TM 5-3800-205-23-3

FIELD MAINTENANCE MANUAL
(INCLUDES UNIT AND DIRECT SUPPORT MAINTENANCE)

FOR

DISTRIBUTOR, WATER, TANK TYPE,
2525 GALLON CAPACITY, SECTIONALIZED
MODEL 613CWD
(NSN 3825-01-497-0690) (EIC: EEF)

WATER DISTRIBUTOR UNIQUE COMPONENTS

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 2005

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

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

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

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.

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.

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 tractor engine in enclosed areas.
2. DO NOT idle tractor engine without adequate ventilation.
3. DO NOT drive tractor 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

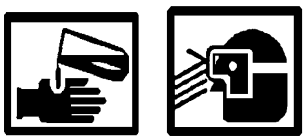
COMPRESSED AIR

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.

WARNING

CONFINED SPACE HAZARD

DO NOT enter water tank. Tank interior is a confined space and therefore hazardous to enter. If tank entry becomes absolutely necessary, contact your local safety office and obtain a confined space entry permit. Requirements of 29 CFR 1910.145(d)(2) (reference 17), as well as any local requirements, must be followed. Failure to follow this warning may result in injury or death due to oxygen deprivation.



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. Failure to follow this warning may result in injury to personnel.
- 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.
- Operation of the 613CWD Water Distributor must comply with applicable regulations of the Code of Federal Regulations (CFR) Title 40, *Protection of Environment,* of the U.S. Environmental Protection Agency (EPA). Failure to comply with EPA regulations may endanger the lives of personnel operating or working near the water distributor or may harm the environment. For further information contact the EPA online at http://www.epa.gov or write to: Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Mail Code 3213A, Washington, DC 20460, (202) 272-0167

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.

WARNING

HYDRAULIC SYSTEM PRESSURE

- Do NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin causing serious injury.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.

WARNING

ISU-60 CONTAINER

Never transport container with doors open. Transporting container with doors open may cause serious injury or death to personnel.

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. Failure to follow this warning may result in illness or death to personnel.
- NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel. Failure to follow this warning may result in illness or death to 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

NON-POTABLE WATER

NEVER drink water contained in water distributor tank. Water contained or dispensed from tank is NON-POTABLE. Drinking non-potable water could result in illness or death.

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.
- DO NOT operate machine at speeds greater than 18 mph (29 kph), in all weather and road conditions and fully loaded. Maximum operating time at 18 mph (29 kph) is 7 hours within a 24-hour period. Failure to follow this warning may cause injury due to whole-body vibration.
- 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 tank. 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, marine or air transport, or when driving tractor into position for assembly to water distributor. Failure to use a ground guide may result in an accident, causing 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 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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- If operating machine without ROPS/FOPS, drive with extreme caution, at low idle, and in 1st gear or reverse ONLY. Machine has no rollover/falling object protection without ROPS/FOPS. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- Always use a ground guide when moving machine during preparation for transport procedures (driving up and down ramps, onto airdrop platform or onto rail flatcars). Failure to use a ground guide may result in an accident, causing death or injury to personnel or damage to equipment.
- Use extreme caution when driving sectionalized tractor with stability skids and no ROPS/FOPS. Use first gear forward or reverse and low idle ONLY. Ground guide or ground safety officer assistance is required to monitor path in front of front stability skid, to avoid obstacles and direct tractor operation. Failure to follow this warning may result in injury or death 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.
- Removal of upper handrail on right side of tractor leaves right side of tractor without any means to safely climb on machine. Use caution when climbing on right side if upper headrail has been removed. Failure to do so may result in injury to personnel.

- Do NOT remove exhaust stack until it has cooled to the touch. Wear gloves and protective clothing as required to guard against burns. Failure to follow this warning may cause personnel injury.

WARNING

PRESSURIZED AIR

- Do NOT disconnect any air system lines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear protection when disconnected air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.



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.

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.

Failure to follow this warning may result in injury or death to personnel.





WARNING

SOLVENT CLEANING COMPOUND

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. Failure to do so may result in injury or death to personnel.

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.
- 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.

- Hitch and steering movement can reduce clearances suddenly and cause personnel injury. Always stop engine BEFORE working in area of hitch link.
- Configuration changes at front of tank should NEVER be attempted without first securing the tank 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 July 2005

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 34 AND TOTAL NUMBER OF WORK PACKAGES IS 48 CONSISTING OF THE FOLLOWING:

Page/WP No.	***Change No.**
Cover/(Back Blank)	0
A/(B Blank)	0
a to h	0
i to vi	0
WP 0001 00 to WP 0048 00	0
Index-1 to Index-4	0
Authentication Page	0
DA Form 2028's	0
Metric Conversion Chart	0
Back Cover	0

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

TECHNICAL MANUAL
TM 5-3800-205-23-3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 15 July 2005

TECHNICAL MANUAL

FIELD MAINTENANCE MANUAL (INCLUDES UNIT AND DIRECT SUPPORT MAINTENANCE)

FOR

DISTRIBUTOR, WATER, TANK TYPE,
2525 GALLON CAPACITY, SECTIONALIZED
MODEL 613CWD
(NSN 3825-01-497-0690) (EIC: EEF)

WATER DISTRIBUTOR UNIQUE COMPONENTS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (*Recommended Changes to Equipment Technical Publications*), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter, DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is: TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

Table of Contents

Page Number

VOLUME 3

Table of Contents - Continued

Table of Contents - Continued

HOW TO USE THIS MANUAL

INTRODUCTION

1. This manual is designed to help you perform troubleshooting and maintenance on the 613CS Scraper and 613CWD Water Distributor.
2. This manual is divided into volumes and written in work package format:
   a. Volume 1 addresses tractor/common components and procedures. Volume 2 addresses scraper unique components. Volume 3 addresses water distributor unique components.
   b. Chapters divide the manual into major categories of information (e.g., *Introductory Information with Theory of Operation, Troubleshooting Procedures, Unit Maintenance Procedures, Unit Level Tractor Maintenance, Direct Support Level Tractor Maintenance, Components of End Item (COEI) Maintenance, Unit Level Scraper Maintenance, Direct Support Level Scraper Maintenance, Unit Level Water Distributor Maintenance, Direct Support Level Water Distributor Maintenance,* and *Supporting Information*).
   c. 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.
   d. 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. Scan through this manual to become familiar with its organization and contents before attempting to operate or maintain the equipment.

CONTENTS OF VOLUME 3 OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of this volume. Become familiar with these warnings before operating or performing troubleshooting or maintenance on the water distributor.
2. A *Table of Contents*, located in the front of this volume, 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 this volume.
3. Chapter 1, *Unit Level Water Distributor Maintenance*, provides instructions on maintaining water distributor components.
4. Chapter 2, *Direct Support and General Support Level Water Distributor Maintenance*, provides instructions on DS maintenance of the water distributor.
5. Chapter 3 includes *Supporting Information: References; Maintenance Allocation Chart (MAC) Introduction; Maintenance Allocation Chart (MAC)*; *Expendable and Durable Items List; Tool Identification List; Torque Limits; Preparation for Storage or Shipment;* and *List of Principle Caterpillar Dealers.*

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 which may result in death or serious injury.

CAUTION

A CAUTION is a reminder of safety practices or directs attention to usage 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 to create 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: “Replace fuel/water separator (WP 0002 00)”, go to Work Package 0002 00 in this manual for instructions on replacing the fuel/water separator.
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. 390-001; 390-002, 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
UNIT LEVEL WATER DISTRIBUTOR MAINTENANCE

FUEL PUMP, HOSES, AND TUBES REPLACEMENT 0001 00

THIS WORK PACKAGE COVERS

Fuel Pump: Removal, Installation

Fuel Hoses: Removal, Installation

Fuel Tubes: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Fuel, diesel (Item 13, 14 or 15 WP 0044 00)

Insulating varnish, electrical (Item 19, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Materials/Parts - Continued

Strap, tiedown (2) (Item 38, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Wire, non-electrical (min. 23 ft) (Item 42, WP 0044 00)

Seal, O-ring (7)

Washer, lock (3)

Personnel Required

Two

Equipment Condition

Fuel shutoff valves closed (TM 5-3800-205-10-2)

Rear steps removed, as required (WP 0018 00)

Tank raised and blocked (TM 5-3800-205-10-2)

WARNING

DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Clean up all leaked or spilled fuel. Fuel may ignite, causing damage to machine and injury or death to personnel.

CAUTION

Cap all hoses, tubes, and fittings to prevent fluid loss and contamination of fuel system.

FUEL PUMP REMOVAL

NOTE

- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.
- Tag all hoses and tubes to aid in installation.

CAUTION

Use two wrench method when disconnecting fuel hoses to avoid damage to ceramic adapter.

1. Disconnect hoses (1 and 4) from fuel pump (3). Remove and discard O-rings.

NOTE

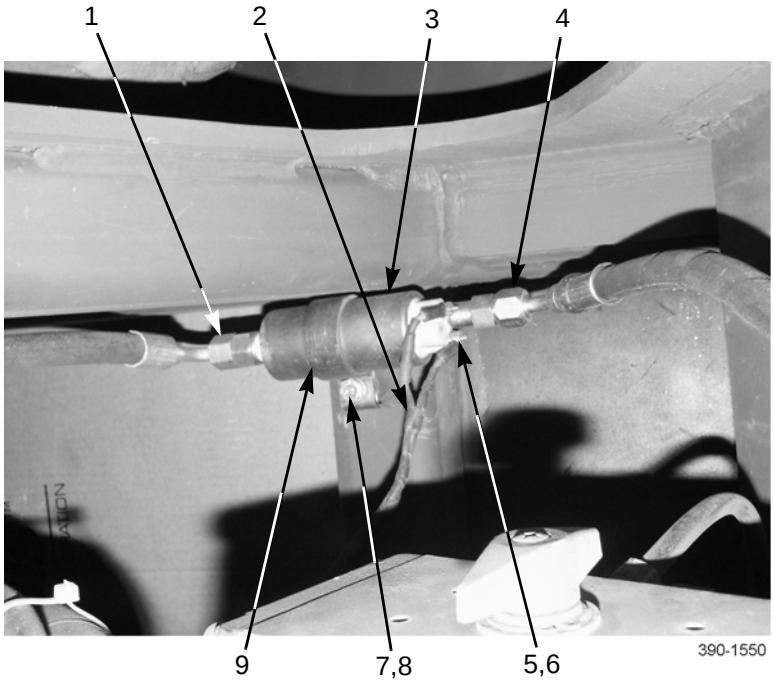
Note position of fuel pump to ensure correct installation.

2. Remove nut (7), lockwasher (8), clamp (9), and fuel pump (3) from rear of water tank. Discard lockwasher.

NOTE

Tag wires for ease in installation.

3. Remove two nuts (5), lockwashers (6), and two wires (2) from fuel pump (3). Discard lockwashers.



FUEL PUMP INSTALLATION

NOTE

Lubricate new O-rings with clean fuel.

1. Install new O-rings and fittings to fuel pump (3).
2. Install two wires (2) to fuel pump (3) with two new lockwashers (6) and nuts (5). Apply varnish over electrical connectors.

NOTE

To ensure proper operation, arrow marking on fuel pump must point toward front of water tank.

3. Install fuel pump (3) to rear of water tank with clamp (9), new lockwasher (8), and nut (7).

CAUTION

Use two wrench method when connecting fuel hoses to avoid damage to ceramic adapter.

4. Connect hoses (1 and 4) to fuel pump (3).
5. Open fuel shutoff valves (TM 5-3800-205-10-2).
6. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

7. Start engine (TM 5-3800-205-10-2) and check for leaks.
8. Install rear steps (WP 0018 00).

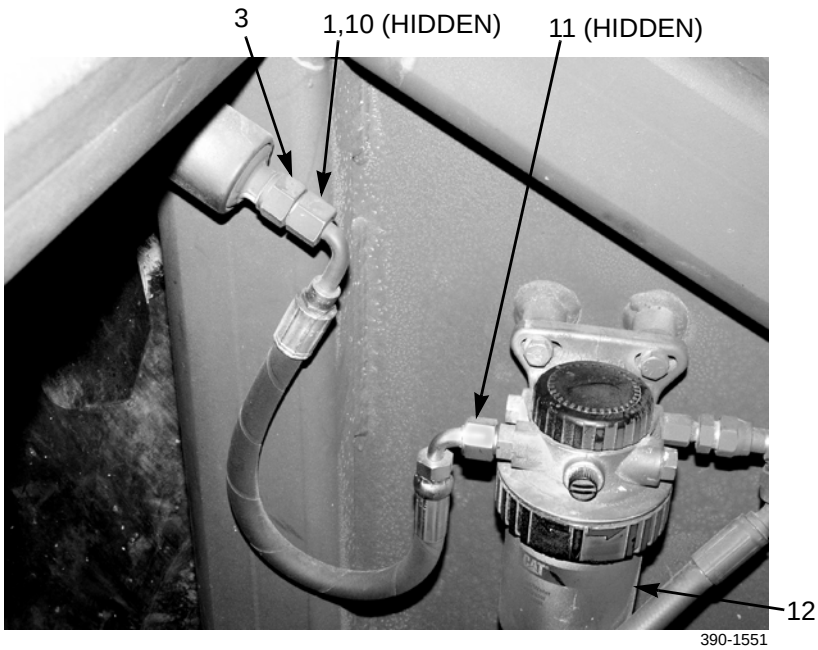
FUEL HOSES REMOVAL

NOTE

- Perform following steps to remove each of seven fuel hoses of water distributor. Hoses are connected to fuel pump, fuel/water separator, fuel tubes, valves, and fittings. Fittings include elbows, tees, and adapters.
- Fuel pump hose is illustrated.

FUEL HOSES REMOVAL - CONTINUED

1. Disconnect hose (1) from fuel pump (3). Remove and discard O-ring (10).
2. Disconnect other end of hose (1) from fuel/water separator (12). Remove and discard O-ring (11).
3. Remove hose (1) from machine.

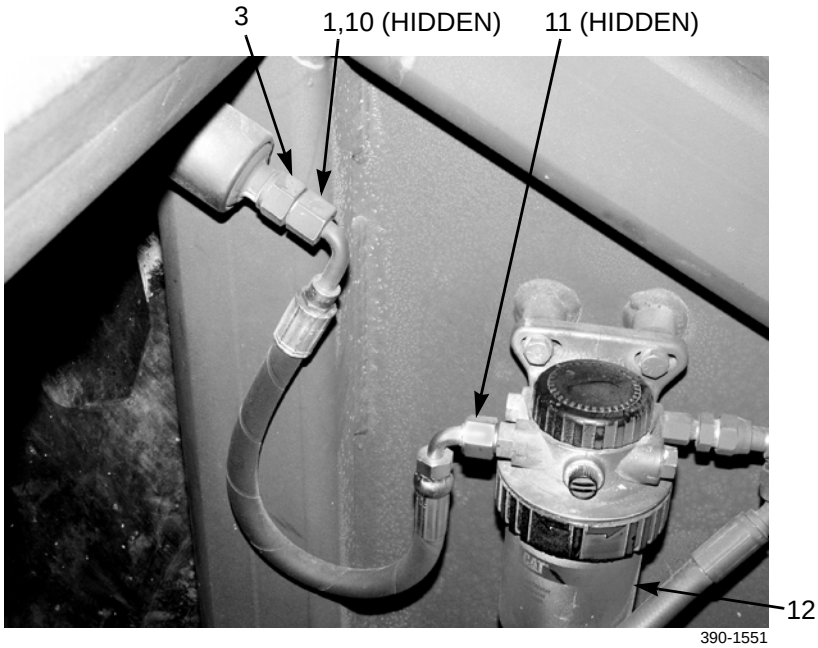


FUEL HOSES INSTALLATION

NOTE

- Perform following steps to install each of seven fuel hoses of water distributor. Hoses are connected to fuel pump, fuel/water separator, fuel tubes, valves, and fittings. Fittings include elbows, tees, and adapters.
- Fuel pump hose is illustrated.
- Lubricate new O-rings with clean fuel.

1. Connect hose (1) and new O-ring (11) to fuel/water separator (12).
2. Connect other end of hose (1) and new O-ring (10) to fuel pump (3).



390-1551

3. Open fuel shutoff valves (TM 5-3800-205-10-2).
4. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

5. Start engine (TM 5-3800-205-10-2) and check for leaks.
6. Install rear steps (WP 0018 00), if removed.

FUEL TUBES REMOVAL

NOTE

Fuel return tube and fuel supply tube are replaced the same way. Fuel return tube is illustrated.

1. Cut and discard tie strap (13) at rear of water tank.

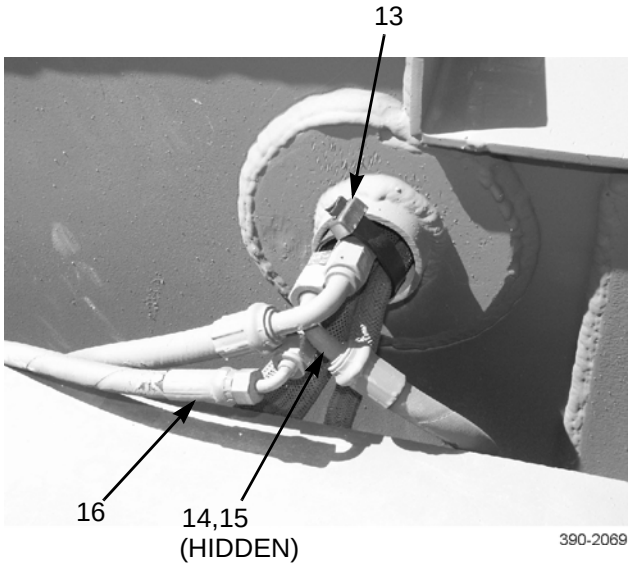
CAUTION

- Use two wrenches when disconnecting fuel hoses to avoid damage.
- Cap hoses and tubes to prevent contamination.

NOTE

- Identify fuel return tube before disconnecting.
- Tag hoses before disconnecting to aid in installation.

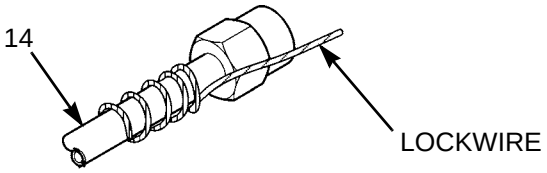
2. Disconnect hose (16) from fuel return tube (14). Remove and discard O-ring (15).



NOTE

Securely attach lockwire to end of fuel return tube at rear of water tank before removing. After fuel return tube is removed, lockwire remains inside conduit. Prior to installation, lockwire is attached to fuel return tube and lockwire is pulled from rear of water tank to aid in installation.

3. Securely connect lockwire to fuel return tube (14).



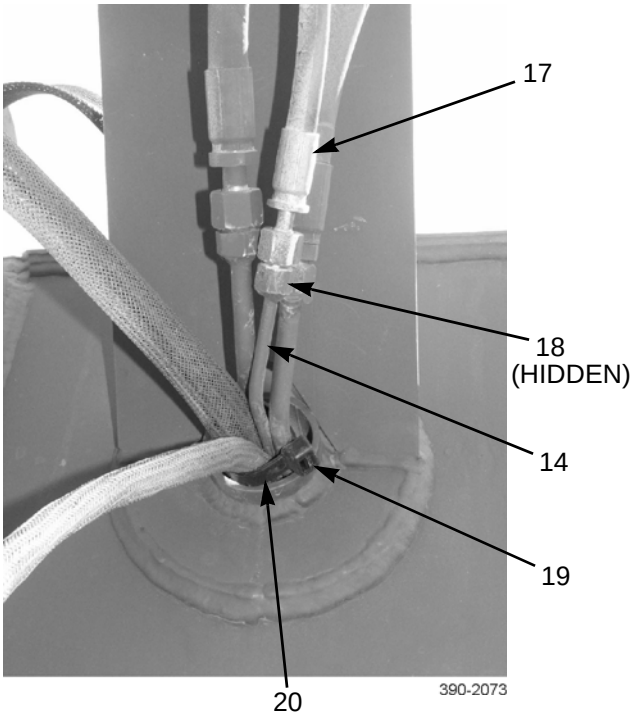
FUEL TUBES REMOVAL - CONTINUED

4. Cut and discard tie strap (19) at front of water tank.
5. Disconnect hose (17) from fuel return tube (14). Remove and discard O-ring (18).

NOTE

- While removing fuel return tube from conduit at front of water tank, have an assistant feed lockwire through conduit from rear of water tank.
- Cap tube before removing.
- Lubricating tube with detergent may ease removal.

6. From front of water tank, remove fuel return tube (14) from conduit (20) until lockwire exits conduit.
7. Disconnect fuel return tube (14) from lockwire leaving lockwire inside conduit (20).



FUEL TUBES INSTALLATION

1. Securely connect fuel return tube (14) to lockwire that is inside conduit (20).

NOTE

- To install tube, feed tube through conduit from front of water tank while an assistant pulls lockwire from rear of water tank.
- Cap tube before installing.
- Lubricating tube with detergent may ease installation.

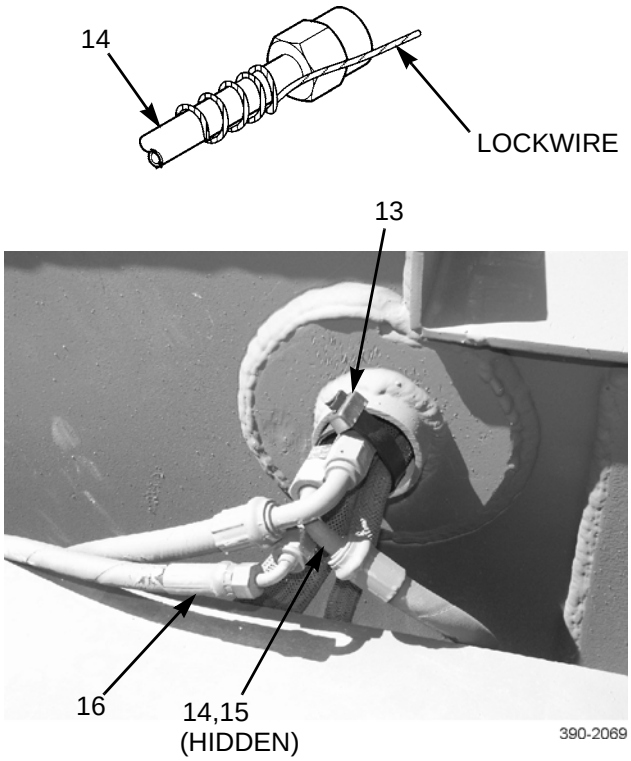
2. Install fuel return tube (14) in conduit (20).

NOTE

Lubricate new O-rings with clean fuel.

3. Install new O-ring (18) and connect hose (17) to fuel return tube (14).

FUEL TUBES INSTALLATION - CONTINUED



4. Remove lockwire from fuel return tube (14) at rear of water tank.
5. Install new O-ring (15) and connect hose (16) to fuel return tube (14).
6. Install new tie strap (13).
7. Install new tie strap (19) at front of water tank.
8. Open fuel shutoff valves (TM 5-3800-205-10-2).
9. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

10. Prime fuel system and start engine (TM 5-3800-205-10-2). Check for fuel leaks.
11. Remove blocks and lower tank (TM 5-3800-205-10-2).

END OF WORK PACKAGE

FUEL/WATER SEPARATOR REPLACEMENT 0002 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Fuel, diesel (Item 13, 14 or 15, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Materials/Parts - Continued

Filter element

O-rings

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

WARNING

DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Clean up all leaked or spilled fuel. Fuel may ignite, causing damage to machine and injury or death to personnel.

NOTE

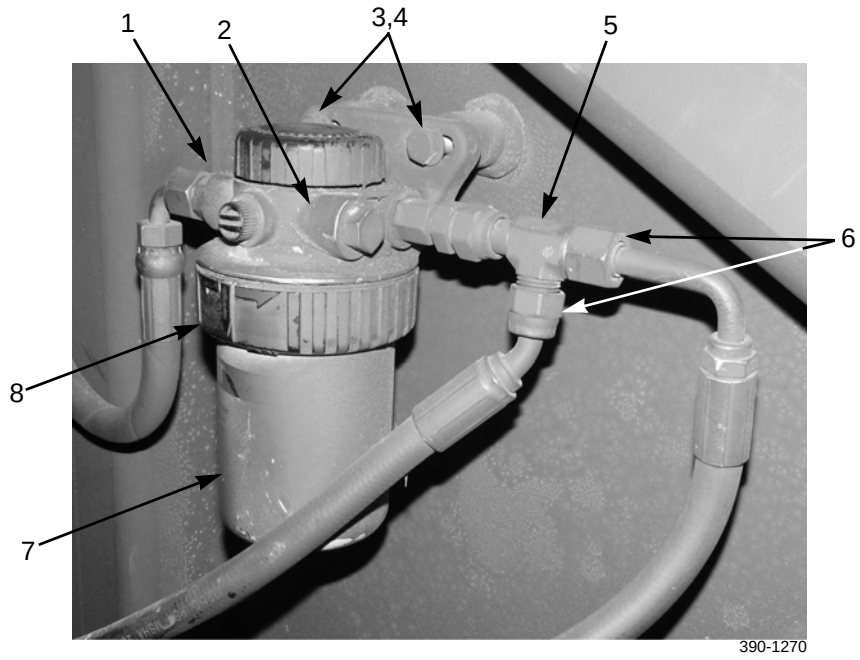
- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.

REMOVAL

1. Close two fuel shutoff valves located under each rear fender (TM 5-3800-205-10-2).
2. Release two latches and open rear access panel at back of machine.

REMOVAL - CONTINUED

3. Clean area around fuel/water separator filter element (7) and fuel/water separator base (2). Unscrew retaining ring (8) and remove filter element from base. Discard filter element.
4. Disconnect hose (1) from fuel/water separator base (2). Disconnect two hoses (6) from tee (5). Install protective caps on hoses.
5. Remove tee (5) from fuel/water separator base (2).
6. Remove two bolts (3), washers (4), and fuel/water separator base (2) from machine.



7. Remove connectors, fittings, and O-rings from fuel/water separator base (2). Discard O-rings.

INSTALLATION

1. Coat new O-rings with clean diesel fuel and install O-rings, connectors, and fittings on fuel/water separator base (2).
2. Install fuel/water separator base (2) on machine with two washers (4) and bolts (3).
3. Install tee (5) on fuel/water separator base (2).
4. Remove protective caps from hoses (1 and 6). Connect hose (1) to fuel/water separator base (2). Connect two hoses (6) to tee (5).

NOTE

- Ensure that fuel/water separator base is clean before installing filter element.
- Fuel/water separator base has a locating notch that only allows for proper installation.

5. Coat seal of new filter element (7) with clean diesel fuel and position filter element on fuel/water separator base (2). Tighten retaining ring (8).

INSTALLATION - CONTINUED

6. Open two fuel shutoff valves located under each rear fender (TM 5-3800-205-10-2).
7. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

8. Prime fuel system and start engine (TM 5-3800-205-10-2). Check for leaks.
9. Close rear access panel and secure with two latches.

END OF WORK PACKAGE

ELECTRICAL GENERAL MAINTENANCE INSTRUCTIONS 0003 00

THIS WORK PACKAGE COVERS

Multiple-Pin Connector Identification Diagrams
Connector Repair
Sealed 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
Wiring Harness Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Heater, gun type, electrical (Item 14, WP 0045 00)

Materials/Parts

Cloth, abrasive (Item 7, WP 0044 00)

Detergent (Item 11, WP 0044 00)

Grease, electrically conductive (Item 17, WP 0044 00)

Insulating sleeving, electrical (Item 20, WP 0044 00)

Insulating varnish, electrical (Item 19, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

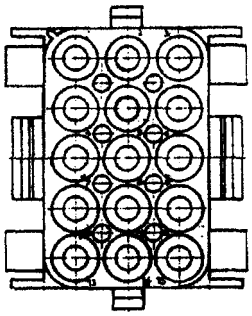
NOTE

- 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 road spray.

MULTIPLE-PIN CONNECTOR IDENTIFICATION DIAGRAMS

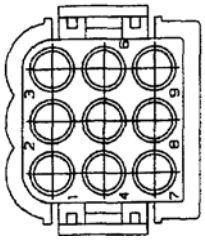
NOTE

The following diagrams illustrate typical multiple-pin connectors and identify pin numbers as viewed from wire side of connector.



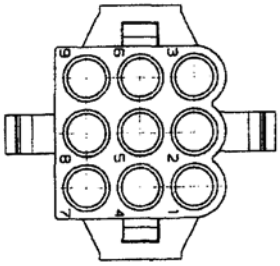
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

390-1189



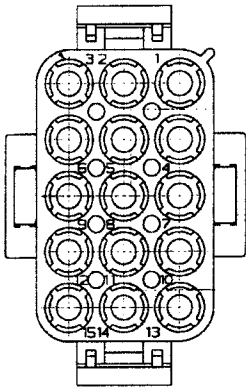
3	6	9
2	5	8
1	4	7

390-1048



9	6	3
8	5	2
7	4	1

390-1049



3	2	1
6	5	4
9	8	7
12	11	10
15	14	13

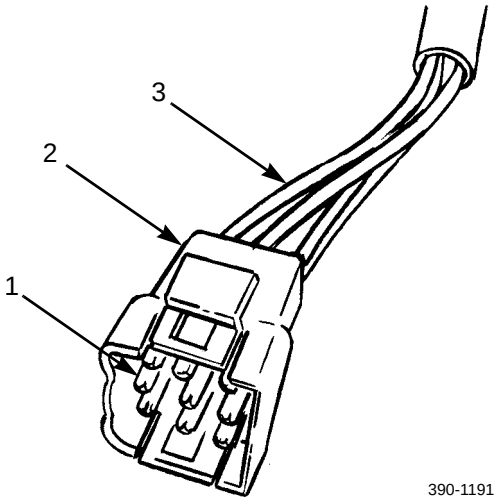
390-1190

CONNECTOR REPAIR

NOTE

- Perform the following steps for each wire of connector.
- Tag wires to aid in installation.

1. Using pin removal tool, position tool over pin (1) and push inward to retract two barbs of pin.
2. Remove wire (3) with pin (1) attached, from rear of connector (2).
3. If defective, remove pin (1) from wire (3) by cutting through wire just behind pin.



390-1191

NOTE

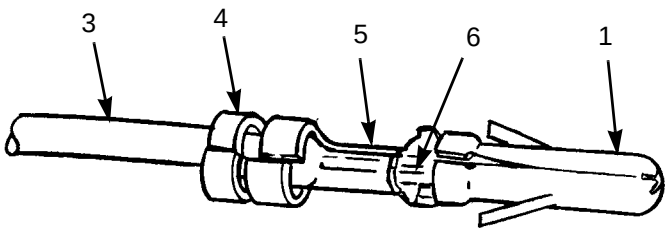
Perform steps 4 through 6 only if pin was removed.

4. Using wire stripping tool, strip insulation of wire (3) to expose proper length of metal strands (6).
5. Using crimping tool, securely crimp tabs (5) of pin (1) over metal strands (6) of wire (3).

NOTE

The other two tabs of pin may need to be crimped slightly in order to enter connector.

6. Using crimping tool, crimp tabs (4) at rear of pin (1) over insulation of wire (3).



390-1192

7. Push pin (1) into rear of connector (2) until fully seated.

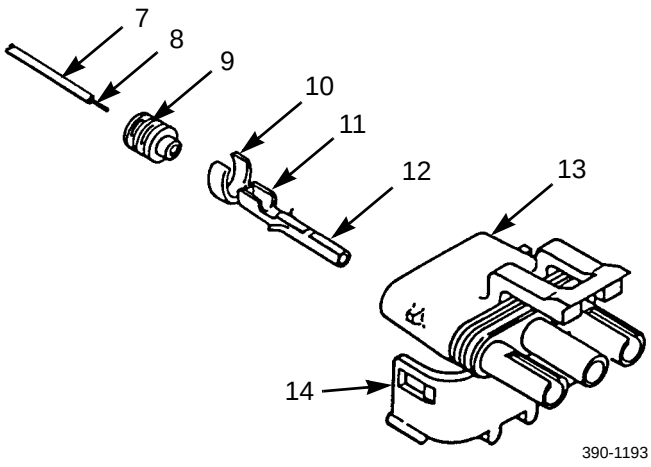
SEALED CONNECTOR REPAIR

1. Open hinged cover (14) of connector (13) for access to rear of connector.

NOTE

- Perform the following steps for each wire of connector.
- Tag wires to aid in installation.

2. Using pin removal tool, position tool over pin (12) and push inward to retract two barbs of pin.
3. Remove wire (7), with pin (12) and seal (9) attached, from rear of connector (13).
4. If defective, remove pin (12) and seal (9) from wire (7) by cutting through wire just behind seal.



NOTE

Perform steps 5 through 8 only if pin and seal were removed.

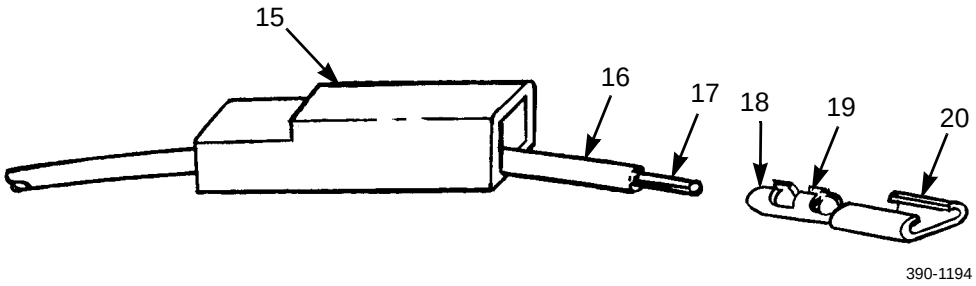
5. Position new seal (9) on wire (7).
6. Using wiring stripping tool, strip insulation of wire (7) to expose 1/8 in. (3 mm) length of metal strands (8).
7. Using crimping tool, securely crimp tabs (11) of pin (12) over metal strands (8) of wire (7).
8. Slide seal (9) next to pin (12) and crimp tabs (10) of pin over end of seal.
9. Push pin (12) into rear of connector (13) until fully seated.
10. Close hinged cover (14) of connector (13).

RECEPTACLE CONNECTOR REPAIR

1. Using removal tool, insert tool into front of connector (15) and depress locking tab of receptacle (20).
2. Push wire (16), with receptacle (20) attached, through front of connector (15).
3. Remove receptacle (20) from wire (16) by cutting through wire just behind receptacle.

RECEPTACLE CONNECTOR REPAIR - CONTINUED

4. Slide connector (15) back on wire (16).

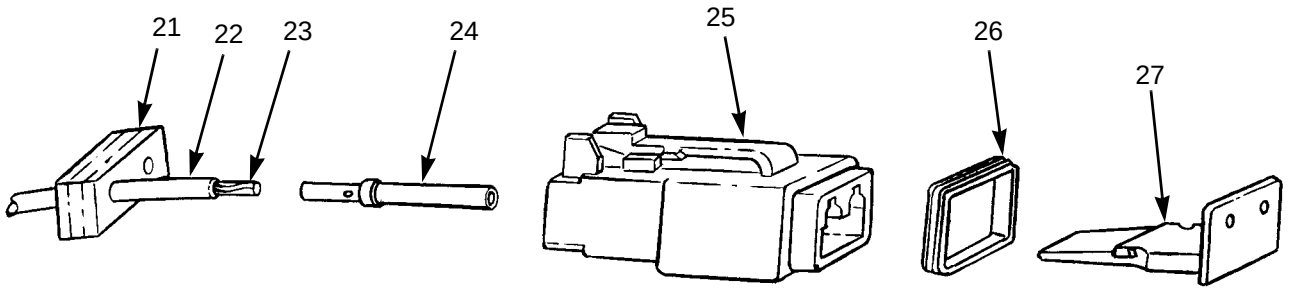


390-1194

5. Using wire stripping tool, strip insulation of wire (16) to expose ¼ in. (6 mm) length of metal strands (17).
6. Using crimping tool, securely crimp tabs (19) of receptacle (20) over metal strands (17).
7. Using crimping tool, crimp tabs (18) of receptacle (20) over insulation of wire (16).
8. Slide connector (15) forward over receptacle (20) until locking tab of receptacle snaps into place.

WATERPROOF CONNECTOR REPAIR

1. Remove end cover (27) and gasket (26) from front of connector (25).
2. Remove seal (21) from rear of connector (25) and slide seal back on wire (22).



390-1195

NOTE

- Perform the following steps for each wire of connector.
- Tag wires to aid in installation.

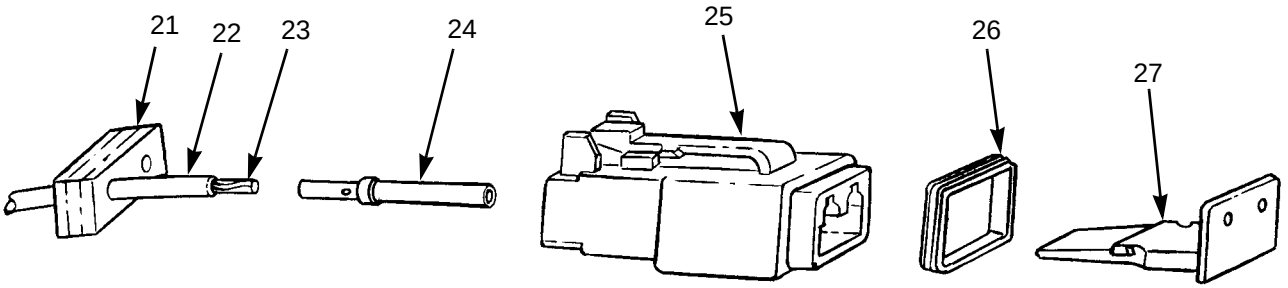
3. Using pin removal tool, insert tool into front of connector (25) and depress locking tab of connector.
4. Remove wire (22) with pin (24) from rear of connector (25).
5. If defective, remove pin (24) from wire (22) by cutting through wire just behind pin.

WATERPROOF CONNECTOR REPAIR - CONTINUED

NOTE

Perform steps 6 through 9 only if pin was removed.

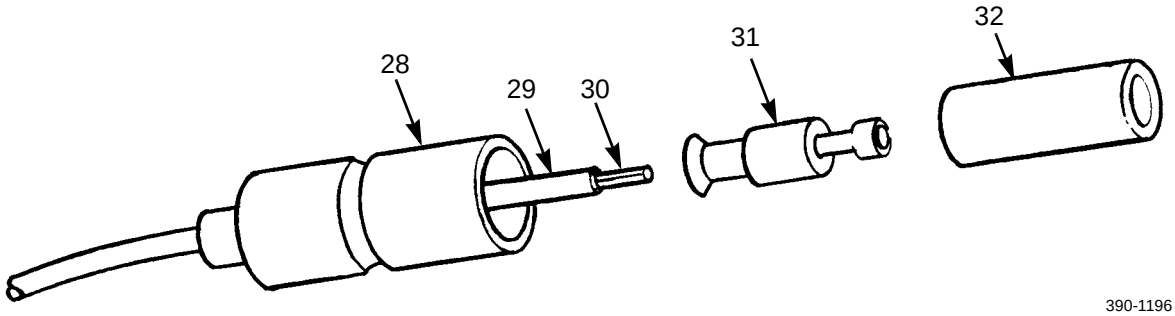
6. Using wire stripping tool, strip insulation of wire (22) to expose ¼ in. (6 mm) length of metal strands (23).
7. Insert metal strands (23) of wire (22) fully into rear of pin (24).
8. Using crimping tool, securely crimp pin (24) to metal strands (23) of wire (22).
9. Push pin (24) into rear of connector (25) until fully seated.
10. Install seal (21) on rear of connector (25).
11. Install gasket (26) and end cover (27) on front of connector (25).



390-1195

MILITARY CONNECTOR REPAIR

1. Slide shell (28) back on wire (29) to expose sleeve (32).
2. Remove sleeve (32) from terminal (31) by pulling sleeve forward.
3. Remove terminal (31) from wire (29) by cutting through wire just behind terminal.

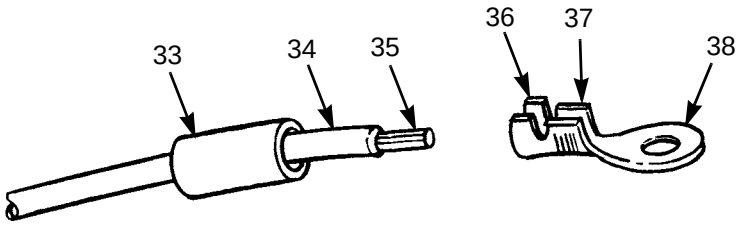


390-1196

4. Using wire stripping tool, strip insulation of wire (29) to expose length of metal strands (30) equal to depth of terminal (31).
5. Using crimping tool, securely crimp terminal (31) to metal strands (30) of wire (29).
6. Install sleeve (32) to terminal (31) by pushing sleeve over front of terminal until fully seated.
7. Slide shell (28) up wire (29) and over sleeve (32).

RING TERMINAL REPAIR

1. Remove ring terminal (38) from wire (34) by cutting through wire just behind heat shrink tubing (33).
2. Cut heat shrink tubing (33) to length sufficient to cover tabs (36 and 37) of ring terminal (38) and ¼ in. (6 mm) of wire (34).
3. Slide heat shrink tubing (33) back on wire (34).
4. Using wire stripping tool, strip insulation of wire (34) to expose proper length of metal strands (35).
5. Using crimping tool, securely crimp tabs (37) of ring terminal (38) over metal strands (35).
6. Using crimping tool, crimp tabs (36) of ring terminal (38) over insulation of wire (34).
7. Slide heat shrink tubing (33) over tabs (36 and 37) of ring terminal (38).
8. Using heat gun, apply heat to heat shrink tubing (33) until tubing snugly conforms to ring terminal (38) and insulation of wire (34).



390-1197

SPLICING WIRES

NOTE

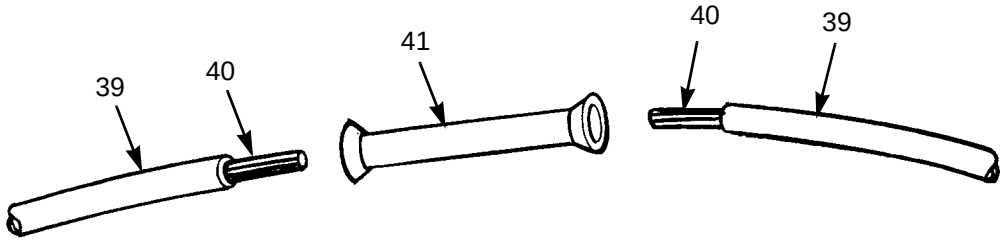
The selection of crimping tool and type of splice connectors is optional. High quality splice connectors can be expected to last the life of the machine.

1. Inspect each end of wire (39). Trim insulation and metal strands (40) of wire back, as necessary, to ensure integrity of wire.
2. Using wire stripping tool, strip each end of wire (39) to expose length of metal strands (40) to suit type of splice connector (41) used.

NOTE

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

3. Insert metal strands (40) of wire (39) fully into splice connector (41).
4. Using crimping tool, securely crimp splice connector (41) to metal strands (40) of wire (39).



390-1198

ELECTRICAL GROUND POINTS

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

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.

a. Remove screw, lockwasher, nut, etc. connecting ground wire terminal to machine ground point.

b. If necessary, clean mounting hardware, wire terminal, and ground point with detergent and a scrub brush.

c. Remove any rust or corrosion from ground point with a wire brush and abrasive cloth.

d. Replace defective mounting hardware and wire terminal as necessary.

e. 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 and 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).

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 readout.

CAUTION

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

b. **Testing for Continuity.**

(1) Zero multimeter.

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

(3) Observe readout and interpret results as follows:

(a) If readout indicates 0 (zero), circuit has continuity.

(b) If readout indicates resistance, circuit is open.

MULTIMETER USAGE - CONTINUED

CAUTION

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

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

(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 0 (zero), circuits are shorted or circuit is grounded if testing to ground.

(b) If readout does not indicate 0 (zero), circuits are not shorted.

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

CAUTION

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

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

(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. **Measuring DC Voltage.**

a. Set multimeter to ON.

b. Select VOLTS.

c. Select volts DC.

d. Select LOWEST VOLTAGE/OHMS range for voltage range higher than volts to be measured.

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

f. Observe readout and interpret results as DC voltage in circuit being tested.

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 the circuit diagram printed or stamped on relay case.

   a. Using a multimeter, check for continuity across relay coil.
   b. Using a multimeter, check open or closed contacts within relay.

WIRING HARNESS REPLACEMENT

NOTE

- Wiring harnesses are composed of multiple wires enclosed in a protective wire loom with one or more connectors of varying configurations at each end. When damaged, wiring harnesses can be repaired by replacing connectors or by splicing wires. If damage is extensive, entire wiring harness should be replaced.
- Perform the following steps to replace a typical wiring harness. Refer to electrical schematics in fold-outs at back of manual for assistance.
- Tag wire leads and connectors to aid in installation.

1. Provide access to wiring harness, as necessary, by removing components.
2. Place battery disconnect switch in OFF position.
3. Remove mounting hardware (nut, locknut, lockwasher, screw etc.) or disconnect connector(s) of wiring harness to disconnect wiring harness from electrical component at one end of wiring harness.
4. Trace length of wiring harness and remove tie straps and clamps, as necessary. Discard tiedown straps.
5. Repeat step 3 at other end of wiring harness.
6. Remove wiring harness from machine.

NOTE

Ensure wire loom is installed over wiring harness as required prior to installation.

7. Position wiring harness to machine.
8. Connect connector(s) of wiring harness or install mounting hardware (nut, locknut, lockwasher, screw etc.) to connect wiring harness to electrical component at one end of wiring harness.
9. Repeat step 8 at other end of wiring harness.
10. Install clamps and new tie straps along length of wiring harness.
11. Place battery disconnect switch in ON position.
12. Install components, as necessary.

END OF WORK PACKAGE

COMPOSITE LIGHT MAINTENANCE 0004 00

THIS WORK PACKAGE COVERS

Lamp: Removal, Installation

Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Washer, lock (2)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

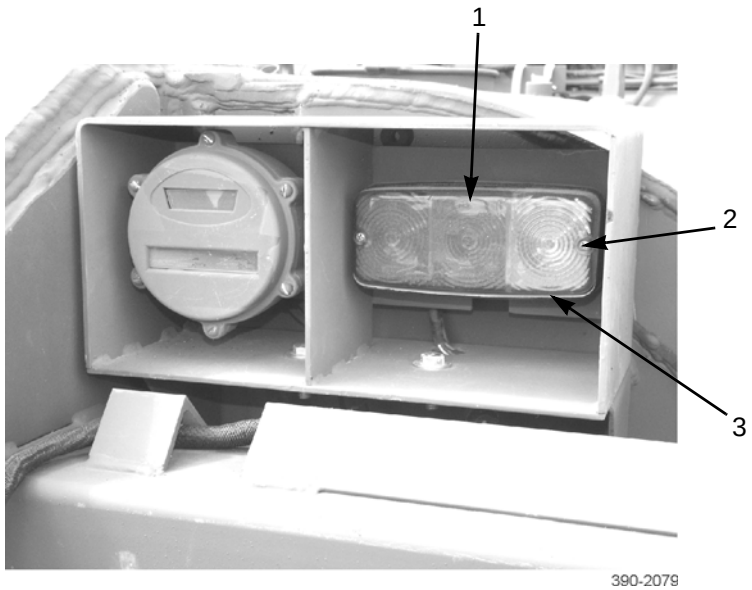
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

NOTE

Right and left composite lights are maintained the same way. Right composite light is illustrated.

LAMP REMOVAL

1. Remove two screws (2) and lens (1) from light housing (3).
2. Inspect lens (1) for damage. Discard lens if damaged.



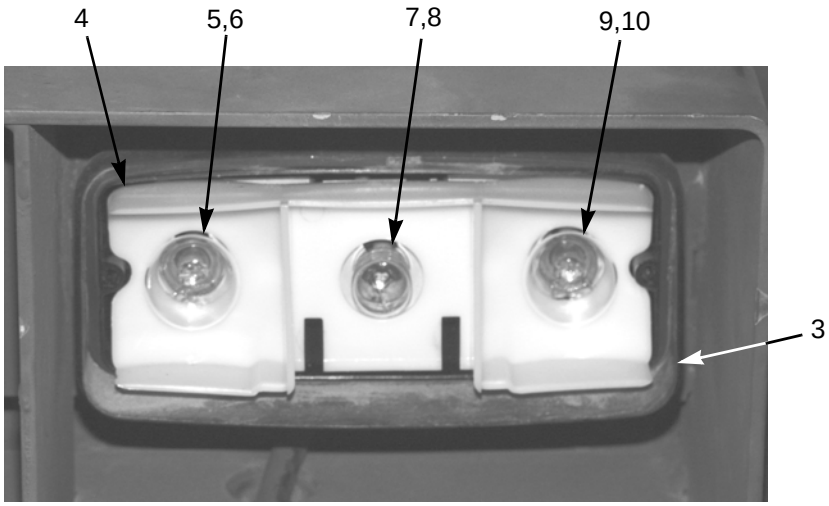
LAMP REMOVAL - CONTINUED

3. Inspect gasket (4) for cracks and tears. Remove and discard gasket if damaged.

NOTE

Left lamp is for stoplight, center lamp is for taillight, and right lamp is for turn signal and hazard light. All lamps are removed the same way.

4. Remove stoplight lamp (5) from socket (6).
5. Remove taillight lamp (7) from socket (8).
6. Remove turn signal and hazard light lamp (9) from socket (10).

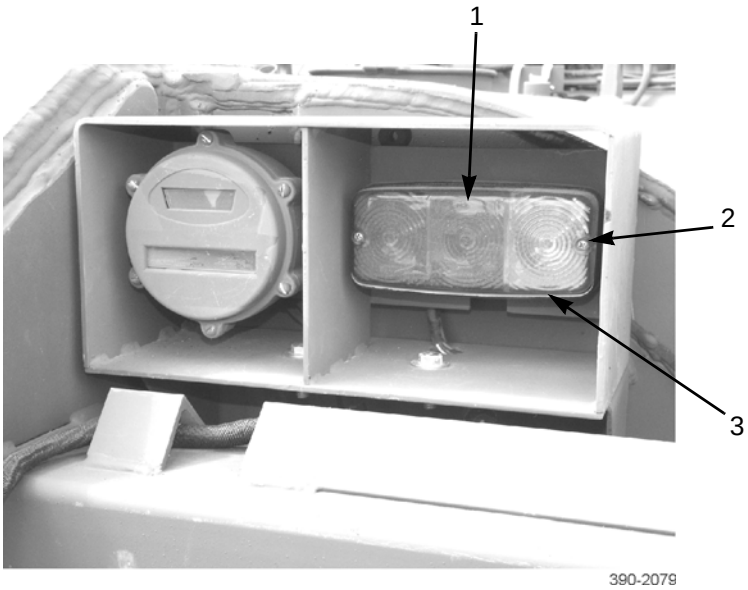


390-1371

LAMP INSTALLATION

1. Install turn signal and hazard light lamp (9) in socket (10).
2. Install taillight lamp (7) in socket (8).
3. Install stoplight lamp (5) in socket (6).
4. If removed, install new gasket (4) on light housing (3).
5. Install lens (1) on light housing (3) with two screws (2).

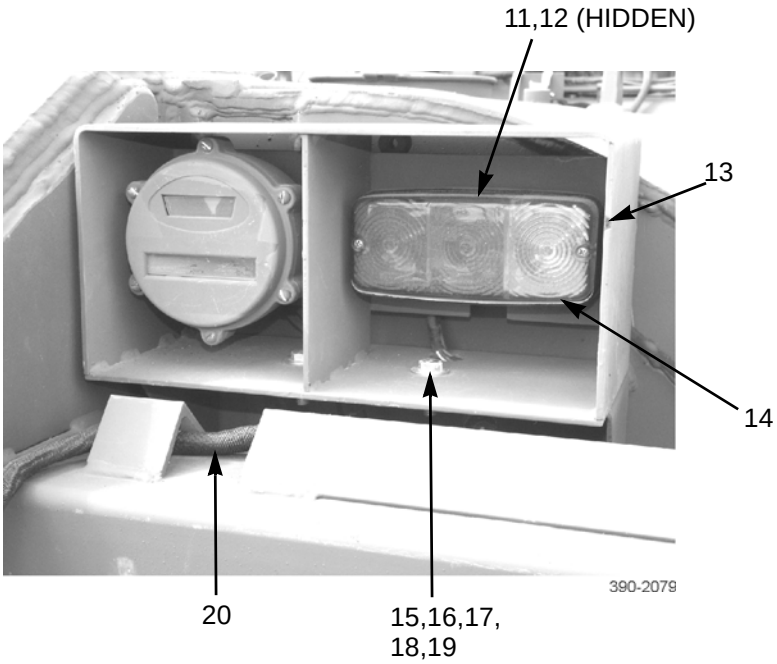
LAMP INSTALLATION - CONTINUED



6. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
7. Check lights for proper operation (TM 5-3800-205-10-2).

LIGHT ASSEMBLY REMOVAL

1. Remove two nuts (15), lockwashers (16), washers (17), bolts (18), washers (19) and enclosure (13). Discard lockwashers.
2. Remove two screws (11) and washers (12) from back of light assembly (14).
3. Disconnect light assembly connector from wiring harness (20).
4. Remove light assembly (14) from enclosure (13).



5. Remove lamps (Refer to *Lamp Removal*).

LIGHT ASSEMBLY INSTALLATION

1. Install lamps (Refer to *Lamp Removal*).
2. Install light assembly (14), two washers (12) and screws (11) on enclosure (13).
3. Connect light assembly connector to wiring harness (20).
4. Install enclosure (13), two washers (19), bolts (18), washers (17), new lockwashers (16) and nuts (15).
5. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
6. Check operation of composite light (TM 5-3800-205-10-2).

END OF WORK PACKAGE

BLACKOUT LIGHT MAINTENANCE 0005 00

THIS WORK PACKAGE COVERS

LED: Removal, Installation

Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Tag, marker (Item 39, WP 0044 00)

Washer, lock (2)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

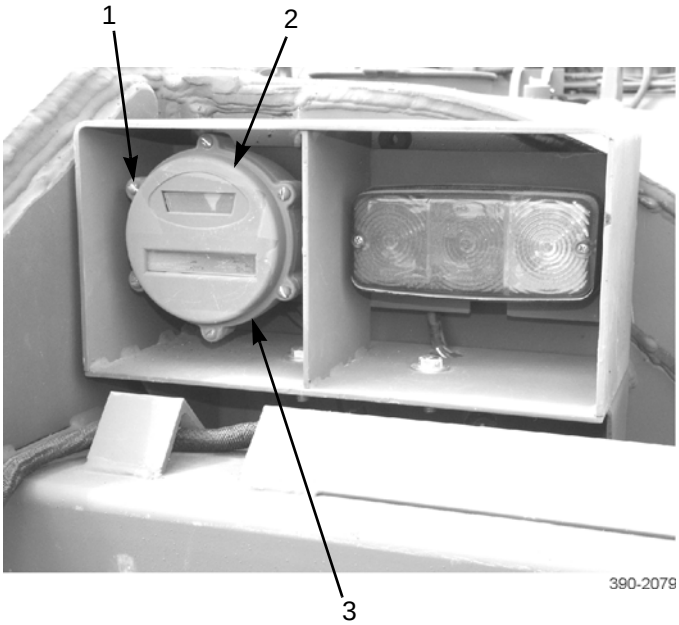
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

NOTE

Right and left blackout lights are maintained the same way. Right blackout light is shown.

LED REMOVAL

1. Loosen six captive screws (1) and remove cover (2) from housing (3).



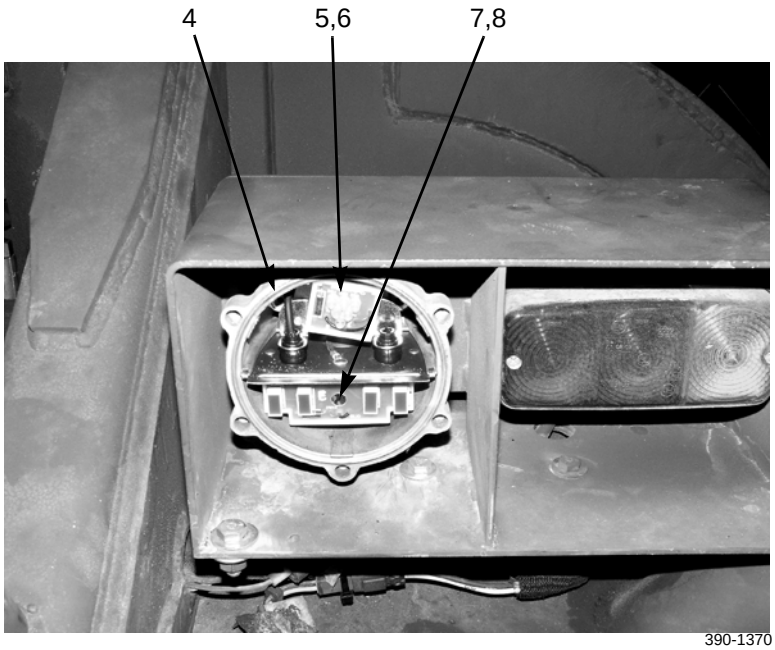
LED REMOVAL - CONTINUED

2. Inspect seal (4) for cracks and tears. Remove and discard seal if damaged.

NOTE

Top LED is for blackout marker light. Bottom LED is for blackout drive light.

3. Remove LED (5) from socket (6).
4. LED (7) from socket (8).



390-1370

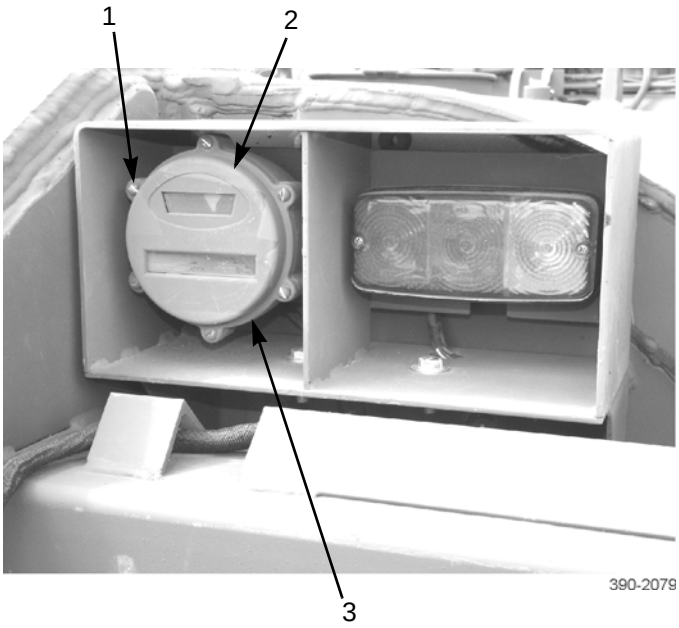
LED INSTALLATION

NOTE

Top LED is for blackout marker light. Bottom LED is for blackout drive light.

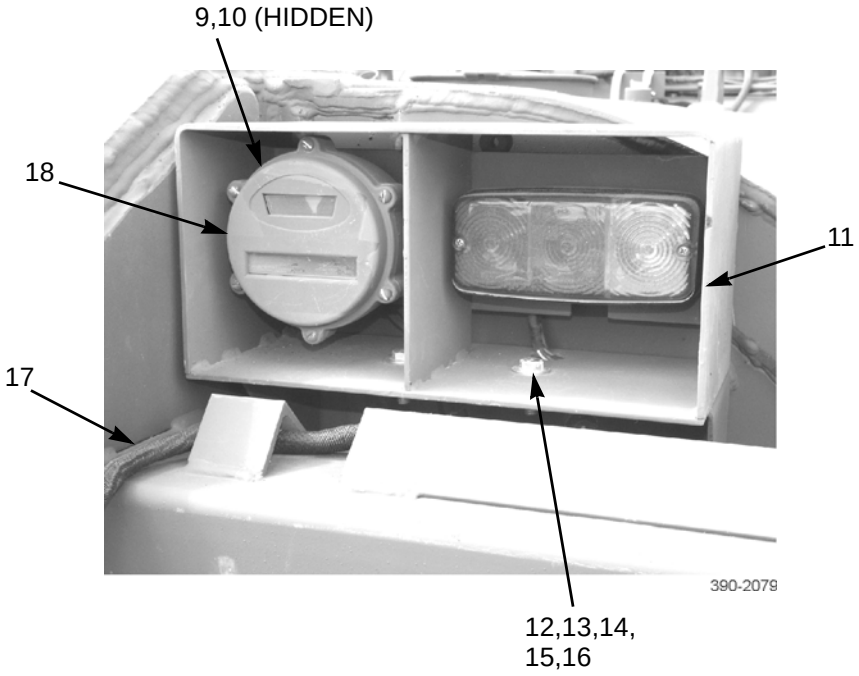
1. Install LED (5) in socket (6).
2. Install LED (7) in socket (8).
3. If removed, install new seal (4) in housing (2).
4. Position cover (2) on housing (3) and tighten six captive screws (1).
5. Check light for proper operation.

LED INSTALLATION - CONTINUED



LIGHT ASSEMBLY REMOVAL

1. Remove two nuts (12), lockwashers (13), washers (14), bolts (15), washers (16) and enclosure (11). Discard lockwashers.
2. Remove two screws (9) and washers (10) from back of light assembly (18).
3. Disconnect two light assembly connectors from wiring harness connectors (17).
4. Remove light assembly (18) from enclosure (11).
5. Remove LEDs (Refer to *LED Removal*).



LIGHT ASSEMBLY INSTALLATION

1. Install LEDs (Refer to *LED Removal*).
2. Install light assembly (18), two washers (10) and screws (9) on enclosure (11).
3. Connect two light assembly connectors to wiring harness connectors (17).
4. Install enclosure (11), two washers (16), bolts (15), washers (14), new lockwashers (13) and nuts (12).
5. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
6. Check operation of blackout light (TM 5-3800-205-10-2).

END OF WORK PACKAGE

WORK LIGHT MAINTENANCE 0006 00

THIS WORK PACKAGE COVERS

Lens and Lamp: Removal, Installation

Work Light Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Equipment Condition - Continued

Tank lowered to ground (TM 5-3800-205-10-2)

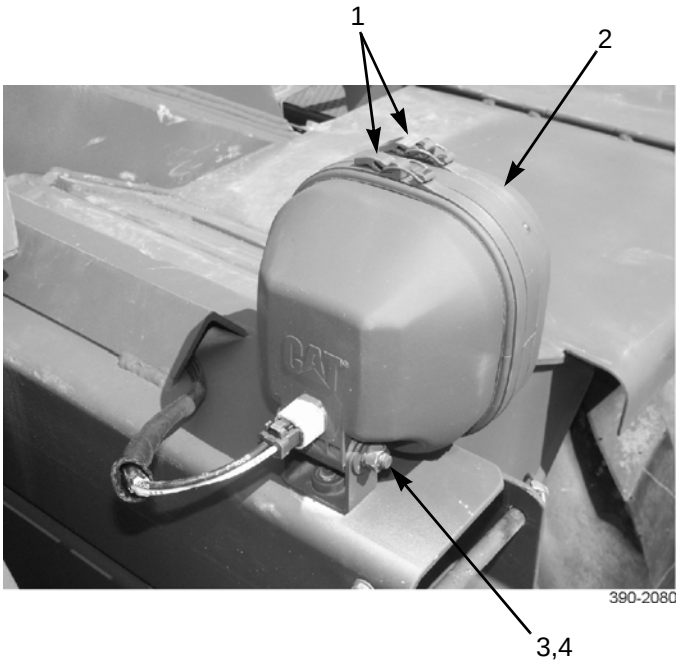
Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

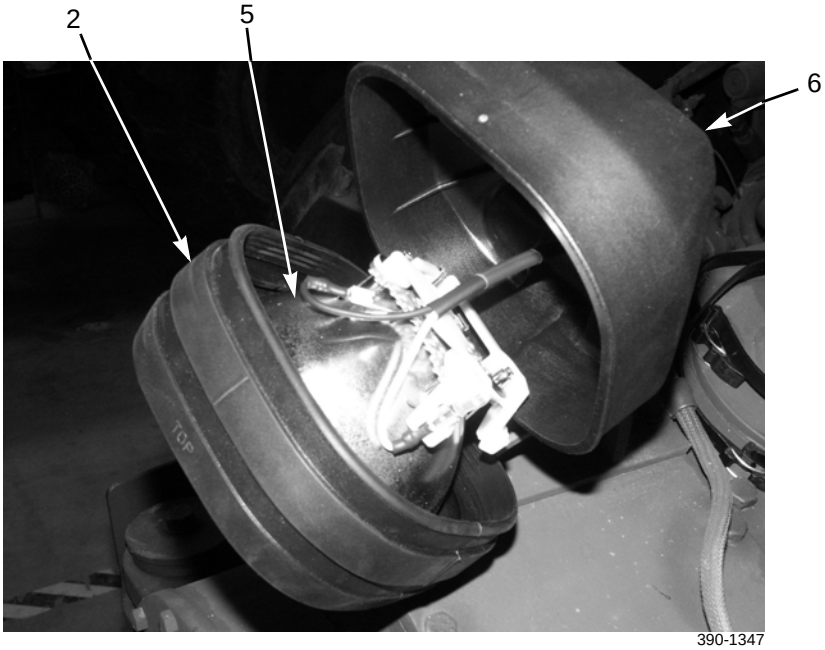
LENS AND LAMP REMOVAL

1. As required, loosen nut (3) on bolt (4) to adjust work light assembly to access two clamps (1).
2. Unclamp and remove two clamps (1) from bezel (2).

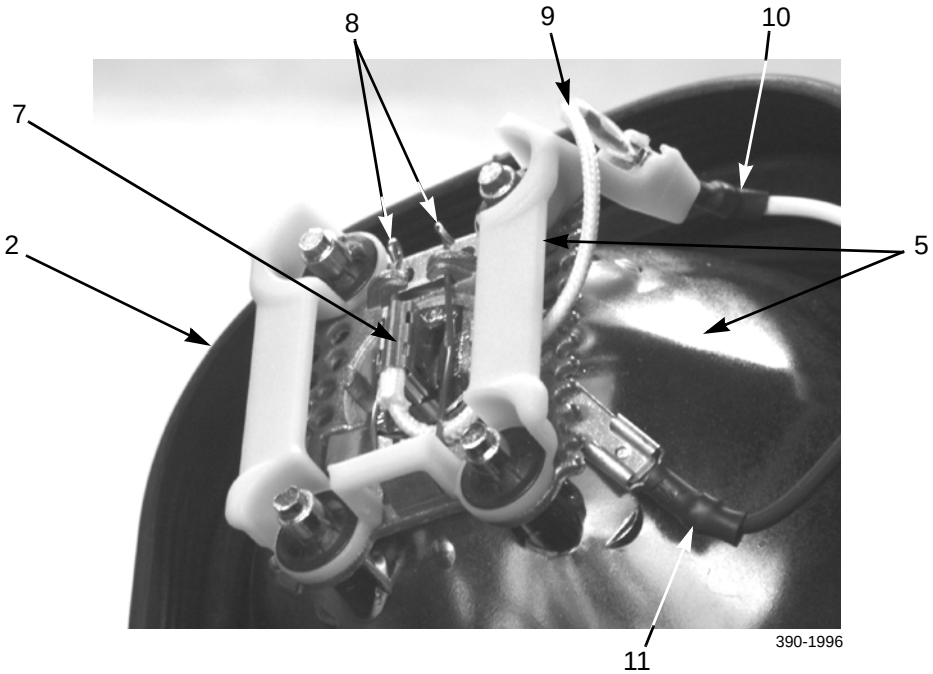


LENS AND LAMP REMOVAL - CONTINUED

3. Pull bezel (2) and work light (5) from housing (6).



4. Disconnect wire (10) from lamp white wire (9).
5. Disconnect wire (11) from work light (5).
6. Remove work light (5) from bezel (2).
7. Remove white wire (9), lamp retainer (8), and lamp (7).
8. Inspect clamps (1) and bezel (2) for damage. If damaged, replace clamps or bezel.



LENS AND LAMP INSTALLATION

NOTE

Outer lip of bezel should overlap work light edge.

1. Install work light (5) in bezel (2).

CAUTION

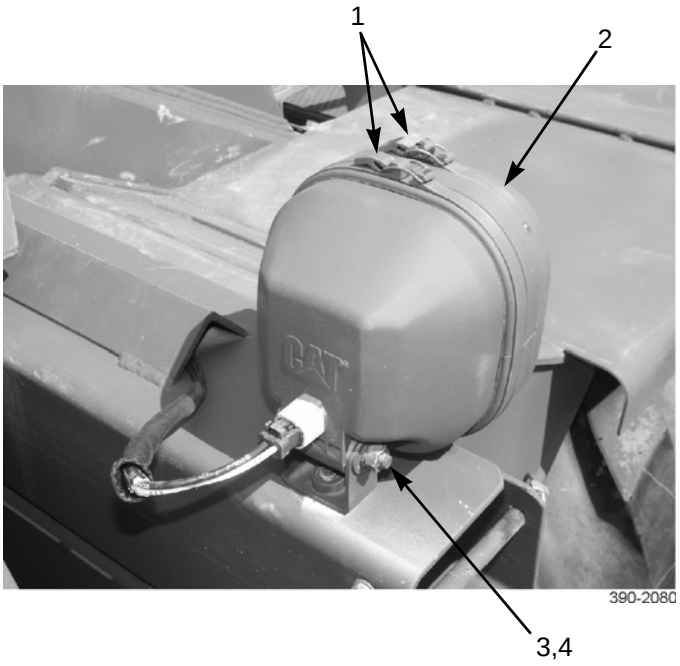
Route white wire so that it is not pinched under lamp retainer. Failure to do so could result in damage.

2. Install lamp (7) into work light receptacle and route white wire (9). Secure lamp with lamp retainer (8).
3. Connect wire (11) to work light (5).
4. Connect wire (10) to white wire (9).

NOTE

Install bezel and work light with word TOP facing up.

5. Install bezel (2) and work light (5) in housing (6).
6. Install two clamps (1) on bezel (2).
7. As required, adjust work light assembly position and tighten nut (3) on bolt (4).
8. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
9. Check operation of work light (TM 5-3800-205-10-2).

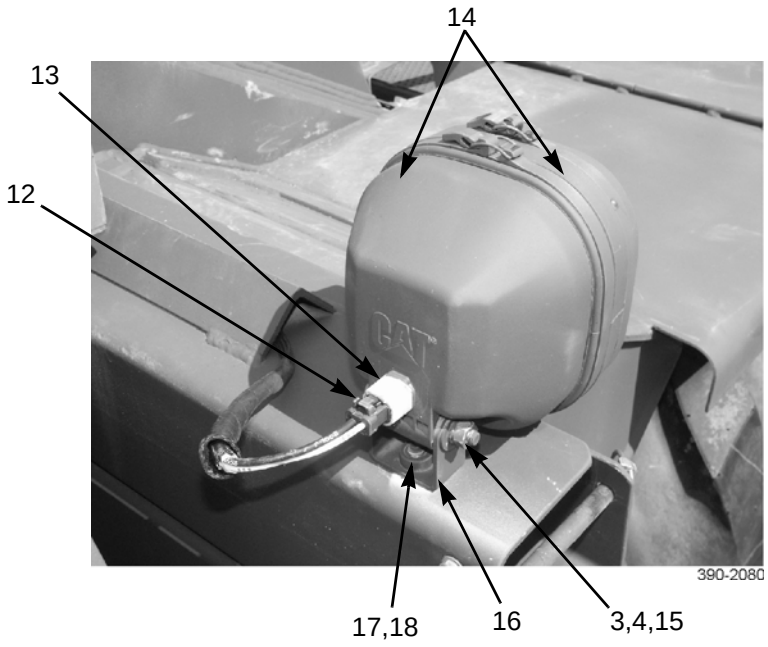


WORK LIGHT ASSEMBLY REMOVAL

NOTE

This procedure is for both work lights. Left work light is shown.

1. Disconnect harness connector (12) from work light receptacle connector (13).
2. Remove bolt (4), two washers (15), and nut (3), and remove work light assembly (14) from mount bracket (16).
3. Inspect mount bracket (16) for damage. If damaged, remove bolt (17), washer (18), and bracket from fender.



WORK LIGHT ASSEMBLY INSTALLATION

NOTE

Mount bracket should be positioned to ensure good visibility to rear and sides of water distributor.

1. If removed, position mount bracket (16) on fender and secure with washer (18) and bolt (17).
2. Position work light assembly (14) on mount bracket (16) and secure with bolt (4), two washers (15,) and nut (3).
3. Connect harness connector (12) to work light receptacle connector (13).
4. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
5. Check operation of work light (TM 5-3800-205-10-2).

END OF WORK PACKAGE

FUEL LEVEL SENDING UNIT AND DIAL SENSOR REPLACEMENT 0007 00

THIS WORK PACKAGE COVERS

Dial Sensor: Removal, Installation

Fuel Level Sending Unit: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Gasket

Packing, preformed

Washer, lock (6)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

WARNING

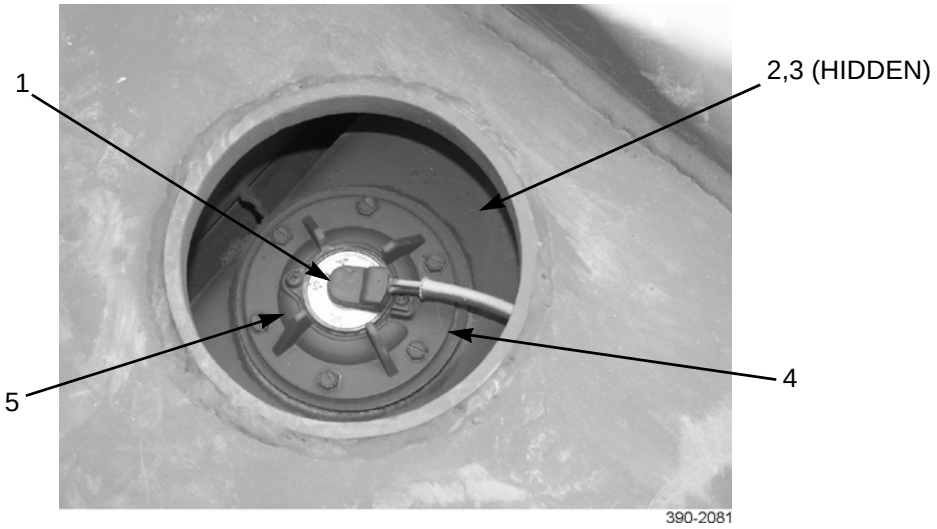
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Clean up all leaked or spilled fuel. Fuel may ignite, causing damage to machine and injury or death to personnel.

DIAL SENSOR REMOVAL

NOTE

Ensure area around dial sensor and fuel tank is clear of dirt and debris.

1. Disconnect electrical connector (2) from harness connector (3).
2. Remove two screws (5) and dial sensor (1) from fuel level sending unit (4).



DIAL SENSOR INSTALLATION

1. Install dial sensor (1) on fuel level sending unit (4) with two screws (5) and tighten.
2. Connect electrical connector (2) to harness connector (3).

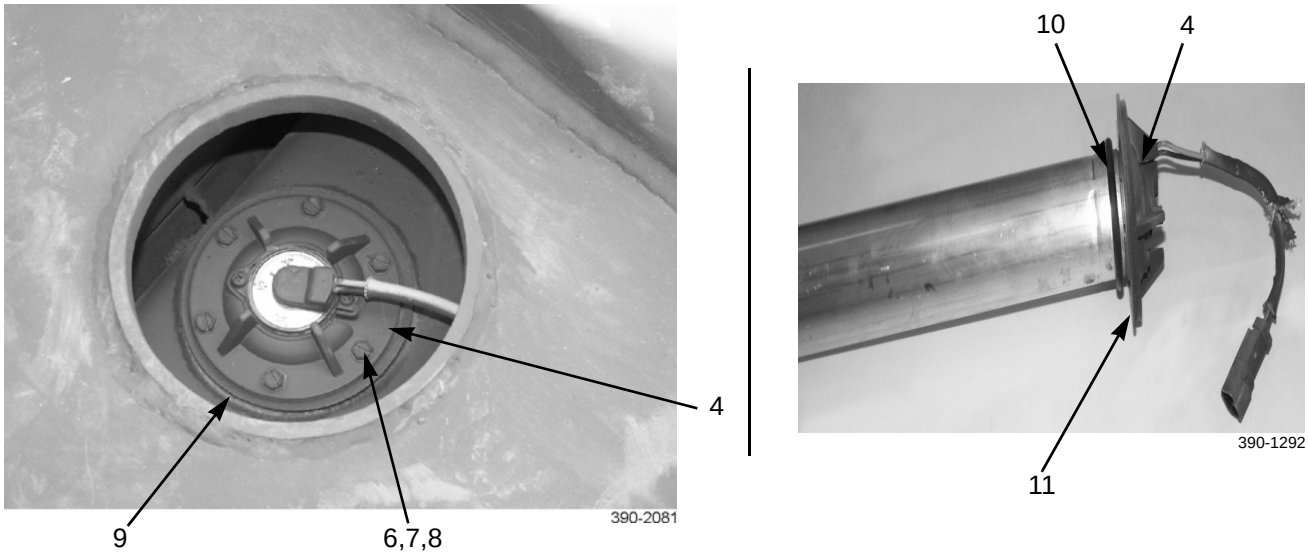
FUEL LEVEL SENDING UNIT REMOVAL

1. Remove dial sensor (Refer to *Dial Sensor Removal*).

NOTE

Ensure area around fuel level sending unit is clear of dirt and debris.

2. Remove six screws (6), lockwashers (7), flatwashers (8), and fuel level sending unit (4) from fuel tank (9). Discard lockwashers.
3. Remove and discard preformed packing (10) and gasket (11) from fuel level sending unit (4).



FUEL LEVEL SENDING UNIT INSTALLATION

1. Install new preformed packing (10) and new gasket (11) on fuel level sending unit (4).

NOTE

Ensure area around fuel level sending unit is clear of dirt and debris.

2. Install fuel level sending unit (4) on fuel tank (9) with six flatwashers (8), new lockwashers (7), and screws (6).
3. Install dial sensor (Refer to *Dial Sensor Installation*).

END OF WORK PACKAGE

BACKUP ALARM REPLACEMENT 0008 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Strap, tiedown (as required) (Item 38, WP 0044 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

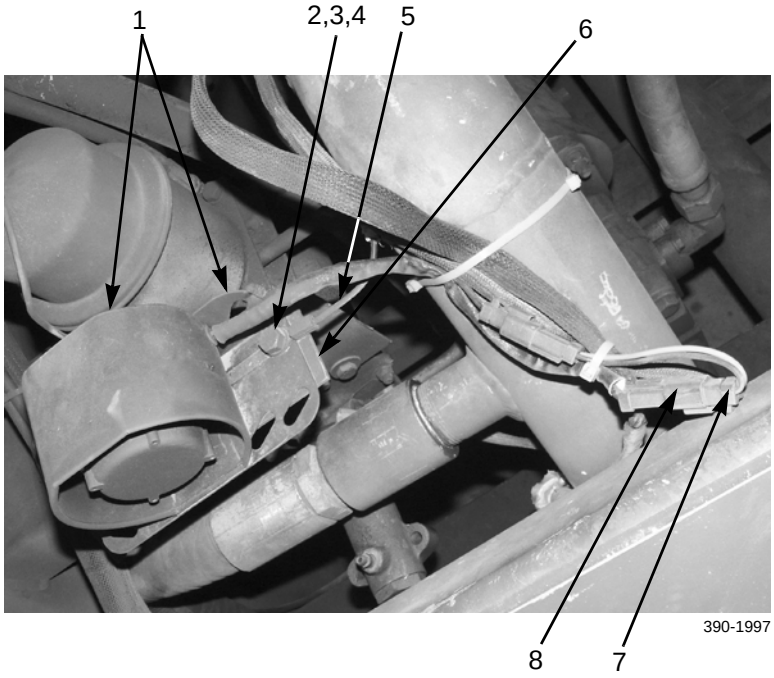
REMOVAL

1. Open rear access panel.

NOTE

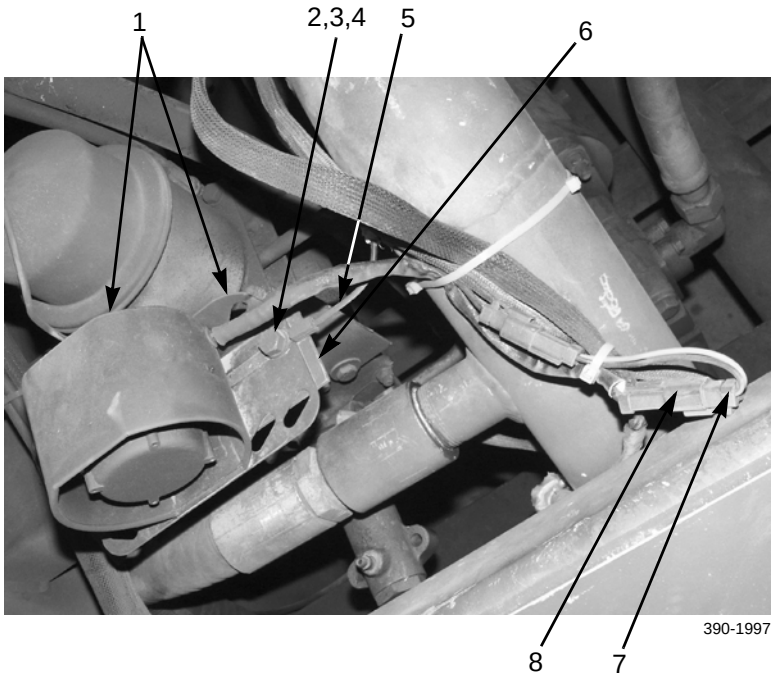
Cut tiedown straps and discard. Use new tiedown straps on installation.

2. Disconnect backup alarm connector (8) from harness connector (7).
3. Remove two nuts (2), four washers (3), and two screws (4), and remove alarm (1) and ground wire (5) from bracket (6).



INSTALLATION

1. Install alarm (1) and ground wire (5) on bracket (6) with two screws (4), four washers (3), and nuts (2).
2. Connect backup alarm connector (8) to harness connector (7).
3. Close rear access panel.



END OF WORK PACKAGE

WATER TANK WIRING HARNESS REPLACEMENT 0009 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Strap, tiedown (3) (Item 38, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Wire, nonelectrical (min. 23 ft) (Item 42, WP 0044 00)

Personnel Required

Two

References

WP 0003 00

Equipment Conditions

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Rear steps removed (WP 0018 00)

Tank raised and blocked (TM 5-3800-205-10-2)

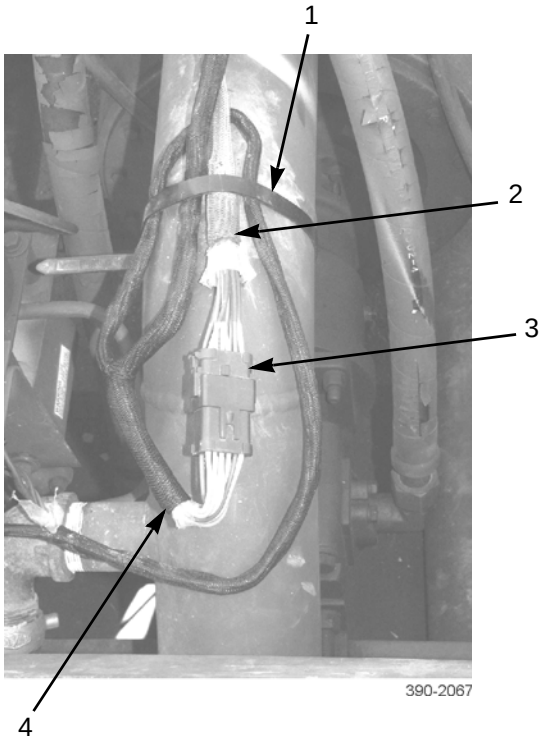
REMOVAL

1. Cut and discard tie strap (1).

NOTE

Tag wiring harnesses before disconnecting to aid in installation.

2. Disconnect water tank wiring harness (2) from wiring harness (4).
3. Remove connector (3) from water tank wiring harness (2) (WP 0003 00).

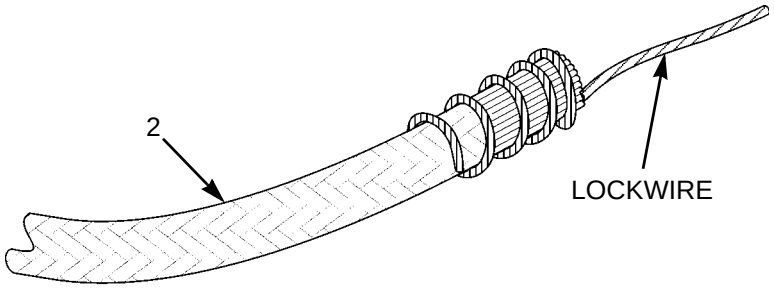


REMOVAL - CONTINUED

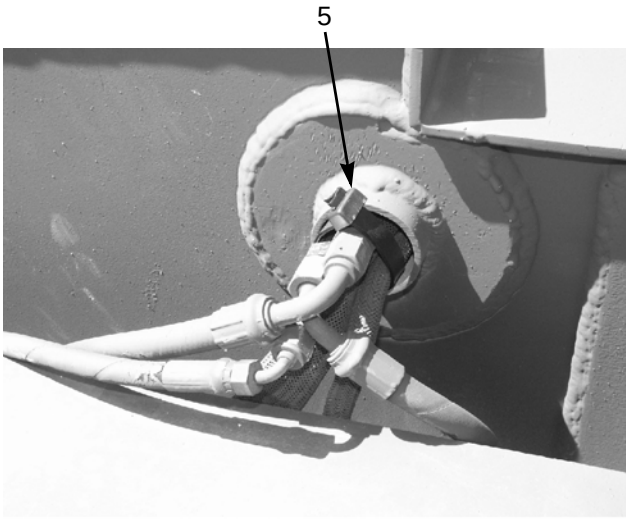
NOTE

Securely attach lockwire to end of water tank wiring harness at rear of water tank before removing. After water tank wiring harness is removed, lockwire remains inside conduit. Prior to installation, lockwire is attached to water tank wiring harness and lockwire is pulled from rear of water tank to aid in installation.

4. Position water tank wiring harness (2) on top of machine and securely attach lockwire to water tank wiring harness.



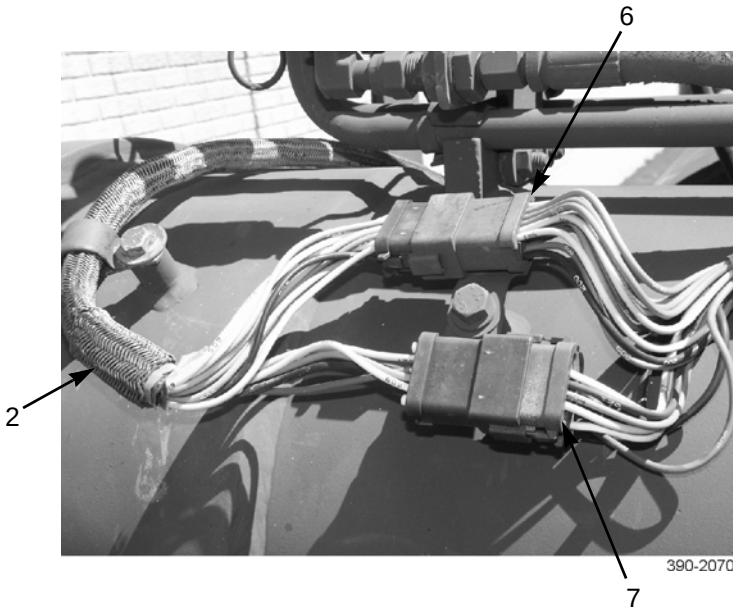
5. Cut and discard tie strap (5) at rear of water tank.



390-2069

REMOVAL - CONTINUED

6. Disconnect water tank wiring harness (2) from connectors (6 and 7).



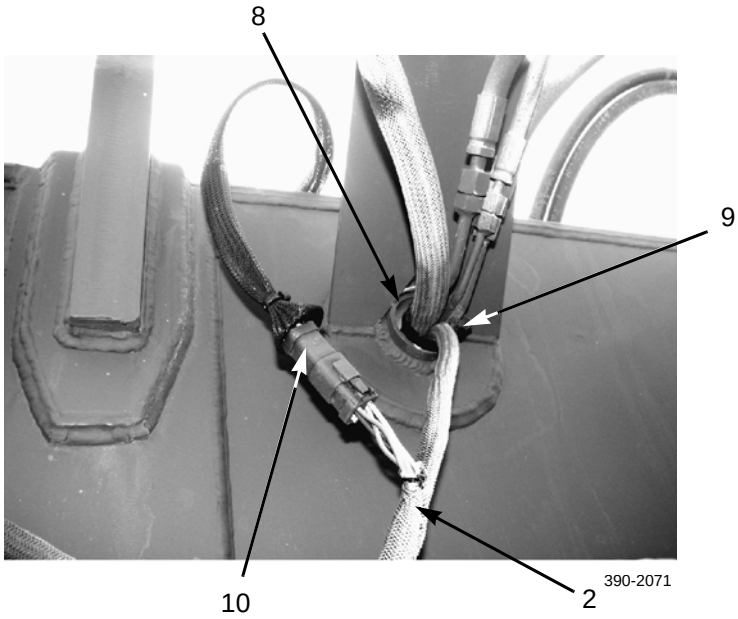
REMOVAL - CONTINUED

7. Disconnect water tank wiring harness (2) from connector (10) at front of water tank.
8. Cut and discard cable tie (9).

NOTE

- While removing water tank wiring harness from conduit from front of water tank, have an assistant feed lockwire through conduit from rear of water tank.
- Lubricating harness with detergent may ease removal.

9. From front of water tank, remove water tank wiring harness (2) from conduit (8) until lockwire exits conduit.
10. Disconnect water tank wiring harness (2) from lockwire leaving lockwire inside conduit (8).

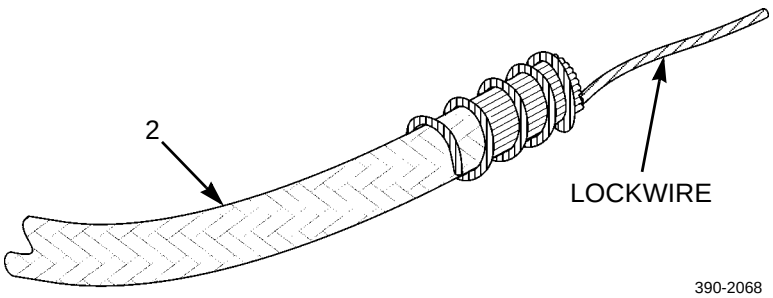


INSTALLATION

NOTE

If installing a new water tank wiring harness, first cut off connector, leaving enough length on wire to splice.

1. Securely connect water tank wiring harness (2) to lockwire that is inside conduit (8).

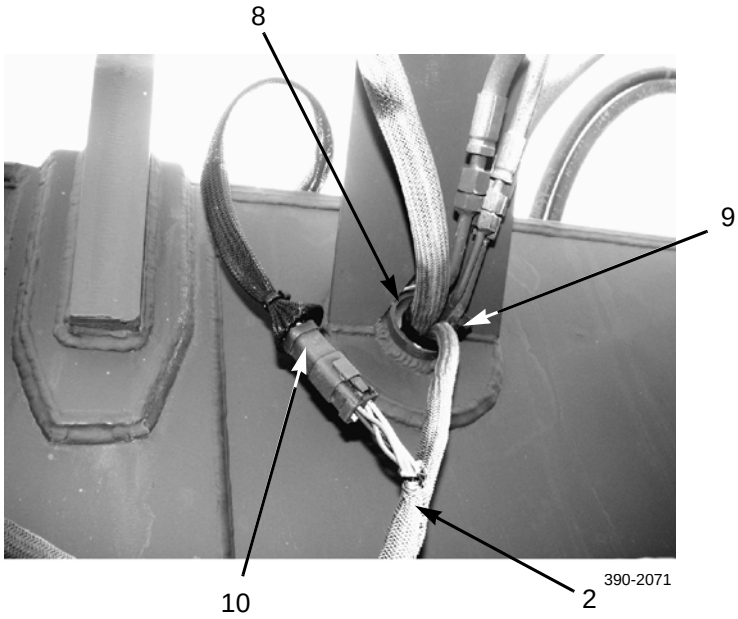


INSTALLATION - CONTINUED

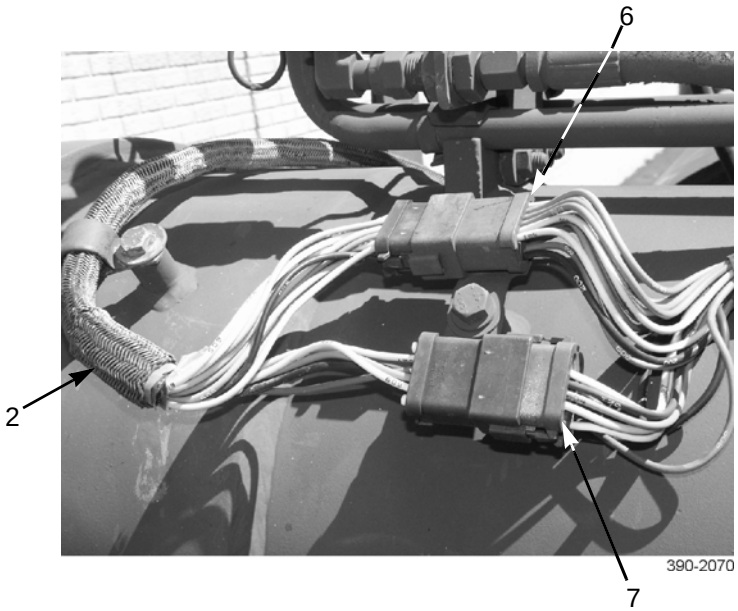
NOTE

- To install water tank wiring harness, feed water tank wiring harness through conduit from front of water tank while an assistant pulls lockwire from rear of water tank.
- Lubricating harness with detergent may ease installation.

2. Install water tank wiring harness (2) in conduit (8).
3. Connect water tank wiring harness (2) to connector (10).

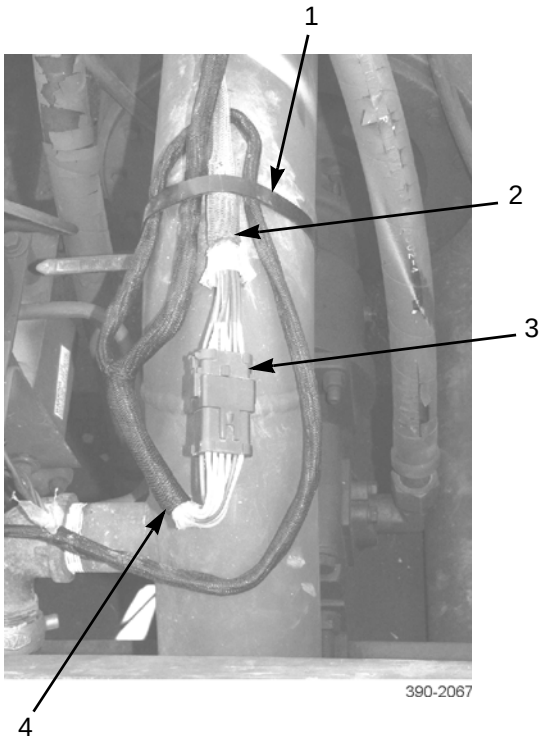


4. Connect water tank wiring harness (2) to connectors (7 and 6).

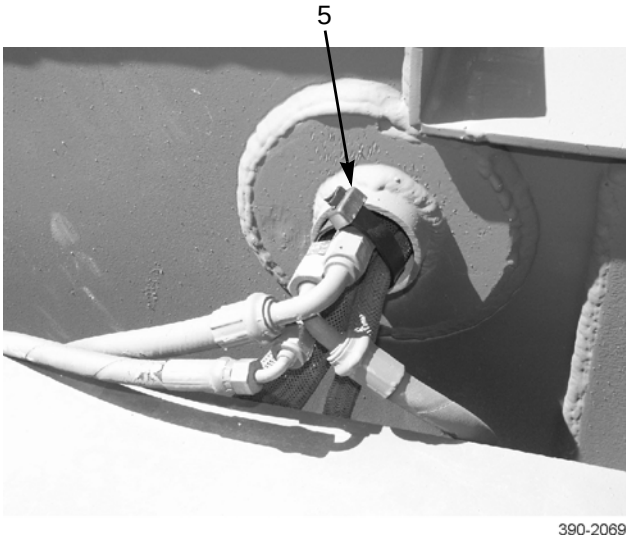


INSTALLATION - CONTINUED

5. Remove lockwire from water tank wiring harness (2) and move into position.
6. Install connector (3) to water tank wiring harness (2) (WP 0003 00).
7. Connect water tank wiring harness (2) to wiring harness (4).
8. Install new tie strap (1).

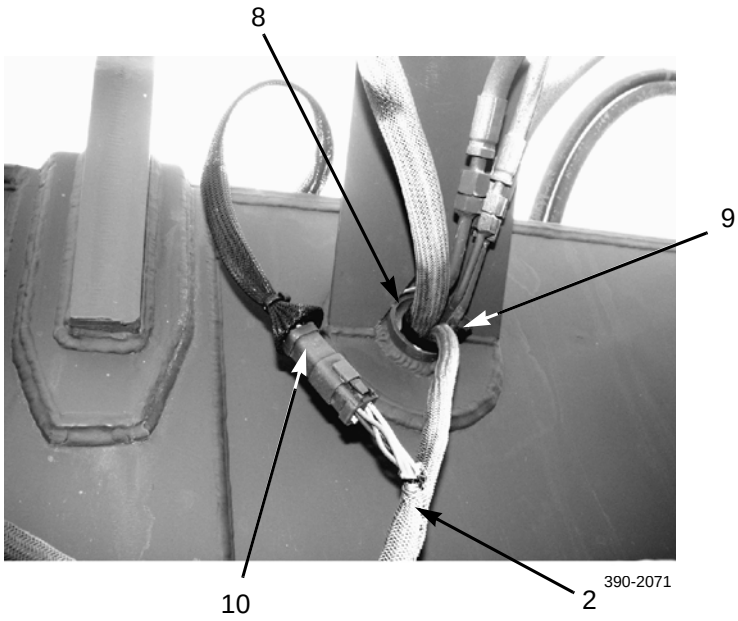


9. Install new tie strap (5) at rear of water tank.



INSTALLATION - CONTINUED

10. Install new tie strap (9) at front of water tank.



11. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
12. Check operation of electrical components (TM 5-3800-205-10-2).
13. Remove blocks and lower tank (TM 5-3800-205-10-2).
14. Install rear steps (WP 0018 00).

END OF WORK PACKAGE

REAR HUB AND DISC REPLACEMENT 0010 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Link, bracket (Item 4, WP 0045 00)

Materials/Parts

Grease, GAA (Item 16, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Gasket

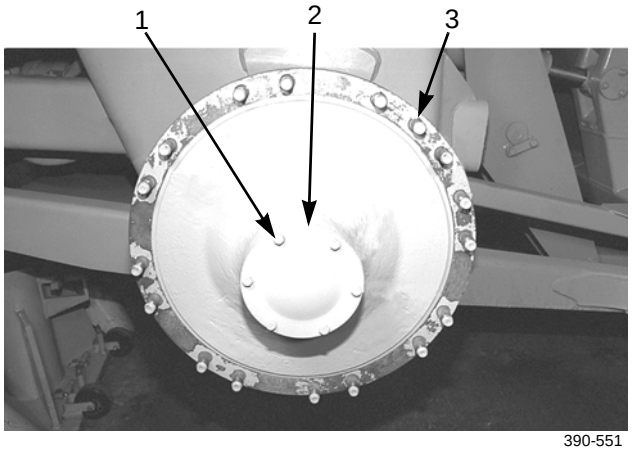
Personnel Required

Two

Equipment Condition

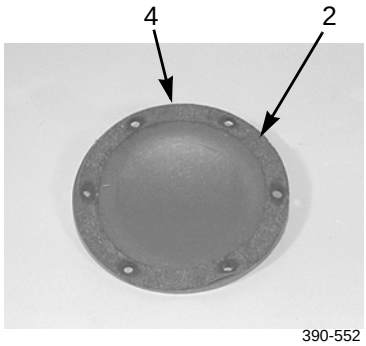
Brake caliper removed (WP 0012 00)

1. Remove six bolts (1) and cover (2) from hub (3).



390-551

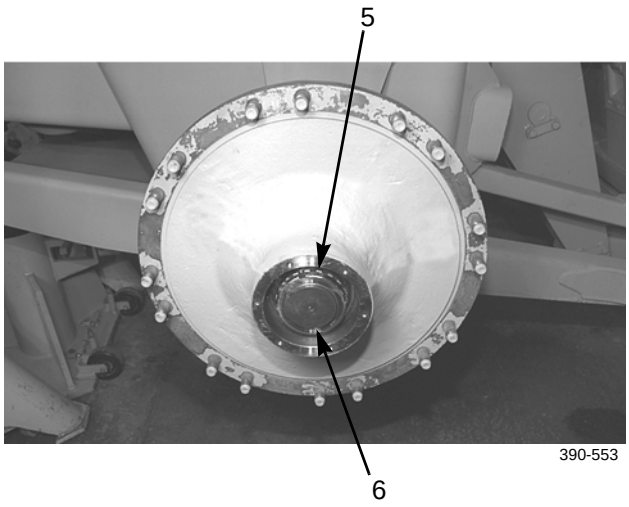
2. Remove and discard gasket (4) from cover (2).



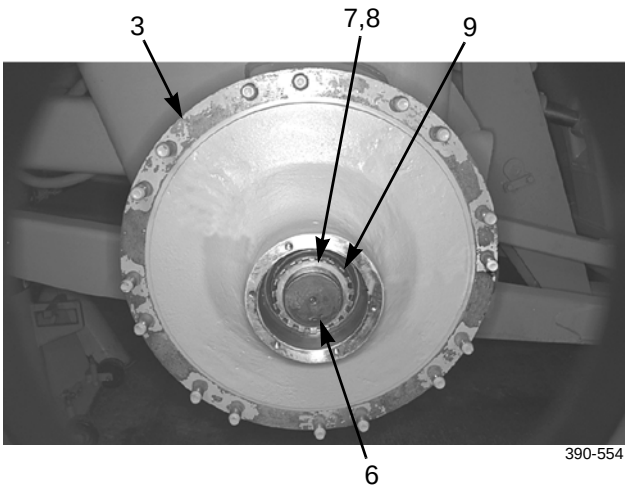
390-552

REMOVAL - CONTINUED

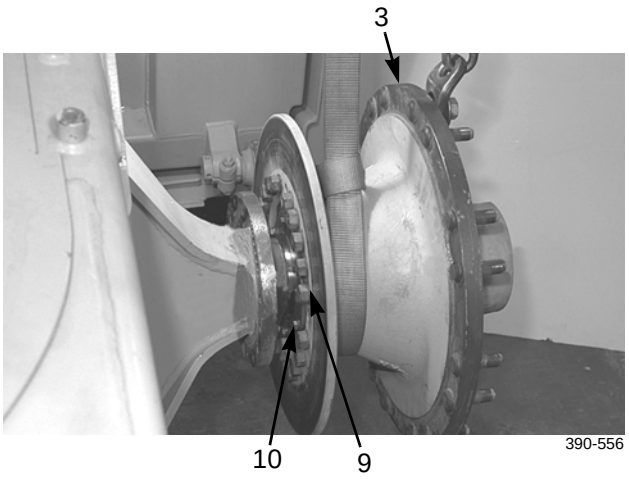
3. Remove locknut (5) from axle shaft (6).



4. Remove tab lockwasher (7) from axle shaft (6).
5. Attach lifting bracket, two nylon lifting straps, and lifting device to hub (3). Remove locknut (8) and outer roller bearing cone (9) from axle shaft (6).



6. Remove six bolts (10) and plate (9) from hub (3).



REMOVAL - CONTINUED

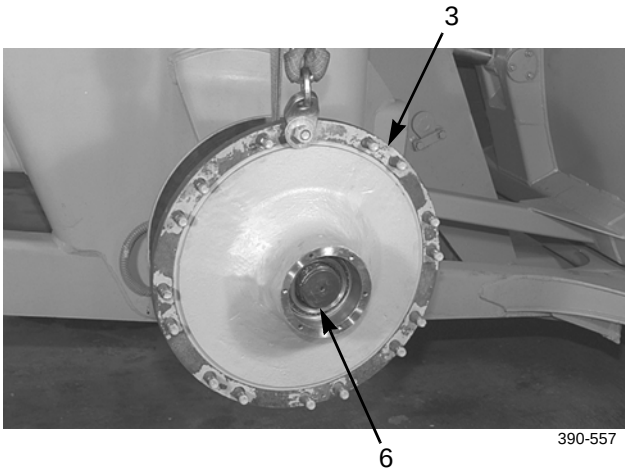
WARNING

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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

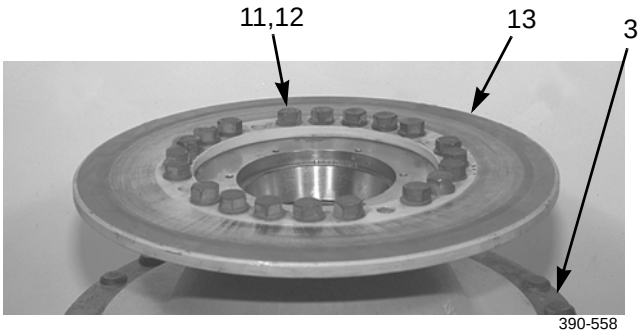
NOTE

Hub weighs 250 lb (113 kg).

7. Remove hub (3) from axle shaft (6).



8. Remove 20 bolts (11), washers (12), and disc (13) from hub (3).



INSTALLATION

1. Install disc (13) on hub (3) with 20 washers (12) and bolts (11). Tighten bolts to 148 lb-ft (200 Nm), then turn bolts another 90 degrees.

INSTALLATION - CONTINUED

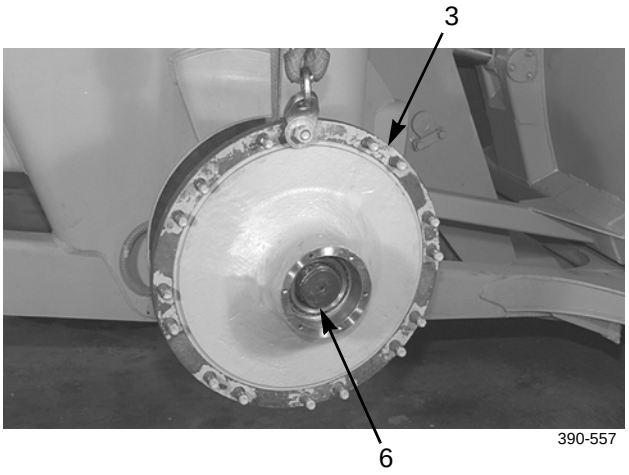
WARNING

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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

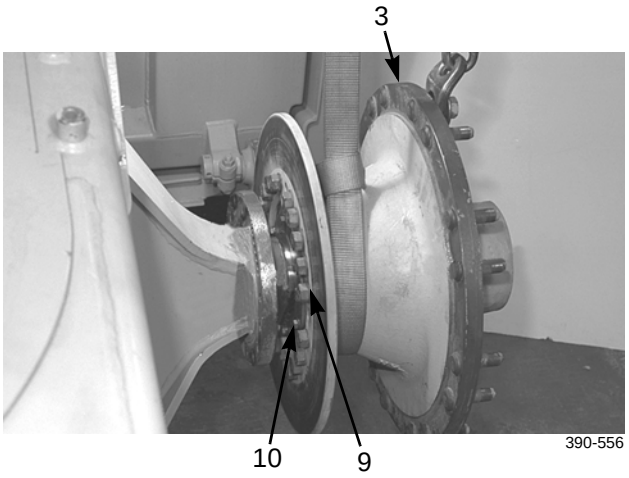
NOTE

Hub weighs 250 lb (113 kg).

2. Attach lifting bracket, two nylon lifting straps, and lifting device to hub (3). Position hub on axle shaft (6).

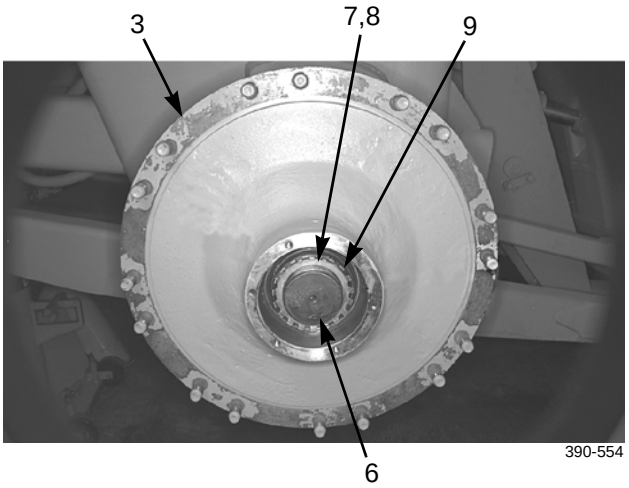


3. Install plate (9) on hub (3) with six bolts (10).

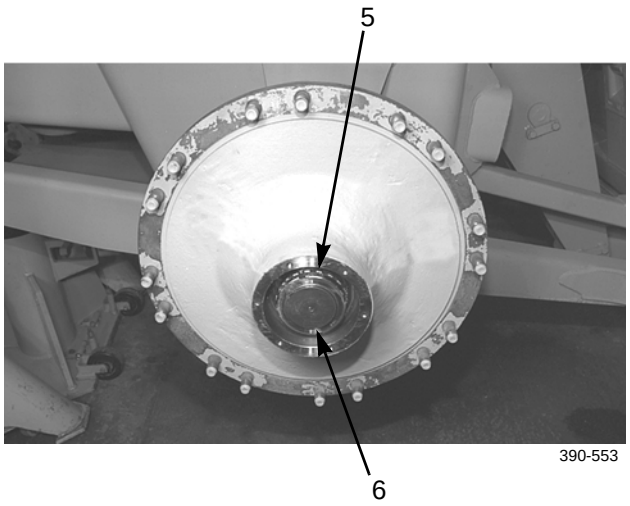


INSTALLATION - CONTINUED

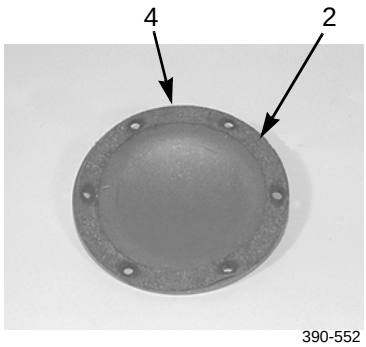
4. Clean and inspect outer roller bearing cone (9), pack with grease, and install on axle shaft (6).
5. Install locknut (8) on axle shaft (6). Tighten locknut until hub seizes, loosen locknut, and tighten to 376 lb-ft (510 Nm).
6. Install tab lockwasher (7) on axle shaft (6).



7. Install locknut (5) on axle shaft (6).

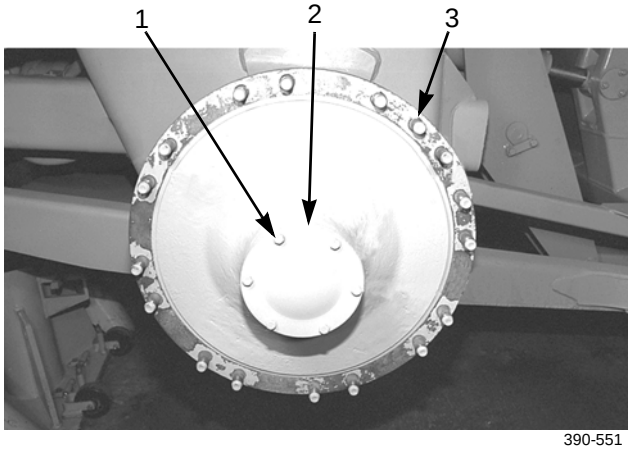


8. Install new gasket (4) on cover (2).



INSTALLATION - CONTINUED

9. Install cover (2) on hub (3) with six bolts (1).



390-551

10. Install brake caliper (WP 0012 00).

END OF WORK PACKAGE

AIR/HYDRAULIC BRAKE CYLINDER REPLACEMENT 0011 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Tape, antiseizing (Item 40, WP 0044 00)

References:

TM 5-3800-205-23-1

WP 0016 00

Equipment Condition

Rear steps removed (WP 0018 00)

Air hose disconnected from quick-release valve (WP 0014 00)

Backup alarm removed (WP 0008 00)

WARNING

- Do NOT disconnect any airlines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear eye protection when disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

NOTE

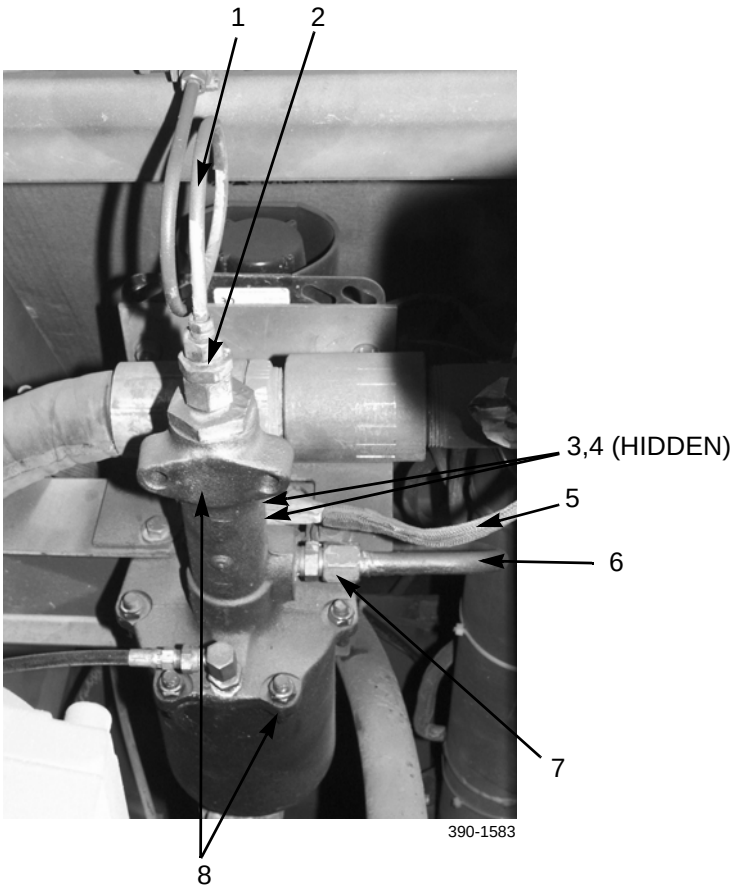
- Tag all hoses, wires, and tubes to aid in installation. Plug all lines, hoses, and tubes to prevent fluid loss and contamination of brake fluid.
- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect fluid with suitable containers before opening any compartment or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.

REMOVAL

CAUTION

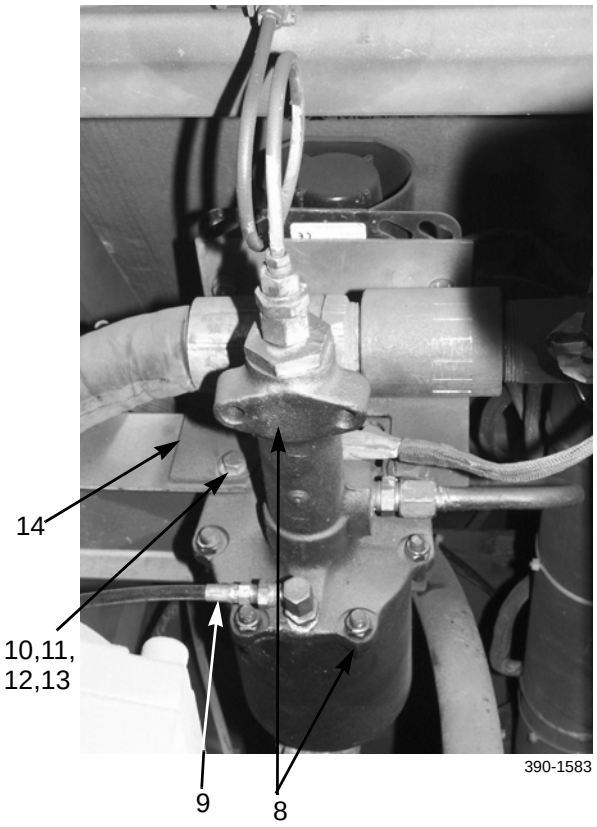
Always use two wrenches on fittings when removing brake lines. Failure to do so may damage fittings.

1. Loosen nut (2), disconnect tube (1) from air/hydraulic brake cylinder (8), and allow brake fluid to drain into a suitable container.
2. Remove two screws (3), washers (4), and electrical leads (5) from air/hydraulic brake cylinder (8).
3. Loosen nut (7), disconnect tube (6) from air/hydraulic brake cylinder (8), and allow brake fluid to drain into a suitable container.
4. Disconnect tube (6) at other end from brake fluid reservoir and remove, as required.



5. Disconnect air exhaust tube (9) from air/hydraulic brake cylinder (8).
6. Remove two nuts (10), lockwashers (11), four flatwashers (12), two bolts (13), air/hydraulic brake cylinder (8), and bracket (14) from machine. Discard lockwashers.
7. Remove quick-release valve from air/hydraulic brake cylinder (8) (WP 0014 00).

REMOVAL - CONTINUED



INSTALLATION

NOTE

Remove old antiseizing tape from male air fittings and apply new tape before connections are made.

1. Install quick-release valve to air/hydraulic brake cylinder (8) (WP 0014 00).
2. Install air/hydraulic brake cylinder (8) and bracket (14) on machine with two bolts (13), four flatwashers (12), two new lockwashers (11), and nuts (10).
3. Connect air exhaust hose (9) to air/hydraulic brake cylinder (8).

CAUTION

Always use two wrenches on fittings when installing brake lines. Failure to do so may damage fittings.

4. If removed, install tube (6) on brake fluid reservoir.
5. Connect other end of tube (6) to air/hydraulic brake cylinder (8) and tighten nut (7).
6. Install two electrical leads (5) on air/hydraulic brake cylinder (8) with two washers (4) and screws (3).
7. Position tube (1) on air/hydraulic brake cylinder (8) and tighten nut (2).

INSTALLATION - CONTINUED

8. Connect air hose to quick-release valve (WP 0014 00).
9. Fill brake fluid reservoir (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
10. Bleed brake system (WP 0016 00).
11. Install backup alarm (WP 0008 00).
12. Install rear steps (WP 0018 00).

END OF WORK PACKAGE

REAR SERVICE BRAKESHOES AND BRAKE CALIPER REPLACEMENT 0012 00

THIS WORK PACKAGE COVERS

Brakeshoes: Removal, Installation

Caliper: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Ship equipment, common no. 1 (Item 24, WP 0045 00)

Bracket, link (Item 4, WP 0045 00)

Sling, nylon (Item 27, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Materials/Parts - Continued

Rag, wiping (Item 32, WP 0044 00)

Personnel Required

Two

References

WP 0016 00

Equipment Condition

Air tanks drained (TM 5-3800-205-10-2)

Rear tire and rim removed (WP 0017 00)

WARNING

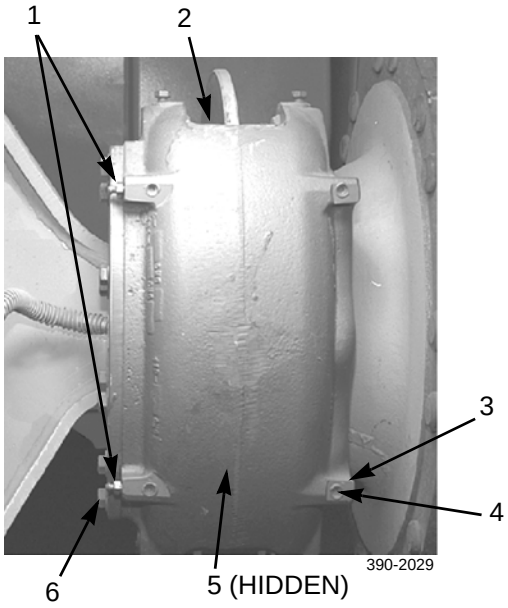
- Do NOT disconnect any airlines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear eye protection when disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

NOTE

- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to collect fluid with suitable containers before opening any compartment or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.

BRAKESHOES REMOVAL

1. Loosen two bleeder screws (1) to relieve pressure in caliper (2).
2. Loosen bolts (4) and install two 1/2 in. (12 NC) bolts (3) in two pins (6).
3. Use two bolts (3) to remove two pins (6).
4. Remove brakeshoes (5) from caliper (2).



BRAKESHOES INSTALLATION

1. Install brakeshoes (5) to brake caliper (2).
2. Push in two pins (6) and tighten bolts (4).
3. Remove two 1/2 in. (12 NC) bolts (3) from two pins (6).
4. Tighten two bleeder screws (1).
5. Bleed service brake system (WP 0016 00).
6. Install rear tire and rim (WP 0017 00).

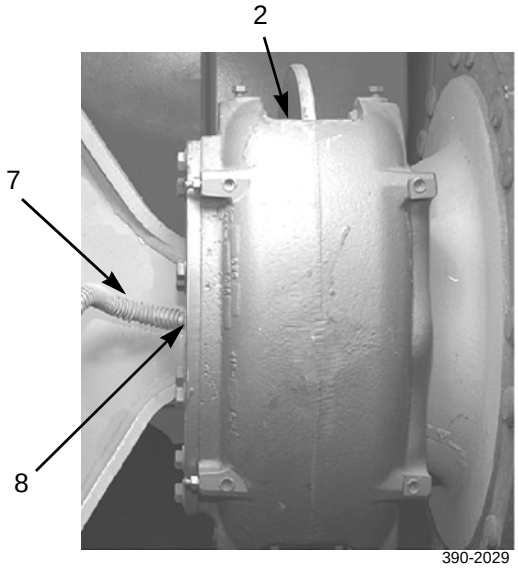
CALIPER REMOVAL

CAUTION

- Always use two wrenches on fittings when removing brake lines. Failure to do so may damage fittings.
- Plug brake line to prevent contamination of brake system.

1. Loosen nut (8) and disconnect brake line (7) from caliper (2).

CALIPER REMOVAL - CONTINUED



2. Install two lifting brackets on caliper (2).
3. Attach nylon sling to lifting brackets and suitable lifting device.

WARNING

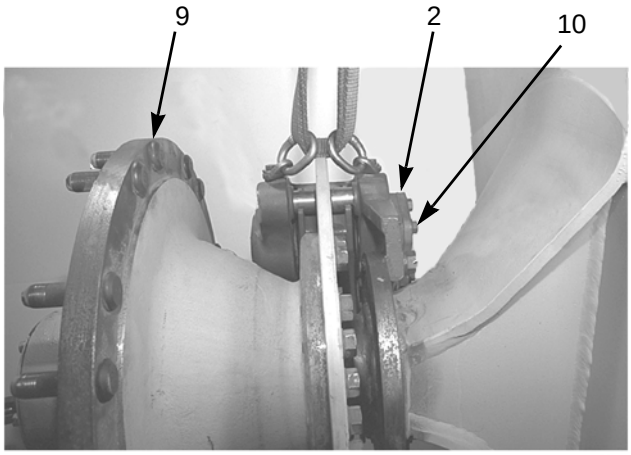
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

NOTE

Brake caliper weighs 106 lb (48 kg).

CALIPER REMOVAL - CONTINUED

4. With assistance, remove eight bolts (10) and caliper (2) from hub (9).



CALIPER INSTALLATION

1. Install two lifting brackets on caliper (2).
2. Attach nylon sling to lifting brackets and suitable lifting device.

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.

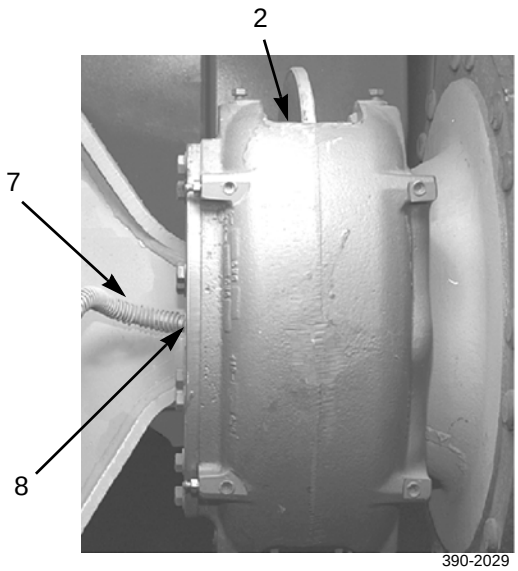
NOTE

Brake caliper weighs 106 lb (48 kg).

3. Install caliper (2) on hub (9) and install eight bolts (10). Tighten bolts to 96 lb-ft (130 Nm), then turn bolts an additional 120 degrees.

CALIPER INSTALLATION - CONTINUED

4. Connect brake line (7) on caliper (2) and tighten nut (8).



5. Bleed service brake system (WP 0016 00).
6. Install rear tire and rim (WP 0017 00).

END OF WORK PACKAGE

BRAKE AIR HOSE AND TUBE REPLACEMENT 0013 00

THIS WORK PACKAGE COVERS

Air Hose: Removal, Installation

Air Tube: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Strap, tiedown (2) (Item 38, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Tape, antiseizing (Item 40, WP 0044 0)

Wire, nonelectrical (min. 23 ft) (Item 42, WP 0044 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Air tanks drained (TM 5-3800-205-10-2)

Tank raised and blocked (TM 5-3800-205-10-2)

WARNING

- Do NOT disconnect any airlines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear eye protection when disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

CAUTION

Use two wrenches when disconnecting hoses to avoid damage.

NOTE

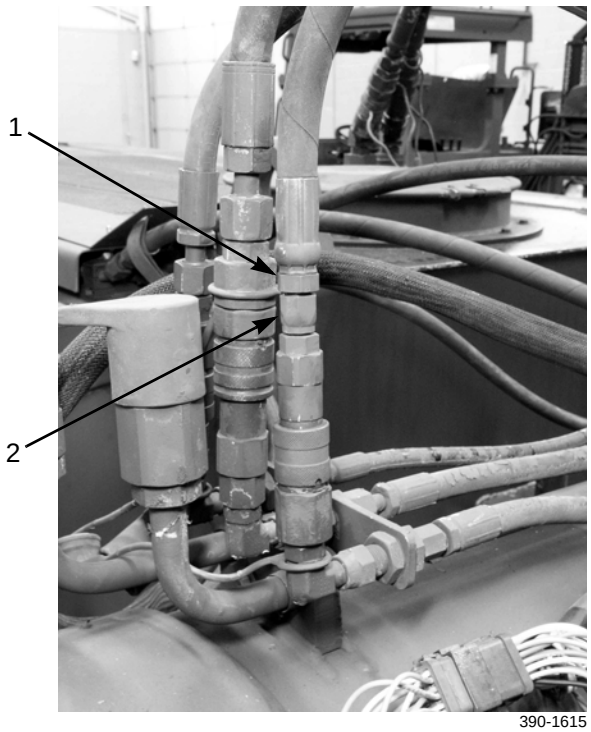
Tag hoses and tubes to aid in installation.

AIR HOSE REMOVAL

NOTE

- To remove air hose between draft frame and top-front of water distributor, perform steps 1-4.
- To remove air hose between top-rear of water distributor and quick-release valve at air/hydraulic brake cylinder, perform steps 4-6.

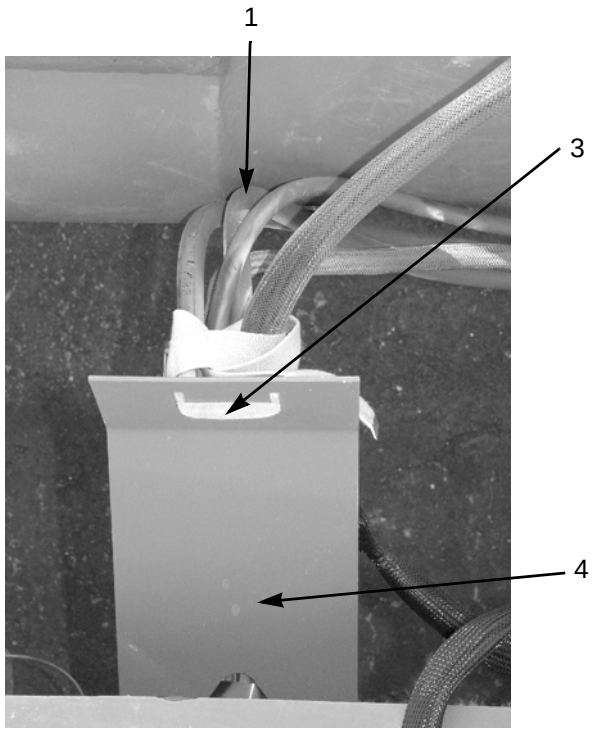
1. At top-right of draft frame, disconnect hose (1) from connector (2).



390-1615

2. Remove strap (3) to release hose (1), air hoses bundle, and two fuel hoses from bracket (4).

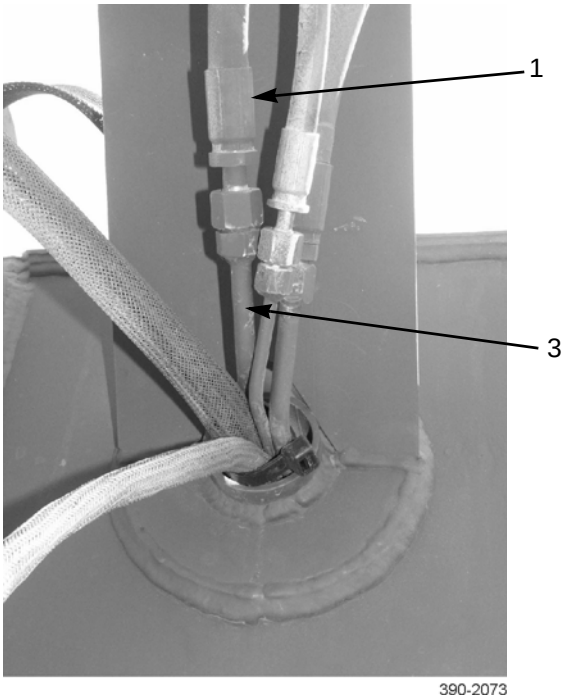
AIR HOSE REMOVAL - CONTINUED



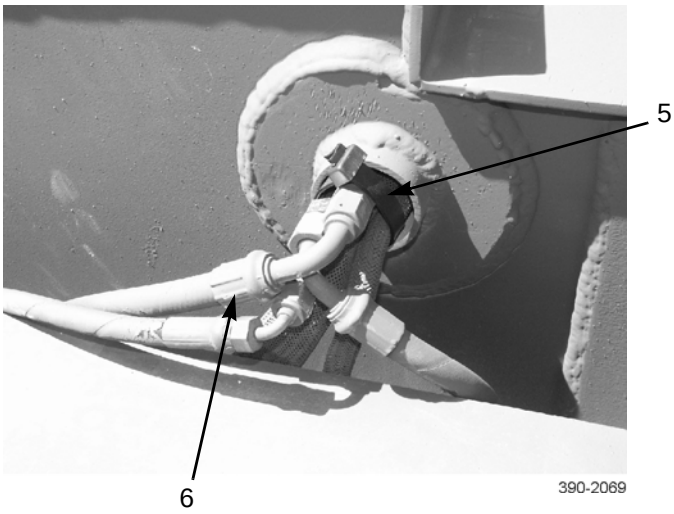
390-2129

AIR HOSE REMOVAL - CONTINUED

3. Disconnect hose (1) from air tube (3) and remove hose from machine.



4. At top-rear of water distributor, disconnect hose (6) from air tube (5).



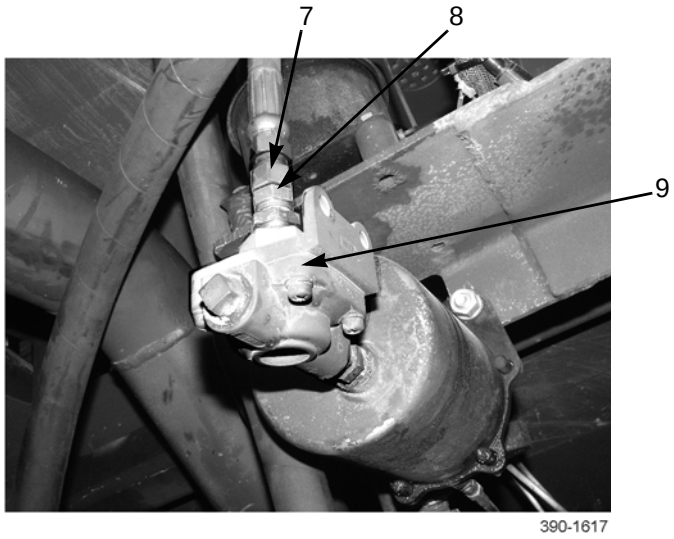
AIR HOSE REMOVAL - CONTINUED

5. Disconnect hose (7) from fitting (8) at quick-release valve (9).

NOTE

Note routing of hose to ensure correct installation.

6. Cut tiedown straps and discard. Remove hose (7) from clamp at left-rear of water distributor and remove from machine.



AIR HOSE INSTALLATION

NOTE

- To install air hose between top-rear of water distributor and quick-release valve at air/hydraulic brake cylinder, perform steps 1-3 and 7-9.
- To install air hose between draft frame and top-front of water distributor, perform steps 4-10.

1. Position hose (7) between points of connection and route through clamp at left-rear of water distributor.

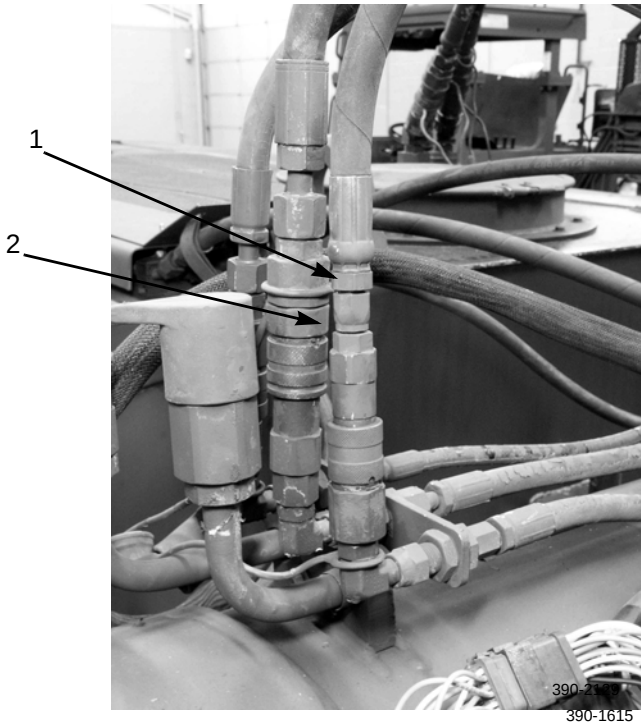
NOTE

Remove old antiseizing tape from fitting and apply new tape before connection is made.

2. Connect hose (7) to fitting (8) at quick-release valve (9).
3. Connect hose (7) to air tube (8). Secure hose with new tiedown straps.
4. Connect hose (1) to air tube (8).

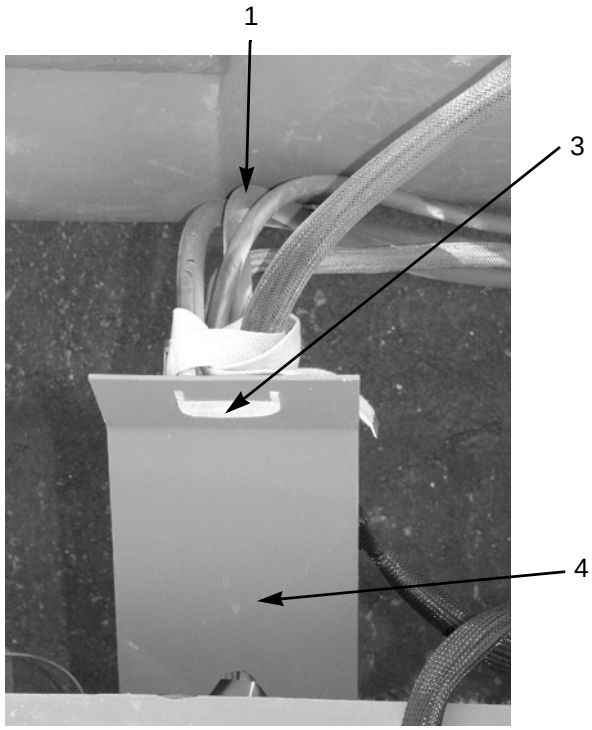
AIR HOSE INSTALLATION - CONTINUED

5. Connect other end of hose (1) to connector (2) at top-right of draft frame.



AIR HOSE INSTALLATION - CONTINUED

6. Secure hose (1), two fuel hoses, and air hoses bundle with strap (3) to bracket (4).



390-2129

7. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

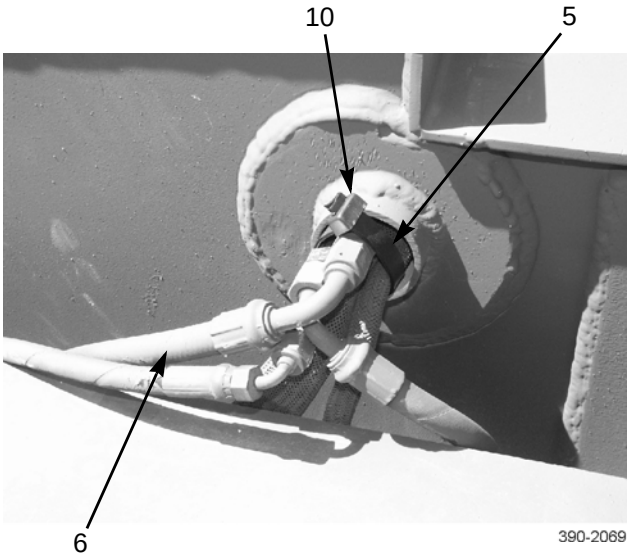
WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

8. Start engine and fully charge air system (TM 5-3800-205-10-2).
9. Check for air leaks and operation of brakes.

AIR TUBE REMOVAL

1. Cut and discard tie strap (10) at rear of water tank.



NOTE

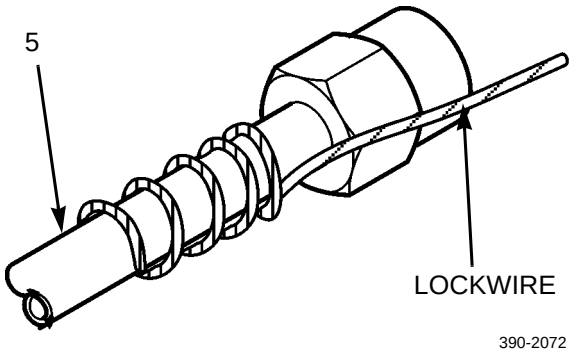
- Identify air tube before disconnecting.
- Tag hoses before disconnecting to aid in installation.

2. Disconnect hose (6) from air tube (5).

NOTE

- Securely attach lockwire to end of air tube at rear of water tank before removing. After air tube is removed, lockwire remains inside conduit. Prior to installation, lockwire is attached to air tube and lockwire is pulled from rear of water tank to aid in installation.
- Cap tube before removing.
- Lubricating tube detergent may ease removal.

3. Securely connect lockwire to air tube (5).



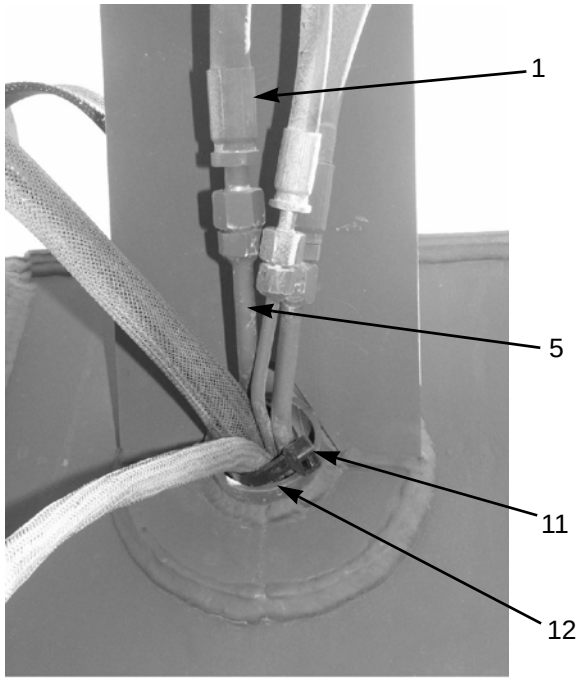
AIR TUBE REMOVAL - CONTINUED

4. Cut and discard tie strap (11) at front of water tank.
5. Disconnect hose (1) from air tube (5).

NOTE

While removing air tube from conduit at front of water tank, have an assistant feed lockwire through conduit from rear of water tank.

6. From front of water tank, remove air tube (8) from conduit (12) until lockwire exits conduit.
7. Disconnect air tube (5) from lockwire leaving lockwire inside conduit (12).



AIR TUBE INSTALLATION

1. Securely connect air tube (5) to lockwire that is inside conduit (12).

NOTE

- To install tube, feed tube through conduit from front of water tank while an assistant pulls lockwire from rear of water tank.
- Cap tube before installing.
- Lubricating tube with detergent may ease installation.

2. Install air tube (5) in conduit (12).
3. Connect hose (1) to air tube (5).
4. Remove lockwire from air tube (5) at rear of water tank.
5. Connect hose (6) to air tube (5).
6. Install new tie strap (10).
7. Install new tie strap (11) at front of water tank.

AIR TUBE INSTALLATION - CONTINUED

8. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

9. Start engine and fully charge air system (TM 5-3800-205-10-2).
10. Check for air leaks and operation of brakes.
11. Remove blocks and lower tank (TM 5-3800-205-10-2).

END OF WORK PACKAGE

QUICK-RELEASE VALVE REPLACEMENT 0014 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Tape, antiseizing (Item 40, WP 0044 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

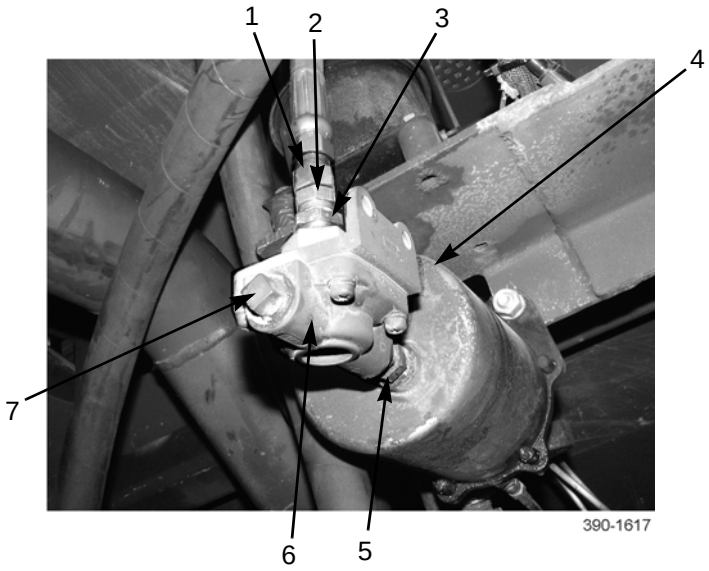
Air tanks drained (TM 5-380-205-10-2)

WARNING

- Do NOT disconnect any air lines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear eye protection when disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

REMOVAL

1. At rear of water distributor, disconnect hose (1) from fitting (2) at top of quick-release valve (6).
2. Remove fitting (2) and adapter (3) from quick-release valve (6).
3. Remove pipe plug (7) from quick-release valve (6).
4. Remove quick-release valve (6) and adapter (5) from air/hydraulic brake cylinder (4).



INSTALLATION

NOTE

Remove old antiseizing tape from male air fittings and apply new tape before connections are made.

1. Install adapter (5) and quick-release valve (6) on air/hydraulic brake cylinder (4).
2. Install pipe plug (7) on quick-release valve (6).
3. Install adapter (3) and fitting (2) to quick-release valve (6).
4. Connect hose (1) to fitting (2).
5. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

6. Start engine and fully charge air system (TM 5-3800-205-10-2).
7. Check for air leaks and operation of brakes.

END OF WORK PACKAGE

BRAKE LINES REPLACEMENT 0015 00

THIS WORK PACKAGE COVERS

Tube Assemblies: Removal, Installation

Caliper Brake Hose Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Materials/Parts - Continued

Tag, marker (Item 39, WP 0044 00)

References

WP 0016 00

Personnel Required

Two

Equipment Condition

Rear steps removed (WP 0018 00)

Rear tires and rims removed (WP 0017 00)

TUBE ASSEMBLIES REMOVAL

CAUTION

- Always use two wrenches on fittings when removing brake lines. Failure to do so may damage fittings.
- Cap all lines to prevent fluid loss and contamination of brake system.

NOTE

- Tag all lines to aid in installation.
- Care must be taken to ensure that fluids are contained during maintenance of machine. Be prepared to collect fluid with suitable containers before opening any component or disassembling any component containing fluids. Ensure all spills are cleaned up.
- Dispose of all fluids according to local regulations and mandates.

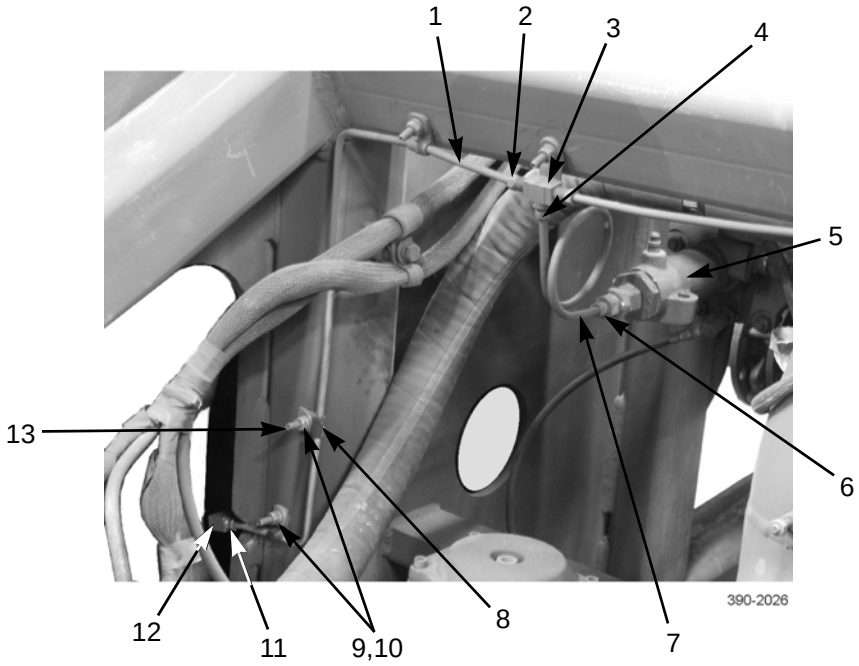
TUBE ASSEMBLIES REMOVAL

1. Loosen nut (6) and disconnect tube assembly (7) from air/hydraulic brake cylinder (5).
2. Loosen nut (4) from tee fitting (3) and remove tube assembly (7).

NOTE

Removal of left-side tube assembly, from tee fitting to brake caliper hose, is shown. Removal of right-side tube assembly is the same, except for quantity of clamps that secure tube assembly to water distributor frame.

3. Loosen nut (2) and disconnect tube assembly (1) from tee fitting (3).
4. Loosen nut (11) and disconnect tube assembly (1) from elbow (12).
5. Remove three nuts (9), washers (10), and clamps (8) from studs (13). Remove tube assembly (1) from clamps.



TUBE ASSEMBLIES INSTALLATION

CAUTION

- Always use two wrenches on fittings when installing brake lines. Failure to do so may damage fittings.
- Care must be taken to ensure tube assembly nuts are not cross-threaded during installation. Failure to do so may damage threads.

NOTE

Installation of left-side tube assembly, from tee fitting to brake caliper hose, is shown. Installation of right-side tube assembly is the same, except for quantity of clamps that secure tube assembly to water distributor frame.

1. Place tube assembly (1) inside three clamps (8) and position clamps on studs (13).
2. Install three washers (10) and nuts (9) to secure tube assembly (1) and clamps (13) to water distributor frame.

TUBE ASSEMBLIES INSTALLATION - CONTINUED

3. Connect tube assembly (1) to elbow (12) and tighten nut (11).
4. Connect tube assembly (1) to tee fitting (3) and tighten nut (2).
5. Connect tube assembly (7) to tee fitting (3) and tighten nut (4).
6. Connect tube assembly (7) to air/hydraulic brake cylinder (5) and tighten nut (6).
7. Bleed brake system (WP 0016 00).
8. Install rear tires and rims (WP 0017 00).
9. Install rear steps (WP 0018 00).

BRAKE CALIPER HOSE ASSEMBLY REMOVAL

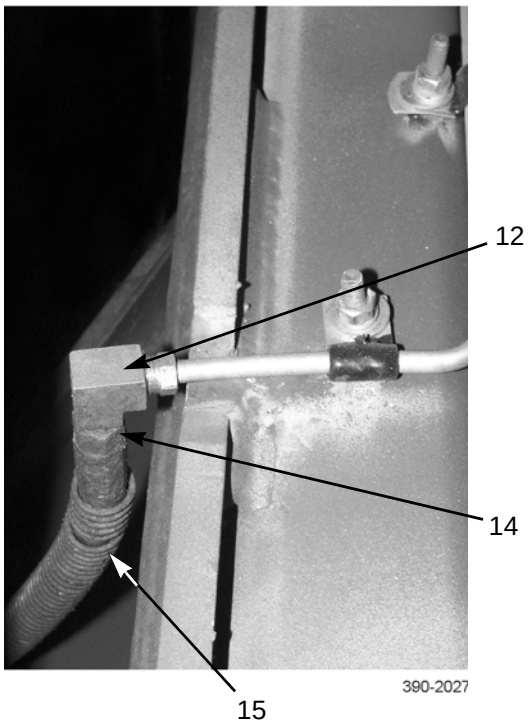
CAUTION

- Always use two wrenches on fittings when removing brake lines. Failure to do so may damage fittings.
- Cap all lines to prevent fluid loss and contamination of brake system.

NOTE

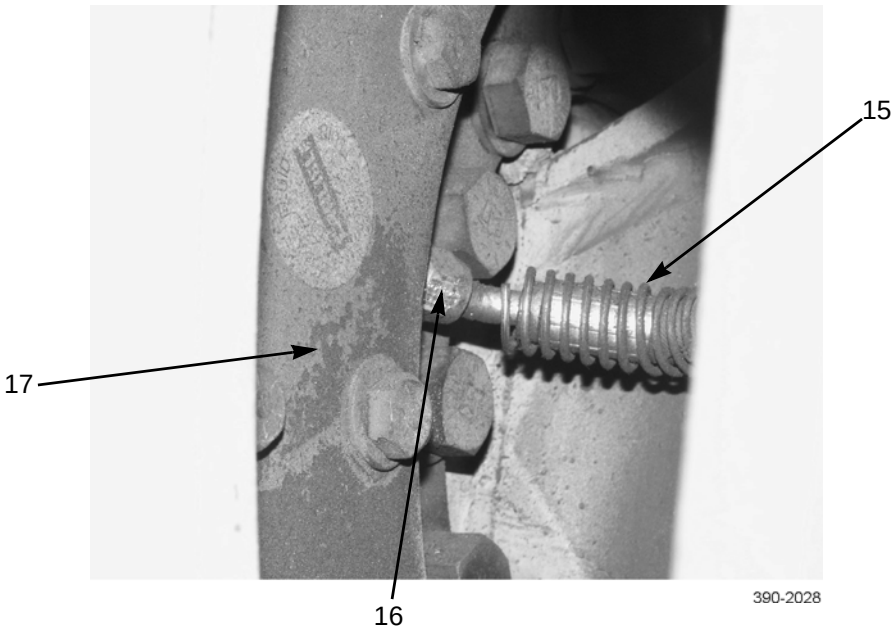
- Tag all lines to aid in installation.
- Care must be taken to ensure that fluids are contained during maintenance of machine. Be prepared to collect fluid with suitable containers before opening any component or disassembling any component containing fluids. Ensure all spills are cleaned up.
- Dispose of all fluids according to local regulations and mandates.

1. Loosen nut (14) and disconnect hose assembly (15) from elbow (12).



BRAKE CALIPER HOSE ASSEMBLY REMOVAL - CONTINUED

2. Loosen nut (16) from adapter at caliper (17) and remove hose assembly (15).



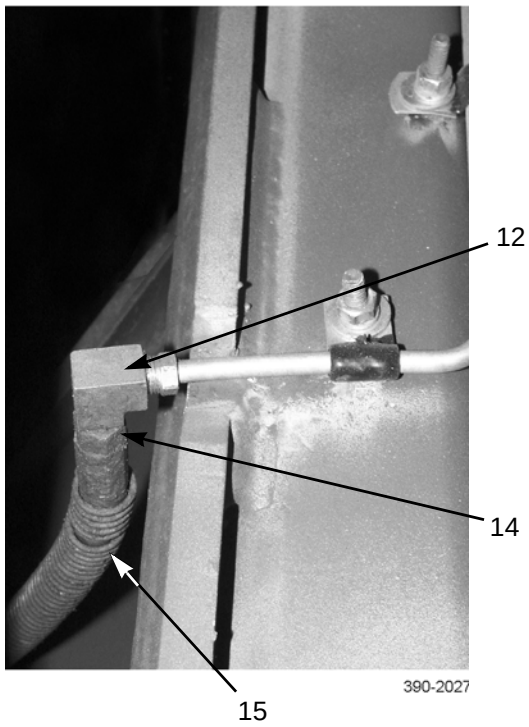
BRAKE CALIPER HOSE ASSEMBLY INSTALLATION

CAUTION

- Always use two wrenches on fittings when installing brake lines. Failure to do so may damage fittings.
- Care must be taken to ensure fitting nuts are not cross-threaded during installation. Failure to do so may damage threads.

1. Connect hose assembly (15) to adapter at caliper (17) and tighten nut (16).
2. Connect hose assembly (15) to elbow (12) and tighten nut (14).

BRAKE CALIPER HOSE ASSEMBLY INSTALLATION - CONTINUED



3. Bleed brake system (WP 0015 00).
4. Install rear tires and rims (WP 0016 00).
5. Install rear steps (WP 0017 00).

END OF WORK PACKAGE

SERVICE BRAKES BLEEDING 0016 00

THIS WORK PACKAGE COVERS

Bleeding

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Brake fluid (Item 4, WP 0044 00)

Materials/Parts - Continued

Hose, clear, neoprene (Item 19, WP 0044 00)

Personnel Required

Two

Equipment Condition

Rear steps removed (WP 0018 00)

Rear tires and rims removed (WP 0017 00)

BLEEDING

CAUTION

- Ensure that brake fluid reservoir, air/hydraulic brake cylinder, and caliper bleed screws are free of external contamination such as dirt, grease, and oil. Failure to follow this caution may result in contamination of brake system.
- Ensure that brake fluid reservoir is full prior to connecting power bleed unit. Failure to follow this caution may cause damage to brake system.

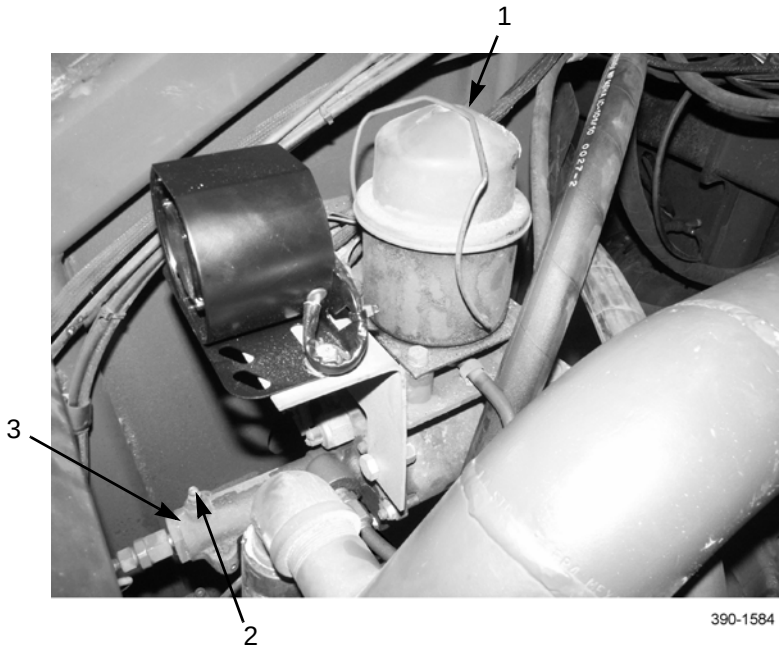
BLEEDING - CONTINUED

1. Connect power bleed unit to brake fluid reservoir (1).
2. Using power bleed unit, allow system air pressure to reach 125 psi (862 kPa).

NOTE

- Care must be taken to ensure that fluids are contained during maintenance of machine. Be prepared to collect fluid with suitable containers before opening any component or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.
- Bleed air/hydraulic brake cylinder before bleeding wheel brake calipers.

3. Attach clear hose to bleed screw (2) on air/hydraulic brake cylinder (3).
4. Open bleed screw (2) to allow fluid flow. Close bleed screw when bubble-free fluid flow is observed. Remove hose from bleed screw.

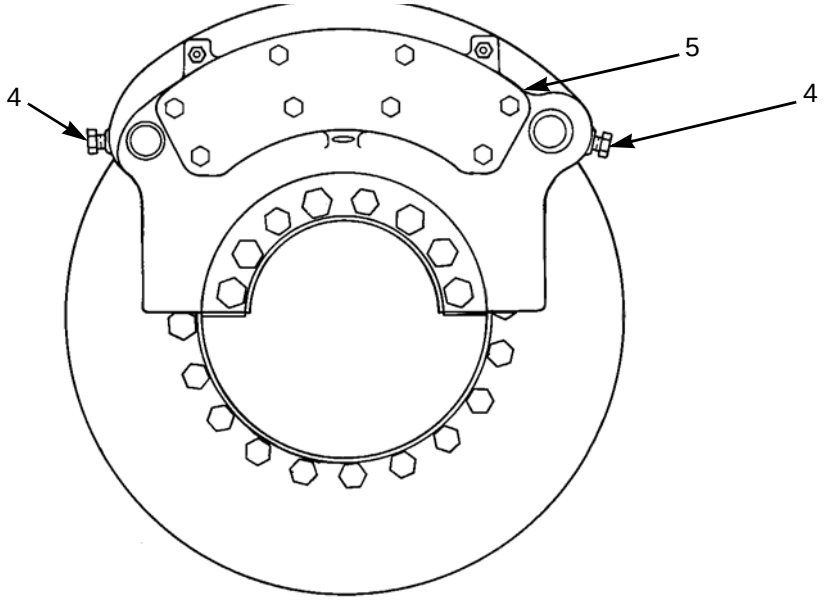


NOTE

Wheel brake calipers have two bleed screws per caliper. When bleeding caliper, do one bleed screw at a time.

5. Install clear hose on one bleed screw (4) at caliper (5). Open bleed screw to allow fluid flow. Close bleed screw when bubble-free fluid flow is observed. Remove hose from bleed screw.
6. Repeat step 5 for other bleed screw (4) on caliper (5).

BLEEDING - CONTINUED



7. Disconnect power bleed unit from brake fluid reservoir (1).
8. Ensure brake fluid reservoir (1) is full before installing cover.
9. Install rear steps (WP 0018 00).
10. Install rear tires and rims (WP 0017 00).

END OF WORK PACKAGE

REAR TIRE AND RIM REPLACEMENT 0017 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Safety strap

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

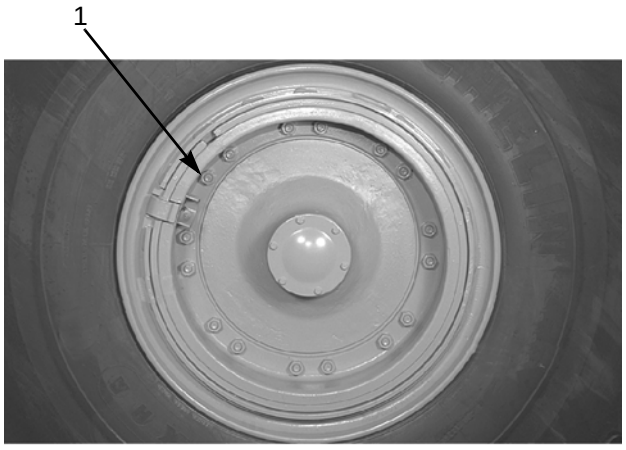
Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

REMOVAL

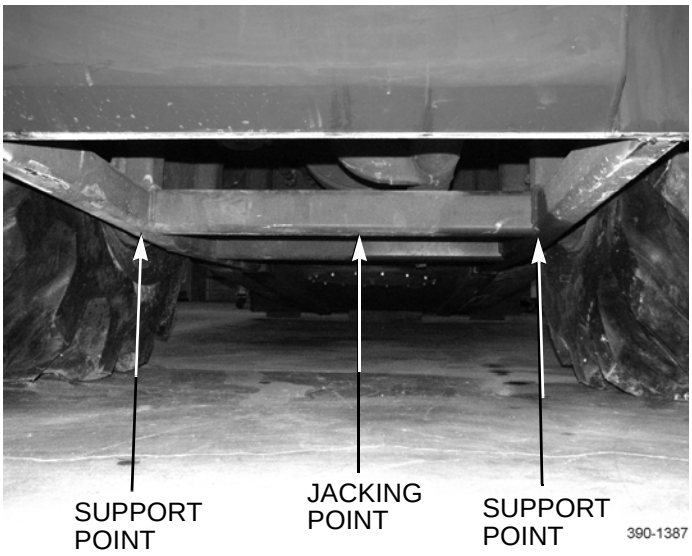
1. Loosen 16 nuts (1).



390-609

REMOVAL - CONTINUED

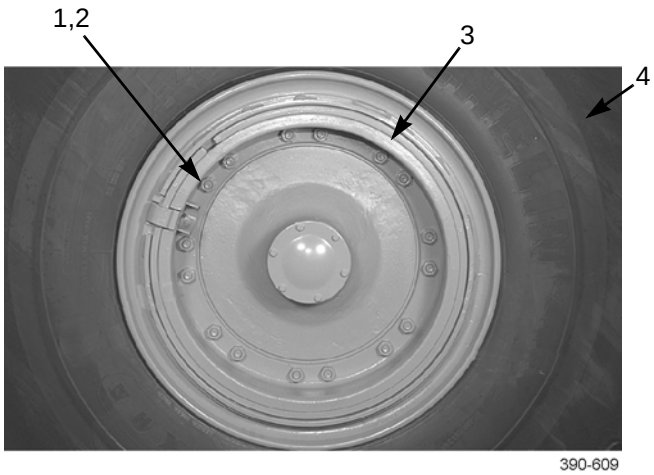
2. Position hydraulic jack under water tank frame at jacking point.
3. Raise rear of tank and position two support stands at support points.



NOTE

Sixteen nuts and washers are used to secure tire to water tank. Remove only 14 at this time.

4. Remove 14 nuts (1) and washers (2) from rim (3). Leave two nuts and washers on rim to hold tire (4) in place.



WARNING

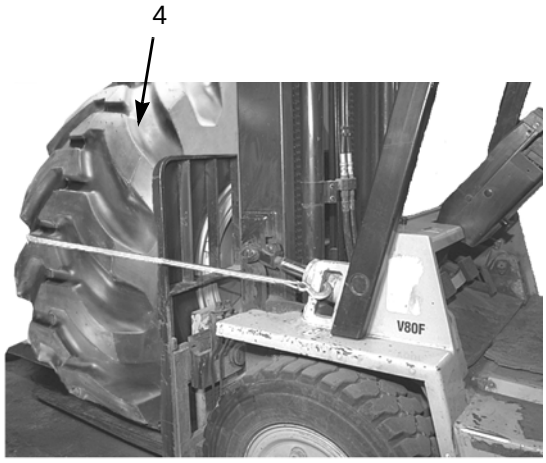
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

REMOVAL - CONTINUED

NOTE

Tire weighs 928 lb (421 kg).

5. Attach a safety strap to tire (4) and to a suitable lifting device with a minimum 1000 lb (454 kg) capacity.



390-1999

6. Remove two remaining nuts (1) and washers (2). Remove tire (4) and rim (3).

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 result in death or injury to personnel.

NOTE

Tire weighs 928 lb (421 kg).

1. Position tire (4) and rim (3) on machine.
2. Install two washers (2) and nuts (1) and hand tighten.
3. Remove strap and lifting device from tire (4).
4. Install 14 remaining washers (2) and nuts (1).
5. Remove support stands and lower water tank to ground.
6. Tighten nuts (1) to 105 lb-ft (140 Nm).
7. Tighten nuts (1) to 370 lb-ft (500 Nm).

REMOVAL - CONTINUED

WARNING

Use of a tire inflation safety cage is required if tire has inflation pressure of 36 psi (248 kPa) or less. Failure to do so may result in injury or death to personnel.

8. Check tire pressure and add air as required (TM 5-3800-205-10-2).

END OF WORK PACKAGE

REAR HANDRAILS AND STEP ASSEMBLY MAINTENANCE 0018 00

THIS WORK PACKAGE COVERS

Rear Handrails Replacement

Access Panel Latch Assembly: Removal, Installation

Step Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Nut, lock (8) (latch assembly replacement)

Personnel Required

Two (step assembly replacement)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

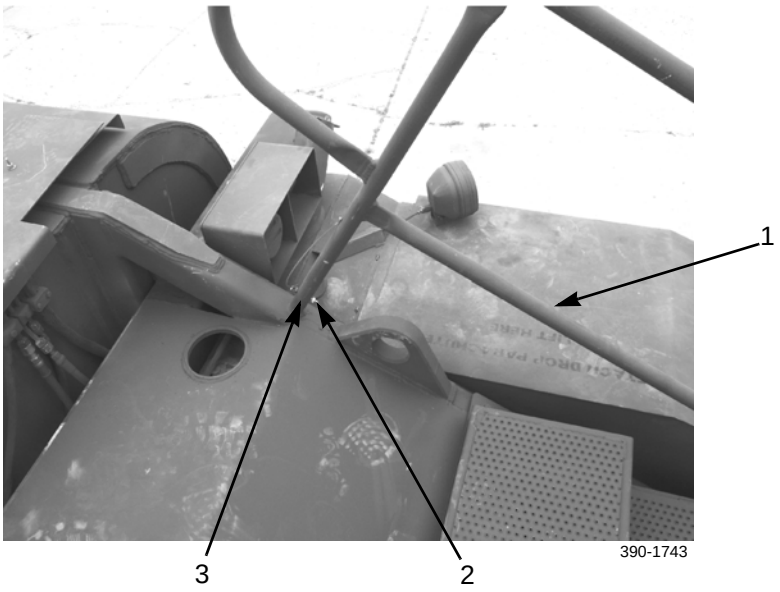
Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

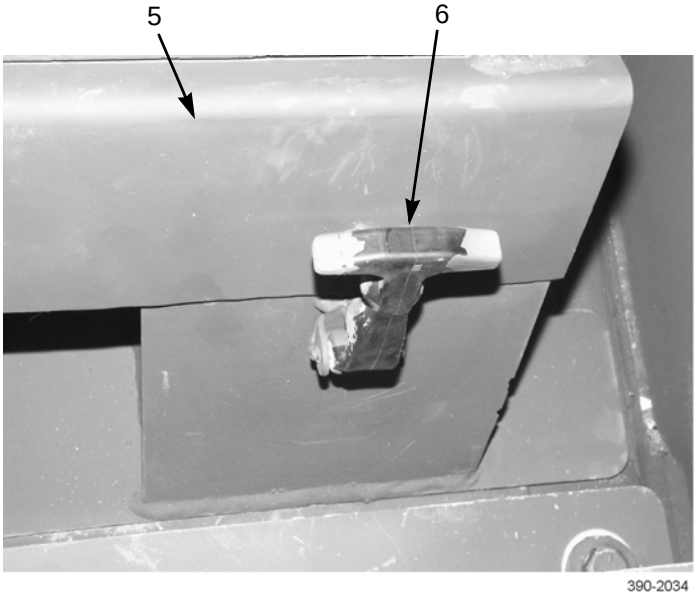
REAR HANDRAILS REPLACEMENT

1. Disconnect two pins (2) and remove handrail (1) from two mounting posts (3) at rear of machine. Repeat for other handrail.
2. Position handrail (1) on two mounting posts (3) and connect two pins (2). Repeat for other handrail.

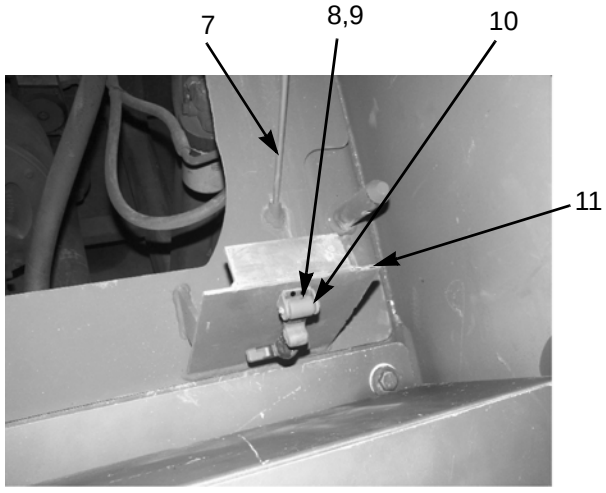


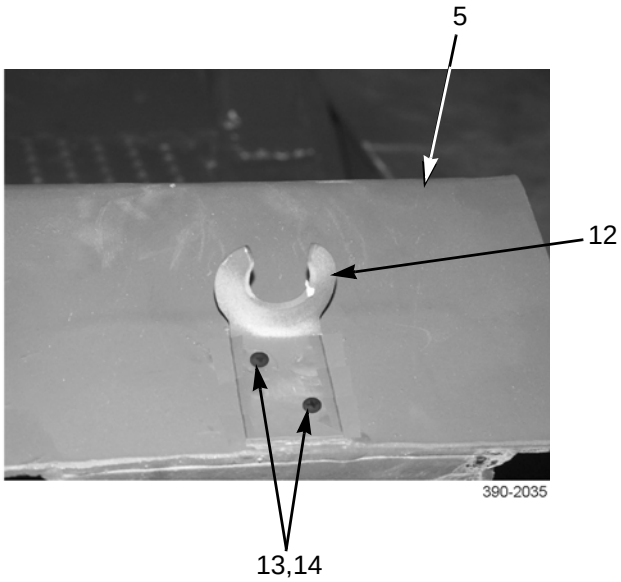
ACCESS PANEL LATCH ASSEMBLY REMOVAL

1. Release latch assembly (6) on each side of access panel (5).



2. Open access panel (5) and secure in open position with prop rod (7).
3. Remove two locknuts (8), screws (9), and latch (10) from bracket (11). Discard locknuts. Repeat for other side.
4. Remove two locknuts (13), screws (14), and retainer (12) from access panel (5). Discard locknuts. Repeat for other side.





ACCESS PANEL LATCH ASSEMBLY INSTALLATION

1. Install retainer (12) to access panel (5) with two screws (14) and new locknuts (13). Repeat for other side.

ACCESS PANEL LATCH ASSEMBLY INSTALLATION - CONTINUED

2. Install latch (10) to bracket (11) with two screws (9) and new locknuts (8). Repeat for other side.
3. Unsecure prop rod (7) and close access panel (5).
4. Secure access panel (5) in closed position with latch assembly (6) on each side of access panel.

STEP ASSEMBLY REMOVAL

1. To improve access to remove step assembly (17), remove rear handrails (Refer to *Rear Handrails Replacement*).

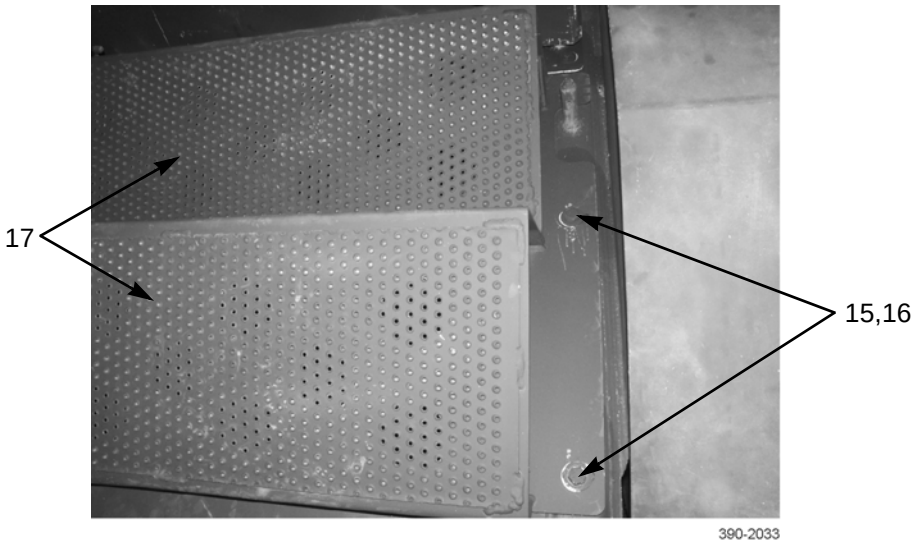
WARNING

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.

NOTE

Step assembly weighs 153 lb (69 kg).

1. Remove four bolts (15) and washers (16) from step assembly (17).
2. With assistance, remove step assembly (17) from water distributor frame.



STEP ASSEMBLY INSTALLATION

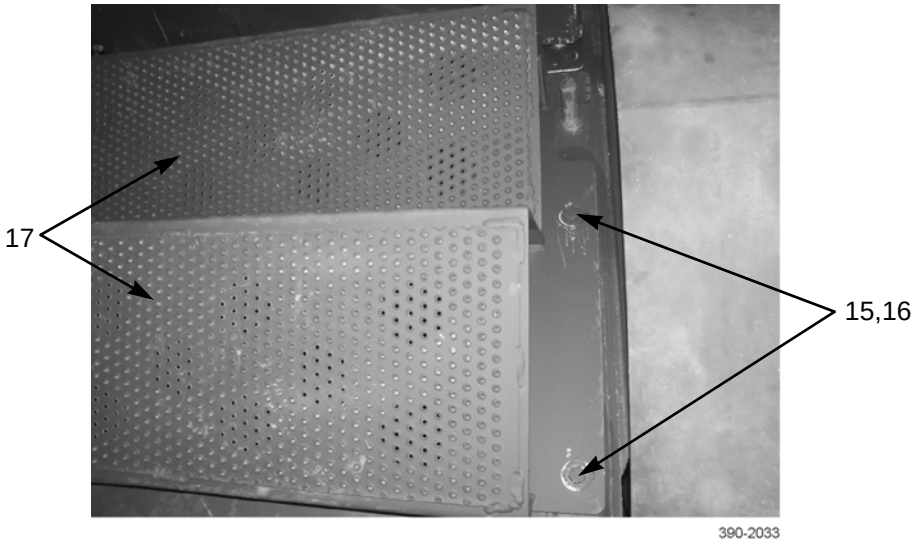
WARNING

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 result in death or injury to personnel.

NOTE

Step assembly weighs 153 lb (69 kg).

1. With assistance, position step assembly (17) on water distributor frame.
2. Secure step assembly (17) with four washers (16) and bolts (15).



3. Install rear handrails (Refer to *Rear Handrails Replacement*).

END OF WORK PACKAGE

TOOLBOX REPLACEMENT 0019 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Nut, lock (4) (as required)

Washer, lock (2)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

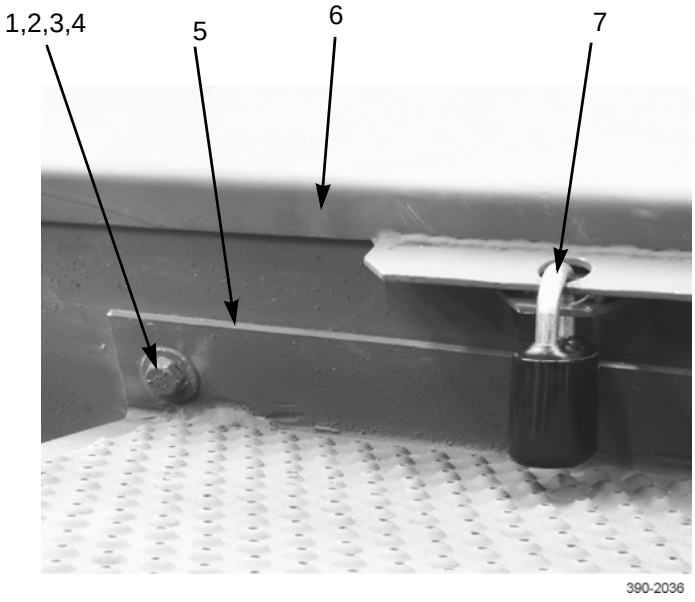
REMOVAL

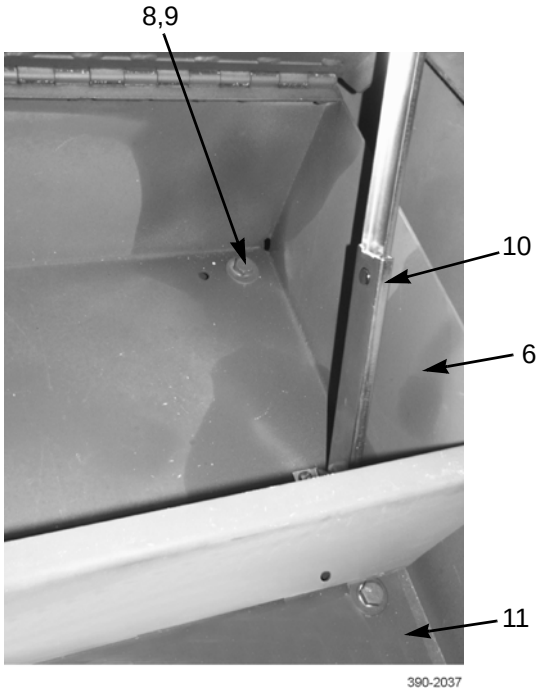
1. Remove padlock (7) from toolbox (6).
2. Open toolbox lid and lock lid in open position with lid support (10).
3. Remove two nuts (1), lockwashers (2), four flatwashers (3), and two bolts (4) to separate step (5) from toolbox (6). Discard lockwashers.

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury to personnel.

4. Remove six bolts (8) and washers (9) from toolbox (6) and hose reel mounting plate (11). With assistance, remove toolbox from machine.





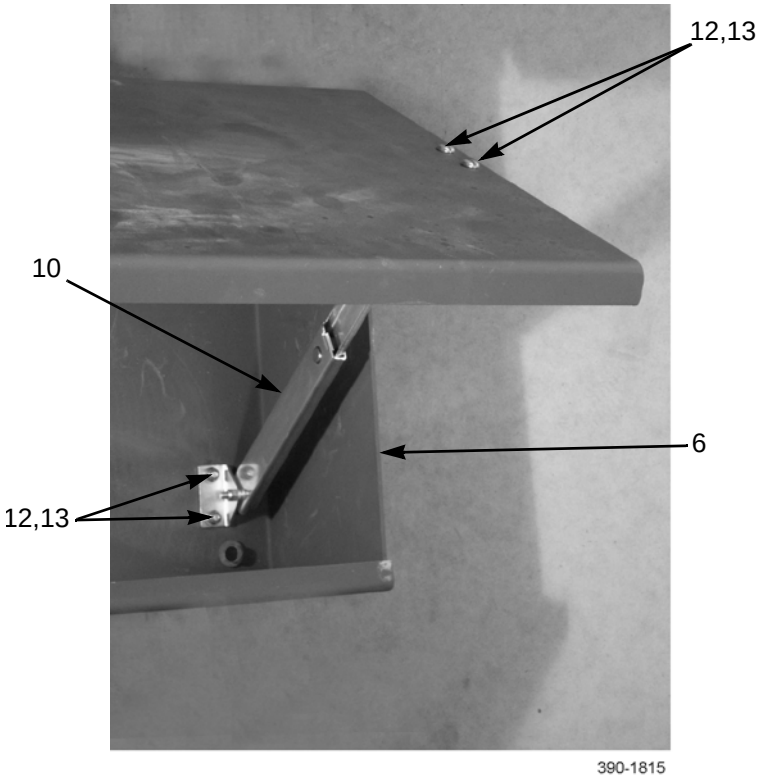
WARNING

Ensure that toolbox lid is supported when removing lid support, to prevent injury to personnel.

5. If damaged, remove four locknuts (12), screws (13), and lid support (10) from toolbox (6). Discard locknuts.

TOOLBOX REPLACEMENT - CONTINUED **0019 00**

REMOVAL - CONTINUED



INSTALLATION

WARNING

Ensure that toolbox lid is supported when installing lid support, to prevent injury to personnel.

1. If removed, install lid support (10) to toolbox (6) with four screws (13) and new locknuts (12).

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury to personnel.

2. With assistance, position toolbox (6) on hose reel mounting plate (11) and install six washers (9) and bolts (8).
3. Secure step (5) to toolbox (6) with two bolts (4), four flatwashers (3), two new lockwashers (2), and nuts (1).
4. Close toolbox lid and use padlock (7) to lock toolbox (6).

END OF WORK PACKAGE

WATER TANK INSPECTION COVER REPLACEMENT 0020 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Gasket

Seal, rubber

Washer, lock (12)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

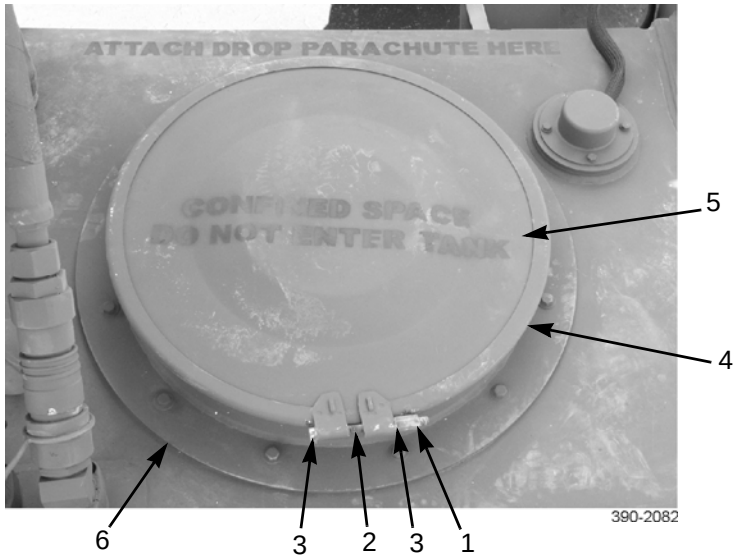
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

WARNING

NEVER drink water contained in water distributor tank. Water contained or dispensed from tank is NON-POTABLE. Drinking non-potable water could result in illness or death.

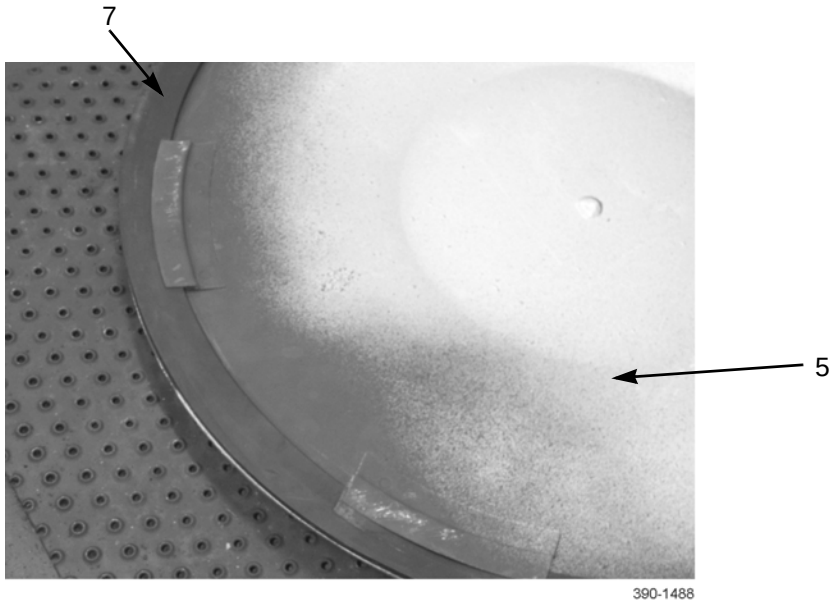
REMOVAL

1. Remove nut (1), bolt (2), two washers (3), locking clamp (4), and inspection cover (5) from cover flange (6).

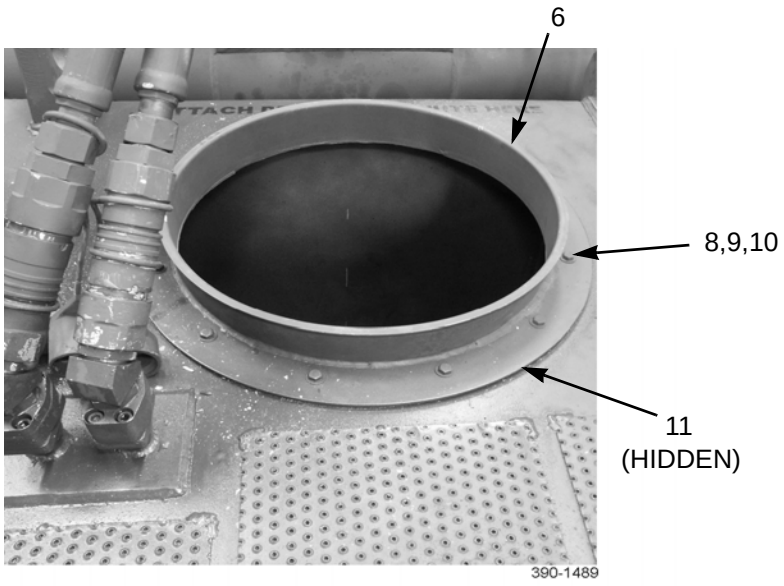


REMOVAL - CONTINUED

2. Inspect, remove, and discard rubber seal (7) from inspection cover (5), if damaged.



3. Remove 12 nuts (8), lockwashers (9), bolts (10), cover flange (6), and gasket (11) from top of tank. Discard lockwashers and gasket.



INSTALLATION

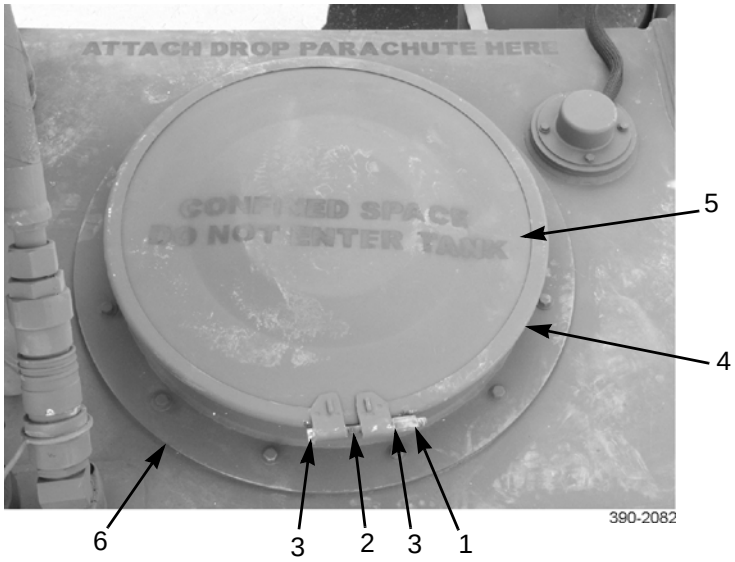
1. Install new gasket (11) and cover flange (6) on top of tank with 12 bolts (10), new lockwashers (9), and nuts (8).
2. Install new rubber seal (7) (if required) on underside of inspection cover (5).

INSTALLATION - CONTINUED

NOTE

Ensure locking clamp is positioned under lip of cover flange and over lip of inspection cover, to ensure proper seating.

3. Position locking clamp (4) and inspection cover (5) on cover flange (6). Install two washers (3), bolt (2), and nut (1). Fully tighten.



END OF WORK PACKAGE

WATER TANK ACCESS COVER MAINTENANCE 0021 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Gloves, work

Materials/Parts

Gasket

Pin, cotter (3)

Seal, rubber

Washer, lock (25)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Water tank access cover opened (TM 5-3800-205-10-2)


WARNING


- DO NOT enter water tank. Tank interior is a confined space and therefore hazardous to enter. If tank entry becomes absolutely necessary, contact your local safety office and obtain a confined space entry permit. Requirements of 29 CFR 1910.145(d)(2) (reference 17), as well as any local requirements, must be followed. Failure to follow this warning may result in injury or death due to oxygen deprivation.
- NEVER drink water contained in water distributor tank. Water contained or dispensed from tank is NON-POTABLE. Drinking non-potable water could result in illness or death.
- Do NOT step on water tank access cover grate. Failure to follow this warning may result in injury to personnel.
- Wear work gloves when performing maintenance on access cover, due to sharp edges of grate and cutter bar. Failure to do so may result in injury to personnel.

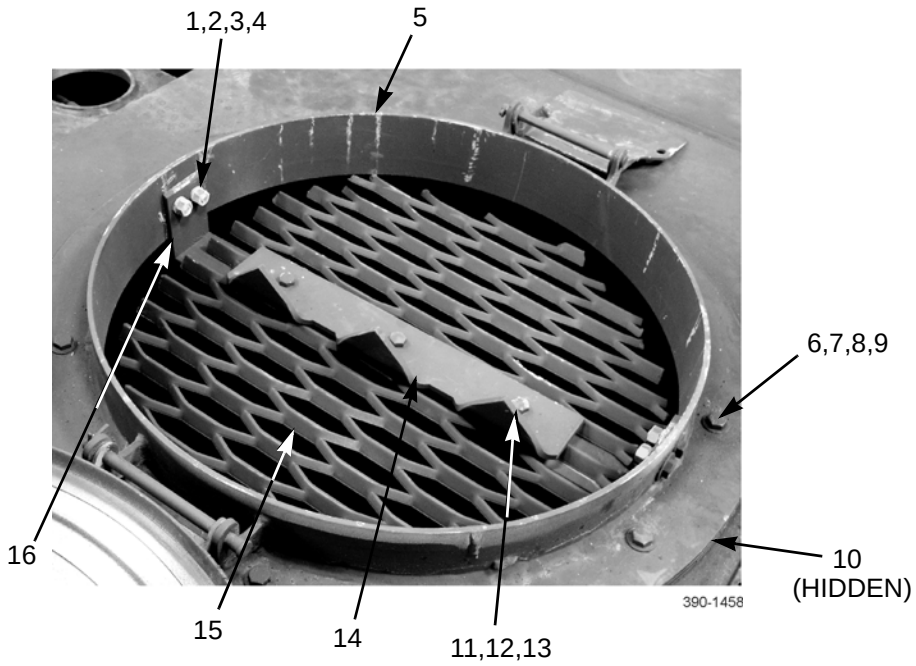
REMOVAL

1. Remove four nuts (1), lockwashers (2), washers (3), and bolts (4) to separate support (16) assembly from water tank access cover (5). Discard lockwashers.
2. Remove three nuts (11), lockwashers (12), bolts (13), cutter bar (14), and grate (15) from support (16). Discard lockwashers.

NOTE

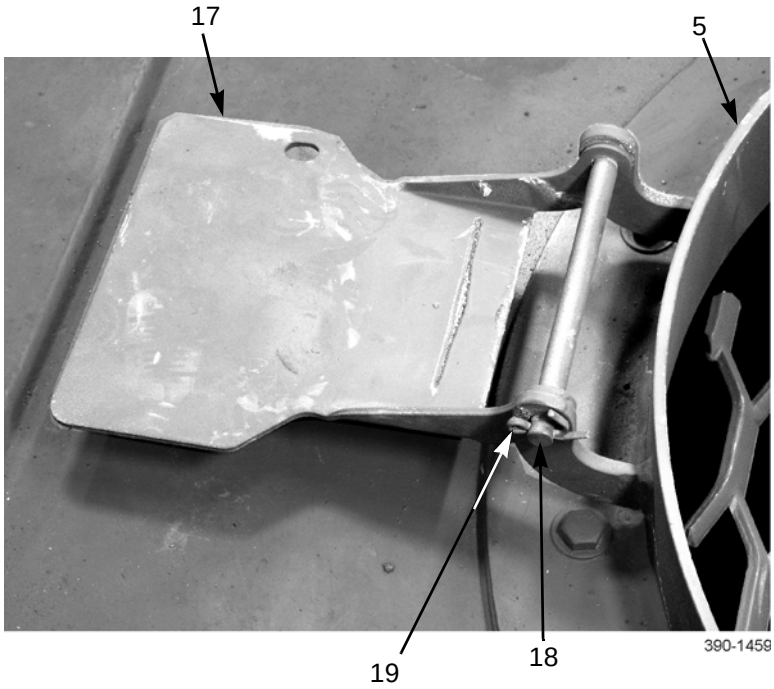
Note position of water tank access cover to aid in installation.

3. Remove 12 nuts (6), lockwashers (7), washers (8), bolts (9), water tank access cover (5), and gasket (10) from top of tank. Discard lockwashers and gasket.

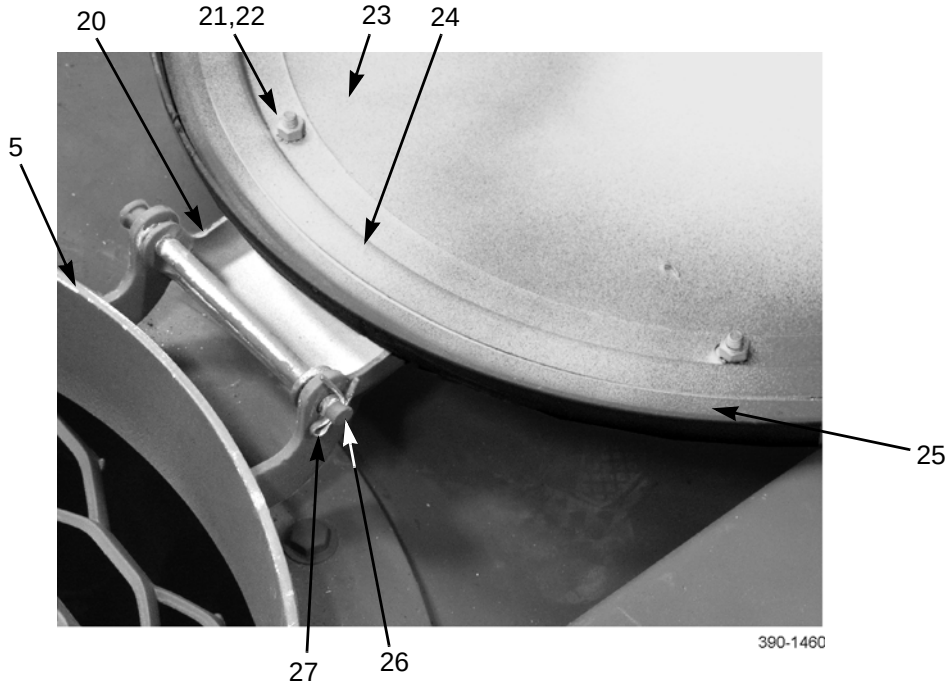


DISASSEMBLY

1. Remove cotter pin (19), pin (18), and latch (17) from water tank access cover (5). Discard cotter pin.



2. Remove cotter pin (27), pin (26) and crossbar (20) with cover (23) from water tank access cover (5). Discard cotter pin.
3. Remove six nuts (21), lockwashers (22), retainer (24), and rubber seal (25) from cover (23). Discard lockwashers and rubber seal.

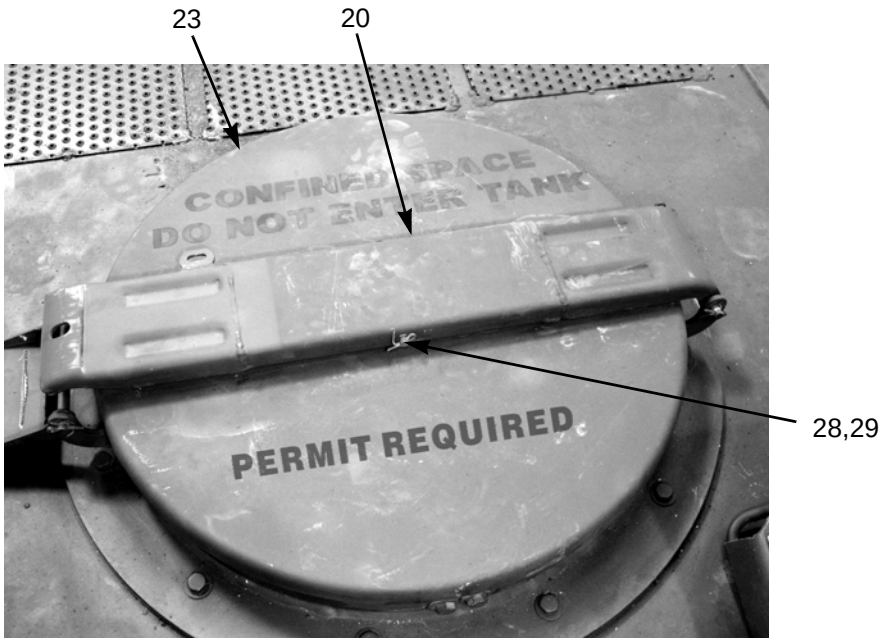


DISASSEMBLY - CONTINUED

NOTE

Note position of crossbar and cover to aid in assembly.

4. Remove cotter pin (28), pin (29), and crossbar (20) from cover (23). Discard cotter pin.

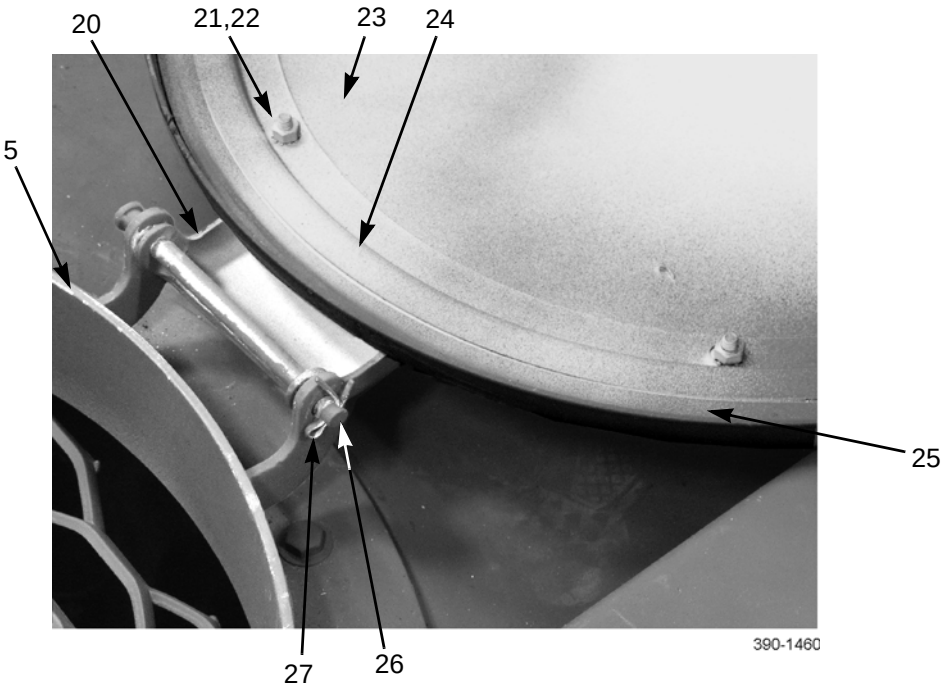


390-1461

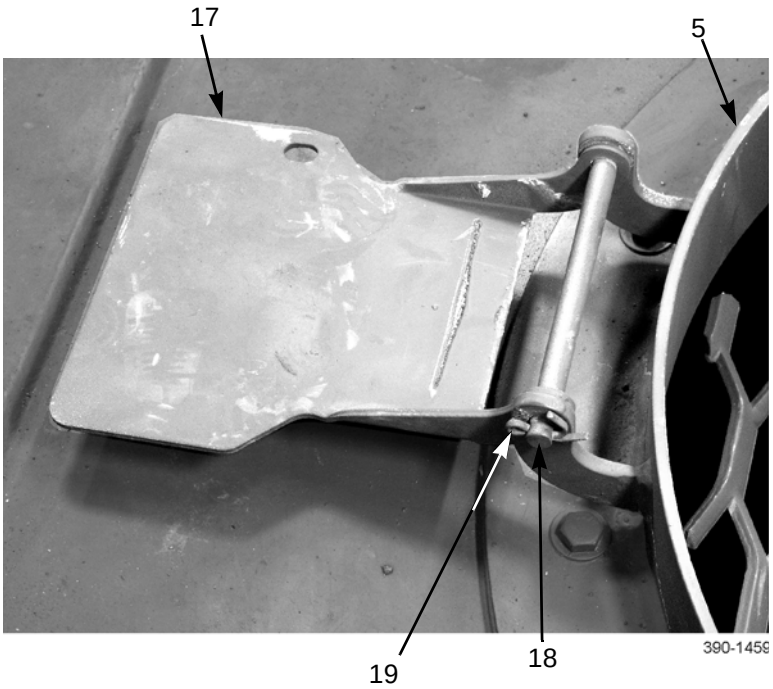
ASSEMBLY

1. Install crossbar (20) on cover (23) with pin (29) and new cotter pin (28).
2. Install new rubber seal (25) and retainer (24) on cover (23) with six new lockwashers (22) and nuts (21).
3. Install crossbar (20) with cover (23) on water tank access cover (5) with pin (26) and new cotter pin (27).

ASSEMBLY - CONTINUED

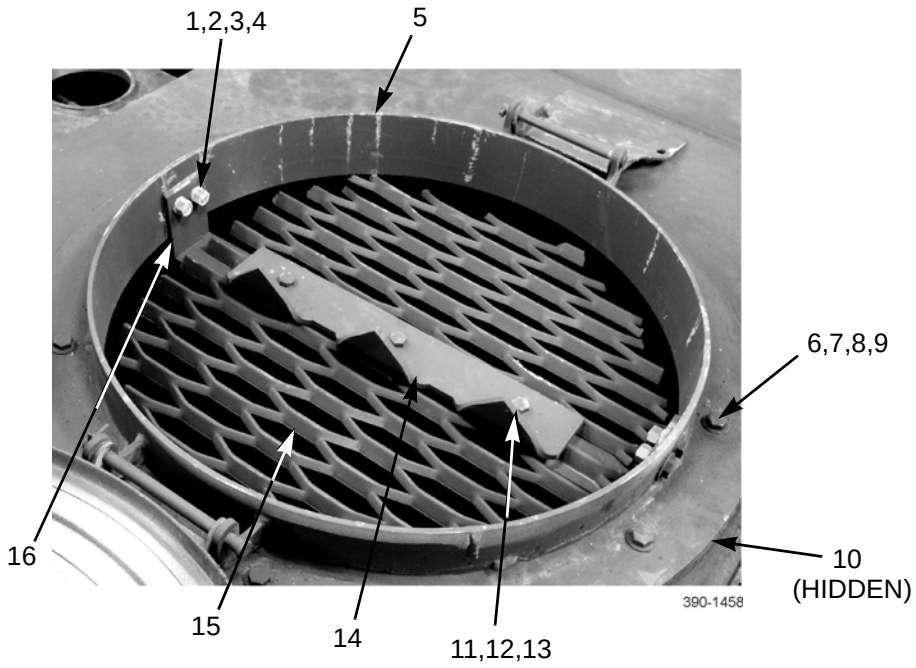


4. Install latch (17) on water tank access cover (5) with pin (18) and new cotter pin (19).



INSTALLATION

1. Install new gasket (10) and water tank access cover (5) on water tank with 12 bolts (9), washers (8), new lockwashers (7), and nuts (6).
2. Install grate (15) and cutter bar (14) on support (16) with three bolts (13), new lockwashers (12), and nuts (11).
3. Install support (16) assembly on water tank access cover (5) with four bolts (4), washers (3), new lockwashers (2), and nuts (1).
4. Close water tank access cover (TM 5-3800-205-10-2).



END OF WORK PACKAGE

MUDFLAP AND REAR GRABHANDLE REPLACEMENT 0022 00

THIS WORK PACKAGE COVERS

Mudflap Replacement

Rear Grabhandle Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Washer, lock (rear grabhandle replacement)

Washer, lock (4) (mudflap replacement)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

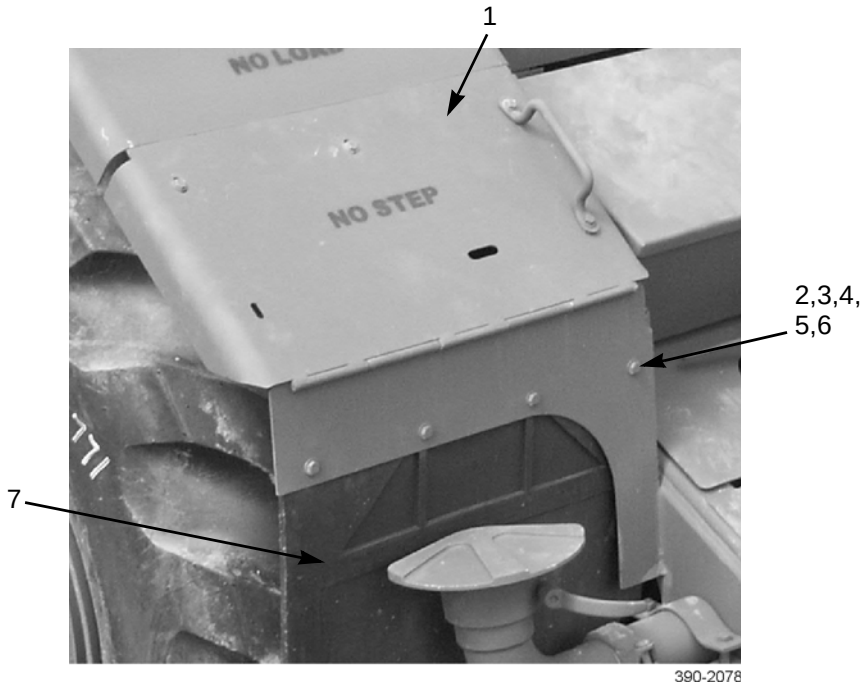
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

MUDFLAP REPLACEMENT

NOTE

Left and right mudflaps are replaced the same way. Left mudflap is illustrated.

1. Remove four nuts (2), lockwashers (3), washers (4), bolts (5), washers (6) and mudflap (7) from fender (1). Discard lockwashers.
2. Install mudflap (7), four washers (6), bolts (5), washers (4), new lockwashers (3) and nuts (2) on fender (1).

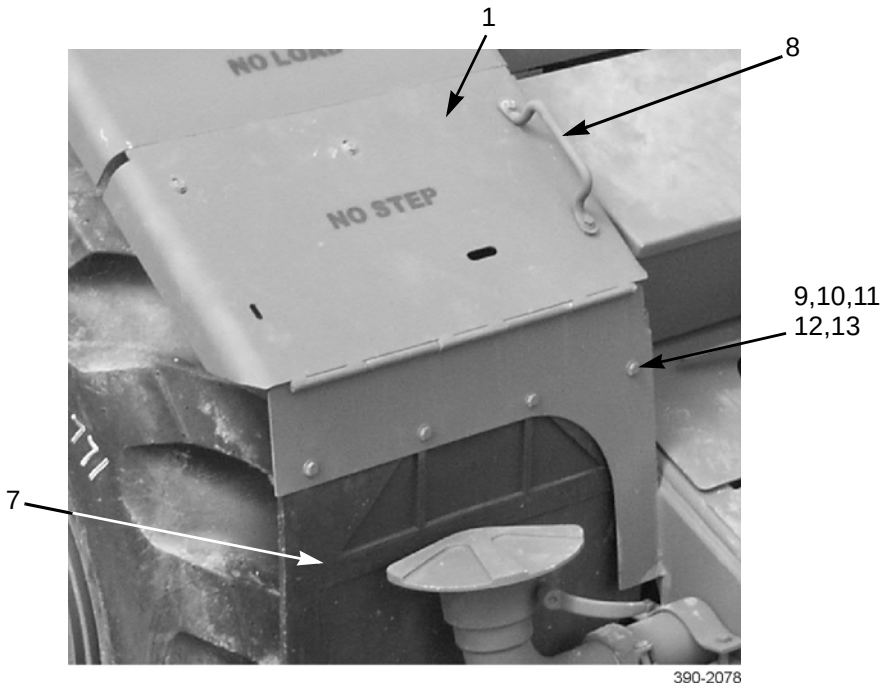


REAR GRABHANDLE REPLACEMENT

NOTE

- Left and right rear grabhandles are replaced the same way. Left rear grabhandle is illustrated.
- There is no lockwasher at grabhandle top mounting bolt.

1. Remove two nuts (9), lockwashers (10), washers (11), bolts (12), washers (13) and handle (8) from fender (1). Discard lockwashers.
2. Install handle (8), two washers (13), bolts (12), washers (11), new lockwashers (10) and nuts (9) on fender (1).



END OF WORK PACKAGE

DATA PLATE REPLACEMENT 0023 00

THIS WORK PACKAGE COVERS

Data Plate (Solid Rivet) Replacement

Data Plate (Blind Rivet) Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Detergent, general purpose (Item 11, WP 0044 00)

Rivet, blind (as required)

Materials/Parts - Continued

Rivet, solid (as required)

Equipment Conditions

Machine parked on hard,level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

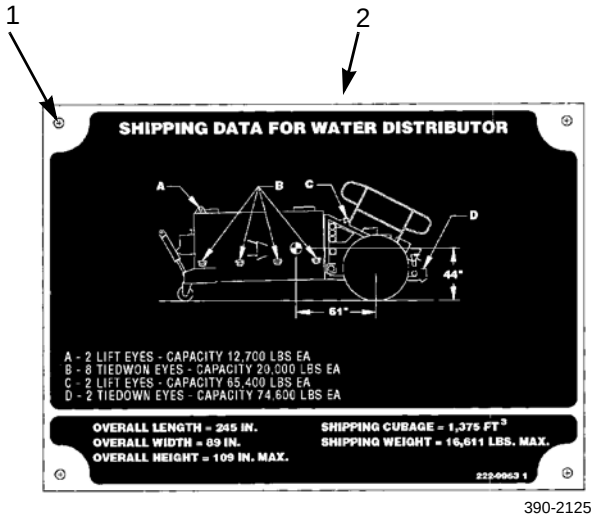
Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

DATA PLATE (SOLID RIVET) REPLACEMENT

1. Using center punch and hammer, mark center of each rivet (1).
2. Using electric drill and twist drill slightly larger than body diameter of rivet (1), drill into each rivet head until rivet head can be separated from rivet body.
3. Remove data plate (2) from water tank.



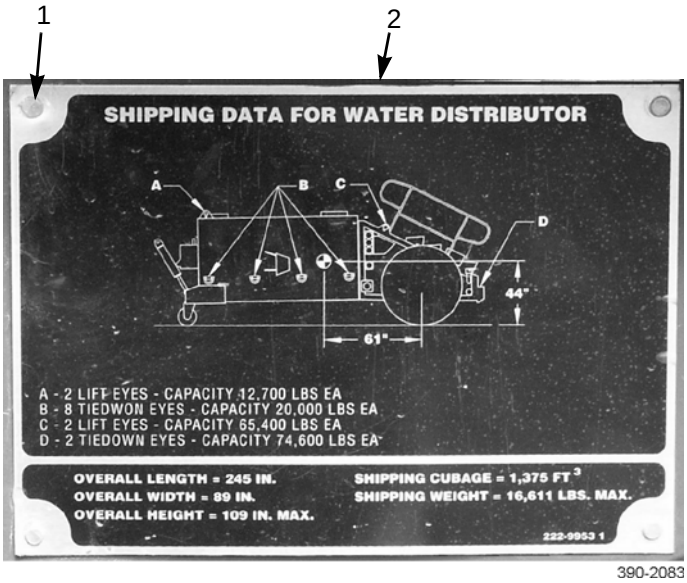
390-2125

DATA PLATE (SOLID RIVET) REPLACEMENT - CONTINUED

CAUTION

DO NOT drill any deeper than necessary to remove rivet body. Failure to follow this caution will result in damage to water tank.

4. Using twist drill the same diameter as rivet (1) body, remove rivet body from water tank.
5. Install data plate (2) on water tank with new rivets (1).



390-2083

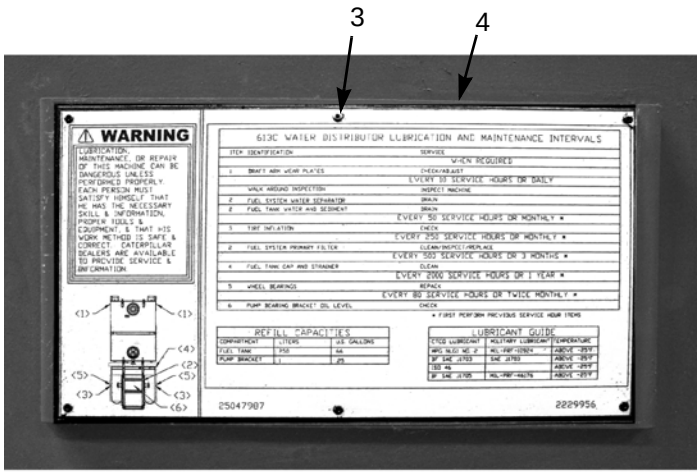
DATA PLATE REPLACEMENT - CONTINUED 0023 00

DATA PLATE (BLIND RIVET) REPLACEMENT

CAUTION

DO NOT drill any deeper than necessary to remove rivet. Failure to follow this caution will result in damage to water tank.

1. Using electric drill and twist drill the same diameter as body of rivet (3), drill through head and body of rivet and remove each rivet from data plate (4).
2. Remove data plate (4) from water tank.
3. Using blind hand riveter, install data plate (4) on water tank with new rivets (3).



390-1541

END OF WORK PACKAGE

HYDRAULIC HOSES MAINTENANCE (DRAFT ARM-TO-WATER TANK) 0024 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protection (Item 5, WP 0044 00)

Oil, lubricating (Item 24 or 29, WP 0044 00)

Rag, wiping (Item 32, WP 0044 00)

Seal, O-ring (2)

References

TM 5-3800-205-23-1

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

WARNING

- Do NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

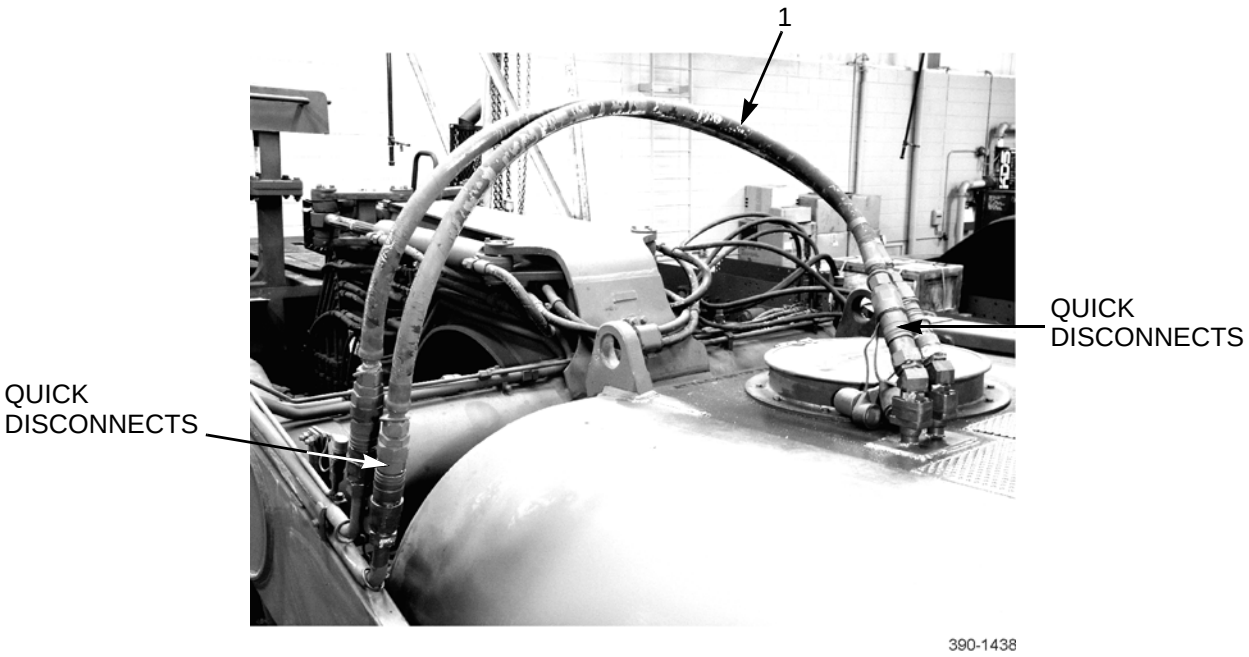
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Right- and left-side hydraulic hoses are maintained the same way. Left-side hydraulic hose is illustrated.

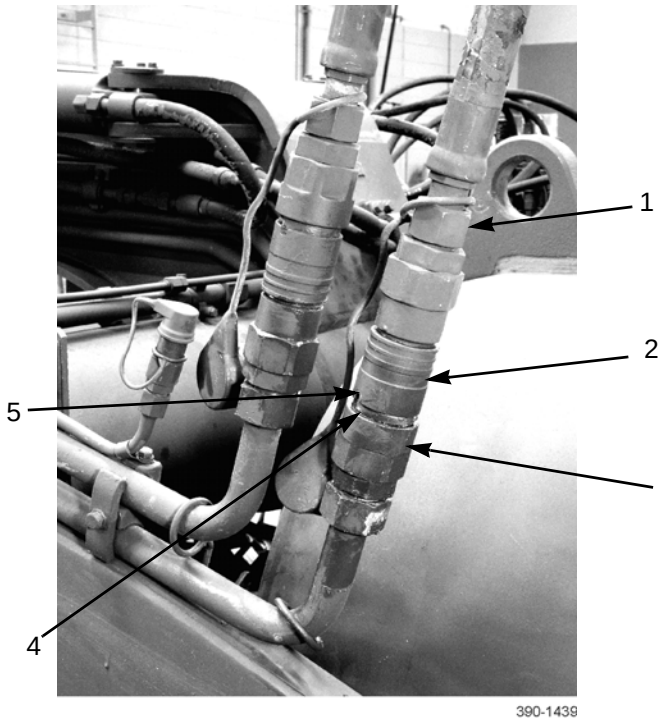
REMOVAL

1. Hydraulic hose (1) is removed by disconnecting each end at quick disconnects as described in steps 2-4.

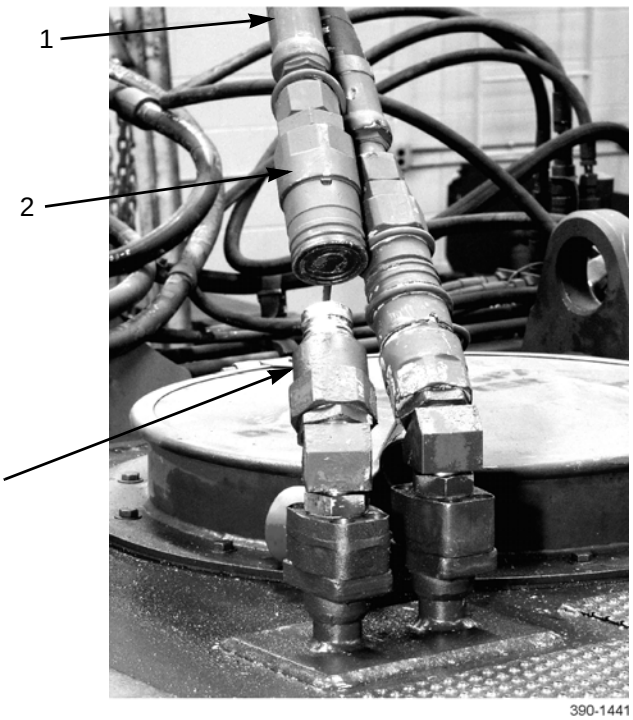


REMOVAL - CONTINUED

2. Turn coupling (2) 180° and align access hole (5) with raised dot (4).
3. Pull coupling (2) downward while holding onto hydraulic hose (1).
4. Disconnect coupling (2) from coupling (3).



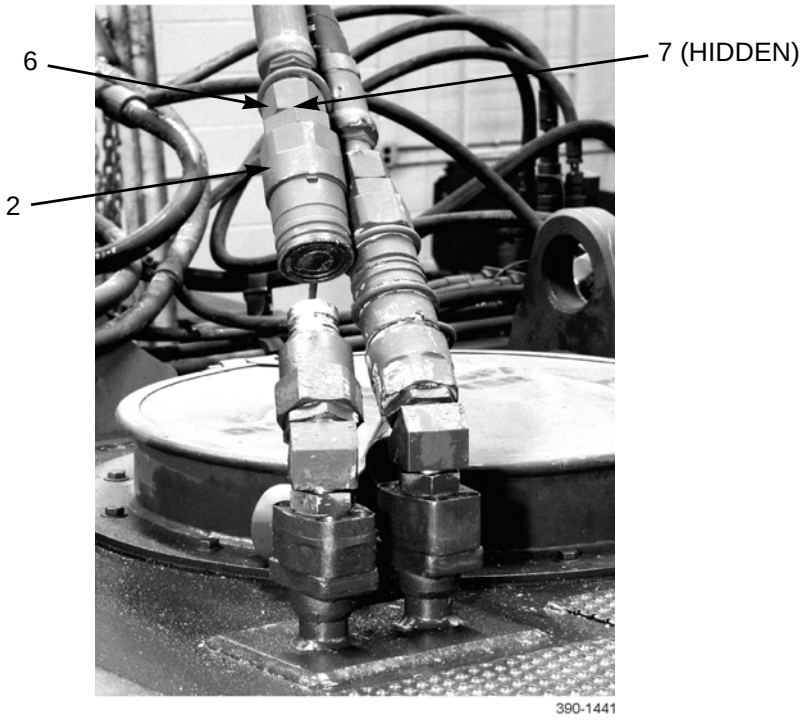
390-1439



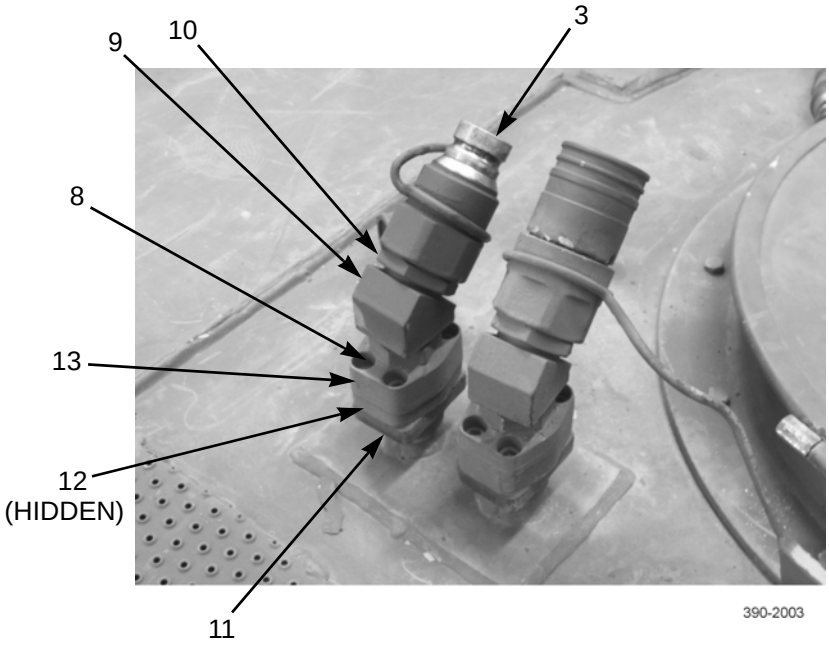
390-1441

DISASSEMBLY

1. Using two wrenches, disconnect hydraulic hose connector (6) from coupling (2).
2. Remove and discard O-ring (7).



3. Remove coupling (3) and adapter (10) from elbow fitting (9).
4. Remove elbow fitting (9) from adapter plate (13).
5. Remove four socket head screws (8) and adapter plate (13) from mount (11).
6. Remove and discard O-ring (11).



ASSEMBLY

CAUTION

Ensure all parts are free of dust or dirt to ensure no contamination to hydraulic system.

NOTE

Lubricate new O-rings with oil prior to installation.

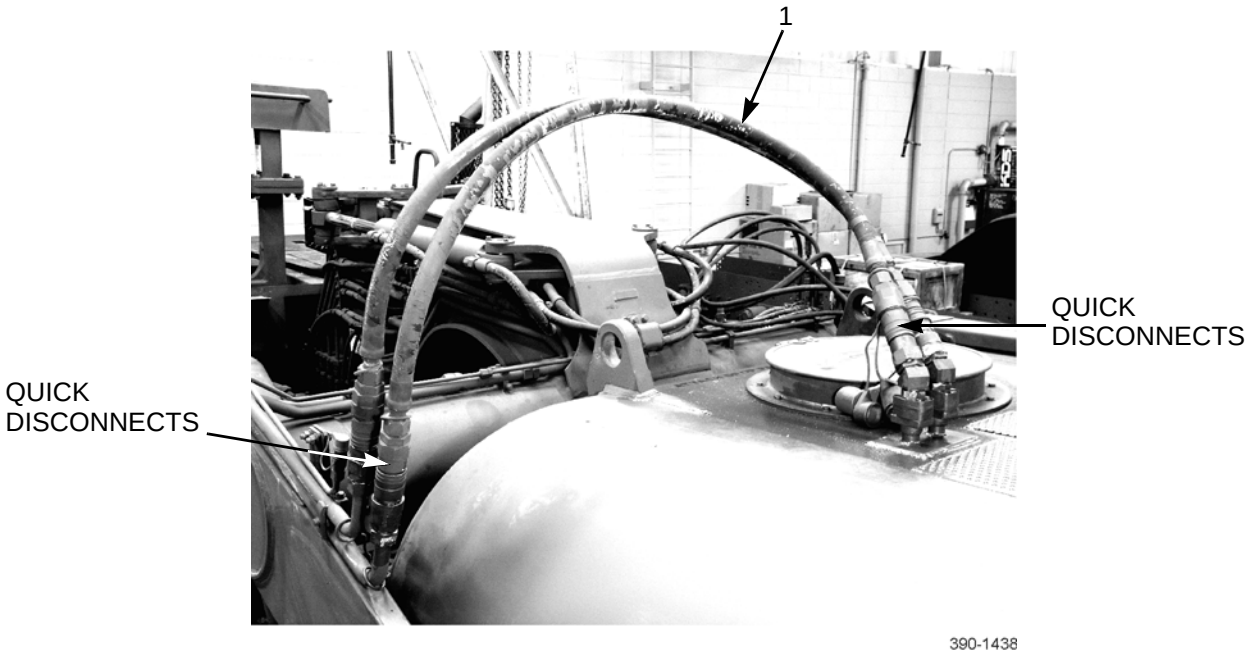
1. Install new O-ring (12) on adapter plate (13).
2. Install adapter plate (13) to mount (11) with four socket head screws (8).
3. Install elbow fitting (9) to adapter plate (13).
4. Install adapter (10) and coupling (3) to elbow fitting (9).
5. Install new O-ring (7) and connect hydraulic hose connector (6) to coupler (2).

INSTALLATION

NOTE

All quick disconnect connections are made the same way. Be sure to turn quick disconnect collar a half turn after connecting to lock connection.

1. Hydraulic hose (1) is installed by connecting each end at quick disconnects.



2. Check hydraulic fluid level in reservoir (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
3. Operate hydraulics (TM 5-3800-205-10-2) and check for leaks.

END OF WORK PACKAGE

HYDRAULIC HOSES REPLACEMENT (WATER TANK-TO-HYDRAULIC MOTOR) 0025 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Oil, lubricating (Item 24 or 29, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Materials/Parts - Continued

Strap, tiedown (Item 38, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Seal, O-ring (2)

References

TM 5-3800-205-10-2

TM 5-3800-205-23-1

Equipment Condition

Hydraulic hoses disconnected from quick disconnect fittings at top of tank (WP 0024 00)

Rear steps removed (WP 0018 00)

WARNING

- Do NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

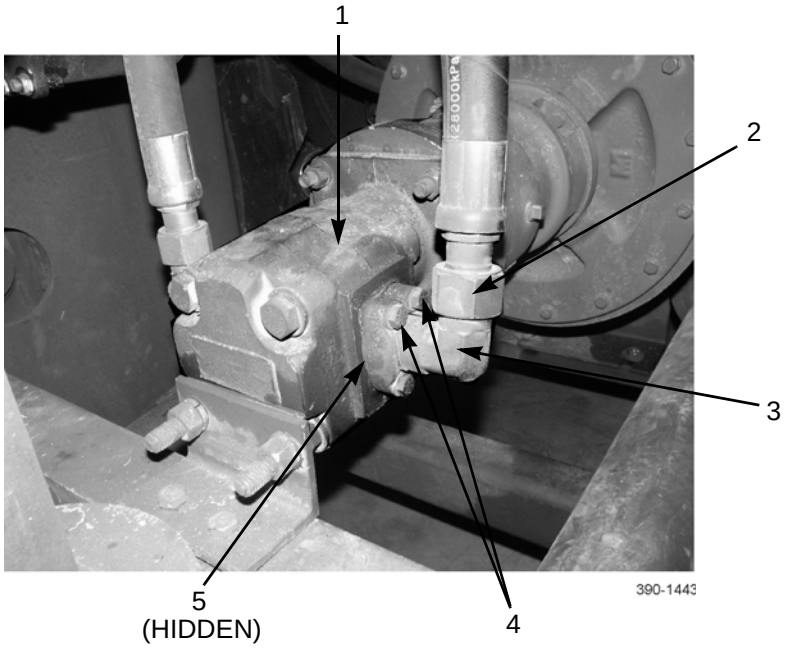
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

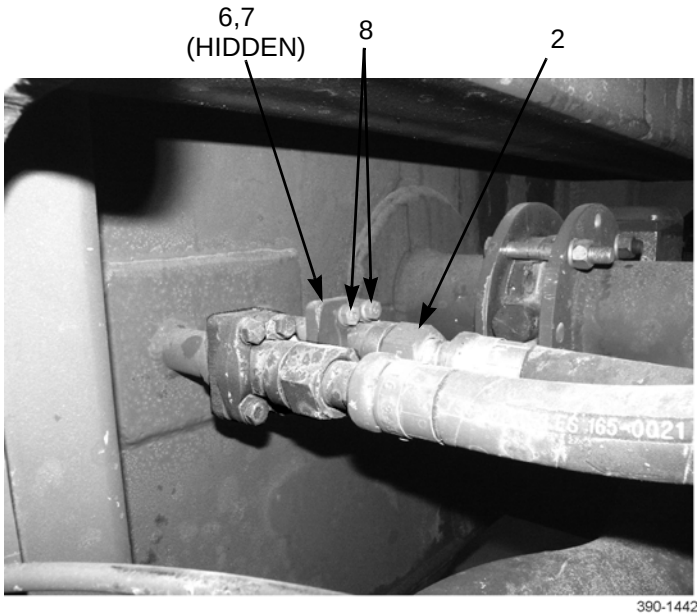
- Tag hydraulic hoses after disconnecting, to ensure correct installation.
- Remove tiedown straps as required and discard. Use new tiedown straps on installation to ensure hydraulic hoses are properly supported.
- Steps to replace hydraulic hoses between water tank bulkhead connectors and water pump hydraulic motor are the same. Right-side hydraulic hose is shown in this procedure.
- Use a suitable container to catch fluid. Dispose of fluid according to local regulations and mandates.

REMOVAL

1. Disconnect hydraulic hose (2) from water pump hydraulic motor (1) at elbow fitting (3). Plug end of hose with a rag.
2. Remove four bolts (4), elbow fitting (3), and O-ring (5) from hydraulic motor (1). Plug opening in hydraulic motor and discard O-ring.



3. Disconnect hydraulic hose (2) from water tank bulkhead connector (6) and plug hydraulic hose.
4. Remove four bolts (8), bulkhead connector (6), and O-ring (7) from water tank bulkhead. Discard O-ring and plug opening in bulkhead.



INSTALLATION

NOTE

Lubricate new O-rings with oil prior to installation.

1. Install new O-ring (7) in bulkhead connector (6).
2. Install four bolts (8) and bulkhead connector (6) to water tank bulkhead.
3. Connect hydraulic hose (2) to bulkhead connector (6).
4. Install new O-ring (5) in elbow fitting (3).
5. Install four bolts (4) and elbow fitting (3) to water pump hydraulic motor (1).
6. Connect hydraulic hose (2) to elbow fitting (2).
7. Connect hydraulic hoses to quick disconnect fittings at top of tank (WP 0024 00).
8. Fill hydraulic reservoir (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
9. Operate hydraulics (TM 5-3800-205-10-2) and check for leaks.
10. Install rear steps (WP 0018 00).

END OF WORK PACKAGE

CHECK VALVE AND LIFT CYLINDER REPLACEMENT 0026 00

THIS WORK PACKAGE COVERS

Check Valve: Removal, Installation

Lift Cylinder: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Sling, nylon (Item 27, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Compound, antiseize (Item 8, WP 0044 00)

Oil, lubricating (Item 24 or 29, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Seal, O-ring (3)

Personnel Required

Two

References

TM 5-3800-205-23-1

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Engine off (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

WARNING

- Do NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

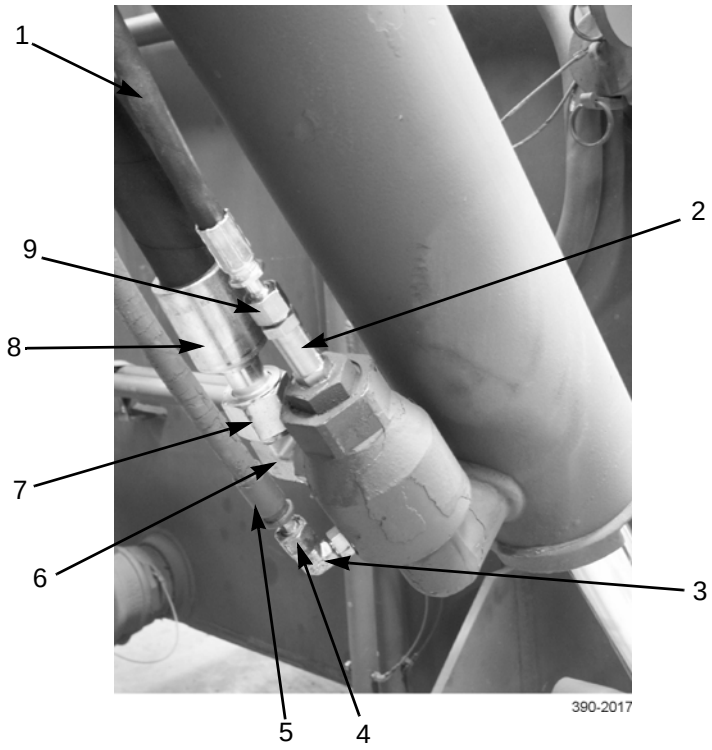
Cap all hoses and openings to prevent fluid loss and contamination of oil system.

NOTE

- Tag all hoses to aid in installation.
- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.
- Dispose of all fluids according to local regulations and mandates.
- Right and left check valves and lift cylinders are replaced the same way. Left-side check valve and lift cylinder is shown.

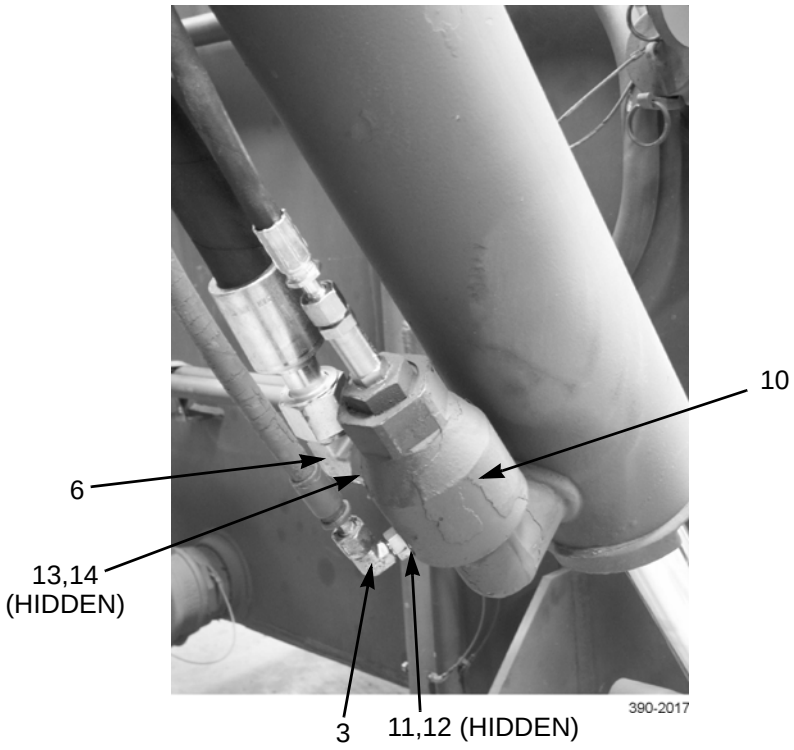
CHECK VALVE REMOVAL

1. Relieve hydraulic pressure by exercising control levers.
2. Disconnect three quick disconnect hoses at draft arm (TM 5 3800-205-10-2).
3. Loosen nut (7) and disconnect hose (8) from swivel adapter (6). Install protective cap.
4. Loosen nut (4) and disconnect hose (5) from elbow fitting (3). Install protective cap.
5. Loosen nut (9) and disconnect hose (1) from check valve (2). Install protective cap.

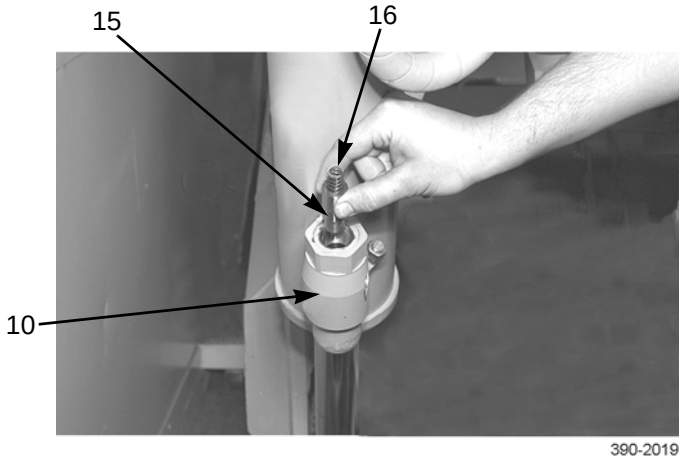


6. Loosen nut (13) and remove swivel adapter (6) and O-ring (14) from check valve housing (10). Discard O-ring.
7. Loosen nut (11) and remove elbow fitting (3) and O-ring (12) from check valve housing (10). Discard O-ring.

CHECK VALVE REMOVAL - CONTINUED

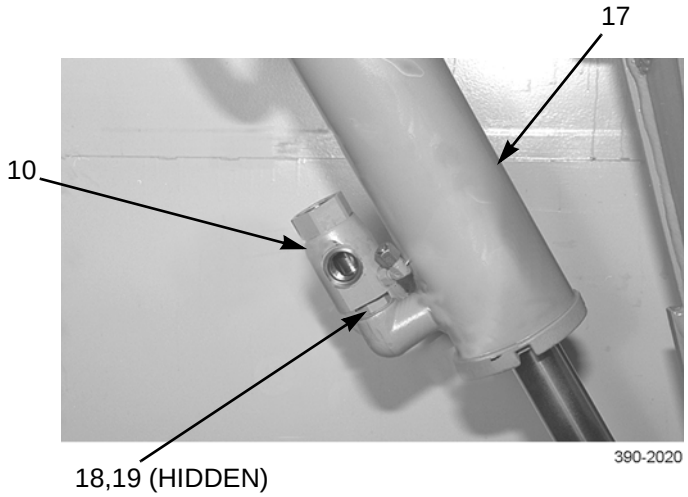


8. Remove spring (16) and check valve (15) from check valve housing (10).



CHECK VALVE REMOVAL - CONTINUED

9. Loosen nut (18) and remove check valve housing (10) and O-ring (19) from lift cylinder (17). Discard O-ring.

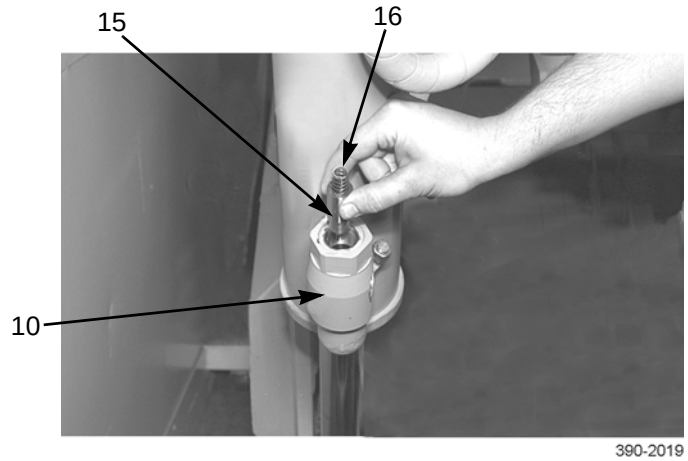


CHECK VALVE INSTALLATION

NOTE

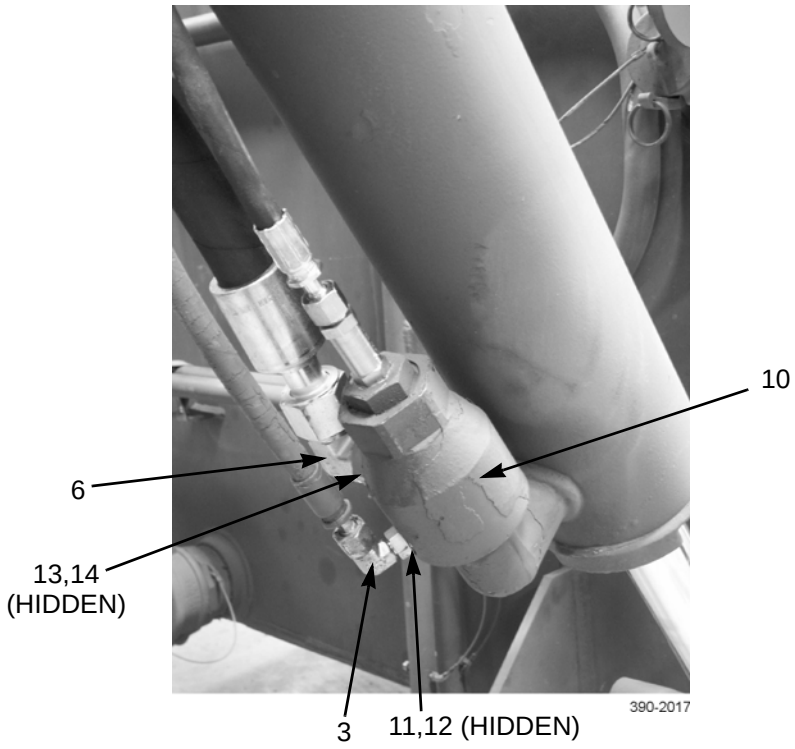
- Clean and inspect all parts prior to installation.
- Lubricate new O-rings with oil prior to installation.

1. Install new O-ring (19) and check valve housing (10) to lift cylinder (17) and tighten nut (18).
2. Install check valve (15) and spring (16) in check valve housing (10).



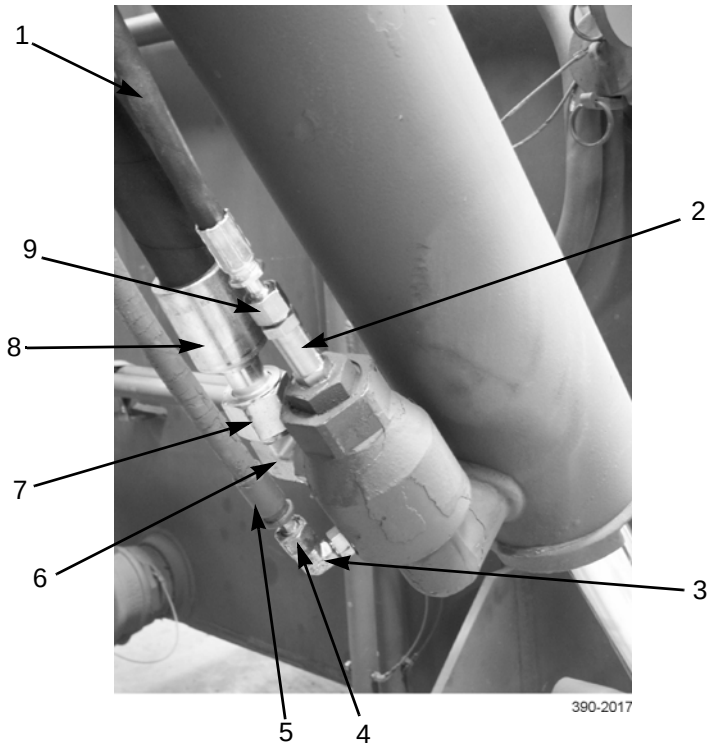
CHECK VALVE INSTALLATION - CONTINUED

3. Install new O-ring (14) and swivel adapter (6) to check valve housing (10) and tighten nut (13).
4. Install new O-ring (12) and elbow fitting (3) to check valve housing (10) and tighten nut (11).



CHECK VALVE INSTALLATION - CONTINUED

5. Remove protective cap, connect hose (1) to check valve (2), and tighten nut (9).
6. Remove protective cap, connect hose (5) to elbow fitting (3), and tighten nut (4).
7. Remove protective cap, connect hose (8) to swivel adapter (6), and tighten nut (7).

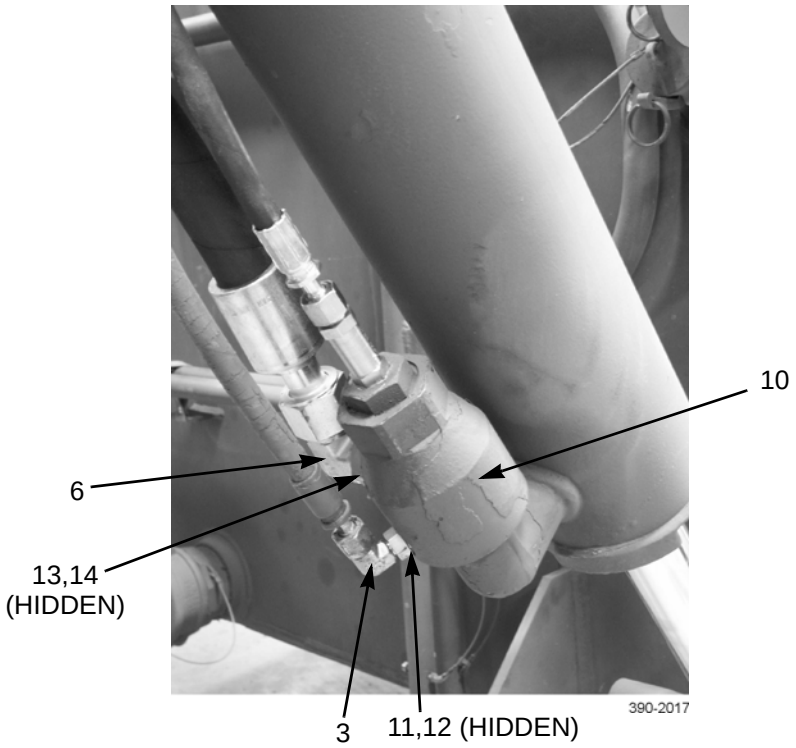


8. Fill hydraulic reservoir with oil (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
9. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
10. Operate lift cylinders (TM 5-3800-205-10-2) and check for leaks and proper operation.

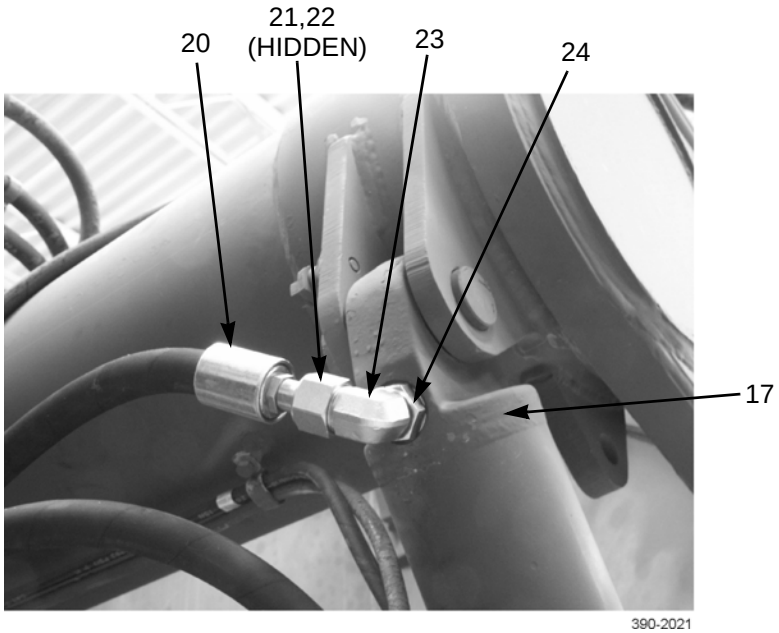
LIFT CYLINDER REMOVAL

1. Relieve hydraulic pressure by exercising control levers.
2. Disconnect three quick disconnect hoses at draft arm (TM 5 3800-205-10-2).
3. Loosen nut (7) and disconnect hose (8) from swivel adapter (6). Install protective cap.
4. Loosen nut (4) and disconnect hose (5) from elbow fitting (3). Install protective cap.
5. Loosen nut (9) and disconnect hose (1) from check valve (2). Install protective cap.
6. Loosen nut (13) and remove swivel adapter (6) and O-ring (14) from check valve housing (10). Discard O-ring.
7. Loosen nut (11) and remove elbow fitting (3) and O-ring (12) from check valve housing (10). Discard O-ring.

LIFT CYLINDER REMOVAL - CONTINUED



8. Loosen nut (21) and disconnect hose (20) from elbow fitting (23). Remove and discard O-ring (22).
9. Loosen nut (24) and remove elbow fitting (23) from lift cylinder (17).



LIFT CYLINDER 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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

NOTE

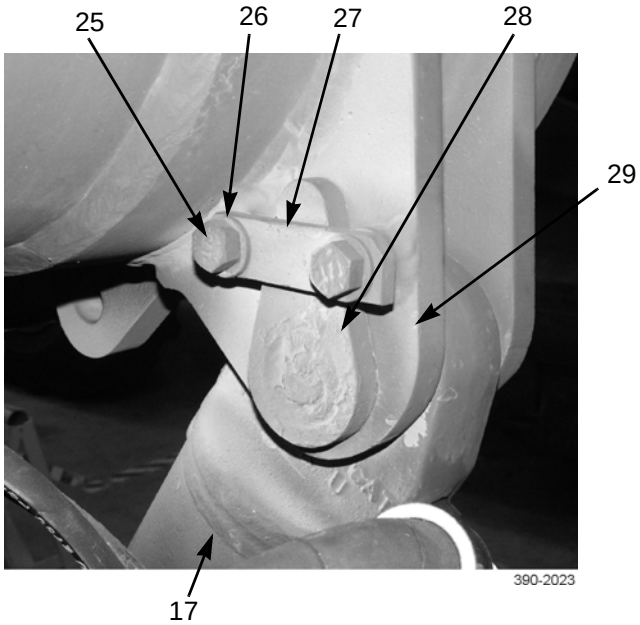
Lift cylinder weighs 128 lb (58 kg).

10. Attach nylon sling to head end of lift cylinder (17) and to a suitable lifting device. Take up slack in sling.

NOTE

Note alignment and position of pin for installation.

11. Remove two bolts (25), washers (26), and retainer bar (27) from draft frame (29).
12. Remove pin (28) from draft frame (29) and head end of lift cylinder (17).



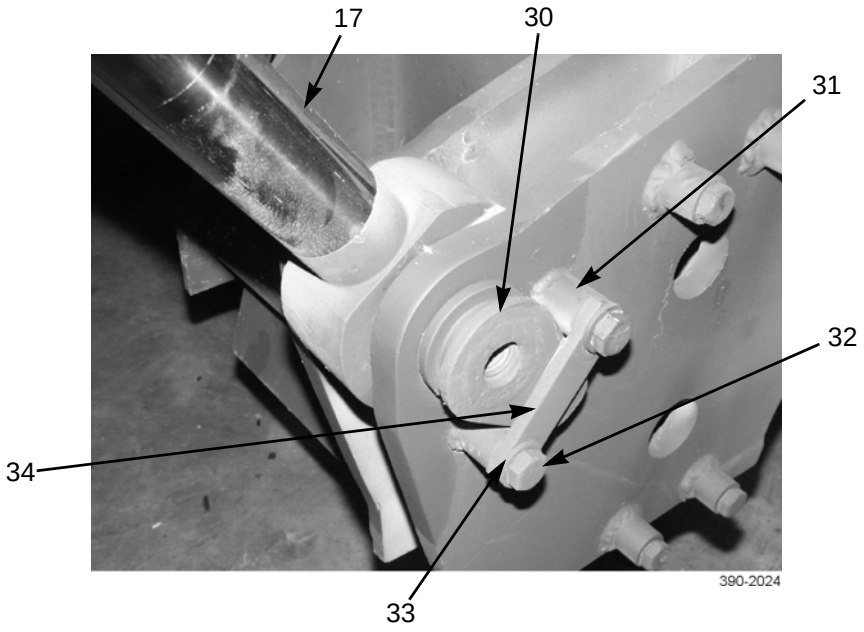
13. Lower lift cylinder (17) onto suitable cribbing.

NOTE

Note alignment and position of pin for installation.

14. Remove two bolts (32), washers (33), and retainer bar (34) from lift cylinder support bracket (31).
15. Remove pin (30) and lift cylinder (17) from machine.

LIFT CYLINDER REMOVAL - CONTINUED



LIFT CYLINDER 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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

NOTE

- Lift cylinder weighs 128 lb (58 kg).
- Clean and inspect all parts prior to installation.

1. Attach nylon sling to lift cylinder (17) and to a suitable lifting device. Take up slack in sling.
2. Position rod end of lift cylinder (17) to machine at lift cylinder support bracket (31).

NOTE

- Clean and lubricate rod end of lift cylinder and pin with antiseize compound before pin is installed.
- Install pin with narrow ear of pin positioned downward and between bolt mounting points.

3. Install pin (30) through lift cylinder support bracket (31) and lift cylinder (17).
4. Install retainer bar (34), two washers (33), and bolts (32). Tighten bolts.

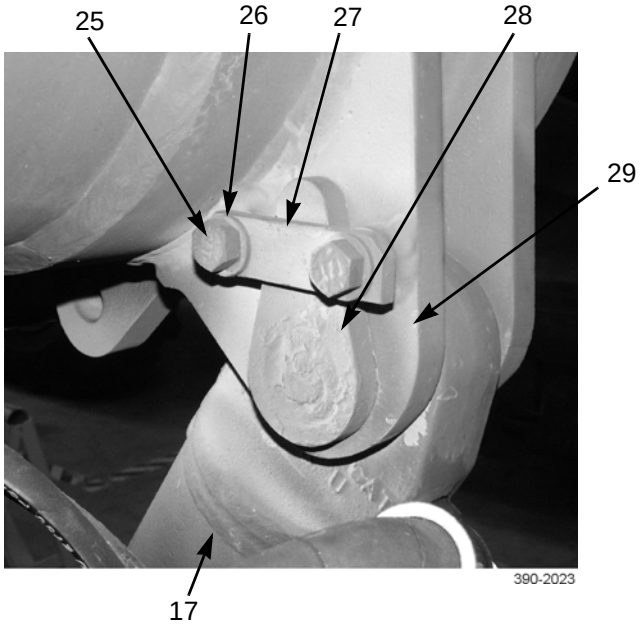
LIFT CYLINDER INSTALLATION - CONTINUED

5. Lower lift cylinder (17) onto suitable cribbing.
6. Move attached nylon sling to head end of lift cylinder (17).

NOTE

- Clean and lubricate head end of lift cylinder and pin with antiseize compound before pin is installed.
- Install pin with narrow ear of pin positioned upward and between bolt mounting points

7. With assistance, raise lift cylinder (17) into position and install pin (28) through head end of lift cylinder and draft frame (29).
8. Install retainer bar (27), two washers (26), and bolts (25). Tighten bolts.
9. Remove nylon sling and lifting device from lift cylinder (17).



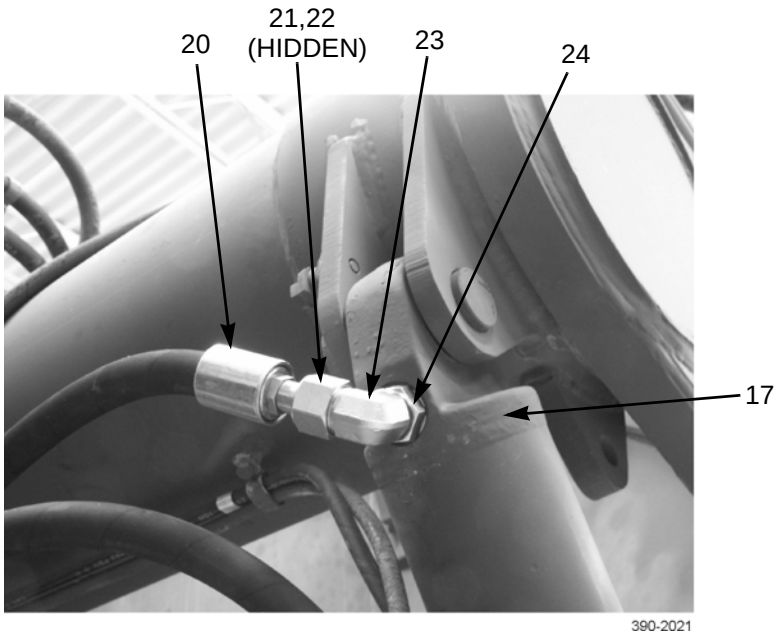
10. Install elbow fitting (23) to lift cylinder (17) and tighten nut (24).

NOTE

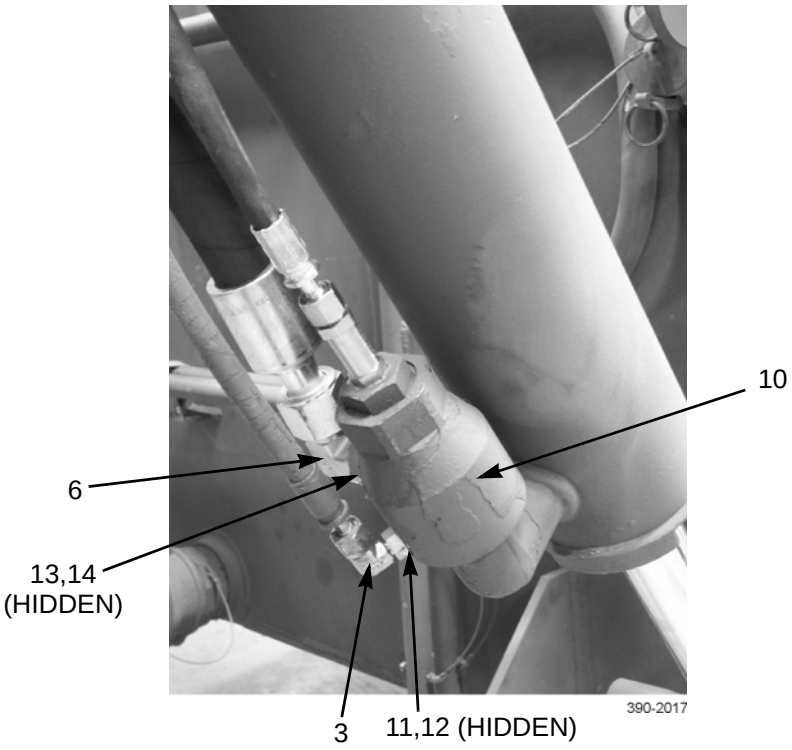
Lubricate new O-rings with oil prior to installation.

11. Install new O-ring (22), connect hose (20) to elbow fitting (23) and tighten nut (21).

LIFT CYLINDER INSTALLATION - CONTINUED

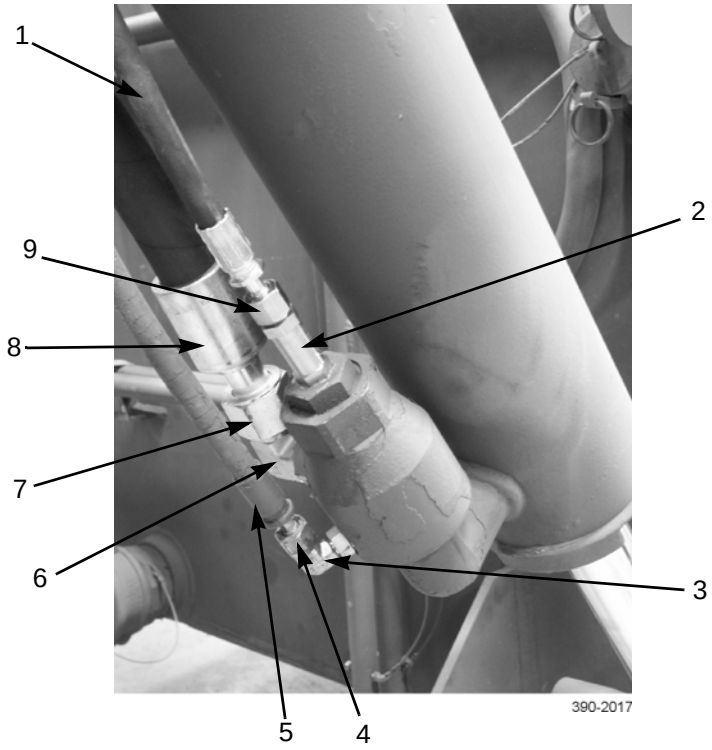


12. Install new O-ring (14) and swivel adapter (6) to check valve housing (10) and tighten nut (13).
13. Install new O-ring (12) and elbow fitting (3) to check valve housing (10) and tighten nut (11).



LIFT CYLINDER INSTALLATION - CONTINUED

14. Remove protective cap, connect hose (1) to check valve (2), and tighten nut (9).
15. Remove protective cap, connect hose (5) to elbow fitting (3), and tighten nut (4).
16. Remove protective cap, connect hose (8) to swivel adapter (6) and tighten nut (7).



17. Fill hydraulic reservoir with oil (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
18. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).
19. Operate lift cylinders (TM 5-3800-205-10-2) and check for leaks and proper operation.

END OF WORK PACKAGE

BUTTERFLY VALVE ASSEMBLY MAINTENANCE 0027 00

THIS WORK PACKAGE COVERS

Actuator Valve: Removal, Installation

Butterfly Valve Assembly: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Tag, marker (Item 39, WP 0044 00)

Tape, antiseizing (Item 40, WP 0044 00)

Washer, lock (4)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Tank drained (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Air tanks drained (TM 5-3800-205-10-2)

Hose reel assembly and mounting plate removed (WP 0030 00)

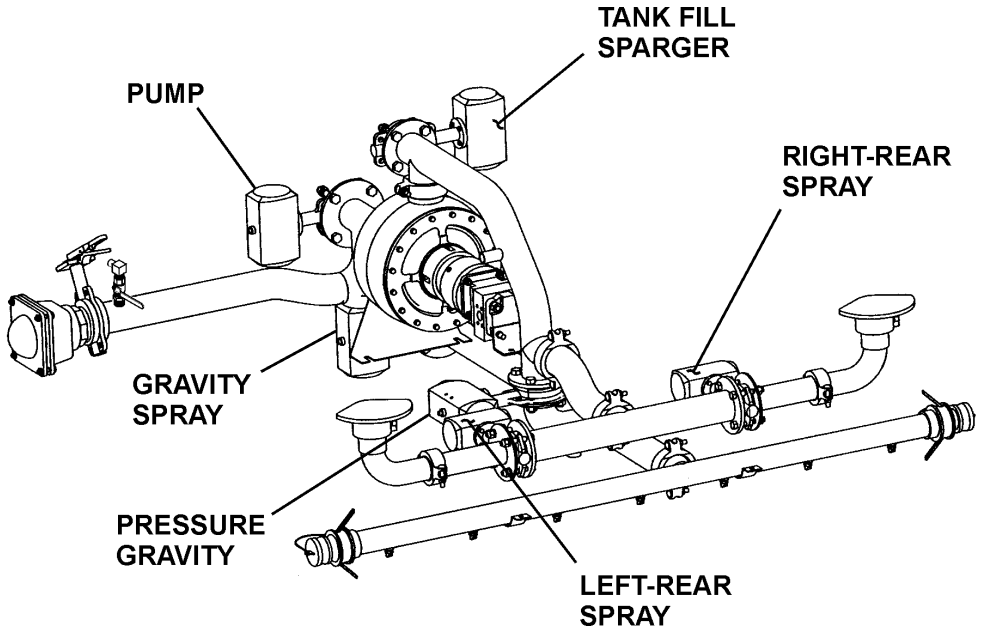
Rear steps removed (WP 0018 00)

WARNING

- Do NOT disconnect any air system lines or fittings unless engine is shut down and air system pressure is relieved. Failure to follow this warning could result in serious injury to personnel.
- Always wear eye protection when disconnected air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

NOTE

- This procedure is used to replace pump, tank fill sparger, pressure gravity, gravity spray, left-rear spray or right-rear spray butterfly valve assembly.
- The location of each valve assembly is illustrated below.



390-1436

ACTUATOR VALVE REMOVAL

NOTE

Right-rear spray actuator valve is shown.

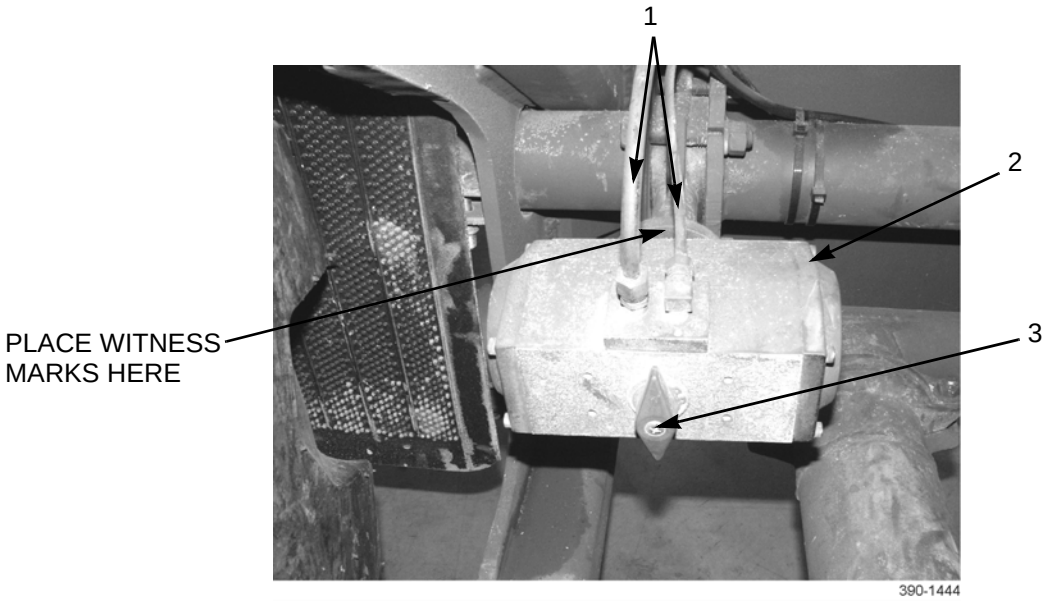
1. Tag and disconnect two air lines (1) from actuator valve (2).

NOTE

Closed position for all valve indicators, except pressure gravity valve indicator, is vertical. Closed position for pressure gravity valve is horizontal.

2. Ensure that valve indicator (3) is in vertical (closed) position.
3. Scribe witness marks on actuator valve (2) and butterfly valve housing to aid in installation.

ACTUATOR VALVE REMOVAL - CONTINUED



NOTE

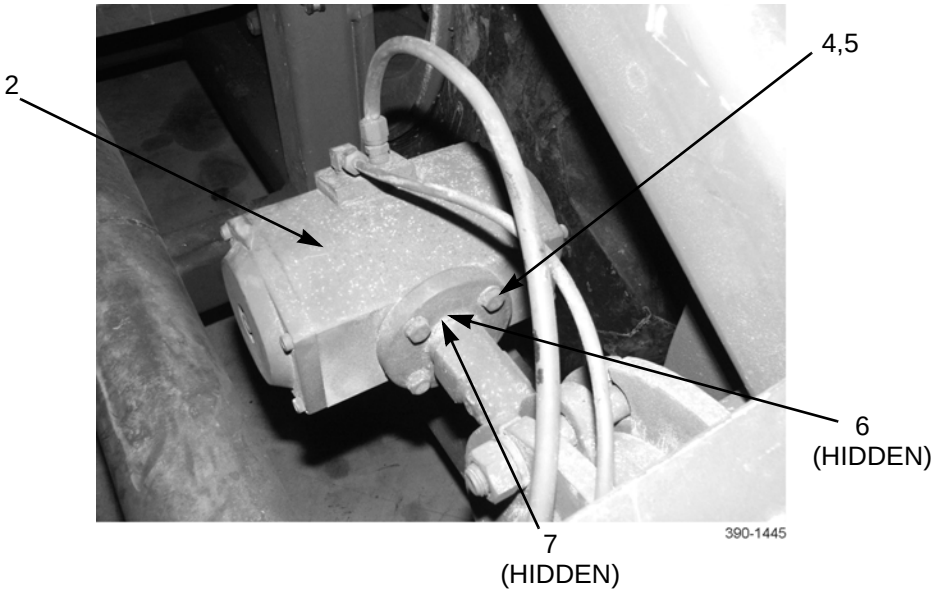
One person should hold actuator valve in place while bolts and lockwashers are removed. Valve will rotate due to spring tension.

4. With assistance, hold actuator valve (2) and remove four bolts (4) and lockwashers (5). Discard lockwashers.
5. Carefully remove actuator valve (2) and sleeve (6) from butterfly valve shaft (7).

NOTE

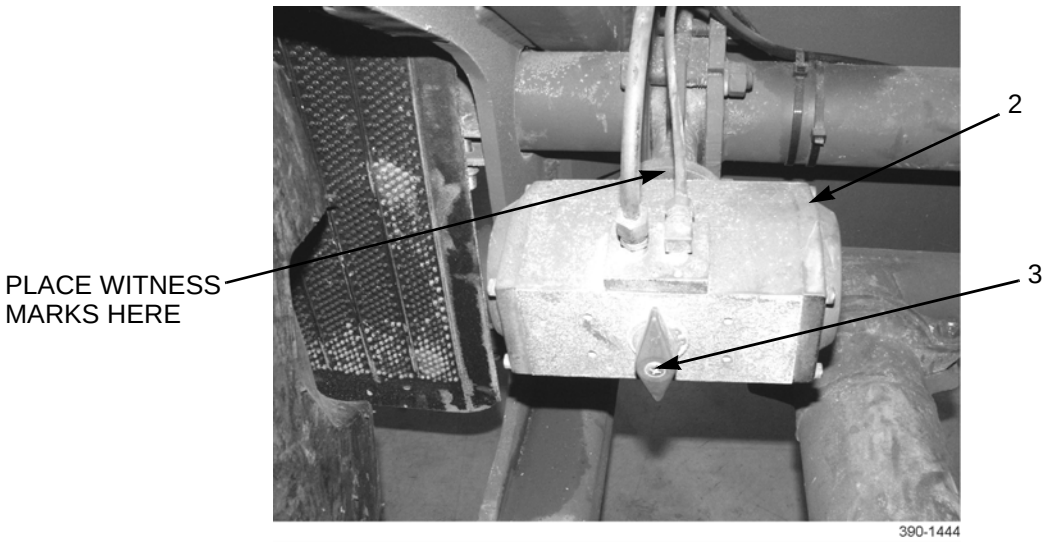
Note position of fittings to aid in installation.

6. Remove fittings from actuator valve (2).



ACTUATOR VALVE INSTALLATION

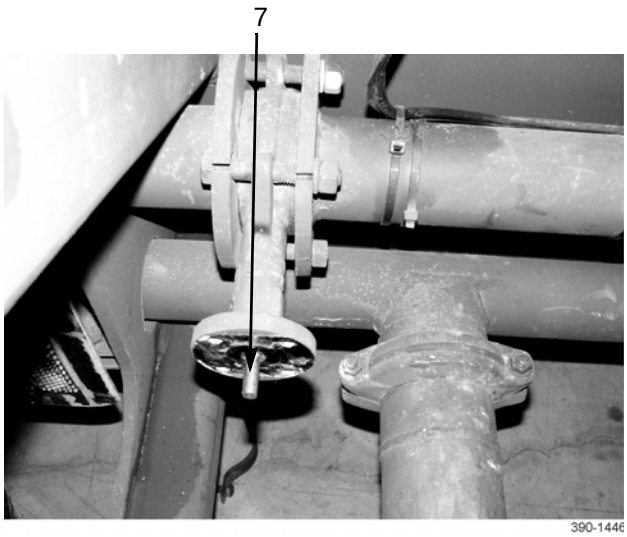
1. Clean threads of fittings and apply new tape.
2. Transfer scribe mark from old actuator valve (2) to new actuator valve.
3. Ensure that valve indicator (3) is in vertical (closed) position.



NOTE

One person should rotate and hold actuator valve in place while bolts and lockwashers are installed. Valve must be rotated to overcome spring tension.

4. Carefully install sleeve (6) and actuator valve (2) on butterfly valve shaft (7).
5. While holding actuator valve (2), install four new lockwashers (5) and bolts (4).
6. Connect two air lines (1) to actuator valve (2) and remove tags.

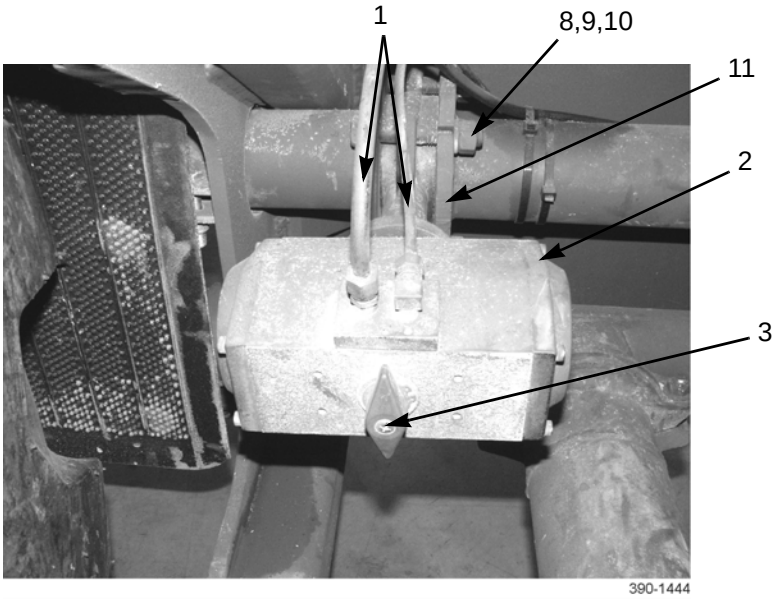


ACTUATOR VALVE INSTALLATION - CONTINUED

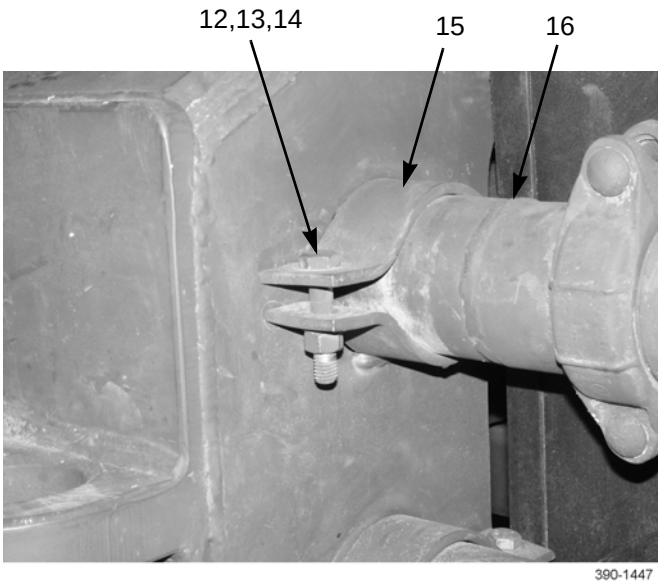
7. Install rear handrails and steps (WP 0017 00).
8. Install hose reel assembly and mounting plate (WP 0030 00).

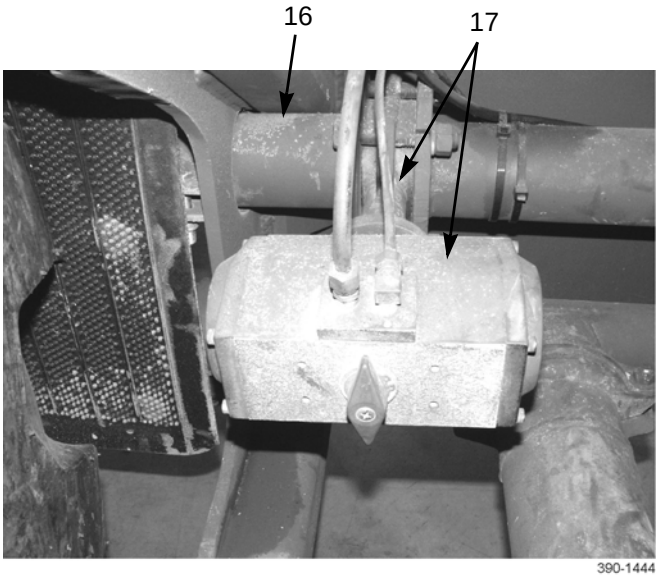
BUTTERFLY VALVE ASSEMBLY REMOVAL

1. Ensure valve indicator (3) is in vertical (closed) position.
2. Tag and disconnect two air lines (1) from actuator valve (2).
3. Remove four nuts (8), lockwashers (9), and bolts (10) from upper spray bar flanges (11). Discard lockwashers.



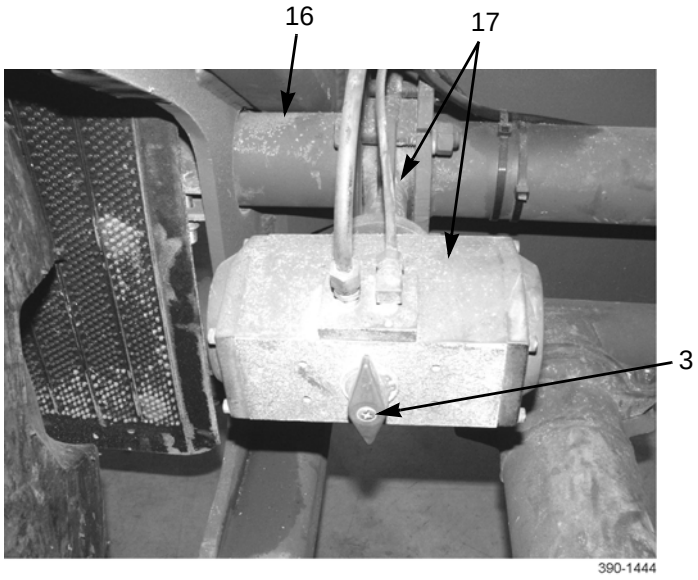
4. Remove two nuts (12), lockwashers (13), bolts (14), and top half of clamp (15) from upper spray bar (16). Discard lockwashers.
5. Remove butterfly valve assembly (17) from upper spray bar (16).





BUTTERFLY VALVE ASSEMBLY INSTALLATION

1. Ensure valve indicator (3) is in vertical (closed) position.
2. Position butterfly valve assembly (17) on upper spray bar (16).

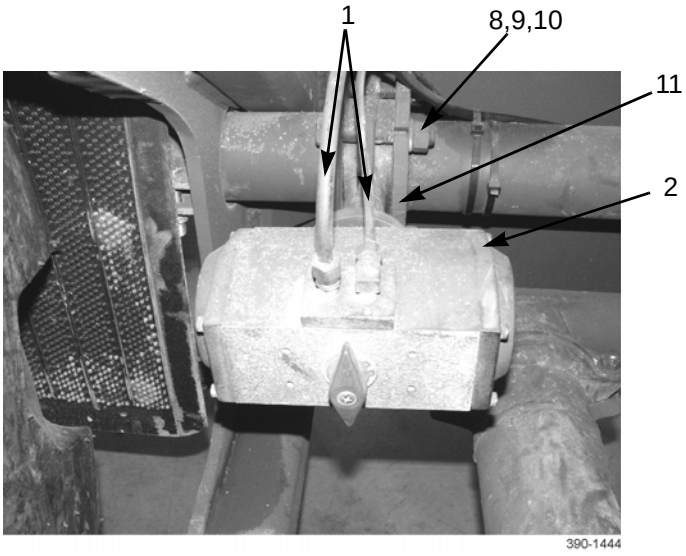


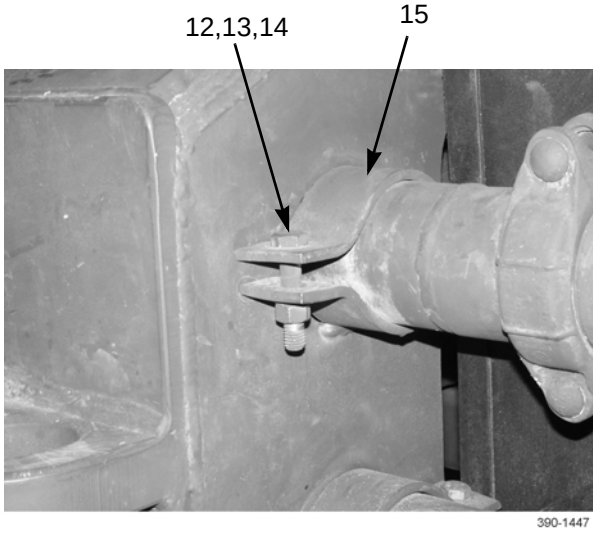
3. Install four bolts (10), new lockwashers (9), and nuts (8) on upper spray bar flanges (11).
4. Install top half of clamp (15) with two bolts (14), new lockwashers (13), and nuts (12).

NOTE

Clean threads of fittings and apply new tape prior to installation.

5. Connect two air lines (1) to actuator valve (2) and remove tags.





BUTTERFLY VALVE ASSEMBLY INSTALLATION - CONTINUED

6. Install rear steps (WP 0018 00).
7. Install hose reel assembly and mounting plate (WP 0030 00).

END OF WORK PACKAGE

UPPER AND LOWER SPRAY BAR REPLACEMENT 0028 00

THIS WORK PACKAGE COVERS

Upper Spray Bar: Removal, Installation

Lower Spray Bar: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Sealing compound, (Item 36, WP 0044 00)

Strap, tiedown (Item 38, WP 0044 00)

Materials/Parts - Continued

Washer, lock (4) (upper spray bar replacement)

Washer, lock (4) (lower spray bar replacement)

Personnel

Two

References

WP 0027 00 (upper spray bar replacement)

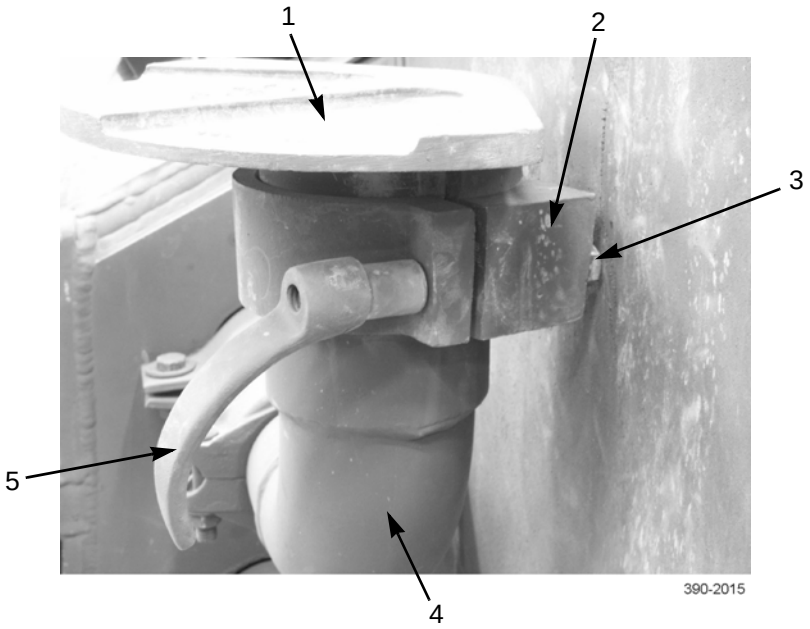
Equipment Condition

Tank drained (TM 5-3800-205-10-2)

Hose reel assembly and mounting plate removed (WP 0030 00)

UPPER SPRAY BAR REMOVAL

1. At each end of upper spray bar, loosen handle (5) from bolt (3), pry clamp loose (2), and remove spray head (1) from elbow (4) as an assembly.



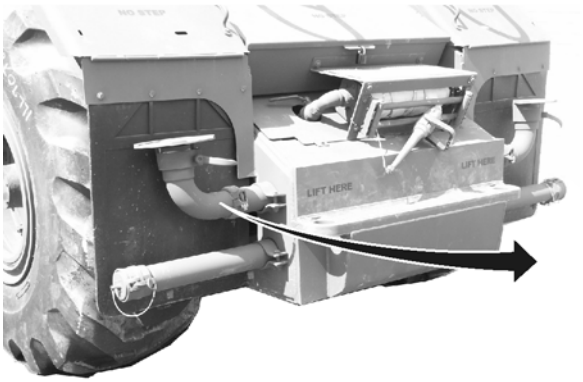
UPPER SPRAY BAR REMOVAL - CONTINUED

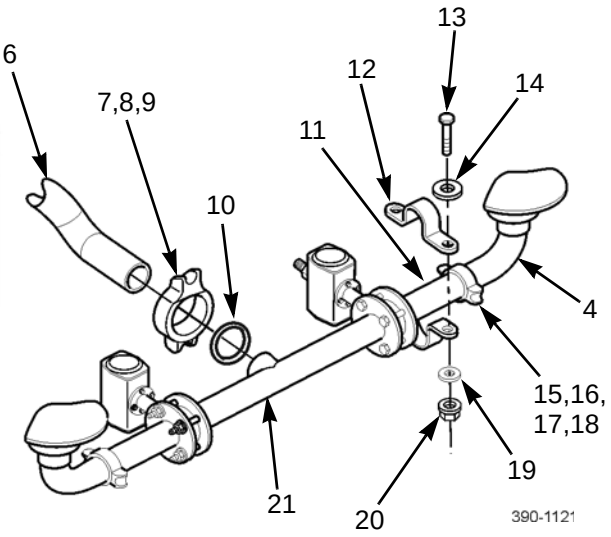
2. At each end, remove two nuts (15), bolts (16), coupling (17), and elbow (4) from flange (11). Remove seal (18) and inspect for dry rot, cracks or tears. Replace seal if damaged.
3. Loosen two nuts (7), bolts (8), and coupling (9) and remove lower pipe (6) from pipe (21).
4. Remove coupling (9) and seal (10). Inspect seal for dry rot, cracks or tears and replace if damaged.
5. At each end, remove two nuts (20), lockwashers (19), bolts (13), flatwashers (14), and clamp (12) from flange (11). Discard lockwashers.
6. Remove tiedown straps securing air hoses to pipe (21), then remove left and right spray butterfly valve assemblies (WP 0027 00). Discard tiedown straps.

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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

7. Remove pipe (21), then flanges (11) from water distributor.
8. Remove drain plug from pipe (21).





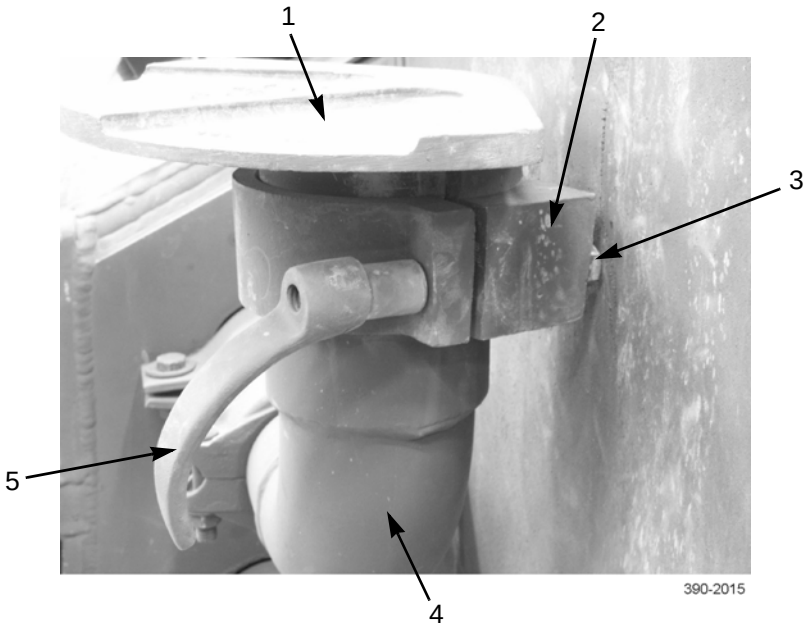
UPPER SPRAY BAR INSTALLATION

1. Apply a thin coat of sealing compound to drain plug and install in pipe (21).

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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

2. Position flanges (11) and clamps (12). Install two bolts (13), flatwashers (14), new lockwashers (19), and nuts (20) to each clamp.
3. Install pipe (21) and position lower pipe (6).
4. Install seal (10) and coupling (9) with two bolts (8) and nuts (7).
5. Install left and right spray butterfly valve assemblies (WP 0027 00). Install new tiedown straps to secure air hoses to pipe (21).
6. Install elbow (4) on each flange (11) with seal (18), coupling (17), two bolts (16), and nuts (15).
7. Position spray head (1), clamp (2), bolt (3), and handle (5) on each elbow (4).
8. Tighten handle (5).
9. Install hose reel assembly and mounting plate (WP 0030 00).
10. Fill tank with water, discharge from upper spray bar, and check for leaks (TM 5-3800-205-10-2).



LOWER SPRAY BAR REMOVAL

NOTE

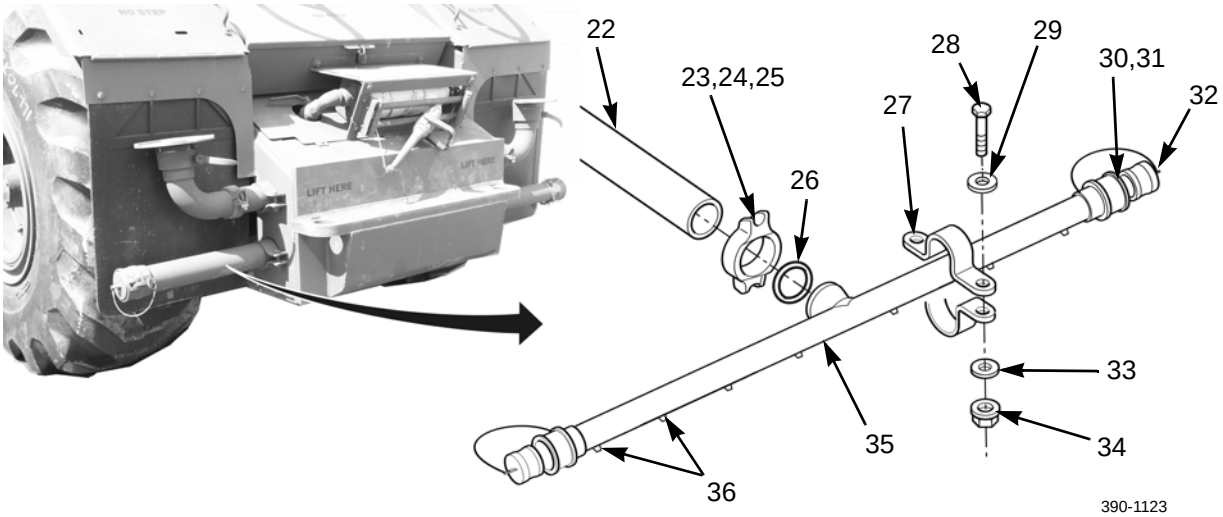
Mark alignment marks for nozzles and lower spray bar to ensure correct alignment on installation.

1. Remove seven nozzles (36) from lower spray bar (35).
2. Unlock camlocks and remove plug (32) from coupling (30) at each end of lower spray bar (35).
3. Remove coupling (30) from each end of lower spray bar (35). Inspect coupling gasket (31) for damage and replace if damaged.
4. Remove two nuts (34), lockwashers (33), bolts (28), flatwashers (29), and clamp (27) from two places on lower spray bar (35). Discard lockwashers.
5. Loosen two nuts (23), bolts (24), and coupling (25) and remove manifold (22) from lower spray bar (35).
6. Remove coupling (25) and seal (26). Inspect seal for dry rot, cracks or tears. Replace seal if damaged.

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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

7. Remove lower spray bar (35) from water distributor.



LOWER SPRAY BAR 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 lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

1. Position lower spray bar (35) on water distributor.
2. Install seal (26) into coupling (25).
3. Position coupling (25) and manifold (22) on lower spray bar (35). Install two bolts (24) and nuts (23) and tighten coupling.
4. Install clamp (27) on two places on lower spray bar (35) with two bolts (28), flatwashers (29), new lockwashers (33), and nuts (34).
5. Apply a thin coat of sealing compound to coupling (30) and install coupling on each end of lower spray bar (35). Ensure gasket (31) is installed inside coupling.
6. Install plug (32) in each coupling (30) and lock camlocks.

NOTE

Ensure alignment marks are aligned on nozzles and lower spray bar when installed.

7. Apply a thin coat of sealing compound to nozzle threads and install seven nozzles (36) on lower spray bar (35).
8. Install hose reel assembly and mounting plate (WP 0030 00).
9. Fill tank with water, discharge water from lower spray bar, and check for leaks (TM 5-3800-205-10-2).

END OF WORK PACKAGE

CONTROL PANEL AND AIR HOSES MAINTENANCE 0029 00

THIS WORK PACKAGE COVERS

Control Panel Assembly: Removal, Installation
Panel Light: Removal, Installation
Panel Light Bulb: Removal, Installation
Work Light Switch: Removal, Installation
Level Indicator: Removal, Installation
Level Indicator Bulb: Removal, Installation
Control Panel Air Valve: Removal, Installation
Control Panel Air Hoses: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Cap set, protetive (Item 5, WP 0044 00)
Strap, tiedown (as required) (Item 38, WP 0044 00)
Tag, marker (Item 39, WP 0044 00)
Tape, antiseizing (Item 40, WP 0044 00)
Wire, nonelectrical (Item 42, WP 0044 00)

Personnel Required

Two

References

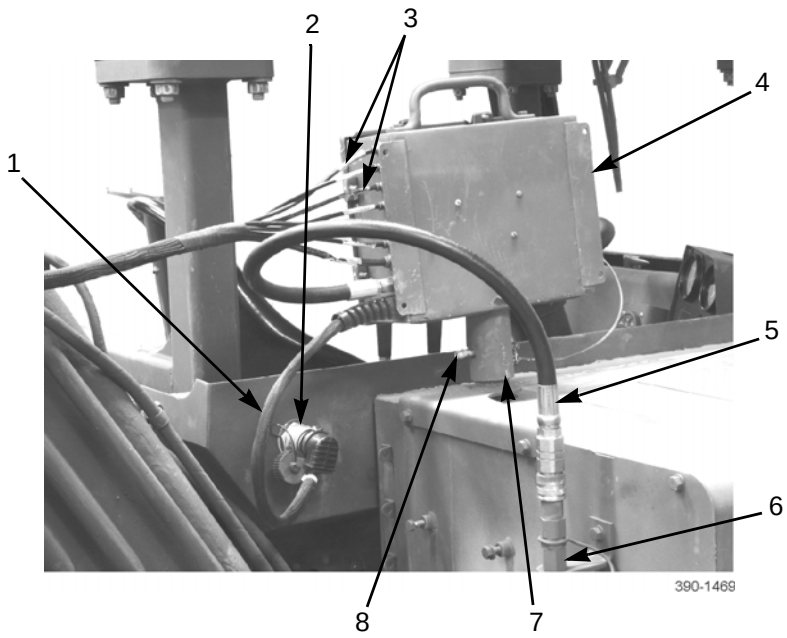
WP 0027 00

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)
Parking brake engaged (TM 5-3800-205-10-2)
Wheels chocked (TM 5-3800-205-10-2)
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)
Air tanks drained (TM 5-3800-205-10-2)
Tank raised and blocked (TM 5-3800-205-10-2)

CONTROL PANEL ASSEMBLY REMOVAL

1. Disconnect electrical cable (1) from receptacle connector (2).



2. Disconnect air hose (5) from air supply (6).
3. Remove pin (8) from mount boss (7) and control panel (4).

NOTE

- Tag air hoses to ensure correct installation.
- To disconnect air hoses from push-in fittings, depress collar against body of fitting and remove air hose.

4. Tag and disconnect seven air hoses (3) from push-in fittings at control panel (4).

CONTROL PANEL ASSEMBLY INSTALLATION

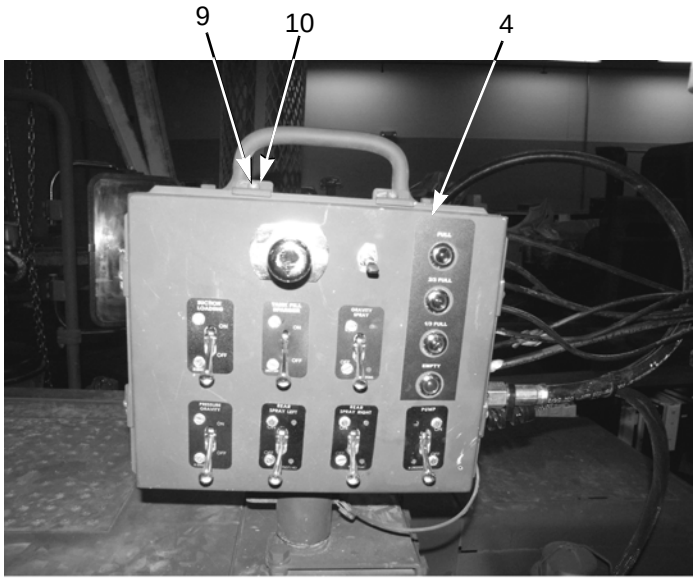
NOTE

To connect air hoses to push-in fittings, insert hose into fitting until it bottoms. Push twice to ensure air hose is inserted past fitting collet and O-ring. Pull on hose to confirm connection is secure.

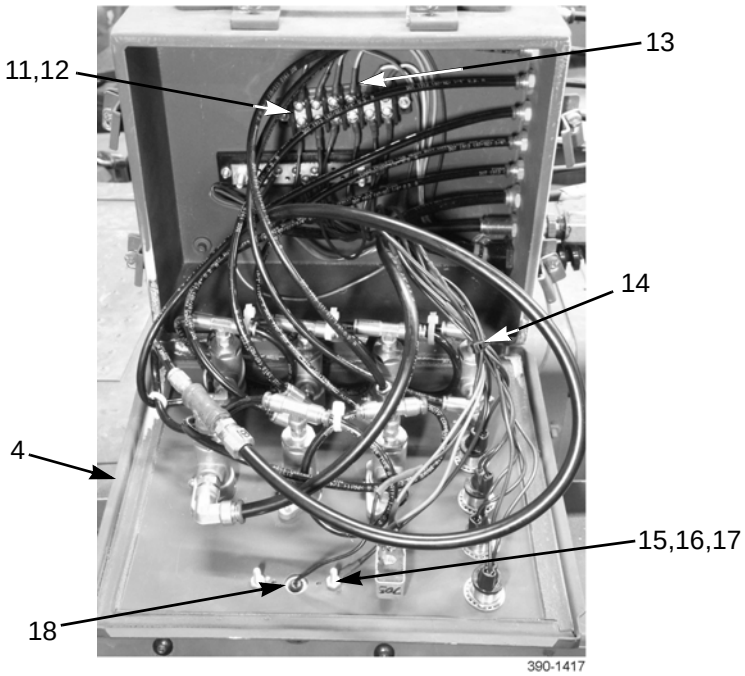
1. Connect seven air hoses (3) to push-in fittings at control panel (4). Remove tags.
2. Position control panel (4) in mount boss (8) and install pin (7).
3. Connect air hose (5) to air supply (6).
4. Connect electrical cable (1) to receptacle connector (2).

PANEL LIGHT REMOVAL

1. Loosen but do not remove six screws (9) and panel locks (10).
2. Open panel (4).

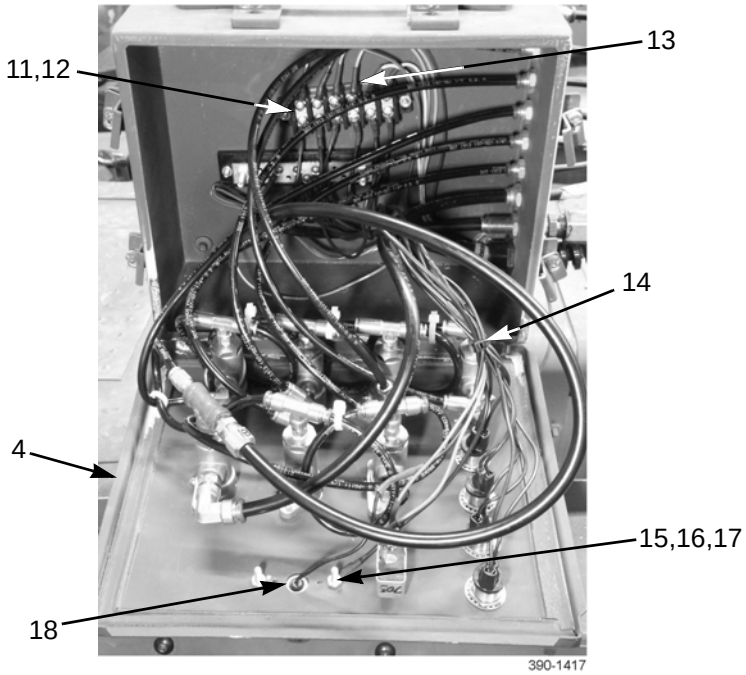


3. Remove screw (11) and lead (12) from terminal strip (13).
4. Cut tiedown strap (14) and discard.
5. Remove two nuts (15), screws (16), and ground lead (17).
6. Remove light assembly (18) from panel (4).

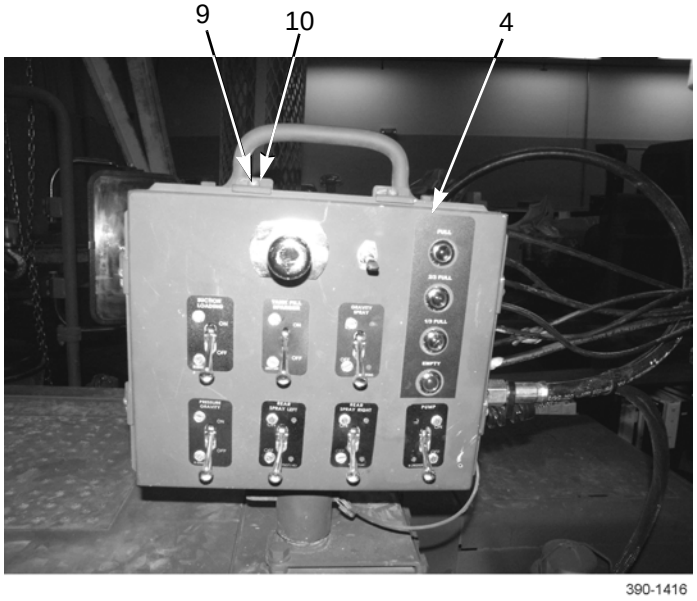


PANEL LIGHT INSTALLATION

1. Position light assembly (18) on panel (4).
2. Install two nuts (15), screws (16), and ground lead (17).
3. Install screw (11) and lead (12) on terminal strip (13).
4. Install new tiedown strap (14).

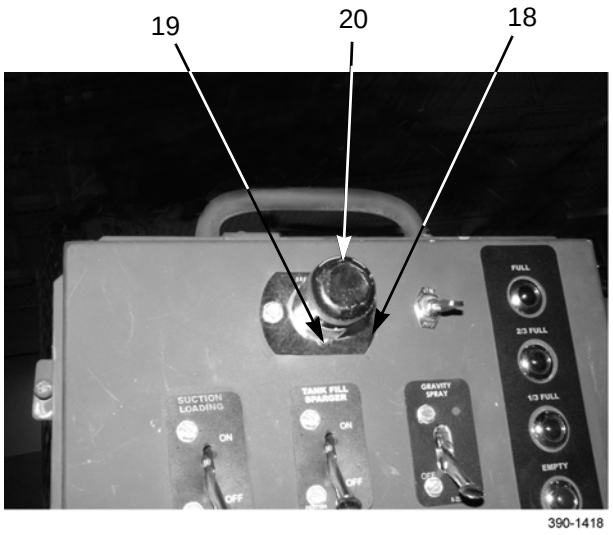


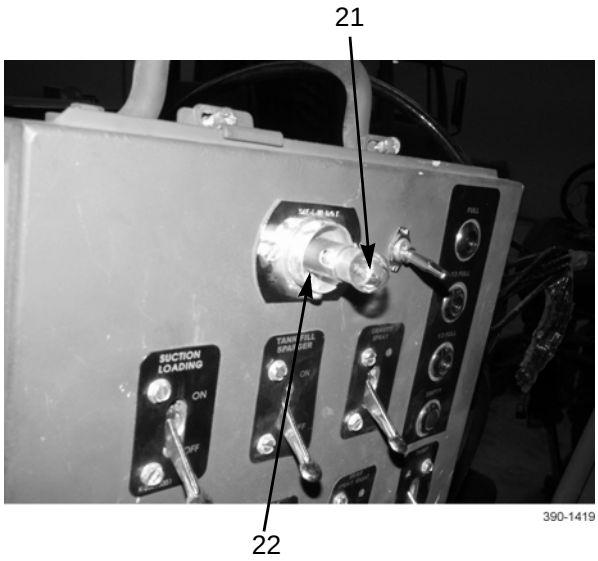
5. Close panel (4).
6. Tighten six screws (9) and panel locks (10).



PANEL LIGHT BULB REMOVAL

1. Loosen but do not remove screw (19).
2. Remove cover (20) from light assembly (18).
3. Remove bulb (21) from socket (22). Discard bulb.



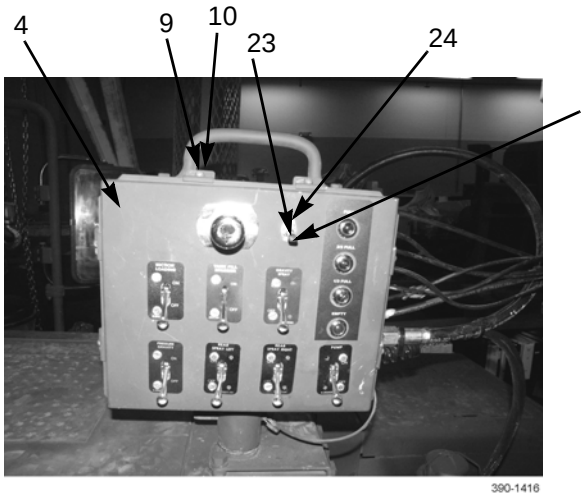


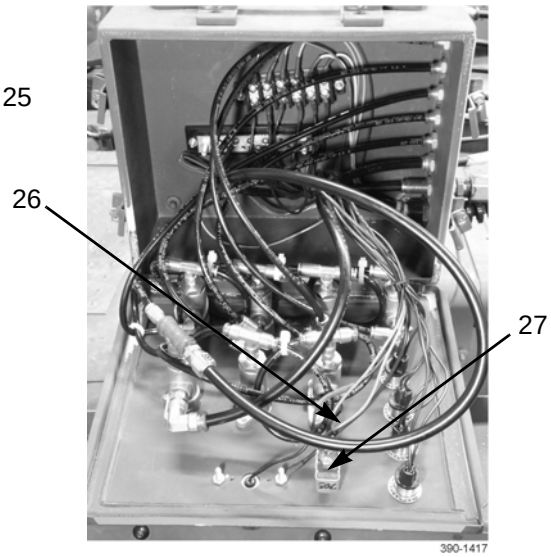
PANEL LIGHT BULB INSTALLATION

1. Install new bulb (21) in socket (22).
2. Install cover (20) on light assembly (18).
3. Tighten screw (19).

WORK LIGHT SWITCH REMOVAL

1. Loosen but do not remove six screws (9) and panel locks (10).
2. Open panel (4).
3. Tag wires (26).
4. Disconnect wires (26) from switch terminals (27).
5. Remove nut (23), ON/OFF face plate (24), and switch (25) from panel (4).





WORK LIGHT SWITCH INSTALLATION

1. Position switch (25) on panel (4).

NOTE

ON/OFF face plate is installed with word ON facing up.

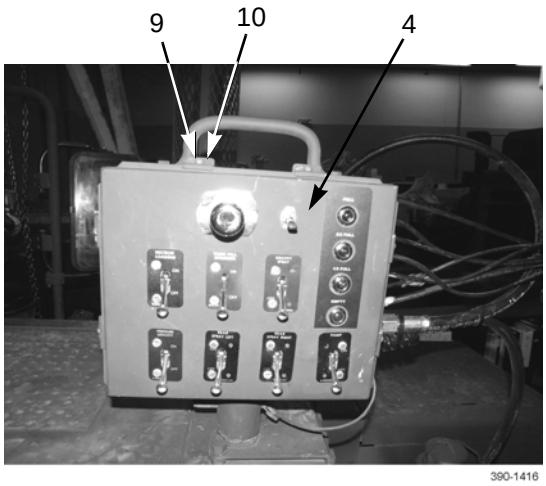
2. Install ON/OFF face plate (24) and nut (23) on switch (25).
3. Connect wires (26) to switch terminals (27).
4. Remove tags from wires (26).
5. Close panel (4).
6. Tighten six screws (9) and panel locks (10).

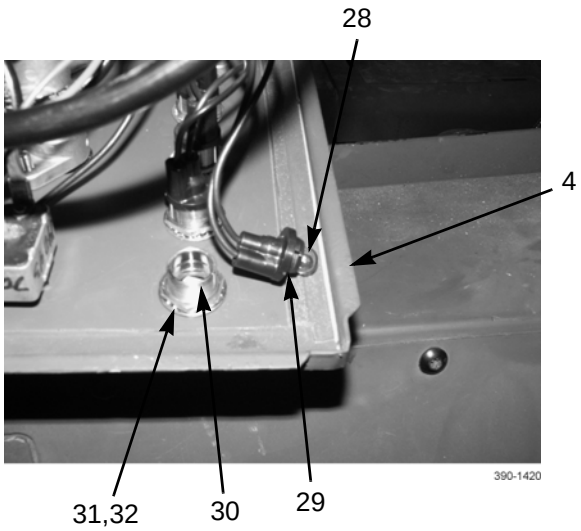
LEVEL INDICATOR REMOVAL

NOTE

The following steps are to be used for all four level indicators. FULL indicator is shown.

1. Loosen but do not remove six screws (9) and panel locks (10).
2. Open panel (4).
3. Remove socket (29) and bulb (28) from indicator (30).
4. Remove nut (31), starwasher (32), and indicator (30) from panel (4).





LEVEL INDICATOR INSTALLATION

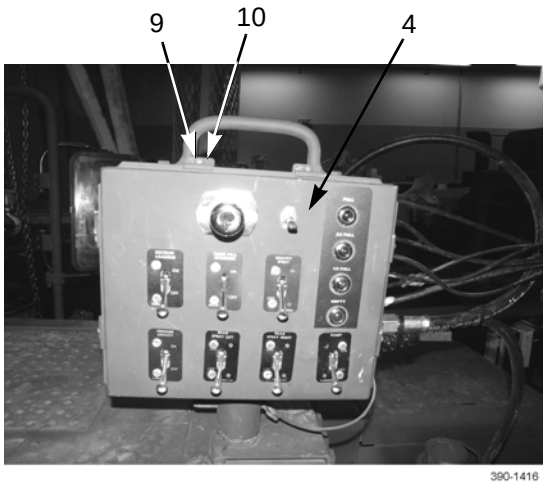
1. Position indicator (30) on panel (4).
2. Install starwasher (32) and nut (31) on indicator (30).
3. Install bulb (28) and socket (29) in indicator (30).
4. Close panel (4).
5. Tighten six screws (9) and panel locks (10).

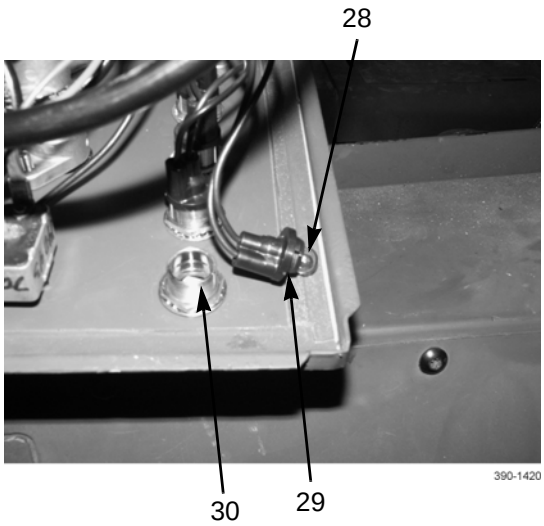
LEVEL INDICATOR BULB REMOVAL

NOTE

The following steps are to be used for all four level indicators. FULL indicator is shown.

1. Loosen but do not remove six screws (9) and panel locks (10).
2. Open panel (4).
3. Pull socket (29) and bulb (28) from indicator (30).
4. Remove bulb (28) from socket (29). Discard bulb.





LEVEL INDICATOR BULB INSTALLATION

1. Install new bulb (28) in socket (29).
2. Install bulb (28) and socket (29) in indicator (30).
3. Close panel (4).
4. Tighten six screws (9) and panel locks (10).

CONTROL PANEL AIR VALVE REMOVAL

NOTE

The following steps are to be used for all control panel air valves. SUCTION LOADING is shown.

1. Loosen but do not remove six screws (9) and panel locks (10).
2. Open panel (4).

NOTE

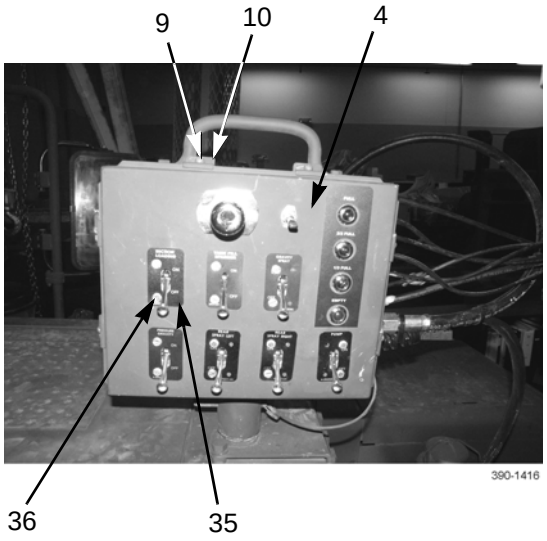
Cut tiedown straps as required and discard.

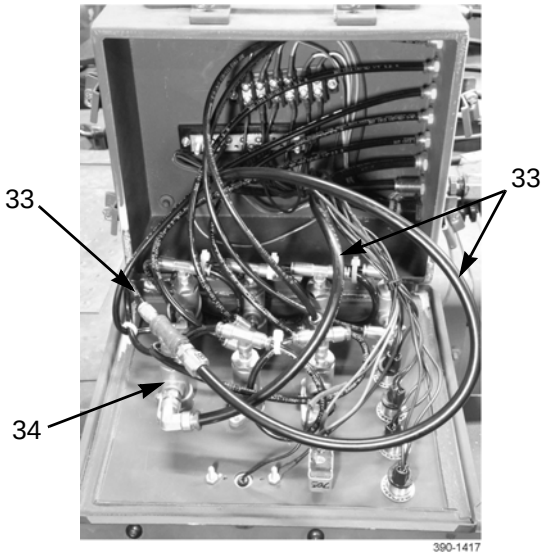
3. Tag and disconnect air lines (33) from valve (34).
4. Remove two screws (36) and faceplate (35) from front of panel (4).
5. Remove valve (34) from rear of panel (4).

NOTE

Note position of all fittings to ensure correct installation.

6. Remove any tees, reducers, adapters etc. from old valve (34).





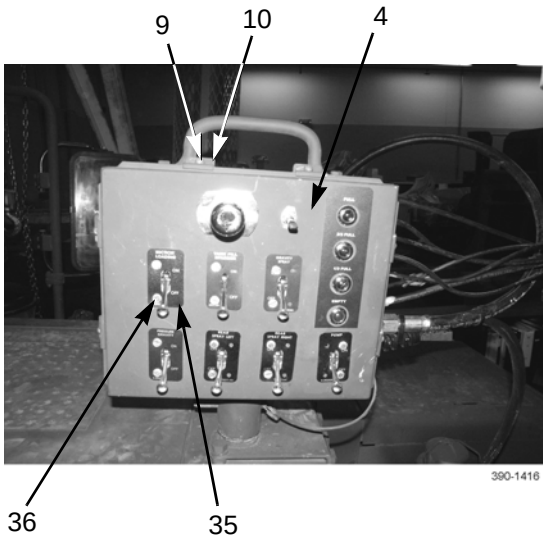
CONTROL PANEL AIR VALVE INSTALLATION

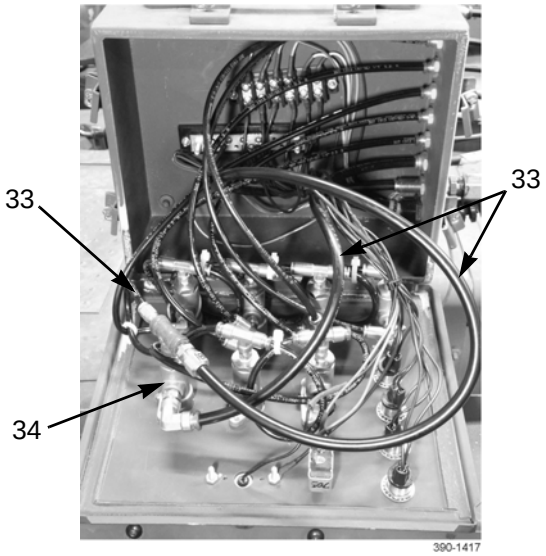
1. Clean threads of all fittings. Apply antiseizing tape to male threads of fittings and new valve (34).
2. Install prepared tees, reducers, adapters etc. on new valve (34).
3. Position valve (34) through rear of panel (4).
4. Install faceplate (35) and two screws (26) on front of panel (4).
5. Connect air lines (33) to valve (34). Remove tags.

NOTE

Install new tiedown straps as required.

6. Close panel (4).
7. Tighten six screws (9) and panel locks (10).



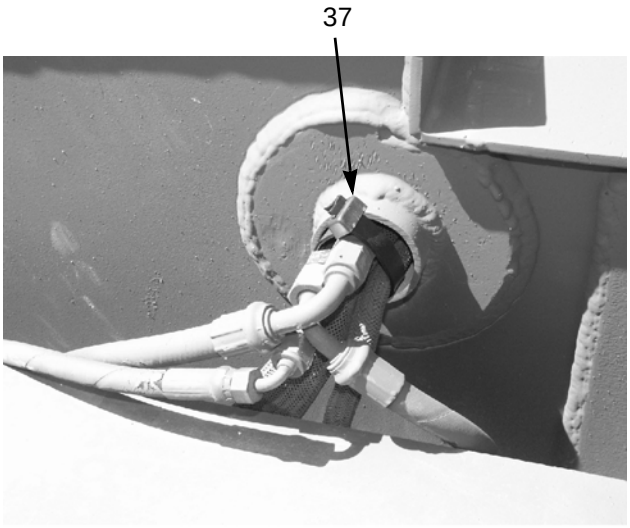


CONTROL PANEL AIR HOSES REMOVAL

NOTE

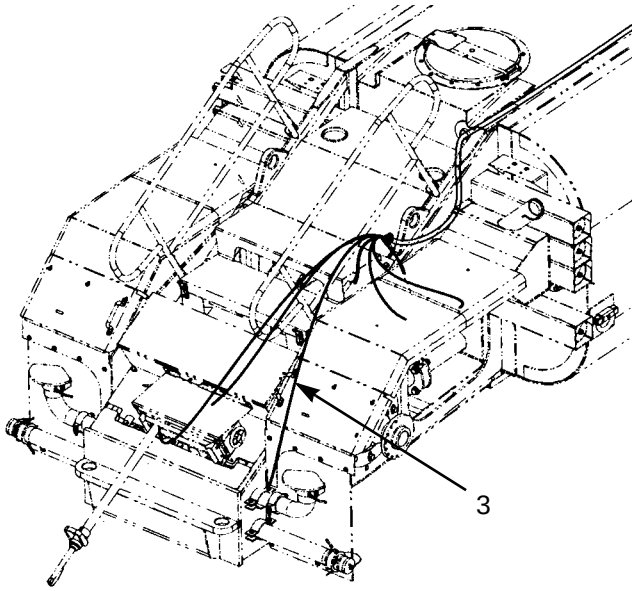
The control panel air hoses are replaced as a bundle. The bundle contains seven air hoses that are wrapped in a protective loom.

1. Cut and discard tie strap (37) at rear of water tank.



390-2069

2. Disconnect seven air hoses (3) from butterfly valves (WP 0027 00).



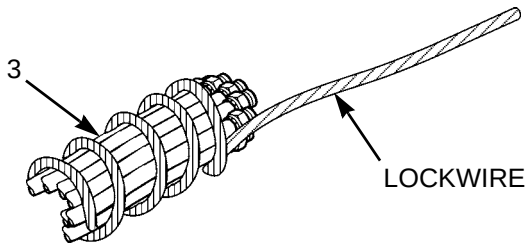
390-2074

CONTROL PANEL AIR HOSES REMOVAL - CONTINUED

NOTE

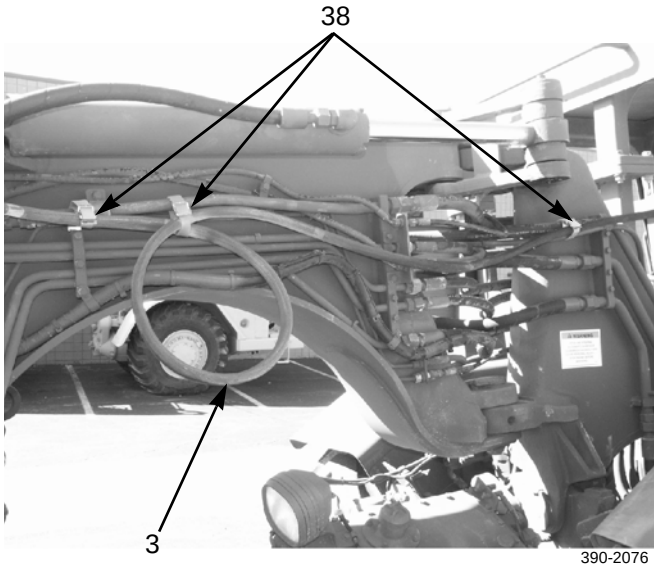
Securely attach lockwire to ends of seven air hoses at rear of water tank before removing them as a bundle. After seven air hoses are removed, lockwire remains inside conduit. Prior to installation, lockwire is attached to seven air hoses and lockwire is pulled from rear of water tank to aid in installation.

3. Position seven air hoses (3) on top of machine and securely attach lockwire to seven air hoses.



390-2075

4. Remove three straps (38) from bundle of seven air hoses (3).



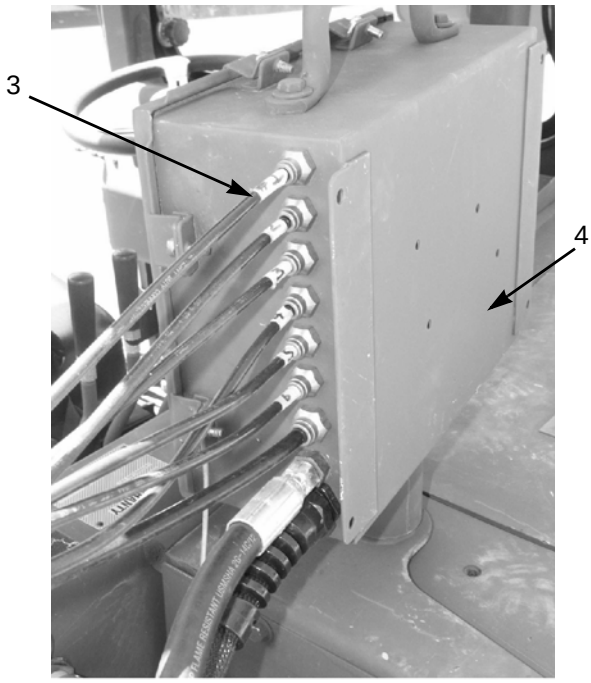
390-2076

CONTROL PANEL AIR HOSES REMOVAL - CONTINUED

NOTE

To disconnect each air hose from push-in fitting, depress collar against body of fitting and remove air hose.

5. Disconnect seven air hoses (3) from control panel (4).

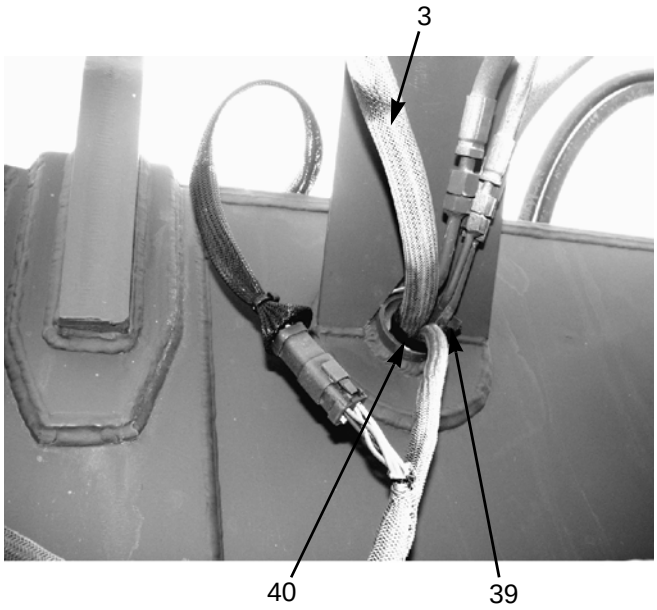


390-2077

6. Cut and discard tie strap (39) at front of water tank.

NOTE

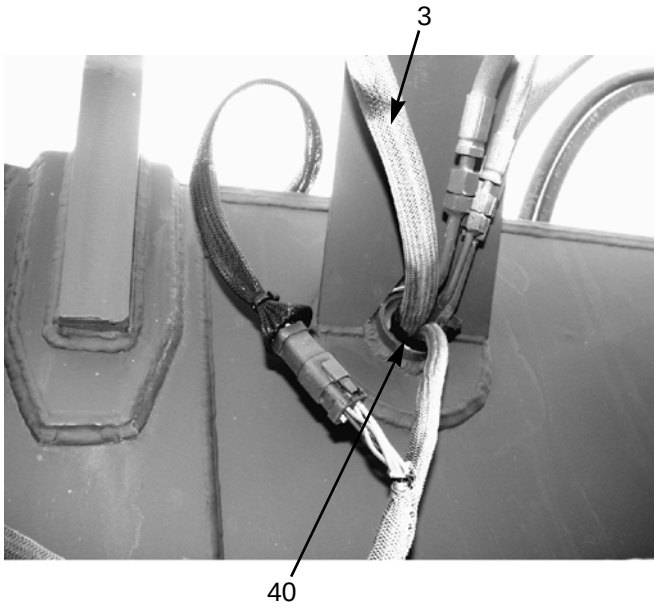
- While removing bundle of seven air hoses from conduit at front of water tank, have an assistant feed lockwire through conduit at rear of water tank.
- Cap hoses before removing.
- Lubricating hoses with detergent may ease removal.



7. From front of water tank, remove bundle of seven air hoses (3) from conduit (40) until lockwire exits conduit.
8. Disconnect seven air hoses (3) from lockwire leaving lockwire inside conduit (40).

CONTROL PANEL AIR HOSES INSTALLATION

1. Securely connect seven air hoses (3) to lockwire that is inside conduit (40).



NOTE

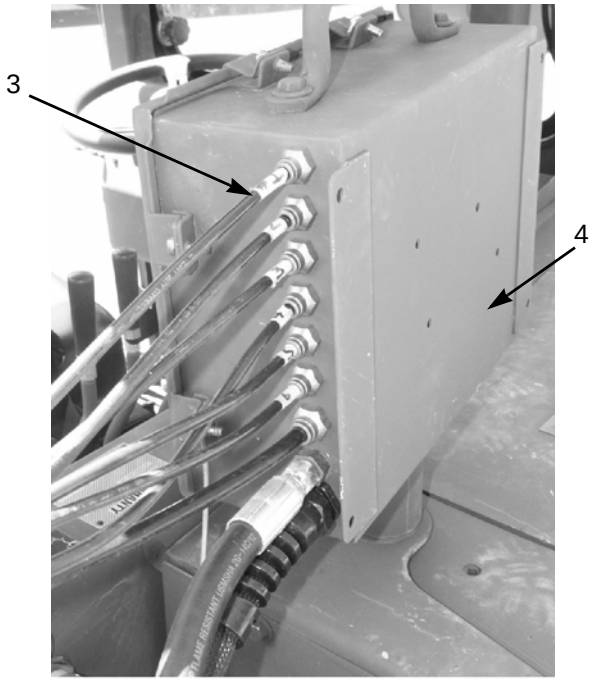
- To install bundle of seven air hoses, feed bundle through conduit from front of water tank while an assistant pulls lockwire from rear of water tank.
- Cap hoses before installing.
- Lubricating hoses with detergent may ease installation.

2. Install bundle of seven air hoses (3) in conduit (40).

NOTE

To connect each air hose to push-in fitting, insert air hose into fitting until it bottoms. Push twice to ensure air hose is inserted past fitting collet and O-ring. Pull on air hose to confirm connection is secure.

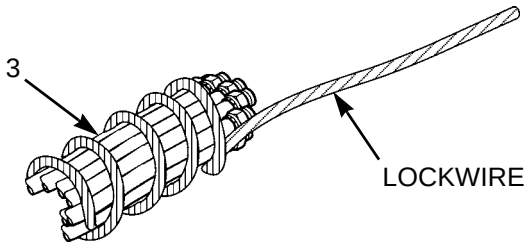
3. Connect seven air hoses (3) to control panel (4).



390-2077

CONTROL PANEL AIR HOSES INSTALLATION - CONTINUED

4. Remove lockwire from seven hoses (3) at rear of water tank.

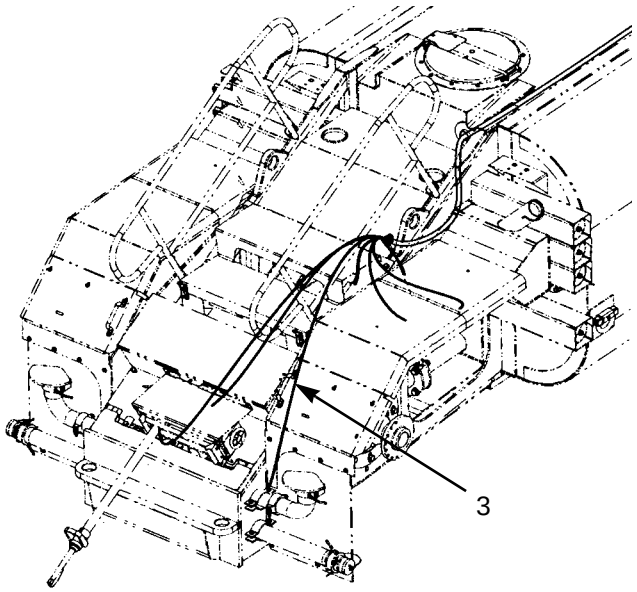


390-2075

NOTE

To determine connection point of each air hose, have an assistant operate switches of control panel one-at-a-time while you observe air being released from corresponding air hose at rear of machine.

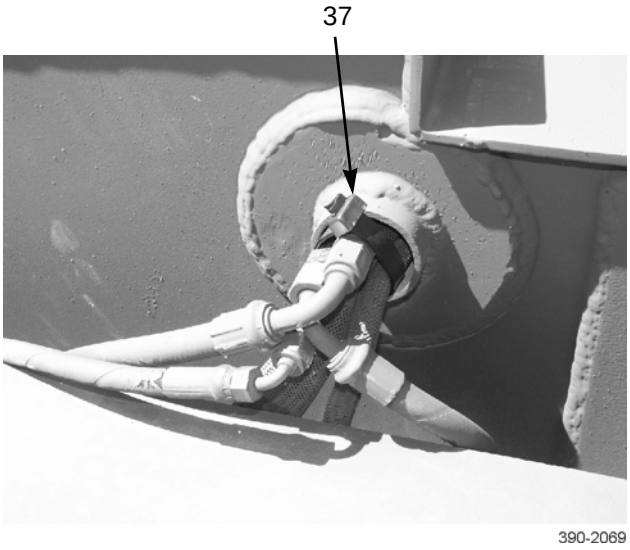
5. Install seven air hoses (3) to butterfly valves (WP 0027 00).



390-2074

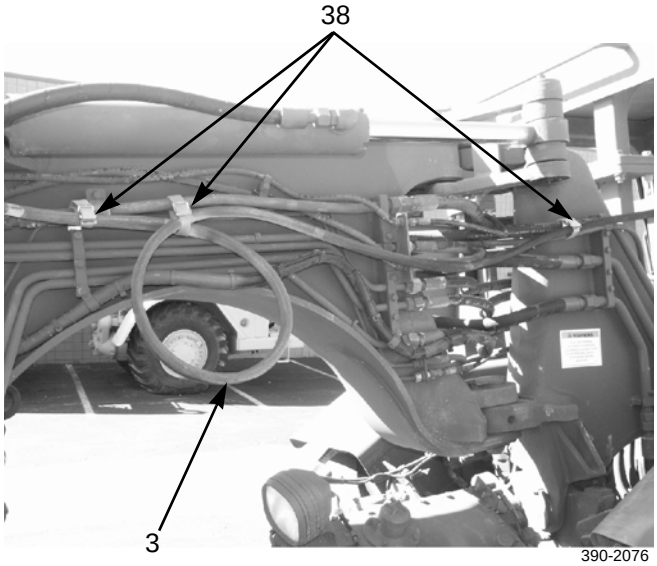
CONTROL PANEL AIR HOSES INSTALLATION - CONTINUED

6. Install new tie strap (37) at rear of water tank.



390-2069

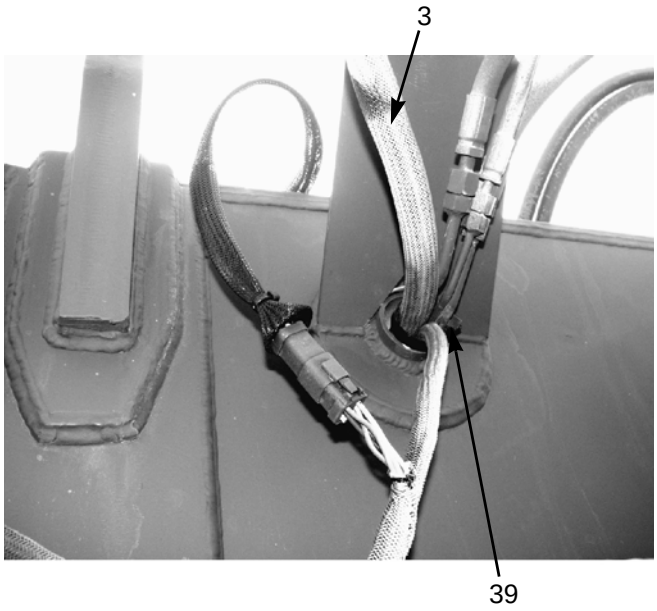
7. Install three straps (38) on bundle of seven air hoses (3).



390-2076

CONTROL PANEL AIR HOSES INSTALLATION - CONTINUED

8. Install new tie strap (39) at front of water tank.



9. Place battery disconnect switch in ON position (TM 5-3800-205-10-2).

WARNING

If machine is parked indoors, DO NOT run engine unless exhaust fumes are vented to the outside. Failure to follow this warning may cause injury or death due to carbon monoxide poisoning.

10. Start engine (TM 5-3800-205-10-2) and check for air leaks.
11. Remove blocks and lower tank (TM 5-3800-205-10-2).

END OF WORK PACKAGE

HOSE REEL ASSEMBLY MAINTENANCE 0030 00

THIS WORK PACKAGE COVERS

Auxiliary Hose: Removal, Disassembly, Assembly, Installation

Hose Reel Fairlead: Removal, Installation

Hose Reel: Removal, Installation

Hose Reel Assembly and Mounting Plate: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Sling, nylon (Item 27, WP 0045 00)

Materials/Parts

Grease, GAA (Item 16, WP 0044 00)

Materials/Parts - Continued

Sealing compound (Item 36, WP 0044 00)

Seal, O-ring (as required)

Washer, lock (as required)

Personnel Required

Two

Equipment Condition

Tank drained (TM 5-3800-205-10-2)

Toolbox removed (WP 0019 00)

WARNING

NEVER drink water contained in water distributor tank. Water contained or dispensed from tank is NON-POTABLE. Drinking non-potable water could result in illness or death.

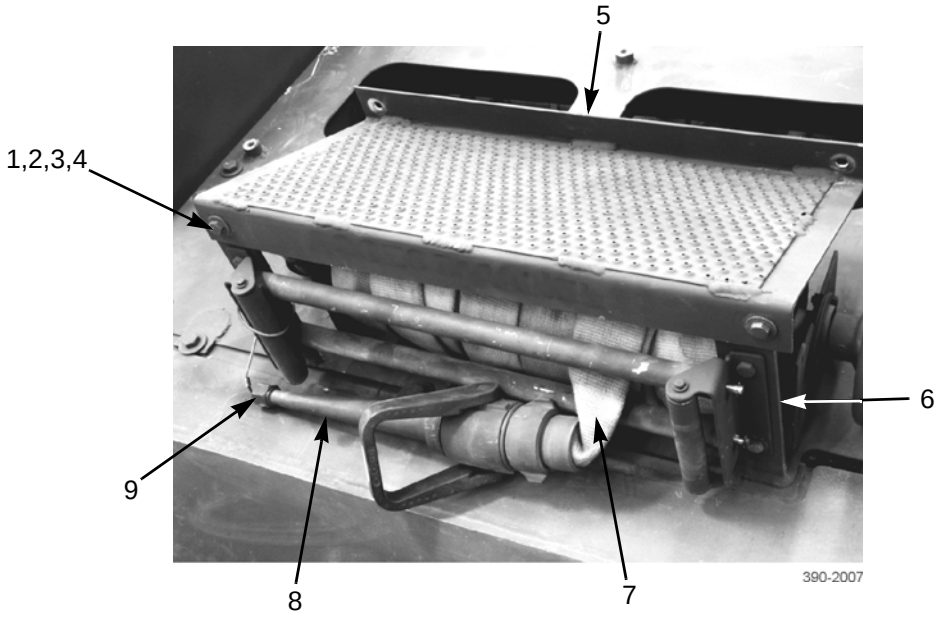
NOTE

Although hose reel maintenance is performed after water tank has been drained, there may be residual water in lines. Ensure all spills are captured in suitable containers and all spills are cleaned up.

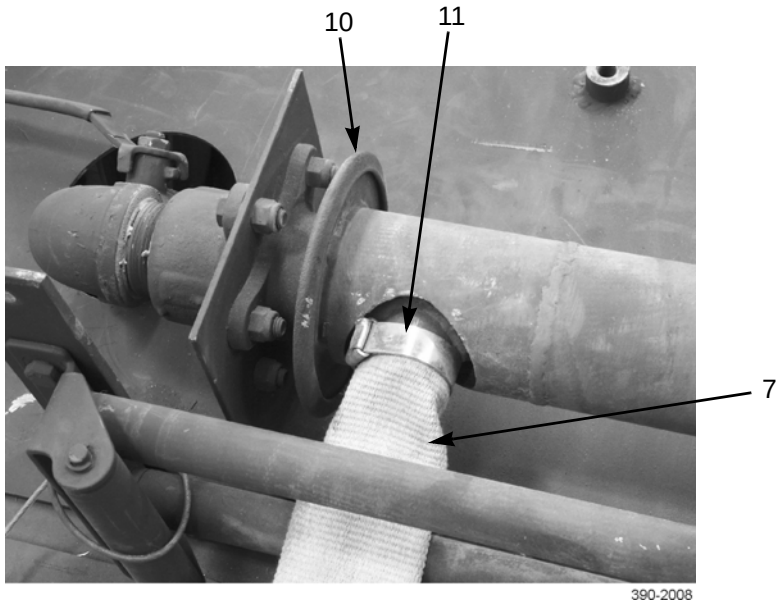
AUXILIARY HOSE REMOVAL

1. Remove two nuts (1), lockwashers (2), flatwashers (3), bolts (4), and step (5) from two welded brackets (6). Discard lockwashers.

2. Remove cap (9) from nozzle (8) and fully unwind hose (7).

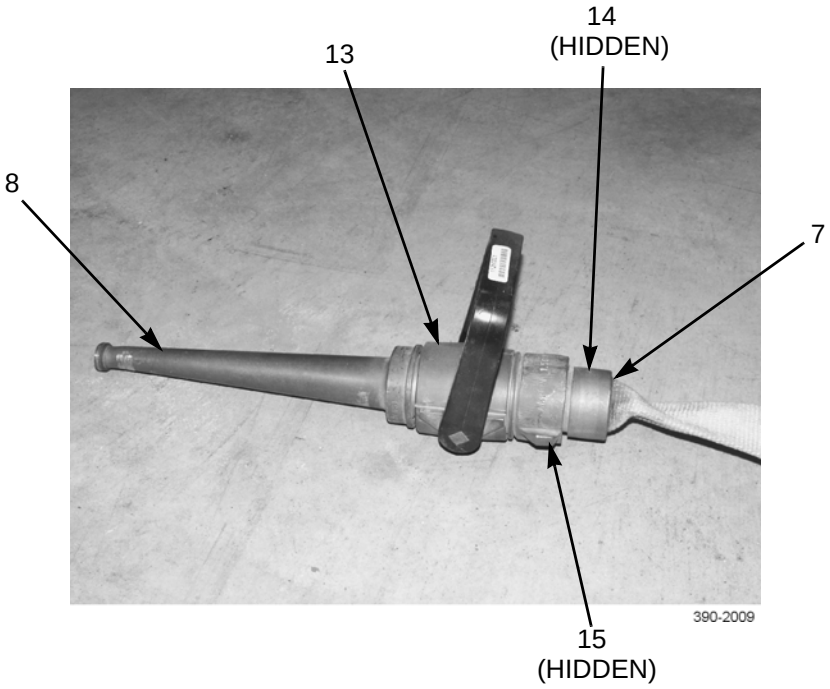


3. Remove clamp (11) from hose (7) and remove hose from hose reel (10).



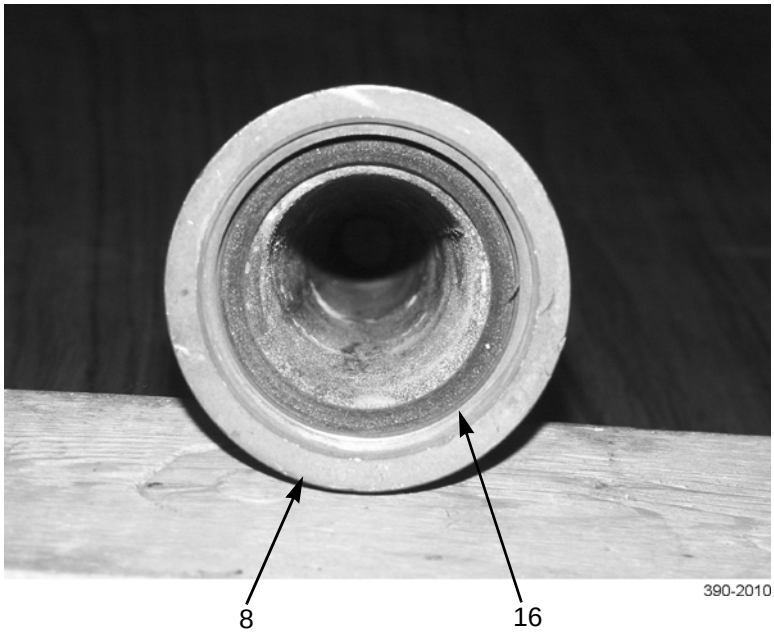
AUXILIARY HOSE DISASSEMBLY

1. Hold hose (7) and separate hose from valve (13).
2. Remove O-ring seal (14) from each end of hose (7) and discard.
3. Remove O-ring seal (15) from valve (13) and discard.
4. Remove nozzle (8) from valve (13).



AUXILIARY HOSE DISASSEMBLY - CONTINUED

5. Remove O-ring seal (16) from nozzle (8) and discard.



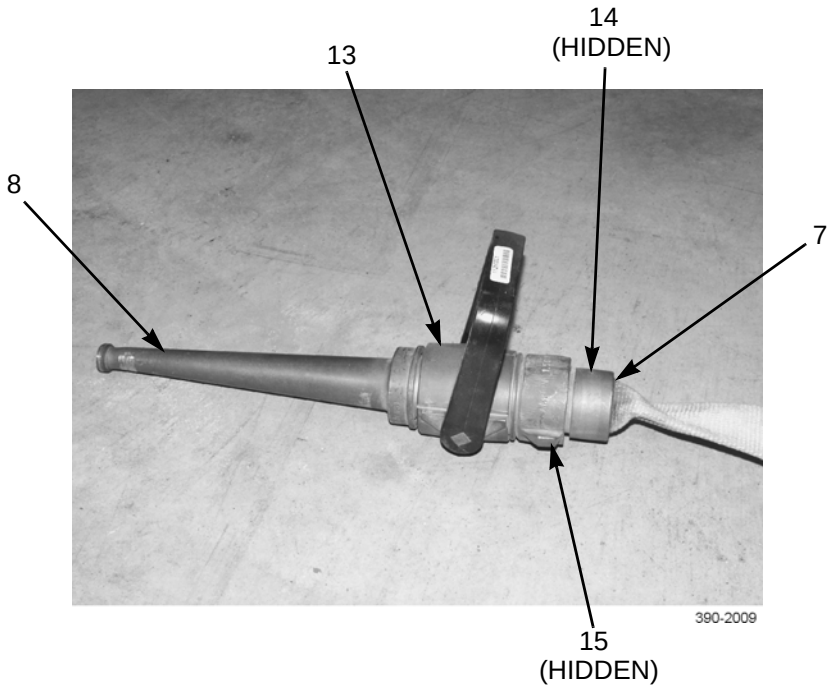
AUXILIARY HOSE ASSEMBLY

NOTE

A light coating of grease may be used to hold O-rings in place as they are installed.

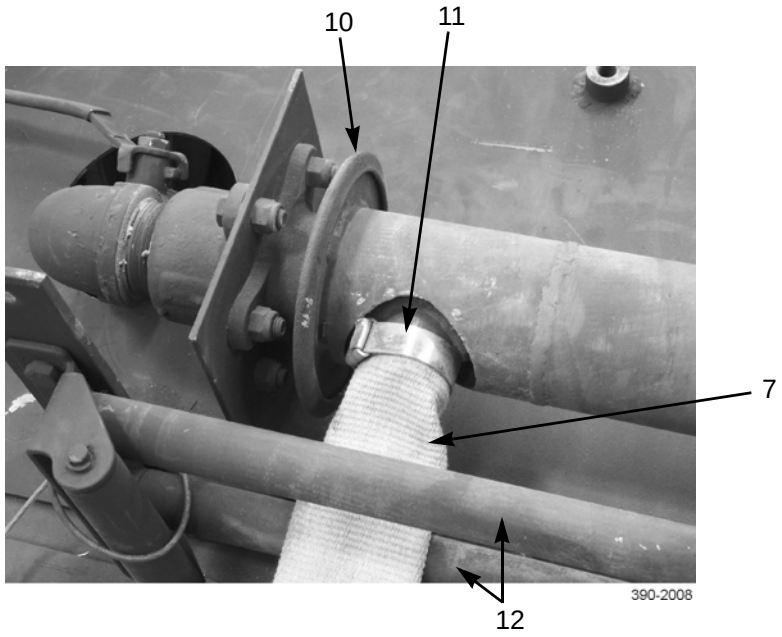
1. Install new O-ring seal (16) in nozzle (8).
2. Install nozzle (8) to valve (13).
3. Install new O-ring seal (15) in valve (13).
4. Install new O-ring seal (14) in each end of hose (7).
5. Install hose (7) to valve (13).

AUXILIARY HOSE ASSEMBLY - CONTINUED



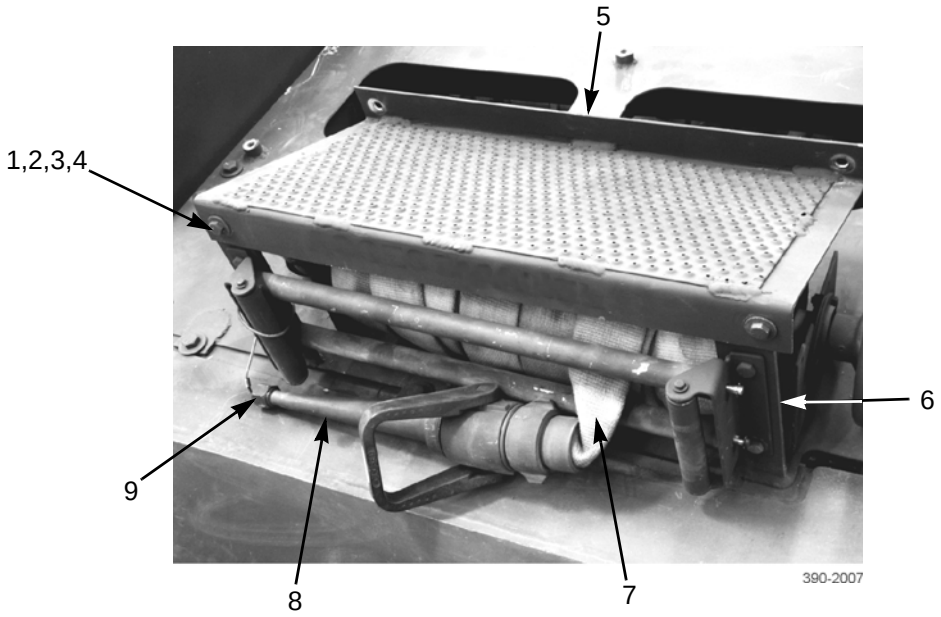
AUXILIARY HOSE INSTALLATION

1. Position hose (7) through fairlead (12) onto hose reel (10). Secure hose with clamp (11).
2. Fully wind hose (7) onto hose reel (10).



AUXILIARY HOSE INSTALLATION - CONTINUED

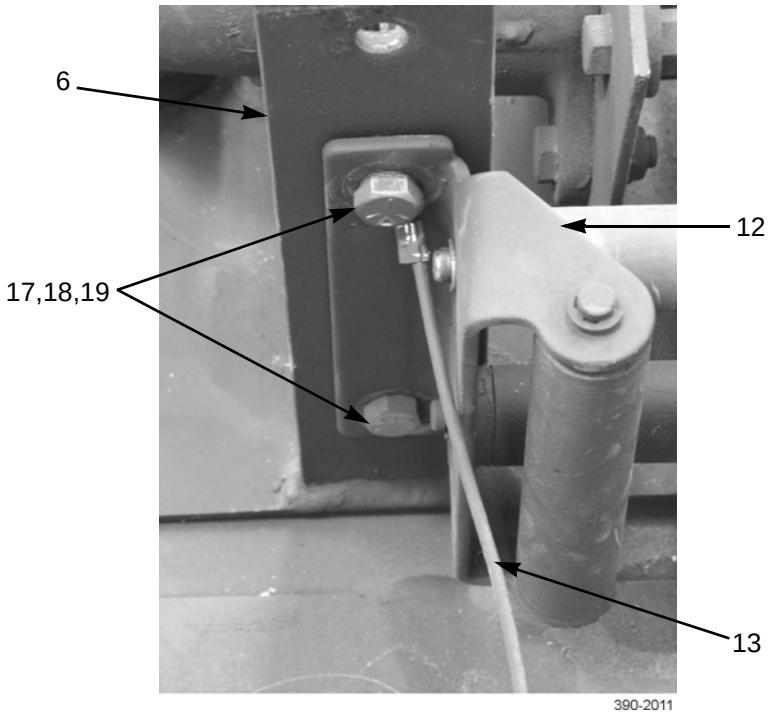
3. Install cap (9) on nozzle (8).
4. Install step (5) on two welded brackets (6) with two bolts (4), flatwashers (3), new lockwashers (2), and nuts (1).



5. Install toolbox (WP 0019 00).

HOSE REEL FAIRLEAD REMOVAL

1. Remove auxiliary hose from hose reel (Refer to *Auxiliary Hose Removal*).
2. Remove four nuts (17), lockwashers (18), bolts (19), nozzle cap lanyard (13), and fairlead (12) from two welded brackets (6). Discard lockwashers.



HOSE REEL FAIRLEAD INSTALLATION

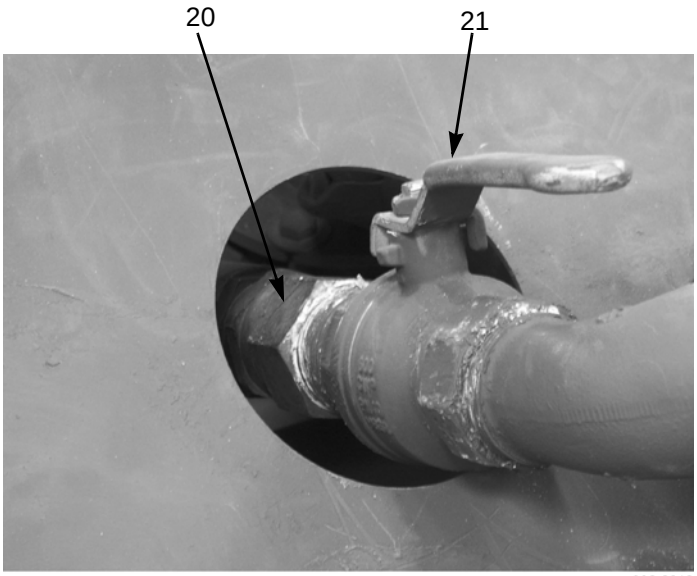
NOTE

Lanyard is secured by top-left bolt.

1. Install fairlead (12) and nozzle cap lanyard (13) on two welded brackets (6) with four bolts (19), new lockwashers (18), and nuts (17).
2. Install auxiliary hose on hose reel (Refer to *Auxiliary Hose Installation*).

HOSE REEL REMOVAL

1. Remove auxiliary hose from hose reel (Refer to *Auxiliary Hose Removal*).
2. Disconnect water supply hose (20) from ball valve (21).

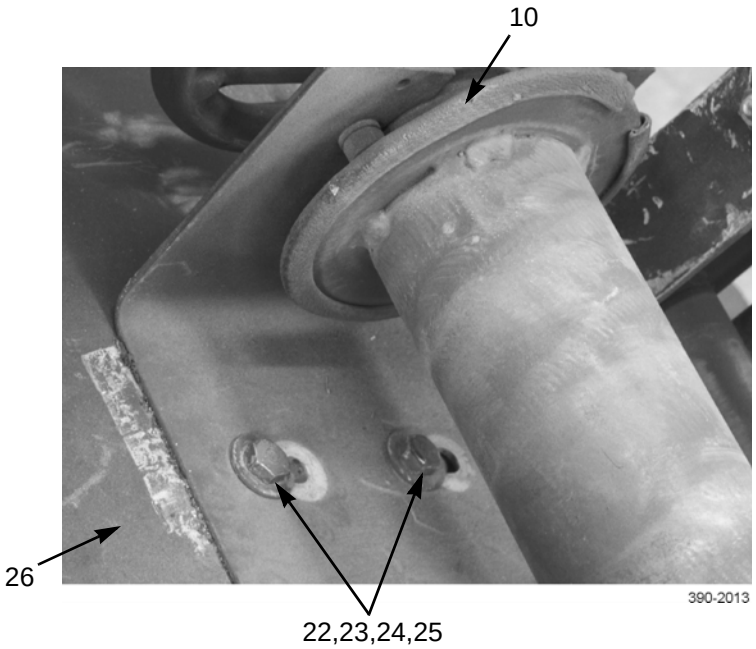


HOSE REEL REMOVAL - CONTINUED

WARNING

Assistance is required to remove hose reel.

3. Remove four nuts (22), lockwashers (23), eight flatwashers (24), four bolts (25), and hose reel (10) from mounting plate (26). Discard lockwashers.



HOSE REEL INSTALLATION

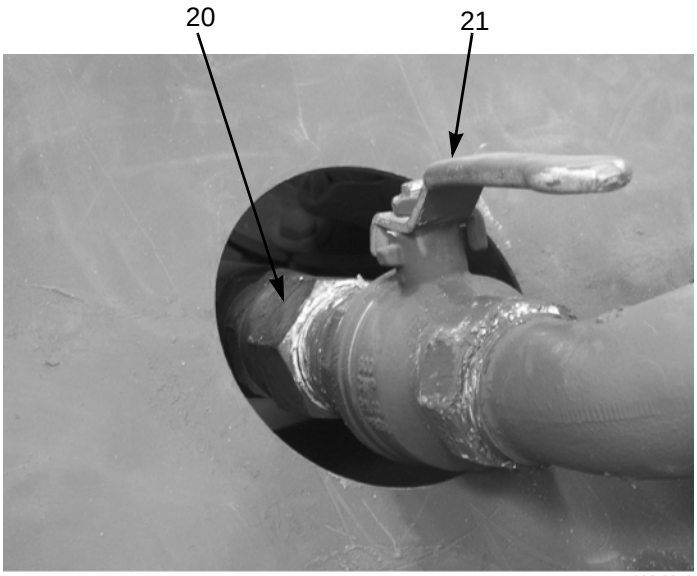
WARNING

Assistance is required to install hose reel.

1. Install hose reel (10) on mounting plate (26) with four bolts (25), eight flatwashers (24), four new lockwashers (23), and nuts (22).
2. Apply a thin coat of sealing compound to male threads of ball valve (21). Connect water supply hose (20) to ball valve.
3. Install auxiliary hose on hose reel (Refer to *Auxiliary Hose Installation*).

HOSE REEL ASSEMBLY AND MOUNTING PLATE REMOVAL

1. Remove step from hose reel (Refer to *Auxiliary Hose Removal*).
2. Disconnect water supply hose (20) from ball valve (21).



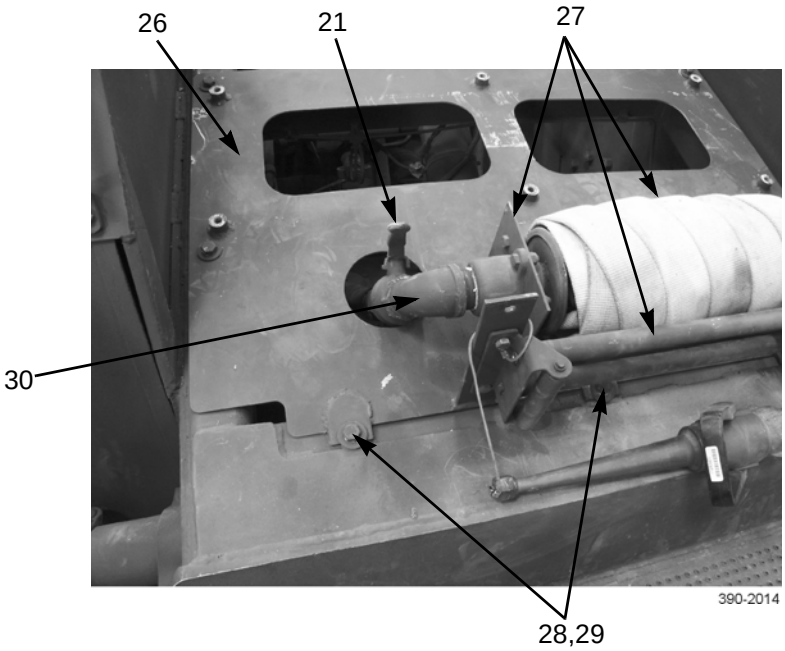
3. If damaged, remove ball valve (21) and elbow (30) from hose reel assembly (27).

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.

4. Secure a nylon sling around hose reel assembly (27) and attach sling to a suitable overhead lifting device. Take up slack in sling.
5. Remove seven bolts (28), washers (29), and hose reel assembly (27) and mounting plate (26) from rear of water distributor.

HOSE REEL ASSEMBLY AND MOUNTING PLATE REMOVAL - CONTINUED



HOSE REEL ASSEMBLY AND MOUNTING PLATE 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 result in death or injury to personnel.

1. Secure a nylon sling around hose reel assembly (27) and attach sling to a suitable overhead lifting device. Take up slack in sling.

1. Position hose reel assembly (27) and mounting plate (26) on rear of water distributor.

2. Install seven washers (29) and bolts (28).

NOTE

Apply a thin coat of sealing compound to male threads of fittings.

3. If removed, install elbow (30) and ball valve (21) to hose reel assembly (27).

4. Connect water supply hose (20) to ball valve (21). If open, close ball valve by turning handle until perpendicular to water supply hose.

HOSE REEL ASSEMBLY AND MOUNTING PLATE INSTALLATION - CONTINUED

5. Install step to hose reel (Refer to *Auxiliary Hose Installation*).
6. Install toolbox (WP 0019 00).

END OF WORK PACKAGE

WATER LEVEL SENDER REPLACEMENT 0031 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Sealing compound (Item 36, WP 0044 00)

Washer, lock (4)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

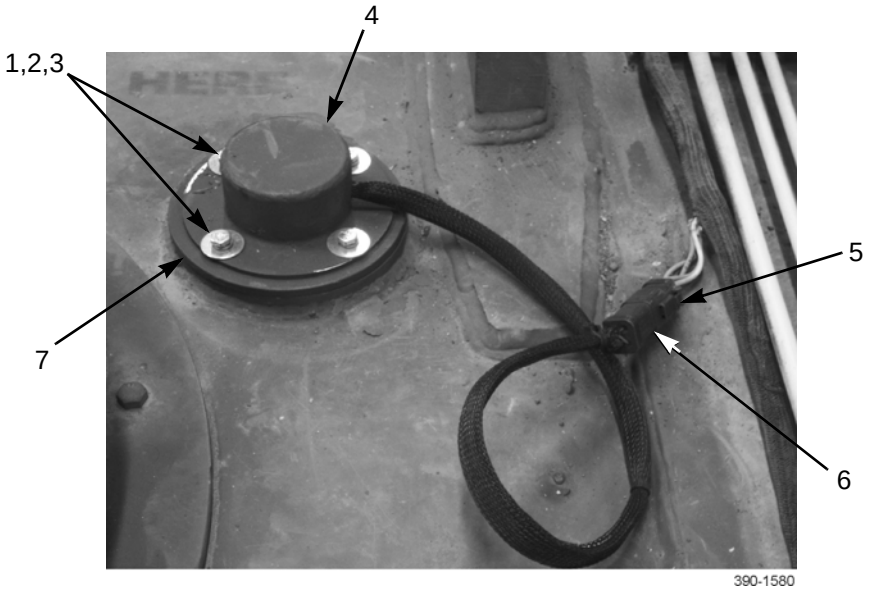
Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

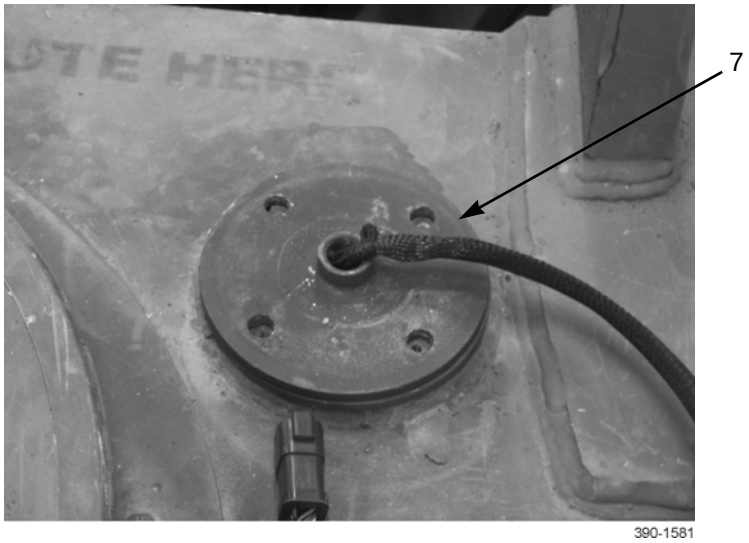
REMOVAL

1. Disconnect connector (6) of water level sender from connector (5) of wiring harness.
2. Remove four bolts (1), lockwashers (2), washers (3), and cover (4) from water level sender flange (7). Discard lockwashers.

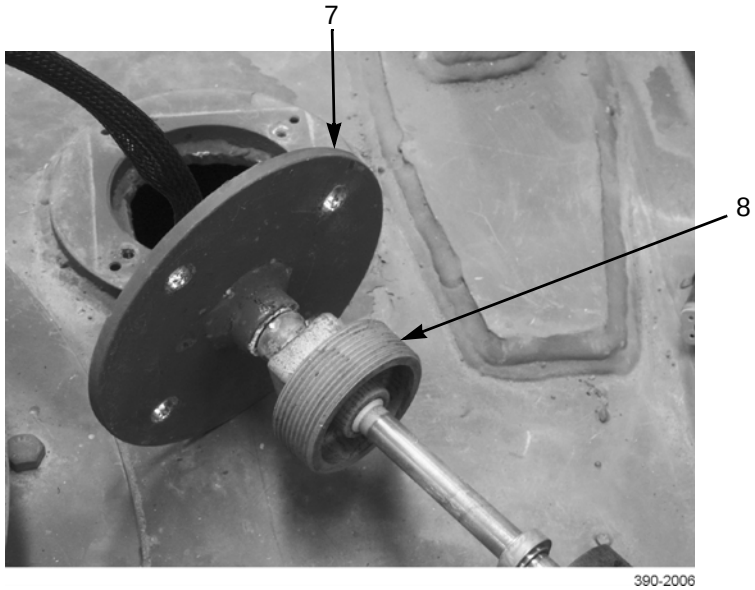


REMOVAL - CONTINUED

3. Remove water level sender flange (7) from top of water tank.



4. Remove flange (7) from water level sender (8).

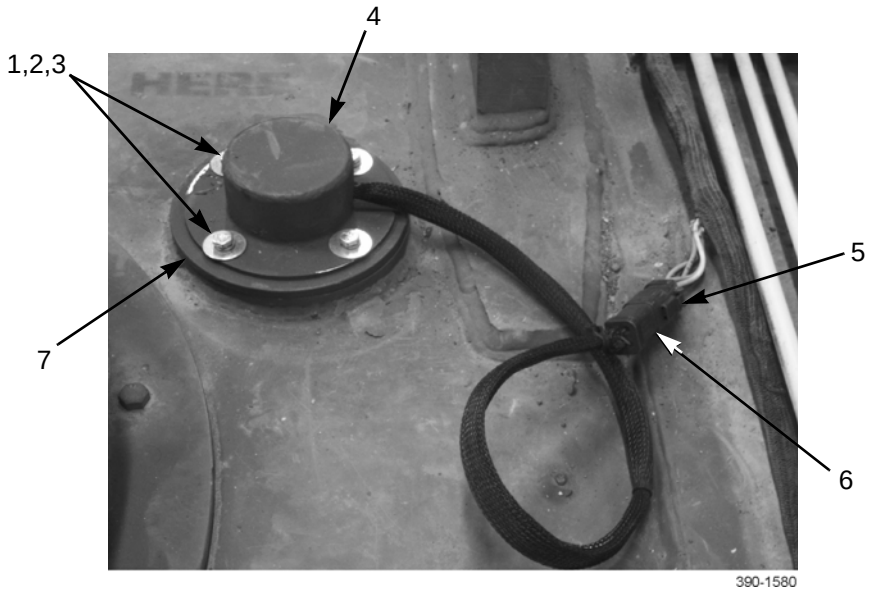


INSTALLATION

1. Clean threads of water level sender (8) and apply a thin coat of sealing compound to threads.
2. Install flange (7) on water level sender (8).
3. Position water level sender flange (7) to top of water tank.
4. Install water level sender flange (7) and cover (4) with four washers (3), new lockwashers (2), and bolts (1).

INSTALLATION - CONTINUED

5. Connect connector (6) of water level sender to connector (5) of wiring harness. Place connectors out of the way under fuel and air tubes.



END OF WORK PACKAGE

WATER TANK FOOT VALVE ASSEMBLY REPLACEMENT 0032 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Grease, GAA (Item 16, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Sealing compound (Item 36, WP 0044 00)

Seal, O-ring

Washer, lock (12)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Tank drained (TM 5-3800-205-10-2)

Tank raised level to ground and blocked (TM 5-3800-205-10-2)

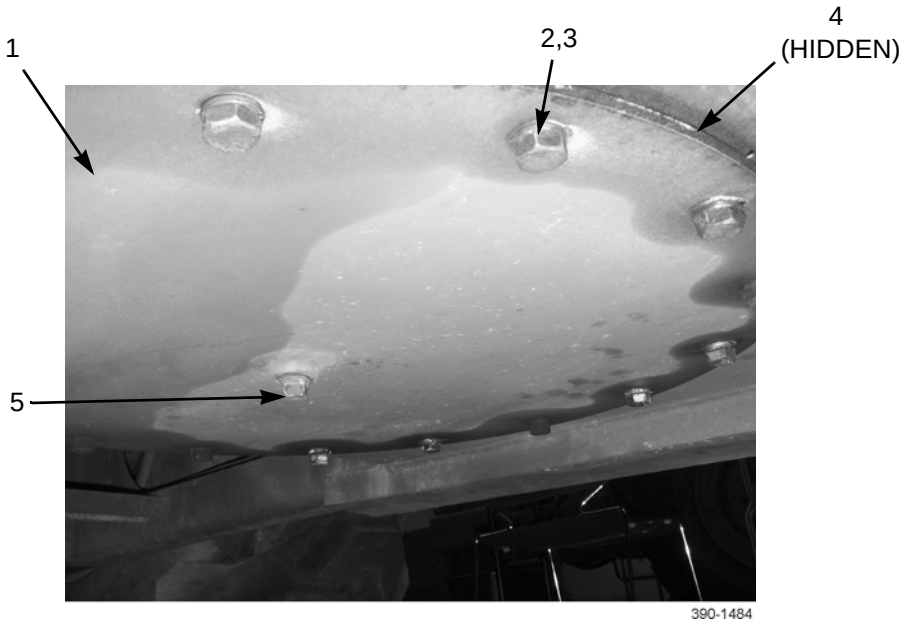
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

REMOVAL

NOTE

Use a suitable container to capture residual water. Wipe up all spills.

1. From below water tank, remove plug (5) from center of plate (1).
2. Loosen 12 bolts (2) securing plate (1) to underside of water tank.
3. Position floor jack under center of plate (1) and raise jack to just contact plate.
4. Remove 12 bolts (2) and lockwashers (3). Discard lockwashers.



NOTE

O-ring may remain attached to water tank or come free with plate.

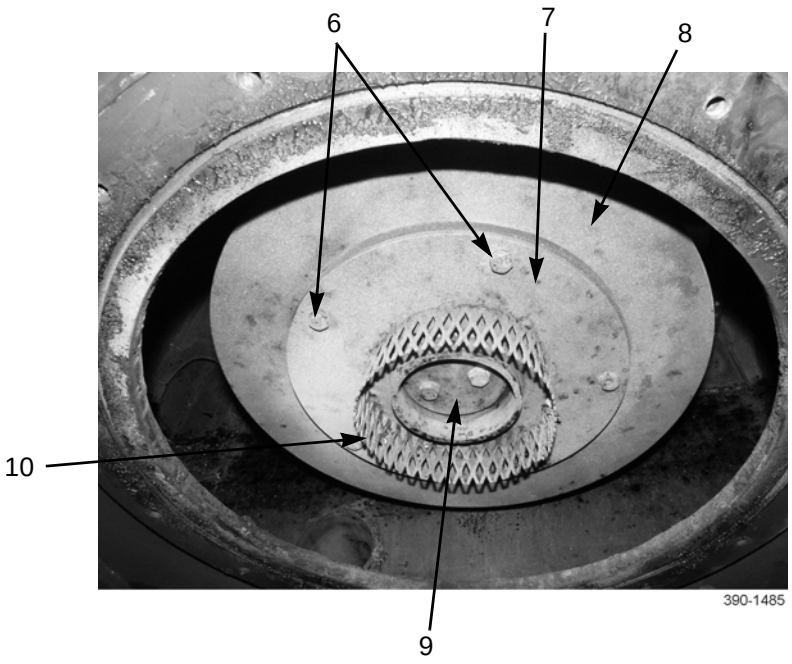
5. While holding plate (1) on jack, lower jack and remove jack, plate, and O-ring (4) from water tank. Discard O-ring.

NOTE

Note position of foot valve for assembly.

6. Remove five bolts (6), flange assembly (7), and foot valve (9) from body assembly (8).
7. Inspect foot valve (9) for damage. If damaged, replace foot valve.
8. Ensure screen (10) is clean of debris.

REMOVAL - CONTINUED



INSTALLATION

1. Ensure plate (1) is clean of debris.
2. Install foot valve (9) and flange assembly (7) to body assembly (8) with five bolts (6).
3. Apply a coat of grease to new O-ring (4) and sealing surface of water tank. Position O-ring in groove of water tank.
4. Position plate (1) so that plate is centered on jack and position jack and plate below water tank. Raise jack.

NOTE

Ensure that O-ring remains in groove of water tank.

5. Install plate (1) on water tank with 12 new lockwashers (3) and bolts (2).
6. Lower and remove jack.
7. Tighten 12 bolts (2).
8. Apply a thin coat of sealing compound to threads of plug (5) and install plug to center of plate (1).
9. Remove blocking and lower water tank (TM 5-3800-205-10-2).

END OF WORK PACKAGE

SUCTION INLET MANUAL VALVE AND VACUUM VALVE REPLACEMENT 0033 00

THIS WORK PACKAGE COVERS

Suction Inlet Manual Valve: Removal, Installation

Vacuum Valve: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Rag, wiping (Item 31, WP 0044 00)

Sealing compound (Item 36, WP 0044 00)

Washer, lock (suction inlet manual valve replacement) (4)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Tank drained (TM 5-3800-205-10-2)

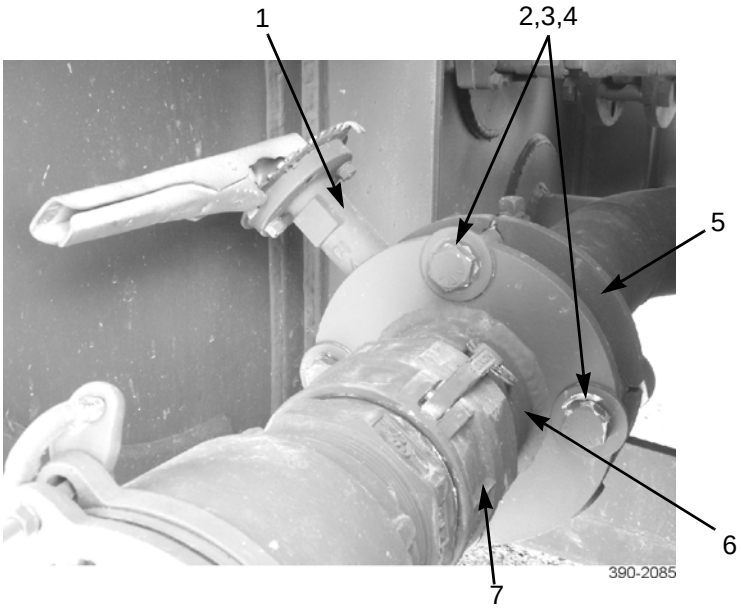
Foot valve assembly removed from stowage on suction inlet (TM 5-3800-205-10-2)

SUCTION INLET MANUAL VALVE REMOVAL

NOTE

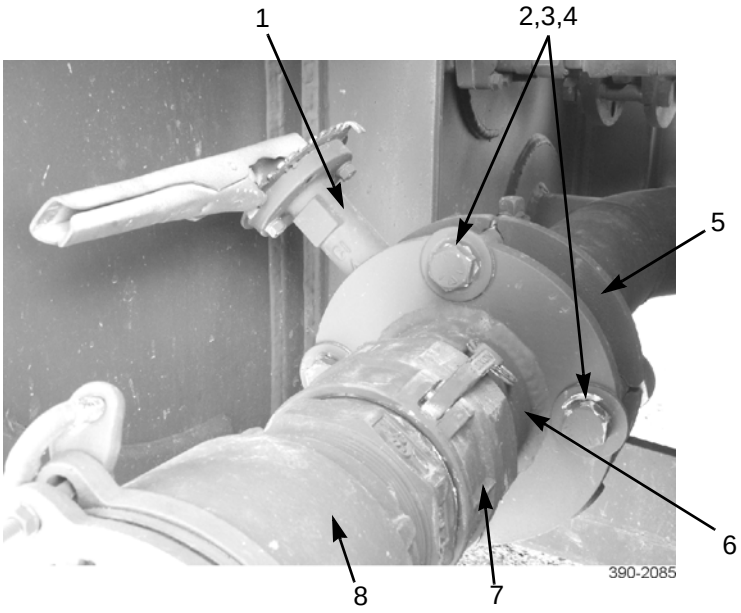
Note position of suction inlet manual valve for installation.

1. Remove four nuts (2), lockwashers (3), bolts (4), flange (6) with coupling (7), and suction inlet manual valve (1) from suction pipe (5). Discard lockwashers.
2. If necessary, remove coupling (7) from flange (6).



SUCTION INLET MANUAL VALVE INSTALLATION

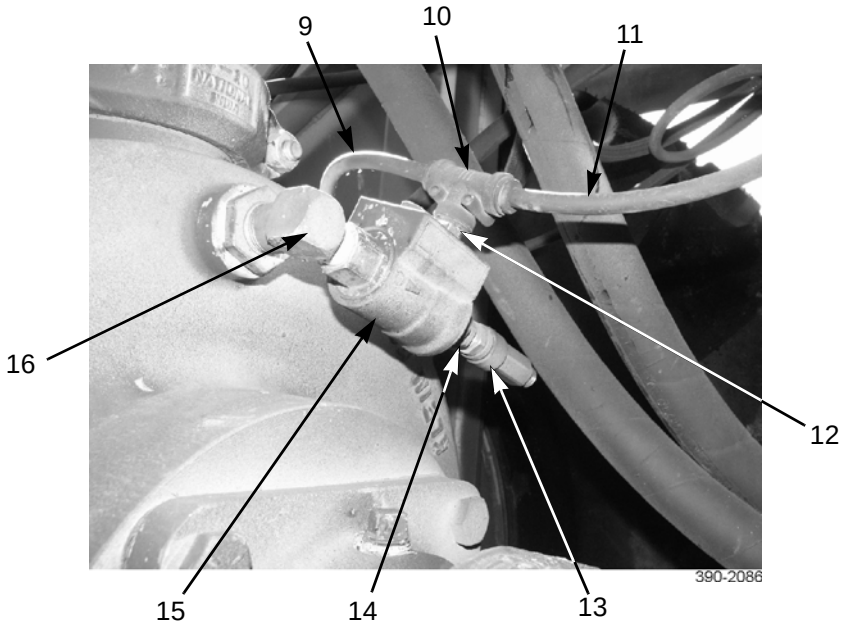
1. If removed, clean threads and apply a thin coat of sealing compound to threads of flange (6) and install coupling (7) to flange.
2. Install suction inlet manual valve (1) and flange (6) with coupling (7) to suction pipe (5) with four bolts (4), new lockwashers (3), and nuts (2).
3. Stow foot valve assembly (8) on suction inlet (TM 5-3800-205-10-2).



VACUUM VALVE REMOVAL

1. Disconnect tube (13) from adapter (14).
2. Remove adapter (14) from vacuum valve (15).
3. Remove two hoses (9 and 11) from tee (10).
4. Remove tee (10) from adapter (12).
5. Remove adapter (12) from vacuum valve (15).
6. Remove vacuum valve (15) from water pump housing elbow (16).

VACUUM VALVE REMOVAL - CONTINUED



VACUUM VALVE INSTALLATION

1. Install vacuum valve (15) on water pump housing elbow (16).
2. Install adapter (12) on vacuum valve (15).
3. Install tee (10) on adpater (12).
4. Install two hoses (11 and 9) on tee (10).
5. Install adapter (14) on vacuum valve (15).
6. Connect tube (13) to adapter (14).

END OF WORK PACKAGE

SUCTION HOSE FOOT VALVE ASSEMBLY REPAIR 0034 00

THIS WORK PACKAGE COVERS

Disassembly, Assembly

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Gasket

Washer, lock (4)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Tank lowered to ground (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

Foot valve assembly removed from suction inlet (TM 5-3800-205-10-2)

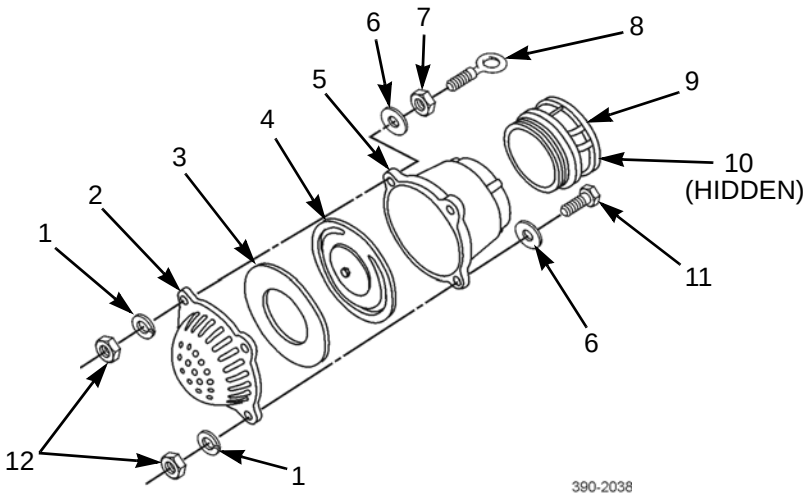
DISASSEMBLY

1. Remove gasket (10) from camlock fitting (9). Discard gasket.
2. Place camlock fitting (9) in a vise. Use a strap wrench to remove foot valve body (5) from camlock fitting.
3. Remove three nuts (12), lockwashers (1), bolts (11), and flatwashers (6) from head (2) and body (5). Discard lockwashers.
4. Remove remaining nut (12), lockwasher (1), and eyebolt (8). Discard lockwasher. As required, remove flatwasher (6) and nut (7) from eyebolt.

NOTE

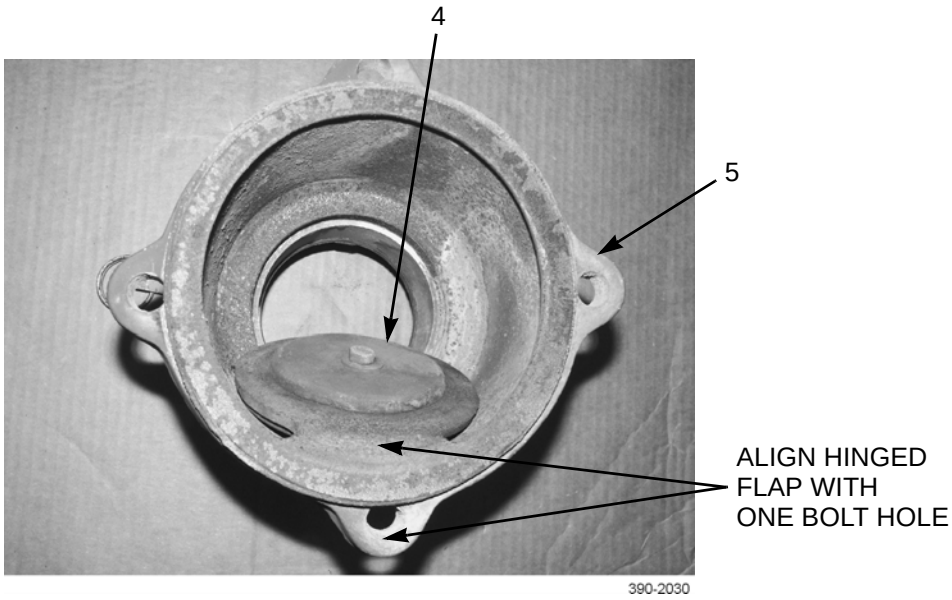
Note orientation of components as they are disassembled to ensure correct assembly.

5. Separate head (2), plate (3), check (flapper) valve (4), and body (5).

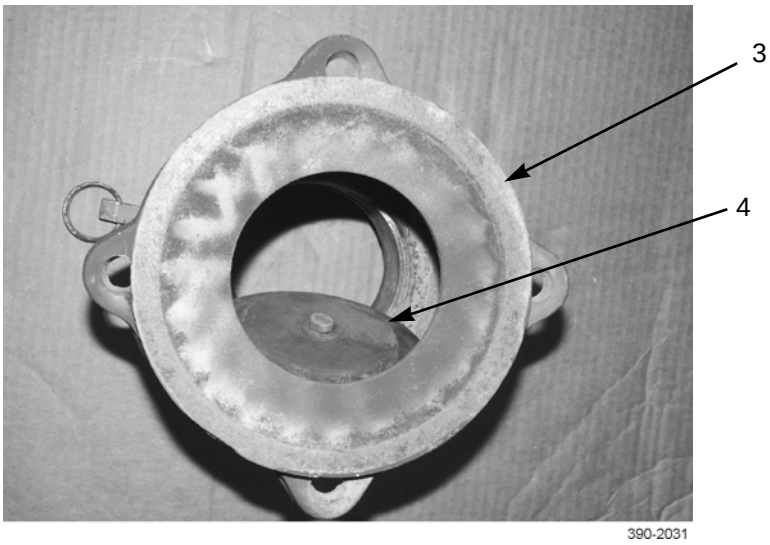


ASSEMBLY

1. Position check (flapper) valve (4) on body (5), with hinged flap of valve aligned with one bolt hole in body.



2. Position plate (3) on top of check (flapper) valve (4), with grooved surface of plate facing check valve.



3. Position head (2) on plate (3).

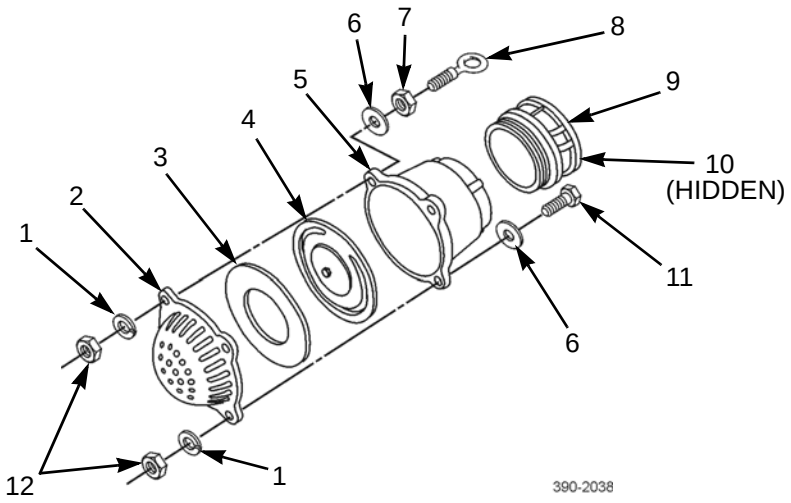
NOTE

Eyebolt is installed in bolt hole that is aligned with hinged flap of check valve.

4. If removed, install nut (7) and flatwasher (6) on eyebolt (8). Install eyebolt through body (5) and head (2) with new lockwasher (1) and nut (12). Do NOT fully tighten nut.

ASSEMBLY - CONTINUED

5. Loosely install three flatwashers (6), bolts (11), new lockwashers (1), and nuts (12). Fully and evenly tighten all four nuts.
6. Place foot valve body (5) in a vise and use a strap wrench to install camlock fitting (9).
7. Install new gasket (10) inside camlock fitting (9).



8. Stow foot valve assembly on suction inlet (TM 5-3800-205-10-2).

END OF WORK PACKAGE

WATER HOSE ASSEMBLIES, INLET/OUTLET PIPES, AND MANIFOLDS REPLACEMENT 0035 00

THIS WORK PACKAGE COVERS

Hose Assembly: Removal, Installation
Lower Pipe: Removal, Installation
Manifold Pipe: Removal, Installation
Upper Pipe: Removal, Installation
Manifold Assembly: Removal, Installation
Suction Pipe: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)
Shop equipment, common no. 1 (Item 24, WP 0045 00)

Materials/Parts

Grease, GAA (Item 16, WP 0044 00)
Rag, wiping (Item 31, WP 0044 00)
Gasket (as required)
Seal, coupling (as required)

Materials/Parts - Continued

Seal, O-ring (as required)
Washer, lock (as required)

Personnel Required

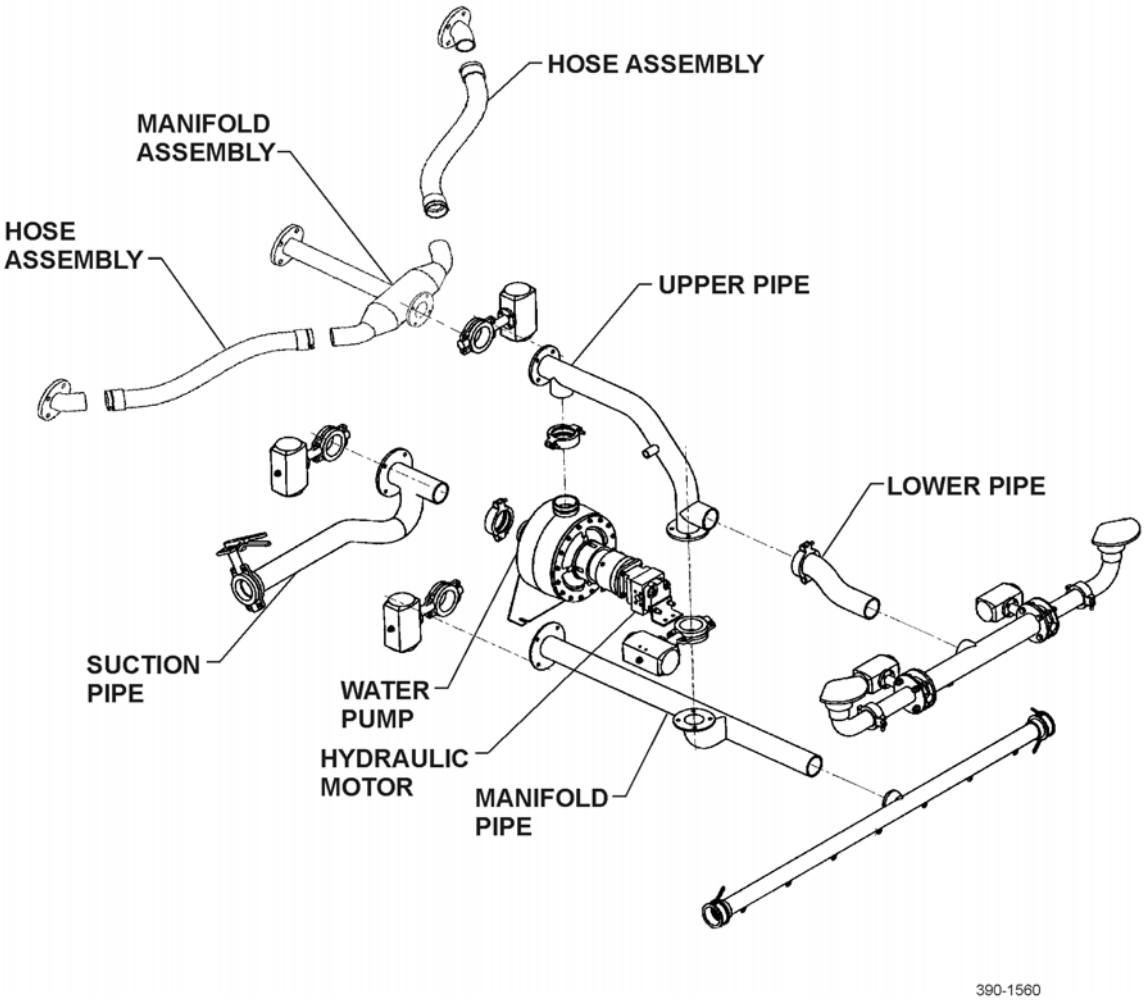
Two

References

WP 0018 00
WP 0027 00
WP 0030 00
WP 0032 00
WP 0033 00

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)
Tank lowered to ground (TM 5-3800-205-10-2)
Parking brake engaged (TM 5-3800-205-10-2)
Wheels chocked (TM 5-3800-205-10-2)
Battery disconnect switch in OFF position (TM 5-3800-205-10-2)
Tank drained (TM 5-3800-205-10-2)



HOSES ASSEMBLY REMOVAL

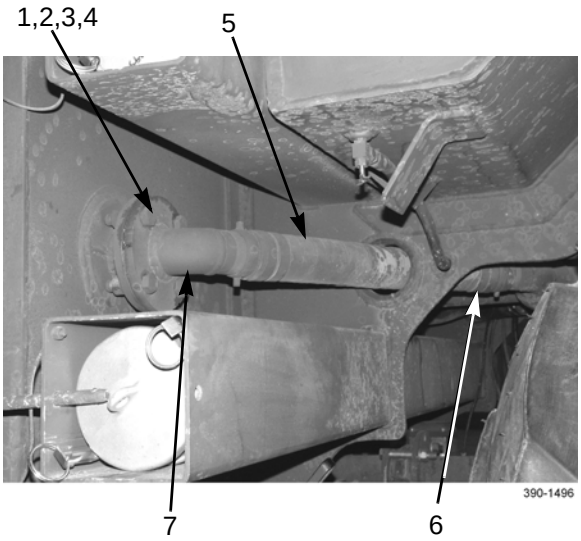
NOTE

This procedure is used for both right and left hose assembly. Left hose assembly is shown.

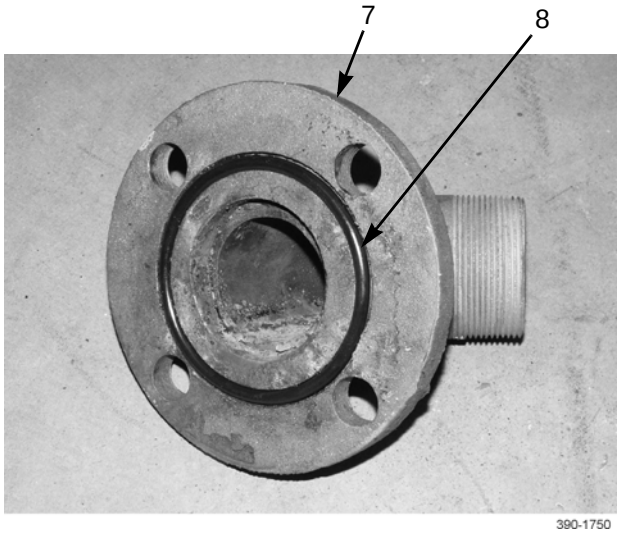
1. Loosen hose (5) at elbow (7).
2. Remove four nuts (1), lockwashers (2), eight flatwashers (3), and four bolts (4) from elbow (7) and tank flange. Discard lockwashers.
3. Remove hose (5) from elbow (7).
4. Remove other end of hose (5) from manifold assembly (6).

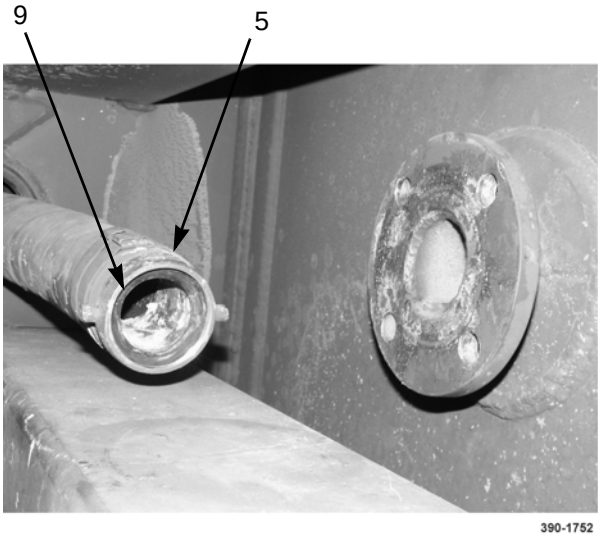
WATER HOSE ASSEMBLIES, INLET/OUTLET PIPES, AND MANIFOLDS REPLACEMENT - CONTINUED **0035 00**

HOSES ASSEMBLY REMOVAL - CONTINUED



5. Remove and discard O-ring (8) from elbow (7).
6. Remove and discard gasket (9) from each end of hose (5).



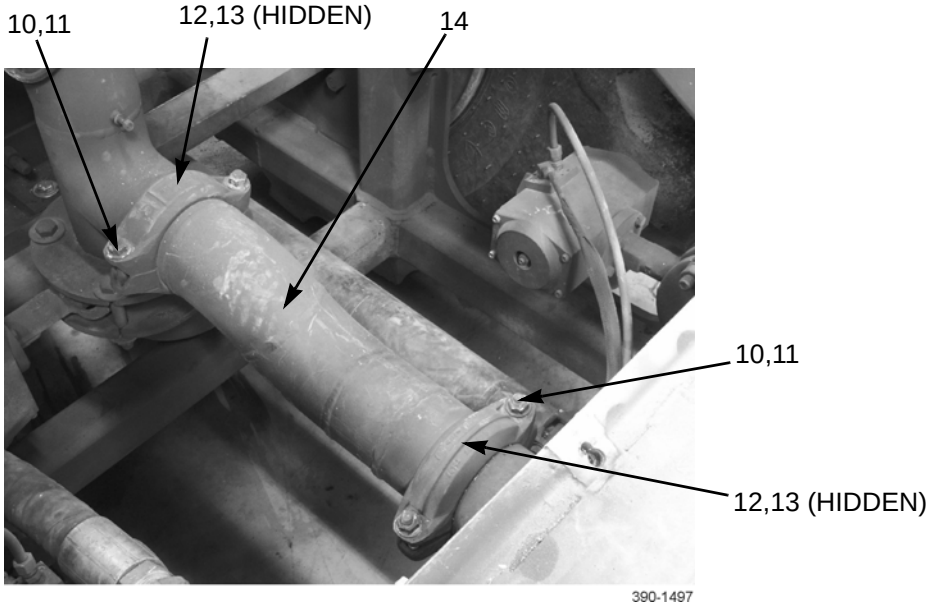


HOSES ASSEMBLY INSTALLATION

1. Lubricate with grease and install new gasket (9) on each end of hose (5).
2. Lubricate with grease and install new O-ring (8) in elbow (7).
3. Connect hose (5) to manifold assembly (6).
4. Install, but do not tighten, other end of hose (5) on elbow (7).
5. Position elbow (7) and hose (5) at tank flange and install four bolts (4), eight flatwashers (3), four new lockwashers (2), and nuts (1).
6. Tighten elbow end of hose (5).

LOWER PIPE REMOVAL

1. Remove hose reel assembly and mounting plate (WP 0030 00).
2. Remove two nuts (10), bolts (11), coupling (12), and seal (13) from both ends of lower pipe (14).
3. Remove two seals (13) and lower pipe (14).
4. Inspect seals (13) for dry rot, cracks or tears. If damaged, replace seals.



LOWER PIPE INSTALLATION

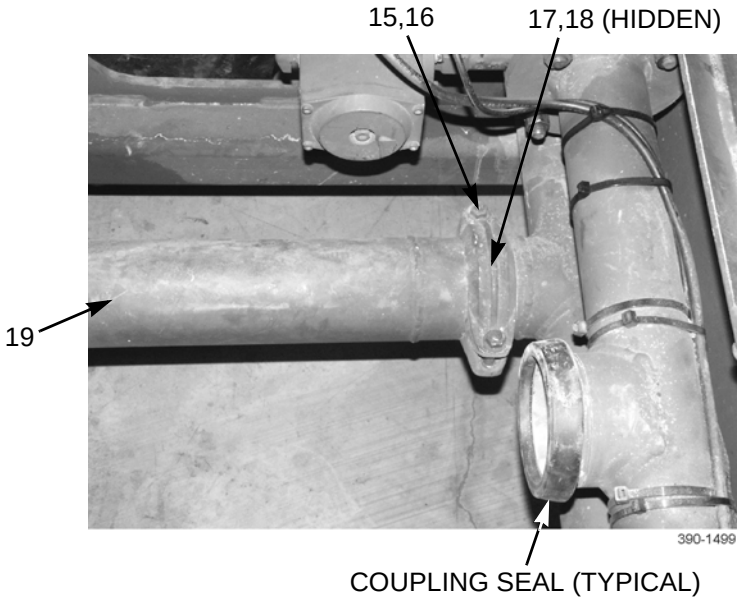
1. Install two seals (13) and lower pipe (14).
2. Install coupling (12) on each end of lower pipe (14) with two bolts (11) and nuts (10).
3. Install hose reel assembly and mounting plate (WP 0030 00).

MANIFOLD PIPE REMOVAL

NOTE

Lower pipe shown removed for clarity.

1. Remove hose reel assembly and mounting plate (WP 0030 00).
2. Remove pressure gravity valve and gravity spray valve assemblies (WP 0027 00).
3. Remove two nuts (15), bolts (16), coupling (17), and seal (18) from manifold pipe (19).
4. With assistance, remove seal (18) and manifold pipe (19).
5. Inspect seal (18) for dry rot, cracks or tears. If damaged, replace seal.

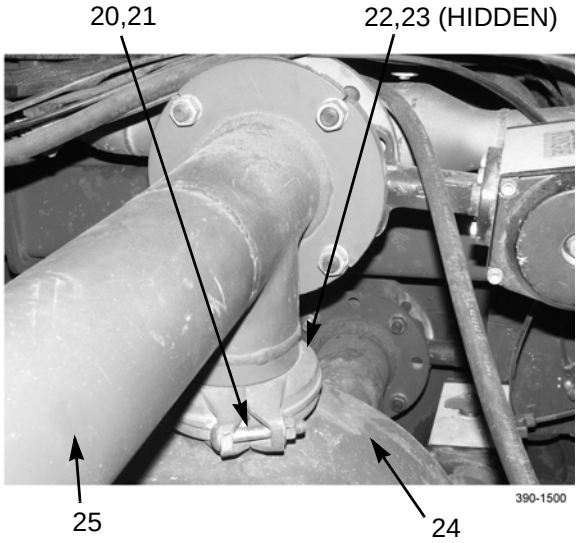


MANIFOLD PIPE INSTALLATION

1. With assistance, position seal (18) and manifold pipe (19) at lower spray bar.
2. Install coupling (17) and seal (18) on manifold pipe (19) with two bolts (16) and nuts (15).
3. Install pressure gravity valve and gravity spray valve assemblies (WP 0027 00).
4. Install hose reel assembly and mounting plate (WP 0030 00).

UPPER PIPE REMOVAL

1. Remove rear steps (WP 0018 00).
2. Remove hose reel assembly and mounting plate (WP 0030 00).
3. Remove pressure gravity and tank fill sparger valve assemblies (WP 0027 00).
4. Remove lower pipe (Refer to *Lower Pipe Removal*).
5. Remove hose reel hose assembly from upper pipe (25).
6. Remove two nuts (20), bolts (21), coupling (22), and seal (23) from upper pipe (25).
7. With assistance, remove seal (23) and upper pipe (25) from water pump housing (24).
8. Inspect seal (23) for dry rot, cracks or tears. If damaged, replace seal.

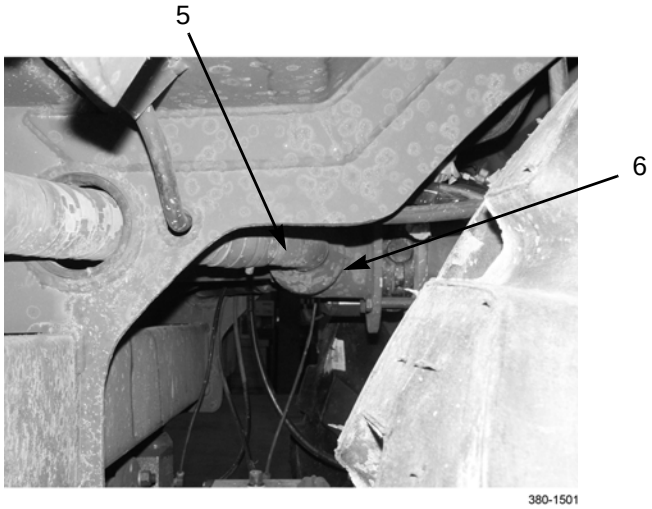


UPPER PIPE INSTALLATION

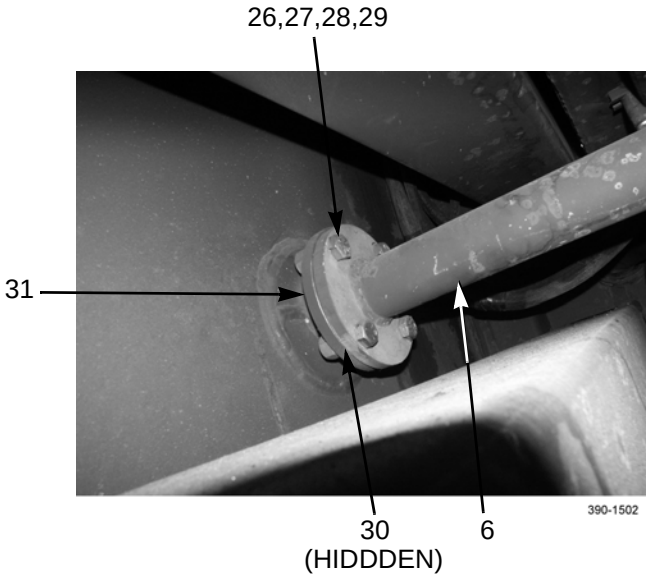
1. With assistance position seal (23) and upper pipe (25) on water pump housing (24).
2. Install coupling (22) and seal (23) on upper pipe (25) with two bolts (21) and nuts (20).
3. Instal hose reel hose assembly on upper pipe (25).
4. Install lower pipe (Refer to *Lower Pipe Installation*).
5. Install pressure gravity and tank fill sparger valve assemblies (WP 0027 00).
6. Install rear steps (WP 0018 00).
7. Install hose reel assembly and mounting plate (WP 0030 00).

MANIFOLD ASSEMBLY REMOVAL

1. Remove rear steps (WP 0018 00).
2. Remove hose (5) assemblies from manifold assembly (6) (Refer to *Hose Assembly Removal*).

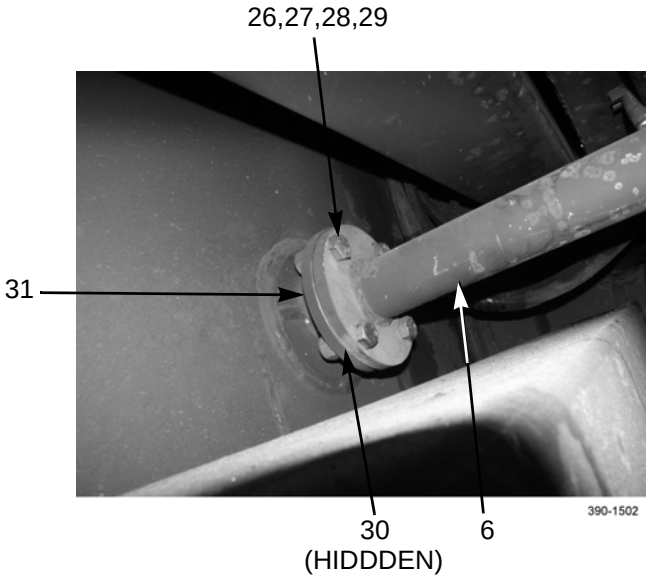


3. Remove tank fill sparger valve assembly (WP 0027 00).
4. With assistance, remove four nuts (26), lockwashers (27), eight flatwashers (28), four bolts (29), and manifold assembly (6) from water tank flange (31). Discard lockwashers.
5. Remove O-ring (30) from manifold assembly (6). Discard O-ring.

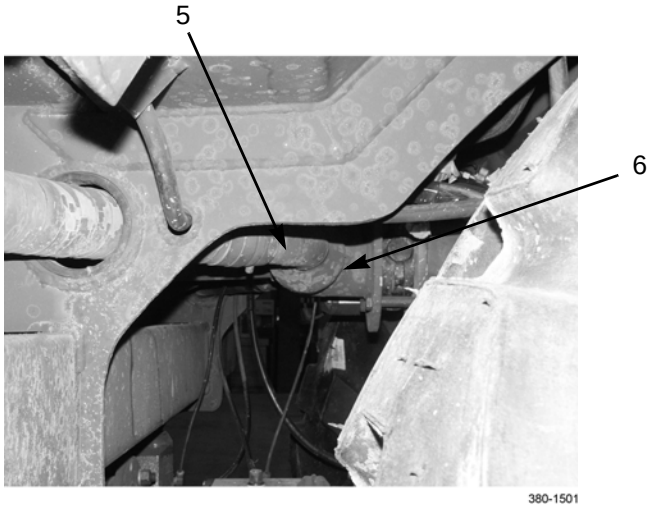


MANIFOLD ASSEMBLY INSTALLATION

1. Lubricate with grease and install new O-ring (30) in manifold assembly (6).
2. With assistance, position manifold assembly (6) on water tank flange (31).
3. Install four bolts (29), eight flatwashers (28), four new lockwashers (27), and nuts (26) to secure manifold assembly (6) to water tank flange (31).



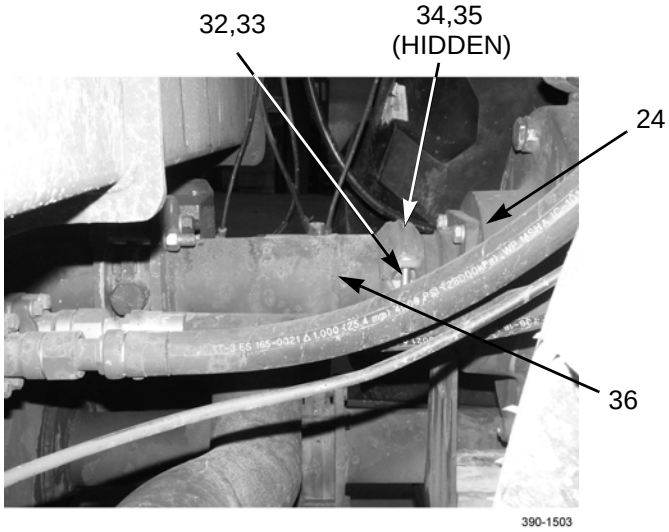
4. Install tank fill sparger valve assembly (WP 0027 00).
5. Install hose assemblies (5) to manifold assembly (6) (Refer to *Hose Assembly Installation*).



6. Install rear steps (WP 0018 00).

SUCTION PIPE REMOVAL

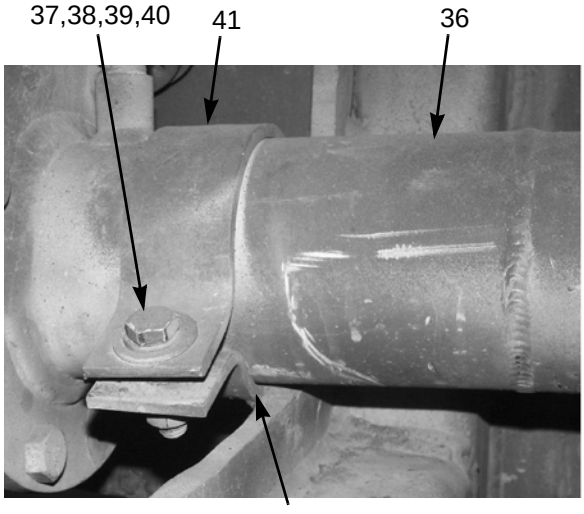
1. Remove rear steps (WP 0018 00).
2. Remove suction inlet manual valve (WP 0033 00).
3. Remove pump valve assembly (WP 0027 00).
4. Remove two nuts (32), bolts (33), coupling (34), and seal (35) from suction pipe (36) at water pump housing (24).
5. Inspect seal (35) for dry rot, cracks or tears. If damaged, replace seal.



NOTE

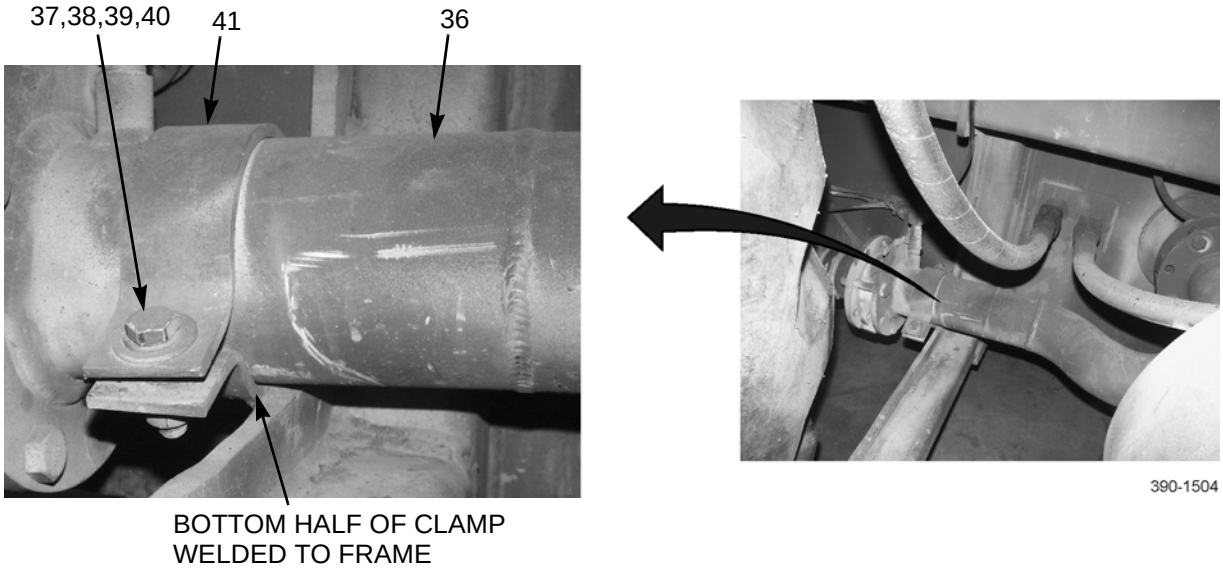
Bottom half of clamp is welded to frame.

6. Remove two nuts (37), lockwashers (38), flatwashers (39), bolts (40), and upper half of clamp (41) from suction pipe (36). Discard lockwashers.
7. With assistance, remove suction pipe (36).

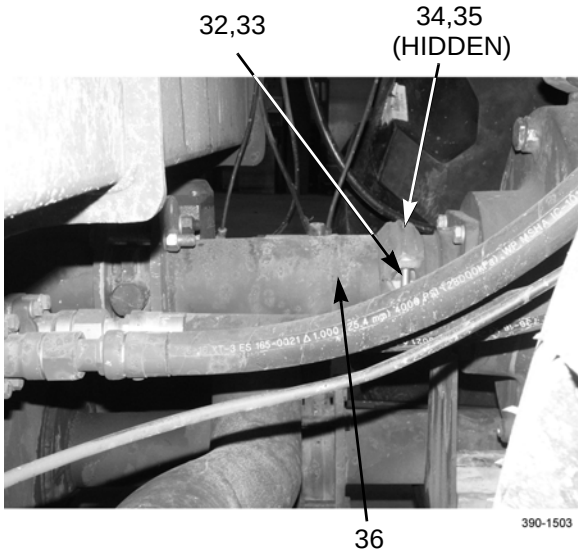


SUCTION PIPE INSTALLATION

1. With assistance, position suction pipe (36).
2. Install upper half of clamp (41) on suction pipe (36) with two bolts (40), flatwashers (39), new lockwashers (38), and nuts (37).



3. Install coupling (34) and seal (35) on other end of suction pipe (36) with two bolts (33) and nuts (32).



4. Install pump valve assembly (WP 0027 00).
5. Install suction inlet manual valve (WP 0033 00).
6. Install rear steps (WP 0018 00).

END OF WORK PACKAGE

CHAPTER 2
DIRECT SUPPORT LEVEL
WATER DISTRIBUTOR MAINTENANCE

REAR WHEEL BEARINGS AND SEAL REPLACEMENT 0036 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, field automotive (Item 23, WP 0045 00)

Driver set (Item 8, WP 0045 00)

Materials/Parts

Grease, GAA (Item 16, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

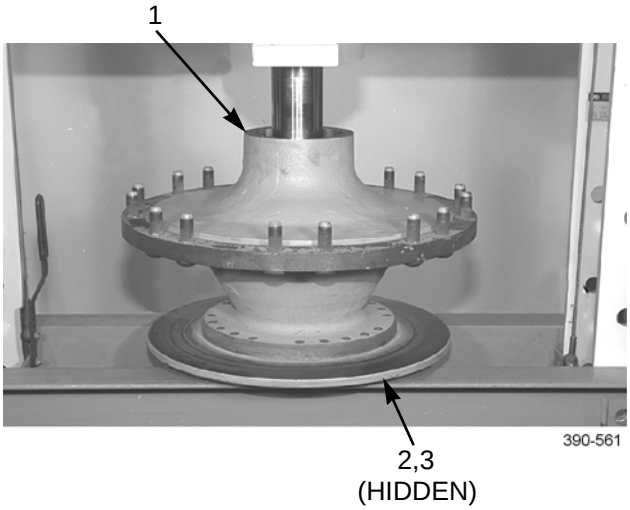
Seal, lip

Equipment Condition

Rear hub and disc removed (WP 0010 00)

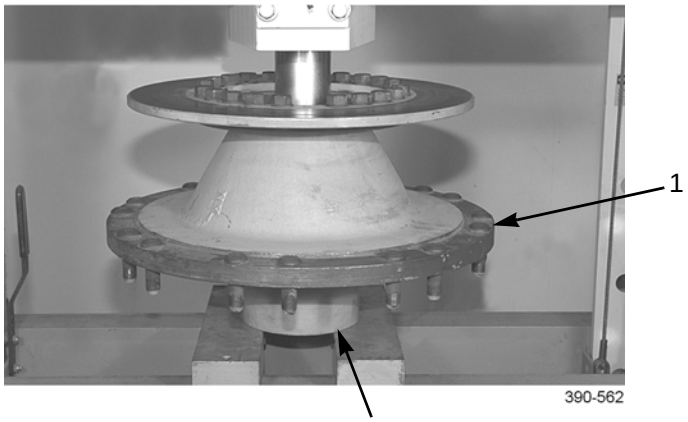
REMOVAL

1. Place hub (1) in a hydraulic press. Using driver and press, remove inner roller bearing cup (2) and tube (3) from hub.

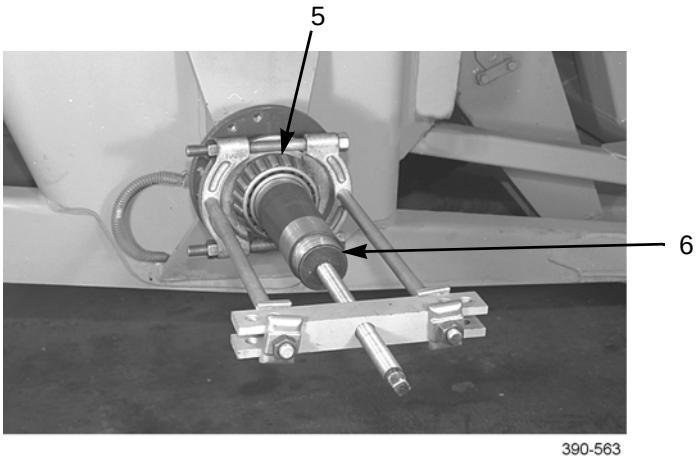


REMOVAL - CONTINUED

2. Using driver and hydraulic press, remove outer roller bearing cup (4) from hub (1).

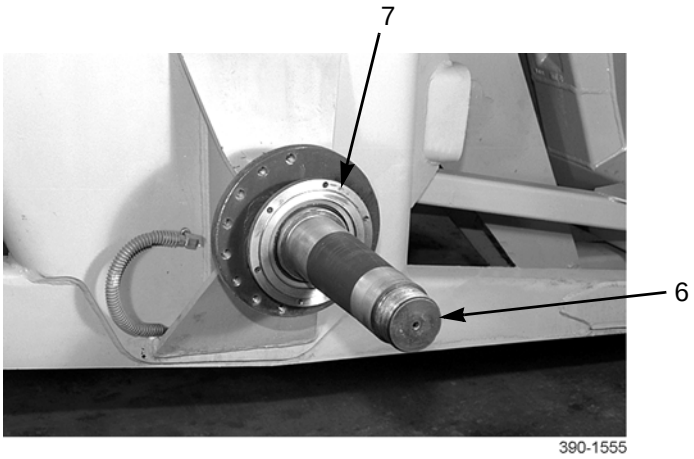


3. Using crossbar, remove inner roller bearing cone (5) from axle shaft (6).

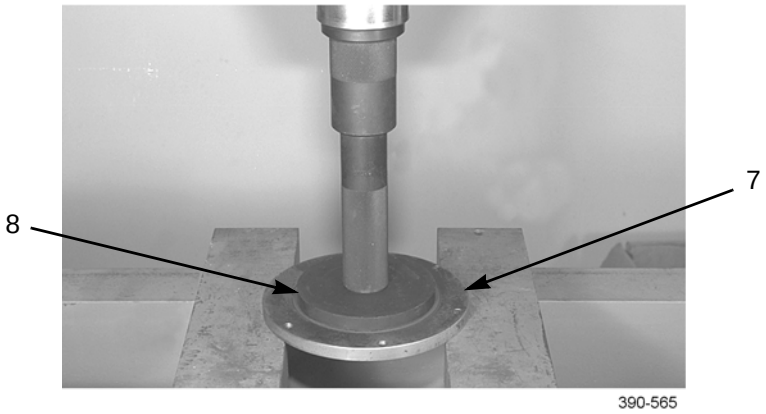


REMOVAL - CONTINUED

4. Remove plate (7) from axle shaft (6).



5. Using driver and hydraulic press, remove lip seal (8) from plate (7). Discard lip seal



INSTALLATION

NOTE

Spring side of lip seal must be toward inside of plate.

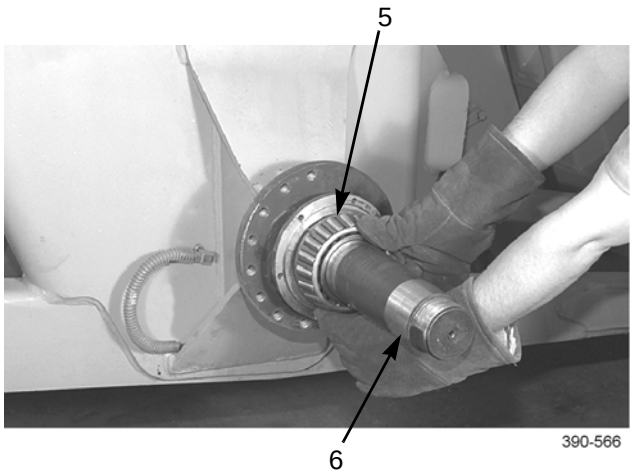
1. Using driver and press, install new lip seal (8) on plate (7) until lip seal is even with outside surface of plate.
2. Clean and inspect seal surface on axle shaft (6). Apply a thin coat of grease on axle shaft.
3. Install plate (7) on axle shaft (6).

INSTALLATION - CONTINUED

WARNING

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

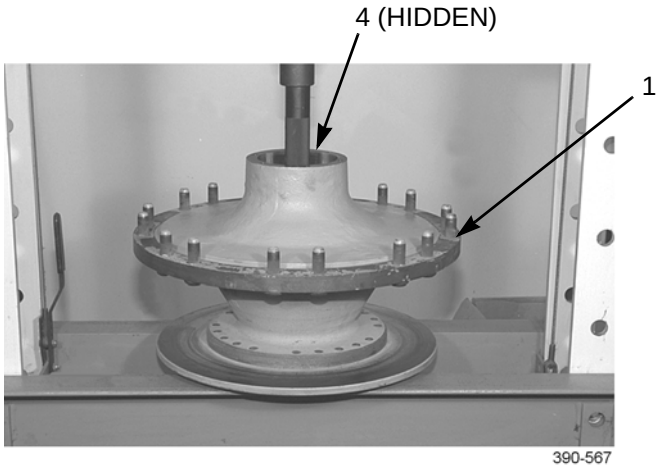
4. Heat inner roller bearing cone (5) to 275°F (135°C) and install inner roller bearing cone on axle shaft (6).



NOTE

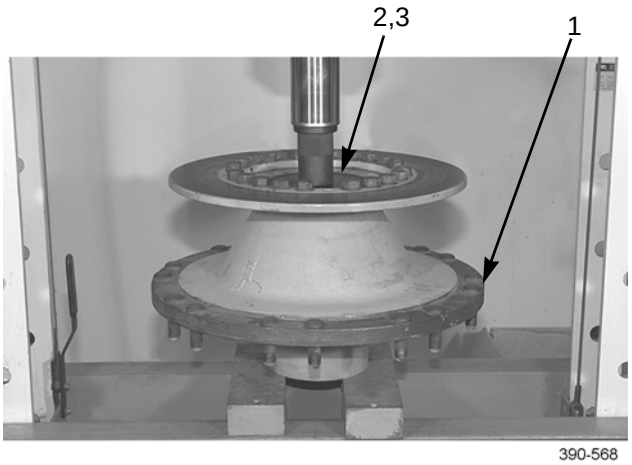
Roller bearing cup should face top of wheel.

5. Using driver and press, install outer roller bearing cup (4) on hub (1).



INSTALLATION - CONTINUED

6. Install tube (3) on hub (1).
7. Using driver and press, install inner roller bearing cup (2) on hub (1) until roller bearing cup is seated.



8. Apply coat of GAA grease to roller bearings and axle shaft.
9. Install rear hub and disc (WP 0010 00).

END OF WORK PACKAGE

WATER PUMP HYDRAULIC MOTOR REPLACEMENT 0037 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, field automotive (Item 23, WP 0045 00)

Materials/Parts

Cap set, protective (Item 5, WP 0044 00)

Oil, lubricating (Item 24 or 29, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Tag, marker (Item 39, WP 0044 00)

Seal, O-ring (3)

Washer, lock (8)

References

TM 5-3800-205-23-1

Personnel Required

Two

Equipment Condition

Quick disconnect hoses disconnected at top of tank (TM 5-3800-205-10-2)

Front of tank level (TM 5-3800-205-10-2)

Toolbox removed (WP 0019 00)

Rear steps removed (WP 0018 00)

WARNING

Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

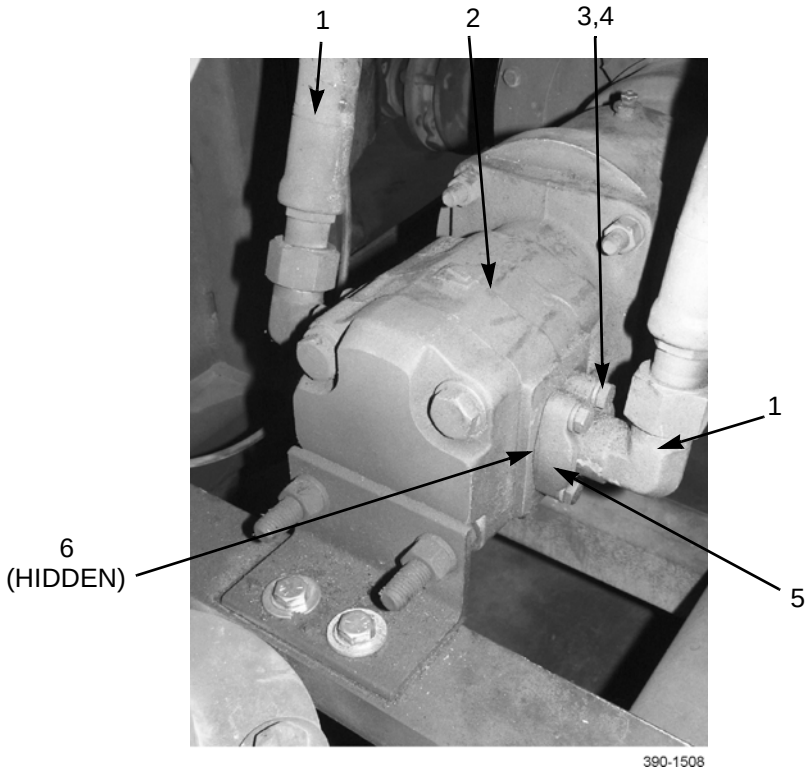
Tag hydraulic hoses to ensure correct installation.

REMOVAL

NOTE

Use a suitable container to capture draining oil. Dispose of fluids according to local regulations and mandates. Ensure all spills are cleaned up.

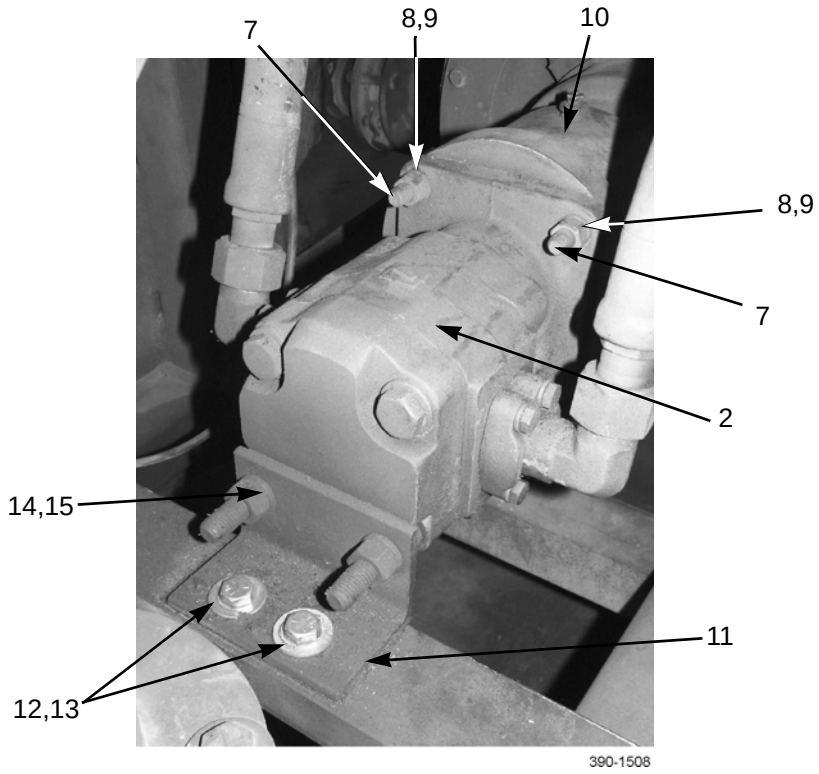
1. Remove four bolts (3) and lockwashers (4) from hydraulic hose coupler (5). Discard lockwashers.
2. Remove hose assembly (1) from hydraulic motor (2). Remove and discard O-ring (6).



3. Repeat steps 1 and 2 for other hose assembly (1).

REMOVAL - CONTINUED

4. Drain oil from water pump bearing housing (10) (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
5. Remove two bolts (12) and lockwashers (13) from support bracket (11) and frame. Discard lockwashers.



NOTE

Support bracket and hydraulic motor are removed as an assembly.

6. Loosen, but do not remove, two nuts (14) and lockwashers (15) from support bracket (11).
7. Remove four nuts (8) and lockwashers (9) securing hydraulic motor (2) to water pump bearing housing (10). Discard lockwashers.

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury or death to personnel.

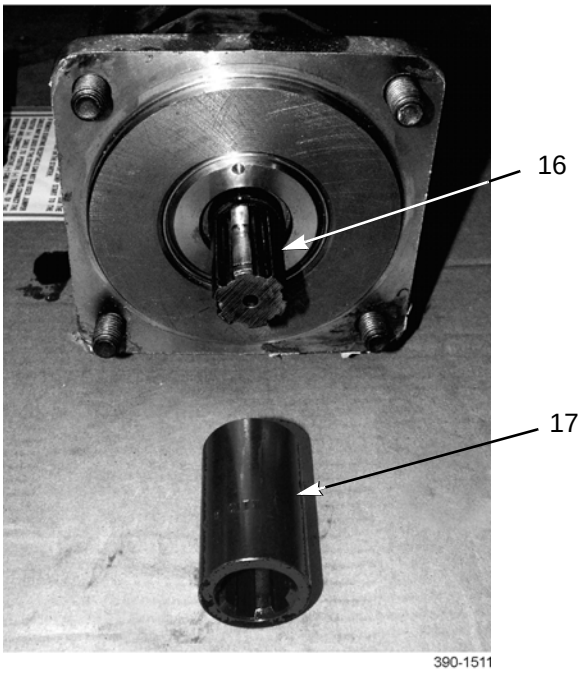
NOTE

Hydraulic motor weighs 55 lb (25 kg).

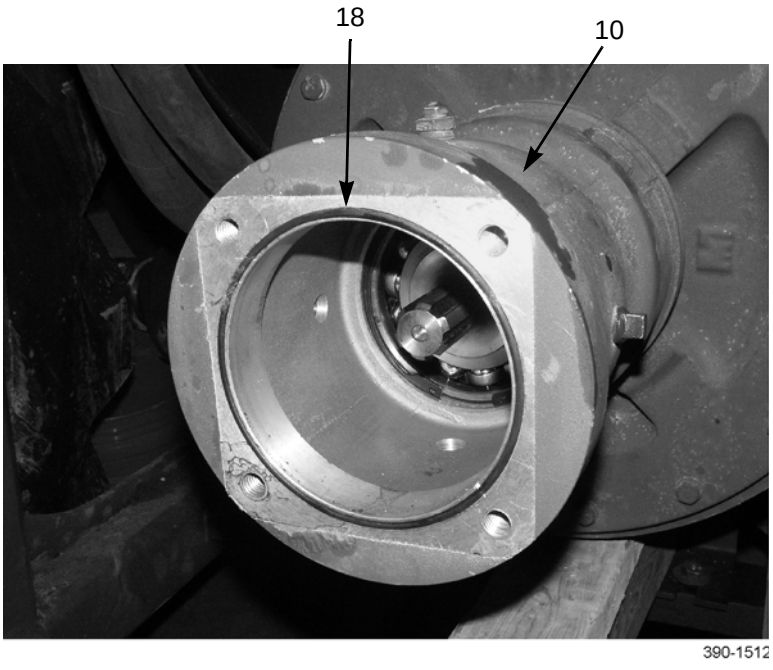
8. With assistance, slide hydraulic motor (2) off studs (7) and remove.
9. Remove two nuts (14), lockwashers (15), and support bracket (11) from hydraulic motor (2). Discard lockwashers.

REMOVAL - CONTINUED

10. Remove coupler (17) from hydraulic motor shaft (16).



11. Remove O-ring (18) from flange of washer pump bearing housing (10) and discard.



INSTALLATION

NOTE

- Ensure all mounting hardware is removed from old motor and assembled onto new hydraulic motor.
- Lubricate new O-rings with oil prior to installation.

1. Install new O-ring (18) in flange of water pump bearing housing (10).
2. Install coupling (17) on hydraulic motor shaft (16).
3. Install support bracket (11) to hydraulic motor (2) with two new lockwashers (15) and nuts (14). Do NOT fully tighten nuts.

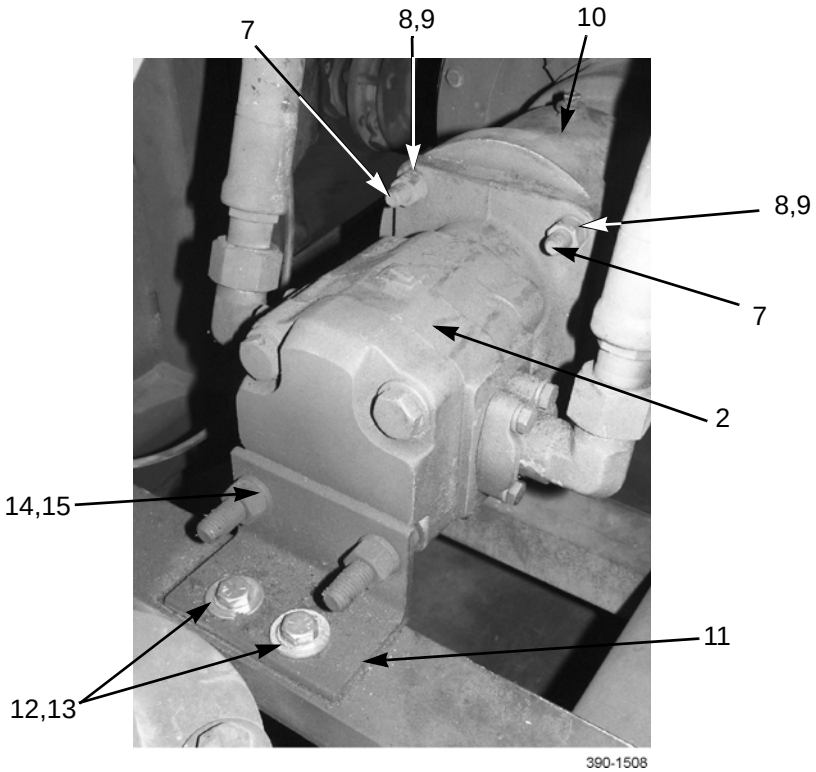
WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury or death to personnel.

NOTE

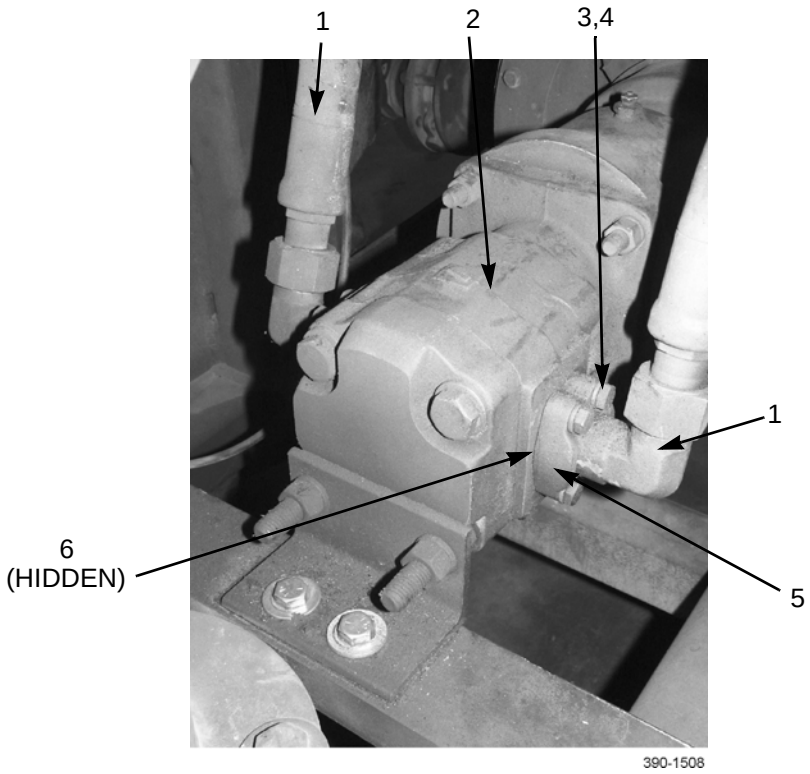
Hydraulic motor weighs 55 lb (25 kg).

4. With assistance, install hydraulic motor (2) on studs (7).
5. Install four new lockwashers (9) and nuts (8) to secure hydraulic motor (2) and tighten.
6. Tighten two lockwashers (15) and nuts (14) to support bracket (11).
7. Install two new lockwashers (13) and bolts (12) to support bracket (11) and frame.
8. Fill water pump bearing housing (10) with oil (Refer to *Unit PMCS* in TM 5-3800-205-23-1).



INSTALLATION - CONTINUED

9. Install new O-ring (6) to elbow fitting of hose assembly (1).
10. Install hose assembly (1) to hydraulic motor (2) with hose coupler (5), four new lockwashers (4), and nuts (3).
11. Repeat steps 9 and 10 to install other hose assembly (1).



12. Connect quick disconnect hoses at top of tank (TM 5-3800-205-10-2).
13. Install toolbox (WP 0019 00).
14. Install rear steps (WP 0018 00).
15. Fill hydraulic reservoir, as required (Refer to *Unit PMCS* in TM 5-3800-205-10-2).

END OF WORK PACKAGE

WATER PUMP MAINTENANCE 0038 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, field automotive (Item 23, WP 0045 00)

Sling, nylon (Item 27, WP 0045 00)

Materials/Parts

Oil, lubricating (Item 25 or 30, WP 0044 00)

Rag, wiping (Item 31, WP 0044 00)

Bearing

Gasket

Pin, cotter

Seal assembly

Seal, lip

Materials/Parts - Continued

Seal, O-ring (diffuser)

Seal, O-ring (power head)

Shim (as required)

Slinger

Washer, lock (16)

Washer, lock (4)

Personnel Required

Two

Equipment Condition

Tank drained (TM 5-3800-205-10-2)

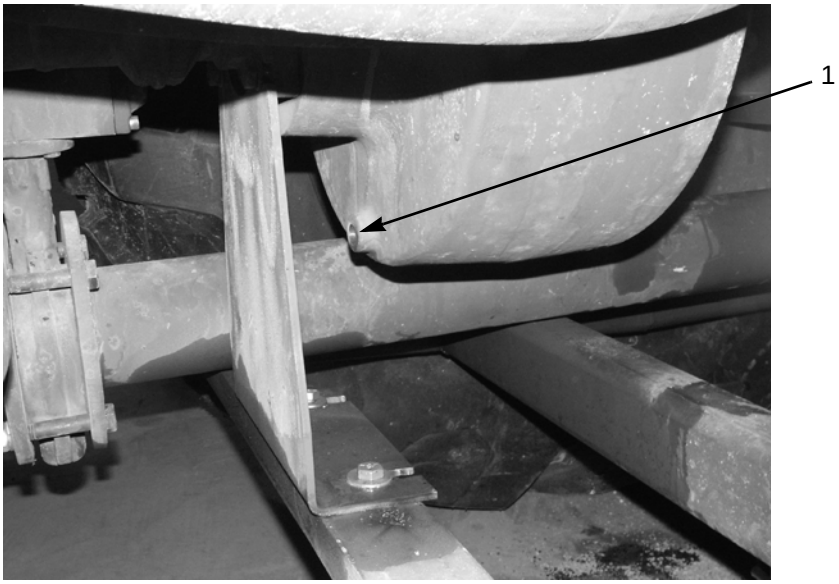
Water pump hydraulic motor removed (WP 0037 00)

NOTE

- Care must be taken to ensure fluid is contained during performance of inspection, maintenance and repair. Be prepared to collect fluid with a suitable container.
- Dispose of all fluids in accordance with local regulations and mandates.

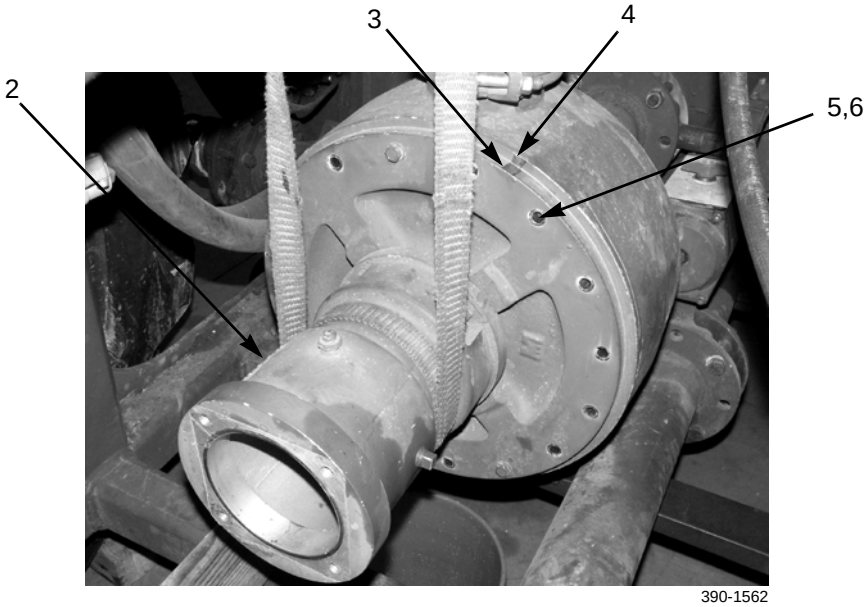
REMOVAL

1. Remove water pump drain plug (1) and allow water to drain completely. Install drain plug.



390-1535

2. Position nylon sling on power head (2) assembly.
3. Place alignment marks on adapter (3) and water pump housing (4).
4. Remove 16 bolts (5) and lockwashers (6) from pump housing (4). Discard lockwashers.



390-1562

REMOVAL - CONTINUED

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during the 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.

NOTE

Power head weighs 115 lb (52 kg).

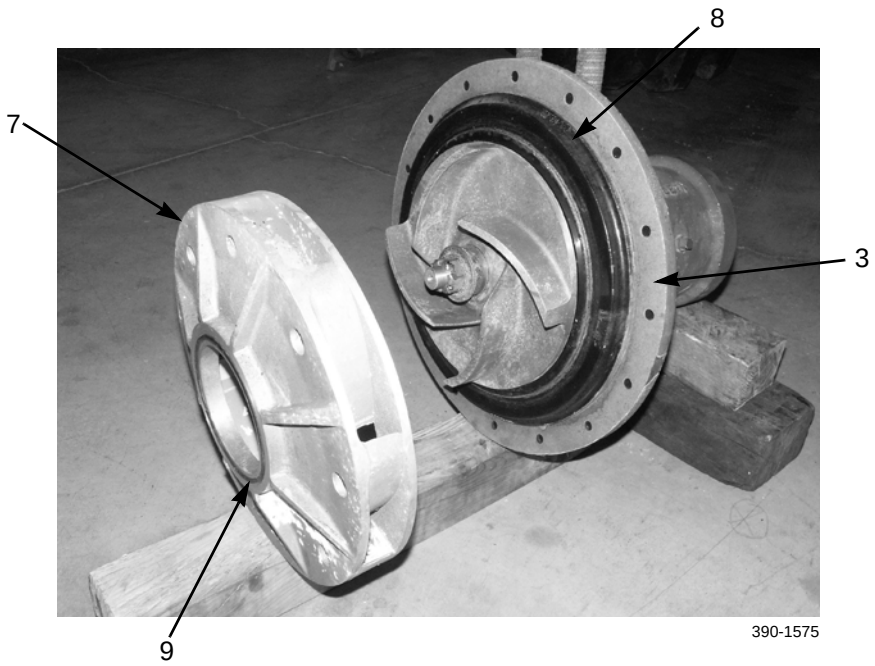
5. With assistance, remove power head (2) assembly from pump housing (4).

DISASSEMBLY

CAUTION

Use care when handling power head and diffuser. Diffuser is loose and could fall from power head, resulting in damage to diffuser.

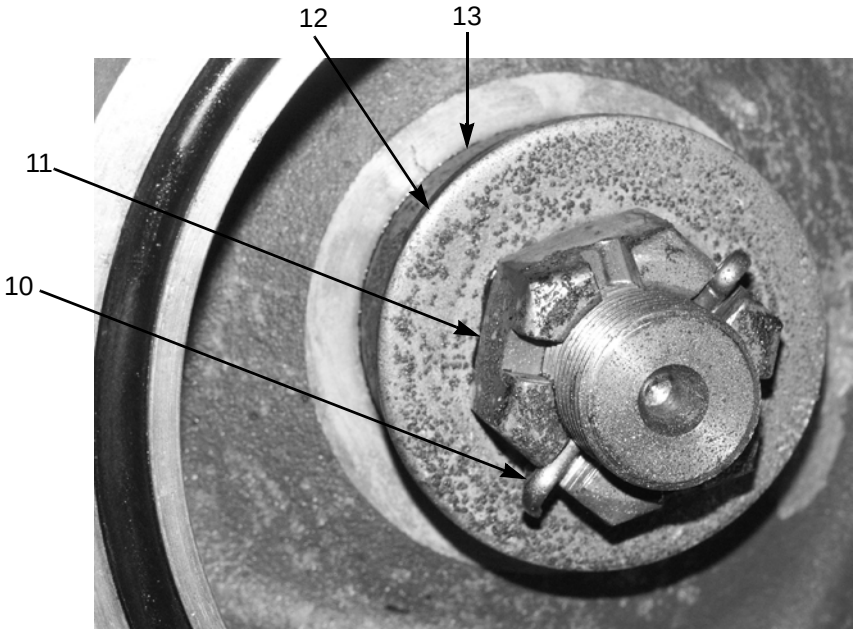
1. Remove diffuser (7) and gasket (8) from adapter (3). Remove and discard O-ring seal (9) from diffuser.



390-1575

DISASSEMBLY - CONTINUED

2. Remove cotter pin (10), castle nut (11), washer (12), and spacer (13). Discard cotter pin.



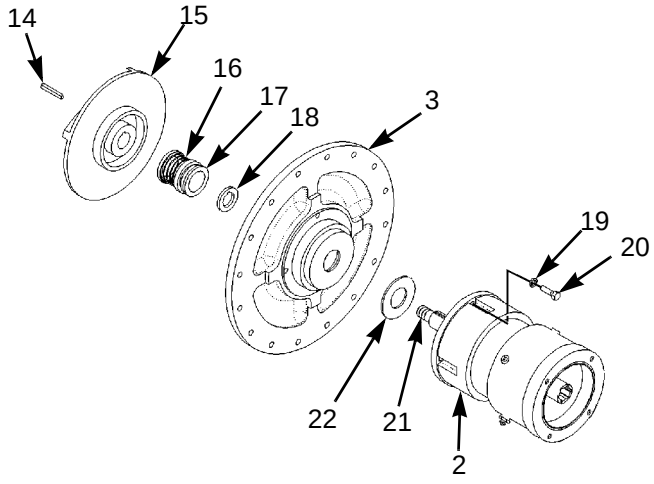
390-1576

3. Remove impeller (15) and shims (18) from pump shaft (21). Set shims aside for later use.

NOTE

Note positioning of seal assembly to ensure correct assembly of new seal.

4. Remove seal spring (16) from seals (17). Discard seal assembly.
5. Remove key (14) from shaft (21).
6. Remove four bolts (20), lockwashers (19), adapter (3), and slinger (22) from power head (2). Discard lockwashers and slinger.



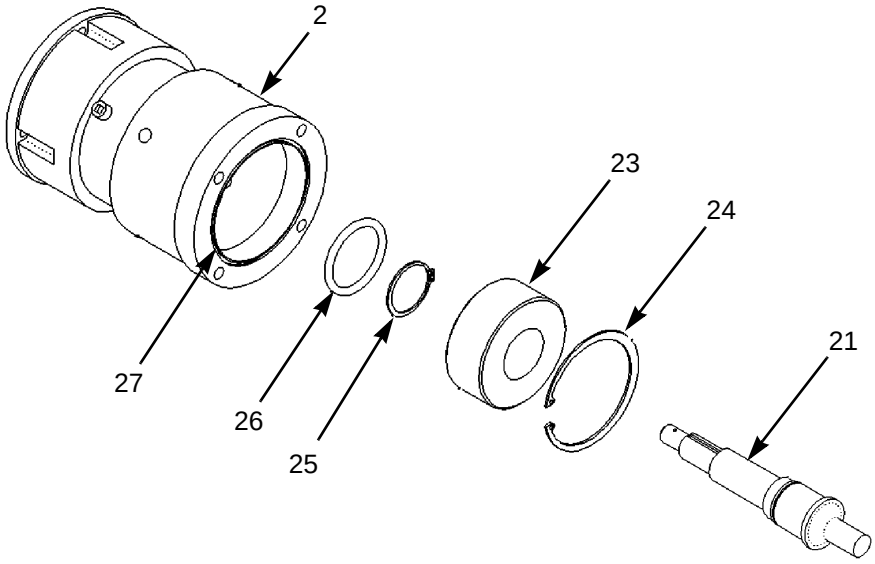
390-2025

DISASSEMBLY - CONTINUED

WARNING

Use extreme care when removing retaining ring. Failure to follow this warning may result in injury to personnel.

7. Remove retaining ring (24).
8. Position a hydraulic press on tip of shaft (21) and press shaft and bearing (23) from power head (2).
9. Remove lip seal (26) from shaft (21). Discard lip seal.
10. Remove retaining ring (25) from shaft (21).
11. Press bearing (23) from shaft (21). Discard bearing.
12. Remove O-ring (27) from power head (2). Discard O-ring.



390-1578

ASSEMBLY

1. Lubricate new O-ring (27) with oil and install on power head (2).
2. Press new bearing (23) on shaft (21).
3. Install retaining ring (25) on shaft (21).
4. Lubricate new lip seal (26) and install on shaft (21), with steel side of lip seal facing out.

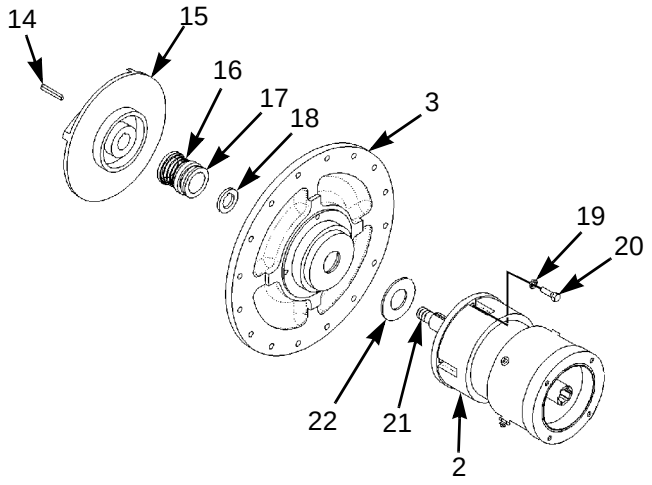
CAUTION

Do NOT roll lip seal when installing bearing shaft. Damage to pump may result.

5. Install shaft (21) with bearing (23) all the way into power head (2).
6. Install retaining ring (24).

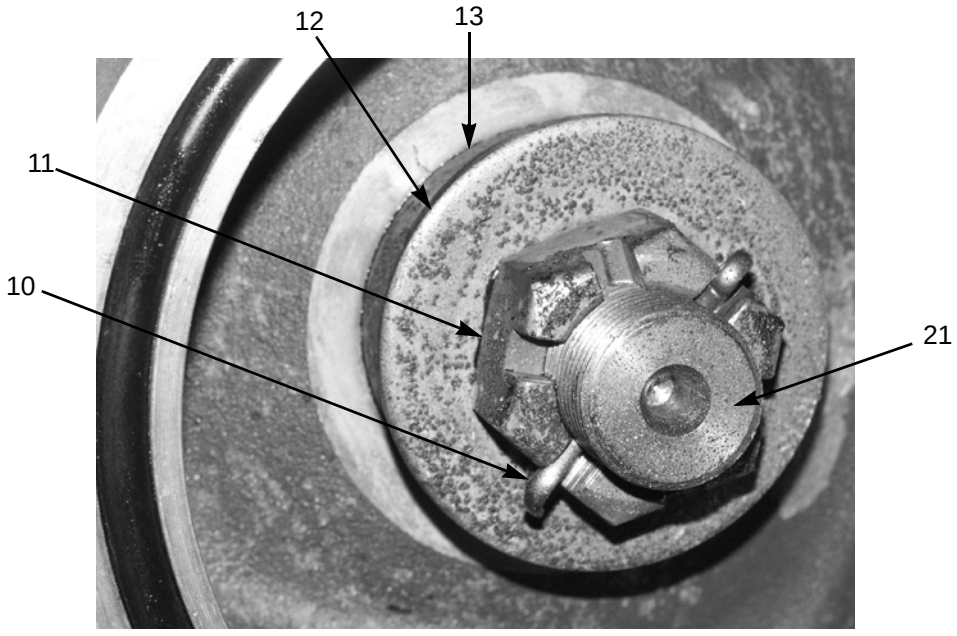
ASSEMBLY - CONTINUED

7. Install new slinger (22) on shaft (21).
8. Install adapter (3) to power head (2) with four new lockwashers (19) and bolts (20).
9. Assemble new seals (17) and new seal spring (16) on shaft (21).
10. Install key (14), shims (18), and impeller (15) on shaft (21).



390-2025

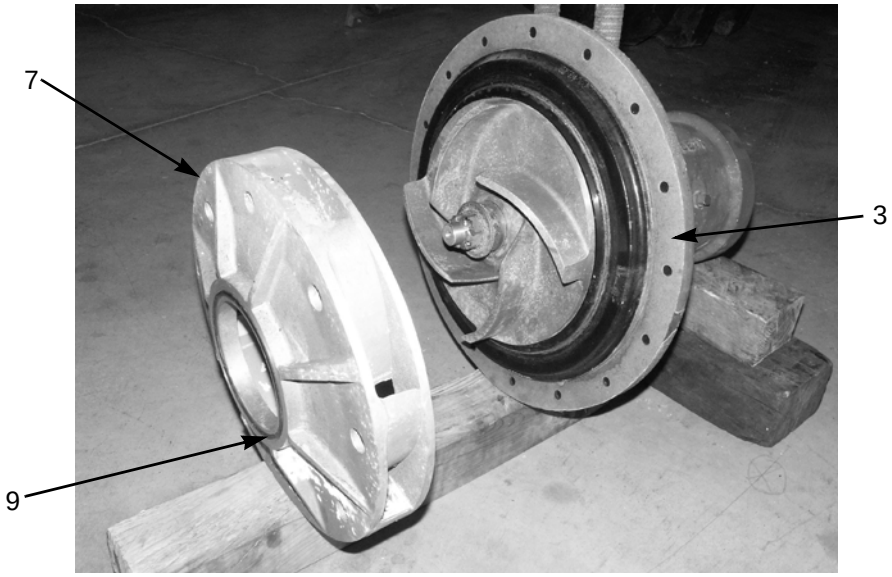
11. Install spacer (13), washer (12), and castle nut (11) on shaft (21).



390-1576

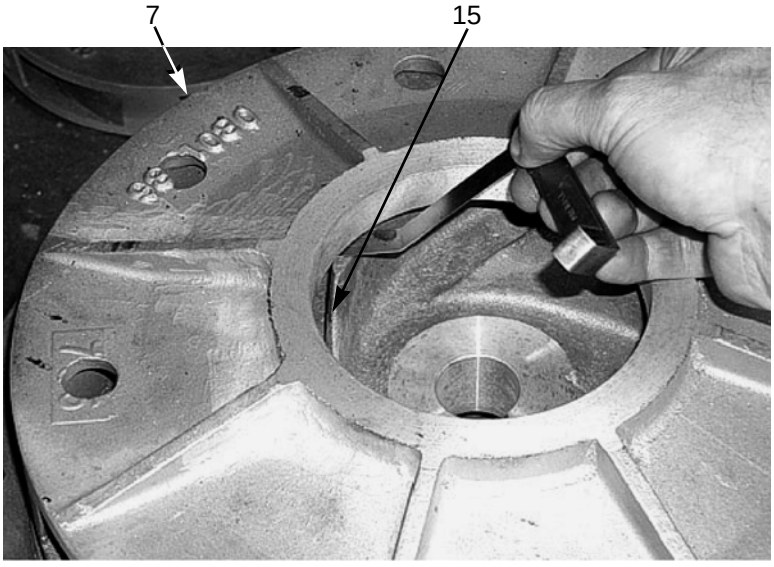
12. Lubricate with oil and install new O-ring seal (9) in diffuser (7).
13. Install diffuser (7) on adapter (3).

ASSEMBLY - CONTINUED



390-1575

14. Using a feeler gage, measure gap between fin of impeller (15) and diffuser (7). Measurement should be 0.005-0.010 in. (0.13-0.25 mm).
    a. If measurement is within specification, go to step 18.
    b. If measurement is not within specification, continue with step 15.



390-1748

15. Remove diffuser (7), castle nut (11), washer (12), spacer (13), and impeller (15).
16. Add or remove shims (18) as required.
17. Install impeller (15), spacer (13), washer (12), and castle nut (11). Install diffuser (7) on adapter (3), then repeat step 14 to recheck clearance.
18. Remove diffuser (7), then tighten castle nut (11) to 93 lb-ft (126 Nm).
19. Tighten castle nut (11) until keyway in nut aligns with hole in shaft (21). Install new cotter pin (10).

INSTALLATION

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during the 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.

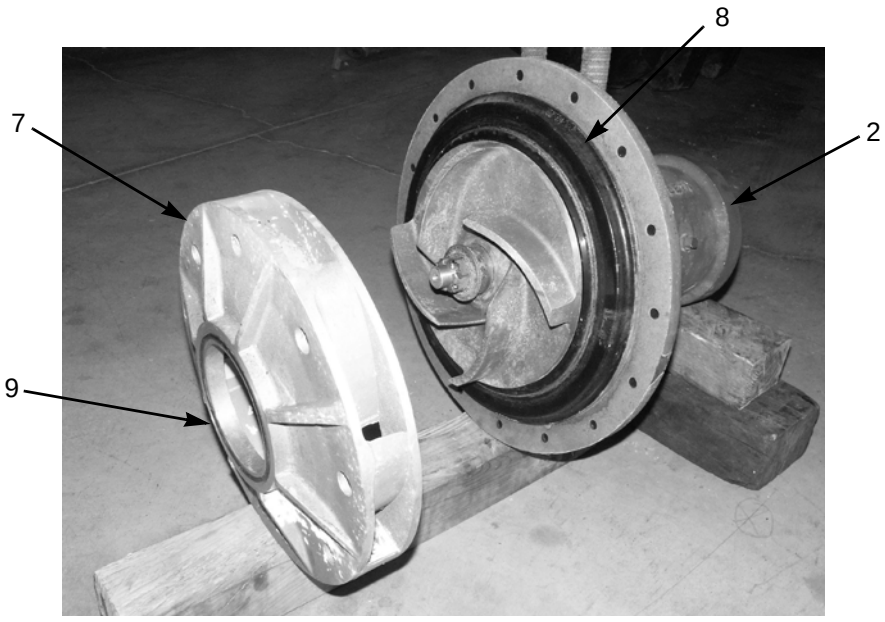
CAUTION

Use care when handling power head and diffuser. Diffuser is loose and could fall from power head, resulting in damage to diffuser.

NOTE

Power head weighs 115 lb (52 kg).

1. Ensure O-ring (9) is positioned in diffuser (7).



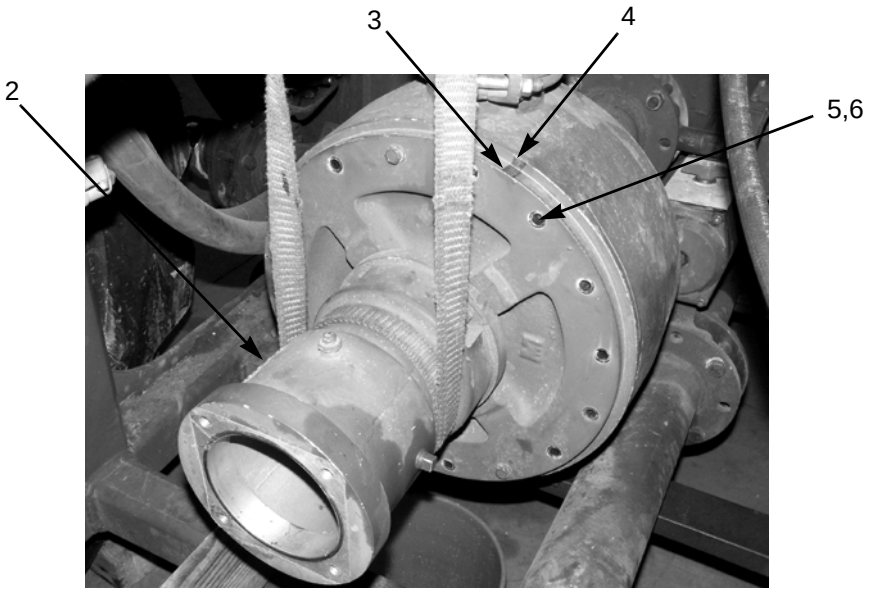
390-1575

2. Lubricate with oil and install new gasket (8) on power head (2). Position diffuser (7) on power head.

3. Position nylon sling on power head (2) assembly. With assistance, install power head assembly on pump housing (4). Ensure alignment marks on adapter (3) and pump housing (4) are aligned.

INSTALLATION - CONTINUED

4. Install 16 new lockwashers (6) and bolts (5) on power head (2) assembly. Tighten bolts in a crisscross pattern.
5. Tighten bolts (5) to 35 lb-ft (45 Nm).
6. Remove nylon sling from power head (2) assembly.



390-1562

7. Install water pump hydraulic motor (WP 0037 00).

END OF WORK PACKAGE

WATER PUMP HOUSING REPLACEMENT 0039 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Shop equipment, field automotive (Item 23, WP 0045 00)

Sling, nylon (Item 27, WP 0045 00)

Materials/Parts

Seal, coupling (as required)

Washer, lock (2)

Personnel Required

Two

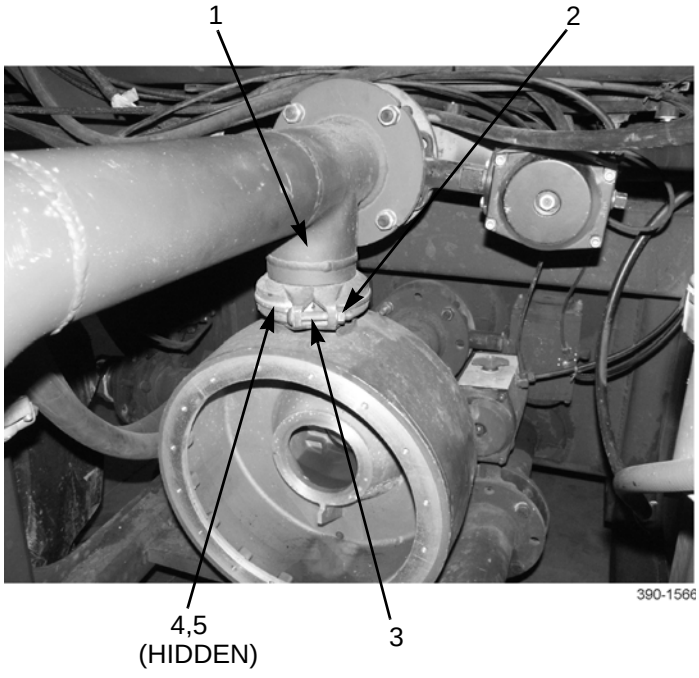
Equipment Condition

Vacuum valve removed (WP 0033 00)

Water pump removed (WP 0038 00)

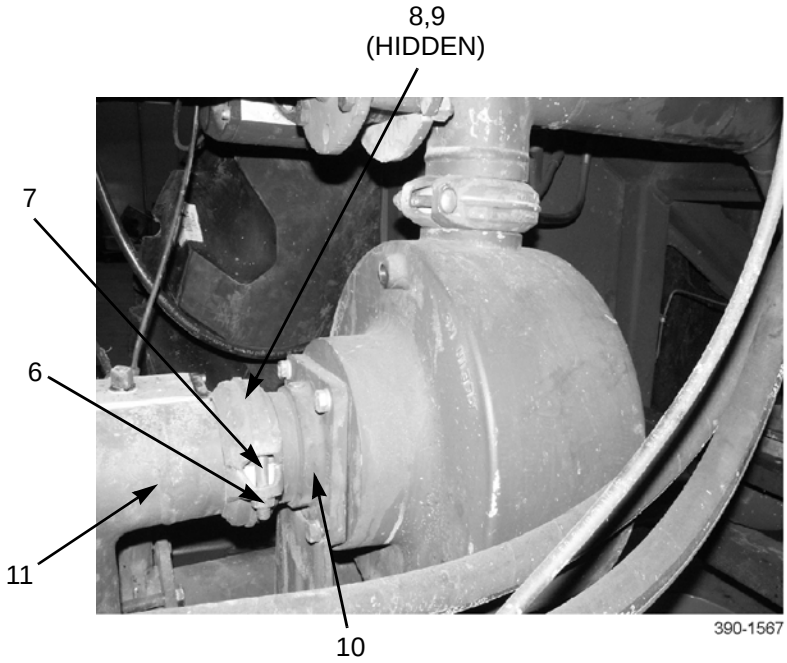
REMOVAL

1. Remove two nuts (2), bolts (3), coupling (4), and seal (5) from upper pipe (1).



REMOVAL - CONTINUED

2. Remove two nuts (6), bolts (7), coupling (8), and seal (9) from suction pipe (11) and flange (10).



NOTE

Do not remove mounting bolts until water pump housing is secured with lifting device.

3. Loosen, but do not remove, two nuts (12), lockwashers (13), four flatwashers (14), and two bolts (15) on mounting bracket (16). Move water pump housing (17) as necessary to position nylon sling and suitable lifting device on housing.

4. Remove two nuts (12), lockwashers (13), four flatwashers (14), and two bolts (15) from mounting bracket (16) and water distributor frame (18). Discard lockwashers.

WARNING

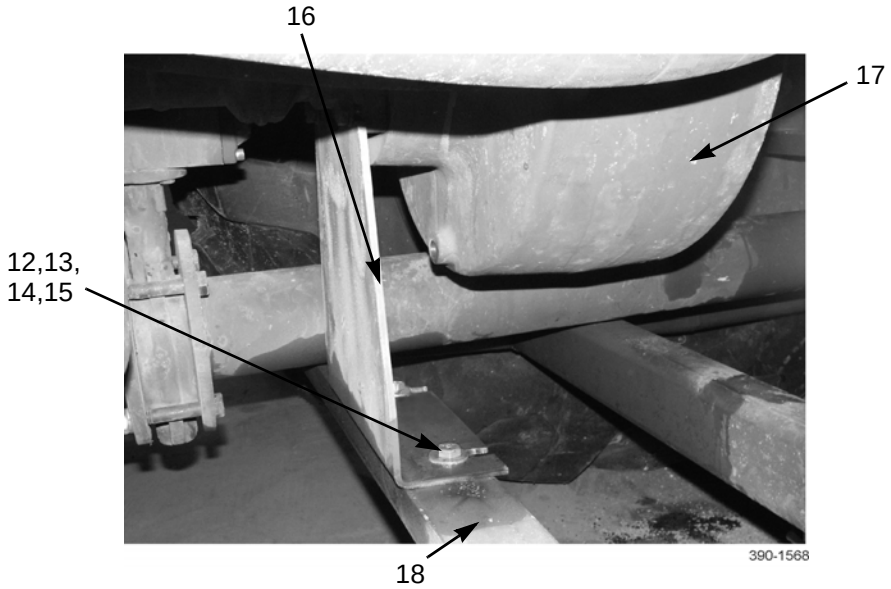
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during the procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result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

NOTE

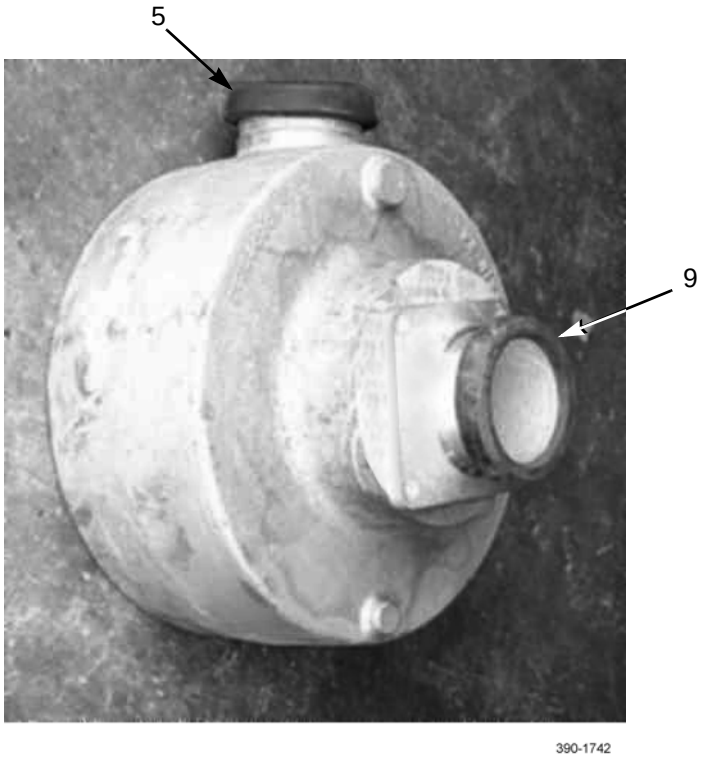
Water pump housing weighs 115 lb (52 kg).

5. Remove water pump housing (17) and mounting bracket (16) from machine and place on suitable blocks.

REMOVAL - CONTINUED



6. Inspect seals (5 and 9) for dry rot, cracks or tears. Replace seals if damaged.



INSTALLATION

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during the 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.

NOTE

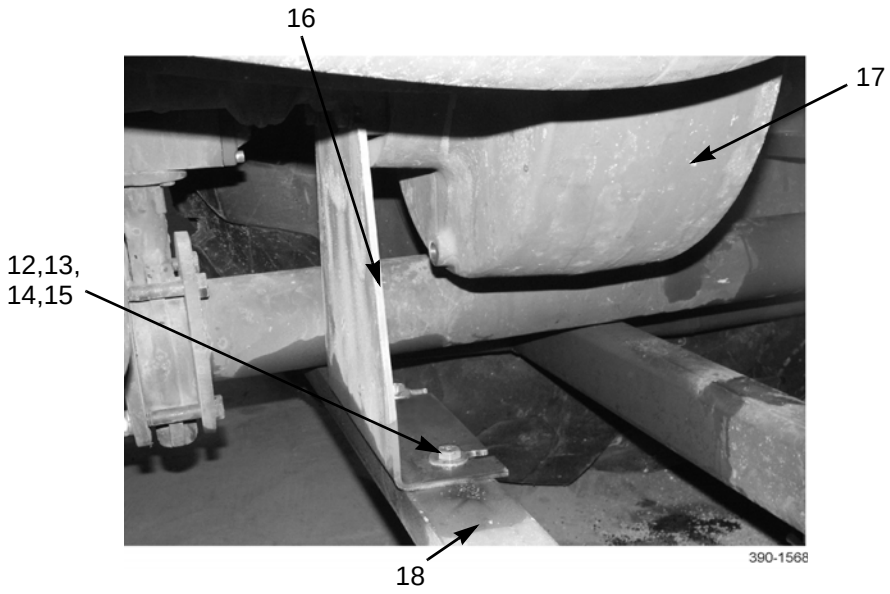
Water pump housing weighs 115 lb (52 kg).

1. Attach nylon sling and suitable lifting device to water pump housing (17).
2. With assistance, position water pump housing (17) and mounting bracket (16) on water distributor frame (18).

NOTE

Do NOT tighten nuts until water pump housing installation and alignment are complete.

3. Install two bolts (15), four flatwashers (14), two new lockwashers (13), and nuts (12) to mounting bracket (16) and water distributor frame (18).

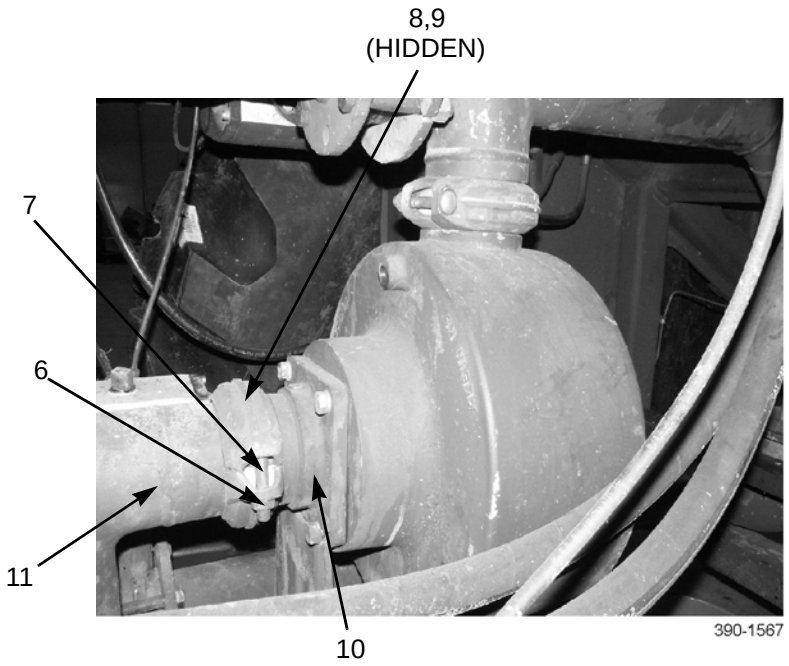


INSTALLATION - CONTINUED

NOTE

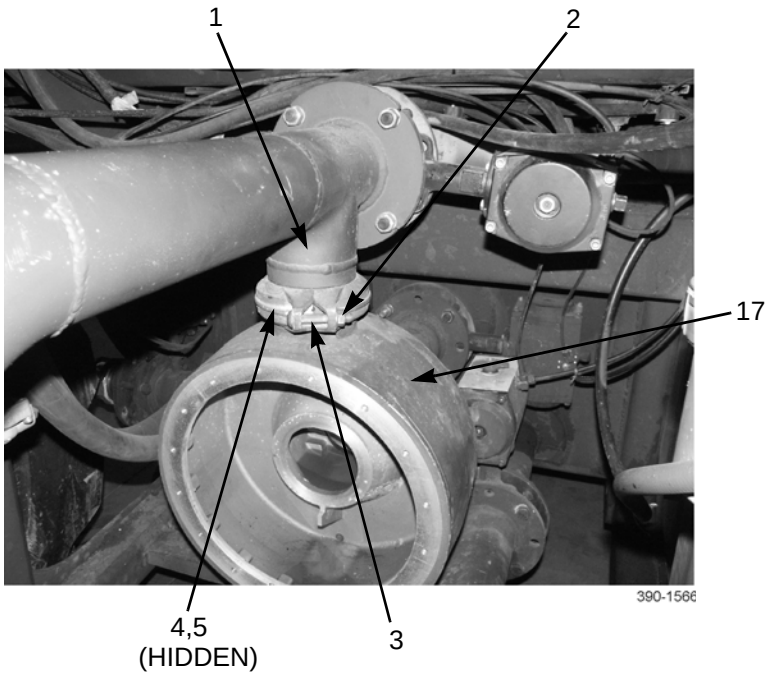
Do NOT tighten coupling nuts at this time.

4. Install seal (9) and coupling (8) on suction pipe (11) and flange (10) with two bolts (7) and nuts (6).

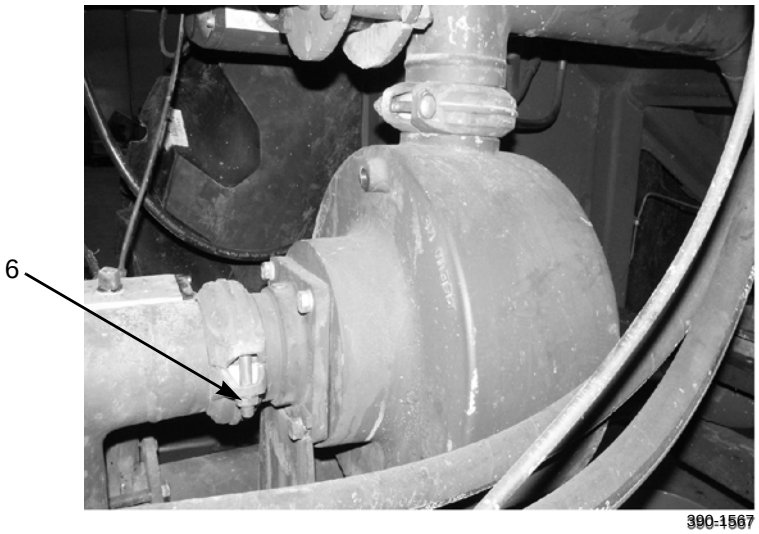


INSTALLATION - CONTINUED

5. Remove nylon sling and lifting device from water pump housing (17).
6. Install seal (5) and coupling (4) on upper pipe (1) with two bolts (3) and nuts (2).
7. Tighten two nuts (2).



8. Tighten two nuts (6).



INSTALLATION - CONTINUED

9. Tighten two nuts (12).

10. Install water pump (WP 0038 00).
11. Install vacuum valve (WP 0033 00).

END OF WORK PACKAGE

WATER PUMP CHECK VALVE ASSEMBLY MAINTENANCE 0040 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0045 00)

Materials/Parts

Gasket

Seal, coupling (as required)

Washer, lock (8)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-2)

Parking brake engaged (TM 5-3800-205-10-2)

Wheels chocked (TM 5-3800-205-10-2)

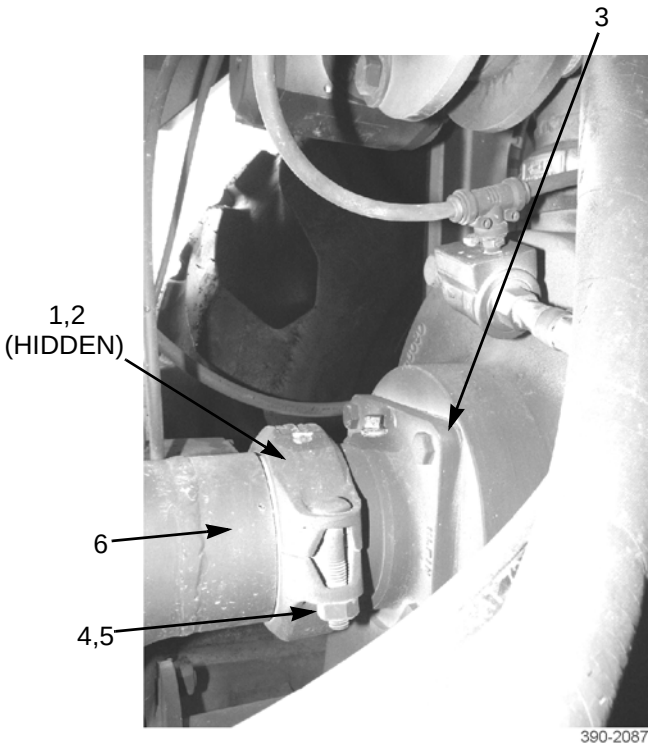
Water pump drained (TM 5-3800-205-10-2)

Tank drained (TM 5-3800-205-10-2)

Battery disconnect switch in OFF position (TM 5-3800-205-10-2)

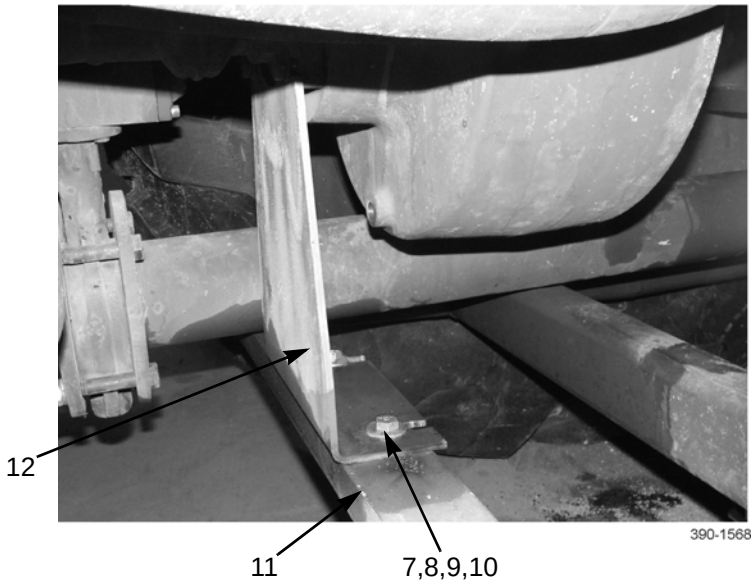
REMOVAL

1. Remove two nuts (4), bolts (5), and coupling (1) from suction pipe (6) and flange (3).
2. Slide seal (2) back onto suction pipe (6).



REMOVAL - CONTINUED

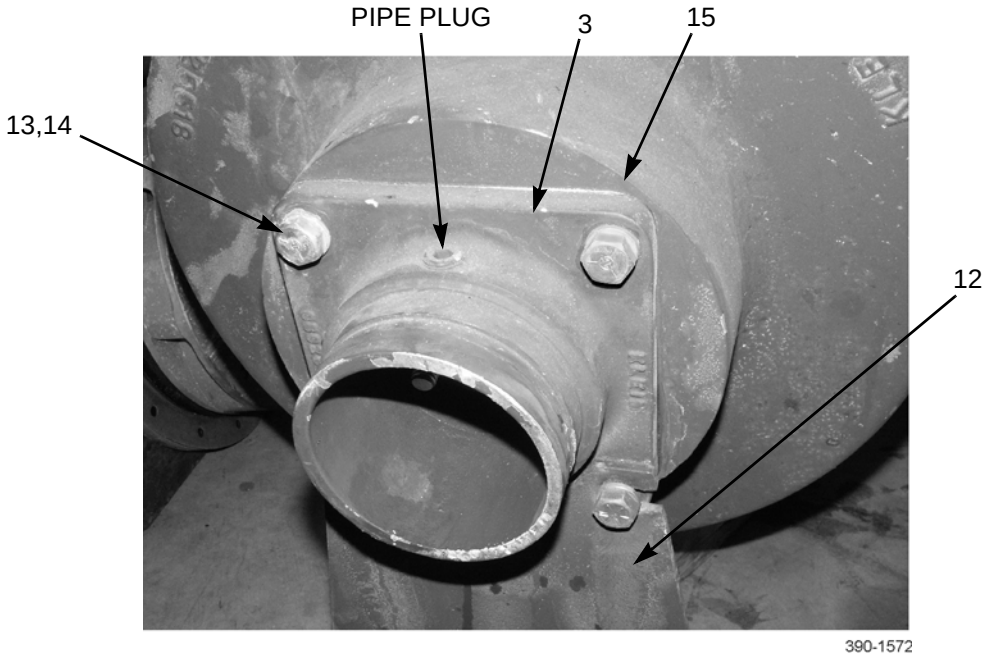
3. Remove two nuts (7), lockwashers (8), four flatwashers (9), and two bolts (10) from support bracket (12) and water distributor frame (11). Discard lockwashers.



NOTE

Note position of pipe plug in flange to ensure proper installation.

4. Remove four bolts (13), lockwashers (14), and support bracket (12). Discard lockwashers.
5. Remove flange (3) from pump housing (15).

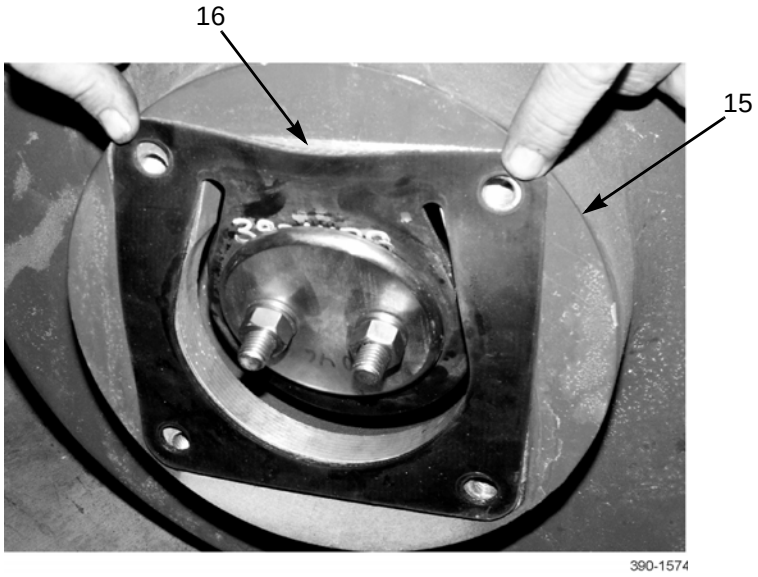


REMOVAL - CONTINUED

NOTE

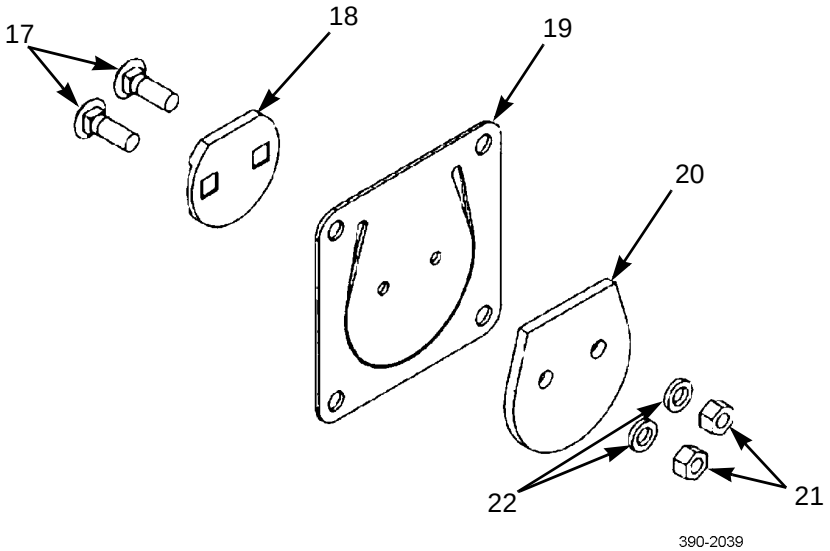
Note position of check valve assembly to ensure correct installation.

6. Remove check valve assembly (16) from pump housing (15).



DISASSEMBLY

Remove two nuts (21), lockwashers (22), bolts (17), and separate plates (18 and 20) from gasket (19). Discard lockwashers and gasket.

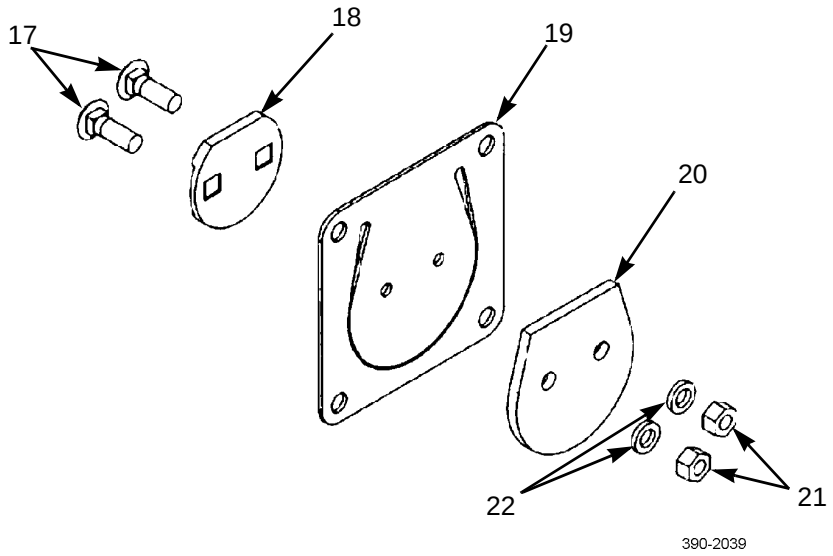


ASSEMBLY

NOTE

Note position of plates to ensure correct installation.

1. Align two plates (18 and 20) on new gasket (19).
2. Install two bolts (17), new lockwashers (22), and nuts (21).

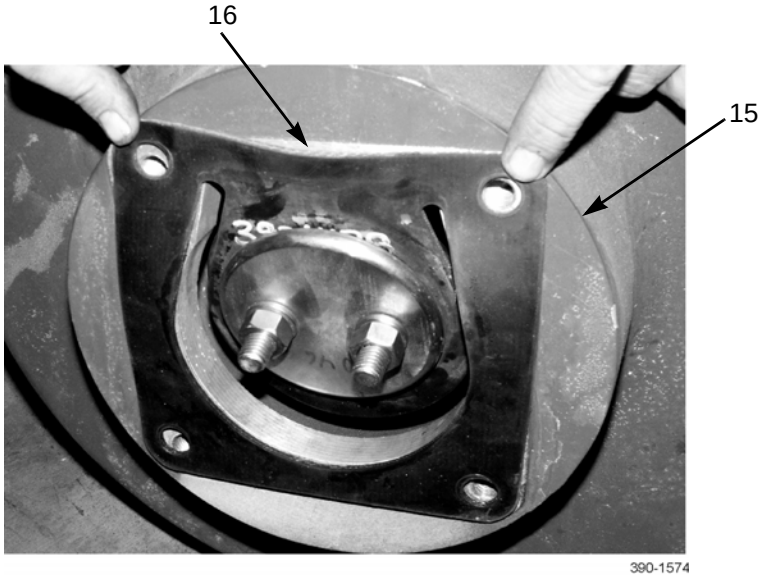


INSTALLATION

NOTE

Ensure that nuts and threads of plate bolts face away from water pump housing.

1. Position check valve assembly (16) on pump housing (15).

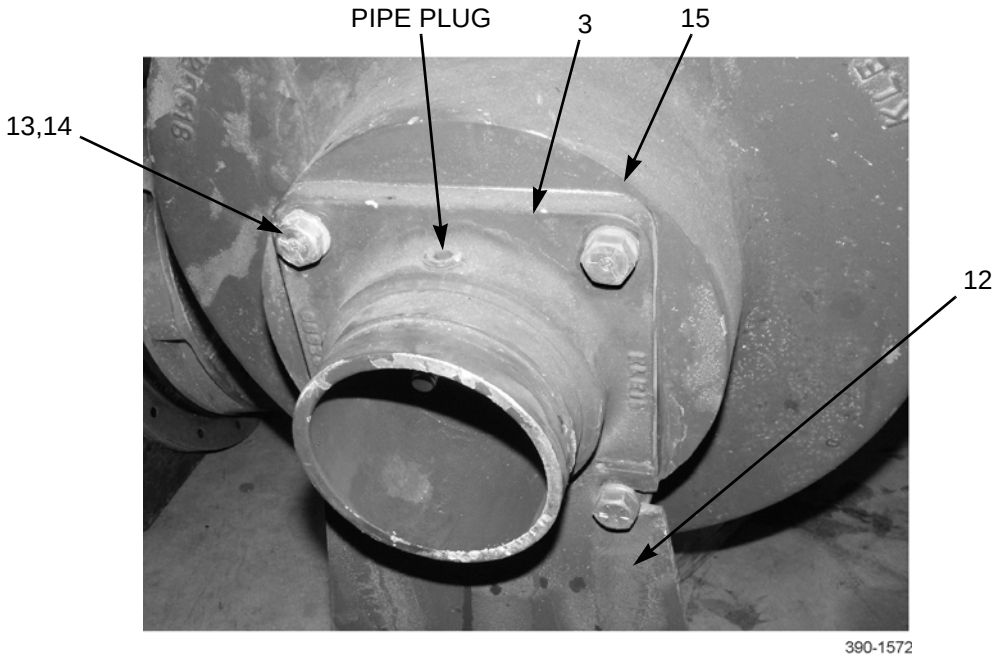


INSTALLATION - CONTINUED

NOTE

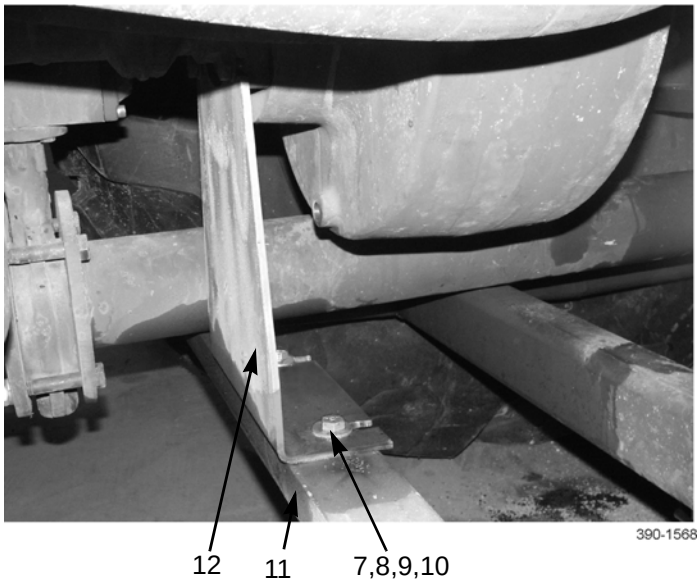
Ensure flange is oriented with pipe plug at top.

2. Position support bracket (12) and flange (3) at pump housing (15). Loosely install four new lockwashers (14) and bolts (13).



INSTALLATION - CONTINUED

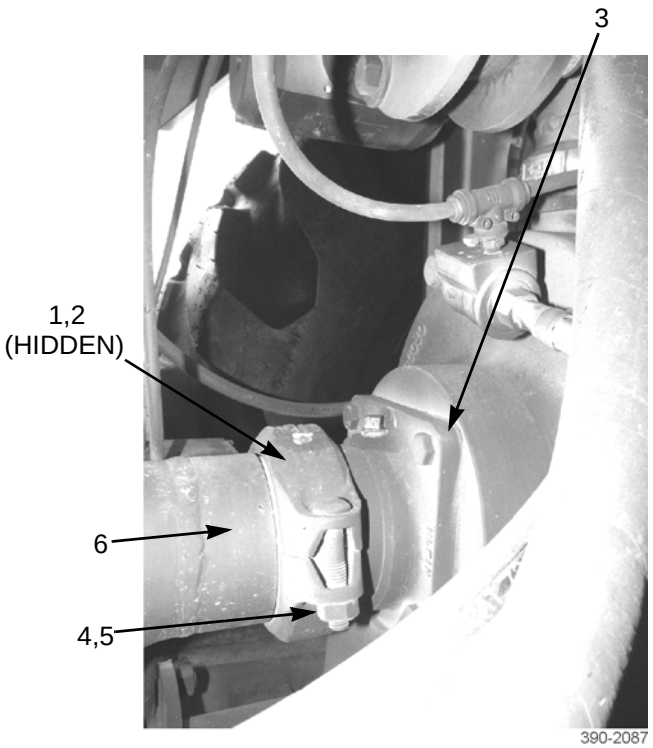
3. Secure support bracket (12) to water distributor frame (11) with two bolts (10), four flatwashers (9), two new lockwashers (8), and nuts (7).



4. Fully tighten four bolts (13).

INSTALLATION - CONTINUED

5. Inspect seal (2) for dry rot, cracks or tears. Replace seal if damaged.
6. Slide seal (2) over suction pipe (6) and flange (3).
7. Install coupling (1) with two bolts (5) and nuts (4).



END OF WORK PACKAGE

CHAPTER 3
SUPPORTING INFORMATION

REFERENCES 0041 00

SCOPE

This work package lists all forms, field manuals, technical bulletins, technical manuals, and other publications referenced in this manual and which apply to the operation of the 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

Consolidated Publication of Component Lists . . . . . EM 0074

Functional User's Manual for the Army Maintenance Management System. . . . . .DA Pam 738-750

FORMS

Refer to DA Pam 738-750, *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

Product Quality Deficiency Report. . . . . SF Form 368

Recommended Changes to Publications and Blank Forms. . . . . DA Form 2028

FIELD MANUALS

Airdrop of Supplies and Equipment . . . . . FM 10-576 Series

Basic Cold Weather Manual . . . . . .FM 31-70

Camouflage, Concealment, and Decoys . . . . . .FM 20-3

Chemical and Biological Contamination Avoidance . . . . . .FM 3-3

Desert Operations . . . . . .FM 90-3

First Aid for Soldiers. . . . . .FM 21-11

Manual for the Wheeled Vehicle Driver . . . . . .FM 21-305

Multiservice Helicopter Sling Load: Dual-Point Load Rigging Procedures. . . . . FM 10-450-5

NBC Decontamination . . . . . .FM 3-5

NBC Protection . . . . . .FM 3-4

Northern Operations . . . . . .FM 31-71

Nuclear Contamination Avoidance . . . . . FM 3-3-1

Operations and Maintenance of Ordnance Materiel in Cold Weather . . . . . .FM 9-207

Painting Instructions for Army Materiel . . . . . .FM 43-0139

Unit Air Movement Planning . . . . . .FM 55-9

REFERENCES - CONTINUED 0041 00

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

Care, Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Tubes. . . . . TM 9-2610-200-14

Destruction of Army Materiel to Prevent Enemy Use . . . . . TM 750-244-6

Field Maintenance Manual (Includes Unit and Direct Support Maintenance) for Scraper, Tractor, Elevating, Self-Propelled, 613CS and Distributor, Water, Tank Type, 613CWD . . . . . TM 9-3800-205-23-1

Field Maintenance RPSTL for Scraper, Tractor, Elevating. Self-Propelled, 613CS and Distributor, Water, Tank Type, 613CWD. . . . . TM 5-3800-205-23P

Operator's, Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14

Operator's Manual for Distributor, Water, Tank Type, 613CWD. . . . . TM 5-3800-205-10-2

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

Marine Lifting and Lashing Handbook. . . . . MTMCTEA Reference 97-55-22

Prevention of Motor Vehicle Accidents . . . . . AR 385-55

Tiedown Handbook for Rail Movements . . . . . MTMCTEA Pamphlet 55-19

Tiedown Handbook for Truck Movements. . . . . MTMCTEA Pamphlet 55-20

Transportability Criteria MIL-STD-1366D

Vehicle Preparation Handbook for Fixed Wing Air Movements . . . . . MTMCTEA Reference 99-55-24

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION 0042 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 immediately following the introduction designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown in the MAC (WP 0043 00) in column (4) as:

   Field - includes subcolumns:

   C - Operator/Crew

   O - Unit

   D - Direct Support

   Sustainment - includes subcolumns:

   H - General Support

   D - Depot
3. The tools and test equipment requirements (immediately following the MAC) 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 (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a 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 (e.g., 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, i.e., 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), to preserve, to drain, to paint, or to 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 bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision 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 and 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 that 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

D - 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" column 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.** 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 Requirements, Table 2.
6. **Column (6) - Remarks.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the Remarks, Table 3.

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, TABLE 2

1. **Column (1) - Tools 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/NATO Stock Number.** 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) - Reference Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC) 0043 00

Table 1. MAC for the 613C ASWDS.

(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	0.3						
		Test		0.5	0.5			37	
		Adjust		1.0				37	
		Service		1.0				28,30,37	
		Replace			40.0			18,21,27,37	A
		Repair		2.0	3.0			27,28,29,37	B
		Overhaul							B
	Engine Supports	Inspect		0.3					
		Replace			1.2			27,37	
		Repair			1.0				
	Lifting Brackets, Rear	Replace			0.2			37	
0101	Crankcase, Cylinder Block, and Head								
	Cylinder Head Assembly	Replace			16.8			27,36,37	
		Repair							B
0102	Rear Main Seal Carrier	Replace			6.0			27,37	
	Rear Main Seal	Replace			6.7			15,26,27,37	
	Front Main Seal	Replace			2.6			16,27,37	
	Vibration Damper and Pulley	Replace		0.8				7,28,37	
0103	Flywheel Assembly								
	Flywheel	Replace			6.4			4,27,37	
	Flywheel Housing	Replace			10.8			4,27,37	
0105	Valves, Camshaft, and Timing System								
	Rocker Shaft Group	Replace			3.9			27,37	
	Intake/Exhaust Valves	Replace			17.5			27,37	
	Rocker Arm Cover	Replace		0.7				37	
	Front Cover	Replace			2.0			37	
0106	Engine Lubrication System								
	Oil Pan and Gasket	Replace		1.8				28,37	
	Oil Filter	Replace		0.3				28,37	
	Oil Filter Base Assembly	Replace			0.6			28,37	

Table 1. MAC for the 613C ASWDS - 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
	Crankcase Breather	Service	0.1						
		Replace		0.2				37	
	Oil Pump Assembly	Replace			2.2			27,37	
		Repair			0.5			37	
0108	Manifolds								
	Exhaust Manifold	Replace			3.5			37	
	Intake Manifold	Replace			4.8			37	
03	**FUEL SYSTEM**								
0301	Fuel Injector								
	Injector Nozzle	Replace			3.0			3,36,37	
		Repair							B
	Injector Control Linkage	Replace			6.3			36,37	
		Adjust			5.6			37	
0302	Fuel Transfer Pump and	Adjust			1.0			36	
	Governor Assembly	Replace			4.0			36,37	
		Repair							B
	Fuel Pump, Electric	Replace		0.3				37	
0304	Air Cleaner Assembly	Service	0.2						
		Replace		0.6				37	
		Repair		0.5				37	
	Air Intake Hoses and Tubes	Replace		0.2				37	
0305	Turbocharger Assembly	Replace			4.0			37	
		Repair							B
0306	Fuel Lines and Hoses	Replace		0.2				37	
	Fuel Shutoff Solenoid	Replace		0.2	1.7			28,37,41	
0309	Fuel Filter Base	Replace		0.5				37	
		Repair		0.3				37	
	Fuel Water Separator and	Service	0.2						
	Secondary Fuel Filters	Replace		0.5				37	
		Repair		1.0				37	

Table 1. MAC for the 613C ASWDS - 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
0311	Cold Starting Aid System	Replace		0.2				37	
		Repair		0.3				37	
	Engine Heater	Replace			1.0			37	
0321	Accelerator Pedal and	Replace		0.2				37	
	Linkage	Repair		0.3				37	
04	**EXHAUST SYSTEM**								
0401	Muffler	Inspect	0.1						
		Replace		0.3				37	
	Exhaust Pipes and Clamps	Inspect	0.1						
		Replace		0.3				37	
05	**COOLING SYSTEM**								
0501	Radiator Assembly	Inspect	0.2	0.3					
		Service		1.0				28,30,37	
		Replace			7.0			20,37	
		Repair			3.5			27,28	B,D
	Hydraulic Oil Cooler	Replace		1.0				37	
	Oil Cooler Assembly	Replace			3.9			27,37	B
		Repair			0.5			37	
0503	Temperature Regulator (Thermostats)	Replace		1.0				37	
	Aftercooler Assembly	Replace			1.7			37	
	Hoses, Tubes, and Clamps	Replace		0.2				37	
0504	Engine Water Pump Assembly	Replace		5.0				28,37	
0505	Fan Drive Assembly	Replace		5.5				37	
		Repair			1.0			37	B
	Fan Assembly	Replace		1.5				37	
0505	Fan Drive Belt	Adjust		0.2				37	
		Replace		0.3				37	
	Belt Tightener	Replace		0.8				37	
06	**ELECTRICAL SYSTEM**								
0601	Alternator								
	Alternator Assembly	Test		0.3				37	
		Replace		1.0					
	Drive Belt	Inspect	0.2						
		Adjust		0.3				37	
		Replace		0.3				37	

Table 1. MAC for the 613C ASWDS - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	EQUIPMENT REF CODE	REMARKS CODE
0603	Starter Assembly	Test		0.3				37	
		Replace		4.5				37	
	Slave Receptacle	Replace		0.3				37	
0605	Battery Disconnect Switch	Replace		0.3				37	
0607	Instrument Panel								
	Instrument Panel	Inspect	0.1						
	Switches,Gages,and Indicator Lights	Replace		0.2				37	
	Fuse, Relay, and Circuit Breakers	Replace		0.3				37	
0609	Lights								
	Headlights	Replace		0.3				37	
	Brake lights	Replace		0.3				37	
		Repair		0.3				37	
	Blackout Lights	Replace		0.3				37	
	Work Lights	Replace		0.3				37	
		Repair		0.3				37	
	Turn Signal Lights	Replace		0.3				37	
0610	Sending Units, Sensors, Warning Switches								
	Temperature Sensors	Test		0.3				37	
		Replace		0.5				37	
	Pressure Sensors	Test		0.3				37	
		Replace		0.5				37	
	Engine Sensors	Test		0.3				37	
		Replace		0.5				37	
	Transmission Sensors	Test		0.3				37	
		Replace		0.5				37	
	Fuel Level Sending Unit	Replace		1.0				37	
	EMS Panel	Test	0.1	0.3					
		Replace		0.5				37	
0611	Horns and Alarms								
	Electric Horn	Replace		0.3				37	
	Backup Alarm	Replace		0.3				37	

Table 1. MAC for the 613C ASWDS - 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		
0612	Batteries	Inspect	0.2						
		Test		0.5					
		Service		1.0				29,30,37	
		Replace		1.0				37	E
	Battery Cables	Inspect	0.2						
		Replace		0.5				37	
	Battery Disconnect Switch	Replace		0.3				37	
0613	Electrical Harness								
	Cab Harnesses	Test		0.5				37	
		Replace			2.0			37	
		Repair		0.3				28,37	
	Engine Compartment Harnesses	Test		0.5				37	
		Replace			2.0			37	
		Repair		0.3				28,37	
	Hitch and Scraper Bowl Harnesses	Test		0.5				37	
		Replace			2.0			37	
		Repair		0.3				28,37	
	Hitch and Water Distributor Harnesses	Test		0.5				37	
		Replace			2.0			37	
		Repair		0.3				28,37	
07	**TRANSMISSION/ TRANSFER**								
0705	Transmission Shifting Components								
	Shift Control Lever and Lock	Replace		1.0				37	
		Repair		0.5				37	
	Shift Control Cable and Linkage	Adjust		0.3				37	
		Replace		1.5				37	
0708	Torque Converter	Replace			24.0			27,37	
		Repair						27,37	A,B
0710	Transmission/Transfer Group	Inspect	0.2						
		Service		0.5				28,30,37	
		Test		0.3					
		Replace			12.0			6,27,37	A,B
		Repair			1.0			27,37	B
		Overhall							B
0710	Hydraulic Control Valve	Replace			4.0			37	A
		Repair			0.5			37	B

Table 1. MAC for the 613C ASWDS - 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
0721	Gear Pump	Replace			4.0			37	
		Repair			0.5			37	B
	Transmission Oil Cooler	Replace		1.0				37	
	Oil Filter Element	Replace		0.2				28,37	
	Oil Filter Base Assembly	Replace		1.5				28,37	
	Internal Oil Suction Screen (Transfer Gear Case)	Service		1.0					
		Replace		1.0				28,37	
	Oil Lines and Hoses	Replace		0.2				28,37	
09	**PROPELLER AND PROPELLER SHAFTS**								
0900	Propeller Shaft (Upper)	Inspect	0.2						
		Replace			4.0			37	
		Repair			1.0				
	Universal Joint (Lower)	Inspect	0.2						
		Service		0.3				28	
		Replace		2.0				28,37	
		Repair		1.0					
10	**FRONT AXLE**								
1000	Front Axle Assembly	Inspect	0.2						
		Service		0.5				28,30,37	
		Replace			60.0			27,37	A
		Repair			1.0			37	B
1002	Differential Assembly	Replace			10.0			2,25,27,37	A
		Repair			1.0			27,37	B
	Differential Lock	Test		0.3					
1003	Front Axle Shafts	Replace		1.0				27,37	
1003	Front Final Drives (Planetary)	Inspect	0.2						
		Service		1.5				27,30,37	
		Replace		4.0				7,20,28,37	
		Repair		14.0				28,37	
	Front Wheel Spindle, Bearings, and Seals	Replace		4.0				8,28,37	
		Repair		14.0				8,28,37	

Table 1. MAC for the 613C ASWDS - 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**								
1201	Parking Brake Actuator	Inspect	0.2						
		Replace		2.0				37	
		Repair		4.0				7,8,28,37	B
	Parking Brake Shoe	Replace		2.5				37	
1202	Service Brake Pads	Inspect		0.5					
		Replace		2.0				37	
1204	Brake Control Valves	Replace		2.0				37	
	Air/Hydraulic Brake	Inspect	0.2						
	Cylinder Assembly	Replace		2.5				37	
		Repair							B
1204	Brake Caliper Assembly	Inspect		0.5					
		Replace		1.5				4,28,37	
1208	Air Lines,Tanks, and	Inspect	0.2						
	Valves	Replace		2.0				37	
1209	Air Compressor	Inspect	0.2						
		Replace		3.5				37	
		Repair		1.0				37	B
13	**WHEELS**								
1311	Rear Spindle Assembly	Replace		4.0					
	Rear Hub and Disk	Inspect	0.2						
		Replace		3.0				6,28,37	
	Rear Wheel Bearings and Seals	Replace			3.5			6,8,27,37	
	Wheel Assembly	Repair		1.0				29	
1313	Tire	Inspect	0.2						
		Replace		2.0				29,37	
		Repair		4.0				27,37	C
14	**STEERING**								
1401	Steering Wheel and	Replace		2.5				28,37	
	Column	Repair		1.0				37	

Table 1. MAC for the 613C ASWDS - 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		
1411	Steering Hoses, Lines, and Fittings	Replace		0.5				37	
1412	Pump, Hydraulic (Hydraulic/Steering Systems)	Replace			2.0			37	A
		Repair			1.0			37	B
	Steering Cylinders	Replace			2.0			37	
		Repair			1.0			37	B
1414	Steering Control Valve	Replace			2.5			37	A
		Repair			1.0				B
15	**FRAME, TOWING, AND ARTICULATION SYSTEMS**								
1501	Hitch Assembly	Inspect	0.2						
		Service		0.3				28,30	
		Replace			12.0			19,27,37	A
		Repair			4.0			24,25 27,32,37	
	Oil Cooler Assembly	Replace			3.9			27,37	
		Repair			0.5			37	
1503	Draft Frame	Replace			16.0			27,37	
		Repair			4.0			27,37	
	Steering Links	Replace			4.0			27,37	
18	**BODY, CAB, HOOD**								
1801	Cab Tops and ROPS	Inspect		0.3					
		Replace		0.5				28,37	
	Hood and Guards	Replace		0.5				37	
		Repair		0.5				29,37	
1802	Fenders and Covers	Replace		0.5				37	
		Repair		0.5				29,37	
	Windshield Assembly	Replace		0.5				37	
		Repair			1.5			27,37	
1806	Seat Assembly	Replace		0.3				37	
		Repair		0.5				28,37	
	Seat Belt	Inspect	0.2						
		Replace		0.3				37	

Table 1. MAC for the 613C ASWDS - 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		
1808	Stowage, Racks and Boxes	Replace							
	Tool Box	Replace		0.3				37	
	Rifle Rack	Replace		0.2				37	
22	**BODY ACCESSORY ITEMS**								
2202	Accessory items								
	Mirrors	Inspect	0.1						
		Adjust	0.2						
		Replace		0.3				37	
	Horn	Replace		0.5				37	
	Windshield Wiper,	Inspect	0.2						
	Motor, and Washer	Replace		.03				37	
	Data Plates	Replace		0.2				37	
24	**HYDRAULIC AND FLUID SYSTEMS**								
2401	Pump and Motors								
	Elevator/Water Pump	Replace			2.5			37	
		Repair						37	B
	Motor Assembly,	Replace			2.0			37	
	Elevator	Repair						37	B
	Motor Assembly, Water Pump	Replace			2.0			37	
2402	Manifolds and Valves								
	Main Control Valve	Replace			2.5			37	A
		Repair						37	B
	Elevator Control Valve	Replace			3.0			37	
		Repair						37	B
	Lift Cylinder Check Valve	Replace			1.0			37	
2403	Hand Controls and Cables	Adjust			0.3			37	
		Replace			1.0			37	
		Repair			1.0			37	
	Floor Check Valve	Replace			1.0			37	
2406	Filters, Strainers, Lines, Hoses, and Fittings								
	Hoses, Lines, and Fittings	Inspect	0.2						
		Replace		0.5				37,39	

Table 1. MAC for the 613C ASWDS - 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
	Filters	Replace		0.5				28,37	
	Oil Sampling Valve	Replace		0.3				37	
2407	Hydraulic Cylinders								
	Lift Cylinders	Replace		2.5				37	
		Repair		0.5				37	B
	Bowl Eject Cylinder	Replace			6.0			20,27,37	
		Repair						37	B
	Bowl Floor Cylinder	Replace			6.0			20,27,37	
		Repair						37	B
2408	Tanks and Reservoirs								
	Hydraulic Tank	Inspect	0.2						
		Service		0.5				28,30	
		Replace			4.0				
		Repair			2.0			27,37	
55	**WATER DISTRIBUTOR COMPONENTS**								
5500	Pump Assembly	Replace			4.0			27,37	
		Repair			2.0			27,37	
5505	Tank Body, Water	Inspect	0.3						
		Repair		1.0	2.0			27,37	
	Inspection Cover	Inspect	0.2						
		Repair		1.0				37	
	Manhole Assembly	Inspect	0.2						
		Replace		1.0				28,37	
		Repair		2.0				28,37	
	Suction and or Discharge System								
	Spray Bar, Upper and	Inspect	0.2						
	Lower	Replace		2.0				37	
		Repair		1.0				28,37	
	Hose Reel Assembly	Inspect	0.2						
		Replace		1.0				28,37	
		Repair		1.0				28,37	
	Hose Assemblies	Inspect	0.3						
		Replace		1.0				28,37	
		Repair		0.5				28,37	

Table 1. MAC for the 613C ASWDS - 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
5510	Inlet/Outlet Components								
	Vacuum Valve Assembly, Suction	Replace		3.0				37	
		Repair		1.0				28,37	
	Valve Assembly, Foot	Replace		2.0				37	
		Repair		1.0				28,37	
	Butterfly Valve Assembly, Upper Bar	Replace		3.0				37	
	Butterfly Valve Assembly, Lower Bar	Replace		3.0				37	
	Valve Assembly, Manual	Inspect	0.2						
		Replace		1.0				37	
5513	Control Panel Assembly	Inspect	0.2						
		Replace		1.0				37	
		Repairs		8.0				28,37	
								37	
	Sensor, Water Level	Replace		1.0				37	
74	**SCRAPER COMPONENTS**								
7448	Elevator Assembly	Inspect	0.2						
		Service		0.3				28,30,37	
		Adjust		0.3				28,37	
		Replace			16			6,7,27,37	
	Elevator Flights	Inspect	0.2						
		Replace		1.0				37	
	Elevator Chain and Idler	Inspect	0.2						
		Adjust		1.0				37	
		Replace			2.5			27,37	
		Repair			1.0			7,27,37	
	Elevator Drive Assembly	Service		0.2				30,37	
		Replace			20.0			20,37	
		Repair			2.0			37	B
	Ejector Bowl Rollers and Support	Inspect	0.2						
		Service		0.2				28,30	
		Replace			1.5			28,37	
		Repair			1.0			7,13,18,22, 27,37	

Table 1. MAC for the 613C ASWDS - 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		
7448	Bowl Sliding Floor	Inspect	0.2						
		Replace			6.0			27,37	
		Repair			2.0			7,13,22,27,37	
	Bowl Sliding Floor Roller, Link and Support	Replace							
	Bowl Sliding Floor Link, and Support	Inspect	0.2						
		Replace		6.0				27,37	
		Repair		2.0				27,37	

Table 2. Tools and Test Equipment Requirement for the 613C ASWDS.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	F	Adapter, Mechanical Puller	5120-01-286-8435	1P1835
2	F	Adapter, Mechanical Puller	5120-01-288-2717	5P4184
3	F	Bar, Governor	2815-01-123-5891	5P0302
4	O	Bolt, Guide	3040-01-517-2921	9U-6896
5	O,F	Bearing, Sleeve	5365-01-394-1970	3J9511
6	F	Bracket, Link	5340-01-476-1734	138-7574
7	O,F	Bushing Driver Set	5120-01-030-1626	1P0510
8	O,F	Bushing Driver Set	5120-01-039-4811	1P0520
9	F	Clamp, Plier	5120-01-503-5364	136-4149
10	F	Cylinder, Assembly	3040-01-264-9538	8S7650
11	F	Distorter, Tool Group	5110-01-288-2428	5P7318
12	O	Guard, Safety, Tire Inflation	4910-00-025-0623	64E33077
13	F	Guide Seal	5330-01-517-3296	1P-0774
14	O	Heater, Gun Type, Electric	4940-01-028-7493	EP-SUL
15	F	Inserter, Seal	5120-01-362-2027	1U7598
16	F	Inserter, Seal	5120-01-362-2026	1U7430
17	O,F	Jack, Dolly Type, Hydraulic: 10 ton capacity	4910-00-289-7233	93660
18	F	Leveler, Load: 6000 lb capacity	3940-01-294-0606	6V6146
19	O	Link	4940-01-268-2201	1387573
20	O,F	Link, Bearing	5120-01-451-1401	1387575
21	F	Link, Chain, End	4010-01-268-9869	5P9736
22	F	Puller Attachment, Mechanical	5120-01-293-1430	8B-7554
23	O,F	Puller Kit, Universal	5180-01-124-1903	IP3075
24	F	Puller, Hydraulic	5130-01-296-4277	6V3175
25	O,F	Pump, Hydraulic Ram, Hand Driven	4320-00-374-1403	4C4865
26	F	Ring	5120-01-288-2447	9S8537

Table 2. Tools and Test Equipment Requirements for the 613C ASWDS - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
27	F,H	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance Basic, Less Power	4910-00-754-0705	SC 4910-95-A31 (LIN: T24660)
28	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1	4910-00-754-0654	SC 4910-95-A74 (LIN: W32593)
29	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2	4910-00-754-0650	SC 4910-95-A72 (LIN: W32730)
30	O,F	Shop Equipment, Contact Maintenance	4940-01-333-8470	11B250000 (LIN: S25681)
31	O,F	Sling, Nylon	2835-01-078-2081	4-8FTX2IN
32	F	Spacer	Fabricated Tool	FT-0064
33	O,F	Stand, Maintenance, Automotive Axle: 24,000 lb capacity, height range 33-3/4-44-1/4 in.	4910-01-475-0672	1779A
34	O,F	Stand, Maintenance, Automotive Axle: 24,000 lb capacity, height range 19-29-1/2 in.	4910-01-480-0147	1778A
35	O	Tool, Drain (Nipple, Pipe)		6B3156
36	F	Tool Kit, Diesel Injector	5180-01-480-8942	173-1530
37	O,F,H	Tool Kit, General Mechanic's: Automotive	5180-01-481-8389	SC 5180-95-N26 (LIN: T28688)
38	F	Tool Kit, Internal Combustion Engine	5180-01-356-8155	223-2454
39	O,F	Tool Outfit, Hydraulic Systems (HSTRU)	4940-01-036-5784	13221E6850 (LIN: T30377)
40	F	Wrench Group, Chain		5P-2706
41	O	Wrench, Spanner	5120-01-363-2795	9U5120

Table 3. Remarks for the 613C ASWDS.

(1) Reference Code	(2) Remarks
A	Prior to removing major assembly, contact Specialized Repair Activity (SRA) for further troubleshooting information and/or technical assistance. For SRA support, contact the local Caterpillar dealer (WP 0175 00).
B	• Complete repair and/or overhaul responsibility is assigned to Sustainment Maintenance: H and D levels and/or SRA. • Limited repair may be authorized at Field Maintenance (O and DS levels). • Refer to Repair Parts and Special Tools List (RPSTL) for the assigned Source, Maintenance, and Recoverability (SMR) codes.
C	Local repair of tire and wheel assembly is authorized.
D	Refer to TM 750-254 (cooling systems) for additional information.
E	Refer to TM 9-6140-200-14 (batteries) for additional information.

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST 0044 00

SCOPE

This work package lists expendable and durable items you will need to maintain the 613CS Scraper and 613CWD Water Distributor. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by 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 narrative instructions to identify the item [e.g., Use antifreeze (Item 3, WP 0044 00)].
2. **Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.

   C - Operator/Crew

   O - Organizational Maintenance
3. **Column (3) - National Stock Number (NSN).** This is the NSN assigned to the item which you can use to requisition it.
4. **Column (4) - Description, Item Name, Commercial and Government Entity Code (CAGEC), and Part Number (P/N).** This provides the other information you need to identify the item.
5. **Column (5) - Unit of Measure (U/M).** This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1	O		ADHESIVE (71984) RTV732	
		8040-00-877-9872	3 Ounce Tube	OZ
2	C		ANTIFREEZE: Permanent: Arctic Grade (81349) MILA11755	
		6850-00-174-1806	55 Gallon Drum	GAL
3	C		ANTIFREEZE: Permanent, Ethylene Glycol, Inhibited (81349) MILA46153	
		6850-00-181-7929	1 Gallon Bottle	GAL
		6850-00-181-7933	5 Gallon Can	GAL
		6850-00-181-7940	55 Gallon Drum	GAL
4	O		BRAKE FLUID, AUTOMOTIVE: Silicone	
		9150-01-102-9455	(81349) MIL-B-46176 1 Gallon Can	GAL
		9150-01-123-3152	(81349) MIL-B-46176 5 Gallon Can	GAL
5	O	5340-00-450-5718	CAP SET, PROTECTIVE: Dust and Moisture Seal (19207) 10935405	EA
6	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
7	O		CLOTH: Abrasive, Emery, Fine (80204) ANSI B74.18	
		5350-00-584-4654	50 Sheet Package	EA
8	O		COMPOUND: Antiseize (05972) 76764	
		8030-00-251-3980	1 Pound Can	LB
9	C		COMPOUND: Cleaning, Windshield (0FTT5) 0854000	
		6850-00-926-2275	16 Ounce Bottle	
10	O		COMPOUND: Gasket Forming, Silicone (05972) 77C	OZ
			13 Ounce Cartridge	OZ

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
11	C		DETERGENT: General Purpose, Liquid (83421) 7930-00-282-9699	
		7930-00-282-9699	1 Gallon Can	GAL
12	O		FLUX: Soldering (58536) A-A-51145TY1 FORM A	
		3439-00-255-9935	1 Pound Can	LB
13	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
14	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
15	C	9130-01-031-5816	FUEL, TURBINE: Aviation (81349) MILT83133 GR JP8	GAL
16	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
17	O	9150-01-361-8919	GREASE: Electrically Conductive (53711) 5190179	OZ
18			HOSE: Clear, Neoprene	
19	O		INSULATING VARNISH: Electrical, Dielectric (75037) 1602	
		5970-00-476-6717	13 Ounce Can, Aerosol Spray	OZ
20	O		INSULATING SLEEVING: Electrical (81343) M23053/5-106-0	
		5970-00-815-1295	250 Foot Spool	FT

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
21	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
22	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
23	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
24	C		OIL: Lubricating, OE/HDO 10 (81349) MIL-PRF-2104	
		9150-00-189-6727	1 Quart Can	QT
		9150-00-186-6668	5 Gallon Can	GAL
		9150-00-191-2772	55 Gallon Drum	GAL
25	C	9150-00-247-0481	OIL: Lubricating, OE/HDO 10W/30 (81349) MIL-L-2104	QT
26	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
27	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
28			OIL: Lubricating, OE/HDO 40 (81349) MIL-PRF-2104	
		9150-00-188-9862	55 Gallon Drum	GAL

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
29	C		OIL: Lubricating, OEA, Arctic	
		9150-00-402-4478	(81349) MIL-L-46167 1 Quart Can	QT
		9150-00-402-2372	(81349) MIL-PRF-46167 5 Gallon Can	GAL
		9150-00-491-7197	(81349) MIL-PRF-46167 55 Gallon Drum	GAL
30	O		PETROLATUM: Technical (82146) 14P1	
		9150-00-250-0926	1.75 Pound Can	LB
31	C		RAG: Wiping (64067) 7920-00-205-1711	
		7290-00-205-1711	50 Pound Bale	LB
32	F	5330-01-485-8999	SEALER: Manifold, High-Temperature (11083) 2P-2333	OZ
33	F		SEALANT: Liquid Gasket (11083) 1U-8846	OZ
34	O		SEALANT: Pipe (15434) 3375066	OZ
35	O		SEALANT: Silicone (11083) 4C-9612	OZ
36	O		SEALING COMPOUND (05972) 07931	
		8030-00-081-2286	50 cc Bottle	CC
37	O		SOLDER: Lead-Tin Alloy, Rosin Core (81348) QQ-S-571	
		3439-00-555-4629	1 Pound Spool	LB
38	O		STRAP: Tiedown, Electrical Components	
		5975-00-903-2284	(96906) MS3367-4-0 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

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
39	O		TAG: Marker (64067) 9905-00-537-8954	
		9905-00-537-8954	Pack of 50	EA
40	O		TAPE: Antiseizing (52152) 6195	
		8030-00-889-3535	260 Inch Roll	IN.
41			TAPE: Duct, 2 Inches Wide (39482) 1791K70	
		5640-00-103-2254	60 Yard Roll	YD
		5970-00-815-1295	250 Foot Spool	FT
42	O		WIRE: Nonelectrical (81346) ASTM A641	
		9905-00-596-0191	5 Pound Coil	LB

END OF WORK PACKAGE

TOOL IDENTIFICATION LIST 0045 00

SCOPE

This work package lists all common tools and supplements and special tools/fixtures needed to maintain the 613CS Scraper and 613CWD Water Distributor.

EXPLANATION OF COLUMNS IN THE TOOL IDENTIFICATION LIST

1. **Column (1) - Item Number (No.).** This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Tool kit, general mechanic's, Item 33, WP 0045 00).
2. **Column (2) - Item Name.** This column lists the item by noun nomenclature and other descriptive features (e.g., Guide, seal).
3. **Column (3) - National Stock Number.** This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.
4. **Column (4) - Part Number/CAGEC.** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.
5. **Column (5) - Reference.** This column identifies the authorizing supply catalog or RPSTL for items listed in this work package.

TOOL IDENTIFICATION LIST

Table 1. Tool Identification List.

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/ CAGEC	(5) REFERENCE
1	Adapter, Mechanical Puller	5120-01-1288-2717	5P4184	TM 5-3800-205-23P
2	Bearing, Sleeve	5365-01-394-1970	3J9511 (11083)	TM 5-3800-205-23P
3	Bolt, Guide	3040-01-517-2921	9U-6896 (11083)	TM 5-3800-205-23P
4	Bracket, Link	5120-01-451-1401	138-7575 (11083)	TM 5-3800-205-23P
5	Bracket, Link	5340-01-476-1734	138-7574 (11083)	TM 5-3800-205-23P
6	Bracket, Link	4940-01-268-2201	1387573 (11083)	TM 5-3800-205-23P
7	Bushing, Driver Set	5120-01-030-1626	1P0510 (11083)	TM 5-3800-205-23P
8	Bushing, Driver Set	5120-01-039-4811	1P0520 (11083)	TM 5-3800-205-23P
9	Clamp, Plier	5120-01-503-5364	136-4149 (11083)	TM 5-3800-205-23P
10	Cylinder Assembly	3040-01-264-9538	857318	TM 5-3800-205-23P
11	Distorter, Tool Group	5110-01-288-2428	5P7318	TM 5-3800-205-23P
12	Guard, Safety, Tire Inflation	4910-00-025-0623	64E33077 (80049)	TM 5-3800-205-23P
13	Guide, Seal	533-01-517-3296	1P-0774 (11083)	TM 5-3800-205-23P
14	Heater, Gun Type, Electric	4940-01-028-7493	EP-5UL (59164)	TM 5-3800-205-23P
15	Inserter, Seal	5120-01-362-2027	1U7598 (11083)	TM 5-3800-205-23P
16	Inserter, Seal	5120-01-362-2026	1U7430 (11083)	TM 5-3800-205-23P
17	Jack, Dolly Type, Hydraulic: 10 ton capacity	4910-00-289-7233	93660 (36251)	TM 5-3800-205-23P
18	Leveler, Load: 6000 lb capacity	3940-01-294-0606	6V6146 (11083)	TM 5-3800-205-23P
19	Link, Chain, End	4010-01-268-9869	5P9736 (11083)	TM 5-3800-205-23P
20	Puller Attachment, Mechanical	5120-01-293-1430	8B-7554 (11083)	TM 5-3800-205-23P
21	Pump, Hydraulic Ram, Hand Driven	4320-00-374-1403	4C4865 (11083)	TM 5-3800-205-23P
22	Ring	5120-01-288-2447	9S8537 (11083)	TM 5-3800-205-23P
23	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance Basic, Less Power	4910-00-754-0705	SC 4910-95CLA31 (19204) (LIN: T24660)	
24	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1	4910-00-754-0654	SC 4910-95CLA74 (19204) (LIN: W32593)	
25	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2	4910-00-754-0650	SC 4910-95CLA72 (19204) (LIN: W32730)	

TOOL IDENTIFICATION LIST - CONTINUED

Table 1. Tool Identification List - Continued.

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/ CAGEC	(5) REFERENCE
26	Shop Equipment, Contact Maintenance	4940-01-333-8470	11B250000 (59678) (LIN: S25681)	
27	Sling, Nylon	2835-01-078-2081	4-8FTX2IN (91796)	
28	Spacer	Fabricated Tool	FT-0064	
29	Stand, Maintenance, Automotive Axle: 24,000 lb capacity, height range 33-3/4-44-1/4 in.	4910-01-475-0672	1779A (45225)	TM 5-3800-205-23P
30	Stand, Maintenance, Automotive Axle: 24,000 lb capacity, height range 19-29-1/2 in.	4910-01-480-0147	1778A (45225)	TM 5-3800-205-23P
31	Tool, Drain (Nipple, Pipe)		6B3156 (11083)	TM 5-3800-205-23P
32	Tool Kit, Diesel Injector	5180-01-480-8942	173-1530 (11083)	TM 5-3800-205-23P
33	Tool Kit, General Mechanic's: Automotive	5180-01-481-8389	DFP389J (59678) (LIN: T28688)	
34	Tool Kit, Internal Combustion Engine	5180-01-356-8155	223-2454 (11083)	TM 5-3800-205-23P
35	Tool Outfit, Hydraulic Systems (HSTRU)	4940-01-036-5784	13221E6850 (97403) (LIN: T30377)	
36	Wrench Group, Chain		5P-2706 (11083)	TM 5-3800-205-23P
37	Wrench, Spanner	5120-01-363-2795	9U5120 (11083)	TM 5-3800-205-23P

END OF WORK PACKAGE

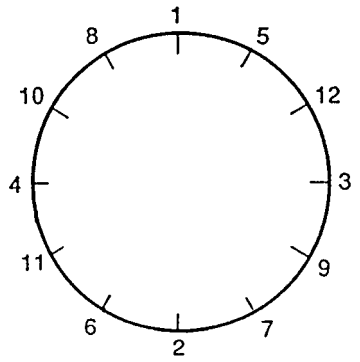
TORQUE LIMITS 0046 00

SCOPE

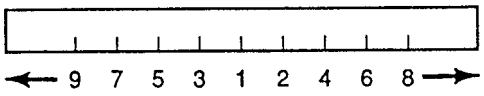
This work package lists standard torque values and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

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).
   b. When tightening fasteners above 30 lb-ft (41 Nm), use the torque pattern but only tighten to 70 percent 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.

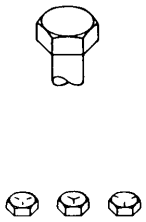
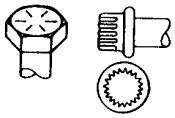
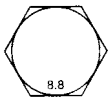
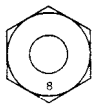
Current Usage		Much Used	Much Used	Used at Times	Used at Times
QUALITY OF MATERIAL		INDETERMINATE	MINIMUM COMMERCIAL	MEDIUM COMMERCIAL	BEST COMMERCIAL
SAE Grade Number		1 or 2	5	6 or 7	8
Cap Screw Head Markings Manufacturer's marks may vary These are all SAE Grade 5 (3 line)					
CAP SCREW BODY SIZE INCHES - THREAD		TORQUE LB-FT (NM)	TORQUE LB-FT (NM)	TORQUE LB-FT (NM)	TORQUE LB-FT (NM)
1/4	20 28	5(7) 6(8)	8(11) 10(14)	10(14)	12(16) 14(19)
5/16	18 24	11(15) 13(18)	17(23) 19(26)	19(26)	24(33) 27(37)
3/8	16 24	18(24) 20(27)	31(42) 35(47)	34(46)	44(60) 49(66)
7/16	14 20	28(38) 30(41)	49(66) 55(75)	55(75)	70(95) 78(106)
1/2	13 20	39(53) 41(56)	75(102) 85(115)	85(115)	105(142) 120(163)
9/16	12 18	51(69) 55(75)	110(149) 120(163)	120(163)	155(210) 170(231)
5/8	11 18	83(113) 95(129)	150(203) 170(231)	167(226)	210(285) 240(325)
3/4	10 16	105(142) 115(156)	270(366) 295(400)	280(380)	375(508) 420(569)
7/8	9 14	160(217) 175(237)	395(536) 435(590)	440(597)	605(820) 675(915)
1	8 14	235(319) 250(339)	590(800) 660(895)	660(895)	910(1234) 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 M8 M8 x 1	5 (7) 12 (16) 13 (18)		7 (9) 17 (23) 18 (24)	
M10 M10 x 1.25	24 (33) 27 (37)		34 (46) 38 (52)	
M12 M12 x 1.5	42 (57) 43 (58)		60 (81) 62 (84)	
M14 M14 x 1.5	66 (89) 72 (98)		95 (129) 103 (140)	
M16 M16 x 1.5	103 (140) 110 (149)		148 (201) 157 (213)	
M18 M18 x 1.5	147 (199) 165 (224)		203 (275) 229 (310)	
M20 M20 x 1.5	208 (282) 213 (313)		288 (390) 320 (434)	
M22 M22 x 1.5	283 (384) 315 (427)		392 (531) 431 (584)	
M24 M24 x 2	360 (488) 392 (531)		498 (675) 542 (735)	
M27 M27 x 2	527 (715) 569 (771)		729 (988) 788 (1068)	
M30 M30 x 2	715 (969) 792 (1074)		990 (1342) 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

PREPARATION FOR STORAGE OR SHIPMENT 0047 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

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 5-3800-205-10-1 or TM 5-3800-205-10-2).
3. Fill fuel tank completely to prevent condensation from forming (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
4. Perform Unit PMCS (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 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/tank lowered to the ground (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
7. When moderate temperatures are expected, leave batteries in place. If extreme cold is expected, remove batteries (TM 5-3800-205-23-1, WP 0067 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 5-3800-205-10-1 or TM 5-3800-205-10-2).
11. Fill in Form DD 1397 completely and attach to a conspicuous part of machine.
12. Drain water tank and water pump (Water Distributor only).

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 (TM 5-3800-205-23-1, WP 0067 00).
3. Check oil and hydraulic fluid levels in engine crankcase, transmission, front axle differential and wheel end final drives, and hydraulic reservoir.
4. Check coolant level in radiator (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
5. Start engine and perform machine warmup (TM 5-3800-205-10-1 or TM 5-3800-205-10-2). Verify proper operation of all gages, switches, and EMS indicator and warning lights.
6. Ensure fuel tank is full (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
7. Operate machine without a load and check engine, transmission, brakes, steering, and electrical accessories for proper operation (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).

PREPARATION FOR LONG-TERM STORAGE

1. Thoroughly clean machine.
2. Perform Operator PMCS (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
3. Perform Unit PMCS (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 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 (Item 16, WP 0044 00) 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 and front axle differential and wheel end final drives (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).
8. Drain engine crankcase and refill with recommended oil (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).
9. Completely drain fuel tank. Mix a solution of diesel fuel (Item 13, 14 or 15, WP 0044 00) and flushing oil per instructions supplied with flushing oil. Pour mixture into fuel tank. Run engine for at least 10 minutes on this solution.
10. Before shutting down engine, treat upper cylinders by spraying recommended engine oil into air intake for about two minutes. Open throttle momentarily, shut engine down, and continue spraying oil into air intake until engine comes to a stop.
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 (TM 5-3800-205-23-1, WP 0031 00 and WP 0032 00).
14. Ensure battery disconnect switch is in OFF position (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
15. Remove batteries (TM 5-3800-205-23-1, WP 0067 00). Clean batteries and ensure they are fully charged (TM 9-6140-200-14).
16. Completely drain fuel tank.
17. Drain water tank and water pump (Water Distributor only).
18. Place blocking under axles to remove weight from tires.
19. 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 31, WP 0044 00) dipped in lubricating oil (Item 25, WP 0044 00).
4. Fill fuel tank with fuel (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
5. Check oil and hydraulic fluid levels in engine crankcase, transmission, front axle differential, and wheel end final drives, and hydraulic reservoir.

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE - CONTINUED

6. Check coolant level in radiator (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
7. Install fully charged batteries (TM 5-3800-205-23-1, WP 0067 00).
8. Tighten or install drive belts (TM 5-3800-205-23-1, WP 0031 00 and WP 0032 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 5-3800-205-10-1 or TM 5-3800-205-10-2). Verify proper operation of all gages, switches, and EMS indicator and warning lights.
11. Operate machine without a load and check engine, transmission, brakes, steering, and electrical accessories for proper operation (TM 5-3800-205-10-1 or TM 5-3800-205-10-2).
12. Check operation of water distributor hydraulic system (TM 5-3800-205-10-2).

END OF WORK PACKAGE

LIST OF PRINCIPLE CATERPILLAR DEALERS 0048 00

1. Table 1 below provides the name and location of local Caterpillar dealers according to principle machine deployment.
2. In the event of OCONUS deployment or outside of home base area of operation, contact Caterpillar Defense and Federal Products at (309) 578-3295 for Caterpillar dealer support in that theatre of operation.

Table 1. Caterpillar Dealer Listing.

Vehicle Location	Local Caterpillar Dealer
Ft. Bragg, NC	Gregory Poole Equipment Co. 5633 U.S. Highway 301 at NC 59 Hope Mills, NC 28348 PH: (910) 424-4400 Fax: (910) 424-1323 www.gregpoole.com
Ft. Campbell, KY	Whayne Supply Company 651 U.S. Highway 31 W. Bypass Bowling Green, KY 42101 PH: (270) 843-3275 Fax: (270) 843-3285
Cape Girardeau, MO	Fabrick Brothers Equipment Co. 3033 Nash Road Scott City, MO 63780-9791 PH: (573) 332-1122 Fax: (573) 332-7109
St. Cloud, MN	Ziegler Inc. 2225 225th Street St. Cloud, MN 56301-8742 PH: (320) 253-2234 Fax: (320) 253-2187
Greenville, SC	Carolina Tractor and Equipment Co. 40 Interstate Blvd Asheville, NC 28806-2261 PH: (828) 251-2500 Fax: (828) 253-9341
Sharonville, OH	Holt Company of Ohio 11330 Mosteller Road Sharonville, OH 45241-1828 PH: (513) 771-0515 Fax: (513) 672-7658
Northfield, NJ	Giles & Ransome Inc. 600 S. Egg Harbor Road Hammonton, NJ 08037-8602 PH: (609) 561-0308 Fax: (609) 567-3970
Jefferson Banks, MO	John Fabick Tractor Company One Fabick Dr. Fenton, MO 63026-2986 PH: (636) 343-5900 Fax: (636) 343-2186

END OF WORK PACKAGE

WARRANTY INFORMATION (CATERPILLAR, INC.) 0049 00

GENERAL WARRANTY INFORMATION

1. The Airborne Scraper and Water Distributor System (ASWDS) is covered by a number of different warranties as described in Table 1. This work package contains information on overall machine, ground engaging tools, battery, and engine specific warranties provided by Caterpillar, including instructions on filing warranty claims. Warranty information for the ISU-60 container and tires is found in WP 0050 00.

Table 1. ASWDS Warranty Information.

Warranted Component	Duration of Warranty	Manufacturer Responsible	Contact Information
Overall Machine	18 Months/1000 Hours	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Ground Engaging Tools	Not limited by time	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Battery	3 Years	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Engine Emission Components (613 ASWDS Engine is EPA Certified)	5 Years/3000 Hours	Caterpillar Inc.	Defense and Federal Products (309) 578-3295
Warranty Information Contained in WP 0050 00			
Tires	5 Years	Bridgestone/Firestone Off Road Tire Company	(800) 572-8905
ISU-60 Container	12 Months	AAR Mobility Systems	(800) 355-2015

2. Scheduled machine maintenance is contained in TM 5-3800-205-10-2 and TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00. The fact that the machines are covered by a warranty does not relieve the user of the responsibility for proper vehicle operation, care, and maintenance.

3. The manufacturer's lubrication and service intervals must be followed.

4. A listing of principle Caterpillar dealers is provided at the end of this work package, as is information on locating Caterpillar dealers in the event of OCONUS deployment.

EXPLANATION OF TERMS

1. **Abuse.** The improper use, maintenance, repair, or mishandling of warranted items that may cause the warranty of those items to become void.

2. **Acceptance Date.** The date the equipment is accepted in the Army's inventory as annotated on DD Form 250, *Material Receiving and Inspection Report*.

3. **Acquiring Command or Activity.** An activity that procures the items or material for a user.

4. **Defect.** An imperfection that impairs the worth or utility of the part or component.

5. **Repair.** To restore an item to a serviceable condition without affecting warranty.

6. **Repairable.** An item that may be reconditioned or economically repaired for reuse.

EXPLANATION OF TERMS - CONTINUED

7. **Warranty.** A written agreement between a contractor and the Government that outlines the rights and obligations of both parties for defective supplies.

8. **Warranty Claim.** Action started by the equipment users for authorized warranty repair or reimbursement.

9. **Warranty Period.** Time during which the warranty is in effect.

10. **Warranty Start Date.** The date the warranty is put into effect (stamped on warranty plate). The warranty plate is proof of warranty start date for all warranties.

ADMINISTRATIVE INFORMATION

1. **Machine Registration.** Upon machine handoff to the assigned unit, the warranty plate will be stamped by the local Caterpillar dealer with the machine warranty start and end dates. The warranty start date for each machine will then be entered into the Caterpillar Warranty Database. Entry of the warranty start date activates the coverage for each machine and allows any Caterpillar dealer worldwide to view the warranty coverage for the machine. This data is accessed by Caterpillar machine serial number.

2. **Warranty Questions.** Any questions regarding warranty coverage should be directed to Caterpillar, Defense and Federal Products at (309) 578-3295 or Caterpillar Operator at (309) 675-1000 and ask for Defense and Federal Products.

3. **Local Caterpillar Dealer Contact Information.** To be completed by Caterpillar Dealer at time of machine delivery.

Dealer Name:	
Address:	
Point of Contact:	
Telephone Number:	
Cellular Number:	
E-mail Address:	

4. **To Obtain Warranty Service.** The ASWDS contract provides you with two options (Caterpillar repair or Government repair) for correcting warranty defects. The choice is the responsibility of the local unit or installation.

   a. **Caterpillar Repair.**

      (1) The using unit should contact the local Caterpillar Dealer (locations and phone numbers are available at http://www.cat.com or in Table 2 at the end of this work package) to coordinate delivery of the machine to the dealer for analysis or providing for dealer travel to the machine for analysis.

      (2) The Caterpillar Dealer will evaluate the problem to determine if the required repair is covered by warranty.

         (a) If the required repair is not covered by warranty, the dealer will contact the unit for further instructions and the unit will be responsible for dealer expenses incurred during machine analysis.

         (b) If the required repair is covered by warranty, the dealer will make the repairs and submit claims to Caterpillar for reimbursement.

      (3) The Caterpillar dealer will provide travel time and mileage or transportation of the machine as part of the warrantable repair.

ADMINISTRATIVE INFORMATION - CONTINUED

(4) If the Caterpillar dealer disputes your warranty claim and you feel the claim is valid, contact Caterpillar Defense and Federal Products at (309) 578-3295 for a review of the claim.

b. **Government Repair.**

(1) Any warranty repairs made by the user are at the user's expense.

(2) Government repairs do NOT void Caterpillar warranty. Government is fully responsible for the repair and/or any maintenance induced failures due to the repair.

5. **Warranty Dispute.** If Caterpillar Defense and Federal Products declines to perform repairs on items for which you believe the Government has a valid warranty claim:

a. Perform the repairs yourself; use your own repair parts.

b. Immediately report the situation using DA Form 2407 (or DA Form 5504).

(1) Record "Warranty Dispute" and complete description of the failure.

(2) Enter name, activity, and telephone number of the person submitting the warranty dispute.

(3) Enter the name, address, and telephone number of the Caterpillar representative or dealership that refused the service.

(4) Give specific reasons for the refusal.

(5) Enter the specific facts/evidence that you feel will disprove Caterpillar's reason for refusal. Include photographs and sketches as appropriate.

(6) Submit copies of DA Form 2407 (or DA Form 5504) to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-AF-CE, 6501 E. 11 Mile Road, Warren, MI 48397-5000.

6. **Caterpillar Responsibilities.** If a defect in material or workmanship is found during the warranty period, Caterpillar will, during normal working hours and at a place of business of a Caterpillar dealer or other source approved by Caterpillar:

a. Provide (at Caterpillar's choice) new, remanufactured, or Caterpillar-approved repaired parts or assembled components needed to correct the defect. Items replaced under this warranty become the property of Caterpillar.

b. Replace lubricating oil, filters, antifreeze, and other service items made unusable by the defect.

c. Provide reasonable and customary labor needed to correct the defect.

7. **User Responsibilities.**

The user is responsible for the following:

a. Providing proof of the warranty start date if warranty data plate is not available.

b. Labor costs, except as stated under "Caterpillar Responsibilities".

c. Local taxes, if applicable.

d. Parts shipping charged in excess of those which are usual and customary.

e. Costs to investigate complaints, unless the problem is caused by a defect in Caterpillar material or workmanship.

f. Performance of the required maintenance (including use of proper fuel, oil, lubricants and coolant) and replacement of items due to normal wear and tear. Failures caused by contaminated fluids are not covered by warranty.

8. **Limitations.**

Caterpillar is not responsible for failures resulting from:

a. Any use or installation which Caterpillar judges improper.

b. Attachments, accessory items, and parts not sold or approved by Caterpillar.

c. Abuse, neglect, and/or improper repair.

ADMINISTRATION INFORMATION - CONTINUED

d. User's delay in making the product available after being notified of a potential product problem.

e. Unauthorized repair or adjustments, and unauthorized fuel setting changes.

f. Breakage of Ground Engaging Tools (GET) due to worn mating components or those that have been hardfaced or improperly welded.

g. Remedies under this warranty are limited to providing parts and labor as stated above. Caterpillar is not responsible for incidental or consequential damages.

OVERALL MACHINE WARRANTY

1. **General.**
   a. The ASWDS machines are covered by Caterpillar's material and workmanship machine for a period of 18 months or 1,000 hours, whichever occurs first.
   b. The warranty period begins on the date of machine handoff to the first using unit. Check the machine data plate for warranty start date.
2. **To Obtain Warranty Service.** To obtain warranty service, follow procedures outlined above in *Administrative Information.*

GROUND ENGAGING TOOLS (GET) WARRANTY

1. **General.**
   a. Caterpillar GET is covered by warranty by Caterpillar Inc.
   b. The warranty period is not limited by time and is applicable throughout the *useful life* of the ground engaging tools covered. GET is considered worn out when it is no longer protecting the structural surface to which the GET is mounted.
2. **To Obtain Warranty Service.** To obtain warranty service on GET, follow procedures outlined above in *Administrative Information.*
3. **Specific Warranty Information.**
   a. The Caterpillar warranty is applicable after the expiration of any standard machine or parts warranty. The following Caterpillar GET are covered:
      (1) Cutting edge (P/N 4T6611)
      (2) Cutting edge (P/N 4T6613)
      (3) Router bits (P/N 4T4336)
   b. After the machine warranty period, the unit is responsible for all labor (including welding) and hardware costs associated with removal and installation of GET. The unit is also responsible for delivering the hardware to the dealer and getting replacement GET.

BATTERY WARRANTY

1. **General.** The battery is covered by 3 year warranty by Caterpillar Inc.
2. **To Obtain Warranty Service.** To obtain warranty service on the battery, follow procedures outlined above in *Administrative Information.*
3. **Specific Warranty Information.**
   a. Caterpillar will replace the battery which it finds to be defective in material or workmanship with a new battery at the following cost to the user:
      (1) For the first 12 months from machine warranty start date there is not charge to the user.

BATTERY WARRANTY - CONTINUED

(2) After 12 months from machine warranty start date, user cost is determined by the following formula:

$$\frac{\text{Current Customer's Battery Price x Months in Service}}{\text{36 (months in battery warranty)}} = \text{User Cost}$$

b. This warranty will be honored upon return of the battery, during normal working hours, to a Caterpillar dealer or other source approved by Caterpillar.

EMISSIONS WARRANTY

NOTE

- **California users must also refer to *Emission Control Warranty for California*.**
- **Certification tags illustrated are sample tags only and may not reflect the tags found on your machine.**
- **Items covered by the emission warranty are:**
  - **Fuel injector group**
  - **Fuel-air ratio control (FRC) and FRC boost line**
  - **Unit injector governor group**
  - **Fuel injector control assembly**
  - **Turbocharger and gasket**
  - **Intake manifold and gasket**
  - **Exhaust manifold and gasket**
  - **Turbocharger-to-aftercooler hoses and clamps**
  - **Engine inlet air aftercooler and gasket.**

1. **General.**

a. Caterpillar Inc. or any of its subsidiaries ("Caterpillar") warrants that certified nonroad diesel engine (powering mobile machinery) are:

(1) Designed, built, and equipped so as to conform, at the time of sale, with all applicable regulations adopted by the United States Environmental Protection Agency (EPA).

(2) Free from defects in materials and workmanship in specific emission-related parts for a period of 60 months, or 3,000 hours of operation, whichever occurs first, after the date of delivery to the first user.

b. If an emission-related part fails during the warranty period, it will be repaired, or replaced. Any such part repaired or replaced under warranty is warranted for the remainder of the warranty period.

c. The engine is certified if it has a special certification label. A Caterpillar dealer can also inform you if the engine is certified.

d. During the term of this warranty, Caterpillar will provide, through a Caterpillar dealer or other source approved by it, repair or replacement of any warranted part at no charge.

e. In an emergency, repairs may be performed at any service establishment, or by the user. Caterpillar will reimburse the user for their expenses, including diagnostic charges for such emergency repair. These expenses shall not exceed Caterpillar's suggested retail price for all warranted parts replaced, and labor charges based on Caterpillar's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate.

f. A part not being available within 30 days or a repair not being complete within 30 days constitutes an emergency.

EMISSIONS WARRANTY - CONTINUED

g. As a condition of reimbursement, replaced parts and validated invoices must be presented at a place of business of a Caterpillar dealer or other source approved by Caterpillar.

2. **Responsibilities and Limitations.** The warranty is subject to the following:

   a. **Caterpillar Responsibilities.** During the emission warranty period, if a defect in material or workmanship of an emission-related part or component is found, Caterpillar will provide:

      (1) New, remanufactured, or repaired parts and/or components, approved pursuant to EPA Regulations, required to correct the defect.

      (2) Note: Items replaced under warranty become the property of Caterpillar.

      (3) Reasonable or customary labor, during normal working hours, needed to correct the defect, including labor for removal and installation when necessary to make the repair.

   b. **User Responsibilities.** During the emission warranty period, the user is responsible for:

      (1) Providing proof of the delivery date to the first user.

      (2) Premium or overtime labor costs.

      (3) Costs to investigate complaints which are not caused by a defect in Caterpillar material or workmanship.

      (4) Providing timely notice or a warrantable failure and promptly making the product available for repair.

      (5) Performance of the required maintenance and use of proper fuel, oil, lubricants and coolant.

      (6) Maintenance, replacement, or repair of the emission control devices and systems may be performed by any non-road engine repair establishment or individual using certified nonroad engine parts.

3. **Limitations.**

   a. Caterpillar is not responsible for resultant damages to an emission-related part of component resulting from:

      (1) Any use or installation which Caterpillar judges improper.

      (2) Attachments, accessory items and parts not sold or approved by Caterpillar.

      (3) Abuse, neglect and/or improper engine repair.

      (4) User’s delay in making the product available after being notified of a potential product problem.

      (5) Unauthorized repair or adjustments and unauthorized fuel setting changes.

   b. This warranty is in addition to Caterpillar’s standard warranty, applicable to the nonroad diesel engine product involved.

   c. NEITHER THE FOREGOING EXPRESS WARRANTY NOR ANY OTHER WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED, IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS WHICH IS WARRANTED DIRECTLY TO THE USER BY ITS MANUFACTURER.

   d. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISION OF MATERIAL AND SERVICES, AS SPECIFIED HEREIN. CATERPILLAR IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

4. **Maintenance Recommendations.**

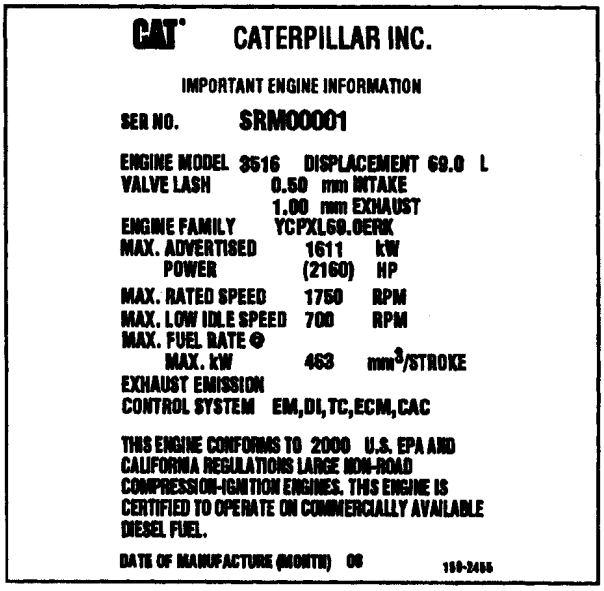
   a. Some Caterpillar nonroad diesel engines are certified by the United States Environmental Protection Agency (EPA) to comply with smoke and gaseous emission standards prescribed by Federal laws at the time of manufacture.

EMISSIONS WARRANTY - CONTINUED

b. The engine is certified if it has a special certification label. Two types of labels that are used by Caterpillar are illustrated. A Caterpillar dealer can also inform you if the engine is certified.

c. Efficiency of emission control and engine performance depends on adherence to proper operation and maintenance recommendations AND use of recommended fuels and lubricating oils. It is recommended that major adjustments and repair be made by your authorized Caterpillar dealer.

d. Various chemical fuel additives, which claim to reduce visible smoke, are available commercially. Although additives have been used by individuals to solve some isolated smoke problems in the field, they are not recommended for general use. Federal smoke regulations require that engines be certified without smoke depressants.


CAT CATERPILLAR INC.

IMPORTANT ENGINE INFORMATION

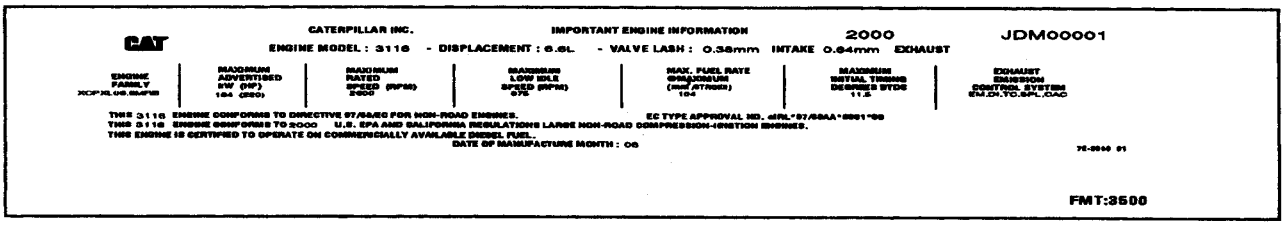
SER NO. SRM00001

ENGINE MODEL 3516 DISPLACEMENT 69.0 L
VALVE LASH 0.50 mm INTAKE
1.00 mm EXHAUST
ENGINE FAMILY YCPXL69.0ERK
MAX. ADVERTISED POWER 1611 kW (2160) HP
MAX. RATED SPEED 1750 RPM
MAX. LOW IDLE SPEED 700 RPM
MAX. FUEL RATE @ MAX. kW 463 mm^3/STROKE
EXHAUST EMISSION CONTROL SYSTEM EM,DI,TC,ECM,CAC

THIS ENGINE CONFORMS TO 2000 U.S. EPA AND CALIFORNIA REGULATIONS LARGE NON-ROAD COMPRESSION-IGNITION ENGINES. THIS ENGINE IS CERTIFIED TO OPERATE ON COMMERCIALLY AVAILABLE DIESEL FUEL.

DATE OF MANUFACTURE (MONTH) 08

159-2455


CAT CATERPILLAR INC. IMPORTANT ENGINE INFORMATION 2000 JDM00001

ENGINE MODEL : 3116 - DISPLACEMENT : 6.6L - VALVE LASH : 0.38mm INTAKE 0.64mm EXHAUST

ENGINE FAMILY | MAXIMUM ADVERTISED HP (HP) 184 (250) | MAXIMUM RATED SPEED (RPM) 2500 | MAXIMUM LOW IDLE SPEED (RPM) 675 | MAX. FUEL RATE @MAXIMUM (mm³/STROKE) 104 | MAXIMUM INITIAL TIMING DEGREES BTDC 11.5 | EXHAUST EMISSION CONTROL SYSTEM EM,DI,TC,SPL,CAC

THIS 3116 ENGINE CONFORMS TO DIRECTIVE 97/68/EC FOR NON-ROAD ENGINES. EC TYPE APPROVAL NO. e4RL*97/68AA*0001*00
THIS 3116 ENGINE CONFORMS TO 2000 U.S. EPA AND CALIFORNIA REGULATIONS LARGE NON-ROAD COMPRESSION-IGNITION ENGINES.
THIS ENGINE IS CERTIFIED TO OPERATE ON COMMERCIALLY AVAILABLE DIESEL FUEL.
DATE OF MANUFACTURE MONTH : 08

FMT:3500

e. The corrective steps taken immediately upon discovery of worn parts, which may affect emission levels, will help assure proper operation of emission control systems. The use of genuine Caterpillar parts is recommended. Suppliers of non-Caterpillar parts must assure the owner that the use of such parts will not adversely affect emission levels.

f. Regular maintenance intervals, along with special emphasis on the following items, are necessary to keep exhaust emissions within acceptable limits for the useful life of the engine. If the engine is operating under severe conditions, adjust the maintenance schedule accordingly.

g. See your authorized Caterpillar dealer to help analyze your specific application, operating environment and maintenance schedule adjustments.

h. The following is an explanation of maintenance for emission-related components.

(1) *Fuel Injectors or Nozzles*. Fuel injectors or nozzles are subject to tip wear as a result of fuel contamination. This damage can cause an increase in fuel consumption, the engine to emit black smoke, misfire or run rough. Inspect, test, and replace if necessary. Fuel injectors can be tested by an authorized Caterpillar dealer.

(2) *Turbocharger*. Check for any unusual sound or vibration in the turbocharger. Inspect inlet and exhaust piping and connections.

(3) *Air/fuel Ratio Control*.

EMISSIONS WARRANTY - CONTINUED

(a) This component is a device to control the black smoke emission of an engine during its operation when low inlet manifold pressure exists.

(b) Slow engine response and low power may indicate a need for adjustment or repair. Your Caterpillar dealer is equipped with the necessary tools, personnel, and procedures to perform this service.

(c) The owner is encouraged to keep adequate maintenance records, but the absence of such, in and of itself, will not invalidate the warranty.

(d) The machine or equipment owner may perform routine maintenance, repairs and other non-warranty work or have it done at any repair facility. Such non-warranty work need not be performed at a designated warranty station in order for the warranty to remain in force.

5. **Customer Assistance - Emission Control Systems Warranty.**

a. Caterpillar Inc. aims to ensure that the Emission Control System warranty is properly administered. In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control Systems Warranty, call or write: Caterpillar, Manager of Warranty Systems, Peoria, IL 61629-1250; (309) 675-4037.

b. Authorized dealers are recommended for major maintenance and repair work as they are staffed with trained personnel, proper tools and are aware of the latest maintenance methods and procedures. Owners and others who desire to perform their own work should purchase a Service Manual and obtain current service information from their Caterpillar dealer.

EMISSION CONTROL WARRANTY FOR CALIFORNIA

1. **Owner Warranty Rights and Obligations.**

a. The California Air Resources Board (CARB) and Caterpillar are pleased to explain the emission control system warranty on your 2000 or later certified heavy duty off-road diesel engine. The engine is certified if it has a special certification label. Two types of labels that are used by Caterpillar are shown on previous pages. A Caterpillar dealer can also inform you if the engine is certified.

b. In California, new heavy duty off-road diesel engines must be designed, built, and equipped to meet the state's stringent anti-smog standards. Caterpillar must warrant the emission control system on your engine for the duration of time listed below provided there has been no abuse, neglect, or improper maintenance on your engine.

c. Your emission control system may include parts such as the fuel injection system, air induction system, and engine computer, if equipped. Also included may be hoses, connectors, clamps, and other emission-related components.

d. Where a warrantable condition exists, Caterpillar will repair the heavy duty off-road diesel engine at no cost to the owner including diagnosis, parts, and labor.

2. **Manufacturer's Warranty Coverage.**

a. The emissions warranty period for new heavy duty off-road diesel engines is a duration of 60 months, or 3,000 hours of operation, whichever occurs first after date of delivery to the initial owner.

b. If an emission-related part or component on your diesel engine is defective, the part or component will be repaired, or replaced by Caterpillar. This is your emission control system WARRANTY.

c. This warranty covers the following emission-related parts and components:

(1) Charge Air Cooling System (if equipped)

(2) Fuel Injection System

(3) Intake Manifold

(4) Exhaust Manifold

(5) Turbocharger System

(6) Air-Fuel Ratio Control System

(7) Electronic Control Module including Sensors and Personality Module (if equipped)

EMISSION CONTROL WARRANTY FOR CALIFORNIA - CONTINUED

(8) Miscellaneous hoses, clamps, connectors and sealing devices used in the above systems.

d. Any replacement part may be used for maintenance or repairs. The owner should ensure that such parts are equivalent in design and durability to genuine Caterpillar parts. Use of non-genuine Caterpillar parts does not invalidate the warranty. However, Caterpillar is not liable for parts which are not genuine Caterpillar parts.

3. **Owner's Warranty Responsibilities.**

a. As the heavy duty off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in the owner's manual (Operation and Maintenance Manual). Caterpillar recommends that you retain all records covering the maintenance on your engine, but cannot deny warranty solely for lack of receipts and records or for failure to ensure the performance of all scheduled maintenance.

b. As the heavy duty off-road diesel engine owner, you should also be aware that Caterpillar may deny you warranty coverage if your heavy duty off-road diesel engine, or an emission components, or part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

c. Your engine is designed to operate on commercial diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emission requirements.

d. You are responsible for contacting your Caterpillar dealer as soon as any engine problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

e. If you have questions regarding your warranty rights and responsibilities contact: Caterpillar Manager, Warranty Operations, Peoria, IL 61629-1250, phone: (309) 675-4037 or California Air Resources Board (CARB), 9528 Telstar Ave., El Monte, CA 91731.

LIST OF PRINCIPLE CATERPILLAR DEALERS

1. Table 2 below provides the name and location of local Caterpillar dealers according to principle vehicle deployment.
2. In the event of OCONUS deployment or outside of home base area of operation, contact Caterpillar Defense and Federal Products at (309) 578-3295 for Caterpillar dealer support in that theatre of operation.

Table 2. Caterpillar Dealer Listing.

Vehicle Location	Local Caterpillar Dealer
Ft. Bragg, NC	Gregory Poole Equipment Co. 5633 U.S. Highway 301 at NC 59 Hope Mills, NC 28348 PH: (910) 424-4400 Fax: (910) 424-1323 www.gregpoole.com
Ft. Campbell, KY	Whayne Supply Company 651 U.S. Highway 31 W. Bypass Bowling Green, KY 42101 PH: (270) 843-3275 Fax: (270) 843-3285
Cape Girardeau, MO	Fabrick Brothers Equipment Co. 3033 Nash Road Scott City, MO 63780-9791 PH: (573) 332-1122 Fax: (573) 332-7109
St. Cloud, MN	Ziegler Inc. 2225 225th Street St. Cloud, MN 56301-8742 PH: (320) 253-2234 Fax: (320) 253-2187
Greenville, SC	Carolina Tractor and Equipment Co. 40 Interstate Blvd Asheville, NC 28806-2261 PH: (828) 251-2500 Fax: (828) 253-9341
Sharonville, OH	Holt Company of Ohio 11330 Mosteller Road Sharonville, OH 45241-1828 PH: (513) 771-0515 Fax: (513) 672-7658
Northfield, NJ	Giles & Ransome Inc. 600 S. Egg Harbor Road Hammonton, NJ 08037-8602 PH: (609) 561-0308 Fax: (609) 567-3970
Jefferson Banks, MO	John Fabick Tractor Company One Fabick Dr. Fenton, MO 63026-2986 PH: (636) 343-5900 Fax: (636) 343-2186

END OF WORK PACKAGE

WARRANTY INFORMATION (ALL EXCEPT CATERPILLAR, INC.) 0050 00

GENERAL WARRANTY INFORMATION

1. The Airborne Scraper and Water Distributor System (ASWDS) is covered by a number of different warranties as described in Table 1. This work package contains information on warranties for the tires and ISU-60 container, including instructions on filing warranty claims. Information on overall machine and engine specific warranties (covered by Caterpillar Inc.) is found in WP 0049 00.

Table 1. ASWDS Warranty Information.

Warranted Component	Duration of Warranty	Manufacturer Responsible	Contact Information
Tires	5 Years	Bridgestone/Firestone Off Road Tire Company	(800) 572-8905
ISU-60 Container	12 Months	AAR Mobility Systems	(800) 355-2015
	Warranty Information Contained in WP 0049 00		
Overall Machine	18 Months/1000 Hours	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Ground Engaging Tools	Not limited by time	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Battery	3 Years	Caterpillar Inc.	Defense and Federal Products (390) 578-3295
Engine Emission Components (613 ASWDS Engine is EPA Certified)	5 Years/3000 Hours	Caterpillar Inc.	Defense and Federal Products (309) 675-4037

2. The warranties covered in this work package are arranged by manufacturer. For example, for information on the ISU-60 container warranty, look for the heading titled *AAR Mobility Systems (ISU-60 Container Warranty)*. Paragraphs under this heading contain all information on the ISU-60 warranty, including administrative and claim filing instructions.
3. Scheduled vehicle maintenance is contained in TM 5-3800-205-10-2 and TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00. The fact that the machines are covered by a warranty does not relieve the user of the responsibility for proper machine operation, care, and maintenance.
4. The manufacturer's lubrication and service intervals must be followed.

EXPLANATION OF TERMS

1. **Abuse.** The improper use, maintenance, repair, or mishandling of warranted items that may cause the warranty of those items to become void.
2. **Acceptance Date.** The date the equipment is accepted in the Army's inventory as annotated on DD Form 250, *Material Receiving and Inspection Report*.
3. **Acquiring Command or Activity.** An activity that procures the items or material for a user.
4. **Defect.** An imperfection that impairs the worth or utility of the part or component.
5. **Repair.** To restore an item to a serviceable condition without affecting warranty.

EXPLANATION OF TERMS - CONTINUED

6. **Repairable.** An item that may be reconditioned or economically repaired for reuse.
7. **Warranty.** A written agreement between a contractor and the Government that outlines the rights and obligations of both parties for defective supplies.
8. **Warranty Claim.** Action started by the equipment users for authorized warranty repair or reimbursement.
9. **Warranty Period.** Time during which the warranty is in effect.
10. **Warranty Start Date.** The date the warranty is put into effect (stamped on warranty plate). The warranty plate is proof of warranty start date for all warranties.
11. **Ton-Mile-Per-Hour.** A rating used to describe the tires ability to carry a load at a given speed; exceeding this will damage the tire.

BRIDGETONE/FIRESTONE OFF ROAD TIRE COMPANY (TIRE WARRANTY)

1. **General.**
   a. ASWDS tires are warranted on a prorated basis by Bridgestone/Firestone Off Road Tire Company (BFOR) for a period of 5 years. Refer to Table 2. for information on prorating tires.
   b. Contact the local BFOR or TACOM-Team Tire for information regarding tire warranty. To find the closest Firestone dealer, use www.bfor.com or call 1-800-572-8905. The original tire on the ASWDS machine is a Super Ground Grip Loader Dozer L-2 Nylon 16 ply rating size 23.5-25.
2. **To Obtain Warranty Service.**
   a. Contact an authorized Bridgestone, Firestone, or America OTR dealer. Please be prepared to provide proof of purchase of the product and purchase date.
   b. The authorized dealer will contact BFOR to arrange for a tire inspection and claim processing. The dealer does NOT have authority/responsibility to make the determination as to eligibility for coverage under this warranty.
3. **Limited Warranty Exclusions - All Tires and Tubes.** All tire and tube warranties are subject to the following exclusions:

NOTE

Overloading tires voids the warranty.

   a. All limited warranties of BFOR are limited to the original purchaser and are not assignable to subsequent purchasers.
   b. Costs of mounting and balancing following prorated replacement or repair of tires or tubes, and applicable federal, state, and local taxes.
   c. Warranties do not cover damage resulting from misuse, improper mounting, misapplication, use of non-approved rims, improper inflation, overloading, running flat, misalignment or imbalance of wheels/rims, defective brakes or shock absorbers, abuse, willful damage, oil, chemical action, fire or externally - generated heat, use of tire chains, use of studs, water or other material entrapped inside the tire during mounting, vehicle damage or road hazards (such as rock cuts, punctures, cut separations, impacts, flex breaks).
   d. Claims for irregular wear are not covered.
   e. Any tire which is operated above its ton-mile per-hour (TMPH) rating, is not covered.
   f. All tube-type tires should be used with proper size Bridgestone/Firestone tubes exclusively.
   g. Warranties apply to original usable tread depth and do not extend to retreaded tires.
   h. Any modifications to the tire (added buttress shoulders, regrooving, relugging, etc.) voids all warranties.
   i. Any material added to the tire (tire fill, sealer, balancer, etc.) is not covered by this warranty and will not be compensated for in case of credit being issued for the tire. Use of solid type fill (such as urethane) voids all warranties.

BRIDGETONE/FIRESTONE OFF ROAD TIRE COMPANY (TIRE WARRANTY) - CONTINUED

j. Any costs associated with the repair of tires are not covered, unless previously approved by the appropriate BFOR employee.

k. Warranties are valid only for tires and tubes purchased and used in the United States.

l. ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THE DURATION OF THIS LIMITED WARRANTY.

m. ALL OBLIGATIONS OR LIABILITIES FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE ARE HEREBY EXCLUDED, INCLUDING LOSS OF USE OF VEHICLE AND LOSS OF TIME.

n. Some states do not allow limitations in how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above such limitations or exclusions may not apply to you.

o. No Bridgestone, Firestone, or America OTR dealer has the authority to make or imply any representation, promise or agreement which in any way varies or extends the terms of this warranty.

Table 2. Tire Warranty Information.

AMOUNT OF CREDIT ISSUED TO THE CUSTOMER FOR WORKMANSHIP AND MATERIAL CONDITIONS								
	Percentage of Original Tread Depth Remaining							
AGE OF TIRE	**81% to 100%**	**71% to 80%**	**61% to 70%**	**51% to 60%**	**41% to 50%**	**31% to 40%**	**21% to 30%**	**0% to 20%**
Less than 180 days	Actual%	70%	60%	50%	40%	30%	20%	0%
180 days to one year	80%	70%	60%	50%	40%	30%	10%	0%
Less than two years	75%	65%	60%	50%	40%	30%	10%	0%
Less than three years	50%	50%	40%	40%	40%	30%	10%	0%
Less than four years	40%	30%	30%	30%	30%	20%	10%	0%
Less than five years	20%	20%	20%	20%	20%	20%	10%	0%
More than five years	0%	0%	0%	0%	0%	0%	0%	0%

AAR MOBILITY SYSTEMS (ISU-60 CONTAINER WARRANTY)

1. **General.** The ISU-60 container is covered by a 12-month materials and workmanship warranty by AAR Mobility Systems.
2. **To Obtain Warranty Service.** Contact AAR Mobility Systems at 1-800-355-2015.

AAR MOBILITY SYSTEMS (ISU-60 CONTAINER WARRANTY) - CONTINUED

3. **ISU-60 Container Warranty.** AAR warrants to the Army that its new goods, excluding components not made by AAR, are free from defects in material and workmanship under normal use and service. AAR's obligation under this warranty is limited to repair or at AAR's option, replacement of any part or parts which are within 12 months after delivery to the Army returned to AAR's place of manufacture and which after examination appears to AAR's satisfaction to be defective under the above warranty. In the event a part is replaced, the aforementioned warranty term shall not be extended beyond one year after the delivery of the original manufactured part to the Army. All costs of shipping any defective goods to AAR and returning them to the Army shall be borne entirely by the Army. AAR shall use its good faith efforts to obtain, in its subcontract with each supplier of components not made by AAR, a provision that the subcontractor's standard warranty, if any, shall survive AAR's inspection, acceptance and payment and shall run to AAR, its successors, assigns and customers. AAR MAKES NO IMPLIED WARRANTY OF MERCHANTABILITY FITNESS FOR ANY SPECIAL USE OR FUNCTION OR LIFE AFTER SALE TO THE ARMY AND/OR TO SUBSEQUENT BUYERS OR USERS OF THE GOODS, BEYOND THE EXPRESSED TERMS OF THIS AGREEMENT. THERE ARE NO WARRANTIES EXPRESSED OR IMPLIED, ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE, WHICH EXTEND BEYOND THE FACE OF THIS AGREEMENT. AAR neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of its goods.

END OF WORK PACKAGE

INDEX

INDEX - Continued

INDEX - Continued

Subject **Work Package/Page**

R - Continued

S

T

U

V

W

INDEX - Continued

Subject **Work Package/Page**

W - Continued

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
0514507

DISTRIBUTION: To be distributed in accordance with the initial distribution requirements for IDN: 256837, requirements for TM 5-3800-205-23-3.

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: July 2005

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 5-3800-205-23-3	15 July 2005	Field Maintenance Manual (Includes Unit and Direct Support Maintenance) for the 613CWD Water Distributor

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0017 00-2				2	Part number supplied for item 2 is incorrect.

** 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

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
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3800-205-23-3	15 July 2005	Field Maintenance Manual (Includes Unit and Direct Support Maintenance) for the 613CWD Water Distributor

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

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

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.)*

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
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3800-205-23-3	15 July 2005	Field Maintenance Manual (Includes Unit and Direct Support Maintenance) for the 613CWD Water Distributor

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

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

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.)*

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
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3800-205-23-3	15 July 2005	Field Maintenance Manual (Includes Unit and Direct Support Maintenance) for the 613CWD Water Distributor

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

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

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.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

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