TM 5-3800-205-23-2

FIELD MAINTENANCE MANUAL

(INCLUDES UNIT AND DIRECT SUPPORT MAINTENANCE)

FOR

SCRAPER, TRACTOR

ELEVATING, SELF-PROPELLED, 11 CUBIC YARDS, SECTIONALIZED

MODEL 613CS
(NSN 3805-01-497-0697) (EIC: EE4)

SCRAPER UNIQUE COMPONENTS

Approved for public release; distribution is unlimited.

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.

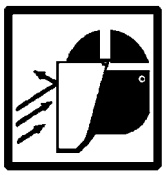
CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.

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

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

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

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

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

POISON - skull and crossbones shows material is poinsonous 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

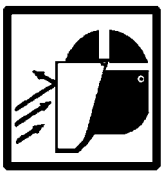
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such 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.

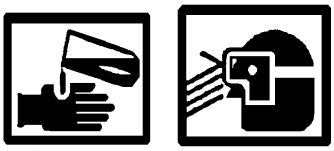
d. **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.



WARNING

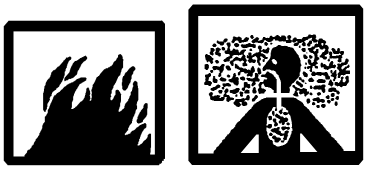
COMPRESSED AIR

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



WARNING

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

WARNING

HAZARDOUS WASTE DISPOSAL

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

WARNING

HEARING PROTECTION

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

WARNING

HYDRAULIC SYSTEM

- 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

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 the tractor. Failure to follow this warning may result in serious injury or death to personnel.
- DO NOT operate machine unless seat belt has been fastened. Failure to follow this warning may result in serious injury or death, in the event of an accident.
- BE ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before starting engine, moving machine or lowering or raising scraper bowl. Failure to follow this warning may result in serious injury or death to personnel or damage to equipment.
- Never leave the operator's position without applying the parking brake. Failure to follow this warning may result in death or 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 scraper. 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.
- For Water Distributor only, 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 external or internal injury due to excessive whole-body vibration.

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.
- Use extreme caution when climbing on ladder. Failure to exercise caution may result in a fall, causing injury to personnel.
- 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 handrail 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 eye protection when disconnecting 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 to cutting edge and cutting edge-to-elevator clearance adjustments should NEVER be attempted without first securing the bowl by blocking it so that it is firmly supported. Failure to follow this warning may cause injury to personnel.

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

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 15 July 2005

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 36 AND TOTAL NUMBER OF WORK PACKAGES IS 51 CONSISTING OF THE FOLLOWING:

Page/WP No.	***Change No.**
Cover/(Back Blank)	0
a to h	0
A (B Blank)	0
i to vi	0
WP 0001 to WP 0051	0
Index-1 to Index-4	0

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

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TECHNICAL MANUAL
TM 5-3800-205-23-2

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

TECHNICAL MANUAL

(INCLUDES UNIT AND DIRECT SUPPORT FIELD MAINTENANCE MANUAL)

FOR

SCRAPER, TRACTOR
ELEVATING, SELF-PROPELLED, 11 CUBIC YARDS, SECTIONALIZED
MODEL 613CS
(NSN 3805-01-497-0697) (EIC:EE4)

SCRAPER 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

Volume 2 TM 5-3800-205-23-2

Table of Contents - Continued

Table of Contents - Continued

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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, Unit Maintenance Procedures, Unit Level Tractor Maintenance, Direct and General Support Tractor Maintenance, Unit Level Scraper Maintenance, Direct and General Support Scraper Maintenance, Unit Level Water Distributor Maintenance, Direct and General Support 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 2 THIS MANUAL

1. A *Warning Summary* is located at the beginning of this manual. Become familiar with these warnings before operating or performing maintenance on the scraper.
2. A *Table of Contents*, located in the front of this manual, lists all chapters and work packages in Volume 2 of 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 manual.
3. Chapter 1, *Unit Level Scraper Maintenance*, provides instructions on unit level maintenance of scraper components.
4. Chapter 2, *Direct Support Level Scraper Maintenance*, provides instructions on DS maintenance of scraper components.
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 0020 00)”, go to Work Package 0020 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 SCRAPER MAINTENANCE

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FUEL PUMP, HOSES, AND TUBES REPLACEMENT 0001 00

THIS WORK PACKAGE COVERS

Fuel Pump Replacement; Fuel Hoses Replacement; Fuel Tubes Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Fuel (Item 13, 14 or 15, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Strap, tiedown (Item 38, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

Lockwasher (2)

O-ring (as required)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

Rear compartment access door opened (TM 5-3800-205-10-1)

Fuel shutoff valves closed (TM 5-3800-205-10-1)

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 to death to personnel.

CAUTION

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

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.
- Tag all hoses and tubes to aid in installation.

FUEL PUMP REPLACEMENT

CAUTION

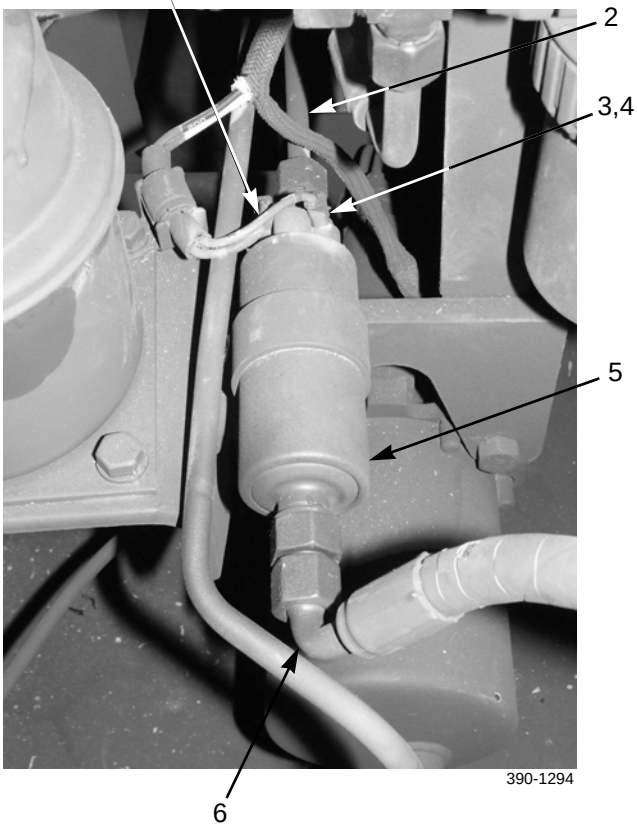
Use two wrench method when disconnecting fuel hose and tube from fuel pump. Failure to follow this caution may result in damage to ceramic adapter.

1. Disconnect hose (6) and tube (2) from fuel pump (5). Remove and discard O-rings.

NOTE

Tag wires to aid in installation.

2. Remove two nuts (3), lockwashers (4), and wires (1) from fuel pump (5). Discard lockwashers.

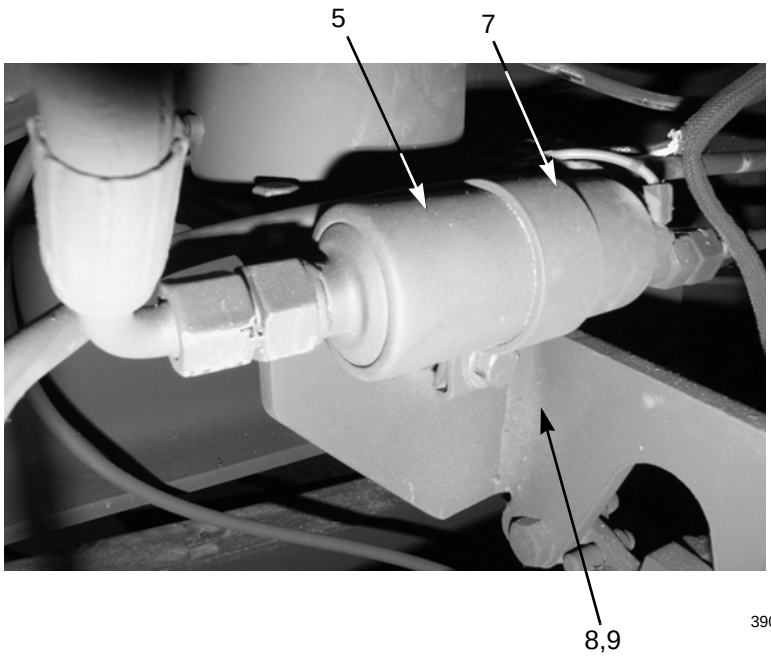


NOTE

Note position of fuel pump to aid in installation.

3. Remove screw (8), washer (9), clamp (7), and fuel pump (5) from rear of machine.
4. Remove and inspect fittings from fuel pump (5). Replace fittings if damaged.
5. Lubricate new O-rings with clean fuel and install on fuel pump (5).
6. Install two wires (1) on fuel pump (5) with two new lockwashers (4) and nuts (3).

FUEL PUMP REPLACEMENT - CONTINUED



NOTE

Arrow marking on fuel pump must point toward front of machine.

7. Position fuel pump (5) on machine and install clamp (7) with washer (9) and screw (8).

CAUTION

Use two wrench method when connecting fuel hose and tube to fuel pump. Failure to follow this caution may result in damage to ceramic adapter.

8. Connect tube (2) and hose (6) on fuel pump (5).

9. Open fuel shutoff valves (TM 5-3800-205-10-1).

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 5-3800-205-10-1). Check for fuel leaks.

11. Close rear compartment access door (TM 5-3800-205-10-1).

FUEL HOSES REPLACEMENT

NOTE

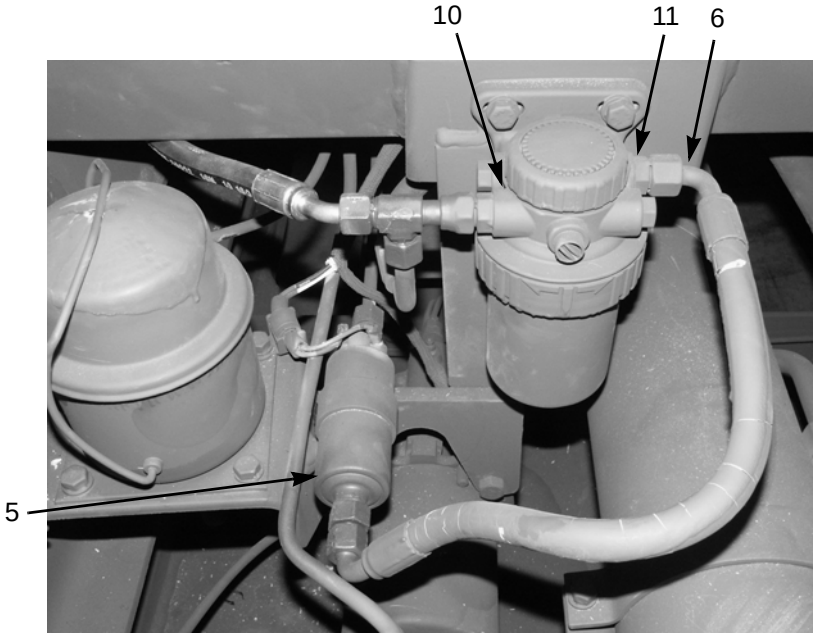
- Perform following steps to replace each of five fuel hoses. Hoses are connected to fuel pump, fuel/water separator, fuel tubes, valves, adapters, and connectors.
- Remove straps, tiedown straps, screws, and hose clamps as necessary to separate each hose from machine.
- Fittings include elbows, tees, and adapters.

1. Disconnect hose (6) from fuel pump (5). Remove and discard O-ring.
2. Disconnect other end of hose (6) from fitting (11) on fuel/water separator (10). Remove and discard o-ring.
3. Remove hose (6) from machine.
4. Lubricate new O-rings with clean fuel and install O-rings on hose (6).
5. Connect hose (6) to fitting (11) of fuel/water separator (10).
6. Connect other end of hose (6) to fuel pump (5).
7. Open fuel shutoff valves (TM 5-3800-205-10-1).

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 5-3800-205-10-1). Check for leaks.
9. Close rear compartment access door (TM 5-3800-205-10-1).

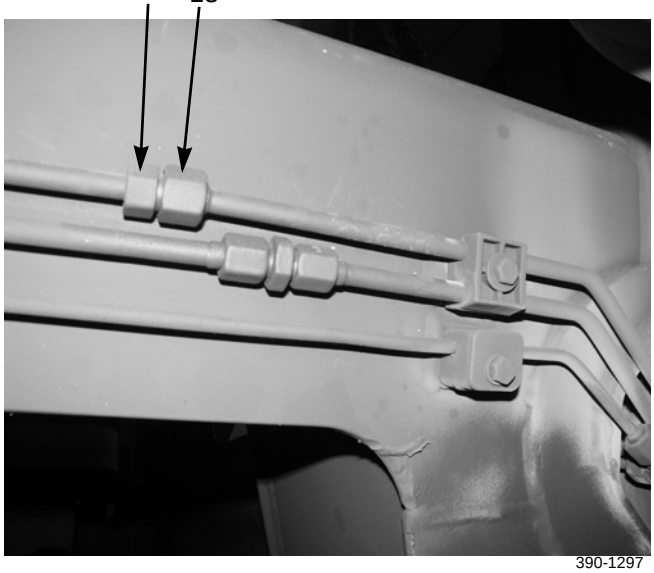


FUEL TUBES REPLACEMENT

NOTE

Perform following steps to replace each of four fuel tubes and one fuel drain tube. Tubes are connected to fuel hoses, fittings, and other tubes.

1. Disconnect tube (13) from tube (12) at front of scraper bowl. Remove and discard O-ring.



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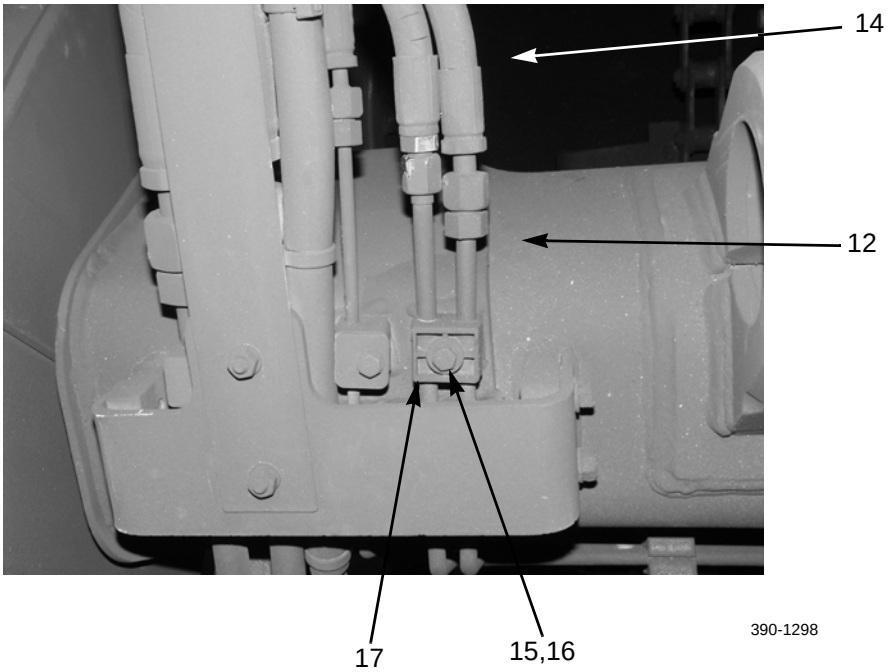
2. Disconnect hose (14) from other end of tube (12). Remove and discard O-ring.
3. Remove three screws (15), washers (16), and clamps (17) from tube (12).
4. Remove tube (12) from machine.



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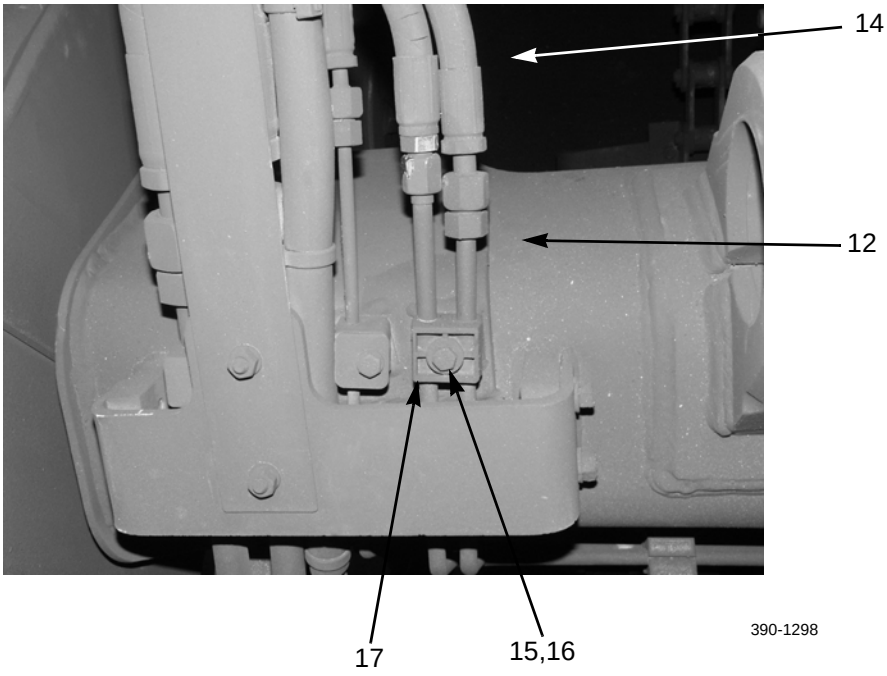
FUEL TUBES REPLACEMENT - CONTINUED

5. Position tube (12) on machine.
6. Lubricate new O-ring with clean fuel and install on hose (14).
7. Connect hose (14) to tube (12).
8. Lubricate new O-ring with clean fuel and install on tube (13).
9. Connect tube (13) to other end of tube (12).
10. Install three clamps (17) on tube (12) with washers (16) and screws (15).



11. Open fuel shutoff valves (TM 5-3800-205-10-1).

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 poinsoning.

12. Prime fuel system and start engine (TM 5-3800-205-10-1). Check for fuel leaks.
13. Close rear compartment access door (TM 5-3800-205-10-1).

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 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Fuel (Item 13, 14 or 15, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Filter element, fluid

O-ring (6)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheel chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

Rear compartment access door opened (TM 5-3800-205-10-1)

Fuel shutoff valves closed (TM 5-3800-205-10-1)

Fuel/water separator drained (TM 5-3800-205-10-1)

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

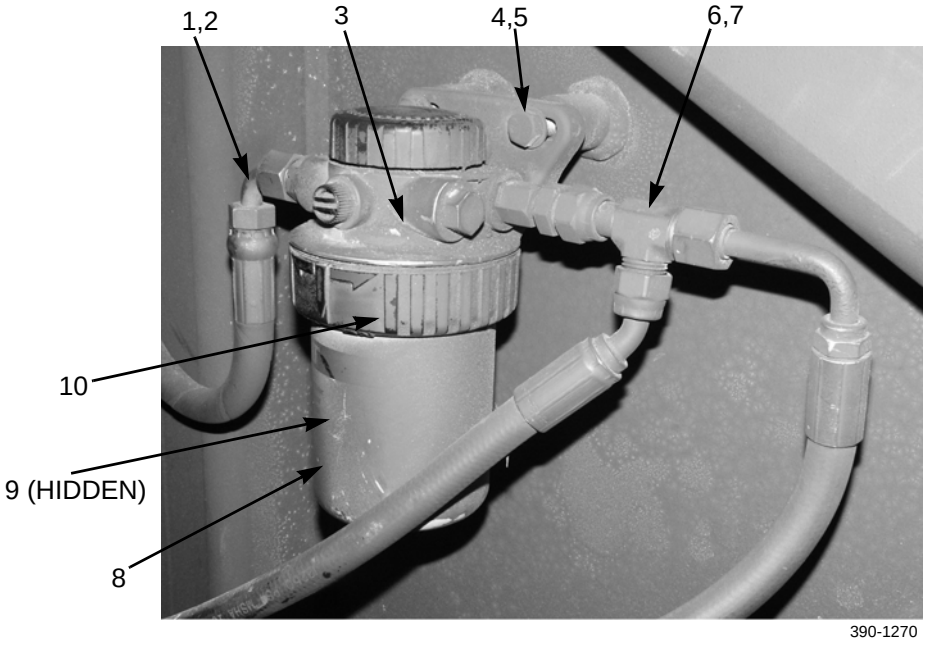
Cap all hoses and fittings to prevent fluid loss and contmination of fuel system.

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.

REMOVAL

1. Clean area around fuel/water separator filter housing (8) and fuel/water separator head (3).
2. Unscrew retaining ring (10) and remove fuel/water separator filter housing (8) from fuel/water separator head (3).
3. Remove filter element (9) from fuel/water separator filter housing (8). Discard filter element.
4. Disconnect hose (1) from connector at fuel/water separator head (3). Remove O-ring (2) from hose and discard. Install protective cap on hose.
5. Remove tee (6) and O-ring (7) from connector at fuel/water separator head (3). Install protective cap on tee. Discard O-ring.
6. Remove two screws (4), washers (5), and fuel/water separator head (3) from rear of scraper.
7. Remove two connectors, two plugs, and four O-rings from fuel/water separator head (3). Discard O-rings.



390-1270

INSTALLATION

NOTE

Coat new O-rings with clean fuel before installation.

1. Install four new O-rings, two connectors, and two plugs on fuel/water separator head (3).
2. Install fuel/water separator head (3) on rear of scraper with two washers (5) and screws (4).
3. Remove protective cap from tee (6). Install new O-ring (7) and tee to connector on fuel/water separator head (3).
4. Remove protective cap from hose (1). Install new O-ring (2) and connect hose to connector on fuel/water separator head (3).
5. Install new filter element (9) in fuel/water separator filter housing (8).

INSTALLATION - CONTINUED

NOTE

- Ensure fuel/water separator head is clean before installing fuel/water separator filter housing to head.
- Fuel filter has a locating notch that only allows proper installation.

6. Install fuel/water separator filter housing (8) on fuel/water separator head (3). Tighten retaining ring (10).
7. Open fuel shutoff valves (TM 5-3800-205-10-1).

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 5-3800-205-10-1). Check for fuel leaks.
9. Close rear compartment access door (TM 5-3800-205-10-1).

END OF WORK PACKAGE

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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 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Heater gun, gun type, electric (Item 14, WP 0048 00)

Materials/Parts

Cloth, abrasive (Item 7, WP 0047 00)

Detergent (Item 11, WP 0047 00)

Grease, electrically conductive (Item 17, WP 0047 00)

Insulating varnish, electrical (Item 19, WP 0047 00)

Insulating sleeving, electrical (Item 20, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

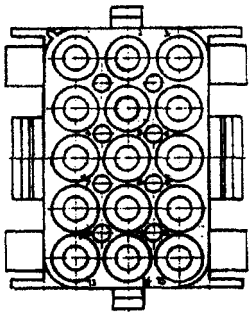
NOTE

- 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

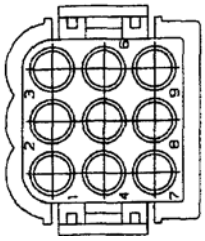
NOTE

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



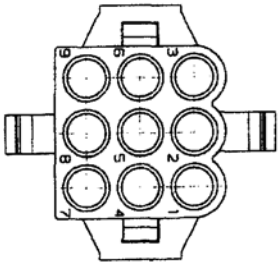
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

390-1189



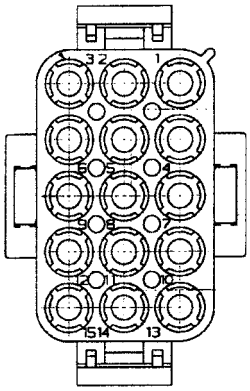
3	6	9
2	5	8
1	4	7

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

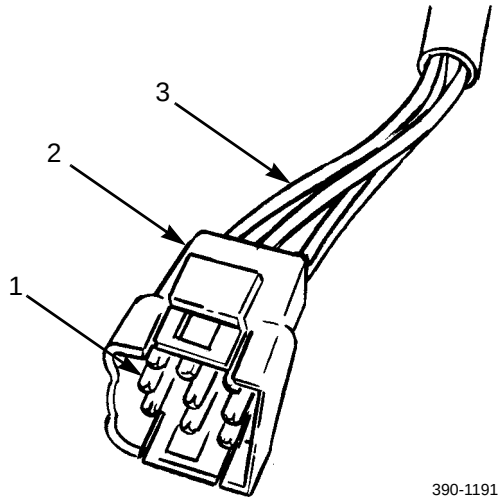
390-1190

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

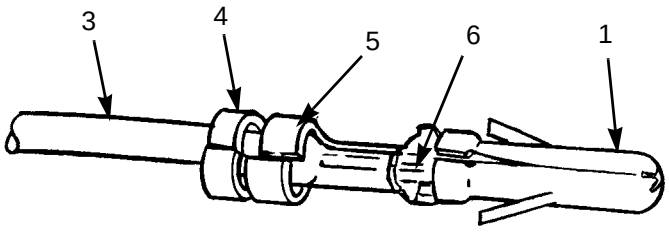
Perform steps 4 through 6 only if pin was removed.

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.

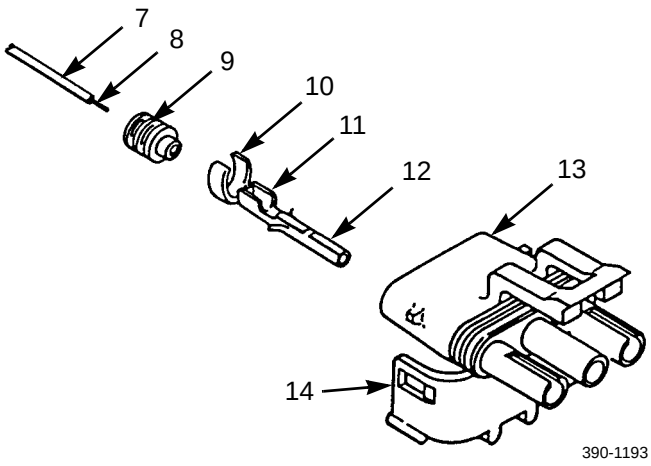
SEALED CONNECTOR REPAIR

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

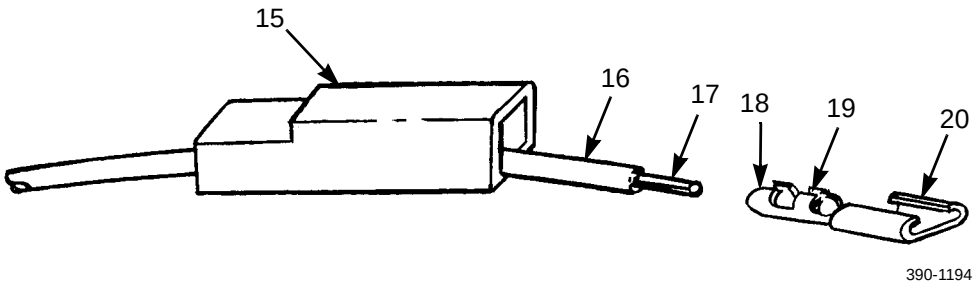
1. Using removal tool, insert tool into front of connector (15) and depress locking tab of receptacle (20).
2. Push wire (16), with receptacle (20) attached, through front of connector (15).
3. If defective, remove receptacle (20) from wire (16) by cutting through wire just behind receptacle.

RECEPTACLE CONNECTOR REPAIR - CONTINUED

NOTE

Perform steps 4 through 7 only if receptacle was removed.

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

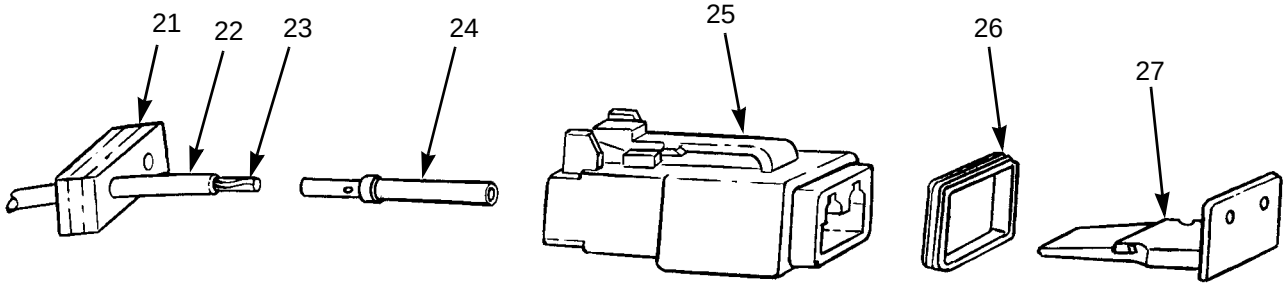


390-1194

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.

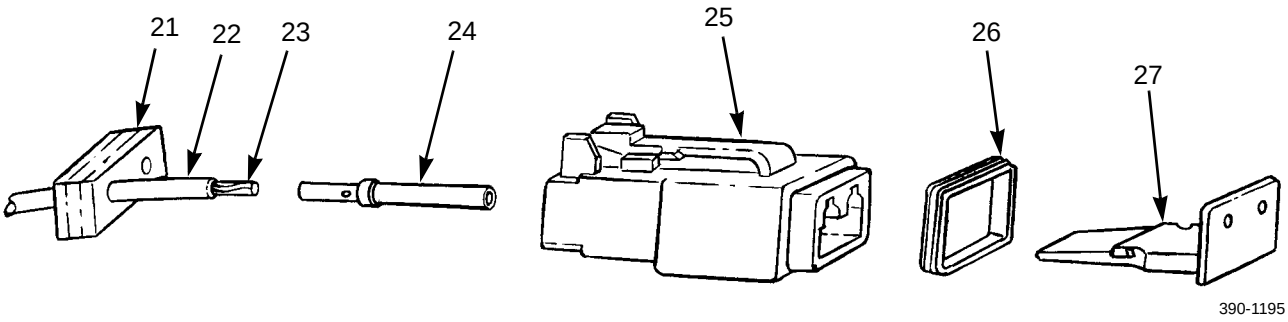
3. Using pin removal tool, insert tool into front of connector (25) and depress locking tab of connector.
4. Remove wire (22) with pin (24) from rear of connector (25).
5. If defective, remove pin (24) from wire (22) by cutting through wire just behind pin.

WATERPROOF CONNECTOR REPAIR - CONTINUED

NOTE

Perform steps 6 through 9 only if pin was removed.

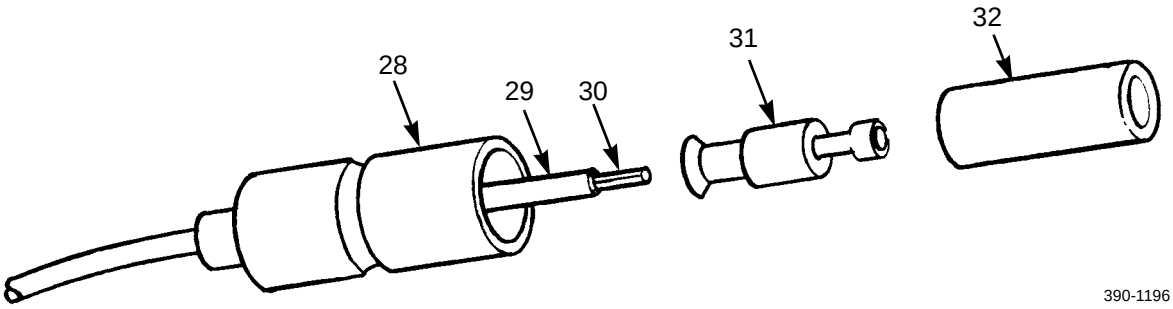
6. Using wire stripping tool, strip insulation of wire (22) to expose ¼ in. (6 mm) length of metal strands (23).
7. Insert metal strands (23) of wire (22) fully into rear of pin (24).
8. Using crimping tool, securely crimp pin (24) to metal strands (23) of wire (22).
9. Push pin (24) into rear of connector (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. If defective, remove terminal (31) from wire (29) by cutting through wire just behind terminal.



390-1196

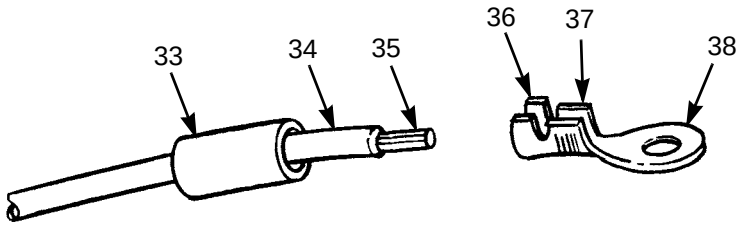
NOTE

Perform steps 4 through 6 only if terminal was removed.

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. Use a heat gun to 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

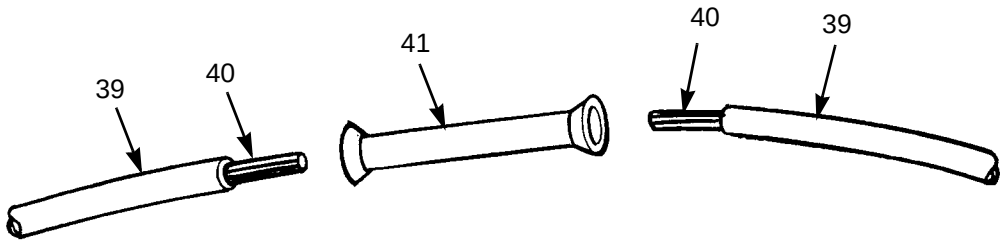
The selection of crimping tool and type of splice connectors is optional. High quality splice connectors can be expected to last the life of the machine.

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. 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 digital 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 of 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 that is 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

GROUND STRAPS REPLACEMENT 0004 00

THIS WORK PACKAGE COVERS

Air Intake Heater-To-Engine Ground Strap Replacement, Starter Ground Cable Replacement, Cab-To-Frame Ground Strap Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Lockwasher

Equipment Conditions

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-204-10-1)

Parking brake engaged (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

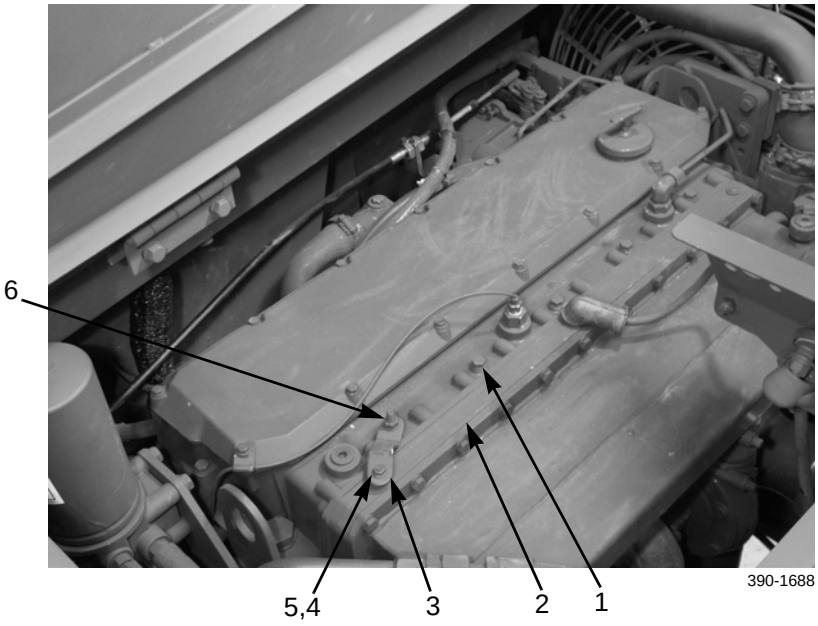
AIR INTAKE HEATER-TO-ENGINE BLOCK GROUND STRAP REPLACEMENT

1. Place battery disconnect switch in OFF position (TM 5-3800-205-10-1).
2. Open engine access door (TM 5-3800-205-10-1).
3. Remove two nuts (5), washers (4), and ground strap (3) from studs (6) on intake heater (2) and engine block (1).

NOTE

Ensure ground points are clean.

4. Install ground strap (3) on studs (6) on intake heater (2) and engine block (1) with two washers (4) and nuts (5).
5. Close engine access door (TM 5-3800-205-10-1).



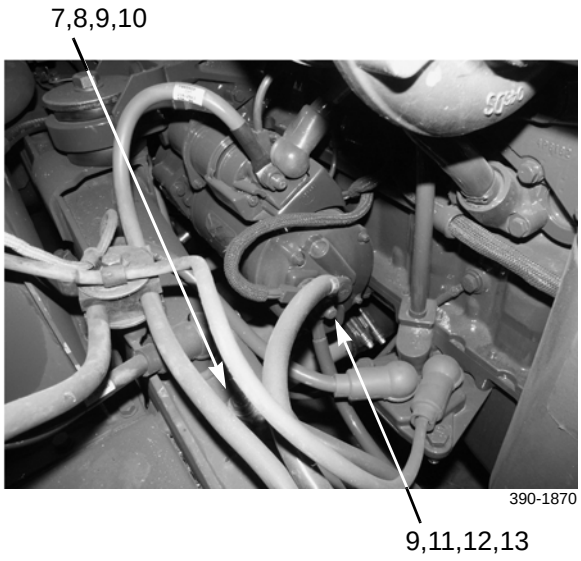
STARTER GROUND CABLE REPLACEMENT

1. Place battery disconnect switch in OFF position (TM 5-3800-205-10-1).
2. Open engine access door (TM 5-3800-205-10-1).
3. Remove screw (7), washer (8), and ground cable (9) from ground lug (10).
4. Remove nut (11), lockwasher (12), and other end of ground cable (9) from starter terminal (13). Discard lockwasher.

NOTE

Ensure ground points are clean and free of paint.

5. Install ground cable (9) on starter terminal (13) with new lockwasher (12) and nut (11).
6. Install other end of ground cable (9) on ground lug (10) with washer (8) and screw (7).
7. Close engine access door (TM 5-3800-205-10-1).



CAB-TO-FRAME GROUND STRAP REPLACEMENT

1. Place battery disconnect switch in OFF position (TM 5-3800-205-10-1).

NOTE

Cab-to-frame ground strap is located below cab and to the rear of seat on left side.

2. Remove screw (14), washer (15), and ground strap (17) from cab ground lug (16).
3. Remove screw (18), washer (19), and other end of ground strap (17) from frame ground lug (20).

NOTE

Ensure gound points are clean and free of paint.

4. Install ground strap (17) on frame ground lug (20) with washer (19) and screw (18).
5. Install other end of ground strap (17 to cab ground lug (16) with washer (15) and screw (14).

END OF WORK PACKAGE

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COMPOSITE LIGHT MAINTENANCE 0005 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 0048 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Equipment Condition - Continued

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

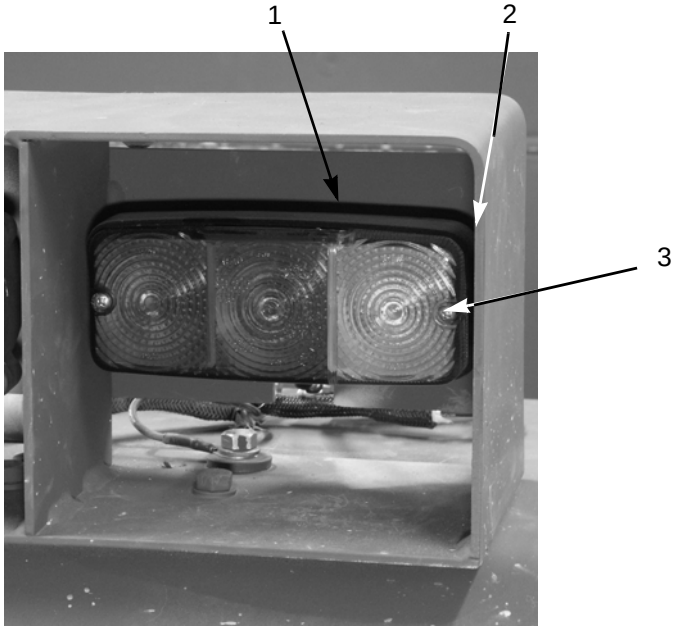
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

NOTE

Right and left composite lights are maintained the same way. Right-side composite light is shown.

LAMP REMOVAL

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



390-1819

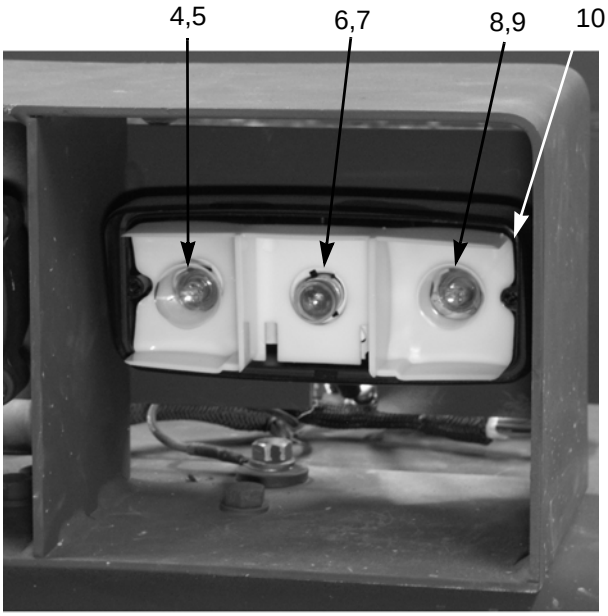
LAMP REMOVAL - CONTINUED

3. Inspect gasket (10) for cracks and tears. Remove and discard gasket if damaged.

NOTE

- Left lamp is for stoplight. Center lamp is for taillight. Right lamp is for turn signal and hazard light.
- All lamps are removed the same way.

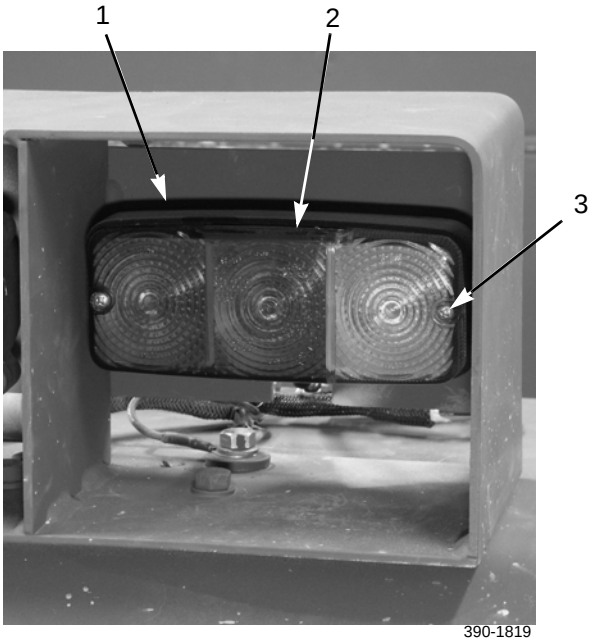
4. Remove stoplight lamp (4) from socket (5).
5. Remove taillight lamp (6) from socket (7).
6. Remove turn signal and hazard light lamp (8) from socket (9).



390-1356

LAMP INSTALLATION

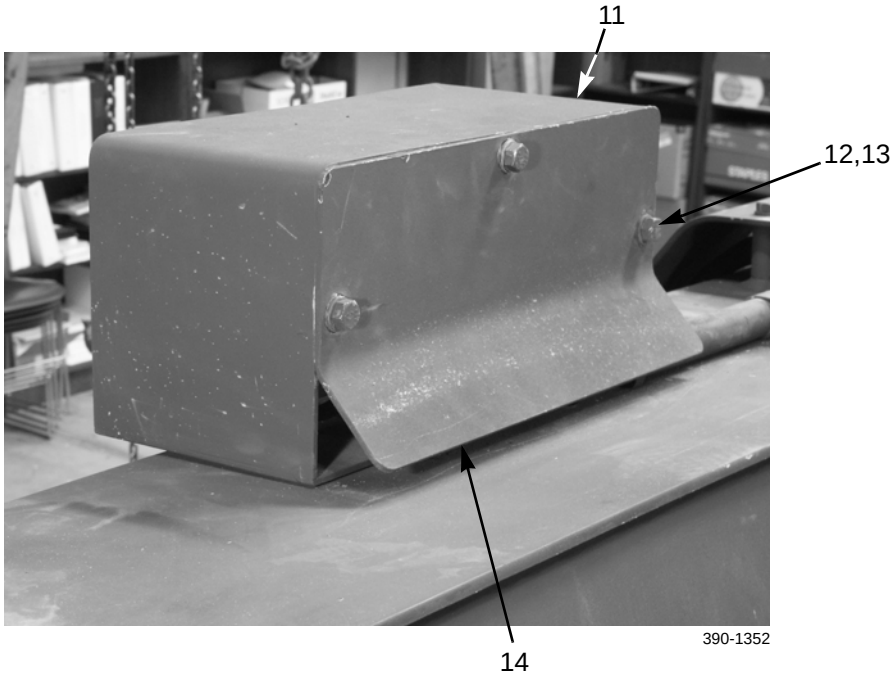
1. Install turn signal hazard light lamp (8) in socket (9).
2. Install taillight lamp (6) in socket (7).
3. Install stoplight lamp (4) in socket (5).
4. If removed, install new gasket (10) and lens (2) on light housing (1) with two screws (3).



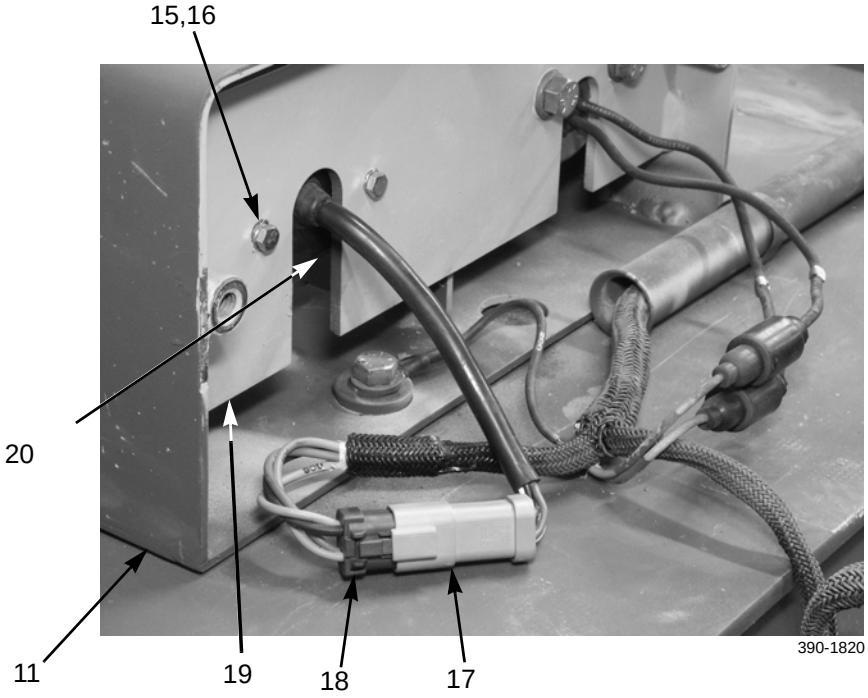
390-1819

LIGHT ASSEMBLY REMOVAL

1. Remove three screws (12), washers (13), and access plate (14) from enclosure (11).

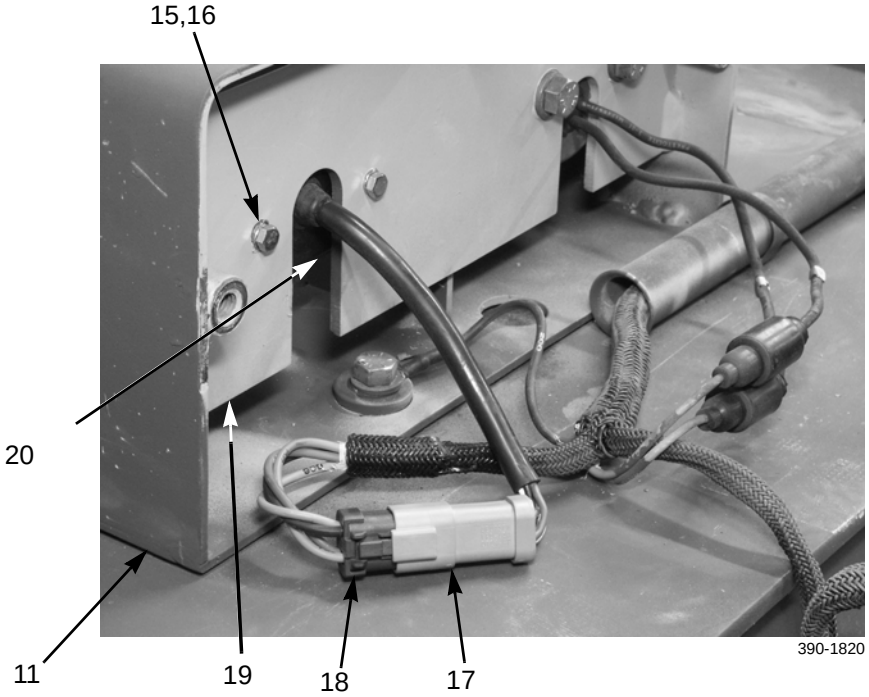


2. Remove two screws (15) and washers (16) from plate (19).
3. Disconnect light assembly connector (17) from wiring harness connector (18).
4. Remove light assembly (20) from plate (19).
5. Remove lamps (Refer to *Lamp Removal*).

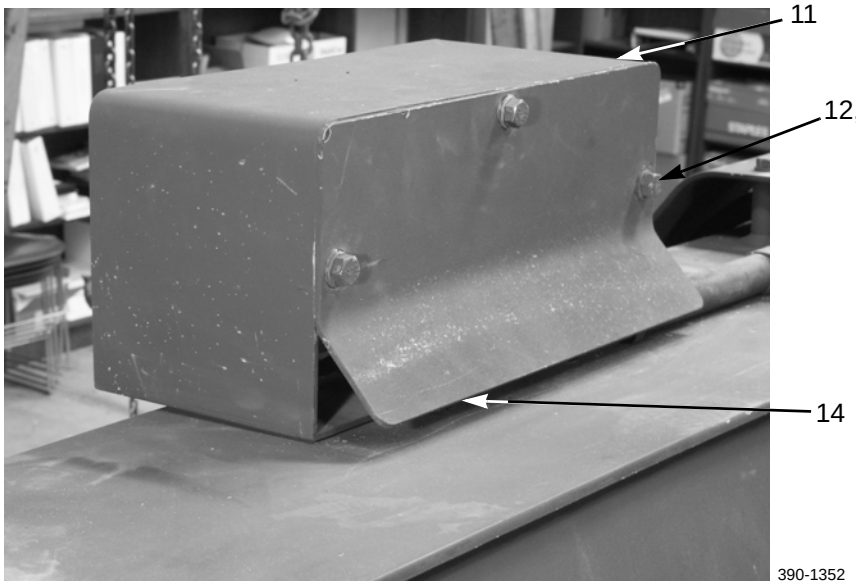


LIGHT ASSEMBLY INSTALLATION

1. Install lamps (Refer to *Lamp Installation*).
2. Install blackout light assembly (20) on plate (19) with two washers (16) and screws (15).
3. Connect light assembly connector (17) to wiring harness connector (18).



4. Install access plate (14) on enclosure (11) with three washers (13) and screws (12).



5. Place battery disconnect switch in ON position (TM 5-3800-205-10-1).
6. Check operation of lights (TM 5-3800-205-10-1).

END OF WORK PACKAGE

BLACKOUT LIGHT MAINTENANCE 0006 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 0048 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Equipment Condition - Continued

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

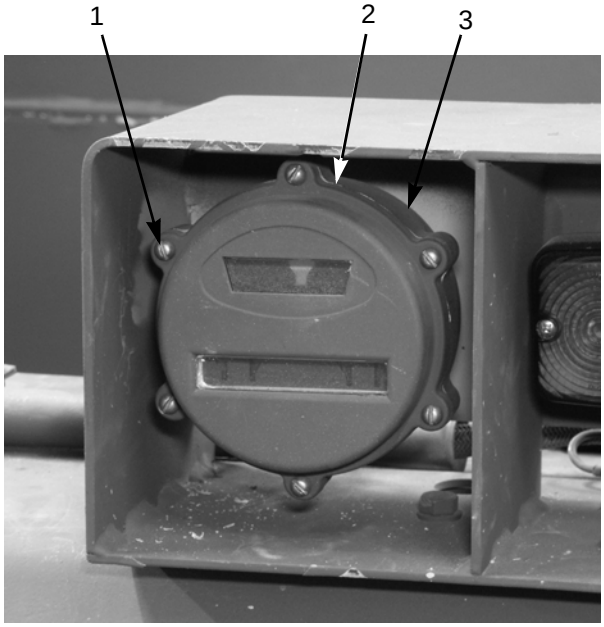
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

NOTE

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

LED REMOVAL

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



390-1354

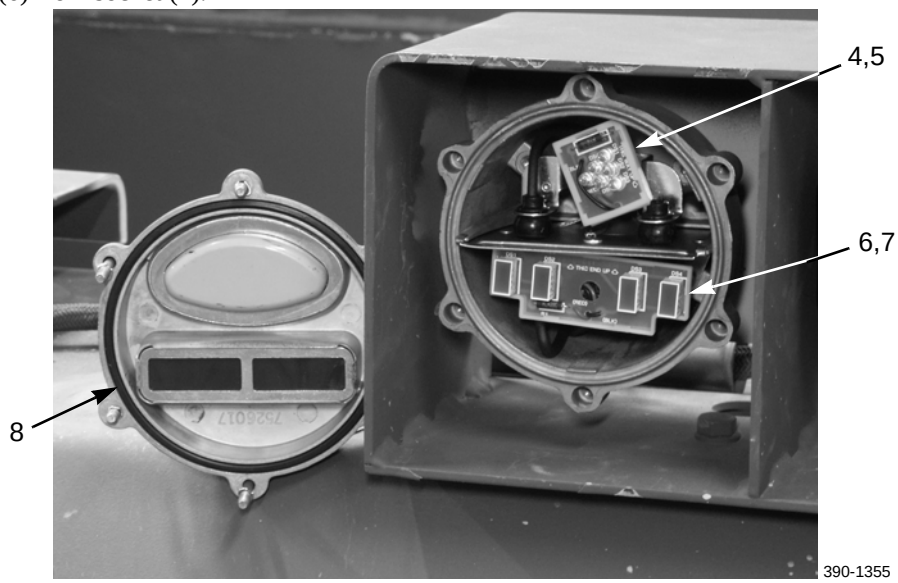
LED REMOVAL - CONTINUED

2. Inspect seal (8) 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 (4) from socket (5).
4. Remove LED (6) from socket (7).

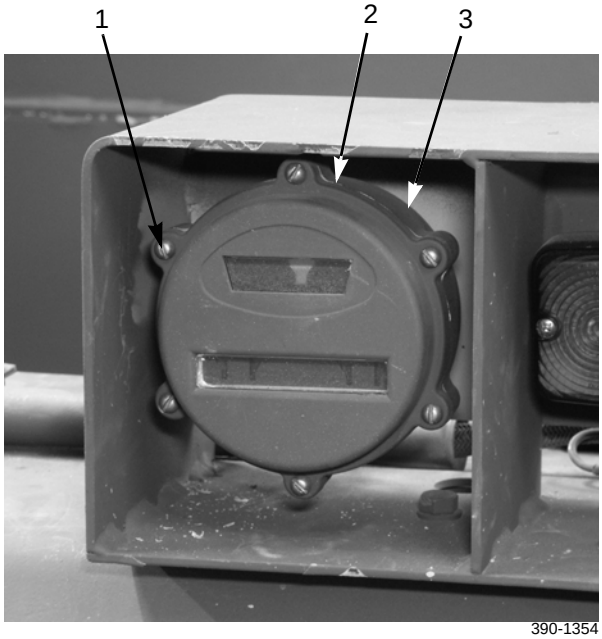


LED INSTALLATION

NOTE

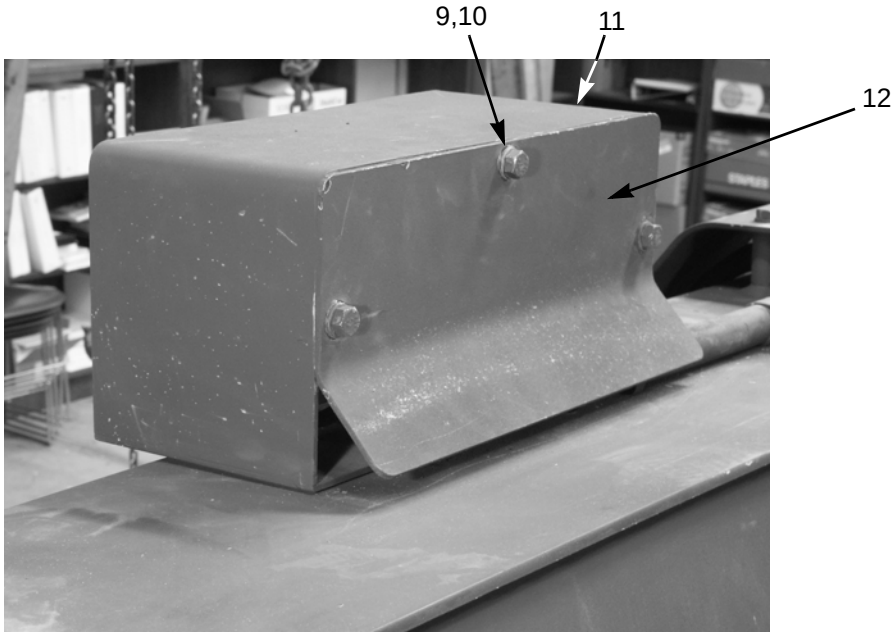
Top LED is for blackout marker light. Bottom LED is for blackout drive light.

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

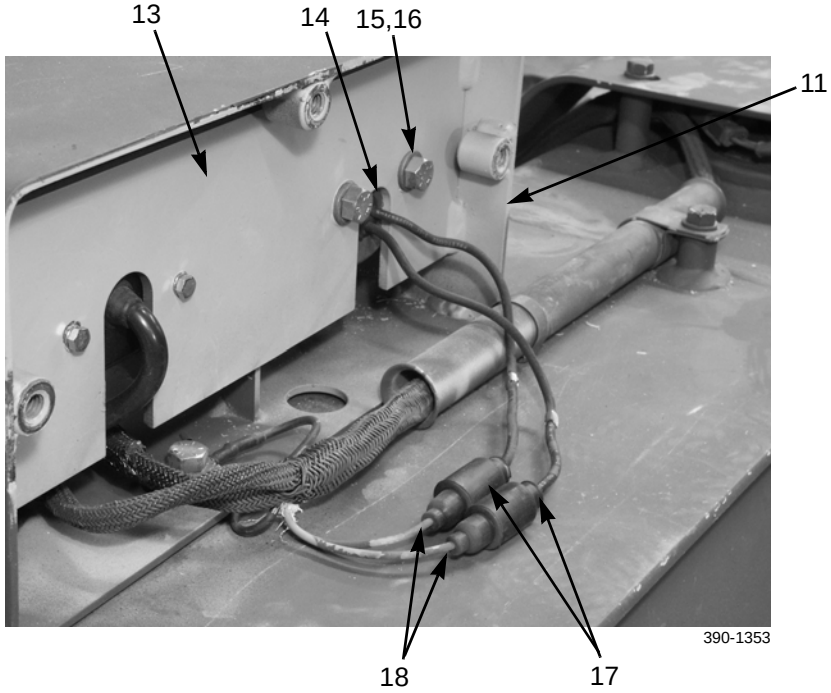


LIGHT ASSEMBLY REMOVAL

1. Remove LEDs (Refer to *LED Removal*).
2. Remove three screws (9), washers (10), and access plate (12) from enclosure (11).

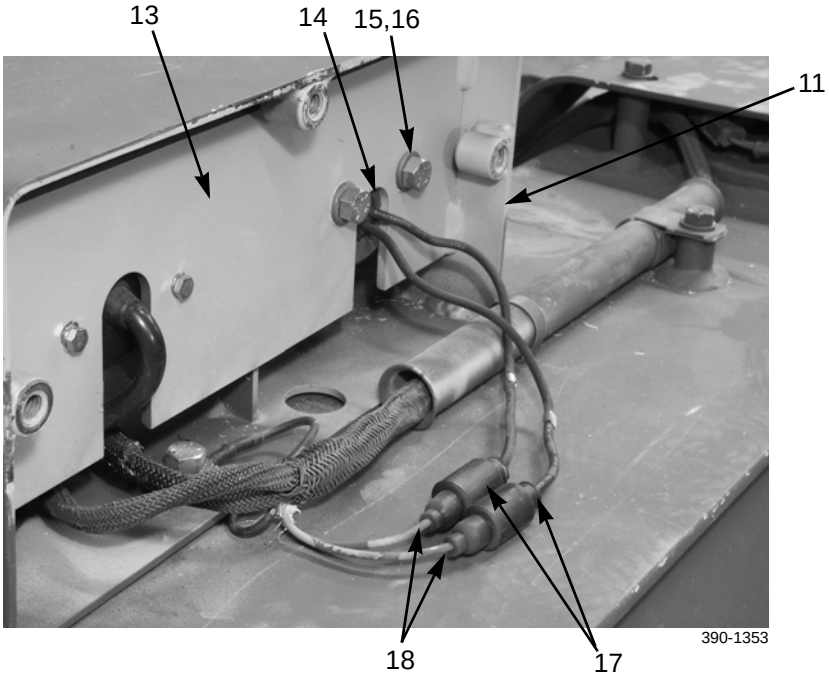


3. Remove two screws (15) and washers (16) from plate (13).
4. Disconnect two light assembly connectors (17) from wiring harness connectors (18).
5. Remove blackout light assembly (14) from plate (13).

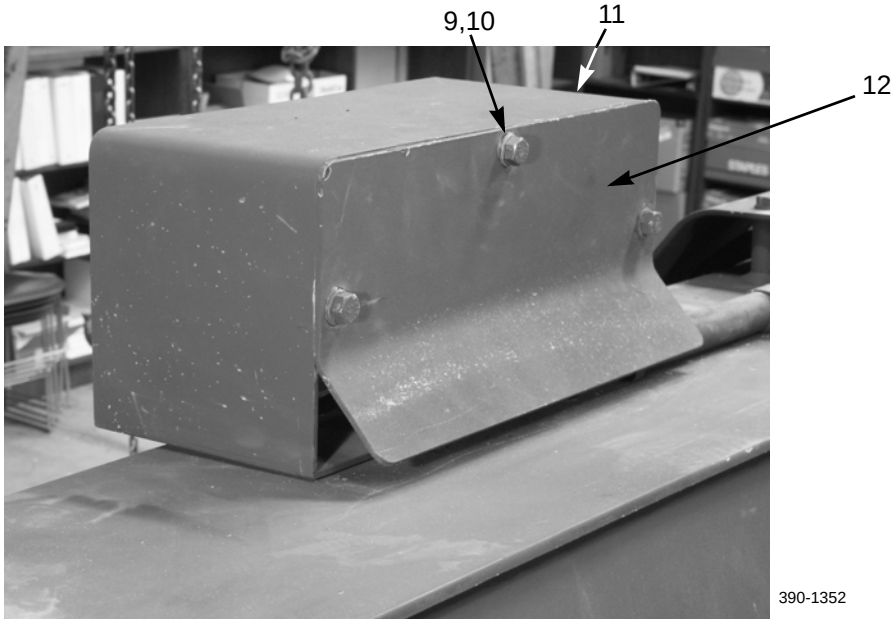


LIGHT ASSEMBLY INSTALLATION

1. Install LEDs (Refer to *LED Installation*).
2. Install blackout light assembly (14) on plate (13) with two washers (16) and screws (15).
3. Connect two light assembly connectors (17) to wiring harness connectors (18).



4. Install access plate (12) on enclosure (11) with three washers (10) and screws (9).



5. Place battery disconnect switch in ON position (TM 5-3800-205-10-1).
6. Check light for proper operation (TM 5-3800-205-10-1).

END OF WORK PACKAGE

FUEL LEVEL SENDING UNIT AND DIAL SENSOR REPLACEMENT 0007 00

THIS WORK PACKAGE COVERS

Dial Sensor: Removal, Installation

Fuel Sending Unit: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Materials/Parts

Fuel (Item 13, 14, or 15, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Gasket

O-ring

Washer, lock (6)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

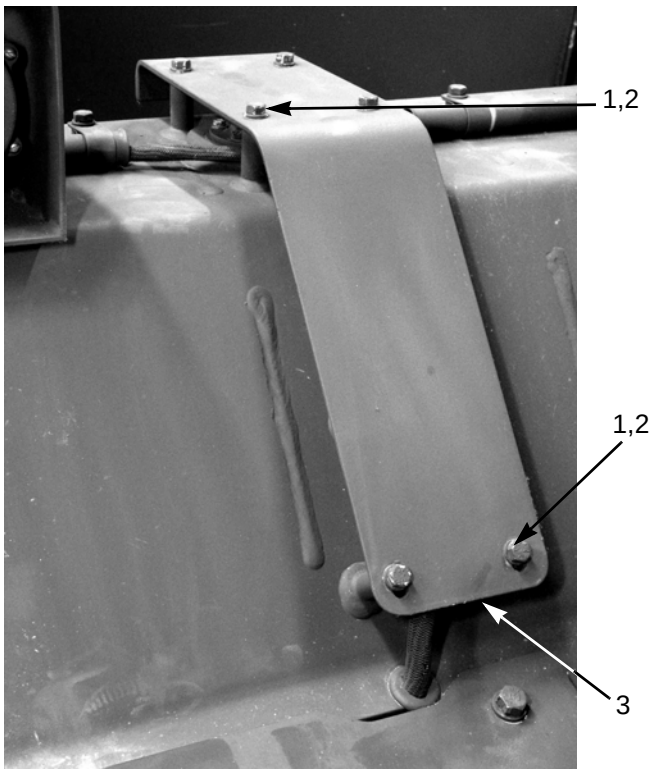
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

WARNING

Do NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to machine and injury or death to personnel.

DIAL SENSOR REMOVAL

1. Remove six screws (1), washers (2), and cover (3) from machine.



390-1290

DIAL SENSOR REMOVAL - CONTINUED

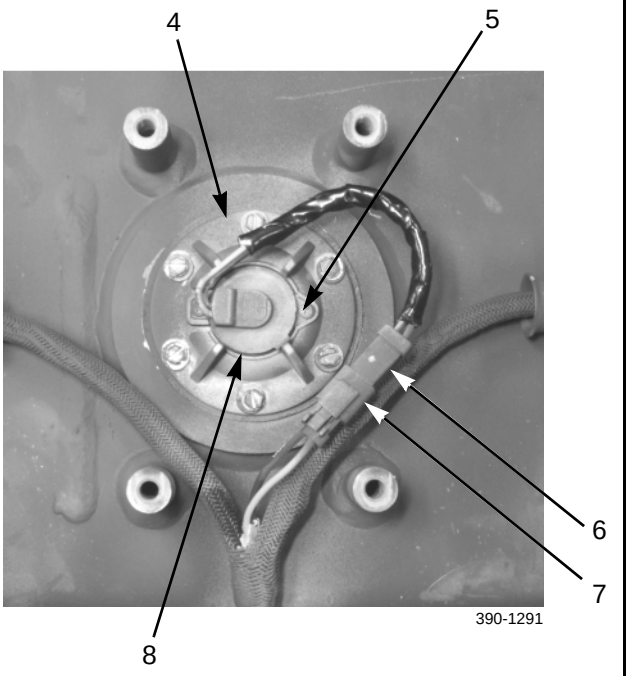
NOTE

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

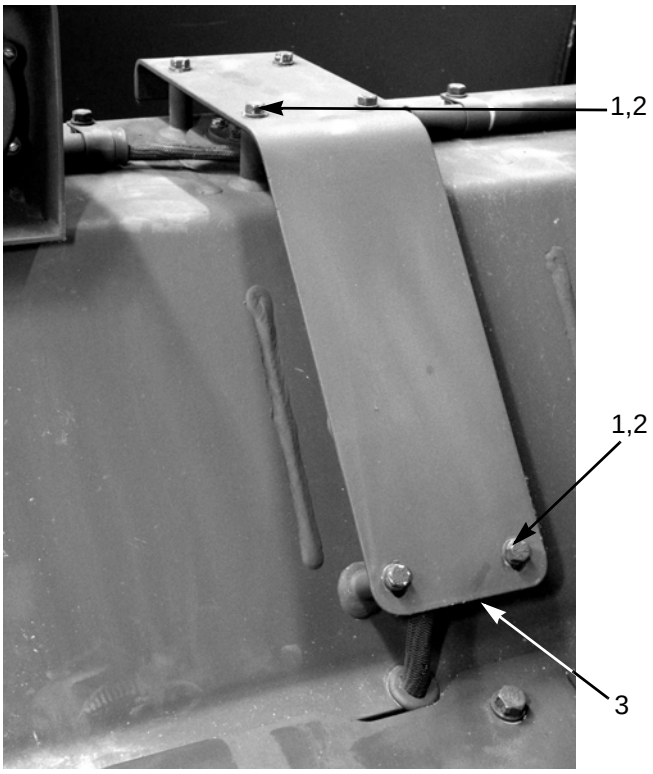
2. Disconnect dial sensor connector (6) from wiring harness connector (7).
3. Remove two screws (5) and dial sensor (8) from fuel level sending unit (4).

DIAL SENSOR INSTALLATION

1. Install dial sensor (8) on fuel level sending unit (4) with two screws (5).
2. Connect dial sensor connector (6) to wiring harness connector (7).
3. Install cover (3) on machine with six screws (1) and washers (2).



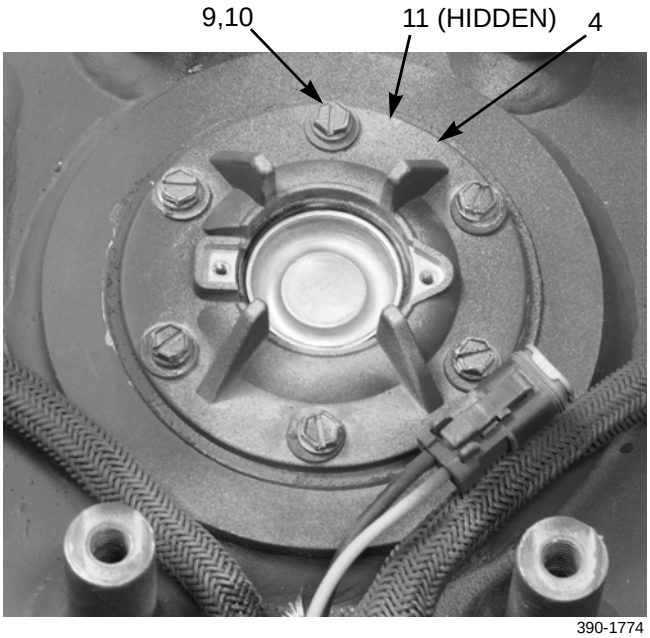
390-1291



390-1290

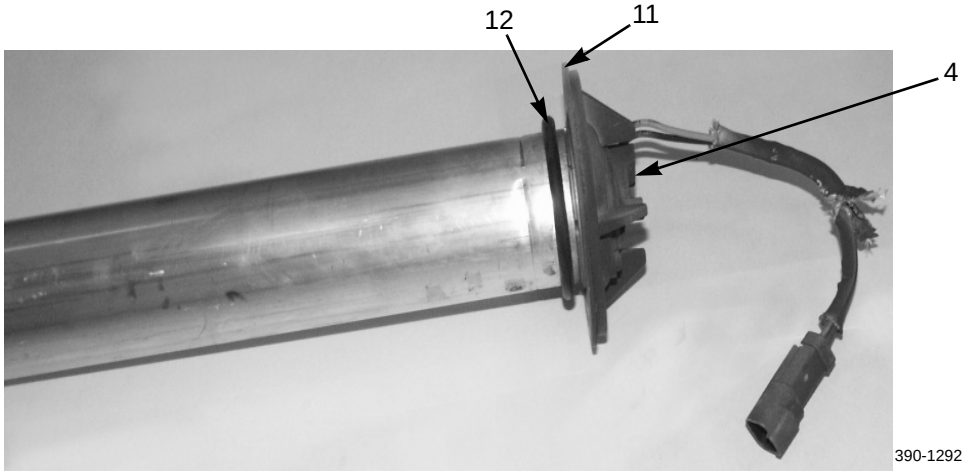
FUEL LEVEL SENDING UNIT REMOVAL

1. Remove dial sensor (Refer to *Dial Sensor Removal*).
2. Remove six screws (9), washers (10), fuel level sending unit (4), and gasket (11) from fuel tank. Discard gasket.



390-1774

3. Remove and discard O-ring (12) from fuel level sending unit (4).



390-1292

FUEL LEVEL SENDING UNIT INSTALLATION

NOTE

Coat new O-ring with clean fuel before installation.

1. Install new O-ring (12) and new gasket (11) on fuel level sending unit (4).

NOTE

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

2. Install fuel level sending unit (4) on fuel tank with six washers (10) and screws (9).
3. Install dial sensor (Refer to *Dial Sensor Installation*).

END OF WORK PACKAGE

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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 0048 00)

Materials/Parts

Strap, tiedown (Item 38, WP 0047 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

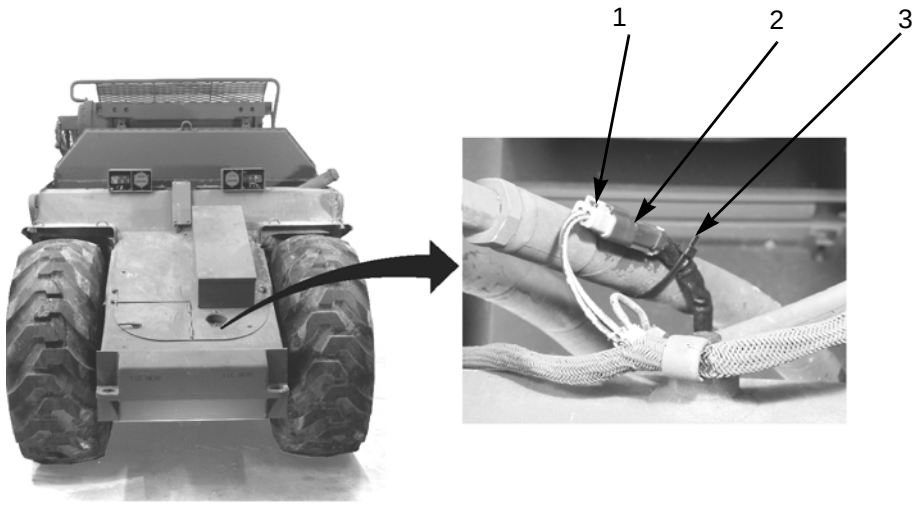
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

NOTE

Backup alarm is located on crossmember, underneath rear deck. Alarm can be accessed from underneath machine.

REMOVAL

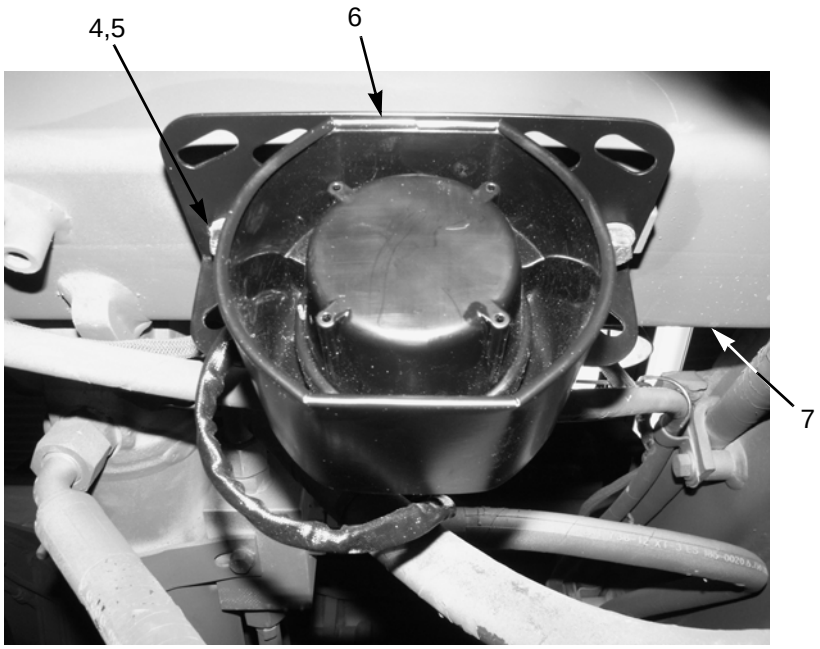
1. Remove electrical tiedown strap (3) and discard.
2. Disconnect backup alarm connector (2) from wiring harness connector (1).



390-1753

REMOVAL - CONTINUED

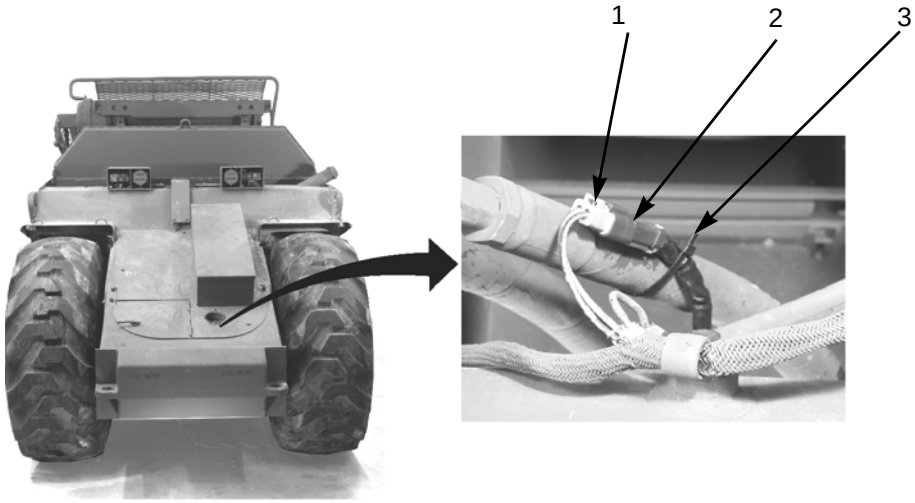
3. Remove two screws (4), washers (5), and backup alarm (6) from crossmember (7).



390-1754

INSTALLATION

1. Install backup alarm (6) on crossmember (7) with two washers (5) and screws (4).
2. Connect backup alarm connector (2) to harness connector (1).
3. Install new tiedown strap (3).



390-1753

END OF WORK PACKAGE

REAR HUB AND DISC 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 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Link, bracket (Item 4, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Personnel Required

Two

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

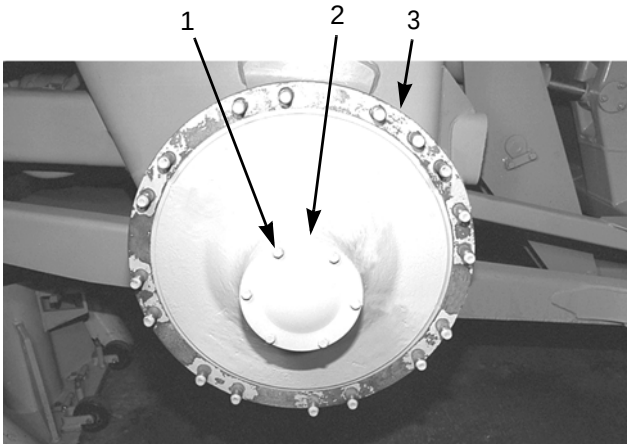
Gasket

Equipment Condition

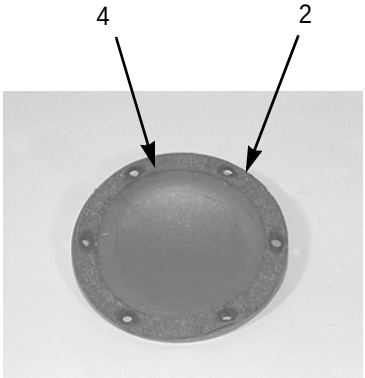
Brake caliper removed (WP 0011 00)

REMOVAL

1. Remove six bolts (1) and cover (2) from hub (3).
2. Remove and discard gasket (4) from cover (2).



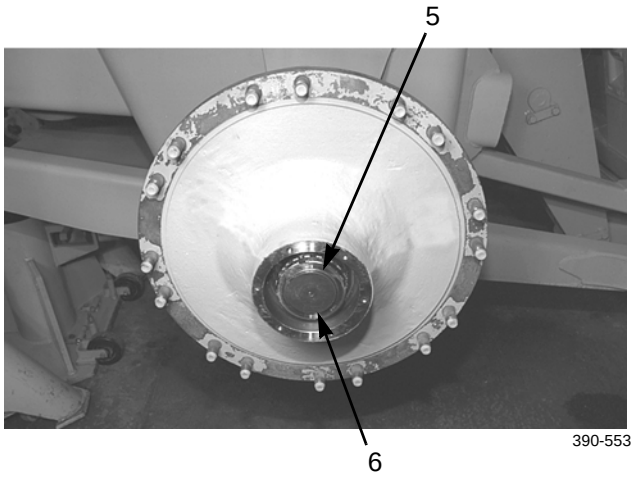
390-551

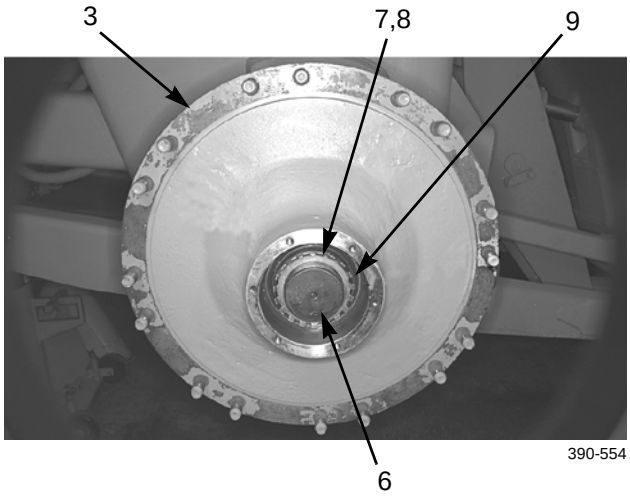


390-552

REMOVAL - CONTINUED

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





4. Remove tab lockwasher (7) from axle shaft (6).

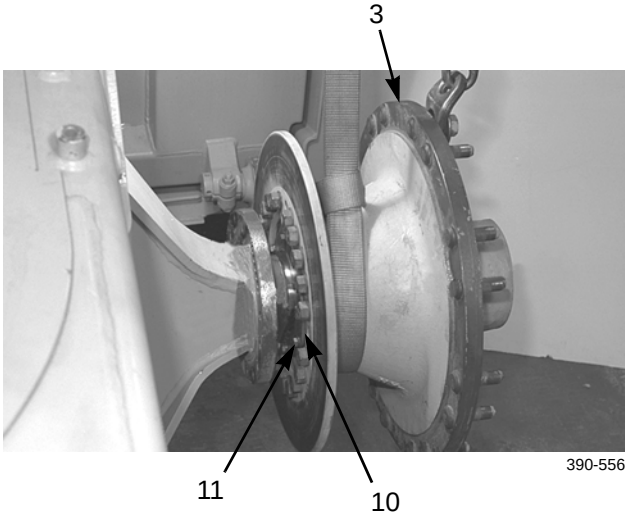
WARNING

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).

5. Attach bearing link, two nylon slings, and a suitable lifting device to hub (3).
6. Remove locknut (8) and outer roller bearing (9) from axle shaft (6).
7. Remove six bolts (11) and plate (10) from hub (3).

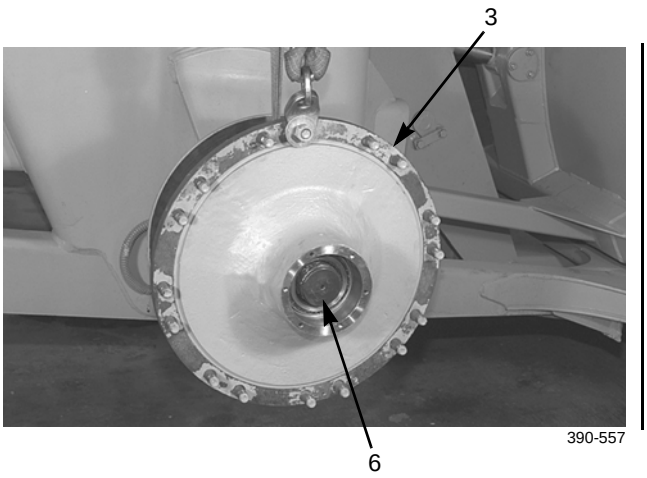


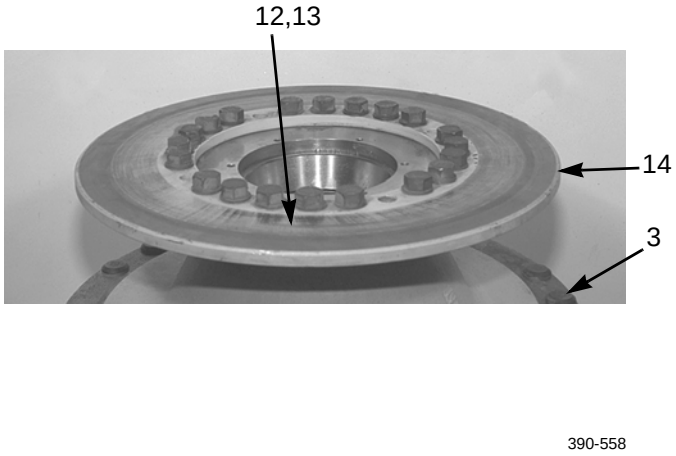
REMOVAL - CONTINUED

NOTE

Hub weighs 250 lb (113 kg).

8. Remove hub (3) from axle shaft (6).
9. Remove 20 bolts (12), washers (13) and disc (14) from hub (3).





INSTALLATION

1. Install disc (14) on hub (3) with 20 washers (13) and bolts (12). Tighten bolts to 148 lb-ft (200 Nm), then turn bolts another 90°.

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.

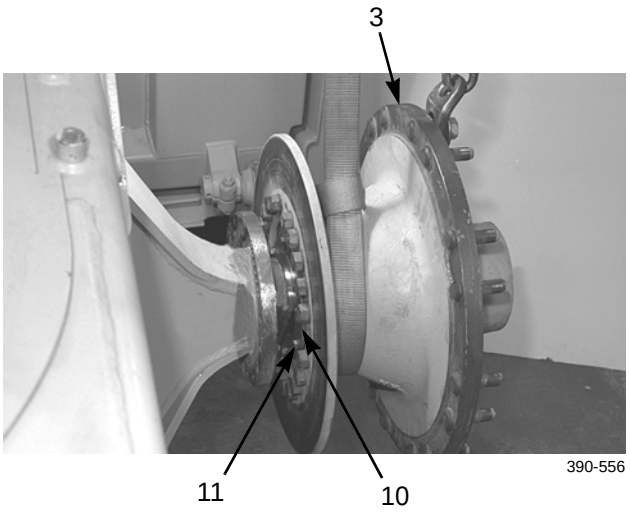
NOTE

Hub weighs 250 lb (113 kg).

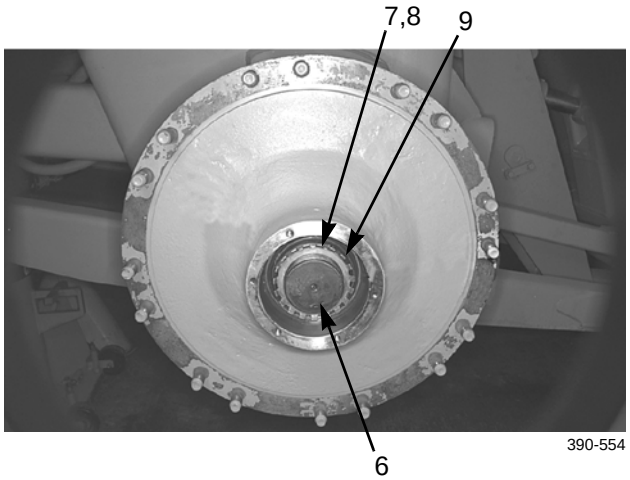
2. Attach bearing link, two nylon slings, and a suitable lifting device to hub (3). Position hub on axle shaft (6).

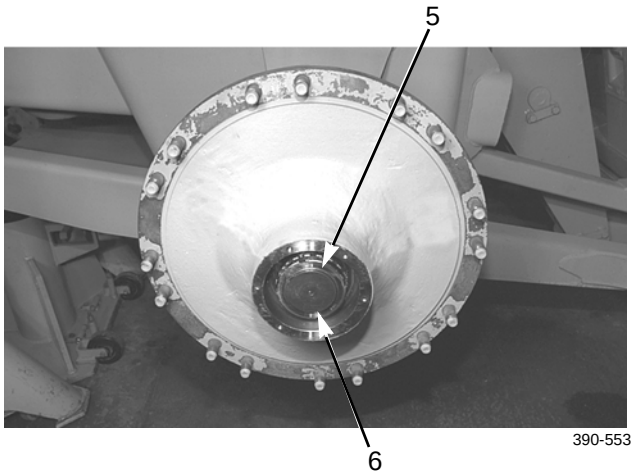
INSTALLATION - CONTINUED

3. Install plate (10) on hub (3) with six bolts (11).

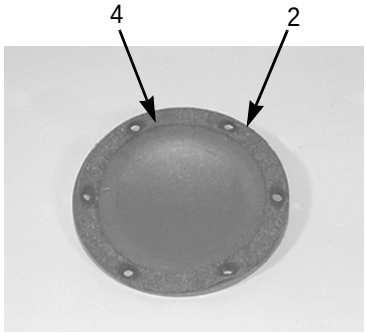


4. Clean and inspect outer roller bearing (9), pack with grease and install on axle shaft (6).
5. Install locknut (8) on axle shaft (6). Tighten locknut until hub seizes, loosen locknut, and tighten to 376 lb-ft (510 Nm).
6. Install tab lockwasher (7) on axle shaft (6).
7. Install locknut (5) on axle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



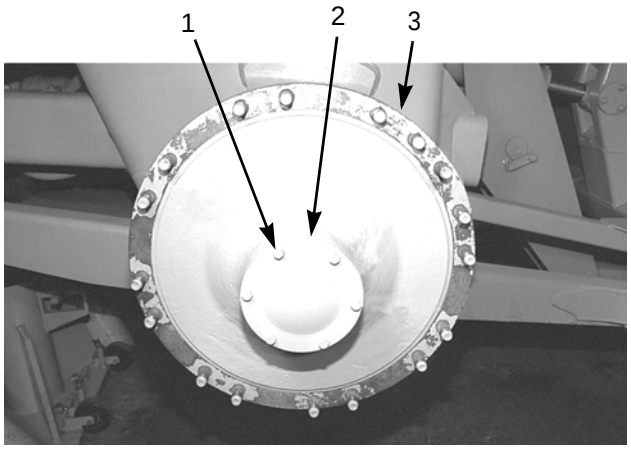


8. Install new gasket (4) on cover (2).



INSTALLATION - CONTINUED

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



390-551

10. Install brake caliper (WP 0011 00).

END OF WORK PACKAGE

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AIR/HYDRAULIC BRAKE CYLINDER 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 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

Tape, antiseizing (Item 40, WP 0047 00)

Personnel Required

Two

References

WP 0014 00

Equipment Condition

Air tube disconnected from quick release valve (WP 0013 00)

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

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 disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

CAUTION

Cap all tubes to prevent fluid loss and contamination of brake fluid.

NOTE

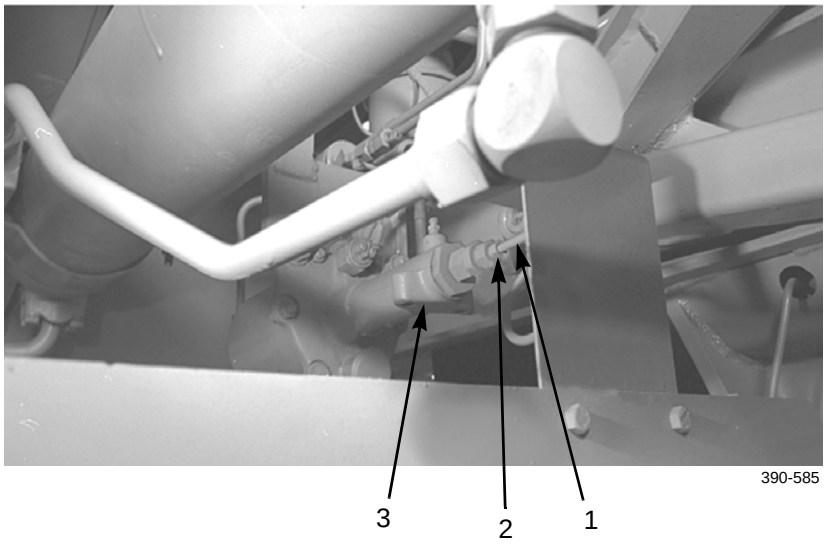
- Tag all tubes to aid in installation.
- Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect fluid with suitable containers before opening any compartment or disassembling any component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

REMOVAL

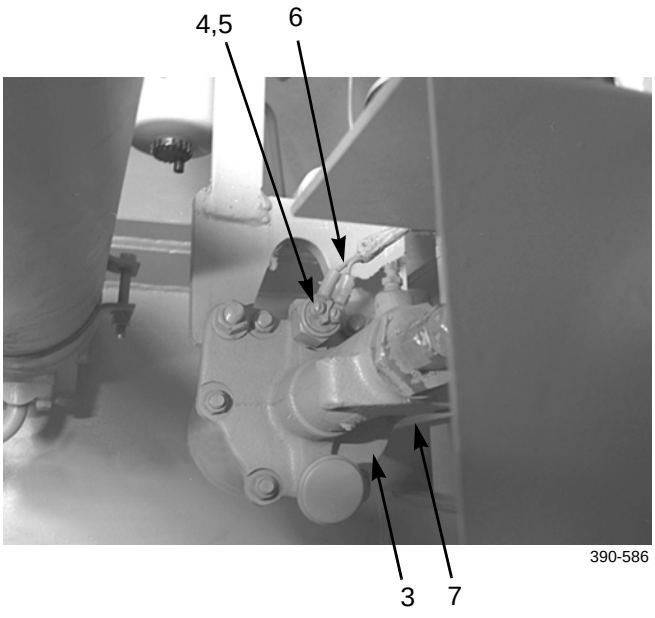
CAUTION

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

1. Loosen nut (2) and disconnect tube (1) from air/hydraulic brake cylinder (3). Install protective cap on tube.

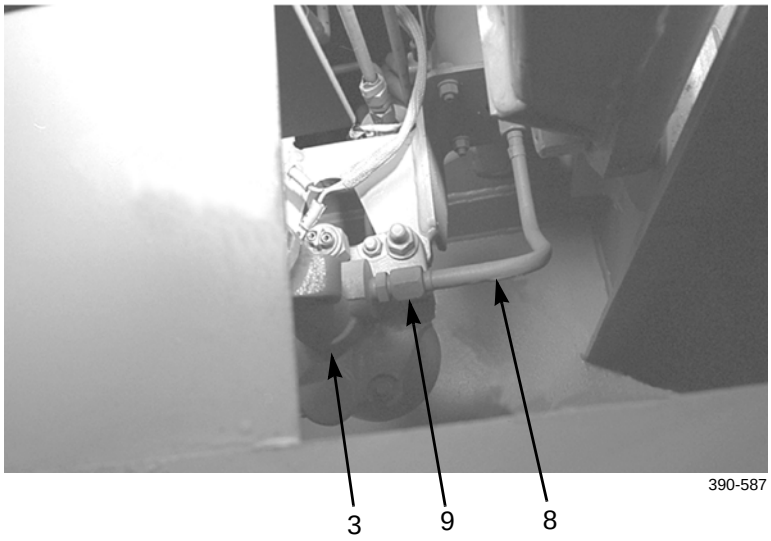


2. Remove two screws (4), washers (5), and electrical leads (6) from air/hydraulic brake cylinder (3).
3. Disconnect vent tube (7) from air/hydraulic brake cylinder (3).

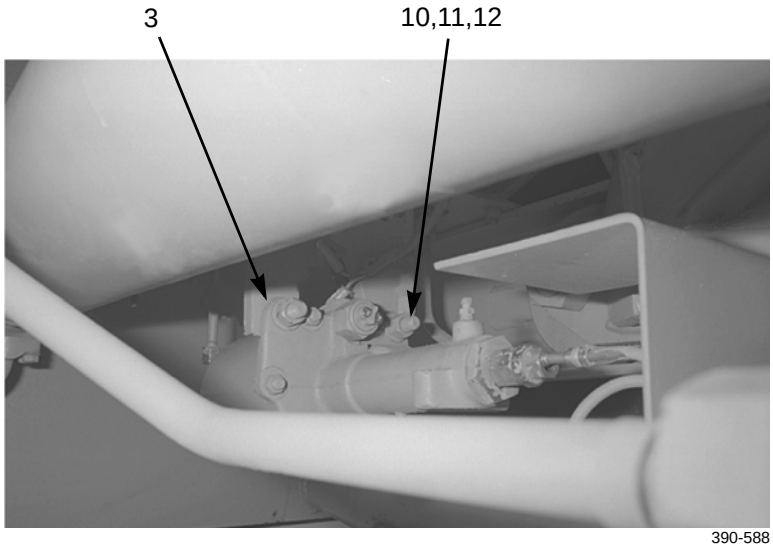


REMOVAL - CONTINUED

4. Loosen nut (9) and disconnect tube (8) from air/hydraulic brake cylinder (3).

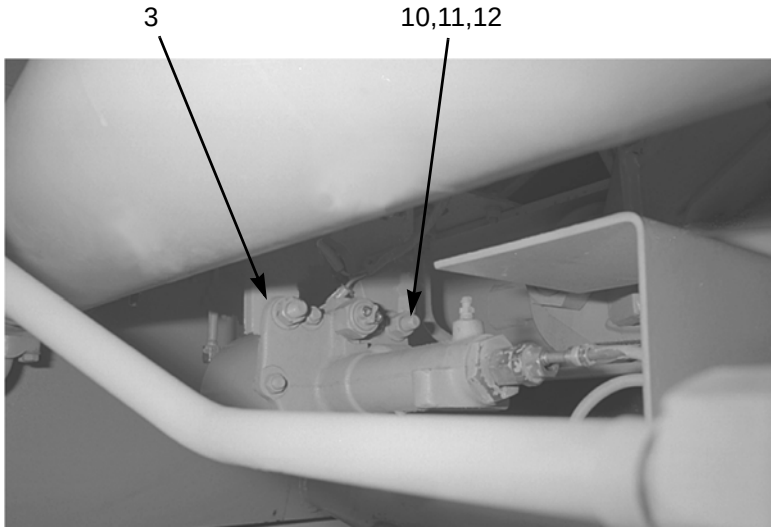


5. Remove two nuts (12), washers (11), bolts (10), and air/hydraulic brake cylinder (3) from bracket.
6. Remove quick-release valve from air/hydraulic brake cylinder (WP 0013 00).



INSTALLATION

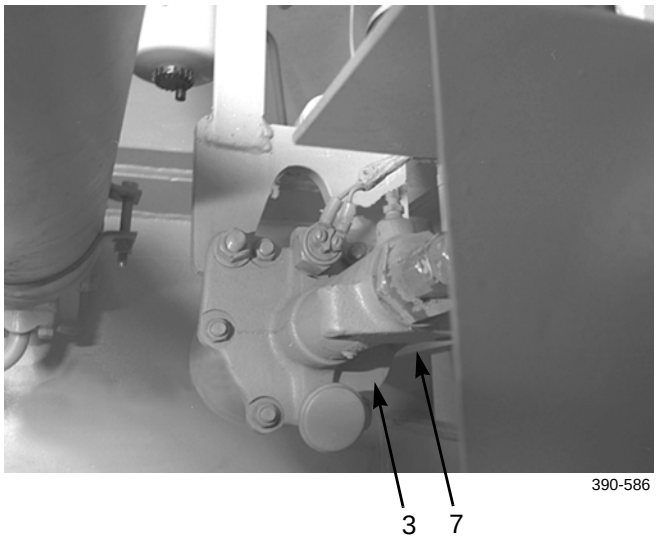
1. Install quick-release valve to air/hydraulic brake cylinder (3) (WP 0013 00).
2. Install air/hydraulic brake cylinder (3) on bracket with two bolts (10), washers (11), and nuts (12).



NOTE

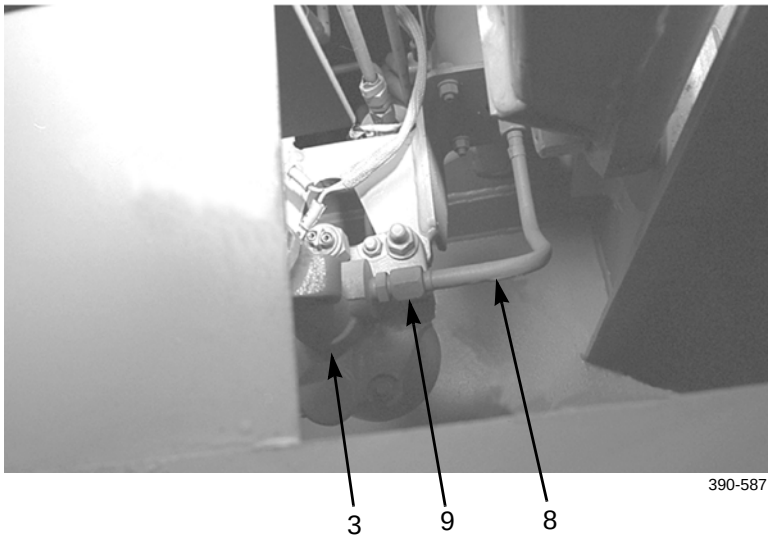
Remove old antiseizing tape and apply new antizseizing tape to male threads of air system fitting before connection is made.

3. Connect vent tube (7) to air/hydraulic brake cylinder (3).

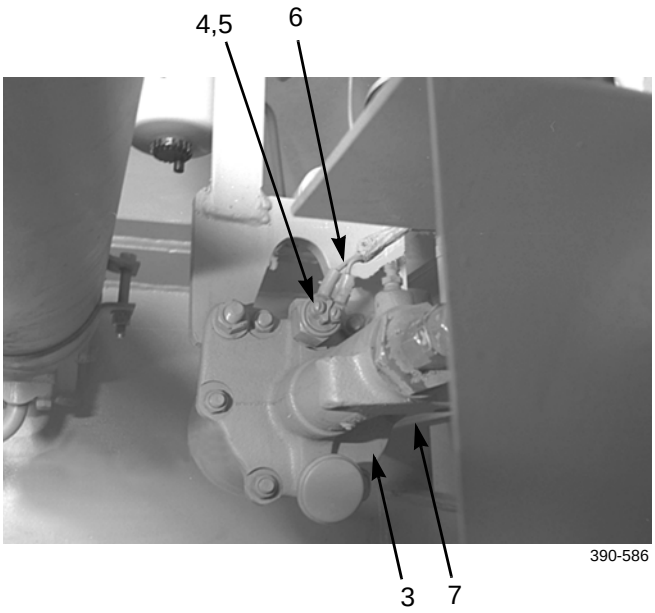


INSTALLATION - CONTINUED

4. Position tube (8) on air/hydraulic brake cylinder (3) and tighten nut (9).



5. Install two electrical leads (6) on air/hydraulic brake cylinder (3) with two washers (5) and screws (4).
6. Position tube (1) on air/hydraulic brake cylinder (3) and tighten nut (2).



7. Connect air tube to quick-release valve (WP 0013 00).
8. Fill brake fluid reservoir (Refer to *Unit PMCS* in TM 5-3800-205-23-1).
9. Bleed brake system (WP 0014 00).

INSTALLATION - CONTINUED

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 and apply and release brakes (TM 5-3800-205-10-1). With assistance, check for air and brake fluid leaks.

END OF WORK PACKAGE

REAR SERVICE BRAKESHOES AND BRAKE CALIPER REPLACEMENT 0011 00

THIS WORK PACKAGE COVERS

Brakeshoes: Removal, Cleaning and Inspection, Installation

Brake Caliper: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Bolt, 1/2 in. X 13NC

Bracket, link (Item 6, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Personnel Required

Two

Equipment Condition

Air tanks drained (TM 5-3800-205-10-1)

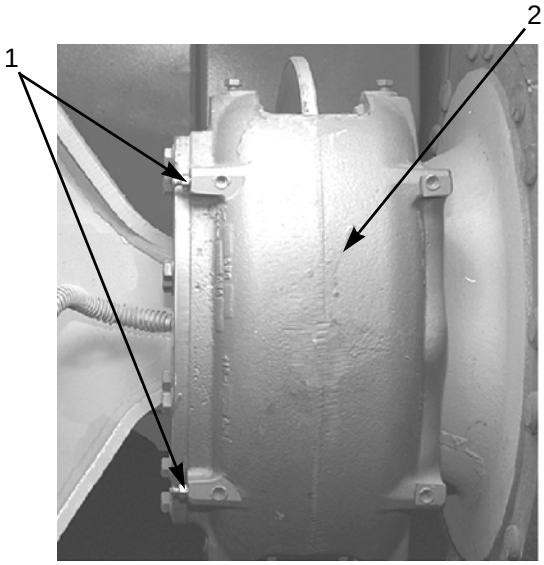
Rear tire and rim removed (WP 0016 00)

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).



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BRAKESHOES REMOVAL - CONTINUED

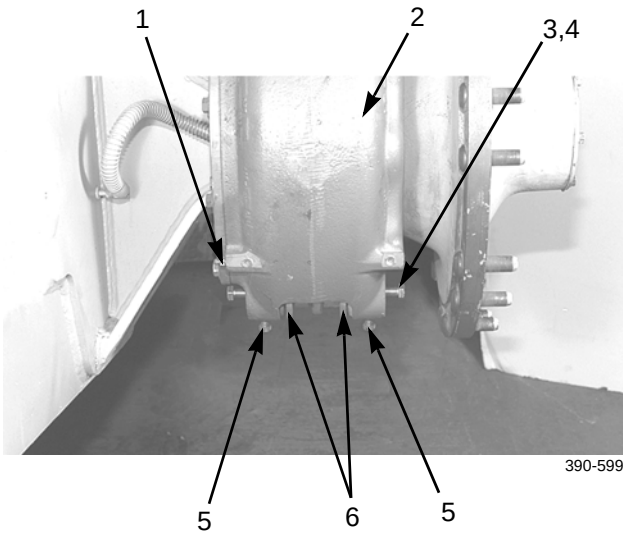
2. Loosen bolts (5) that secure pins (3) in position.
3. Install 1/2 in. X 13NC bolts (4) in pins (3).
4. Use bolts (4) to remove pins (3).
5. Remove brakeshoes (6) from caliper (2).

CLEANING AND INSPECTION

1. Clean and inspect all parts.
2. Measure thickness of brakeshoes at each end. Minimum allowable thickness in area of most wear for a used brakeshoe is 0.591 in. (15.01 mm).
3. Replace worn and damaged parts.

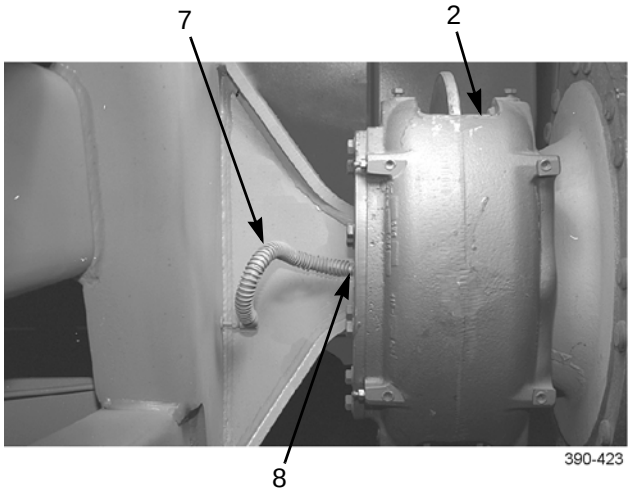
BRAKESHOES INSTALLATION

1. Remove bolts (4) from pins (3).
2. Install brakeshoes (6) in caliper (2).
3. Push in pins (3) and tighten bolts (5).
4. Check clearance between pin (3) and brake disc:
   a. Clearance between pin (3) and brake disc must not be less than 0.010 in. (0.25 mm) and not more than 0.118 in. (3.00 mm).
   b. If clearance between pin (3) and brake disc is less than 0.010 in. (0.25 mm), loosen bolt (5) and slide pin (3) to obtain required clearance.
5. Tighten two bleeder screws (1).
6. Bleed service brake system (WP 0015 00).
7. Install rear tire and rim (WP 0016 00).



BRAKE CALIPER REMOVAL

1. Loosen nut (8) and disconnect brake line (7) from brake caliper (2). Install protective cap on brake line.



BRAKE CALIPER REMOVAL - CONTINUED

2. Remove two bolts from brake caliper (2) and install two links on caliper.

WARNING

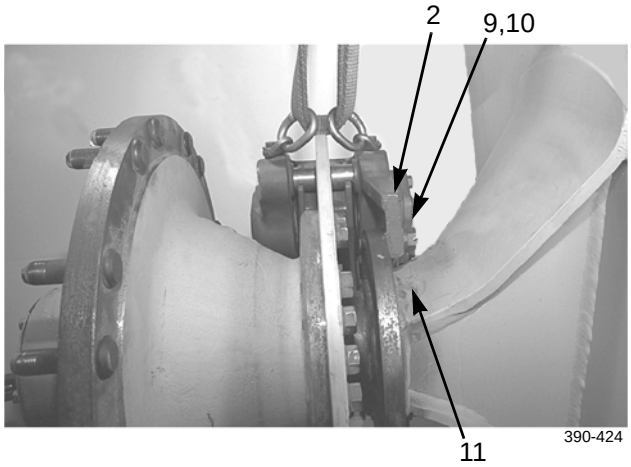
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

3. Attach nylon sling to links and suitable lifting device.

NOTE

Brake caliper weighs 90 lb (1 kg).

4. With assistance, remove eight screws (9), washers (10), and brake caliper (2) from axle housing (11).
5. If replacing brake caliper (2), remove links from caliper.



BRAKE CALIPER INSTALLATION

1. If installing a new brake caliper (2), remove two bolts from caliper and install two links.

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.

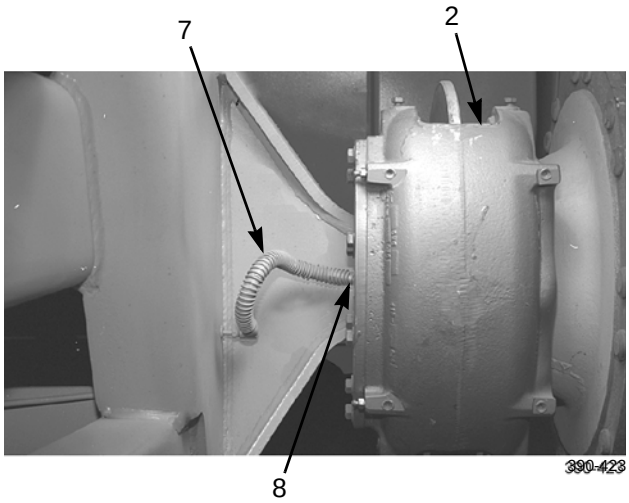
NOTE

Brake caliper weighs 90 lb (1 kg).

2. Attach nylon sling to links and suitable lifting device.

BRAKE CALIPER INSTALLATION - CONTINUED

3. Install brake caliper (2) on axle housing (11) with eight washers (10), and screws (9).
4. Remove links and reinstall two bolts to brake caliper.
5. Install brake line (7) on brake caliper (2) and tighten nut (8).



6. Bleed brake system (WP 0015 00).
7. Install rear tire and rim (WP 0016 00).

END OF WORK PACKAGE

AIR HOSE AND TUBES REPLACEMENT 0012 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 0048 00)

Materials/Parts

Strap, tiedown (Item 38, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

Tape, antizeizing (Item 40, WP 0047 00)

O-ring (as required)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Ejector in forward position (TM 3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

Air tanks drained (TM 5-3800-205-10-1)

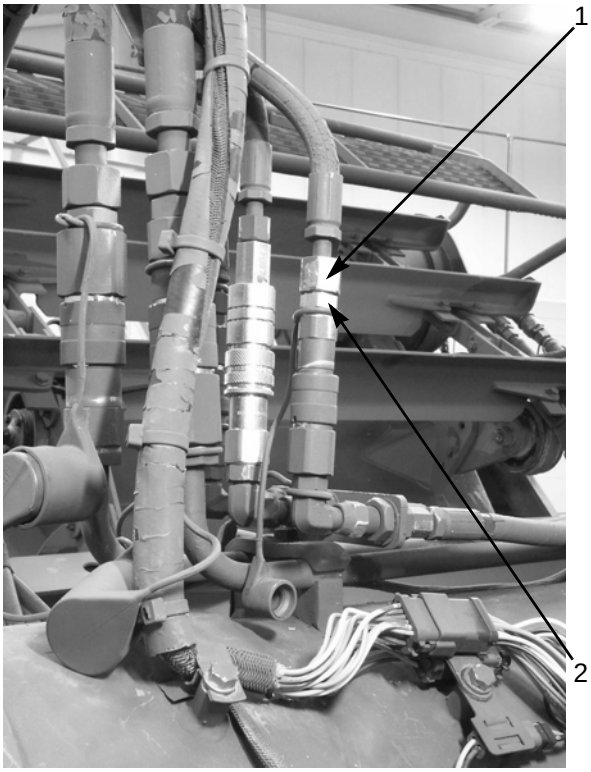
Toolbox and rear deck cover removed, if required for access (WP 0017 00)

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 disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

AIR HOSE REMOVAL

1. At right-front of scraper, disconnect hose (1) from connector (2). Remove and discard O-ring.



390-1604

NOTE

Cut tiedown straps as required to remove hose from machine.

2. Remove screw (5), washer (6), hose clamp (7), and buckle-type straps (3), as required, to separate hose (1) from machine.
3. Disconnect other end of hose (1) from tube (4).
4. Remove hose (1) from machine.

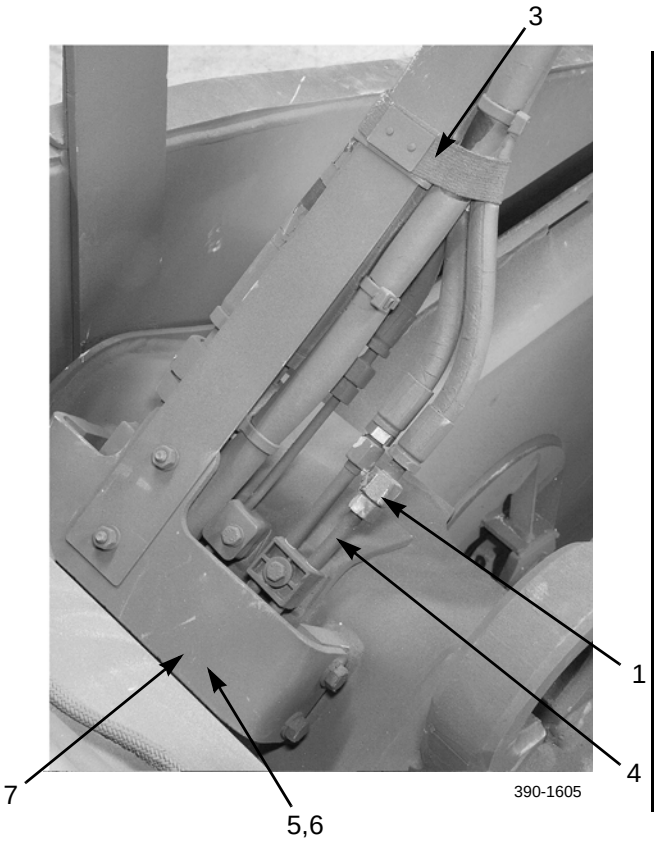
NOTE

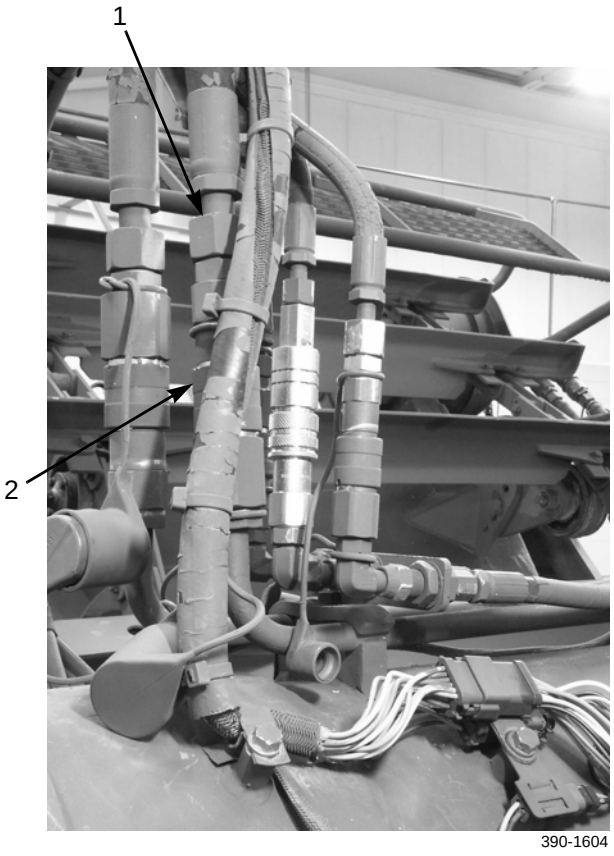
Remove old antiseizing tape and apply new antiseizing tape to male threads of all fittings before connections are made.

1. Position hose (1) on machine.
2. Connect hose (1) to tube (4).
3. Install new O-ring on other end of hose (1) and connect hose to connector (2).

AIR HOSE INSTALLATION

4. Install hose clamp (7) with washer (6) and screw (5) and install buckle-type straps (3), as required to secure hose (1) to machine.





5. Start engine and fully charge air system (TM 5-3800-205-10-1).
6. Check for air leaks.

AIR TUBE REMOVAL

NOTE

- Perform following steps to replace eight air tubes on machine. Tubes are connected to hoses, adapters, and elbows.
- Tag tubes to aid in installation.

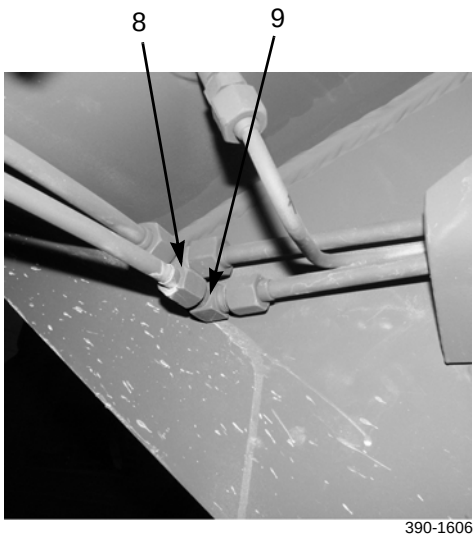
1. At left-rear of scraper, disconnect tube (8) from elbow (9).
2. Remove screw (10), washer (11), and clamp (12), as required, to allow removal of air tube (8) from machine.
3. Disconnect other end of tube (8) from tube (13).
4. Remove tube (8) from machine.

AIR TUBE INSTALLATION

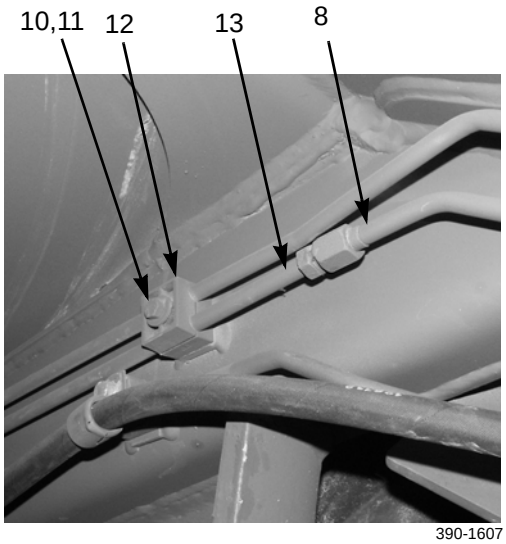
NOTE

Remove old antiseizing tape and apply new antiseizing tape to male threads of all fittings before connections are made.

1. Position tube (8) on machine.
2. Connect tube (8) to tube (13).
3. Connect other end of tube (8) to elbow (9).
4. If removed, install clamp (12) with washer (11) and screw (10).



390-1606



390-1607

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 and fully charge air system (TM 5-3800-205-10-1).
6. Check for air leaks.
7. If removed, install toolbox and rear deck cover plate (WP 0017 00).

END OF WORK PACKAGE

QUICK-RELEASE VALVE REPLACEMENT 0013 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Materials/Parts

Tape, antiseizing (Item 40, WP 0047 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Equipment Condition - Continued

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

Air tanks drained (TM 5-3800-205-10-1)

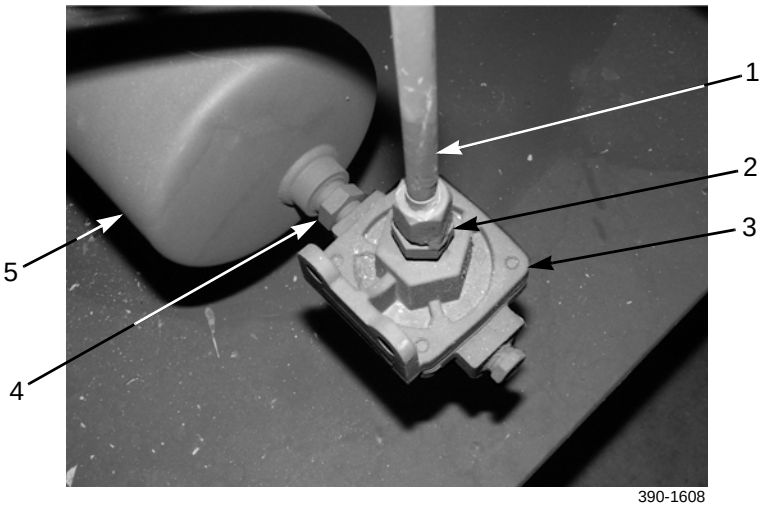
Rear compartment access door open (TM 5-3800-205-10-1)

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 disconnecting air lines. Residual air will be expelled. Failure to follow this warning may result in serious eye injury.

REMOVAL

1. Disconnect tube (1) from adapter (2).
2. Remove adapter (2), quick-release valve (3), and adapter (4) from air/hydraulic brake cylinder (5).



390-1608

INSTALLATION

NOTE

Remove old antiseizing tape and apply new antiseizing tape to male threads of all fittings before connections are made.

1. Install adapter (4) and quick-release valve (3) on air/hydraulic brake cylinder (5).
2. Install adapter (2) on quick-release valve (3) and connect tube (1).

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.

3. Start engine and fully charge air system (TM 5-3800-205-10-1).
4. Check for air leaks.
5. Close rear compartment access door (TM 5-3800-205-10-1).

END OF WORK PACKAGE

BRAKE LINES REPLACEMENT 0014 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 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

References

WP 0015 00

Personnel Required

Two

Equipment Condition

Rear tires and rims removed (WP 0016 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.

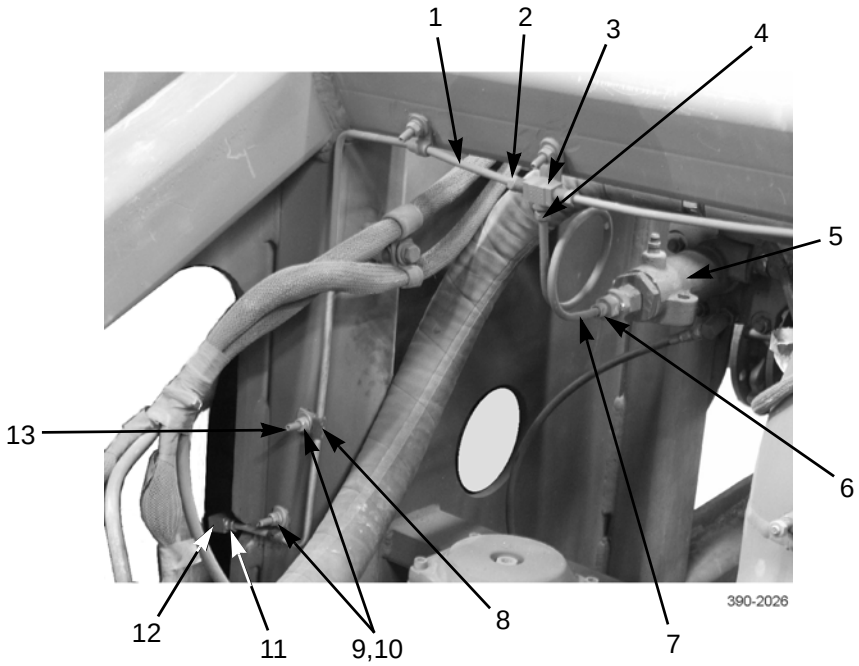
TUBE ASSEMBLIES REMOVAL

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 scraper 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.

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 scraper 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 scraper 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 0015 00).
8. Install rear tires and rims (WP 0016 00).

BRAKE CALIPER HOSE ASSEMBLY REMOVAL

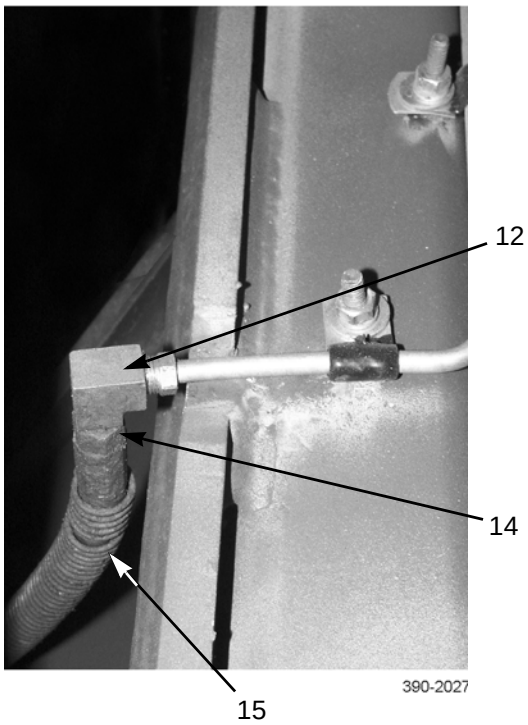
CAUTION

- 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

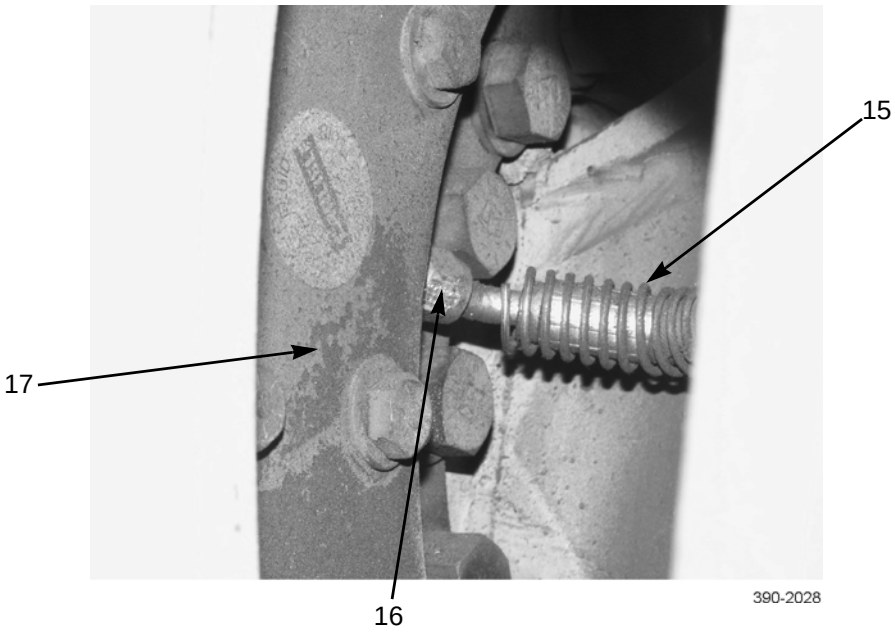
- Tag all lines to aid in installation.
- Care must be taken to ensure that fluids are contained during maintenance of machine. Be prepared to collect fluid with suitable containers before opening any component or disassembling any component containing fluids. Ensure all spills are cleaned up.
- Dispose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



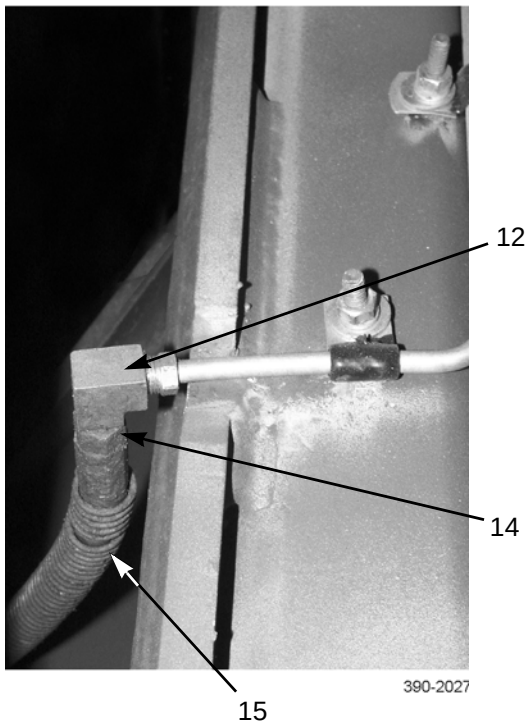
BRAKE CALIPER HOSE ASSEMBLY INSTALLATION

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.

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).

END OF WORK PACKAGE

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SERVICE BRAKES BLEEDING 0015 00

THIS WORK PACKAGE COVERS

Bleeding

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048)

Materials/Parts

Brake fluid (Item 4, WP 0047 00)

Hose, clear, neoprene (Item 18, WP 0047 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

Rear compartment access cover opened (TM 5-3800-205-10-1).

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.

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).

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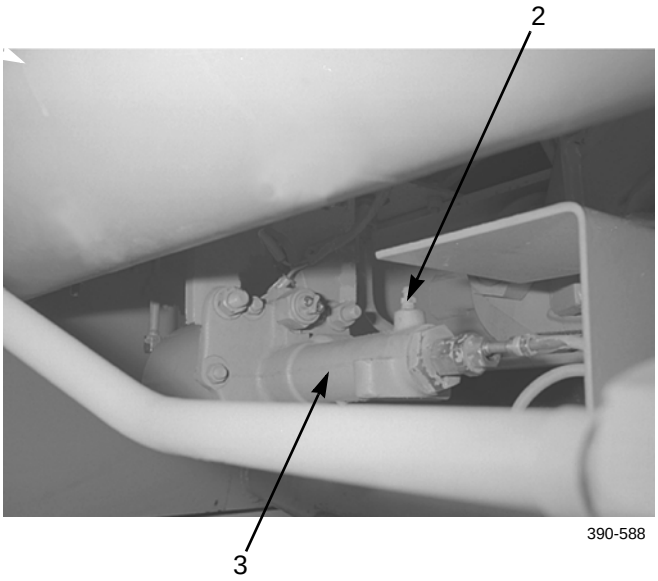
BLEEDING - CONTINUED

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 brake wheel 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.

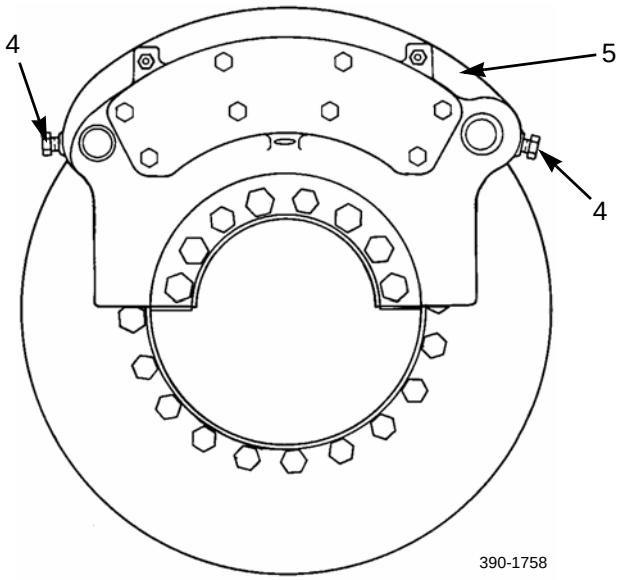


390-588

NOTE

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

5. Install clean 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.
6. Repeat step 5 for other bleed screw (4) on caliper (5).
7. Disconnect power bleed unit.
8. Ensure brake fluid reservoir is full before installing cover.
9. Close rear access cover (TM 5-3800-205-10-1).



390-1758

END OF WORK PACKAGE

REAR TIRE AND RIM REPLACEMENT 0016 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 2 (Item 24, WP 0048 00)

Guard, safety, tire inflation (Item 12, WP 0048 00)

Jack, dolly type, hydraulic (Item 17, WP 0048 00)

Stand, maintenance (Item 29 or 30, WP 0048 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

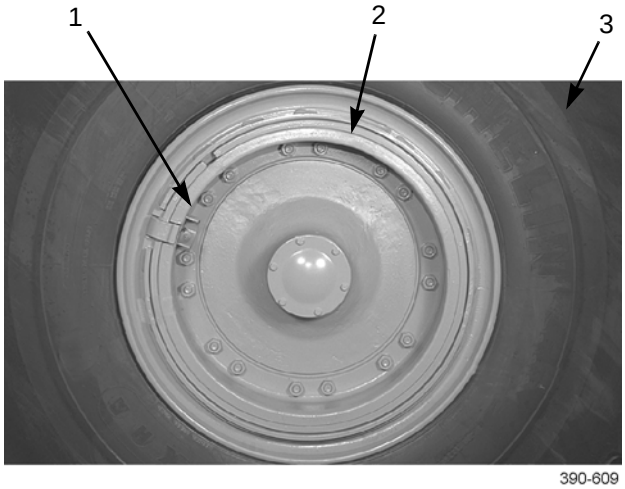
Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

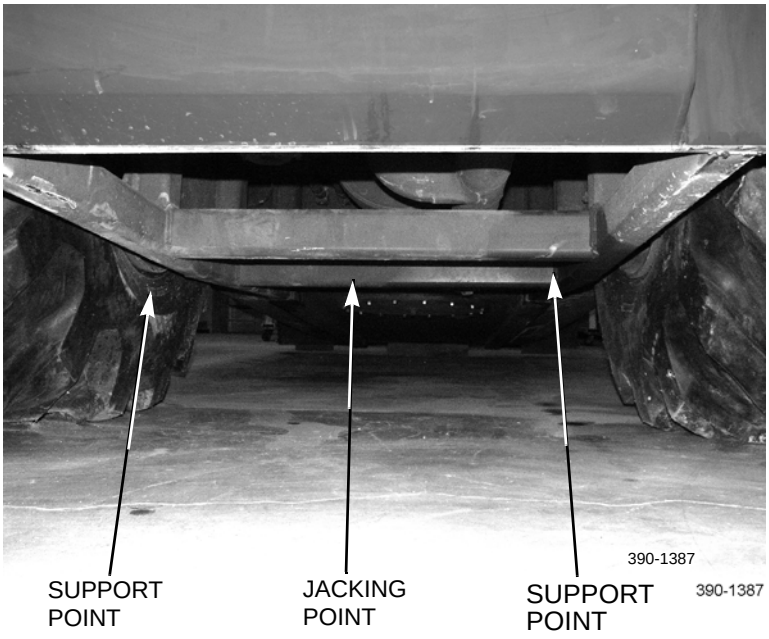
REMOVAL

1. Loosen 16 nuts (1).



REMOVAL - CONTINUED

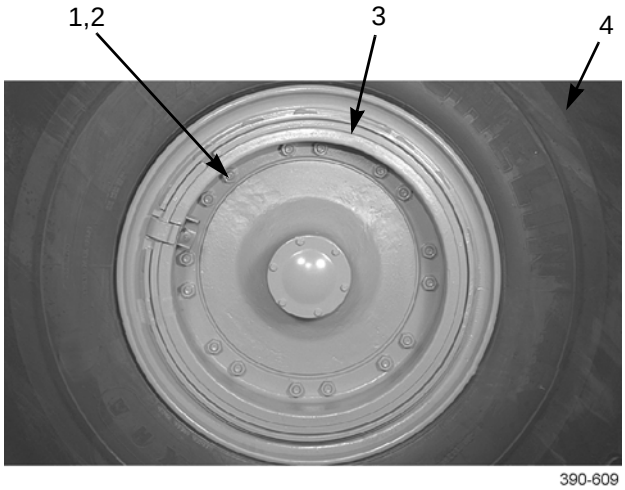
2. Position floor jack under scraper frame at jacking point.
3. Raise rear of scraper and position two stands at support points.



NOTE

Sixteen nuts are used to secure tire to scraper. Remove only 14 at this time.

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



REMOVAL - CONTINUED

WARNING

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

NOTE

Tire and rim assembly weigh 928 lb (421 kg).

5. Secure tire (4) to lift truck and remove two remaining nuts (1), washers (2), and tire from scraper.
6. If required, tire and rim assembly may be disassembled at a local repair facility.

390-610

INSTALLATION

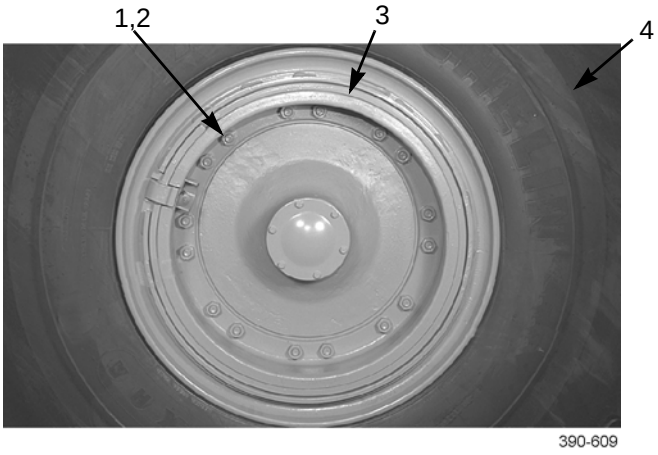
WARNING

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 and rim assembly weigh 928 lb (421 kg).

1. Position tire (4) on scraper.
2. Install two washers (2) and nuts (1) on rim (3) and remove lift truck from tire (4).
3. Install 14 remaining washers (2) and nuts (1) on rim (3). Tighten nuts to 105 lb-ft (140 Nm).
4. Tighten nuts (1) to 370 lb-ft (500 Nm).



5. Remove two stands and use floor jack to lower scraper to ground.

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.

6. Check tire pressure and add air as required (TM 5-3800-205-10-1).

END OF WORK PACKAGE

TOOLBOX AND REAR DECK COVER REPLACEMENT 0017 00

THIS WORK PACKAGE COVERS

Toolbox: Removal, Installation

Mounting Plate: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

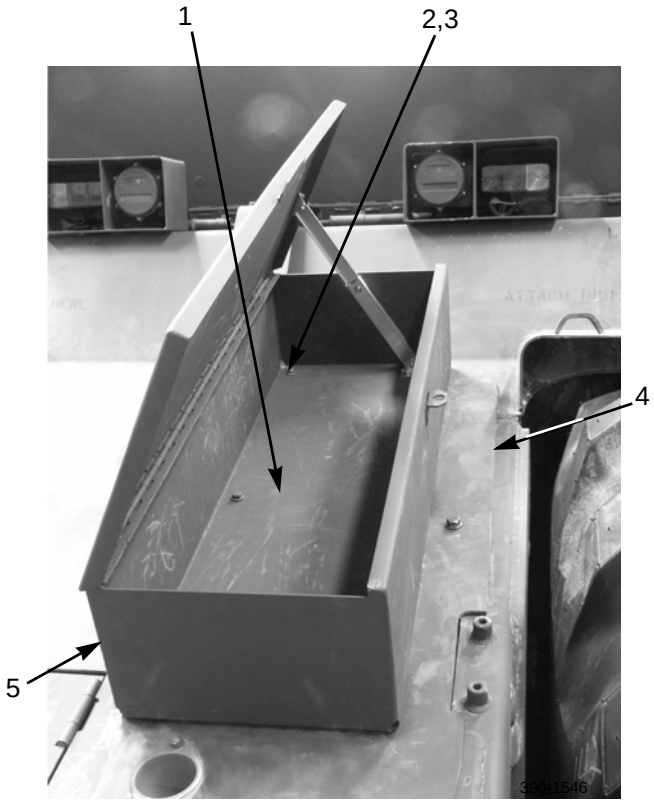
TOOLBOX REMOVAL

1. With toolbox lid (1) opened and secured against closing, remove six screws (2) and washers (3) from toolbox (5).

WARNING

Use extreme caution when removing toolbox lid holdback brace. Use assistance to support lid during procedure. Failure to do so may result in injury.

2. Remove toolbox (5) from rear deck cover (4).



TOOLBOX REMOVAL - CONTINUED

WARNING

Use extreme caution when removing toolbox lid holdback brace. Use assistance to support lid during procedure. Failure to do so may result in injury.

NOTE

Perform step 3 only if toolbox lid holdback brace is damaged.

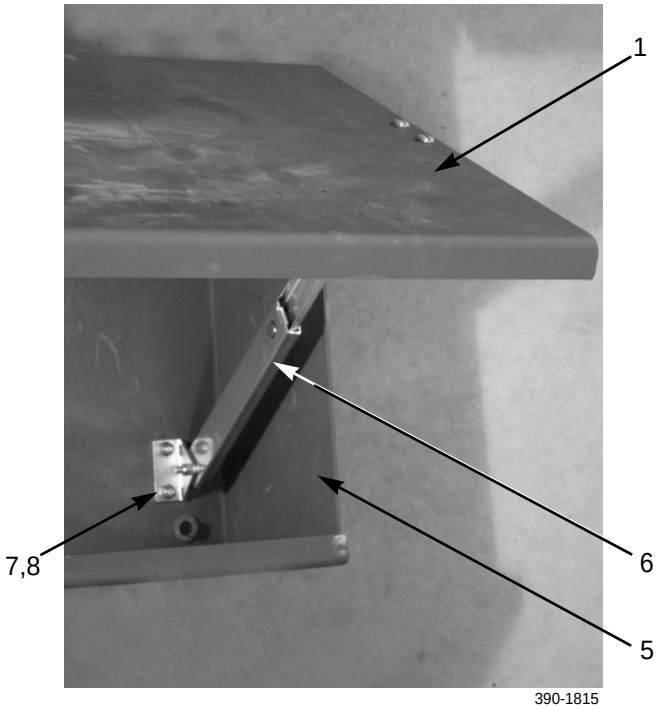
3. Remove four nuts (7), screws (8), and toolbox lid holdback brace (6) from toolbox (5) and toolbox lid (1).

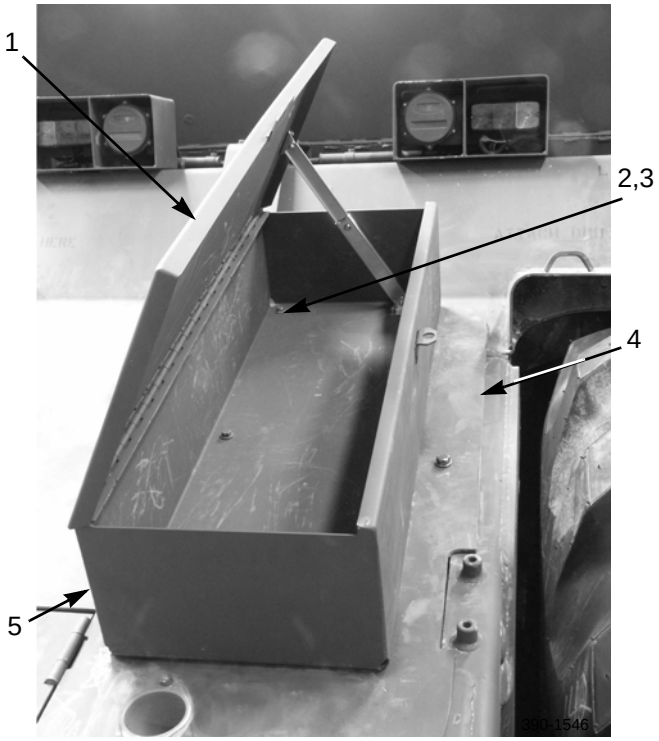
TOOLBOX INSTALLATION

WARNING

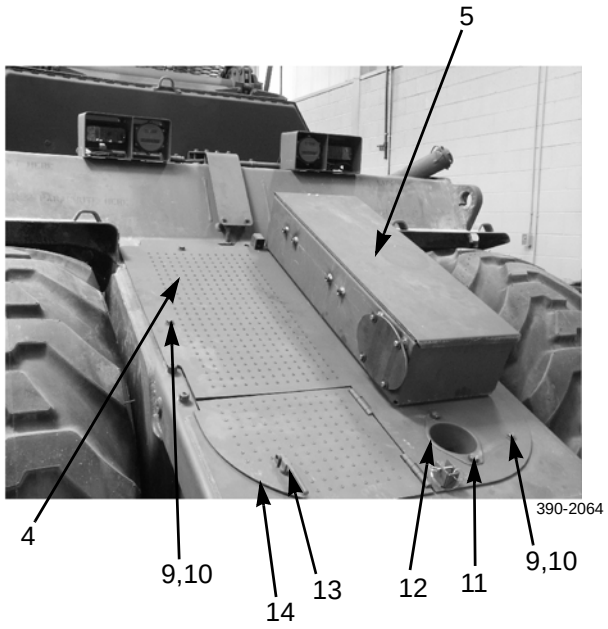
Use extreme caution when installing toolbox lid holdback brace. Use assistance to support lid during procedure. Failure to do so may result in injury.

1. If removed, install toolbox lid holdback brace (6) on toolbox (5) and toolbox lid (1) with four screws (8) and nuts (7).
2. Install toolbox (5) on rear deck cover (4) with six washers (3) and screws (2).
3. Close toolbox lid (1).





REAR DECK COVER REMOVAL



1. Remove toolbox (5) (Refer to *Toolbox Removal*).
2. Remove two bolts (11) and elevator motor stowage cup (12) from cover (4).
3. Open latch (13) on access door (14).

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 four bolts (9), washers (10), and cover (4) from machine.

REAR DECK COVER INSTALLATION

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.

1. Install cover (4) on machine with four washers (10) and bolts (9).
2. Close latch (13) on access door (14).
3. Install elevator motor stowage cup (12) on cover (4) with two bolts (11).
4. Install toolbox (5) (Refer to *Toolbox Installation*).

END OF WORK PACKAGE

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DATA PLATE REPLACEMENT 0018 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Rivet, solid (as required)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

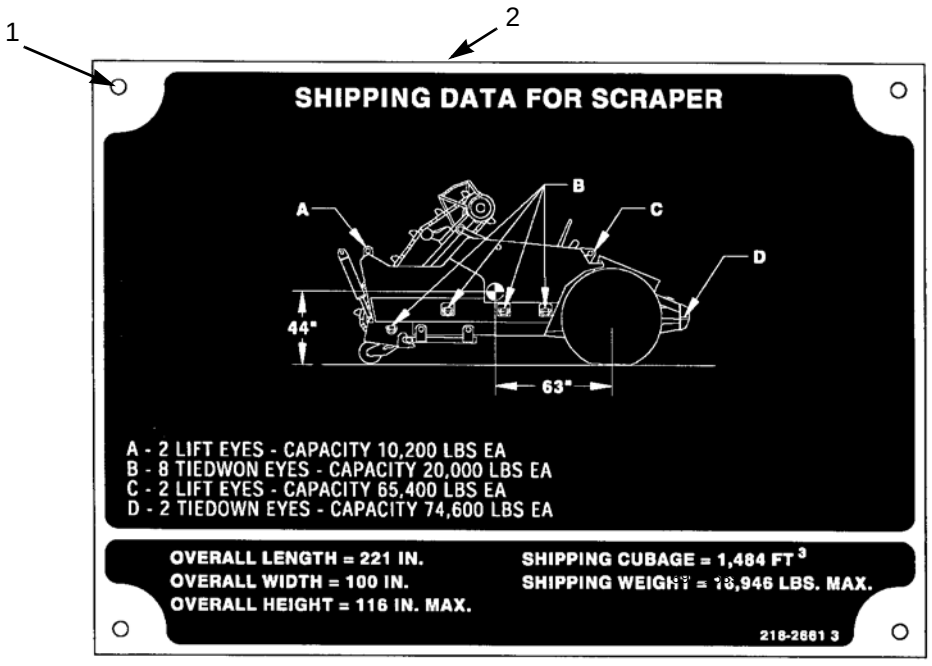
Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

REMOVAL

1. Using center punch and hammer, mark center of each rivet (1).
2. Using electric drill and a 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 scraper.



390-1539

REMOVAL - CONTINUED

CAUTION

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

4. Using twist drill the same diameter as rivet (1) body, remove rivet body from scraper.

INSTALLATION

Install data plate (2) on scraper with new rivets (1).

END OF WORK PACKAGE

ELEVATOR MOTOR 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 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

Personnel Required

Two

References

TM 5-3800-205-23-1

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

WARNING

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

CAUTION

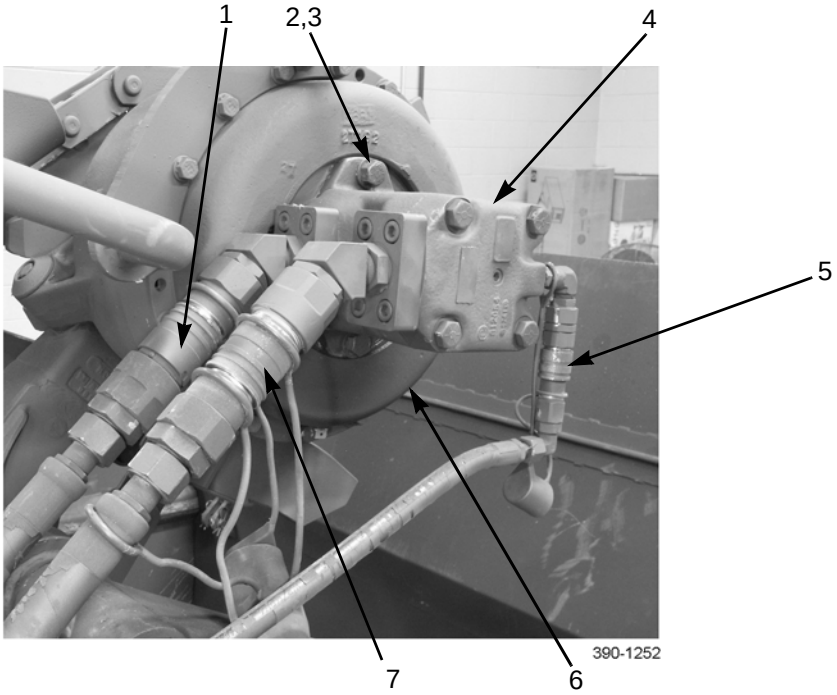
Cap hoses to prevent fluid loss and contamination of fuel system.

NOTE

- Tag 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 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. Relieve hydraulic system pressure (to facilitate disconnection and connection of hoses) by moving control levers through all positions (TM 5-3800-205-10-1).
2. Disconnect hydraulic hose quick-disconnects (1, 5, and 7) from elevator motor (4).
3. Position nylon sling and suitable lifting device on elevator motor (4).



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

Elevator motor weighs 65 lb (30 kg).

4. With assistance, remove two bolts (2), washers (3), and elevator motor (4) from elevator drive speed reducer (6).

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

Elevator motor weighs 65 lb (30 kg).

1. Position nylon sling and suitable lifting device on elevator motor (4).
2. Install elevator motor (4) on elevator speed reducer (6) with two washers (3) and bolts (2).
3. Connect hydraulic hose quick-disconnects (1, 5, and 7) to elevator motor (4).
4. Check level of oil in speed reducer and add as needed. Refer to *PMCS* in TM 5-3800-205-23-1.

END OF WORK PACKAGE

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HYDRAULIC LINES AND FITTINGS REPLACEMENT 0020 00

THIS WORK PACKAGE COVERS

Quick Disconnect Coupling: Removal, Installation

Hydraulic Hose: Removal, Installation

Hydraulic Tube: Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Oil, lubricating (Item 24 or 29, WP 0047 00)

Materials/Parts - Continued

Rag, wiping (Item 31, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

O-ring (as required)

References

WP 0009 00

Equipment Condition

Hydraulic tank drained (all except quick disconnect hoses) (TM 5-3800-205-23-1, WP 0010 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 hydraulic lines. 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

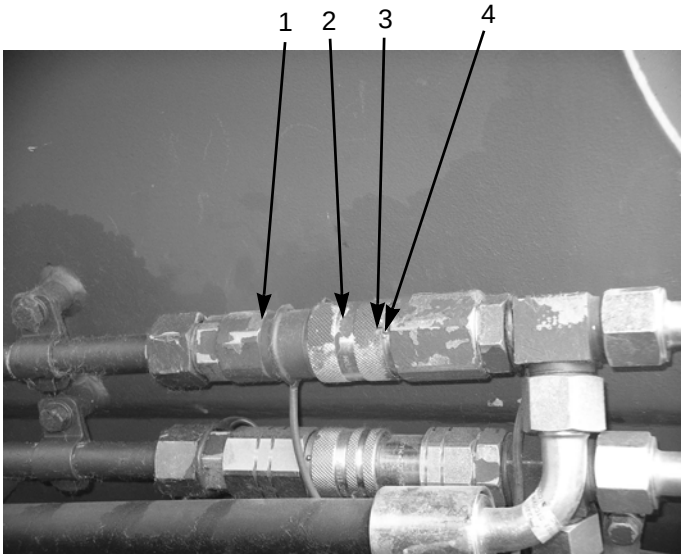
Wipe area clean around all hydraulic connections prior to disconnecting. Cap all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag hydraulic lines to aid in installation.

QUICK DISCONNECT COUPLING REMOVAL

1. Relieve hydraulic system pressure (to facilitate disconnection and connection of quick disconnect connectors) by moving control levers through all positions (TM 5-3800-205-10-1).
2. Turn coupling (2) until small indentation (3) is aligned with pin (4).
3. Pull down on coupling (2) and disconnect from coupling (1).



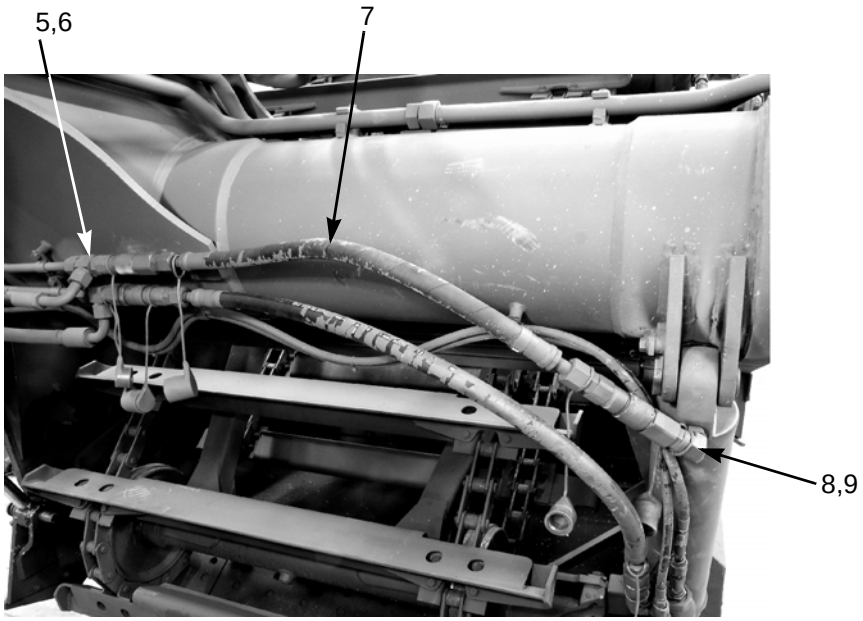
390-1490

QUICK DISCONNECT COUPLING INSTALLATION

1. Align small indentation (3) on coupler (2) with pin (4).
2. Pull down on coupling (2) and connect to coupling (1) until it clicks into position.
3. Turn coupling (2) so that small indentation (3) is not aligned with pin (4).

HYDRAULIC HOSE REMOVAL

1. Disconnect hose (7) from elbow (8). Remove O-ring (9) and discard. Install protective caps on hose and elbow.
2. Disconnect hose (7) from tee (5). Remove O-ring (6) and discard. Install protective caps on hose and tee.



HYDRAULIC HOSE INSTALLATION

NOTE

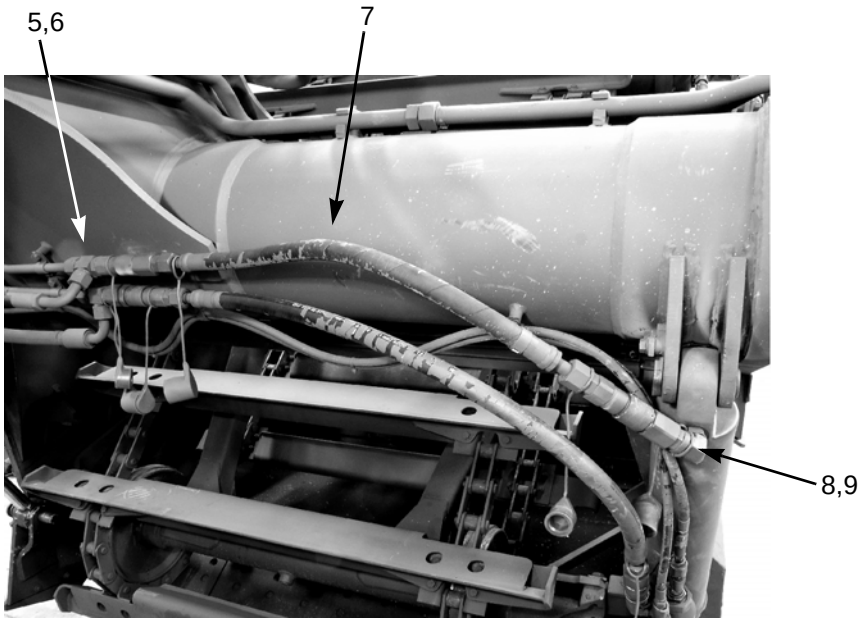
Lubricate new O-rings with clean oil before installation.

1. Remove protective caps from tee (5) and hose (7). Install new O-ring (6) and connect hose to tee.
2. Remove protective caps from elbow (8) and hose (7). Install new O-ring (9) and connect hose to elbow.
3. Fill hydraulic tank (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).

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.

4. Start engine (TM 5-3800-205-10-1) and check for leaks.



390-1492

HYDRAULIC TUBE REMOVAL

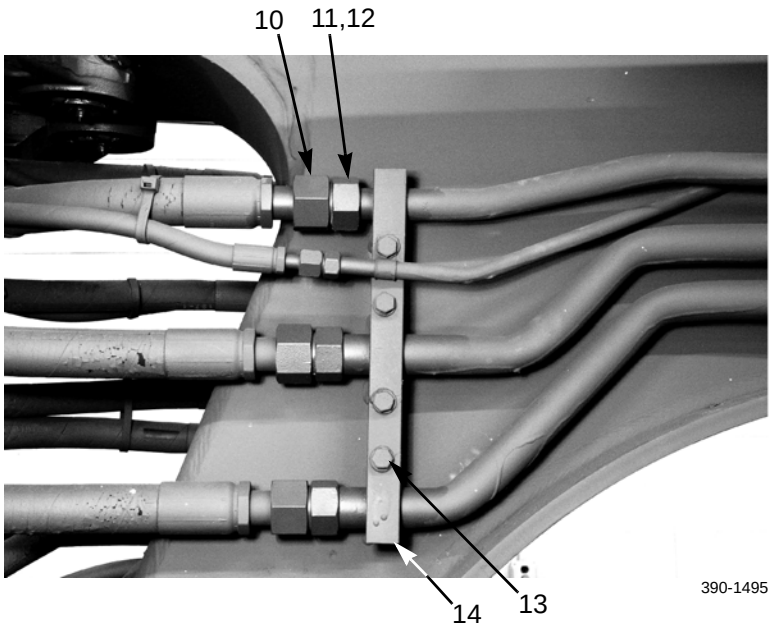
CAUTION

Use two wrench method when disconnecting non-quick disconnect connections to prevent damage to fittings.

NOTE

Hydraulic system uses several different style clamps. A four-bolt clamp is shown.

1. Disconnect hose (10) from tube (11). Remove O-ring (11) and discard. Install protective caps on hose and tube.
2. Remove four bolts (13) from front half of clamp (14).
3. Repeat steps 1 and 2 to remove the other end of tube (11). Remove tube from machine.



HYDRAULIC TUBE INSTALLATION

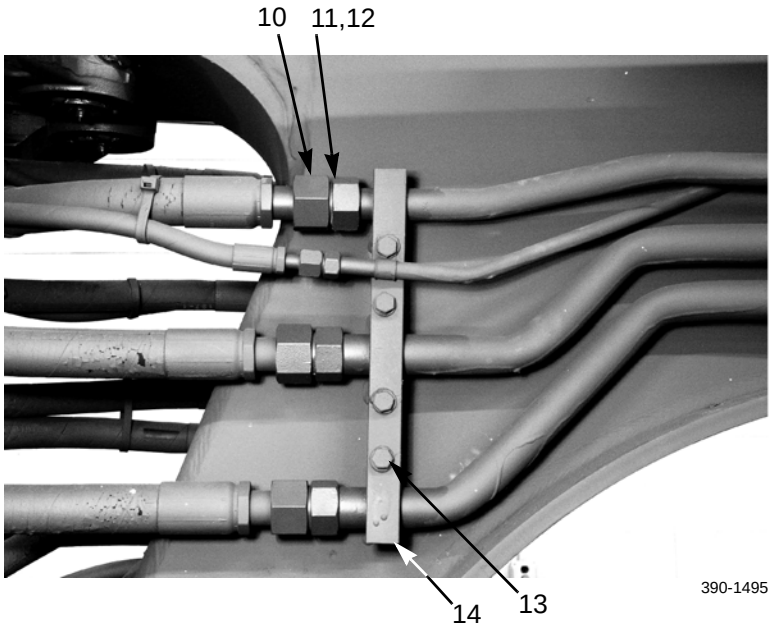
CAUTION

Use two wrench method when connecting non-quick disconnect connections to prevent damage to fittings.

NOTE

- Hydraulic system uses several different style clamps. A four-bolt clamp is shown.
- Lubricate new O-rings with clean oil before installation.

1. Position tube (11) on machine.
2. Remove protective caps from hose (10) and tube (11). Install new O-ring (12) to connect hose to tube.
3. Install front half of clamp (14) with four bolts (13).
4. Repeat steps 2 and 3 to install other end of tube (11).



5. Fill hydraulic tank (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).

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 (TM 5-3800-205-10-1) and check hydraulic lines for leaks.

END OF WORK PACKAGE

CHECK VALVE AND LIFT CYLINDER REPLACEMENT 0021 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 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Compound, antiseize (Item 8, WP 0047 00)

Oil, lubricating (Item 24 or 29, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

Seal, O-ring (3)

Personnel Required

Two

References

TM 5-3800-205-23-1

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground TM 5-3800-205-10-1)

Parking brake engaged (TM 5-3800-205-10-1)

Engine off (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

WARNING

- Do NOT disconnect or remove any hydraulic system line or fitting unless 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

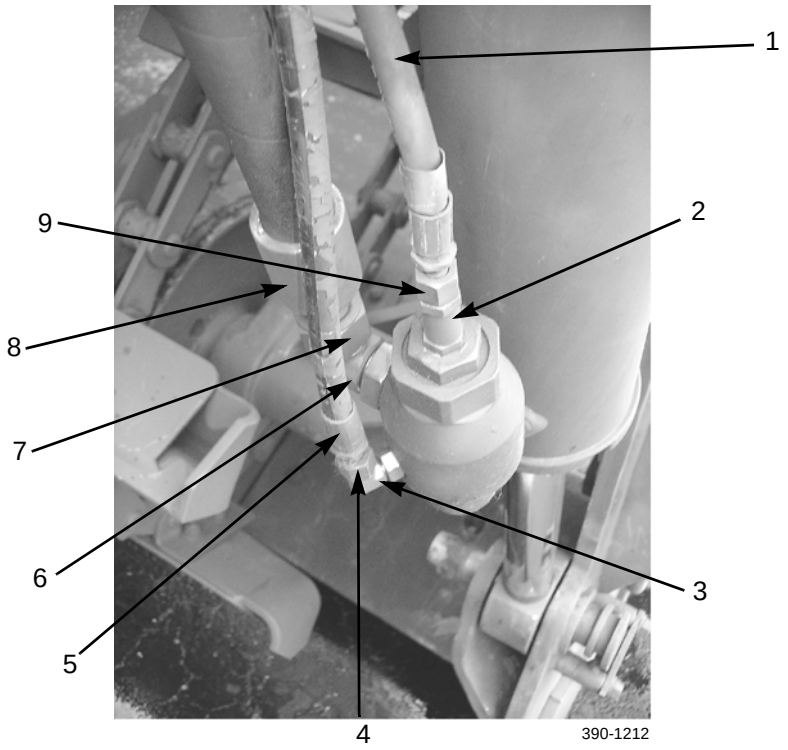
Cap all hoses and openings to prevent fluid loss and contamination of oil system.

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.

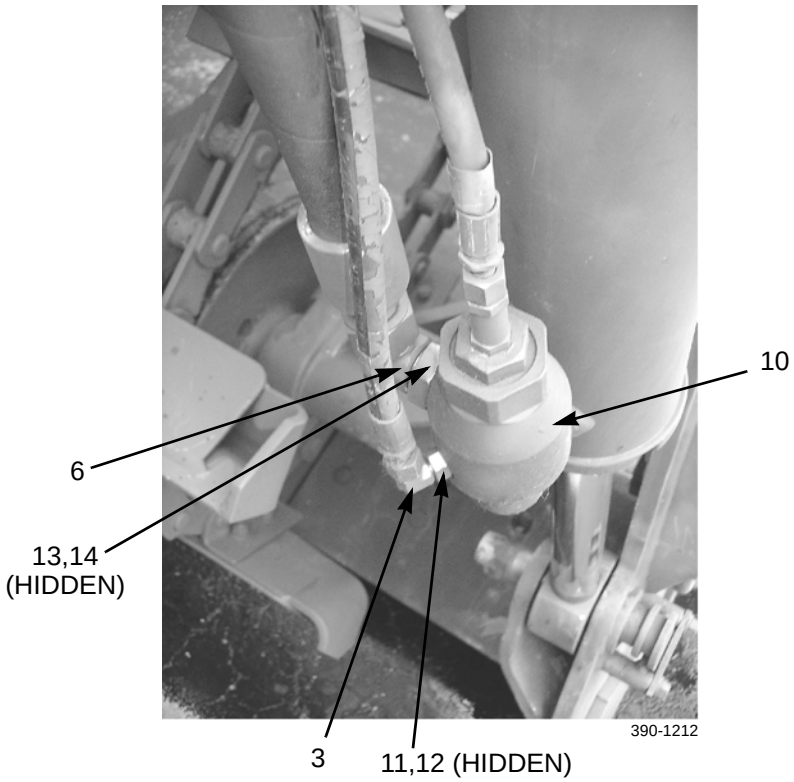
CHECK VALVE REMOVAL

1. Relieve hydraulic pressure by exercising control levers.
2. Disconnect three quick disconnect hoses at draft arm (TM 5 3800-205-10-1).
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.

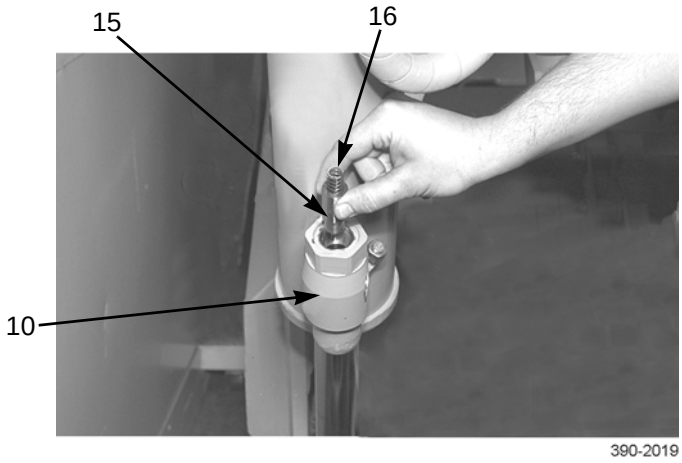


6. Loosen nut (13) and remove swivel adapter (6) and O-ring (14) from check valve housing (10). Discard O-ring.
7. Loosen nut (11) and remove elbow fitting (3) and O-ring (12) from check valve housing (10). Discard O-ring.

CHECK VALVE REMOVAL - CONTINUED

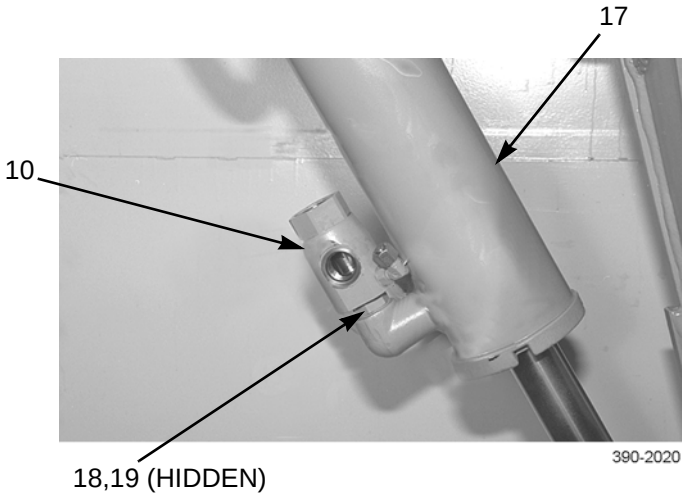


8. Remove spring (16) and check valve (15) from check valve housing (10).



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.

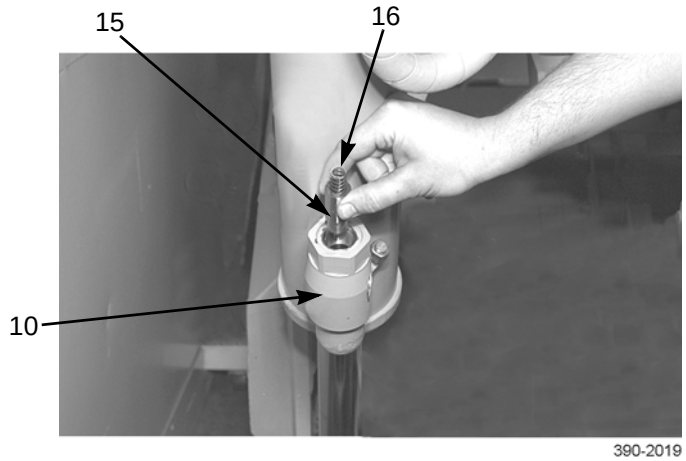


CHECK VALVE INSTALLATION

NOTE

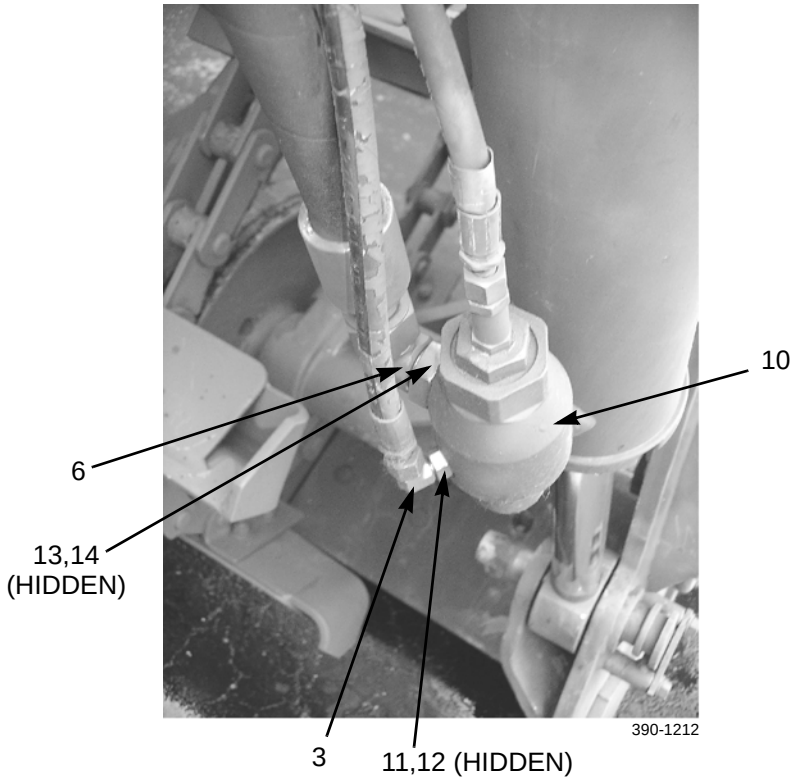
- Clean and inspect all parts prior to installation.
- Lubricate new O-rings with oil prior to installation.

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).



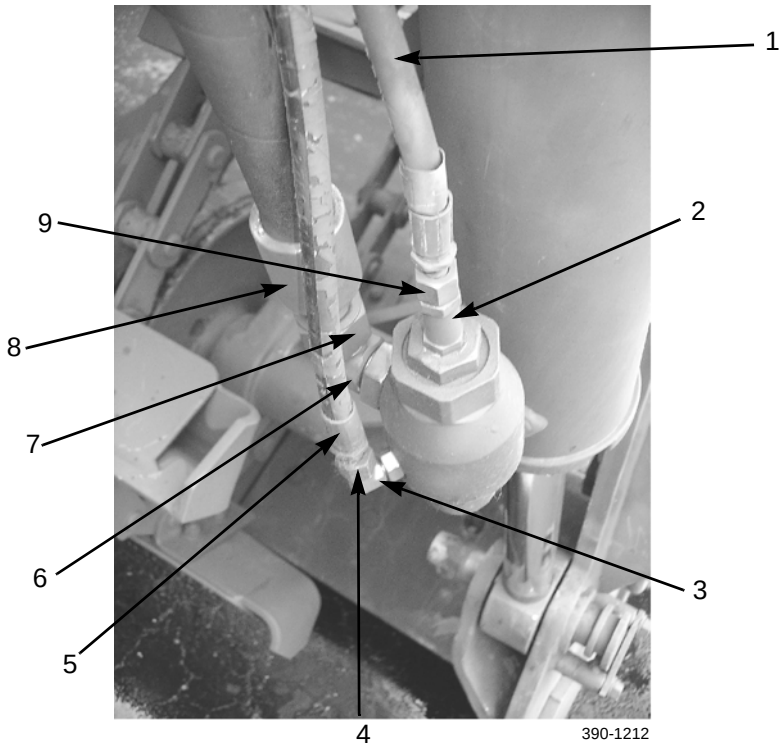
CHECK VALVE INSTALLATION - CONTINUED

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).

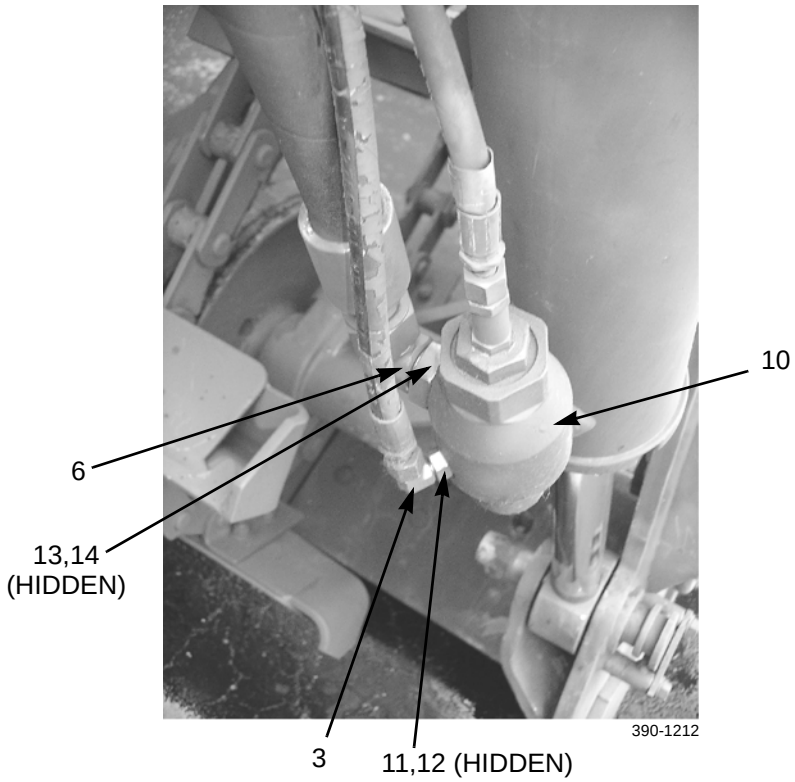


8. Fill hydraulic reservoir with oil (Refer to *Unit PMCS* in TM 5-3800-205-24-1).
9. Place battery disconnect switch in ON position (TM 5-3800-205-10-1).
10. Operate lift cylinders (TM 5-3800-205-10-1) and check for leaks and proper operation.

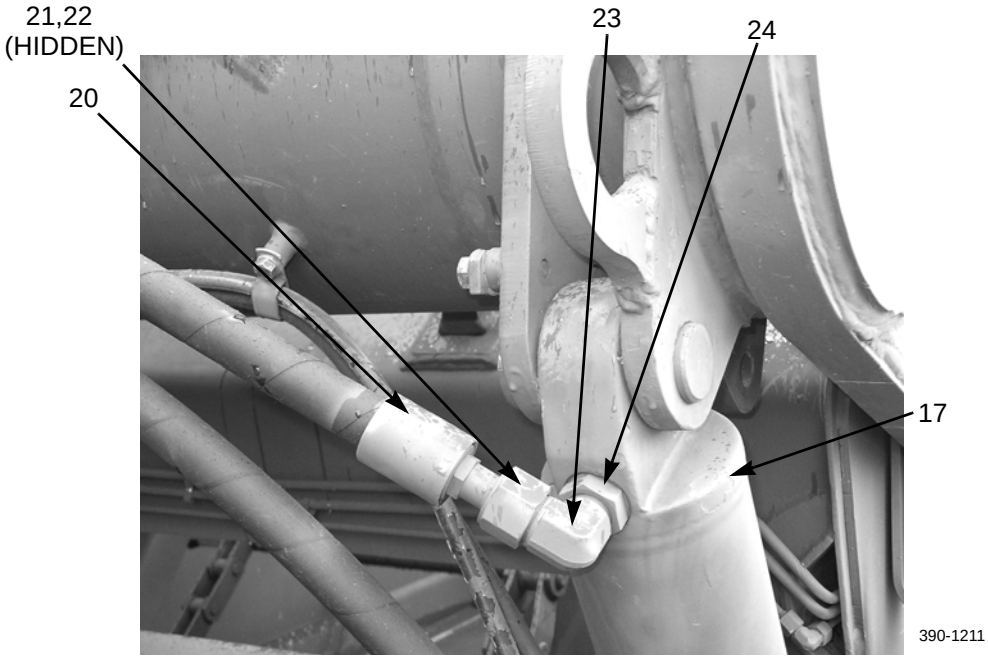
LIFT CYLINDER REMOVAL

1. Relieve hydraulic pressure by exercising control levers.
2. Disconnect three quick disconnect hoses at draft arm (TM 5 3800-205-10-1).
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

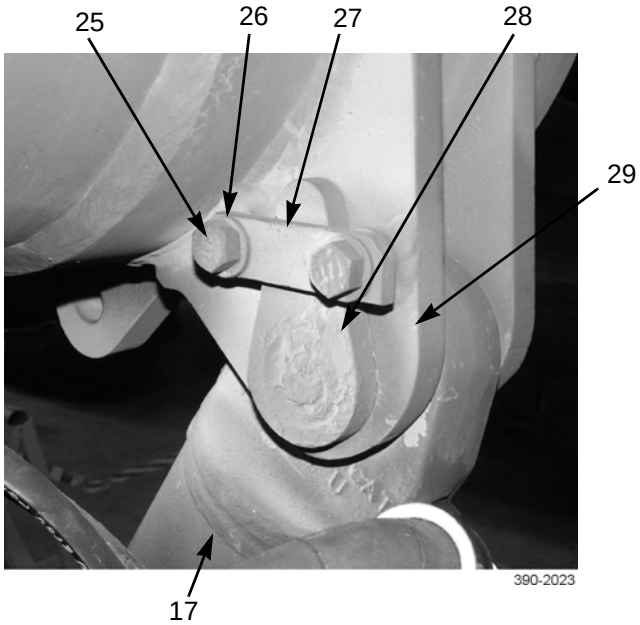
Lift cylinder weighs 128 lb (58 kg).

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).



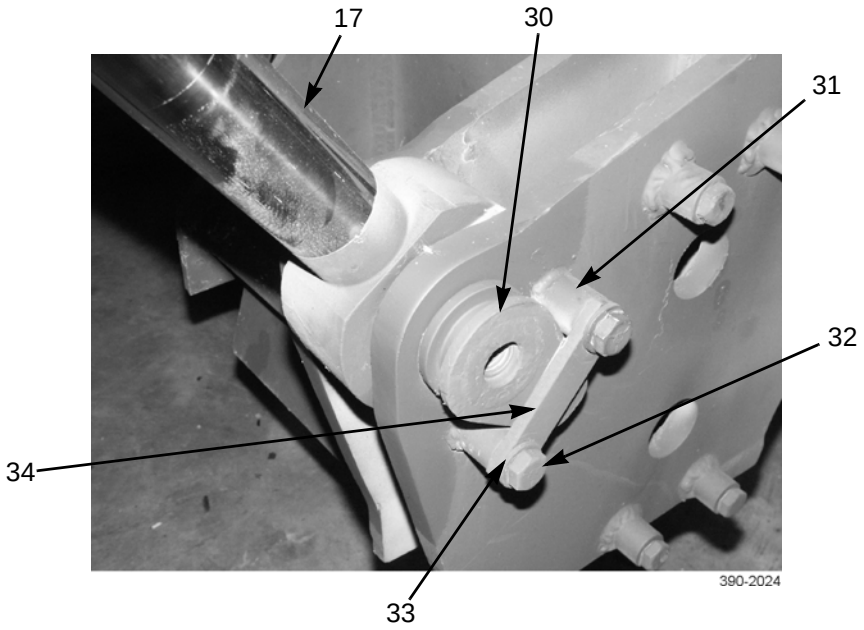
13. Lower lift cylinder (17) onto suitable cribbing.

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.

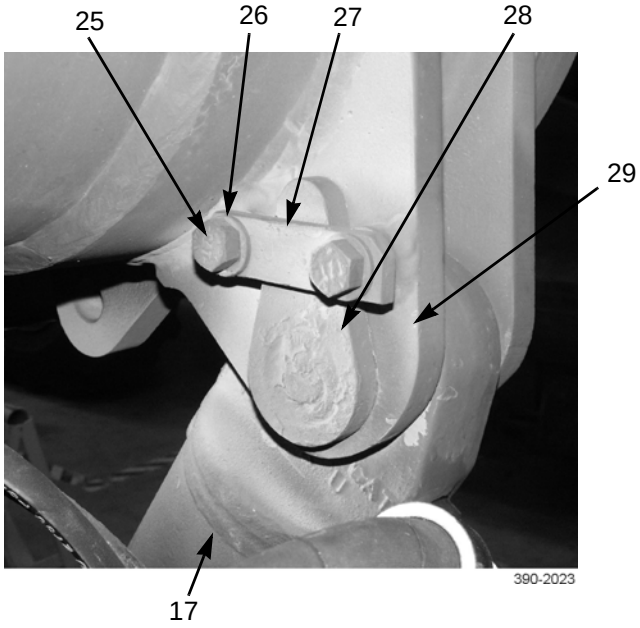
LIFT CYLINDER INSTALLATION - CONTINUED

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).



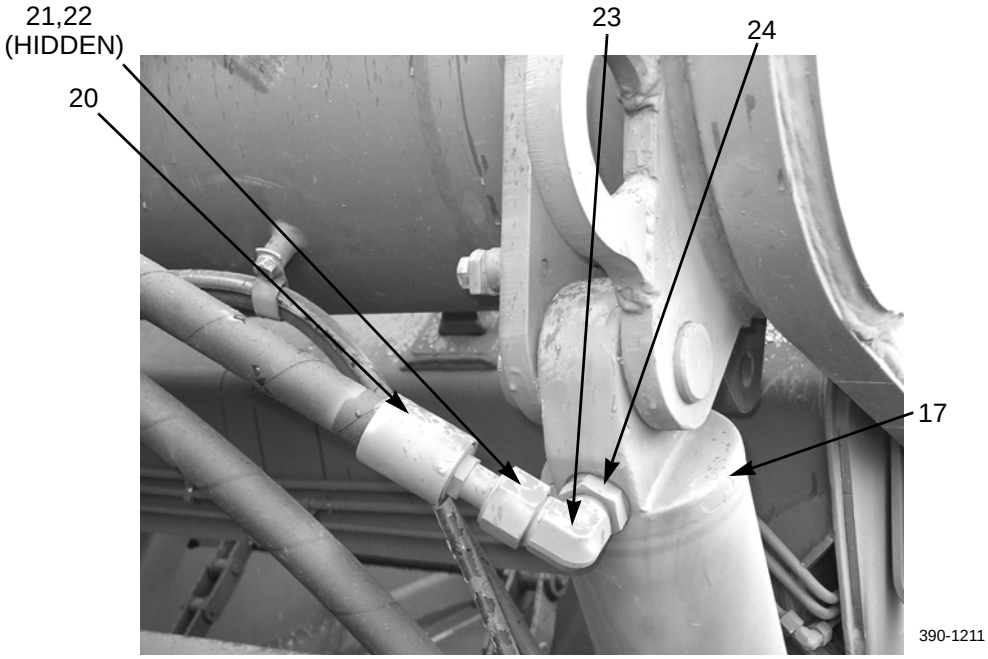
10. Install elbow fitting (23) to lift cylinder (17) and tighten nut (24).

NOTE

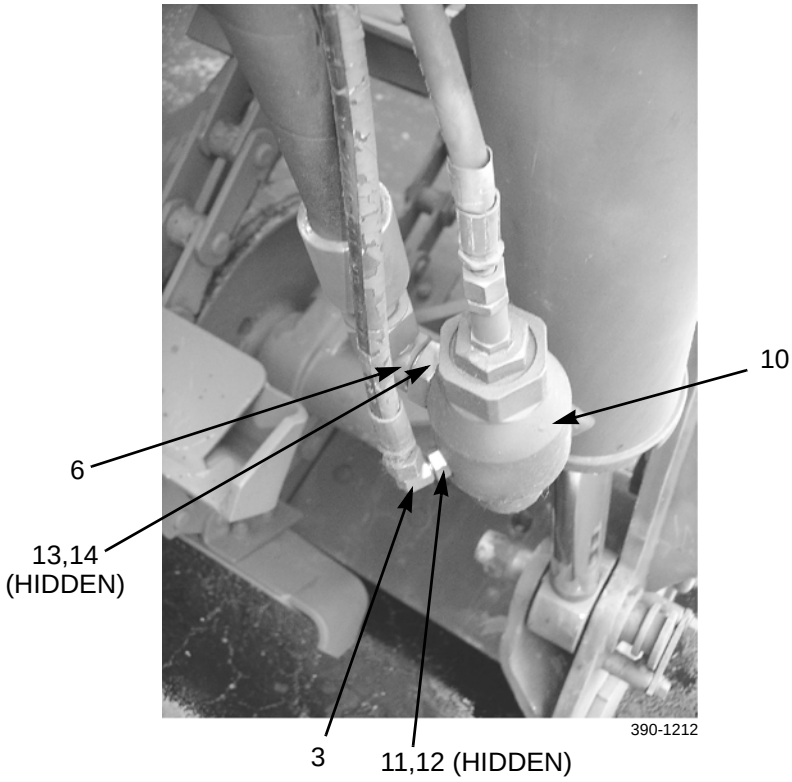
Lubricate new O-rings with oil prior to installation.

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

LIFT CYLINDER INSTALLATION - CONTINUED

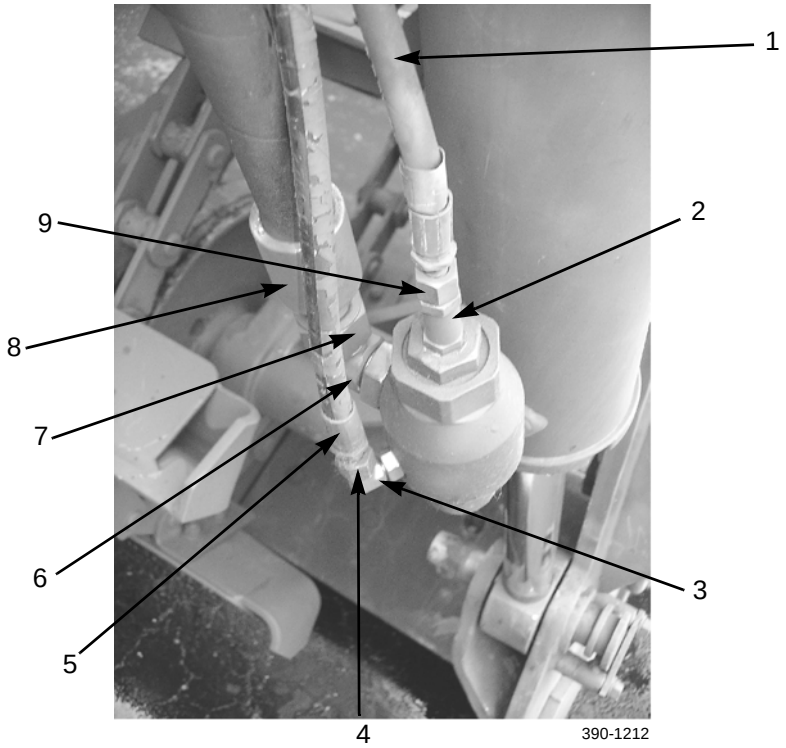


12. Install new O-ring (14) and swivel adapter (6) to check valve housing (10) and tighten nut (13).
13. Install new O-ring (12) and elbow fitting (3) to check valve housing (10) and tighten nut (11).



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 5-3800-205-24-1).
18. Place battery disconnect switch in ON position (TM 5-3800-205-10-1).
19. Operate lift cylinders (TM 5-3800-205-10-1) and check for leaks and proper operation.

END OF WORK PACKAGE

ELEVATOR ASSEMBLY ADJUSTMENT 0022 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Equipment Condition - Continued

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

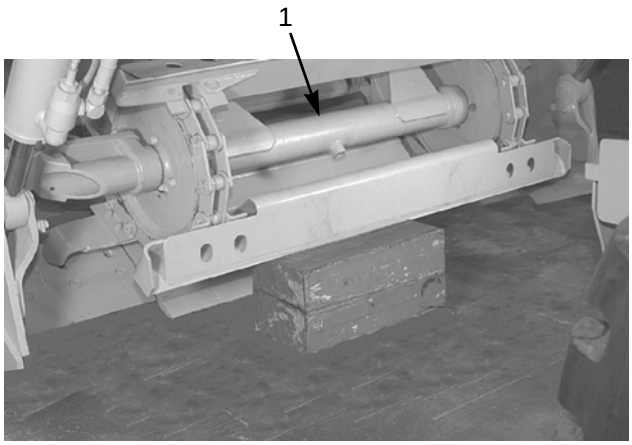
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

ADJUSTMENT

NOTE

- Clearance between elevator flights and top of cutting edge may be adjusted. Distance between top of cutting edge and elevator flight is set at factory at approximately 2.4 in. (61 mm). Two shims are located at top of bracket when machine is shipped from factory. Brackets are located on each side of the bowl. Shims must be equally placed on each of the brackets.
- Shims may need to be added to top of bracket when working on material which is compacted. Space that is between cutting edge and elevator flight will become wider. Shims may also need to be added to top of bracket when components of elevator become worn.
- Shims may need to be moved from top of bracket when working on loose material. Space between cutting edge and elevator flight will become narrower.

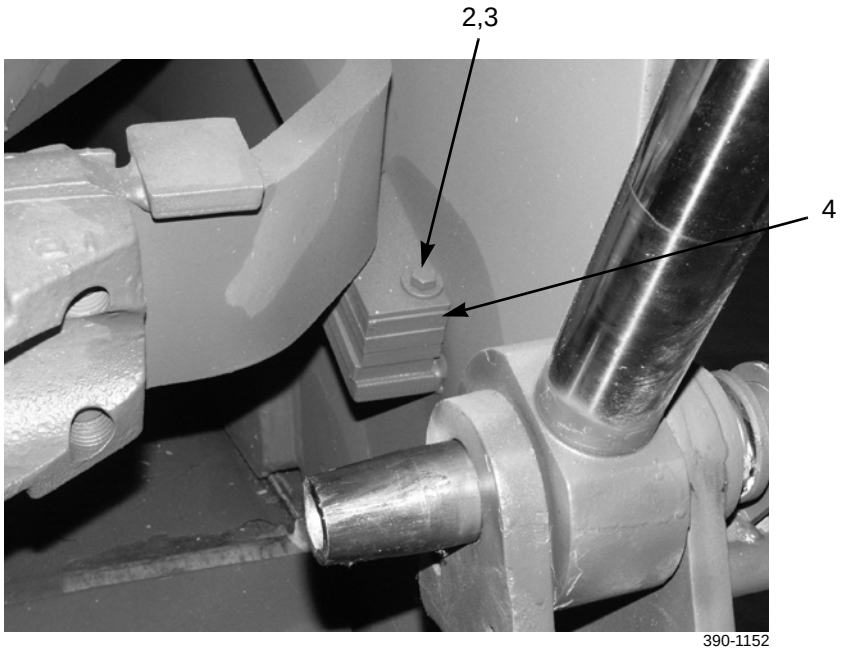
1. Raise front of elevator (1) with jack or hoist and place blocks or stands under front of elevator. Lower elevator until resting on blocks or stands.



390-1150

ADJUSTMENT - CONTINUED

2. Remove two bolts (2), washers (3), and shims (4) from elevator (1).
3. Add or remove shims (4) as required to obtain proper adjustment.
4. Install two washers (3) and bolts (2).
5. Repeat steps 2 through 4 for other side of scraper bowl.



390-1152

END OF WORK PACKAGE

ELEVATOR FLIGHTS AND CHAINS REPLACEMENT 0023 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Sling, nylon (2) (Item 27, WP 0048 00)

Wrench clamp, chain cutter (Item 36, WP 0048 00)

Personnel Required

Two

References

WP 0025 00

Equipment Condition

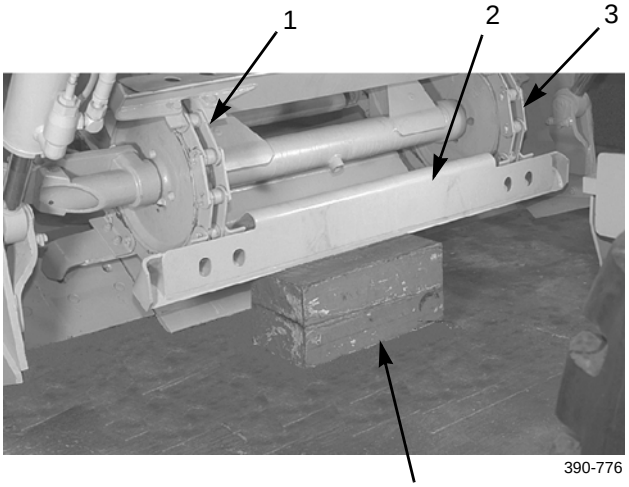
Elevator guard removed (WP 0024 00)

REMOVAL

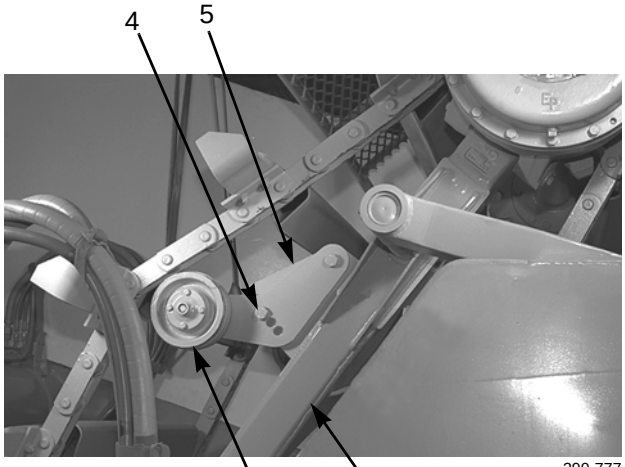
NOTE

Master link is an offset link. There is one master link on each chain.

1. Rotate chain (1) and flights (2) until master link (3) is in front of scraper bowl. Position wood blocks under chain and flights.
2. Attach a nylon strap and suitable lifting device to flights (2) and chain (1).
3. Remove bolt (4) from bracket (5) and lower elevator chain adjustment roller (7) against elevator (6). Repeat step for other side. Remove lifting device and nylon strap from flights (2) and chain (1).



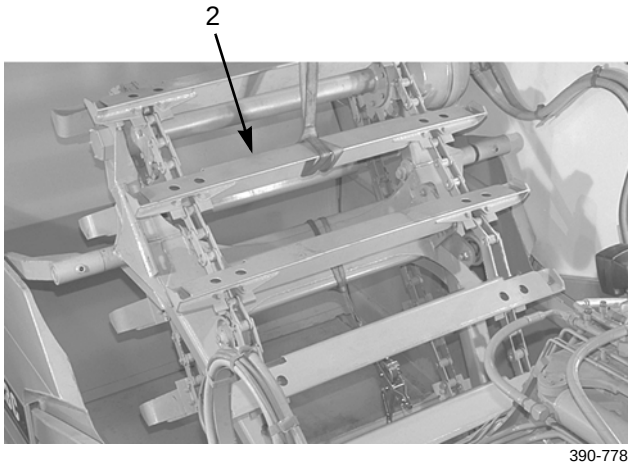
390-776



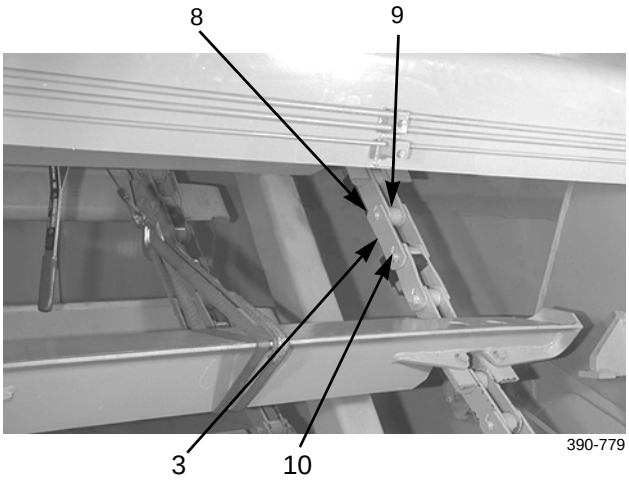
390-777

REMOVAL - CONTINUED

4. Attach ratchet strap, two nylon straps and a suitable lifting device to flights (2).
5. Attach a suitable clamp one full link above and one full link below master link (3).
6. Remove two lock pins (10), plate (8), two spacers (9), and master link (3).



390-778



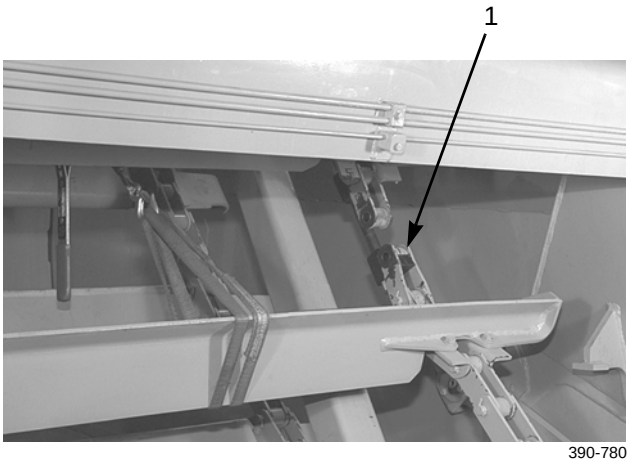
390-779

7. Slowly remove clamp from chain (1).
8. Repeat steps 5 through 7 for other side.

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.

9. Release tension on lifting device to ease removal of chain (1) and flights (2) from elevator. Carefully remove move chain and flights from elevator.



390-780

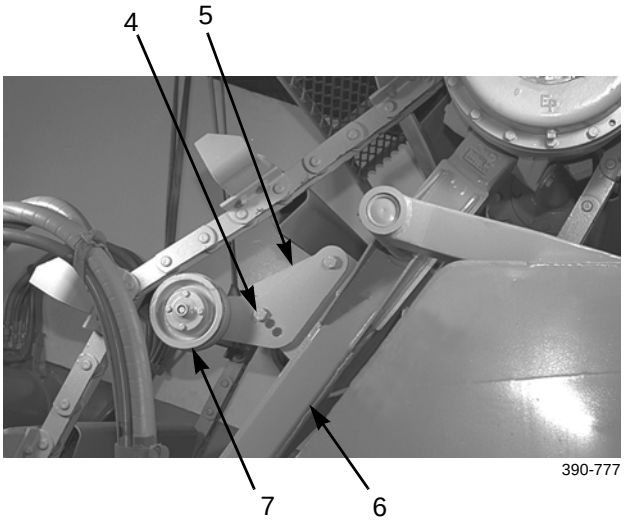
390-781

INSTALLATION

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.

1. Use ratchet strap, chain wrench clamp and a nylon lifting strap to position chain (1) and flights (2) to front of elevator. Use a hoist and a nylon lifting strap to position chain and flights to top of elevator. Position chain and flights on elevator, as shown.
2. Attach a suitable clamp one full link above and one full link below master link (3).
3. Install master link (3), two spacers (9), plate (8), and two lock pins (10).
4. Attach a nylon strap and suitable lifting device to chain (1) and flights (2). Raise elevator chain adjustment roller (6) and install bolt (4) on bracket (5).
5. Adjust elevator chain (WP 0025 00).
6. Install elevator guard (WP 0024 00).



END OF WORK PACKAGE

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ELEVATOR GUARD REPLACEMENT 0024 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Seal, lip

Grease, GAA (Item 16, WP 0047 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

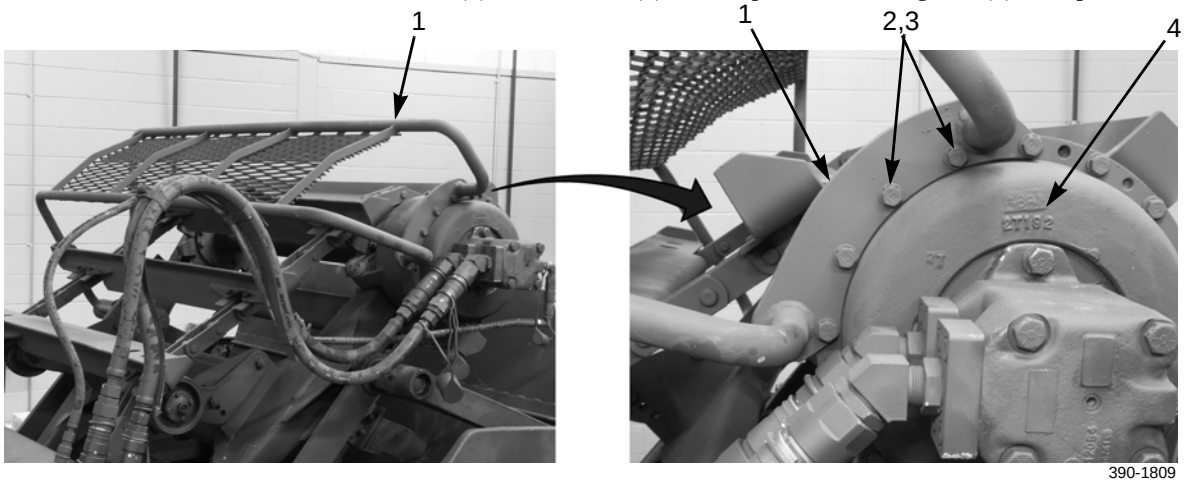
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

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 injury or death to personnel.

REMOVAL

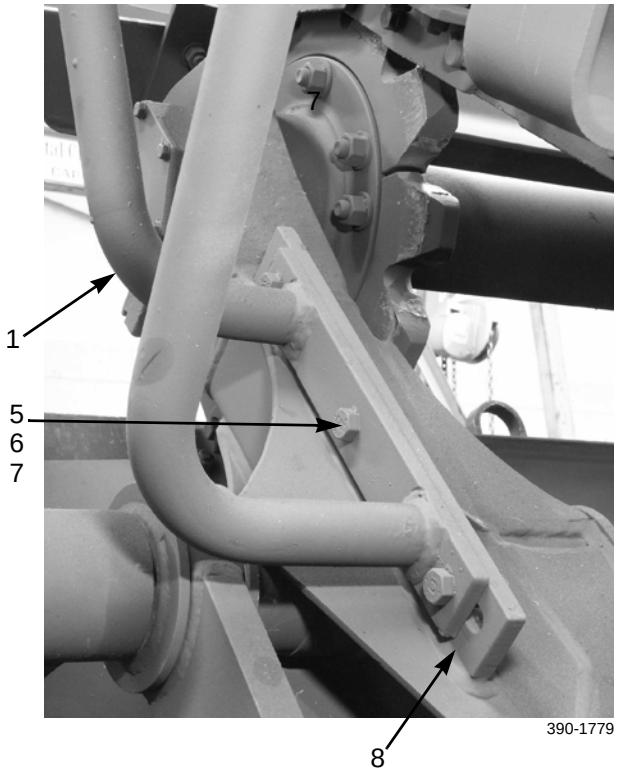
1. Attach nylon slings and suitable lifting device to elevator guard (1). Take up slack in nylon slings.
2. On left side of machine, remove five bolts (2) and washers (3) from separate elevator guard (1) and speed reducer (4).



390-1809

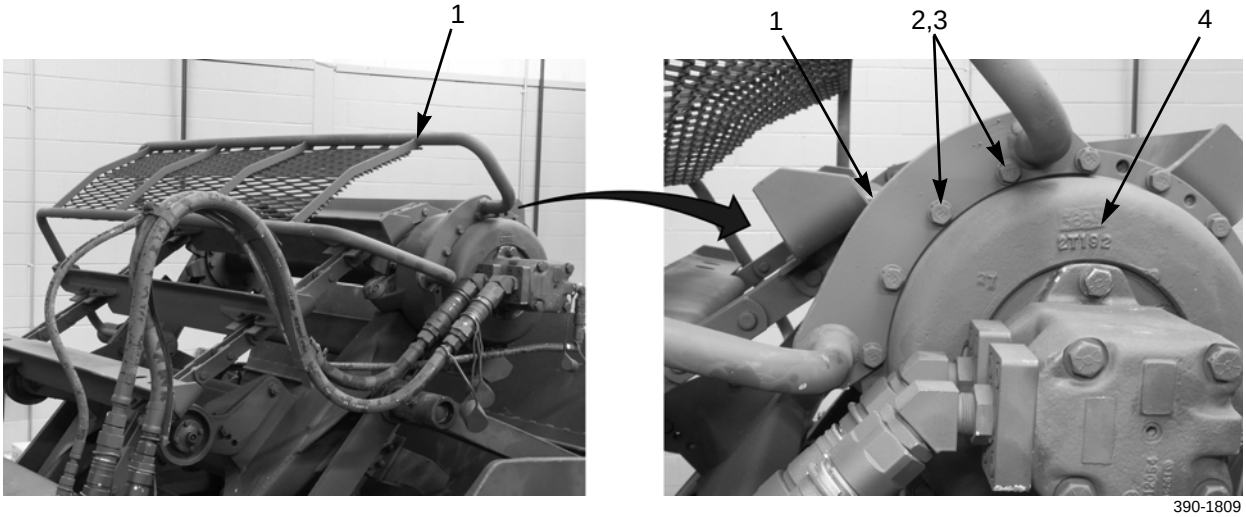
REMOVAL - CONTINUED

3. On right side of machine, remove three nuts (5), washers (6), bolts (7), and elevator guard (1) from elevator frame (8).



INSTALLATION

1. Attach nylon slings and a suitable lifting device to elevator guard (1). Position elevator guard on machine.
2. On right side of machine, install elevator guard (1) on elevator frame (8) with three bolts (7), washers (6), and nuts (5).
3. At left side of machine, install elevator guard (1) to speed reducer (4) with five washers (3) and bolts (2).
4. Remove nylon slings from elevator guard (1).



END OF WORK PACKAGE

ELEVATOR CHAIN ADJUSTMENT 0025 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

ADJUSTMENT

NOTE

- Elevator chain requires adjustment when distance between bottom of elevator frame and elevator chain is greater than 9 in. (229 mm). Distance between bottom of elevator frame and elevator chain should be 5-9 in. (127-229 mm).
- When an adjustment is made to one elevator chain, the same adjustment must be made to second elevator chain.

1. Measure elevator chain slack. Take measurement approximately half way between upper sprocket and lower idler, at widest space between edge of elevator frame and upper side of chain. Chain slack must be 5-9 in. (127-229 mm).

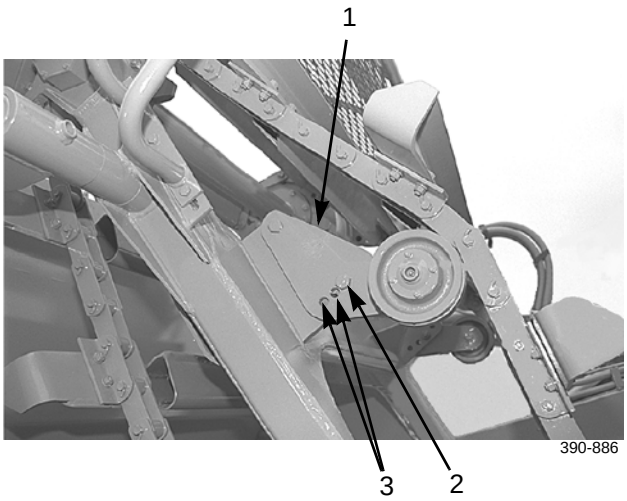
NOTE

- Arm can be moved to another position to tighten elevator chain.
- One link changes the length of the chain approximately 4 in. (100 mm).

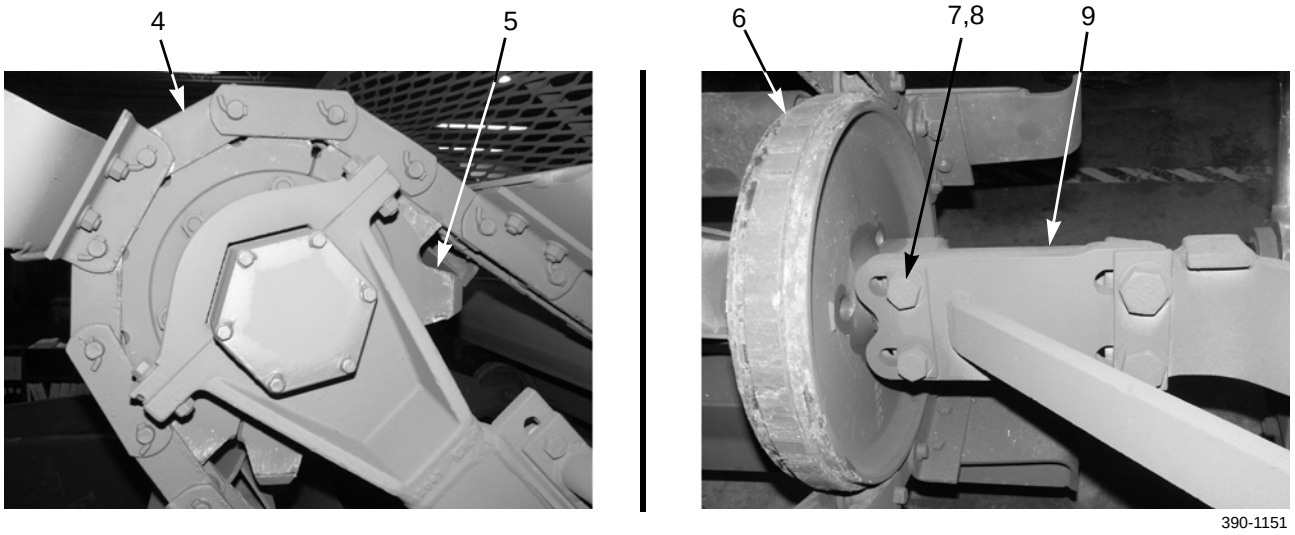
ELEVATOR CHAIN ADJUSTMENT - CONTINUED 0025 00

ADJUSTMENT - CONTINUED

2. Remove nut and bolt (2).
3. Move arm (1) up toward chain at top.
4. Install nut and bolt into next hole (3). Tighten nut to 275 lb-ft (373 Nm).
5. If chain is still loose, move arm (1) again. If arm has been moved all the way, remove a link from elevator chain. Remove offset link from new chain.



6. Sprockets (5) must be in alignment with rollers (6) or chains (2) will come off of sprocket. To align sprocket, loosen four bolts (7) and washers (8) on hub (9). Move to correct alignment. Tighten bolts, then torque to 375-400 lb-ft (510-540 Nm).



END OF WORK PACKAGE

ELEVATOR CHAIN IDLER REPLACEMENT 0026 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Sling, nylon (2) (Item 27, WP 0048 00)

Personnel Required

Two

References

WP 0025 00

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

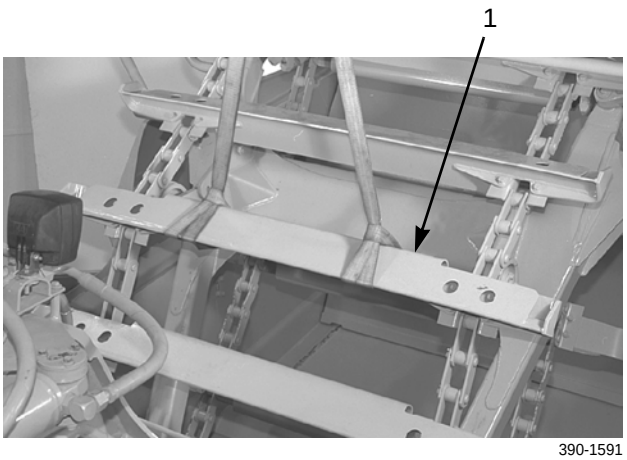
Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

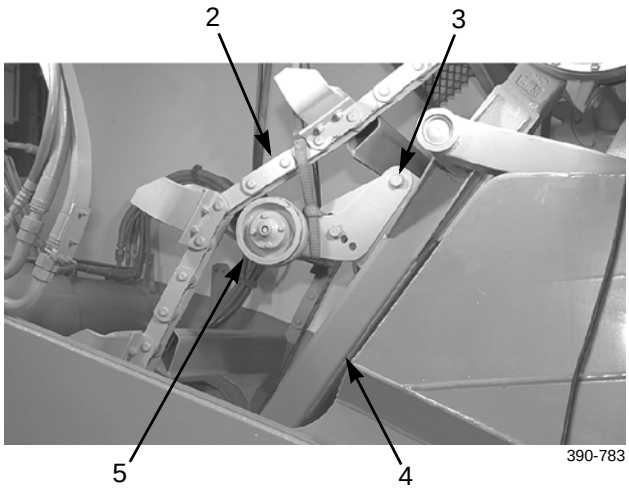
Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

REMOVAL

1. Attach two nylon slings and suitable lifting device to elevator flight (1). Lift elevator flight and chain (2) off elevator chain idler (5).
2. Attach nylon sling and suitable lifting device to elevator chain idler (5).



390-1591



390-783

REMOVAL - CONTINUED

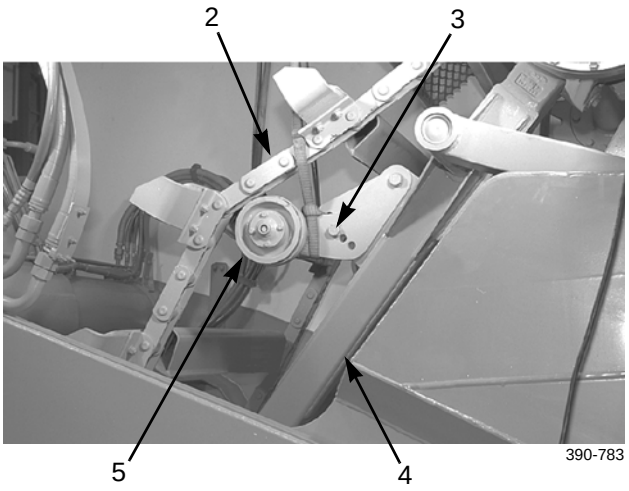
WARNING

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

Idler weighs 40 lb (18 kg).

3. Remove two bolts (3) and elevator chain idler (5) from elevator (4).



390-783

INSTALLATION

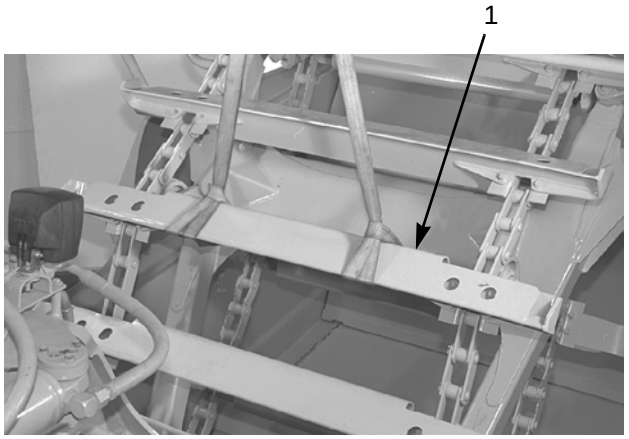
WARNING

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

Idler weighs 40 lb (18 kg).

1. Install elevator chain idler (5) on elevator (4) with two bolts (3).
2. Remove nylon sling and lifting device from elevator chain idler (5). Ensure chain (2) rests on elevator chain idler.
3. Lower flight (1) and remove nylon slings and lifting device.
4. Adjust elevator chain (WP 0025 00).



390-1591

END OF WORK PACKAGE

CHAPTER 2
DIRECT SUPPORT LEVEL
SCRAPER MAINTENANCE

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EJECTOR CLEARANCE ADJUSTMENT 0027 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Ejector positioned to rear (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

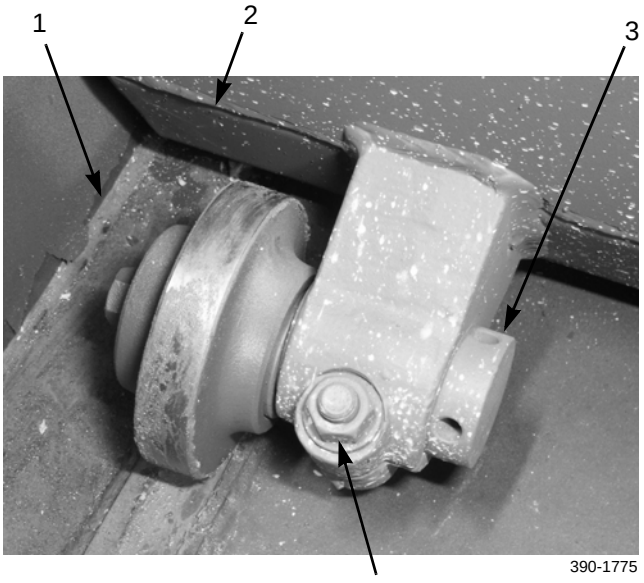
Battery disconnect switch in off position (TM 5-3800-205-10-1)

ADJUSTMENT

NOTE

When roller shaft is rotated, roller moves up or down.

1. Measure clearance between bottom edge of ejector (2) and scraper floor (1). Clearance must be 0.03-0.25 in. (0.8-6.4 mm). If clearance is not as specified, loosen locknut (4).
2. Insert a 0.44 in. (11 mm) diameter rod in holes of roller shaft (3) to move bottom edge of ejector (1).
3. Once correct clearance is obtained, tighten locknut (4).



390-1775

END OF WORK PACKAGE

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CUTTING EDGES AND ROUTER BITS REPLACEMENT 0028 00

THIS WORK PACKAGE COVERS

Cutting Edge Replacement

Router Bits Replacement

INITIAL SETUP

Maintenance Level

Unit

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, common no. 1 (Item 24, WP 0048 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl supported by wood cribbing (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

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.

CUTTING EDGES REPLACEMENT

NOTE

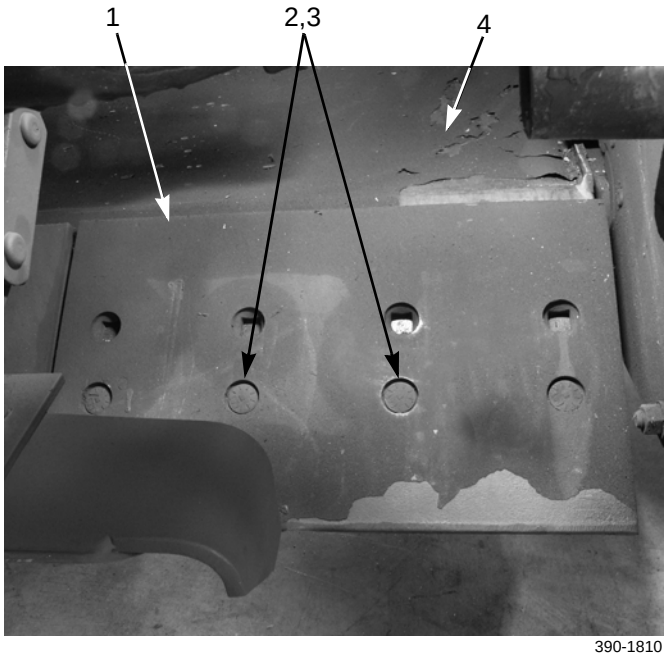
Perform the following steps to replace each of three cutting edges.

1. Support cutting edge (1) by placing wood cribbing between cutting edge and ground.
2. Clean cutting edge (1) of excess dirt to expose cutting edge nuts (2) and bolts (3).

NOTE

Center cutting edge weighs 127 lb (57.7 kg) and uses seven nuts and bolts. Left and right cutting edges each weigh 63 lb (28.6 kg) and use four nuts and bolts. Cutting edge at left side of scraper is shown.

3. Remove four nuts (2), bolts (3), and cutting edge (1) from scraper bowl (4). Replace any worn or damaged nuts and bolts.



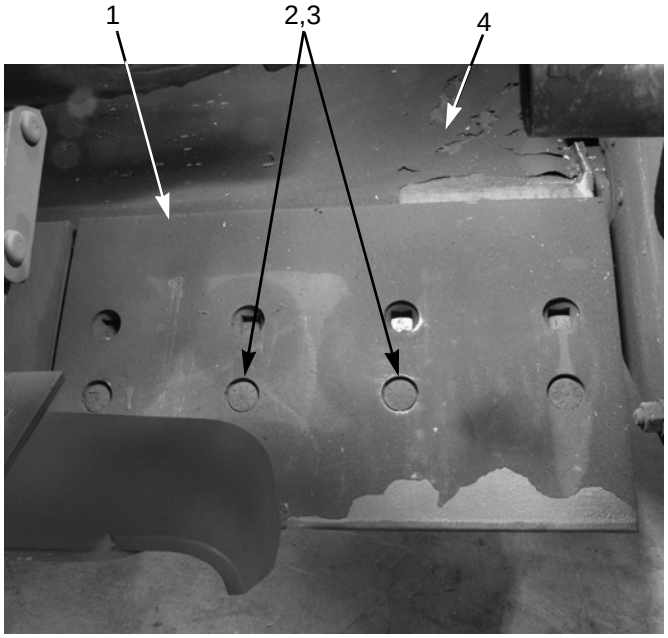
390-1810

CUTTING EDGES REPLACEMENT - CONTINUED

CAUTION

- DO NOT attempt to increase wear life or worn cutting edges by adding weld. This may result in cutting edge failure.
- DO NOT operate scraper without all cutting edges in place and secured. Mounting surfaces of scraper bowl may be damaged.

4. Clean mounting surface of scraper bowl (4).
5. Install cutting edge (1) on scraper bowl (4) with four bolts (3) and nuts (2). Tighten nuts to 300-400 lb-ft (405-545 Nm).
6. Remove wood cribbing from under cutting edge (1).



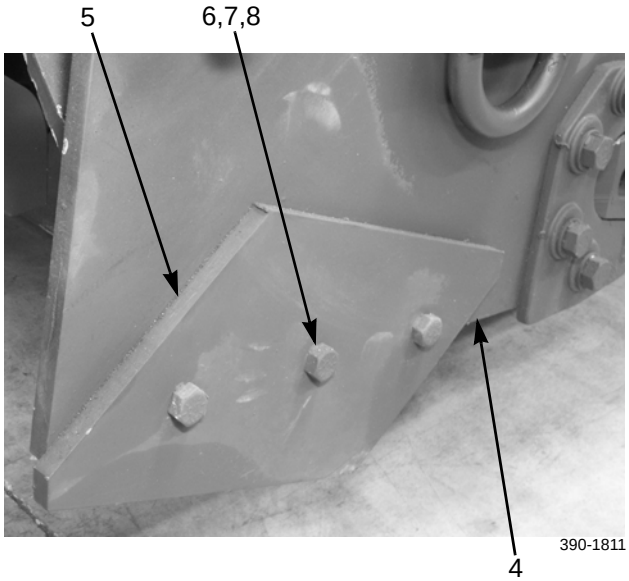
390-1810

ROUTER BITS REPLACEMENT

NOTE

Perform the following steps to replace each of two router bits. Router bits on left side of scraper is shown.

1. Clean router bit (5) of excess dirt to expose router bit nuts (6), washers (7), and bolts (8).
2. Remove three nuts (6), washers (7), bolts (8), and router bit (5) from scraper bowl. Replace any worn or damaged nuts, washers and bolts.
3. Clean mounting surface of scraper bowl (4).
4. Install router bit (5) on scraper bowl (4) with three bolts (8), washers (7), and nuts (6). Tighten nuts to 170-220 lb-ft (230-300 Nm).



390-1811

END OF WORK PACKAGE

REAR WHEEL BEARINGS AND SEAL REPLACEMENT 0029 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 0048 00)

Shop equipment, field automotive (Item 33, WP 0048 00)

Driver set (Item 8, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

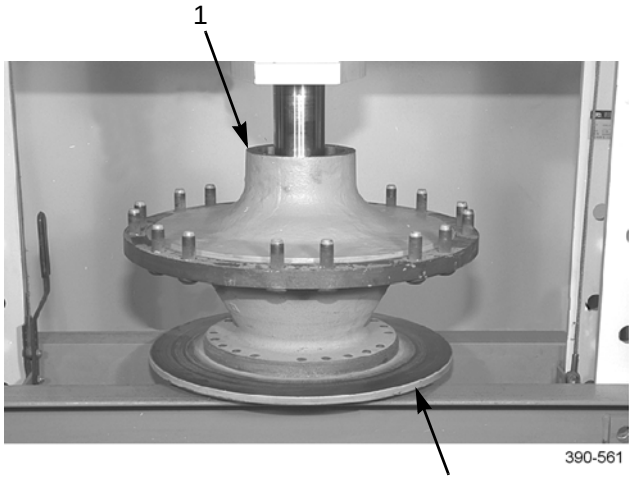
Seal, lip

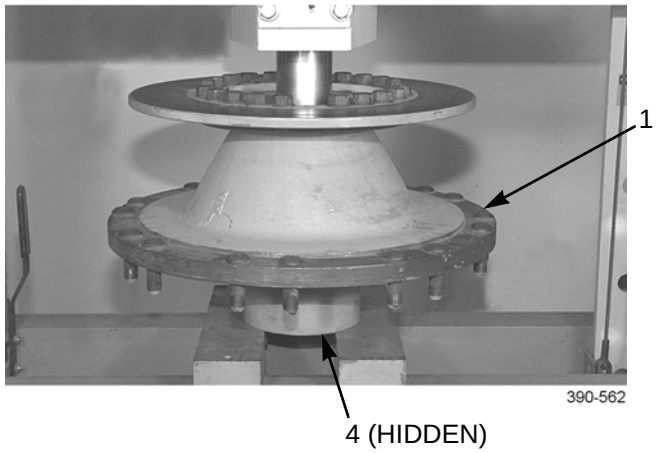
Equipment Condition

Rear hub and disc removed (WP 0009 00)

REMOVAL

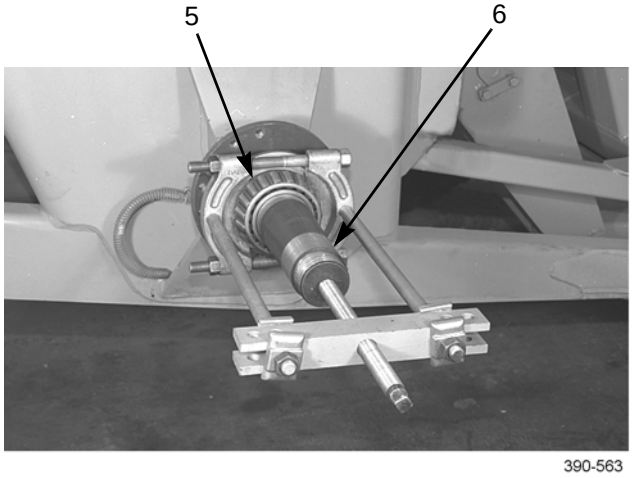
1. Place hub (1) in hydraulic press. Using driver and press, remove roller bearing cup (2) and tube (3) from wheel.
2. Using driver and press, remove roller bearing cup (4) from hub (1).

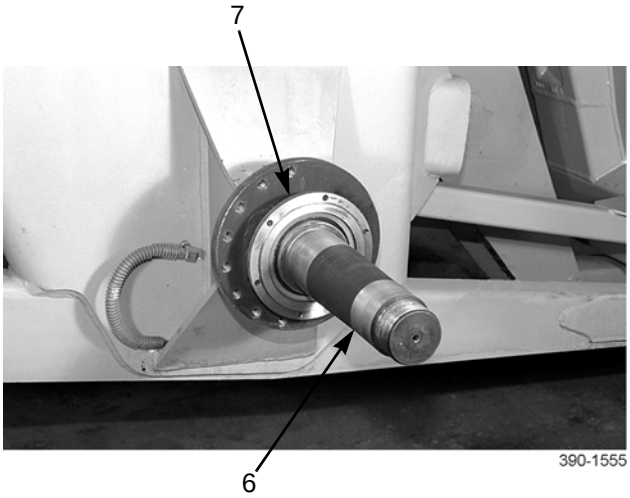




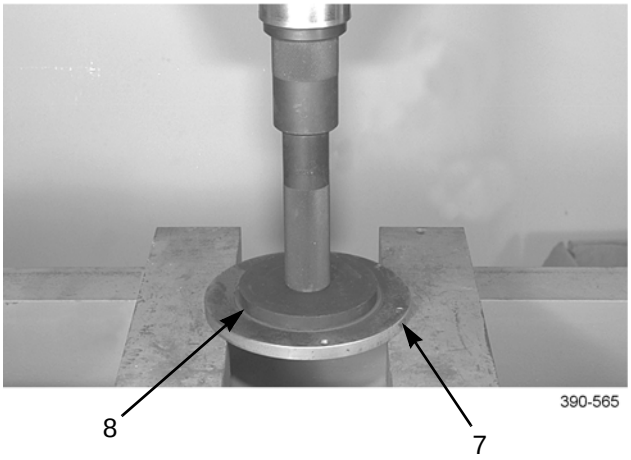
REMOVAL - CONTINUED

3. Using crossbar, remove roller bearing cone (5) from axle shaft (6).
4. Remove plate (7) from axle shaft (6).





5. Using driver and 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. Install plate (7) on axle shaft (6).

WARNING

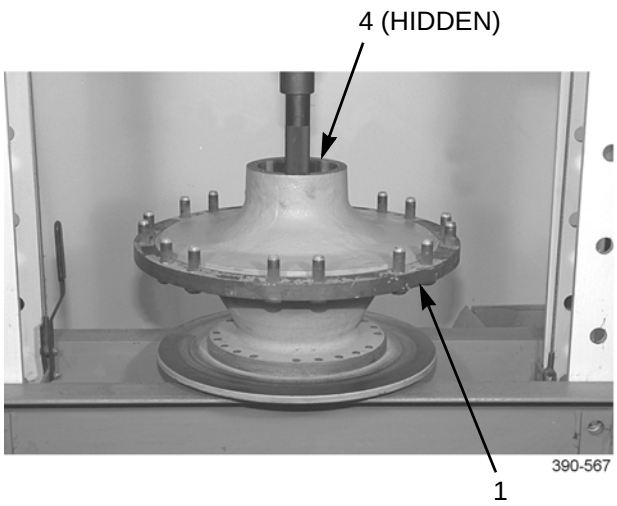
Hot oil and components can cause injury to personnel. Do not allow hot oil or components to contact skin.

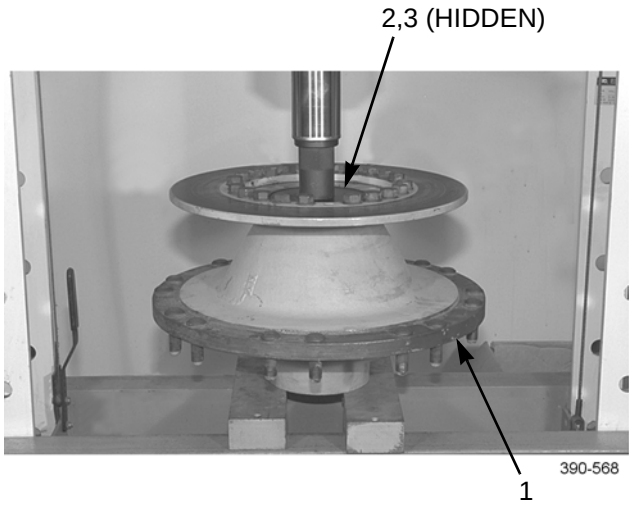
3. Heat roller bearing cone (5) to 275°F (135°C) and install roller bearing cone on axle shaft (6).

NOTE

Roller bearing cup should face top of wheel.

4. Using driver and press, install outer roller bearing cup (4) on hub (1).
5. Install tube (3) on hub (1).
6. Using driver and press, install inner roller bearing cup (2) on hub (1) until roller bearing cup is seated.
7. Apply GAA grease to roller bearings and axle shaft.
8. Install rear hub and disc (WP 0009 00).





END OF WORK PACKAGE

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FLOOR CHECK VALVE REPLACEMENT 0030 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 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Oil, lubricating (Item 24 or 29, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Materials/Parts - Continued

Tag, marker (Item 39, WP 0047 00)

O-ring (as required)

References

TM 5-3800-205-23-1

Equipment Condition

Toolbox and rear deck cover removed (WP 0017 00)

Quick disconnects at right side of draft arms disconnected (TM 5-3800-205-10-1)

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 is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

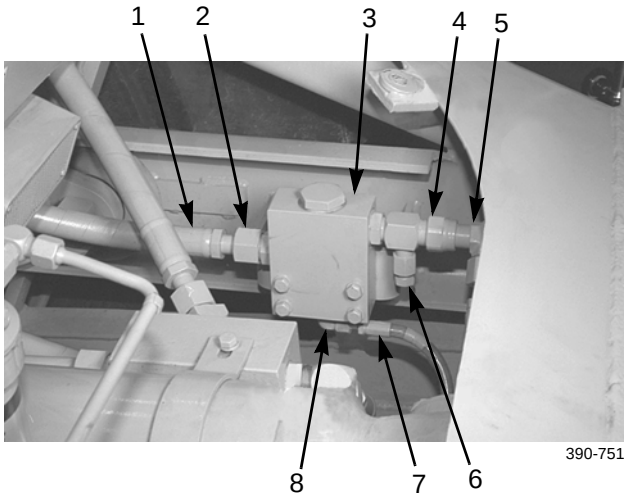
Cap all hoses to prevent fluid loss and contamination of oil system.

NOTE

- Tag all lines, hoses, wires, and tubes 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.

REMOVAL - CONTINUED

1. Loosen relief valve (10) and relieve pressure in hydraulic circuit.
2. Loosen retaining nut (4) and disconnect hose (5) from floor check valve (3). Install protective cap on hose.
3. Loosen retaining nut (2) and disconnect hose (1) from floor check valve (3). Install protective cap on hose.
4. Loosen retaining nut (8) and disconnect hose (7) from floor check valve (3). Install protective cap on hose.

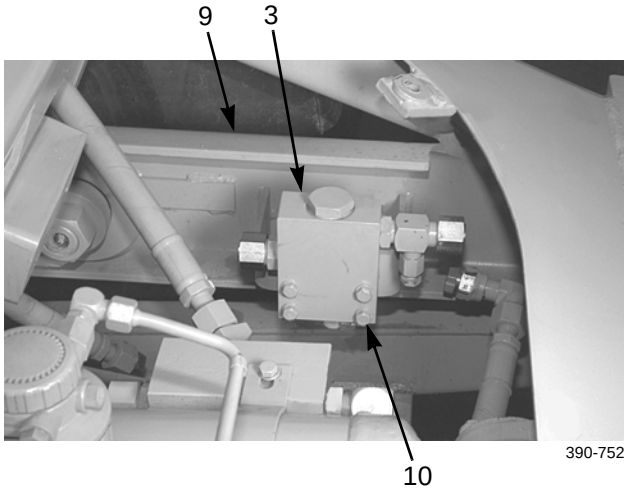


5. Remove four bolts (10) and floor check valve (3) from frame (9).

NOTE

Note position of fittings to aid in installation.

6. Remove fittings and O-rings from floor check valve (3). Discard O-rings.



INSTALLATION

1. Lubricate new o-rings with clean hydraulic oil and install o-rings and fittings on floor check valve (3) in same position as removed.
2. Install check valve (3) on frame (9) with four bolts (10).
3. Remove protective cap from hose (7). Position hose on floor check valve (3) and tighten retaining nut (8).
4. Remove protective cap from hose (1). Position hose on floor check valve (3) and tighten retaining nut (2).
5. Remove protective cap from hose (5). Position hose on floor check valve (3) and tighten retaining nut (4).
6. Connect quick disconnects at right side of draft arms (TM 5-3800-205-10-1).
7. Install toolbox and rear deck cover (WP 0017 00).
8. Check hydraulic oil level. Add hydraulic oil as required (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).

END OF WORK PACKAGE

EJECTOR CYLINDER REPLACEMENT 0031 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Grease, GAA (Item 16, WP 0047 00)

Rag, wiping (Item 31, WP 0047 00)

Materials/Parts - Continued

Tag, marker (Item 39, WP 0047 00)

O-ring (as required)

Personnel Required

Two

References

TM 5-3800-205-23-1

Equipment Condition

Toolbox and rear deck cover removed (WP 0017 00)

Quick disconnects at right side of draft arms disconnected (TM 5-3800-205-10-1)

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 is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- Hydraulic oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

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

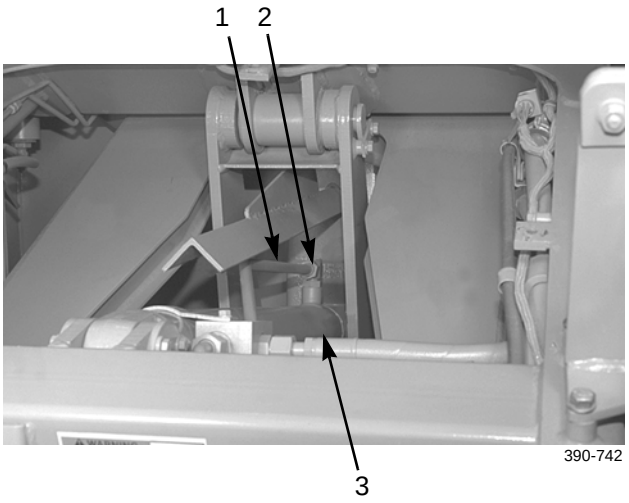
NOTE

- Tag all lines, hoses, wires, and tubes 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.

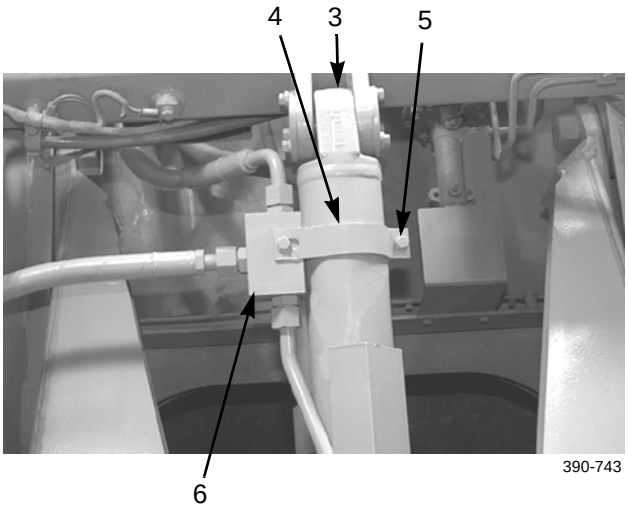
EJECTOR CYLINDER REPLACEMENT - CONTINUED 0031 00

REMOVAL - CONTINUED

1. Loosen retaining nut (2) and disconnect tube (1) from ejector cylinder (3). Install protective cap on tube.
2. Remove two bolts (5), bracket (4), and block (6) from ejector cylinder (3).

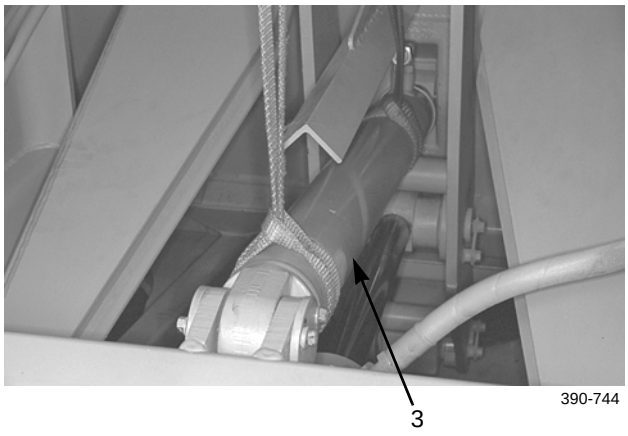


390-742

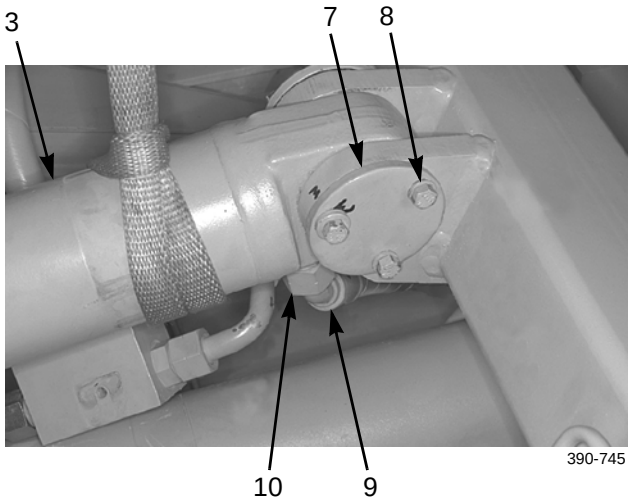


390-743

3. Attach a suitable lifting device to ejector cylinder (3).
4. Loosen retaining nut (10) and disconnect hose (9) from ejector cylinder (3). Install protective cap on hose.
5. Remove three bolts (8) and plate (7) from ejector cylinder (3). Repeat step for other side.



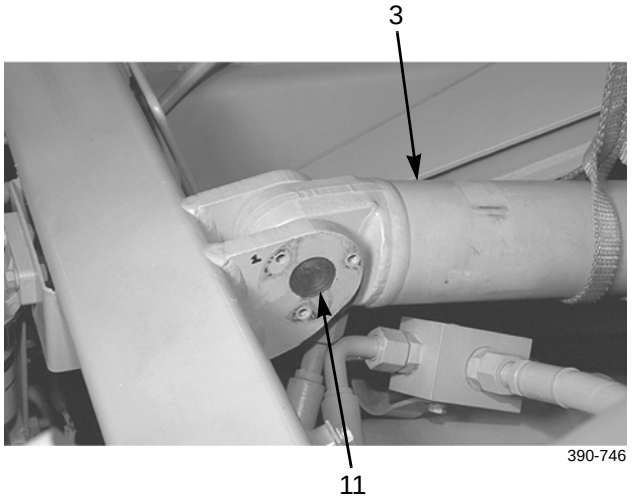
390-744

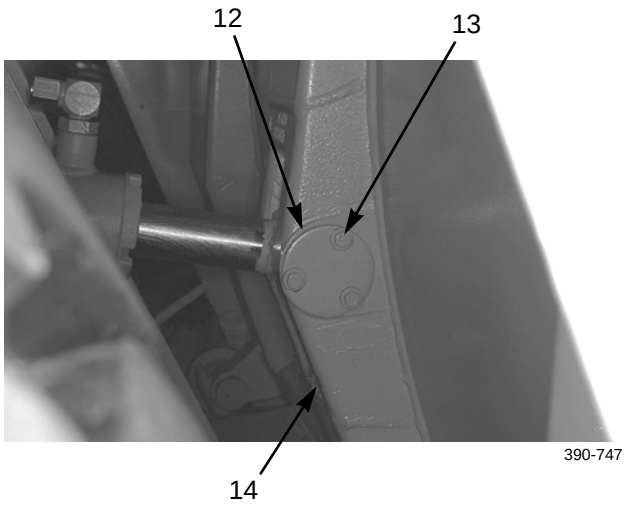


390-745

REMOVAL - CONTINUED

6. Using a hammer and brass rod, remove pin (11) from ejector cylinder (3).
7. Remove three bolts (13) and plate (12) from ejector (14). Repeat step for other side.





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

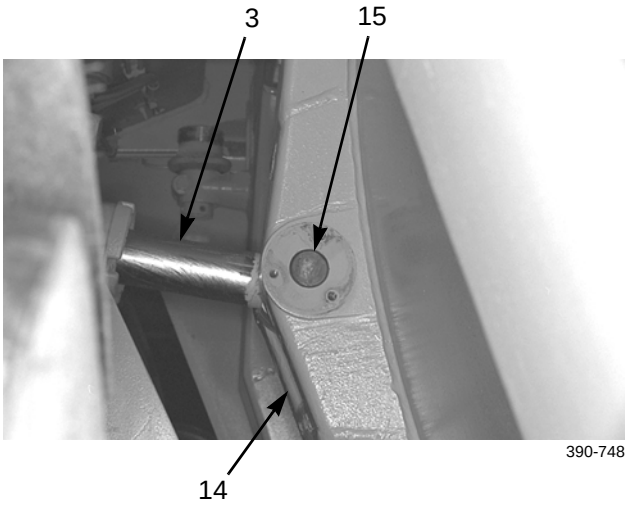
Ejector cylinder weighs 132 lb (60 kg).

8. Using a hammer and brass rod, remove pin (15) from ejector cylinder and ejector (3). Remove ejector cylinder from machine.

NOTE

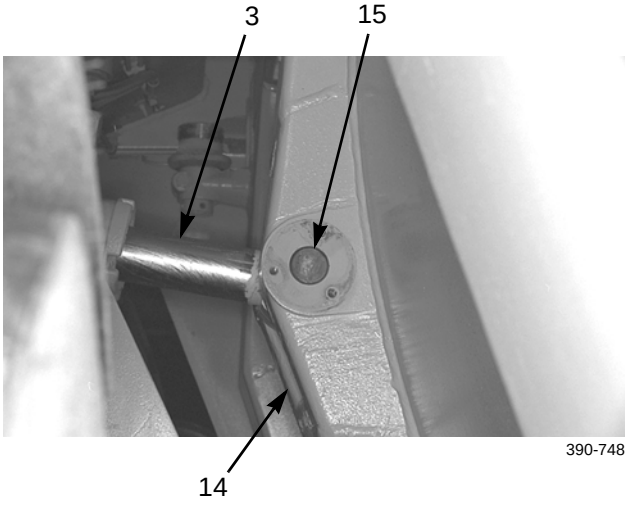
Note position of fittings to aid in installation.

9. Remove fittings and O-rings from ejector cylinder (3). Discard O-rings.

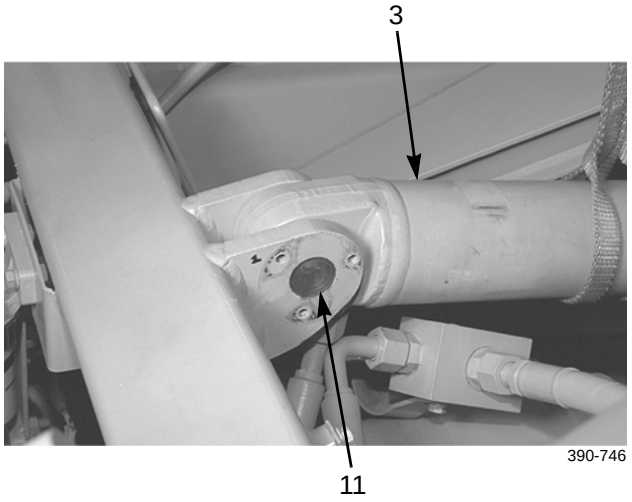


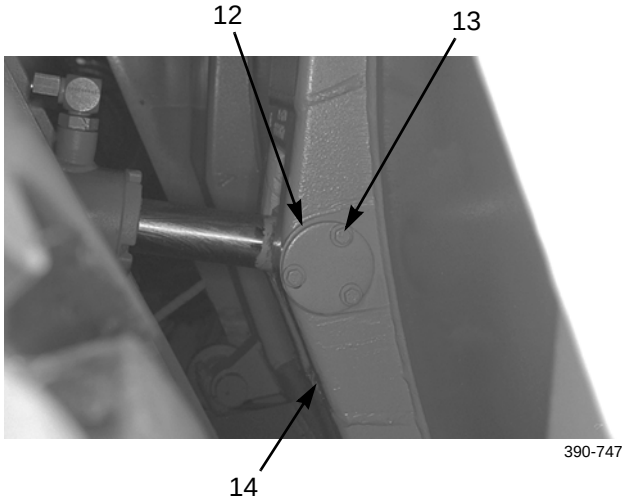
INSTALLATION

1. Lubricate new O-rings with clean hydraulic oil and install O-rings and fittings on ejector cylinder (3) in same position as removed.
2. Clean and lubricate pin (15). Position ejector cylinder (3) on machine and install pin using a soft faced hammer.



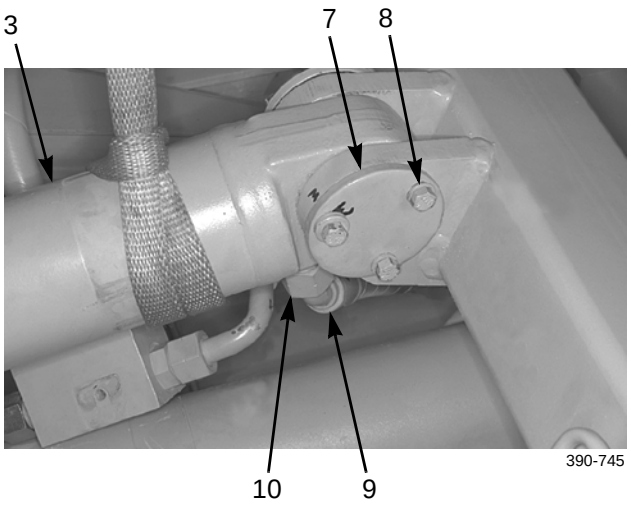
3. Install plate (12) on ejector (14) with three bolts (13).
4. Clean and lubricate pin (11). Using a soft faced hammer, install pin on ejector cylinder (3).

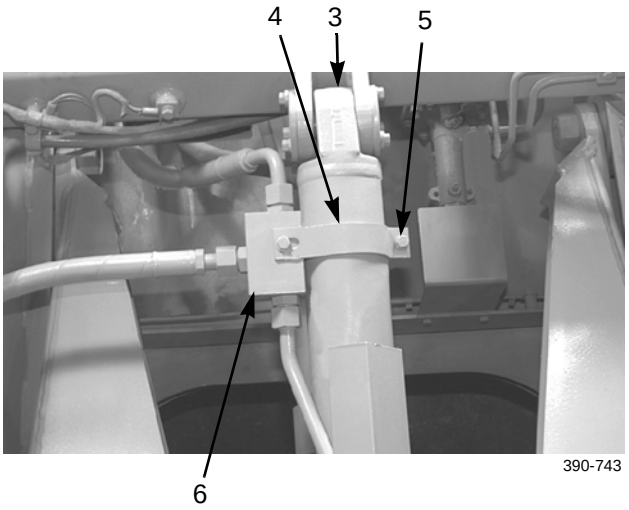




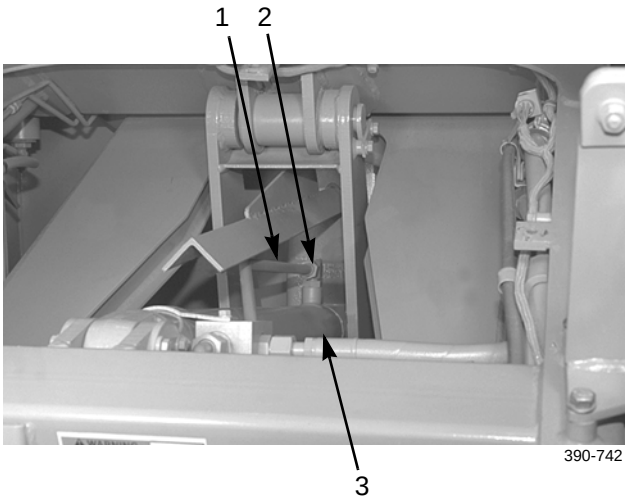
INSTALLATION - CONTINUED

5. Install plate (7) on ejector cylinder (3) with three bolts (8). Repeat the procedure for the other side.
6. Remove protective cap from hose (9). Position hose on ejector cylinder (3) and tighten retaining nut (10).
7. Install block (6) and bracket (4) on ejector cylinder (3) with two bolts (5).





8. Remove protective cap from tube (1). Position tube on ejector cylinder (3) and tighten retaining nut (2).



9. Connect quick disconnects at right side of draft arms (TM 5-3800-205-10-1).
10. Install toolbox and rear deck cover (WP 0017 00).
11. Check hydraulic oil level and add hydraulic oil as required (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).

END OF WORK PACKAGE

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FLOOR CYLINDER REPLACEMENT 0032 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Personnel Required

Two

Materials/Parts

Cap set, protective (Item 5, WP 0047 00)

Oil, hydraulic (Item 24 or 29, WP 0047 00)

Materials/Parts - Continued

Rag, wiping (Item 31, WP 0047 00)

Tag, marker (Item 39, WP 0047 00)

O-rings

References

TM 5-3800-205-23-1

Equipment Condition

Toolbox and rear deck cover removed (WP 0017 00)

Quick disconnects at right side of draft arm disconnected (TM 5-3800-205-10-1)

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 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

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

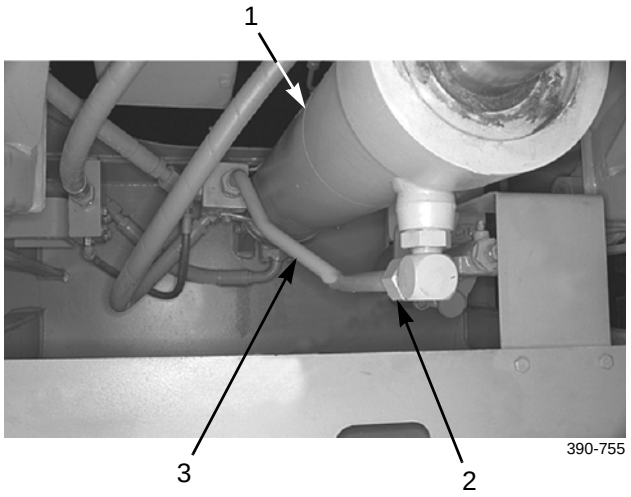
NOTE

- Tag all lines, hoses, wires, and tubes 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.

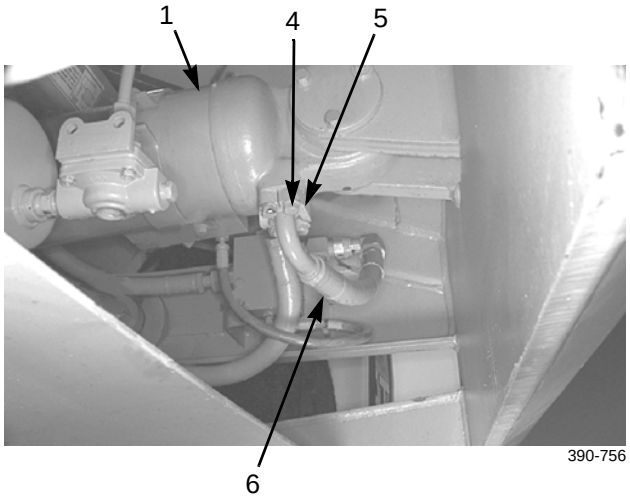
FLOOR CYLINDER REPLACEMENT - CONTINUED 0032 00

REMOVAL

1. Loosen retaining nut (2) and disconnect tube (3) from floor cylinder (1). Install protective cap on tube.
2. Remove four bolts (4), two half flanges (5), and hose (6) from floor cylinder (1). Install protective cap on hose.

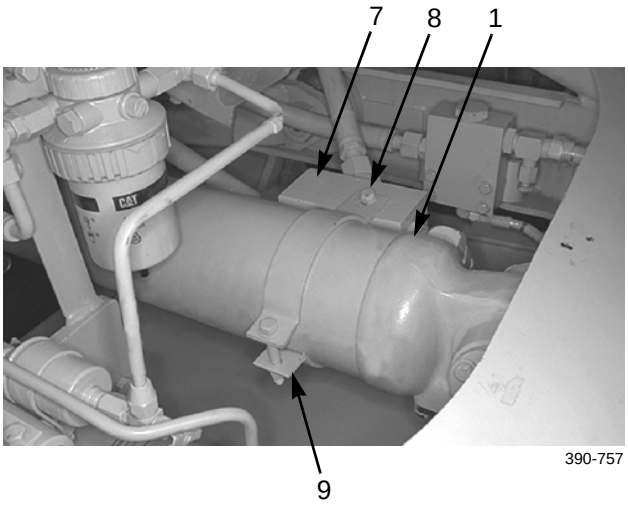


390-755

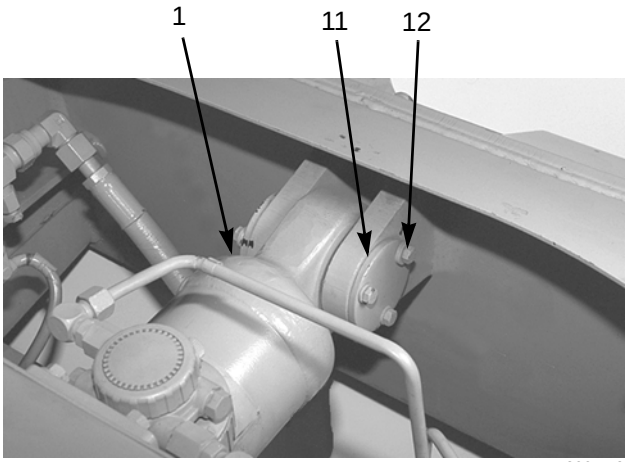


390-756

3. Remove two bolts (8), bracket (9) and block (7) from floor cylinder (1).
4. Attach suitable lifting device to floor cylinder (1) and remove three bolts (12) and plate (11) from floor cylinder. Repeat step for other side.



390-757



390-758

REMOVAL - CONTINUED

5. Using a hammer and brass rod, remove pin (13) from floor cylinder (1).

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

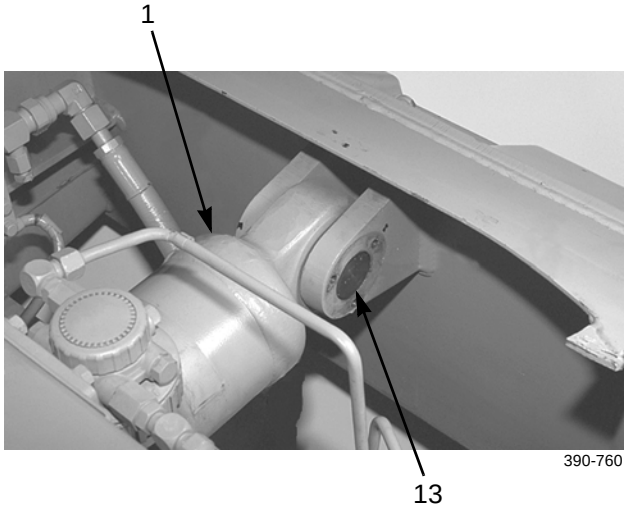
Floor cylinder weighs 121 lb (55 kg).

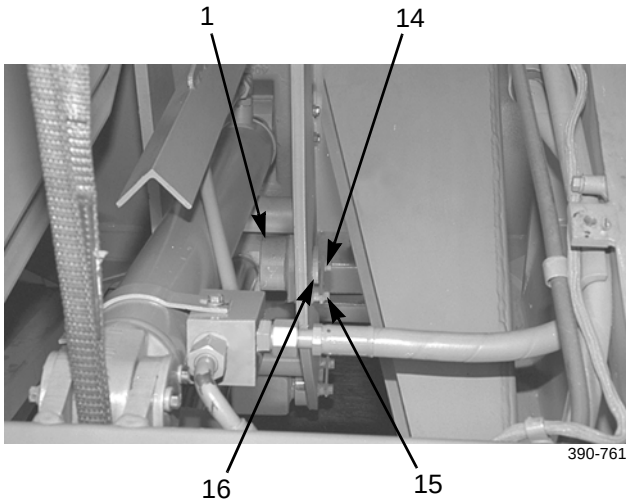
6. Remove two bolts (14) and bar (15) from floor cylinder (1).
7. Using a hammer and brass rod, remove pin (16) from floor cylinder (1).
8. Remove floor cylinder (1) from machine.

NOTE

Note position of fittings to aid in installation.

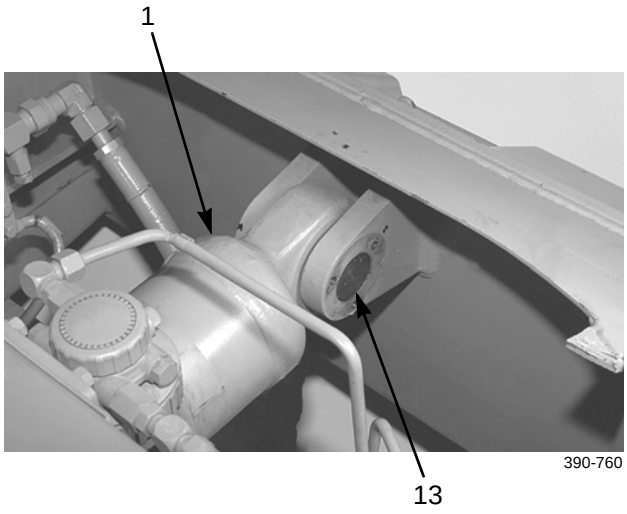
9. Remove fittings and O-rings from floor cylinder (1). Discard O-rings.

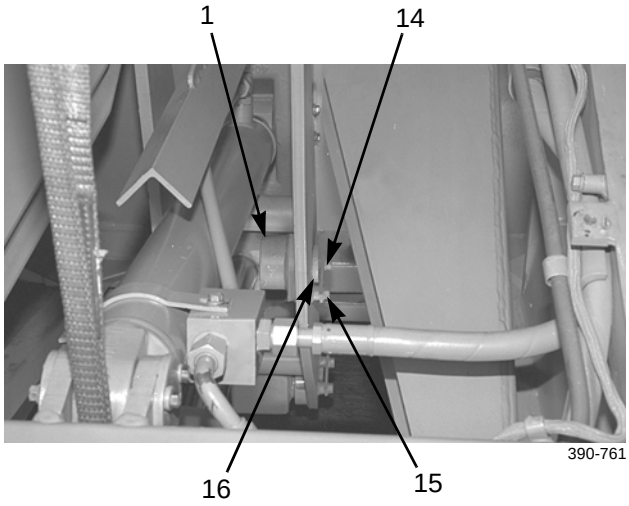




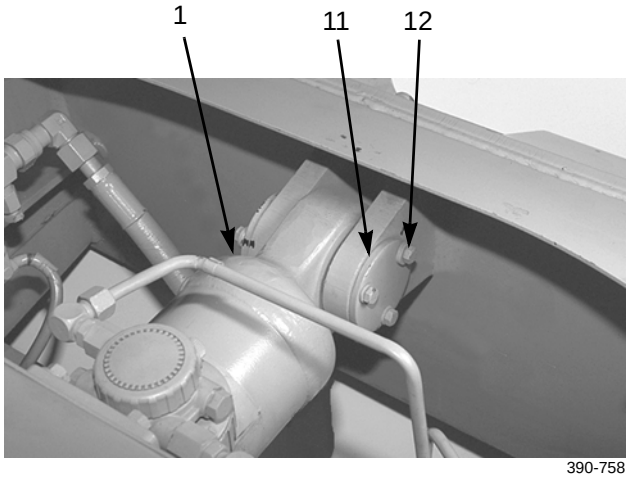
INSTALLATION

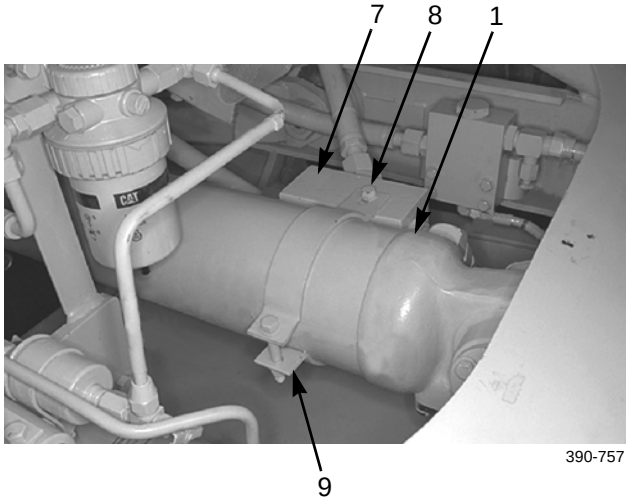
1. Lubricate new O-rings with clean hydraulic oil and install O-rings and fittings on floor cylinder (1) in same position as removed.
2. Clean pin (16) and, using soft-faced hammer, install pin (19) on floor cylinder (1).
3. Install bar (18) on floor cylinder (1) with two bolts (17).
4. Clean pin (13) and, using soft-faced hammer, install pin on floor cylinder (1).





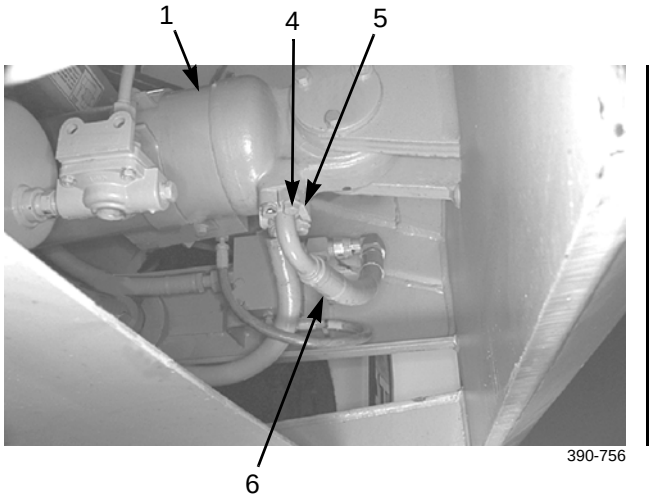
5. Install plate (11) on floor cylinder (1) with three bolts (12). Repeat step for other side.
6. Install block (7) on floor cylinder (1) with bracket (9) and two bolts (8).

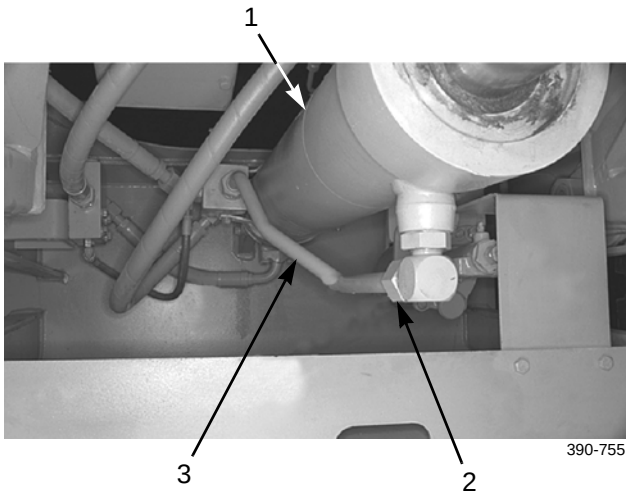




INSTALLATION - CONTINUED

7. Remove protective cap from hose (6). Position hose on floor cylinder (1) and install two half flanges (5) with four bolts (4).
8. Remove protective cap from tube (3). Position tube on floor cylinder (1) and tighten retaining nut (2).





9. Connect quick disconnects at right side of draft arms (TM 5-3800-205-10-1).
10. Install toolbox and rear deck cover (WP 0017 00).
11. Check hydraulic oil level and add oil as required (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).

END OF WORK PACKAGE

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ELEVATOR ASSEMBLY REPLACEMENT 0033 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Bracket, link (2) (Item 5, WP 0048 00)

Personnel Required

Two

References

TM 5-3800-205-23-1

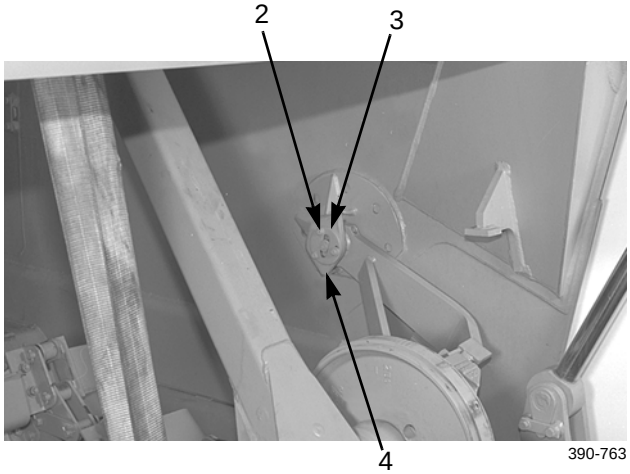
Equipment Condition

Elevator drive removed (WP 0036 00)

REMOVAL

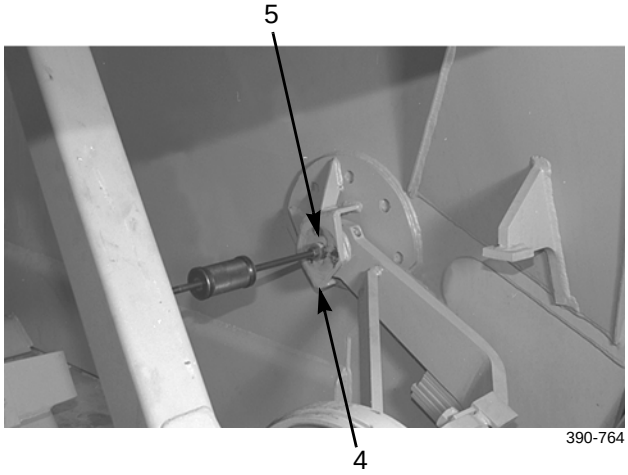
1. Attach two link brackets and suitable lifting device to elevator (1).
2. Remove three bolts (2) and plate (3) from bracket (4). Repeat step for other side.

390-762



390-763

3. Using slide hammer, remove pin (5) from bracket (4). Repeat step for other side.



390-764

REMOVAL - CONTINUED

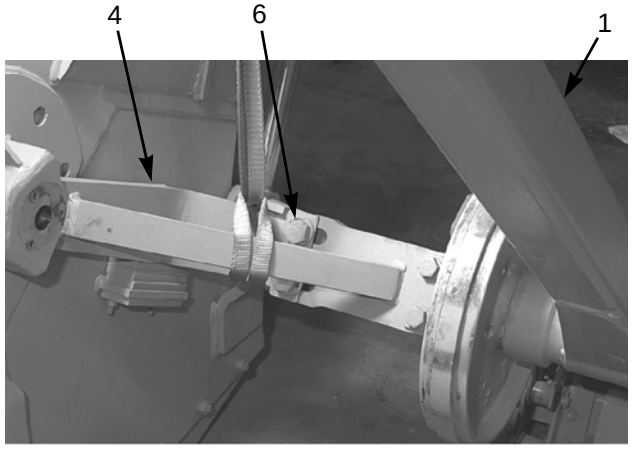
WARNING

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

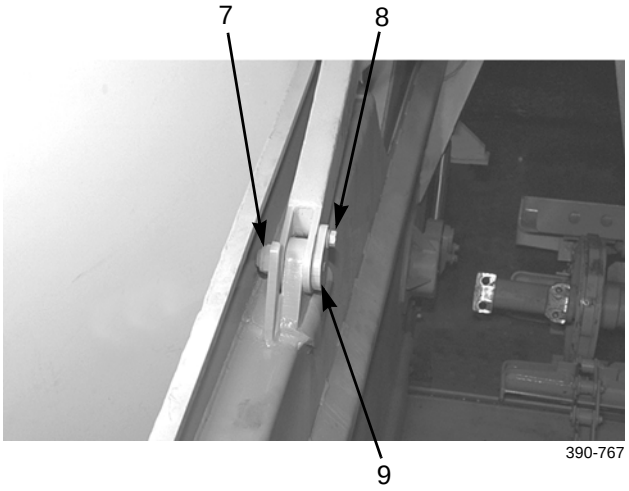
NOTE

Bracket weighs 55 lb (25 kg).

4. Attach a nylon strap and suitable lifting device to bracket (4).
5. Remove four bolts (6) and bracket (4) from elevator (1).
6. Remove bracket (4) from scraper bowl.
7. Remove nut (7) and bolt (8) from pin (9). Repeat step for other side.

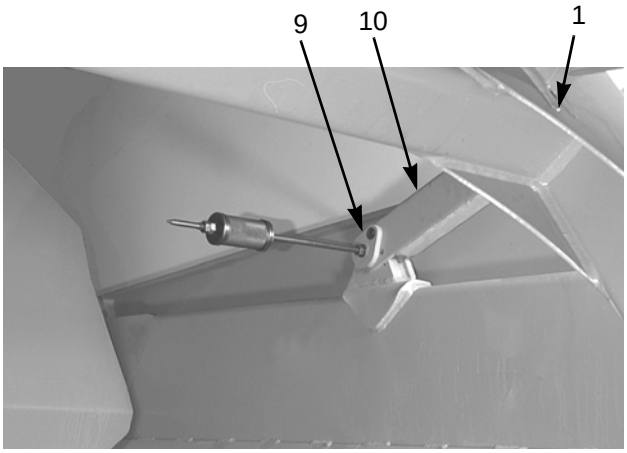


390-765



390-767

8. Using slide hammer, remove pin (9) and hanger (10) from scraper bowl. Repeat step for other side.
9. Remove hanger (10) from elevator (1). Repeat step for other side.



390-768

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

Elevator weighs 1050 lb (475 kg).

10. Remove elevator (1) from scraper bowl.

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

Elevator weighs 1050 lb (475 kg).

1. Position elevator (1) on scraper bowl and install hanger (10). Repeat step for other side.
2. Clean and lubricate pin (9). Position hanger (10) on scraper bowl and install pin using a soft-faced hammer. Install bolt (8) and nut (7) in pin. Repeat step for other side.

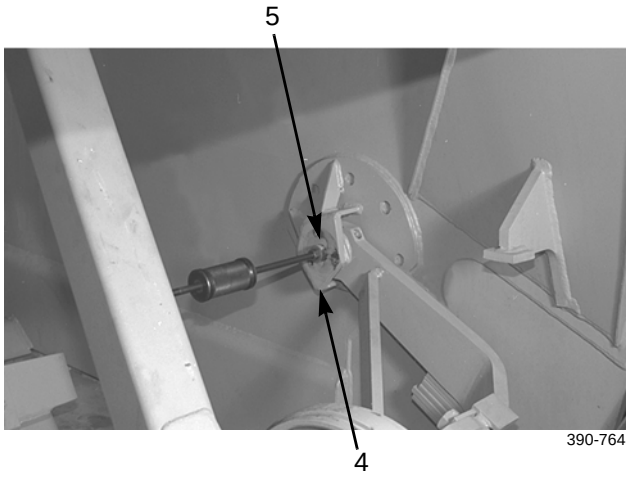
NOTE

Bracket weighs 55 lb (25 kg).

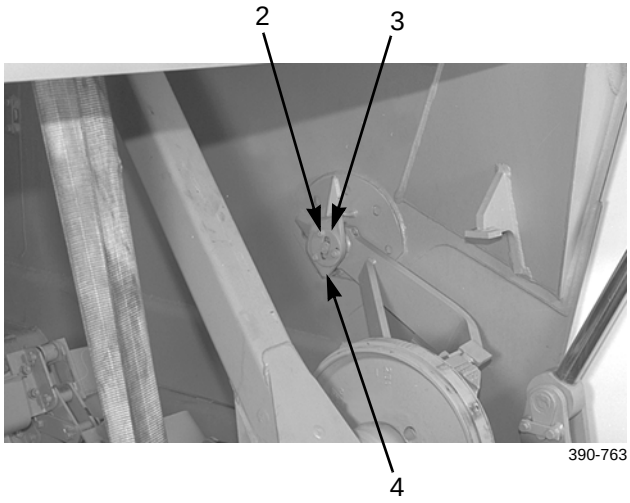
3. Install bracket (4) on scraper bowl with four bolts (6). Remove lifting device and nylon strap from bracket. Repeat step for other side.

INSTALLATION - CONTINUED

4. Clean and lubricate pin (5).
5. Using a soft-faced hammer, install pin (5) on bracket (4).



6. Install plate (3) on bracket (4) with three bolts (2). Repeat step for other side.



7. Lubricate elevator (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).
8. Install elevator drive (WP 0036 00).

END OF WORK PACKAGE

ELEVATOR CHAIN IDLER REPAIR 0034 00

THIS WORK PACKAGE COVERS

Disassembly, Cleaning and Inspection, Assembly

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Driver set (Item 7, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

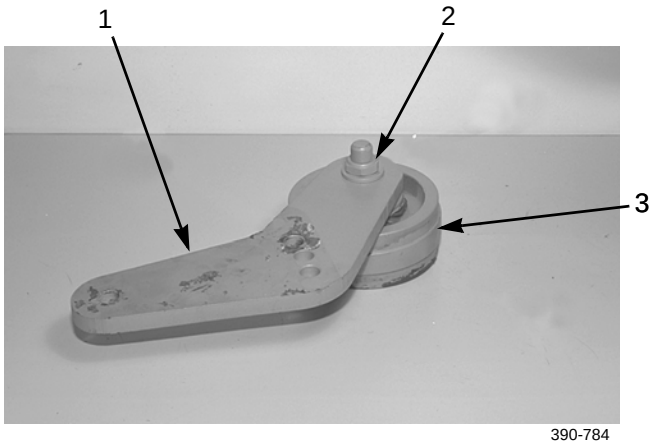
Seal, lip

Equipment Condition

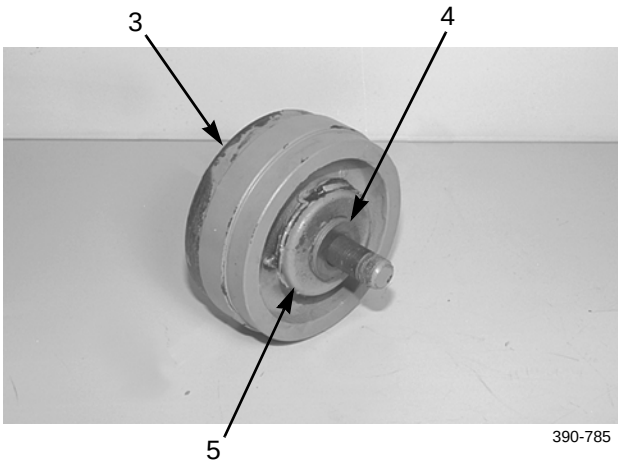
Elevator chain idler removed (WP 0026 00)

DISASSEMBLY

1. Remove nut (2) and bracket (1) from roller (3).
2. Remove four shims (4) and shield (5) from roller (3).

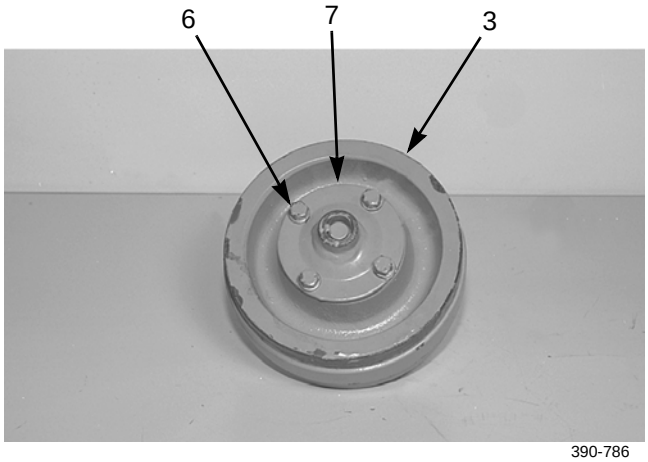


390-784



390-785

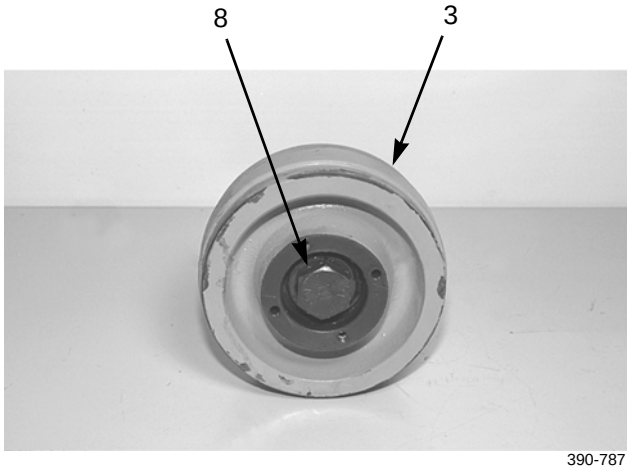
3. Remove four bolts (6) and cap (7) from roller (3).



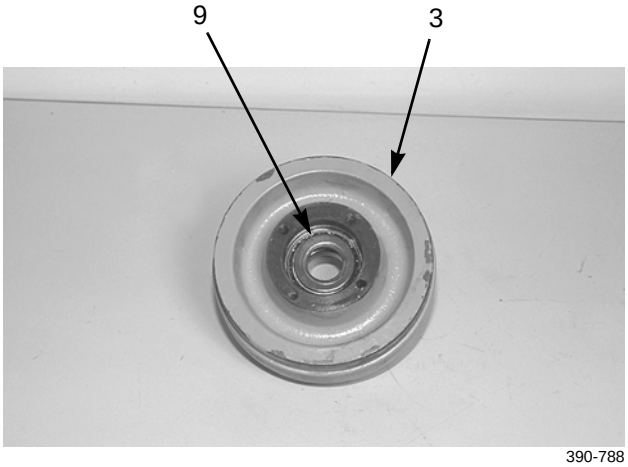
390-786

DISASSEMBLY - CONTINUED

4. Remove bolt (8) from roller (3).
5. Remove washer (9) from roller (3).

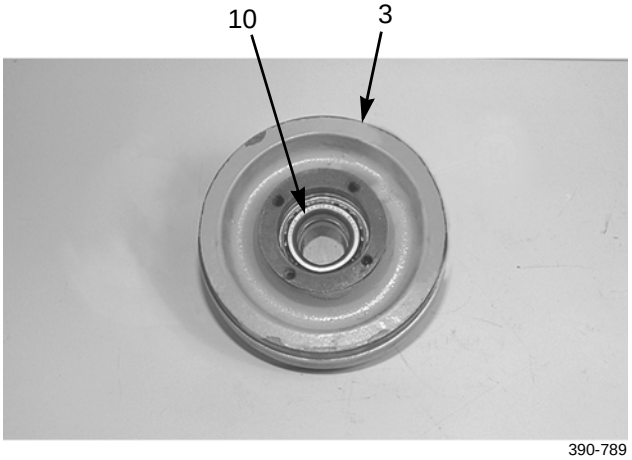


390-787

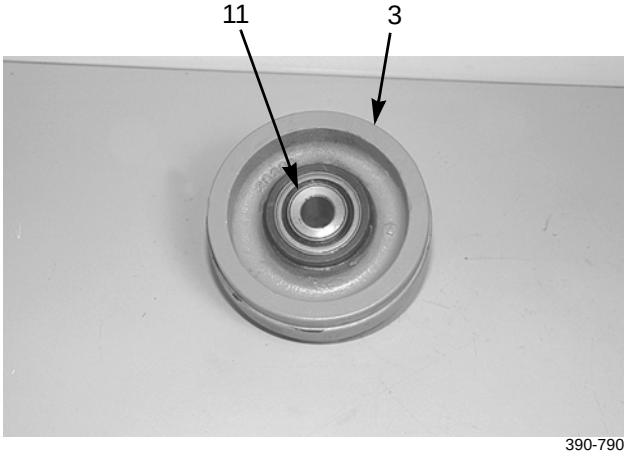


390-788

6. Remove roller bearing (10) from roller (3).
7. Remove spacer (11) from roller (3).

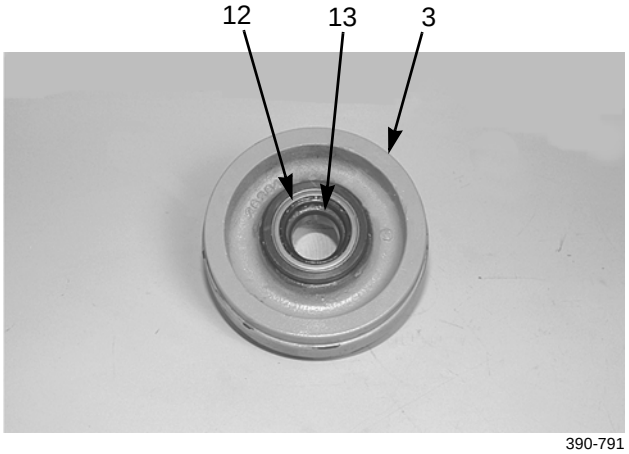


390-789



390-790

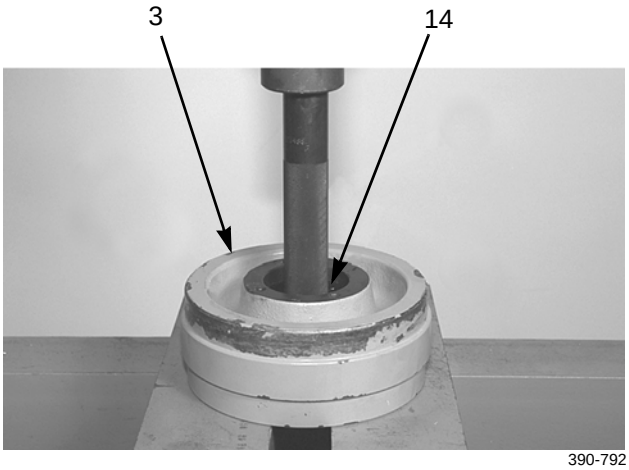
8. Remove lip seal (12) and roller bearing (13) from roller (3).



390-791

DISASSEMBLY - CONTINUED

9. Using driver and press, remove bearing race (14) from roller (3). Repeat step for other bearing race.



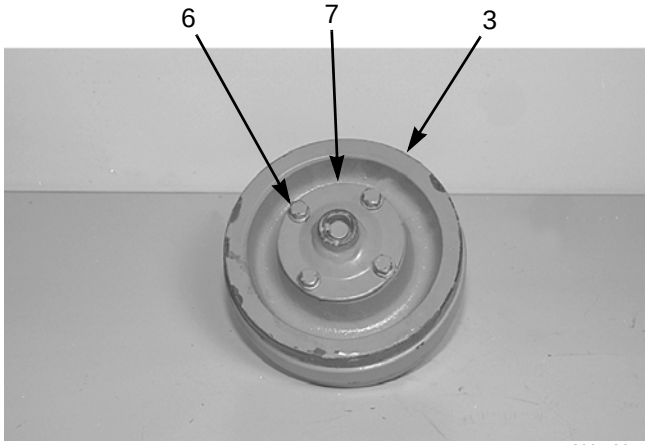
390-792

CLEANING AND INSPECTION

Clean all parts and inspect for wear and damage. Replace worn or damaged parts.

ASSEMBLY

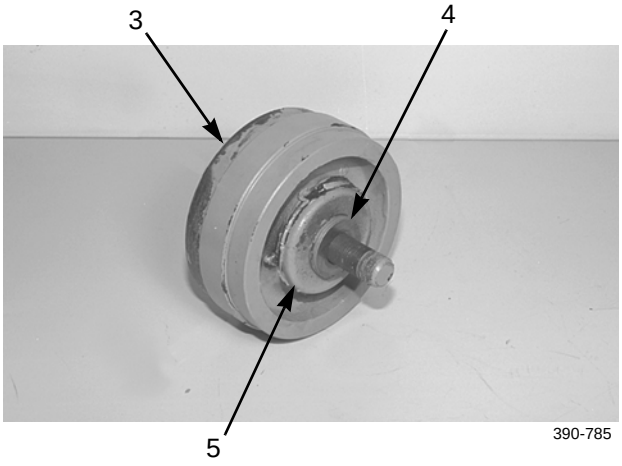
1. Using driver and press, install bearing race (14) in roller (3) until bearing race is seated in roller. Repeat step for other bearing race.
2. Apply GAA grease to roller bearing (13) and install roller bearing in roller (3).
3. Using driver, install new lip seal (12) in roller (3).
4. Install spacer (11) on roller (3).
5. Apply GAA grease to roller bearing (10) and install roller bearing on roller (3).
6. Install washer (9) on roller (3).
7. Install bolt (8) on roller (3).
8. Install cap (7) on roller (3) with four bolts (6).



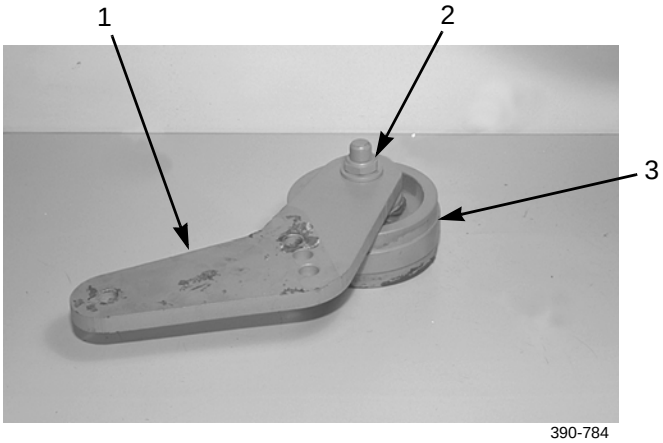
390-786

DISASSEMBLY - CONTINUED

9. Install shield (5) and four shims (4) on roller (3).
10. Install bracket (2) on roller (3) with nut (1). Lubricate grease fitting on other side of roller with GAA grease.



390-785



390-784

11. Install elevator chain idler (WP 0026 00).

END OF WORK PACKAGE

ELEVATOR CHAIN ROLLER REPLACEMENT 0035 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Driver set (Item 7, WP 0048 00)

Materials/Parts

Seal, lip

Personnel Required

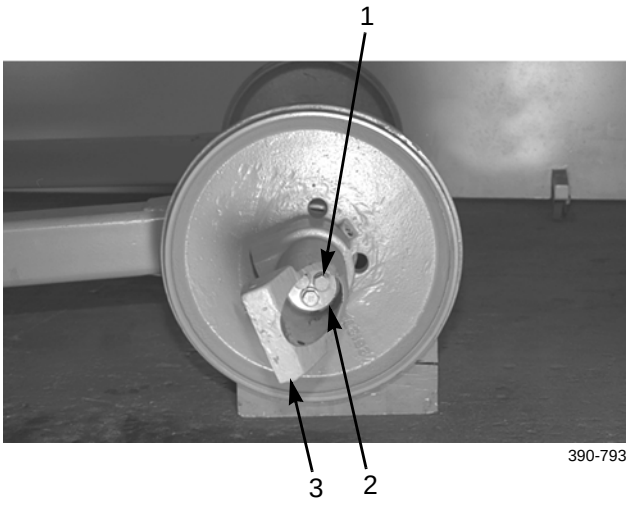
Two

Equipment Condition

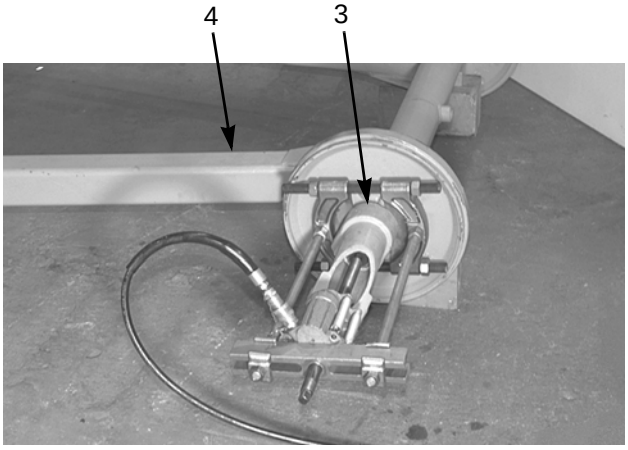
Elevator assembly removed (WP 0033 00)

REMOVAL

1. Remove three bolts (1) and plate (2) from hub (3).
2. Install hydraulic puller on elevator (4) and remove hub (3) from elevator.



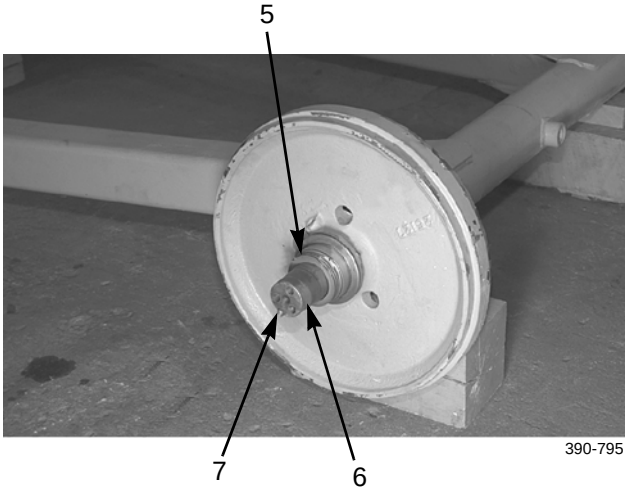
390-793



390-794

REMOVAL - CONTINUED

3. Remove key (7) and shims (5) from shaft (6).



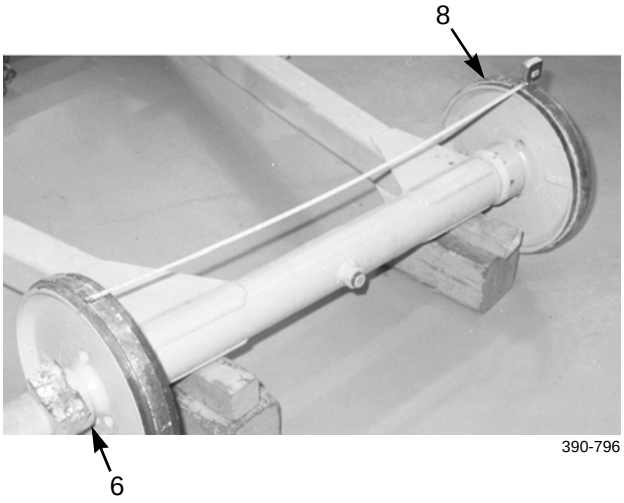
WARNING

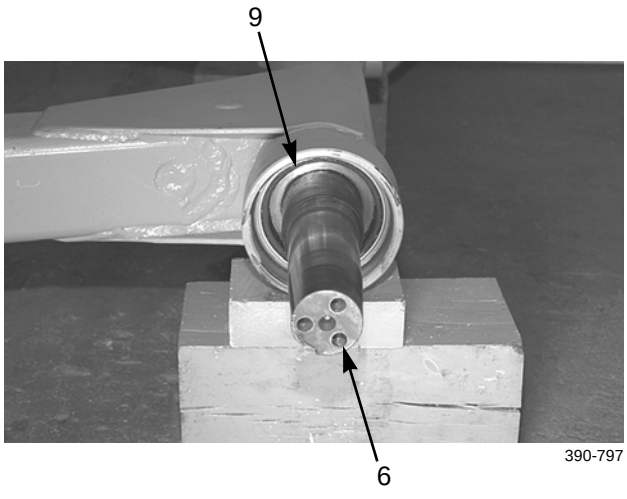
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

NOTE

Roller weighs 75 lb (34 kg).

4. With assistance, remove roller (8) from shaft (6).
5. Remove shims (9) from shaft (6).





REMOVAL - CONTINUED

6. Remove plug (10) from elevator (4).

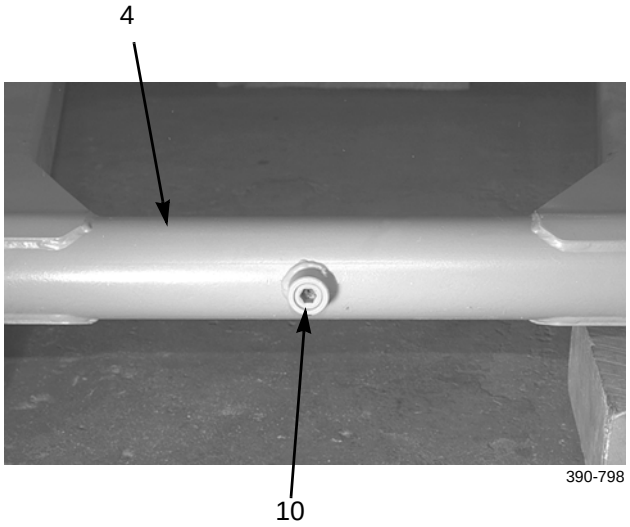
WARNING

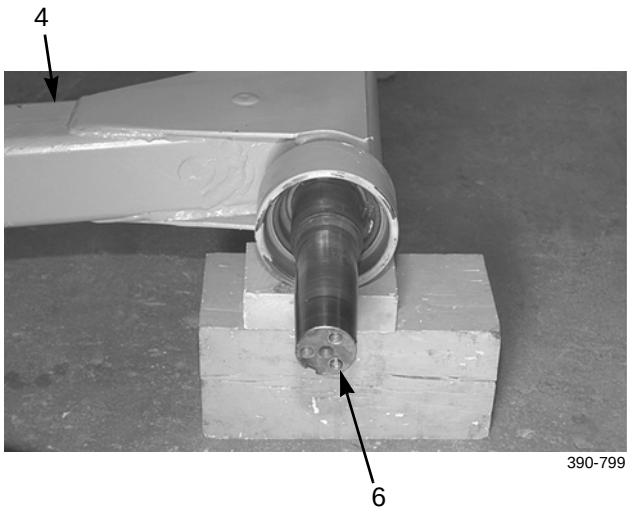
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

NOTE

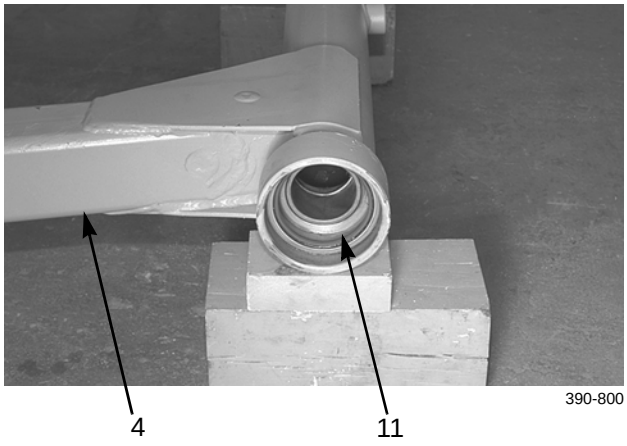
Shaft weighs 85 lb (39 kg).

7. With assistance, remove shaft (6) from elevator (4).





8. Remove and discard lip seal (11) from elevator (4).



INSTALLATION

NOTE

Lip seal must be installed with spring of lip seal toward roller.

1. Using a driver and hammer, install new lip seal (11) on elevator (4).

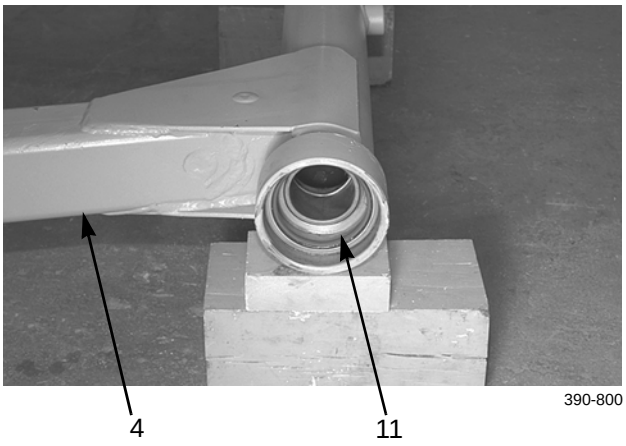
WARNING

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.

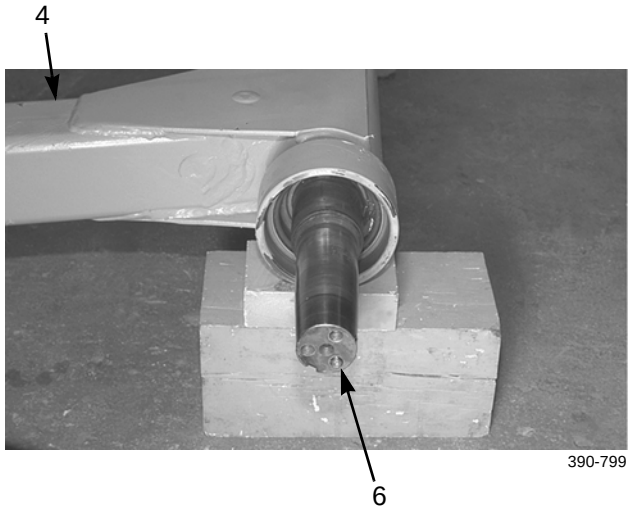
NOTE

Shaft weighs 85 lb (39 kg).

2. With assistance, install shaft (6) on elevator (4).



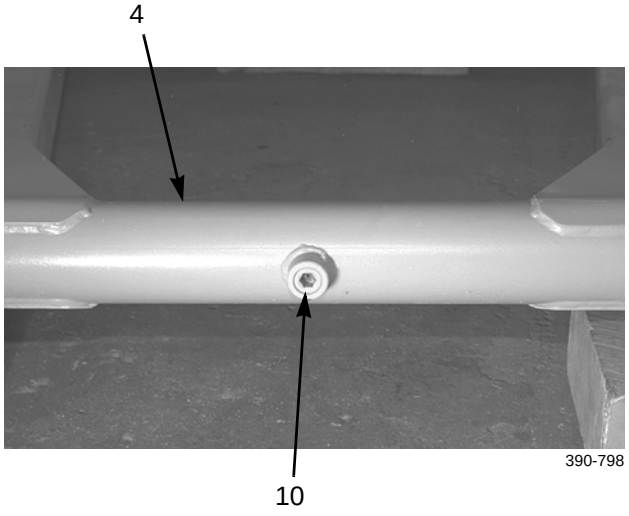
390-800

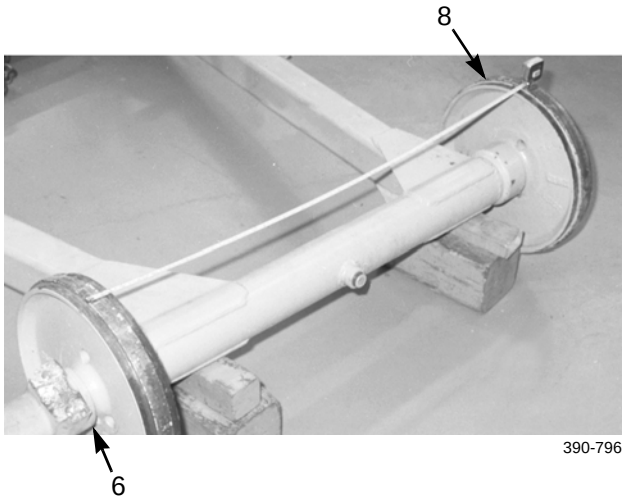


390-799

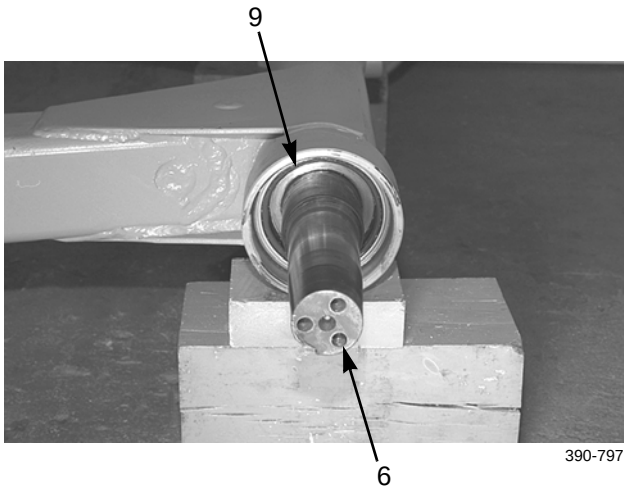
INSTALLATION - CONTINUED

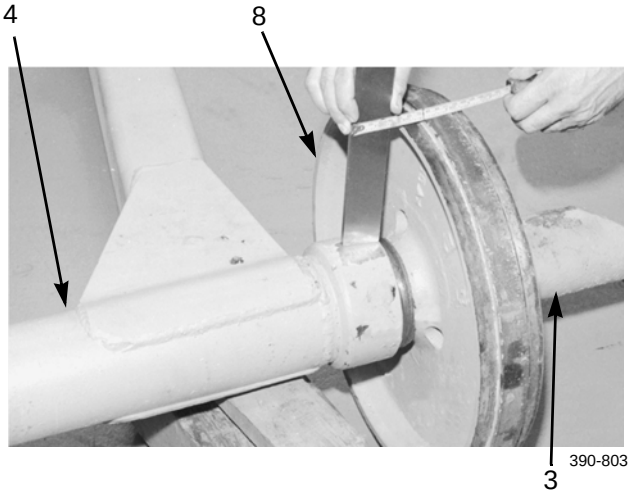
3. Install plug (10) on elevator (4). Do NOT tighten plug.
4. With assistance, install roller (8) on elevator. Push roller against elevator (4).
5. Determine correct number of shims (9) by subtracting distance between rollers from 47 in. (11.94 cm) measuring between center of each roller.
6. Install roller (8) on elevator (4). Tighten plug (10).





7. Install number of shims (9) required (determined in step 5) on shaft (6).
8. Install roller (8) and hub (3) on elevator (4).



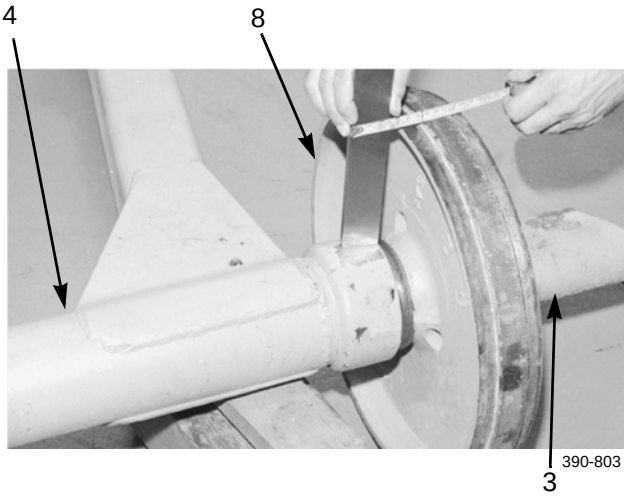


INSTALLATION - CONTINUED

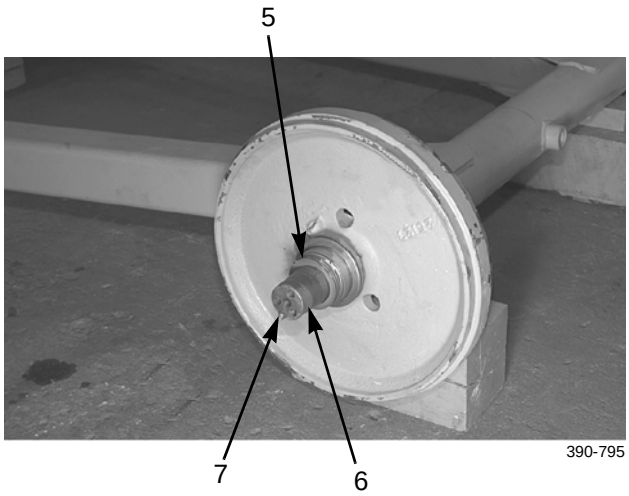
NOTE

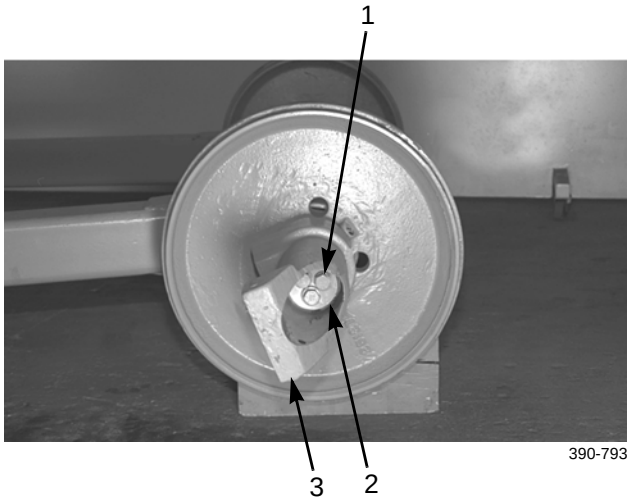
To determine correct amount of shims needed, subtract distance by 0.06 in. (1.5 mm).

9. Measure end play of roller (8):
   a. Push roller (8) against elevator (4).
   b. Place straight edge on elevator (4) and against roller (8).
   c. Push roller against hub (3) and measure distance.
   d. Subtract measurement from 0.06 in. (1.5 mm) to determine number of shims required.
10. Remove hub (3) from elevator (4).



11. Install number of shims (5) required (determined in step 9) on shaft (6).
12. Install key (7) on shaft (6).
13. Install hub (3) on elevator (4).
14. Install plate (2) on hub (3) with three bolts (1). Use a hammer and wood block to seat hub on roller and tighten bolts to 100 lb-ft (135 Nm).





15. Install elevator assembly (WP 0033 00).

END OF WORK PACKAGE

ELEVATOR DRIVE 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Bracket, link (Item 4, WP 0048 00)

Personnel Required

Two

Equipment Condition

Speed reducer drained (TM 5-3800-205-23-1)

Elevator flights and chains removed (WP 0023 00)

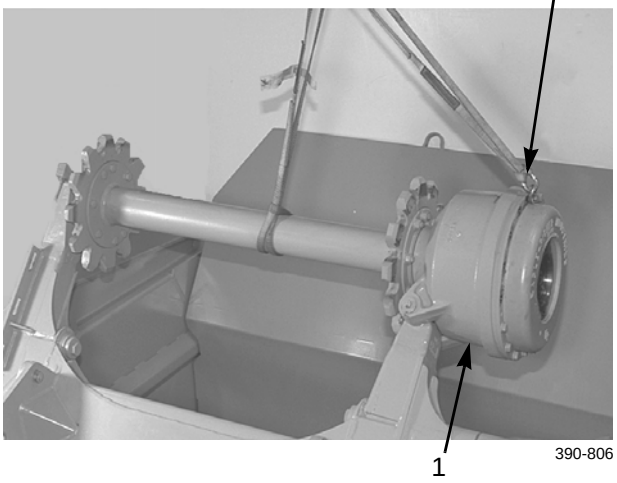
Elevator motor removed (WP 0019 00)

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. Attach link bracket, lifting strap, and suitable lifting device to elevator drive (1).



ELEVATOR DRIVE REPLACEMENT - CONTINUED 0036 00

REMOVAL - CONTINUED

1. Remove two bolts (2) and bracket (4) from elevator (3)
2. Remove bolt (5) and washer (6) from elevator drive (1).
3. Using a hammer and brass rod, remove pin (7) from elevator drive (1).

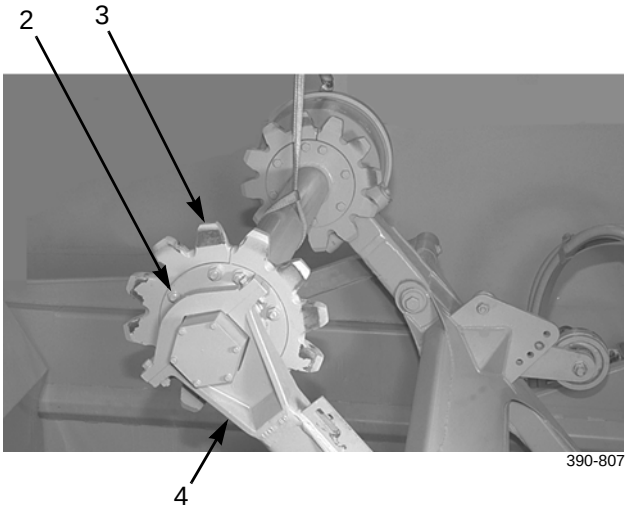
WARNING

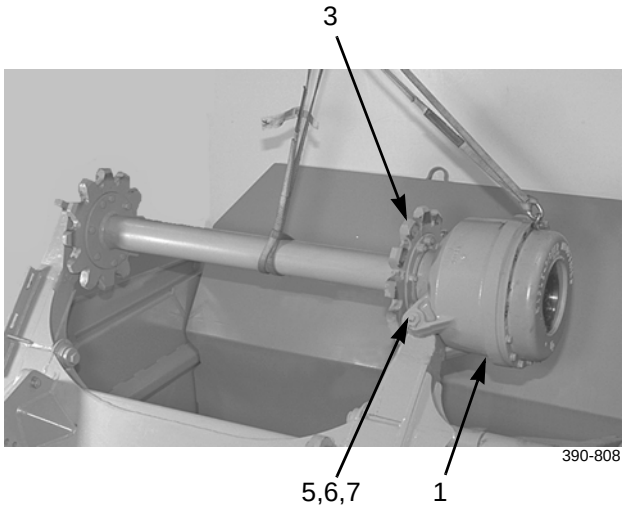
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

NOTE

Elevator drive weighs 750 lb (340 kg).

4. Carefully remove elevator drive (1) from elevator (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 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

Elevator drive weighs 750 lb (340 kg).

1. Position elevator drive (1) on elevator (3) and using soft-faced hammer, install pin (7).
2. Install washer (6) and bolt (5) on elevator drive (1).
3. Install bracket (4) on elevator (3) with two bolts (2).
4. Fill speed reducer (TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00).
5. Install elevator motor (WP 0019 00).
6. Install elevator flights and chains (WP 0023 00).

END OF WORK PACKAGE

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EJECTOR CARRIER ROLLER MAINTENANCE 0037 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Bearing, sleeve (Item 2, WP 0048 00)

Driver set (Item 7, WP 0048 00)

Guide, seal (Item 13, WP 0048 00)

Puller attachment, mechanical (Item 20, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

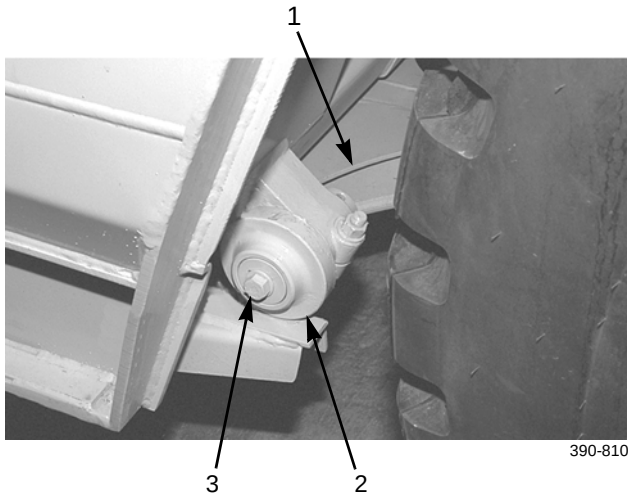
Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

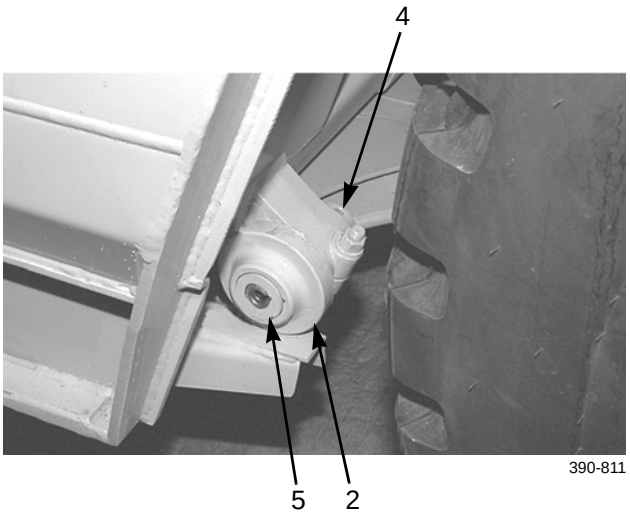
REMOVAL

1. Start engine and position ejector (1) to rear of scraper bowl. Stop engine (TM 5-3800-205-10-1).
2. Attach nylon sling and suitable lifting device to ejector (1). Lift ejector.
3. Remove bolt (3) from ejector carrier roller (2).

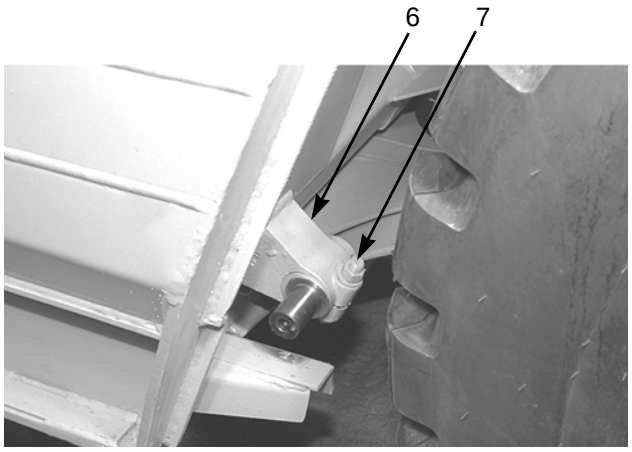


REMOVAL - CONTINUED

4. Remove washer (5) and ejector carrier roller (2) from roller shaft (4).
5. Remove bolt (7) from bracket (6).

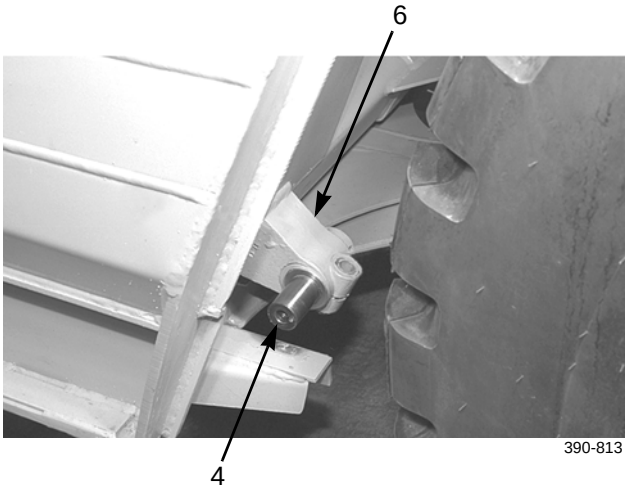


390-811



390-812

6. Remove roller shaft (4) from bracket (6).

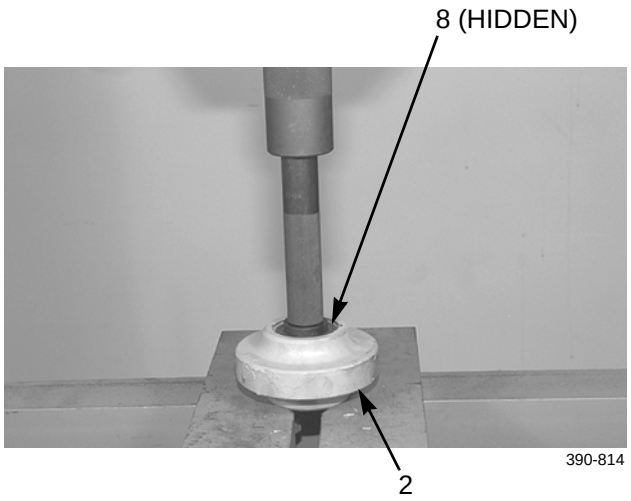


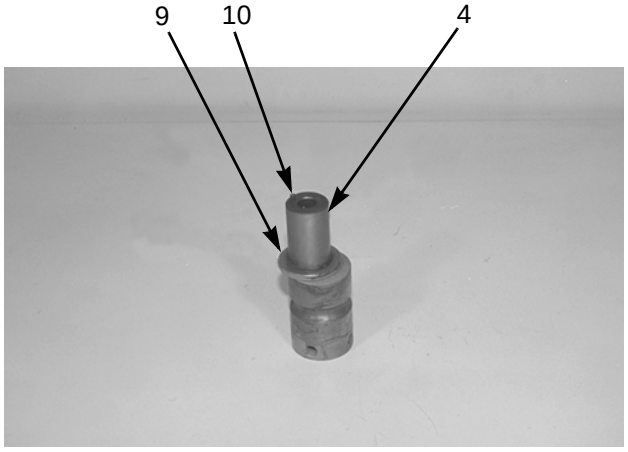
390-813

DISASSEMBLY

1. Using a driver and hydraulic press, remove bearing (8) from ejector carrier roller (2).
2. Remove washer (9) and key (10) from roller shaft (4).

DISASSEMBLY - CONTINUED





CLEANING AND INSPECTION

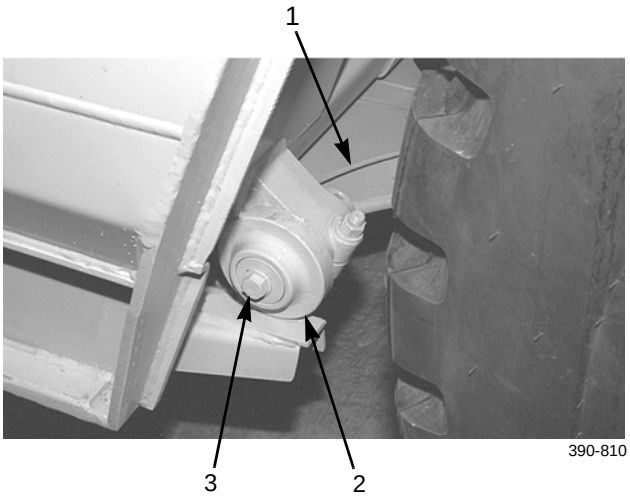
Clean and inspect all parts. Replace worn or damaged parts.

ASSEMBLY

1. Install key (10) and washer (9) on roller shaft (4).
2. Using a driver and hydraulic press, install bearing (8) in ejector carrier roller (2) until bearing is seated.

INSTALLATION

1. Position roller shaft (4) on bracket (6).
2. Install bolt (7) on bracket (6). Do not tighten bolt (5).
3. Apply GAA grease to ejector carrier roller (2) and install roller and washer (5) on roller shaft (4).
4. Install bolt (3) on roller (2).
5. Adjust ejector carrier roller (Refer to *Adjustment*).

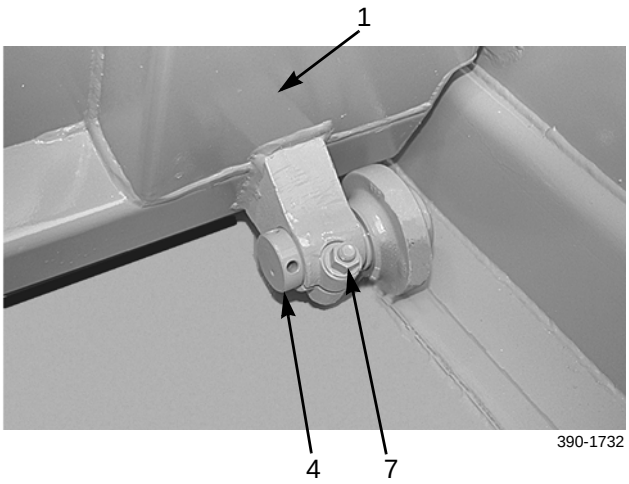


ADJUSTMENT

NOTE

Ejector carrier rollers are correctly adjusted if ejector does not contact bottom of scraper bowl.

1. Loosen bolt (7).
2. Move roller shaft (4) to a position that allow ejector to pass over bottom of scraper bowl.
3. Tighten bolt (7).
4. Repeat steps 1 through 3 for other ejector roller.
5. Start engine (TM 5-3800-205-10-1).
6. Move ejector (1) forward and backward (TM 5-3800-205-10-1). Check for drag between ejector (1) and bottom of scraper bowl.
7. Stop engine (TM 5-3800-205-10-1).
8. Repeat procedure if additional adjustment is necessary.



END OF WORK PACKAGE

EJECTOR GUIDE ROLLER MAINTENANCE 0038 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Bearing, sleeve (Item 2, WP 0048 00)

Driver set (Item 7, WP 0048 00)

Guide, seal (Item 13, WP 0048 00)

Puller attachment, mechanical (Item 20, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Seal, lip

Personnel Required

Two

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

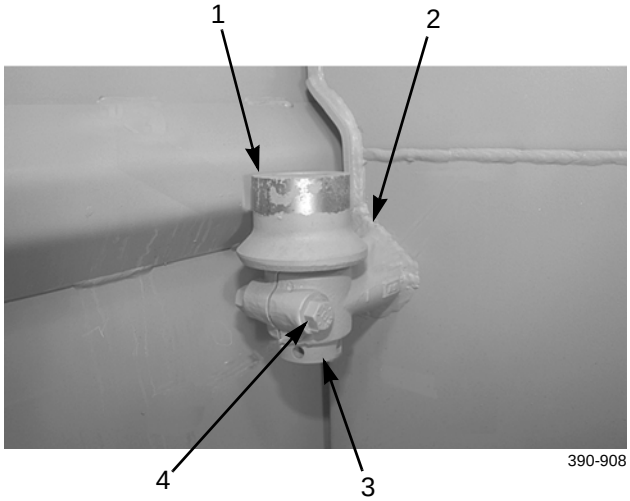
Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

REMOVAL

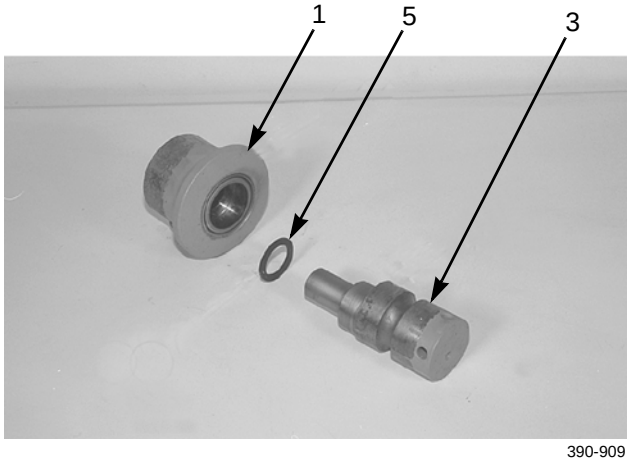
1. Start engine and position ejector to front of scraper bowl. Stop engine (TM 5-3800-205-10-1).
2. Remove bolt (4), ejector guide roller (1), and roller shaft (3) from bracket (2).



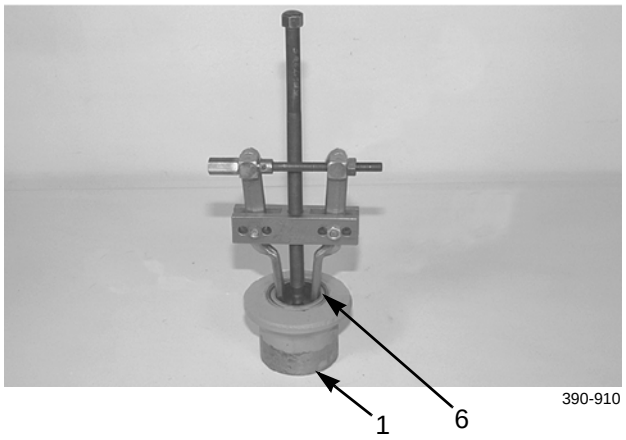
EJECTOR GUIDE ROLLER MAINTENANCE - CONTINUED 0038 00

DISASSEMBLY

1. Remove ejector guide roller (1) and washer (5) from roller shaft (3).
2. Using bearing cup remover, remove lip seal (6) from ejector guide roller (1). Discard lip seal.

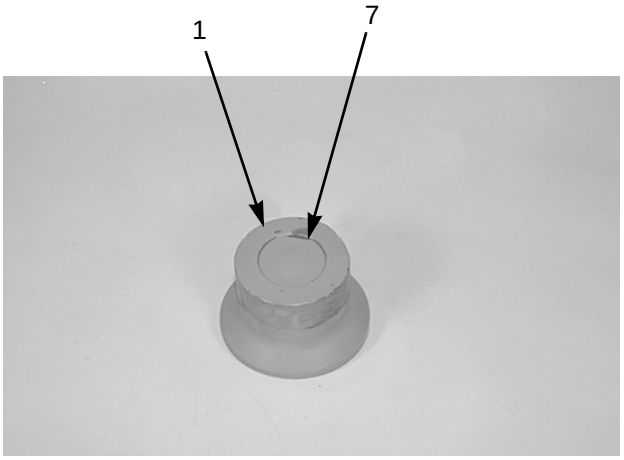


390-909

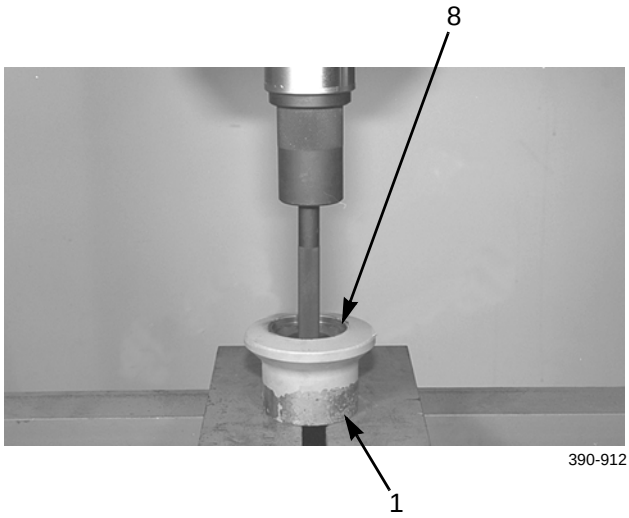


390-910

3. Using a hammer and brass rod, remove plug (7) from ejector guide roller (1).
4. Using a driver and hydraulic press, remove bearing (8) from ejector guide roller (1).



390-911



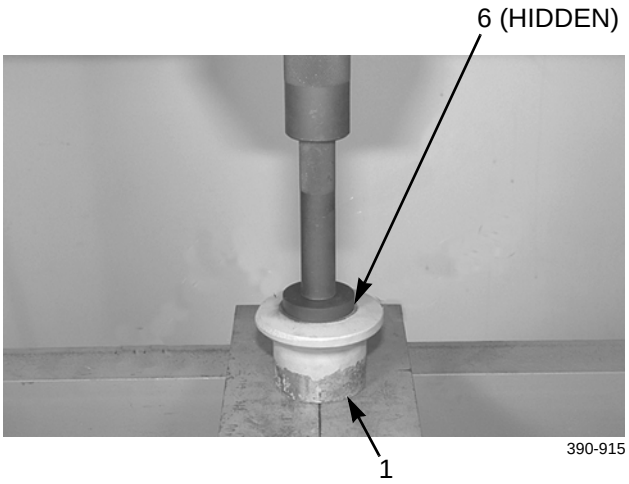
390-912

ASSEMBLY

1. Using a driver and hydraulic press, install bearing (8) in ejector guide roller (1) until bearing is seated.
2. Using a soft-faced hammer, install plug (7) on ejector guide roller (1).

ASSEMBLY - CONTINUED

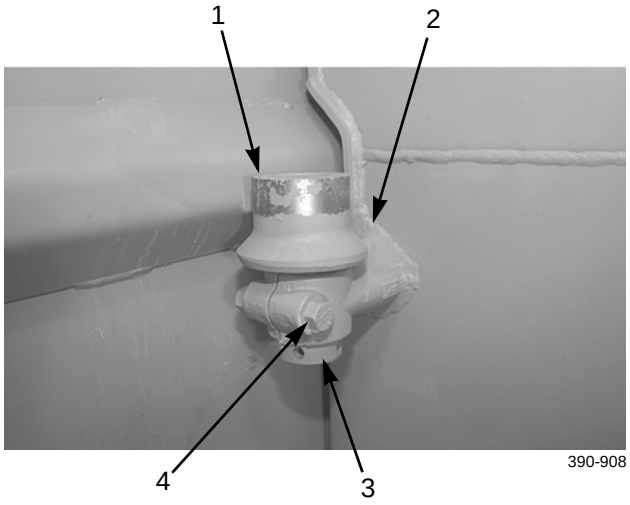
3. Using a driver and hydraulic press, install new lip seal (6) on ejector guide roller (1).



4. Apply GAA grease to ejector guide roller (1) and install washer (5) and roller (1) on roller shaft (3).

INSTALLATION

1. Install ejector guide roller (1) and roller shaft (3) on bracket (2) with bolt (4).
2. Adjust ejector guide roller (Refer to *Adjustment*).

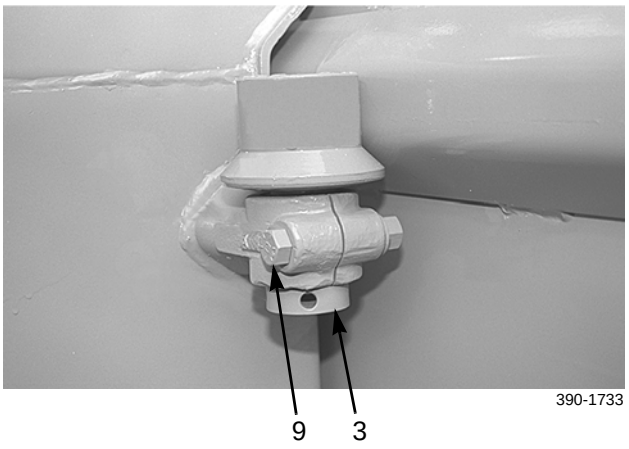


ADJUSTMENT

NOTE

Ejector guide rollers are correctly adjusted if ejector does not contact sides of scraper bowl. Ejector guide rollers should be in a position that prevents ejector from rising too far above the floor of scraper bowl.

1. Loosen bolt (9).
2. Move roller shaft (3) to a position that allows ejector to pass over sides of scraper bowl.
3. Tighten bolt (9).
4. Repeat steps 1 through 3 for other ejector guide roller.
5. Start engine (TM 5-3800-205-10-1).
6. Move ejector forward and backward (TM 5-3800-205-10-1). Check for drag between ejector and sides of scraper bowl.
7. Stop engine (TM 5-3800-205-10-1).
8. Repeat procedure if additional adjustment is necessary.



390-1733

END OF WORK PACKAGE

EJECTOR SUPPORT ROLLER MAINTENANCE 0039 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 33, WP 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Bearing, sleeve (Item 2, WP 0048 00)

Driver set (Item 7, WP 0048 00)

Guide, seal (Item 13, WP 0048 00)

Puller attachment, mechanical (Item 20, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Personnel Required

Two

References

WP 0027 00

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

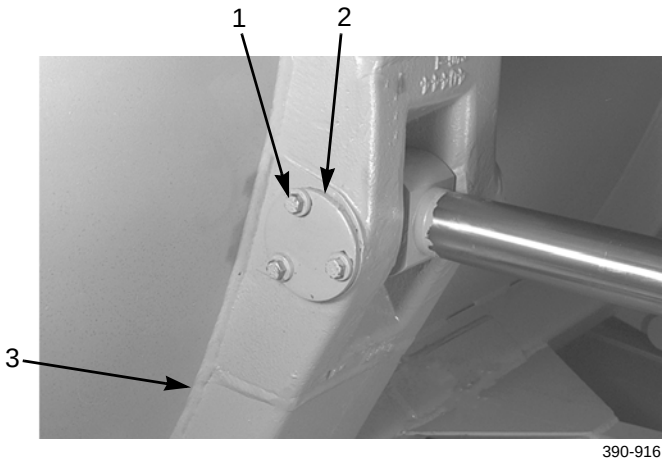
Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

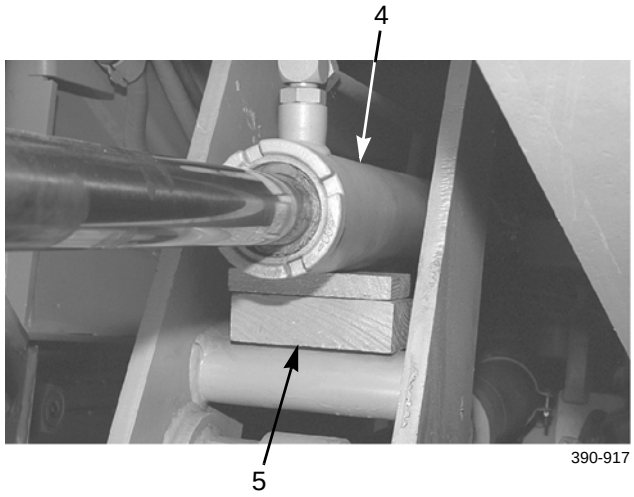
Wheels chocked (TM 5-3800-205-10-1)

REMOVAL

1. Start engine and position ejector (3) to front of scraper bowl. Stop engine (TM 5-3800-205-10-1).
2. Attach a nylon strap and suitable lifting device to ejector (3).
3. Remove three bolts (1) and plate (2) from ejector (3).
4. Place block (5) under ejector cylinder (4).



390-916

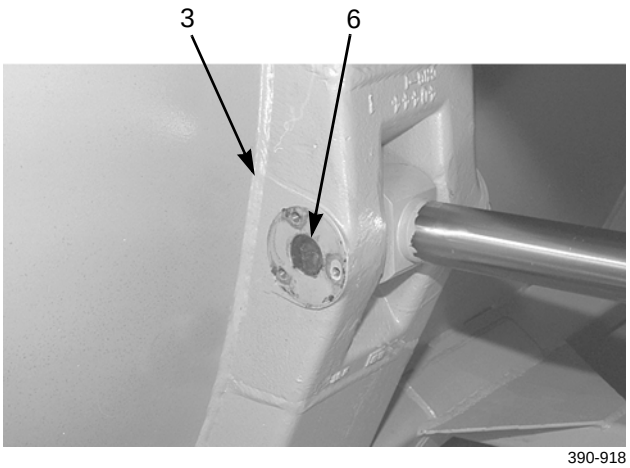


390-917

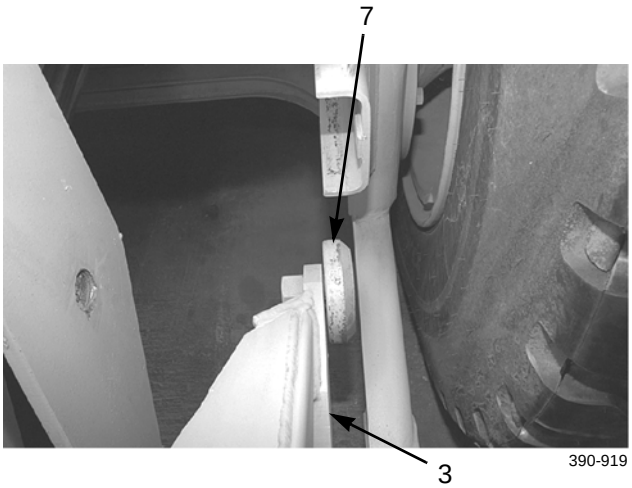
EJECTOR SUPPORT ROLLER MAINTENANCE - CONTINUED 0039 00

REMOVAL - CONTINUED

5. Using a hammer and brass rod, remove pin (6) from ejector (3).
6. Using suitable lifting device, move ejector (3) forward and remove ejector support roller (7) from track assembly.

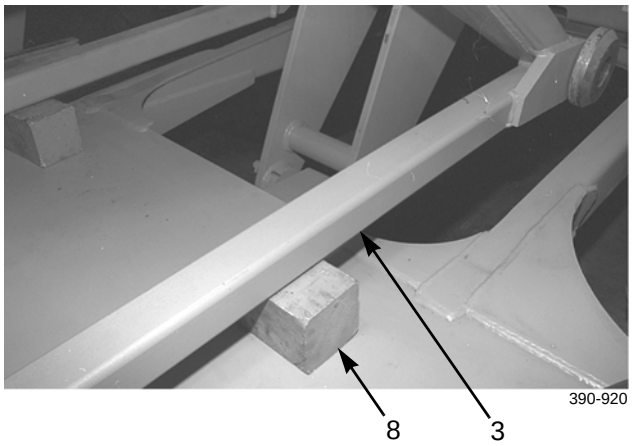


390-918

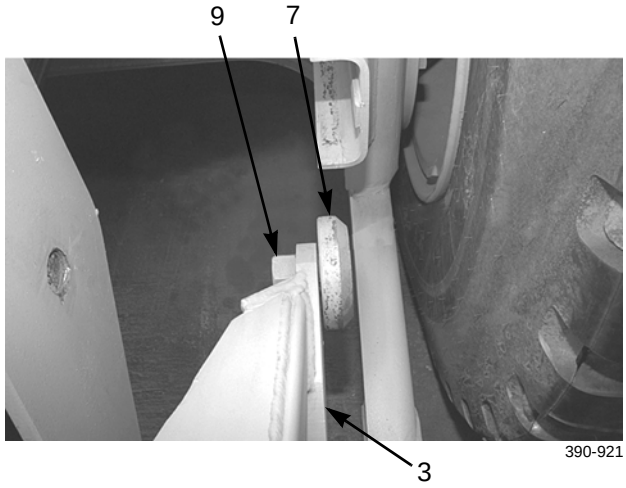


390-919

7. Place a block (8) under ejector (3).
8. Remove nut (9) from ejector support roller (7).
9. Using soft-faced hammer, remove roller (7) from ejector (3).



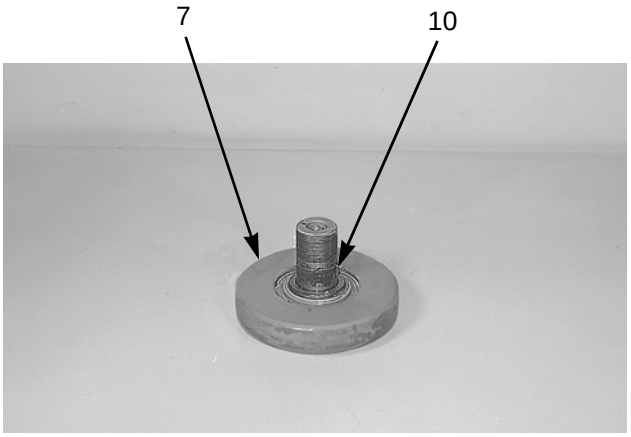
390-920



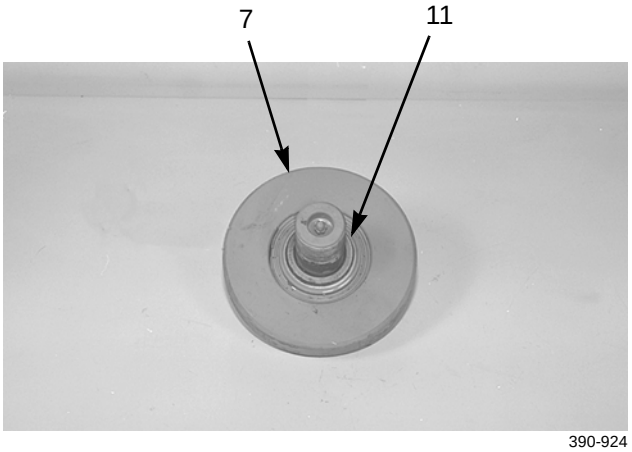
390-921

DISASSEMBLY

1. Remove key (10) from ejector support roller (7).
2. Remove retaining ring (11) from ejector support roller (7).

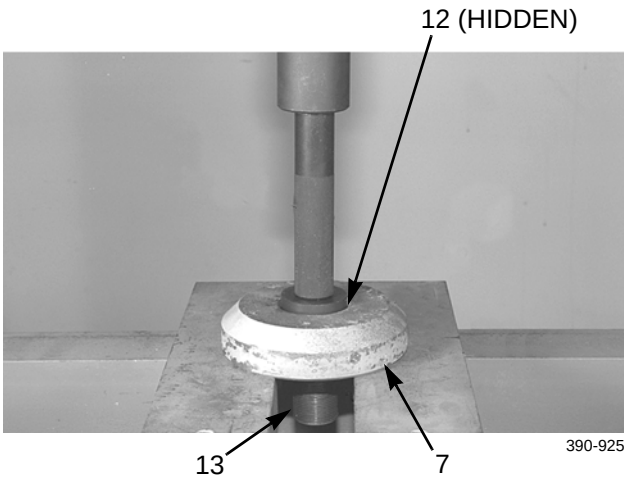


390-923

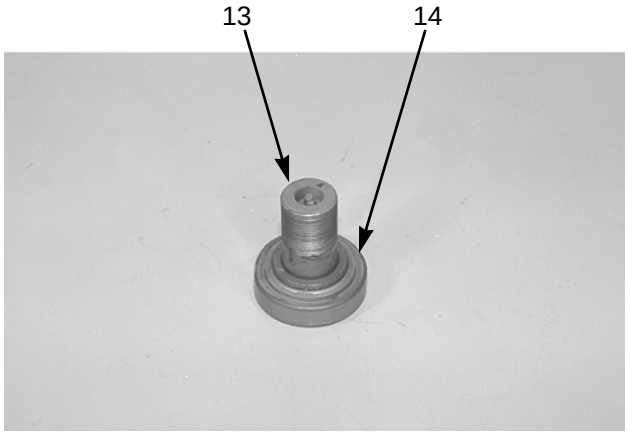


390-924

3. Using a driver and hydraulic press, remove plug (12) and roller shaft (13) from ejector support roller (7).
4. Remove roller bearing (14) from roller shaft (13).



390-925



390-926

CLEANING AND INSPECTION

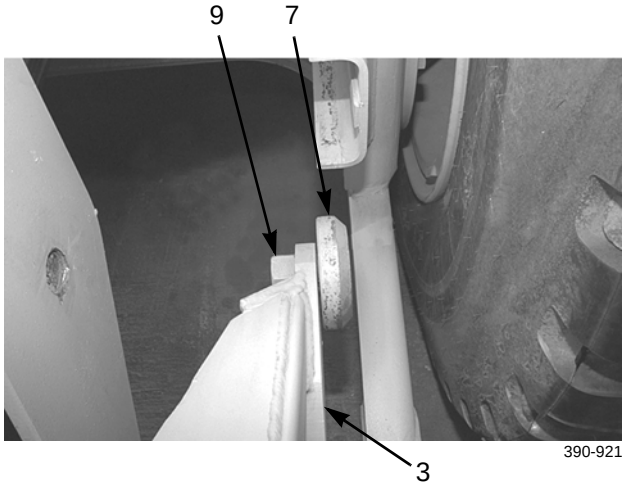
Clean and inspect all parts. Replace worn or damaged parts.

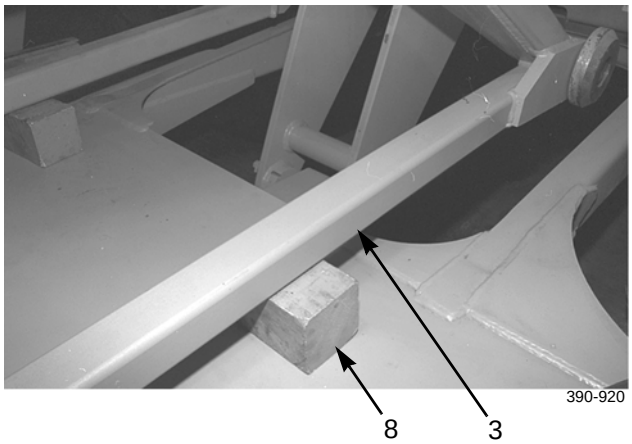
ASSEMBLY

1. Apply GAA grease to roller bearing (14) and install roller bearing on roller shaft (13).
2. Using a driver, seal guide, sleeve bearing, and hydraulic press, install plug (12) and roller shaft (13) on ejector support roller (7) until roller shaft is seated in roller.
3. Install retaining ring (11) on ejector support roller (7).
4. Install key (10) on ejector support roller (7).

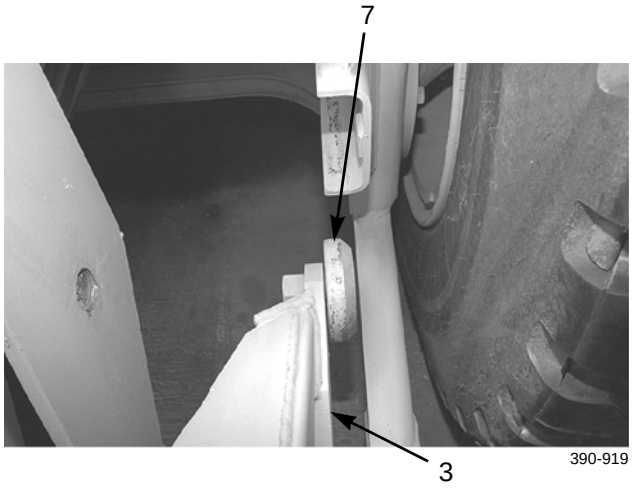
INSTALLATION

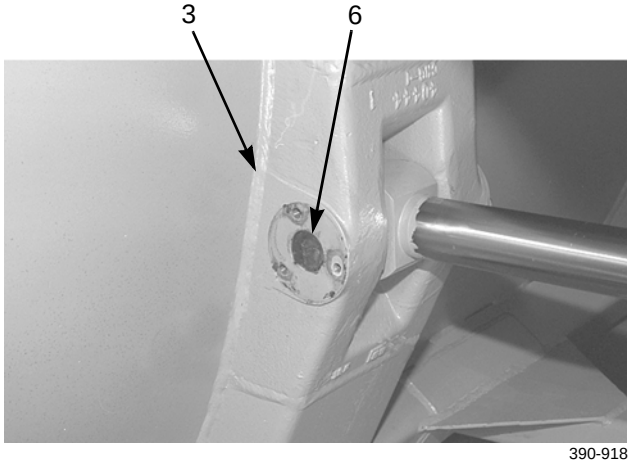
1. Using soft-faced hammer, install ejector support roller (7) on ejector (3).
2. Install nut (9) on ejector support roller (7). Torque nut to 450 lb-ft (610 Nm).
3. Remove block (8) from ejector (3).





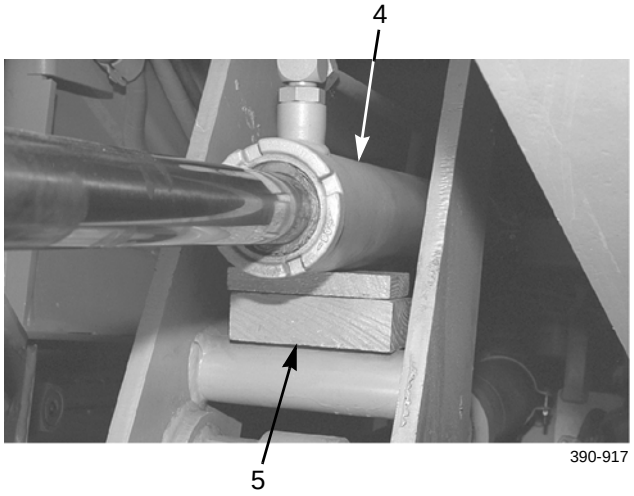
4. Using a suitable lifting device, move ejector (3) to rear of scraper bowl. Position ejector support roller (7) on track assembly.
5. Using a hammer and brass rod, install pin (6) to ejector (3).



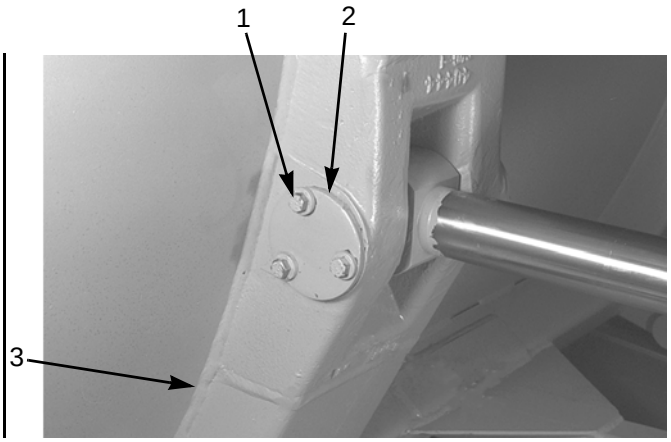


INSTALLATION - CONTINUED

6. Remove block (5) from ejector cylinder (4). Remove nylon strap and lifting device.
7. Install plate (2) on ejector (3) with three bolts (1).
8. Adjust ejector support roller (Refer to *Adjustment*).



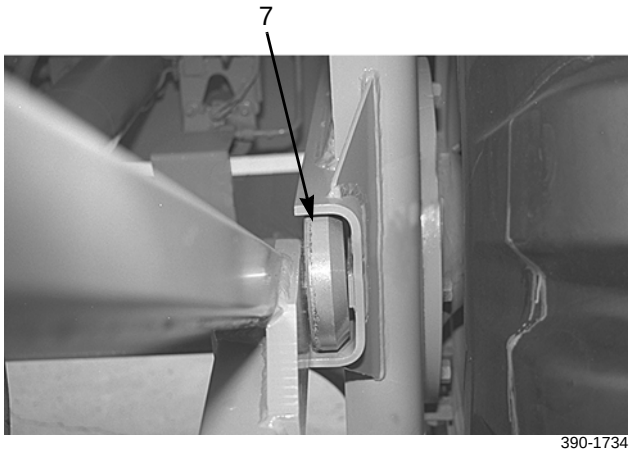
390-917



390-916

ADJUSTMENT

Measure clearance between ejector support roller (7) and track assembly. Measurement should be 0.032-0.19 in. (0.80-4.8 mm). If measurement is not as specified, adjust ejector clearance (WP 0027 00).



390-1734

END OF WORK PACKAGE

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SLIDING FLOOR REPLACEMENT 0040 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Materials/Parts

Shim (as required)

Personnel Required

Two

Equipment Condition

Sliding floor link removed (WP 0042 00)

REMOVAL

1. Lower scraper bowl on block and position suitable lifting device under sliding floor (3).
2. Remove four bolts (2) and two rollers (1) from sliding floor (3). Repeat for other side of scraper.

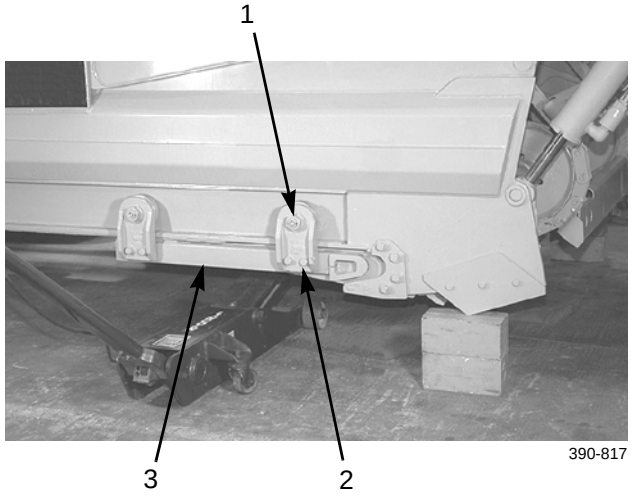
WARNING

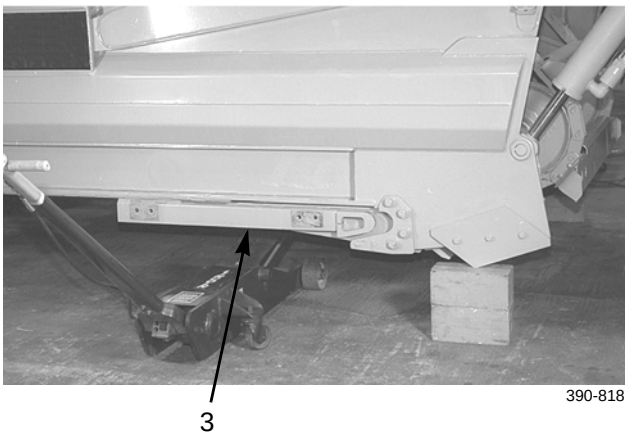
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in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

NOTE

Sliding floor weighs 860 lb (390 kg).

3. Carefully lower sliding floor (3) and remove from machine.





INSTALLATION

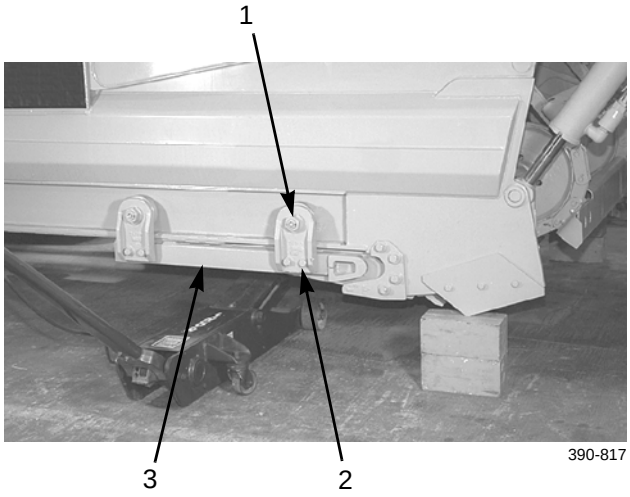
WARNING

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.

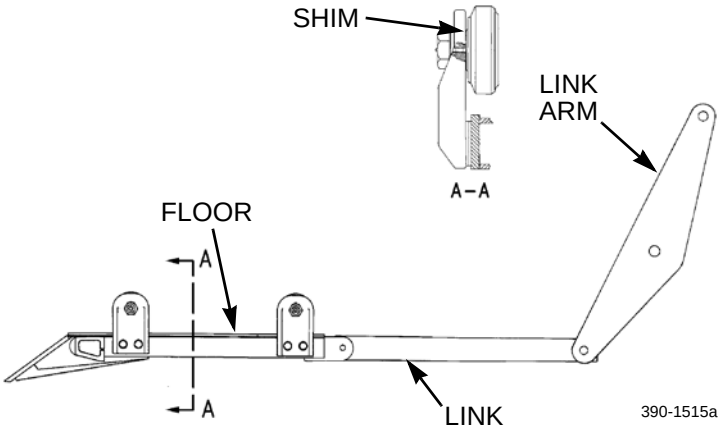
NOTE

Sliding floor weighs 860 lb (390 kg).

1. Using suitable lifting device, carefully raise sliding floor (3) and position on machine.
2. Install two rollers (1) on sliding floor (3) with four bolts (2). Repeat step for other side of scraper.



3. Measure clearance between roller assemblies and bowl. Clearance should be 0.06-0.18 in. (1.5-4.6 mm).
4. If clearance is not as specified, adjust by adding or removing shims.
5. Install sliding floor link (WP 0042 00).



END OF WORK PACKAGE

SLIDING FLOOR ROLLER MAINTENANCE 0041 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Materials/Parts

Grease, GAA (Item 16, WP 0047 00)

Ring, retaining

Seal, lip

References

WP 0038 00

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

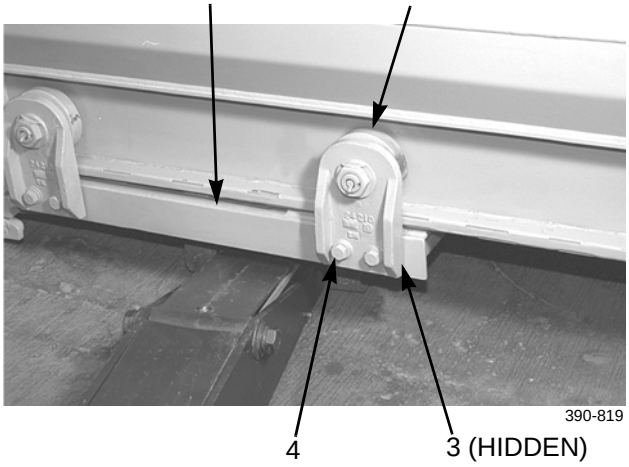
Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

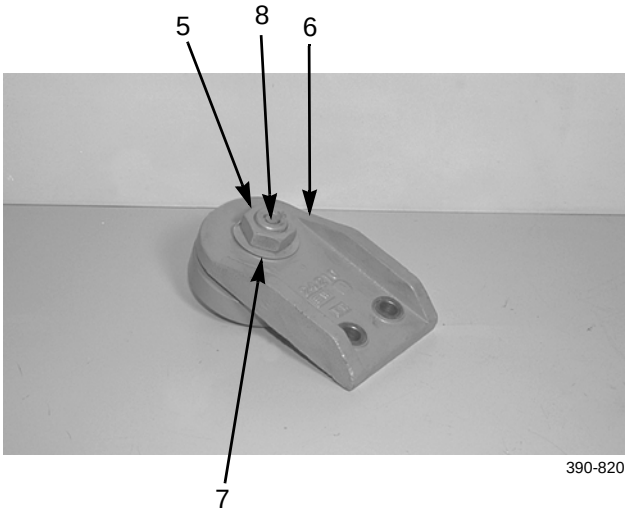
REMOVAL

1. Position floor jack under sliding floor (1). Raise sliding floor until tension is released from roller assembly (2).
2. Remove two bolts (4), washers, roller assembly (2), and two shims (3) from sliding floor (1).

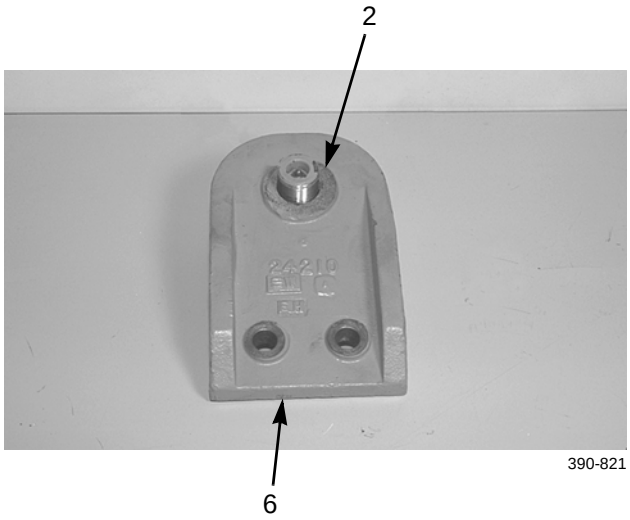


DISASSEMBLY

1. Bend lockwasher (7) away from nut (5) and remove nut and lockwasher from roller bracket (6).
2. Remove grease fitting (8).
3. Remove roller assembly (2) from roller bracket (6).

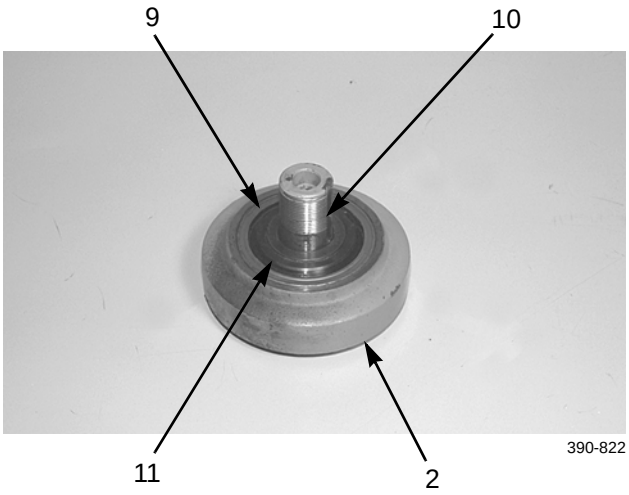


390-820

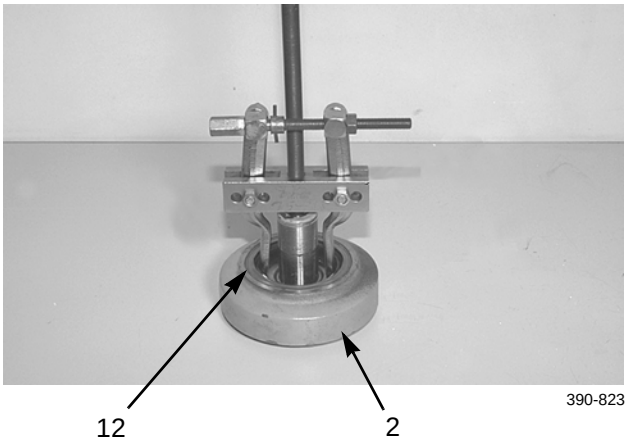


390-821

4. Remove washer (9), key (10), and spacer (11) from roller assembly (2).
5. Using a puller, remove and discard lip seal (12) from roller assembly (2).



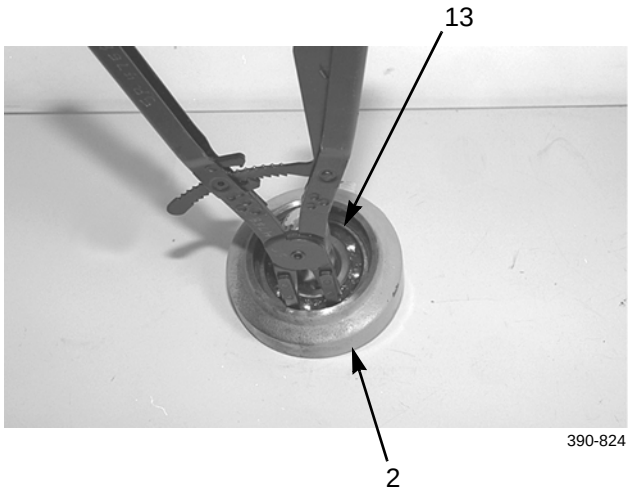
390-822

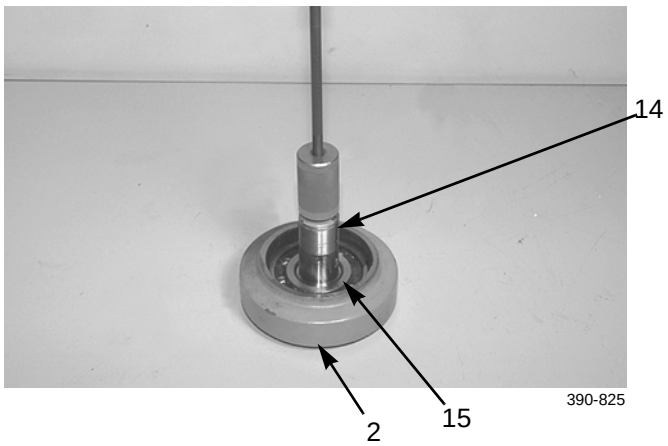


390-823

DISASSEMBLY - CONTINUED

6. Remove and discard retaining ring (13) from roller assembly (2).
7. Using a slide hammer, remove shaft (14) and roller bearing (15) from roller assembly (2).



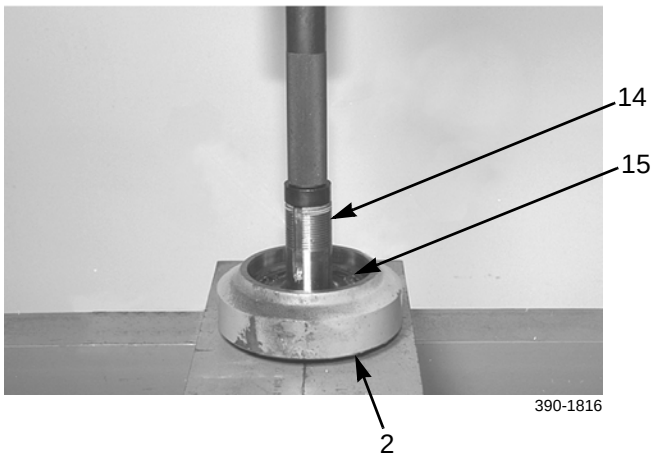


CLEANING AND INSPECTION

Clean and inspect all parts. Replace worn or damaged parts.

ASSEMBLY

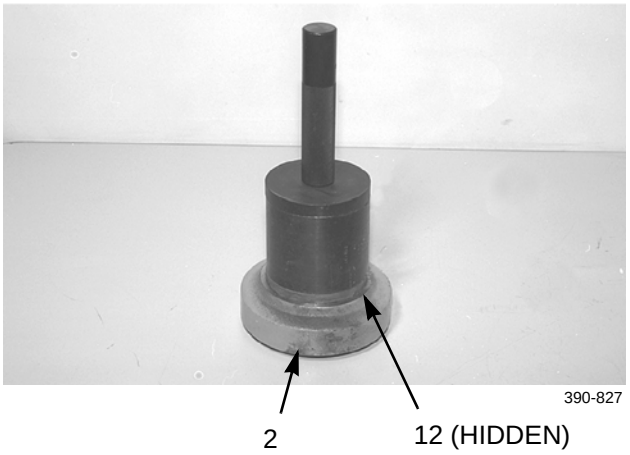
1. Using a driver and hydraulic press, install shaft (14) and roller bearing (15) on roller assembly (2).

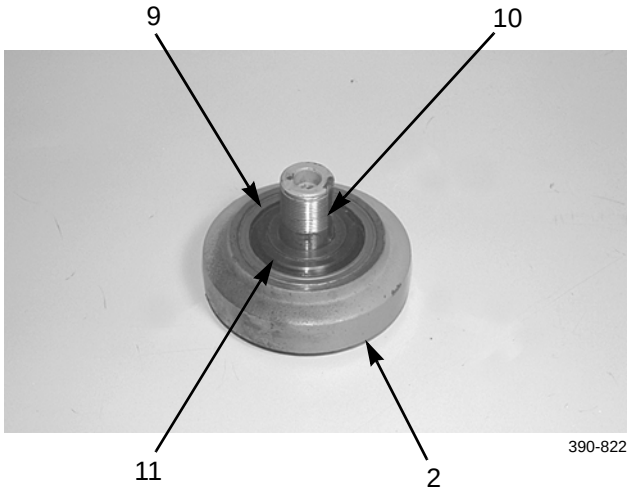


2. Install new retaining ring (13) on roller assembly (2).

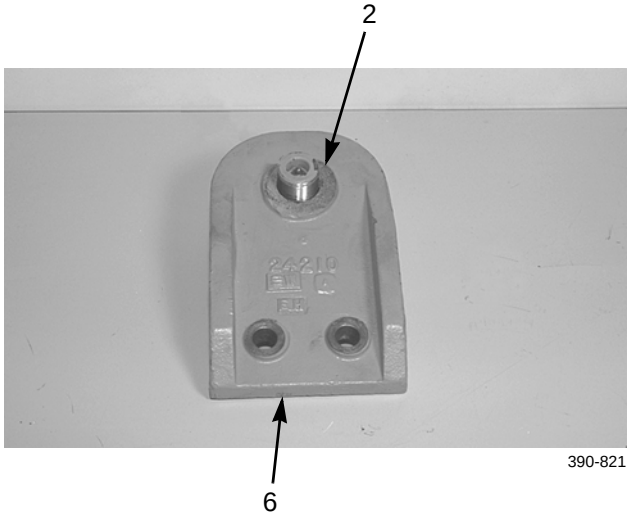
ASSEMBLY - CONTINUED

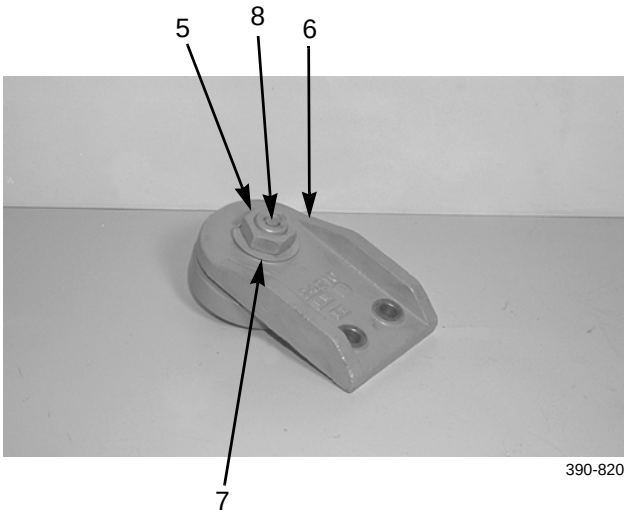
3. Using a driver, install new lip seal (12) on roller assembly (2).
4. Install spacer (11), key (10), and washer (9) on roller assembly (2).





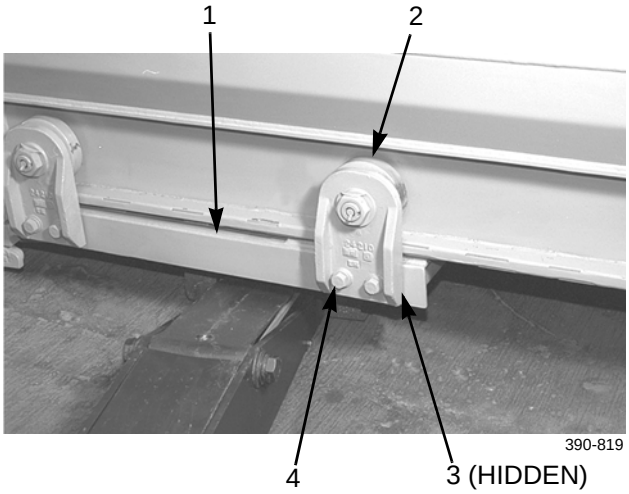
5. Install roller assembly (2) on roller bracket (6).
6. Install grease fitting (8).
7. Install nut (5) and lockwasher (7) on roller bracket (7). Bend lockwasher on nut.
8. Lubricate roller assembly (2).





INSTALLATION

1. Install two shims (3) and roller assembly (2) on sliding floor (1) with two washers and bolts (4).
2. Adjust clearance between roller assembly (2) and scraper bowl (WP 0038 00).



END OF WORK PACKAGE

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SLIDING FLOOR LINK REPLACEMENT 0042 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

Parking brake applied (TM 5-3800-205-10-1)

Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

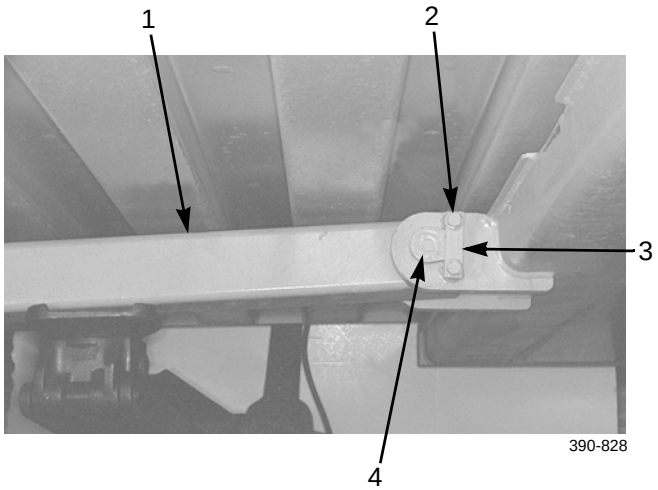
WARNING

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

Link assembly weighs 100 lb (45 kg).

1. Position floor jack under link assembly (1) and remove two bolts (2), bar (3) and pin assembly (4). Lower link assembly (1) to ground.

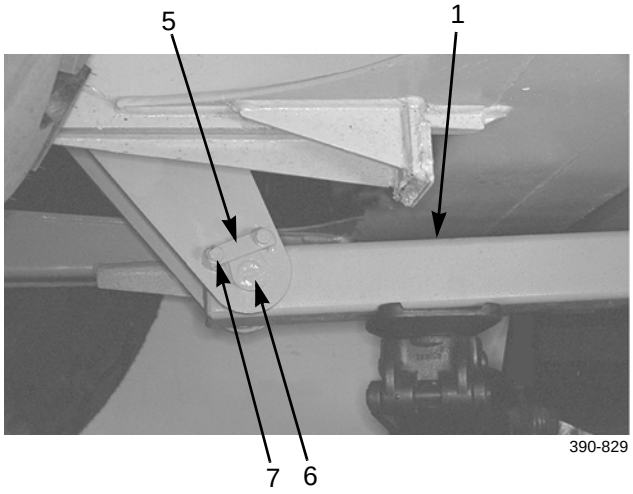


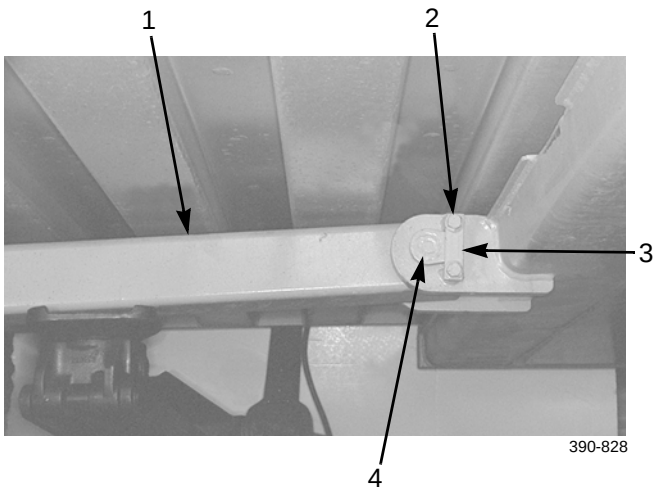
REMOVAL

2. Position floor jack under other end of link assembly (1) and remove two bolts (7), bar (5), and pin assembly (6). Lower link assembly from machine.

INSTALLATION

1. Using floor jack, position link assembly (1) on machine and install pin assembly (6) and bar (5) with two bolts (7) and remove floor jack from link assembly.
2. Using floor jack, position other end of link assembly (1) on machine and install pin assembly (4) and bar (3) with two bolts (2). Remove floor jack from link assembly.





END OF WORK PACKAGE

SLIDING FLOOR DUMP ARM REPLACEMENT 0043 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 0048 00)

Shop equipment, field automotive (Item 23, WP 0048 00)

Sling, nylon (Item 27, WP 0048 00)

Equipment Condition

Machine parked on hard, level surface (TM 5-3800-205-10-1)

Scraper bowl lowered to ground (TM 5-3800-205-10-1)

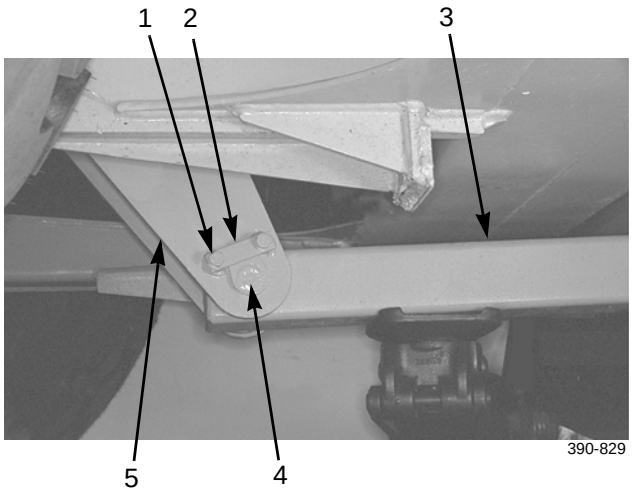
Parking brake applied (TM 5-3800-205-10-1)

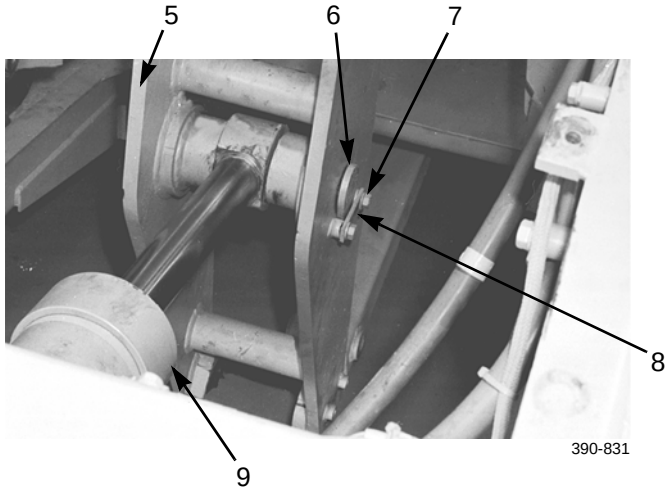
Wheels chocked (TM 5-3800-205-10-1)

Battery disconnect switch in OFF position (TM 5-3800-205-10-1)

REMOVAL

1. Position floor jack under link assembly (3) and remove two bolts (1), bar (2) and pin assembly (4) from dump arm assembly. Lower link assembly to ground.
2. Place wooden block under floor cylinder (9) for support and remove two bolts (7), bar (8) and pin (6) from dump arm assembly (5).





REMOVAL - CONTINUED

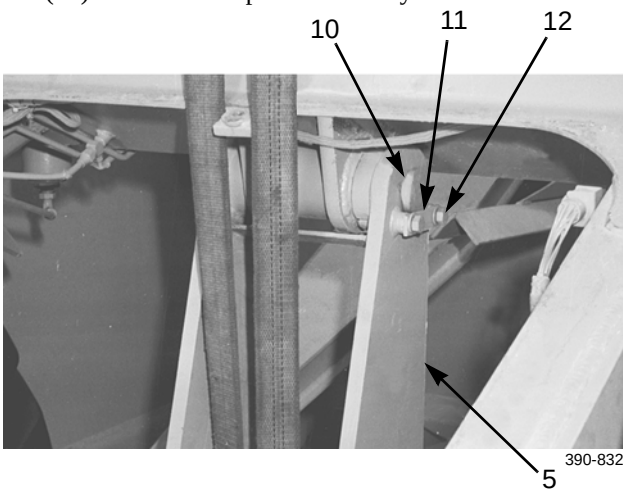
WARNING

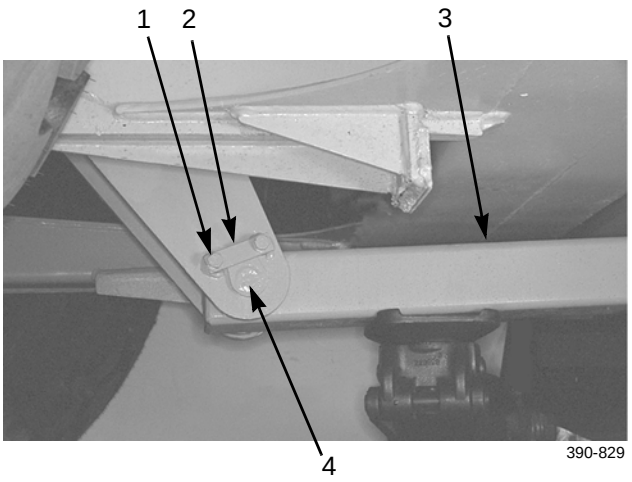
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device is in good condition and of suitable lift capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death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

NOTE

Dump arm assembly weighs 60 lb (27 kg).

3. Attach a nylon sling and suitable lifting device to dump arm assembly (5) and remove two bolts (12), bar (11), and pin (10). Remove dump arm assembly from machine.





INSTALLATION

WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device is in good condition and of suitable 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

Dump arm assembly weighs 60 lb (27 kg).

1. Install dump arm assembly (5) on machine with pin (10), bar (11), and two bolts (12). Remove nylon sling and lifting device from dump arm assembly.
2. Install pin (6), bar (8), and two bolts (7) on dump arm assembly (5). Remove wooden block from floor cylinder (9).
3. Position link assembly (3) on dump arm assembly (5) and install pin assembly (4), bar (2), and two bolts (1).

END OF WORK PACKAGE

CHAPTER 3
SUPPORTING INFORMATION

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REFERENCES 0044 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 **0044 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 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 Scraper, Tractor, Elevating, Self-Propelled, 613CS . . . . . TM 5-3800-205-10-1

Unit, Direct Support/General Support Maintenance Manual for Scraper, Tractor, Elevating, Self-Propelled, 613CS and Distributor, Water, Tank Type, 613CWD . . . . . TM 9-3800-205-23-1

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 0045 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 0046 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.

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MAINTENANCE ALLOCATION CHART (MAC) 0046 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 REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D		
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 REF CODE	REMARKS CODE
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D		
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

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EXPENDABLE AND DURABLE ITEMS LIST 0047 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 0047 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 0048 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 0048 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

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TORQUE LIMITS 0049 00

SCOPE

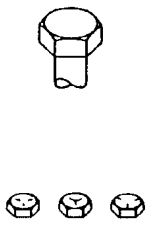
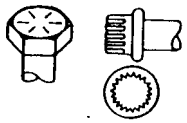
1. This work package lists standard torque values, as shown in Table 1, and provides general information for applying torque.
2. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

GENERAL

1. Always use the torque values listed in Table 1 when the maintenance procedure does not give a specific torque value.
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. Capscrews threaded into aluminum may require reductions in torque of 30% or more of Grade 5 capscrew torque. Capscrew threaded into aluminum must also attain two capscrew diameters of thread engagement.

TORQUE LIMITS - CONTINUED **0049 00**

Table 1. Torque Limits.

Current Usage	Much Used	Much Used	Used at Times	Used at Times
Quality of Material	**Indeterminate**	**Minimum Commercial**	**Medium Commercial**	**Best Commercial**
SAE Grade Number	1 or 2	5	6 or 7	8
Capscrew Head Markings **Manufacturer's marks may vary** **These are all SAE Grade 5 (3 line)**				
Capscrew Body Size Inches - Thread	**Torque lb.-ft. (N•m)**	**Torque lb.-ft. (N•m)**	**Torque lb.-ft. (N•m)**	**Torque lb.-ft. (N•m)**
1/4 20	5 (7)	8 (11)	10 (14)	12 (16)
28	6 (8)	10 (14)		14 (19)
5/16 18	11 (15)	17 (23)	19 (26)	24 (33)
24	13 (18)	19 (26)		27 (37)
3/8 16	18 (24)	31 (42)	34 (46)	44 (60)
24	20 (27)	35 (47)		49 (66)
7/16 14	28 (38)	49 (66)	55 (75)	70 (95)
20	30 (41)	55 (75)		78 (106)
1/2 13	39 (53)	75 (102)	85 (115)	105 (142)
20	41 (56)	85 (115)		120 (163)
9/16 12	51 (69)	110 (149)	120 (163)	155 (210)
18	55 (75)	120 (163)		170 (231)
5/8 11	83 (113)	150 (203)	167 (226)	210 (285)
18	95 (129)	170 (231)		240 (325)
3/4 10	105 (142)	270 (366)	280 (380)	375 (508)
16	115 (156)	295 (400)		420 (569)
7/8 9	160 (217)	395 (536)	440 (597)	605 (820)
14	175 (237)	435 (590)		675 (915)
1 8	235 (319)	590 (800)	660 (895)	910 (1234)
14	250 (339)	660 (895)		990 (1342)

PREPARATION FOR STORAGE OR SHIPMENT 0050 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).
3. Fill fuel tank completely to prevent condensation from forming (TM 5-3800-205-10-1).
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 lowered to the ground (TM 5-3800-205-10-1).
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).
11. Fill in Form DD 1397 completely and attach to a conspicuous part of machine.

PREPARATION FOR RETURN TO SERVICE FROM SHORT-TERM STORAGE

1. Remove seals from all engine openings, including air intake, exhaust outlet, and crankcase breather tube.
2. If removed, install batteries (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 tank (PMCS in TM 5-3800-205-10-1 and Unit PMCS in TM 5-3800-205-23-1).
4. Check coolant level in radiator (TM 5-3800-205-10-1).
5. Start engine and perform machine warmup (TM 5-3800-205-10-1). 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).
7. Operate machine without a load and check engine, transmission, brakes, steering, and electrical accessories for proper operation (TM 5-3800-205-10-1).

PREPARATION FOR LONG-TERM STORAGE

1. Thoroughly clean machine.
2. Perform Operator PMCS (TM 5-3800-205-10-1).
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 0047 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 fuel (Item 13, 14 or 15, WP 0047 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).
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. Place blocking under axles to remove weight from tires.
18. Fill in Form DD 1397 completely and attach to a conspicuous part of machine.

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE

1. Ensure tires are inflated to 45 psi (310 kPa).
2. Remove blocking from under axles.
3. Remove GAA grease from exposed hydraulic cylinder rods. Wipe rods clean with a rag (Item 31, WP 0047 00) dipped in lubricating oil (Item 25, WP 0047 00).
4. Fill fuel tank with fuel (TM 5-3800-205-10-1).
5. Check oil and hydraulic fluid levels in engine crankcase, transmission, front axle differential, and wheel end final drives, and hydraulic tank (PMCS in TM 5-3800-205-10-1 and Unit PMCS in TM 5-3800-205-23-1).

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE - CONTINUED

6. Check coolant level in radiator (TM 5-3800-205-10-1).
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). 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).

END OF WORK PACKAGE

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LIST OF PRINCIPLE CATERPILLAR DEALERS 0051 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

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WARRANTY INFORMATION (CATERPILLAR, INC.) 0052 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 0053 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 0053 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 5-3800-205-10-1 and TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00 of this manual. 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.**

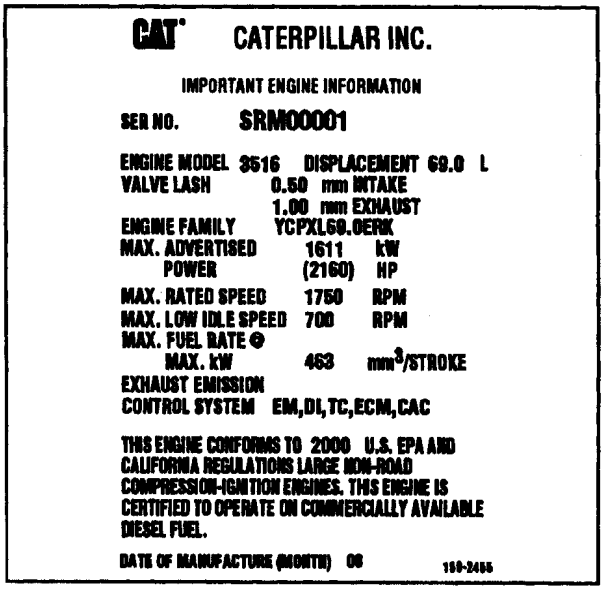
   a. Some Caterpillar nonroad diesel engines are certified by the United States EPA to comply with smoke and gaseous emission standards prescribed by Federal laws at the time of manufacture.

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

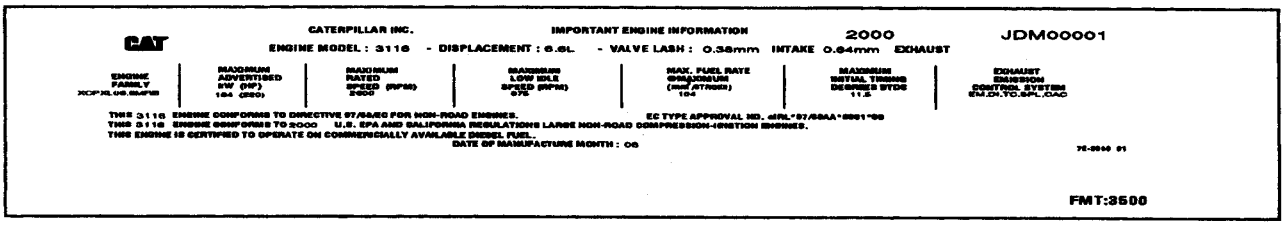
SER NO. SRM00001

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.) 0053 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 0052 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 0027 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 5-3800-205-10-1 and TM 5-3800-205-23-1, WP 0009 00 and WP 0010 00 of this manual. 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

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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
0514506

DISTRIBUTION: To be distributed in accordance with the initial distribution requirements for IDN: 256836, requirements for TM 5-3800-205-23-2.

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 5-3800-205-23-2	15 July 2005	Field Maintenance Manual (Includes Unit, and DS Support Maintenance) for the 613CS Scraper, Tractor

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)*	

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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

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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