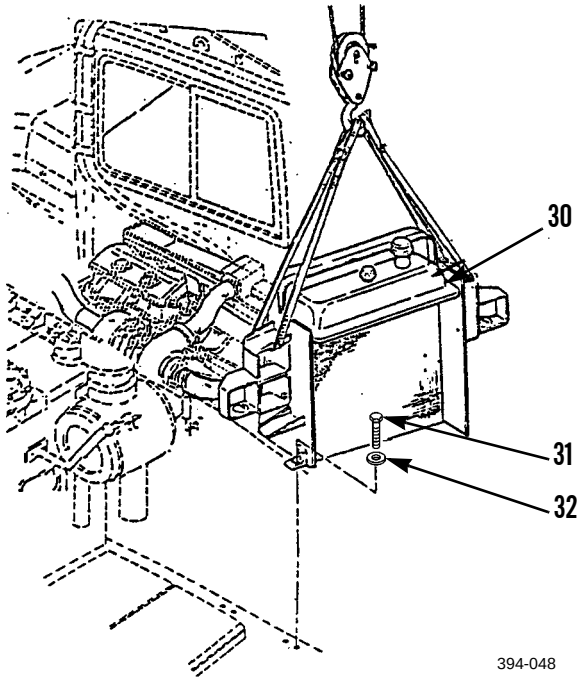
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of radiator and support assembly is 1,000 lb (454 kg).

15. Attach lifting device to radiator and support assembly (30).
16. Remove eight bolts (31) and washers (32).



RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING REMOVAL - CONTINUED

WARNING

- Radiator and support assembly must be placed on clean floor surface, fan side down. Wood blocks must be placed in position to support radiator at top and bottom. Do not position radiator and support assembly in an upright position. Failure to follow this procedure may cause injury.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

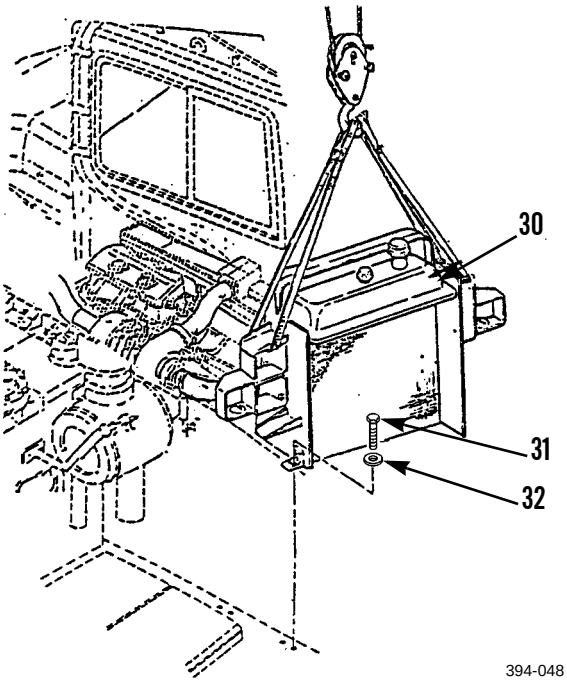
CAUTION

Lift radiator and support assembly straight up to prevent contact with fan blades. Failure to follow this procedure may result in damage to equipment.

NOTE

Weight of radiator and support assembly is 1,000 lb (453 kg).

17. Remove radiator and support assembly (30) from machine and lower onto wood blocks.
18. Remove lifting device.



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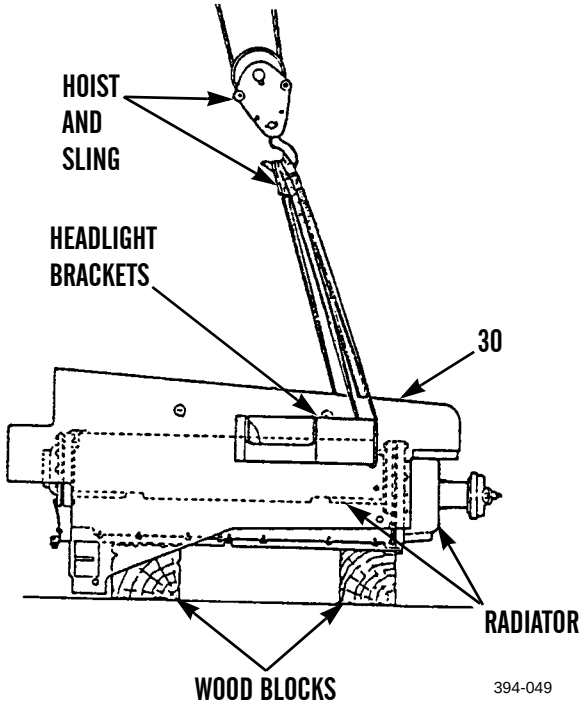


394-049

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING DISASSEMBLY

WARNING

- Radiator and support assembly must be placed on clean floor surface, fan side down. Wood blocks must be placed in position to support radiator at top and bottom. Do not position radiator and support assembly in an upright position. Failure to follow this procedure may cause injury.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

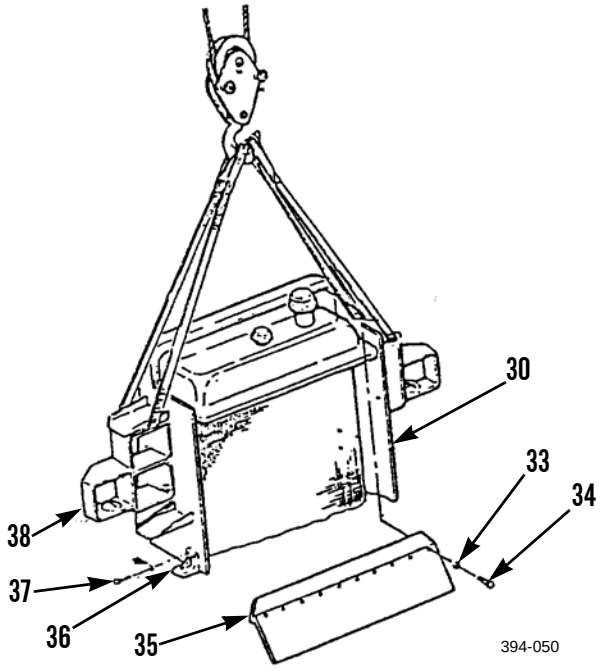
Weight of radiator and support assembly is 1,000 lb (454 kg).

1. Attach lifting device to headlight brackets. Attach at both sides of support assembly (30).
2. Apply lift tension and take up slack.

WARNING

Do not remove lifting device after radiator and support assembly is placed in upright position. Lifting device must stay in position to prevent radiator and support assembly from falling. Failure to follow this procedure may cause injury.

3. Position radiator and support assembly (30) upright. Do not remove lifting device.
4. Remove six bolts (34) and washers (33).
5. Remove baffle assembly (35).
6. Remove four bolts (37) and washers (38).
7. Remove two bracket assembly (36).



RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING DISASSEMBLY - CONTINUED

CAUTION

Wood blocks must be positioned under the top and bottom tank parts of the radiator. The blocks are to support radiator after support assembly is removed. Do not place blocks under finned portion of the radiator. Failure to follow this procedure may result in damage to the radiator.

8. Position wood blocks to support radiator. Locate wood blocks under radiator top and bottom tank portions.

WARNING

- Radiator and support assembly must be placed on clean floor surface, fan side down. Wood blocks must be placed in position to support radiator at top and bottom. Do not position radiator and support assembly in an upright position. Failure to follow this procedure may cause injury.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

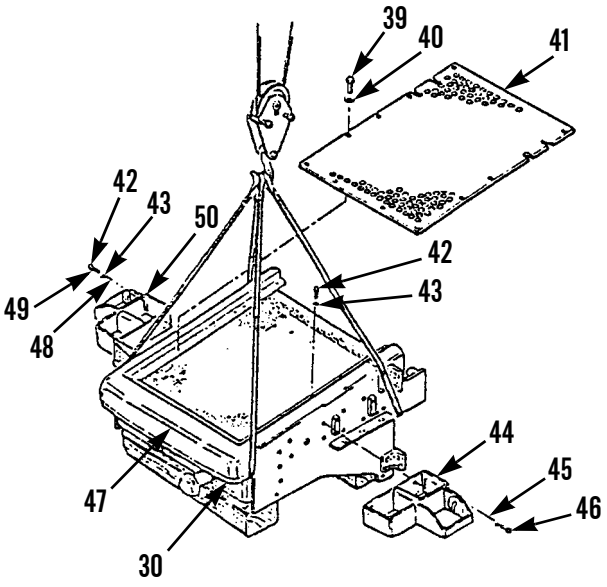
NOTE

Weight of radiator support assembly is 200 lb (91 kg).

9. Use lifting device to place radiator and support assembly (30) on wood blocks. Maintain tension and do not remove lifting device.
10. Remove four bolts (46) and washers (45) from left side of support assembly (47).
11. Remove headlight bracket (44).
12. Remove four bolts (49) and washers (48) from right side of support assembly (50).
13. Remove headlight bracket (50).
14. Remove four washers (43) and bolts (42).
15. Remove ten bolts (39), washers (40) and guard (41).

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING DISASSEMBLY - CONTINUED

16. Remove support assembly (47) from radiator assembly (30).



394-051

17. Remove lifting device.

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING ASSEMBLY

WARNING

- Radiator and support assembly must be placed on clean floor surface, fan side down. Wood blocks must be placed in position to support radiator at top and bottom. Do not position radiator and support assembly in an upright position. Failure to follow this procedure may cause injury.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

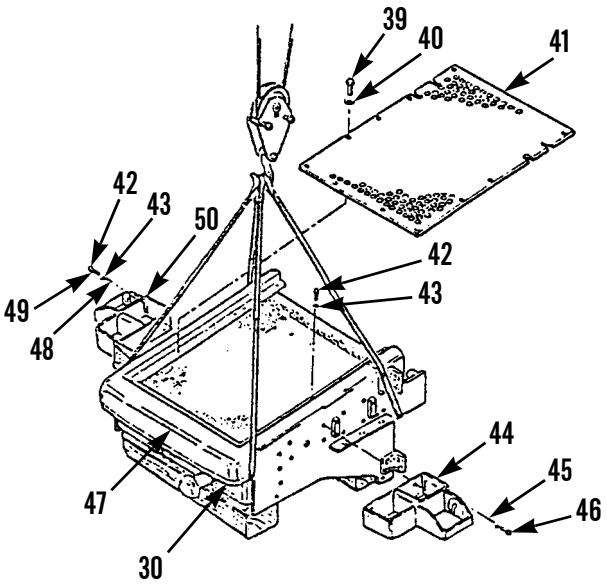
Weight of radiator assembly is 800 lb (363 kg).

1. Place wood blocks under radiator.

NOTE

Weight of radiator support assembly is 200 lb (91 kg.).

2. Attach lifting device to support assembly (47).
3. Use lifting device to install support assembly (47) on radiator assembly (30).
4. Install guard (41), ten washers (40) and bolts (39).
5. Install four washers (43) and bolts (42).
6. Install headlight bracket assembly (50), four washers (48) and bolts (49).
7. Install headlight bracket (44), four washers (45) and bolts (46).



394-051

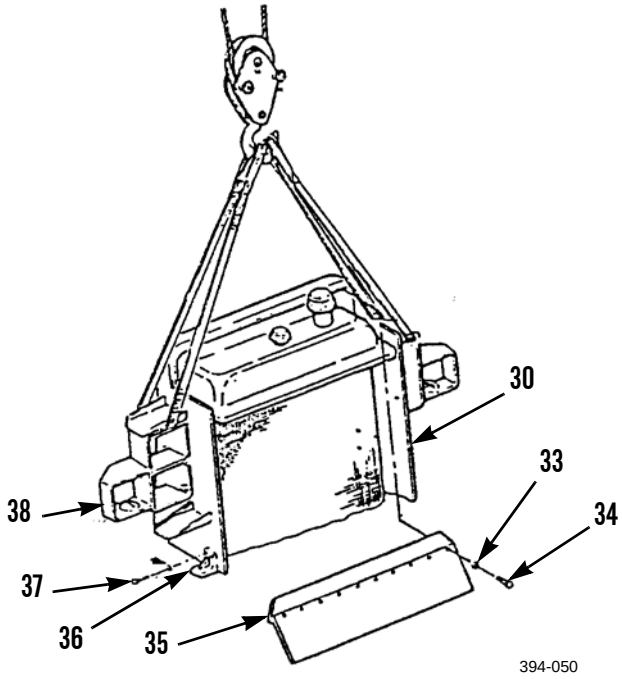
NOTE

Weight of radiator and support assembly is 1,000 lb (453 kg.).

8. Remove lifting device and attach to headlight brackets (44 and 50) and at both sides of support assembly (47).

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING ASSEMBLY - CONTINUED

9. Position radiator and support assembly (30) upright.
10. Install two bracket assembly (36), four washers (38) and bolts (37).
11. Install baffle assembly (35), six washers (33) and bolts (34).



WARNING

Do not remove lifting device and leave radiator and support assembly standing upright. If radiator and support assembly are not to be installed in machine, steps 12 through 14 of this task must be completed. If radiator and support assembly are being installed on machine, proceed to installation in this work package. Failure to follow this procedure may cause injury. If you are injured, seek medical aid immediately.

12. Place wood blocks under radiator.
13. Use lifting device to lower radiator and support assembly (30) onto wood blocks.
14. Remove lifting device.

RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING INSTALLATION

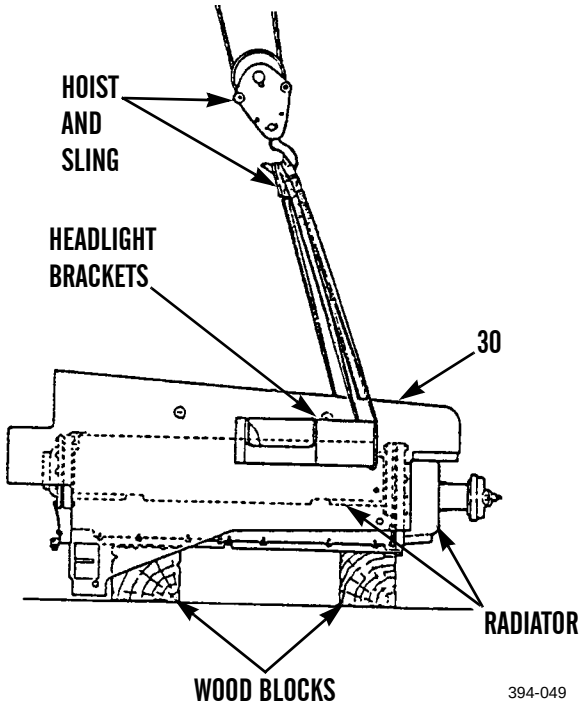
WARNING

- Radiator and support assembly must be placed on clean floor surface, fan side down. Wood blocks must be placed in position to support radiator at top and bottom. Do not position radiator and support assembly in an upright position. Failure to follow this procedure may cause injury.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of radiator and support assembly is 1,000 lb (453 kg).

1. Attach lifting device to radiator and support assembly (30).
2. Raise radiator and support assembly (30) to upright position.

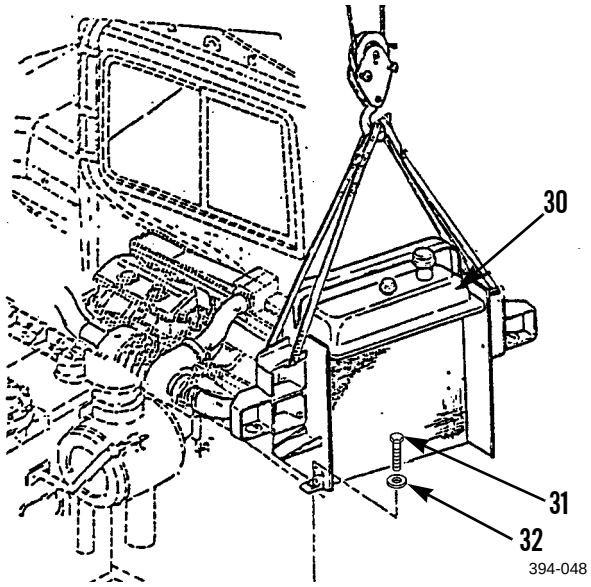


RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING INSTALLATION - CONTINUED

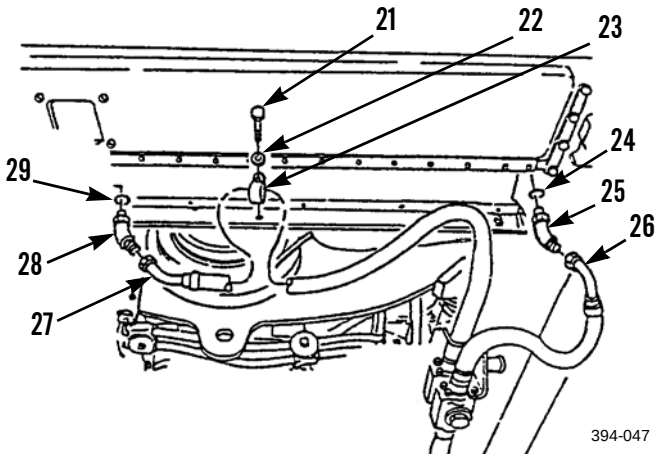
CAUTION

Lower radiator and support assembly straight down to prevent contact with fan blades. Failure to follow this procedure may result in damage to equipment.

3. Position radiator and support assembly (30) on machine. Align holes.
4. Install eight washers (32) and bolts (31).

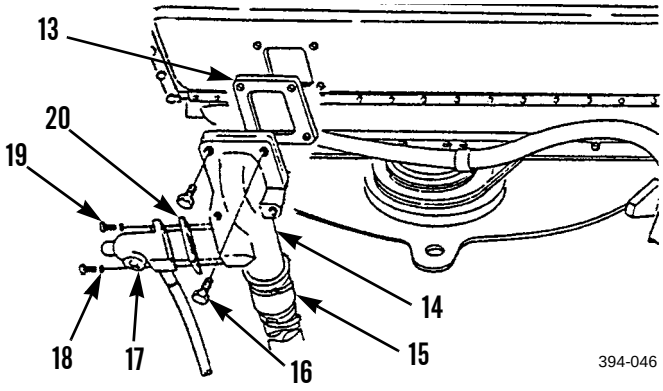


5. Install clip (23), washer (22) and bolt (21) and secure hose (27).
6. Install new preformed packings (29 and 24) in elbows (25 and 28).
7. Install elbows (25 and 28).
8. Connect hoses (26 and 27) and tighten.

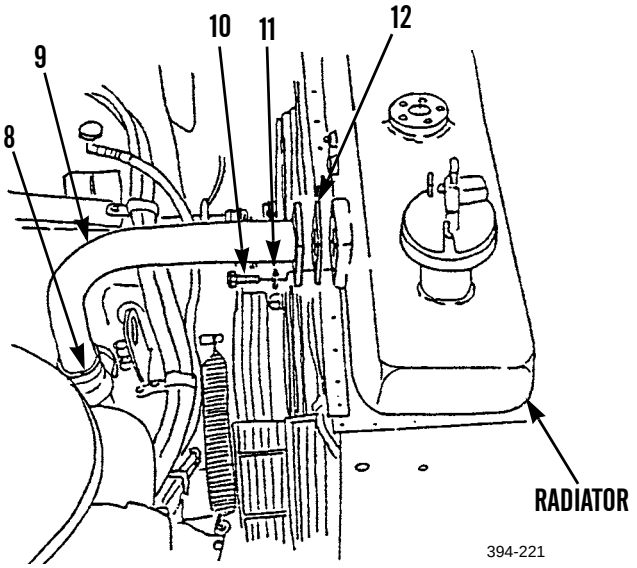


RADIATOR ASSEMBLY, SUPPORT ASSEMBLY AND MOUNTING INSTALLATION - CONTINUED

9. Install new gasket (20) and connect hose (17).
10. Install two washers (18) and bolts (19).
11. Install new gasket (13) and four bolts (16) on elbow (14).



12. Tighten clamp (15).
13. Install new gasket (12).
14. Rotate tube (9) clockwise toward radiator.
15. Install four washers (11) and bolts (10).
16. Tighten clamp (8).



17. Install emergency fuel shut-off (WP 0036 00).
18. Install ether injector cylinder and lines (WP 0039 00).
19. Install muffler (WP 0041 00).
20. Install radiator fan shield assembly (WP 0045 00).
21. Refill transmission to proper level (WP 0128 00).
22. Fill cooling system to proper level (WP 0042 00).
23. Install worklight (WP 0083 00).
24. Install high beam headlight (WP 0084 00).
25. Install low beam headlight (WP 0084 00).
26. Install machine headlight harness (WP 0018 00).
27. Install bumper (WP 0185 00).
28. Install hood (WP 0189 00).

END OF WORK PACKAGE

RADIATOR FAN SHIELD REPLACEMENT 0045 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Hood removed (WP 0189 00)

Front crankcase guard removed (WP 0201 00)

REMOVAL

1. Remove eight bolts (2) and washers (3) from front fan guard assembly (1) on engine.
2. Remove fan guard assembly (1).
3. Remove two bolts (7) and split two fan guard (1) halves.

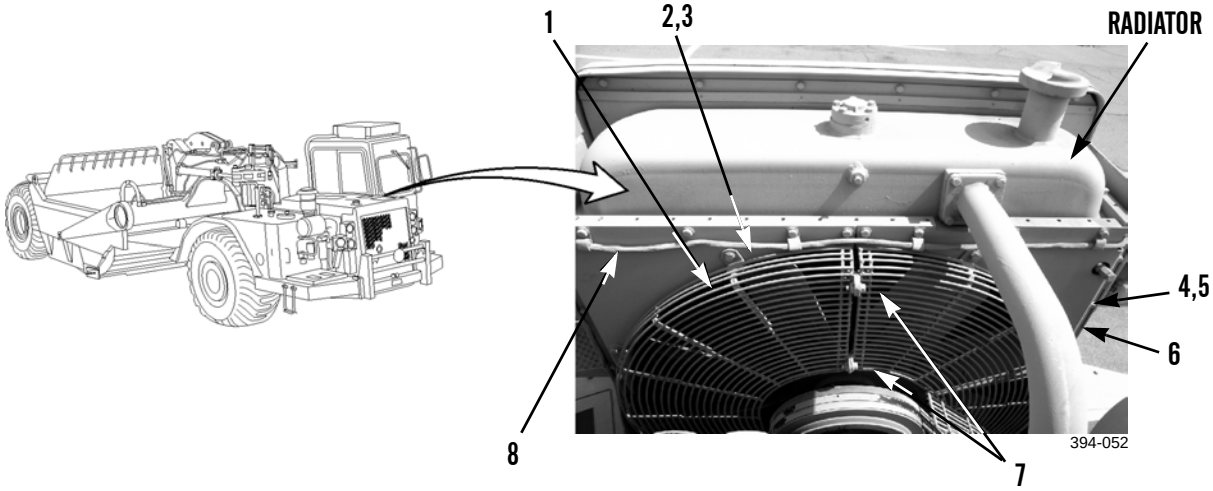
CAUTION

Use care when removing lower shield assemblies so that ether starting aid tube is not dented, bent or punctured. Failure to follow this procedure may result in damage to equipment.

NOTE

It is not necessary to remove loop clamps (8) from harness assembly, ether starting aid tube or emergency shut-off cable.

4. Remove twenty-four bolts (4) and washers (5) from outer edges of shield assembly (6). Position harness assembly, ether starting aid tube and emergency shut-off cable aside.
5. Remove strip at bottom of shield (6). Remove four shield quarters.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

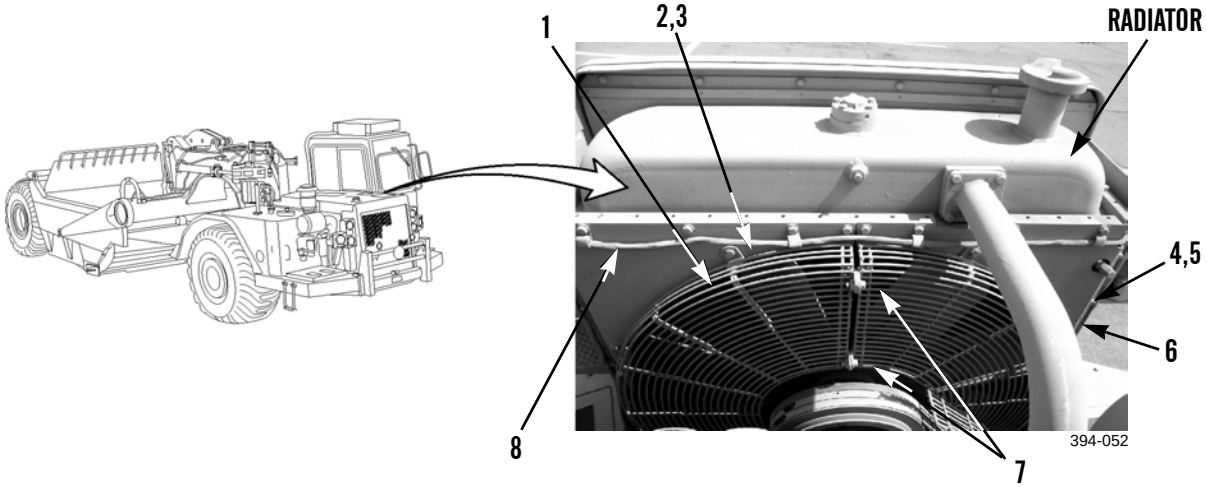
CAUTION

Use care when installing lower shield assemblies so that ether starting aid tube is not dented, bent or punctured. Failure to follow this procedure may result in damage to equipment.

NOTE

Install items through harness and ether starting aid tube mounting clips where required.

1. Position four shield (6) quarters and strip at bottom of shield assembly on radiator assembly.
2. Position loop clamps (8), install twenty-four washers (5) and bolts (4) in outer edges of shield (6) assembly.
3. Assemble two fan guard (1) halves and install two bolts (7).
4. Install fan guard assembly (1).
5. Install eight washers (3) and bolts (2) in front fan guard assembly (1) on engine.



6. Install hood (WP 0189 00).
7. Install front crankcase guard (WP 0201 00).

END OF WORK PACKAGE

THERMOSTAT AND HOUSING REPLACEMENT 0046 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Testing, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze, permanent (Item 4 or 5, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Sealant, silicone (Item 38, WP 0339 00)

Gasket (2)

Packing, preformed

Seal

Equipment Condition

Hood removed (WP 0189 00)

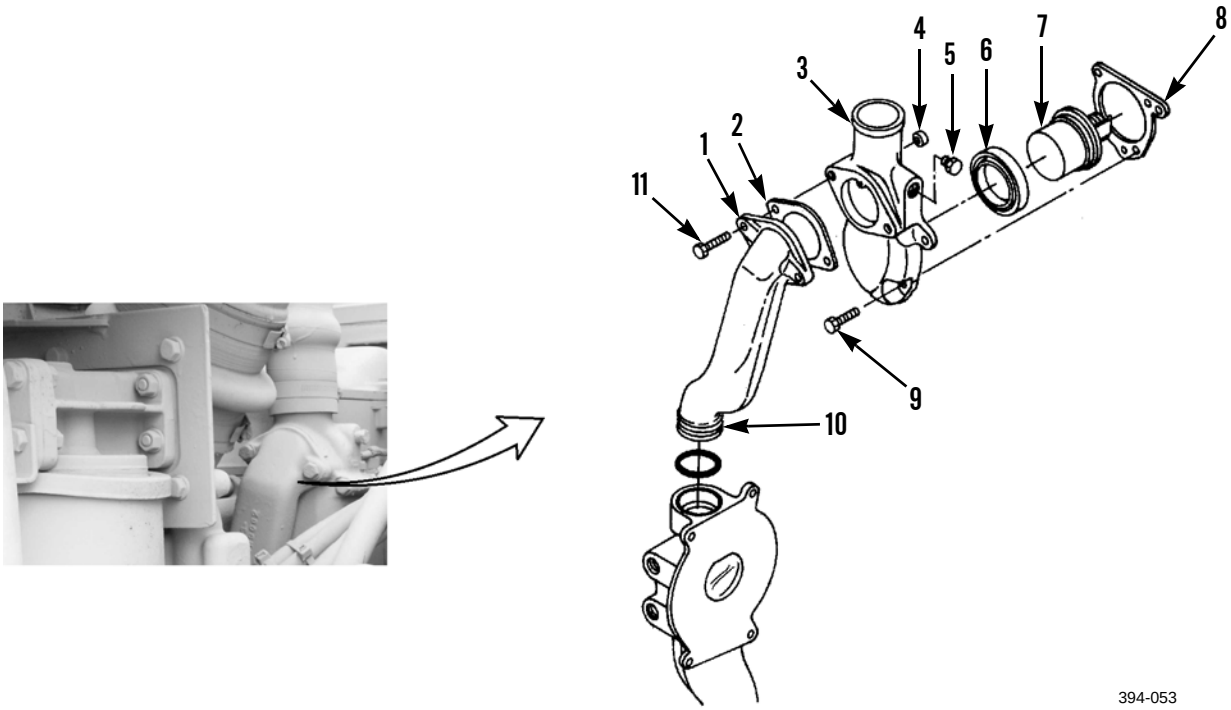
Upper radiator hose disconnected from thermostat housing (WP 0049 00)

Coolant drained (WP 0042 00)

REMOVAL

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

1. Remove two bolts (11) from elbow (1).
2. Remove elbow (1) from cover (3). Remove and discard preformed packing (10) from elbow.
3. Remove and discard gasket (2).
4. Remove three bolts (9) and cover (3).
5. Remove ferrule (4) and plug (5) from cover (3).
6. Remove seal (6), thermostat (7) and gasket (8). Discard seal and gasket.



CLEANING AND INSPECTION

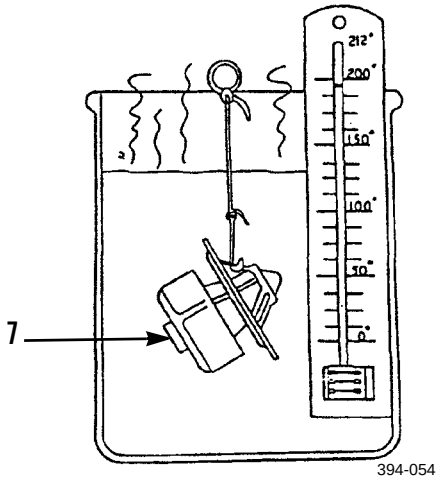
WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

TESTING

1. Test thermostat (7) by suspending in container of water heated to 197°F (92°C).
2. Completely immerse thermostat (7) in water, then shake.
3. Soak thermostat (7) for ten minutes. Keep water at a minimum of 197°F (92°C).
4. Remove thermostat (7).
5. Measure distance that regulator is open. If less than 0.375 in. (9.53 mm), replace thermostat (7).



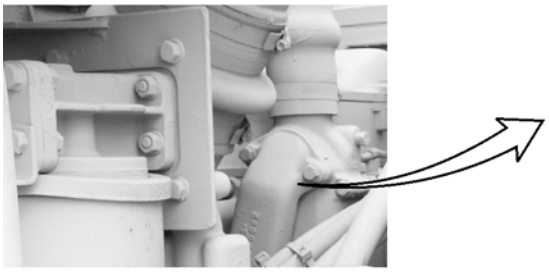
INSTALLATION

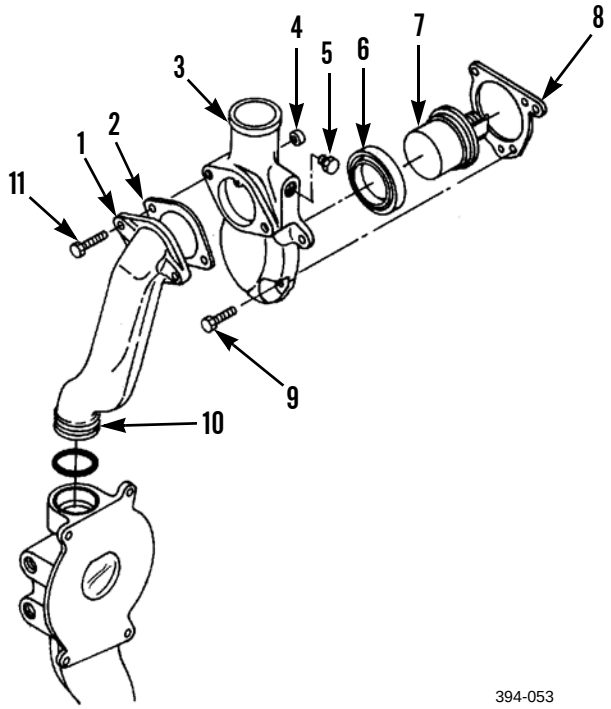
1. Install new seal (6) and thermostat (7).
2. Apply silicone sealant to threads of plug (5) and install.
3. Install ferrule (4).
4. Install new gasket (8).
5. Install cover (3) and three bolts (9).

NOTE

Lightly coat new preformed packing with clean coolant prior to installation.

6. Install new preformed packing (10).
7. Install new gasket (2) and new preformed packing (10).
8. Install elbow (1) and two bolts (11).





9. Refill coolant (WP 0042 00).
10. Install hood (WP 0189 00).
11. Connect upper radiator hose to thermostat housing (WP 0049 00).

END OF WORK PACKAGE

AFTERCOOLER WATER LINES AND FITTINGS REPLACEMENT 0047 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze, permanent (Item 4 or 5, WP 0339 00)

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket (4)

Packing, preformed (4)

Equipment Condition

Muffler removed (WP 0041 00)

Coolant drained (WP 0042 00)

Hood removed (WP 0189 00)

REMOVAL

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

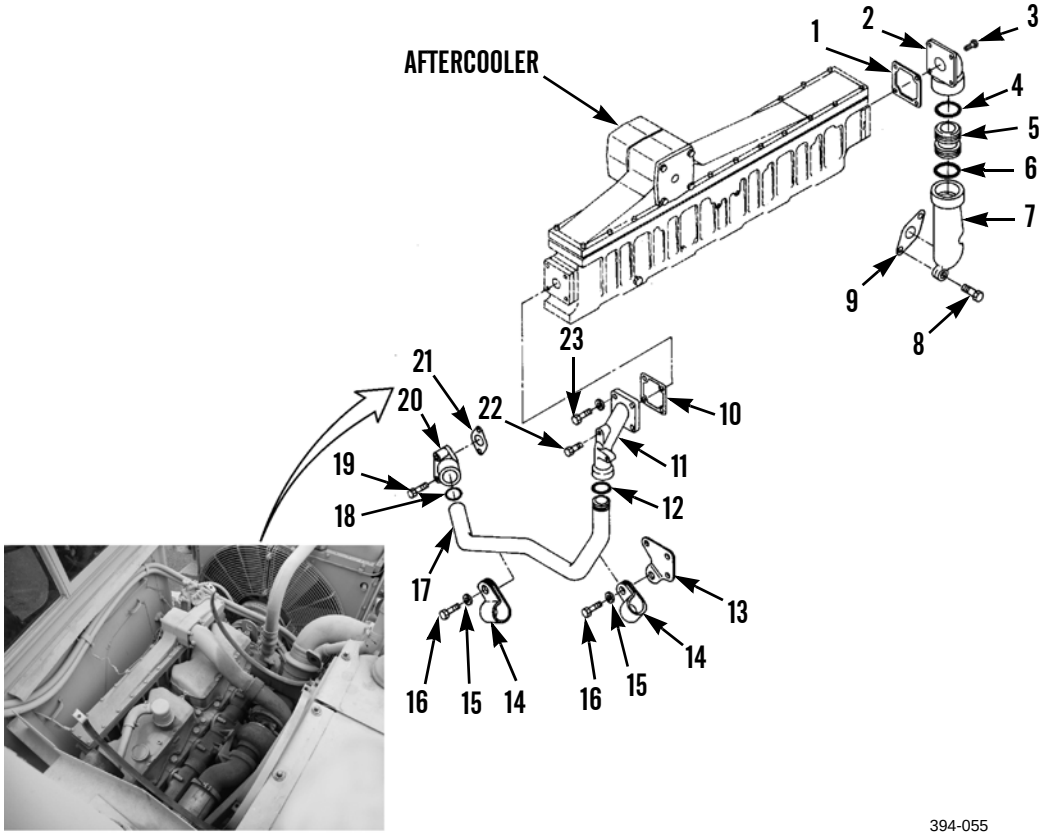
AFTERCOOLER WATER LINES AND FITTINGS REPLACEMENT - CONTINUED 0047 00

REMOVAL - CONTINUED

NOTE

All hose and tube assemblies must be tagged prior to removal to ensure correct installation.

1. Remove four bolts (3) from aftercooler.
2. Remove elbow (2) from aftercooler.
3. Remove and discard gasket (1).
4. Remove two bolts (8).
5. Remove elbow (7) from pipe (5).
6. Remove and discard gasket (9).
7. Remove pipe (5) and preformed packings (4 and 6). Discard preformed packings.
8. Remove five bolts (16), washers (15), two clips (14) and bracket (13) from cylinder head.
9. Remove four bolts (23) two bolts (19) and tube assembly (17) with elbows (20 and 11) attached.
10. Remove and discard gaskets (10 and 21).
11. Remove plug (22) from elbow (11).
12. Remove elbow (11) and preformed packing (12). Discard preformed packing.
13. Remove elbow (20) and preformed packing (18) from tube assembly (17). Discard preformed packing.



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Inspect all parts for damage and replace as necessary.
4. Dry all parts with compressed air.

INSTALLATION

NOTE

Lightly coat new preformed packing with clean coolant prior to installation.

1. Install preformed packings (12 and 18) and elbows (11 and 20) on ends of tube assembly (17).
2. Install new gaskets (10 and 21), tube assembly (17), four bolts (23) and two bolts (19).
3. Install plug (22) in elbow (11).
4. Install bracket (13), two clips (14), five washers (15) and bolts (16) on cylinder head.
5. Install preformed packings (4 and 6) and elbows (7 and 2) on pipe (5).
6. Install new gasket (1) and four bolts (3).
7. Install new gasket (9) and four bolts (8).
8. Install muffler (WP 0041 00).
9. Refill coolant (WP 0042 00).
10. Install hood (WP 0189 00).

END OF WORK PACKAGE

WATER PUMP LINES AND FITTINGS, AND ENGINE OIL COOLER WATER LINES AND FITTINGS REPLACEMENT 0048 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze, permanent (Item 4 or 5, WP 0339 00)

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Sealant, silicone (Item 38, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Gasket

Packing, preformed (3)

Equipment Condition

Air cleaner removed (WP 0031 00)

Muffler removed (WP 0041 00)

Coolant drained (WP 0042 00)

Hood removed (WP 0189 00)

Thermostat housing and tube removed (WP 0046 00)

Aftercooler lines disconnected from oil cooler (WP 0047 00)

REMOVAL

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

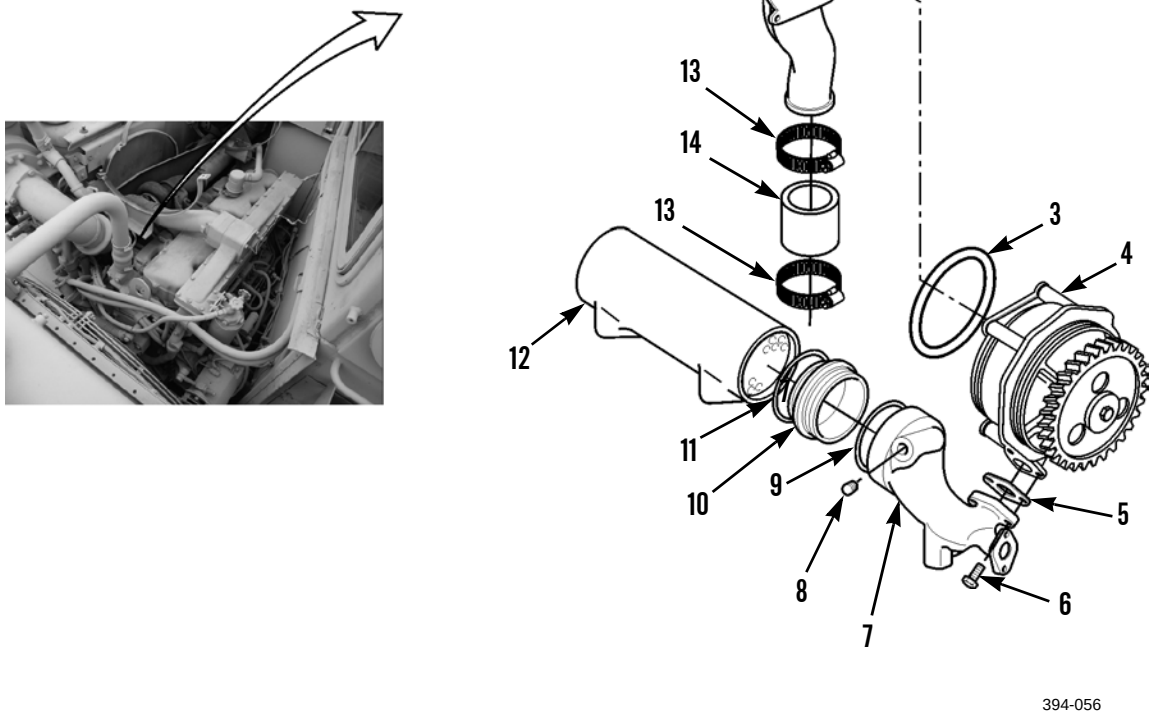
WATER PUMP LINES AND FITTINGS, AND ENGINE OIL COOLER WATER LINES AND FITTINGS REPLACEMENT - CONTINUED **0048 00**

REMOVAL - CONTINUED

NOTE

All hose and tube assemblies must be tagged prior to removal to ensure correct installation.

1. Loosen two clamps (13).
2. Remove four bolts (1), cover (2), two clamps (13), preformed packing (3) and hose (14). Discard preformed packing.
3. Remove two bolts (6), gasket (5) and preformed packing (3) from water pump (4). Discard gasket packing.
4. Remove oil cooler bonnet (7) and preformed packing (9) from adapter (10). Discard preformed packing.
5. Remove plug (8) from bonnet (7).
6. Remove adapter (10) and preformed packing (11) from oil cooler (12). Discard preformed packing.



CLEANING AND INSPECTION

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Lightly coat new preformed packings with clean coolant prior to installation.

1. Apply silicone sealant to threads on plug (8) and install in bonnet (7).
2. Apply silicone sealant to threads of adapter (10) and install new preformed packing (11) in oil cooler (12).
3. Install new preformed packing (9) and oil cooler bonnet (7) on adapter (10).
4. Install new preformed packing (3), gasket (5) and two bolts (6) on water pump (4).
5. Install hose (14), two clamps (13), water pump cover (2) and four bolts (1).
6. Tighten two clamps (13).
7. Install aftercooler lines disconnected from oil cooler (WP 0047 00).
8. Install thermostat housing and tube (WP 0046 00).
9. Install air cleaner (WP 0031 00).
10. Install muffler (WP 0041 00).
11. Refill coolant (WP 0042 00).
12. Install hood (WP 0189 00).

END OF WORK PACKAGE

RADIATOR HOSES REPLACEMENT 0049 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze, permanent (Item 4 or 5, WP 0339 00)

Cap set, protective (Item 6, WP 0339 00)

Materials/Parts - Continued

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket (2)

Equipment Condition

Muffler removed (WP 0041 00)

Coolant drained (WP 0042 00)

REMOVAL

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

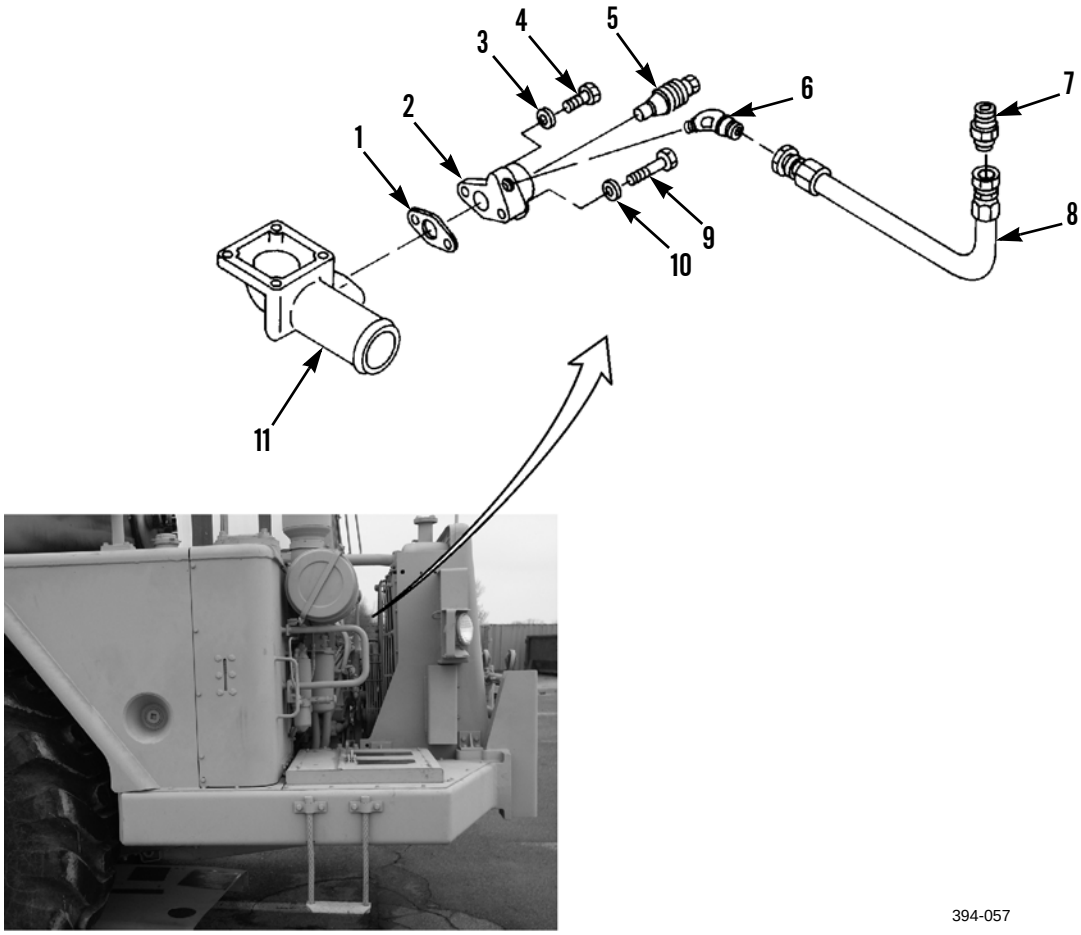
Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

REMOVAL - CONTINUED

NOTE

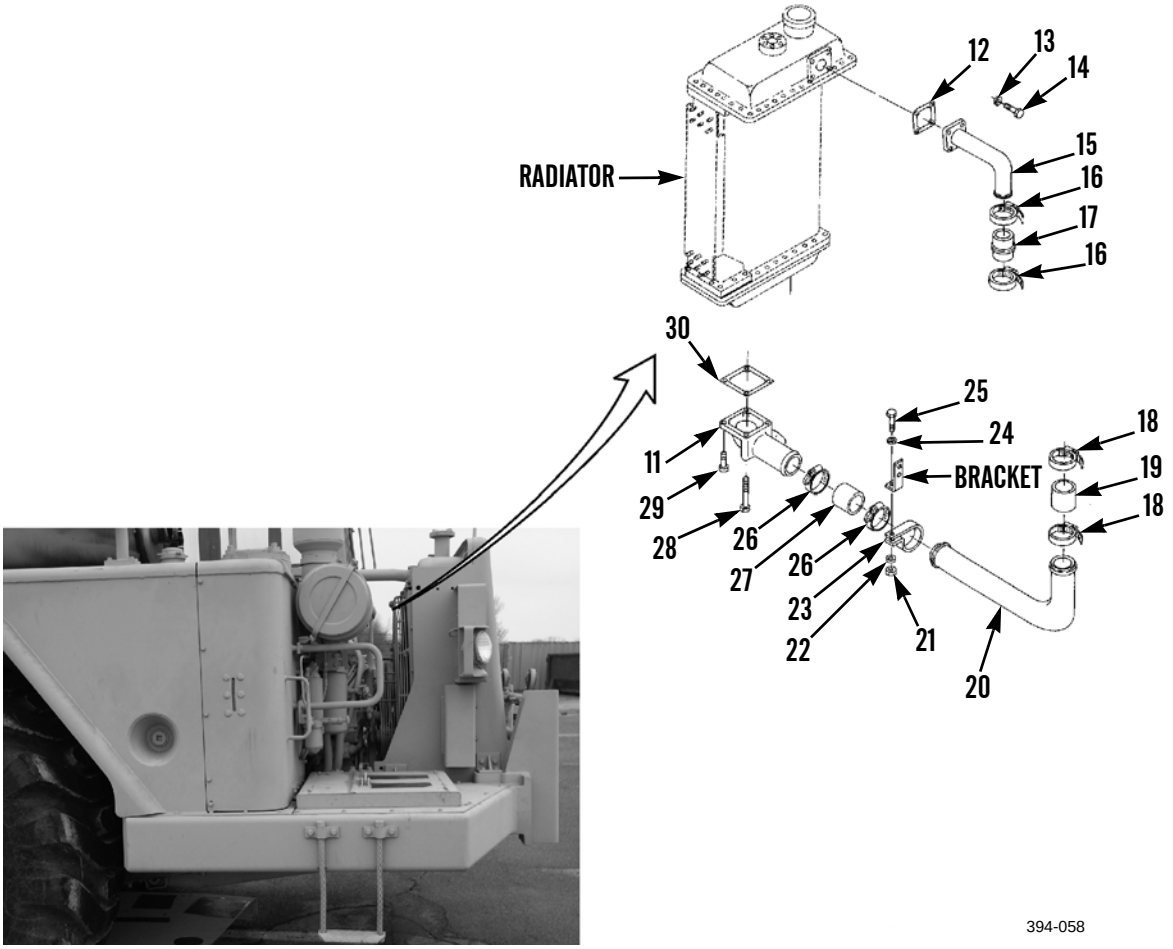
All hose and tube assemblies must be tagged prior to removal to ensure correct installation.

1. Remove hose (8) from adapter (7) and fitting (6).
2. Remove fitting (6) from adapter (2).
3. Remove drain valve (5) from adapter (2).
4. Remove bolts (4 and 9), washers (3 and 10), adapter (2) and gasket (1) from elbow (11). Discard gasket.



REMOVAL - CONTINUED

5. Loosen two clamps (26) and remove bolt (28), three bolts (29), elbow (11) and gasket (30) from bottom of radiator. Discard gasket.
6. Remove two clamps (26) and hose (27).
7. Remove nut (21), washer (22), bolt (25), washer (24) and clamp (23) from bracket.
8. Loosen two clamps (18) and remove tube (20), clamps and hose (19).
9. Loosen two clamps (16) and remove hose (17) and clamps from tube (15).
10. Remove four bolts (14), washers (13), tube (15) and gasket (12) from radiator. Discard gasket.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

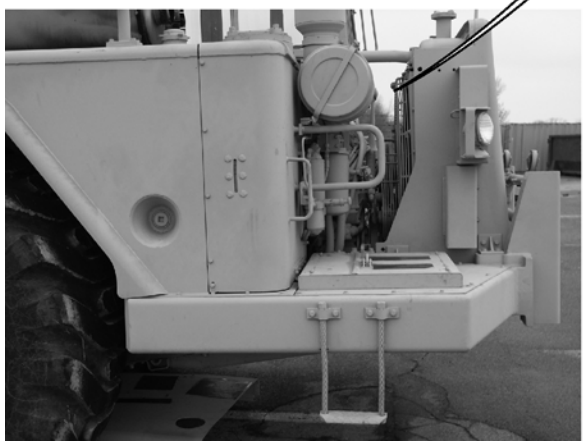
1. Remove gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

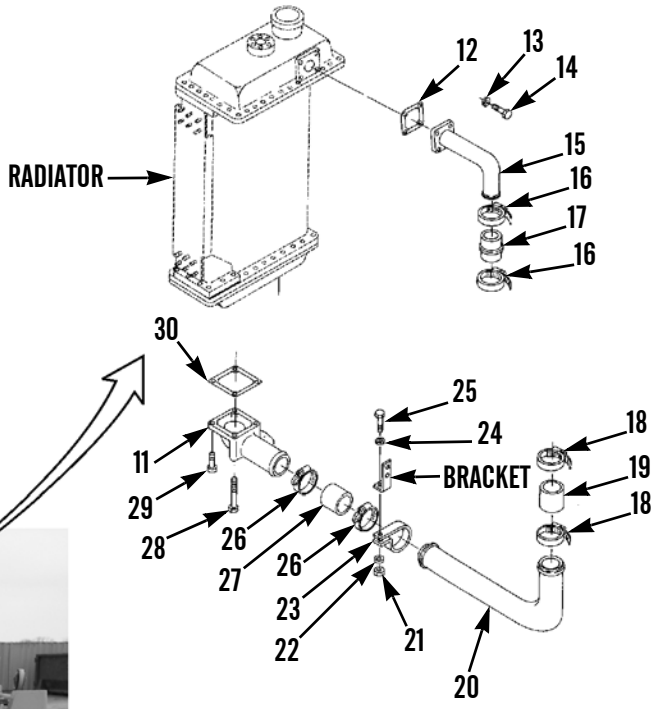
INSTALLATION

1. Install new gasket (12), tube (15), four washers (13), and bolts (14) on radiator.
2. Install two clamps (16) and hose (17).
3. Loosely install two clamps (18) and hose (19) on tube (20).
4. Install tube (20), clamp (23), washer (24), bolt (25), washer (22) and nut (21) in bracket.
5. Loosely install two clamps (26) and hose (27) on tube (20).

INSTALLATION - CONTINUED

6. Install elbow (11), new gasket (30), bolt (28) and three bolts (29) on bottom of radiator. Tighten two clamps (26) and two clamps (18).





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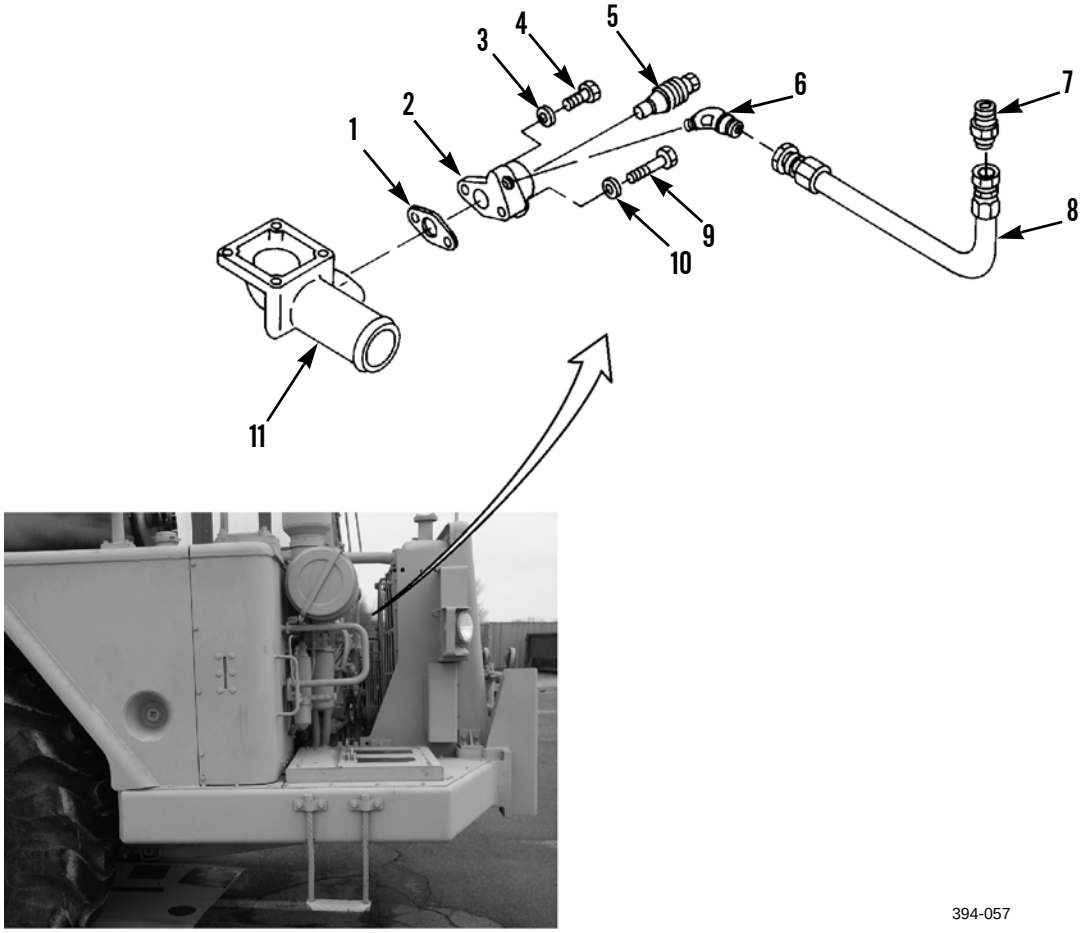
INSTALLATION - CONTINUED

7. Install new gasket (1), adapter (2), washers (3 and 10), and bolts (4 and 9) on elbow (11).
8. Install drain valve (5) in adapter (2).
9. Install fitting (6) in adapter (2).
10. Install hose (8) on fitting (6) and adapter (7).



11. Install muffler (WP 0041 00).
12. Refill coolant (WP 0042 00).

END OF WORK PACKAGE

COOLANT FILTER REPLACEMENT 0050 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113 WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Antifreeze, permanent (Item 4 or 5, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Right side engine compartment access door removed (WP 0190 00)

Coolant drained (WP 0042 00)

REMOVAL

WARNING

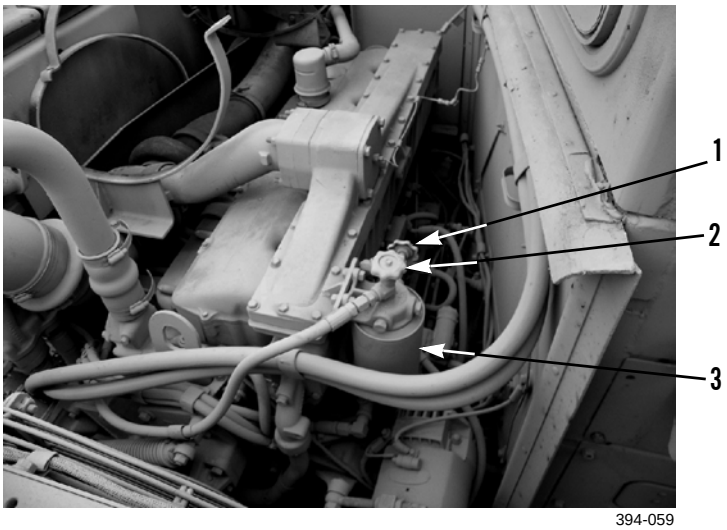
- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Cooling system conditioner contains alkali. Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL - CONTINUED

NOTE

All hose and tube assemblies must be tagged prior to removal to ensure correct installation.

1. Close inlet valve (2) and outlet valve (1) on left front of engine.
2. Remove and discard coolant filter (3).



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INSTALLATION

CAUTION

Use a coolant condition element to treat plain water or antifreeze. Use precharge filter whenever coolant is changed. Do not use both the liquid cooling system conditioner and the coolant conditioner element at the same time.

1. Lubricate new coolant filter (3) seal lightly with coolant.
2. Install new coolant filter. Refer to PMCS (WP 0019 00) for correct filter element selection.
3. Turn new coolant filter until seal seats with base assembly. Tighten an additional 3/4 turn.
4. Open inlet valve (2) and outlet valve (1) on left front engine.
5. Refill coolant (WP 0042 00).
6. Install right side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

COOLANT FILTER MOUNTING, HOSES AND FITTINGS REPLACEMENT 0051 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Sealant, silicone (Item 38, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Hood removed (WP 0189 00)

Coolant drained (WP 0042 00)

Coolant filter removed (WP 0050 00)

REMOVAL

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.
- Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

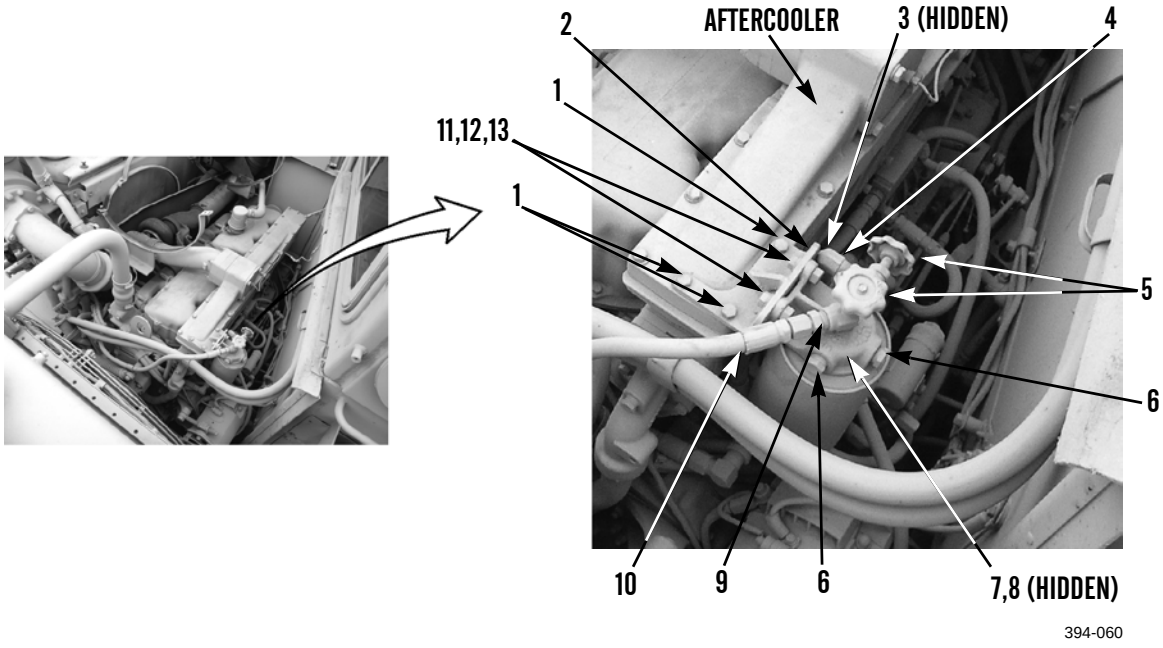
Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

REMOVAL - CONTINUED

NOTE

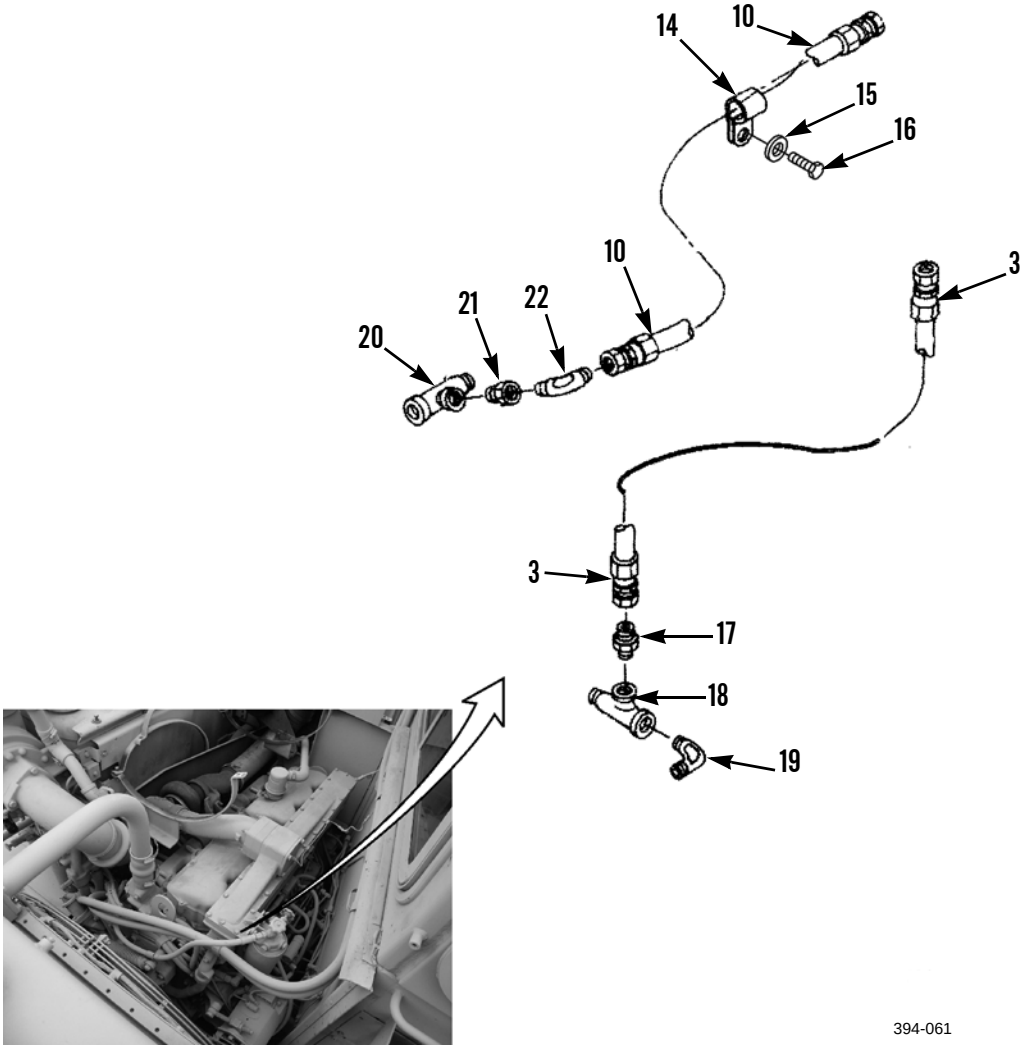
All hose and tube assemblies must be tagged prior to removal to ensure correct installation.

1. Disconnect hose assembly (3) from elbow (4) on left side of engine compartment.
2. Disconnect hose assembly (10) from adapter (9).
3. Remove adapter (9) and elbow (4) from two valves (5).
4. If damaged, remove two plugs (6) from housing (7).
5. Remove two valves (5) from housing (7).
6. Remove pin (8) from bottom of housing (7).
7. Remove two nuts (11), washers (12), bolts (13) and housing (7) from bracket (2).
8. Remove three bolts (1) and bracket (2) from top of aftercooler.



REMOVAL - CONTINUED

9. Remove bolt (16), washer (15) and clip (14) from hose (10).
10. Remove hose (10) from elbow (22).
11. Remove elbow (22) from bushing (21).
12. Remove bushing (21) from tee (20).
13. Remove tee (20).
14. Remove hose (3) from adapter (17).
15. Remove adapter (17) from tee (18).
16. Remove tee (18) from elbow (19).
17. Remove elbow (19).



CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

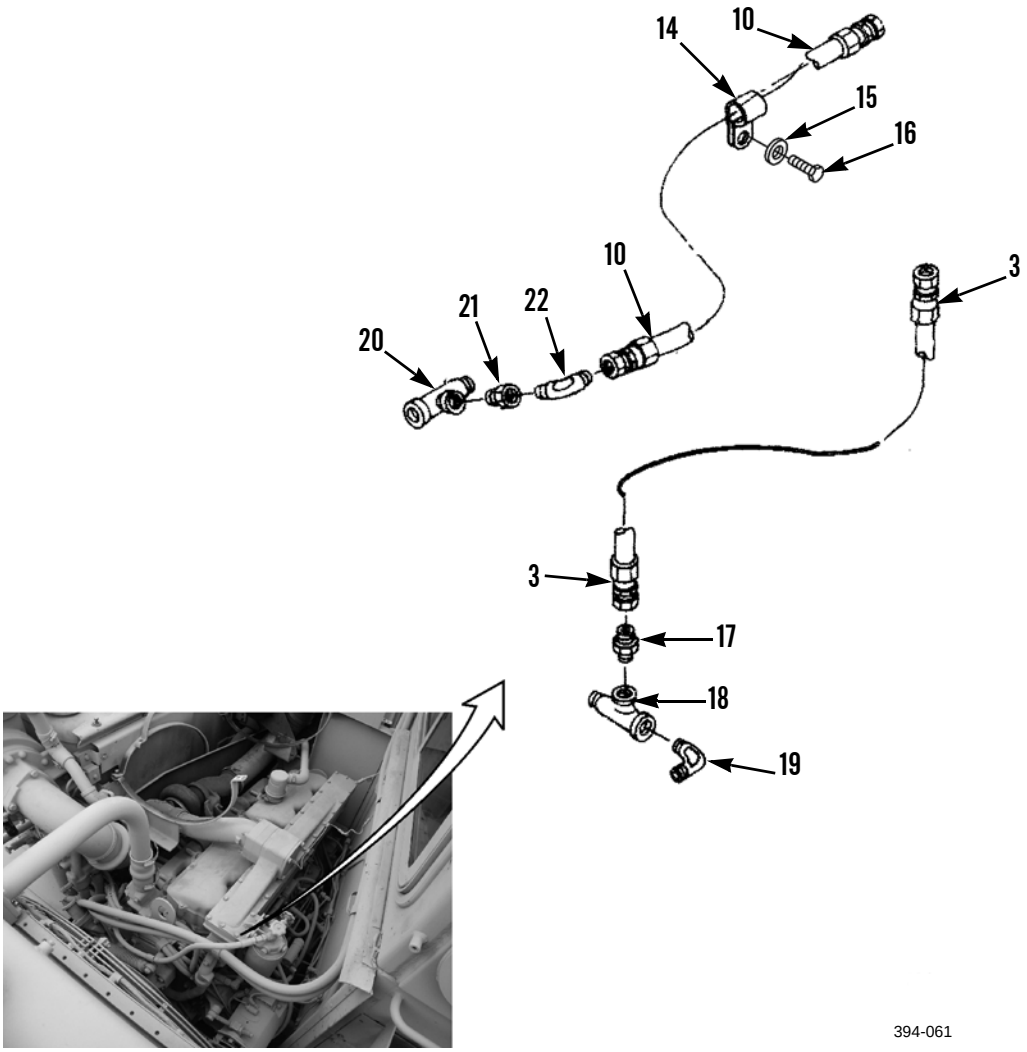
1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install elbow (19).
2. Install tee (18) on elbow (19).
3. Install adapter (17) on tee (18).
4. Install hose (3) on adapter (17).
5. Install tee (20).
6. Install bushing (21) on tee (20).
7. Install elbow (22) on bushing (21).

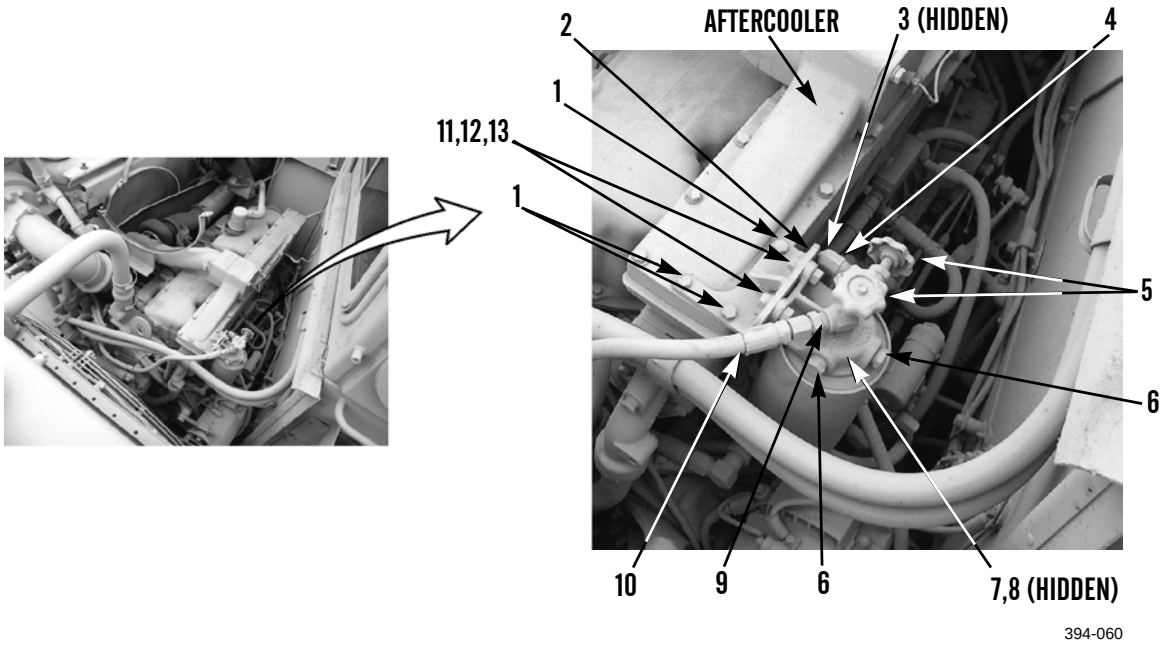
INSTALLATION - CONTINUED

8. Install hose (10) on elbow (22).
9. Position clip (14) around hose (10) and secure to fan support with washer (15) and bolt (16).



INSTALLATION - CONTINUED

10. Install bracket (2) and three bolts (1) on top of aftercooler.
11. Install housing (7) with two bolts (13) washers (12), and nuts (11) on bracket (2).
12. Apply silicone sealant to half of threads on pin (8) and Install on bottom of housing (7).
13. Install two valves (5) on housing (7).
14. If removed, install two plugs (6) in housing (7).
15. Install adapter (9) and elbow (4) from valves (5).
16. Connect hose assembly (10) to adapter (9).
17. Connect hose assembly (3) to elbow (4).



NOTE

Valves must be opened before engine can be operated.

18. Install coolant filter (WP 0050 00).
19. Refill coolant (WP 0042 00).
20. Install hood (WP0189 00).

END OF WORK PACKAGE

WATER PUMP REPLACEMENT 0052 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (2)

Gasket

Personnel Required

Two

Equipment Condition

Oil gage and guide assembly removed (WP 0024 00)

Oil filler tube assembly removed (WP 0025 00)

Water pump lines and fittings and engine oil cooler, water lines and fittings removed (WP 0048 00)

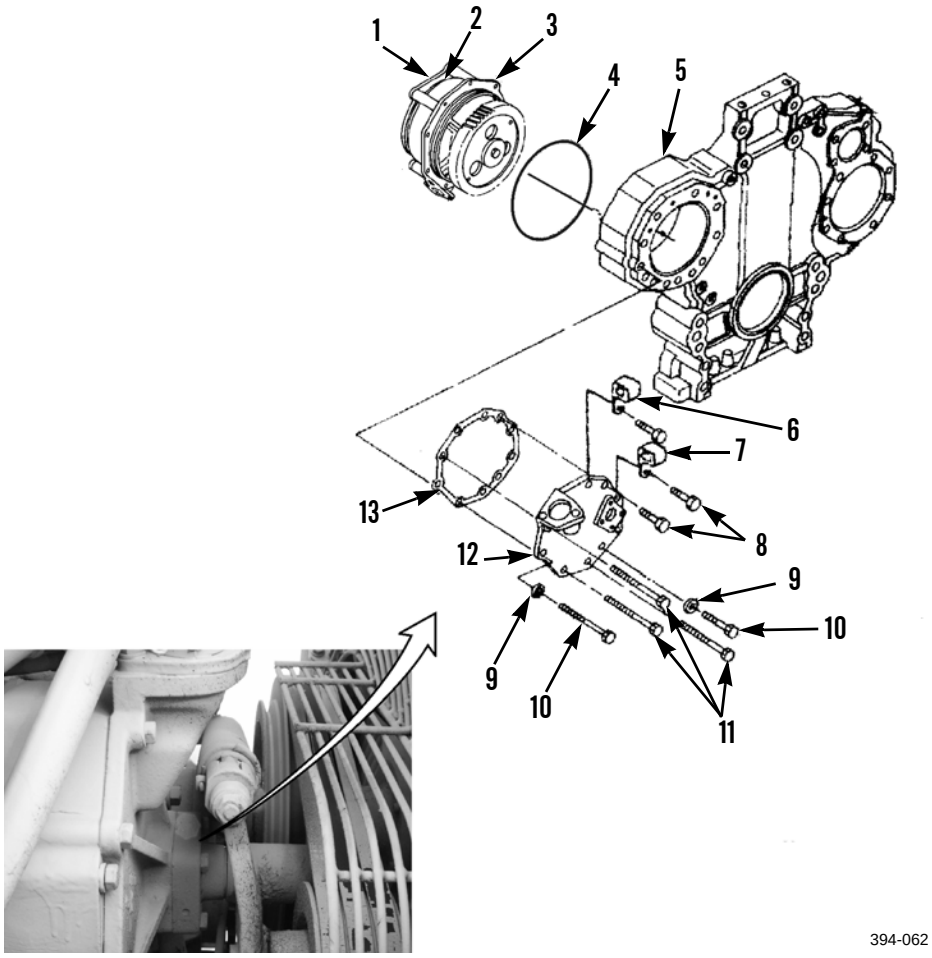
Radiator hoses disconnected from water pump cover (WP 0049 00)

Fan belt tightener removed (WP 0054 00)

WATER PUMP REPLACEMENT - CONTINUED 0052 00

REMOVAL

1. Remove four bolts (8) and clips (6 and 7).
2. Remove three bolts (11).
3. Remove two bolts (10) and washers (9).
4. Remove cover (12) and gasket (13) from front cover (5). Discard gasket.
5. Remove water pump (3) from front cover (5).
6. Remove rear cover (1) and preformed packing (2) from water pump (3). Discard preformed packing.
7. Remove preformed packing (4) from water pump (3). Discard preformed packing.



CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new preformed packing (4) on water pump (3).
2. Install new preformed packing (2) and rear cover (1) on water pump (3).
3. Install water pump (3) in front cover (5).
4. Install new gasket (13) and cover (12) on front cover (5).
5. Install washers (9) and two bolts (10).
6. Install three bolts (11).
7. Install clips (6 and 7) and four bolts (8).
8. Install oil gage and guide assembly (WP 0024 00).
9. Install oil filler tube assembly (WP 0025 00).
10. Install water pump lines and fittings and engine oil cooler water lines and fittings (WP 0048 00).
11. Install radiator hoses (WP 0049 00).
12. Install fan belt tightener (WP 0054 00).

END OF WORK PACKAGE

FAN BELTS MAINTENANCE 0053 00

THIS WORK PACKAGE COVERS

Removal, Inspection, Installation/Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

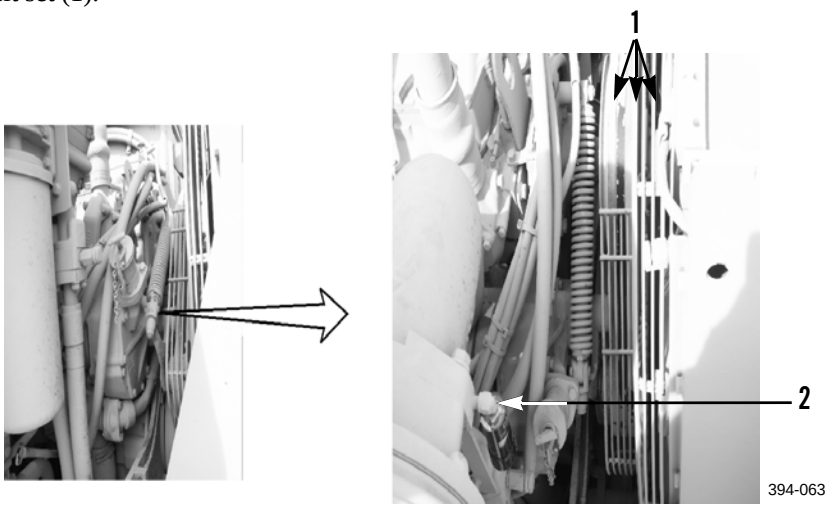
Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Radiator fan shield assembly removed (WP 0045 00)

REMOVAL

1. Loosen nut (2) on eyebolt to remove tension from V-belt set on front, right side of tractor.
2. Remove V-belt set (1).



INSPECTION

Inspect belts for cracking or wear. Replace as necessary.

INSTALLATION/ADJUSTMENT

NOTE

Always replace V-belts as a complete set.

1. Install V-belt set (1) on belt tensioner arm.
2. Tighten nut (2) to adjust belt deflection to 9/16 in. (14 mm) under 25 lb-ft (34 Nm) force halfway between belt tensioner arms.
3. Install radiator fan shield assembly (WP 0045 00).

END OF WORK PACKAGE

FAN BELTS TENSIONER MAINTENANCE 0054 00

THIS WORK PACKAGE COVERS

Shock Absorber Type: Removal, Installation, Disassembly, Cleaning and Inspection, Assembly

Hook-and-Eye Type: Removal, Installation, Disassembly, Cleaning and Inspection, Assembly

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Cotter pin

Gasket

Seal

Equipment Condition

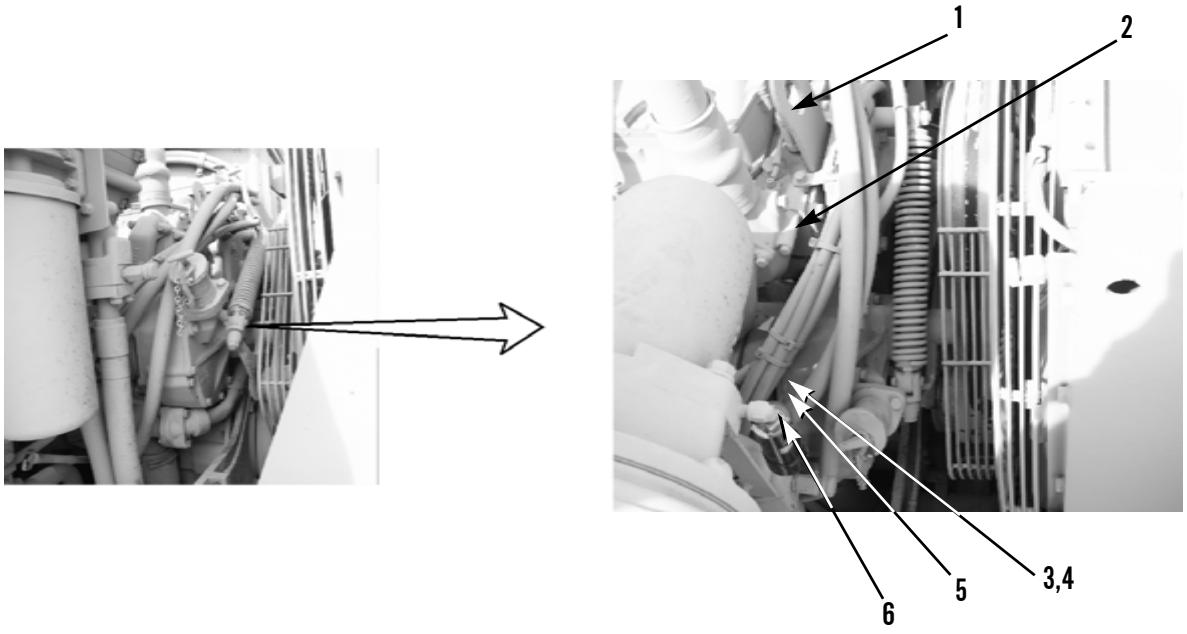
Fan belts removed (WP 0053 00)

SHOCK ABSORBER TYPE REMOVAL

WARNING

- Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions may cause injury.
- Some components are under spring tension. Wear eye protection and use extreme caution when disassembling them to avoid injury.
- Do not disassemble the tensioner spring assembly (2). Failure to follow this warning could result in injury or damage to equipment.

1. Remove nut (6), pin (4), cotter pin (3) and stud (5). Discard cotter pin.
2. Remove nut (1) and tensioner spring assembly (2).



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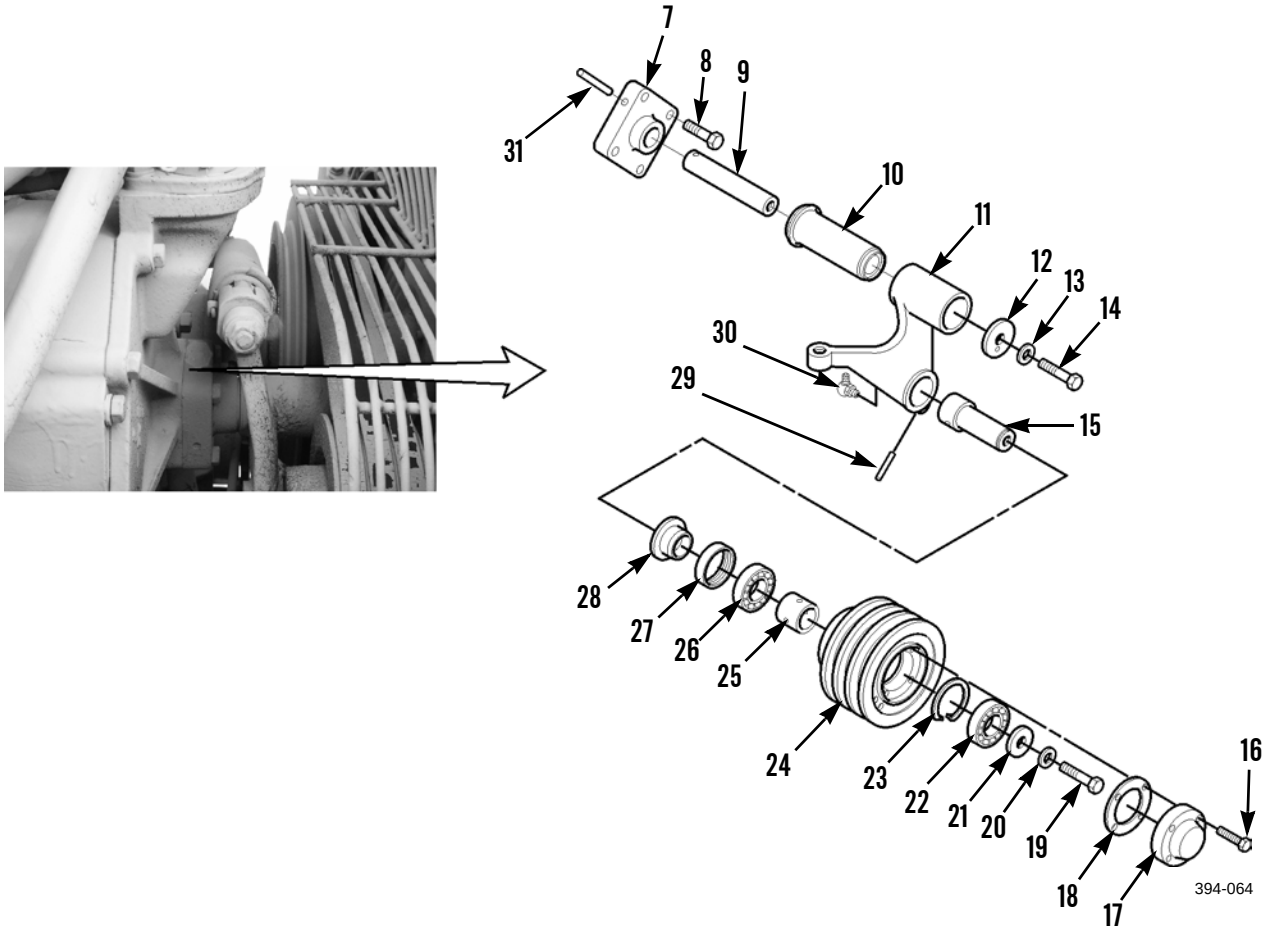
3. Remove four bolts (8) and tensioner arm (11) assembly from front of engine.

SHOCK ABSORBER TYPE INSTALLATION

Install tensioner arm (11) assembly and four bolts (8).

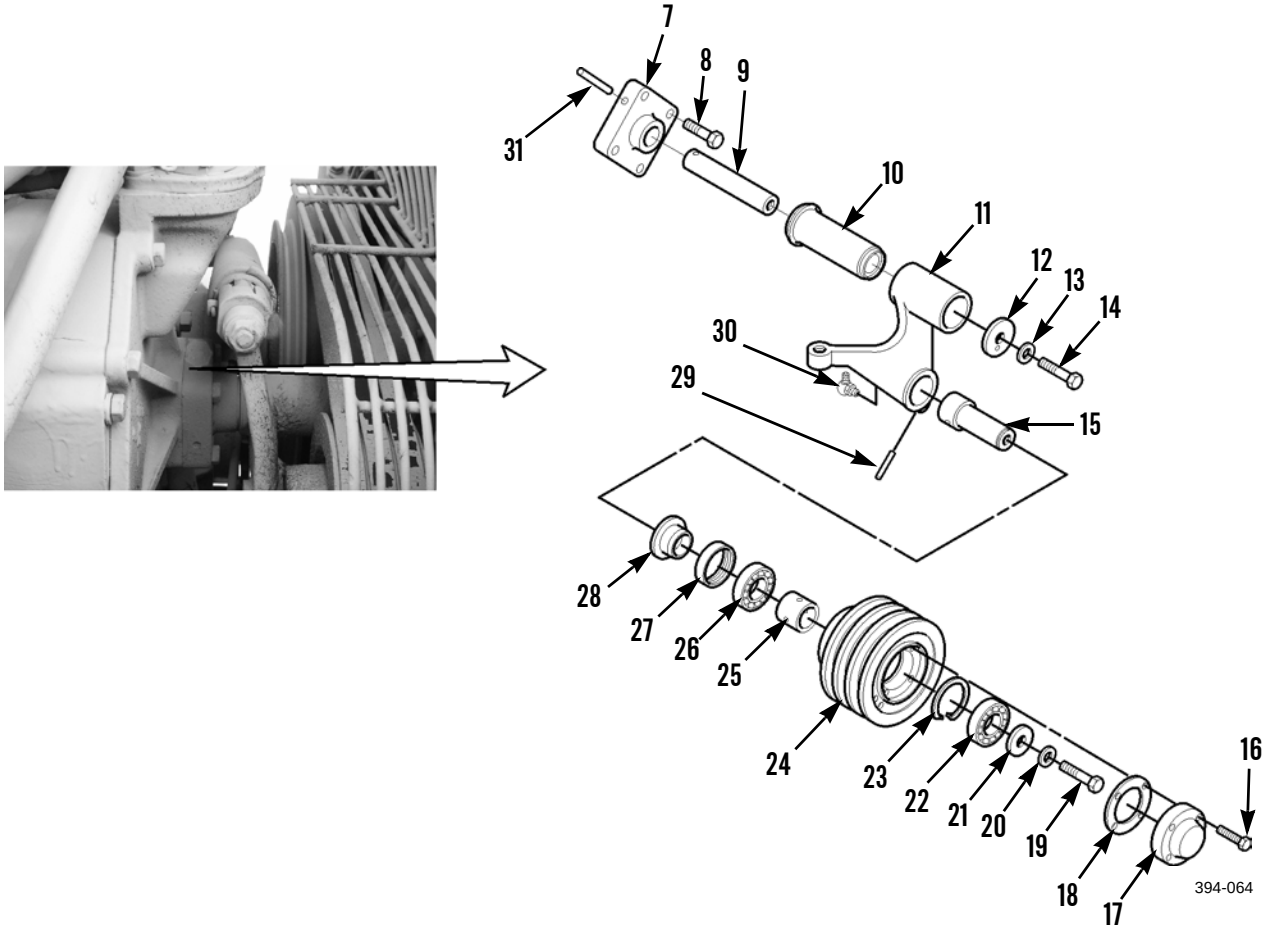
SHOCK ABSORBER TYPE DISASSEMBLY

1. Remove four bolts (16), cover (17) and gasket (18). Discard gasket.
2. Remove bolt (19), washers (20 and 21) and bearing (22).
3. Remove pulley assembly (24) from tensioner arm (11).
4. Remove retaining ring (23), spacer (25), bearing (26), seal (27) and spacer (28) from pulley (24). Discard seal.
5. Remove pin (29), shaft (15) and fitting (30) from tensioner arm (11).
6. Remove bolt (14), washer (13) and retainer (12).
7. Remove pin (31) and flange (7).
8. Remove shaft (9) and bushing (10) for tensioner (11).



SHOCK ABSORBER TYPE DISASSEMBLY - CONTINUED

9. Remove shaft (9) and bushing (10) from tensioner arm (11).



SHOCK ABSORBER TYPE CLEANING AND INSPECTION

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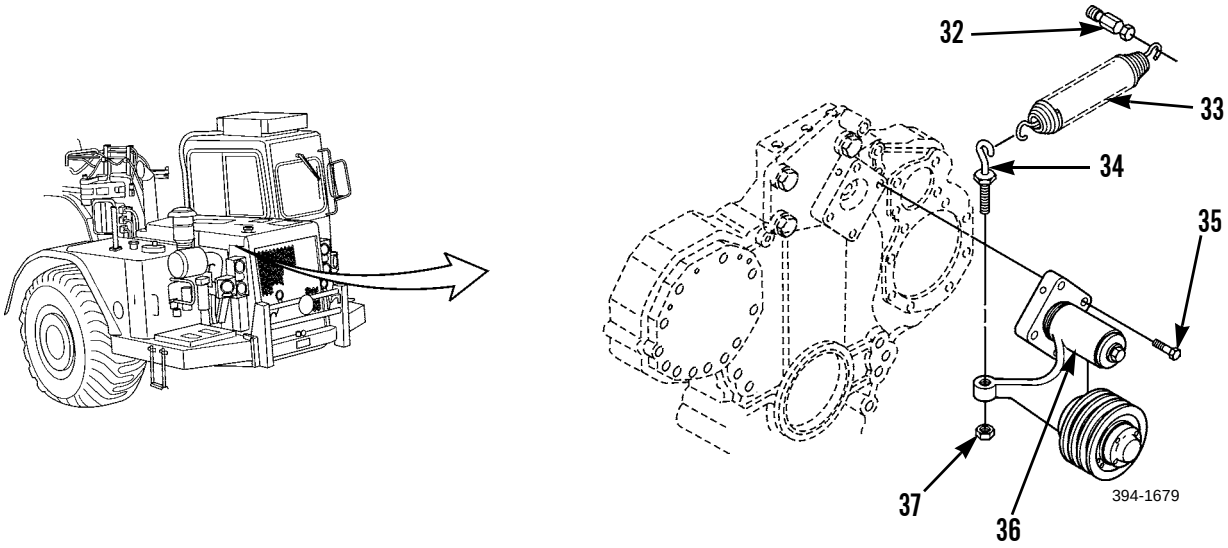
1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

SHOCK ABSORBER TYPE ASSEMBLY

1. Install bushing (10) and shaft (9) in tensioner arm (11).
2. Install flange (7) and pin (31).
3. Install retainer (12), washer (13) and bolt (14) in tensioner arm (11).
4. Install fitting (30), shaft (15) and pin (29).
5. Install spacer (28), new seal (27), bearing (26) and spacer (25) in pulley (24).
6. Install retainer ring (23) in pulley (24).
7. Install pulley (24) assembly on arm (11).
8. Install bearing (22), washer (21 and 20) and bolt (19).
9. Install new gasket (16), cover (17) and four bolts (18).

HOOK-AND-EYE TYPE REMOVAL

1. Remove nut (37), eyebolt (34, spring (33) and bolt (32).
2. Remove four bolts (35) and tensioner arm (36) assembly.



HOOK-AND-EYE TYPE INSTALLATION

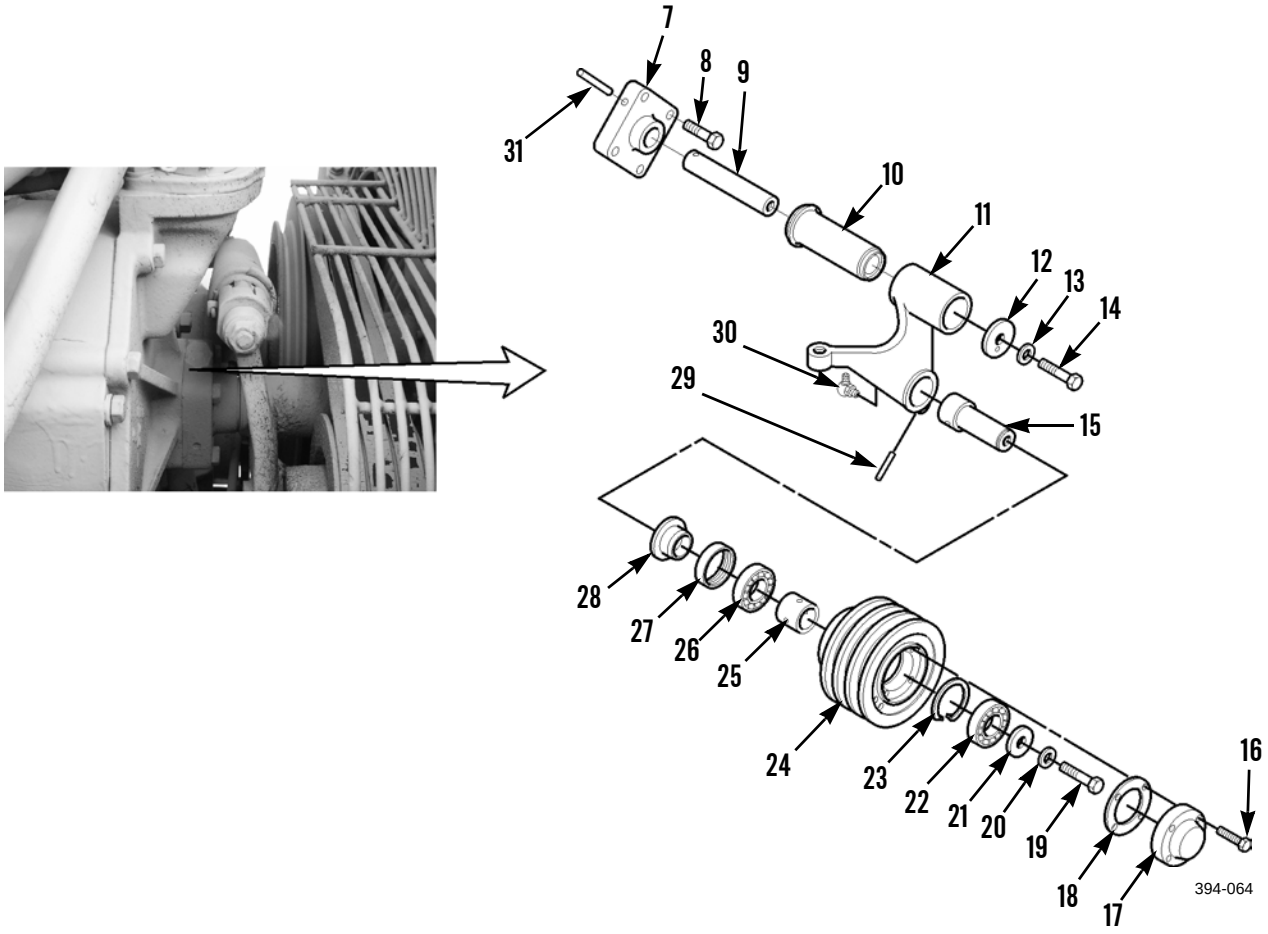
1. Install tensioner arm (36) and 4 bolt (35).
2. Install eyebolt (34) and nut (37).
3. Install tensioner spring assembly (33) on bolt (32) and eyebolt (34).
4. Install fan belts (WP 0053 00).

HOOK-AND-EYE TYPE DISASSEMBLY

1. Remove four bolts (16), cover (17) and gasket (18). Discard gasket.
2. Remove bolt (19), washers (20 and 21) and bearing (22).
3. Remove pulley assembly (24) from tensioner arm (11).

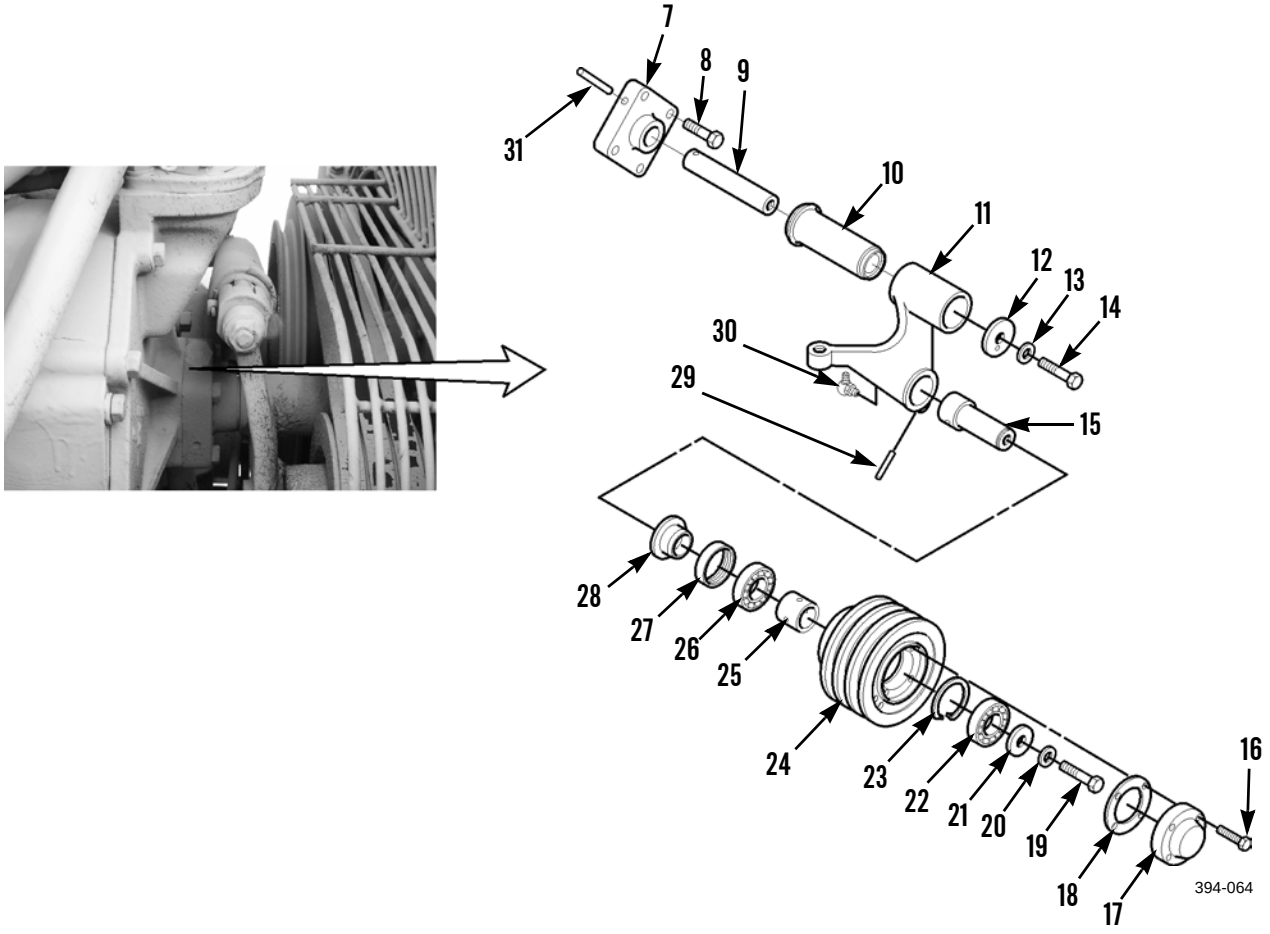
HOOK-AND-EYE TYPE DISASSEMBLY - CONTINUED

4. Remove retaining ring (23), spacer (25), bearing (26), seal (27) and spacer (28) from pulley (24). Discard seal.
5. Remove pin (29), shaft (15) and fitting (30) from tensioner arm (11).
6. Remove bolt (14), washer (13) and retainer (12).
7. Remove pin (31) and flange (7).
8. Remove shaft (9) and bushing (10) for tensioner (11).



HOOK-AND-EYE TYPE DISASSEMBLY - CONTINUED

9. Remove shaft (9) and bushing (10) from tensioner arm (11).



HOOK-AND-EYE TYPE CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

HOOK-AND-EYE TYPE ASSEMBLY

1. Install bushing (10) and shaft (9) in tensioner arm (11).
2. Install flange (7) and pin (31).
3. Install retainer (12), washer (13) and bolt (14) in tensioner arm (11).
4. Install fitting (30), shaft (15) and pin (29).
5. Install spacer (28), new seal (27), bearing (26) and spacer (25) in pulley (24).
6. Install retainer ring (23) in pulley (24).
7. Install pulley (24) assembly on arm (11).
8. Install bearing (22), washer (21 and 20) and bolt (19).
9. Install new gasket (16), cover (17) and four bolts (18).

END OF WORK PACKAGE

ALTERNATOR REPLACEMENT 0055 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

WP 0190 00

Personnel Required

Two

Equipment Condition

Alternator belt removed (WP 0056 00)

Battery cables disconnected (WP 0104 00)

Radio interference suppressor removed (WP 0124 00)

WARNING

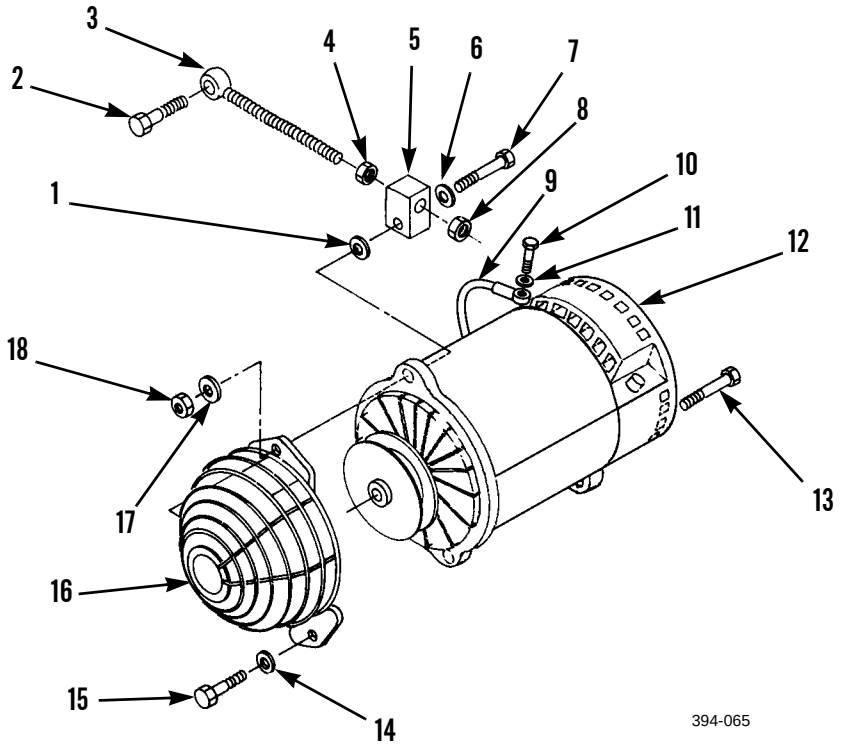
- Ensure battery cables are disconnected before replacing alternator. Failure to follow this warning may cause injury or damage to equipment.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in injury or death.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove bolt (10), washer (11) and wire (9).
2. Remove bolt (7), washers (1, 6 and 17) and nut (18) from alternator (12).
3. Remove bolt (15), washer (14) and guard (16) from alternator (12).
4. Remove bolt (13) and alternator (12) from engine.
5. Remove nut (4), remote control lever (5) and nut (8) from rod (3).
6. Remove bolt (2) and rod (3) from engine.

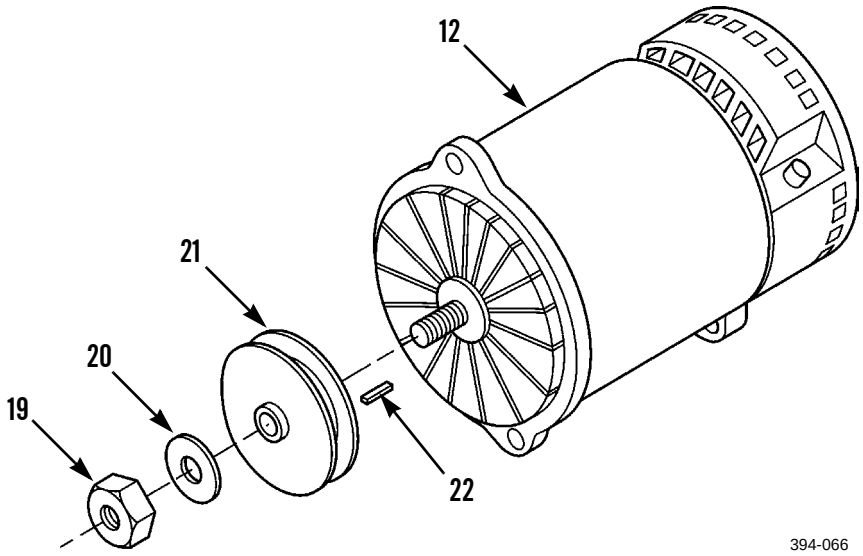


REMOVAL - CONTINUED

NOTE

Perform step 7 for Delco Remy Alternator only.

7. Use a 5/16-in. (8-mm) Allen socket to hold the shaft, and remove nut (19), washer (20) and alternator pulley (21).



NOTE

Perform step 8 and 9 for Robert Bosch Alternator only.

8. Remove nut (19), washer (20) and alternator pulley (21).

9. Remove key (22).

INSTALLATION

NOTE

Perform step 1 and 2 for Robert Bosch Alternator only.

1. Position key (22) in shaft keyway and install alternator pulley (21).

2. Install washer (20) and nut (19). Torque nut to 75 lb-ft (102 Nm).

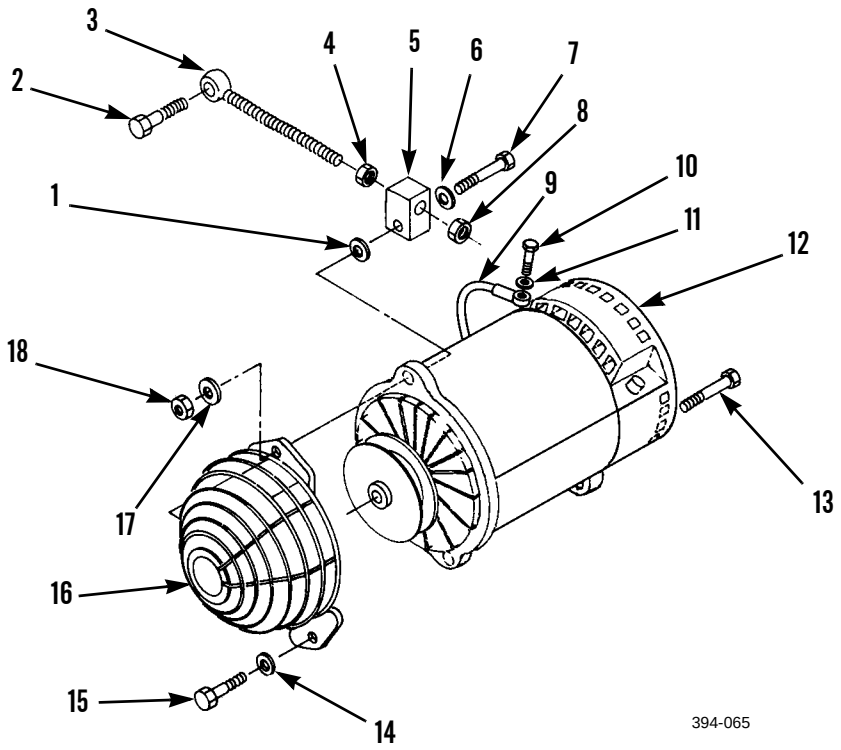
NOTE

Perform step 3 for Delco Remy Alternator only.

3. Use a 5/16-in. (8-mm) Allen socket to hold the shaft, and install alternator pulley (21), washer (20) and nut (19). Torque nut to 80 lb-ft (108 Nm).

INSTALLATION - CONTINUED

4. Loosely install rod (3) and bolt (2) on engine.
5. Loosely install nut (8), remote control lever (5) and nut (4) on rod (3).
6. Using assistance, loosely install alternator (12) and bolt (13) on engine.
7. Loosely install guard (16), washer (14) and bolt (15) on alternator (12).
8. Loosely install washers (1, 6 and 17), bolt (7) and nut (18).
9. Install wire (9), washer (11) and bolt (10).



10. Install radio interference suppressor (WP 0124 00).
11. Install alternator belt (WP 0056 00).
12. Install battery cables (WP 0104 00).
13. Install door assembly (WP 0190 00).

END OF WORK PACKAGE

ALTERNATOR BELT REPLACEMENT 0056 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

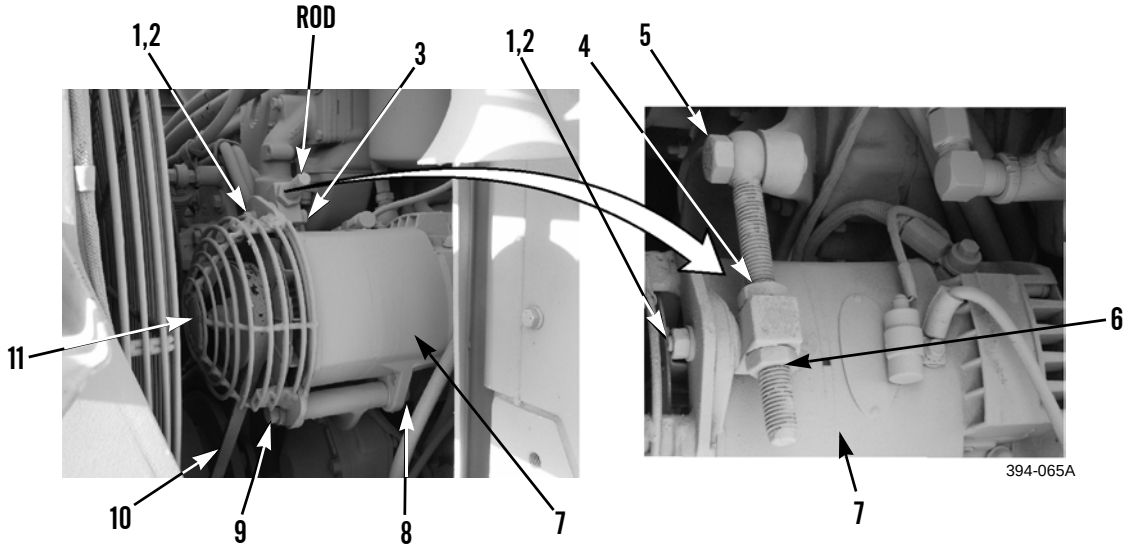
Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Fan belts removed (WP 0053 00)

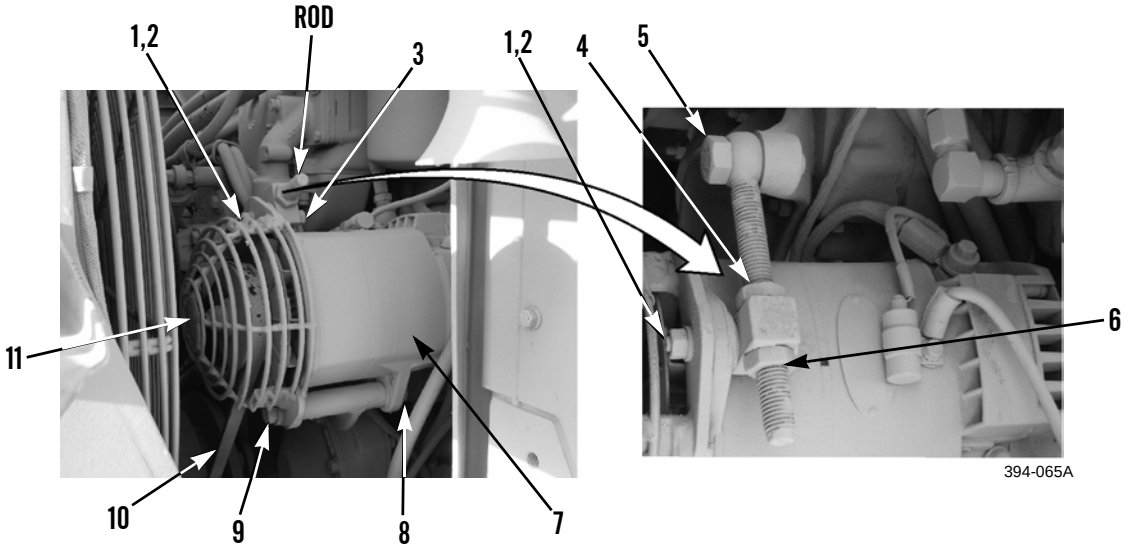
REMOVAL

1. Loosen bolt (5, 8 and 9) and nut (6).
2. Loosen nut (4). Turn nut toward eye of rod and push alternator (7) toward engine to release belt tension.
3. Remove nut (1) and washer (2).
4. Push bolt (3) toward rear of machine and rotate guard assembly (11) clockwise to gain access to alternator pulley.
5. Remove belt (10).



INSTALLATION

1. Install alternator belt (10).
2. Rotate guard assembly (11) counterclockwise to align guard with bolt (3).
3. Loosely install nut (1) and washer (2) on bolt (3).
4. Tighten nut (4).
5. Using a 6-in. scale at midpoint between pulleys, adjust nuts (4 and 6) to achieve 7/8” (2.2 cm) of deflection on belt. Use your hand with moderate amount of force to measure belt deflection.
6. Tighten nut (6), bolts (3, 5, 8 and 9).



7. Install fan belts (WP 0053 00).

END OF WORK PACKAGE

STARTING MOTOR REPLACEMENT 0057 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Lifting device, 100 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Gasket

Lockwasher (5)

References

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Crankcase guards removed (WP 0201 00)

Battery cables disconnected (WP 0104 00)

WARNING

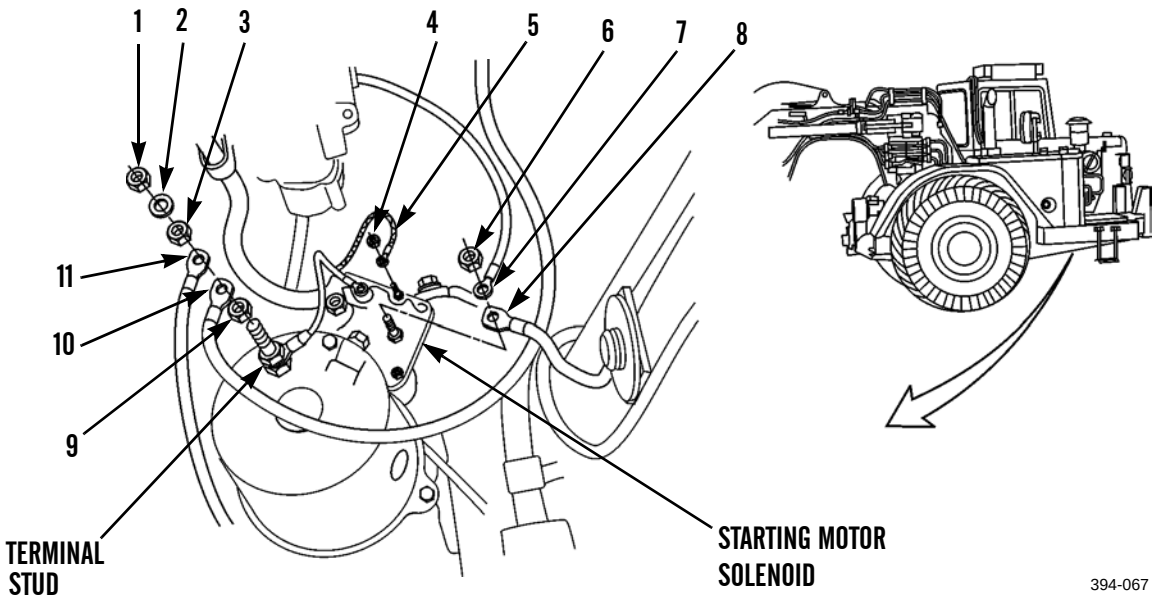
Ensure battery cables are disconnected before replacing alternator. Failure to follow this warning could result in personal injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove nut (6) and disconnect cables (7 and 8) from starting motor solenoid.
2. Remove nut (4) and disconnect wiring harness (5).
3. Remove nut (1), lockwasher (3) and washer (2) from terminal stud. Discard lockwasher.
4. Disconnect cables (11 and 10).
5. Remove lockwasher (9). Discard lockwasher.



REMOVAL - CONTINUED

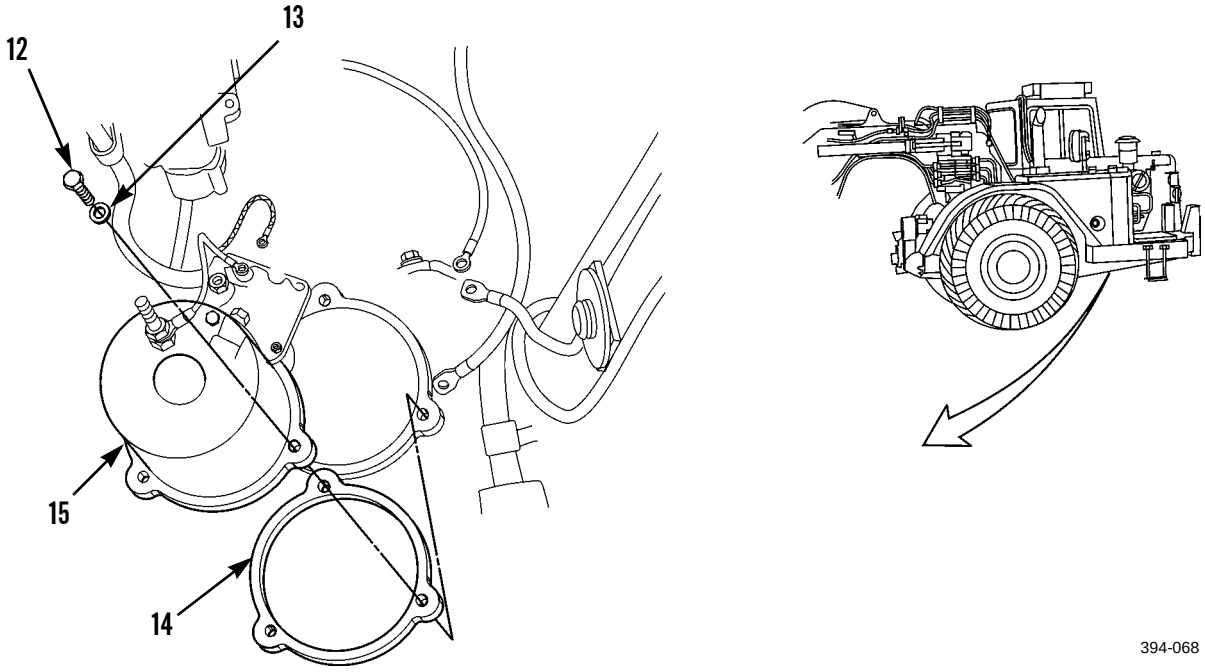
WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Starting motor weighs 77 lb (35 kg).

6. Loosen three bolts (12).
7. Attach lifting device to support starting motor (15).
8. Remove three bolts (12) and washers (13).
9. Remove starting motor (15) and gasket (14). Discard gasket.



INSTALLATION

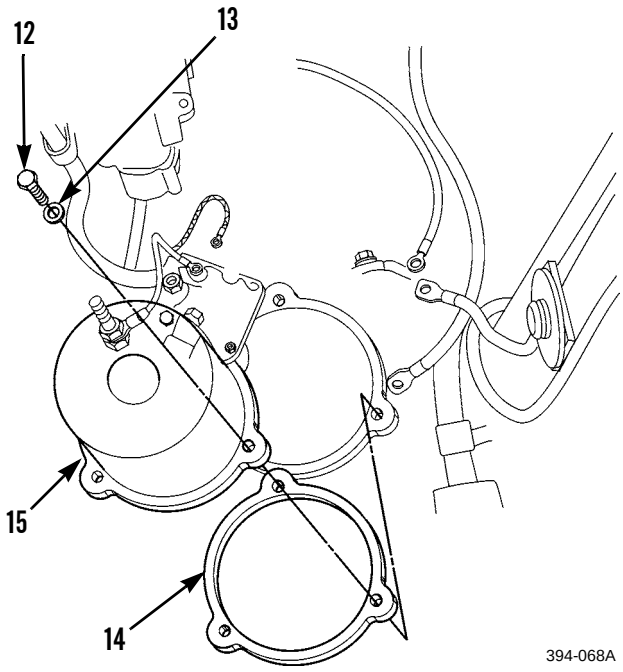
WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

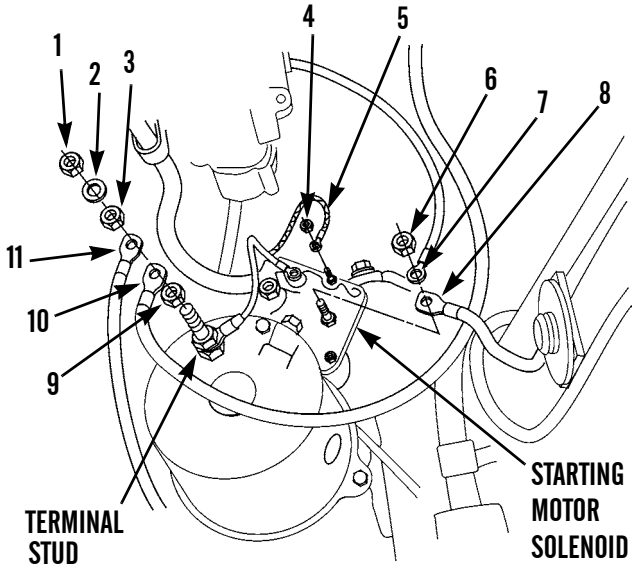
Starting motor weighs 77 lb (35 kg).

1. Position new gasket (14). Attach lifting device and position starting motor (15) in flywheel housing.
2. Install three washers (13) and bolts (12).



INSTALLATION - CONTINUED

3. Install lockwasher (9).
4. Connect cables (11 and 10).
5. Install nut (1), lockwasher (3), and washer (2) on terminal stud.
6. Connect wiring harness (5) and install nut (4).
7. Connect cables (7 and 8) to starting motor solenoid.
8. Install nut (6) on starting motor solenoid and torque to 22 lb-ft (30 Nm).



394-067A

9. Install crankcase guards (WP 0201 00).
10. Connect battery cables (WP 0104 00).
11. Start engine to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

COOLANT TEMPERATURE GAGE AND CONVERTER/RETARDER TEMPERATURE GAGE REPLACEMENT

0058 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (4)

Seal

Equipment Condition

Upper front access plates removed (WP 0192 00)

Battery cables disconnected (WP 0104 00)

NOTE

The following replacement procedure is for the coolant temperature gage and converted retarder gage. The replacement procedure for the converter/retarder temperature gage is identical.

COOLANT TEMPERATURE GAGE AND CONVERTER/RETARDER TEMPERATURE GAGE REPLACEMENT - CONTINUED 0058 00

REMOVAL

WARNING

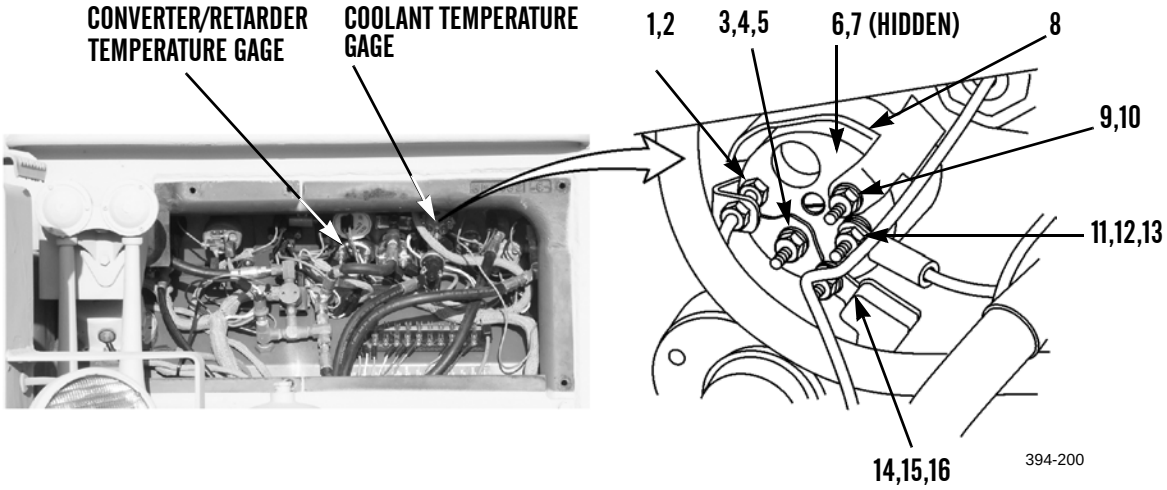
Ensure the battery cables are disconnected before replacing coolant temperature gage and converted retarder gage. Failure to follow this warning may cause injury or damage to equipment.

1. Remove nut (3) and lockwasher (4). Discard lockwasher.

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect wire connector (5) from terminal post.
3. Remove nut (11) and lockwasher (12). Discard lockwasher.
4. Disconnect wire connector (13) from terminal post.
5. Remove nut (14) and lockwasher (15). Discard lockwasher.
6. Disconnect wire connector (16) from terminal post.
7. Remove nut (1) and lockwasher (2). Discard lockwasher.
8. Remove nut (9) and lockwasher (10). Discard lockwasher.
9. Remove bracket (8).
10. Remove coolant temperature gage (6) from inside operator compartment.
11. Remove and discard seal (7).



INSTALLATION

1. Install new seal (7) and coolant temperature gage (6) in instrument panel.
2. Install bracket (8) on posts of coolant temperature gage (6).
3. Install new lockwasher (2) and nut (1).
4. Install new lockwasher (10) and nut (9).
5. Connect wire connector (5) at terminal.
6. Install new lockwasher (4) and nut (3).
7. Connect wire connector (13) at terminal.
8. Install new lockwasher (12) and nut (11).
9. Connect wire connector (16) at terminal.
10. Install new lockwasher (15) and nut (14).
11. Install upper front access plates (WP 0192 00).
12. Connect battery cables (WP 0104 00).
13. Operate machine and verify gage operates correctly (TM 5-3805-248-10).

END OF WORK PACKAGE

AMMETER REPLACEMENT 0059 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Seal

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing ammeter. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

1. Remove two nuts (1).

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect two wire connectors (2) from terminal posts.
3. Remove four washers (3).
4. Remove bracket (6).
5. Remove ammeter (4) from inside operator compartment.
6. Remove and discard seal (5).

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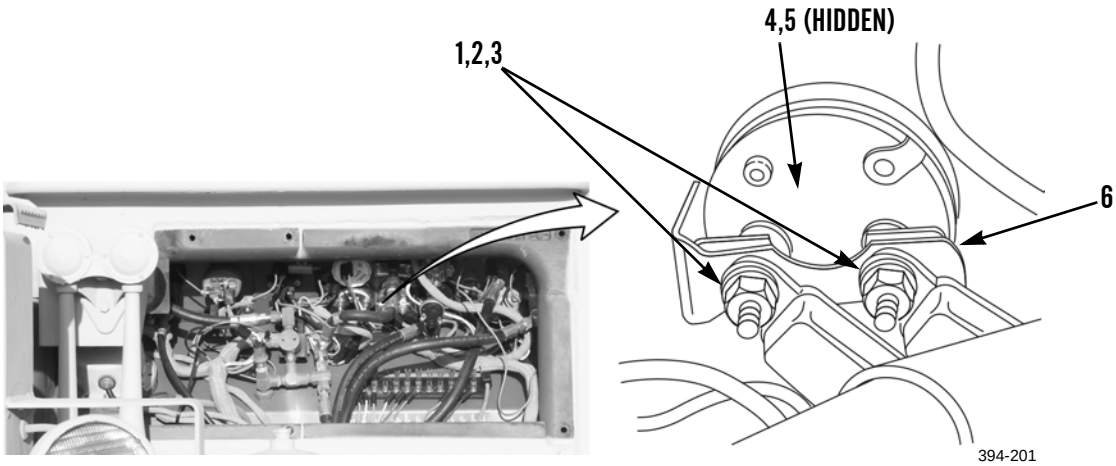


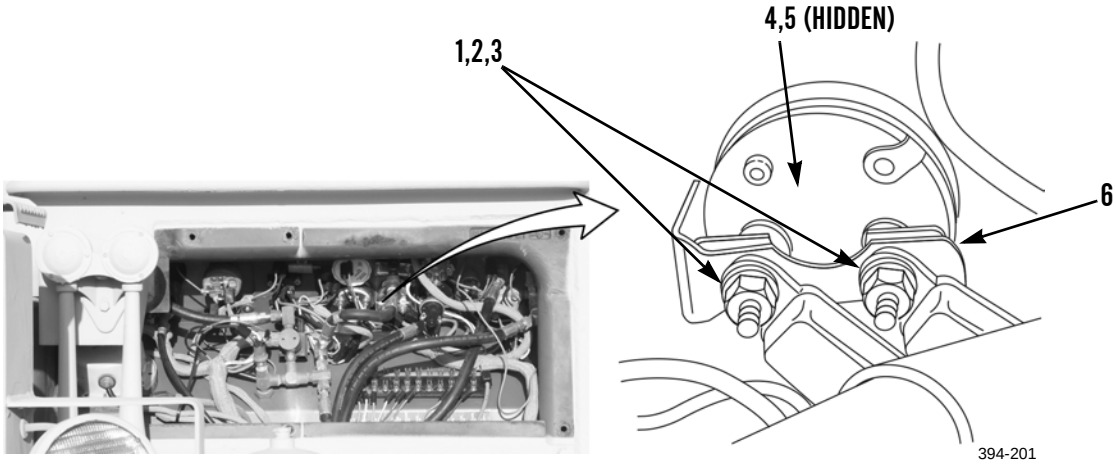
INSTALLATION

1. Install new seal (5) on ammeter (4).
2. Install ammeter (4) from inside operator compartment.

WARNING

Insulating washers must be between the inner nuts and bracket and also must be between the bracket and both wire connectors. Failure to follow this warning may cause injury or damage to equipment.

3. Install two washers (3) on ammeter (4).
4. Install bracket (6) on posts of ammeter (4).
5. Install two washers (3).
6. Connect two wire connectors (2) at terminal posts.
7. Install two nuts (1).



8. Install upper front access plates (WP 0192 00).
9. Connect battery cables (WP 0104 00).
10. Operate machine and verify gage operates correctly (TM 5-3805-248-10).

END OF WORK PACKAGE

HOUR METER REPLACEMENT 0060 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

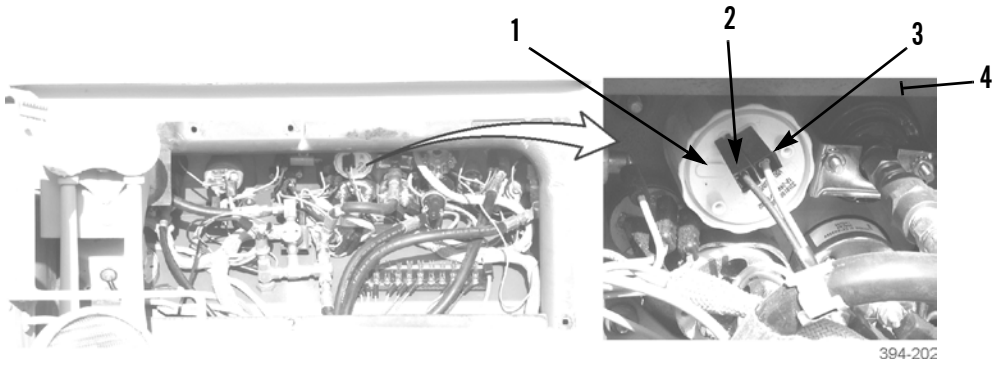
Ensure the battery cables are disconnected before replacing hour meter. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Disconnect two wire connectors (2 and 3).
2. Remove hour meter (1) from instrument panel (4).



INSTALLATION

1. Install hour meter (1) in instrument panel (4).
2. Connect wire connectors (2 and 3).

INSTALLATION - CONTINUED

3. Install upper front access plates (WP 0192 00).
4. Connect battery cables (WP 0104 00).
5. Operate machine and verify gage operates correctly (TM 5-3805-248-10).

END OF WORK PACKAGE

LOW AIR PRESSURE WARNING LAMP REPLACEMENT 0061 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing low air pressure warning lamp. Failure to follow this warning may cause injury or damage to equipment.

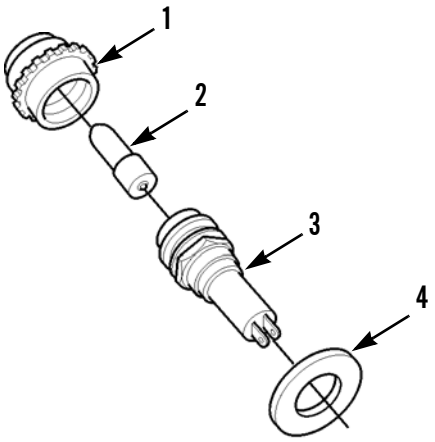
REMOVAL

1. Remove lens (1) from instrument panel (8).
2. Remove lamp (2).

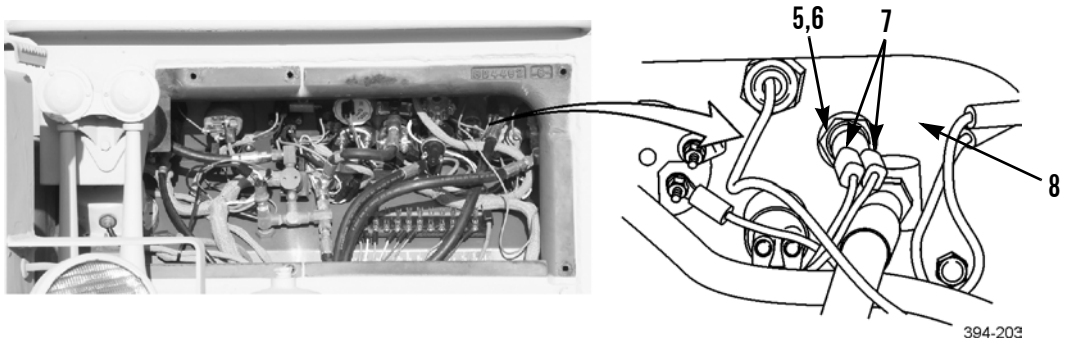
NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

3. Disconnect two wire connectors (7).
4. Remove nut (5) and lockwasher (6). Discard lockwasher.
5. Remove base (3) and plate (4).



394-204



394-203

INSTALLATION

1. Install plate (4) and base (3) on instrument panel (8).
2. Install new lockwasher (6) and nut (5).
3. Connect two wire connectors (7).
4. Install lamp (2).
5. Install lens (1).
6. Install upper front access plate (WP 0192 00).
7. Connect battery cables (WP 0104 00).
8. Operate machine (TM 5-3805-248-10) and verify indicator operates correctly.

END OF WORK PACKAGE

ETHER STARTING SWITCH REPLACEMENT 0062 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing ether starting switch. Failure to follow this warning may cause injury or damage to equipment.

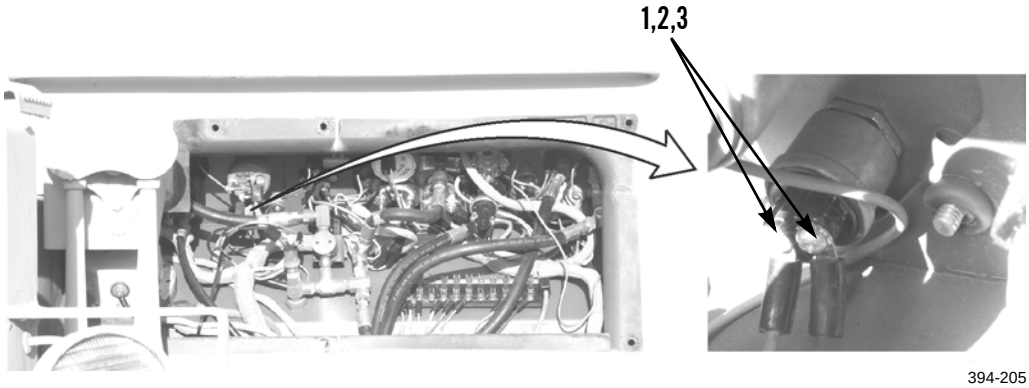
REMOVAL

1. Remove two screws (1) and lockwashers (2). Discard lockwashers.

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect two wire connectors (3).

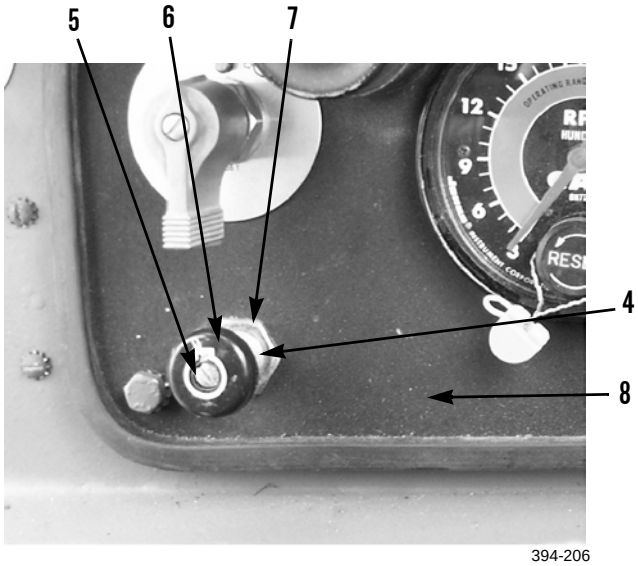


394-205

ETHER STARTING SWITCH REPLACEMENT - CONTINUED 0062 00

REMOVAL - CONTINUED

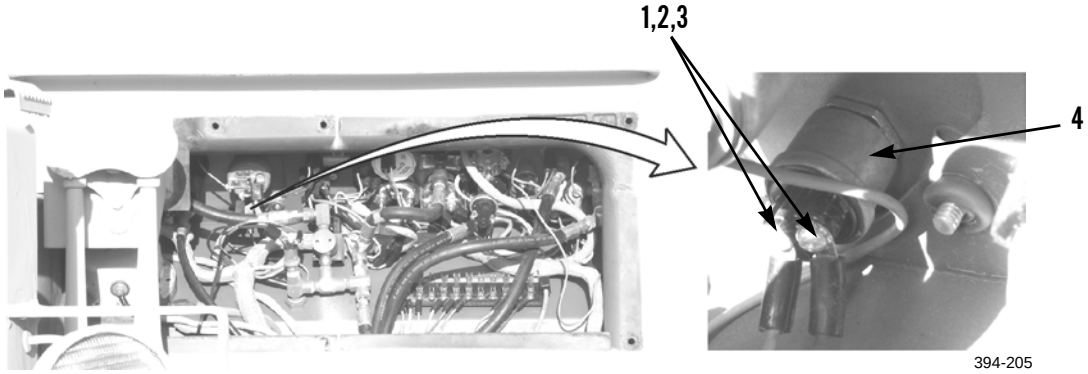
3. Remove screw (5), knob (6) and nut (7).
4. Remove switch (4) from instrument panel (8).



394-206

INSTALLATION

1. Position switch (4) in instrument panel (8).
2. Install nut (7).
3. Install knob (6) and screw (5).
4. Connect two wire connectors (3).
5. Install two new lockwashers (2) and screws (1).



394-205

6. Install upper front access plates (WP 0192 00).
7. Connect battery cables (WP 0104 00).
8. Verify correct operation of starting aid (TM-5-3805-248-10).

END OF WORK PACKAGE

WINDSHIELD WIPER SWITCH REPLACEMENT 0063 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

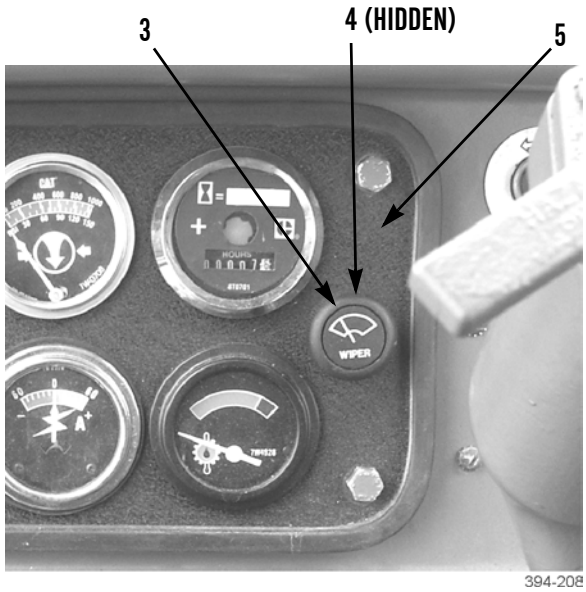
Ensure the battery cables are disconnected before replacing windshield wiper switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

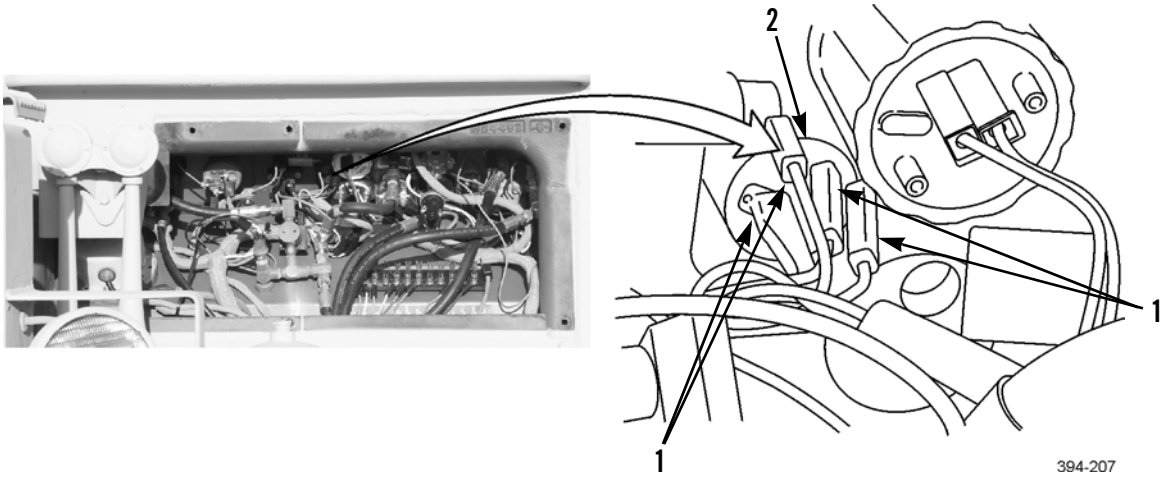
Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Disconnect four wire connectors (1).
2. Remove knob (3). Pull knob to remove from switch (2).
3. Remove nut (4).
4. Remove switch (2) from instrument panel (5).



INSTALLATION

1. Install switch (2) in instrument panel (5).
2. Install nut (4).
3. Install knob (3). Push on shaft of switch (2).
4. Connect four wire connectors (1).



5. Install upper front access plates (WP 0192 00).
6. Connect battery cables (WP 0104 00).
7. Verify correct wiper operation (TM 5-3805-248-10).

END OF WORK PACKAGE

WORKLIGHT SWITCH REPLACEMENT 0064 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

References

WP 0073 00

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing worklight switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

1. Remove screw (9) and lockwasher (8). Discard lockwasher.

NOTE

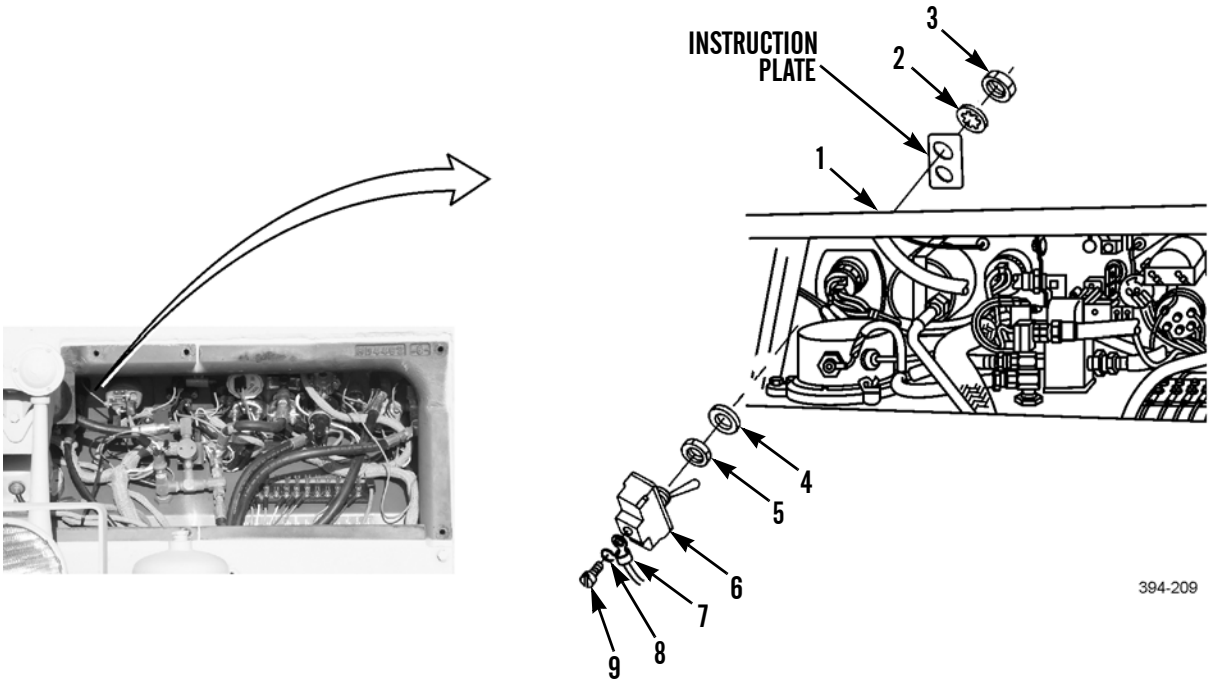
Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect wire connector (7).
3. Remove nut (3) and lockwasher (2). Discard lockwasher.
4. Remove switch (6) from instrument panel (1).
5. Remove key washer (4) and nut (5) from switch (6).

NOTE

If it is necessary to remove instruction plate, perform step 6.

6. Remove ground-driven steering pump indicator light (WP 0073 00).



INSTALLATION

1. If removed, install instruction plate and ground-driven steering pump indicator light (WP 0073 00).
2. Install nut (5) and key washer (4) on switch (6).
3. Install switch (6) in instrument panel (1).
4. Install new lockwasher (2) and nut (3).
5. Connect wire connector (7).
6. Install new lockwasher (8) and screw (9).
7. Install upper front access plates (WP 0192 00).
8. Connect battery cables (WP 0104 00).
9. Verify operation of worklight (TM 5-3805-248-10).

END OF WORK PACKAGE

LOW AIR PRESSURE HORN OVERRIDE SWITCH REPLACEMENT 0065 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing low air pressure horn override switch. Failure to follow this warning may cause injury or damage to equipment.

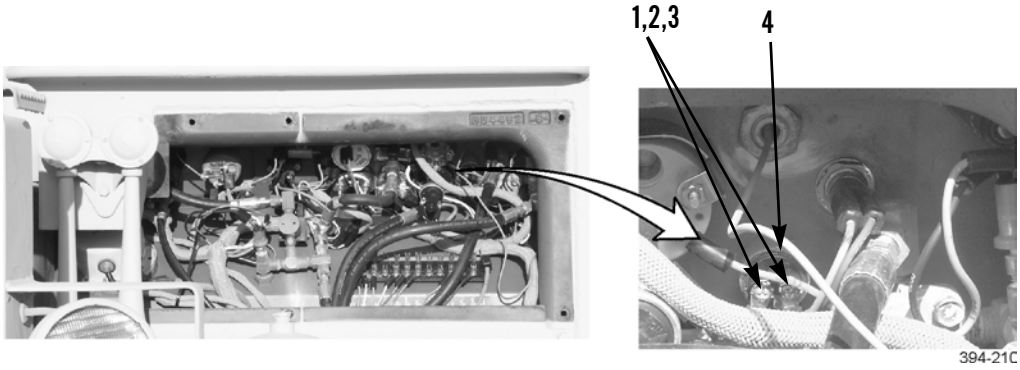
REMOVAL

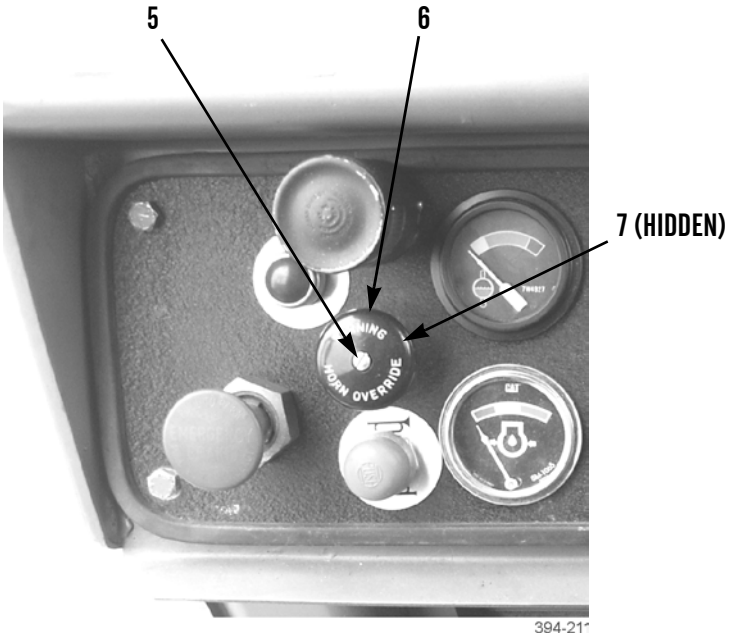
1. Remove two screws (1) and lockwashers (2). Discard lockwashers.

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect two wire connectors (3).
3. Remove screw (5) and button (6) from instrument panel.
4. Remove nut (7).
5. Remove switch (4).





INSTALLATION

1. Install switch (4) and nut (7) in instrument panel.
2. Install button (6) and screw (5).
3. Connect two wire connectors (3).
4. Install two new lockwashers (2) and screws (1).
5. Install upper front access plate (WP 0192 00).
6. Connect battery cables (WP 0104 00).
7. Verify operation of low air pressure horn override (TM 5-3805-248-10).

END OF WORK PACKAGE

AIR HORN SWITCH REPLACEMENT 0066 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing air horn switch. Failure to follow this warning may cause injury or damage to equipment.

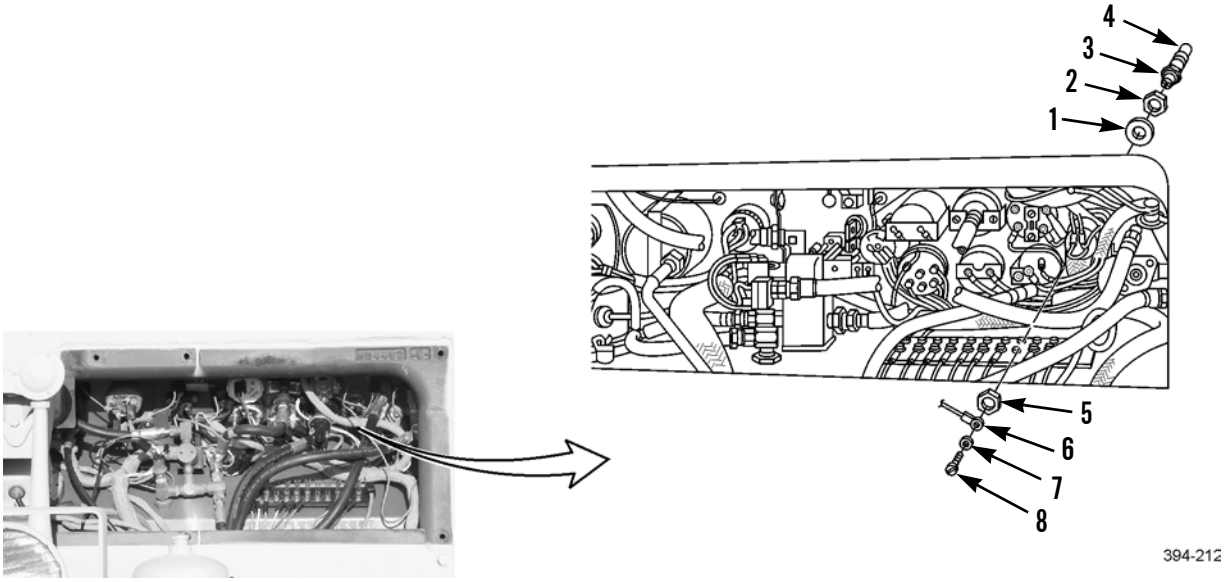
REMOVAL

1. Remove two screws (8) and lockwashers (7). Discard lockwashers.

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Disconnect two wire connectors (6).
3. Remove nut (5).
4. Remove button (4).
5. Remove switch (3) and instruction plate (1).
6. Remove nut (2).



INSTALLATION

1. Install nut (2) on switch (3).
2. Install instruction plate (1) and switch (3).
3. Install button (4).
4. Install nut (5).
5. Connect two wire connectors (6).
6. Install two new lockwashers (7) and screws (8).
7. Install upper front access plate (WP 0192 00).
8. Connect battery cables (WP 0104 00).
9. Verify correct operation of air horn (TM 5-3805-248-10).

END OF WORK PACKAGE

LIGHT SWITCH ASSEMBLY REPLACEMENT 0067 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (4)

Equipment Condition

Battery cables disconnected (WP 0104 00)

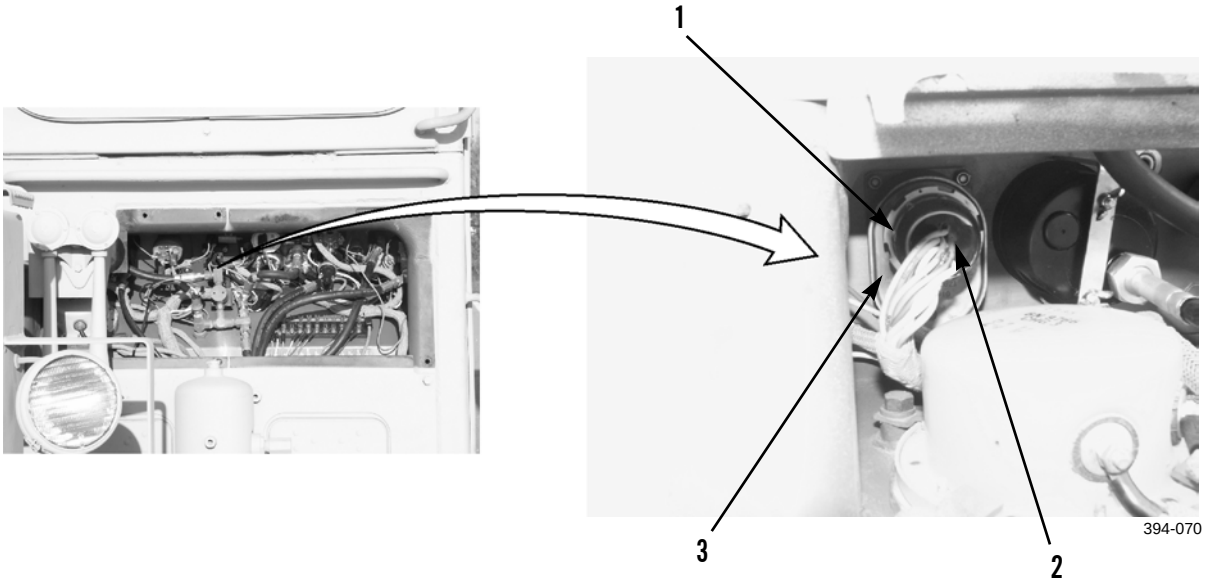
Upper front access plates removed (WP 0192 00)

WARNING

Ensure battery cables are disconnected before replacing switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

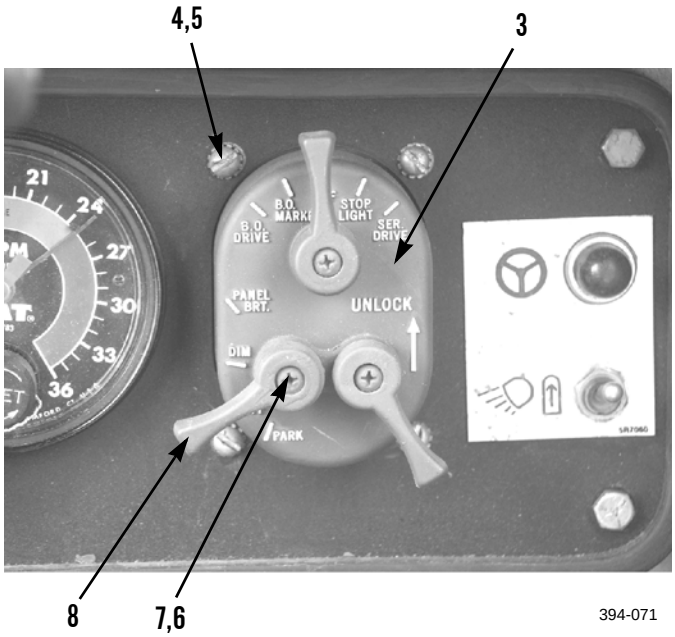
1. Remove nut (1) to disconnect cannon plug (2) from switch (3).



LIGHT SWITCH ASSEMBLY REPLACEMENT - CONTINUED 0067 00

REMOVAL - CONTINUED

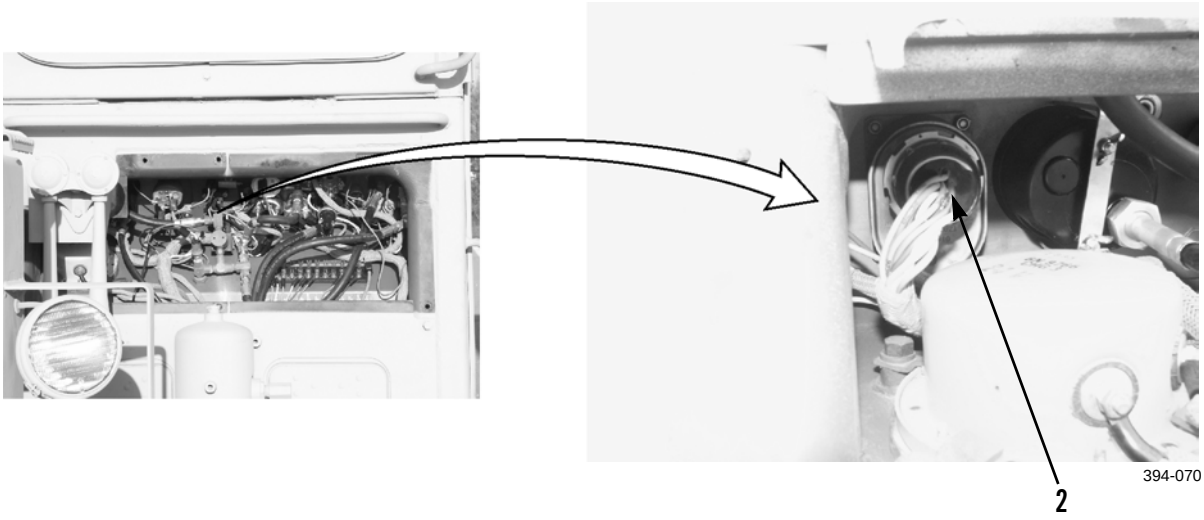
2. If damaged, remove three screws (6), washers (7) and levers (8).
3. Remove four screws (4) and lockwashers (5). Discard lockwashers.
4. Remove switch (3) from instrument panel.



394-071

INSTALLATION

1. Install switch (3) in instrument panel.
2. Install four new lockwashers (5) and screws (4).
3. If removed, install three levers (8), washers (7) and screws (6) on shafts of switch (3).
4. Align and connect cannon plug (2) to light switch (3).



394-070

INSTALLATION - CONTINUED

5. Verify lamps operate correctly.
6. Install front access plates (WP 0192 00).
7. Connect battery cables (WP 0104 00).
8. Verify correct operation of lights (TM-5-3805-248-10).

END OF WORK PACKAGE

STARTER SWITCH REPLACEMENT 0068 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

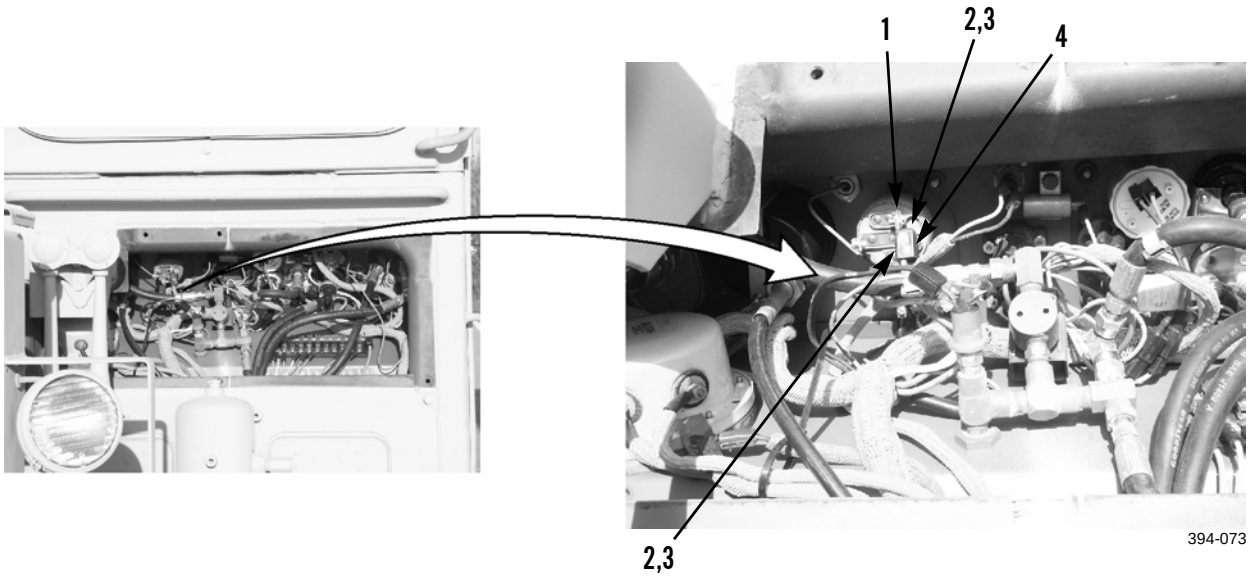
Ensure battery cables are disconnected before replacing switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

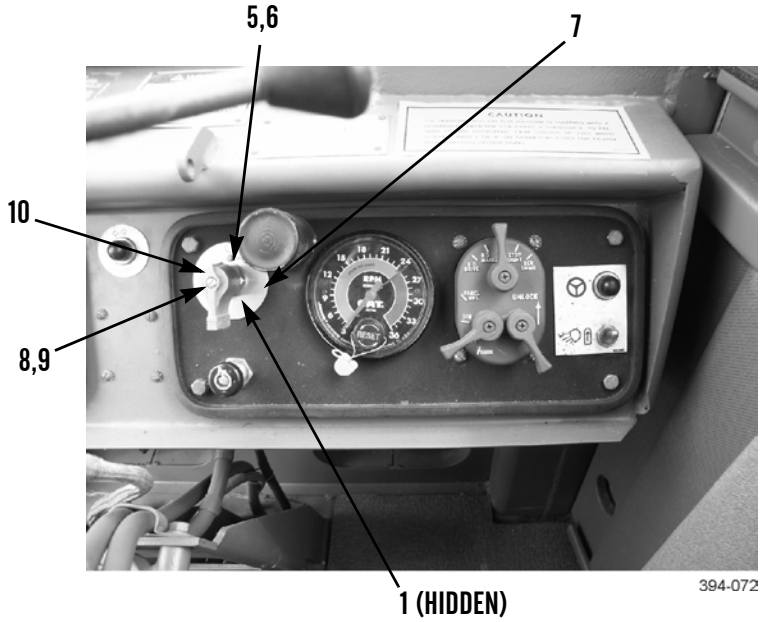
1. Remove two screws (2) and washers (3) from starter switch (1) on right side of instrument panel.
2. Disconnect two wire connectors (4) from starter switch (1).



STARTER SWITCH REPLACEMENT - CONTINUED 0068 00

REMOVAL - CONTINUED

3. Remove screw (8), washer (9) and lever (10).
4. Remove nut (5), lockwasher (6) and instruction plate (7). Discard lockwasher.
5. Remove starter switch (1) from instrument panel.

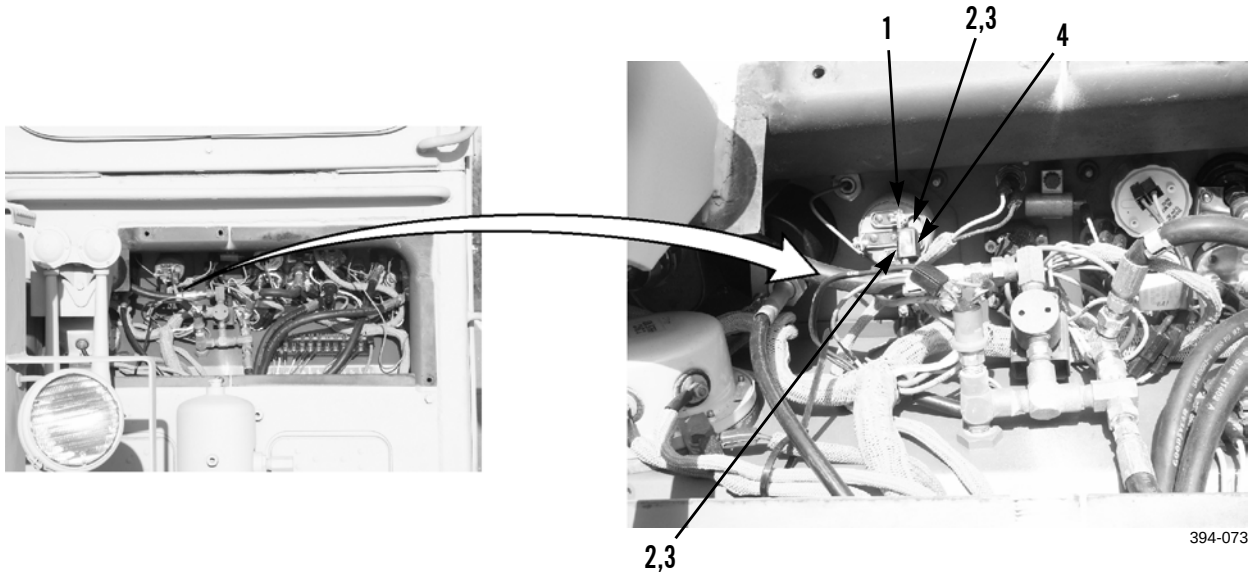


INSTALLATION

1. Position starter switch (1) in instrument panel.
2. Install instruction plate (7), new lockwasher (6) and nut (5).
3. Install lever (10), washer (9) and screw (8) on shaft of starter switch (1).

INSTALLATION - CONTINUED

4. Connect two wire connectors (4) at terminals on starter switch (1).
5. Install two washers (3) and screws (2).



6. Connect battery cables (WP 0104 00).
7. Start engine to verify correct operation of the starter (TM 5-3805-248-10).
8. Install front access plates (WP 0192 00).

END OF WORK PACKAGE

PANEL LAMP REPLACEMENT 0069 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

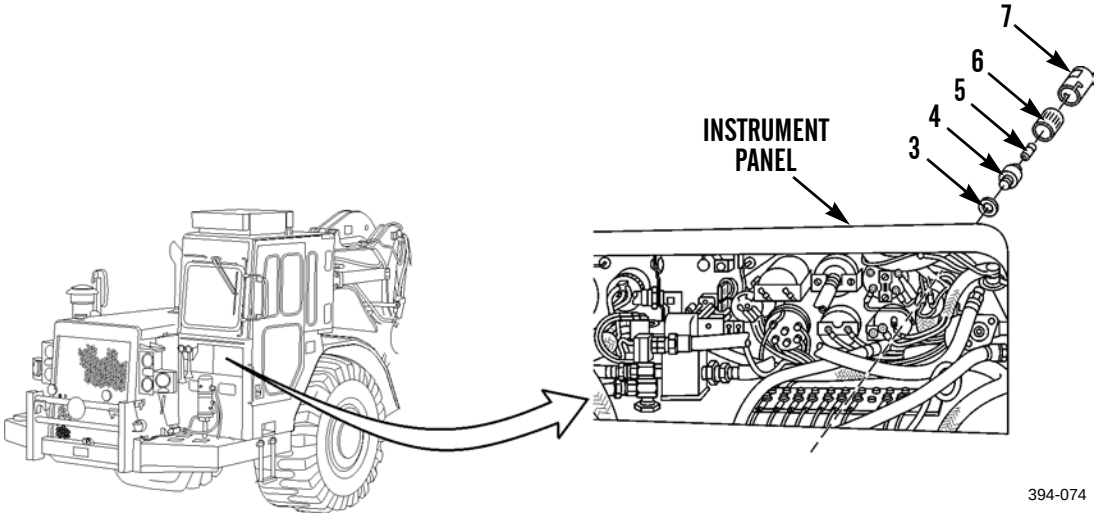
Ensure battery cables are disconnected before replacing lamp. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

The following maintenance procedure is for the left instrument panel lamp. The maintenance procedure for the right panel lamp is identical.

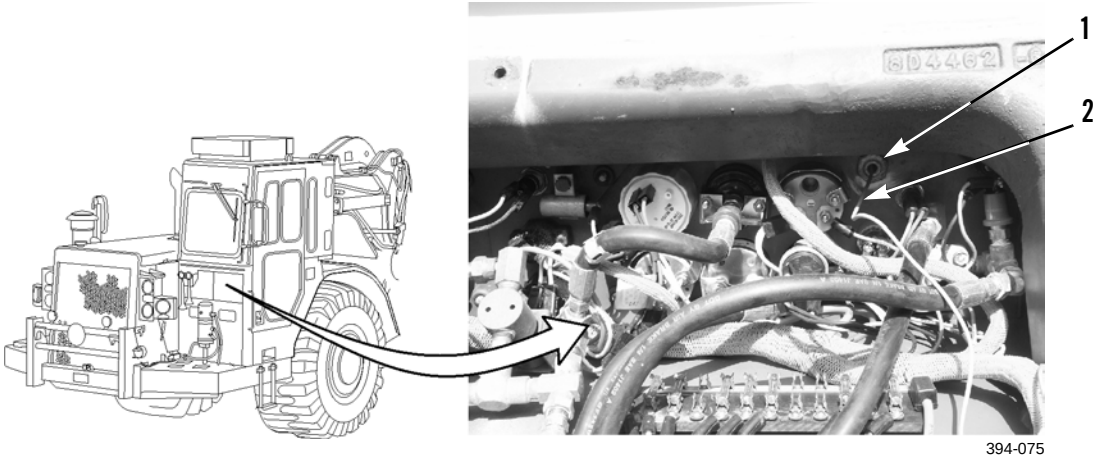
1. Remove hood (7) from instrument panel by pushing hood in and rotating counterclockwise.
2. Remove lens (6) from hood.
3. Remove lamp (5) by pushing lamp in and rotating counterclockwise.



NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

4. Disconnect wire connector assembly (2).
5. Remove nut (1).
6. Remove base (4) and washer (3) from instrument panel.



INSTALLATION

1. Install washer (3) on base (4).
2. Install base (4) in instrument panel.
3. Install nut (1).
4. Connect wire connector assembly (2).
5. Install lamp (5) in base (4) by pushing lamp in and rotating clockwise.
6. Install lens (6) in hood (7).
7. Install hood (7) by pushing in and rotating clockwise.
8. Verify correct panel lamp operation (TM 5-3805-248-10).
9. Install front access plate (WP 0192 00).
10. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

CIRCUIT BREAKERS REPLACEMENT 0070 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

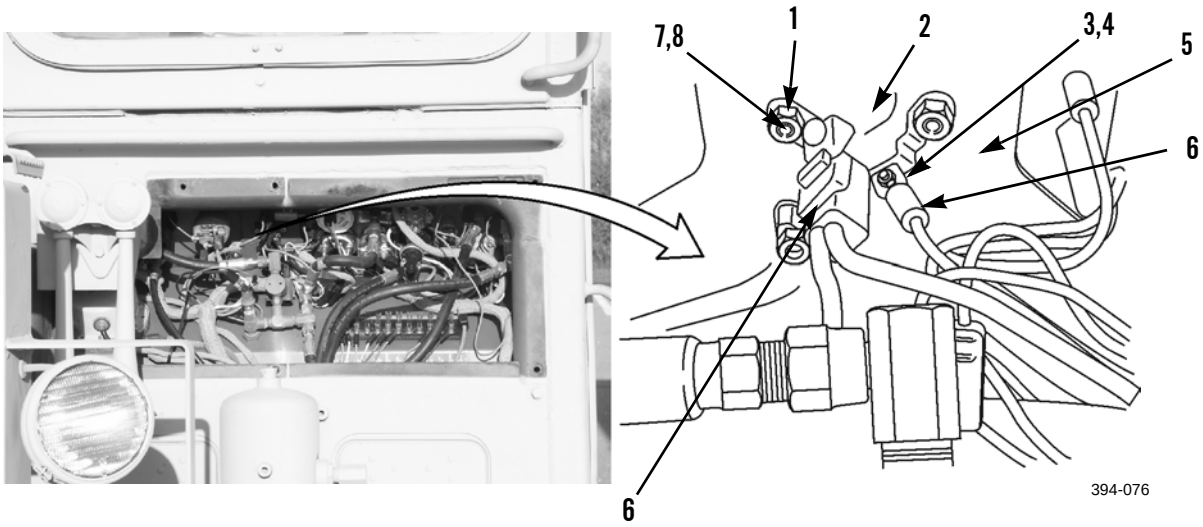
Ensure battery cables are disconnected before replacing switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

- The following maintenance procedure is for the upper circuit breaker. The maintenance procedure for the lower circuit breaker is identical.
- Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove two screws (3) and washers (4).
2. Disconnect two wire connectors (6) at terminals from circuit breaker (2).
3. Remove four nuts (1), screws (7) and washers (8).
4. Remove circuit breaker (2) from instrument panel (5).



INSTALLATION

1. Install circuit breaker (2) on instrument panel (5).
2. Install four washers (8), screws (7) and nuts (1).
3. Connect two wire connectors (6) at terminals on circuit breaker (2).
4. Install two washers (4) and screws (3).
5. Install front access plate (WP 0192 00).
6. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

LEFT PANEL REPLACEMENT 0071 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Seal

Equipment Condition

Coolant temperature gage and converter/retarder temperature gage removed (WP 0058 00)

Ammeter removed (WP 0059 00)

Hour meter removed (WP 0060 00)

Equipment Condition - Continued

Low air pressure warning lamp removed (WP 0061 00)

Wiper switch removed (WP 0063 00)

Low air pressure horn override switch removed (WP 0065 00)

Air horn switch removed (WP 0066 00)

Panel lamp removed (WP 0069 00)

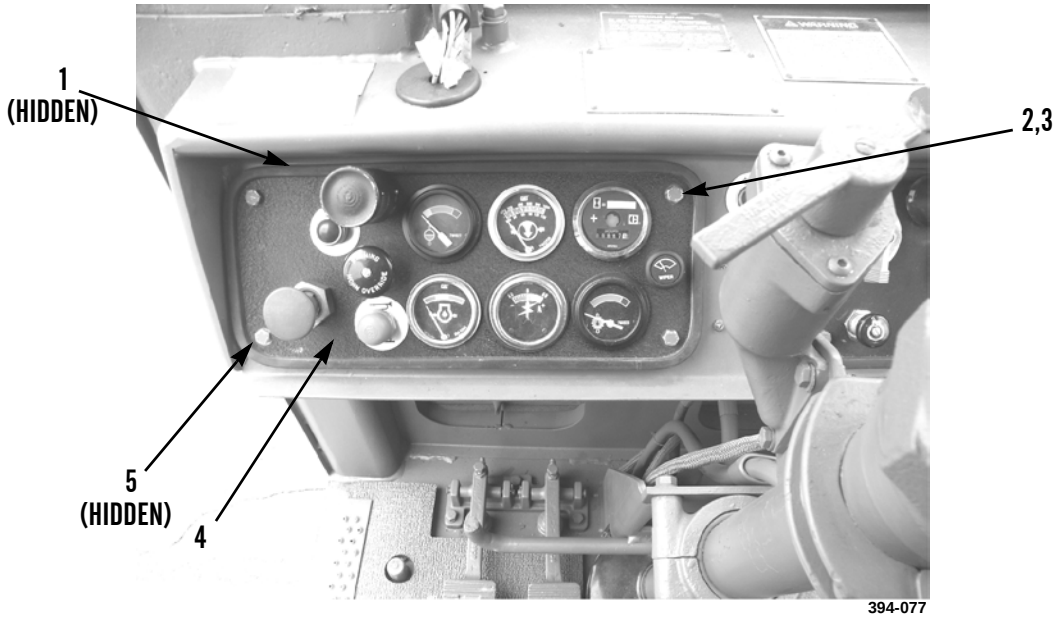
Park and emergency valve removed (WP 0145 00)

Oil pressure gage removed (WP 0249 00)

Air pressure gage removed (WP 0250 00)

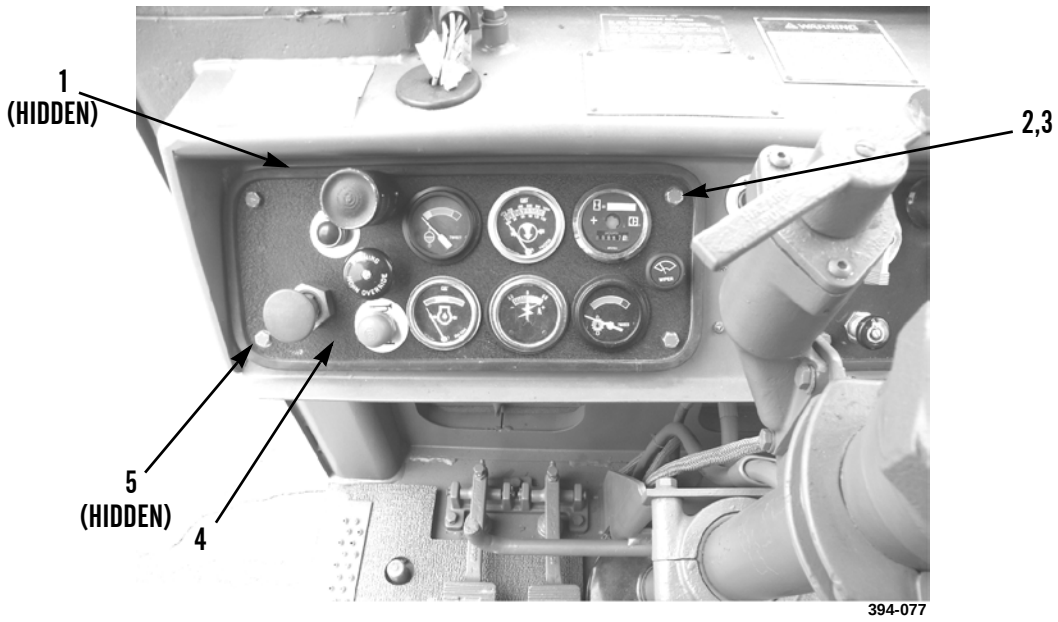
REMOVAL

1. Remove four bolts (2) from left instrument panel.
2. Remove left instrument panel (4) and seal (1). Discard seal.
3. Remove four well nuts (3).
4. Remove strap (5) from one of four well nuts (3).



INSTALLATION

1. Install strap (5) on one of four well nuts (3).
2. Bend strap (5) over head of one of four well nuts (3).
3. Install four well nuts (3) in compartment assembly.
4. Install new seal (1) on left instrument panel (4).
5. Position left instrument panel (4) in compartment assembly and align holes.
6. Install four bolts (2).



7. Install air pressure gage (WP 0250 00).
8. Install oil pressure gage (WP 0249 00).
9. Install park and emergency valve (WP 0145 00).
10. Install panel lamp (WP 0069 00).
11. Install air horn switch (WP 0066 00).
12. Install low air pressure horn override switch (WP 0065 00).
13. Install wiper switch (WP 0063 00).
14. Install low air pressure warning lamp (WP 0061 00).
15. Install hour meter (WP 0060 00).
16. Install ammeter (WP 0059 00).
17. Install coolant temperature gage and converter/retarder temperature gage (WP 0058 00).

END OF WORK PACKAGE

RIGHT PANEL REPLACEMENT 0072 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Ether start switch removed (WP 0062 00)

Worklight switch removed (WP 0064 00)

Light switch assembly removed (WP 0067 00)

Starter switch removed (WP 0068 00)

Panel lamp removed (WP 0069 00)

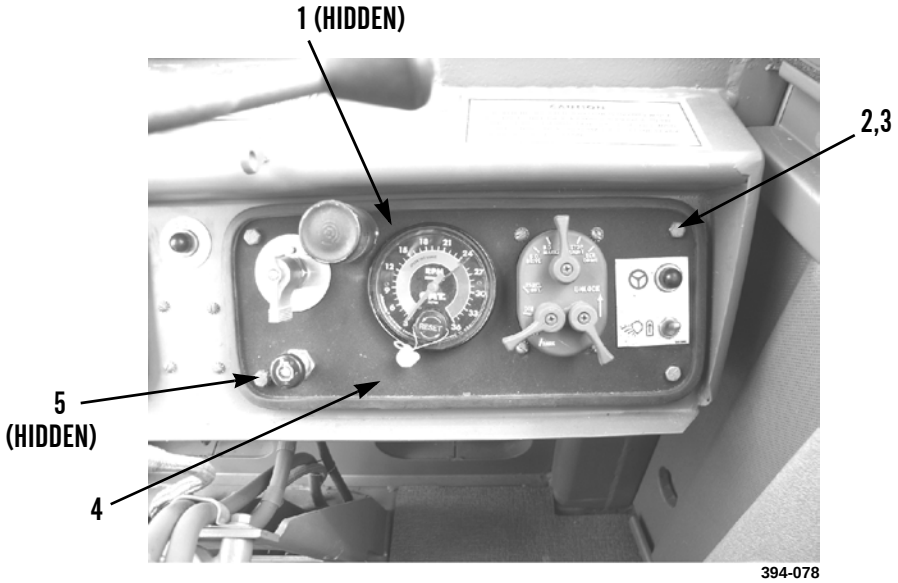
Ground driven steering pump indicator light removed (WP 0073 00)

Upper front access plates removed (WP 0192 00)

Tachometer removed (WP 0247 00)

REMOVAL

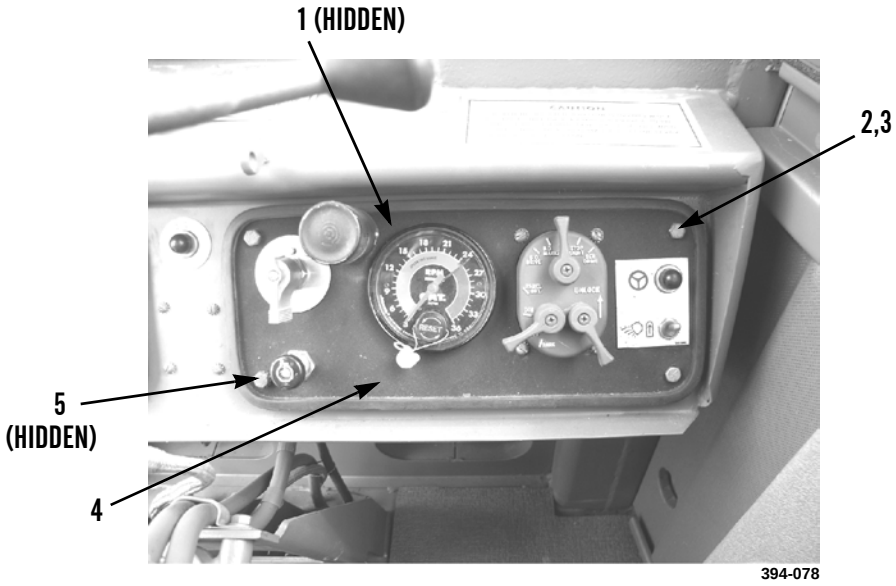
1. Remove four bolts (2) from right instrument panel (4).
2. Remove right instrument panel (4) and seal (1). Discard seal.
3. Remove four well nuts (3).
4. Remove strap (5) from one of four well nuts (3).



394-078

INSTALLATION

1. Install strap (5) on one of four well nuts (3).
2. Bend strap (5) over head of one of four well nuts (3).
3. Install four well nuts (3) in compartment assembly.
4. Install new seal (1) on right instrument panel (4).
5. Position right instrument panel (4) in compartment assembly and align holes.
6. Install four bolts (2).



7. Install upper front access plates (WP 0192 00).
8. Verify all accessories operate correctly (TM 5-3805-248-10).
9. Install tachometer (WP 0247 00).
10. Install ground driven steering pump indicator light (WP 0073 00).
11. Install panel lamp (WP 0069 00).
12. Install starter switch (WP 0068 00).
13. Install light switch assembly (WP 0067 00).
14. Install worklight switch (WP 0064 00).
15. Install ether switch (WP 0062 00).

END OF WORK PACKAGE

GROUND DRIVEN STEERING PUMP INDICATOR LIGHT REPLACEMENT 0073 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher

References

WP 0075 00

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure battery cables are disconnected before replacing lamp. Failure to follow this warning could result in injury or damage to equipment.

REMOVAL

1. Remove lens (3). Rotate counterclockwise.
2. Remove lamp (2). Press in and rotate counterclockwise.

NOTE

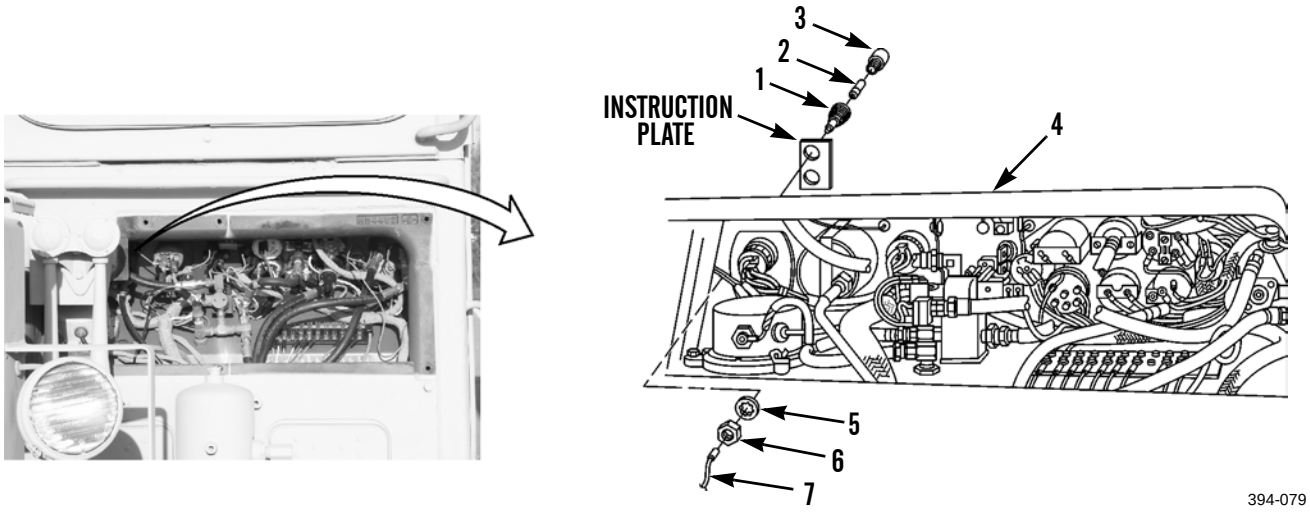
Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

3. Disconnect two wire connectors (7) at terminals.
4. Remove nut (6) and lockwasher (5). Discard lockwasher.
5. Remove socket (1) from instrument panel (4).

NOTE

If necessary to remove instruction plate, perform step 6.

6. Remove worklamp switch and, if necessary, remove instruction plate (WP 0075 00).



INSTALLATION

1. If removed, install instruction plate.
2. If removed, install worklight switch (WP 0075 00).
3. Install socket (1) in instrument panel (4).
4. Install new lockwasher (5) and nut (6).
5. Connect two wire connectors (7) at terminals.
6. Install lamp (2). Push in and rotate clockwise.
7. Install lens (3). Rotate clockwise.
8. Connect battery cables (WP 0104 00).
9. Operate machine and verify correct operation of ground driven steering pump indicator light (TM 5-3805-248-10).
10. Install upper front access plates (WP 0192 00).

END OF WORK PACKAGE

BATTERY DISCONNECT SWITCH REPLACEMENT 0074 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (3)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

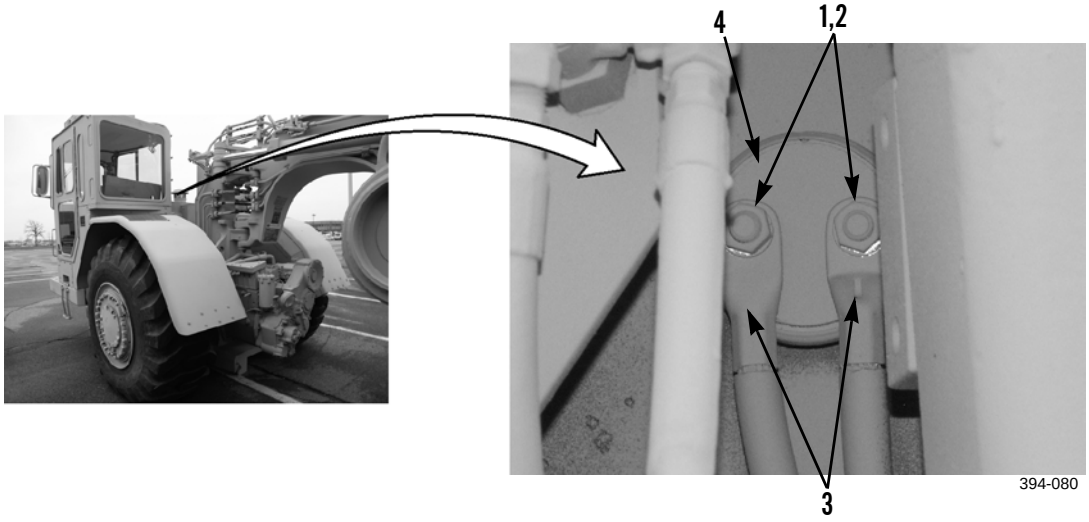
Ensure battery cables are disconnected before replacing switch. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

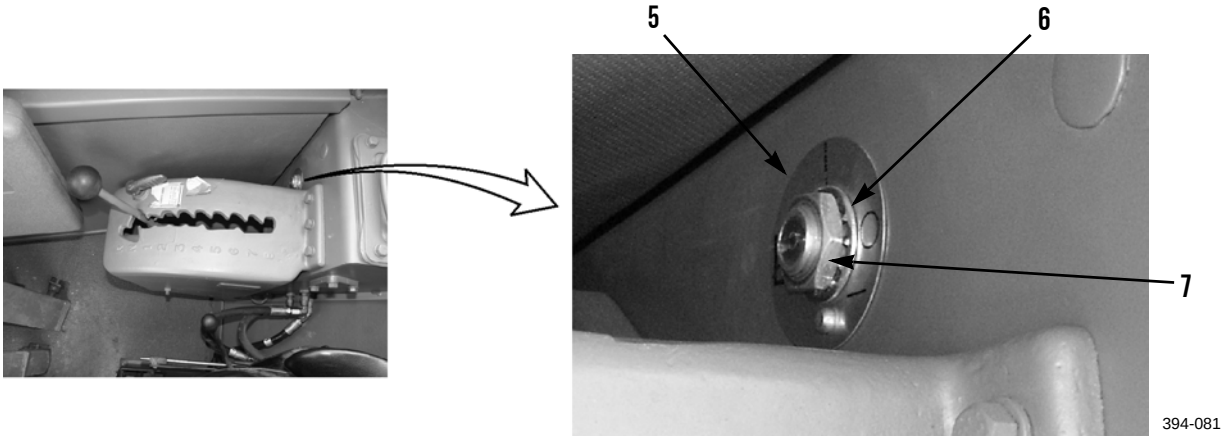
NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove two nuts (1) and lockwashers (2) from disconnect switch (4). Discard lockwashers.
2. Disconnect two cables (3) from disconnect switch (4).



3. Remove nut (7), lockwasher (6) and instruction plate (5). Discard lockwasher.
4. Remove disconnect switch (4) from machine.



5. Remove all corrosion from switch terminals and wire ends.

INSTALLATION

1. Install disconnect switch (4) in machine.
2. Install instruction plate (5), new lockwasher (6) and nut (7).
3. Connect two cables (3) to disconnect switch (4).
4. Install two new lockwashers (2) and nuts (1) on disconnect switch (4).
5. Install upper front access plates (WP 0192 00)
6. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

FUSE AND FUSE BLOCK REPLACEMENT 0075 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (15)

Marker, identification

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure the battery cables are disconnected before replacing fuse or fuse block. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

1. Remove cover (1) from fuse block assembly (5).

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

2. Remove screw (2) and lockwasher (3). Discard lockwasher.
3. Disconnect wire connector (4).

NOTE

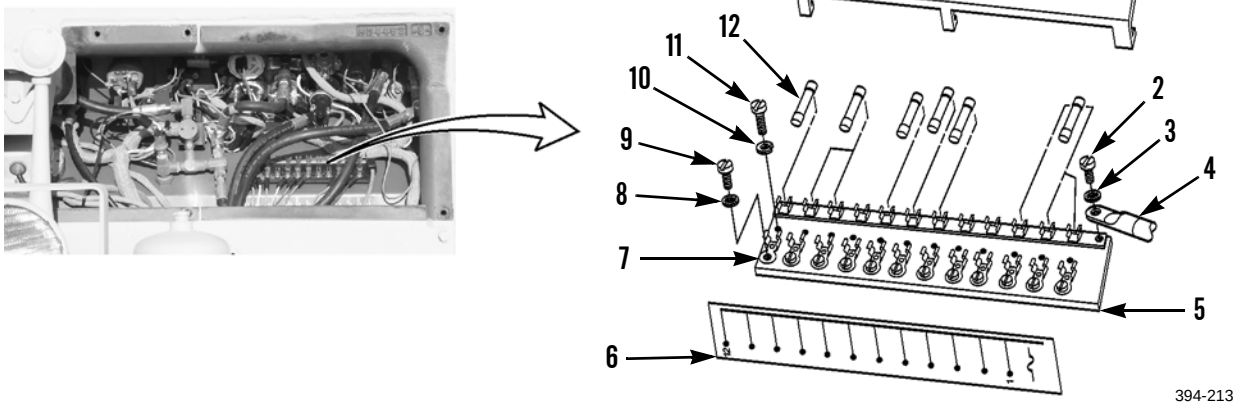
Note location of fuses to ensure correct installation.

4. Remove nine fuses (12).
5. Remove twelve screws (9) and lockwashers (8). Discard lockwashers.
6. Disconnect nine wire connectors (7).
7. Remove two screws (11) and lockwashers (10). Discard lockwashers.
8. Remove fuse block assembly (5).

NOTE

Remove identification marker only if replacement is necessary.

9. Remove and discard identification marker (6), if necessary.



INSTALLATION

1. If removed, install new identification marker (6), if necessary.
2. Install fuse block assembly (5) with two screws (11) and new lockwashers (10).
3. Connect nine wire connectors (7).
4. Install twelve screws (9) and new lockwashers (8).
5. Install nine fuses (12).
6. Connect wire connector (4).
7. Install screw (2) and new lockwasher (3).
8. Install cover (1) on fuse block assembly (5).
9. Install upper front access plate (WP 0192 00).
10. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

MAIN CIRCUIT BREAKER REPLACEMENT 0076 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Lockwasher (4)

References

WP 0193 00

WP 0194 00

Equipment Condition

Battery cables disconnected (WP 0104 00)

Hood assembly removed (WP 0189 00)

REMOVAL

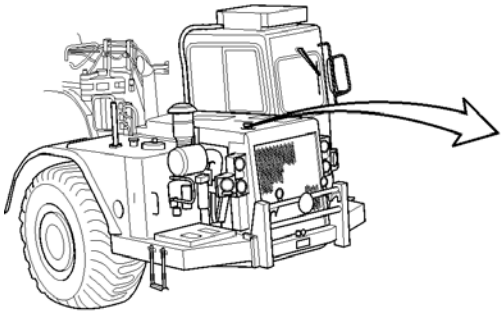
WARNING

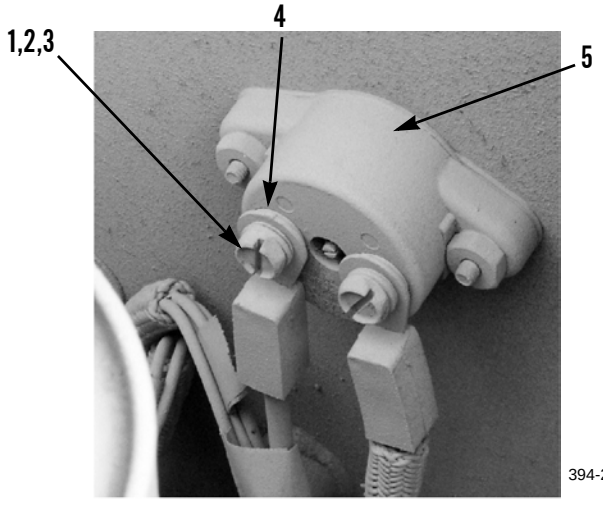
Ensure battery cables are disconnected before replacing circuit breaker. Failure to follow this warning may result in injury or damage to equipment.

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Remove two screws (1) from rear of circuit breaker (5).
2. Remove two lockwashers (2). Discard lockwashers.
3. Disconnect two wire connectors (4).
4. Remove two lockwashers (3). Discard lockwashers.





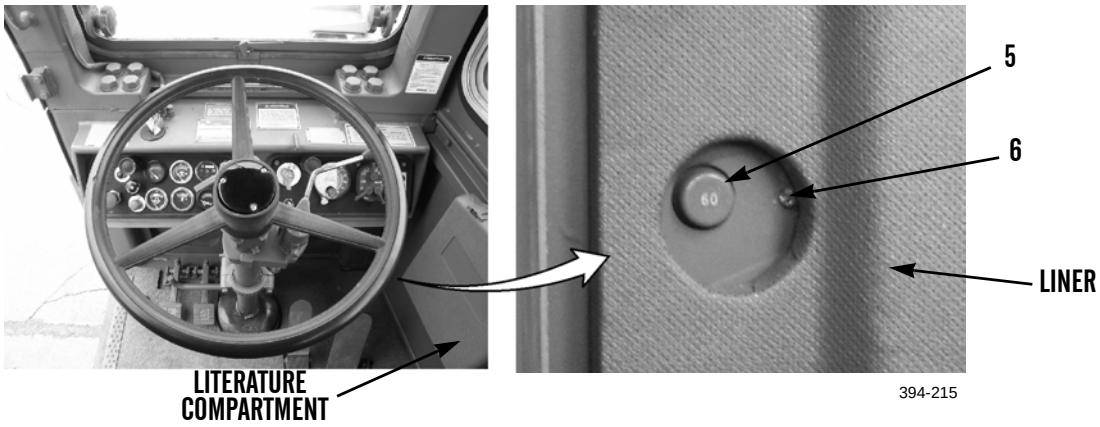
394-214

REMOVAL - CONTINUED

NOTE

If necessary to gain access to two interior circuit breaker screws, perform steps 5 and 6.

5. Remove literature compartment (WP 0193 00).
6. Loosen cab liner bolts and position aside (WP 0194 00).
7. Remove two screws (6) from interior of operator compartment.
8. Remove circuit breaker (5). Pull through outside of operator compartment.

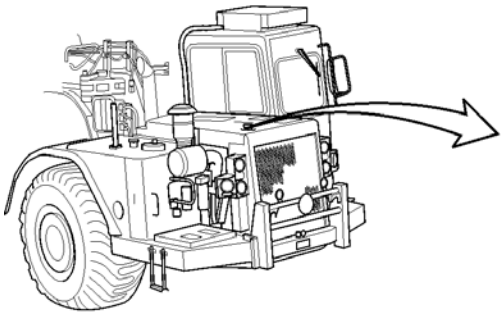


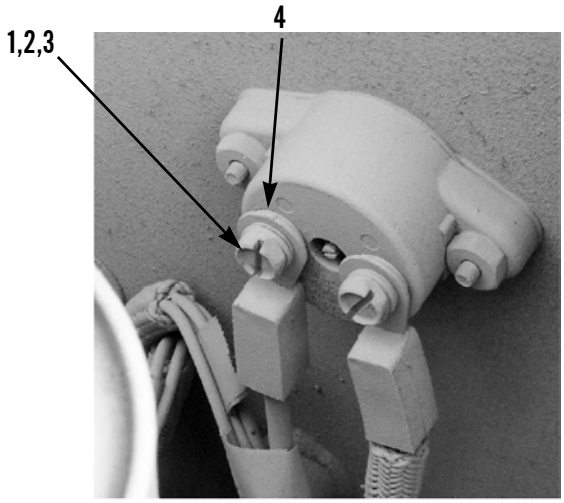
INSTALLATION

1. Install circuit breaker (5). Insert through exterior of operator compartment.
2. Install two screws (6).
3. If loosened, tighten cab liner bolts (WP 0194 00).
4. If removed, install literature compartment (WP 0193 00).

INSTALLATION - CONTINUED

5. Install two new lockwashers (3).
6. Connect two wire connectors (4).
7. Install two new lockwashers (2).
8. Install two screws (1).





394-214

9. Install hood assembly (WP 0189 00).
10. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

WINDSHIELD WIPER CAPACITORS REPLACEMENT 0077 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

Ensure battery cables are disconnected before replacing capacitors. Failure to follow this warning may result in injury or damage to equipment.

NOTE

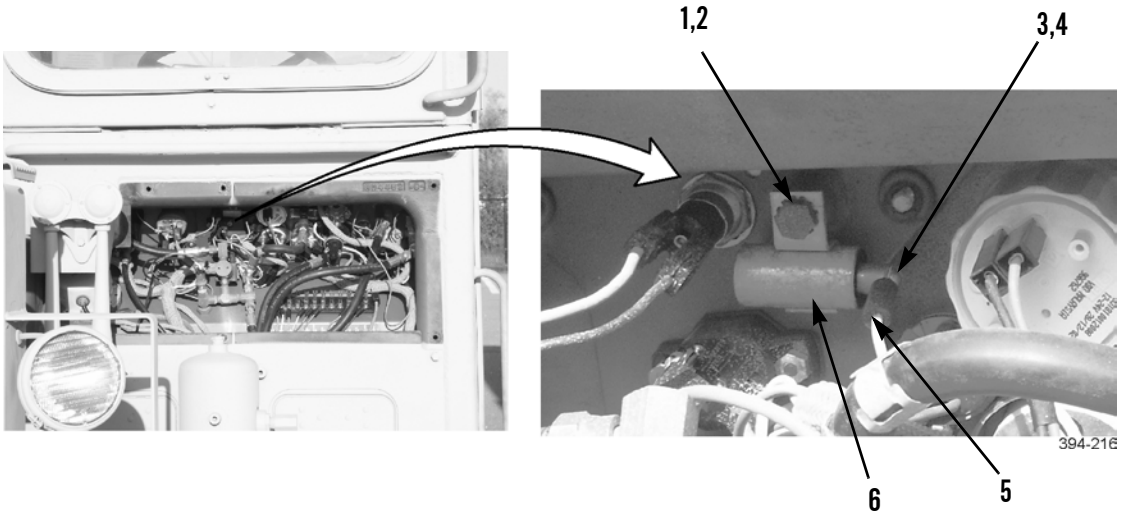
- There are four capacitors in the windshield wiper circuit. Three are located above the windshield in the operator compartment and one is located behind the upper front access plates.
- The following maintenance procedure is for one capacitor. The maintenance procedure for the remaining three capacitors is identical.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Remove screw (3) and lockwasher (4) from capacitor (6). Discard lockwasher.
2. Disconnect wire connector (5).
3. Remove bolt (1), lockwasher (2) and capacitor (6). Discard lockwasher.



INSTALLATION

1. Install capacitor (6), new lockwasher (2) and bolt (1).
2. Connect wire connector (5).
3. Install new lockwasher (4).
4. Install screw (3).
5. Install upper front access plates (WP 0192 00).
6. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

WORKLIGHT, HIGH BEAM, LOW BEAM AND BACKUP ALARM/HORN RELAYS REPLACEMENT

0078 00

HIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Step assembly removed (WP 0200 00)

REMOVAL

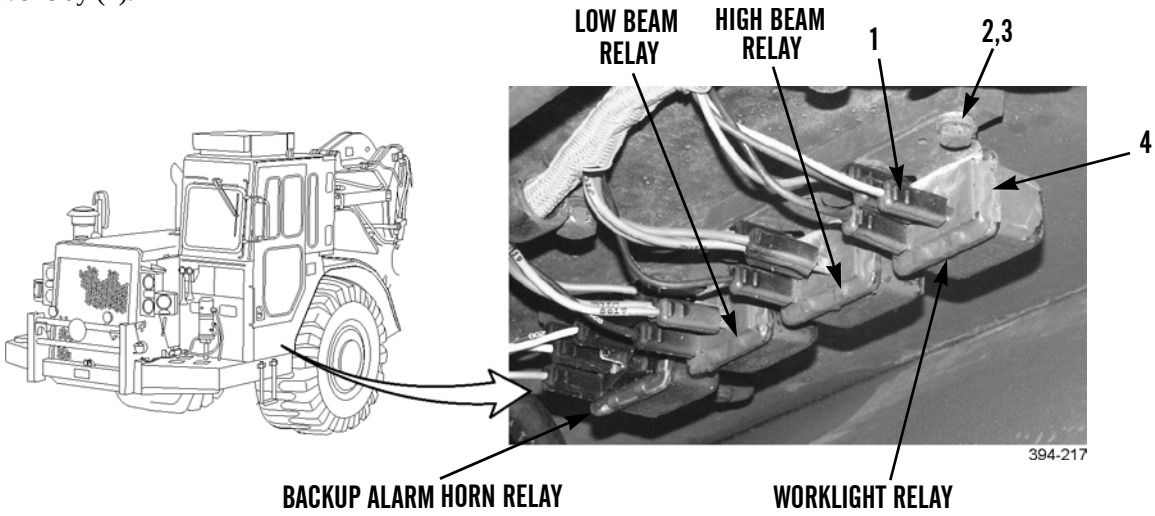
WARNING

Turn battery disconnect to OFF position before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

NOTE

- The following maintenance procedure is for the worklight relay. The maintenance procedure for the high beam, low beam and backup alarm/horn relays are identical.
- Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

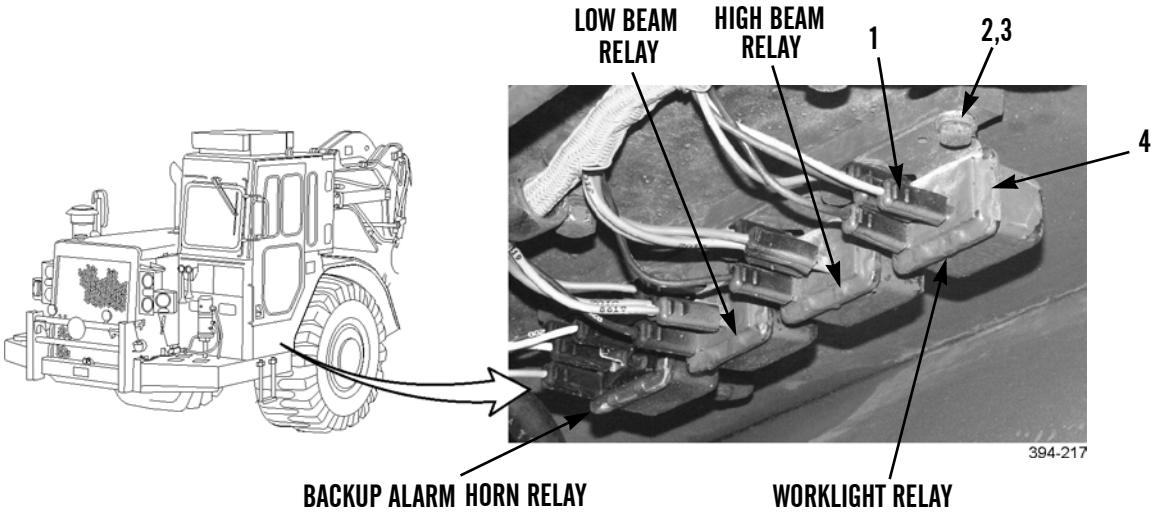
1. Disconnect four wire connectors (1) from relay (4).
2. Remove two bolts (2) and washers (3).
3. Remove relay (4).



WORKLIGHT, HIGH BEAM, LOW BEAM AND BACKUP ALARM/HORN RELAYS REPLACEMENT - CONTINUED 0078 00

INSTALLATION

1. Position relay (4) on mounting surface and align holes.
2. Install two washers (3) and bolts (2).
3. Connect four wire connectors (1).



4. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

HEAD LAMP DIMMER SWITCH REPLACEMENT 0079 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Step assembly removed (WP 0200 00)

WARNING

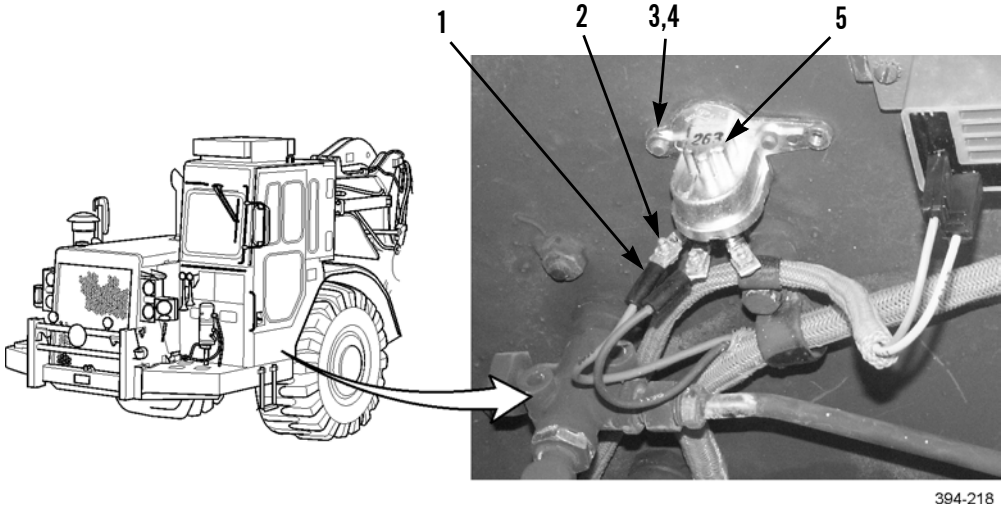
Turn battery disconnect to OFF position before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

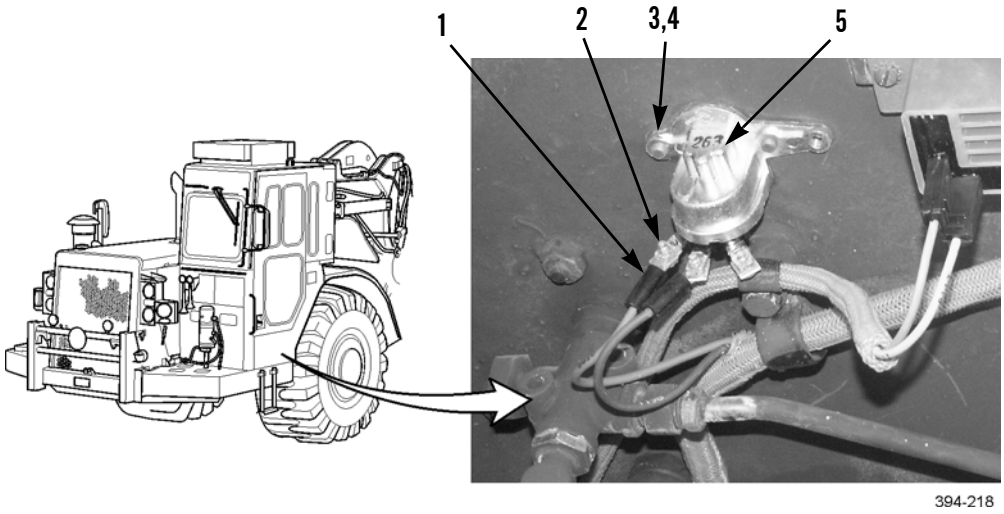
Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Remove two screws (2).
2. Disconnect two wire connectors (1).
3. Remove two screws (3) and lockwashers (4). Discard lockwashers.
4. Remove dimmer switch (5). Pull dimmer switch through bottom of compartment floor.



INSTALLATION

1. Install dimmer switch (5) through bottom of compartment floor.
2. Install two new lockwashers (4) and screws (3).
3. Connect two wire connectors (1).
4. Install two screws (2).



5. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

TURN SIGNAL AND HAZARD WARNING SWITCH REPLACEMENT 0080 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (3)

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

WARNING

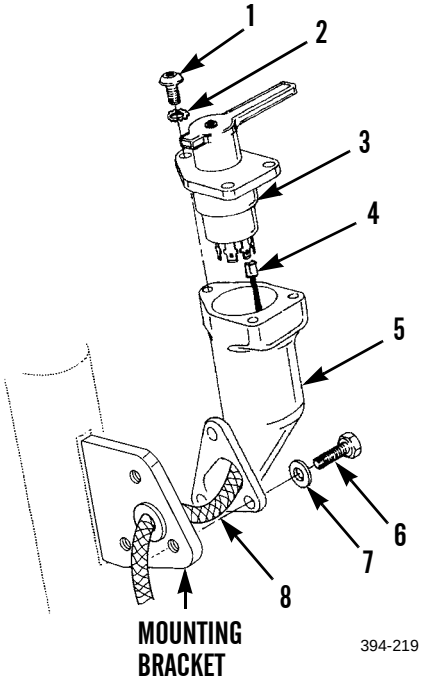
Turn battery disconnect to OFF position before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

1. Remove three screws (1) and lockwashers (2) from switch (3). Discard lockwashers.
2. Pull switch (3) out of holder (5).

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

3. Disconnect five wire connectors (4).
4. If necessary, remove three bolts (6), washers (7) and holder (5) from mounting bracket and slide wiring harness (8) out of holder.

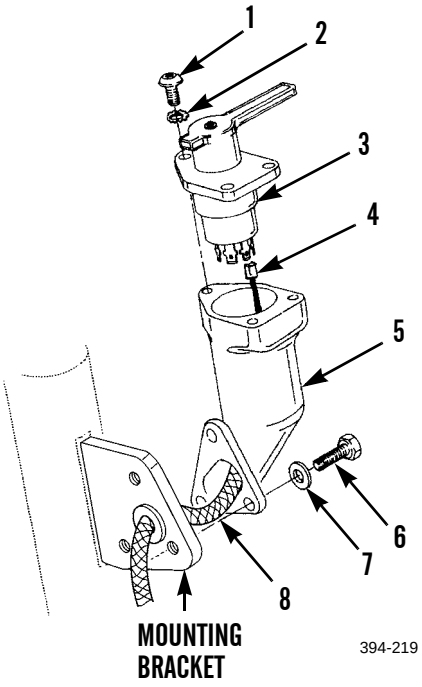


INSTALLATION

NOTE

If holder was removed, perform steps 1 and 2. Otherwise, skip to step 3.

1. Route wiring harness (8) through holder (5) and position holder on mounting bracket.
2. Install three washers (7) and bolts (6).
3. Connect five wire connectors (4) to switch (3).
4. Install switch (3).
5. Install three new lockwashers (2) and screws (1).



END OF WORK PACKAGE

TURN SIGNAL FLASHER REPLACEMENT 0081 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Step assembly removed (WP 0200 00)

WARNING

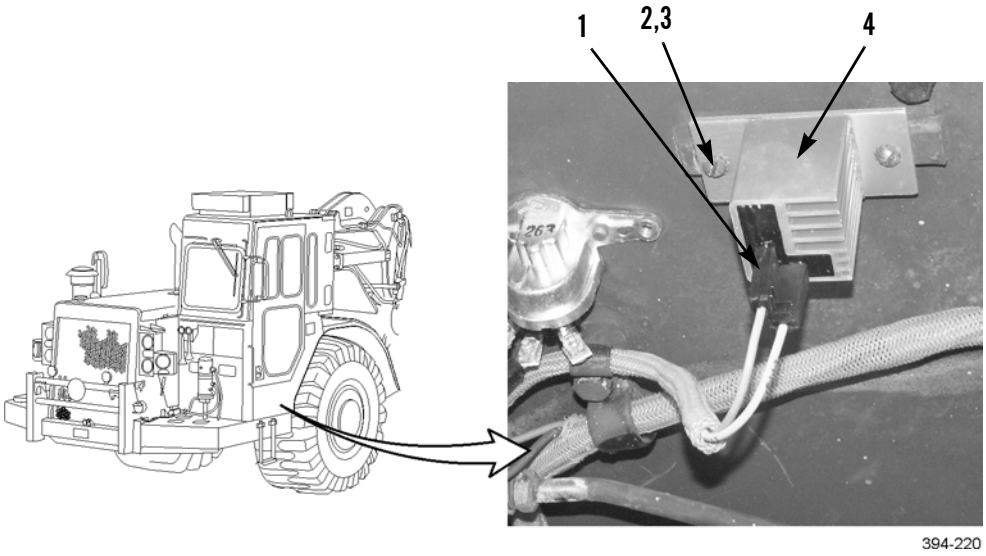
Ensure battery disconnect is in OFF position before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Disconnect two wire connectors (1) from turn signal flasher (4).
2. Remove two screws (2) and lockwashers (3). Discard lockwashers.
3. Remove turn signal flasher unit (4).



INSTALLATION

1. Position turn signal flasher unit (4).
2. Install two new lockwashers (3) and screws (2).
3. Install two wire connectors (1).
4. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

BLACKOUT DRIVE LIGHT ASSEMBLY REPLACEMENT 0082 00

THIS WORK PACKAGE COVERS

Blackout Drive Lamp: Removal, Installation

Blackout Drive Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (2)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

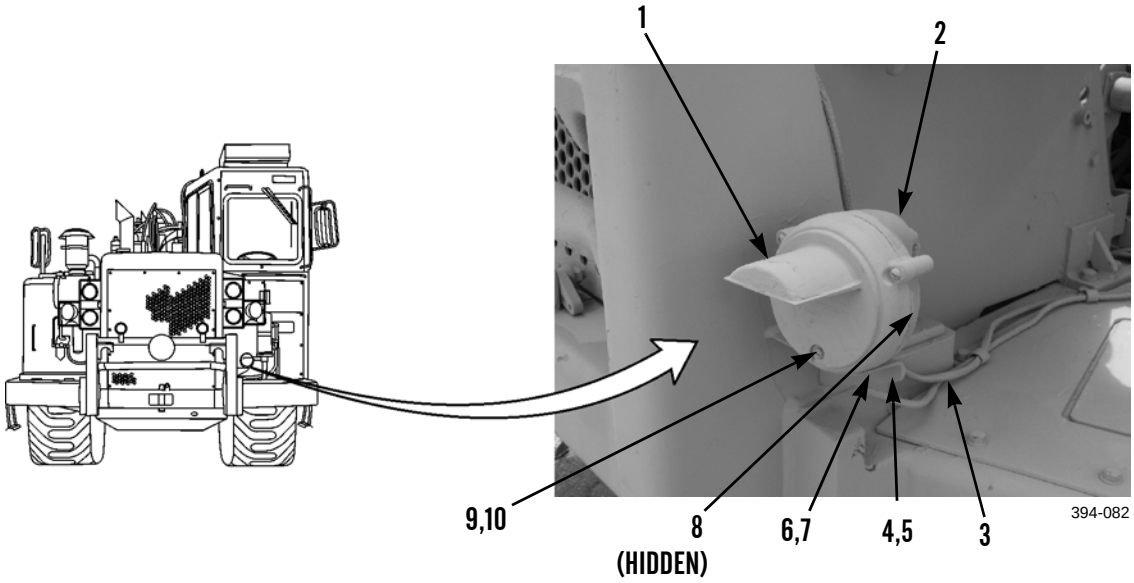
Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

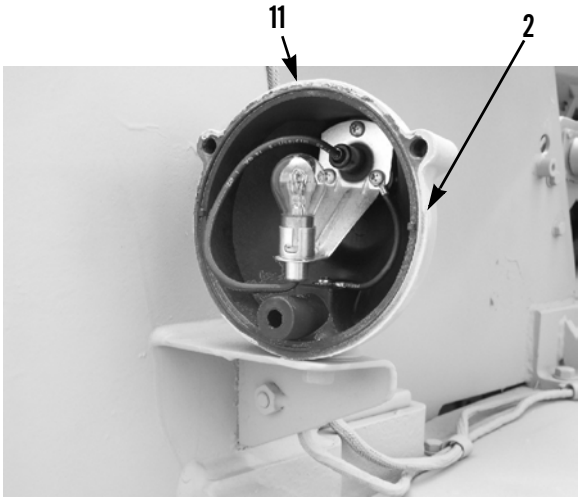
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

BLACKOUT DRIVE LIGHT REMOVAL

1. Remove three screws (9).
2. Remove door assembly (1) from blackout drive light (2).
3. Remove gasket (8) and preformed packing (10). Discard if damaged.



4. Remove lamp (11) from blackout drive light (2).



BLACKOUT DRIVE LIGHT INSTALLATION

1. Install lamp (11) in blackout drive light (2).
2. Install preformed packing (10) and new gasket (8).
3. Install door assembly (1).
4. Install three screws (9).
5. Verify correct operation of blackout drive light (TM 5-3805-248-10).

BLACKOUT DRIVE LIGHT ASSEMBLY REMOVAL

1. Disconnect wiring harness (3) from rear of blackout drive light (2).
2. Remove nut (4) and lockwasher (5). Discard lockwasher.
3. Remove blackout drive light (2).
4. Remove washer (7) and lockwasher (6). Discard lockwasher.

BLACKOUT DRIVE LIGHT ASSEMBLY INSTALLATION

1. Install new lockwasher (6) and washer (7).
2. Install blackout drive light (2).
3. Install new lockwasher (5) and nut (4).
4. connect wiring harness (3) to rear of blackout drive light (2).
5. Verify correct operation of blackout drive light (TM 5-3805-248-10).

END OF WORK PACKAGE

FRONT WORKLIGHTS REPLACEMENT 0083 00

THIS WORK PACKAGE COVERS

Front Worklight Lamp: Removal, Installation

Front Worklight Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

NOTE

The following maintenance procedure is for the right front worklight. The maintenance procedure for the left front worklight is identical.

FRONT WORKLIGHT LAMP REMOVAL

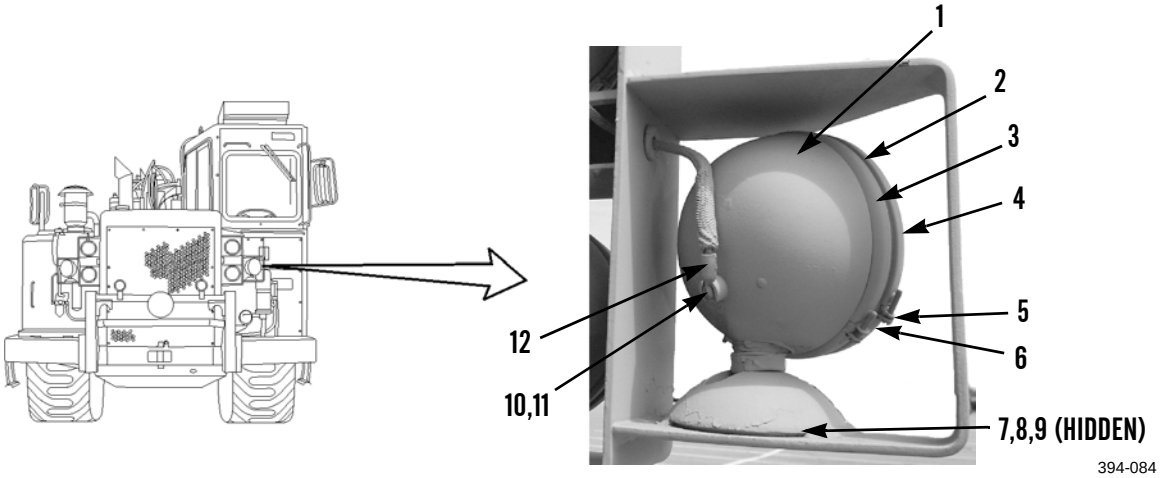
1. Remove screw (5) and terminal lug (4).
2. Remove lamp (13).
3. Disconnect harness assembly (14) from lamp (13).

FRONT WORKLIGHT LAMP INSTALLATION

1. Connect wire assembly (14) to lamp (13).
2. Install lamp (13).
3. Install terminal lug (4) and screw (5).
4. Verify correct operation of worklights (TM 5-3805-248-10).

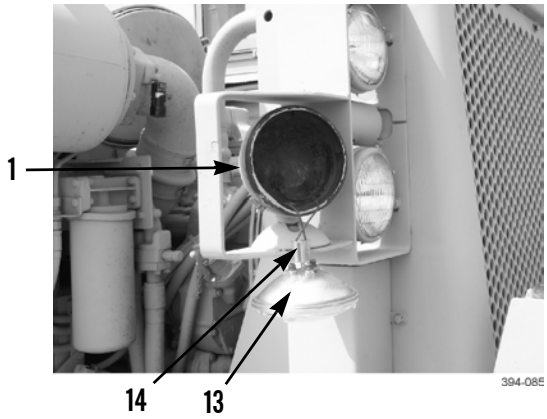
FRONT WORKLIGHT ASSEMBLY REMOVAL

1. Remove screw (10) and washer (11) from back of worklight housing (1).
2. Disconnect wire connector (12).
3. If necessary, remove worklight. Refer to *Front Worklight Lamp Removal* in this work package. If necessary, remove screw (6) and terminal lug (3).
4. If necessary, remove lens retainer (2) from worklight housing (1).
5. Remove nut (7) and washers (8 and 9).
6. Remove worklight housing (1) assembly.



FRONT WORKLIGHT ASSEMBLY INSTALLATION

1. Install worklight housing (1) assembly on machine bracket.
2. Install washers (9 and 8) and nut (7).
3. If removed, install lens retainer (2), terminal lug (3) and screw (6) on worklight housing (1).
4. If removed, install floodlamp. Refer to *Front Worklight Lamp* in this work package.
5. Connect wire connector (12).
6. Install washer (11) and screw (10).



7. Verify correct operation of worklights (TM 5-3805-248-10).

END OF WORK PACKAGE

HEADLIGHTS REPLACEMENT 0084 00

THIS WORK PACKAGE COVERS

Headlight Lamp: Removal, Installation

Headlight Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

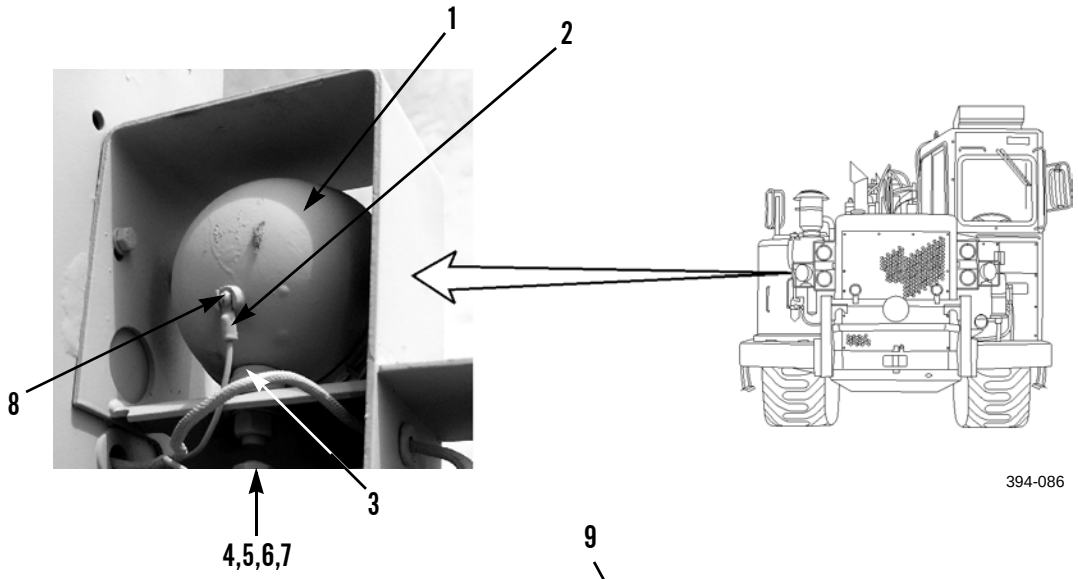
Ensure the battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

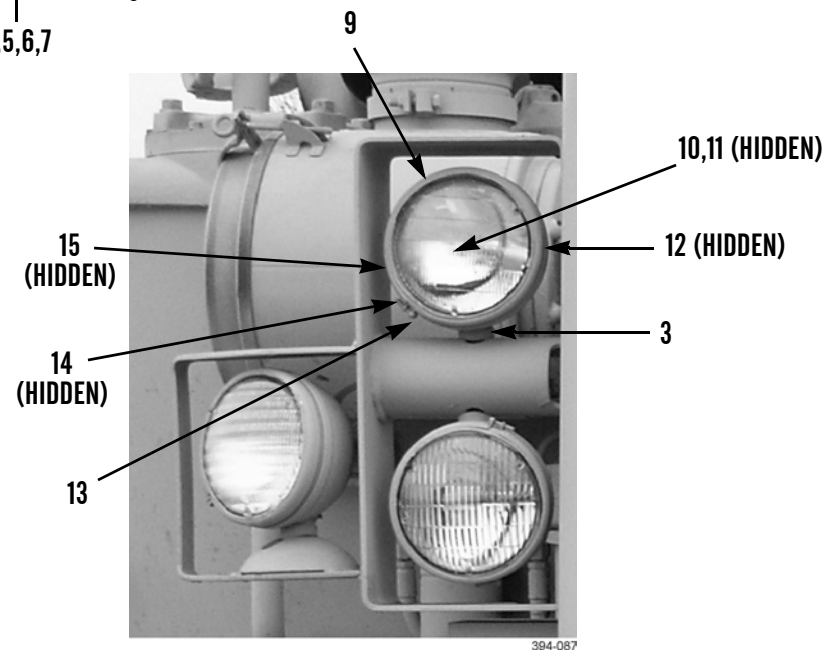
NOTE

The following maintenance procedure is for the right high beam headlight. The maintenance procedures for the left high beam headlight and the left and right low beam headlights are identical.

HEADLIGHT LAMP REMOVAL

1. Remove screw (13) and terminal lug (9) from lens retainer (12).
2. Remove lamp (10) and disconnect harness assembly (11).





HEADLIGHT LAMP INSTALLATION

1. Connect harness assembly (11) to lamp (10).
2. Install lamp (10).
3. Install terminal lug (9) and screw (13).
4. Verify correct operation of headlights (TM 5-3805-248-10).

HEADLIGHT ASSEMBLY REMOVAL

1. Remove screw (8) from rear of high beam headlight housing (1) assembly.
2. Disconnect connector (2).
3. If necessary, remove headlight lamp. Refer to *Headlight Lamp Removal* in this work package.
4. If necessary, remove screw (14) and terminal lug (15) from lens retainer (12).
5. If necessary, remove lens retainer (12) from high beam headlight housing (1).
6. Remove nut (4), lockwasher (5) and spacers (6 and 7). Discard lockwasher.
7. Remove headlight housing (1).
8. Remove spacer (3).

HEADLIGHT ASSEMBLY INSTALLATION

1. Install spacer (3).
2. Install high beam headlight housing (1) assembly.
3. Install spacers (7 and 6), new lockwasher (5) and nut (4).
4. If removed, install lens retainer (12), terminal lug (15) and screw (14) on high beam headlight housing (3).
5. If removed, install headlight lamp. Refer to *Headlight Lamp Installation* in this work package.
6. Connect connector (2).
7. Install screw (8).
8. Verify correct operation of headlights (TM 5-3805-248-10).

END OF WORK PACKAGE

HEADLIGHTS AND WORKLIGHT BRACKETS REPLACEMENT 0085 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Front worklight connector disconnected (WP 0083 00)

Headlight connector disconnected (WP 0084 00)

WARNING

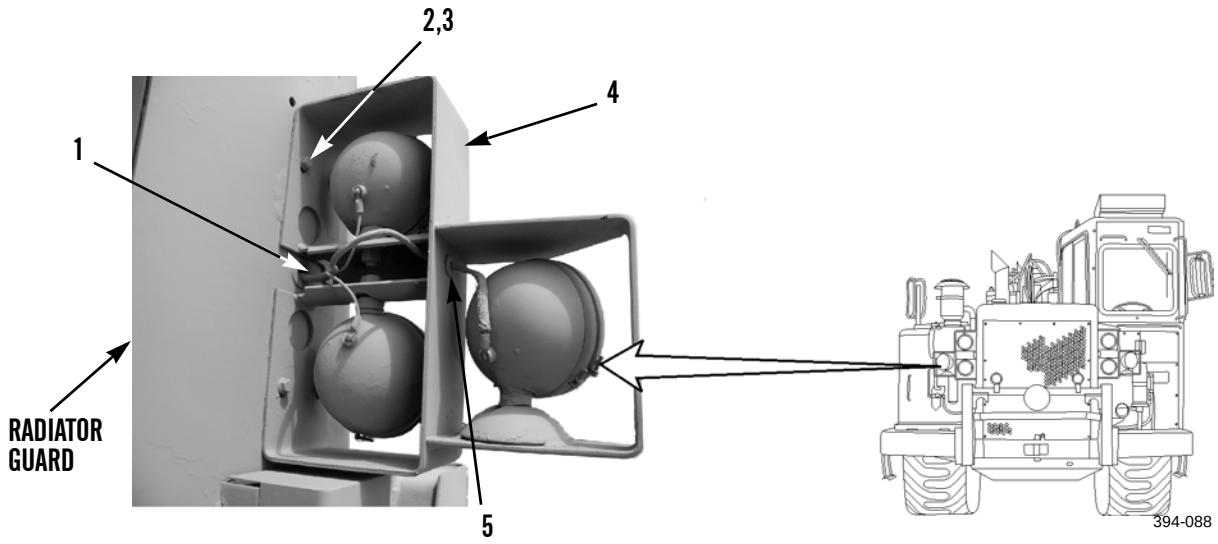
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

NOTE

- The following maintenance procedure is for the right side headlights and worklight bracket. The maintenance procedure for the left side headlights and worklight brackets is identical.
- Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

REMOVAL

1. Pull wiring harness (1) out of grommet (5).
2. If damaged, remove grommet (5).
3. Remove four bolts (2) and washers (3).
4. Remove bracket (4) from radiator guard.



CLEANING AND INSPECTION

- Dry cleaning solvent MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. The use of protective gloves and goggles is suggested. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Position bracket (4) on radiator guard.
2. Install four washers (3) and bolts (2).
3. If removed, install grommet (5) in bracket (4).
4. Pull wiring harness (1) through grommet (5).
5. Connect front worklight connector (WP 0083 00).
6. Install headlight connector (WP 0084 00).

END OF WORK PACKAGE

CUTTING EDGE WORKLIGHT REPLACEMENT 0086 00

THIS WORK PACKAGE COVERS

Cutting Edge Worklight Lamp: Removal, Installation

Cutting Edge Worklight Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

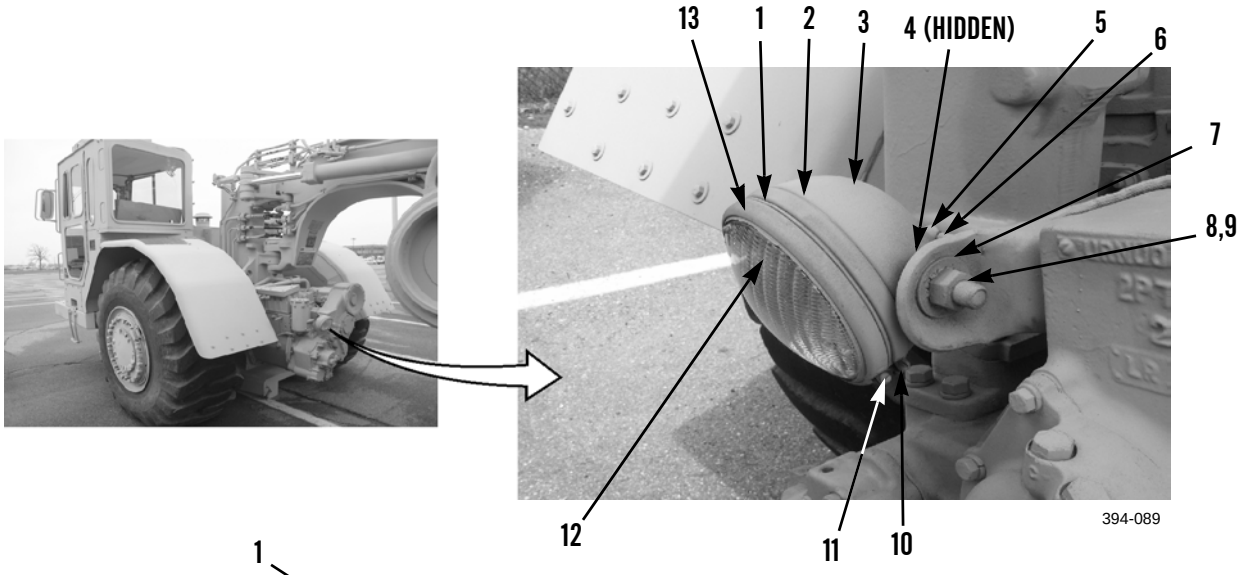
Battery disconnect switch in OFF position (TM 5-3805-248-10)

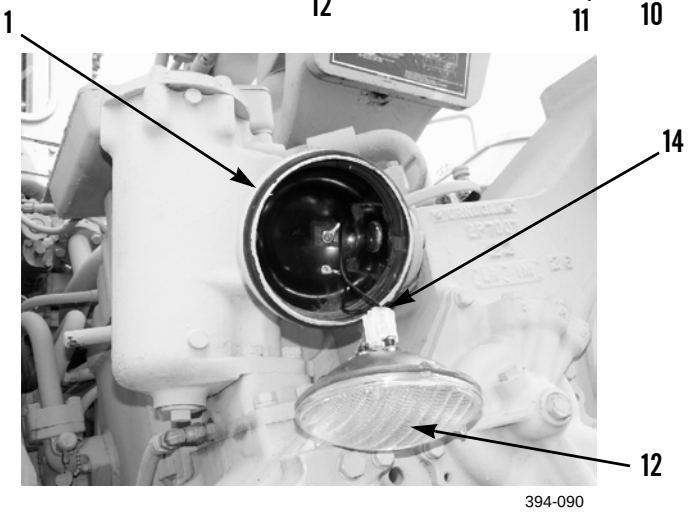
WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

CUTTING EDGE WORKLIGHT LAMP REMOVAL

1. Remove screw (11) and lug terminal (13).
2. Remove lamp (12) from lens retainer (1).
3. Unplug lamp (12) from socket (14) inside worklight housing (3).





CUTTING EDGE WORKLIGHT LAMP INSTALLATION

1. Plug lamp (12) into socket (14) inside worklight housing (3).
2. Install lamp (12).
3. Install terminal lug (13) and screw (11).
4. Verify correct operation of worklight (TM 5-3805-248-10).

CUTTING EDGE WORKLIGHT ASSEMBLY REMOVAL

1. Remove screw (5) from rear of worklight housing (3).
2. Disconnect connector (6).
3. If necessary, remove cutting edge worklight lamp, refer to *Cutting Edge Worklight Lamp Removal* in this work package.
4. If necessary, remove screw (10) and lug terminal (2).
5. If necessary, remove lens retainer (1) from worklight housing (3).
6. Remove nut (8), lockwasher (9) and washer (7). Discard lockwasher.
7. Remove worklight housing (3).
8. Remove washer (4) from worklight housing (3).

CUTTING EDGE WORKLIGHT ASSEMBLY INSTALLATION

1. Install washer (4) on worklight housing (3).
2. Install worklight (3).
3. Install washer (7), new lockwasher (8) and nut (9).
4. If removed, install lens retainer (1) on worklight housing (3).
5. If removed, position terminal lug (2) on lens retainer (1).
6. If removed, install screw (10) in terminal lug (2).
7. If removed, install cutting edge worklight lamp. Refer to *Cutting Edge Worklight Lamp Installation* in this work package.
8. Connect wire connector (6).
9. Install screw (5).
10. Verify correct operation of worklight (TM 5-3805-248-10).

END OF WORK PACKAGE

SERVICE STOP/TAIL LIGHT REPLACEMENT 0087 00

THIS WORK PACKAGE COVERS

Service Stop/Tail Light Lamp: Removal, Installation

Service Stop/Tail Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

NOTE

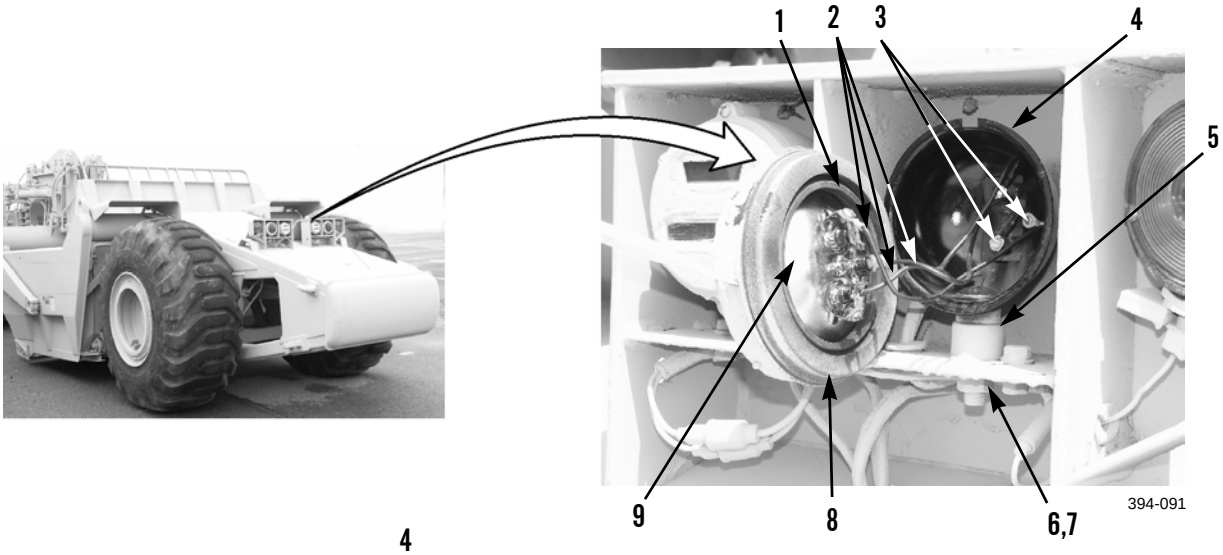
- Tag all wire connectors, cables and harnesses before disconnecting to ensure correct installation.
- The following maintenance procedure is for the left service stop/tail light. The maintenance procedure for the right service stop/tail light is identical.

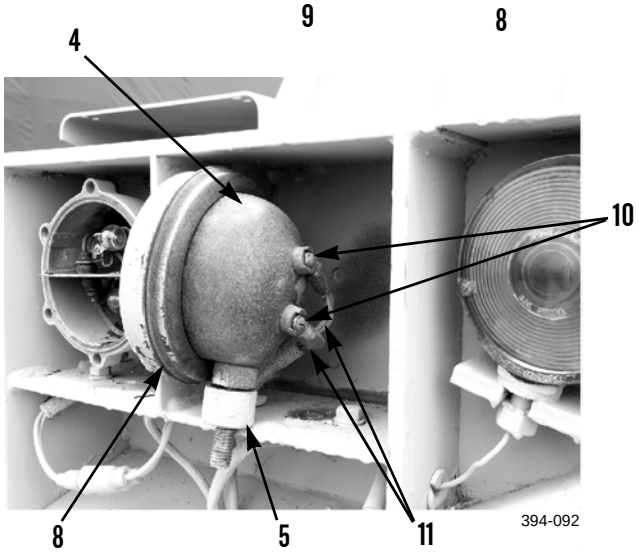
SERVICE STOP/TAIL LIGHT LAMP REMOVAL

1. Separate lens retainer (8) from tail light housing (4).
2. Remove three screws (1). Disconnect three wires (2) from terminals on lamp (9).
3. Remove lens retainer (8) from lamp (9).

SERVICE STOP/TAIL LIGHT LAMP INSTALLATION

1. Install lens retainer (8) on lamp (9).
2. Connect three wires (2) at terminals on lamp (9).
3. Install lens retainer (8) on tail light housing (4).
4. Install three screws (1).
5. Verify correct operation of stop/tail lights (TM 5-3805-248-10).





SERVICE STOP/TAIL LIGHT ASSEMBLY REMOVAL

1. Remove nut (6) and lockwasher (7). Discard lockwasher.
2. Rotate tail light (4) for access to rear.
3. Remove two screws (10).
4. Disconnect two wire connectors (11).
5. Remove tail light (4).
6. Remove spacer (5).
7. If necessary, remove service stop/tail light lamp. Refer to *Service Stop/Tail Light Lamp Removal* in this work package.
8. If necessary, remove two screws (3).
9. If necessary, remove two wires (2) from terminals on tail light housing (4).

SERVICE STOP/TAIL LIGHT ASSEMBLY INSTALLATION

1. If removed, connect two wires (2) to terminals on tail light housing (4).
2. If removed, install two screws (3).
3. If removed, install service stop/tail light lamp. Refer to *Service Stop/Tail Light Lamp Installation* in this work package
4. Install spacer (5) in tail light (4).
5. Loosely install tail light (4), new lockwasher (4) and nut (3).
6. Connect two wire connectors (2) at terminals.
7. Install two screws (10).
8. Rotate tail light (4) and tighten nut (3) to 51 lb-ft (69 Nm).
9. Verify correct operation of stop/tail lights (TM 5-3805-248-10).

END OF WORK PACKAGE

BLACKOUT STOP AND TAIL LIGHT MAINTENANCE 0088 00

THIS WORK PACKAGE COVERS

Blackout Stop and Tail Light Lamps: Removal, Installation

Blackout Stop and Tail Light: Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item, 42 WP 0339 00)

Lockwasher (2)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

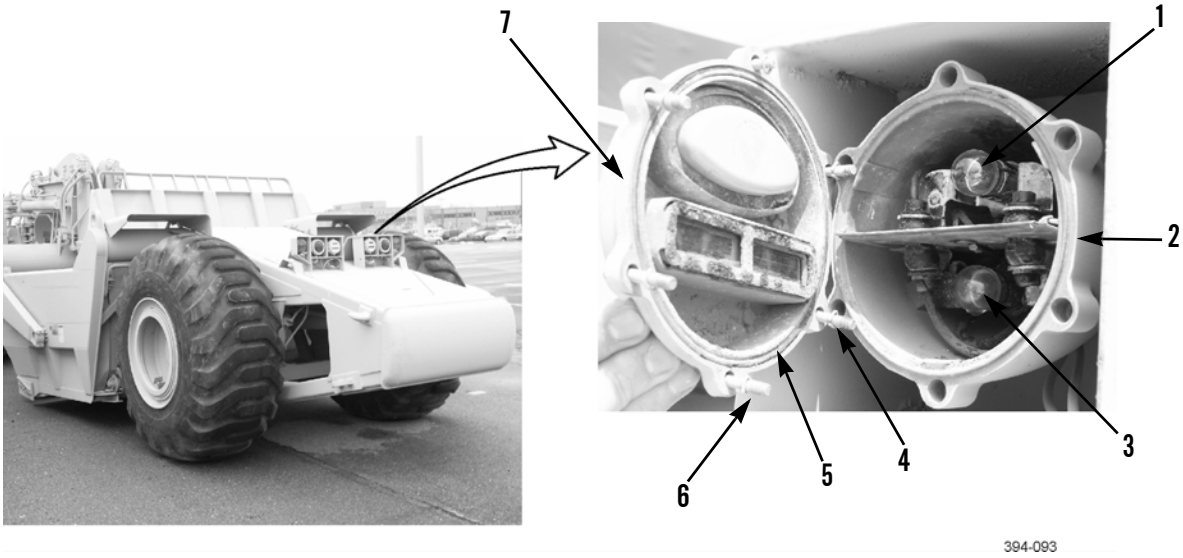
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

NOTE

- The following maintenance procedure is for the left blackout stop and tail light. The maintenance procedure for the right blackout stop and tail light is identical.
- Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

BLACKOUT STOP AND TAIL LIGHT LAMPS REMOVAL

1. Loosen six screws (6) all the way.
2. Remove lens retainer (7) from blackout tail light housing (2).
3. If damaged, remove and discard preformed packing (5).
4. If damaged, remove six retaining clips (4) from screws (6) and remove six screws (6) from lens retainer (7).
5. Remove lamps (1 and 3).



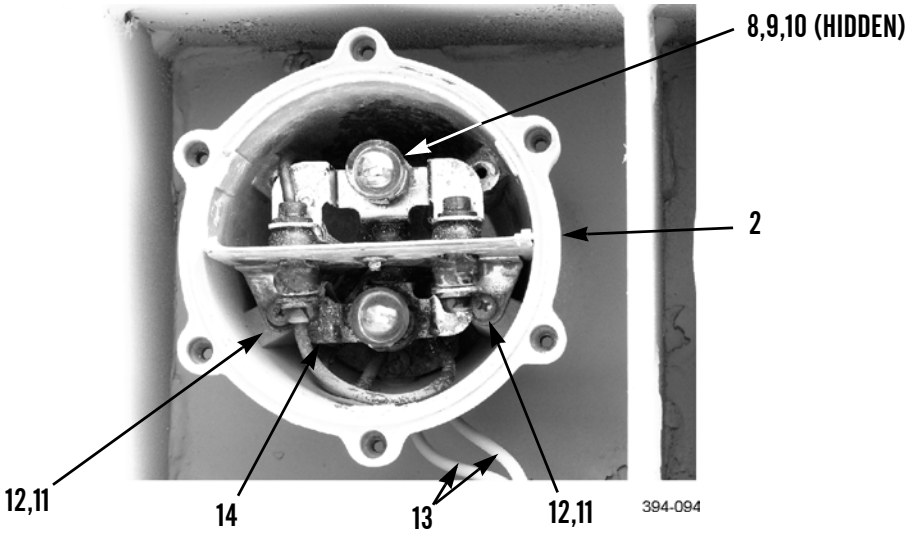
BLACKOUT STOP AND TAIL LIGHT LAMPS INSTALLATION

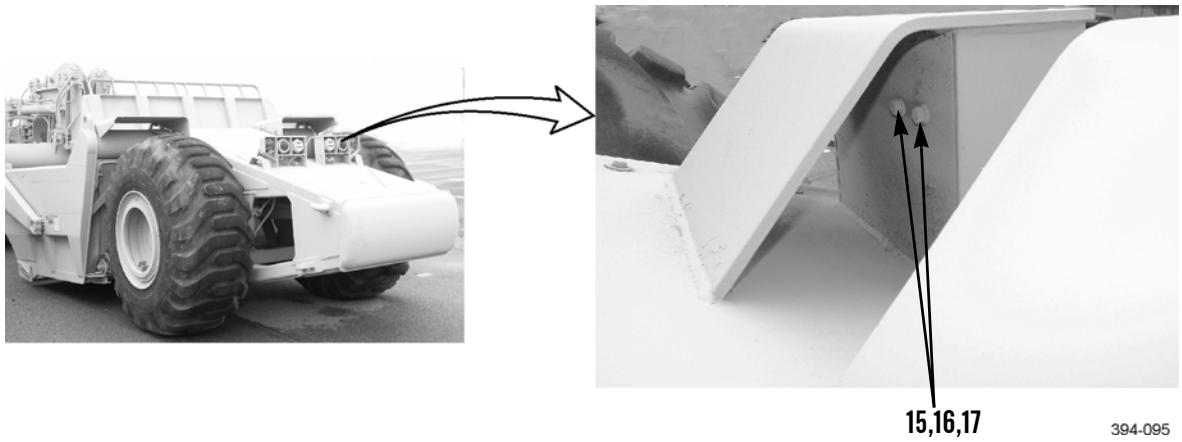
1. Install lamps (1 and 3).
2. If removed, install six screws (6) on lens retainer (7) loosely.
3. If removed, install six retaining clips (4) onto screws (6).
4. If removed, install preformed packing (5) on lens retainer (7).
5. Install lens retainer (7) and tighten six screws (6).
6. Verify correct operation of blackout stop/tail lights (TM 5-3805-248-10).

BLACKOUT STOP AND TAIL LIGHT REMOVAL

1. Disconnect two wire assemblies (13) from wire harness.
2. Remove two bolts (15) and washers (16).
3. Remove blackout tail light housing (2) assembly.
4. Remove two spacers (17).

BLACKOUT STOP AND TAIL LIGHT REMOVAL - CONTINUED





BLACKOUT STOP AND TAIL LIGHT DISASSEMBLY

1. Remove blackout stop and tail light lamps. Refer to *Blackout Stop and Tail Light Lamps* in this work package.
2. Remove two screws (11), lockwashers (12) and lamp holder assembly (14). Discard lockwashers.
3. Remove three screws (8), plate (9) and grommet (10) from blackout tail light housing (2).

BLACKOUT STOP AND TAIL LIGHT ASSEMBLY

1. Install grommet (10), plate (9) and three screws (8) into blackout tail light housing (2).
2. Install lamp holder assembly (14), two new lockwashers (12) and screws (11).
3. Install blackout stop and tail light lamps. Refer to *Blackout Stop and Tail Light Lamps* in this work package.

BLACKOUT STOP AND TAIL LIGHT INSTALLATION

1. Install two spacers (17) and blackout tail light housing (2).
2. Install two washers (16) and bolts (15).
3. Connect two wire assemblies (13) to wire harness.
4. Verify correct operation of blackout stop/tail lights (TM 5-3805-248-10).

END OF WORK PACKAGE

DIRECTIONAL LIGHT INDICATOR LIGHT REPLACEMENT 0089 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher

Equipment Condition

Battery cables disconnected (WP 0104 00)

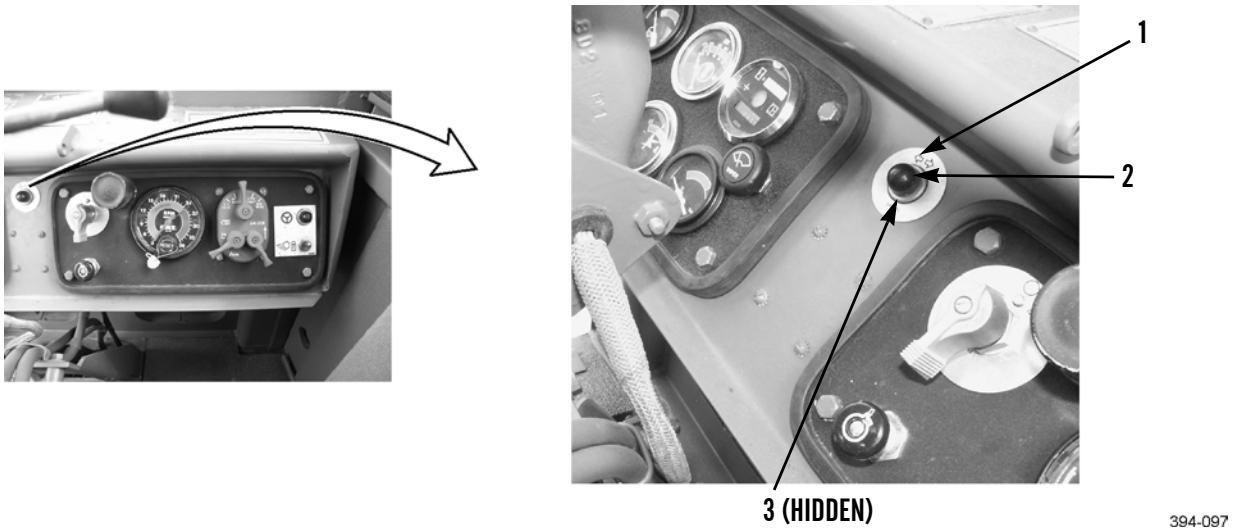
Upper front access plates removed (WP 0192 00)

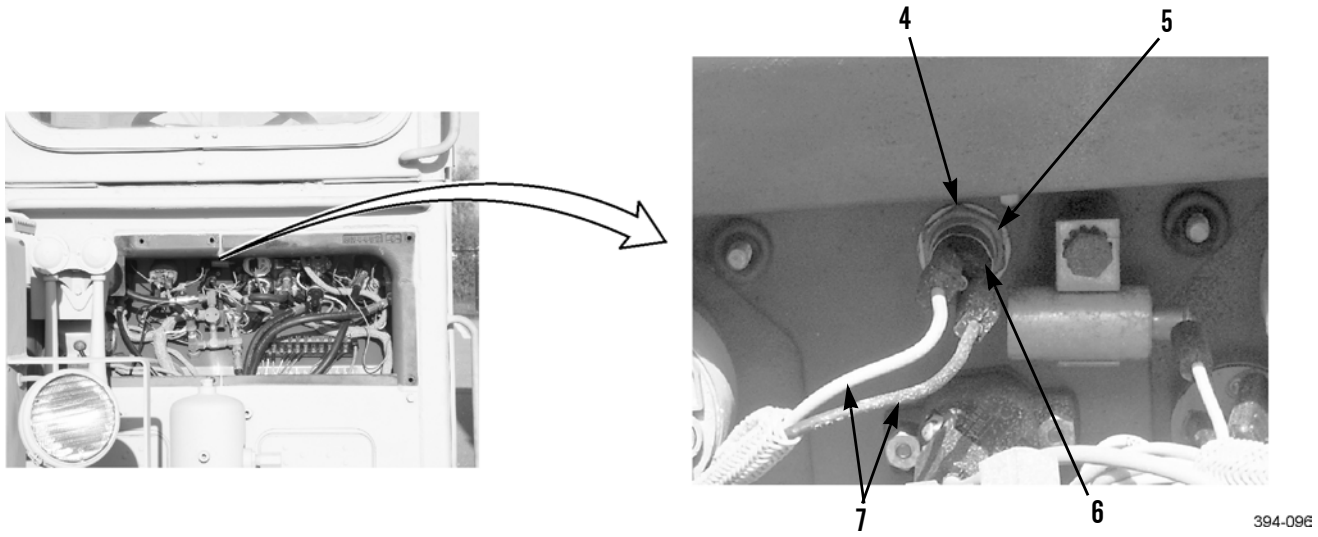
WARNING

Ensure the battery cables are disconnected before performing this maintenance. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

1. Remove lens (2).
2. Remove lamp (3) from base (6).
3. Disconnect two connectors (7).
4. Remove nut (5) and lockwasher (4). Discard lockwasher.
5. Remove base (6).
6. Remove instruction plate (1) from operator's compartment.





INSTALLATION

1. Install instruction plate (1) on operator’s compartment.
2. Install base (6).
3. Install new lockwasher (4) and nut (5).
4. Connect two connectors (7).
5. Install lamp (3) in base (6).
6. Install lens (2).
7. Connect battery cables (WP 0104 00).
8. Operate directional lights to verify correct operation (TM 5-3805-248-10).
9. Install upper front access plate (WP 0192 00).

END OF WORK PACKAGE

DIRECTIONAL LIGHT ASSEMBLY (FRONT) REPLACEMENT 0090 00

THIS WORK PACKAGE COVERS

Directional Lamp: Removal, Installation

Directional Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

Materials/Parts - Continued

Lockwasher

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

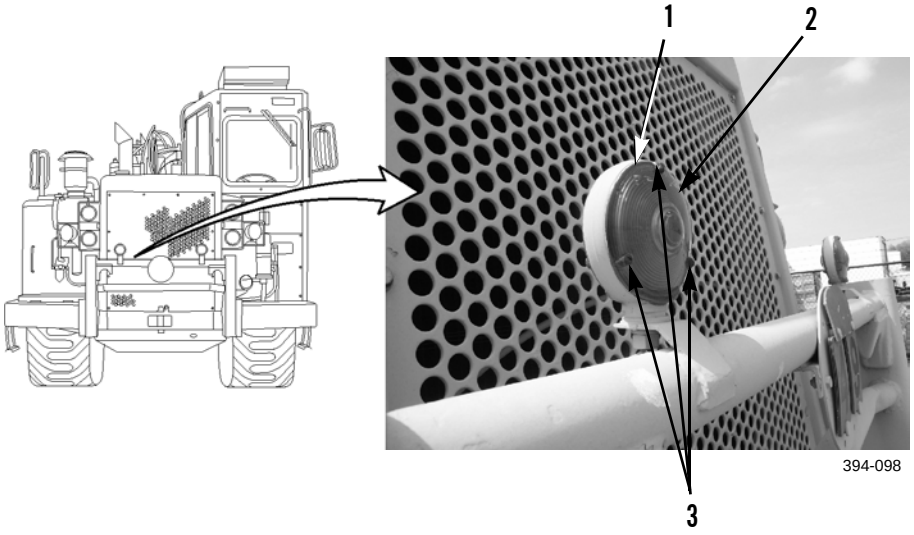
NOTE

The following replacement procedure is for the right directional light assembly. The replacement procedure for the left directional light assembly is identical.

DIRECTIONAL LAMP REMOVAL

1. Remove three screws (3) from directional light assembly (1).
2. Remove lens (2).

.



3. Remove lamp (4).
4. If damaged, remove and discard gasket (5).

DIRECTIONAL LAMP INSTALLATION

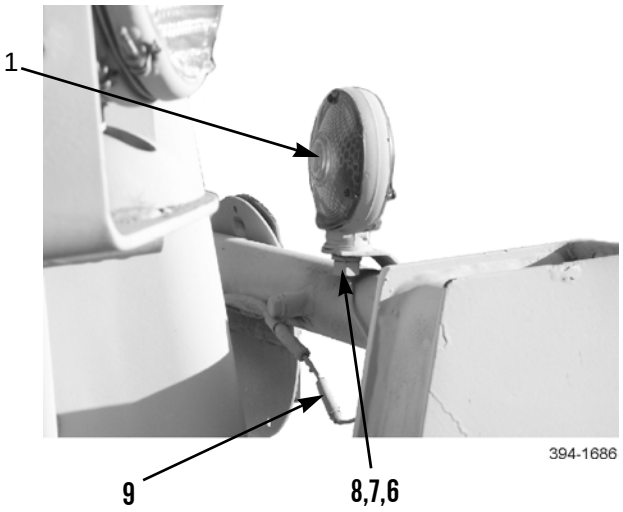
1. Install new gasket (5).
2. Install lamp (4).
3. Position lens (2) on directional light assembly (1).
4. Install three screws (3).
5. Verify correct operation of directional lights (TM 5-3805-248-10).

DIRECTIONAL LIGHT ASSEMBLY REMOVAL

1. Disconnect wire connector (9) from wiring harness.
2. Remove nut (6), lockwasher (7) and washer (8). Discard lockwasher.
3. Remove directional light assembly (1).

DIRECTIONAL LIGHT ASSEMBLY INSTALLATION

1. Install directional light assembly (1).
2. Install washer (8), new lockwasher (7) and nut (6).
3. Connect wire connector (9).



4. Verify correct operation of directional lights (TM 5-3805-248-10).

END OF WORK PACKAGE

DIRECTIONAL LIGHT ASSEMBLY (REAR) REPLACEMENT 0091 00

THIS WORK PACKAGE COVERS

Directional Lamp: Removal, Installation

Directional Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

Materials/Parts - Continued

Lockwasher

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

NOTE

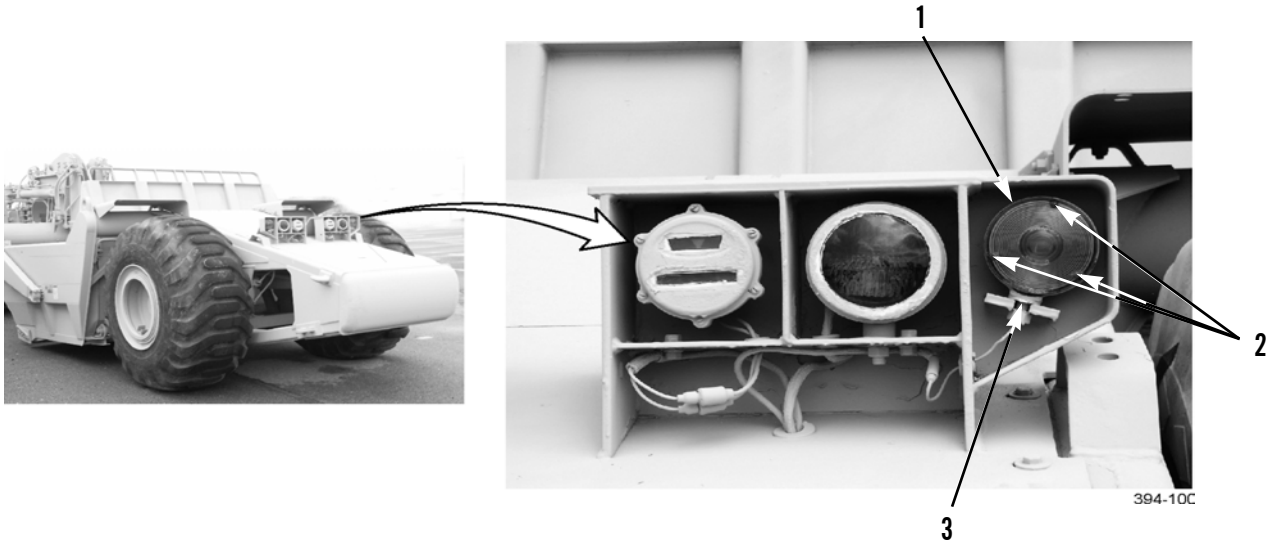
The following replacement procedure is for the right directional light assembly. The replacement procedure for the left directional light assembly is identical.

DIRECTIONAL LIGHT ASSEMBLY (REAR) REPLACEMENT - CONTINUED 0091 00

DIRECTIONAL LAMP REMOVAL

1. Remove three screws (2) from directional light assembly (3).
2. Remove lens (1).
3. Remove lamp (5).
4. Remove gasket (4). If damaged, discard gasket.

.



DIRECTIONAL LAMP INSTALLATION

1. If removed, install new gasket (4).
2. Install lamp (5).
3. Position lens (1) on directional light assembly (3).
4. Install three screws (2).

DIRECTIONAL LAMP INSTALLATION - CONTINUED

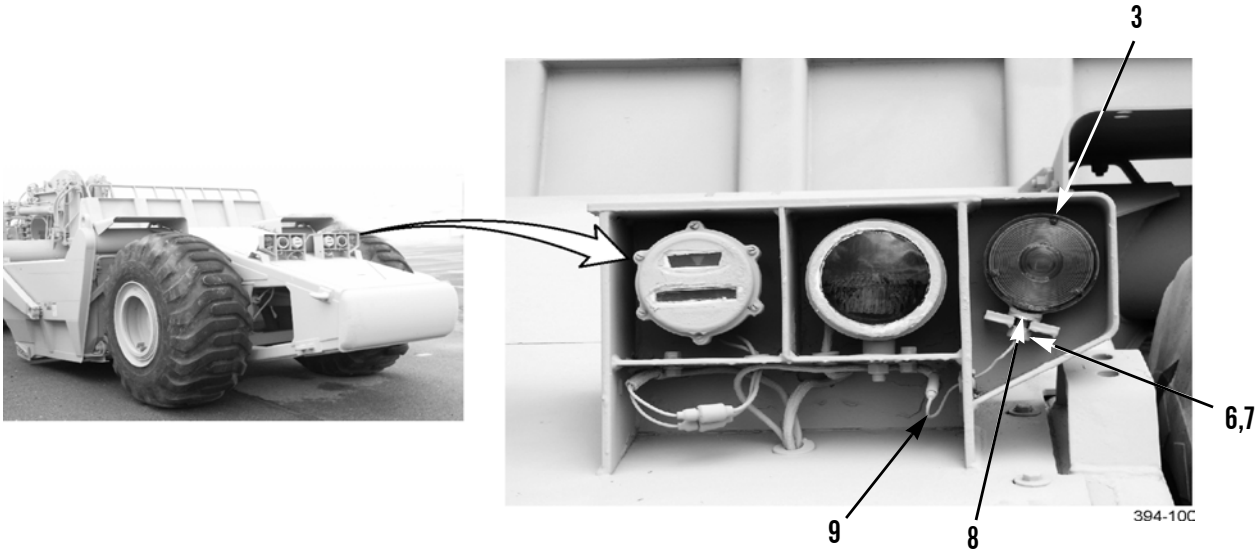
5. Verify correct operation of directional lights (TM 5-3805-248-10).

DIRECTIONAL LIGHT ASSEMBLY REMOVAL

1. Disconnect wire connector (9) from wiring harness.
2. Remove nut (6) and lockwasher (7). Discard lockwasher.
3. Remove directional light assembly (3) and two washers (8).

DIRECTIONAL LIGHT ASSEMBLY INSTALLATION

1. Install two washers (8) and directional light assembly (3).
2. Install new lockwasher (7) and nut (6).
3. Connect wire connector (9).
4. Place battery disconnect switch in the ON position (TM 5-3805-248-10).
5. Verify correct operation of directional lights (TM 5-3805-248-10).



END OF WORK PACKAGE

WATER TEMPERATURE SENDING UNIT REPLACEMENT 0092 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Hood removed (WP 0189 00)

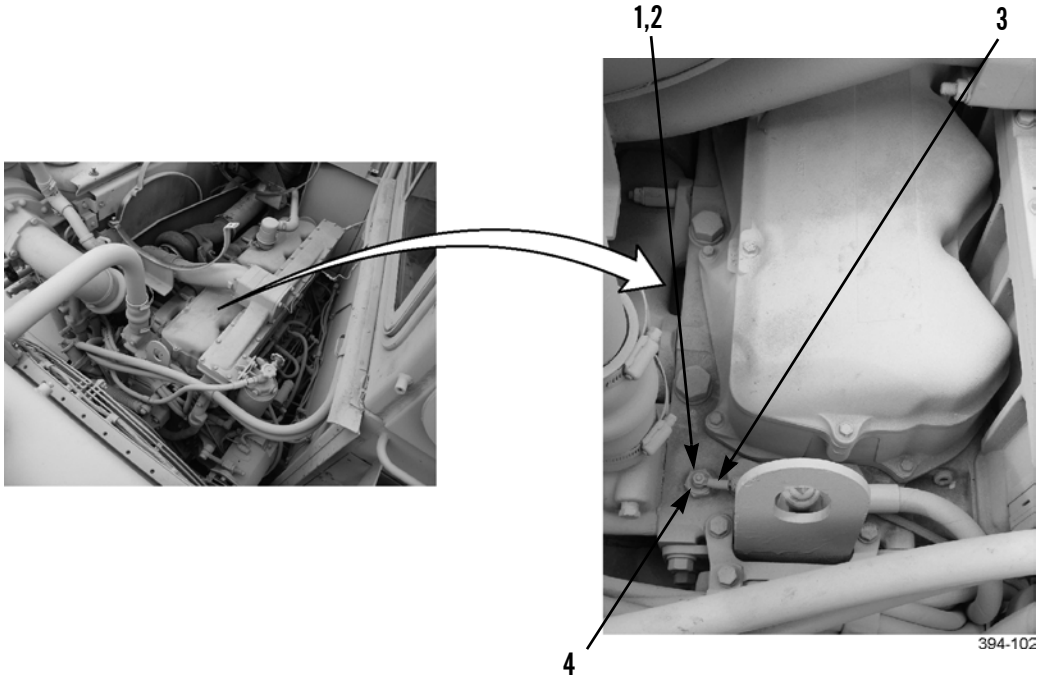
Coolant drained to below level of temperature sender (WP 0042 00)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

1. Remove nut (1) and washer (2) from top front of engine.
2. Disconnect wire connector (3) at terminal.
3. Remove water temperature sending unit (4).



INSTALLATION

CAUTION

Do not hit or drop temperature sender on any hard surface. Damage to sender may occur if dropped.

1. Install water temperature sending unit (4).
2. Connect wire connector (3) at terminal.
3. Install washer (2) and nut (1).
4. Install hood (WP 0189 00).
5. Check coolant and fill to correct level (WP 0042 00).
6. Operate engine and allow to reach normal operating temperature (TM 5-3805-248-10).
7. Verify correct operation of temperature gage.

END OF WORK PACKAGE

CONVERTER/RETARDER TEMPERATURE SENDING UNIT REPLACEMENT 0093 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tape, anti-seizing (Item 43, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Crankcase guard removed (WP 0201 00)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

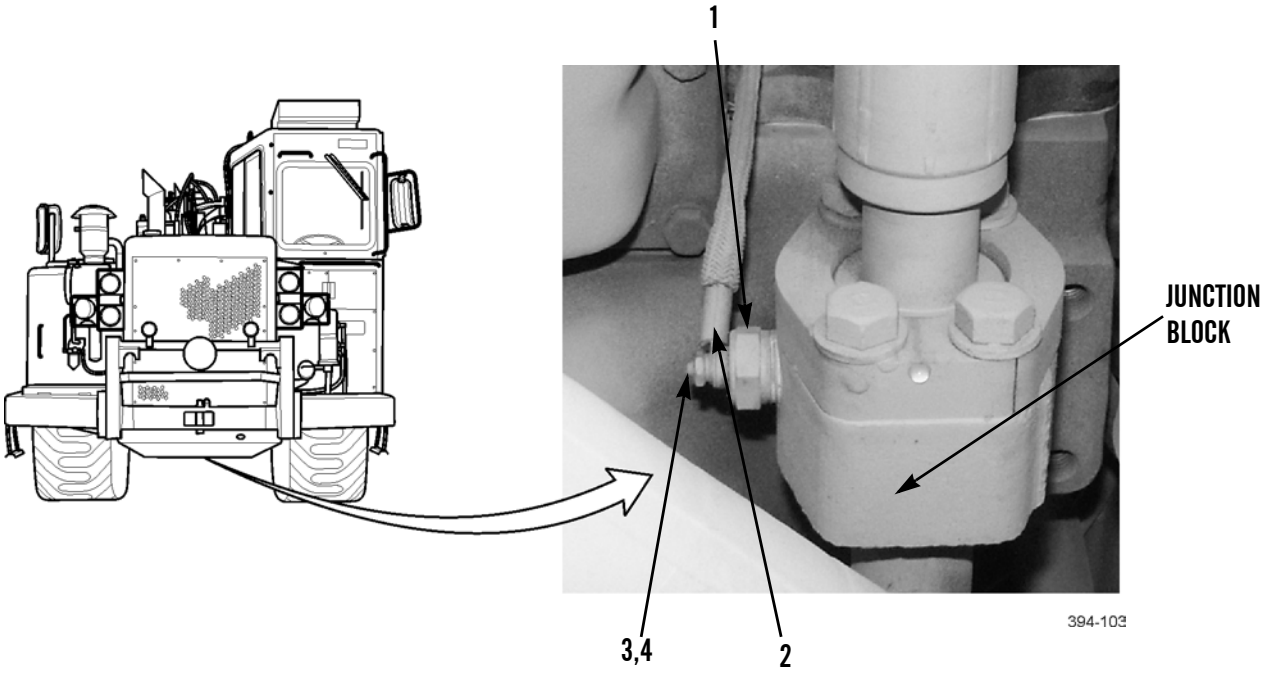
REMOVAL

1. Remove nut (4) and washer (3) under right side of machine.
2. Disconnect wire connector (2).

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

3. Remove temperature sending unit (1) from brake retarder oil line junction block.



INSTALLATION

1. Wrap threads of temperature sending unit with anti-seizing tape and install temperature sending unit (1).
2. Connect wire connector (2).
3. Install washer (3) and nut (4).
4. Install crankcase guard (WP 0201 00).
5. Verify correct transmission oil level (TM 5-3805-248-10).
6. Operate engine and allow to reach normal operating temperature.
7. Verify correct operation of converter/retarder temperature gage (TM 5-3805-248-10).
8. Turn battery disconnect switch to ON position (TM 5-3805-248-10).

END OF WORK PACKAGE

LOW AIR PRESSURE WARNING LAMP SWITCH REPLACEMENT 0094 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Upper front access plates removed (WP 0192 00)

Battery cables disconnected (WP 0104 00)

Air tanks drained (TM 5-3805-248-10)

WARNING

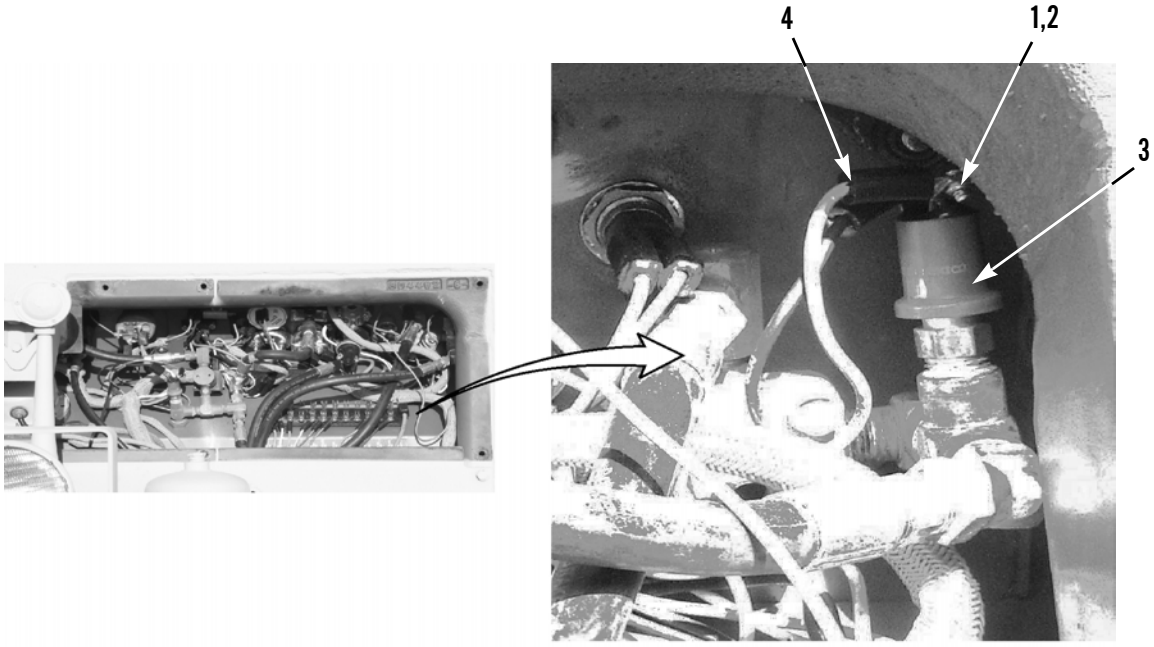
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove two screws (1) and washers (2) from switch (3).
2. Disconnect two wire connectors (4).
3. Remove switch (3).



394-104

INSTALLATION

1. Wrap threads of switch (3) with anti-seizing tape and install.
2. Connect two wire connectors (4).
3. Install two washers (2) and screws (1).
4. Install upper front access plates (WP 0192 00).
5. Connect battery cables (WP 0104 00).
6. Verify correct operation of warning alarm (TM 5-3805-248-10).

END OF WORK PACKAGE

LOW AIR PRESSURE WARNING ALARM SWITCH MAINTENANCE 0095 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Upper front access plates removed (WP 0192 00)

Battery cables disconnected (WP 0104 00)

Air tanks drained (TM 5-3805-248-10)

WARNING

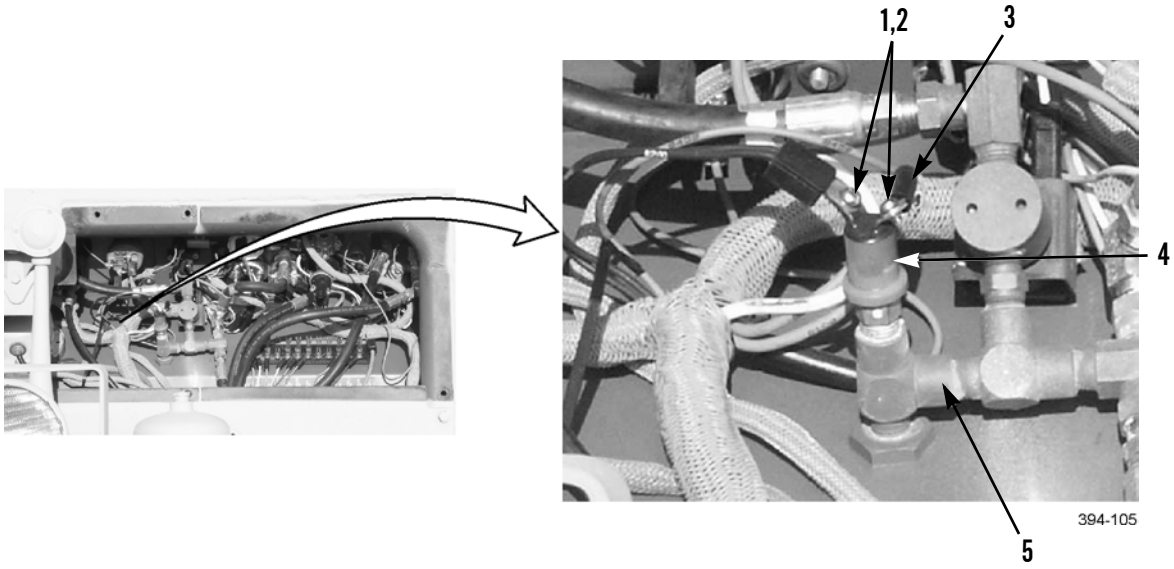
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wires before disconnecting to ensure correct installation.

1. Remove two screws (1) and washers (2) from switch (4).
2. Disconnect two wire connectors (3).
3. Remove switch (4) from tee (5).



INSTALLATION

NOTE

Apply anti-seizing tape to threads of switch prior to installation to ensure proper sealing.

1. Install switch (4) on tee (5).
2. Connect two wire connectors (3).
3. Install two washers (2) and screws (1).
4. Install upper front access plates (WP 0192 00).
5. Connect battery cables (WP 0104 00).
6. Verify correct operation of warning alarm (TM 5-3805-248-10).

END OF WORK PACKAGE

STOPLIGHT SWITCH REPLACEMENT 0096 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Step assembly removed (WP 0200 00)

Air tanks drained (TM 5-3805-248-10)

WARNING

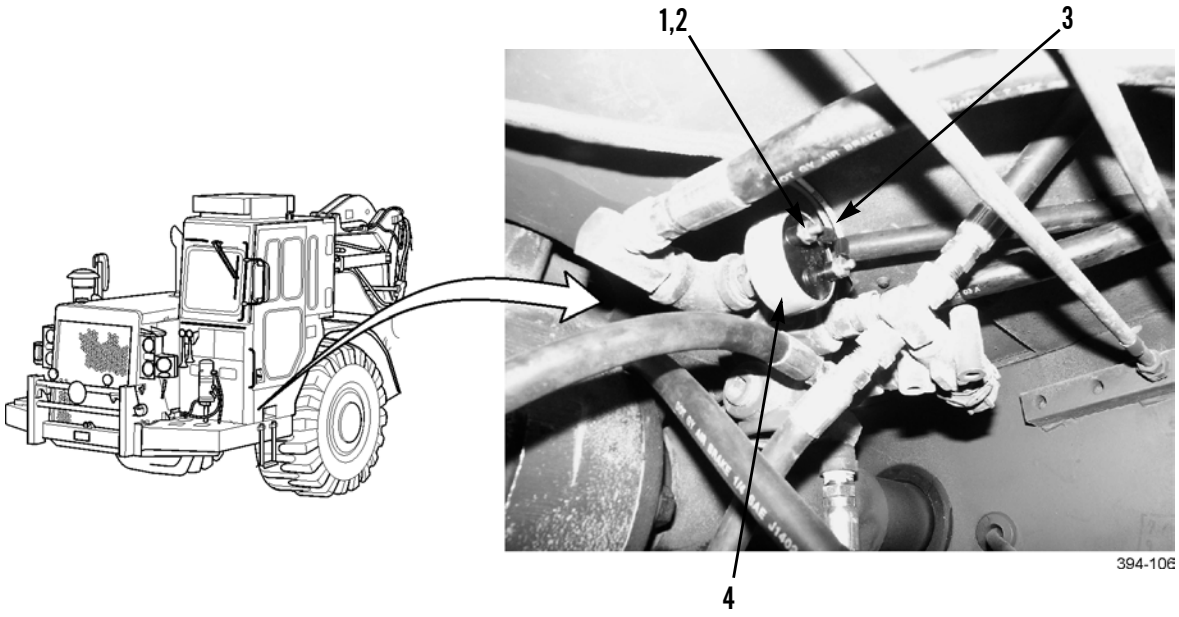
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

Tag all wires before disconnecting to ensure correct installation.

1. Remove two nuts (1) and washers (2) from stoplight switch (4). Do not loosen inner nuts on switch posts.
2. Disconnect two wire connectors (3).
3. Remove stoplight switch (4).



INSTALLATION

1. Wrap threads of stoplight switch (4) with anti-seizing tape and install.
2. Connect two wire connectors (3).
3. Install two washers (2) and nuts (1). Verify inner nuts are tight.
4. Install step assembly (WP 0200 00).
5. Connect battery cables (WP 0104 00).
6. Verify correct operation of stoplights (TM 5-3805-248-10).

END OF WORK PACKAGE

HOUR METER SWITCH REPLACEMENT 0097 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Upper front access plates removed (WP 0192 00)

Battery cables disconnected (WP 0104 00)

WARNING

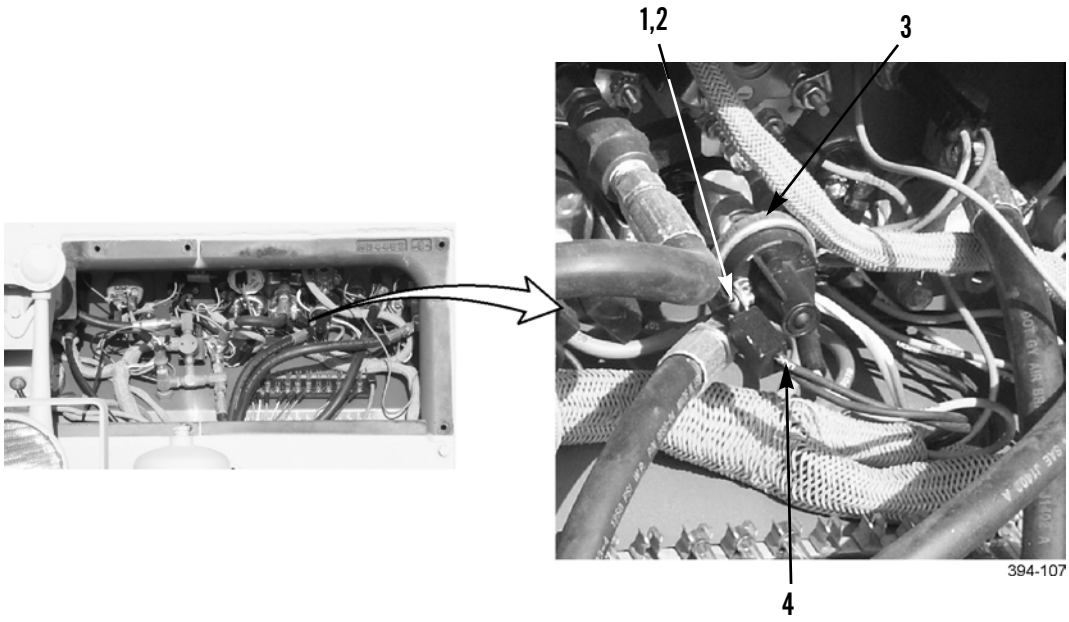
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wires before disconnecting to ensure correct installation.

1. Remove two screws (1) and washers (2) from hour meter switch (3).
2. Disconnect two wire connectors (4).
3. Remove hour meter switch (3).



INSTALLATION

1. Install hour meter switch (3).
2. Install two wire connectors (4).
3. Install two washers (2) and screws (1).
4. Install upper front access plates (WP 0192 00).
5. Connect battery cables (WP 0104 00).
6. Verify correct operation of hour meter (TM 5-3805-248-10).

END OF WORK PACKAGE

ETHER START SENDING UNIT REPLACEMENT 0098 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Materials/Parts - Continued

Lockwasher

References

TM 5-3805-248-10

Equipment Condition

Muffler removed (WP 0041 00)

Coolant drained to below level of ether start sender switch (WP 0042 00)

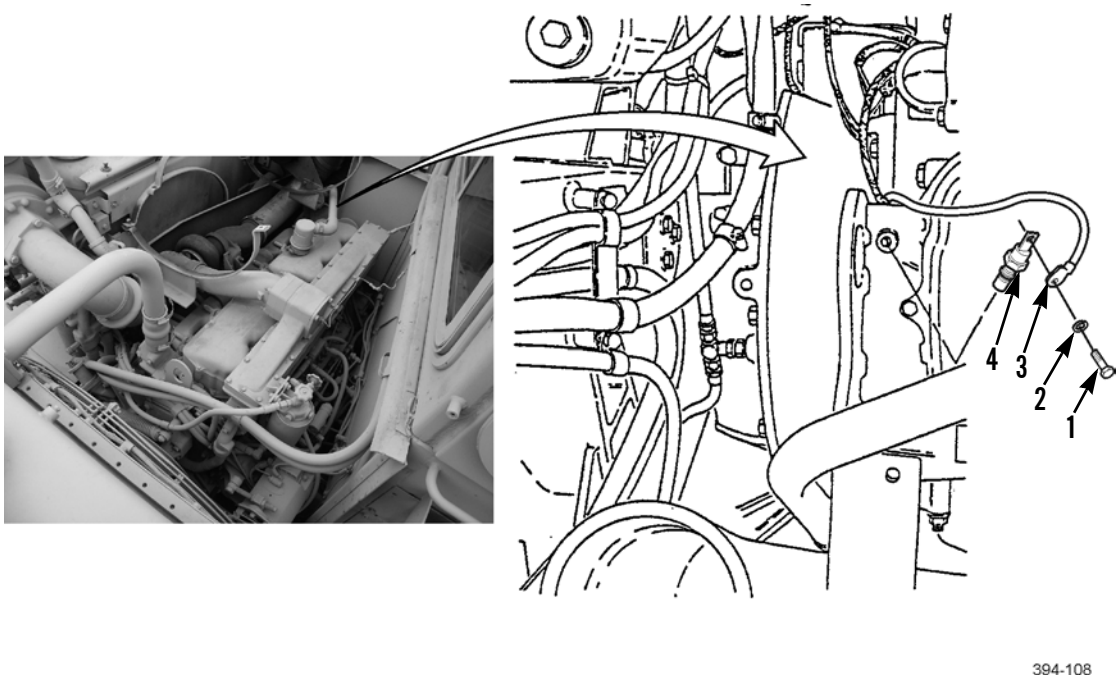
Battery disconnect switch in OFF position

WARNING

Ensure battery disconnect switch is in the OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

1. Remove screw (1) and lockwasher (2) from temperature switch (4).
2. Disconnect wire connector (3).
3. Remove sending unit (4).



INSTALLATION

1. Wrap threads of sending unit (4) with anti-seizing tape and install.
2. Connect wire connector (3).
3. Install new lockwasher (2) and screw (1).
4. Install muffler (WP 0041 00).
5. Refill coolant (WP 0042 00).
6. Verify correct operation of ether starting aid (TM 5-3805-248-10).

END OF WORK PACKAGE

LOW AIR PRESSURE WARNING HORN REPLACEMENT 0099 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Gasket

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Upper front access plates removed (WP 0192 00)

WARNING

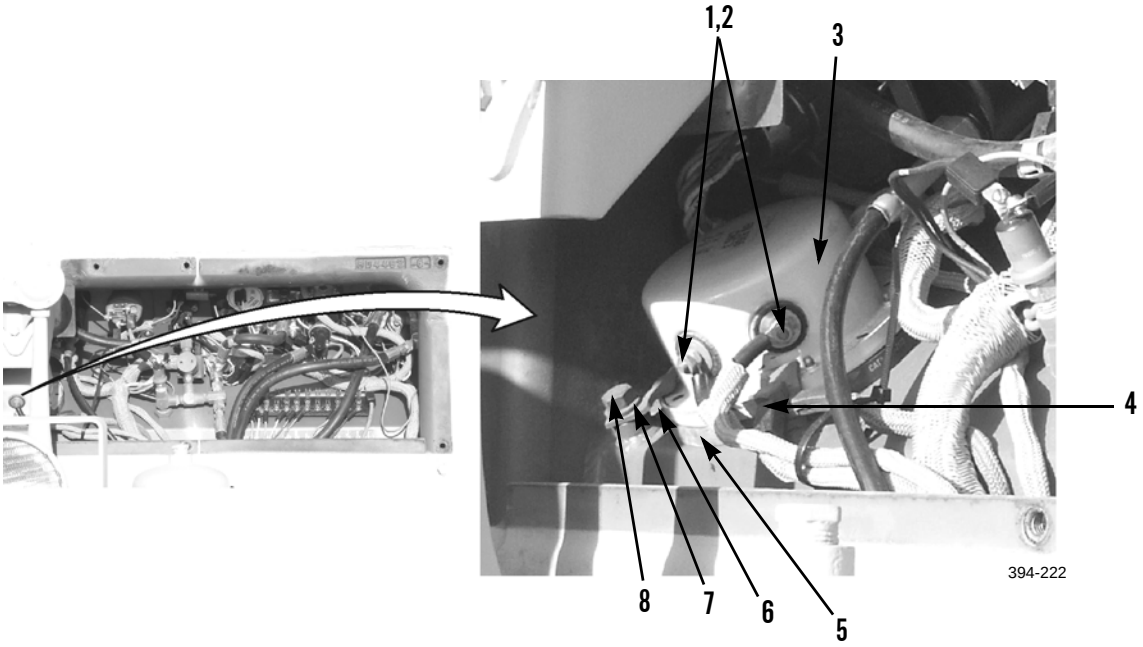
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors and cables prior to removal to ensure correct installation.

1. Remove two nuts (1) from horn terminals.
2. Disconnect two wire connectors (2).
3. Remove three bolts (8), washers (7) and clips (6).
4. Disconnect two wire connectors (4).
5. Remove horn (3).
6. Remove and discard gasket (5).



INSTALLATION

1. Install new gasket (5) on horn (3).
2. Install horn (3).
3. Connect two wire connectors (4) with clip (6), washers (7) and bolt (8).
4. Install remaining two clips (6), washers (7) and bolts (8).
5. Connect two wire connectors (2) at terminals.
6. Install two nuts (1).
7. Install upper front access plates (WP 0192 00).
8. Connect battery cables (WP 0104 00).
9. Operate machine and verify horn operation (TM 5-3805-248-10).

END OF WORK PACKAGE

BACKUP ALARM REPLACEMENT 0100 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

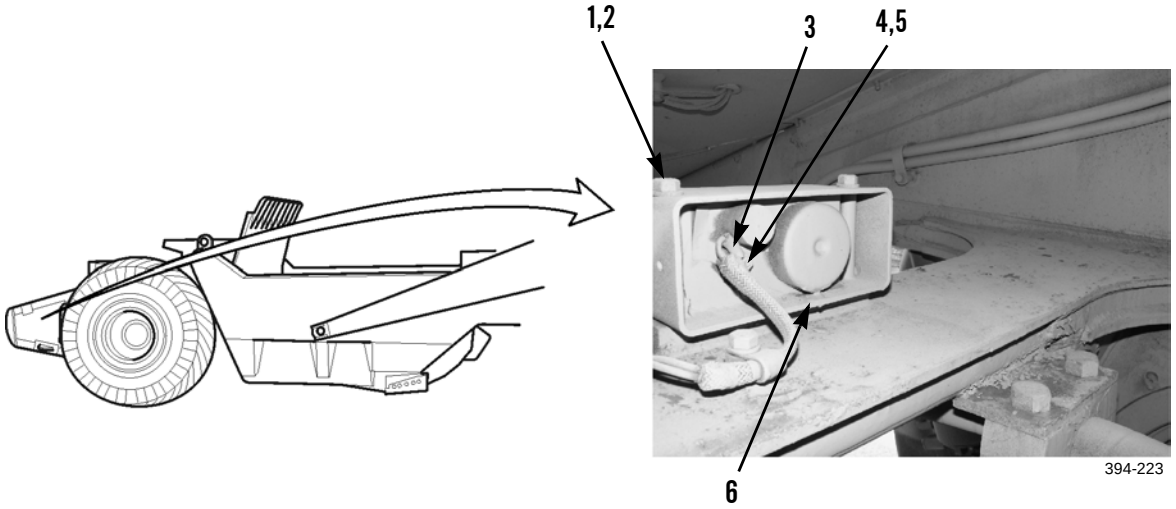
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors before disconnecting to ensure correct installation.

1. Remove two nuts (4) and washers (5) from rear of backup alarm (6).
2. Disconnect two wire connectors (3).
3. Remove two bolts (1) and washers (2).
4. Remove backup alarm (6).



INSTALLATION

1. Position backup alarm (6).
2. Install two washers (2) and bolts (1).
3. Connect two wire connectors (3).
4. Install two washers (5) and nuts (4).
5. Operate machine and verify backup alarm operates correctly (TM 5-3805-248-10).

END OF WORK PACKAGE

BACKUP ALARM SWITCH REPLACEMENT 0101 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

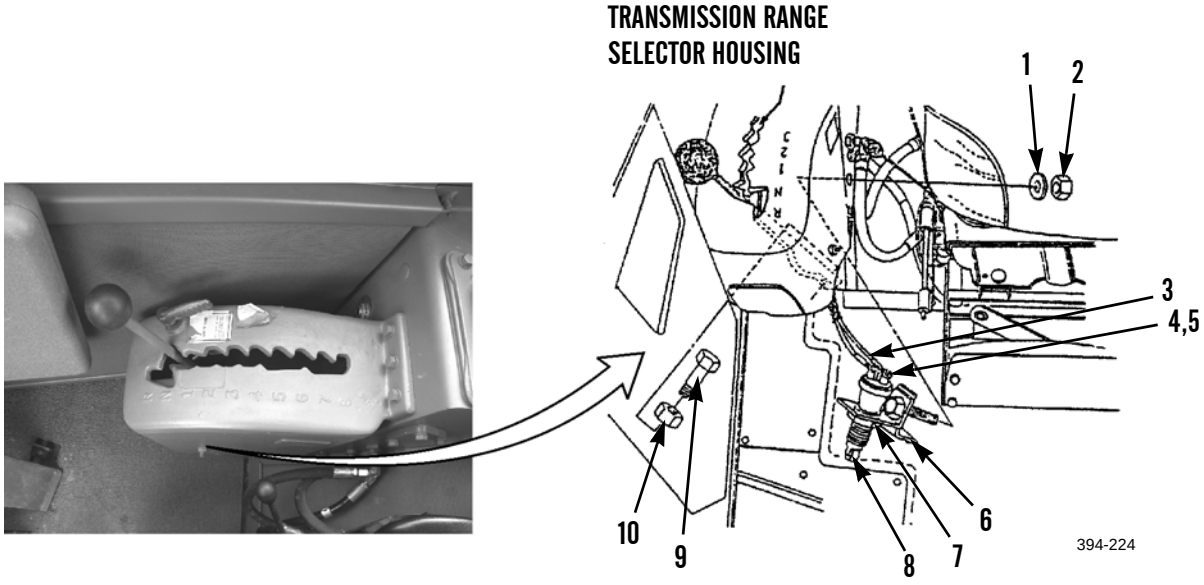
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors before disconnecting to ensure correct installation.

1. Remove nut (2) and washer (1) from transmission range selector housing on right side of operator compartment.
2. Lower backup alarm switch (8) assembly through bottom of transmission range selector housing.
3. If necessary, remove bolt (9) and nut (10) from transmission range selector.
4. Remove two screws (4) and lockwashers (5). Discard lockwashers.
5. Disconnect two wire connectors (3) at terminals.
6. Remove nut (7) and backup alarm switch (8) from bracket assembly (6).



INSTALLATION

1. Install backup alarm switch (8) in bracket assembly (6).
2. Install nut (7).
3. Connect two wire connectors (3) at terminals.
4. Install two new lockwashers (5) and screws (4).
5. Position backup alarm switch (8) assembly into transmission range selector housing.
6. If removed, install nut (10) and bolt (9).
7. Install washer (1) and nut (2).
8. Adjust bolt (9) so that switch (8) is pressed only when transmission range selector is placed in REVERSE.
9. Operate machine and verify backup alarm sounds when transmission range selector is placed in REVERSE (TM 5-3805-248-10).

END OF WORK PACKAGE

BATTERY BOX COVER REPLACEMENT 0102 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Pin, cotter (2)

Personnel Required

Two

Equipment Condition

Battery cables disconnected (WP 0104 00)

- Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning could result in personal injury or damage to equipment.
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If battery is giving off gases, it may explode and cause injury. Remove all jewelry such as rings, ID tags, watches and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment and injury.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in injury or death.
- **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.
- **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
- **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.
- **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

NOTE

Inspect batteries for corrosion, damage or signs of leaking. Clean or replace as necessary.

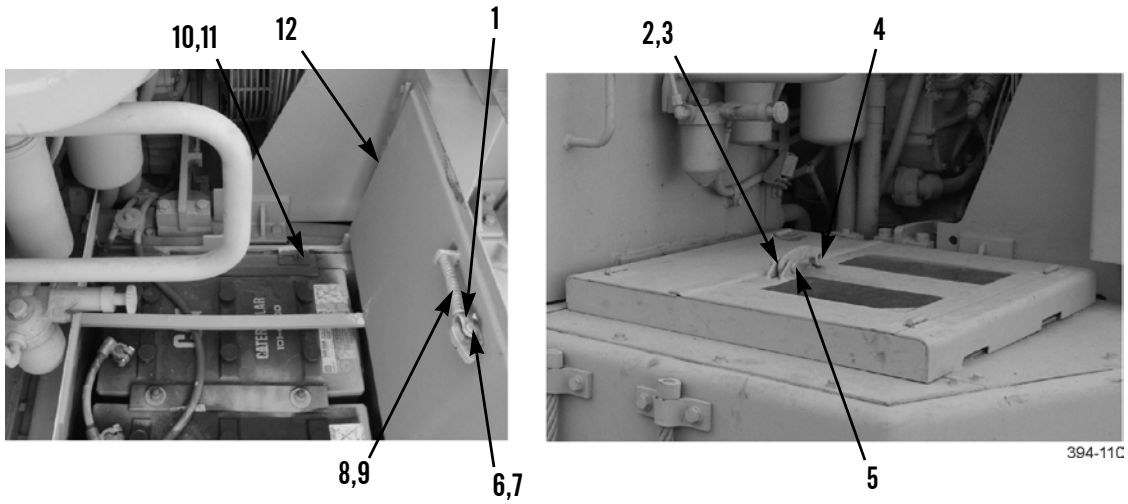
REMOVAL

1. Lift handle (4) and open cover assembly (12).

NOTE

If necessary to remove handle, perform steps 2 through 5. Otherwise, go to step 6.

2. Grasp rod (1), compress spring (9) and remove and discard cotter pin (6).
3. Remove pin (7), rod (1), washer (8) and spring (9).
4. Remove and discard cotter pin (2).
5. Remove washer (3), pin (5) and handle (4) from cover assembly (12).
6. Remove four bolts (10) and washers (11).



REMOVAL - CONTINUED

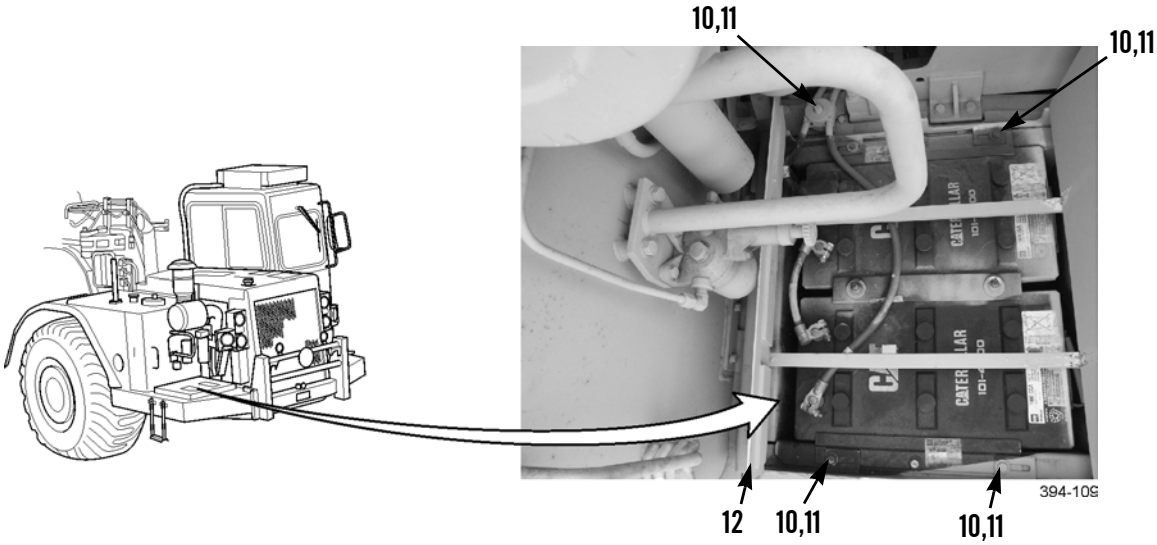
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury to personnel.

NOTE

Weight of battery box cover is 41 lb (19 kg).

7. Remove battery box cover (12).



INSTALLATION

1. Install battery box cover (12).
2. Install four washers (11) and bolts (10).

NOTE

If handle was removed, perform steps 4 through 8. Otherwise, go to step 9.

3. Install handle (4), pin (5) and washer (3) to cover assembly (12).
4. Install new cotter pin (2).
5. Install spring (9) and washer (8) on rod (1).
6. Grasp rod (1) and compress spring (9).
7. Install pin (7) through rod (1) and handle (4).
8. Install new cotter pin (6).
9. Connect battery cables (WP 0104 00).
10. Operate machine and verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

BATTERY AND HOLDDOWN REPLACEMENT 0103 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Nut, self-locking (2)

Personnel Required

Two

Equipment Condition

Battery box cover removed (WP 0102 00)

- Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning could result in personal injury or damage to equipment.
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If battery is giving off gases, it may explode and cause injury. Remove all jewelry such as rings, ID tags, watches and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment and injury.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in injury or death.
- **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.
- **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
- **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.
- **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

NOTE

Inspect batteries for corrosion, damage or signs of leaking. Clean or replace as necessary.

REMOVAL

1. Remove two bolts (7), washers (8) and holddowns (6).
2. Remove two self-locking nuts (3) and washers (4) from rods (1). Discard self-locking nuts.
3. Remove holddown (5).

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury to personnel.

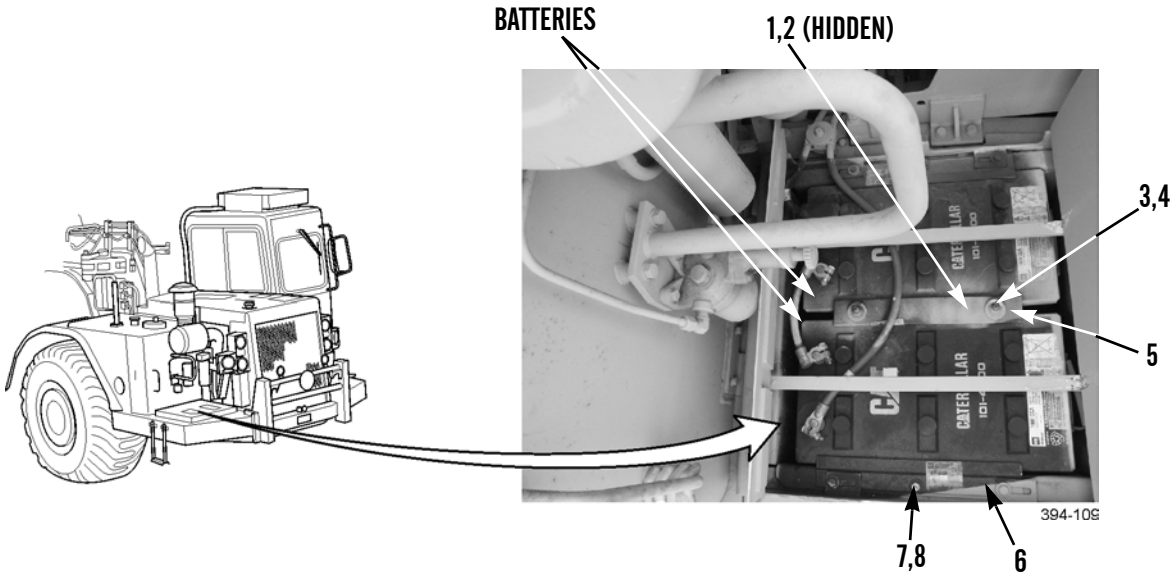
CAUTION

When removing a battery from a machine, note the location of the positive (+) battery terminal so that the battery can be re-installed in the same position. This is to avoid danger of reversing the polarity. If battery polarity is reversed, damage to equipment may occur.

NOTE

Weight of each battery is 90 lb (40 kg).

4. Remove two batteries.
5. Remove two rods (1) and nuts (2).



INSTALLATION

1. Thread two nuts (2) on rods (1).
2. Thread two rods (1) on battery box weld nuts.
3. Tighten two nuts (2).
4. Use a clamp-type battery carrier to install two batteries.
5. Install holddown (5).
6. Install two washers (4) and new self-locking nuts (3).
7. Install two holddowns (6), washers (8) and bolts (7).
8. Install battery box cover (WP 0102 00).

END OF WORK PACKAGE

BATTERY CABLES REPLACEMENT 0104 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Front crankcase guard removed (WP 0201 00)

WARNING

- Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning could result in personal injury or damage to equipment.
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If battery is giving off gases, it may explode and cause injury. Remove all jewelry such as rings, ID tags, watches and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment and injury.
- Make sure disconnected cable terminal is placed away from battery post. Failure to follow this warning may cause electric shock and possible injury. If you are injured, seek medical attention immediately.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in injury or death.
- **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.
- **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
- **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.
- **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

REMOVAL

NOTE

- Inspect batteries for corrosion, damage or signs of leaking. Clean or replace as necessary.
- Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.
- If referred here from another work package perform steps 1 through 6 only.

1. Open battery cover.
2. Remove nut (1) and bolt (3) from negative battery cable (2) on post of inner battery.
3. Disconnect battery cable (2).
4. Remove two nuts (9) and bolts (10) from battery cable (11).
5. Remove battery cable (11).
6. Remove nut (7) and bolt (8) from battery cable (4) on positive post of outer battery.
7. Disconnect battery cable (4).
8. Remove nut (5) and clamp (6) from center battery holddown bar.

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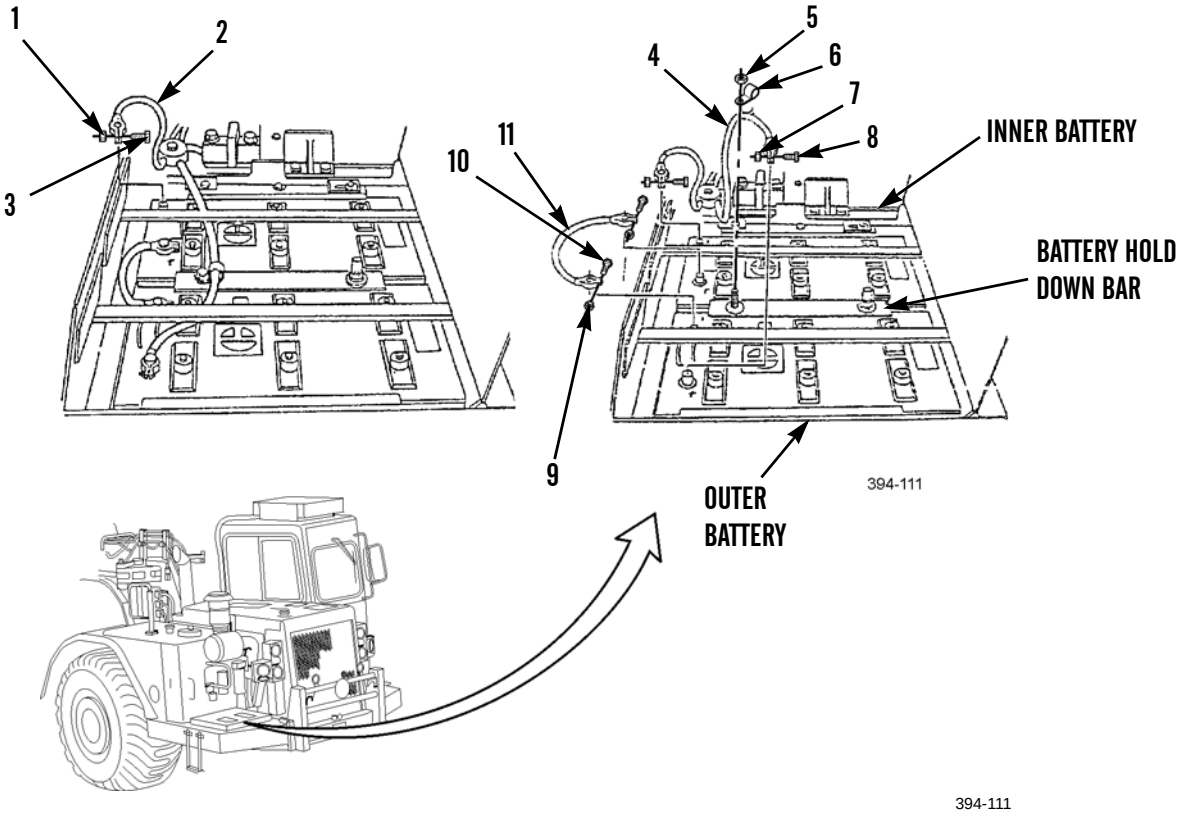
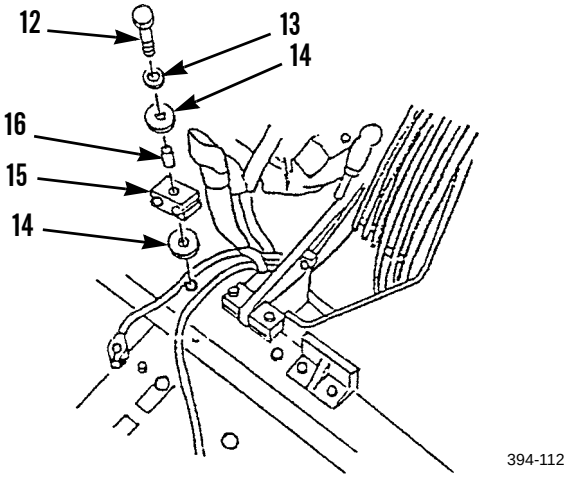


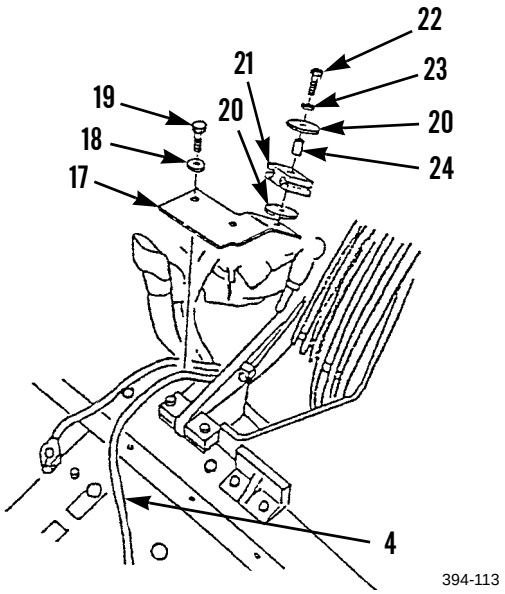
394-111

REMOVAL - CONTINUED

9. Remove bolt (12), washer (13) and two washers (14).
10. Remove clamp (15) and spacer (16).



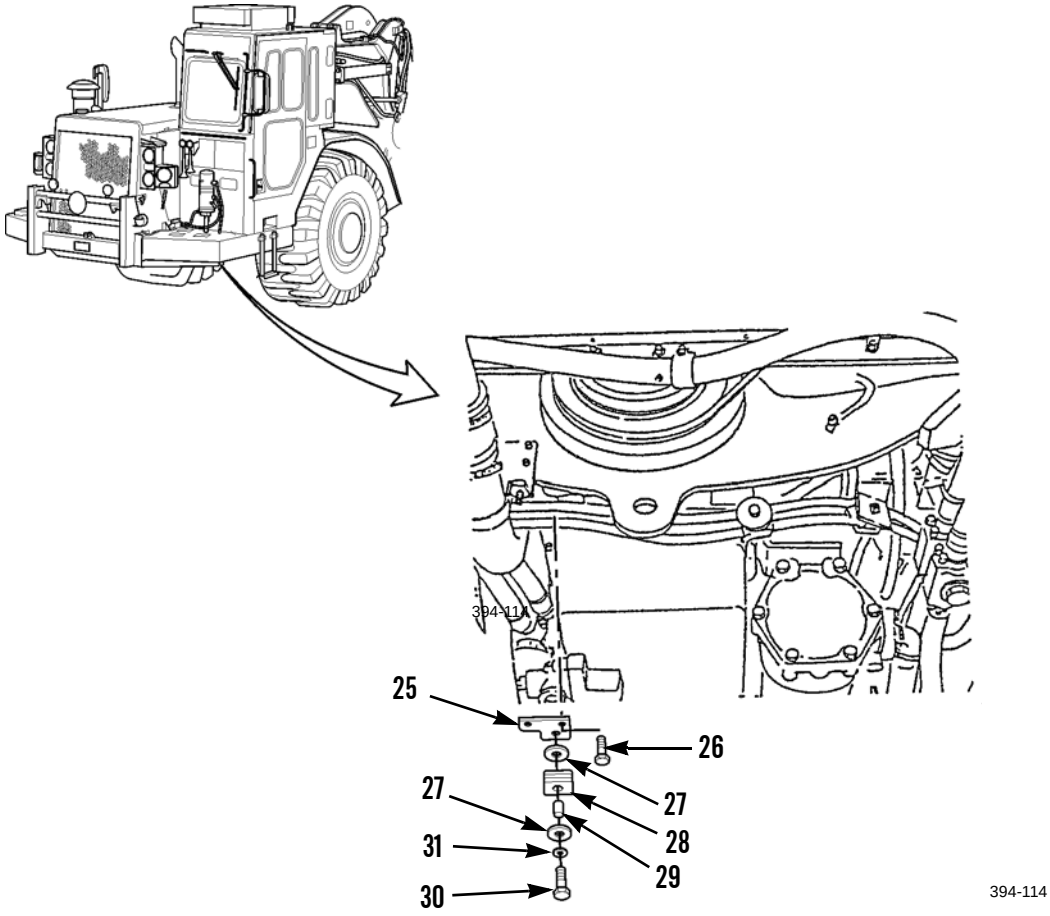
11. Remove bolt (22), washer (23) and two washers (20) from under engine on front side of machine.
12. Remove clamp (21) and spacer (24).
13. Remove two bolts (19), washer (18) and plate (17).



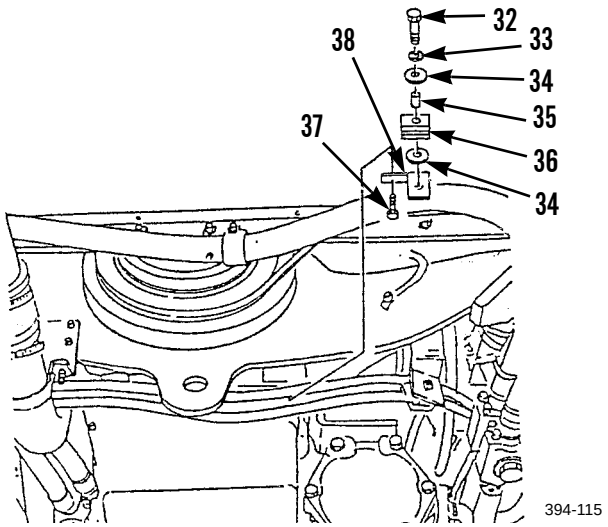
BATTERY CABLES REPLACEMENT - CONTINUED 0104 00

REMOVAL - CONTINUED

14. Remove bolt (30), washer (31) and two washers (27).
15. Remove clamp (28) and spacer (29).
16. Remove two bolts (26) and plate (25).



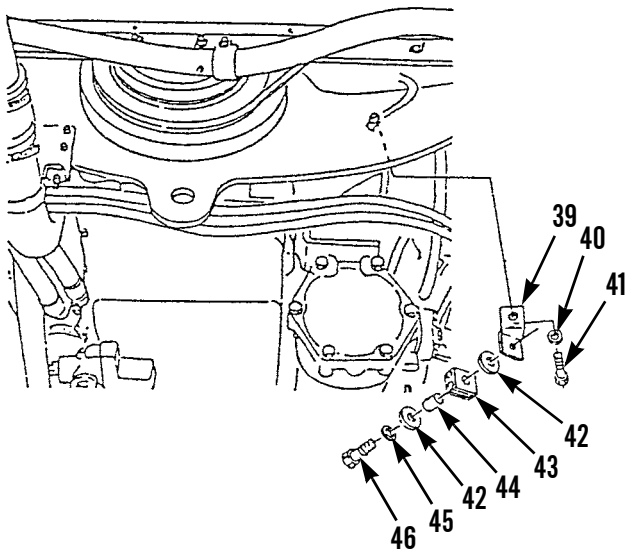
17. Remove bolt (32), washer (33) and two washers (34).
18. Remove clamp (36) and spacer (35).
19. Remove two bolts (37) and plate (38).



BATTERY CABLES REPLACEMENT - CONTINUED 0104 00

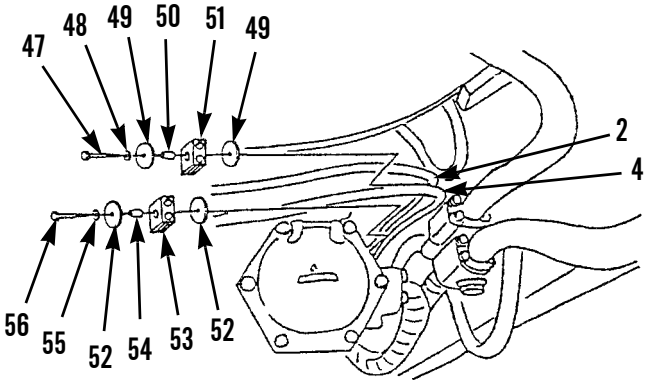
REMOVAL - CONTINUED

20. Remove bolt (46), washer (45) and two washers (42).
21. Remove clamp (43) and spacer (44).
22. Remove bolt (41), washer (40) and plate (39).



394-116

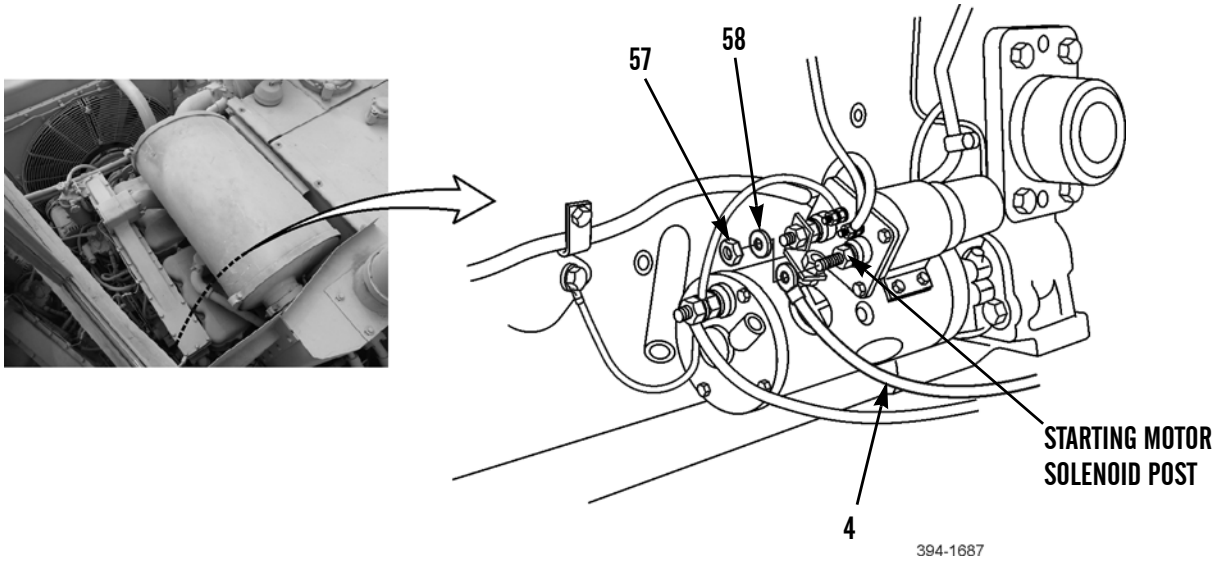
23. Remove bolt (47), washer (48) and two washers (49).
24. Remove clamp (51) and spacer (50).
25. Remove bolt (56), washer (55) and two washers (52).
26. Remove clamp (53) and spacer (54).



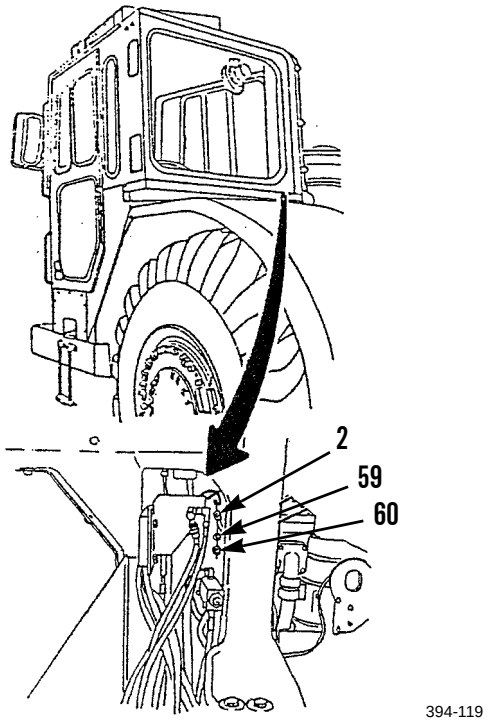
394-117

REMOVAL - CONTINUED

27. Remove nut (57), washer (58) and battery cable (4) from starting motor solenoid under operator compartment.

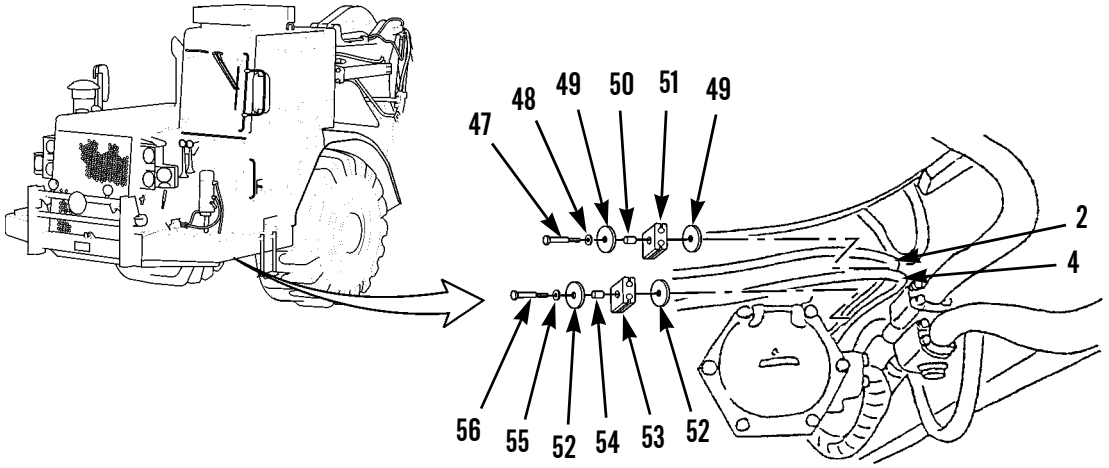


28. Remove nut (60), washer (59) and battery cable (2) from disconnect switch.



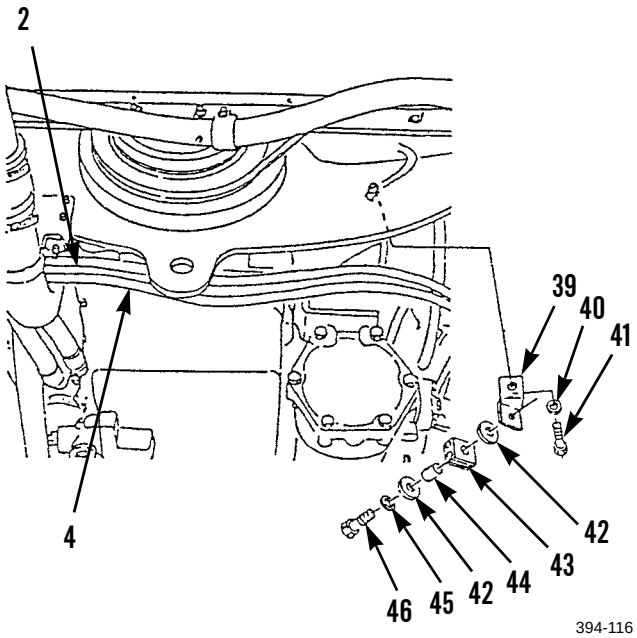
INSTALLATION

1. Install battery cable (2), washer (59) and nut (60) on disconnect switch. Torque to 61 lb-in (83 Nm).
2. Install battery cable (4), washer (58) and nut (57) on starting motor solenoid post under operator compartment on left side of machine.
3. Install clamp (53) on battery cables (2 and 4).
4. Install spacer (54), clamp (53), two washers (52), washer (55) and bolt (56) on frame.
5. Install clamp (51) on battery cables (2 and 4).
6. Install spacer (50), clamp (51), two washers (49), washer (48) and bolt (47) on frame.



394-1688

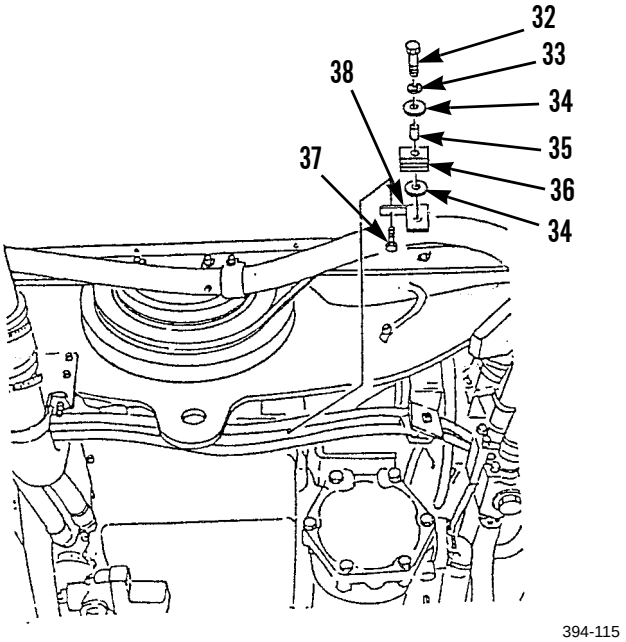
7. Install plate (39), washer (40) and bolt (41).
8. Install clamp (43) on battery cables (2 and 4).
9. Install spacer (44), clamp (43), two washers (42), washer (45) and bolt (46) on frame.



394-116

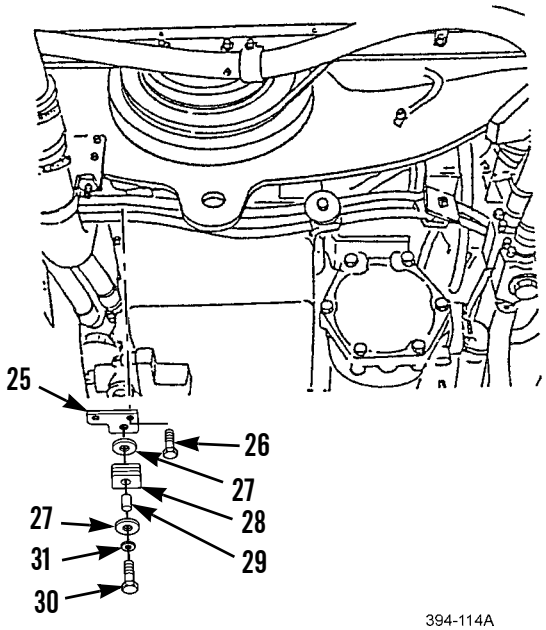
INSTALLATION - CONTINUED

10. Install plate (38) and two bolts (37).
11. Install clamp (36) on battery cables (2 and 4).
12. Install spacer (35), clamp (36), two washers (34), washer (33) and bolt (32) on plate (38).



394-115

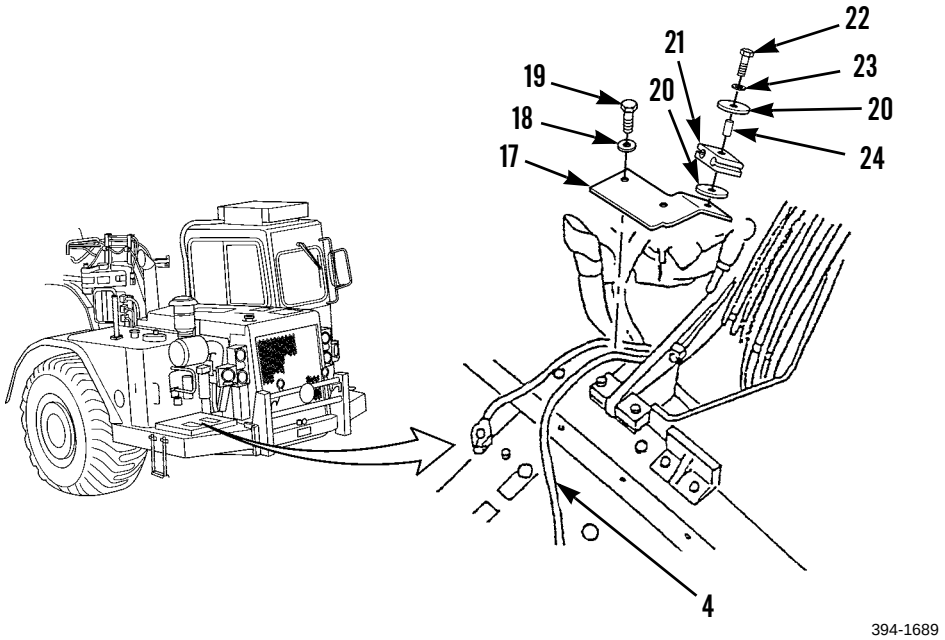
13. Install plate (25) and two bolts (26).
14. Install clamp (28) on battery cables (2 and 4).
15. Install spacer (29), clamp (28), two washers (27), washer (31) and bolt (30) on frame.



394-114A

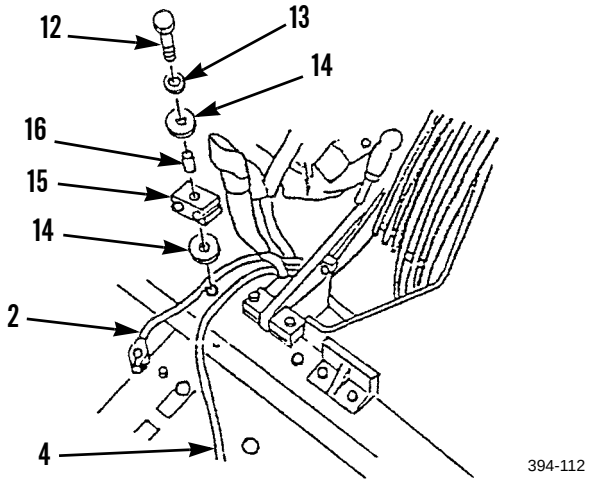
INSTALLATION - CONTINUED

16. Install plate (17), two washers (18) and bolts (19) on frame.
17. Install clamp (21) on battery cables (2 and 4).
18. Install spacer (24), clamp (21), two washers (20), washer (23) and bolt (22) on plate (17).



394-1689

19. Install clamp (15) on battery cables (2 and 4).
20. Install spacer (16), clamp (15), two washers (14), washer (13) and bolt (12) on frame.



394-112

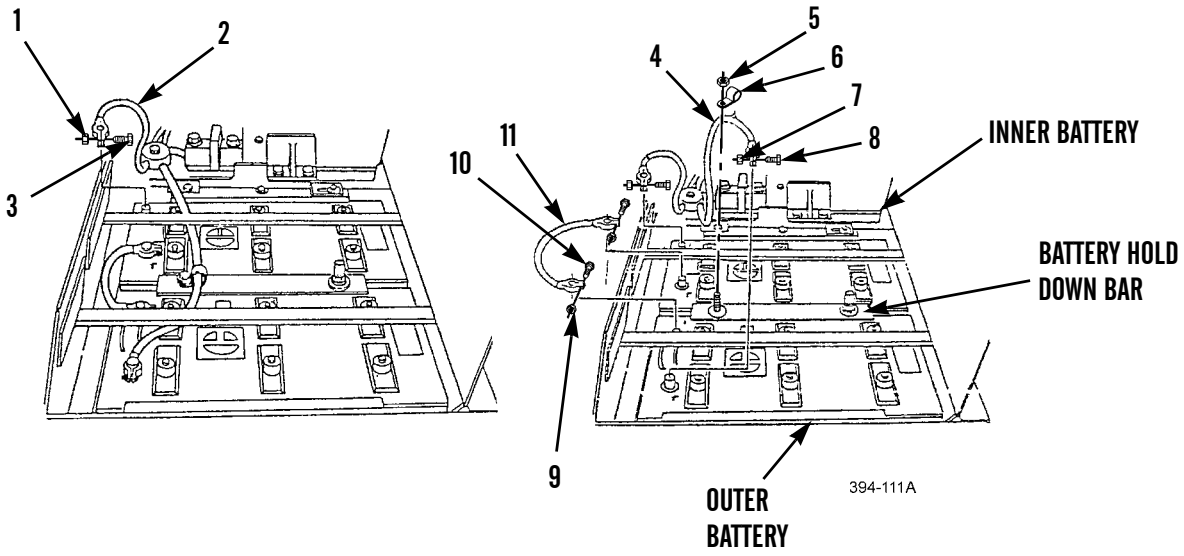
INSTALLATION - CONTINUED

21. Install clamp (6) on battery cable (4).
22. Install clamp (6) and nut (5) on battery holddown bar.

NOTE

If referred here from another work package, perform steps 23 through 28 only.

23. Connect battery cable (4) to positive post of outer battery.
24. Install bolt (8) and nut (7).
25. Connect battery cable (11) on negative post of outer battery and positive post of inner battery.
26. Install two bolts (10) and nuts (9).
27. Connect battery cable (2) on negative post of inner battery.
28. Install bolt (3) and nut (1).



29. Start engine to verify operation (TM 5-3805-248-10).
30. Install front crankcase guard (WP 0201 00).
31. Close battery cover.

END OF WORK PACKAGE

BATTERY BOX REPLACEMENT 0105 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 150 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

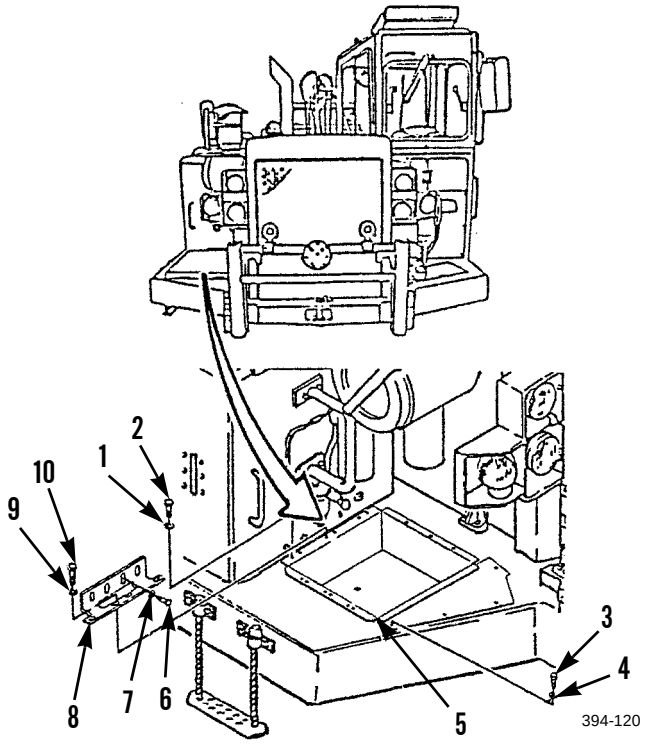
Equipment Condition

Battery box cover assembly removed (WP 0102 00)

Battery holddowns and batteries removed (WP 0103 00)

REMOVAL

1. Remove four bolts (6) and washers (7).
2. Remove four bolts (10), washers (9) and angle (8).
3. Remove bolt (2) and washer (1) from rear of battery box (5).
4. Remove four bolts (3) and washers (4) from front of battery box (5).



REMOVAL - CONTINUED

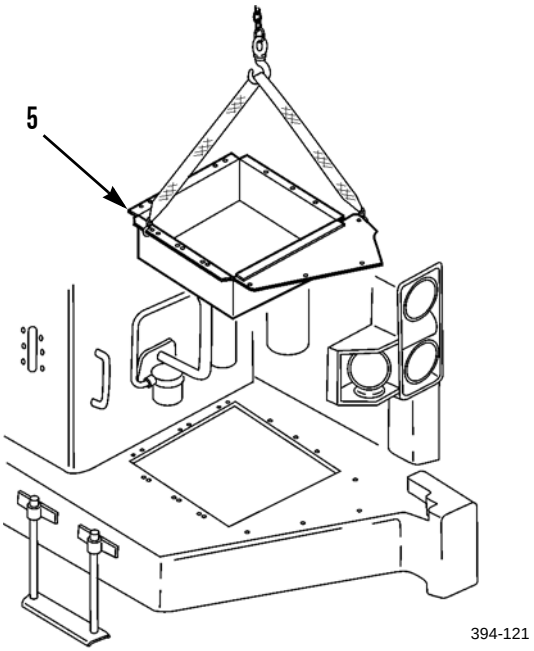
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device is in good condition and of suitable load capacity. Failure to follow this warning may cause injury to personnel.

NOTE

Weight of battery box is 73 lb (33 kg).

5. Attach lifting device to battery box (5) and remove battery box (5).



394-121

INSTALLATION

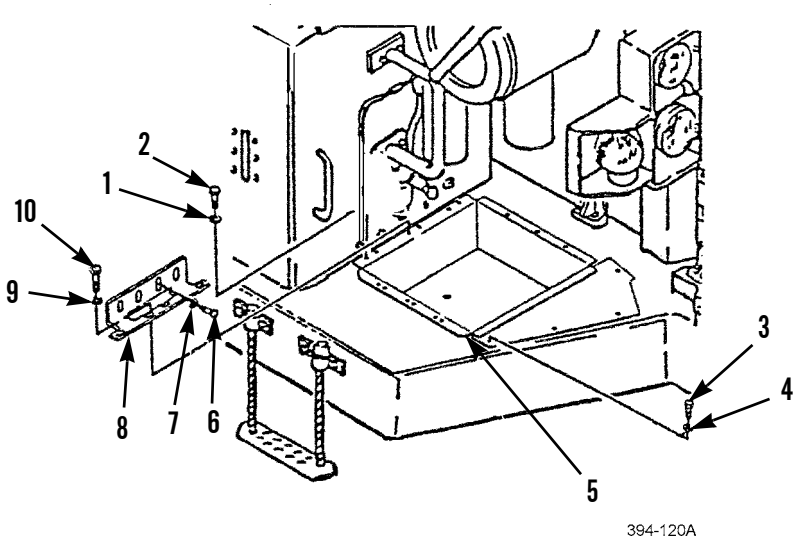
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device is in good condition and of suitable load capacity. Failure to follow this warning may cause injury to personnel.

NOTE

Weight of battery box is 73 lb (33 kg).

1. Attach lifting device to battery box (5).
2. Install battery box (5) on front right side of machine.
3. Remove lifting device and hook.
4. Install four washers (4) and bolts (3) on front of battery box (5).
5. Install washer (1) and bolt (2) on rear of battery box (5).
6. Install angle (8), four washers (9) and bolts (10).
7. Install four washers (7) and bolts (6).
8. Install battery holddowns and batteries (WP 0103 00).
9. Install battery box cover assembly (WP 0102 00).



END OF WORK PACKAGE

OPERATOR COMPARTMENT WIRING HARNESS REPLACEMENT 0106 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

WP 0071 00

WP 0072 00

WP 0075 00

References - Continued

WP 0078 00

WP 0079 00

WP 0081 00

WP 0096 00

WP 0218 00

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Hood removed (WP 0189 00)

Lower front access plate removed (WP 0197 00)

Upper front access plate removed (WP 0192 00)

Step assembly removed (WP 0200 00)

WARNING

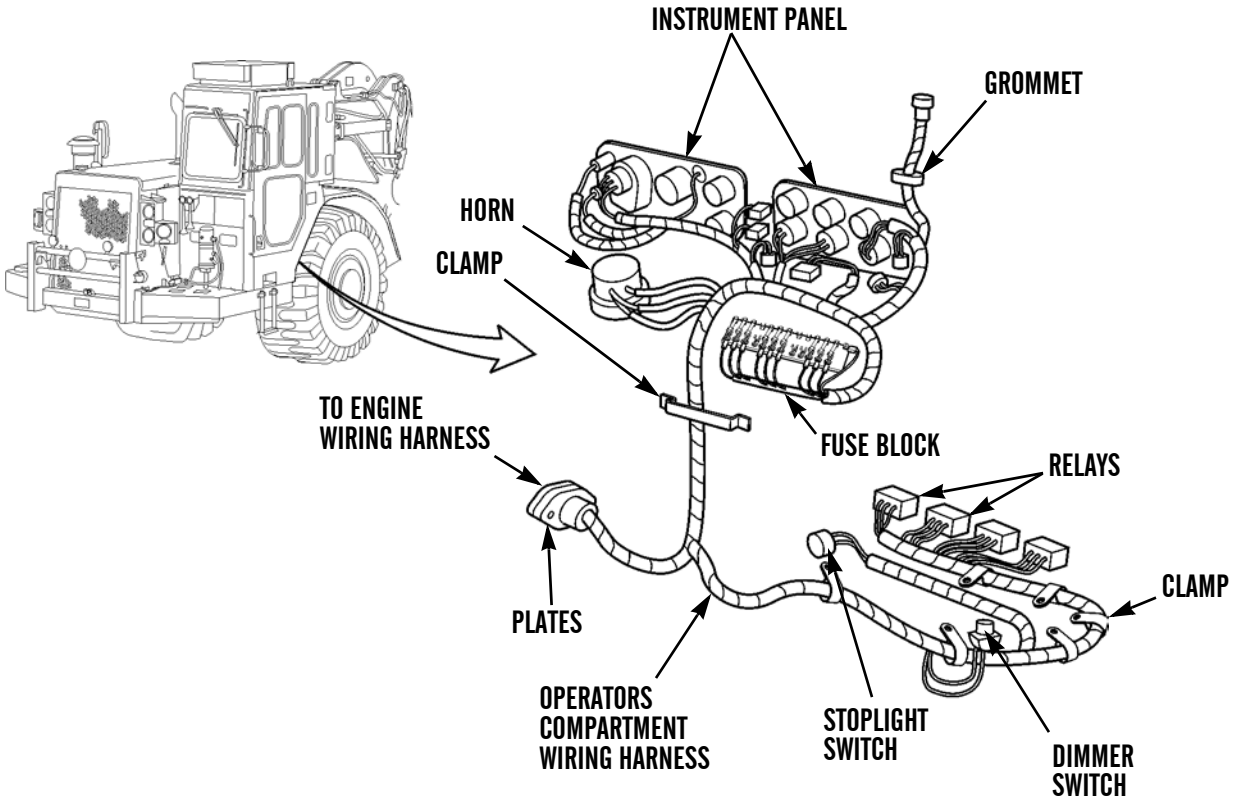
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

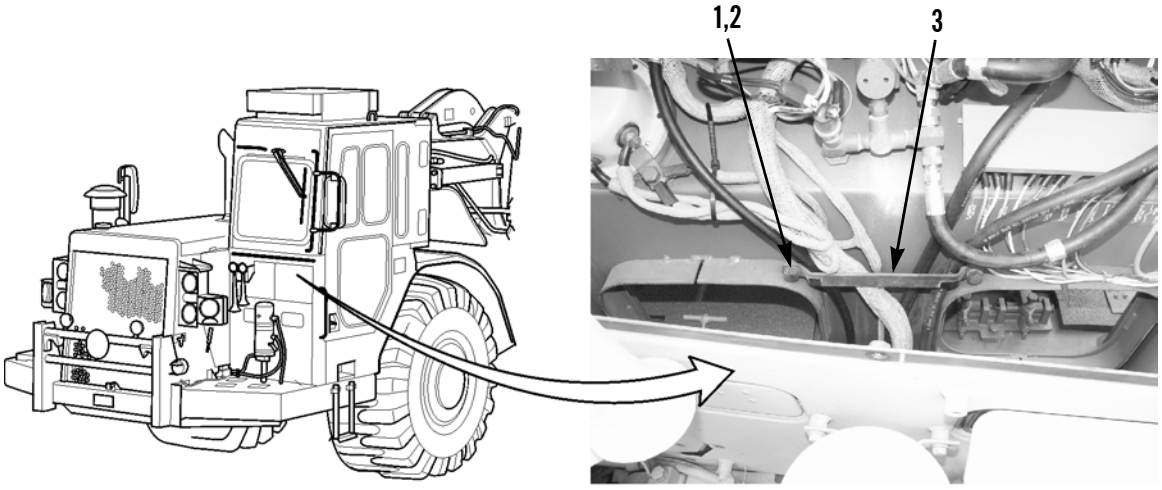
1. Disconnect operator compartment wiring harness from left instrument panel (WP 0071 00).
2. Disconnect operator compartment wiring harness from right instrument panel (WP 0072 00).
3. Disconnect operator compartment wiring harness from fuse block (WP 0075 00).
4. Disconnect operator compartment wiring harness from relays (WP 0078 00).
5. Disconnect operator compartment wiring harness from dimmer switch (WP 0079 00).
6. Disconnect operator compartment wiring harness from stoplight switch (WP 0096 00).
7. Disconnect operator compartment wiring harness from turn signal flasher (WP 0081 00).
8. Disconnect operator compartment wiring harness from air horn (WP 0218 00).
9. Disconnect engine wiring harness cannon plug (WP 0107 00).



OPERATOR COMPARTMENT WIRING HARNESS REPLACEMENT - CONTINUED 0106 00

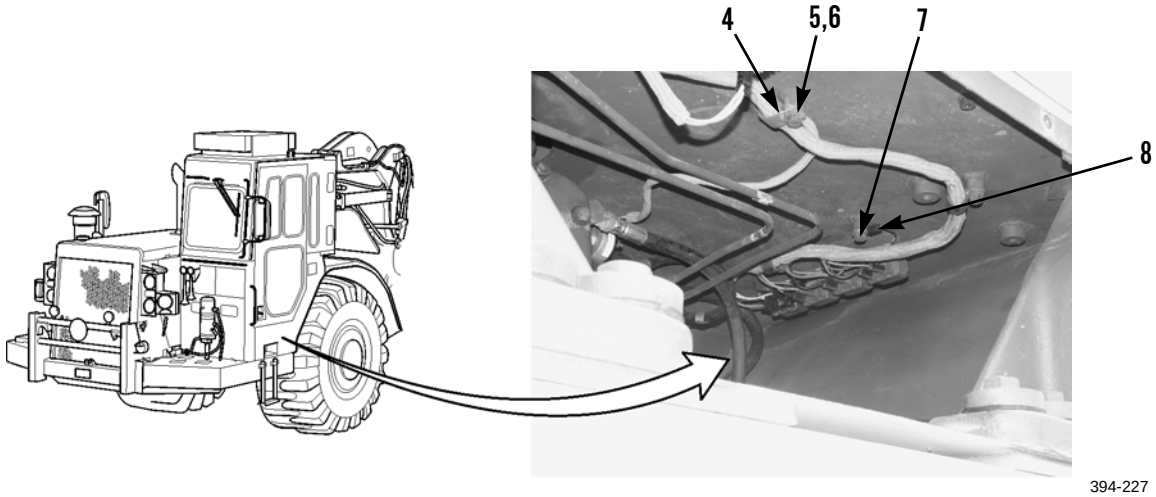
REMOVAL - CONTINUED

10. Remove two bolts (1), washers (2) and clamp (3).



394-226

11. Remove bolt (7) and ground terminal (8).
12. Remove three bolts (5), washers (6) and clamps (4).



394-227

OPERATOR COMPARTMENT WIRING HARNESS REPLACEMENT - CONTINUED 0106 00

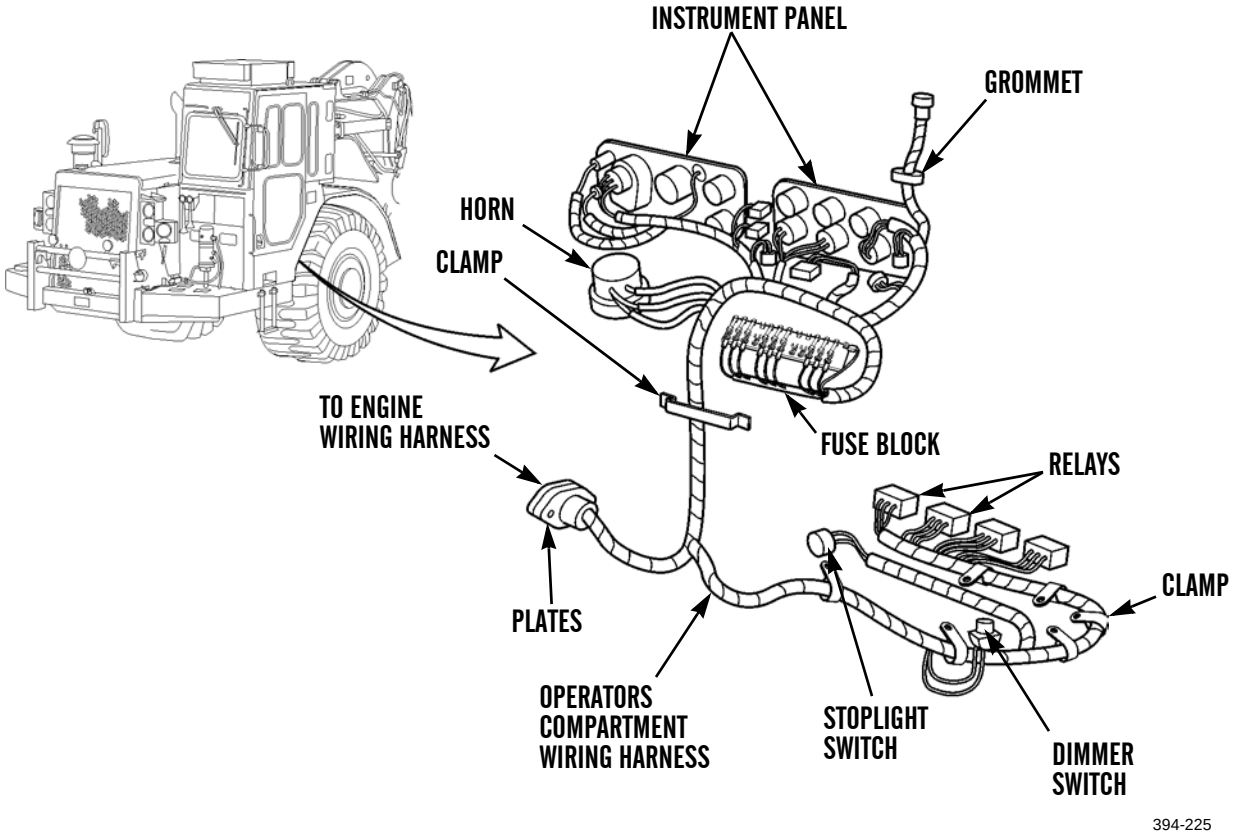
REMOVAL - CONTINUED

13. Remove grommet and plates securing operator compartment wiring harness.

NOTE

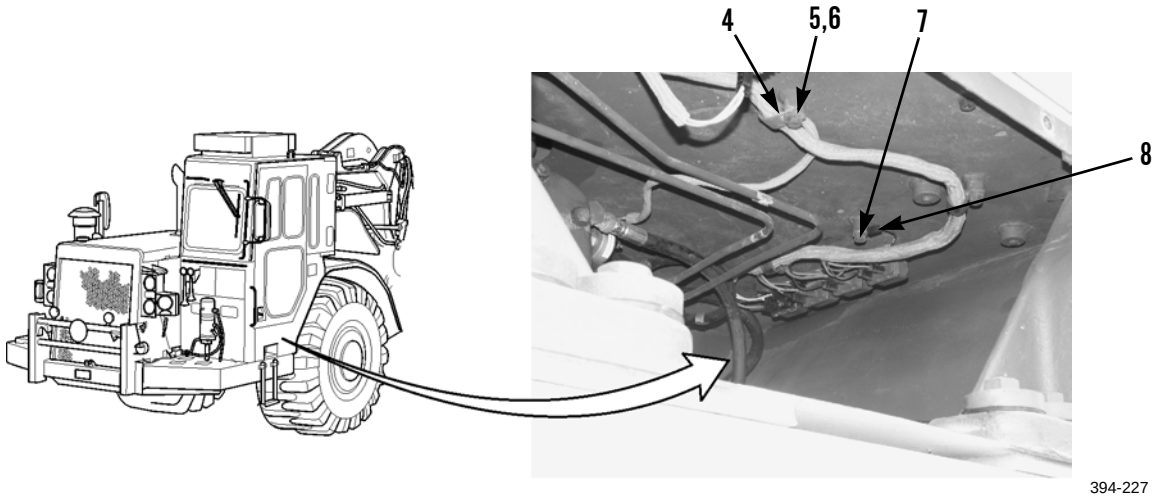
Note routing of harness to ensure correct installation.

14. Remove operator compartment wiring harness.

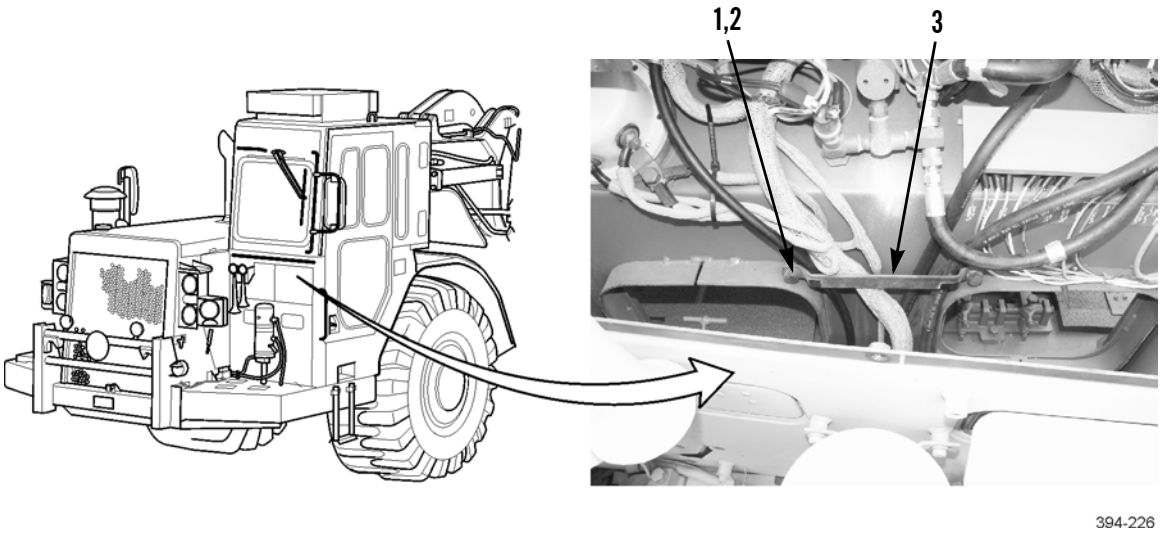


INSTALLATION

1. Position operator compartment wiring harness in machine.
2. Install plates and grommet securing operator compartment wiring harness.
3. Install three bolts (5), washers (6) and clamps (4).
4. Install ground terminal (8) and bolt (7).

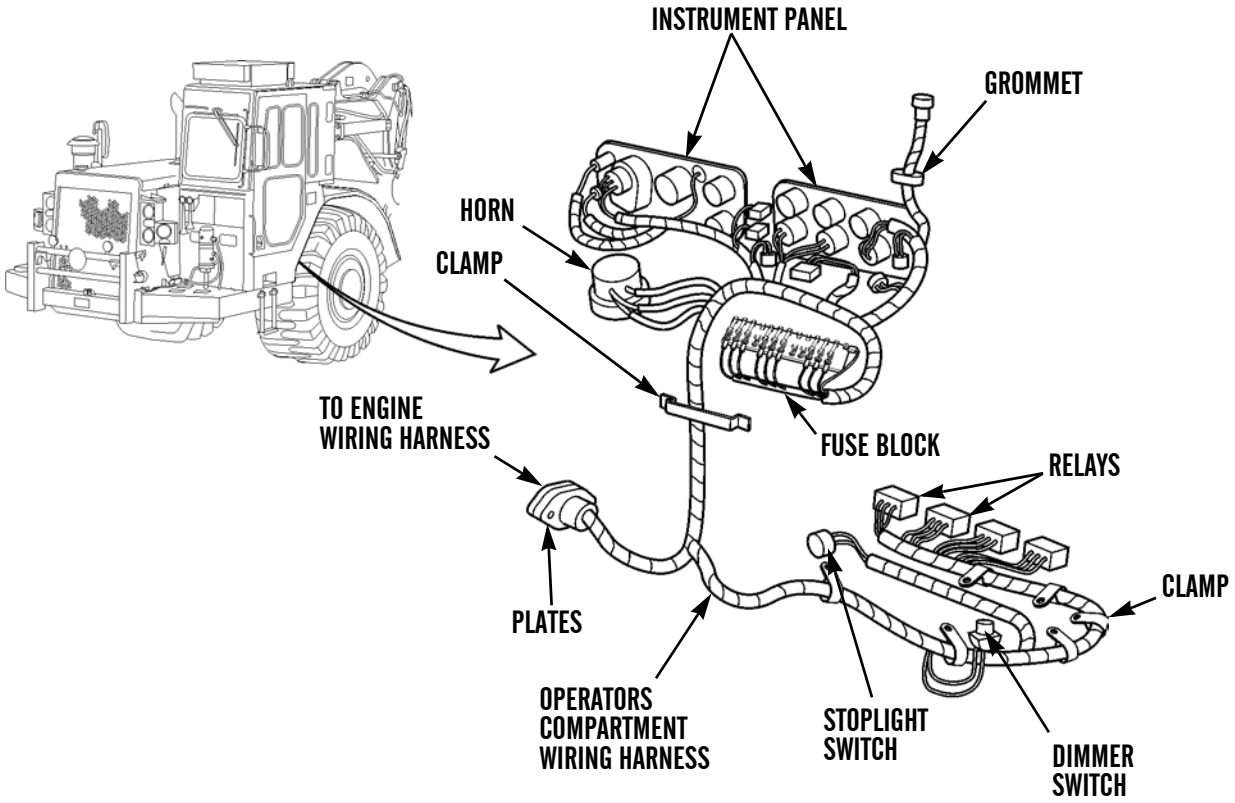


5. Install two bolts (1), washers (2) and clamp (3).



INSTALLATION - CONTINUED

6. Connect engine wiring harness to cannon plug (WP 0107 00).
7. Connect operator compartment wiring harness to air horn (WP 0218 00).
8. Connect operator compartment wiring harness to stoplight switch (WP 0096 00).
9. Connect operator compartment wiring harness to turn signal flasher (WP 0081 00).
10. Connect operator compartment wiring harness to dimmer switch (WP 0079 00).
11. Connect operator compartment wiring harness to relays (WP 0078 00).



12. Connect operator compartment wiring harness to fuse block (WP 0075 00).
13. Connect operator compartment wiring harness to left instrument panel (WP 0071 00).
14. Connect operator compartment wiring harness to right instrument panel (WP 0072 00).
15. Connect battery cables (WP 0104 00).
16. Operate machine and verify correct operation (TM 5-3805-248-10).
17. Install step assembly (WP 0200 00).
18. Install lower front access plate (WP 0197 00).
19. Install upper front access plate (WP 0192 00).
20. Install hood (WP 0189 00).

END OF WORK PACKAGE

ENGINE COMPARTMENT WIRING HARNESS REPLACEMENT 0107 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

WP 0055 00

WP 0057 00

WP 0076 00

References - Continued

WP 0092 00

WP 0093 00

WP 0098 00

WP 0116 00

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Hood removed (WP 0189 00)

Engine compartment access door assembly removed (WP 0190 00)

Crankcase guards removed (WP 0201 00)

WARNING

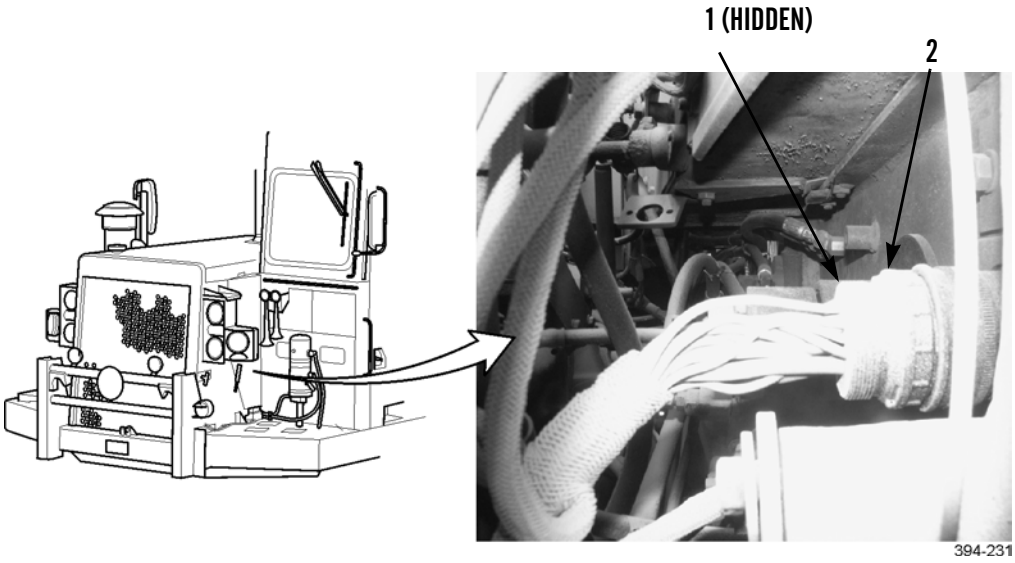
Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

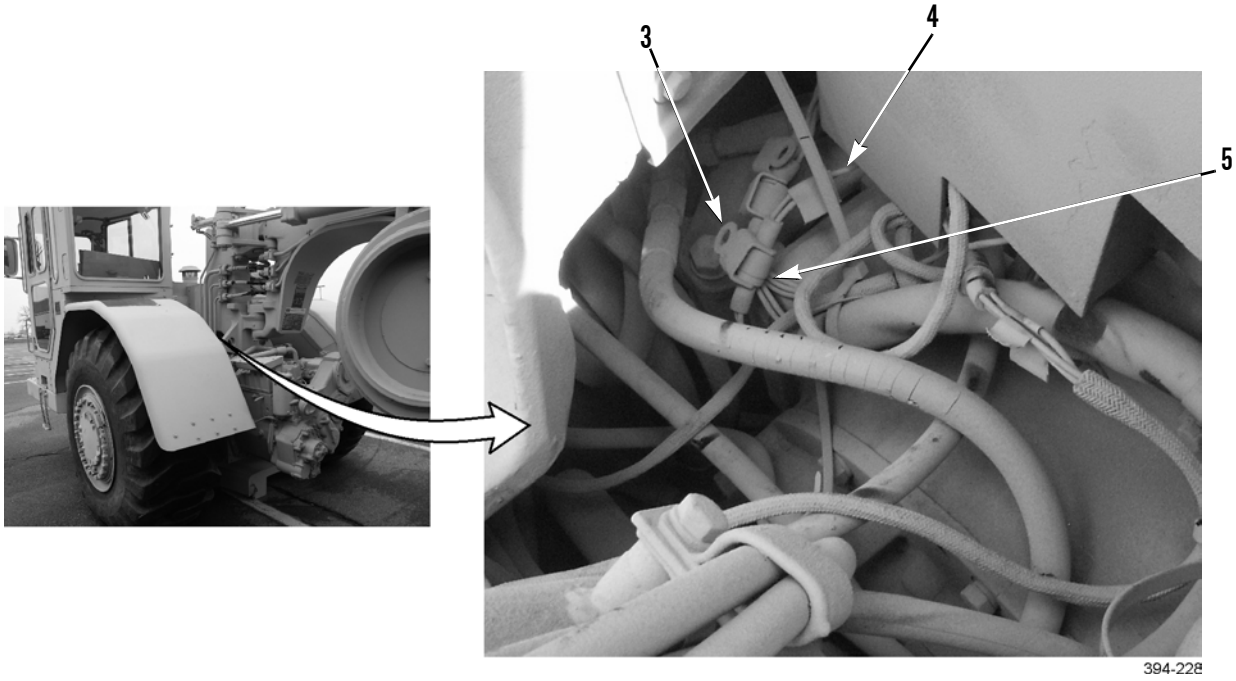
Tag all wire connectors, cables and wiring harnesses prior to removal to ensure correct installation.

1. Disconnect engine wiring harness from water temperature sending unit (WP 0092 00).
2. Disconnect engine wiring harness from ether start sender switch (WP 0098 00).
3. Disconnect engine wiring harness from retarder/torque converter temperature sender (WP 0093 00).
4. Disconnect engine wiring harness from starting motor (WP 0057 00).
5. Disconnect engine wiring harness from main circuit breaker (WP 0076 00).
6. Disconnect engine wiring harness from alternator (WP 0055 00).
7. Disconnect turn signal wiring harness (1) from operator compartment wiring harness.
8. Disconnect engine wiring harness connector (2) from operator compartment wiring harness.

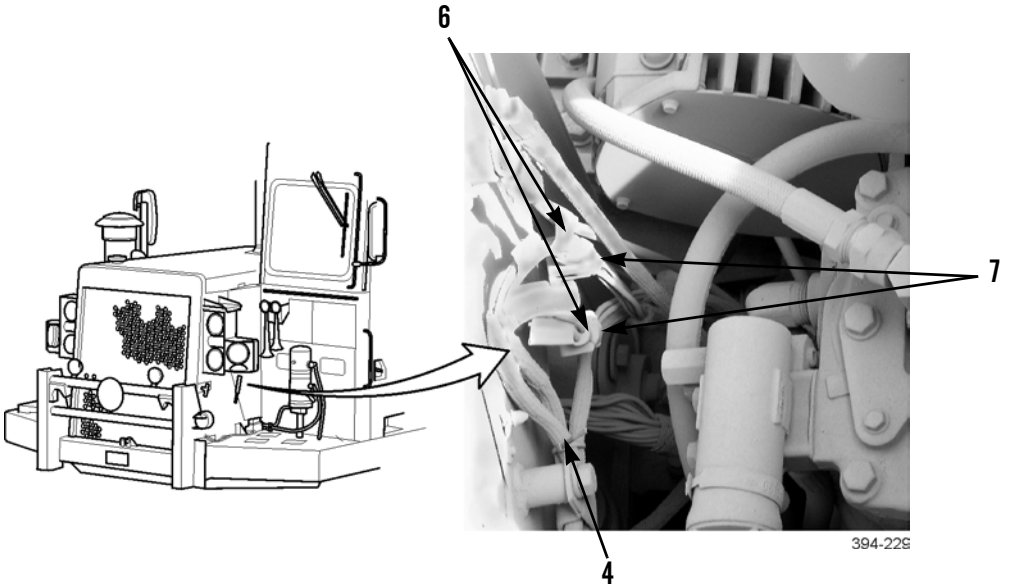


REMOVAL - CONTINUED

9. Remove four clips (3) and disconnect four connectors (5) from engine wiring harness (4).

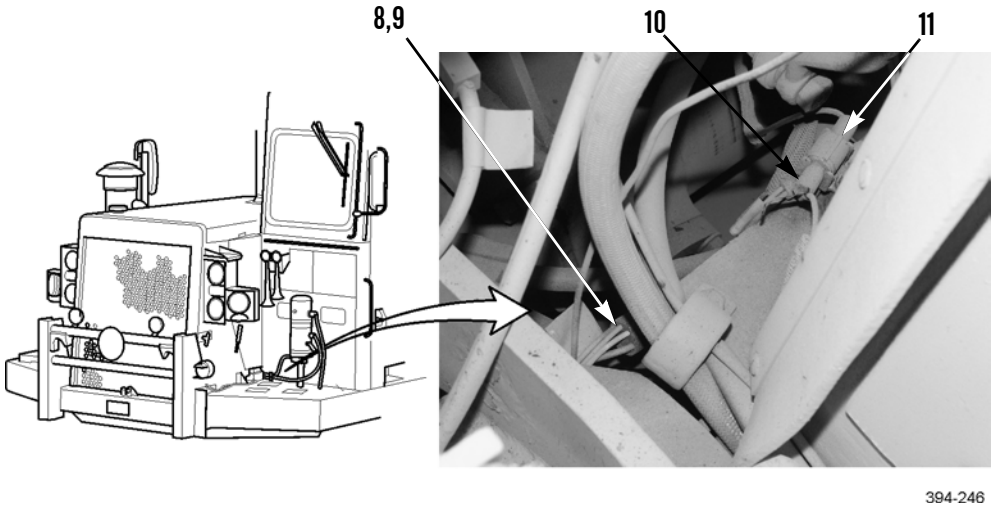


10. Disconnect engine wiring harness from air dryer assembly (WP 0116 00).
11. Separate two connectors from clips (7) and disconnect connectors (6) from engine wiring harness (4).

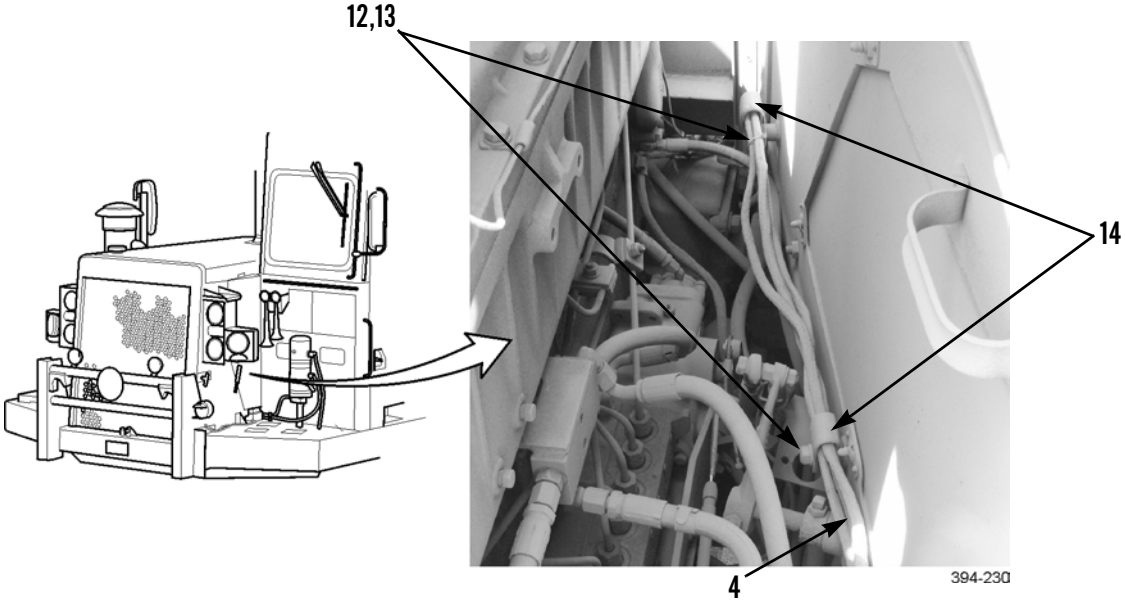


REMOVAL - CONTINUED

12. Separate connector from clip (9) and disconnect connector (8) from engine wiring harness (4).
13. Separate two connectors from clips (10) and disconnect connectors (11) from engine wiring harness (4).



14. Remove two bolts (12), washers (13) and mounting clips (14).

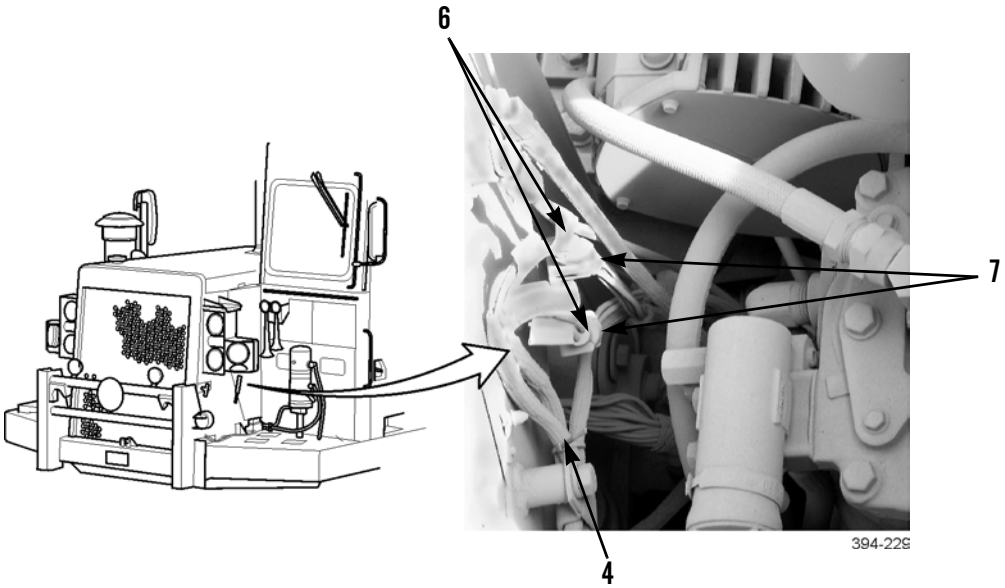


15. Remove engine wiring harness (4) from machine.

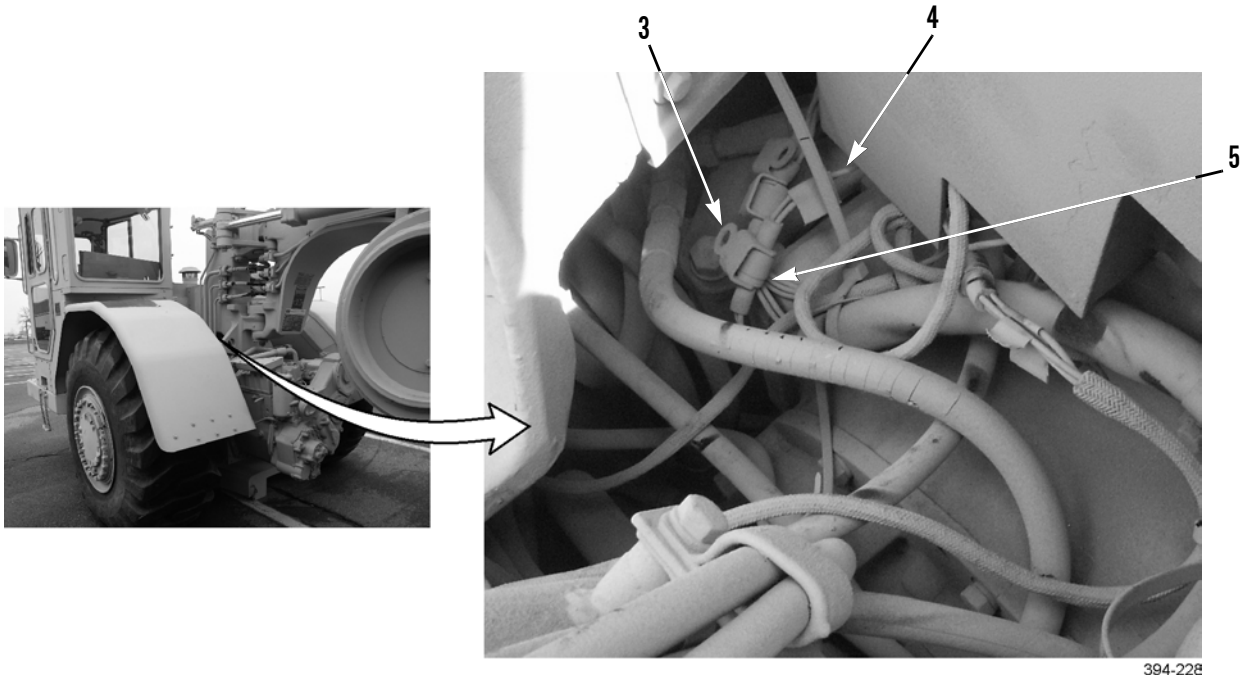
INSTALLATION

1. Position engine wiring harness (4) in machine.
2. Install two mounting clips (14), washers (13) and bolts (12).
3. Connect two connectors (11) to engine wiring harness (4) and attach to clips (10).
4. Connect connector (8) to engine wiring harness (4) and attach to clip (9).
5. Connect two connectors (6) to clip (7) and attach to engine wiring harness (4).

INSTALLATION - CONTINUED

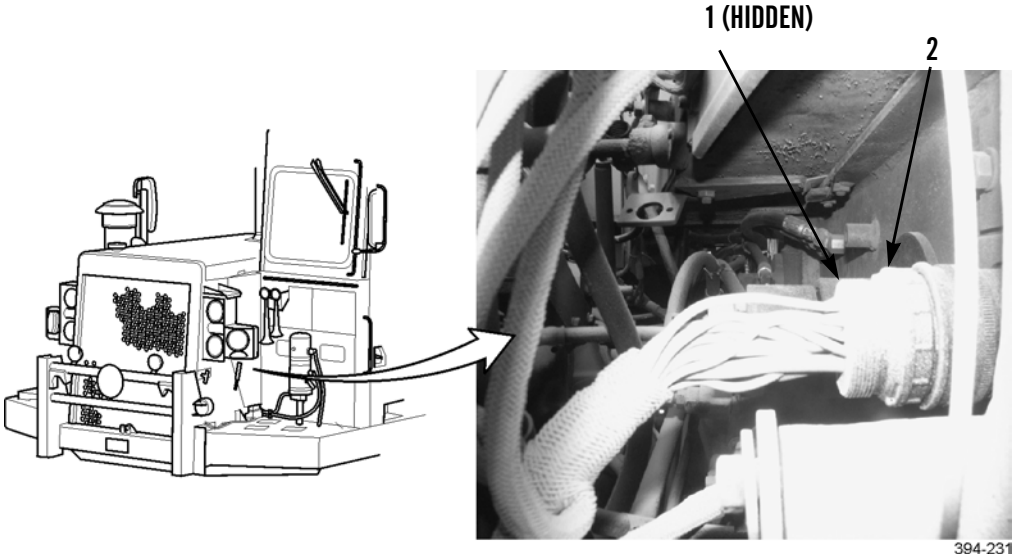


6. Connect engine wiring harness to air dryer assembly (WP 0104 00).
7. Connect four connectors (5) to engine wiring harness (4) and attach to clips (3).



INSTALLATION - CONTINUED

8. Connect engine wiring harness connector (2) to operator compartment wiring harness.
9. Connect turn signal wiring harness connector (1) to operator compartment wiring harness.



10. Connect engine wiring harness to alternator (WP 0055 00).
11. Connect engine wiring harness to main circuit breaker (WP 0076 00).
12. Connect engine wiring harness to starting motor (WP 0057 00).
13. Connect engine wiring harness to retarder/torque converter temperature sender (WP 0093 00).
14. Connect engine wiring harness to ether start sender switch (WP 0098 00).
15. Connect engine wiring harness to water temperature sending unit (WP 0092 00).
16. Install hood (WP 0189 00).
17. Install engine compartment access door assembly (WP 0190 00).
18. Install crankcase guards (WP 0201 00).
19. Connect battery cables (WP 0104 00).
20. Operate machine and verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

BACKUP ALARM SWITCH WIRING HARNESS REPLACEMENT 0108 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Backup alarm switch removed (WP 0101 00)

Battery cables disconnected (WP 0104 00)

WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

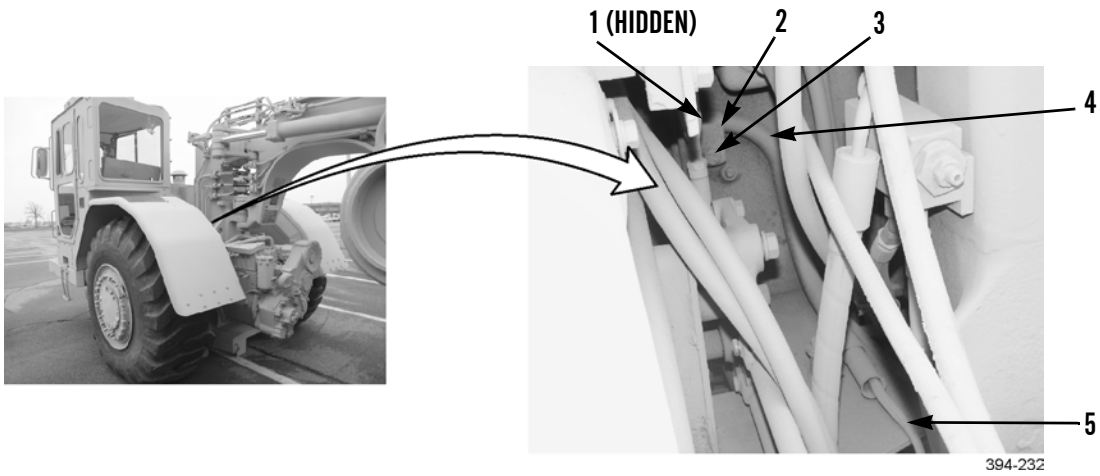
Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Disconnect backup alarm switch wiring harness (5) connector.
2. Remove two capscrews (2) and clips (3).
3. Remove grommet (1).

NOTE

Note routing of harness to ensure correct installation.

4. Remove backup alarm switch wiring harness (5) and tube (4).
5. Remove backup alarm switch wiring harness (5) from tube (4).



INSTALLATION

1. Insert backup alarm switch wiring harness (5) in tube (4).
2. Position tube (4) and backup alarm wiring harness (5) as an assembly on machine.
3. Install grommet (1).
4. Install two clips (2) and capscrews (3).
5. Connect backup alarm switch wiring harness (5) connector.
6. Install backup alarm switch (WP 0101 00).
7. Connect battery cables (WP 0104 00).
8. Verify correct operation of backup alarm (TM 5-3805-248-10).

END OF WORK PACKAGE

HEATER, DEFROSTER AND FRONT WIPER WIRING HARNESS REPLACEMENT 0109 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

WP 0221 00

TM 5-3805-248-10

Equipment Condition

Heater control console removed (WP 0224 00)

Operator compartment liner removed (WP 0194 00)

Battery cables disconnected (WP 0104 00)

WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

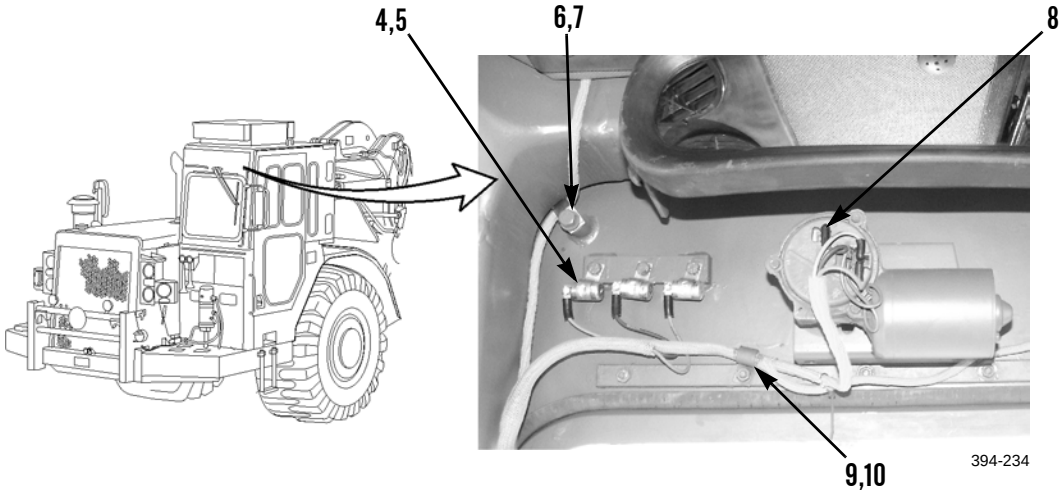
NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Disconnect harness (1) from clip (3).
2. Disconnect harness (1) from operator compartment wiring harness (2).

REMOVAL - CONTINUED

3. Remove three screws (4) and connectors (5).
4. Remove two capscrews (6) and loop clamps (7).
5. Disconnect three connectors (8) from windshield wiper assembly.
6. Remove two nuts (9) and loop clamps (10).



7. Disconnect harness (1) from defroster fan (WP 0221 00).

NOTE

Note position of harness to ensure correct installation.

8. Remove heater, defroster and front wiper harness (1).

INSTALLATION

1. Install harness (1) in vehicle.
2. Connect harness (1) to defroster fan (WP 0221 00).
3. Install two loop clamps (10) and nuts (9).
4. Connect three connectors (8) to windshield wiper assembly.
5. Install two loop clamps (7) and capscrews (6).
6. Install three connectors (5) and screws (4).
7. Connect harness (1) to operator compartment wiring harness (2).
8. Connect harness (1) to clip (3).

9. Install heater control console (WP 0224 00).
10. Connect battery cables (WP 0104 00).
11. Verify correct operation of electrical accessories (TM 5-3805-248-10).
12. Install liner in operator compartment (WP 0194 00).

END OF WORK PACKAGE

MAIN CIRCUIT BREAKER-TO-STARTING MOTOR SOLENOID WIRE REPLACEMENT 0110 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

References

WP 0057 00

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Hood removed (WP 0189 00)

Crankcase guard removed (WP 0201 00)

WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Remove screw (4) and lockwasher (3). Discard lockwasher.
2. Disconnect wiring harness (2) connector from side of operator compartment.
3. Remove lockwasher (1) and discard.

NOTE

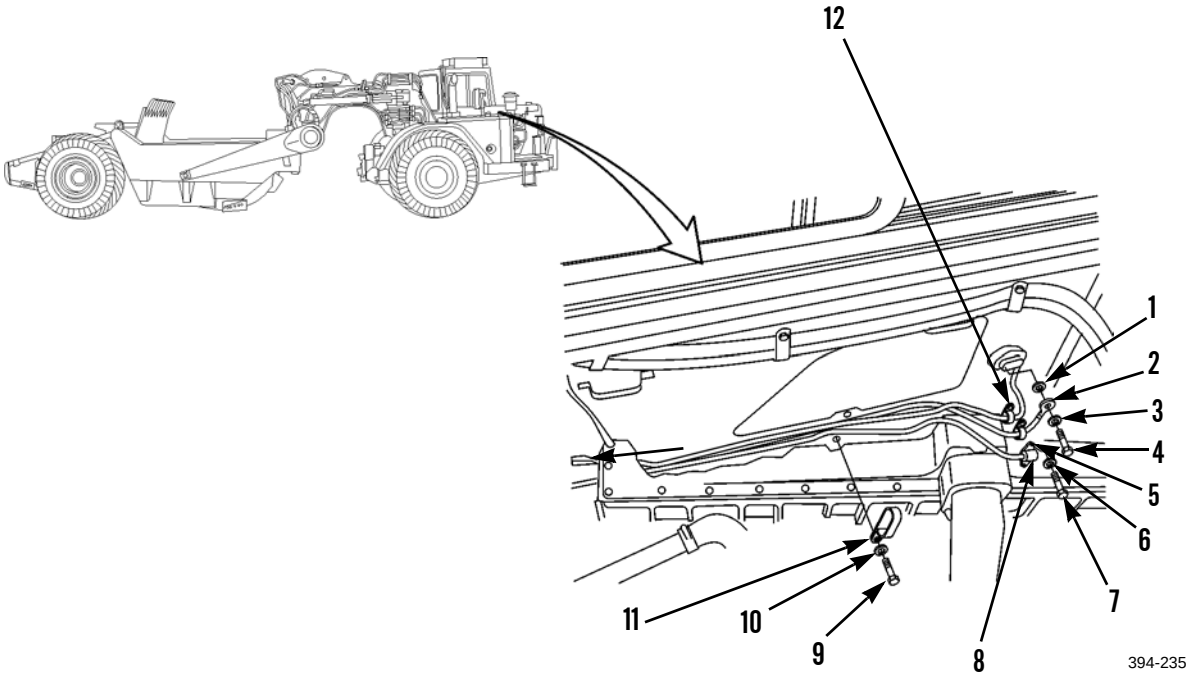
Keep wire connectors attached to retaining strap and one of two clips.

4. Remove bolt (7) and washer (6) from retaining strap (8) and clips (5 and 12).
5. Remove clip (5).
6. Remove two bolts (9), washers (10) and clips (11).
7. Disconnect wire harness (2) connector from starting motor (WP 0057 00).

NOTE

Note routing of wiring harness to ensure correct installation.

8. Remove wiring harness (2) from machine.



INSTALLATION

1. Position wiring harness (2) on machine.
2. Connect wiring harness (2) connector to starting motor solenoid (WP 0057 00).
3. Install two clips (11), washers (10) and bolts (9).
4. Position clip (5).
5. Install washer (6) and bolt (7) on retaining strap (8) and clips (5 and 12).
6. Install new lockwasher (1).
7. Connect wiring harness (2) connector at side of operator compartment at terminal.
8. Install new lockwasher (3) and screw (4).
9. Connect battery cables (WP 0104 00).
10. Operate machine and verify correct operation (TM 5-3805-248-5).
11. Install hood (WP 0189 00).
12. Install crankcase guard (WP 0201 00).

END OF WORK PACKAGE

BATTERY DISCONNECT SWITCH-TO-STARTING MOTOR WIRE REPLACEMENT 0111 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (4)

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Crankcase guard removed (WP 0201

WARNING

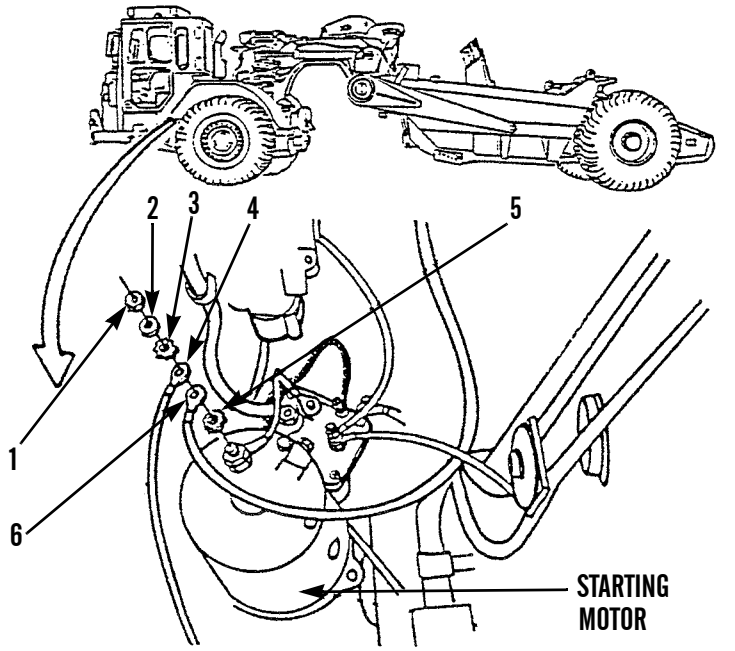
Ensure battery cables are disconnected before working on any electrical system components. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

Note routing of wire assembly to ensure correct installation.

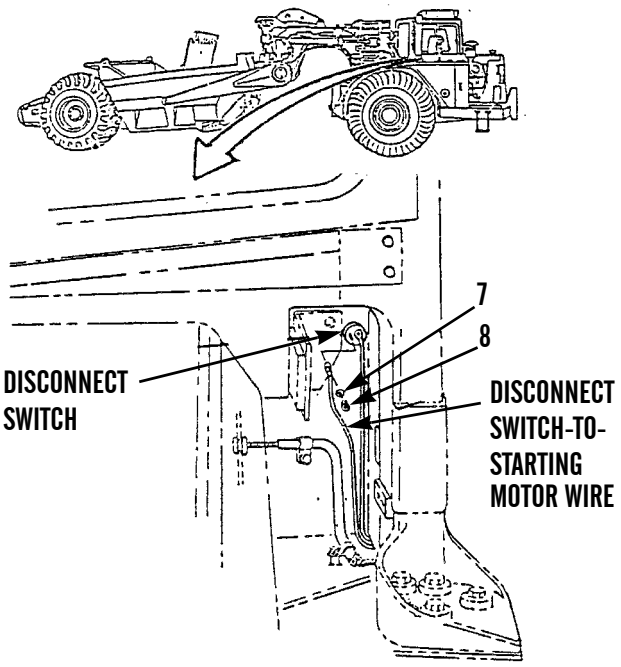
1. Remove nut (1) and lockwashers (2 and 3) from starting motor. Discard lockwashers.
2. Disconnect wire connector (4).
3. Disconnect wire connector (6).
4. Remove lockwasher (5) and discard.



394-1680

REMOVAL - CONTINUED

5. Remove nut (8) and lockwasher (7) from disconnect switch on rear exterior of operator compartment.
6. Remove battery disconnect switch-to-starting motor wire assembly from machine.



INSTALLATION

1. Position battery disconnect switch-to-starting motor wire assembly on machine.
2. Connect wire connector (6) to left terminal of battery disconnect switch.
3. Install new lockwasher (7) and nut (8).
4. Install new lockwasher (5) and connect wire connectors (6 and 4).
5. Install new lockwashers (3 and 2) and nut (1).
6. Connect battery cables (WP 0104 00).
7. Operate machine and verify correct operation (TM 5-3805-248-10).
8. Install crankcase guard (WP 0201 00).

END OF WORK PACKAGE

STARTING MOTOR GROUND WIRE REPLACEMENT 0112 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Lockwasher (4)

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Crankcase guard removed (WP 0201 00)

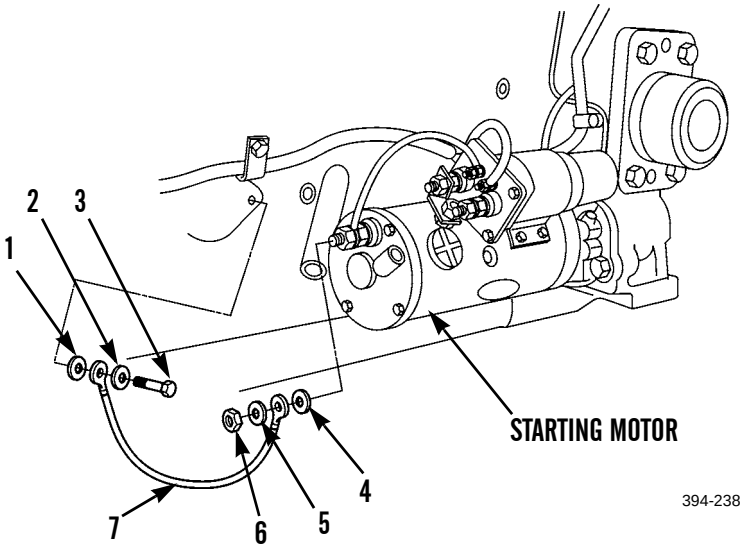
WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

STARTING MOTOR GROUND WIRE REPLACEMENT - CONTINUED 0112 00

REMOVAL - CONTINUED

1. Remove nut (6) and lockwasher (5) from starting motor. Discard lockwasher.
2. Disconnect starting motor ground wire (7) at starting motor.
3. Remove lockwasher (4). Discard lockwasher.
4. Remove bolt (3), lockwasher (2), starting motor ground wire assembly (7) and lockwasher (1). Discard lockwashers.



INSTALLATION

1. Install new lockwasher (1), starting motor ground wire assembly (7), new lockwasher (2) and bolt (3).
2. Install lockwasher (4).
3. Connect starting motor ground wire (7) at starting motor.
4. Install new lockwasher (5) and nut (6) on starting motor.
5. Connect battery cables (WP 0104 00).
6. Start engine and verify correct operation (TM 5-3805-248-10).
7. Install crankcase guard (WP 0201 00).

END OF WORK PACKAGE

ALTERNATOR GROUND WIRE REPLACEMENT 0113 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (3)

References

WP 0009 00

Equipment Condition

Battery cables disconnected (WP 0104 00)

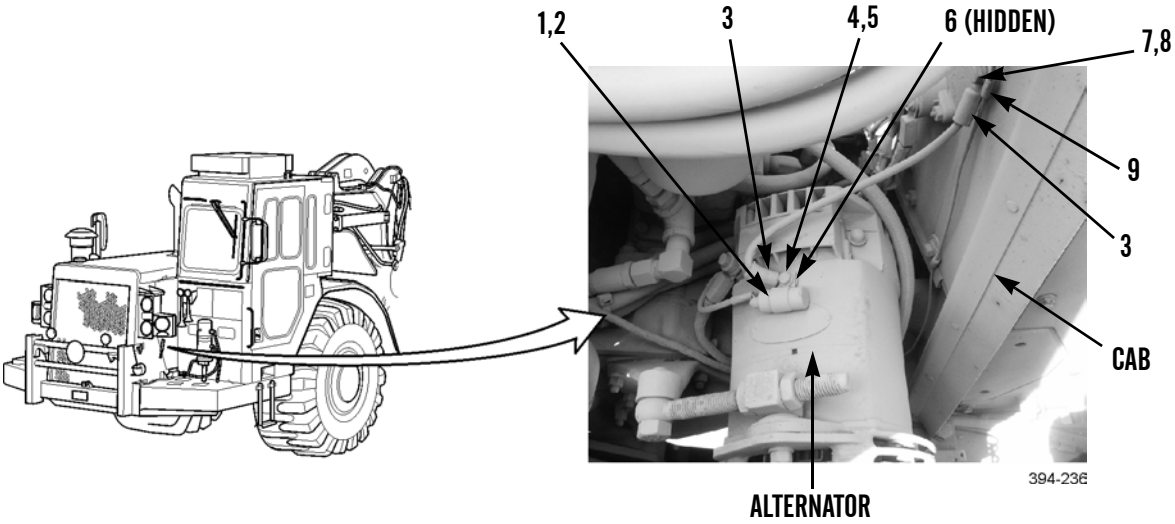
Engine compartment access doors removed (WP 0190 00)

WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in personal injury or damage to equipment.

REMOVAL

1. Remove bolt (4) and lockwasher (5). Discard lockwasher.
2. Disconnect wire (3) to alternator and operator compartment.
3. Remove lockwasher (2), capacitor (1) and lockwasher (6). Discard lockwashers.
4. Remove bolt (7), washer (8), clip (9) and wire (3).



INSTALLATION

1. Position wire (3) and install clip (9), washer (8) and bolt (7).
2. Install new lockwasher (6), capacitor (1) and new lockwasher (2) on alternator.
3. Connect wire (3) to alternator and cab.
4. Install new lockwasher (5) and bolt (4).
5. Connect battery cables (WP 0104 00).
6. Verify correct charging operation (WP 0009 00).
7. Install engine compartment access doors (WP 0190 00).

END OF WORK PACKAGE

ENGINE FRONT COVER-TO-SUPPORT GROUND WIRE REPLACEMENT 0114 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Engine compartment access doors removed (WP 0190 00)

Hood removed (WP 0189 00)

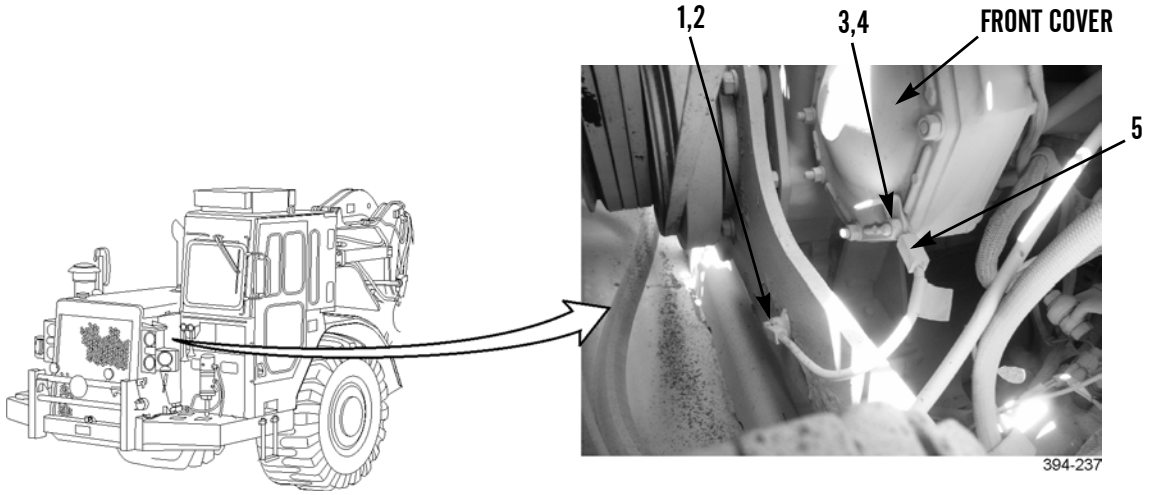
WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

ENGINE FRONT COVER-TO-SUPPORT GROUND WIRE REPLACEMENT - CONTINUED 0114 00

REMOVAL

1. Remove nut (3) and lockwasher (4). Discard lockwasher.
2. Disconnect engine front cover-to-support ground wire assembly (5) from front cover.
3. Remove bolt (1), lockwasher (2) and wire (5) from support. Discard lockwasher.



INSTALLATION

1. Install wire assembly (5), new lockwasher (2) and bolt (1) on support.
2. Connect wire assembly (5) to front cover.
3. Install new lockwasher (4) and nut (3) on engine cover stud.
4. Install hood (WP 0189 00).
5. Install engine compartment access doors (WP 0190 00).
6. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

AFTERCOOLER TO OPERATOR COMPARTMENT GROUND WIRE REPLACEMENT 0115 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Hood removed (WP 0189 00)

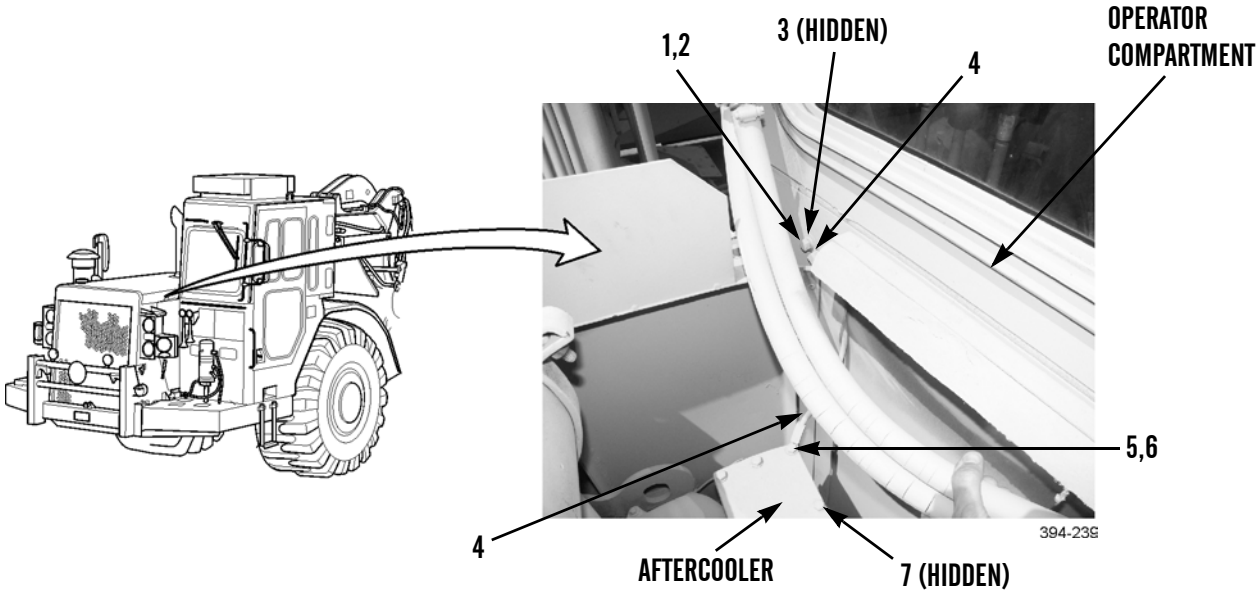
WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

AFTERCOOLER TO OPERATOR COMPARTMENT GROUND WIRE REPLACEMENT - CONTINUED 0115 00

REMOVAL

1. Remove bolt (1) and washer (2).
2. Disconnect wire (4) from operator compartment.
3. Remove lockwasher (3). Discard lockwasher.
4. Remove bolt (5), washer (6), wire (4) and lockwasher (7). Discard lockwasher.



INSTALLATION

1. Install new lockwasher (7), and connect wire (4) to aftercooler.
2. Install washer (6) and bolt (5) in aftercooler.
3. Install new lockwasher (3).
4. Connect wire (4) to operator compartment.
5. Install washer (2) and bolt (1).
6. Install hood (WP 0189 00).
7. Connect battery cables (WP 0104 00).

END OF WORK PACKAGE

AIR DRYER WIRE REPLACEMENT 0116 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Lockwasher

References

WP 0218 00

Equipment Condition

Battery cables disconnected (WP 0104 00)

Engine compartment access doors removed (WP 0190 00)

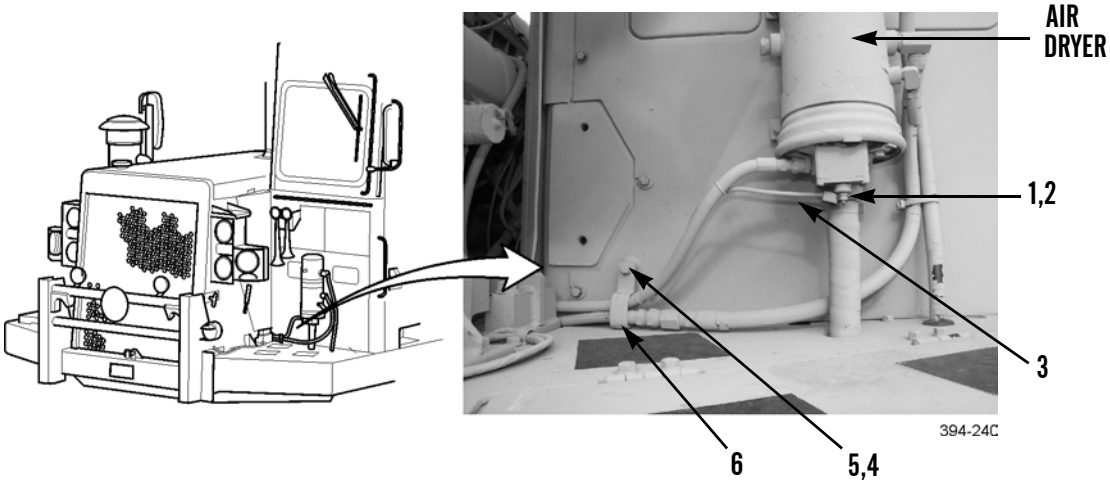
WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

AIR DRYER WIRE REPLACEMENT - CONTINUED 0116 00

REMOVAL

1. Remove nut (1) and lockwasher (2) from air dryer. Discard lockwasher.
2. Disconnect air dryer wire (3) from air dryer.
3. Remove bolt (4), washer (5) and clip (6).
4. Disconnect and remove air dryer wire (3) from engine wiring harness.



INSTALLATION

1. Position air dryer wire (3) on machine.
2. Install clip (6), washer (5) and bolt (4).
3. Connect air dryer wire (3) to air dryer.
4. Install new lockwasher (2) and nut (1).
5. Connect air dryer (3) to engine wiring harness.
6. Connect battery cables (WP 0104 00).
7. Check for voltage at air dryer terminal (WP 0218 00).
8. Install engine compartment access doors (WP 0190 00).

END OF WORK PACKAGE

HEADLIGHT, WORKLIGHT AND STARTING AID WIRING HARNESS REPLACEMENT 0117 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

WP 0039 00

WP 0083 00

WP 0084 00

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Engine compartment access doors removed (WP 0190 00)

Hood removed (WP 0189 00)

WARNING

Ensure battery cables are disconnected before working on any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

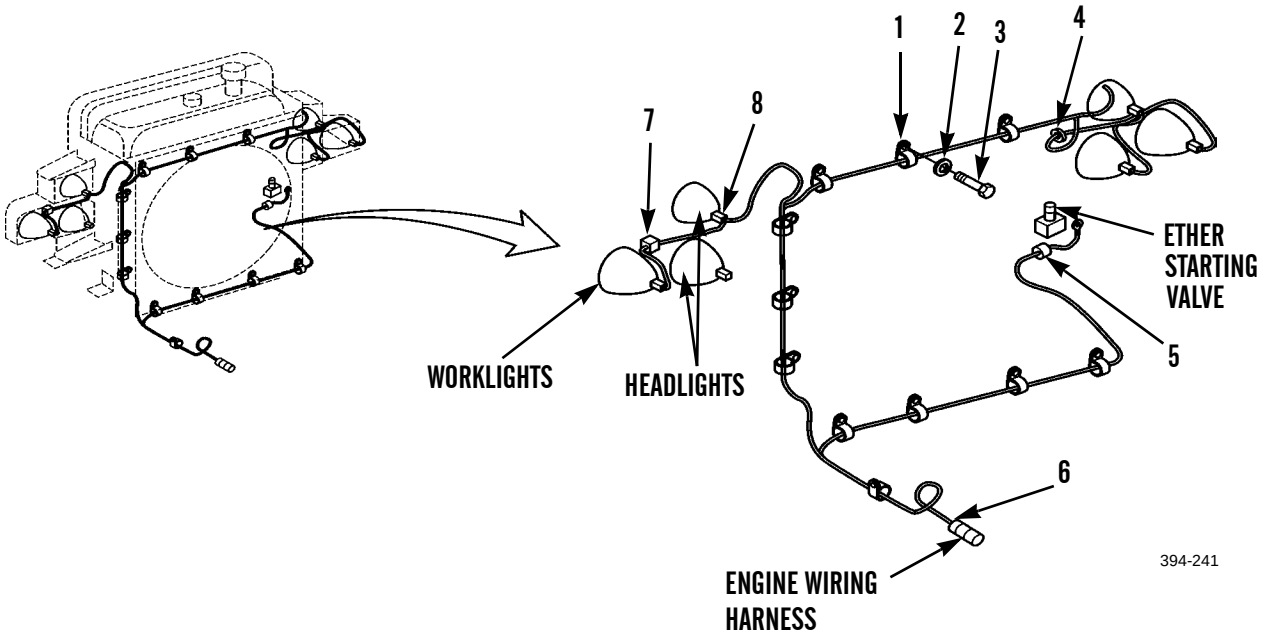
HEADLIGHT, FLOODLIGHT AND STARTING AID WIRING HARNESS REPLACEMENT - CONTINUED 0117 00

REMOVAL

NOTE

Tag all wire connectors, cable and wiring harnesses before disconnecting to ensure correct installation.

1. Disconnect wiring harness from ether starting valve (WP 0039 00).
2. Disconnect wiring harness from front worklight assemblies (WP 0083 00).
3. Disconnect wiring harness from high beam and low beam headlight assemblies (WP 0084 00).
4. Remove eleven bolts (3), washers (2) and clips (1).
5. Remove grommets (4, 5, 7 and 8).
6. Disconnect wiring harness (6) from engine wiring harness and remove wiring harness from machine.



INSTALLATION

1. Position wiring harness (6) on machine.
2. Connect wiring harness (6) to engine wiring harness.
3. Install grommets (4, 5, 7 and 8).
4. Install eleven clips (1), washers (2) and bolts (3).
5. Connect wiring harness to the high beam and low beam headlight assemblies (WP 0084 00).
6. Connect wiring harness to front floodlight assemblies (WP 0083 00).
7. Connect wiring harness to ether start valve (WP 0039 00).
8. Connect battery cables (WP 0104 00).
9. Operate machine and verify correct operation of all components disconnected (TM 5-3805-248-10).
10. Install engine compartment access doors (WP 0190 00).
11. Install hood (WP 0189 00).

END OF WORK PACKAGE

VEHICLE FRONT BLACKOUT LIGHT WIRE REPLACEMENT 0118 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Engine compartment access doors removed (WP 0190 00)

WARNING

Ensure battery cables are disconnected before working any electrical system component. Failure to follow this warning may result in injury or damage to equipment.

REMOVAL

NOTE

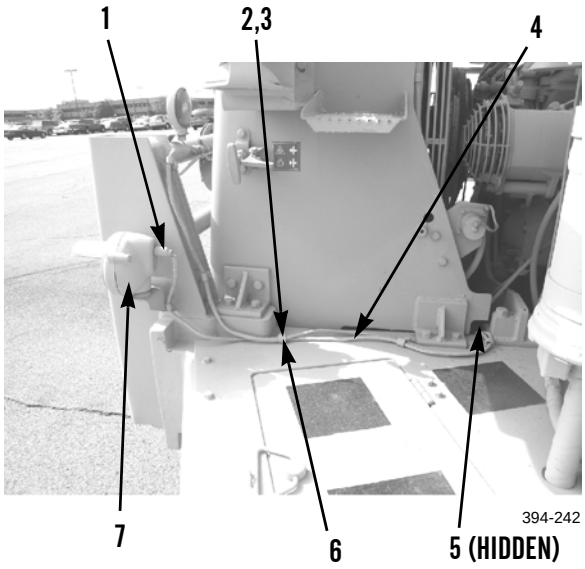
Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.

1. Disconnect wire (4) from engine harness connector (5).

NOTE

Clips secure front blackout wire (4) and turn signal wire.

2. Remove three bolts (2), washers (3) and clips (6).
3. Disconnect wire connector (1) from front blackout light (7).
4. Separate wire (4) from turn signal wire.



INSTALLATION

1. Connect wire connector (1) to front blackout light (7).
2. Install three clips (6), washers (3) and bolts (2).
3. Connect wire (4) to engine harness connector (5).
4. Connect battery cables (WP 0104 00).
5. Operate front blackout light to verify correct operation (TM 5-3805-248-10).
6. Install engine compartment access doors (WP 0190 00).

END OF WORK PACKAGE

REAR LIGHT HARNESS REPLACEMENT 0119 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Blackout stoplight/tail lights disconnected (WP 0088 00)

Battery cables disconnected (WP 0104 00)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

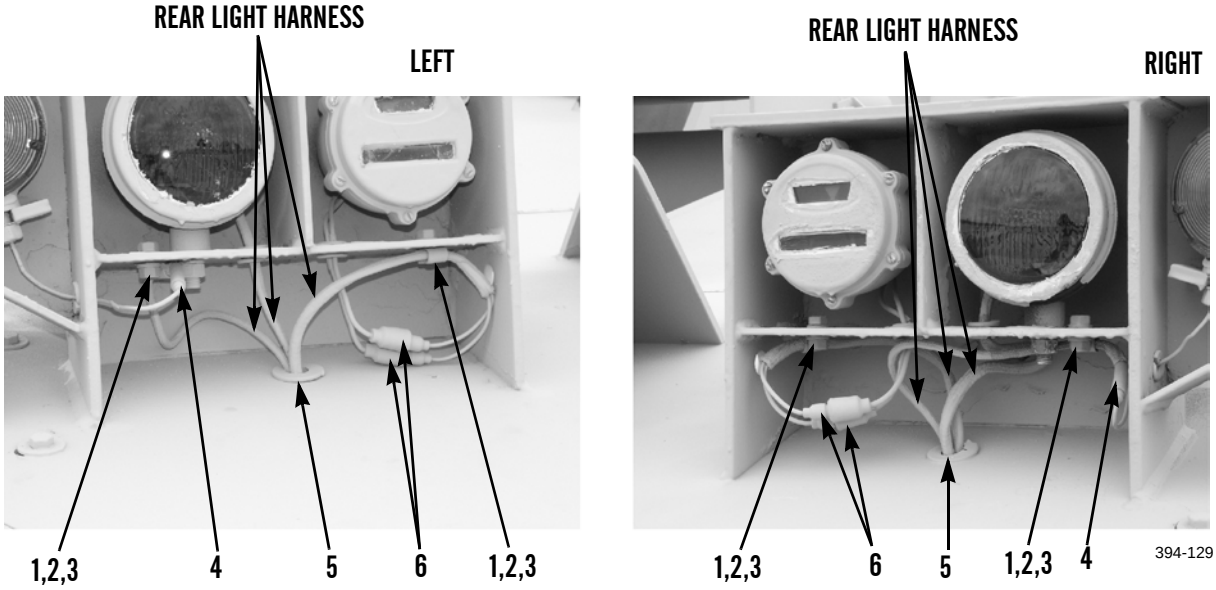
REAR LIGHT HARNESSES REPLACEMENT - CONTINUED 0119 00

REMOVAL

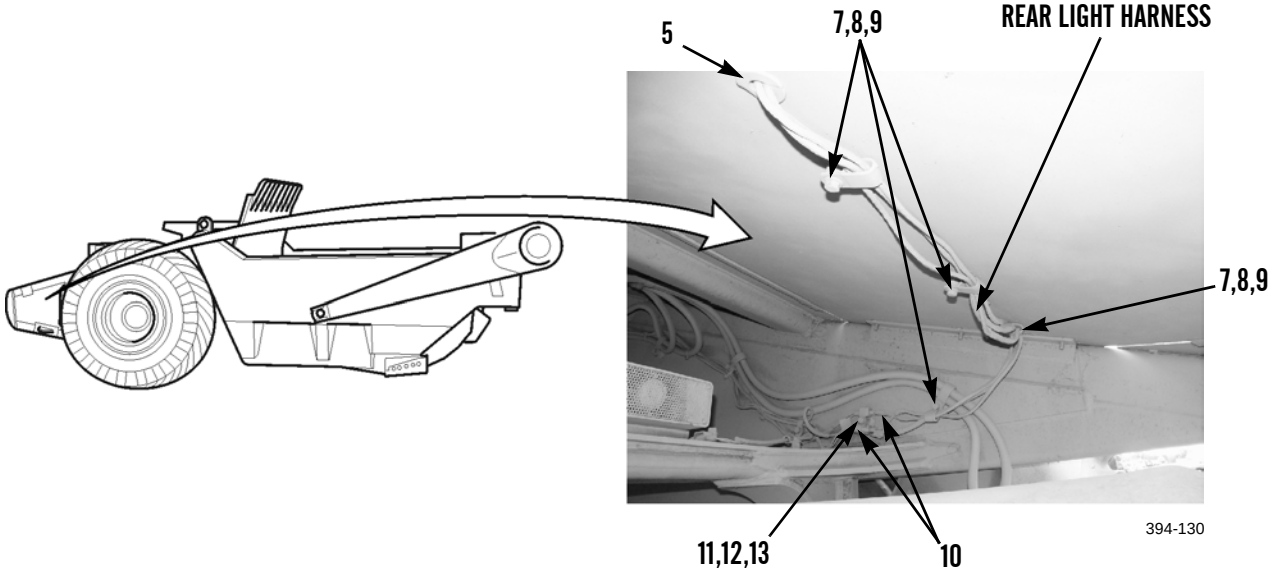
NOTE

- Tag all wiring harnesses before disconnecting to ensure correct installation.
- Note the routing of harnesses to ensure correct installation.

1. Disconnect two wire connectors (4).
2. Disconnect four wire connectors (6).
3. Remove four nuts (1), washers (2) and clamps (3) from machine. Remove clamps from rear light harnesses.
4. Remove two grommets (5) from rear deck and rear light harnesses. If damaged, discard grommet.



5. Remove four bolts (7), washers (8) and clamps (9) from underside of rear deck and rear light harnesses.
6. Remove bolt (11), washer (12) and three clips (13) from inside of right rear scraper wall.
7. Separate three wire connectors (10) from clips (11) and disconnect connectors.



REMOVAL - CONTINUED

8. Remove rear light harnesses from machine.

INSTALLATION

1. Install rear light harnesses on machine.
2. Install two grommets (5) on rear light harnesses and rear deck.
3. Connect four wire connectors (6).
4. Connect two wire connectors (4).
5. Connect three wire connectors (10) and install three clips (11), washer (12) and bolt (11) on inside of right rear scraper wall.
6. Install four clamps (9), washers (8) and bolts (7) on underside of rear deck.
7. Install four clamps (3), washers (2) and nuts (1).
8. Connect blackout stoplights/tail lights (WP 0088 00).
9. Connect battery cables (WP 0104 00).
10. Verify correct operation of rear lights (TM 5-3805-248-10).

END OF WORK PACKAGE

REAR HARNESSES REPLACEMENT 0120 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Backup alarm disconnected (WP 0100 00)

Battery cables disconnected (WP 0104 00)

WARNING

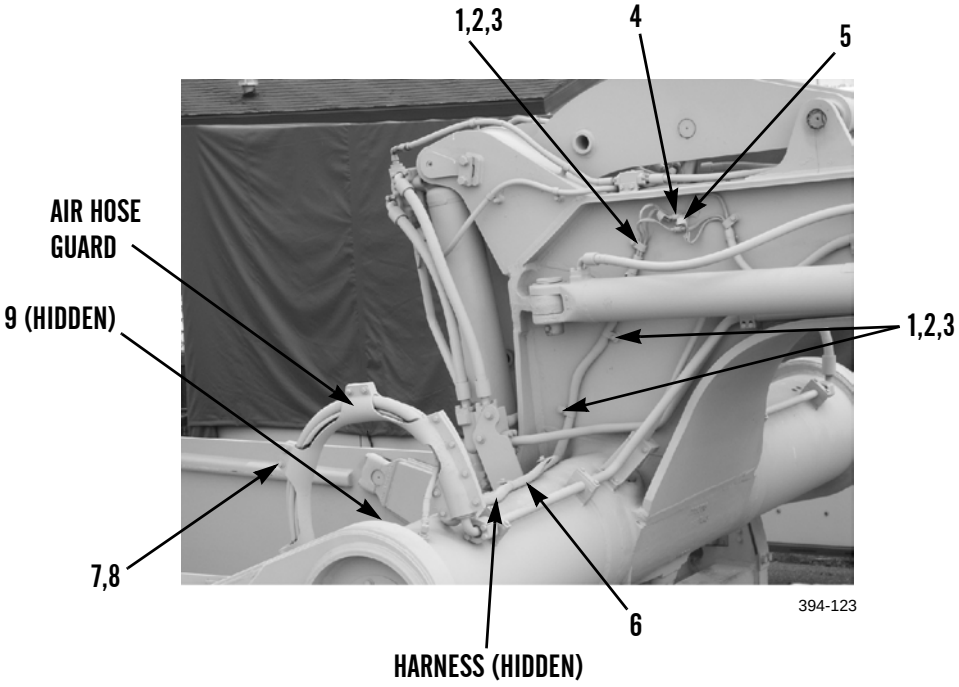
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

- Tag all wire connectors, cables and wiring harnesses before disconnecting to ensure correct installation.
- Note the routing of harnesses to ensure correct installation.

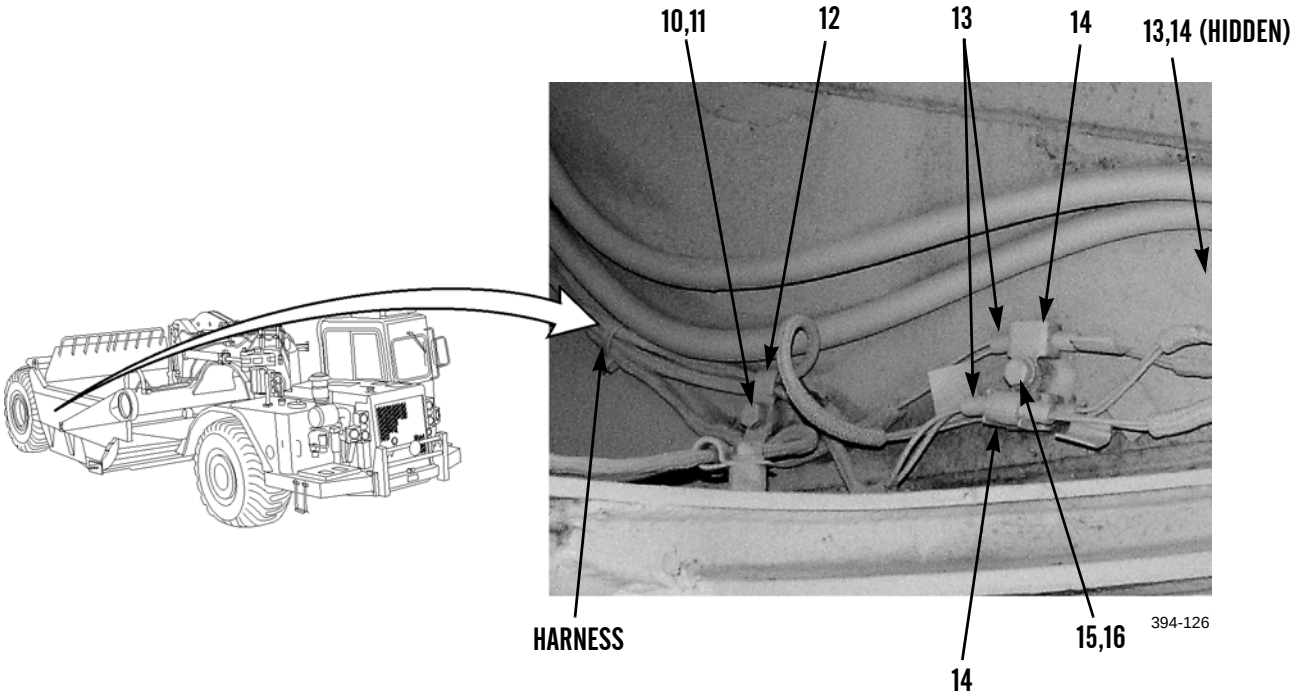
1. Remove 16 nuts (7), washers (8) and air hose guard from machine.
2. Separate three wire connectors (4) from clamps (5) and disconnect wire connectors.
3. Remove clamp (9), four bolts (1), washers (2) and clamps (3) from rubber shield (6) and harness.



REAR HARNESS REPLACEMENT - CONTINUED 0120 00

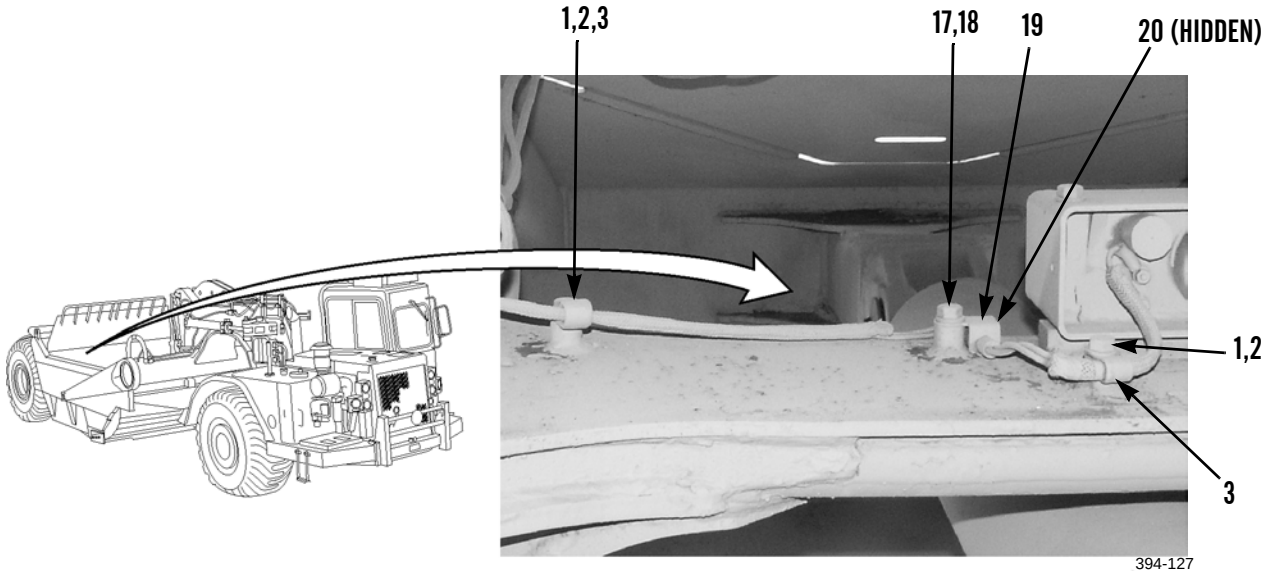
REMOVAL - CONTINUED

4. Remove bolt (10), washer (11) and clamp (12) from harness.
5. Remove bolt (15), washer (16) and separate three clips (14) from three wire connectors (13).



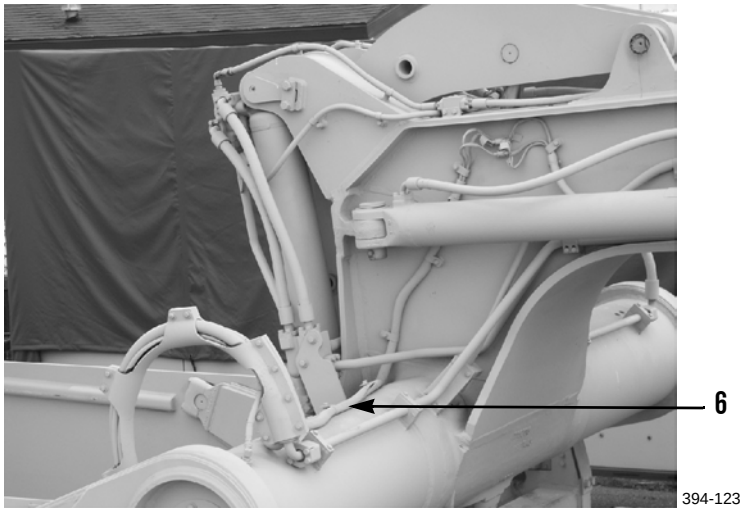
REMOVAL - CONTINUED

6. Remove 2 bolts (1), washers (2) and clamps (3).
7. Remove bolt (17), washer (18) and separate clip (19) from wire connector (20).
8. Disconnect wire connector (20).



NOTE

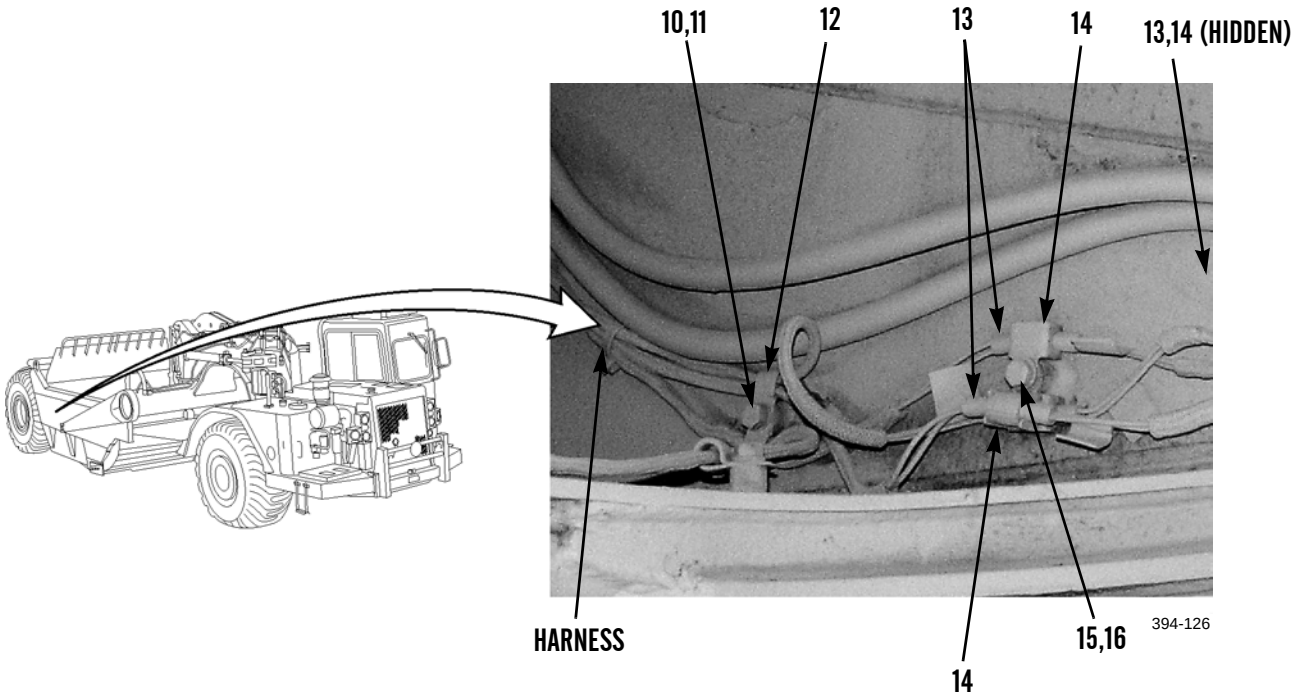
Note location of all clamps and tie straps to ensure correct installation.



9. Trace harness and remove all remaining tie straps and clamps from rubber shield (6).
10. Fasten a piece of non-electrical wire (longer than rubber shield (6) and harness) to rear end of guard and harness before removing from machine. This will make feeding harness through bowl easier.
11. Remove rubber shield (6) and harness from machine by pulling through front of bowl. DO NOT pull non-electrical wire completely out. Leave a tail at both ends.
12. If necessary to replace rubber shield (6), remove harness from rubber shield.

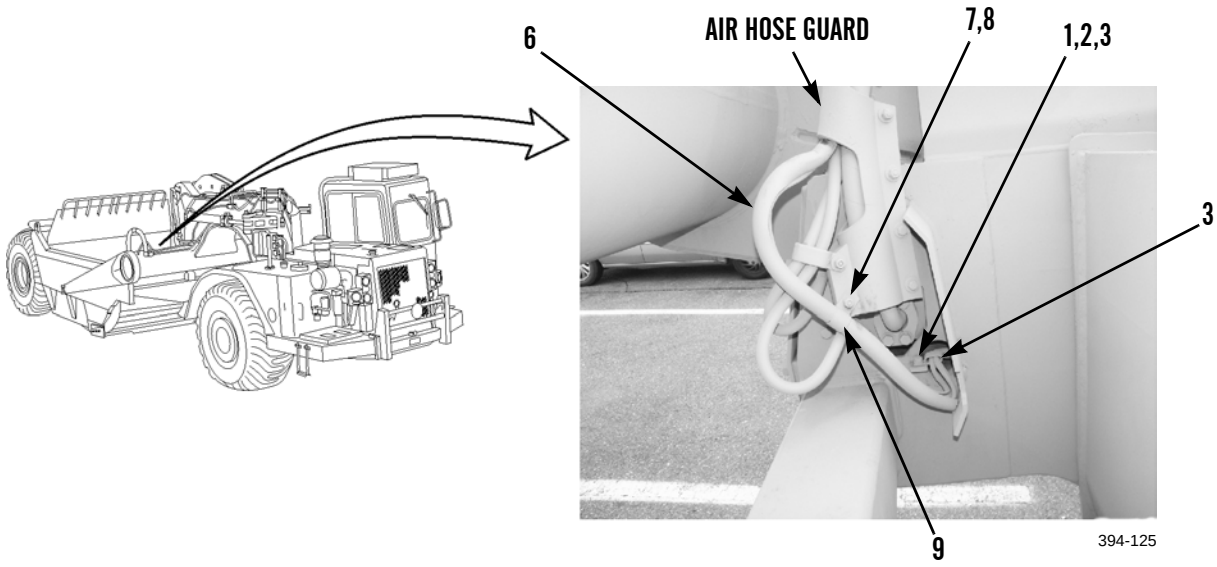
INSTALLATION

1. If removed, install harness into rubber shield (6).
2. Fasten non-electrical wire still in bowl to rear end of rubber shield (6) and harness. Feed harness through front of bowl by pulling non-electrical wire out from rear.
3. Trace harness and install all new tie straps.
4. Connect wire connector (20) and install clip (19), washer (18) and bolt (17) to wire connector (20).
5. Connect backup alarm (WP 0100 00).
6. Connect three wire connectors (13) and install three clips (14), washer (16) and bolt (15).
7. Install harness in clamp (12) and install clamp (12), washer (11) and bolt (10).

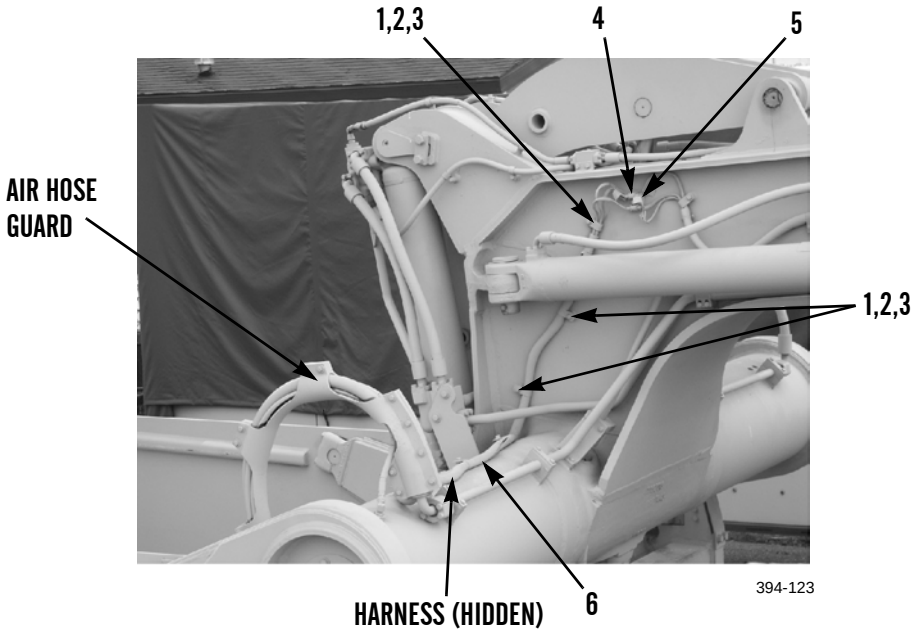


INSTALLATION - CONTINUED

8. Install clamp (9) around rubber shield (6).
9. Install air hose guard.
10. Install clamp (9), 16 washers (8) and nuts (7) on studs of air hose guard.



11. Connect three wire connectors (4) and install in clamp (5).
12. Install six clamps (3) on rubber shield (6), and install harness, washers (2) and bolts (1) on machine.



13. Connect battery cables (WP 0104 00).
14. Verify correct operation of all rear accessories (TM 5-3805-248-10).

END OF WORK PACKAGE

SCRAPER HARNESSES (INTERMEDIATE) REPLACEMENT 0121 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

WARNING

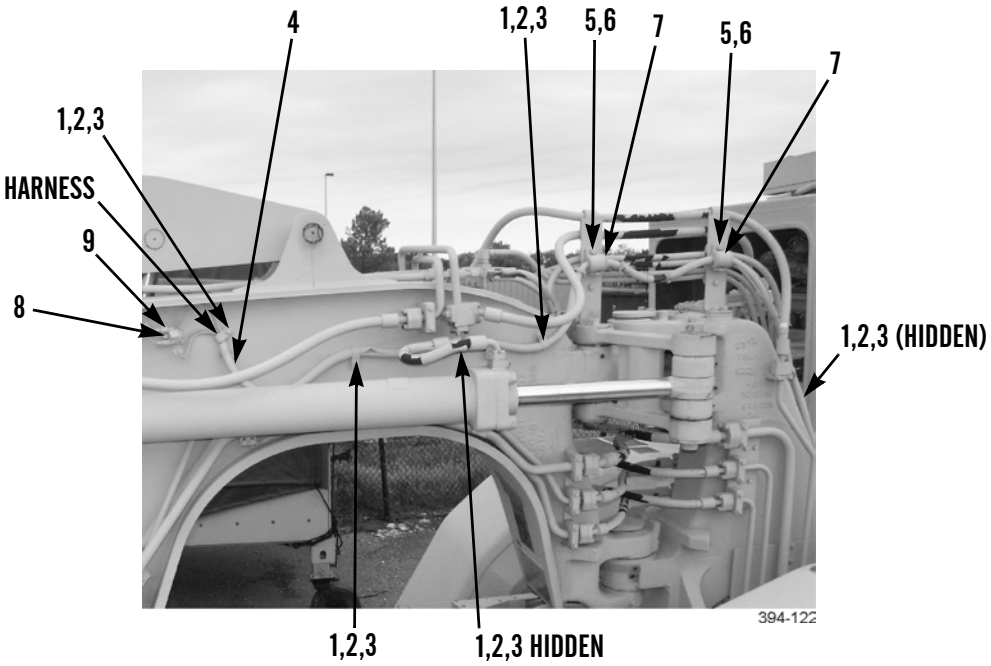
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

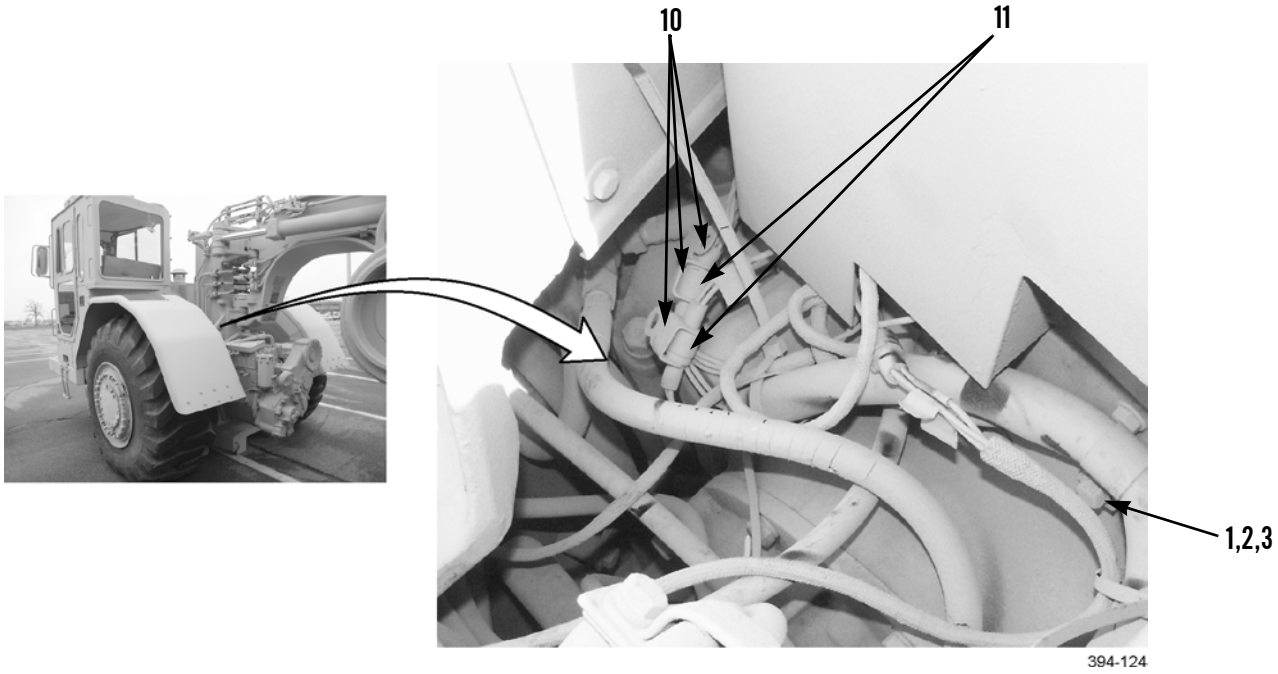
- Tag all harnesses before disconnecting to ensure correct installation.
- Note the location of all clamps and tie straps and the routing of harnesses to ensure correct installation.

1. Separate three wire connectors (9) from clamp (8) and disconnect wire connectors.
2. Remove six bolts (1), washers (2) and clamps (3).
3. Remove two bolts (5), washers (6) and clamps (7).



REMOVAL - CONTINUED

4. Remove three clips (10) and disconnect three wire connectors (11).
5. Trace harness and remove all remaining tie straps and clamps.
6. Remove guard (4) and harness from machine.
7. If necessary, remove all clamps (3 and 7) from guard (4) and remove harnesses from guard.



INSTALLATION

1. If removed, install harnesses into guard (4).
2. Position guard (4) and harness on machine.
3. Trace harness and install all new tie straps.
4. Connect three wire connectors (11) and install three clips (10).
5. Connect three wire connectors (9) and install in clamp (8).
6. Install all remaining clamps and tie straps on guard (4).
7. If removed, install all clamps (3 and 7) on guard (4).
8. Install two clamps (7), washers (6) and bolts (5).
9. Install six clamps (3), washers (2) and bolts (1).
10. Connect battery cables (WP 0104 00).
11. Operate machine and verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

CUTTING EDGE WORKLIGHT AND SUPPLEMENTAL STEERING PUMP SWITCH HARNESS REPLACEMENT

0122 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Cutting edge worklight disconnected (WP 0086 00)

Battery cables disconnected (WP 0104 00)

WARNING

Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

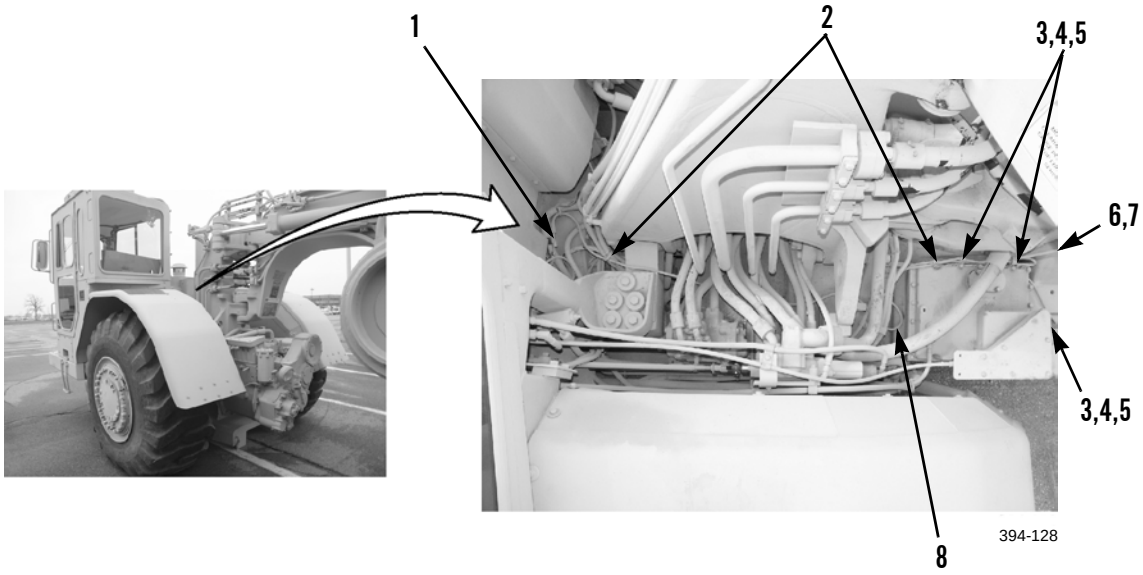
CUTTING EDGE WORKLIGHT AND SUPPLEMENTAL STEERING PUMP SWITCH HARNESS REPLACEMENT - CONTINUED 0122 00

REMOVAL

NOTE

- Tag all wiring harnesses before disconnecting to ensure correct installation.
- Note the location of all clamps and tie straps and the routing of harness to ensure correct installation.

1. Remove two screws (6) and washers (7) from supplemental steering pump switch.
2. Disconnect wire connector (1).
3. Trace harness and remove all bolts (3) washers (4) and clips (5).
4. Trace harness; cut and discard all tie straps (2).
5. Remove cutting edge worklight and supplemental steering pump switch wiring harness (8) from machine.



INSTALLATION

1. Install cutting edge worklight and supplemental steering pump switch wiring harness (8) on machine.
2. Install all clips (5) washers (4) and bolts (3).
3. Install new tie straps (2).
4. Connect wire connector (1).
5. Connect harness (8) and install two washers (7) and screws (6) on supplemental steering pump switch.
6. Connect cutting edge worklight (WP 0086 00).
7. Connect battery cables (WP 0104 00).
8. Verify correct operation of worklights (TM 5-3805-248-10).

END OF WORK PACKAGE

FRONT TURN SIGNAL HARNESS REPLACEMENT 0123 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Right side engine compartment access door removed (WP 0190 00)

WARNING

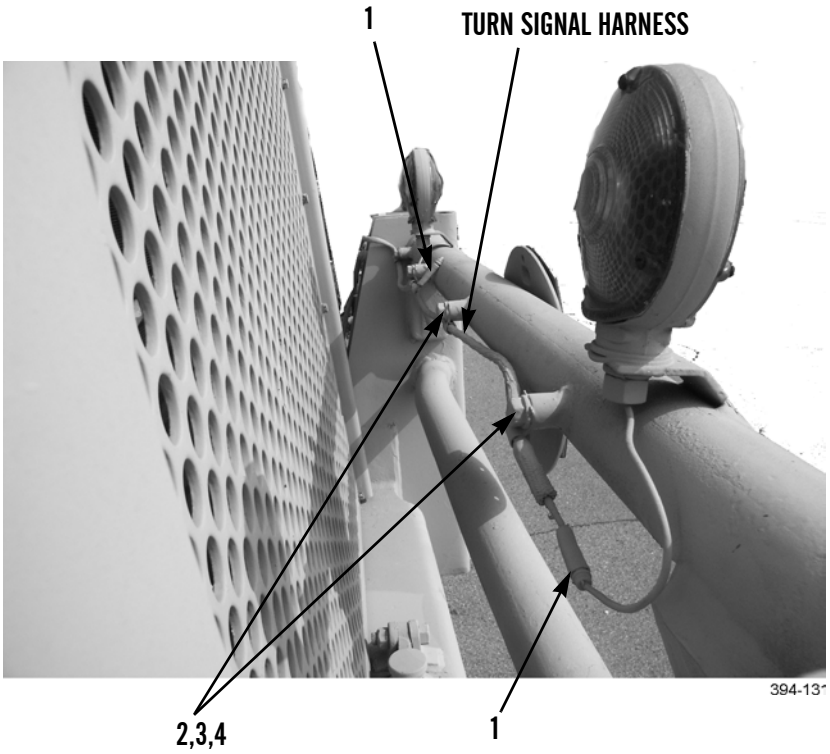
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

REMOVAL

NOTE

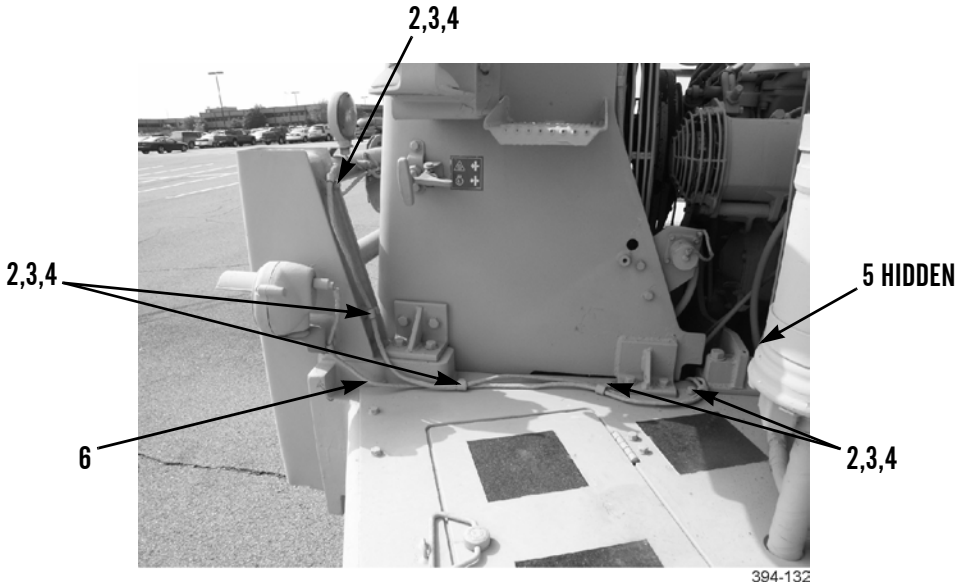
- Tag all wiring harnesses before disconnecting to ensure correct installation.
- Note the routing of harness to ensure correct installation.

1. Disconnect two wire connectors (1)
2. Remove nine bolts (2), washers (3) and clips (4).



REMOVAL - CONTINUED

3. Disconnect wire connector (5) located under main circuit breaker on left side of engine compartment.
4. Remove turn signal wiring harness (6).



INSTALLATION

1. Position turn signal harness (6) on machine.
2. Connect two wire connectors (1).
3. Connect wire connector (5) located under main circuit breaker.
4. Install nine clips (4), washers (3) and bolts (2).
5. Install right side engine compartment access door (WP 0190 00).
6. Connect battery cables (WP 0104 00).
7. Verify correct operation of turn signals (TM 5-3805-248-10).

END OF WORK PACKAGE

RADIO INTERFERENCE SUPPRESSION COMPONENTS REPLACEMENT 0124 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Lockwasher (6)

References

WP 0112 00

TM 5-3805-248-10

Equipment Condition

Battery cables disconnected (WP 0104 00)

Left side engine compartment access door removed (WP 0190 00)

WARNING

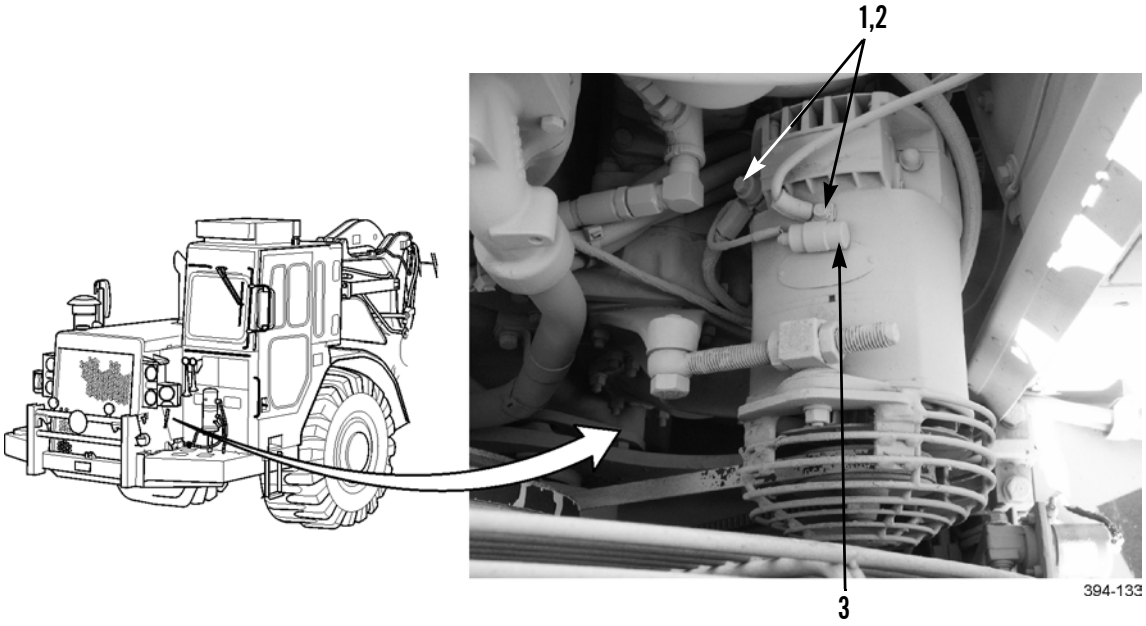
Ensure battery disconnect switch is in OFF position before working on any electrical system component. Failure to follow this warning may cause injury or damage to equipment.

NOTE

For removal of the starting motor radio suppression wire, refer to WP 0112 00.

REMOVAL

1. Remove two bolts (1) and six lockwashers (2). Discard lockwashers.
2. Remove capacitor (3).



INSTALLATION

1. Install capacitor (3).
2. Install six new lockwashers (2) and two bolts (1).
3. Connect battery cables (WP 0104 00).
4. Operate engine and verify correct operation (TM 5-3805-248-10).
5. Install left side engine compartment access door (WP 0190 00).

END OF WORK PACKAGE

SHIFT CONTROL CABLE MAINTENANCE 0125 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Shift Control Cable Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Cotter pin

Materials/Parts - Continued

Gasket (3)

Lockwasher

References

TM 5-3805-248-10

Equipment Condition

Backup alarm switch removed (WP 0101 00)

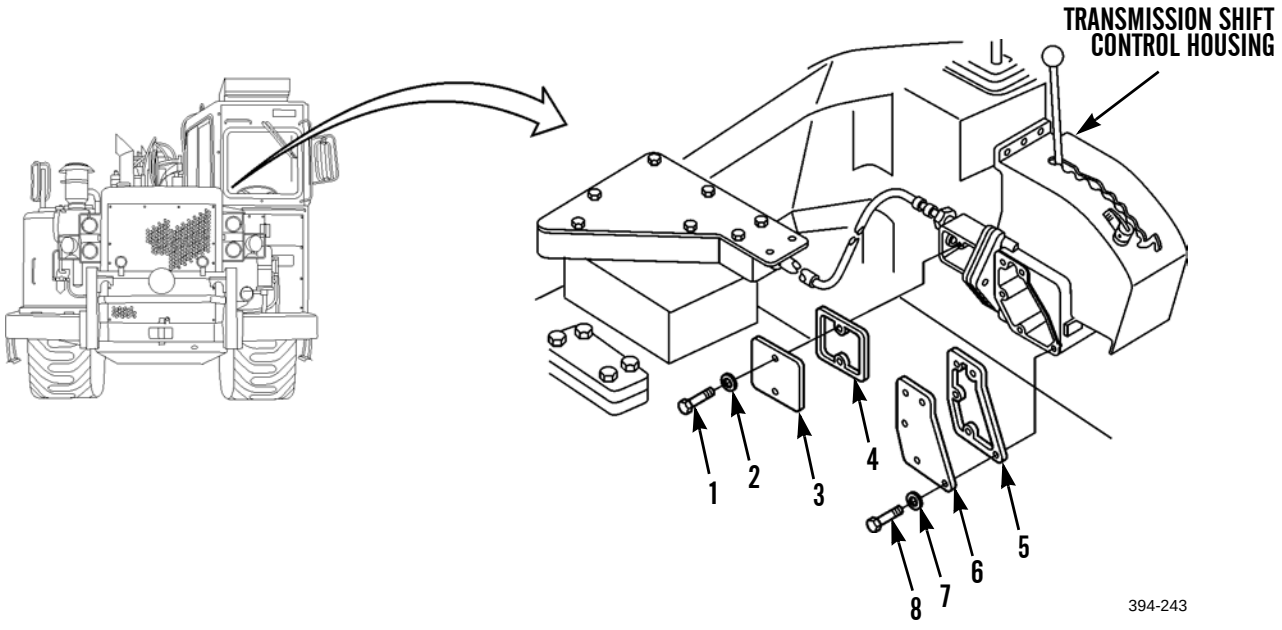
Hood removed (WP 0189 00)

Operator's compartment side panel liner removed (WP 0194 00)

Operator's compartment side panel removed (WP 0195 00)

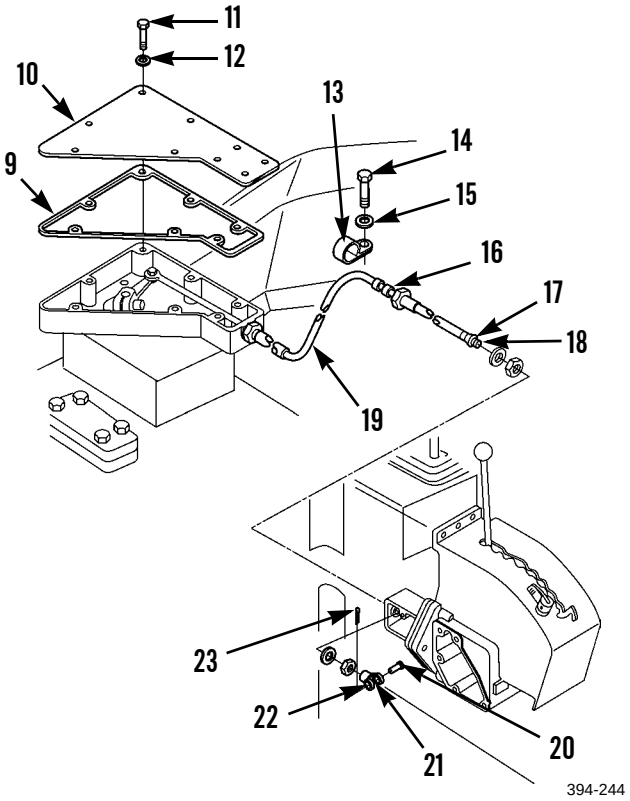
REMOVAL

1. Remove five bolts (8) and washers (7) from transmission shift control housing.
2. Remove cover (6).
3. Remove and discard gasket (5).
4. Remove two bolts (1) and washers (2).
5. Remove cover (3).
6. Remove and discard gasket (4).

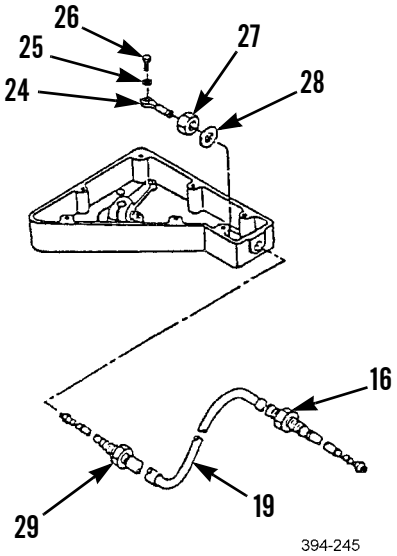


REMOVAL - CONTINUED

7. Loosen nut (16).
8. Remove and discard cotter pin (23).
9. Remove washer (20), pin (22) and rod end (21).
10. Disconnect cable assembly (19) from transmission shift control housing.
11. Remove nut (18) and washer (17).
12. Remove bolt (14), washer (15) and clip (13).
13. Remove seven bolts (11), washers (12) and cover (10) from left side of transmission.
14. Remove and discard gasket (9).



15. Loosen nut (29).
16. Remove bolt (26), lockwasher (25) and rod end (24). Discard lockwasher.
17. Remove nut (27) and washer (28).
18. Remove cable assembly (19).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

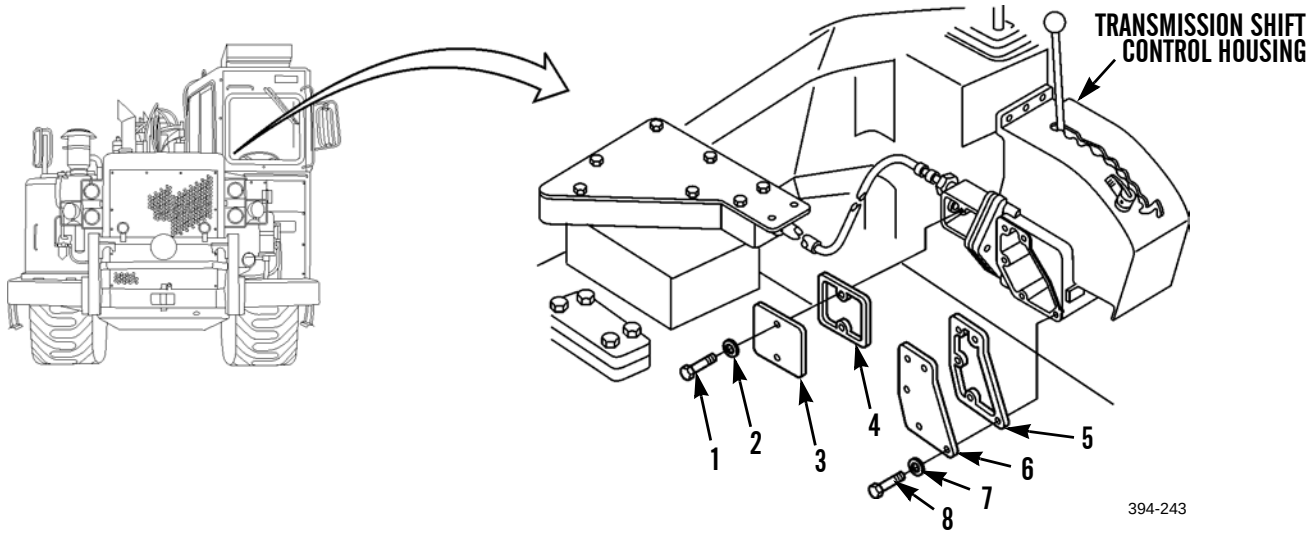
1. Remove gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Insert ends of cable assembly (19) into housings.
2. Install washer (28) and nut (27).
3. Install rod end (24), new lockwasher (25) and bolt (26).
4. Install new gasket (9).
5. Install cover (10), seven washers (12) and bolts (11) on left side of transmission.
6. Install clip (13), washer (15) and bolt (14).
7. Install washer (17) and nut (18).
8. Position transmission shift control lever in first gear.
9. Install rod end (21) on cable assembly (19) and align with shift control lever.
10. Install pin (22), washer (20) and new cotter pin (23).

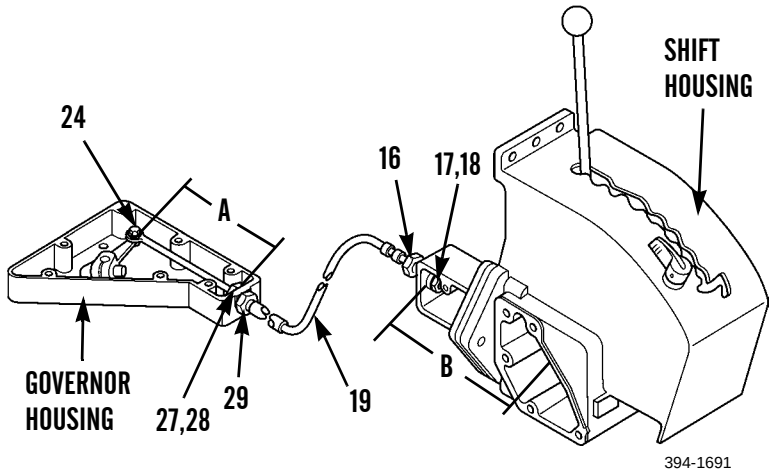
INSTALLATION - CONTINUED

11. Install new gasket (4).
12. Install cover (3), two washers (2) and bolts (1).
13. Install new gasket (5).
14. Install cover (6), five washers (7) and bolts (8) on transmission shift control housing.
15. Adjust shift control cable. Refer to *Adjustment* in this work package.



SHIFT CONTROL CABLE ADJUSTMENT

1. Place transmission selector lever in neutral.
2. Loosen nut (27).
3. Adjust nut (29) to remove slack from area A.
4. Tighten nut (27).
5. Loosen nut (18).
6. Adjust nut (16) to remove slack from area B.
7. Tighten nut (18).



8. Install backup alarm switch (WP 0101 00).
9. Operate machine and verify correct transmission shifter lever operation (TM 5-3805-248-10).
10. Install hood (WP 0189 00).
11. Install operator compartment side panel (WP 0195 00).
12. Install operator compartment side panel liner (WP 0194 00).

END OF WORK PACKAGE

SHIFT CONTROL LEVER AND HOUSING MAINTENANCE 0126 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Rag, wiping (Item 33, WP 0339 00)

Materials/Parts - Continued

Cotter pin

Gasket

Pin

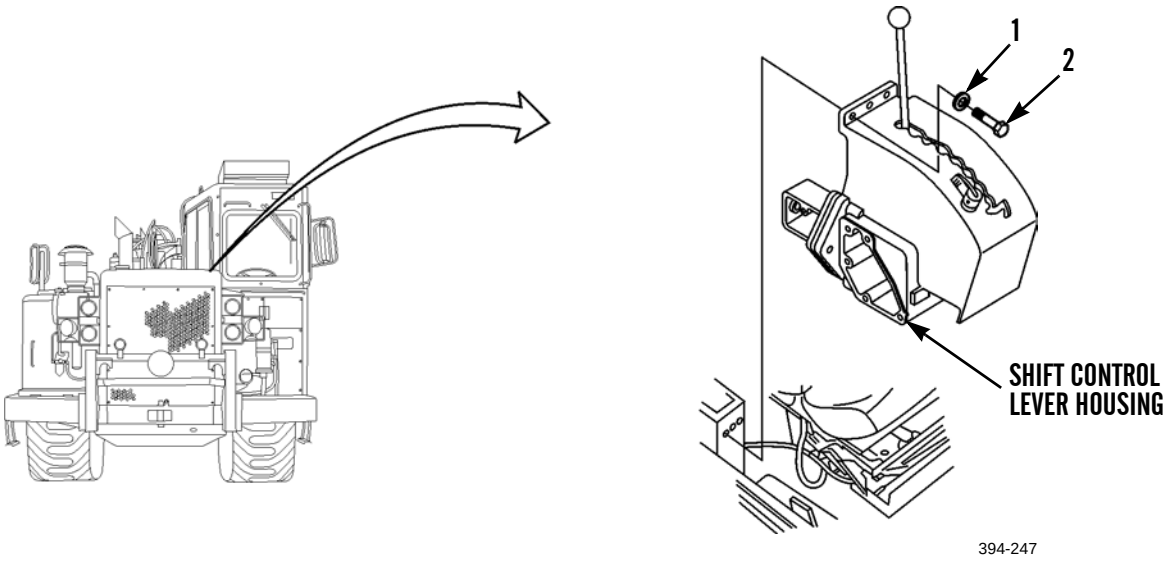
Seal

Equipment Condition

Transmission shift control cable removed (WP 0125 00)

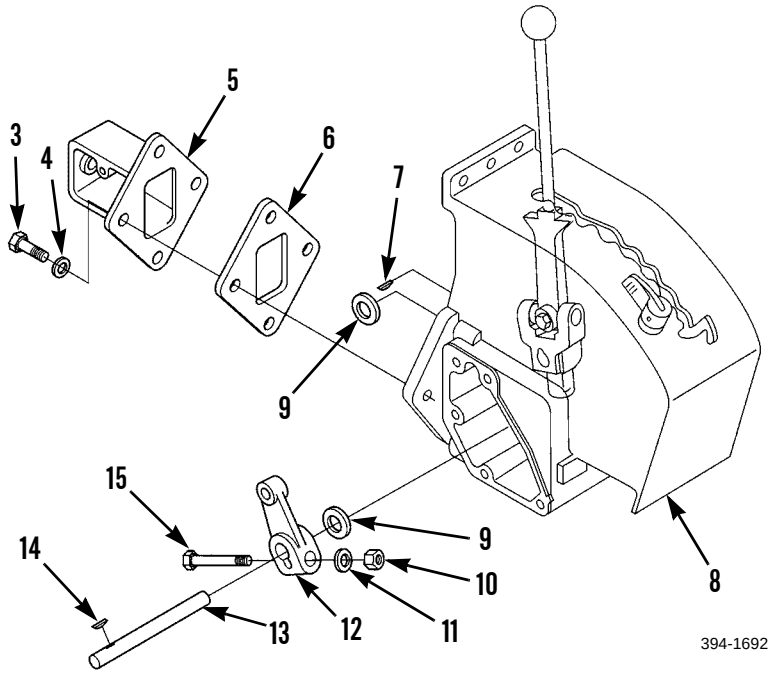
REMOVAL

1. Remove six bolts (2) and washers (1).
2. Remove shift control lever housing assembly.

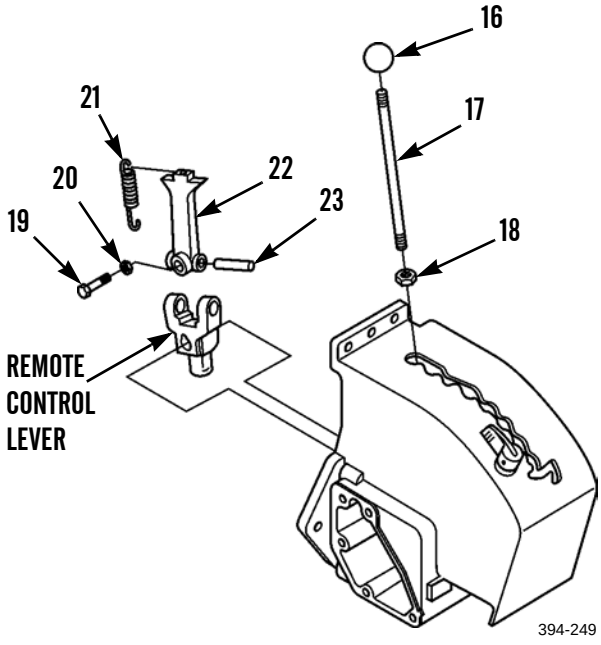


DISASSEMBLY

1. Remove four bolts (3), washers (4), housing (5) and gasket (6) from rear of transmission shift control housing (8). Discard gasket.
2. Remove nut (10), washer (11) and bolt (15) from lever (12) on right side of transmission shift control housing (8).
3. Remove lever (12), woodruff key (14), key (7), washers (9) and shaft (13).

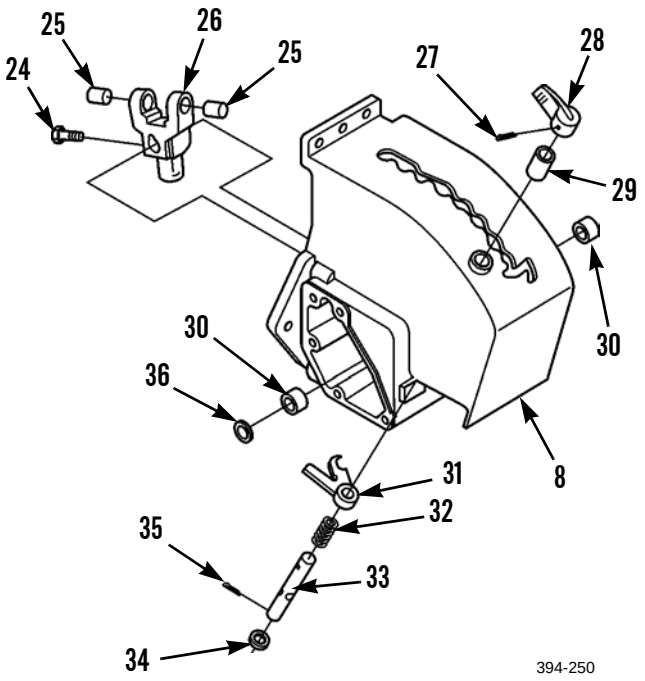


4. Remove handle (16) from rod (17).
5. Remove nut (18) and rod (17).
6. Remove two springs (21).
7. Remove setscrew (19) and nut (20) from lever (22).
8. Remove shaft (23) and lever (22).
9. Remove remote control lever assembly.

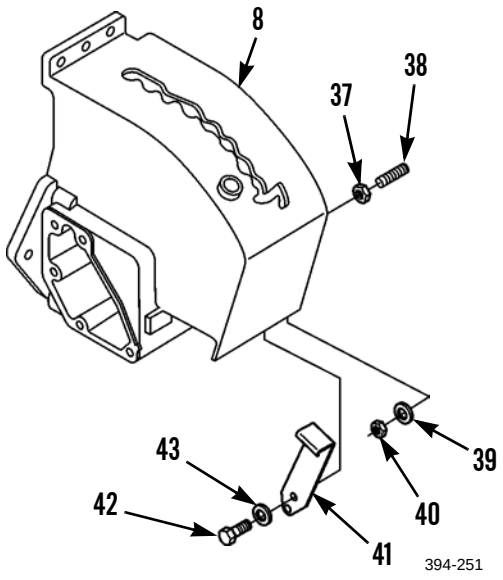


DISASSEMBLY - CONTINUED

10. Remove bolt (24) and two bearings (25) from lever (26).
11. Remove and discard seal (36) from transmission shift control housing (8).
12. Remove bearing (30) from each side of transmission shift control housing (8).
13. Applying downward pressure, push handle (28) and remove pin (27) and washer (34) from pin (33). Discard pin (27).
14. Remove pin (33), spring (32) and plate (31) from transmission shift control housing (8).
15. Remove and discard cotter pin (35).
16. Remove handle (28) and bearing (29) from top of transmission shift control housing (8).



17. Remove two capscrews (42), washers (43) and spring (41) from inner side of transmission shift control housing (8).
18. Hold setscrew (38) and remove nut (40) and washer (39) from transmission shift control housing (8).
19. Remove setscrew (38) and nut (37).



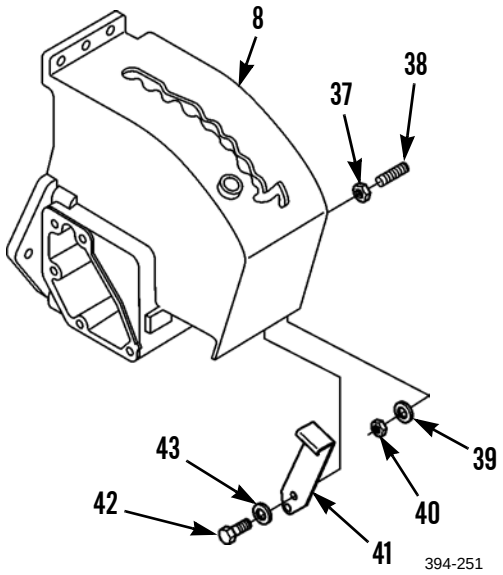
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

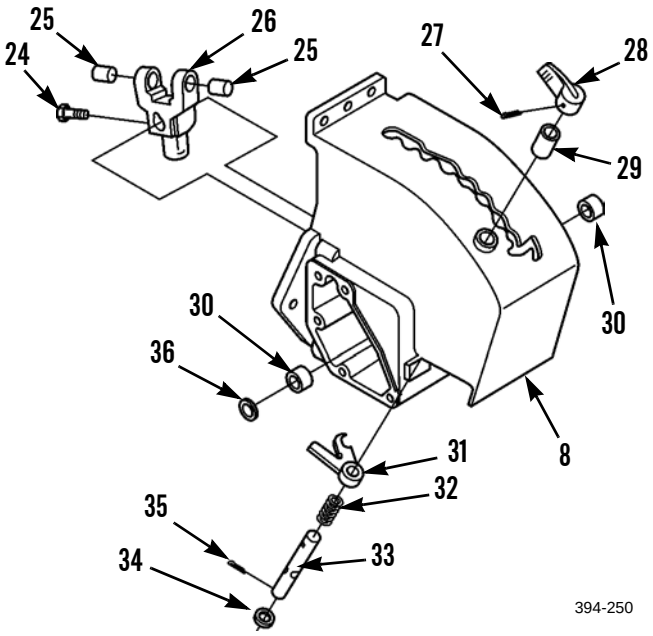
ASSEMBLY

1. Install nut (37) and setscrew (38) on transmission shift control housing (8).
2. Hold setscrew (38) and install washer (39) and nut (40).
3. Install spring (41), two washers (43) and capscrews (42) in inner transmission shift control housing (8).

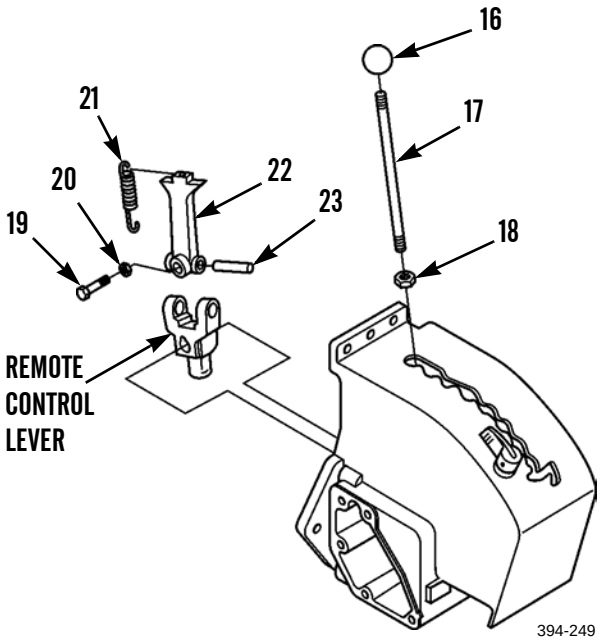


ASSEMBLY - CONTINUED

4. Install bearing (29) and handle (28) on top of transmission shift control housing (8).
5. Install new pin (27).
6. Install plate (31), spring (32) and pin (33) in transmission shift control housing (8).
7. Install washer (34) and new cotter pin (35) on pin (33).
8. Install bearing (30) on each side of transmission shift control housing (8).
9. Lubricate new seal (36) with clean lubricating oil and install with lip of new seal (36) facing inward.
10. Install two bearings (25) and bolt (24) on lever (26).
11. Install remote control lever assembly.

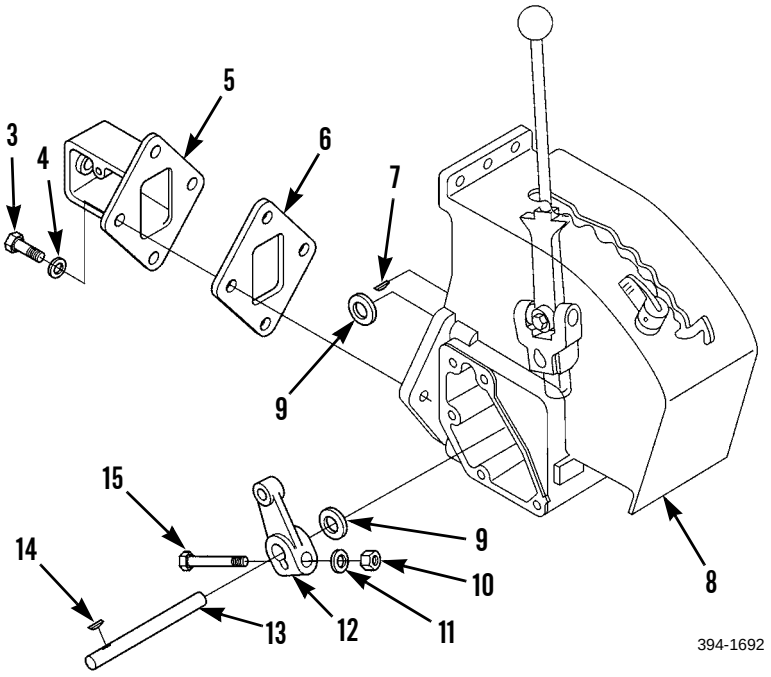


12. Install lever (22) and shaft (23).
13. Install nut (20) and setscrew (19) on lever (22). Torque screw (19) to 35 lb-ft (47 Nm). Then tighten nut (20).
14. Install two springs (21).
15. Install rod (17) and nut (18).
16. Install handle (16) on rod (17).



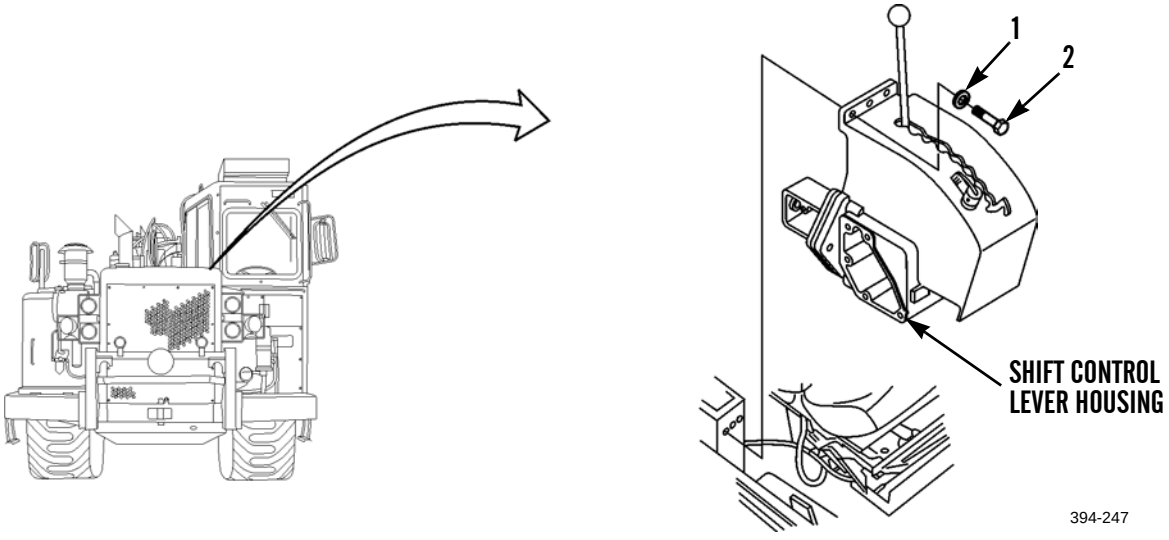
ASSEMBLY - CONTINUED

17. Install shaft (13), two washers (9), woodruff key (14), key (7) and lever (12).
18. Install bolt (15), washer (11) and nut (10) on lever (12).
19. Install new gasket (6), housing (5), four washers (4) and bolts (3) in rear of transmission shift control housing (8).



INSTALLATION

1. Install shift control lever housing assembly.
2. Install six washers (1) and bolts (2).
3. Install and adjust transmission shift control cable (WP 0125 00).
4. Operate machine and verify correct operation of shift control lever (TM 5-3805-248-10).



END OF WORK PACKAGE

TRANSMISSION OIL SAMPLING VALVE REPLACEMENT 0127 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

9/16-18-2A THD plug

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed (2)

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

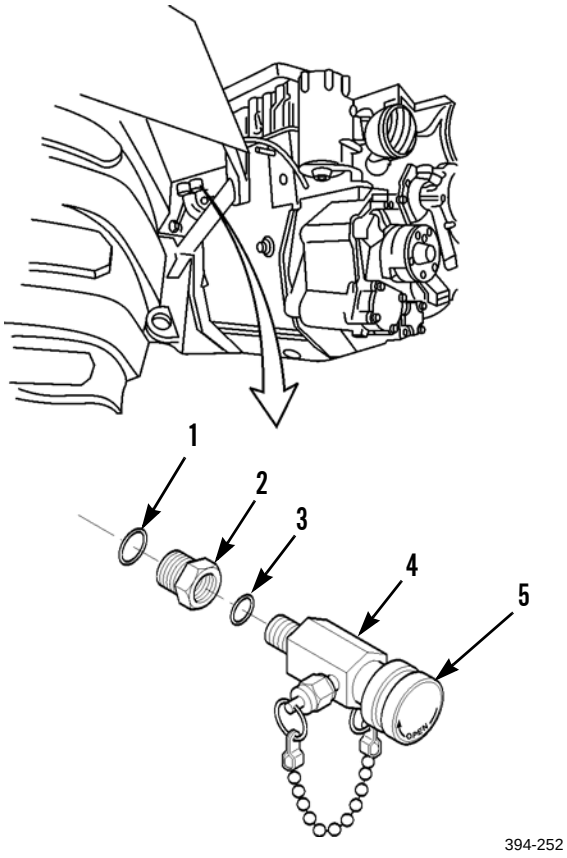
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove cap (5) on transmission oil sampling valve (4).
2. Open valve (4) and allow fluid to drain.
3. Remove transmission oil sampling valve (4).
4. Remove and discard preformed packing (3).
5. Remove adapter (2) and preformed packing (1). Discard preformed packing.
6. Install 9/16-18-2A THD plug to prevent contamination.



CLEANING AND INSPECTION

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Remove 9/16-18-2A THD plug.

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

2. Install new preformed packing (1), adapter (2), new preformed packing (3) and transmission oil sampling valve (4).
3. Install cap (5) on valve (4).
4. Read sight gage to determine fluid level (TM 5-3805-248-10).
5. Add transmission fluid to maintain level between ADD and FULL marks (TM 5-3805-248-10).

END OF WORK PACKAGE

TRANSMISSION OIL DRAIN AND REFILL 0128 00

THIS WORK PACKAGE COVERS

Draining, Cleaning and Inspection, Filling

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

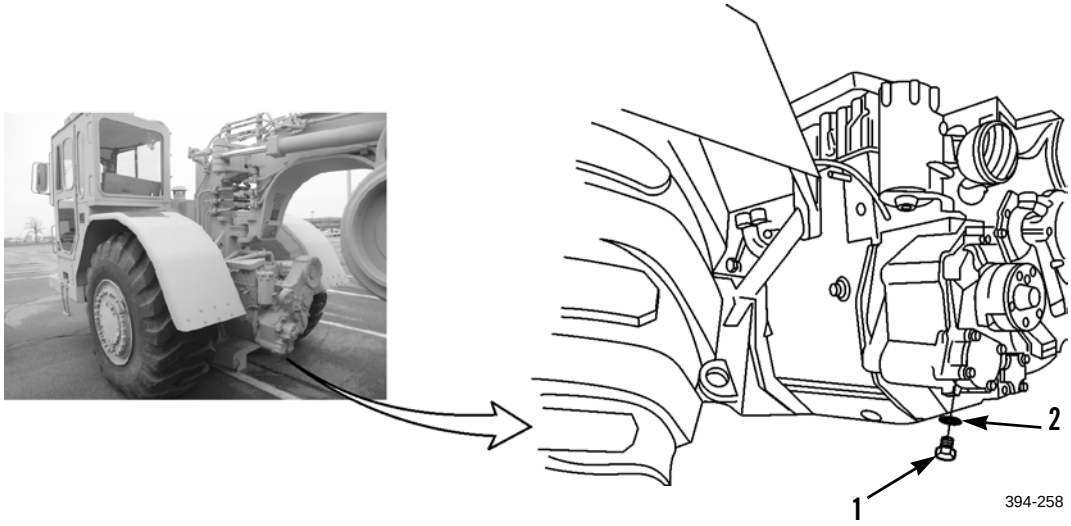
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

DRAINING

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove plug (1) and drain oil (approximately 22 gallons ([83.3 l]).
2. Remove and discard preformed packing (2) from plug (1).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

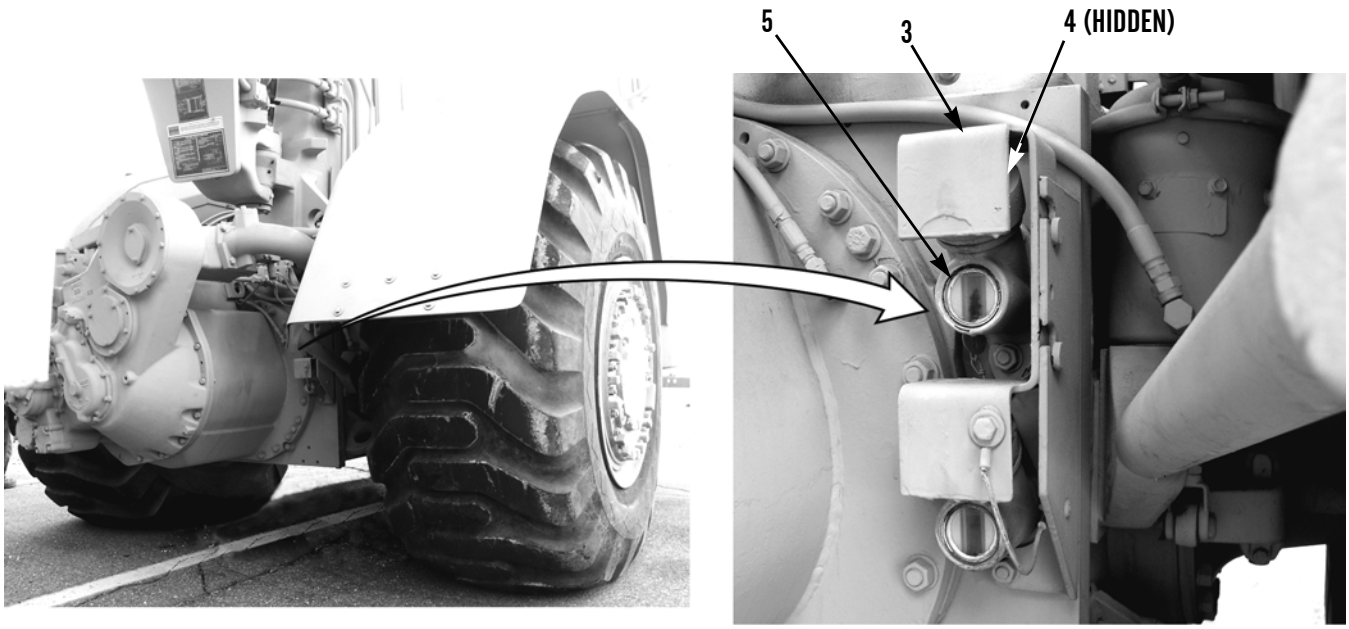
1. Remove preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect plug for damage and replace as necessary.
5. Inspect used oil for foreign material and contact supervisor if foreign material is found.

FILLING

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

1. Install new preformed packing (2) on plug (1).
2. Install plug (1).
3. Remove shield (3) and transmission fill cap (4).
4. Add transmission oil until visible in sight gage (5).
5. Install transmission fill cap (4).
6. Operate machine until oil reaches operating temperature (TM 5-3805-248-10).
7. Check the oil level with the engine operating at low idle.
8. Add transmission oil as necessary until at full line at top of sight gage (TM 5-3805-248-10).
9. Install shield (3).
10. Check transmission and plug (1) for oil leaks.



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END OF WORK PACKAGE

TRANSMISSION OIL FILTER REPLACEMENT 0129 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Nut, self-locking

Packing, preformed (6)

References

WP 0128 00

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

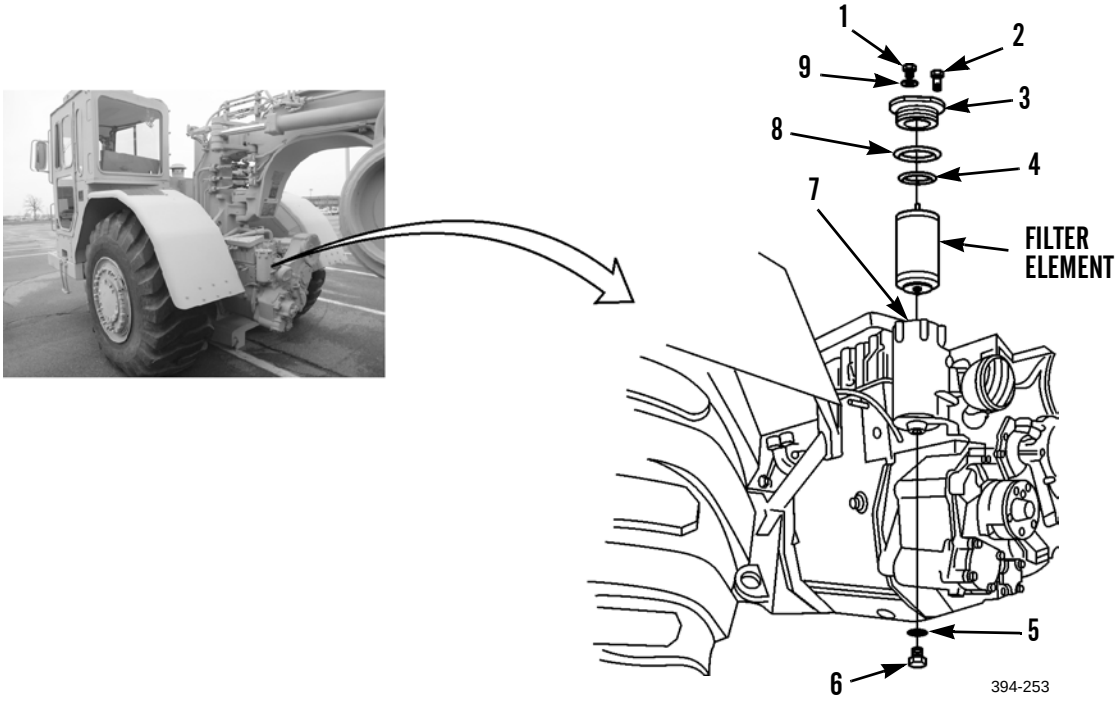
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL

NOTE

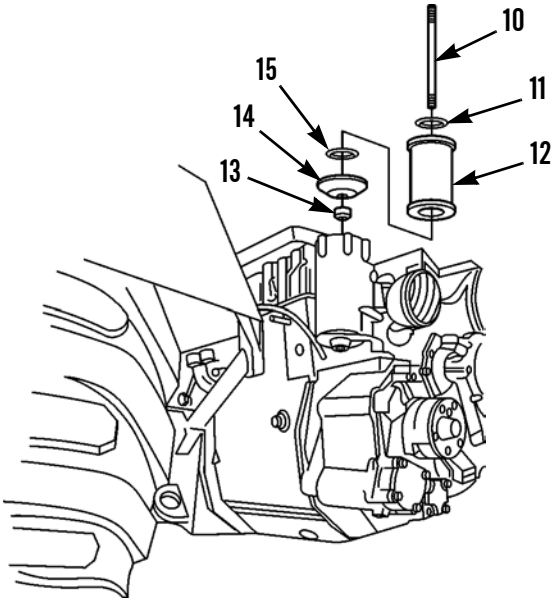
Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove plugs (1 and 6) and drain oil.
2. Remove and discard seal (5) and preformed packing (9) from plugs (1 and 6).
3. Remove six capscrews (2) and cover (3).
4. Remove preformed packings (4 and 8) and filter element as an assembly. Discard preformed packings.



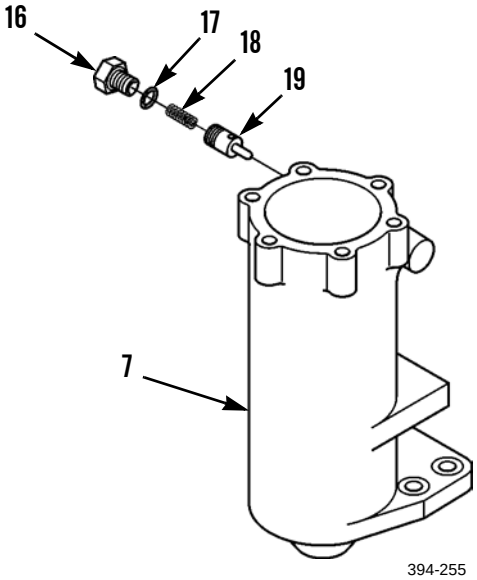
REMOVAL - CONTINUED

5. Remove self-locking nut (13) and retainer (14). Discard self-locking nut.
6. Remove and discard preformed packings (11 and 15).
7. Remove stud (10) from element (12).



394-254

8. If necessary, remove plug (16), preformed packing (17), spring (18) and valve spool (19) from housing (7). Discard preformed packing.



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CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

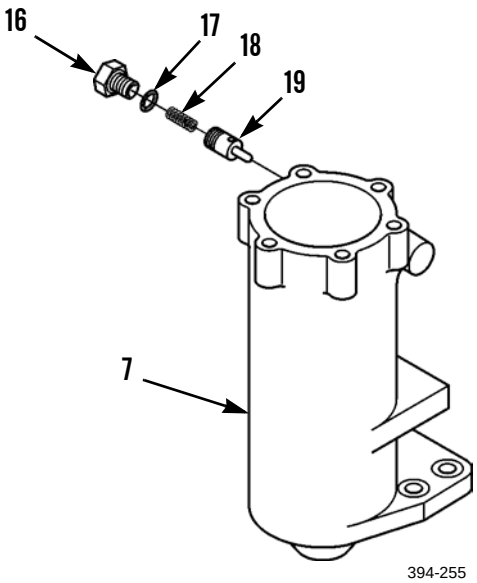
1. Remove preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

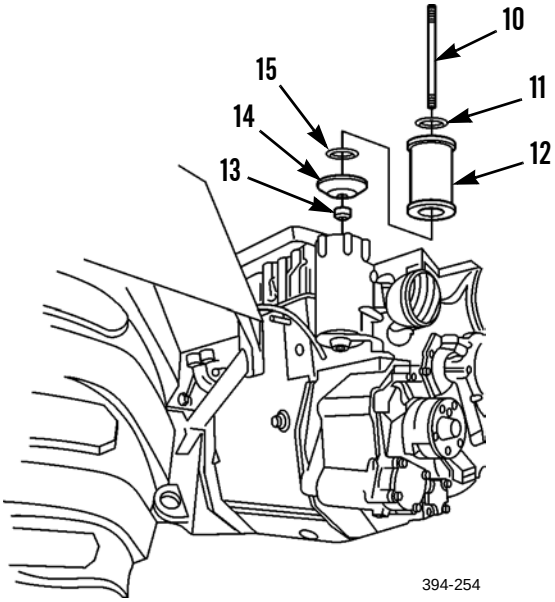
Lubricate all preformed packings with clean lubricating oil prior to installation.

1. If removed, install valve spool (19), spring (18), new preformed packing (17) and plug (16) in housing (7).

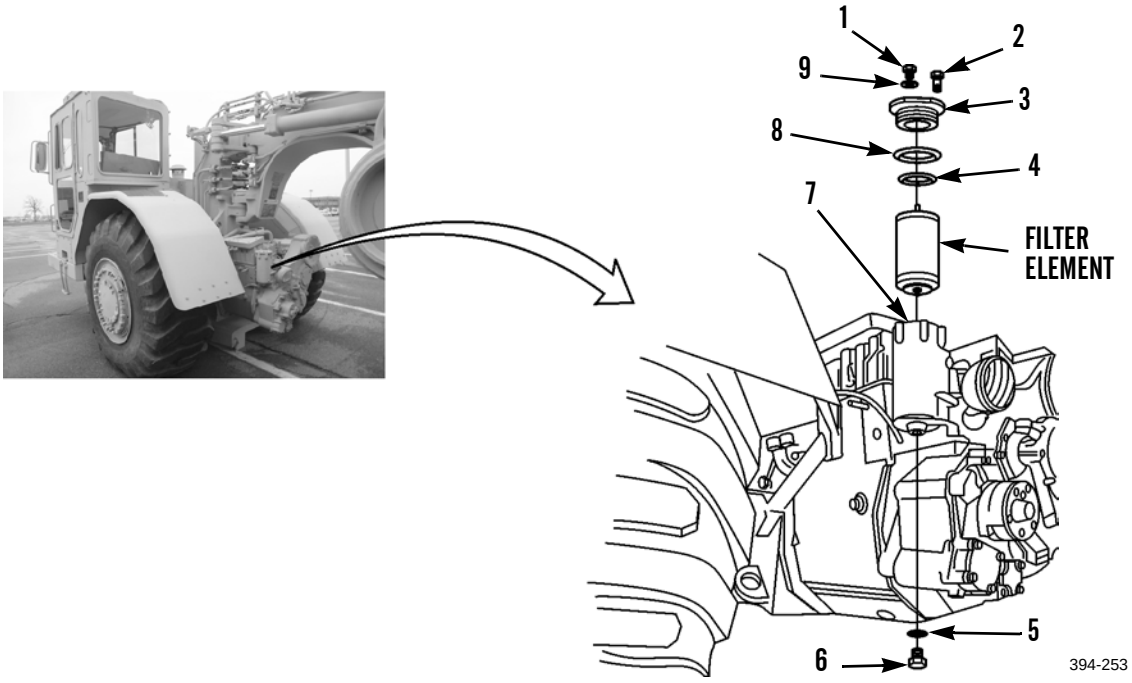


INSTALLATION - CONTINUED

2. Install stud (10) in element (12).
3. Install new preformed packings (11 and 15).
4. Install retainer (14) and new self-locking nut (13). Torque self-locking nut (13) to 10 lb-ft (13.6 Nm).



5. Install filter element as an assembly.
6. Lubricate and install new preformed packings (4 and 8).
7. Install cover (3) and six cap screws (2).
8. Install two new seal (5) and new preformed packing (9) on plugs (1 and 6).
9. Install two plugs (1 and 6) and torque to 35 lb-ft (47 Nm).
10. Read sight gage and add transmission oil as necessary (WP 0128 00).



END OF WORK PACKAGE

MAGNETIC STRAINER REPLACEMENT 0130 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Packing, preformed

Lockwasher (4)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

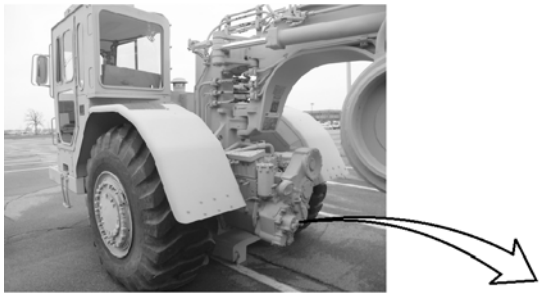
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

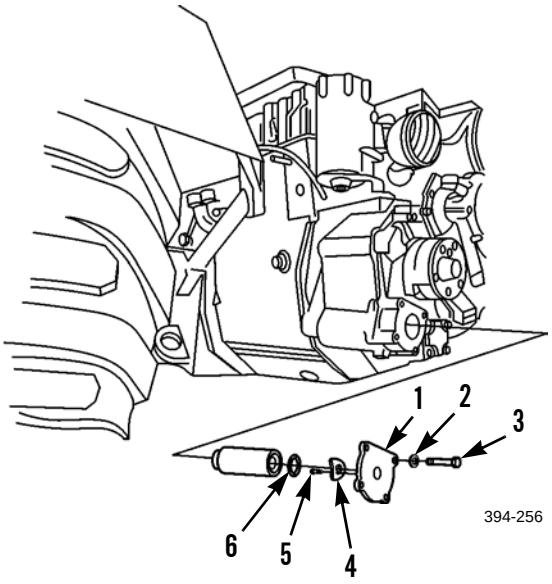
REMOVAL

NOTE

Use a 5-gallon container to catch any draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Slowly loosen four bolts (4) and allow transmission oil to drain.
2. Remove four bolts (3), lockwashers (2) and cover (1) from pump housing. Discard lockwashers.
3. Remove and discard preformed packing (6) from filter element (9).
4. If necessary, remove two screws (5) and washer (4).
5. Remove filter element assembly.

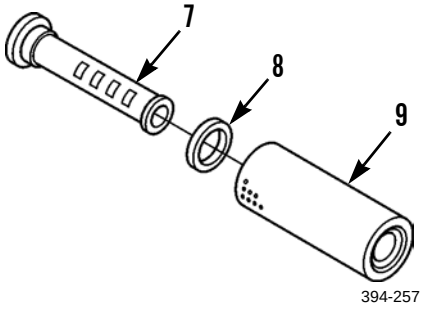




NOTE

Inspect filter and magnet for foreign material. If foreign material is found, notify your supervisor.

6. Remove tube assembly (7) from filter element (9).
7. Remove magnet (8) from tube assembly (7).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection

1. Remove preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install magnet (8) on tube assembly (7).
2. Install tube assembly (7) in filter element (9).
3. Install filter element as an assembly into pump housing.
4. If removed, install washer (4) and two screws (5).

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

5. Install new preformed packing (6) and cover (1).
6. Install four new lockwashers (2) and bolts (3).
7. Read sight gage and add transmission oil as necessary (TM 5-3805-248-10).
8. Operate machine (TM 5-3805-248-10) and check for transmission oil leaks.

END OF WORK PACKAGE

OIL PUMP SUCTION SCREEN REPLACEMENT 0131 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 30, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (4)

Packing, preformed

Nut, self-locking

Equipment Condition

Transmission oil drained (WP 0128 00)

WARNING

Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL

NOTE

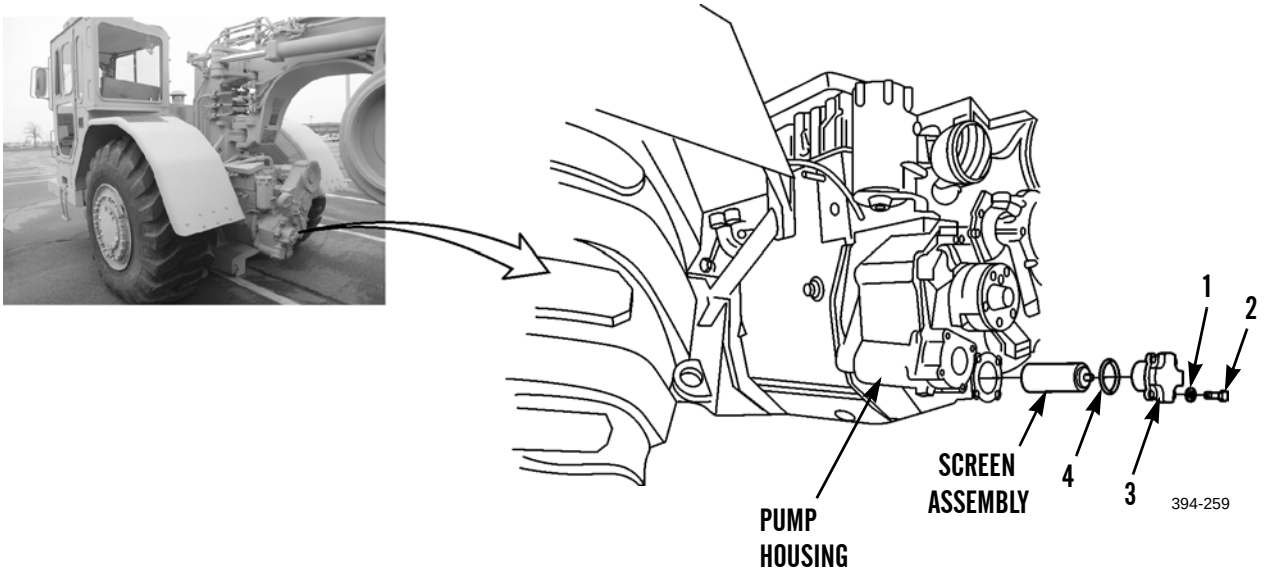
Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove four bolts (2) and lockwashers (1). Discard lockwashers.
2. Remove cover (3) and preformed packing (4). Discard preformed packing.

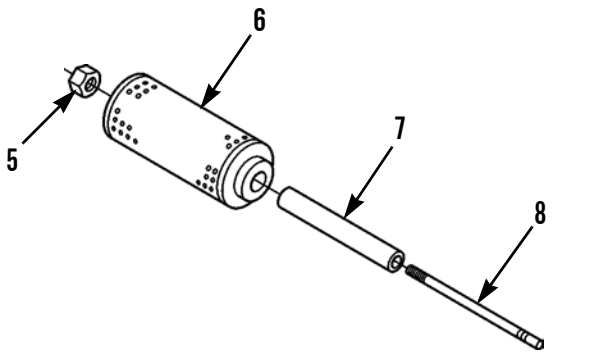
NOTE

Inspect filter for foreign material. If found, contact your supervisor.

3. Remove screen assembly from pump housing.



4. Remove and discard self-locking nut (5).
5. Remove stud (8).
6. Remove tube (7) from screen (6).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install tube (7) into screen (6).
2. Install stud (8).
3. Install new self-locking nut (5).
4. Install screen assembly in pump housing.

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

5. Install new preformed packing (4) and cover (3).
6. Install four new lockwashers (1) and bolts (2).
7. Refill transmission oil (WP 0128 00).

END OF WORK PACKAGE

TRANSMISSION BREATHER REPLACEMENT 0132 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent, general purpose (Item 13, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

References

WP 0138 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

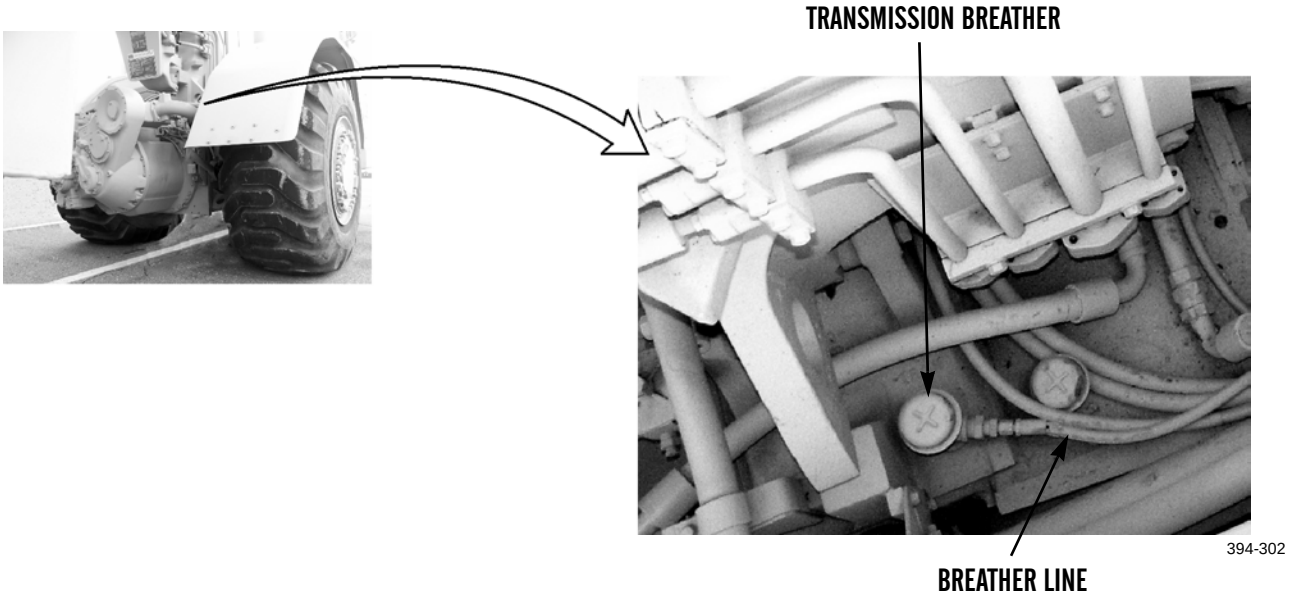
Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Remove transmission breather from right-rear of machine.
2. Remove breather line from machine if necessary (WP 0138 00).



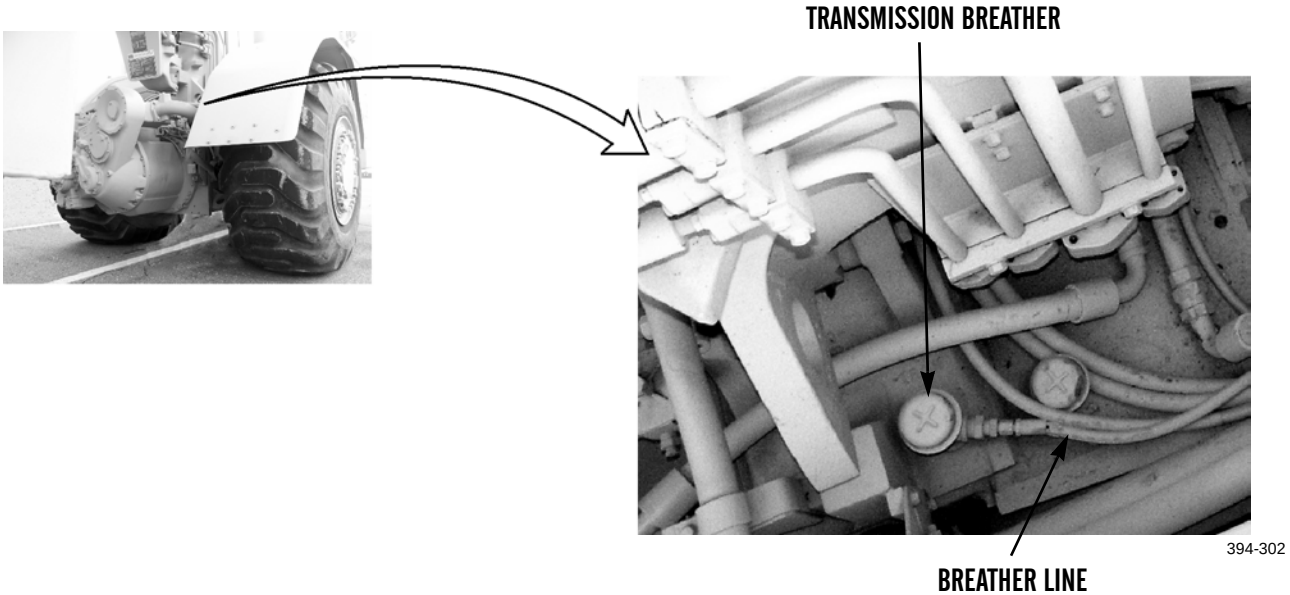
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all metal parts with solvent and rubber parts with detergent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install breather line (WP 0138 00).
2. Install transmission breather in right-rear of machine.



END OF WORK PACKAGE

FLYWHEEL LUBRICATION SCREEN REPLACEMENT 0133 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (4)

Gasket

References

WP 0128 00

Equipment Condition

Crankcase guards removed (WP 0201 00)

WARNING

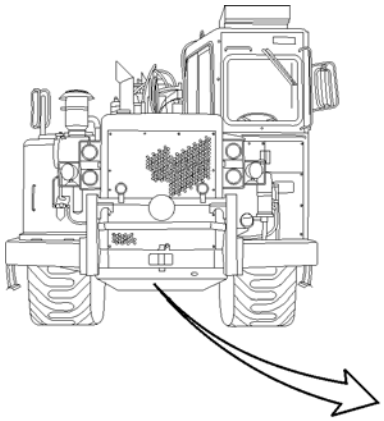
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

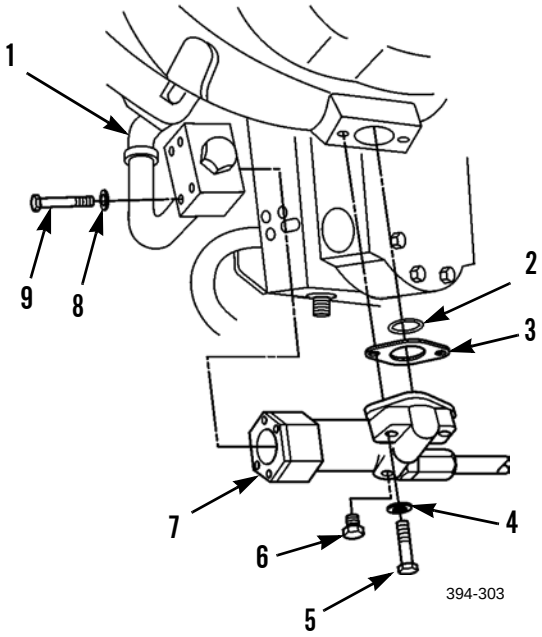
REMOVAL

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove plug (6) to allow transmission fluid to drain (approximately 22 gallons ([83.3 l[).
2. Remove four bolts (9) and washers (8).





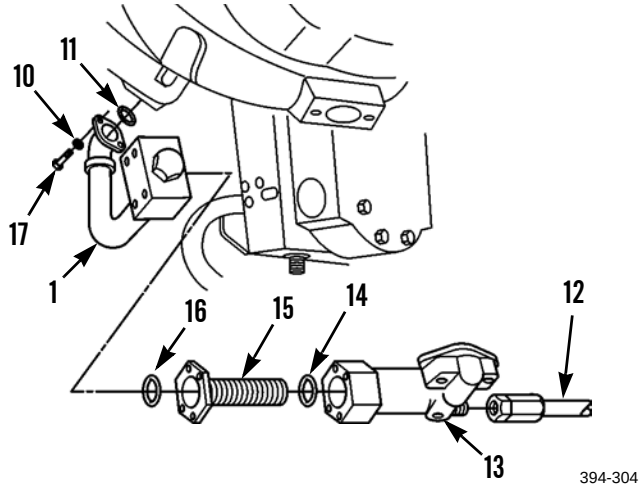
CAUTION

Cap oil lines and plug openings after removing lines. Contamination of transmission system could result in premature failure.

NOTE

Tag all hose assemblies prior to removal to ensure correct installation.

3. Disconnect tube assembly (1).
4. Remove two bolts (5), washers (4), gasket (3) and preformed packing (2) from elbow (7). Discard gasket and preformed packing.
5. Remove preformed packing (16), screen assembly (15) and preformed packing (14). Discard preformed packings.
6. Disconnect hose assembly (12) from elbow (13).
7. Remove two capscrew (17), washers (10), preformed packing (11) and tube assembly (1). Discard preformed packing.



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing and gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install tube assembly (1), new preformed packing (11), two washers (10) and capscrews (17).
2. Connect hose assembly (12) to elbow (7).

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

3. Install new preformed packing (14), screen assembly (15) and new preformed packing (16).
4. Install new preformed packing (2), new gasket (3), two washers (4) and bolts (5) on elbow (17).
5. Connect tube assembly (1).
6. Install four washers (8) and bolts (9).
7. Install plug (6).
8. Refill transmission with transmission fluid. Maintain level between ADD and FULL marks (WP 0128 00).
9. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

TORQUE CONVERTER OIL COOLER REPLACEMENT 0134 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Device, lifting 160 lb minimum capacity

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Wood blocks, 4x4x8

Personnel Required

Two

Equipment Condition

Transmission oil drained (WP 0128 00)

Radiator removed (WP 0044 00)

Torque converter oil cooler lines disconnected from torque converter oil cooler (WP 0137 00)

REMOVAL

WARNING

- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.
- Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

NOTE

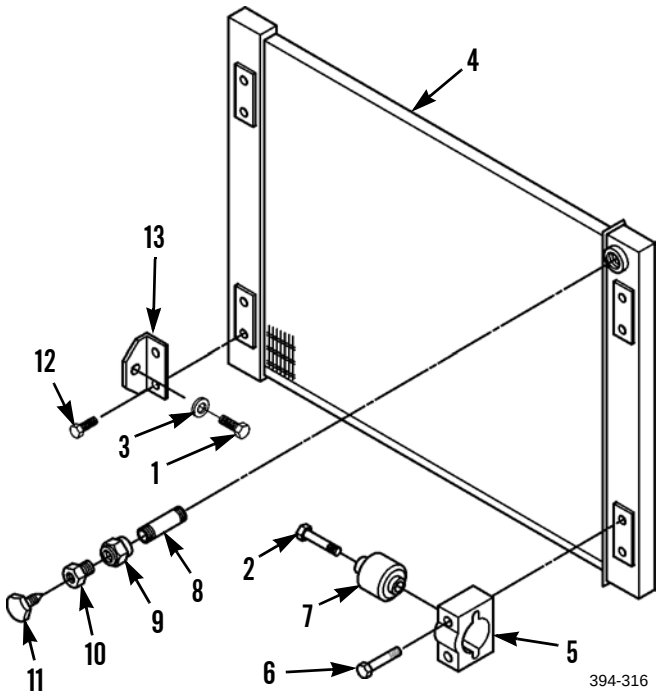
Weight of torque converter oil cooler assembly is 80 lb (36 kg).

1. Attach lifting device on torque converter oil cooler assembly.

TORQUE CONVERTER OIL COOLER REPLACEMENT - CONTINUED 0134 00

REMOVAL - CONTINUED

2. Remove two capscrews (1 and 2) and washer (3).
3. Use lifting device to remove torque converter oil cooler assembly and lay flat on wood blocks.
4. Remove lifting device.
5. Remove two capscrews (6), clamp (5) and bumper (7).
6. Remove two capscrews (12) and bracket (13).
7. Remove bleeder valve (11), valve body (10), pipe coupling (9) and nipple (8) from core assembly (4).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install nipple (8), pipe coupling (9), valve body (10) and bleeder valve (11) on core assembly (4). Torque valve (11) to 8 lb-ft (11 Nm).
2. Install bracket (13) and two capscrews (12).
3. Install clamp (5) and two capscrews (6).
4. Install bumper (7) in clamp (5).

WARNING

- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.
- Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

NOTE

Weight of torque converter oil cooler assembly is 80 lb (36 kg).

5. Install lifting device on torque converter oil cooler assembly.
6. Use lifting device to install torque converter oil cooler assembly.
7. Install washer (3) and capscrews (1 and 2).
8. Remove lifting device.
9. Install radiator (WP 0044 00).
10. Refill transmission oil (WP 0128 00).
11. Connect torque converter oil cooler lines (WP 0137 00).

END OF WORK PACKAGE

OIL LINES REPLACEMENT 0135 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent, general purpose (Item 13, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 30, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (8)

Equipment Condition

Transmission oil drained (WP 0128 00)

Crankcase guards removed (WP 0201 00)

WARNING

Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

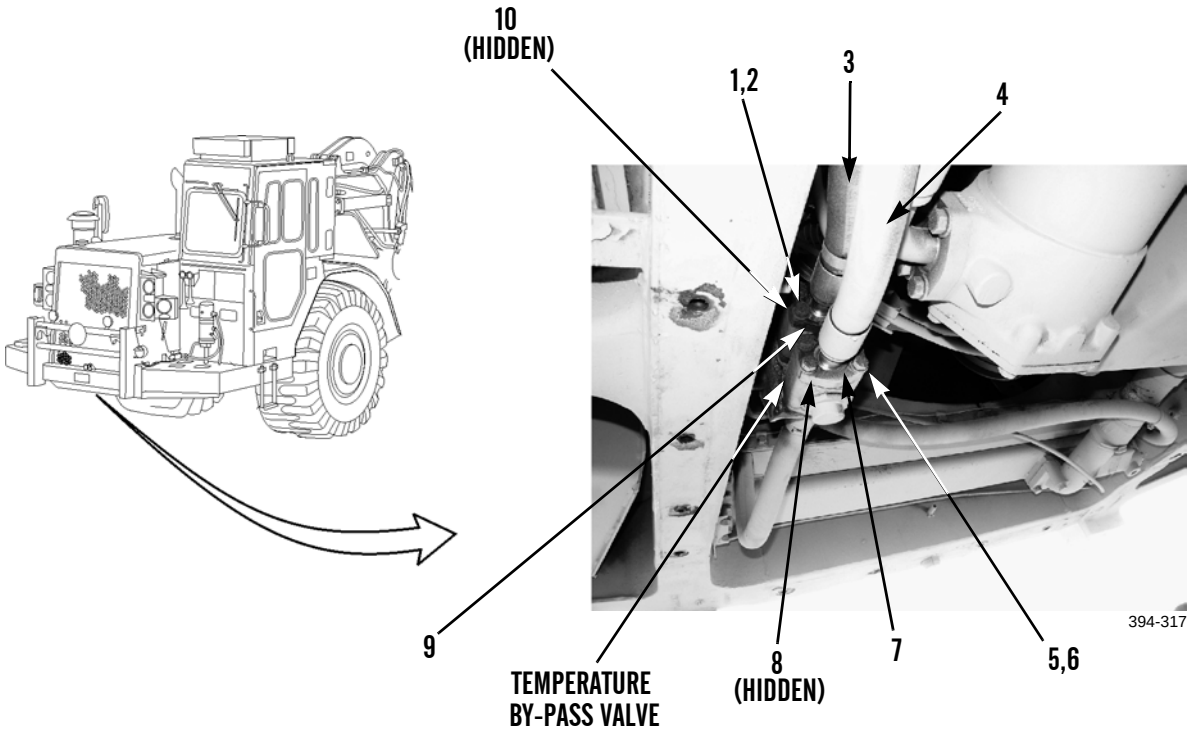
Cap oil lines and plug openings after removing lines. Contamination of transmission system could result in premature failure.

NOTE

Tag all hose assemblies prior to removal to ensure correct installation.

REMOVAL

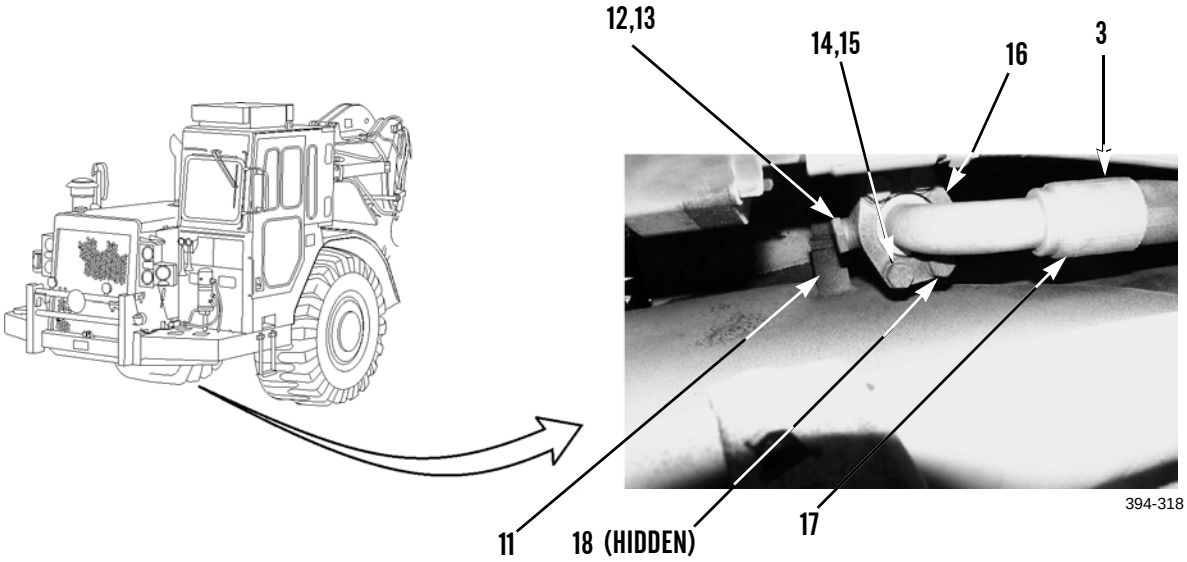
1. Remove four bolts (5), washers (6) and two flange halves (7) from temperature by-pass valve under front-left side of machine.
2. Disconnect hose assembly (4) and remove preformed packing (8). Discard preformed packing.
3. Remove four bolts (1), washers (2) and two flange halves (9) from temperature by-pass valve under front-left side of machine.
4. Disconnect hose assembly (3) and remove preformed packing (10). Discard preformed packing.



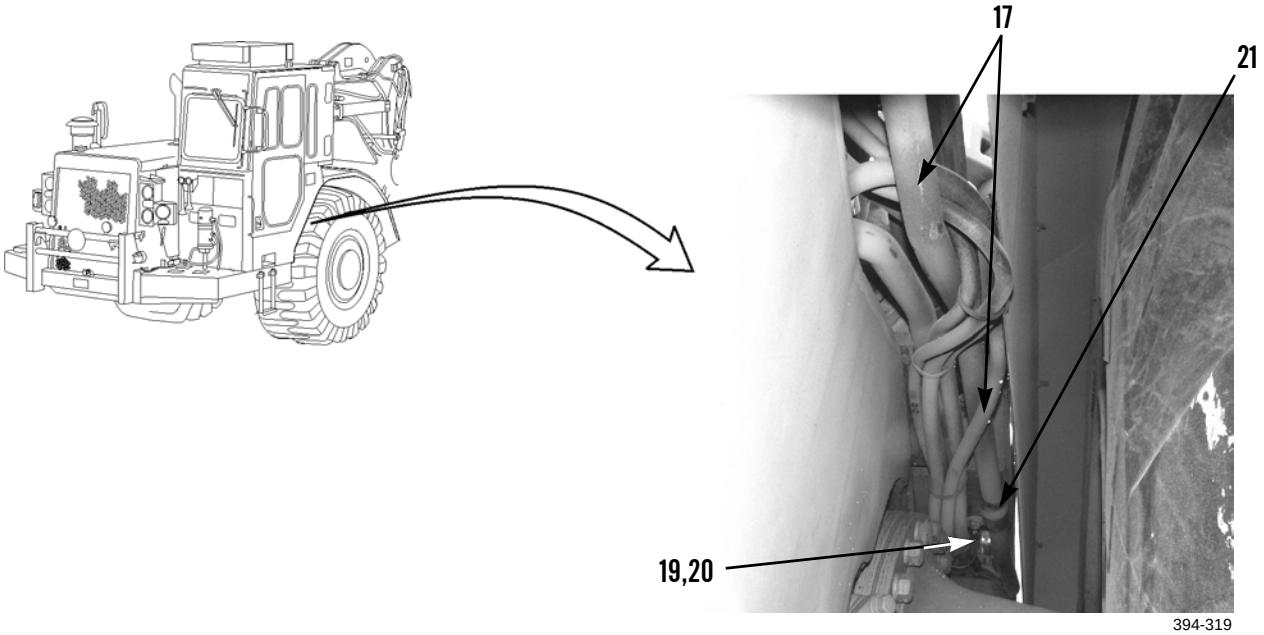
OIL LINES REPLACEMENT - CONTINUED 0135 00

REMOVAL - CONTINUED

5. Remove bolt (12), washer (13) and clip (11).
6. Remove four bolts (14), washers (15) and two flange halves (16).
7. Remove hose assembly (3) and preformed packing (18). Discard preformed packing.

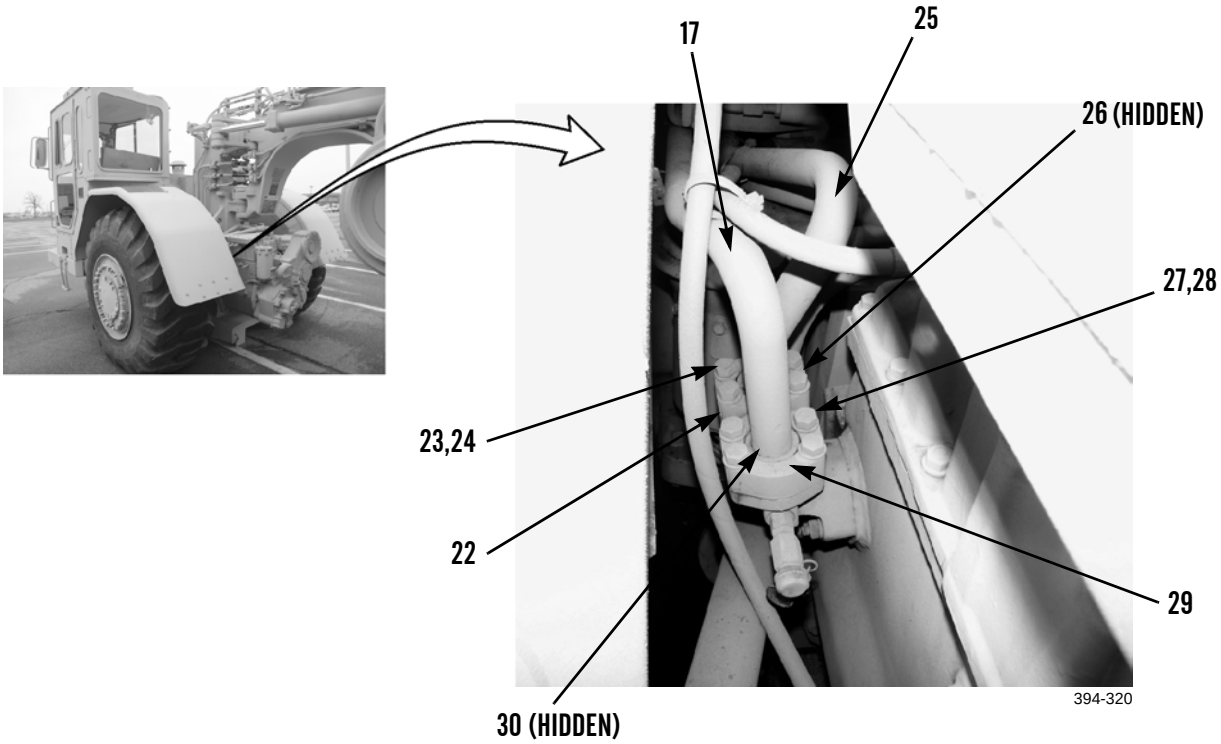


8. Remove bolt (19), washer (20) and loop clamp (21) from hose assembly (17).



REMOVAL - CONTINUED

9. Remove four bolts (27), washers (28) and two flange halves (29).
10. Remove hose assembly (17) and preformed packing (30). Discard preformed packing.
11. Remove four bolts (23), washers (24) and two flange halves (22).
12. Disconnect hose assembly (25) and remove preformed packing (26). Discard preformed packing.

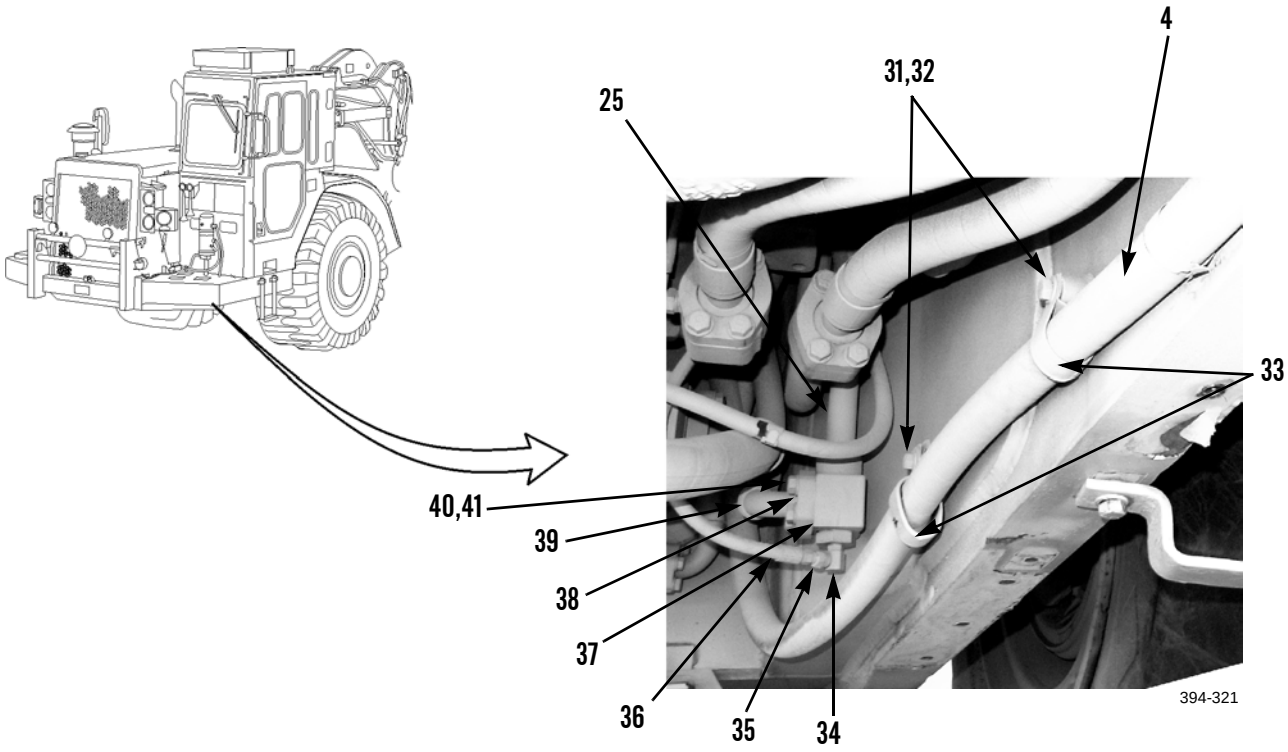


13. Remove two bolts (31), washers (32) and loop clamps (33).
14. Disconnect hose assembly (36) from coupling (35).
15. Remove coupling (35) and elbow (34).

OIL LINES REPLACEMENT - CONTINUED 0135 00

REMOVAL - CONTINUED

16. Remove four bolts (40), washers (41) and two flange halves (38).
17. Disconnect hose assembly (39) from hose assembly (25) and remove preformed packing (37). Discard preformed packing.
18. Remove hose assembly (25).

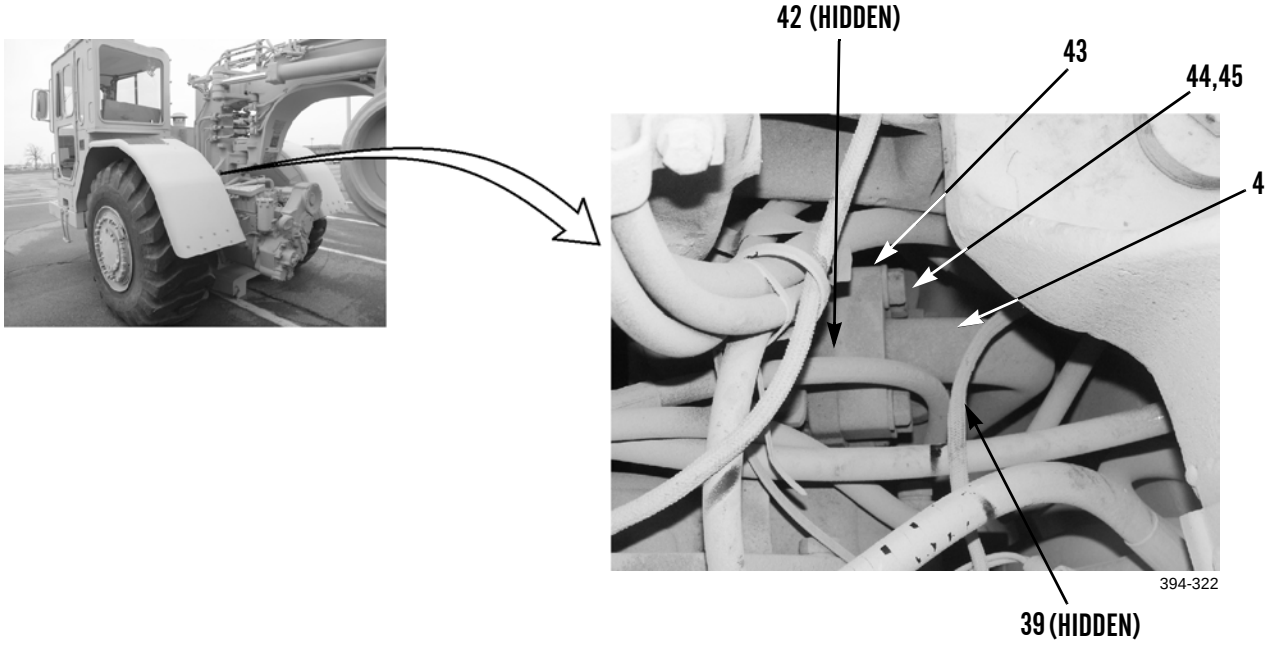


REMOVAL - CONTINUED

NOTE

The following steps remove hose assembly from the retarder control valve assembly. Hose assembly is located just below it and the removal procedure is the same.

19. Remove four bolts (44), washers (45) and two flange halves (43).
20. Remove hose assembly (4) and preformed packing (42). Discard preformed packing.
21. Remove hose assembly (39).



CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all metal parts with solvent and all rubber parts with detergent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

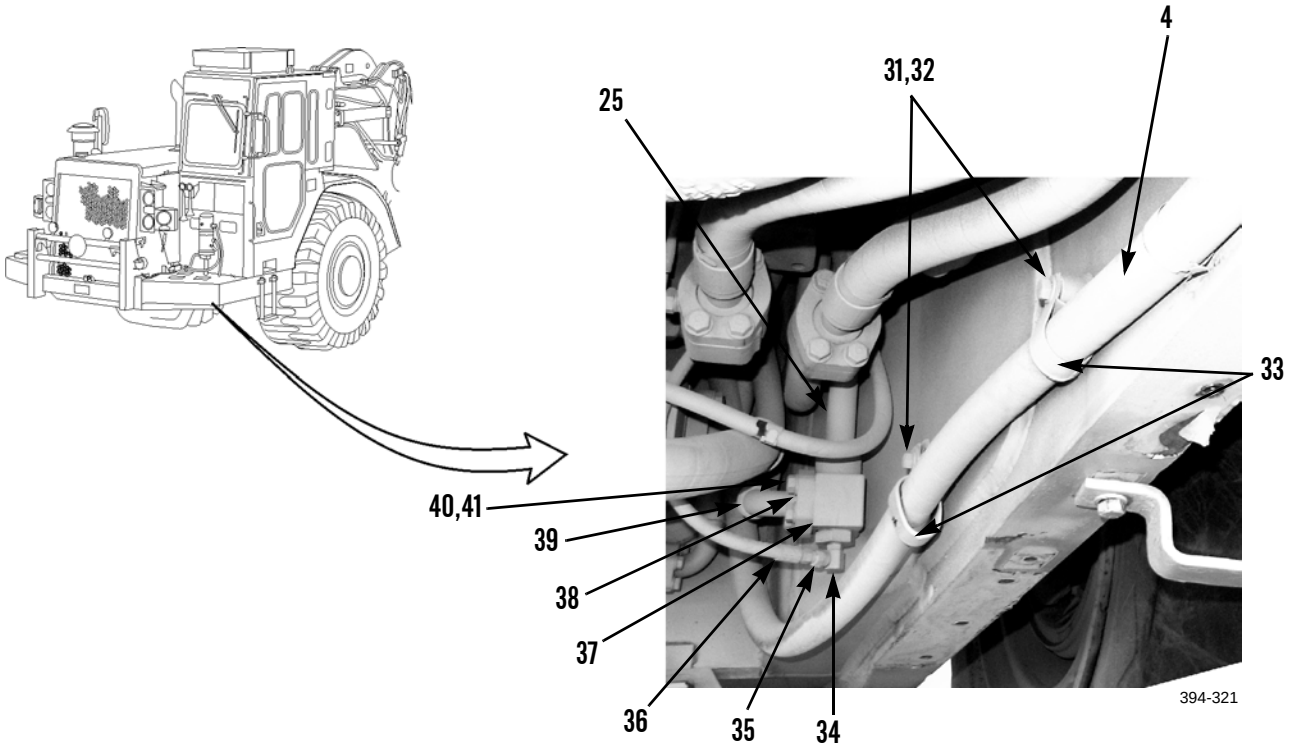
NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

1. Install hose assembly (39).
2. Position hose assembly (4) on machine.
3. Install new preformed packing (42), two flange halves (43), four washers (45) and bolts (44) on hose assembly (4).

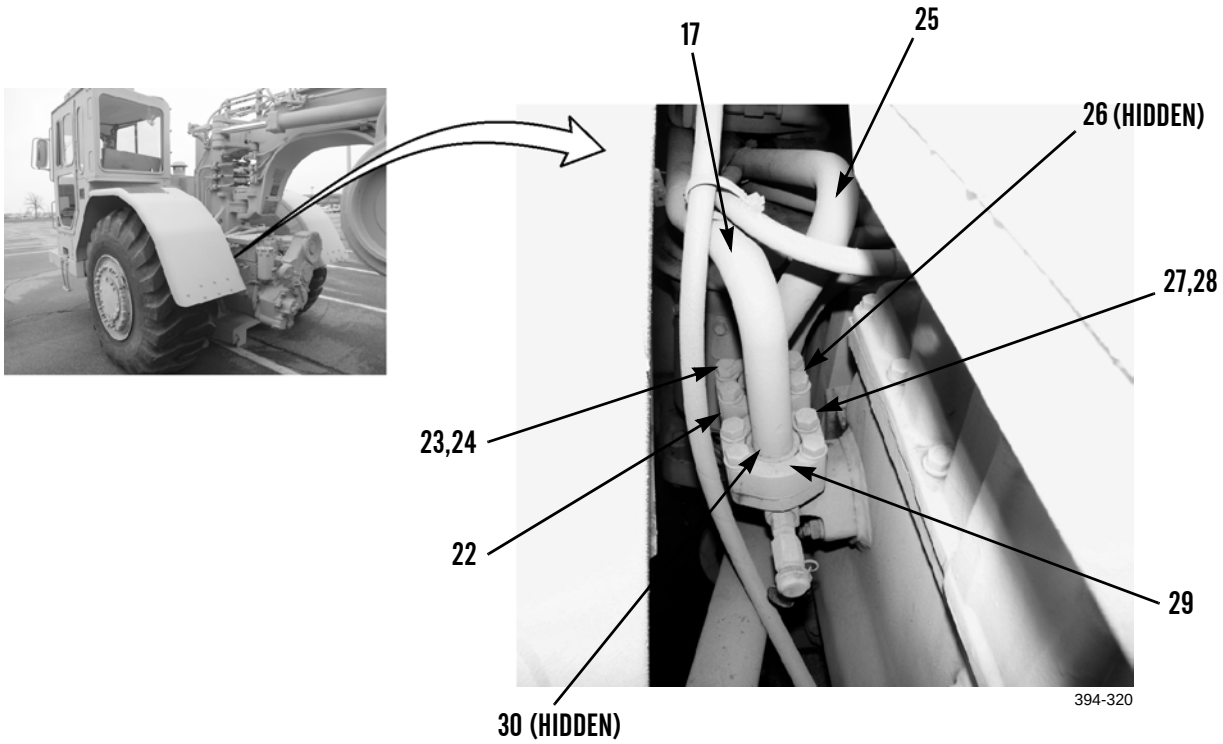
INSTALLATION - CONTINUED

4. Position hose assembly (25) on machine.
5. Install new preformed packing (37) between hose assembly (39) and hose assembly (25).
6. Install two flange halves (38), four washers (41) and bolts (40) on hose assembly (39).

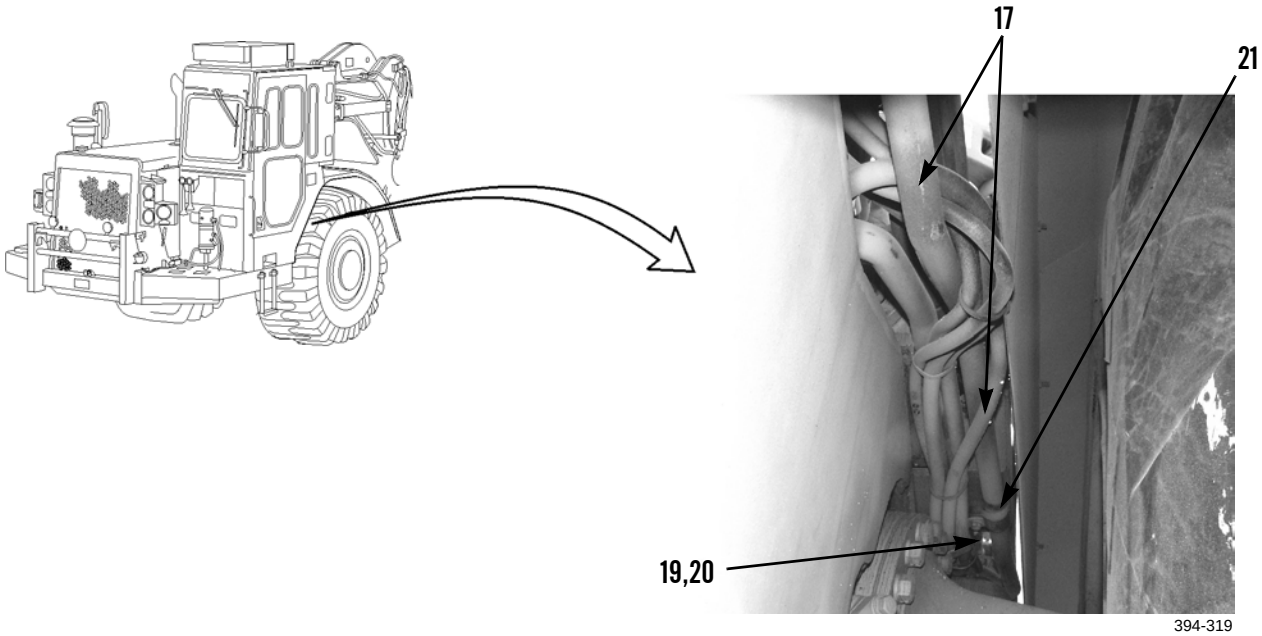


7. Install elbow (34), coupling (35) and connect hose assembly (36) to coupling (35).
8. Install two loop clamps (33), washers (32) and bolts (31) on hose assembly (4).
9. Install new preformed packing (26), two flange halves (22), four washers (24) and bolts (23) on hose assembly (25)
10. Position hose assembly (17) on machine.
11. Install new preformed packing (30), two flange halves (29), four washers (28) and bolts (27) on hose assembly (17).

INSTALLATION - CONTINUED

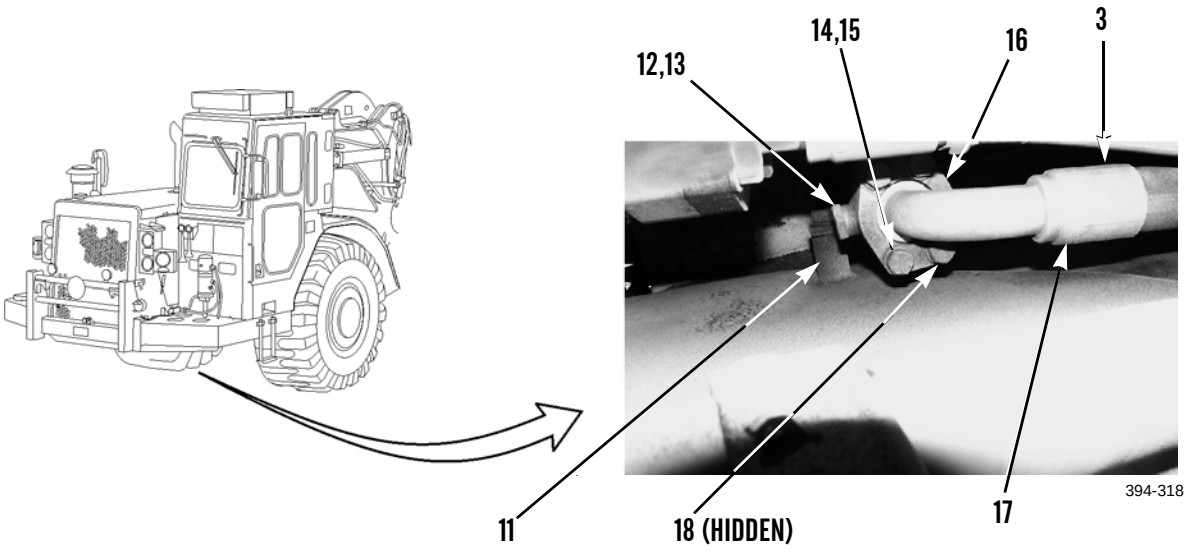


12. Install loop clamp (21), washer (20) and bolt (19) on hose assembly (17).



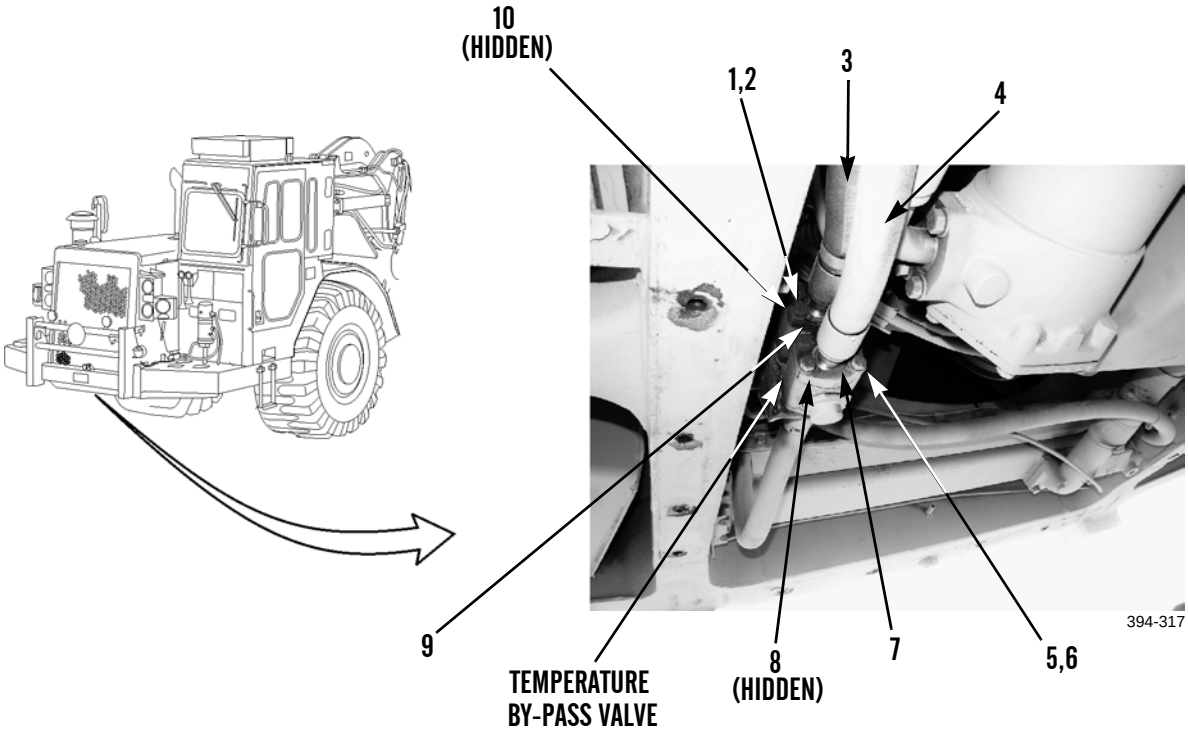
INSTALLATION - CONTINUED

13. Position hose assembly (3) on machine.
14. Install new preformed packing (18) between hose assembly (3) and hose assembly (17).
15. Install two flange halves (16), four washers (15) and bolts (14) on hose assembly (3).
16. Install clip (11), washer (13) and bolt (12) on hose assembly (17).



INSTALLATION - CONTINUED

17. Install new preformed packing (10) and connect hose assembly (3) to temperature by-pass valve.
18. Install two flange halves (9), four washers (2) and bolts (1) on hose assembly (3).
19. Install new preformed packing (8) and connect hose assembly (4) to temperature by-pass valve.
20. Install two flange halves (7), four washers (6) and bolts (5) on hose assembly (4).



21. Refill transmission oil (WP 0128 00).
22. While engine is running, check for leaks at all transmission oil lines.
23. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

TEMPERATURE BY-PASS VALVE REPLACEMENT 0136 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

Equipment Condition

Crankcase guards removed (WP 0201 00)

Transmission oil drained (WP 0128 00)

WARNING

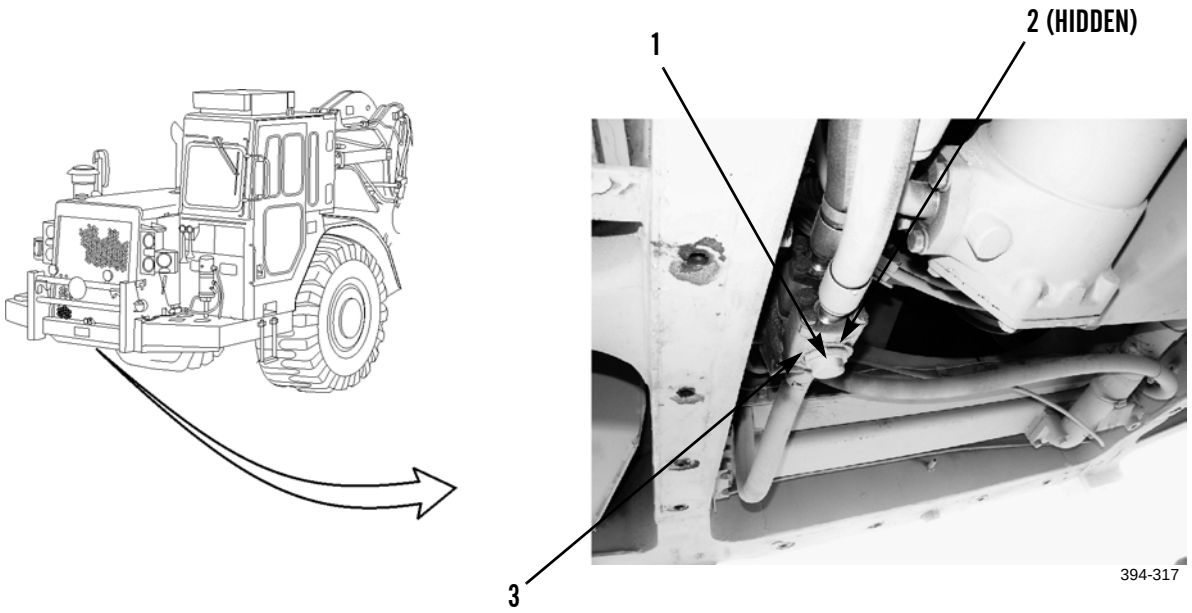
Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

REMOVAL

1. Remove valve (1) and gasket (2) from valve body (3) under front, left side of machine. Discard gasket.



CLEANING AND INSPECTION

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1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new gasket (2) and valve (1) to valve body (3) under front, left side of machine. Torque valve (1) to 65 lb-ft (88 Nm).
2. Refill transmission oil (WP 0128 00).
3. While running engine, check for leak at temperature bypass valve.
4. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

TORQUE CONVERTER OIL COOLER LINES REPLACEMENT 0137 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent, general purpose (Item 13 WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (2)

Seal (2)

Equipment Condition

Front crankcase guard removed (WP 0201 00)

Transmission oil drained (WP 0128 00)

WARNING

Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL

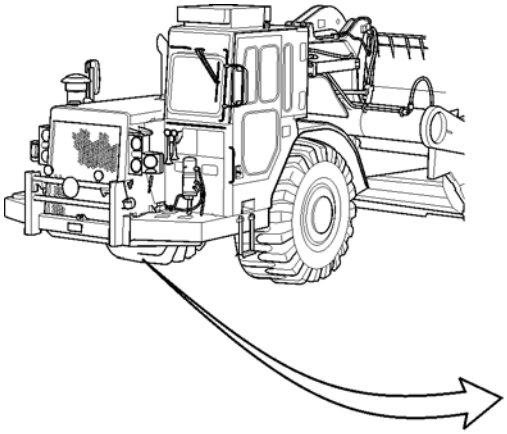
CAUTION

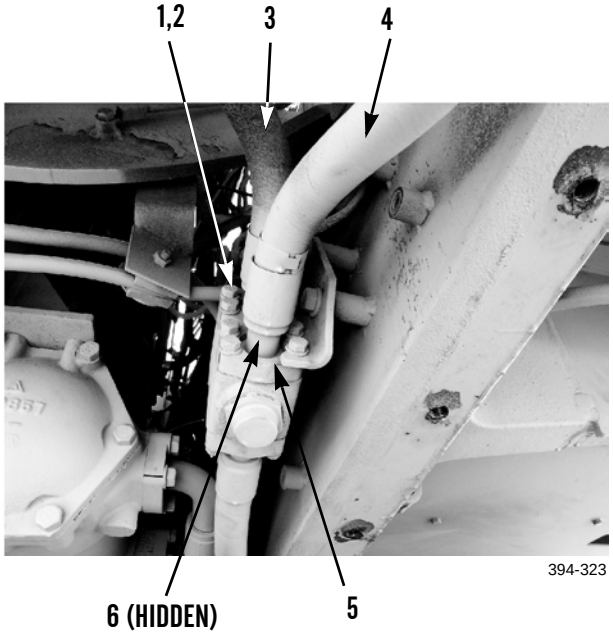
Cap oil lines and plug openings after removing lines. Contamination of transmission system could result in premature failure.

NOTE

Tag all hose assemblies prior to removal to ensure correct installation.

1. Remove eight bolts (1), washers (2) and four flange halves (5) from temperature by-pass valve under front-left side of machine.
2. Disconnect hose assemblies (3 and 4) from temperature by-pass valve and remove two preformed packings (6) from hose assemblies. Discard preformed packings.

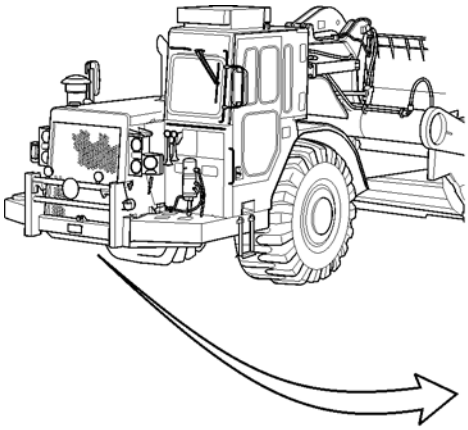


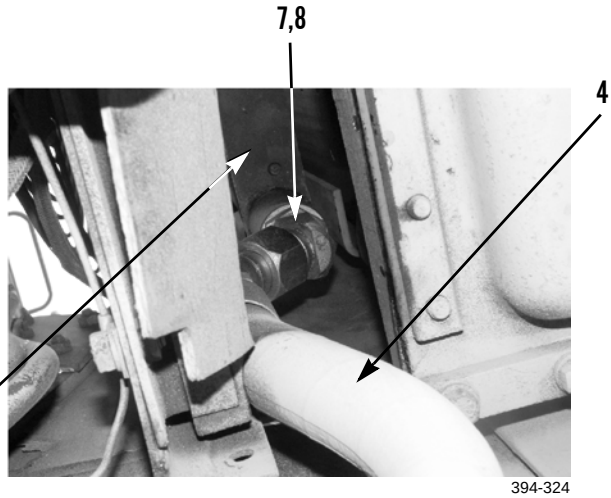


394-323

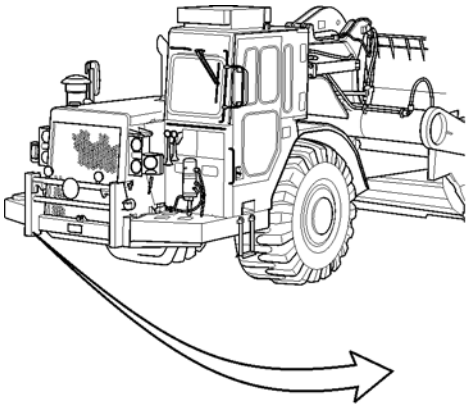
REMOVAL - CONTINUED

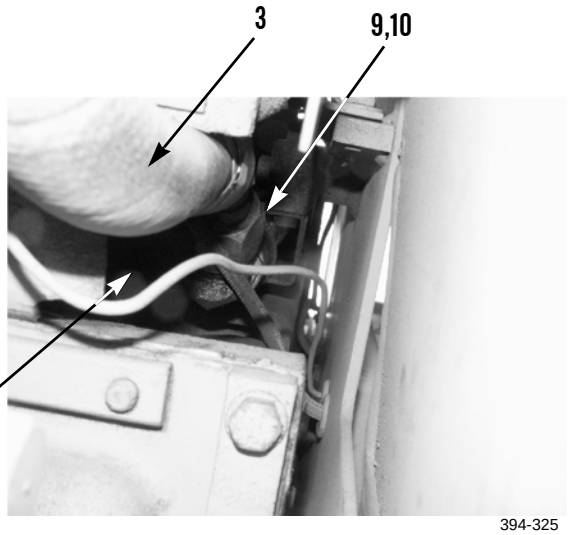
3. Remove hose assembly (4) from elbow (7).
4. Remove elbow (7) and seal (8) from torque converter oil cooler. Discard seal.





5. Remove hose assembly (3) from elbow (9).
6. Remove elbow (9) and seal (10) from torque converter oil cooler. Discard seal.





CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

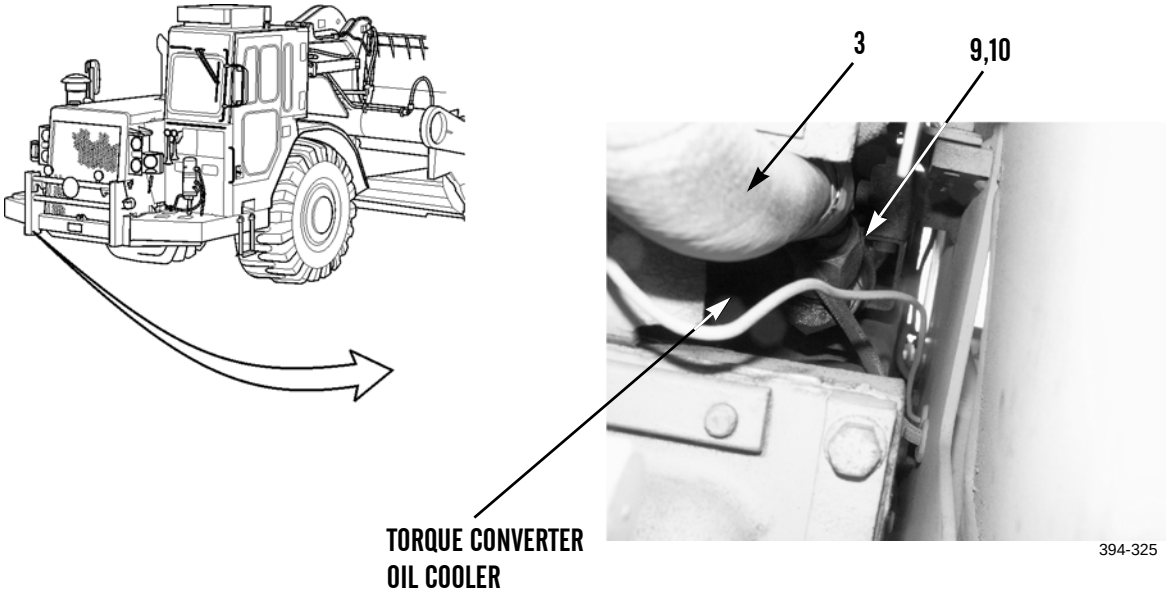
1. Remove all gasket and seal material from mounting surfaces.
2. Clean all metal parts with solvent and rubber parts with detergent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

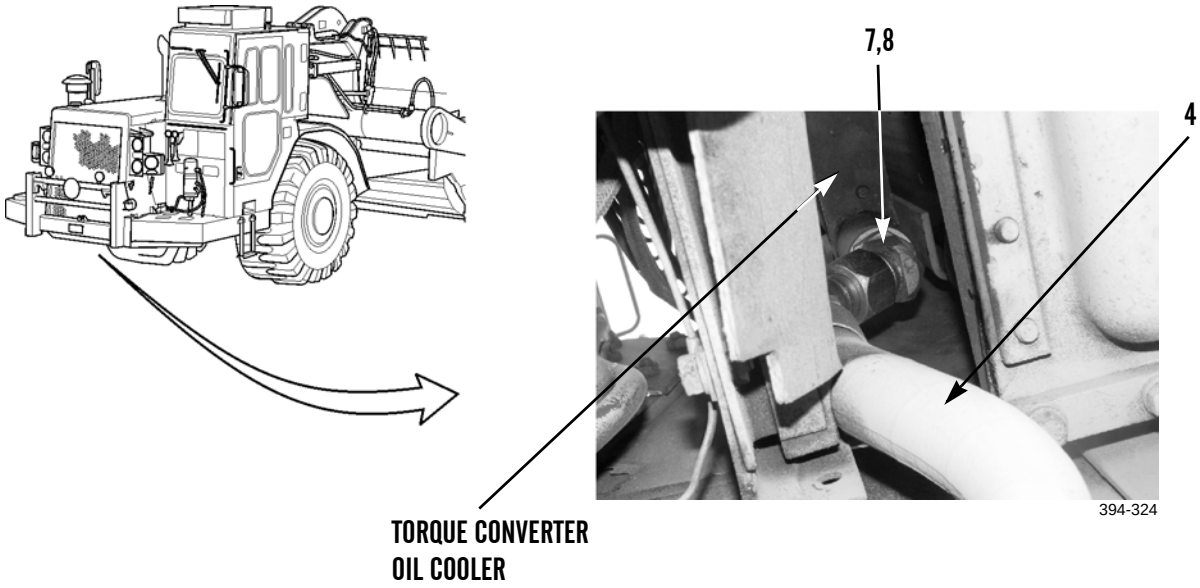
Lightly coat new preformed packings and seals with clean oil prior to installation.

1. Install new seal (10) and elbow (9) on torque converter oil cooler.
2. Install hose assembly (3) on elbow (9).

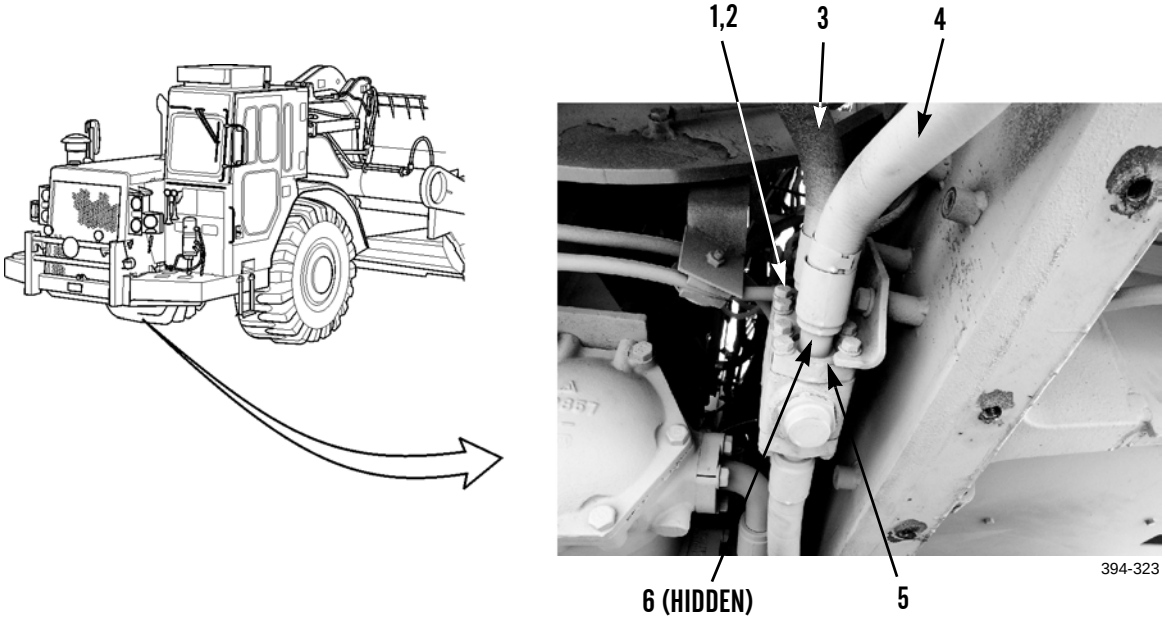


INSTALLATION - CONTINUED

3. Install new seal (8) and elbow (7) on torque converter oil cooler.
4. Install hose assembly (4) on elbow (7).



5. Install new preformed packings (6) and connect hose assemblies (3 and 4) to temperature by-pass valve.
6. Install four flange halves (5), eight washers (2) and bolts (1) on temperature by-pass valve.



7. Refill transmission oil (WP 0128 00).
8. While running engine, check for leaks around oil cooler.
9. Install front crankcase guard (WP 0201 00).

END OF WORK PACKAGE

FLYWHEEL LUBRICATION LINES AND FITTINGS REPLACEMENT 0138 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent, general purpose (Item 13, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket

Packing, preformed (2)

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Crankcase guards removed (WP 0201 00)

Flywheel lubrication screen removed (WP 0133 00)

WARNING

Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

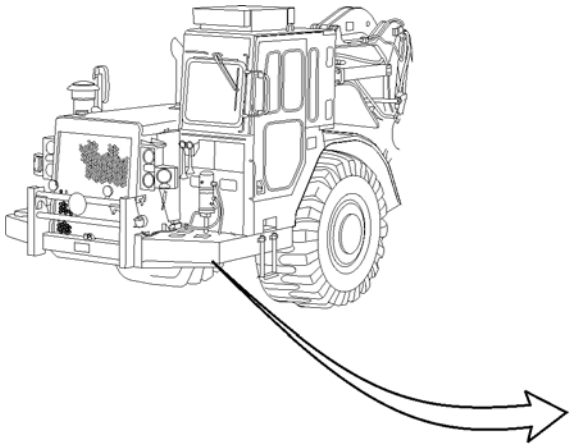
Cap oil lines and plug openings after removing lines. Contamination of transmission system could result in premature failure.

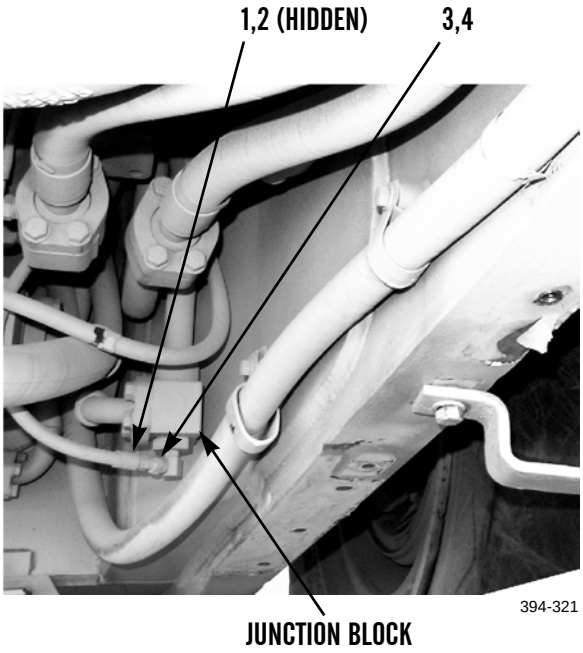
NOTE

Tag all hose assemblies prior to removal to ensure correct installation.

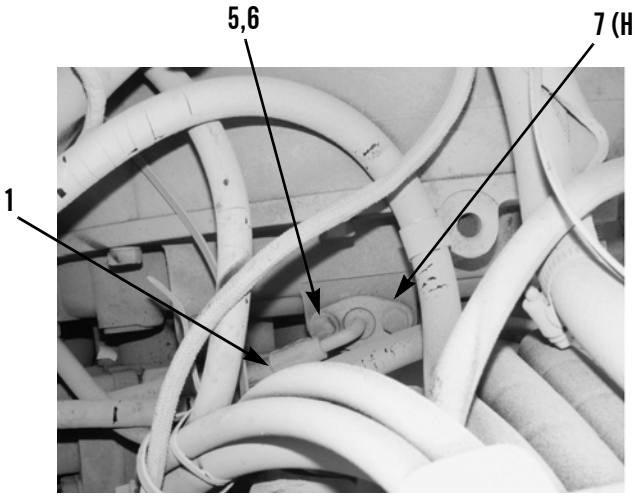
REMOVAL

1. Disconnect hose assembly (1) and remove preformed packing (2) from elbow (3). Discard preformed packing.
2. Remove elbow (3) and preformed packing (4) from junction block. Discard preformed packing.





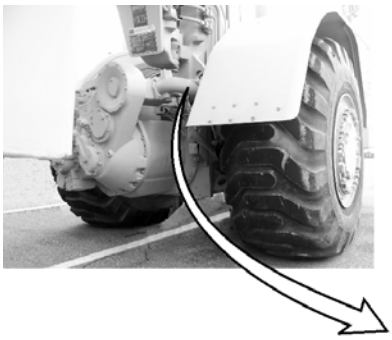
3. Remove two bolts (5), washers (6) and gasket (7) from top of flywheel housing. Discard gasket.
4. Remove hose assembly (1).

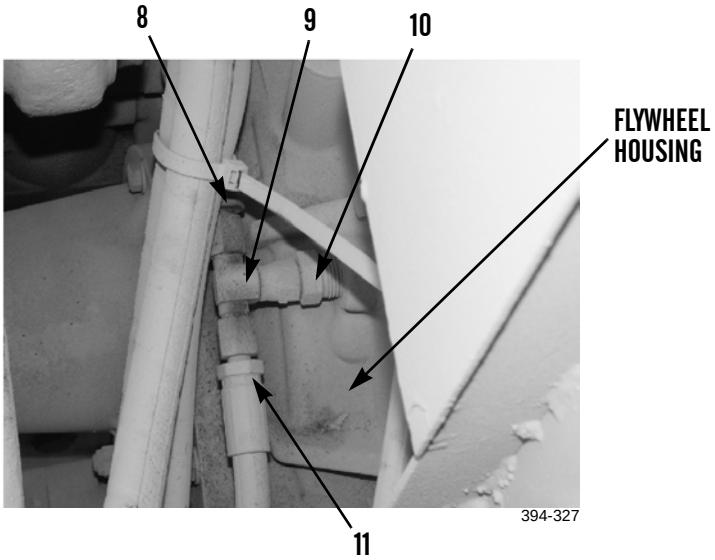


FLYWHEEL LUBRICATION LINES AND FITTINGS REPLACEMENT - CONTINUED 0138 00

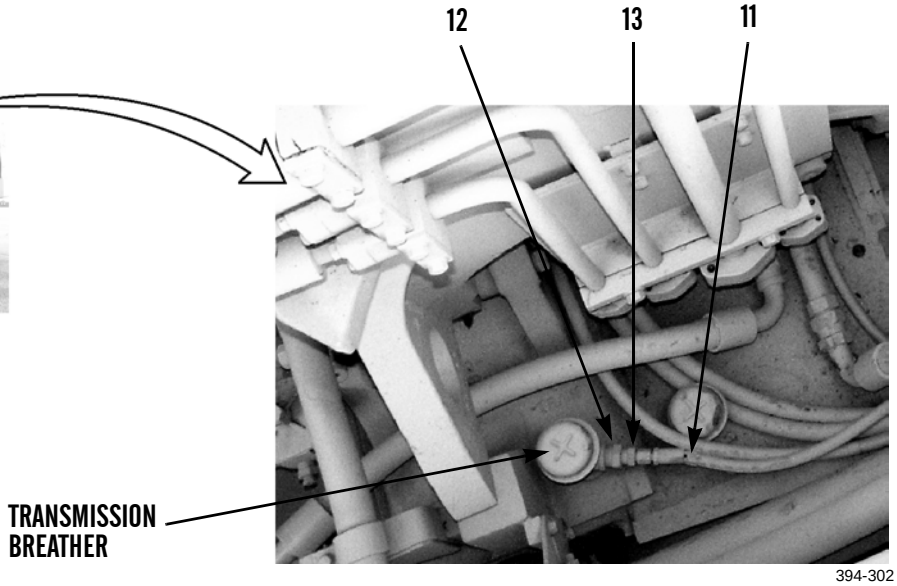
REMOVAL - CONTINUED

5. Disconnect hose assemblies (8 and 11) from tee (9) on top of the flywheel housing.
6. Remove tee (9) and connector (10) from flywheel housing.





7. Remove connector (12), adapter (13) and hose assembly (11) from transmission breather.



CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

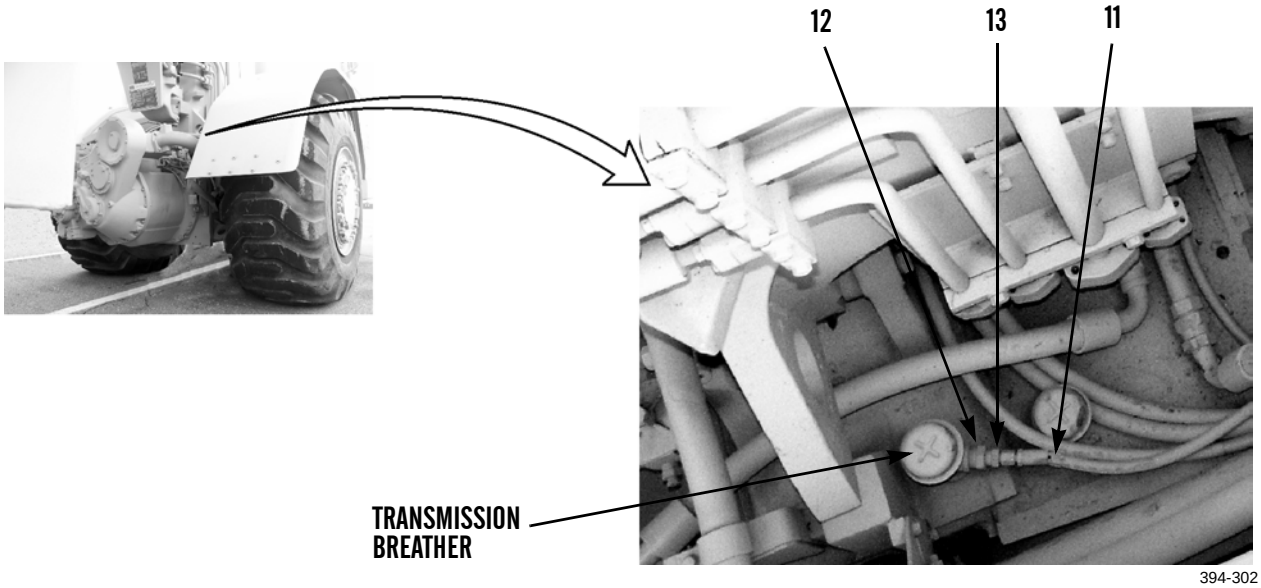
1. Remove all preformed packing material from mounting surfaces.
2. Clean all metal parts with solvent and rubber parts with detergent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

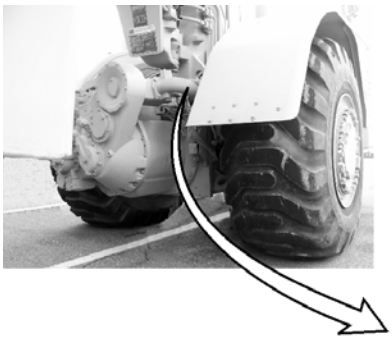
1. Install adapter (13) and connector (12).
2. Install hose assembly (11) to transmission breather.

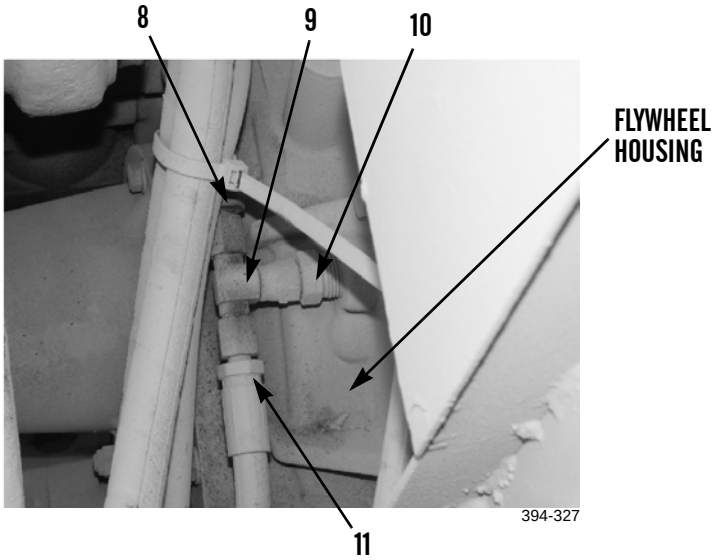


394-302

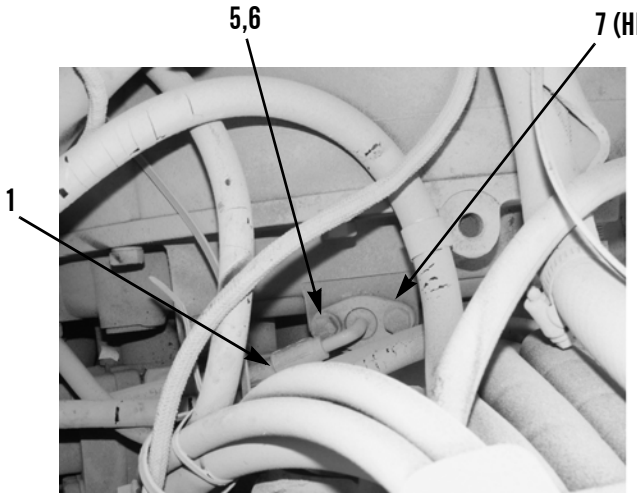
INSTALLATION - CONTINUED

3. Install connector (10) and tee (9) on flywheel housing.
4. Connect hose assemblies (8 and 11) on tee (9).





5. Install new gasket (7), hose assembly (1), two washers (6) and bolts (5) on top of flywheel housing.

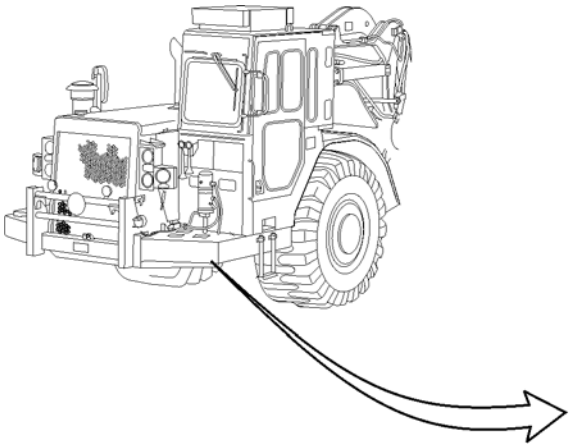


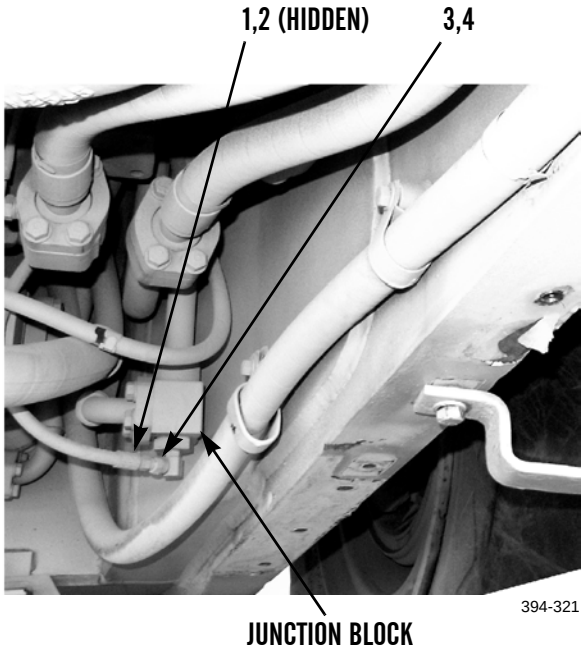
INSTALLATION - CONTINUED

NOTE

Lubricate all preformed packings with clean lubricating oil prior to installation.

6. Install new preformed packing (4) and elbow (3) under left side of machine.
7. Install new preformed packing (2) and connect hose assembly (1).





8. Install flywheel lubrication screen (WP 0133 00).
9. While running engine, check for leaks around lines.
10. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

TRANSMISSION HOLD PEDAL REPLACEMENT 0139 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Cotter pin

Lockwasher (3)

References

TM 5-3805-248-10

Equipment Condition

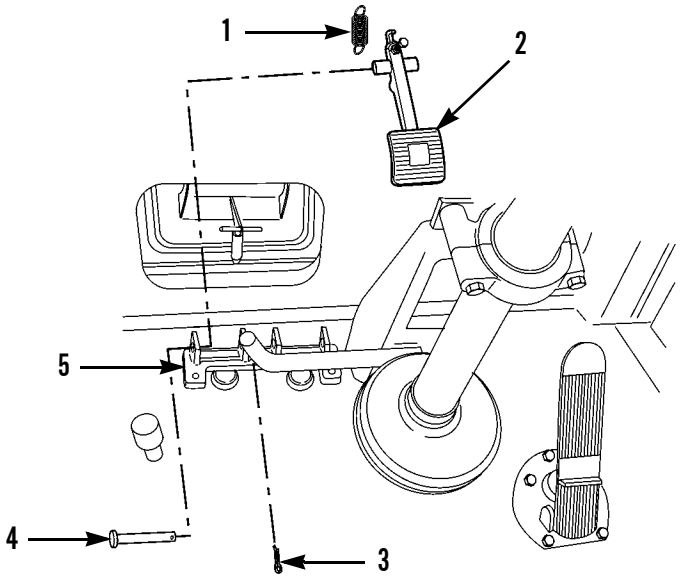
Differential lock pedal removed (WP 0171 00)

REMOVAL

WARNING

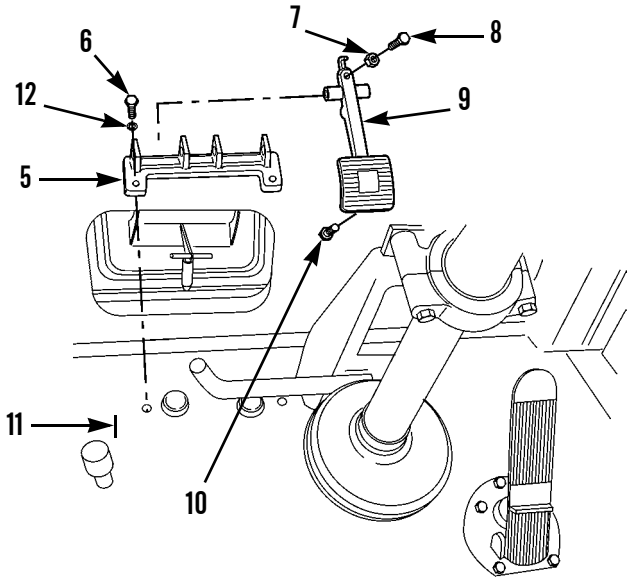
Always wear eye protection when removing parts under spring tension. Remove restraining parts slowly to relieve spring pressure. Failure to follow this warning may result in injury.

1. Remove cotter pin (3), pin (4), spring (1) and transmission hold pedal assembly (2) from bracket (5). Discard cotter pin.



REMOVAL - CONTINUED

2. Remove bolts (8 and 10) and nut (7) from transmission hold pedal (9).
3. Remove three bolts (6), lockwashers (12) and bracket (5) from floor plate (11). Discard lockwashers.



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CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent cleaning compound.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

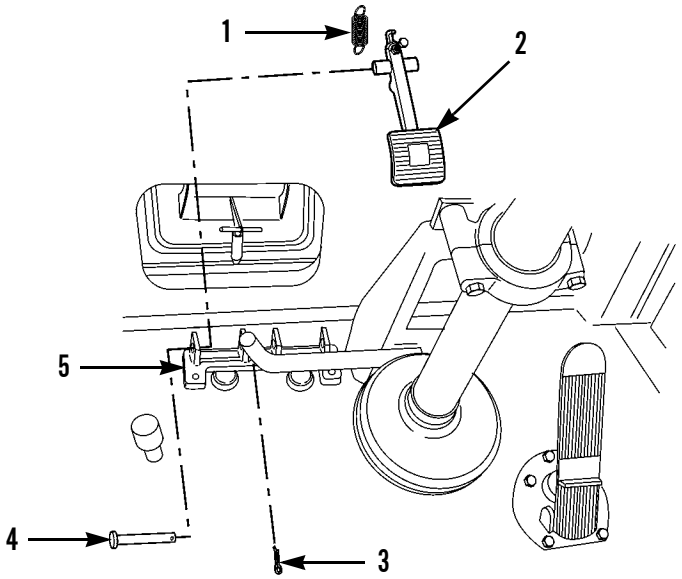
INSTALLATION

1. Install bracket (5) on cab floor (11) with three new lockwashers (12) and bolts (6).
2. Install nut (7) and bolts (8 and 10) on transmission hold pedal (9).

WARNING

Always wear eye protection when working with parts under spring tension. Remove restraining parts slowly to relieve spring pressure. Failure to follow this warning may result in injury.

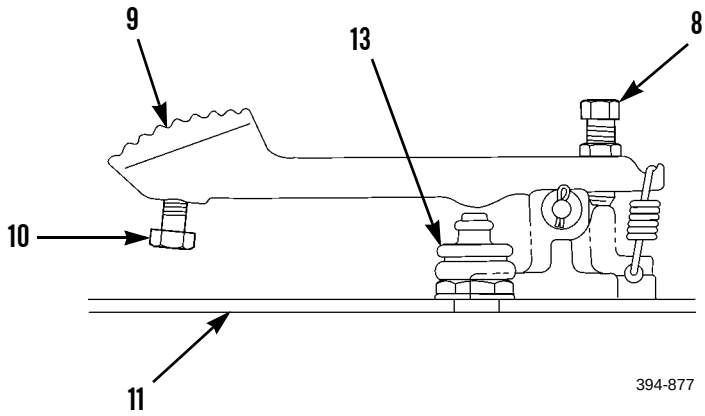
3. Install transmission hold pedal assembly (2) on bracket (5) with spring (1), pin (4) and new cotter pin (3).



394-875

ADJUSTMENT

1. Adjust bolt (8) until transmission hold pedal (9) is parallel with the floor plate (11), but does not move the valve plunger (13).
2. Adjust bolt (10) until distance between the bolt head and transmission hold pedal (9) is 0.75 in. (19 mm).
3. Push transmission shift pedal (9) down fully.
4. If necessary, adjust bolt (10) to allow valve plunger (13) 0.16 ±0.003 in. (4.0 ±0.08 mm) movement.



5. Install differential lock pedal (WP 0171 00).
6. Operate machine and verify proper transmission hold pedal operation (TM 5-3805-248-10).

END OF WORK PACKAGE

RETARDER OIL COOLER LINES REPLACEMENT 0140 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (6)

References

TM 5-3805-248-10

Equipment Condition

Transmission oil drained (WP 0128 00)

Crankcase guards removed (WP 0201 00)

WARNING

Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL

CAUTION

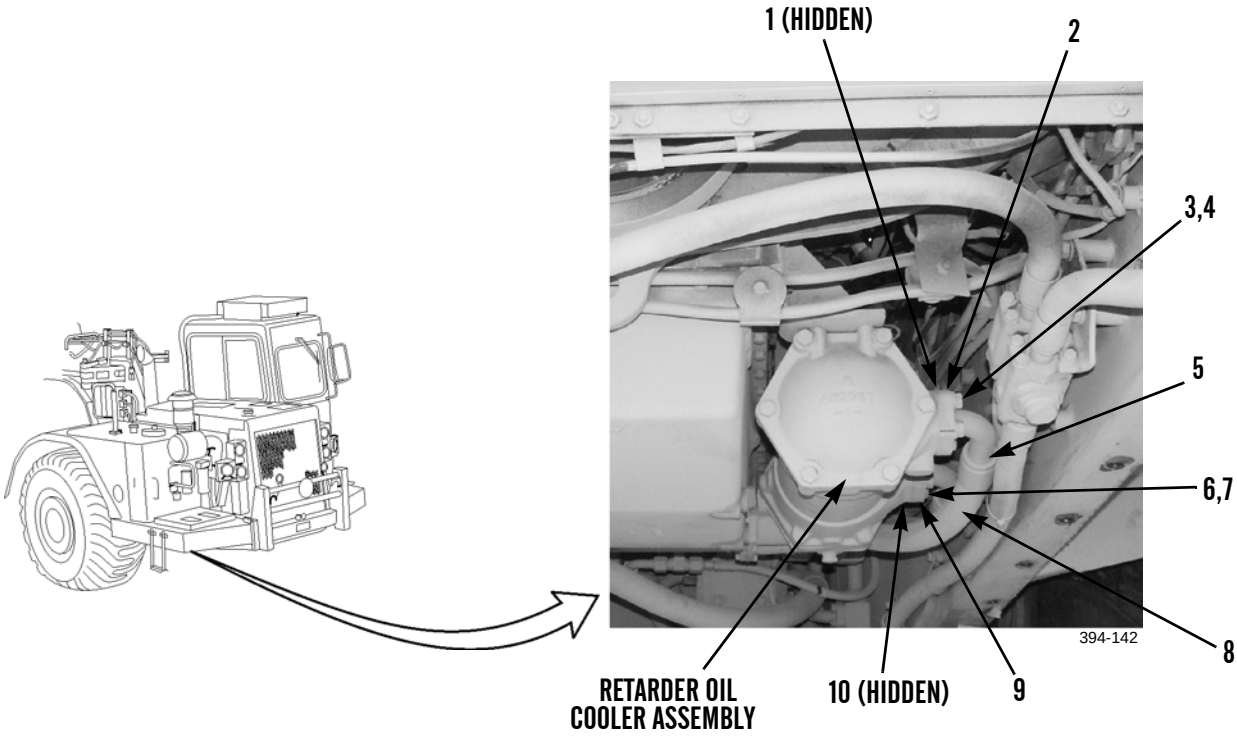
Wipe area clean around all connections prior to removal. Cap oil lines and plug openings after removing lines. Contamination of oil system could result in premature failure.

NOTE

- Tag all hoses before disconnecting to ensure correct installation.
- Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove four bolts (4), washers (3), two flange halves (2), hose assembly (5) and preformed packing (1) from retarder oil cooler assembly. Discard preformed packing.

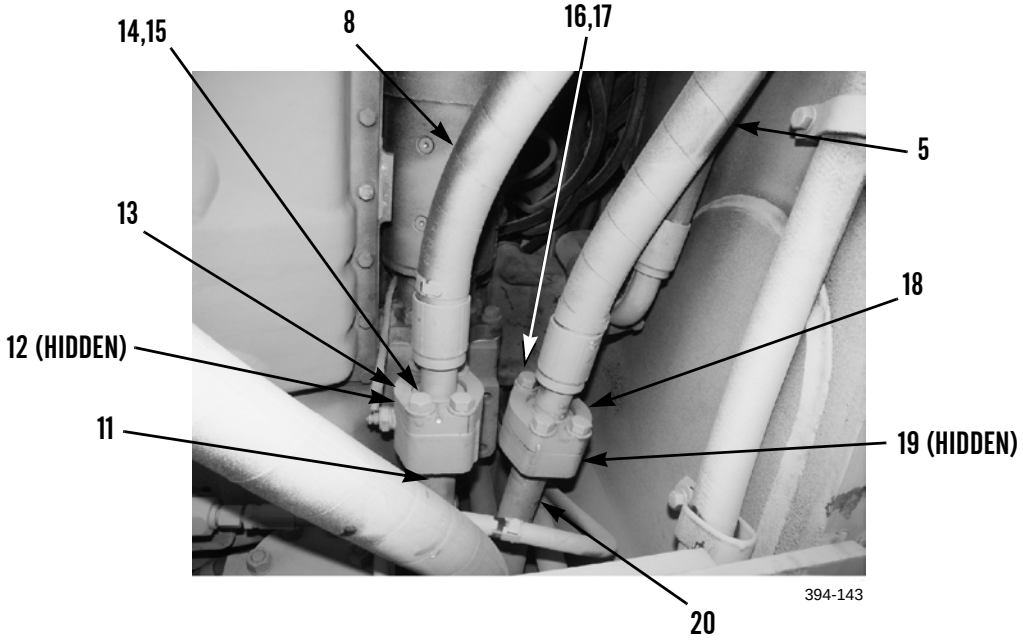
2. Remove four bolts (6), washers (7), two flange halves (9), hose assembly (8) and preformed packing (10) from retarder oil cooler assembly. Discard preformed packing.



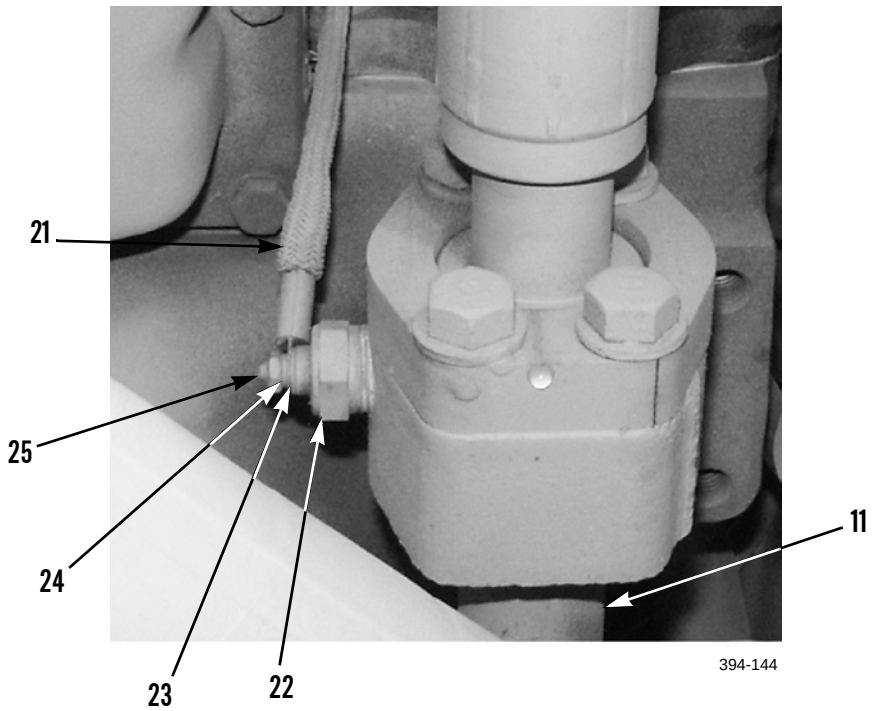
3. Remove four bolts (17), washers (16), two flange halves (18), hose assembly (5) and preformed packing (19) from tube assembly (20). Discard preformed packing.

4. Remove four bolts (15), washers (14), two flange halves (13), hose assembly (8) and preformed packing (12) from tube assembly (11). Discard preformed packing.

REMOVAL - CONTINUED

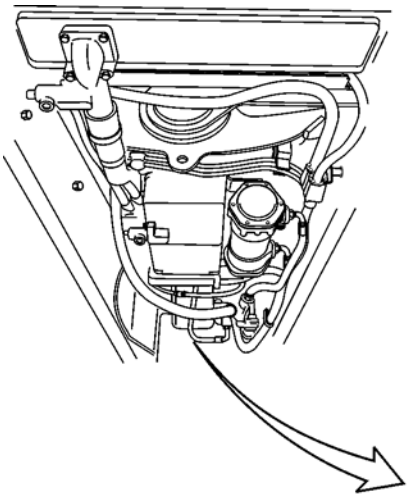


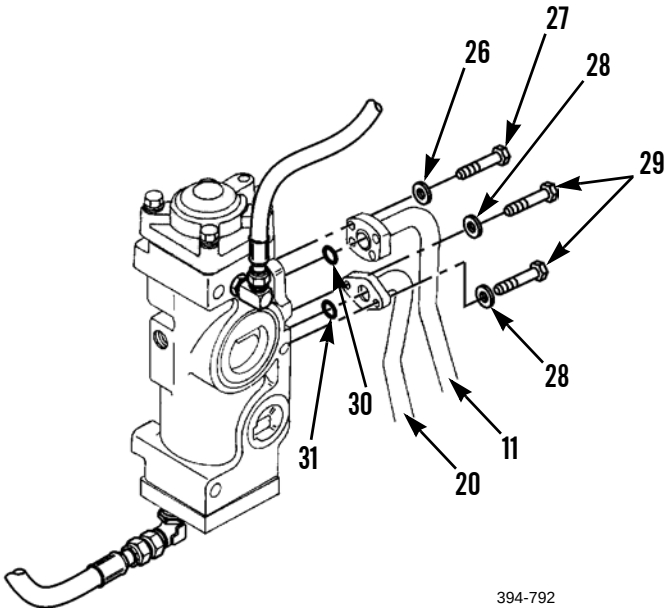
5. Remove nut (25) and washer (24) from retarder temperature sending unit (22).
6. Disconnect wire connector (21) from retarder temperature sending unit (22).
7. Remove washer (23) and retarder temperature sending unit (22) from tube assembly (11).



REMOVAL - CONTINUED

8. Remove two bolts (29) and washers (28).
9. Remove tube assembly (20).
10. Remove and discard preformed packing (31).
11. Remove four bolts (27) and washers (26).
12. Remove tube assembly (11).
13. Remove and discard preformed packing (30).





CLEANING AND INSPECTION

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

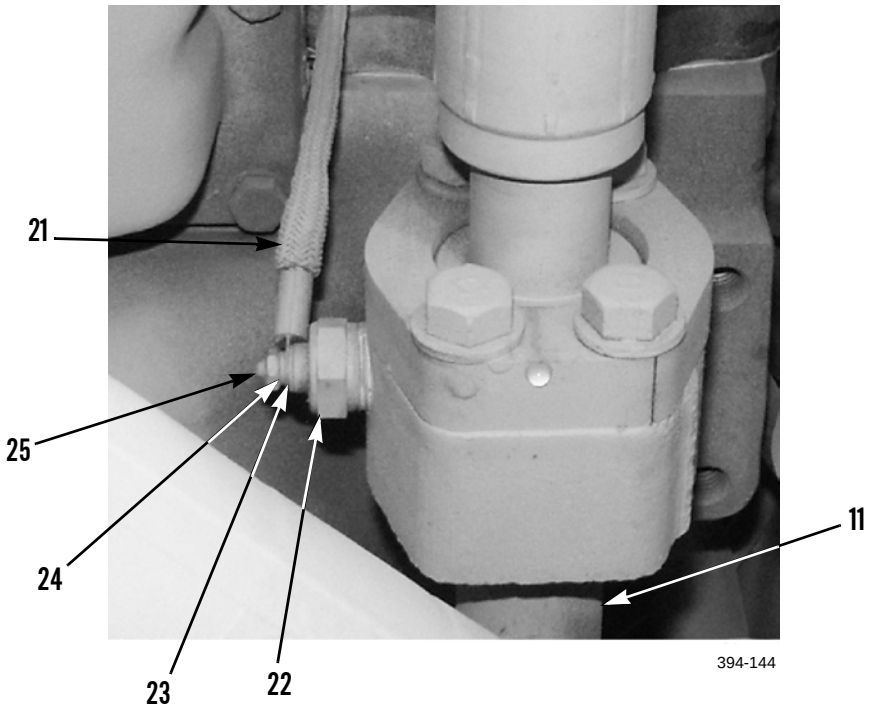
1. Clean all parts with solvent cleaning compound.
2. Dry parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new preformed packing (30).
2. Install tube assembly (11).
3. Install four washers (26) and bolts (27).
4. Install new preformed packing (31).
5. Install tube assembly (20).
6. Install two washers (28) and bolts (29).

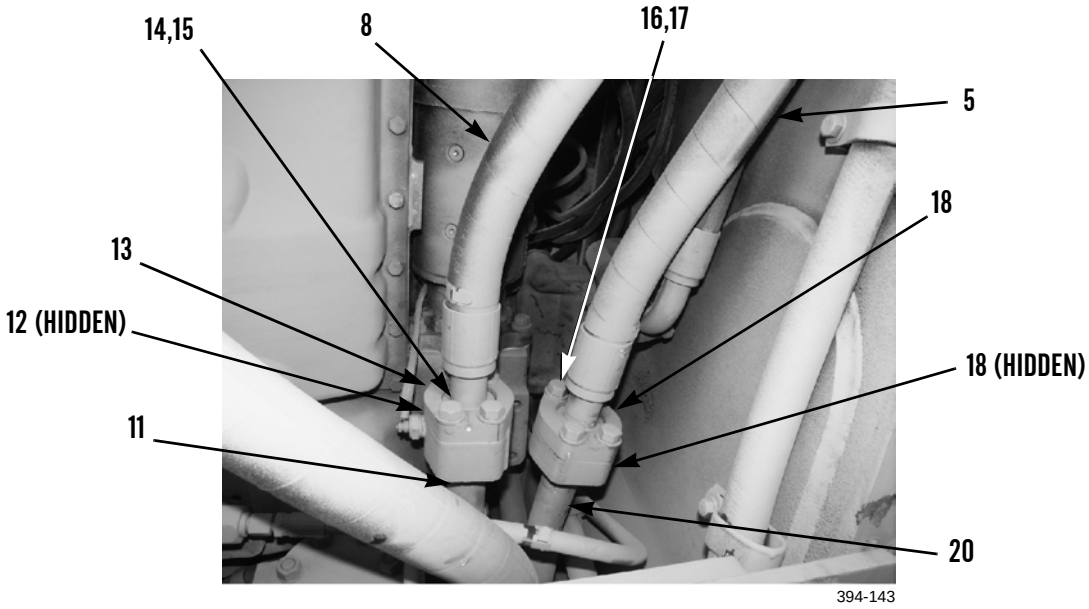
INSTALLATION - CONTINUED

7. Install retarder temperature sending unit (22) and washer (23) on tube assembly (11).
8. Connect wire connector (21).
9. Install washer (24) and nut (25).

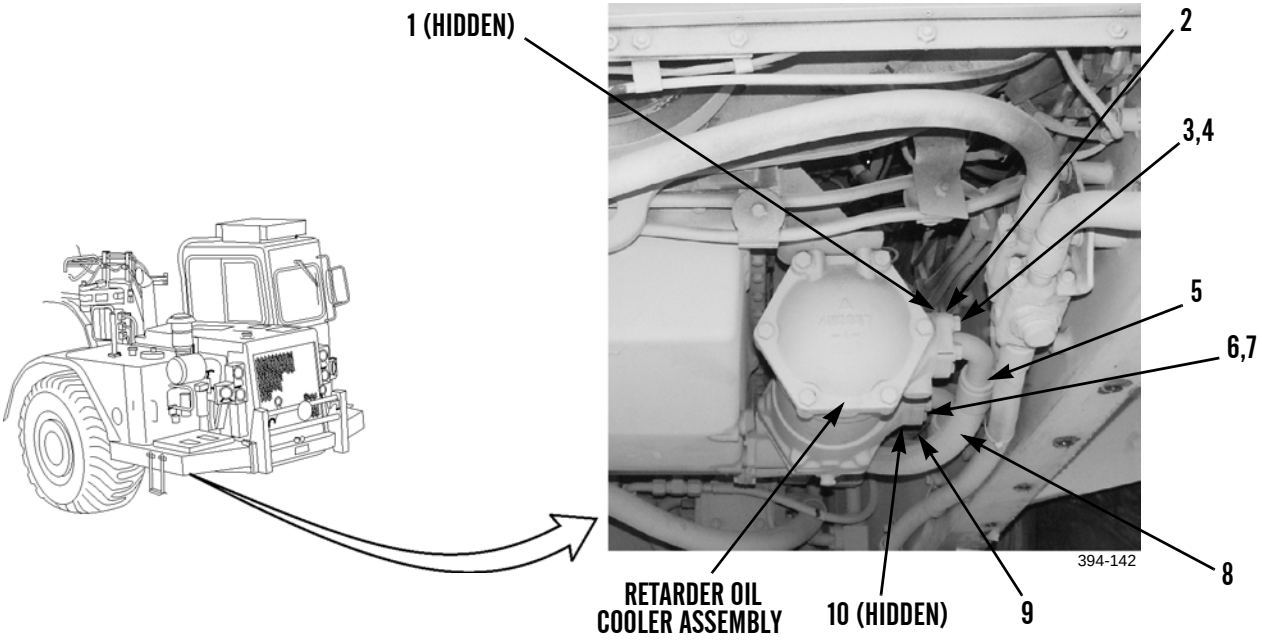


INSTALLATION - CONTINUED

10. Install new preformed packing (12), assembly (7), two flange halves (13), four washers (14) and bolts (15) to tube assembly (11).
11. Install new preformed packing (19), hose assembly (5), two flange halves (18), four washers (16) and bolts (17) to tube assembly (20).



12. Install new preformed packing (10), hose assembly (8), two flange halves (9), four washers (7) and bolts (6).
13. Install new preformed packing (1), hose assembly (5), two flange halves (2), four washers (3) and bolts (4).



INSTALLATION - CONTINUED

14. Refill transmission oil (WP 0128 00).
15. Operate machine and verify correct operation (TM 5-3805-248-10).
16. Shut down engine and inspect for leaks.
17. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

FRONT AXLE MAINTENANCE 0141 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 150 lb minimum capacity

Screw, forcing 1/2-13NC (3)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Lockwasher (6)

O-ring

Equipment Condition

Final drive drained (WP 0143 00)

Right tractor wheel raised and blocked (WP 0302 00)

NOTE

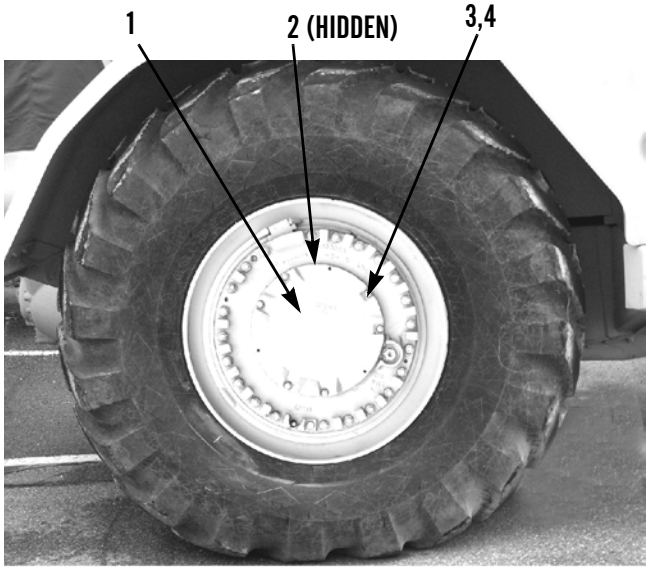
The following procedure is for the right front wheel; the procedure for the left front wheel is identical.

REMOVAL

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Remove six nuts (3) and lockwashers (4). Discard lockwashers.
2. Install three 1/2-13NC forcing screws in cover (1).
3. Tighten three 1/2-13NC forcing screws and, with assistance, remove cover (1).
4. Remove three 1/2-13NC forcing screws and cover (1).
5. Remove and discard O-ring (2) from cover (1).



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REMOVAL - CONTINUED

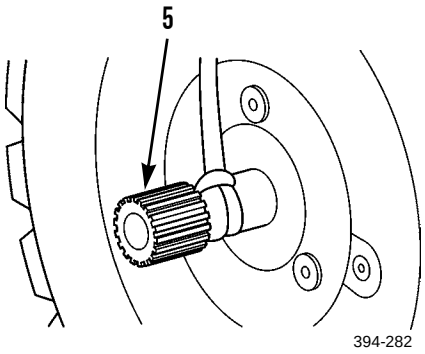
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in injury or death.

NOTE

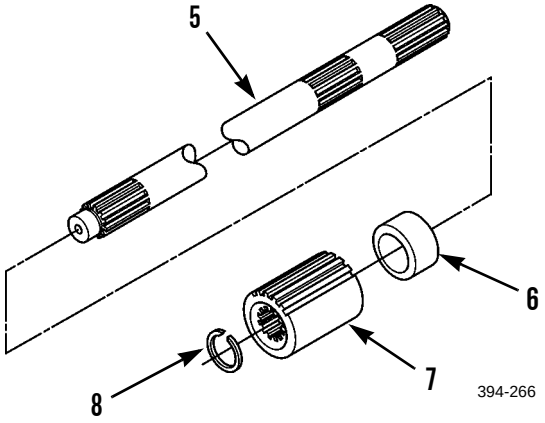
- Weight of front axle is 90 lb (40 kg).
- Do not move machine until axle is reinstalled.

6. Use lifting device to remove axle (5) assembly from machine.



DISASSEMBLY

1. Remove retaining ring (8) from axle (5).
2. Remove gear (7) and spacer (6) from axle (5).



CLEANING AND INSPECTION

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent cleaning compound.
2. Dry parts with compressed air.
3. Inspect all parts for damage and replace damaged parts as necessary.

ASSEMBLY

1. Install spacer (6) and gear (7) on axle (5).
2. Install retaining ring (8) on axle (5).

INSTALLATION

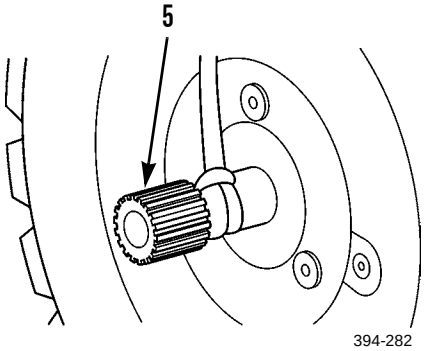
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in injury or death.

NOTE

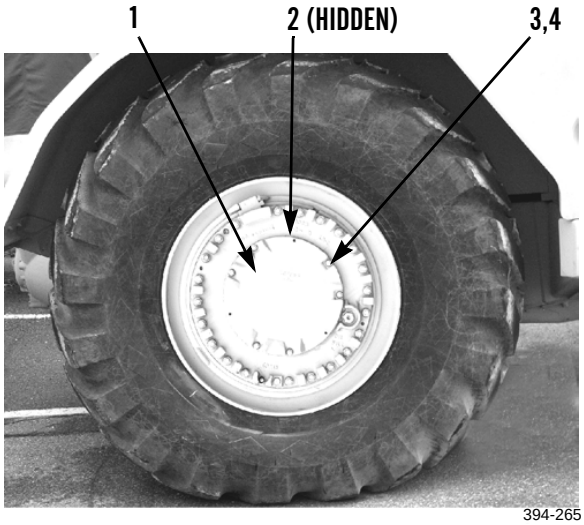
Weight of front axle is 90 lb (40 kg).

1. Use lifting device to install axle (5) assembly.



INSTALLATION - CONTINUED

2. Install new O-ring (2).
3. Install cover (1).
4. Install six new lockwashers (4) and nuts (3).



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5. Unblock and lower right tractor wheel (WP 0302 00).
6. Refill final drive with oil (WP 0143 00).

END OF WORK PACKAGE

DIFFERENTIAL BREATHER REPLACEMENT 0142 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

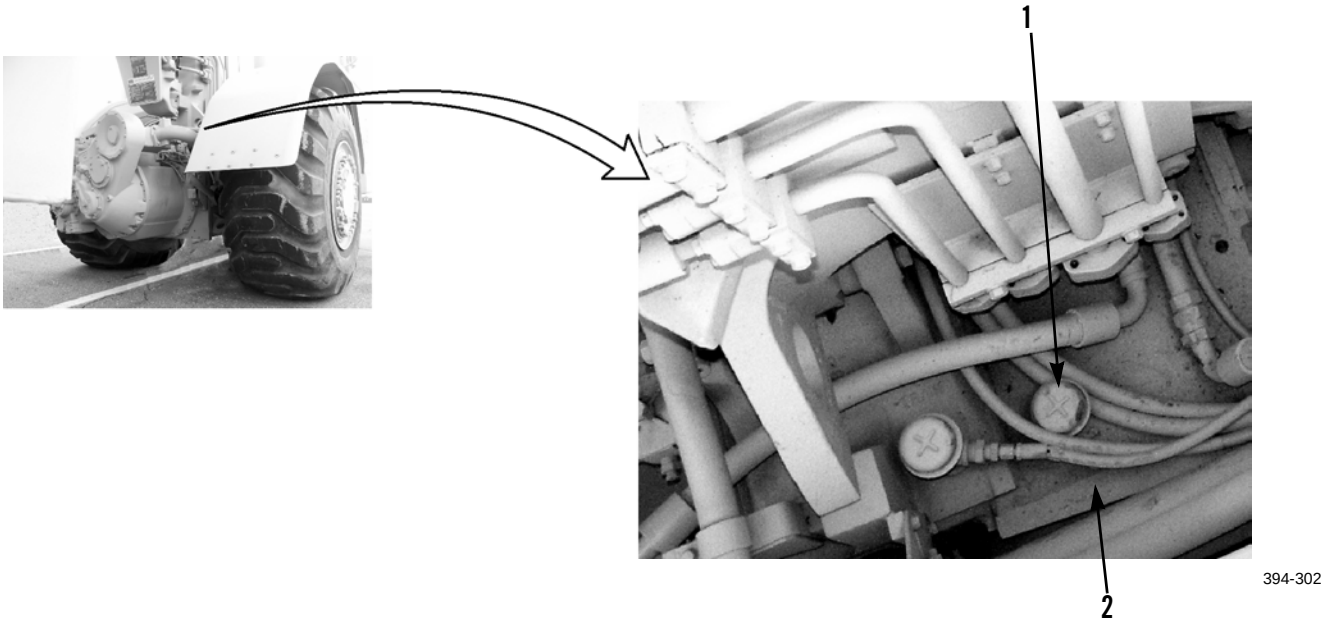
Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Clean area around breather (1).
2. Remove breather (1) from differential housing (2).



CLEANING AND INSPECTION

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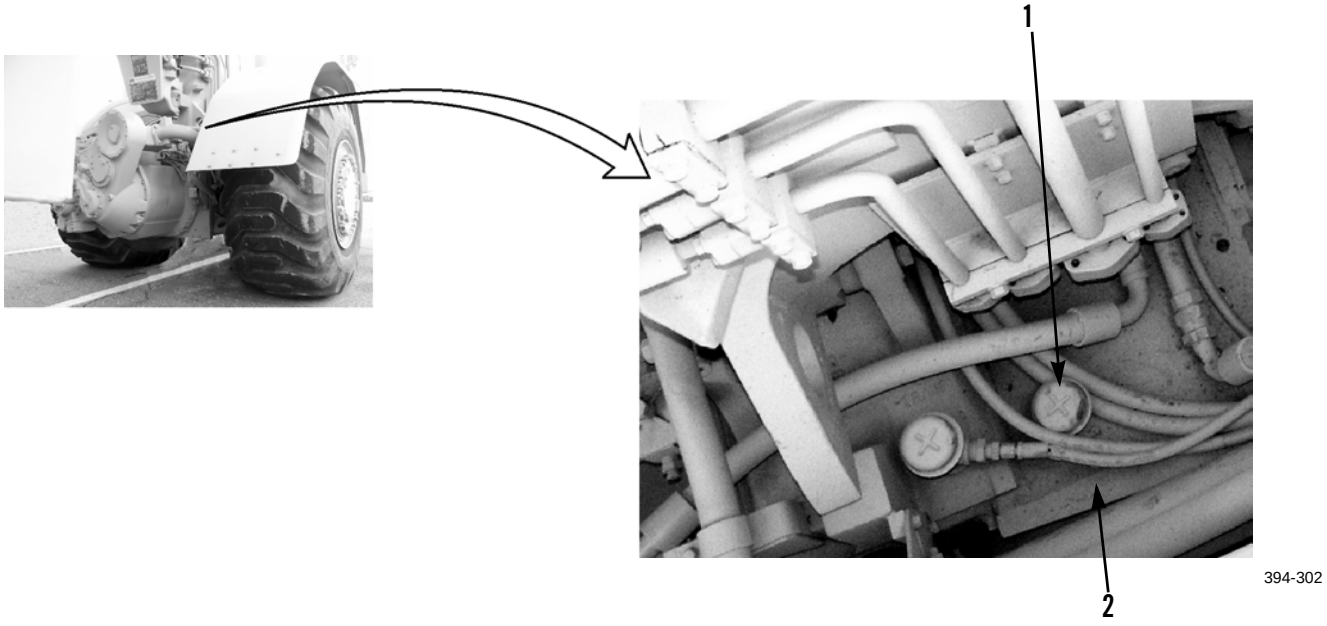
1. Clean breather with solvent cleaning compound.
2. Dry parts with compressed air.
3. Inspect for damage and replace if necessary.

INSTALLATION

Install breather (1) in differential housing (2).



END OF WORK PACKAGE

FINAL DRIVE MAINTENANCE 0143 00

THIS WORK PACKAGE COVERS

Drain and Refill, Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 450 lb minimum capacity

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed (3)

References

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

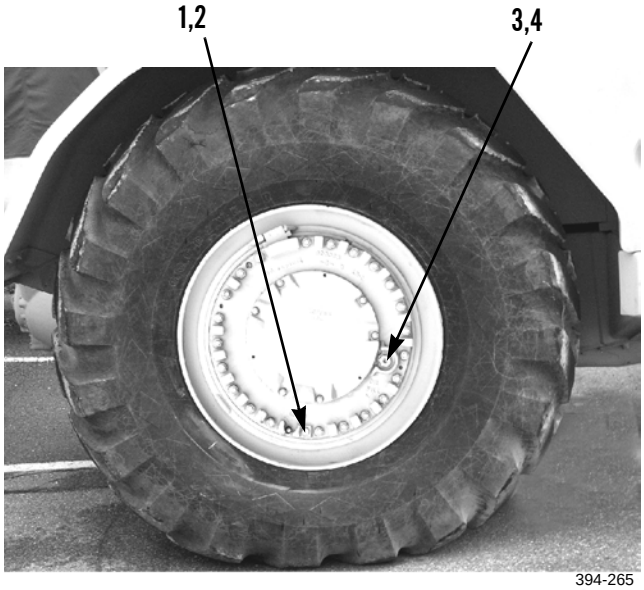
Front axle removed (WP 0141 00)

DRAIN AND REFILL

NOTE

Use a container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Rotate right front wheel of machine until drain plug (1) is at bottom of wheel.
2. Remove drain plug (1) and gasket (2) and allow oil to drain completely. Discard gasket.
3. Remove fill plug (3) and gasket (4). Discard gasket.
4. Install new gasket (2) and drain plug (1). Torque to 75 lb-ft (101 Nm).
5. Fill final drive housing with lubricating oil until level reaches fill plug (3) opening.
6. Install new gasket (4) and fill plug (3). Torque to 75 lb-ft (101 Nm).



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DRAIN AND REFILL - CONTINUED

7. Operate machine and verify normal operation (TM 5-3805-248-10).

NOTE

It may be necessary to recheck oil level in final drive after operating machine.

8. Shut down engine, check for leaks and recheck oil level (TM 5-3805-248-10).

REMOVAL

NOTE

This procedure is for the final drive from the front-right wheel; the procedure for the front-left wheel is identical.

1. Drain final drive assembly. Refer to *Drain and Refill* steps 1 through 3 in this work package.

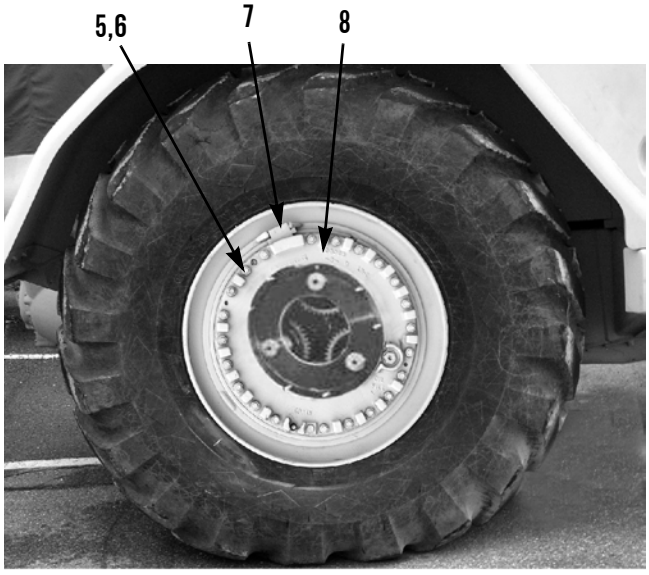
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

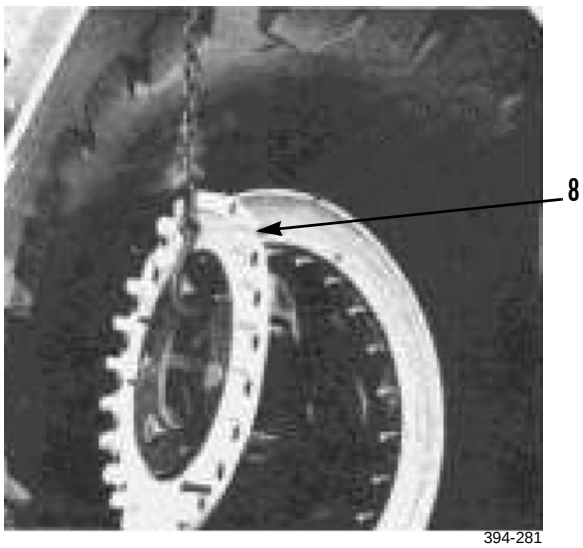
NOTE

Weight of carrier is 300 lb (136 kg).

2. Attach lifting device to carrier (8) assembly.
3. Remove 22 nuts (5) and washers (6) from right front wheel of machine.
4. With assistance, use lifting device to remove carrier (8) assembly.
5. Remove driver (7).



394-280



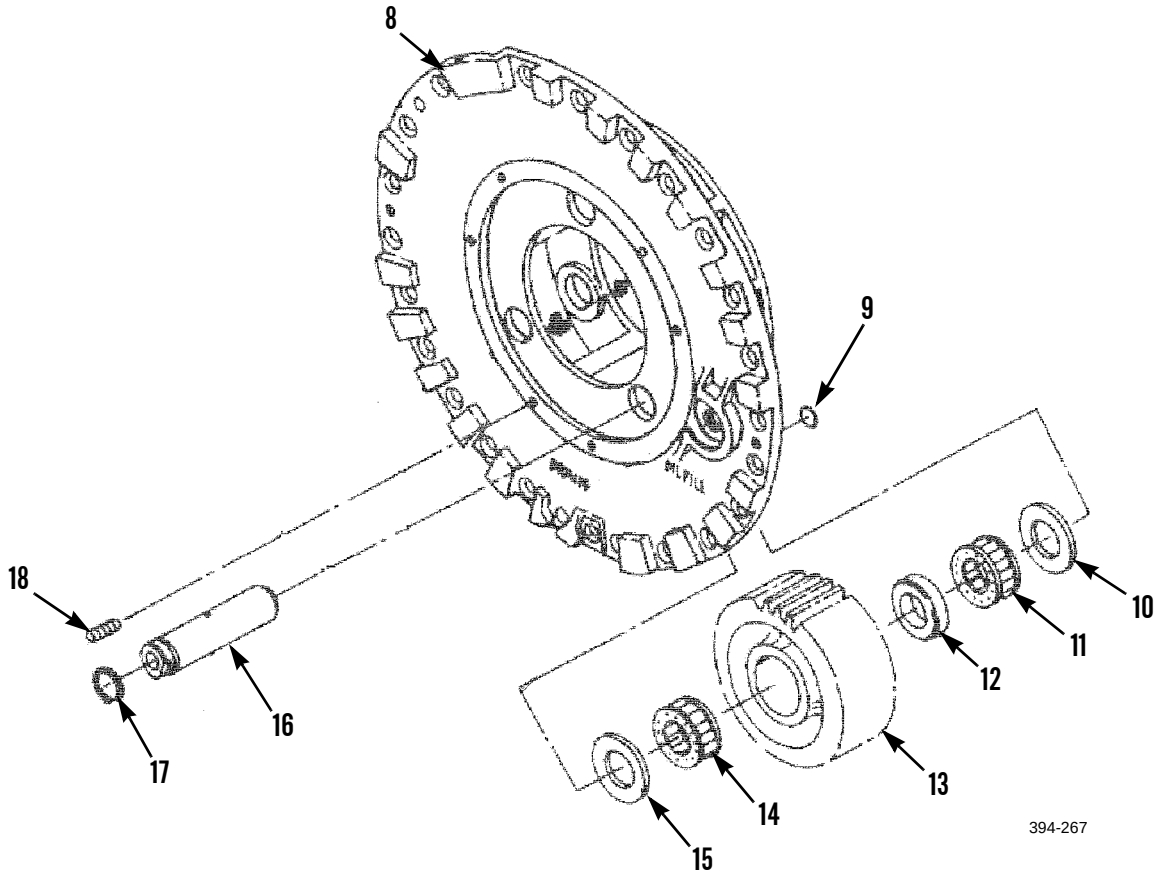
394-281

REMOVAL - CONTINUED

NOTE

Note position and location of all components. Ensure components are match-mark for correct installation.

6. Remove two preformed packings (9) from carrier (8).
7. Remove three retaining rings (17), shafts (16) and gear (13) assemblies.
8. Remove three spacers (10) and spacers (15) from gears (13).
9. Remove three bearings (11), bearings (14) and spacers (12).
10. Remove six studs (18) from carrier (8).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Clean all parts with solvent cleaning compound.
2. Dry with compressed air.
3. Inspect all parts for damage and replace damaged parts as necessary.

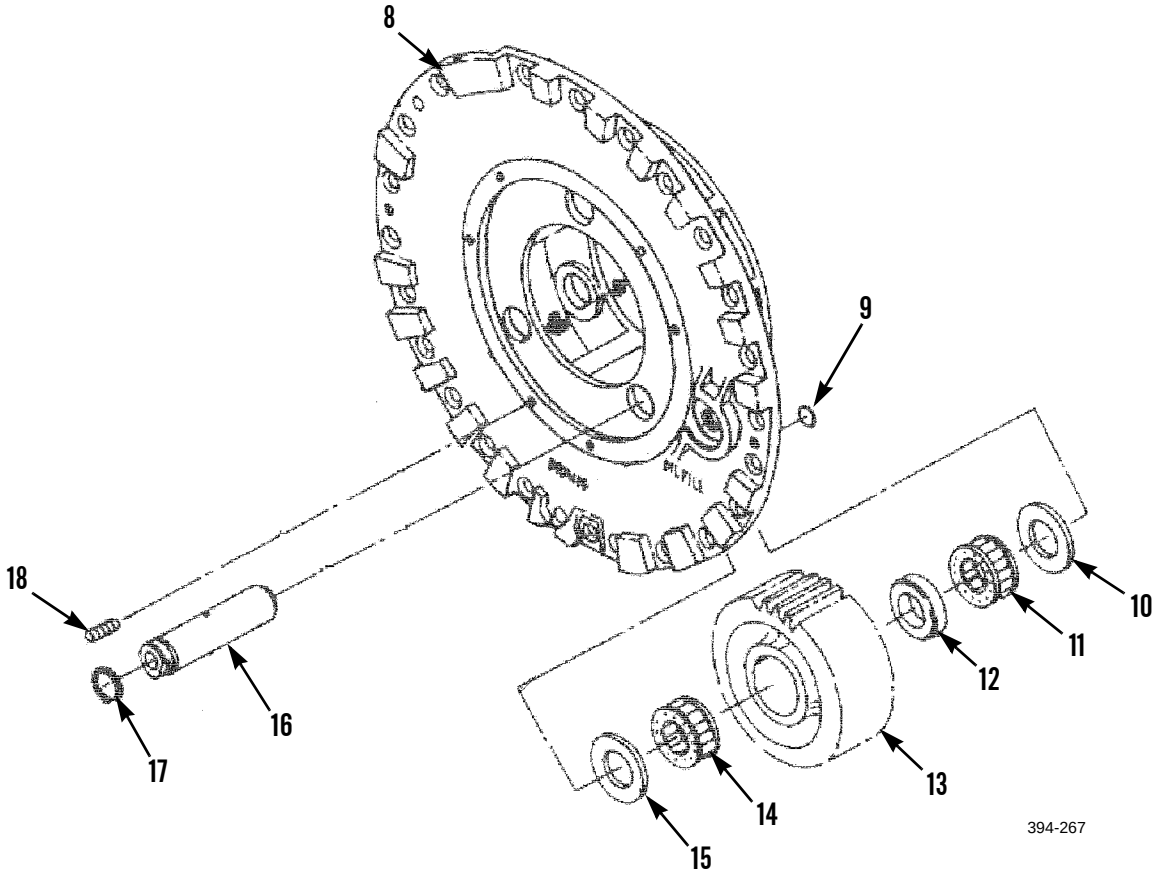
CAUTION

Install all components as marked to prevent damage to equipment.

ASSEMBLY

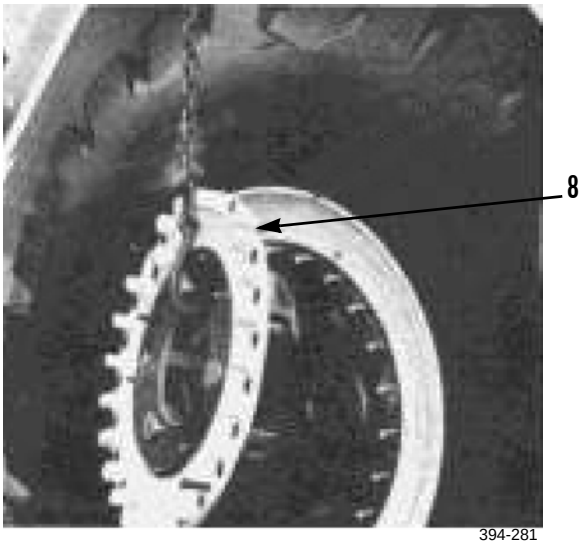
1. Install six studs (18) on carrier (8) and torque to 40 lb-ft (54 Nm).
2. Install three spacers (12), bearings (14) and bearings (11).
3. Install three spacers (15) and spacers (10) in gears (13).
4. Install three gears (13) in carrier (8).
5. Install three shafts (16) with flat end toward outside.
6. Install three rings (17).

ASSEMBLY - CONTINUED



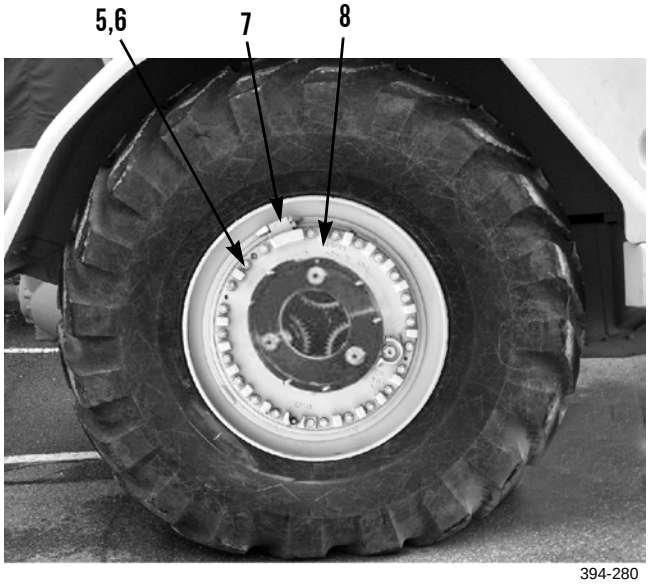
INSTALLATION

1. Install new preformed packings (9).
2. Install driver (7).
3. Attach lifting device and install carrier (8) assembly in wheel.



INSTALLATION - CONTINUED

4. Install 22 washers (6) and nuts (5). Torque nuts (5) in criss-cross pattern to 265 lb-ft (359 Nm).



394-280

5. Install front axle (WP 0141 00).
6. Refill final drive. Refer to *Drain and Refill*, steps 4 through 6, in this work package.

END OF WORK PACKAGE

RETARDER AIR LINES REPLACEMENT 0144 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Gasket

Equipment Condition

Step assembly removed (WP 0200 00)

Operator compartment lower front access plate removed (WP 0197 00)

Crankcase guards removed (WP 0201 00)

Air tanks drained (TM 5-3805-248-10)

REMOVAL

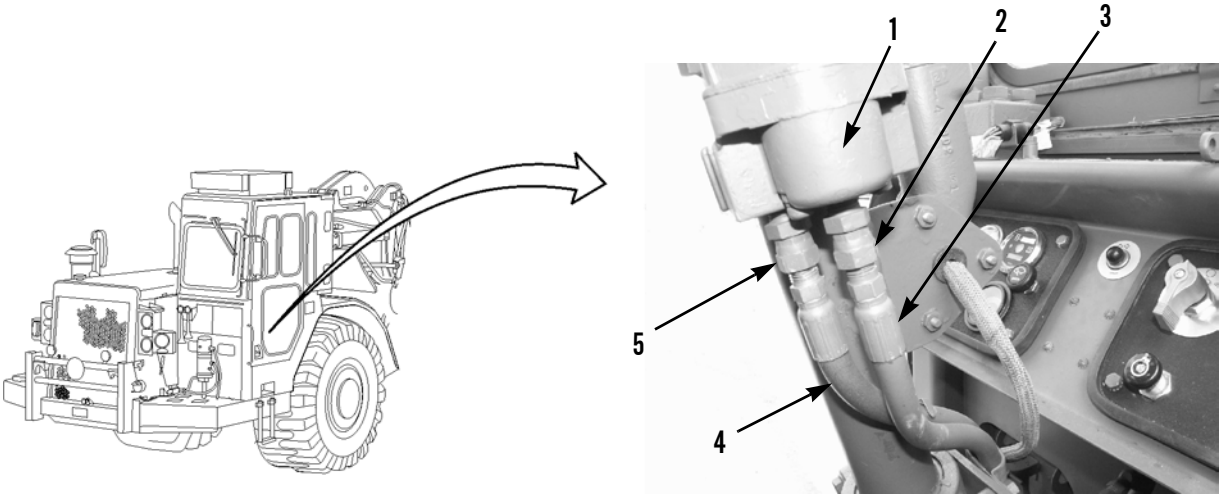
CAUTION

Wipe area clean around all air lines connections to be opened during removal. Cap lines and plug openings after removing lines. Contamination of air system could result in premature failure.

NOTE

Tag hose assemblies prior to removal to aid in installation.

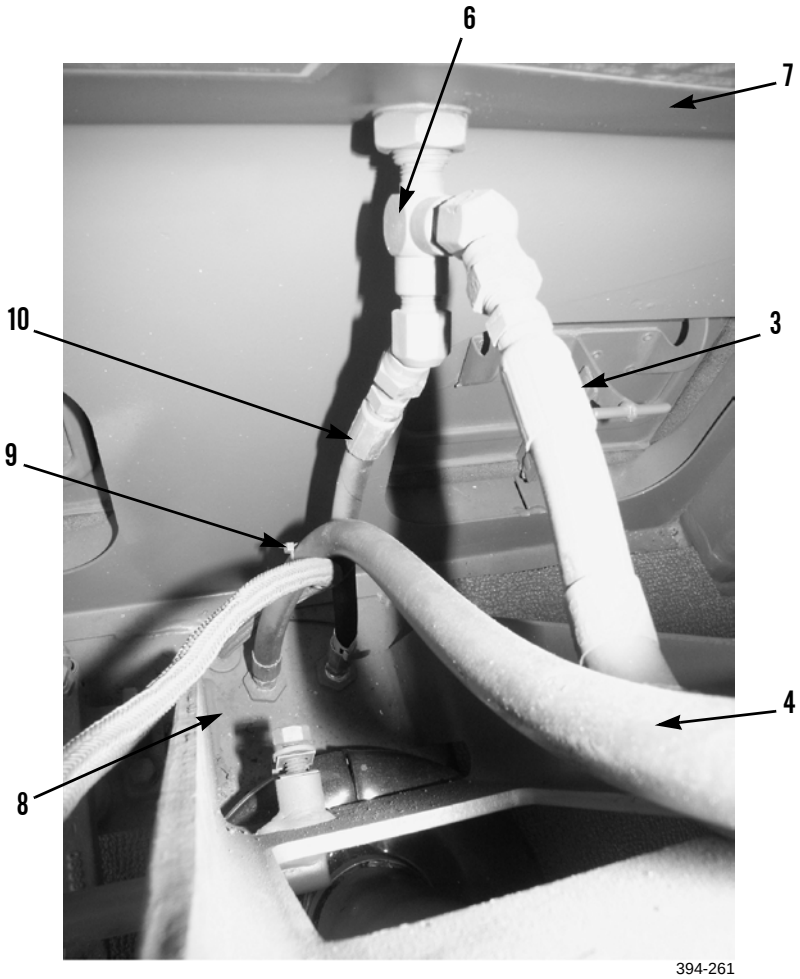
1. Remove two hose assemblies (3 and 4) and pipe couplings (2 and 5) from retarder valve (1).



394-260

REMOVAL - CONTINUED

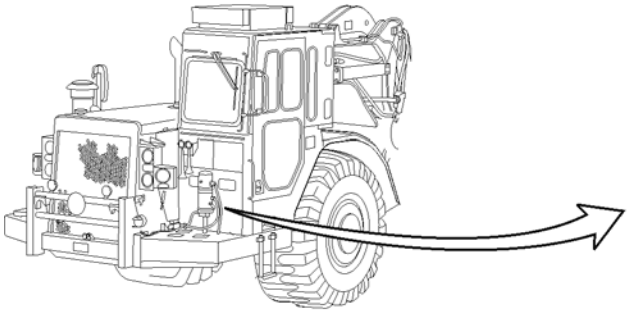
2. Remove hose assembly (3) from tee (6) under front instrument panel (7).
3. Remove hose assembly (4) from cab floor (8).
4. Disconnect hose assembly (10) from tee (6) and cab floor (8) and remove hose assembly from machine.
5. Cut and discard tiestrap (9).

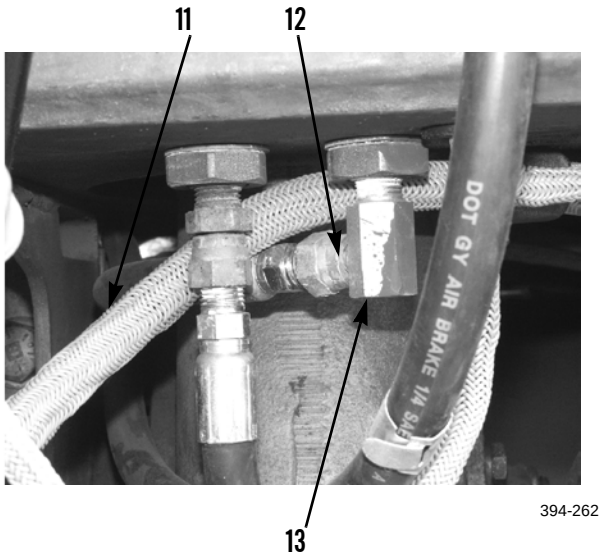


394-261

REMOVAL - CONTINUED

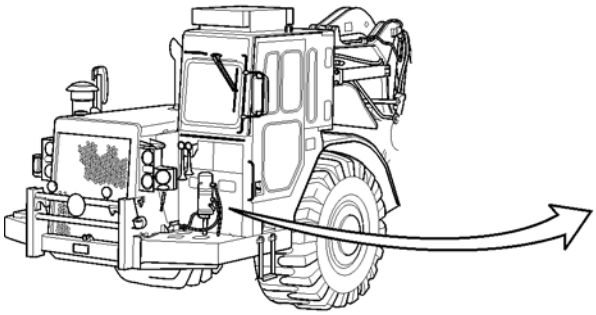
6. Remove hose assembly (11), pipe coupling (12) and elbow (13) from machine.

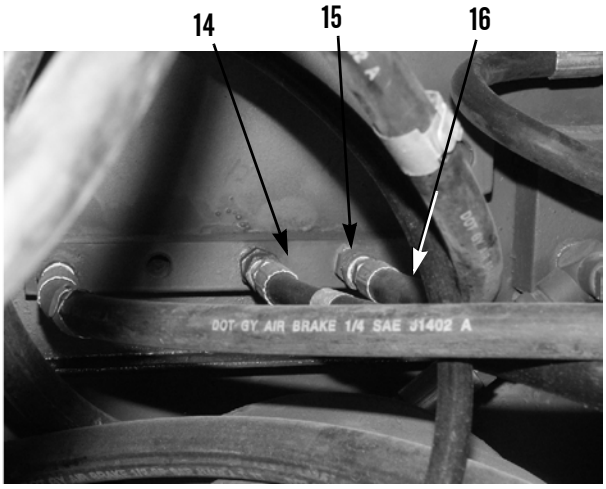




394-262

7. Remove hose assembly (16) and pipe coupling (15) from manifold (14).





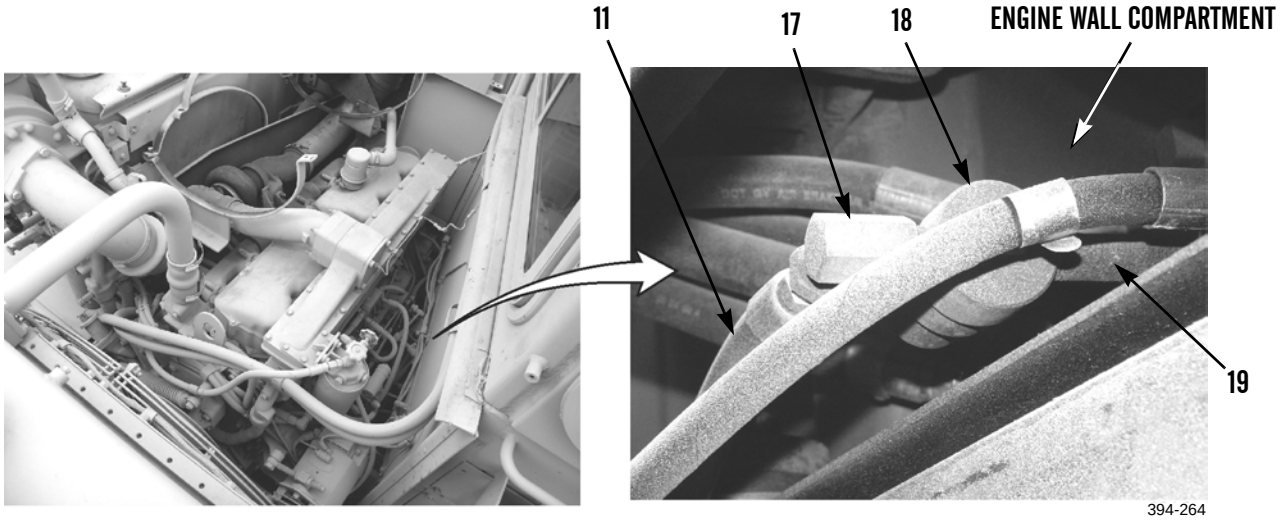
394-263

REMOVAL - CONTINUED

NOTE

Access air regulator assembly from underneath machine above retarder cooler oil lines.

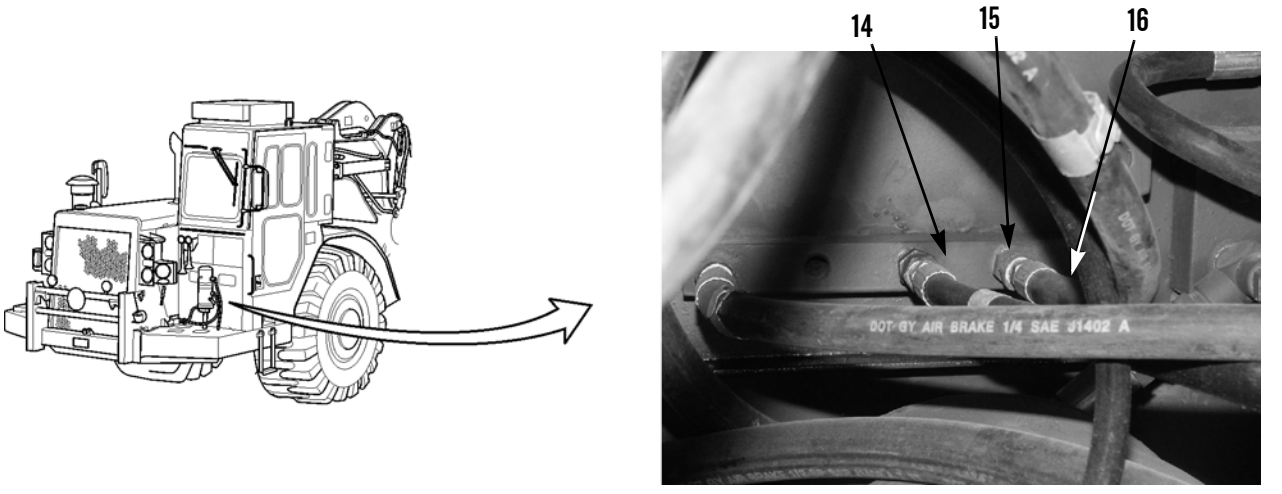
8. Remove elbow (17), air regulator assembly (18) and connector (19) from engine compartment wall on outside of cab.



394-264

INSTALLATION

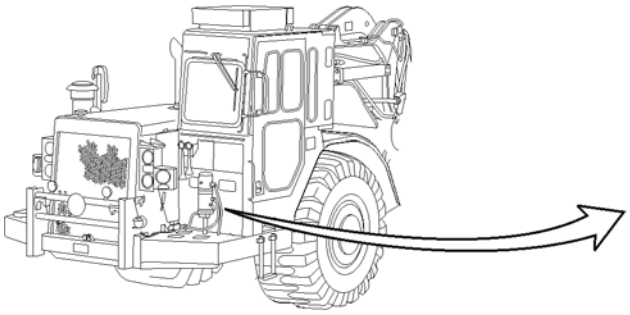
1. Install connector (19), air regulator assembly (18) and elbow (17) on manifold (14) on outside of cab.
2. Install pipe coupling (15) and hose assembly (16) on manifold (14).

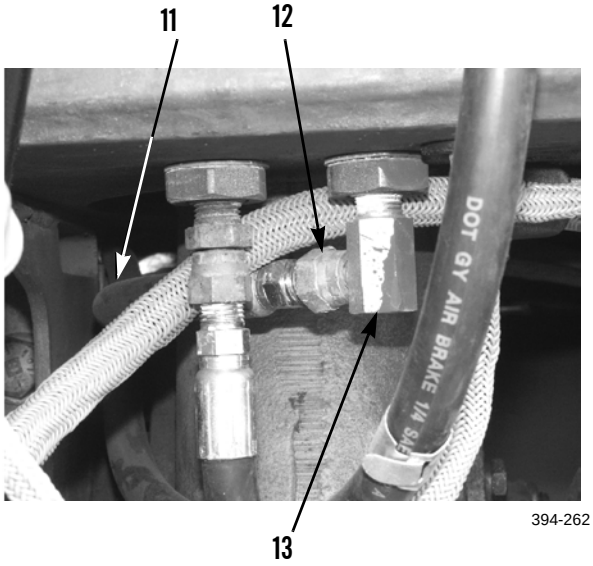


394-263

INSTALLATION - CONTINUED

3. Install elbow (13), pipe coupling (12) and hose assembly (11) on machine.

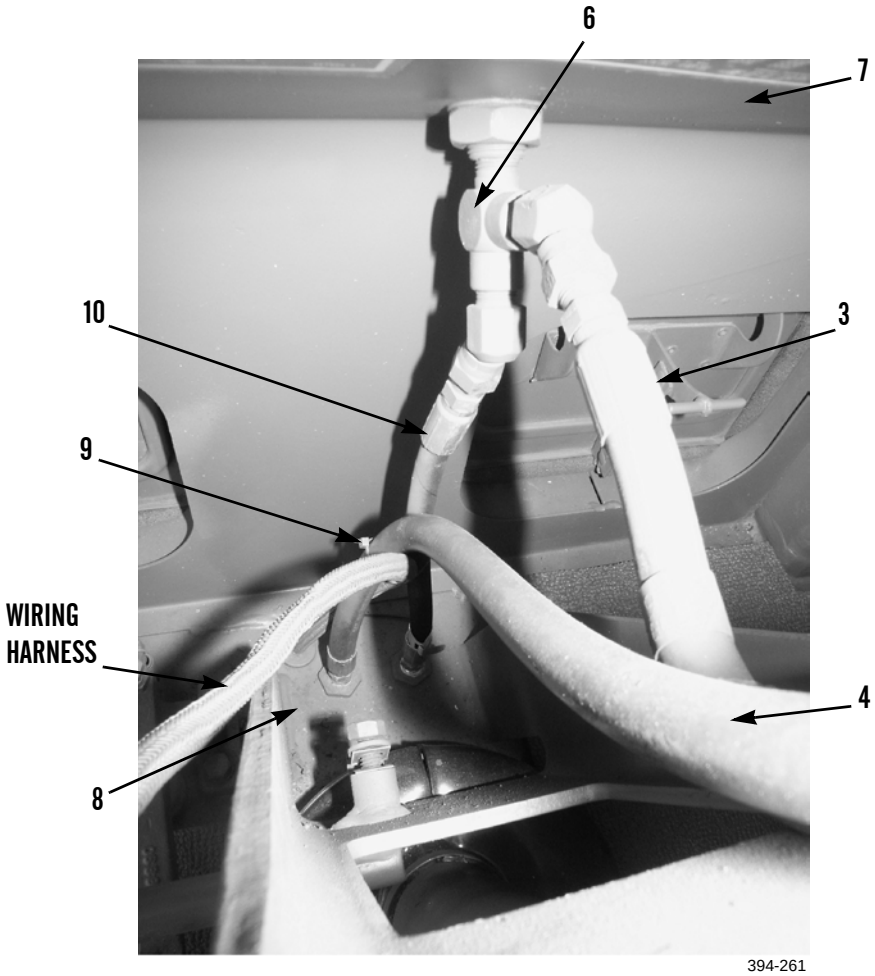




394-262

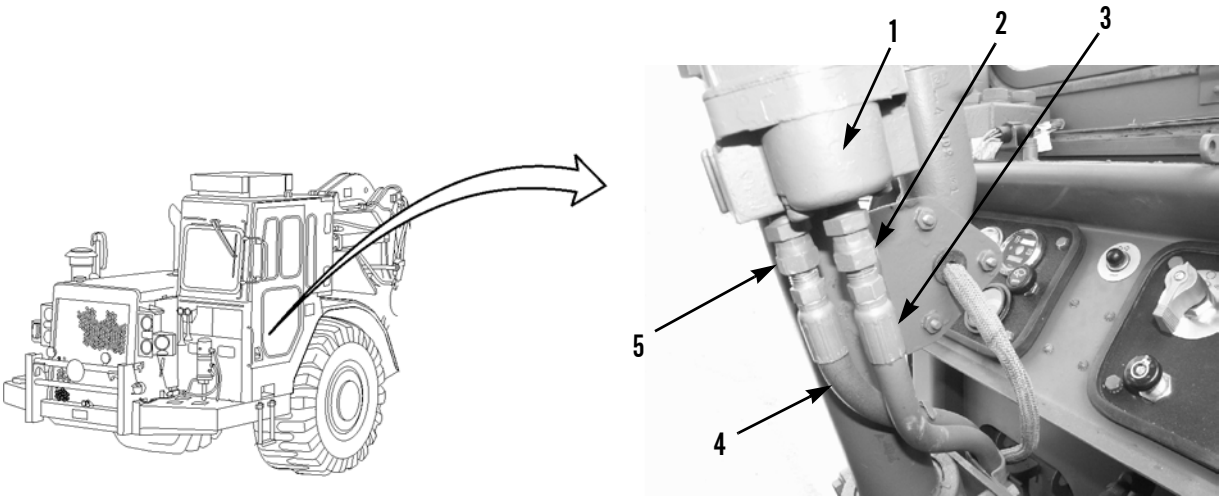
INSTALLATION - CONTINUED

4. Position hose assembly (10) in operator compartment and connect hose assembly to tee (6) and cab floor (8).
5. Install hose assembly (4) on cab floor (8).
6. Install hose assembly (3) on tee (6) under front instrument panel (7).
7. Install new tiestrap (9) on hose assembly (4) and wiring harness.



INSTALLATION - CONTINUED

8. Install two pipe couplings (2 and 5) and hose assemblies (3 and 4) on retarder valve (1).



9. Operate machine and verify correct operation of retarder (TM 5-3805-248-10).
10. Check for air leaks.
11. Install step assembly (WP 0200 00).
12. Install operator compartment lower front access plate (WP 0197 00).
13. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

PARK AND EMERGENCY VALVE MAINTENANCE 0145 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Materials/Parts - Continued

Gasket

Preformed packing

References

TM 5-3805-248-10

Equipment Condition

Low air pressure warning lamp switch removed (WP 0094 00)

Park and emergency valve hoses disconnected from valve (WP 0146 00)

REMOVAL

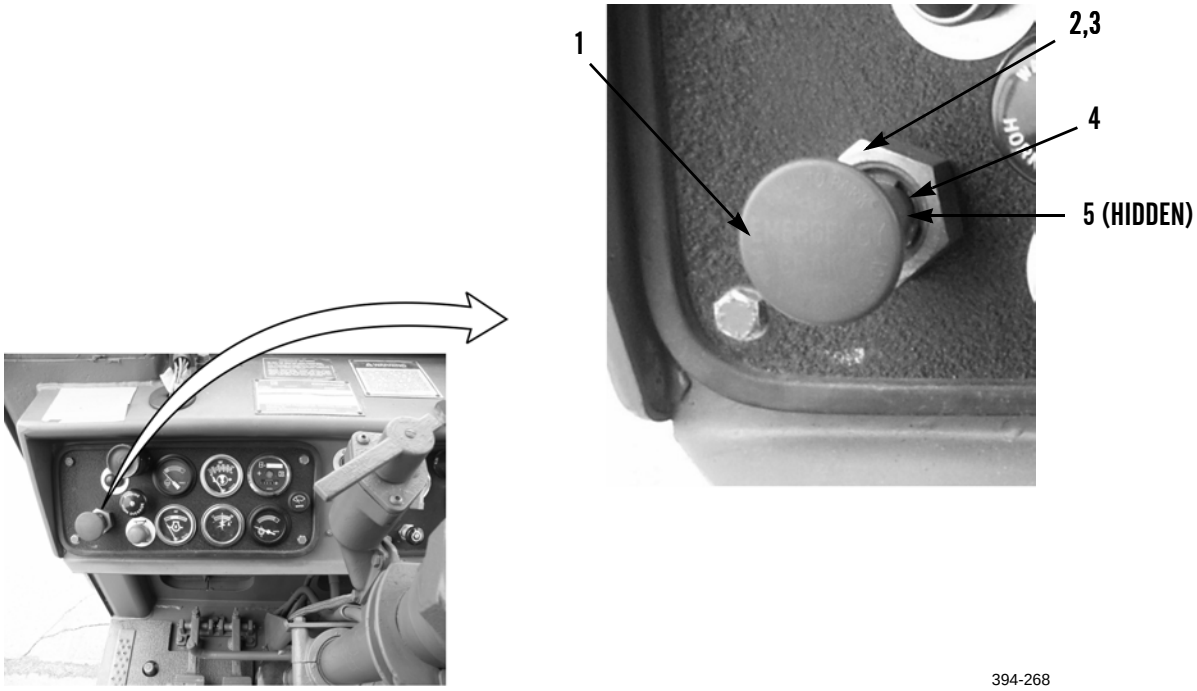
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

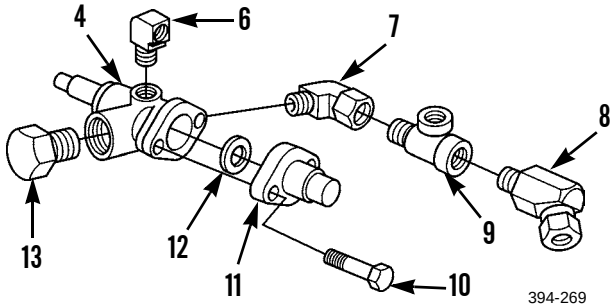
Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Remove pin (5), knob (1) and nut (2) from valve (4).
2. Remove and discard preformed packing (3).
3. Remove park and emergency valve (4) assembly from back of instrument panel.



DISASSEMBLY

1. Remove plug (13) and elbows (6 and 8).
2. Remove tee (9) and elbow (7).
3. Remove two screws (10).
4. Remove brake pneumatic valve (11) and gasket (12) from park and emergency valve (4). Discard gasket.



CLEANING AND INSPECTION

WARNING

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Ensure threads of pipe connection are clean.
3. Clean all parts with solvent cleaning compound.
4. Dry parts with compressed air.
5. Inspect all parts for damage and replace damaged parts as necessary.

ASSEMBLY

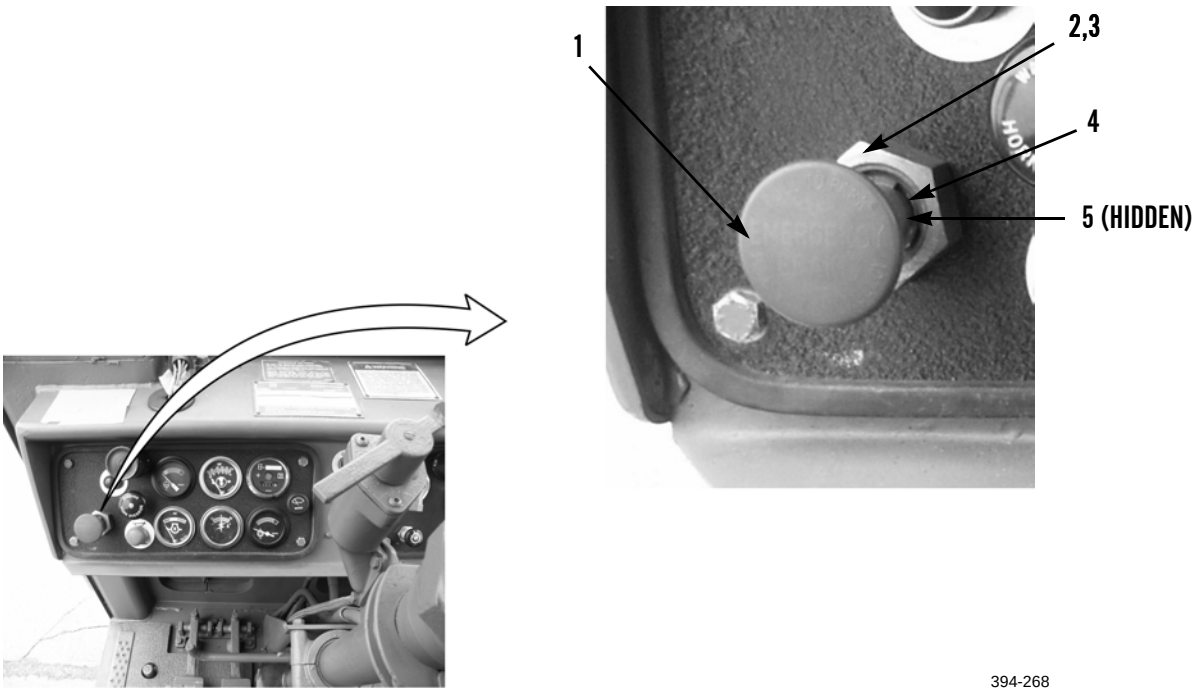
NOTE

Apply anti-seizing tape halfway up the threads of all pipe connections.

1. Install new gasket (12) and brake pneumatic valve (11) on park and emergency valve (4).
2. Install two screws (10).
3. Install elbow (7) and tee (9).
4. Install elbows (6 and 8) and plug (13).

INSTALLATION

1. Install park and emergency valve (4) assembly through back of instrument panel.
2. Install new preformed packing (3).
3. Install nut (2), knob (1) and pin (5).
4. Install low air pressure warning lamp switch (WP 0094 00).



5. Connect park and emergency valve hoses (WP 0146 00).
6. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
7. Shut down engine (TM 5-3805-248-10).
8. Check for air system leaks.

END OF WORK PACKAGE

PARK AND EMERGENCY VALVE HOSES AND FITTINGS REPLACEMENT 0146 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Air tanks drained (TM 5-3805-248-10)

Upper front access plates removed (WP 0192 00)

Lower access plate removed (WP 0197 00)

Step assembly removed (WP 0200 00)

REMOVAL

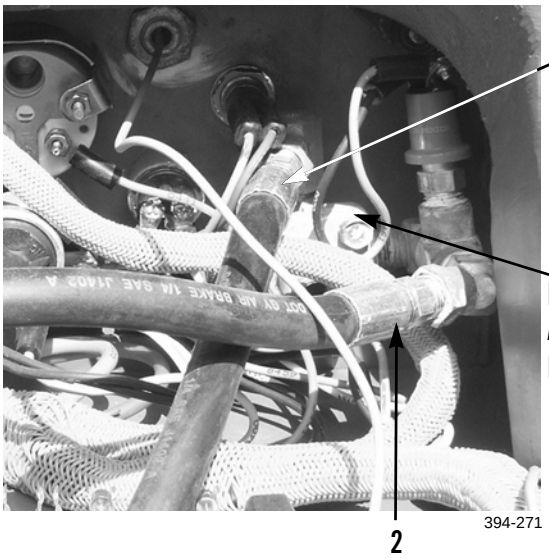
CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

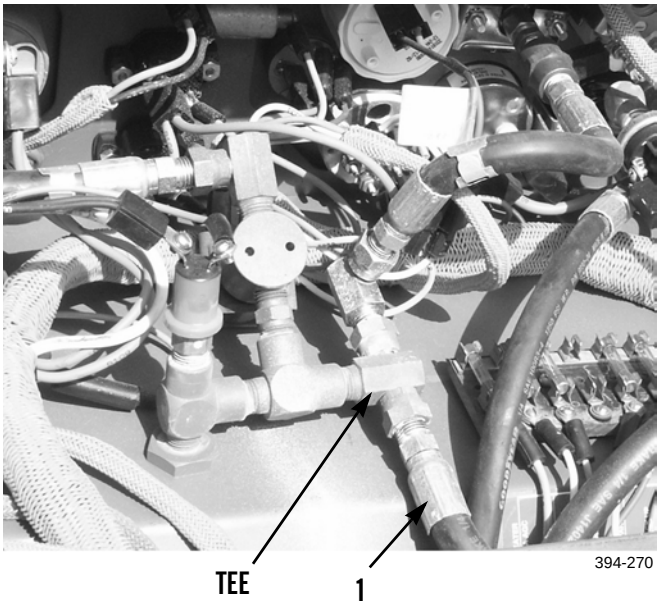
1. Disconnect hose assemblies (1 and 2) from park and emergency valve at rear of instrument panel.



PARK AND EMERGENCY VALVE HOSES AND FITTINGS REPLACEMENT - CONTINUED 0146 00

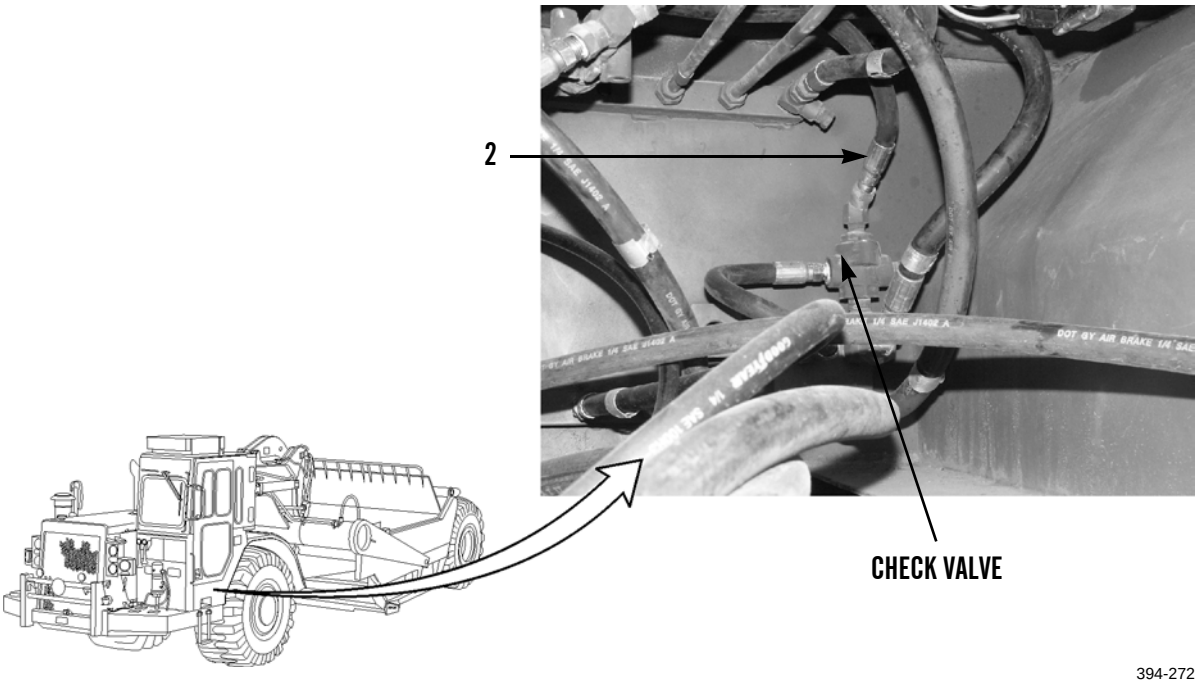
REMOVAL - CONTINUED

2. Disconnect hose assembly (1) from tee.



394-270

3. Disconnect hose assembly (2) from check valve under operator compartment.
4. Remove hose assembly (2) from machine.
5. If necessary, remove fittings from tee, check valve and park and emergency valve.



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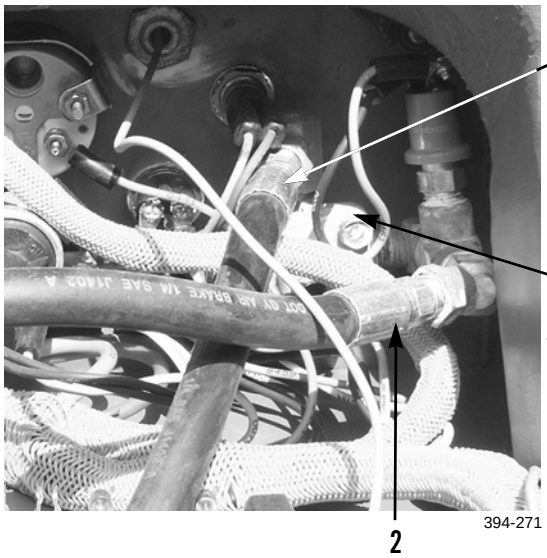
INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all pipe and hose connections prior to installation to ensure correct sealing.

1. If removed, install all fittings to tee, check valve and park and emergency valve.
2. Position hose assembly (2) on machine.
3. Connect hose assembly (2) to check valve under operator compartment.
4. Connect hose assembly (1) to tee.
5. Connect hose assemblies (1 and 2) to park and emergency valve at rear of instrument panel.



6. Install upper front access plates (WP 0192 00).
7. Install lower access plate (WP 0197 00).
8. Install step assembly (WP 0200 00).
9. Operate machine and verify correct operation of parking emergency brake (TM 5-3805-248-10).
10. Shut down engine (TM 5-3805-248-10).
11. Check for air system leaks.

END OF WORK PACKAGE

TRACTOR BRAKE CAMSHAFT AND SLACK ADJUSTOR MAINTENANCE 0147 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Grease, automotive and artillery, GAA (Item 20, WP 0339 00)

Rag, wiping (Item 33, WP 0339 00)

Materials/Parts - Continued

Bushing

Rivet (5)

Seal (3)

References

TM 5-3805-248-10

Equipment Condition

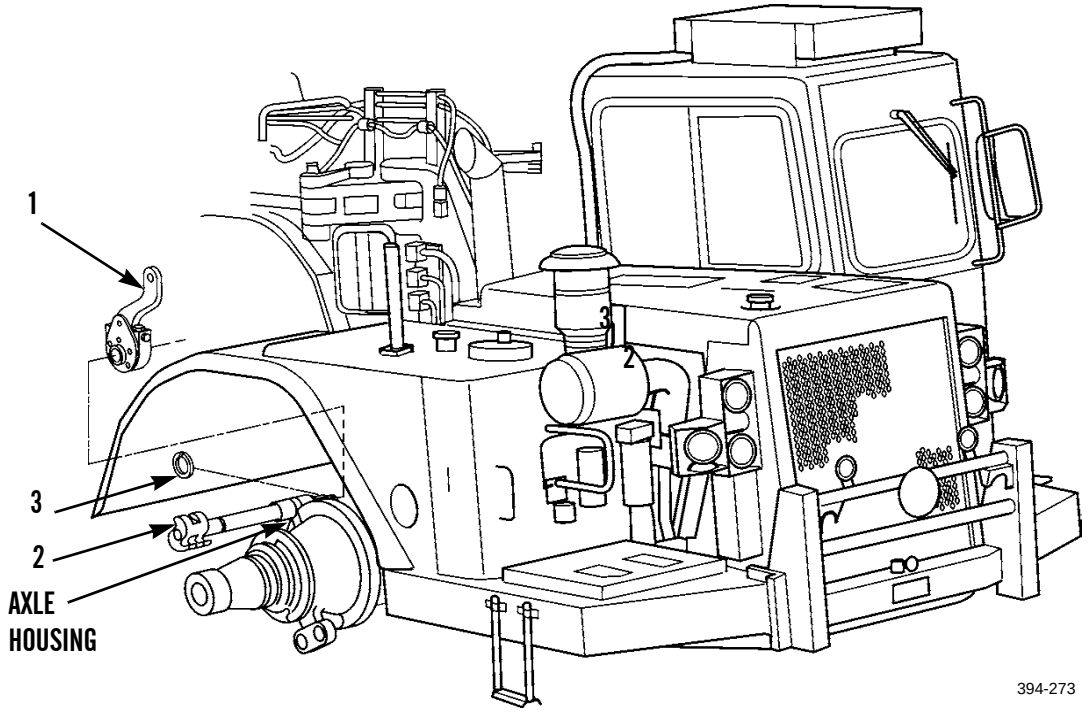
Brake actuator disconnected (WP 0151 00)

Tire and wheel removed (WP 0302 00)

Wheels chocked

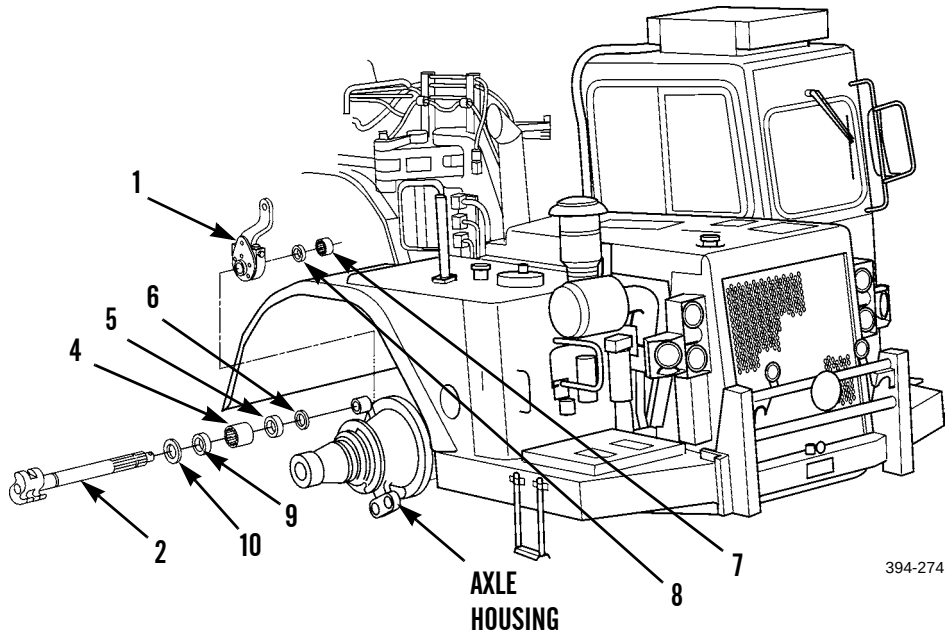
REMOVAL

1. Remove retaining ring (3).
2. Pull camshaft (2) out of axle housing.
3. Remove slack adjustor (1) assembly.



REMOVAL - CONTINUED

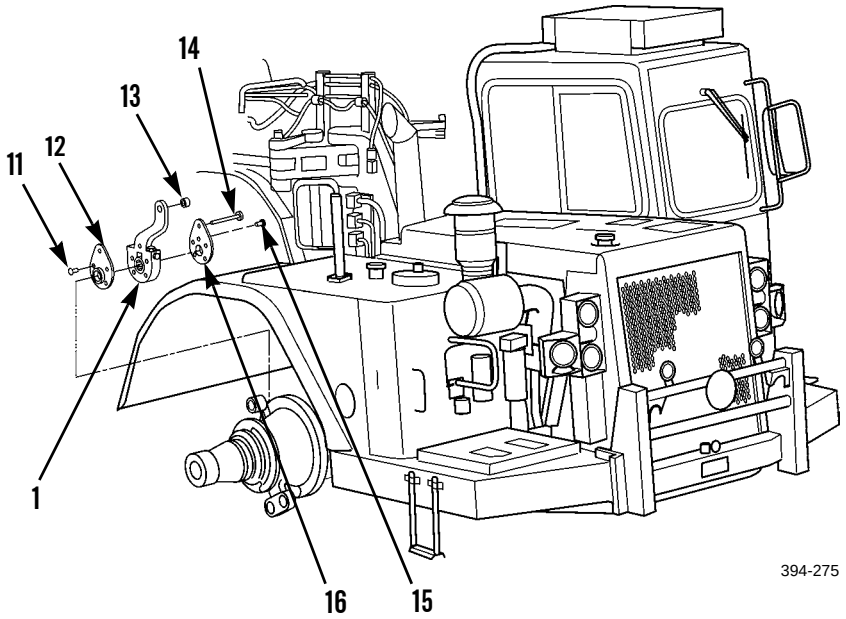
4. Remove seals (5 and 9), bearing (4) and washers (6 and 10). Discard seals.
5. Remove bearing (7) and seal (8) from axle housing assembly. Discard seal.



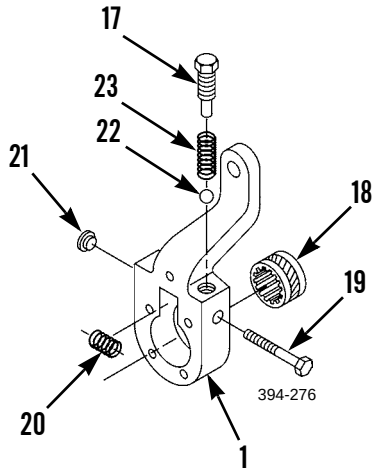
DISASSEMBLY

1. Remove bushing (13) from slack adjustor (1). Discard bushing.
2. Drill out five rivets (14). Discard rivets.
3. Remove covers (12 and 16) from slack adjustor (1).
4. Remove dust shields (11 and 15).

DISASSEMBLY - CONTINUED



5. Remove bushing insulator (17), spring (23) and ball (22).
6. Remove shaft (19), worm (20), gear (18) and expansion plug (21) from slack adjustor (1).



CLEANING AND INSPECTION

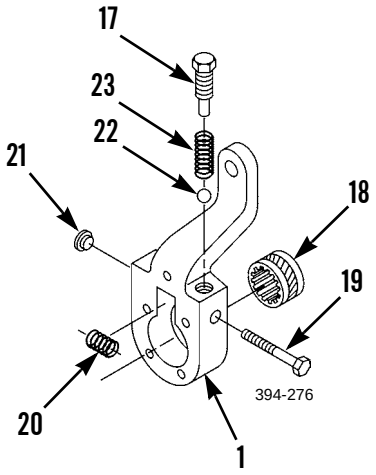
WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.

1. Clean metal parts of brake assembly with solvent cleaning compound. Do not use a metal brush on brake assembly or to apply the solvent cleaning compound.
2. Dry brake assembly using clean rags.
3. Clean brake assembly again using soap and water. Apply with a soft bristle brush or a cloth.

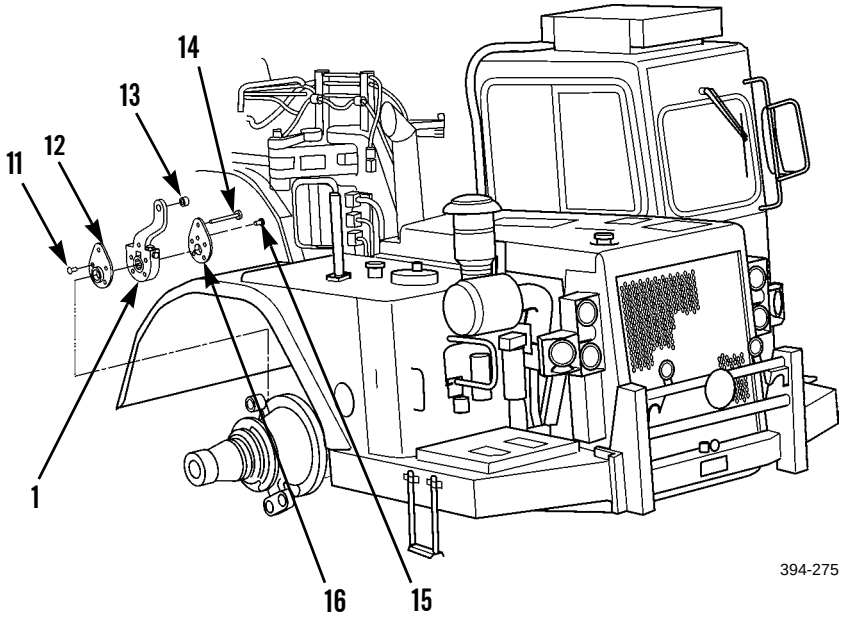
ASSEMBLY

1. Lubricate with grease and install expansion plug (21), gear (18), worm (20) and shaft (19).
2. Install ball (22), spring (23) and bushing insulator (17).



ASSEMBLY - CONTINUED

3. Install dust shields (11 and 15).
4. Position covers (12 and 16) on slack adjustor (1).
5. Install five new rivets (14).
6. Install new bushing (13) on slack adjustor (1).

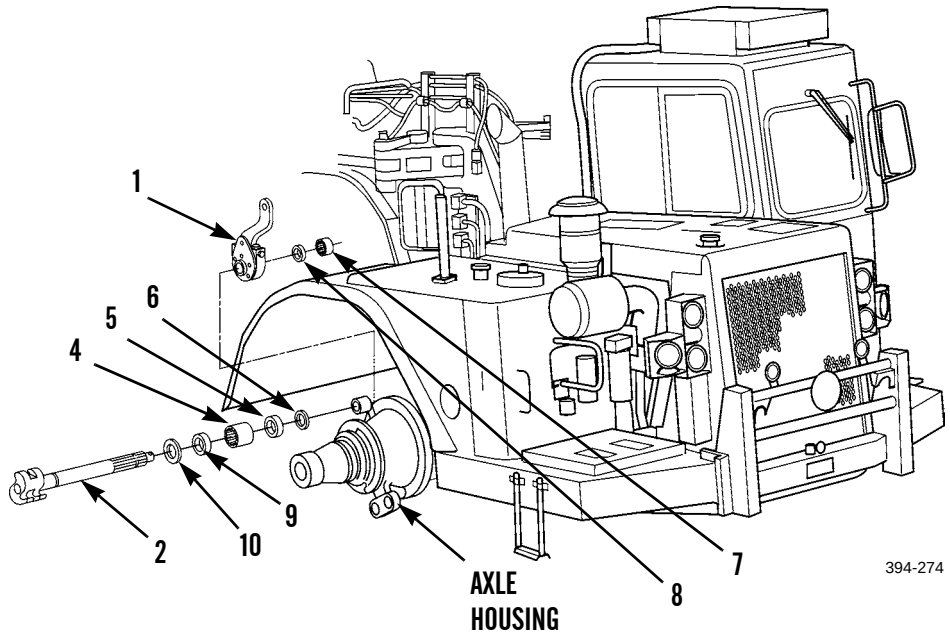


INSTALLATION

NOTE

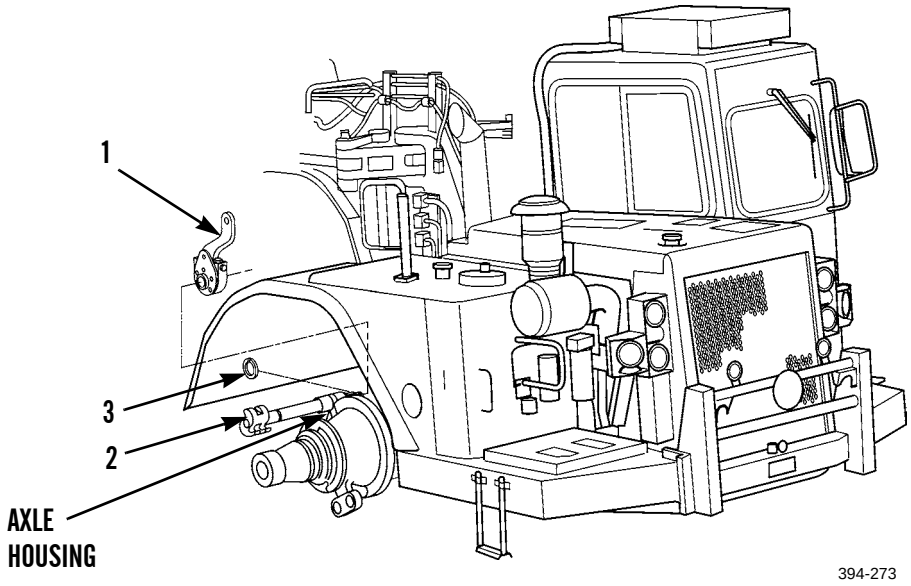
Install seals with lip toward differential case. Install even with surface of axle housing.

1. Install bearing (7) and new seal (8) in axle housing.
2. Install washers (6 and 10), seals (5 and 9), bearing (4) and camshaft (2) in axle housing.



INSTALLATION - CONTINUED

3. Install slack adjustor (1) assembly.
4. Install retaining ring (3).



5. Connect brake actuator (WP 0151 00).
6. Install tire and wheel (WP 0302 00).
7. Operate machine and verify correct operation of service brakes (TM 5-3805-248-10).

END OF WORK PACKAGE

SCRAPER BRAKE CAMSHAFT AND SLACK ADJUSTOR MAINTENANCE 0148 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Grease, automotive and artillery, GAA (Item 20, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Bushing

Rivet (5)

Seal (4)

Wood blocks 4" x 4" x 8"

References

TM 5-3805-248-10

Equipment Condition

Brake actuator disconnected (WP 0151 00)

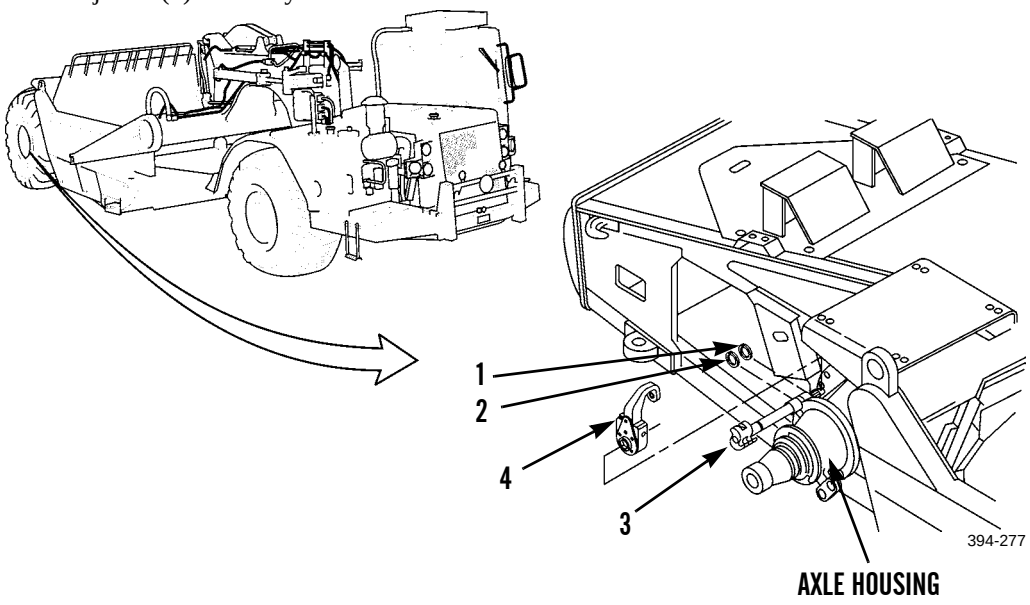
Tire and wheel removed (WP 0303 00)

REMOVAL

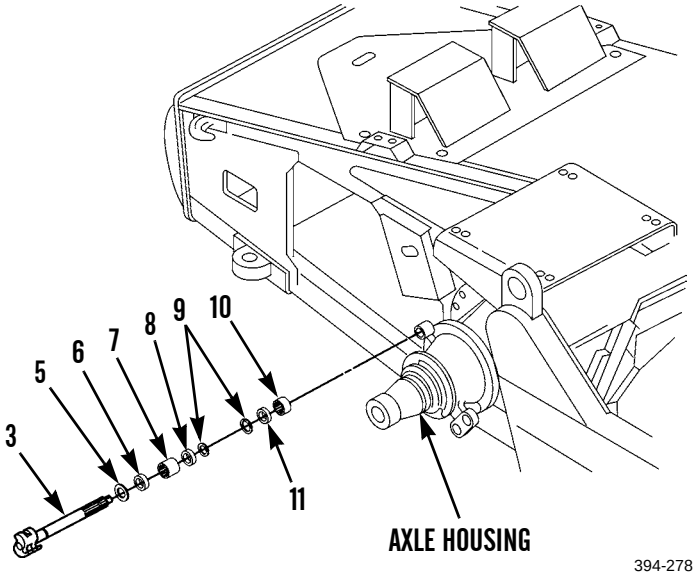
NOTE

Brake shoes must be held in position during camshaft and slack adjustor removal. Place wood blocks between brake shoes and axle housing before performing this task.

1. Remove retaining rings (1 and 2).
2. Pull camshaft (3) out of axle housing.
3. Remove slack adjustor (4) assembly.

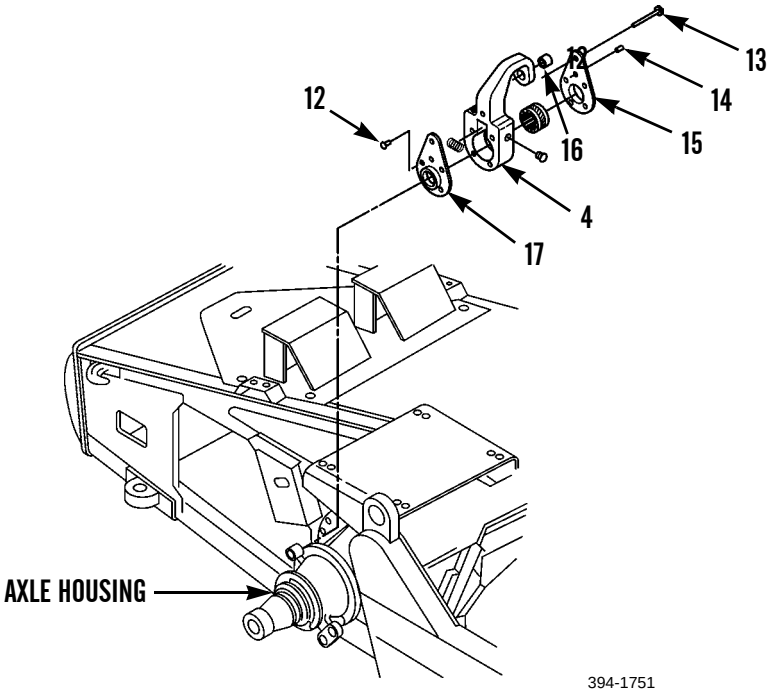


4. Remove camshaft (3) and washers (5 and 9) from axle housing.
5. Remove seals (6, 8 and 11) and bearings (7 and 10) from axle housing. Discard seals.

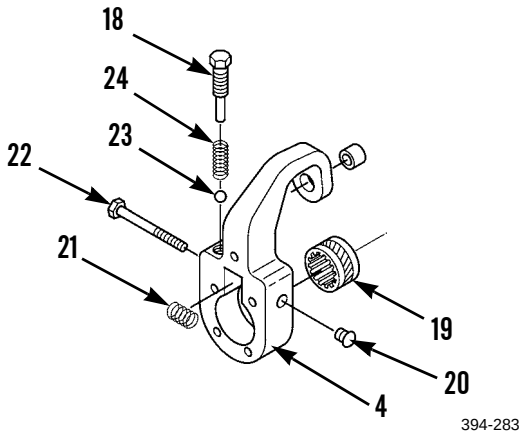


DISASSEMBLY

1. Remove bushing (16) from slack adjustor (4). Discard bushing.
2. Drill out five rivets (13).
3. Remove covers (15 and 17) from slack adjustor (4).
4. Remove dust shields (12 and 14).



5. Remove bushing insulator (18), spring (24) and ball (23).
6. Remove shaft (22), worm (21), gear (19) and expansion plug (20) from slack adjustor (4).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean metal parts of brake assembly with solvent cleaning compound. Do not use a metal brush on brake assembly or to apply the solvent cleaning compound.
2. Dry brake assembly using clean rags.
3. Clean brake assembly again using soap and water. Apply with a soft bristle brush or a cloth.

ASSEMBLY

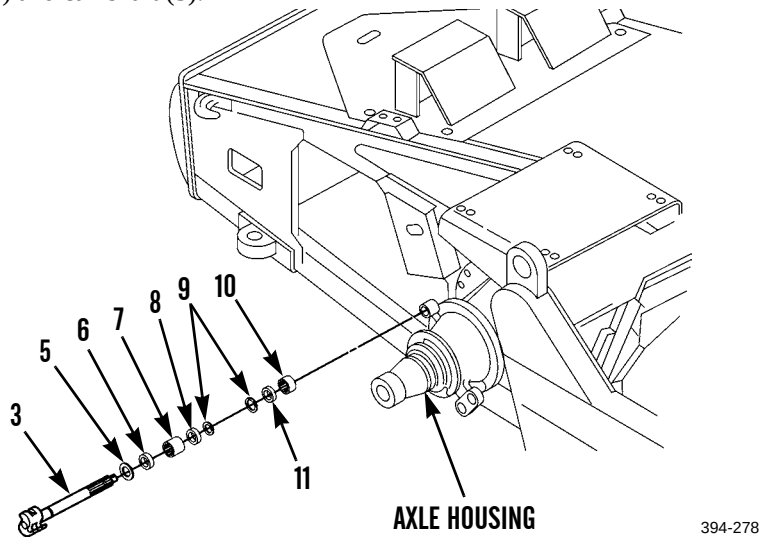
1. Lubricate with grease and install expansion plug (20), gear (19), worm (21) and shaft (22).
2. Install ball (23), spring (24) and bushing insulator (18).
3. Install dust shields (12 and 14).
4. Position covers (15 and 17) on slack adjustor (4).
5. Install five new rivets (13).
6. Install new bushing (16) on slack adjustor (4).

INSTALLATION

NOTE

Install seals with lip toward differential case. Install even with surface of axle housing.

1. Install bearings (7 and 10) and new seals (6, 8 and 11) in axle housing.
2. Install washers (5 and 9) and camshaft (3).



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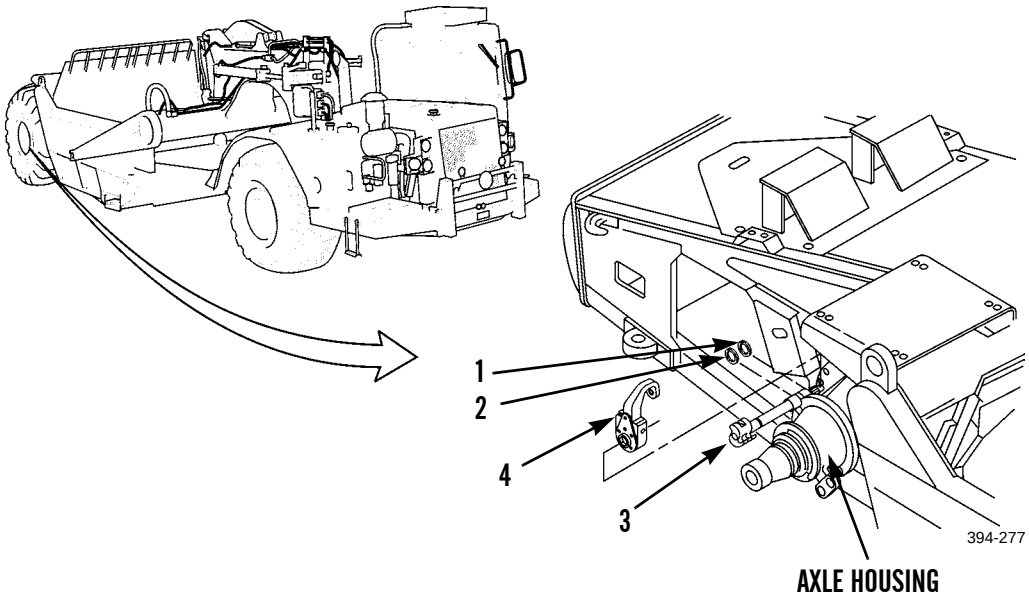
INSTALLATION - CONTINUED

3. Install slack adjustor (4) assembly.
4. Push camshaft (3) inside axle housing.
5. Install retaining rings (1 and 2).



6. Connect brake actuator (WP 0151 00).
7. Install tire and wheel (WP 0303 00).
8. Operate machine and verify correct operation of service brakes (TM 5-3805-248-10).

END OF WORK PACKAGE

ADJUSTMENT OF BRAKES 0149 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

ADJUSTMENT

NOTE

The following procedure is for the right brake. The maintenance procedures for the other brakes are identical.

1. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).

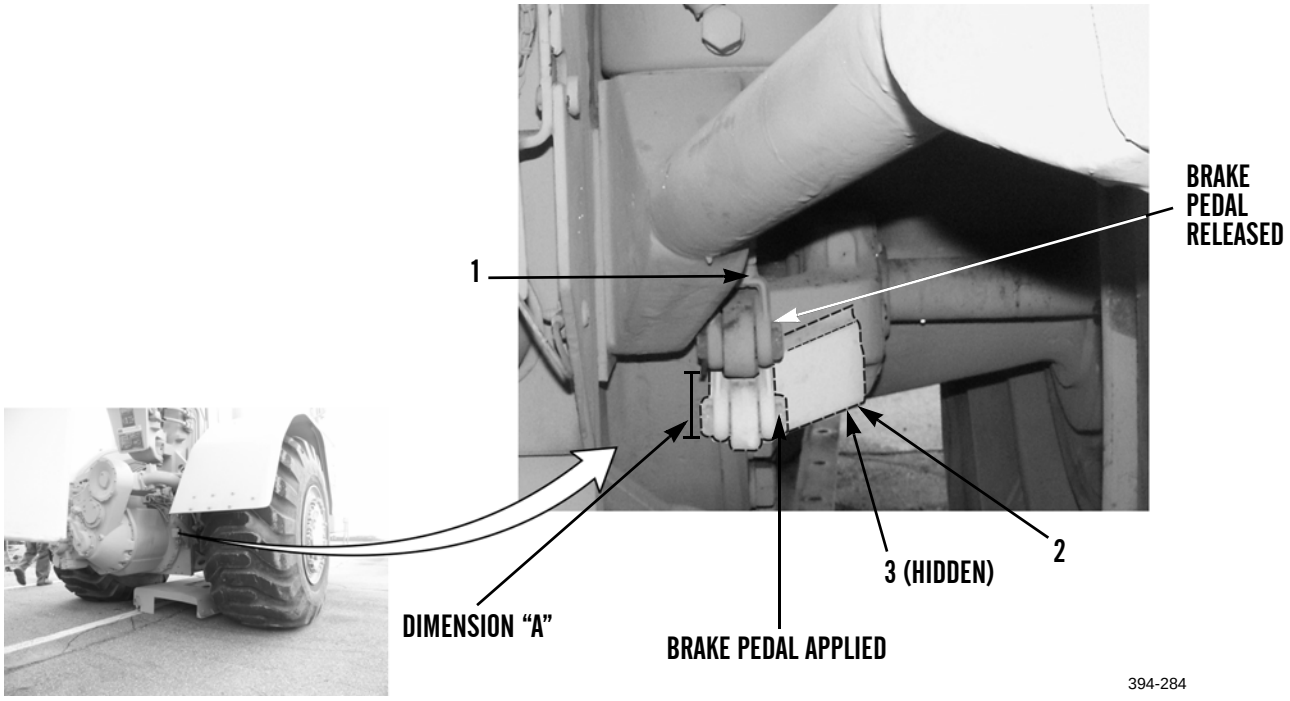
WARNING

Make sure transmission is not engaged while engine is running and parking brake remains applied. Failure to follow this procedure may cause injury.

ADJUSTMENT OF BRAKES - CONTINUED 0149 00

ADJUSTMENT - CONTINUED

2. With assistance, measure brake actuator rod travel distance (A). Start with brake pedal released then apply and hold brake pedal. If brake actuator rod movement is less than 2.5 in. (66 mm), brake adjustment is not necessary.



NOTE

Perform the following steps only if rod movement is more than 2.5 in. (66 mm).

3. Loosen screw (2).
4. Rotate shaft (3) clockwise approximately 1/2 turn.
5. Repeat steps 2 through 5 until brake actuator rod (1) travel is 1.62 in. (41 mm).
6. Tighten screw (2).
7. Operate machine and verify correct operation of service brakes (TM 5-3805-248-10).

END OF WORK PACKAGE

BRAKE SHOE ASSEMBLY REPLACEMENT 0150 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Washer, felt (4)

Wire, lock

Personnel Required

Two

References

TM 5-3805-248-10

WP 0149 00

Equipment Condition

Tire and wheel removed (WP 0302 00 or WP 0303 00)

Wheels chocked

REMOVAL

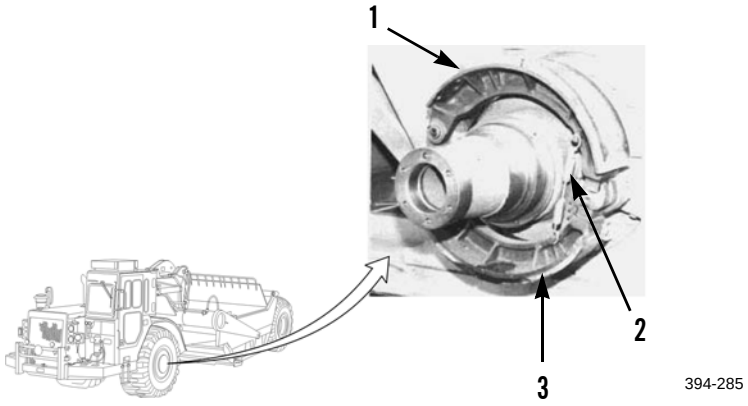
WARNING

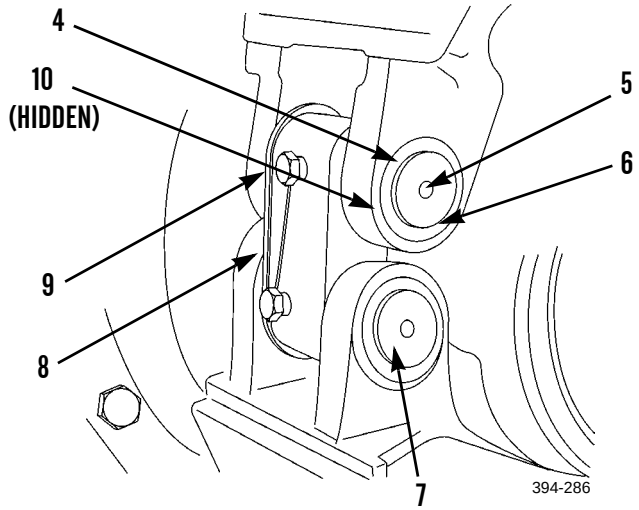
A dust mask is required when working on brake system. Follow the cleaning procedure in this task before removal to prevent the possibility of airborne fibers. Failure to follow this warning may result in injury or death.

NOTE

The following maintenance procedure is for the left tractor brake. The replacement procedures for the other brakes are identical.

1. Remove spring (2) from left brake of tractor.
2. Remove and discard lock wire (8) by cutting.
3. Remove two bolts (9).
4. Remove two lock springs (4).
5. Remove two spacer rings (6) and felt washers (10). Discard felt washers.





REMOVAL - CONTINUED

WARNING

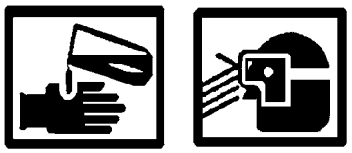
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure any lifting device used is in good condition of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

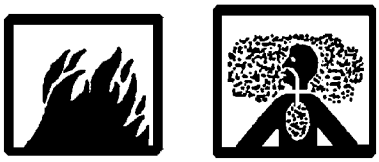
Each brake shoe weighs 45 lb (20 kg).

6. Remove pin (5) and brake shoe (1) from machine.
7. Remove pin (7) and brake shoe (3) from machine.

CLEANING AND INSPECTION



WARNING



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- Dust mask is required when cleaning brakes.

1. Clean metal parts of brake assembly with solvent cleaning compound. Do not use a metal brush on brake assembly or to apply the solvent cleaning compound.
2. Dry brake assembly using clean rags.
3. Clean brake assembly again using soap and water. Apply with a soft bristle brush or a cloth.

INSTALLATION

1. Install pin (5) and brake shoe (1).
2. Install pin (7) and brake shoe (3).
3. Install two new felt washers (10) and spacer rings (6) on pins (5 and 7).
4. Install two lock springs (4) on pins (5 and 7).
5. Install two bolts (9).
6. Install new lock wire (8).
7. Install spring (2).
8. Install tire and wheel (WP 0302 00 or WP 0303 00).
9. Adjust brakes (WP 0149 00).
10. Operate machine and verify correct operation of brakes (TM 5-3805-248-10).

END OF WORK PACKAGE

BRAKE ACTUATOR REPLACEMENT 0151 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Cotter pin

References

WP 0149 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Wheels chocked

REMOVAL

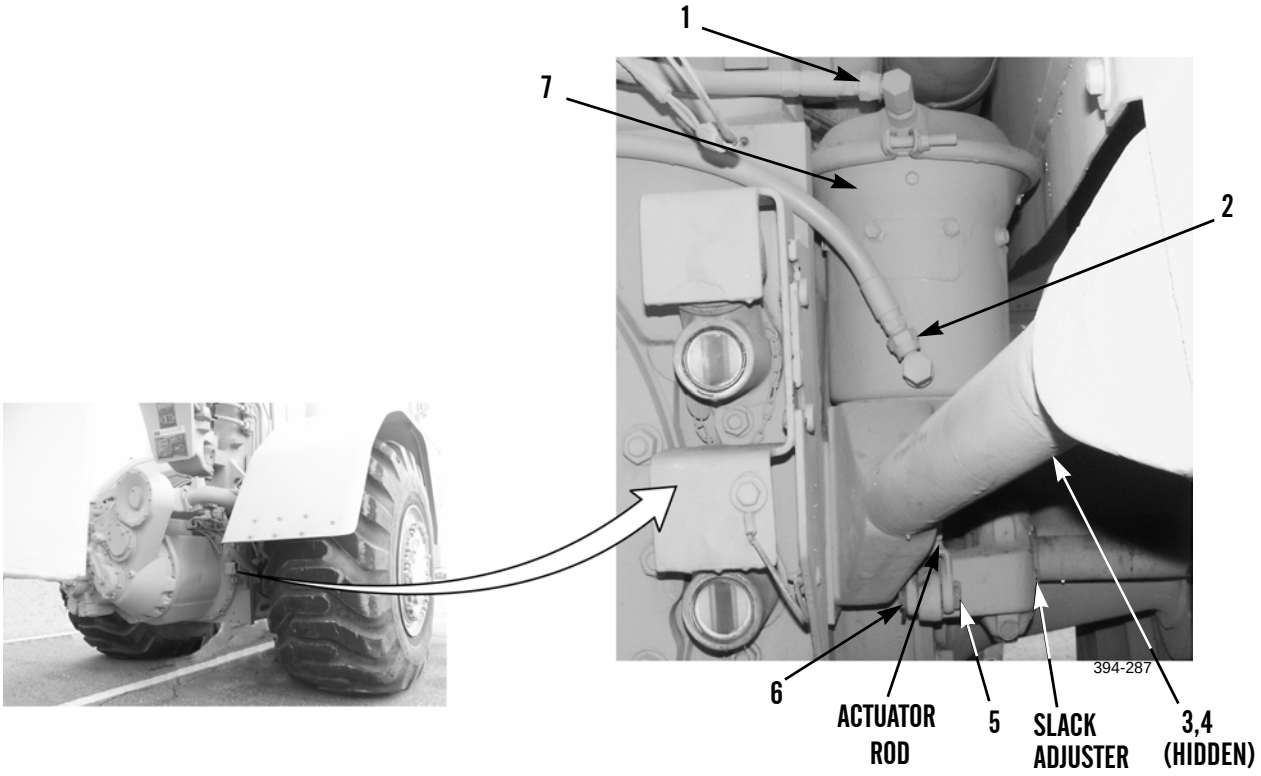
CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of fuel system could result in premature failure.

NOTE

- The following maintenance procedure is for the brake actuator assembly for the right wheel. The replacement procedures for all other brake actuator assemblies are identical.
- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Run engine until normal air pressure is reached (TM 5-3805-248-10) to retract actuator rod.
2. Remove cotter pin (6) and pin (5). Discard cotter pin.
3. Drain air tanks (TM 5-3805-248-10).
4. Disconnect two hose assemblies (1 and 2) from actuator (7).
5. Remove two nuts (3) and washers (4).
6. Remove brake actuator (7) from machine.



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CLEANING AND INSPECTION

WARNING

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.

1. Clean all parts with solvent cleaning compound.
2. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose connections prior to installation to ensure correct sealing.

1. Install brake actuator (7) on machine.
2. Install two washers (4) and nuts (3). Torque two nuts to 130 lb-ft (176 Nm).
3. Connect two hose assemblies (1 and 2).
4. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10) to retract actuator rod.
5. Release parking brake (TM 5-3805-248-10).
6. Align slack adjustor with actuator rod at 50 percent of stroke.
7. Install pin (5) and new cotter pin (6).

NOTE

Actuator rod should not bottom out on piston during stroke. Service brakes must be adjusted with rod as short as possible without brake shoes dragging.

8. Ensure that actuator rod does not bottom out with brake pedal released or applied.
9. Adjust brakes (WP 0149 00).
10. Operate machine and verify correct operation of brakes (TM 5-3805-248-10).

END OF WORK PACKAGE

AIR DRYER REPLACEMENT 0152 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Battery cables disconnected (WP 0104 00)

Air tanks drained (TM 5-3805-248-10)

WARNING

Ensure the battery cables are disconnected before performing this replacement. Failure to follow this warning may result in personal injury or damage to equipment.

REMOVAL

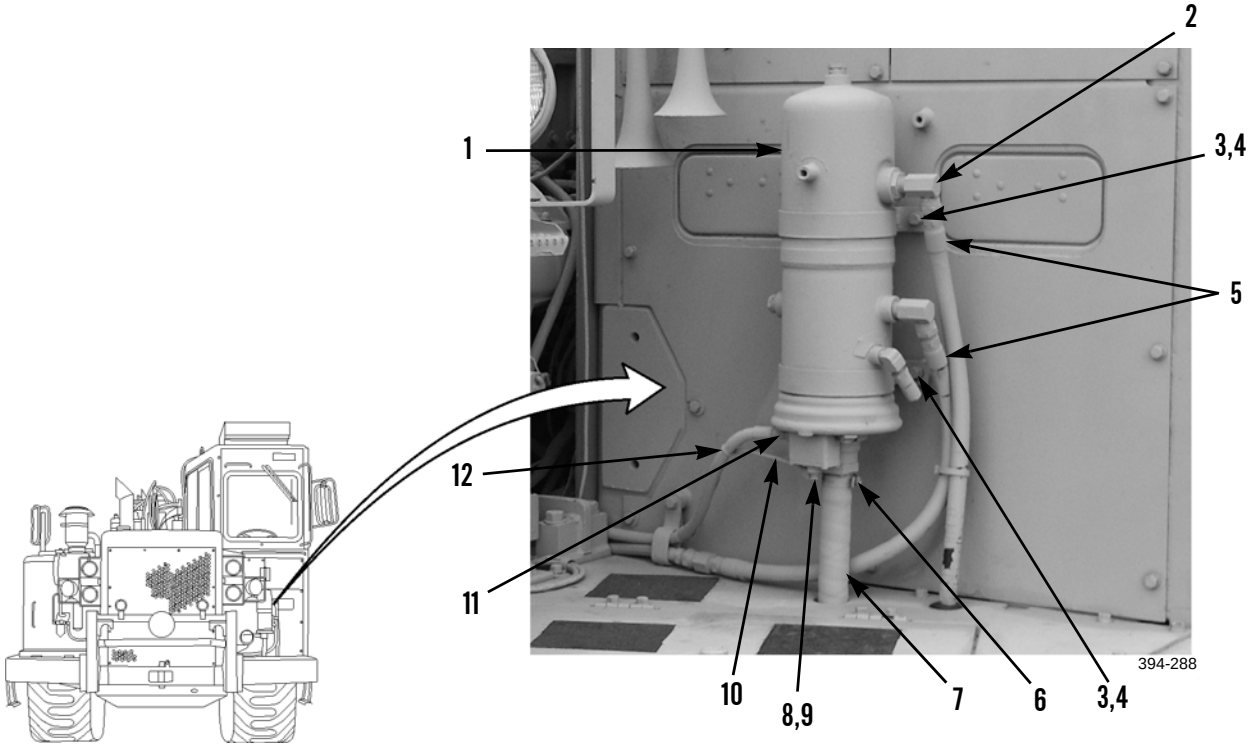
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Disconnect two hose assemblies (5) and elbows (2) from air dryer (1).
2. Loosen clamp (6).
3. Disconnect hose (7) from air dryer (1).
4. Remove clamp (6) from hose (7).
5. Disconnect hose (12) and remove coupling (11) from air dryer (1).
6. Remove nut (8) from air dryer (1).
7. Disconnect wire connector (10).
8. Remove washer (9) from bottom of air dryer (1).
9. Remove four bolts (3), washers (4) and air dryer (1).



INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose connections prior to installation to ensure correct sealing.

1. Install air dryer (1), four washers (4) and bolts (3).
2. Install two elbows and coupling (11).
3. Connect hose assembly (12) to air dryer (1).
4. Install washer (9), connect wire connector (10) and install nut (8) on bottom of air dryer (1).
5. Install clamp (6) loosely on hose (7).
6. Connect hose (7) to air dryer (1).
7. Tighten clamp (6).
8. Connect two hose assemblies (5) to air dryer (1).
9. Connect battery cables (WP 0104 00).
10. Operate machine and verify correct operation of park emergency brake (TM 5-3805-248-10).
11. Shut down engine (TM 5-3805-248-10).
12. Check for air system leaks.

END OF WORK PACKAGE

TRACTOR AIR TANKS AND LINES AND FITTINGS REPLACEMENT 0153 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0182 00

WP 0200 00

Personnel

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air tanks drained (TM 5-3805-248-10)

REMOVAL

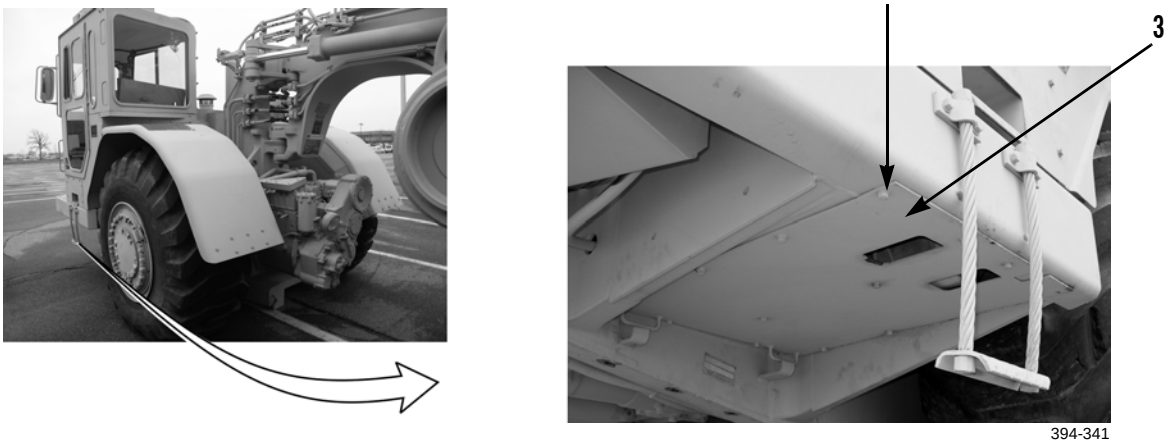
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Air tanks and access cover as an assembly weighs 90 lb (40 kg).

1. Remove twelve bolts (1), washers (2) and lower tractor air tank access cover (3) to gain access to fittings.



CAUTION

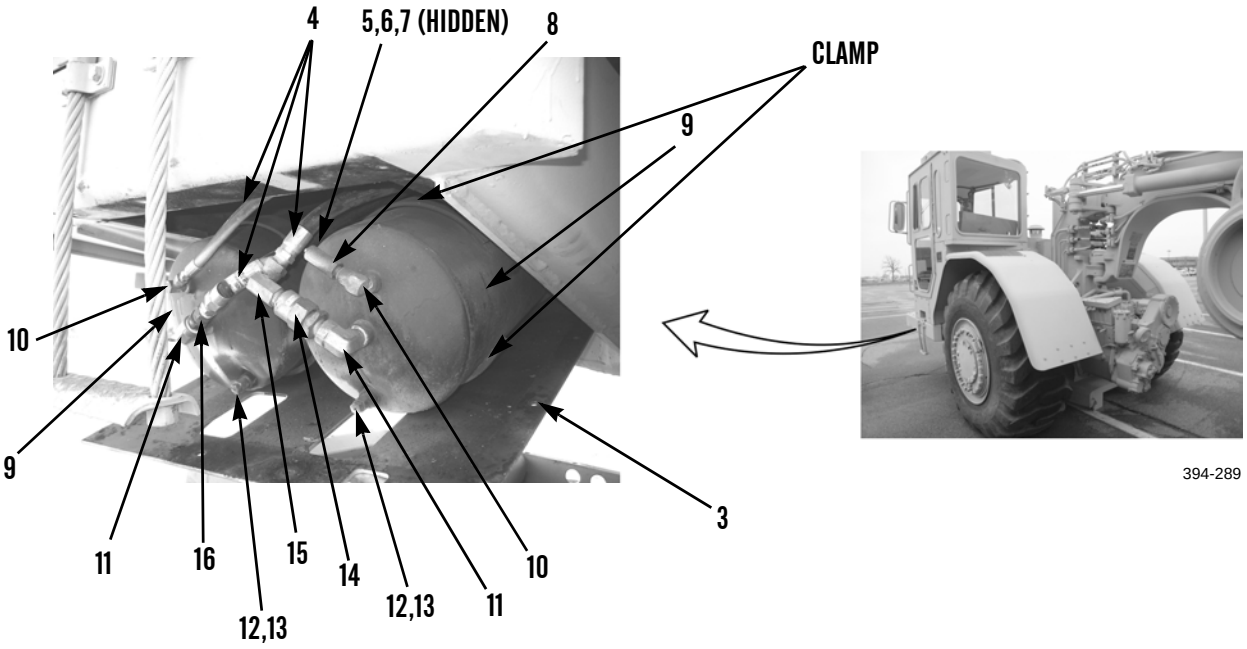
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnect lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

REMOVAL - CONTINUED

2. Disconnect three hose assemblies (4) from front of two tractor air tanks (9).



NOTE

Perform steps 3 through 8 only if fittings must be replaced. Otherwise, proceed to step 10.

3. If necessary, remove pipe reducer (16) from front of air tank (9).
4. If necessary, remove elbow (15) from front of air tank (9).
5. If necessary, remove check valve (14) from front of air tank (9).
6. If necessary, remove safety relief valve (8) from front of air tank (9).
7. If necessary, remove two elbows (10 and 11) from front of two air tanks (9).
8. If necessary, remove two valves (12) and valve bodies (13) from front of two air tanks (9).

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

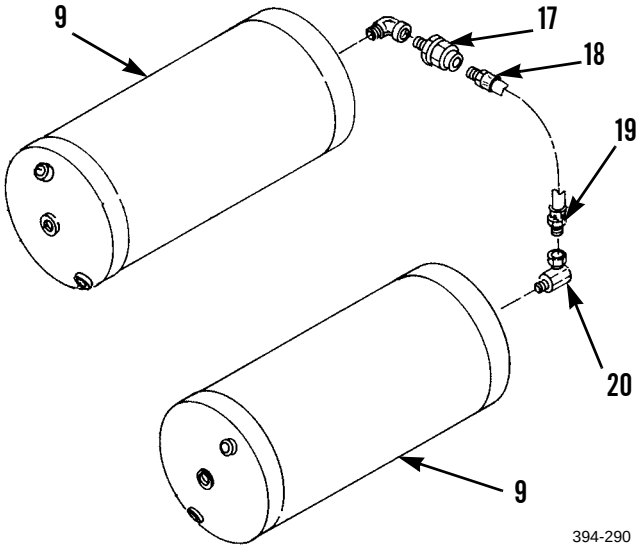
NOTE

Air tanks and access cover as an assembly weighs 90 lb (40 kg).

9. With assistance, remove cover (3) and tanks (9) as an assembly from the machine.
10. Remove two bolts (5), nuts (6), washers (7) and two clamps.

REMOVAL - CONTINUED

11. Remove two air tanks (9) from cover (9).
12. Remove hose (19) from rear two tractor air tanks (9).
13. Remove valve (18) from rear of tractor air tank (9).
14. Remove elbows (17 and 20) from rear of two tractor air tanks (9).

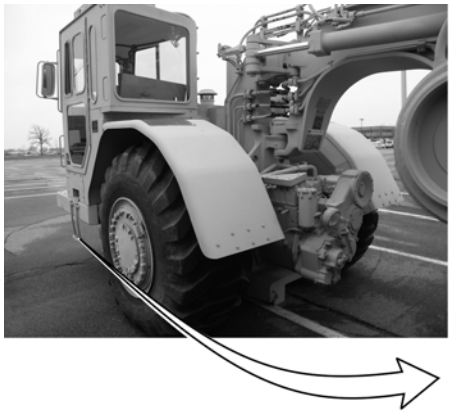


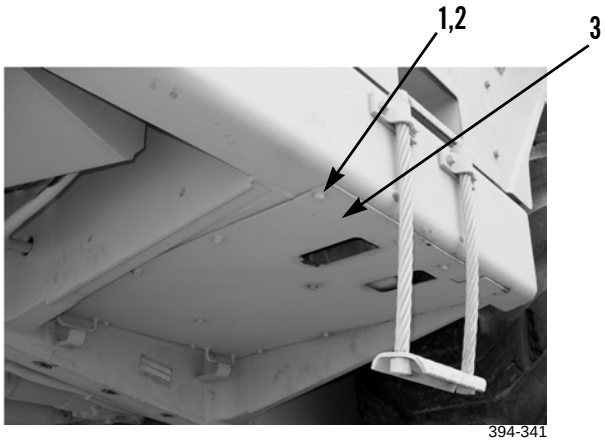
INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Install elbows (17 and 20) on rear of two tractor air tanks (9).
2. Install valve (18) on rear of tractor air tank (1).





3. Install hose (19) on rear of tractor air tanks (1 and 8).
4. Install two clamp assemblies, air tanks (9), bolts (5), washers (7) and nuts (6) on cover (3).

INSTALLATION - CONTINUED

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

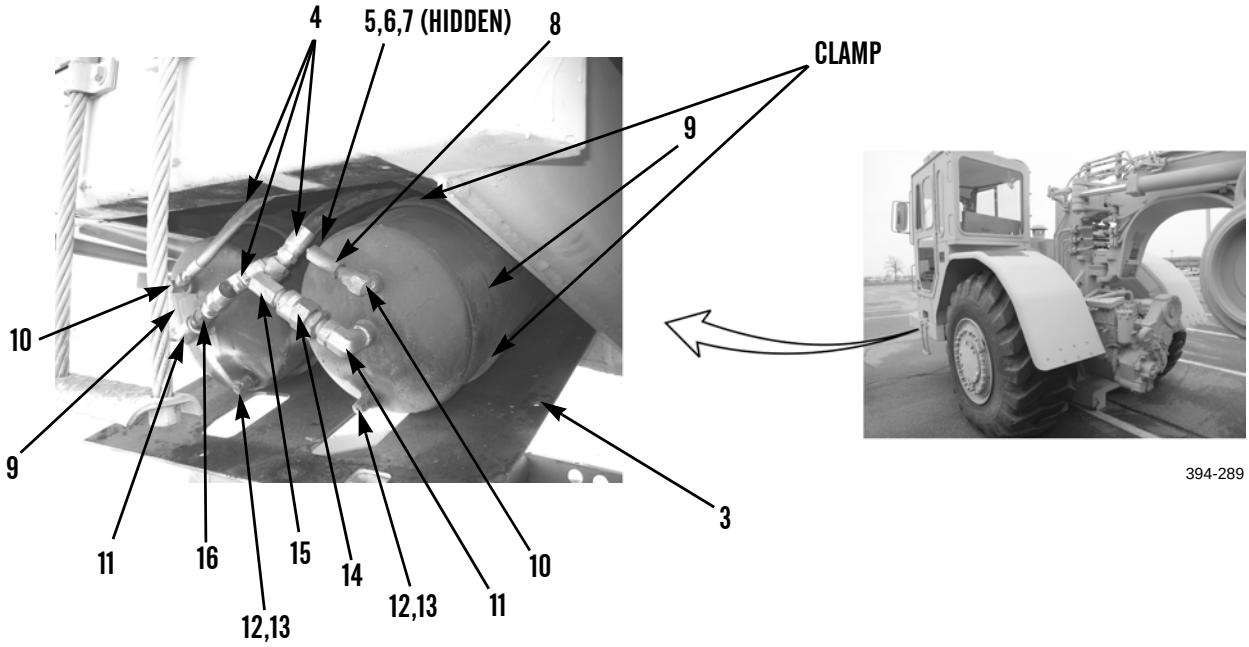
Air tanks and access cover as an assembly weighs 90 lb (40 kg).

5. With assistance, position cover (3) and two tanks (9) assembly on pivot points underneath machine.

NOTE

Perform steps 6 through 11 only if fittings were removed. Otherwise, proceed to step 12.

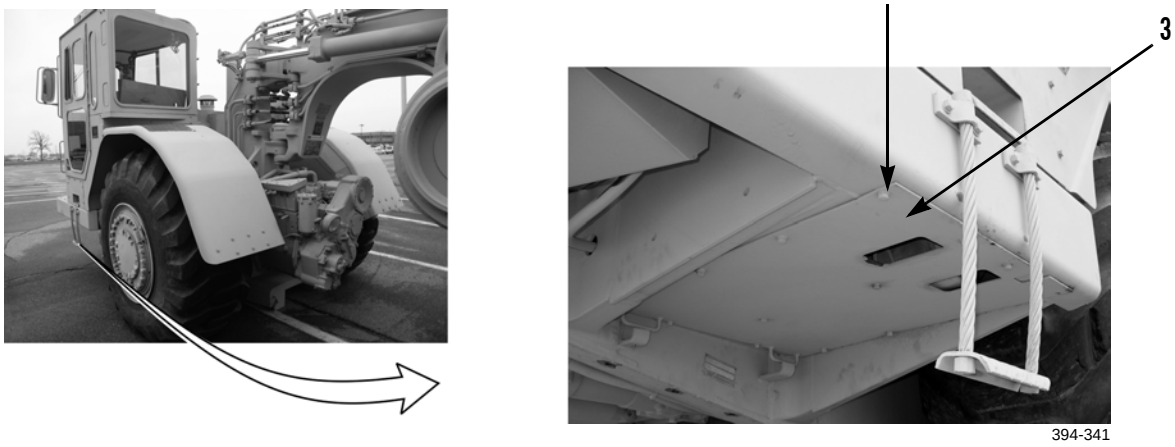
6. If removed, install two valve bodies (13) and valves (12) on front of two air tanks (9).
7. If removed, install two elbows (10 and 11) on front of two air tanks (9).
8. If removed, install safety relief valve (8) on front of air tank (9).
9. If removed, install check valve (14) on front of air tank (9).
10. If removed, install elbow (15) on front of air tank (9).



11. If removed, install pipe reducer (16) on front of air tank (9).
12. Connect three hose assemblies (4) on front of two tractor air tanks (9).

INSTALLATION - CONTINUED

13. Install air tank access cover (3), 12 washers (2), and bolts (1).



14. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
15. Shut down engine (TM 5-3805-248-10).
16. Inspect air tanks and hose assemblies for air leaks.
17. Install step assembly on left side of machine (WP 0200 00).

END OF WORK PACKAGE

SCRAPER AIR TANK REPLACEMENT 0154 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

Wheels chocked

REMOVAL

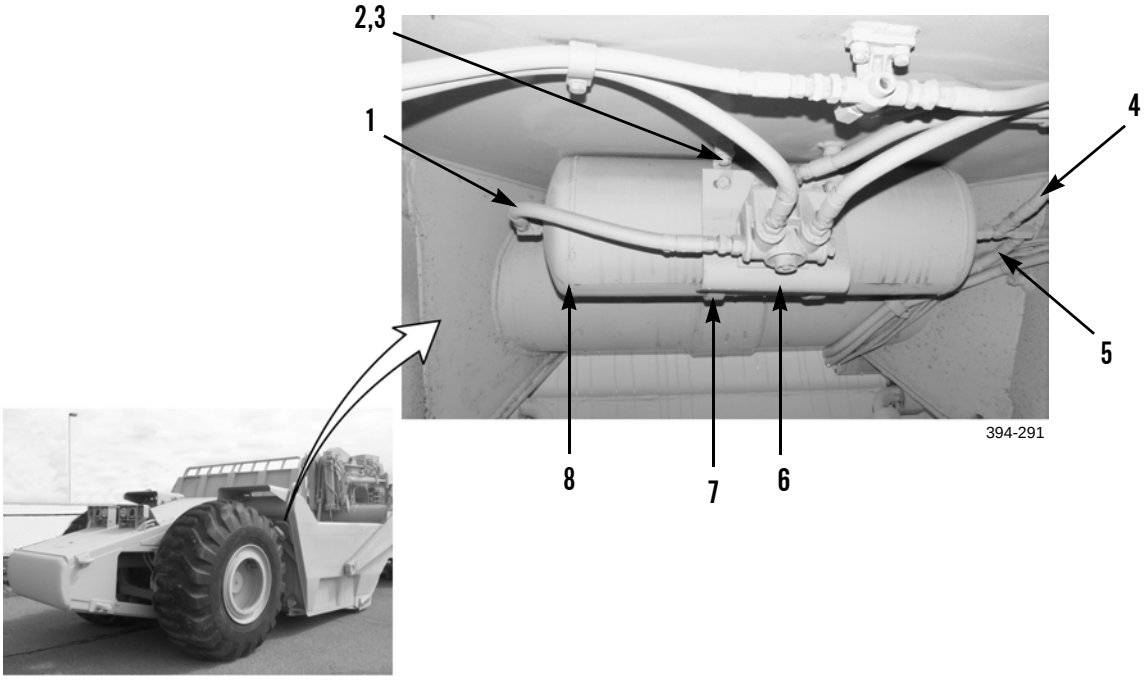
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

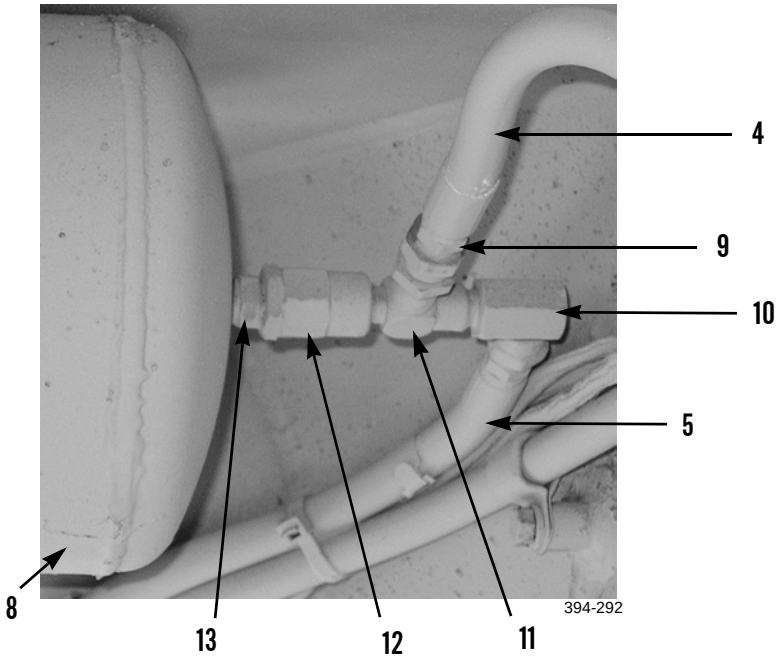
Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Disconnect hose assemblies (1, 4 and 5) from air tank (8) in center rear of scraper.
2. Use an assistant to support air tank (8), remove four bolts (2) and washers (3).
3. Position bracket (6) and two clamps (7) aside.
4. Remove air tank (8) from scraper.

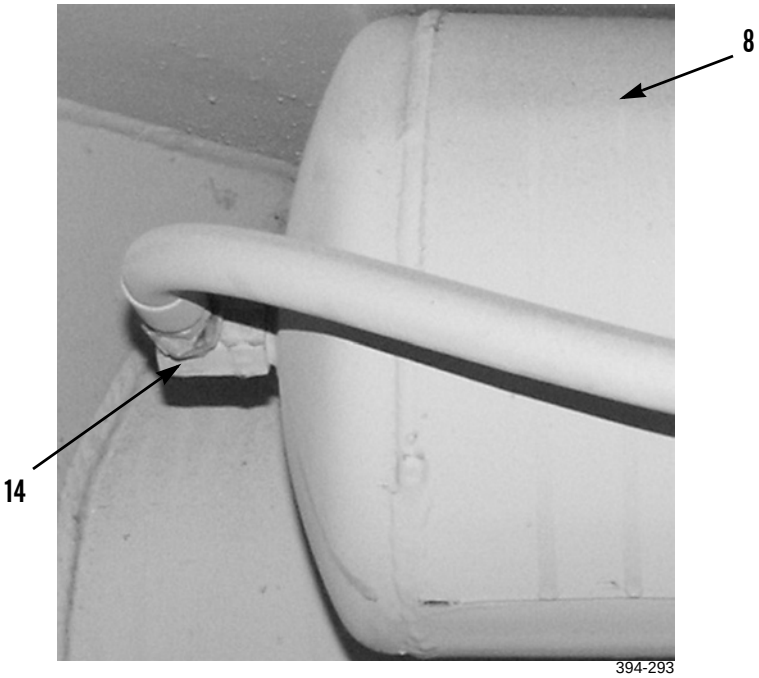


REMOVAL - CONTINUED

5. If necessary, remove elbow (10) and pipe reducer (9) from tee (11).
6. If necessary, remove tee (11) from check valve (12).
7. If necessary, remove check valve (12) and bushing (13) from air tank (8).

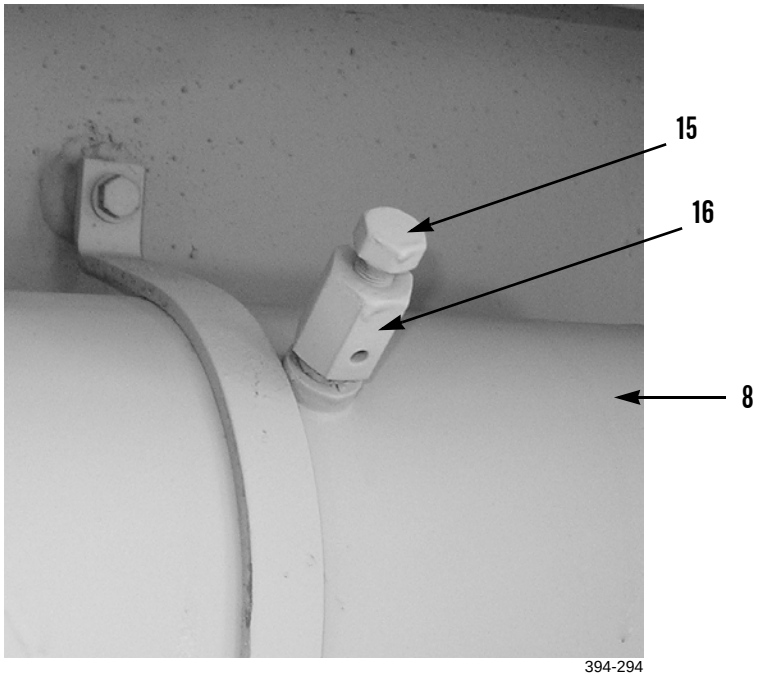


8. If necessary, remove elbow (14) from air tank (8).



REMOVAL - CONTINUED

9. If necessary, remove screw (15) and valve body (16) from air tank (8).



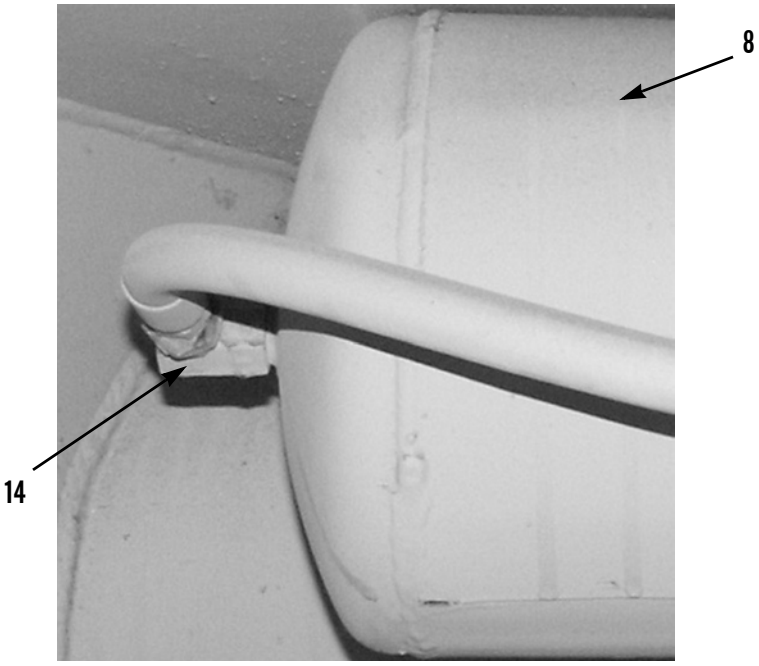
394-294

INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

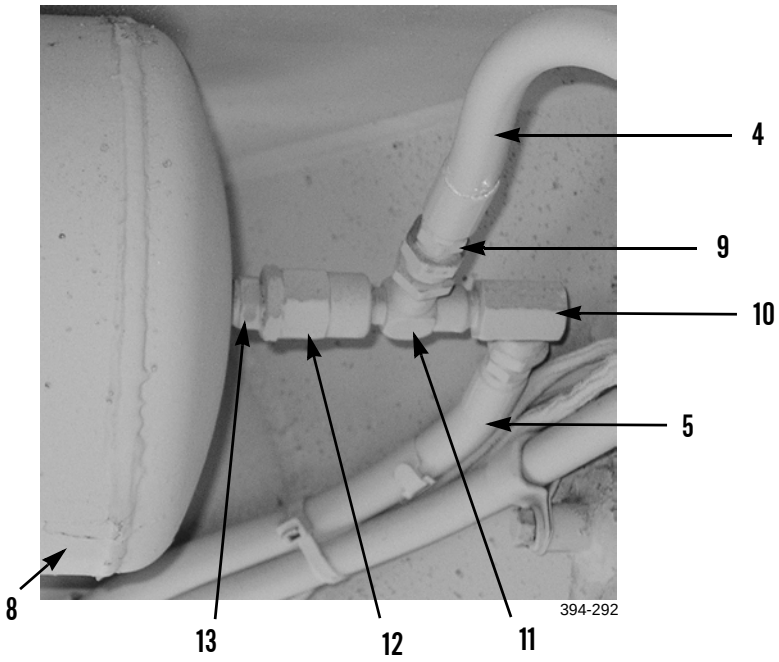
1. If removed, install valve body (16) and screw (15) in air tank (8).
2. If removed, install elbow (14) in air tank (8).



394-293

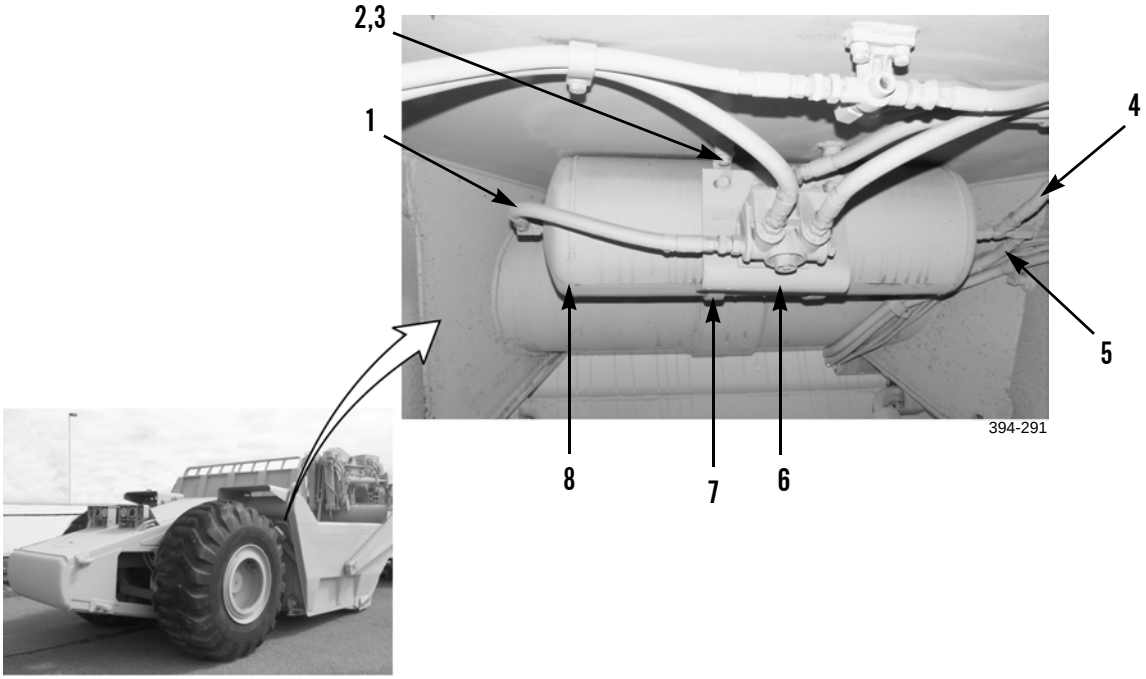
INSTALLATION - CONTINUED

3. If removed, install bushing (13) and check valve (12).
4. If removed, install tee (11) in check valve (12).
5. If removed, install pipe reducer (9) and elbow (10) in tee (11).



INSTALLATION - CONTINUED

6. Position air tank (8) in scraper and install two clamps (7), bracket (6), four washers (3) and bolts (2).
7. Connect hose assemblies (1, 4 and 5) to air tank (8).



8. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
9. Shut down engine (TM 5-3805-248-10).
10. Check for air system leaks.

END OF WORK PACKAGE

BRAKE PEDAL AND CONTROL VALVE REPLACEMENT 0155 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Materials/Parts - Continued

Cotter pin (2)

References

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Stoplight switch removed (WP 0096 00)

Floor mat removed (WP 0198 00)

Step assembly removed (WP 0200 00)

REMOVAL

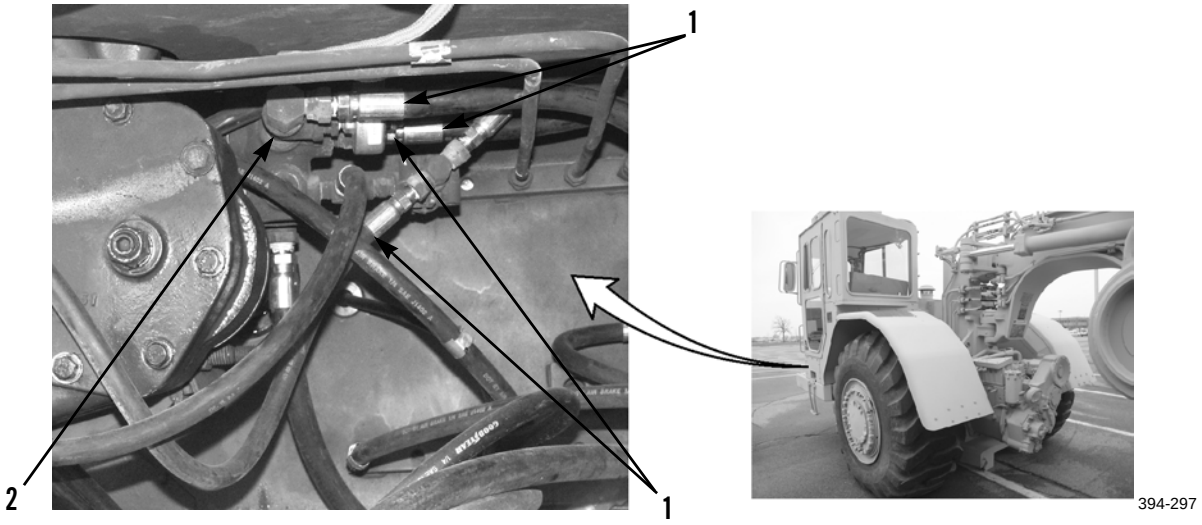
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

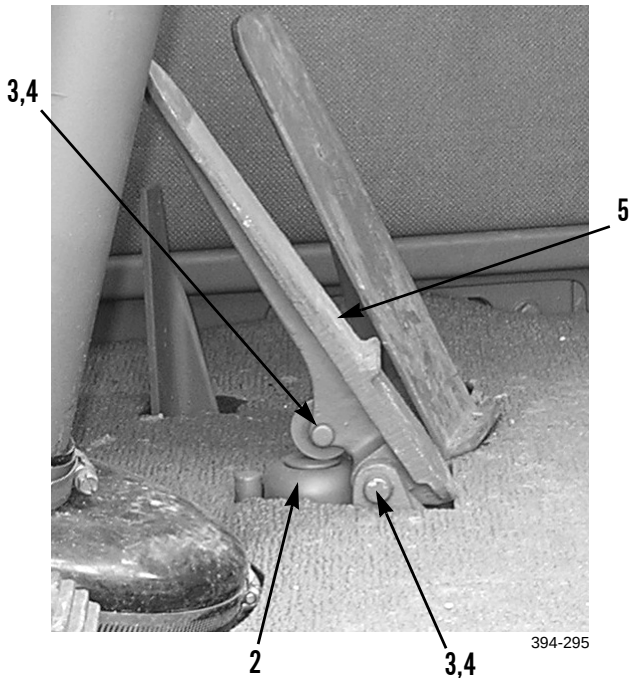
NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Disconnect eight hose assemblies (1) from brake control valve (2) beneath operator compartment.

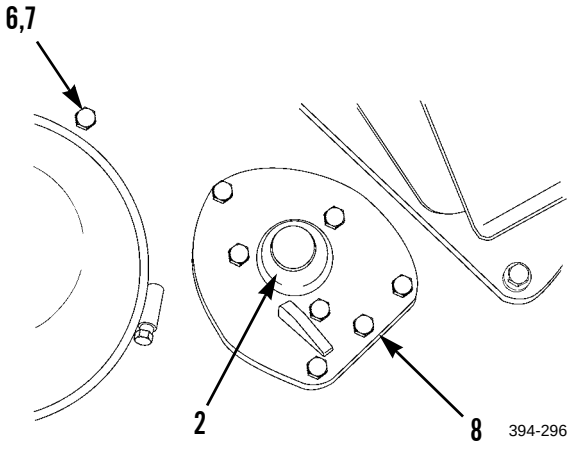


2. Remove two cotter pins (3), pins (4) and brake pedal (5) from inside operator compartment. Discard cotter pins.



REMOVAL - CONTINUED

3. Use assistant to support brake control valve (2) beneath operator compartment and remove six bolts (6) and washers (7) and plate (8) from operator compartment floor.
4. Remove brake control valve (2) from beneath operator compartment.



INSTALLATION

1. With assistance, position brake control valve (2) from beneath operator compartment and install plate (8), six washers (7) and bolts (6).

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

2. Connect eight hose assemblies (1) to brake control valve (2) beneath operator compartment.
3. Install brake pedal (5), two pins (4) and new cotter pins (3) inside operator compartment.
4. Install stoplight switch (WP 0096 00).
5. Install floor mat (WP 0198 00).
6. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
7. Shut down engine (TM 5-3805-248-10).
8. Check for air system leaks.
9. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

TRACTOR QUICK RELEASE AND HOLDING VALVE REPLACEMENT 0156 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

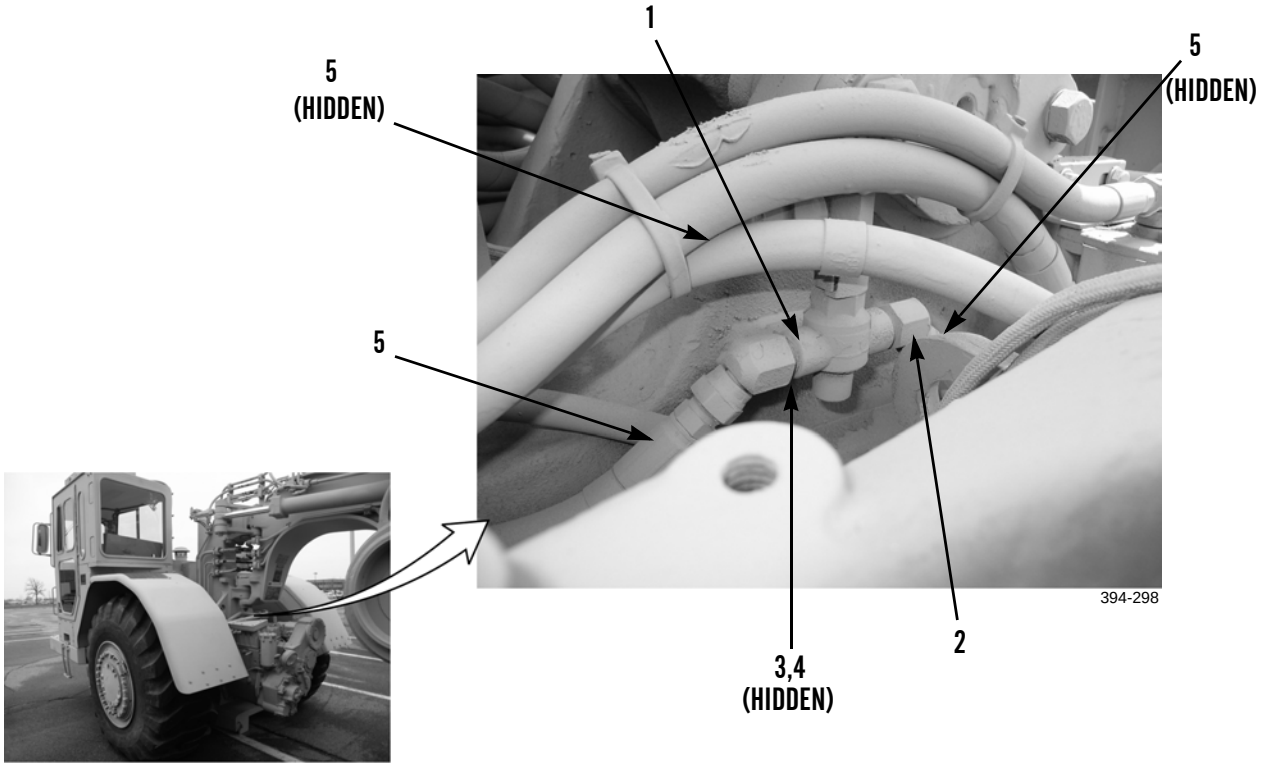
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

1. Disconnect three hose assemblies (5) from valve (1) assembly in center of machine.
2. Remove two bolts (3) and washers (4).
3. Remove valve (1) assembly.
4. If necessary, remove three elbows (2) from valve (1).



INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install three elbows (2) on valve (1).
2. Install valve (1) assembly on machine.
3. Install two washers (4) and bolts (3).
4. Connect three hose assemblies (5) to valve (1).
5. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
6. Shut down engine (TM 5-3805-248-10).
7. Check for air system leaks.

END OF WORK PACKAGE

SCRAPER QUICK RELEASE AND HOLDING VALVE REPLACEMENT 0157 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

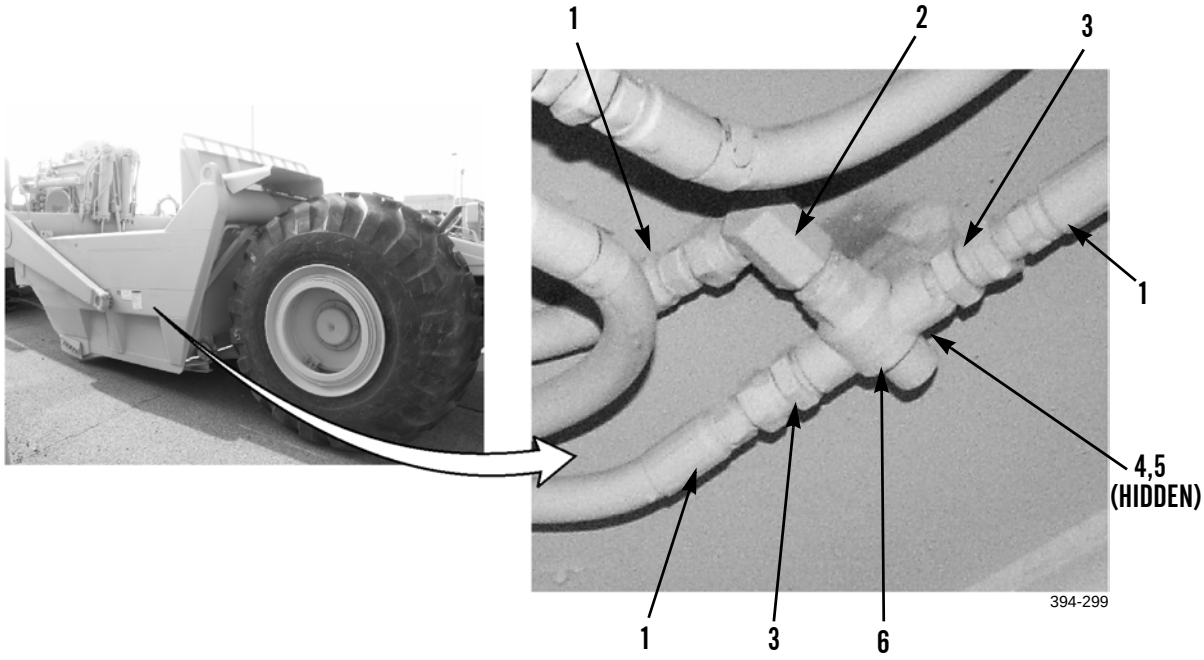
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect three hose assemblies (1) from holding valve (6) in rear of machine.
2. Remove two bolts (4) and washers (5).
3. Remove holding valve assembly (6).
4. If necessary, remove two adapters (3) and elbow (2) from holding valve (6).



INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install elbow (2) and two adapters (3) in holding valve (6).
2. Install holding valve (6) assembly on machine.
3. Install two washers (5) and bolts (4).
4. Connect three hose assemblies (1).
5. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
6. Shut down engine (TM 5-3805-248-10).
7. Check for air system leaks.

END OF WORK PACKAGE

DOUBLE CHECK VALVE REPLACEMENT 0158 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Air pressure vented (TM 5-3805-248-10)

Step assembly removed (WP 0200 00)

REMOVAL

CAUTION

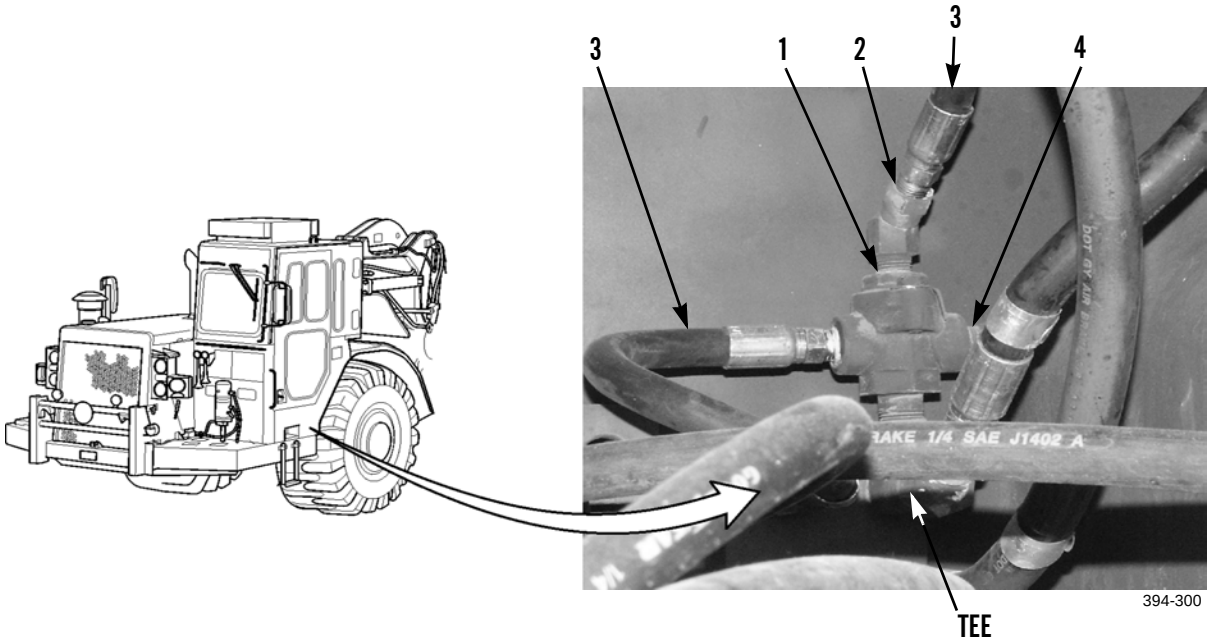
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect two hose assemblies (3) from double check valve (1) assembly from beneath cab.
2. Remove double check valve assembly (1) from tee.
3. If damaged, remove elbow (2) from double check valve (1).
4. If damaged, remove pipe plug (4) from double check valve (1).



INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install plug (4) in double check valve (1).
2. If removed, install elbow (2).
3. Install double check valve (1) on tee.
4. Connect two hose assemblies (3) to double check valve (1).
5. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
6. Shut down engine (TM 5-3805-248-10).
7. Check for air system leaks.
8. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

TRACTOR AIR BRAKE RELAY VALVE REPLACEMENT 0159 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

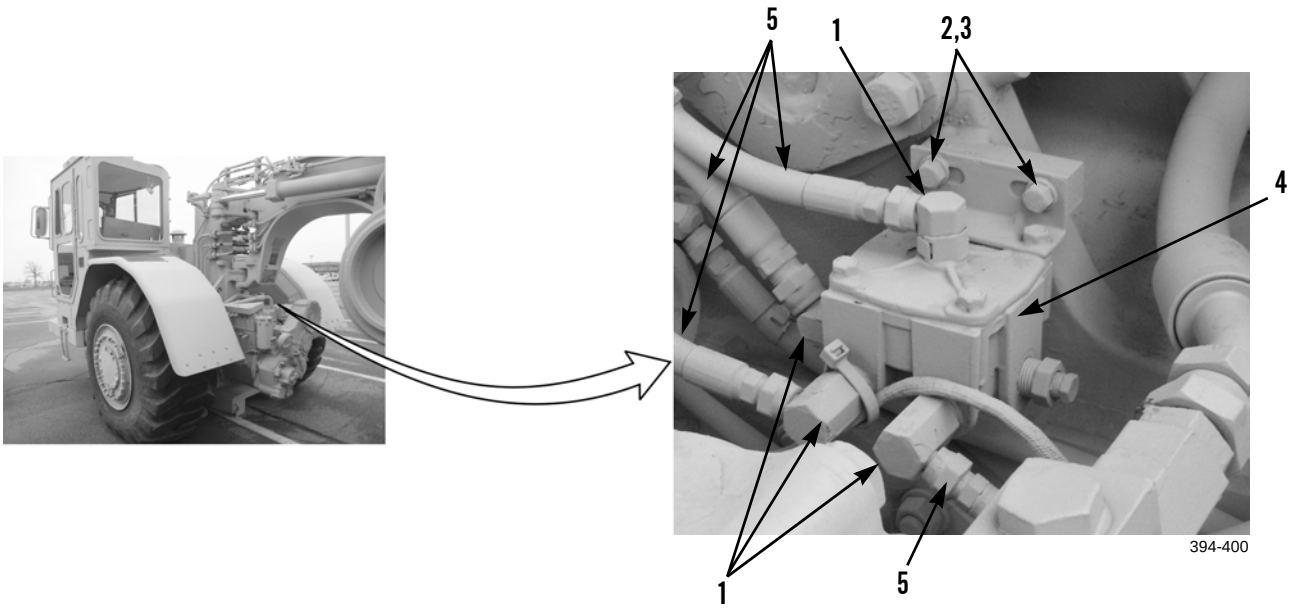
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect four hose assemblies (5) from relay valve (4) assembly located at right, center of tractor.
2. Remove two bolts (2) and washers (3).
3. Remove relay valve (4) assembly from tractor.
4. If damaged, remove four elbows (1) from relay valve (4).



INSTALLATION

NOTE

Apply anti-seizing tape halfway up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install four elbows (1) on relay valve (4).
2. Install relay valve (4) assembly on right center of tractor.
3. Install two washers (3) and bolts (2).
4. Connect four hose assemblies (5) to relay valve (4) assembly.
5. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
6. Shut down engine (TM 5-3805-248-10).
7. Check for air system leaks.

END OF WORK PACKAGE

SCRAPER AIR BRAKE RELAY VALVE REPLACEMENT 0160 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

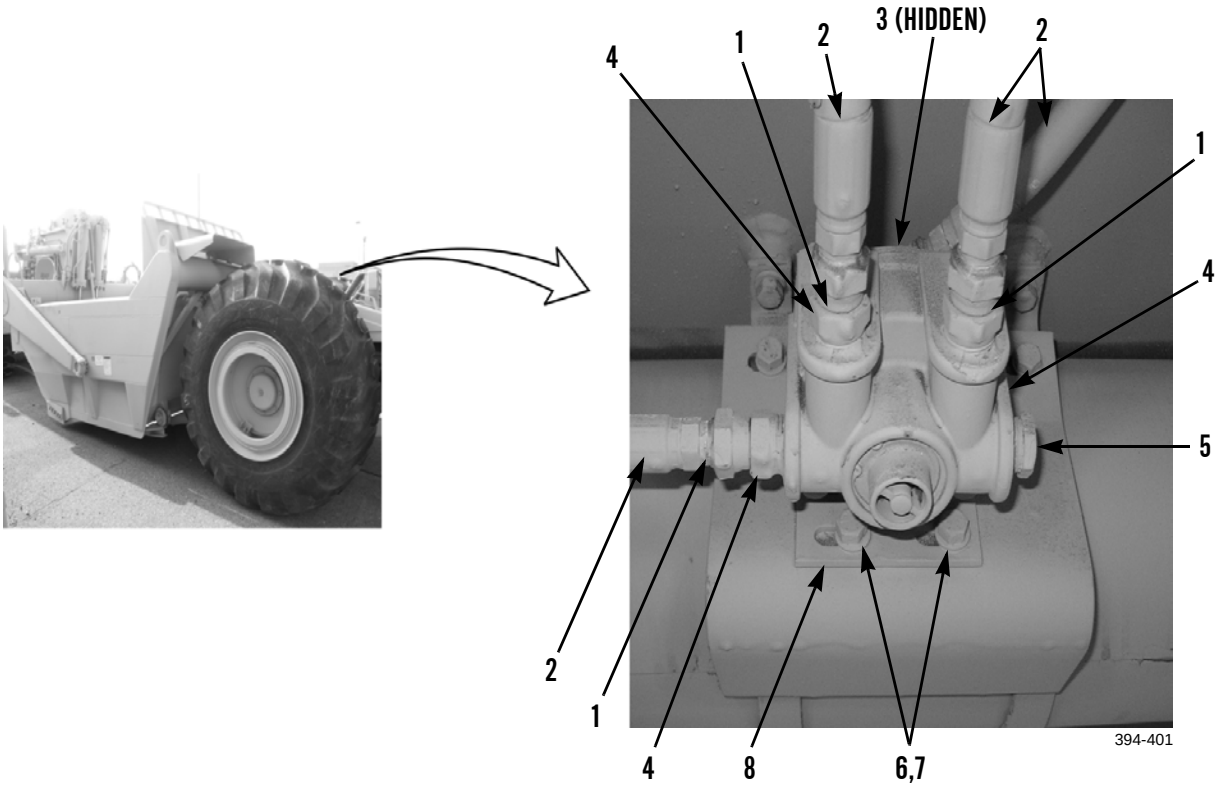
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect four hose assemblies (2).
2. Remove two bolts (6) and washers (7).
3. Remove relay valve assembly (8) from machine.
4. If damaged, remove three adapters (1) and pipe bushings (4) from relay valve (8).
5. If damaged, remove elbow (3) from relay valve (8).
6. If damaged, remove two pipe plugs (5) from relay valve (8).



INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install two pipe plugs (5) in relay valve (8).
2. If removed, install elbow (3) in relay valve (8).
3. If removed, install three pipe bushings (4) and adapters (1) in relay valve (8).
4. Install relay valve (8) two washers (7) and bolts (6) assembly on machine.
5. Connect four hose assemblies (2).
6. Operate engine until normal operating air pressure is reached (TM 5 3805-248-10).
7. Shut down engine (TM 5 3805-248-10).
8. Check for air system leaks.

END OF WORK PACKAGE

BRAKE CONTROL VALVE LINES AND FITTINGS REPLACEMENT 0161 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0145 00

WP 0153 00

WP 0155 00

WP 0158 00

Equipment Condition

Air pressure vented (TM 5-3805-248-10)

Step assembly removed (WP 0200 00)

Operator compartment lower access plate removed (WP 0197 00)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

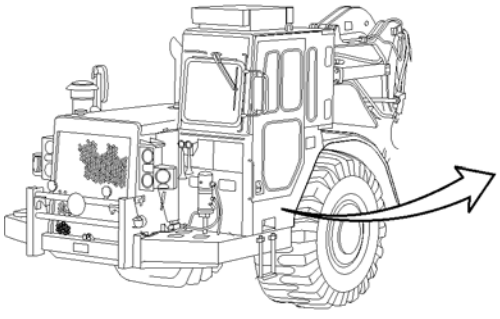
NOTE

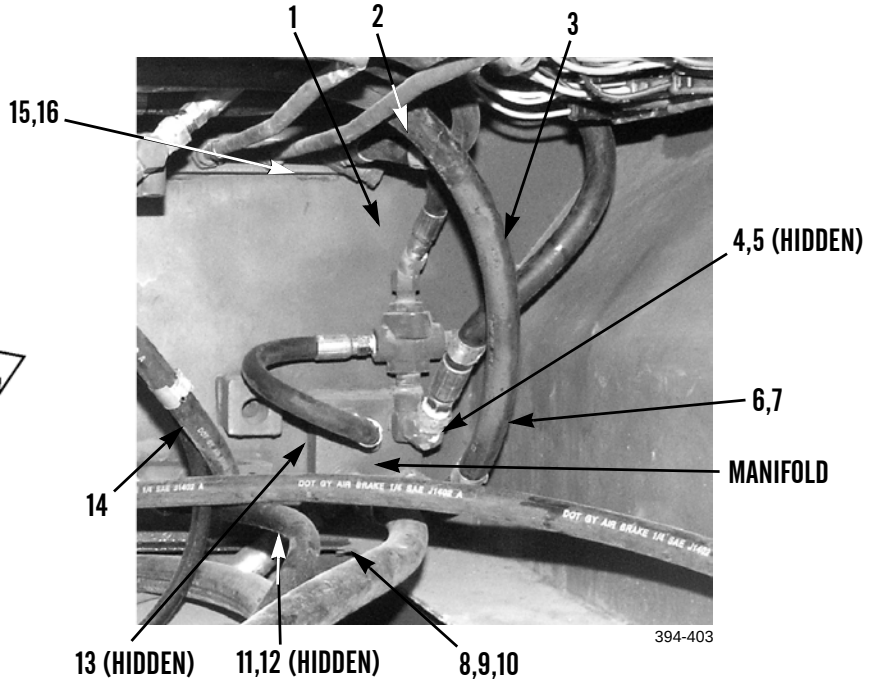
- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

BRAKE CONTROL VALVE LINES AND FITTINGS REPLACEMENT - CONTINUED 0161 00

REMOVAL - CONTINUED

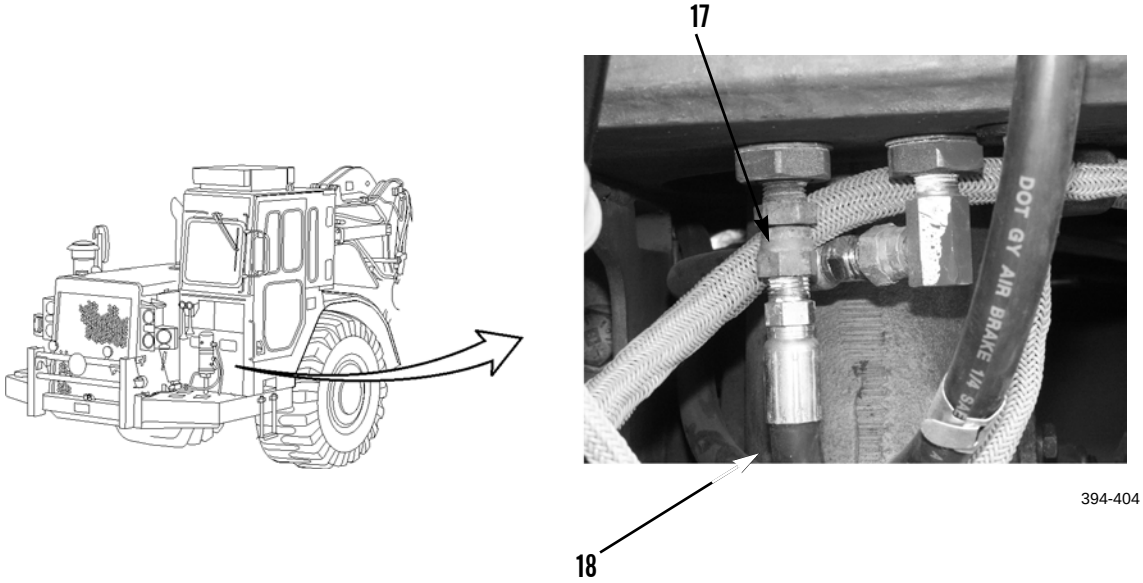
1. Disconnect hose assembly (1) from double check valve.
2. Disconnect other end of hose assembly (1) from park and emergency valve (WP 0145 00).
3. Remove hose assembly (1) from machine.
4. Disconnect hose assembly (3) from elbow (4).
5. Disconnect other end of hose assembly (3) from brake control valve (WP 0155 00).
6. Remove hose assembly (3) from machine.
7. Disconnect hose assembly (6) from adapter (7).
8. Disconnect other end of hose assembly (6) from brake control valve (WP 0155 00).
9. Remove hose assembly (6) from machine.
10. Disconnect hose assembly (2) from tee (15).
11. Disconnect other end of hose assembly (2) from brake control valve (WP 0155 00).
12. Remove hose assembly (2) from machine.
13. Disconnect hose assembly (14) from pipe reducer (13) and double check valve.
14. Remove hose assembly (14) from machine.
15. Disconnect hose assembly (11) from pipe reducer (12).
16. Disconnect other end of hose assembly (11) from brake control valve (WP 0155 00).
17. Remove hose assembly (11) from machine.
18. Disconnect hose assembly (8) from pipe reducer (9).
19. Disconnect other end of hose assembly (8) from tractor air tank (WP 0153 00).
20. Remove hose assembly (8) from machine.



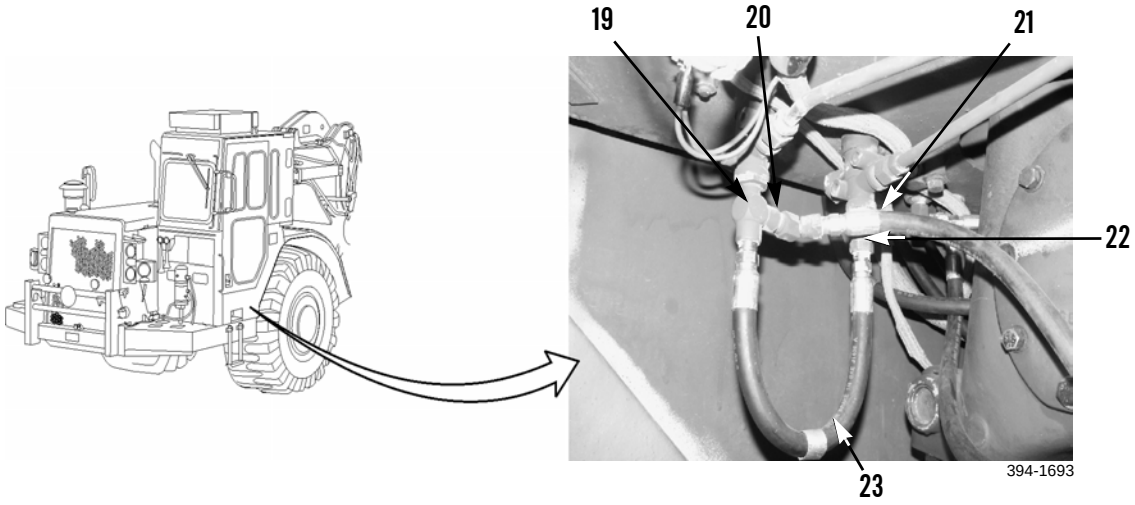


REMOVAL - CONTINUED

21. Disconnect hose assembly (18) from adapter (17).
22. Disconnect other end of hose assembly (18) from brake control valve (WP 0155 00).
23. Remove hose assembly (18) from machine.



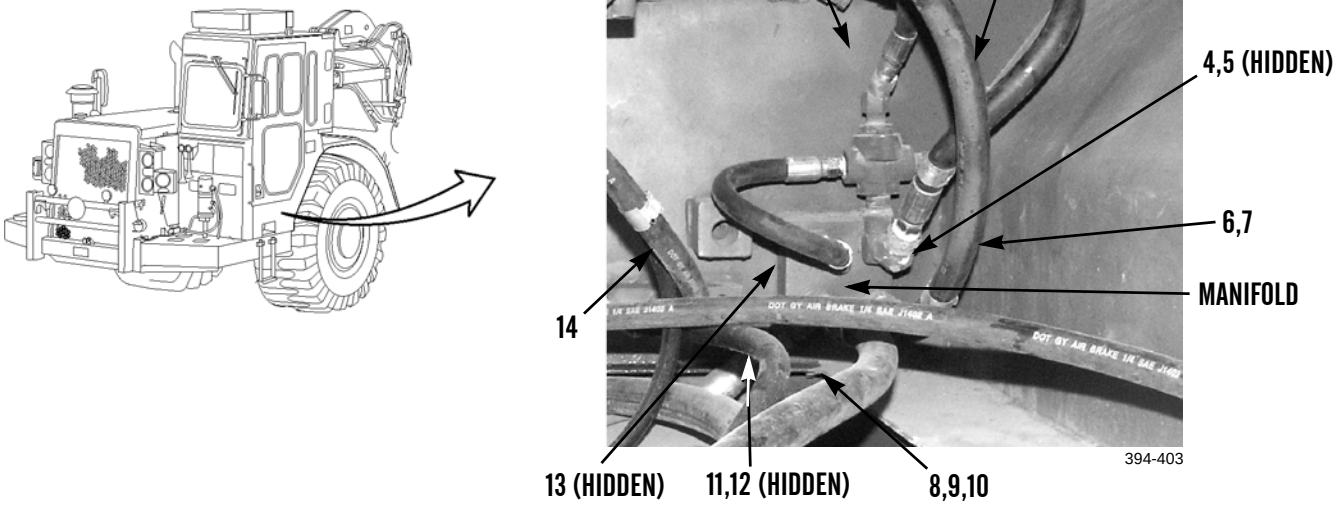
24. Disconnect hose assembly (23) from tee (19) and coupling (22).
25. Remove hose assembly (23) from machine.
26. Disconnect hose assembly (21) from elbow (20).
27. Disconnect other end of hose assembly (21) from brake control valve (WP 0155 00).
28. Remove hose assembly (21) from machine.



BRAKE CONTROL VALVE LINES AND FITTINGS REPLACEMENT - CONTINUED 0161 00

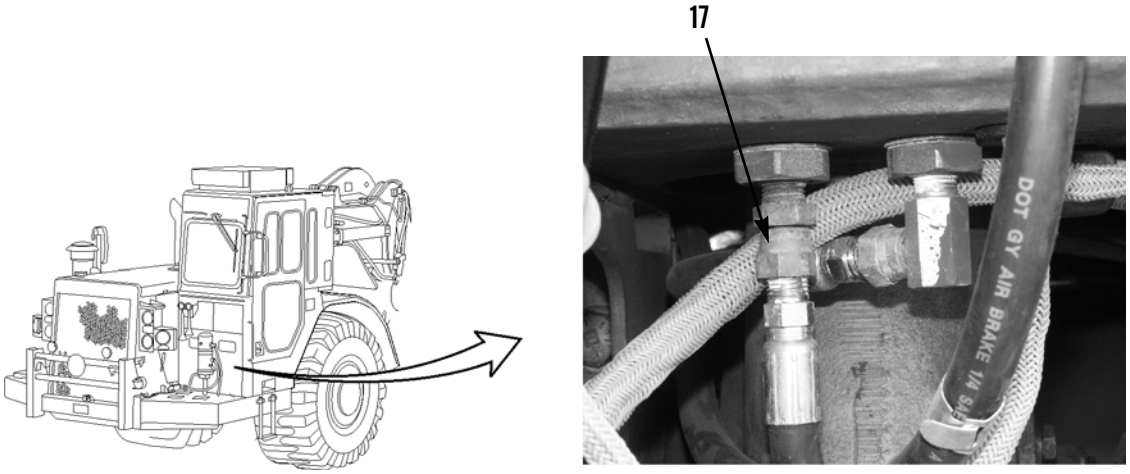
REMOVAL - CONTINUED

29. If damaged, remove elbow (4) and tee (5) from manifold.
30. If damaged, remove adapter (7) from manifold.
31. If damaged, remove pipe plug (16) and tee (15) from machine.
32. If damaged, remove pipe reducer (13).
33. If damaged, remove pipe reducer (12) from tee (10).
34. If damaged, remove pipe reducer (9) and tee (10) from machine.



REMOVAL - CONTINUED

35. If damaged, remove adapter (17) from beneath operator compartment.



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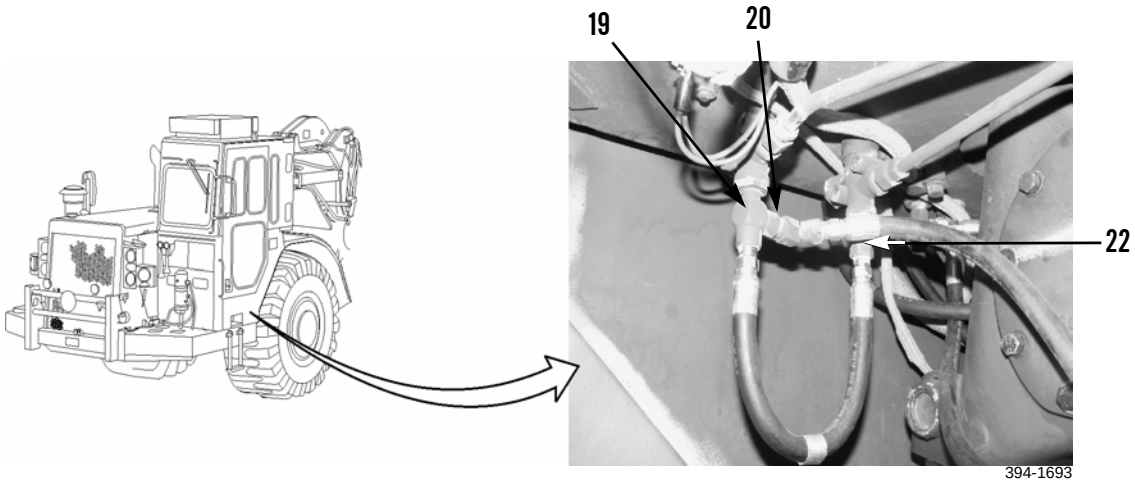
36. If damaged, remove tee (19), coupling (22) and elbow (20) from beneath operator compartment.



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REMOVAL - CONTINUED

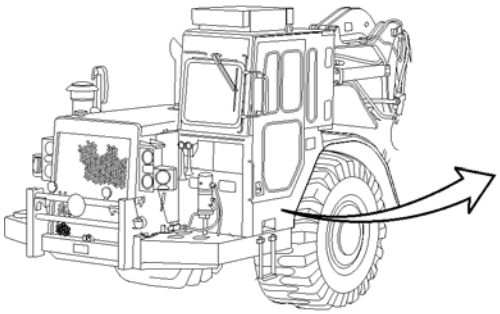
37. If damaged, remove fittings from park and emergency valve (WP 0145 00).
38. If damaged, remove fittings from double check valve (WP 0158 00).
39. If damaged, remove fittings from park and emergency valve (WP 0145 00).
40. If damaged, remove fittings from double check valve (WP 0158 00).

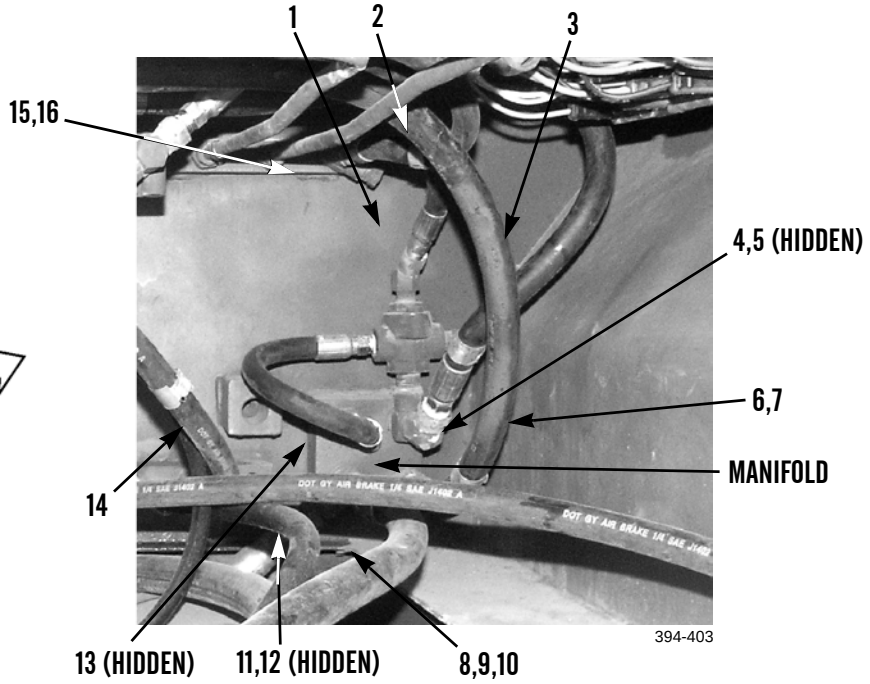
INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

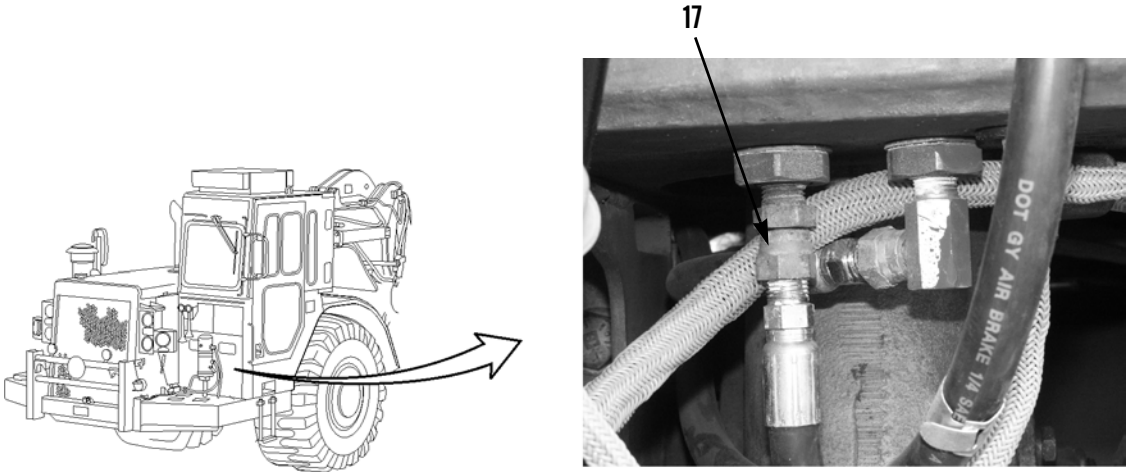
1. If removed, install elbow (4) and tee (5) on manifold.
2. If removed, install adapter (7) on manifold.
3. If removed, install pipe plug (16) and tee (15) on machine.
4. If removed, install pipe reducer (13).
5. If removed, install pipe reducer (12) on tee (10).
6. If removed, install pipe reducer (9) and tee (10) on machine.





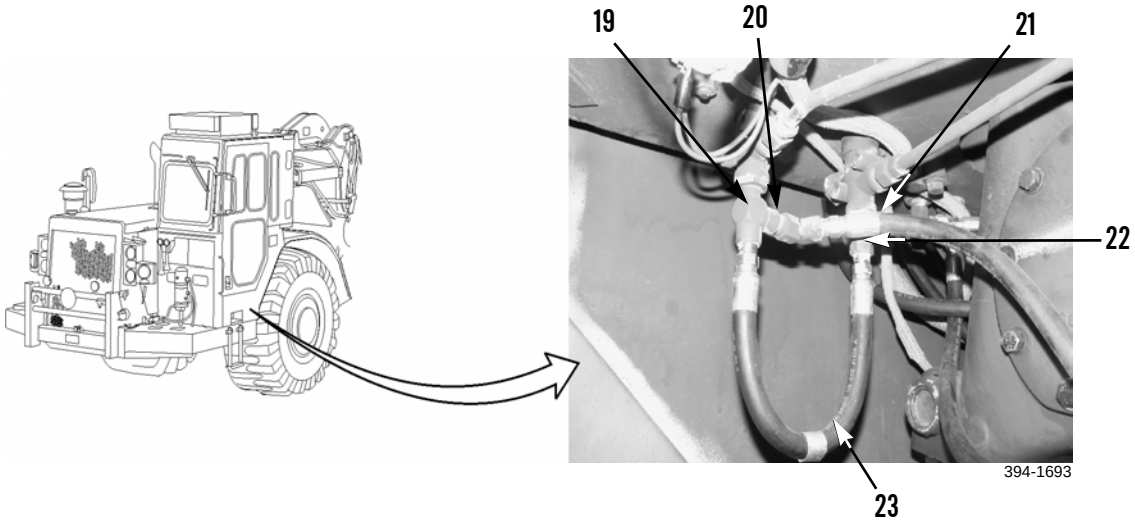
INSTALLATION - CONTINUED

7. If removed, install adapter (17) on beneath operator compartment.



394-404

8. If removed, install tee (19), coupling (22) and elbow (20) on beneath operator compartment.
9. If removed, install fittings on park and emergency valve (WP 0145 00).
10. If removed, install fittings on double check valve (WP 0158 00).
11. Position hose assembly (21) on machine.
12. Connect hose assembly (21) to elbow (20).
13. Connect other end of hose assembly (21) to brake control valve (WP 0155 00).
14. Position hose assembly (23) on machine.
15. Connect hose assembly (23) to tee (19) and coupling (22).



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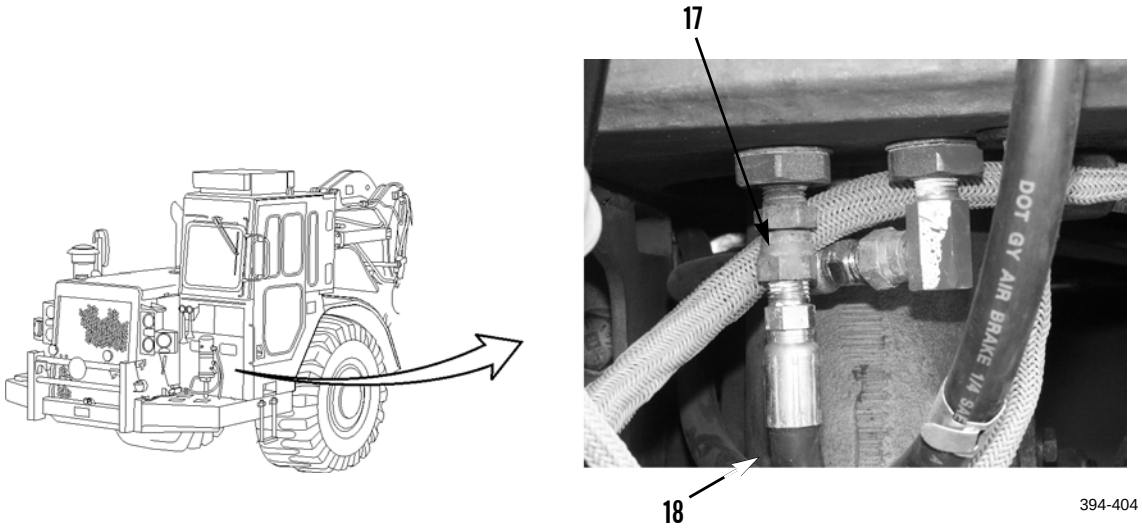
INSTALLATION - CONTINUED

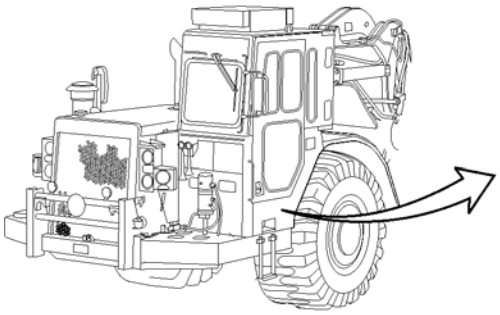
16. Position hose assembly (18) on machine.
17. Connect hose assembly (18) to adapter (17).
18. Connect other end of hose assembly (18) to brake control valve (WP 0155 00).

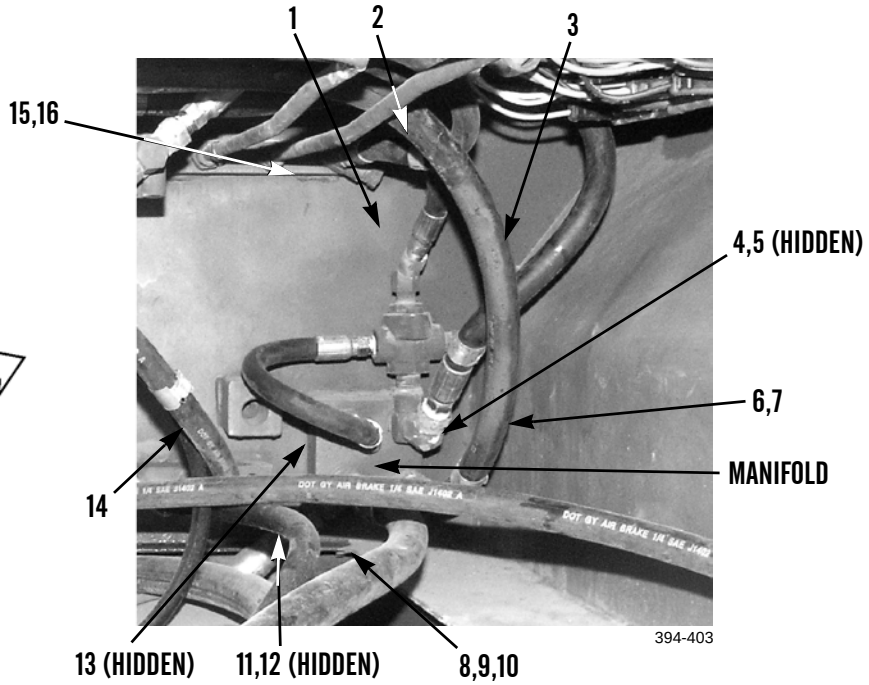


19. Position hose assembly (1) on machine.
20. Connect hose assembly (1) to double check valve.
21. Connect other end of hose assembly (1) to park and emergency valve (WP 0145 00).
22. Position hose assembly (3) on machine.
23. Connect hose assembly (3) to elbow (4).
24. Connect other end of hose assembly (3) to brake control valve (WP 155 00).
25. Position hose assembly (6) on machine.
26. Connect hose assembly (6) to adapter (7).
27. Connect other end of hose assembly (6) to brake control valve (WP 0155 00).
28. Position hose assembly (2) on machine.
29. Connect hose assembly (2) to tee (15).
30. Connect other end of hose assembly (2) to brake control valve (WP 0155 00).
31. Position hose assembly (14) on machine.
32. Connect hose assembly (14) to pipe reducer (13) and other end to double check valve.
33. Position hose assembly (11) to machine.
34. Connect hose assembly (11) to pipe reducer (12).
35. Connect other end of hose assembly (11) to brake control valve (WP 0155 00).
36. Position hose assembly (8) on machine.
37. Connect hose assembly (8) to pipe reducer (9).

INSTALLATION - CONTINUED

38. Connect other end of hose assembly (6) to brake control valve (WP 0155 00).





END OF WORK PACKAGE

TRACTOR BRAKE ACTUATOR LINES AND FITTINGS REPLACEMENT 0162 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0151 00

References - Continued

WP 0156 00

WP 0159 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if necessary to replace.
- This replacement is for the right side actuator lines and fittings. The procedure for the left side is identical.

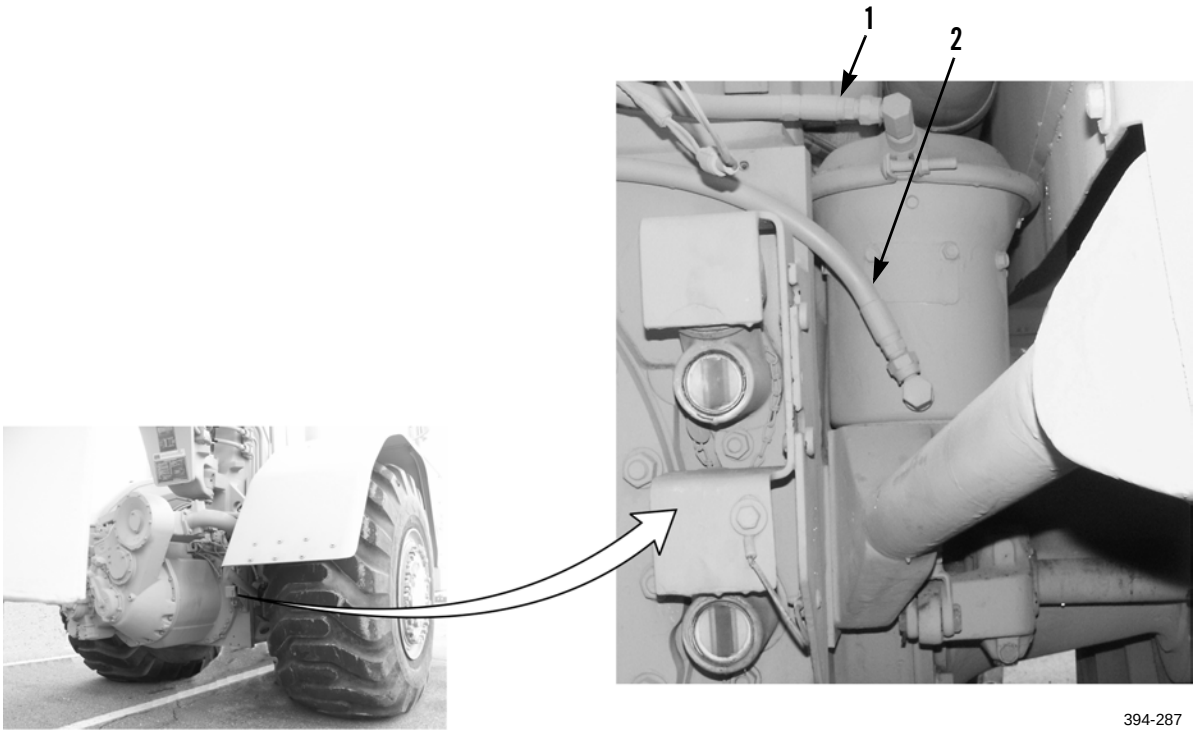
REMOVAL - CONTINUED

1. Disconnect hose assemblies (1 and 2) from brake actuator (WP 0151 00).
2. Disconnect other end of hose assembly (2) from tractor quick release and holding valve (WP 0156 00).
3. Disconnect other end of hose assembly (1) from tractor air brake relay valve (WP 0159 00).

NOTE

Note the routing and position of the hoses, any retaining hardware, and tie straps prior to removal to ensure correct installation.

4. Trace routing of two hose assemblies and remove all retaining hardware and tie straps.
5. Remove four hose assemblies from machine.



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INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Position four hoses on machine.
2. Connect hose assemblies (1 and 2) to brake actuators (WP 0151 00).
3. Connect other end of hose assembly (2) to tractor quick release and holding valve (WP 0156 00).
4. Connect other end of hose assembly (1) to tractor air brake relay valve (WP 0159 00).
5. Install all retaining hardware and new tie straps.

INSTALLATION - CONTINUED

6. Operate engine until normal operating air pressure is reached (TM 5 3805-248-10).
7. Shut down engine (TM 5 3805-248-10).
8. Check for air system leaks.

END OF WORK PACKAGE

TRACTOR AIR BRAKE LINES AND FITTINGS REPLACEMENT 0163 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0156 00

WP 0159 00

Equipment Condition

Air pressure vented (TM 5-3805-248-10)

Crankcase guard removed (WP 0201 00)

REMOVAL

CAUTION

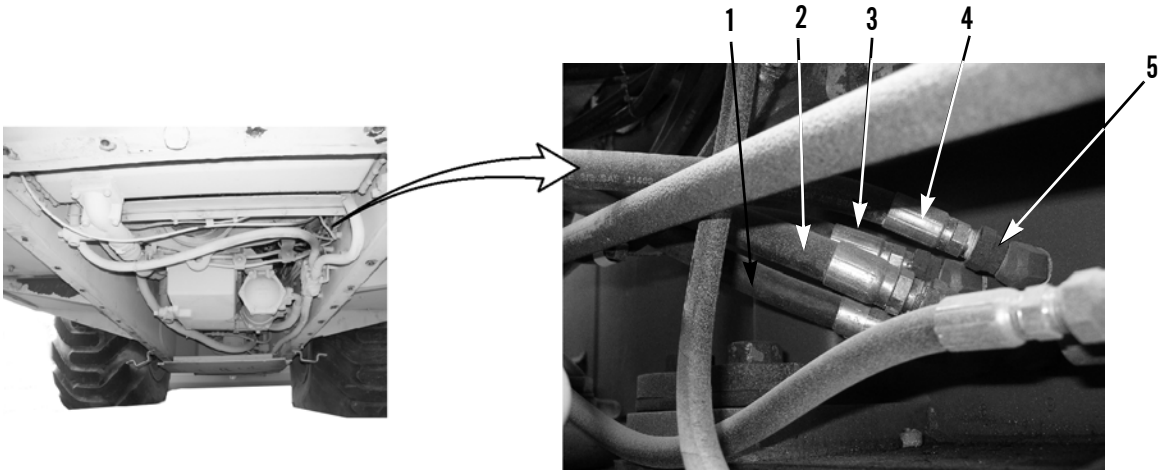
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

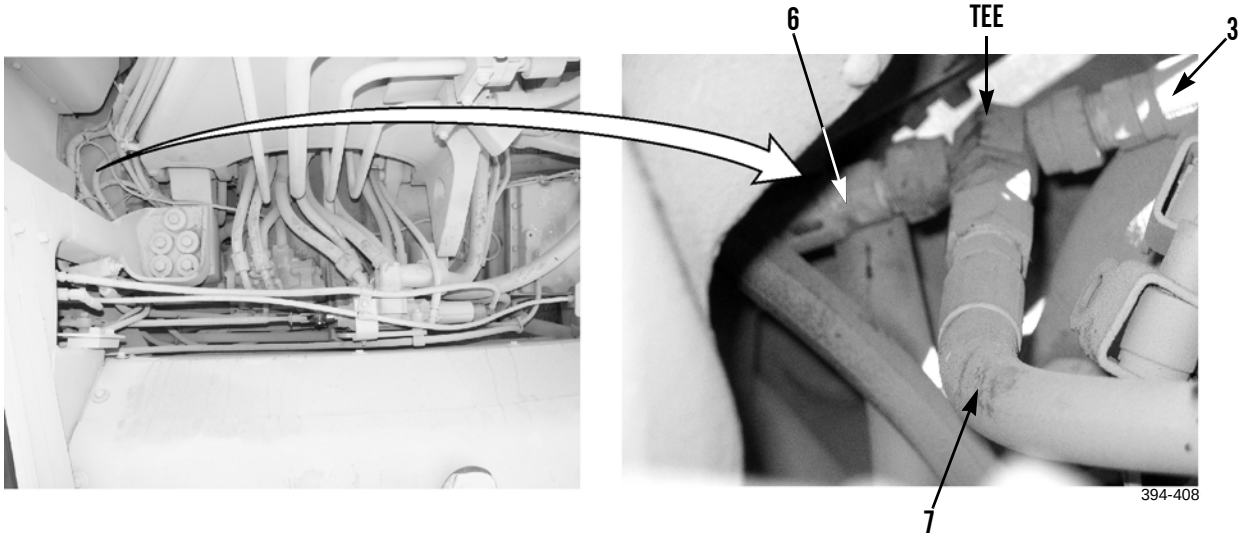
- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

REMOVAL - CONTINUED

1. Disconnect hose assemblies (1, 2, 3 and 4) from outside of right operator compartment wall.
2. If damaged, remove four elbows (5) from machine.
3. Disconnect other end of hose assemblies (1 and 2) from top of tractor air brake relay valve (WP 0159 00).
4. If damaged, remove fittings from tractor air brake relay valve (WP 0159 00).

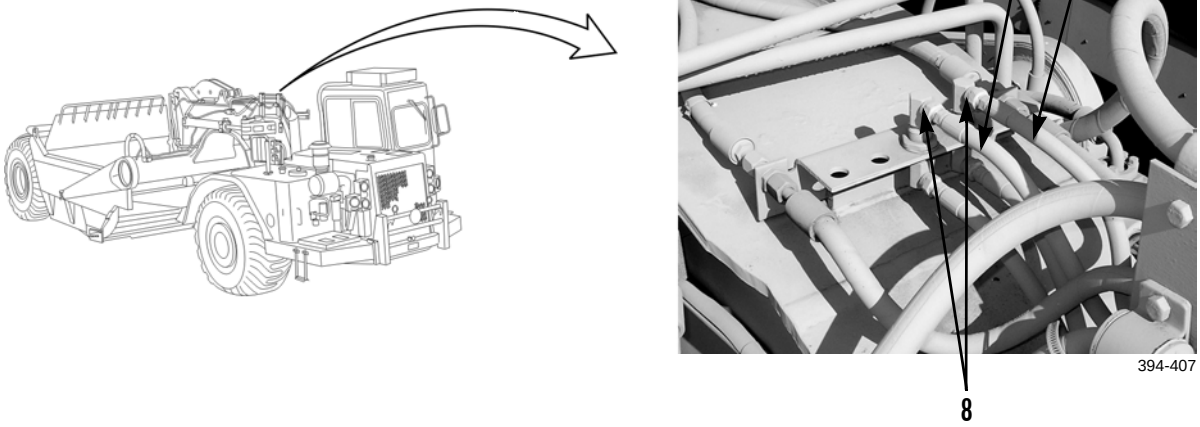


5. Disconnect other end of hose assembly (3) from tee.
6. Disconnect hose assemblies (6 and 7) from tee.
7. Disconnect other end of hose assembly (6) from tractor quick release and holding valve (WP 0156 00).
8. If damaged, remove fittings from tractor quick release and holding valve (WP 0156 00).



REMOVAL - CONTINUED

9. Disconnect other end of hose assemblies (7 and 4) from elbows (8) on top of draft arm.
10. If damaged, remove two elbows (8).



NOTE

Note the routing and position of the hoses, any retaining hardware and tie straps prior to removal to ensure correct installation.

11. Trace routing of all hose assemblies (1, 2, 3, 4, 6 and 7) and remove all retaining hardware and tie straps.
12. Remove hose assemblies (1, 2, 3, 4, 6 and 7) from machine.

INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Position hose assemblies (1, 2, 3, 4, 6 and 7) on machine.
2. If removed, install four elbows (5) on machine.
3. If removed, install fittings to tractor air brake relay valve (WP 0159 00).
4. Connect hose assemblies (1, 2, 3 and 4) to outside of right operator compartment wall.
5. Connect other end of hose assemblies (1 and 2) to top of tractor air brake relay valve (WP 0159 00).
6. If removed, install fittings to tractor quick release and holding valve (WP 0156 00).
7. Connect other end of hose assembly (3) to tee.
8. Connect hose assemblies (6 and 7) to tee.
9. Connect other end of hose assembly (6) to tractor quick release and holding valve (WP 0156 00).
10. Install all retaining hardware and new tie straps.
11. If removed, install two elbows (8) on top of draft arm.
12. Connect other end of hose assembly (7 and 4) to elbows (8) on top of draft arm.

INSTALLATION - CONTINUED

13. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
14. Shut down engine (TM 5-3805-248-10).
15. Check for air system leaks.
16. Install crankcase guard (WP 0201 00).

END OF WORK PACKAGE

TRACTOR TO SCRAPER LINES AND FITTINGS REPLACEMENT 0164 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0240 00

WP 0257 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10) (TM 5-3805-248-10)

REMOVAL

CAUTION

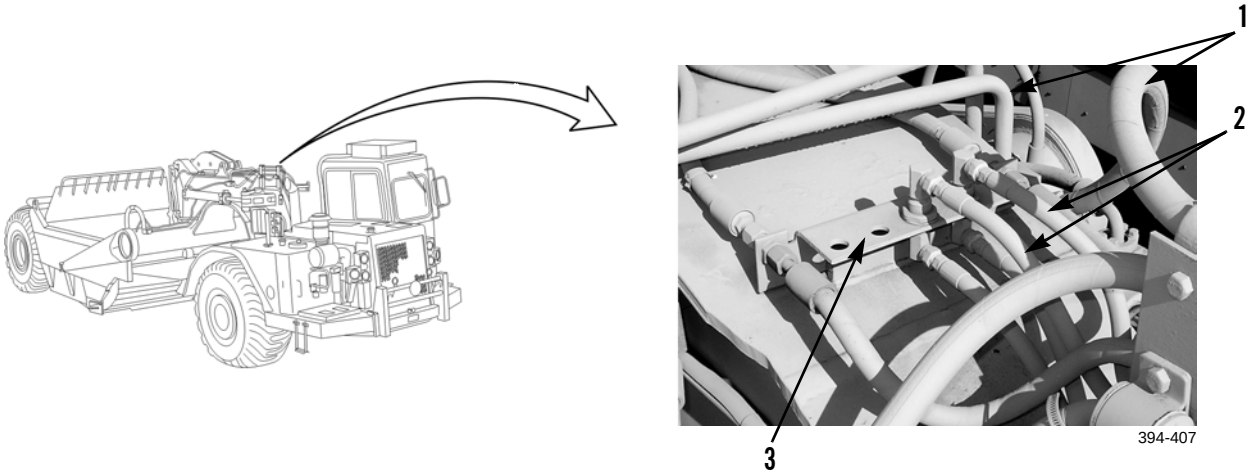
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

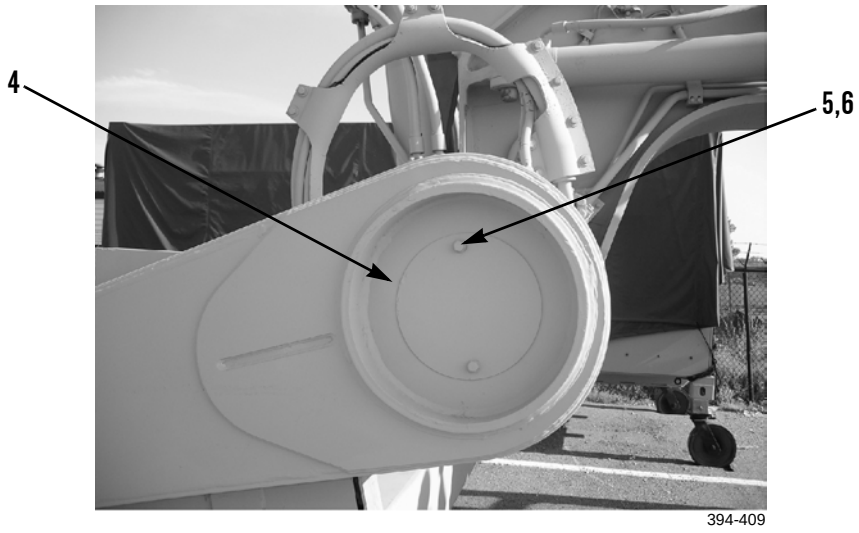
- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if necessary to replace.
- Note the routing and position of the hoses, any retaining hardware and tie straps prior to removal to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect two hose assemblies (2) from elbows (1).
2. If damaged, remove elbows (1) from bracket (3).



3. Remove two bolts (5), washers (6) and plate (4) from draft arm.



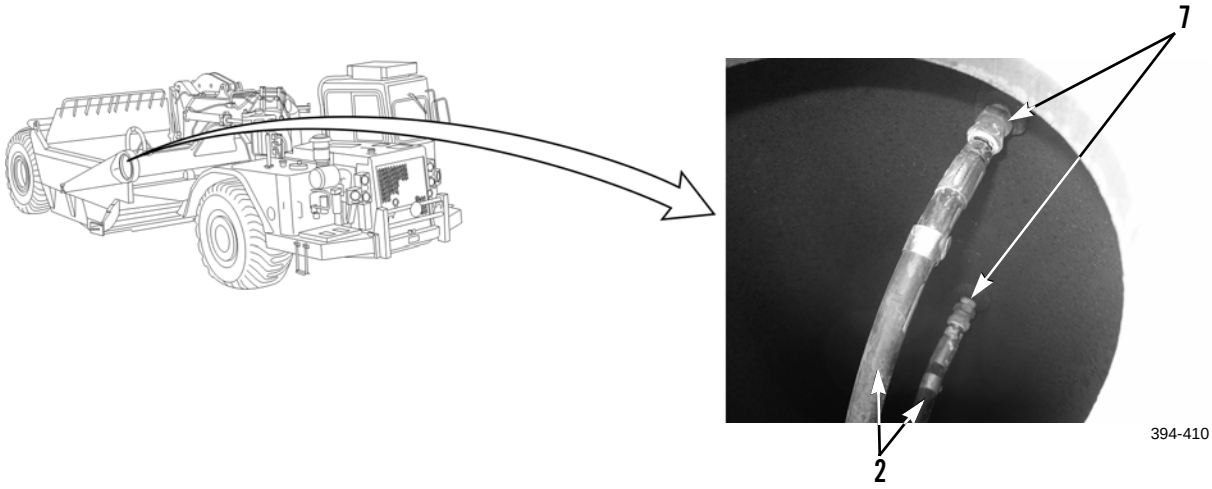
REMOVAL - CONTINUED

4. Disconnect two hose assemblies (2) from adapters (7).
5. If damaged, remove adapters (7) from inside of draft arm.

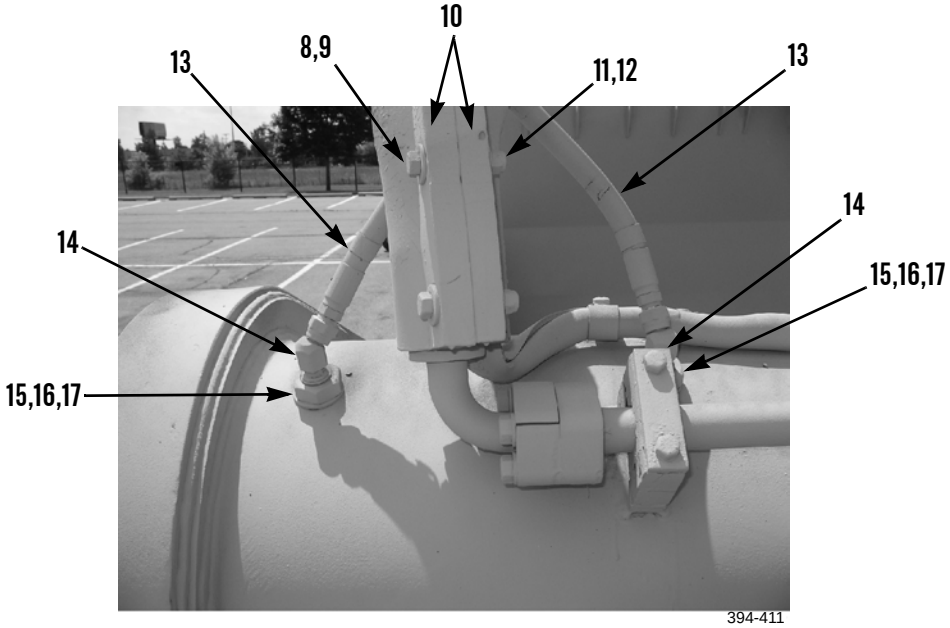
NOTE

Note the routing and position of the hoses, any retaining hardware and tie straps prior to removal to ensure correct installation.

6. Trace routing of two hose assemblies (2) and remove all retaining hardware and straps.
7. Remove two hoses (2) from machine.



8. Remove 19 capscrews (8) washers (9), nuts (12), 18 washers (11) and guard (10) from draft arm.
9. Disconnect two hose assemblies (13) from elbows (14).
10. If damaged, remove two elbows (14), nuts (15), washers (16) and connectors (17) from draft arm.



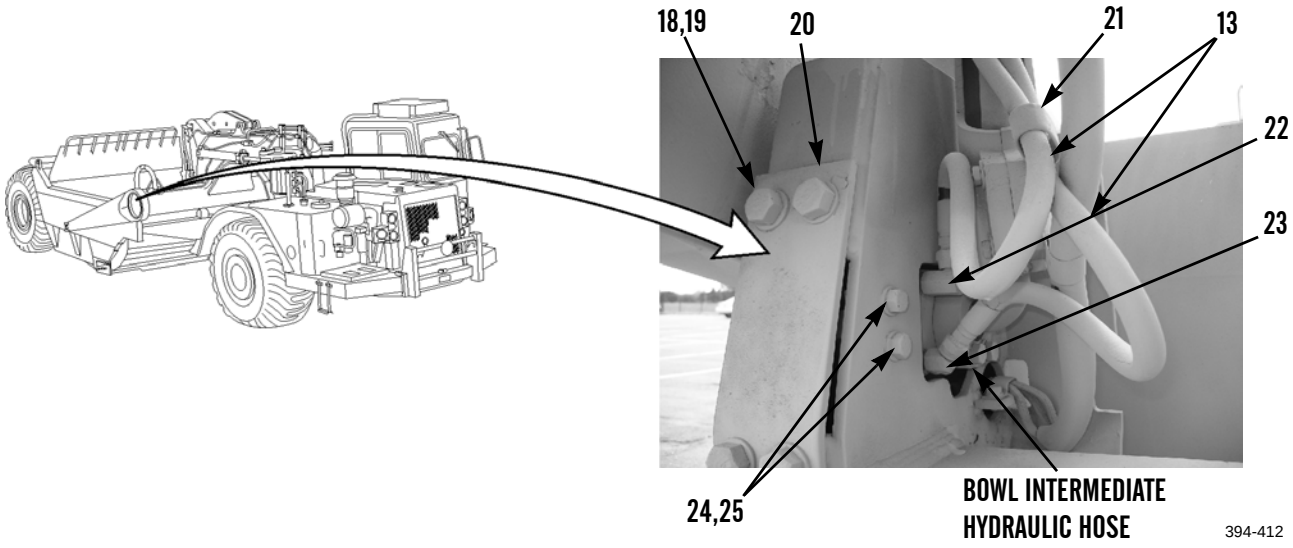
REMOVAL - CONTINUED

11. Disconnect two hose assemblies (13) from elbows (22 and 23).
12. Remove elbows (22 and 23).

WARNING

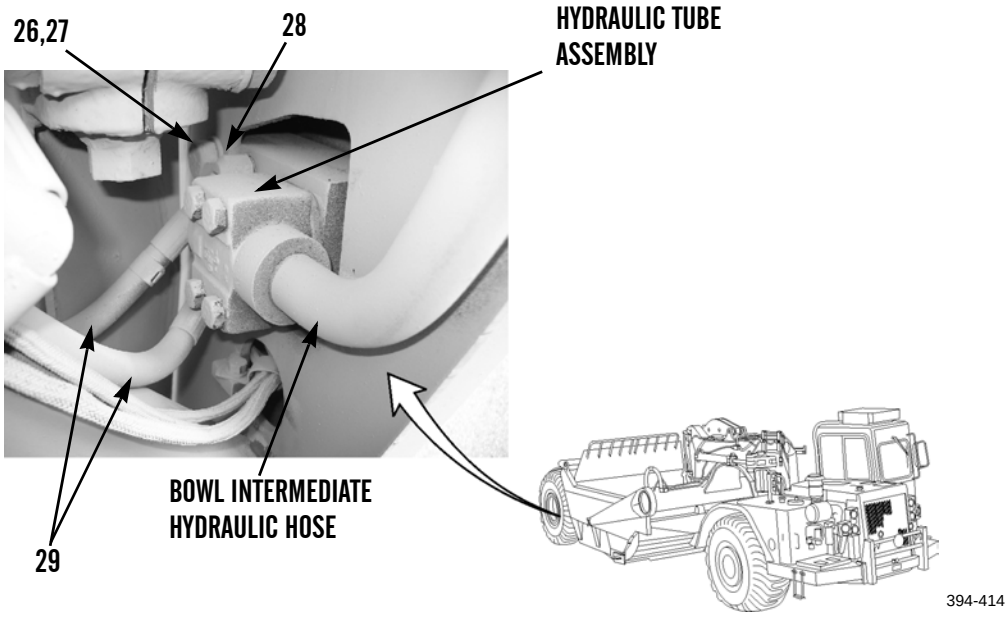
Pay attention to all warnings, cautions and notes in WP 0240 00 when disconnecting the bowl intermediate hydraulic hose. Failure to follow them could result in personal injury or damage to the machine.

13. Disconnect bowl intermediate hydraulic hose at front of bowl (WP 0240 00).
14. Remove two bolts (24) and washers (25).
15. Remove four bolts (18), washers (19) and plate (20) from right side of bowl.
16. Remove clip (21) from two hose assemblies (13).
17. Remove two hose assemblies (13) from bowl.

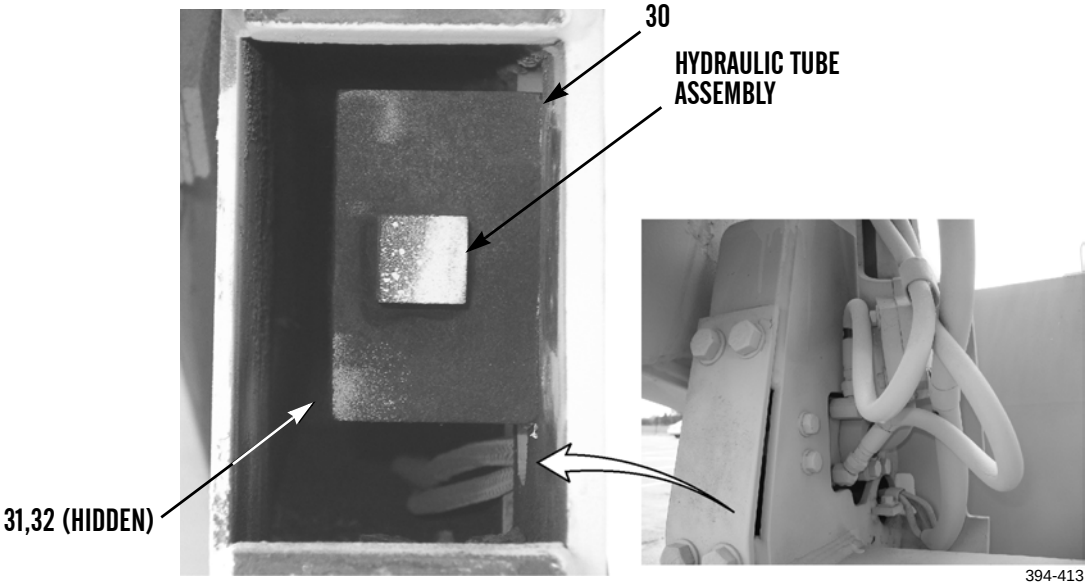


REMOVAL - CONTINUED

18. Disconnect bowl intermediate hydraulic hose at rear of bowl (WP 0240 00).
19. Disconnect two hose assemblies (29) from elbows (28).
20. Remove two elbows (28) from hydraulic tube assembly.
21. Remove two bolts (26) and washers (27) from bowl.



22. Remove bracket (30) from hydraulic tube assembly.
23. Remove hydraulic tube assembly through front of bowl.
24. Remove two hose assemblies (31) from hydraulic tube assembly.
25. If damaged, remove four adapters (32) from hydraulic tube assembly.

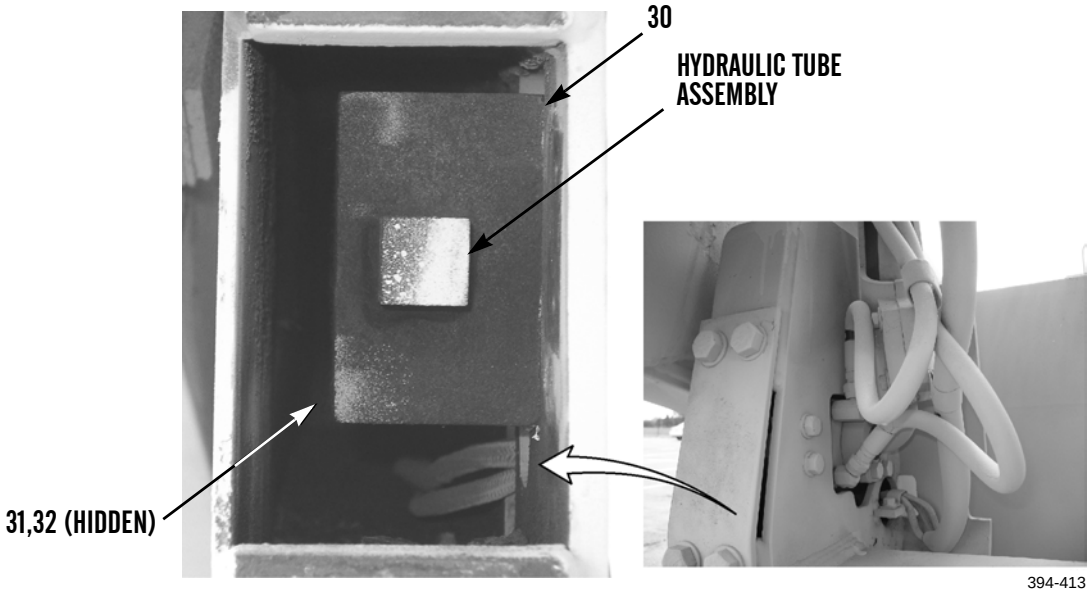


INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install four adapters (32) in hydraulic tube assembly.
2. Install two hose assemblies (31) in four adapters (32).
3. Install hydraulic tube assembly through front of bowl.
4. Install bracket (30) on hydraulic tube assembly.



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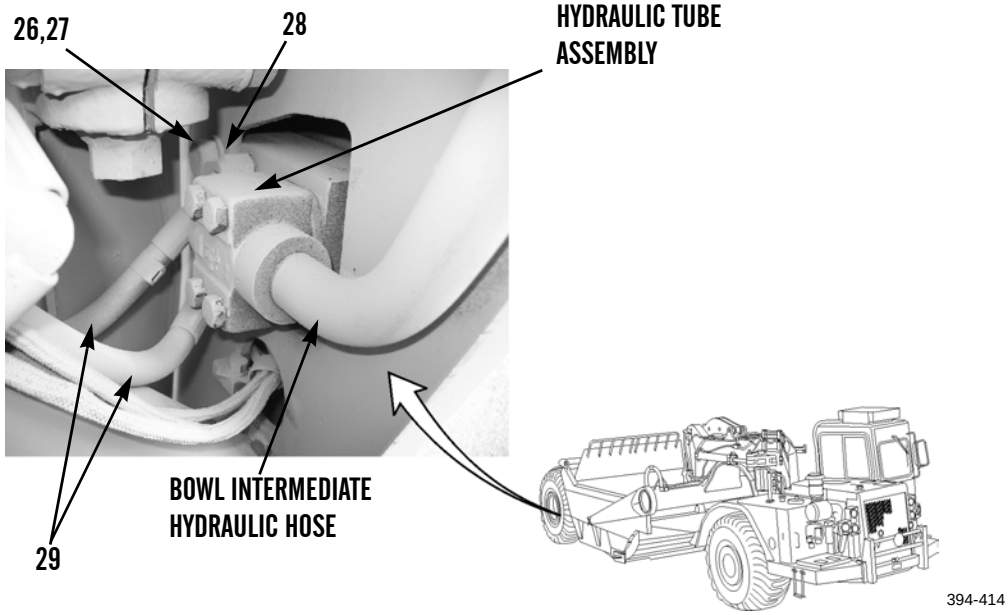
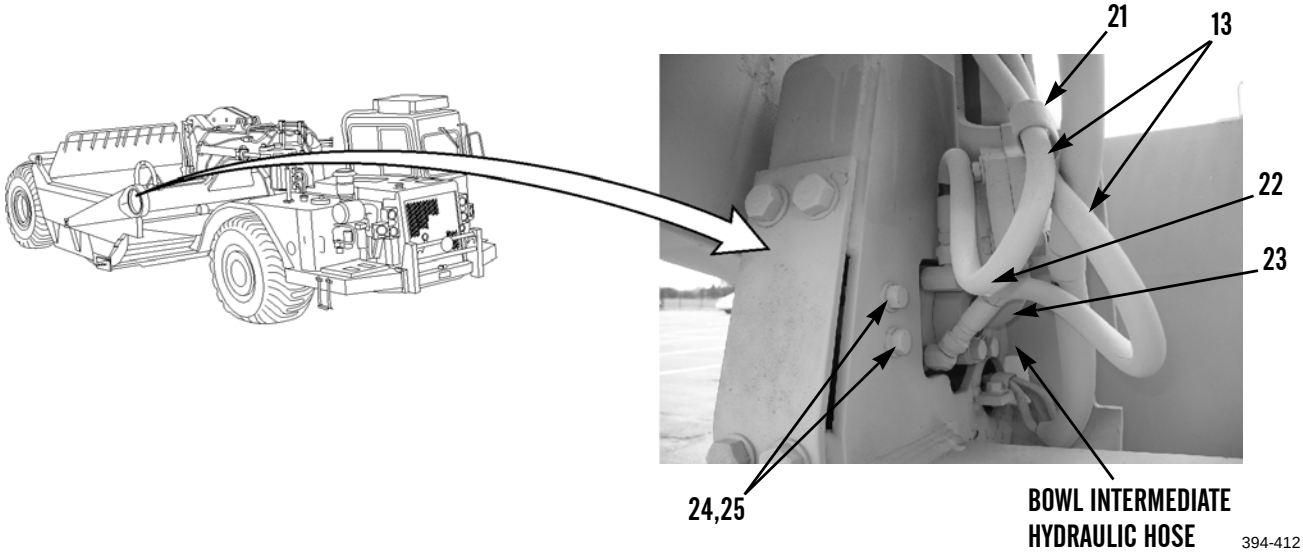
INSTALLATION - CONTINUED

5. Install two washers (27) and bolts (26) on bowl.
6. Install two elbows (28) in hydraulic tube assembly.
7. Connect two hose assemblies (29) to elbows (28).
8. Connect bowl intermediate hydraulic hose at rear of bowl (WP 0257 00).

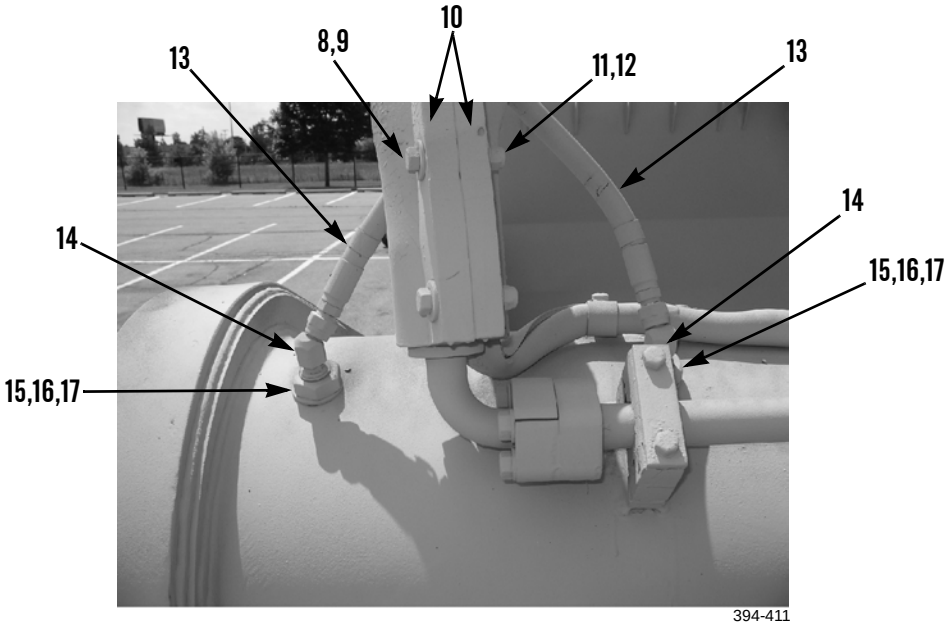


9. Position two hose assemblies (13) on bowl.
10. Install two washers (25) and bolts (24).
11. Install elbows (22 and 23) hydraulic tube assembly.
12. Connect two hose assemblies (13) to elbows (22 and 23).
13. Install clip (21) on hose assemblies (13) and position clip over bolt opening.
14. Connect bowl intermediate hydraulic hose at front of bowl (WP 0240 00).

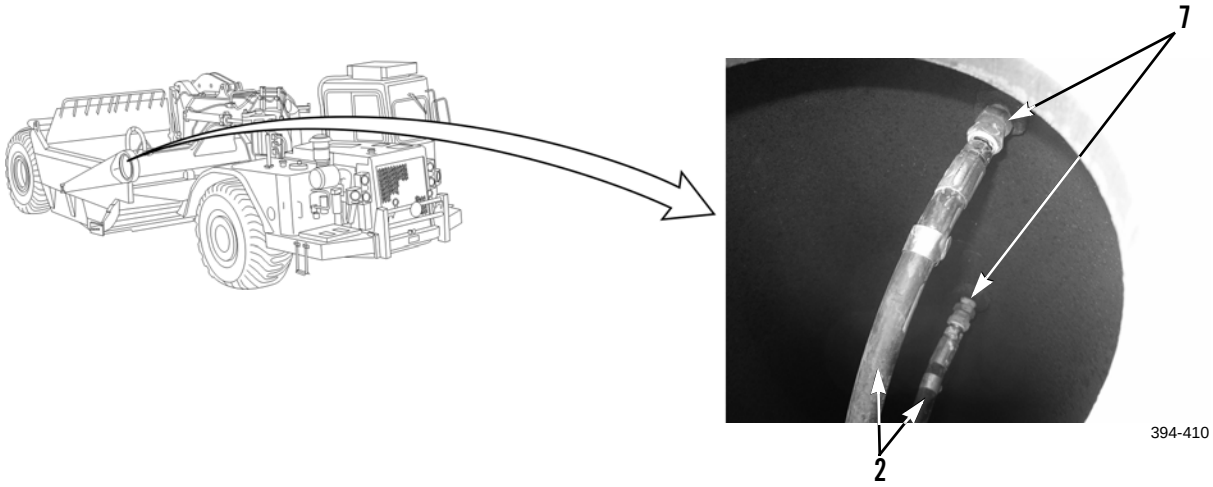


INSTALLATION - CONTINUED

15. If removed, install two connectors (17), washers (16), nuts (15) and elbows (14) on draft arm.
16. Connect two hose assemblies (13) to elbows (14).
17. Install guard (10), 18 washers (11), 19 nuts (12), washers (9) and cap screws (8) on draft arm.

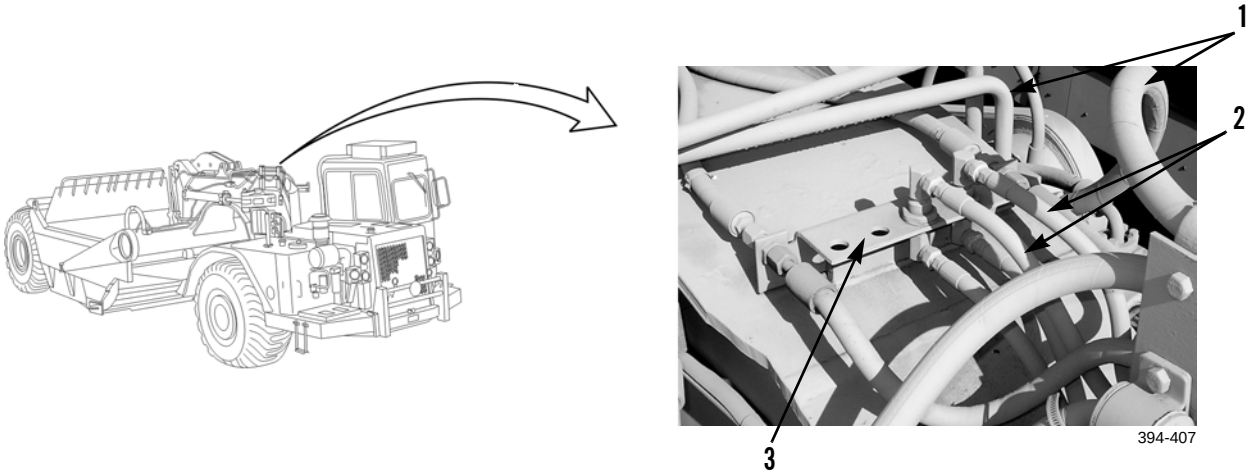


18. If removed, install adapters (7) inside of draft arm.
19. Position two hose assemblies (2) on machine.
20. Connect two hose assemblies (2) to adapters (7).
21. Install all retaining hardware and new tie straps.

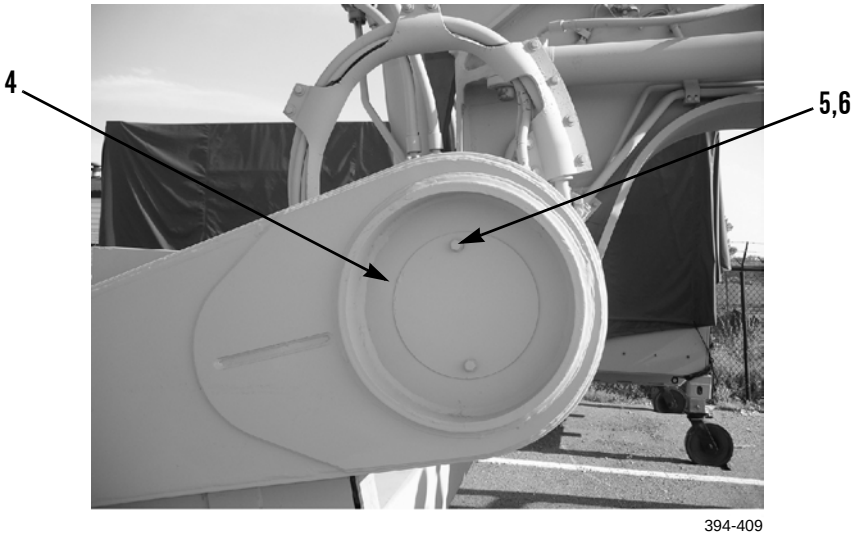


INSTALLATION - CONTINUED

22. If removed, install elbows (1) on bracket (3).
23. Connect two hose assemblies (2) to elbows (1).

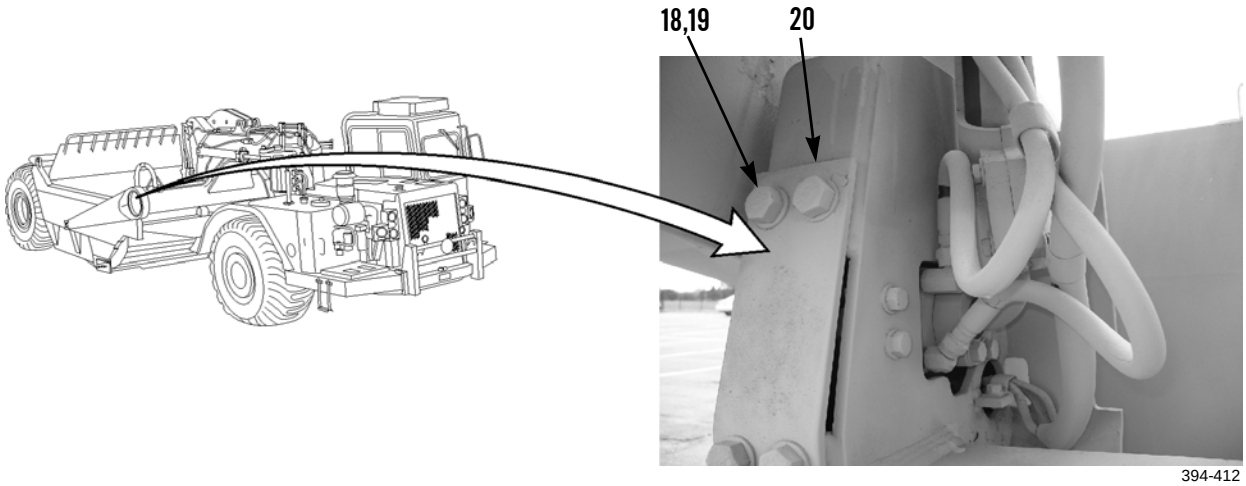


24. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
25. Shut down engine (TM 5-3805-248-10).
26. Check for air system leaks.
27. Install plate (4), two washers (6) and bolts (5) on draft arm.



INSTALLATION - CONTINUED

28. Install plate (20), washers (19) and four bolts (18) on right side of bowl.



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END OF WORK PACKAGE

SCRAPER AIR TANK LINES AND FITTINGS REPLACEMENT 0165 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0154 00

WP 0157 00

References - Continued

WP 0160 00

WP 0164 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

1. Disconnect scraper air tank hose from quick release and holding valve (WP 0157 00).
2. Disconnect scraper air tank hose from scraper air brake relay valve (WP 0160 00).
3. Disconnect scraper air tank hose from bowl intermediate hydraulic hose (WP 0164 00).
4. Disconnect three scraper air tank hoses from scraper air tank (WP 0154 00).
5. If damaged, remove fittings from quick release and holding valve (WP 0157 00).
6. If damaged, remove fittings from scraper air brake relay valve (WP 0160 00).
7. If damaged, remove fittings from scraper air tank (WP 0154 00).
8. If damaged, remove fittings from bowl intermediate hydraulic hose (WP 0164 00).

REMOVAL - CONTINUED

NOTE

Note the routing and position of the hoses, any retaining hardware, and tie straps prior to removal to ensure correct installation.

9. Trace routing of three hose assemblies and remove all retaining hardware and tie straps.
10. Remove all scraper air tank hoses from machine.

INSTALLATION

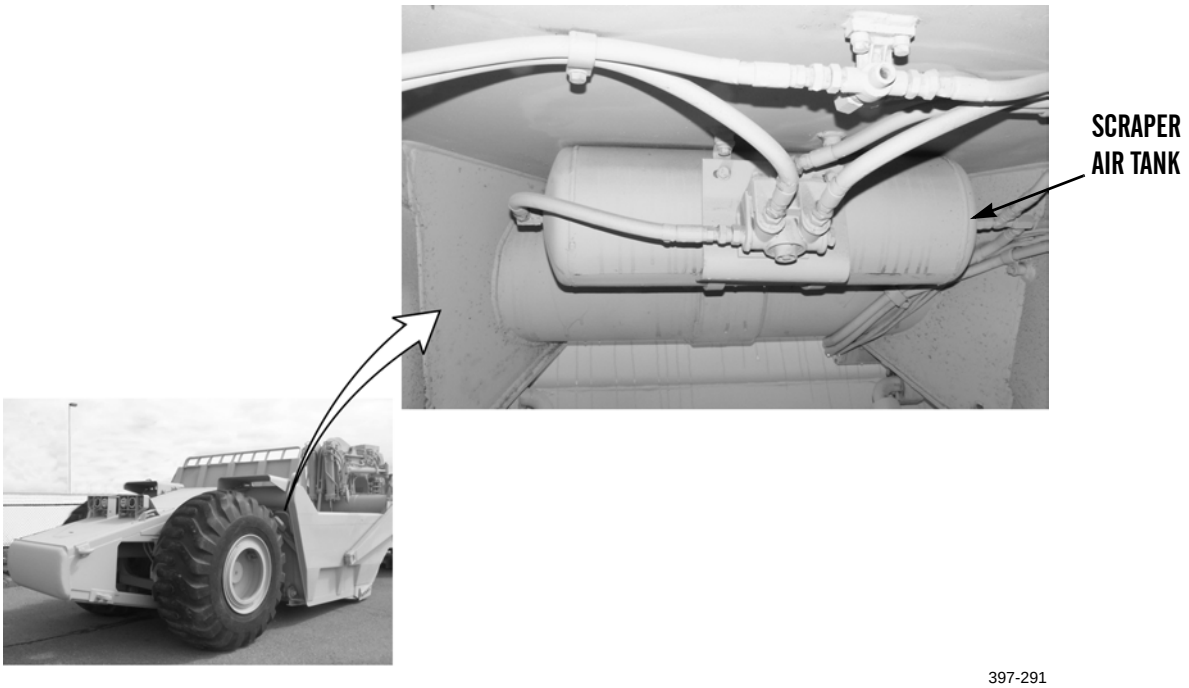
NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install fittings on bowl intermediate hydraulic hose (WP 0164 00).
2. If removed, install fittings on scraper air tank (WP 0154 00).
3. If removed, install fittings on scraper air brake relay valve (WP 0160 00).
4. If removed, install fittings on quick release and holding valve (WP 0157 00).
5. Position three scraper air tank hoses on machine.
6. Connect three scraper air tank hoses to scraper air tank (WP 0154 00).
7. Connect scraper air tank hose to quick release and holding valve (WP 0157 00).
8. Connect scraper air tank hose to bowl intermediate hydraulic hose (WP 0164 00).
9. Connect scraper air tank hose to scraper air brake relay valve (WP 0160 00).
10. Install all retaining hardware and new tie straps.

INSTALLATION - CONTINUED

11. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
12. Shut down engine (TM 5-3805-248-10).
13. Check for air system leaks.



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END OF WORK PACKAGE

SCRAPER BRAKE ACTUATOR LINES AND FITTINGS REPLACEMENT 0166 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap Set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0151 00

WP 0157 00

WP 0160 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnect lines. Contamination of air system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

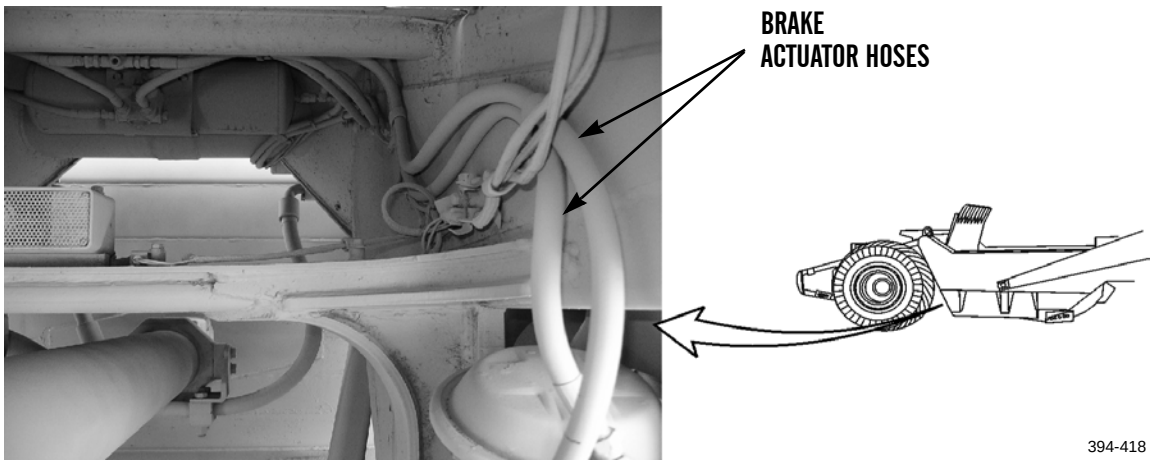
1. Disconnect four scraper air brake actuator hoses from scraper air brake actuators (WP 0151 00).
2. Disconnect other end of two scraper air brake actuator hoses from quick release and holding valve (WP 0157 00).
3. Disconnect other end of two scraper air brake actuator hoses from scraper air brake relay valve (WP 0160 00).
4. If damaged, remove fittings from quick release and holding valve (WP 0157 00).
5. If damaged, remove fittings from scraper air brake relay valve (WP 0160 00).
6. If damaged, remove fittings from air brake actuators (WP 0151 00).

REMOVAL - CONTINUED

NOTE

Note the routing and position of the hoses, any retaining hardware, and tie straps prior to removal to ensure correct installation.

7. Trace routing of four hose assemblies and remove all retaining hardware and tie straps.
8. Remove four scraper air brake actuator hoses from machine.



INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. If removed, install fittings on air brake actuators (WP 0151 00).
2. If removed, install fittings on scraper air brake relay valve (WP 0160 00).
3. If removed, install fittings on quick release and holding valve (WP 0157 00).
4. Position four scraper air brake actuators hoses on machine.
5. Connect four scraper air brake actuator hoses to scraper air brake actuators (WP 0151 00).
6. Connect other end of two scraper air brake actuator hoses to quick release and holding valve (WP 0157 00).
7. Connect other end of two scraper air brake actuator hoses to scraper air brake relay valve (WP 0160 00).
8. Install all retaining hardware and new tie straps.
9. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
10. Shut down engine (TM 5-3805-248-10).
11. Check for air system leaks.

END OF WORK PACKAGE

AIR COMPRESSOR REPLACEMENT 0167 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Compound, sealing (Item 10, WP 0339 00)

Oil, lubricating (Item 30, 31 and 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Materials/Parts - Continued

Tape, anti-seizing (Item 43, WP 0339 00)

Gasket

Seal

References

WP 0042 00

WP 0168 00

Personnel Required

Two

Equipment Condition

Hood removed (WP 0189 00)

REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air, cooling or lubrication system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

REMOVAL - CONTINUED

1. Disconnect six hose assemblies (4) from air compressor (3) assembly.
2. Remove three nuts (1) and washers (2).

WARNING

Use caution when handling heavy parts. Failure to follow this warning may cause injury.

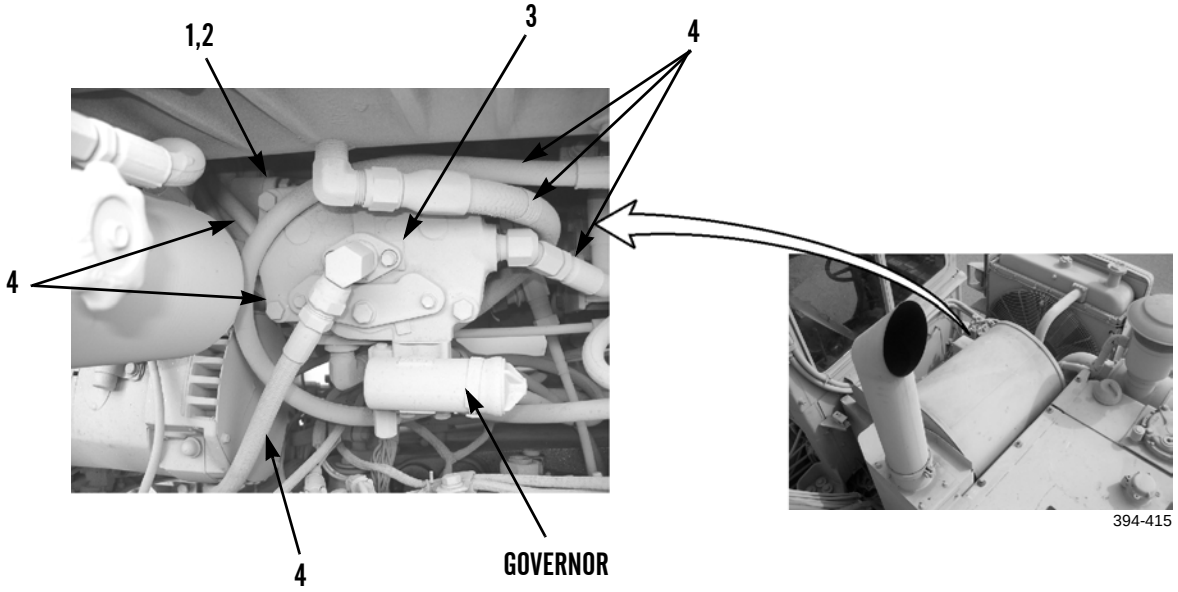
CAUTION

Lines near the air compressor may obstruct the removal path. Use extra care when removing the air compressor so other parts of the machine are not damaged.

NOTE

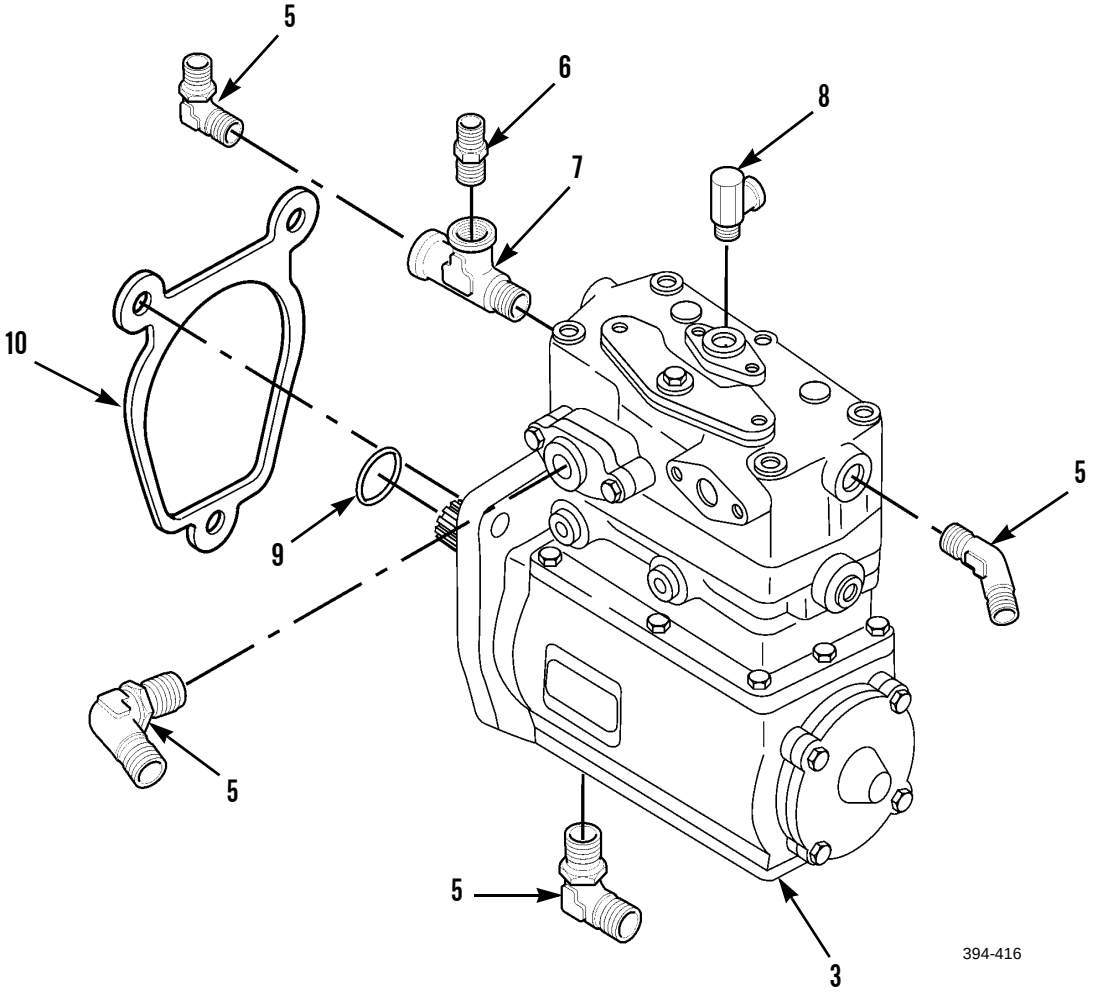
Air compressor weighs 50 lb (23 kg).

3. Use assistance to remove air compressor assembly (3) from machine.



REMOVAL - CONTINUED

4. If damaged, remove four elbows (5), elbow (8), connector (6) and tee (7) from air compressor assembly (3).
5. Remove and discard gasket (10) and seal (9) from air compressor assembly (3).
6. Remove governor (WP 0168 00).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove gasket material from all mating surfaces.
2. Clean all parts with solvent cleaning compound.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install governor (WP 0168 00).
2. Apply a thin coat of lubricating oil to lip of new seal (9) and install in crankshaft of air compressor assembly (3).
3. Apply a thin coat of lubricating oil to accessory drive bore where the air compressor assembly (3) contacts accessory drive.
4. Position new gasket (10) on compressor assembly (3).

CAUTION

Do NOT use anti-seizing tape on oil line connections. Use sealing compound instead. Anti-seizing tape can deteriorate and contaminate the oil system causing premature failure.

NOTE

- Apply anti-seizing tape half way up the threads of all AIR AND COOLANT hose and fitting connections prior to installation to ensure correct sealing.
- Apply sealing compound to the threads of all OIL hose and fitting connections prior to installation to ensure correct sealing.

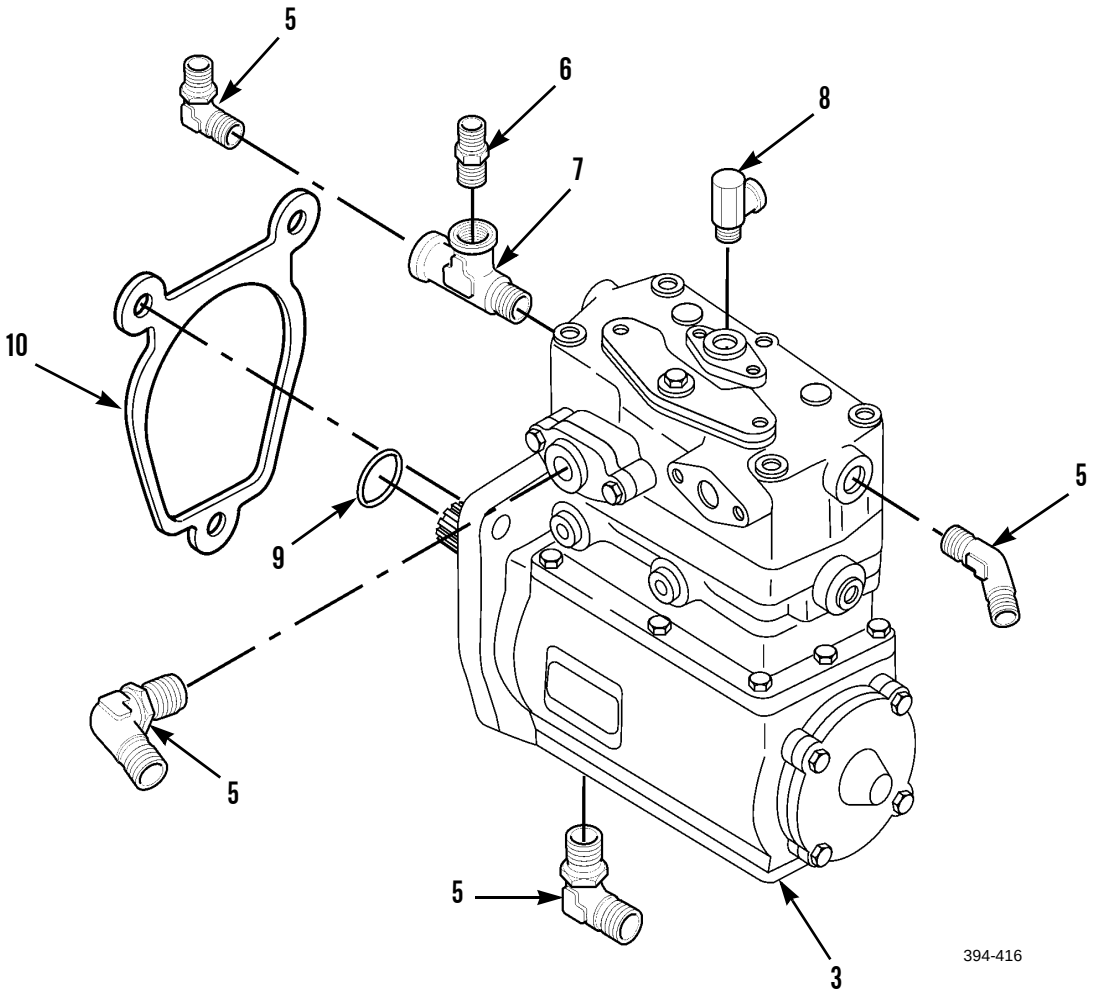
5. Install four elbows (5), elbow (8), connector (6) and tee (7) on air compressor assembly (3).

INSTALLATION - CONTINUED

CAUTION

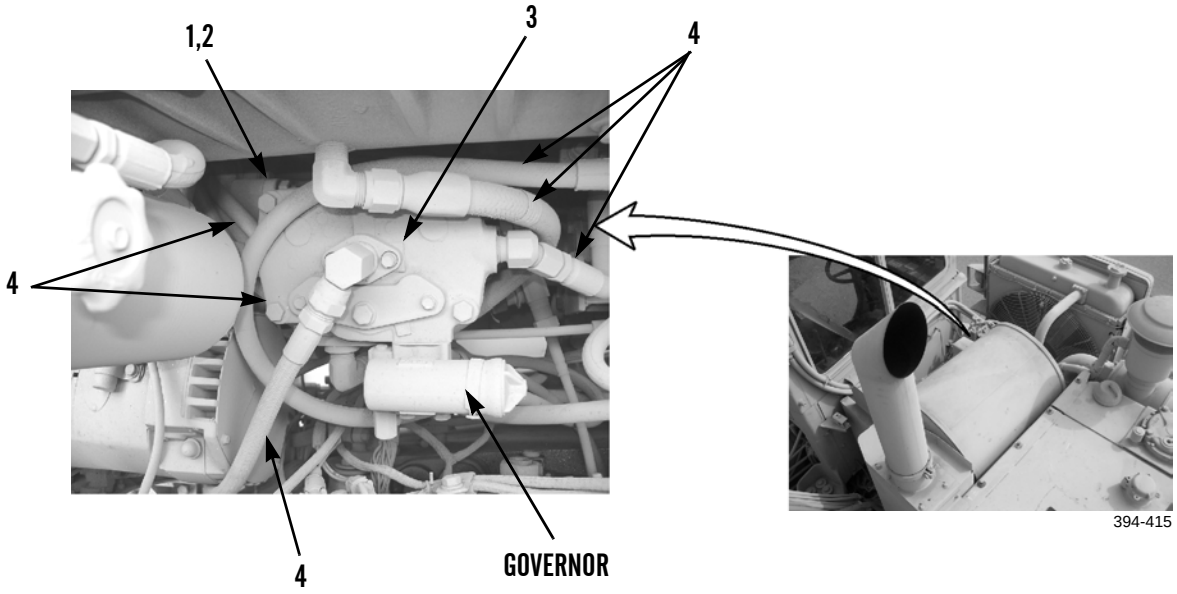
Lines near the air compressor may obstruct the installation path. Use extra care when installing the air compressor so other parts of the machine are not damaged.

6. Position air compressor assembly (3) on machine.



INSTALLATION - CONTINUED

7. Install three washers (2) and nuts (1).
8. Connect six hose assemblies (4) to air compressor (3).



9. Refill coolant (WP 0042 00).
10. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
11. Shut down engine (TM 5-3805-248-10).
12. Inspect hose assemblies and connections for oil, coolant or air leaks.
13. Install hood (WP 0189 00).

END OF WORK PACKAGE

AIR COMPRESSOR GOVERNOR MAINTENANCE 0168 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Gasket

Personnel Required

Two

Equipment Condition

Hood removed (WP 0189 00)

Air pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

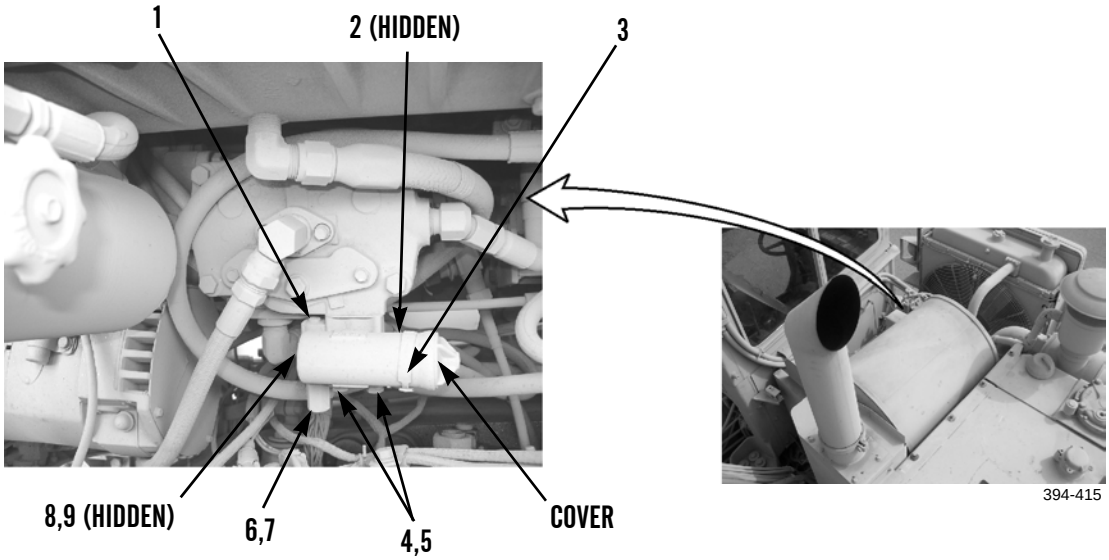
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if necessary to replace.

REMOVAL - CONTINUED

1. Disconnect two hose assemblies (6) from air compressor governor (3).
2. Remove two bolts (4) and washers (5).
3. Remove air compressor governor assembly (3).
4. Remove and discard gasket (2).
5. Remove elbow (7), connector (8), two plugs (1) and vent (9) from air compressor governor assembly (3).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent cleaning compound.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Install vent (9), two plugs (1), connector (8) and elbow (7) on air compressor governor (3).
2. Install new gasket (2).
3. Install air compressor governor assembly (3) on compressor.
4. Install two washers (5) and bolts (4) in air compressor governor assembly (3).
5. Connect two hose assemblies (6) to air compressor governor assembly (3).

ADJUSTMENT

NOTE

The following steps require assistance.

1. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10). Read air pressure gage. Allow air pressure to reach cut-out pressure of 115-125 psi (793-822 kPa).
2. Push in brake pedal rapidly several times.
3. Read air pressure gage. Air pressure should drop to cut-in pressure to 95-100 psi (655-690 kPa).

NOTE

If cut-out and cut-in pressure do not meet specifications, make the adjustments in the following steps.

4. Remove cover of governor assembly (3) from left side of engine.
5. Loosen locknut.
6. Turn adjustment screw counterclockwise to increase cut-out pressure; clockwise to decrease. One full turn changes cut-out and cut-in pressure approximately 20 psi (138 kPa).

NOTE

If adjustment screw does not change cut-out pressure, the air compressor unloading valves are not working correctly. If the cut-in to cut-out pressure difference is not 20-30 psi (138-207 kPa), replace governor.

7. Hold adjustment screw.
8. Tighten locknut.
9. Install cover of governor assembly (3).
10. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
11. Shut down engine (TM 5-3805-248-10).
12. Check for air system leaks.
13. Install hood (WP 0189 00).

END OF WORK PACKAGE

AIR COMPRESSOR LINES AND FITTINGS REPLACEMENT 0169 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Compound, sealing (Item 10, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0022 00

WP 0042 00

WP 0051 00

WP 0152 00

WP 0167 00

Equipment Condition

Air pressure vented (TM 5-3805-248-10)

Hood removed (WP 0189 00)

REMOVAL

WARNING

Make sure air pressure is discharged before attempting any disassembly or removal of lines.

CAUTION

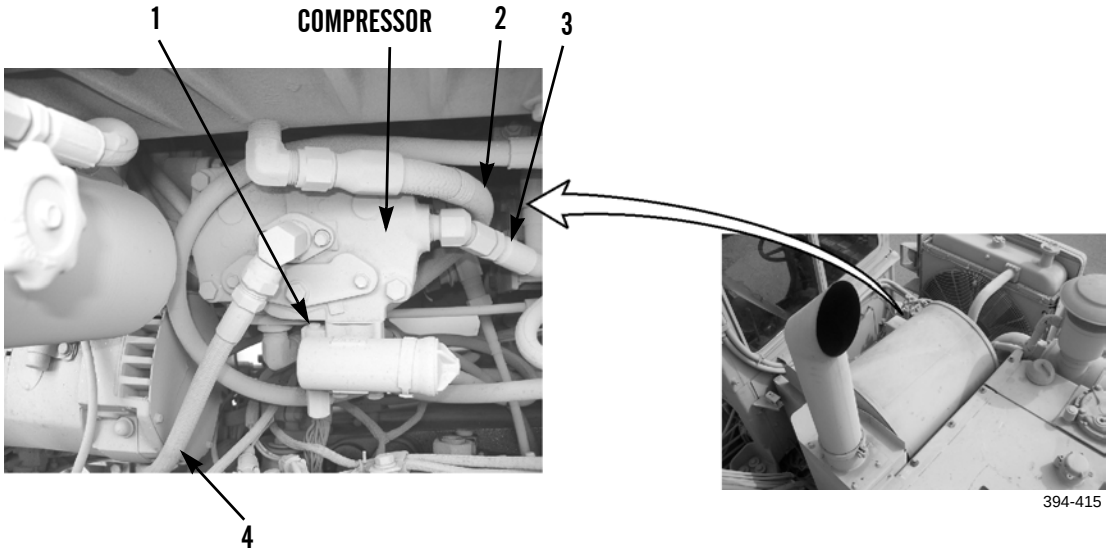
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air, cooling or lubrication system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if necessary to replace.

REMOVAL - CONTINUED

1. Disconnect hose assemblies (2, 3, 4, 5 and 6) from compressor.
2. Disconnect hose assembly (2) from elbow (1).
3. Remove elbow (1) from aftercooler.
4. Disconnect two hose assemblies (3) from cylinder block.
5. Disconnect other end of hose assembly (5) from cylinder head.
6. Disconnect hose assembly (4) from air dryer (WP 0152 00).



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7. Disconnect hose assembly (6) from coolant filter housing (WP 0051 00).

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8. If damaged, remove fittings from air compressor (WP 0167 00).
9. If damaged, remove fittings from coolant filter housing (WP 0051 00).
10. If damaged, remove fittings from air dryer (WP 0152 00).
11. Remove any leaking or damaged fittings from cylinder head or cylinder block.

REMOVAL - CONTINUED

NOTE

Note the routing and position of the hoses, any retaining hardware, and tie straps prior to removal to ensure correct installation.

12. Trace routing of six hose assemblies and remove all retaining hardware and tie straps.
13. Remove six hoses from machine.

INSTALLATION

CAUTION

Do NOT use anti-seizing tape on oil line connections. Use sealing compound instead. Anti-seizing tape can deteriorate and contaminate the oil system causing premature failure.

NOTE

- Apply anti-seizing tape half way up the threads of all AIR AND COOLANT hose and fitting connections prior to installation to ensure correct sealing.
- Apply sealing compound to the threads of all OIL hose and fitting connections prior to installation to ensure correct sealing.

1. Position six hoses on machine.
2. If removed, install fittings on cylinder head or cylinder block.
3. If removed, install fittings on air dryer (WP 0152 00).
4. If removed, install fittings on coolant filter housing (WP 0051 00).
5. If removed, install fittings on air compressor (WP 0167 00).
6. If removed, install elbow (1) on aftercooler.
7. Connect hose assemblies (2, 3, 4, 5, and 6) to compressor.
8. Connect hose assembly (6) to coolant filter housing (WP 0051 00).
9. Connect hose assembly (4) to air dryer (WP 0152 00).
10. Connect other end of hose assembly (5) to cylinder head.
11. Connect two hose assemblies (3) to cylinder block.
12. Connect hose assembly (2) to elbow (1).
13. Install all retaining hardware and new tie straps.
14. Fill coolant (WP 0042 00).
15. Fill oil (WP 0022 00).
16. Operate engine until normal operating air pressure is reached (TM 5-3805-248-10).
17. Shut down engine (TM 5-3805-248-10).
18. Inspect hose assemblies and connections for oil, coolant or air leaks.
19. Install hood (WP 0189 00).

END OF WORK PACKAGE

TRANSMISSION HOLD AIR LINES REPLACEMENT 0170 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent (Item 13, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Step assembly removed (WP 0200 00)

Crankcase guards removed (WP 0201 00)

Air tank pressure vented (TM 5-3805-248-10)

REMOVAL

CAUTION

Wipe area clean around all connections prior to removal. Cap lines and plug openings after removal. Contamination of system could result in premature failure.

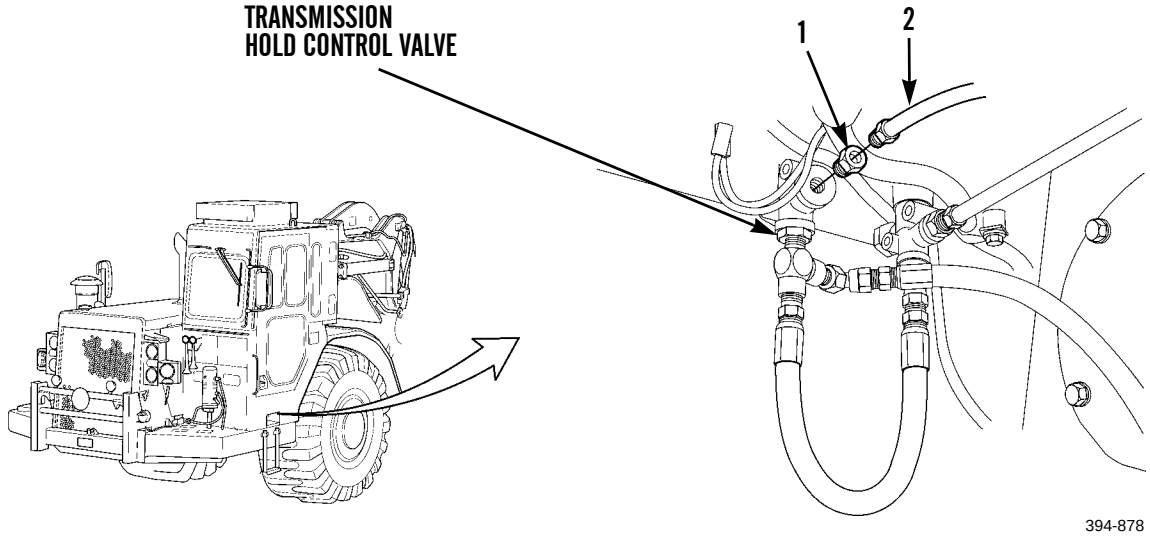
NOTE

- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Remove and note location of all clips that secure hose assemblies to ensure correct installation.

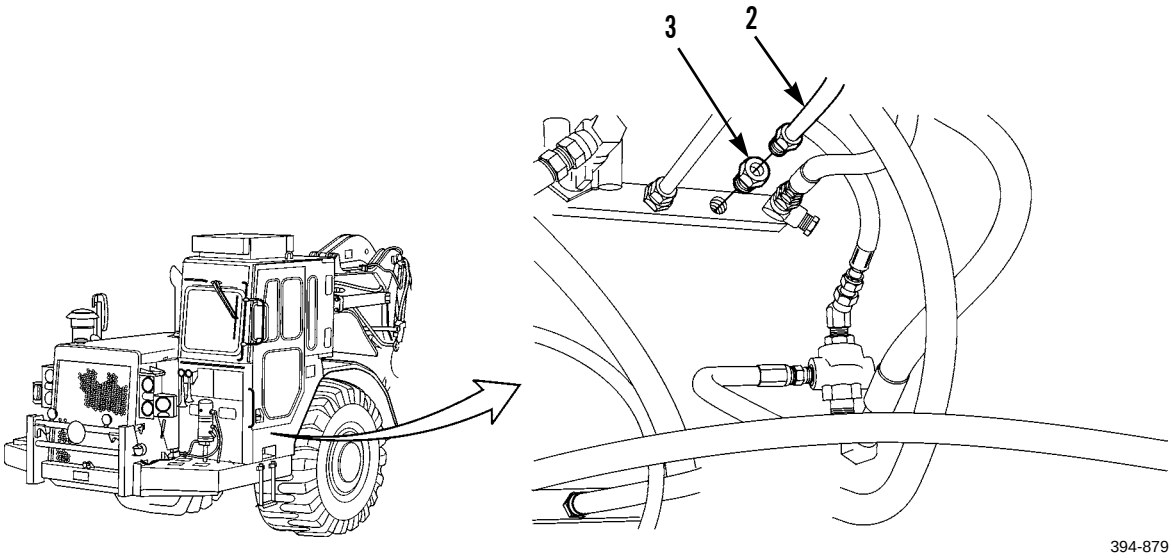
TRANSMISSION HOLD AIR LINES REPLACEMENT - CONTINUED 0170 00

REMOVAL - CONTINUED

1. Disconnect tube assembly (2) from transmission hold control valve assembly under operator compartment floor.
2. Remove connector (1).



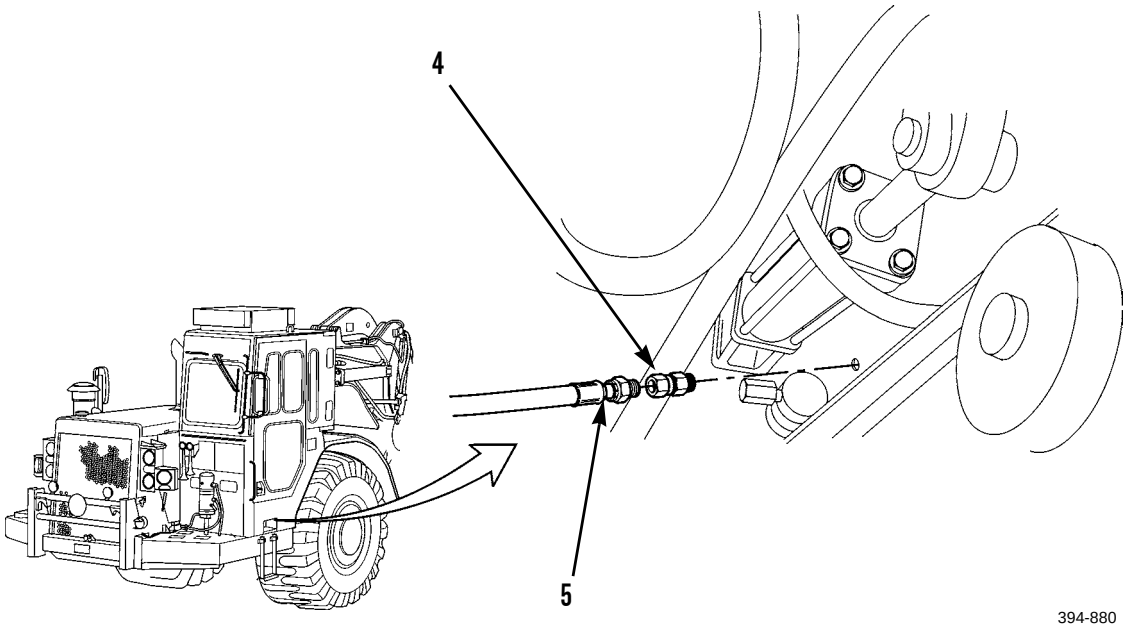
3. Remove tube assembly (2) and connector (3) from manifold.



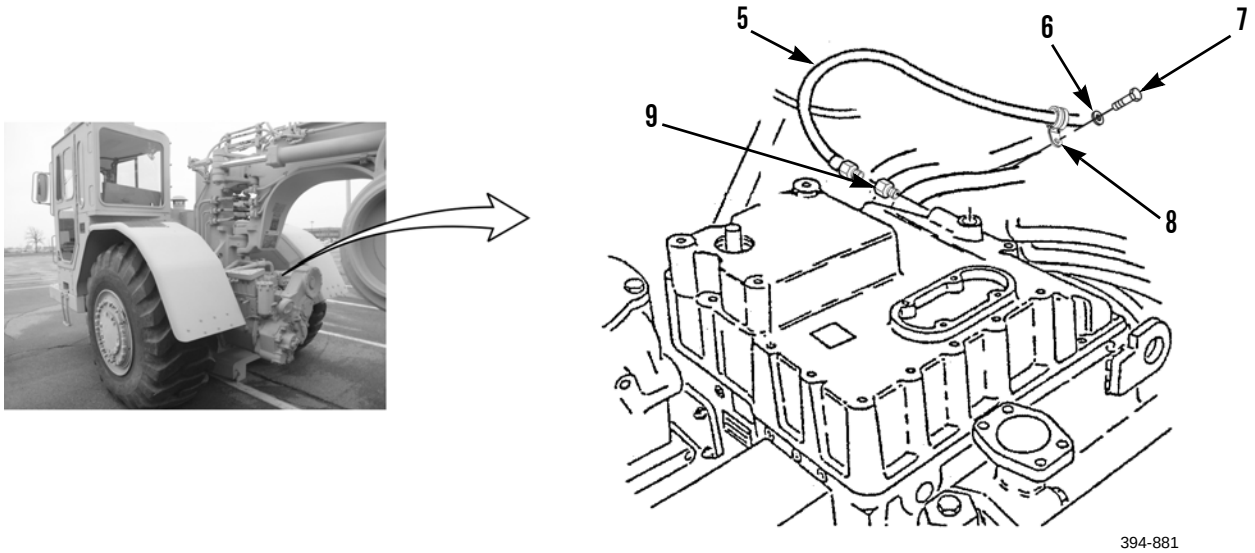
TRANSMISSION HOLD AIR LINES REPLACEMENT - CONTINUED 0170 00

REMOVAL - CONTINUED

4. Disconnect hose assembly (5) from union (4) under right side of machine.



5. Remove bolt (7), washer (6) and clip (8).
6. Remove hose assembly (5) and union (9).



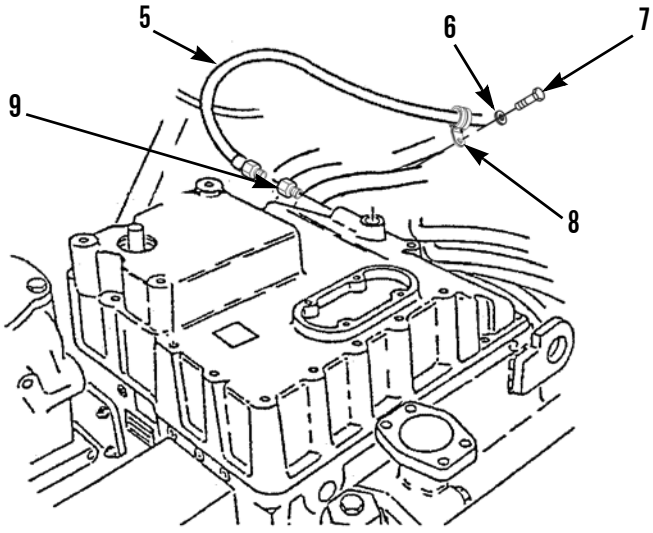
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all metal parts with solvent and rubber parts with detergent.
2. Dry parts with compressed air.
3. Inspect all parts and replace if damaged.

INSTALLATION

1. Install union (9).
2. Install hose assembly (5).
3. Install clip (8), washer (6) and bolt (7).



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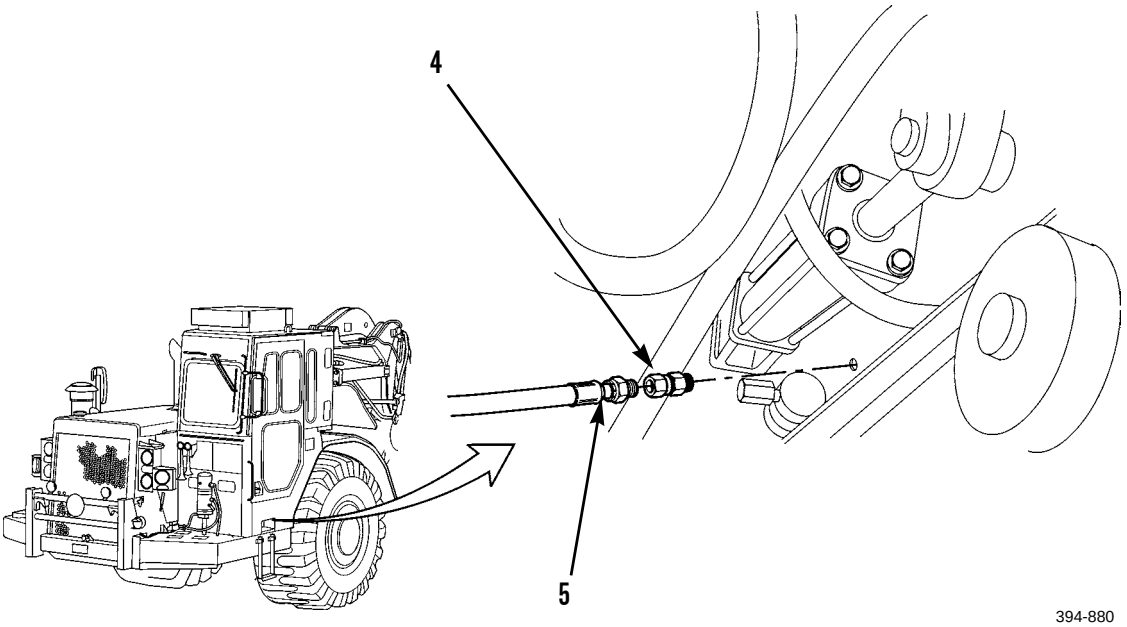
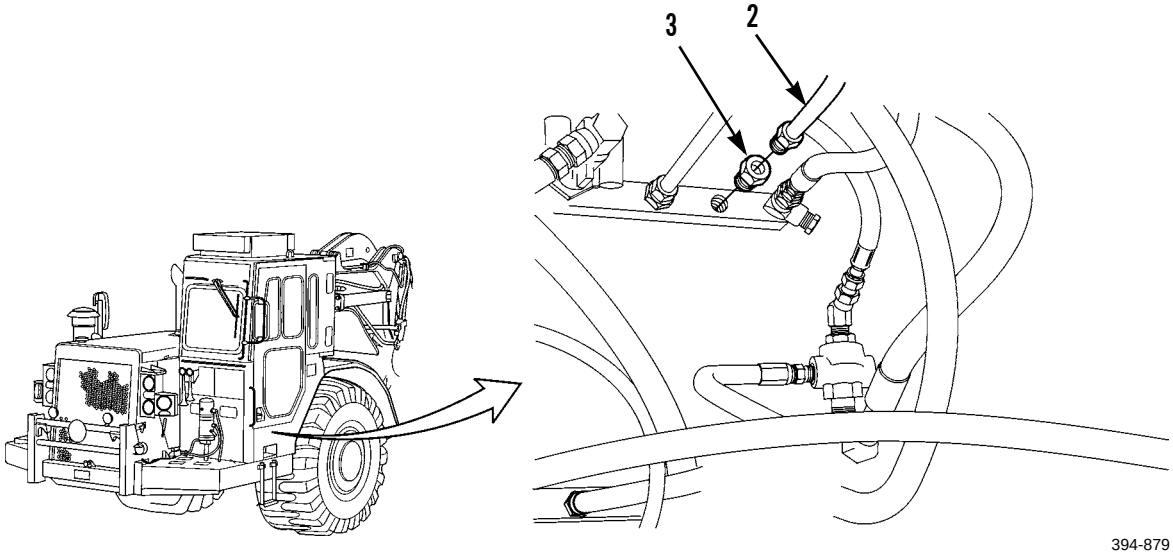
INSTALLATION - CONTINUED

4. Install union (4).
5. Connect hose assembly (5).

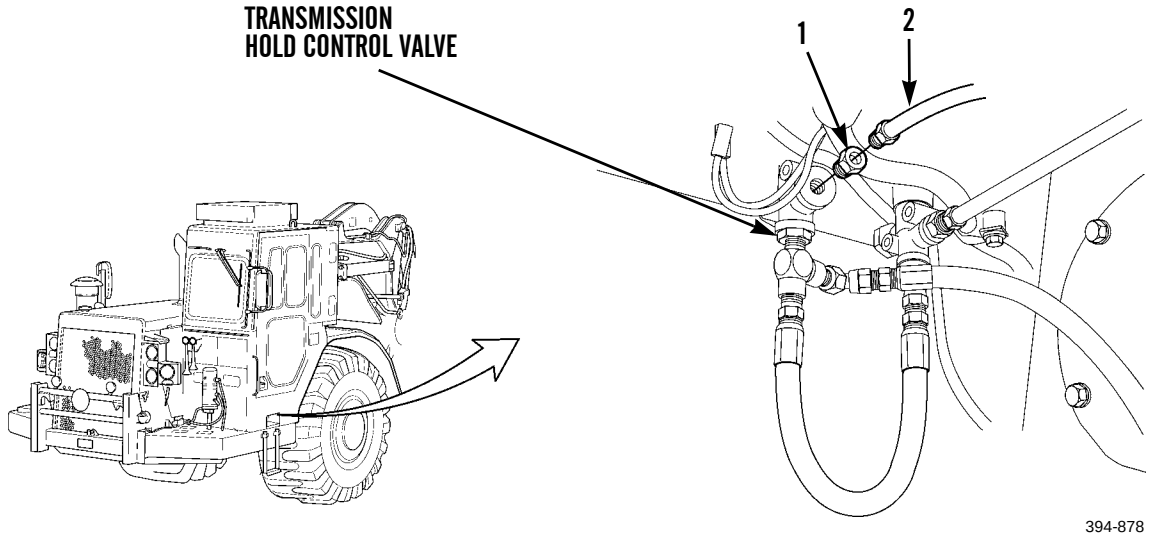


6. Install connector (3).
7. Install tube assembly (2).



INSTALLATION - CONTINUED

8. Install connector (1).
9. Connect tube assembly (2).



10. Operate machine and check for leaks (TM 5-3805-248-10).
11. Install step assembly (WP 0200 00).
12. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

DIFFERENTIAL LOCK PEDAL REPLACEMENT 0171 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Pin, cotter

References

WP 0173 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

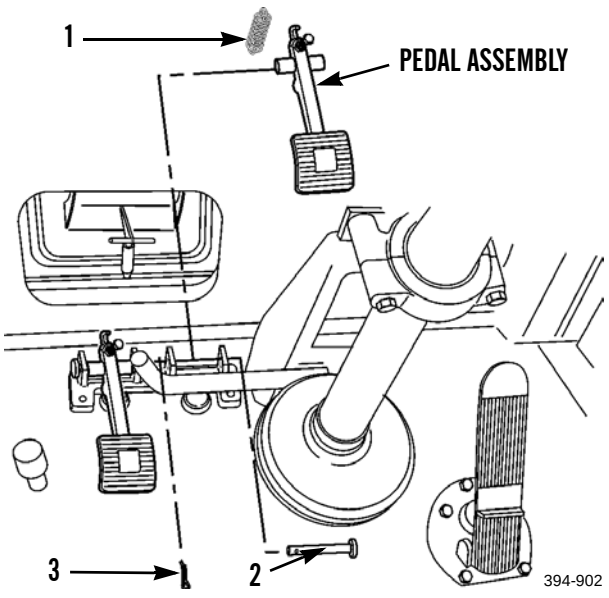
Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

WARNING

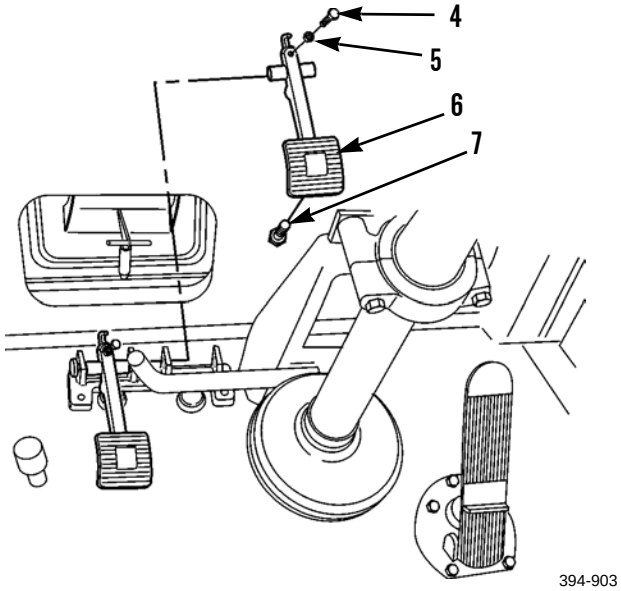
Some components are under spring tension. Wear eye protection and use caution during disassembly to avoid injury.

1. Remove cotter pin (3), pin (2), spring (1) and pedal assembly. Discard cotter pin.



REMOVAL - CONTINUED

2. Remove lock bolt (7), bolt (4) and nut (5) from pedal (6).

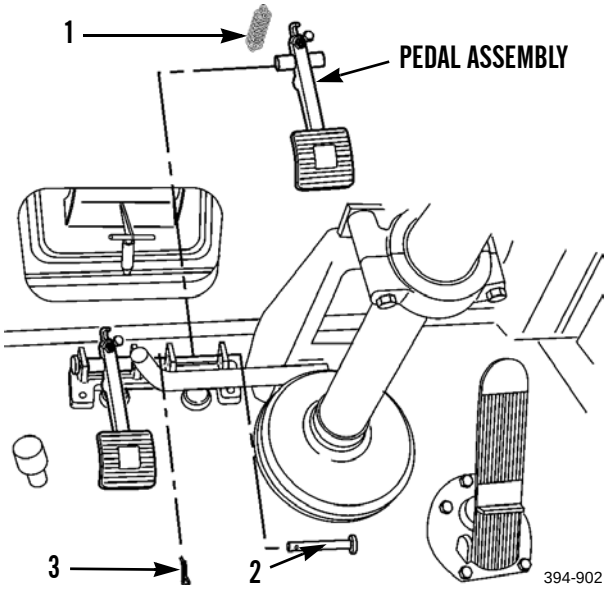


INSTALLATION

WARNING

Some components are under spring tension. Wear eye protection and use caution during disassembly to avoid injury.

1. Install nut (5) and bolt (4). Tighten bolt only until threads protrude through pedal (6).
2. Install lock bolt (7).
3. Install pedal assembly, spring (1), pin (2) and new cotter pin (3).
4. Adjust pedal and valve (WP 0173 00).
5. Operate machine to verify correct differential lock pedal operation (TM 5-3805-248-10).



END OF WORK PACKAGE

DIFFERENTIAL LOCK LINES REPLACEMENT 0172 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Engine compartment shields removed (WP 0191 00)

Step assembly removed (WP 0200 00)

Crankcase guards removed (WP 0201 00)

REMOVAL

CAUTION

Wipe area clean around all connections prior to removal. Cap lines and plug openings after removal. Contamination could result in premature failure of differential lock system.

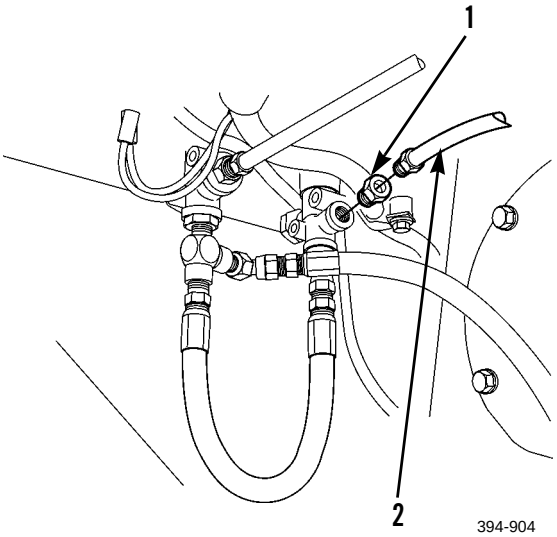
NOTE

- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Remove and note location of all clips that secure hose assemblies to ensure correct installation.

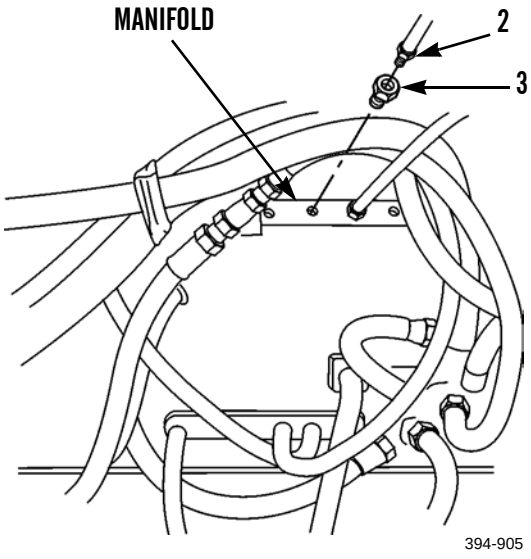
DIFFERENTIAL LOCK LINES REPLACEMENT - CONTINUED 0172 00

REMOVAL - CONTINUED

1. Disconnect tube assembly (2) from differential lock control valve assembly under cab.
2. Remove connector (1).

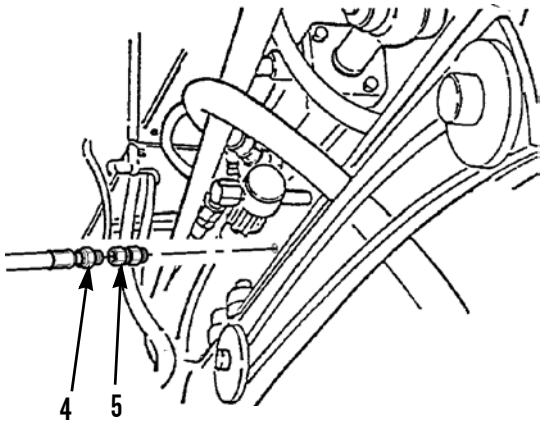


3. Remove tube assembly (2) from manifold under cab.
4. Remove connector (3).



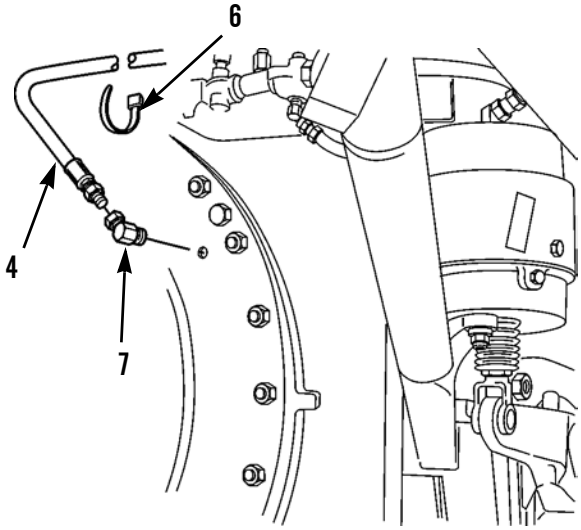
REMOVAL - CONTINUED

5. Disconnect hose assembly (4) from manifold on outside of cab beneath governor linkage shaft.
6. Remove connector (5).



394-906

7. Remove and discard four straps (6) from hose assembly (4).
8. Remove hose assembly (4) and elbow (7) from differential housing at right rear of machine.



394-907

INSTALLATION

1. Install elbow (7) on differential housing at right rear of machine.
2. Install and position hose assembly (4) in original position from front of machine to rear of machine.
3. Connect hose assembly (4) to elbow (7).
4. Install four new straps (6) on hose assembly (4).
5. Install connector (5).
6. Connect hose assembly (4) to connector (5).
7. Install connector (3).
8. Install tube assembly (2).
9. Install connector (1).
10. Connect tube assembly (2).

INSTALLATION - CONTINUED

11. Install crankcase guards (WP 0201 00).
12. Install engine compartment shields (WP 0191 00).
13. Install step assembly (WP 0200 00).
14. Inspect hose and tubes for leaks (TM 5-3805-248-10).
15. Operate machine to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

DIFFERENTIAL LOCK CONTROL VALVE ASSEMBLY MAINTENANCE 0173 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, automotive maintenance and repair (Item 103, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Compound, sealing (Item 10, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 30, WP 0339)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

Personnel Required

Two

References

TM 5-3805-248-10

Equipment Condition

Brake control valve removed (WP 0155 00)

Step assembly removed (WP 0200 00)

REMOVAL

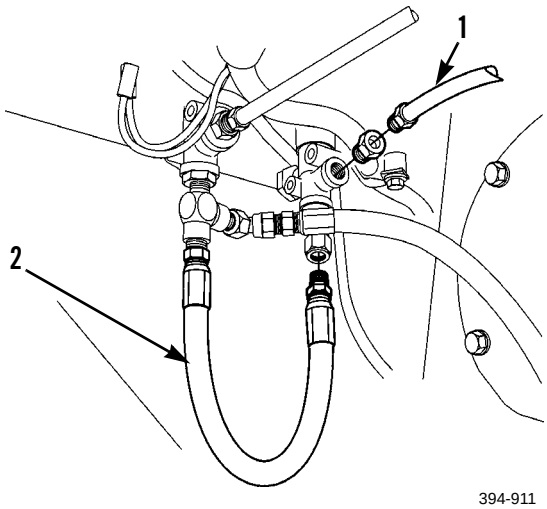
CAUTION

Wipe area clean around all connections to be opened during removal and disassembly. Cap lines and plug openings after removing lines. Contamination of hydraulic system could result in premature failure of differential lock.

NOTE

Use container to capture any oil which may drain from lines. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.

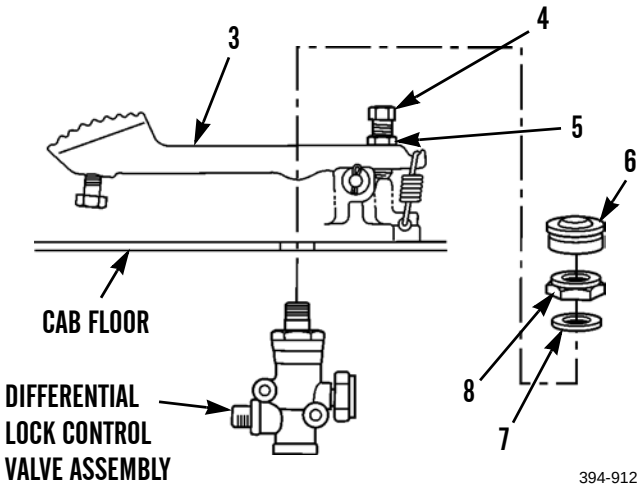
1. Disconnect tube assembly (1) from differential control valve assembly under left side of cab floor.
2. Disconnect hose assembly (2).



394-911

REMOVAL - CONTINUED

3. Loosen nut (5) and bolt (4) and raise pedal assembly (3).
4. Support differential lock control valve assembly and remove boot (6), nut (8) and washer (7) from differential lock control valve.
5. With assistance, remove differential lock control valve assembly from cab floor.



394-912

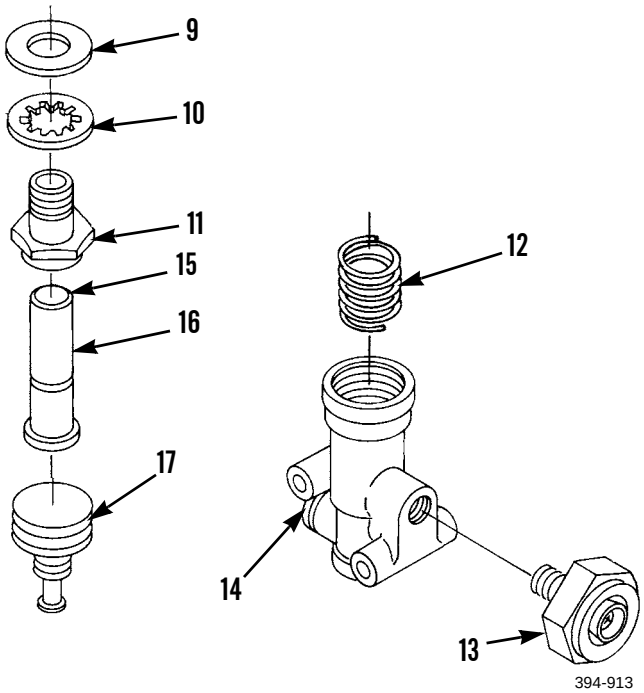
DISASSEMBLY

1. Remove washers (9 and 10) from sleeve (11).
2. Remove connector (14) and valve (13) from differential lock control valve.

WARNING

Some components are under spring tension. Wear eye protection and use caution during disassembly to avoid injury.

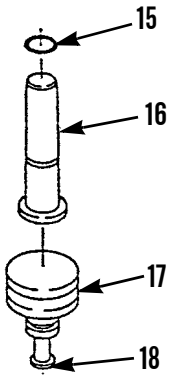
3. Remove sleeve (11), plunger assembly (16), spool assembly (17) and spring (12) from differential lock control valve.



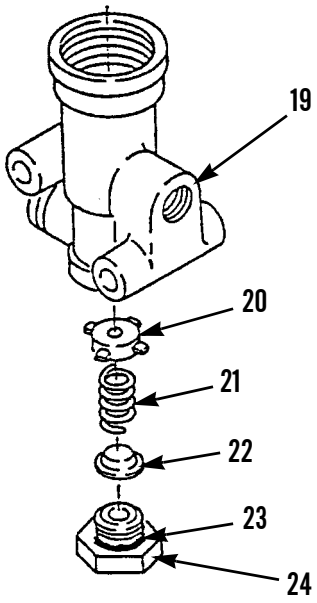
394-913

DISASSEMBLY - CONTINUED

4. Remove and discard preformed packing (15) from plunger (16) and preformed packing (18) from spool (17).



5. Remove nut (24) and preformed packing (23) from differential lock control valve (19). Discard preformed packing.
6. Remove retainer (22), spring (21) and valve (20) from body (19).



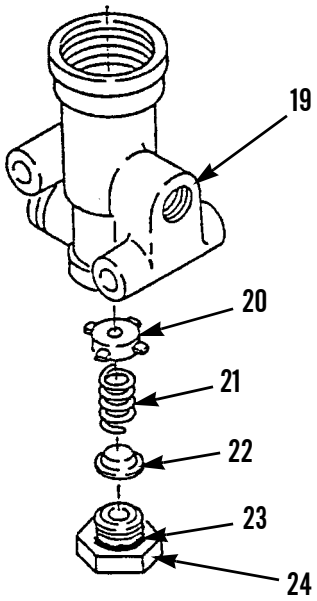
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

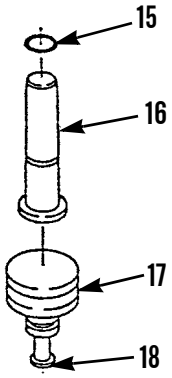
ASSEMBLY

1. Install new preformed packing (23) on nut (24) and lubricate threads of nut (24) with clean oil.
2. Lubricate bore of body (19) with lubricant.
3. Install valve (20), spring (21), retainer (22) and nut (24) in body (19).

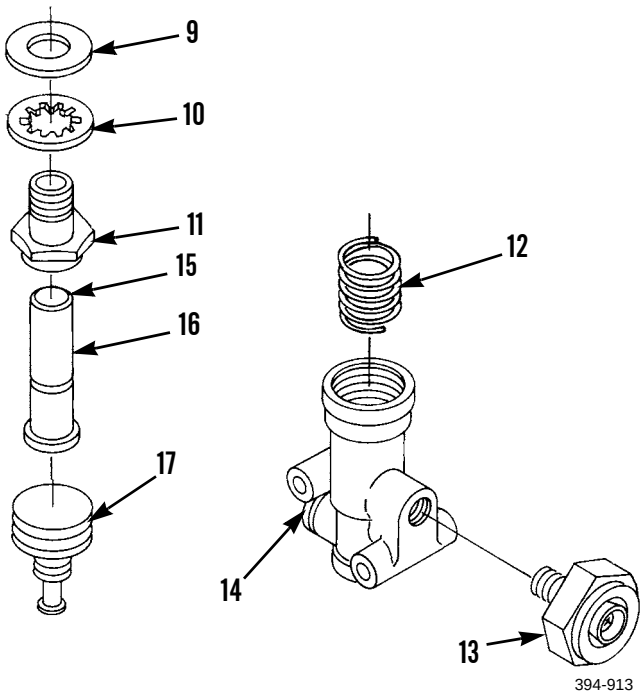


ASSEMBLY - CONTINUED

4. Install new preformed packing (18) on spool (17) and new preformed packing (15) on plunger (16).

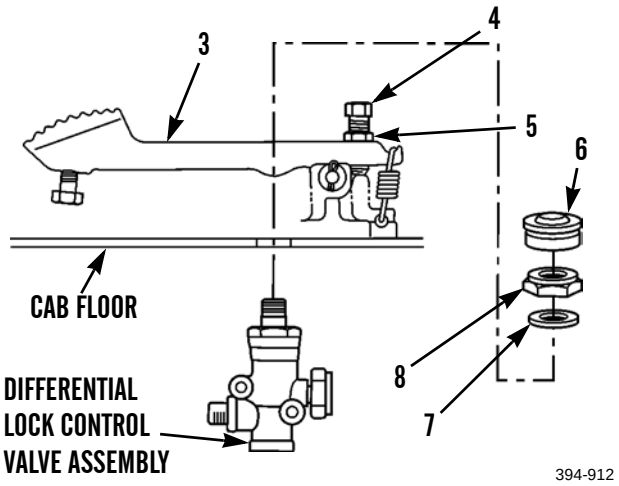


5. Install spring (12), spool assembly (17), plunger assembly (16) and sleeve (11) on differential lock control valve.
6. Install valve (13) and connector (14) on differential lock control valve.
7. Install washers (9 and 10) on sleeve (11).

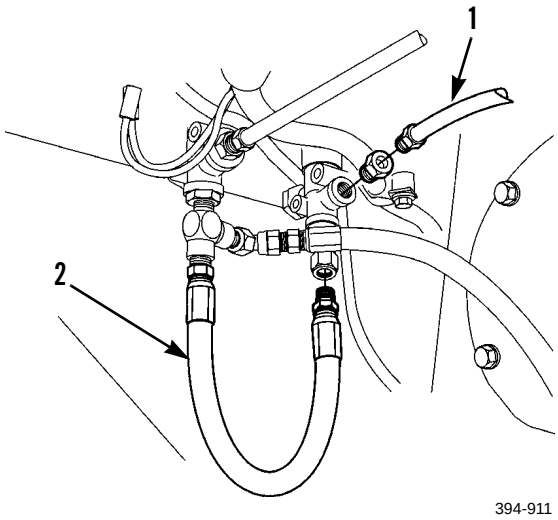


INSTALLATION

1. With assistance, insert differential lock control valve assembly through hole in floor from under left side of cab.
2. Install washer (7), nut (8) and boot (6) on differential lock control valve.

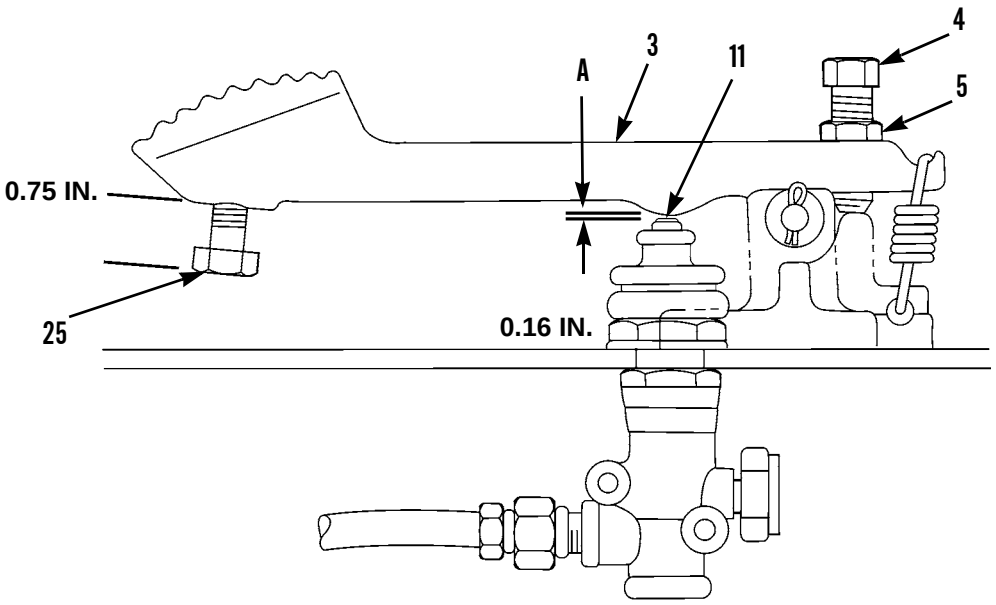


3. Apply sealing compound to threads of hose assembly (2) and tube assembly (1) and install on differential lock control valve.



ADJUSTMENT

1. Turn bolt (4) until pedal (3) is parallel with floor without moving plunger (11).
2. Turn bolt (4) until distance (A) is 0.16 in. (4.0 mm.). Repeat steps 1 and 2 until proper dimension is obtained.
3. Tighten nut (5)
4. Adjust bolt (25) to 0.75 in. as shown.



5. Install brake control valve (WP 0145 00).
6. Install step assembly (WP 0191 00).
7. Operate machine and verify proper operation (TM 5-3805-248-10).

END OF WORK PACKAGE

TRANSMISSION HOLD CONTROL VALVE ASSEMBLY MAINTENANCE 0174 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Grease, automotive and artillery, GAA (Item 20, WP 0339 00)

Materials/Parts - Continued

Lubricating oil, general purpose (Item 26, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Thread sealant (Item 38, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Personnel Required

Two

Equipment Condition

Air tank pressure vented (TM 5-3805-248-10)

Step assembly removed (WP 0200 00)

REMOVAL

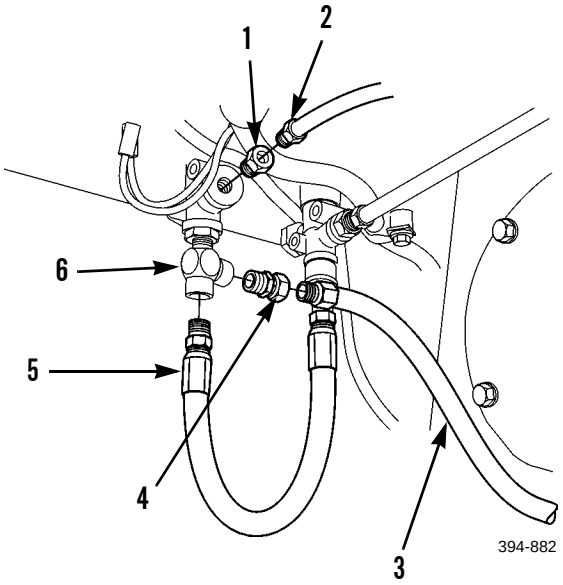
CAUTION

Wipe area clean around all connections prior to removal. Cap lines and plug openings after removal. Contamination of system could result in premature failure.

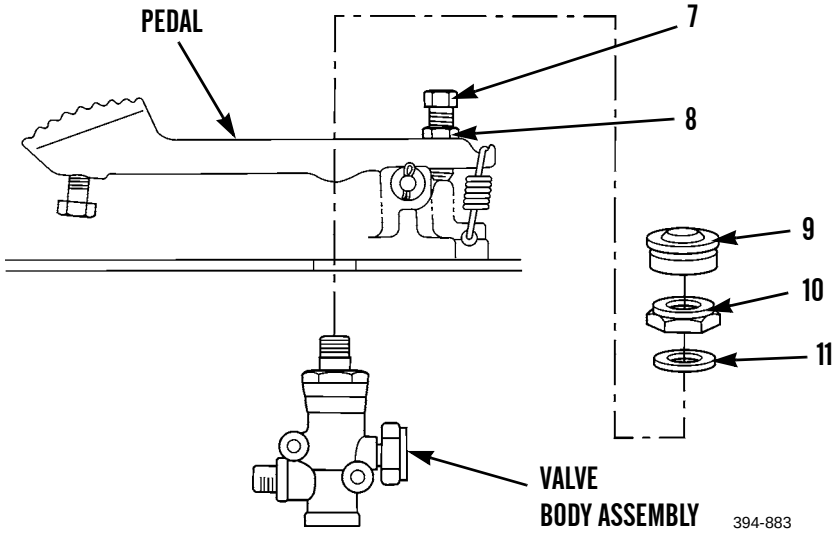
NOTE

- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Remove and note location of all clips that secure hose assemblies to ensure correct installation.

1. Disconnect hose assembly (3) from under left side of operator compartment.
2. Remove connector (4).
3. Disconnect hose assembly (5).
4. Remove elbow (6).
5. Disconnect tube assembly (2).
6. Remove connector (1).



7. Loosen nut (8) and bolt (7) and raise pedal.
8. With assistance, support valve body assembly and remove boot (9), nut (10) and one of two washers (11).
9. Remove valve body assembly from under operator compartment floor.



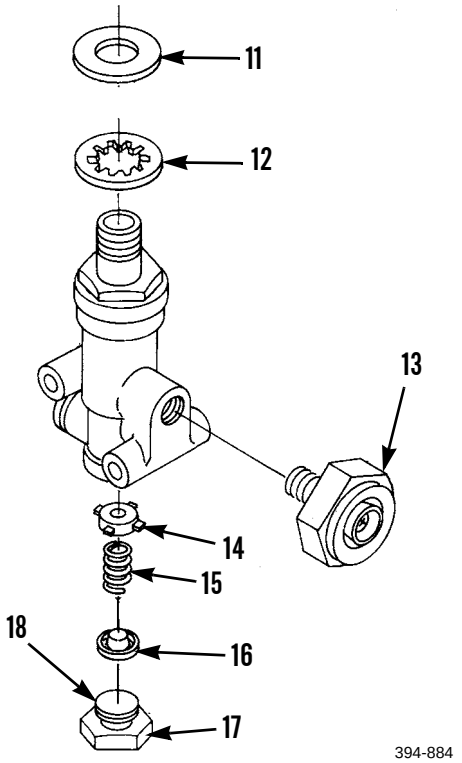
DISASSEMBLY

1. Remove remaining one of two washers (11), lockwasher (12) and valve (13).

WARNING

Always wear safety glasses when removing or installing parts restraining compressed springs. Remove restraining parts slowly to relieve spring pressure. Injury may result if you do not follow this procedure.

2. Remove nut (17), preformed packing (18), retainer (16), spring (15) and valve (14). Discard preformed packing.



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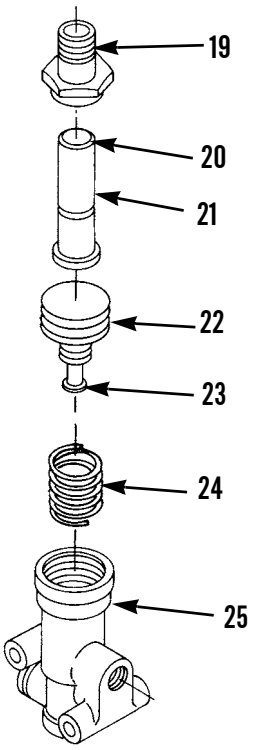
3. Remove sleeve (19), plunger (21) and preformed packing (20). Discard preformed packing.
4. Remove spool (22), preformed packing (23) and spring (24) from body (25). Discard preformed packing.



394-885

CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. The use of protective gloves and goggles is suggested. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

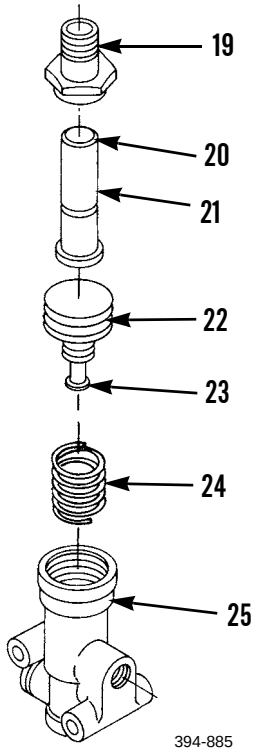
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry parts with compressed air.
4. Inspect all parts and replace if damaged.

ASSEMBLY

NOTE

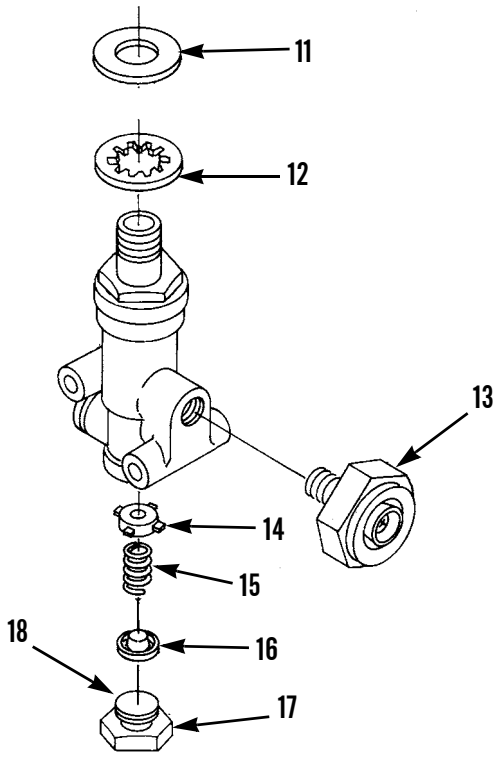
All parts furnished in transmission shift control valve assembly kit will be used to replace like parts being discarded during removal. Entirety of transmission shift control valve assembly kit will be used.

1. Using clean oil, lubricate and install new preformed packing (23) on spool (22).
2. Using clean oil, lubricate and install new preformed packing (20) on plunger (21).
3. Using grease, lubricate bore of valve body (25).
4. Using thread sealant, coat threads of sleeve (19).
5. Install spring (24) and spool (22) assembly.
6. Install plunger (21) assembly and sleeve (19) in valve body (25).



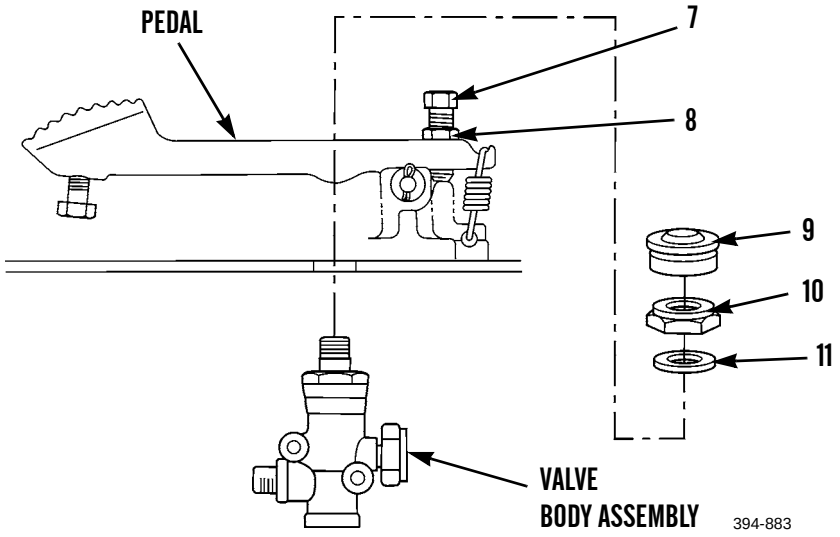
ASSEMBLY - CONTINUED

7. Using clean oil, lubricate and install new preformed packing (18) on nut (17).
8. Use thread sealant, coat threads of nut (17).
9. Install valve (14), spring (15), retainer (16), nut (17), valve (13), new lockwasher (12) and one of two washers (11).



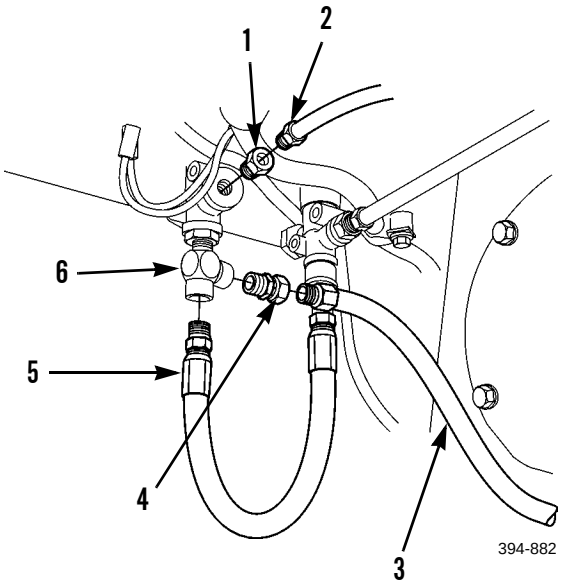
INSTALLATION

1. With assistance, install valve body assembly through operator compartment floor.
2. Install remaining one of two washers (11), nut (10) and boot (9).



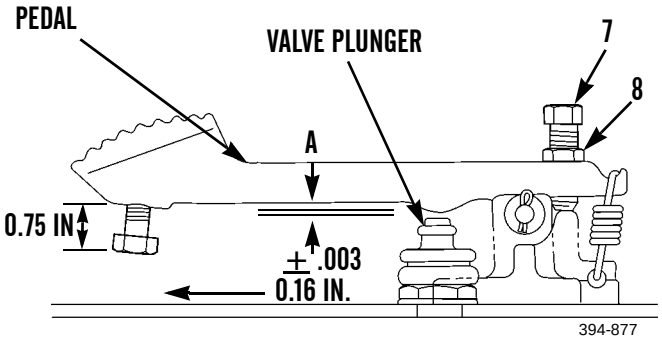
INSTALLATION - CONTINUED

3. Install connector (1).
4. Connect tube assembly (2).
5. Install elbow (6).
6. Using thread sealant, coat threads of hose assembly (5).
7. Connect hose assembly (5).
8. Install connector (4).
9. Using thread sealant, coat threads of hose assembly (3).
10. Connect hose assembly (3).
11. Adjust pedal refer to *Adjustment* in this work package.



ADJUSTMENT

1. Turn bolt (7) until pedal is parallel with floor without moving plunger.
2. Turn bolt (7) until distance A is 0.16 in. ± 0.003 in. (4 mm ± 0.076 mm).
3. Measure distance between pedal and plunger. Travel of pedal under full pedal depression must be 0.16 in. (4 mm). If not, repeat steps 1 through 3 until proper distance is obtained.
4. Tighten nut (8).



5. Install step assembly (WP 0200 00).
6. Operate machine to verify correct operation of transmission hold pedal (TM 5-3805-248-10).

END OF WORK PACKAGE

MECHANICAL STEERING ASSEMBLY ADJUSTMENT 0175 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

References

WP 0176 00

References - Continued

WP 0197 00

WP 0335 00

Personnel Required

Two

Equipment Condition

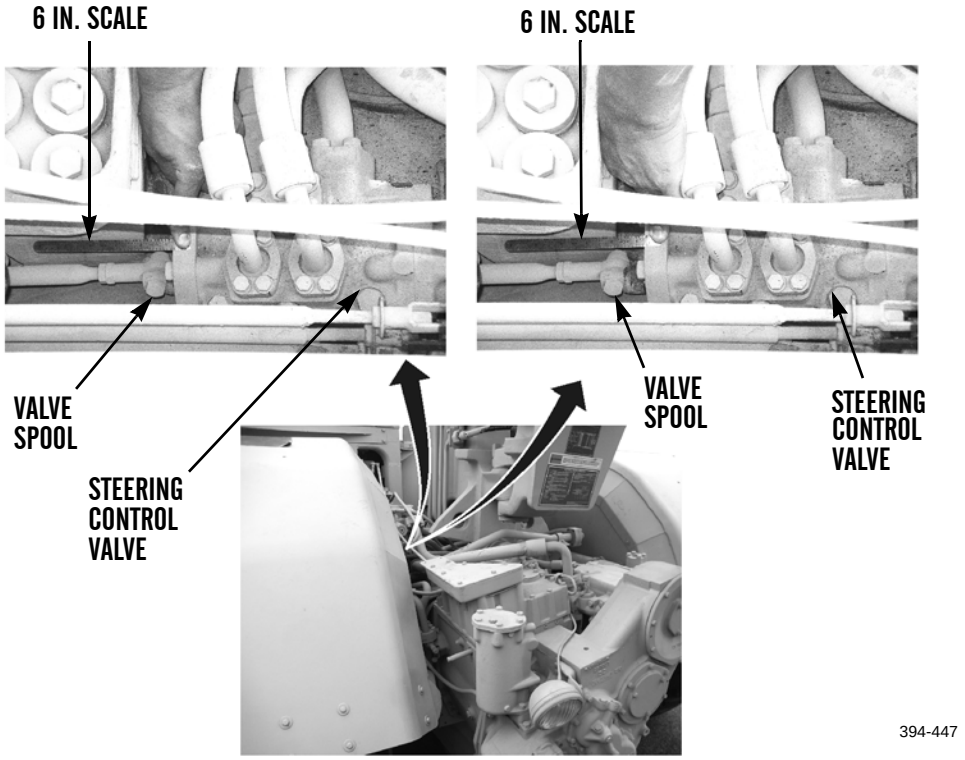
Front crankcase guard removed (WP 0201 00)

ADJUSTMENT

NOTE

Machine must be in straight ahead position before steering linkage adjustment is made.

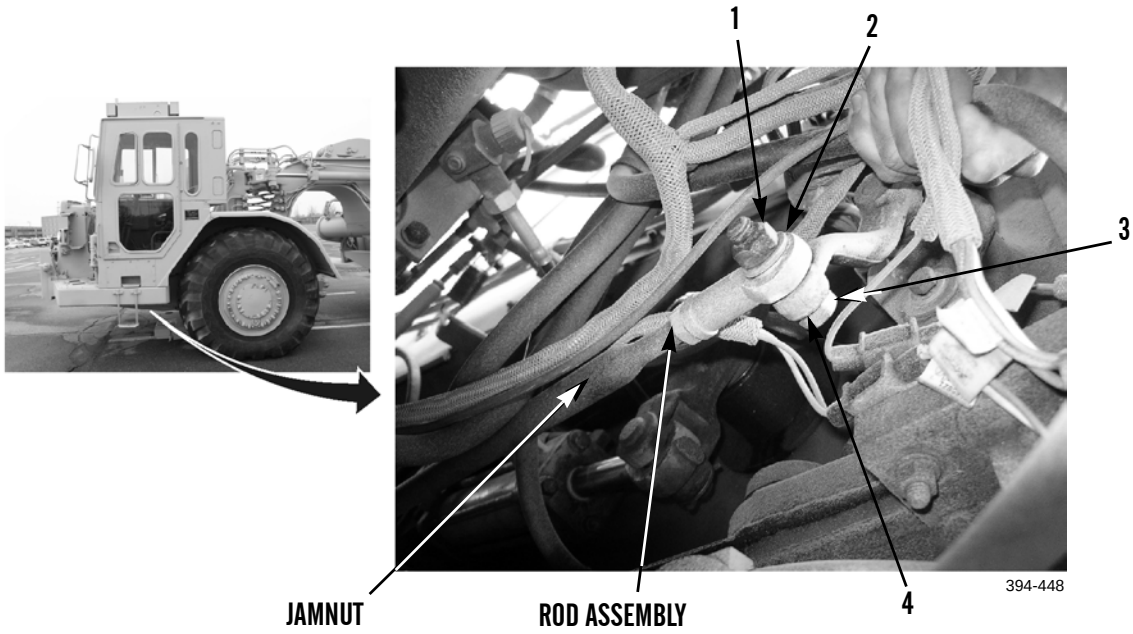
1. Turn steering wheel to right. Use force to turn steering wheel as far as it will go. This will push valve spool of steering control valve all the way in.
2. Measure the travel of valve spool, on left side behind cab, with 6-in. (15 cm) machinist's ruler. Note measurement of valve spool.
3. Turn steering wheel to left. Use force to turn steering wheel as far as it will go. This will move valve spool of steering control valve all the way out.
4. Measure the travel of valve spool. Note measurement of valve spool. If travel of valve spool does not fall within 1.12-1.15 in. (2.8-2.9 cm) range, perform the following steps.



MECHANICAL STEERING ASSEMBLY ADJUSTMENT- CONTINUED 0175 00

ADJUSTMENT - CONTINUED

5. Remove nut (1), washer (2) and bolt (3) from rod assembly.
6. Disconnect rod assembly from lever (4) on left, front side of engine.
7. With assistance measure travel of rod assembly by holding a 6 in. (15 cm) machinist's ruler at rod assembly. Measure the travel of lever (4) at hole from which bolt (3) was removed, while turning steering wheel completely to left.



ADJUSTMENT - CONTINUED

NOTE

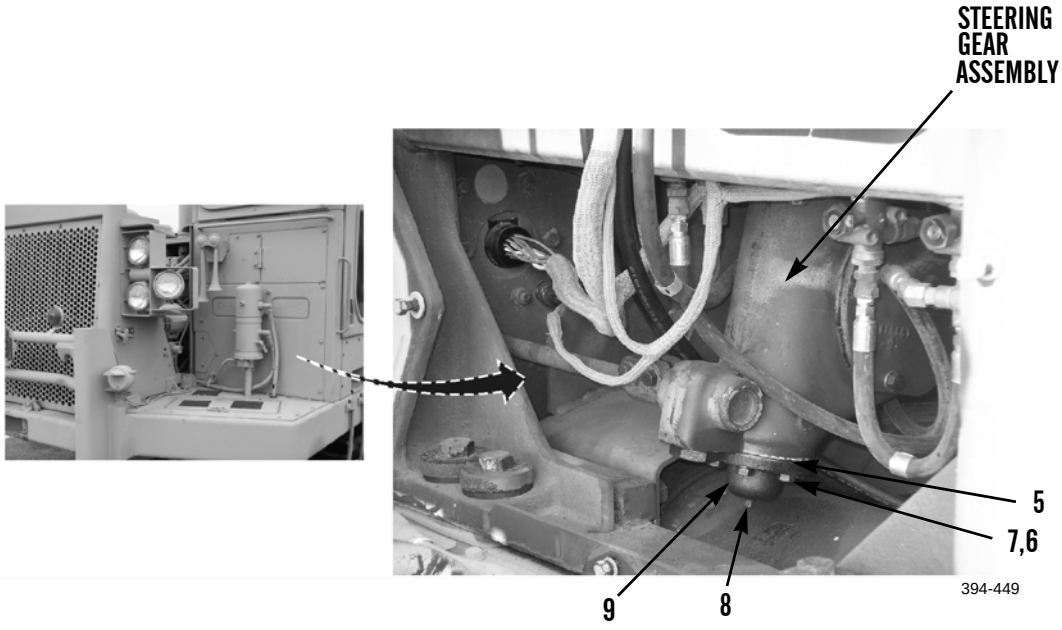
If travel of lever is less than 1.12 in. (2.8 cm) or greater than 1.15 in. (2.9 cm), it will be necessary to add or remove shim(s) in steering gear assembly.

8. Remove operator compartment front access plate (WP 0197 00).
9. Place a container under steering gear assembly.
10. Remove plug (8) from steering gear assembly. Drain lubricant.
11. Remove six bolts (6), washers (7) and cap (9) from steering gear assembly.

NOTE

If travel of lever is less than 1.12 in. (2.8 cm), add shim(s). If travel of lever is greater than 1.15 in. (2.9 cm), remove shim(s).

12. Remove or install shim(s) (5) as necessary.
13. Install cap (9), six washers (7) and bolts (6) on steering gear assembly.
14. Verify that travel of lever is greater than 1.12 in. (2.8 cm) but less than 1.15 in (2.9 cm).
15. Remove six bolts (6) and washers (7) from steering gear assembly. Discard six bolts (6).
16. Install six washers (7) and new bolts (6) on steering gear assembly torque IAW (WP 0335 00).
17. Install plug (8) on cap (9).
18. Lubricate steering gear assembly (WP 0176 00).



ADJUSTMENT - CONTINUED

NOTE

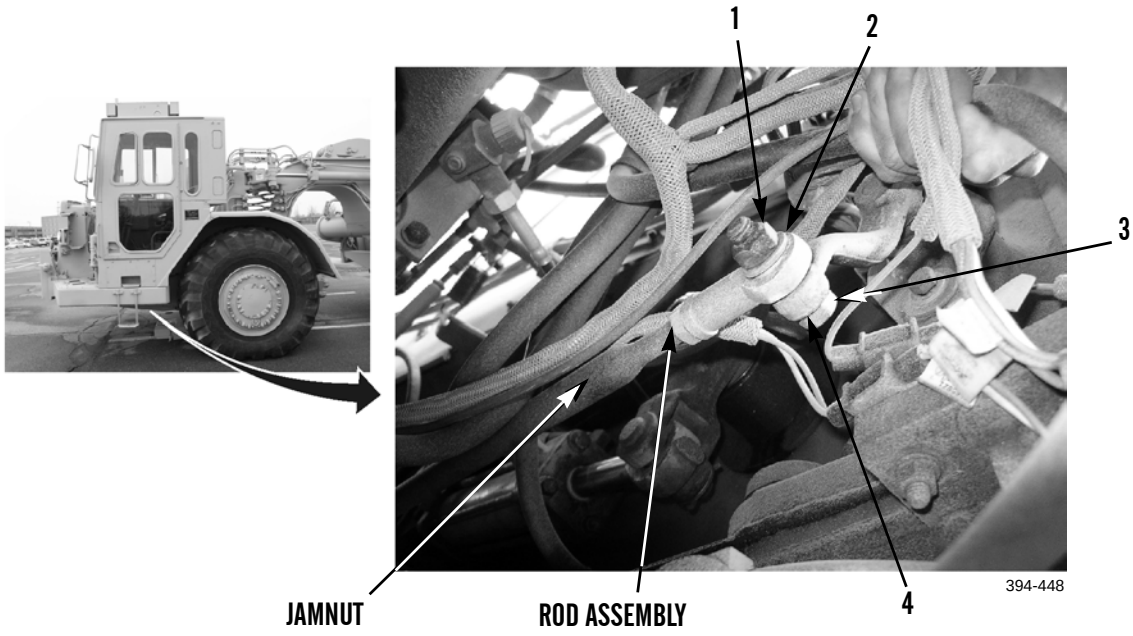
Step 19 requires assistance.

19. Center position of lever (4). With assistance, turn the steering wheel, while measuring full travel of lever (4) to locate its center point.

CAUTION

Do not push or pull on rod assembly. This will cause movement of valve spool. Do not force bolt through rod assembly and lever. If bolt does not fit through hole in rod assembly and lever, proceed with the following steps.

20. Loosen jamnut.
21. Turn rod end in or out to align hole in rod end with hole in lever (4). Torque IAW (WP 0335 00).
22. Tighten jamnut.
23. Position rod assembly and lever (4) together with holes aligned.
24. Install bolt (3), washer (2) and nut (1) on lever (4) torque IAW (WP 0335 00).



25. Recheck travel of steering control valve spool. Refer to step 1.
26. Install operator compartment front access plate (WP 0197 00).
27. Install front crankcase guard (WP 0201 00).

END OF WORK PACKAGE

STEERING GEAR REPLACEMENT 0176 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 150 lb minimum capacity

Lifting links, forged (3/8-16NC)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Lockwasher

Pin, cotter

References

WP 0175 00

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Turn signal and hazard warning switch removed (WP 0080 00)

Retarder valve lines disconnected from retarder valve assembly and steering column (WP 0141 00)

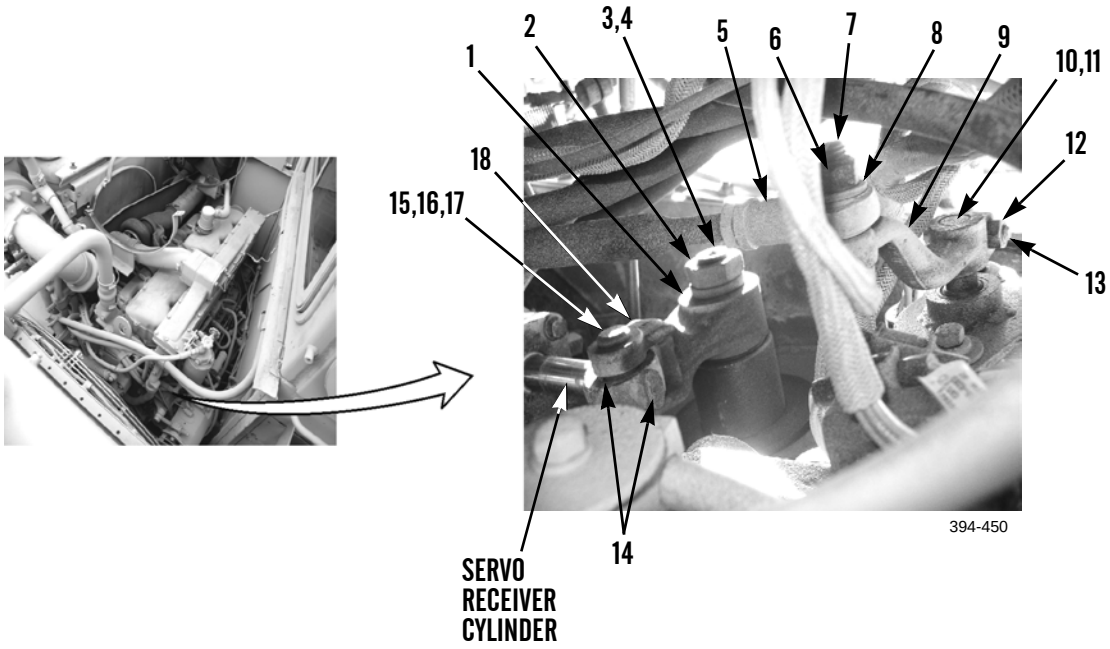
Air tanks removed (WP 0153 00)

Hood removed (WP 0189 00)

Operator compartment lower front access plate removed (WP 0197 00)

REMOVAL

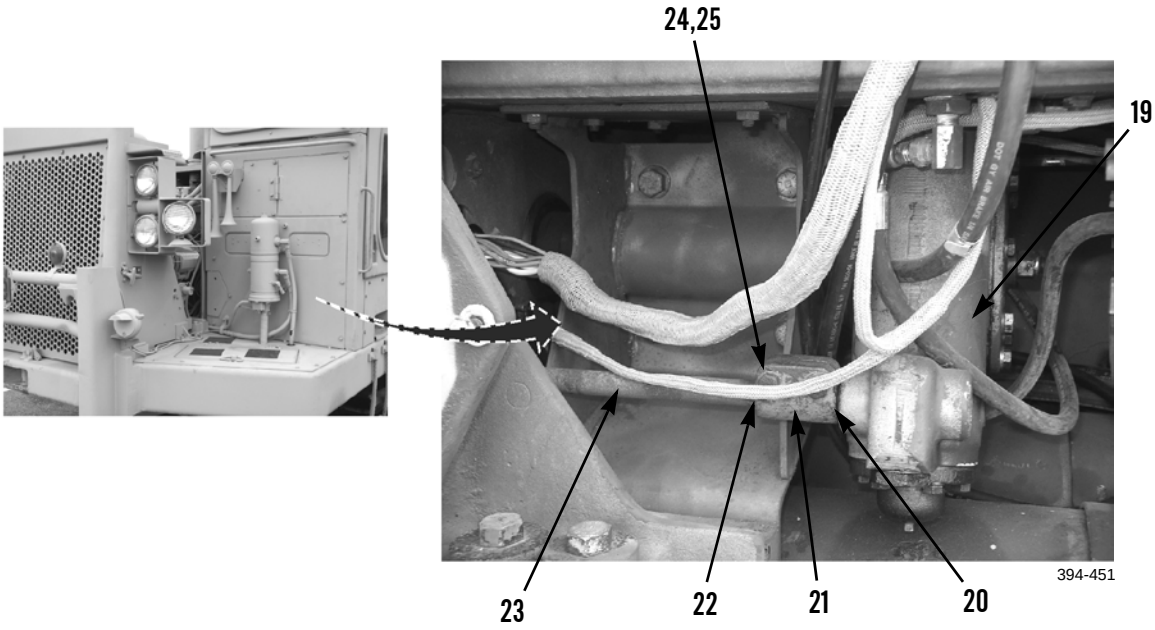
1. Remove nut (6), washer (8) and bolt (7) from front left side of engine compartment.
2. Disconnect rod assembly (5) from lever (9).
3. Remove nut (2) and lockwasher (1) from lever (18). Discard lockwasher.
4. Remove cotter pin (17), washer (16), pin (15) and two spacers (14) from servo-receiver cylinder. Discard cotter pin.
5. Remove lever (18) and key (4) from shaft (3).
6. Remove nut (12), bolt (13), lever (9) and key (11) from shaft (10).



STEERING GEAR REPLACEMENT - CONTINUED 0176 00

REMOVAL - CONTINUED

7. Remove two nuts (25) and bolts (24) from coupling (21).
8. Push shaft (23) toward engine until free of steering gear (19).
9. Remove key (20), coupling (21) and key (22) from steering gear (19).



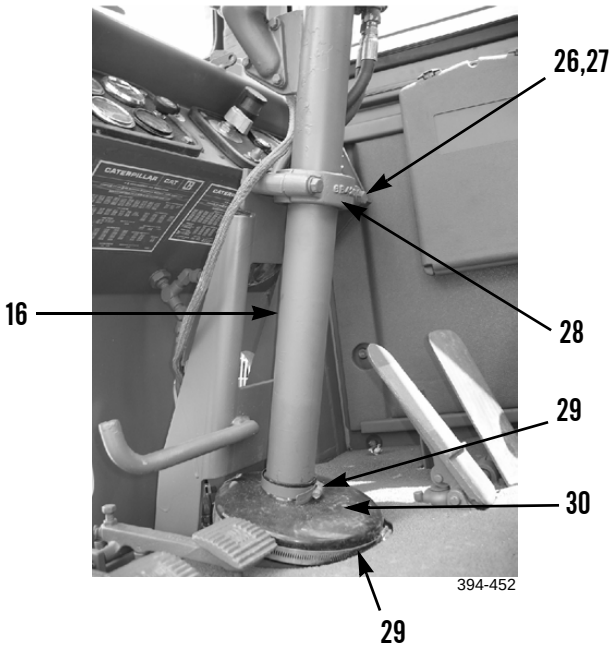
REMOVAL - CONTINUED

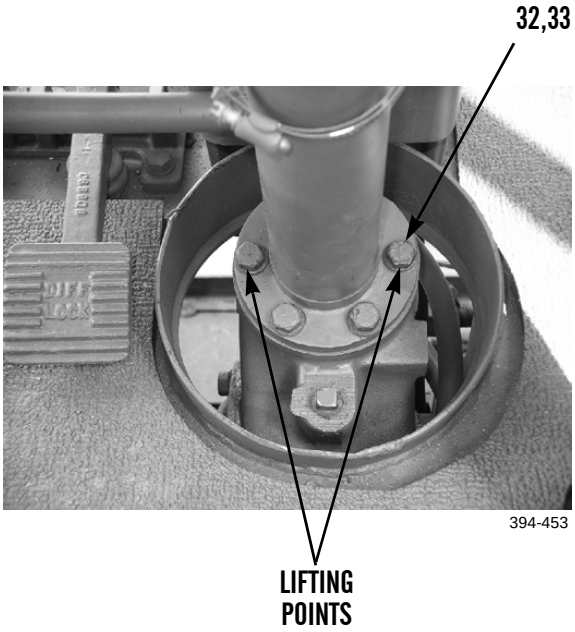
10. Remove two clamps (29) and boot (30) from column assembly (16).
11. Remove two bolts (26), washers (27) and bracket (28) from column assembly (16).
12. Remove six bolts (32), washers (33) and column assembly (16) from steering gear (19).
13. Install two 3/8-16NC forged lifting links at lifting points of steering gear (19).

WARNING

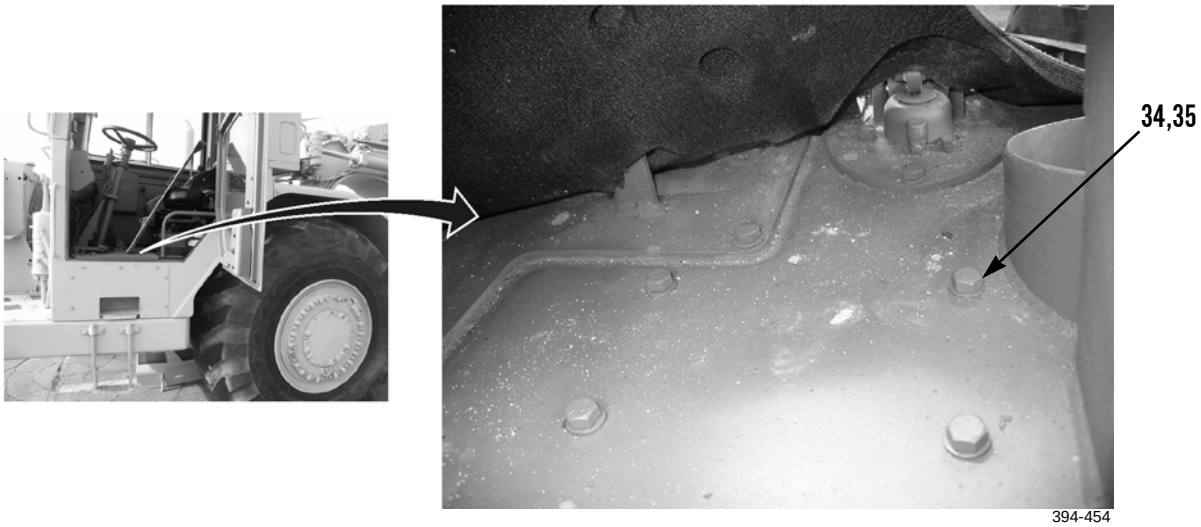
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

14. Attach lifting device to lifting links.





REMOVAL - CONTINUED

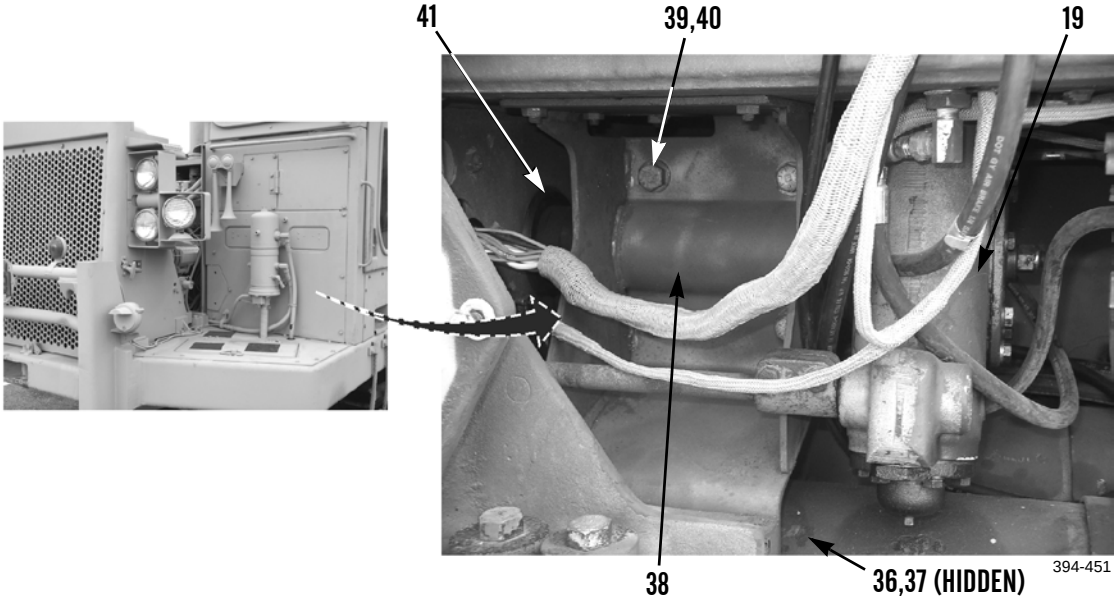


15. Remove four bolts (34) and washers (35) from operator compartment floor.
16. Remove two bolts (36) and washers (37) from under operator compartment floor.
17. Remove four bolts (39), washers (40) and support clamp assembly (38) from machine.

NOTE

- Remove steering gear assembly by lowering through operator compartment floor.
- Weight of steering gear assembly is 85 lb (39 kg).

18. Remove steering gear (19) from machine.
19. Remove grommet (41) from under operator compartment. Push out toward engine.
20. Remove lifting device and two lifting links from steering gear (19).



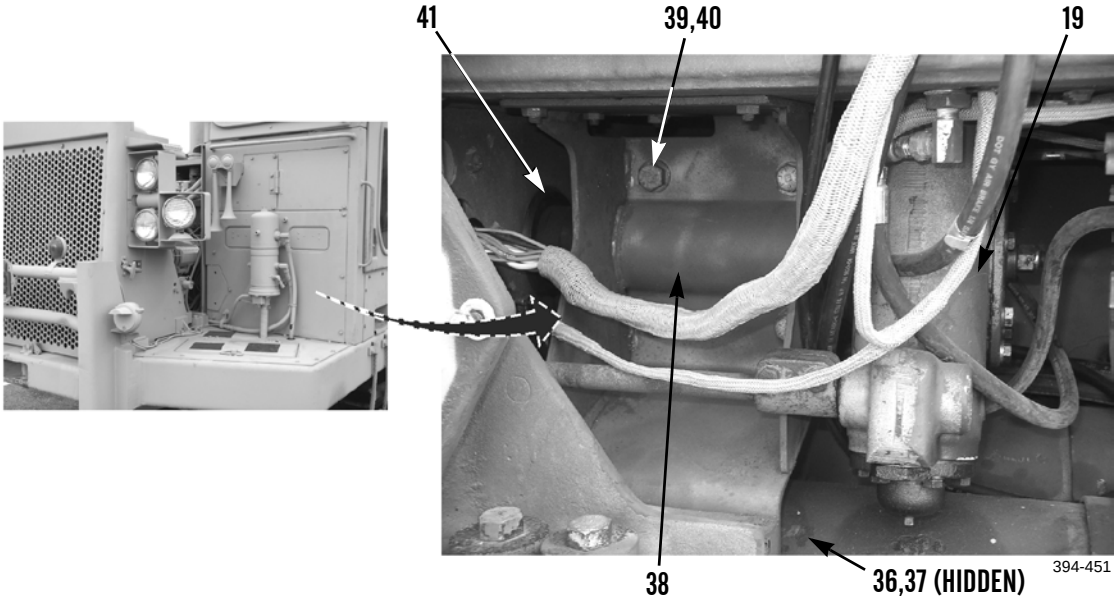
INSTALLATION

1. Install grommet (41) on wall in operator compartment.
2. Loosely install support and clamp assembly (38), four washers (40) and bolts (39) to hold support and clamp (38) on steering gear (19).
3. Install two lifting links in top of steering gear (19).

NOTE

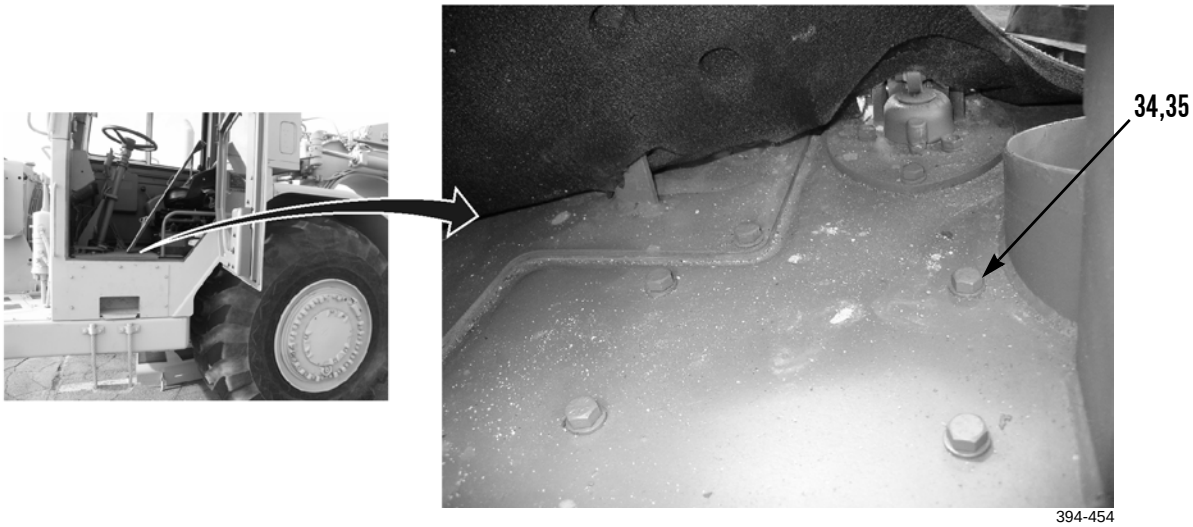
Raise steering gear assembly through operator compartment floor with lifting device.

4. Install lifting device.
5. Position steering gear (19) on machine by inserting housing into grommet (41) in operator compartment wall.
6. Install two washers (37) and bolts (36) securing support and clamp assembly (38).
7. Tighten four bolts (39).

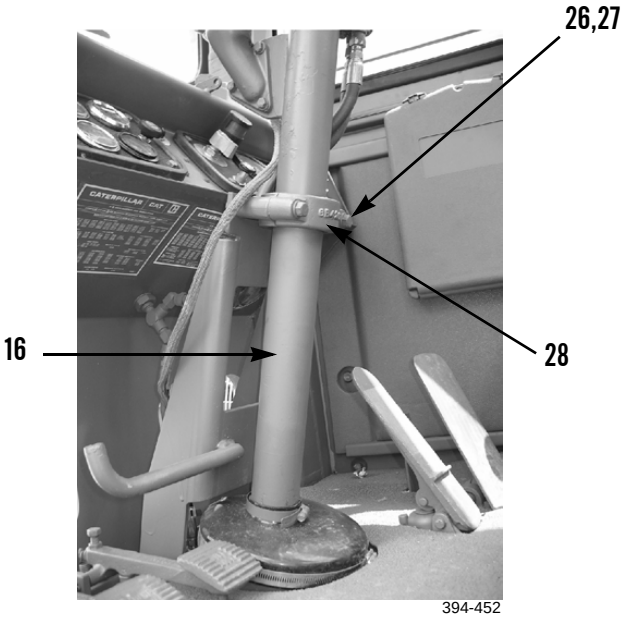


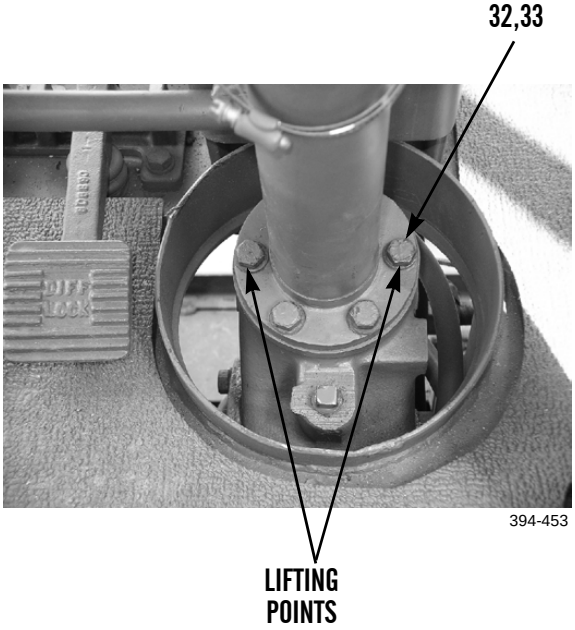
INSTALLATION - CONTINUED

8. Install four washers (35) and bolts (34) in operator compartment floor.



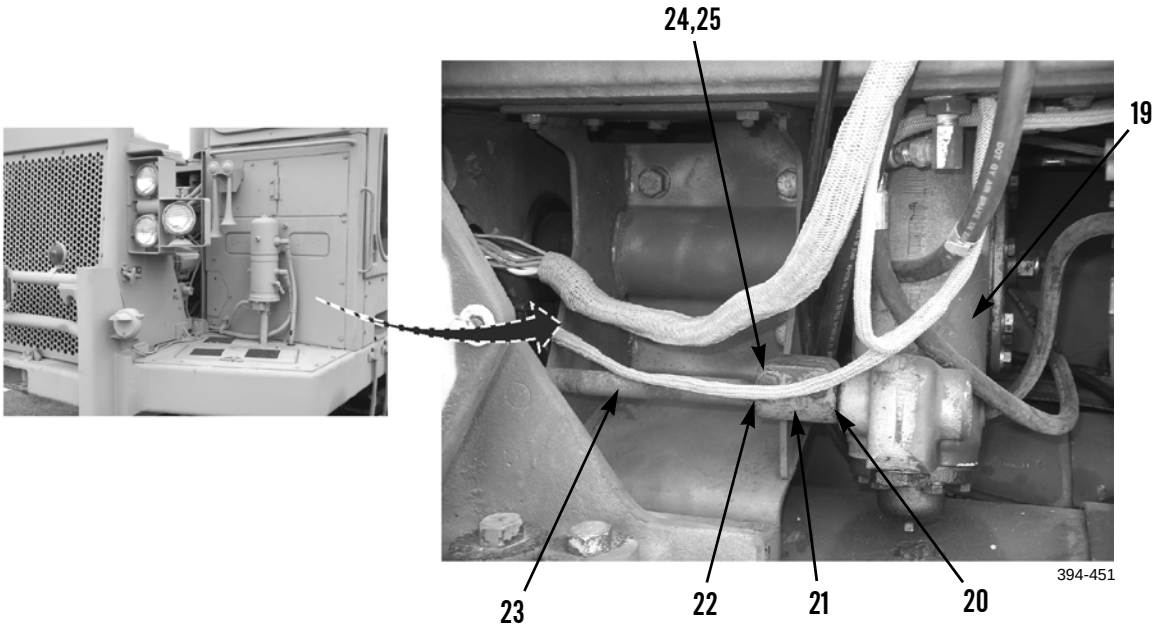
9. Remove lifting device and lifting links from steering gear (19).
10. Install column assembly (16) on machine.
11. Install bracket (28), two washers (27) and bolts (26) to secure column assembly (16).
12. Install six washers (33) and bolts (32) which hold column assembly (16) on steering gear (19).





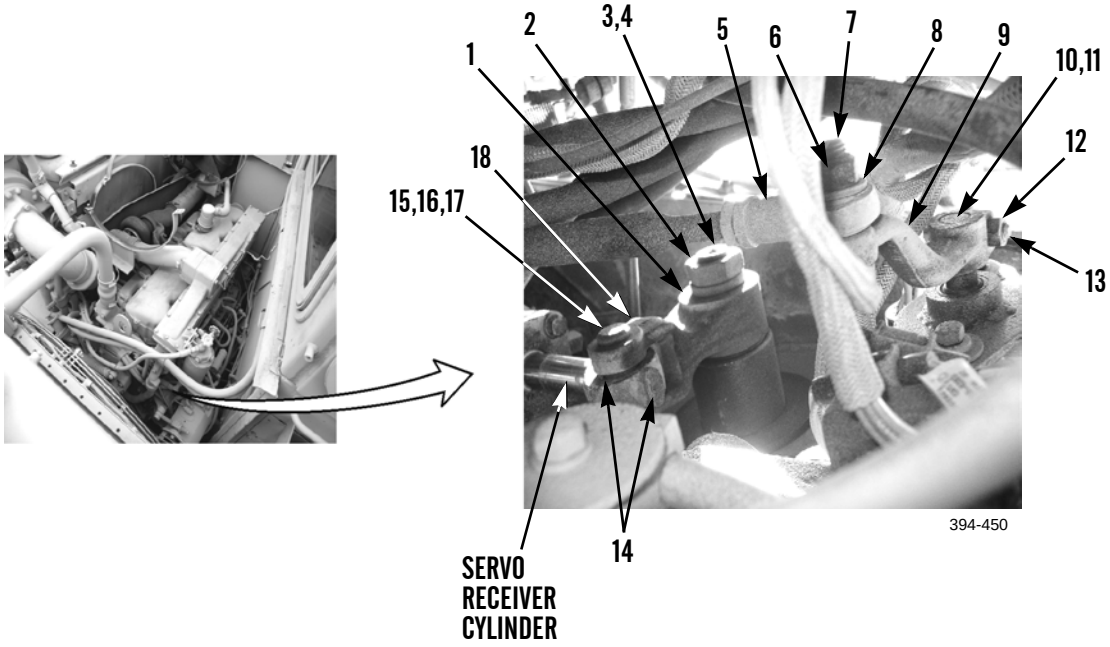
INSTALLATION - CONTINUED

13. Install key (20) in keyway of steering gear (19).
14. Install key (22) in keyway of shaft (23).
15. Install coupling (21) between shafts (23) and steering gear (19).
16. Push shaft (23) toward steering gear (19).
17. Install two bolts (25) and nuts (24) to coupling (21).

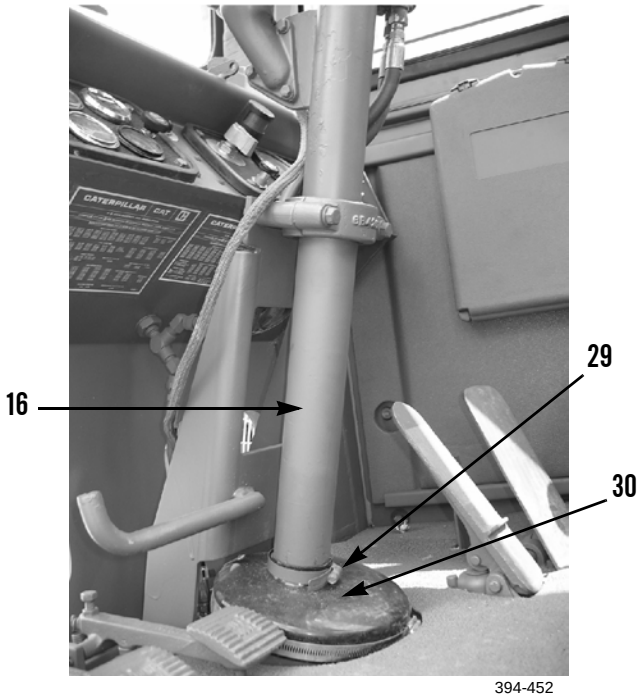


18. Install key (11) in keyway of shaft (10) between engine and operator compartment.
19. Install lever (9), bolt (13) and nut (12) on shaft (10).
20. Install key (4) in keyway of shaft (3).
21. Install lever (18) on shaft (3).
22. Install two spacers (14), pin (17), washer (16), new cotter pin (15) on lever (18) and servo-receiver cylinder.
23. Install new lockwasher (1) and nut (2) on shaft (3).
24. Connect rod assembly (5) to lever (9).
25. Install bolt (7), washer (8) and nut (6) to machine.
26. Remove fill plug from steering gear (19).

INSTALLATION - CONTINUED



27. Fill steering gear assembly with lubricating oil to bottom of the fill plug opening.
28. Install two clamps (29) and boot (30) to column assembly (16).



INSTALLATION - CONTINUED

29. Adjust mechanical steering assembly (WP 0175 00).
30. Install turn signal and hazard warning switch (WP 0080 00).
31. Connect retarder valve lines to retarder valve assembly and steering column (WP 0141 00).
32. Install air tanks (WP 0153 00).
33. Install hood (WP 0189 00).
34. Install operator compartment lower access plate (WP 0197 00).
35. Operate machine and verify correct operation of steering. (TM 5-3805-248-10).

END OF WORK PACKAGE

STEERING WHEEL REPLACEMENT 0177 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Gasket

Nut, self locking

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

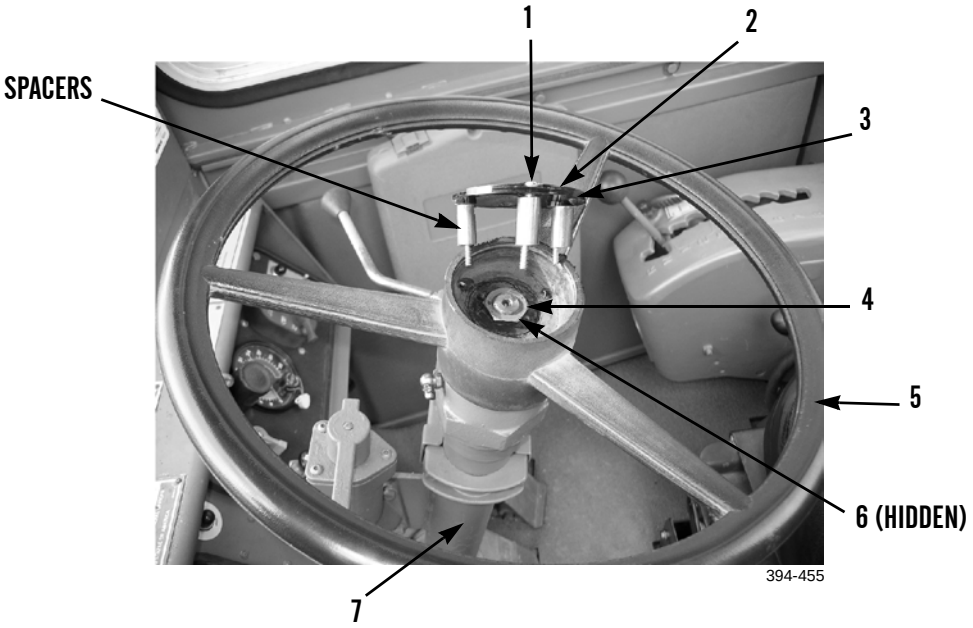
Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

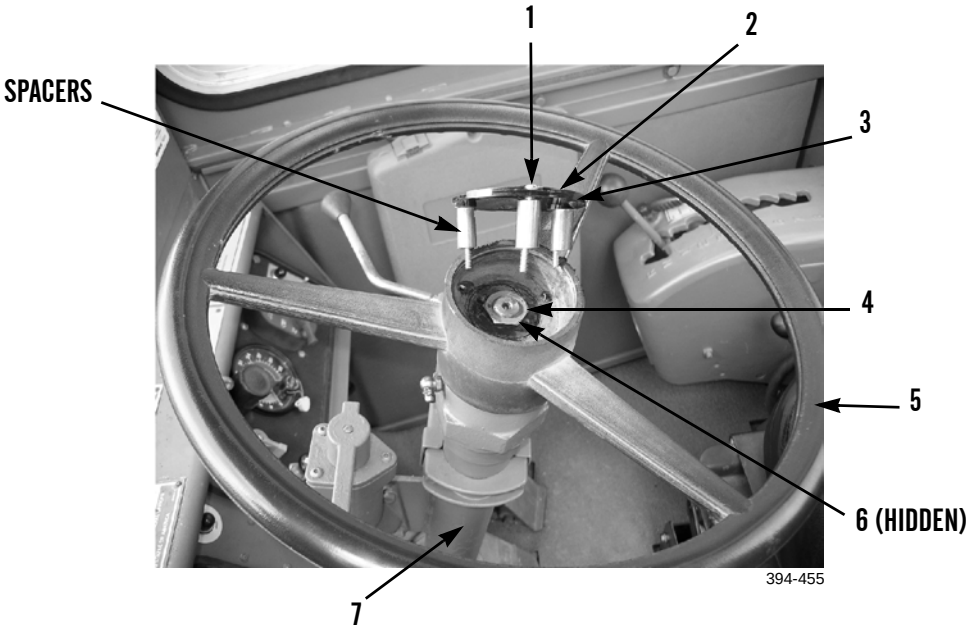
REMOVAL

1. Remove three screws (1), spacers (if equipped) and cover (2) from steering wheel (5) inside operator compartment.
2. Remove and discard gasket (3).
3. Remove nut (4) and steering wheel (5).
4. Remove woodruff key (6) from shaft (7).



INSTALLATION

1. Install woodruff key (6) in keyway on shaft (7).
2. Install steering wheel (5) and nut (4). Torque nut (4) to 100 lb-ft (136 Nm).
3. Install new gasket (3).
4. Install spacers (if equipped), cover (2) and three screws (1).



END OF WORK PACKAGE

STEERING COLUMN AND SHAFT REPLACEMENT 0178 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Gasket

Seal

References

TM 5-3805-248-10

Equipment Condition

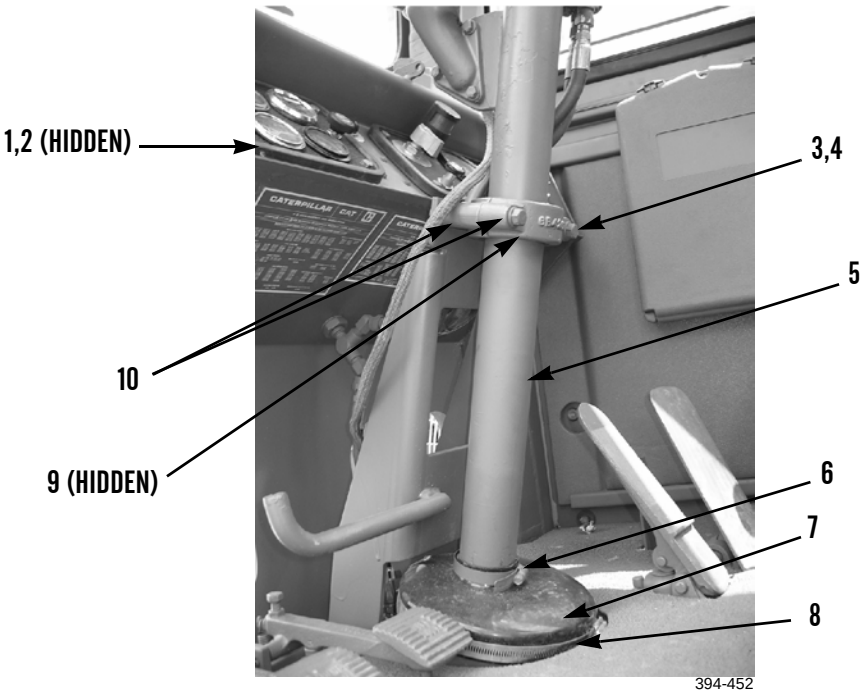
Turn signal and hazard warning switch removed (WP 0080 00)

Retarder valve assembly removed (WP 0141 00)

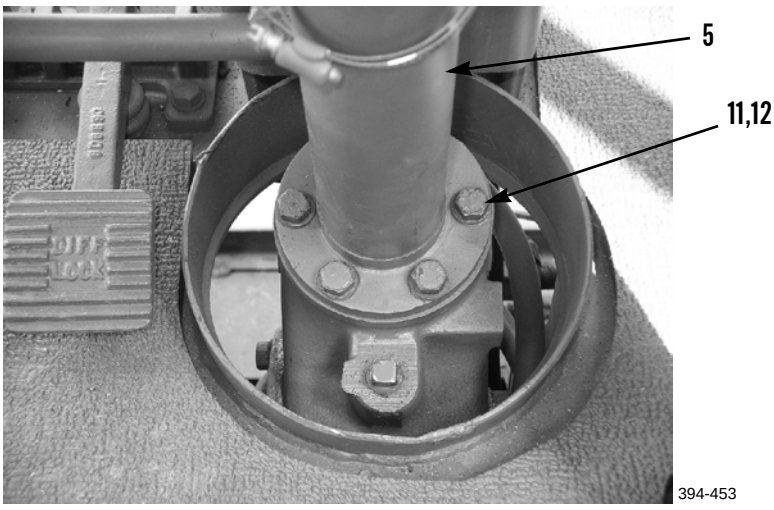
Steering wheel removed (WP 0177 00)

REMOVAL

1. Remove clamps (6 and 8) from boot (7) in front, center of operator compartment.
2. Remove boot (7).
3. Remove six bolts (11) and washers (12).
4. Remove two bolts (1) and washers (2).
5. Remove two bolts (3), washers (4), bracket (10) and gasket (9). Discard gasket.
6. Remove steering column (5) assembly.



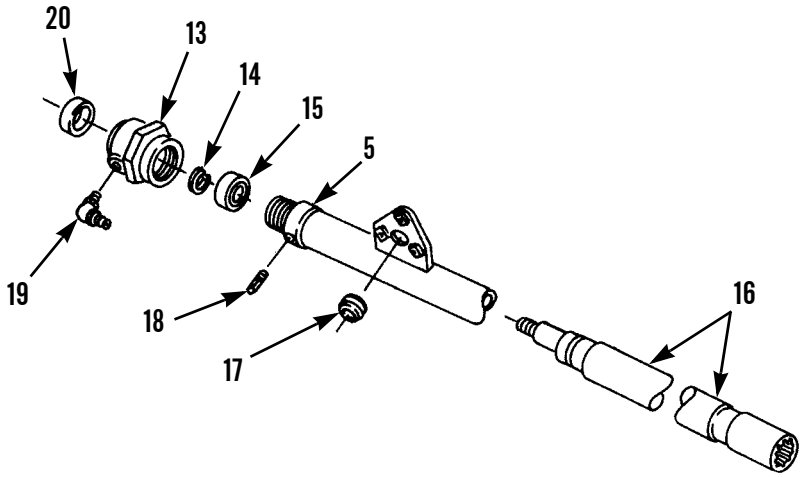
394-452



394-453

DISASSEMBLY

1. Remove nut (13) assembly from steering column assembly (5).
2. Remove fitting (19) and seal (20) from nut (13). Discard seal.
3. Remove plug (18) and grommet (17) from steering column assembly (5).
4. Remove shaft (16) assembly from steering column assembly (5).
5. Remove retaining ring (14).
6. Remove bearing (15) from shaft (16).



394-456

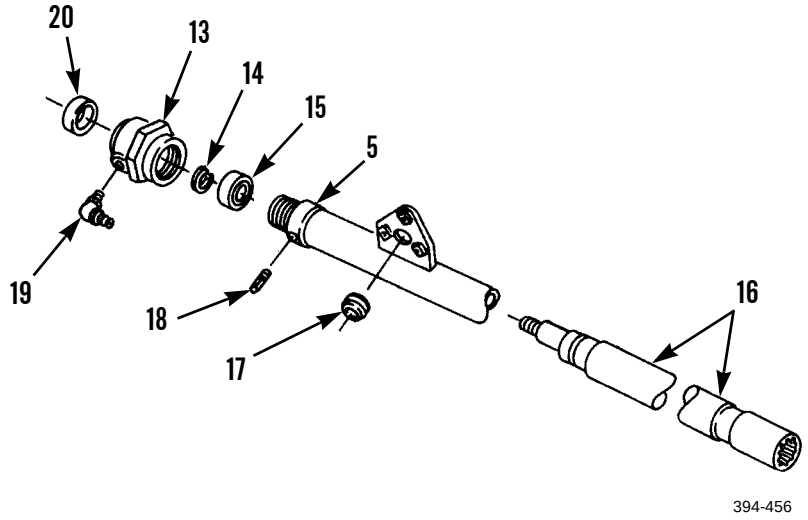
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry parts with compressed air.
4. Inspect parts for damage. Replace damaged parts as necessary.

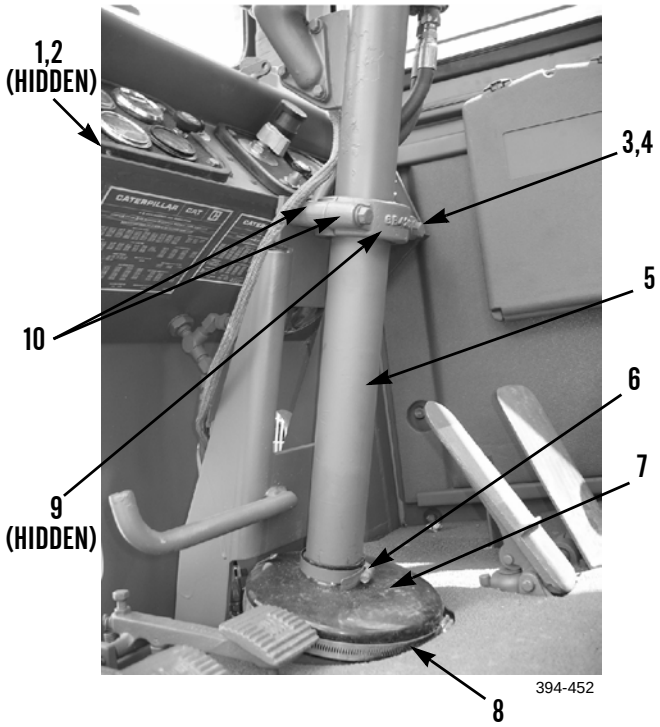
ASSEMBLY

1. Install bearing (15) on shaft (16).
2. Install retaining ring (14) on shaft (16).
3. Install shaft (16) assembly through top of steering column assembly (5).
4. Install grommet (17) and plug (18) to column assembly (5).
5. Install new seal (20) in nut (13). Install seal with lip facing up.
6. Install fitting (19) to nut (13).
7. Install nut (13) assembly in steering column assembly (5). Tighten nut (13) assembly to 150 lb-ft (203 Nm).

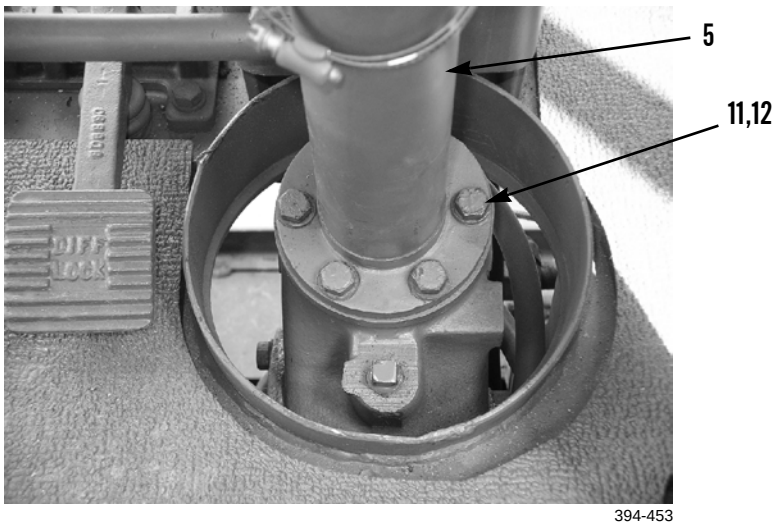


INSTALLATION

1. Install bracket (10), two washers (2) and bolts (1) to column assembly (5).
2. Install steering column assembly (5).
3. Loosely install new gasket (9), two washers (4) and bolts (3) to column assembly (5).



4. Install six washers (12) and bolts (11) to column assembly (5).
5. Tighten two bolts (3).
6. Install boot (7) to column assembly (5).
7. Install clamps (6 and 8) on boot (7).



INSTALLATION - CONTINUED

8. Lubricate steering column assembly at lubrication fitting.
9. Install turn signal and hazard warning switch (WP 0080 00).
10. Install retarder valve assembly (WP 0141 00).
11. Install steering wheel (WP 0177 00).
12. Operate machine and verify operation of steering (TM 5-3805-248-10).

END OF WORK PACKAGE

MECHANICAL LINKAGE REPLACEMENT 0179 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Bearing

References

WP 0175 00

WP 0176 00

Equipment Condition

Hood removed (WP 0189 00)

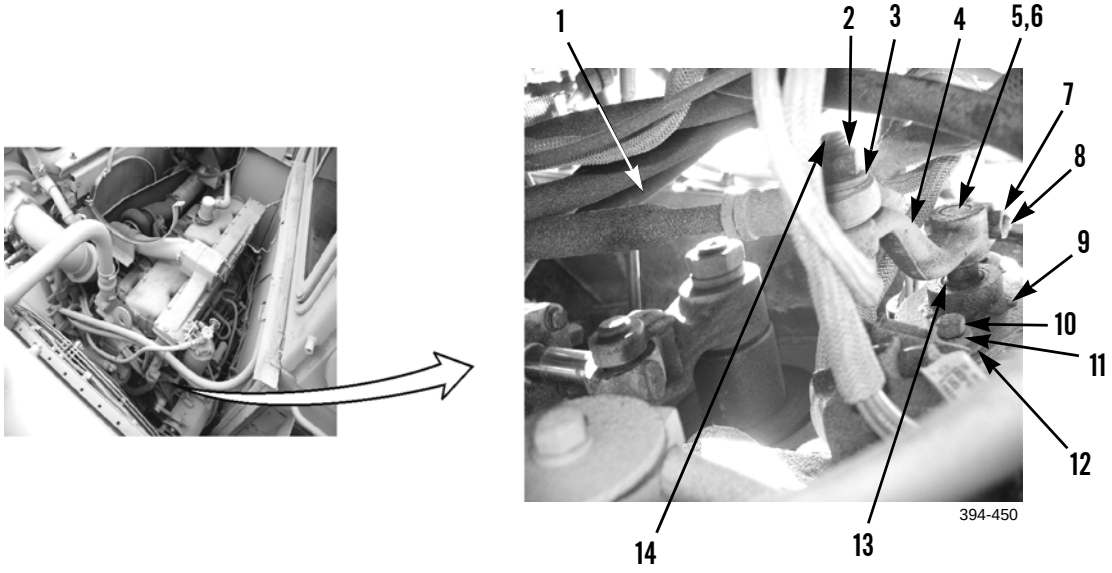
REMOVAL

1. Remove nut (2), washer (3) and bolt (14) from lever (4).
2. Disconnect rod assembly (1) from lever (4).
3. Remove nut (7), bolt (8), lever (4) and key (6) from shaft (5).
4. Remove two bolts (10), two washers (11 and 12) and plate assembly (9).

CAUTION

Removal of bearing from plate may result in destruction of bearing. Remove bearing only if inspection indicates replacement is necessary.

5. If damaged, remove bearing (13) from plate (9) assembly.
6. Disconnect shaft (5) from steering gear (WP 0176 00).
7. Remove shaft (5) through opening in engine compartment wall.

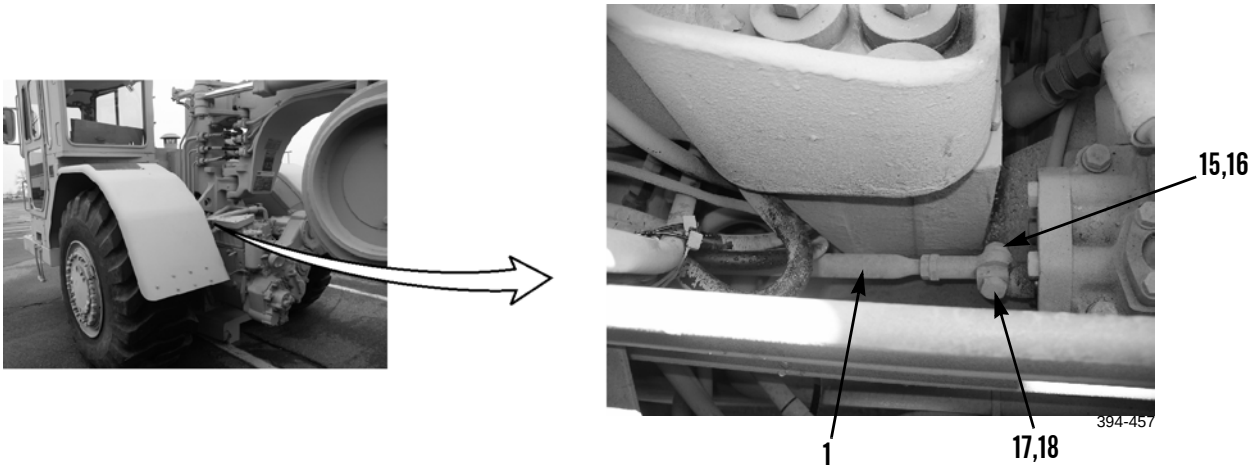


REMOVAL - CONTINUED

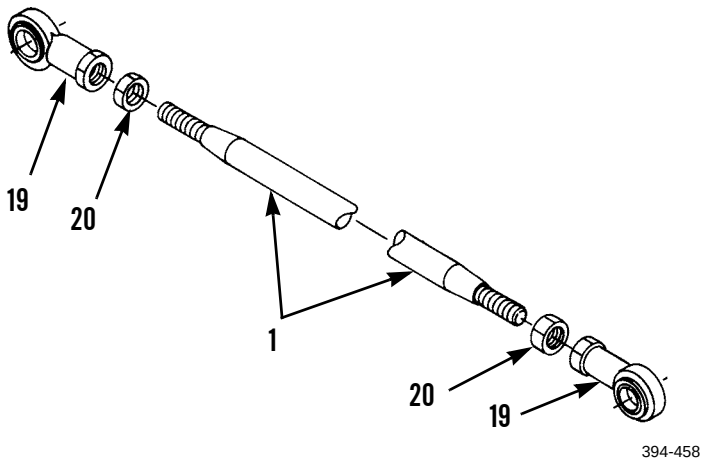
NOTE

Do NOT move valve spool in or out of steering control valve during removal or installation of steering linkage. Movement of valve spool may affect adjustment of steering linkage.

8. Measure total length of rod (1) assembly and record measurement to ensure correct installation.
9. Remove nut (15), washer (16), rod assembly (1), washer (17) and bolt (18) from valve spool on steering control valve.



10. Loosen two nuts (20) on rod (1).
11. Remove two rod ends (19) and nuts (20) from rod (1).

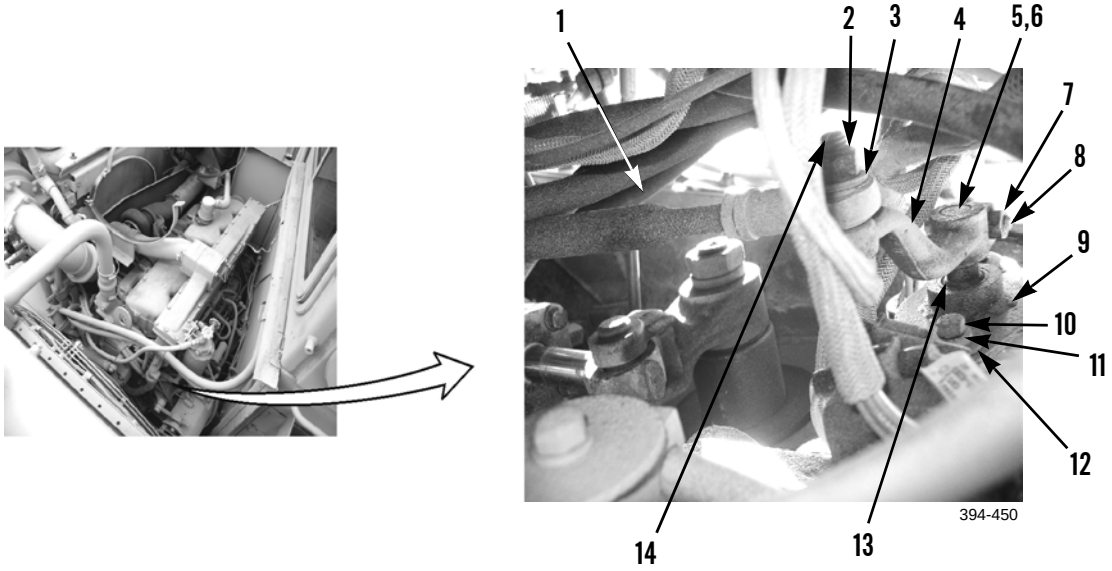


INSTALLATION

1. Install two nuts (20) and rod ends (19) on rod (1).
2. Evenly adjust two rod ends (19) on rod (1) until measurement recorded earlier is obtained.
3. Tighten two nuts (20) on rod (1).
4. Install bolt (17), washer (18), rod (1) assembly, washer (16) and nut (15) on valve spool on steering control valve.

INSTALLATION - CONTINUED

5. Position shaft (5) in opening of engine compartment wall.
6. Connect shaft (5) to steering gear (WP 0176 00).
7. If removed, install new bearing (13) in plate assembly (9).
8. Install plate assembly (9) over shaft (5).
9. Install two washers (11 and 12) and bolts (10) on plate assembly (9).
10. Install key (6) and lever (4) on shaft (5).
11. Install bolt (8) and nut (7) on lever (4).
12. Install bolt (14) through rod assembly (1) and lever (4).
13. Install washer (3) and nut (2) to lever (4).



14. Adjust steering linkage (WP 0175 00).
15. Install hood (WP 0189 00).

END OF WORK PACKAGE

STEERING HOSES, LINES AND FITTINGS REPLACEMENT 0180 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Strap, tiedown (Item 41, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (23)

Seal (2)

References

WP 0184 00

WP 0233 00

WP 0234 00

WP 0309 00

WP 0311 00

TM 5-3805-248-10

Equipment Condition

Hood removed (WP 0189 00)

Crankcase guards removed (WP 0201 00)

Hydraulic pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL - CONTINUED

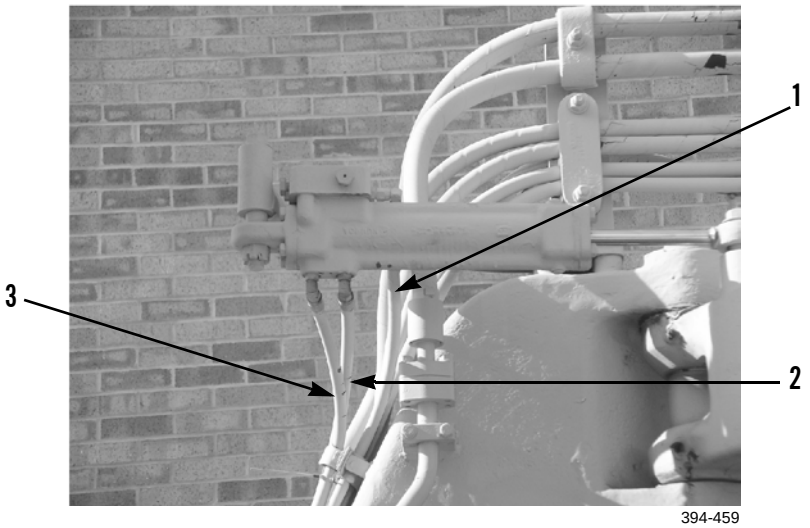
CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after removing lines. Contamination of air system could result in premature failure.

NOTE

- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.
- Note the routing and position of the hoses, any retaining hardware and tie straps prior to removal to ensure correct installation.

1. Disconnect hose assemblies (1, 2 and 3) from hydraulic steering servo-sender cylinder (WP 03095 00).
2. Disconnect other end of hose assemblies (2 and 3) from hydraulic steering servo-receiver cylinder (WP 0311 00).
3. Disconnect other end of hose assembly (1) from hose multi-connector (WP 0233 00).
4. Trace routing of hose assemblies (1, 2 and 3) and remove all retaining hardware and tie straps.
5. Remove hose assemblies (1, 2 and 3) from machine.
6. If damaged, remove fittings from hydraulic steering servo-sender and receiver cylinders which connect to hose assemblies (1, 2 and 3) (WP 0311 00).
7. If damaged, remove fittings from hose multi-connector which connects to hose assembly (1) (WP 0233 00).



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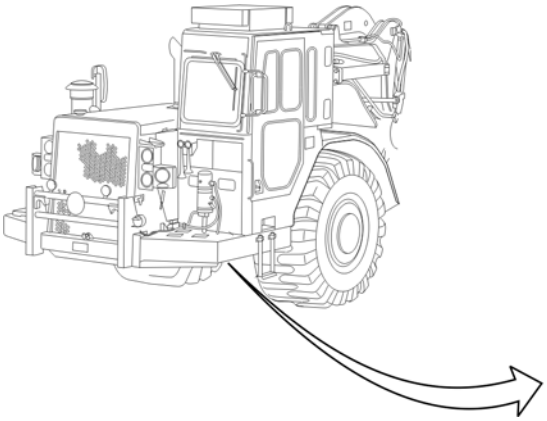
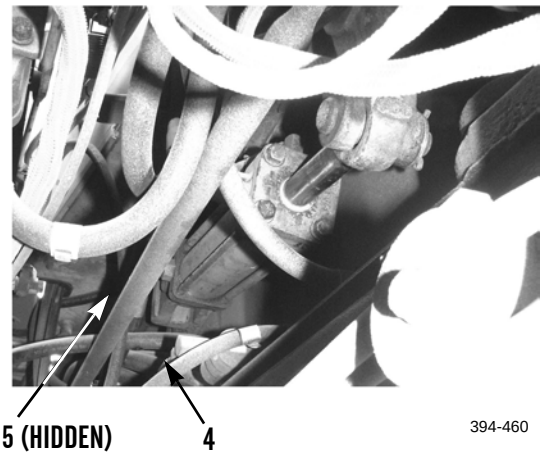
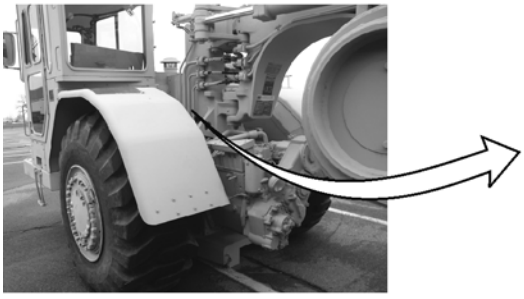
REMOVAL - CONTINUED

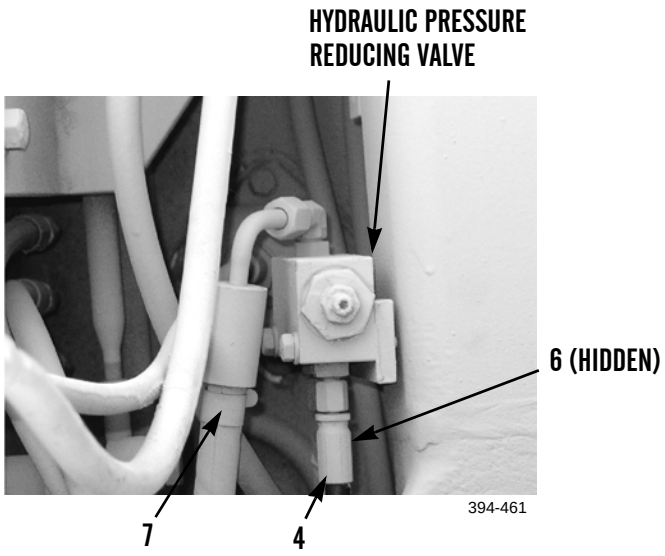
8. Disconnect hose assembly (4) from tee (5).
9. Disconnect other end of hose assembly (4) from hydraulic steering pressure reducing valve (WP 0184 00).





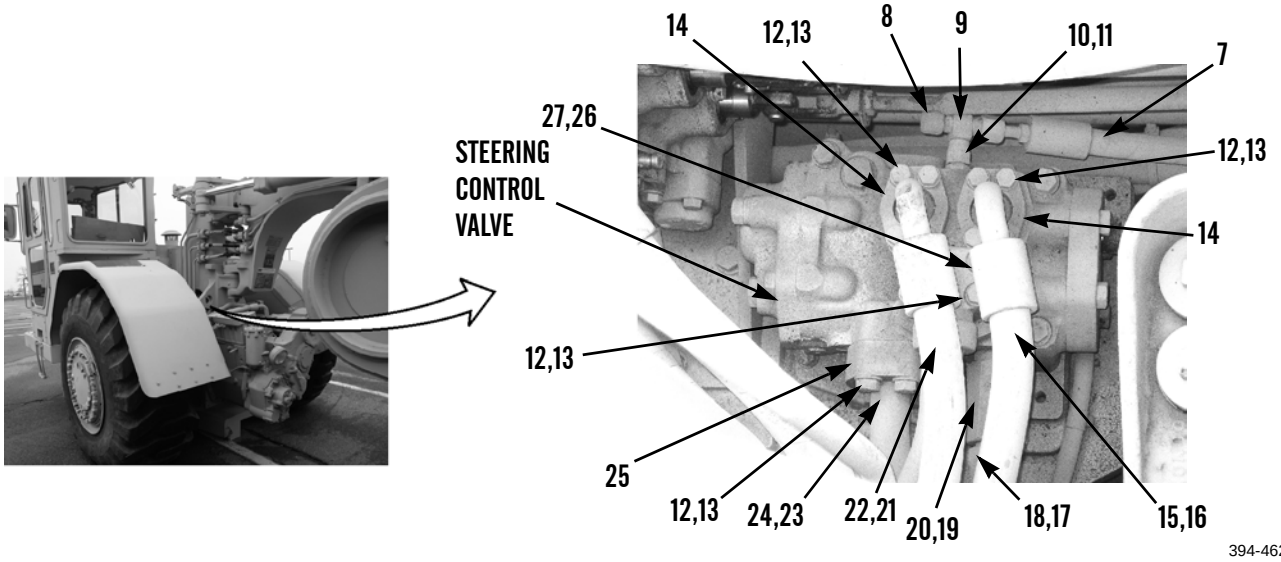
10. Disconnect hose assembly (6 and 7) from hydraulic steering pressure reducing valve (WP 0184 00).
11. Disconnect other end of hose assembly (6) from hose multi-connector (WP 0233 00).
12. Trace routing of hose assemblies (4 and 6) and remove all retaining hardware and tie straps.
13. Remove hose assemblies (4 and 6) from machine.
14. If damaged, remove fittings from hydraulic steering pressure reducing valve which connects to hose assemblies (4 and 6) (WP 0184 00).
15. If damaged, remove fittings from hose multi-connector which connect to hose assembly (6) (WP 0233 00).





REMOVAL - CONTINUED

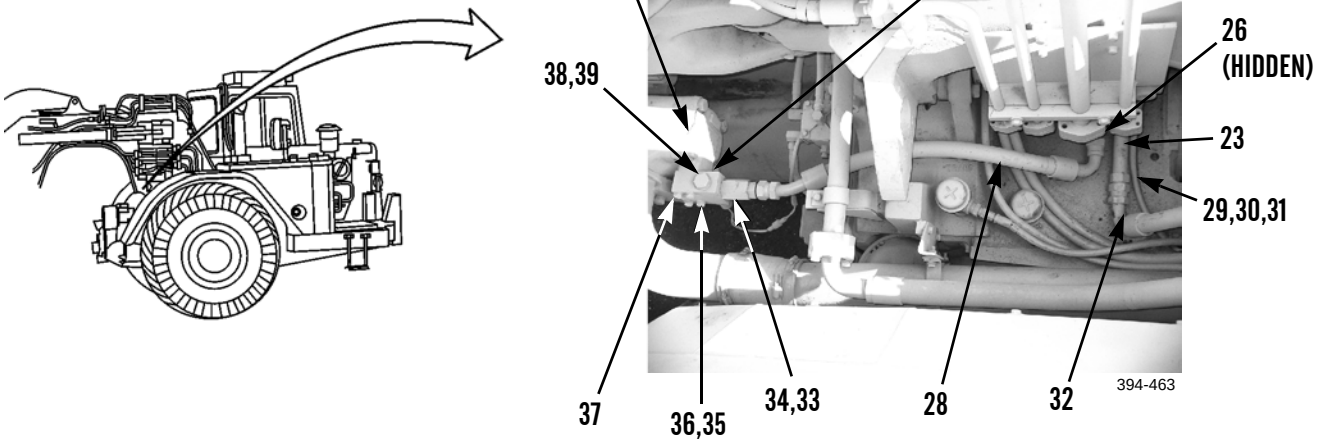
16. Disconnect hose assembly (7) from tee (9).
17. Trace routing of hose assembly (7) and remove all retaining hardware and tie straps.
18. Remove hose assembly (7) from machine.
19. If damaged, remove fittings from hydraulic steering pressure reducing valve which connect to hose assembly (7) (WP 0184 00).
20. Remove 16 bolts (12), washers (13), two flange halves (25) and four flange halves (14) from steering control valve.
21. Disconnect hose assemblies (15 and 21) and tube assemblies (23 and 26) from steering control valve.
22. Remove and discard performed packings (16, 22, 24 and 27).
23. Disconnect hose assembly (17) from elbow (18).
24. If damaged, remove cap (8), tee (9), adapter (10) and preformed packing (11). Discard preformed packing.
25. If damaged, remove elbow (18), valve (19) and seal (20) from steering control valve. Discard seal.
26. Disconnect other end of hose assemblies (15 and 21) from hitch hoses (WP 0234 00).
27. Trace routing of hose assemblies (15 and 21) and remove all retaining hardware and tie straps.
28. Remove hose assemblies (15 and 21) from machine.
29. If damaged, remove fittings from hitch hoses which connect to hose assemblies (15 and 21) (WP 0234 00).



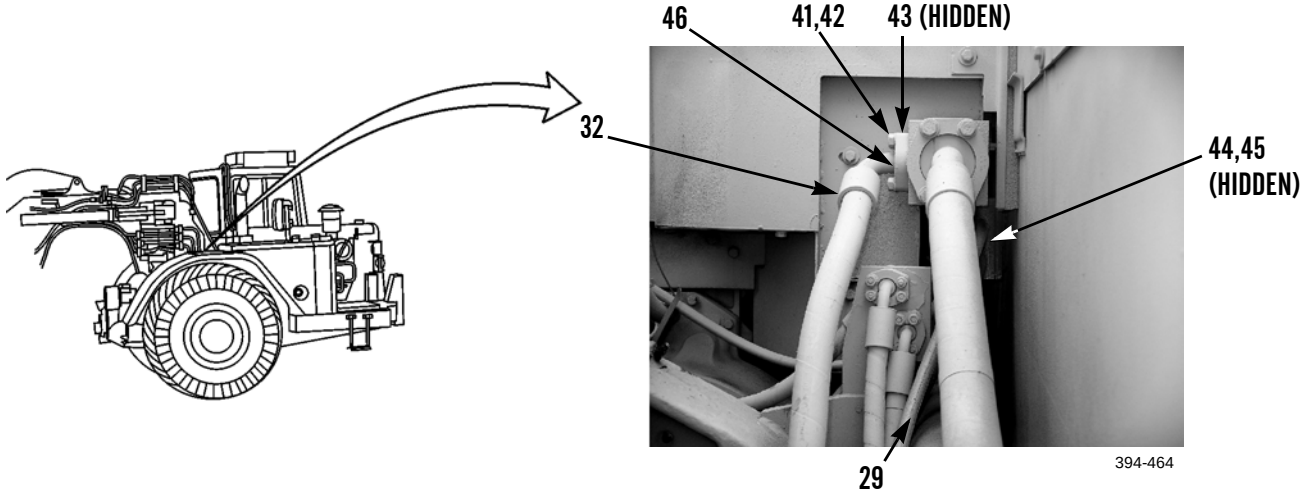
30. Disconnect hose assembly (29) from elbow (30).
31. If damaged, remove elbow (30) and preformed packing (31). Discard preformed packing.
32. Disconnect tube assembly (26) from hose assembly (28) and remove tube assembly (26) from machine.
33. Disconnect tube assembly (23) from hose assembly (32) and remove tube assembly (23) from machine.

REMOVAL - CONTINUED

34. Disconnect hose assembly (28) from valve (33) and remove hose assembly (28) from machine.
35. If damaged, remove valve (33) and seal (34) from adapter (37). Discard seal.
36. If damaged, remove plug (38), and preformed packing (39) from adapter (37). Discard preformed packing.
37. If damaged, remove four capscrews (35), washers (36), adapter (37) and preformed packing (40) from hydraulic implement pump. Discard preformed packing.

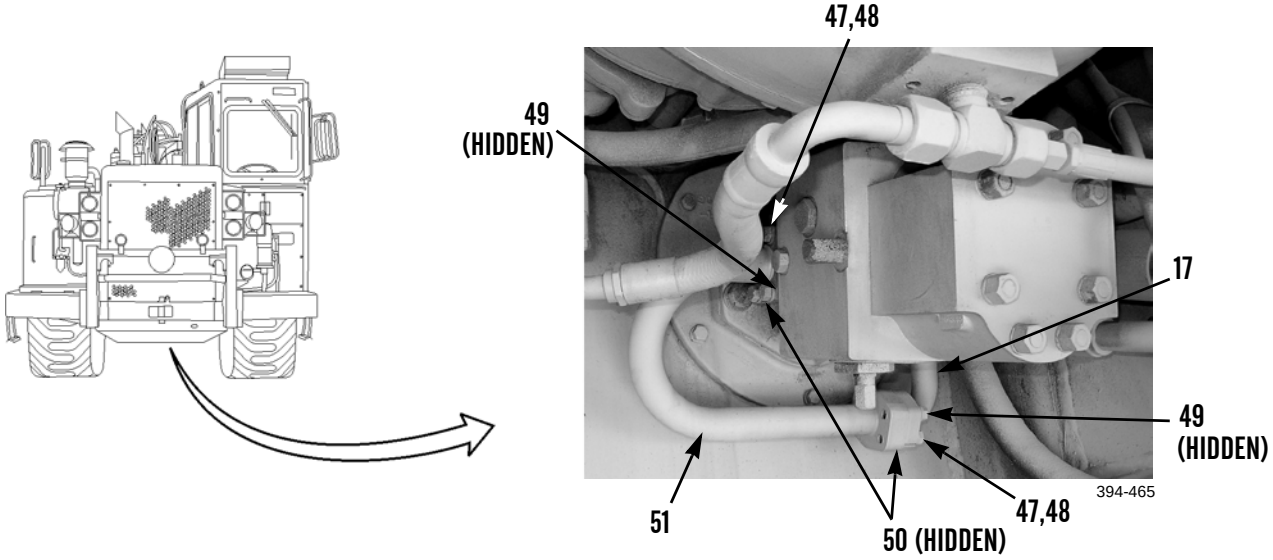


38. Remove four capscrews (41), washers (42) and two flange halves (46).
39. Disconnect hose assembly (32).
40. Remove and discard preformed packing (43).
41. Disconnect hose assembly (29) from adapter (44).
42. Remove hose assemblies (29 and 32) from machine.
43. If damaged, remove adapter (44) and preformed packing (45). Discard preformed packing.

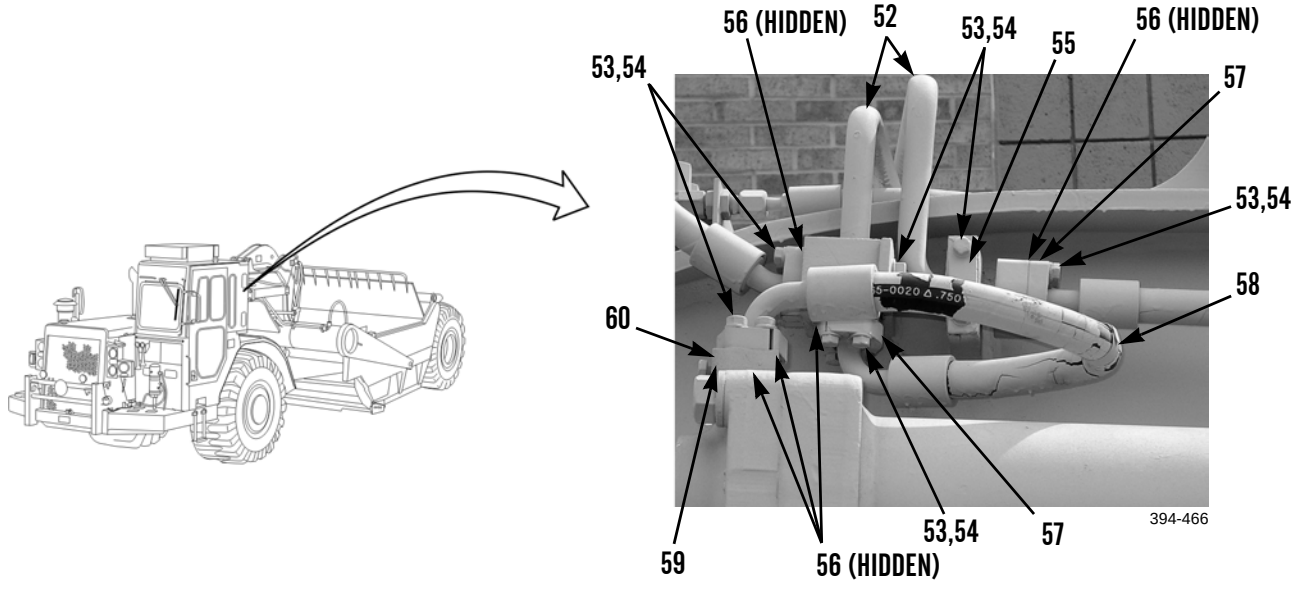


REMOVAL - CONTINUED

44. Remove eight capscrews (47), washers (48), four flange halves (49), tube assembly (51) and two preformed packings (50). Discard preformed packings.
45. Trace routing of hose assembly (17) and remove all retaining hardware and tie straps.
46. Remove hose assembly (17) from machine.



47. Remove 40 bolts (53), washers (54) and 16 flange halves (57).
48. Remove two brackets (55), tube assemblies (52), hose assemblies (58) and two connectors (59).
49. Remove and discard 10 preformed packings (56).
50. If damaged, remove two plugs (60) from connectors (59).



REMOVAL - CONTINUED

51. Remove four capscrews (61), washers (62), two flange halves (64), hose assembly (63) and preformed packing (65) from steering cylinder. Discard preformed packings.

NOTE

- Repeat step for other steering cylinder.
- The following is a maintenance procedure for the right steering cylinder assembly. The maintenance procedure for the left steering cylinder assembly is identical.

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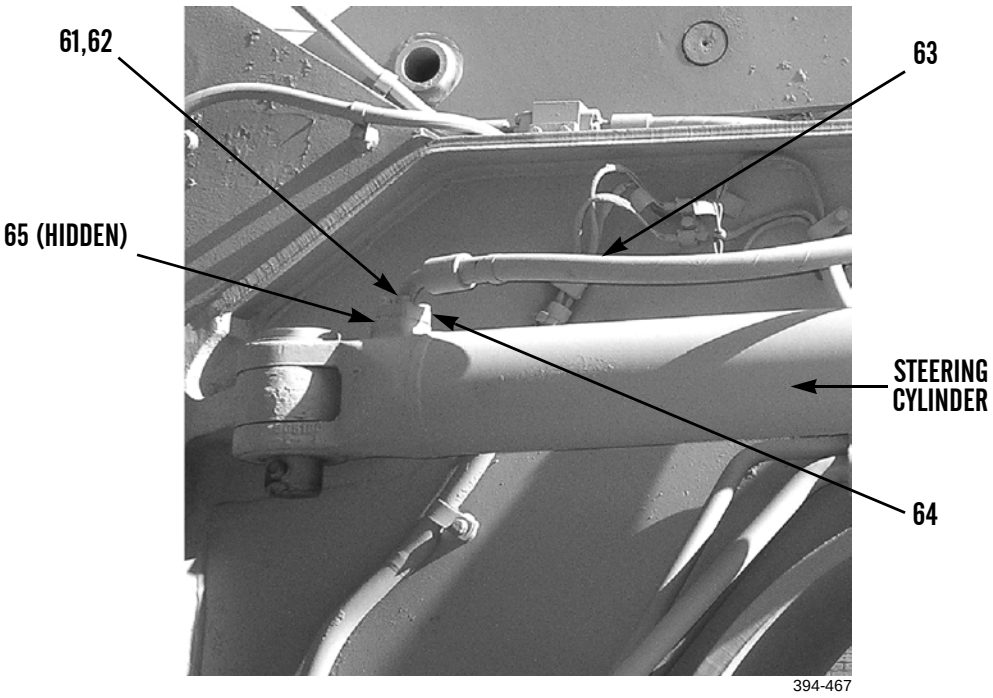


INSTALLATION

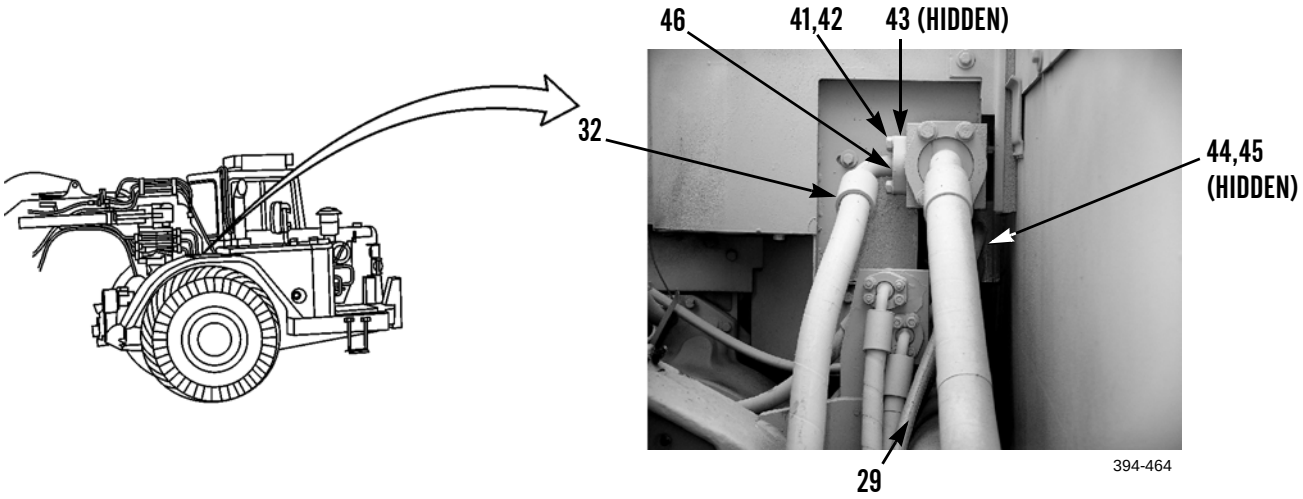
NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

1. Install two preformed packing (65), hose assembly (63) two flange halves (64) four washers (62), and capscrews (61) on steering cylinder.
2. If removed, install two plugs (60) on connectors (59).
3. Install 10 new preformed packings (56).
4. Install two connectors (59), hose assemblies (58), tube assemblies (52) and brackets (55).
5. Install 16 flange halves (57), 40 washers (54) and bolts (53).
6. Install hose assembly (17) on machine.
7. Install two new preformed packings (50), tube assembly (51) and four flange halves (49), eight washers (48) and capscrews (47).

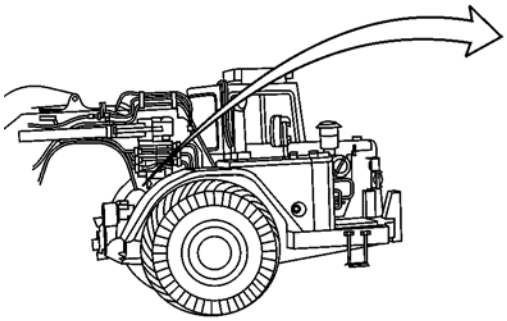
INSTALLATION - CONTINUED

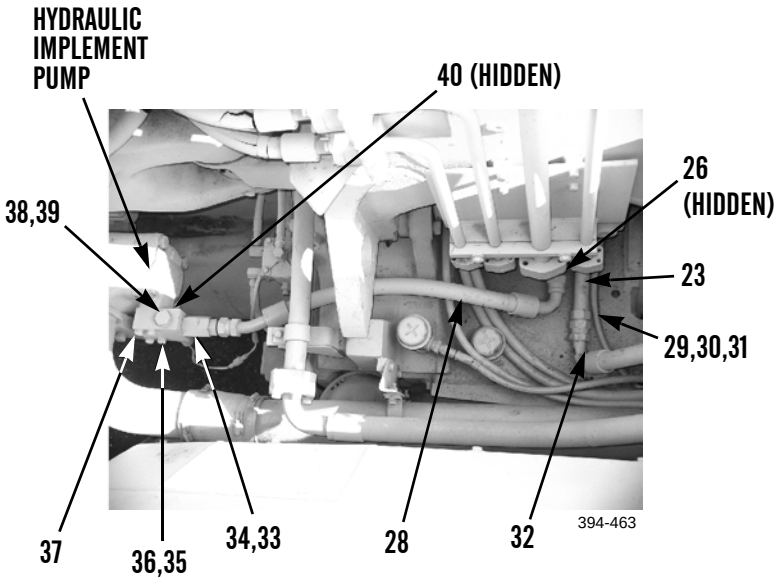
8. Install all retaining hardware and tie straps.
9. If removed, install new preformed packing (45) and adapter (44) to machine.
10. Install hose assemblies (29 and 32) on machine.
11. Connect hose assembly (29) to adapter (44).
12. Install new preformed packing (43).
13. Connect hose assembly (32).
14. Install two flange halves (46), four washers (42) and capscrews (41).



INSTALLATION - CONTINUED

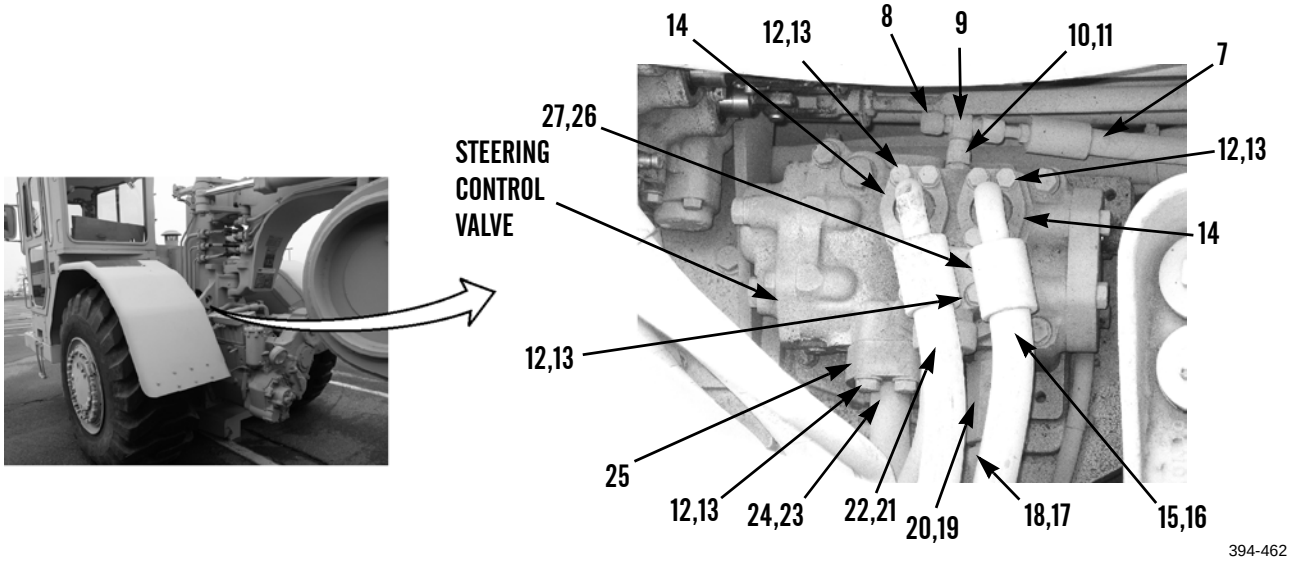
15. If removed, install new preformed packing (40), adapter (37), four capscrews (35), and washers (36) on hydraulic implement pump.
16. If removed, install new preformed packing (39) and plug (38) on adapter (37).
17. If removed, install new seal (34) and valve (33) on adapter (37).
18. Install hose assembly (28) on machine and connect hose assembly (28) to valve (33).
19. Install hose assembly (23) on machine and connect hose assembly (23) to hose assembly (32).
20. Install tube assembly (26) on machine and connect tube assembly (26) to hose assembly (28).
21. If removed, install new preformed packing (31) and elbow (30).
22. Connect hose assembly (29) to elbow (30).





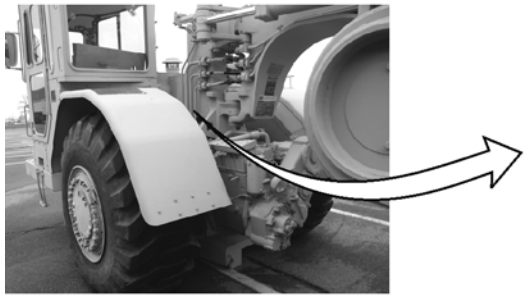
INSTALLATION - CONTINUED

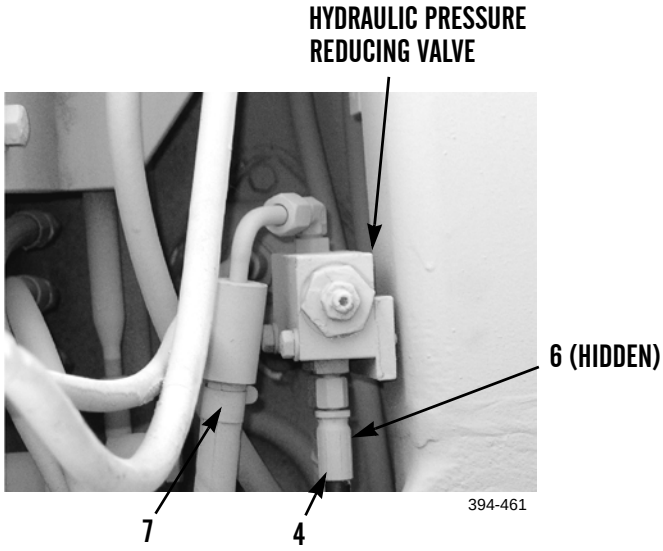
23. If removed, install fittings on hitch hoses which connect to hose assemblies (15 and 21) (WP 0234 00).
24. Install hose assemblies (15, 17 and 21) and tube assemblies (23 and 26) on machine.
25. Connect hose assemblies (15 and 21) to hitch hoses (WP 0234 00).
26. If removed, install new seal (20), valve (19) and elbow (18) on steering control valve.
27. If removed, install new preformed packing (11), adapter (10), tee (9) and cap (8) on steering control valve.
28. Connect hose assembly (17) to elbow (18).
29. Install performed packings (16, 22, 24 and 27).
30. Connect hose assemblies (15 and 21) and tube assemblies (23 and 26) to steering control valve.
31. Install four flange halves (14), two flange halves (25), 16 washers (13) and bolts (12) on steering control valve.
32. If removed, install fittings on hose multi-connector which connect to hose assembly (6) (WP 0233 00).
33. If removed, install fittings on hydraulic steering pressure reducing valve which connect to hose assemblies (4, 6 and 7) (WP 0184 00).
34. Install hose assembly (7) on machine.
35. Connect hose assembly (7) to tee (9).
36. Install all retaining hardware and straps on hose assemblies (7, 15 and 21).



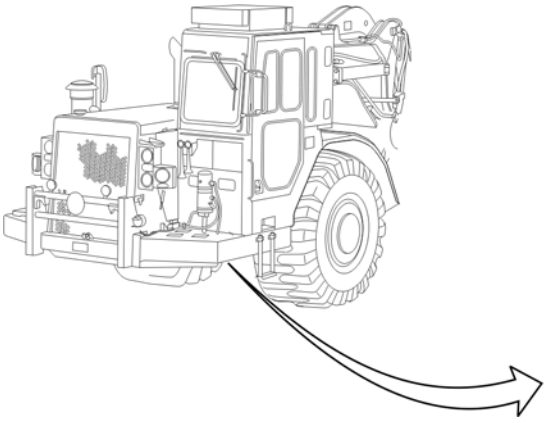
INSTALLATION - CONTINUED

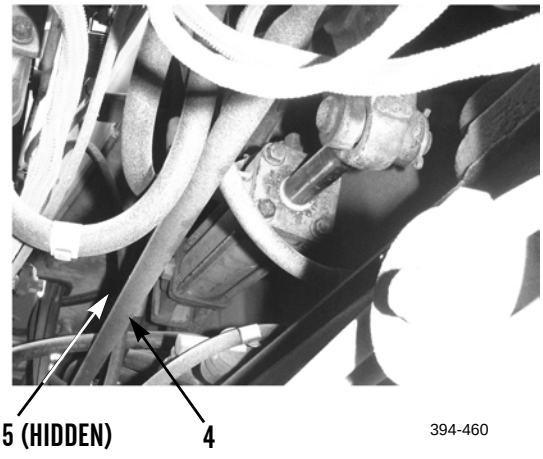
37. Install hose assemblies (4 and 6).
38. Install all retaining hardware and tie straps on hose assemblies (4 and 6).
39. If removed, install fittings on hose multi-connector which connect to hose assembly (WP 0233 00).
40. Connect hose assembly (6) to multi-connector (WP 0233 00).
41. Connect hose assembly (6 and 7) to hydraulic steering pressure reducing valve (WP 0184 00).





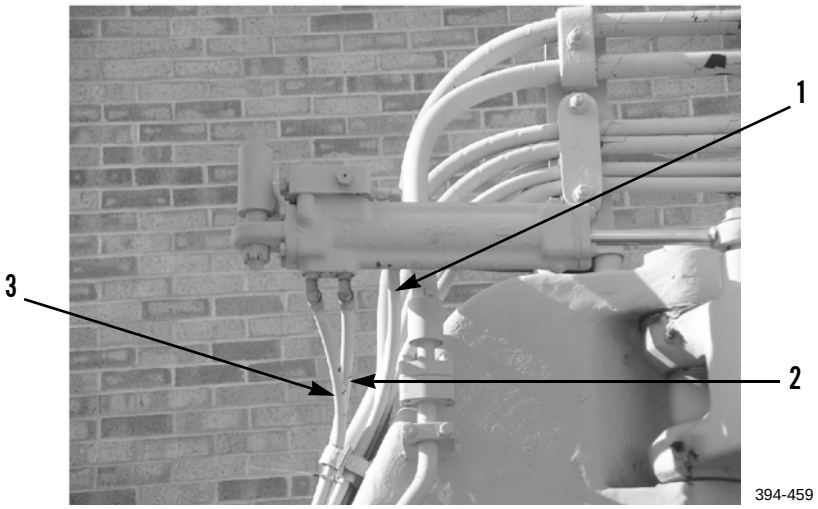
42. Connect hose assembly (4) to hydraulic steering pressure reducing valve (WP 0184 00).
43. Connect hose assemblies (4) to tee (5).





INSTALLATION - CONTINUED

44. If removed, install fittings on hydraulic steering servo-sender and receiver cylinders which connect to hose assemblies (1, 2 and 3) (WP 0309 00 and WP 0311 00).
45. Install hose assemblies (1, 2 and 3) on machine.
46. Connect hose assembly (1) to multi-connector (WP 0233 00).
47. Connect hose assemblies (2 and 3) to hydraulic steering servo-receiver cylinder (WP 0311 00).
48. Connect hose assemblies (1, 2 and 3) to hydraulic steering servo-sender cylinder (WP 0309 00).
49. Install all retaining hardware and straps on hose assemblies (1, 2 and 3).



50. Refill hydraulic tank to proper level (TM 5-3805-248-10).
51. Start engine (TM 5-3805-248-10).
52. Operate steering. Move system through at least five full movements of travel. This will bleed the air out of the system.
53. Shut down engine (TM 5-3805-248-10).
54. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
55. Inspect all hose and tube assemblies for leaks.
56. Install hood (WP 0189 00).
57. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

STEERING CYLINDERS REPLACEMENT 0181 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 300 lb minimum capacity

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Grease, GAA (Item 20, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Personnel Required

Two

References

WP 0180 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Ejector moved forward (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- The following is a procedure for the right steering cylinder assembly. The maintenance procedure for the left steering cylinder assembly is identical.

REMOVAL - CONTINUED

1. Disconnect hoses (1) from steering cylinder assembly (WP 0180 00).

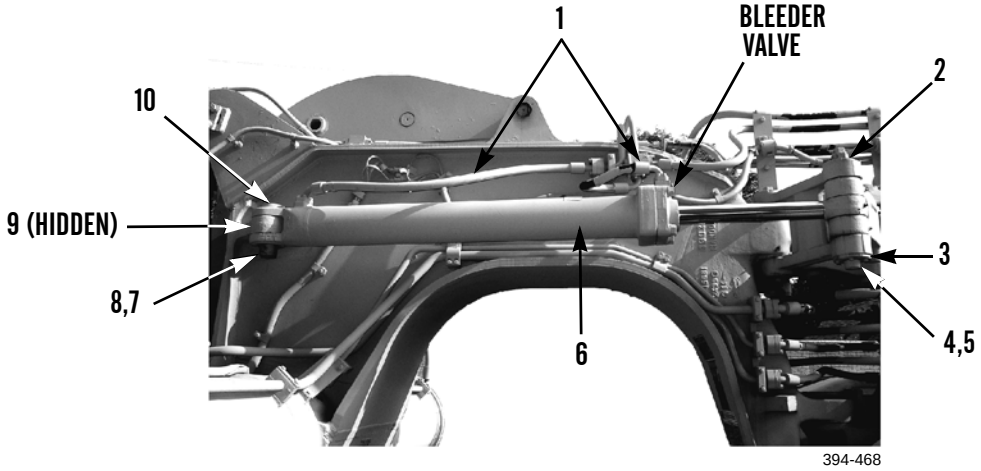
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of steering cylinder assembly is 200 lb (91 kg).

2. Install lifting device to steering cylinder assembly (6).
3. Remove pin (7) and spring (8).
4. Remove pin (10).
5. Remove four bolts (4), washers (5) and two yokes (3).
6. Remove pin (2).
7. Use lifting device to remove steering cylinder assembly (6).
8. If damaged, remove bushing (9) from draft frame.
9. Remove lifting device from steering cylinder assembly (6).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent cleaning compound.
2. Dry parts with compressed air.
3. Inspect all parts for damage and replace damaged parts as necessary.

INSTALLATION

1. If removed, install bushing (9) in draft frame.

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

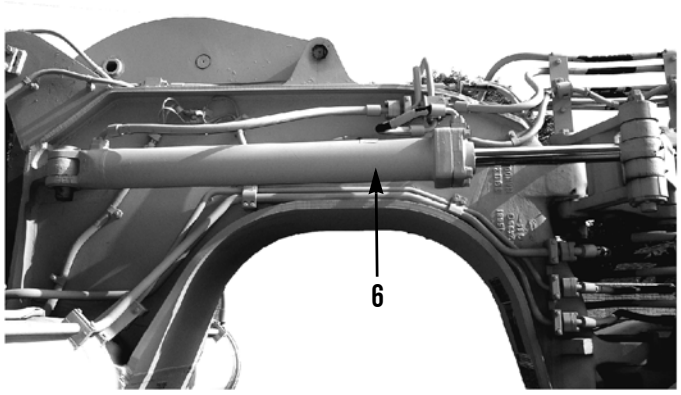
NOTE

Weight of steering cylinder assembly is 200 lb (91 kg).

2. Install lifting device to steering cylinder assembly (6).
3. Use lifting device to install steering cylinder assembly (6).
4. Lubricate pins (2, 7 and 10) with grease.
5. Install pin (2), two yokes (3), four washers (5) and bolts (4).
6. Install pin (10), spring (8) and pin (7).
7. Remove lifting device from steering cylinder assembly (6).
8. Start engine.
9. Rotate steering wheel fully, in both directions, several times.
10. Loosen bleeder valves on right and left steering cylinder assemblies (6) to open. Leave bleeder valves open until hydraulic fluid, free of air bubbles, flows from bleeder valve.
11. Tighten bleeder valves on right and left steering cylinder assemblies (6) to close.
12. Rotate steering wheel full left.

INSTALLATION - CONTINUED

13. Loosen bleeder valves on right and left steering cylinder assemblies (6) to open. Leave bleeder valves open until hydraulic fluid, free of air bubbles, flows from bleeder valves.
14. Tighten bleeder valves on right and left steering cylinder assemblies (6) to close. Torque both bleeder valves to 24 lb-ft (33 Nm).



394-468

15. Stop engine.
16. Refill hydraulic tank to proper level (TM 5-3805-248-10).
17. Start engine (TM 5-3805-248-10).
18. Operate steering. Move system through at least five full movements of travel. This will bleed air out from system.
19. Shut down engine (TM 5-3805-248-10).
20. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
21. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

HYDRAULIC STEERING SERVO-SENDER CYLINDER MAINTENANCE 0182 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 34, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Pin, cotter

References

WP 0183 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Ejector moved forward (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

REMOVAL - CONTINUED

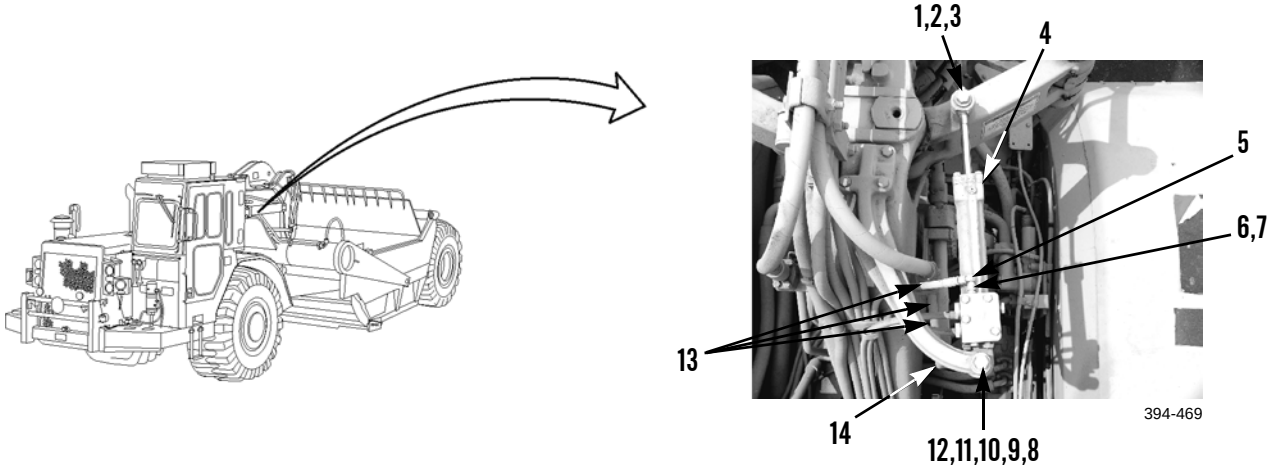
CAUTION

Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.

1. Disconnect three hose assemblies (13) from elbows (5) on hydraulic steering servo-sender cylinder assembly (4).
2. Remove three elbows (5), connector (6) and three preformed packings (7). Discard preformed packing.
3. Remove bolt (1), washer (2) and spacer (3).
4. Remove and discard cotter pin (12).
5. Remove nut (11), washer (10), bolt (9), spacer (8) and hydraulic steering servo-sender cylinder assembly (4) from bracket (14).



INSTALLATION

1. Install hydraulic steering servo-sender cylinder assembly (4), spacer (8), bolt (9), washer (10) and nut (11) to bracket (14).
2. Install new cotter pin (12).
3. Install spacer (3), washer (2) and bolt (1) to secure hydraulic steering servo-sender cylinder assembly (4).
4. Install three new preformed packings (7), connector (6) and three elbows (5) to bottom of hydraulic steering servo-sender cylinder assembly (4).
5. Connect three hose assemblies (13).

INSTALLATION - CONTINUED

6. Bleed air from follow-up circuit (WP 0183 00).
7. Refill hydraulic tank to proper level (TM 5-3805-248-10).
8. Start engine (TM 5-3805-248-10).
9. Operate steering. Move system through at least five full movements of travel. This will bleed air from system.
10. Shut down engine (TM 5-3805-248-10).
11. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
12. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

BLEEDING FOLLOW-UP CIRCUIT 0183 00

THIS WORK PACKAGE COVERS

Service

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Ejector moved forward (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic pressure relieved (WP 0231 00)

SERVICE

WARNING

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

NOTE

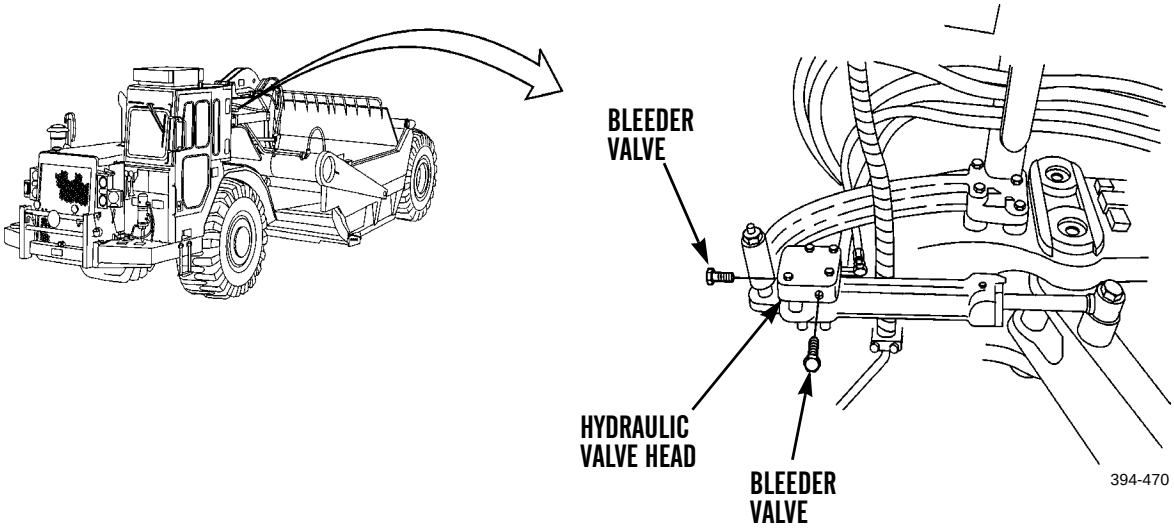
Use a suitable container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.

1. Start engine.
2. Rotate steering wheel full right.

BLEEDING FOLLOW-UP CIRCUIT - CONTINUED 0183 00

SERVICE - CONTINUED

3. Loosen two bleeder valves on hydraulic valve head at front, right side of machine to open. Leave two bleeder valves open until hydraulic fluid, free of air bubbles, flows from two bleeder valves.
4. Tighten two bleeder valves on hydraulic valve head to close.
5. Rotate steering wheel full left.
6. Loosen two bleeder valves on hydraulic valve head. Leave bleeder valves open until hydraulic fluid, free of air bubbles, flows from two bleeder valves.
7. Tighten two bleeder valves on hydraulic valve head to close. Torque two bleeder valves to 25 lb-ft (34 Nm).
8. Stop engine.
9. Refill hydraulic tank to proper level (TM 5-3805-248-10).
10. Start engine (TM 5-3805-248-10).
11. Operate steering. Move system through at least five full movements of travel. This will bleed air from the system.
12. Shut down engine (TM 5-3805-248-10).
13. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
14. Inspect all hose and tube assemblies for leaks.



END OF WORK PACKAGE

HYDRAULIC STEERING PRESSURE REDUCING VALVE REPLACEMENT 0184 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Ejector moved forward (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

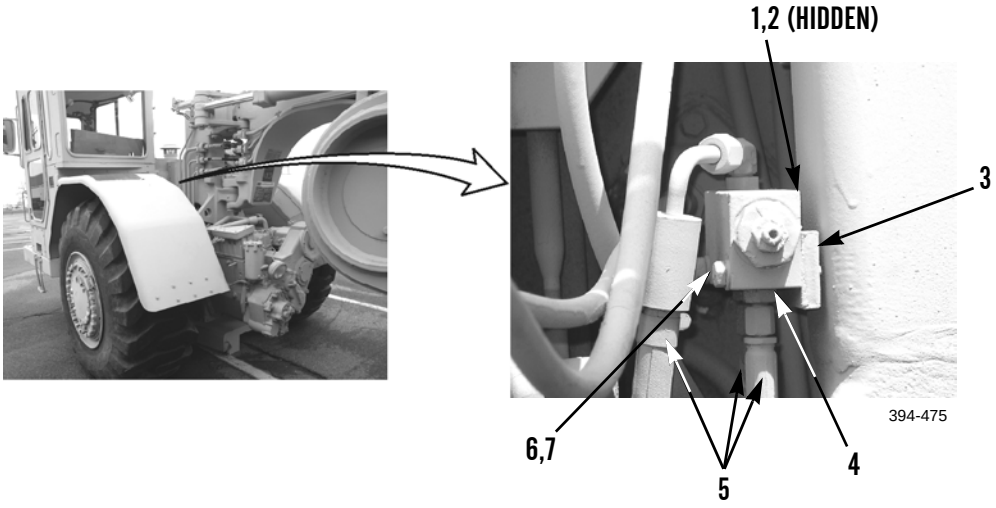
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

NOTE

- Use container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.

REMOVAL - CONTINUED

1. Disconnect three hoses (5) from pressure reducing valve (4).
2. Remove two bolts (6), washers (7) and pressure reducing valve (4).
3. Remove two bolts (1), washers (2) and bracket (3) from rear side of cab.



INSTALLATION

1. Install bracket (3), two washers (2) and bolts (1) on rear side of cab.
2. Install pressure reducing valve (4), two washers (7) and bolts (6).
3. Connect three hoses (5) on pressure reducing valve (4).
4. Refill hydraulic tank to proper level (TM 5-3805-248-10).
5. Start engine (TM 5-3805-248-10).
6. Operate steering. Move system through at least five full movements of travel. This will bleed air from system.
7. Shut down engine (TM 5-3805-248-10).
8. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
9. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

FRONT BUMPER REPLACEMENT 0185 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Compound, anti-seize (Item 11, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Wood block, 4x4x12" long

Personnel Required

Two

Equipment Condition

Blackout drive lamp removed (WP 0082 00)

Directional light assemblies removed (WP 0090 00)

WARNING

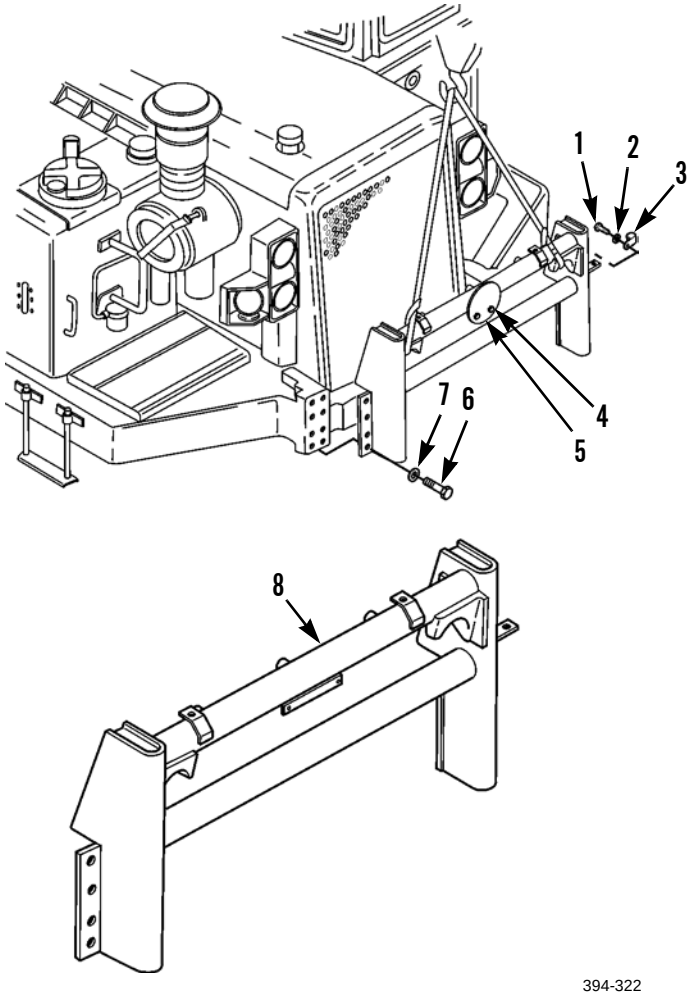
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

REMOVAL

NOTE

- This work package is for machines equipped with a front bumper that is attached with bolts. Some machines may have a front bumper that is welded in place.
- Weight of front bumper assembly is 180 lb (82 kg).
- If necessary, remove two bolts (4) and bridge weight class plate (5) from bumper (8).

1. Remove bolt (1), washer (2) and clip (3) from front bumper (8).
2. Attach lifting device to front bumper (8).
3. Remove eight bolts (6) and washers (7) from front bumper (8).
4. Use lifting device to remove front bumper (8) from machine and set on wood blocks.
5. Remove lifting device.



394-322

INSTALLATION

1. Attach lifting device to front bumper (8).
2. Use lifting device to install front bumper on machine.
3. Apply anti-seize compound to eight bolts (6) and to both sides of eight washers (7).
4. Remove lifting device.
5. Install clip (3), washer (2) and bolt (1).
6. Install blackout drive lamp (WP 0082 00).
7. Install two directional light assemblies (WP 0090 00).
8. If removed, install bridge weight class plate (5) and two bolts (4) on bumper (8).

END OF WORK PACKAGE

TOWING PIN REPLACEMENT 0186 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Nut, self-locking

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

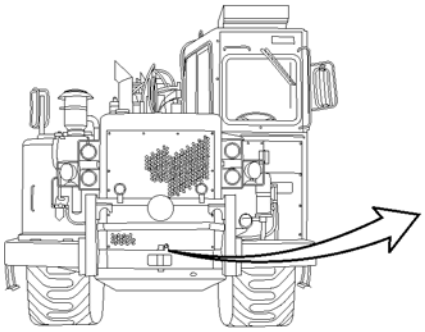
Engine shut down (TM 5-3805-248-10)

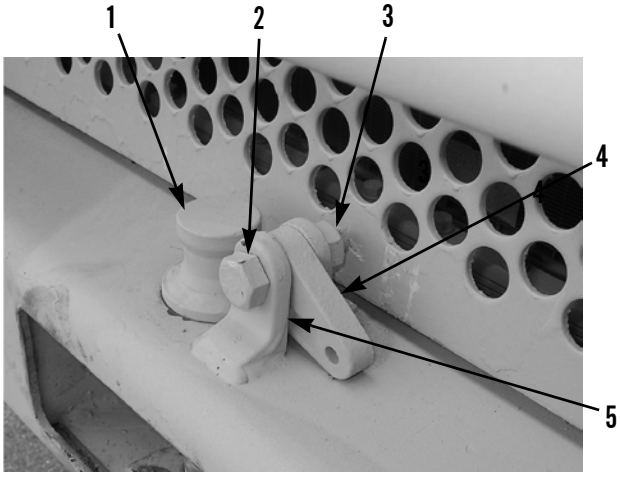
Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Lift latch (4) on center front of machine and remove towing pin (1).
2. Remove self-locking nut (3), capscrew (2) and latch (4) from bracket (5). Discard self-locking nut.





394-329

INSTALLATION

1. Install latch (4), capscrew (2) and new self-locking nut (3) on bracket (5).
2. Lift latch (4) and install towing pin (1).
3. Lower latch (4).

END OF WORK PACKAGE

FRAME STEP ASSEMBLY REPLACEMENT 0187 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

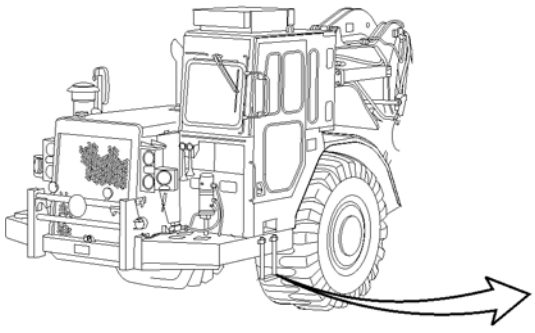
Battery disconnect switch in OFF position (TM 5-3805-248-10)

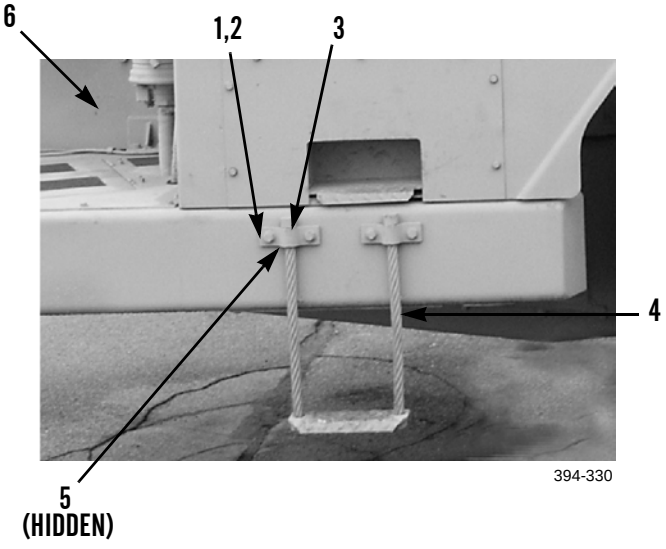
REMOVAL

NOTE

The following is a maintenance procedure for the left frame step assembly. The maintenance procedure for the right frame step assembly is identical.

1. Remove four bolts (1) and washers (2) from side of machine (6).
2. Remove two clamps (3), frame step assembly (4) and two plate spacers (5).

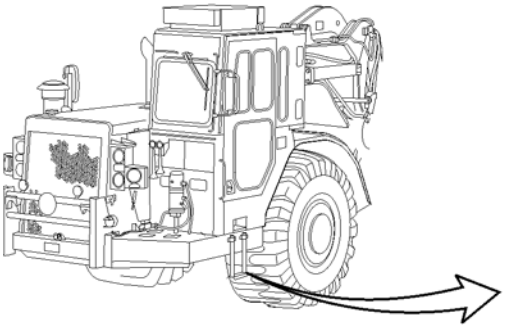


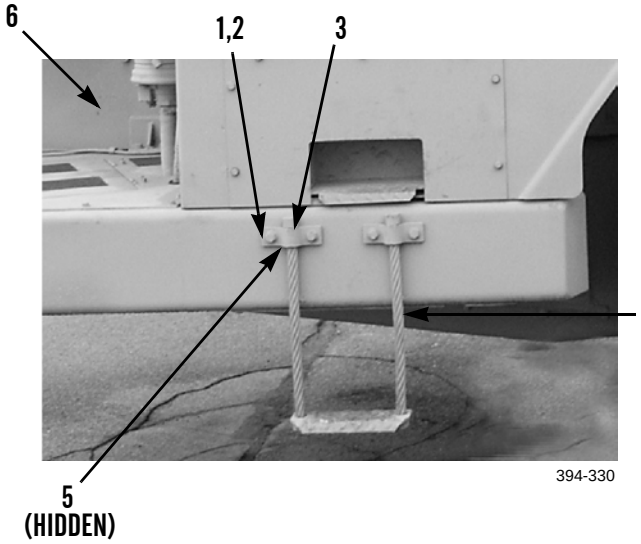


FRAME STEP ASSEMBLY REPLACEMENT - CONTINUED 0187 00

INSTALLATION

1. Install two plate spacers (5), frame step assembly (4) and two clamps (3).
2. Install four washers (2) and bolts (1) on machine (6).





END OF WORK PACKAGE

RADIATOR GUARD REPLACEMENT 0188 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may cause injury.

REMOVAL

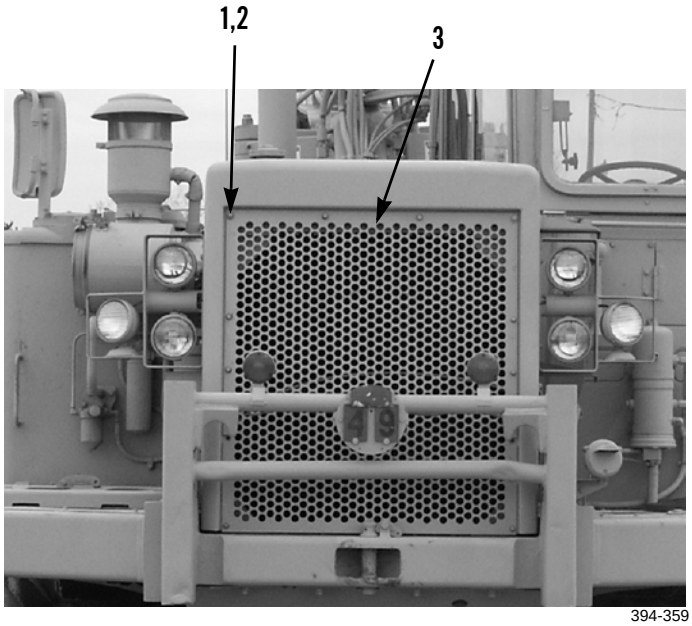
NOTE

Weight of radiator guard assembly is 46 lb (21 kg).

1. Remove eleven bolts (1) and washers (2) from radiator guard (3).
2. With assistance, remove radiator guard (3).

INSTALLATION

1. With assistance, install radiator guard (3).
2. Install eleven washers (2) and bolts (1) on radiator guard (3).



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END OF WORK PACKAGE

HOOD, BRACKETS AND MOUNTING REPLACEMENT 0189 00

THIS WORK PACKAGE COVERS

Hood: Removal, Installation

Hood Brackets and Mounting: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Lifting device, 120 lb minimum capacity

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Rivet (9)

Grommet (2)

Personnel Required

Two

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Engine compartment access doors removed (WP 0190 00)

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

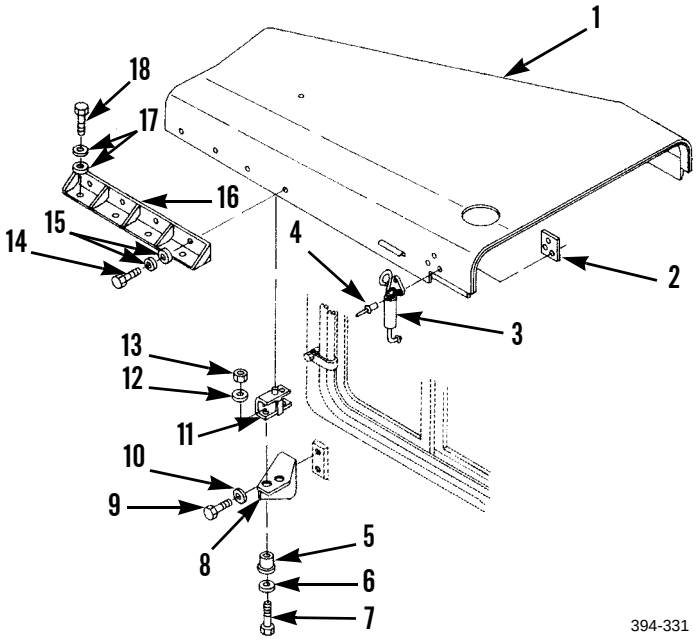
NOTE

The weight of the hood is 112 lb (50 kg).

HOOD, BRACKETS AND MOUNTING REPLACEMENT - CONTINUED 0189 00

HOOD REMOVAL

1. Remove four bolts (14) and eight washers (15) from angle assembly (16) at top right side of engine compartment.
2. Unlatch three latch assemblies (3) on hood (1).
3. Attach lifting device to hood (1).
4. With assistance, use lifting device to remove hood (1).
5. Remove lifting device.
6. If necessary, drill out nine rivets (4), remove three latch assemblies (3) and plates (2) from hood (1). Discard rivets.



HOOD BRACKETS AND MOUNTING REMOVAL

1. Remove four bolts (18) and eight washers (17) from angle assembly (16) at top right side of engine compartment.
2. Remove angle assembly (16).
3. Remove two nuts (13), washers (12), bolts (7), washer (6) and grommets (5) from support (8). Discard grommets.
4. Remove bracket (11) from support (8).
5. Remove two bolts (9), washers (10) and support (8).

HOOD BRACKETS AND MOUNTING INSTALLATION

1. Install support (8), two washers (10) and bolts (9).
2. Install bracket (11) on support (8).
3. Install two new grommets (5), washers (6), bolts (7), washers (12) and nuts (13) on bracket (8).
4. Install angle assembly (16) on machine.
5. Install eight washers (17), four bolts (18) on angle assembly (16).

HOOD INSTALLATION

1. If removed, install three plates (2), latch assemblies (3) and nine new rivets (4) on hood (1).
2. Install lifting device on hood (1).
3. With assistance, use lifting device to install hood (1) on machine.
4. Remove lifting device.
5. Latch three latch assemblies (3) on hood (1).
6. Install eight washers (15) and four bolts (14) on angle assembly (16).
7. Install access doors (WP 0190 00).

END OF WORK PACKAGE

ENGINE COMPARTMENT ACCESS DOORS REPLACEMENT 0190 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Rivet (5)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

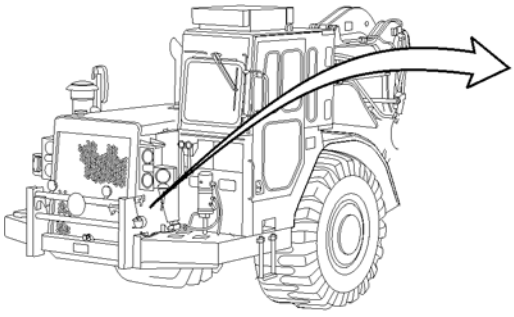
Battery disconnect switch in OFF position (TM 5-3805-248-10)

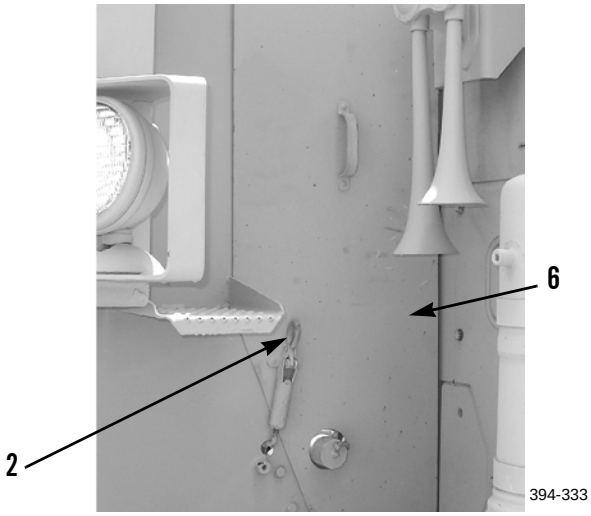
REMOVAL

NOTE

This procedure is for the left engine compartment access door. The procedure for the right engine compartment access door is identical.

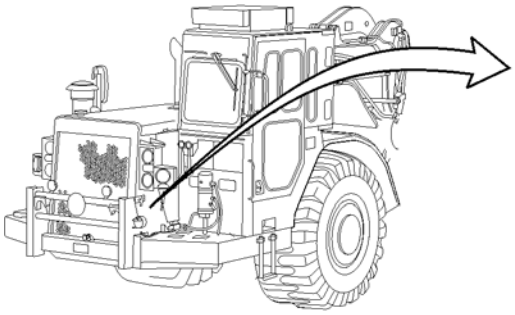
1. Release latch (2) on engine compartment access door (6).
2. Remove engine compartment access door (6) from machine.

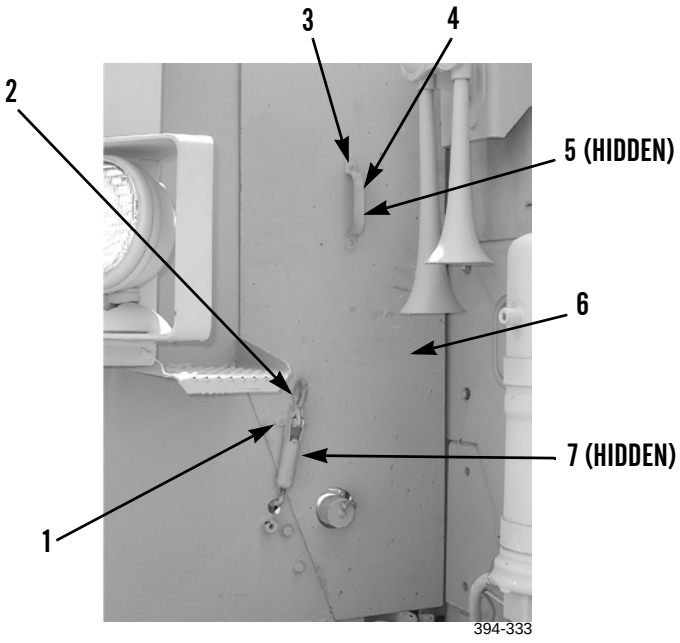




DISASSEMBLY

1. Drill out three rivets (1) from latch (2). Discard rivets.
2. Remove latch (2) and plate (7).
3. Drill out two rivets (3) from handle (4). Discard rivets.
4. Remove handle (4) and plate (5) from engine compartment access door (6).





ASSEMBLY

1. Install plate (5) and handle (4) on engine compartment access door (6).
2. Install two new rivets (3) on handle (4).
3. Install plate (7) and latch (2) on engine compartment access door (6).
4. Install three new rivets (1) on latch (2).

INSTALLATION

1. Install engine compartment access door (6) on machine.
2. Engage latch (2) on engine compartment access door (6).

END OF WORK PACKAGE

ENGINE COMPARTMENT SHIELDS REPLACEMENT 0191 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

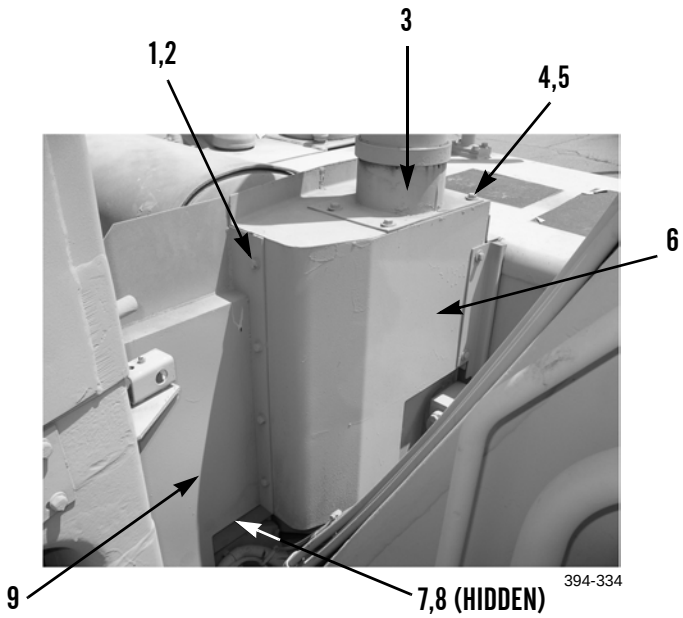
Exhaust removed (WP 0041 00)

Hood removed (WP 0189 00)

Engine compartment access door removed (WP 0190 00)

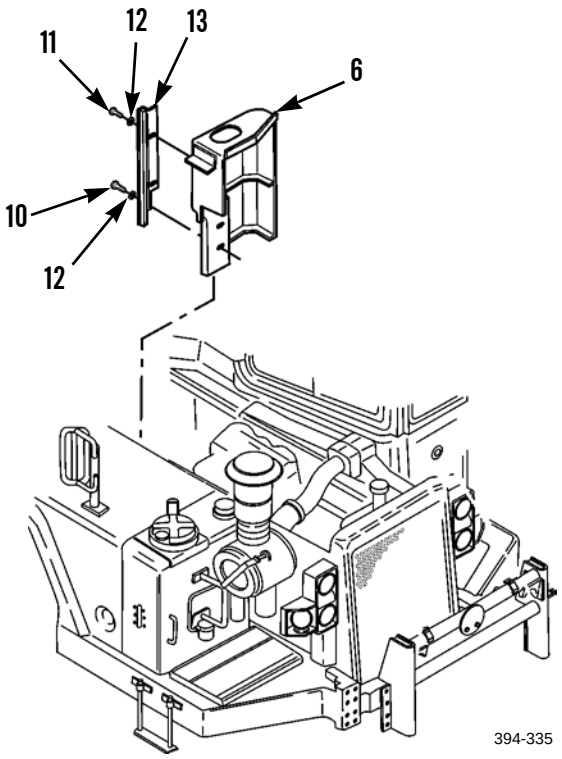
REMOVAL

1. Remove four bolts (1) and washers (2).
2. Remove six bolts (7), washers (8) and deflector assembly (9) from rear of engine compartment.
3. Remove four bolts (4), washers (5) and collar assembly (3) from spacer plate (6).

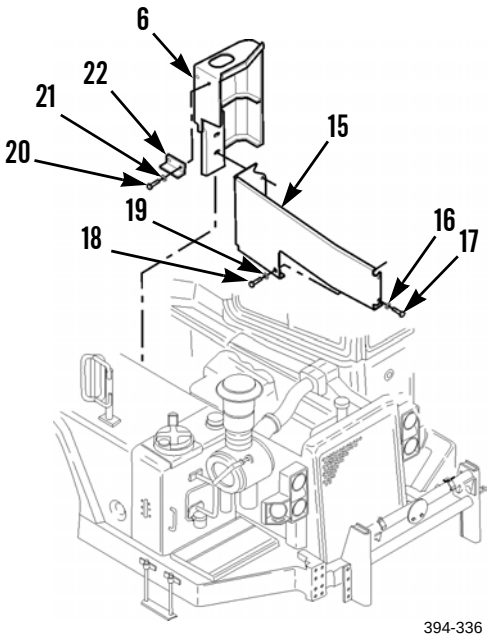


REMOVAL - CONTINUED

4. Remove two bolts (10), bolts (11), four washers (12), and baffle (13) from spacer plate (6).

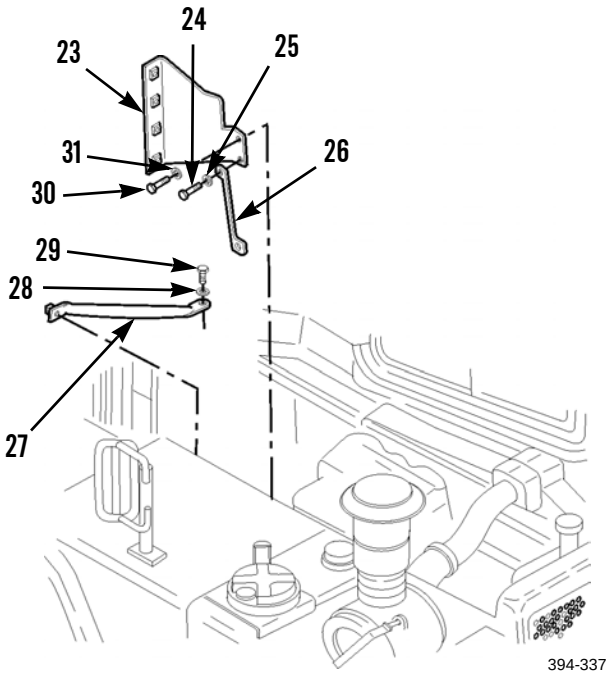


5. Remove two bolts (20), washers (21) and angle bracket (22) from deflector assembly (14).
6. Remove spacer plate (6) from machine.
7. Remove two capscrews (17), washers (16), bolt (18), washer (19) and cover (15) from right side of engine compartment.



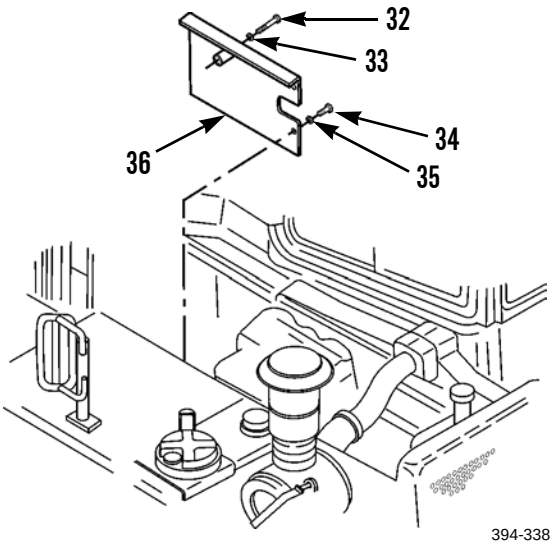
REMOVAL - CONTINUED

8. Remove bolt (24), washer (25) and double angle bracket (26) from support shield (23).
9. Remove two bolts (30), washers (31) and support shield (23) from machine.
10. Remove bolt (29), washer (28) and rearview mirror arm (27).



394-337

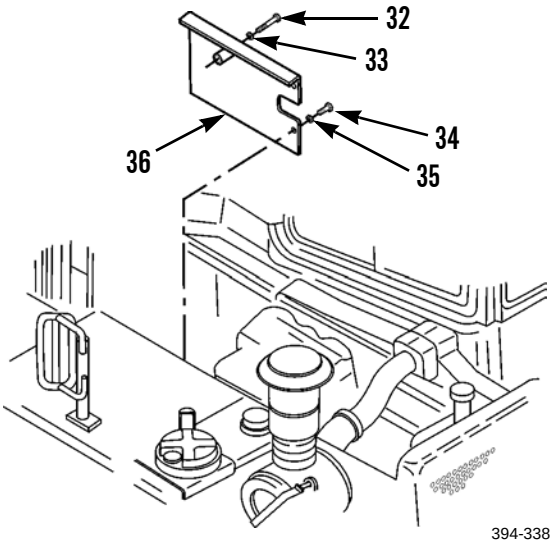
11. Remove bolt (32), washer (33), two bolts (34), washers (35) and plate shield (36) from side of hydraulic tank.



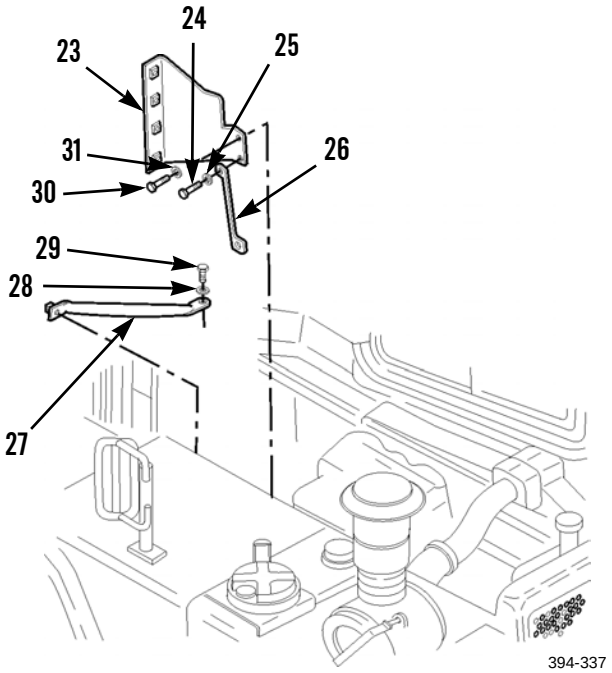
394-338

INSTALLATION

1. Install plate shield (36), two washers (35), bolts (34), washer (33) and bolt (32) on side of hydraulic tank.



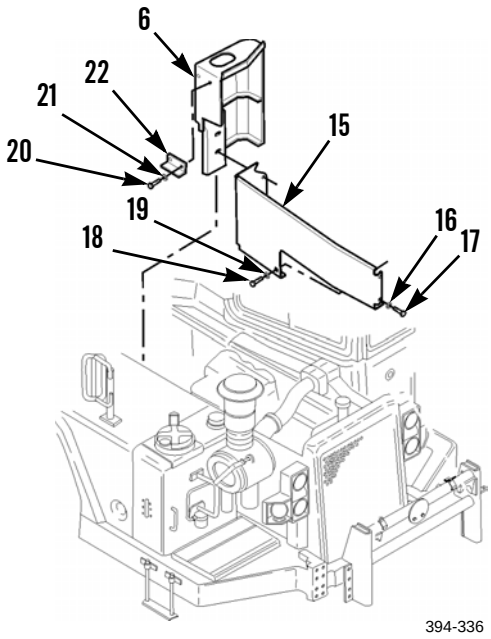
2. Install rearview mirror arm (27), washer (28) and bolt (29).
3. Install support shield (23), washer (31) and bolt (30).
4. Install double angle bracket (26), washer (25) and bolt (24).



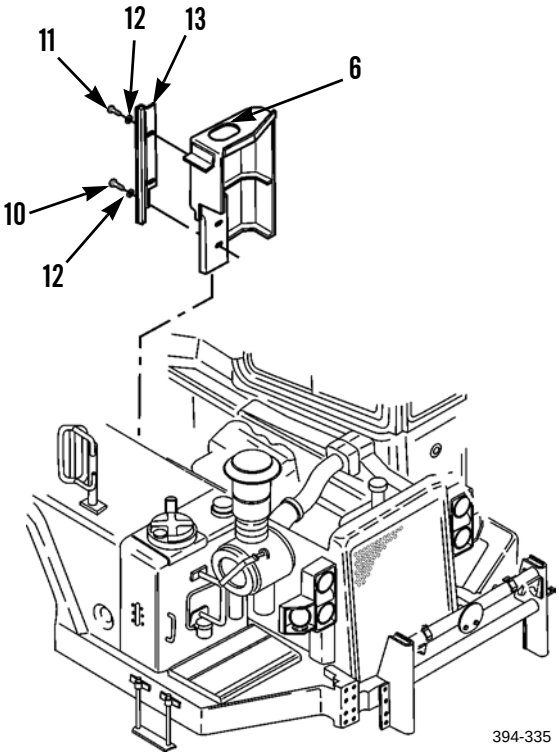
ENGINE COMPARTMENT SHIELDS REPLACEMENT - CONTINUED 0191 00

INSTALLATION - CONTINUED

5. Install shield assembly (15), washer (19), bolt (18), two washers (16) and capscrews (17).
6. Install angle bracket (22), two washers (21) and bolts (20) on deflector assembly (14).

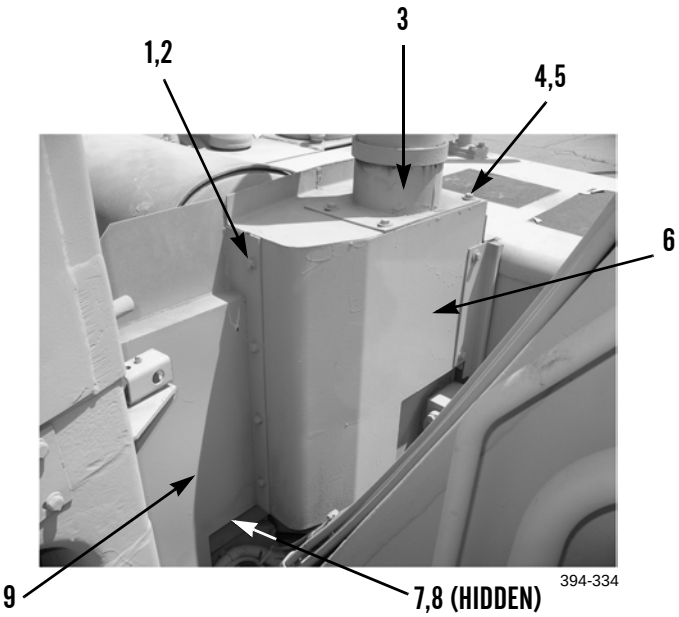


7. Install spacer plate (6) on machine.
8. Install baffle (11), four washers (12), two bolts (10) and bolts (11) on spacer plate (6).



INSTALLATION - CONTINUED

9. Install collar assembly (3), four washers (5) and bolts (4) on spacer plate (6).
10. Install deflector assembly (9), four washers (2) and bolts (1).
11. Install six washers (8) and bolts (7) on deflector (9).



12. Inspect engine compartment shields. Check to see that no oil, air or fuel lines are touching metal parts.
13. Install exhaust (WP 0041 00).
14. Install hood (WP 0189 00).
15. Install door assembly (WP 0190 00).

END OF WORK PACKAGE

OPERATOR COMPARTMENT UPPER FRONT ACCESS PLATES REPLACEMENT 0192 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

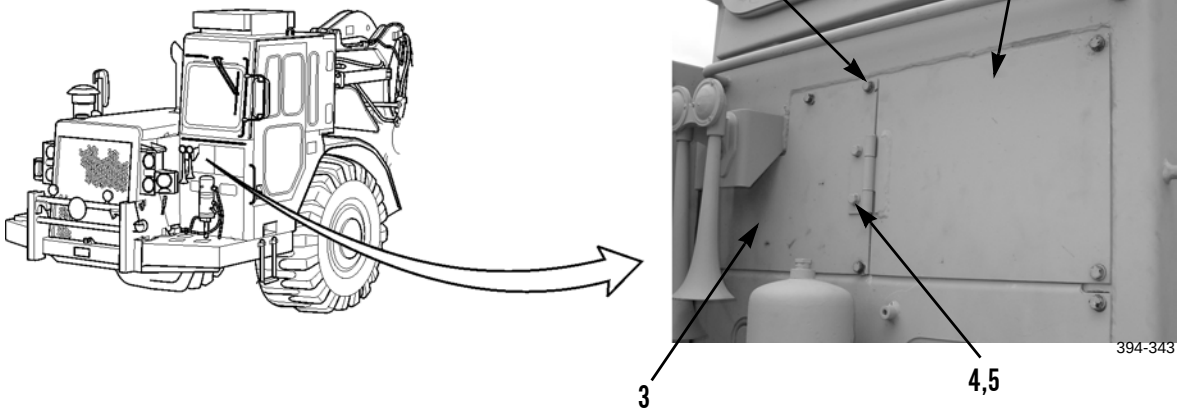
Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

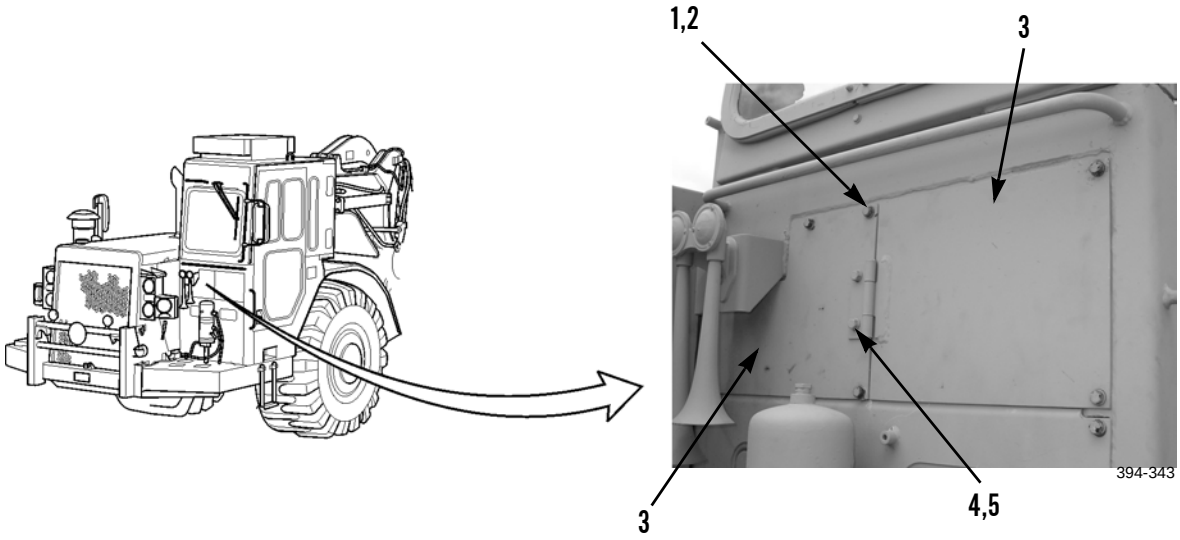
1. Remove seven bolts (1) and washers (2) upper front access plate (3).
2. Remove upper front access plates (3) from cab.
3. If necessary, remove two bolts (4) and washers (5) to separate two plates.



OPERATOR COMPARTMENT UPPER FRONT ACCESS PLATES REPLACEMENT - CONTINUED 0192 00

INSTALLATION

1. If removed, assemble two plates (3), install two washers (5) and bolts (4) on upper front access plates (3).
2. Install plate (3), seven washers (2) and bolts (1) on cab.



END OF WORK PACKAGE

LITERATURE COMPARTMENT REPLACEMENT 0193 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Rivet (2)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

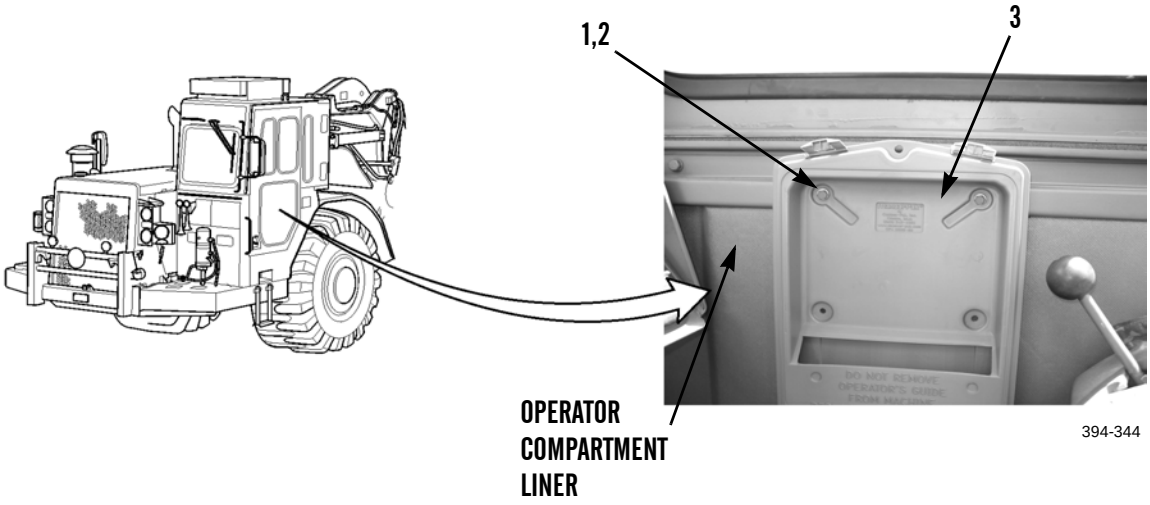
Engine shut down (TM 5-3805-248-10)

Bowl lowered to the ground (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Open literature compartment cover on right side of operator's compartment and remove literature.
2. Drill out two rivets (1) and washers (2). Discard rivets.
3. Remove literature compartment (3) from operator compartment liner.



INSTALLATION

1. Install literature compartment (3) on operator compartment liner.
2. Install two washers (2) and new rivets (1) on literature compartment (3).
3. Place literature in literature compartment (3).
4. Close the literature compartment cover.

END OF WORK PACKAGE

OPERATOR COMPARTMENT SIDE PANEL LINER REPLACEMENT 0194 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

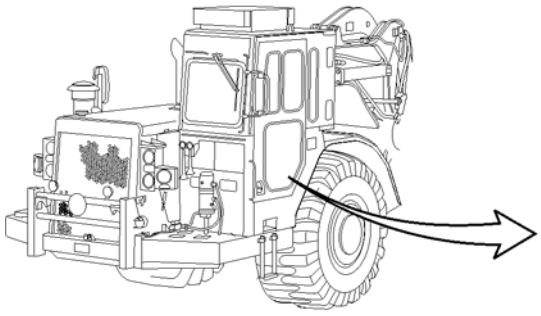
Equipment Condition

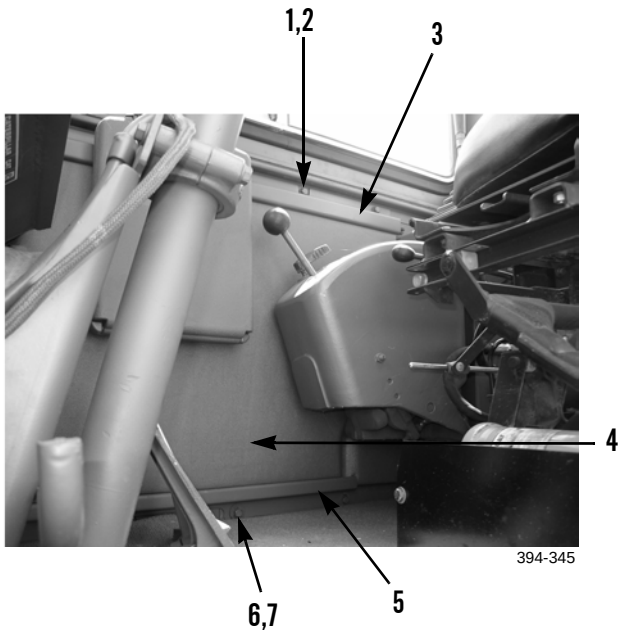
Battery disconnect switch in OFF position (TM 5-3805-248-10)

Literature compartment removed (WP 0193 00)

REMOVAL

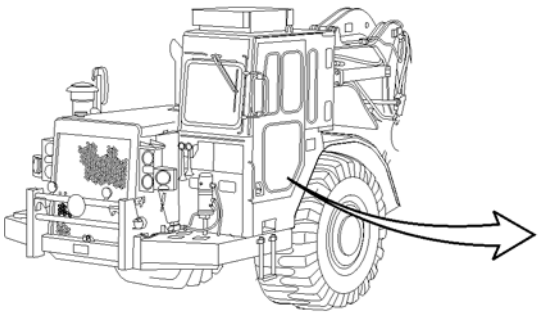
1. Remove five capscrews (1) and washers (2) from upper support (3).
2. Remove upper support (3) from upper right side of operator compartment.
3. Remove three capscrews (6) and washers (7) from lower support (5).
4. Remove lower support (5) from lower right side of operator compartment.
5. Remove liner (4) from right side of operator compartment.

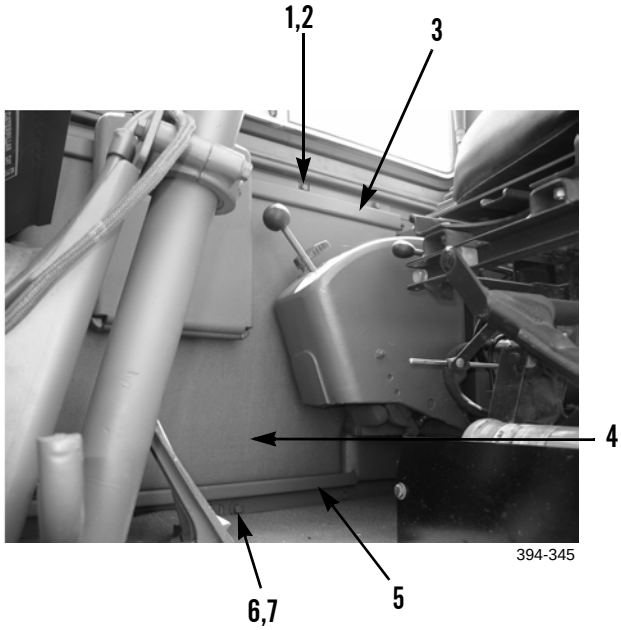




INSTALLATION

1. Install lower support (5) on lower right side of operator compartment.
2. Install three washers (7) and capscrews (6) on lower support (5).
3. Position liner (4) on right side of operator compartment.
4. Install upper support (3) on upper right side of operator compartment.
5. Install five washers (2) and capscrews (1) on upper support (3).





6. Install literature compartment (WP0193 00).

END OF WORK PACKAGE

OPERATOR COMPARTMENT SIDE PANEL REPLACEMENT 0195 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Adhesive (Item 1, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Reference

WP 0039 00

WP 0107 00

WP 0113 00

WP 0115 00

Equipment Condition

Battery disconnect switch in OFF position (TM 3805-248-10)

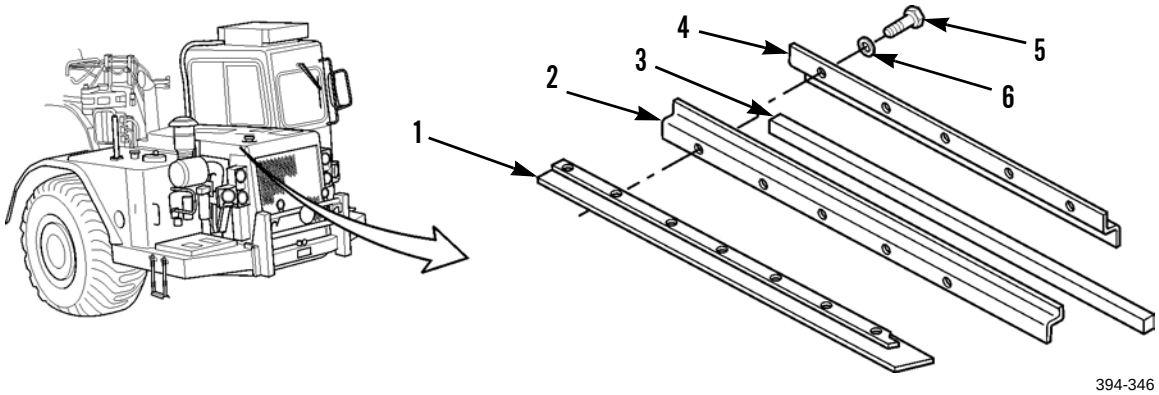
Main circuit breaker removed (WP 0076 00)

Hood removed (WP 0189 00)

Side panel liner removed (WP 0194 00)

REMOVAL

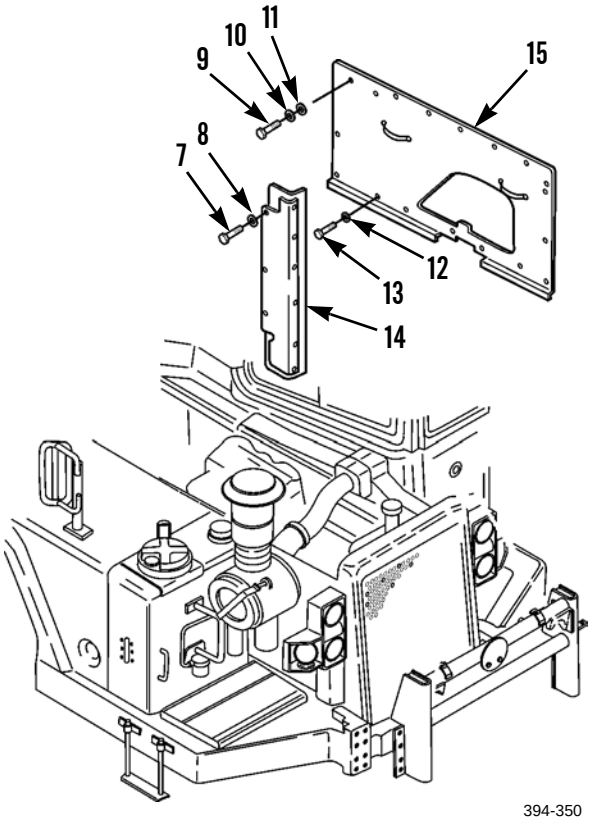
1. Disconnect ether starting aid line clamps from side of operator compartment (WP 0039 00).
2. Disconnect engine compartment wiring harness clamps from side of operator compartment (WP 0107 00).
3. Disconnect alternator ground wire from side of operator compartment (WP 0113 00).
4. Disconnect engine aftercooler to operator compartment ground wire from side of operator compartment (WP 0115 00).
5. Remove two bolts (6) and washers (5) from insulation support (4).
6. Remove baffle assembly (1) and support (2) from insulation support (4).
7. If necessary, remove and discard seal (3).



OPERATOR COMPARTMENT SIDE PANEL REPLACEMENT - CONTINUED 0195 00

REMOVAL - CONTINUED

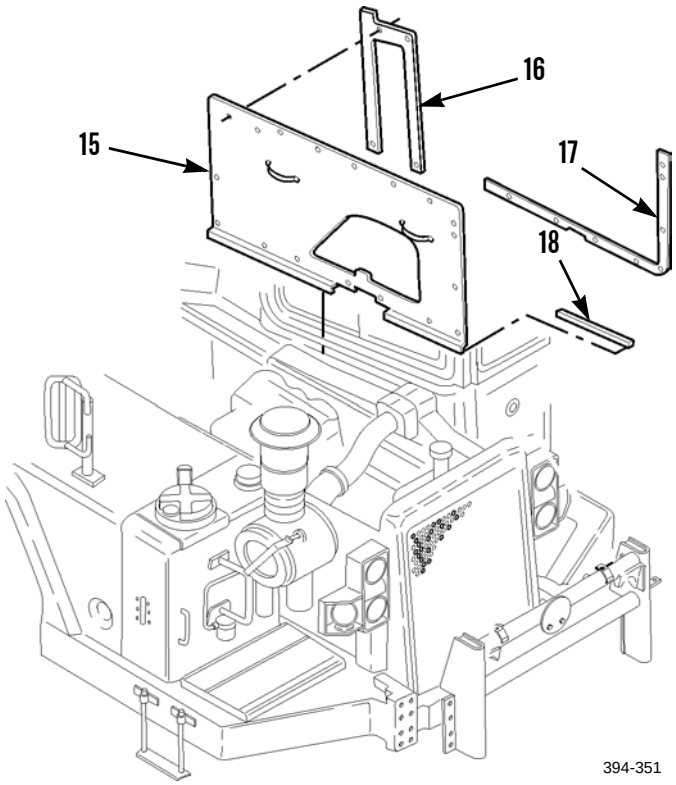
8. Remove bolt (7) and washer (8) from side panel (15).
9. Remove baffle assembly (14) from right side of side panel (15).
10. Remove bolt (9) and washers (10 and 11) from side panel (15).
11. Remove seven bolts (13) and washers (12).
12. Remove side panel (15) from machine.



394-350

REMOVAL - CONTINUED

13. If necessary, remove and discard gaskets (16 and 17) from side panel (15).
14. If necessary, remove and discard seal (18) from side panel (15).



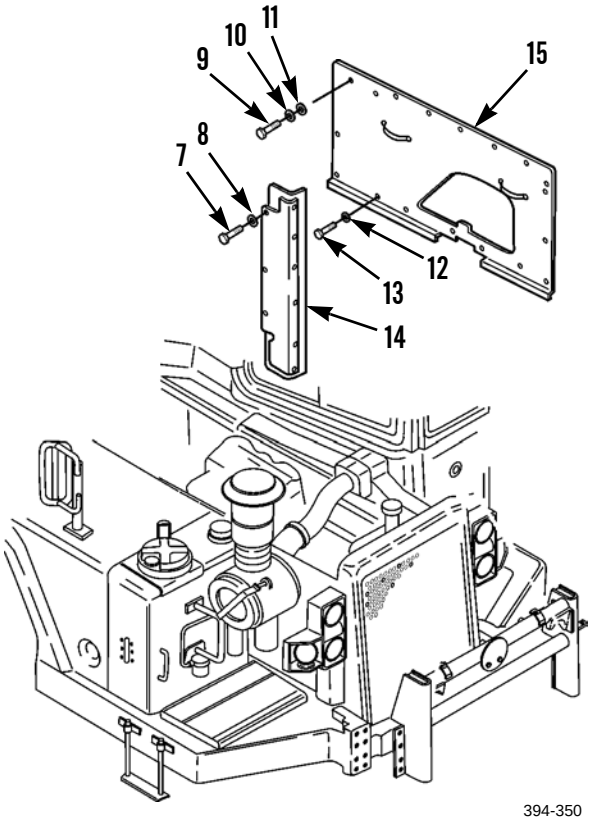
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket and seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

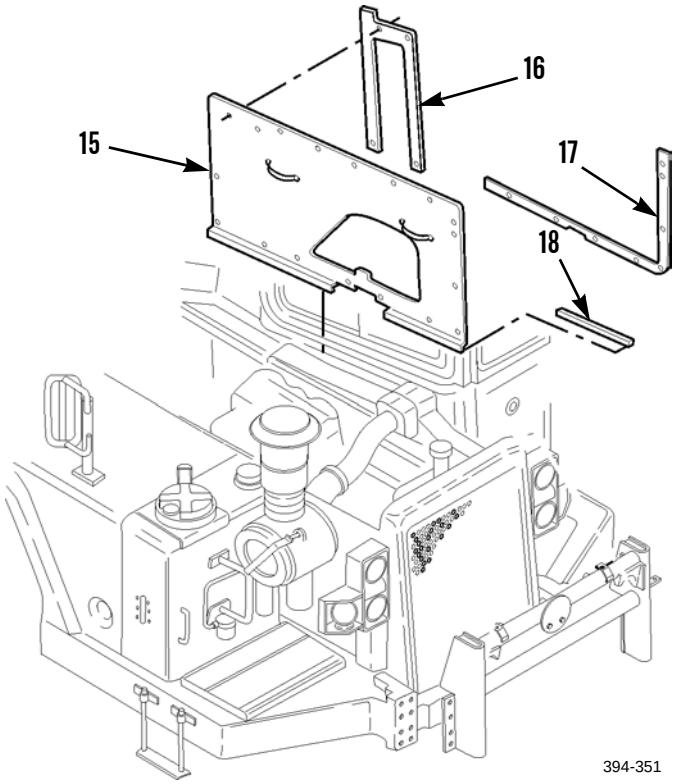
INSTALLATION

1. If removed, install new seal (18) on bottom of side panel (15).
2. If removed, install new gaskets (17 and 16) on side panel (15).
3. Install side panel (15) on machine.
4. Install seven washers (12) and bolts (13) on side panel (15).
5. Install washers (11 and 10) and bolt (9) on side panel (15).
6. Install baffle assembly (14), washer (8) and bolt (7) on side panel (15).

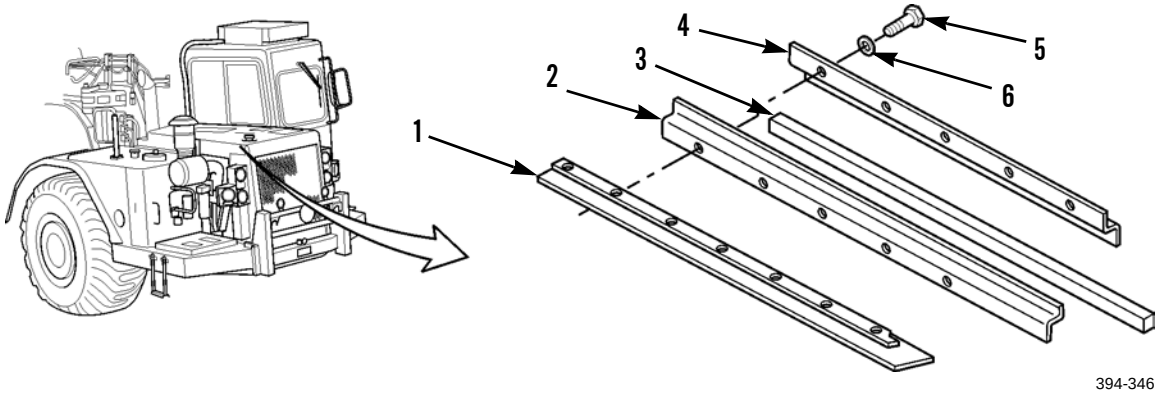


394-350

INSTALLATION - CONTINUED



7. If removed, install new seal (3) on insulation support (4).
8. Install baffle assembly (1) and support (2) on insulation support (4).
9. Install two washers (5) and bolts (6) on side of operator compartment.



INSTALLATION - CONTINUED

10. Connect engine aftercooler to operator compartment ground wire to side of operator compartment (WP 0115 00).
11. Connect alternator ground wire to side of operator compartment (WP 0113 00).
12. Connect engine compartment wiring harness clamps to side of operator compartment (WP 0107 00).
13. Connect ether starting aid line clamps to side of engine compartment (WP 0039 00).
14. Install main circuit breaker (WP 0076 00).
15. Install side panel liner (WP 0194 00).
16. Install hood (WP 0189 00).

END OF WORK PACKAGE

OPERATOR COMPARTMENT SIDE PANEL PLATE REPLACEMENT 0196 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

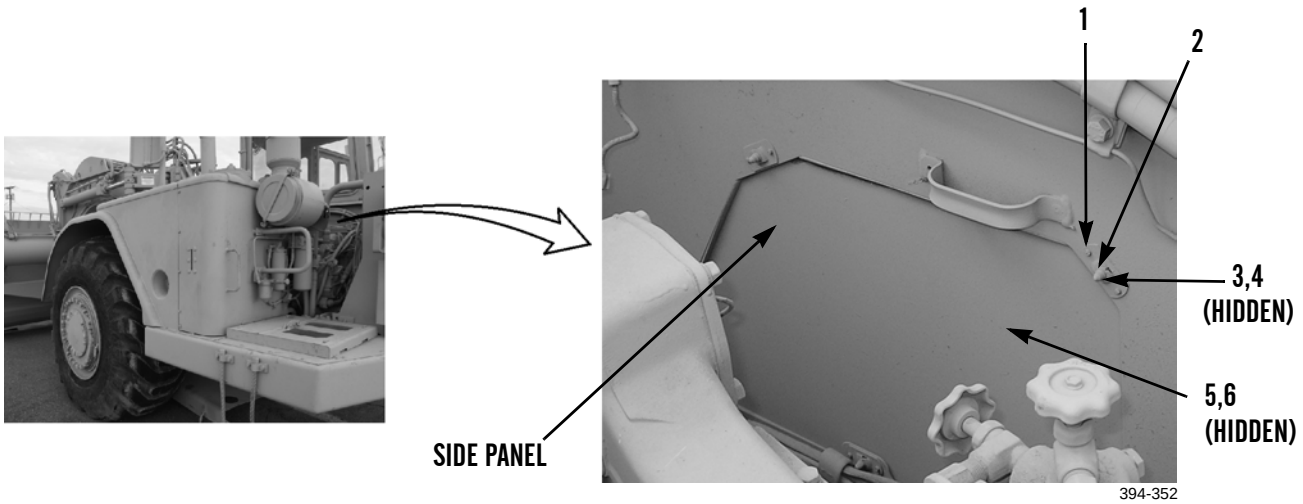
Seal

Equipment Condition

Side panel liner removed (WP 0194 00)

REMOVAL

1. Remove five thumbscrews (3) from right side of operator compartment.
2. Remove side panel plate (5) and five washers (4).
3. If necessary, remove and discard seal (6).
4. If necessary, drill out and discard ten rivets (1) from right side panel.
5. If necessary, remove and discard five nuts (2).



CLEANING AND INSPECTION

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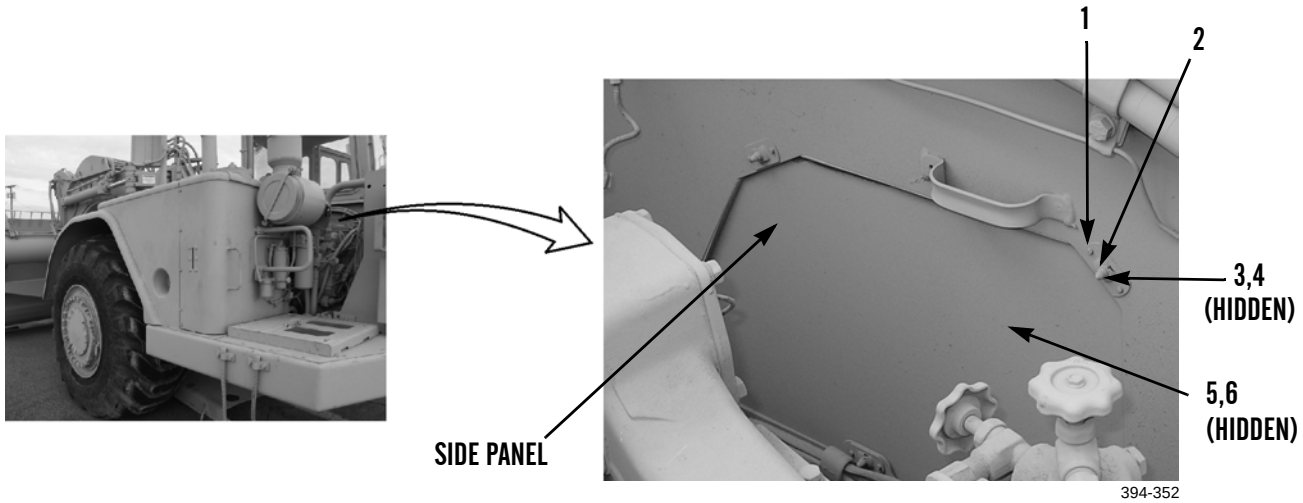
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install five new nuts (2) and ten new rivets (1) on side panel.
2. If removed, install new seal (6) on side panel plate (5).
3. Install five washers (4) and side panel plate (5) on side panel.
4. Install five thumbscrews (3) on side panel plate (5).



5. Install side panel liner (WP 0194 00).

END OF WORK PACKAGE

OPERATOR COMPARTMENT LOWER FRONT ACCESS PLATE REPLACEMENT 0197 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

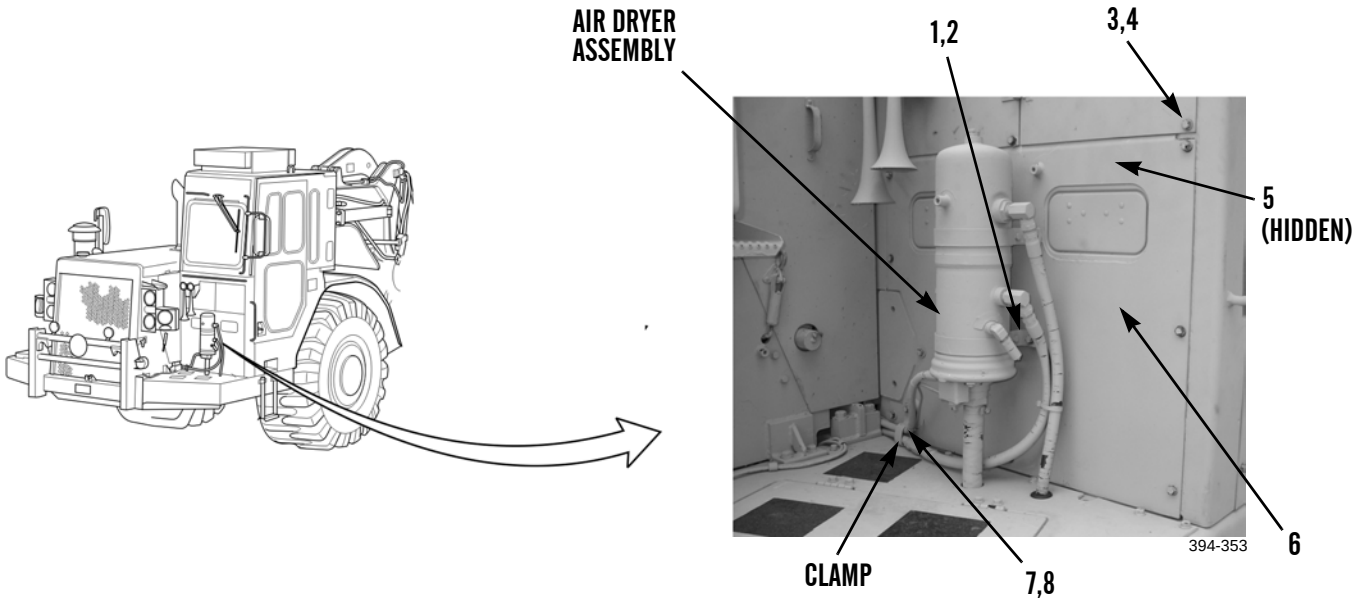
Seal

Equipment Condition

Operator compartment upper front access plates removed (WP 0192 00)

REMOVAL

1. Remove four bolts (1), washers (2) and position air dryer assembly aside.
2. Remove bolt (7), washer (8) and position clamp aside.
3. Remove eight bolts (3) and washers (4) from lower front access plate (6).
4. Remove lower front access plate (6).
5. If necessary, remove two seals (5) from lower front access plate (6).



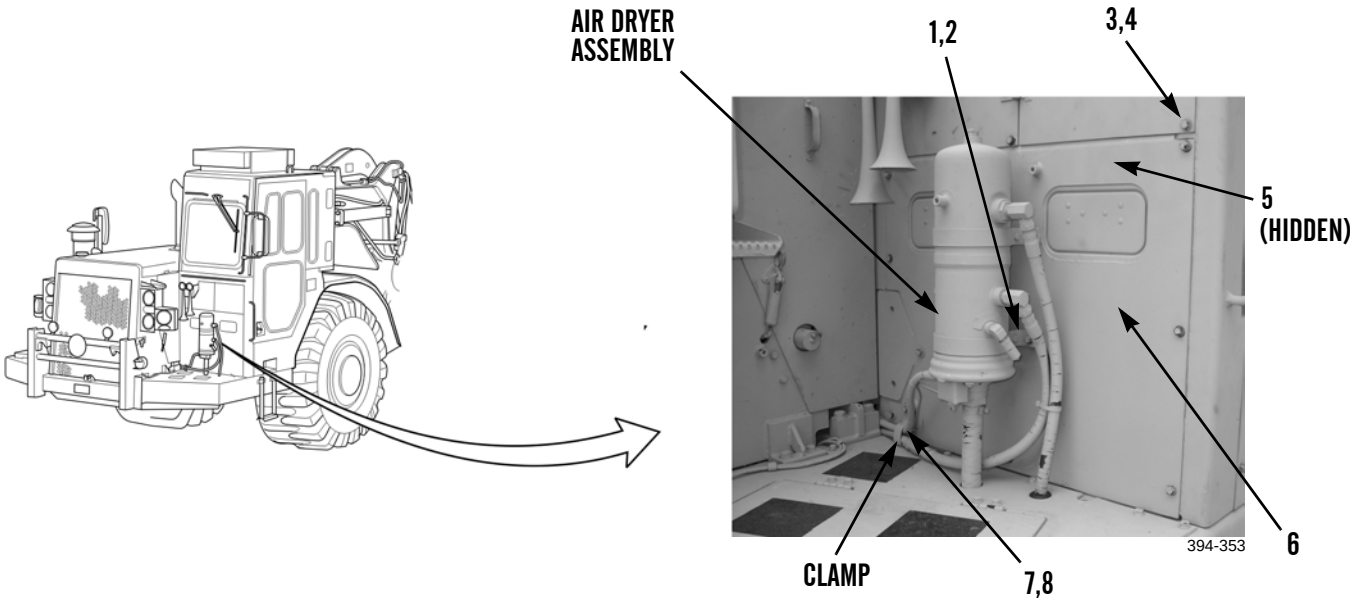
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install two new seals (5) on lower front access plate (6).
2. Position plate (6) on front left side of operator compartment.
3. Install eight washers (4) and bolts (3) on lower front access plate (6).
4. Position clamp and install washer (8) and bolt (7) securing air hoses and harness assembly to weldment.
5. Position air dryer assembly and install four washers (2) and bolts (1) on lower front access plate (6).
6. Install operator’s compartment upper front access plates (WP 0192 00).



END OF WORK PACKAGE

FLOOR MAT AND CAB STEP REPLACEMENT 0198 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

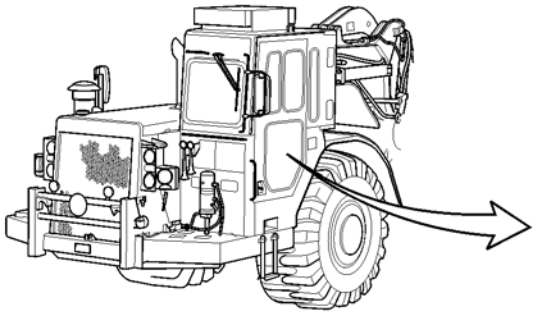
Equipment Condition

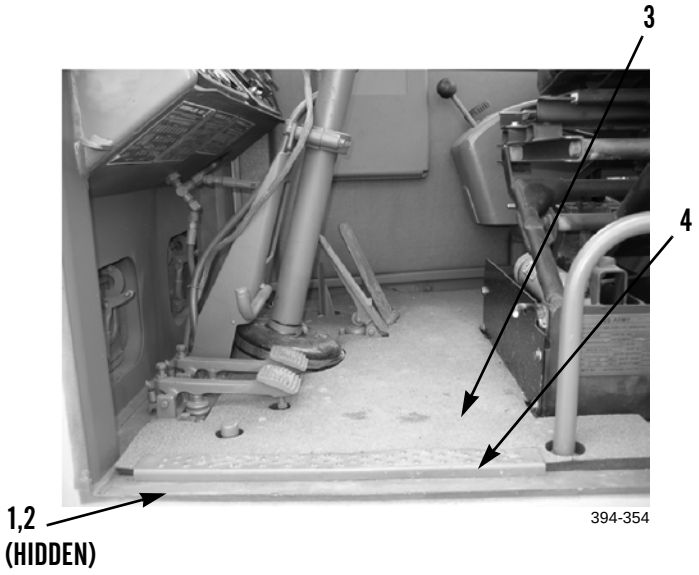
Battery disconnect switch in OFF position (TM 5-3805-248-10)

Step assembly removed (WP 0200 00)

REMOVAL

1. Remove three capscrews (1) and washers (2) from under operator compartment floor.
2. Remove cab step (4) from operator compartment floor.
3. Remove floor mat (3). Open cut in right side. Lift over accelerator pedal and brake actuator. Open cut in left side. Lift cover over handle.





INSTALLATION

1. Install floor mat (3). Open cut in left side and lower over handle. Open cut in right side and lower over accelerator pedal and brake actuator.
2. Install cab step (4). Align three bosses on bottom of cab step (4) with three openings in floor mat (3) and frame.
3. Install three washers (2) and cap screws (1) from under operator compartment floor.
4. Install step assembly (WP 0200 00).

END OF WORK PACKAGE

OPERATOR COMPARTMENT REAR LINER REPLACEMENT 0199 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

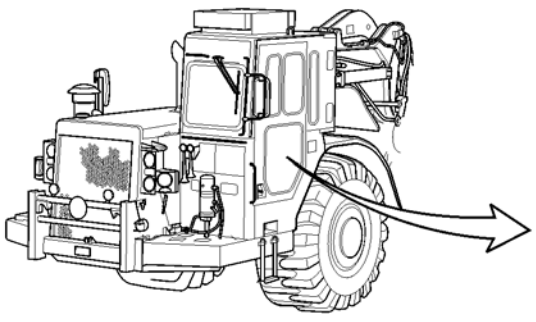
REMOVAL

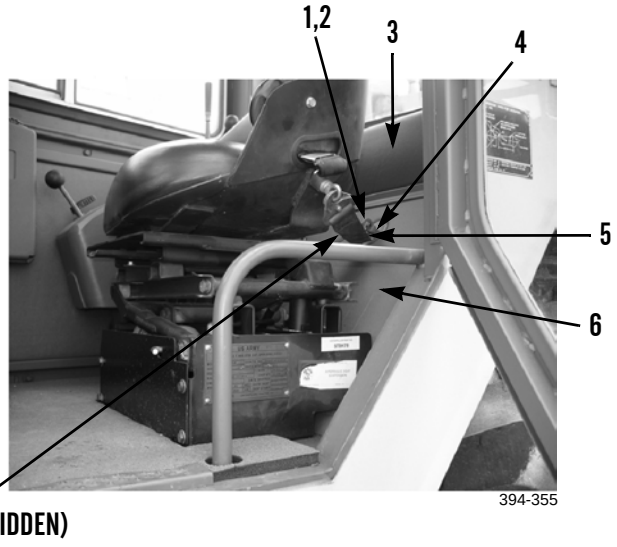
1. Move seat to full-forward position (TM 5-3805-248-10).

NOTE

Pull liner carefully from under edges of frame.

2. Remove liner (3) from inside rear of cab.
3. Remove nut (7) and bolt (8) from seat belt clasps (5).
4. Loosen nut (2) and remove lifting link (1), washer (4) and nut.





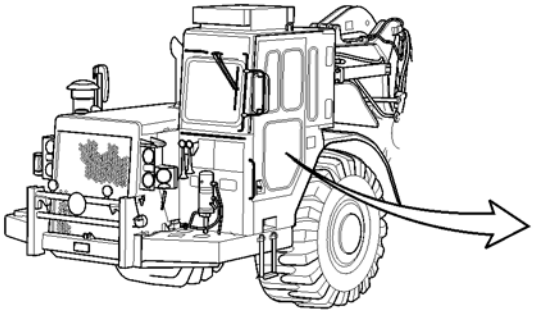
REMOVAL - CONTINUED

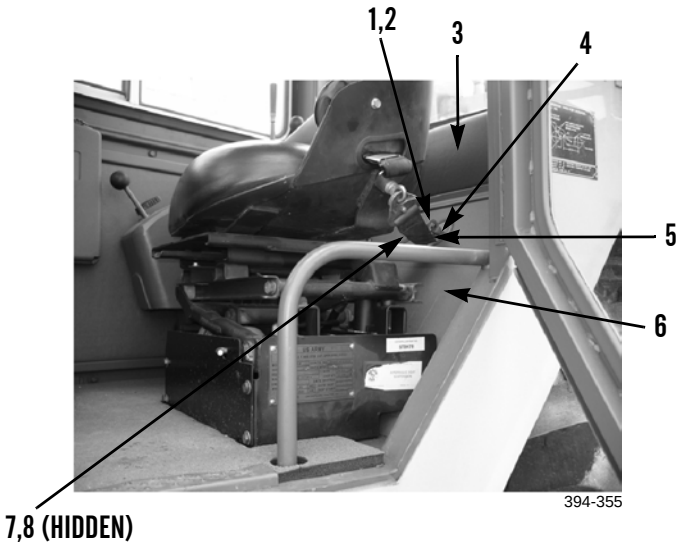
5. Separate seat belt clasps (5).

NOTE

Pull liner (6) carefully from under edges of frame.

6. Remove liner (6) from rear wall in operator compartment. Pull liner (6) carefully from under edges of frame.





INSTALLATION

NOTE

Align hole in liner with lifting link weldment on rear wall.

1. Install liner (6) to rear wall in operator compartment.
2. Tuck liner (6) under edges of frame.
3. Install nut (2), washer (4) and lifting link (1).
4. Install seat belt clasps (5) on lifting link (1).
5. Install bolt (7) and nut (8) on seat belt clasps (5).
6. Install liner (3) to inside rear of cab.
7. Tuck liner (3) under edges of frame.

END OF WORK PACKAGE

STEP ASSEMBLY REPLACEMENT 0200 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

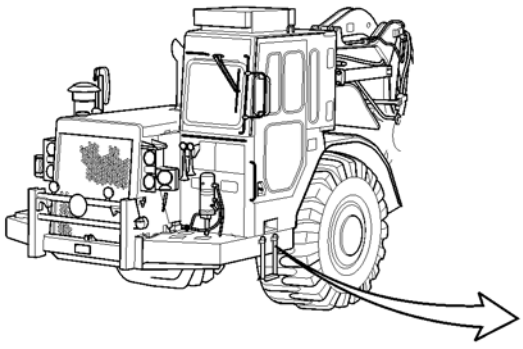
Bowl lowered to ground (TM 5-3805-248-10)

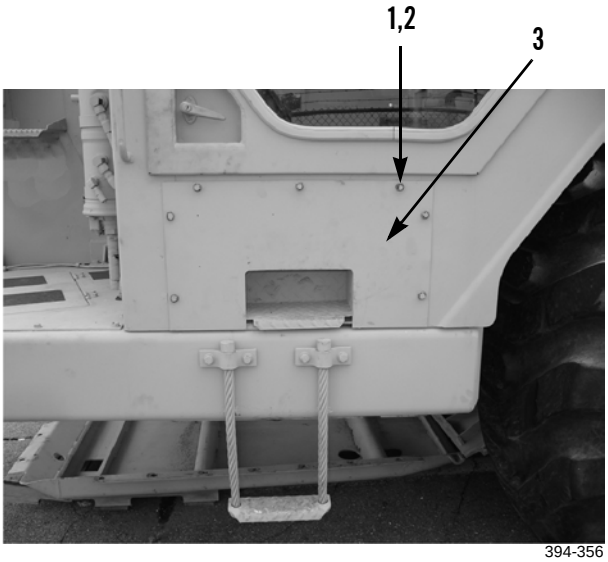
Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Remove seven capscrews (1) and washers (2) from step assembly (3) on left side of operator compartment.
2. Remove step assembly (3).





394-356

INSTALLATION

1. Position step assembly (3) on left side of operator compartment.
2. Install seven washers (2) and capscrews (1) on step assembly (3).

END OF WORK PACKAGE

CRANKCASE GUARD REPLACEMENT 0201 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

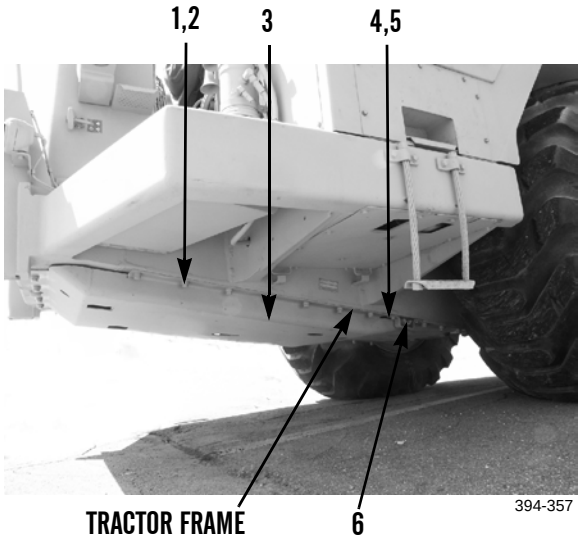
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

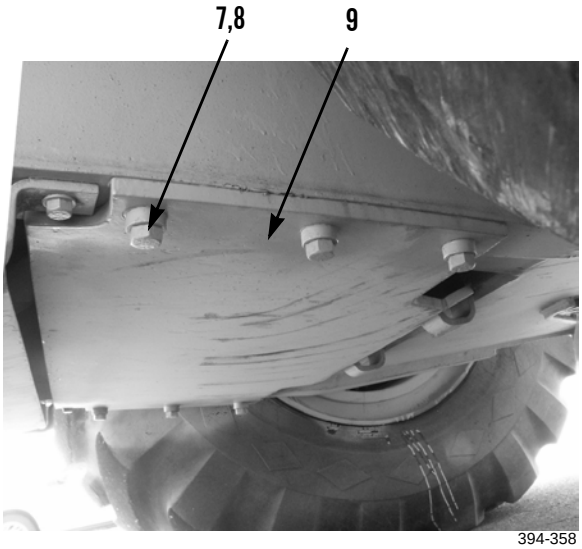
REMOVAL

NOTE

Weight of front crankcase guard assembly is 275 lb (125 kg). Weight of rear crankcase guard is 90 lb (41 kg).

1. Support front of crankcase guard (3) with floor jack.
1. Remove 18 cap screws (1) and spacers (2) from crankcase guard (3).
2. Lower front of crankcase guard (3).
3. Support rear of crankcase guard (3) with floor jack.
4. Remove four bolts (4), washers (5) and two retaining straps (6).
5. Lower rear of crankcase guard (3).
6. Support rear guard (9) with floor jack.
7. Remove six bolts (7), spacers (8) and rear guard (9).





INSTALLATION

1. Use floor jack to install rear guard (9), six spacers (8) and bolts (7).
2. Use floor jack to raise rear of crankcase guard (3).
3. Install two retaining straps (6), four washers (5) and bolts (4) on tractor frame.
4. Use floor jack to raise front of crankcase guard (3) and align mounting holes.
5. Install 18 spacers (2) and cap screws (1) on crankcase guard assembly (3).
6. Remove floor jack.

END OF WORK PACKAGE

ROLLOVER PROTECTION DOOR MAINTENANCE 0202 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 150 lb minimum capacity

Materials/Parts

Adhesive, loctite (Item 3, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Locknut (2)

Pin, cotter (4)

Seal

Personnel Required

Two

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Door vent window removed (WP 0206 00)

Door stationary windows removed (WP 0209 00)

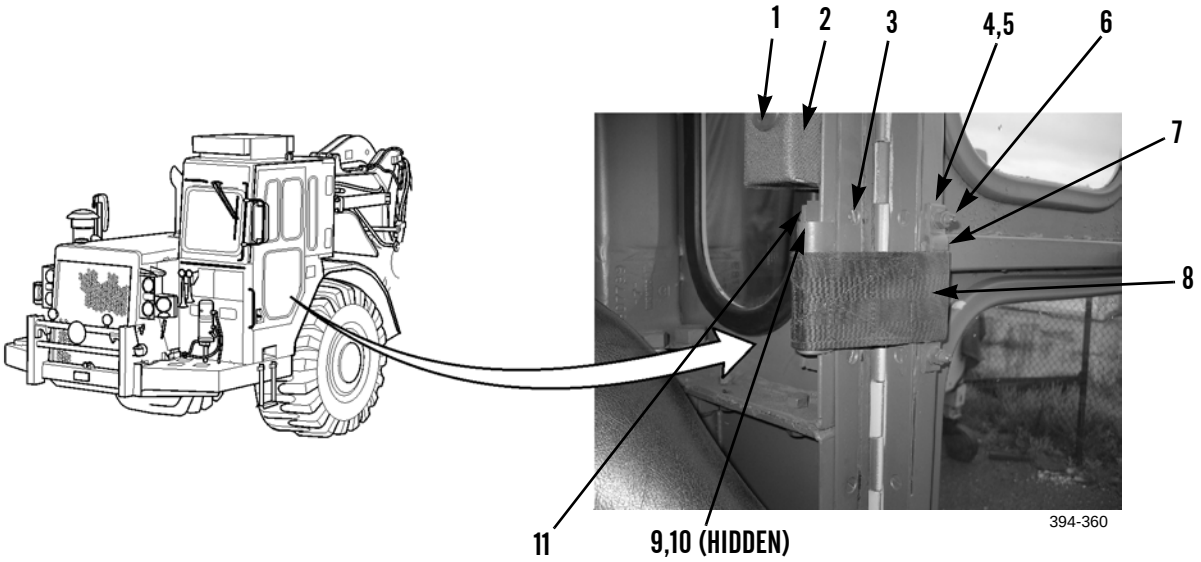
REMOVAL

1. Remove three plug buttons (1) and insulating sleeve (2) from operator compartment.

NOTE

Hinge border must be marked on cab to ensure correct alignment during installation.

2. Mark hinge (12) border on cab.
3. Remove two nuts (4), washers (5), bolts (6) and strap (7).



4. Remove two nuts (9), washers (10), screws (3), strap (11) and stop (8) from center of hinge (12).

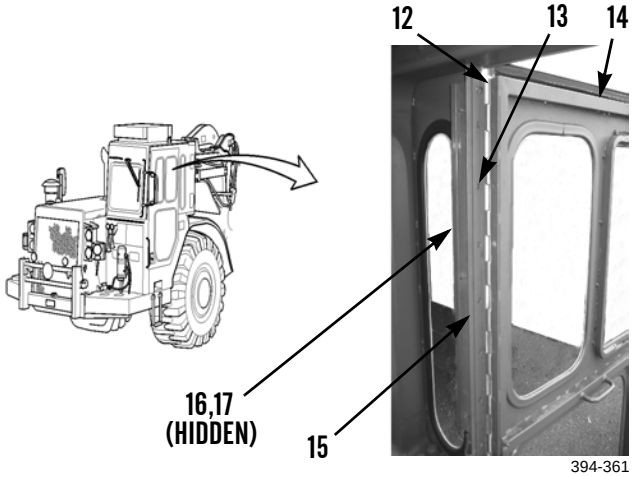
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

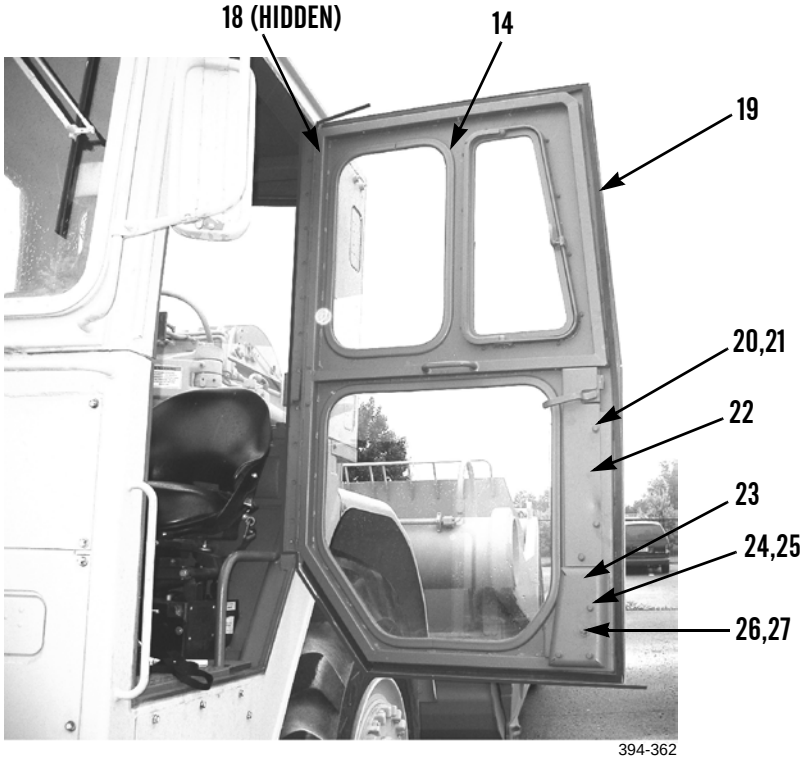
Weight of door assembly is 93 lb (42 kg).

5. Attach lifting device to door assembly (14).
6. With assistance, remove eleven nuts (16), washers (17), screws (13) and bracket (15) from hinge (12).
7. Use lifting device to remove door assembly (14) from machine.



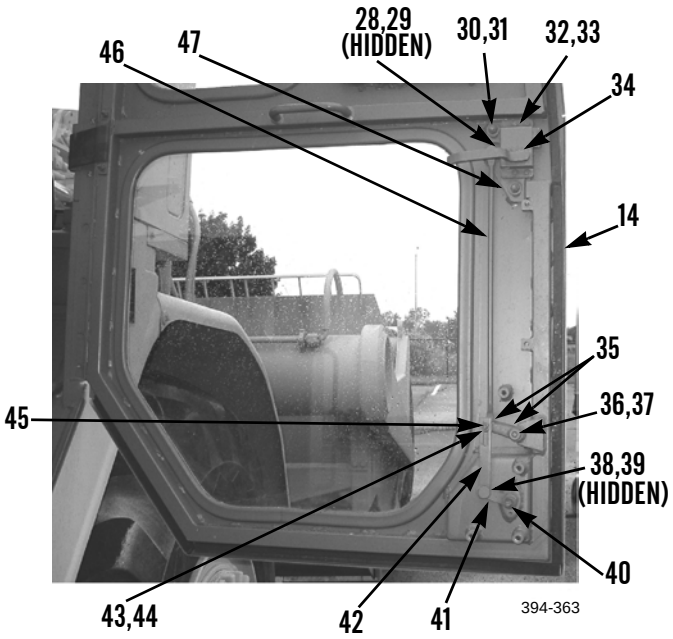
DISASSEMBLY

1. Position door assembly (14) on work surface with inside of door assembly (14) facing up.
2. Remove lifting device from door assembly (14).
3. Remove thirteen screws (18) and hinge (12) from door assembly (14).
4. Remove and discard seal (19) from outer door (14).
5. Remove three bolts (20), washers (21) and cover (22).
6. Remove cotter pin (26) and washer (27) from door assembly (14). Discard cotter pin.
7. Remove three bolts (24), washers (25) and cover (23).



DISASSEMBLY - CONTINUED

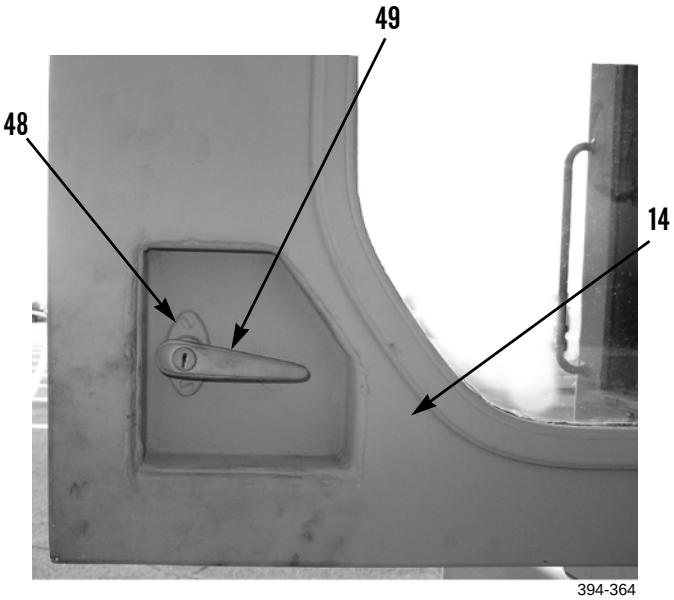
8. Remove four screws (32) and washers (33) from catch (34).
9. Remove cotter pin (29) and washer (28). Discard cotter pin.
10. Separate rod (46) from catch (34).
11. Remove catch (34) and washer (28).
12. Remove two locknuts (30), washers (31) and plate (47). Discard locknuts.
13. Remove cotter pin (43), washer (44) and rod (46). Discard cotter pin.
14. Remove pin (45) from rod (46).
15. Remove two pins (37), washers (36) and levers (35).
16. Remove cotter pin (38), washer (39) and retaining plate (42). Discard cotter pin.
17. Remove washer (40), handcrank arm (41) and washer (40) from shaft of handle.



18. Remove two screws (48) and handle (49) from door assembly (14).

ASSEMBLY

1. Install handle (49) and two screws (48) to door assembly (14).
2. Install washer (40), handcrank arm (41) and washer (40) on shaft of handle.
3. Install retaining plate (42), washer (39) and new cotter pin (38) on hand crank arm (41).
4. Install two levers (35), washers (36) and pins (37) on door assembly (14).
5. Align retaining plate (42) and rod (46) to levers (35).
6. Install pin (45), two washers (44) and new cotter pin (43) to levers (35).
7. Install plate (47), two washers (31) and new locknuts (30) on door assembly (14).
8. Install catch (34), four washers (33) and screws (32) on door assembly (14).
9. Attach rod (46) to catch (34) and install washer (28) and new cotter pin (29).



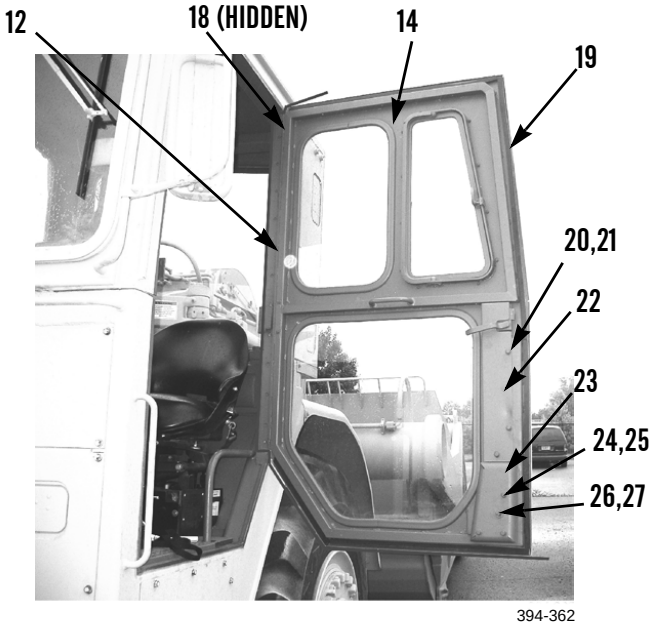
ASSEMBLY - CONTINUED

10. Install cover (23), three washers (25) and bolts (24) on door assembly (14).
11. Install washer (27) and new cotter pin (26) on handle shaft.
12. Install cover (22), three washers (21) and bolts (20) on door assembly (14).

NOTE

Do not put bulk seal on hinge side.

13. Install seal (19) to inner lip of door assembly (14). Cut 142 in. (361 cm) of bulk seal (19) to fit in five sections around door assembly (14).
14. Position hinge (12) on door assembly (14) and install thirteen screws (18) on hinge (12).



394-362

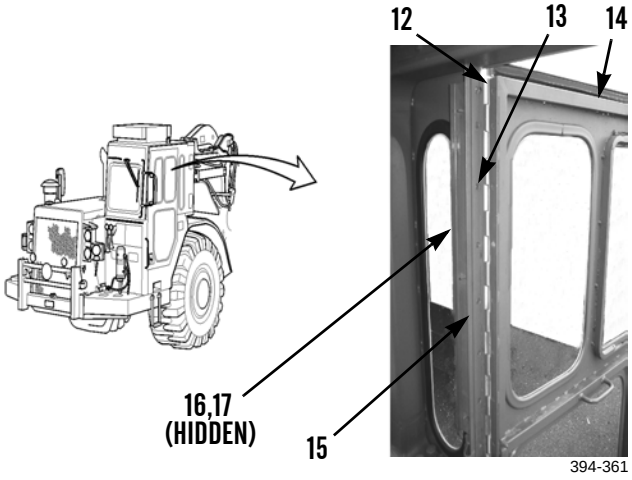
INSTALLATION

1. Attach lifting device to door assembly (14).
2. Use lifting device to position door assembly (14) on cab frame.

NOTE

Before tightening hinge bolts, align hinge to marks made during removal.

3. Position bracket (15), install eleven screws (13), washers (17) and nuts (16) on hinge (12).

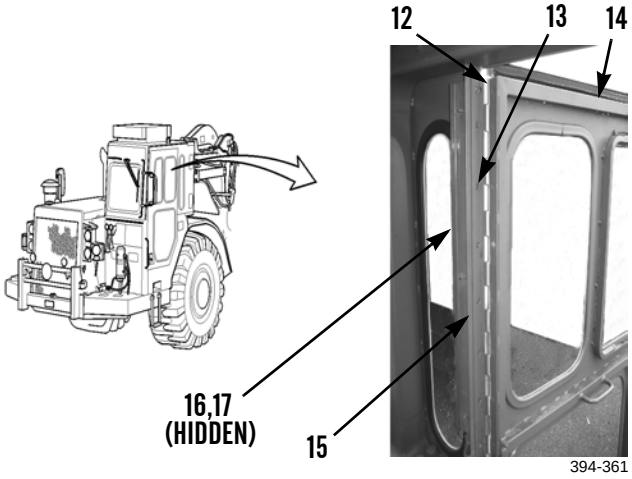


394-361

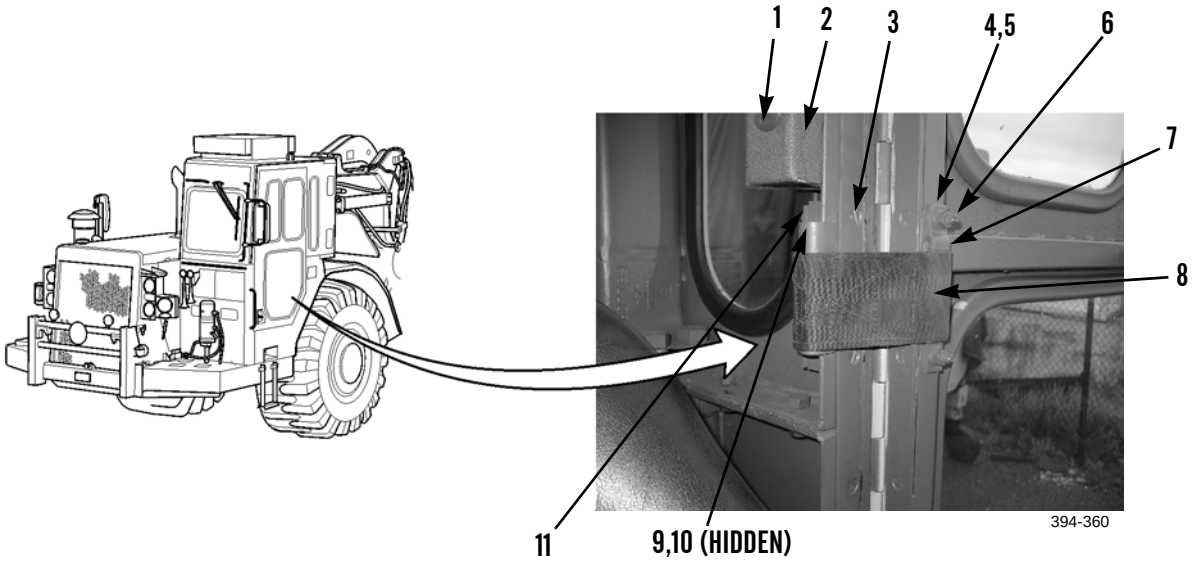
4. Close door assembly (14). Inspect alignment by making sure all sections of seal (19) are flush against cab frame.

INSTALLATION - CONTINUED

5. Remove lifting device.
6. Install two screws (3) through hinge (12) and bracket (15).
7. Position strap (11) through loop of stop (10).
8. Install strap (11), two washers (10) and nuts (9).
9. Install two bolts (6) through door assembly (14) from outside.
10. Position strap (7) through loop of stop (10).
11. Install strap (7), two washers (5) and nuts (4).



12. Install liner (2) and three buttons (1) on bracket (15).



13. Install door vent window (WP 0206 00).
14. Install door stationary windows (WP 0209 00).
15. Verify correct operation of door assembly (TM 5-3805-248-10).

END OF WORK PACKAGE

ROLLOVER PROTECTION STRUCTURE (ROPS) REPLACEMENT 0203 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 1,100 lb minimum capacity

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Personnel Required

Two

Equipment Condition

Operator compartment rear liner removed (WP 0199 00)

Rollover protection door removed (WP 0202 00)

Windshield removed (WP 0207 00)

Sliding window assembly removed (WP 0208 00)

Stationary windows removed (WP 0209 00)

Windshield wipers removed (WP 0217 00)

Rearview mirrors removed (WP 0220 00)

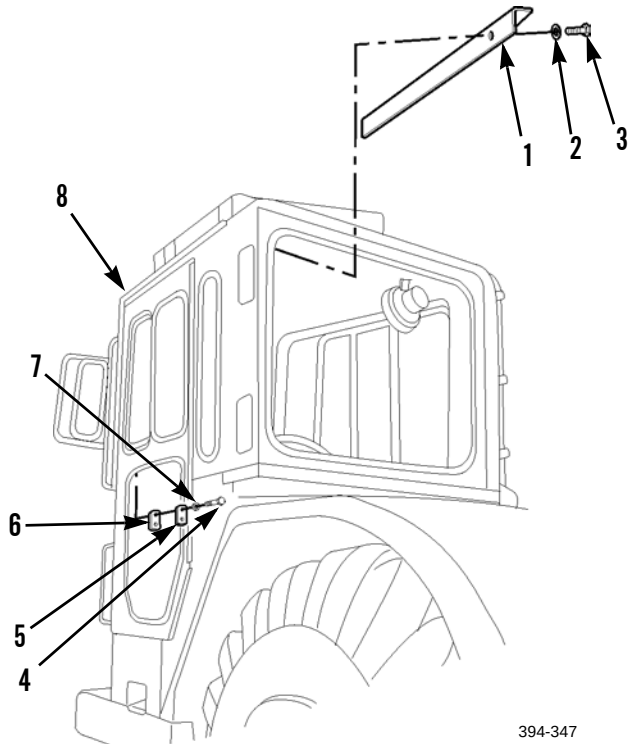
Heater assembly removed (WP 0224 00)

REMOVAL

NOTE

Measure and record thickness of shim(s). Tie shim(s) together and tag to ensure correct installation.

1. Remove two cap screws (4), square cone washers (7), catch (5), and shim(s) (6).
2. Remove three bolts (3), washers (2) and angle (1) from top left of rollover protection system (8).



REMOVAL - CONTINUED

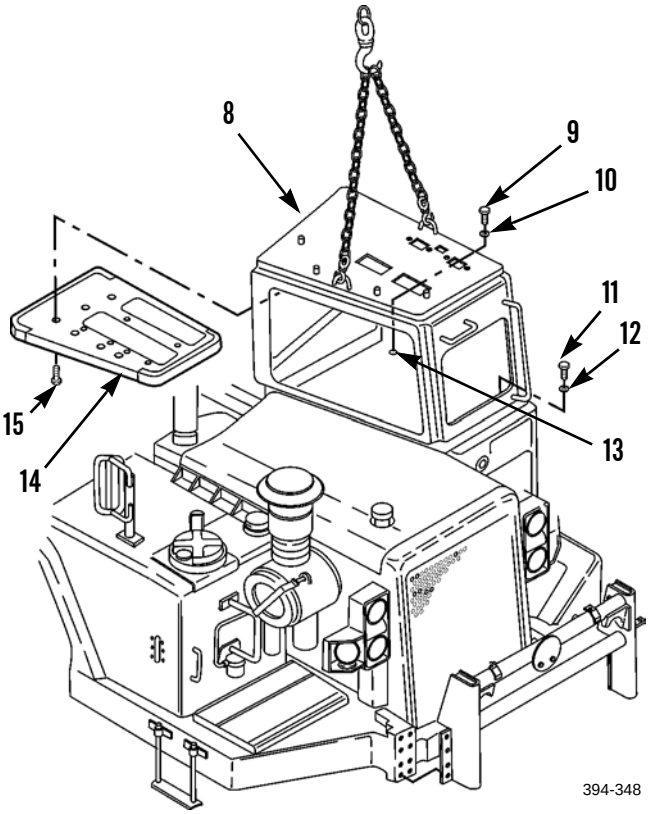
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

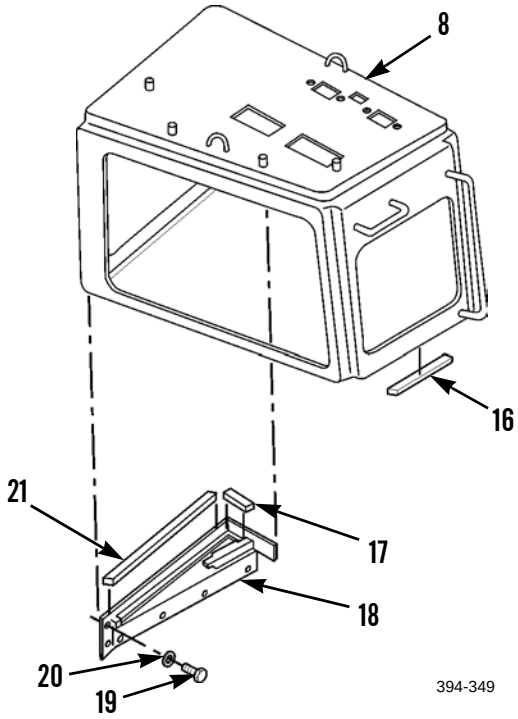
Weight of ROPS is 675 lb (306 kg).

3. Remove five plug buttons (15) and support assembly (14).
4. Attach suitable lifting device to rollover protection system (8).
5. Remove 16 capscrews (11) and washers (12).
6. Remove two nuts (13), bolts (9) and washers (10).
7. With assistance, use lifting device to remove rollover protection system (8).
8. Remove lifting device.
9. Remove seven cap screws (19) and washers (20) from section assembly (18).
10. Remove section assembly (18) from ROPS (8).



REMOVAL - CONTINUED

11. If damaged, remove and discard seals (17 and 21) from section assembly (18).
12. If damaged, remove and discard seal (16) from roll-over protection system (8).



CLEANING AND INSPECTION

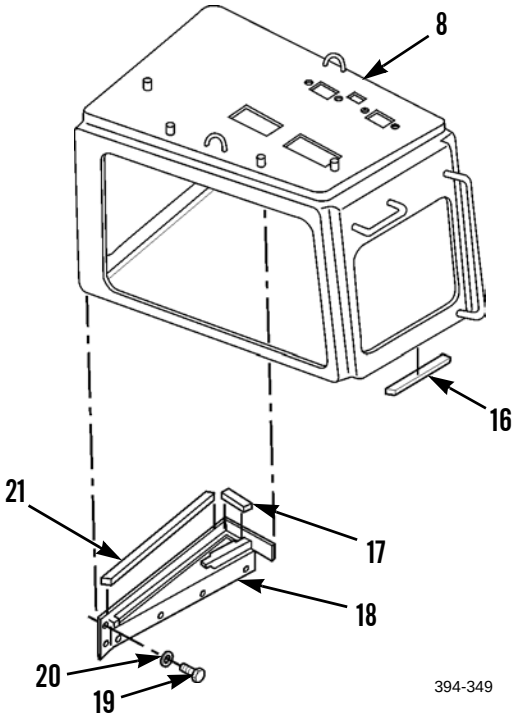
WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. If removed, install new seal (16) on ROPS (8).
2. If removed, install new seals (21 and 17) on ROPS (8).
3. Position section assembly (18) on ROPS (8).
4. Install seven washers (20) and cap screws (19) on section assembly (18).



INSTALLATION - CONTINUED

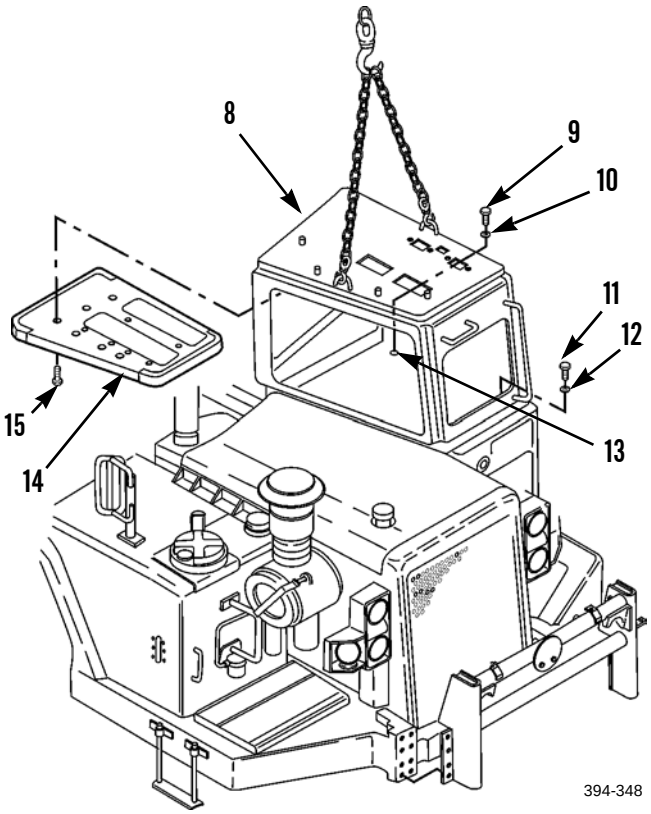
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

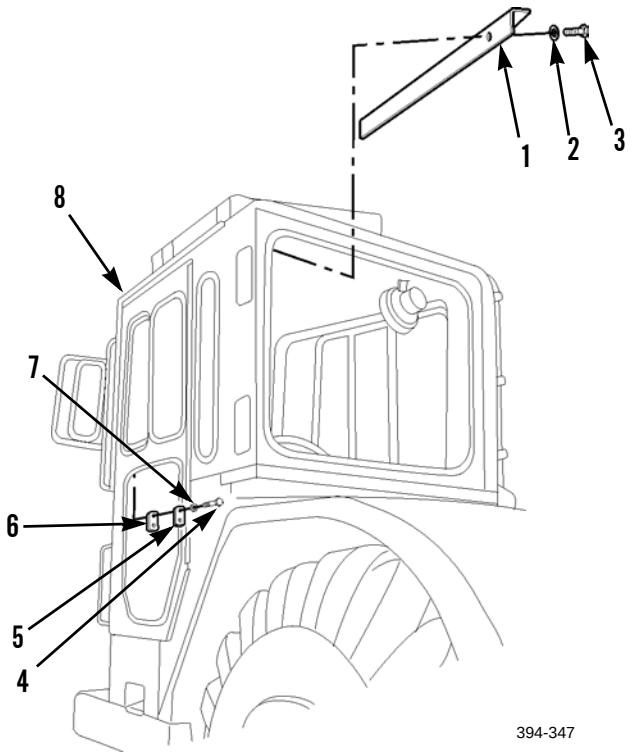
Weight of ROPS is 675 lb (306 kg).

5. Attach lifting device to rollover protection system (8).
6. With assistance, use lifting device to install ROPS (8) on operator compartment.
7. Install two washers (10), bolts (9) and nuts (13). Torque nuts (13) to 75 lb-ft (102 Nm).
8. Install 16 washers (12) and capscrews (11). Torque capscrews (11) to 75 lb-ft (102 Nm).
9. Position support assembly (14) on ROPS (8).
10. Install five buttons (15) on support assembly (14).



INSTALLATION - CONTINUED

11. Position angle (1) at top left inside ROPS (8).
12. Install three washers (2) and bolts (3). Torque three bolts (3) to 18 lb-ft (24 Nm).
13. Install shim(s) (6) equal to thickness as originally installed (recorded when removed).
14. Install catch (5) over mounting holes on left front corner of ROPS (8).
15. Install two square cone washers (7) and bolts (4) on catch (5).



16. Install operator compartment rear liner (WP 0199 00).
17. Install rollover protection door (WP 0202 00).
18. Install windshield (WP 0207 00).
19. Install sliding window assembly (WP 0208 00).
20. Install stationary windows (WP 0209 00).
21. Install windshield wipers (WP 0217 00).
22. Install rearview mirrors (WP 0220 00).
23. Install heater assembly (WP 0224 00).

END OF WORK PACKAGE

RIGHT SIDE FENDER REPLACEMENT 0204 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Bracket, link (Item 9, WP 0338 00)

Lifting device, 350 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

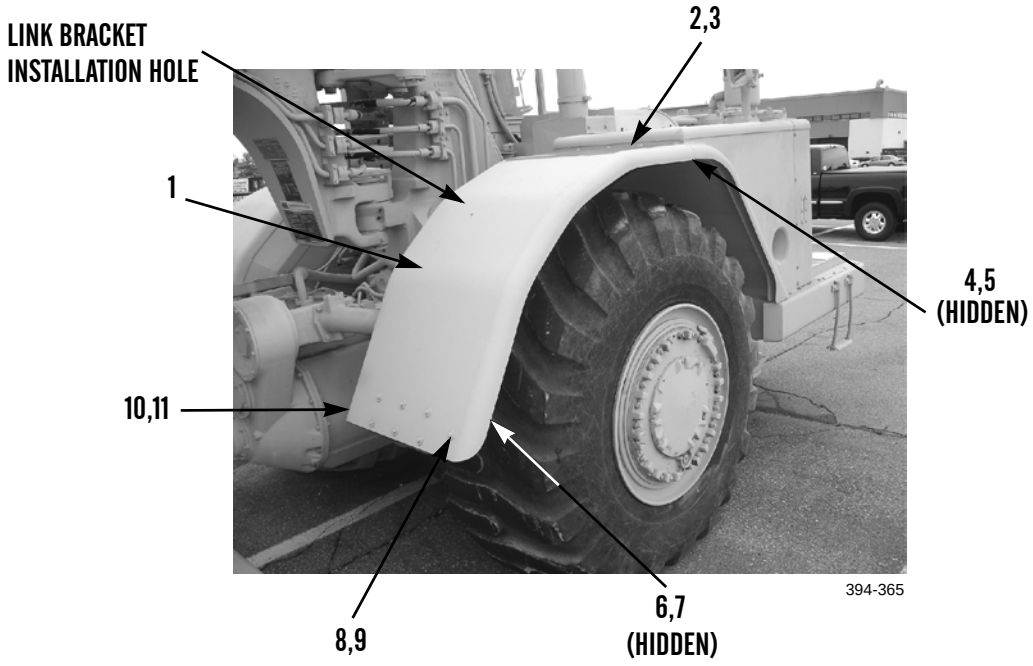
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

REMOVAL

NOTE

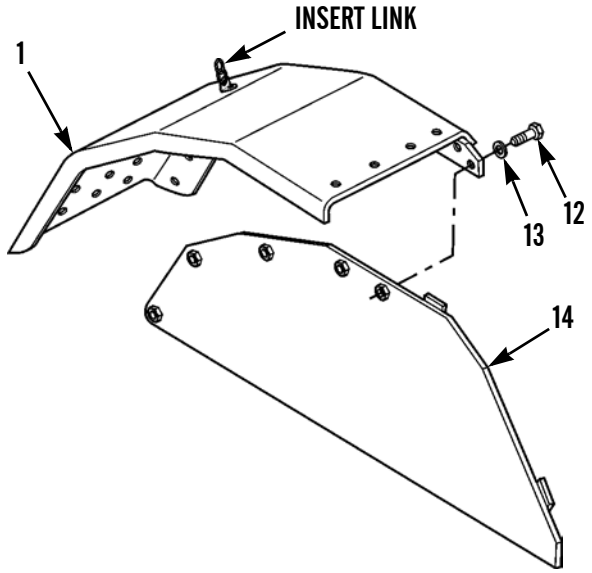
Weight of fender is 212 lb (96 kg).

1. Install link bracket in top center of right fender (1) with one bolt (10) and washer.
2. Attach lifting device to 5/16-18NC forged lifting link.
3. Remove cap screw (4) and washer (5) from under side of fender (1).
4. Remove five capscrews (2) and washers (3) from fender (1).
5. Remove two bolts (10) and washers (11) from fender (1).
6. Remove seven nuts (6), washers (7), bolts (8) and washers (9) from fender (1).



REMOVAL - CONTINUED

7. Use lifting device to pull fender (1) assembly toward rear of machine until clear of fuel tank and remove fender (1) assembly from machine.
8. Remove lifting device from fender (1) assembly.
9. Remove five capscrews (12) and washers (13).
10. Separate fender (1) from shield (14).



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INSTALLATION

1. Position fender (1) and shield (14) together.
2. Install five washers (13) and capscrews (12).
3. Attach lifting device to link bracket with one bolt (10) and washer (11).
4. Use lifting device to position fender (1) assembly on machine.
5. Install seven washers (9), bolts (8), washers (7) and nuts (6) on fender (1).
6. Install two washers (11) and bolts (10) on fender (1).
7. Install five washers (3) and capscrews (2) on top of fender (1).
8. Install washer (5) and capscrew (4) to outer top of fender (1).
9. Remove lifting device.
10. Remove bracket link from fender.

END OF WORK PACKAGE

LEFT SIDE FENDER REPLACEMENT 0205 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Bracket, link (Item 9, WP 0338 00)

Lifting device, 350 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

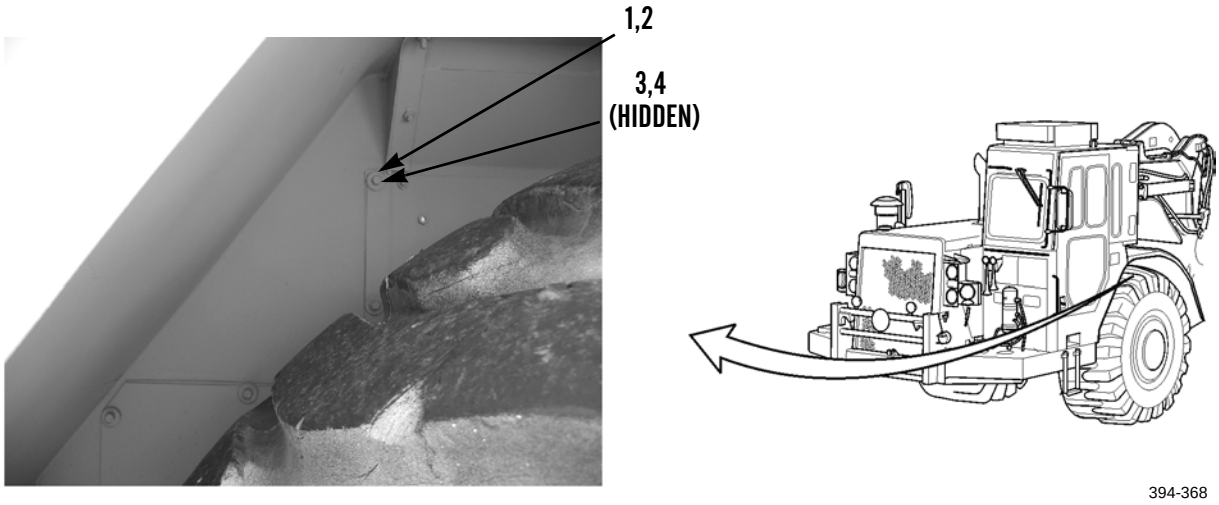
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

REMOVAL

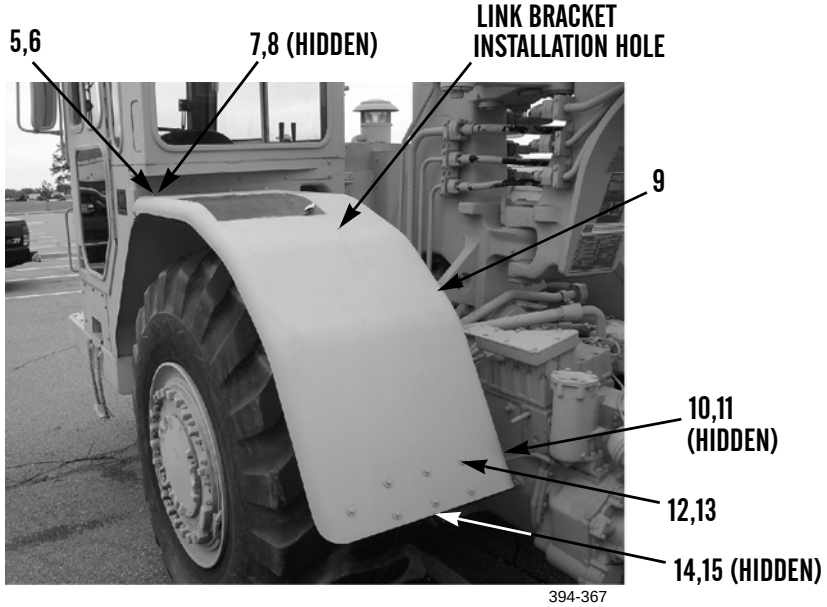
NOTE

Weight of fender is 224 lb (102 kg).

1. Remove six capscrews (1), washers (2), spacers (3) and shoulder washers (4) from inner wheel well.

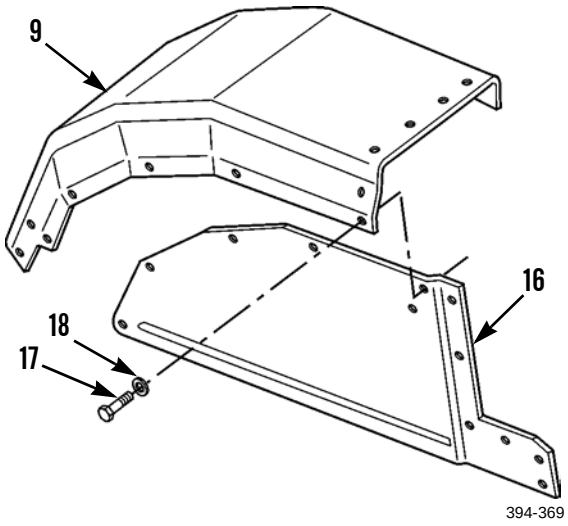


2. Install link bracket in top center of fender (9).
3. Attach lifting device to link bracket with one capscrew (1) and washer (2).
4. Remove six capscrews (5), washers (6), spacers (7) and shoulder washers (8) from top of fender (9).
5. Remove two bolts (10) and washers (11) from fender (9).
6. Remove seven nuts (14), washers (15), bolts (12) and washers (13) from fender (9).
7. Use lifting device to remove fender (9).



REMOVAL - CONTINUED

8. Remove lifting device.
9. Remove five capscrews (17) and three washers (18) from fender (9).
10. Separate fender (9) from shield (16).



INSTALLATION

1. Position fender (9) and shield (16) together.
2. Install five washers (18) and capscrews (17) on fender (9).
3. Attach lifting device to link bracket with one capscrew (1) and washer (2).
4. Use lifting device to position fender (9) assembly on machine.
5. Install seven washers (13), bolts (12), washers (15) and nuts (14) on fender (9).
6. Install two washers (11) and bolts (10) on fender (9).
7. Install six shoulder washers (8), spacers (7), washers (6) and capscrews (5) on top of fender (9).
8. Install six shoulder washers (4), spacers (3), washers (2) and bolts (1) to fender (9).
9. Remove lifting device.
10. Remove link bracket from fender.

END OF WORK PACKAGE

VENT WINDOW ASSEMBLY REPLACEMENT 0206 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

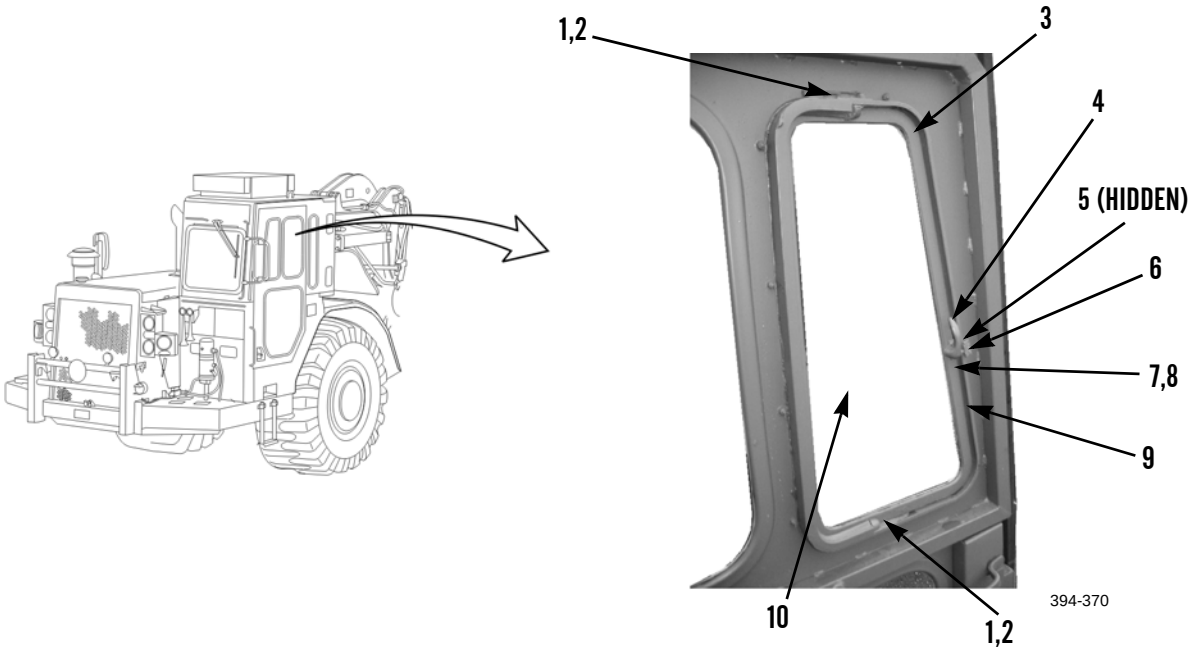
Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

When working with broken glass, wear heavy gloves and eye protection. Remove all glass fragments before removing seal. Failure to follow this procedure may cause injury. If injured, seek medical aid immediately.

REMOVAL

1. Remove two screws (1) and washers (2) from vent window assembly (3).
2. Remove two screws (5) and catch (6).
3. Remove vent window assembly (3).



DISASSEMBLY

1. Remove two screws (7), nuts (8) and lock (4).
2. If damaged, remove and discard seal (9).
3. Remove glass (10) from frame.

ASSEMBLY

1. If removed, install seal (9) and glass (10) on frame.
2. Install lock (4), two screws (7) and nuts (8).

INSTALLATION

1. Install vent window assembly (3).
2. Install catch (6) and two screws (5).
3. Install two washers (2) and screws (1) in vent window assembly (3).
4. Verify correct operation of vent window assembly (3).

END OF WORK PACKAGE

WINDSHIELD ASSEMBLY REPLACEMENT 0207 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Detergent (Item 13, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Locknut (4)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

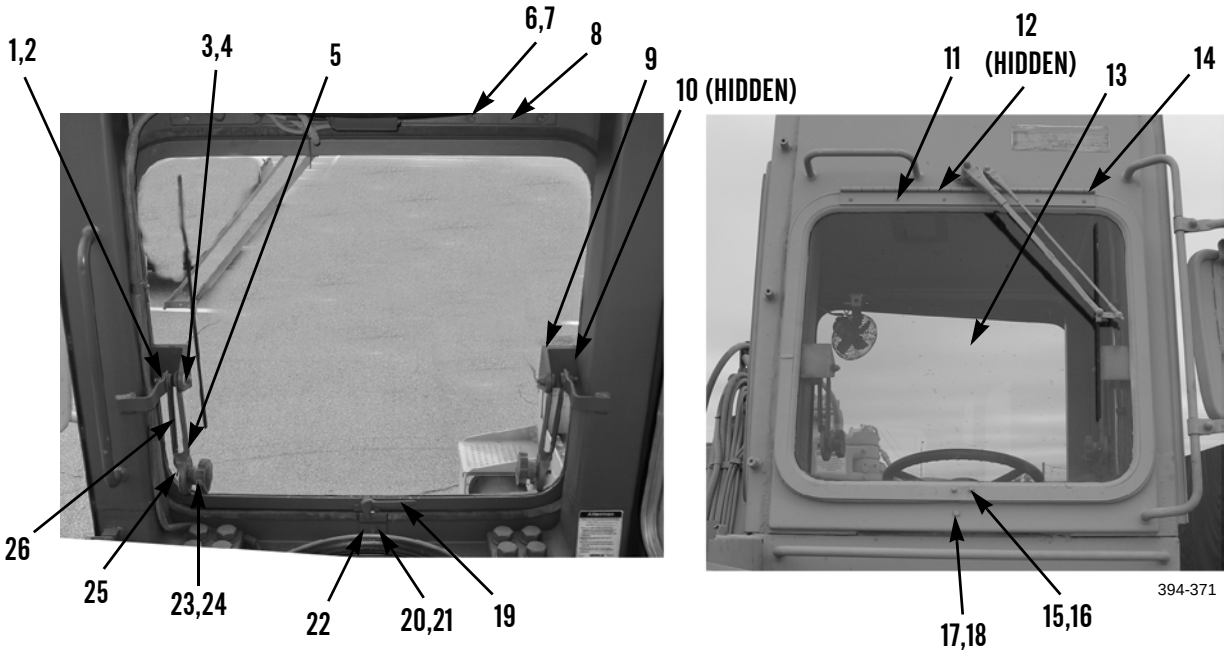
Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

When working with broken glass, wear heavy gloves and eye protection. Remove all glass fragments before removing seal. Failure to follow this procedure may cause injury. If injured, seek medical aid immediately.

REMOVAL

1. Unlock handle (19) on windshield assembly (13).
2. Loosen two windshield arm assembly knobs (23).
3. Remove two locknuts (1) and washers (2) from arms (26). Discard locknuts.
4. Remove nut (20), washer (21), bolt (17), washer (18) and clip (22) from bottom of windshield (13).



WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may cause injury.

NOTE

Weight of windshield is 50 lb (23 kg).

5. With assistance, remove six nuts (6), washers (7), bolts (12), anchor strap (8) and windshield assembly (13).

DISASSEMBLY

1. Remove two spring pins (25) from knobs (23).
2. Remove two window assembly knobs (23), washers (24) and arms (26).
3. Remove two locknuts (3), washers (4) and arms (5). Discard locknuts.
4. Remove four screws (10) and bracket (9) from each side of windshield assembly (13).
5. Remove six screws (11) and hinge (14) from windshield (13).
6. Remove two screws (15), nuts (16) and handle (19).

ASSEMBLY

1. Install handle (19), two screws (16) and nuts (15) on bottom of windshield assembly (13).
2. Install hinge (14) and six screws (11) on top of windshield (13).
3. Install bracket (9) and four screws (10) on each side of windshield (13).
4. Install two arms (5), washers (4) and new locknuts (3) on bracket (9).
5. Install two arms (26), washers (24) and knobs (23).

INSTALLATION

1. Install two spring pins (25) in knobs (23) installation.
2. With assistance, position windshield assembly (13) on machine.
3. Position anchor strap (8) and install six bolts (12), washers (7) and nuts (6).
4. Install two washers (2) and new locknuts (1) on arms (26).
5. Install clip (22), washer (18), bolt (17), washer (21) and nut (20) below bottom of windshield (13).
6. Open and close windshield to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

SLIDING WINDOW ASSEMBLY REPLACEMENT 0208 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Detergent (Item 13, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

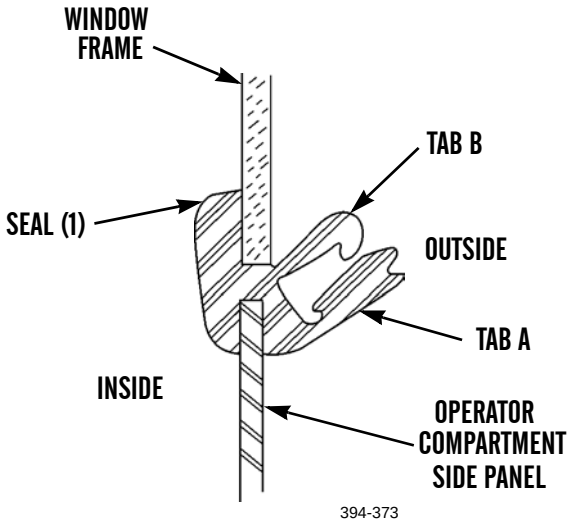
Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

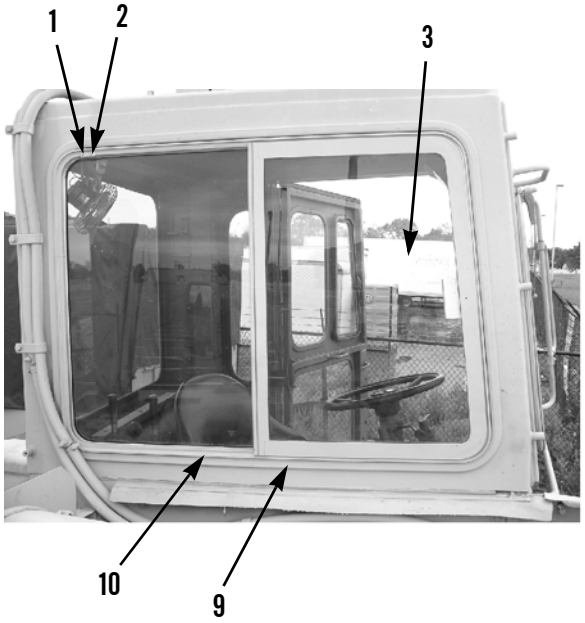
When replacing broken glass, wear heavy gloves and eye protection. Remove all glass fragments before removing seal. Failure to follow this procedure may cause injury. If injured, seek medical aid immediately.

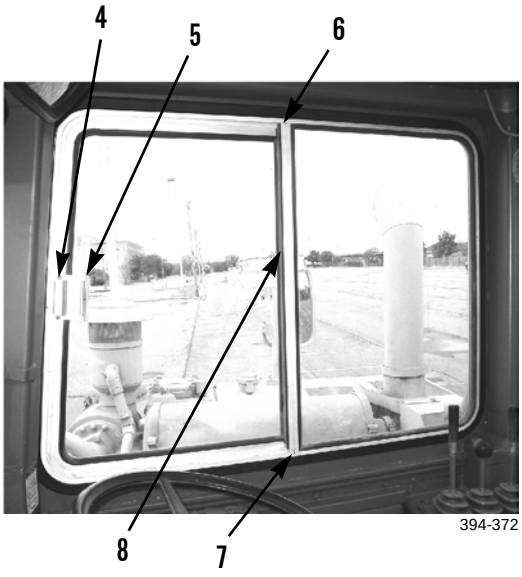
REMOVAL

1. Open seal (9) on exterior, engine side of operator compartment. Locate separation point of seal (9). Use screwdriver to pull tab A away from tab B. Push tab B away from frame (10).



2. Lubricate by applying detergent and water solution along frame (10) and tab B.
3. Remove sliding window from operator compartment.
4. If damaged, remove and discard seal (9).





DISASSEMBLY

1. Remove two screws (1) and stop (2) from sliding window (3).
2. Remove two screws (4) and handle (5) from sliding window (3).
3. If damaged, remove screws (6 and 7) and center support (8) from frame (10).

ASSEMBLY

1. If removed, install center support (8) and screws (6 and 7) on frame (10).
2. Install handle (5) and two screws (4) on sliding window assembly (3).
3. Install stop (2) and two screws (1) on frame (10) installation.
4. If removed, install new seal (9) on operator compartment.
5. Pull tab B out to open slot for window frame. Lubricate frame slot with detergent and water solution. Install sliding window assembly (3).
6. Install tab A into tab B by pushing down on tab A and working all the way around seal.
7. Open and close sliding window to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

STATIONARY WINDOWS REPLACEMENT 0209 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Detergent (Item 13, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

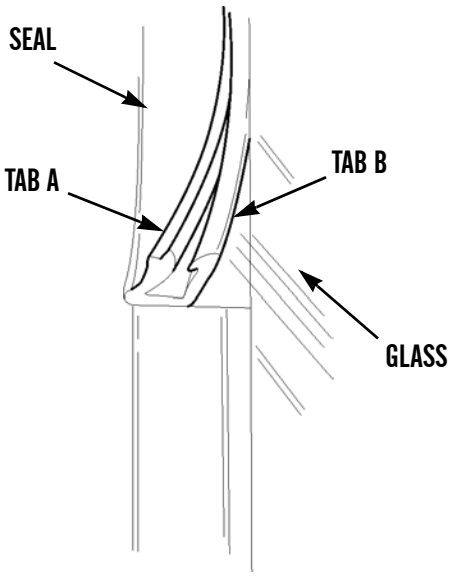
Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

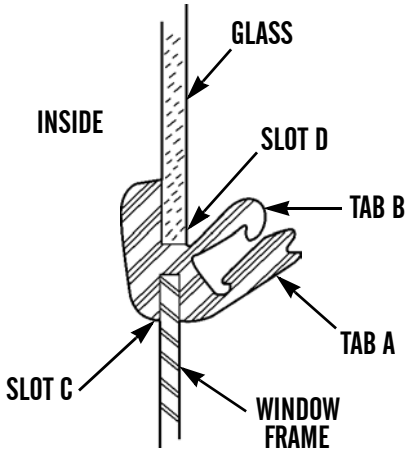
When replacing broken glass, wear heavy gloves and eye protection. Remove all glass fragments before removing seal. Failure to follow this procedure may cause injury. If injured, seek medical aid immediately.

REMOVAL

1. Find separation point of seal and pull tab A away from tab B. Push tab B away from glass.
2. Apply detergent and water solution along glass and tab B. Gently remove glass out of seal.
3. If damaged, remove seal from window frame.



394-374



394-375

INSTALLATION

1. Install seal slot C on window frame.
2. Lubricate glass and slot D with detergent and water solution.
3. Install glass by carefully sliding glass into slot D.
4. Lubricate tabs A and B with detergent and water solution.
5. Install tab A into tab B by pushing down on tab A and working all the way around seal.
6. Wipe away excess detergent and water solution with wiping rag.

END OF WORK PACKAGE

TRACTOR SAFETY TREADS REPLACEMENT 0210 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Anti-skid treads (bulk material)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

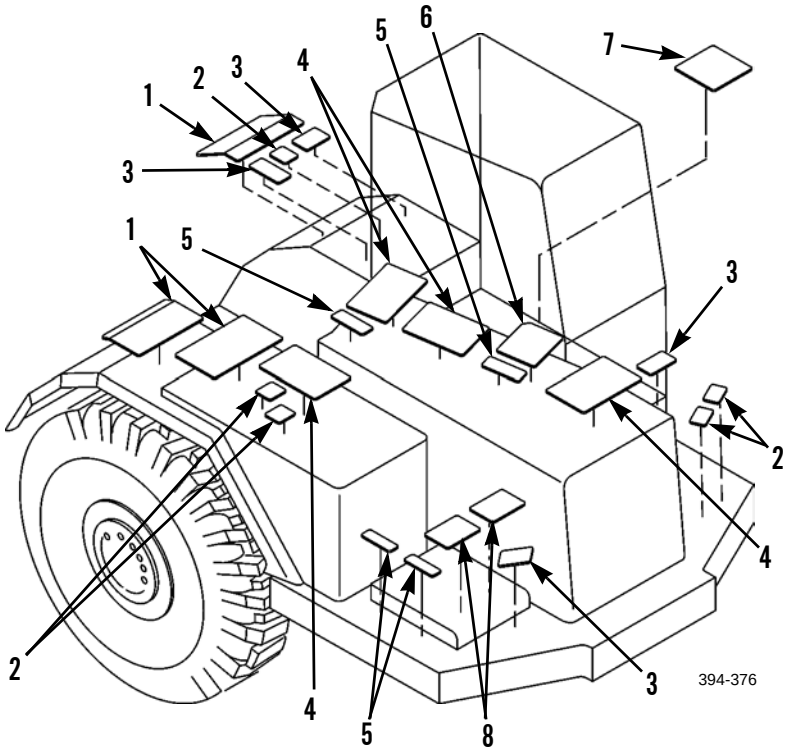
Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

NOTE

The following is a maintenance procedure for anti-skid treads. The maintenance procedure for all other anti-skid treads is identical.

Using a heavy duty scraper, remove and discard each damaged anti-skid treads from machine.



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all adhesive from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Anti-skid treads may not be adjusted once applied to mounting surface. Be sure anti-skid treads are positioned correctly before applying adhesive to backing and mounting surface.

1. Use the dimensions in the following table to cut new anti-skid treads from anti-skid bulk material.
2. Position anti-skid treads on mounting surface.

NOTE

Anti-skid treads may not be adjusted once applied to mounting surface. Be sure anti-skid treads are positioned correctly before applying adhesive to backing and mounting surface.

Item	Dimension
1	8 in. x 26 in. (20.3 cm x 66 cm)
2	6 in. x 6 in. (15.3 cm x 15.3 cm)
3	6 in. x 12 in. (15.3 cm x 30.5 cm)
4	12 in. x 24 in. (30.5 cm x 61 cm)
5	3 in. x 12 in. (7.6 cm x 30.5 cm)
6	10 in. x 12 in. (25.4 cm x 30.5 cm)
7	12 in. x 12 in. (30.5 cm x 30.5 cm)
8	9 in. x 12 in. (22.9 cm x 30.5 cm)

When installing anti-skid treads, partially remove backing of anti-skid tread along one edge and attach to machine. While moving across anti-skid tread, peal off backing and attach anti-skid tread to machine. Continue until anti-skid tread is completely attached.

3. Install anti-skid treads in correct location.
4. Verify anti-skid treads completely adhere to machine.

END OF WORK PACKAGE

SEAT ASSEMBLY REPLACEMENT 0211 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Locknut (5)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

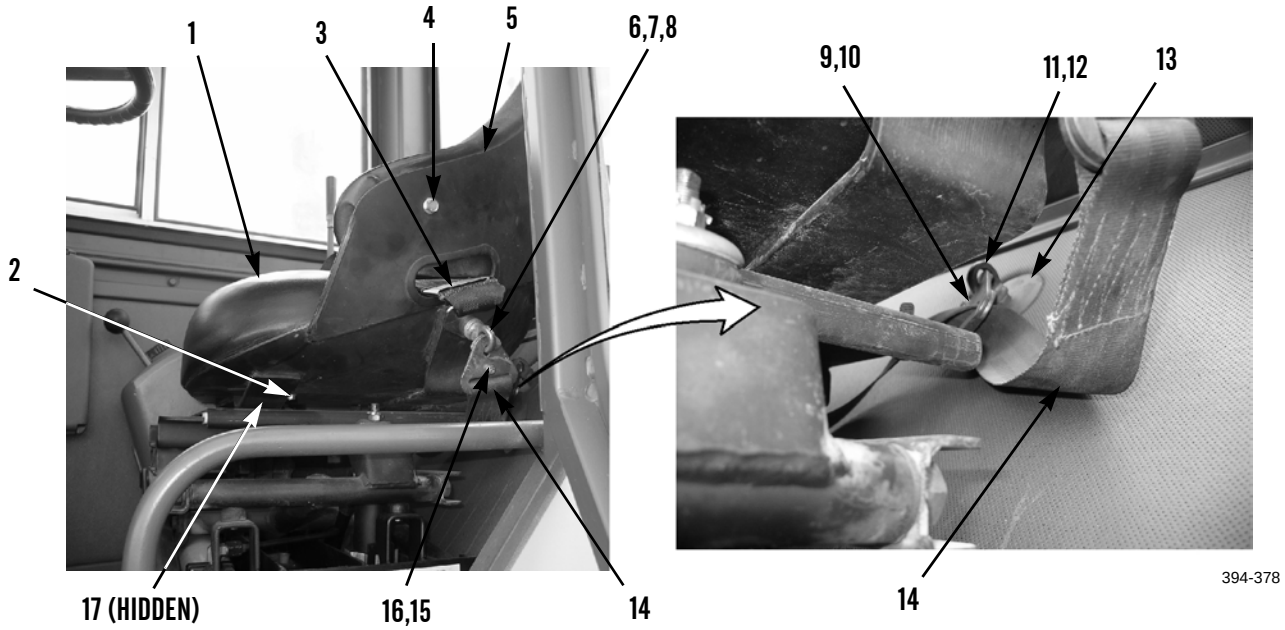
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Remove two bolts (2) from seat assembly underside.
2. Remove cushion (1) from seat.
3. Remove two locknuts (15) and bolts (16) from belt assemblies (14). Discard locknuts.
4. Disconnect two belts (14) from eyebolt (8).
5. Remove two locknuts (6), washers (7) and eyebolt (8) from seat. Discard locknuts.
6. Remove seat belt (3).
7. Remove seat assembly.
8. Remove locknut (9) and bolt (10) from belt (14). Discard locknut.
9. Remove seat belt (14).
10. Remove eyebolt (11), nut (12) and washer (13) from behind seat assembly.
11. Remove four bolts (17) from under seat assembly.



DISASSEMBLY

1. Remove five bolts (4) from seat back cushion (5).
2. Remove seat back cushion (5) from seat assembly.

ASSEMBLY

1. Position seat back cushion (5) on seat assembly.
2. Install five bolts (4) on seat back cushion (5).

INSTALLATION

NOTE

Install buckle side of seat belt on the right side of seat.

1. Install washer (13), nut (12) and eyebolt (11) behind seat.
2. Install seat belt (14) on eyebolt (11).
3. Install bolt (10) and new locknut (9) on belt assembly (14).
4. Install seat assembly.
5. Install seat belt (3).
6. Install two eyebolts (8), washers (7) and new locknuts (6) on seat.
7. Connect two belts (14) to eyebolt (8).
8. Install two bolts (16) and new locknuts (15) on belt (14).
9. Install cushion (1) and two bolts (2) on seat.

END OF WORK PACKAGE

SEAT SUSPENSION ASSEMBLY ADJUSTMENT 0212 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Weight, 8.2 lb

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Equipment Condition - Continued

Parking/emergency brake applied (TM 5-3805-248-10)

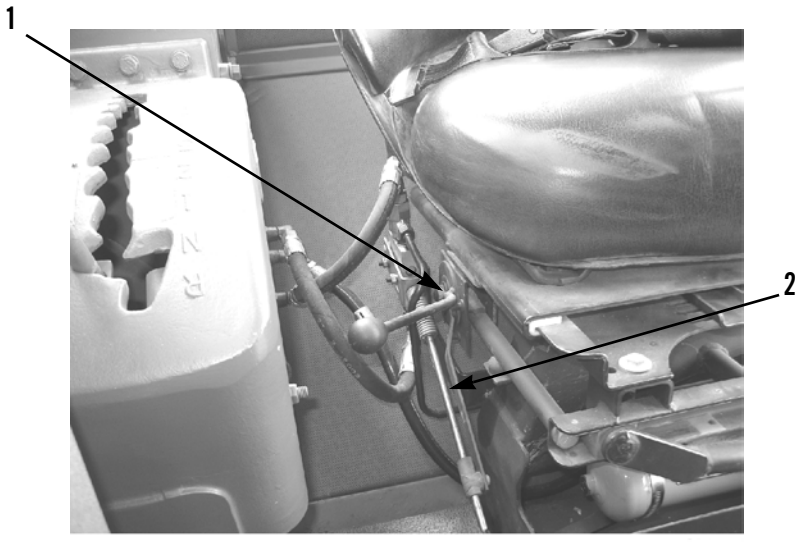
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

ADJUSTMENT

1. Tighten nut (1) on right side of seat.
2. Install weight on spring arm (2).
3. Loosen nut (1) until spring arm (2) moves down. Do not tighten nut (1).
4. Remove weight from spring arm (2).
5. Verify correct operation of seat (TM 5-3805-248-10).



394-379

END OF WORK PACKAGE

SEAT HOSES, LINES AND FITTINGS REPLACEMENT 0213 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 30, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Compound, sealing (Item 10, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Reference

WP 0128 00

WP 0215 00

Equipment Condition

Crankcase guards removed (WP 0201 00)

REMOVAL

WARNING

Never remove the seat front panel, any oil lines or the bolt on the seat cylinder rod until the pressure in the hydraulic system of the seat is released. Failure to follow this warning may cause injury.

1. Drain approximately two gallons of oil from transmission (WP 0128 00).
2. Move seat height control lever up and down to release pressure in lines.

REMOVAL - CONTINUED

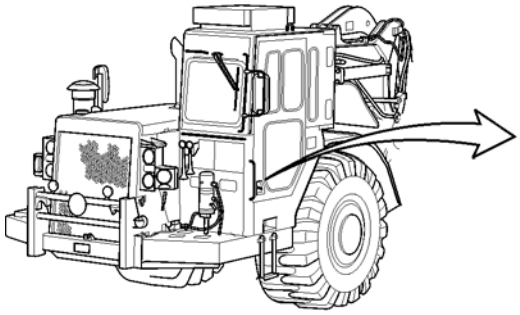
CAUTION

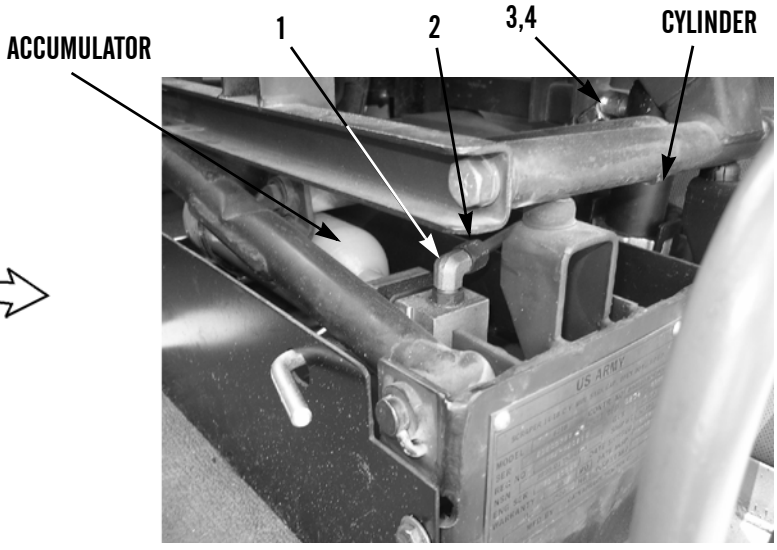
Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

NOTE

- All hose and tube assemblies must be tagged prior to removal to ensure correct installation.
- Only remove fittings if necessary to replace.

3. Disconnect hose assemblies (8 and 9) and tube (2) from height control valve on seat (WP 0215 00).
4. Disconnect tube (2) from accumulator.
5. Disconnect hose assembly (3) from cylinder.
6. If damaged, remove elbow (1) from accumulator.
7. If damaged, remove elbow (4) from cylinder.





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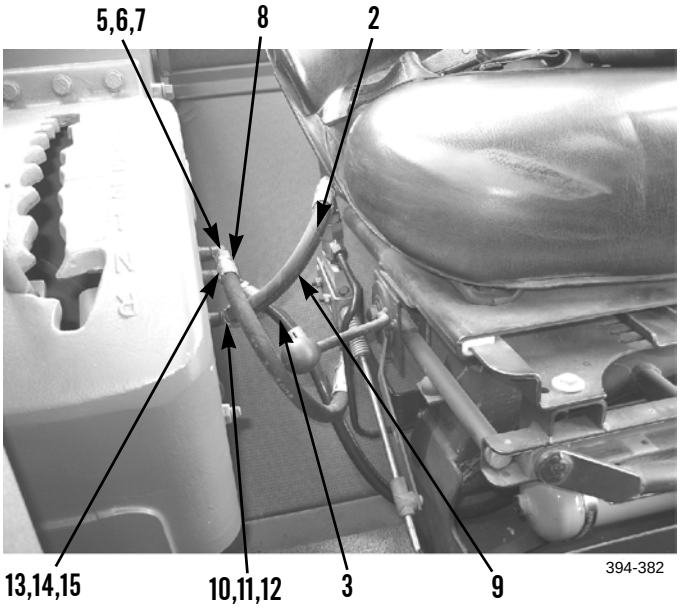
8. Remove hose assembly (8) from bowl control housing.
9. Remove hose assembly (3) from bowl control housing.
10. Remove hose assembly (9) from bowl control housing.
11. If damaged, remove elbow (5), nut (6) and lockwasher (7). Discard lockwasher.
12. If damaged, remove elbow (13), nut (14) and lockwasher (15). Discard lockwasher.
13. If damaged, remove elbow (10), nut (11) and lockwasher (12). Discard lockwasher.

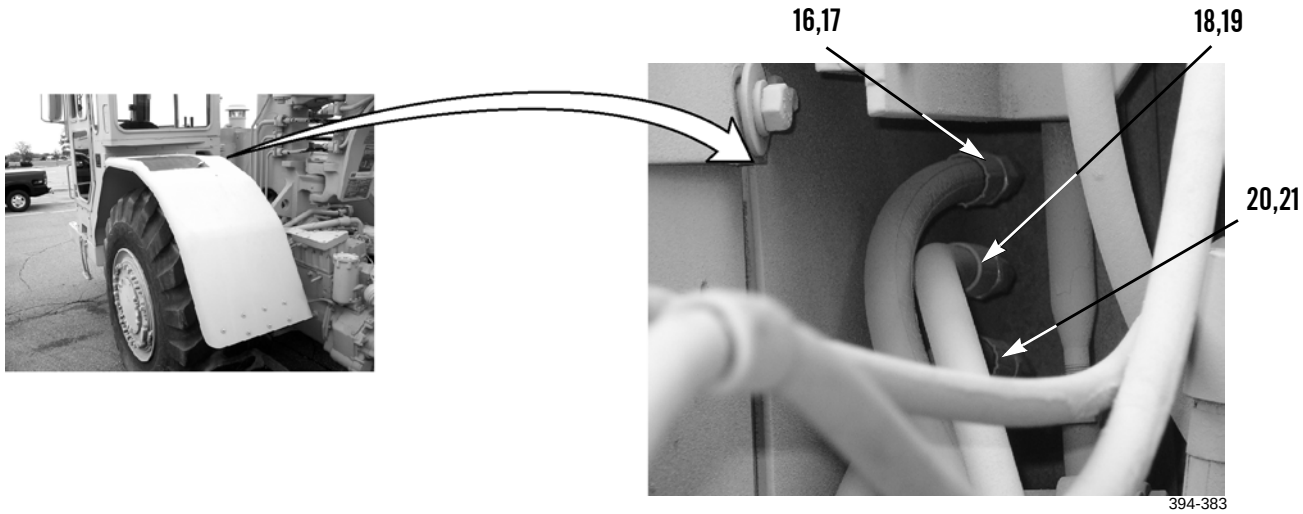
REMOVAL - CONTINUED



NOTE

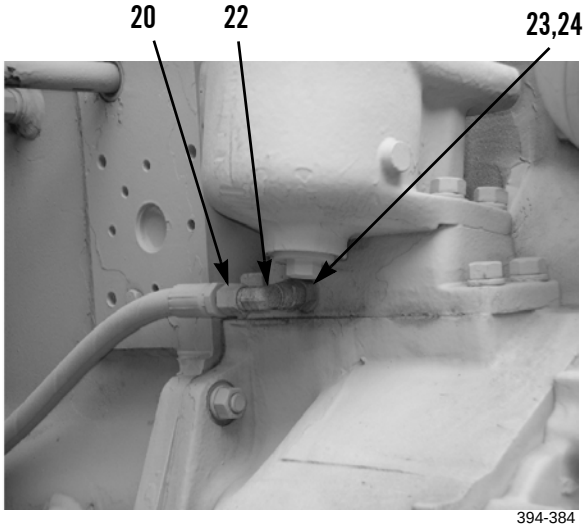
Note the routing and position of the hoses, any retaining hardware and tie straps prior to removal to ensure correct installation.

14. Disconnect hose assembly (16) from under bowl control housing.
15. Disconnect hose assembly (18) from under bowl control housing.
16. Disconnect hose assembly (20) from under bowl control housing.
17. If damaged, remove elbows (17, 19 and 21).



REMOVAL - CONTINUED

18. Remove hose assembly (20) from transmission oil filter adapter.
19. If damaged, remove elbow (22), adapter (23) and preformed packing (24). Discard preformed packing.



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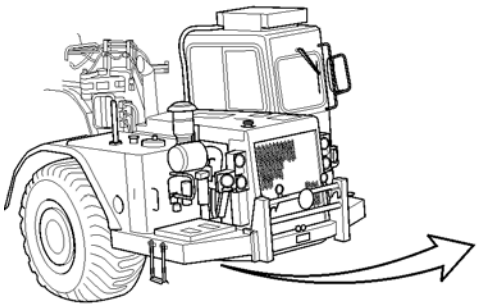
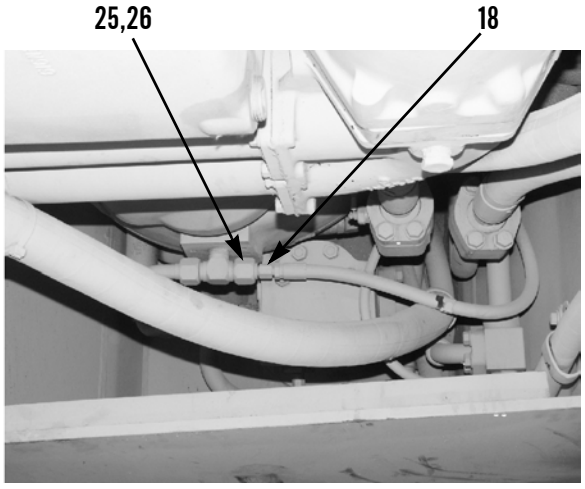
20. Remove hose assembly (18) from bottom of flywheel housing.
21. If damaged, remove adapter (25) and preformed packing (26). Discard preformed packing.





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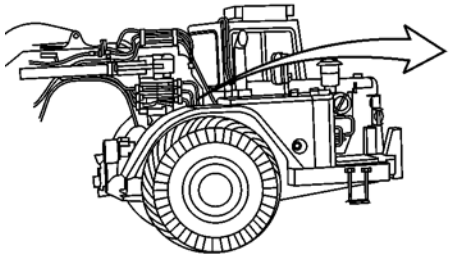
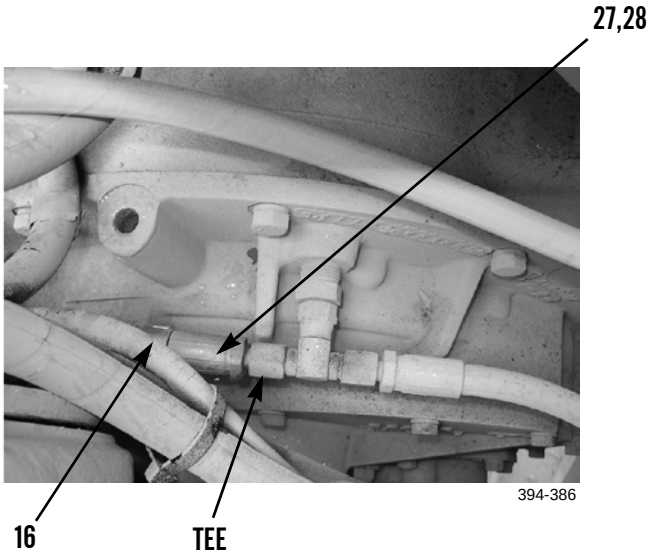
REMOVAL - CONTINUED

22. Remove hose assembly (16) from top of flywheel housing.
23. If damaged, remove adapter (27) and preformed packing (28) from tee on top of flywheel housing.





CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

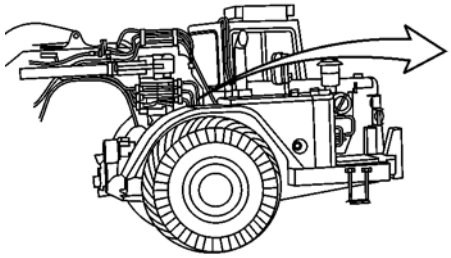
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

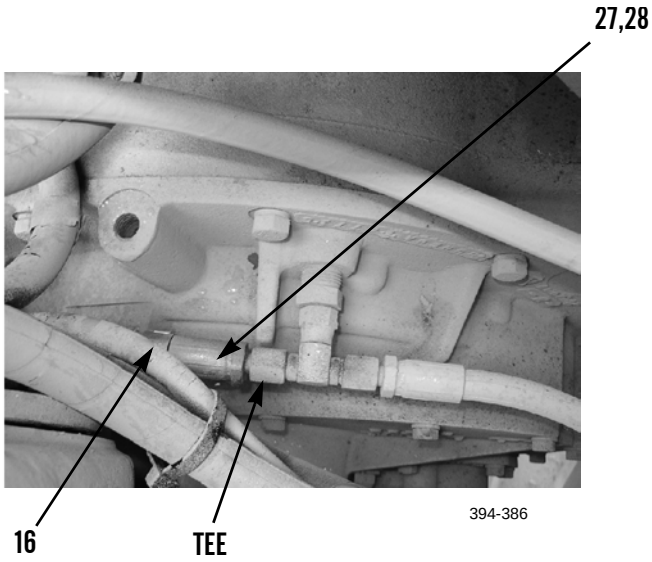
INSTALLATION

NOTE

Apply sealing compound to the threads of hose and fitting connections prior to installation to ensure correct sealing. Sealing compound is not necessary on connections that have preformed packings.

1. If removed, install new preformed packing (28) and adapter (27) in tee on top of flywheel housing.
2. Install hose assembly (16) on top of flywheel housing.





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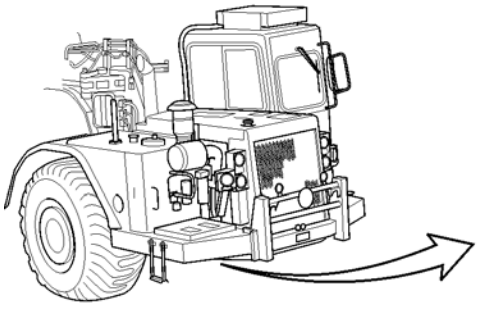
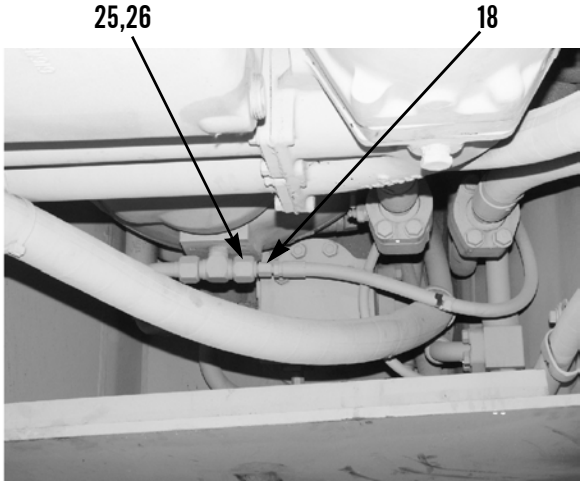
3. If removed, install new preformed packing (26) and adapter (25) on bottom of flywheel housing.
4. Install hose assembly (18) on bottom of flywheel housing.





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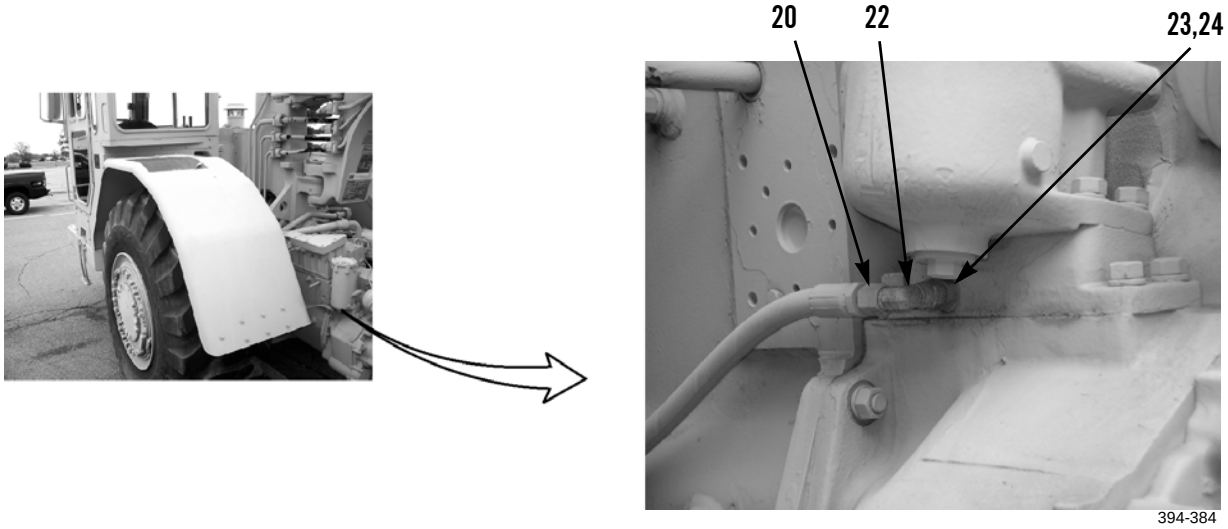
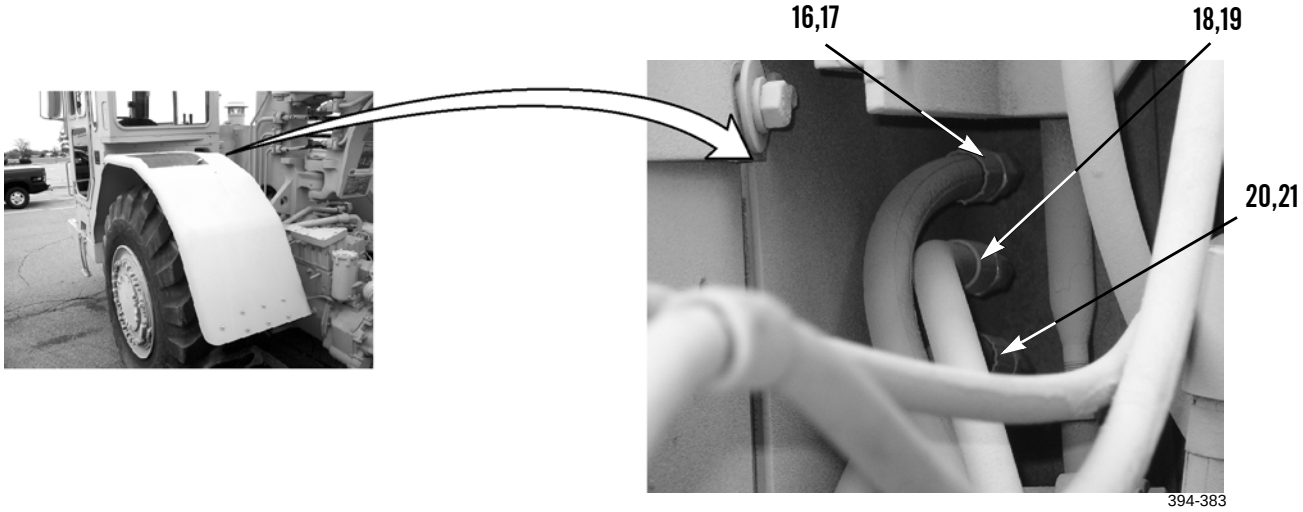
INSTALLATION - CONTINUED

5. If removed, install new preformed packing (24), adapter (23) and elbow (22) on transmission oil filter adapter.



6. Install hose assembly (20) on transmission oil filter adapter.

7. If removed, install elbow (21) under bowl control housing.



8. If removed, install elbow (19) under bowl control housing.

9. If removed, install elbow (17) under bowl control housing.

10. Connect hose assembly (20) on elbow (21).

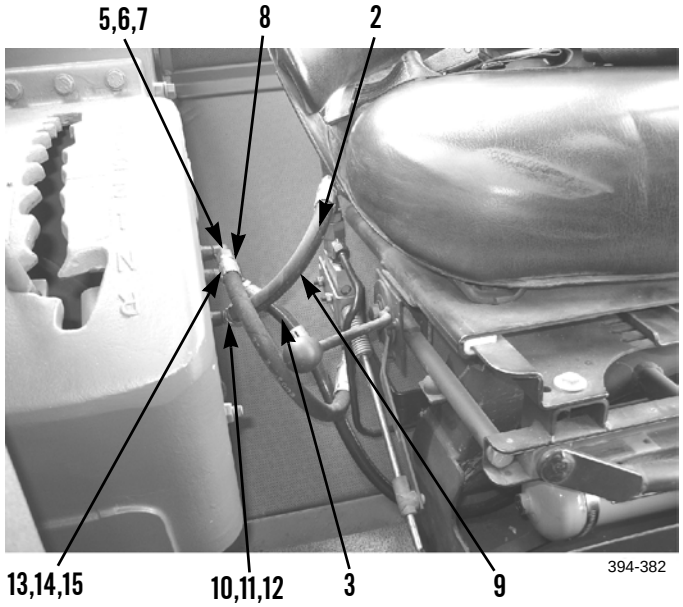
11. Connect hose assembly (18) on elbow (19).

12. Connect hose assembly (16) on elbow (17).

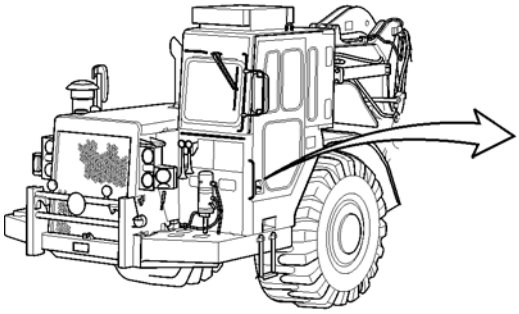
SEAT HOSES, LINES AND FITTINGS REINSTALLATION - CONTINUED 0213 00

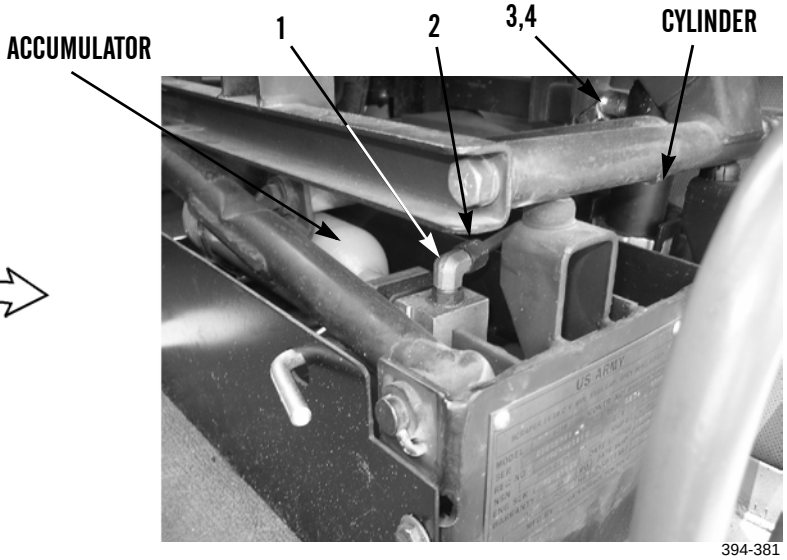
INSTALLATION - CONTINUED

13. If removed, install lockwasher (12), nut (11) and elbow (10) on bowl control housing.
14. If removed, install lockwasher (15), nut (14) and elbow (13) on bowl control housing.
15. If removed, install lockwasher (7), nut (6) and elbow (5) on bowl control housing.
16. Install hose assembly (9) on elbow (10).
17. Install hose assembly (3) on elbow (13).
18. Install hose assembly (8) on elbow (5).



19. If removed, install elbow (4) to cylinder under seat.
20. If removed, install elbow (1) to accumulator.
21. Connect hose assembly (3) to elbow (4).
22. Connect hose assembly (2) to elbow (1).





INSTALLATION - CONTINUED

23. Connect three hose assemblies to height control valve on seat (WP 0215 00).
24. Refill transmission with oil.

NOTE

Maintain oil level between ADD and FULL marks on sight gage (WP 0128 00).

25. Operate seat and verify correct operation (TM 5-3805-248-10).
26. Install crankcase guards (WP 0201 00).

END OF WORK PACKAGE

SEAT STRAINER ASSEMBLY REPLACEMENT 0214 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

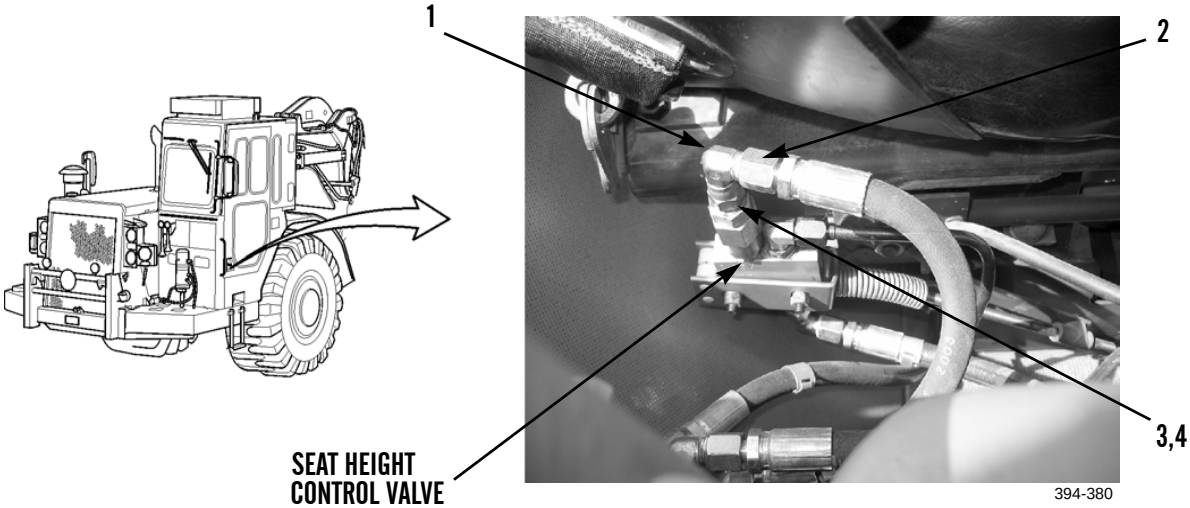
Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

WARNING

Never remove the seat front panel, any oil lines or the bolt on the seat cylinder rod until the pressure in the hydraulic system of the seat is released. Failure to follow this warning may cause injury.

1. Move seat height control lever up and down to release pressure in hydraulic system.
2. Disconnect hose assembly (2) from top of seat height control valve.
3. Remove elbow (1), strainer (3) and preformed packing (4). Discard preformed packing.

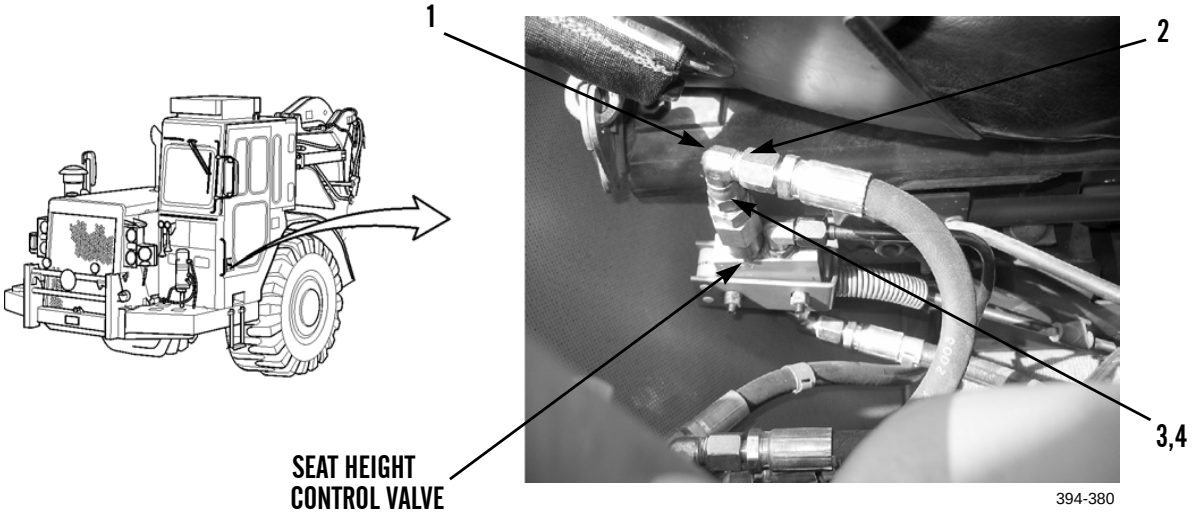


CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION



1. Install new preformed packing (4) and strainer (3) on top of seat height control valve.
2. Install elbow (1) on strainer (3).
3. Connect hose assembly (2) to elbow (1).
4. Inspect hose connections and check for leaks.
5. Operate seat controls to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

HEIGHT CONTROL VALVE REPLACEMENT 0215 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Move seat height control lever up and down to release pressure in hydraulic system.

CAUTION

Wipe area clean around all connections to be opened during removal. Cap lines and plug openings after disconnecting lines. Contamination of air system could result in premature failure.

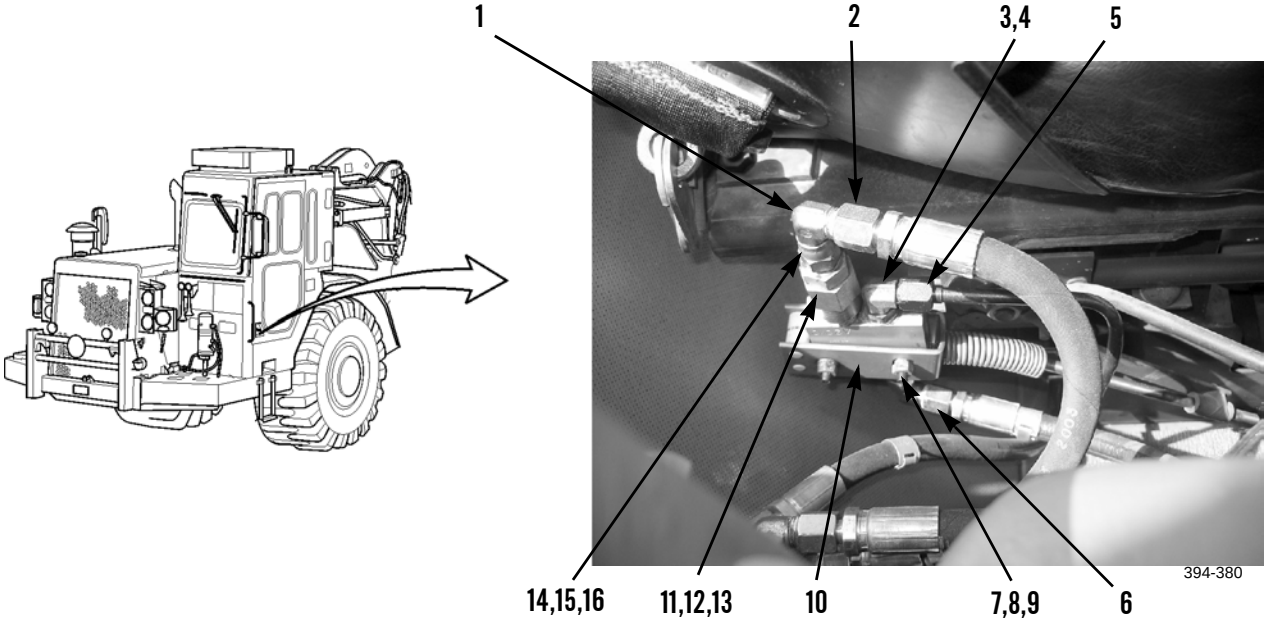
NOTE

- Use a container to catch any transmission oil that may drain from the hose assemblies after disconnecting.
- Tag hoses and fittings prior to disconnecting or removing to ensure correct installation.
- Only remove fittings if damaged.

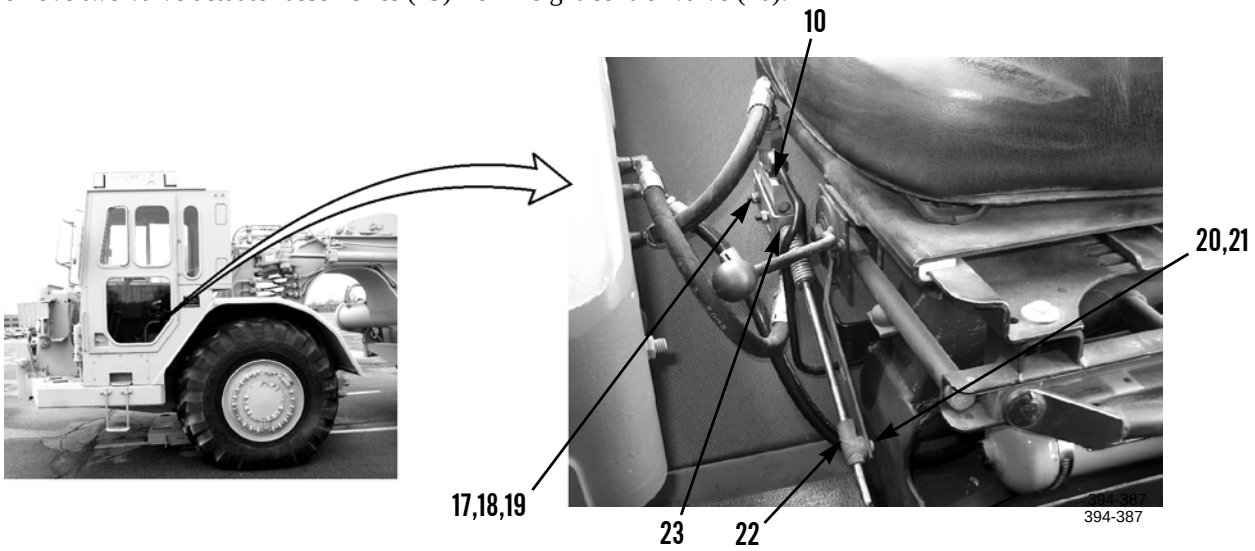
HEIGHT CONTROL VALVE REPLACEMENT - CONTINUED 0215 00

REMOVAL - CONTINUED

2. Disconnect hose assembly (2) from top of height control valve (10).
3. Disconnect hose assembly (6) from bottom of height control valve (10).
4. Disconnect tube assembly (5) from top of height control valve (10).
5. If damaged, remove elbow (1), strainer (14) and preformed packing (15). Discard preformed packing.
6. If damaged, remove reducer (16) and preformed packing (11). Discard preformed packing.
7. If damaged, remove adapter (12) and preformed packing (13). Discard preformed packing.
8. If damaged, remove elbow (7), adapter (8) and preformed packing (9). Discard preformed packing.
9. If damaged, remove elbow (3) and preformed packing (4). Discard preformed packing.



10. Remove screw (20), washer (21) and slide (22) from valve actuator rod (23).
11. Remove two nuts (17) and sleeves (18) from height control valve (10).
12. Remove height control valve (10) and actuator (23) from seat.
13. Remove two valve actuator assemblies (19) from height control valve (10).



CLEANING AND INSPECTION

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- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

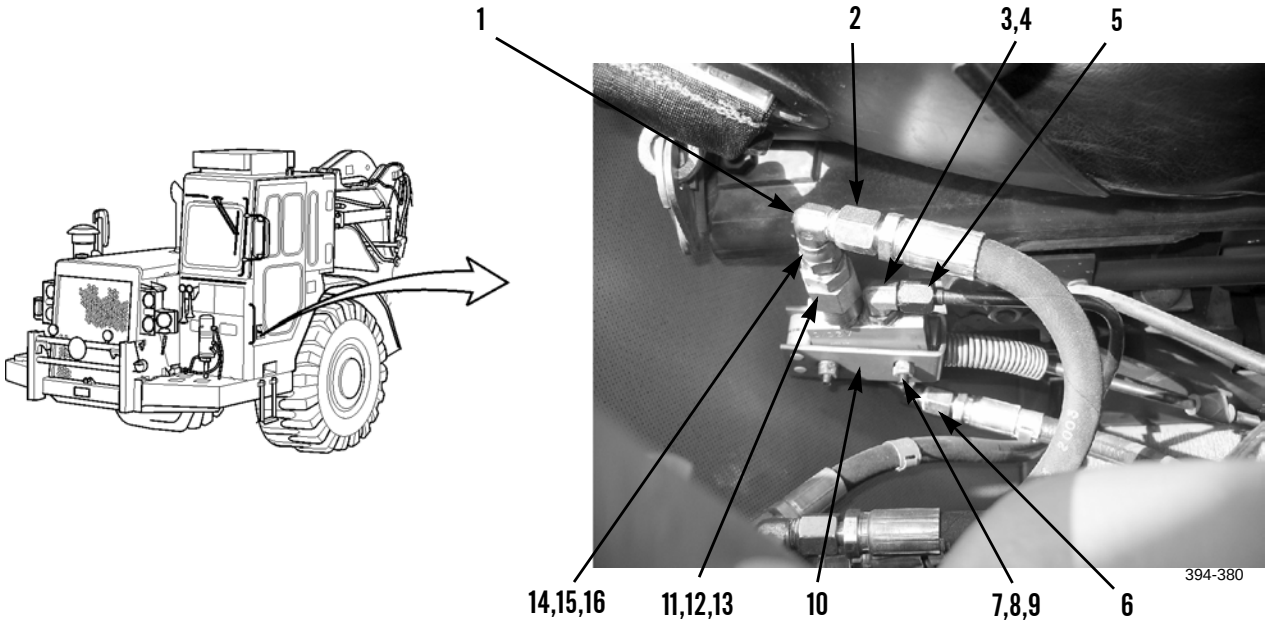
INSTALLATION

1. Install two valve actuator assemblies (19) on height control valve (10).
2. Install valve actuator (23) and height control valve (10) on seat.
3. Install two sleeves (18) and nuts (17) on height control valve (10).
4. Install slide (22), washer (21) and screw (20) on valve actuator rod (23).
5. If removed, install new preformed packing (9), adapter (8) and elbow (7) on bottom of height control valve (10).

HEIGHT CONTROL VALVE REPLACEMENT - CONTINUED 0215 00

INSTALLATION - CONTINUED

6. If removed, install new preformed packing (4) and elbow (3) to top of height control valve (10).
7. If removed, install new preformed packing (13) and adapter (12) to top of height control valve (10).
8. If removed, install new preformed packing (11) and reducer (16).
9. If removed, install new preformed packing (15), strainer (14) and elbow (1).
10. Connect hose assembly (6) to bottom of height control valve (10).
11. Connect tube assembly (5) to elbow (3).
12. Connect hose assembly (2) to top of height control valve (10).



13. Refill transmission with transmission oil. Maintain level between ADD and FULL marks on sight gage (TM 5-3805-248-10).
14. Operate engine until normal operating temperature is reached (TM 5-3805-248-10).
15. Shut down engine (TM 5-3805-248-10).
16. Inspect connections and check for leaks.
17. Operate seat controls to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

TRACTOR STORAGE COMPARTMENT REPLACEMENT 0216 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

References

WP 0152 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

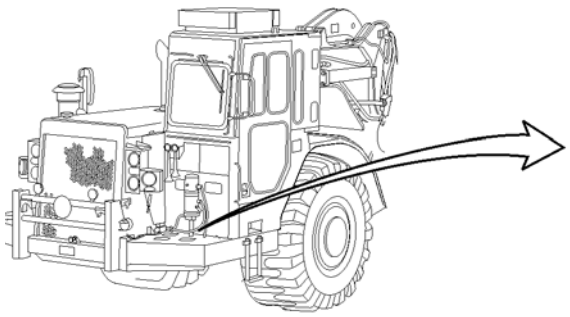
Engine shut down (TM 5-3805-248-10)

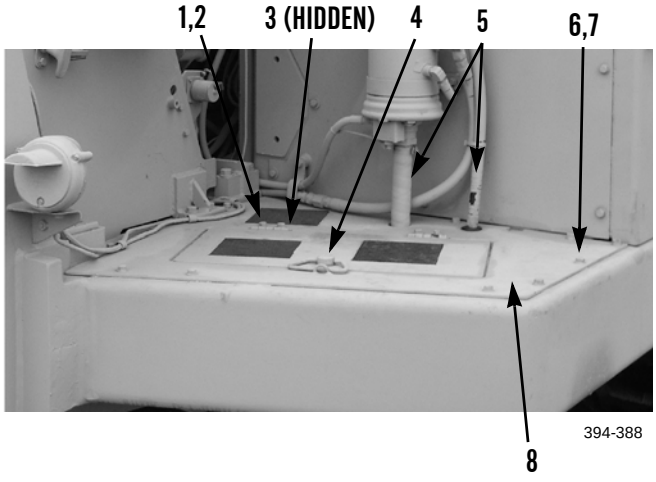
Battery disconnect switch in OFF position (TM 5-3805-248-10)

All items removed from storage compartment

REMOVAL

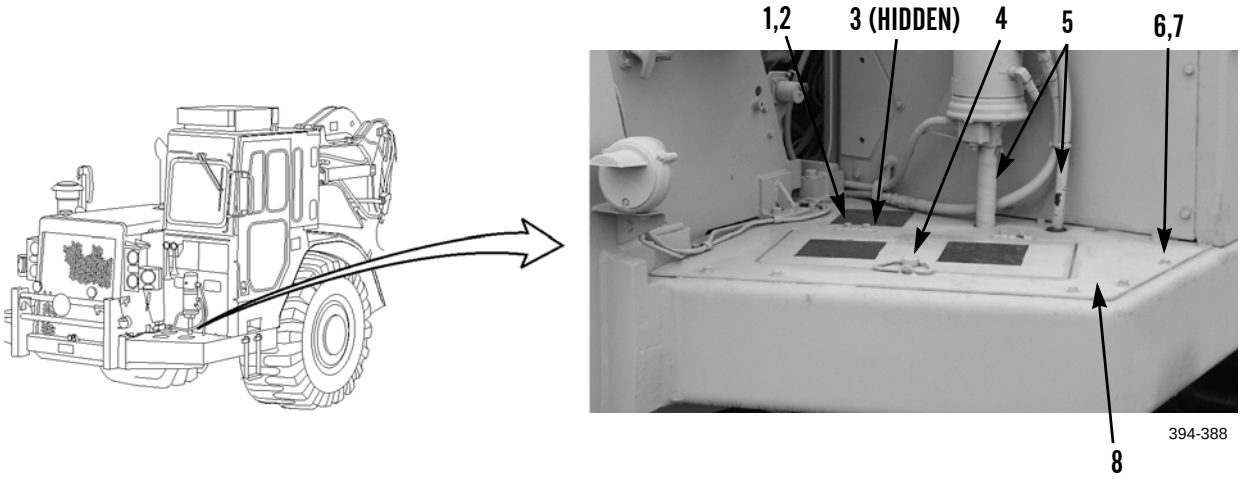
1. Disconnect and position air dryer hoses (5) aside (WP 0152 00).
2. Remove four capscrews (1), washers (2) and two plates (3) from lid (4).
3. Remove lid (4) from plate (8).
4. Remove 12 capscrews (6) and washers (7) from plate (8).
5. Remove plate (8) from machine.





INSTALLATION

1. Install plate (8) on machine.
2. Install 12 washers (7) and capscrews (6).
3. Position lid (4) on plate (8).
4. Install two plates (3), four washers (2) and capscrews (1).



5. Install air dryer hoses (5) (WP 0152 00).

END OF WORK PACKAGE

WINDSHIELD WIPER ASSEMBLY REPLACEMENT 0217 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Gasket (2)

Lockwasher (3)

Materials/Parts - Continued

Nut, self-locking

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

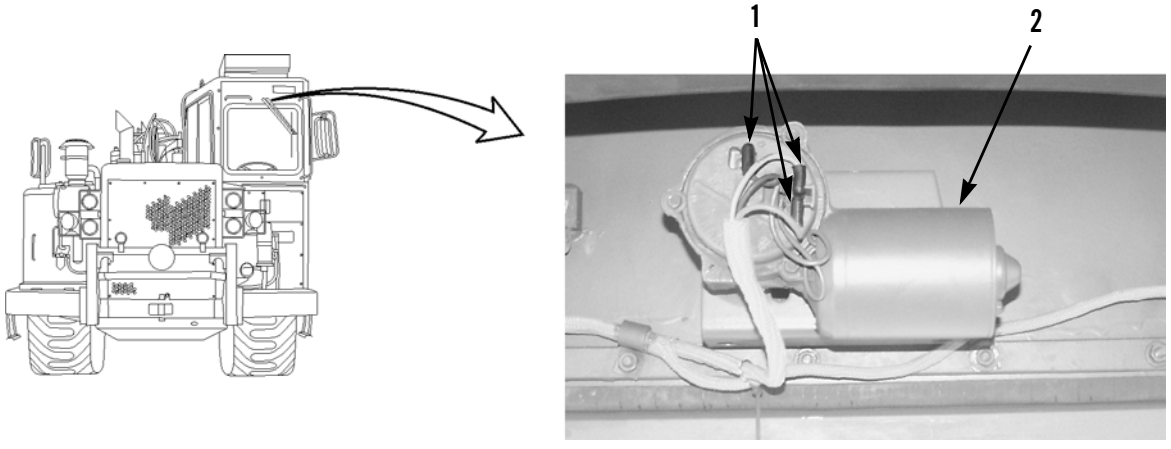
Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

NOTE

- Tag wire assemblies prior to removal to ensure correct installation.
- Mark location of arm assembly prior to removal to ensure correct installation.

1. Disconnect three wire connectors (1) at terminals from motor assembly (2) on inside of operator compartment.



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REMOVAL - CONTINUED

2. Remove nut (3) and lockwasher (4) from arm assembly (6). Discard lockwasher.
3. Remove nut (5) from arm assembly (6).
4. Remove arm assembly (6).

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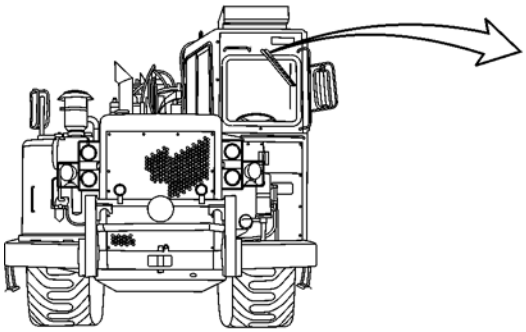

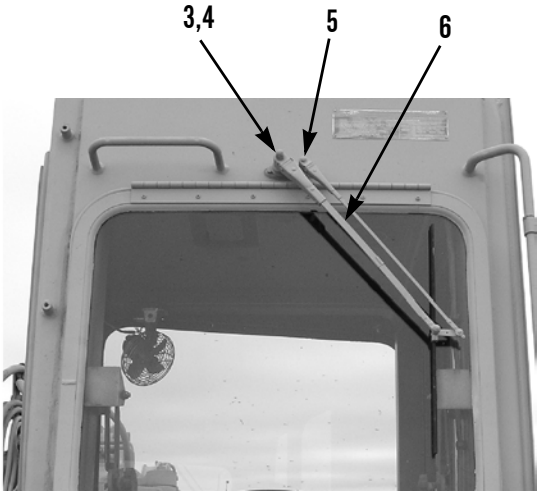

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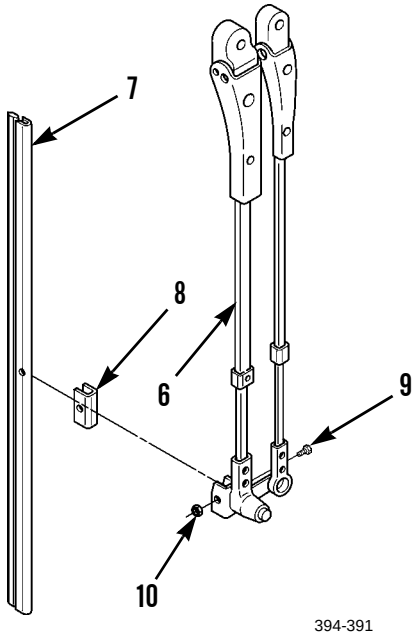
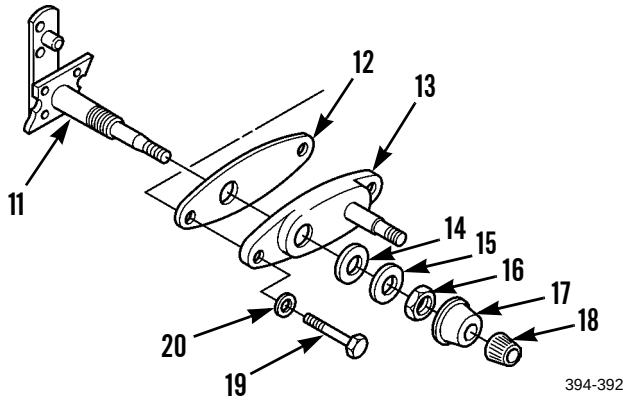
5. Remove screw (9), self-locking nut (10) and clip (8) from arm assembly (6). Discard self-locking nut.
6. Remove blade assembly (7).



394-391

REMOVAL - CONTINUED

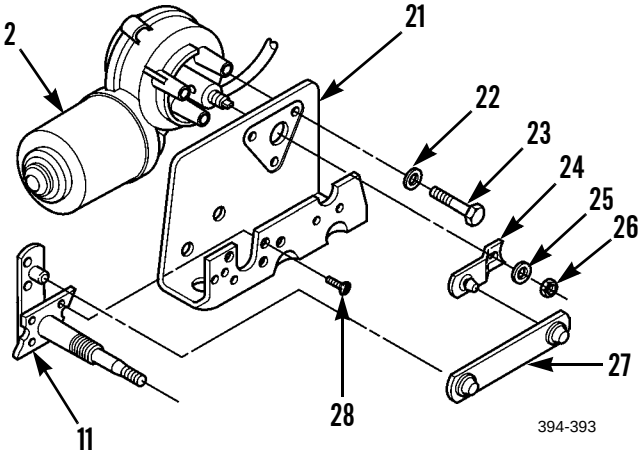
7. Remove drive adapter (18), cap (17), nut (16), washer (15) and gasket (14) from driveshaft assembly (11). Discard gasket.
8. Remove two capscrews (19) and lockwashers (20). Discard lockwashers.
9. Remove pivot assembly (13) and gasket (12) from driveshaft assembly (11). Discard gasket.



NOTE

Mark location of connecting link and crank prior to removal to ensure correct installation.

10. Remove connecting link (27) from crank (24) and driveshaft assembly (11) from inside of operator compartment.
11. Remove nut (26) and spring tension washer (25) from crank (24).
12. Remove crank (24) from motor assembly (2).
13. Remove four screws (28) from driveshaft assembly (11).
14. Remove driveshaft assembly (11) from bracket (21).
15. Remove three bolts (23) and washers (22) from motor assembly (2).
16. Remove motor assembly (2) from bracket (21).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use of protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

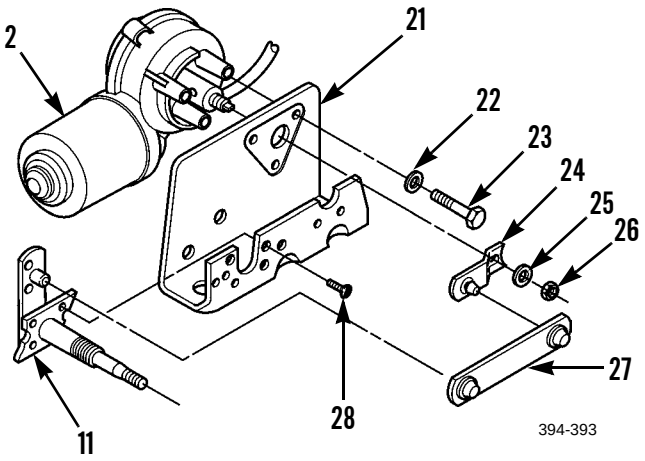
INSTALLATION

1. Install motor assembly (2) in bracket (21) on inside of operator compartment.
2. Install three washers (22) and bolts (23) in bracket (21). Torque bolts to 49 lb-in. (5.5 Nm).
3. Install drive shaft assembly (11) in bracket (21).
4. Install four screws (28) and torque to 54 lb-in. (6.1 Nm).

NOTE

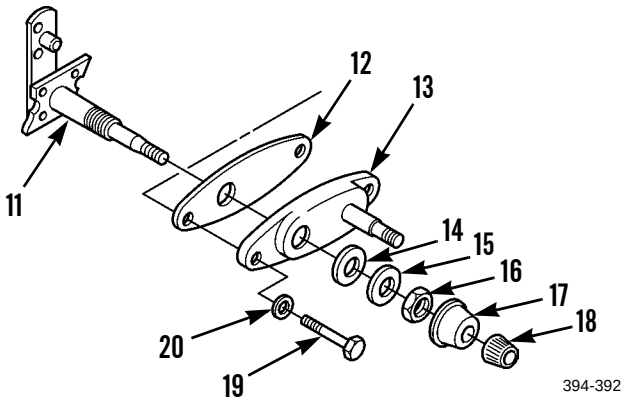
Align crank with mark made during removal to ensure correct installation.

5. Install crank (24) on motor assembly (2).
6. Install spring tension washer (25) and nut (26). Torque nut to 120 lb-in. (14 Nm).
7. Install connecting link (27) on drive shaft assembly (11) and crank (24).

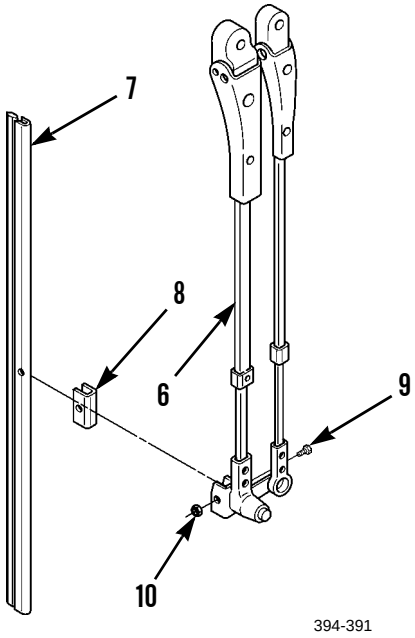


INSTALLATION - CONTINUED

8. Install new gasket (12) and pivot assembly (13) on driveshaft assembly (11) on outside of operator compartment.
9. Install two new lockwashers (20) and capscrews (19) on pivot assembly (13).
10. Install new gasket (14), washer (15), nut (16), cap (17) and drive adapter (18) on driveshaft assembly (11). Torque nut to 15 lb-ft (20 Nm).



11. Install blade assembly (7), clip (8), screw (9) and new self-locking nut (10) on arm assembly (6).

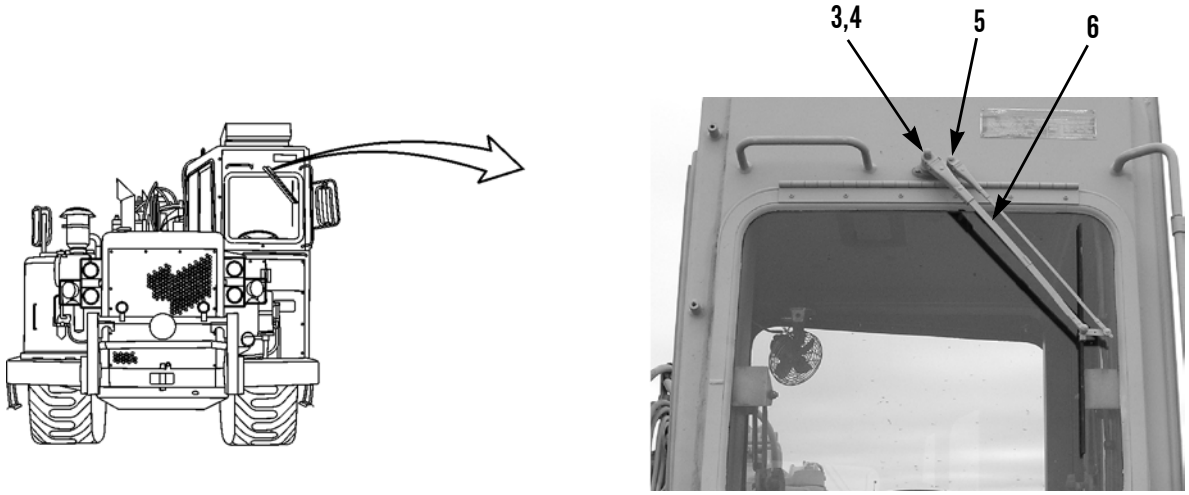


INSTALLATION - CONTINUED

NOTE

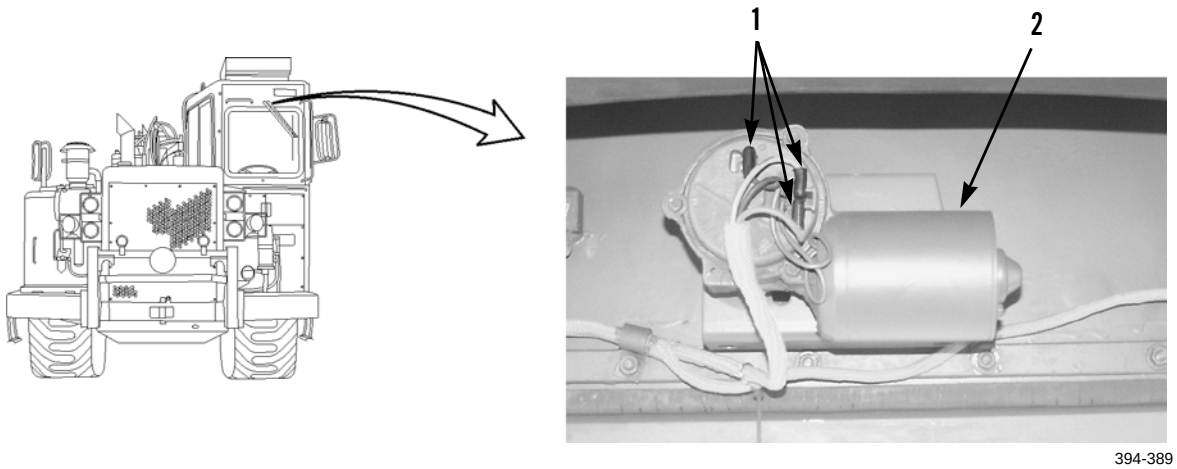
Align arm assembly with mark made during removal to ensure correct installation.

12. Install arm assembly (6) on outside of operator compartment.
13. Install new lockwasher (4) and nuts (5 and 3). Torque nut (3) to 144 lb-in. (16 Nm).



394-390

14. Connect three wire assemblies (1) at terminals to motor assembly (2) on inside of operator compartment.



394-389

15. Operate windshield wiper and verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

AIR HORN REPLACEMENT 0218 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tape, anti-seizing (Item 43, WP 0339 00)

Gasket (2)

Lockwasher (4)

Equipment Condition

Upper front access plates removed (WP 0192 00)

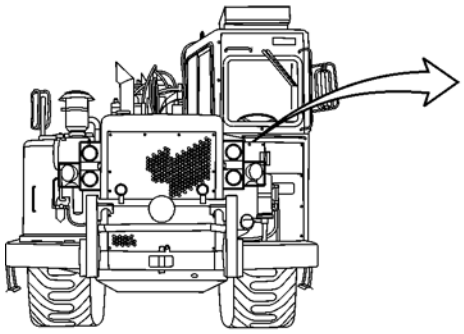
Air pressure vented (TM 5-3805-248-10)

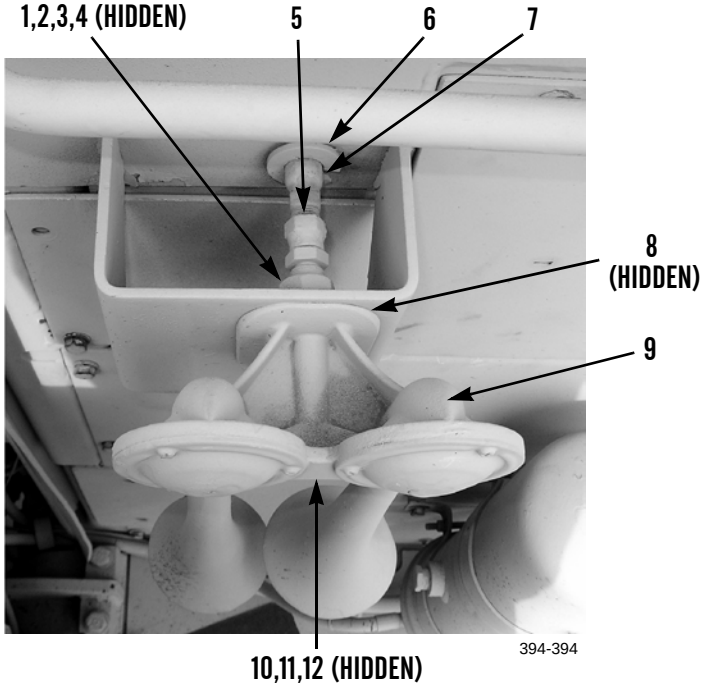
REMOVAL

CAUTION

Wipe area clean around all connections to be opened during removal. Cap hoses and plug openings after disconnecting. Contamination of air system could result in premature failure.

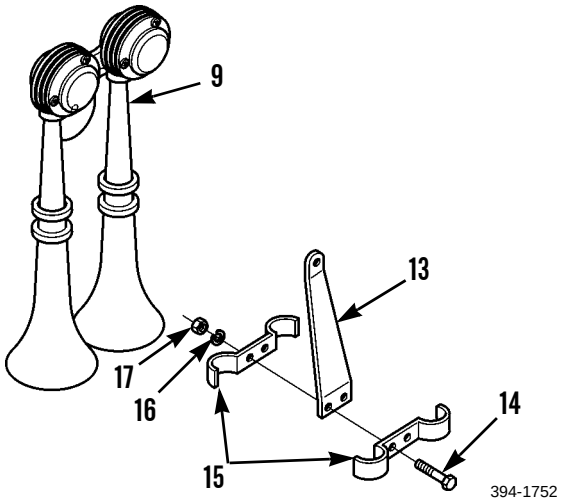
1. Disconnect pipe reducer (5) from hose assembly (7) and pull hose through grommet (6) but not all the way through.
2. Remove reducer (5), nut (4), lockwasher (3), adapter (2) and washer (1). Discard lockwasher.
3. Remove nut (12), lockwasher (11) and bolt (10) from air horn assembly (9). Discard lockwasher.
4. Remove air horn assembly (9) and pad (8) from machine.



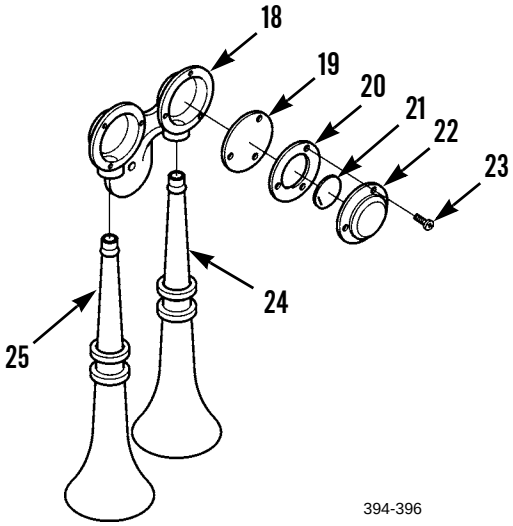


DISASSEMBLY

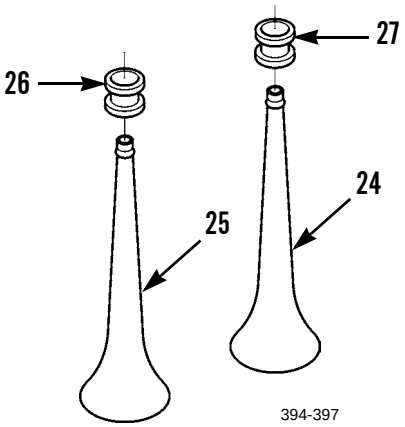
1. Remove two nuts (17), lockwashers (16) and bolts (14) from air horn assembly (9). Discard lockwashers.
2. Remove two clamps (15) and bracket (13) from air horn assembly (9).



3. Remove six screws (23) and two covers (22).
4. Remove two adjusting discs (21) from horn (18).
5. Remove and discard two gaskets (20).
6. Remove two diaphragms (19).
7. If damaged, remove and discard projectors (24 and 25) from horn (18).



8. If damaged, remove and discard grommets (26 and 27) from projectors (24 and 25).



ASSEMBLY

1. If removed, install new grommets (26 and 27) on projectors (24 and 25).

NOTE

All parts furnished in diaphragm kit will be used to replace like parts discarded during disassembly. Entire diaphragm kit will be used.

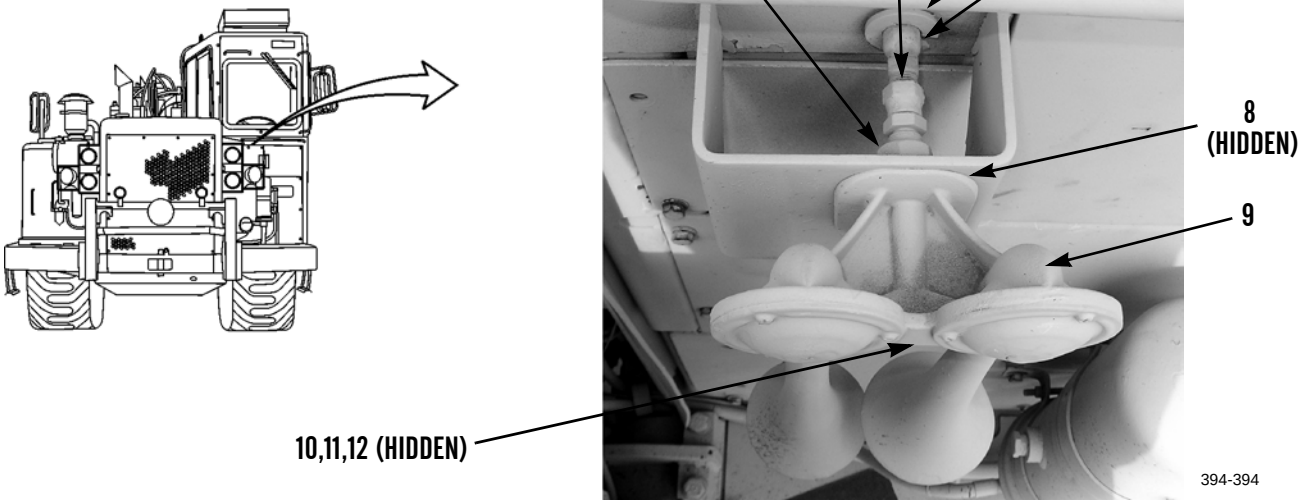
2. If removed, install new projectors (24 and 25) on horn (18).
3. Install two diaphragms (19) in housing (18).
4. Install two new gaskets (20).
5. Install two adjusting discs (21) with rims down, center two adjusting discs (21) on diaphragms (19).
6. Install two covers (22) and six screws (23). Tighten screws evenly.
7. Install bracket (13) and two clamps (15) in air horn assembly (9).
8. Install two bolts (14), new lockwashers (16) and nuts (17).

INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Install pad (8) and horn assembly (9) on machine.
2. Install bolt (10), new lockwasher (11) and nut (12) on horn assembly (9).
3. Install washer (1) and adapter (2) on air horn assembly (9).
4. Install new lockwasher (3) and nut (4) on adapter (2).
5. Install reducer (5) and connect to hose assembly (7).



6. Operate air horn to verify correct operation (TM 5-3805-248-10).
7. Install upper front access plates (WP 0192 00).

END OF WORK PACKAGE

AIR HORN SOLENOID AND HOSE ASSEMBLY REPLACEMENT 0219 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Equipment Condition

Upper front access plates removed (WP 0192 00)

Air horn hose assembly disconnected from air horn (WP 0218 00)

REMOVAL

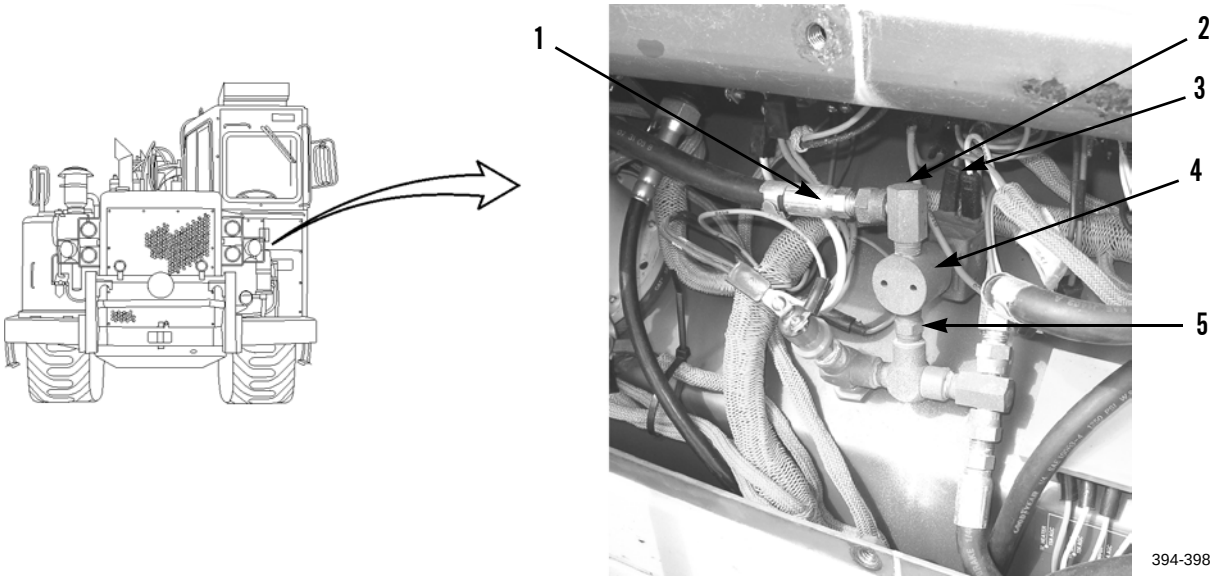
CAUTION

Wipe area clean around all connections to be opened during removal. Cap hoses and plug openings after disconnecting. Contamination of air system could result in premature failure.

NOTE

- Tag wire assemblies prior to removal to ensure correct installation.
- Only remove fittings if damaged.

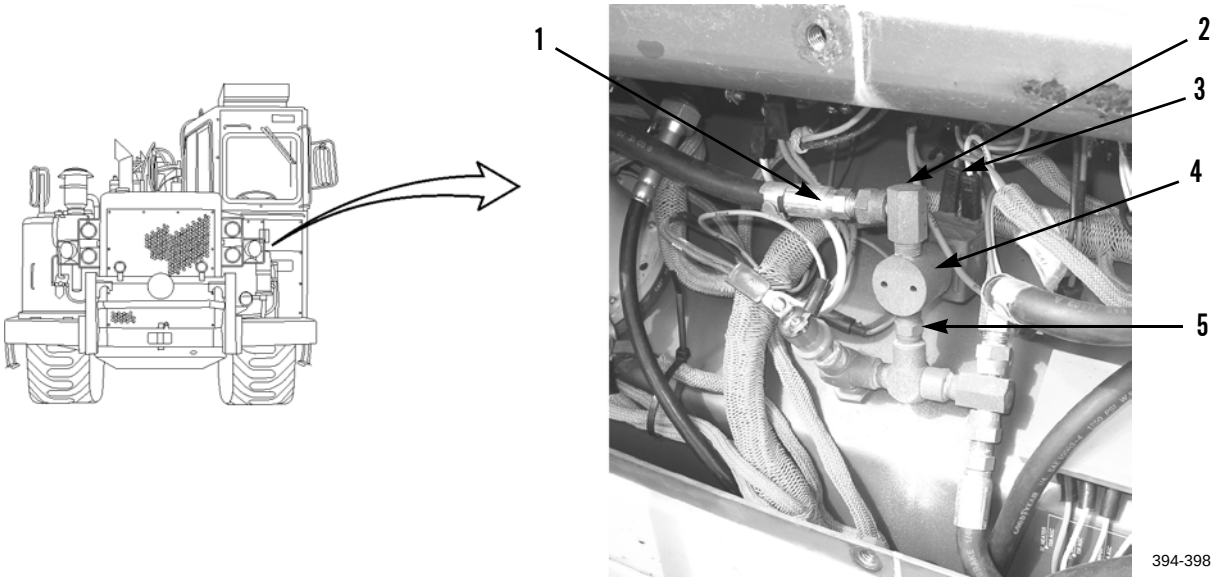
1. Disconnect two wire connectors (3) from solenoid valve (4) on front of operator compartment.
2. Remove hose assembly (1) from elbow (2).
3. Remove elbow (2) from solenoid valve (4).
4. Remove solenoid valve (4) from nipple (5).
5. If damaged, remove nipple (5).



INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.



1. If removed, install nipple (5).
2. Install solenoid valve (4) on nipple (5).
3. Install elbow (2) on solenoid valve (4).
4. Connect two wire connectors (3) to solenoid valve (4).
5. Connect hose assembly (1) to elbow (2).
6. Connect hose assembly (1) to air horn assembly (WP 0218 00).
7. Operate air horn to verify correct operation (TM 5-3805-248-10).
8. Install upper front access plates (WP 0192 00).
9. Check for air leaks around fittings and lines (TM 5-3805-248-10).

END OF WORK PACKAGE

REARVIEW MIRRORS REPLACEMENT 0220 00

THIS WORK PACKAGE COVERS

Inside Mirror: Removal, Installation

Left Mirror: Removal, Installation

Right Mirror: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

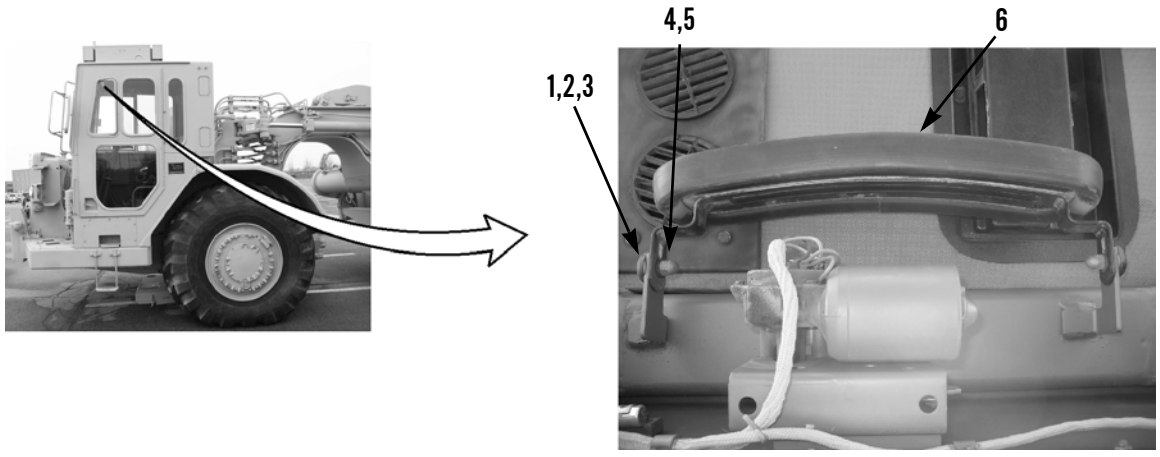
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

INSIDE MIRROR REMOVAL

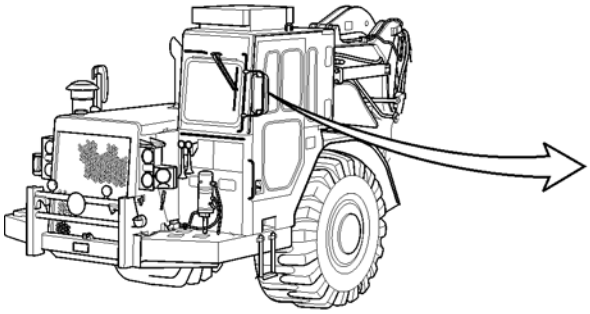
1. Remove two caps (1), nuts (4), washers (5), bolts (2), shouldered washers (3) and mirror (6) from inside of operator compartment.

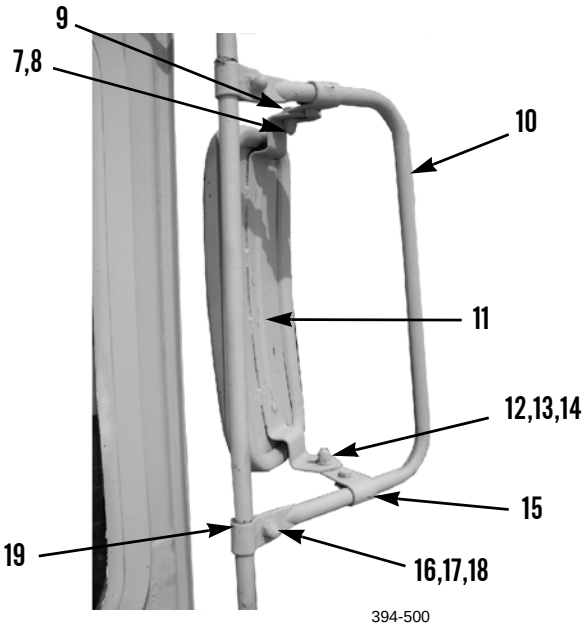


394-399

LEFT MIRROR REMOVAL

1. Remove two nuts (7), washers (8), bolts (9) and mirror assembly (11) from loop clamps (15).
2. Remove two nuts (12), washers (13), bolts (14) and loop clamps (15) from bow arm (10).
3. Remove two nuts (16), washers (17), bolts (18), loop clamps (19) and bow arm (10) from machine.

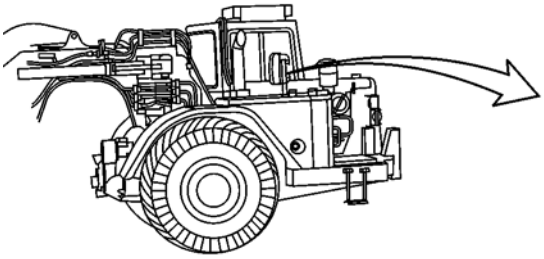


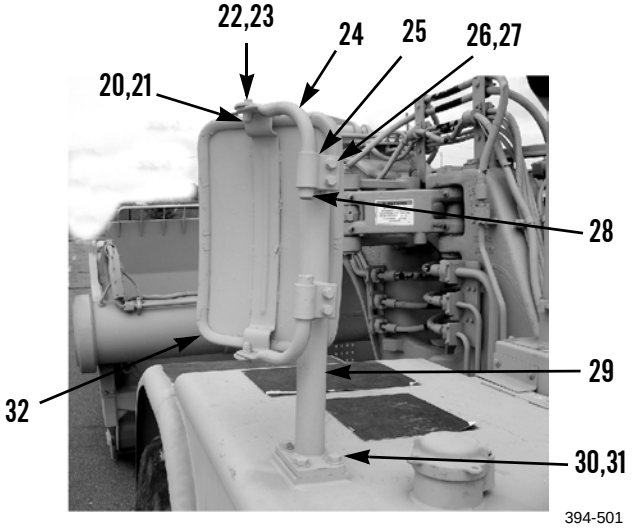


394-500

RIGHT MIRROR REMOVAL

1. Remove two nuts (20), washers (21), bolts (22), washers (23) and mirror assembly (32) from arms (24).
2. Remove four bolts (26), washers (27), two loop clamps (25), arms (24) and protective plugs (28).
3. Remove four bolts (30), washers (31) and support assembly (29).





394-501

RIGHT MIRROR INSTALLATION

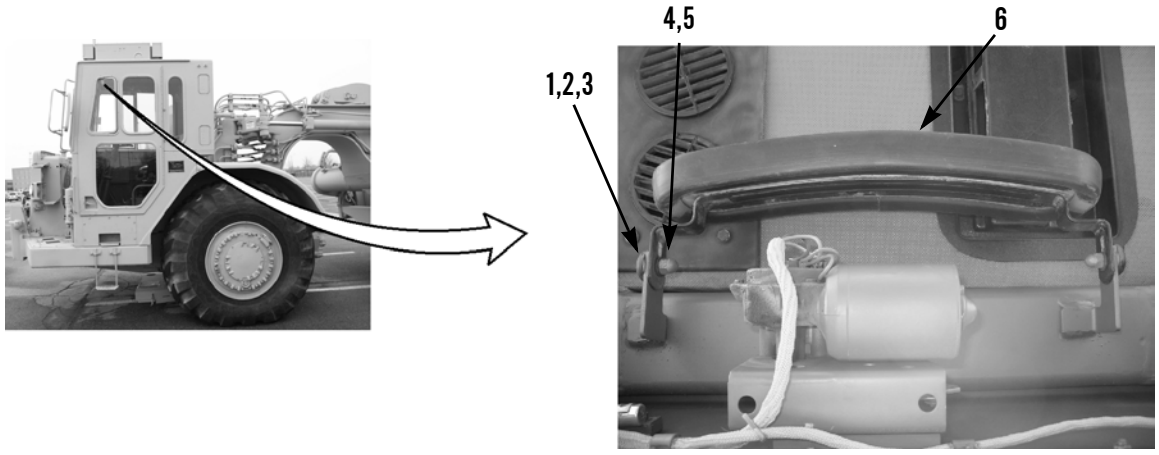
1. Install support assembly (29), four washers (31) and bolts (30) on right front of machine.
2. Install two protective plugs (28) on arms (24). Install two arms (24), loop clamps (25), four washers (27) and bolts (26) on support assembly (29).
3. Install mirror (32), two washers (23), bolts (22), washers (21) and nuts (20) on arms (24). Torque nuts to 18 lb-ft (24 Nm).

LEFT MIRROR INSTALLATION

1. Install bow arm (10), two loop clamps (19), bolts (18), washers (17) and nuts (16) on left side of operator compartment.
2. Install two loop clamps (15), bolts (14), washers (13) and nuts (12) on bow arm (10). Torque nuts to 18 lb-ft (24 Nm).
3. Install mirror (11), two bolts (9), washers (8) and nuts (7). Torque nuts to 18 lb-ft (24 Nm).

INSIDE MIRROR INSTALLATION

Install mirror (6), two washers (3), bolts (2), washers (5), nuts (4) and caps (1) on inside of operator compartment. Torque nuts to 18 lb-ft (24 Nm).



394-399

END OF WORK PACKAGE

DEFROSTER FAN REPLACEMENT 0221 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher

Nut, self-locking (2)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

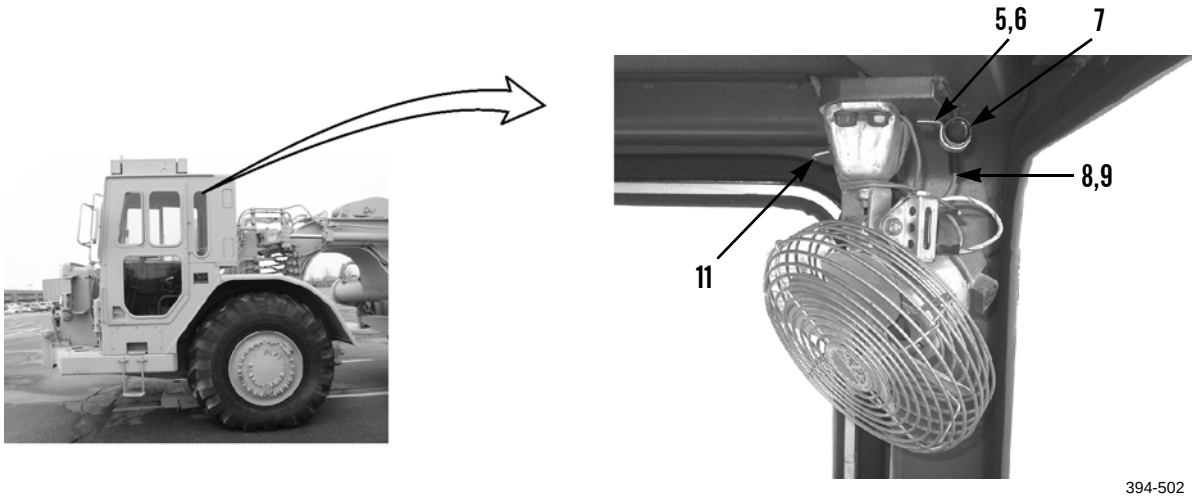
WARNING

Ensure battery disconnect switch is in OFF position before performing this replacement. Failure to follow this warning may result in injury, or damage to equipment.

NOTE

Tag wire assemblies prior to removal to ensure correct installation.

1. Remove screw (8) and wire connectors (9) from capacitor (7).
2. Remove capscrew (5), lockwasher (6) and capacitor (7). Discard lockwasher.



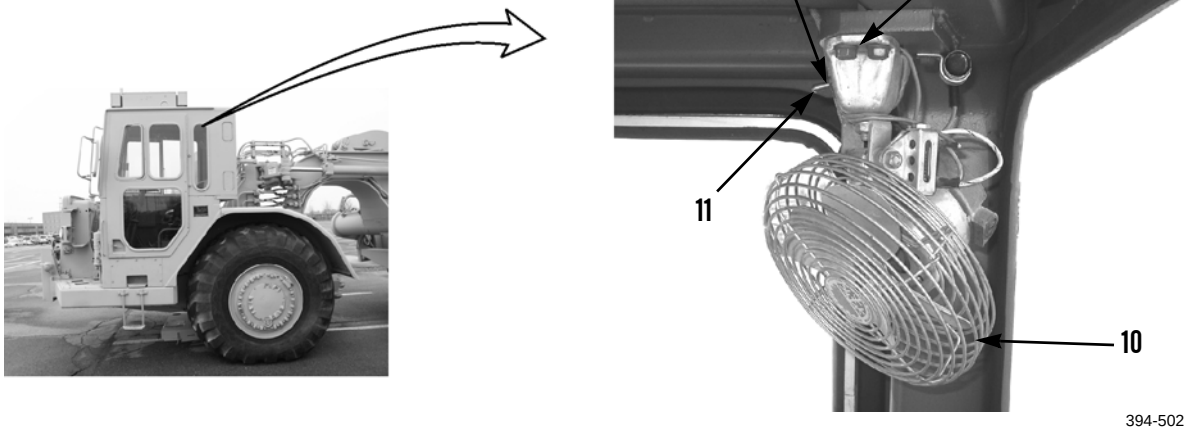
394-502

REMOVAL - CONTINUED

NOTE

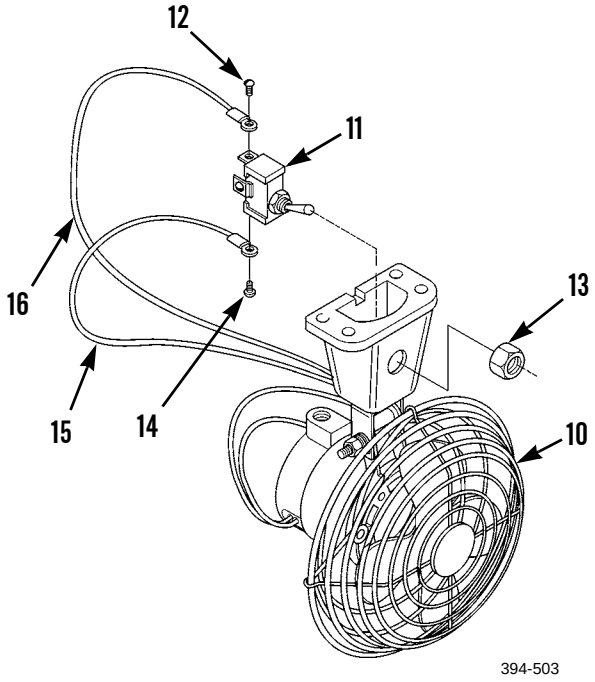
Defroster fan assembly cannot be removed until screw is removed and wire connector is disconnected.

3. Support fan assembly and remove four bolts (3) and washers (4).
4. Remove screw (1) and wire connectors (2) from fan switch (11).
5. Remove defroster fan assembly (10).



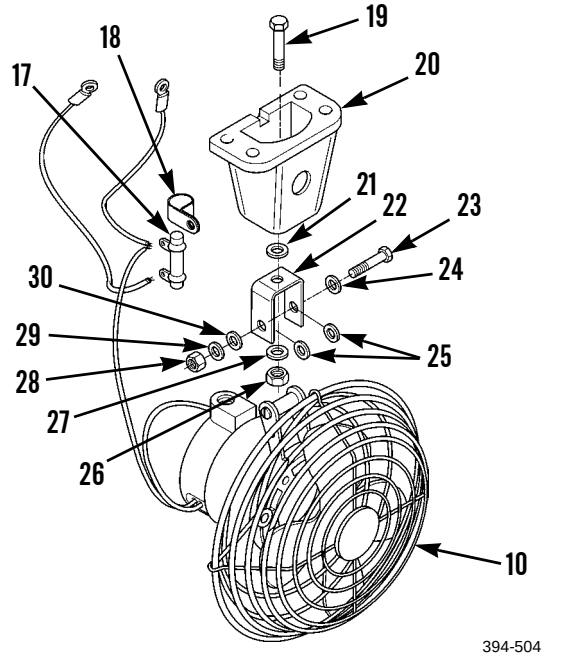
DISASSEMBLY

1. Remove nut (13) from fan assembly (10).
2. Lift switch (11) out of fan assembly (10).
3. Remove screws (12 and 14) from fan switch (11).
4. Disconnect wire connectors (15 and 16) and remove fan switch (11).



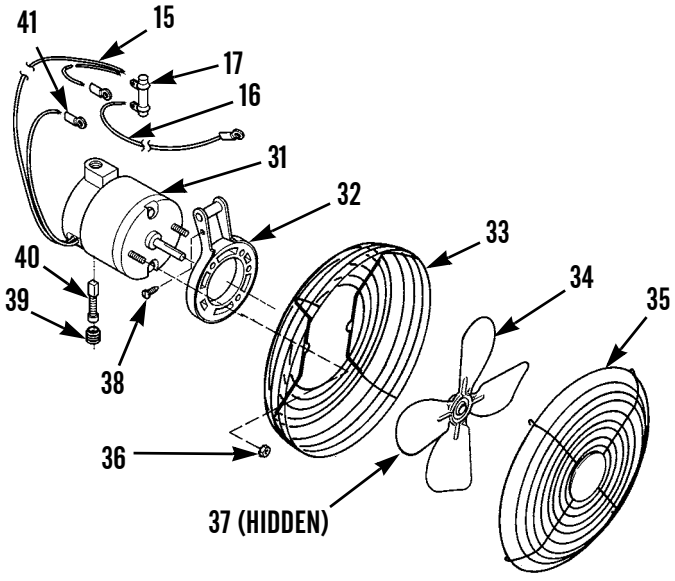
DISASSEMBLY - CONTINUED

5. Remove self-locking nut (28), washer (29), clip (18), resistor (17) and washer (30) from retaining strap (22). Discard self-locking nut.
6. Remove bolt (23), two washers (25) and washer (24) from retaining strap (22).
7. Remove self-locking nut (26), washer (27), retaining strap (22), washer (21), bolt (19) and base (20). Discard self-locking nut.



394-504

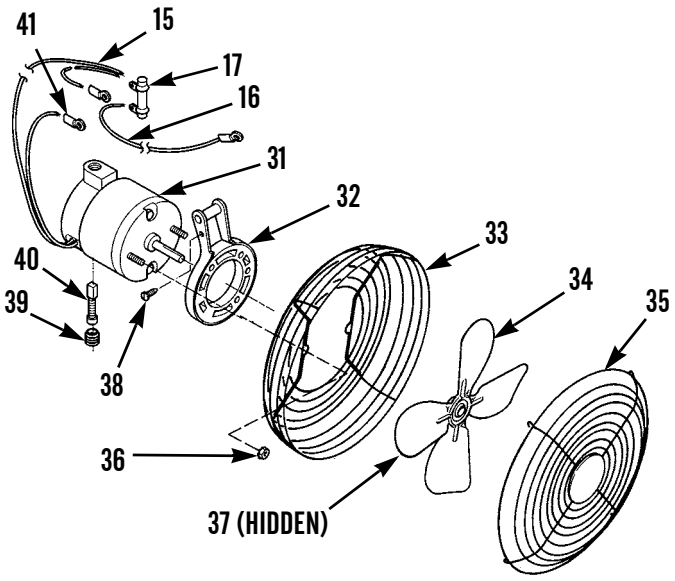
8. Remove outer fan guard (35) from inner fan guard (33) by detaching the four hooks on outer fan guard (35).
9. Remove setscrew (37) and fan impeller (34) from motor (31).
10. Remove tapping screw (38) and disconnect wire connector (41) from bracket (32).
11. Remove two nuts (36), inner fan guard (33) and bracket (32) from motor (31).
12. Remove two caps (39) and brushes (40) from motor (31).
13. Remove wire connectors (15 and 16) from resistor (17).



394-505

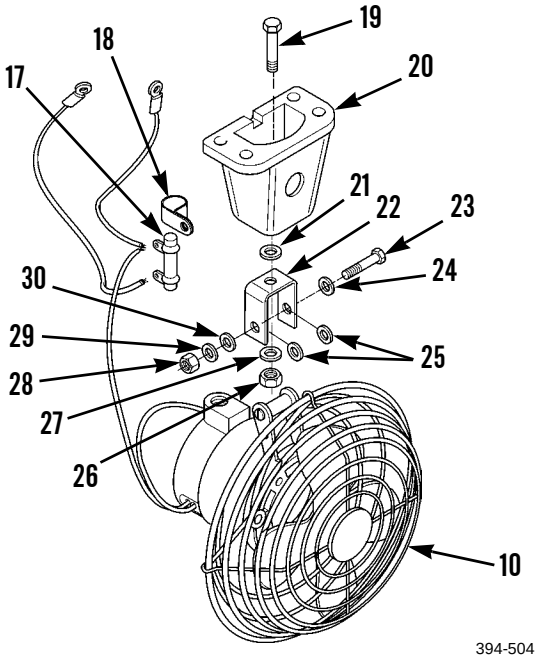
ASSEMBLY

1. Install wire connectors (16 and 15) to resistor (17).
2. Install two brushes (40) and caps (39) in motor (31).
3. Install bracket (32), inner fan guard (33) and two nuts (36) on motor (31).
4. Connect wire connector (41) and install tapping screw (38) on bracket (32).
5. Install fan impeller (34) and setscrew (37) on motor (31).
6. Attach outer fan guard (35) to inner fan guard (33) by using the hooks on outer fan guard (35).



394-505

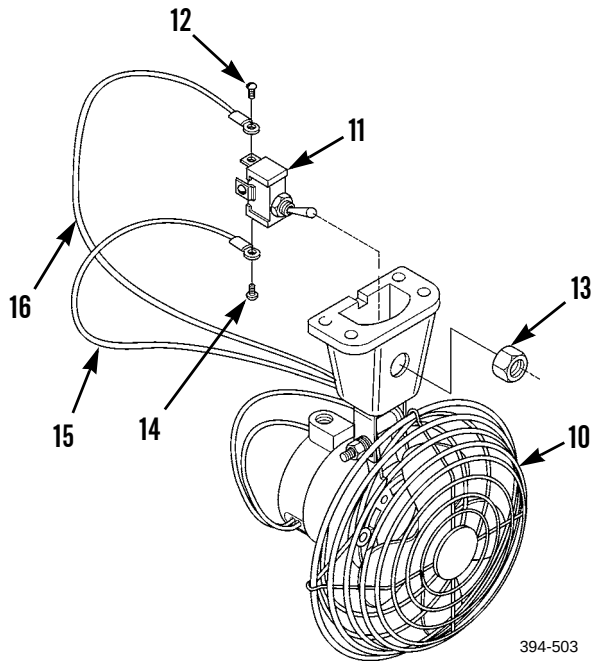
7. Install base (20), bolt (19), washer (21), retaining strap (22), washer (27) and new self-locking nut (26).
8. Position fan assembly (10) and align with holes in retaining strap (22).
9. Install washer (24), two washers (25) and bolt (23).
10. Install washer (30), resistor (17), clip (18), washer (29) and new self-locking nut (28) on retaining strap (22).



394-504

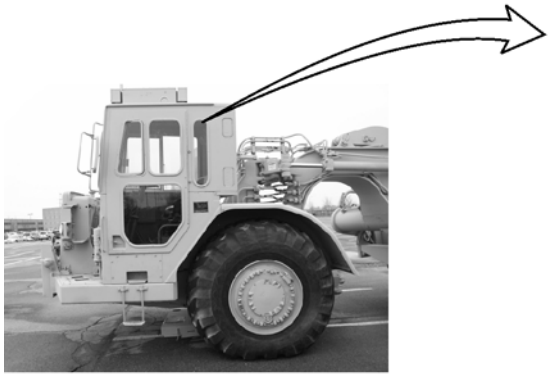
ASSEMBLY - CONTINUED

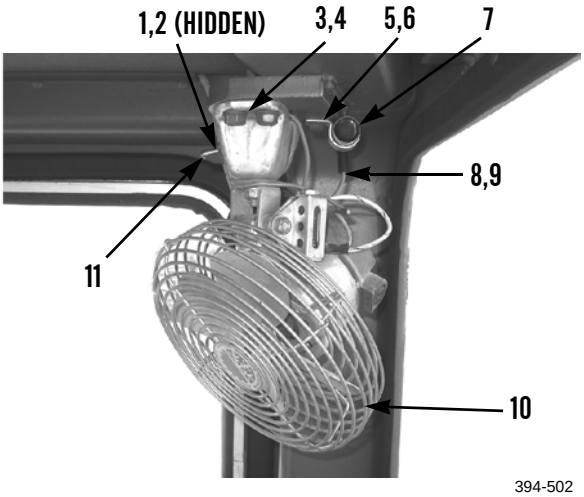
11. Connect wire connectors (15 and 16) to fan switch (11).
12. Install screws (12 and 14) in fan switch (11).
13. Position fan switch (11) in fan assembly (10) and install nut (13).



INSTALLATION

1. Position fan assembly (10) in operator compartment.
2. Connect wire assembly (2) and install screw (1) to switch (11).
3. Install four washers (4) and bolts (3) on fan assembly (10).
4. Install capacitor (7), new lockwasher (6) and capscrew (5).
5. Connect wire connector (9) and install screw (8) on capacitor (7).





6. Operate defroster fan to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

CONTROL CONSOLE ASSEMBLY REPLACEMENT 0222 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (4)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

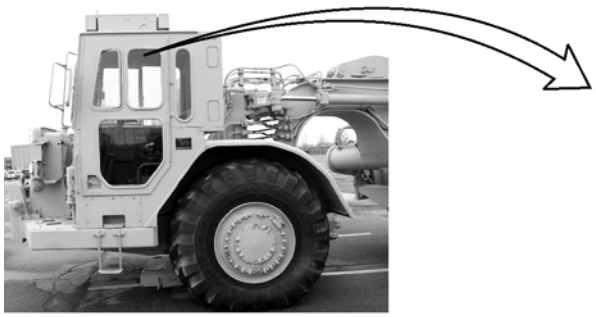
Bowl lowered to ground (TM 5-3805-248-10)

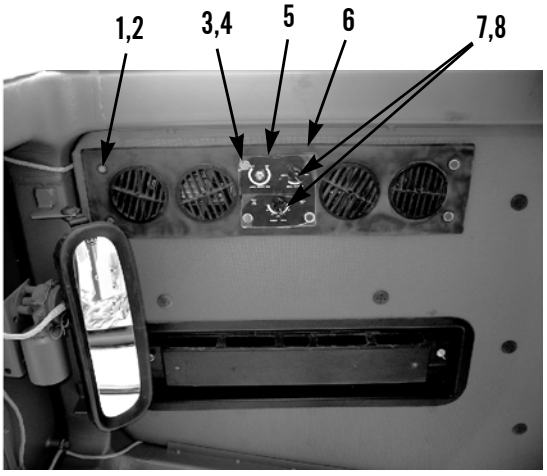
Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Remove four bolts (3) and washers (4) from plate (5).
2. Loosen two setscrews (8) and remove two knob assemblies (7).
3. Remove four bolts (1) and washers (2) from control console assembly (6).





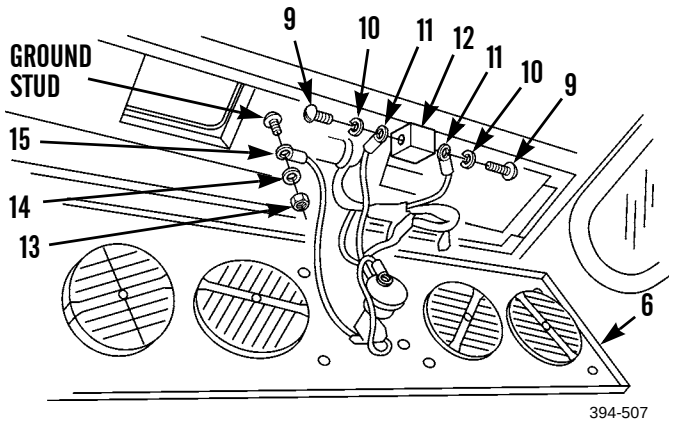
394-506

REMOVAL - CONTINUED

NOTE

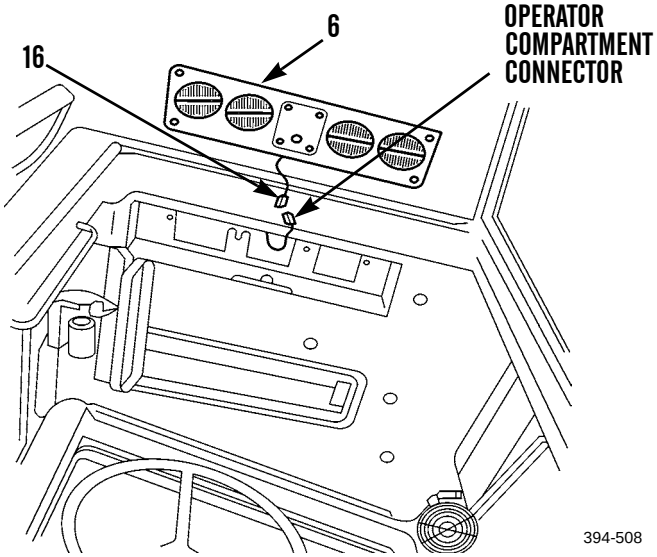
Tag wire assemblies prior to removal to ensure correct installation.

4. Lower control console assembly (6) and remove nut (13) and lockwasher (14) from ground stud. Discard lockwasher.
5. Disconnect wire assembly (15) from ground stud.
6. Remove two screws (9) and lockwashers (10) from breaker assembly (12). Discard lockwashers.
7. Disconnect two wire connectors (11) from breaker assembly (12).



394-507

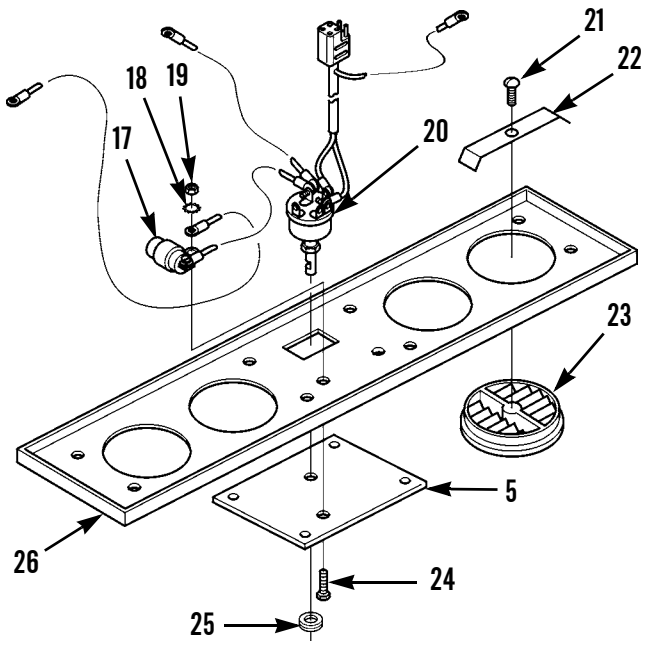
8. Disconnect wire connector (16) from operator compartment connector.
9. Remove control console assembly (6).



394-508

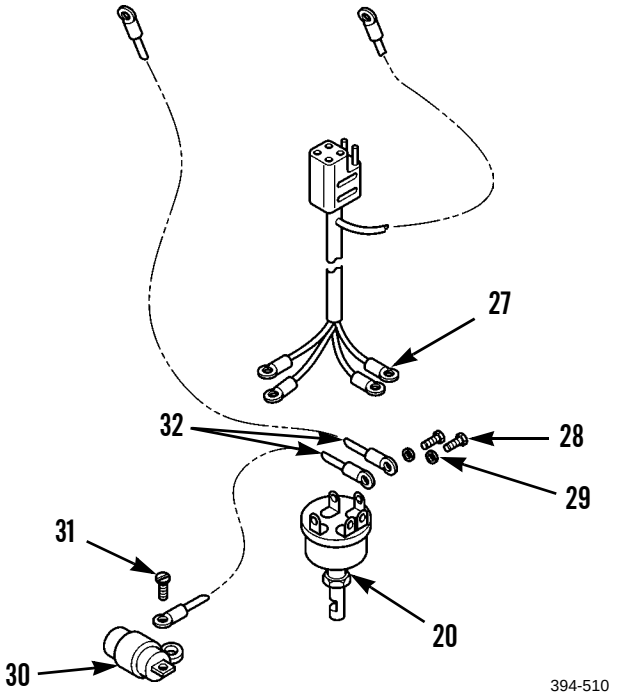
DISASSEMBLY

1. Remove nut (19), lockwasher (18) and screw (24) from cover (26). Discard lockwasher.
2. Remove nut (25), switch assembly (20), wire connector (17) and plate (5) from cover (26).
3. Remove four screws (21), retainers (22), louvers (23) from cover (26).



394-509

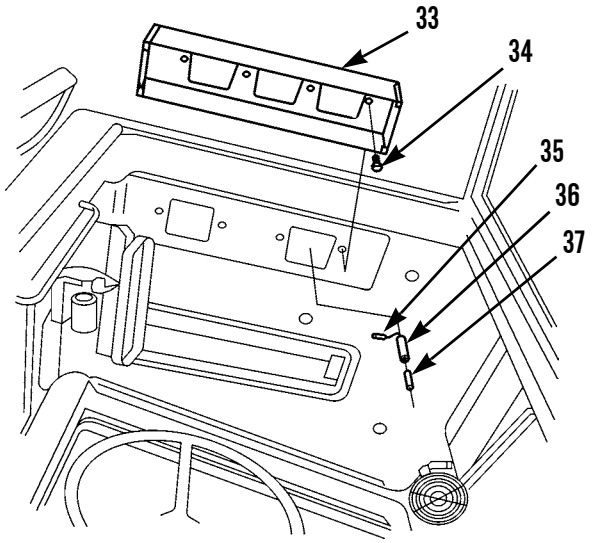
4. Remove five screws (28) and washers (29) from switch assembly (20).
5. Disconnect six wire connectors (32) from switch assembly (20).
6. Remove screw (31) and capacitor (30) from wire connector (32).



394-510

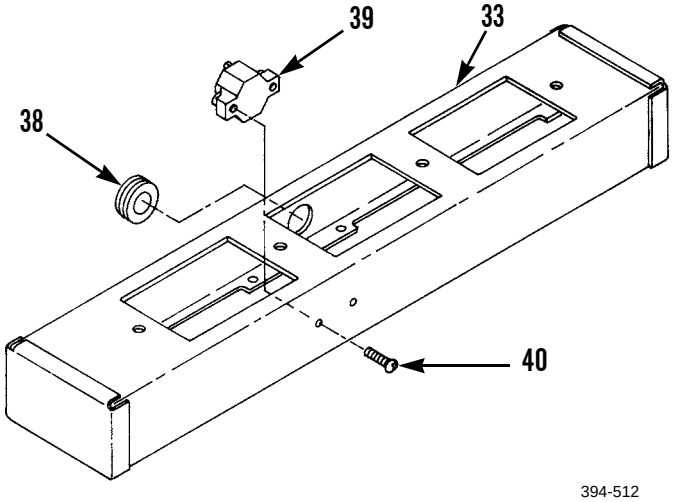
DISASSEMBLY - CONTINUED

7. Remove four nuts (34) from duct cover (33).
8. Remove duct cover assembly (33), two pins (35), rod (37) and sleeve (36).



394-511

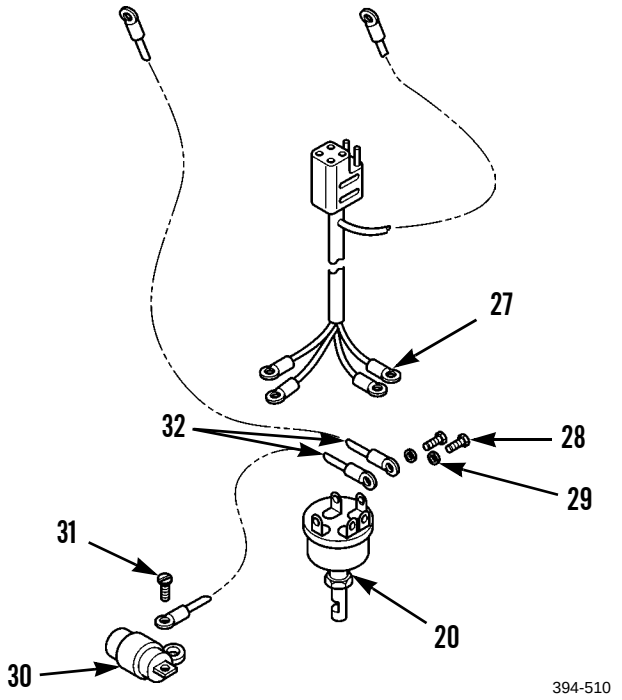
9. Remove two screws (40), breaker assembly (39) and grommet (38) from duct cover (33).



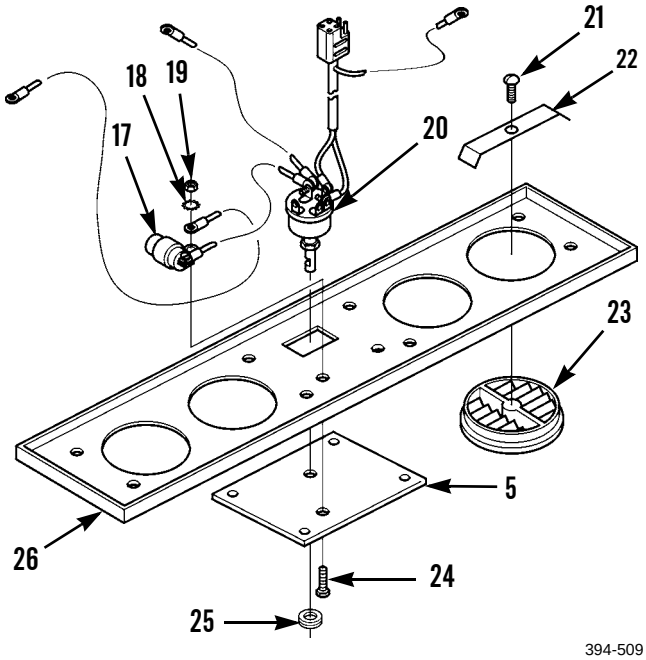
394-512

ASSEMBLY

1. Install grommet (38), breaker assembly (39) and two screws (40) in duct cover (33).
2. Install sleeve (36), rod (37) and two pins (35).
3. Position duct cover assembly (33) and install four nuts (34) on studs. Torque nuts to 12 lb-ft (16 Nm).
4. Connect wire assembly (32) on capacitor (30) and install screw (31).
5. Connect four wire assemblies (27) and two wire assemblies (32) to switch assembly (20).
6. Install five washers (29) and screws (28) on switch assembly (20).

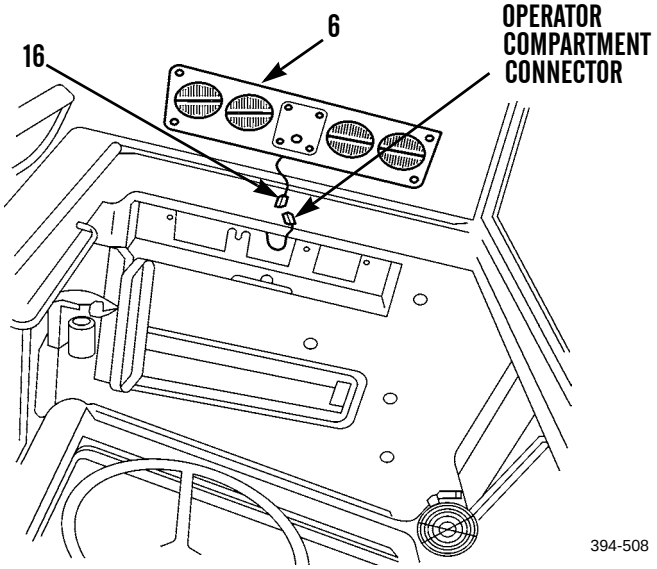


7. Install four louvers (23), retainers (22) and screws (21) on cover (26).
8. Install wire assembly (17), new lockwasher (18), nut (19), plate (5) and screw (24). Torque nut to 12 lb-ft (16 Nm).
9. Install switch assembly (20) and nut (25) on plate (5).

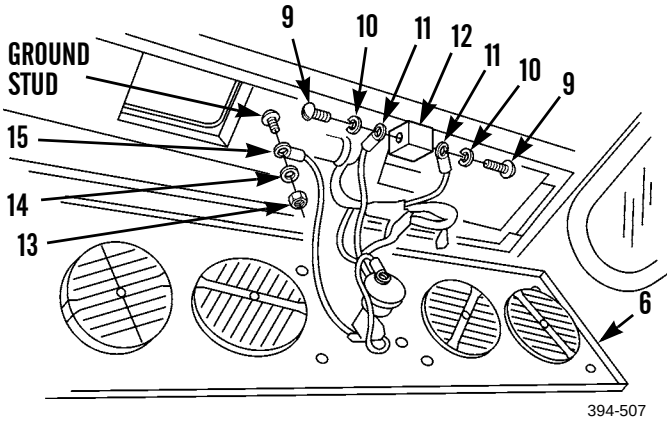


INSTALLATION

1. Connect harness connector (16) to operator compartment connector.

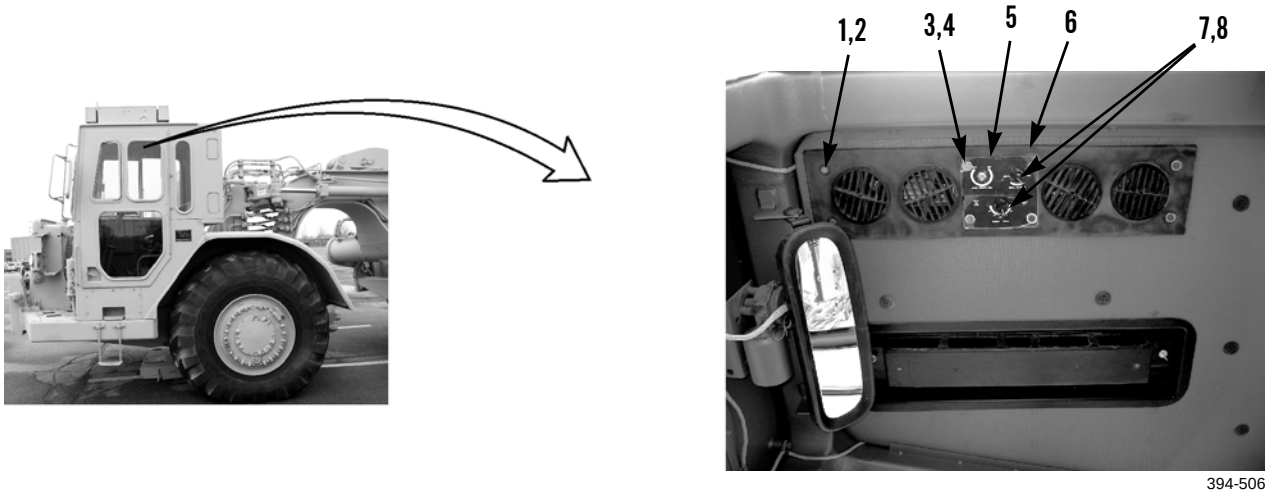


2. Connect two wire assemblies (11) to breaker assembly (12).
3. Install two new lockwashers (10) and screws (9) to breaker assembly (12).
4. Connect wire assembly (15) and install new lockwasher (14) and nut (13) to ground stud.



INSTALLATION - CONTINUED

5. Install control console assembly (6), four washers (2) and bolts (1). Torque bolts to 66 lb-in. (7 Nm).
6. Install two knob assemblies (7) and tighten setscrews (8).
7. Install four washers (4) and bolts (3) on plate (5).



394-506

8. Operate control console to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

AIR RETURN CONSOLE ASSEMBLY REPLACEMENT 0223 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

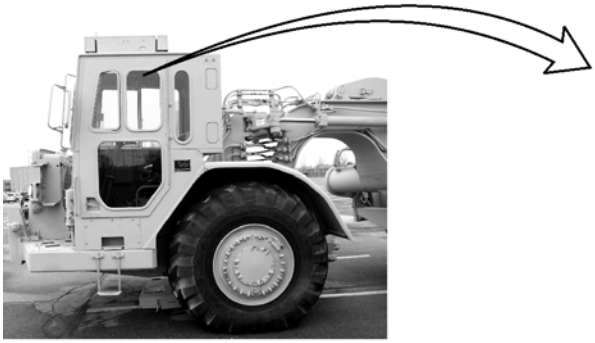
Bowl lowered to ground (TM 5-3805-248-10)

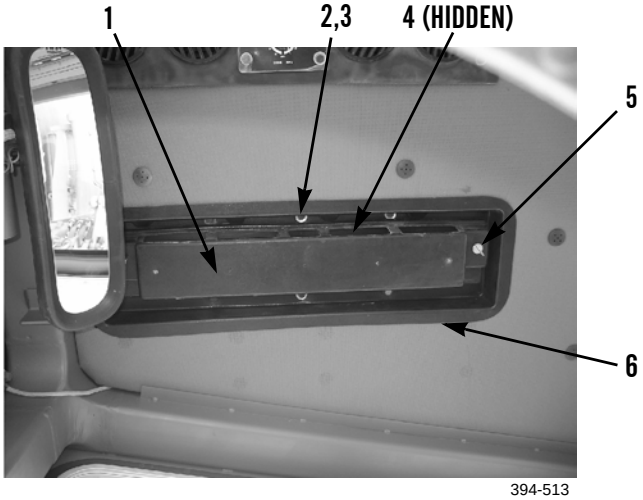
Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Loosen two thumbscrews (5) and remove cover (1).
2. Remove two filters (4) from cover assembly (6).
3. Remove six bolts (2) and washers (3) from cover assembly (6).
4. Remove cover assembly (6) from operator compartment.





394-513

INSTALLATION

1. Install cover assembly (6) in operator compartment.
2. Install six washers (3) and bolts (2). Tighten bolts to 66 lb-in. (7.4 Nm).
3. Install two filters (4) in cover assembly (6).
4. Install cover (1) and tighten two thumbscrews (5).

END OF WORK PACKAGE

HEATER ASSEMBLY REPLACEMENT 0224 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Bracket, link (Item 9, WP 0338 00)

Lifting device, 275 lb minimum capacity

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Sealant, silicone (Item 38, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

Seal (6)

References

WP 0042 00

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Interior rearview mirror removed (WP 0220 00)

Control console assembly removed (WP 0222 00)

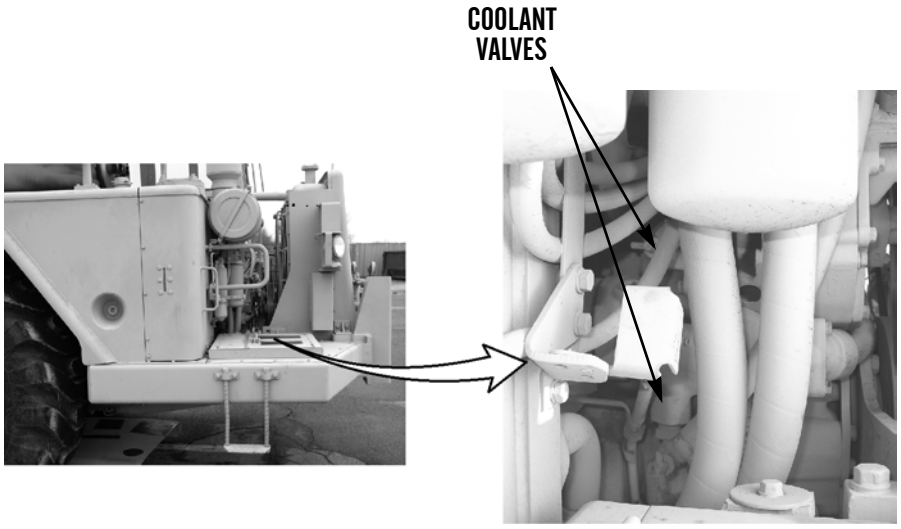
Air return console assembly removed (WP 0223 00)

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.

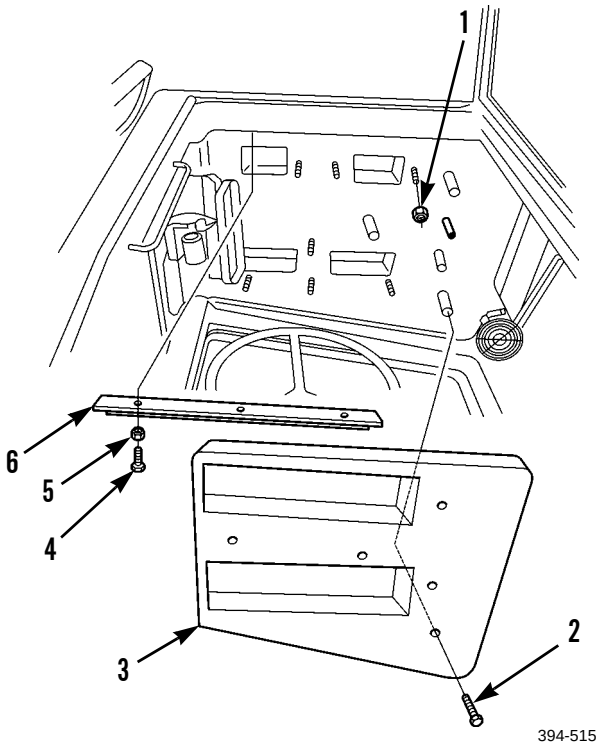
REMOVAL

1. Close two coolant valves on right side of engine compartment.



394-514

2. Remove three bolts (4), washers (5) and angle (6) from operator compartment ceiling.
3. Remove five plugs (2) and liner (3) from operator compartment ceiling.
4. Remove ten nuts (1) from operator compartment ceiling.



394-515

REMOVAL - CONTINUED

5. Install four lifting links on top of heater assembly (7).

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in injury or death.

NOTE

Weight of heater assembly is 175 lb (80 kg).

6. Install lifting device to four lifting links.
7. With assistance, use lifting device to lift heater assembly (7) approximately 12 in. (30 cm) above operator compartment.
8. If damaged, remove and discard two seals (8) and four seals (10) from underside of heater assembly (7).

WARNING

Immediately wipe up any spills. Failure to follow this warning may cause injury.

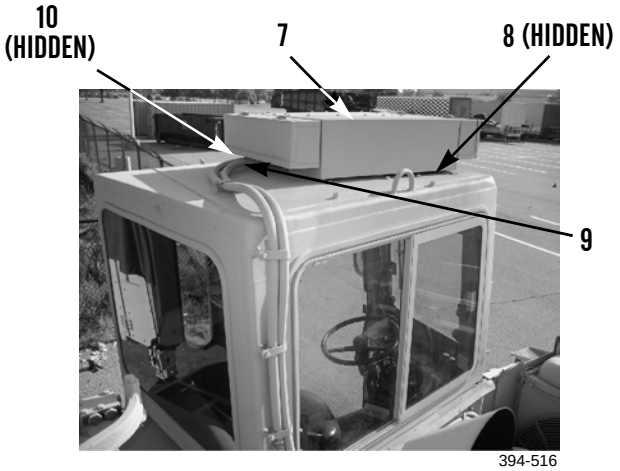
CAUTION

Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

NOTE

- Use a container to capture draining coolant. Dispose of coolant IAW local policy and ordinances.
- Tag hose assemblies prior to removal to ensure correct installation.

9. Disconnect two hose assemblies (9) from heater assembly (7).
10. Using lifting device, remove heater assembly (7).
11. Remove lifting device.
12. Remove lifting links from heater assembly (7).



394-516

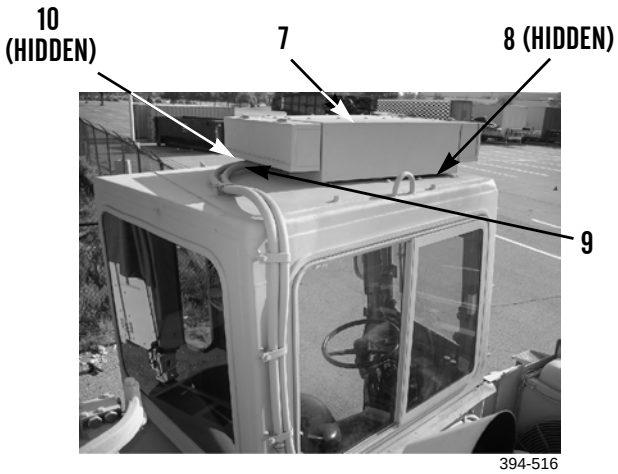
CLEANING AND INSPECTION

- Solvent cleaning MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install four lifting links on top of heater assembly (7).
2. Install lifting device to lifting links.
3. Apply silicone sealant and if removed, install four new seals (10) and two new seals (8) to underside of heater assembly (7).
4. Position heater assembly (7) approximately 12 in. (30 cm) above operator compartment.



394-516

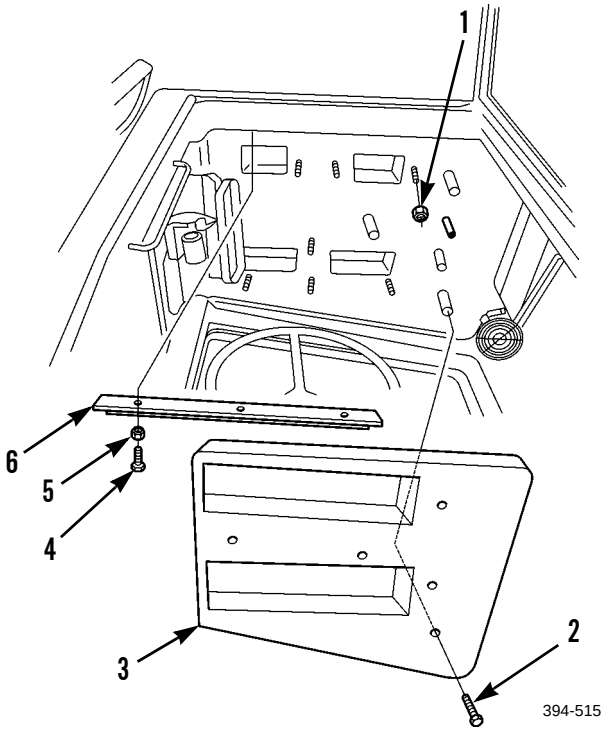
NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

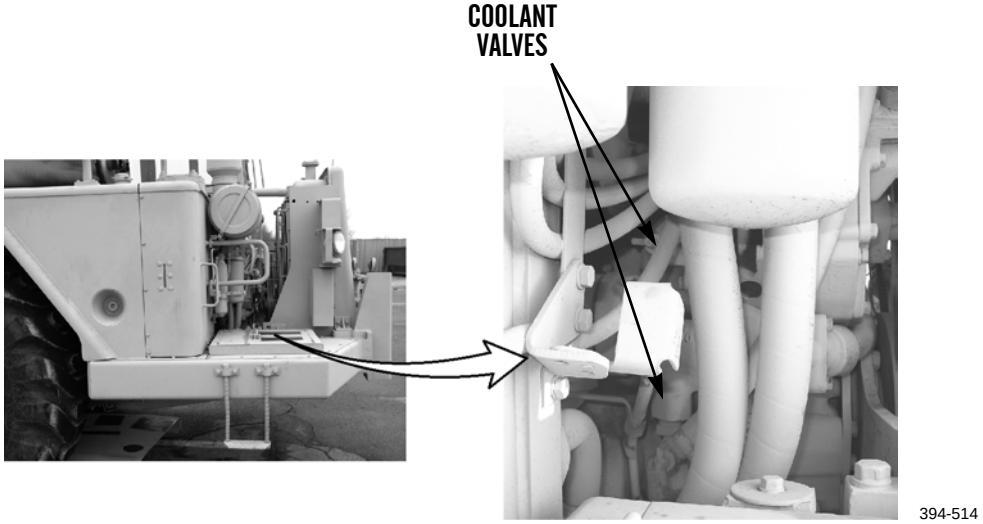
5. Connect two hose assemblies (9) to heater assembly (7).
6. Install heater assembly (7) on top of operator compartment.
7. Remove lifting device.
8. Remove four lifting links from heater assembly (7).

INSTALLATION - CONTINUED

9. Install ten nuts (1) and torque to 12 lb-ft (16 Nm).
10. Install liner (3) and five plugs (2) on operator compartment ceiling.
11. Install angle (6), three washers (5) and bolts (4) on operator compartment ceiling.



12. Open two coolant valves on right side of engine compartment.



13. Install control console assembly (WP 0222 00).
14. Install air return console assembly (WP 0223 00).
15. Refill cooling system (WP 0042 00).
16. Operate heater assembly and verify correct operation (TM 5-3805-248-10).
17. Install interior rearview mirror (WP 0220 00).

END OF WORK PACKAGE

HEATER ASSEMBLY AND AIR RETURN CONSOLE FILTERS REPLACEMENT 0225 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Four Filters

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

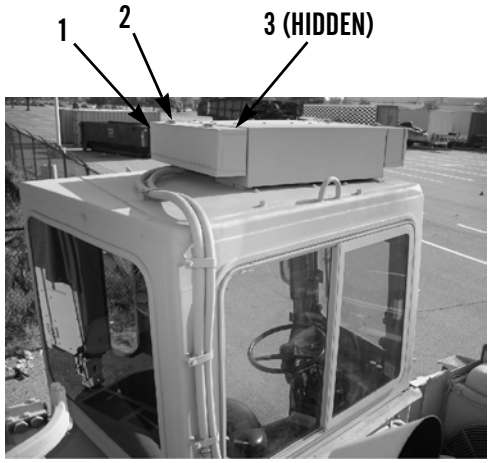
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

1. Open two latches (2) on each filter box (1).
2. Remove and discard two filters (3).

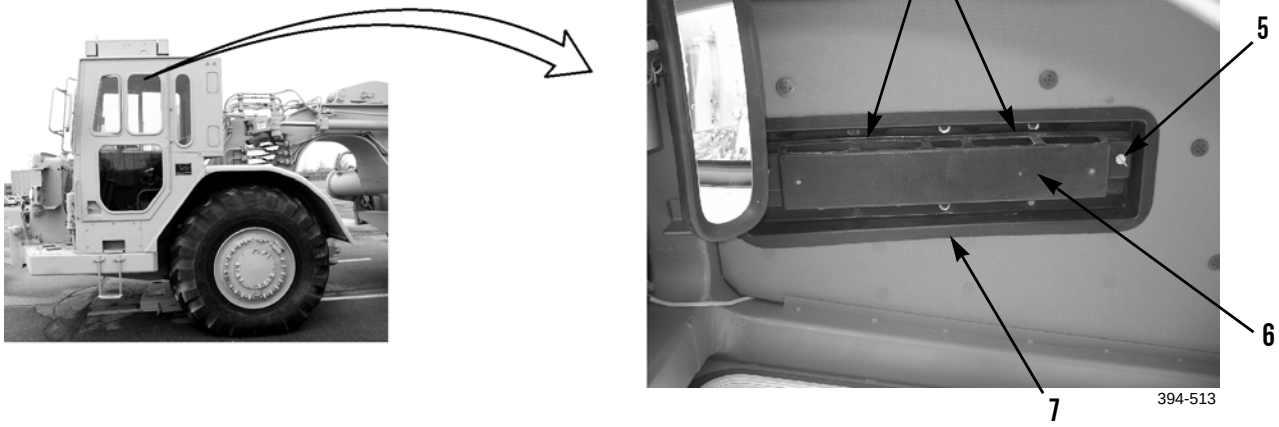


394-516

HEATER ASSEMBLY AND AIR RETURN CONSOLE FILTERS REPLACEMENT - CONTINUED 0225 00

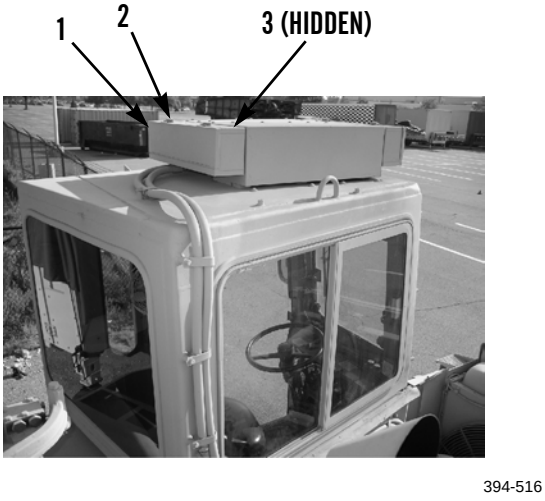
REMOVAL - CONTINUED

3. Loosen two thumbscrews (5) on operator compartment ceiling.
4. Remove access cover (6).
5. Remove two filters (4) from air return duct (7). Discard filters.



INSTALLATION

1. Install two new filters (4) in air return duct (7).
2. Install access cover (6).
3. Tighten two thumbscrews (5).
4. Install two new filters (3) in filter boxes (1).
5. Close two latches (2) on each filter box (1).



6. Operate heater assembly to verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

HEATER ASSEMBLY LINES AND FITTINGS REPLACEMENT 0226 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Tape, anti-seizing (Item 43, WP 0339 00)

References

WP 0042 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove and skin protection when handling coolants. Failure to do so may cause injury.

REMOVAL

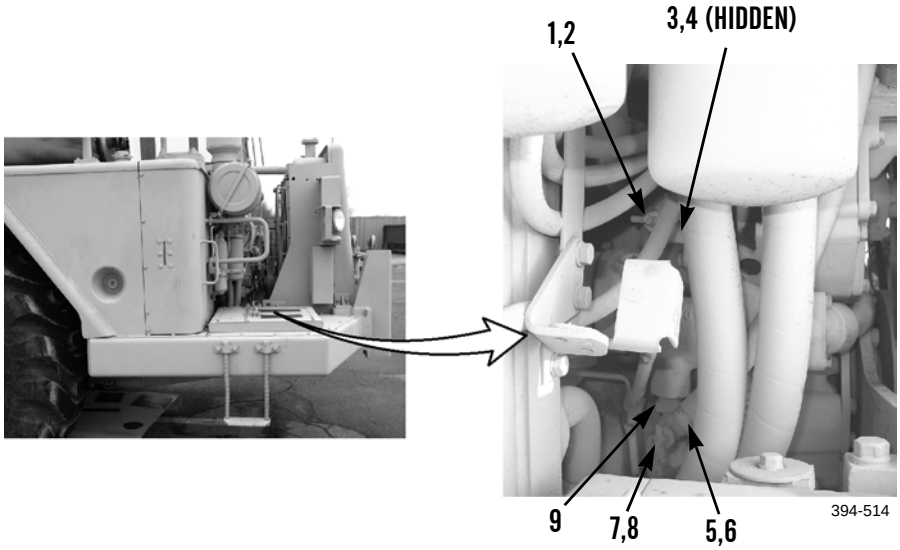
CAUTION

Wipe area clean around all connections to be opened during removal. Cap coolant lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

NOTE

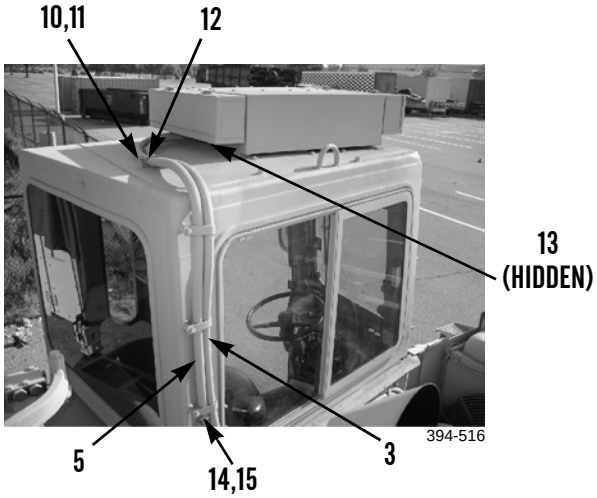
- Use container to capture draining coolant. Dispose of coolant IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of heater hose assemblies prior to removal to ensure correct installation.

1. Drain cooling system to level below coolant valves (1 and 7) (WP 0042 00).
2. Loosen two clamps (3 and 5) and slide up on hose assemblies (4 and 6).
3. Disconnect hose assemblies (4 and 6) from coolant valves (1 and 7).
4. Remove coolant valves (1 and 7).
5. Remove clamps (3 and 5) from hose assemblies (4 and 6).
6. Remove elbow (8) and bushings (2 and 9) from water pump cover.



REMOVAL - CONTINUED

7. Remove nine bolts (10), washers (11) and clamps (12).
8. Remove four clamps (14) and two spacers (15) from hose assemblies (4 and 6).
9. Remove two hose assemblies (4 and 6) from adapters (13).
10. Remove two adapters (13) from fittings on heater assembly.



INSTALLATION

NOTE

Apply anti-seizing tape half way up the threads of all hose and fitting connections prior to installation to ensure correct sealing.

1. Install two adapters (13) in hose assemblies (4 and 6).
2. Connect two adapters (13) on fittings on heater assembly.
3. Install two spacers (15) and four clamps (14) on hose assemblies (4 and 6).
4. Position hose assemblies (3 and 5) on machine.
5. Install nine clamps (12), washers (11) and bolts (10).
6. Install bushings (9 and 2) and elbow (8) in water pump cover.
7. Install coolant valves (1 and 7).
8. Position clamps (4 and 6) on hose assemblies (4 and 6).
9. Connect hose assemblies (3 and 5) on coolant valves (1 and 7).
10. Tighten clamps (4 and 6) on hose assemblies (4 and 6).
11. Refill coolant (WP 0042 00).
12. Start engine (TM 5-3805-248-10).
13. Operate heater assembly to verify correct operation (TM 5-3805-248-10).
14. Check hose assemblies and fittings for leaks.
15. Shut down engine (TM 5-3805-248-10).

END OF WORK PACKAGE

INSTRUCTION AND DATA PLATES REPLACEMENT 0227 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Data plate

Screw, drive (4)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

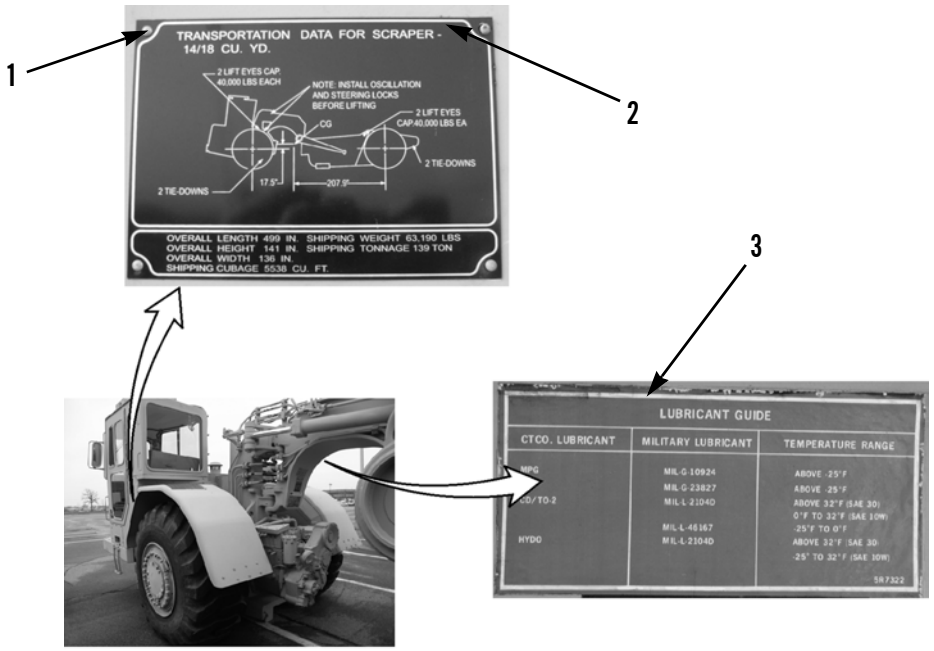
Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

NOTE

The following is a maintenance procedure for a drive screw mounted data plate and a self-adhesive mounted label. The maintenance procedure for all other data plates is identical.

1. Remove four drive screws (1) and transportation data plate (2) from left side of machine.
2. Using a heavy duty scraper, remove and discard lubrication label (3).



394-517

CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all adhesive from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.

INSTALLATION

NOTE

When installing lubrication label, partially remove backing along one edge and attach to machine. While moving across lubrication label, peel off backing and attach to machine. Continue until lubrication label is completely attached.

1. Install new lubrication label (3).
2. Install transportation data plate (2) and four new drive screws (1).

END OF WORK PACKAGE

BOWL LIFTING CHECK VALVE ASSEMBLY REPLACEMENT 0228 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (7)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic pressure vented (WP 0231 00)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

Wipe area clean around all connections to be opened during removal. Cap hydraulic lines and plug openings after removing lines. Contamination of cooling system could result in premature failure.

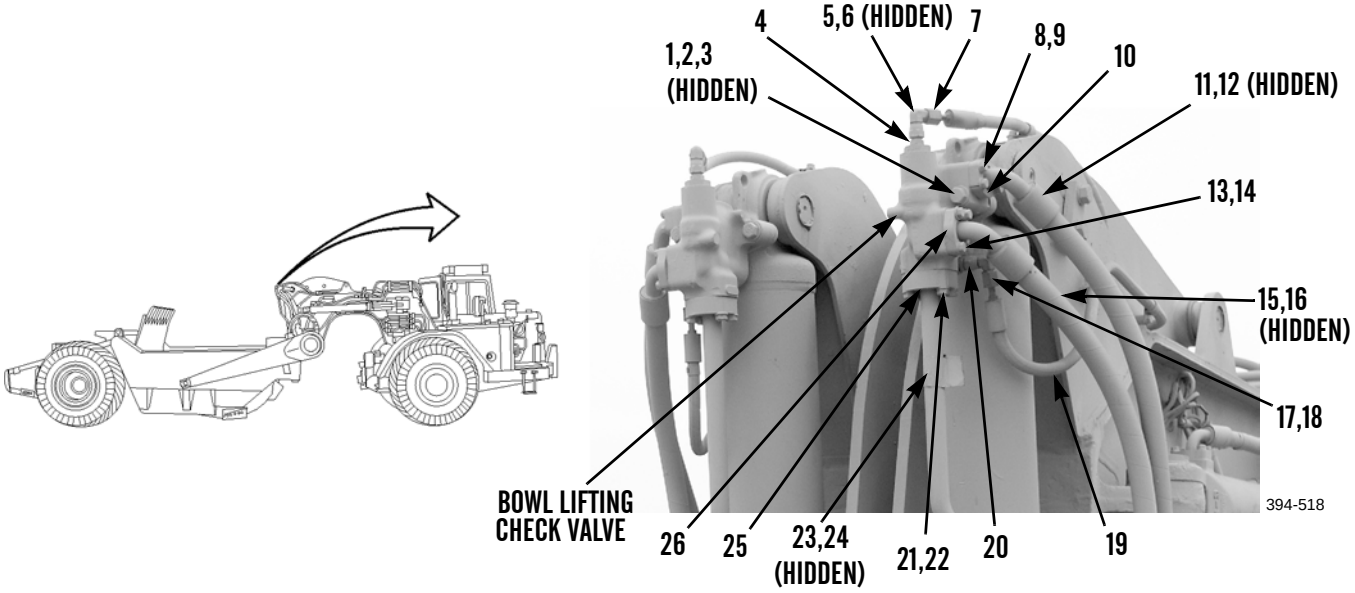
Hydraulic pressure vented (WP 0231 00).

REMOVAL - CONTINUED

NOTE

- Use container to capture draining hydraulic oil. Dispose of coolant IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- With engine shut down, operate bowl control lever to ensure pressure is vented from hydraulic system (TM 5-3805-248-10).

3. Disconnect hose assembly (7) from elbow (5).
4. Remove elbow (5), preformed packing (6) and connector (4) from bowl lifting check valve. Discard preformed packing.
5. Remove four bolts (8), washers (9) and two flange halves (10).
6. Disconnect hose assembly (11).
7. Remove preformed packing (12) and discard.
8. Remove four bolts (13), washers (14) and two flange halves (26).
9. Disconnect hose assembly (15).
10. Remove preformed packing (16) and discard.
11. Remove four bolts (21), washers (22) and two flange halves (25).
12. Disconnect tube assembly (23).
13. Remove preformed packing (24) and discard.
14. Disconnect hose assembly (19).
15. Remove elbow (17), preformed packing (18) and connector (20). Discard preformed packing.
16. Remove two bolts (1) and washers (2).
17. Remove bowl lifting check valve.
18. Remove and discard two preformed packings (3).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install two new preformed packings (3).
2. Install bowl lifting check valve.
3. Install two washers (2) and bolts (1).
4. Install connector (20), new preformed packing (18) and elbow (17).
5. Connect hose assembly (19).
6. Install new preformed packing (24).
7. Connect tube assembly (23).
8. Install two flange halves (25), four washers (22) and bolts (21).
9. Install new preformed packing (16).
10. Connect hose assembly (15).
11. Install two flange halves (26), four washers (14) and bolts (13).
12. Install new preformed packing (12).
13. Connect hose assembly (11).
14. Install two flange halves (10), four washers (9) and bolts (8).
15. Install connector (4), new preformed packing (6) and elbow (5).
16. Connect hose assembly (7).

INSTALLATION - CONTINUED

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the machine. Failure to follow this warning may cause injury.

17. Start engine (TM 5-3805-248-10).
18. Operate hydraulic bowl controls. Move each system through at least five full movements of travel to bleed air out of the system (TM 5-3805-248-10).
19. Shut down engine (TM 5-3805-248-10).
20. Refill hydraulic tank to proper level (TM 5-3805-248-10). Maintain level between ADD and FULL marks.
21. Inspect hose assemblies, tube assemblies and connections for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

HYDRAULIC TANK MAINTENANCE 0229 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

Drain and Fill

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Filter element (2)

Lockwasher (4)

Packing, preformed

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

REMOVAL

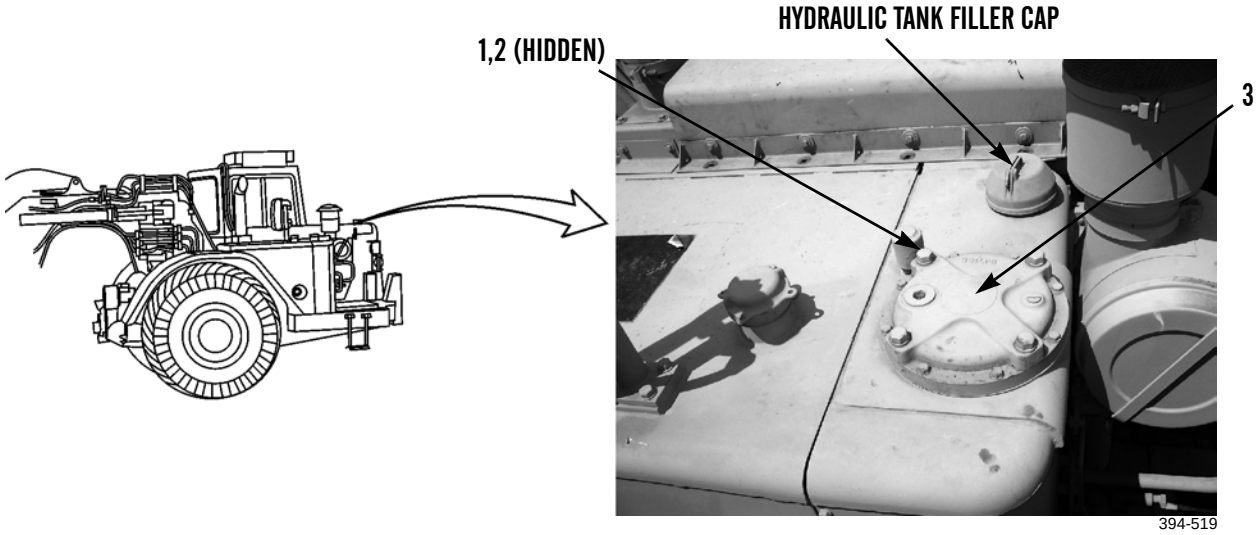
WARNING

Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.

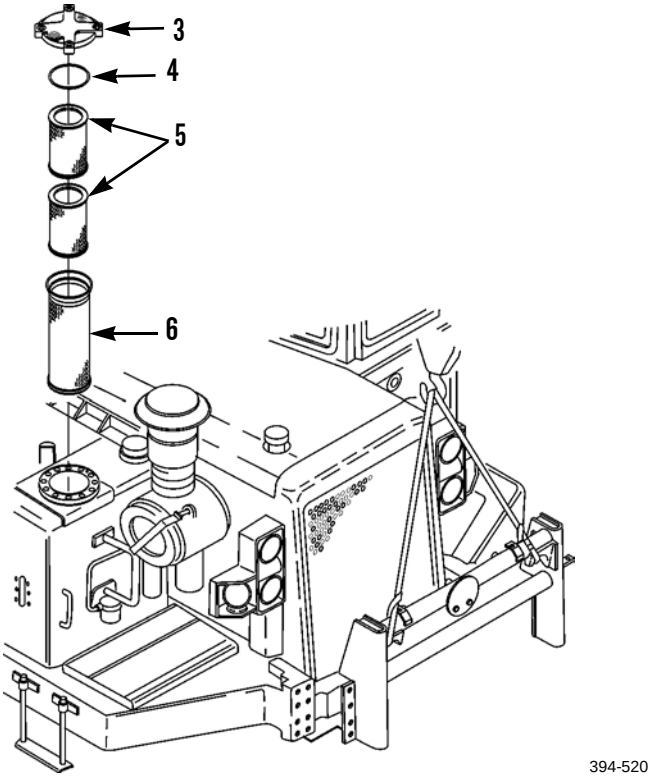
1. Remove hydraulic tank filler cap (WP 0231 00).

REMOVAL - CONTINUED

2. Remove four capscrews (1) and lockwashers (2) from cover (3).
3. Remove cover (3).



4. Remove and discard preformed packing (4).
5. Remove two filter elements (5) and screen assembly (6). Discard two filter elements (5).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

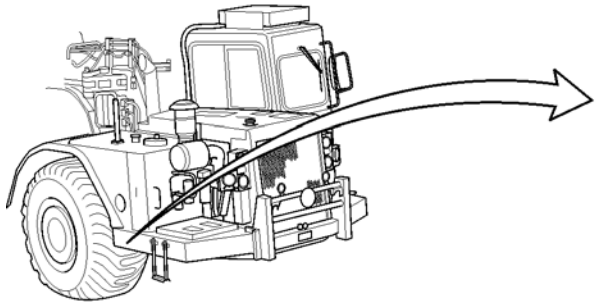
1. Install screen assembly (6) and two new filter elements (5).
2. Apply hydraulic fluid to new preformed packing (4) and install.
3. Install cover (3).
4. Install four new lockwashers (2) and capscrews (1) on cover (3).
5. Install hydraulic tank filler cap (WP 0231 00).
6. Start engine (TM 5-3805-248-10).
7. Operate at low idle to fill filters and check for leaks.
8. Shut down engine (TM 5-3805-248-10).
9. Inspect hydraulic tank sight gage. Maintain level between ADD and FULL marks (TM 5-3805-248-10).

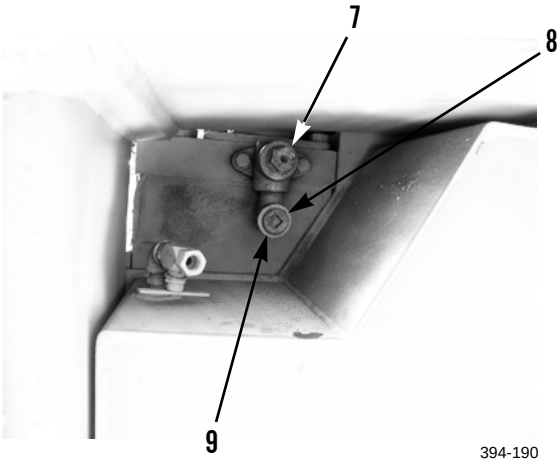
DRAIN AND FILL

NOTE

- Use container to capture draining oil. Dispose of oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tank holds 29 gallons (110 liters).

1. Remove plug (8) from valve assembly (9).
2. Turn nut (7) to open valve assembly (9).
3. Allow oil to drain completely.
4. Turn nut (7) to close valve assembly (9).
5. Install plug (8) in valve assembly (9).
6. Fill tank to between ADD and FULL marks on sight gage.
7. Inspect for leaks around valve assembly (9).





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END OF WORK PACKAGE

BREAKER RELIEF VALVE ASSEMBLY REPLACEMENT 0230 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

Equipment Condition

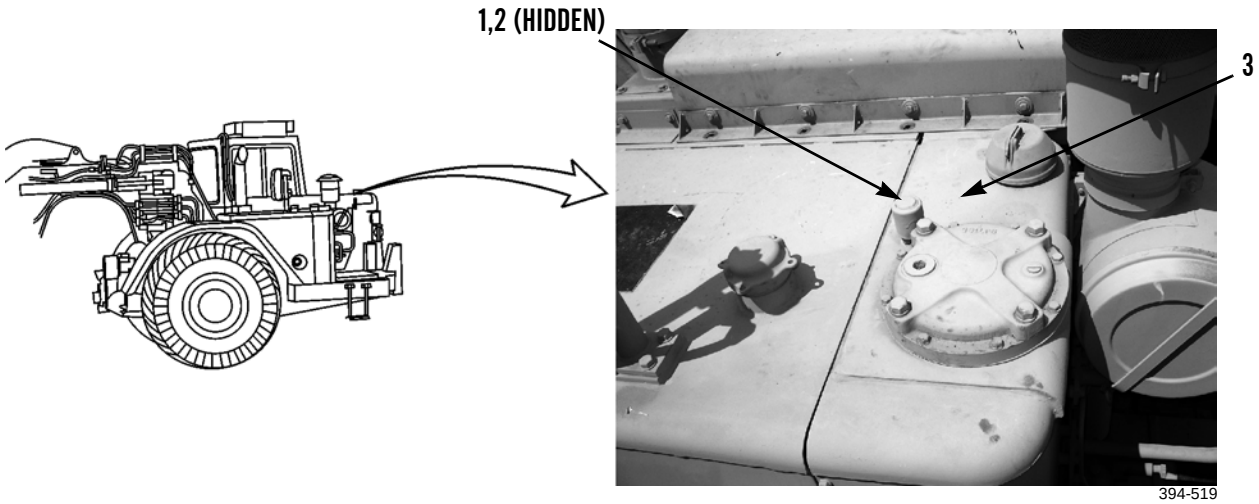
Hydraulic system pressure relieved (WP 0231 00)

REMOVAL

WARNING

Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.

1. Remove relief valve assembly (1) from hydraulic tank (3).
2. Remove and discard preformed packing (2).



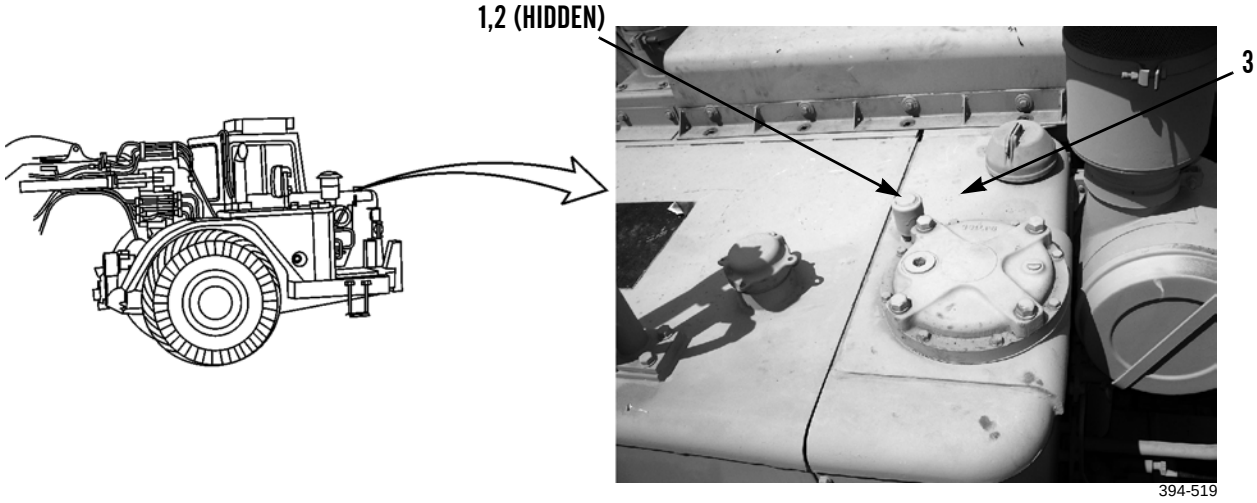
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new preformed packing (2).
2. Install relief valve assembly (1) on hydraulic tank (3).



END OF WORK PACKAGE

HYDRAULIC TANK FILLER CAP AND STRAINER ASSEMBLY REPLACEMENT 0231 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Gasket

References

WP 0017 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

WARNING

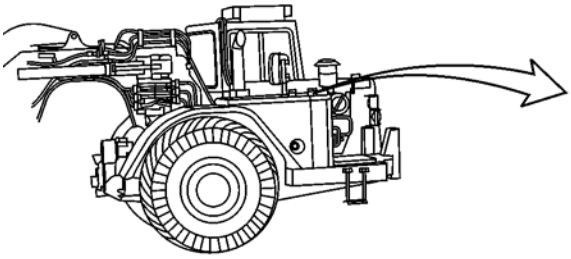
Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.

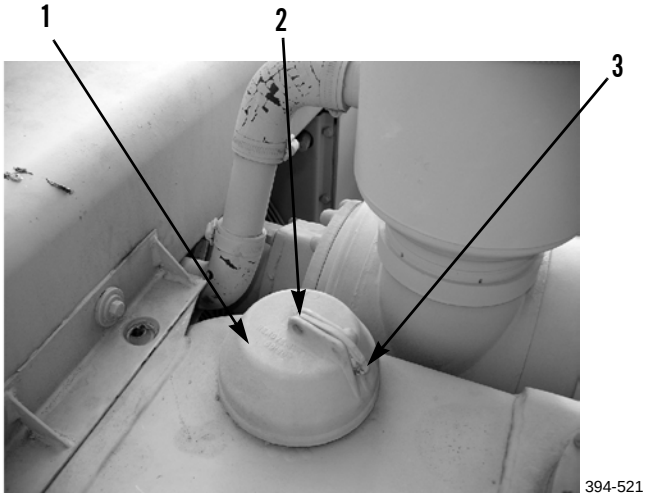
1. Relieve hydraulic pressure (WP 0017 00).

HYDRAULIC TANK FILLER CAP AND STRAINER ASSEMBLY REPLACEMENT - CONTINUED 0231 00

REMOVAL - CONTINUED

2. Raise lever (3) and slowly unscrew filler cap (1) assembly to relieve any pressure in hydraulic tank.
3. Remove filler cap (1) assembly from hydraulic tank.
4. Remove pin (2) and lever (3) from filler cap (1) assembly.





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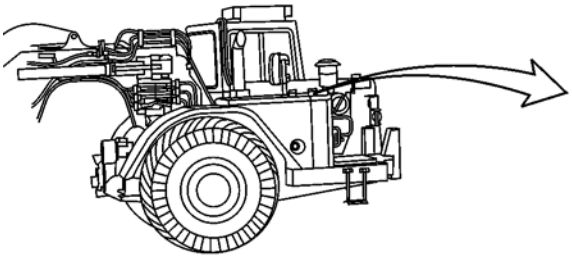
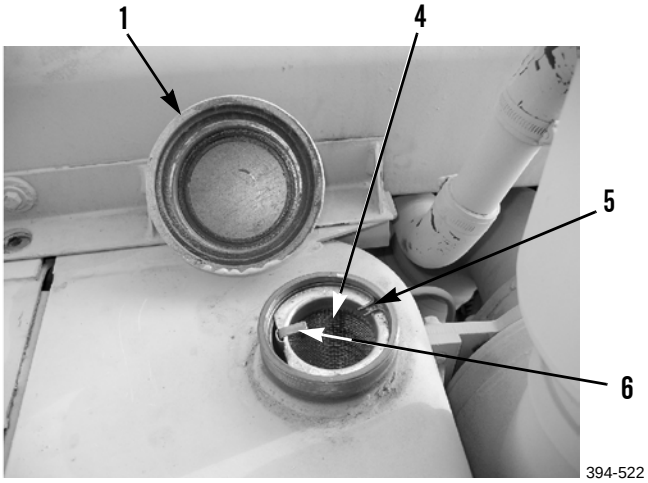
5. Remove plunger (6) and retaining ring (5) from hydraulic tank.
6. Remove strainer assembly (4).





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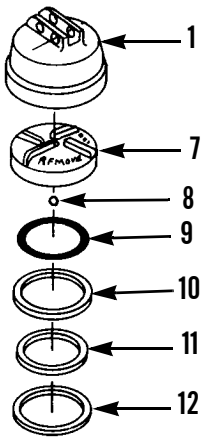
REMOVAL - CONTINUED

7. Remove retaining ring (12) and ring spacer (11) from filler cap (1).
8. Remove gasket (10) and access cover (9). Discard gasket.
9. Remove ball (8) and cap (7) from filler cap (1).



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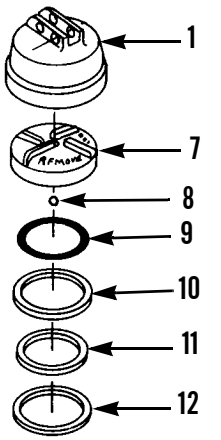
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all gasket material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install cap (7) and ball (8) in filler cap (1).
2. Install access cover (9) and new gasket (10).
3. Install ring spacer (11) and retaining ring (12).



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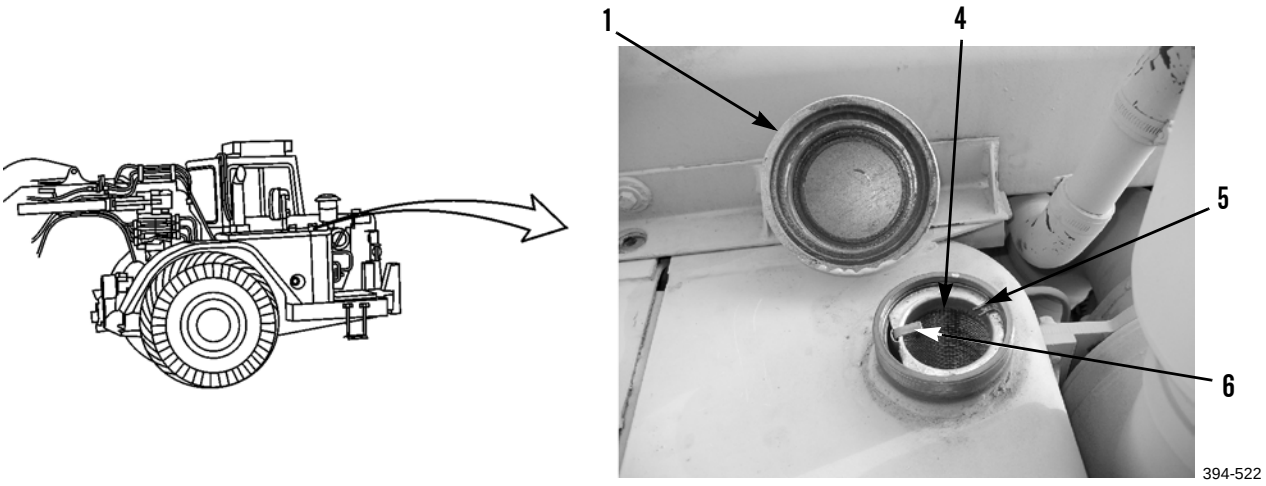
4. Install strainer assembly (4) in hydraulic tank.
5. Install retaining ring (5) and plunger (6).
6. Install filler cap (1) assembly on hydraulic tank.



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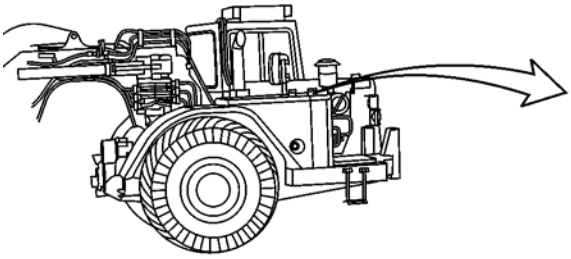
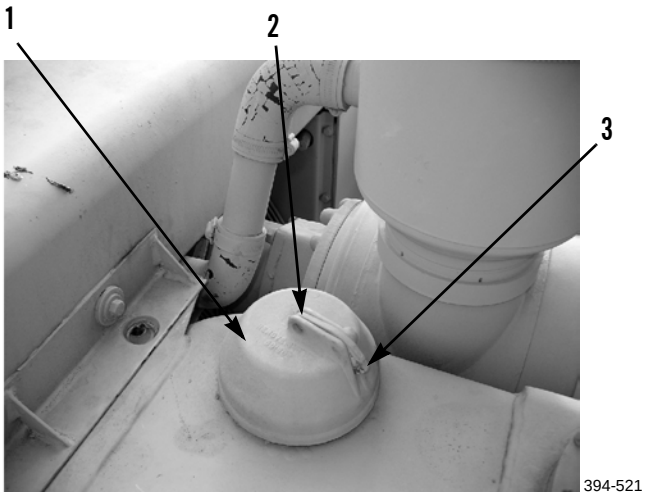
INSTALLATION - CONTINUED

7. Install lever (3) and dowel (2) on filler cap (1) assembly.
8. Raise lever (3) and tighten filler cap (1) assembly.
9. Lower lever (3) on filler cap (1) assembly.





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END OF WORK PACKAGE

HYDRAULIC CONTROL VALVE HOSES, LINES AND FITTINGS REPLACEMENT 0232 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed

References

TM 5 3805-248-10

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

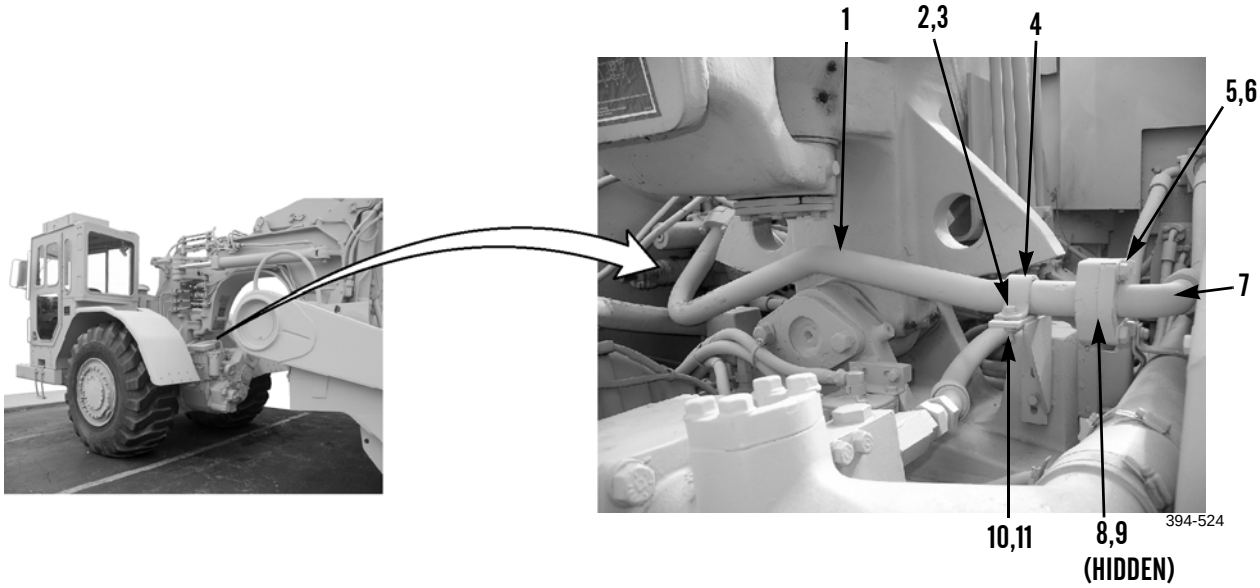
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removing lines. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

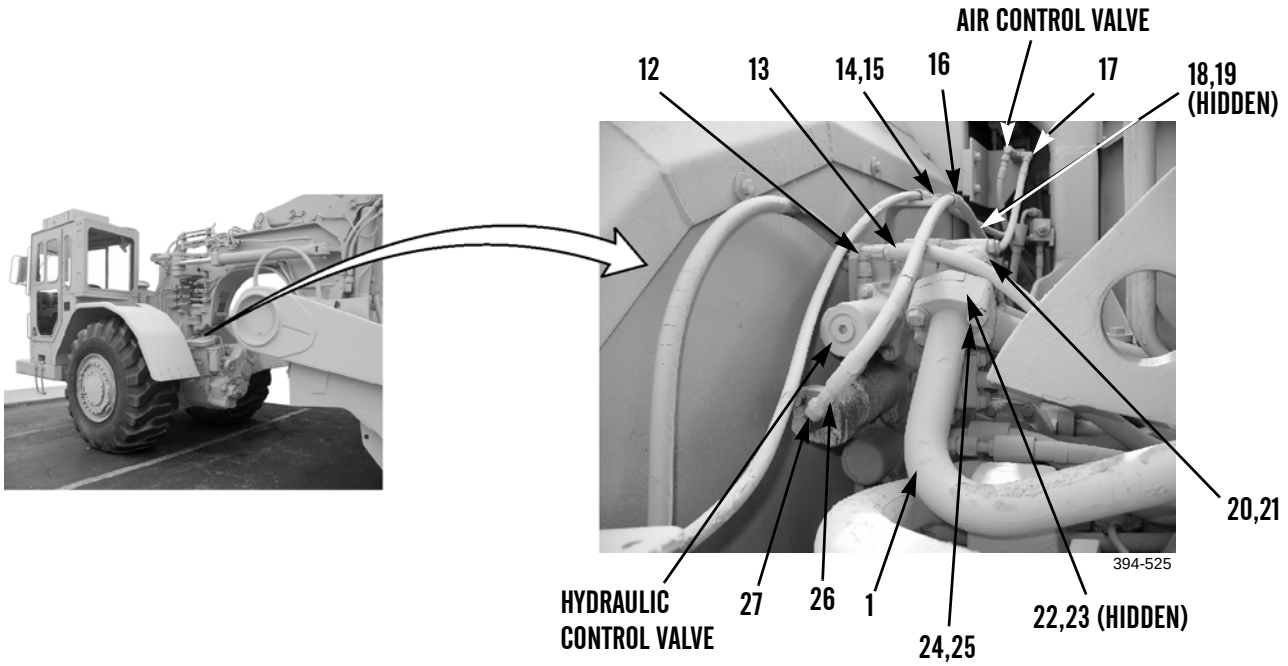
- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Only remove connectors, adapters or elbows if they are damaged.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Note location of any straps, ties or guards prior to removal to ensure correct installation.

1. Remove nut (10), washer (11), bolt (2), washer (3) and clamp (4) from hose assembly (1).
2. Remove four bolts (5), washers (6) and two flange halves (8) from hose assembly (1).
3. Disconnect hose assembly (1) from hose assembly (7) and remove preformed packing (9). Discard preformed packing.

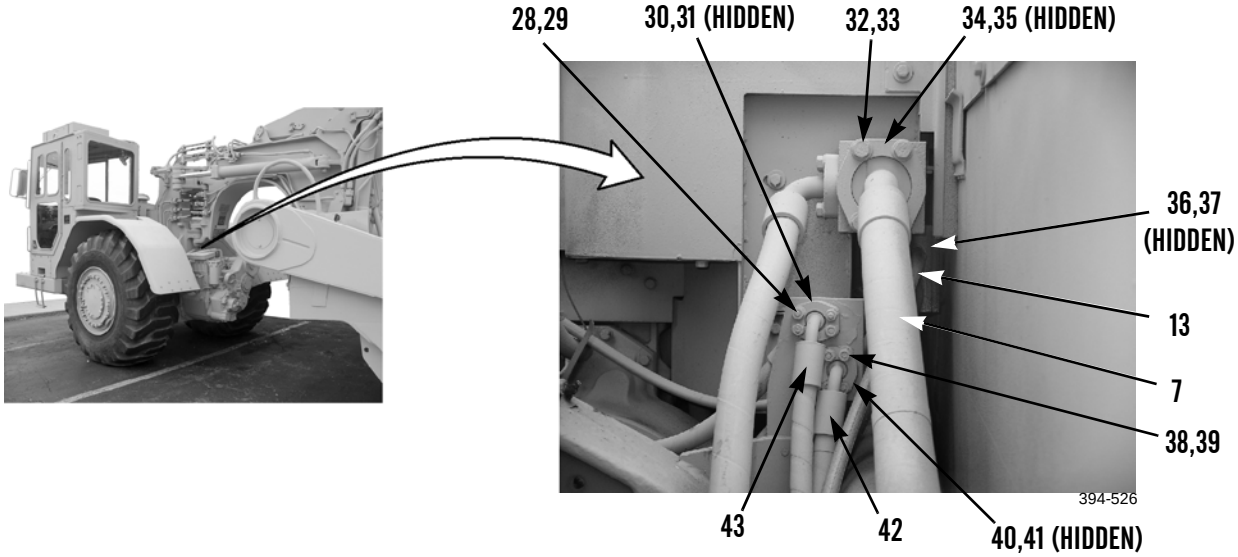


4. Remove four capscrews (24), washers (25) and two flange halves (22) from hose assembly (1).
5. Remove hose assembly (1) and preformed packing (23) from adapter (18). Discard preformed packing.
6. Remove four capscrews (20) and washers (21) from adapter (18).
7. Remove adapter (18) and preformed packing (19). Discard preformed packing.
8. Disconnect hose assembly (26) from elbow (27) and remove elbow (27) from hydraulic control valve.
9. Remove bolt (14), washer (15) and clamp (16) from hose assembly (26).
10. Remove hose assembly (26) from elbow (17) and remove elbow (17) from air control valve.
11. Disconnect hose assembly (13) from elbow (12) and remove elbow (12) from hydraulic control valve.

REMOVAL - CONTINUED



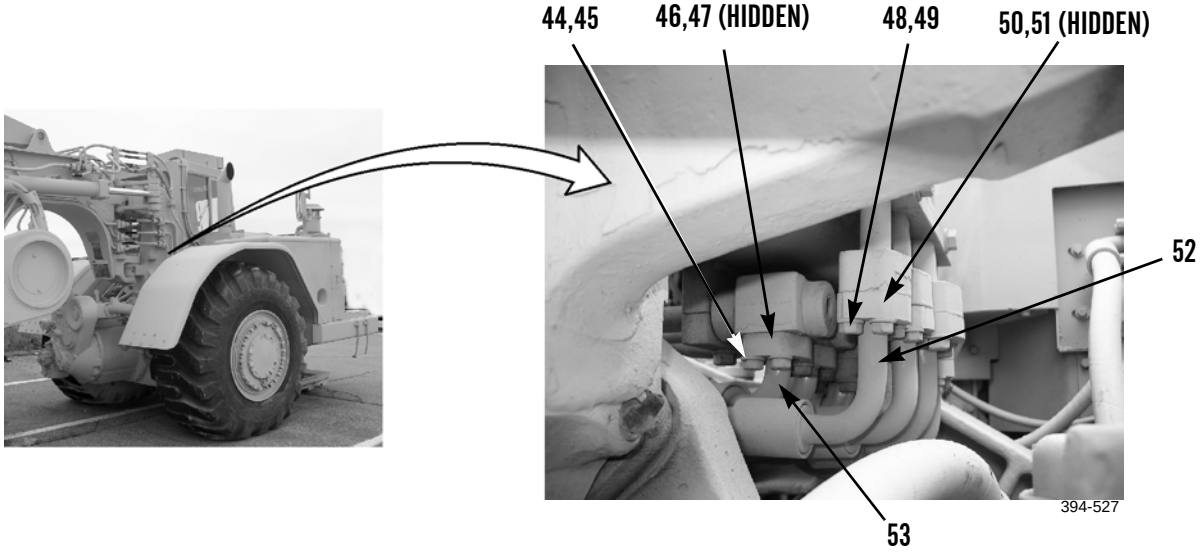
12. Remove four nuts (28), washers (29) and two flange halves (30) from bracket on fuel tank.
13. Disconnect hose assembly (43) and remove preformed packing (31). Discard preformed packing.
14. Remove four nuts (38), washers (39) and two flange halves (40) from hose assembly.
15. Disconnect hose assembly (42) and remove preformed packing (41). Discard preformed packing.
16. Remove four capscrews (32), washers (33) and two flange halves (34).
17. Remove hose assembly (7) and preformed packing (35). Discard preformed packing.
18. Remove hose assembly (13), adapter (36) and preformed packing (37). Discard preformed packing.



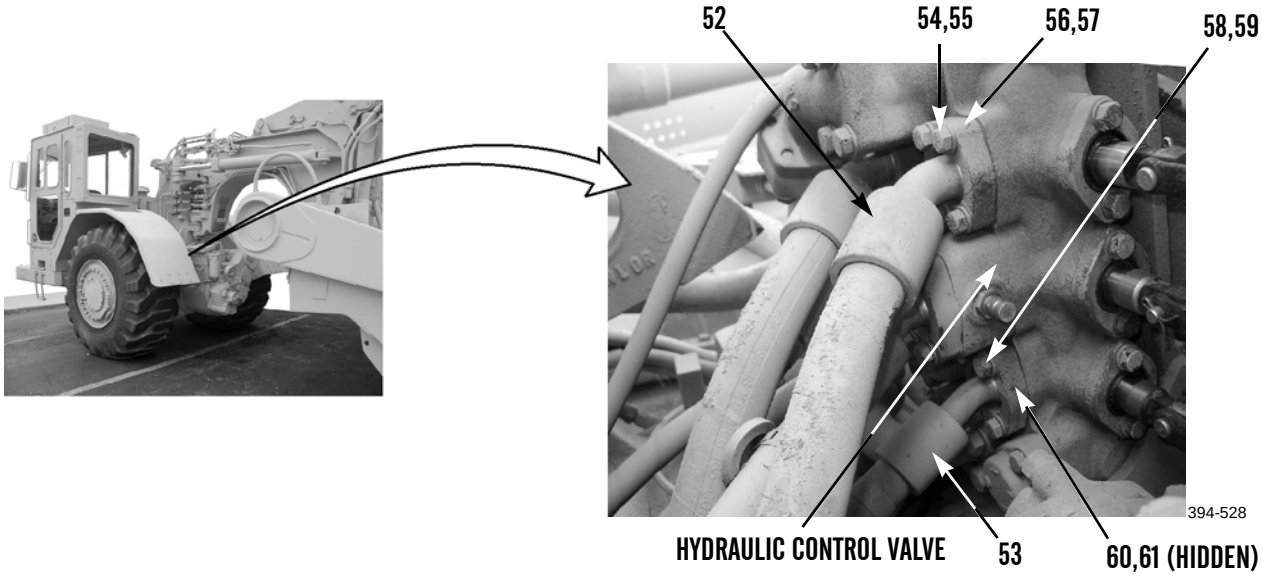
HYDRAULIC CONTROL VALVE HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0232 00

REMOVAL - CONTINUED

19. Remove twelve capscrews (48), washers (49) and six flange halves (50) from three hose assemblies (52).
20. Disconnect three hose assemblies (52) and remove preformed packings (51). Discard preformed packings.
21. Remove twelve capscrews (44), washers (45) and six flange halves (46) from three hose assemblies (53).
22. Disconnect three hose assemblies (53) and remove preformed packings (47). Discard preformed packings.

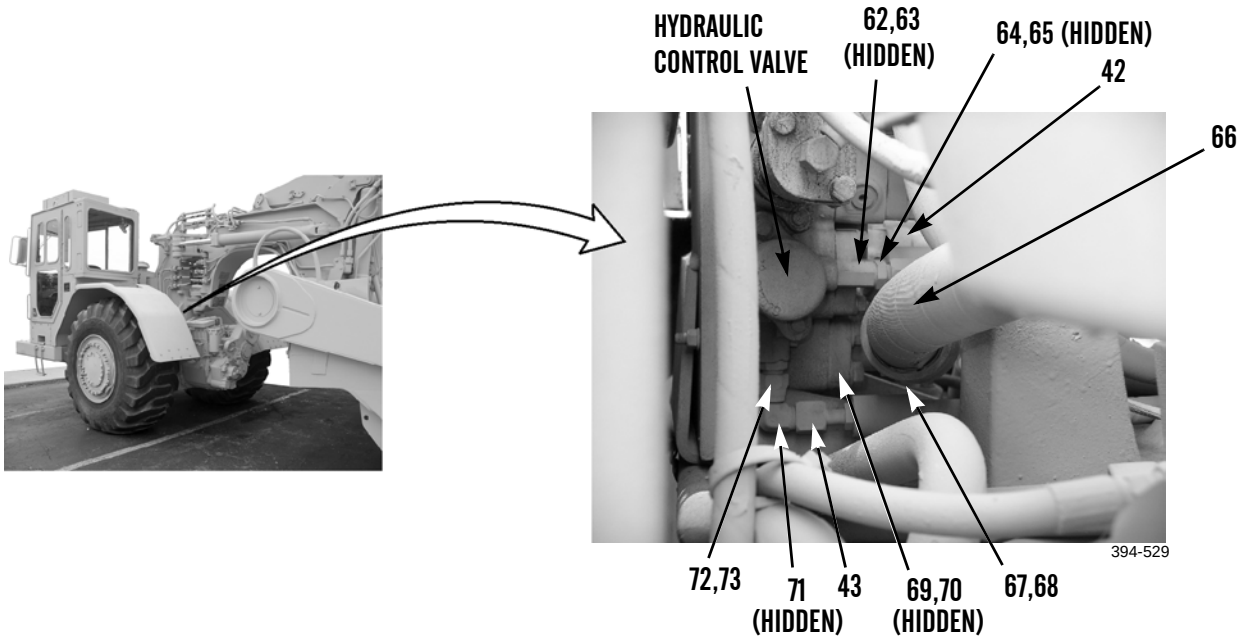


23. Remove twelve capscrews (54), washers (55) and six flange halves (56) from three hose assemblies (52).
24. Remove three hose assemblies (52) and preformed packings (57). Discard preformed packings.
25. Remove twelve capscrews (58), washers (59) and six flange halves (60) from three hose assemblies (53).
26. Remove three hose assemblies (53) and preformed packings (61). Discard preformed packings.



REMOVAL - CONTINUED

27. Remove hose assembly (42), connector (64), preformed packing (65), adapter (62) and preformed packing (63). Discard preformed packing from hydraulic control valve.
28. Remove four capscrews (67), washers (68) and two flange halves (69) from hose assembly (66).
29. Disconnect hose assembly (66) from hydraulic control valve and remove preformed packing (70). Discard preformed packing.
30. Remove hose assembly (43).
31. Remove elbow (71), connector (72) and preformed packing (73) from hydraulic control valve. Discard preformed packing.



REMOVAL - CONTINUED

32. Remove four bolts (76), washers (77) and two flange halves (74) from hose assembly (66).

33. Remove hose assembly (66) and remove preformed packing (75) from top of transmission housing. Discard preformed packing.

CLEANING AND INSPECTION

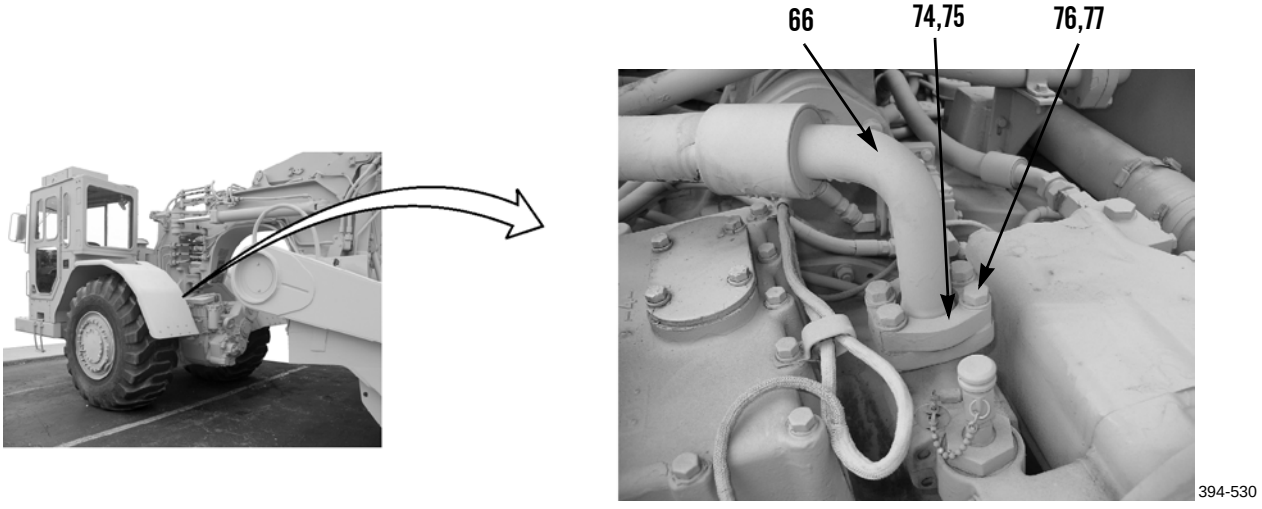
WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

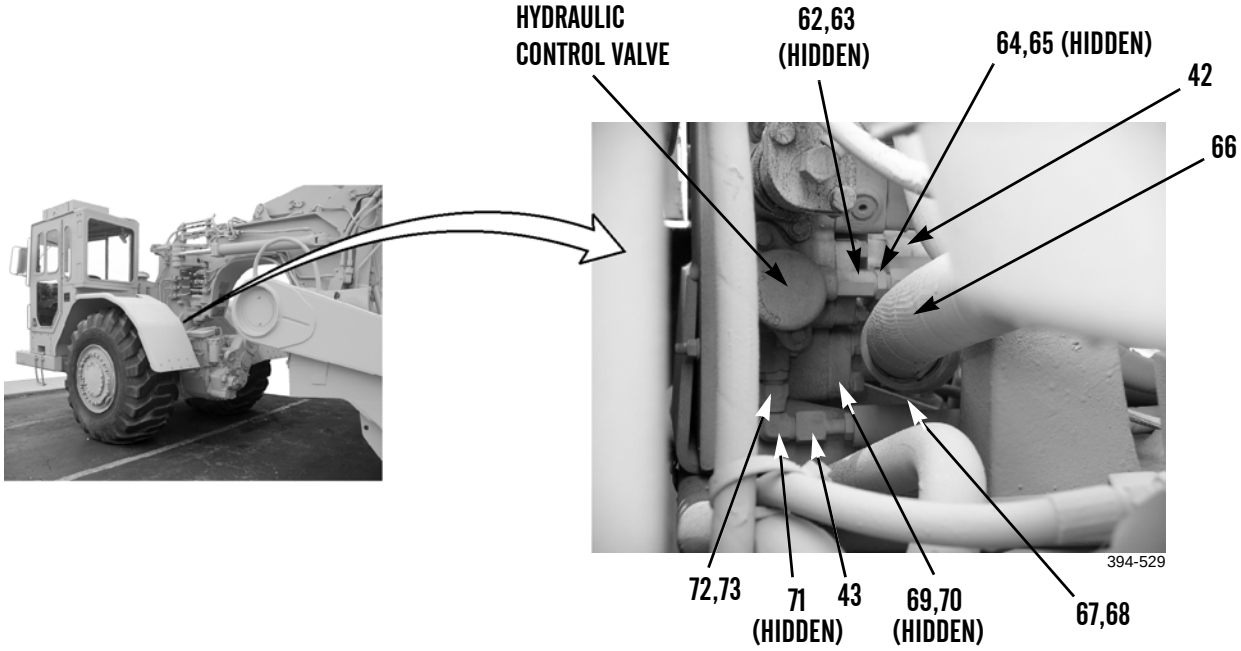
INSTALLATION

1. Install new preformed packing (75) and hose assembly (66) to top of transmission housing.
2. Install two flange halves (74), four washers (77) and bolts (76) to hose assembly (66).



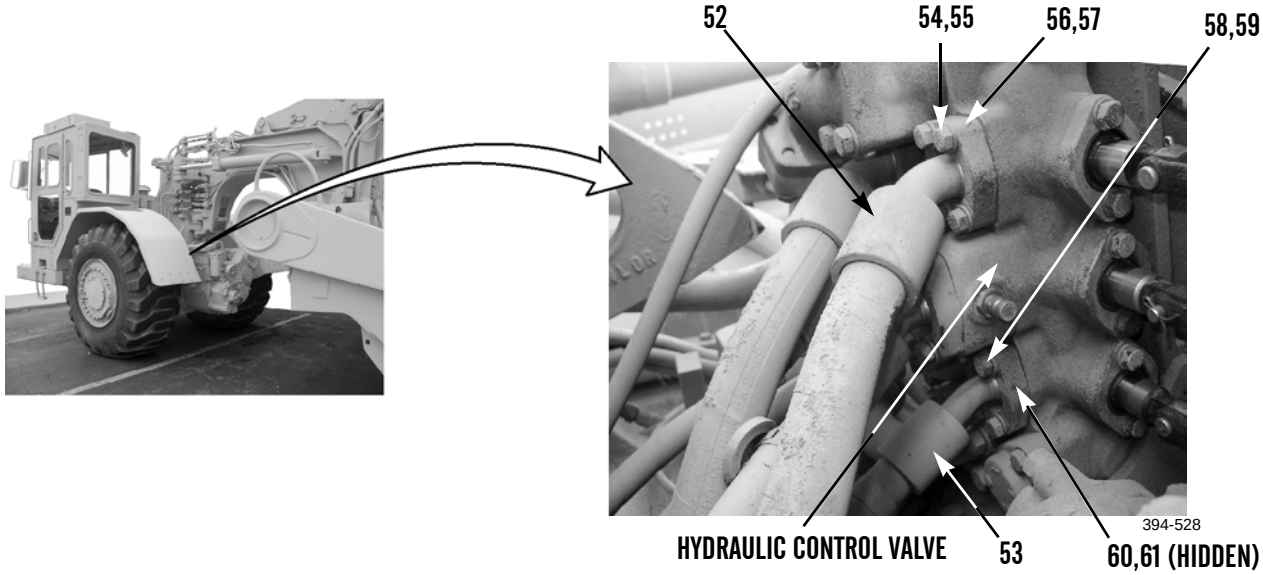
INSTALLATION - CONTINUED

3. Install new preformed packing (73), connector (72) and elbow (71) to hydraulic control valve.
4. Connect hose assembly (43) to elbow (71).
5. Install new preformed packing (70) and connect hose assembly (66) to hydraulic control valve.
6. Install two flange halves (69), four washers (68) and capscrews (67) to hose assembly (66).
7. Install new preformed packing (63), adapter (62), new preformed packing (65) and connector (64) to hydraulic control valve.
8. Install hose assembly (42).

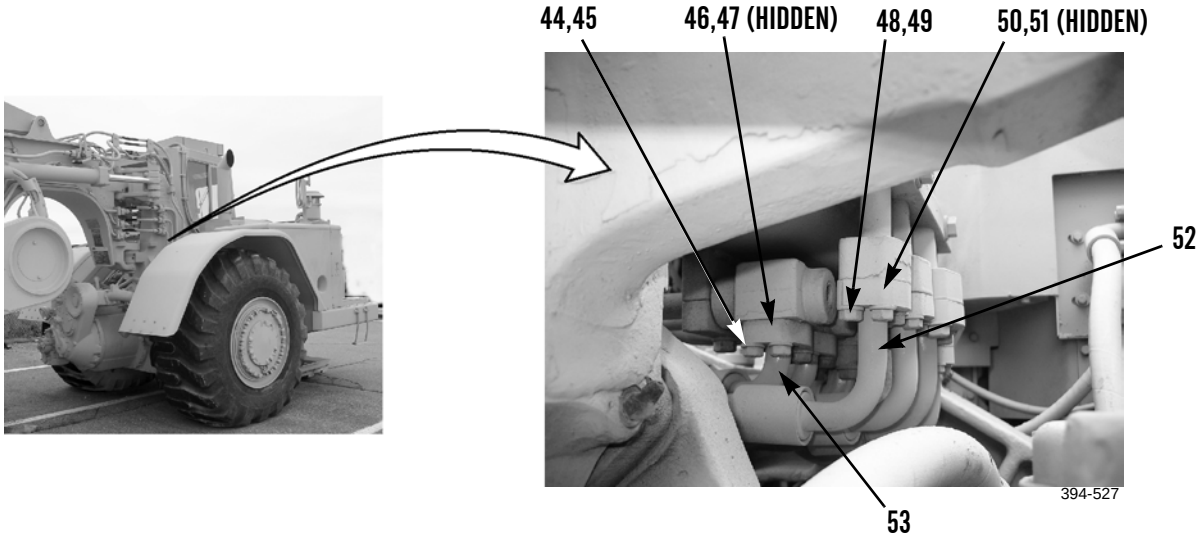


INSTALLATION - CONTINUED

9. Install three new preformed packings (61) and hose assemblies (53) to hydraulic control valve.
10. Install six flange halves (60), twelve washers (59) and capscrews (58) on hose assemblies (53).
11. Install three new preformed packings (57) and hose assemblies (52) to hydraulic control valve.
12. Install six flange halves (56), twelve washers (55) and capscrews (54) on hose assemblies (52).

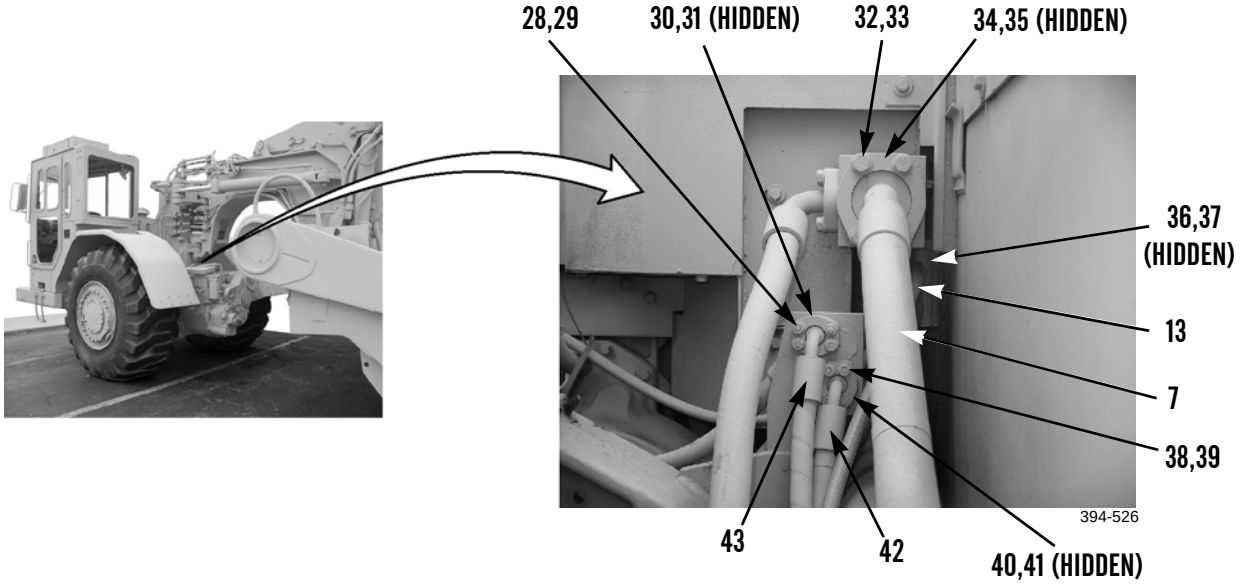


13. Install three new preformed packings (47) and connect three hose assemblies (53).
14. Install six flange halves (46), twelve washers (45) and capscrews (44) to hose assemblies (53).
15. Install three new preformed packing (51) and connect three hose assemblies (52).
16. Install six flange halves (50), twelve washers (49) and capscrews (48) to hose assemblies (52).



INSTALLATION - CONTINUED

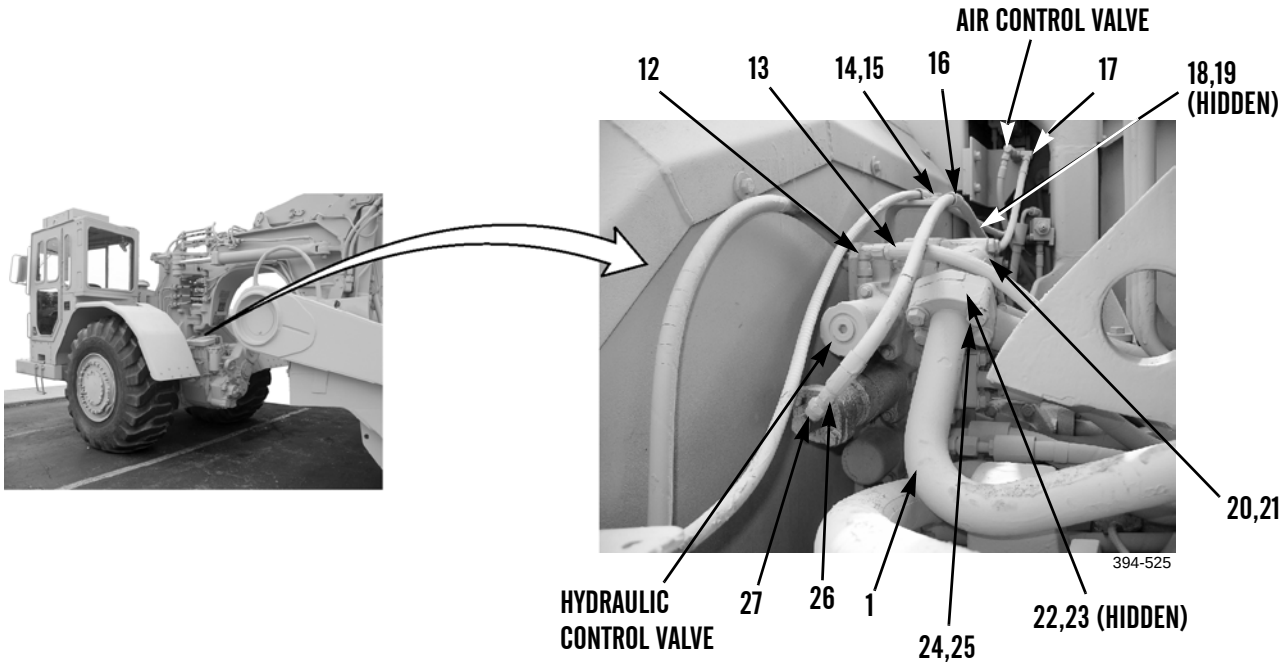
17. Install new preformed packings (41 and 31) and connect hose assemblies (42 and 43).
18. Install two flange halves (40), four washers (39) and nuts (38) to hose assembly (42).
19. Install two flange halves (30), four washers (29) and nuts (28) to hose assembly (43).
20. Install new preformed packing (35) and connect hose assembly (7).
21. Install two flange halves (34), four washers (33) and capscrews (32) to hose assembly (7).



HYDRAULIC CONTROL VALVE HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0232 00

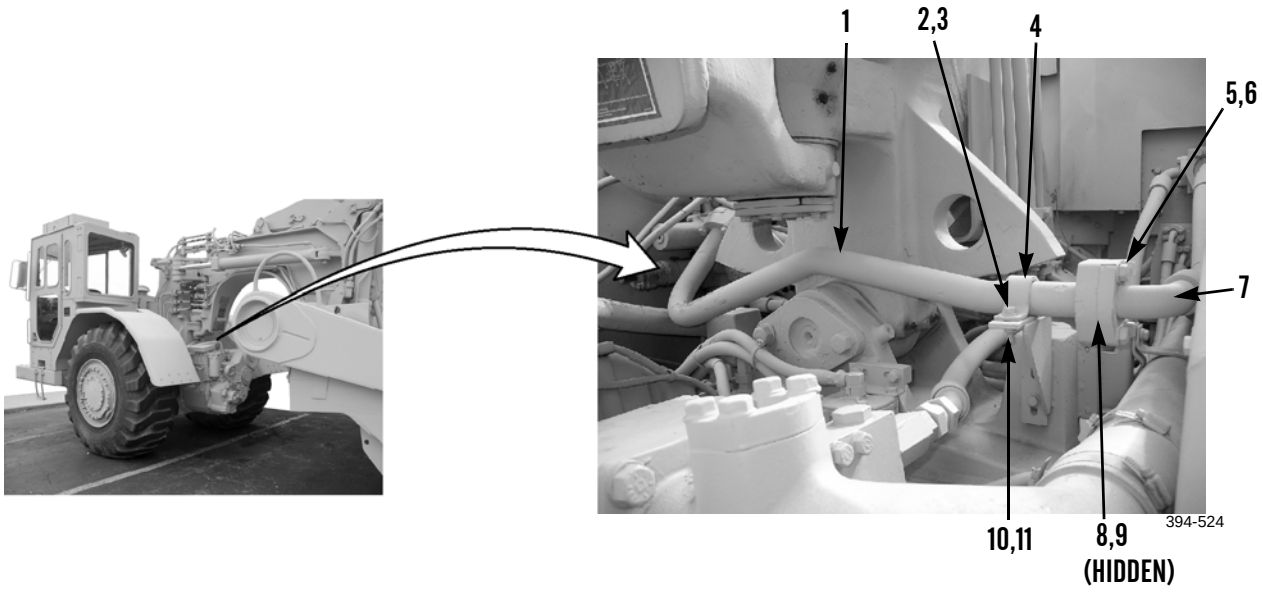
INSTALLATION - CONTINUED

22. Install elbow (27) on hydraulic control valve.
23. Install hose assembly (26) on elbow (27).
24. Install new preformed packing (19) and adapter (18) to hydraulic control valve.
25. Install four washers (21) and capscrews (20) on adapter (18).
26. Install new preformed packing (23) and hose assembly (1) to adapter (18).
27. Install two flange halves (22), four washers (25) and capscrews (24) to hose assembly (1).
28. Install elbow (17) on air control valve.
29. Connect hose assembly (26) to elbow (17).
30. Install clamp (16), washer (15) and bolt (14) to secure hose assembly (26).
31. Install elbow (12) and connect hose assembly (13) to hydraulic control valve.



INSTALLATION - CONTINUED

32. Install new preformed packing (9) and connect hose assembly (1) to hose assembly (7).
33. Install two flange halves (8), four washers (6) and capscrews (5) to hose assembly (1).
34. Install clamp (4), washer (3), bolt (2), washers (11) and nut (10) to hose assembly (1).
35. Install any straps, ties or guards noted during removal.



36. Refill hydraulic tank to correct level (WP 0229 00).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this warning may cause injury. If you are injured, obtain medical aid immediately.

NOTE

If hose or tube assemblies were removed from a certain system, such as the ejector, operate only the ejector control. If hose or tube assemblies were removed from all systems, operate all the controls to complete the next procedure.

37. Start engine (TM 5-3805-248-10).
38. Operate hydraulic controls. Move each system through at least five full movements of travel to bleed the air out of system (TM 5-3805-248-10).
39. Stop engine (TM 5-3805-248-10).
40. Refill hydraulic tank to correct level (TM 5-3805-248-10).
41. Inspect hoses assemblies and connections for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

HYDRAULIC TANK HOSES, LINES AND FITTINGS REPLACEMENT 0233 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (21)

Ring seal

References

WP 0027 00

Equipment Condition

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Engine oil filter removed (WP 0022 00)

Air cleaner assembly removed (WP 0031 00)

Muffler, tube and pipe removed (WP 0041 00)

Hood removed (WP 0189 00)

Engine compartment access doors removed (WP 0190 00)

Hydraulic oil tank drained (TM 5-3805-248-10)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

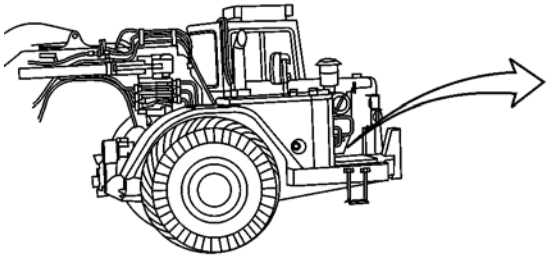
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

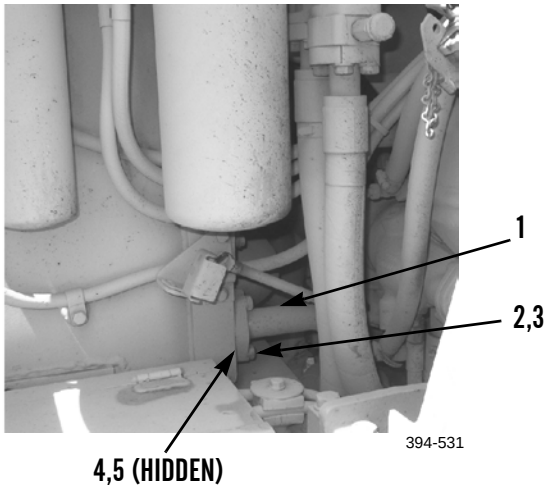
REMOVAL - CONTINUED

NOTE

- Use container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Only remove connectors, adapters or elbows if they are damaged.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Note location of any straps, ties or guards prior to removal to ensure correct installation.

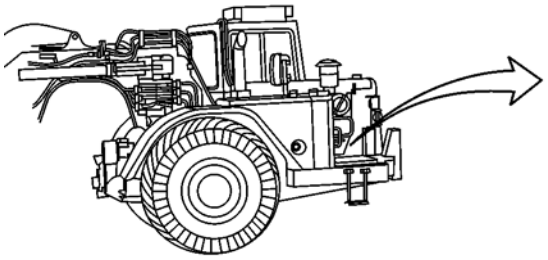
1. Disconnect engine oil filter hose assemblies from oil filter base (WP 0027 00).
2. Remove four capscrews (2), washers (3) and two flange halves (4) from hose assembly (1).
3. Disconnect hose assembly (1) and remove preformed packing (5) from hydraulic tank. Discard preformed packing.

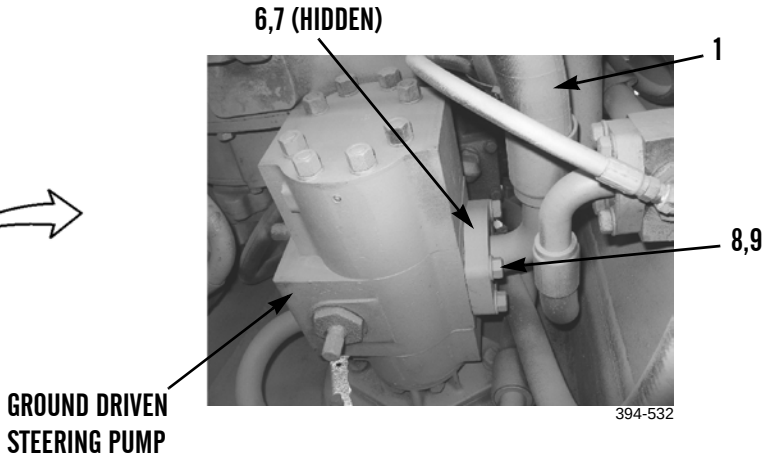




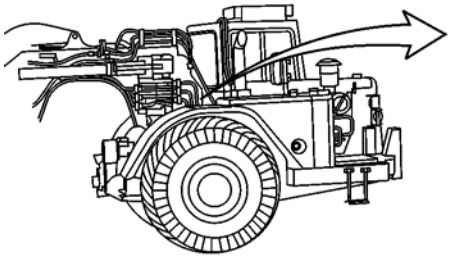
REMOVAL - CONTINUED

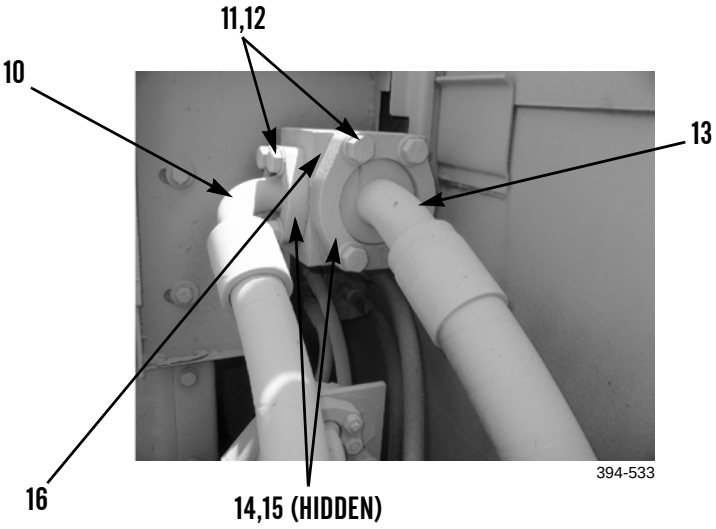
4. Remove four capscrews (8), washers (9) and two flange halves (6) from hose assembly (1).
5. Remove hose assembly (1) and preformed packing (7) from ground driven steering pump. Discard preformed packing.





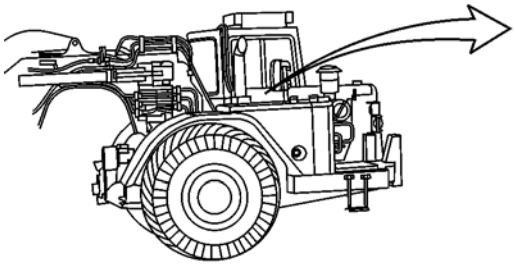
6. Remove eight capscrews (11), washers (12) and four flange halves (14) from rear of fuel tank.
7. Disconnect hose assemblies (10 and 13) from tube assembly (16).
8. Remove and discard two preformed packings (15).

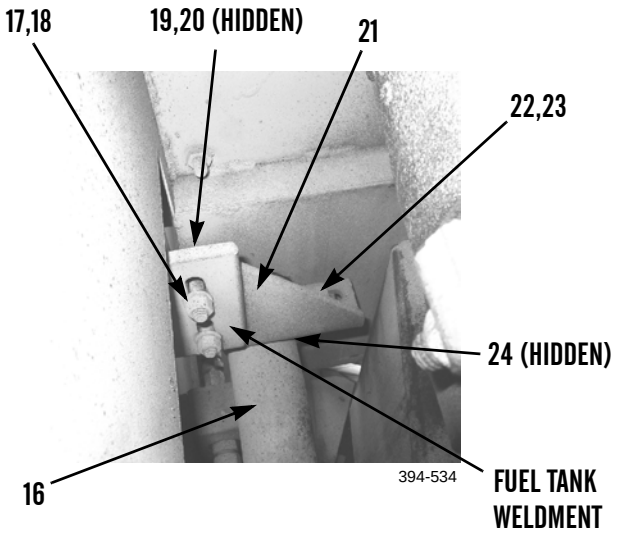




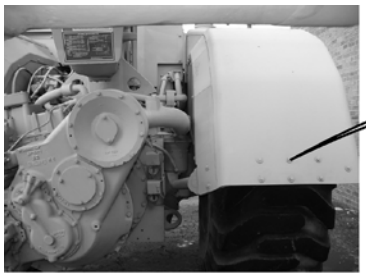
REMOVAL - CONTINUED

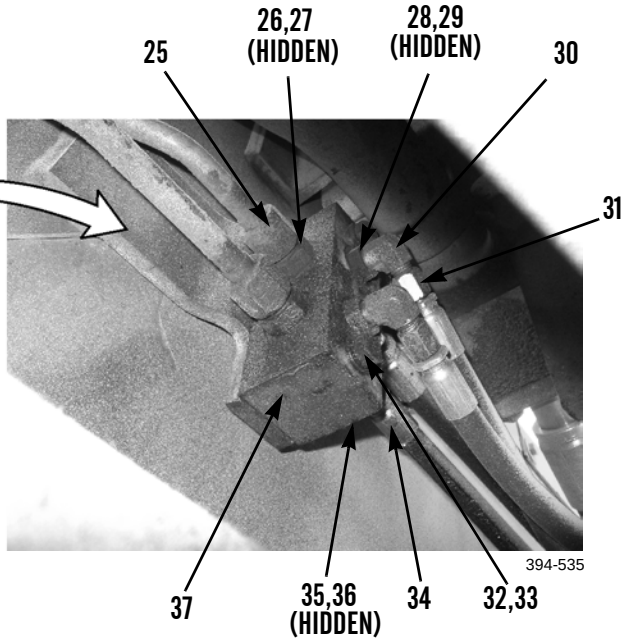
9. Remove two bolts (22), washers (23) and clamp (24) from tube assembly (16).
10. Remove two nuts (17), washers (18), bolts (19), washers (20) and bracket (21) from fuel tank weldment.





11. Disconnect two hose assemblies (25) from adapters (26).
12. Remove two adapters (26) and preformed packings (27) from multiple connector (37). Discard preformed packings.
13. Disconnect two hose assemblies (31) from elbows (30).
14. Remove two elbows (30), adapters (28) and preformed packings (29) from multiple connector (37). Discard preformed packings.
15. Disconnect two hose assemblies (34) from adapters (35).
16. Remove two adapters (35) and preformed packings (36) from multiple connector (37). Discard preformed packings.
17. Remove two bolts (32), washers (33) and multiple connector (37) from rear of fuel tank.

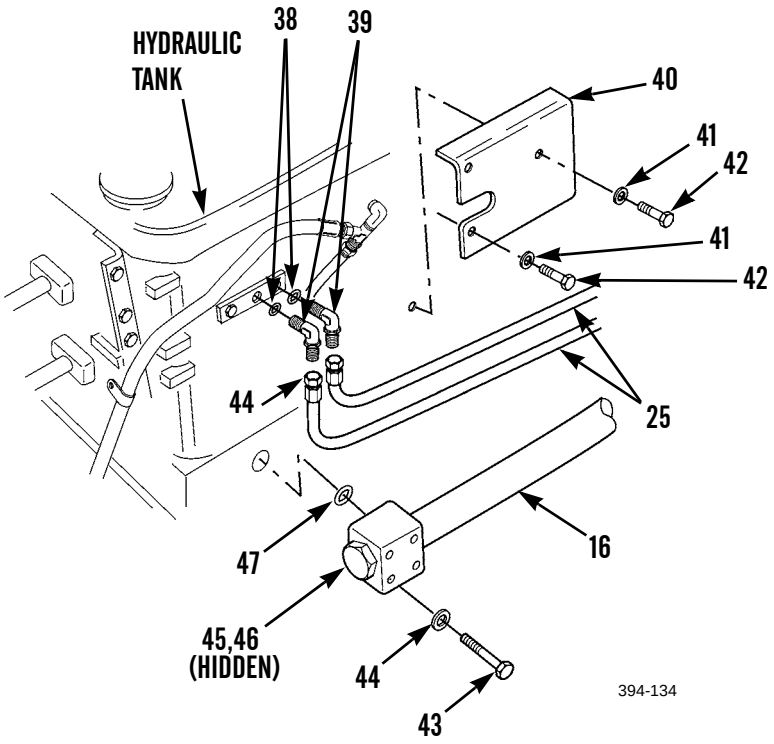




HYDRAULIC TANK HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0233 00

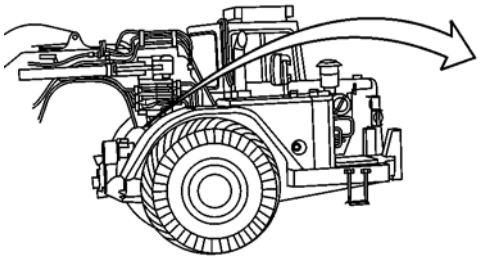
REMOVAL - CONTINUED

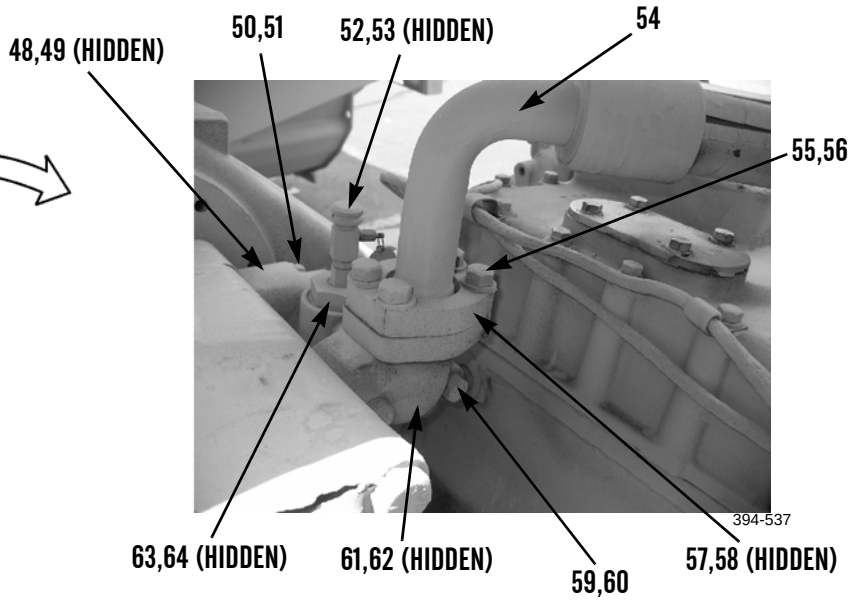
18. Remove three bolts (42), washers (41) and shield (40) from hydraulic tank.
19. Remove two tube assemblies (25) from elbows (39).
20. Remove two elbows (39) and preformed packings (38) from hydraulic tank. Discard preformed packings.
21. Remove four bolts (43) and washers (44) from hydraulic tank.
22. Remove tube assembly (16) and preformed packing (47). Discard preformed packing.
23. Remove plug (45) and preformed packing (46) from tube assembly (16). Discard preformed packing.



REMOVAL - CONTINUED

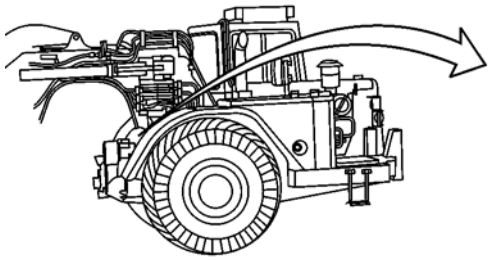
24. Remove four capscrews (55), washers (56) and two flange halves (57) from flange elbow (61).
25. Disconnect hose assembly (54) and remove preformed packing (58) from flange elbow (61). Discard preformed packing.
26. Remove four capscrews (59), washers (60), elbow flange (61) and preformed packing (62) from flange elbow (48). Discard preformed packing.
27. Remove hydraulic oil sampling valve (52) and preformed packing (53) from plug (63). Discard preformed packing.
28. Remove plug (63) and preformed packing (64) from flange elbow (48). Discard preformed packing.
29. Remove four capscrews (50), washers (51), flange elbow (48) and preformed packing (49) from hydraulic pump. Discard preformed packing.

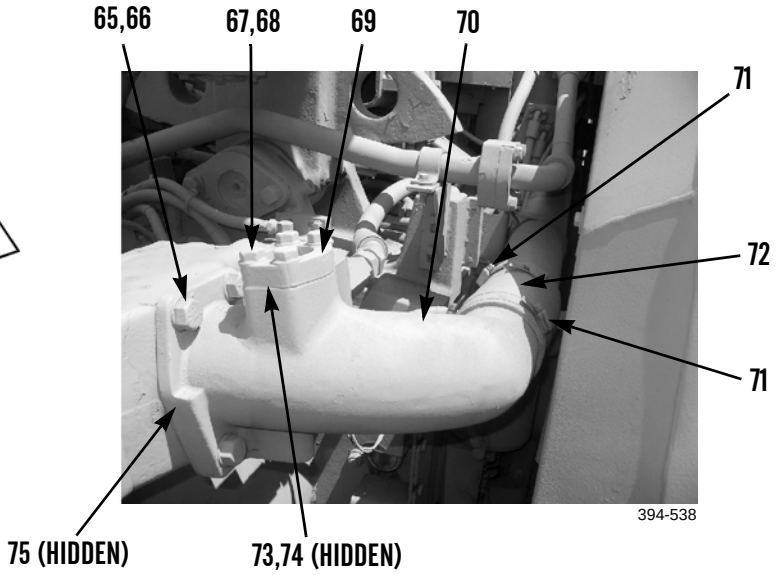




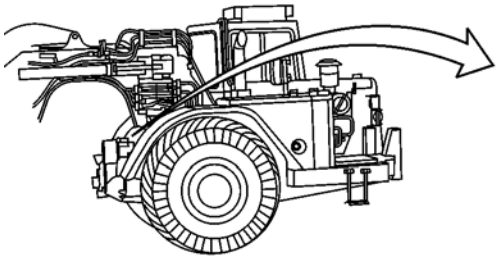
REMOVAL - CONTINUED

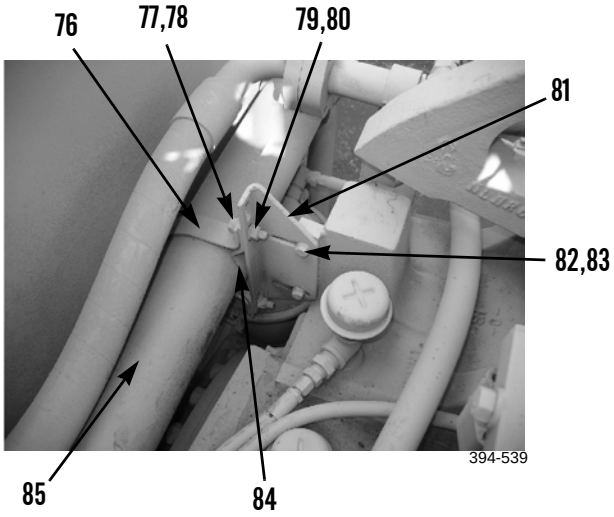
30. Remove four bolts (67), washers (68), two flange halves (69), cover (73) and preformed packing (74) from flange elbow (70). Discard preformed packing.
31. Loosen four clamps (71) on hose (72).
32. Remove four bolts (65), washers (66), flange elbow (70) and preformed packing (75) from hydraulic pump and hose (72). Discard preformed packing.
33. Remove four clamps (71) and hose (72) from tube assembly (85).





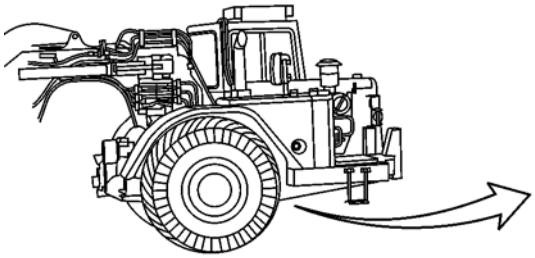
34. Remove two nuts (79), washers (80), capscrews (77), washers (78) and retaining straps (76 and 84) from tube assembly (85).
35. Remove two capscrews (82), washers (83) and angle bracket (81) from top of transmission.

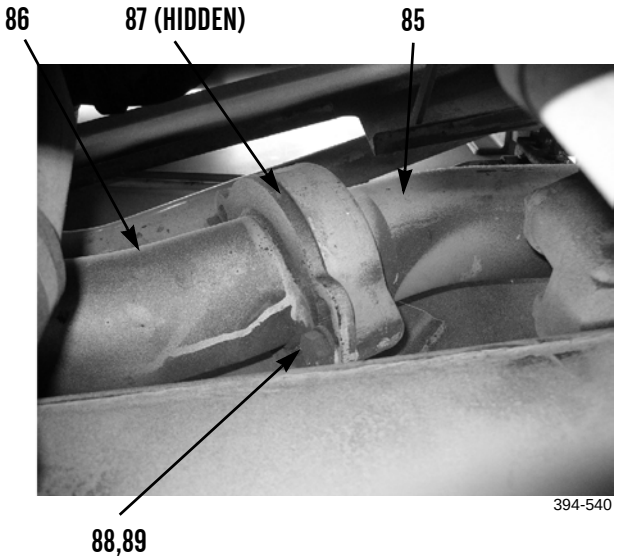




REMOVAL - CONTINUED

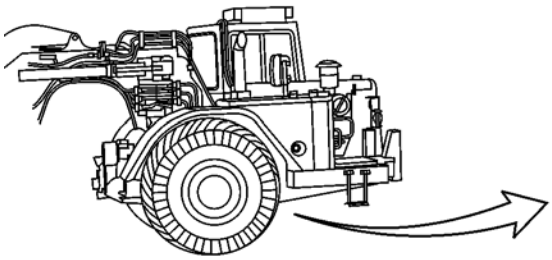
36. Remove two bolts (88), washers (89), tube assembly (85) and preformed packing (87) from tube assembly (86). Discard preformed packing.

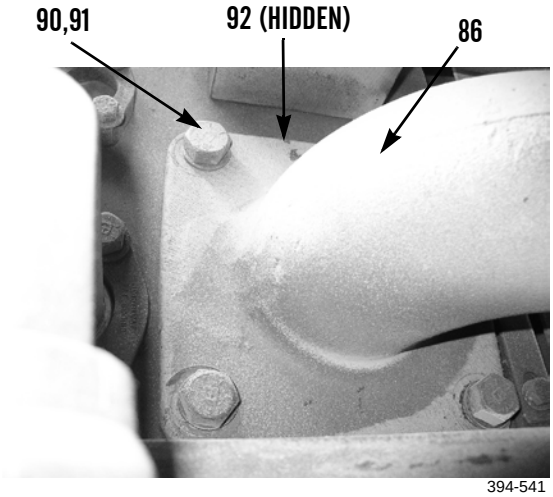




394-540

37. Remove four bolts (90) and washers (91) from tube assembly (86) on hydraulic tank.
38. Remove tube assembly (86) and ring seal (92) from hydraulic tank. Discard preformed packing.





394-541

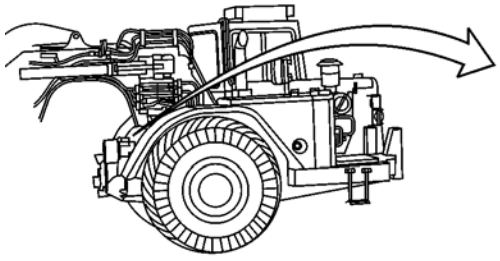
CLEANING AND INSPECTION

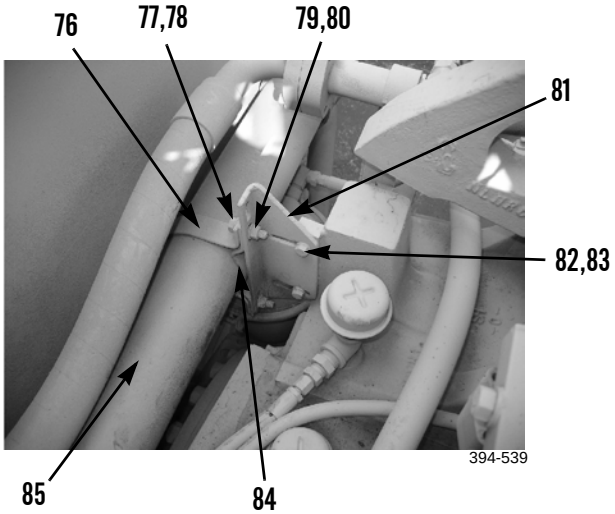
- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing and seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

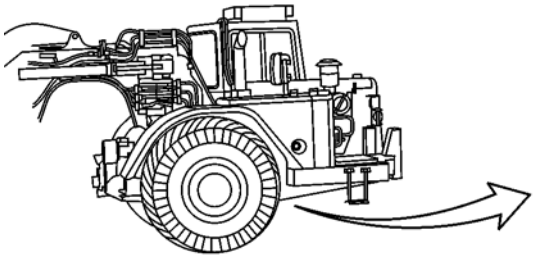
1. Install new ring seal (92) and tube assembly (86) on hydraulic tank.
2. Install four washers (91) and bolts (90) on tube assembly (86).
3. Install new preformed packing (87) and tube assembly (85) on tube assembly (86).
4. Install two washers (89) and bolts (88) on tube assembly (86).
5. Install angle bracket (81), two washers (83) and capscrews (82) on top of transmission.
6. Install retaining straps (76 and 84), two washers (78), capscrews (77), washers (80) and nuts (79) on tube assembly (85).





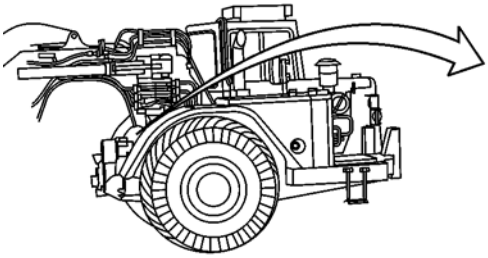
INSTALLATION - CONTINUED

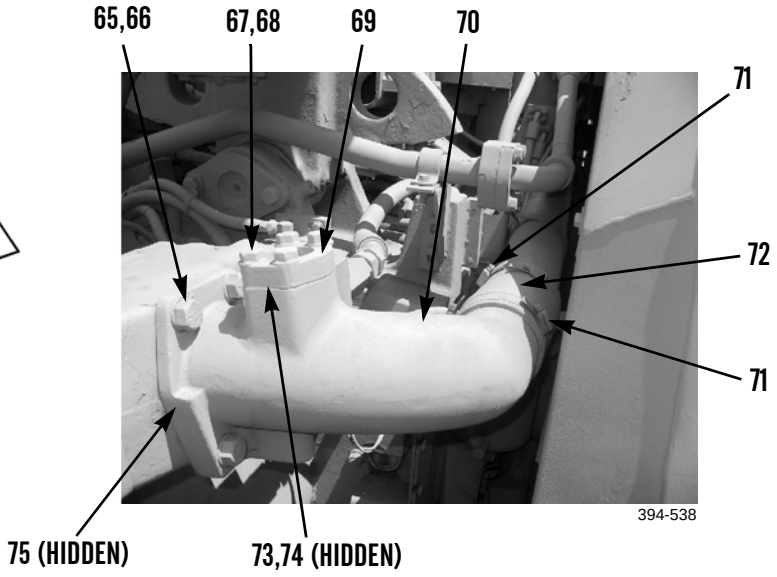
7. Install hose (72) and four clamps (71) on tube assembly (85). Do not tighten clamps at this time.



394-540

8. Install new preformed packing (75), flange elbow (70), four washers (66) and bolts (65) to hydraulic pump and hose (72).
9. Tighten four clamps (71) on hose (72).
10. Install new preformed packing (74), cover (73), two flange halves (69), four washers (68) and capscrews (67) to flange elbow (70).

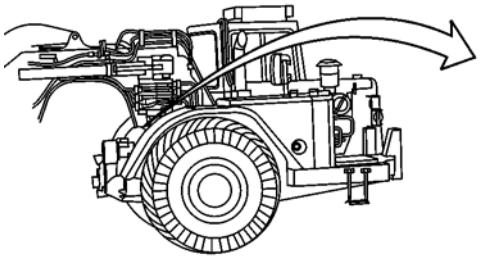


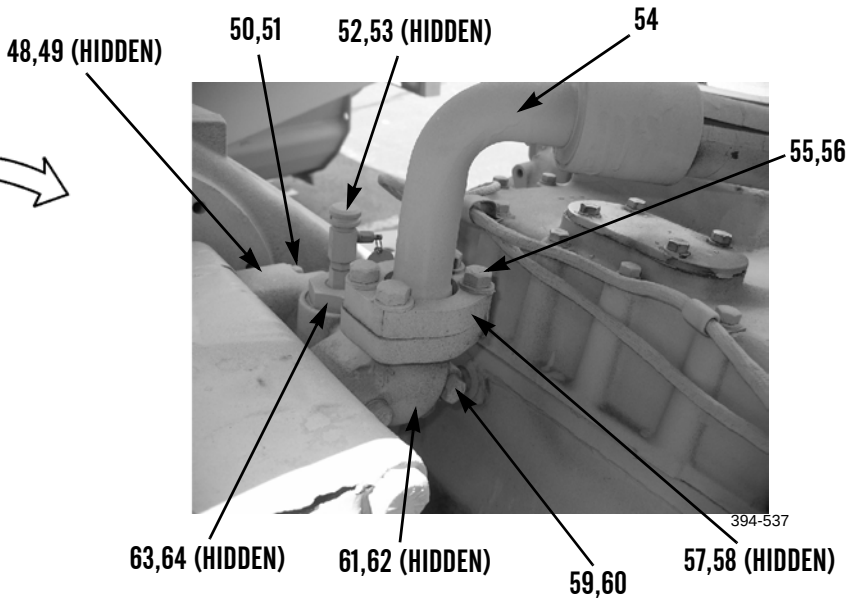


394-538

INSTALLATION - CONTINUED

11. Install new preformed packing (49), flange elbow (48), four washers (51) and capscrews (50) to hydraulic pump.
12. Install new preformed packing (64) and plug (63) to elbow flange (48).
13. Install new preformed packing (53) and hydraulic oil sampling valve (52) to plug (63).
14. Install new preformed packing (62), elbow flange (61), four washers (60) and capscrews (59) to elbow (48).
15. Install new preformed packing (58) and connect hose assembly (54) to elbow flange (61).
16. Install two flange halves (57), four washers (56) and capscrews (55) to elbow flange (61).

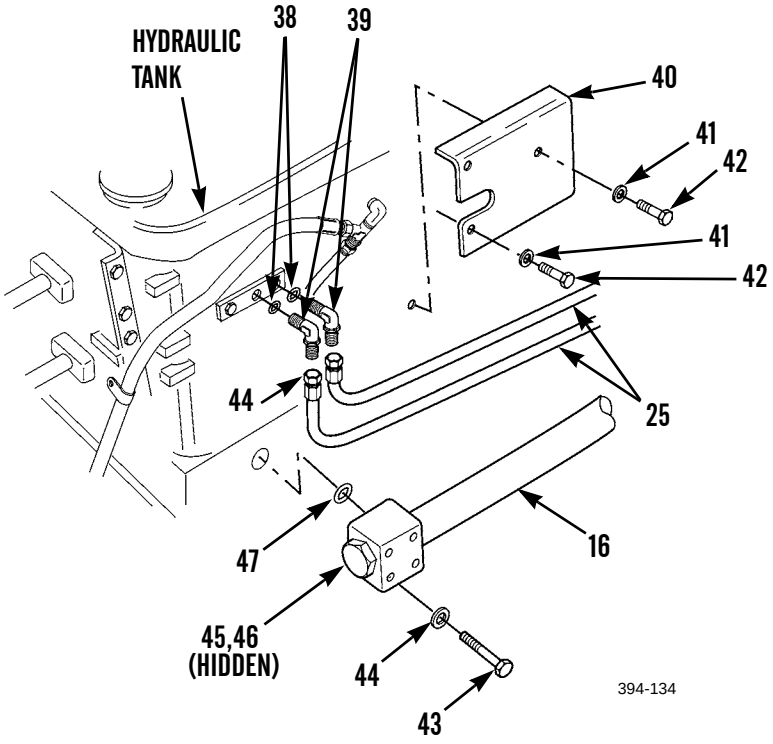




HYDRAULIC TANK HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0233 00

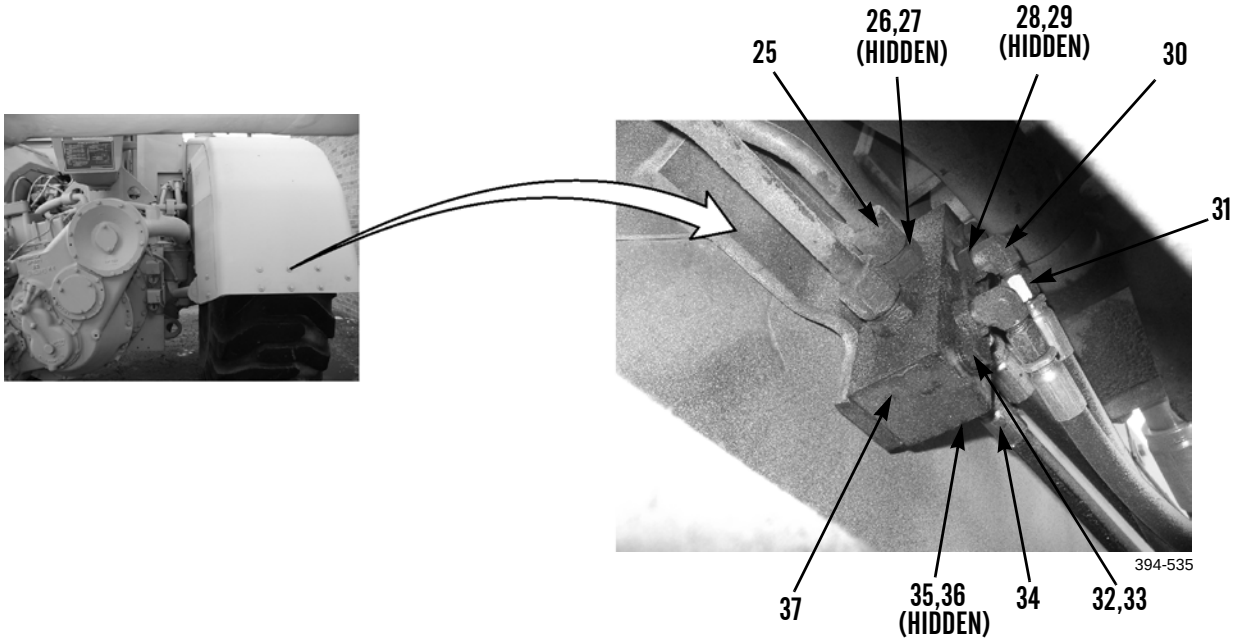
INSTALLATION - CONTINUED

17. Install new preformed packing (46) and plug (45) to tube assembly (16).
18. Install new preformed packing (47), tube assembly (16), four washers (44) and bolts (43) to hydraulic tank.
19. Install two new preformed packings (38) and elbows (39) to hydraulic tank.
20. Install two tube assemblies (25) to elbows (39).
21. Install shield (40), three washers (41) and bolts (42) to hydraulic tank.



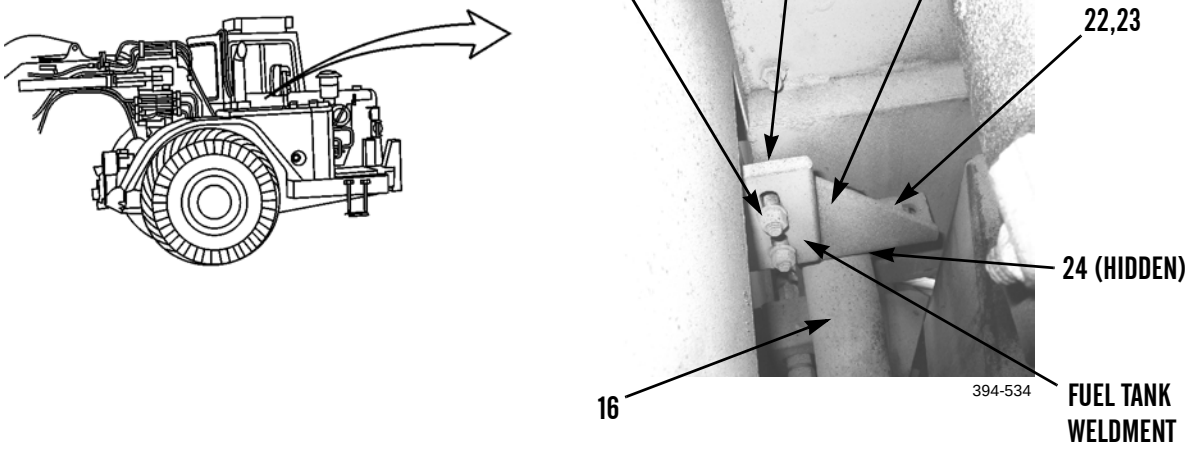
INSTALLATION - CONTINUED

22. Install multiple connector (37), two washers (33) and bolts (32) to rear of fuel tank.
23. Install two new preformed packings (36) and adapters (35) to multiple connector (37).
24. Connect two hose assemblies (34) to adapters (35).
25. Install two new preformed packings (29), adapters (28) and elbows (30) to multiple connector (37).
26. Connect two hose assemblies (31) to elbows (30).
27. Install new preformed packing (27), adapters (26) and connect two hose assemblies (25) to multiple connector (37).

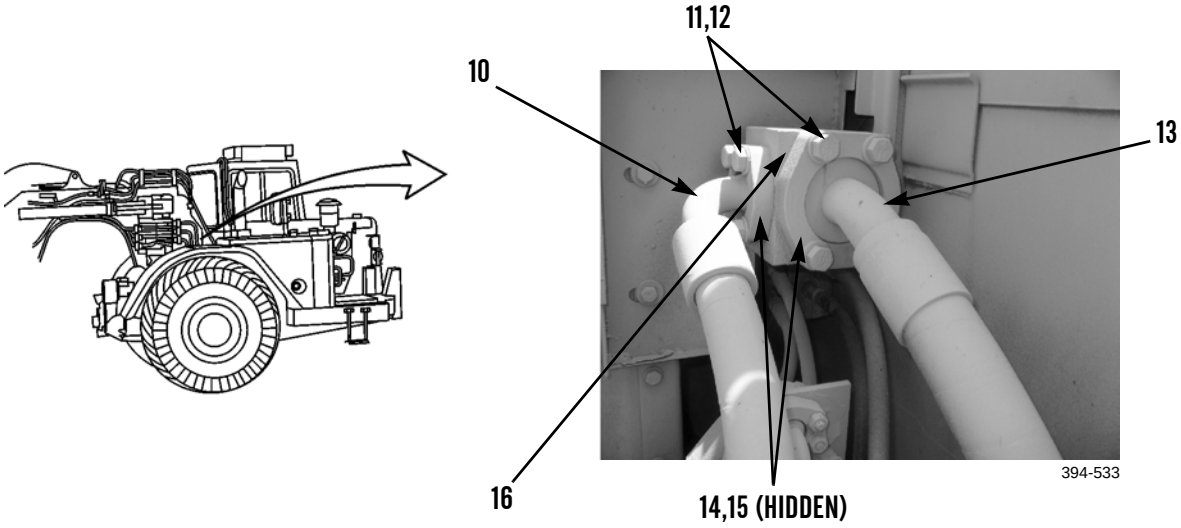


INSTALLATION - CONTINUED

28. Install bracket (21), two washers (20), bolts (19), washers (18) and nuts (17) on fuel tank weldment.
29. Install clamp (24), two washers (23) and bolts (22) on tube assembly (16).

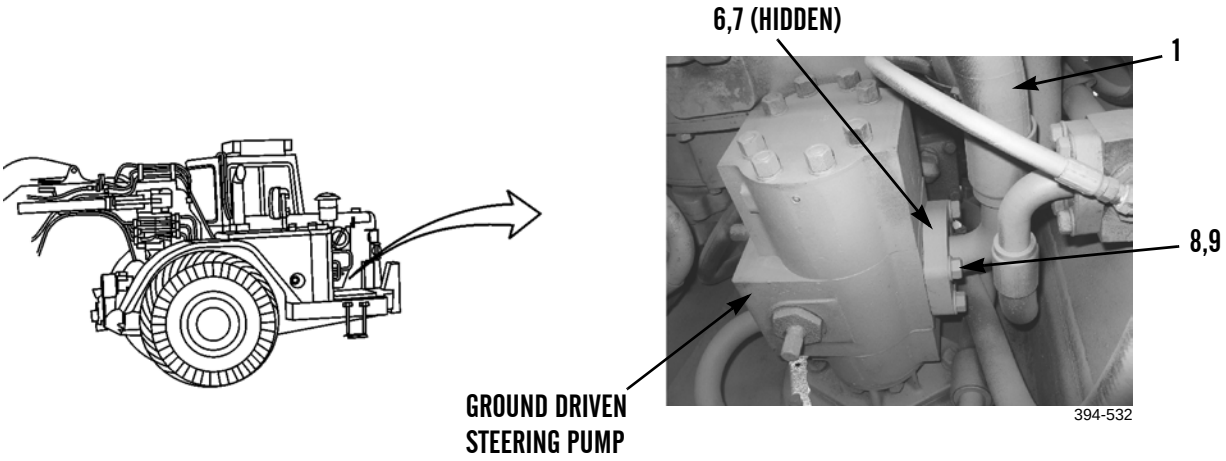


30. Install two new preformed packings (15) and connect hose assemblies (13 and 10) to tube assembly (16).
31. Install four flange halves (14), eight washers (12) and capscrews (11) to rear of fuel tank.

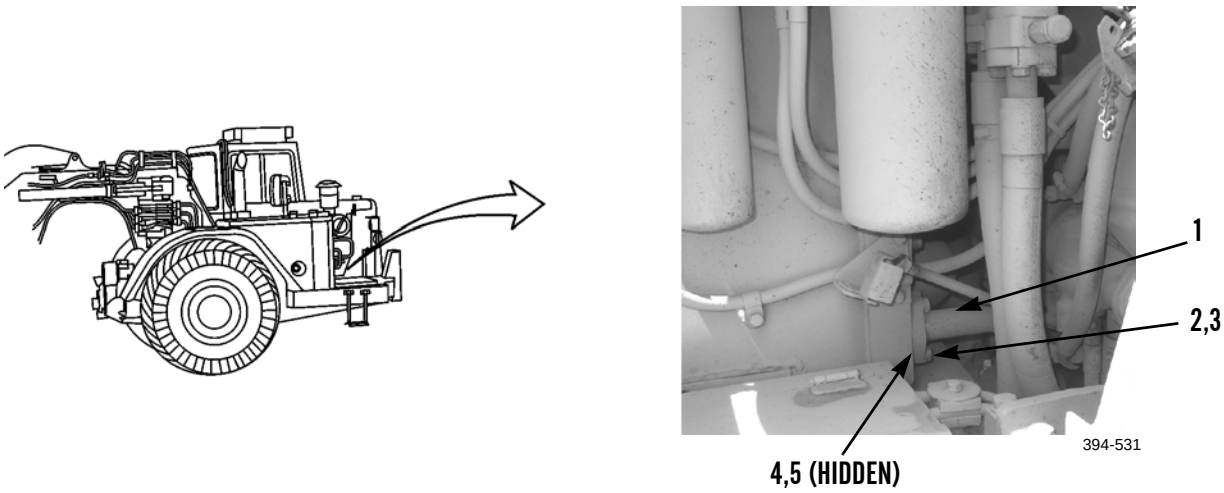


INSTALLATION - CONTINUED

32. Install new preformed packing (7) and connect hose assembly (1) to steering pump.
33. Install two flange halves (6), four washers (9) and capscrews (8) on hose assembly (1).



34. Install new preformed packing (5) and connect hose assembly (1) to hydraulic tank.
35. Install two flange halves (4), four washers (3) and capscrews (2) to hose assembly (1).



36. Connect engine oil filter hose assemblies to oil filter base (WP 0027 00).
37. Install engine oil filter (WP 0022 00).
38. Install air cleaner assembly (WP 0031 00).
39. Install muffler, tube and pipe (WP 0041 00).
40. Refill hydraulic tank (TM 5-3805-248-10).
41. Operate engine (TM 5-3805-248-10).

INSTALLATION - CONTINUED

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the machine. Failure to follow these instructions may cause injury.

NOTE

If hose or tube assemblies were removed from a certain system, such as the ejector, operate only the ejector control. If hose or tube assemblies were removed from all systems, operate all the controls to complete the next procedure.

42. Operate hydraulic controls through at least five full movements of travel. This will bleed air out of system (TM 5-3805-248-10).
43. Shut down engine (TM 5-3805-248-10).
44. Check hydraulic oil level in tank and add oil as necessary (TM 5-3805-248-10).
45. Inspect all connections for leaks (TM 5-3805-248-10).
46. Install hood (WP 0189 00).
47. Install engine compartment access doors (WP 0190 00).

END OF WORK PACKAGE

HITCH HOSES, LINES AND FITTINGS REPLACEMENT 0234 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent (Item 13, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (11)

References

WP 0181 00

WP 0235 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

Hydraulic oil tank drained (TM 5-3805-248-10)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

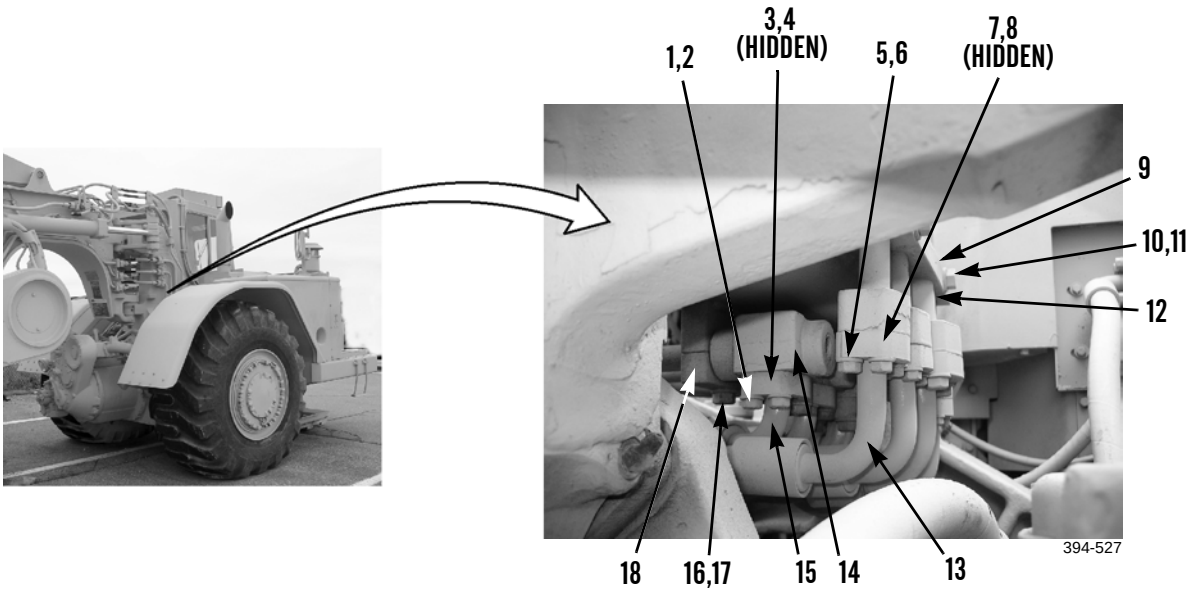
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

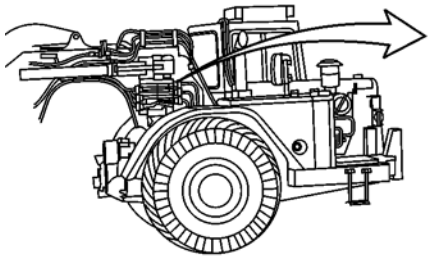
- Use container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Only remove connectors, adapters or elbows if they are damaged.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Note location of any straps, ties or guards prior to removal to ensure correct installation.

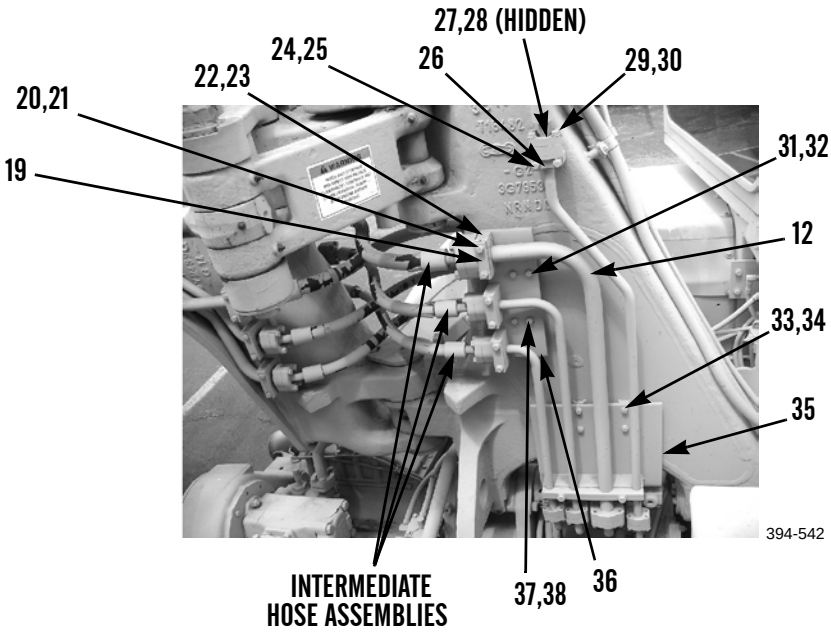
1. Remove 16 capscrews (5), washers (6) and eight flange halves (7) from four tube assemblies (12).
2. Disconnect four hose assemblies (13) from tube assemblies (12).
3. Remove and discard four preformed packings (8).
4. Remove 16 capscrews (1), washers (2) and eight flange halves (3) from four tube assemblies (14).
5. Disconnect four hose assemblies (15) from tube assemblies (14).
6. Remove and discard four preformed packings (4).
7. Remove two bolts (16), washers (17) and clamp (18) from under hitch.
8. Remove two bolts (10), washers (11) and clamp (9) from side of hitch.



REMOVAL - CONTINUED

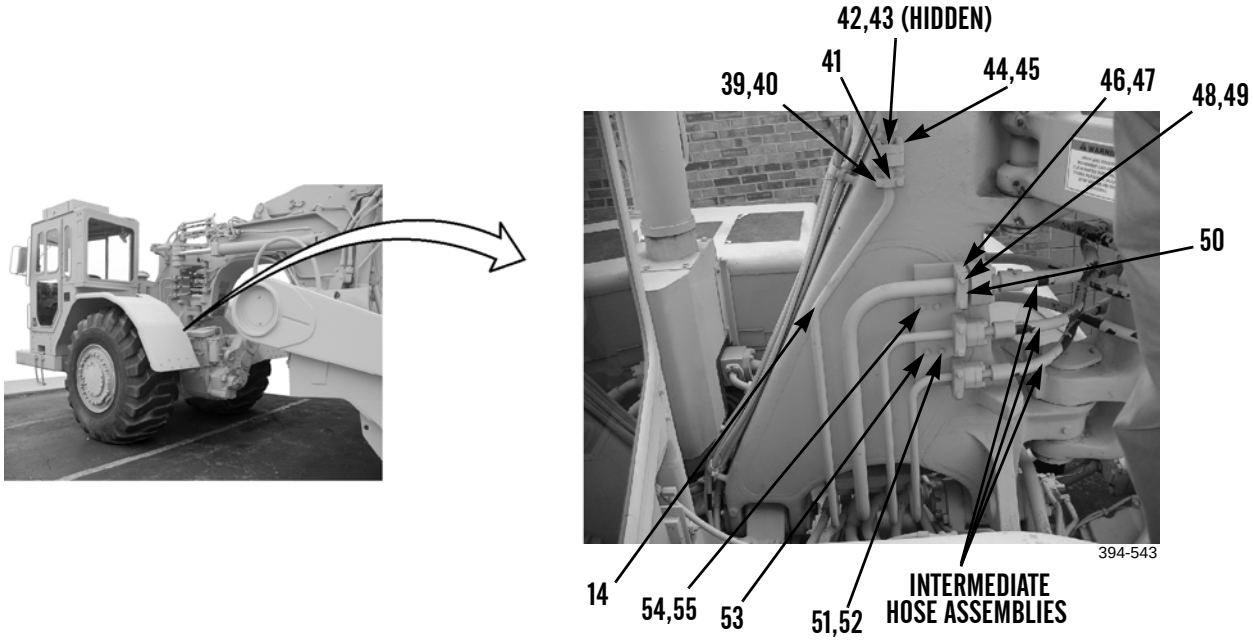
9. Disconnect intermediate hose assemblies (WP 0235 00).
10. Remove four capscrews (29), washers (30) and two flange halves (27) from hose assembly (12).
11. Remove two bolts (24), washers (25) and clamp halves (26).
12. Remove and discard preformed packing (28).
13. Remove six capscrews (20), washers (21), spacers (19), clamp halves (22), sleeves (23) and four tube assemblies (12).
14. Remove two bolts (31) and washers (32).
15. Remove two bolts (37), washers (38) and plate (36) from hitch.
16. Remove four bolts (33), washers (34) and plate (35) from hitch.





REMOVAL - CONTINUED

17. Remove four capscrews (44), washers (45) and two flange halves (42) from hose assembly (14).
18. Remove two bolts (39), washers (40) and clamp halves (41).
19. Remove hose assembly (14) from hitch.
20. Remove and discard preformed packing (43).
21. Remove six bolts (48), washers (49), spacers (50), clamp halves (46), sleeves (47) and remaining three tube assemblies (14).
22. Remove two bolts (54) and washers (55).
23. Remove two bolts (51), washers (52) and plate (53) from hitch.



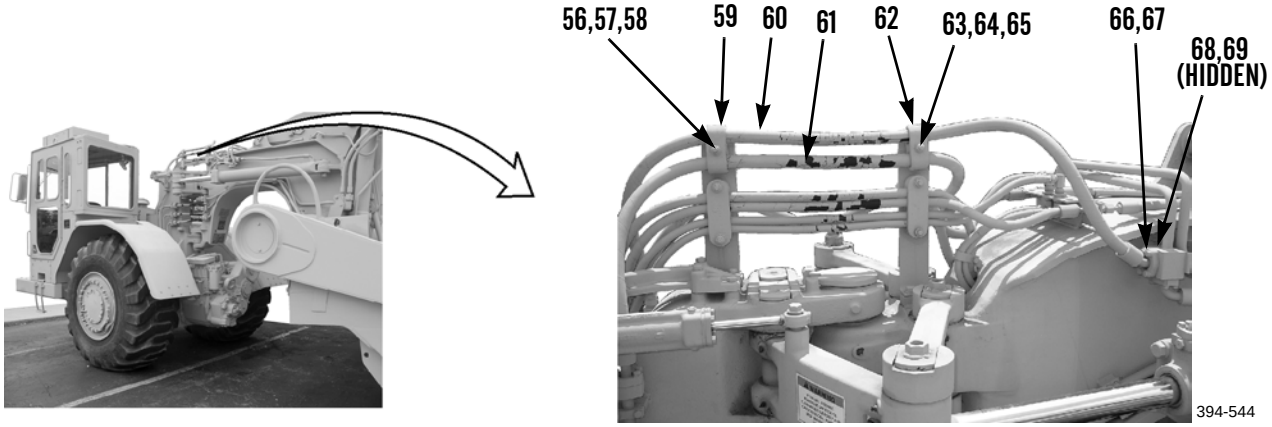
24. Remove nut (56), washer (57), capscrew (58) and two clamp halves (59) from top of hitch.
25. Remove nut (63), washer (64), capscrew (65) and two clamp halves (62) from top of hitch.

REMOVAL - CONTINUED

NOTE

The following two steps are for hitch hose assembly that connects to the left side steering cylinder hose. Hitch hose assembly that connects to the right side is identical.

26. Remove four capscrews (66), washers (67) and two flange halves (68) on hose assembly (60).
27. Remove hose assembly (60) and preformed packing (69) from hitch. Discard preformed packing.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

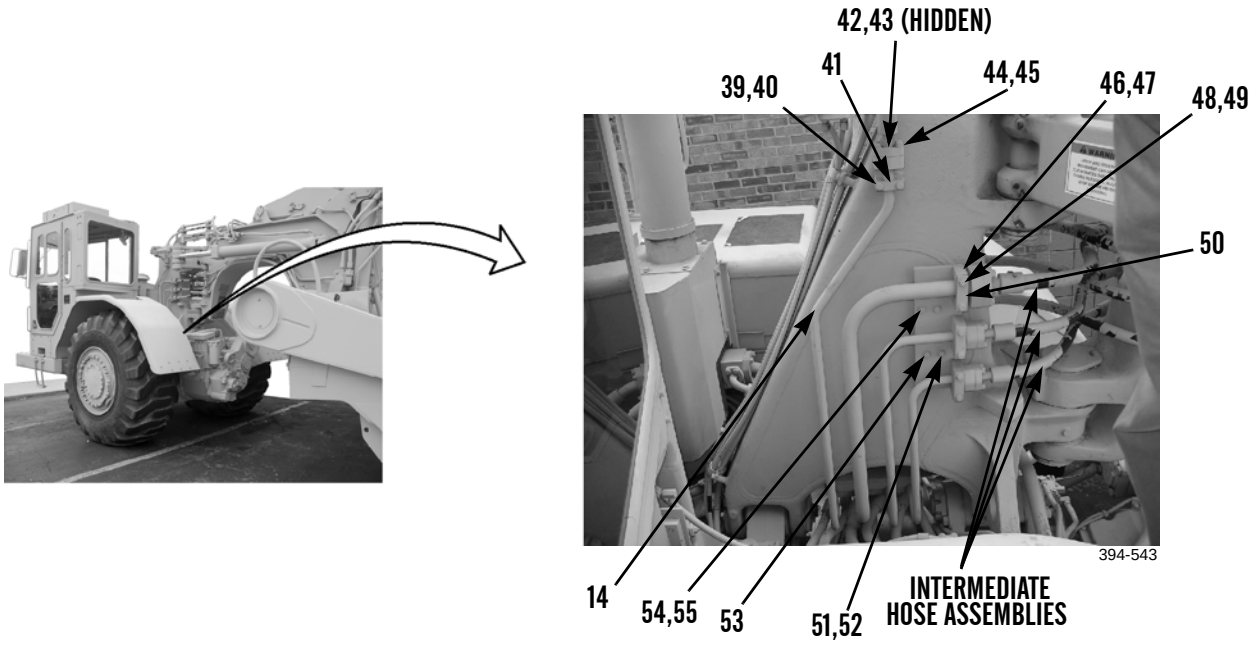
1. Remove all preformed packing and seal material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Install new preformed packing (69) and position hose assembly (60) on hitch.
2. Install two flange halves (68), four washers (67) and capscrews (66) on hose assembly (60).
3. Install two clamp halves (62), capscrew (65), washer (64) and nut (63) on hitch.
4. Install two clamp halves (59), capscrew (58), washer (57) and nut (56) on hitch.

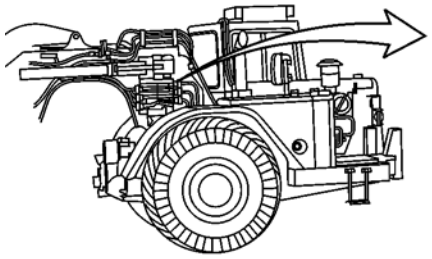
INSTALLATION - CONTINUED

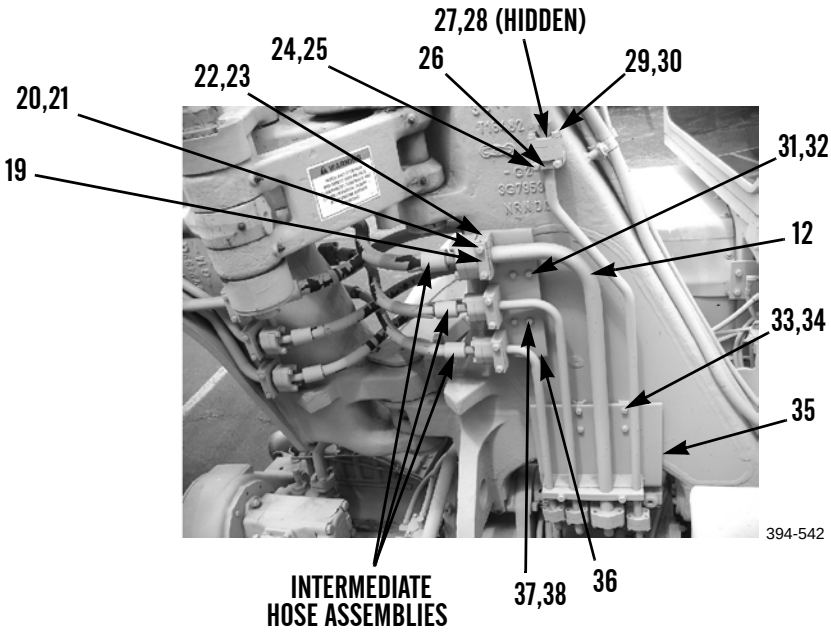
5. Install plate (53), two washers (52) and bolts (51) on hitch.
6. Install two washers (55) and bolts (54) on hitch.
7. Position three tube assemblies (14) and install six sleeves (47), clamp halves (46), spacers (50), washers (49) and bolts (48).
8. Install intermediate hose assemblies (WP 0235 00).
9. Position tube assembly (55) and install two clamp halves (41), washers (40) and bolts (39) on hitch.
10. Install new preformed packing (43) and connect hose assembly (61) to tube assembly (14).
11. Install two flange halves (42), four washers (45) and capscrews (44).



INSTALLATION - CONTINUED

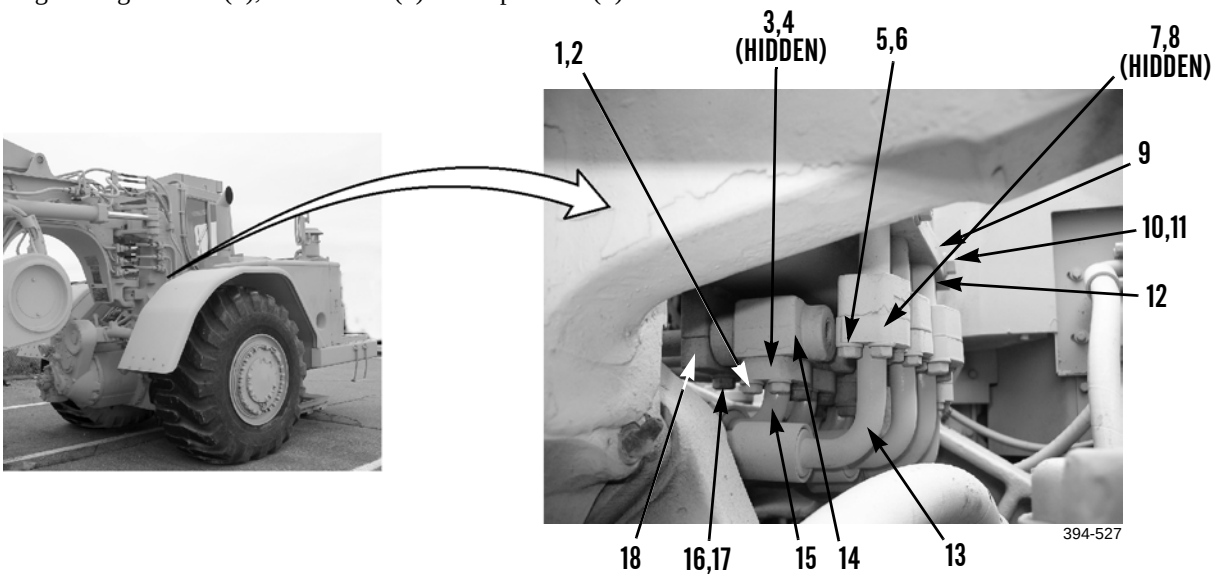
12. Install plate (36), four washers (38) and bolts (37) on hitch.
13. Install plate (35), four washers (34) and bolts (33) on hitch.
14. Position three tube assemblies (12) and install six sleeves (23), clamp halves (22), spacers (19), washers (21) and bolts (20).
15. Install intermediate hose assemblies (WP 0235 00).
16. Position remaining tube assembly (12) and install two clamp halves (26), washers (25) and bolts (24) on hitch.
17. Install new preformed packing (28) and connect hose assembly (60).
18. Install two flange halves (27), washers (30) and capscrews (29).





INSTALLATION - CONTINUED

19. Install clamp (18), two washers (17) and bolts (16) to under side of hitch.
20. Install four new preformed packings (4) and connect four hose assemblies (15) to tube assemblies (14).
21. Install eight flange halves (3), 16 washers (2) and capscrews (1).
22. Install clamp (9), two washers (11) and bolts (10) to hitch.
23. Install four new preformed packings (8) and connect four hose assemblies (13) to tube assemblies (12).
24. Install eight flange halves (7), 16 washers (6) and capscrews (5).



25. Refill hydraulic tank on right, front of vehicle to proper level (TM 5-3805-248-10).
26. Start engine (TM 5-3805-248-10).

NOTE

Perform the next step only if steering tube assemblies were removed.

27. Bleed air from two steering cylinders (WP 0181 00).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this procedure may cause injury.

NOTE

If hose or tube assemblies were removed from a certain system, such as the ejector, operate only the ejector control. If hose or tube assemblies were removed from all systems, operate all the controls to complete the next procedure.

28. Operate hydraulic bowl controls. Move each system through at least five full movements of travel to bleed air out of system.
29. Shut down engine (TM 5-3805-248-10).
30. Check oil level in hydraulic tank and add oil as necessary. (TM 5-3805-248-10).
31. Inspect all hose and tube assemblies for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

HITCH TO DRAFT FRAME INTERMEDIATE HOSES, LINES AND FITTINGS REPLACEMENT 0235 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Materials/Parts - Continued

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (2)

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

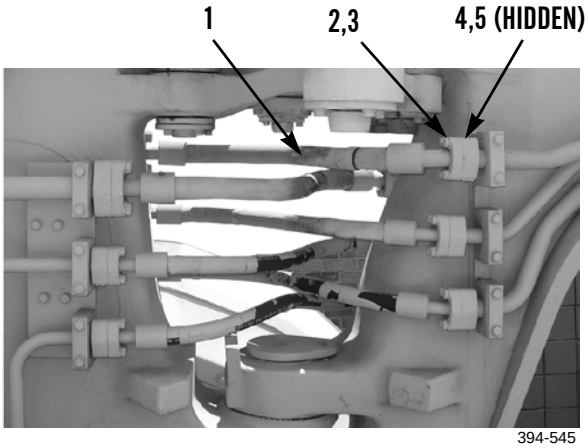
HITCH TO DRAFT FRAME INTERMEDIATE HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0235 00

REMOVAL - CONTINUED

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- The following procedure is for the upper hydraulic hitch to draft frame intermediate hose. The procedure for other hydraulic hitch to draft frame intermediate hoses are identical.

1. Remove four capscrews (2), washers (3) and two flange halves (4) from hose assembly (1) on draft frame.
2. Disconnect hose assembly (1).
3. Remove preformed packing (5) from hose assembly (1) and discard.



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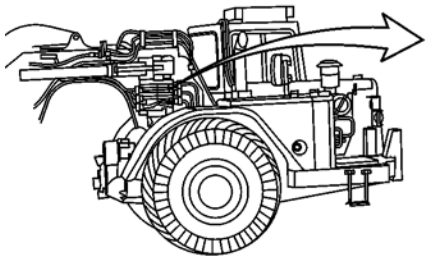
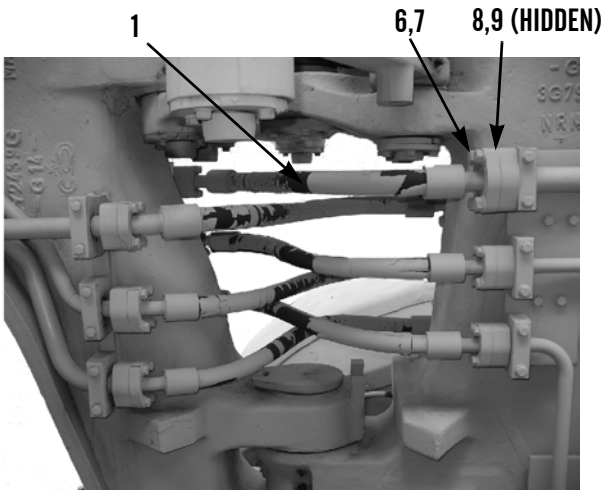
REMOVAL - CONTINUED

4. Remove four capscrews (6), washers (7) and two flange halves (8) from hose assembly (1).
5. Remove hose assembly (1) from machine.
6. Remove preformed packing (9) from hose assembly (1) and discard.





394-545

CLEANING AND INSPECTION

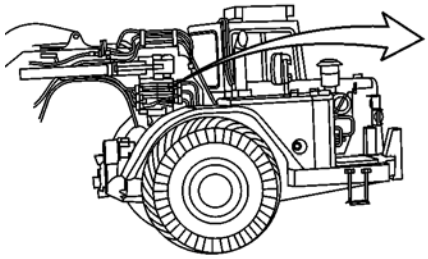
- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

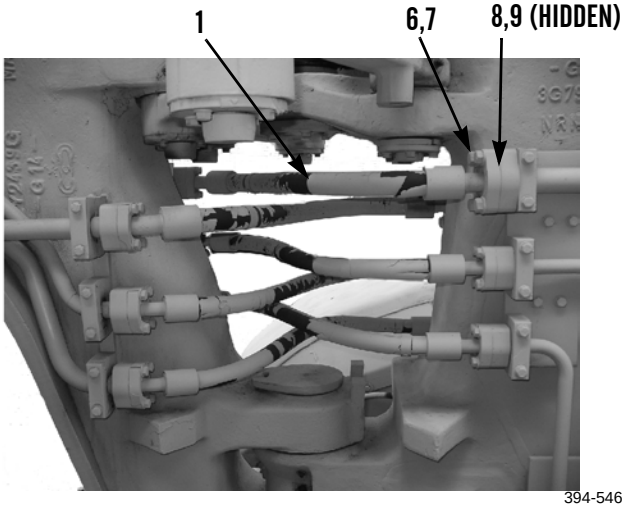
1. Remove all preformed packing material from mounting surfaces.
2. Clean all metal parts with solvent and rubber parts with detergent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

HITCH TO DRAFT FRAME INTERMEDIATE HOSES, LINES AND FITTINGS REPLACEMENT - CONTINUED 0235 00

INSTALLATION

1. Install new preformed packing (9) on hose assembly (1).
2. Install and two flange halves (8) on hose assembly (1)
3. Install four washers (7) and capscrews (6) on hose assembly (1).





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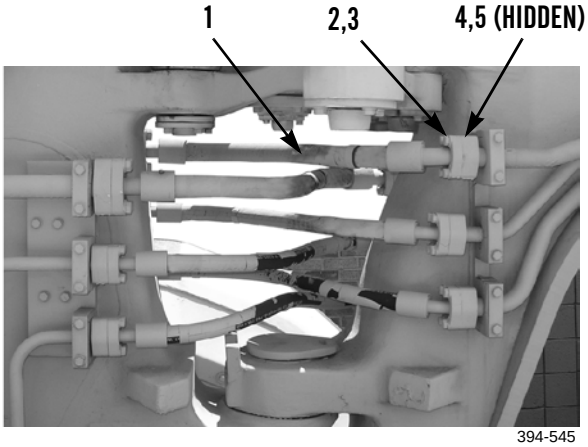
4. Install new preformed packing (5) on hose assembly (1).
5. Connect hose assembly (1) to draft frame and install two flange halves (4).
6. Install four washers (3) and capscrews (2) on hose assembly (1).



394-545

7. Fill hydraulic tank to correct level (TM 5-3805-248-10).

INSTALLATION - CONTINUED

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this warning may cause injury.

8. Start engine (TM 5-3805-248-10).

NOTE

If hose or tube assemblies were removed from a certain system, such as the ejector, operate only the ejector control. If hose or tube assemblies were removed from all systems, operate all the controls to complete the next procedure.

9. Operate hydraulic controls. Move each system through at least five full movements of travel to bleed air out of system (TM 5-3805-248-10).
10. Shut down engine (TM 5-3805-248-10).
11. Check oil level in hydraulic tank and add oil if necessary (TM 5-3805-248-10).
12. Inspect all hose and tube assemblies for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

DRAFT FRAME HOSES, LINES AND FITTINGS REPLACEMENT 0236 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 101, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (4)

References

WP 0235 00

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

NOTE

The following replacement procedure is for left side hydraulic draft frame hoses. The procedure for right side is identical.

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

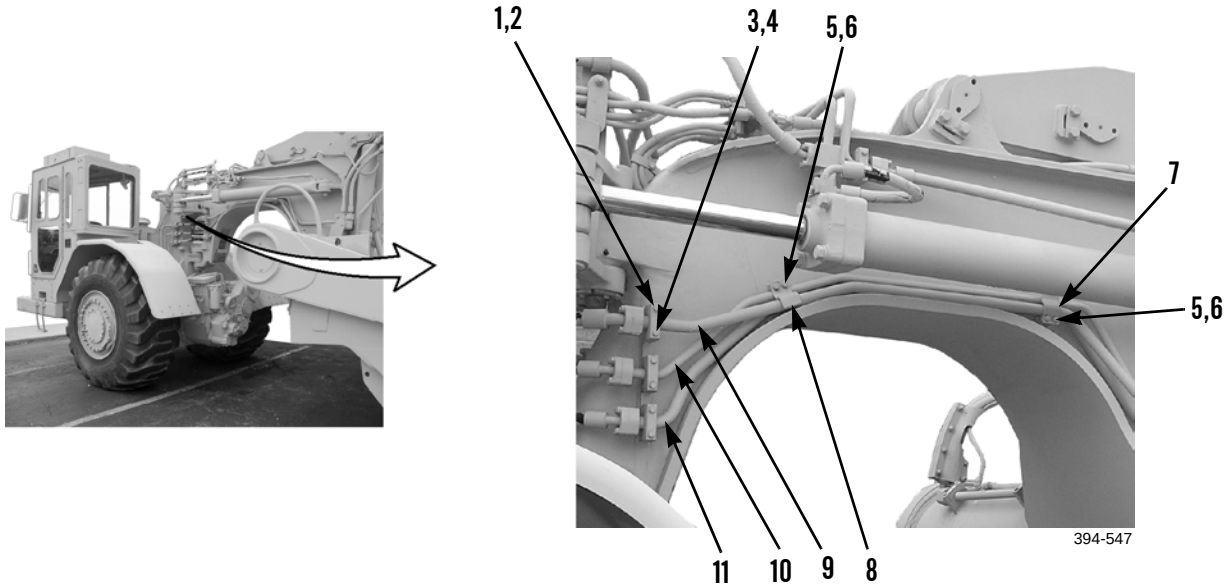
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

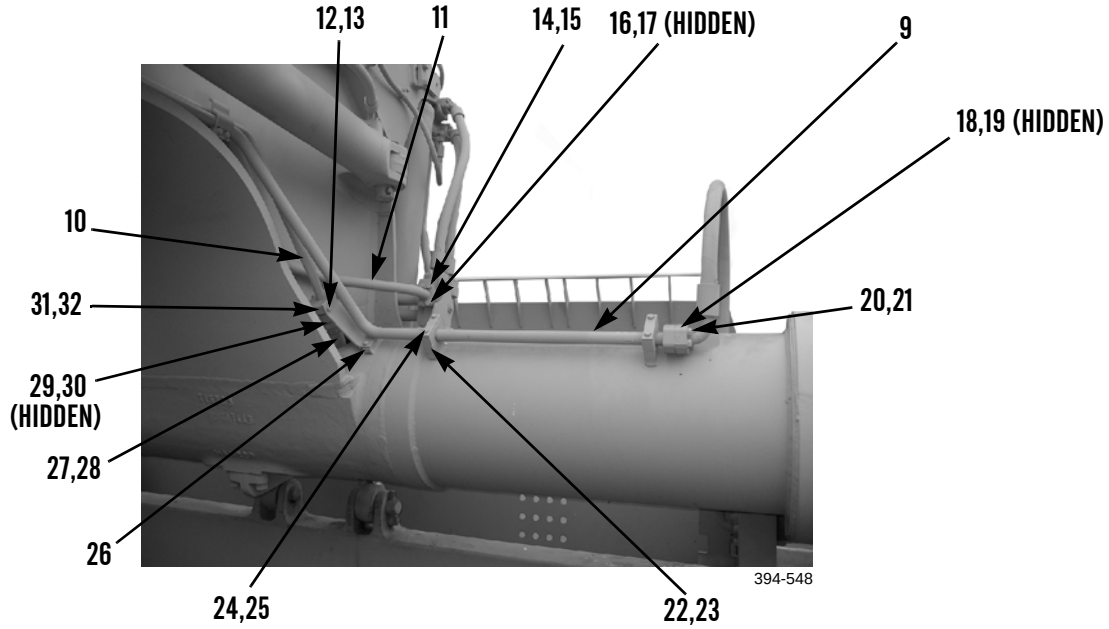
- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.

1. Disconnect hitch to draft frame intermediate hoses (WP 0235 00).
2. Remove six capscrews (1) and three spacers (3) from draft frame.
3. Remove six clamp halves (4) and sleeves (2) from tube assemblies (9, 10 and 11).
4. Remove four capscrews (5), washers (6) and two clamps (7 and 8).

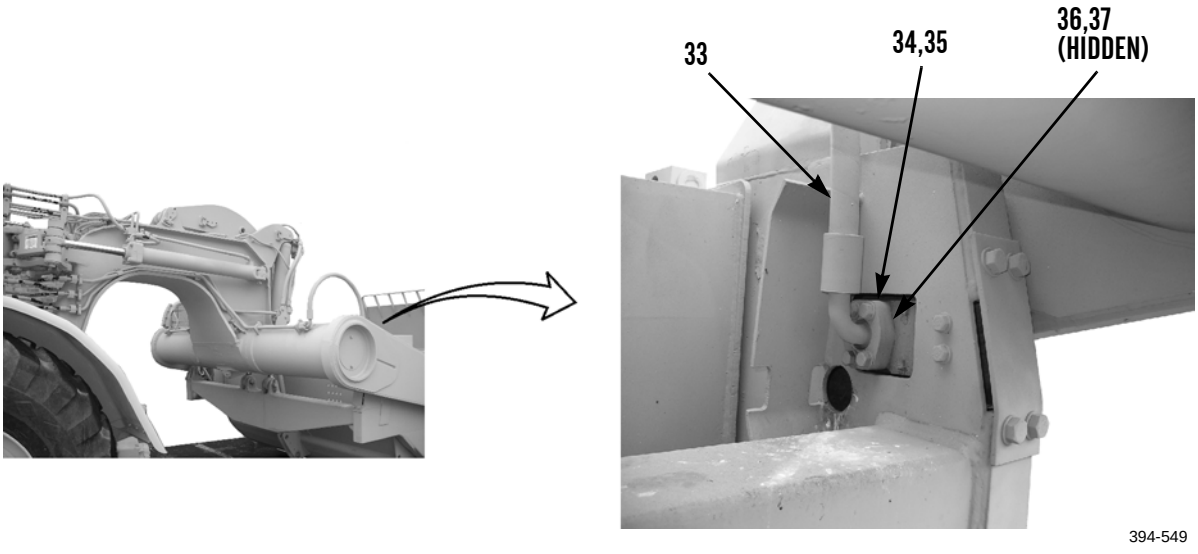


5. Remove four capscrews (20), washers (21) and two flange halves (18) from tube assembly (9).
6. Remove four capscrews (24), two spacers (25) and clamp halves (22).
7. Remove four sleeves (23), tube assembly (9) and preformed packing (19). Discard preformed packing.
8. Remove four capscrews (12), two nuts (13), and retaining strap (26) from draft frame.
9. Remove four capscrews (27), washers (28) and two flange halves (29) from tube assembly (10).
10. Remove tube assembly (10) and preformed packing (30). Discard preformed packing.
11. Remove four capscrews (14), washers (15), and two flange halves (16) from tube assembly (11).
12. Remove tube assembly (11) and preformed packing (17) from draft frame. Discard preformed packing.

REMOVAL - CONTINUED



13. Remove four capscrews (34), washers (35) and two flange halves (36) from hose assembly (33).
14. Remove hose assembly (33) and preformed packing (37) from draft frame. Discard preformed packing.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

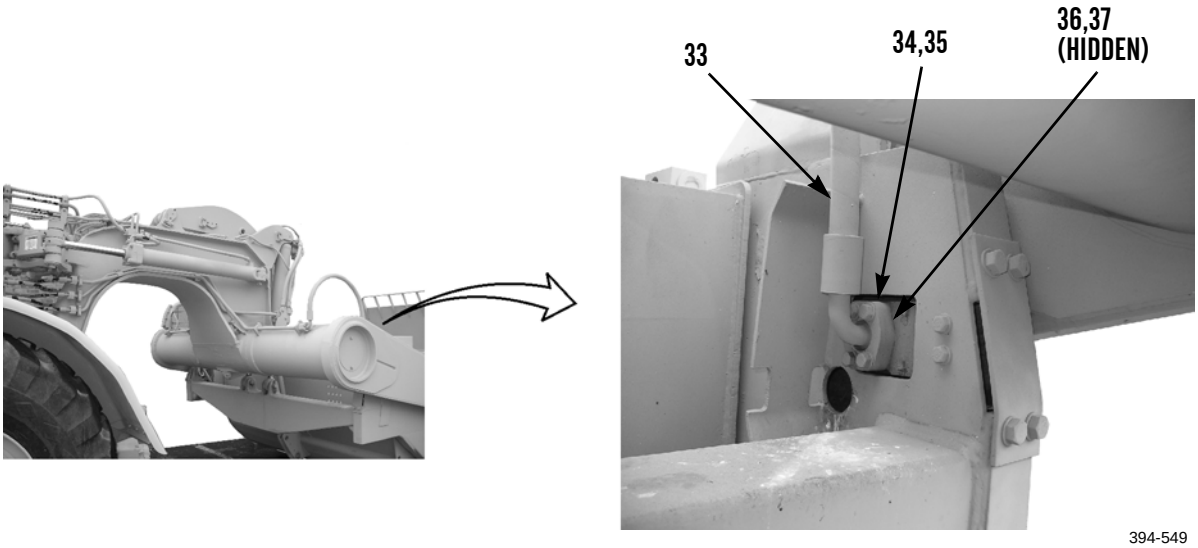
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

1. Install new preformed packing (37) and hose assembly (33) on draft frame.
2. Install two flange halves (36), four washers (35) and capscrews (34) on hose assembly (33).



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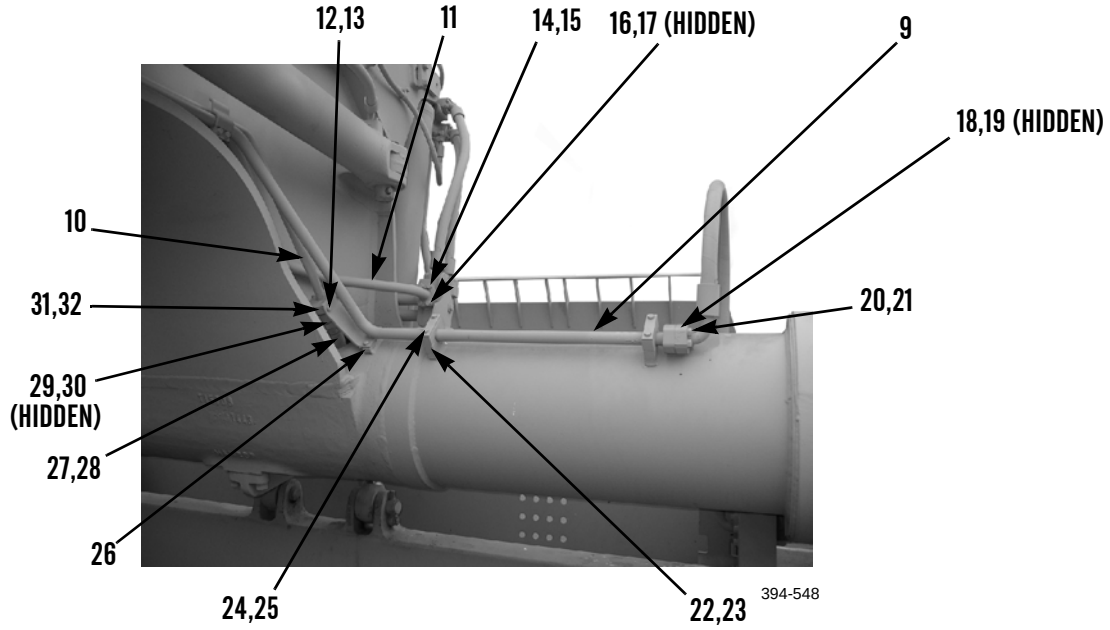
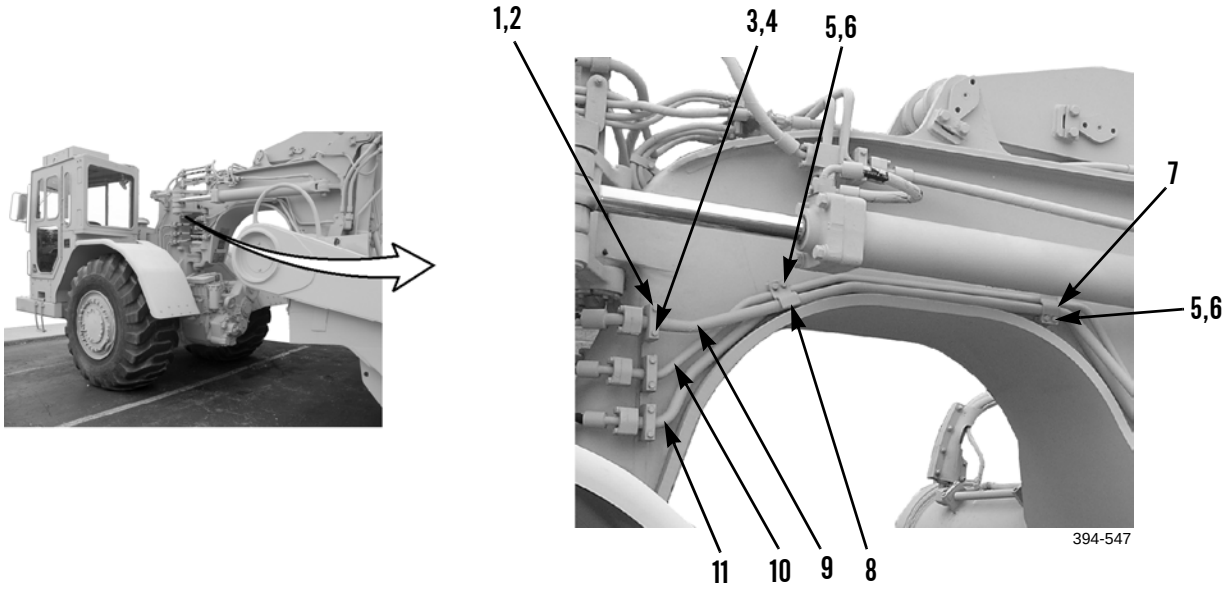
INSTALLATION - CONTINUED

3. Install new preformed packing (17) and tube assembly (11) on draft frame.
4. Install two flange halves (16), four washers (15) and capscrews (14) on tube assembly (11).
5. Install new preformed packing (30) and tube assembly (10).
6. Install two flange halves (29), four washers (28) and capscrews (27) on tube assembly (10).
7. Install two clamp halves (31) and sleeves (32) on tube assembly (10).
8. Install retaining strap (26), four capscrews (12) and two nuts (13) on tube assembly (10).
9. Install new preformed packing (19) and tube assembly (9) on draft frame.
10. Install two flange halves (18), four washers (21) and capscrews (20) on tube assembly (9).
11. Install four sleeves (23), two clamp halves (22), spacers (25) and four capscrews (24).



INSTALLATION - CONTINUED

12. Connect hitch to draft frame intermediate hoses (WP 0235 00).
13. Install six clamp halves (4) and three spacers (3) on tube assemblies (9, 10 and 11).
14. Install six sleeves (2) and capscrews (1).
15. Install two clamps (7 and 8), four washers (6) and capscrews (5) on tube assemblies (9, 10 and 11).



16. Refill hydraulic tank to correct level (TM 5-3805-248-10).
17. Start engine (TM 5-3805-248-10).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this warning may cause injury. If you are injured, obtain medical aid immediately.

NOTE

If hose or tube assemblies were removed from a certain system, such as the ejector, operate only the ejector control. If hose or tube assemblies were removed from all systems, operate all the controls to complete the next procedure.

18. Operate hydraulic controls. Move each system through at least five full movements of travel to bleed air out of system.
19. Shut down engine (TM 5-3805-248-10).
20. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
21. Inspect all hose and tube assemblies for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

APRON CYLINDER HOSES, LINES AND FITTINGS REPLACEMENT 0237 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (5)

References

WP 0231 00

WP 0244 00

WP 0253 00

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

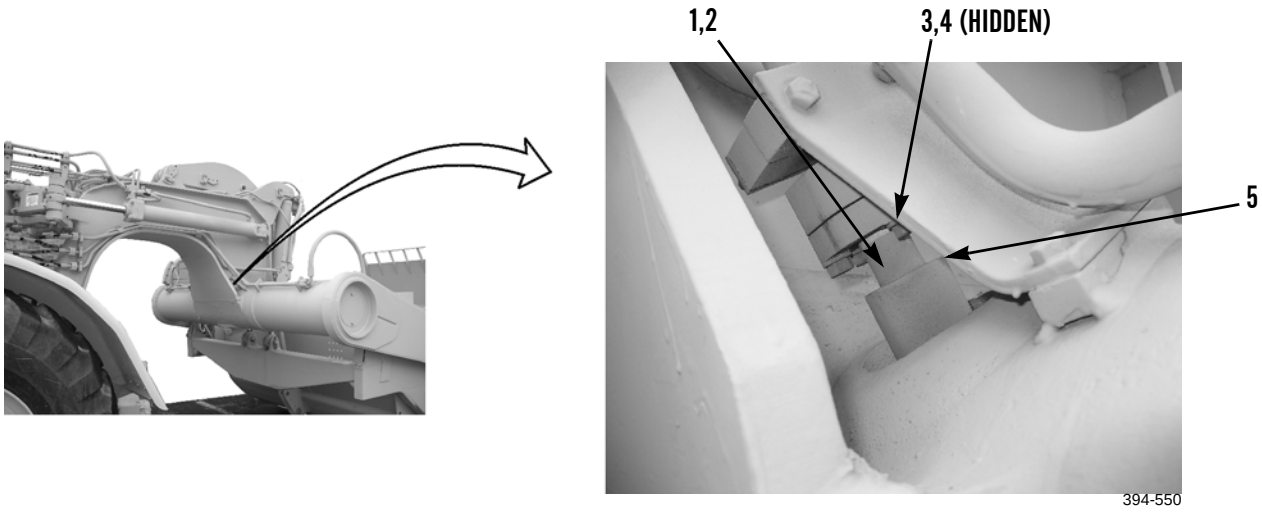
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

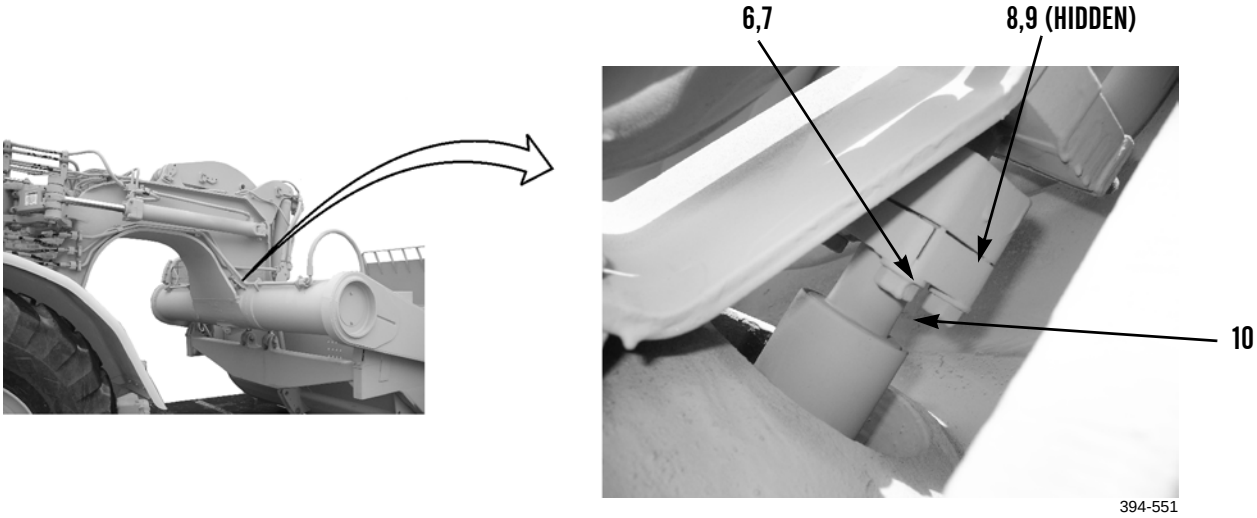
- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.

1. Start engine (TM 5-3805-248-10).
2. Raise bowl (TM 5-3805-248-10).
3. Place two jack stands under bowl.
4. Lower bowl until weight is on jack stands (TM 5-3805-248-10).
5. Block apron (WP 0253 00).
6. Retract cylinder rod (WP 0244 00).
7. Vent hydraulic pressure (WP 0231 00).
8. Remove four capscrews (1), washers (2) and two flange halves (3) from hose assembly (5).
9. Disconnect hose assembly (5).
10. Remove preformed packing (4) from hose assembly and discard.

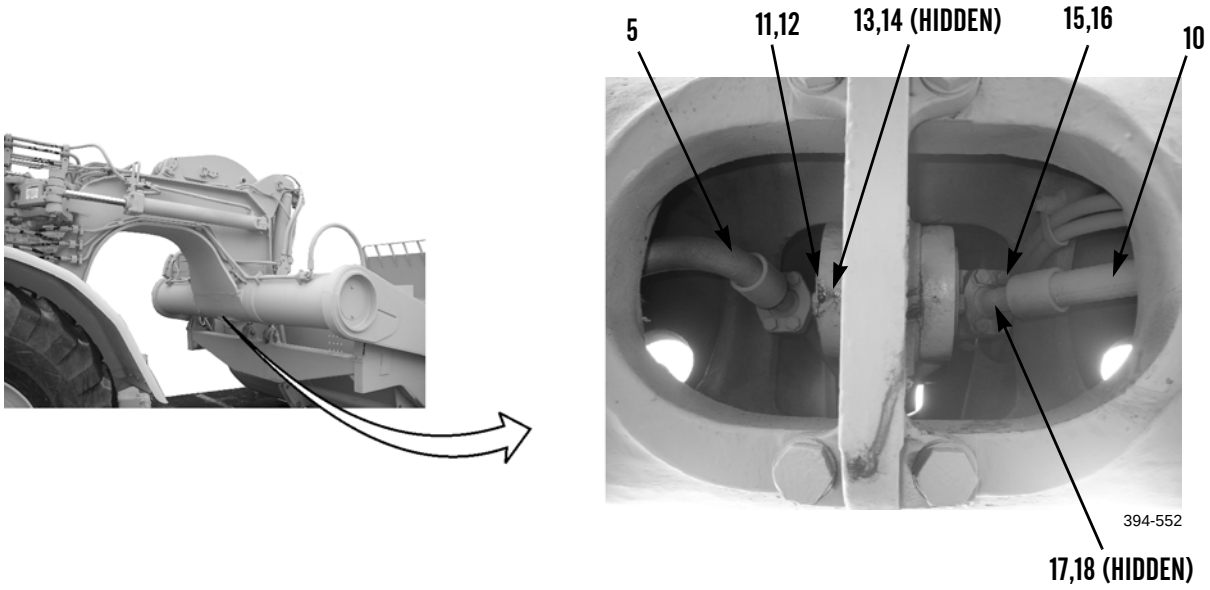


REMOVAL - CONTINUED

11. Remove four capscrews (6), washers (7) and two flange halves (8) from hose assembly (10).
12. Disconnect hose assembly (10).
13. Remove and discard preformed packing (9).

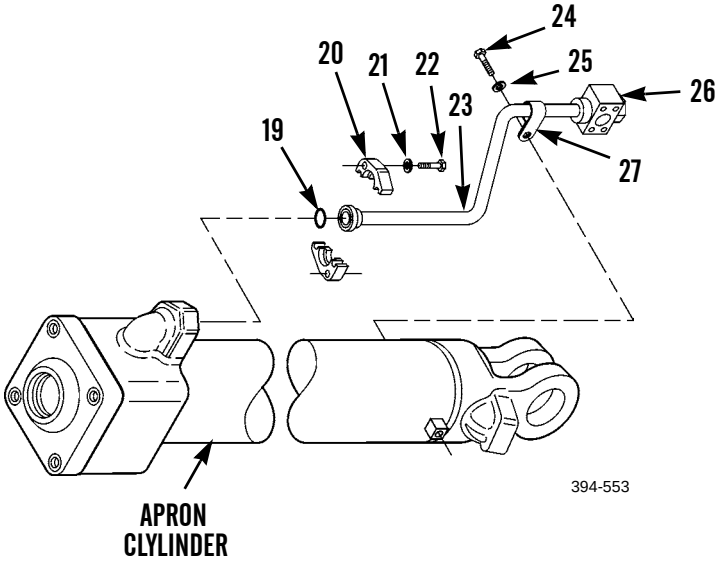


14. Remove four capscrews (11), washers (12) and two flange halves (13) through port hole of draft frame.
15. Remove hose assembly (5).
16. Remove and discard preformed packing (14) from hose assembly (5).
17. Remove four capscrews (15), washers (16) and two flange halves (17) through port hole of draft frame.
18. Remove hose assembly (10).
19. Remove and discard preformed packing (18) from hose assembly (10).



REMOVAL - CONTINUED

20. Remove apron cylinder from machine (WP 0244 00).
21. Remove bolt (24), clamp (26), washer (25) and nut (27) from tube assembly (23).
22. Remove four capscrews (22), washers (21) and two flange halves (20).
23. Remove tube assembly (23) from apron cylinder.
24. Remove and discard preformed packing (19) from tube assembly (23).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

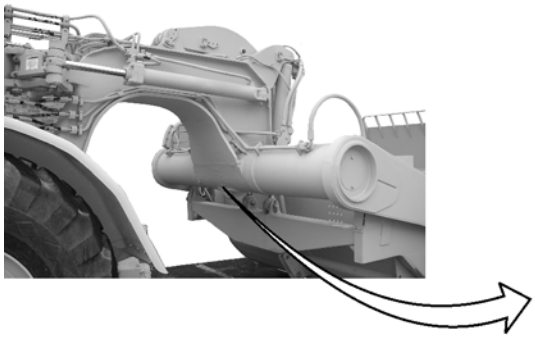
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

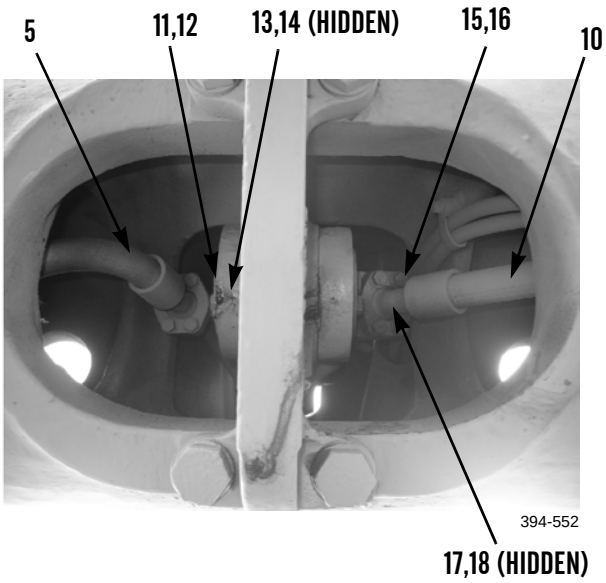
INSTALLATION

NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

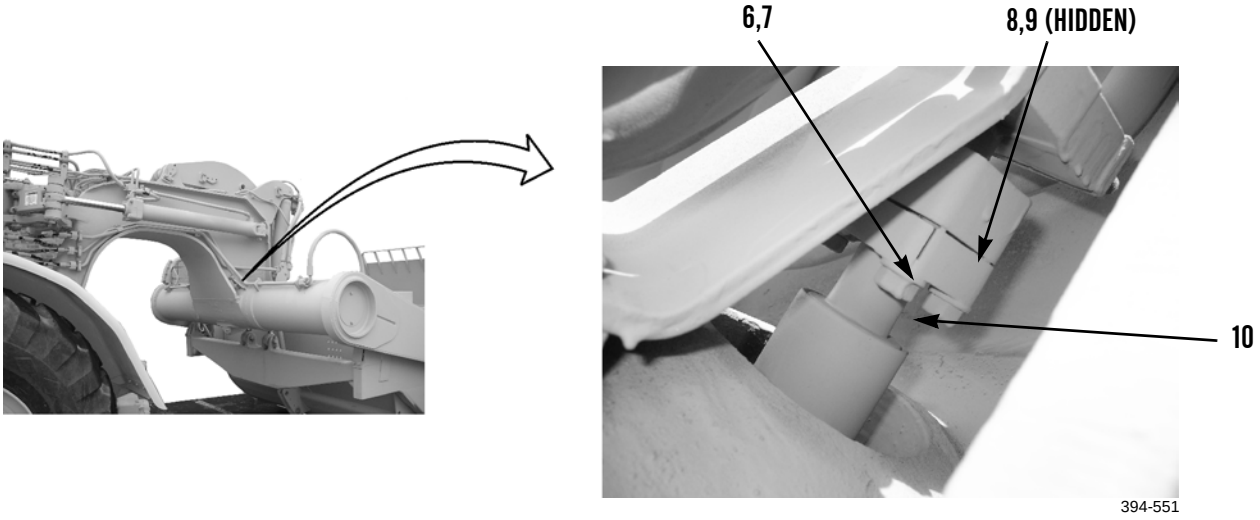
1. Install new preformed packing (19) on tube assembly (23).
2. Position tube assembly (23) and two flange halves (20) on apron cylinder.
3. Install four washers (21) and capscrews (22).
4. Install nut (27), washer (25), clamp (26) and bolt (24) on tube assembly (23).
5. Install apron cylinder (WP 0244 00).
6. Install new preformed packing (18) in hose assembly (10).
7. Position hose assembly (10) and two flange halves (17) on right side of draft frame.
8. Install four washers (16) and capscrews (15).
9. Install new preformed packing (14) on hose assembly (5).
10. Position hose assembly (5) and two flange halves (13) on left side of draft frame.
11. Install four washers (12) and capscrews (11) on hose assembly (5).



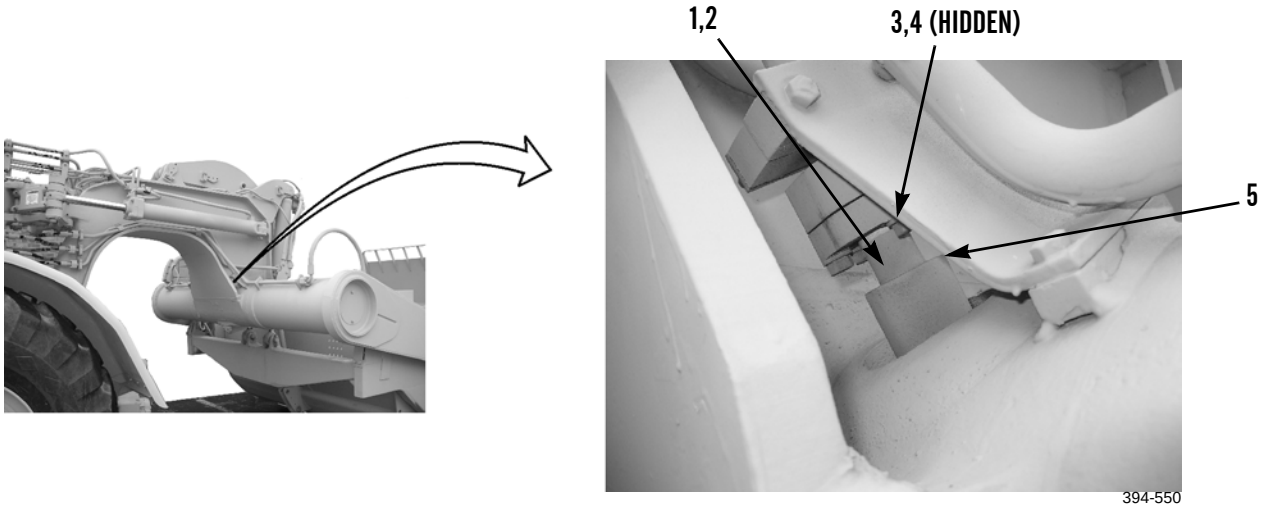


INSTALLATION - CONTINUED

12. Install new preformed packing (9) in hose assembly (10).
13. Connect hose assembly (10) and two flange halves (8) on right side of draft frame.
14. Install four washers (7) and capscrews (6).



15. Install new preformed packing (4) on hose assembly (5).
16. Connect hose assembly (5) and two flange halves (3) on left side of draft frame.
17. Install four washers (2) and capscrews (1).



INSTALLATION - CONTINUED

18. Refill hydraulic tank to correct level (TM 5-3805-248-10).
19. Extend cylinder rod (WP 0244 00).
20. Unblock apron (WP 0253 00).
21. Raise bowl (TM 5-3805-248-10).
22. Remove two jack stands from under bowl.
23. Lower bowl (TM 5-3805-248-10).
24. Start engine (TM 5-3805-248-10).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the machine. Failure to follow this procedure may cause injury.

25. Operate hydraulic apron control. Apron should be moved through at least five full movements of travel. This will bleed the air out of the system.
26. Shut down engine (TM 5-3805-248-10).
27. Check hydraulic oil level and add as necessary (TM 5-3805-248-10).
28. Inspect hose and tube assemblies for leaks.

END OF WORK PACKAGE

HOSES (WITH CROSSOVER TUBE), LINES AND FITTINGS TO BOWL CYLINDERS REPLACEMENT

0238 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (5)

References

WP 0236 00

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

NOTE

The following replacement procedure is for the right bowl cylinder hoses, lines and fittings. The left side is identical.

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

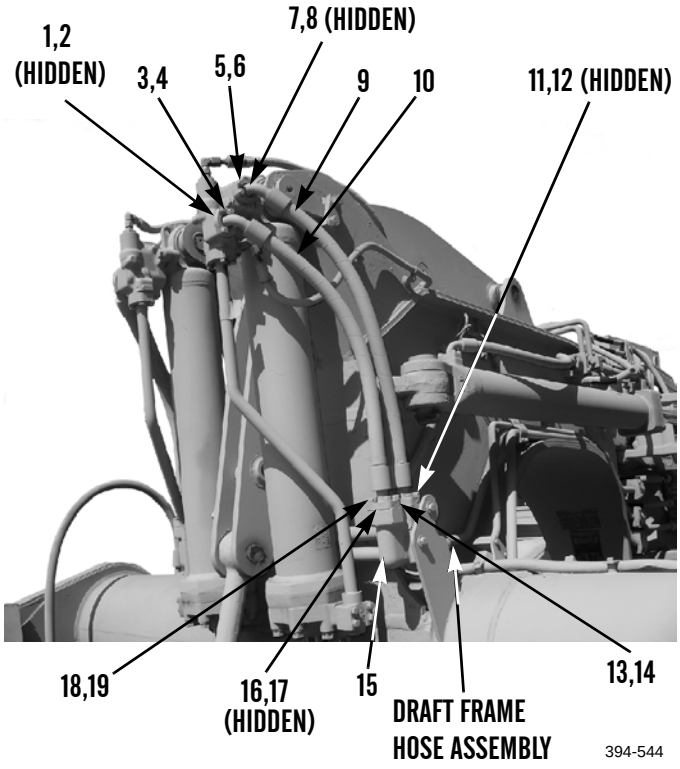
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.

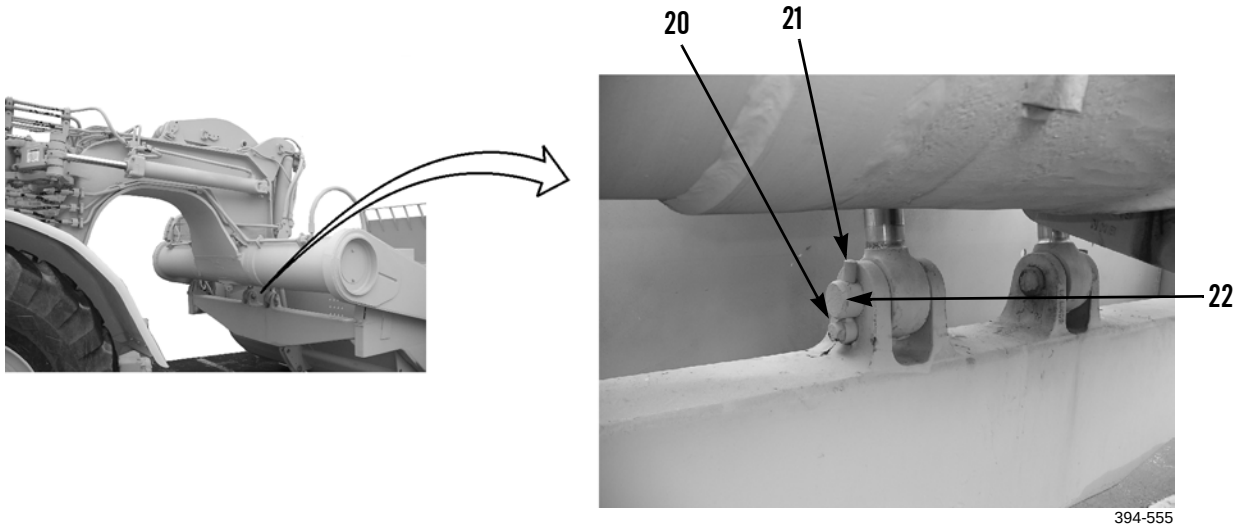
1. Remove four capscrews (3), washers (4) and two flange halves (1) from hose assembly (10) on right side of draft frame.
2. Disconnect hose assembly (10) from top of bowl cylinder.
3. Remove preformed packing (2) from hose assembly (10) and discard.
4. Remove four capscrews (5), washers (6) and two flange halves (7) from hose assembly (9) on right side of draft frame.
5. Disconnect hose assembly (9) from top of bowl assembly (15).
6. Remove and discard preformed packing (8) from hose assembly (9).
7. Remove four capscrews (13), washers (14) and two flange halves (11) from hose assembly (9).
8. Remove hose assembly (9) from tube assembly (16).
9. Remove and discard preformed packing (12) from hose assembly (9).
10. Remove four capscrews (18), washers (19) and two flange halves (16) from hose assembly (10).
11. Remove hose assembly (10) from tube assembly (15).
12. Remove and discard preformed packing (17) from hose assembly (10).
13. Remove right side draft frame tube assembly from tube assembly (15) (WP 0236 00).



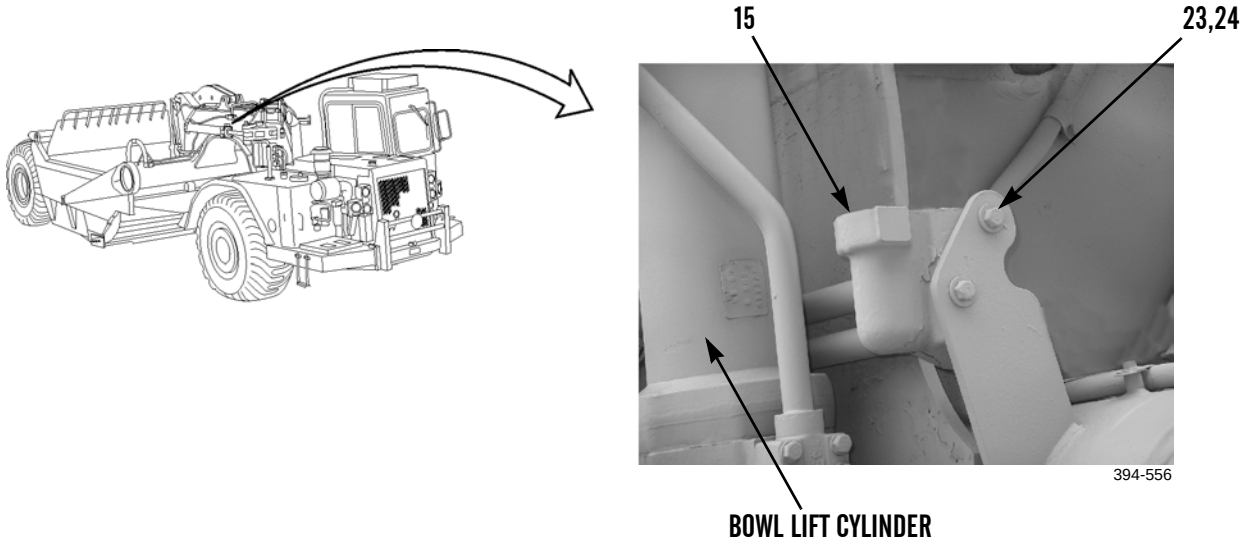
HOSES (WITH CROSSOVER TUBE), LINES AND FITTINGS TO BOWL CYLINDERS REPLACEMENT - CONTINUED

REMOVAL - CONTINUED

14. Remove bolt (20) from cylinder rod mounting bracket in front of bowl.
15. Remove pin assembly (21) from pin (22) in rod eye bracket.
16. Remove pin (22) from bowl cylinder rod eye and mounting bracket.



17. Remove four bolts (23) and washers (24) (2 on each side) from tube assembly (15).
18. With assistance, position bowl cylinder toward rear of machine and remove tube assembly (15).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

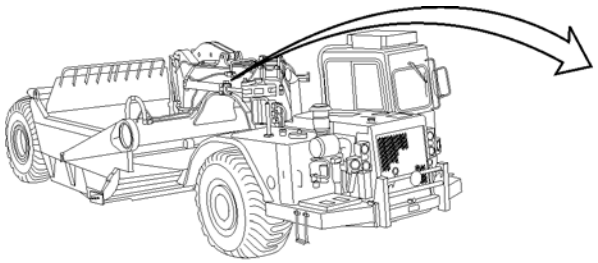
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

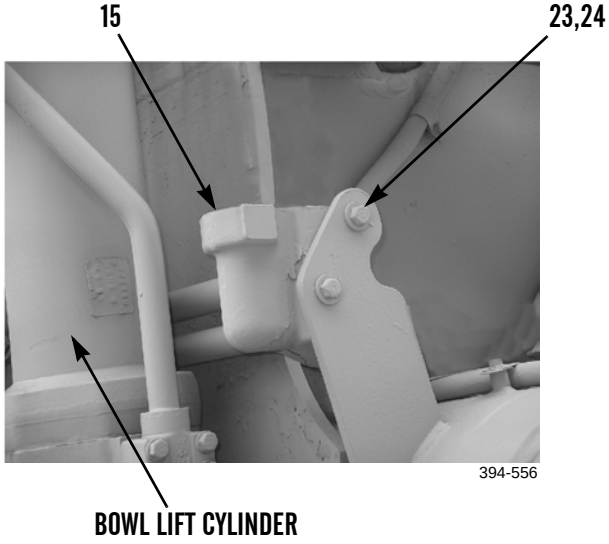
INSTALLATION

NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

1. With assistance, push bowl cylinder toward rear of machine and install tube assembly (15).
2. Install four washers (24) and bolts (23) on tube assembly (15).

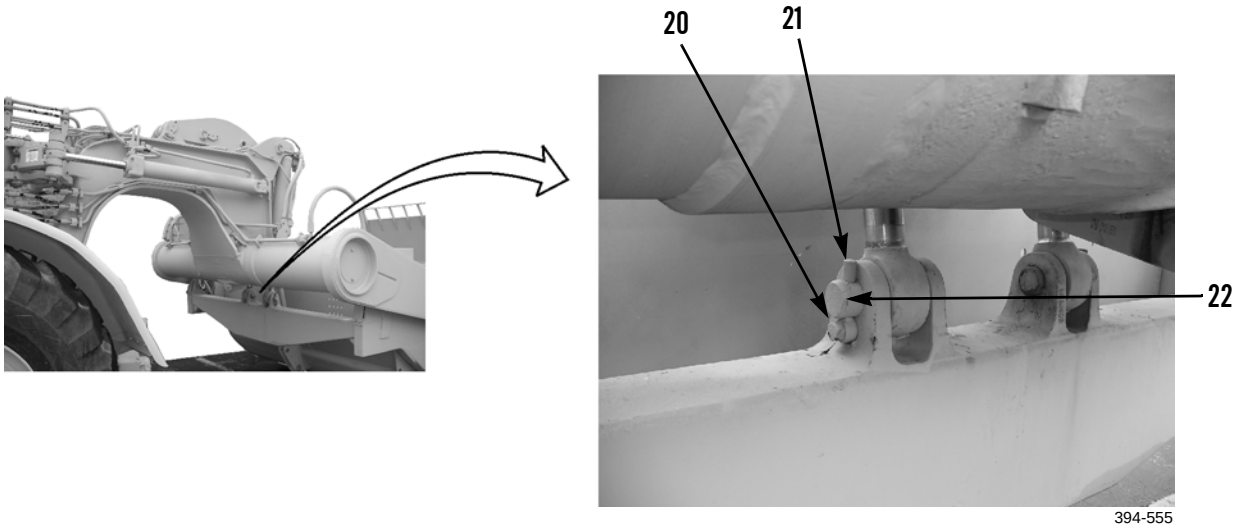




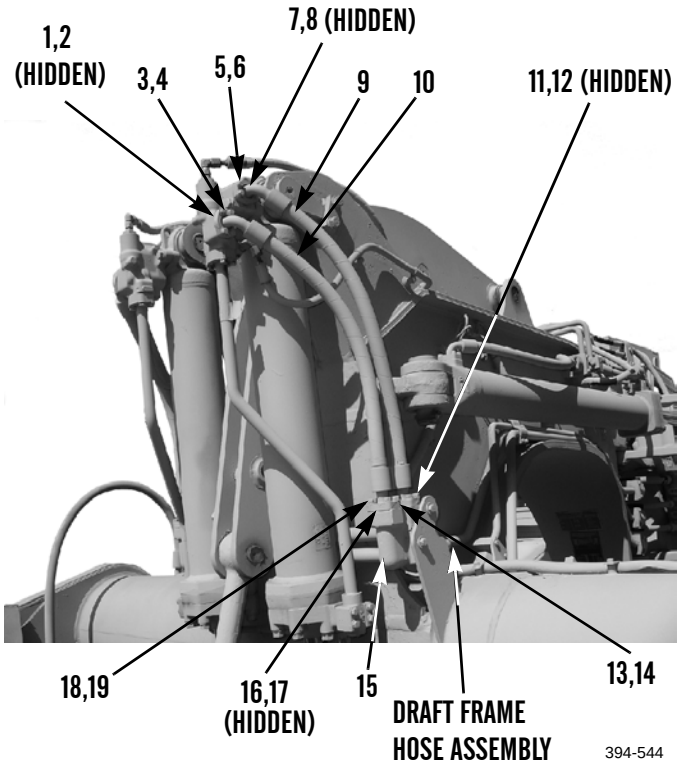
HOSES (WITH CROSSOVER TUBE), LINES AND FITTINGS TO BOWL CYLINDERS REPLACEMENT - CONTINUED 0238 00

INSTALLATION - CONTINUED

3. Position bowl cylinder rod eye in mounting bracket and install pin (22).
4. Install pin assembly (21) and bolt (20).



5. Install right side draft frame tube assembly on tube assembly (15) (WP 0236 00).
6. Install new preformed packing (17) in hose assembly (10).
7. Position hose assembly (10) and two flange halves (16) on tube assembly (15).
8. Install four washers (19) and capscrews (18).
9. Install new preformed packing (12) in hose assembly (9).
10. Position hose assembly (9) and two flange halves (11) on tube assembly (15).
11. Install four washers (14) and capscrews (13).
12. Install new preformed packing (8) on hose assembly (9).
13. Connect hose assembly (9) and two flange halves (7) at top of bowl cylinder.
14. Install four washers (6) and capscrews (5).
15. Install new preformed packing (2) on hose assembly (10).
16. Connect hose assembly (10) and two flange halves (1) at top of bowl cylinder.
17. Install four washers (4) and capscrews (3).
18. Fill hydraulic tank to correct level (TM 5-3805-248-10).



INSTALLATION - CONTINUED

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this procedure may cause injury.

19. Start engine (TM 5-3805-248-10).
20. Operate hydraulic bowl cylinder control. Move system through at least five full movements of travel. This will bleed the air out of the system.
21. Shut down engine (TM 5-3805-248-10).
22. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
23. Inspect hose and tube assemblies for leaks.

END OF WORK PACKAGE

BOWL CYLINDERS HOSES, LINES AND FITTINGS REPLACEMENT 0239 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (3)

References

WP 0228 00

TM 5-3805-248-10

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

NOTE

This replacement procedure is for the right bowl cylinder hoses, lines and fittings. The replacement procedure for the left bowl cylinder hoses, lines and fittings is identical.

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

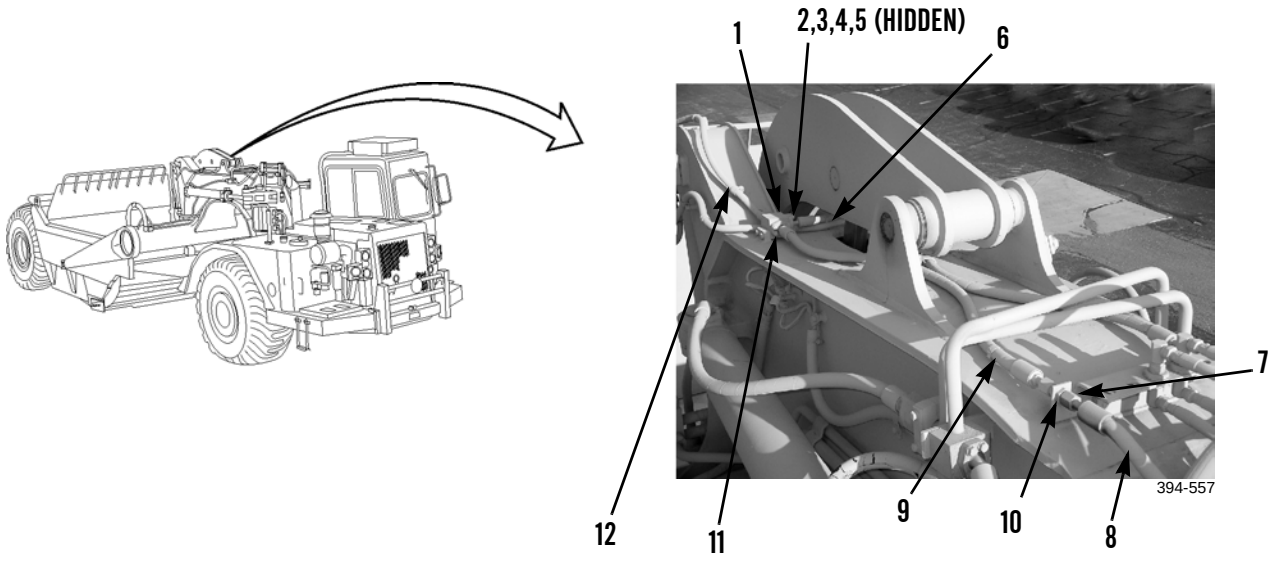
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Remove and note location of all clips that secure hose assemblies to ensure correct installation.

1. Disconnect hose assemblies (8 and 9) from tube nipple (10) on top of draft frame.
2. Remove nut (7) and tube nipple (10).
3. Remove 12 capscrews (2), washers (3) and six flange halves (4) from junction box (1).
4. Disconnect three hose assemblies (6, 9 and 12) from junction box (1).
5. Remove and discard three preformed packings (5) from hose assemblies (6, 9 and 12).
6. Remove two bolts (11) and junction box (1) from top of draft frame.
7. Disconnect hose assemblies from (6 and 12) from bowl lifting check valve assembly (WP 0228 00).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

1. Connect hose assemblies (6 and 12) to bowl lifting check valve (WP 0228 00).
2. Install junction box (1) and two bolts (11) on top of draft frame.
3. Install three new preformed packings (5) on hose assemblies (6, 9 and 12).
4. Connect hose assemblies (6, 9 and 12) and install six flange halves (4) on junction box (1).
5. Install 12 washers (3) and capscrews (2) on hose assemblies (6, 9 and 12).
6. Install tube nipple (10) and nut (7) on top of draft frame.
7. Connect hose assemblies (8 and 9) to tube nipple (10).
8. Fill hydraulic tank to correct level (TM 5-3805-248-10).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this procedure may cause injury. If you are injured, obtain medical aid immediately.

9. Start engine (TM 5-3805-248-10).
10. Operate hydraulic bowl cylinder control. Move system through at least five full movements of travel. This will bleed the air out of the system.
11. Shut down engine (TM 5-3805-248-10).
12. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
13. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

BOWL INTERMEDIATE HOSES, LINES AND FITTINGS REPLACEMENT 0240 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent (Item 13, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed

References

WP 0164 00

WP 0229 00

Equipment Condition

Ejector moved forward (TM 5-3805-248-10)

Hydraulic system pressure relieved (WP 0231 00)

NOTE

This replacement procedure is for the right bowl hoses, lines and fittings. The replacement procedure for the left bowl cylinder hoses, lines and fittings is identical.

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

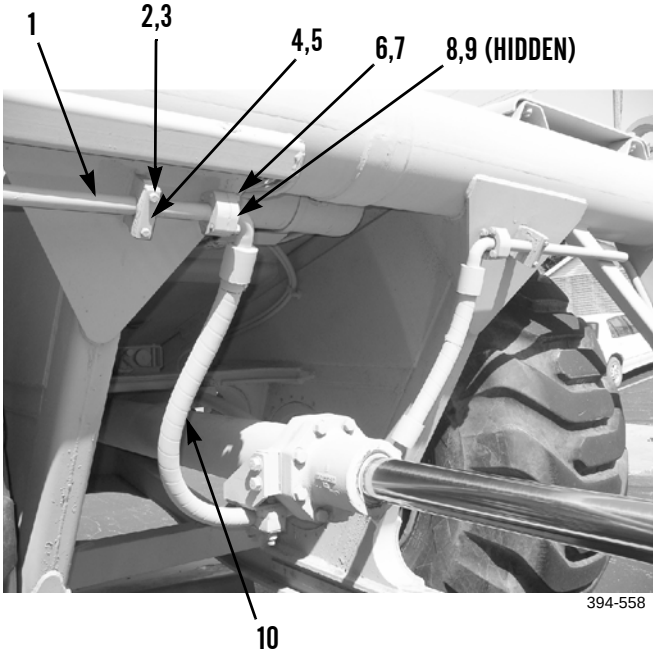
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Remove and note location of all clips that secure hose assemblies to ensure correct installation.

1. Remove bowl intermediate hydraulic hose assembly (WP 0164 00).
2. Remove four capscrews (6), washers (7) and two flange halves (8) from behind ejector.
3. Disconnect hose assembly (10) from tube assembly (1).
4. Remove preformed packing (9) from hose assembly (10) and discard.
5. Remove two bolts (2), sleeves (3), spacer (4) and flange half (5) from tube assembly (1).
6. Remove tube assembly (1).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all preformed packing material from mounting surfaces.
2. Clean all metal parts with solvent and rubber parts with detergent.

CLEANING AND INSPECTION - CONTINUED

3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

Lightly coat all new preformed packings with clean oil prior to installation.

1. Install tube assembly (1) behind ejector.
2. Install flange half (5), spacer (4), two sleeves (3) and bolts (2) on tube assembly (1).
3. Install new preformed packing (9) on hose assembly (10).
4. Position hose assembly (10) and two flange halves (8) on tube assembly (1).
5. Install four washers (7) and capscrews (6).
6. Install bowl intermediate hydraulic hose assembly (WP 0164 00).
7. Fill hydraulic tank to correct level (WP 0229 00).
8. Start engine (TM 5-3805-248-10).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this procedure may cause injury. If you are injured, obtain medical aid immediately.

NOTE

If hose or tube assemblies were removed from a certain system, such as ejector, then operate only ejector control. If hose or tube assemblies were removed from all systems, then operate all the controls to complete the next procedure.

9. Operate hydraulic ejector control lever. Move system through at least five full movements of travel. This will bleed the air out of the system.
10. Shut down engine (TM 5-3805-248-10).
11. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
12. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

EJECTOR CYLINDER HOSES, LINES AND FITTINGS REPLACEMENT 0241 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Detergent (Item 13, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed

References

WP 0240 00

Equipment Condition

Ejector moved forward (TM 5-3805-248-10)

Hydraulic system pressure relieved (WP 0231 00)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

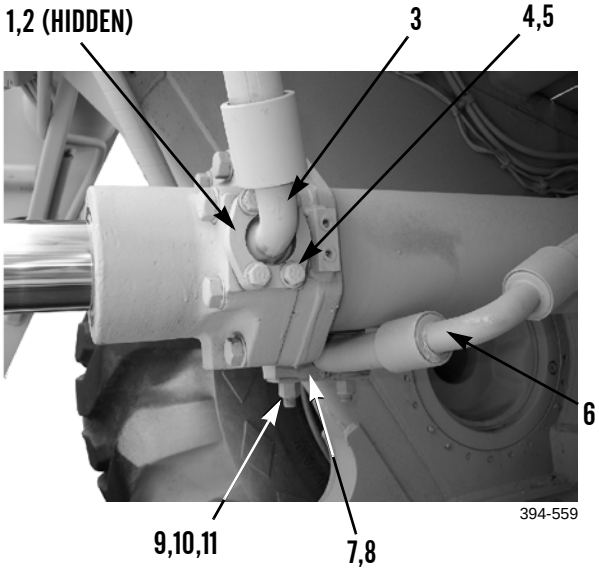
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

NOTE

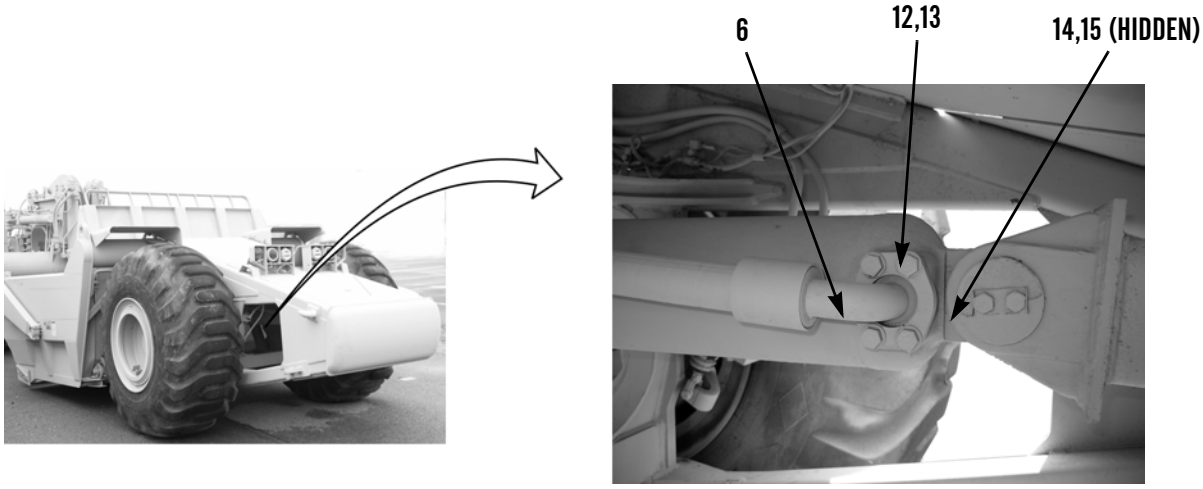
- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.

1. Disconnect bowl intermediate hoses (WP 0240 00).
2. Remove four capscrews (4), washers (5) and two flange halves (1) from front, left side of ejector cylinder.
3. Disconnect hose assembly (3).
4. Remove and discard preformed packing (2).
5. Remove two nuts (9) and spacer (7) from ejector cylinder.
6. Remove two bolts (11), sleeves (10) and clamp halves (8) from hose assembly (6).



REMOVAL - CONTINUED

7. Remove four capscrews (12), washers (13) and two flange halves (14) from ejector cylinder.
8. Remove hose assembly (6) and preformed packing (15). Discard preformed packing.



394-560

CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

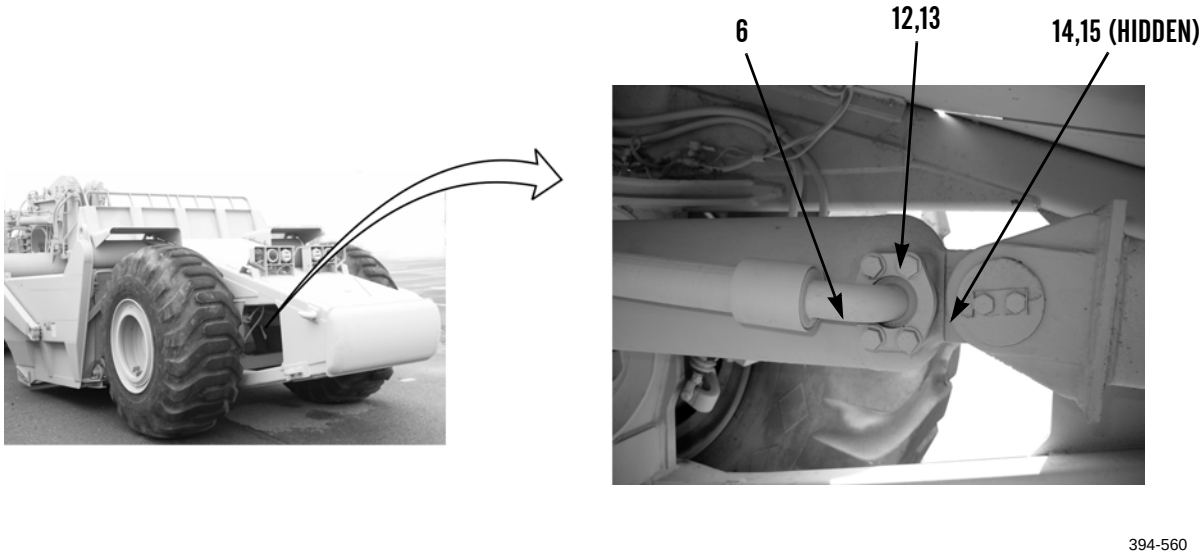
1. Remove all preformed packing material from mounting surfaces.
2. Clean all metal parts with solvent and rubber parts with detergent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

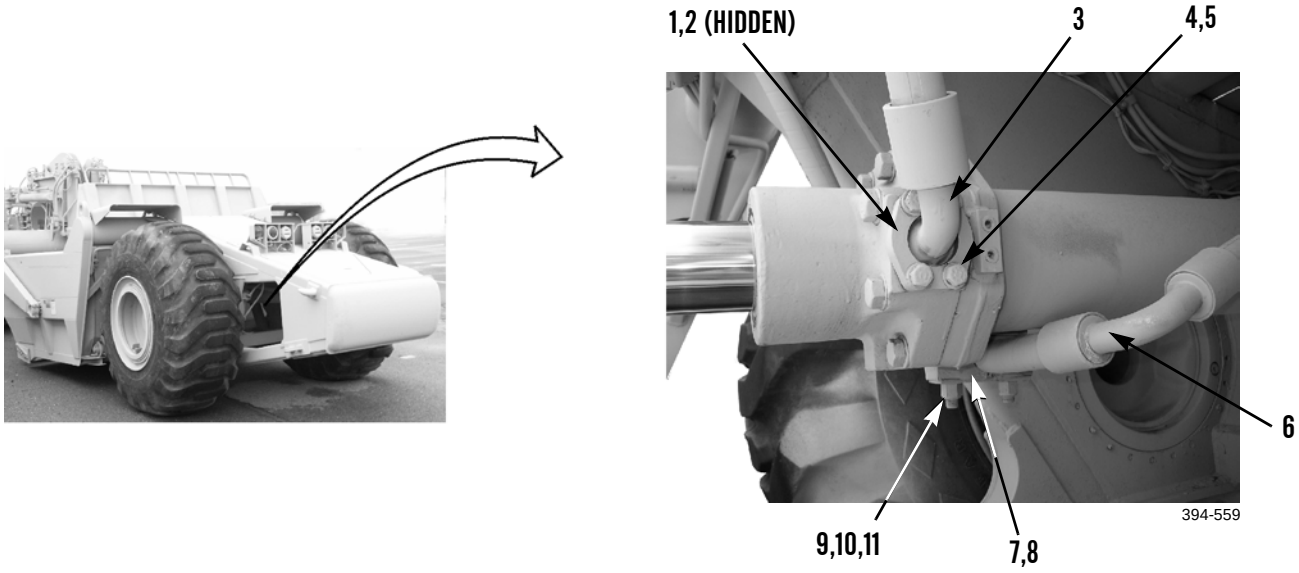
Lightly coat all new preformed packings with clean oil prior to installation.

1. Install new preformed packing (15) on hose assembly (6).
2. Position hose assembly (6) and two flange halves (14) on ejector cylinder.
3. Install four washers (13) and capscrews (12).



394-560

4. Install two clamp halves (8), sleeves (10), bolts (11), spacer (7) and two nuts (9) on hose assembly (6).
5. Install new preformed packing (2) on hose assembly (3) on ejector cylinder.
6. Position hose assembly (3) and two flange halves (1) on ejector cylinder.
7. Install four washers (5) and capscrews (4).



394-559

INSTALLATION - CONTINUED

8. Connect bowl intermediate hoses (WP 0240 00).
9. Fill hydraulic tank (TM 5-3805-248-10).

WARNING

Only a qualified operator may perform the following procedure. All other personnel must clear the immediate area of the vehicle. Failure to follow this procedure may cause injury.

10. Start engine (TM 5-3805-248-10).
11. Operate hydraulic ejector control lever. Move system through at least five full movements of travel. This will bleed the air out of the system.
12. Shut down engine (TM 5-3805-248-10).
13. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
14. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

BOWL LIFT CYLINDERS REPLACEMENT 0242 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Lifting device, 400 lb minimum capacity

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Packing, preformed (2)

Personnel Required

Two

References

WP 0228 00

Equipment Condition

Hydraulic system pressure relieved (WP 0231 00)

NOTE

This replacement procedure is for removal of the left bowl lifting cylinder. The maintenance procedure for removal of the right bowl lifting cylinder is identical.

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

CAUTION

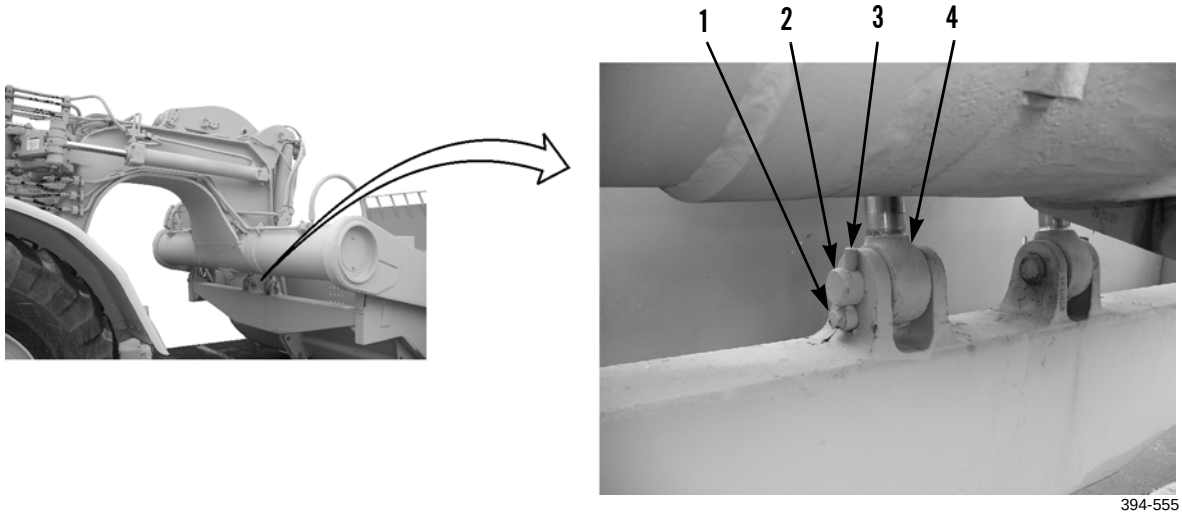
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

REMOVAL - CONTINUED

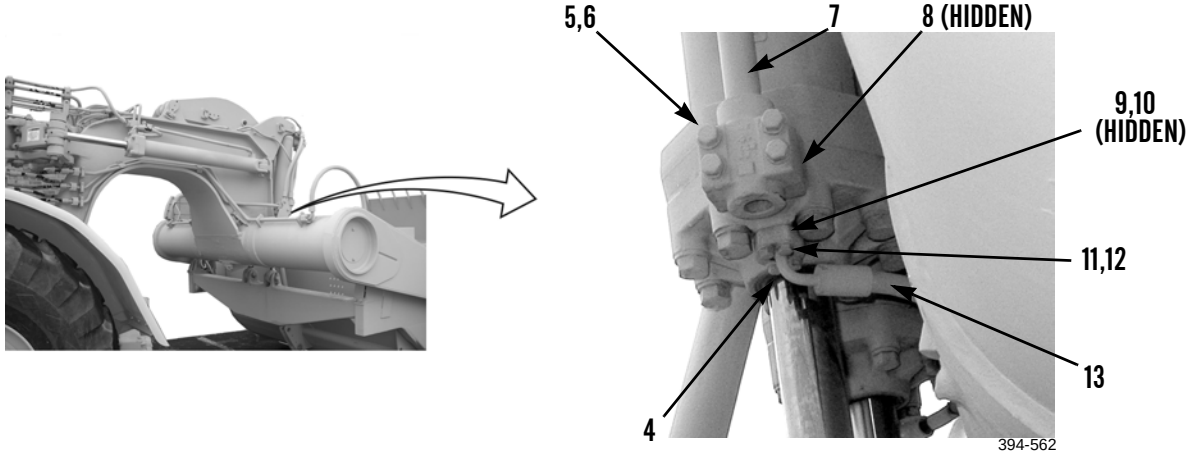
NOTE

- Use a container to capture draining hydraulic oil. Dispose of hydraulic oil IAW local policy and ordinances. Ensure all spills are cleaned up.
- Tag hose and tube assemblies prior to removal to ensure correct installation.
- Note routing of all hose assemblies prior to removal to ensure correct installation.
- Ensure bowl is resting on blocks.

1. Attach lifting device to top of bowl lifting cylinder.
2. Remove bolt (1), pin (3) and pin (2) from bowl lifting cylinder (4).



3. Remove four capscrews (5) and washers (6) from tube assembly (7).
4. Disconnect tube assembly (7) and remove preformed packing (8). Discard preformed packing.
5. Remove four capscrews (11), washers (12) and two flange halves (9) from bottom of bowl lifting cylinder (4).
6. Disconnect hose assembly (13) and remove preformed packing (10). Discard preformed packing.



REMOVAL - CONTINUED

7. Remove bowl lifting check valve assembly (WP 0228 00).
8. Remove two bolts (16), washers (17) and mending plate (18) from top of bowl lifting cylinder (4).

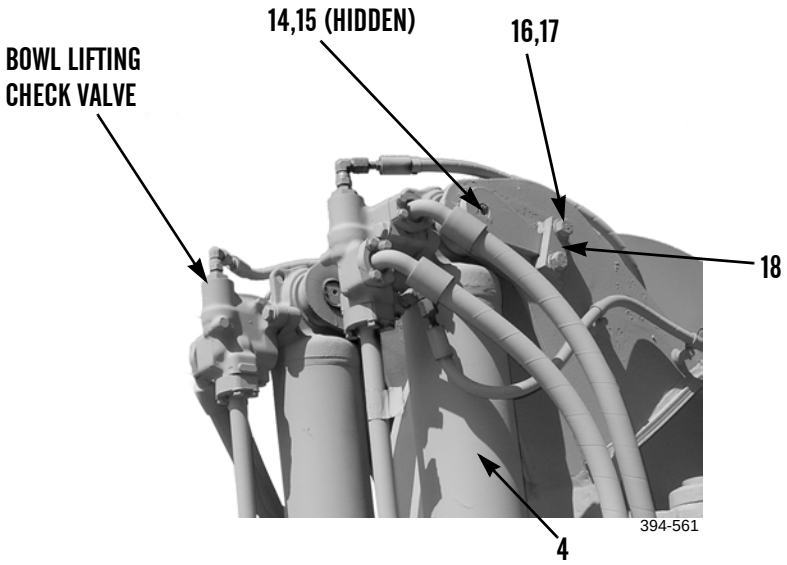
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause death or injury.

NOTE

Weight of bowl lifting cylinder is 270 lb (123 kg.).

9. Use lifting device to remove pin (14), bowl lifting cylinder (4) and sleeve bearing (15).
10. Remove lifting device from bowl lifting cylinder (4).



CLEANING AND INSPECTION

WARNING

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

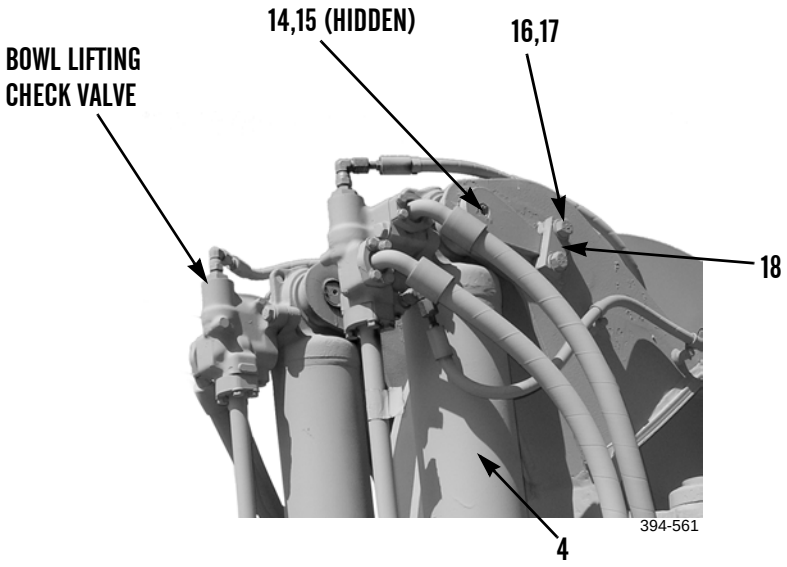
1. Remove all preformed packing material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

NOTE

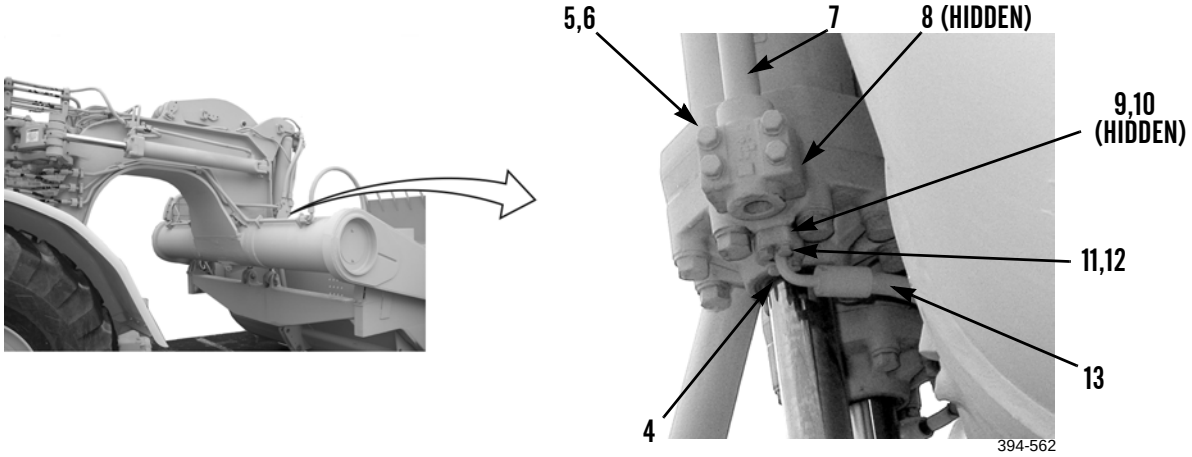
Lightly coat all new preformed packings with clean oil prior to installation.

1. Install sleeve bearing (15) on bowl lifting cylinder (4).
2. Attach lifting device to bowl lifting cylinder (4).
3. Use lifting device to position bowl lifting cylinder (4) on machine.
4. Install pin (14), mending plate (18), two washers (17) and bolts (16).
5. Install bowl lifting check valve (WP 0228 00).

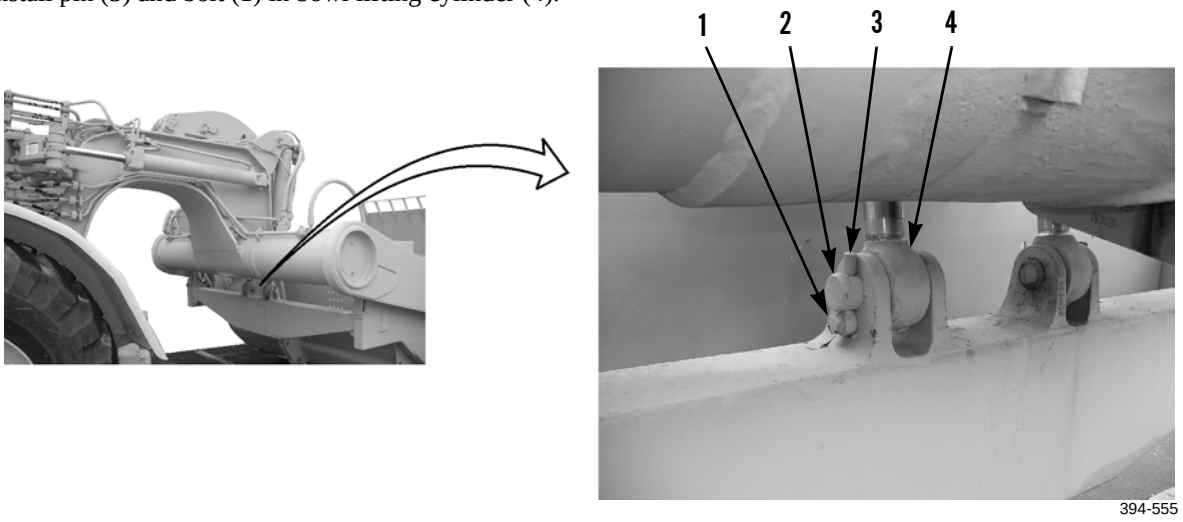


INSTALLATION - CONTINUED

6. Install new preformed packing (8) and tube assembly (7).
7. Install four washers (6) and capscrews (5) on tube assembly (7).
8. Install new preformed packing (10), hose assembly (13) and two flange halves (9) on bowl lifting cylinder (4).
9. Install four washers (12) and capscrews (11).



10. With assistance, position bowl lifting cylinder (4) and install pin (2).
11. Install pin (3) and bolt (1) in bowl lifting cylinder (4).



12. Fill hydraulic tank to correct level (TM 5-3805-248-10).
13. Operate engine and verify correct operation of bowl lifting cylinders (TM 5-3805-248-10).
14. Completely raise and lower bowl 5 times to purge air from system.
15. Shut down engine (TM 5-3805-248-10).
16. Check oil level in hydraulic tank and add if necessary (TM 5-3805-248-10).
17. Inspect all hose and tube assemblies for leaks.

END OF WORK PACKAGE

EJECTOR CYLINDER REPLACEMENT 0243 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Lifting device, 750 lb minimum capacity

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Cleaning compound, solvent (Item 8, WP 0339 00)

Oil, lubricating (Item 32, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

References

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Scraper bowl plate assembly removed (WP 0256 00)

Ejector hose assemblies removed (WP 0241 00)

REMOVAL

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

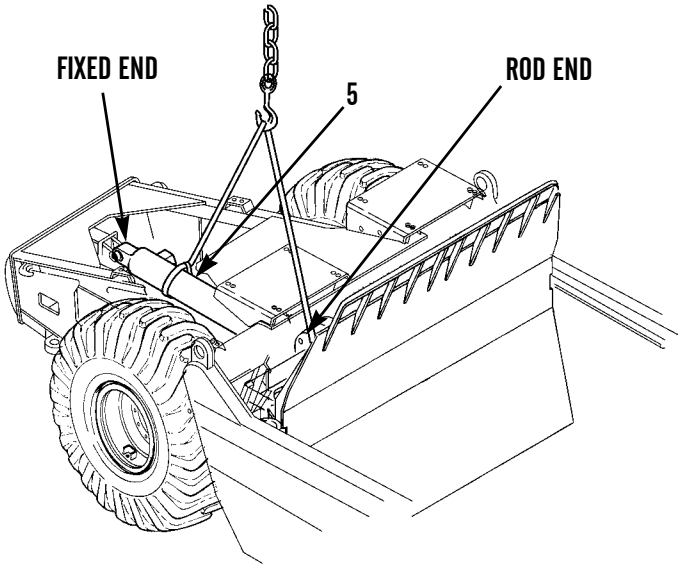
NOTE

Weight of ejector cylinder is 456 lb (207 kg).

EJECTOR CYLINDER REPLACEMENT - CONTINUED 0243 00

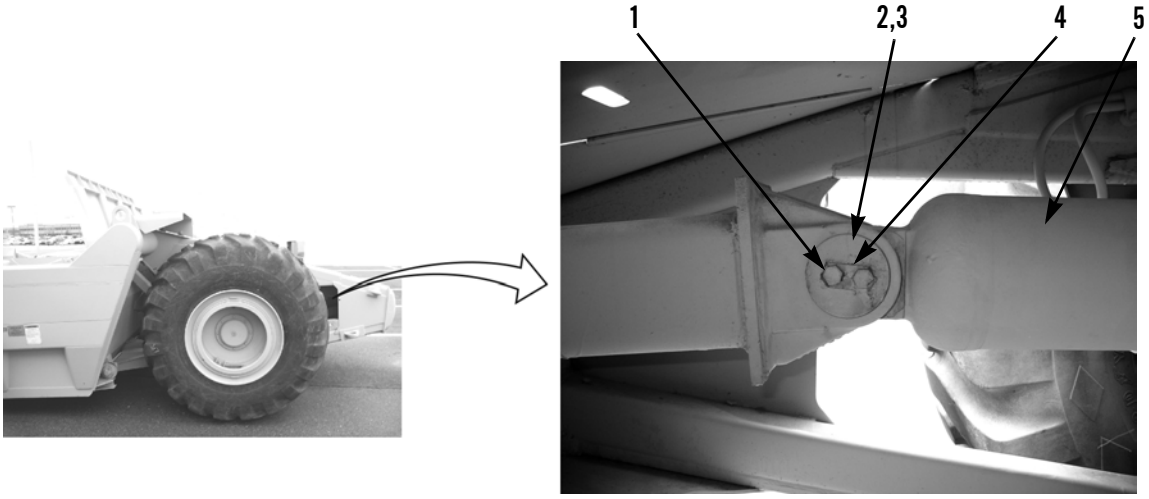
REMOVAL - CONTINUED

1. Attach lifting device to ejector cylinder assembly (5) at both ends.



394-565

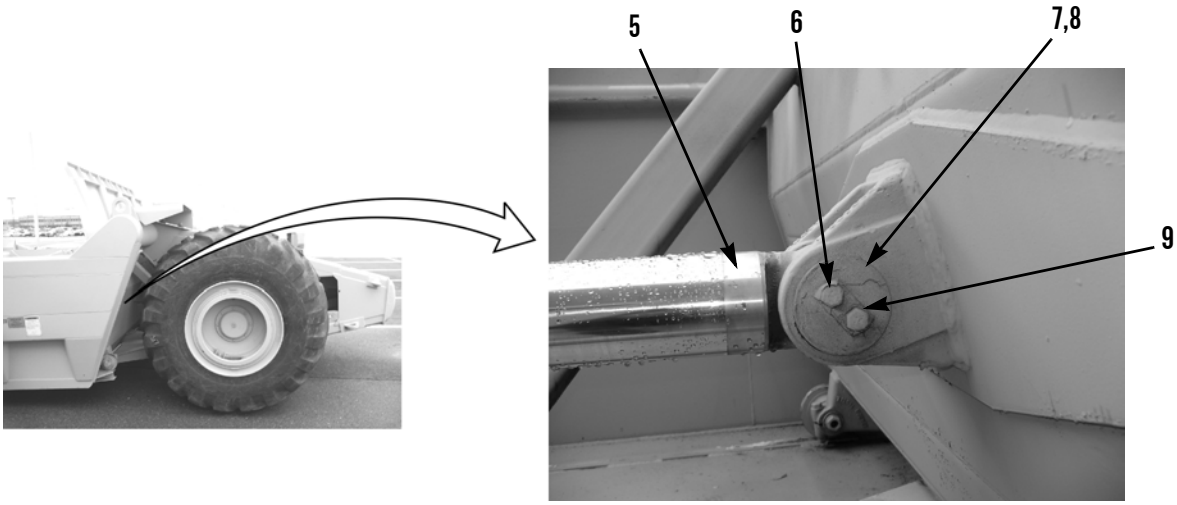
2. Remove four bolts (1), two locks (4), washers (2) and pin (3) from ejector cylinder assembly (5).



394-563

3. Remove four bolts (6), two locks (9), washers (7) and pin (8) from ejector cylinder assembly (5).
4. Position wood blocks under rod end of cylinder assembly (5) on ejector cross member.

REMOVAL - CONTINUED

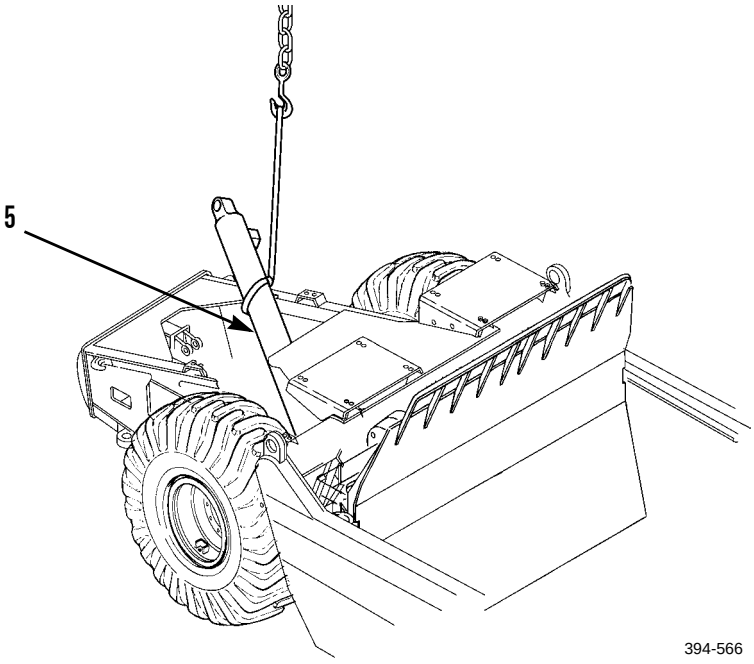


5. Lower ejector cylinder assembly (5) on wood blocks.

CAUTION

If cylinder assembly could not be retracted and rod is exposed, wrap rod with a cloth to prevent damage during removal.

6. Attach lifting device to fixed end and remove ejector cylinder assembly (5) through hull opening.



7. Lower ejector cylinder assembly (5) on wood blocks.
8. Remove lifting device.

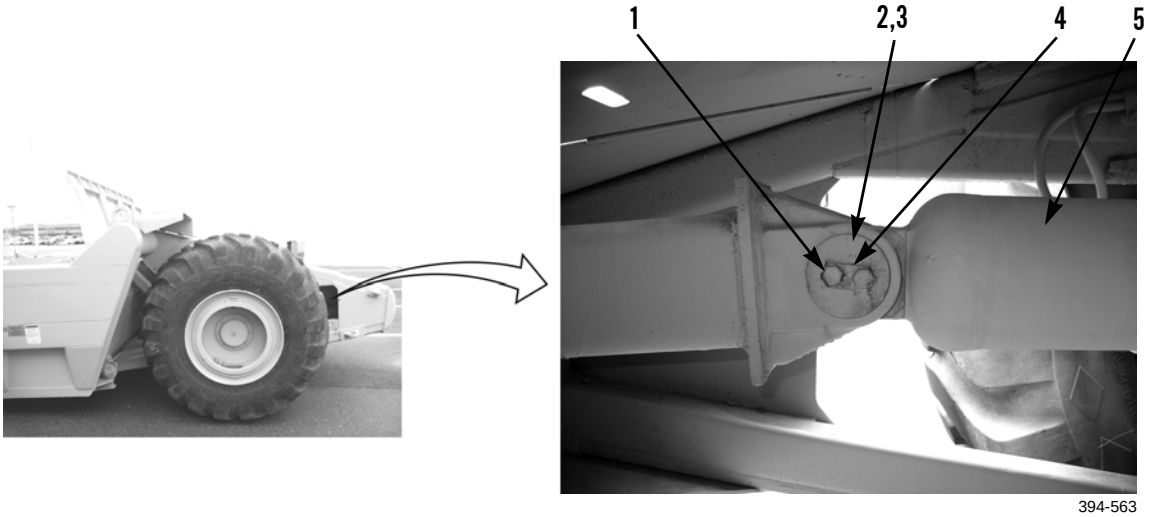
CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in serious injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Clean all parts with solvent.
2. Dry all parts with compressed air.
3. Inspect all parts for damage and replace as necessary.

INSTALLATION

1. Position wood blocks on ejector cross member.
2. Attach lifting device to fixed end and lower ejector cylinder assembly (5) through hull opening.
3. Position ejector cylinder assembly (5) on wood blocks.
4. Attach lifting device to both ends of ejector cylinder assembly (5).
5. Use suitable lifting device to align fixed end of ejector cylinder with mounting bracket.
6. Install pin (3), two washers (2), locks (4) and four bolts (1).

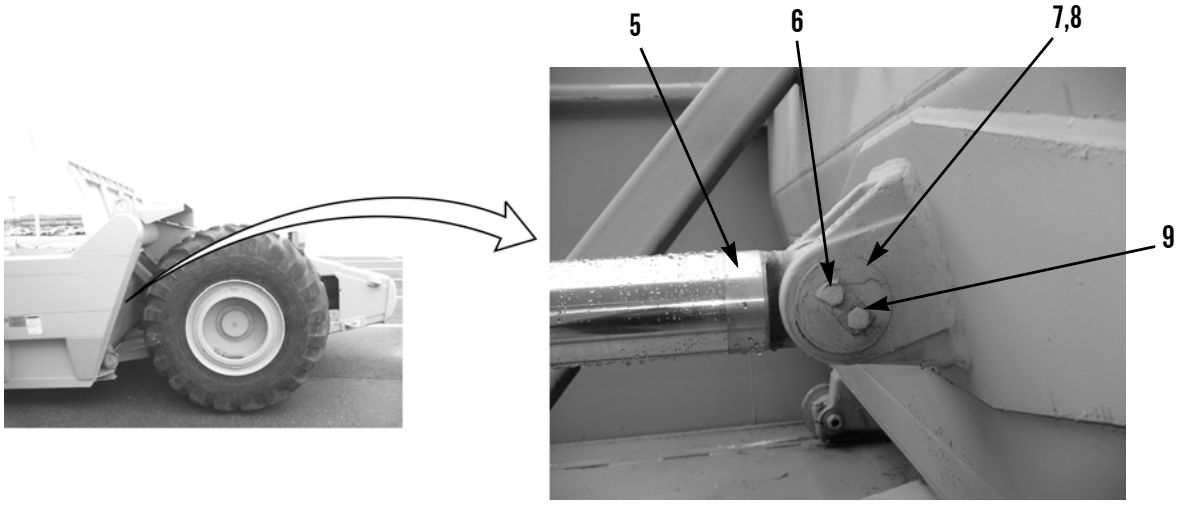


394-563

7. Attach lifting device to ejector frame.
8. Use lifting device to align ejector cylinder assembly (5) with ejector frame.

INSTALLATION - CONTINUED

9. Install pin (8), two washers (7), locks (9) and four bolts (6).



10. Remove wood blocks.
11. Remove lifting device.
12. Connect ejector hose assemblies (WP 0241 00).
13. Install bowl assembly plate (WP 0256 00).
14. Operate ejector and verify correct operation (TM 5-3805-248-10).

END OF WORK PACKAGE

APRON CYLINDER REPLACEMENT 0244 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Lifting device, 700 lb minimum capacity

Arbor press

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Materials/Parts - Continued

Oil, lubricating (Item 32, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Packing, preformed

References

WP 0231 00

WP 0237 00

WP 0229 00

TM 5-3805-248-10

Equipment Condition

Apron blocked (WP 0253 00)

REMOVAL

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

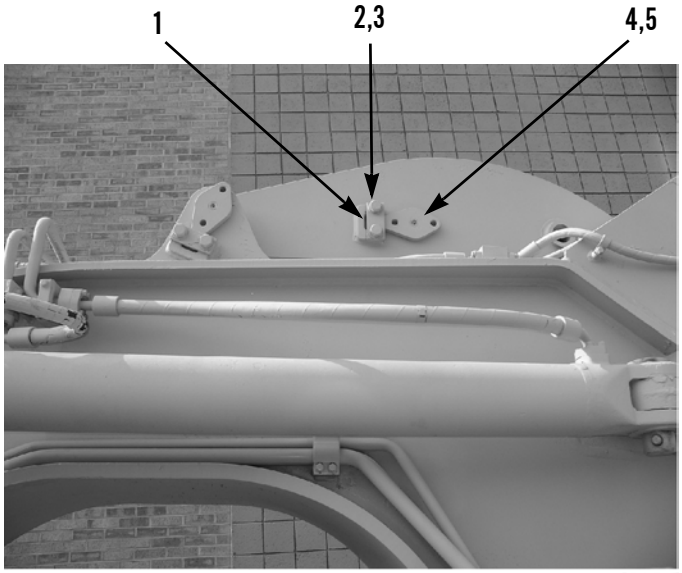
NOTE

Weight of apron cylinder is 460 lb (209 kg).

APRON CYLINDER REPLACEMENT - CONTINUED 0244 00

REMOVAL - CONTINUED

1. Attach lifting device to apron cylinder assembly at rod end, below flange.
2. Remove two bolts (2), washers (3) and plate (1).
3. Remove pin (4) and two bearings (5).



394-567

4. Operate engine (TM 5-3805-248-10).
5. Retract rod of apron cylinder assembly (TM 5-3805-248-10).

WARNING

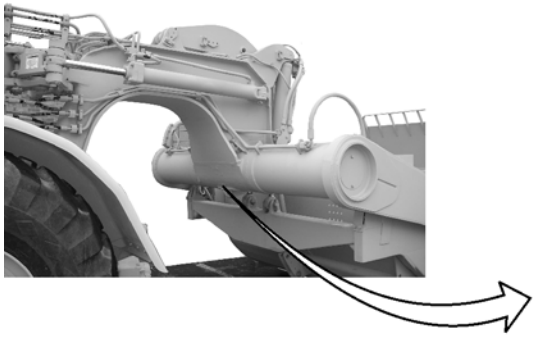
- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

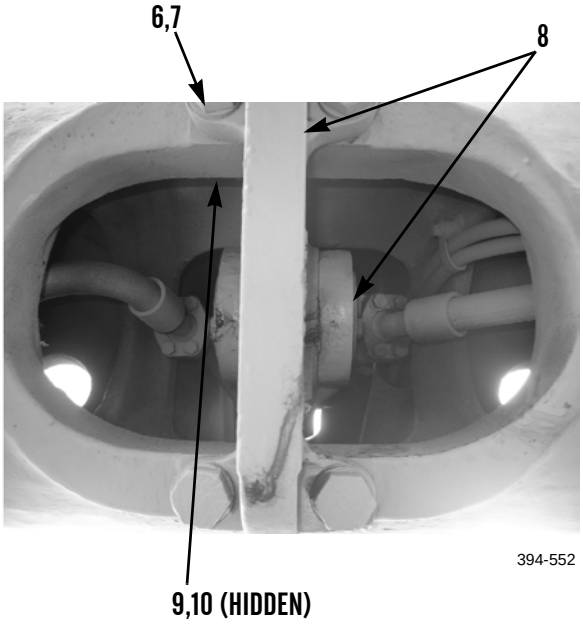
6. Shut down engine (TM 5-3805-248-10).
7. Move hydraulic control levers back and forth. Release all hydraulic oil pressure.
8. Loosen hydraulic tank filler cap (WP 0231 00).
9. Disconnect apron cylinder hose assemblies (WP 0237 00).

APRON CYLINDER REPLACEMENT - CONTINUED 0244 00

REMOVAL - CONTINUED

10. Remove four bolts (6), washers (7), nuts (9) and washers (10) from bottom of draft frame.
11. Use lifting device to remove apron cylinder assembly (8) through bottom of draft frame.





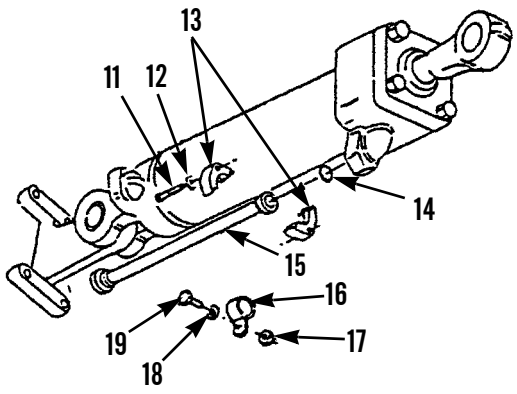
12. Remove lifting device.

DISASSEMBLY

CAUTION

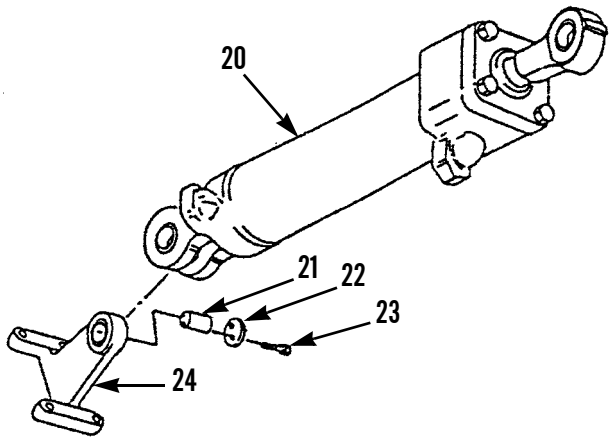
Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after removal. Contamination of hydraulic system could result in premature failure.

1. Remove bolt (19), washer (18) and nut (17).
2. Remove clamp (16).
3. Remove four capscrews (11) and washers (12).
4. Remove two flange halves (13) and tube assembly (15).
5. Remove preformed packing (14) from tube assembly (15) and discard.



394-569

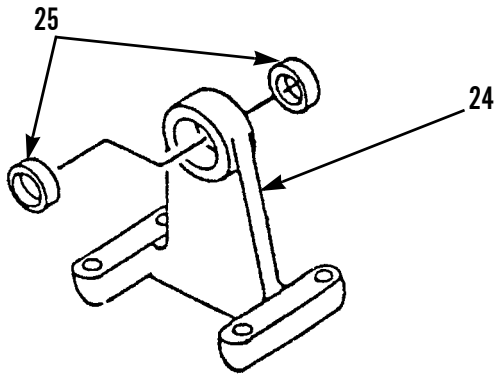
6. Remove four bolts (23) and two washers (22) from cylinder (20).
7. Remove pin (21) and bracket (24) assembly.



394-570

DISASSEMBLY - CONTINUED

8. If damaged, use adapter and arbor press to remove two bearings (25) from bracket assembly (24).



394-571

ASSEMBLY

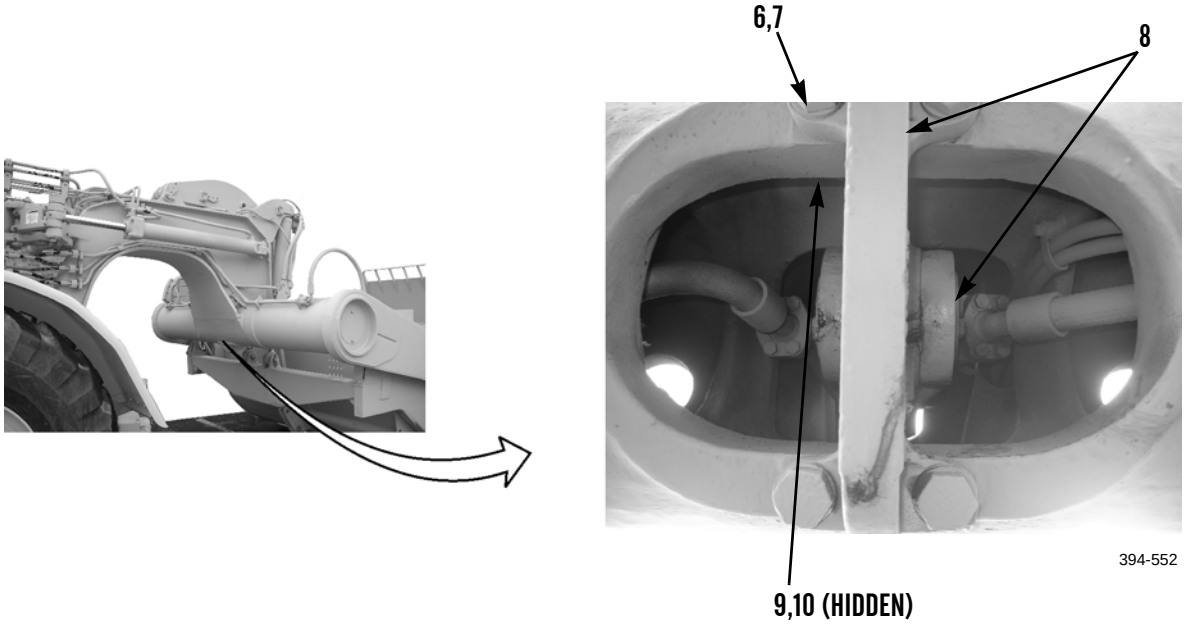
1. If removed, use adapter and arbor press to install two bearings (25) in bracket assembly (24) until flush with outside surface.
2. Install bracket assembly (24) on cylinder (20).
3. Install pin (21), two washers (22) and four bolts (23).
4. Install new preformed packing (14) on tube assembly (15).
5. Install tube assembly (15) and two flange halves (13).
6. Install four washers (12) and capscrews (11).
7. Install clamp (16), nut (17), washer (18) and bolt (19).

INSTALLATION

WARNING

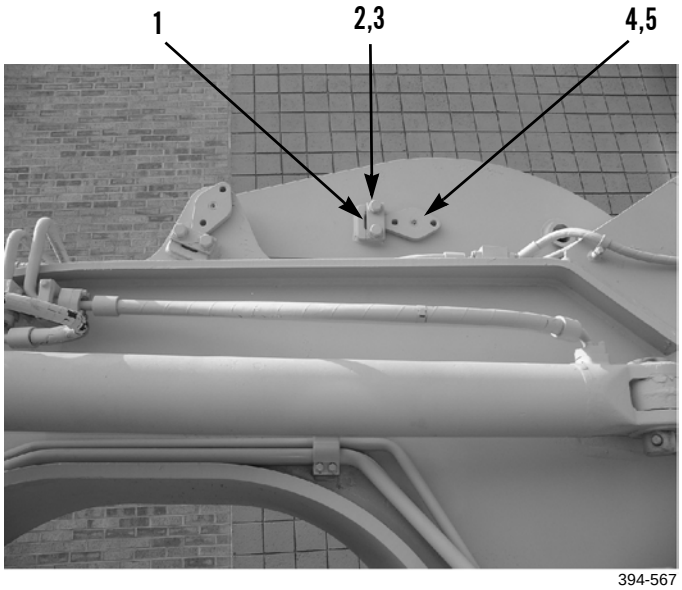
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

1. Attach lifting device to apron cylinder assembly (8) at rod end, below flange.
2. Install apron cylinder assembly (8) through bottom of draft frame.
3. Install four washers (7), bolts (6), washers (10) and nuts (9) on bottom of draft frame.



INSTALLATION - CONTINUED

4. Connect apron cylinder hose assemblies (WP 0237 00).
5. Tighten hydraulic tank filler cap (WP 0231 00).
6. Operate engine (TM 5-3805-248-10).
7. Extend rod of cylinder assembly to align with hole in apron lift frame assembly (TM 5-3805-248-10).
8. Shut down engine (TM 5-3805-248-10).
9. Install two bearings (5) and pin (4).
10. Install plate (1), two washers (3) and bolts (2).



394-567

11. Remove lifting device.
12. Fill hydraulic tank to correct level (WP 0229 00).
13. Unblock apron (WP 0253 00).

END OF WORK PACKAGE

HYDRAULIC TANK REPLACEMENT 0245 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Lifting device, 700 lb minimum capacity

Materials/Parts

Bracket, link (Item 9, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Wooden wedge, 3 in. x 8 in.

References

WP 0035 00

WP 0229 00

WP 0233 00

Personnel Required

Two

Equipment Condition

Hydraulic tank drained (TM 5-3805-248-10)

Engine oil filter base removed (WP 0022 00)

Air cleaner removed (WP 0031 00)

Secondary fuel filter base removed (WP 0037 00)

Primary fuel filter removed (WP 0038 00)

Muffler removed (WP 0041 00)

Filler cap and strainer assembly removed (WP 0231 00)

Hood removed (WP 0189 00)

REMOVAL

WARNING

- Do not remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2,500 psi (17,237 kPa), even with engine and pump off. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then slowly loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate skin, causing injury or death.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury.

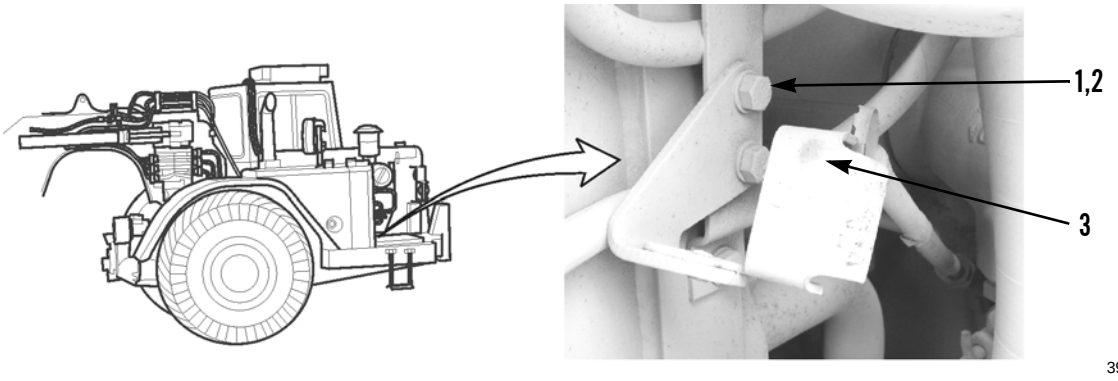
1. Disconnect hydraulic tank hoses (WP 0233 00).

REMOVAL - CONTINUED

WARNING

- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury to personnel or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.
- Wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing.

2. Disconnect fuel lines (WP 0035 00).
3. Remove two bolts (1), washers (2) and guard assembly (3).



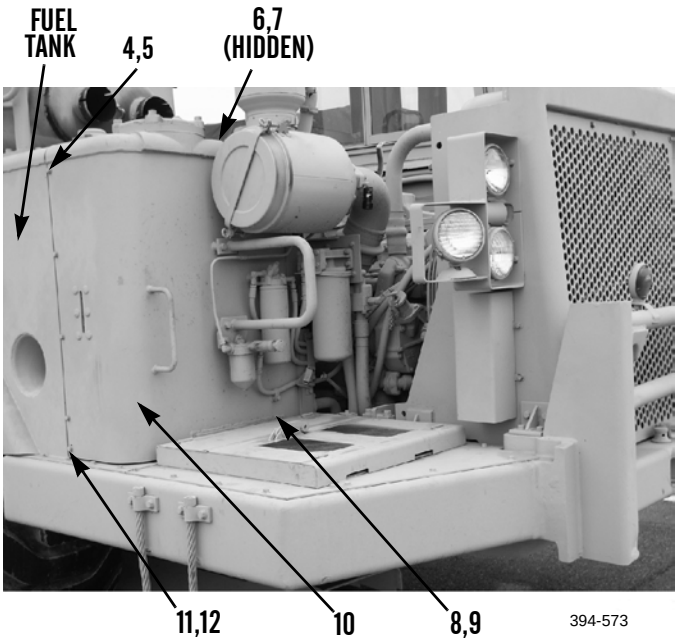
394-572

4. Remove four bolts (8) and washers (9) from lower front of hydraulic tank (10).
5. Remove two bolts (6) and washers (7) from engine side of hydraulic tank (10).

NOTE

It is not necessary to remove bolts (11) and washers (12) until after hydraulic tank is removed.

6. Remove four bolts (4) and washers (5) from right side of hydraulic tank (10).
7. Use prybar to separate approximately three inches between fuel tank and hydraulic tank (10) and insert wedge.
8. Install two lifting links in top left and right side holes in hydraulic tank.



394-573

REMOVAL - CONTINUED

WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

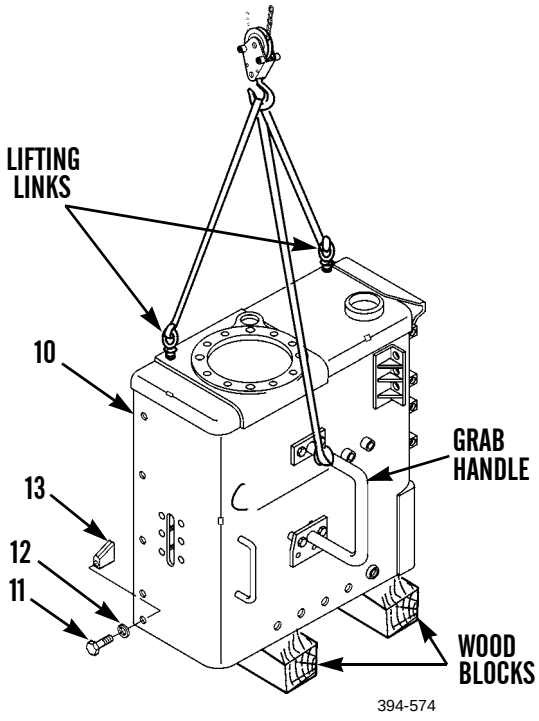
Weight of hydraulic tank is 570 lb (259 kg).

9. Attach lifting device to lifting links and front grab handle.
10. Remove wedge from between hydraulic tank (10) and fuel tank.

CAUTION

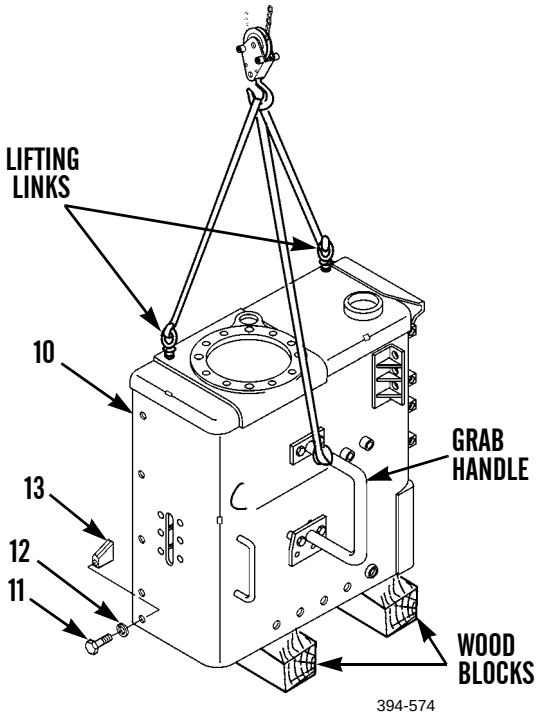
Lift hydraulic tank slowly. Use care not to damage surrounding tube assemblies or adapter assembly under hydraulic tank.

11. Use lifting device to remove hydraulic tank (10) from machine. Support hydraulic tank (10) on wood blocks.
12. Remove two bolts (11), washers (12) and blocks (13) from lower left and right side of hydraulic tank (10).
13. Remove lifting device and two lifting links.



INSTALLATION

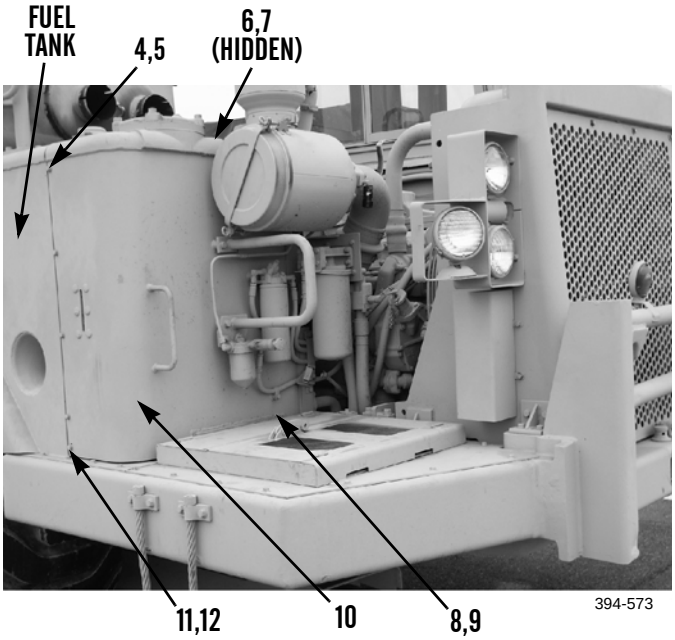
1. Install two lifting links and lifting device to hydraulic tank (10).
2. Install two blocks (13), washers (12) and bolts (11) to lower left and right side of hydraulic tank (10).



CAUTION

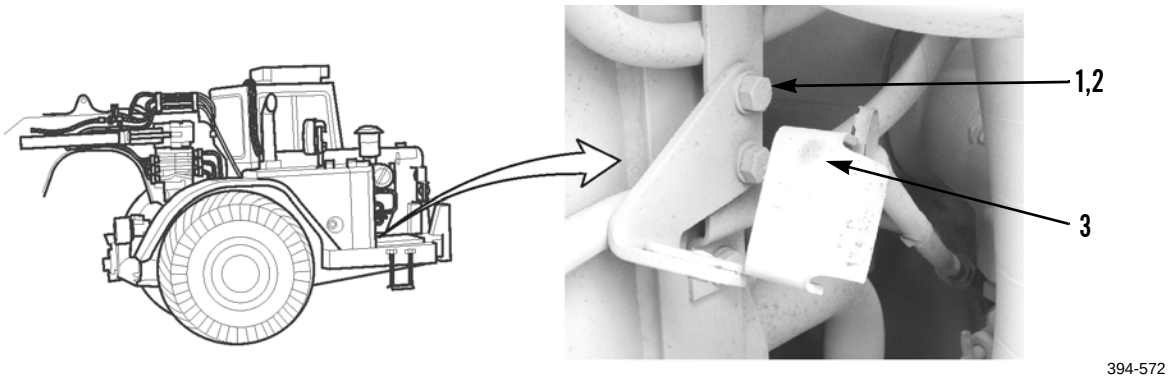
Position hydraulic tank slowly. Use care not to damage surrounding tube assemblies or adapter assembly under hydraulic tank.

3. Use lifting device to position hydraulic tank (10) on machine.
4. Position wedge between hydraulic tank (10) and fuel tank.
5. Remove lifting device and two lifting links.
6. Use a prybar to separate hydraulic tank (10) and fuel tank and remove wedge.
7. Install four washers (5) and bolts (4) to right side of hydraulic tank (10).
8. Install two washers (7) and bolts (6) to engine side of hydraulic tank (10).
9. Install four washers (9) and bolts (8) to lower front of hydraulic tank (10).



INSTALLATION - CONTINUED

10. Install guard assembly (3), two washers (2) and bolts (1) to front, lower left side of hydraulic tank (10).



11. Connect fuel lines (WP 0035 00).
12. Connect hydraulic tank hoses (WP 0233 00).
13. Install engine oil filter base (WP 0022 00).
14. Install air cleaner (WP 0031 00).
15. Install secondary fuel filter base (WP 0037 00).
16. Install primary fuel filter (WP 0038 00).
17. Install muffler (WP 0041 00).
18. Fill hydraulic tank to correct level (WP 0229 00).
19. Install filler cap and strainer assembly (WP 0231 00).
20. Operate engine (TM 5-3805-248-10).
21. Operate hydraulic bowl controls to allow buildup of pressure in hydraulic system (TM 5-3805-248-10).
22. Shut down engine (TM 5-3805-248-10).
23. Check oil level in hydraulic tank and add as necessary (TM 5-3805-248-10).
24. Inspect tube and hose assemblies and connections for leaks.
25. Install hood (WP 0189 00).

END OF WORK PACKAGE

HYDRAULIC TANK COMPONENTS REPLACEMENT 0246 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 1 (Item 104, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

Materials/Parts - Continued

Gasket (6)

Grommet

Packing, preformed

References

TM 5-3805-248-10

Equipment Condition

Brake relief valve assembly removed (WP 0230 00)

Hydraulic tank removed (WP 0245 00)

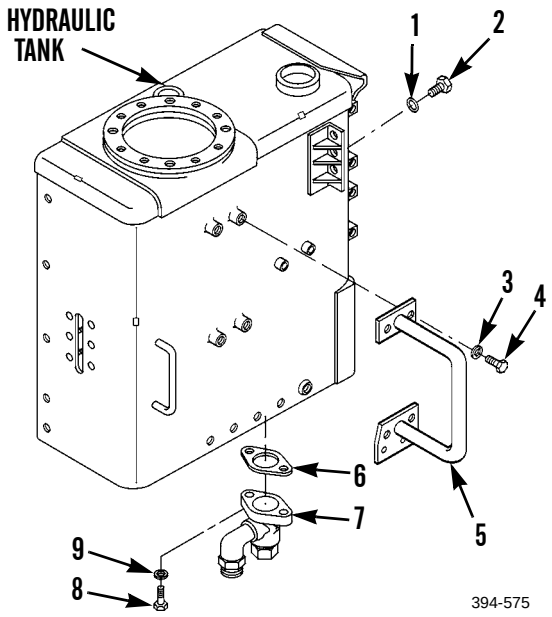
REMOVAL

1. Removal two bolts (8), washers (9), drain valve assembly (7) and gasket (6) from bottom of hydraulic tank. Discard gasket.

NOTE

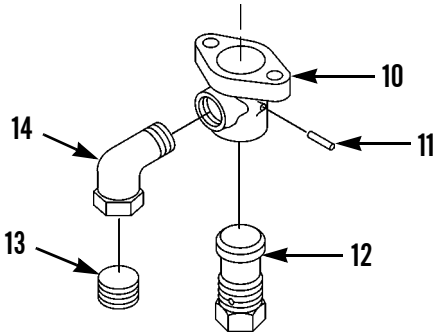
Handle can be removed without removing hydraulic tank.

2. Remove four bolts (4), washers (3) and grab handle (5) from hydraulic tank.
3. Remove plug (2) and preformed packing (1) from left side of hydraulic tank. Discard preformed packing.



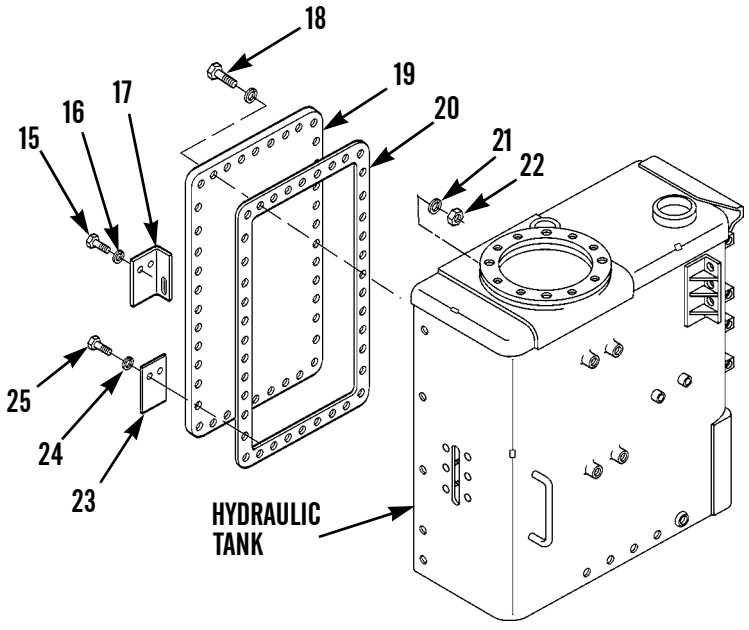
REMOVAL - CONTINUED

4. Remove plug (13), elbow (14), pin (11) and plug valve (12) from adapter (10).



394-576

5. Remove two bolts (25), washers (24) and plate (23) from rear, lower right side of hydraulic tank.
6. Remove two bolts (15), washers (16) and angle (17) from rear, lower left side of hydraulic tank.
7. Loosen two of 40 bolts (18), nuts (22) and washers (21) from rear hydraulic tank.
8. Remove 38 of 40 bolts (18), nuts (22) and washers (21).
9. Separate and support cover (19) from hydraulic tank at bottom.
10. Remove remaining two of 40 bolts (18), nuts (22), washers (21), cover (19) and gasket (20). Discard gasket.



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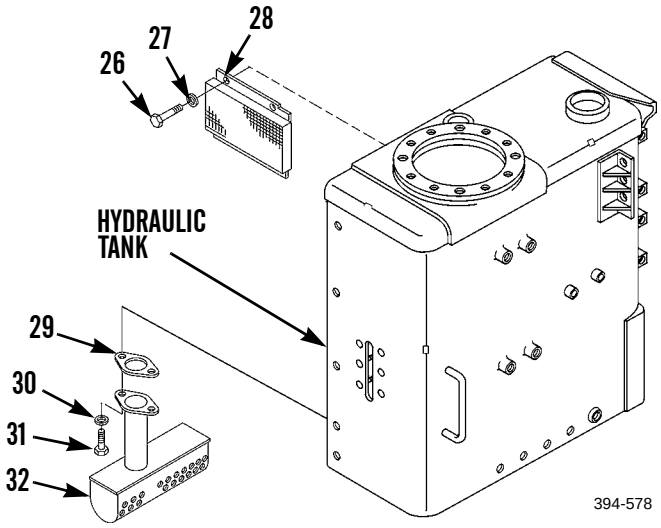
REMOVAL - CONTINUED

11. Remove four bolts (26), washers (27) and screen assembly (28) from inner left side of hydraulic tank.
12. Remove two bolts (31), washers (30), diffuser assembly (32) and gasket (29) from inside of hydraulic tank. Discard gasket.

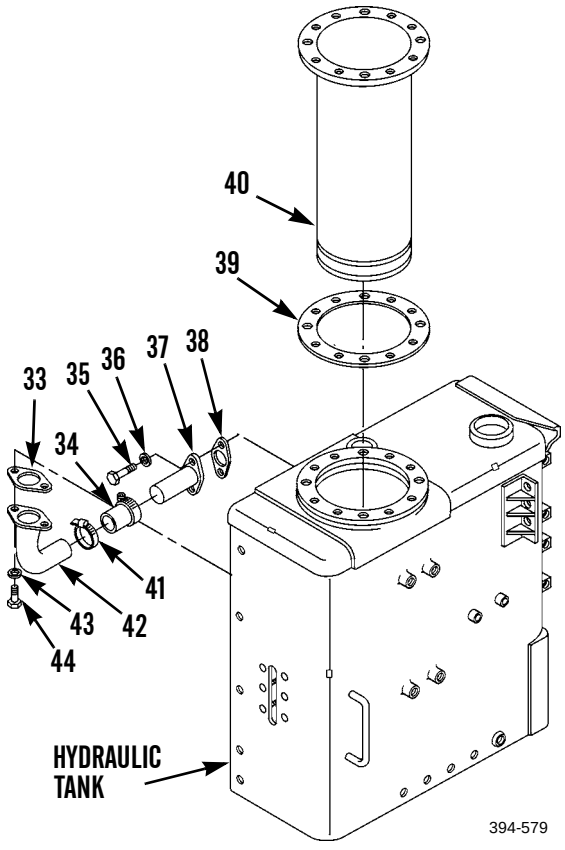


13. Loosen two clamps (41) from inside of hydraulic tank.

NOTE

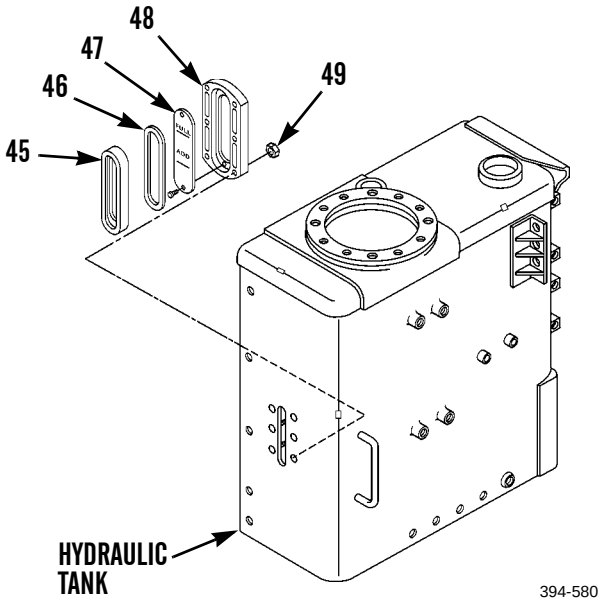
All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

14. Remove two bolts (44), washers (43), elbow (42), gasket (33), two clamps (41) and hose (34) from bottom part of filter body (40). Discard gasket.
15. Remove two bolts (35), washers (36), tube assembly (37) and gasket (38) from inner left side of hydraulic tank. Discard gasket.
16. Remove filter body (40) and gasket (39) from top of hydraulic tank. Discard gasket.



REMOVAL - CONTINUED

17. Remove six nuts (49), retainer (48), plate (47), glass (46) and grommet (45) from inner right side of hydraulic tank. Discard grommet.



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may result in injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear eye protection.

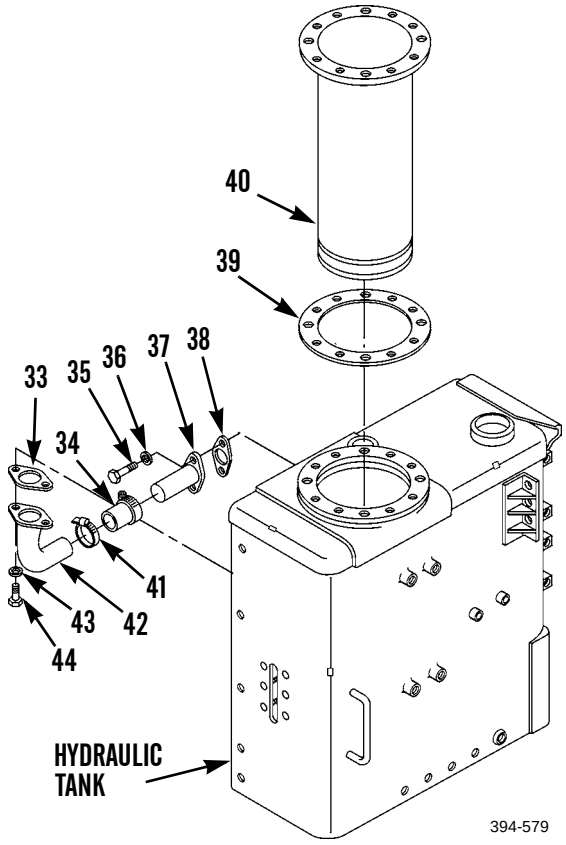
1. Remove all gasket and grommet material from mounting surfaces.
2. Clean all parts with solvent.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

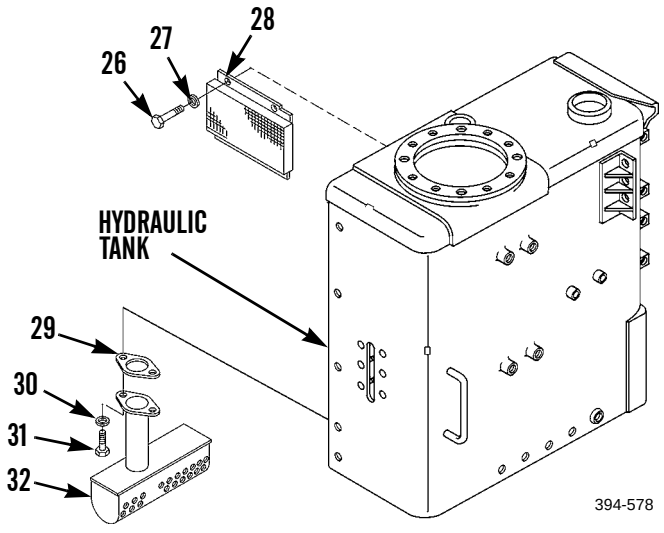
1. Remove six nuts (49), retainer (48), glass (46) from inner right side of hydraulic tank. Discard grommet.
2. Install plate (47) and new grommet (45) in retainer (48).
3. Install retainer (48) and six nuts (49) to hydraulic tank.

INSTALLATION - CONTINUED

4. Position new gasket (39) in hydraulic tank.
5. Install filter body (40) in hydraulic tank.
6. Install new gasket (38), tube assembly (37), two washers (36) and bolts (35) over inlet port on inner left side of hydraulic tank.
7. Install hose (34).
8. Install two clamps (41) loosely.
9. Position new gasket (33) and elbow (42) on bottom port of filter body (40).
10. Install two washers (43), bolts (44) and tighten two clamps (41).

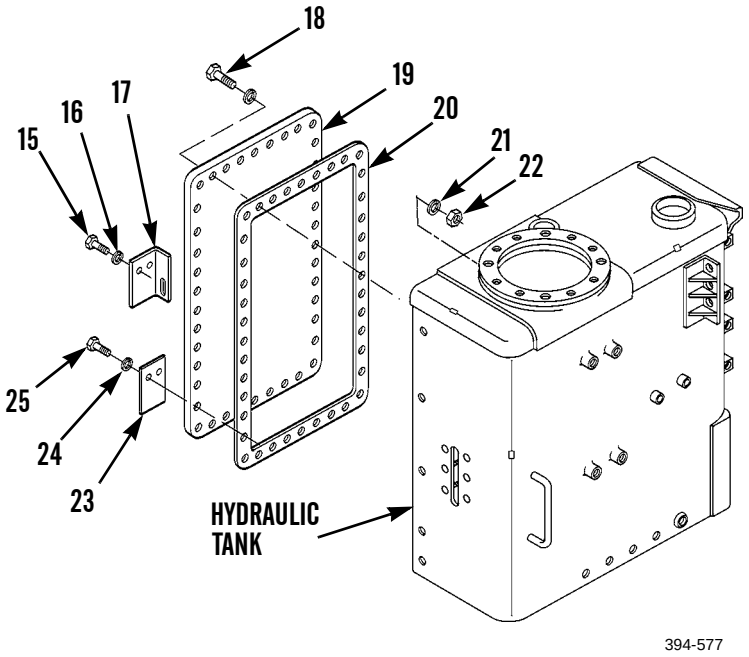


11. Install new gasket (29), diffuser assembly (32), two washers (30) and bolts (31) on right side port of filter body (40).
12. Install screen assembly (28), four washers (27) and bolts (26) over lower outlet port on inner, left side of hydraulic tank.



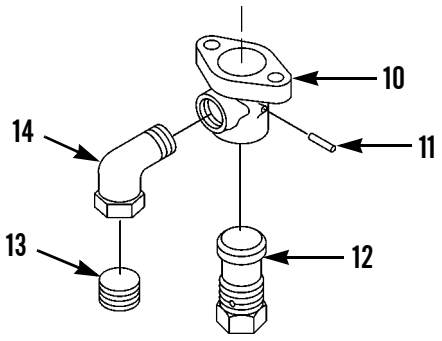
INSTALLATION - CONTINUED

13. Install new gasket (20), cover (19), 40 bolts (18), washers (21) and nuts (22) to rear of hydraulic tank.
14. Install angle (17), two washers (16) and bolts (15) to lower left side corner of hydraulic tank.
15. Install plate (23), two washers (24) and bolts (25) to lower right side of hydraulic tank.



394-577

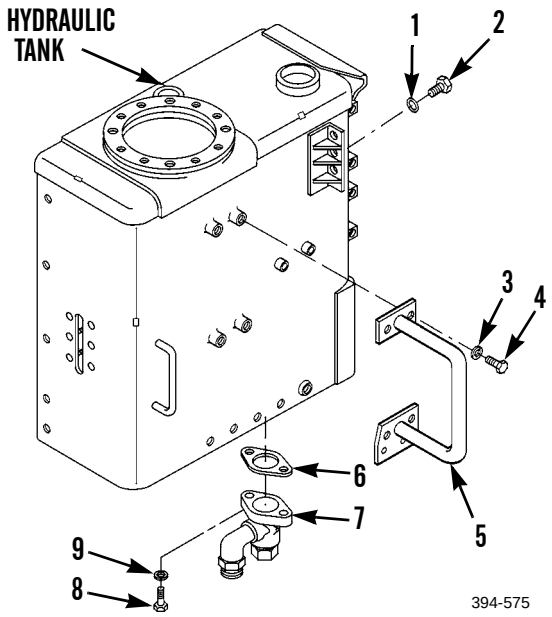
16. Install plug (12) in adapter (10).
17. Install pin (11) through adapter (10).
18. Install elbow (14) and plug (13).



394-576

INSTALLATION - CONTINUED

19. Install new preformed packing (1) and plug (2) to upper left side of hydraulic tank.
20. Install grab handle (5), four washers (3) and bolts (4) to front of hydraulic tank.
21. Install new gasket (6), drain valve assembly (7), two washers (9) and bolts (8) under hydraulic tank.



22. Install brake relief valve assembly (WP 0230 00).
23. Install hydraulic tank (WP 0245 00).
24. Fill hydraulic tank to correct level (TM 5-3805-248-10).
25. Inspect hose assemblies and connections for leaks (TM 5-3805-248-10).

END OF WORK PACKAGE

TACHOMETER REPLACEMENT 0247 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

References

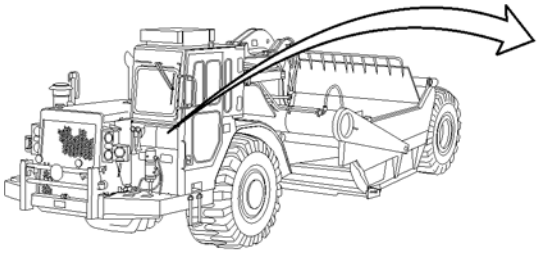
TM 5-3805-248-10

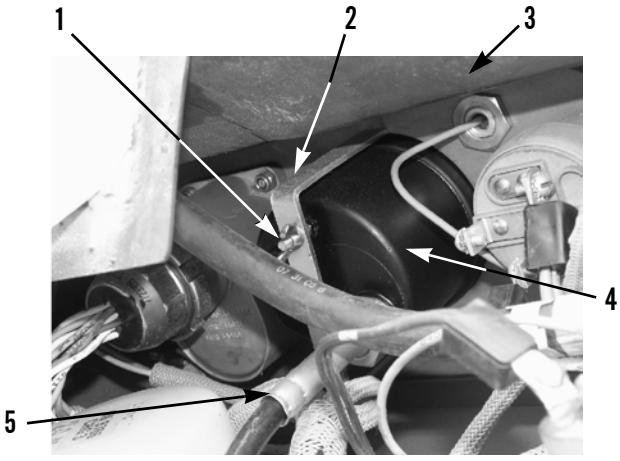
Equipment Condition

Upper front access plate removed (WP 0192 00)

REMOVAL

1. Disconnect cable assembly (5) from back of tachometer (4).
2. Remove two nuts (1), bracket (2) and remove tachometer (4) from front of instrument panel (3).





394-581

INSTALLATION

1. Position tachometer (4) on instrument panel (3) and install bracket (2) with two nuts (1).
2. Connect cable assembly (5) to tachometer (4).
3. Install upper front access plate (WP 0192 00).
4. Operate engine and verify correct operation of tachometer (TM 5-3805-248-10).

END OF WORK PACKAGE

TACHOMETER DRIVE CABLE ASSEMBLY REPLACEMENT 0248 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Material/Parts

Grommet

References

TM 5-3805-248-10

Equipment Condition

Upper front access plate removed (WP 0192 00)

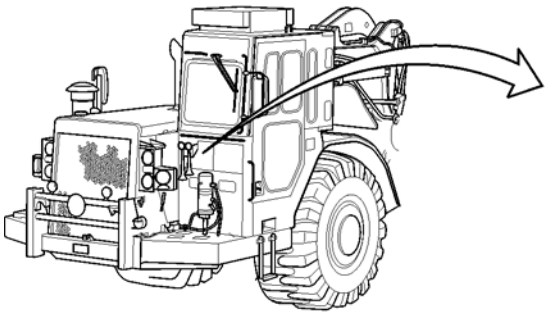
Lower front access plate removed (WP 0197 00)

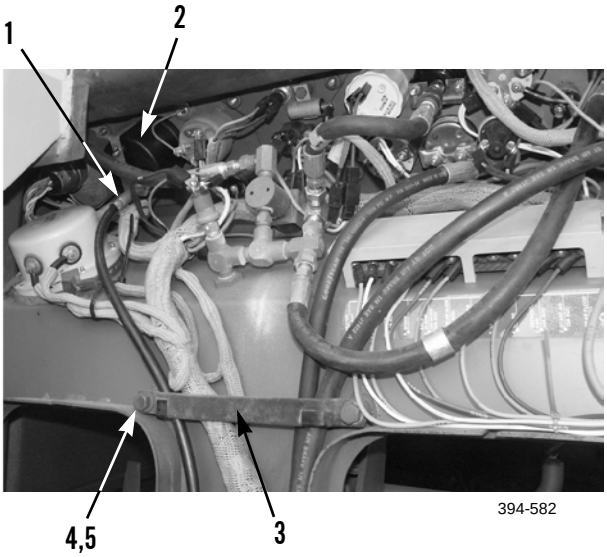
Step assembly removed (WP 0200 00)

Hood removed (WP 0189 00)

REMOVAL

1. Disconnect cable assembly (1) from tachometer (2).
2. Remove two bolts (4), washers (5) and strap (3) from machine.

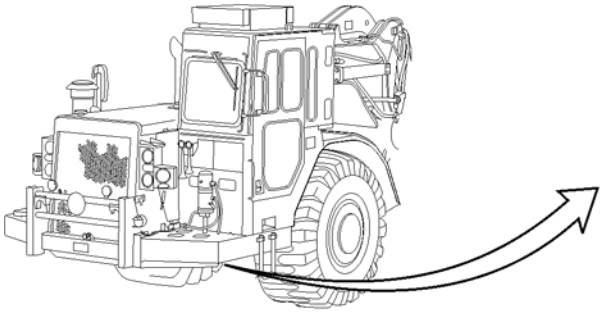


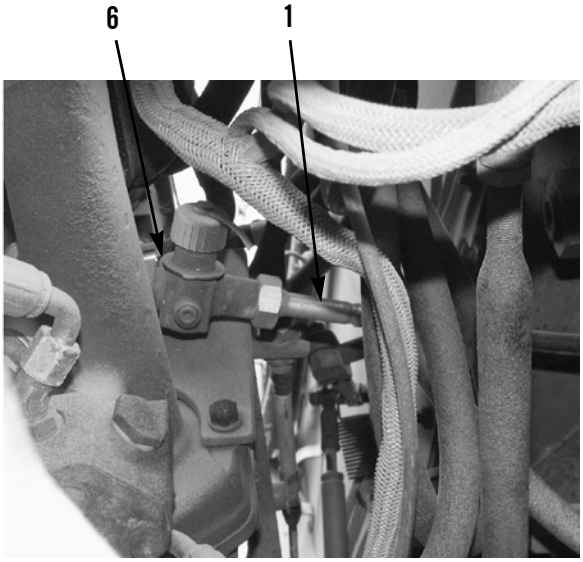


TACHOMETER DRIVE CABLE ASSEMBLY REPLACEMENT - CONTINUED 0248 00

REMOVAL - CONTINUED

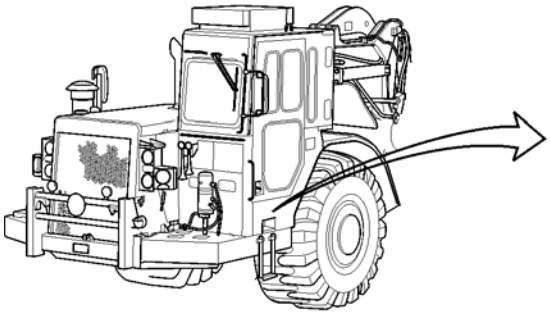
3. Disconnect cable assembly (1) from engine (6).

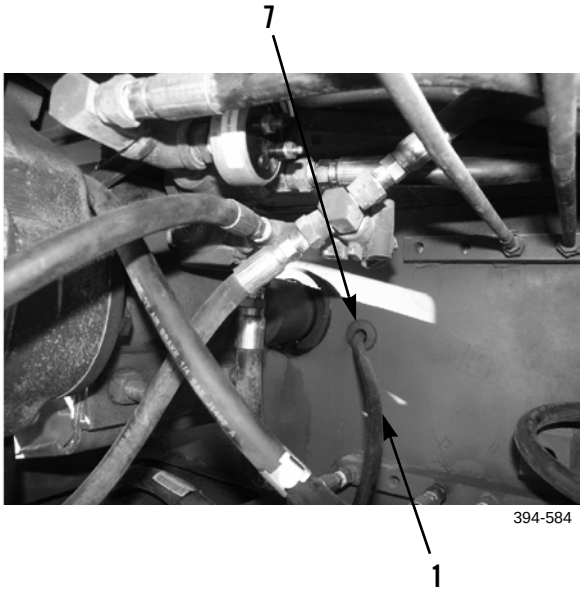




394-583

4. Remove cable assembly (1) and grommet (7) from machine. Discard grommet.

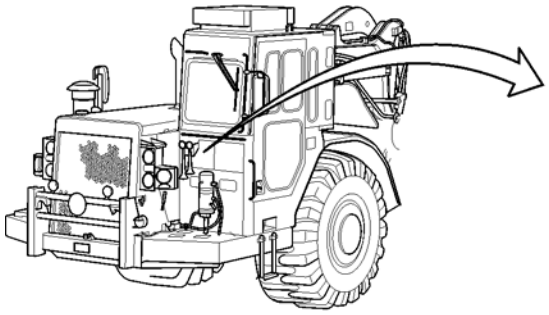


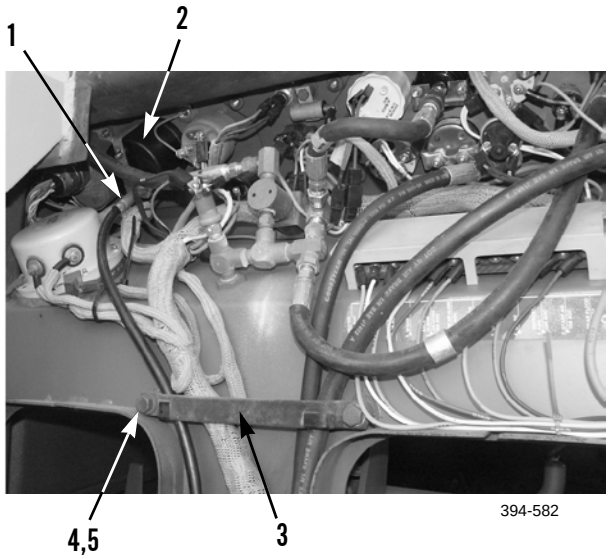


394-584

INSTALLATION

1. Install new grommet (7) and cable assembly (1) on machine.
2. Connect cable assembly (1) to engine (6).
3. Connect cable assembly (1) to tachometer (2).
4. Install strap (3) on machine using two washers (5) and bolts (4).





5. Install hood (WP 0189 00).
6. Install step assembly (WP 0200 00).
7. Install lower front access plate (WP 0197 00).
8. Install upper front access plate (WP 0192 00).
9. Operate engine and verify correct operation of tachometer (TM 5-3805-248-10).

END OF WORK PACKAGE

OIL PRESSURE GAGE REPLACEMENT 0249 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Materials/Parts - Continued

Rag, wiping (Item 35, WP 0339 00)

Tag, marker (Item 42, WP 0339 00)

Lockwasher (2)

References

TM 5-3805-248-10

Equipment Condition

Upper front access plate removed (WP 0192 00)

REMOVAL

1. Remove two screws (10) and lockwashers (11) from oil pressure switch (1). Discard lockwashers.

NOTE

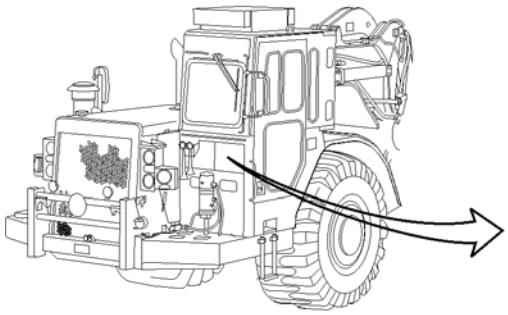
Tag all wire connectors prior to removal to ensure correct installation.

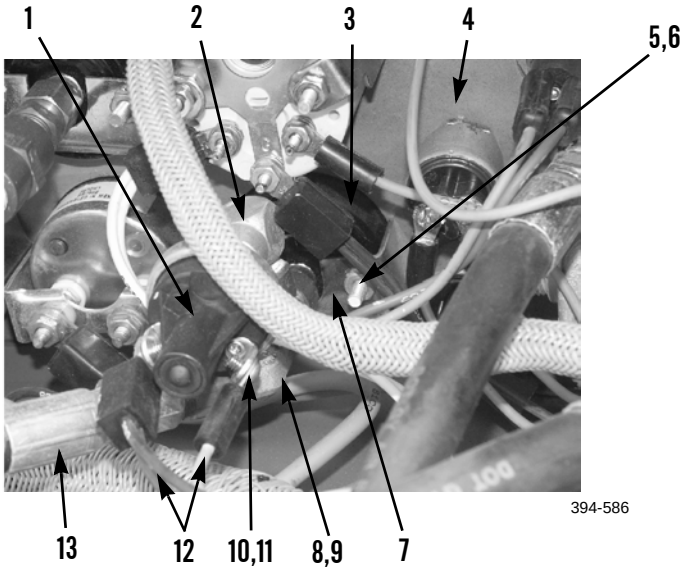
2. Disconnect two wire connectors (12) from oil pressure switch (1).
3. Remove oil pressure switch (1) and elbow (2) from oil pressure gage (3).

CAUTION

Wipe area clean around all connections prior to removal. Cap hydraulic oil lines and plug openings after disconnecting hose assembly. Contamination of system could result in premature failure.

4. Disconnect hose assembly (13) from elbow (8).
5. Remove elbow (8) and tee (9) from oil pressure gage (3).
6. Remove two nuts (5), washers (6), bracket (7) and oil pressure gage (3) from instrument panel (4).





INSTALLATION

1. Position oil pressure gage (3) on instrument panel (4) and install bracket (7) with two washers (6) and nuts (5).
2. Install tee (9) and elbow (8) on oil pressure gage (3).
3. Connect hose assembly (13) to elbow (8).
4. Install elbow (2) and oil pressure switch (1) on oil pressure gage (3).
5. Install two wire connectors (12) on oil pressure switch (1).
6. Install two new lockwashers (11) and screws (10) on oil pressure switch (1).
7. Operate engine and verify correct operation of engine oil pressure gage (TM 5-3805-248-10).
8. Install upper front access plate (WP 0192 00).

END OF WORK PACKAGE

AIR PRESSURE GAGE REPLACEMENT 0250 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Cap set, protective (Item 6, WP 0339 00)

Equipment Condition

Air tank pressure released (TM 5-3805-248-10)

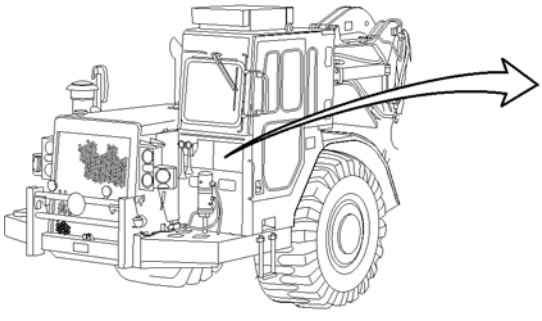
Upper front access plate removed (WP 0192 00)

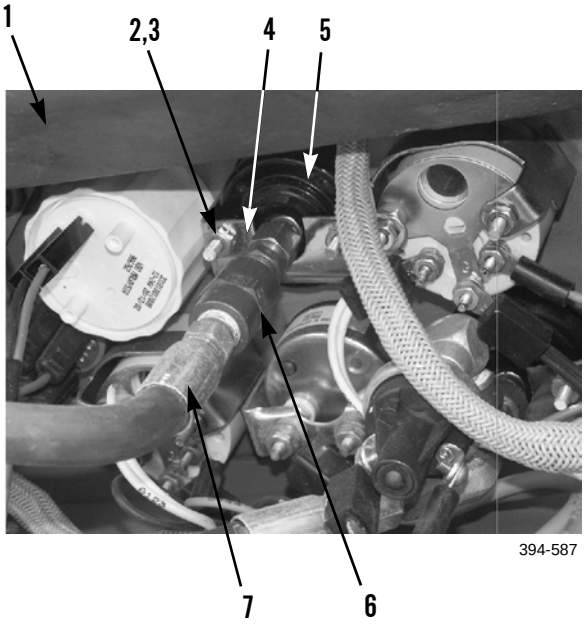
REMOVAL

CAUTION

Wipe area clean around all connections prior to removal. Cap hydraulic lines and plug openings after disconnecting hose assembly. Contamination of system could result in premature failure.

1. Disconnect hose assembly (7) from coupling (6).
2. Remove coupling (6) from air pressure gage (5).
3. Remove two nuts (2), washers (3), bracket (4) and air pressure gage (5) from instrument panel (1).

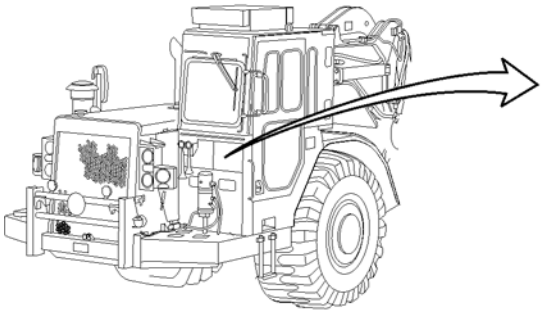


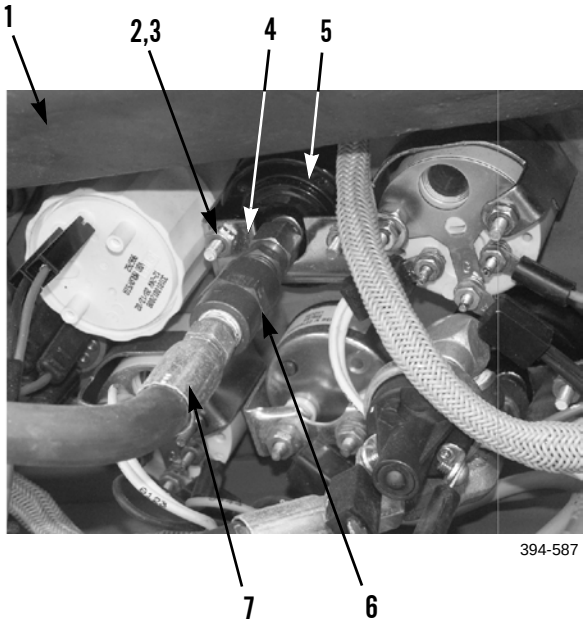


394-587

INSTALLATION

1. Position air pressure gage (5) on instrument panel (1) and install bracket (4) with two washers (3) and nuts (2).
2. Install coupling (6) on air pressure gage (5).
3. Connect hose assembly (7) to air pressure gage (5).





4. Operate engine and verify correct operation of air pressure gage (TM 5-3805-248-10).
5. Install upper front access plate (WP 0192 00).

END OF WORK PACKAGE

AIR CLEANER SERVICE INDICATOR REPLACEMENT 0251 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Equipment Condition - Continued

Parking/emergency brake applied (TM 5-3805-248-10)

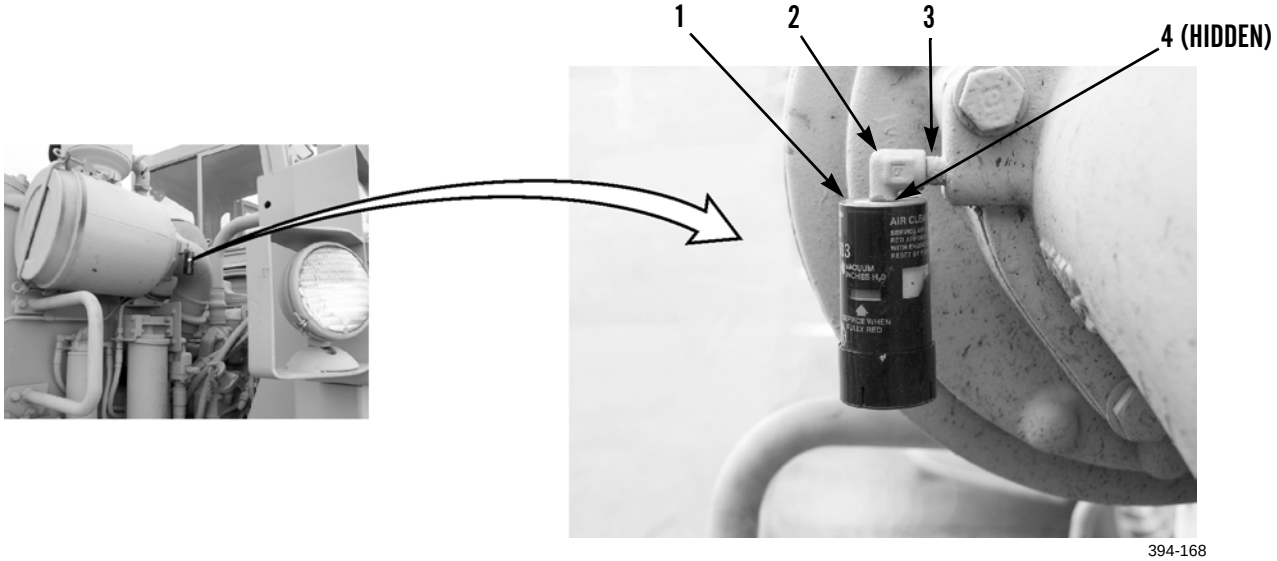
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

REMOVAL

Remove air cleaner service indicator (1), nipple (4), elbow (2) and screen filter (3) from right-front side of machine.



394-168

INSTALLATION

Install screen filter (3), install elbow (2), nipple (4) and air cleaner service indicator (1) to right-front side of machine.

END OF WORK PACKAGE

CUTTING EDGES REPLACEMENT 0252 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Shop equipment, common no. 2 (Item 102, WP 0338 00)

Materials/Parts

Cleaning compound, solvent (Item 8, WP 0339 00)

Rag, wiping (Item 35, WP 0339 00)

References

WP 0253 00

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

WARNING

Bowl and apron must be securely blocked before cutting edges are removed. Failure to follow this warning may cause injury or death.

REMOVAL

1. Raise bowl high enough to position wood blocks under bowl.
2. Position wood blocks at sides of bowl, 15 in. (38 cm) behind cutting edges and lower bowl onto wood blocks.
3. Block apron (WP 0253 00).

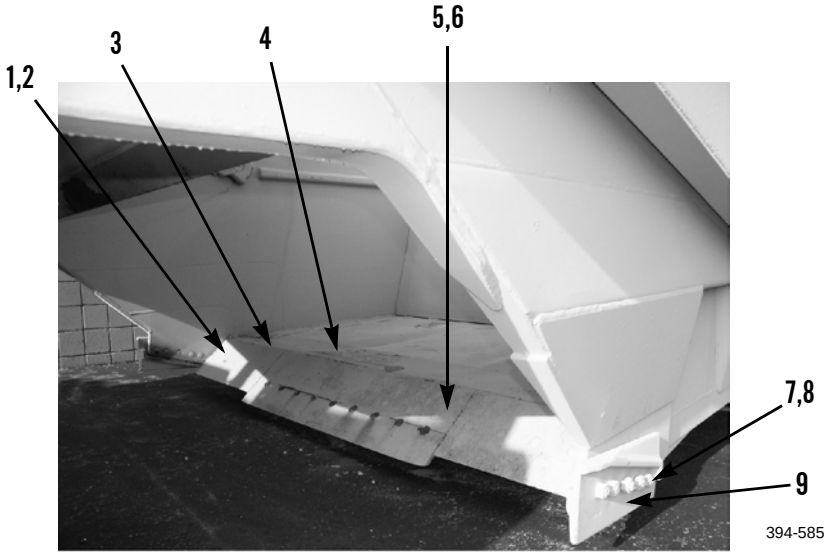
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of center cutting edge is 175 lb (79 kg). Weight of side cutting edges is 85 lb (39 kg) each. Router bits weigh 48 lb.

4. Position floor jack under center cutting edge (4).
5. Remove nine nuts (5) and bolts (6) from center cutting edge of bowl.
6. Use floor jack to remove center cutting edge (4).
7. Remove ten nuts (1) and bolts (2) from left and right side cutting edges (3).
8. Use assistance to remove right and left side cutting edges (3).
9. Remove ten nuts (7) and bolts (8) from right and left router bits (9).
10. Remove right and left router bits (9).



CLEANING AND INSPECTION

- Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.
- Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.

1. Remove all rust, paint, nicks and burrs from mounting surfaces.
2. Clean all parts with solvent cleaning compound.
3. Dry all parts with compressed air.
4. Inspect all parts for damage and replace as necessary.

INSTALLATION

CAUTION

To obtain correct bolt torque on ground engaging tools, use the following steps:

- Clean all surfaces, including recesses; remove all rust, paint, nicks and burrs.
- Assemble the component and apply specified torque to fasteners. On components that require more than one fastener, start in the middle and work out to the ends or start at one end and work to the other end.
- Hit the bolt heads with a hammer.
- Recheck fastener torque and retighten if necessary.

NOTE

For a fine cut (finish work), the forward mounting holes of the center cutting edge should be used. For a deeper cut, the rear mounting holes should be used.

1. Use floor jack to support center cutting edge (4) while aligning mounting holes.
2. Install nine bolts (6) and nuts (5).
3. Use assistance to support left and right side cutting edges (3) while aligning mounting holes.
4. Install ten bolts (2) and nuts (1).
5. Position left and right router bits (9).
6. Install ten bolts (8) and nuts (7).
7. Use a torque wrench to tighten nine nuts (5) and bolts (6), ten nuts (7) and bolts (2) to 900 lb-ft (1,220 Nm).
8. Unblock apron (WP 0253 00).

INSTALLATION - CONTINUED

9. Remove blocks from underneath bowl.
10. Operate machine and verify proper operation of cutting edges (TM 5-3805-248-10).

END OF WORK PACKAGE

BLOCKING THE APRON 0253 00

THIS WORK PACKAGE COVERS

Blocking, Unblocking

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

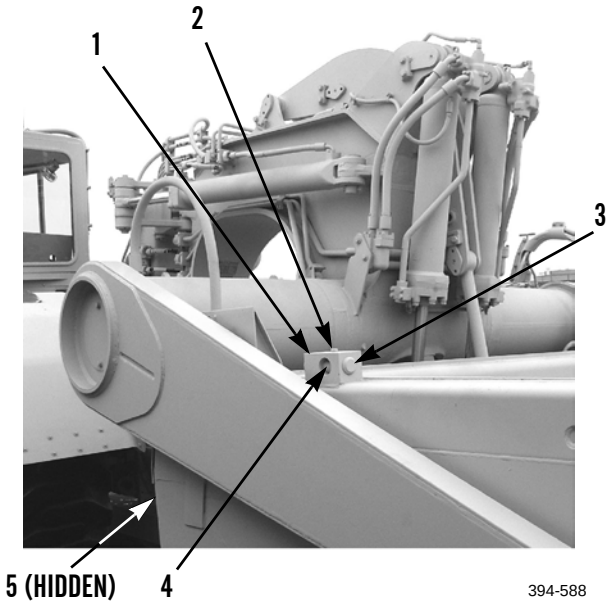
Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

BLOCKING

1. Start engine (TM 5-3805-248-10).
2. Raise apron (5) to upper (open) position (TM 5-3805-248-10).
3. Shut down engine and remove key (TM 5-3805-248-10).
4. Remove blocking pin retaining bolt (2) from block (1).
5. Remove blocking pin (3) from block (1), turn 90 degrees and insert through block hole (4) under raised apron (5).
6. Install pin retaining bolt (2).
7. Start engine (TM 5-3805-248-10).



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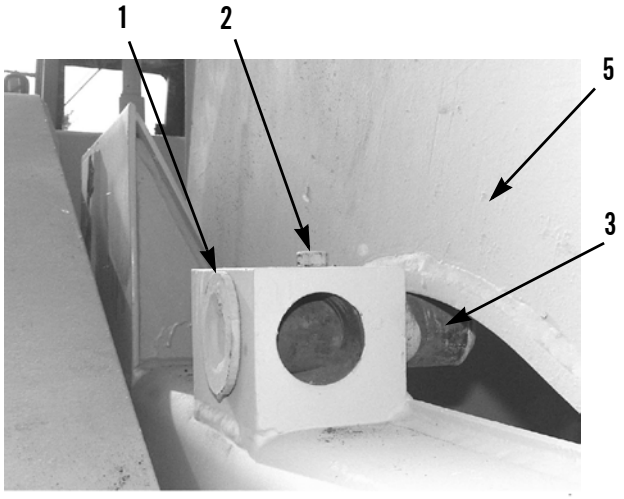


394-589

8. Lower apron (5) onto blocking pin (3).
9. Shut down engine (TM 5-3805-248-10).

UNBLOCKING

1. Start engine (TM 5-3805-248-10).
2. Raise apron (5) to upper (open) position.
3. Shut off engine and remove key (TM 5-3805-248-10).
4. Remove blocking pin retaining bolt (2) from block (1).
5. Remove blocking pin (3) from block hole (4), turn 90 degrees and insert through block (1), in unblocked position.
6. Install blocking pin retaining bolt (2) to left side of bowl.
7. Start engine (TM 5-3805-248-10).
8. Lower apron (TM 5-3805-248-10).
9. Shut down engine (TM 5-3805-248-10).

END OF WORK PACKAGE

ADJUSTING THE APRON 0254 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

References

TM 5-3805-248-10

Personnel Required

Two

Equipment Condition

Apron blocked (WP 0253 00)

ADJUSTMENT

WARNING

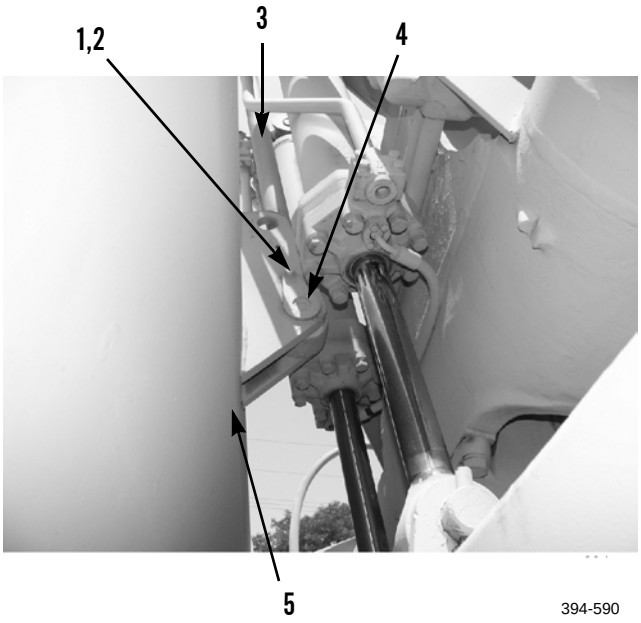
Adjustment of apron will require the assistance of a qualified operator. Failure to follow these instructions may cause injury.

1. Remove capscrews (1) and mending plate (2) in center, front of apron (5).

NOTE

Check apron blocking if removal of pin becomes difficult.

2. Remove pin (4).
3. Separate link assembly (3) and apron (5).



ADJUSTMENT - CONTINUED

WARNING

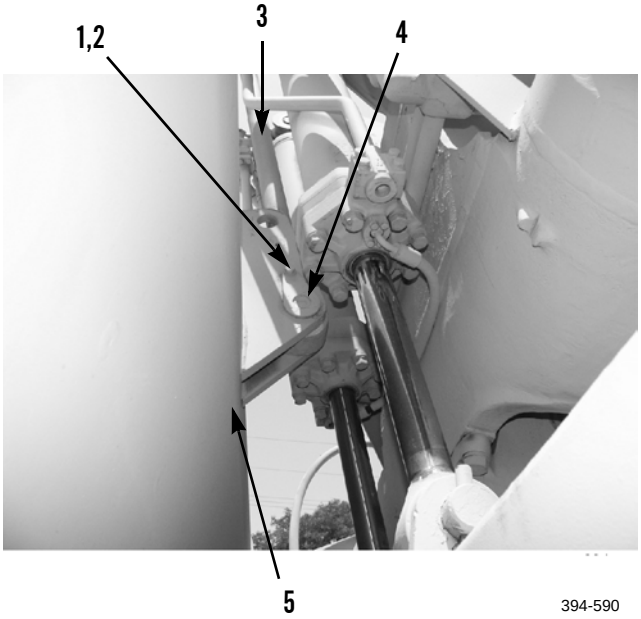
Tractor must be turned fully left to ensure operator has view of apron adjustment area. Slowly and with caution, operate apron control. Failure to follow these instructions may cause injury.

4. Start engine (TM 5-3805-248-10).
5. Operate apron control. Slowly move link assembly (3) in alignment with upper or lower hole on apron (5).

WARNING

Use caution when inserting or striking pin with a hammer. Wear protective glasses. Failure to follow these instructions may cause injury.

6. Install pin (4).
7. Install mending plate (2) and capscrew (1).



8. Shut down engine (TM 5-3805-248-10).
9. Unblock apron (WP 0253 00).

END OF WORK PACKAGE

REAR FENDERS, LEFT AND RIGHT REPLACEMENT 0255 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 150 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 5-3805-248-10)

Parking/emergency brake applied (TM 5-3805-248-10)

Bowl lowered to ground (TM 5-3805-248-10)

Engine shut down (TM 5-3805-248-10)

Battery disconnect switch in OFF position (TM 5-3805-248-10)

NOTE

The following replacement is for the left fender. The replacement for the right fender is identical.

REMOVAL

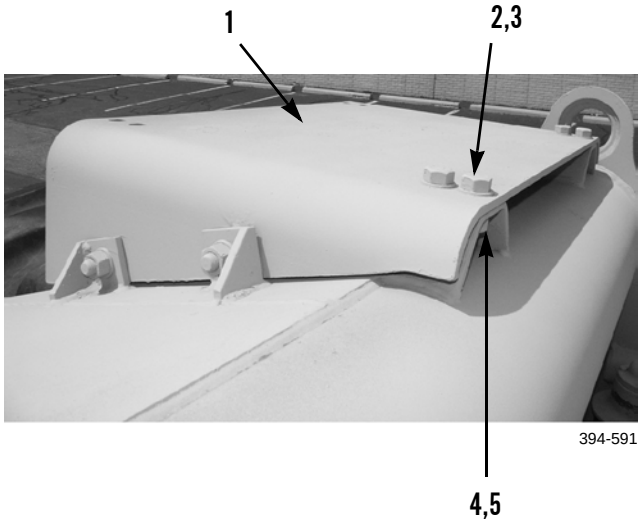
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of fender is 106 lb (48 kg).

1. Attach lifting device to fender (1).
2. Remove six nuts (4), washers (5), bolts (2) and washers (3) from fender (1).
3. Use lifting device to remove fender (1).
4. Remove lifting device.



394-591

INSTALLATION

1. Attach lifting device to fender (1).
2. Use lifting device to position fender (1) on machine.
3. Install six washers (3), bolts (2), washers (5) and nuts (4).
4. Remove lifting device.

END OF WORK PACKAGE

SCRAPER BOWL ASSEMBLY PLATE ASSEMBLY REPLACEMENT 0256 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 113, WP 0338 00)

Lifting device, 350 lb minimum capacity

Materials/Parts

Rag, wiping (Item 35, WP 0339 00)

Personnel Required

Two

Equipment Condition

Wiring harnesses pulled through scraper plates (WP 0119 00)

REMOVAL

NOTE

Perform the next 3 steps only if required.

1. Remove service stop and tail lights (WP 0087 00).
2. Remove blackout stop and tail lights (WP 0088 00).
3. Remove rear directional light assemblies (WP 0091 00).

REMOVAL - CONTINUED

4. Remove six bolts (2) and washers (3) from scraper.

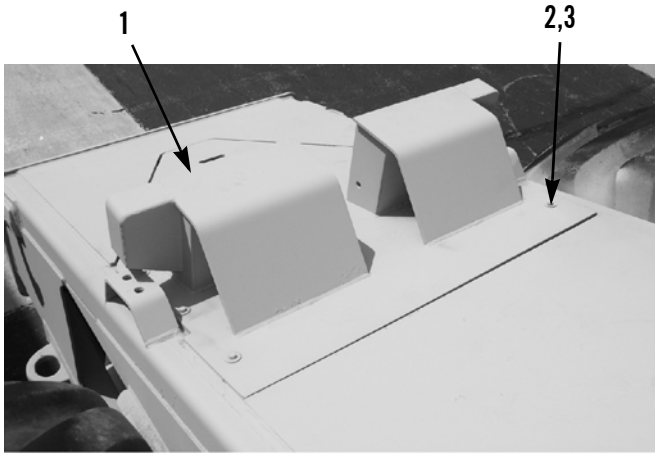
WARNING

Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

NOTE

Weight of scraper bowl assembly plate is 266 lb (121 kg).

5. Attach lifting device to plate assembly (1).
6. Remove plate assembly (1) from scraper.
7. Remove lifting device.



394-592

INSTALLATION

1. Attach lifting device to plate assembly (1).
2. Use lifting device to position plate (1) assembly (1) on scraper and guide wiring harnesses through plate (1).
3. Install six washers (3) and bolts (2).
4. Remove suitable lifting device.
5. If removed, install service stop and tail lights (WP 0087 00).
6. If removed, install blackout stop and tail lights (WP 0088 00).
7. If removed, install rear turn signals (WP 0091 00).

END OF WORK PACKAGE

CHAPTER 5
SUPPORTING INFORMATION

PREPARATION FOR STORAGE AND SHIPMENT 0333 00

THIS WORK PACKAGE COVERS

Preparation for Short-Term Storage

Preparation for Return to Service from Short-Term Storage

Preparation for Long-Term Storage

Preparation for Return to Service from Long-Term Storage

Preparation for Shipment

NOTE

Short-term storage is storage for two weeks or less. Long-term storage is for more than two weeks.

PREPARATION FOR SHORT-TERM STORAGE

1. Thoroughly clean machine.
2. Perform Operator Preventive Maintenance Checks and Services (PMCS) (TM 5-3805-248-10).
3. Fill fuel tank completely to prevent condensation from forming (TM 5-3805-248-10).
4. Perform Unit PMCS (WP 0019 00 and WP 0020 00).
5. Schedule next PMCS on ULLS-G (Unit Level Logistics System – Ground).
6. Store machine indoors in a dry, protected area with scraper bowl lowered to the ground (TM 5-3805-248-10).
7. When moderate temperatures are expected, leave batteries in place. If extreme cold is expected, remove batteries (WP 0103 00) and store in a protected area.
8. Check engine coolant to ensure coolant has correct mixture for expected temperatures (TB 750-651).
9. Seal all openings in engine, including air intake, exhaust outlet, and crankcase breather tube.
10. Ensure battery disconnect switch is in OFF position (TM 5-3805-248-10).
11. Fill in Form DD 1397 completely and attach to a conspicuous part of machine.

PREPARATION FOR RETURN TO SERVICE FROM SHORT-TERM STORAGE

1. Remove seals from all engine openings, including air intake, exhaust outlet and crankcase breather tube.
2. If removed, install batteries (WP 0103 00).
3. Check oil and hydraulic fluid levels in engine crankcase, transmission, front axle differential, wheel end final drives and hydraulic reservoir.
4. Check coolant level in radiator (TM 5-3805-248-10).
5. Start engine and perform machine warmup (TM 5-3805-248-10). Verify proper operation of all gages, switches and lights.
6. Ensure fuel tank is full (TM 5-3805-248-10).
7. Operate machine without a load and check engine, transmission, brakes, steering and electrical accessories for proper operation (TM 5-3805-248-10).

PREPARATION FOR LONG-TERM STORAGE

1. Thoroughly clean machine.
2. Perform Operator Preventive Maintenance Checks and Services (PMCS) (TM 5-3805-248-10).
3. Perform Unit PMCS (WP 0019 00 and WP 0020 00).
4. Schedule next PMCS on ULLS-G.
5. Inspect machine for corrosion. Use touch-up paint where necessary to prevent rust.
6. Coat all exposed hydraulic cylinder rods with GAA grease to protect polished surfaces.

NOTE

If machine has accumulated very low mileage since its last scheduled lubrication service, do not drain and refill transmission and front axle; skip step 7.

7. Drain and refill transmission, differential and wheel end final drives (WP 0019 00 and WP 0020 00).
8. Drain engine crankcase and refill with recommended oil (WP 0019 00 and WP 0020 00).
9. Operate engine and treat upper cylinders by spraying recommended engine oil into air intake for about two minutes. Open throttle momentarily, shut down engine, and continue spraying oil into air intake until engine comes to a stop.
10. Completely drain fuel tank. Mix a solution of diesel fuel (Item 14 or 15, WP 0339 00) and flushing oil per instructions supplied with flushing oil. Pour mixture into fuel tank. Run engine for at least 10 minutes with this solution.
11. Check engine coolant to ensure coolant has correct mixture for expected temperatures (TB 750-651).
12. Seal all openings in engine, including air intake, exhaust outlet and crankcase breather tube.
13. Loosen or remove drive belts (WP 0053 00 and WP 0056 00).
14. Ensure battery disconnect switch is in OFF position (TM 5-3805-248-10).
15. Remove batteries (WP 0103 00). Clean batteries and ensure they are fully charged.
16. Completely drain fuel tank.
17. Place blocking under axles to remove weight from tires.
18. Fill in Form DD 1397 completely and attach to a conspicuous part of machine.

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE

1. Ensure tires are inflated to 45 psi (310 kPa).
2. Remove blocking from under axles.
3. Remove GAA grease from exposed hydraulic cylinder rods. Wipe rods clean with a rag (Item 35, WP 0339 00) dipped in lubricating oil (Item 26, WP 0339 00).
4. Fill fuel tank with fuel (TM 5-3805-248-10).
5. Check oil and hydraulic fluid levels in engine crankcase, transmission, front axle differential, final drives and hydraulic reservoir.

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE - CONTINUED

6. Check coolant level in radiator (TM 5-3805-248-10).
7. Install fully charged batteries (WP 0103 00).
8. Tighten or install drive belts (WP 0053 00 and WP 0056 00).
9. Remove seals from all engine openings, including air intake, exhaust outlet and crankcase breather tube.
10. Start engine and perform machine warmup (TM 5-3805-248-10). Verify proper operation of all gages, switches and lights.
11. Operate machine without a load and check engine, transmission, brakes, steering and electrical accessories for proper operation (TM 5-3805-248-10).

PREPARATION FOR SHIPMENT

1. Perform Operator Preventive Maintenance Checks and Services (PMCS) (TM 5-3805-248-10).
2. Perform Unit Maintenance Preventive Maintenance Checks and Services (PMCS) (WP 0019 00 and WP 0020 00).
3. Schedule the next PMCS on DD Form 814, *Preventive Maintenance Schedule and Record*.
4. Seal exhaust stack opening and engine air cleaner precleaner opening with tape.
5. Consult shipping and transportation data on data plate (TM 5-3805-248-10).

END OF WORK PACKAGE

ILLUSTRATED LIST OF MANUFACTURED ITEMS 0334 00

THIS WORK PACKAGE COVERS

Part number index

List of bulk material needed for making manufactured items

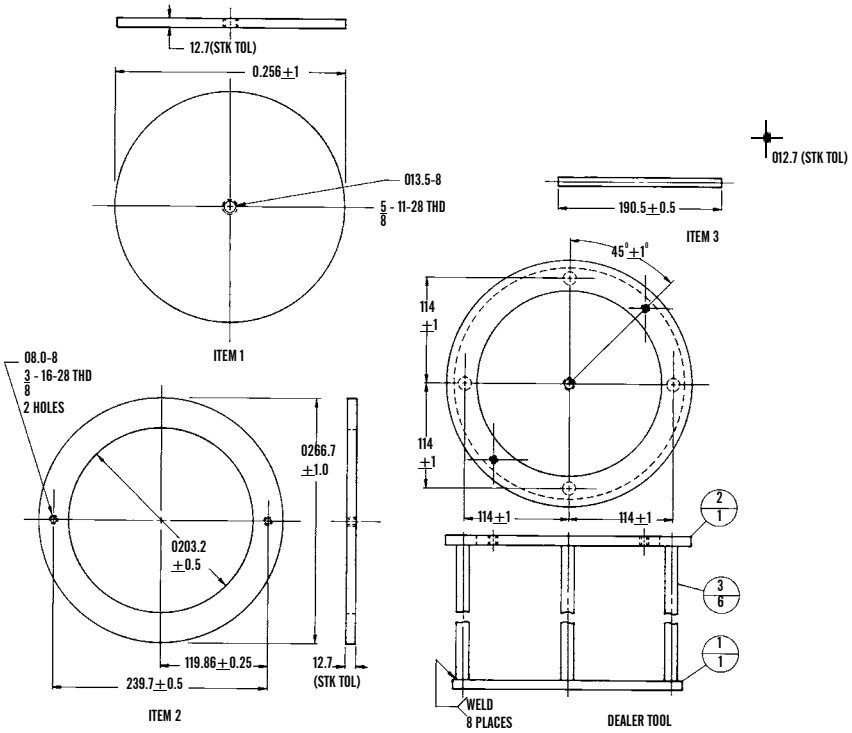
Illustrations with dimensions for making manufactured items

PART NUMBER INDEX

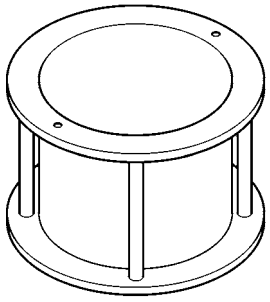
1. FT0165: Used for disassembly and assembly of turbocharger.
2. FT0174: Used to service turbocharger.
3. FT0808: Used to service turbocharger.
4. FT1206: Used for engine in-chassis seal and wear sleeve installation.

FT 0165

Material Chart			
Item	**Quantity**	**Name**	**Material**
1	1	Plate - Bottom	SAE 1020 Steel
2	1	Plate - Top	SAE 1020 Steel
3	4	Rod	SAE 1020 Steel
Weld four 1/2” x 7 1/2” rods at illustrated locations.			



394-1699



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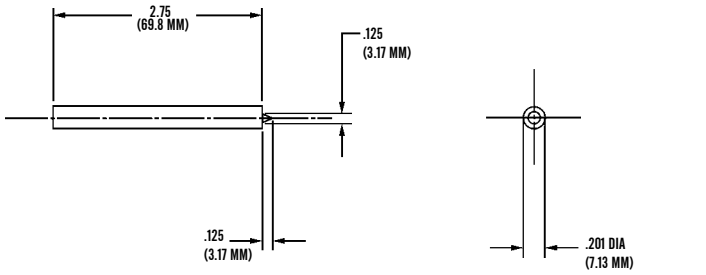
FT 0174

Material Chart			
Item	**Quantity**	**Name**	**Material**
—	1	Rod	SAE 4140 Steel



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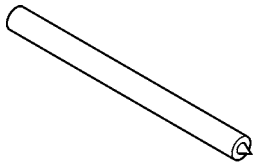

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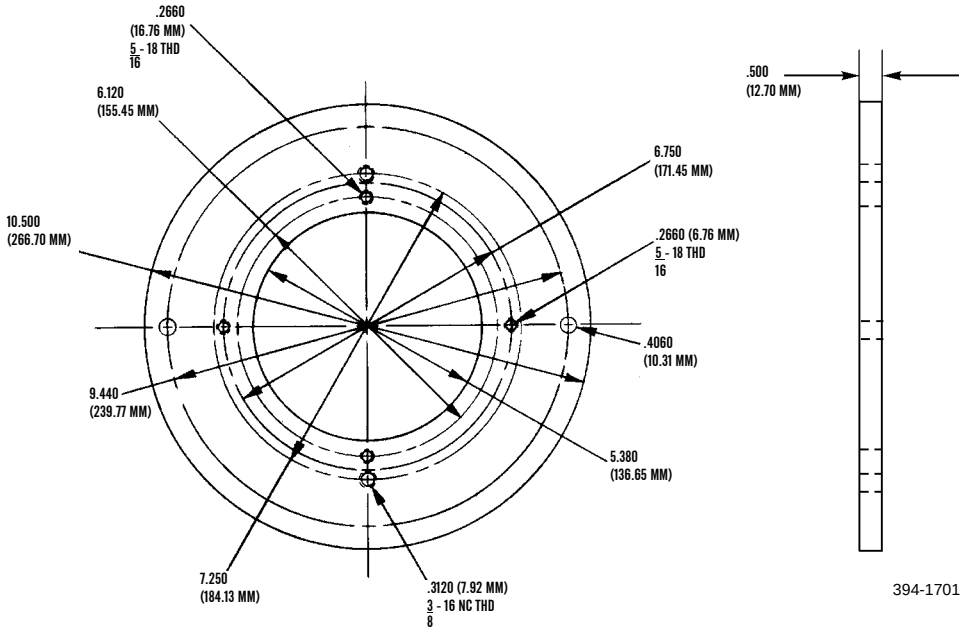
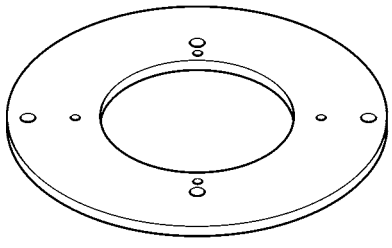
FT 0808

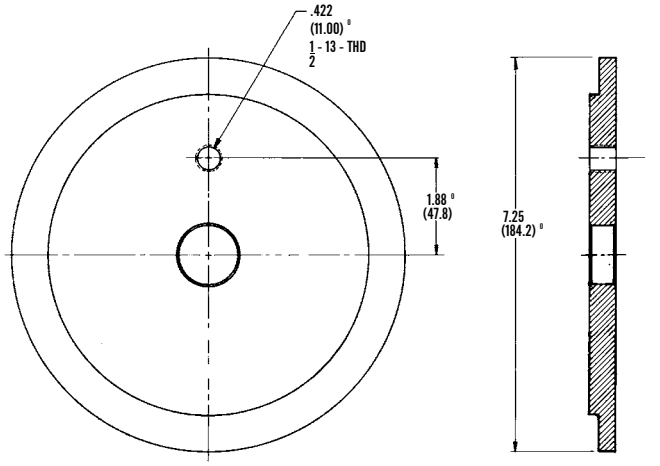
Material Chart			
Item	**Quantity**	**Name**	**Material**
—	1	Plate	1018 Steel





FT 1206

FT 1206 is made from plate, seal inserter (Item 77, WP 0338 00).



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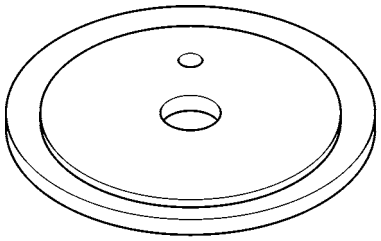


394-1611

END OF WORK PACKAGE

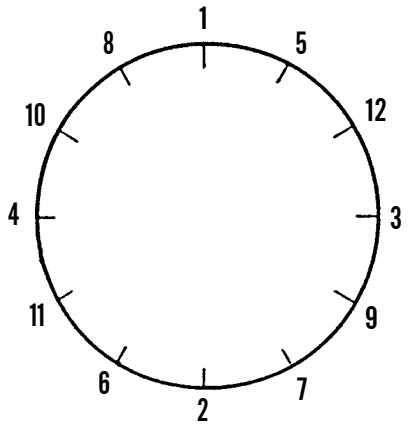
TORQUE LIMITS **0335 00**

SCOPE

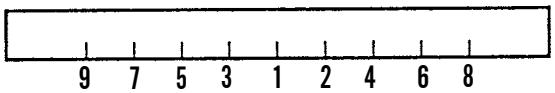
This work package lists standard torque values and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

GENERAL

1. Always use torque values listed in Tables 1 and 2 when a maintenance procedure does not give a specific torque value.
   a. Table 1 provides torque limits for SAE standard fasteners.
   b. Table 2 provides torque limits for metric fasteners.
2. Unless otherwise indicated, standard torque tolerance shall be +/−10%.
3. Torque values listed are based on clean, dry threads. Reduce torque by 10% when engine oil is used as a lubricant. Reduce torque by 20% if new plated capscrews are used.
4. If the maintenance procedures do not specify a tightening order, use the following guides:
   a. Unless otherwise specified, lubricate threads of fasteners with oil (OE/HDO-10 or OEA-30).
   b. When tightening fasteners above 30 lb-ft (41 Nm), use the torque pattern but only tighten to 70% of final value (multiply final value by 0.7). Repeat pattern until final value is reached.
   c. Tighten circular patterns using circular torque pattern and tighten straight patterns using straight torque pattern.



CIRCULAR TORQUE PATTERN



STRAIGHT TORQUE PATTERN

CAUTION

If replacement capscrews are of higher grade than originally supplied, use torque specifications for the original. This will prevent equipment damage due to overtorquing.

Table 1. Torque Limits - SAE Standard Fasteners.

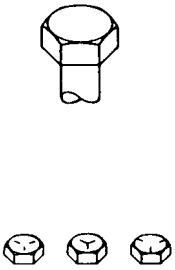
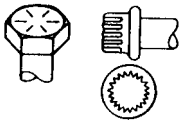
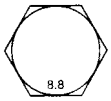
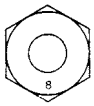
CURRENT USAGE	MUCH USED	MUCH USED	USED AT TIMES	USED AT TIMES
QUALITY OF MATERIAL	INDETERMINATE	MINIMUM COMMERCIAL	MEDIUM COMMERCIAL	BEST COMMERCIAL
SAE Grade Number	1 or 2	5	6 or 7	8
Capscrew Head Markings Manufacturer's marks may vary These are all SAE Grade 5 (3 line)				
CAPSCREW BODY SIZE IN. - THREAD	TORQUE LB-FT (NM)	TORQUE LB-FT (NM)	TORQUE LB-FT (NM)	TORQUE LB-FT (NM)
1/4 20	5 (7)	8 (11)	10 (14)	12 (16)
28	6 (8)	10 (14)		14 (19)
5/16 18	11 (15)	17 (23)	19 (26)	24 (33)
24	13 (18)	19 (26)		27 (37)
3/8 16	18 (24)	31 (42)	34 (46)	44 (60)
24	20 (27)	35 (47)		49 (66)
7/16 14	28 (38)	49 (66)	55 (75)	70 (95)
20	30 (41)	55 (75)		78 (106)
1/2 13	39 (53)	75 (102)	85 (115)	105 (142)
20	41 (56)	85 (115)		120 (163)
9/16 12	51 (69)	110 (149)	120 (163)	155 (210)
18	55 (75)	120 (163)		170 (231)
5/8 11	83 (113)	150 (203)	167 (226)	210 (285)
18	95 (129)	170 (231)		240 (325)
3/4 10	105 (142)	270 (366)	280 (380)	375 (508)
16	115 (156)	295 (400)		420 (569)
7/8 9	160 (217)	395 (536)	440 (597)	605 (820)
14	175 (237)	435 (590)		675 (915)
1 8	235 (319)	590 (800)	660 (895)	910 (1234)
14	250 (339)	660 (895)		990 (1342)

Table 2. Torque Limits - Metric Fasteners.

TORQUE VALUES FOR METRIC THREAD FASTENERS* WITH LUBRICATED OR PLATED† THREADS				
Thread Diameter-Pitch	 **Class 8.8 Bolt**	 **Class 8 Nut**	**Class 10.9 Bolt**	**Class 10 Nut**
	Torque: lb-ft (Nm)		**Torque: lb-ft (Nm)**	
M6	5 (7)		7 (9)	
M8	12 (16)		17 (23)	
M8 x 1	13 (18)		18 (24)	
M10	24 (33)		34 (46)	
M10 x 1.25	27 (37)		38 (52)	
M12	42 (57)		60 (81)	
M12 x 1.5	43 (58)		62 (84)	
M14	66 (89)		95 (129)	
M14 x 1.5	72 (98)		103 (140)	
M16	103 (140)		148 (201)	
M16 x 1.5	110 (149)		157 (213)	
M18	147 (199)		203 (275)	
M18 x 1.5	165 (224)		229 (310)	
M20	208 (282)		288 (390)	
M20 x 1.5	213 (313)		320 (434)	
M22	283 (384)		392 (531)	
M22 x 1.5	315 (427)		431 (584)	
M24	360 (488)		498 (675)	
M24 x 2	392 (531)		542 (735)	
M27	527 (715)		729 (988)	
M27 x 2	569 (771)		788 (1068)	
M30	715 (969)		990 (1342)	
M30 x 2	792 (1074)		1096 (1486)	

* All plated and unplated fasteners should be coated with oil before installation.
† Use these torque values if either the bolt or nut is lubricated or plated (zinc-phosphate conversion-coated, cadmium-plated, or waxed).

END OF WORK PACKAGE

REFERENCES 0336 00

SCOPE

This work package lists all forms, field manuals, technical bulletins, technical manuals and other publications that are referenced in this manual and that apply to maintenance of the 621B Scraper.

PUBLICATION INDEXES

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Army Publications and Forms Index. . . . . DA PAM 25-30

Functional User's Manual for the Army Maintenance Management System . . . . . DA PAM 738-750

FORMS

Refer to DA PAM 738-750, *Functional User's Manual for The Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404, DA Form 5988-E

Maintenance Request . . . . . DA Form 2407

Material Receiving and Inspection Report . . . . . DD Form 250

Organizational Control Record for Equipment . . . . . DA Form 2401

Preventive Maintenance Schedule and Record . . . . . DD Form 314

Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines . . . . . DD Form 1397

Product Quality Deficiency Report . . . . . SF Form 368

Recommended Changes to Publications and Blank Forms. . . . . DA Form 2028

FIELD MANUALS

Basic Cold Weather Manual . . . . . .FM 31-70

Chemical and Biological Contamination Avoidance . . . . . .FM 3-3

Desert Operations . . . . . .FM 90-3

First Aid. . . . . FM 4-25.11

NBC Decontamination . . . . . .FM 3-5

Northern Operations . . . . . .FM 31-71

Nuclear Contamination Avoidance . . . . . FM 3-3-1

Operations and Maintenance of Ordnance Materiel in Cold Weather . . . . . .FM 9-207

Recovery and Battlefield Damage Assessment and Repair . . . . . FM 9-43-2

Rigging Techniques, Procedures, and Applications . . . . . .FM 5-125

TECHNICAL BULLETINS

CARC Spot Painting . . . . . TB 43-0242

Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment and Materials Handling Equipment . . . . . TB 43-0209

TECHNICAL MANUALS

Hand Receipt for Components of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for 621B Scraper . . . . . TM 5-3805-248-10HR

Inspection, Care and Maintenance of Antifriction Bearings. . . . . TM 9-214

REFERENCES - CONTINUED 0336 00

TECHNICAL MANUALS - CONTINUED

Joint Oil Analysis Program Laboratory Manual Vol. I, Introduction, Theory Benefits, Customer Sampling Procedures, Programs and Reports (TO 33-1-37-1; NAVAIR 17-15-50.1) . . . . . TM 38-301-1

Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materiels Including Chemicals . . . . . TM 9-247

Operator's Manual for 621B Scraper . . . . . TM 5-3805-248-10

Operator's, Unit, and Direct Support Maintenance Manual for Tool Outfit, Hydraulic Systems Test and Repair Unit (HSTRU) (NSN 4940-01-036-5784) (EIC:2DD) . . . . . TM 9-4940-468-13

Operator's, Unit, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14

Painting Instructions for Army Material . . . . . TM 43-0139

Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command) . . . . . TM 750-244-3

Transportability Guidance, Tractor, Full-Tracked, Low-Speed DED, Medium Drawbar Pull . . . . . TM 5-3805-248-14

Unit, Direct Support and General Support Including Depot Maintenance RPSTL for 621B Scraper . . . . . TM 5-3805-248-23P

OTHER PUBLICATIONS

Abbreviations and Acronyms . . . . . ASME Y14.38-1999

Army Medical Department Expendable/Durable Items . . . . . CTA 8-100

Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items) . . . . . CTA 50-970

Operator's Circular for Welding Theory and Application . . . . . TC 9-237

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION 0337 00

THE ARMY MAINTENANCE SYSTEM MAC

1. 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.
2. The MAC (WP 0338 00), Table 1) 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 in the MAC (WP 0338 00) in column (4) as:

   Field - includes subcolumns:

   C - Operator/Crew
   O - Unit
   F - Direct Support

   Sustainment - includes subcolumns:

   H - General Support
   D - Depot
3. The tools and test equipment requirements (WP 0338 00, Table 2) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.
4. The remarks (WP 0338 00, Table 3) contain supplemental instructions and explanatory notes for particular maintenance function.

MAINTENANCE FUNCTIONS

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 (i.e., by sight, sound or feel).
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 (e.g., load testing of lift devices and hydrostatic testing of pressure hoses).
3. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), preserve, drain, paint or replenish fuel, lubricants, chemical fluids or gases.
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 achieve optimum or desired performance.
6. **Calibrate.** To determine and make corrections or adjustments on test, measurement and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
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. **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.
9. **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.

MAINTENANCE FUNCTIONS - 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.

10. **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.

11. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1

1. **Column (1) - Group Number.** Column (1) lists group numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies and modules with the Next Higher Assembly (NHA).

2. **Column (2) - Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies and modules for which maintenance is authorized.

3. **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).

4. **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 a maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies 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:

Field:

C - Operator/Crew Maintenance
O - Unit Maintenance
F - Direct Support Maintenance

Sustainment:

H - General Support Maintenance
D - Depot Maintenance

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1 - CONTINUED

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" subcolumn of column (4), and an associated reference code is used in the REMARKS CODE, column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

5. **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.
6. **Column (6) - Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries (Table 3).

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, TABLE 2

1. **Column (1) - Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.
2. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
3. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.
4. **Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.
5. **Column (5) - Tool Number.** The manufacturer's part number, model number, or type number.

EXPLANATION OF COLUMNS IN THE REMARKS, TABLE 3

1. **Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** Information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

Table 1. MAC for the 621B Scraper.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE**								
0100	Engine Assembly:	Inspect	0.1						A
		Service						101,113	B
		Adjust	0.3	2.0	0.5			103,113	
		Replace			14.0			103,113	
		Repair				10.0		104,113	
		Overhaul					110.0	104,113	
	Engine Support Trunnion	Inspect	0.1					113	
		Replace			1.0				
0101	Crankcase, Cylinder Block, and Head Assembly:								
	Cylinder Head Assembly	Replace			2.0			103,113	
		Repair			1.0	2.3		13,22.30 38,41,104 113	
	Engine Block, Crankcase	Replace				6.0			
		Repair				6.0	8.0	7,26,27,28, 40,46,55,64,69, 73,84,86,90,95, 104, 113	
0102	Crankshaft:								
	Crankshaft	Replace				3.5		4,50,58	
		Repair				16.0		61,68,84,85,88, 91,113	
	Bearings	Replace				2.5		94,104,113	
	Seals, Main	Replace			2.5			6,8,45,48,52, 62,74,77,88, 113	
	Pulley & Dampers	Replace			1.3			113	
0103	Flywheel Assembly:								
	Flywheel	Replace			8.0			10,113	
	Housing, Flywheel	Replace			1.0			113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE - Continued**								
0104	Pistons and Connecting Rod Assembly:								
	Piston and Connecting Rod Assembly	Replace				2.0		14,20,49,113	
		Repair				3.0		70,71,104, 113	
0105	Valves, Camshafts and Timing System:								
	Valves and Springs	Replace				6.9		103,113	
		Adjust			1.1			103,113	C
	Pushrods	Replace			1.4			103,113	
	Rocker Arms	Replace			0.5			113	
	Covers, Valve	Replace		1.0				101,113	
	Lifters, Valve	Replace			1.2			103,113,120	
	Bridges	Adjust			0.3			103,113	
	Camshaft	Replace				1.0		67,104,113	
	Bearings, Camshaft	Replace				2.0		18,55,113	
	Timing Gears & Plate	Replace				1.5		36,44,72,87,109	
0106	Engine Lubrication System:								
	Oil Pump	Replace			0.4			11,103, 113	D
	Oil Filter	Replace		0.2				101,113	
	Oil Filter Base	Replace		1.0				103,113	
	Oil Pan	Replace			2.0			103,113	
	Oil Lines & Fittings	Inspect	1.0					113	
		Replace		0.7					
	Oil Cooler	Inspect			0.5				
		Replace			1.5			113	
0108	Manifolds Exhaust	Inspect		0.2					
		Replace			0.5			113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE - Continued**								
0109	Accessory Driving Mechanisms:								
	Accessory Drive Group	Replace			1.0			113	
03	**FUEL SYSTEM**								
0301	Fuel Injector Nozzles:								
	Fuel Injector	Replace			0.7			21,33,60,83,92, 113,121	
	Lines, Fuel Injection	Inspect	0.1						
		Replace		0.7				101,113	
0302	Fuel Pumps:	Test			0.2				E
	Pump, Fuel Injection	Adjust			1.2			66,67,113	E
		Replace			2.0			113	
		Repair				3.0		25,29,53,65,75, 76,78,92,93,98, 104, 113,123,111	
	Pump, Transfer	Replace			0.3			113,117 118	
	Lines and Fittings	Replace		0.4				113	
0304	Air Cleaner:	Service	0.2					113	
		Replace		0.4				113	
	Air Cleaner Assembly	Repair		1.1				113	
	Precleaner	Service	0.2					113	
		Replace		0.3				113	
		Repair		0.8				113	
0305	Turbocharger:	Replace			0.7			113	
		Repair				4.0		19,24,37,56,10 4,113,120	
	After Cooler	Replace			1.5			113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
03	**FUEL SYSTEM - Continued**								
0306	Tanks, Lines, Fittings:								
	Tank, Fuel	Inspect	0.1						
		Service	0.3						
		Service		0.3				101,113	
		Replace		9.8				101,113	
	Lines, Fuel	Inspect		0.2					
		Replace		0.7				101,113	
0308	Engine Speed Governor and Controls Assembly:								
	Governor Controls	Adjust			0.5			113	
		Replace			0.7			113	
	Air-Fuel Ratio Control	Replace				0.3		104,113	
		Repair				1.0		104,113,105, 112	
	Automatic Timing Advance Unit	Replace			0.6			66,67,113	
	Governor and Fuel Pump Drive	Replace			1.3			113	
		Repair			0.5				
0309	Fuel Filters:								
	Secondary Filter	Replace		0.2					
	Primary Filter	Service	0.1						
		Replace		0.2					
	Fuel Filter Base	Inspect		0.2					
		Replace		0.5				101,113	
0311	Engine Starting Aids:								
	Ether Start Group	Service	0.1						
		Replace		0.2				101,113	
	Fuel Priming Pump	Test	0.1						
		Replace		0.3				101,113	
04	**EXHAUST SYSTEM**								
0401	Muffler and Pipes	Inspect	0.1						
		Replace		0.3				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
05	**COOLING SYSTEM**								
0501	Radiator Assembly:	Inspect	0.1						F
		Service	0.2	0.6				101,113	
		Repair				12.0		113	
	Radiator Cap Assembly	Inspect	0.1						
		Replace		0.1				113	
0502	Cowling Deflectors, Air Ducts, Shrouds, etc.:								
	Radiator Guard	Replace		1.5				113	
0503	Water Manifold, Headers, Thermostats and Housing:	Test		1.0				101,113	
		Replace		0.4				101,113	
	Hoses, Coolant	Inspect	0.1						
		Replace		0.8				113	
0504	Water Pump	Replace		1.7				101,113	
		Repair			3.0			113,103	
0505	Fan and Fan Drive Assembly:								
	Fan and Fan Drive	Inspect	0.1						
		Replace			1.0			113	
		Repair			1.5			113	
	Fan Belts	Inspect	0.1						
		Adjust		0.2				113	
		Replace		0.8				113	
	Fan Belt Tensioner	Replace		0.5				113	
0508	Filter, Coolant	Replace		0.3				113	
06	**ELECTRICAL SYSTEM**								
0601	Alternator:	Test			0.5			113	
		Replace		0.4				101,113	
		Repair				4.0		113	
	Alternator Vee Belt	Inspect	0.1						
		Adjust		0.1				113	
		Replace		0.3				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM - Continued**								
0603	Starting Motor:	Test		0.2				113	
		Replace		3.0				101,113	
		Repair				8.0		103,113	
	Starter Solenoid	Test		0.2				113	
		Replace		0.5				113	
		Repair				1.0		113	
0607	Instrument or Engine:								
	Control Panel	Inspect	0.1						
	Switches	Test		0.2				113	
		Replace		1.4				113	
	Wiring	Inpsect	0.1						
		Replace		1.0				113	
	Gauges, Electrical	Inspect	0.1						
		Test		0.5				113	
		Replace		1.6				113	
	Lamps	Replace						113	
		Inspect	0.1						
	Meters	Test		0.4				113	
		Replace		1.8				113	
0608	Miscellaneous Items:								
	Fuses & Fuse	Inspect	0.1						
	Holders	Replace		0.2				113	
	Circuit	Inspect	0.1						
	Breakers	Replace		0.2				113	
	Master Battery Switch	Replace		0.3				113	
0609	Lights:								
	Headlamp	Inspect	0.1						
	Floodlamp	Replace		0.2				113	
	Taillights	Repair		0.2				113	
0610	Sending Units and Warning:								
	Switches Oil and	Inspect		1.0					
	Water Temp Senders	Replace		0.2				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM - Continued**								
	Low Air Warning Pressure Switch	Inspect		0.1					
		Replace		0.2				113	
0611	Horn and Alarm:								
	Low Air Warning Horn	Inspect	0.1						
		Replace		1.0				113	
	Back-Up Alarm	Replace		1.4				113	
	Air Horn Switch	Replace		0.5				113	
0612	Batteries:								G
	Storage Battery	Inspect	0.1						
		Service	0.2						
		Test		0.4				113	
		Replace		0.4				101,113	
	Box, Battery	Service	0.2						
		Replace		1.0				113	
	Cable, Battery	Inspect	0.1						
		Replace		0.3				113	
		Repair		0.5				113	
0613	Hull or Chassis Wiring Harness:								
	Harness, Tractor	Inspect		0.2					
		Test		1.0				113	
		Replace		4.2				113	
		Repair		1.0				113	
	Harness, Scraper	Inspect		0.2					
		Test		1.0				113	
		Replace		3.5				113	
		Repair		1.0				113	
0615	Radio Interference Suppression:								
	Capacitor	Replace		0.3				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
07	**TRANSMISSION**								
0705	Transmission Shifting Components:								
	Hydraulic Controls	Test			1.0				
		Adjust			1.0				
		Replace			3.5				
		Repair			2.5				
	Control Linkage and Arms, Pedals, etc.	Adjust		1.1				113	
		Replace		2.1				113	
0708	Torque Converter	Replace			6.0			104,113	H
		Repair				4.0		35,70,104 113	
0710	Transmission Assembly	Inspect	0.1						
		Service		0.3				101,113	
		Test			1.5			16,31,32,113	
		Adjust			0.5			16,31,32,113	
		Replace			7.0			113	
		Overhaul					36.0	104,113	
0719	Reduction or Transfer Gears:								
	Transfer Gears	Replace				1.0		104,113	
0721	Cooler, Pumps Motors:								
	Oil Pump, Scavenge	Test			0.5			113	
		Replace			1.0			113	
	Oil Pump Transmission	Replace				1.1		113	
	Oil Pump, Flywheel Scavenge and Differential	Replace			1.0			107,113	
		Repair				1.5		107,113	
	Oil Filter, Magnetic	Replace		0.5				104,113	
	Screen	Service		0.3				104,113	
		Replace		0.5				104,113	
	Oil Cooler, Torque Converter	Replace		1.5					
	Oil Cooler Lines	Inspect		0.1					
		Replace		0.5				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
07	**TRANSMISSION - Continued**								
0726	Brakes (Special) Hydraulic Retarder:								
	Oil Cooler, Brake	Replace			0.6			103,113	
	Retarder Oil Lines	Inspect		0.5					
		Replace		0.5				113	
	Air Lines and Fittings	Inspect		0.1					
		Replace		0.4				113	
	Retarder Control Valve	Replace			1.0			113	
		Repair			1.5			113	
	Regulator, Air Pressure	Replace		0.5				113	
09	**PROPELLER AND PROPELLER SHAFTS**								
0900	Propeller Shafts:								I
	Drive Shafts	Replace		3.0				67,103,113,116	
10	**FRONT AXLE**								
1000	Front Axle:								
	Axle	Replace		0.8				113	
	Axle Housing	Replace			1.1			113	
1002	Differential:								
	Differential and Bevel Gear	Service	0.2						
		Replace			1.5			9,113	
		Repair				6.0		113	
	Breather	Service		0.3				113	
		Replace		0.5				113	
1003	Planetary or Final Drive:								
	Final Drives	Service	0.2						
		Replace		2.5				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
11	**REAR AXLE**								
1100	Rear Axle Assembly:								
	Axle Housing	Replace		1.1				113	
12	**BRAKES**								
1201	Hand Brakes, Valve, Park and Emergency:	Inspect	1.0						
		Replace		0.2				113	
	Hose and Fittings	Inspect	1.0						
		Replace		0.2				113	
1202	Service Brakes Shoe Assembly:	Replace		0.8				104,113	
	Brake, Camshafts and Slack Adjusters	Adjust		0.2				113	
		Replace		1.2				113	
		Repair		1.8				113	
1208	Air Brake System, Brake Actuator:	Replace		2.1				101,113	
	Air Tanks	Inspect	0.2						
		Service	0.2						
		Replace		2.2				101,113	
	Brake Control Valve	Replace		0.5				113	
		Repair			0.5			113	
	Tractor and Scraper Relay Valves	Replace		1.1				113	
		Repair			2.0			113	
	Quick-Release Valve	Replace		1.4				113	
	Double Check Valve	Inspect		0.1				113	
		Replace		1.1				113	
	Air Dryer	Replace			0.4			113	
		Repair			2.0			113	
1209	Air Compressor Assembly:								
	Air Compressor	Inspect	0.1						
		Service	0.2						
		Replace		1.0				101,113	
		Repair				3.0		101,113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
12	**BRAKES - Continued**								
	Governor, Air	Adjust		0.3				113	
	Compressor	Replace		1.2				113	
		Repair			2.0			104,113	
	Lines and Fittings	Inspect	0.1					113	
		Replace		1.1					
13	**WHEELS AND TRACKS**								
1311	Wheel Assembly:	Inspect			0.2			2,17,47,63, 96,103,107,107, 113,119	
	Wheels	Replace			1.0			103,113	
		Repair			0.5			2,17,47,63, 96,103,107, 107,119	
	Wheel Bearings and Seals	Adjust			1.0			113	
	Brake Drums	Inspect			0.1				
		Replace			1.0				
1313	Tires, Tubes:	Test	0.1						
	Tire Chains	Inspect	0.1					5,15,101,113	
	Tires	Service	0.2						
		Replace		0.3					
14	**STEERING**								
1401	Mechanical:								
	Steering Gear	Adjust		0.3				101,113	
		Replace		4.5				113	
		Replace		0.6				104,113	
	Steering Wheel	Adjust		0.3				113	
	Steering Link Assemblies	Replace		3.0				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
1410	Hydraulic Pump Assembly:								
14	**STEERING - Continued**								
	Supplemental Steering Pump and Valve	Inspect		0.2					
		Test				0.5		104,113	
		Adjust				0.2		104,113	
		Replace			1.0			113	
		Repair				4.0		104,113	
1411	Hoses, Lines, and Fittings	Inspect	0.2						
		Replace		0.5					
1412	Hydraulic Cylinders:								
	Steering Cylinders	Test		0.5				113	
		Replace		1.4				113	
		Repair			0.3			57,59,86,91,99, 104,106,109, 113	
	Cylinder Follow-Up (Sender)	Test		0.5				113	
		Replace		1.4				113	
		Repair			0.3			11,104,113	
	Cylinder Follow-Up (Receiver)	Test		0.5				113	
		Replace			0.6			113	
		Repair			0.3			11,104,113	
1414	Steering System Valves:								
	Steering Control Valve	Inspect		0.1					
		Test			0.5			104,117,114	
		Replace			2.4			104,113	
		Repair			1.0			104,113	
	Pressure Reducing Valve	Inspect		0.1					
		Test		0.5				113,114	
		Replace		2.1				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
15	**FRAME, TOWING ATTACHMENTS, DRAWBARS AND ARTICULATED SYSTEMS**								
1503	Pintels and Towing Attachments:								
	Hitch King Pin Bearings	Service Replace	0.1				0.5	 104,113	
	Hitch Link Bearings	Service Replace	0.2		 0.5			 104,113	
18	**BODY, CAB HOOD AND HULL**								
1801	Body, Cab Hood and Hull:								
	Cab, ROPS	Inspect Service Replace	0.1	 0.3 3.5				 113 113	 J
	Hood	Inspect Replace	0.1	 0.5				 101,113	
	Door	Inspect Replace Repair	0.1	 0.5	 1.0			 113 113	
	Engine Compartment Shield	Inspect Replace	0.1	 0.7				 113	
	Crankcase Guards	Inspect Replace	0.1	 2.0				 101,113	
1802	Fenders, Windshield:								
	Fenders	Replace		0.8				113	
	Windshield Assembly	Replace Repair		1.0 1.0				113 113	
	Cab Window	Replace Repair		1.0 1.0					

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D		
18	**BODY, CAB HOOD AND HULL - Continued**								
1806	Upholstery, Seats:								
	Seat	Inspect	0.1						
		Replace		1.2				113	
		Repair		0.8				113	
	Seat Belts	Inspect	0.1						
		Replace		0.5				113	
	Seat Suspension	Adjust		0.5				113	
		Replace			1.2			113	
		Repair			1.0			103,113	
	Seat Cylinder Seat	Replace		0.5				103,113	
	Accumulator	Service			0.2			103,113	
		Replace			0.5			103,113	
	Height Control Valve	Adjust			0.2			113	
		Replace		0.5				113	
1808	Tool/Storage Boxes:								
	Stowage Compartments	Inspect	0.1						
		Replace		1.0				113	
22	**BODY, CHASSIS AND HULL ACCESSORY ITEMS**								
2202	Accessory Items:								
	Windshield Wiper and Washer	Service	0.1						
		Replace		1.0				113	
	Mirror Assemblies	Adjust	0.1						
		Replace		0.5				113	
	Air Horns	Replace		1.0				113	
	Air Horn Valve	Replace		1.0				113	
2207	Winterization Equipment Heater	Inspect	0.1						
		Replace		2.4				101,113	
		Repair			1.5			113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
18	**BODY, CHASSIS AND HULL ACCESSORY ITEMS - Continued**								
2208	Data Plates and Instruction Holders	Inspect	0.1						
		Replace		0.2				113	
24	**HYDRAULIC AND FLUID SYSTEMS**								
2400	Scraper Hydraulic System:								
	Systems Operation	Test		0.2				113,114	
2401	Pump and Motor Implement:								
	Hydraulic Pump	Test			0.5			113,114	
		Replace			1.0			113	
		Repair				2.1		5,104,113	
2402	Manifold and Control Valves:								
	Control Valves, Scraper	Test			0.2			113	
		Replace			3.8			113	
		Repair			0.5	1.9		11,104,113	
	Quick Drop Valve (Bowl)	Test			0.2			113	
		Replace		1.1	1.1			113	
		Repair				1.5		113	
	Sequence Valve (Apron)	Test				0.2		25,113	
		Replace			1.5			101,113	
		Repair				1.2		113	
2403	Hydraulic Manual Controls:								
	Control Levers and Linkage	Replace			0.5			113	
		Repair			2.5			113	
2406	Strainers, Filters, Lines, and Fittings:								
	Filters and Strainers	Replace		0.4				101,113	
		Service		0.2				101,113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
24	**HYDRAULIC AND FLUID SYSTEMS - Continued**								
	Lines and Fittings	Inspect	0.1						
		Replace		1.0				103,113	
2407	Hydraulic Cylinders:								
	Bowl Lift Cylinder	Replace			2.2			103,113	
		Repair			0.5	2.2		57,86,91,104, 113	
	Apron Cylinder	Replace			3.5			103,113	
		Repair			0.5	3.0		57,86,91 104,113	
	Ejector Cylinder	Replace			4.5			103,113	
		Repair			0.5	4.0		57,86,91,104, 113	
2408	Liquid Tanks or Reservoirs:								
	Hydraulic Tank	Inspect	0.1						
		Service	0.3	0.6				101,113	K
		Replace		4.0				107,113	
47	**GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES**								
4701	Instruments (Speed and Distance):								
	Tachometer	Replace		0.6				113	
	Tachometer Drive Cable	Replace		1.0				113	
4702	Gages, Mounting, Lines and Fittings:								
	Oil Pressure Gage	Inspect	0.1						
		Replace		0.5				113	
	Air Pressure Gage	Inspect	0.1						
		Replace		0.5				113	

Table 1. MAC for the 621B Scraper - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
47	**GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES - Continued**								
4703	Hourmeter:								
	Hourmeter Assembly	Inspect	0.1						
		Replace		0.6				113	
74	**EARTHMOVING EQUIPMENT COMPONENTS**								
7448	Bowl and Discharge Components:								
	Ejector	Replace				4.0		113	
	Cutting Edges	Inspect	0.1						
		Replace		2.0				102,113	
	Apron Assembly	Adjust		0.2				113	
		Replace				3.0		113	

Table 2. Tools and Test Equipment Requirements for 621B Scraper.

(1) TOOLS OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
1	O	Adapter, Mechanical Puller	5120-01-286-8435	1P1835
2	O	Assembly, Base	(11083)	8S7610
3	O	Attachment, Bearing Cup Puller	5120-00-293-1430	8B7554
4	H	Attachment, Brg Pulling	(11083)	1H3110
5	F	Bead Breaker, Pneumatic Tire	4910-00-773-9341	2D2820
6	H	Bolt	5306-01-136-0057	5P1737
7	H	Bolt, Machine	5306-00-426-5835	7B5163
8	H	Bolt, Machine	5306-01-026-9992	9S8890
9	F	Bracket, Link	4940-01-268-2201	1387573
10	O	Bracket, Link	5340-01-476-1743	1387574
11	F	Bushing Driver Set	5120-01-030-1626	1P0510
12	F	Bushing, Driver Set (FD)	5120-01-039-4811	1P0520
13	F	Bushing, Sleeve	3120-01-273-0057	5P2396
14	H	Compressor, Piston Ring	5120-01-184-0331	5P3526
15	F	Constrictor, Bead Expanding, Pneumatic	4910-01-038-3865	31989A
16	H	Control, Throttle	(11083)	5P8602
17	O	Cylinder Assembly, Actuating, Linear	3040-01-264-9538	8S7650
18	H	Driver Kit, Bearing	4910-01-032-3128	8S2241
19	H	Driver Tool		FT0174
20	H	Expander, Piston Ring	5120-01-184-7174	7M3978
21	F	Extractor Adapter, Fuel Nozzle	4930-01-268-7417	5P6229
22	F	Extractor, Group Valve	4910-01-296-3862	1667441
23	F	Fixture, Adapter		FT0808
24	H	Fixture Assembly, Turbocharger	4910-01-264-4024	9S6363
25	H	Fuel Pump Adapter Group	(11083)	6V9441
26	H	Gage	(11083)	1P5507
27	H	Gage	(11083)	6V0118
28	H	Gage	(11083)	8T0843
29	H	Gage, Fuel Injection	5210-00-861-1344	5P4158

Table 2. Tools and Test Equipment Requirements for 621B Scraper - Continued.

(1) TOOLS OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
30	F	Gage, Gp Valves	2815-01-123-5983	5P3536
31	F	Gage, Pressure Kit	4940-01-266-5687	1U5481
32	H	Gage, Pressure Kit Adapter	4940-01-270-5380	1U5482
33	F	Guide, Seal	5120-01-350-5904	6V7025
34	H	Group, Pickup	5120-01-276-0544	6V4950
35	H	Handle, Driver	5120-01-123-5981	1P0531
36	F	Handle, Transfer Pump	4910-01-124-1723	1P0529
37	H	Holding Fixture, Turbo	5120-01-119-1777	9S6343
38	F	Honing Kit, Valve Guide	5180-01-229-1114	1P7451
39	F	Indicator, Dial	5210-00-314-6140	8T5096
40	H	Indicator Tool Gp	5210-01-124-1737	8T0455
41	F	Inserter And Remover, Stud	5120-01-030-1628	7S8859
42	F	Inserter And Remover, Bearing and Bushing	5120-01-338-7182	J25447B
43	F	Inserter, Bearing and Bushing	5120-01-123-5877	1P0465
44	H	Inserter, Bearing And Bushing	5120-01-123-5879	1P0487
45	H	Inserter, Seal	5120-01-295-1536	6V6143
46	H	Installer	4910-01-097-6946	2P8260
47	O	Installer, Seal		8T9206
48	H	Installing Tool	5120-01-276-0527	6V6142
49	H	Kystone, Ring Groove	5120-01-351-0594	1U6431
50	H	Leg, Mechanical Puller	5120-00-633-5075	1H3108 or 1110
51	O	Link, Bearing (Fd)	5120-01-451-1401	1387575
52	H	Locator	5840-01-136-1056	5P1733
53	H	Machine, Bolt	5306-00-260-4508	0S1594
54	H	Magnet Assembly	2815-01-126-5621	8S2293
55	H	Master Gage		6V6189
56	H	Modified Fixture		FT0165
57	F	Multiplier, Torque Wrench	5120-01-296-4234	6V0109
58	H	Nut		3H0466
59	F	Nut, Fastener	5310-01-483-6594	1P0544

Table 2. Tools and Test Equipment Requirements for 621B Scraper - Continued.

(1) TOOLS OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
60	F	Nut, Plain, Hexagon	5310-00-208-9735	1B4201
61	H	Nut, Plain, Hexagon	5310-01-123-1417	1B4209
62	H	Nut, Sleeve	5310-01-038-8318	9S8858
63	O	Pin, Shoulder, Headless (Fd & Track)	5315-01-270-2832	8S7615
64	H	Pin, Straight, Knurled	5315-01-271-7753	5P2406
65	F	Pin, Timing	5315-01-159-8266	6V2112
66	H	Pin, Timing	5315-01-268-2194	6V4186
67	F	Pinion Turning Tool	3020-01-250-1610	9S9082
68	H	Plate		3H0468
69	H	Plate, Adapter	5120-01-275-2155	1P2396
70	H	Plate, Intermediate, Friction Clutch	2520-01-408-9266	1P479
71	H	Plate, Intermediate, Friction Clutch	2520-01-408-9263	1P481
72	H	Plate, Intermediate, Friction Clutch	2520-01-408-9278	1P491
73	H	Plate, Mechanical Puller	5120-01-124-1738	3H0465
74	H	Plate, Pusher		FT1206
75	H	Plate, Retaining, Bearing	3110-01-038-3898	1P7410
76	H	Plate, Retaining, Shaft	3040-01-268-0305	5P1744
77	H	Plate, Seal Inserter	5120-01-030-7422	9S8864
78	H	Pointer	5355-01-159-8267	5P1768
79	F	Press	4940-01-268-2202	5P8639
80	H	Prod, Test	6625-01-344-7987	8T0500
81	O	Puller Attachment, Mechanical	5120-01-512-7167	1H3112
82	O	Puller Attachment, Mechanical (Fd)	5120-00-288-6756	8B7551 or 5F7343
83	F	Puller Kit, Universal	5180-01-124-1903	1P3075
84	H	Puller, Dowel	5120-01-353-2224	5P0944
85	H	Puller, Hydraulic	5130-00-363-6680	6V3160
86	F	Puller, Hydraulic	5130-01-296-4277	6V3175
87	H	Puller, Mechanical	5120-00-589-1446	1P2321
88	H	Puller, Mechanical	5120-00-633-5074	1H3107
89	O	Puller, Mechanical	5120-00-417-2952	5P8665

Table 2. Tools and Test Equipment Requirements for 621B Scraper - Continued.

(1) TOOLS OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
90	H	Puller, Mechanical	5120-00-633-5085	8B7548
91	O	Pump, Hydraulic Ram, Hand Driven (Fd & Track)	4320-00-374-1403	4C4865 or 9U6600
92	F	Pumping Unit, Hydraulic, Hand Driven	4320-01-263-9716	5P4150
93	H	Punch Driver	5120-01-484-9392	6V4818
94	H	Remover, Electrical Contact	5120-01-124-1906	2P5518
95	H	Repair Kit, Diesel Engine	2815-01-366-7229	5P4175
96	O	Repair Tool, Special Purpose (Track)	4910-01-264-4778	8S7621
97	O	Saddle Assembly, Lifting Block (Track)	2510-01-264-8424	8S8048
98	H	Screw, Cap	5305-00-252-8919	0S0509
99	O	Screw, Forcing	5120-00-302-5857	5F7345
100	F	Seal Guide	4320-01-050-3419	1P6079
101	O	Shop Equipment, Automotive Maintenance And Repair: Common No. 1, Less Power	4910-00-754-0654	SC4910-95CLA74
102	O	Shop Equipment, Automotive Maintenance And Repair: Common No. 2, Less Power	4910-00-754-0650	SC4910-95CLA72
103	F	Shop Equipment, Automotive Maintenance And Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	SC4910-95CLA31
104	O	Shop Equipment, Machine Shop: Field Maintenance, Basic	3470-00-754-0708	SC3470-95CLA02
105	H	Shut Off Group, Manual	11083	2W9161
106	F	Sleeve	5120-01-288-2445	9S5565
107	O	Stand Assembly (Fd)	4910-01-264-4777	8S7640
108	O	Stand, Lifting (Fd & Track)	5120-01-343-8085	4C6486
109	H	Step Plate, Mechanical Puller	5120-00-378-4254	8B7561
110	F	Stud, Plain	5307-01-286-8388	9S5558
111	H	Tachometer, Photo	6680-01-135-7427	6V3121

Table 2. Tools and Test Equipment Requirements for 621B Scraper - Continued.

(1) TOOLS OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
112	H	Tool Kit, Fuel Injection	5180-01-183-8580	6V6070
113	O	Tool Kit, General Mechanic's: Automotive, SC5180-90-CL-N05	5180-00-699-5273	SC5180-90-CL-N05
114	F	Tool Outfit, Hydraulic System Test and Repair (HSTRU)	4940-01-036-5784	SC3470-95-CL-B07 13221E6850 (97403)
115	F	Tool, Alignment		6V3069
116	F	Tool, Drive		6V0188
117	F	Tool, Pump Assembly, Fuel Transfer		5P2391
118	F	Tool, Pump Assembly, Fuel Transfer		5P2392
119	O	Tool, Special (Fd & Track)	4910-01-265-0428	8S7611
120	F	Tool, Valve Lifter	5120-01-276-0528	5P7433
121	F	Tube Assembly, Metal	4710-01-240-6763	7N8371
122	H	Turbine Holder	4910-01-181-5660	8S9944
123	H	Wrench, Bonnet	5120-01-266-7433	8T5287
124	O	Wrench, Ratchet	5120-01-123-5881	8H0684

Table 3. Remarks for 621B Scraper.

(1) REFERENCE CODE	(2) REMARKS
A	Inspect by checking lubricating oil level and checking for leaks.
B	Service by changing oil.
C	Valve mechanism adjustment consists of measuring clearance between rocker arm and valve turning adjustment screw. Procedure also indicates how to locate Top Dead Center (TDC) compression stroke for no. 1 piston.
D	Includes removal of suction bell.
E	Fuel injection pump timing checks can be performed with engine installed or removed.
F	Inspect by checking coolant level and by checking for leaks.
G	Battery maintenance instructions are provided in TM 9-6140-200-14.
H	Inspect by checking transmission oil level and checking for leaks.
I	Service by lubrication.
J	Check for damage and missing or loose bolts.
K	Service by changing hydraulic system oil.

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST 0339 00

SCOPE

This work package lists expendable and durable items you will need to maintain the 621B Scraper. This listing 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)*, or CTA 8-100, *Army Medical Department Expendable/Durable Items*.

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is assigned to the entry in the list and is referenced in the work package Initial Setup lists [e.g., Use antifreeze (Item 1, WP 0381 00)].
2. **Column (2) - Level.** This column identifies the lowest level of Field Maintenance that requires the listed item.

   C - Operator/Crew

   O - Unit Maintenance

   F - Direct Support Maintenance

   H - Sustainment Maintenance
3. **Column (3) - National Stock Number.** This is the NSN assigned to the item which you can use to requisition it.
4. **Column (4) - Description, Commercial and Government Entity Code (CAGEC), and Part Number.** This provides the other information you need to identify the item.
5. **Column (5) - (U/M) Unit of Measure.** This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List for 621B Scraper.

(1) NEW ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1		8040-00-262-9026	Adhesive	OZ
2	O		ADHESIVE (71984) RTV732	
		8040-00-877-9872	3 Ounce Tube	OZ
3	O	8040-01-250-3969	ADHESIVE: Loctite (05972) 242	OZ
4	C		ANTIFREEZE: Permanent, Ethylene Glycol, Inhibited (81349) MILA461 53	
		6850-00-181-7929	1 Gallon Bottle	GAL
		6850-00-181-7933	5 Gallon Can	GAL
		6850-00-181-7940	55 Gallon Drum	GAL
5	C		ANTIFREEZE: Permanent, Arctic Grade (81349) MILLAl 1755	
		6850-00-174-1806	55 Gallon Drum	GAL
6	O	5340-00-450-5718	CAP SET, PROTECTIVE: Dust and Moisture Seal (19207) 10935405	EA
7	H	2825-00-827-1526	Caulking Strip (0129)	EA
8	C		CLEANING COMPOUND: Solvent, Type III (81349) MIL-PRF-680	
		6850-01-474-2320	5 Gallon Can	GAL
		6850-01-474-2321	55 Gallon Drum	GAL
9	O		CLOTH: Abrasive, Emery, Fine (80204) ANSI B74. 18	
		5350-00-584-4654	50 Sheet Package	EA
10	F	8030-00-180-6222	Compound, Sealing	
11	O		COMPOUND: Anti-seize (05972) 76764	
		8030-00-251-3980	1 Pound Can	LB

Table 1. Expendable and Durable Items List for 621B Scraper - Continued.

(1) NEW ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
12	O		COMPOUND: Gasket Forming, Silicone (05972) 77C	
			13 Ounce Cartridge	OZ
13	C		DETERGENT: General Purpose, Liquid (83421) 7930-00-282-9699	
		7930-00-282-9699	1 Gallon Can	GAL
14	C		FUEL: Diesel, DF-1 Grade, Winter (81346) ASTM D 975	
		9140-00-286-5286	Bulk	GAL
		9140-00-286-5287	5 Gallon Can	GAL
		9140-00-286-5288	55 Gallon Drum	GAL
15	C		FUEL: Diesel, DF-2 Grade (81346) ASTM D 975	
		9140-00-286-5294	Bulk	GAL
		9140-00-286-5295	5 Gallon Can	GAL
		9140-00-286-5296	55 Gallon Drum	GAL
16	F		GAGE: Bearing Clearance (77220)	
		5210-00-640-6176	PLASTIGAGEPB1 0.004-0.009 Inch Clearance	EA
		5210-00-640-6177	Range Blue Color, Box of 12 (77220) PG-1 0.001-0.003 Inch Clearance	EA
		5210-00-640-6178	Range Green Color, Box of 12 (77220) PLASTIGAGEPR1 0.002-0.006 Inch Clearance Range Red Color, Box of 12	EA
17	O		Grease, automotive (98308) MIL-G-10924D Braycote 610	
		9150-00-190-0905	1 Pound Can	LB

Table 1. Expendable and Durable Items List for 621B Scraper - Continued.

(1) NEW ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
18	O		Grease, gear, multi-purpose MIL-L-2105B	
		9150-00-985-7248	35 Pound Can	LB
19	H	9150-00-985-7316	GREASE, GENERAL PURPOSE (81349) MIL-G-23549	LB
20	C		GREASE: Automotive and Artillery, GAA	
		9150-01-197-7688	(81349) M-10924-A 2-1/4 Ounce Tube	OZ
		9150-01-197-7690	(81349)M-10924-C 1-3/4 Pound Can	LB
		9150-01-197-7692	(81349) M-10924-E 35 Pound Can	LB
		9150-01-197-7693	(81349) M-10924-B 14 Ounce Cartridge	OZ
		9150-01-197-7688	(81349) M-10924-A 1-1/4 Ounce Tube	OZ
21	O	9150-01-361-8919	GREASE: Electrically Conductive (53711) 5190179	OZ
22	O		HOSE: Clear, Neoprene	FT
23	O	5970-00-815-1295	INSULATING SLEEVING: Electrical (81343) M23053/5-106-0 250 Foot Spool	FT
24	O	5970-00-161-7422	INSULATING VARNISH: Electrical Glyptal 1201(GE 1201) (65313)	OZ
25	O		INSULATING VARNISH: Electrical, Dielectric (75037) 1602	
		5970-00-476-6717	13 Ounce Can, Aerosol Spray	OZ
26	F	9150-00-231-6689	LUBRICATING OIL, GENERAL PURPOSE (D9455)	QT

Table 1. Expendable and Durable Items List for 621B Scraper - Continued.

(1) NEW ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
27	C		OIL: Lubricating, GO 75 (81349) MIL-PRF-2105	
		9150-01-035-5390	1 Quart Can	QT
		9150-01-035-5391	5 Gallon Can	GAL
28	C		OIL: Lubricating, GO 80W/90 (81349) MIL-PRF-2105	
		9150-01-035-5392	1 Quart Can	QT
		9150-00-001-9395	5 Gallon Can	GAL
		9150-01-035-5394	55 Gallon Drum	GAL
29	O		OIL: Lubricating, GO 85W/140 (81349) MIL-PRF-2105	
		9150-01-048-4591	1 Quart Can	QT
		9150-01-035-5395	5 Gallon Can	GAL
		9150-01-035-5396	55 Gallon Drum	GAL
30	C	9150-00-247-0481	OIL: Lubricating, OE/HDO 10W/30 (81349) MIL-L-2104	QT
31	C		OIL: Lubricating, OE/HDO 15W/40 (81349) MIL-PRF-2104	
		9150-01-152-4117	1 Quart Can	QT
		9150-01-152-4118	5 Gallon Can	GAL
		9150-01-152-4119	55 Gallon Drum	GAL
32	C		OIL: Lubricating, OE/HDO 30 (81349) MIL-PRF-2104	
		9150-00-186-6681	1 Quart Can	QT
		9150-00-188-9858	5 Gallon Can	GAL
33	F		OIL: Lubricating, OEA, Arctic (81349) MIL-L-46167	
		9150-00-402-4478	1 Quart Can	QT
		9150-00-402-2372	(81349) MIL-PRF-46167 5 Gallon Can (81349)	GAL
		9150-01-035-5396	MIL-PRF-2104 55 Gallon Drum	GAL

Table 1. Expendable and Durable Items List for 621B Scraper - Continued.

(1) NEW ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
34	C	8030-01-163-0083	Primer, OK Cure	
35	C		RAG: Wiping (64067)	
		7290-00-205-1711	50 Pound Bale	LB
36	O	11083	Sealant, silicone, RTV blue (11083) RTV 8T-9022	OZ
37	O	11083	SEALANT: Pipe (11083) 5P3413	OZ
38	O	11083	SEALANT: Silicone (11083) 4C-9612	OZ
39	F	8030-01-509-1597	SEALING COMPOUND 9S3263 (11083)	OZ
40	H		SOLDER: Lead-Tin Alloy, Rosin Core (81348) QQ-S-571	
		3439-00-555-4629	1 Pound Spool	LB
41	O		STRAP: Tiedown, Electrical Components (96906) MS3367-4-0	
		5975-00-903-2284	4 Inch Length, Black Package of 100	EA
		5975-00-984-6582	(96906) MS3367-1-0 6 Inch Length, Black Package of 100	EA
		5975-00-935-5946	(96906) MS3367-2-1 13.35 Inch Minimum Length, Brown Package of 100	EA
42	O		TAG: Marker (64067) 9905-00-537-8954	EA.
		9905-00-537-8954	Package of 50	EA
43	O		TAPE: Anti-seizing (52152) 6195	
		8030-00-889-3535	260 Inch Roll	IN.
44	O	9330-00-753-5372	Tubing, Plastic spiral wrap	EA

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Wire Replacement
- Aftercooler to Operator Compartment Ground 0115 00-1
- Air Dryer 0116 00-1
- Alternator Ground 0113 00-1
- Battery Disconnect Switch-to-Starting Motor 0111 00-1
- Engine Front Cover-to-Support Ground 0114 00-1
- Front Blackout Light 0118 00-1
- Main Circuit Breaker to Starting Motor Solenoid 0110 00-1
- Starting Motor Ground 0112 00-1

Wiring Harness Replacement
- Backup Alarm Switch 0108 00-1
- Engine Compartment 0107 00-1
- Headlight, Floodlight and Starting Aid 0117 00-1
- Heater, Defroster and Front Wiper 0109 00-1
- Operator Compartment 0106 00-1
- Rear 0120 00-1
- Rear Light 0119 00-1

Worklight
- Relay Replacement 0078 00-1
- Replacement 0086 00-1
- Replacement Front 0083 00-1
- Switch Replacement 0064 00-1

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0601208

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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE 1 July 2006
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-CI/TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: *(Activity and location) (Include ZIP Code)* 125th Transportation Company ATTN: Motor SGT (SGT Wilson) Ft. Riley, KA 78665-4000	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3805-248-23-1	15 February 2005	Maintenance Manual for Scraper, Earth Moving, Motorized, DED, Model 621B

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0007 00-1					Part number supplied for item 2 is incorrect.

SAMPLE

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Johnny Wilson, E-5, MOTOR SGT	DSN 867-7967	

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

SAMPLE

PART III - REMARK *(Use this part for any explanatory 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	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS 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
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PART III - REMARKS *(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.)*

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THE METRIC SYSTEM AND EQUIVALENTS

Linear Measure

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 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 Pounds
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 = 0.0386 Sq Miles

Cubic Measure

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

Temperature

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq 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
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

PIN: 082986-000