TM 5-3805-261-23-2

TECHNICAL MANUAL

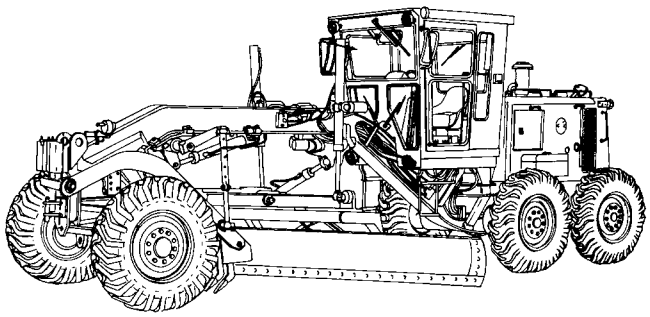
FIELD MAINTENANCE MANUAL
(Includes Unit and Direct Support Maintenance)

FOR

GRADER, ROAD, MOTORIZED, DIESEL ENGINE DRIVEN (DED), HEAVY, COMMERCIAL CONSTRUCTION EQUIPMENT (CCE)
(NSN 3805-01-150-4795) CATERPILLAR MODEL 130G (EIC: EHF)

TYPE I, NONSECTIONALIZED
(NSN 3805-01-126-7894) CATERPILLAR MODEL 130GNS (EIC: EHN)
(NSN 3805-01-252-0128) CATERPILLAR MODEL 130GNSCE (EIC: EJJ)

TYPE II, SECTIONALIZED
(NSN 3805-01-126-7895) CATERPILLAR MODEL 130GS (EIC: EHP)
(NSN 3805-01-251-8252) CATERPILLAR MODEL 130GSCE (EIC: EJH)



SUPERSEDURE NOTICE - This manual supersedes TM 5-3805-261-20, dated 30 April 1992; TM 5-3805-261-34, dated 25 April 1989, including all changes; TM 5-3805-259-24, dated 16 April 1988; and TM 5-3805-263-14&P-1,-2,-3, and -4, dated 14 April 1989.
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DISTRIBUTION STATEMENT A - Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 2007

WARNING SUMMARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WARNING

CARBON MONOXIDE (EXHAUST GASES) CAN KILL!

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

1. DO NOT operate engine in enclosed areas.
2. DO NOT idle engine without adequate ventilation.
3. DO NOT drive machine 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, and Chemical (NBC) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation!


WARNING

BATTERIES

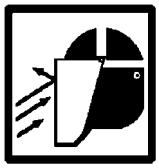
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will cause 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 cause injury or death to personnel.

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

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

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

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



WARNING

COMPRESSED AIR

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


WARNING

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 injury or death 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 cause injury to personnel or damage to equipment.
- DO NOT perform fuel system checks, inspections, or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing injury or death to personnel or damage to equipment.
- 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 cause 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

Your hearing can be PERMANENTLY DAMAGED if you are exposed to constant high noise levels of 85 dB or greater. Hearing protection is required when operating machine or when working on machine while it is operating. Failure to wear hearing protection may cause hearing loss.

WARNING

HEAVY PARTS--LESS THAN 40 LB (18 KG)

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

WARNING

HEAVY PARTS--40 LB (18 KG) OR MORE

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

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 injury to personnel.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to follow this warning may cause injury to personnel.

WARNING

MACHINE OPERATION

- Use caution and maintain three-point contact at all times when mounting or dismounting machine. Do NOT use steering wheel as a handhold. Failure to follow this warning may cause injury or death to personnel.
- BE ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before moving. Failure to follow this warning may cause injury or death to personnel.
- Use of seat belt while operating machine is mandatory. Fasten belt BEFORE operating machine. Trying to fasten belt during operation creates a hazardous condition. Failure to follow this warning may cause injury or death to personnel.
- DO NOT allow riders on machine. Failure to follow this warning may cause injury or death to personnel.
- NEVER leave operator compartment without applying parking brake. Failure to follow this warning may cause injury or death to personnel.
- DO NOT use parking/emergency brake to stop a moving machine under usual conditions. Only if service brakes fail, apply parking/emergency brake. Failure to follow this warning may cause 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 cause injury or death to personnel or damage to equipment.
- Always use a ground guide when driving machine up or down ramps in preparation for highway or marine transport. Failure to use a ground guide may cause injury or death to personnel or damage to equipment.

WARNING

NBC EXPOSURE

- If NBC exposure is suspected, personnel wearing protective equipment must handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- Refer to FM 3-11.3, *Chemical and Biological Contamination Avoidance,* FM 3-11.5, *NMC Decontamination,* FM 3-3-1, *Nuclear Contamination Avoidance.*
- NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel.
- Failure to follow these warnings may cause 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

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 may cause injury to personnel.
- Always wear eye protection when disconnecting air lines. Residual air will be expelled. Failure to follow this warning may cause 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 may cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury to personnel.

WARNING

SLAVE STARTING

When slave starting machine:

- 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 cause 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 cause 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. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- Use a self-inflating chuck and stand at tread side of tire at maximum distance allowed by inflation hose. Failure to do so may cause 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 cause injury or death to personnel or damage to equipment.
- Improper use of lifting equipment and improper attachment of cables to machine may cause injury to personnel or damage to equipment. Observe all standard rules of safety.
- Hitch and steering movement can reduce clearances suddenly and cause injury to personnel. Always stop engine BEFORE working in area of hitch link.
- Ensure locking pin is installed before working on hitch area (TM 5-3805-261-10). Failure to follow this warning may cause injury to personnel.
- Configuration changes to blade cutting edge should NEVER be attempted without first securing the blade by blocking it so that it is firmly supported. Failure to follow this warning may cause injury to personnel.
- 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 to personnel due to carbon monoxide poisoning.
- Lubricating/hydraulic oils, engine coolant, fuel, and other fluids used in the performance of maintenance can be very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 28 February 2007

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 19 AND TOTAL NUMBER OF WORK PACKAGES IS 85 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 00267 00 to WP 0352 00	0
Index-1 to Index-6	0
Authentication Page	0
DA Form 2028 Sample	0
DA Form 2028	0
Metric Convsersion Chart	0
Back Cover	0

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

TECHNICAL MANUAL
TM 5-3805-261-23-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 28 February 2007

TECHNICAL MANUAL

FIELD MAINTENANCE MANUAL
(Includes Unit and Direct Support Maintenance)

FOR

GRADER, ROAD MOTORIZED, DIESEL ENGINE DRIVEN (DED), HEAVY, COMMERCIAL CONSTRUCTION EQUIPMENT (CCE) (NSN 3805-01-150-4795) CATERPILLAR MODEL 130G

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(NSN 3805-01-251-8252) CATERPILLAR MODEL 130GSCE

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 https://aeps.ria.army.mil/. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. 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 or DA Form 2028 direct to: AMSTA-LC-LMIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is: ROCK-TACOM-TECH-PUBS@conus.army.mil. The fax number is DSN 793-0726 or Commerical (309) 782-0726.

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Table of Contents

Table of Contents - Continued

Table of Contents - Continued

HOW TO USE THIS 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.

INTRODUCTION

1. This manual is designed to help you perform troubleshooting and maintenance on the 130G Series Grader.
2. This manual is divided into chapters and written in work package format:
   a. Chapters divide the manual into major categories of information (e.g., *General Information, Equipment Description, and Theory of Operation; Troubleshooting Procedures; Unit Field Maintenance Instructions; Direct Support Field Maintenance Instructions; and Supporting Information).*
   b. Each Chapter is divided into work packages, which are identified by a 6-digit number (e.g., 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The work package page number (e.g., 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
   c. If a Change Package is issued to this manual, added work packages use the 5^{th} and 6^{th} digits of their number to indicate new material. For instance, work packages inserted between WP 0001 00 and WP 0002 00 are numbered WP 0001 01, WP 0001 02, etc.
3. Due to the size of this manual, it is separated into two volumes:
   a. The first volume (TM 5-3805-261-23-1) consists of Chapters 1 through 3 (through WP 0266 00).
   b. The second volume (TM 5-3805-261-23-2) contains Chapter 4.
   c. Both volumes have Chapter 5, *Supporting Information*, for reference purposes.
4. Scan through this manual to become familiar with its organization and contents before attempting to operate or maintain the equipment.

CONTENTS OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of this manual. Become familiar with these warnings before operating or performing troubleshooting or maintenance on the grader.
2. A *Table of Contents*, located in the front of the manual, lists all chapters and work packages in the publication.
   a. The Table of Contents also provides *Reporting Errors and Recommending Improvements* information and DA Form 2028 addresses, for the submittal of corrections to this manual.
   b. If you cannot find what you are looking for in the Table of Contents, refer to the alphabetical *Index* at the back of the manual.
3. Chapter 1, *General Information, Equipment Description, and Theory of Information*, provides general information on the manual and the equipment.
4. Chapter 2 covers *Troubleshooting Procedures*. WP 0005 00 contains a *Troubleshooting Symptom Index*. If the machine malfunctions, this index should always be consulted to locate the appropriate troubleshooting procedure. Chapter 2 also includes STE/ICE-R testing of selected machine systems.
5. Chapter 3 covers *Unit Field Maintenance Instructions*. Major areas covered are *Preventive Maintenance Checks and Services (PMCS)*, *Service Upon Receipt*, as well as instruction on maintaining components at Unit Field Maintenance level.
6. Chapter 4 covers *Direct Support Field Maintenance Instructions*.
7. Chapter 5 includes *Supporting Information: References, Maintenance Allocation Chart (MAC) Introduction; MAC; Expendable and Durable Items List; Tool Identification List; Illustrated List of Manufactured Items; Torque Limits; and Schematic Diagrams*.

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 injury or death.

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: “Refer to *General Maintenance Instructions* (WP 0020 00)” go to Work Package 0020 00 in this manual for instructions on general maintenance.

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., 397-001; 397-002, etc.) are art control numbers and are used for tracking purposes only. Disregard these numbers.
6. Dashed leader lines used in the Lubrication Chart (WP 0022 00) and in the PMCS illustrations (WP 0023 00) indicate that called out lubrication points are located on both sides of the equipment.
7. Unless otherwise indicated, 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.

CHAPTER 4
DIRECT SUPPORT FIELD MAINTENANCE INSTRUCTIONS

ENGINE REPLACEMENT 0267 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Leveler, load (Item 42, WP 0348 00)

Stand, engine (Item 85, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Lifting device, 2,300-lb capacity

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Lockwasher (19)

Packing, preformed (2)

Pin, cotter

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Equipment Conditions - Continued

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Articulation anti-pivot pin installed (TM 5-3805-261-10)

Engine oil drained (WP 0024 00)

Coolant drained (WP 0065 00)

Radiator inlet and outlet tubes removed (WP 0057 00)

Engine compartment dash plate removed (WP 0183 00)

Supplemental steering motor (with pump) removed (WP 0091 00)

Air pressure relieved (TM 5-3805-261-10)

Fuel tank removed (WP 0044 00)

Air cleaner body removed (WP 0038 00)

Heater hoses disconnected from engine (WP 0211 00)

Air compressor line to air dryer disconnected (WP 0164 00)

Transmission oil cooler lines disconnected (WP 0298 00)

Turbocharger lines and hoses removed (WP 0039 00)

Exhaust muffler and pipe removed (WP 0051 00)

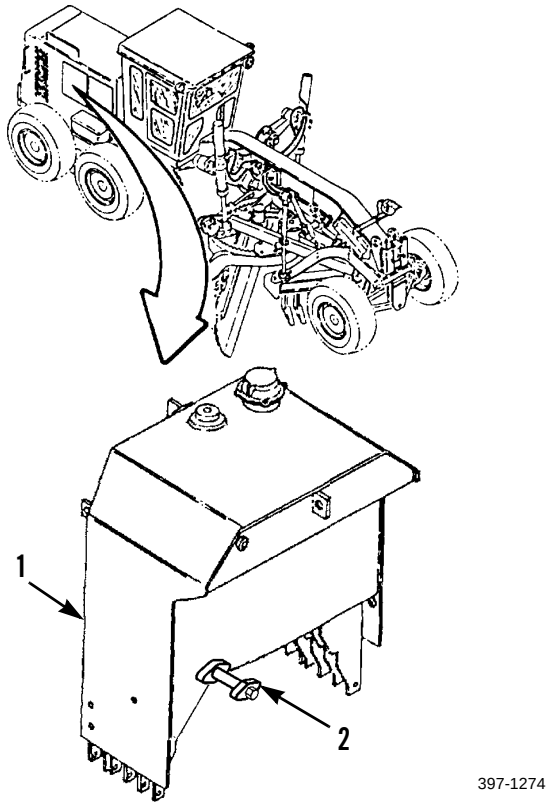
Fuel pressure switch removed (WP 0115 00)

Hydraulic pump drive removed (WP 0232 00)

ENGINE REPLACEMENT - CONTINUED 0267 00

REMOVAL

1. Close fuel shutoff valve (2) on fuel tank (1).

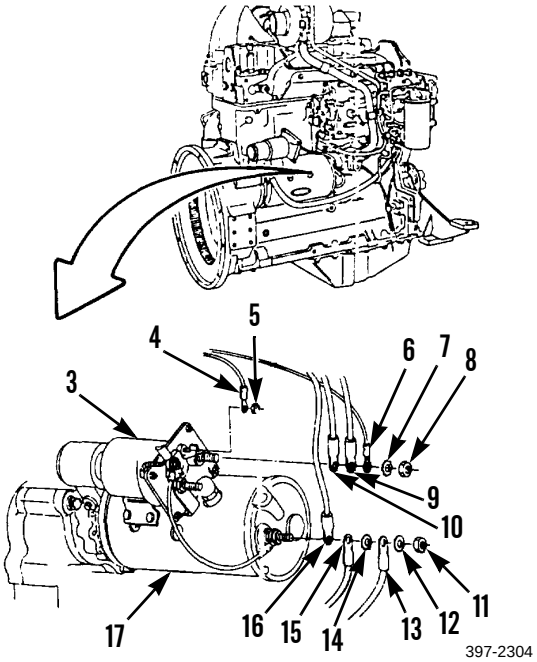


2. Remove nut (5) from solenoid (3).

NOTE

Tag wire, cable, and harness assemblies before disconnecting to aid in installation.

3. Disconnect wire assembly (4) at terminal from solenoid (3).
4. Remove nut (8) and lockwasher (7). Discard lockwasher.
5. Disconnect wire assembly (6) and cable assemblies (9 and 10) from "battery" terminal of solenoid (3).
6. Remove nut (11) and lockwasher (12). Discard lockwasher.
7. Disconnect cable assembly (13) from starting motor (17) and slave receptacle. Remove and discard lockwasher (14).
8. Disconnect cable assemblies (15 and 16) from starting motor (17).



REMOVAL - CONTINUED

9. Remove bolt (27), washer (28), and clip (29).

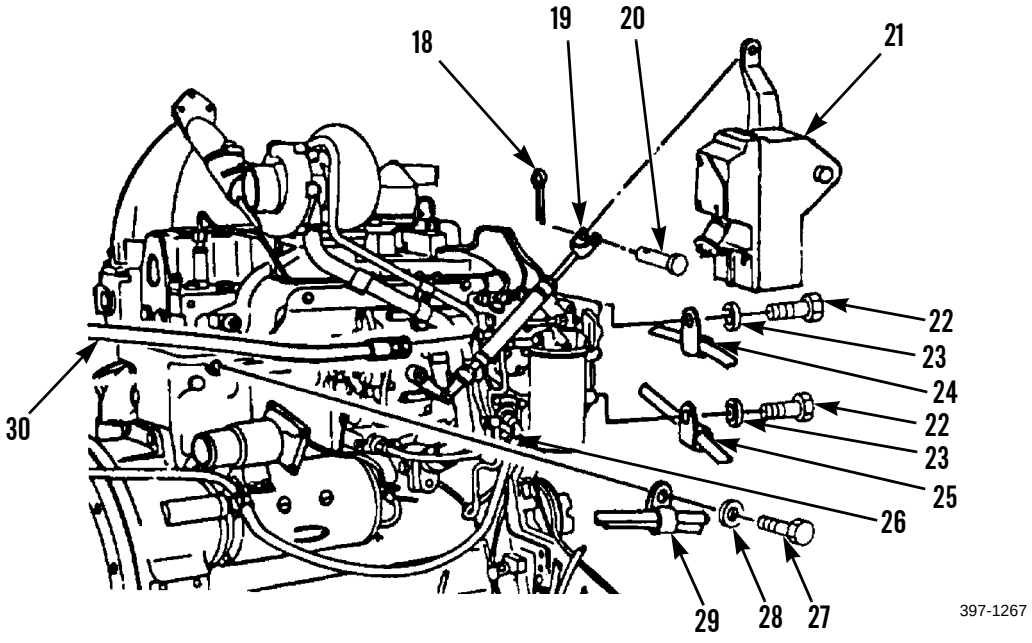
CAUTION

Cap hose and tube ends and plug open ports to prevent contamination.

NOTE

Tag hose and tube assemblies before disconnecting to aid in installation.

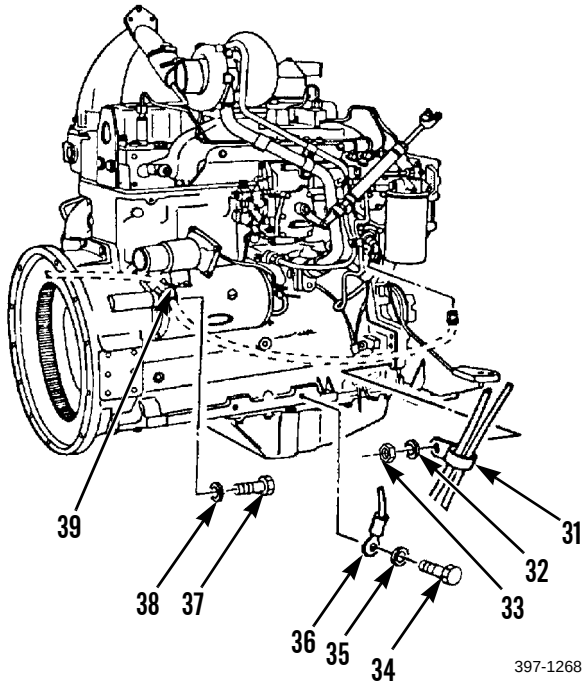
10. Disconnect fuel supply hose assembly (30).
11. Disconnect fuel return hose assembly (26).
12. Remove and discard cotter pin (18) from pin (20).
13. Remove pin (20).
14. Separate linkage assembly (19) from lever of governor control assembly (21).
15. Support governor control assembly (21).
16. Remove three bolts (22), washers (23), and clips (24 and 25).
17. Position governor control assembly (21) to side.



ENGINE REPLACEMENT - CONTINUED **0267 00**

REMOVAL - CONTINUED

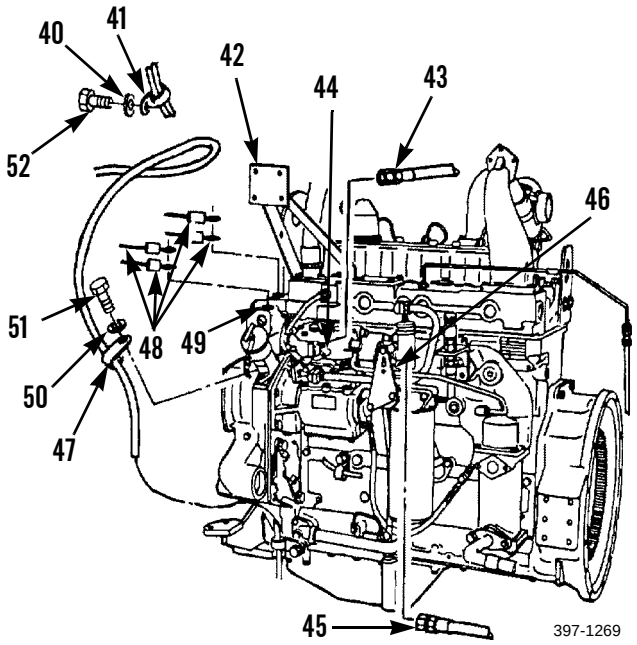
18. Remove nut (33), washer (32), and clip (31).
19. Remove bolt (34) and washer (35).
20. Disconnect wire assembly (36) at terminal.
21. Remove fuel line bolt (37), washer (38), and clip (39).



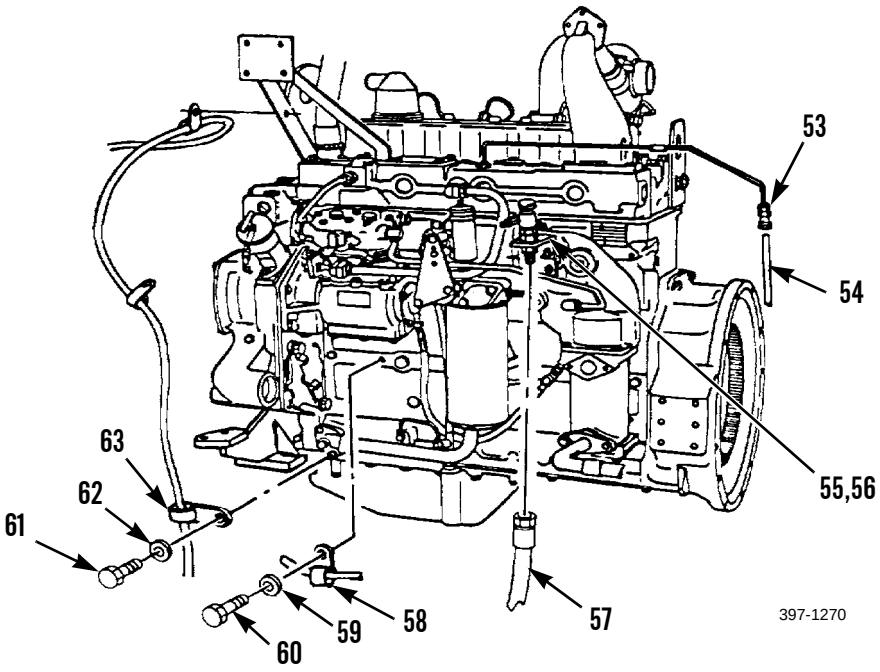
ENGINE REPLACEMENT - CONTINUED 0267 00

REMOVAL - CONTINUED

22. Disconnect hose assemblies (43 and 45) from air compressor (44) and air compressor governor (46).
23. Remove bolt (52), washer (40), and clip (41) from supplemental steering motor mounting bracket (42).
24. Remove bolt (51), washer (50), and clip (47).
25. Disconnect four wire assemblies (48) at terminals from coolant temperature switch (49).

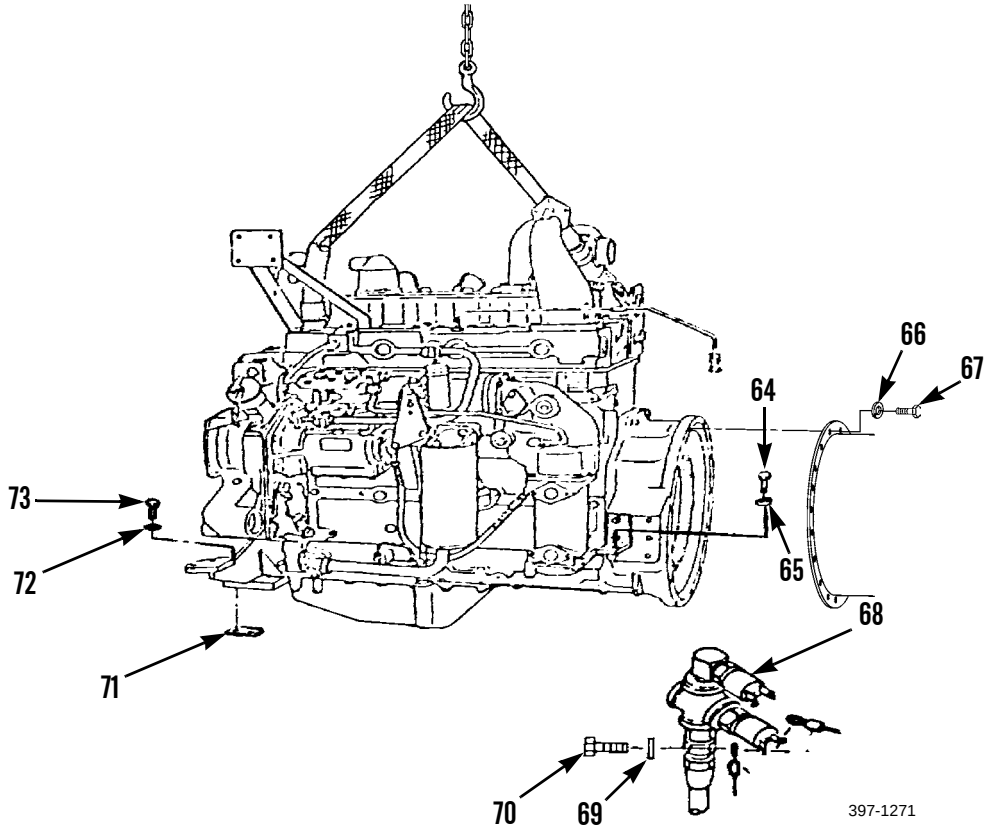


26. Disconnect tube assemblies (53 and 54).
27. Disconnect hose (57) and clip from sampling valve assembly (55) from engine oil cooler (56).
28. Remove bolt (60), washer (59), and clip (58).
29. Remove bolt (61), washer (62), and clip (63).



REMOVAL - CONTINUED

30. Remove 4 screws (70) and washers (69) from engine oil pressure switches (68).



WARNING

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

NOTE

Engine weighs 1,500 lb (680 kg).

31. With assistance, attach sling to both lifting eyes mounted on each end of cylinder head and take up slack.
32. Remove 12 bolts (67) and lockwashers (66). Discard lockwashers.
33. Remove four bolts (73) and lockwashers (72) from trunnion on bottom-front left and right sides of engine and separate. Discard lockwashers.

REMOVAL - CONTINUED

WARNING

Do not allow engine to swing. Failure to follow this warning may cause injury to personnel.

CAUTION

- Clear all hose, cable, wires and other detached assemblies from engine area before lifting engine from frame.
- Lift engine slowly, always checking to be sure cables and hoses are not caught on anything. Watch for any hoses, lines, and wires that may still be connected.

34. Remove engine.
35. Support on engine stand or blocking.
36. Remove sling.
37. Remove shim(s) (71) from front of frame, left and right sides. Tie shim(s) together and tag for identification.

NOTE

Record the number of threads on bolts that extend above nuts before removing.

38. Remove two bolts (64) and nuts (65) from bottom-rear of engine, left and right sides.

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

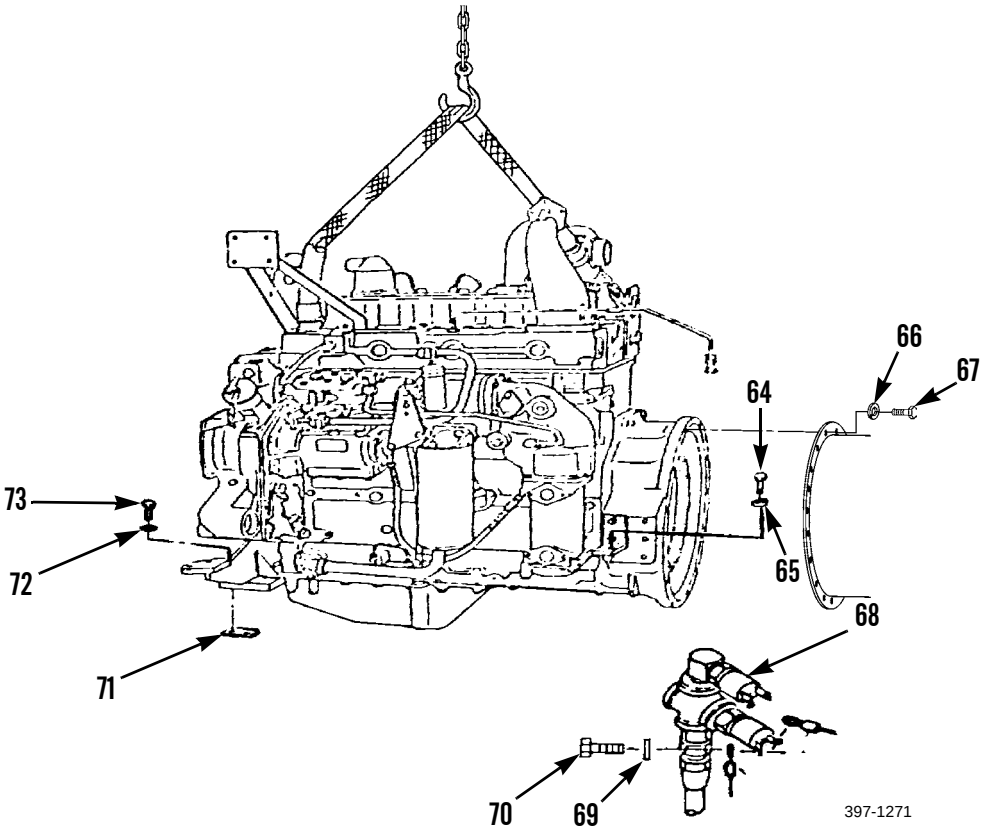
INSTALLATION

1. Install two nuts (65) and bolts (64) in rear engine mounts, left and right sides of engine.
2. Position shim(s) (71) in same location as removed to front of frame, left and right sides.
3. Attach sling.
4. Position engine and lower slowly.
5. Align flywheel with engine coupling gear. If flywheel and coupling to not engage, turn crankshaft hub mounting bolt at front of engine. This will turn flywheel, allowing gear teeth to engage.
6. Inspect shim(s) (71) for proper alignment.
7. Remove sling.
8. Install four new lockwashers (72) and bolts (73) loosely in trunnion and frame on left and right sides of bottom-front of engine.

ENGINE REPLACEMENT - CONTINUED **0267 00**

INSTALLATION - CONTINUED

9. Install 2 of 12 new lockwashers (66) and bolt (67) in two top mounting holes in engine-to-transmission adapter, securing adapter to engine.
10. Align engine.
11. After proper alignment has been made, tighten four bolts (73) to 150 lb-ft (203 Nm).
12. Install four washers (69) and screws (70).



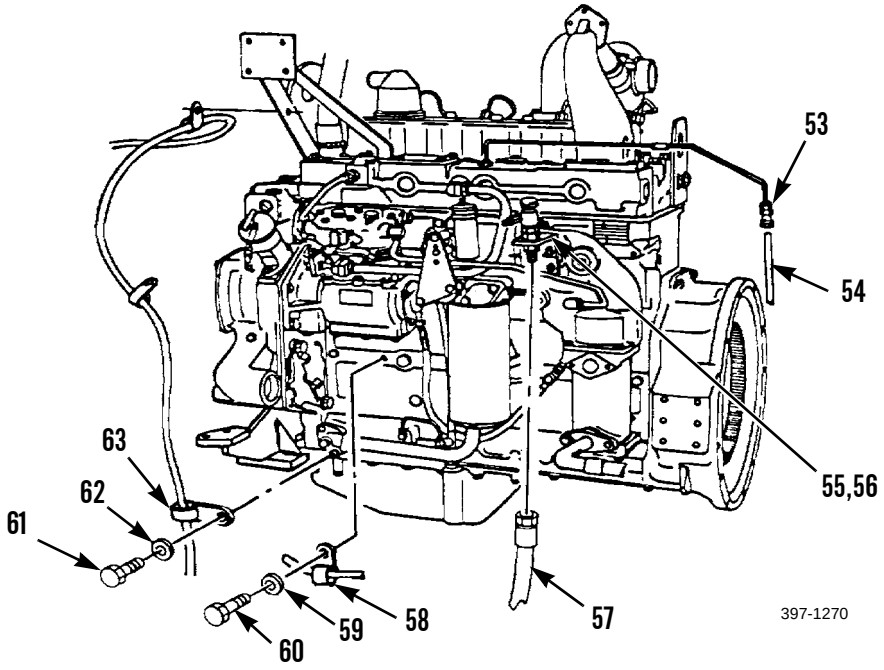
ENGINE REPLACEMENT - CONTINUED **0267 00**

INSTALLATION - CONTINUED

NOTE

Route engine wiring harness between engine block and oil gauge tube.

13. Install clip (63), washer (62), and bolt (61).
14. Install clip (58), washer (59), and bolt (60).
15. Connect oil sampling valve tube assemblies (53 and 54).

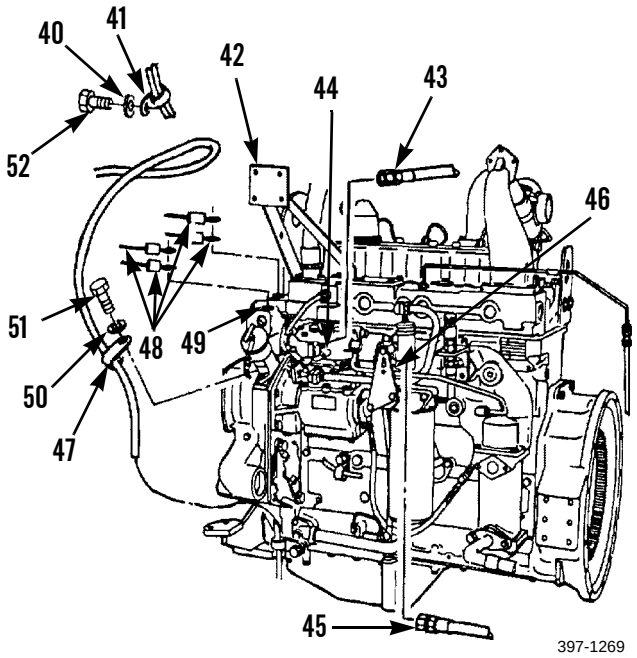


INSTALLATION - CONTINUED

NOTE

Bring wire assemblies behind coolant tube for transmission oil cooler, located behind air compressor.

16. Connect three wire assemblies (48) on coolant temperature switches (49).
17. Install clip (47), washer (50), and bolt (51).
18. Install clip (42), washer (40), and bolt (52) to supplemental steering motor mounting bracket (41).
19. Connect hose assembly (45) to air compressor governor (46).
20. Connect hose assembly (43) to air compressor (44).



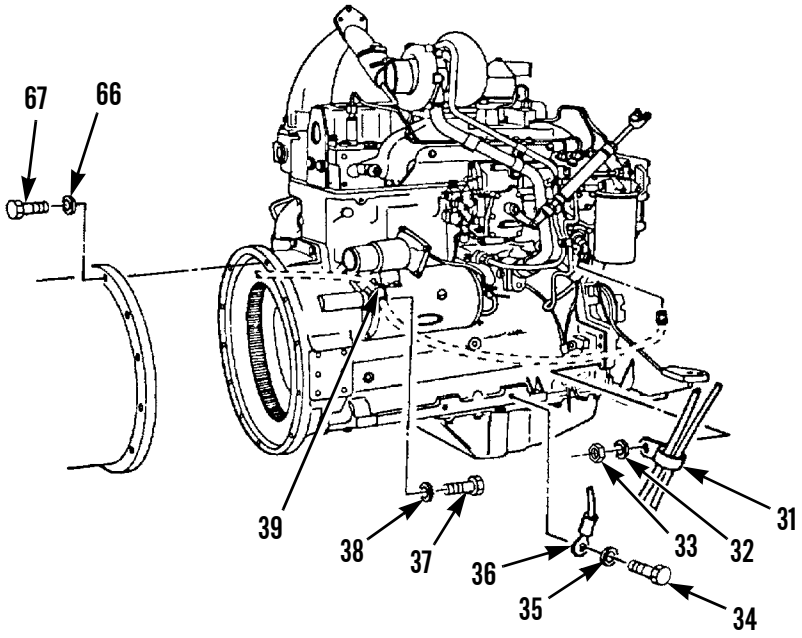
INSTALLATION - CONTINUED

21. Install 10 of 12 new lockwashers (66) and bolts (67).
22. Install clip (39), washer (38), and bolt (37).
23. Position wire assembly (36).
24. Install washer (37) and bolt (36).

NOTE

Secure cables to backside of engine front cover.

25. Install clip (31), washer (32), and nut (33).



397-2504

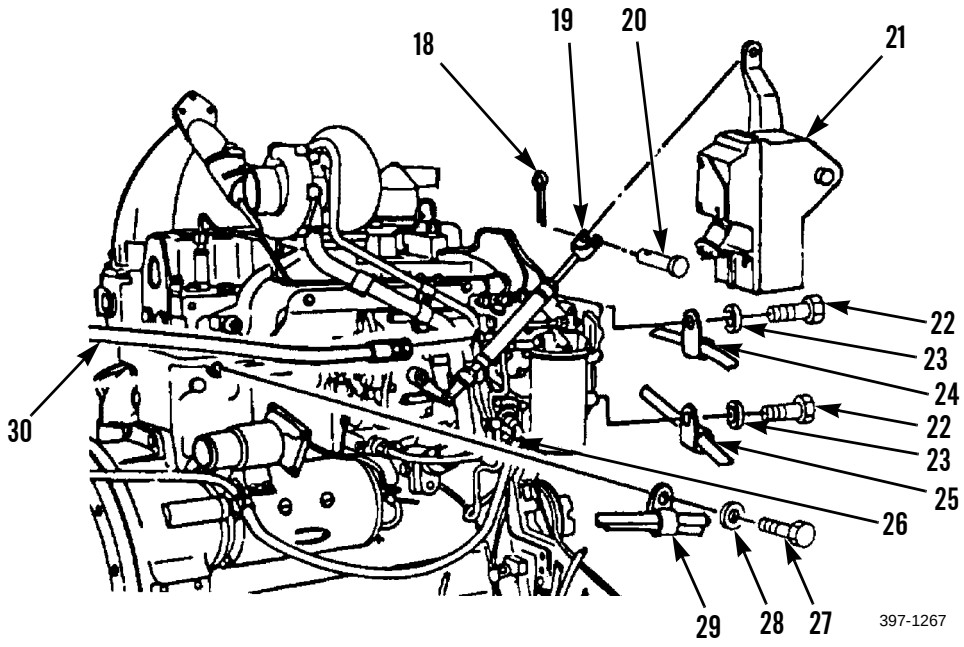
INSTALLATION - CONTINUED

26. Position governor control assembly (21).
27. Position three washers (23) and bolts (22).

NOTE

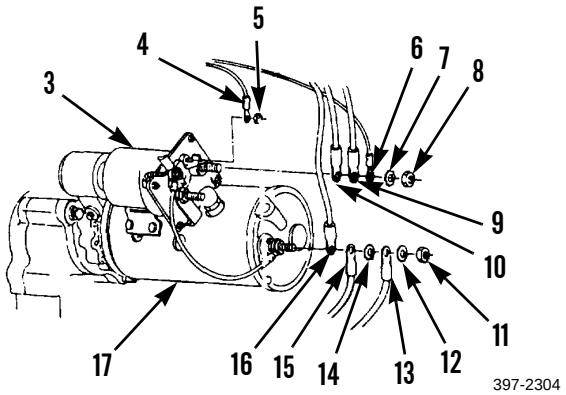
Secure hose, cables, and governor control housing to engine front cover.

28. Install clips (24 and 25), three washers (23), and bolts (22).
29. Position linkage assembly (19) on lever of governor control assembly (21).
30. Install pin (20) and new cotter pin (18).
31. Connect fuel transfer pump hose assembly (30).
32. Connect fuel injection pump hose assembly (26).
33. Install clip (29), washer (28), and bolt (27) securing three starting motor cables.

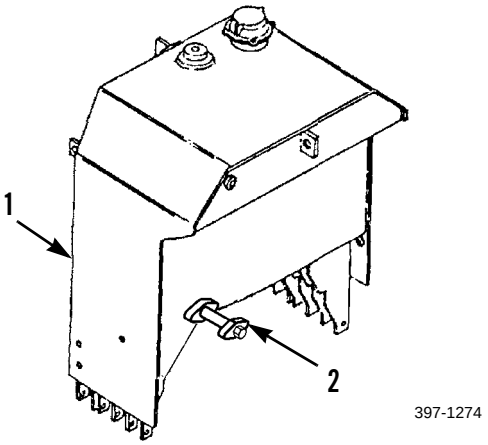


INSTALLATION - CONTINUED

34. Install cable assemblies (15 and 16), new lockwasher (14), cable assembly (13), new lockwasher (12), and nut (11) to starting motor (17). Tighten nut to 22 lb-ft (30 Nm).
35. Install cable assemblies (9 and 10), wire assembly (6), new lockwasher (7), and nut (8) to solenoid "battery" terminal. Tighten nut to 22 lb-ft (30 Nm).
36. Install wire assembly (4) at terminal and nut (5) on "S" terminal of solenoid (3).



37. Open fuel shutoff valve (2) on fuel tank (1) to turn fuel on.



38. Install hydraulic pump drive (WP 0232 00).
39. Install fuel pressure switch (WP 0115 00).
40. Install exhaust muffler and pipe (WP 0051 00).
41. Install turbocharger lines and hoses (WP 0039 00).
42. Connect transmission oil cooler line (WP 0298 00).
43. Connect compressor line to air dryer (WP 0164 00).
44. Connect heater hoses to engine (WP 0211 00).
45. Install air cleaner body (WP 0038 00).
46. Install fuel tank (WP 0044 00).
47. Install supplemental steering motor (with pump) (WP 0091 00).
48. Install engine compartment dash plate (WP 0183 00).
49. Install radiator inlet and outlet tubes (WP 0057 00).
50. Refill radiator to proper level (WP 0065 00).
51. Refill engine oil crankcase to proper level (WP 0024 00).
52. Install battery cables (WP 0024 00).
53. Remove articulation anti-pivot pin (TM 5-3805-261-10).
54. Turn disconnect switch to ON position and start engine (TM 5-3805-261-10).
55. Check for leaks.
56. Stop engine.

END OF WORK PACKAGE

ENGINE MOUNTING AND TRUNNION REPLACEMENT 0268 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Detergent (Item 11, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

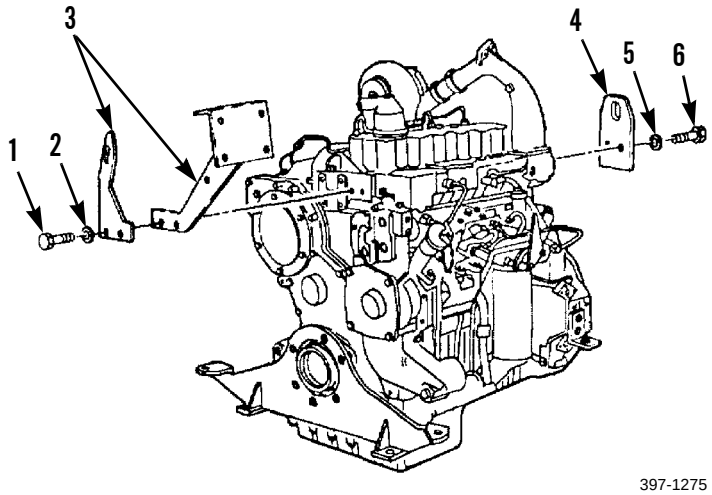
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hub drive removed (WP 0271 00)

REMOVAL

1. Remove two screws (1), washers (2), and plates (3) from top-front of engine.
2. Remove two screws (6), washers (5), and plate (4) from top-rear of engine.

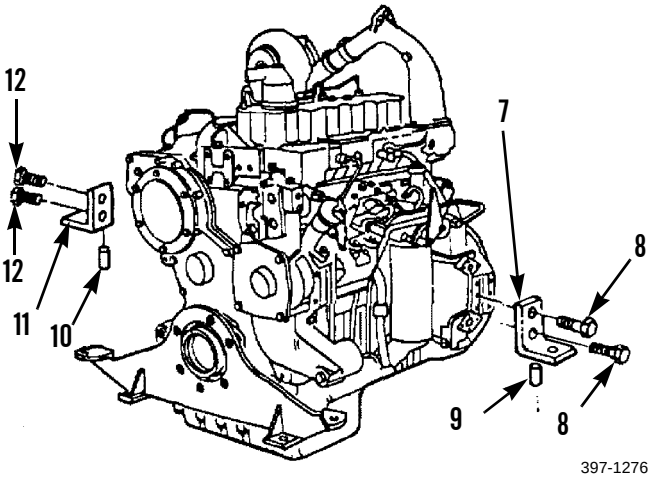


397-1275

ENGINE MOUNTING AND TRUNNION REPLACEMENT - CONTINUED 0268 00

REMOVAL - CONTINUED

3. Remove two bolts (8) and bracket (7) from bottom-rear of engine.
4. Remove dowel (9) from bracket (7).
5. Remove two bolts (12) and bracket (11) from bottom-rear of engine.
6. Remove dowel (10) from bracket (11).



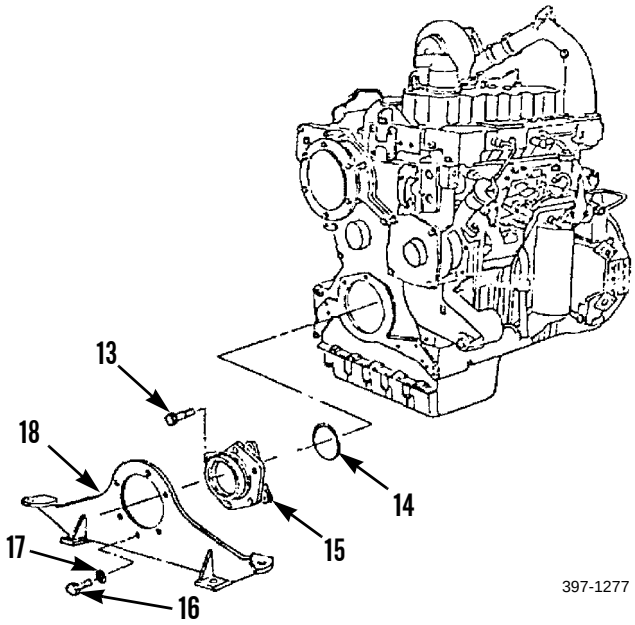
397-1276

7. Remove six bolts (16), washers (17), and support (18) from bottom-front of engine.

CAUTION

Use care when removing and installing trunnion to prevent damage to crankshaft front seal.

8. Remove three bolts (13), trunnion (15), and preformed packing (14) as an assembly. Discard preformed packing.



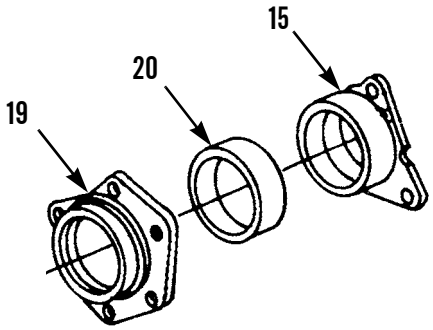
397-1277

DISASSEMBLY

NOTE

Do not disassemble trunnion assembly unless preformed packing is worn or defective.

9. Remove trunnion (15) and preformed packing (20) from support (19). Discard preformed packing.



397-1278

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

NOTE

If trunnion preformed packing was replaced, go to step 1. If preformed packing was not replaced, go to step 2.

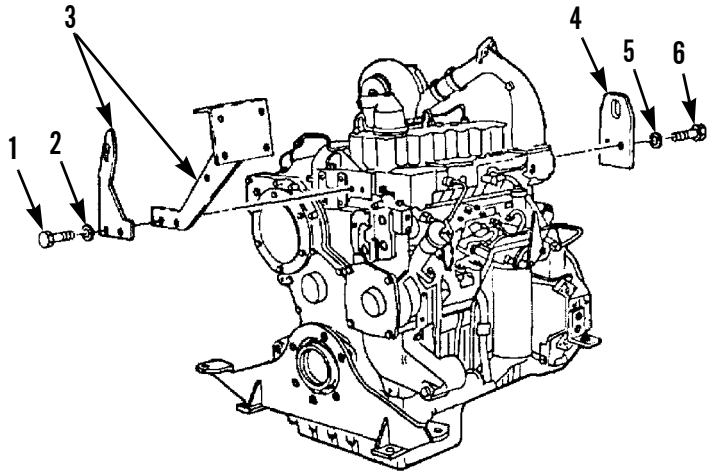
1. Install new preformed packing (20) in support (19). Preformed packing must be recessed 0.040 to 0.080 in. (1.02 to 2.03 mm) from back edge of support.
2. Lubricate inner surface of preformed packing (20) with 3 percent detergent solution to facilitate trunnion (15) installation.
3. Install trunnion (15) in support (19).

INSTALLATION

1. Install new preformed packing (14), trunnion (15), and three bolts (13).
2. Install support (18), six washers (17), and bolts (16).
3. Install dowel (10) on bracket (11).
4. Install bracket (11) and two bolts (12) on bottom-rear of engine.
5. Install dowel (9) on bracket (7).
6. Install bracket (7) and two bolts (8) on bottom-rear of engine.

INSTALLATION - CONTINUED

7. Install plate (4), two washers (5), and screws (6) on top-rear of engine.
8. Install two plates (3), washers (2), and screws (1) on top-front of engine.



9. Install hub drive (WP 0271 00).

END OF WORK PACKAGE

ENGINE FRONT COVERS REPLACEMENT 0269 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Gasket cement (Item 16, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket (2)

Packing, preformed

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

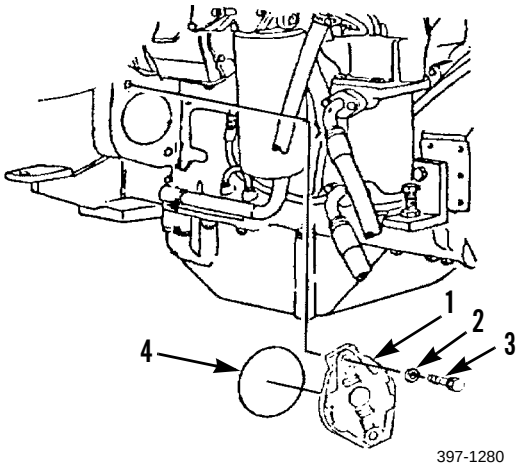
Engine mounting and trunnion removed (WP 0268 00)

Water pump removed (WP 0060 00)

Air compressor removed (WP 0317 00)

REMOVAL

1. Remove two bolts (3), washers (2), and cover (1).
2. Remove preformed packing (4) from cover (1). Discard preformed packing.



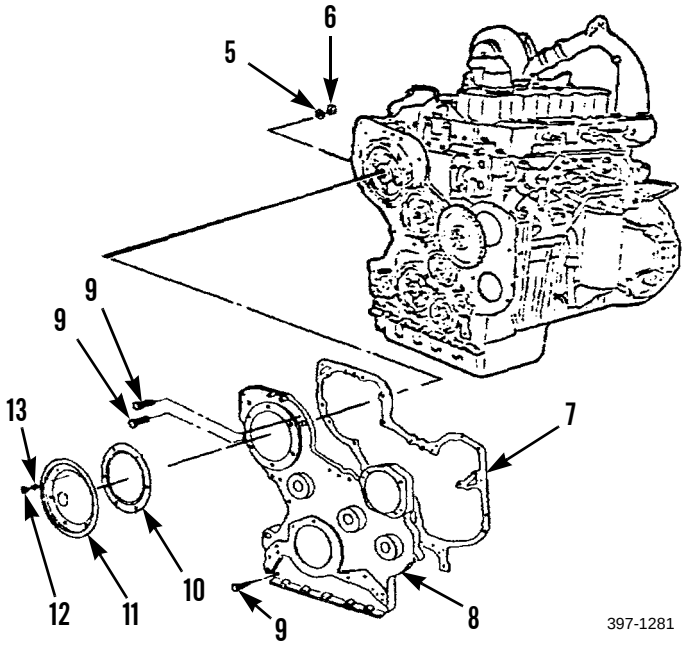
397-1280

REMOVAL - CONTINUED

NOTE

Mark all bolts to ensure that they are installed in their original positions during installation.

3. Remove six nuts (12) and washers (13).
4. Remove cover (11) and gasket (10). Discard gasket.
5. Remove 21 bolts (9), nuts (6), and washers (5).
6. Remove cover (8) and gasket (7). Discard gasket.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

NOTE

- Position new gasket on timing gear plate and cut gasket even with bottom face of cylinder block before installing.
- Gasket cement is applied to bottom of gasket where it contacts oil pan plate gasket.

1. Apply gasket cement to bottom of new gasket (7) and install new gasket.

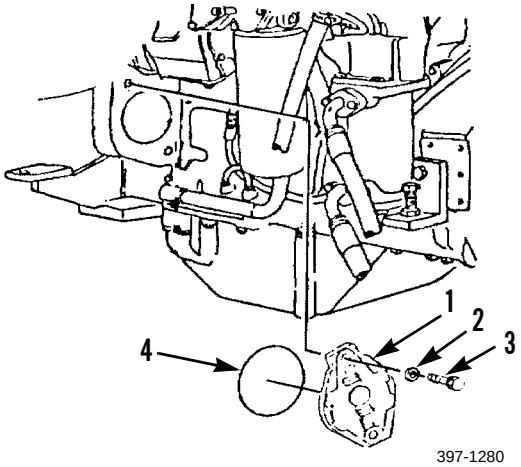
NOTE

Position timing gear cover on timing gear plate.

2. Install timing gear cover (8).
3. Install 21 bolts (9), washers (5), and nuts (6). Tighten nuts to 14 to 20 lb-ft (19 to 27 Nm).

INSTALLATION - CONTINUED

4. Install new preformed packing (4), cover (1), two washers (2), and bolts (3).



5. Install air compressor (WP 0317 00).
6. Install water pump (WP 0060 00).
7. Install engine mounting and trunnion (WP 0268 00).

END OF WORK PACKAGE

CYLINDER BLOCK HEAD ASSEMBLY MAINTENANCE 0270 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 97, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

Lifting device, 150-lb capacity

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Detergent (Item 11, WP 0349 00)

Oil, lubricating (Item 27, 28, or 29, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket (4)

Packing, preformed

Plug (12)

Seal (16)

Personnel Required

Two

References

WP 0020 00

WP 0235 00

WP 0274 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hood removed (WP 0181 00)

Air cleaner body removed (WP 0038 00)

Turbocharger air lines removed (WP 0039 00)

Temperature regulator (thermostat) removed (WP 0059 00)

Coolant switch removed (WP 0114 00)

Ether aid switch removed (WP 0114 00)

Supplemental steering pump motor removed (WP 0091 00)

Rocker arm assembly removed (WP 0273 00)

Exhaust manifold removed (WP 0277 00)

Fuel injector nozzles removed (WP 0278 00)

REMOVAL

CAUTION

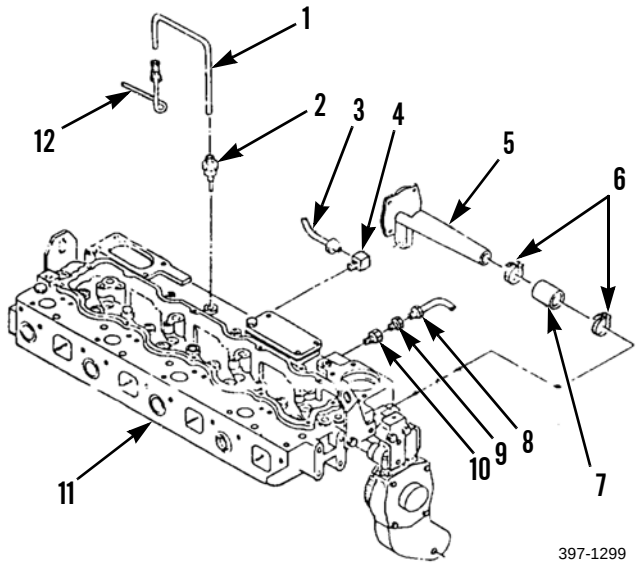
Cap all hose and tube ends to prevent contamination.

NOTE

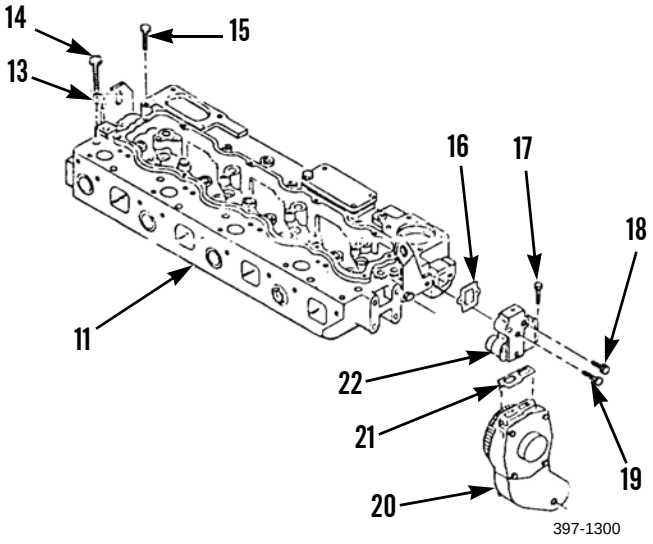
Tag all hose and tube assemblies before disconnecting to aid in installation.

REMOVAL - CONTINUED

1. Remove tube (1) from tube assembly (12) and atomizer (2) on top-left side of engine.
2. Remove atomizer (2) from cylinder head (11).
3. Disconnect tube assembly (3).
4. Remove elbow (4).
5. Disconnect tube assembly (8).
6. Remove connector (9) and bushing (10).
7. Loosen two clamps (6) on left side of engine.
8. Remove hose (7) from pipe (5).



9. Remove bolts (18 and 19) and two bolts (17) from front-left side of engine.
10. Separate elbow (22) from cylinder block head (11) and water pump (20).
11. Remove and discard gaskets (16 and 21).
12. Remove five screws (15), 14 bolts (14), and washers (13) from top of cylinder block head (11).



WARNING

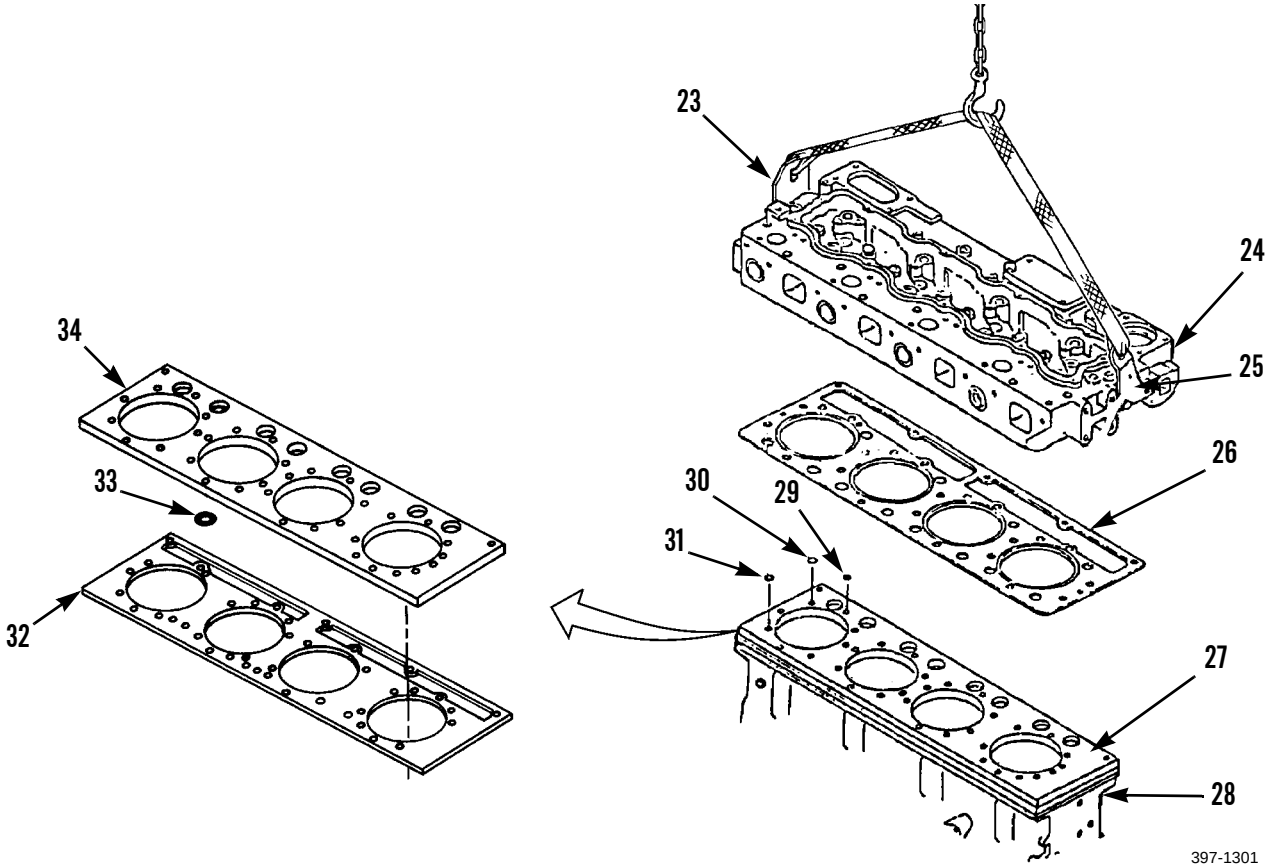
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury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

REMOVAL - CONTINUED

NOTE

Cylinder block head assembly weighs 129 lb (59 kg).

13. Attach sling to plates (23 and 25).
14. Remove cylinder block head assembly (24) from block (28), using sling.



CAUTION

Do not set machined surfaces of cylinder block head assembly on an abrasive surface. Concrete and abrasive metal surfaces can scratch and cause damage to the cylinder block head assembly.

15. Detach sling from plates (23 and 25). Do not remove plates.
16. Remove gasket (26), plate (34), preformed packing (33), gasket (32), preformed packing (29), four seals (30), and 12 seals (31) from top of engine. Discard gaskets, preformed packings, and seals.

DISASSEMBLY

1. Remove four bolts (35), washers (36), cover (37), and gasket (38). Discard gasket.

NOTE

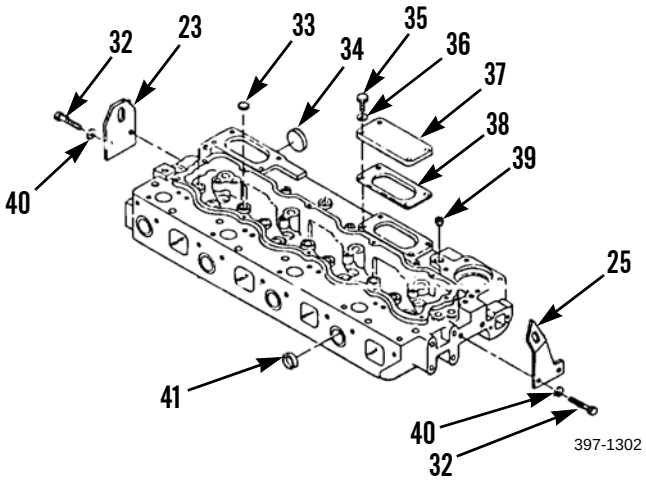
Plates can remain installed on cylinder block head assembly to facilitate installation.

2. Remove four screws (32), washers (40), and plates (23 and 25).
3. Remove three plugs (39).

NOTE

To remove plugs, drill hole through plug and pry out.

4. Remove and discard four plugs (33 and 34) and eight plugs (41).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

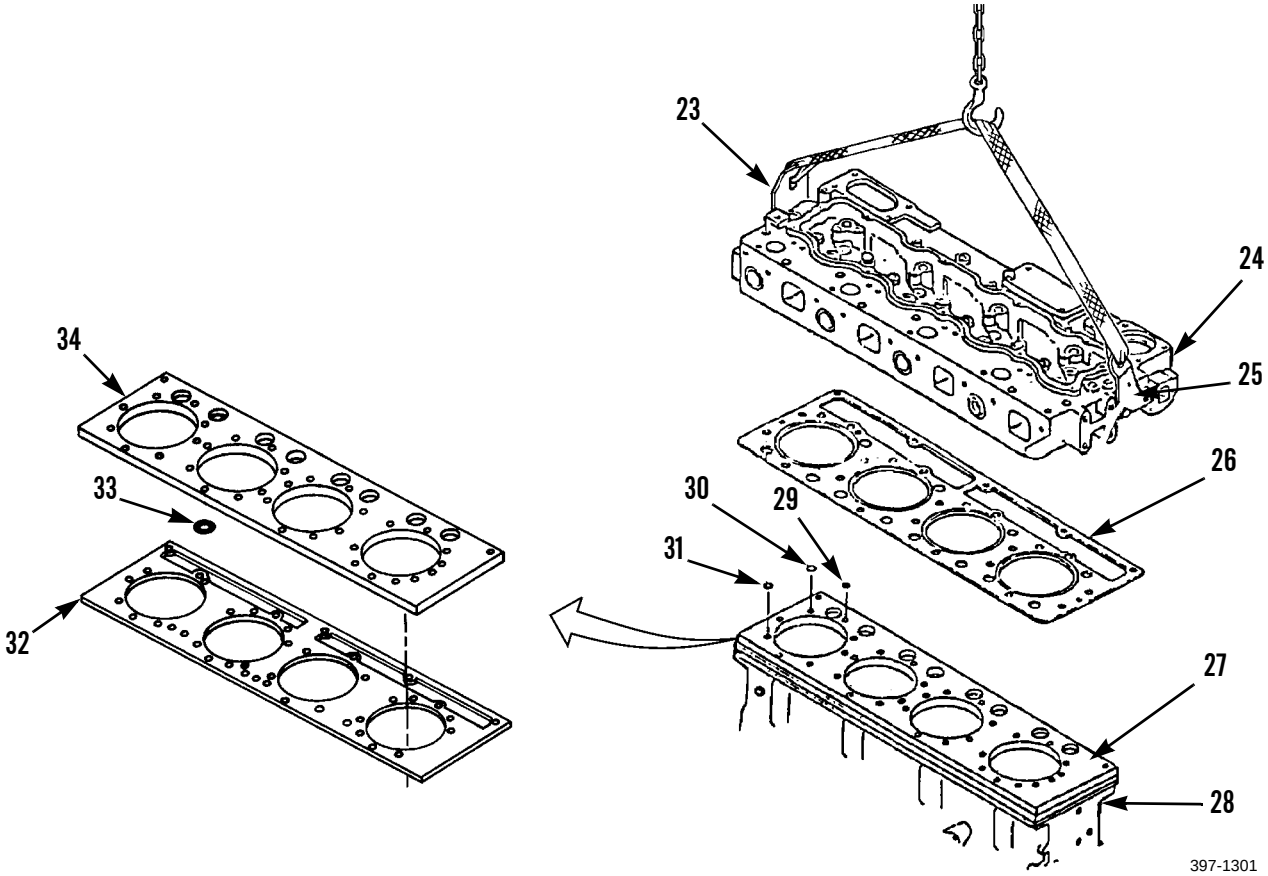
ASSEMBLY

1. Reduce temperature of eight new plugs (41) and four new plugs (33 and 34) and install using driver and hammer.
2. Install three plugs (39).
3. Install plates (23 and 25), four washers (40), and screws (32).
4. Install new gasket (38), cover (37), four washers (36), and bolts (35).

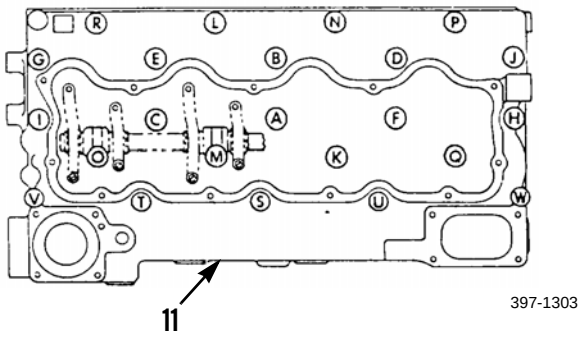
CYLINDER BLOCK HEAD ASSEMBLY MAINTENANCE - CONTINUED 0270 00

INSTALLATION

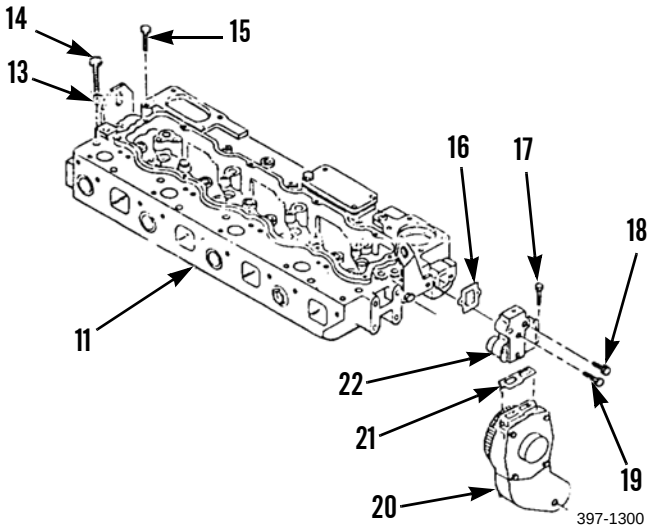
1. Position 12 new seals (31), four new seals (30), and new preformed packing (29) on spacer plate (27).
2. Install new gasket (32), new preformed packing (33), plate (34), and new gasket (26) over spacer plate (27) on dowels in block.
3. Attach sling.
4. Position cylinder block head assembly (24) over engine using sling, align with dowels in block (28), and install.



INSTALLATION - CONTINUED

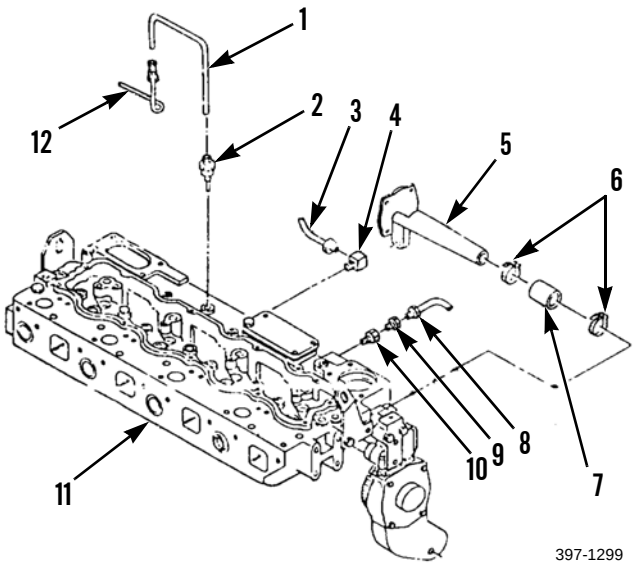


5. Install 14 washers (13) and bolts (14), and five screws (15) loosely on cylinder head (11). Lubricate threads on five screws with oil.
6. Install rocker arm assembly (WP 0273 00).
7. Tighten cylinder block head (11) bolts A through R in letter sequence to 115 lb-ft (156 Nm).
8. Tighten bolts A through R to 185 lb-ft (291 Nm).
9. Tighten bolts A through R again in letter sequence to 185 lb-ft (251 Nm).
10. Tighten bolts S through W in letter sequence to 32 lb-ft (43 Nm).
11. Adjust valves (WP 0274 00).
12. Position new gaskets (16 and 21) and elbow (22) on left-front of engine.
13. Install two bolts (17) and bolts (18 and 19).



INSTALLATION - CONTINUED

14. Position two clamps (6) on hose (7), slide hose (7) on pipe (5), and tighten two clamps (6).
15. Install bushing (10), connector (9), and tube assembly (8).
16. Install elbow (4) and connect hose assembly (3).
17. Install atomizer (2) to top-left of cylinder block head (11).
18. Install tube (1) on tube assembly (12) and atomizer (2).



19. Remove sling.
20. Install fuel injector nozzles (WP 0278 00).
21. Install exhaust manifold (WP 0277 00).
22. Install rocker arm assembly (WP 0273 00).
23. Install supplemental steering pump motor (WP 0091 00).
24. Install ether aid switch (WP 0114 00).
25. Install coolant switch (WP 0114 00).
26. Install temperature (thermostat) regulator (WP 0059 00).
27. Install turbocharger air lines (WP 0039 00).
28. Install air cleaner body (WP 0038 00).
29. Install hood (WP 0181 00).

END OF WORK PACKAGE

HUB DRIVER REPLACEMENT 0271 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Puller (Item 54, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

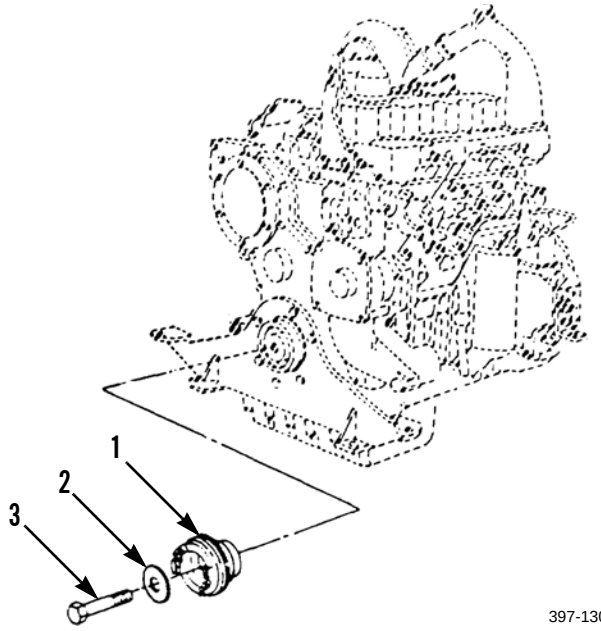
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Engine removed (WP 0267 00)

REMOVAL

1. Loosen bolt (3) at front of engine. Do not remove.
2. Use puller to loosen hub (1) from crankshaft.
3. Remove bolt (3), washer (2), and hub (1).

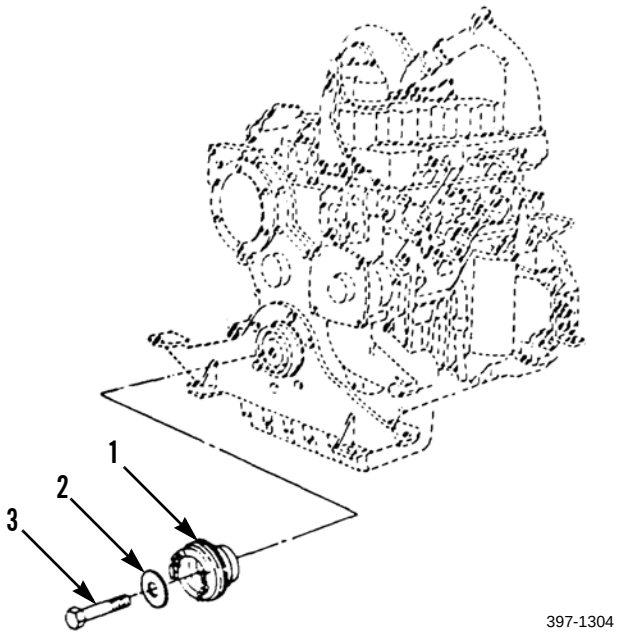


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Position hub (1) on crankshaft.
2. Install washer (2) and bolt (3). Tighten bolt to 230 lb-ft (312 Nm). Tap with hammer. Retighten bolt to 230 lb-ft (312 Nm).



3. Install engine (WP 0267 00).

END OF WORK PACKAGE

FLYWHEEL AND FLYWHEEL HOUSING REPLACEMENT 0272 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Bracket, lifting (Item 10, WP 0348 00)

Bracket, link (2) (Item 18, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

1/2-13NC guide bolt (2)

5/8-18NF guide bolt (2)

Lifting device, 150-lb capacity

Materials/Parts

Gasket cement (Item 16, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Engine removed (WP 0267 00)

Starting motor removed (WP 0067 00)

Oil pan and plate removed (WP 0275 00)

REMOVAL

1. Remove plugs (1 and 4) from rear of engine.
2. Using scriber, matchmark flywheel assembly (2) and crankshaft at same location.
3. Install two link brackets and 3/8-16-2B bolt on flywheel assembly (2).

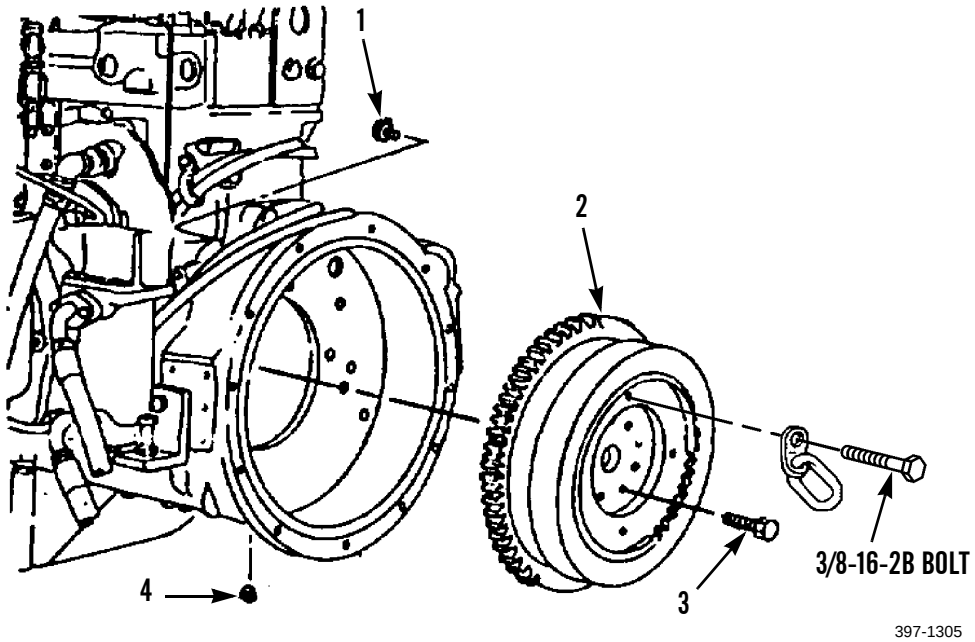
WARNING

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

NOTE

Flywheel assembly weighs 120 lb (54 kg).

4. Attach sling to link brackets.
5. Install 5/8-18NF guide bolts.
6. Remove seven screws (3).
7. Remove two screws (3).
8. Use sling to remove flywheel assembly (2).
9. Remove sling and link bracket.



397-1305

REMOVAL - CONTINUED

10. Install two link brackets and 3/8-16-2B bolts on flywheel housing (6).

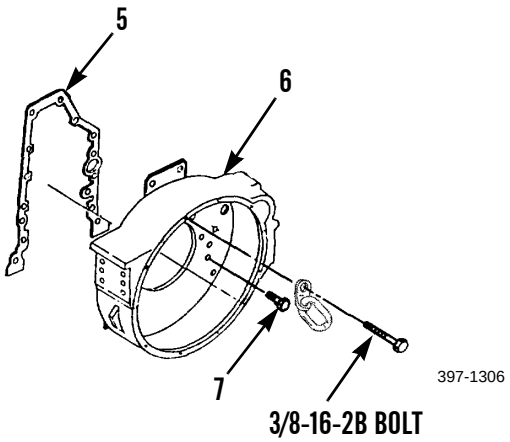
WARNING

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

NOTE

Flywheel housing weighs 86 lb (40 kg).

11. Attach sling to link brackets.
12. Remove 13 bolts (7).
13. Remove flywheel housing (6), using sling.
14. Remove gasket (5) and discard.
15. Remove sling, two 3/8-16-2B bolts, and link brackets.

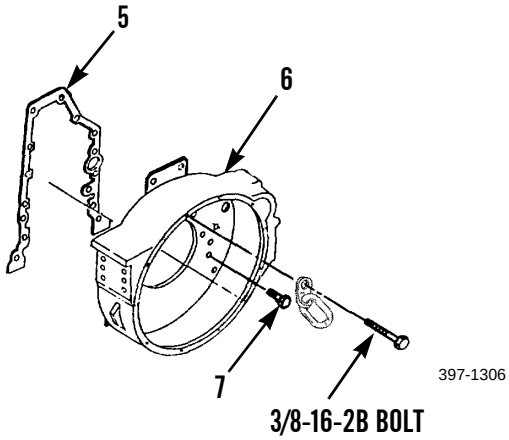


CLEANING AND INSPECTION

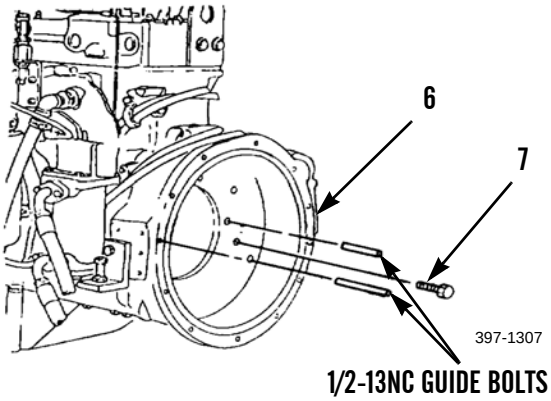
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Apply gasket cement to gasket (5).
2. Position new gasket (5) on rear of engine block.
3. Install two link brackets and 3/8-16-2B bolts on flywheel housing (6).
4. Attach sling to link brackets.
5. Install two 1/2-13NC guide bolts.
6. Position flywheel housing (6) on 1/2-13NC guide bolts, using sling.
7. Install 11 of 13 bolts (7).
8. Remove two 1/2-13NC guide bolts.
9. Install remaining two of 13 bolts (7).



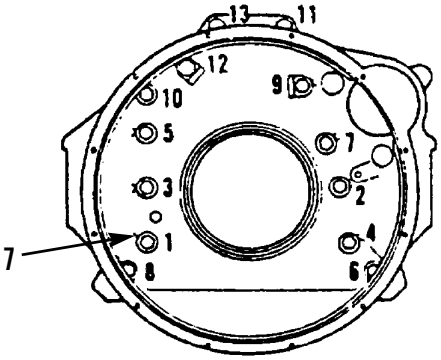
397-1306



397-1307

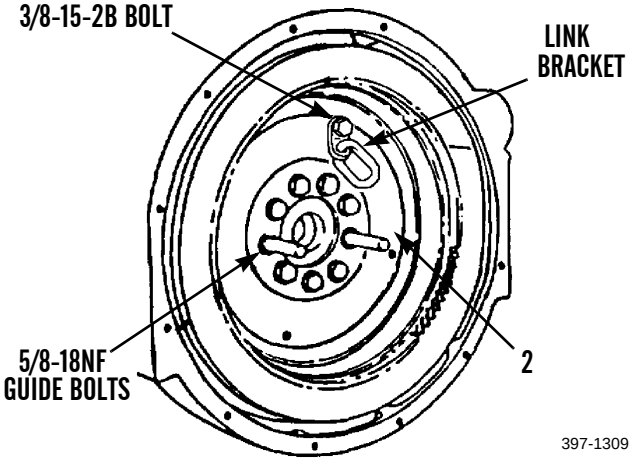
INSTALLATION - CONTINUED

10. Tighten 13 bolts (7), in sequence, to 75 lb-ft (102 Nm).
11. Trim new gasket (5) even with bottom of cylinder block and flywheel housing (6).
12. Remove sling, two 3/8-16-2B bolts, and link brackets.



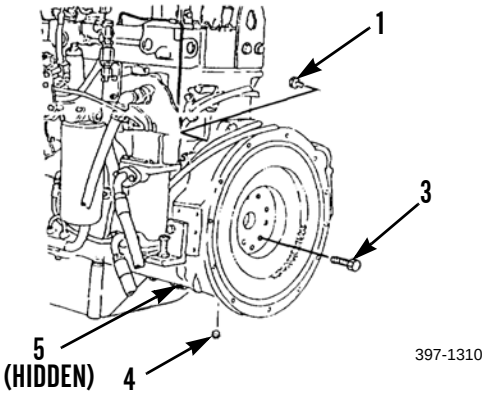
397-1308

13. Install two 5/8-18NF guide bolts in end of crankshaft.
14. Install link brackets and 3/8-16-2B bolt on flywheel assembly (2).
15. Attach sling to link brackets.
16. Position flywheel assembly (2) over end of crankshaft, using sling.
17. Align matchmarks on flywheel assembly (2) and crankshaft.
18. Position flywheel assembly (2) on two 5/8-18NF guide bolts, using sling.



397-1309

19. Install seven of nine screws (3).
20. Remove two 5/8-18NF guide bolts.
21. Install remaining two screws (3).
22. Install plugs (1 and 4).
23. Remove sling, 3/8-16-2B bolt, and link brackets.



397-1310

24. Install oil pan and plate (WP 0275 00).
25. Apply gasket cement to bottom of gasket (5), where gasket contacts oil pan plate.
26. Install starting motor (WP 0067 00).
27. Install engine (WP 0267 00).

END OF WORK PACKAGE

ROCKER ARM ASSEMBLY MAINTENANCE 0273 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Gear, engine turning (Item 28, WP 0348 00)

Housing, gear shaft (Item 31, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

3/8-16NC bolt

Magnet

Materials/Parts

Antiseize compound, (Item 6, WP 0349 00)

Oil, lubricating (Item 26, 27, or 30 WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Materials/Parts - Continued

Plug (2)

Ring, retaining

Washer, spring tension (2)

References

WP 0020 00

WP 0067 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Valve cover removed (WP 0031 00)

REMOVAL

NOTE

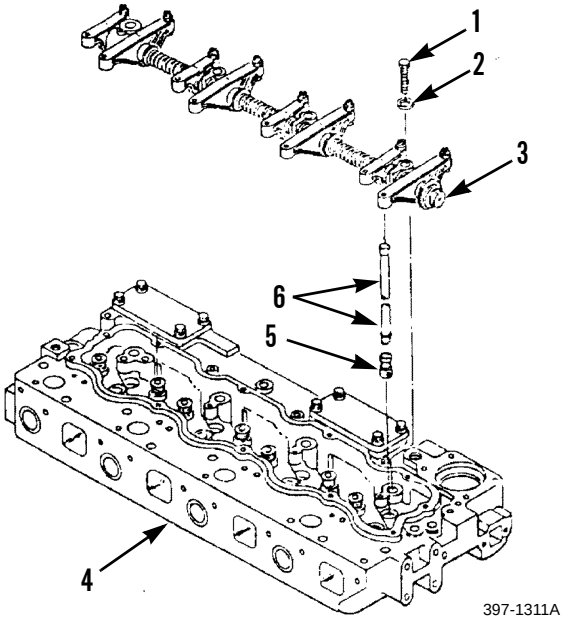
Remove parts only as necessary to replace damaged parts.

1. Remove four bolts (1) and washers (2) from top of cylinder head (4).
2. Lift valve mechanism assembly (3) straight up to remove.

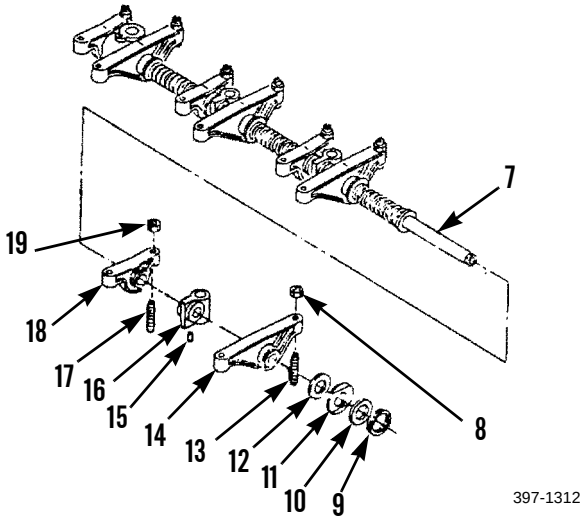
NOTE

ID each push rod and tappet during removal, to facilitate installation.

3. Remove eight push rods (6).
4. Use magnet to remove eight tappets (5).
5. Remove retaining ring (9), washer (10), spring tension washer (11), and washer (12). Discard spring tension washer and retaining ring.

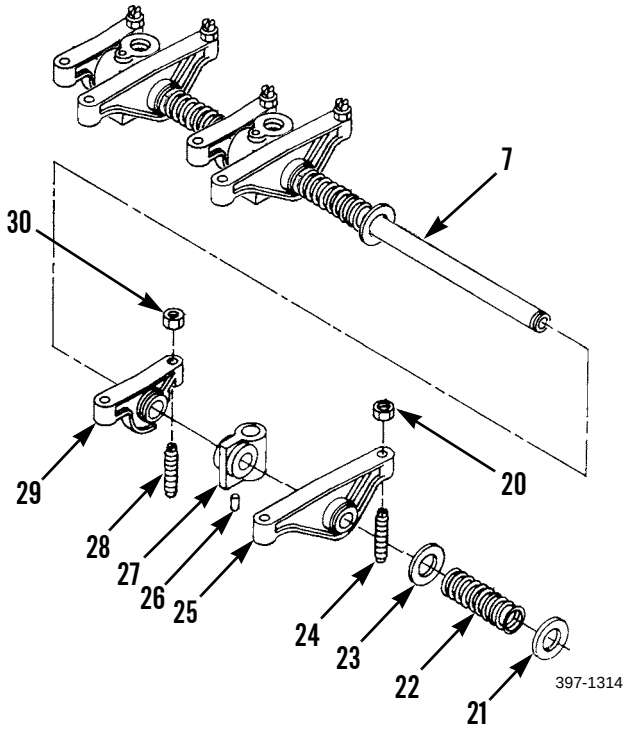


6. Remove rocker arm assembly (14) from shaft (7).
7. Remove nut (8) and screw (13) from rocker arm assembly (14).
8. Remove bracket (16).
9. Remove pin (15) from bracket (16).
10. Remove rocker arm (18).
11. Remove nut (19) and screw (17) from rocker arm assembly (18).

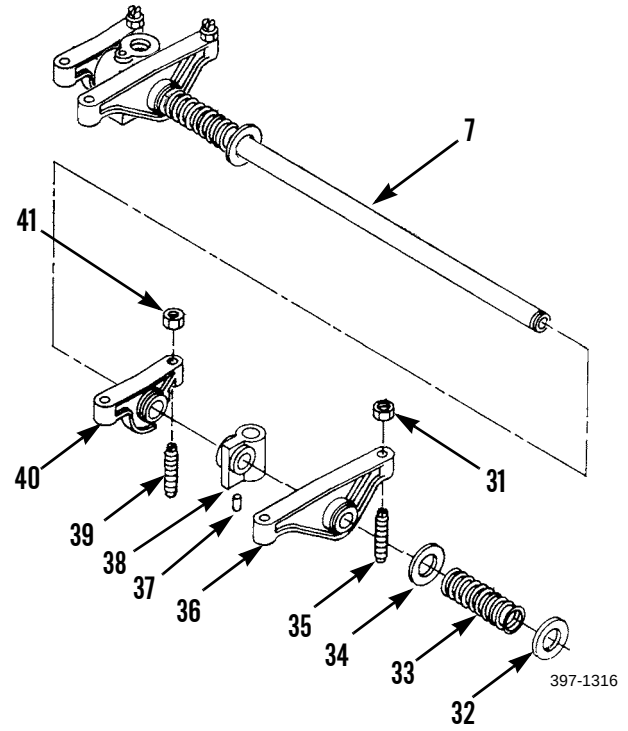


REMOVAL - CONTINUED

12. Remove washer (21), spring (22), and washer (23).
13. Remove rocker arm assembly (25).
14. Remove nut (20) and screw (24) from rocker arm (25).
15. Remove bracket (27).
16. Remove pin (26) from bracket (27).
17. Remove rocker arm assembly (29).
18. Remove nut (30) and screw (28) from rocker arm (29).

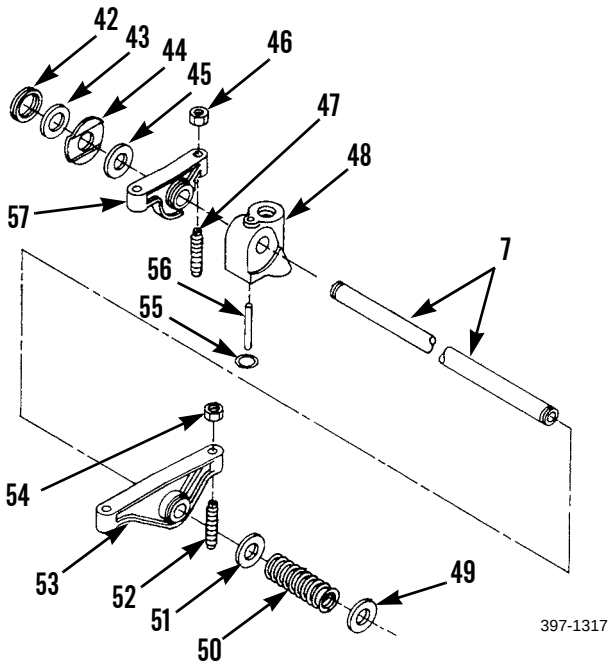


19. Remove washer (32), spring (33), and washer (34).
20. Remove rocker arm assembly (36).
21. Remove nut (31) and screw (35) from rocker arm (36).
22. Remove bracket (38).
23. Remove pin (37) from bracket (38).
24. Remove rocker arm assembly (40).
25. Remove nut (41) and screw (39) from rocker arm (40).



REMOVAL - CONTINUED

26. Remove washer (49), spring (50), and washer (51).
27. Remove rocker arm assembly (53).
28. Remove nut (54) and screw (52) from rocker arm (53).
29. Remove bracket assembly (48).
30. Remove preformed packing (55) from bracket (48) and discard.
31. Remove shaft (56) from bracket (48).
32. Remove rocker arm assembly (57).
33. Remove nut (46) and screw (47) from rocker arm (57).

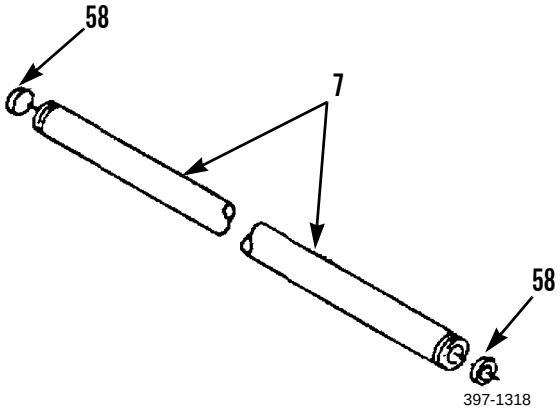


34. Remove washer (45), spring tension washer (44), washer (43), and ring (42) from shaft (7). Discard spring tension washer.

NOTE

To remove plugs, drill and pry out.

35. Remove two plugs (58) from shaft (7) and discard.



CLEANING AND INSPECTION

1. Clean and inspect all parts in accordance with WP 0020 00.
2. Inspect for damaged or bent push rods.

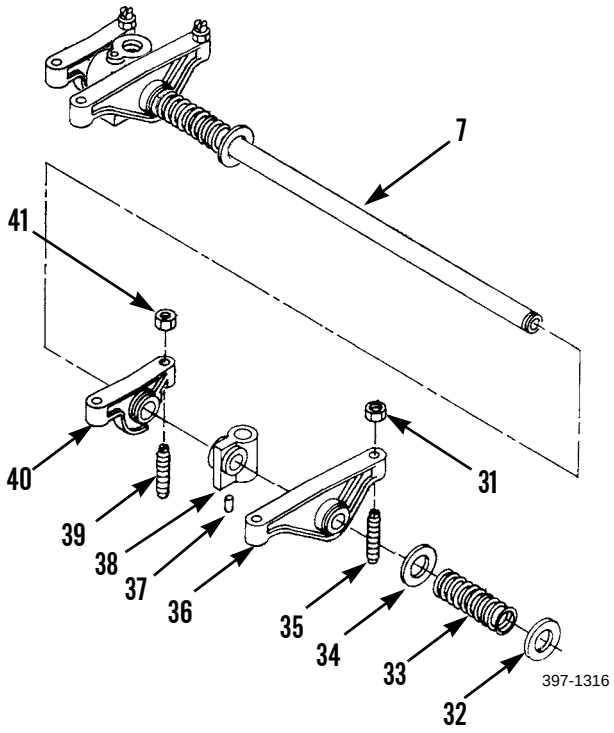
INSTALLATION

1. Install two new plugs (58) in ends of shaft (7). Tap in with hammer until flush with ends of shaft.
2. Install ring (42), washer (43), new spring tension washer (44), and washer (45) on shaft (7).
3. Install screw (47) and new locknut (46) on rocker arm (57). Hand-tighten locknut.
4. Install rocker arm assembly (57) on shaft (7).

NOTE

Align bracket with large hole on end.

5. Position bracket (48) on shaft (7).
6. Install shaft (56) in bracket (48). Shaft must extend 0.378 in. (9.60 mm) out of bracket.
7. Install new preformed packing (55) in bracket (48).
8. Install screw (52) and new locknut (54) on rocker arm (53). Hand-tighten locknut.
9. Install rocker arm assembly (53).
10. Install washer (51), spring (50), and washer (49) on shaft (7).
11. Install screw (39) and new nut (41) on rocker arm (40). Hand-tighten nut.
12. Install rocker arm assembly (40).
13. Install pin (37) in bracket (38); pin must extend 0.23 in. (5.8 mm) out of bracket.
14. Install bracket (38).
15. Install screw (35) and nut (31) on rocker arm (36). Hand-tighten nut.
16. Install rocker arm assembly (36).
17. Install washer (34), spring (33), and washer (32).



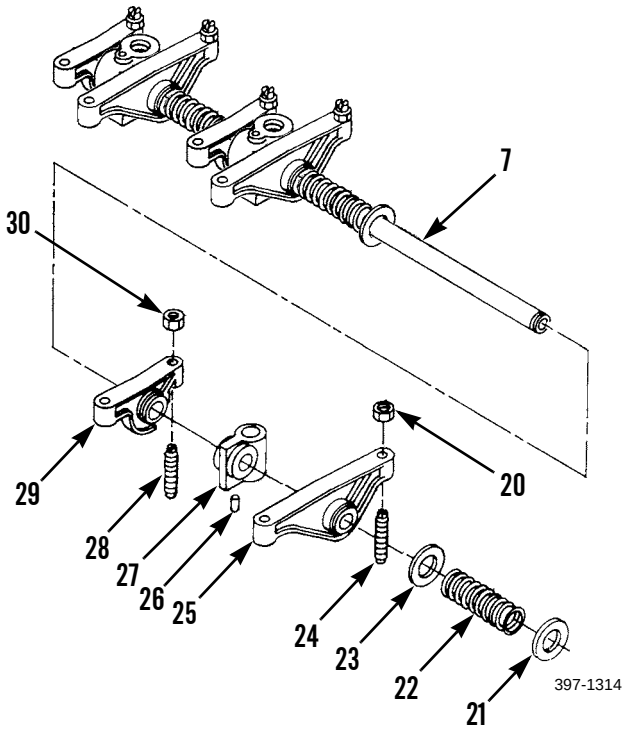
INSTALLATION - CONTINUED

18. Install screw (28) and nut (30) on rocker arm (29). Hand-tighten nut.
19. Install rocker arm assembly (29).
20. Install pin (26) in bracket (27).

NOTE

Pin must extend 0.23 in. (5.8 mm) out of bracket.

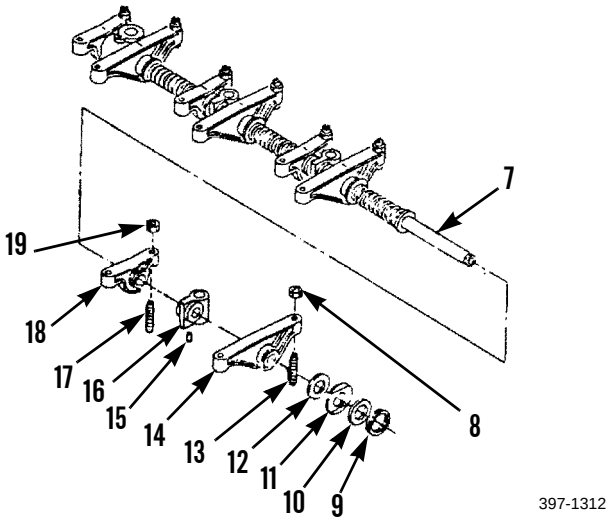
21. Install bracket assembly (27).
22. Install screw (24) and nut (20) on rocker arm (25). Hand-tighten nut.
23. Install rocker arm assembly (25).
24. Install washer (23), spring (22), and washer (21).
25. Install screw (17) and nut (19) on rocker arm (18). Hand-tighten nut.
26. Install rocker arm assembly (18) on shaft (7).



NOTE

Pin must extend 0.23 in. (5.8 mm) out of bracket.

27. Install pin (15) in bracket (16).
28. Install bracket (16).
29. Install screw (13) and nut (8) on rocker arm (14). Hand-tighten nut.
30. Install rocker arm assembly (14).
31. Install washer (12), spring tension washer (11), washer (10), and new retaining ring (9) on shaft (7).

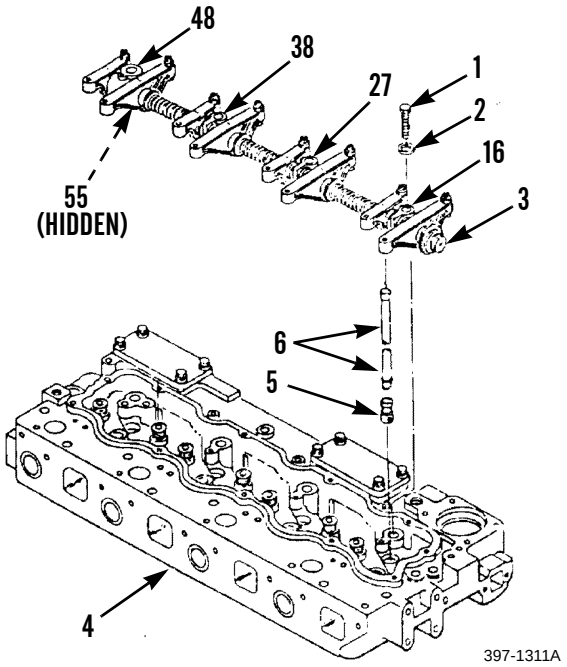


INSTALLATION - CONTINUED

NOTE

- Install push rods and tappets in original positions.
- Install flat end of tappets first and ball end of push rods to mate with tappets.

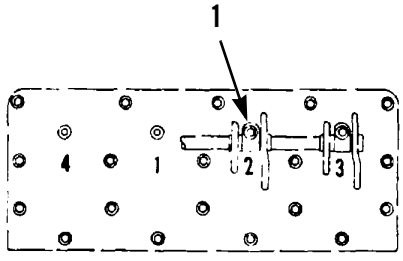
32. Lubricate eight tappets (5) and push rods (6) with oil and install in cylinder head (4) in original positions.
33. Cover threads of one bolt (1) with tape to protect preformed packing (55) in bracket (48).
34. Install washer (2) and bolt (1) with taped threads through bolt hole in bracket (48). Remove tape.
35. Install three washers (2) and bolts (1) through brackets (16, 27, and 38).
36. Apply antiseize compound to threads of four bolts (1).
37. Install valve mechanism assembly (3), bolts (1), and washers (2) on cylinder head (4) as an assembly.



CAUTION

Adjusting screws must be loose and seated on push rods before installing bolts.

38. Tighten four bolts (1) in sequence to 115 lb-ft (156 Nm).
39. Tighten four bolts (1) in sequence to 185 lb-ft (251 Nm).
40. Repeat tightening four bolts (1) in sequence to 185 lb-ft (251 Nm).



ADJUSTMENT

NOTE

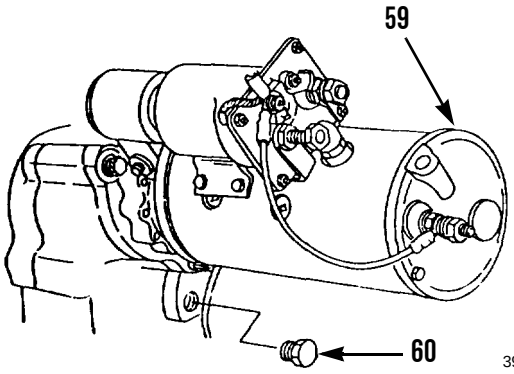
The following step is for locating number one cylinder Top Center (TC).

1. Remove starting motor (59) on right side of engine (WP 0067 00).
2. Install engine turning gear on starting motor mounting flange.

NOTE

In the following steps, the engine is viewed from the flywheel end.

3. Turn engine clockwise 30 degrees, using engine turning gear to remove timing gear play.
4. Remove plug (60).
5. Turn engine counterclockwise, using engine turning gear and ratchet. Look through hole where plug (60) was removed for threaded hole in flywheel where 3/8-16NC bolt can be installed. If hole is passed, repeat step 3.



397-1321

ADJUSTMENT - CONTINUED

NOTE

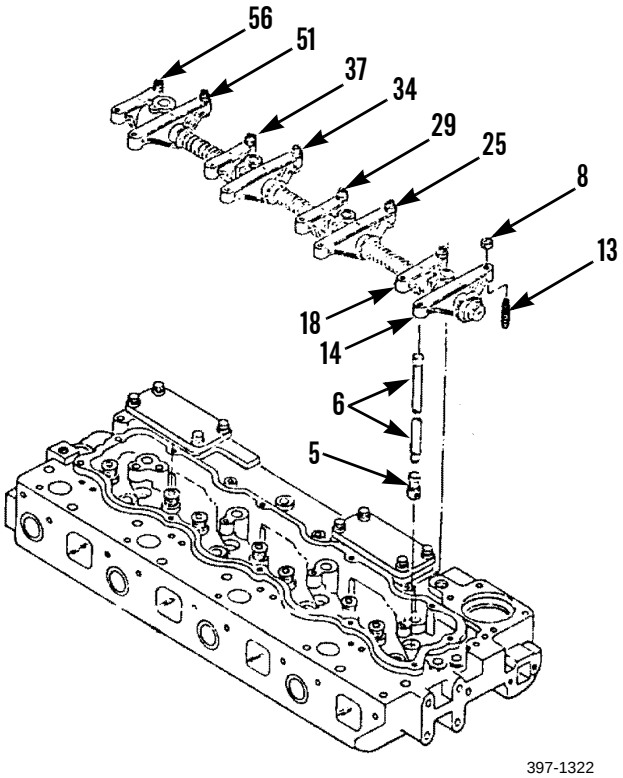
Number one cylinder must be at compression stroke for proper valve adjustment.

6. Check number one cylinder for compression stroke. Intake and exhaust valves must be closed. This can be checked by visually inspecting the valves and by movement in both rocker arms. If exhaust valve is open, remove 3/8-16NC bolt and turn engine 360 degrees.
7. Adjust intake valves for cylinders 1 and 2. Turn adjusting screws (13) in arms (18 and 29) until a clearance of 0.012 to 0.018 in. (0.30 to 0.46 mm) is obtained. Secure screws (13) with nuts (8).
8. Adjust exhaust valves for cylinders 1 and 3. Turn adjusting screws (13) in arms (14 and 34) until a clearance of 0.022 to 0.028 in. (0.56 to 0.71 mm) is obtained between arms (14 and 34) and push rods (6). Secure screws (13) with nuts (8).

NOTE

Remove 3/8-16NC bolt from flywheel before turning engine.

9. Turn engine counterclockwise 360 degrees. Verify that number 4 cylinder is at TC position.
10. Install 3/8-16NC bolt in flywheel.
11. Adjust intake valves for cylinders 3 and 4 by turning screws in arms (37 and 56). Repeat adjustment procedures in step 7.
12. Adjust exhaust valves for cylinders 2 and 4 by turning screws in arms (25 and 51). Repeat adjustment procedures in step 8.
13. Tighten eight nuts (8). Hold adjusting screws and tighten eight nuts to 22 lb-ft (30 Nm).



397-1322

14. Remove engine turning gear.
15. Remove 3/8-16NC bolt from flywheel housing.
16. Install valve cover (WP 0031 00).

END OF WORK PACKAGE

VALVES MAINTENANCE 0274 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Testing, Repair, Assembly, Installation, Testing

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Bushing driver, valve (Item 19, WP 0348 00)

Compressor, valve spring (Item 20, WP 0348 00)

Extractor, valve group (Item 25, WP 0348 00)

Gage, profile (Item 26, WP 0348 00)

Gage, profile (Item 27, WP 0348 00)

Tester, spring resiliency (Item 88, WP 0348 00)

Materials/Parts

Oil, lubricating (Item 27, 28, or 29 WP 0349 00)

Prussian blue (Item 34, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Materials/Parts - Continued

Tag, marker (Item 44, WP 0349 00)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

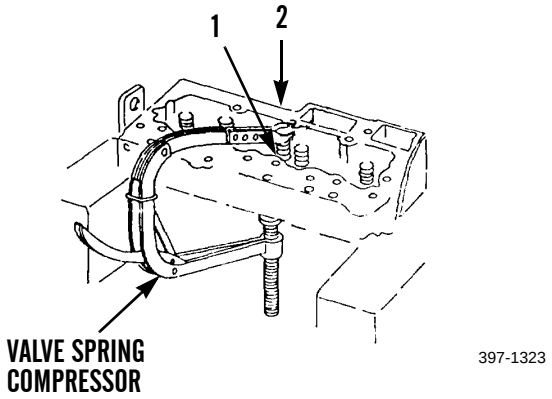
Cylinder block head removed (WP 0270 00)

REMOVAL

NOTE

The following maintenance procedure is for one valve. Follow these instructions for the remaining seven valves.

1. Position valve spring compressor on valve spring (1) and bottom of valve on cylinder block head (2).
2. Compress valve spring (1).



REMOVAL - CONTINUED

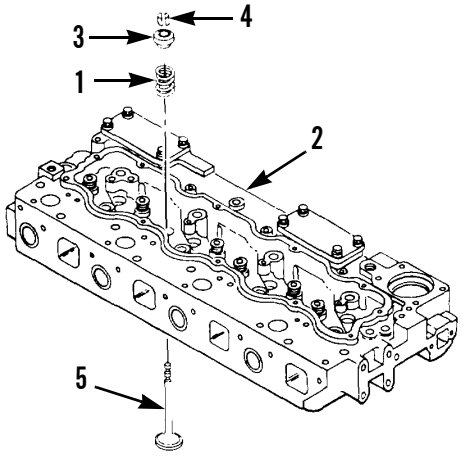
WARNING

Use extreme caution when removing locks and rotocoil assembly. Wear safety glasses. Uncontrolled release of the valve spring may cause injury to personnel.

NOTE

Tag all parts before removal to aid in installation.

3. Carefully remove two locks (4) and rotocoil assembly (3) from valve stem (5). Do not release valve spring (1).
4. Slowly release valve spring compressor.
5. Remove valve spring (1) and valve stem (5) from cylinder block head (2).



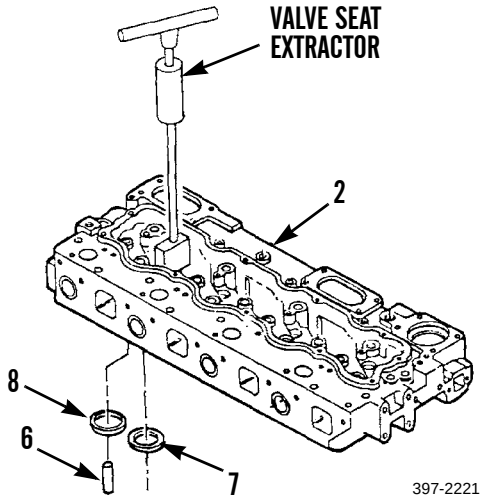
397-1324

DISASSEMBLY

NOTE

Remove guides and washers only if inspection indicates replacement is necessary.

1. Inspect eight valve stem guides (6). Replace if cracked, broken, grooved, scored, or bore diameter exceeds 0.3772 in. (9.581 mm).
2. Use driver and hammer to remove damaged or worn guide (6) from bottom of cylinder block head (2).
3. Inspect four exhaust valve seats (7) and intake washers (8). Replace if cracked, broken, burned, or pitted.
4. Use valve seat extractor to remove intake washers (8).



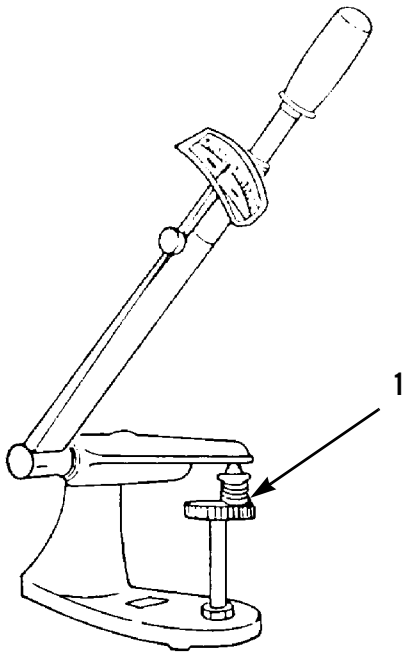
397-2221

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

TESTING

Test valve springs (1), using spring resiliency tester. Length of spring under test force of 53 to 62 lbf (236 to 276 N) must be 1.766 in. (44.86 mm). Free length after test must be 2.05 in. (5.2 cm).



397-1326

REPAIR

1. Grind four exhaust valve seats (7) and intake washers (8) to an angle of 30 degrees.

NOTE

To reduce maximum seat angle, grind seat face to 15 degrees.

2. Grind seat face to 15 degrees, if necessary.

NOTE

Valves must be matched with the exhaust valve seat or intake washer with which they are measured. Mark valve and matching valve seat or washer to identify matching sets.

3. Measure valve recess for four exhaust valve seats (7). Minimum dimension between combustion surface and exhaust valve (9) face is 0.026 in. (0.66 mm).
4. Measure valve recess for four intake washers (8). Minimum dimension between combustion surface and intake valve (5) face is 0.006 in. (0.15 mm).
5. Match and mark four exhaust valves (9) and intake valves (5) with their respective exhaust valve seats or intake washers.

NOTE

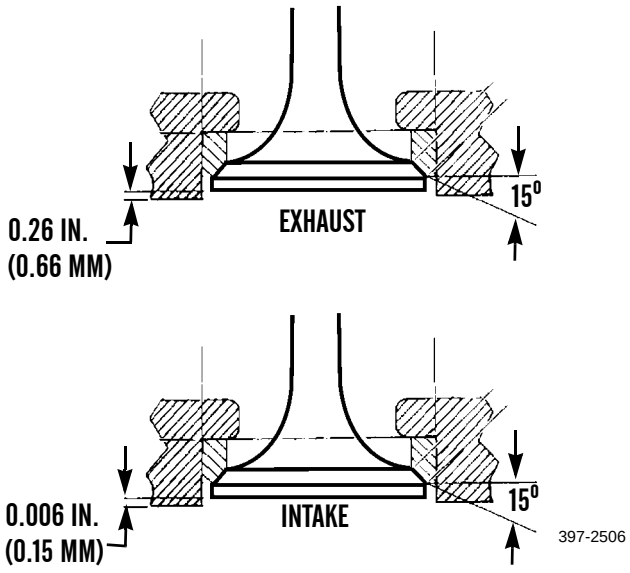
Angle of exhaust and intake valves must be 29-1/4 degrees.

6. Grind four exhaust valves (9) and four intake valves (5).
7. Apply prussian blue to face of four exhaust valves (9) and intake valves (5) and install into matchmarked valve seat (7) or intake washer (8) respectively.

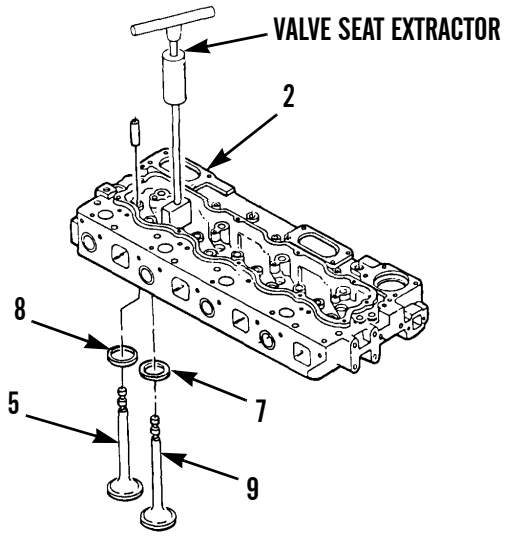
NOTE

In the following step, if blue is transferred to center of valve face, contact is correct. If blue is transferred to top of valve face, lower valve seat or washer by grinding. If blue is transferred to bottom edge of valve face, raise valve seat or washer by grinding.

8. Turn valve stem allowing valve face to lightly contact face of valve seat or washer. Remove valve. Observe blue transfer, grind as necessary.



397-2506



397-1325A

ASSEMBLY

CAUTION

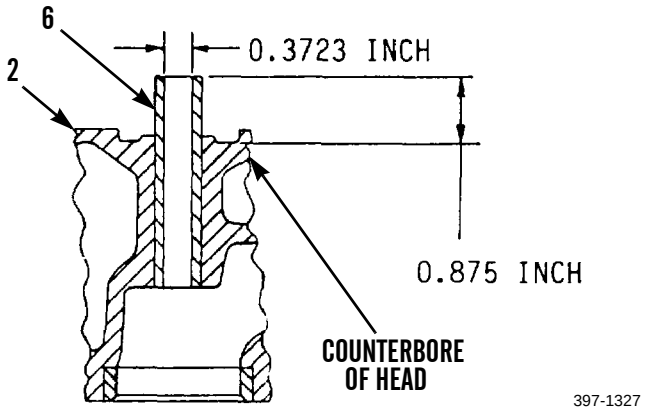
When installing new valve seat or washer, do not expand extractor tooling diameter.

1. Chill four exhaust valve seats (7) and intake washers (8).
2. Use extractor to install exhaust valve seats (7) and intake washers (8) in cylinder block head (2). Press until seated on counterbore.
3. Measure valve recess. Valve must be below combustion surface with no protrusion.

NOTE

- Eight guides must contact enough to allow easy fit into cylinder.
- Minimum diameter of bore of new guides after installation is 0.3723 in. (9.456 mm).

4. Lower temperature of eight guides (6).
5. If removed, use driver and press to install eight new guides (6). Ensure that guides extend above top of cylinder blockhead (2) by 0.875 in. (22.23 mm).
6. Remove all burrs and clean eight new guides (6) after installation.



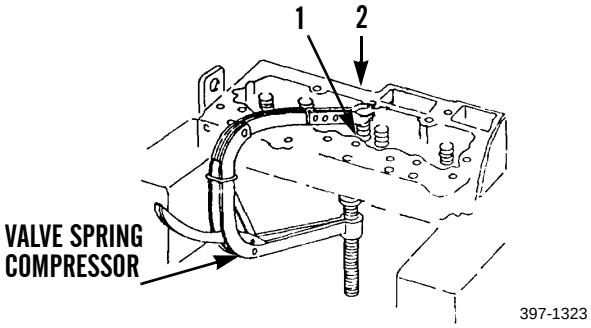
INSTALLATION

1. Use clean engine oil to lubricate each valve stem.
2. Install intake valve (5), or exhaust valve (9), and valve spring (1) in correct location in cylinder block head (2).

WARNING

Use caution when valve spring is compressed. Wear safety glasses when installing valve spring assembly. Accidental release of valve spring may cause injury to personnel.

3. Position valve spring compressor on top of valve spring (1).
4. Tighten compression spring.
5. Install rotocoil assembly (3) to valve stem.
6. Position two locks (4) into grooves on valve stem.
7. Install two locks (4).



397-1323

NOTE

Be sure locks are in correct position in grooves on valve stems before removing valve spring compressor.

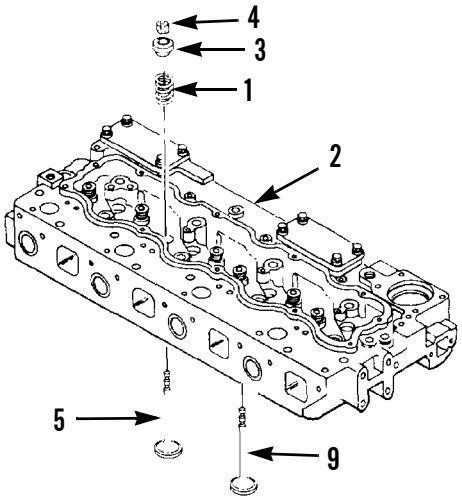
8. Remove valve spring compressor carefully from cylinder block head (2).

TESTING

1. Mark rotocoil assembly (3) with chalk. Tap lightly with soft-tip plastic hammer six to eight times.

NOTE

Rotocoil assembly must turn when tapped with hammer several times. Replace rotocoil assembly if it does not turn.



397-2219

2. Install cylinder block head (WP 0270 00).

END OF WORK PACKAGE

OIL PAN AND OIL PAN PLATES REPLACEMENT 0275 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

3/8-16NC guide bolt (2)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket (2)

References

WP 0020 00

WP 0276 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Engine oil level gauge and tube removed (WP 0027 00)

Engine removed (WP 0267 00)

REMOVAL

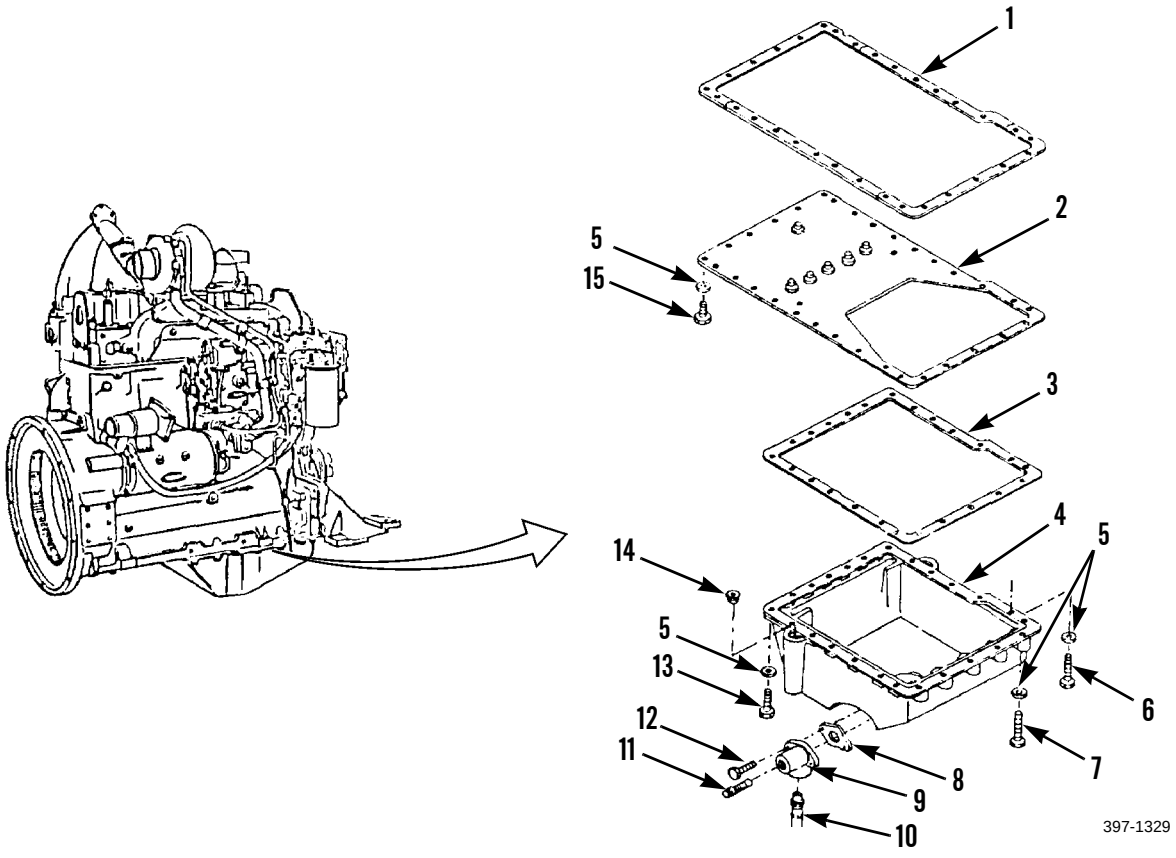
CAUTION

Cap all hose and tube ends to prevent contamination.

NOTE

Tag hose and tube assemblies before disconnecting to aid in installation.

1. Remove hose assembly (10) from bottom of engine.
2. Remove two bolts (12), elbow (9), and gasket (8). Discard gasket.
3. Support oil pan (4).
4. Remove bolt (6), cap screws (7), 17 screws (13), and 24 of 39 washers (5).
5. Remove oil pan (4) and gasket (3). Discard gasket.
6. Loosen plug (14).
7. Remove 15 bolts (15), 15 of 39 washers (5), plate assembly (2), and gasket (1). Discard gasket.
8. Remove oil pump scavenger tube (WP 0276 00).
9. Remove plug (11) from elbow (9).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00. Remove all gasket material from mounting surfaces.

INSTALLATION

1. Install plug (11) in elbow (9).
2. Attach oil pump scavenger tube to plate assembly (2).
3. Install new gasket (1), plate assembly (2), 15 of 39 washers (5), and 15 bolts (15). Install two 3/8-16NC guide bolts in cylinder block to aid in installation.
4. Install oil pump scavenger tube to oil pump (WP 0276 00).
5. Tighten plug (14).
6. Install new gasket (3), oil pan (4), 24 of 39 washers (5), 17 screws (13), six cap screws (7), and bolt (6). Remove two 3/8-16NC guide bolts.
7. Install new gasket (8), elbow (9), and two bolts (12).
8. Install hose assembly (10).
9. Install engine oil level gauge and tube (WP 0027 00).
10. Install engine (WP 0267 00).

END OF WORK PACKAGE

OIL PUMP AND LINES REPLACEMENT 0276 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

3/8-16NC 1-1/2 in. bolt (2)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Lubricating oil (Item 26, 27, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Bearing

Gasket (2)

Materials/Parts - Continued

Ring seal

References

WP 0020 00

WP 0234 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

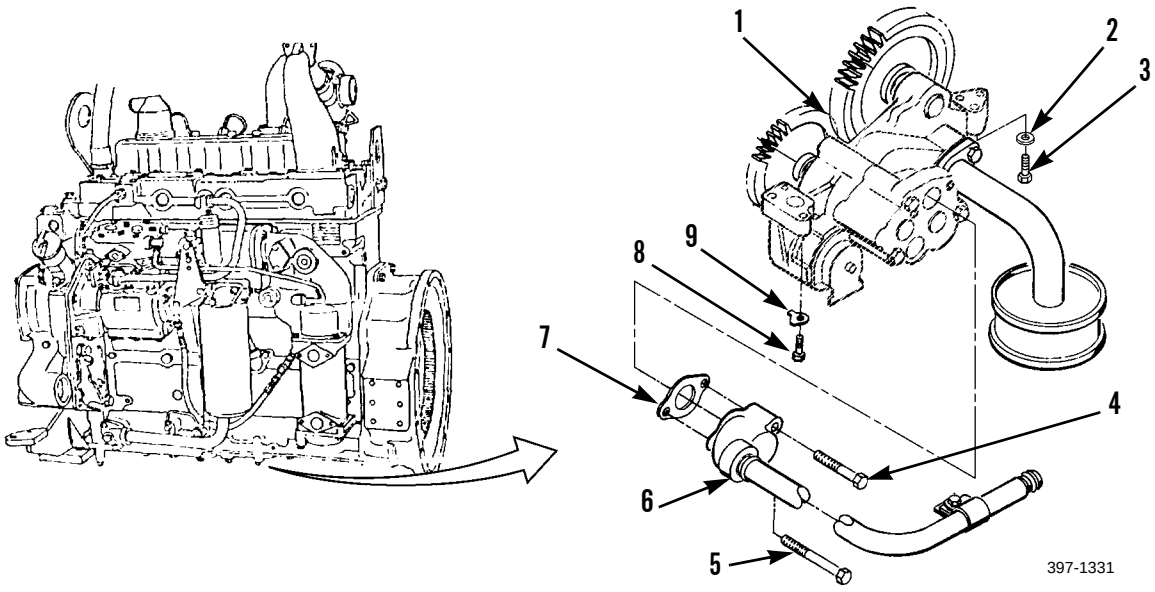
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Oil pan removed (WP 0275 00)

REMOVAL

1. Remove bolts (4 and 5) from oil pump assembly (1).
2. Support oil pump assembly (1).
3. Remove two bolts (8), locks (9), bolts (3), and washers (2).
4. Remove oil pump assembly (1) and gasket (7) from elbow (6).
5. Remove gasket (7) from oil pump assembly (1). Discard gasket.



REMOVAL - CONTINUED

6. Remove two bolts (15), lock (14), bell (16), and gasket (13) from oil pump (12). Discard gasket.

NOTE

Matchmark each gear to the other gear to aid in installation.

7. Use puller to remove gear (10).

CAUTION

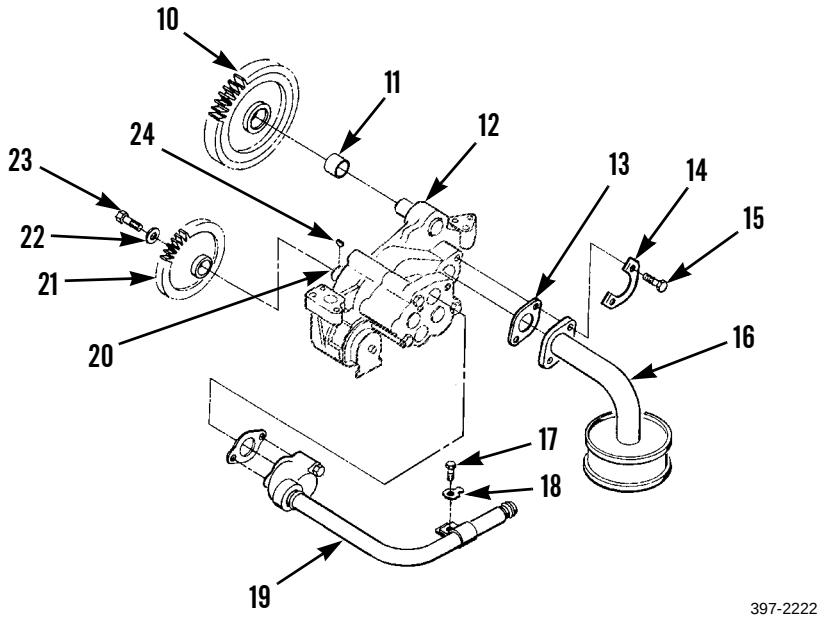
Removal of bearing from gear will cause destruction of bearing. Remove bearing only if inspection indicates replacement is necessary.

8. Inspect bearing (11). Replace if cracked, broken, distorted, grooved, or scored.
9. Use driver and press to remove bearing (11) if necessary.
10. Remove bolt (23) and washer (22).
11. Use puller to remove gear (21).
12. Remove key (24) from oil pump shaft (20).
13. Remove oil pan plate from bottom of engine (WP 0275 00).
14. Remove bolt (17), lock (18), and scavenger elbow with scavenger tube (19) from oil pan plate.

CAUTION

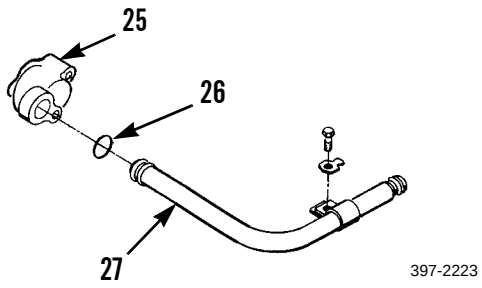
Cap tube ends to prevent contamination.

15. Remove elbow with tube (19) as an assembly, from oil pan plate.



REMOVAL - CONTINUED

16. Remove elbow (25) from tube (27).
17. Remove ring seal (26) from tube (27). Discard ring seal.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Position tube (27) to oil pan plate.
2. Install lock (18) and bolt (17). Bend lock tab up against bolt head.
3. Use clean oil to lubricate outer diameter of new ring seal (26) and install ring seal on tube (27).
4. Install elbow (25) on tube (27).
5. Install elbow with scavenger tube (19) as an assembly, on oil pan plate.
6. Install oil pan plate (WP 0275 00).
7. Install key (24) on oil pump shaft (20).
8. Install gear (21) on shaft (20).
9. Install washer (22) and bolt (23). Tighten bolt to 32 lb-ft (43 Nm).
10. Use driver and press to install new bearing (11), if removed. Install flush with outer face of gear (10).
11. Install gear (10). Align mark on gear (10) with mark on gear (21).

CAUTION

Pump must be filled with clean oil to prevent initial startup damage.

12. Use clean oil to lubricate oil pump (12).
13. Position new gasket (13) and bell (16) on oil pump (12).
14. Install lock (14) and two bolts (15). Bend lock tabs up against bolt heads.

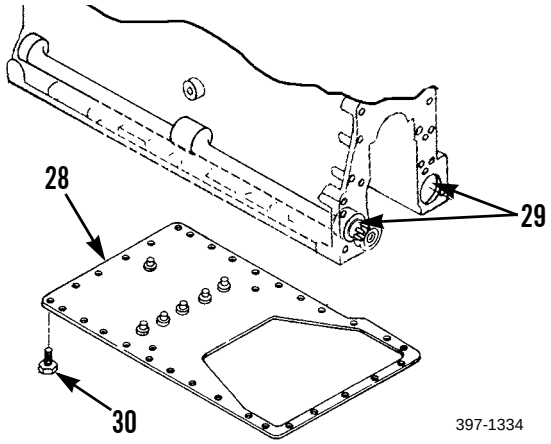
NOTE

Proper timing of balancer shafts and oil pump gears is obtained when 3/8-16NC holes in balancer shafts are in alignment with holes in oil pan plate and number one cylinder is at top center compression stroke.

15. Locate top center of compression stroke of number one cylinder on engine (WP 0234 00).

INSTALLATION - CONTINUED

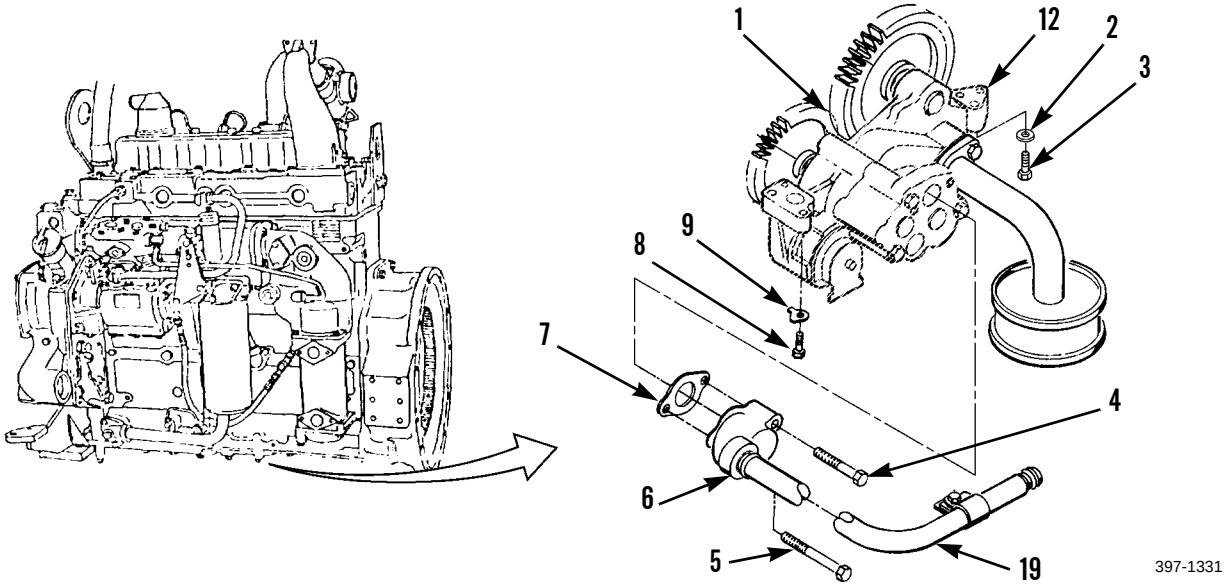
16. Turn balancer shafts (29) so that the flat sides of shaft face the opposite direction of oil pan plate (28).
17. Install two 3/8-16NC 1-1/2 in. long bolts (30) through oil pan plate (28) and into each balancer shaft (29). Tighten bolts until they touch bottom of holes of balancer shafts, then loosen 1/2 turn.



CAUTION

Mark on gear must be in alignment with mark on other gear.

18. Position elbow with scavenger tube (19) as an assembly.
19. Loosely install two washers (2), bolts (3), locks (9), and bolts (8).
20. Position new gasket (7) between elbow with tube (19) and oil pump (12).
21. Loosely install bolts (4 and 5).
22. Tighten two bolts (3) and bolts (8) evenly. Bend lock (9) tabs up, toward front of engine, against bolt heads.
23. Tighten bolts (4 and 5) evenly.



24. Remove two 3/8-16NC 1-1/2 in. long bolts (30) from oil pan plate (28) and balancer shafts (29).
25. Install oil pan (WP 0275 00).

END OF WORK PACKAGE

EXHAUST MANIFOLD REPLACEMENT 0277 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Materials/Parts

Antiseize compound (Item 6, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket (4)

References

WP 0020 00

WP 0046 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Muffler and exhaust pipe removed (WP 0051 00)

Turbocharger removed (WP 0283 00)

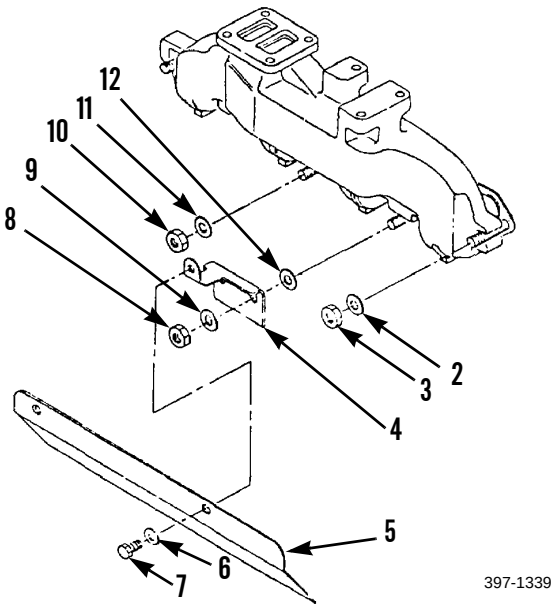
Fuel injection lines removed (WP 0035 00)

REMOVAL

NOTE

For models 130GS and 130GNS, disconnect primary fuel/priming pump as necessary (WP 0046 00) and lay aside.

1. Remove two bolts (7), washers (6), and shield (5) from top-right of engine.
2. Remove four nuts (8), washers (9), two brackets (4) and four washers (12).
3. Remove four nuts (10), washer (2), nut (3), and three washers (11).



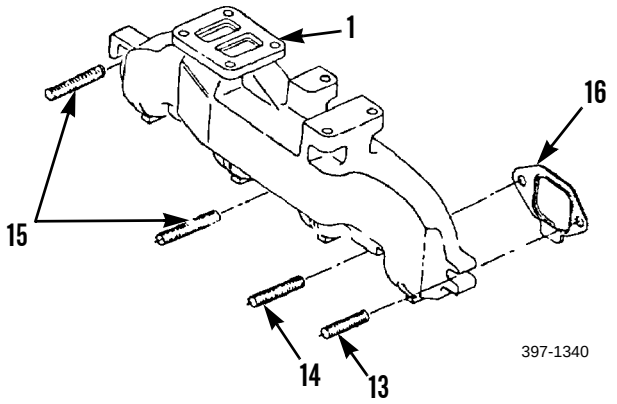
397-1339

REMOVAL - CONTINUED

CAUTION

Remove studs only if inspection proves replacement is necessary.

4. Remove manifold (1) and four gaskets (16). Discard gaskets.
5. Remove stud (13), four studs (14), and three studs (15) from right side of cylinder head, if necessary. Replace if cracked, broken, heat damaged, or if threads are damaged.

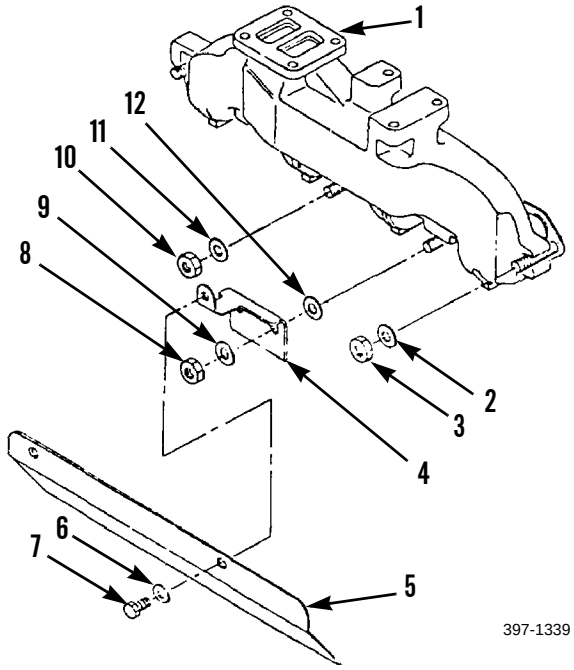


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install three studs (15), four studs (14), and stud (13) on right side of cylinder head, if removed. Apply anti-seize compound to half of studs (13, 14, and 15) being installed in cylinder head. Tighten studs to 20 lb-ft (27 Nm).
2. Install four new gaskets (16) on studs (13, 14, and 15) on top-right of engine.
3. Install manifold (1).
4. Install three washers (11), washer (2), nut (3), and four nuts (10). Tighten nuts to 32 lb-ft (43 Nm).
5. Install four washers (12), two brackets (4), four washers (9), and nuts (8). Tighten nuts to 32 lb-ft (43 Nm).
6. Install shield (5), two washers (6), and bolts (7).



NOTE

If disconnected, connect primary fuel filter/priming pump (WP 0046 00).

7. Install fuel injection lines (WP 0035 00).
8. Install turbocharger (WP 0283 00).
9. Install muffler and exhaust pipe (WP 0051 00).

END OF WORK PACKAGE

FUEL INJECTION NOZZLES MAINTENANCE 0278 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Testing, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, nozzle (Item 8, WP 0348 00)

Puller group, nozzle (Item 58, WP 0348 00)

Tester group, nozzle (Item 87, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Fuel, diesel (Item 13, WP 0349 00)

Rags, wiping (Item 35, WP 0349 00)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Fuel injection lines removed (WP 0035 00)

REMOVAL

NOTE

This procedure covers replacement of one fuel injection nozzle. Follow these instructions for the remaining three fuel injection nozzles.

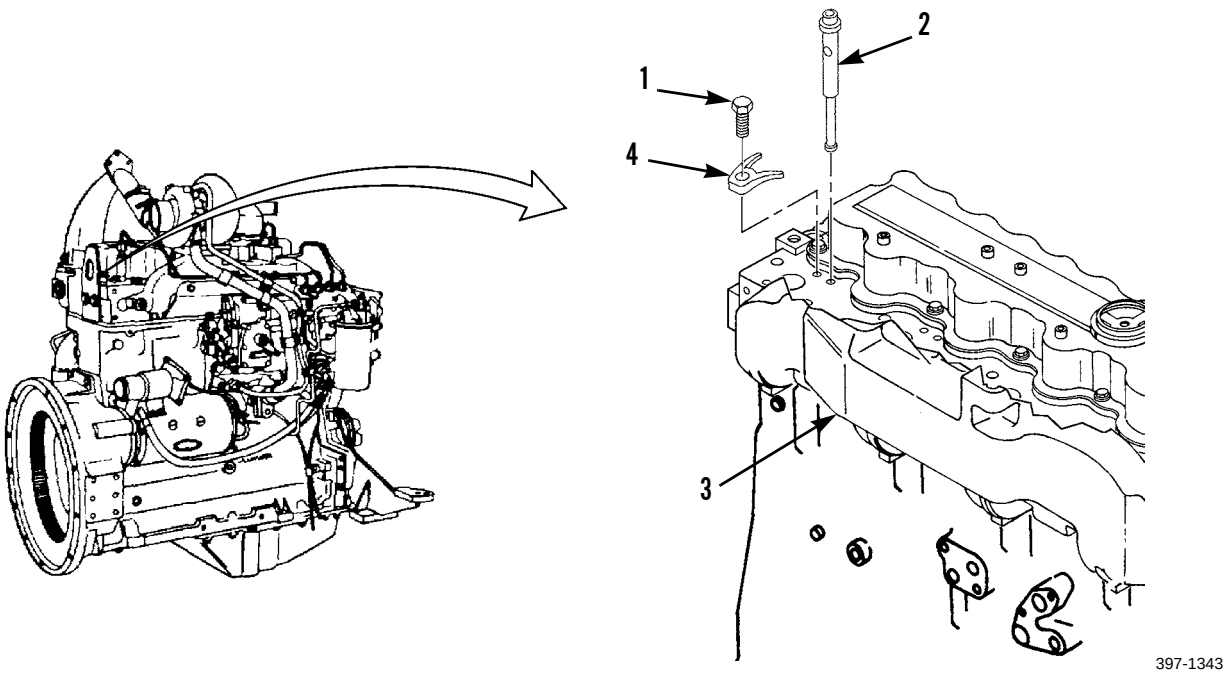
REMOVAL - CONTINUED

1. Remove bolt (1) and clamp (4) from top of cylinder head (3).

CAUTION

- Do not apply more than 150 lb-in. (17 Nm) pressure to remove fuel injection nozzle.
- Cap nozzle to prevent contamination if it is to be stored.

2. Use nozzle puller and, if necessary, nozzle puller adapter to remove fuel injection nozzle (2).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

TESTING

NOTE

All carbon must be removed from injection nozzle tip before proceeding with testing.

Use nozzle tester and diesel fuel at 65 to 75°F (18 to 24°C) to test fuel injection nozzle for valve opening pressure. Valve opening pressure must be 2,050 to 2,350 psi (14,134 to 16,203 kPa).

NOTE

It is possible for the pressure reading of the gauge to go down fast if the valve makes a noise (chatters) when it opens. It is also possible for the pressure reading of the gauge to be almost constant when the valve in the fuel injection nozzle opens.

INSTALLATION

1. Position fuel injection nozzle (2) on top of cylinder head (3).
2. Install clamp (4) and bolt (1).
3. Install fuel injection lines (WP 0035 00).

END OF WORK PACKAGE

FUEL INJECTION PUMP REPLACEMENT 0279 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Lifting device, 100-lb capacity

Wood block

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Oil, lubricating (Item 26, 27, and 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket (2)

Packing, preformed (13)

Pin, cotter

Washer, felt (4)

References

WP 0020 00

WP 0277 00

WP 0279 00

WP 0282 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Engine hood removed (WP 0181 00)

Turbocharger oil lines removed (WP 0033 00)

Fuel injection lines removed (WP 0035 00)

Secondary fuel filter and mounting removed (WP 0047 00 or WP 0048 00)

Tachometer drive removed (Models 130G, 130GSCE, and 130GNSCE) (WP 0034 00)

Fuel transfer pump removed (Models 130G, 130GSCE, and 130GNSCE) (WP 0281 00)

REMOVAL

CAUTION

Plug open fuel ports and individual injection pumps to prevent contamination.

1. Remove cotter pin (8) and pin (7) from right side of engine. Discard cotter pin.
2. Disconnect linkage assembly (6) from fuel injection pump and governor control lever (9). Move linkage assembly out of the way.
3. Remove governor control lever (9) (WP 0282 00).

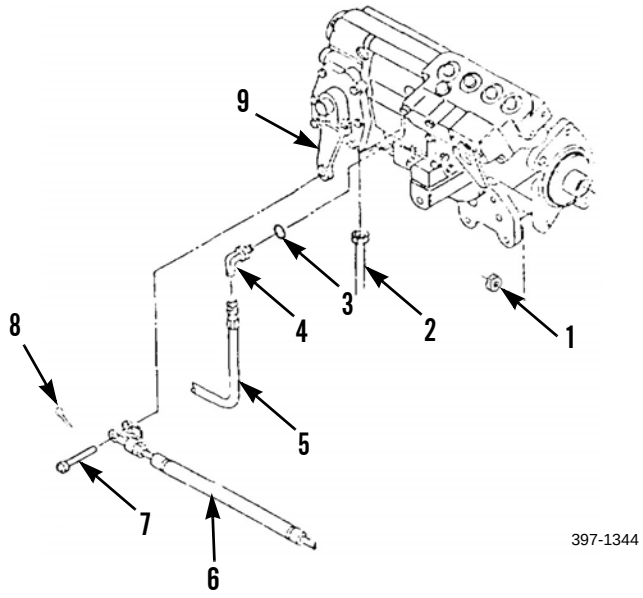
CAUTION

Cap hose ends to prevent contamination.

NOTE

Tag hose assemblies before disconnecting to aid in installation.

4. Disconnect hose assembly (5) from fuel injection pump.
5. Remove elbow (4) and preformed packing (3). Discard preformed packing.
6. Remove hose assembly (2).
7. Remove manifold shield (WP 0277 00).
8. Remove three nuts (1).



REMOVAL - CONTINUED

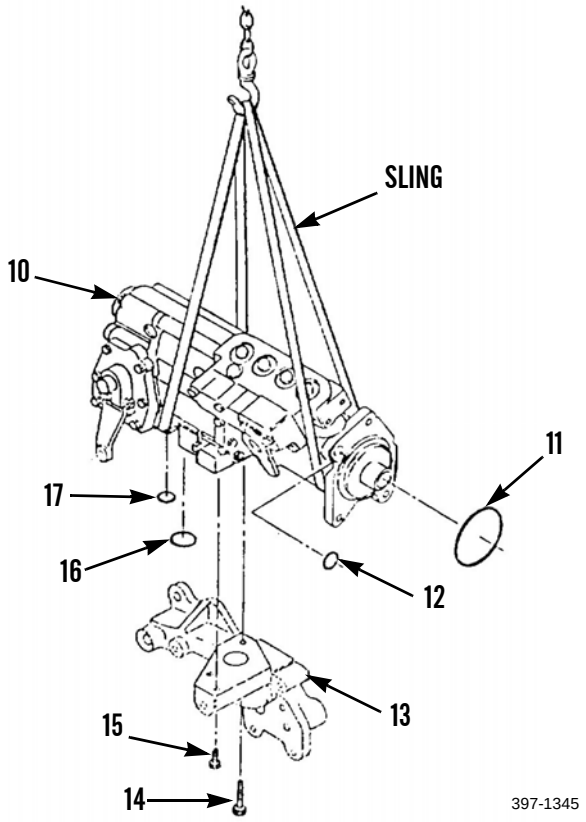
WARNING

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

NOTE

Fuel injection pump and governor weighs 58 lb (26 kg).

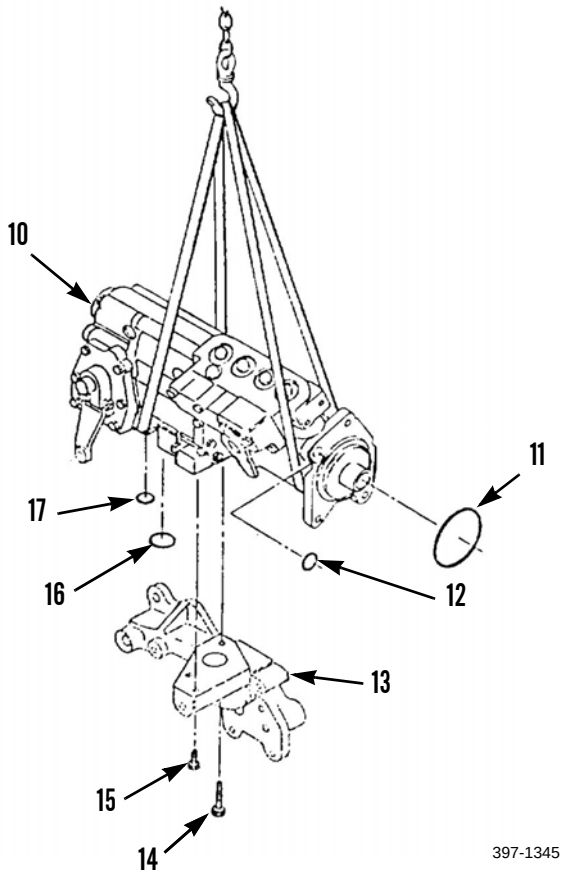
9. Attach sling to fuel injection pump and governor (10).
10. Remove bolts (14 and 15) from under support (13).
11. Remove fuel injection pump and governor (10). Pull back to separate from front cover plate and lift up from support (13).
12. Remove and discard preformed packings (11, 12, 16, and 17).



13. Remove sling.

INSTALLATION

1. Install governor assembly on fuel injection pump (10) (WP 0279 00).
2. Lubricate and install new preformed packings (11, 12, 16, and 17) under fuel injection pump and governor (10).
3. Use sling to position fuel injection pump and governor (10) on support (13) and timing gear plate.
4. Install bolts (14 and 15).



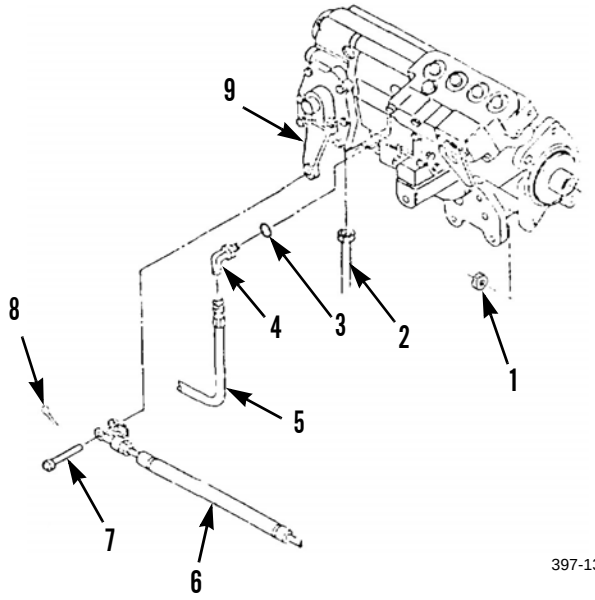
INSTALLATION - CONTINUED

5. Remove hoist.
6. Install three nuts (1).
7. Install manifold shield (WP 0277 00).
8. Install governor control lever (9) (WP 0282 00).

CAUTION

After the fuel injection pump and governor are installed, move governor control lever back and forth. Preformed packing can hold rack and prevent free movement. If rack does not move freely, remove fuel injection pump and governor and reset preformed packing.

9. Connect hose assembly (5).
10. Install hose assembly (2), new preformed packing (3), and elbow (4).
11. Position linkage assembly (6) on governor control lever (9).
12. Install pin (7) and new cotter pin (8).



CAUTION

Do not attempt to start engine until fuel injection pump and governor have been adjusted.

13. Install fuel transfer pump (Models 130G, 130GSCE, 130GNSCE) (WP 0281 00).
14. Install tachometer drive (Models 130G, 130GSCE, 130GNSCE) (WP 0034 00).
15. Install secondary fuel filter and mounting (WP 0047 00 or WP 0048 00).
16. Install fuel injection lines (WP 0035 00).
17. Install turbocharger oil lines (WP 0033 00).
18. Install engine hood (WP 0181 00).

GOVERNOR ADJUSTMENT

CAUTION

If fuel injection pump and governor are assembled wrong, it is possible for the engine to run out of control. Follow the next step to take the necessary precaution to stop the engine if it overspeeds.

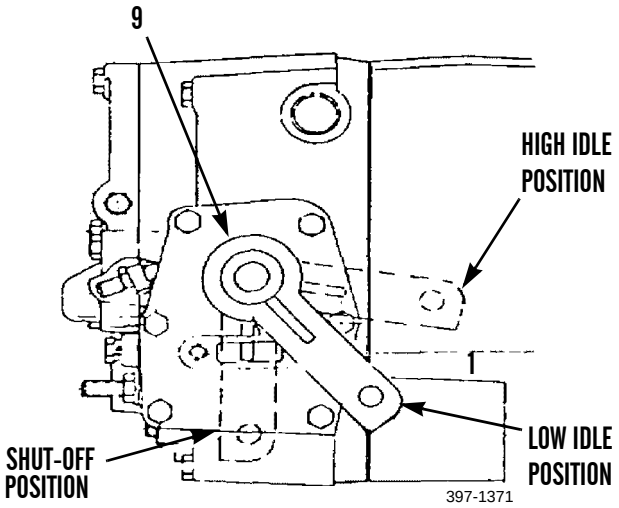
1. Remove turbocharger air pipe from top of engine (WP 0039 00). If engine runs out of control, a steel plate can be put over the turbocharger air inlet to starve engine of air.
2. Start engine (TM 5-3805-261-10). Run until normal operating temperature is reached.

LOW IDLE ADJUSTMENT

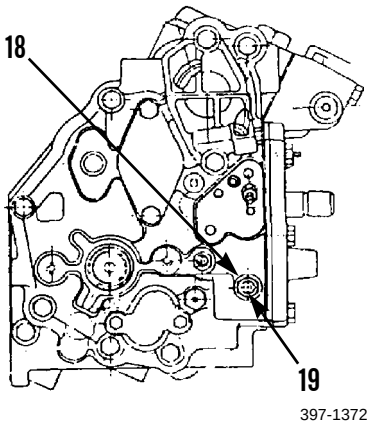
CAUTION

If engine runs out of control and governor control lever won't shut engine off, place a steel plate over air inlet of turbocharger.

1. Position governor control lever (9) in low idle.



2. Loosen locknut (18).
3. Using accurate tachometer, adjust low idle screw (19). Attach to tachometer drive at rear of governor, adjust low idle to 800 RPM.
4. Increase engine speed and return to low idle. Check low idle speed again with tachometer.
5. Tighten locknut (18).



6. Stop engine.

END OF WORK PACKAGE

FUEL INJECTION PUMP MOUNTING REPLACEMENT 0280 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (4)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

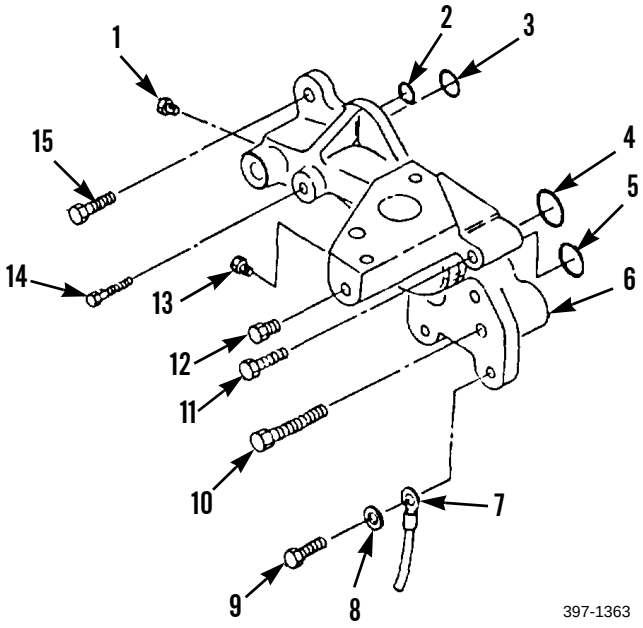
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Governor and fuel injection pump removed (WP 0279 00)

FUEL INJECTION PUMP MOUNTING REPLACEMENT - CONTINUED 0280 00

REMOVAL

1. Remove bolt (9) and washer (8) from support (6).
2. Disconnect wire assembly (7).
3. Remove bolts (15, 14, 11, and 10), support (6), and preformed packings (5, 4, 3, and 2). Discard preformed packings.
4. Remove plugs (1, 13, and 12) from support (6).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install plugs (1, 13, and 12) on support (6).
2. Install new preformed packings (5, 4, 3, and 2), support (6) and bolts (15, 14, 11, and 10) on engine.
3. Connect wire assembly (7).
4. Install washer (8) and bolt (9).
5. Install governor and fuel injection pump (WP 0279 00).

END OF WORK PACKAGE

FUEL TRANSFER PUMP MAINTENANCE (MODELS 130G, 130GSCE, AND 130GNSCE) 0281 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Fuel, diesel (Item 13 or 14, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (9)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Right side engine panel removed (WP 0182 00)

Air bled from fuel lines (WP 0035 00)

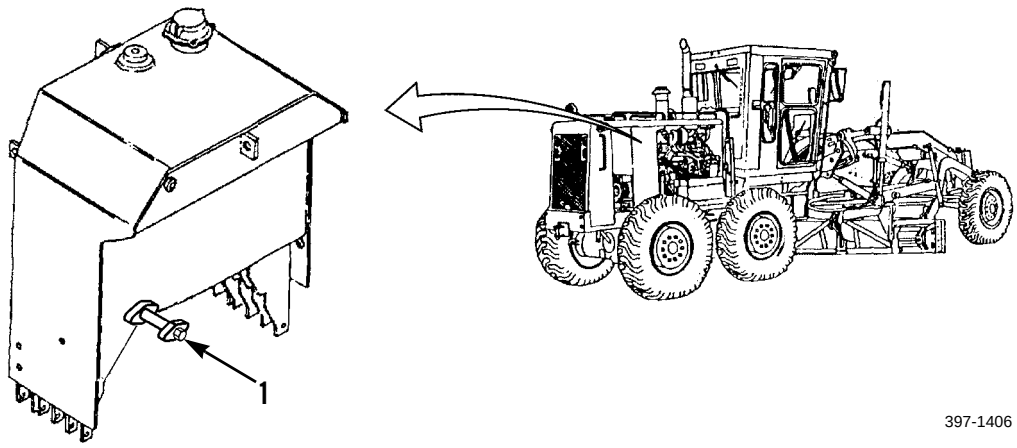
FUEL TRANSFER PUMP MAINTENANCE
(MODELS 130G, 130GSCE, AND 130GNSCE) - CONTINUED **0281 00**

REMOVAL

NOTE

On models 130GS and 130GNS, the fuel transfer pump is serviced elsewhere.

1. Close fuel valve (1) on front-lower-right of fuel tank.



2. Open bleed valve (19) on fuel injection pump (2) to relieve fuel pressure and close.
3. Loosen bolt (11).

CAUTION

Cap hose and tube ends and plug open ports to prevent contamination.

NOTE

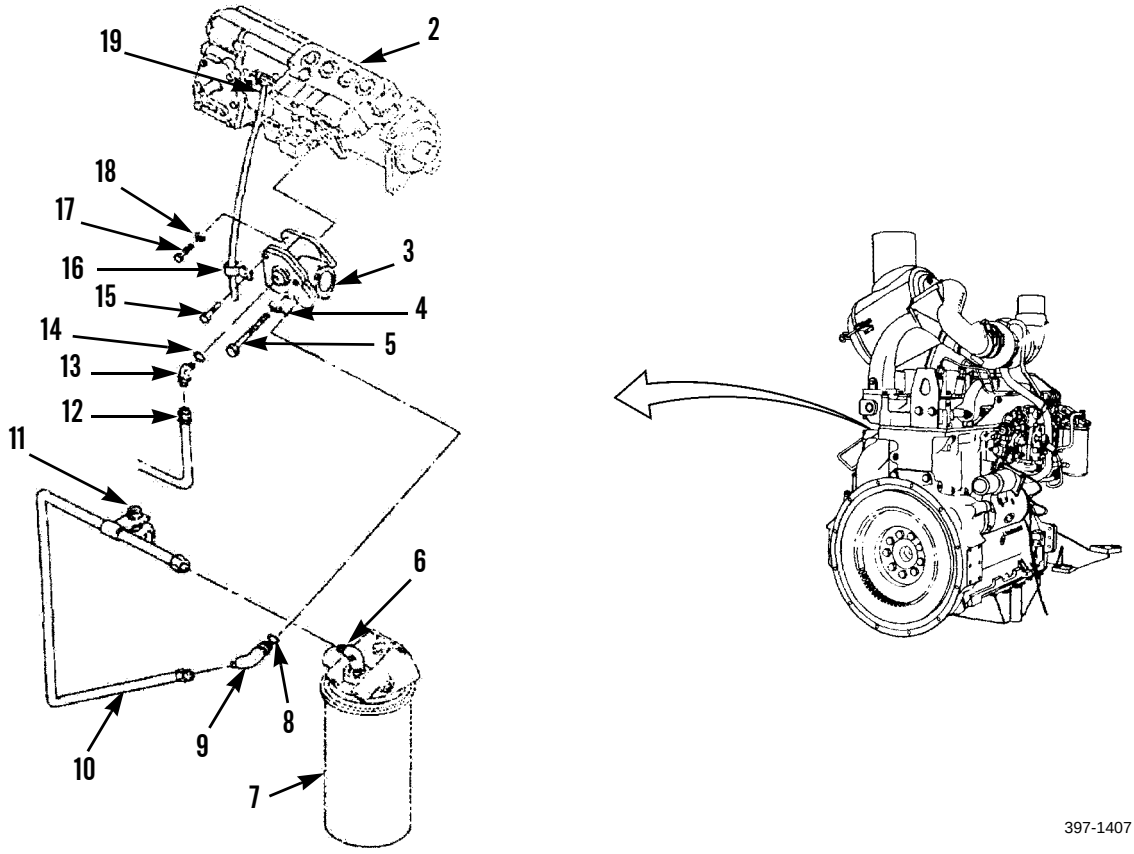
Tag hose and tube assemblies before disconnecting to aid in installation.

4. Disconnect tube assembly (10) from elbows (9 and 6) and fuel filter (7).
5. Remove elbow (9) and preformed packing (8). Discard preformed packing.
6. Disconnect hose assembly (12).
7. Remove elbow (13) and preformed packing (14). Discard preformed packing.

FUEL TRANSFER PUMP MAINTENANCE (MODELS 130G, 130GSCE, AND 130GNSCE) - CONTINUED 0281 00

REMOVAL - CONTINUED

8. Remove one of two bolts (15) and clip (16).
9. Install one of two bolts (15).
10. Remove bolt (5) and washer (4).
11. Remove bolt (17) and washer (18).
12. Remove fuel transfer pump assembly (3) from fuel injection pump (2).



DISASSEMBLY

NOTE

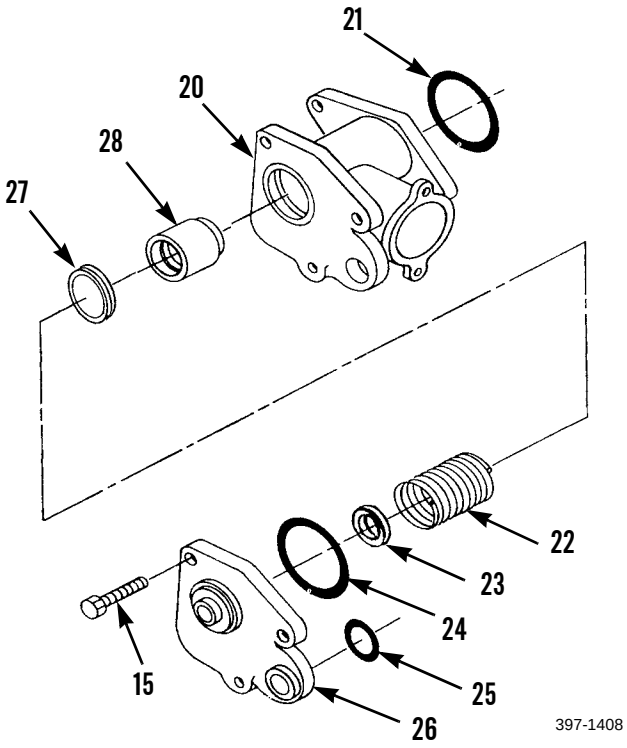
If preformed packing is not found in housing, check injection pump for it.

1. Remove and discard preformed packing (21) from housing (20).

WARNING

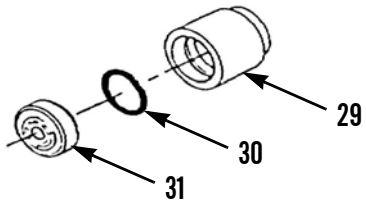
Cover is under tension from spring. Wear face shield and remove bolts carefully. Failure to follow this warning may cause injury to personnel.

2. Remove two bolts (15) from housing (20).
3. Remove cover (26), preformed packings (24 and 25), valve (23), and spring (22). Discard preformed packings.
4. Remove washer (27).
5. Remove piston assembly (28).



397-1408

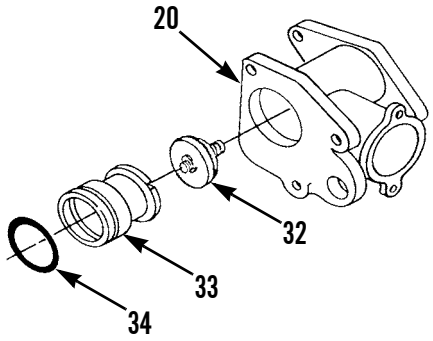
6. Remove valve (31) from inside piston (29).
7. Remove preformed packing (30) from valve (31). Discard preformed packing.



397-1409

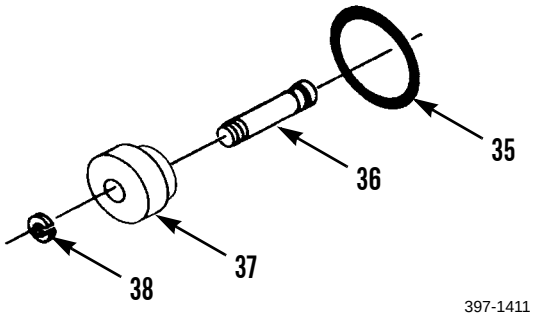
DISASSEMBLY - CONTINUED

8. Remove sleeve (33).
9. Remove preformed packing (34) from sleeve (33). Discard preformed packing.
10. Remove guide and tappet assembly (32) from housing (20).



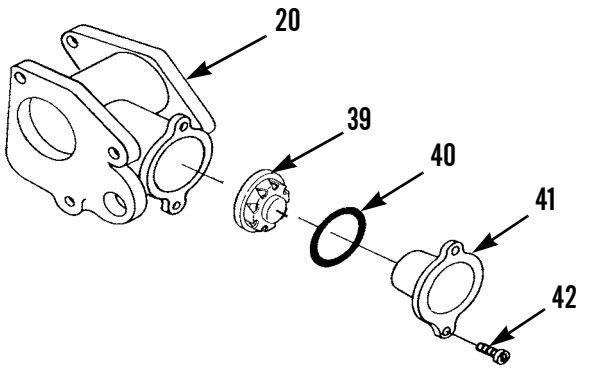
397-1410

11. Remove and discard preformed packing (35).
12. Remove ring (38).
13. Separate tappet (36) and guide (37).



397-1411

14. Remove two screws (42).
15. Remove cover (41) and preformed packing (40). Discard preformed packing.
16. Remove valve (39) from housing (20).



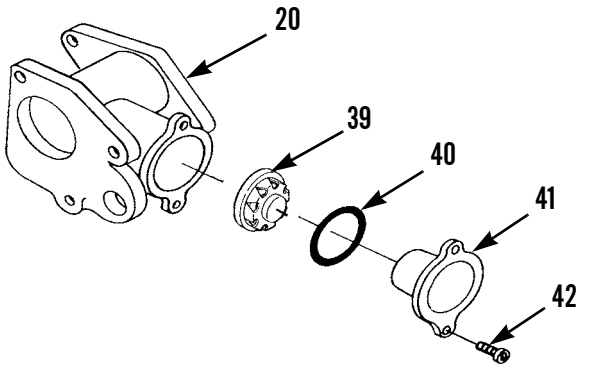
397-1412

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

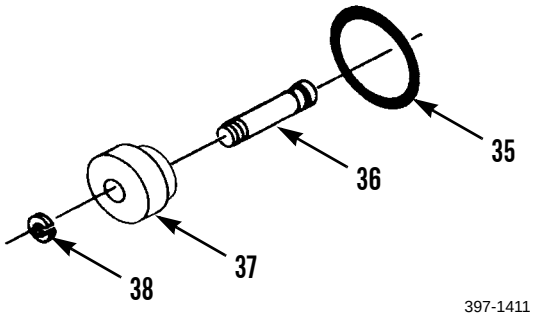
ASSEMBLY

1. Install valve (39) in housing (20) with pyramid side of valve facing out.
2. Install new preformed packing (40) and cover (41). Lubricate outer diameter of new preformed packing with clean diesel fuel.
3. Install two screws (42).



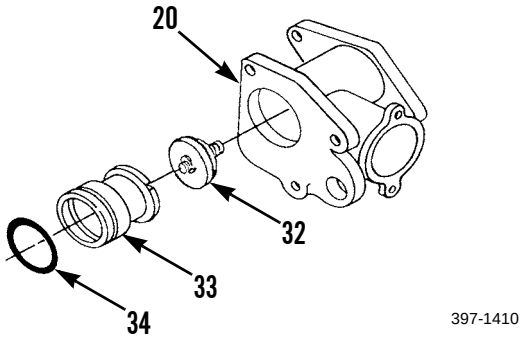
397-1412

4. Position tappet (36) in guide (37).
5. Install ring (38).
6. Install new preformed packing (35) on groove of guide (37). Lubricate outer diameter of new preformed packing with clean diesel fuel.



397-1411

7. Install guide and tappet assembly (32) in housing (20).
8. Install new preformed packing (34) on groove of sleeve (33). Lubricate outer diameter of new preformed packing with clean diesel fuel.
9. Install new preformed packing (34) and sleeve (33) as an assembly in housing (20).

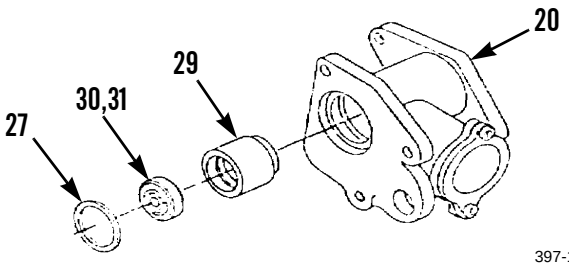


397-1410

FUEL TRANSFER PUMP MAINTENANCE (MODELS 130G, 130GSCE, AND 130GNSCE) - CONTINUED 0281 00

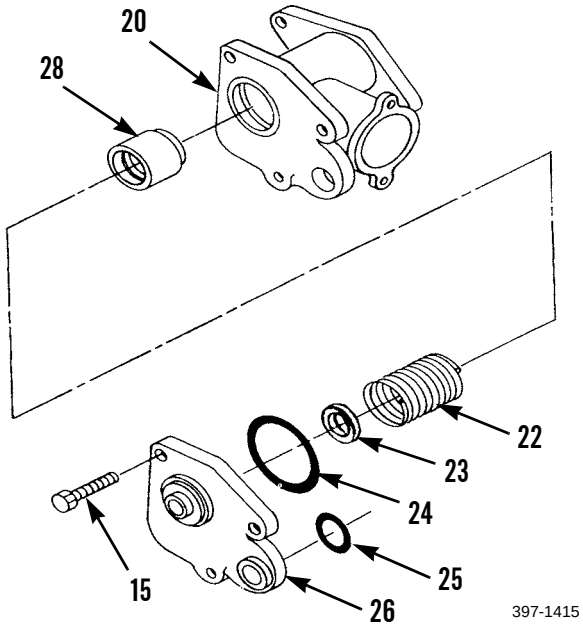
ASSEMBLY - CONTINUED

10. Install new preformed packing (30) on pyramid side of valve (31). Lubricate outer diameter of valve with clean diesel fuel.
11. Install new preformed packing (30) and valve (31) as an assembly and washer (27) in piston (29).



397-1414

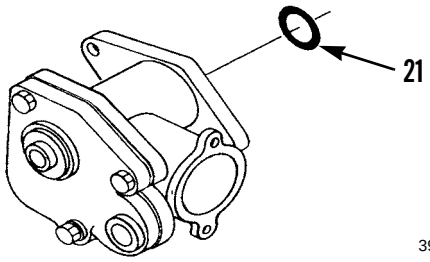
12. Install piston assembly (28).
13. Install spring (22).
14. Install new preformed packings (24 and 25) in cover (26).
15. Position valve (23) in cover (26).
16. Position cover (26) on housing (20). Valve (23) must seat in spring (22).
17. Install two bolts (15).



397-1415

INSTALLATION

1. Install new preformed packing (21). Lubricate outer diameter of new preformed packing with clean diesel fuel.



397-1416

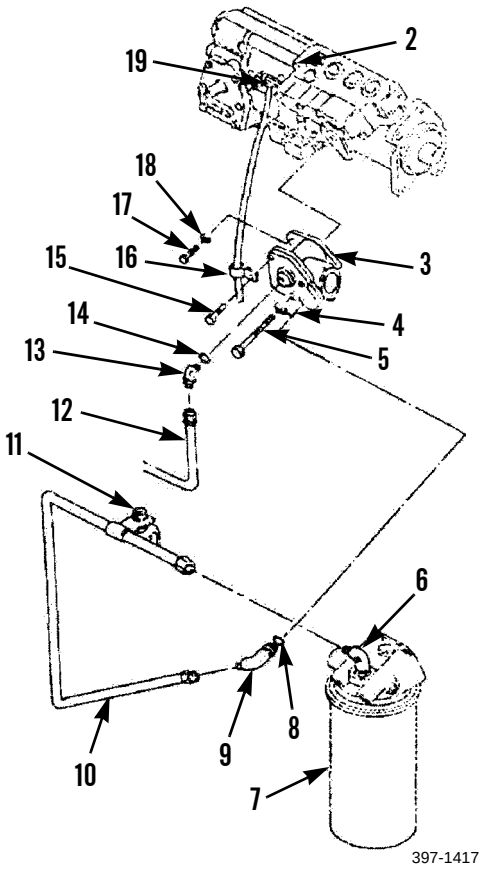
INSTALLATION - CONTINUED

2. Install fuel transfer pump assembly (3) on fuel injection pump (2).

NOTE

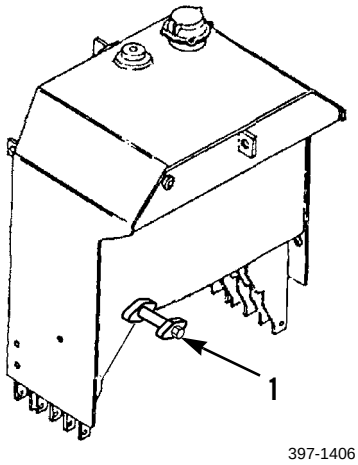
Insert tappet and seat in plunger inside fuel injection pump.

3. Install washer (18), bolt (17), and two bolts (15). Tighten evenly.
4. Install washer (4) and bolt (5). Tighten evenly.
5. Install one of two bolts (15).
6. Install clip (16) and one of two bolts (15) securing air bleed tube in fuel injection pump (2).
7. Install new preformed packing (14) and elbow (13).
8. Connect hose assembly (12).
9. Install new preformed packing (8) and elbow (9).
10. Connect tube assembly (10) to elbows (6 and 9) and fuel filter (7).
11. Tighten bolt (11).



INSTALLATION - CONTINUED

12. Open fuel valve (1) on front-lower-right of fuel tank.



13. Bleed air from fuel lines (WP 0035 00).
14. Install right side engine panel (WP 0182 00).

END OF WORK PACKAGE

GOVERNOR CONTROLS MAINTENANCE 0282 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (2) (Item 43, WP 0349 00)

Gasket (3)

Pin, cotter (3)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

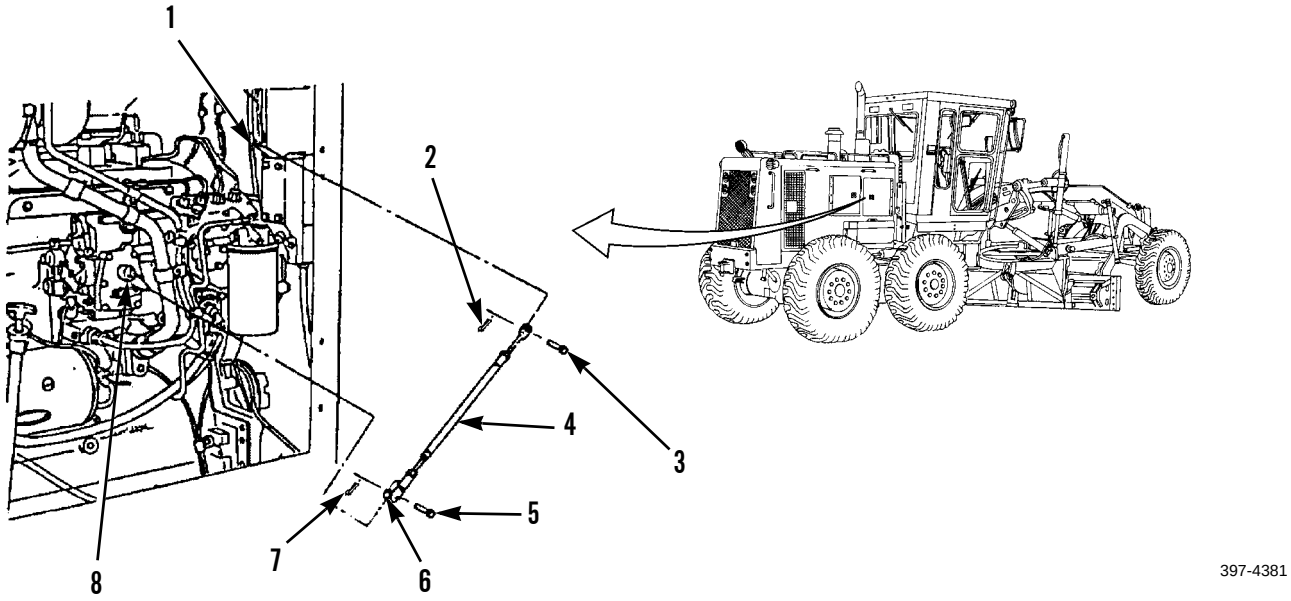
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Governor switch removed (WP 0088 00)

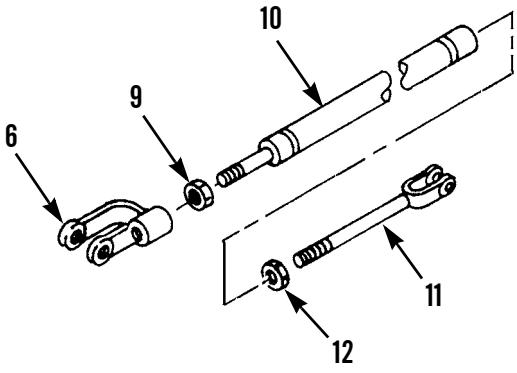
REMOVAL

1. Remove and discard cotter pin (7) from lever (8) on fuel injection pump governor on right side of engine.
2. Remove pin (5) from rod assembly (4).
3. Separate rod end (6) from lever (8).
4. Remove and discard cotter pin (2) from inner-right side of dash panel in engine compartment.
5. Remove pin (3) from rod assembly (4).
6. Remove rod assembly (4) from lever (1).
7. Remove rod assembly (4) from machine.



397-4381

8. Loosen nut (12).
9. Remove rod (11) and nut (12) from link (10).
10. Loosen nut (9).
11. Remove rod end (6), nut (9), and link (10).



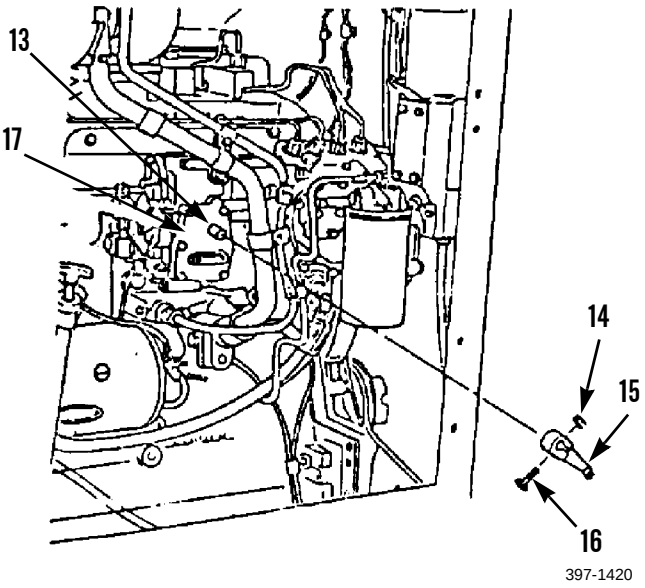
397-1419

REMOVAL - CONTINUED

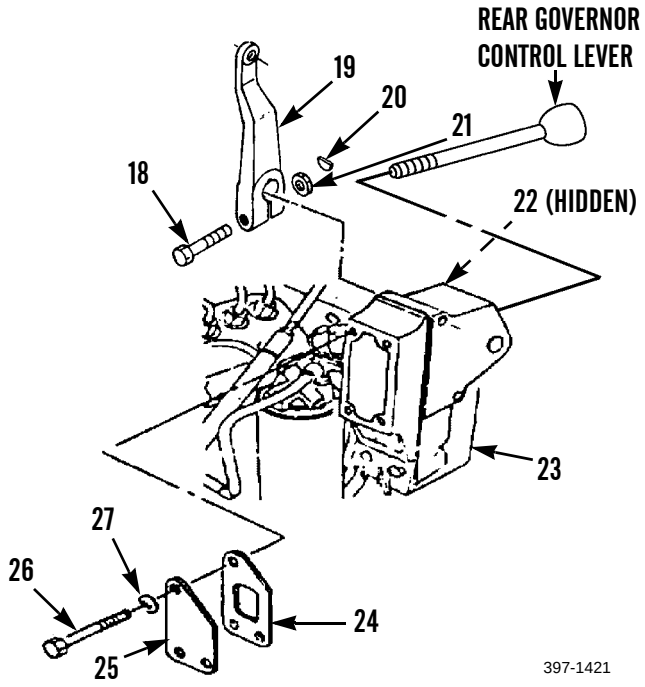
NOTE

Matchmark lever and fuel injection pump governor shaft to aid in aligning lever on fuel injection pump governor shaft during installation to fuel injection pump governor (17).

12. Remove nut (14) and bolt (16).
13. Remove lever (15) from fuel injection pump governor shaft. (13).

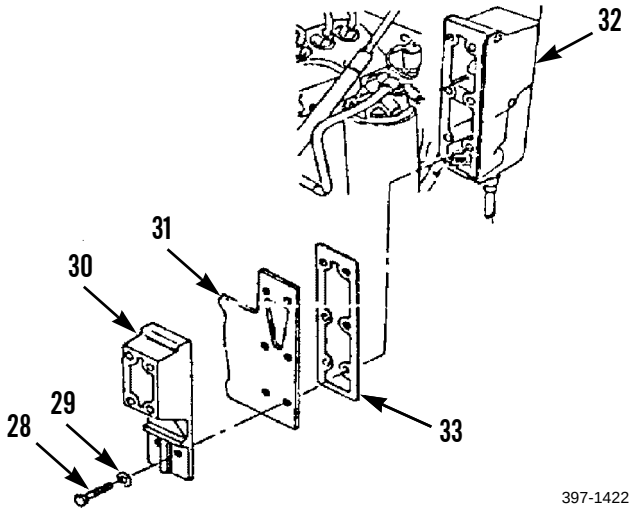


14. For Type II machines, unscrew rear governor control lever.
15. Remove nut (21) and bolt (18) from inner-right side of dash panel in engine compartment.
16. Remove lever (19) from shaft (22) on inside of housing (23).
17. Remove key (20) from shaft (22).
18. Remove four bolts (26), washers (27), cover (25), and gasket (24). Discard gasket.
19. Support housing (23).

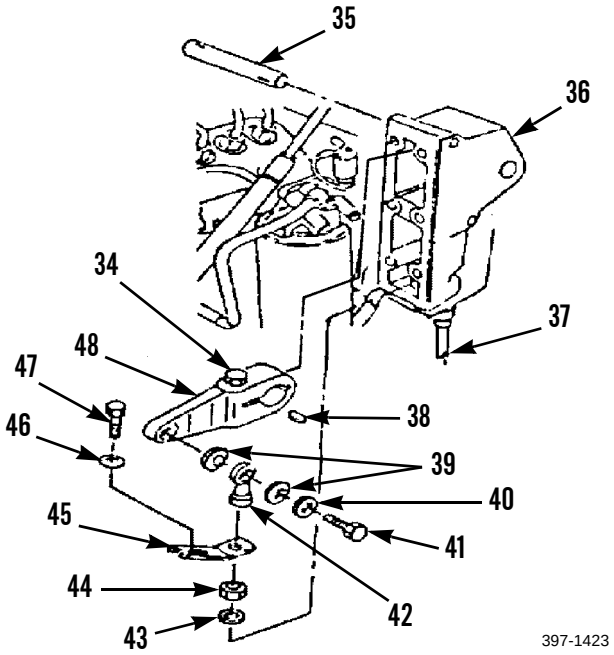


REMOVAL - CONTINUED

20. Remove two bolts (28), washers (29), housing (30), and gasket (33). Discard gasket.
21. Separate housing assembly (32) from cover (31).

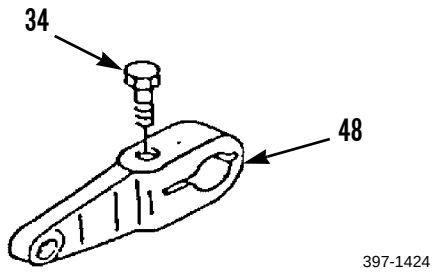


22. Remove bolt (47) and nut (46) from actuator (45).
23. Remove bolt (41), washer (40), and two springs (39).
24. Separate rod end (42) and lever (48).
25. Loosen nut (44).
26. Remove rod end (42), actuator (45), and nut (44) from cable end (37).
27. Remove nut (43) from inside of housing (36).
28. Loosen bolt (34).
29. Move lever assembly (48) on shaft (35) to expose key (38). Remove key from shaft.
30. Remove shaft (35).
31. Remove lever assembly (48) from housing (36).



REMOVAL - CONTINUED

32. Remove bolt (34) from lever assembly (48).



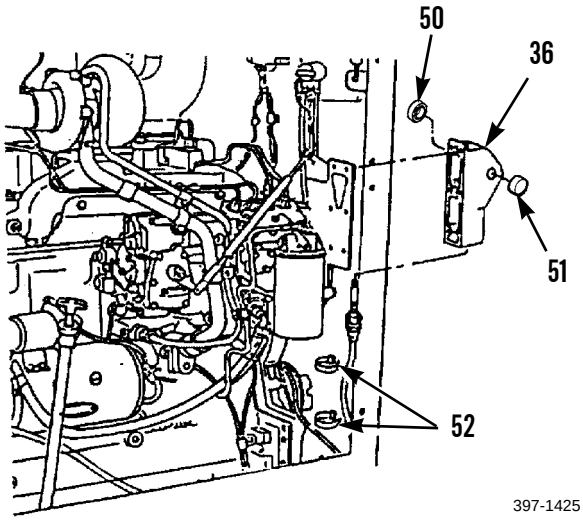
397-1424

33. Remove housing (36) from machine.

NOTE

Removal of bearings from housing may cause destruction of bearings. Remove bearings only if inspection indicates replacement is necessary.

34. Inspect bearings (50 and 51). Replace if cracked, broken, or worn.
35. Remove bearings (50 and 51), if necessary, from housing (36).
36. Remove and discard two tie straps (52).



397-1425

REMOVAL - CONTINUED

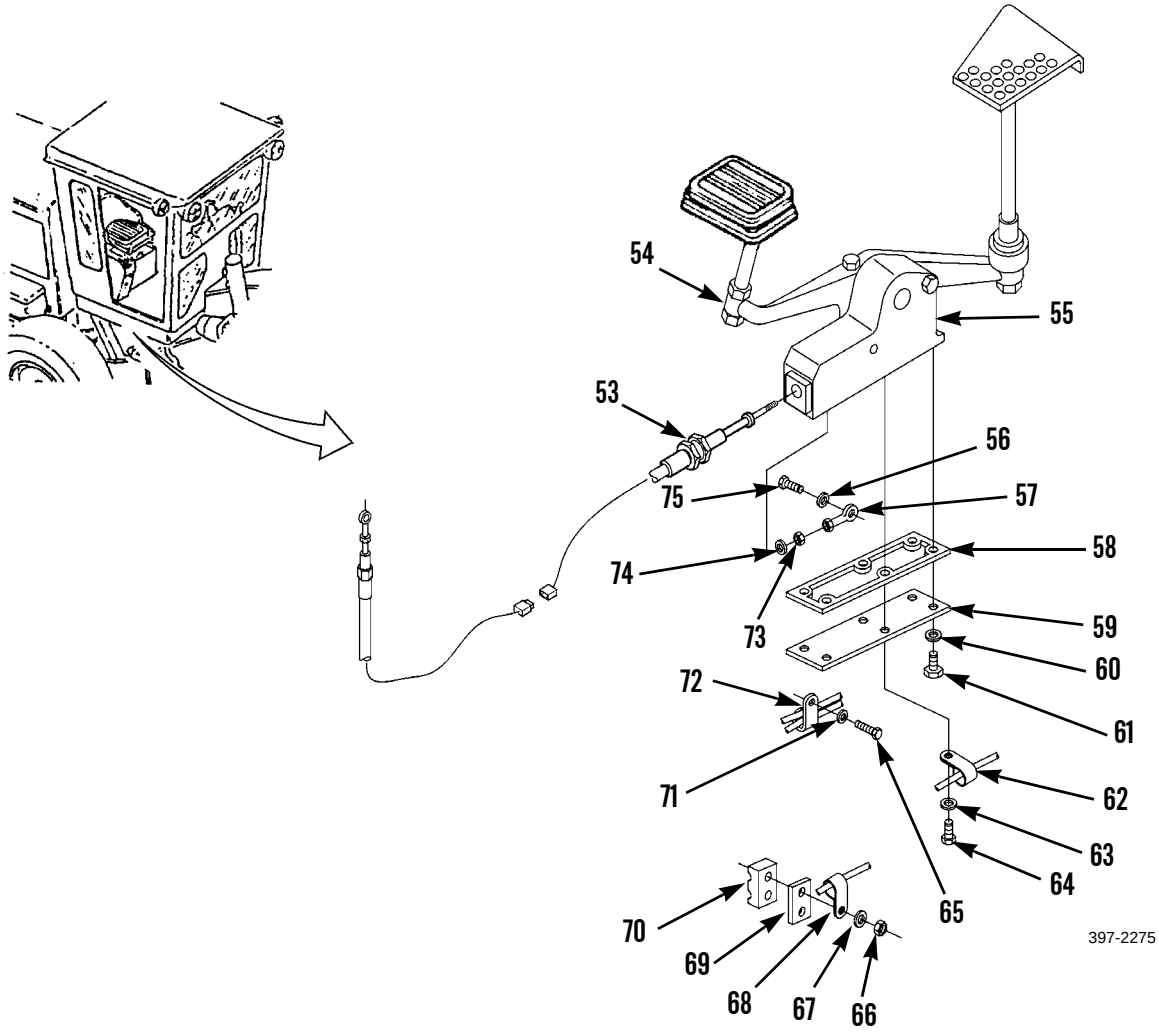
37. Remove four nuts (66), washers (67), three clips (68), two plates (69), and clamps (70) from front and rear of articulation area.
38. Separate cable end (53) from left and right clamps (70) and pull cable through articulation area.
39. Remove bolt (65), washer (71), and clip (72) from under right side of operator's compartment.
40. Remove bolt (64), washer (63), and clip assembly (62) from under right side of operator's compartment. Leave clip assembly mounted to hydraulic hose.
41. Remove five bolts (61), washers (60), cover (59), and gasket (58). Discard gasket.
42. Remove bolt (75) and washer (56).
43. Separate rod end (57) and lever (54).
44. Loosen nut (73).
45. Remove rod end (57) and nut (73).
46. Remove nut (74) from inside housing (55).

NOTE

For Type II machines, cable is divided between sections of machine. Either part of cable can be replaced separately.

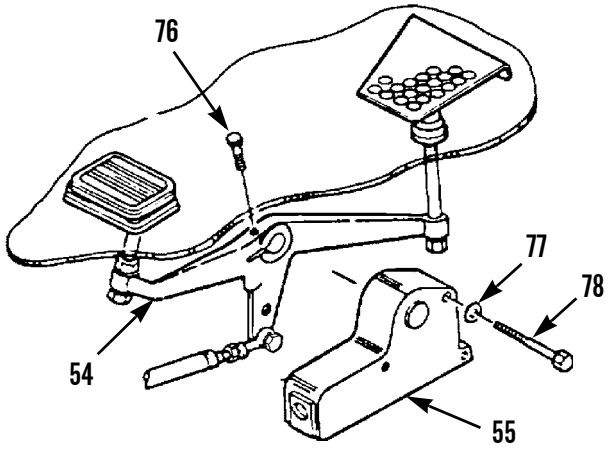
REMOVAL - CONTINUED

47. Remove cable end (53) from machine.



REMOVAL - CONTINUED

48. Remove bolt (76).
49. Remove three bolts (78) and washers (77).
50. Pull lever assembly (54) and housing assembly (55) away from engine.
51. Remove housing assembly (55) from lever assembly (54).



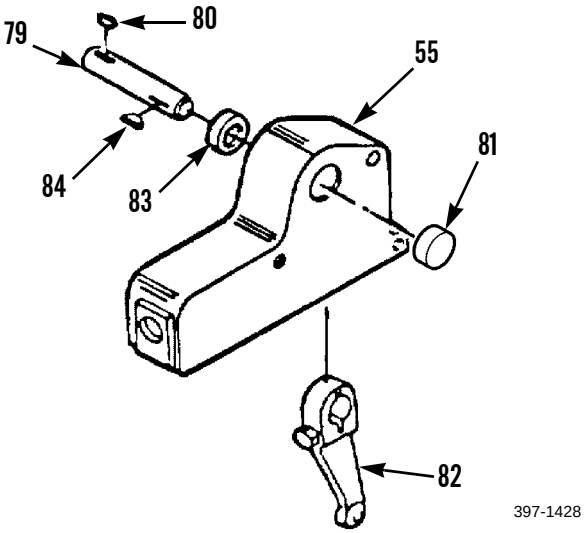
397-1427

52. Remove shaft (79) and keys (84 and 80).
53. Loosen bolt (85) and remove lever assembly (82).

NOTE

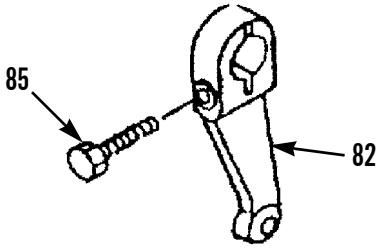
Removal of bearings from housing may cause destruction of bearings. Remove bearings only if inspection indicates replacement is necessary.

54. Inspect bearings (81 and 83). Replace if cracked, broken, or worn.
55. Remove bearings (81 and 83), if necessary, from housing (55).



397-1428

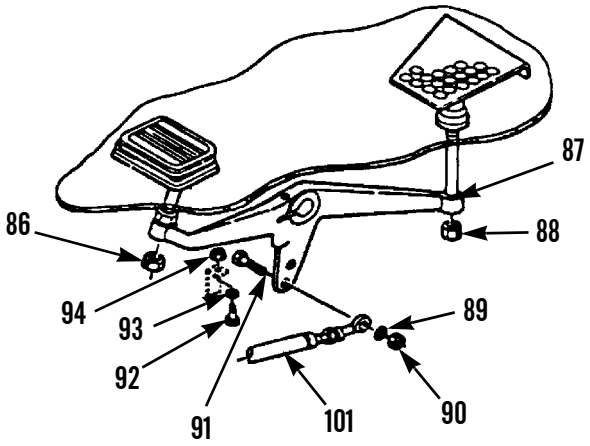
56. Remove bolt (85) from lever assembly (82).

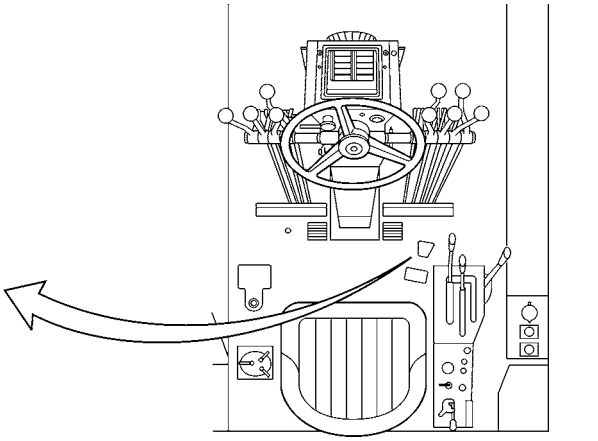


397-1429

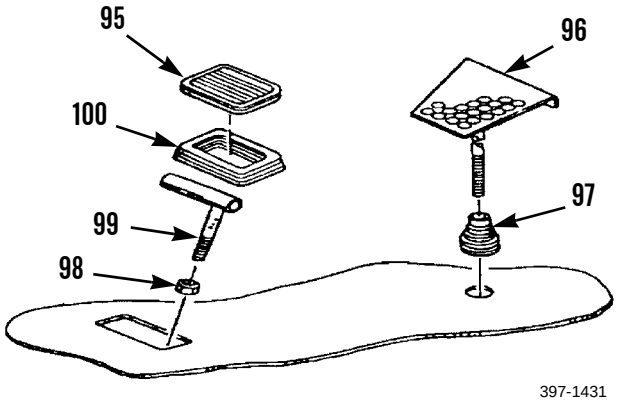
REMOVAL - CONTINUED

57. Remove pedal stop bolt (92), nut (94), and washer (93).
58. Remove nut (90), washer (89), and bolt (91).
59. Remove nuts (88 and 86).
60. Remove lever (87).



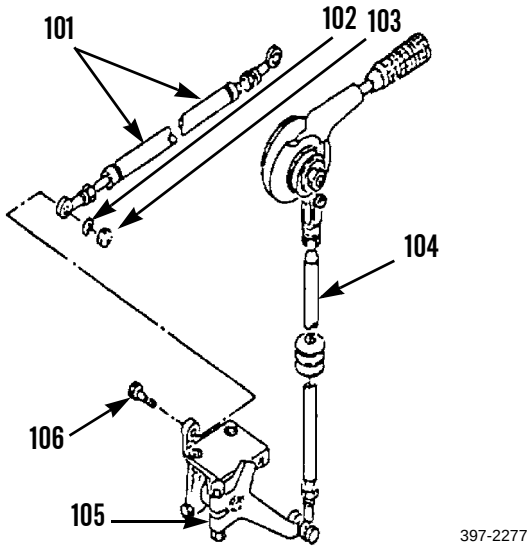


61. Remove pad (95) and boot (100) from right side of floor in operator's compartment.
62. Remove treadle (99) and nut (98).
63. Remove treadle (96) and boot (97).

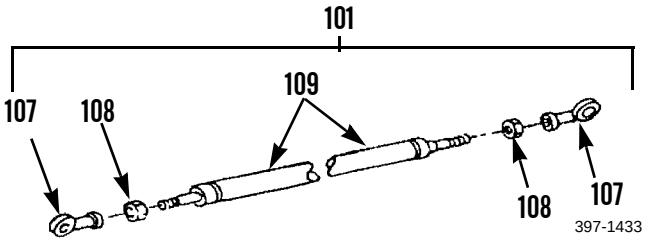


REMOVAL - CONTINUED

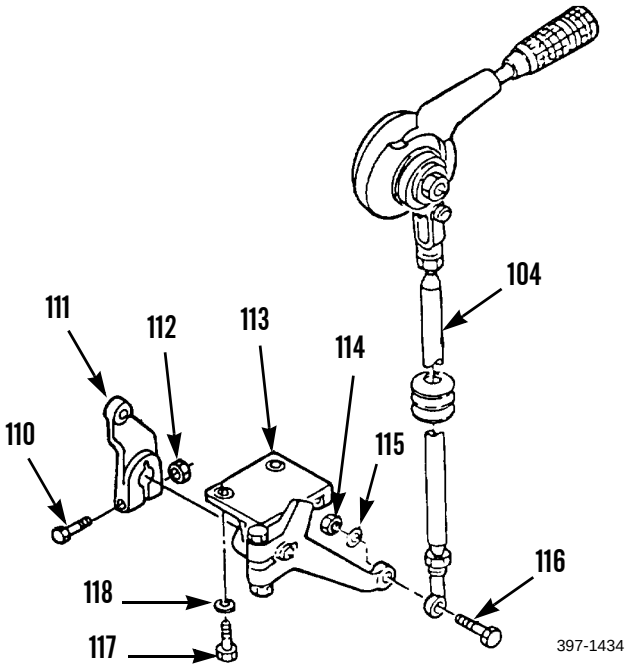
64. Remove nut (103), washer (102), bolt (106), and rod assembly (101) from bracket assembly (105) and rod assembly (104), as a unit.



65. Loosen two nuts (108).
66. Remove two rod ends (107) and nuts (108) from link (109).



67. Remove nut (112) and bolt (110).
68. Remove lever (111).
69. Remove nut (114), washer (115), and bolt (116) from bracket assembly (113), and rod assembly (104).
70. Support bracket assembly (113) under right side of operator's compartment.
71. Remove two bolts (117), washers (118), and bracket assembly (113).



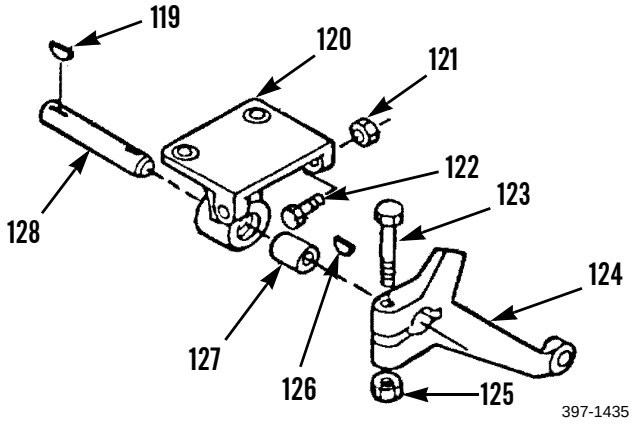
REMOVAL - CONTINUED

72. Remove key (119).
73. Remove nut (125) and bolt (123).
74. Remove lever (124) and key (126) from shaft (128).
75. Remove shaft (128) from bracket (120).
76. Remove two nuts (121) and bolts (122).

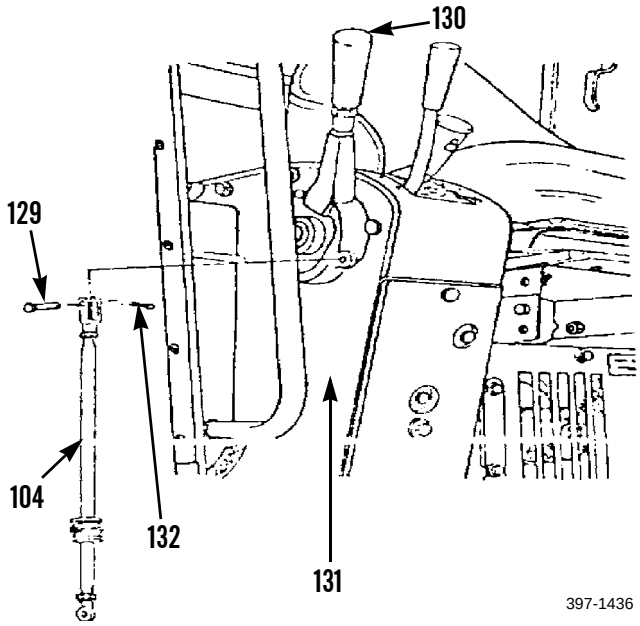
CAUTION

Removal of bushing may cause destruction of bearing. Remove bushing only if inspection indicates replacement is necessary.

77. Inspect bushing (127). Replace if cracked, broken, grooved, or worn.
78. Remove bushing (127), if necessary, and bracket (120).

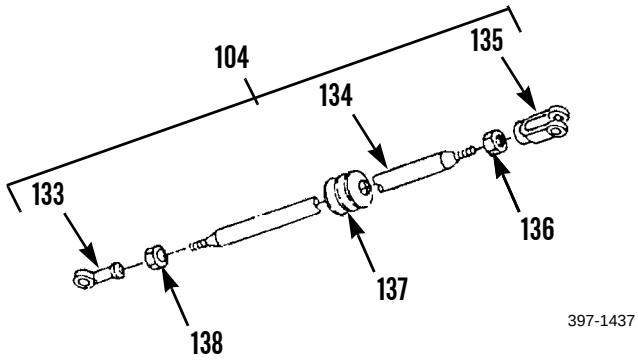


79. Remove and discard cotter pin (132) from right side of operator's control console (131) in operator's compartment.
80. Remove pin (129).
81. Separate rod assembly (104) from handle (130).
82. Remove rod assembly (104) from machine.

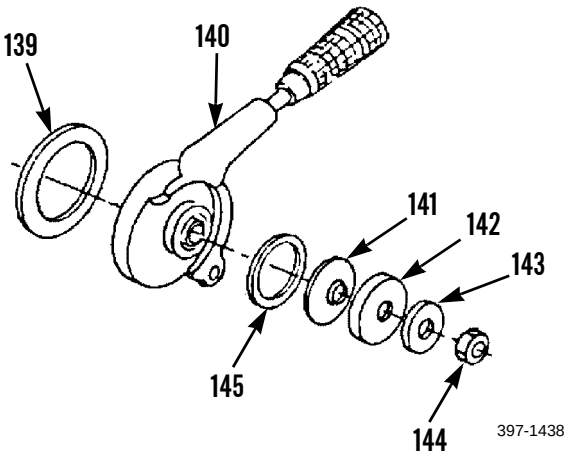


REMOVAL - CONTINUED

83. Loosen nuts (136 and 138).
84. Remove rod end (135), nut (136), rod end (133), nut (138), boot (137), and rod (134).



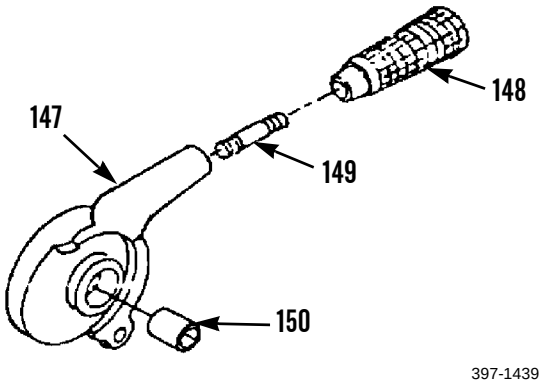
85. Remove nut (144), washer (143), seat (142), six springs (141), washer (139), handle assembly (140), and disc (145).



NOTE

Remove bearing only if inspection indicates replacement is necessary.

86. Inspect bearing (150). Replace if cracked, broken, or worn.
87. Remove bearing (150), if necessary.
88. Remove handle (148) from stud (149).
89. Remove stud (149) from handle (147).

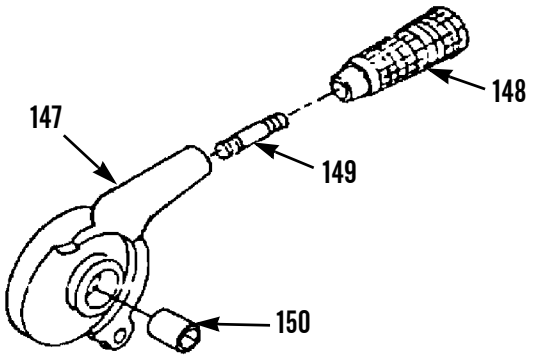


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

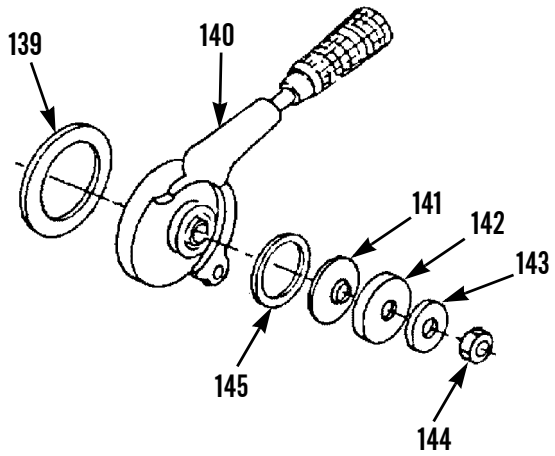
INSTALLATION

1. Install new bearing (150), if removed, to handle (147).
2. Install stud (149) in handle (147).
3. Install handle (148) on stud (149).



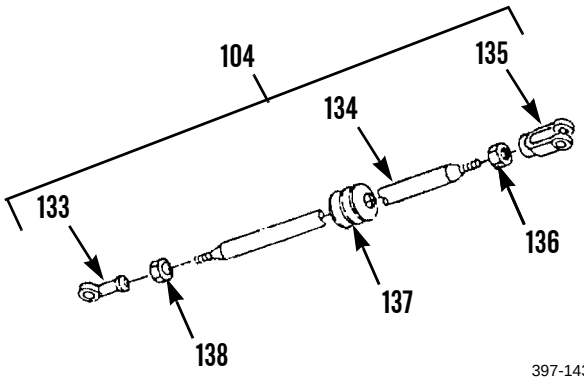
397-1439

4. Position disc (145), handle assembly (140), washer (139), six springs (141), seat (142), and washer (143).
5. Install nut (144) loosely.



397-1438

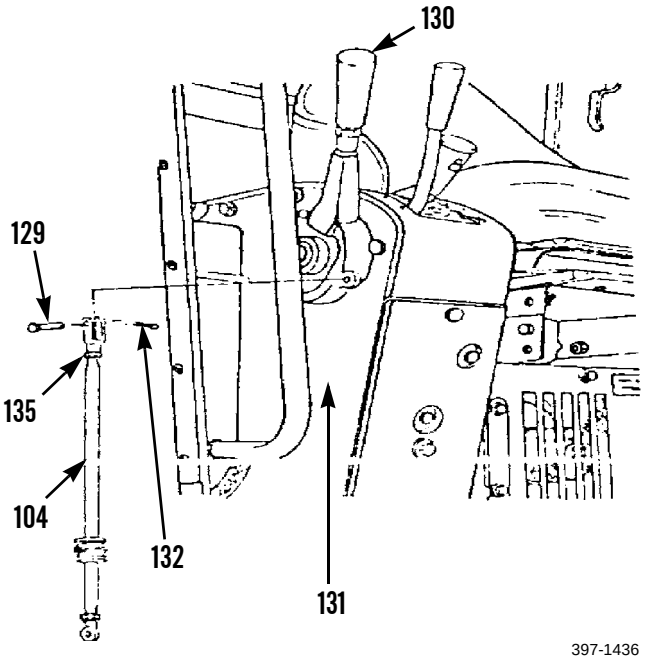
6. Position boot (137) on rod (134).
7. Install nut (138), rod end (133), nut (136), and rod end (135) on ends of rod (134).



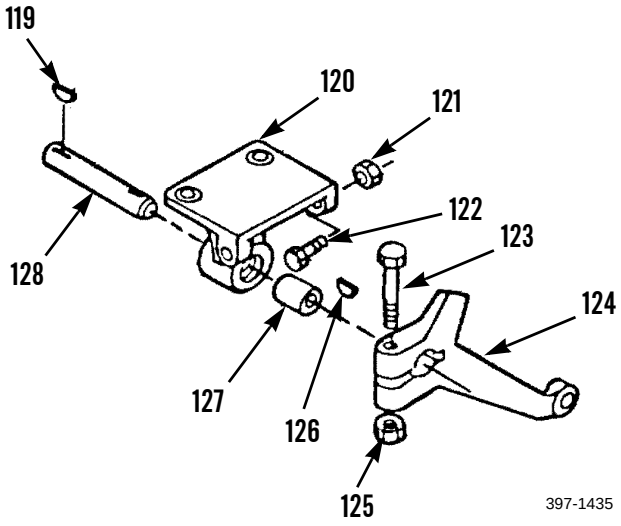
397-1437

INSTALLATION - CONTINUED

8. Position rod assembly (104) through floor with rod end (135) positioned to eye of handle (130).
9. Install pin (129) and new cotter pin (132) at right side of operator's control console (131).

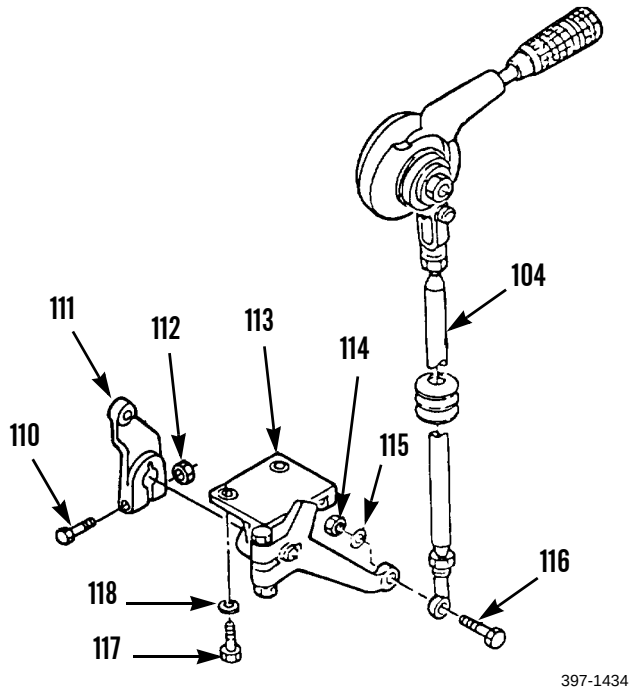


10. Install bushing (127), if removed, and bracket (120) under right side of operator's compartment.
11. Install two bolts (122) and nuts (121) in bracket (120).
12. Install shaft (128).
13. Install key (126), lever (124), bolt (123), and nut (125).
14. Install key (119).



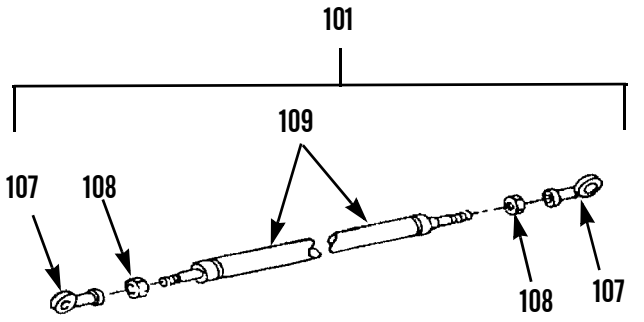
INSTALLATION - CONTINUED

15. Install bracket assembly (113), two washers (118), and bolts (117).
16. Install bolt (116), rod assembly (104), washer (115), and nut (114).
17. Install lever (111).
18. Install bolt (110) and nut (112).



397-1434

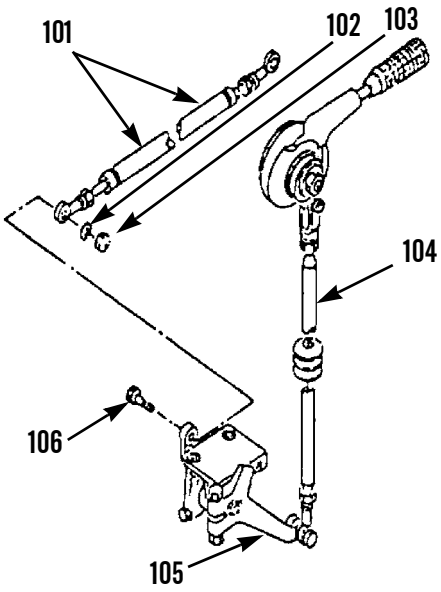
19. Install two nuts (108) and rod ends (107) loosely on link (109).



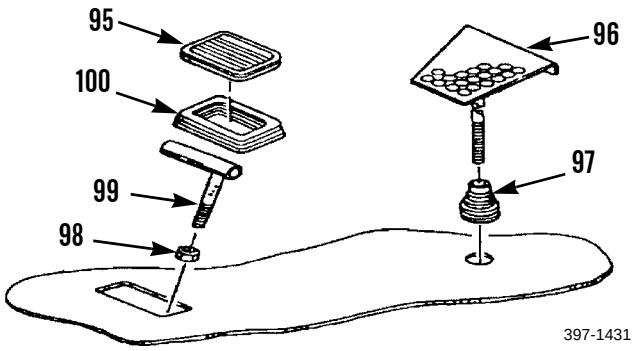
397-1433

INSTALLATION - CONTINUED

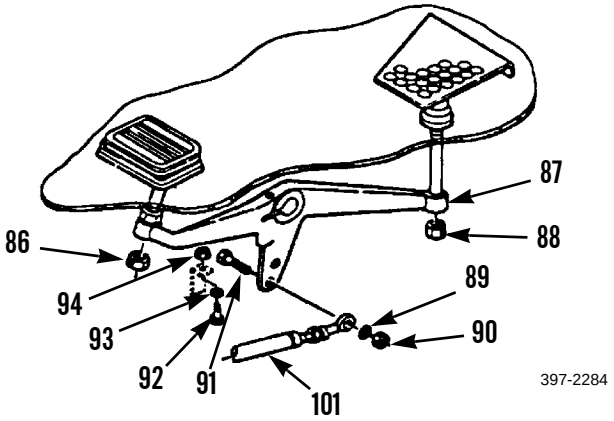
20. Position bracket assembly (105) with rod assembly (104) on machine.
21. Position rod assembly (101) on bracket assembly (105).
22. Install bolt (106), washer (102), and nut (103).



23. Install boot (97) and pedal (96) in right side of floor in operator's compartment.
24. Install nut (98) and treadle (99).
25. Install boot (100) and pad (95).

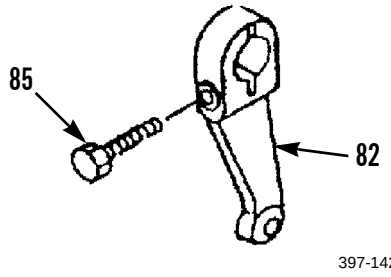


26. Install lever (87).
27. Install nuts (88 and 86).
28. Install bolt (91), lever (101) washer (89), and nut (90).
29. Install pedal stop washer (93), nut (94), and bolt (92).

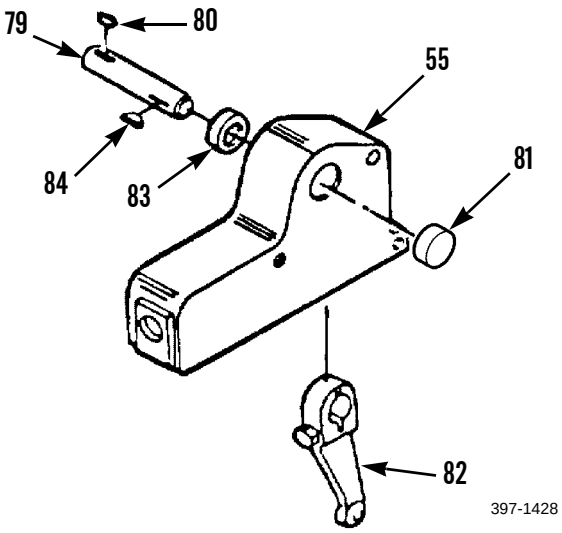


INSTALLATION - CONTINUED

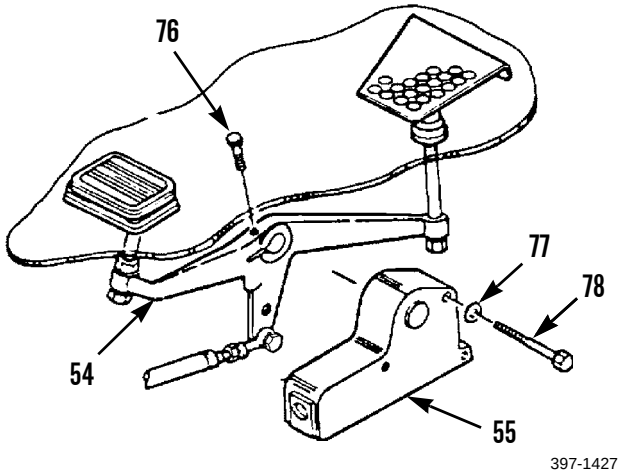
30. Install bolt (85) in lever (82).



31. Install new bearings (81 and 83), if removed.
32. Install lever assembly (82) in housing (55).
33. Install keys (84 and 80) and shaft (79).



34. Position housing assembly (55).
35. Install three washers (77) and bolts (78).
36. Install bolt (76).

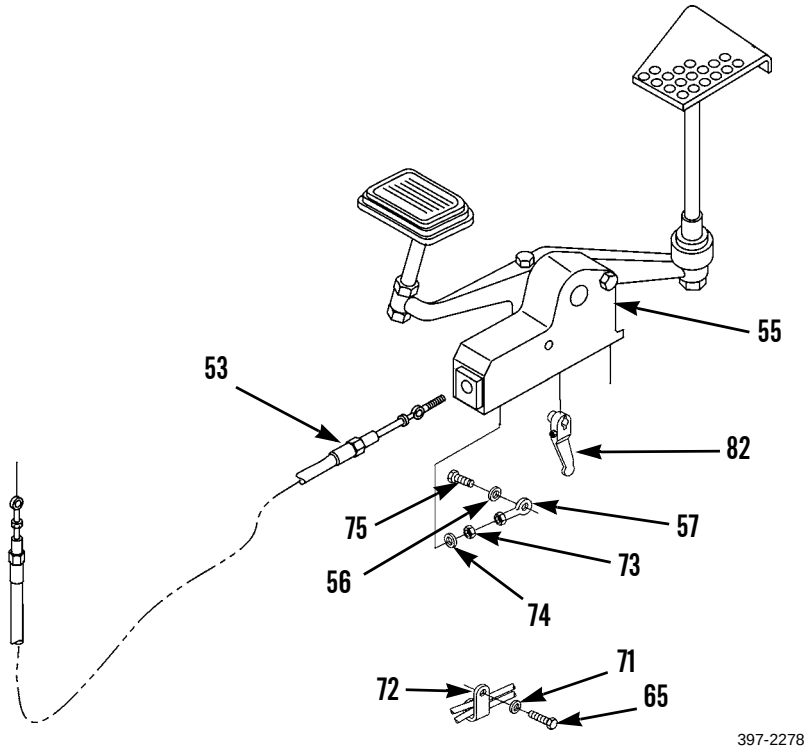


INSTALLATION - CONTINUED

NOTE

For Type II machines, cable is divided between sections of machine. Either part of cable can be replaced separately.

37. Position cable end (53) through housing (55).
38. Install nut (74).
39. Install nut (73) and rod end (57) loosely.
40. Align lever (82) and rod end (57).
41. Install washer (56) and bolt (75).
42. Install clip (72), washer (71), and bolt (65), securing cable end (53) along with surrounding hose and clip assembly to right side of frame.



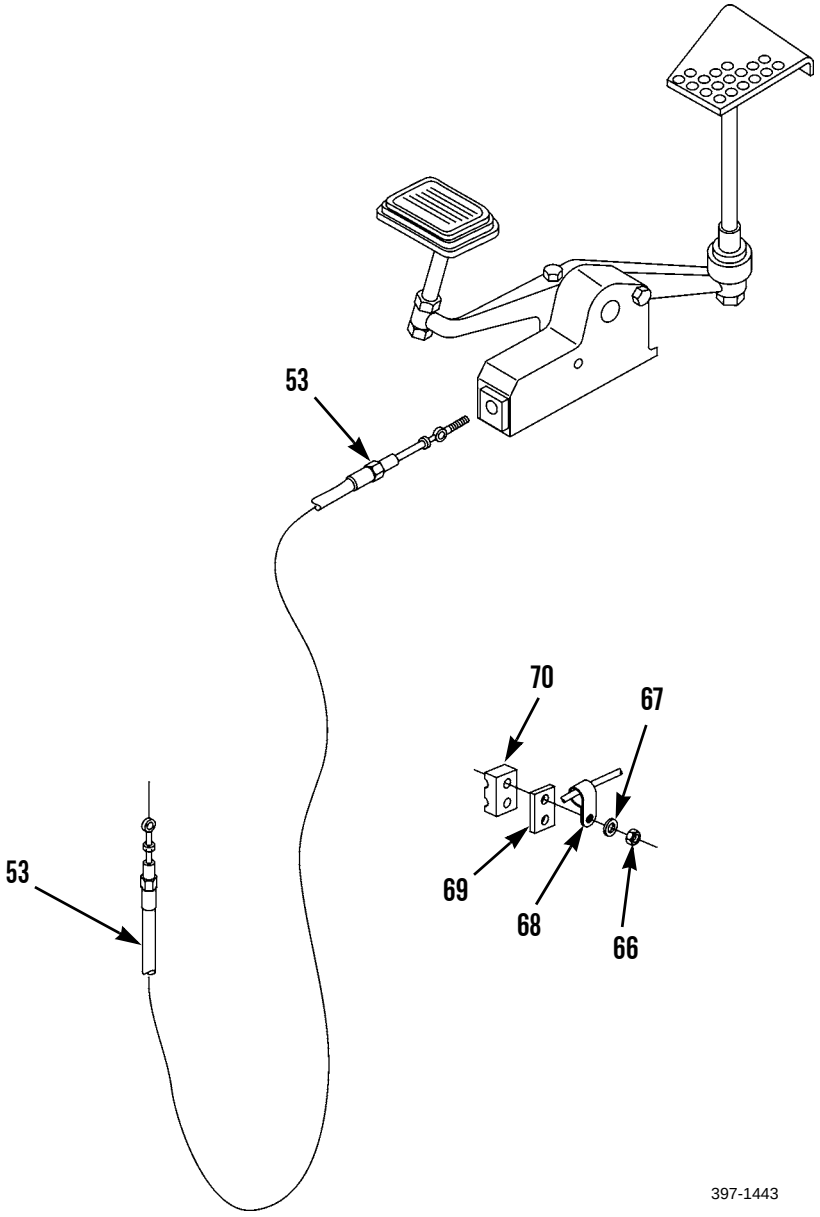
INSTALLATION - CONTINUED

43. Position cable end (53) in lower slot of right and left clamps (70) on rear and front of articulation area.
44. Install one of two clamps (70), plates (69), two clips (68), washers (67), and nuts (66) loosely. Secure hoses to clips.

NOTE

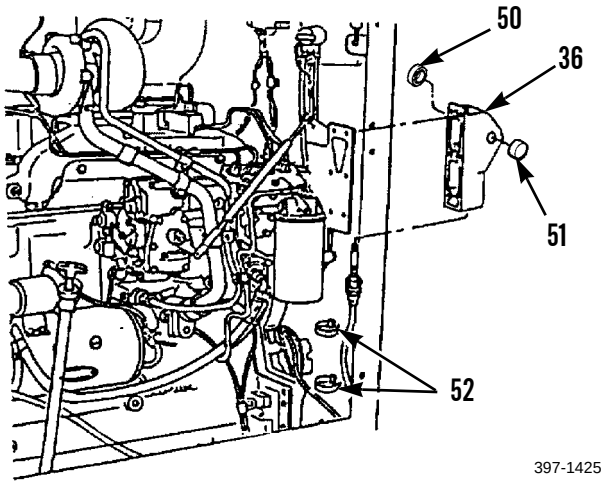
Do not tighten nuts.

45. Install one of two clamps (70), plates (69), two clips (68), washers (67), and nuts (66) loosely. Secure hoses to clips.
46. Position cable end (53) from articulation area up to right side of engine compartment.

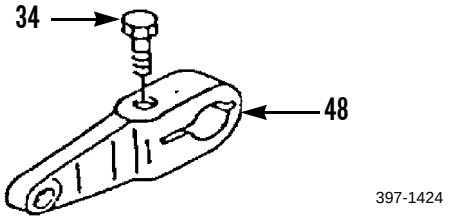


INSTALLATION - CONTINUED

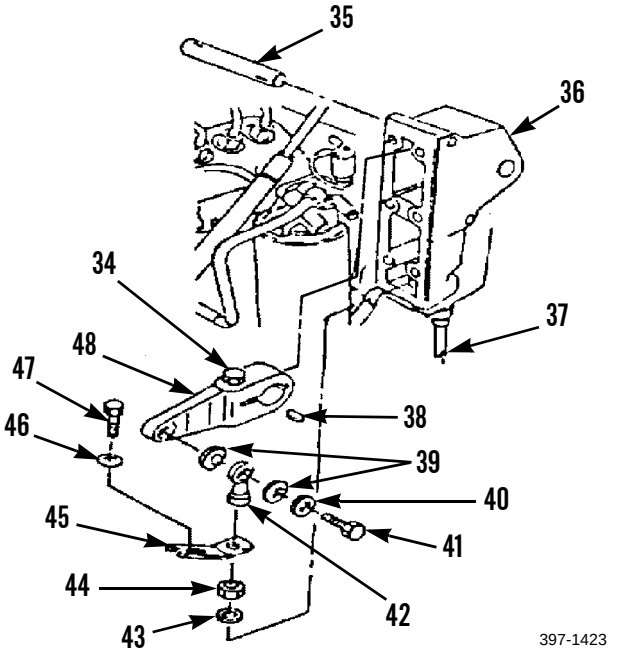
47. Install two new tie straps (52), and bearings (50 and 51), if removed. Drive new bearings on stamped side into housing (36).



48. Install bolt (34) in lever (48).

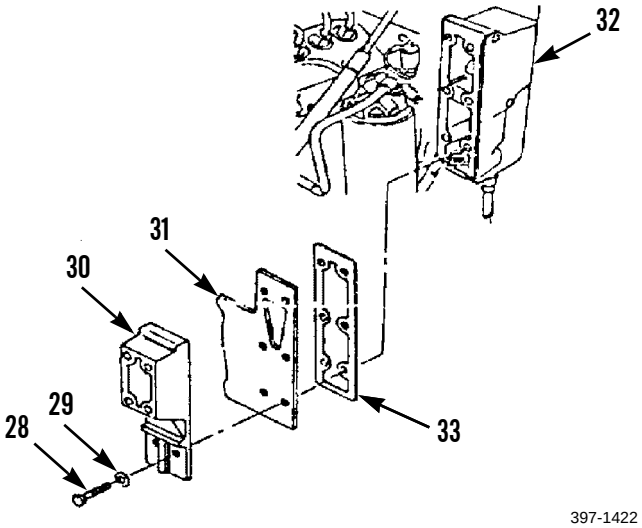


49. Position shaft (35) in housing (36).
50. Install key (38) in shaft (35).
51. Install lever (48) on shaft (35) in housing (36).
52. Install shaft (35) into housing (36).
53. Tighten bolt (34).
54. Position cable end (37) in housing (36).
55. Install two nuts (43).
56. Install nut (44), actuator (45), and rod end (42) on cable end (37).
57. Align lever (48) and rod end (42).
58. Install two springs (39), washer (40), and bolt (41).
59. Install nut (46) and bolt (47) in actuator (45).

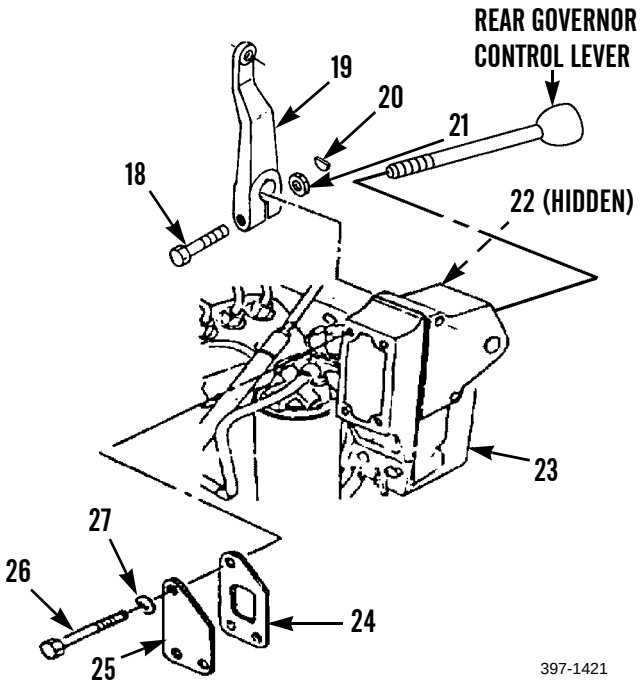


INSTALLATION - CONTINUED

60. Position housing assembly (32), new gasket (33), and housing (30) on cover (31).
61. Install two washers (29) and bolts (28).

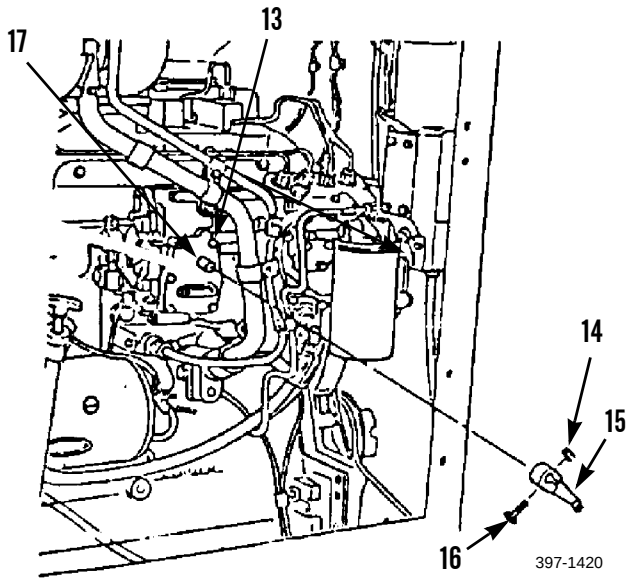


62. Install key (20) in shaft (22).
63. For Type II machines, install rear governor control lever.
64. Install lever (19) on shaft (22).
65. Install bolt (18) and nut (21).
66. Install new gasket (24), cover (25), four washers (27), and bolts (26) to housing (23).

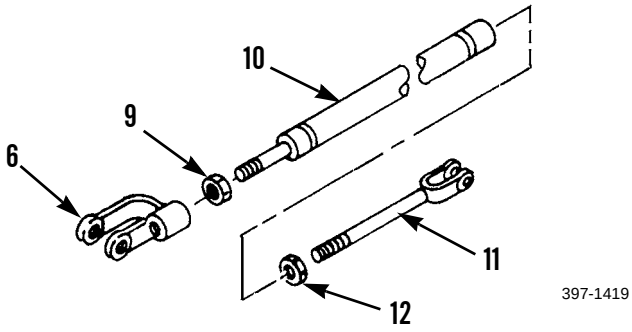


INSTALLATION - CONTINUED

67. Align fuel injection pump governor shaft (13) and lever (15) with matchmarks on fuel injection pump governor (17).
68. Install bolt (16) and nut (14).



69. Install nut (9), rod end (6), nut (12), and rod (11) loosely on link (10).

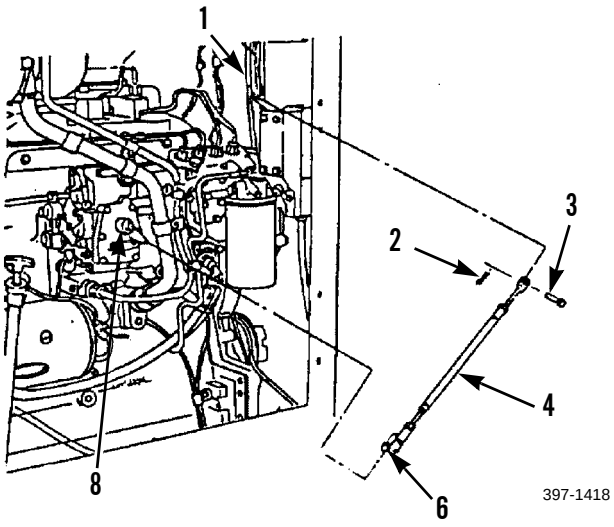


70. Position rod assembly (4).

NOTE

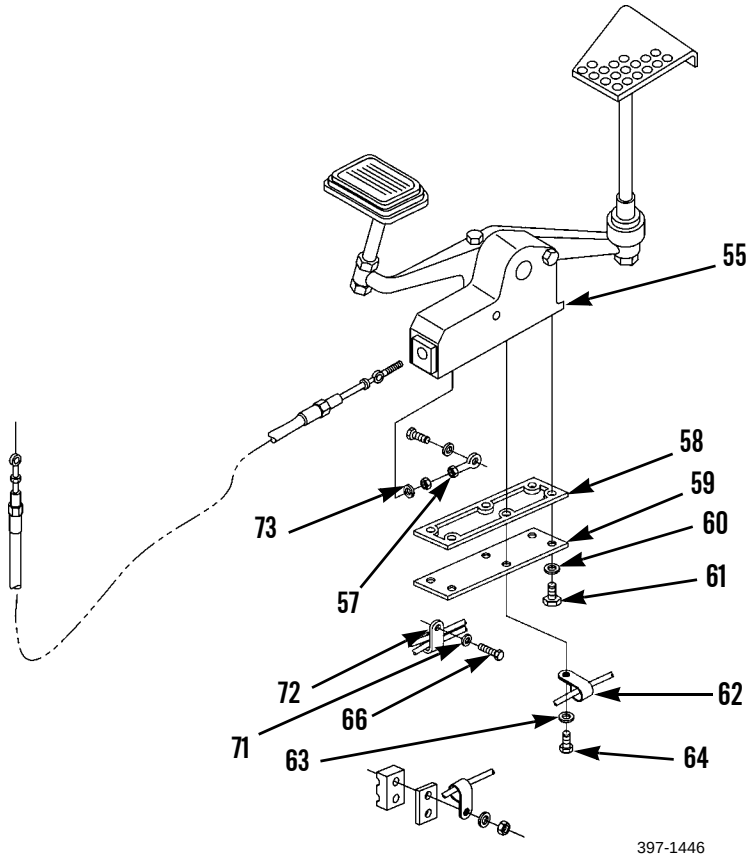
Do not bend back two cotter pins at this time.

71. Install pin (3) and new cotter pin (2) to rod assembly (4) and lever (1).
72. Install rod end (6) to rod assembly (4) and lever (8).



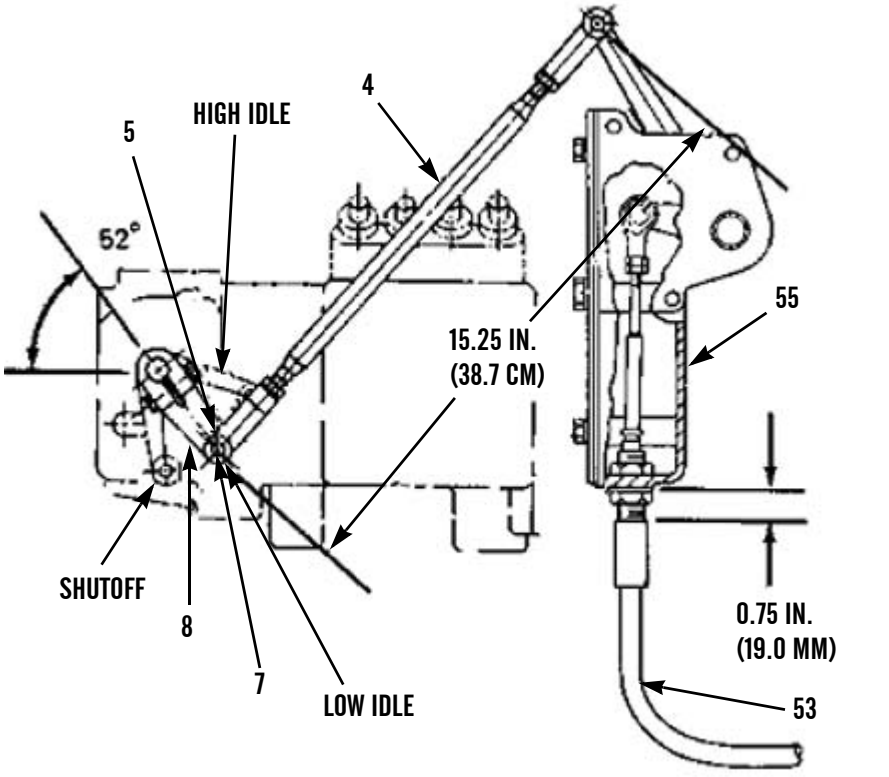
INSTALLATION - CONTINUED

73. Tighten nut (73) securing rod end (57) in housing (55) under right side of operator's compartment.
74. Install new gasket (58), cover (59), five washers (60), and bolts (61).
75. Position clip assembly (72) with hydraulic hose on cover (59). Install four washers (71) and bolts (66).
76. Install washer (63) and bolt (64).
77. Tighten four bolts (66) at front and rear of articulation area.



ADJUSTMENT

1. Disconnect rod assembly (4) from governor lever (8).
2. Position governor lever (8) in low idle position.
3. Start engine and ensure low idle RPMs are within specifications.
4. Shut off engine.
5. Disconnect cable end (53) from housing (55).



6. Adjust rod assembly (4) to 15.25 in. (38.7 cm).
7. Connect rod assembly (4) to governor lever (8).
8. Install pin (5) and new cotter pin (7).

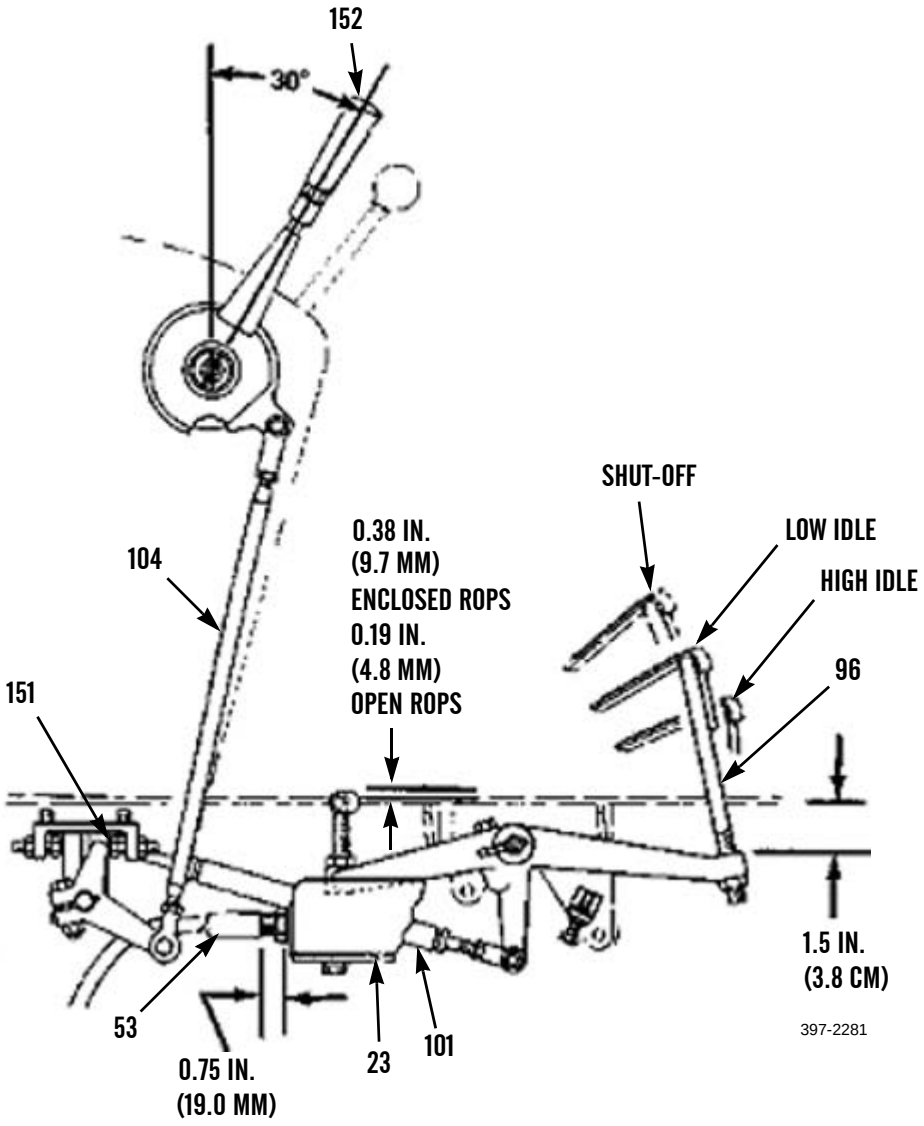
ADJUSTMENT - CONTINUED

9. Disconnect cable end (53) from housing (23) at engine.
10. Disconnect rod (101).
11. Adjust length between bolt holes of rod (101) to 13.81 in. (35.1 cm).

NOTE

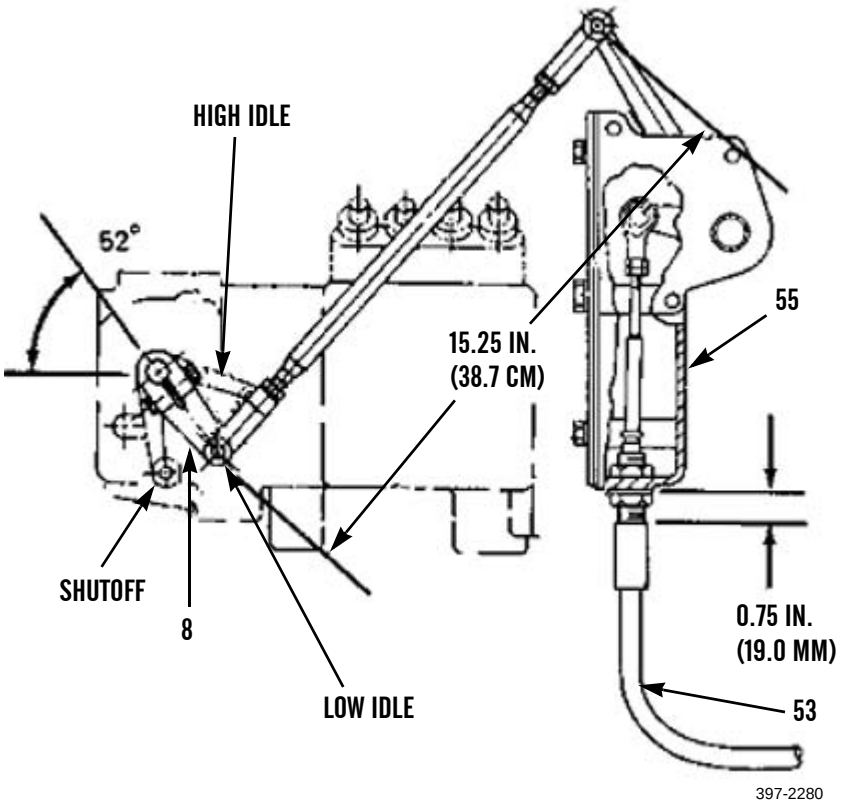
On machines with high detent force, when going from low idle to shut off, distance between treadle lever and floor plate can be increased to 2 in. (5 cm) to allow for needed cable stretch.

12. Install rod (101) and adjust linkage low idle stop (151) so that treadle lever (96) is 1.5 in. (3.8 cm) below floor plate. This is low idle position of pedal (96).
13. Adjust length between pin holes of rod (104) to 17.53 in. (44.5 cm). When governor control linkage is against low idle stop (151), governor control handle (152) will be positioned approximately 30 degrees from vertical.



ADJUSTMENT - CONTINUED

14. Adjust position of cable end (53) to housing (23) and housing (55). Ensure shoulder of each cable end is approximately 0.75 in. (19 mm) from face of housing.
15. At engine, set governor lever (8) to a 52-degree angle for the low idle position.
16. With governor lever (8) and governor control handle (152) in low idle position, adjust cable ends to allow for connection to levers inside housings (23) and (55).
17. Check engine shutoff by pulling up on accelerator treadle. There should be a distinct detent for off position.

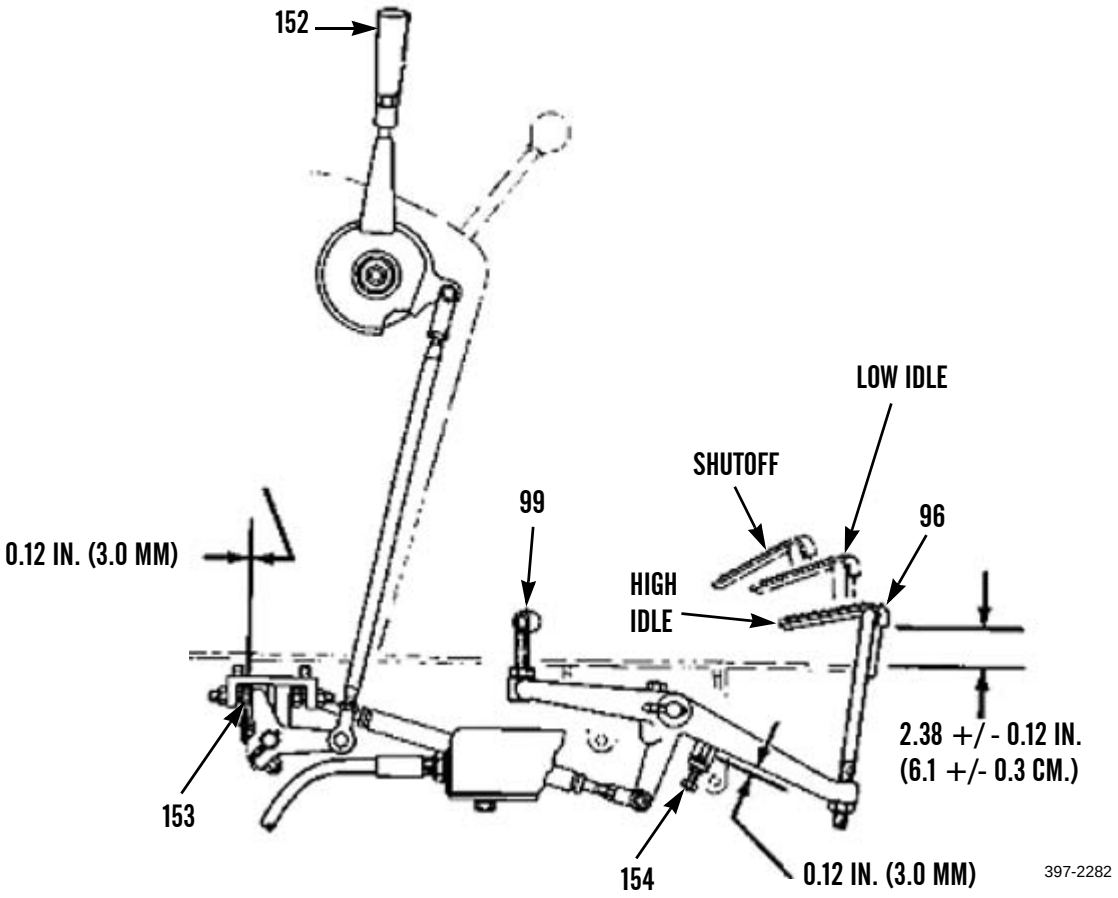


ADJUSTMENT - CONTINUED

NOTE

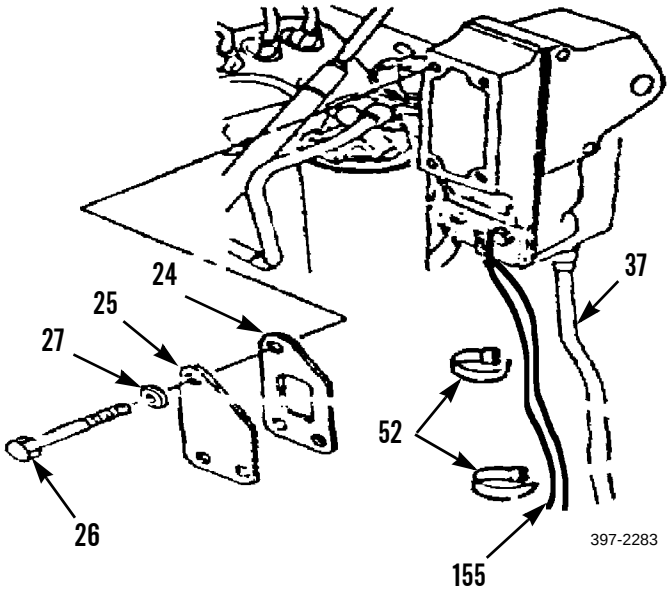
Low idle RPM can be adjusted at governor. Do NOT change high idle RPM by adjusting governor.

18. Place governor control linkage (153) in low idle position and start engine.
19. Move governor control lever (8) to the high idle position. Adjust governor control linkage (153) high idle stop and pedal lever (154) high idle stop. Ensure a 0.12 in. (3 mm) clearance between levers and stops when governor control lever is in high idle position. Stop engine by pulling up on accelerator pedal (96).
20. Put accelerator pedal (96) in low idle position.
21. For machines with open ROPS, adjust decelerator pedal (99). Set top of pedal to 0.19 in. (4.8 mm) above floor plate. For machines with enclosed ROPS, set top of decelerator pedal to 0.38 in. (9.7 mm) above floor plate.
22. Position treadle assembly to high idle. Adjust accelerator treadle (96) to provide 2.38 in. (6.1 cm) clearance between bottom of treadle and floor plate.



ADJUSTMENT - CONTINUED

23. Install two new tie straps (52) around cable end (37) and governor switch wires (155).
24. Install new gasket (24), cover (25), four washers (27), and bolts (26).



25. Install governor switch (WP 0088 00).

END OF WORK PACKAGE

TURBOCHARGER REPLACEMENT 0283 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Materials/Parts

Antiseize compound (Item 6, WP 0349 00)

Cap set, protective (Item 7, WP 0349 00)

Oil, lubricating (Items 26, 27, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Turbocharger oil lines removed (WP 0033 00)

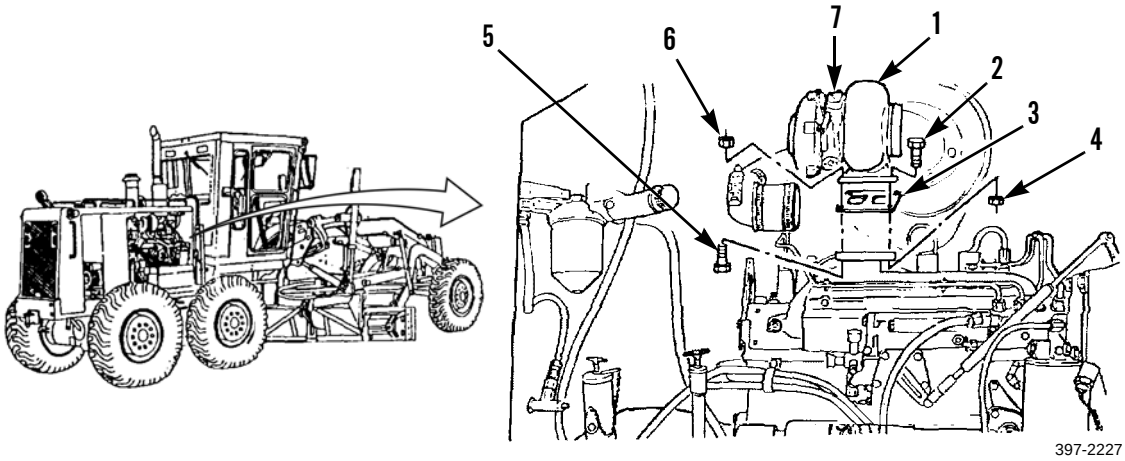
Turbocharger air lines removed (WP 0039 00)

Turbocharger exhaust elbow removed (WP 0040 00)

TURBOCHARGER REPLACEMENT - CONTINUED 0283 00

REMOVAL

1. Remove four nuts (4), bolts (2), bolt (5), and nut (6).
2. Remove turbocharger (1) and gasket (3). Discard gasket.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install new gasket (3) and turbocharger (1).
2. Coat threads of nut (6), bolt (5), four bolts (2), and nuts (4) with antiseize compound and install. Tighten bolts to 40 lb-ft (54 Nm).
3. Install turbocharger exhaust elbow (WP 0040 00).
4. Install turbocharger air lines (WP 0039 00).
5. Install return turbocharger oil line (WP 0033 00).
6. Pour 1/2 cup clean oil into turbocharger oil supply port (7).
7. Install supply turbocharger oil line (WP 0033 00).

END OF WORK PACKAGE

ELECTRONIC MONITORING SYSTEM (EMS) PANEL REPAIR 0284 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 75, WP 0348 00)

Wrench, torque (Item 98, WP 0348 00)

Materials/Parts

Silicone compound (Item 41, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Sealing compound (Item 39, WP 0349 00)

Packing, preformed (2)

Washer, key (9)

Washer, seal

References

WP 0021 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

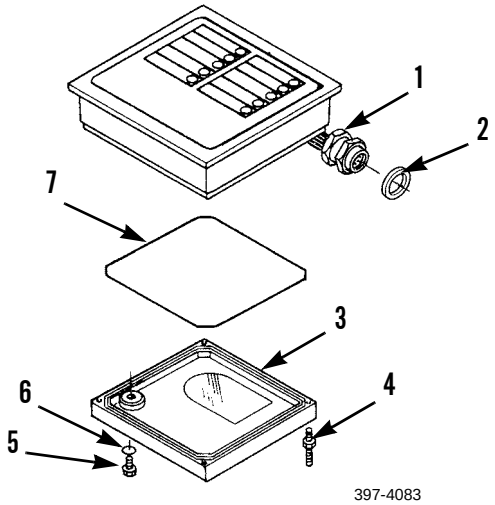
Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Electronic monitoring system panel removed (WP 0069 00)

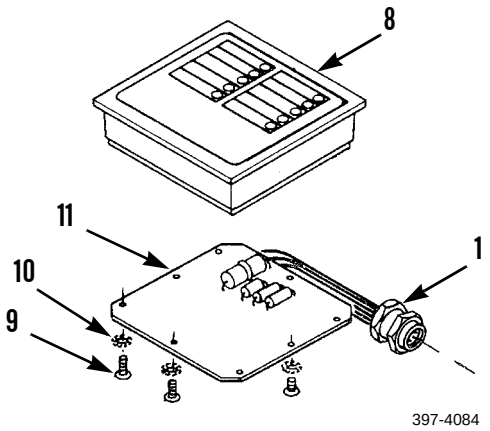
DISASSEMBLY

1. Remove plug (5) and preformed packing (6) from cover (3). Discard preformed packing.
2. Remove four stud bolts (4), cover (3), and preformed packing (7). Discard preformed packing.
3. Remove and discard seal washer (2) from connector (1).



DISASSEMBLY - CONTINUED

4. Remove nine screws (9), key washers (10), magnet (11), and housing (8). Discard key washers.

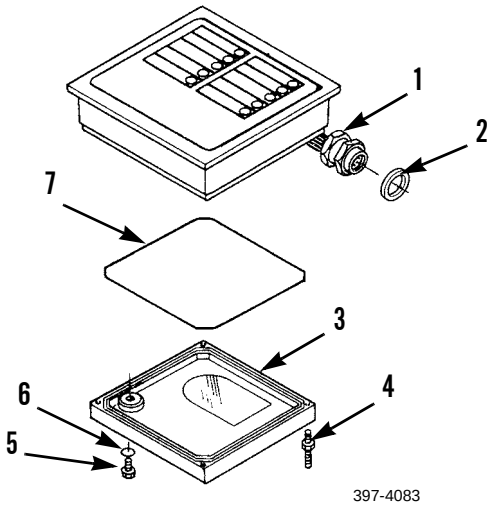


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

ASSEMBLY

1. Apply silicone (heat transfer) compound to corner of magnet (11) where transistor and heat sink are located. Apply thread sealant to nine screws (9). Install housing (8), magnet, nine new key washers (10), and screws.
2. Install new seal washer (2) on connector (1). Tighten to 72 lb-in. (8 Nm).
3. Install new preformed packing (7), cover (3), and four stud bolts (4). Tighten stud bolts to 48 lb-in. (5 Nm).
4. Install new preformed packing (6) and plug (5).



5. Install EMS panel (WP 0069 00).
6. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

REAR SIGNAL LIGHT AND BACKUP ALARM WIRING HARNESS REPLACEMENT 0285 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Engine screen doors opened (TM 5-3805-261-10)

Radiator grille removed (WP 0054 00)

REAR SIGNAL LIGHT AND BACKUP ALARM WIRING HARNESS REPLACEMENT - CONTINUED 0285 00

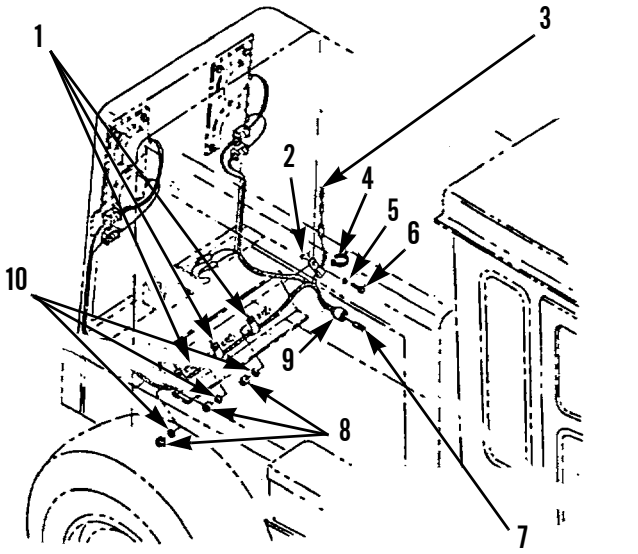
REMOVAL

1. Remove three nuts (8), washers (10), and clips (1).

NOTE

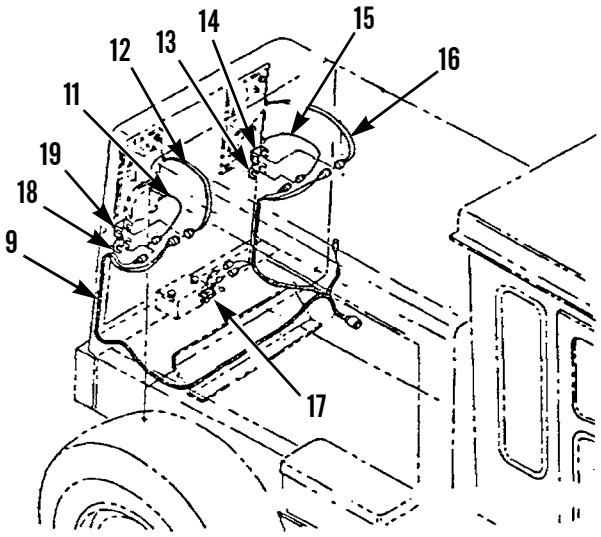
Tag and note routing of wiring harnesses before disconnecting to aid in installation.

2. Disconnect rear signal light and backup alarm wiring harness (9) from main wiring harness (7).
3. Remove bolt (6), washer (5), and clip (2).
4. Cut and discard tie strap (4).
5. Disconnect rear signal light and backup alarm wiring harness (9) from rear work light wiring harness (3).



397-4085

6. Disconnect two wire assemblies (17) from rear signal light and backup alarm wiring harness (9).
7. Remove rear signal light and backup alarm wiring harness (9) from clip (19).
8. Disconnect wire assembly (12) from rear signal light and backup alarm wiring harness (9).
9. Remove rear signal light and backup alarm wiring harness (9) from clip (18).
10. Disconnect wire assembly (11) from rear signal light and backup alarm wiring harness (9).
11. Remove rear signal light and backup alarm wiring harness (9) from clip (13).
12. Disconnect wire assembly (15) from rear signal light and backup alarm wiring harness (9).
13. Remove rear signal light and backup alarm wiring harness (9) from clip (14).
14. Disconnect wire assembly (16) from rear signal light and backup alarm wiring harness (9).
15. Remove rear signal light and backup alarm wiring harness (9) from machine.



397-4086

CLEANING AND INSPECTION

1. Clean and inspect all parts in accordance with WP 0021 00.
2. Repair rear signal light and backup alarm wiring harness, if necessary (WP 0021 00).

INSTALLATION

CAUTION

Do not position rear signal light and backup alarm wiring harness against any rough surface. Failure to follow this procedure may cause chafing.

NOTE

Route rear signal light and backup alarm wiring harness exactly as it was removed.

1. Position rear signal light and backup alarm wiring harness (9) in machine.
2. Connect wire assembly (16) to rear signal light and backup alarm wiring harness (9).
3. Install rear signal light and backup alarm wiring harness (9) into clip (14).
4. Connect wire assembly (15) to rear signal light and backup alarm wiring harness (9).
5. Install rear signal light and backup alarm wiring harness (9) into clip (13).
6. Connect wire assembly (11) to rear signal light and backup alarm wiring harness (9).
7. Install rear signal light and backup wiring harness (9) into clip (18).
8. Connect wire assembly (12) to rear signal light and backup alarm wiring harness (9).
9. Install rear signal light and backup alarm wiring harness (9) into clip (19).
10. Connect two wire assemblies (17) to rear signal light and backup alarm wiring harness (9).
11. Connect rear signal light and backup alarm wiring harness (9) to rear work light wiring harness (3).
12. Install new tie strap (4).
13. Install clip (2), washer (5), and bolt (6).
14. Connect rear signal light and backup alarm wiring harness (9) to main wiring harness (7).
15. Install three clips (1), washers (10), and nuts (8).
16. Connect battery cables (WP 0125 00).
17. Install radiator grill (WP 0054 00).
18. Close engine screen doors (TM 5-3805-261-10).

END OF WORK PACKAGE

MAIN WIRING HARNESS REPLACEMENT 0286 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

WP 0050 00

WP 0066 00

WP 0067 00

WP 0069 00

WP 0093 00

References - Continued

WP 0096 00

WP 0103 00

WP 0108 00

WP 0113 00

WP 0114 00

WP 0252 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Left and right side engine panels removed (WP 0182 00)

Left and right side panels removed from operator's panel console (WP 0093 00)

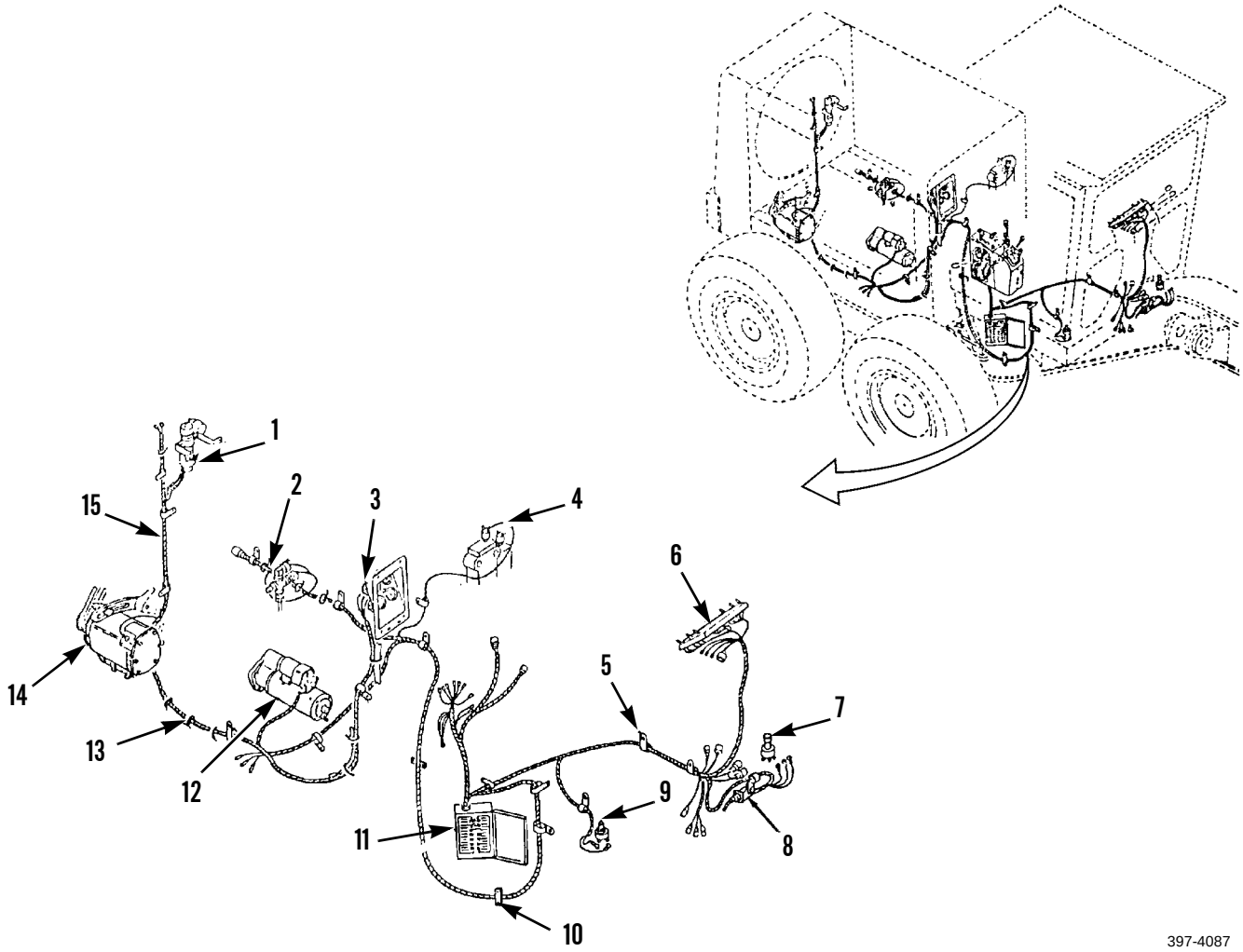
Operator's panel console base removed (WP 0328 00)

REMOVAL

NOTE

Tag and note routing of wiring harness before disconnecting to aid in installation.

1. Disconnect main wiring harness (15) from ether start valve (1) (WP 0050 00), alternator (14) (WP 0066 00), starting motor (12) (WP 0067 00), air pressure and hourmeter gauges (3) (WP 0252 00), oil pressure and hourmeter switches (2) (WP 0113 00), ether start temperature switch (4) (WP 0114 00), fuse box (11) (WP 0096 00), stop light switch (9) (WP 0108 00), blade float limit switch (CCE machine) (8) (WP 0093 00), dimmer switch (7) (WP 0103 00), and EMS panel (6) (WP 0069 00).
2. Remove clips (5), clamps (10), and tie straps (13). Discard tie straps.
3. Remove main wiring harness (15) from machine.



CLEANING AND INSPECTION

Repair main wiring harness, if necessary (WP 0021 00).

INSTALLATION

CAUTION

Do not position main wiring harness against any rough surface. Failure to follow this procedure may cause chafing.

NOTE

Route main wiring harness exactly as it was removed.

1. Position main wiring harness (15) on machine.
2. Connect main wiring harness (15) to EMS panel (6) (WP 0069 00), dimmer switch (7) (WP 0103 00), blade float limit switch (CCE machine) (8) (WP 0093 00), stop light switch (9) (WP 0108 00), fuse box (11) (WP 0096 00), ether start temperature switch (4) (WP 0114 00), oil pressure and hourmeter switches (2) (WP 0113 00), air pressure and hourmeter gauges (3) (WP 0252 00), starting motor (12) (WP 0067 00), alternator (14) (WP 0066 00), and ether start valve (1) (WP 0050 00).
3. Install new tie straps (13), clamps (10), and clips (5).
4. Install operator's panel console base (WP 0328 00).
5. Install left and right side panels on operator's panel console (WP 0193 00).
6. Install left and right side engine panels (WP 0182 00).
7. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

MAIN BLACKOUT LIGHT WIRING HARNESS REPLACEMENT 0287 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

WP 0096 00

WP 0101 00

WP 0102 00

WP 0117 00

WP 0193 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

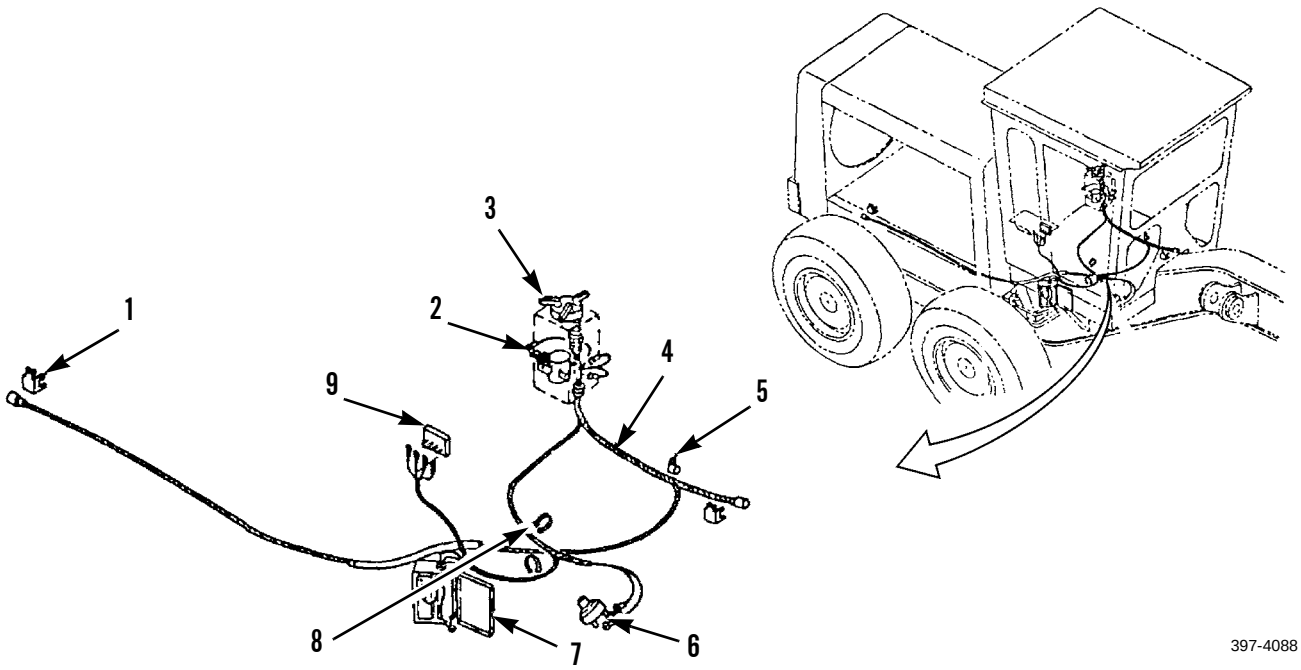
Operator's console cover removed (WP 0082 00)

REMOVAL

NOTE

Tag and note routing of wiring harness before disconnecting to aid in installation.

1. Disconnect main blackout light wiring harness (4) from magnetic switch (2) (WP 0102 00), vehicle light switch (3) (WP 0101 00), blackout/stop light switch (6) (WP 0117 00), fuse box (7) (WP 0096 00), and junction block (WP 0193 00).
2. Remove clips (1), clamps (5), and tie straps (8). Discard tie straps.
3. Remove main blackout light wiring harness (4) from machine.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

INSTALLATION

CAUTION

Do not position main blackout light wiring harness against any rough surface. Failure to follow this procedure may cause chafing.

NOTE

Route main blackout light wiring harness exactly as it was removed.

1. Position main blackout light wiring harness (4) on machine.
2. Install main blackout light wiring harness (4) to junction block (9) (WP 0193 00), fuse box (7) (WP 0096 00), blackout/stop light switch (6) (WP 0117 00), vehicle light switch (3) (WP 0101 00), and magnetic switch (2) (WP 0102 00).
3. Install new tie straps (8), clamps (5), and clips (1).
4. Install operator's console cover (WP 0082 00).
5. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

FRONT BLACKOUT LIGHT WIRING HARNESS REPLACEMENT 0288 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Lockwasher (2)

References

WP 0021 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

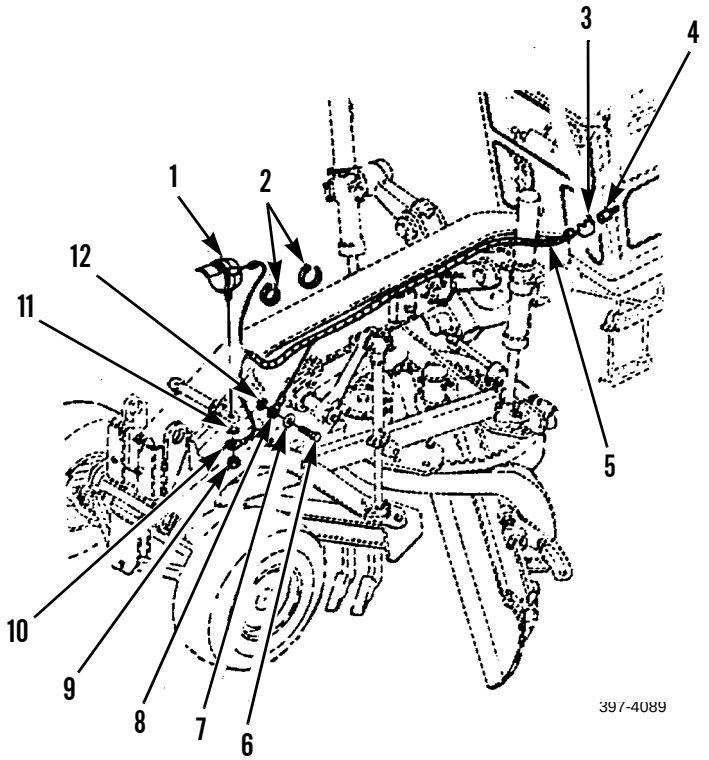
Left side frame cover removed (WP 0179 00)

REMOVAL

NOTE

Tag and note routing of wiring harnesses before disconnecting to aid in installation.

1. Disconnect front blackout light wiring harness (5) from back of front blackout light (1).
2. Remove nut (9).
3. Disconnect wire assembly (10) from bottom of front blackout light (1).
4. Remove lockwasher (11) and front blackout light (1). Discard lockwasher.
5. Remove and discard seven tie straps (2) from left-front frame of machine.
6. Remove bolt (6) and washer (7).
7. Disconnect wire assembly (8).
8. Remove and discard lockwasher (12).
9. Remove front blackout light wiring harness (5) and main blackout light wiring harness (4) from clip (3).
10. Disconnect front blackout light wiring harness (5) from main blackout light wiring harness (4).
11. Remove front blackout light wiring harness (5) from machine.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

INSTALLATION

CAUTION

Do not position front blackout light wiring harness against any rough surface. Failure to follow this procedure may cause chafing.

NOTE

Route front blackout light wiring harness exactly as it was removed.

1. Position front blackout light wiring harness (5) on machine.
2. Connect front blackout light wiring harness (5) to main blackout light wiring harness (4) and attach to clip (3).
3. Install new lockwasher (12) on left-front frame of machine.
4. Connect wire assembly (8).
5. Install washer (7) and bolt (6).
6. Install seven new tie straps (2).
7. Install front blackout light (1) and new lockwasher (11).
8. Connect wire assembly (10) to bottom of front blackout light (1).
9. Install nut (9).
10. Connect front blackout light wiring harness (5) to back of front blackout light (1).
11. Install left side frame cover (WP 0179 00).
12. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

REAR BLACKOUT LIGHT WIRING HARNESS REPLACEMENT 0289 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Right and left engine side screen doors opened (WP 0055 00)

Baffles removed (WP 0053 00)

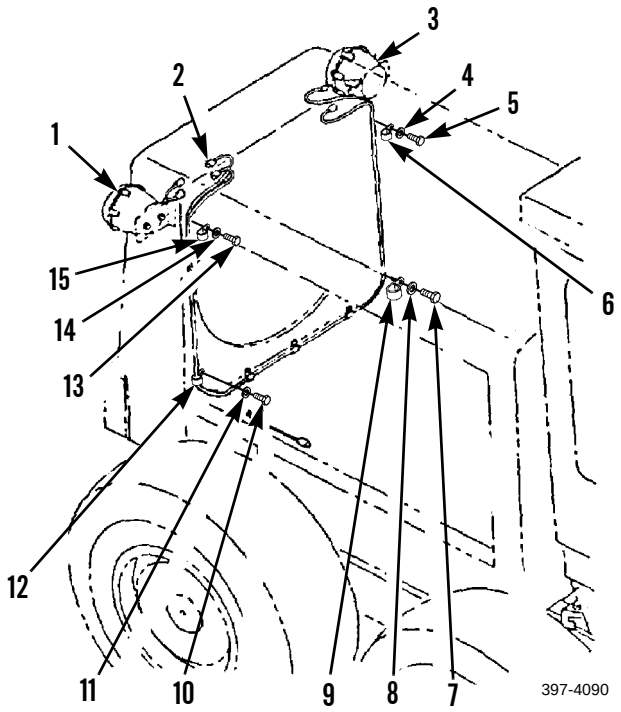
Grille removed (WP 0054 00)

REMOVAL

NOTE

Tag and note routing of wiring harnesses before disconnecting to aid in installation.

1. Disconnect rear blackout light wiring harness (2) from right blackout light (1).
2. Remove two bolts (13), washers (14), and small clips (15).
3. Remove two bolts (10), washers (11), and large clips (12).
4. Disconnect rear blackout light wiring harness (2) from left blackout light (3).
5. Remove two bolts (5), washers (4), and small clips (6).
6. Remove two bolts (7), washers (8), and large clips (9).



REAR BLACKOUT LIGHT WIRING HARNESS REPLACEMENT - CONTINUED 0289 00

REMOVAL - CONTINUED

7. Remove three nuts (20), washers (16), and clips (21).
8. Remove and discard tie strap (17).
9. Remove rear blackout light wiring harness (2) from clip (18).
10. Remove rear blackout light wiring harness (2) from main wiring harness (19).
11. Remove rear blackout light wiring harness (2) from machine.

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

INSTALLATION

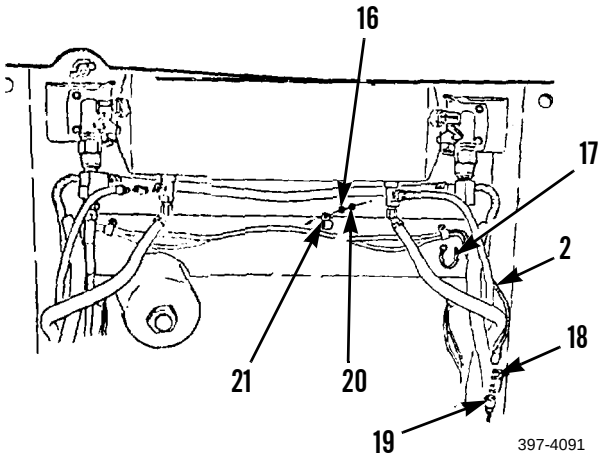
CAUTION

Do not position rear blackout light wiring harness against any rough surface. Failure to follow this procedure may cause chafing.

NOTE

Route rear blackout light wiring harness exactly as it was removed.

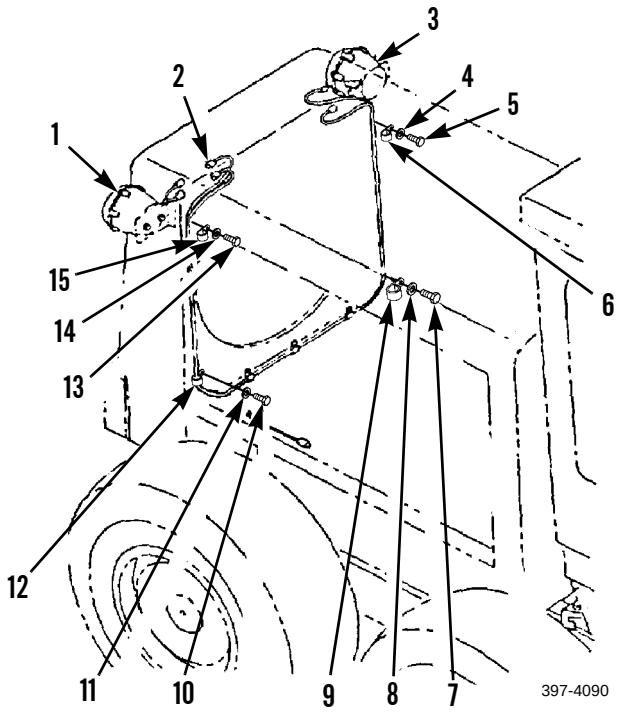
1. Position rear blackout light wiring harness (2) on machine.
2. Connect rear blackout light wiring harness (2) to main blackout light wiring harness.
3. Install rear blackout light wiring harness (2) into clip (18).
4. Install new tie strap (17).
5. Install three clips (21), washers (16), and three nuts (20).



REAR BLACKOUT LIGHT WIRING HARNESS REPLACEMENT - CONTINUED 0289 00

INSTALLATION - CONTINUED

6. Install two large clips (9), washers (8), and bolts (7).
7. Install two small clips (6), washers (4), and bolts (5).
8. Connect rear blackout light wiring harness (2) to left blackout light (3).
9. Install two large clips (12), washers (11), and bolts (10).
10. Install two small clips (15), washers (14), and bolts (13).
11. Connect rear blackout light wiring harness (2) to right blackout light (1).



12. Install grille (WP 0054 00).
13. Install baffles (WP 0053 00).
14. Close right and left side engine screen doors (WP 0055 00).
15. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

SUPPLEMENTAL STEERING MAIN WIRING HARNESS REPLACEMENT 0290 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

WP 0066 00

WP 0076 00

WP 0078 00

WP 0089 00

WP 0099 00

WP 0102 00

WP 0112 00

WP 0131 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Left and right side engine panels removed (WP 0182 00)

Steering control console plates removed (WP 0197 00 or WP 0198 00)

SUPPLEMENTAL STEERING MAIN WIRING HARNESS REPLACEMENT - CONTINUED 0290 00

REMOVAL

NOTE

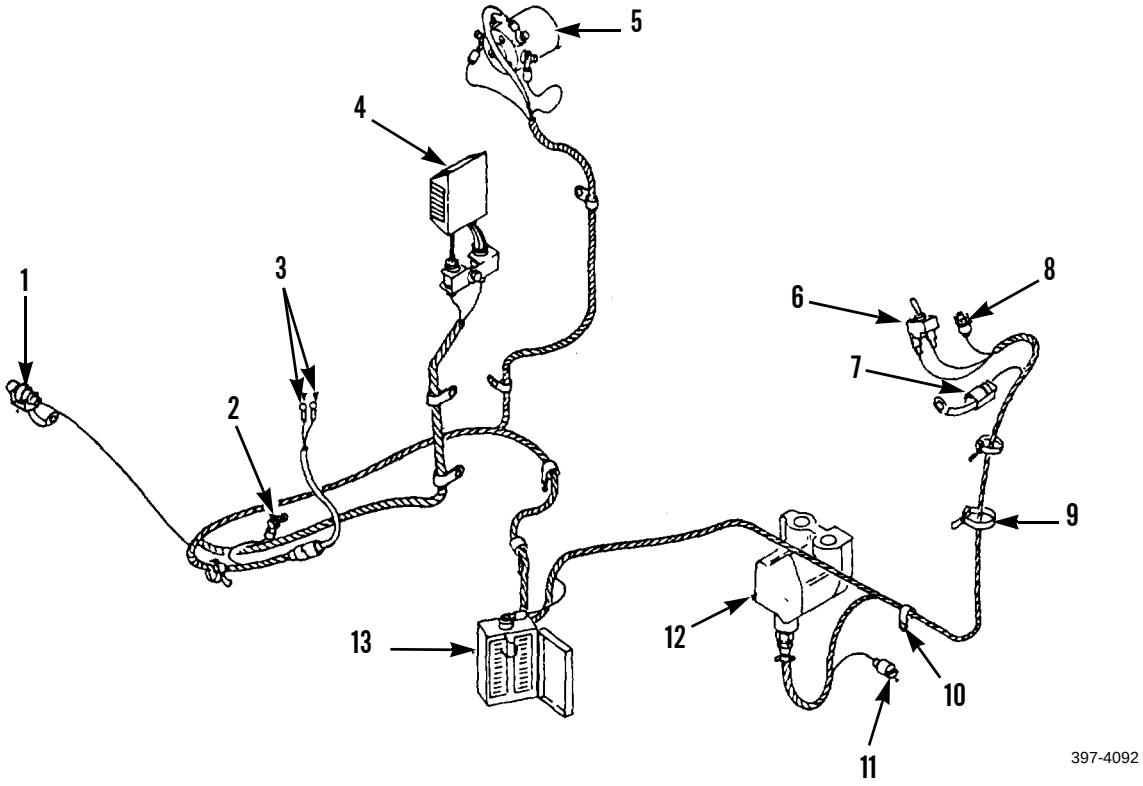
Tag and note routing of wire harnesses before disconnecting to aid in installation.

1. Disconnect supplemental steering main wiring harness (3) from electronic control (4) (WP 0089 00), ground (2), alternator wire assembly (1) (WP 0066 00), magnetic switch (5) (WP 0102 00), fuse box (13) (WP 0096 00), steering pressure switch (12) (WP 0112 00), dump valve harness (11) (WP 0131 00), monitor panel harness (7), indicator light (8) (WP 0078 00), and manual switch (6) (WP 0074 00).
2. Remove clips/clamps (10) and tie straps (9). Discard tie straps.

NOTE

For Type II machines, wiring harness is divided between sections of machine.

3. Remove supplemental steering main wiring harness (3) from machine.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

INSTALLATION

CAUTION

Do not position supplemental steering main wiring harness against any rough surface. Failure to follow this procedure could cause chafing.

NOTE

Route supplemental steering main wiring harness exactly as it was removed.

1. Position supplemental steering main wiring harness (3) from machine.
2. Disconnect supplemental steering main wiring harness (3) from electronic control (4) (WP 0089 00), ground (2), alternator wire assembly (1) (WP 0066 00), magnetic switch (5) (WP 0102 00), fuse box (13) (WP 0096 00), steering pressure switch (12) (WP 0112 00), dump valve harness (11) (WP 0131 00), monitor panel harness (7), indicator light (8) (WP 0078 00), and manual switch (6) (WP 0076 00).
3. Install new tie straps (9) and clips/clamps (10).
4. Install steering control console plates (WP 0197 00 or WP 0198 00).
5. Install left and right side engine panels (WP 0182 00).
6. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

ELECTRONIC MONITORING SYSTEM (EMS) MAIN WIRING HARNESS REPLACEMENT 0291 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

WP 0066 00

WP 0067 00

WP 0069 00

WP 0070 00

WP 0071 00

WP 0086 00

References - Continued

WP 0112 00

WP 0113 00

WP 0114 00

WP 0115 00

WP 0114 00

WP 0119 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Left and right side engine panels removed (WP 0182 00)

Steering control console plates removed (WP 0197 00 or WP 0198 00)

ELECTRONIC MONITORING SYSTEM (EMS) MAIN WIRING HARNESS REPLACEMENT - CONTINUED **0291 00**

REMOVAL

NOTE

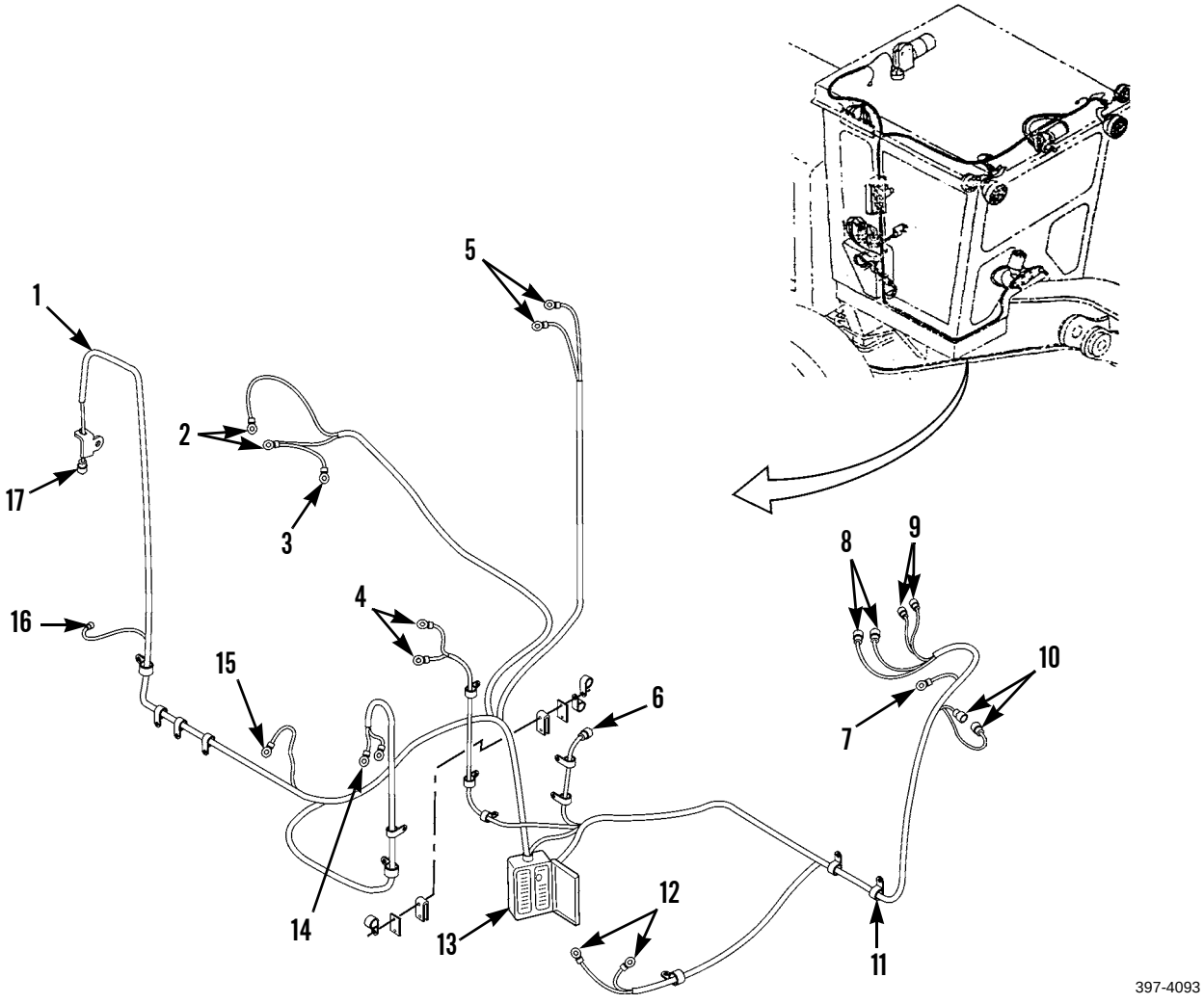
Tag and note routing of wiring harness before disconnecting to aid in installation.

1. Disconnect EMS wiring harness (1) from test switch (8) (WP 0070 00), lamp (9) (WP 0071 00), EMS panel (7) (WP 0069 00), supplemental steering (10) (WP 0086 00), air pressure switches (12) (WP 0112 00), fuse box (13) (WP 0096 00), warning horn (6) (WP 0119 00), coolant temperature switch (5) (WP 0114 00), engine oil pressure switch (2) (WP 0113 00), hourmeter switch (3) (WP 0113 00), hydraulic oil temperature switch (4) (WP 0116 00), fuel pressure switch (14) (WP 0115 00), starting motor (15) (WP 0067 00), alternator (16) (WP 0066 00), and jumper wire (17).
2. Remove clips/clamps (11) and tie straps. Discard tie straps.

NOTE

For Type II machines, wiring harness is divided between sections of machine.

3. Remove EMS wiring harness (1) from machine.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0021 00.

INSTALLATION

CAUTION

Do not position electrical monitor wiring harness against any rough surface. Failure to follow this procedure could cause chafing.

NOTE

Route electrical monitor wiring harness exactly as it was removed.

1. Position EMS wiring harness (1) on machine.
2. Connect electrical monitor wiring harness (1) to jumper wire (17), alternator (16) (WP 0062 00), starting motor (15) (WP 0067 00), fuel pressure switch (14) (WP 0115 00), hydraulic oil temperature switch (4) (WP 0116 00), hourmeter switch (3) (WP 0113 00), engine oil pressure switch (2) (WP 0113 00), coolant temperature switch (5) (WP 0114 00), warning horn (6) (WP 0119 00), fuse box (13) (WP 0096 00), air pressure switches (12) (WP 0112 00), supplemental steering (10) (WP 0086 00), EMS panel (7) (WP 0069 00), lamp (9) (WP 0071 00), and test switch (8) (WP 0070 00).
3. Install new tie straps and clips/clamps (11).
4. Install steering control console plates (WP 0197 00 or WP 0198 00).
5. Install left and right side engine panels (WP 0182 00).
6. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

CAB MAIN WIRING HARNESS REPLACEMENT (CCE MACHINE) 0292 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

WP 0097 00

WP 0104 00

WP 0107 00

References - Continued

WP 0206 00

WP 0207 00

WP 0208 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Cab switch panel removed (WP 0085 00)

Windshield washer removed (WP 0209 00)

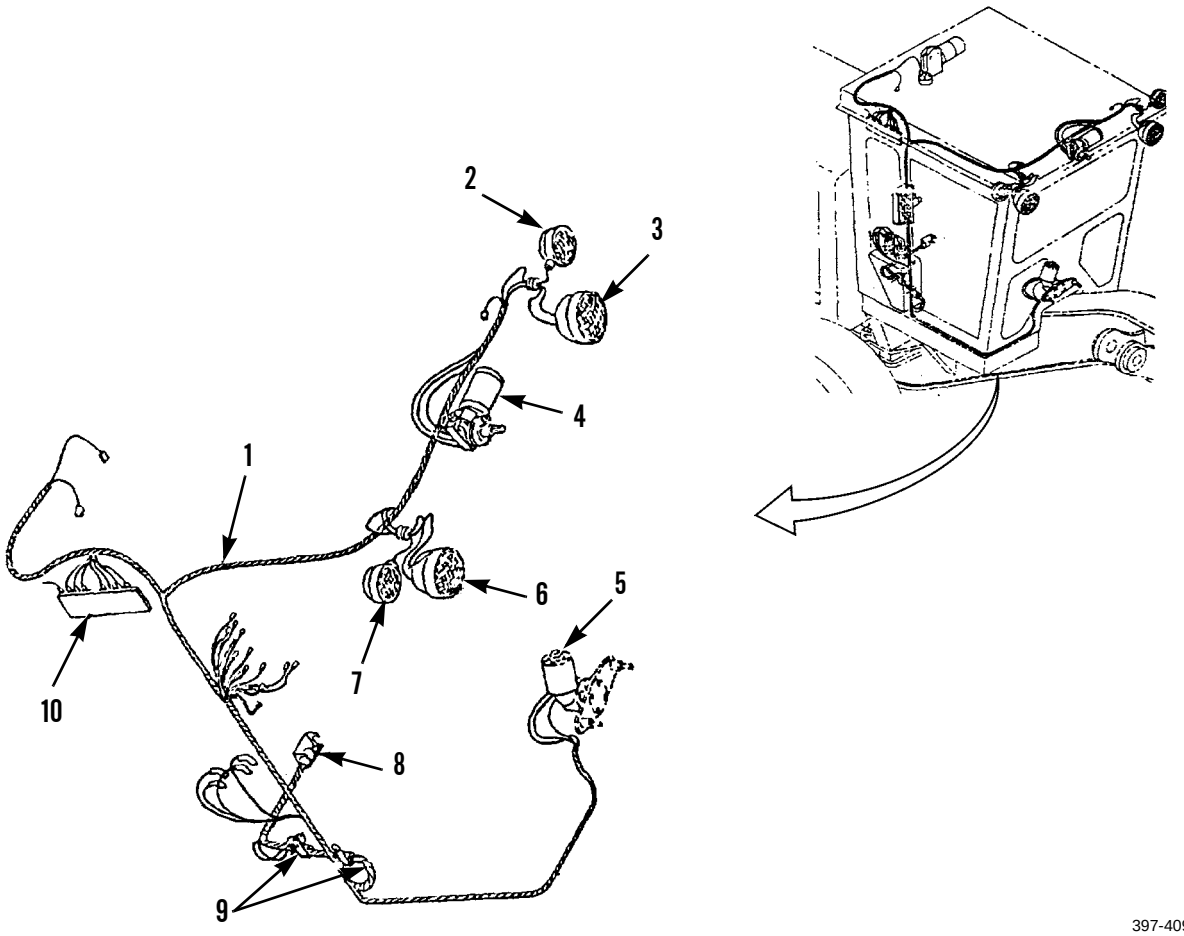
REMOVAL

1. Remove two plates behind right cab door hinge.

NOTE

Tag and note routing of wiring harness before disconnecting to aid in installation.

2. Disconnect cab main wiring harness (1) from rear wiper switch (WP 0208 00).
3. Disconnect cab main wiring harness (1) from cab fuse box (10) (WP 0095 00), cab signal lights (2 and 7) (WP 0107 00), headlights (3 and 6) (WP 0104 00), upper wiper motor (4) (WP 0207 00), lower wiper motor (5) (WP 0206 00), and wiring harnesses.
4. Remove mounting clips (9) and harness clip (8).
5. Remove cab main wiring harness (1) from machine.



397-4094

CLEANING AND INSPECTION

Repair cab main wiring harness, if necessary (WP 0021 00).

INSTALLATION

CAUTION

Do not position cab main wiring harness against any rough surface. Failure to follow this procedure could cause chafing.

NOTE

Route cab main wiring harness exactly as it was removed.

1. Position cab main wiring harness (1) on machine.
2. Connect cab main wiring harness (1) to wiring harnesses, lower wiper motor (5) (WP 0206 00), upper wiper motor (4) (WP 0207 00), headlights (6 and 3) (WP 0104 00), cab signal lights (7 and 2) (WP 0107 00), and cab fuse fox (10) (WP 0095 00).
3. Install harness clip (8) and mounting clips (9).
4. Connect cab main wiring harness (1) to rear wiper switch (WP 0208 00).
5. Install two plates behind right cab door hinge.
6. Install windshield washer (WP 0209 00).
7. Install cab switch panel (WP 0085 00).
8. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

REAR WIPER WIRING HARNESS REPLACEMENT (CCE MACHINE) 0293 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0021 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

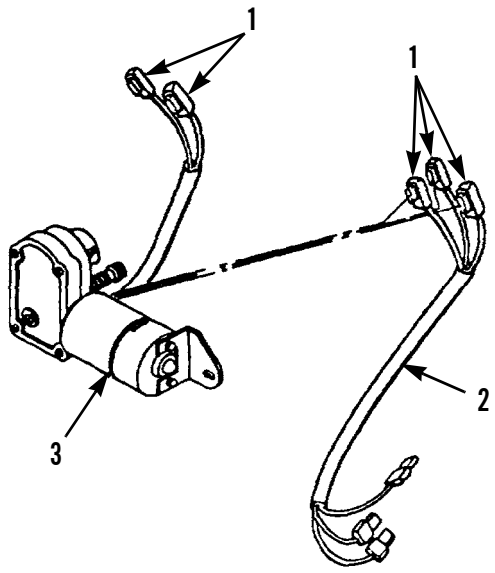
Rear wiper motor access cover removed (WP 0208 00)

REMOVAL

NOTE

Tag and note routing of wire assemblies before disconnecting to aid in installation.

1. Disconnect five wire assemblies (1) from motor (3).
2. Remove rear wiper wiring harness (2).



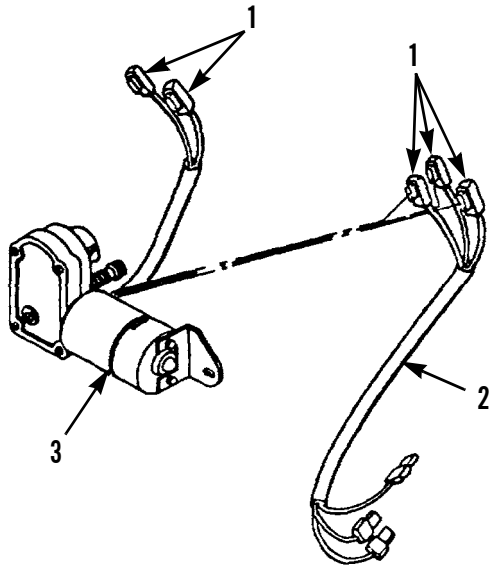
397-4095

CLEANING AND INSPECTION

Repair rear wiper wiring harness, if necessary (WP 0021 00).

INSTALLATION

1. Position rear wiping wiring harness (2).
2. Connect five wire assemblies (1) to motor (3).



397-4095

3. Install rear wiper motor access cover (WP 0208 00).
4. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

TRANSMISSION, ADAPTER, AND DIFFERENTIAL REPLACEMENT 0294 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Lifting device, 2,500-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Equipment Conditions - Continued

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Anti-articulation pin installed (TM 5-3805-261-10)

Coolant drained from cooling system (WP 0065 00)

Oil drained from transmission (WP 0147 00)

Engine hood removed (WP 0181 00)

Left and right side engine panels removed (WP 0182 00)

Air pressure relieved (TM 5-3805-261-10)

Fuel tank removed (WP 0044 00)

Radiator hoses removed (WP 0057 00)

Transmission control cables removed from transmission housing (WP 0152 00)

Transmission oil filter base removed (WP 0153 00)

Transmission oil lines removed (WP 0155 00)

Remote steer air valves removed (Type II machine) (WP 0315 00)

Transmission oil pump removed (WP 0297 00)

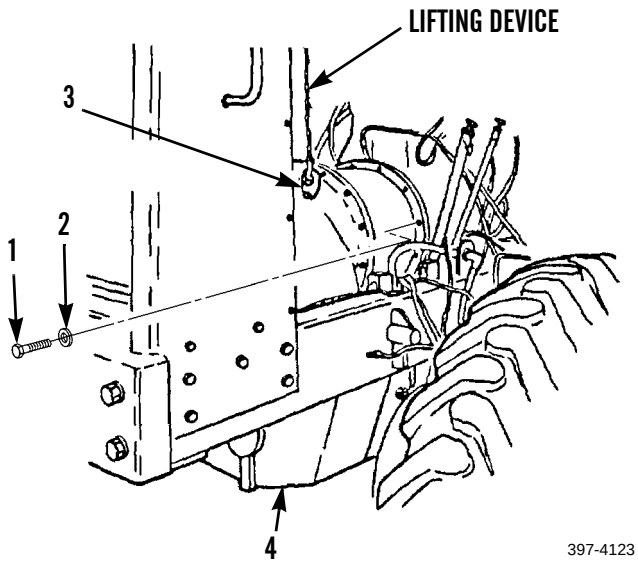
Differential lock line disconnected from transmission relief valve (WP 0306 00)

Drive axles removed (WP 0307 00)

Parking brake actuator and valve removed (WP 0312 00)

REMOVAL

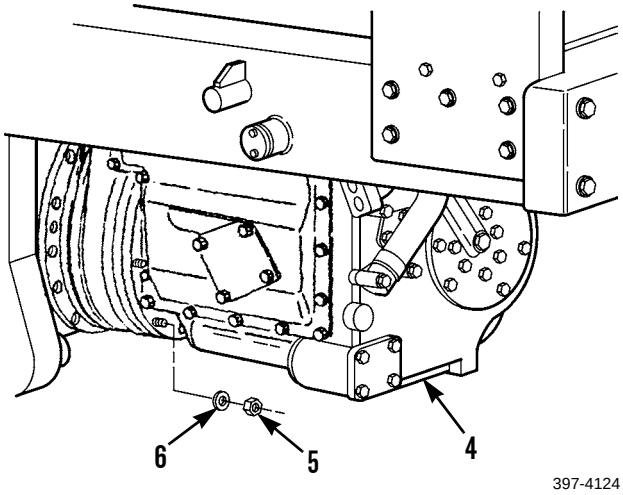
1. Attach lifting device to two lifting eyes (3) on transmission (4).
2. Remove 12 bolts (1) and washers (2) between adapter and flywheel housing.



NOTE

Perform the following steps only if transmission must be removed.

3. Remove 10 nuts (5) and washers (6) between transmission (4) and drive axle assembly.



REMOVAL - CONTINUED

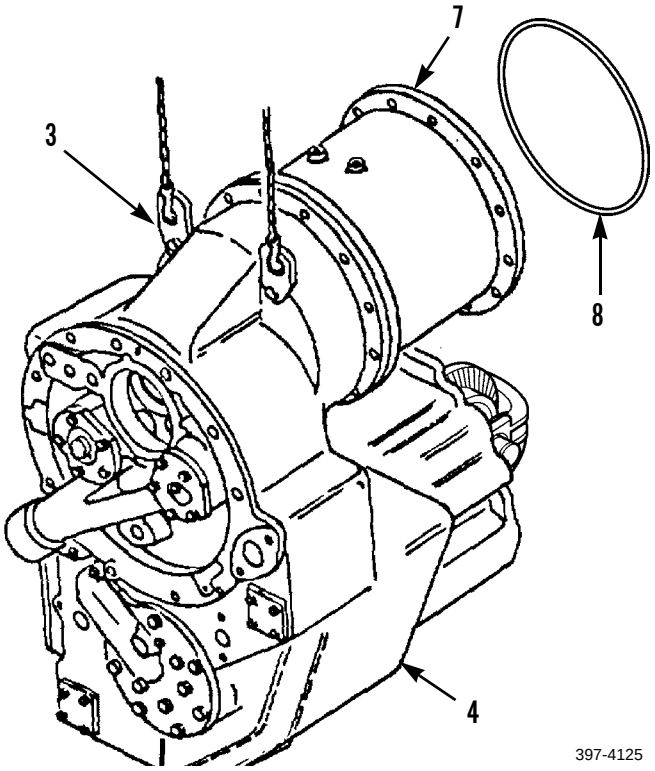
WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death to personnel.

NOTE

Transmission weighs 2,000 lb (907 kg).

4. Use lifting device to remove transmission (4) and adapter (7) from machine.
5. Place transmission (4) and adapter (7) on stand.
6. Remove and discard preformed packing (8)
7. Remove lifting device from two lifting eyes (3).



CLEANING AND INSPECTION

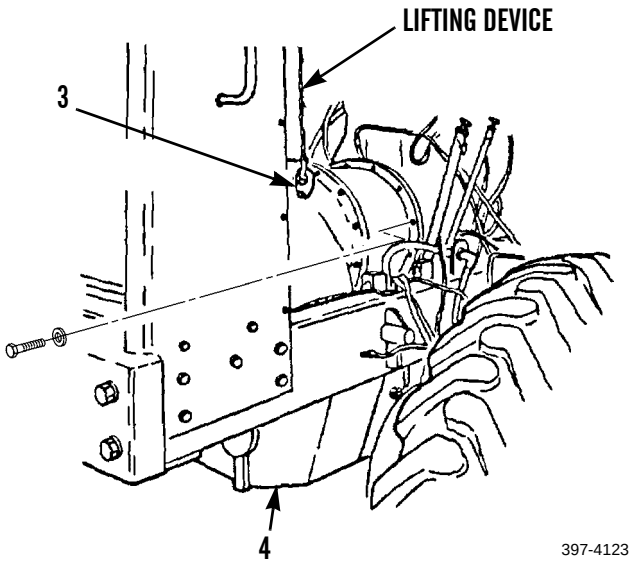
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

NOTE

Elevate two rear wheels, right or left.

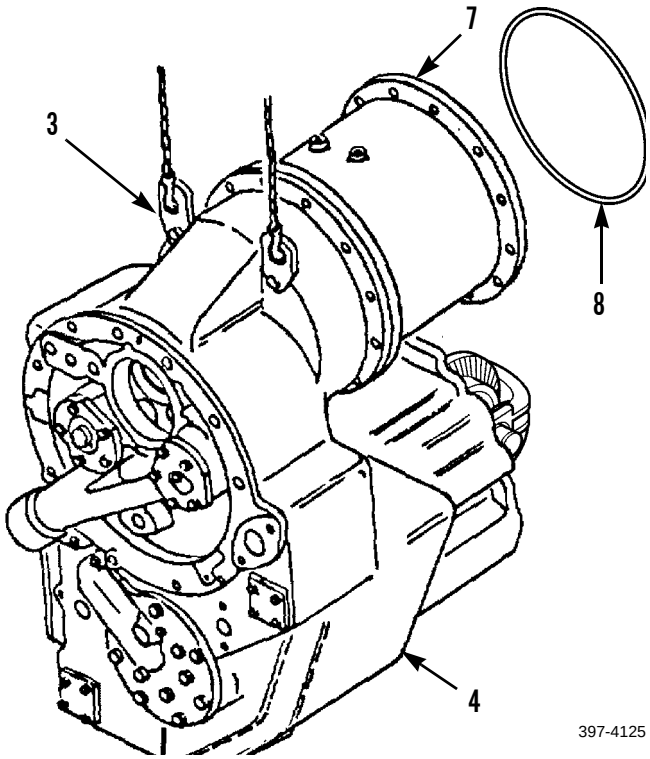
1. Attach lifting device to two lifting eyes (3) on transmission (4).



NOTE

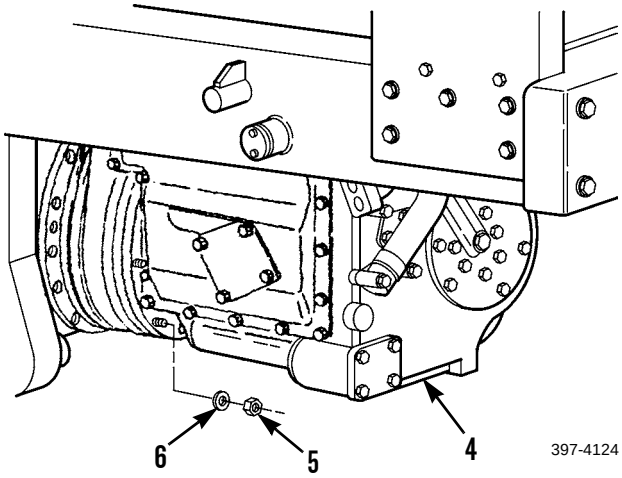
If splines do not line up, raise one wheel and rotate until the two splines are in line.

2. Install preformed packing (8).
3. Use lifting device to install transmission (4) and adapter (7) in machine. Fit transmission splines in transmission into splines in differential.

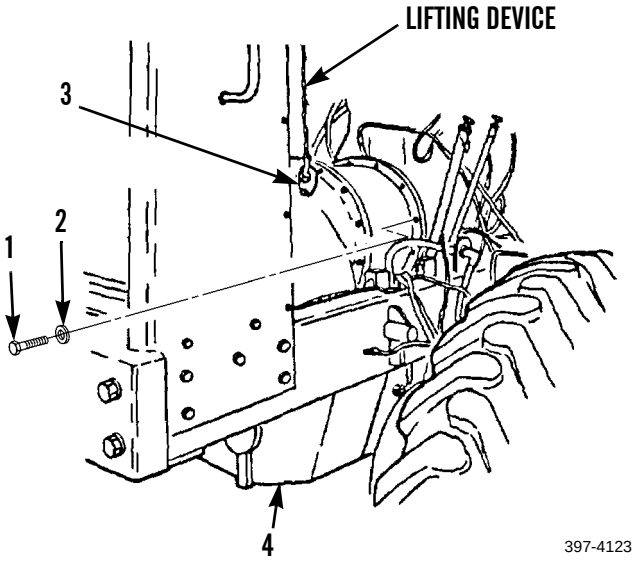


INSTALLATION - CONTINUED

4. Rotate oil pump shaft to align splines of transmission adapter gear to engine flywheel.
5. Install 10 washers (6) and nuts (5) over studs between transmission (4) and drive axle assembly.



6. Install 12 washers (2) and bolts (1) between adapter and flywheel housing.
7. Remove lifting device from lifting eyes (3) of transmission (4).



8. Install parking brake actuator and valve (WP 0312 00).
9. Install drive axles (WP 0307 00).
10. Connect differential lock line to transmission relief valve (WP 0306 00).
11. Install transmission oil pump (WP 0297 00).
12. Install remote steer air valves (Type II machine) (WP 0315 00).
13. Install transmission oil lines (WP 0155 00).
14. Install transmission oil filter base (WP 0153 00).
15. Install transmission control cables to transmission housing (WP 0152 00).
16. Install radiator hoses (WP 0057 00).
17. Install fuel tank (WP 0044 00).

INSTALLATION - CONTINUED

18. Install left and right side engine panels (WP 0182 00).
19. Install engine hood (WP 0181 00).
20. Fill transmission with oil (WP 0147 00).
21. Fill cooling system with coolant (WP 0065 00).
22. Remove and store anti-articulation pin (TM 5-3805-261-10).
23. Start engine. Check for leaks.

END OF WORK PACKAGE

ENGINE-TO-TRANSMISSION ADAPTER REPLACEMENT 0295 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Bracket, link (2) (Item 18, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

Materials/Parts

Oil, lubricating (Item 26, 27, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket

Lockwasher (12)

Packing, preformed (3)

Wood blocks

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

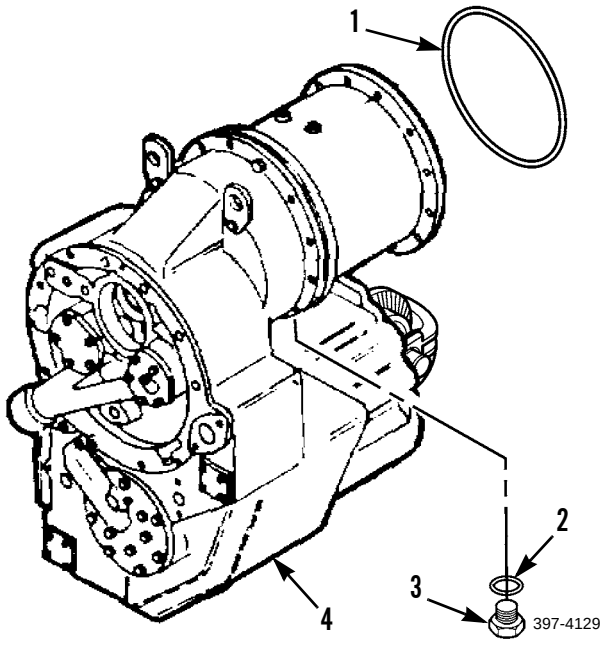
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Transmission, adapter, and differential removed (WP 0294 00)

REMOVAL

1. Remove plug (3) and gasket (2) from transmission (4). Discard gasket.
2. Remove and discard preformed packing (1).



REMOVAL - CONTINUED

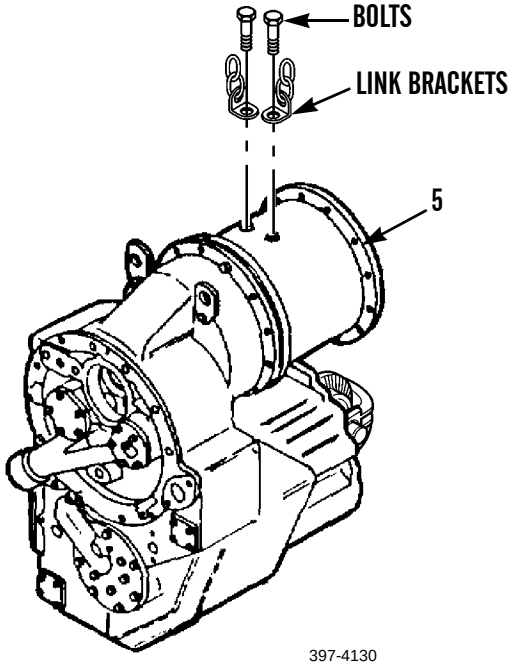
WARNING

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

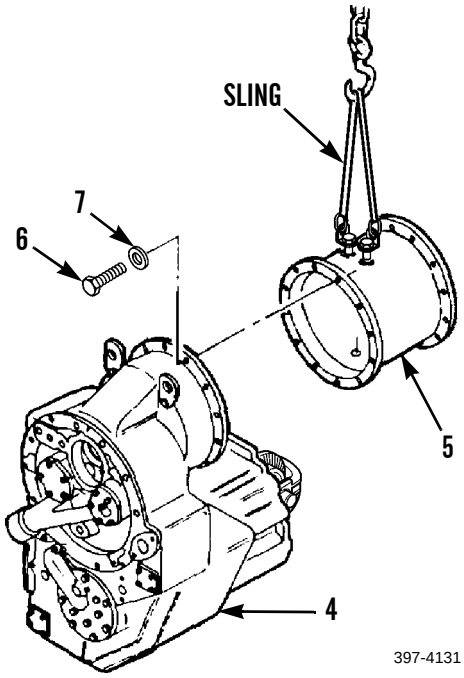
NOTE

Housing weighs 84 lb (38 kg).

3. Install two link brackets and 3/8-16-2B bolts in holes at top of housing (5).

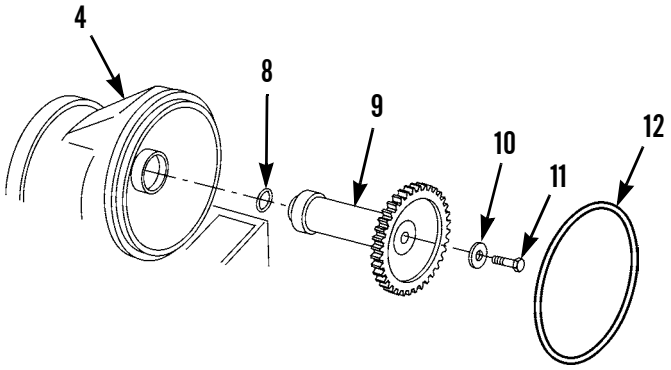


4. Attach sling to housing (5) and take up slack.
5. Remove 12 bolts (6) and lockwashers (7).
6. Remove housing (5) from transmission (4) and lower onto wood blocks.
7. Remove sling.



REMOVAL - CONTINUED

8. Remove and discard preformed packing (12).
9. Support coupling (9).
10. Remove bolt (11), retainer (10), and coupling (9) from transmission (4) input shaft.
11. Remove and discard preformed packing (8).



CLEANING AND INSPECTION

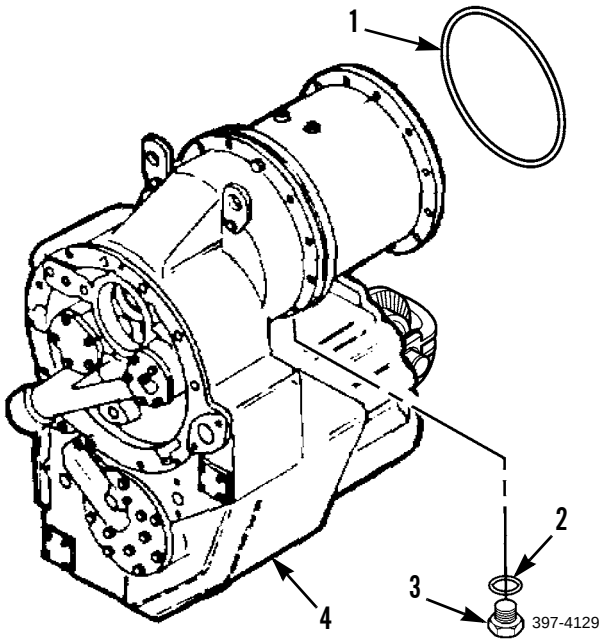
Clean and inspection all parts in accordance with WP 0020 00.

INSTALLATION

1. Position new preformed packing (8) on transmission (4) input shaft.
2. Position coupling (9).
3. Install retainer (10) and bolt (11). Tighten bolt to 85 lb-ft (115 Nm).
4. Install new preformed packing (12) on groove of transmission (4).
5. Use sling to install housing (5) on transmission (4).
6. Install 12 new lockwashers (7) and bolts (6).
7. Remove sling.
8. Remove two 3/8-16-2B bolts and link brackets.

INSTALLATION - CONTINUED

9. Install new preformed packing (1) and lubricate with oil.
10. Install new gasket (2) with seam facing transmission (4).
11. Install plug (3).



12. Install transmission, adapter, and differential (WP 0294 00).

END OF WORK PACKAGE

TRANSMISSION CONTROL RELIEF VALVE MAINTENANCE 0296 00

THIS WORK PACKAGE COVERS

Testing, Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

9/16-18 adapter

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (14)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Left side engine panel removed (WP 0182 00)

TESTING

CAUTION

Cap hose ends and plug open ports to prevent contamination.

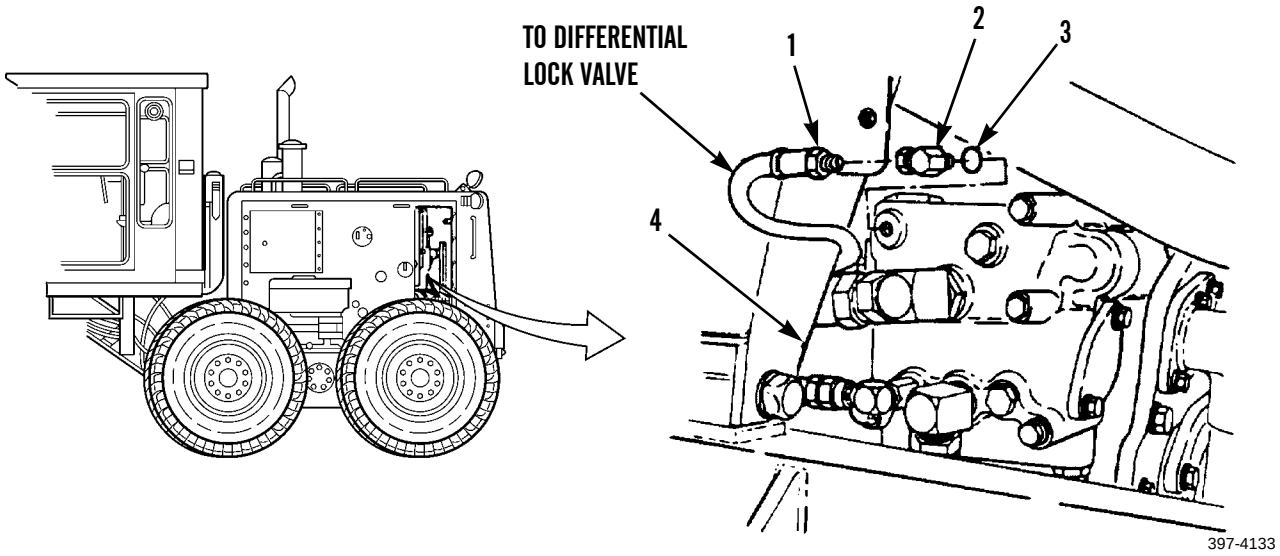
NOTE

- The following test is for transmission pump relief pressure.
- Test must be made with transmission hydraulic system at normal operating temperature.
- Tag hose assemblies before disconnecting to aid in installation.

TRANSMISSION CONTROL RELIEF VALVE MAINTENANCE - CONTINUED **0296 00**

TESTING - CONTINUED

1. Disconnect hose assembly (1) from valve assembly (4).
2. Remove elbow (2) and preformed packing (3). Discard preformed packing.

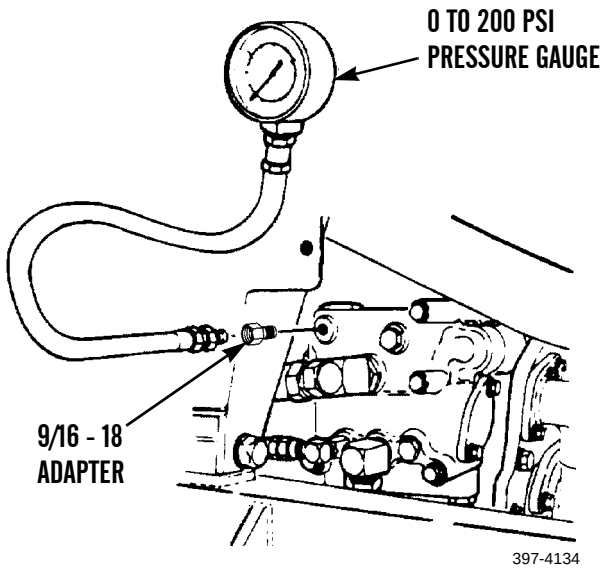


3. Use a 9/16-18 adapter to install 0 to 200 psi (0 to 1,379 kPa) pressure gauge.
4. Start engine (TM 5-3805-261-10).

NOTE

Pressure gauge must read 75 psi (517 kPa). If not, replace control relief valve.

5. Position transmission control lever in neutral. Read pressure gauge.
6. Stop engine.
7. Remove 0 to 200 psi (0 to 1,379 kPa) pressure gauge and 9/16-18 adapter.



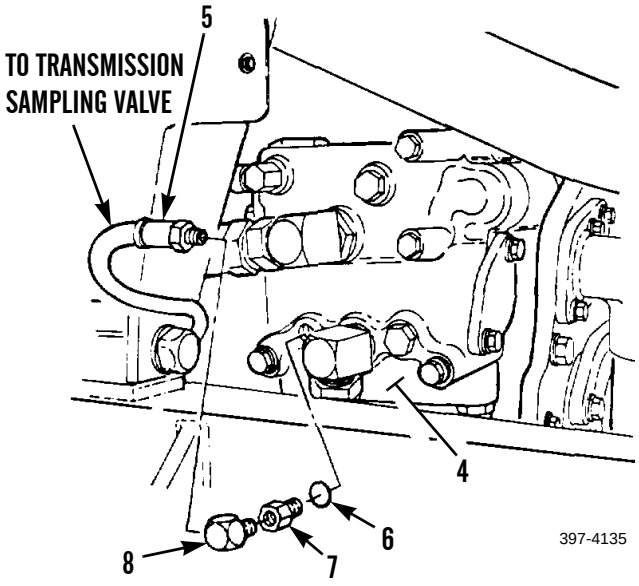
8. Install new preformed packing (3) and elbow (2) on valve assembly (4).
9. Connect hose assembly (1).

TESTING - CONTINUED

NOTE

The following test is for transmission oil cooler relief pressure.

10. Disconnect hose assembly (5) from valve assembly (4).
11. Remove elbow (8), adapter (7), and preformed packing (6). Discard preformed packing.

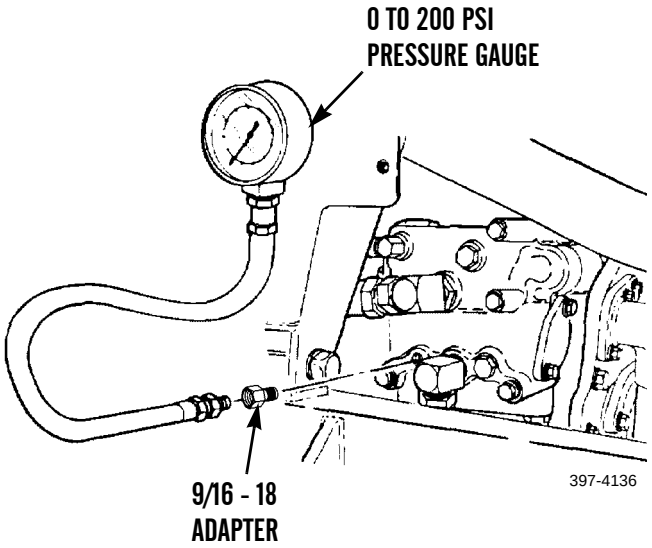


12. Use a 9/16-18 adapter to install 0 to 200 psi (10 to 1,379 kPa) pressure gauge.
13. Start engine (TM 5-3805-261-10).

NOTE

Pressure gauge must read 75 psi (517 kPa). If not, replace control relief valve.

14. Position transmission control lever in first speed forward and read pressure gauge.
15. Stop engine.
16. Remove 0 to 200 psi (0 to 1,379 kPa) pressure gauge and 9/16-18 adapter.



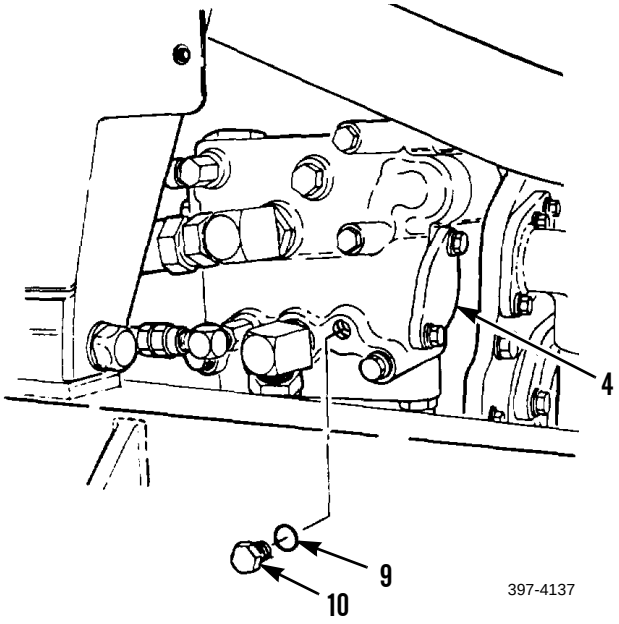
17. Install new preformed packing (6), adapter (7), and elbow (8) on valve assembly (4).
18. Connect hose assembly (5).

TESTING - CONTINUED

NOTE

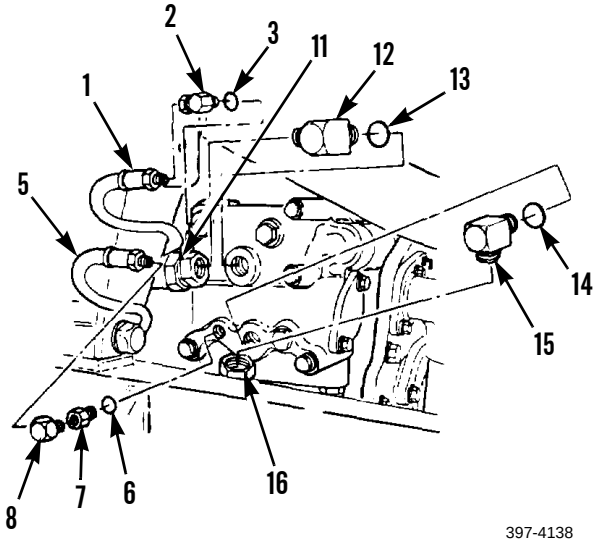
The following test is for transmission lubrication oil relief pressure.

19. Remove plug (10) and preformed packing (9) from valve assembly (4). Discard preformed packing.
20. Test lubrication oil relief valve. Repeat steps 12 through 16.
21. Install new preformed packing (9) and plug (10).



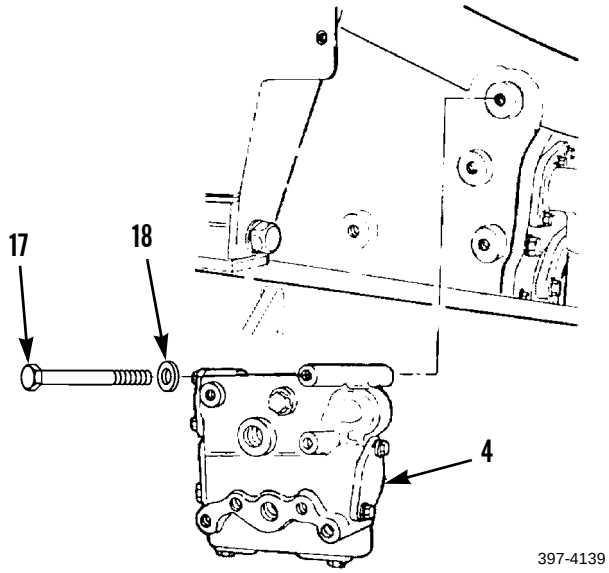
REMOVAL

1. Disconnect hose assembly (1).
2. Remove elbow (2) and preformed packing (3). Discard preformed packing.
3. Disconnect hose assembly (5).
4. Remove elbow (8), adapter (7), and preformed packing (6). Discard preformed packing.
5. Disconnect hose assembly (16).
6. Remove elbow (15) and preformed packing (14). Discard preformed packing.
7. Disconnect hose assembly (11).
8. Remove elbow (12) and preformed packing (13). Discard preformed packing.

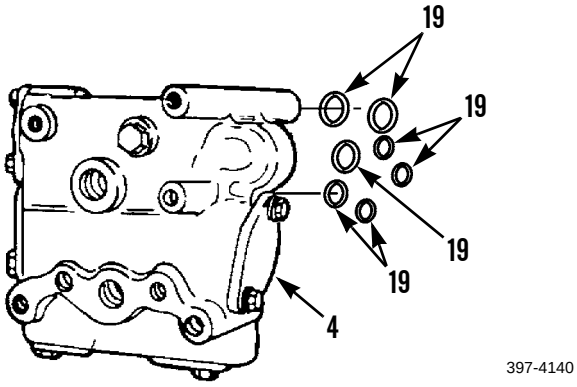


REMOVAL - CONTINUED

9. Support valve assembly (4).
10. Remove four bolts (17), washers (18), and valve assembly (4).



11. Remove and discard seven preformed packings (19) from valve assembly (4).



CLEANING AND INSPECTION

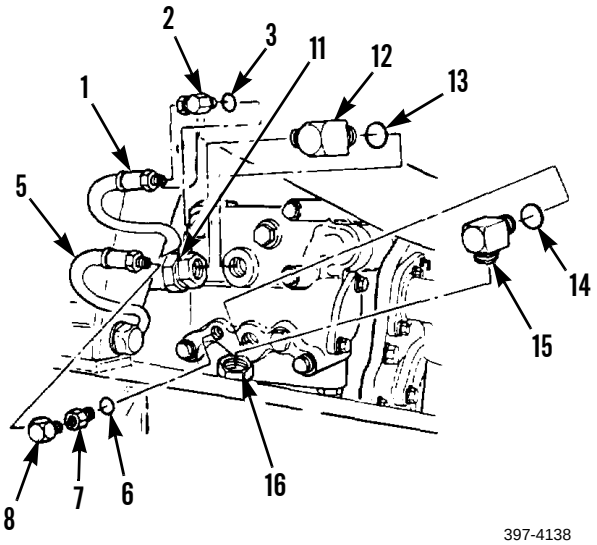
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install seven new preformed packings (19) in valve assembly (4).
2. Position valve assembly (4).
3. Install four washers (18) and bolts (17).

INSTALLATION - CONTINUED

4. Install new preformed packing (13) and elbow (12).
5. Connect hose assembly (11).
6. Install new preformed packing (14) and elbow (15).
7. Connect hose assembly (16).
8. Install new preformed packing (6), adapter (7), and elbow (8).
9. Connect hose assembly (5).
10. Install new preformed packing (3) and elbow (2).
11. Connect hose assembly (1).
12. Turn disconnect switch to ON position and start engine (TM 5-3805-261-10).
13. Check for leaks.
14. Stop engine.
15. Install left side engine panel (WP 0182 00).



397-4138

END OF WORK PACKAGE

TRANSMISSION OIL PUMP REPLACEMENT 0297 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's, (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Lifting device, 100-lb capacity

Wood blocks

Materials/Parts

Oil, lubricating (Item 26, 27, or 29, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket

Lockwasher (23)

Packing, preformed (9)

References

WP 0020 00

Personnel Required

Two

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

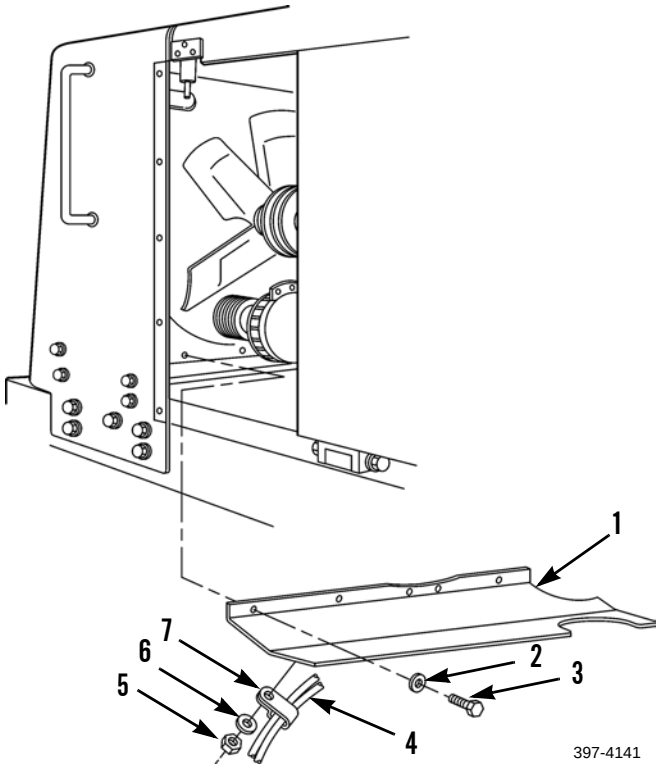
Transmission oil drained (WP 0147 00)

Fan belts removed (WP 0061 00)

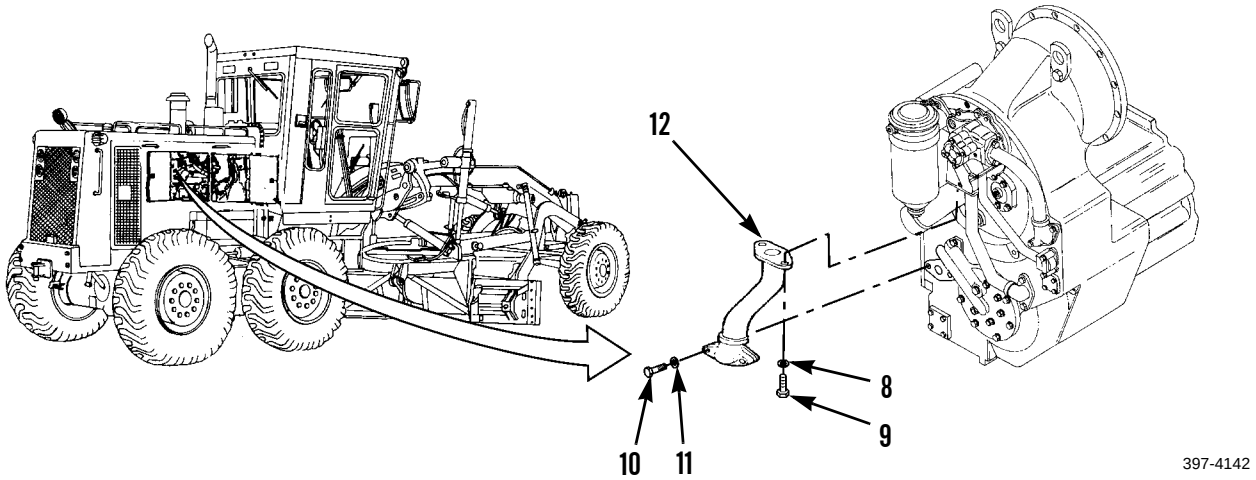
TRANSMISSION OIL PUMP REPLACEMENT - CONTINUED 0297 00

REMOVAL

1. Remove three nuts (5), washers (6), and clips (7) from under plate (1) at rear of transmission. Move wire assembly (4) to one side.
2. Remove five bolts (3), washers (2), and plate (1).

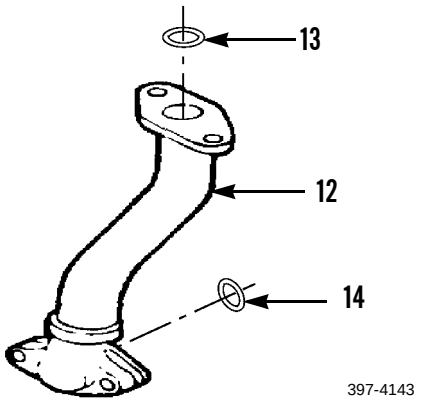


3. Remove two bolts (9), lockwashers (8), bolts (10), lockwashers (11), and tube (12). Discard lockwashers.

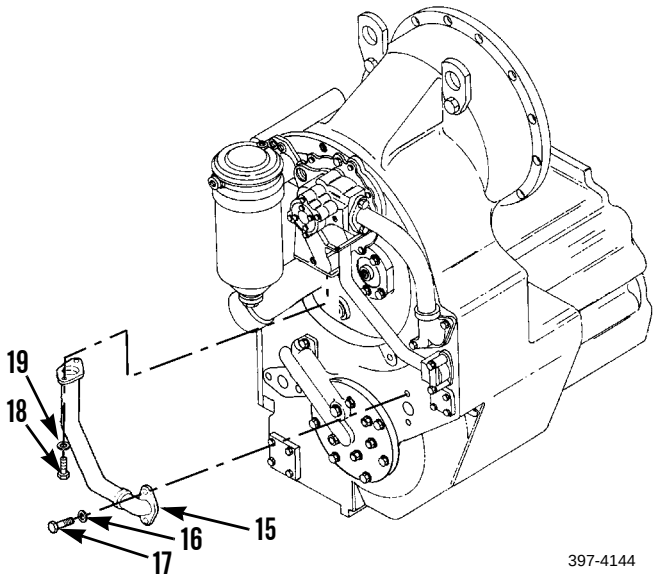


REMOVAL - CONTINUED

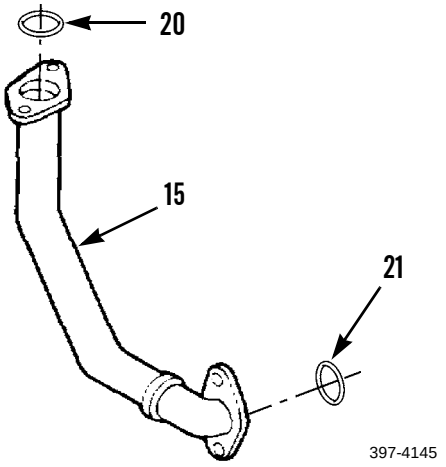
4. Remove preformed packings (13 and 14) from tube (12) and discard.



5. Remove two bolts (17), lockwashers (16), bolts (18), lockwashers (19), and tube (15). Discard lockwashers.

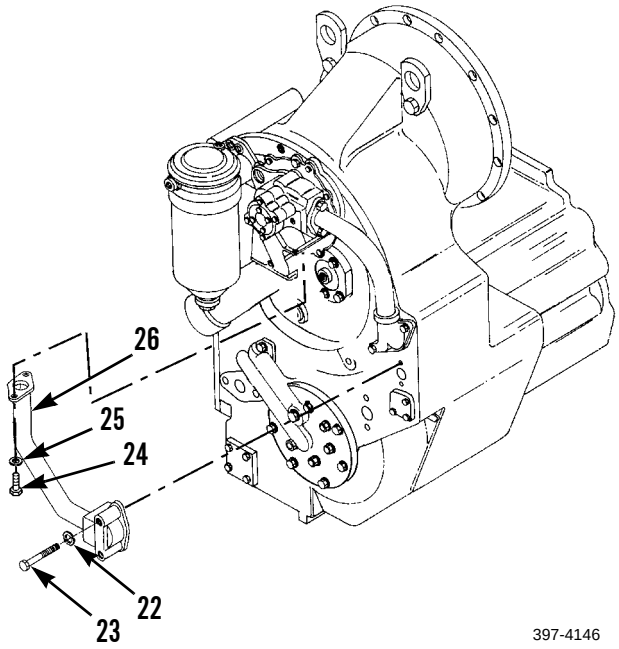


6. Remove and discard preformed packings (20 and 21) from tube (15).



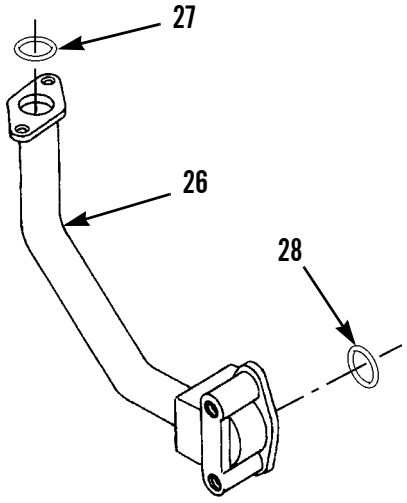
REMOVAL - CONTINUED

7. Remove two bolts (24), lockwashers (25), bolts (23), lockwashers (22), and tube (26). Discard lockwashers.



397-4146

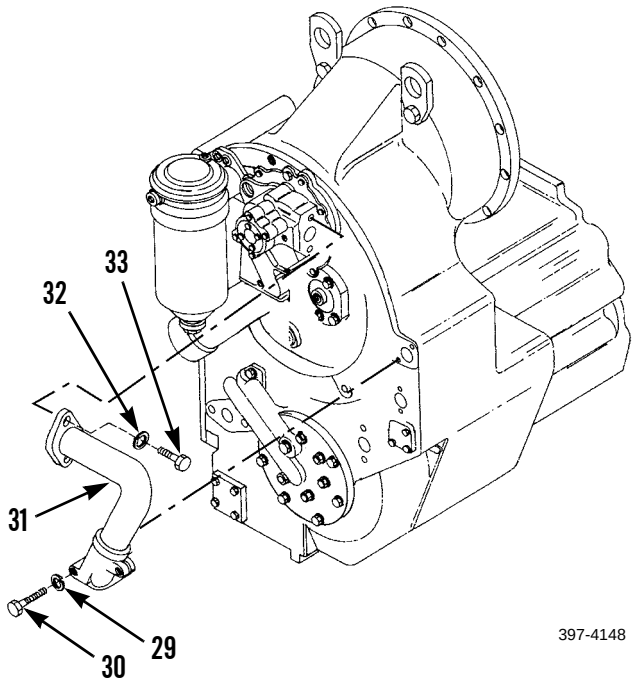
8. Remove preformed packings (27 and 28) from tube (26) and discard.



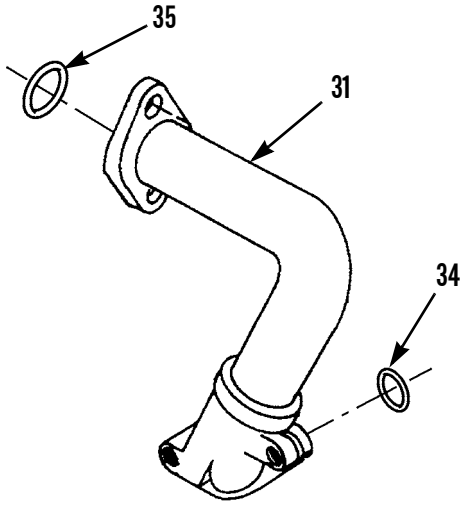
397-4147

REMOVAL - CONTINUED

9. Remove two bolts (30), lockwashers (29), bolts (33), lockwashers (32), and tube (31). Discard lockwashers.



10. Remove preformed packings (34 and 35) from tube (31) and discard.



REMOVAL - CONTINUED

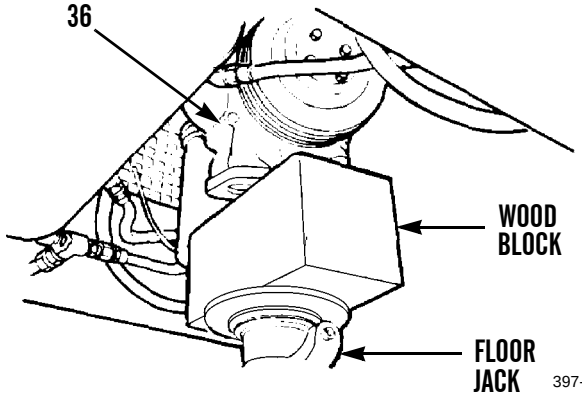
WARNING

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

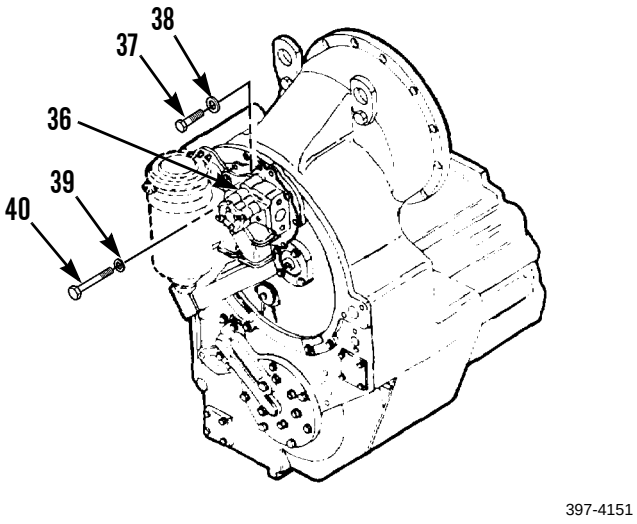
NOTE

Transmission oil pump weighs 76 lb (35 kg).

11. Support oil pump (36) with floor jack and wood block(s).

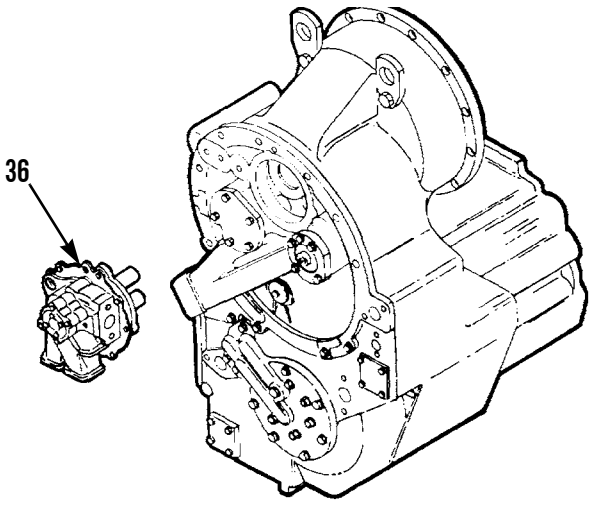


12. Remove two bolts (40), lockwashers (39), five bolts (37), lockwashers (38) from oil pump (36). Discard lockwashers.



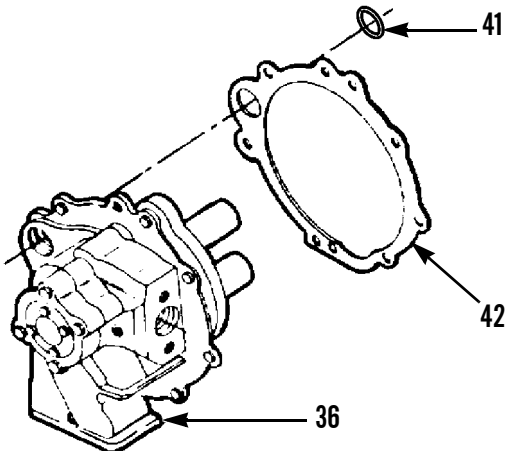
REMOVAL - CONTINUED

13. Pull oil pump (36) away from dowel on transmission and rotate pump so it can be lowered out bottom of machine.



397-4152

14. Remove preformed packing (41) and gasket (42) from oil pump (36) and discard.



397-4153

CLEANING AND INSPECTION

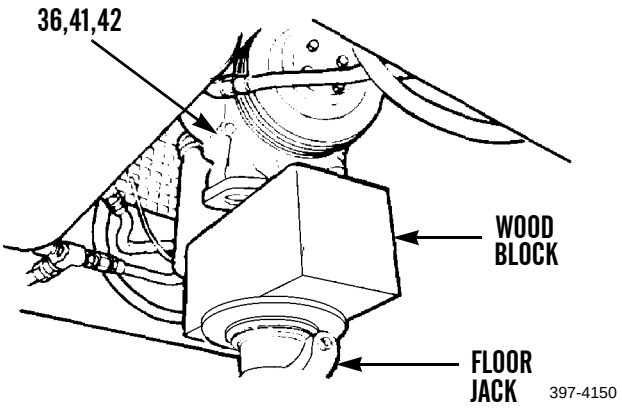
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

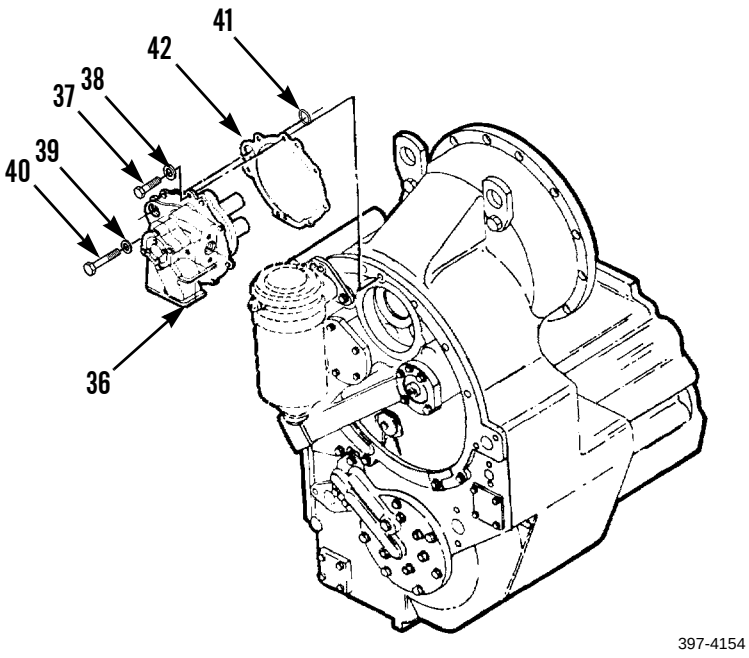
NOTE

Add clean transmission oil to pump before installing.

1. Use floor jack and wood block(s) to position oil pump (36), new preformed packing (41), and new gasket (42) at rear of transmission and align with dowel and bolt holes.

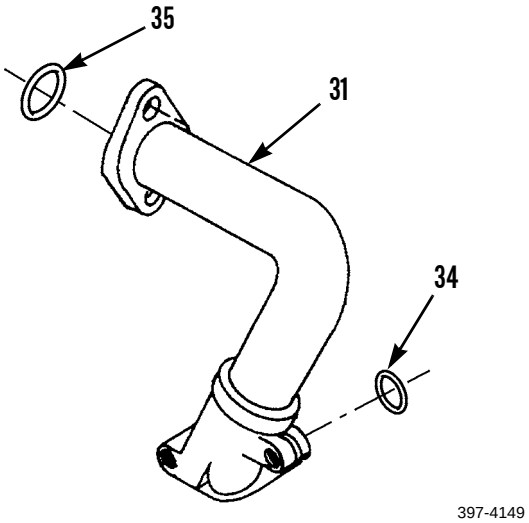


2. Install oil pump (36), new gasket (42), new preformed packing (41), five new lockwashers (38), and bolts (37), two new lockwashers (39), and bolts (40).



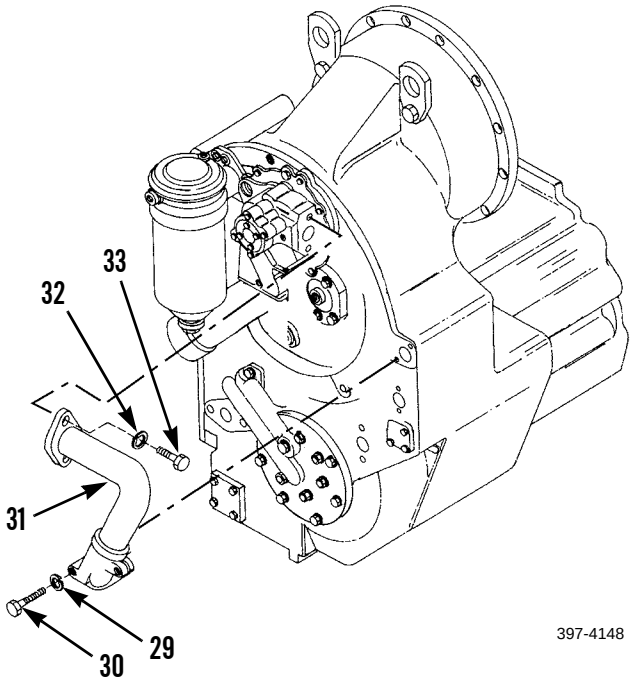
INSTALLATION - CONTINUED

3. Install new preformed packings (35 and 34) in tube (31).



397-4149

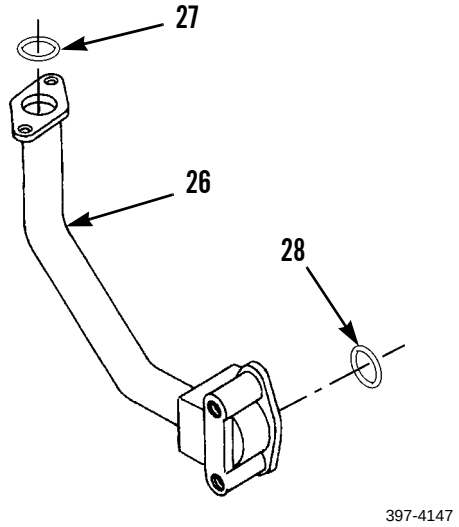
4. Align tube (31) with bolt holes and install two new lockwashers (32), bolts (33), lockwashers (29), and bolts (30).



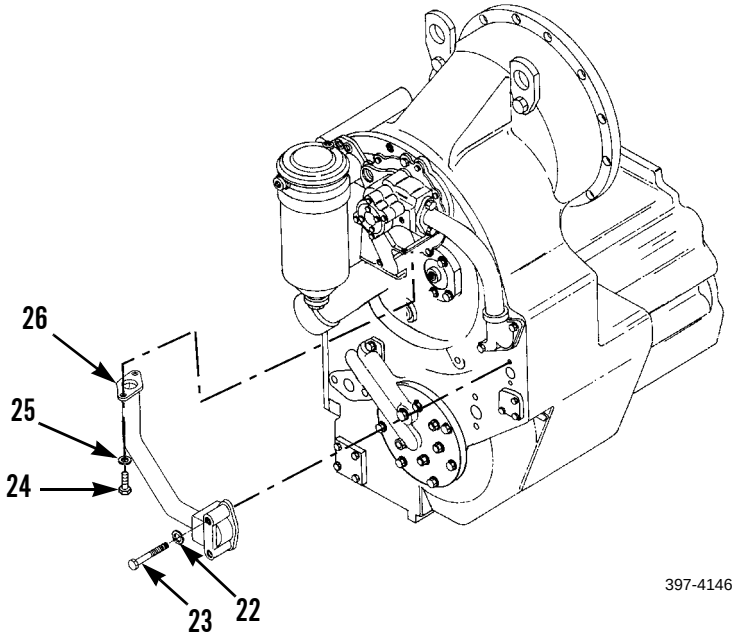
397-4148

INSTALLATION - CONTINUED

5. Install new preformed packings (27 and 28) in tube (26).

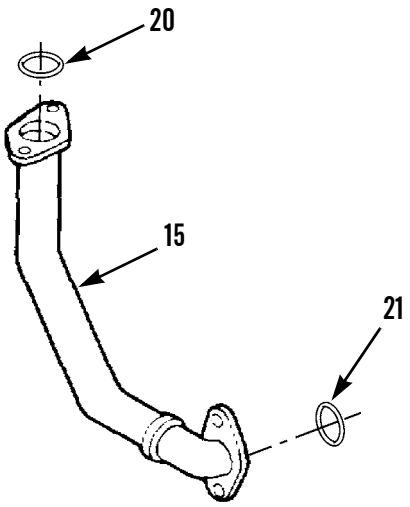


6. Align tube (26) with bolt holes and install two new lockwashers (22), bolts (23), lockwashers (25), and bolts (24).



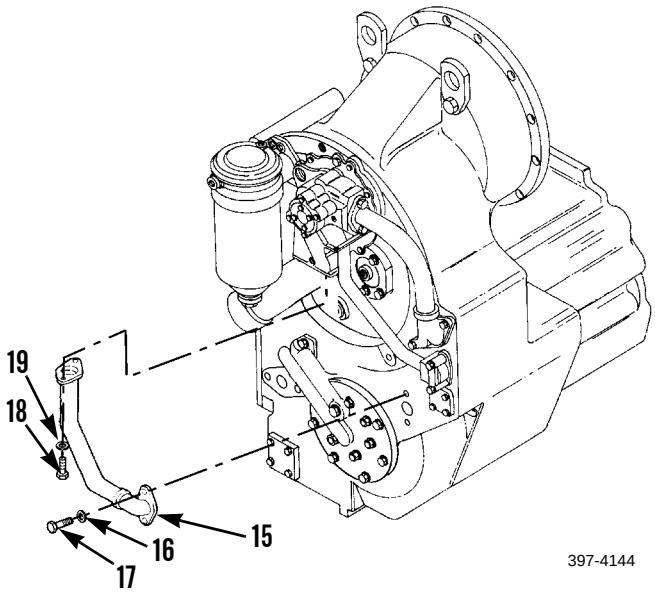
INSTALLATION - CONTINUED

7. Install new preformed packings (20 and 21) in tube (15).



397-4145

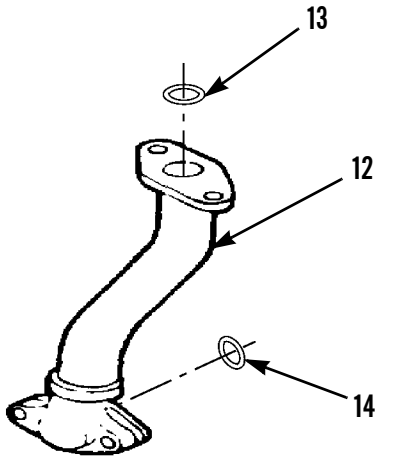
8. Align tube (15) with bolt holes and install two new lockwashers (19), bolts (18), lockwashers (16), and bolts (17).



397-4144

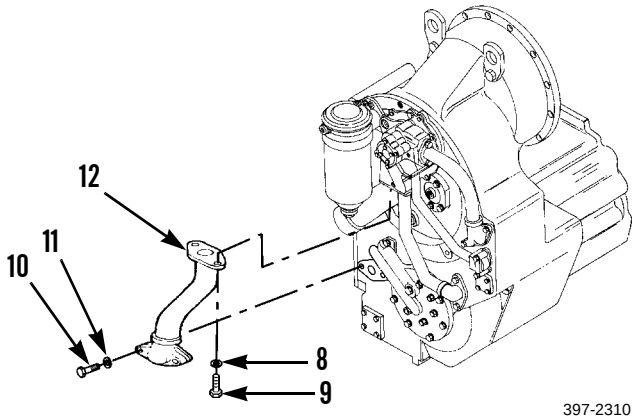
INSTALLATION - CONTINUED

9. Install new preformed packings (13 and 14) in tube (12).



397-4143

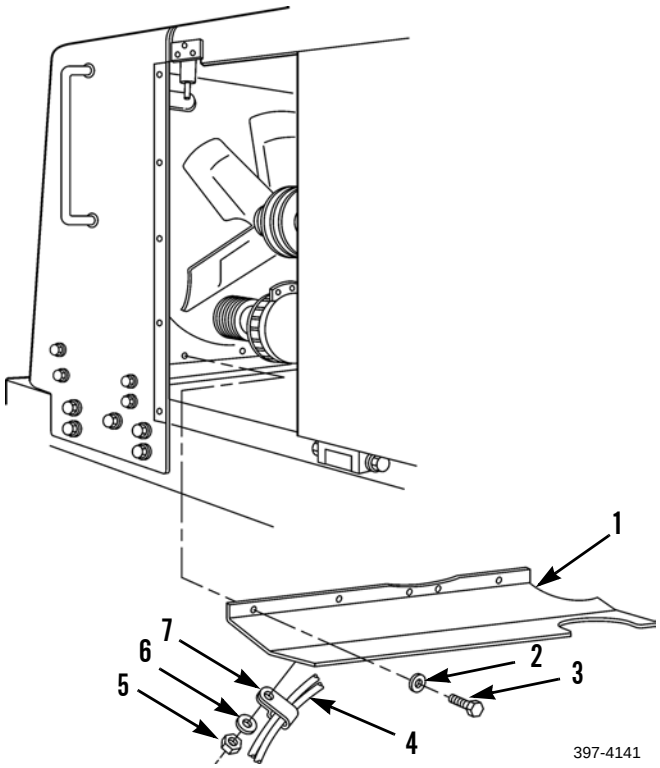
10. Align tube (12) with bolt holes and install two new lockwashers (11), bolts (10), lockwashers (8), and bolts (9).



397-2310

INSTALLATION - CONTINUED

11. Install plate (1), five washers (2), and bolts (3).



12. Reposition wire assembly (4) under plate (1) and install three clamps (7), washers (6), and nuts (5).
13. Install fan belts (WP 0061 00).
14. Fill transmission with oil (WP 0147 00).
15. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
16. Check for leaks.
17. Stop engine.

END OF WORK PACKAGE

TRANSMISSION OIL COOLER MAINTENANCE 0298 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Oil, lubricating (Item 26, 27 or 29, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket (5)

Packing, preformed (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Air pressure relieved (TM 5-3805-261-10)

Radiator drained (WP 0065 00)

Left side engine panel removed (WP 0182 00)

Transmission sampling unit removed (WP 0154 00)

REMOVAL

CAUTION

Cap hose ends and plug open ports to prevent contamination.

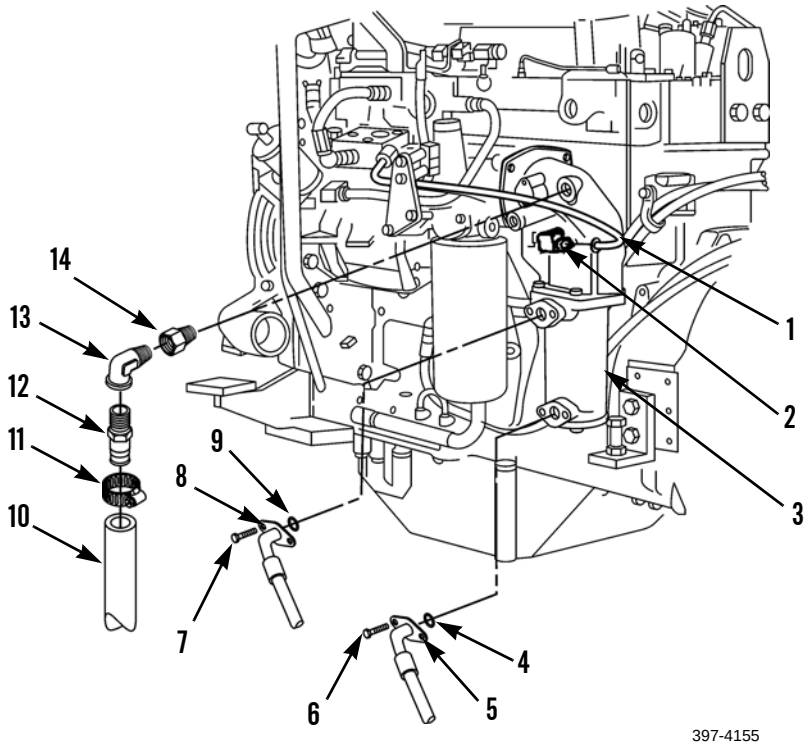
NOTE

Tag hose, lines, and fittings before disconnecting to aid in installation.

TRANSMISSION OIL COOLER MAINTENANCE - CONTINUED 0298 00

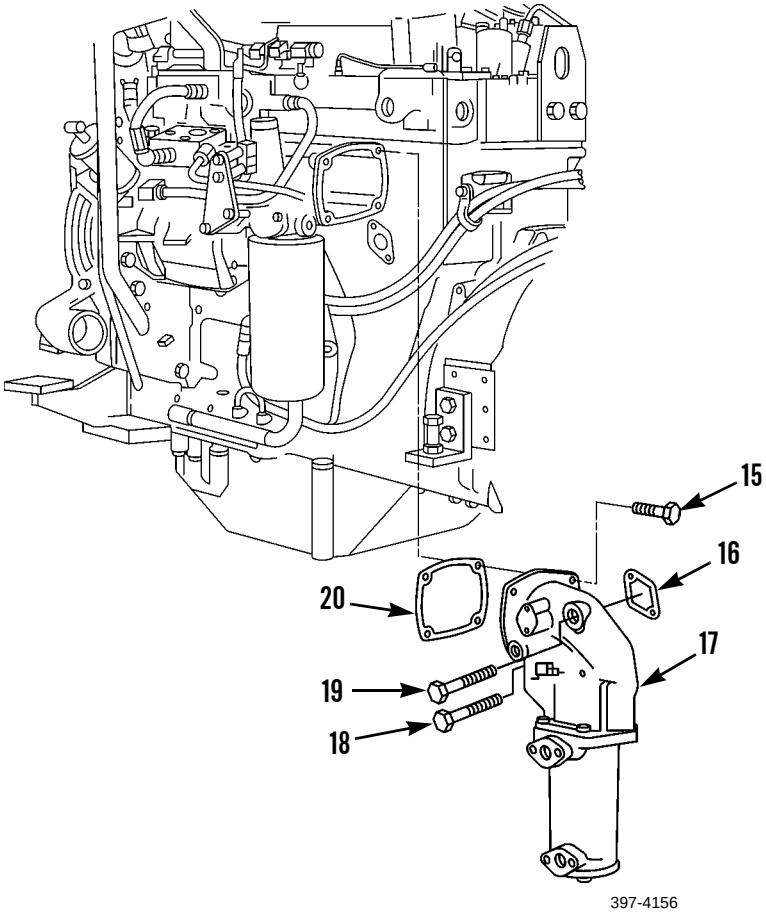
REMOVAL - CONTINUED

1. Disconnect air line (1) from elbow (2).
2. Remove two bolts (6), oil line (5), and preformed packing (4) from transmission oil cooler core (3). Discard preformed packing.
3. Remove two bolts (7), oil line (8), and preformed packing (9) from transmission oil cooler core (3). Discard preformed packing.
4. Loosen clamp (11) and slide down on water hose (10).
5. Remove water hose (10), clamp (11), adapter (12), elbow (13), and adapter (14).



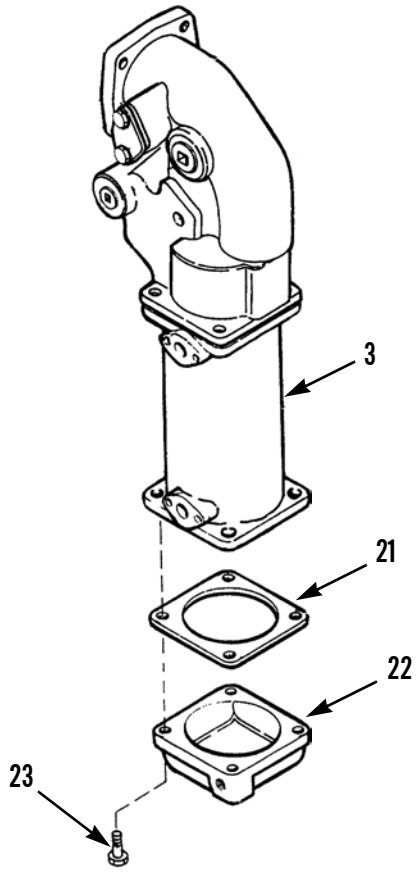
REMOVAL - CONTINUED

6. Remove four bolts (15).
7. Remove bolts (18 and 19) and withdraw transmission oil cooler and core assembly (17).
8. Remove and discard gaskets (16 and 20).



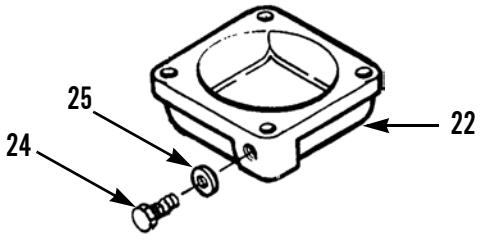
DISASSEMBLY

1. Remove four bolts (23) from bottom of transmission oil cooler core (3) and separate access cover (22) and gasket (21). Discard gasket.



397-4157

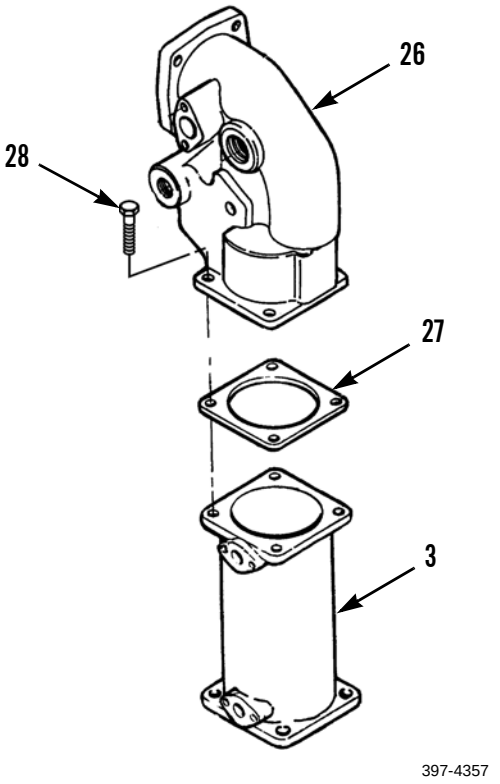
2. Remove plug (24) and washer (25) from access cover (22).



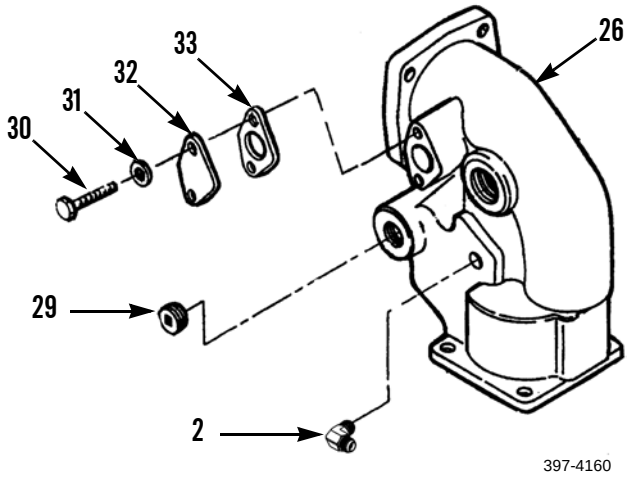
397-4158

DISASSEMBLY - CONTINUED

3. Remove four bolts (28) and gasket (27) from bonnet (26) and separate from transmission oil cooler core (3). Discard gasket.



4. Remove two bolts (30), washers (31), cover (32), and gasket (33) from bonnet (26). Discard gasket.
5. Remove plug (29).
6. Remove elbow (2).

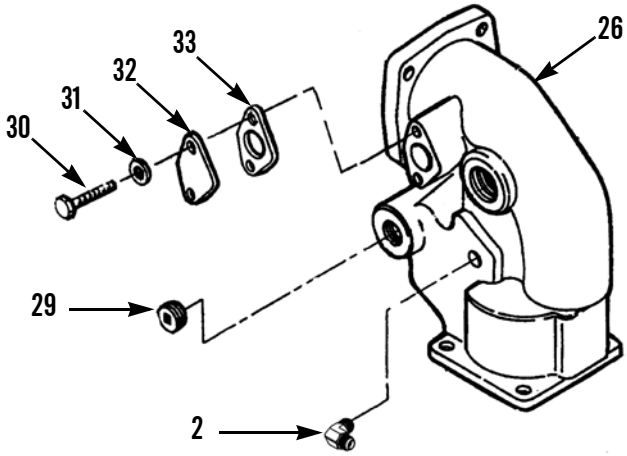


CLEANING AND INSPECTION

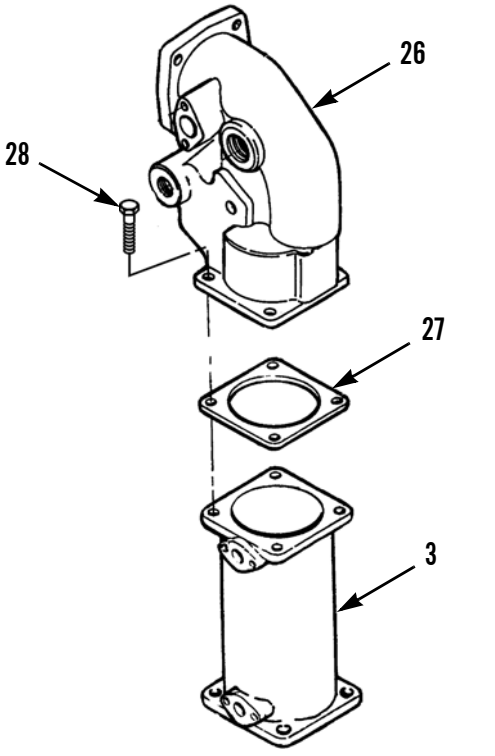
Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install elbow (2) on bonnet (26).
2. Install plug (29).
3. Install new gasket (33), cover (32), two washers (31), and bolts (30).

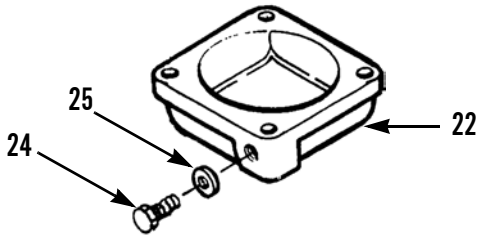


4. Position bonnet (26) and new gasket (27) on top end of transmission oil cooler core (3) and install four bolts (28).



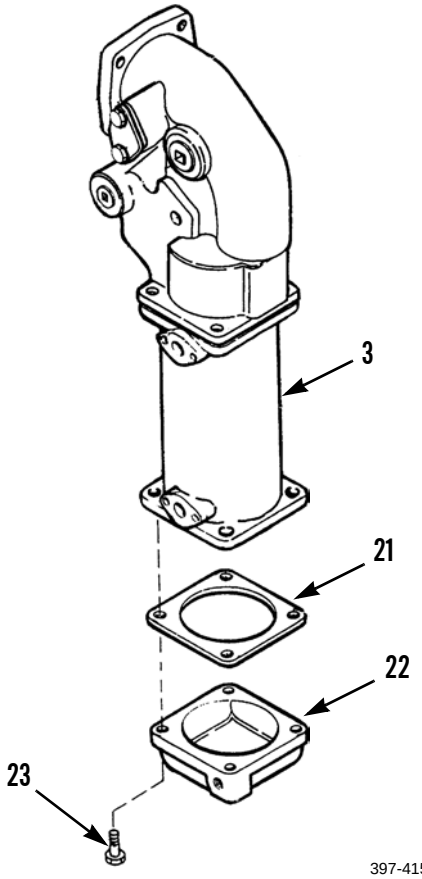
ASSEMBLY - CONTINUED

5. Install washer (25) and plug (24) in access cover (22).



397-4158

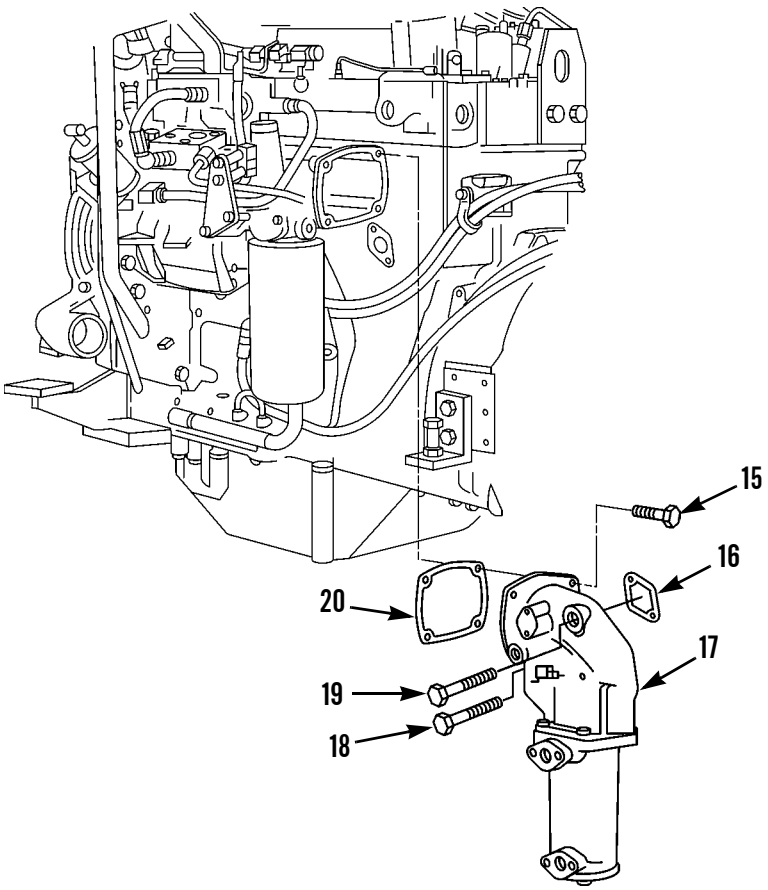
6. Position new gasket (21) and access cover (22) on bottom end of transmission oil cooler core (3) and install four bolts (23).



397-4157

INSTALLATION

1. Position two new gaskets (16 and 20) onto transmission oil cooler and core assembly (17) and align with engine mounting bolt holes.
2. Install bolts (18 and 19) and four bolts (15).



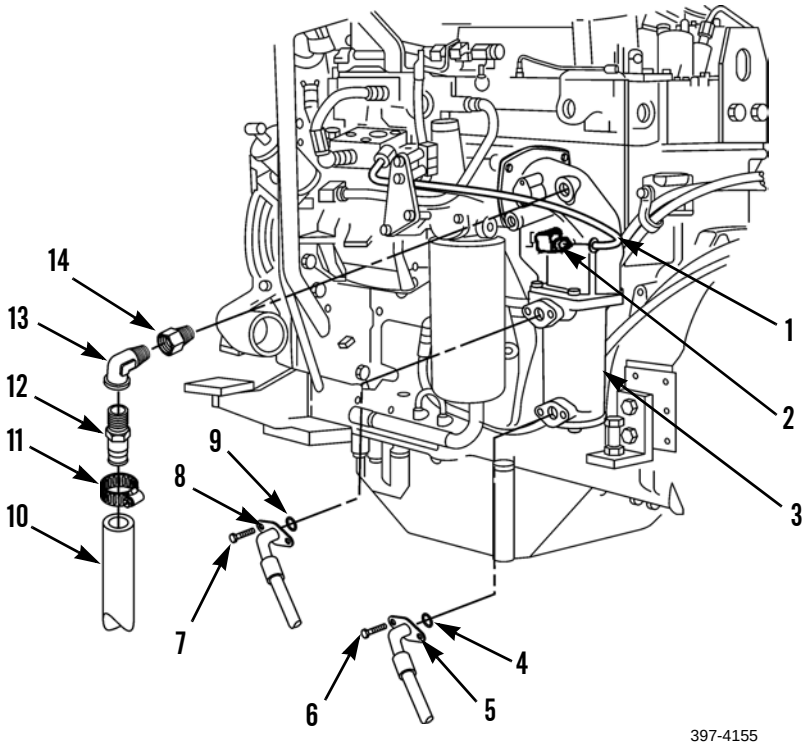
INSTALLATION - CONTINUED

3. Install adapter (14), elbow (13), and adapter (12).
4. Slide clamp (11) onto water hose (10).
5. Install water hose (10) and clamp (11) onto adapter (12).

NOTE

Lightly lubricate all preformed packings with clean oil before installation.

6. Install new preformed packing (9), oil line (8), and two bolts (7) on transmission oil cooler core (3).
7. Install new preformed packing (4), oil line (5), and two bolts (6) on transmission oil cooler core (3).
8. Connect air line (1) on elbow (2).



9. Install transmission sampling unit (WP 0154 00).
10. Install left side engine panel (WP 0182 00).
11. Fill radiator to proper level (WP 0065 00).
12. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
13. Check for leaks.
14. Stop engine.

END OF WORK PACKAGE

TRANSMISSION OIL FILLER AND OIL LEVEL GAUGE REPLACEMENT 0299 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Bolt, self-locking (2)

Gasket

Lockwasher (5)

Packing, preformed

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Right side engine panel removed (WP 0182 00)

Transmission oil drained (WP 0147 00)

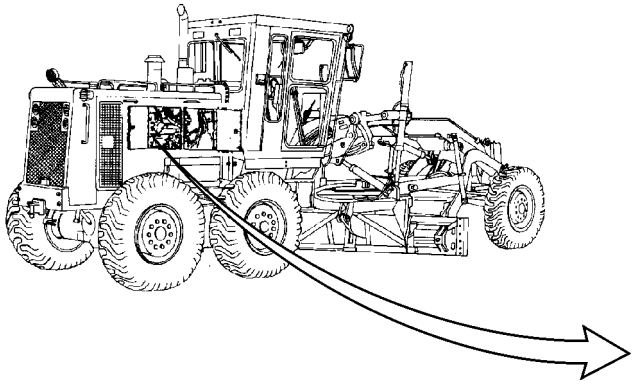
WARNING

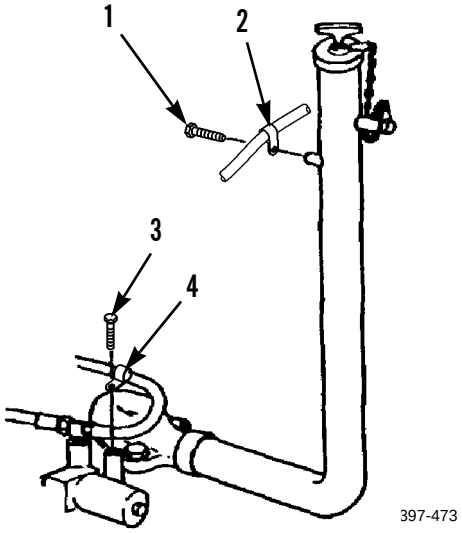
- Exercise care when working with hot oil or components saturated with hot oil. Allow to cool before handling. Failure to follow this warning may result in injury to personnel.
- Transmission oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury to personnel.

TRANSMISSION OIL FILLER AND OIL LEVEL GAUGE REPLACEMENT - CONTINUED 0299 00

REMOVAL

1. Remove bolt (1) and clamp (2).
2. Remove bolt (3) and clamp (4).





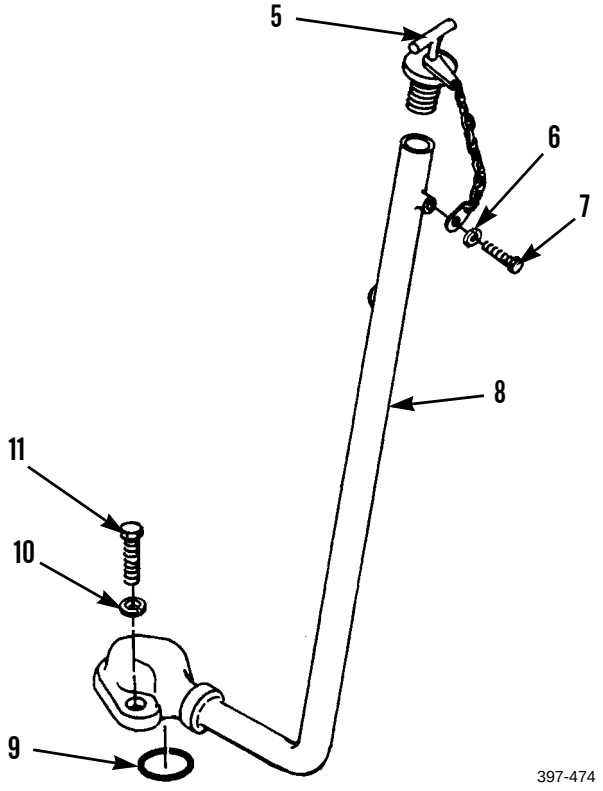
CAUTION

Cap tube ends and open ports to prevent contamination.

NOTE

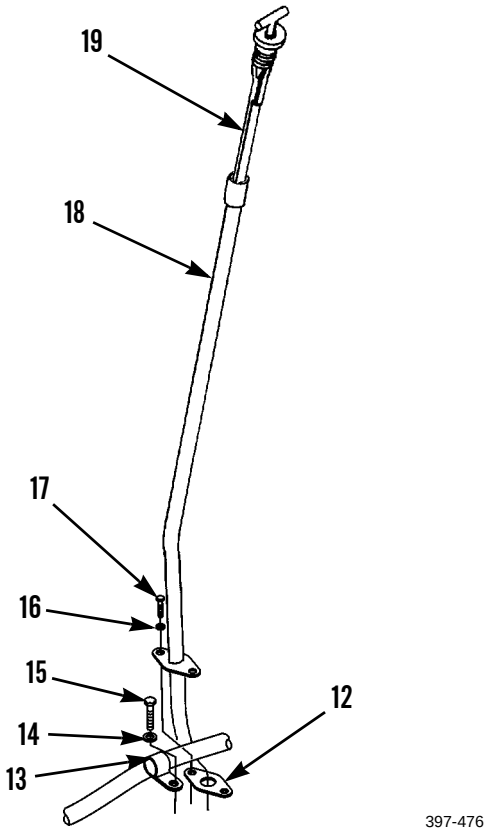
Position drain pan under tubes.

3. Remove two bolts (11), lockwashers (10), tube assembly (8), and preformed packing (9). Discard preformed packing.
4. Remove screw (7), lockwasher (6), and cap (5) from tube assembly (8). Discard lockwasher.



REMOVAL - CONTINUED

5. Remove gauge rod (19) from tube (18).
6. Remove bolt (15) and washer (14) from clip (13).
7. Slide clip (13) over.
8. Remove two self-locking bolts (17), lockwashers (16), tube (18), and gasket (12). Discard self-locking bolts, lockwashers and gasket.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install new gasket (12), tube (18), two new lockwashers (16), and new self-locking bolts (17).
2. Position clip (13).
3. Install washer (14) and bolt (15) in clip (13).
4. Install gauge rod (19) in tube (18).
5. Install cap (5), new lockwasher (6) and screw (7) on tube assembly (8).
6. Install new preformed packing (9), tube assembly (8), two new lockwashers (10), and bolts (11).
7. Install clamp (4) and bolt (3).
8. Install clamp (2) and bolt (1).
9. Refill transmission oil to proper level (WP 0147 00).
10. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
11. Check for leaks. Stop engine.
12. Install right side engine panel (WP 0182 00).

END OF WORK PACKAGE

FRONT AXLE ASSEMBLY REPLACEMENT 0300 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, puller (Item 9, WP 0348 00)

Jack stand (Item 85, WP 0348 00)

Nut (Item 45, WP 0348 00)

Puller, hydraulic (Item 60, WP 0348 00)

Pump, hydraulic ram (Item 65, WP 0348 00)

Screw (Item 71, WP 0348 00)

Sling (Item 78, WP 0348 00)

Washer (Item 92, WP 0348 00)

Lifting device, 1,800-lb capacity

Wood blocks

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Bearing (2)

Seal (2)

Personnel Required

Two

References

WP 0020 00

WP 0023 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Inplements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Front wheels removed (WP 0166 00)

Leaning wheel mechanism removed (WP 0303 00)

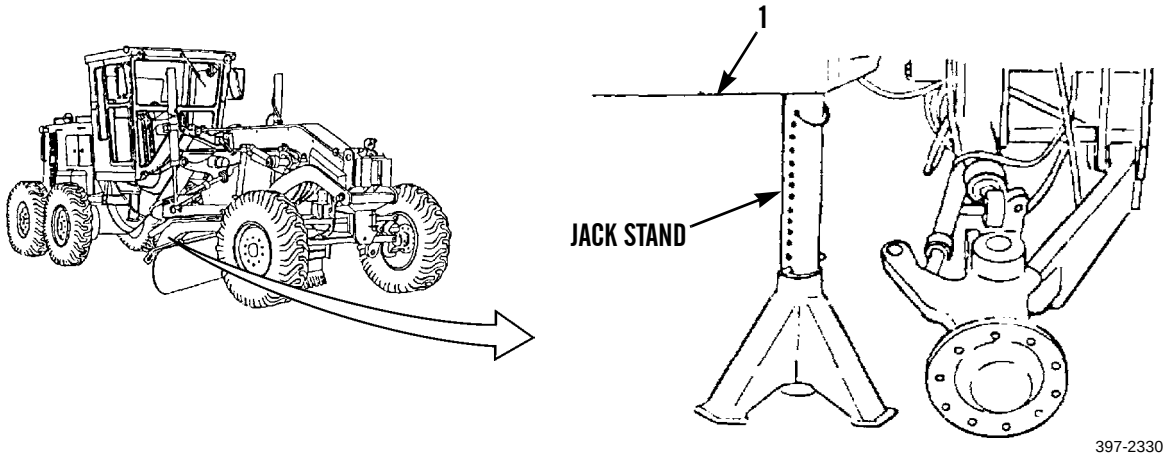
Leaning wheel cylinder removed (WP 0304 00)

Steering cylinders removed (WP 0320 00)

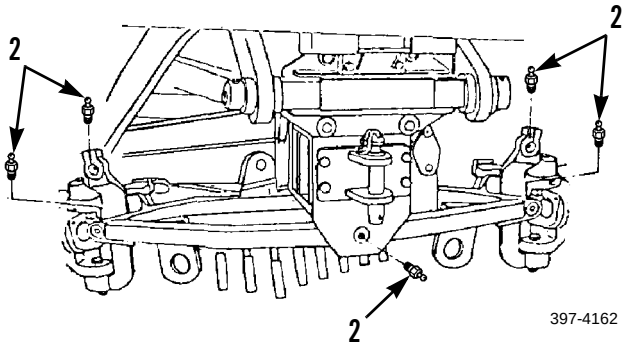
FRONT AXLE ASSEMBLY REPLACEMENT - CONTINUED 0300 00

REMOVAL

1. Position jack stand under circle drawbar (1).



2. Remove seven fittings (2).



REMOVAL - CONTINUED

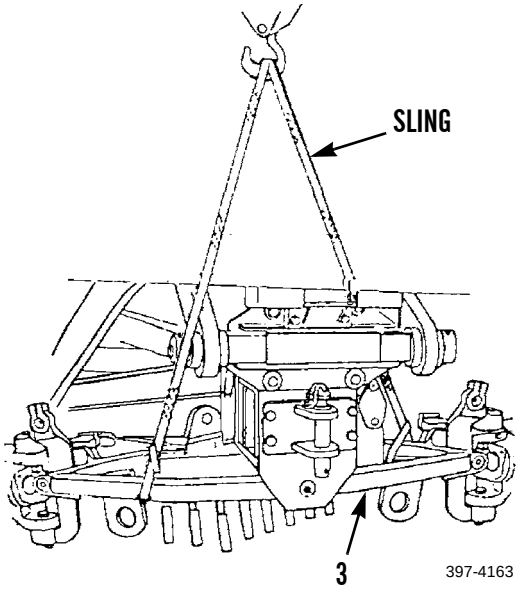
WARNING

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

NOTE

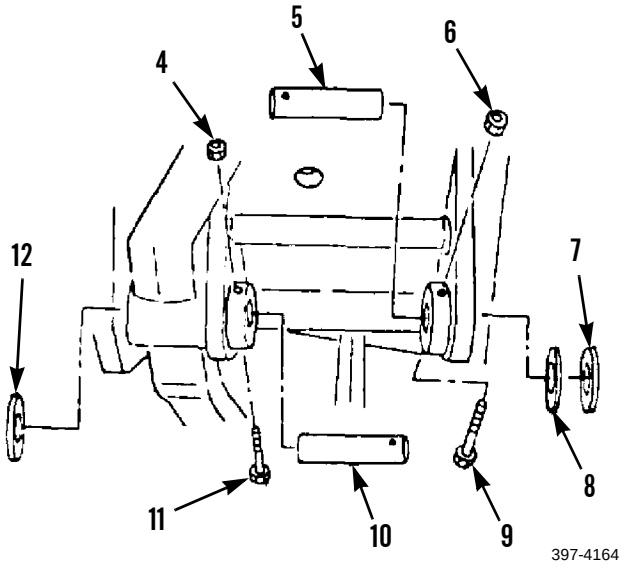
Front axle assembly weighs 1,220 lb (553 kg).

3. Install sling on front axle assembly (3).

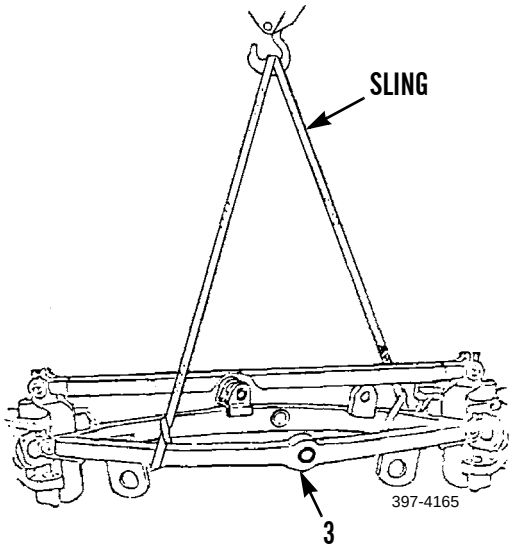


REMOVAL - CONTINUED

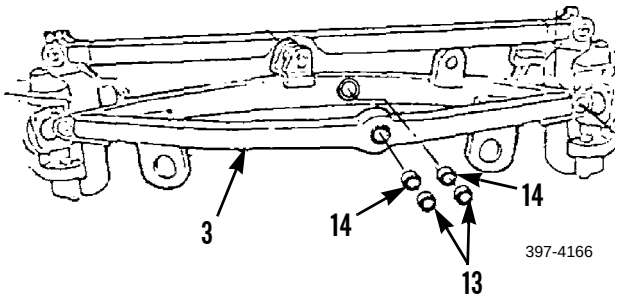
4. Remove nut (4), bolt (11), pin (10), and washer (12).
5. Remove nut (6), bolt (9), pin (5), and washers (7 and 8).



6. Use sling to remove front axle assembly (3) and lower onto wood blocks.
7. Remove sling.



8. Remove two seals (13) and bearings (14) from axle (3). Discard bearings and seals.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Use pulling adapter, hydraulic puller, hydraulic pump, washer, screw, and nut, to install two new bearings (14) 0.282 in. (7.16 mm) from each surface of front axle assembly (3).
2. Use driver to install two new seals (13) with lips toward outside surface, even with outside surface of axle (3).

WARNING

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

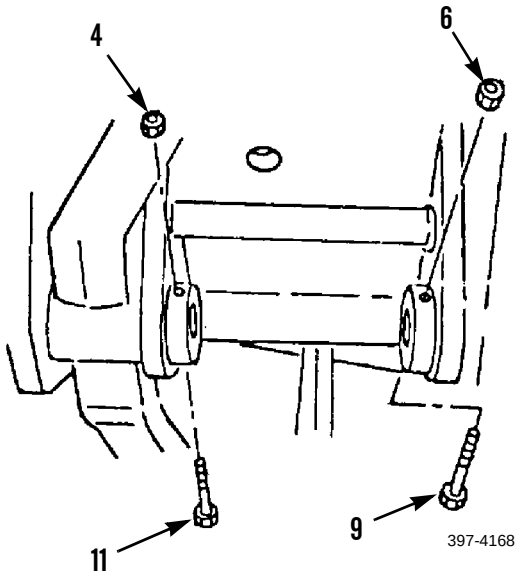
NOTE

Front axle assembly weighs 1,220 lb (553 kg).

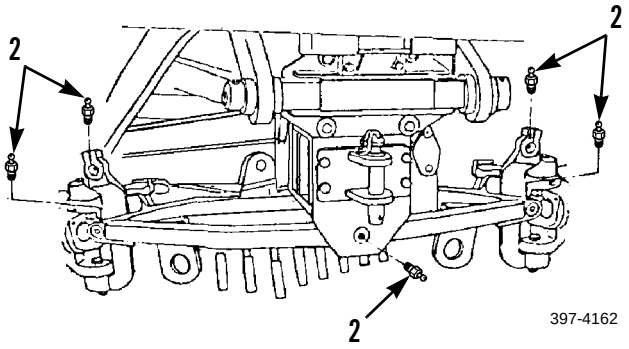
3. Attach sling to front axle assembly (3).
4. Position front axle assembly (3) on machine.
5. Install washer (8) and pin (5). Install washer (7) only if required to obtain a maximum gap of 0.06 in. (1.5 mm) between front axle assembly (3) and machine frame. Hole in pin must align with hole in front axle assembly (3).
6. Install washer (12) and pin (10). Hole in pin must align with hole in front axle assembly (3).

INSTALLATION - CONTINUED

7. Remove sling.
8. Install bolt (9), nut (6), bolt (11), and nut (4).
9. Remove jack stand.



10. Install and lubricate seven fittings (2) (WP 0023 00).



11. Install steering cylinder (WP 0320 00).
12. Install leaning wheel cylinder (WP 0304 00).
13. Install leaning wheel mechanism (WP 0303 00).
14. Install front wheels (WP 0166 00).

END OF WORK PACKAGE

STEERING ARMS AND TIE ROD MAINTENANCE 0301 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, puller (Item 11, WP 0348 00)

Jack, hydraulic (Item 37, WP 0348 00)

Jack stand (2) (Item 84, WP 0348 00)

Leg, mechanical puller (Item 40, WP 0348 00)

Nut, plain (Item 49, WP 0348 00)

Puller attachment (Item 57, WP 0348 00)

Puller, hydraulic (Item 61, WP 0348 00)

Puller, mechanical (Item 63, WP 0348 00)

Pump, hydraulic ram (Item 65, WP 0348 00)

Screw, machine (Item 73, WP 0348 00)

Sling (Item 78, WP 0348 00)

Spacer (Item 80, WP 0348 00)

Spacer, sleeve (Item 82, WP 0348 00)

Washer (Item 92, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Lifting device, 500-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Chalk

Gasket

Locknut

Packing, preformed

Pin, cotter (2)

References

WP 0020 00

WP 0166 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Wheel lean prevention bolt and nut removed (WP 0303 00)

Wheel spindles removed (WP 0302 00)

Front wheels removed (WP 0166 00)

REMOVAL

NOTE

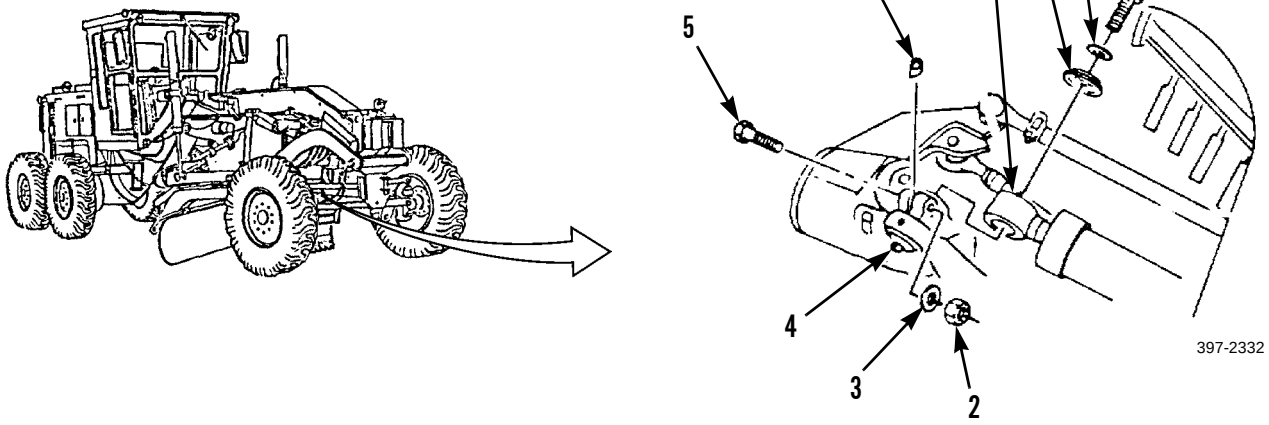
This procedure covers replacement of the right steering arm. Follow these instructions for the left steering arm.

1. Remove nut (2), washer (3), bolt (5), and lock (6).
2. Remove bolt (1), washer (9), and retainer (8).

CAUTION

Do not remove pin from wheel lean, lean arm, or lean bar.

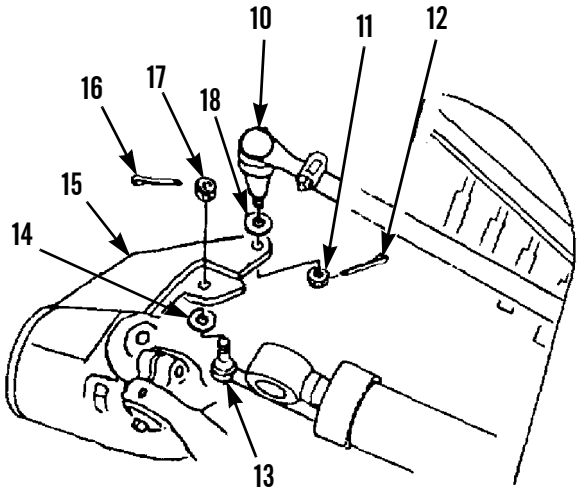
3. Remove pin (4) from leaning wheel rod assembly (7). Drive out pin with hammer and punch just far enough to clear rod assembly.
4. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
5. Operate wheel lean control lever to retract rod assembly (7) into cylinder (TM 5-3805-261-10).



6. Stop engine.
7. Turn battery disconnect switch to OFF position (TM 5-3805-261-10).

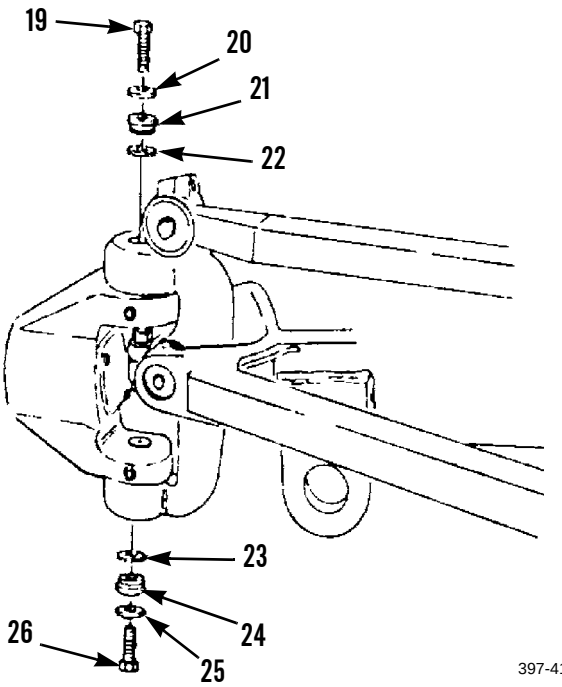
REMOVAL - CONTINUED

8. Remove and discard cotter pin (12) from front-right socket (10).
9. Loosen nut (11) until even with end of threads on socket assembly (10).
10. Tap nut (11) with hammer to loosen socket assembly (10) from its taper and remove nut (11).
11. Move socket assembly (10) away from housing (15).
12. Remove washer (18).
13. Remove and discard cotter pin (16).
14. Loosen nut (17) until even with end of threads on steering cylinder socket assembly (13).
15. Tap nut (17) with hammer to loosen socket assembly (13) from its taper and remove nut.
16. Move socket assembly (13) away from housing (15).
17. Remove washer (14).



397-4170

18. Remove bolt (19), washer (20), and retainer (21).
19. Remove ring (22) from retainer (21).
20. Remove bolt (26), washer (25), and retainer (24).
21. Remove ring (23) from retainer (24).



397-4171

REMOVAL - CONTINUED

22. Remove two bolts (28) and washers (29).

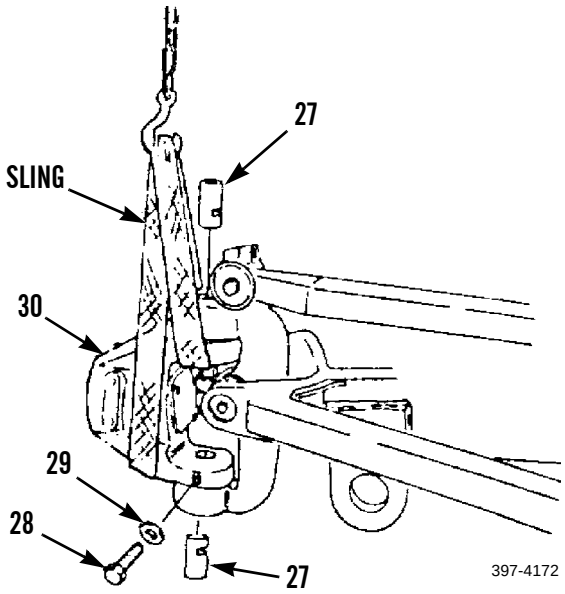
WARNING

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

NOTE

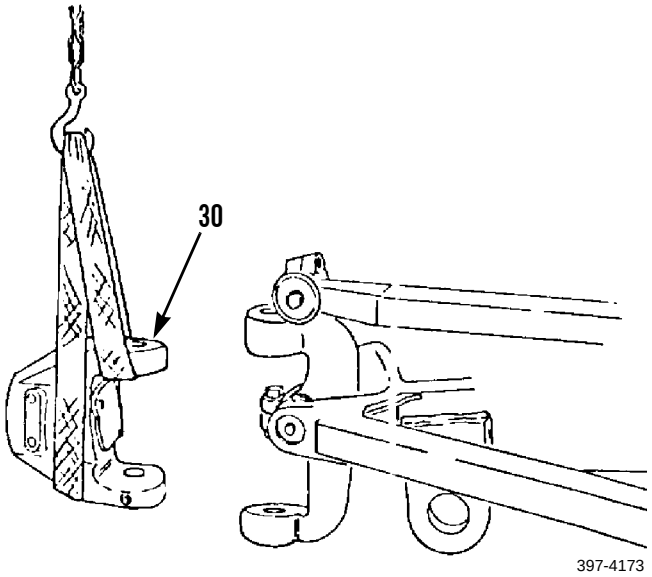
Drag link and spindle assembly weighs 415 lb (188 kg).

23. Attach sling to drag link and spindle assembly (30).
24. Use assembled puller adapter, washer, nut, screw, puller assembly, pump group, and spacer to remove two pins (27).

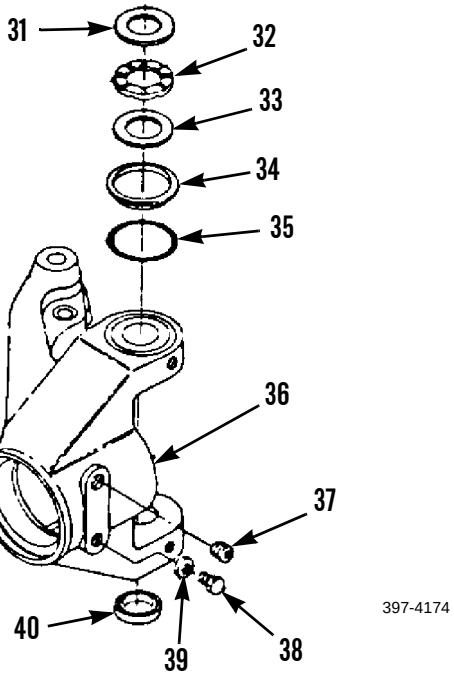


REMOVAL - CONTINUED

25. Remove drag link and spindle assembly (30).
26. Remove sling.

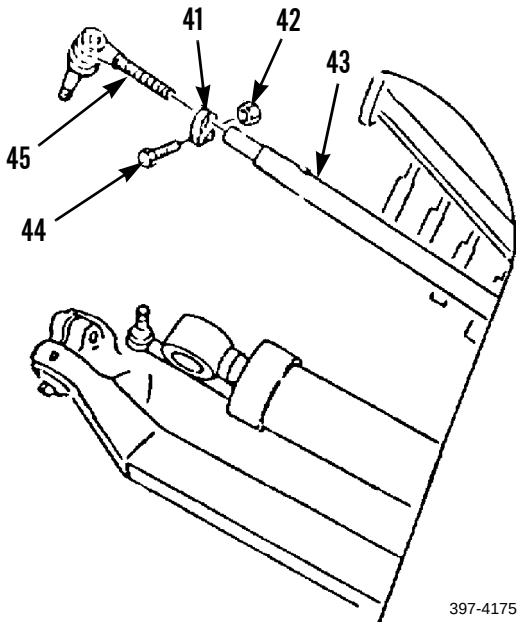


27. Remove washers (31, 32, and 33).
28. Remove seal (34), preformed packing (35), and seal (40). Discard preformed packing.
29. Remove plug (38), gasket (39), and plug (37) from housing (36). Discard gasket.



REMOVAL - CONTINUED

30. Remove locknut (42), bolt (44), and clamp (41). Discard locknut.
31. Remove socket assembly (45) from steering tie rod (43).

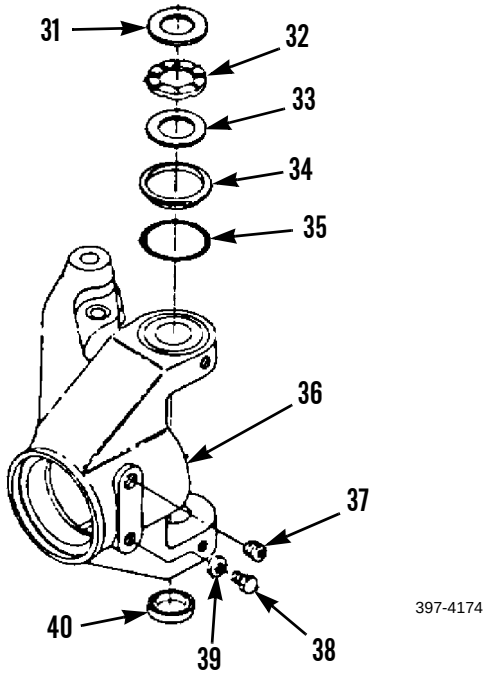


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install socket assembly (45) on steering tie rod (43).
2. Install clamp (41), bolt (44), and new locknut (42). Tighten locknut to 55 lb-ft (76 Nm).
3. Install plug (37), new gasket (39), and plug (38) in housing (36).
4. Install seal (40), new preformed packing (35), and seal (34).
5. Install washers (31, 32, and 33).



INSTALLATION - CONTINUED

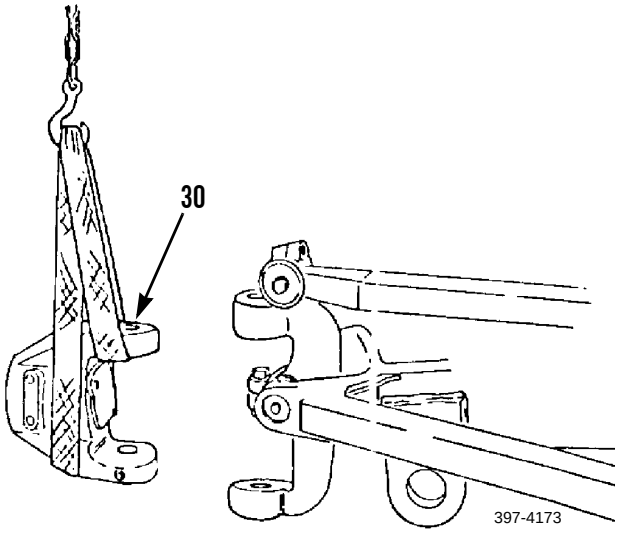
WARNING

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

NOTE

Drag link and spindle assembly weighs 415 lb (188 kg).

6. Attach sling to drag link and spindle assembly (30).

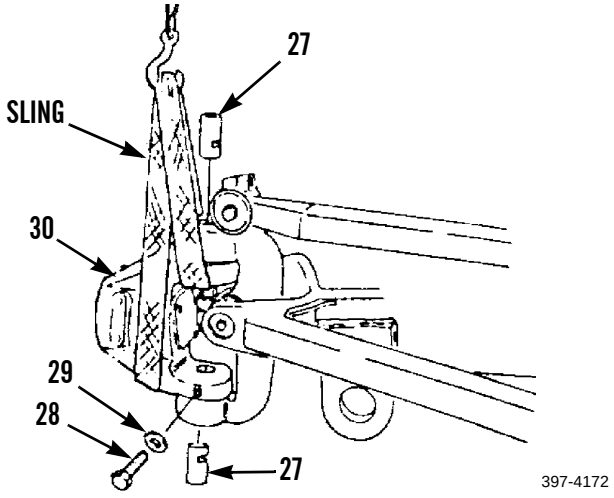


7. Position drag link and spindle assembly (30) on wheel lean arm.
8. Lower temperature of two pins (27) to aid in installation.

NOTE

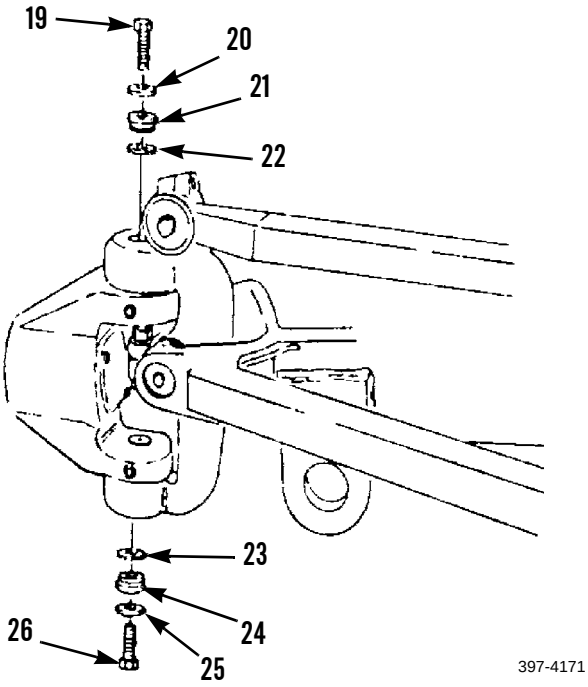
Ensure grooves in two pins are in alignment with openings in housing.

9. Use assembled puller assembly, pump group, two legs, puller assembly, bearing puller assembly, and six spacers to install two pins (27).
10. Install two washers (29) and bolts (28).
11. Remove sling.



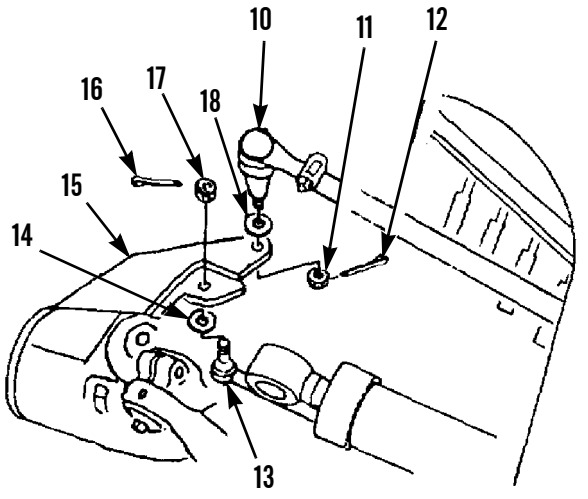
INSTALLATION - CONTINUED

12. Install ring (23).
13. Use driver to install retainer (24), washer (25), and bolt (26).
14. Install ring (22).
15. Install retainer (21), washer (20), and bolt (19).



397-4171

16. Install washer (14) on socket assembly (13).
17. Install socket assembly (13) in housing (15).
18. Install nut (17) and tighten to 90 lb-ft (122 Nm). Slot in nut must align with hole in socket assembly (13).
19. Install new cotter pin (16).
20. Install washer (18).
21. Position socket assembly (10) on housing (15).
22. Install nut (11) and tighten to 90 lb-ft (122 Nm).
23. Install new cotter pin (12).

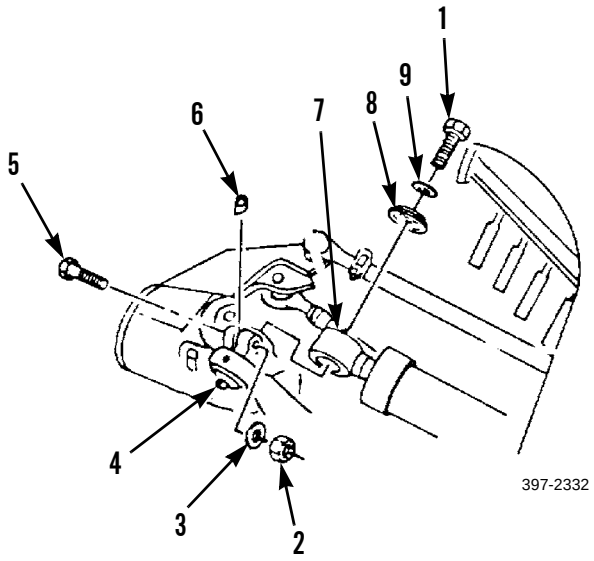


397-4170

24. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).

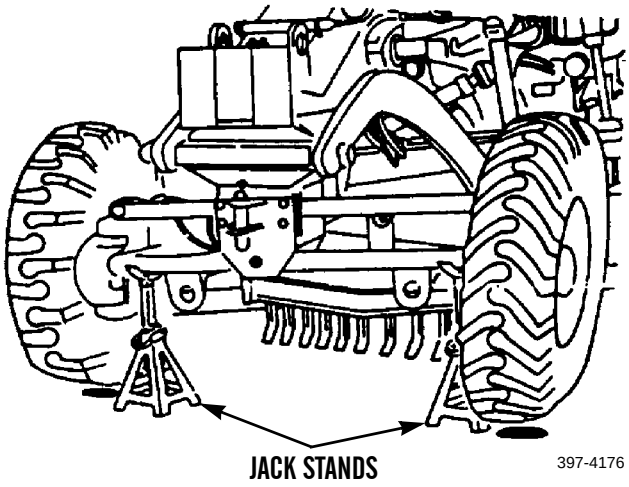
INSTALLATION - CONTINUED

25. Operate wheel lean control lever to position rod assembly (7) in line with pin (4) on right front of machine.
26. Stop engine.
27. Turn battery disconnect switch to OFF position (TM 5-3805-261-10).
28. Position pin (4) through eye of rod assembly (7) on front-right of machine.
29. Install retainer (8), washer (9), and bolt (1).
30. Install lock (6), bolt (5), washer (3), and nut (2). Tighten nut to 185 lb-ft (251 Nm).
31. Install wheel spindles (WP 0302 00).
32. Install front wheels (WP 0166 00).



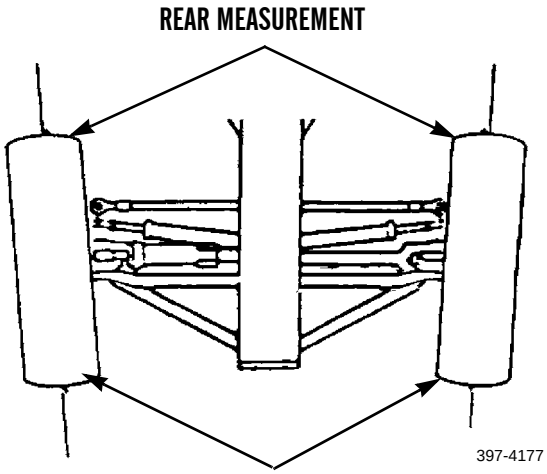
ADJUSTMENT

1. Install wheel lean prevention bolt and nut (WP 0303 00).
2. Raise front axle off ground with jack and support with two jack stands.

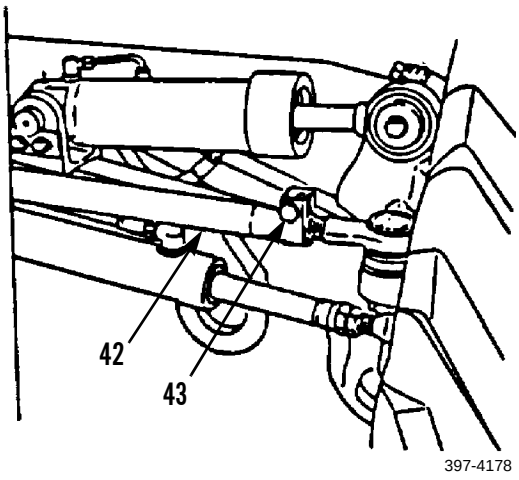


ADJUSTMENT - CONTINUED

3. Using a piece of chalk to mark the center of the threads of both tires, rotate and mark front tires on front of machine. Tires should be facing straight ahead.
4. Measure distance between front centers and rear centers of tires. Front measurement of the tires must be 1/8 to 1/4 in. (3.0 to 6.4 mm) less than the rear measurement of the tires.



5. Loosen locknut (43) if adjustment is necessary.
6. Turn steering tie rod (42) in direction needed to obtain the distance required.
7. Tighten locknut (43) to 55 lb-ft (75 Nm).
8. Lower front axle to ground and remove jack and two jack stands.
9. Remove wheel lean prevention bolt and nut (WP 0303 00).



END OF WORK PACKAGE

WHEEL SPINDLE, BEARINGS, AND SEALS REPLACEMENT 0302 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, contact truck (Item 77, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, mechanical puller (Item 2, WP 0348 00)

Inserter, seal (Item 33, WP 0348 00)

Jack group (Item 36, WP 0348 00)

Leg (Item 39, WP 0348 00)

Plate, step (Item 53, WP 0348 00)

Puller, mechanical (Item 64, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Cleaning compound (Item 8, WP 0349 00)

Lubricating oil, gear (Item 23 or 24, WP 0349 00)

Materials/Parts - Continued

Oil, lubricating (Item 26, 27, 28, 29, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Wheel spindle housing lubricant drained (WP 0023 00)

Front wheels removed (WP 0166 00)

REMOVAL

NOTE

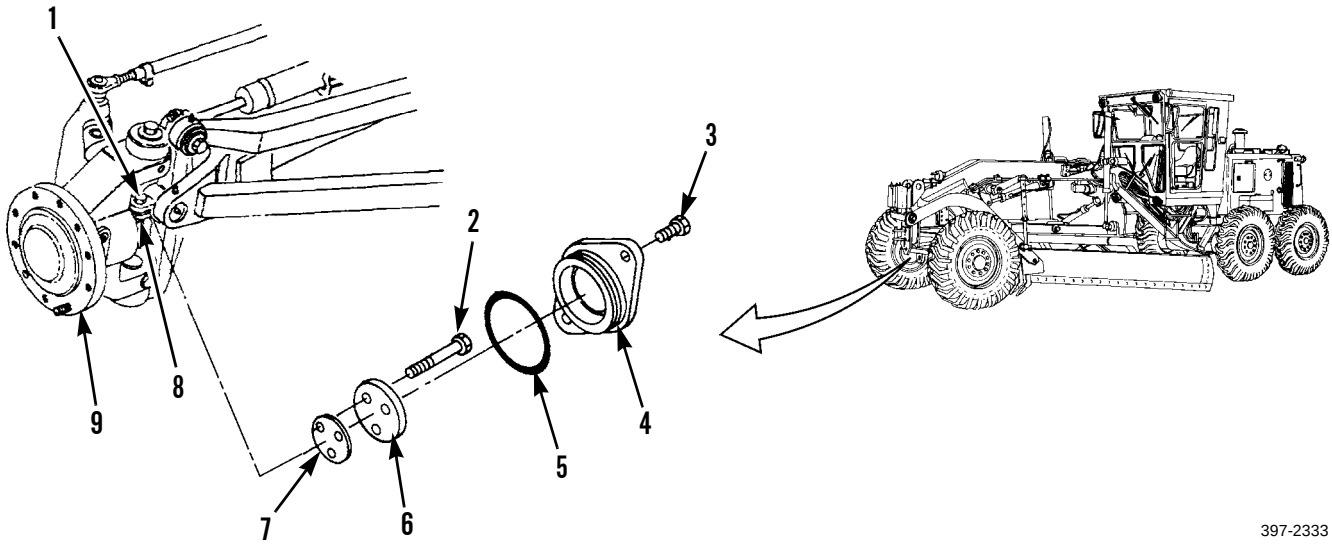
This procedure covers the replacement of the right wheel spindle, bearings, and seals. Follow these instructions for the left wheel spindle, bearings, and seals.

1. Remove two bolts (3) and cover (4).
2. Remove and discard preformed packing (5).

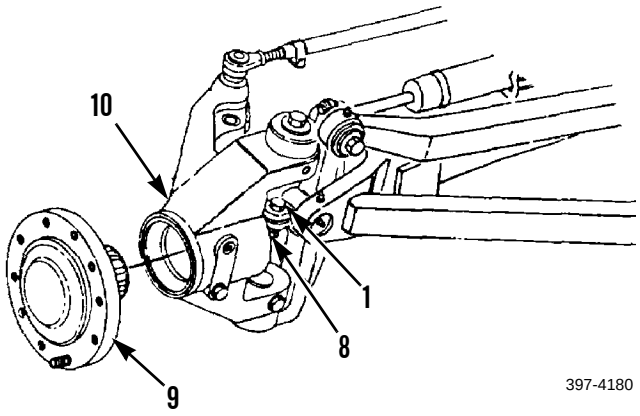
NOTE

Tie shim(s) together and tag for identification.

3. Remove three bolts (2), retainer (6), and shim(s) (7).
4. Loosen bolt (8) and nut (1).
5. Position forks of jack group on threads of bolt (8) at center of wheel lean arm. Position other end of jack group against wheel spindle assembly (9).



6. Remove spindle assembly (9) from housing (10) by tightening nut on jack group.
7. Tighten bolt (8) and nut (1).

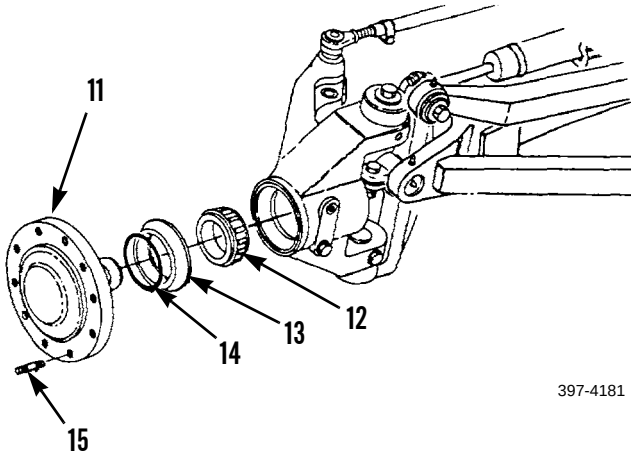


REMOVAL - CONTINUED

CAUTION

Be careful not to damage ring or spindle.

8. Remove and separate ring (14) and seal (13) from spindle. Discard seal.
9. Use puller to remove bearing (12) from spindle (11).
10. Remove 10 studs (15) and spindle (9).

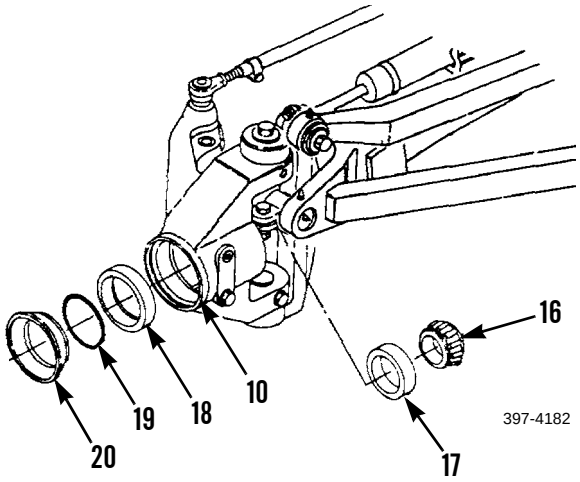


11. Remove and separate ring (19) and seal (20) from housing (10). Discard seal.

CAUTION

Be careful not to damage seals or rings.

12. Remove bearings (16, 17, and 18) from housing (10).



CLEANING AND INSPECTION

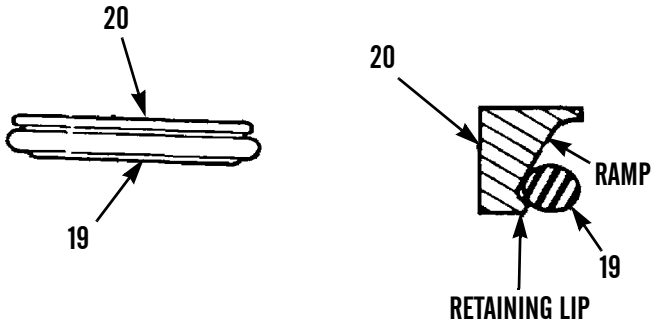
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Lower temperature of bearings (17 and 18) to aid in installation and install in housing (10).
2. Install bearing (16) in housing (10).

INSTALLATION - CONTINUED

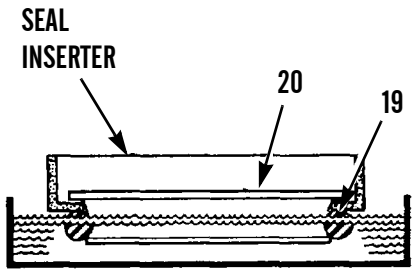
3. Install new seal (20) on ring (19). Ensure seal is not twisted and is seated properly on bottom of ring ramp and against retaining lip.
4. Install seal inserter on seal (20) and ring (19) as an assembly.



397-4183

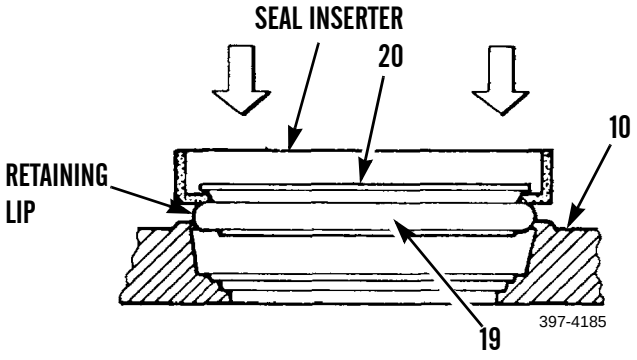
Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to follow this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

5. Use seal inserter to lower seal (20) and ring (19) as an assembly into container of solvent cleaning compound until completely wet.



397-4184

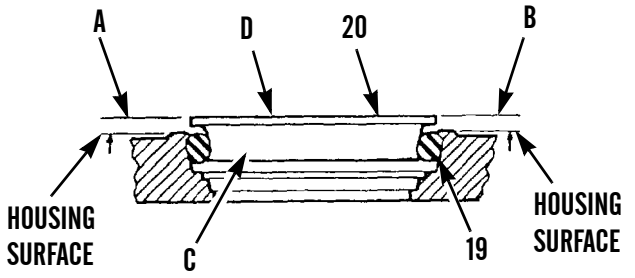
6. Position seal (20) and ring (19) in housing (10). With ring still wet, use seal inserter to position seal and ring as an assembly squarely against housing.
7. Install seal (20) and ring (19). With sudden and even pressure on the seal inserter, push to seat ring under retaining lip of housing (10).



397-4185

INSTALLATION - CONTINUED

8. Measure at points (A through D), 90 degrees apart with depth rule gauge. Check height from housing surface to top of seal (20). Differences in heights between points (A through D) must not exceed 0.04 in (1.0 mm).



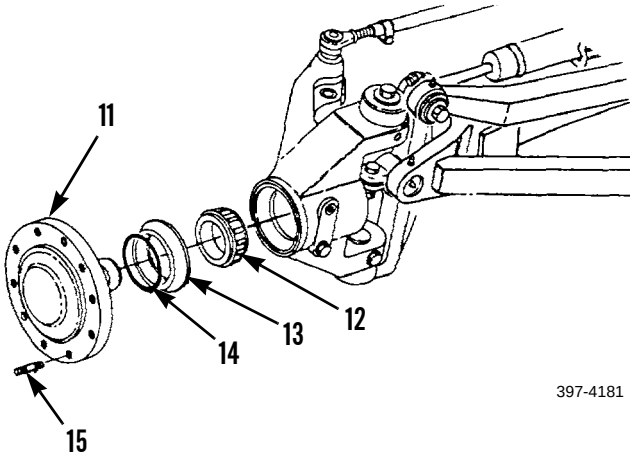
397-4186

9. Adjust seal (20) and ring (19), if necessary, using a seal inserter.

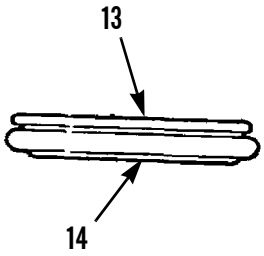
NOTE

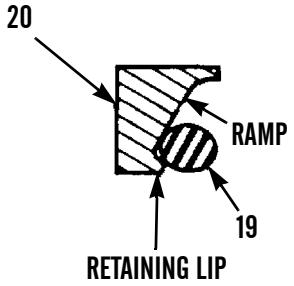
If any dirt particles remain on seal face, seal will leak.

10. Clean seal (20) mating surface with a lint free cloth.
11. Lubricate mating surface of seal (20) with gear lubricant.
12. Inspect ring (19) for twists or bulges. Incorrect installation will result in seal (20) failure. If incorrect installation is obvious, repeat steps 6 through 11.
13. Install 10 studs (15) on spindle (11). Tighten studs to 170 lb-ft (230 Nm).
14. Install bearing (12) on spindle (11).
15. Install ring (14) on seal (13). Ensure ring is not twisted and is seated properly on bottom of seal ramp and against retaining lip.



397-4181





397-4183

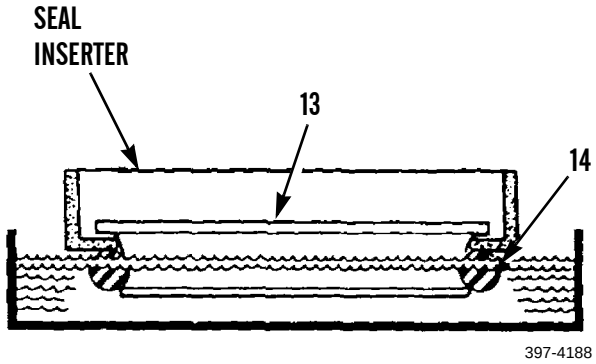
INSTALLATION - CONTINUED

16. Install seal inserter on seal (13) and ring (14).

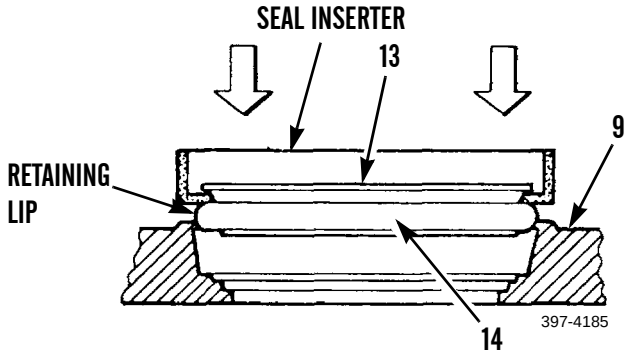
WARNING

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

17. Use seal inserter to lower seal (13) and ring (14) into container of solvent cleaning compound until ring is completely wet.



18. Position seal (13) and ring (14) on spindle (9). With ring still wet, use seal inserter to position seal and ring squarely against spindle.
19. Install seal (13) and ring (14). With sudden and even pressure on the seal inserter, push to seat ring under retaining lip of spindle (9).
20. Adjust seal (13) and ring (14), if necessary, using seal inserter.



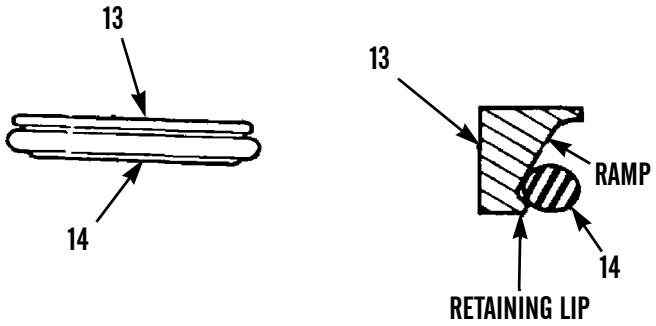
INSTALLATION - CONTINUED

21. Inspect ring (14) for twists or bulges. Ensuring is seated properly on bottom of seal ramp and against retaining lip. Incorrect installation will result in seal failure. If incorrect installation is obvious, repeat steps 18 through 20.

NOTE

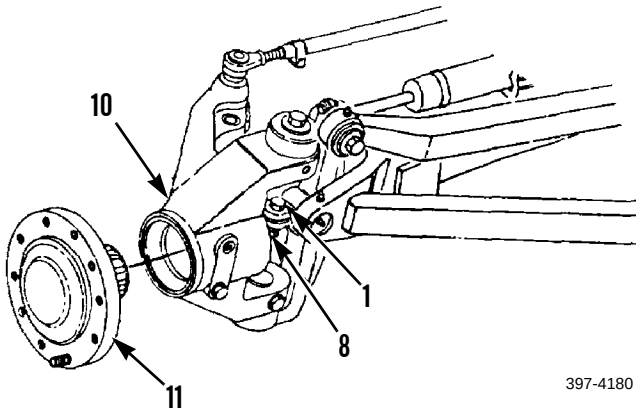
If any dirt particles remain on seal face, seal will leak.

22. Clean seal (13) mating surface with a lint free cloth.
23. Lubricate mating surface of seal (13) with gear lubricant.



397-4183

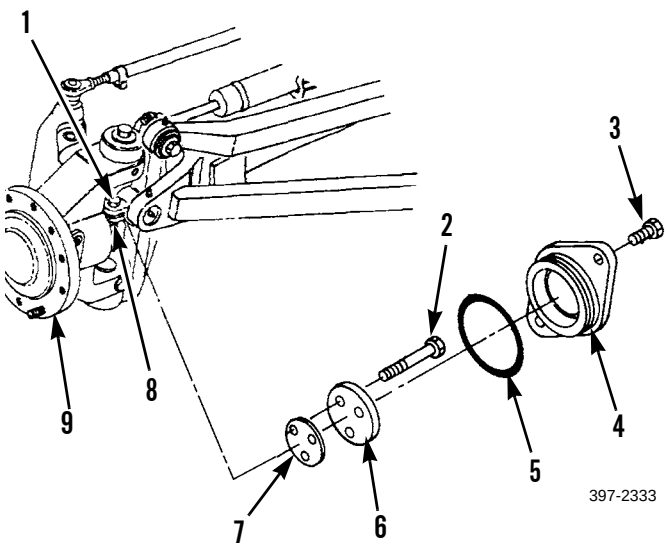
24. Loosen bolt (8) and nut (1).
25. Install spindle assembly (11) in housing (10).
26. Tighten bolt (8) and nut (1).



397-4180

INSTALLATION - CONTINUED

27. Install shim(s) (7), retainer (6), and three bolts (2). Tighten bolts to 96 lb-ft (130 Nm).
28. Install new preformed packing (5).
29. Install cover (4) and two bolts (3).



30. Fill wheel spindle housing with lubricant (WP 0023 00).
31. Install front wheels (WP 0166 00).
32. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
33. Operate machine and check for leaks.
34. Stop engine.

END OF WORK PACKAGE

LEANING WHEEL MECHANISM MAINTENANCE 0303 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, bearing remover (Item 1, WP 0348 00)

Adapter, puller (Item 9, WP 0348 00)

Nut (Item 45, WP 0348 00)

Nut, plain, round (Item 50, WP 0348 00)

Pump, hydraulic ram (Item 65, WP 0348 00)

Ratchet assembly (Item 66, WP 0348 00)

Screw (Item 71, WP 0348 00)

Sling (Item 78, WP 0348 00)

Spacer sleeve (Item 82, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Lifting device, 100-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Personnel Required

Two

References

WP 0020 00

WP 0023 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

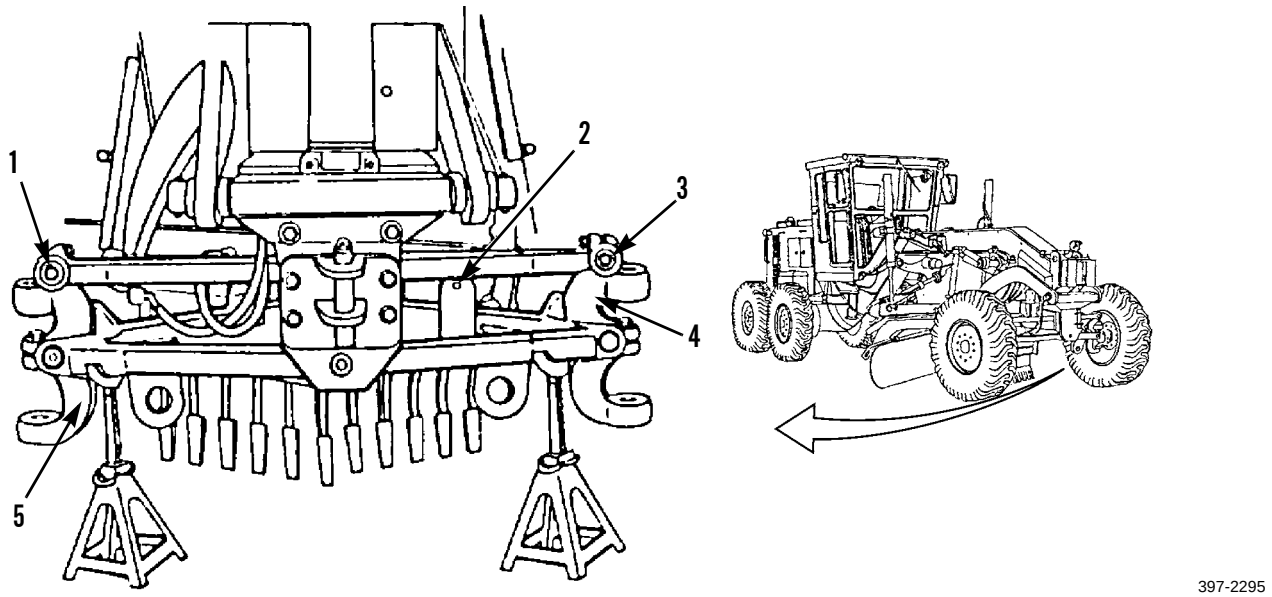
Steering arms and tie rod removed (WP 0301 00)

REMOVAL

NOTE

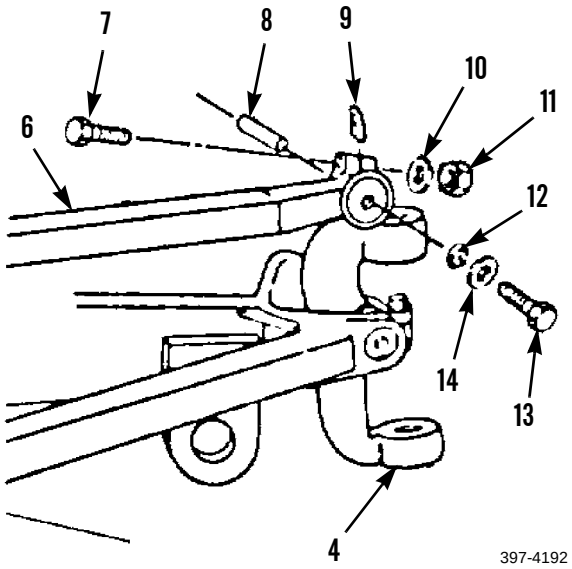
This procedure covers replacement of the left arm. Follow these instructions for the right arm.

1. Install wheel lean lock pin (2) (TM 5-3805-261-10).
2. Fasten ratchet assembly to arms (4 and 5) on front of machine to reduce the load on pins (1 and 3) to aid in their removal.



397-2295

3. Remove nut (11), washer (10), bolt (7), and lock (9) from left-front of machine.
4. Remove bolt (13), washer (14), retainer (12), and pin (8) from bar assembly (6).



397-4192

REMOVAL - CONTINUED

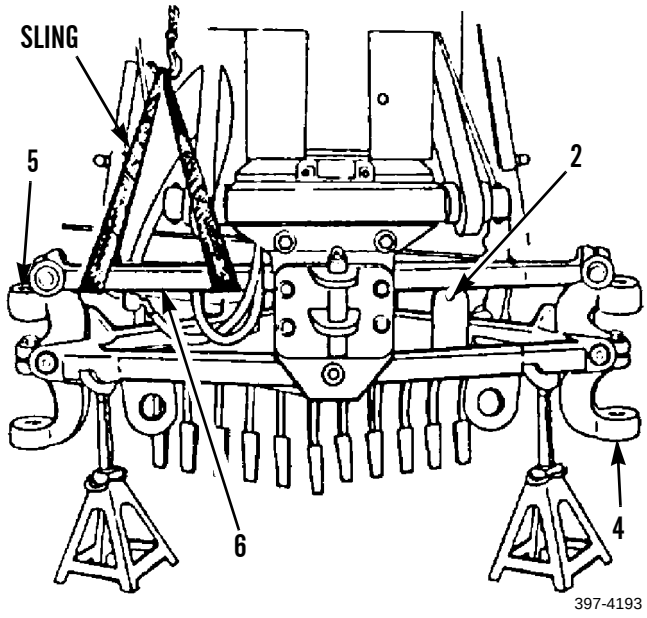
WARNING

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

NOTE

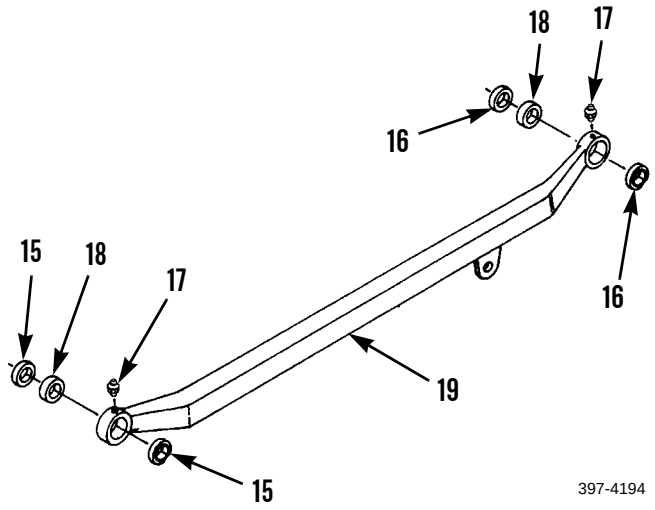
Bar assembly weighs 55 lb (25 kg).

5. Attach sling to bar assembly (6).
6. Remove wheel lean lock pin (2) (TM 5-3805-261-10).
7. Remove bar assembly (6) from arm assemblies (4 and 5).
8. Remove sling.



REMOVAL - CONTINUED

9. Remove four seals (15 and 16) and two bearings (18).
10. Remove two fittings (17) and bar (19).



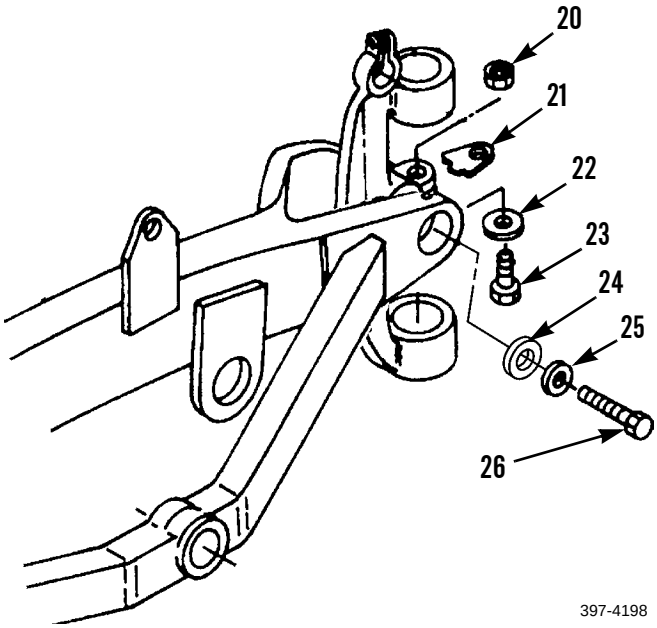
WARNING

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

NOTE

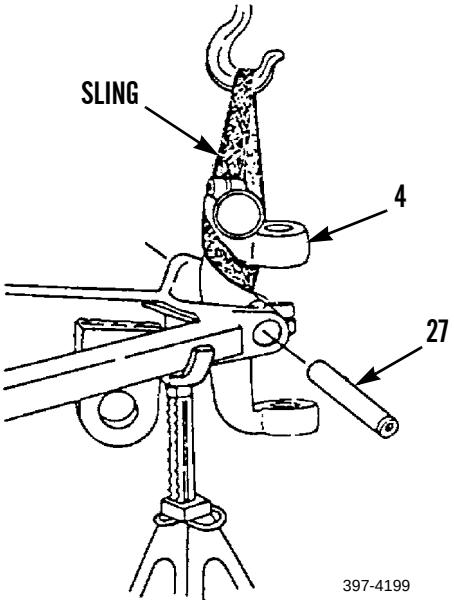
Arm assembly weighs 60 lb (27 kg).

11. Remove two bolts (26) and washers (24 and 25).
12. Remove nut (20), bolt (23), washer (22), and lock (21).

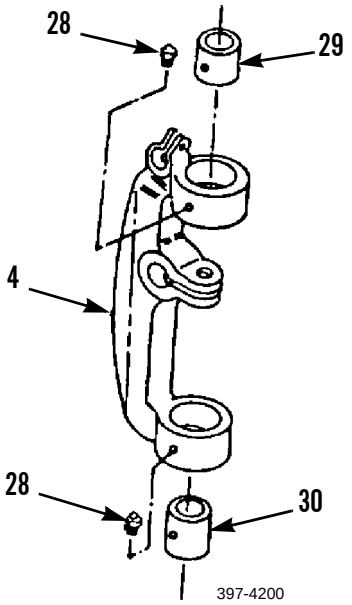


REMOVAL - CONTINUED

13. Attach sling to arm assembly (4).
14. Remove pin (27).
15. Remove arm assembly (4).
16. Remove sling.



17. Remove bearings (29 and 30).
18. Remove fittings (28) from arm assembly (4).



CLEANING AND INSPECTION

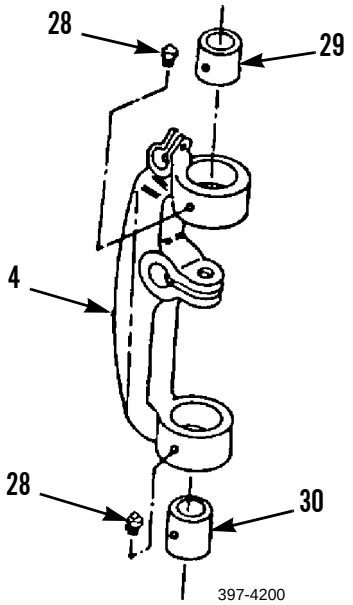
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

CAUTION

- To prevent damage, special tools must be used to install bearings.
- These tools must also be used to install bearing flush with upper surface of collar on arm.

19. Use assembled spacer, nut, pulling adapter, screw, nut, bearing remover adapter, and hydraulic pump to install bearing (29) flush with lower surface of collar on arm (4).
20. Install bearing (30).
21. Install two fittings (28) on arm assembly (4).

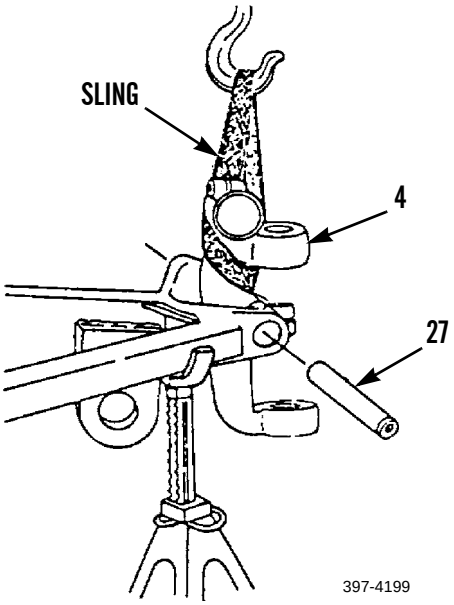


22. Attach sling to arm assembly (4).
23. Position arm assembly (4) on machine.

NOTE

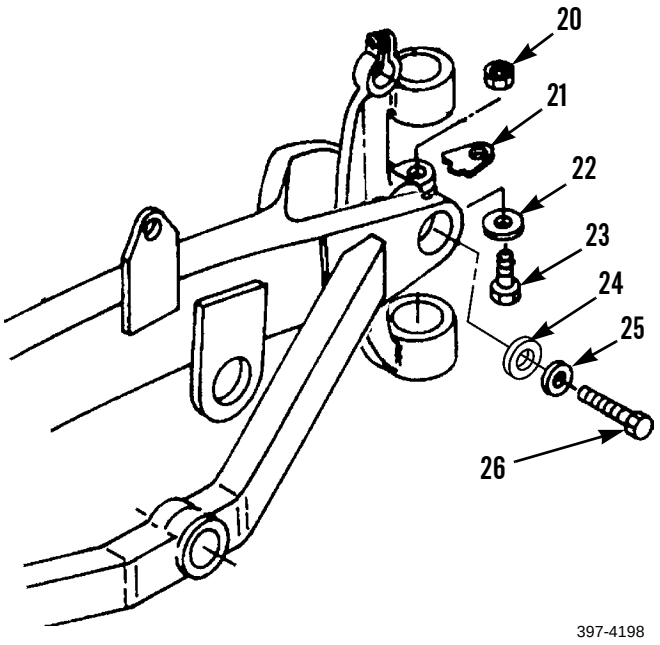
Groove in pin must align with opening in arm assembly.

24. Install pin (27).
25. Remove sling.

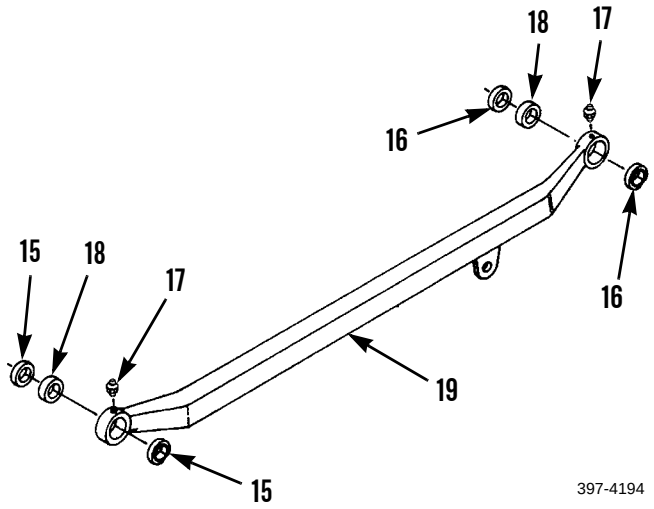


INSTALLATION - CONTINUED

26. Install lock (21), washer (22), bolt (23), and nut (20). Tighten nut to 515 lb-ft (698 Nm).
27. Install two washers (24 and 25) and bolts (26).

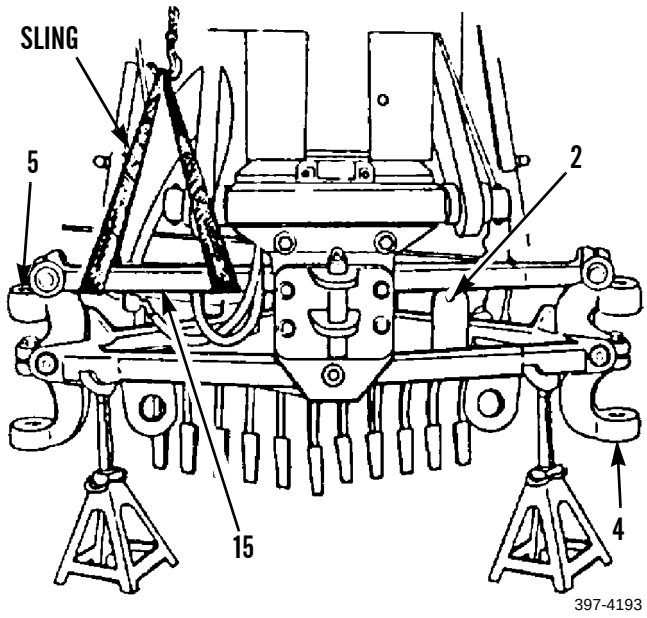


28. Install two fittings (17) in bar (19).
29. Use assembled washer, puller assembly, hydraulic pump, screw, nut, and adapter to install two bearings (18).
30. Install four seals (15 and 16) with lips toward the outside, even with the outside surface of bar (19).



INSTALLATION - CONTINUED

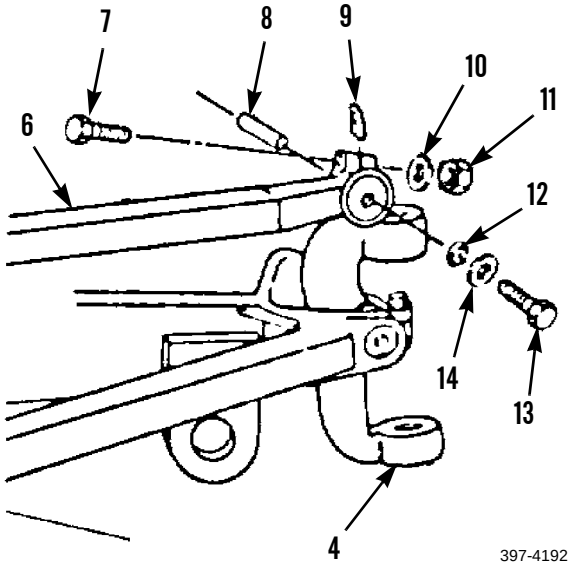
31. Fasten ratchet assembly to arms (4 and 5) and machine frame.
32. Attach sling to bar assembly (15).
33. Position bar assembly (15) on arm assemblies (4 and 5).
34. Install wheel lean lock pin (2) (TM 5-3805-261-10).
35. Use ratchet assembly to align arm assemblies (4 and 5) with bar (6).



NOTE

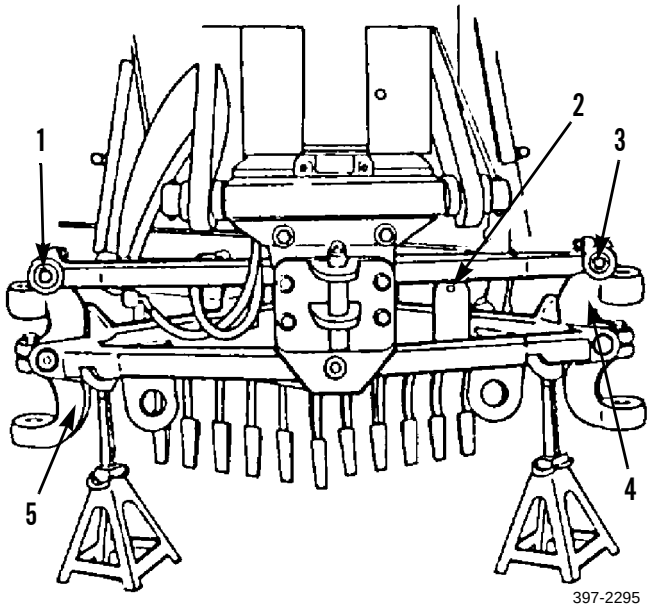
Groove in pin must align with opening in top of arm.

36. Install pin (8).
37. Install retainer (12), washer (14), and bolt (13). Use shim(s) between pin (8), and retainer (12) to give a 0.030 in. (0.76 mm) gap between bar (6) and retainer.
38. Install lock (9), bolt (7), washer (10), and nut (11). Tighten nut to 185 lb-ft (251 Nm).



INSTALLATION - CONTINUED

39. Remove ratchet assembly from arm assemblies (4 and 5) to put load on pins (1 and 3).
40. Remove wheel lean lock pin (2) (TM 5-3805-261-10).
41. Remove sling.



397-2295

42. Lubricate fittings (WP 0023 00).
43. Install steering arms and tie rod (WP 0301 00).

ADJUSTMENT

CAUTION

Always check camber after replacement of leaning wheel mechanism to prevent damage to machine. All motor graders should have 2 degrees of positive camber on each front wheel. Neither wheel should be perpendicular to the ground which will cause excessive wear on tires.

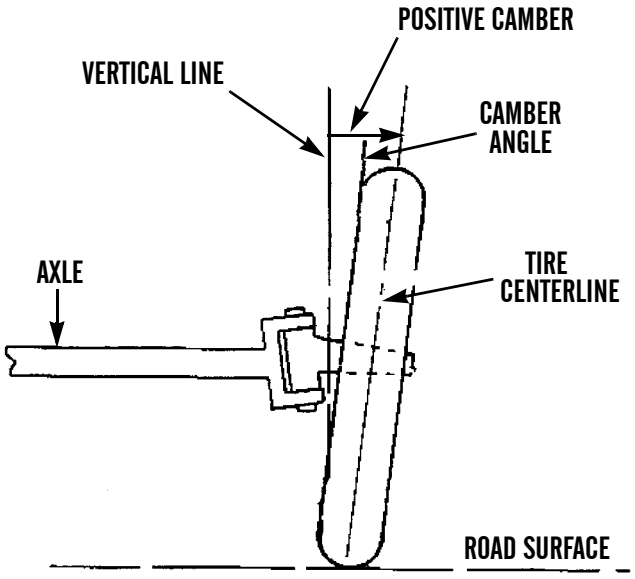
1. Raise front of machine.
2. Use a plumb bob over the outside edge of one tire to obtain vertical reference.

ADJUSTMENT - CONTINUED

NOTE

The camber angle and distance is shown on the inner side of the tire to better illustrate how the camber angle is obtained.

3. Measure distance from bottom of tire to plumb bob. Distance should be 0.7 in. (18 mm) which indicates 2 degrees of positive camber.
4. Check the other front tire using the same method. If the camber is more or less than 2 degrees of positive camber, lengthen or shorten lean bar so camber is correct on both wheels.



397-2238

END OF WORK PACKAGE

LEANING WHEEL CYLINDER REPAIR 0304 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Expander assembly (Item 23, WP 0348 00)

Inserter, seal (Item 34,WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Lifting device, 100-lb capacity

Wood blocks

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27 or 28, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (3)

Materials/Parts - Continued

Ring (2)

Seal (8)

Seal assembly

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Leaning wheel cylinder removed (WP 0156 00)

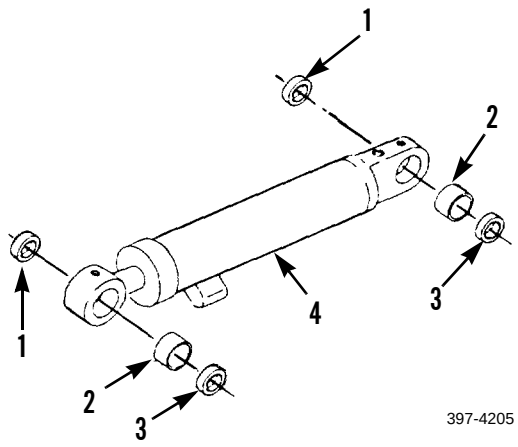
DISASSEMBLY

1. Remove and discard four seals (1 and 3) from cylinder (4).

CAUTION

Removal of bearings from cylinder eyes may cause destruction of bearings. Remove bearings only if inspection indicates replacement is necessary.

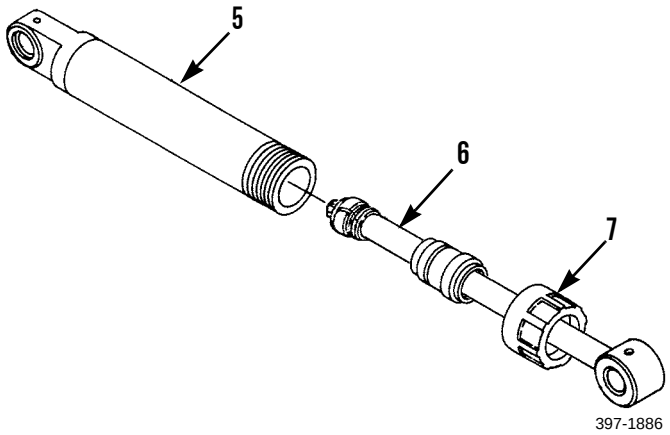
2. Inspect two bearings (2). Replace if cracked, broken, scored, or grooved.
3. Remove two bearings (2), if necessary.



NOTE

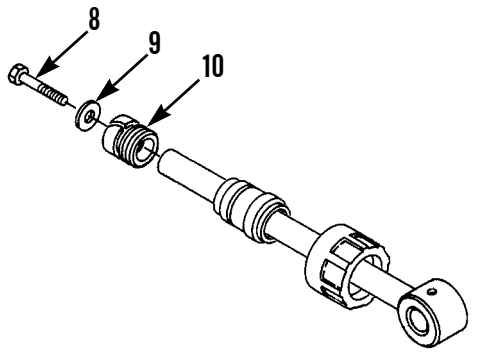
Mount hydraulic cylinder on suitable repair stand to ease disassembly.

4. Loosen shaft collar (7) until it is completely disengaged from threads of cylinder (5).
5. Remove connecting link assembly (6) from cylinder (5).



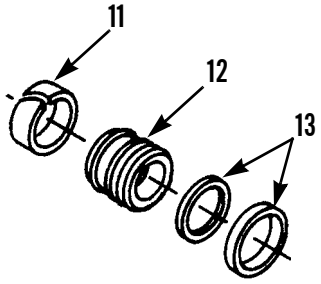
DISASSEMBLY - CONTINUED

6. Remove bolt (8), washer (9), and linear actuator piston assembly (10).



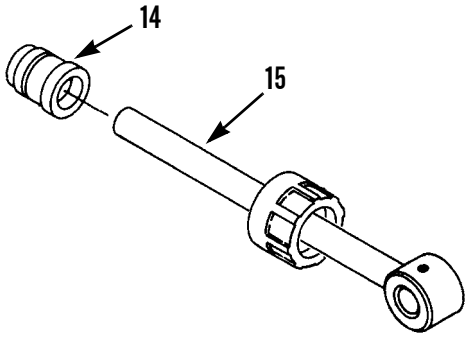
397-1887

7. Remove ring (11) and seal assembly (13) from piston (12) and discard.



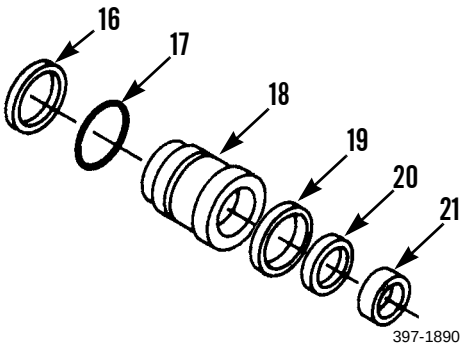
397-1888

8. Remove linear actuator cap assembly (14) from connecting link rod (15).



397-1889

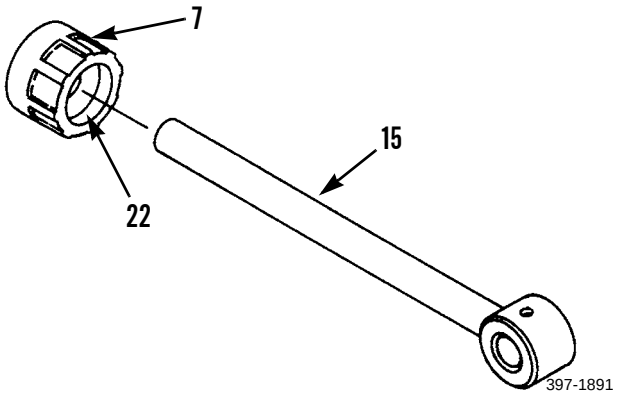
9. Remove ring (16), preformed packing (17), and seals (19, 20, and 21) from cap (18) and discard.



397-1890

DISASSEMBLY - CONTINUED

10. Remove shaft collar (7) from connecting link rod (15).
11. Remove and discard seal (22) from shaft collar (7).

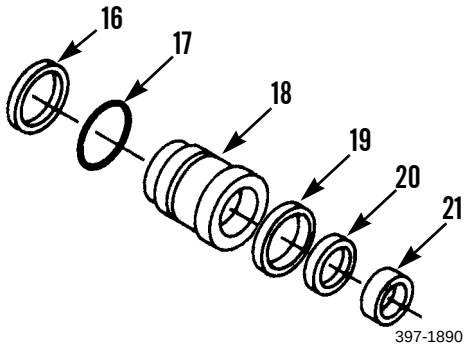


CLEANING AND INSPECTION

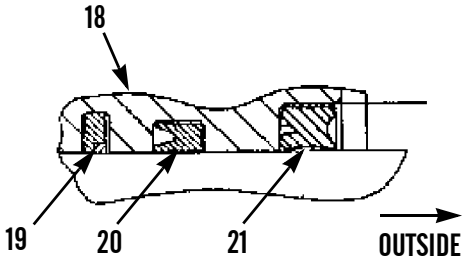
Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install new seal (22) in shaft collar (7).
2. Use lubricating oil to lubricate inside of shaft collar (7).
3. Install shaft collar (7) on connecting link rod (15).
4. Use clean oil to lubricate new seals (19, 20, and 21), new preformed packing (17), and new ring (16).

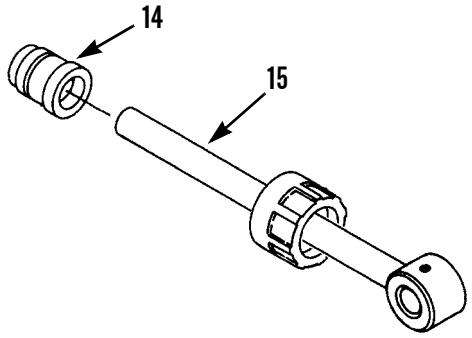


5. Use seal inserter to install new seals (19, 20, and 21) in cap (18). Lip of seal (20) is toward inside of cap. Lip of seal (19) is toward outside of cap.
6. Install new preformed packing (17) and new ring (16) to cap (18).



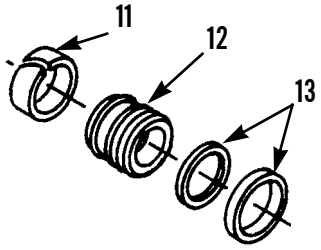
ASSEMBLY - CONTINUED

7. Install linear actuator cap assembly (14) on connecting link rod (15).



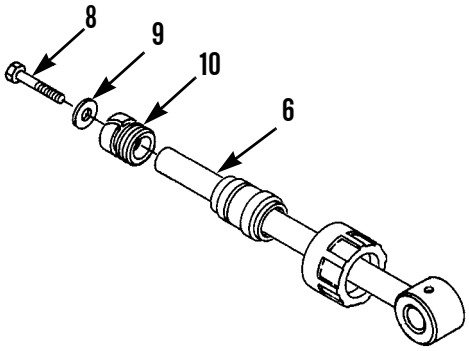
397-1889

8. Use expander assembly to install new seal assembly (13) and ring (11) on piston (12).



397-1888

9. Install linear actuator piston assembly (10) on connecting link (6).
10. Use thread lubricant to lubricate threads of bolt (8). Install washer (9) and bolt. Tighten to 720 to 880 lb-ft (976 to 1193 Nm).



397-1887

ASSEMBLY - CONTINUED

NOTE

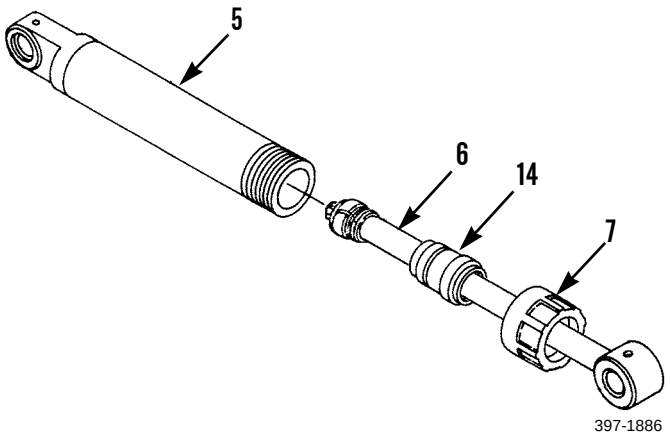
Use lubricating oil to lubricate outside of linear actuator cap assembly (14) and inside of cylinder.

11. Install connecting link (6) inside cylinder (5).

NOTE

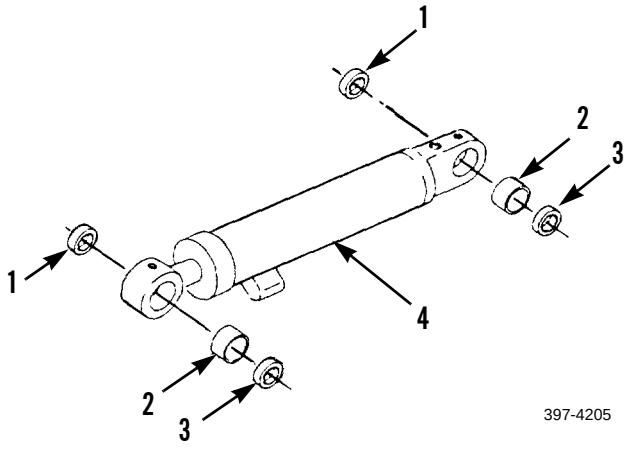
Connecting link rod must be fully extended before tightening cap. This will keep cylinder, piston, and head in alignment.

12. Tighten cap (14) and shaft collar (7) on cylinder (5) to 350 to 550 lb-ft (475 to 746 Nm).



397-1886

13. Install two new bearings (2) centered on cylinder (4), if removed, allowing installation of four new seals (1 and 3).
14. Install four new seals (1 and 3) with lips facing outward.



397-4205

15. Install leaning wheel cylinder (WP 0156 00).

END OF WORK PACKAGE

DIFFERENTIAL REPLACEMENT 0305 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Lifting device, 750-lb capacity

Wood blocks

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Transmission, adapter, and differential removed (WP 0294 00)

REMOVAL

WARNING

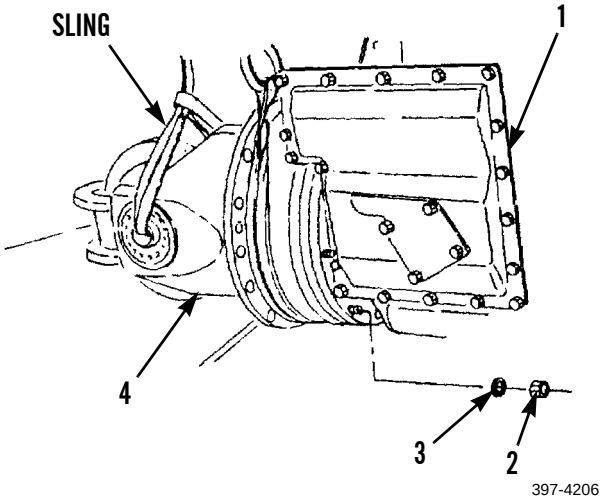
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury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

REMOVAL - CONTINUED

NOTE

Differential weighs 500 lb (227 kg).

1. Attach sling to differential (4).
2. Remove 10 nuts (2) and washers (3).
3. Separate differential (4) from transmission (1).
4. Remove sling.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

WARNING

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

NOTE

Differential weighs 500 lb (227 kg).

1. Attach sling to differential (4).
2. Position differential (4) to transmission (1).
3. Install 10 washers (3) and nuts (2).
4. Remove sling.
5. Install transmission, adapter, and differential (WP 0294 00).

END OF WORK PACKAGE

DIFFERENTIAL LOCK CONTROL VALVE REPLACEMENT 0306 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Locknut

Packing, preformed (5)

Seal kit

References

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hydraulic pressure relieved (WP 0020 00)

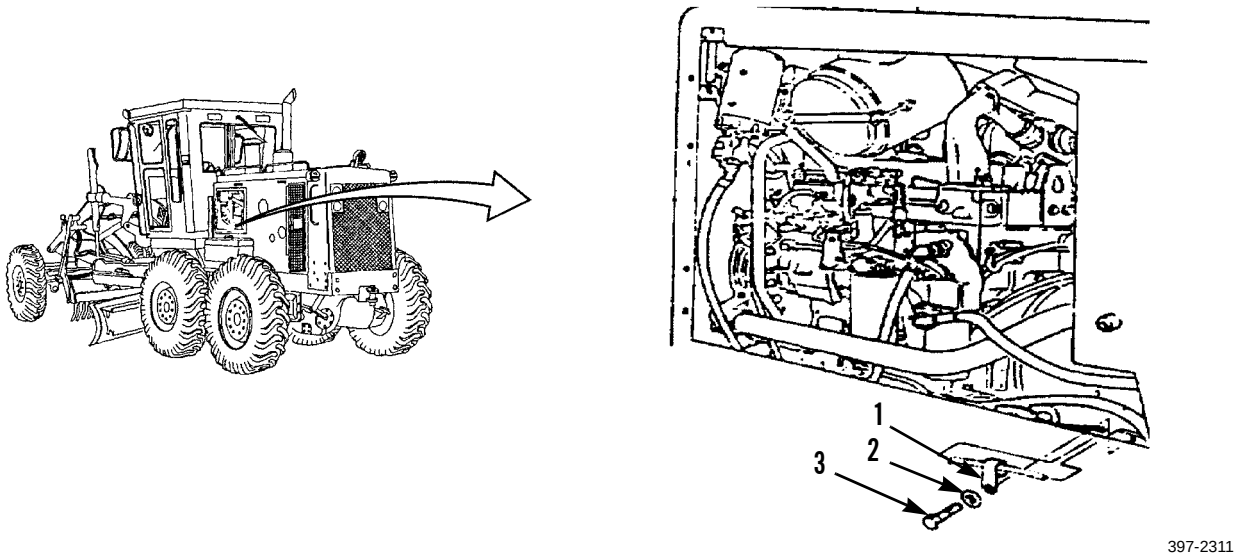
Left side engine panel removed (WP 0182 00)

REMOVAL

NOTE

For Type II machines, remove remote group plate for easier access to components.

1. Remove bolt (3), washer (2), and clip (1).



REMOVAL - CONTINUED

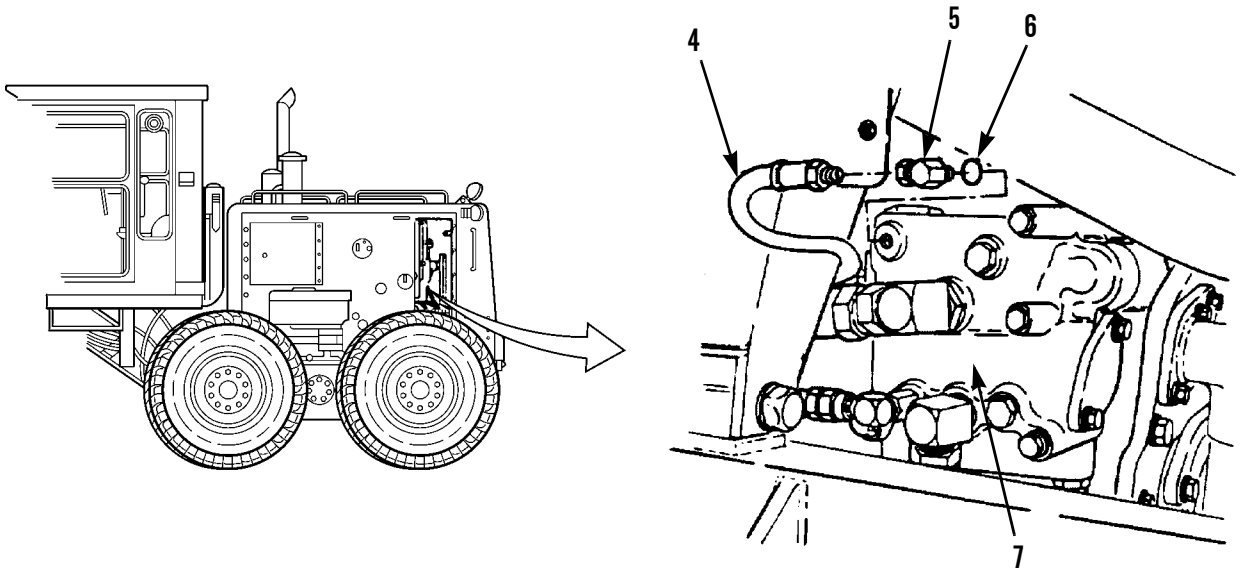
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

Tag hose assemblies before disconnecting to aid in installation.

2. Disconnect hose assembly (4) from transmission control relief valve (7).
3. Remove elbow (5) and preformed packing (6). Discard preformed packing.

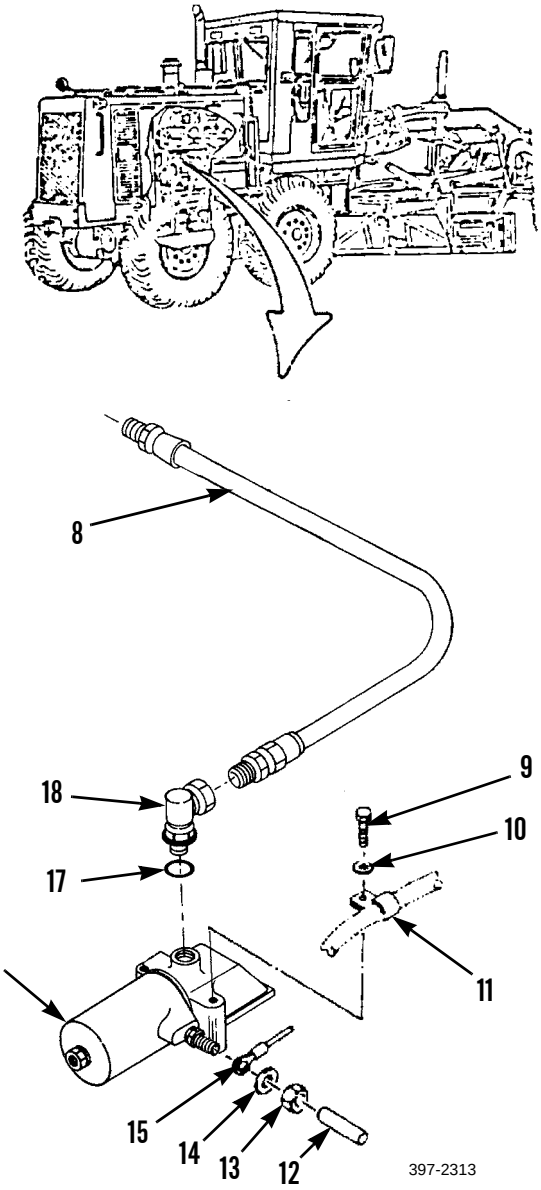


397-4133

DIFFERENTIAL LOCK CONTROL VALVE REPLACEMENT - CONTINUED 0306 00

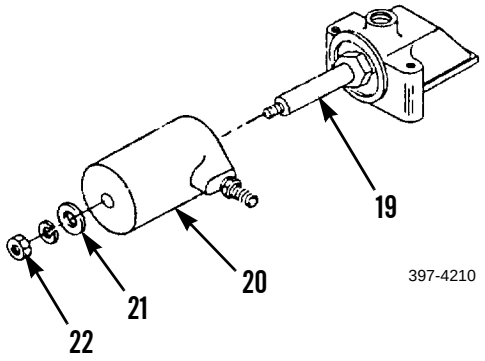
REMOVAL - CONTINUED

4. Remove hose assembly (8), elbow (18), and preformed packing (17). Discard preformed packing.
5. Remove cap (12), nut (13), and washer (14).
6. Disconnect wire assembly (15) from terminal.
7. Remove two bolts (9), washers (10), and clip (11).
8. Remove coil assembly (16).

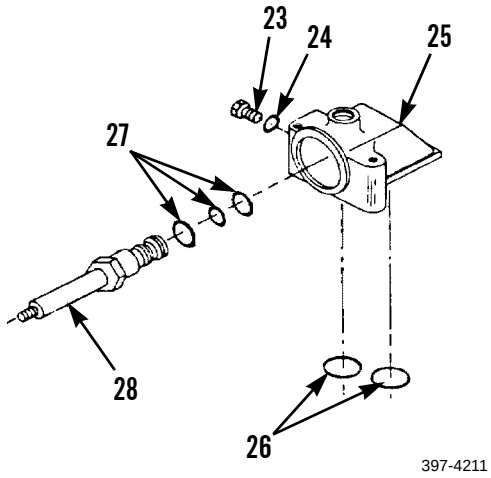


REMOVAL - CONTINUED

9. Remove locknut (22) and washers (21). Discard locknut.
10. Remove coil (20) from solenoid valve assembly (19).



11. Remove cartridge (28), seal kit (27), plug (23), preformed packing (24), and two preformed packings (26) from solenoid valve (25). Discard seal kit and preformed packing.



CLEANING AND INSPECTION

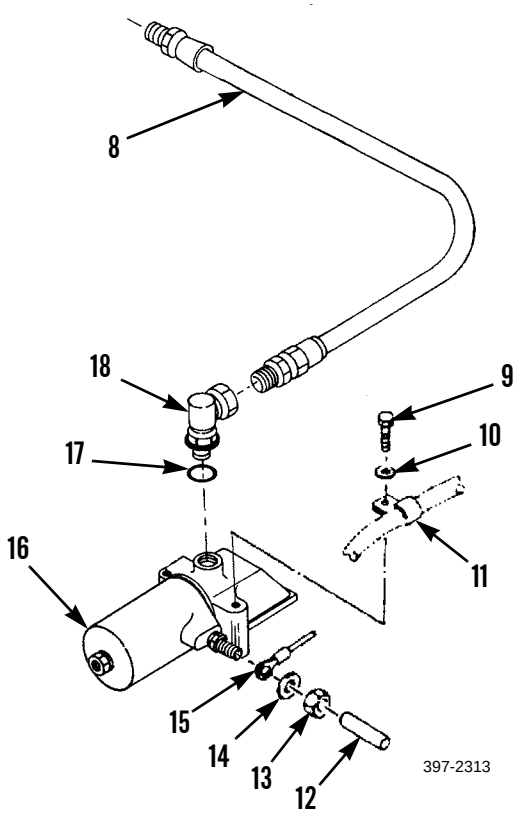
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

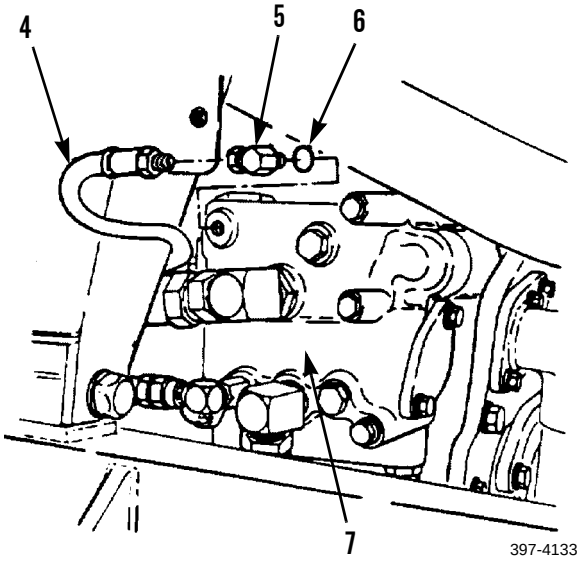
1. Install new preformed packings (24 and 26) and plug (23) in valve (25).
2. Install new seal kit (27) and cartridge (28).
3. Install coil (20), washer (21), and new locknut (22) on solenoid valve assembly (19).

INSTALLATION - CONTINUED

4. Position coil assembly (16).
5. Install clip (11), two washers (10), and bolts (9).
6. Connect wire assembly (15) to terminal.
7. Install washer (14), nut (13), and cap (12).
8. Install new preformed packing (17) and elbow (18).
9. Install hose assembly (8).

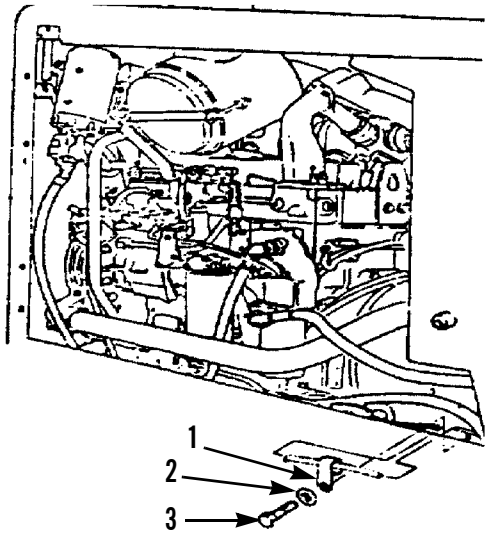


10. Install new preformed packing (6) and elbow (5) to transmission control relief valve (7).
11. Connect hose assembly (4).



INSTALLATION - CONTINUED

12. Install clip (1), washer (2), and bolt (3).
13. Install left side engine panel (WP 0182 00).
14. Turn battery disconnect switch to ON position and start engine (TM 5-3805-261-10).
15. Check for leaks.
16. Refill hydraulic tank if necessary (WP 0216 00).
17. Stop engine.



397-2311

END OF WORK PACKAGE

DRIVE AXLES REPLACEMENT 0307 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

3/8-16 forcing screw (2)

1/2-13 forged eyebolt

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Oil, lubricating (Item 26, 27, 28, 29, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Materials/Parts - Continued

Gasket

Lockwasher (8)

Packing, preformed

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

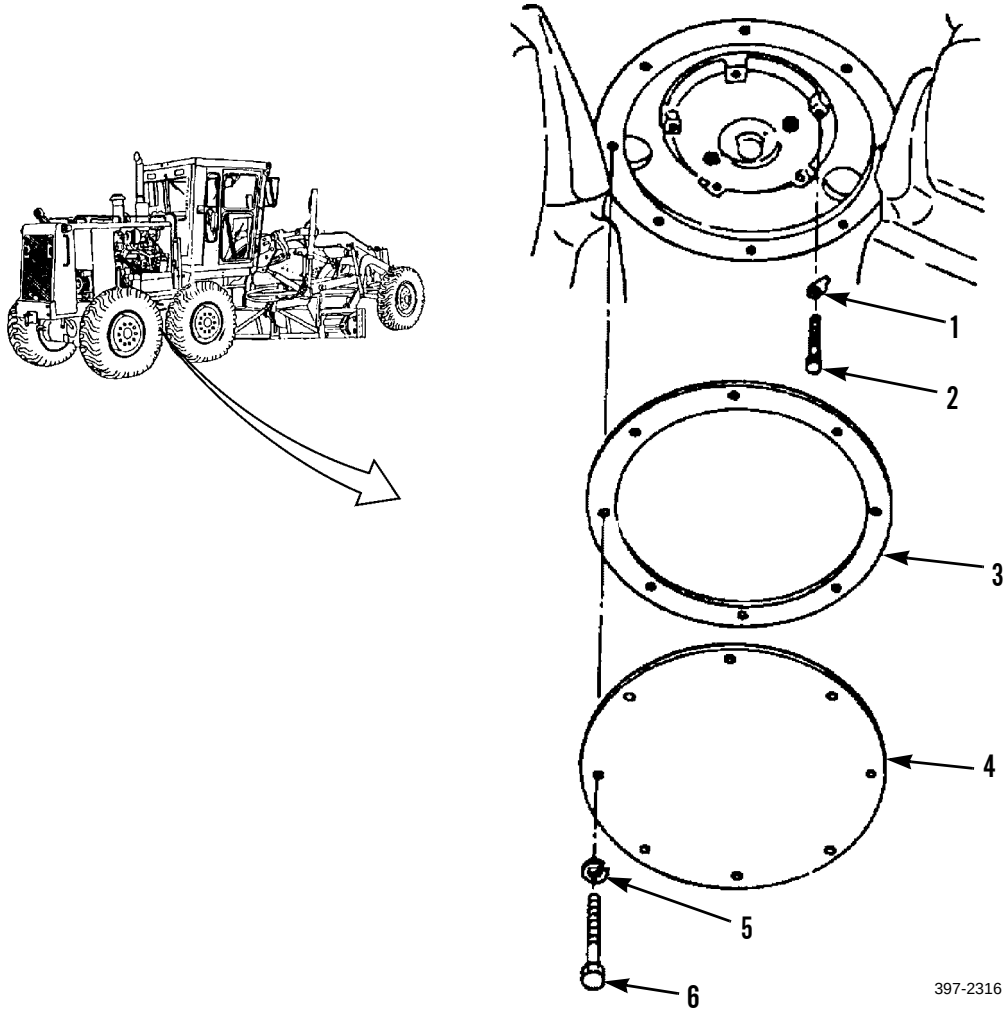
Tandem drive housing drained below drive axle level (TM 5-3805-261-10)

REMOVAL

NOTE

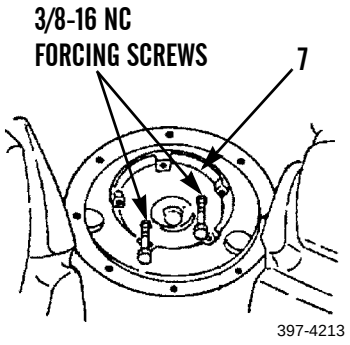
This procedure covers replacement of right side drive axle. Follow these instructions for left side drive axle.

1. Remove eight bolts (6), lockwashers (5), cover (4), and gasket (3). Discard gasket and lockwashers.
2. Bend tabs away from five locks (1) and bolts (2).
3. Remove five bolts (2) and locks (1).

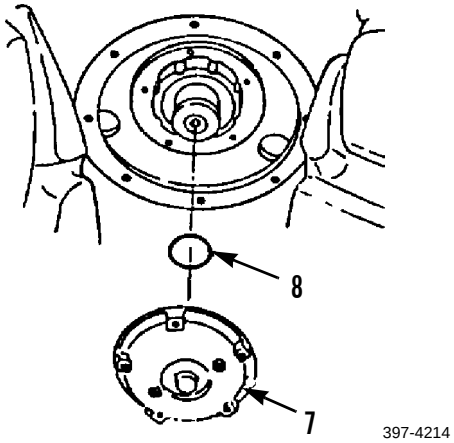


REMOVAL - CONTINUED

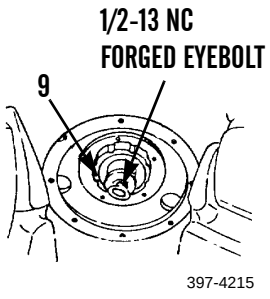
4. Install two 3/8-16 NC forcing screws to remove retainer (7).



5. Remove retainer (7).
6. Remove two 3/8-16 NC forcing screws.
7. Remove and discard preformed packing (8).

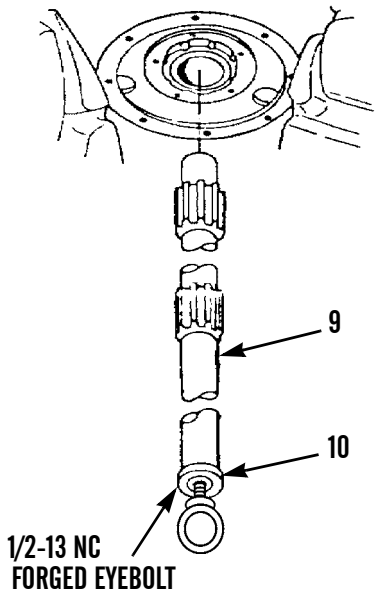


8. Install 1/2-13 NC forged eyebolt in end of shaft (9) to aid in removal.



REMOVAL - CONTINUED

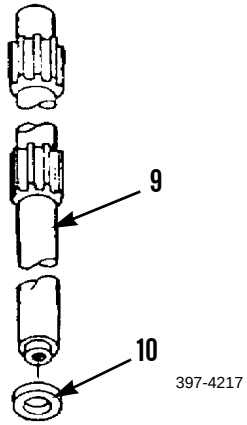
9. Remove shaft (9) and washer (10) as an assembly.
10. Remove 1/2-13 NC forged eyebolt.



NOTE

Removal of washer from shaft may cause destruction of washer. Remove washer only if inspection indicates replacement is necessary.

11. Inspect washer (10). Replace if cracked, broken, worn, grooved, or scored.
12. Remove washer (10), if necessary, from shaft (9).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

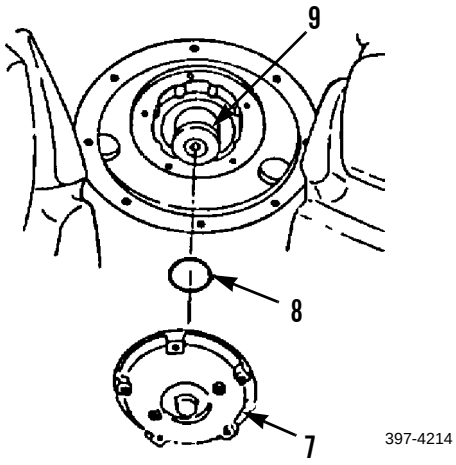
INSTALLATION

1. Install new washer (10), if removed.

NOTE

Align splines of shaft with splines in final drive and differential.

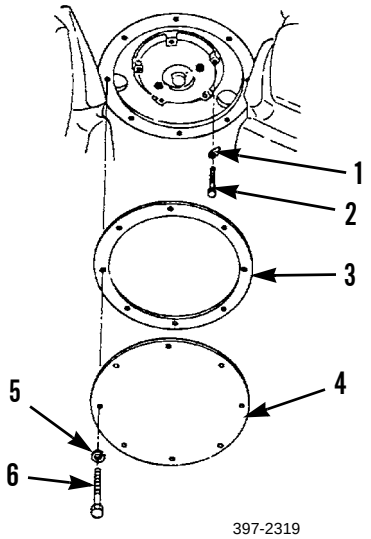
2. Install shaft (9).
3. Install new preformed packing (8) on groove of retainer (7).



NOTE

Lubricate outer diameter of new preformed packing with clean oil.

4. Position retainer (7) on shaft (9).
5. Install five locks (1) and bolts (2).
6. Bend tabs over five bolts (2) and locks (1).
7. Install new gasket (3) and cover (4).
8. Install eight lockwashers (5) and bolts (6).



9. Refill differential and tandem drive housing to proper level (TM 5-3805-261-10).

END OF WORK PACKAGE

DRIVE SPROCKETS REPLACEMENT 0308 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Socket, spanner (Item 79, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Tandem drive housing removed (WP 0310 00)

REMOVAL

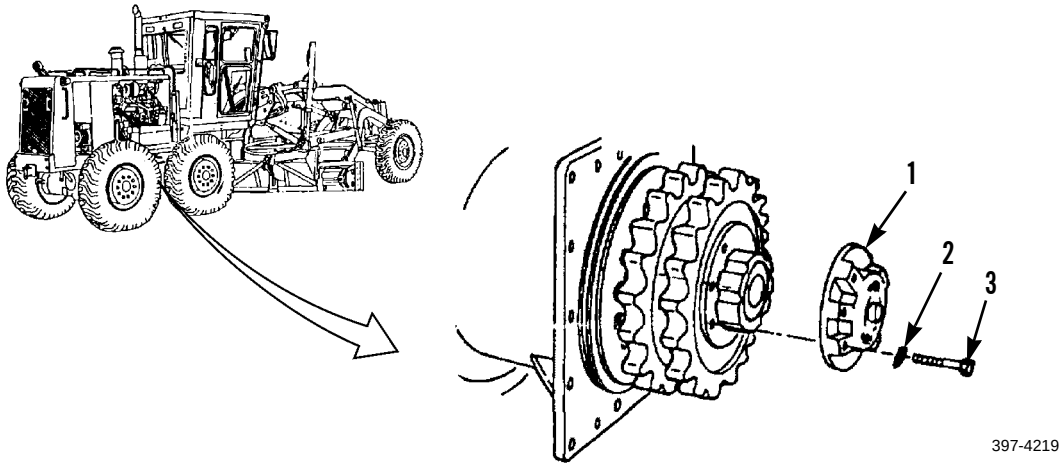
NOTE

This procedure covers replacement of right side drive sprockets. Follow these instructions for left side drive sprockets.

DRIVE SPROCKETS REPLACEMENT - CONTINUED 0308 00

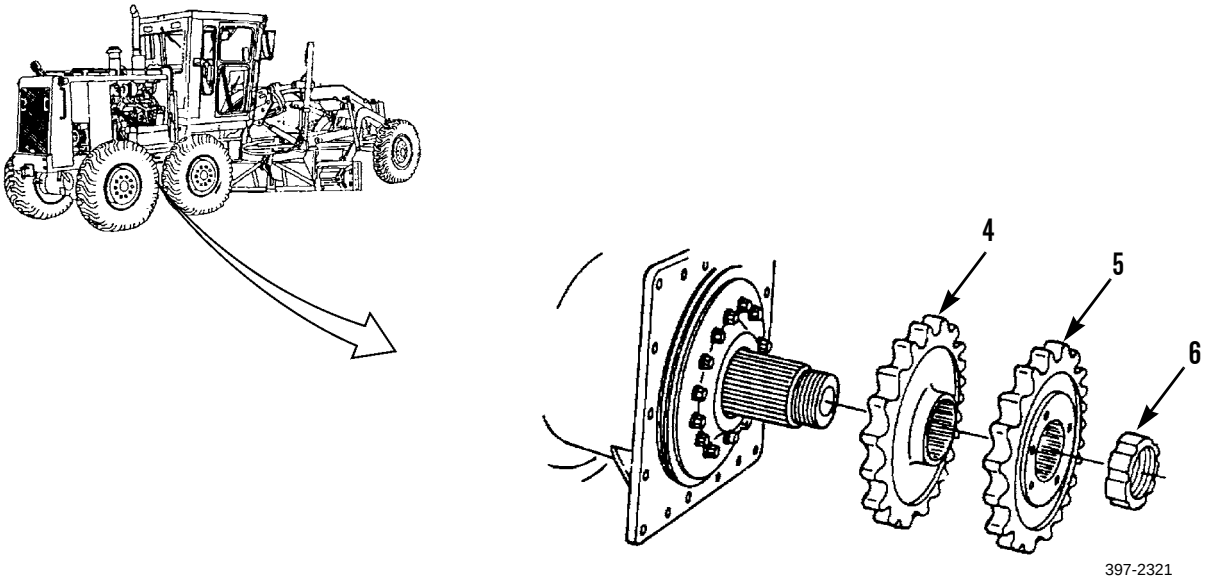
REMOVAL - CONTINUED

1. Remove five bolts (3), locks (2), and retainer (1).
2. Remove nut (6).
3. Remove two drive sprockets (4 and 5).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.



INSTALLATION

1. Install two drive sprockets (4 and 5) on driveshaft of machine. Install inner sprocket with hub away from final drives. Install outer sprocket with hub toward hub of inner sprocket.

CAUTION

The following procedure must be used to put the correct amount of preload on the final drive bearings.

2. Use spanner socket to install nut (6) and tighten to 100 lb-ft (136 Nm).
3. Turn sprockets (4 and 5) to seat bearings.
4. Use large punch and hammer to hit hub of sprockets (4 and 5). Repeat steps 2, 3, and 4 until nut (6) does not turn when tightened.
5. Loosen nut (6).
6. Tighten nut (6) to 50 lb-ft (68 Nm).
7. Position retainer (1) over nut (6).
8. Check alignment of mount bolt holes. Bolt holes of retainer must line up with bolt holes of sprockets.
9. Tighten nut (6), if necessary, until mounting bolts can be installed.
10. Install five locks (2) and bolts (3).
11. Install tandem drive housing (WP 0310 00).

END OF WORK PACKAGE

FINAL DRIVE ASSEMBLY REPLACEMENT 0309 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, contact truck (Item 77, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, mechanical puller (Item 2, WP 0348 00)

Bracket, link (3) (Item 17, WP 0348 00)

Jack, hydraulic (Item 37, WP 0348 00)

Leg, puller (Item 41, WP 0348 00)

Pin (Item 51, WP 0348 00)

Puller attachment, bearing (Item 55, WP 0348 00)

Puller attachment, cup (Item 56, WP 0348 00)

Puller, mechanical (Item 62, WP 0348 00)

Ratchet assembly (Item 66, WP 0348 00)

Saddle (Item 70, WP 0348 00)

Sling (Item 78, WP 0348 00)

Socket, spanner (Item 79, WP 0348 00)

Stand assembly (Item 83, WP 0348 00)

Tool, special (Item 90, WP 0348 00)

Wrench, ratchet (Item 93, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

3/4-10NC forcing screw

Lifting device, 500-lb capacity

Forklift

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Oil, lubricating (Item 26, 27, 28, 29, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Wire, non-electrical (Item 46, WP 0349 00)

Cup (2)

Packing, preformed (2)

Ring, retaining

Seal

Washer, thrust (8)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

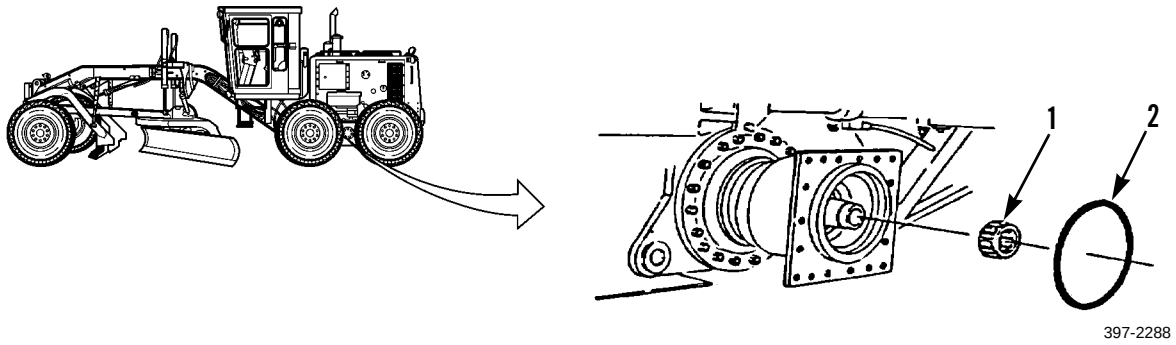
Drive sprockets removed (WP 0308 00)

REMOVAL

NOTE

The following procedure covers replacement of left final drive. Follow these procedures for right final drive.

1. Remove preformed packing (2) and roller bearing (1). Discard preformed packing.



NOTE

Tie shim(s) together and tag for identification.

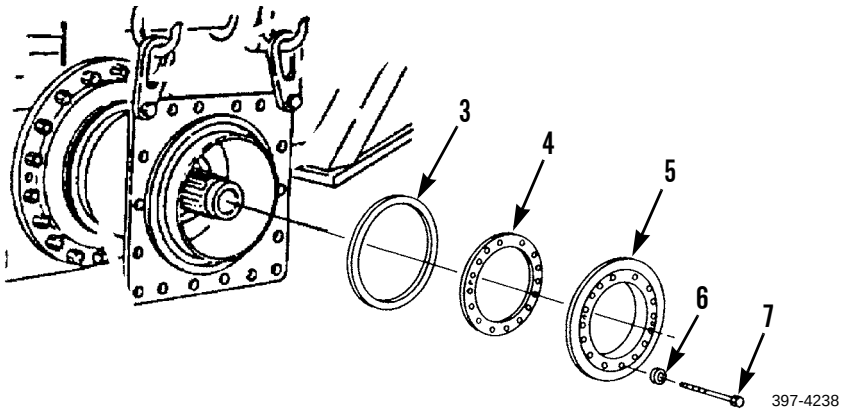
2. Remove 16 bolts (7), washers (6), retainer (5), shim(s) (4), and thrust washer (3). Discard thrust washer.

WARNING

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

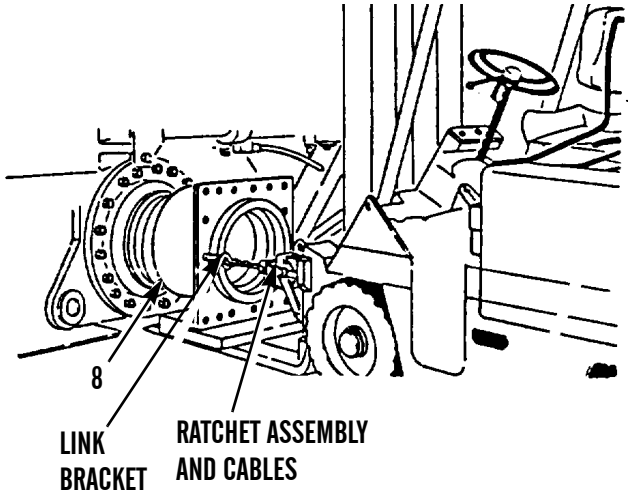
NOTE

Tandem housing weighs 2,300 lb (1,043 kg).

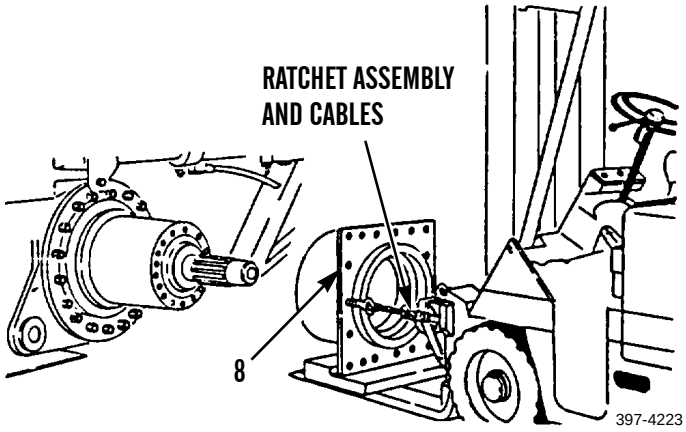


REMOVAL - CONTINUED

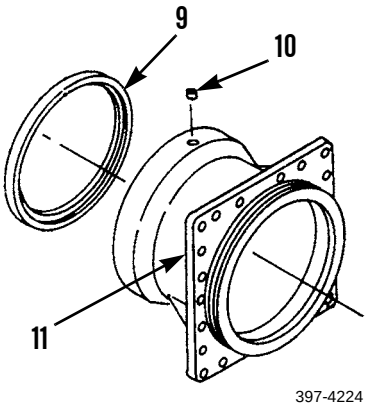
3. Support tandem housing (8) and install two link brackets. Position forklift under tandem housing. Secure ratchet assembly to forklift and secure cables to link brackets.



4. Use ratchet assembly and cables to remove tandem housing (8) from machine.

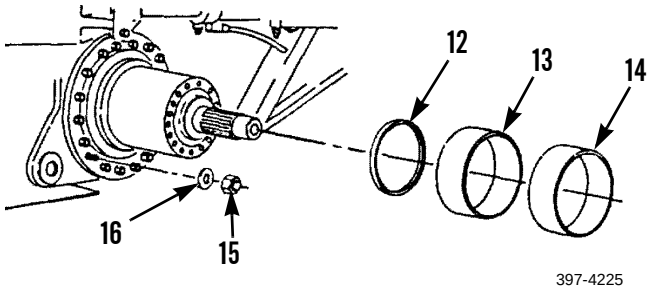


5. Remove plug (10) and seal (9) from outer housing (11). Discard seal.



REMOVAL - CONTINUED

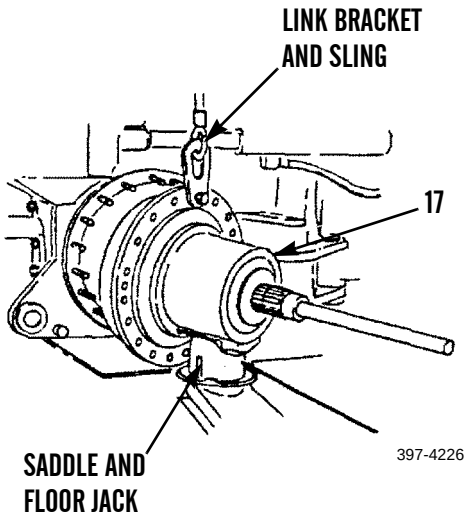
6. Remove rings (13 and 14) and thrust washer (12). Discard thrust washer.
7. Remove 19 nuts (15) and washers (16).



CAUTION

Use rags between saddle and hydraulic jack and planet carrier assembly to prevent damage to housing.

8. Use saddle and hydraulic jack to support planet carrier assembly (17).



WARNING

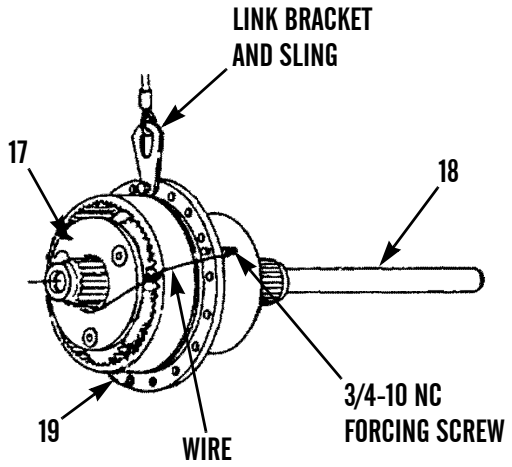
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury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

NOTE

- Final drive housing weighs 360 lb (163 kg).
- Ensure planet carrier assembly is held in place during removal.

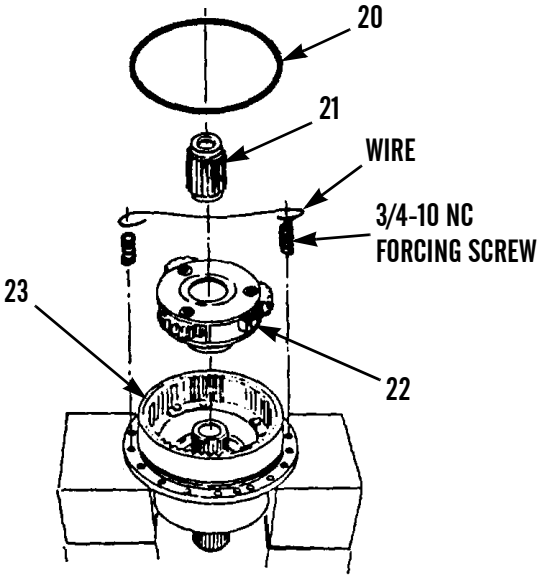
REMOVAL - CONTINUED

9. Install two 3/4-10NC forcing screws in housing (19). Tighten each forcing screw a small amount at a time, alternating between screws, until housing has been moved far enough out on the studs to install a link bracket sling on housing. Put axleshaft (18) in position in housing to keep planet carrier assembly (17) in balance. Use link bracket sling to carefully remove planet carrier assembly from machine.
10. Install wire from forcing screws behind housing assembly (19) across planet carrier assembly (17) to keep inner components from falling.



397-4227

11. Position housing (23) on blocks with planet carrier (22) facing up. Remove wire and forcing screws from housing.
12. Remove preformed packing (20) and gear (21). Discard preformed packing.



397-4228

REMOVAL - CONTINUED

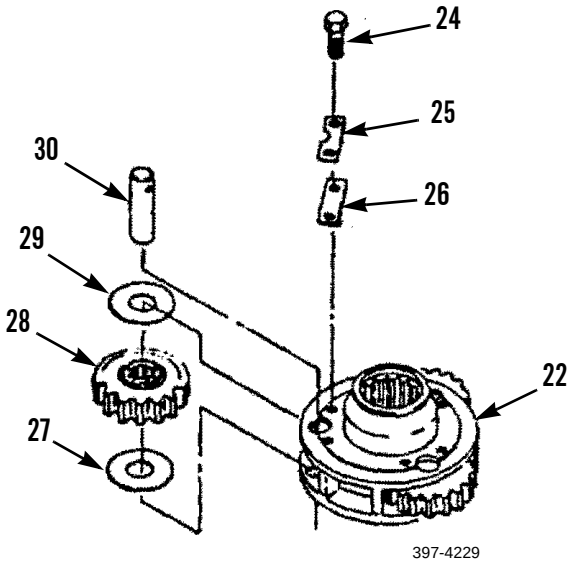
WARNING

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

NOTE

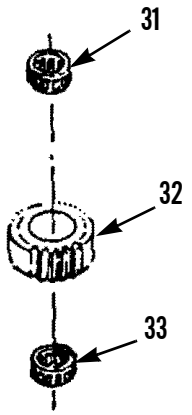
Planet carrier weighs 90 lb (41 kg).

13. With assistance, use pry bars to carefully remove planet carrier (22) turning over and placing on flat surface.
14. Remove six bolts (24), three locks (25), retainers (26), and shafts (30) from planet carrier (22).
15. Remove six thrust washers (27 and 29) and three spur gear assemblies (28). Discard thrust washers.



397-4229

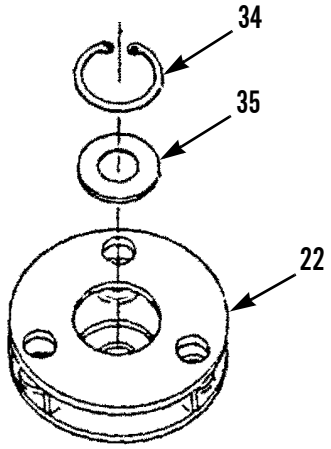
16. Remove two roller bearings (31 and 33) from gears (32).



397-4230

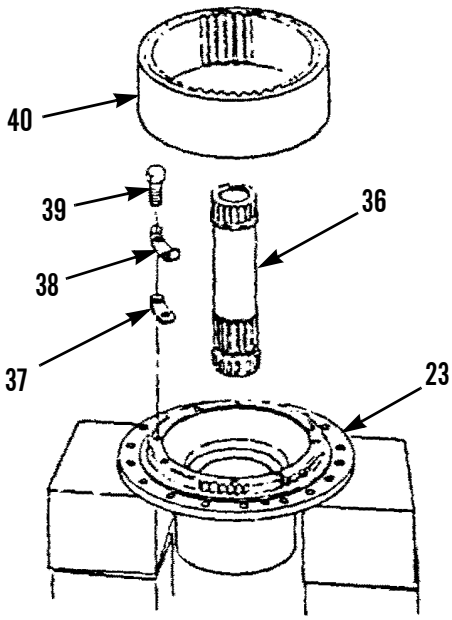
REMOVAL - CONTINUED

17. Remove retaining ring (34) and washer (35) from planet carrier (22). Discard retaining ring.



397-4231

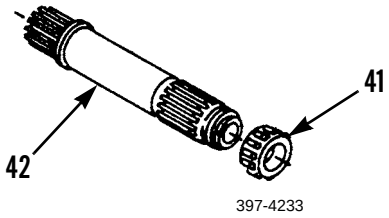
18. Remove eight bolts (39), four locks (38), and plates (37) from housing (23).
19. Remove gear (40).
20. Remove spur gearshaft assembly (36).



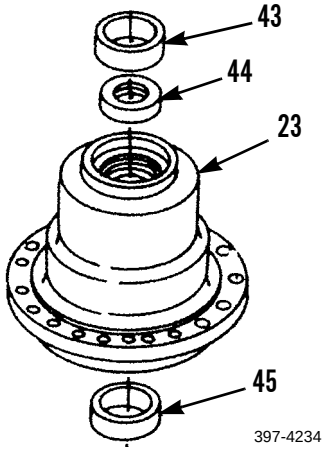
397-4232

REMOVAL - CONTINUED

21. Remove roller bearing (41) from shaft (42).



22. Remove and discard cup (43) and seal (44) from housing (23).
23. Remove and discard cup (45).

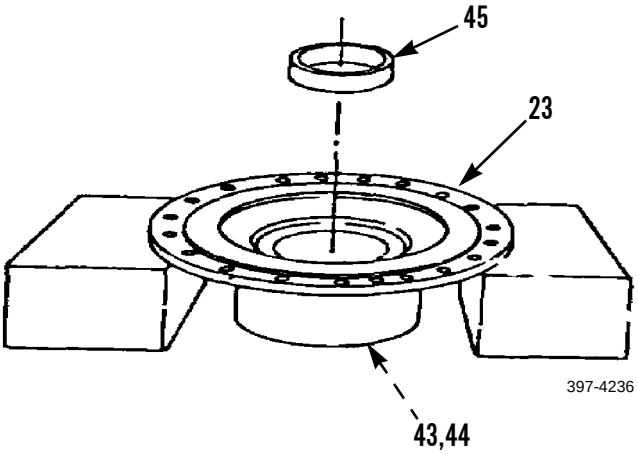


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

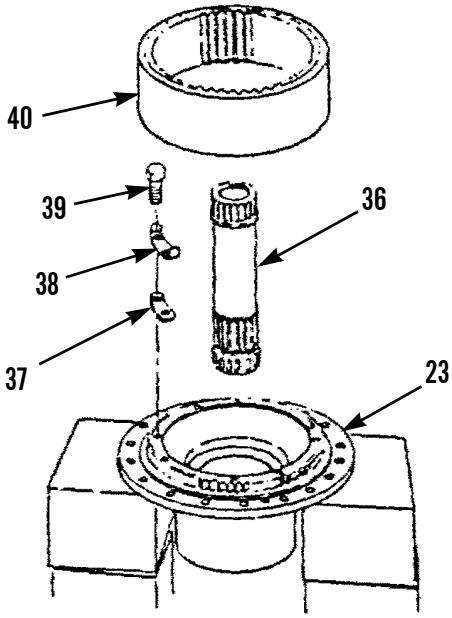
1. Lower temperature of new cup (45) and install in housing (23).
2. Lubricate new seal (44) with oil and install with lip of new seal toward new cup (43).
3. Turn housing (23) over with new cup (43) and new seal (44) installed.
4. Lower temperature of new cup (43) and install.



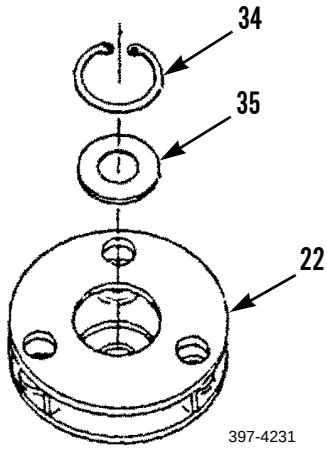
5. Heat roller bearing (41) and install on shaft (42).

INSTALLATION - CONTINUED

6. Install spur gearshaft assembly (36) in housing (23).
7. Install gear (40).
8. Install four plates (37), locks (38), and eight bolts (39).

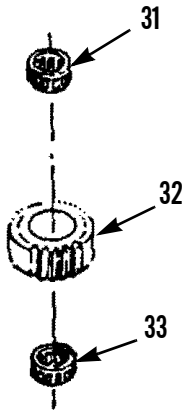


9. Install washer (35) and new retaining ring (34) on planet carrier (22).



INSTALLATION - CONTINUED

10. Install two roller bearings (31 and 33) in gears (32).



397-4230

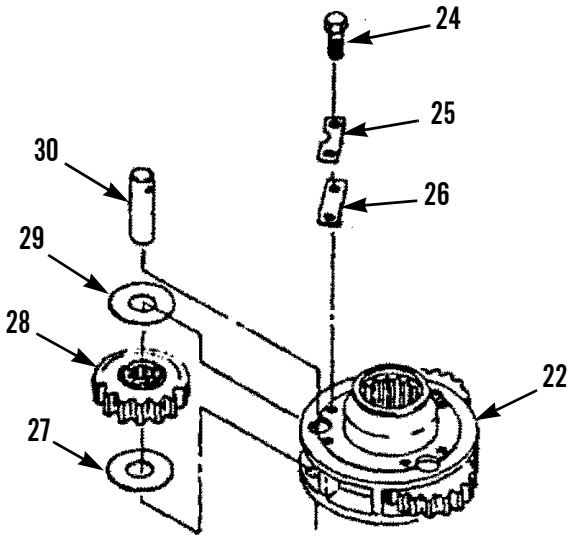
WARNING

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

NOTE

Planet carrier weighs 90 lb (41 kg).

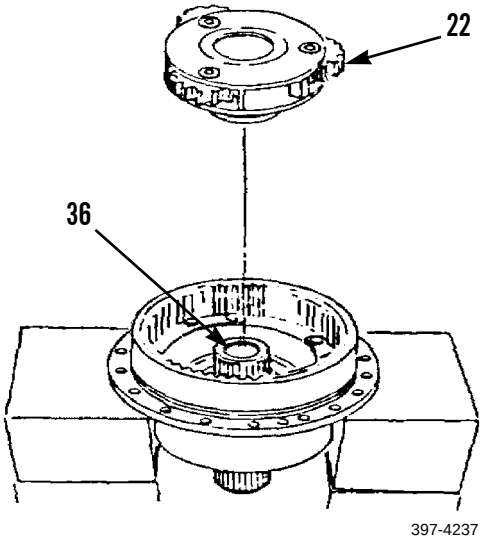
11. With assistance, turn over planet carrier (22) and install three spur gear assemblies (28), six new thrust washers (27 and 29), three shafts (30), retainers (26), locks (25), and six bolts (24) on planet carrier (22).



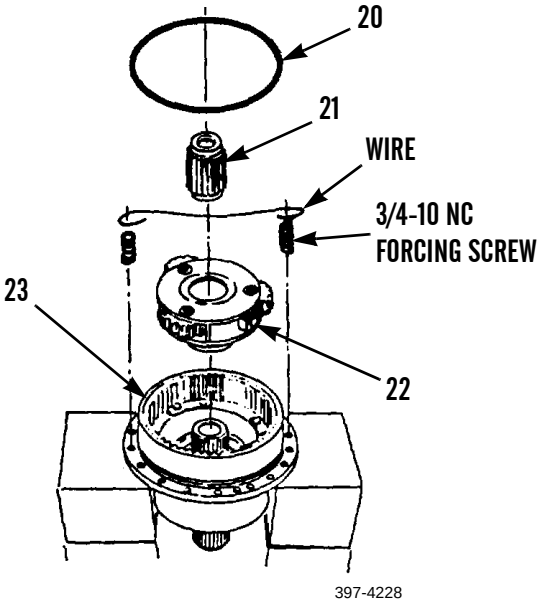
397-4229

INSTALLATION - CONTINUED

12. Turn over planet carrier (22) and install over shaft (36).



13. Install gear (21) and new preformed packing (20).
14. Install two 3/4-10NC forcing screws in housing (23). Attach wire to forcing screws behind housing across planet carrier (22) to keep planet carrier from falling when seal (20) and gear (21) are positioned on machine.



INSTALLATION - CONTINUED

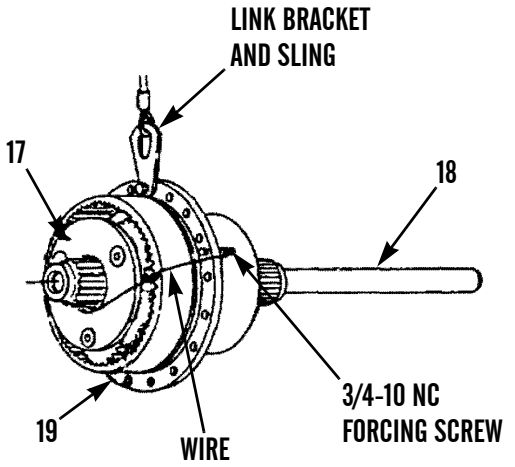
WARNING

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

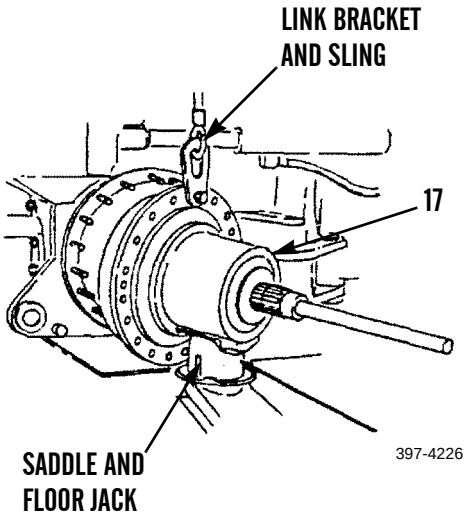
NOTE

Final drive housing weighs 360 lb (163 kg).

15. Attach link bracket and sling to planet carrier assembly (17) and position on saddle and floor jack. Put axleshaft (18) in position in housing (19) to keep planet carrier assembly in balance.
16. Move planet carrier assembly (17) to bottom-rear-left of machine.
17. Remove wire and two 3/4-10NC forcing screws.

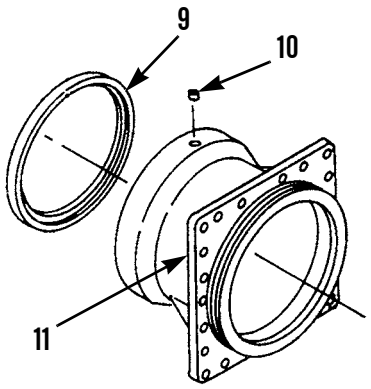


18. Position planet carrier assembly (17) on studs of machine.

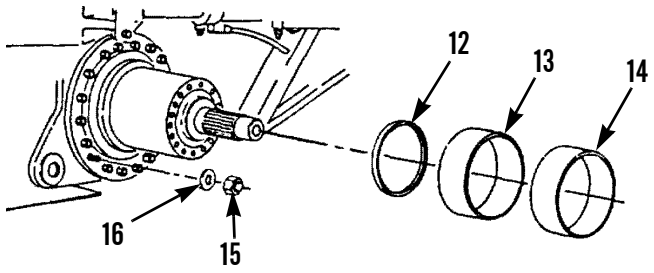


INSTALLATION - CONTINUED

19. Remove sling and link bracket and install 19 washers (16) and nuts (15). Tighten nuts to 285 to 315 lb-ft (386 to 427 Nm).
20. Apply grease to new thrust washer (12) and install.
21. Lubricate rings (13 and 14) with clean oil and install rings.
22. Apply oil to new seal (9) and install seal and plug (10) in housing (11).



397-4224



397-4225

INSTALLATION - CONTINUED

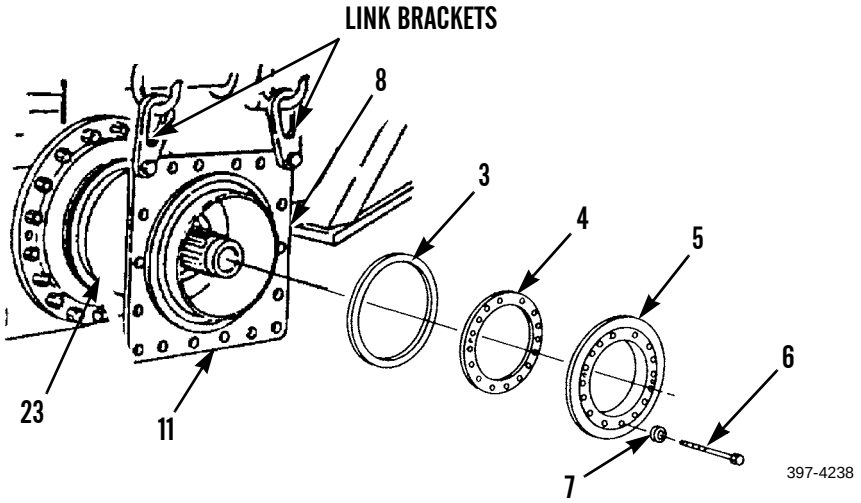
WARNING

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

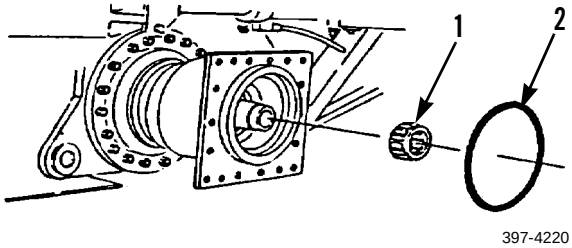
NOTE

Tandem housing weighs 2,300 lb (1,043 kg).

23. Install two link brackets in tandem housing (8).
24. Use sling to position tandem housing (8) on bottom-rear-left of machine.
25. Install new thrust washer (3), shim(s) (4), retainer (5), 16 washers (7), and bolts (6).
26. Apply grease to new thrust washer (3) after installation. Adjust shim(s) (4) to provide 0.0 to 0.0025 in (0.0 to 0.064 mm) end play between inner housing (23) and outer housing (11). Tighten 16 bolts (6) to 260 to 280 lb-ft (353 to 380 Nm).
27. Remove link brackets.



28. Install roller bearing (1) and new preformed packing (2).



29. Install drive sprockets (WP 0308 00).

END OF WORK PACKAGE

TANDEM DRIVE HOUSING ASSEMBLY MAINTENANCE 0310 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Ratchet assembly (Item 66, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Lifting device, 1,500-lb capacity

Materials/Parts

Adhesive (Item 4, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Rear wheels removed (WP 0167 00)

Right service brakes removed (WP 0313 00)

Air brake lines removed (WP 0161 00)

Tandem drive housing drained (WP 0023 00)

REMOVAL

WARNING

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

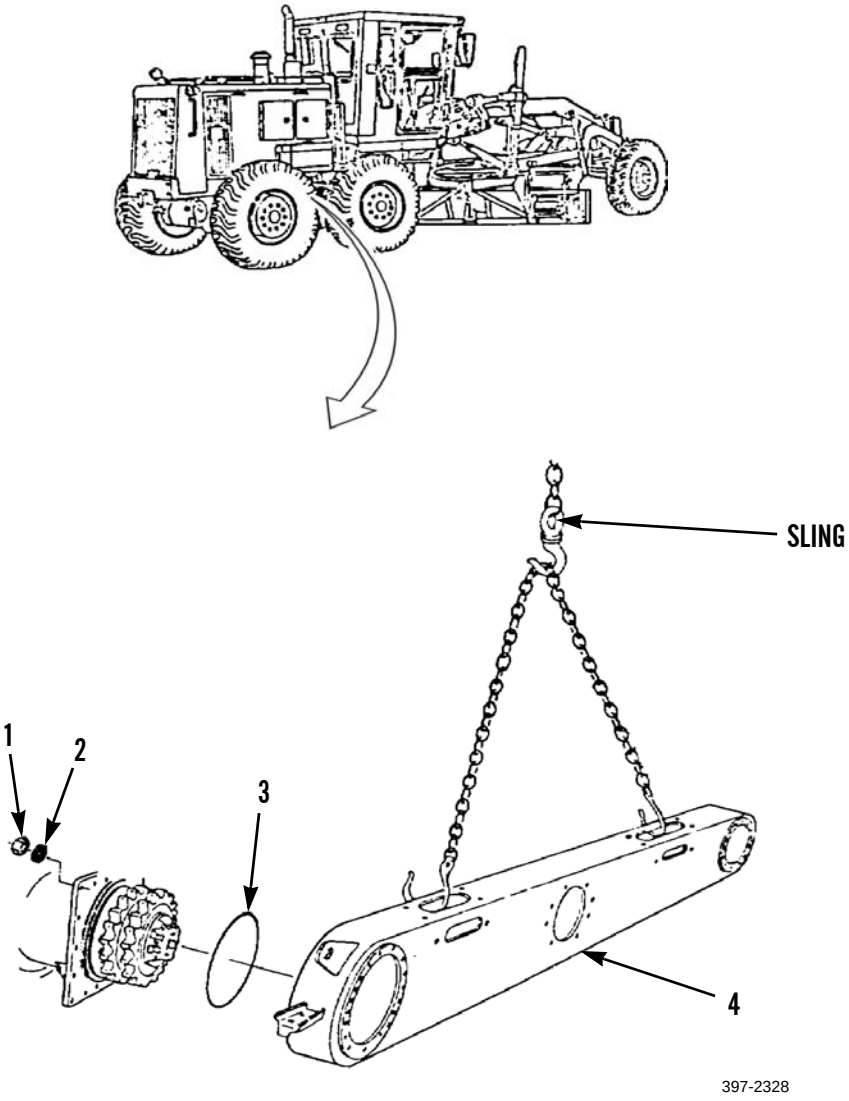
NOTE

- Tandem drive housing weighs 1,310 lb (594 kg).
- This procedure covers maintenance of the right side tandem drive housing. Follow these instructions for the left side tandem drive housing.

TANDEM DRIVE HOUSING ASSEMBLY MAINTENANCE - CONTINUED 0310 00

REMOVAL - CONTINUED

1. Attach sling and ratchet assembly to tandem drive housing assembly (4).
2. Remove 18 nuts (1), washers (2), and tandem drive housing assembly (4).
3. Remove and discard preformed packing (3).

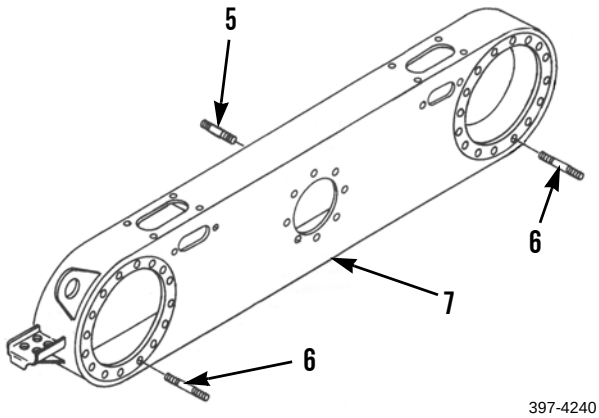


DISASSEMBLY

NOTE

Note and mark location of four longer studs to aid in installation.

1. Remove 24 studs (6) from outside of tandem housing (7).
2. Remove 15 studs (5) from inside of tandem housing (7).



397-4240

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Apply adhesive to 15 studs (5) on inside of tandem housing (7) and install.
2. Apply adhesive to 24 studs (6) on outside of tandem housing (7) and install.

INSTALLATION

1. Install new preformed packing (3).
2. Use sling and ratchet assembly to position tandem drive housing assembly (4).
3. Install 18 washers (2) and nuts (1). Tighten nuts to 175 to 195 lb-ft (237 to 264 Nm).
4. Install air brake lines (WP 0161 00).
5. Install right service brakes (WP 0313 00).
6. Install rear wheels (WP 0167 00).
7. Fill tandem drive housing (WP 0023 00).

END OF WORK PACKAGE

TANDEM DRIVE CHAIN ASSEMBLY REPLACEMENT 0311 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Leg (2) (Item 38, WP 0348 00)

Puller attachment, cup (Item 56, WP 0348 00)

Ratchet assembly (Item 66, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Gasket (3)

Pin, cotter (2)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Rear wheels removed (WP 0167 00)

Drive axles removed (WP 0307 00)

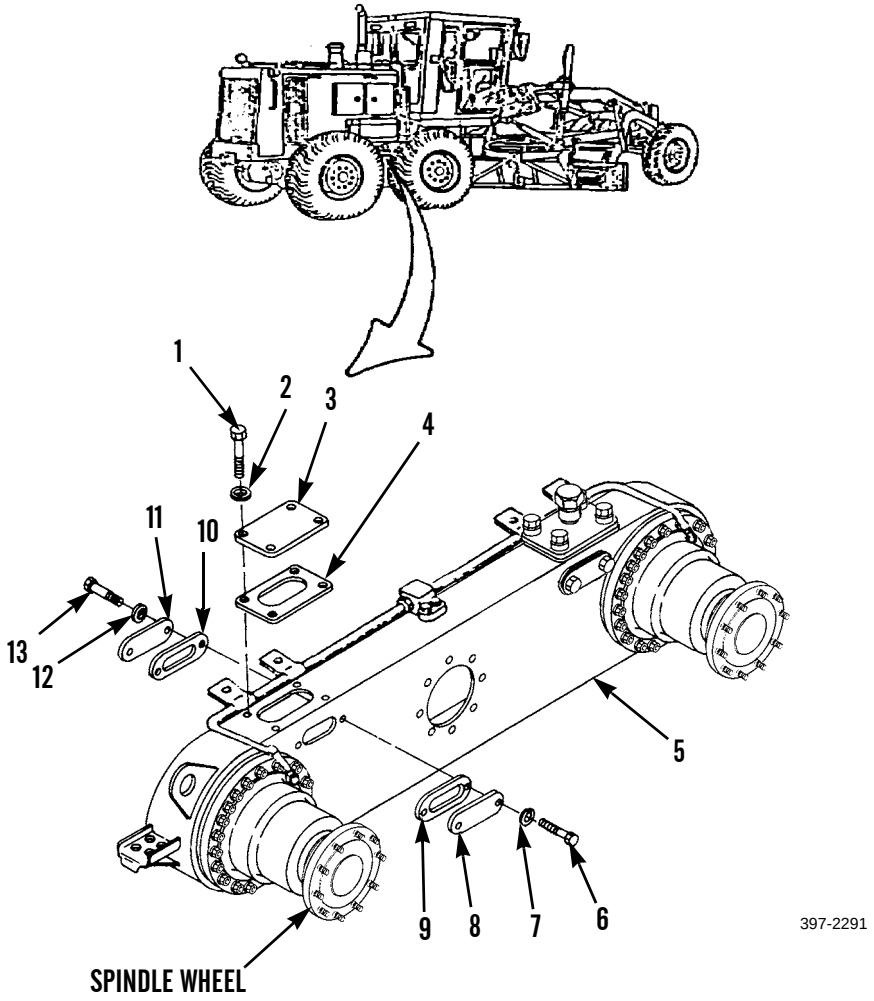
TANDEM DRIVE CHAIN ASSEMBLY REPLACEMENT - CONTINUED **0311 00**

REMOVAL

NOTE

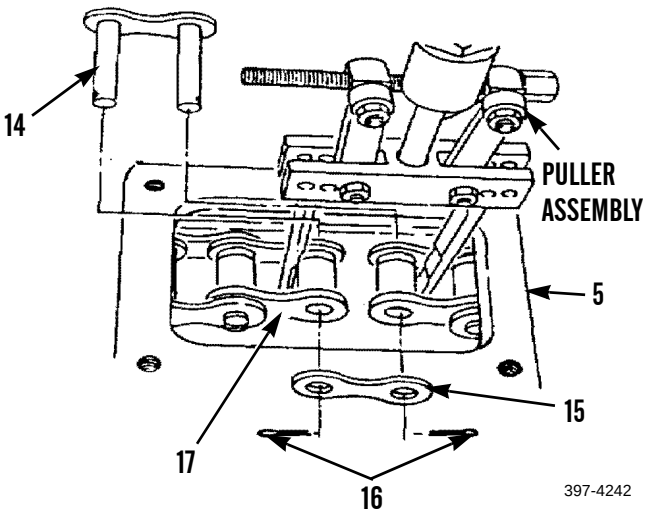
This procedure covers replacement of one of the right side tandem drive chain assemblies. Follow these instructions for left side drive chain assemblies.

1. Remove four bolts (1), washers (2), cover (3), and gasket (4) from top of tandem housing (5) on right axle, rear frame. Discard gasket.
2. Remove two bolts (6), washers (7), cover (8), and gasket (9) from outer side of tandem housing (5). Discard gasket.
3. Remove two bolts (13), washers (12), cover (11), and gasket (10) from inner side of tandem housing (5). Discard gasket.



REMOVAL - CONTINUED

4. Turn spindle wheel until master link of chain assembly appears.
5. Remove and discard two cotter pins (16).
6. Use puller attachment and two legs to remove bar (15).
7. Use puller attachment and two legs to remove link (14).
8. Turn wheel spindle to left while pulling chain (17) out of tandem housing (5).



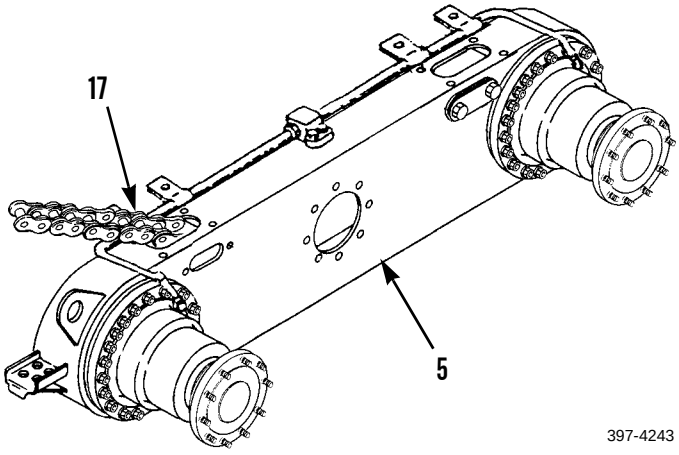
WARNING

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

NOTE

Drive chain weighs 50 lb (23 kg).

9. Remove chain (17) from tandem drive housing (5).



CLEANING AND INSPECTION

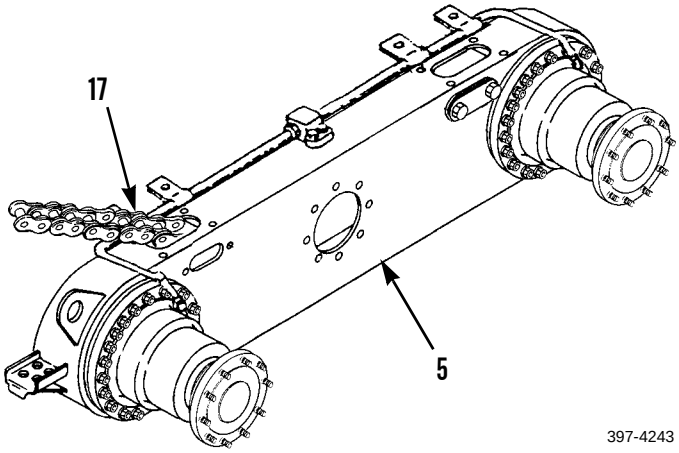
1. Inspect chain for wear and elongation. Measure 12 links at 610 lb (277 kg) of tension. Maximum elongation of chain is 24.72 in (62.9 cm).
2. Clean and inspect all other parts in accordance with WP 0020 00.

INSTALLATION

NOTE

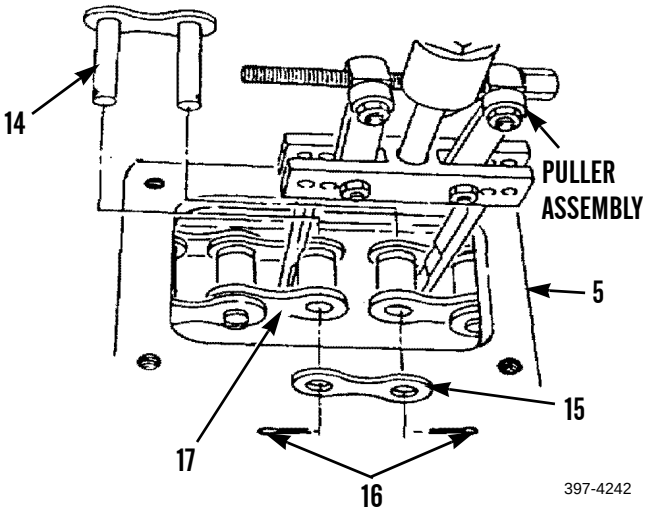
Master link should be installed with the bar (15) toward the other chain. Ensure the master links of the two chains are not side by side on the same tooth of the drive sprocket.

1. Position chain (17) with ends of the chain at the openings of tandem drive housing (5).
2. Install ratchet assembly on chain (17).



397-4243

3. Install puller attachment and two legs on chain (17).
4. Install link (14) in ends of chain (17).
5. Remove ratchet assembly from chain (17).
6. Install bar (15) on link (14).
7. Remove puller attachment and two legs from chain (17).
8. Install two new cotter pins (16) in link (14).

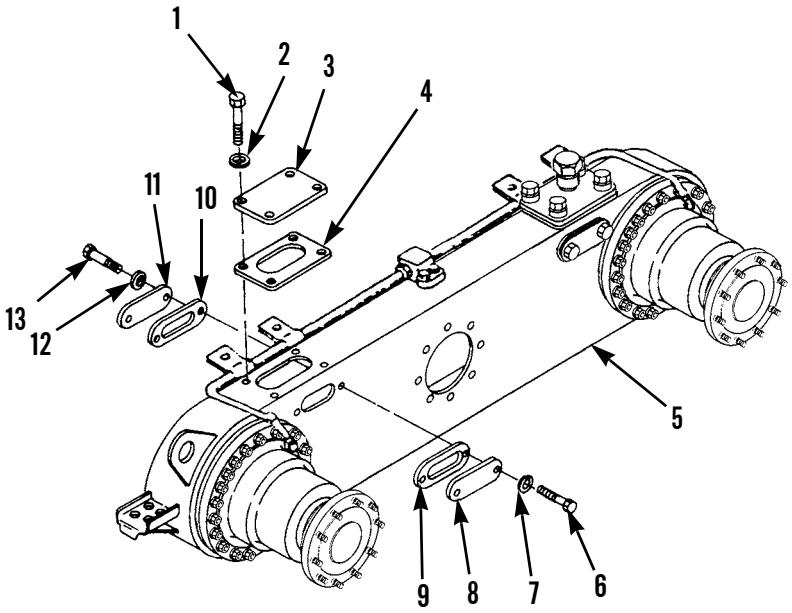


397-4242

TANDEM DRIVE CHAIN ASSEMBLY REPLACEMENT - CONTINUED **0311 00**

INSTALLATION - CONTINUED

9. Install new gasket (10), cover (11), two washers (12), and bolts (13) on inner side of tandem housing (5).
10. Install new gasket (9), cover (8), two washers (7), and bolts (6) on outer side of tandem housing (5).
11. Install new gasket (4), cover (3), four washers (2), and bolts (1) on top of tandem housing (5).



12. Install drive axles (WP 0307 00).
13. Install rear wheels (WP 0167 00).

END OF WORK PACKAGE

PARKING BRAKE ACTUATOR AND RELEASE VALVE REPAIR 0312 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Puller attachment (Item 55, WP 0348 00)

Puller, mechanical (Item 63, WP 0348 00)

Spacer puller screw (Item 81, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed seal (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

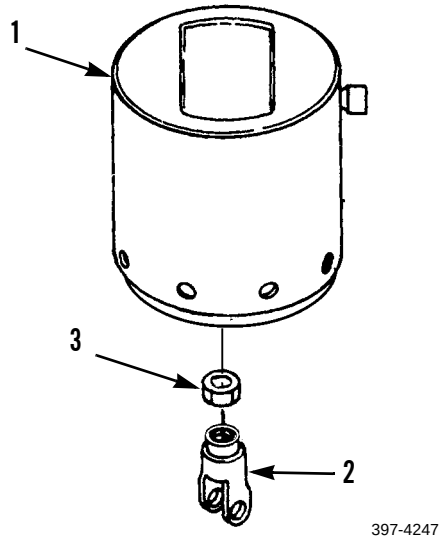
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Parking brake actuator and release valve removed (WP 0157 00)

DISASSEMBLY

1. Loosen nut (3).
2. Remove rod end (2) from air brake chamber assembly (1).
3. Remove nut (3).

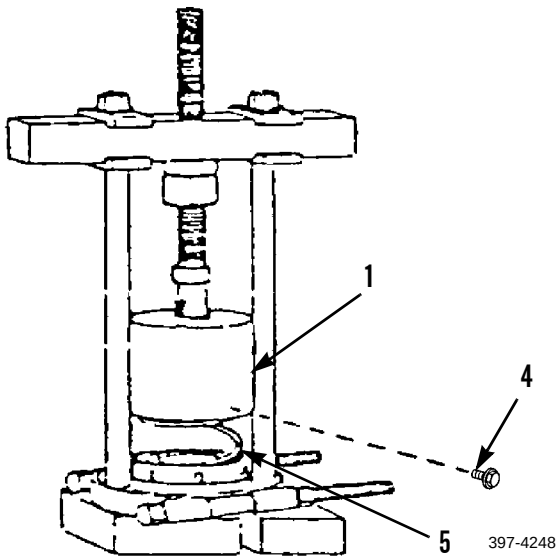


4. Install puller assembly, bearing puller attachment, and spacer on air brake chamber assembly (1).
5. Remove eight bolts (4).

WARNING

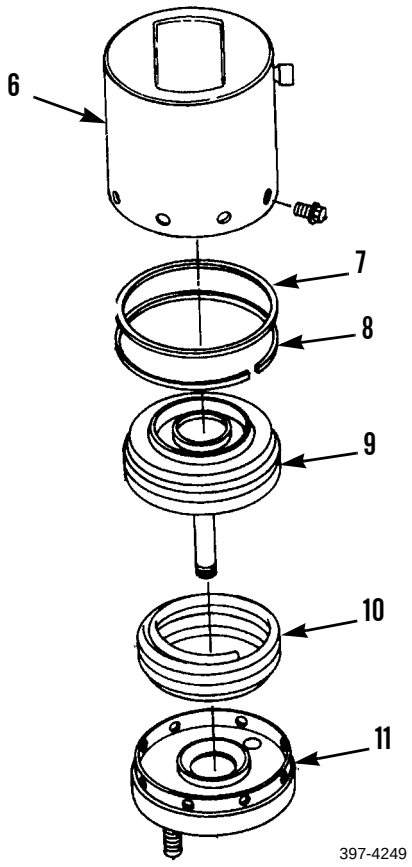
Use caution when removing parts under spring tension. Wear safety glasses. Uncontrolled release of spring may cause injury to personnel.

6. Slowly release tension on spring (5) with tooling.
7. Remove puller assembly, bearing puller attachment, and spacer.

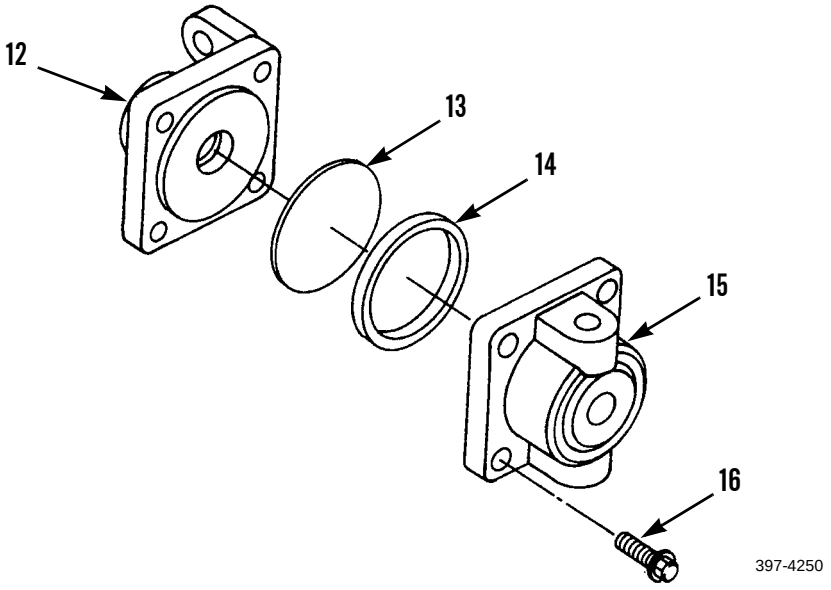


DISASSEMBLY- CONTINUED

8. Remove cover (11) and spring (10) from housing assembly (6).
9. Remove preformed packing (8) and seal (7) from piston (9). Discard preformed packing and seal.



10. Remove four screws (16), cover (15), seal (14), and diaphragm (13) from body (12). Discard seal.

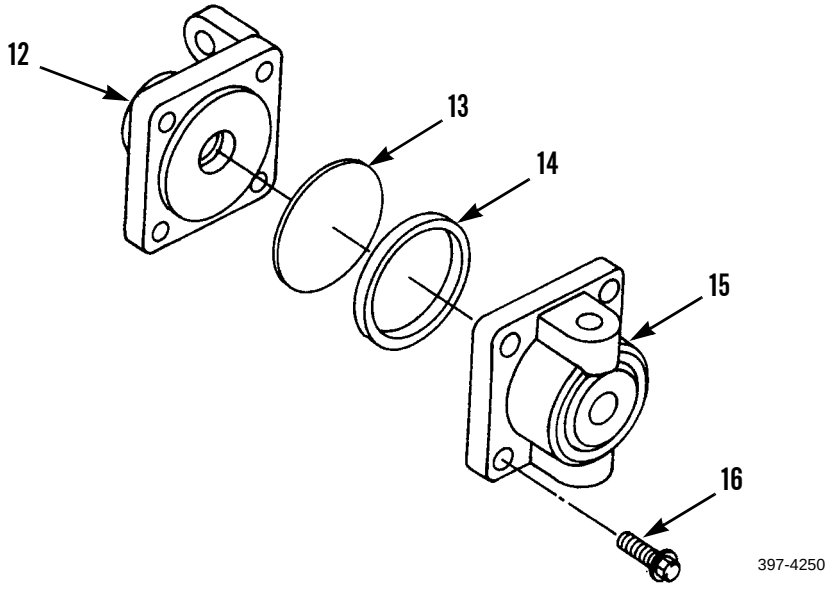


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

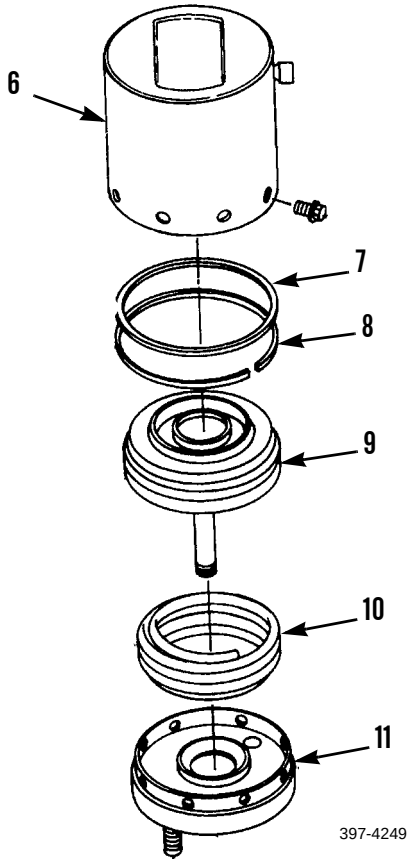
ASSEMBLY

1. Install diaphragm (13) and new seal (14) on body (12).
2. Position cover (15) on body (12).
3. Install four screws (16) on cover (15).

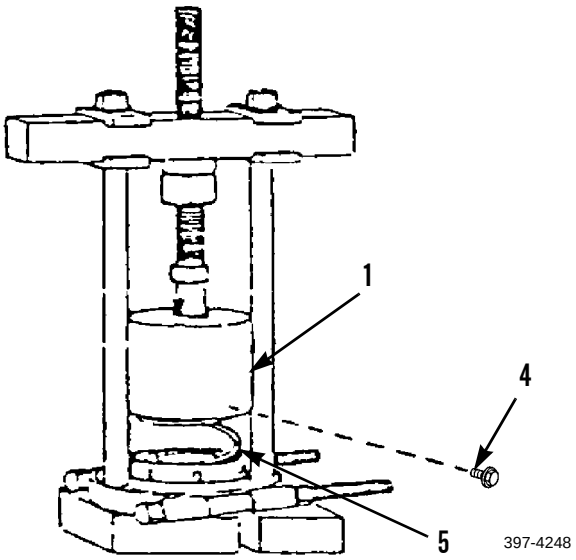


ASSEMBLY - CONTINUED

4. Install new seal (7) and new preformed packing (8) on piston (9).
5. Install housing assembly (6).
6. Install spring (10) and cover (11) on housing assembly (6).

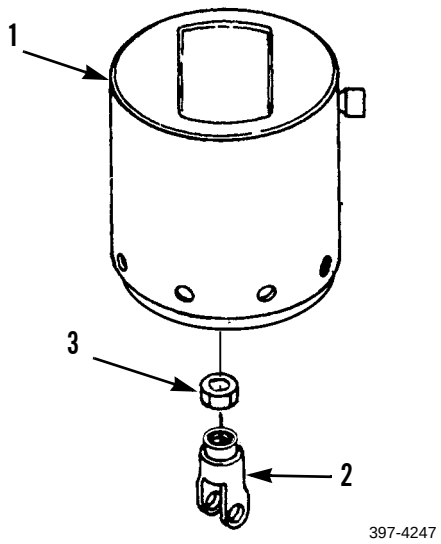


7. Install puller assembly, bearing puller attachment, and spacer on air brake chamber assembly (1).
8. Push spring (5) into air brake chamber assembly (1) with tooling.
9. Install eight bolts (4).
10. Remove puller assembly, bearing puller attachment, and spacer.



ASSEMBLY - CONTINUED

11. Loosely install nut (3).
12. Install rod end (2) to air brake chamber assembly (1).
13. Tighten nut (3).
14. Install parking brake actuator and release valve (WP 0157 00).



END OF WORK PACKAGE

SERVICE BRAKES MAINTENANCE 0313 00

THIS WORK PACKAGE COVERS

Disassembly, Cleaning and Inspection, Assembly, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Bracket, link (2) (Item 17, WP 0348 00)

Installer, seal (Item 33, WP 0348 00)

Puller attachment, bearing (Item 55, WP 0348 00)

Puller attachment, cup (Item 56, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Lifting device, 150-lb capacity

Wood blocks

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Oil, lubricating (Item 29, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Materials/Parts - Continued

Lockwasher (4)

Seal (4)

Seal assembly (2)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

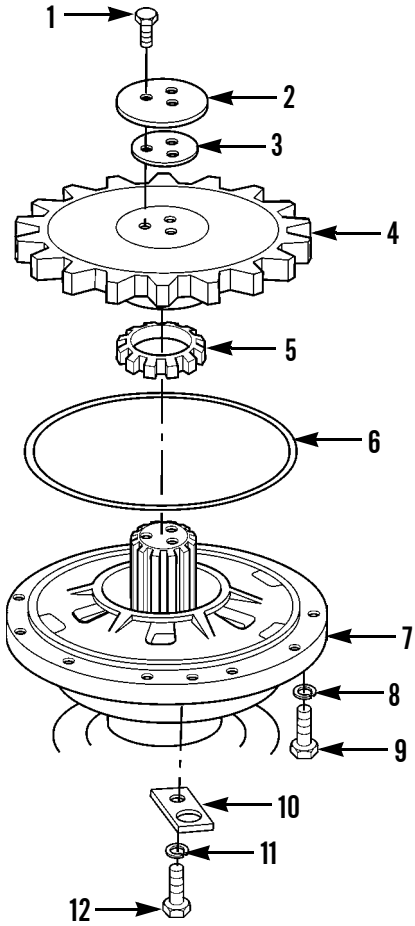
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Service brake and wheel spindle housing assembly removed (WP 0314 00)

DISASSEMBLY

1. Remove three bolts (1), retainer (2), shim(s) (3), and sprocket (4).
2. Remove cone roller (5) and seal (6). Discard seal.
3. Remove bolt (12), lockwasher (11), plate (10), three bolts (9), and lockwashers (8) from cover (7). Discard lockwashers.



397-1920

DISASSEMBLY - CONTINUED

4. Install two link brackets in cover (7).

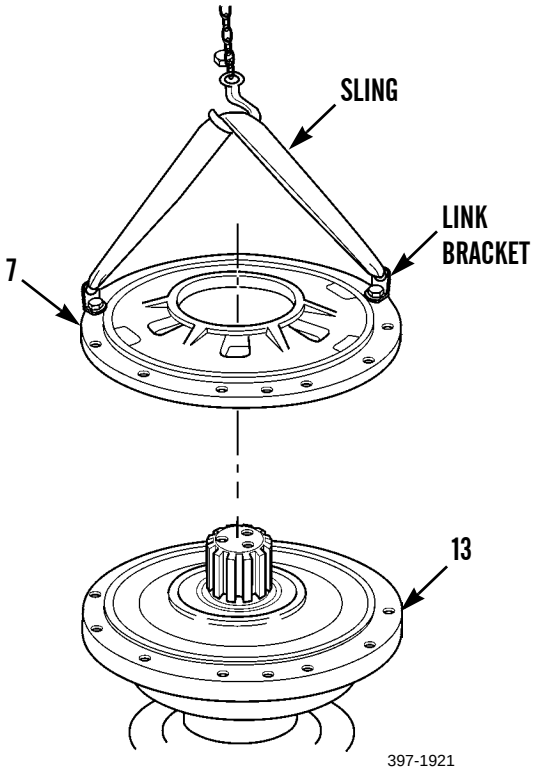
WARNING

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

NOTE

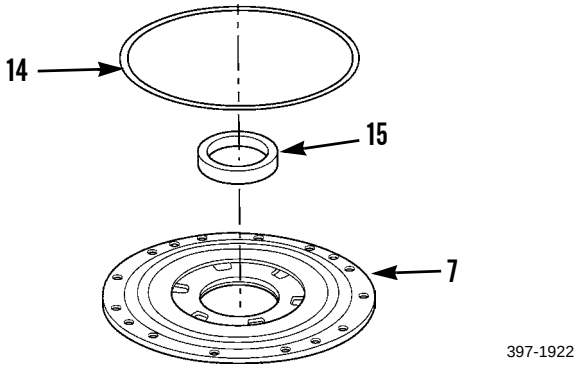
Cover weighs 50 lb (23 kg).

5. Install sling to link brackets.
6. Remove cover (7) from housing (13) and place on wood blocks.
7. Remove sling.
8. Remove two link brackets.



DISASSEMBLY - CONTINUED

9. Remove seal (14) and cup (15) from cover (7). Discard seal.



10. Remove hub (16) from housing (13).

NOTE

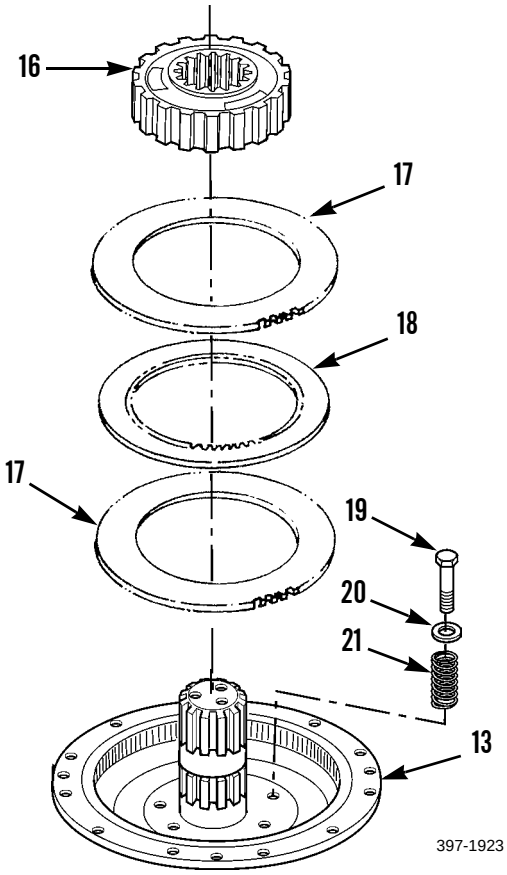
Note order of discs to aid in assembly.

11. Remove 10 discs (17) and nine disc assemblies (18) from housing (13).

WARNING

Use caution when spring is compressed. Wear safety glasses when removing springs. Accidental release of spring may cause injury to personnel.

12. Remove six bolts (19), washers (20), and springs (21).



DISASSEMBLY - CONTINUED

13. Install two link brackets in housing assembly (22).

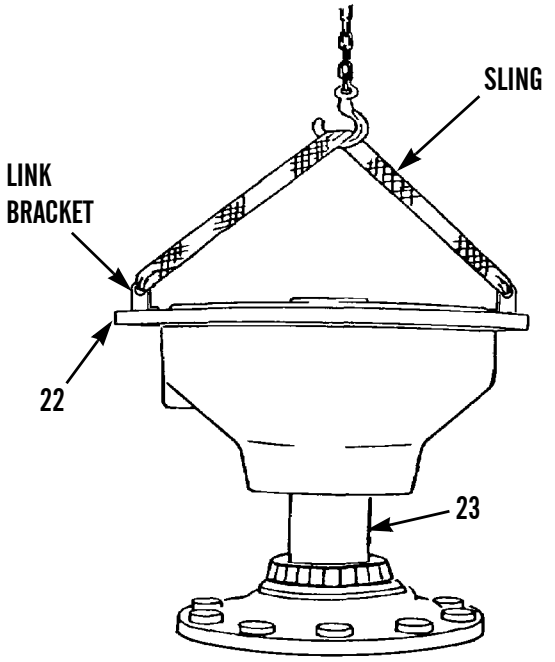
WARNING

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

NOTE

Housing weighs 100 lb (46 kg).

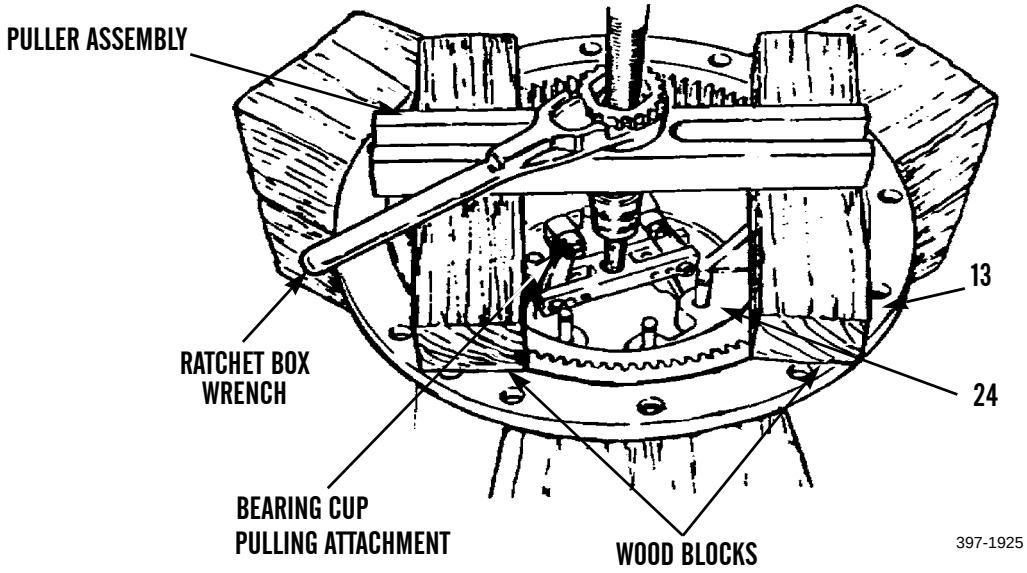
14. Install sling to link brackets.
15. Remove housing assembly (22) from spindle assembly (23).
16. Remove sling.
17. Remove two link brackets.



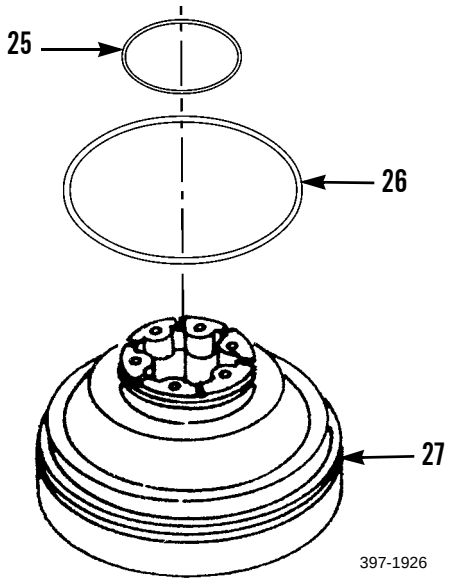
397-1924

DISASSEMBLY - CONTINUED

18. Use wood blocks, cup puller attachments, torque, and bearing puller attachment to remove piston assembly (24) from housing (13).

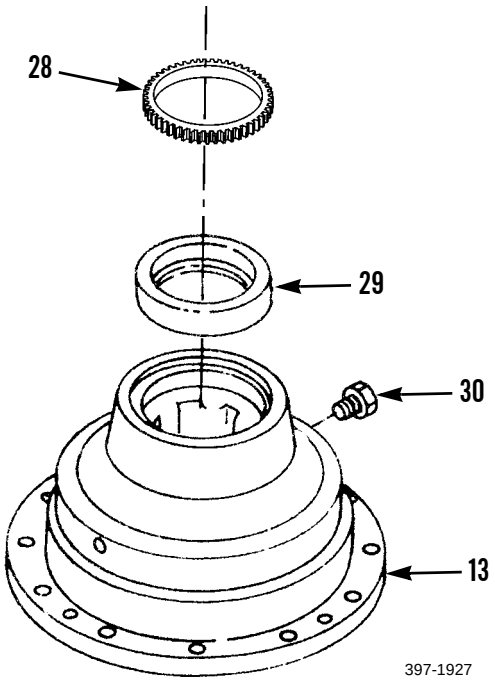


19. Remove seals (25 and 26) from piston (27). Discard seals.

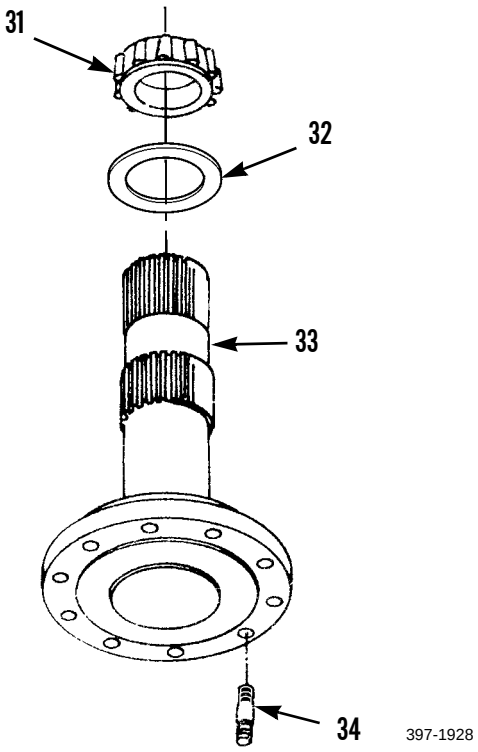


DISASSEMBLY - CONTINUED

20. Remove seal assembly (28), cup (29), and plug (30) from housing (13). Discard seal assembly.

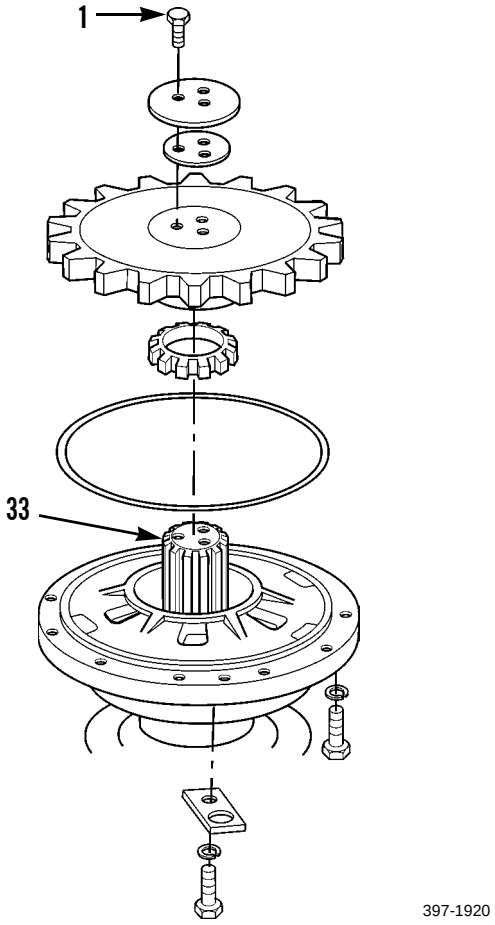


21. Use a bearing separator and puller to remove cone (31) from spindle (33).
22. Remove seal assembly (32) and 10 studs (34) from spindle (33). Discard seal assembly.



CLEANING AND INSPECTION

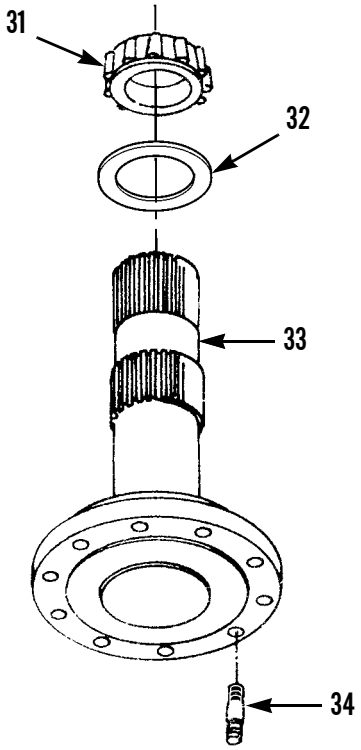
1. Inspect three bolts (1) and bolt holes for wear and damage.
2. If hole threads are damaged or bolts (1) cannot be hand-tightened in hole, replace bolts and spindle (33).



3. Clean and inspect all other parts in accordance with WP 0020 00.

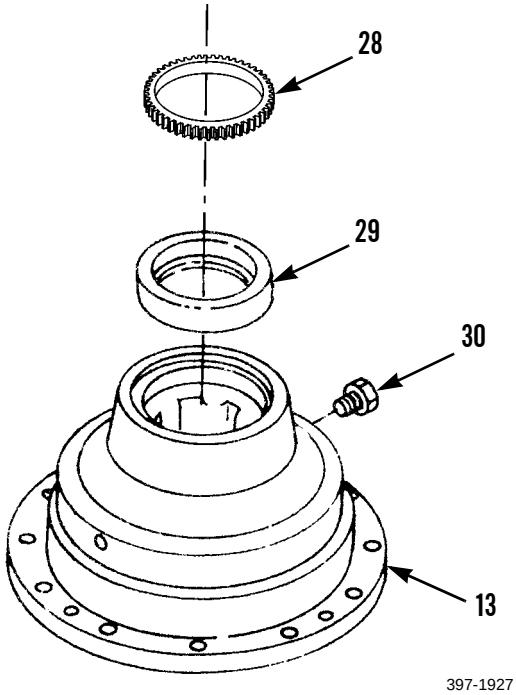
ASSEMBLY

1. Install 10 studs (34) on spindle (33).
2. Use seal installer to install new seal assembly (32) on spindle (33).
3. Coat metal surface of seal assembly (32) with clean oil.
4. Heat cone (31).
5. Install cone (31) on spindle (33).



397-1928

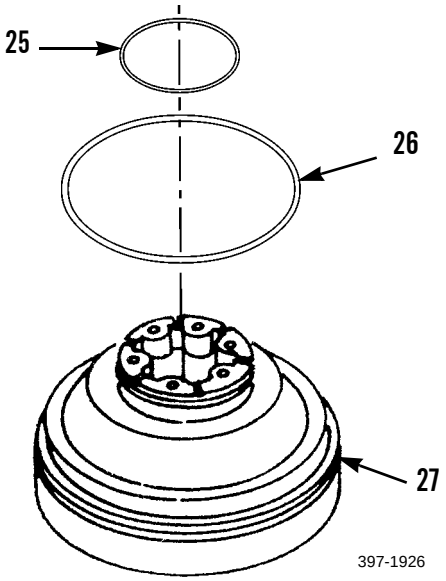
6. Install plug (30) on housing (13).
7. Lower temperature of cup (29).
8. Install cup (29) on housing (13).
9. Use seal installer to install new seal assembly (28) on housing (13).
10. Coat metal surface of seal assembly (28) with clean oil.



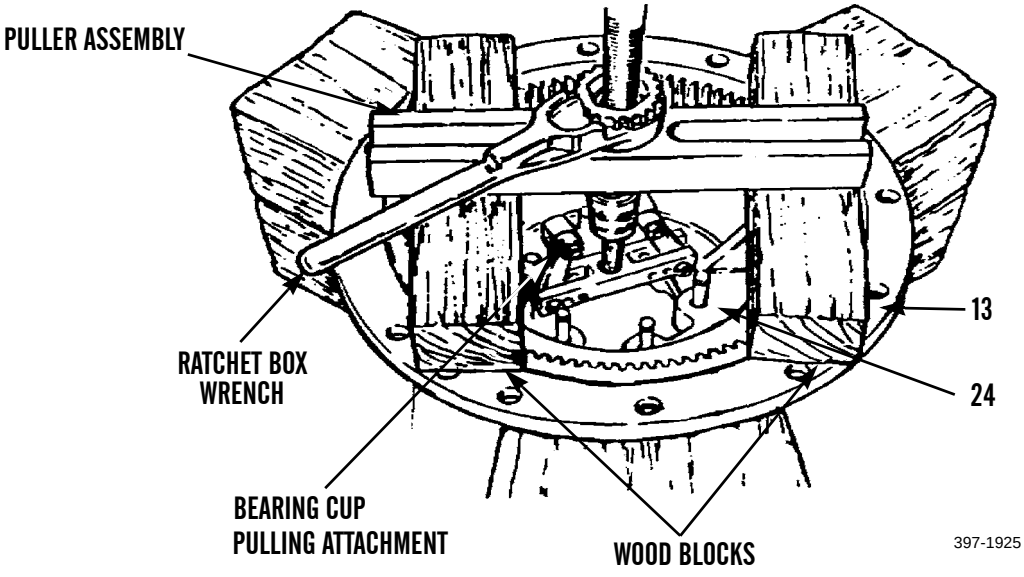
397-1927

ASSEMBLY - CONTINUED

11. Install new seals (25 and 26) on piston (27).

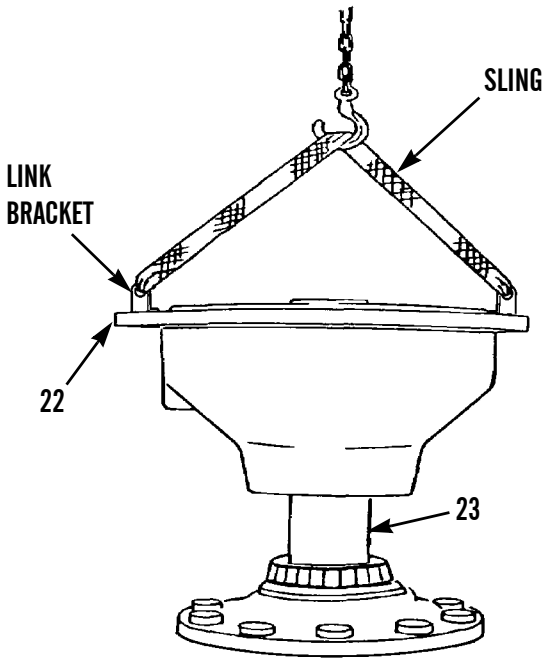


12. Install piston assembly (24) on housing (13).



ASSEMBLY - CONTINUED

13. Install two link brackets on housing assembly (22).
14. Install sling.
15. Install housing assembly (22) on spindle assembly (23).
16. Remove sling.
17. Remove two link brackets.



397-1924

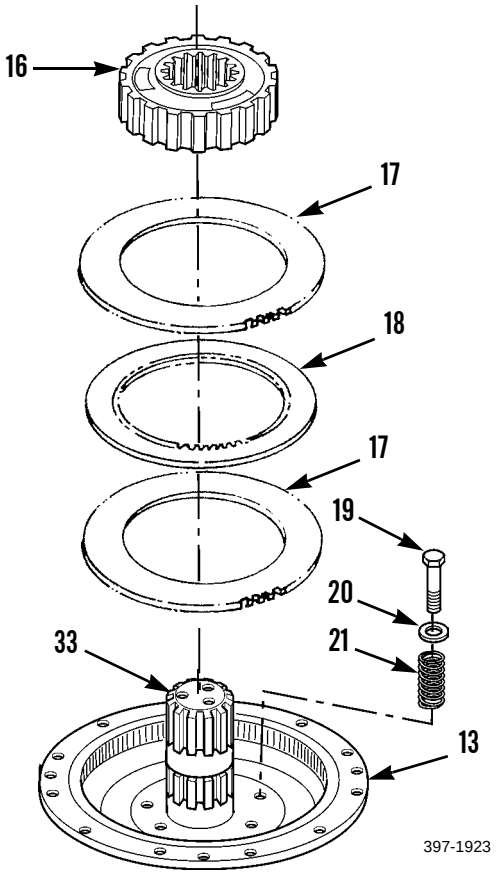
ASSEMBLY - CONTINUED

18. Install six springs (21), washers (20), and bolts (19) on housing (13).
19. Apply a thin coat of clean oil to nine disc assemblies (18) and 10 discs (17).

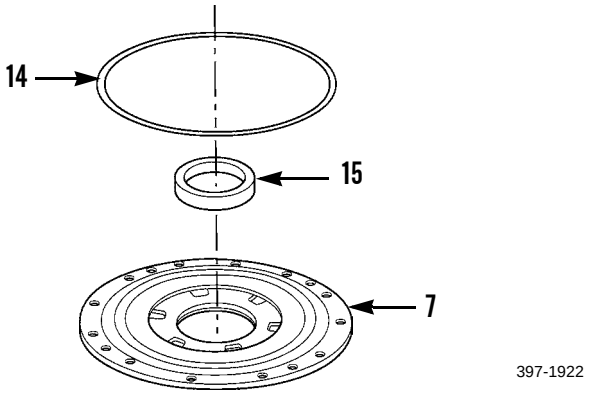
NOTE

Ensure there is a disc assembly between each disc.

20. Starting with a disc, install 10 disc (17) and nine disc assemblies (18) on housing (13).
21. Install hub (16) on spindle (33).



22. Install new seal (14) on cover (7).
23. Coat seal (14) with grease.
24. Lower temperature of cup (15).
25. Install cup (15) on cover (7).



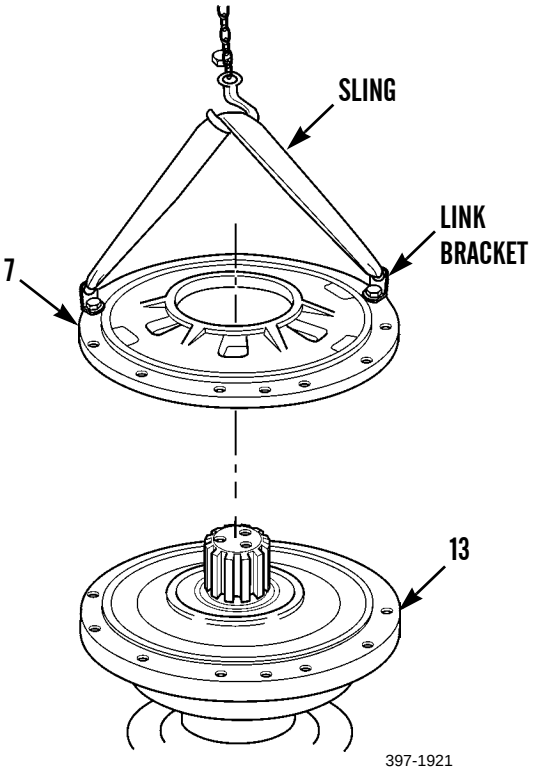
ASSEMBLY - CONTINUED

26. Install two link brackets on cover (7).

WARNING

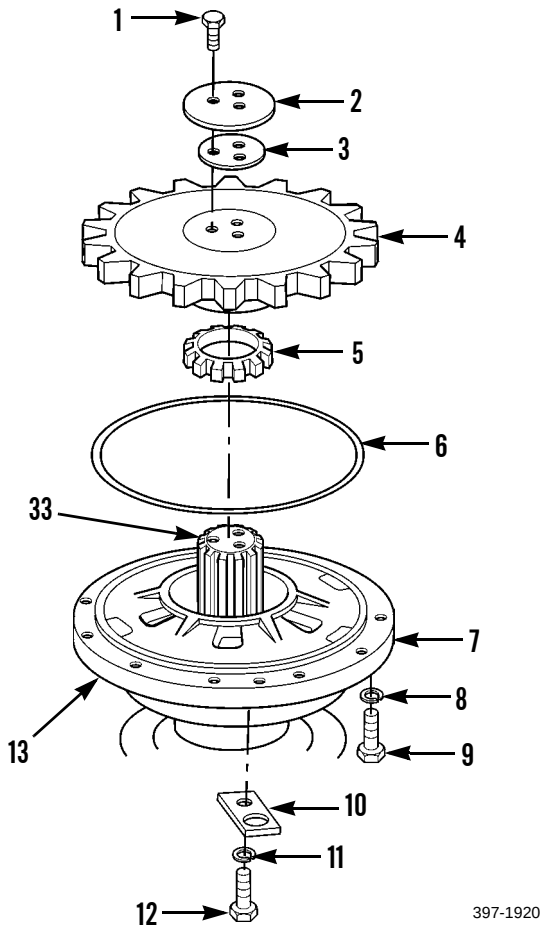
Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury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

27. Install sling.
28. Install cover (7) on housing (13).
29. Remove sling.
30. Remove two link brackets.



ASSEMBLY - CONTINUED

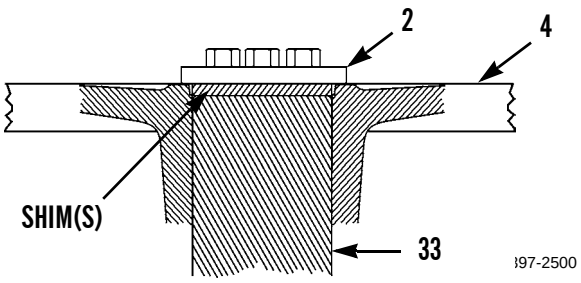
31. Install seal (6) on cover (7).
32. Coat seal (6) with grease.
33. Install three new lockwashers (8), bolts (9), plate (10), new lockwasher (11), and bolt (12).
34. Install cone roller (5) over spindle (33).



NOTE

The sprocket for the front service brake and wheel spindle housing must be installed with teeth next to cover. The sprocket for the rear service brake and wheel spindle housing must be installed with teeth away from cover.

35. Install sprocket (4) over splines on spindle (33).
36. Install retainer (2) and three bolts (1). Tighten bolts to 35 lb-ft (47 Nm) while turning housing (13).
37. Remove three bolts (1) and retainer (2).
38. Use a caliper to measure distance between end of sprocket (4) and spindle (33).
39. Install shim(s) (3), which have total thickness equal to distance measured in step 38 minus 0.010 to 0.015 in. (0.25 to 0.38 mm).
40. Install retainer (2) and three bolts (1). Tighten bolts to 192 lb-ft (260 Nm).



41. Install service brake and wheel spindle housing assembly (WP 0314 00).

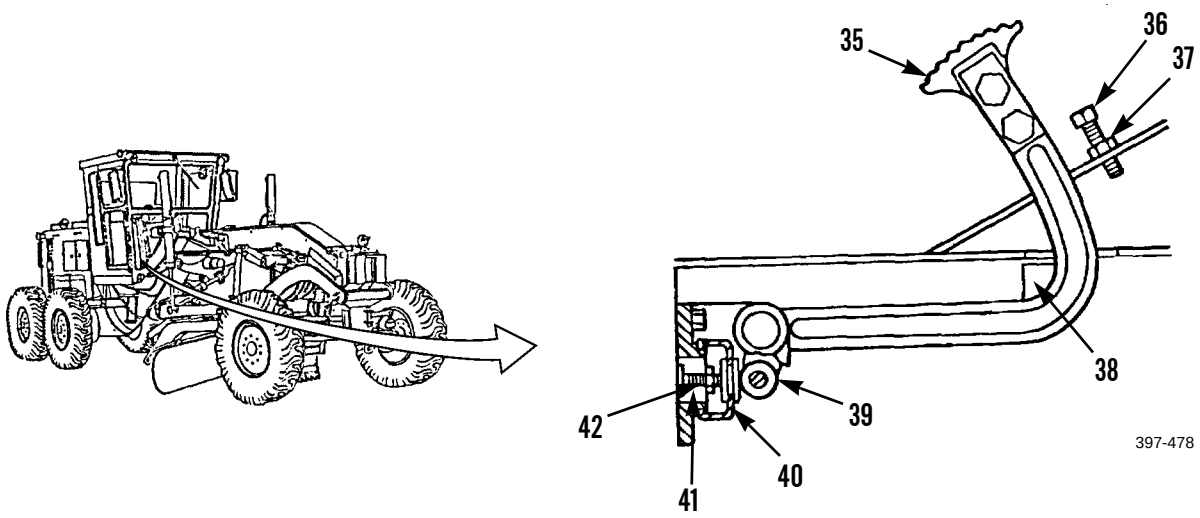
ADJUSTMENT

1. Fully release pedal (35) from beneath floor plate on right side of cab.
2. Check roller (39). Roller must be slightly in contact with plunger of brake control valve (40). A slight drag will be felt if roller is turned.
3. Clean stop (38) as required to make contact. Ensure there is no dirt between stop and floor.
4. Vent all air pressure (TM 5-3805-261-10).
5. Loosen nut (42).
6. Back out screw (41). A slight drag must be felt when roller (39) is turned.
7. Loosen nut (37).
8. Turn stop screw (36) all the way down.
9. Depress pedal (35) and hold until solid stop in valve is felt. This is maximum stroke of valve.

NOTE

If pedal hits platform before maximum stroke of valve is felt, back out screw (41) one turn.

10. Turn stop screw (36) up until contact is made with pedal (35) in depressed position.
11. Release pedal (35).
12. Tighten nuts (42 and 37). Do not turn stop screw (36) and screw (41) after nuts are tightened.
13. Depress pedal (35) and release. Check to ensure valve is exhausting when pedal is up; there must be no pressure (0 psi) at tandem.



END OF WORK PACKAGE

SERVICE BRAKE AND WHEEL SPINDLE HOUSING ASSEMBLY REPLACEMENT 0314 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Lifting device, 500-lb capacity

7/8-14 nut (2)

Wood blocks

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Lockwasher (12)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Tandem drive chain assembly removed (WP 0311 00)

Air pressure relieved (TM 5-3805-261-10)

SERVICE BRAKE AND WHEEL SPINDLE HOUSING ASSEMBLY REPLACEMENT - CONTINUED 0314 00

REMOVAL

NOTE

The following is a maintenance procedure for the right-rear brake and wheel spindle housing assembly. The maintenance procedure for the remaining three brake and wheel spindle housing assemblies is identical.

1. Remove two nuts (5), lockwashers (6), and guard (4) from brake and wheel spindle housing assembly (8). Discard lockwashers.

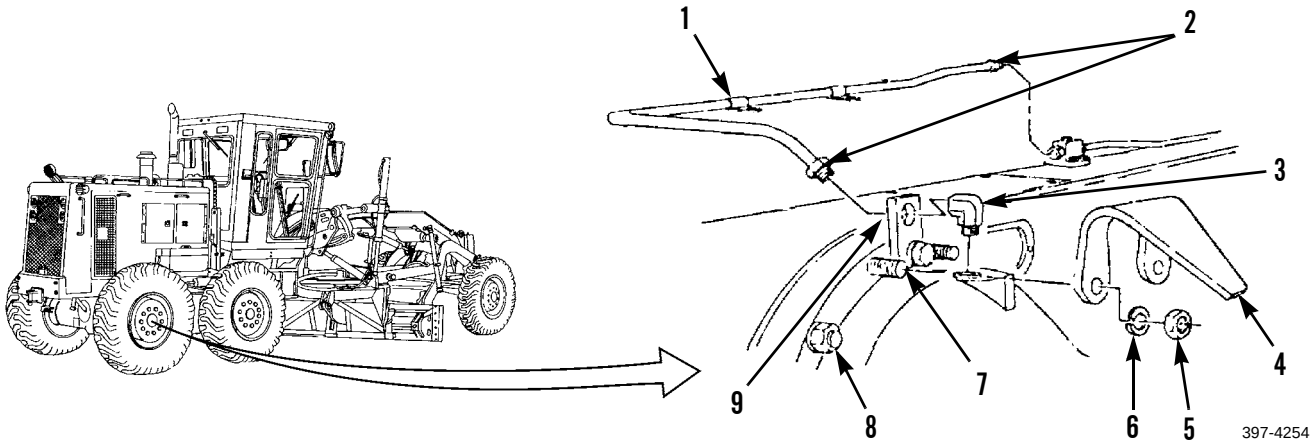
CAUTION

Cap all hose and tube ends to prevent contamination.

NOTE

Tag hose and tube assemblies before removal to aid in installation.

2. Loosen two nuts (2) on tube assembly (1).
3. Remove tube assembly (1), elbow (3), bolt (7), and plate (9) from brake and wheel spindle housing assembly (8).



REMOVAL - CONTINUED

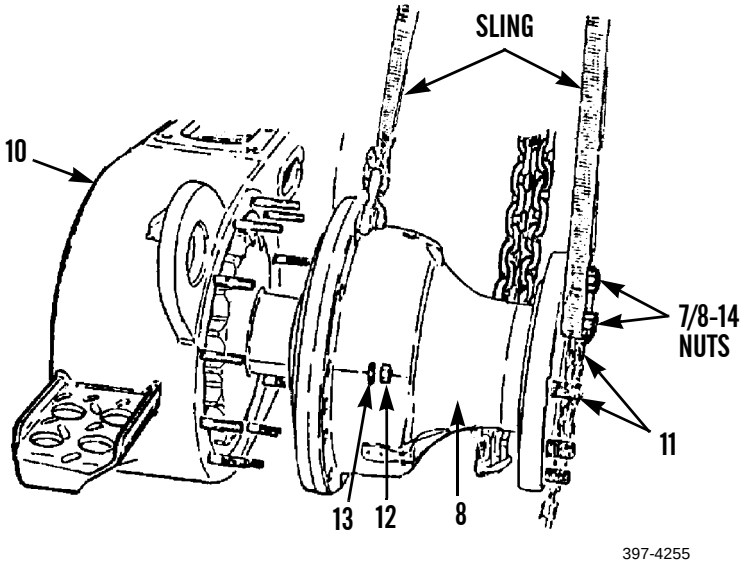
WARNING

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

NOTE

Brake and wheel spindle housing assembly weighs 350 lb (159 kg).

4. Install sling assembly on brake and wheel spindle housing assembly (8).
5. Install two 7/8-14 nuts on studs (11).
6. Remove ten nuts (12) and lockwashers (13). Discard lockwashers.
7. Use ratchet assembly to remove brake and wheel spindle housing assembly (8) from tandem drive housing assembly (10).
8. Place brake and wheel spindle housing assembly (8) on wood blocks.
9. Remove two 7/8-14 nuts from studs (11).
10. Remove sling assembly.



397-4255

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

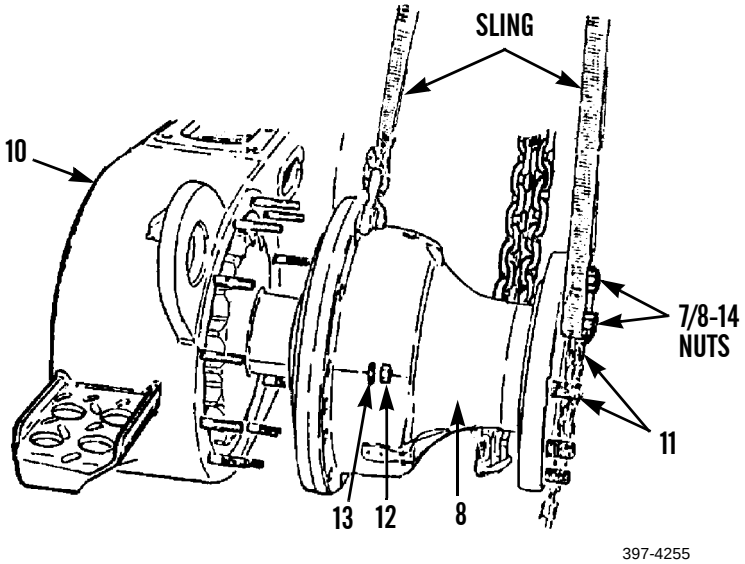
WARNING

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

NOTE

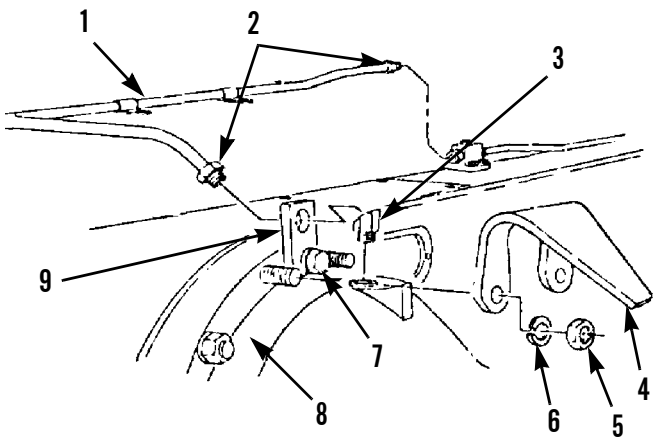
Brake and wheel spindle housing assembly weighs 350 lb (159 kg).

1. Install sling on brake and wheel spindle housing assembly (8).
2. Install two 7/8-14 nuts on studs (11).
3. Install brake and wheel spindle housing assembly (8) to tandem drive housing assembly (10).
4. Install 10 new lockwashers (13) and nuts (12).
5. Remove two 7/8-14 nuts from studs (11).
6. Remove sling.



INSTALLATION - CONTINUED

7. Install plate (9), bolt (7), elbow (3), and tube assembly (1) on brake and wheel spindle housing assembly (8).
8. Tighten two nuts (2) on tube assembly (1).
9. Install guard (4), two new lockwashers (6), and nuts (5).



397-2297

10. Install tandem drive chain assembly (WP 0311 00).

END OF WORK PACKAGE

REMOTE STEER AIR VALVES REPLACEMENT (TYPE II MACHINE) 0315 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Left and right side engine panels removed (WP 0182 00)

Air pressure relieved (TM 5-3805-261-10)

REMOVAL

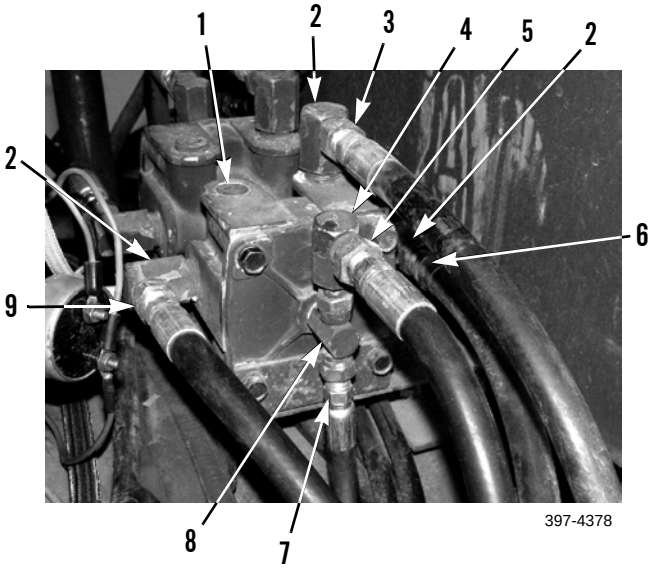
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

- Each of two steer air valves is removed the same way. Left steer air valve is shown.
- Tag air lines before disconnecting to aid in installation.

1. Disconnect air lines (3, 6, and 9) from three elbows (2) of steer air valve (1).
2. Remove three elbows (2) from steer air valve (1).
3. Disconnect air line (5) from elbow (4) at top of tee (8).
4. Remove elbow (4) from tee (8).
5. Disconnect air line (7) from bottom of tee (8).
6. Remove tee (8) from steer air valve (1).



NOTE

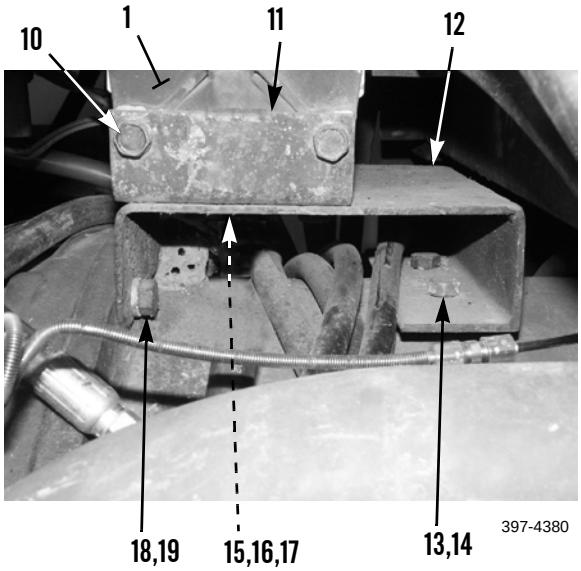
Note position of plug at top of steer air valve for installation.

7. Remove two bolts (10) and steer air valve (1) from valve bracket (11).
8. Remove two nuts (15), four washers (16), two bolts (17), and valve bracket (11) from bracket (12).

NOTE

Perform steps 9 and 10 to remove bracket from top of transmission.

9. Remove two bolts (13) and washers (14).
10. Remove two bolts (18), washers (19), and bracket (12) from transmission.



INSTALLATION

NOTE

- Each of two steer air cylinders is installed the same way. Left steer air cylinder is shown.
- Perform steps 1 and 2 to install bracket to top of transmission.

1. Install bracket (12) to transmission with two washers (14) and bolts (13).
2. Install two washers (19) and bolts (18).
3. Install valve bracket (11) to bracket (12) with two bolts (17), four washers (16), and two nuts (15).

NOTE

Ensure plug at top of steer air valve is in position noted. Change position if necessary.

4. Install steer air valve (1) to valve bracket (11) with two bolts (10).
5. Install tee (8) to steer air valve (1).
6. Connect air line (7) to bottom of tee (8).
7. Install elbow (4) to top of tee (8).
8. Connect air line (5) to elbow (4).
9. Install three elbows (2) to steer air valve (1).
10. Connect air lines (3, 6, and 9) to three elbows (2).Install left and right side engine panels (WP 0182 00).

END OF WORK PACKAGE

AIR BRAKE VALVE REPLACEMENT 0316 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed (7)

Rubber spring

Washer

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Blackout and service lights switches removed (WP 0117 00)

Air pressure switch removed (WP 0129 00)

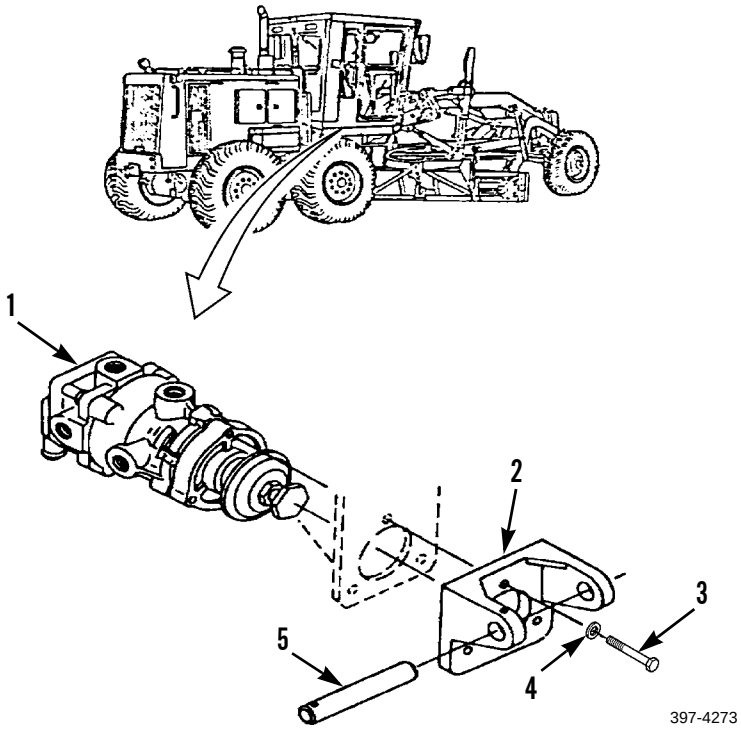
Air brake controls removed (WP 0160 00)

Air brake lines removed (WP 0161 00)

Air brake control lines disconnected (WP 0161 00)

REMOVAL

Remove three bolts (3), washers (4), bracket (2), shaft (5), and air brake valve (1) from under right side of cab.

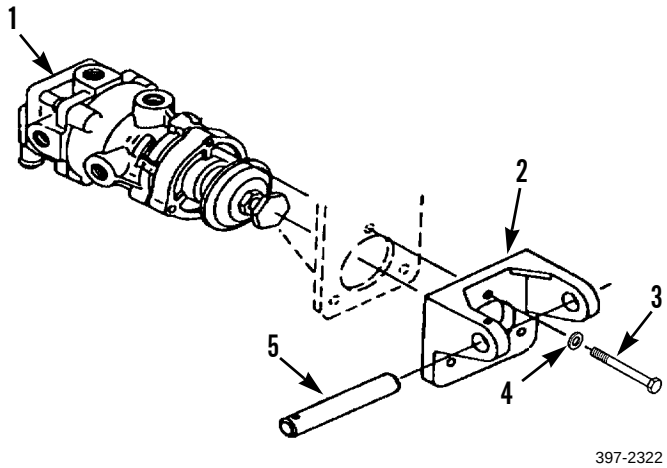


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install air brake valve (1), shaft (5), bracket (2), three washers (4), and bolts (3) under right side of cab.
2. Connect air brake control line (WP 0161 00).
3. Install air brake lines (WP 0161 00).
4. Install air brake controls (WP 0160 00).
5. Install air pressure switches (WP 0129 00).
6. Install blackout and service lights switches (WP 0117 00).



END OF WORK PACKAGE

AIR COMPRESSOR ASSEMBLY REPLACEMENT 0317 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, (WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Petrolatum, technical (Item 33, WP 0349 00)

Oil, lubricating (Item 29, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Gasket (7)

Grommet (2)

Lockwasher (24)

Packing, preformed (3)

Materials/Parts - Continued

Washer (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Air pressure relieved (TM 5-3805-261-10)

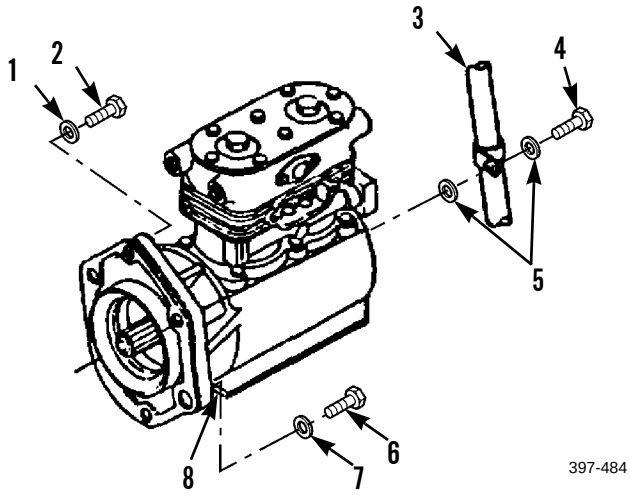
Cooling system drained below cylinder head level (WP 0065 00)

Left side engine panel removed (WP 0182 00)

Air compressor lines and fittings removed (WP 0318 00)

REMOVAL

1. Remove bolt (4) and two washers (5).
2. Position tube assembly (3) away from air compressor (8).
3. Remove bolt (6), washer (7), bolt (2), and washer (1).



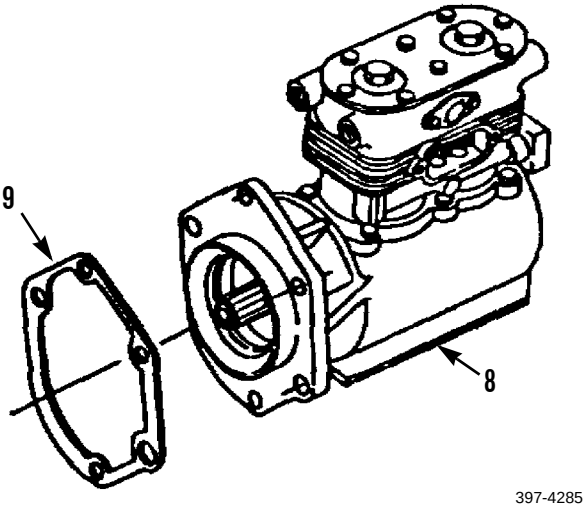
WARNING

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

NOTE

Weight of air compressor is 34 lb (16 kg).

4. Remove air compressor (8) and gasket (9) from front timing gear housing in left-front side of engine. Discard gasket.



CLEANING AND INSPECTION

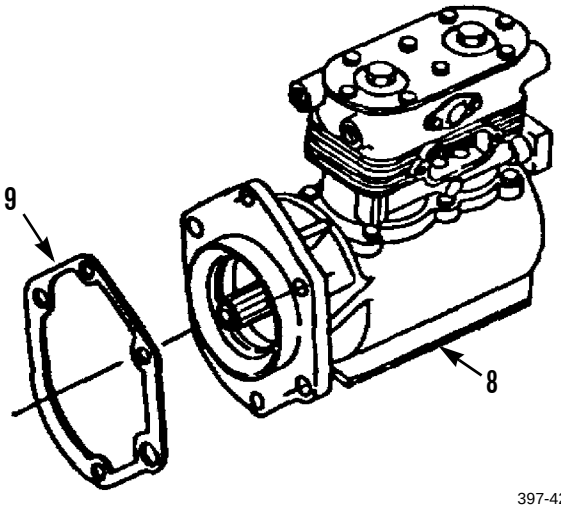
Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

NOTE

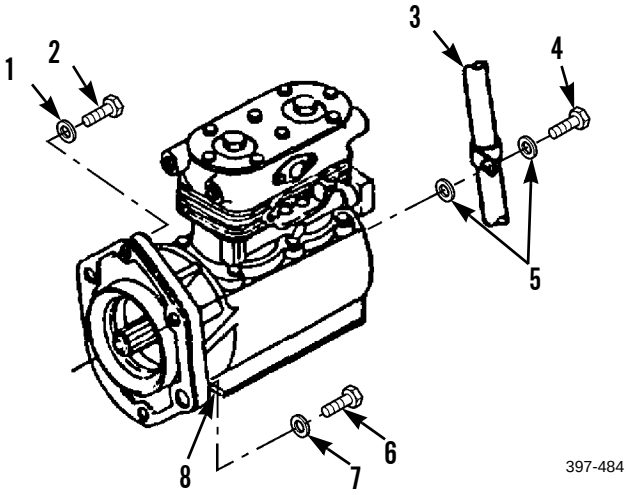
Align and engage splines of air compressor shaft with water pump drive gear.

1. Position new gasket (9) and air compressor (8) on backside of front timing gear housing in left-front side of engine.



397-4285

2. Install washer (1), bolt (2), washer (7), and bolt (6) on air compressor (8).
3. Position tube assembly (3) on air compressor (8).
4. Install two washers (5) and bolt (4), securing tube assembly (3).



397-484

5. Install air compressor lines and fittings (WP 0318 00)
6. Refill cooling system to proper level (WP 0065 00).
7. Start engine (TM 5-3805-261-10).
8. Run engine for two minutes. Stop engine.
9. Check for leaks.
10. Install left side engine panel (WP 0182 00).

END OF WORK PACKAGE

AIR COMPRESSOR LINES AND FITTINGS REPLACEMENT 0318 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0020 00

WP 0113 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Air pressure relieved (WP 0161 00)

Cooling system drained below cylinder head level (WP 0065 00)

REMOVAL

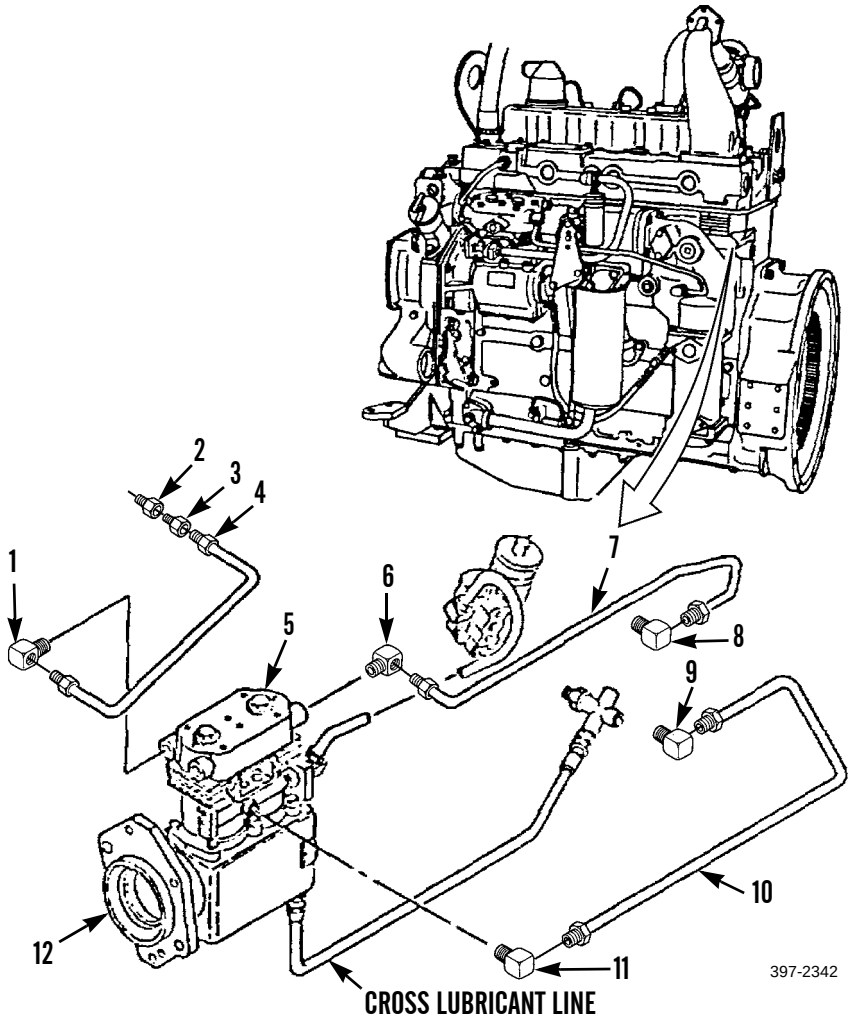
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

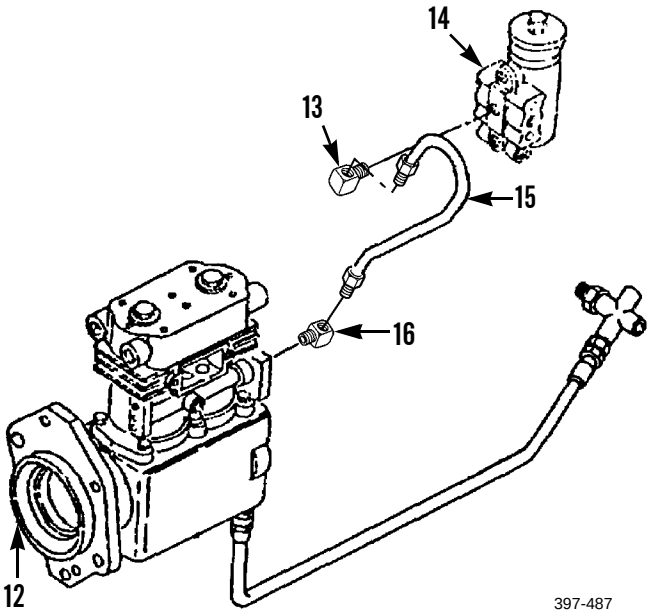
Tag hose and tube assemblies before disconnecting to aid in installation.

1. Disconnect tube assembly (4) from elbow (1) on cylinder head (5).
2. Remove tube assembly (4) from connector (3).
3. Remove elbow (1) from air compressor (12).
4. Remove connector (3) and bushing (2) from cylinder head (5).
5. Disconnect and remove tube assembly (7) from elbows (6 and 8).
6. Remove elbow (6) from air compressor (12).
7. Remove elbow (8) from transmission oil cooler.
8. Disconnect and remove tube assembly (10) from elbows (9 and 11).
9. Remove elbow (11) from air compressor (12).
10. Remove elbow (9) from engine.
11. Remove two oil pressure sending units from cross lubricant line (WP 0113 00).

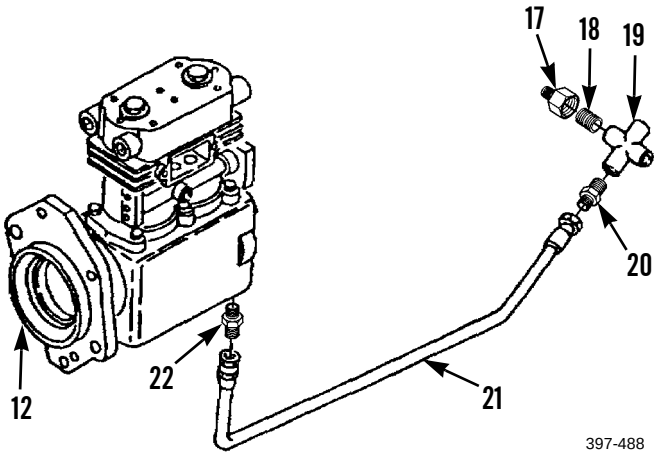


REMOVAL - CONTINUED

12. Disconnect and remove tube assembly (15) from elbows (13 and 16).
13. Remove elbow (16) from air compressor (12).
14. Remove elbow (13) from governor (14).



15. Disconnect and remove hose assembly (21) from connectors (20 and 22).
16. Remove connector (20) from cross (19).
17. Remove connector (22) from air compressor (12).
18. Remove cross (19) from nipple (18).
19. Remove nipple (18) and adapter (17) from engine block.



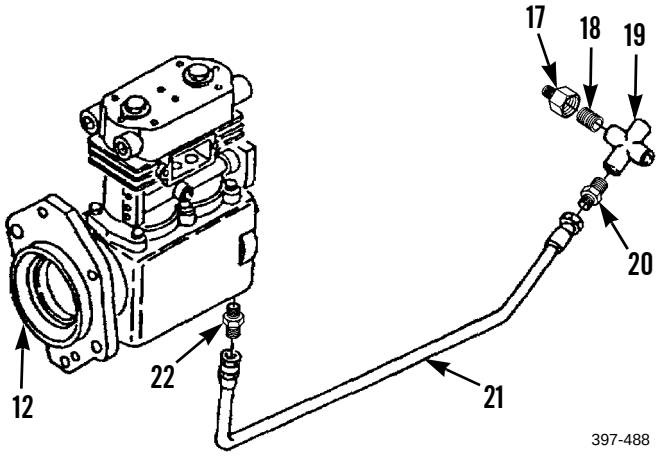
CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

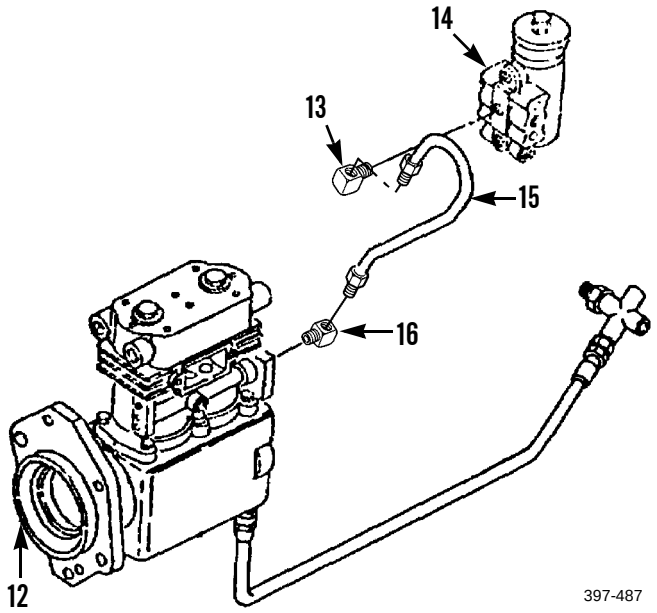
AIR COMPRESSOR LINES AND FITTINGS REPLACEMENT - CONTINUED 0318 00

INSTALLATION

1. Install adapter (17) and nipple (18) on engine block.
2. Install cross (19) on nipple (18).
3. Install connector (22) on air compressor (12).
4. Install connector (20) on cross (19).
5. Connect hose assembly (21) on connectors (20 and 22).

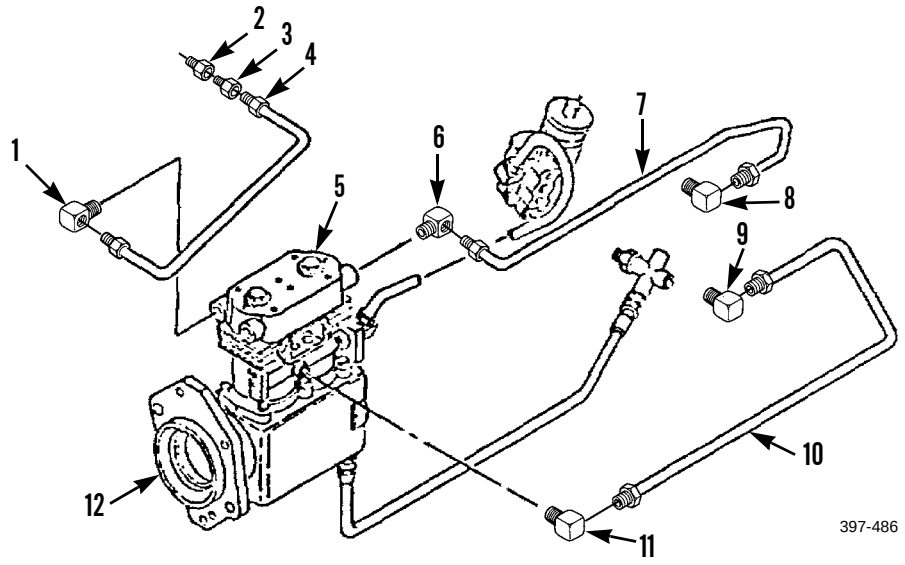


6. Install elbow (13) on governor (14).
7. Install elbow (16) on air compressor (12).
8. Connect tube assembly (15) on elbows (13 and 16).



INSTALLATION - CONTINUED

9. Install two oil pressure sending units on cross lubricant line (WP 0113 00).
10. Install elbow (9) on air intake manifold in air compressor (12).
11. Install elbow (11) on air compressor (12).
12. Connect tube assembly (10) on elbows (9 and 11).
13. Install elbow (8) on transmission oil cooler.
14. Install elbow (6) on air compressor (12).
15. Connect tube assembly (7) on elbows (6 and 8).
16. Install bushing (2) and connector (3) on cylinder head (5) in air compressor (12).
17. Install elbow (1) on air compressor (12).
18. Connect tube assembly (4) on connector (3) and elbow (1).
19. Fill cooling system to operating level (WP 0065 00).



END OF WORK PACKAGE

STEERING CONTROL PUMP MAINTENANCE 0319 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 98, WP 0348 00)

Materials/Parts

Oil, lubricating (Item 26, 27, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

O-ring (4)

Packing, preformed (9)

Seal (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Horn switch removed (WP 0120 00)

Steering console panel and hood removed (WP 0196 00)

REMOVAL

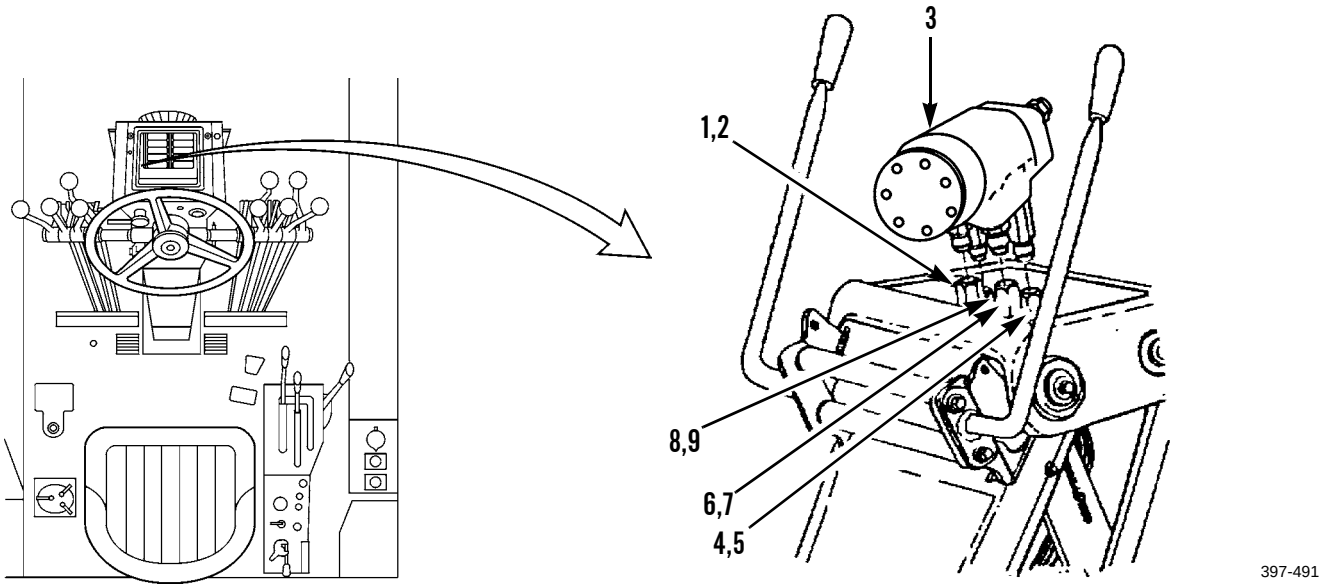
CAUTION

Cap hose end and plug open ports to prevent contamination.

NOTE

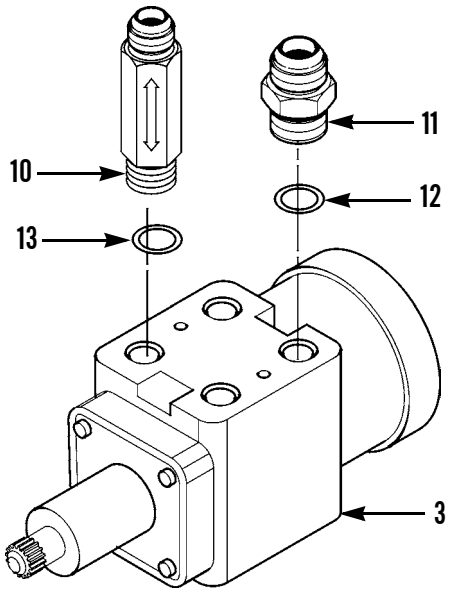
Tag hose assemblies before disconnecting to aid in installation.

1. Disconnect hose assemblies (1, 4, 6, and 8) and remove O-rings (2, 5, 7, and 9). Discard O-rings.
2. Remove control pump assembly (3).



REMOVAL - CONTINUED

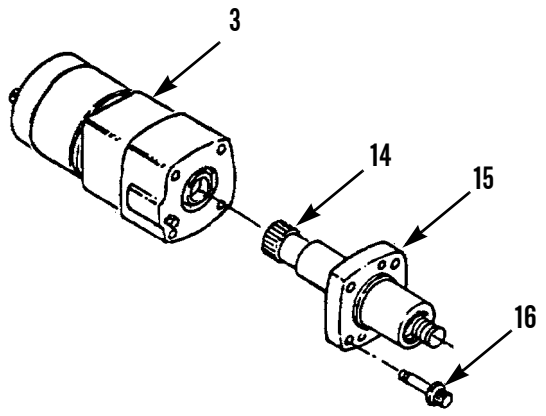
3. Remove two connectors (10) and preformed packings (13) from control pump assembly (3). Discard preformed packings.
4. Remove two connectors (11) and preformed packings (12) from control pump assembly (3). Discard preformed packings.



397-492

DISASSEMBLY

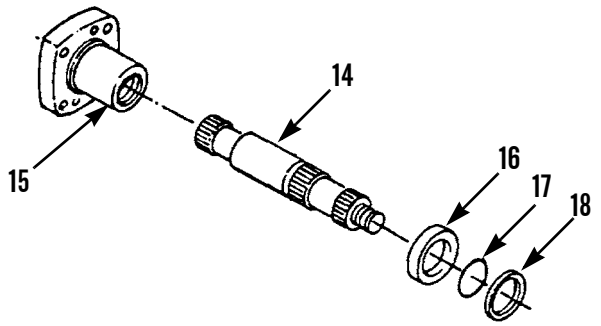
1. Remove four bolts (16), shaft (14), and housing (15) as an assembly from control pump (3).



397-4316

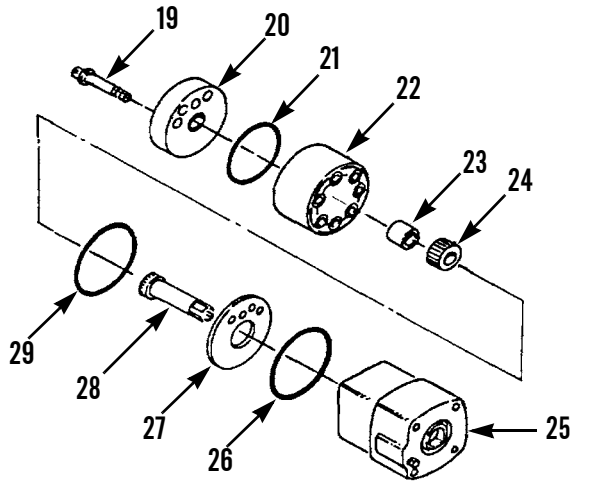
DISASSEMBLY - CONTINUED

2. Remove retaining rings (17 and 18), bearing (16), and shaft (14) from housing (15).



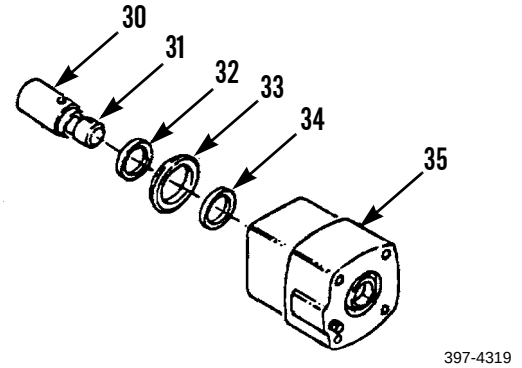
397-4317

3. Remove seven bolts (19), cap (20), and preformed packing (21) from liquid pump assembly (25). Discard preformed packing.
4. Remove gear rotor (22), spacer (23), inner gear (24), preformed packing (29), driver (28), spacer (27), and preformed packing (26). Discard preformed packing.



397-4318

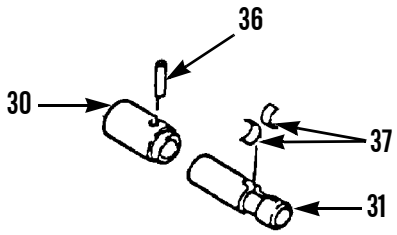
5. Remove sleeve (30), spool (31), race (32), bearing (33), and race (34) as an assembly, from liquid pump housing (35).



397-4319

DISASSEMBLY - CONTINUED

6. Remove pin (36), sleeve (30), spool (31), and six springs (37).



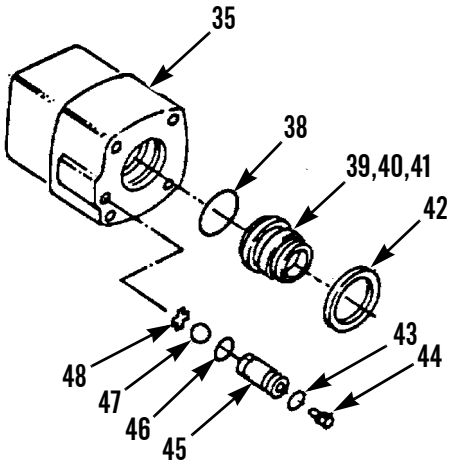
397-4320

7. Remove snap ring (42), sleeve bushing (40), seals (39 and 41), and preformed packing (38) as an assembly, from liquid pump housing (35). Discard preformed packing.

NOTE

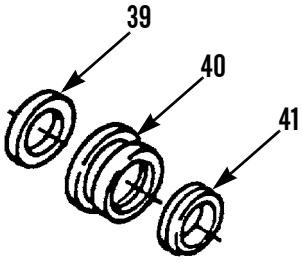
Use small threaded screw for removal of the seat.

8. Remove screw (44), seat (45), preformed packings (43 and 46), ball (47), and retainer (48) from liquid pump housing (35). Discard preformed packing.



397-4321

9. Remove seal (41) and preformed packing (39) from bushing (40). Discard seals.



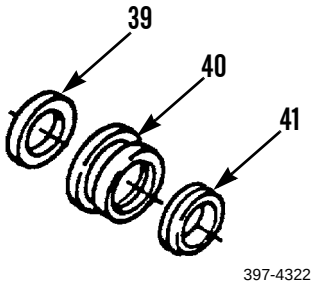
397-4322

CLEANING AND INSPECTION

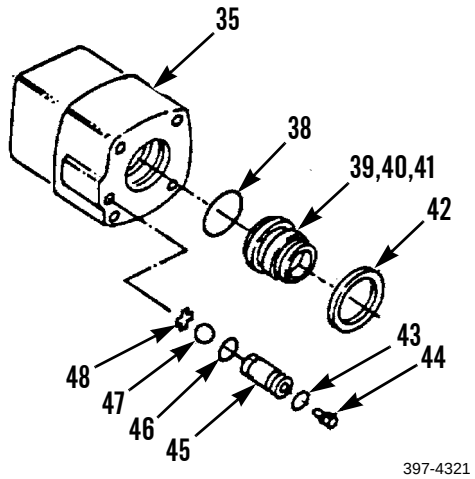
Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install new seal and preformed packing (39) and seal (41) on bushing (40).



397-4322

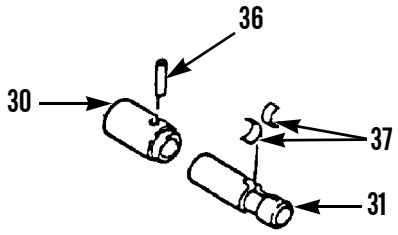


397-4321

NOTE

Lubrication may be necessary for assembly.

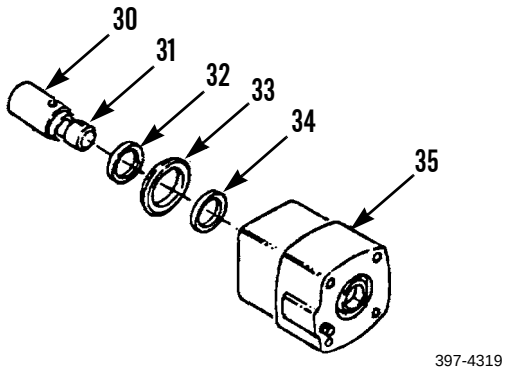
2. Install retainer (48), ball (47), new preformed packing (46), seat (45), new preformed packing (43), and screw (44) in pump body (35). Tighten screw to 96 lb-in. (11 Nm).
3. Install new preformed packing (38), sleeve bushing (40), preformed packing (39), seal (41), and snap ring (42) as an assembly in liquid pump housing (35).
4. Install spool (31), sleeve (30), and pin (36).
5. Install six springs (37) in spool (31) and sleeve (30). Ensure curves of springs are in contact and in center of spool.



397-4320

ASSEMBLY - CONTINUED

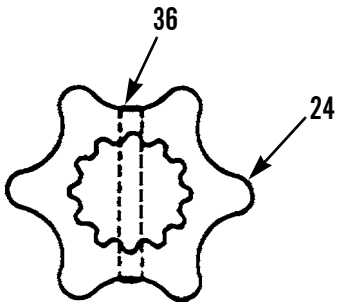
6. Install race (34), bearing (33), race (32), spool (31), and sleeve (30) as an assembly, into liquid pump housing (35).



397-4319

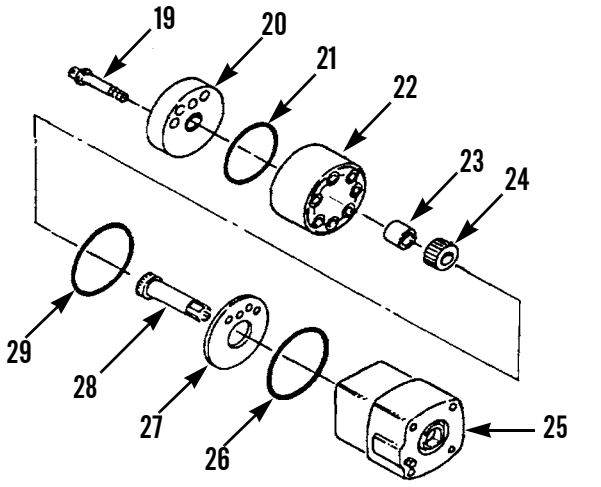
NOTE

Pin (36) in sleeve assembly must be in alignment with gear.



397-4324

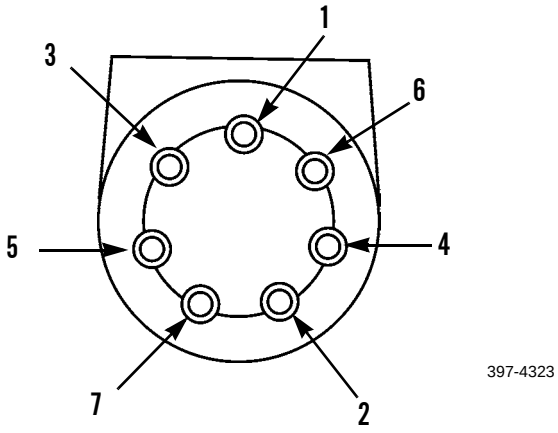
7. Install new preformed packing (26), spacer (27), driver (28), new preformed packing (29), inner gear (24), spacer (23), and gear rotor (22) into liquid pump assembly (25).
8. Install new preformed packing (21), cap (20), and seven bolts (19).



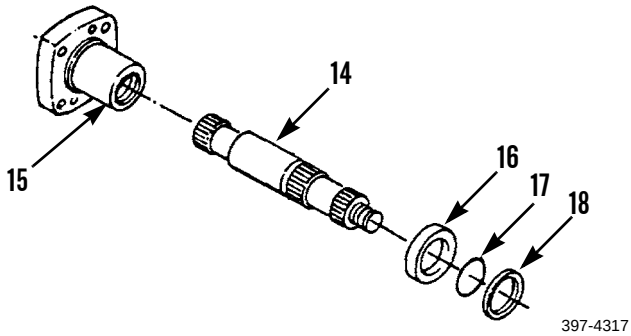
397-4318

ASSEMBLY - CONTINUED

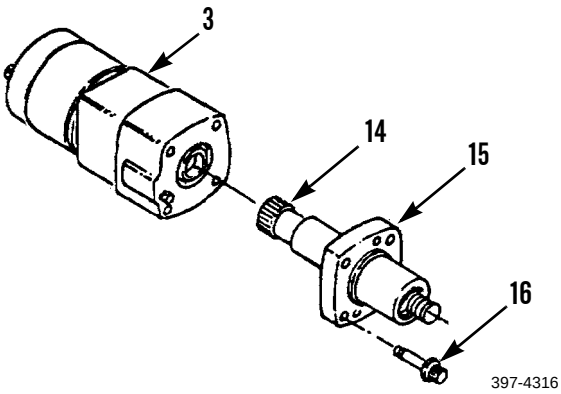
9. Tighten seven bolts to 120 lb-in. (14 Nm) in the order shown. Then tighten to 252 lb-in. (28 Nm).



10. Install shaft (14), bearing (16), and retaining rings (17 and 18) into housing (15).

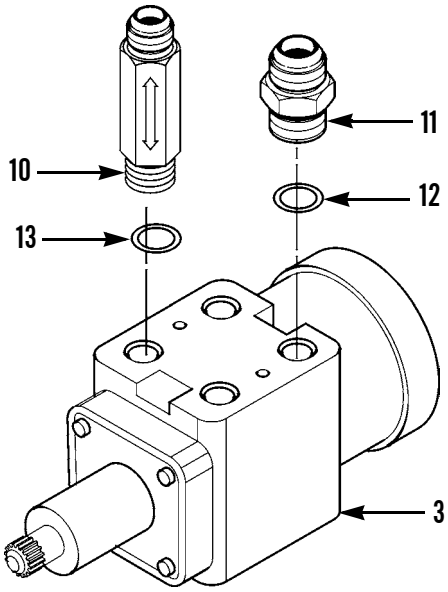


11. Install shaft (14) and housing (15) as an assembly, and four bolts (16) on control pump (3).



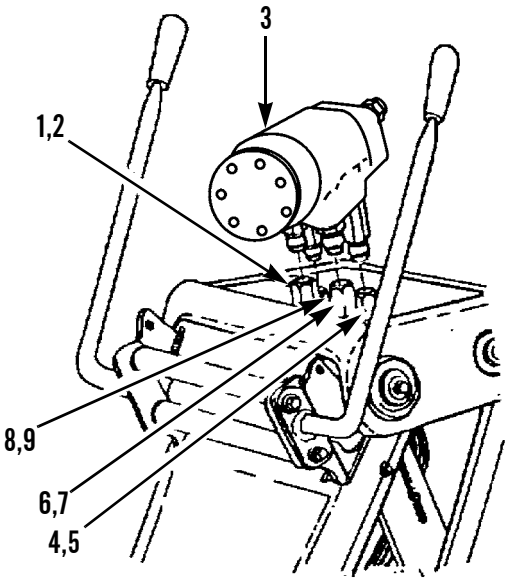
INSTALLATION

1. Install two new preformed packings (13) and connectors (10) on control pump (3).
2. Install two connectors (11) and new preformed packing (12) on control pump (3).



397-492

3. Install control pump (3) on steering console.
4. Connect hose assemblies (1, 4, 6, and 8) and new O-rings (2, 5, 7, and 9).



397-491

5. Install horn switch (WP 0120 00).
6. Install steering console panel and hood (WP 0196 00).

END OF WORK PACKAGE

STEERING CYLINDER REPAIR 0320 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Wood blocks

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 26, 27, or 30, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Materials/Parts - Continued

Packing, preformed

Seal assembly

Seal (3)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

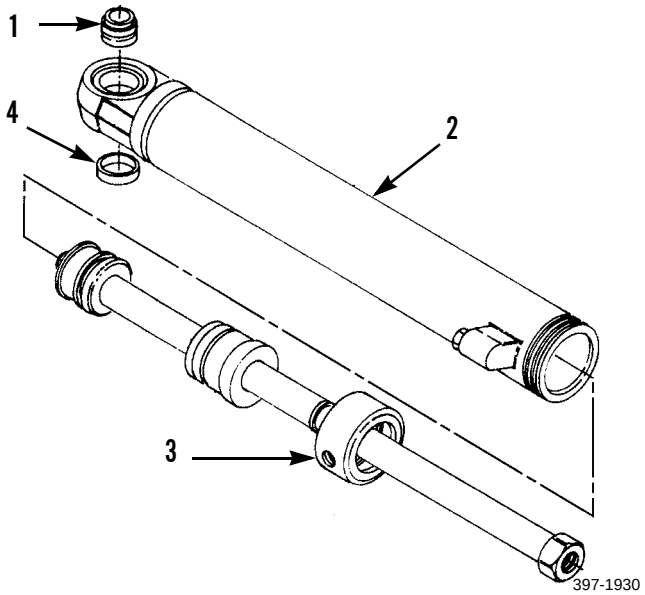
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Steering cylinder removed (WP 0176 00)

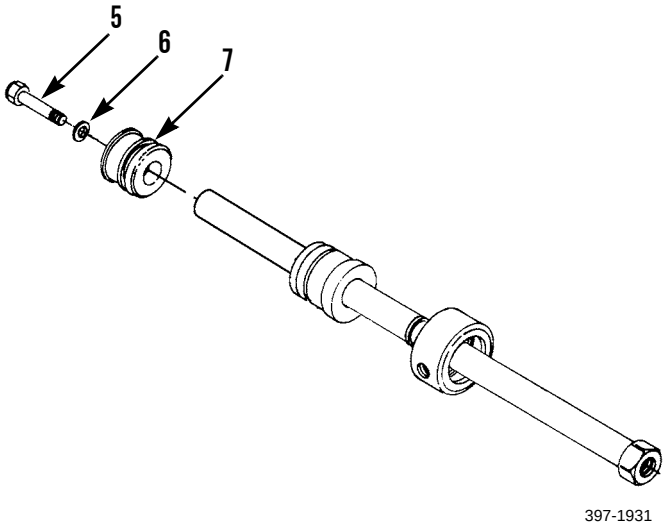
STEERING CYLINDER REPAIR - CONTINUED 0320 00

DISASSEMBLY

1. Remove two rings (4) and bearing (1).
2. Loosen linear actuator cap assembly (3).
3. Remove cylinder tube (2).

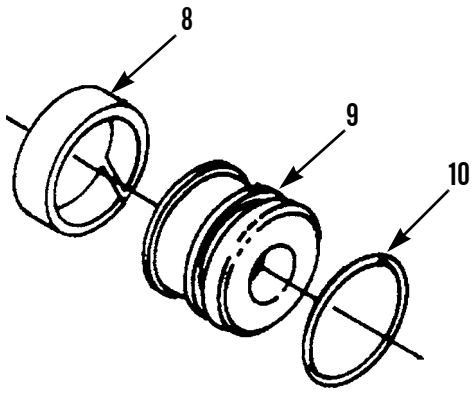


4. Remove bolt (5) and washer (6).
5. Remove linear actuator assembly (7).



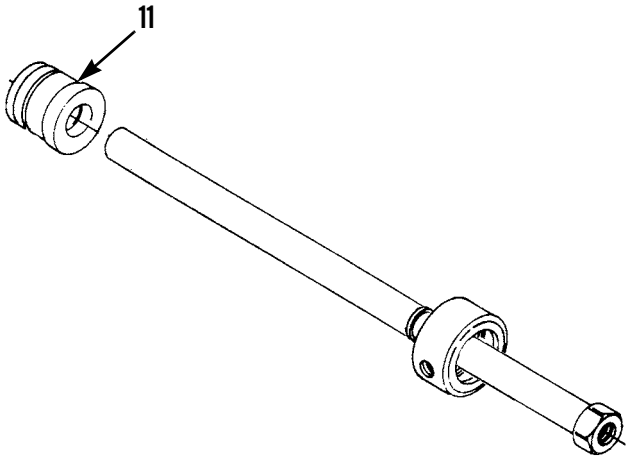
DISASSEMBLY - CONTINUED

6. Remove ring (8) and seal assembly (10) from piston (9). Discard seal assembly.



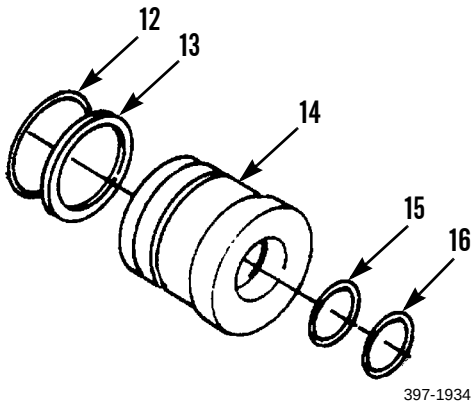
397-1932

7. Remove hydraulic motor head assembly (11).



397-1933

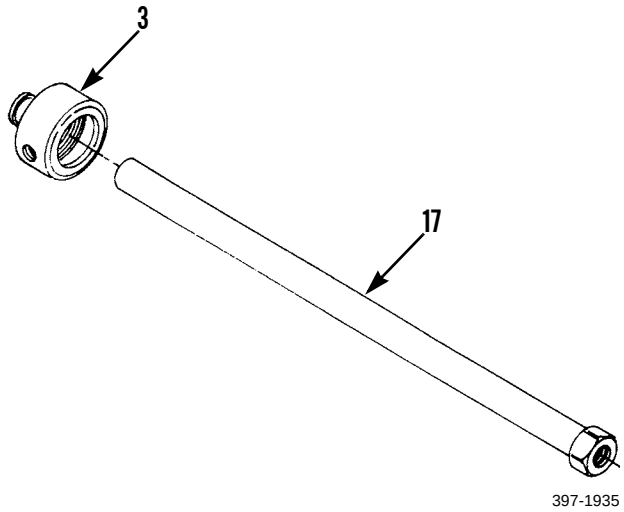
8. Remove seals (15 and 16), preformed packing (12), and ring (13) from head (14). Discard seals and preformed packing.



397-1934

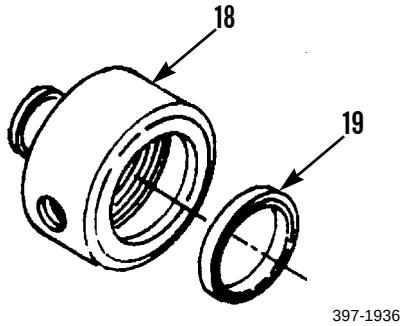
DISASSEMBLY - CONTINUED

9. Remove linear actuator cap assembly (3) from cylinder shaft (17).



397-1935

10. Remove seal (19) from cap (18). Discard seal.



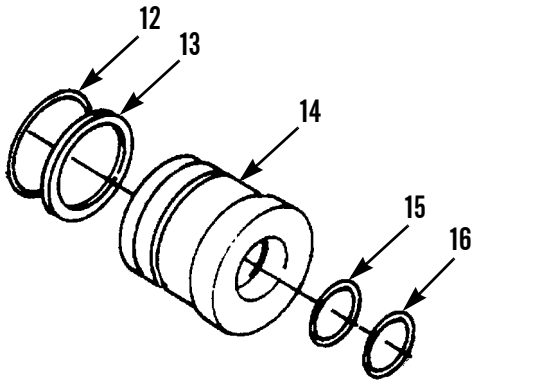
397-1936

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

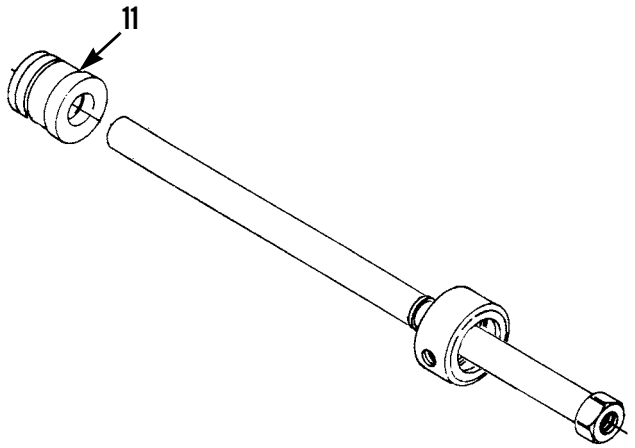
ASSEMBLY

1. Install new seal (19) into cap (18).
2. Install linear actuator cap assembly (3) on cylinder shaft (17).
3. Coat ring (13), new preformed packing (12), and new seals (15 and 16) with lubricating oil.
4. Install ring (13), new preformed packing (12), and new seals (15 and 16) in head (14).
5. Ensure lip of seal (16) is facing toward inside of head (14) and lip of seal (15) is facing toward outside of head.



397-1934

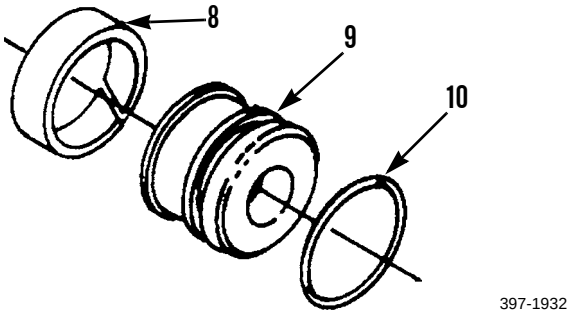
6. Install hydraulic motor head assembly (11).



397-1933

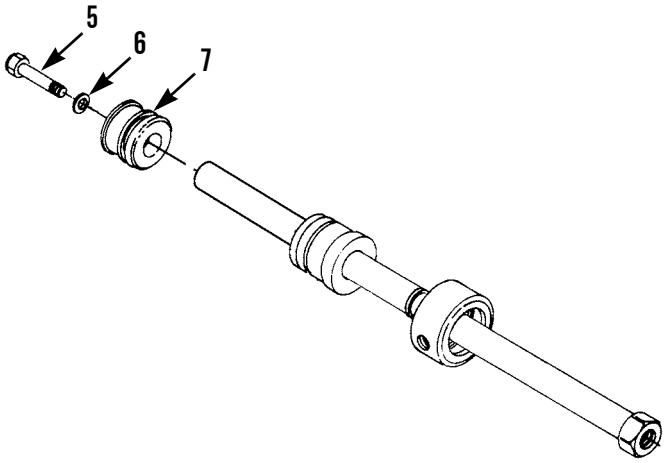
ASSEMBLY - CONTINUED

7. Install new seal assembly (10) and ring (8) on piston (9).



397-1932

8. Install linear actuator assembly (7).
9. Apply thread lubricant to threads of bolt (5).
10. Install bolt (5) and washer (6). Torque bolt to 720 to 880 lb-ft (976 to 1,193 Nm).



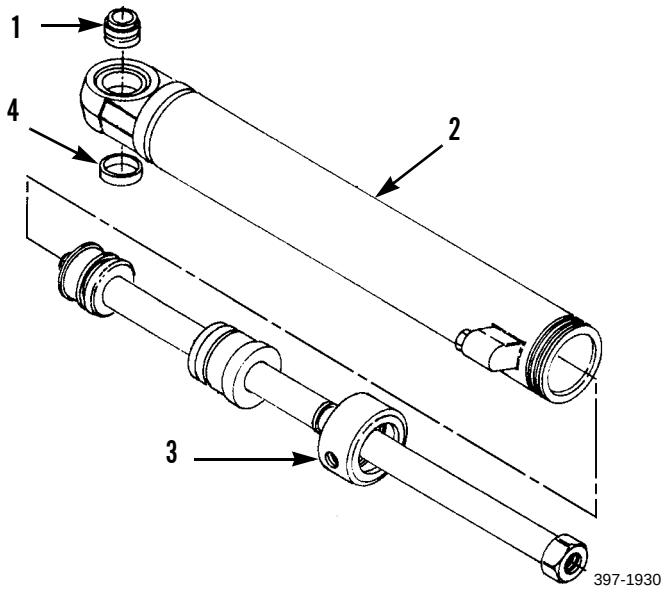
397-1931

11. Lubricate outside of bearing (1), inside of linear actuator cap assembly (3), and inside of cylinder tube (2) thoroughly with hydraulic oil.
12. Install cylinder tube (2).

NOTE

Tighten linear actuator cap with cylinder shaft fully extended. This will keep cylinder, piston, and head in alignment.

13. Tighten linear actuator cap assembly (3) to 450 lb-ft (610 Nm) on cylinder tube (2).
14. Install bearing (1) and two rings (4).
15. Install steering cylinder (WP 0176 00).



397-1930

END OF WORK PACKAGE

STEERING VALVE MAINTENANCE (DUAL VALVE DESIGN) 0321 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wood block

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (11)

References

WP 0020 00

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hoses disconnected (WP 0171 00)

REMOVAL

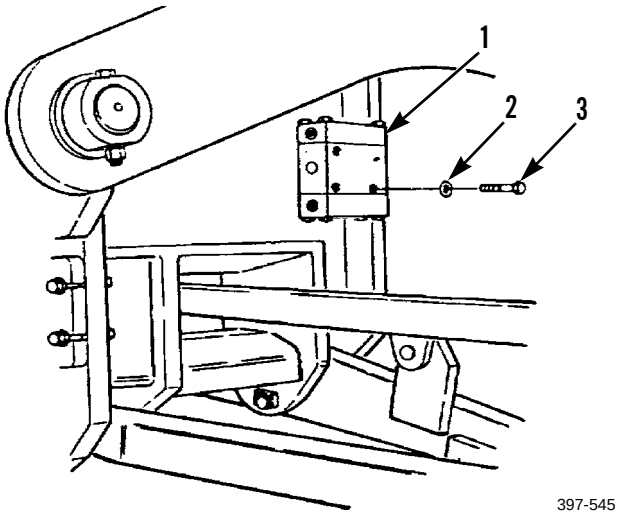
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

The following is a maintenance procedure for the left steering valve. The maintenance procedure for the right steering valve is identical.

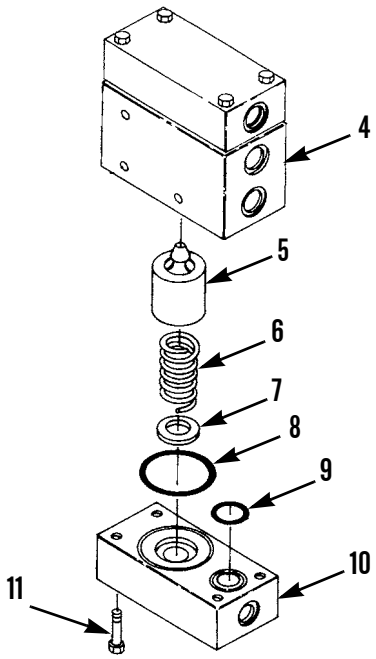
Remove three bolts (3), washers (2), and left steering valve (1).



397-545

DISASSEMBLY

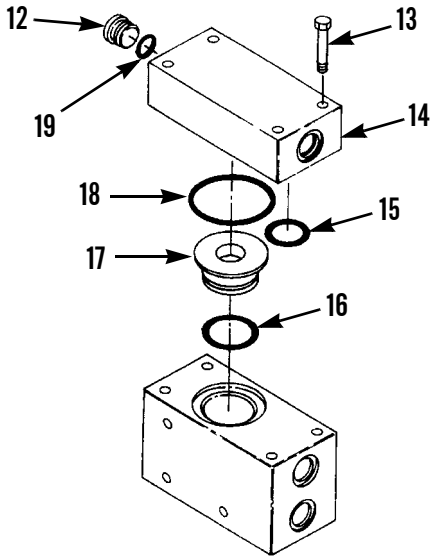
1. Evenly loosen four bolts (11) to relieve spring (6).
2. Remove four bolts (11) and valve head (10) from relief valve body assembly (4).
3. Remove preformed packings (8 and 9) and shims (7). Discard preformed packings.
4. Remove spring (6) and valve disk (5).



397-4328

DISASSEMBLY - CONTINUED

5. Remove plug (12) and preformed packing (19). Discard preformed packing.
6. Remove four bolts (13) and valve head (14).
7. Remove and discard two preformed packings (15 and 18).
8. Remove seat (17).
9. Remove and discard preformed packing (16).



397-4329

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install new preformed packing (16).
2. Install seat (17).
3. Install two new preformed packings (18 and 15).
4. Install valve head (14) and four bolts (13).
5. Install new preformed packing (19) and plug (12).
6. Install valve disk (5) and spring (6).
7. Install shims (7) and new preformed packings (9 and 8).
8. Install valve head (10) and four bolts (11) evenly on relief valve body assembly (4).

INSTALLATION

1. Install left steering valve (1), three washers (2), and bolts (3).
2. Connect hoses (WP 0171 00).
3. Start engine (TM 5-3805-261-10).
4. Turn steering wheel to the right while moving the machine slowly forward a few feet.
5. Turn steering wheel to the left while moving the machine slowly forward a few feet.
6. Repeat steps 13 and 14 at least five times to bleed air from system.
7. Stop engine.
8. Check for leaks.
9. Refill hydraulic tank to proper level (WP 0216 00).

END OF WORK PACKAGE

STEERING VALVE MAINTENANCE (SINGLE VALVE DESIGN) 0322 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

O-ring

Packing, preformed (6)

References

WP 0020 00

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

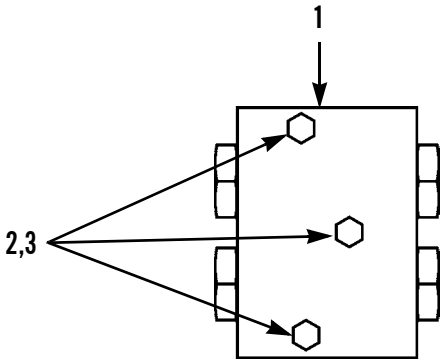
Hydraulic hoses, lines, and fittings disconnected (WP 0169 00)

REMOVAL

CAUTION

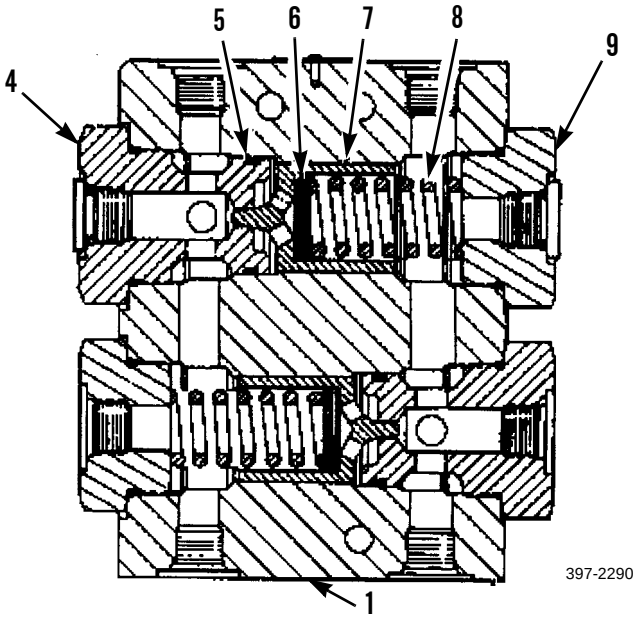
Cap hose ends and plug open ports to prevent contamination.

1. Remove three bolts (2), washers (3), and steering valve (1).



397-2289

2. Remove adapter (9).
3. Remove O-ring (5), valves (7), shims (6), and spring (8).
4. Remove seat (4).
5. Repeat steps 1 through 3 for bottom half of valve.



397-2290

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install new O-ring (5).
2. Install seat (4).
3. Install valves (7), shims (6), and spring (8) on steering valve (1).
4. Install adapters (9).
5. Repeat steps 1 through 4 for bottom half of valve.

INSTALLATION

1. Install steering valve (1), three washers (3), and bolts (2).
2. Connect hydraulic hoses, lines, and fittings (WP 0169 00).
3. Start engine (TM 5-3805-261-10).
4. Turn steering wheel to the right while moving the machine slowly forward a few feet.
5. Turn steering wheel to the left while moving the machine slowly forward a few feet.
6. Repeat steps 4 and 5 at least five times to bleed air from system.
7. Stop engine.
8. Inspect hose assemblies and connections for leaks.
9. Refill hydraulic tank to proper level (WP 0216 00).

END OF WORK PACKAGE

COMBINATION VALVE MAINTENANCE 0323 00

THIS WORK PACKAGE COVERS

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

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Indicator, dial (Item 32, WP 0348 00)

Test, spring resiliency (Item 88, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

O-ring (11)

Packing, preformed (27)

Pin, cotter

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hydraulic tank drained (WP 0216 00)

Supplemental steering pressure switch disconnected (WP 0087 00)

WARNING

Lubricating/hydraulic oils, engine coolant, fuel, and other fluids used in the performance of maintenance can be very slippery. Immediately wipe up any spills. Failure to follow this warning may cause injury to personnel

REMOVAL

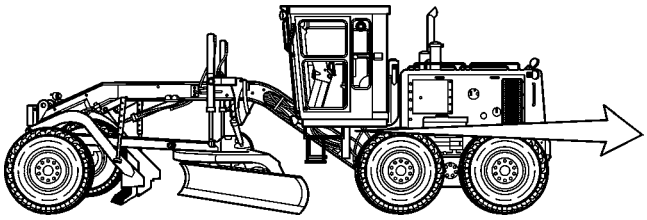
CAUTION

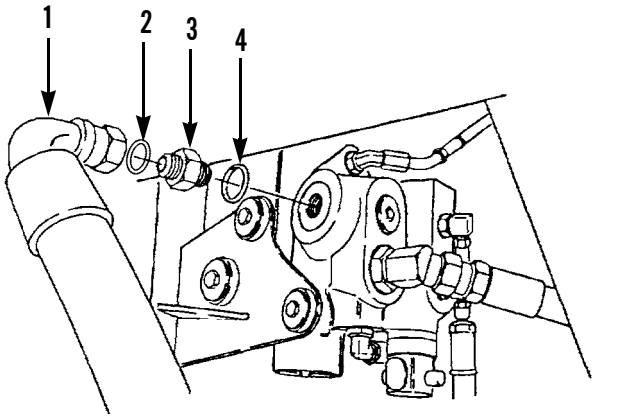
Cap hose and tube ends and plug open ports to prevent contamination.

NOTE

Tag hose and tube assemblies before disconnecting to aid in installation.

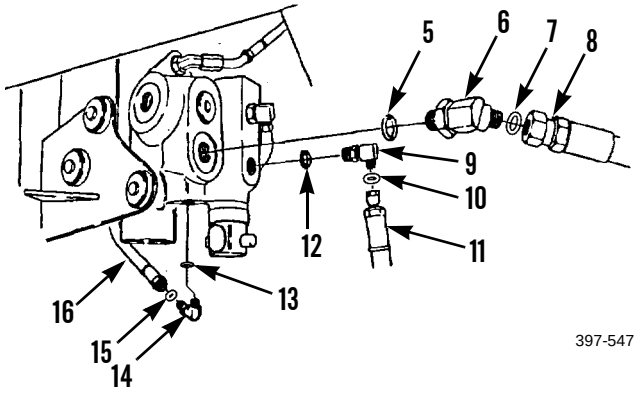
1. Disconnect tube assembly (1) and remove O-ring (2). Discard O-ring.
2. Remove connector (3) and preformed packing (4). Discard preformed packing.





397-546

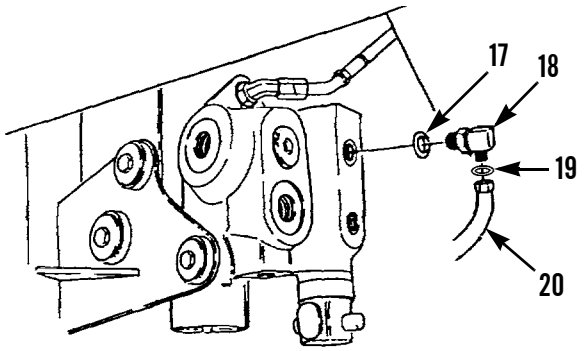
3. Disconnect hose assembly (16) and remove O-ring (15) from bottom of valve. Discard O-ring.
4. Remove elbow (14) and preformed packing (13). Discard preformed packing.
5. Disconnect hose assembly (8) and remove O-ring (7). Discard O-ring.
6. Remove elbow (6) and preformed packing (5). Discard preformed packing.
7. Disconnect hose assembly (11) and remove O-ring (10). Discard O-ring.
8. Remove elbow (9) and preformed packing (12). Discard preformed packing.



397-547

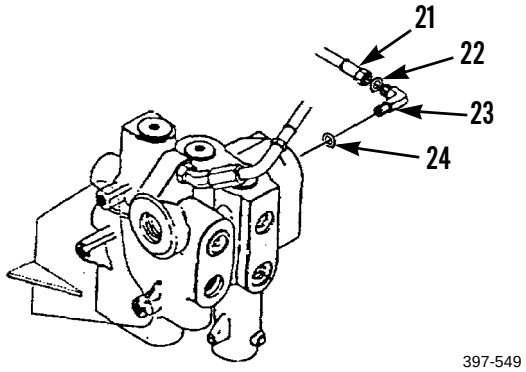
REMOVAL - CONTINUED

9. Disconnect hose assembly (20) and remove O-ring (19). Discard O-ring.
10. Remove elbow (18) and preformed packing (17). Discard preformed packing.



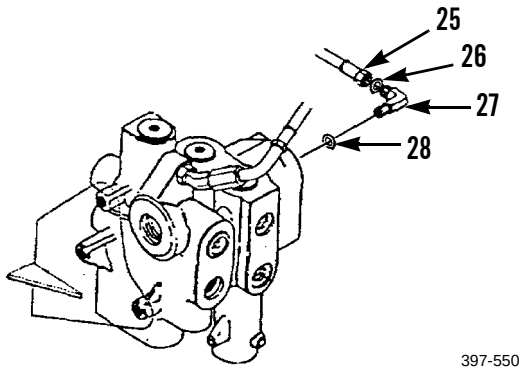
397-548

11. Disconnect hose assembly (21) and remove O-ring (22). Discard O-ring.
12. Remove elbow (23) and preformed packing (24). Discard preformed packing.



397-549

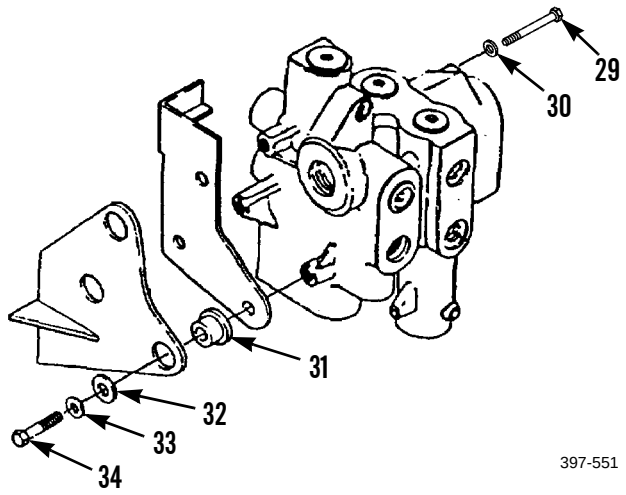
13. Disconnect hose assembly (25) and remove O-ring (26). Discard O-ring.
14. Remove elbow (27) and preformed packing (28). Discard preformed packing.



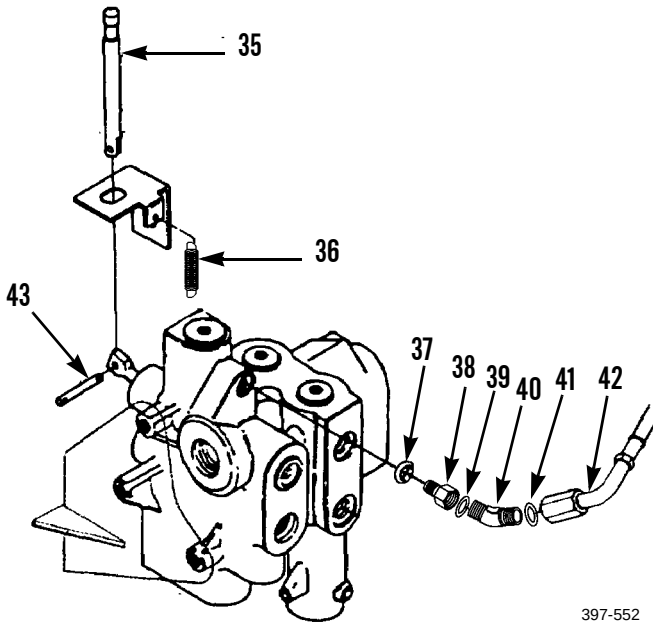
397-550

REMOVAL - CONTINUED

15. Remove three bolts (29), washers (30), bolts (34), washers (33 and 32), and mountings (31).

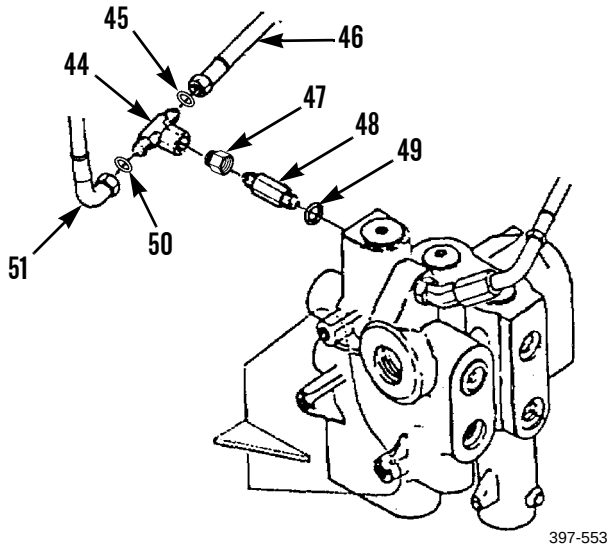


16. Remove spring (36), cotter pin (43), and pin (35). Discard cotter pin.
17. Disconnect hose assembly (42) from elbow (40).
18. Remove elbow (40), adapter (38), O-rings (39 and 41), and preformed packing (37). Discard preformed packing and O-ring.

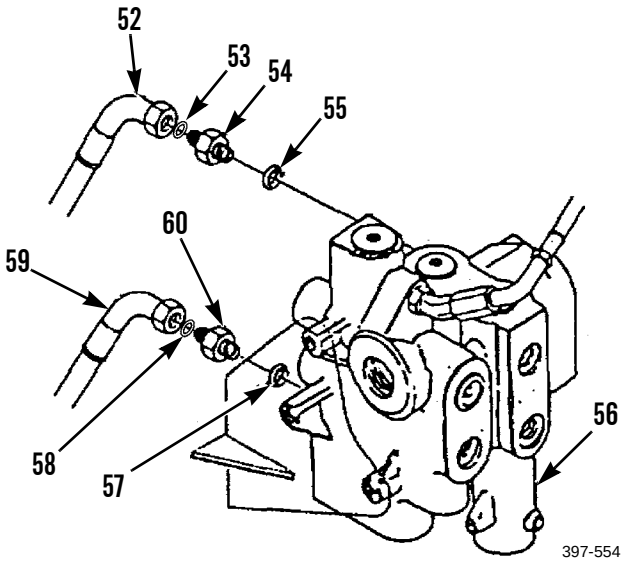


REMOVAL - CONTINUED

19. Disconnect hose (51) and remove O-ring (50) from tee (44). Discard O-ring.
20. Disconnect hose (46) and remove O-ring (45) from tee (44). Discard O-ring.
21. Remove tee (44), adapter (47), valve (48), and preformed packing (49). Discard preformed packing.

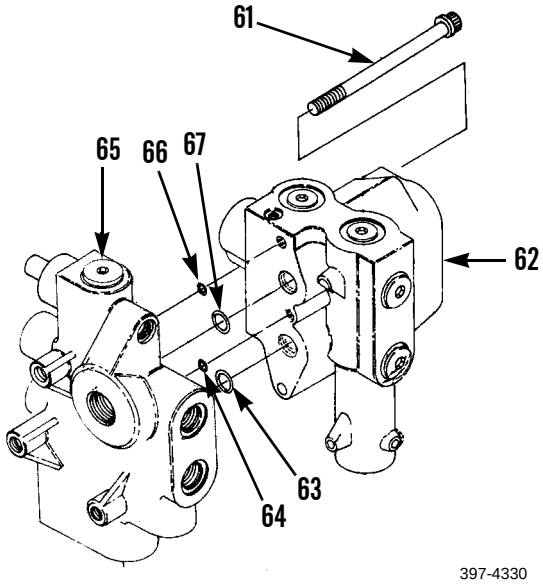


22. Disconnect hose assembly (59).
23. Remove connector (60), O-ring (58), and preformed packing (57). Discard preformed packing and O-ring.
24. Disconnect hose assembly (52).
25. Remove connector (54), O-ring (53), and preformed packing (55). Discard preformed packing and O-ring.
26. Remove combination valve (56).
27. Remove all fittings, adapters, preformed packings, and O-rings. Discard O-rings and preformed packings.



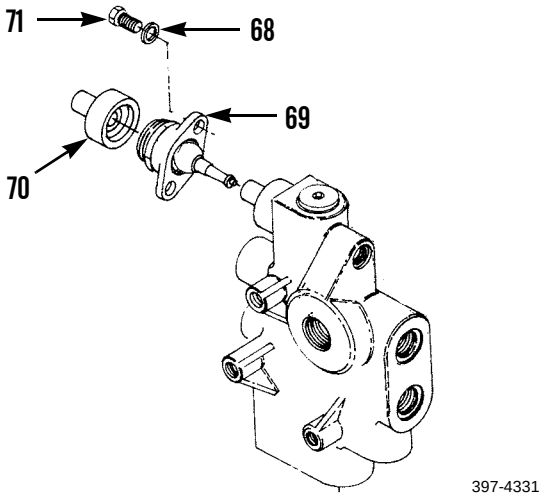
DISASSEMBLY

1. Remove three bolts (61).
2. Remove unloader valve assembly (65) from valve body assembly (62).
3. Remove and discard preformed packings (63, 64, 66, and 67).



397-4330

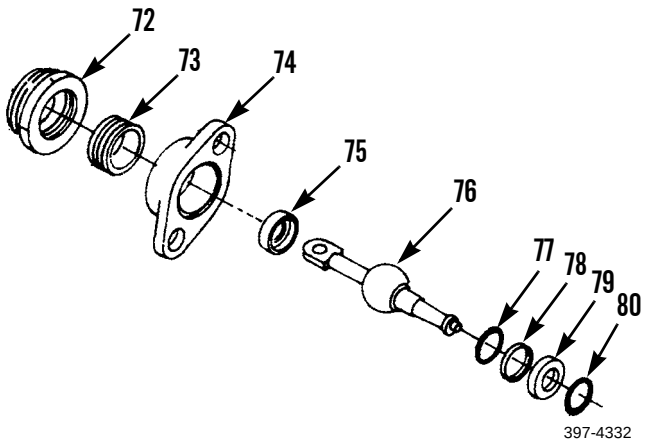
4. Remove two bolts (71), washers (68), boot (70), and manual control lever assembly (69).



397-4331

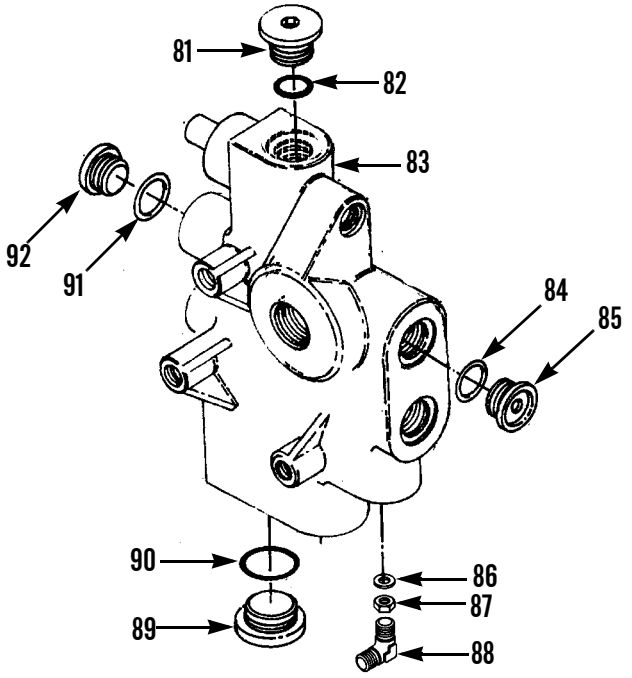
DISASSEMBLY - CONTINUED

5. Remove housing (74), preformed packing (80), bearing (79), ring (78), preformed packing (77), lever (76), and bearing (75). Discard preformed packings.
6. Remove nut (72) and threaded ring (73) from housing (74).



397-4332

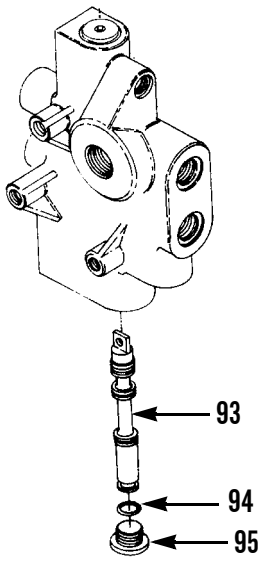
7. Remove plug (81) and preformed packing (82). Discard preformed packing.
8. Remove plug (92) and preformed packing (91). Discard preformed packing.
9. Remove plug (85) and preformed packing (84). Discard preformed packing.
10. Remove nut (87), washer (86), and elbow (88).
11. Remove plug (89) and preformed packing (90) from body (83). Discard preformed packing.



397-4333

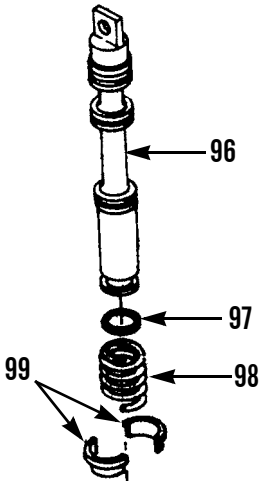
DISASSEMBLY - CONTINUED

12. Remove plug (95), preformed packing (94), and stem assembly (93). Discard preformed packing.



397-4334

13. Compress spring (98).
14. Remove two retainers (99), spring (98), and washer (97) from stem (96).



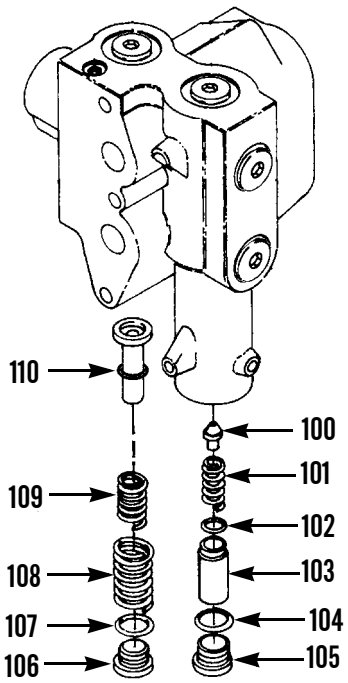
397-4335

DISASSEMBLY - CONTINUED

NOTE

Retain shims for reassembly.

15. Remove plug (105), preformed packing (104), retainer (103), shims (102), spring (101), and valve (100). Discard preformed packing.
16. Remove plug (106), preformed packing (107), springs (108 and 109), and valve stop assembly (110). Discard preformed packing.

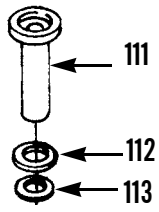


397-4336

NOTE

Retain shims for reassembly.

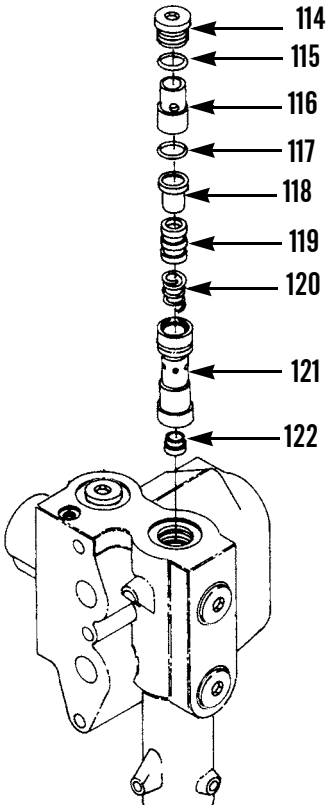
17. Remove washer (113) and shims (112) from stop (111).



397-4337

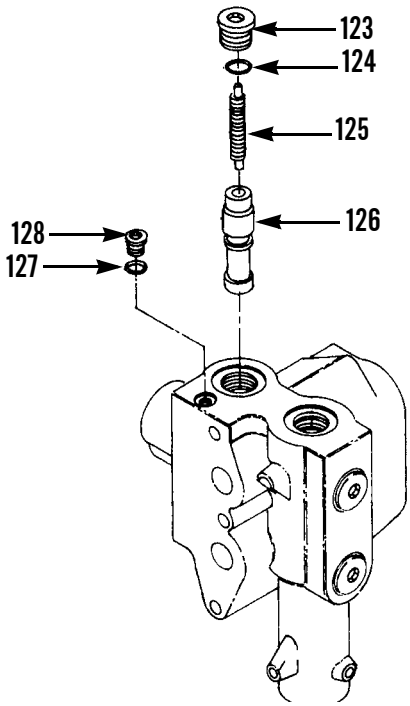
DISASSEMBLY - CONTINUED

18. Remove plug (114), preformed packing (115), spacer (116), preformed packing (117), spacer (118), valve (119), spring (120), body (121), and seat (122). Discard preformed packings.



397-4338

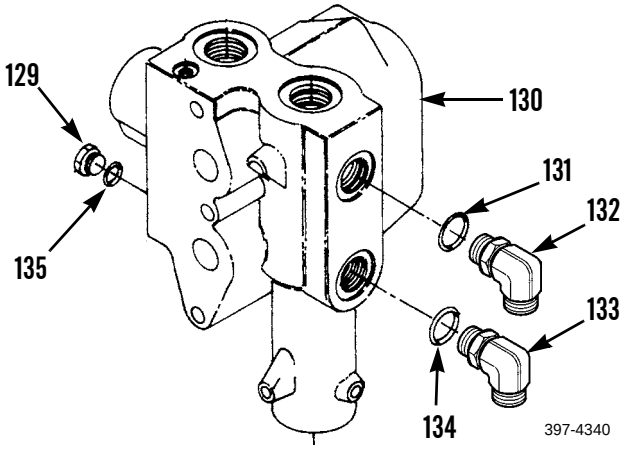
19. Remove plug (123), preformed packing (124), piston (125), and stem assembly (126). Discard preformed packing.
20. Remove plug (128) and preformed packing (127). Discard preformed packing.



397-4339

DISASSEMBLY - CONTINUED

21. Remove plug (129) and preformed packing (135). Discard preformed packing.
22. Remove elbow (133) and preformed packing (134). Discard preformed packing.
23. Remove elbow (132) and preformed packing (131) from body (130). Discard preformed packing.
24. Remove supplemental steering pressure switch (WP 0087 00).



CLEANING AND INSPECTION

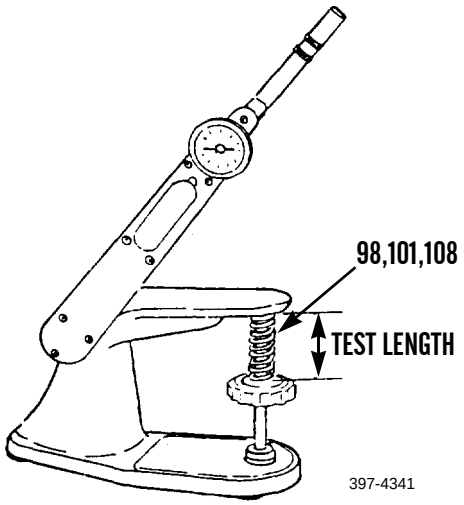
Clean and inspect all parts in accordance with WP 0020 00.

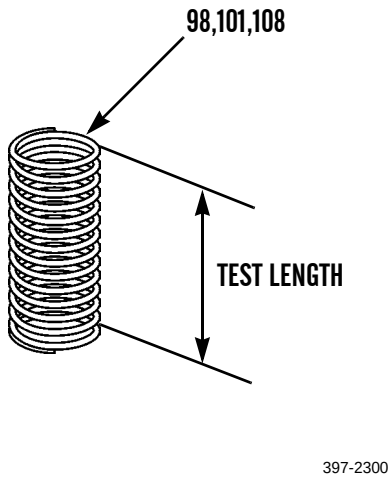
TESTING

NOTE

Replace springs if broken, collapsed, have twisted coils, or are out of tolerance.

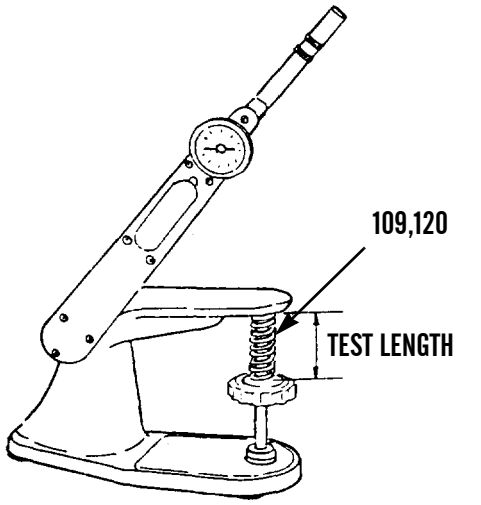
1. Use spring tester and torque wrench to apply test load to spring (98). Test load is 24.99 to 27.61 lb (11.34 to 12.52 kg).
2. Measure length of spring (98). Test length is 1.53 in. (3.89 mm).
3. Remove test load.
4. Measure free length of spring (98). Free length should be 2.375 in. (6.03 mm).
5. Use spring tester and torque wrench to apply test load to spring (101). Test load is 64 to 70 lb (29 to 32 kg).
6. Measure length of spring (101). Test length should be 1.43 in. (3.63 mm).
7. Remove test load.
8. Measure free length of spring (101). Free length should be 1.74 in. (4.42 mm).
9. Use spring tester and torque wrench to apply test load to spring (108). Test load is 63.9 to 75.1 lb (29.0 to 34.1 kg).
10. Measure length of spring (108). Test length should be 1.66 in. (4.22 mm).
11. Remove test load.
12. Measure free length of spring (108). Free length should be 2.42 in. (6.15 mm).



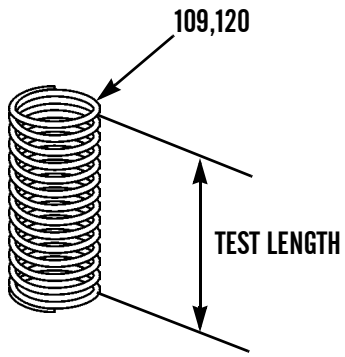


TESTING - CONTINUED

13. Use spring tester and torque wrench to apply test load to spring (109). Test load is 26.3 to 30.9 lb (11.9 to 14.0 kg).
14. Measure length of spring (109). Test length should be 1.66 in. (4.22 cm).
15. Remove test load.
16. Measure free length of spring (109). Free length should be 2.46 in. (6.25 cm).
17. Use spring tester and torque wrench to apply test load to spring (120). Test load is 8 lb (3.6 kg).
18. Measure length of spring (120). Test length should be 0.80 in. (20.3 mm).
19. Remove test load.
20. Measure free length of spring (120). Free length should be 1.2 in. (3.0 cm).



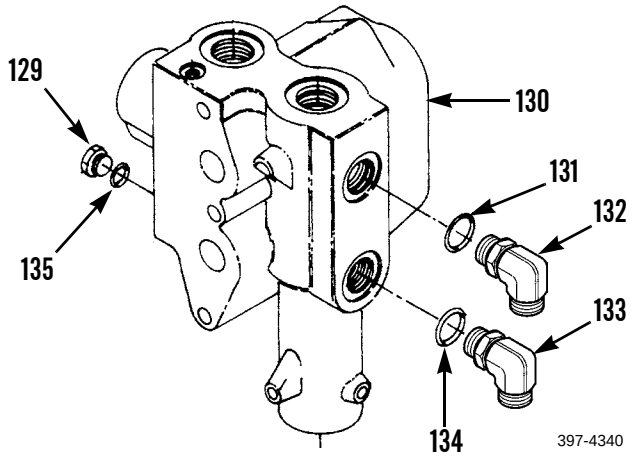
397-2299



397-2300

ASSEMBLY

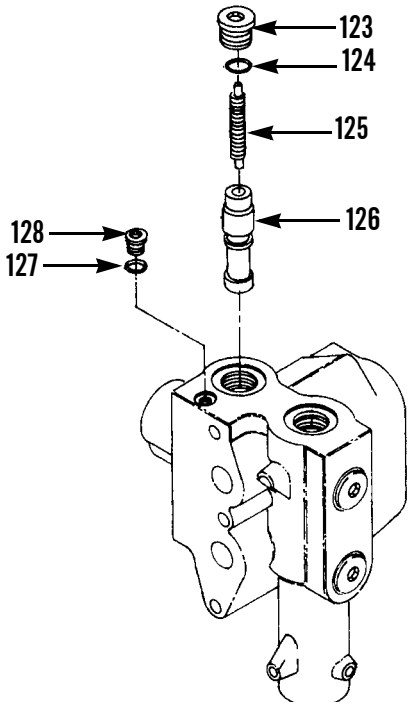
1. Install supplemental steering pressure switch (WP 0087 00).
2. Install new preformed packing (131) and elbow (132) in body (130).
3. Install new preformed packing (134) and elbow (133).
4. Install new preformed packing (135) and plug (129).



397-4340

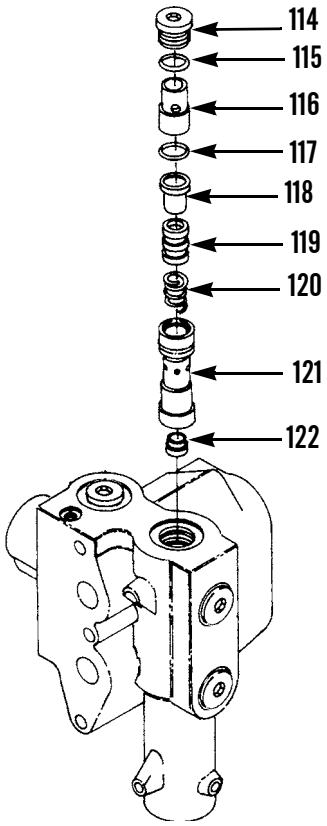
ASSEMBLY - CONTINUED

5. Install new preformed packing (127) and plug (128).
6. Install stem assembly (126), piston (125), new preformed packing (124), and plug (123).



397-4339

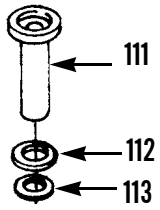
7. Install seat (122), body (121), spring (120), valve (119), spacer (118), new preformed packing (117), spacer (116), new preformed packing (115), and plug (114).



397-4338

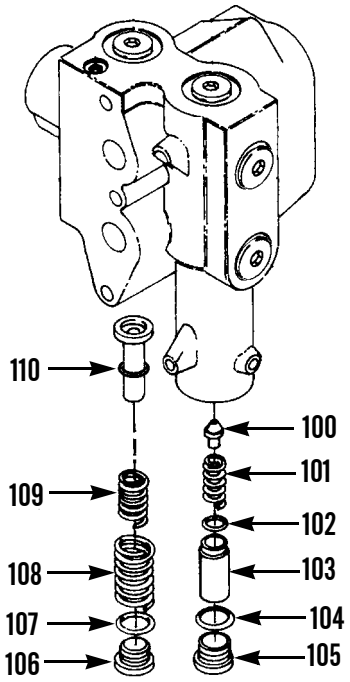
ASSEMBLY - CONTINUED

8. Install shims (112) and washer (113) to stop (111).



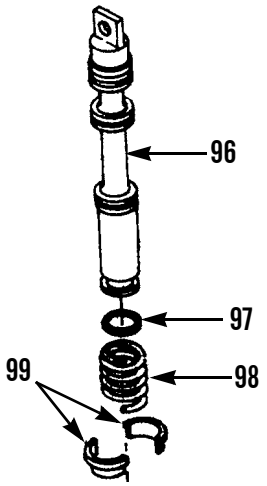
397-4337

9. Install valve stop assembly (110), springs (108 and 109), new preformed packing (107), and plug (106).
10. Install valve (100), spring (101), shim (102), retainer (103), new preformed packing (104), and plug (105).



397-4336

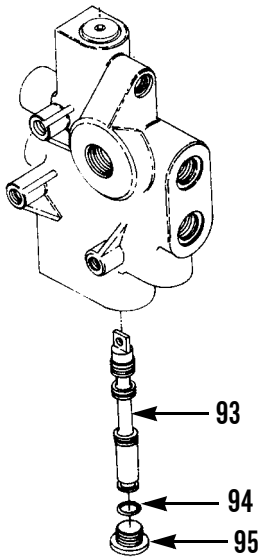
11. Install washer (97) and spring (98) on stem (96).
12. Compress spring (98).
13. Install two retainers (99).



397-4335

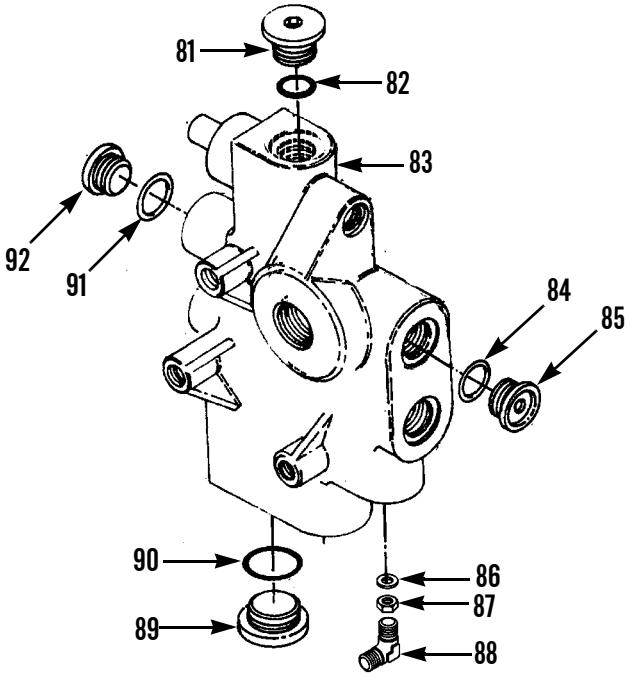
ASSEMBLY - CONTINUED

14. Install stem assembly (93), new preformed packing (94), and plug (95).



397-4334

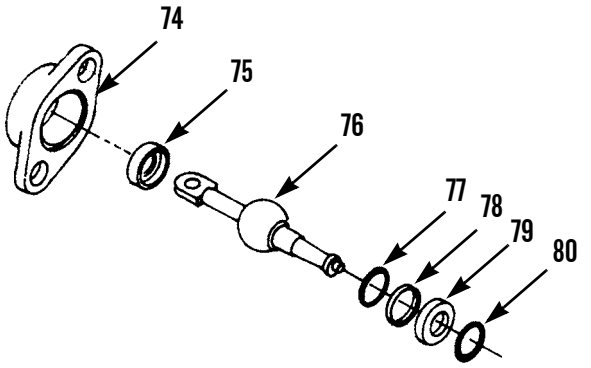
15. Install new preformed packing (90) and plug (89) in body (83).
16. Install elbow (88), washer (86), and nut (87).
17. Install new preformed packing (84) and plug (85).
18. Install new preformed packing (91) and plug (92).
19. Install new preformed packing (82) and plug (81).



397-4333

ASSEMBLY - CONTINUED

20. Install new preformed packings (77 and 80), ring (78), and bearings (75 and 79) on lever (76).
21. Install housing (74).

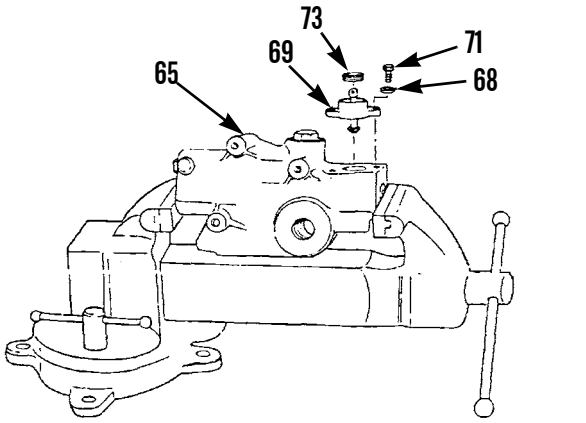


397-4343

NOTE

Place unloader valve in vise.

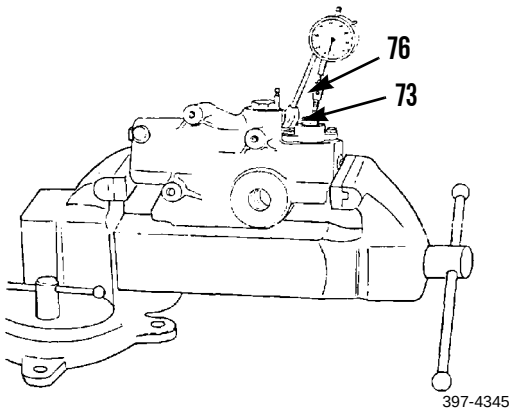
22. Install manual control lever assembly (69), two washers (68), and bolts (71) in unloader valve assembly (65).
23. Install threaded ring (73).

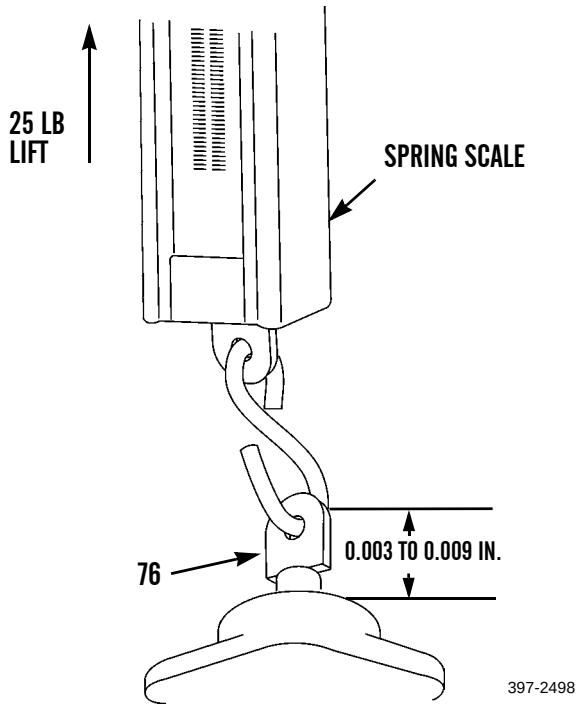


397-4344

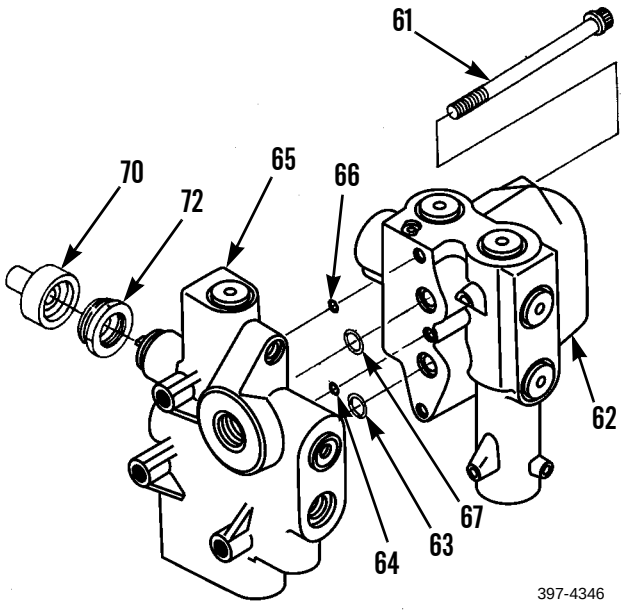
ASSEMBLY - CONTINUED

24. Lift lever (76) with a force of 25 lb (11.3 kg) using a spring scale.
25. Adjust threaded ring (73). Turn threaded ring in or out until end play of lever (76) is 0.003 to 0.009 in. (0.076 to 0.23 mm).



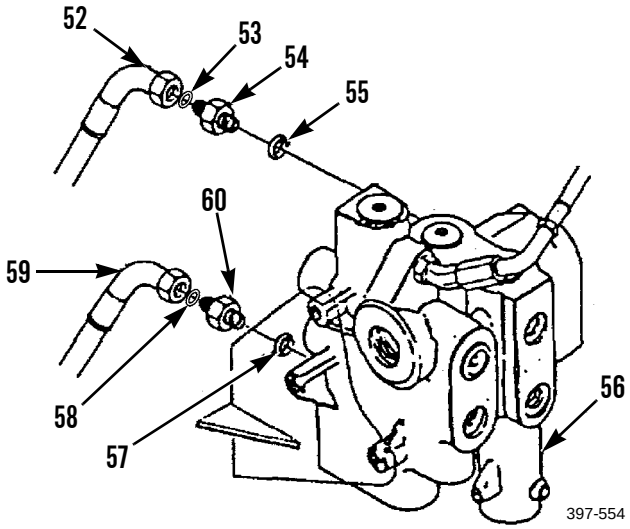


26. Install nut (72) and boot (70).
27. Install new preformed packings (63, 64, 66, and 67), unloader valve assembly (65) with valve body assembly (62), and three bolts (61).

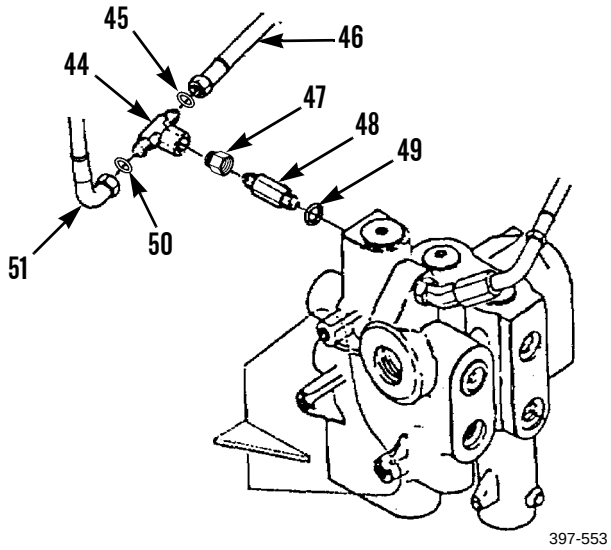


INSTALLATION

1. Position combination valve (56).
2. Install new preformed packing (55) and connector (54).
3. Install new O-ring (53) and connect hose assembly (52).
4. Install new preformed packing (57) and connector (60).
5. Install new O-ring (58) and connect hose assembly (59) to connector (60).

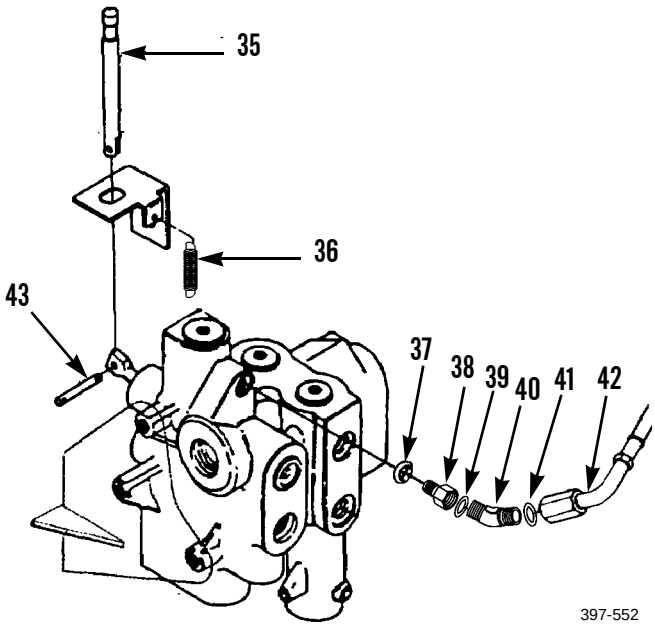


6. Install new preformed packing (49), new O-rings (45 and 50), valve (48), adapter (47), and tee (44).
7. Connect hose assembly (46) to tee (44).
8. Connect hose assembly (51) to tee (44).

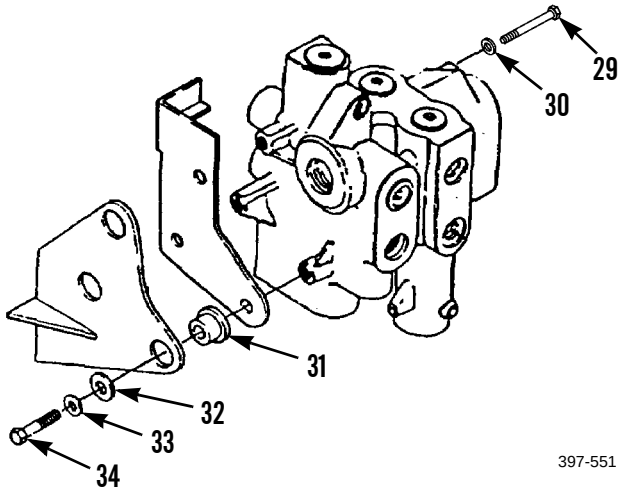


INSTALLATION - CONTINUED

9. Install new preformed packing (37), adapter (38), new O-ring (39), and elbow (40).
10. Install new O-ring (41) and connect hose assembly (42) to elbow (40).
11. Install pin (35), new cotter pin (43), and spring (36).

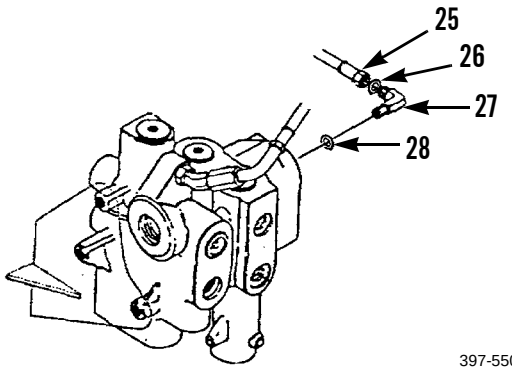


12. Install three mountings (31), washers (33 and 32), bolts (34), washers (30), and bolts (29).

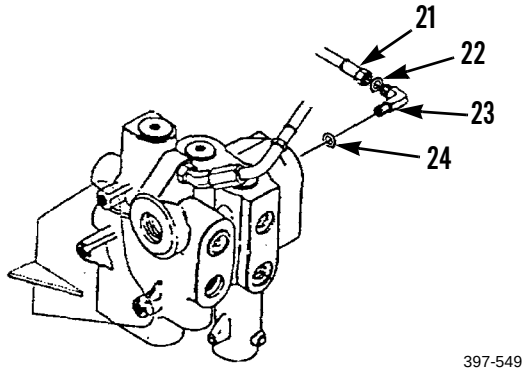


INSTALLATION - CONTINUED

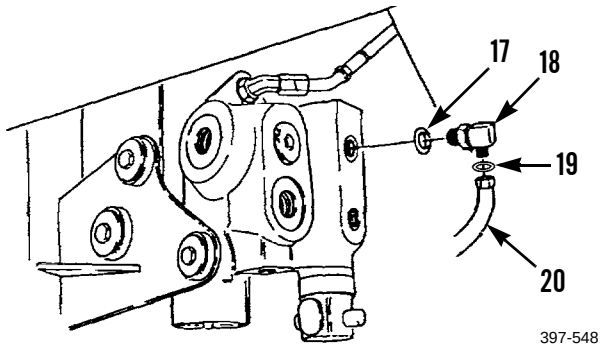
13. Install new preformed packing (28) and elbow (27).
14. Install new O-ring (26) and connect hose assembly (25).



15. Install new preformed packing (24) and elbow (23).
16. Install new O-ring (22) and connect hose assembly (21).

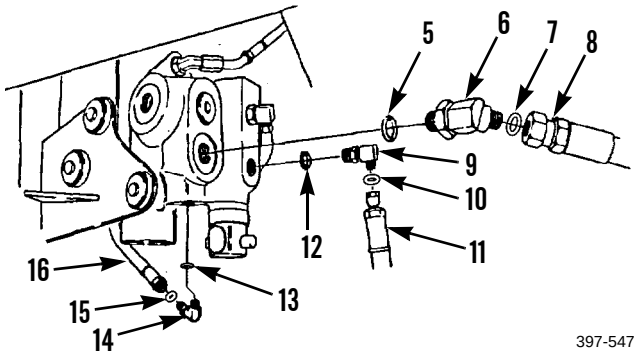


17. Install new preformed packing (17) and elbow (18).
18. Install new O-ring (19) and connect hose assembly (20).

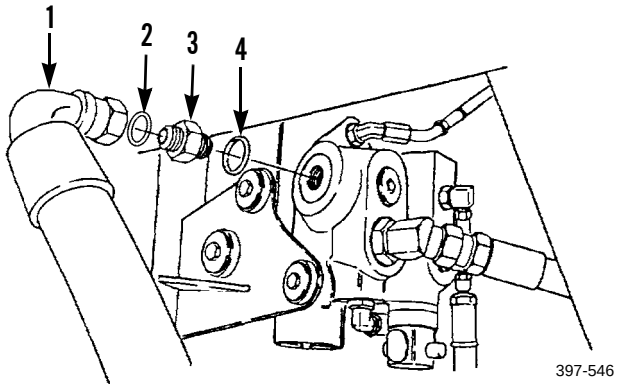


INSTALLATION - CONTINUED

19. Install new preformed packing (12) and elbow (9).
20. Install new O-ring (10) and connect hose assembly (11).
21. Install new preformed packing (5) and elbow (6).
22. Install new O-ring (7) and connect hose assembly (8).
23. Install new preformed packing (13) and elbow (14).
24. Install new O-ring (15) and connect hose assembly (16).
25. Install new preformed packing (4) and connector (3).
26. Install new O-ring (2) and connect tube assembly (1).



397-547



397-546

27. Install supplemental steering pressure switch (WP 0087 00).
28. Fill hydraulic tank to proper level (WP 0216 00).
29. Start engine (TM 5-3805-261-10).
30. Turn steering wheel to the left and right while moving the machine slowly forward a few feet.
31. Repeat step 29 at least five times to bleed air from system.
32. Stop engine.
33. Inspect hose assemblies and connections for leaks.

END OF WORK PACKAGE

FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) 0324 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Jack, hydraulic (Item 37, WP 0348 00)

Jack stand (Item 84, WP 0348 00)

Wrench, torque (Item 99, WP 0348 00)

Bolt, 5/8-11NC x 6 (2)

Heavy-duty forklift truck

Pusher bolt, 3/8-16NC (2)

Wood block

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Lockwasher (36)

Pin, cotter

Personnel Required

Two

References

WP 0020 00

WP 0152 00

WP 0212 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Air pressure relieved (TM 5-3805-261-10)

Equipment Conditions - Continued

Left and right side engine panels removed (WP 0182 00)

Engine coolant drained (WP 0024 00)

Wheel lean lock bolt installed (TM 5-3805-261-10)

Hydraulic pump drive shaft removed (WP 0232 00)

Seat removed (CCE Machine) (WP 0200 00)

Supplemental steering lines to hydraulic tank disconnected (WP 0172 00 and WP 0173 00)

Hydraulic hose disconnected at hydraulic tank (0250 00)

Oil cooler to hydraulic pump relief valve disconnected (0250 00)

Hydraulic line disconnected at relief valve (0250 00)

Disconnect switch cable disconnected at starting motor and mounting hardware removed (WP 0142 00)

Main harness disconnected from all items in engine compartment and mounting hardware removed (0286 00)

Blackout light harness disconnected from rear blackout lights and mounting hardware removed (WP 0287 00)

Supplemental steering harness disconnected from all items in engine compartment and mounting hardware removed (WP 0290 00)

EMS harness disconnected from all items in engine compartment and mounting hardware removed (WP 0291 00)

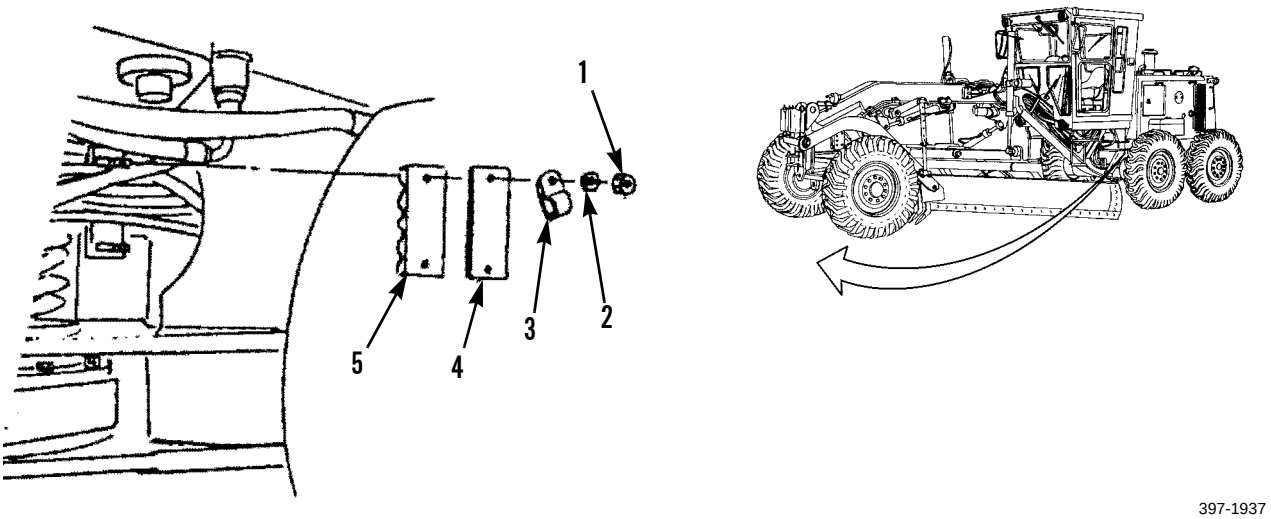
Air brake lines disconnected from brake control valve (WP 0161 00)

Front pin of articulation cylinder disconnected (WP 0336 00)

FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0324 00

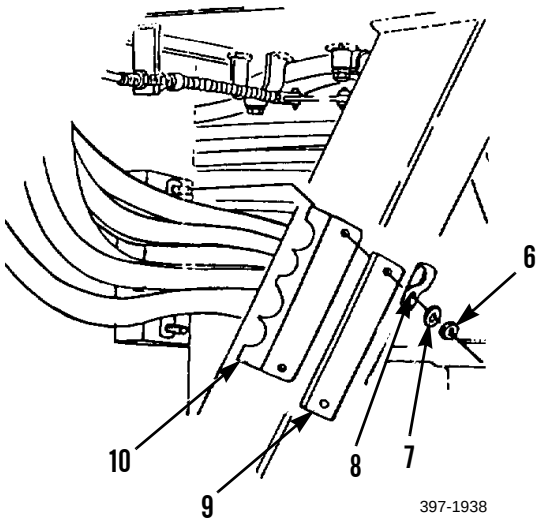
REMOVAL

1. Remove two nuts (1), washers (2), clip (3), plate (4), and clamp (5).



397-1937

2. Remove two nuts (6), washers (7), clip (8), plate (9), and clamp (10) from under left-rear of cab.



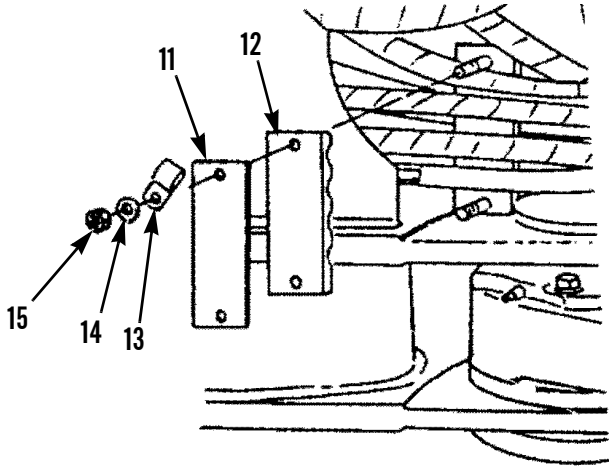
397-1938

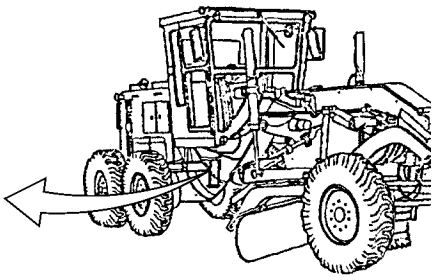
FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED

0324 00

REMOVAL - CONTINUED

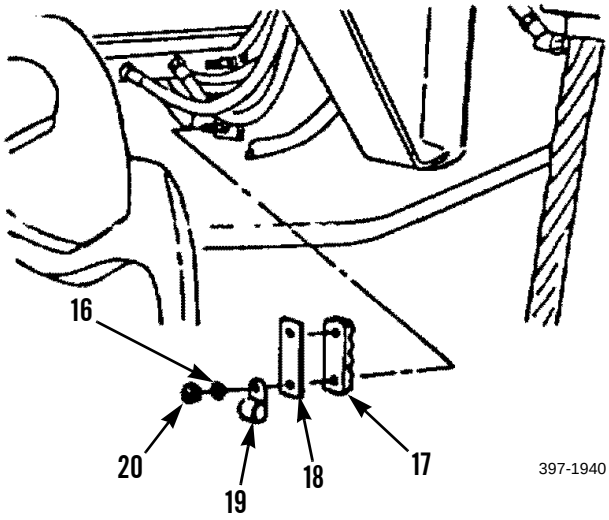
3. Remove two nuts (15), washers (14), clip (13), plate (11), and clamp (12).





397-1939

4. Remove two nuts (20), washers (16), clip (19), plate (18), and clamp (17) from under right-rear of cab.

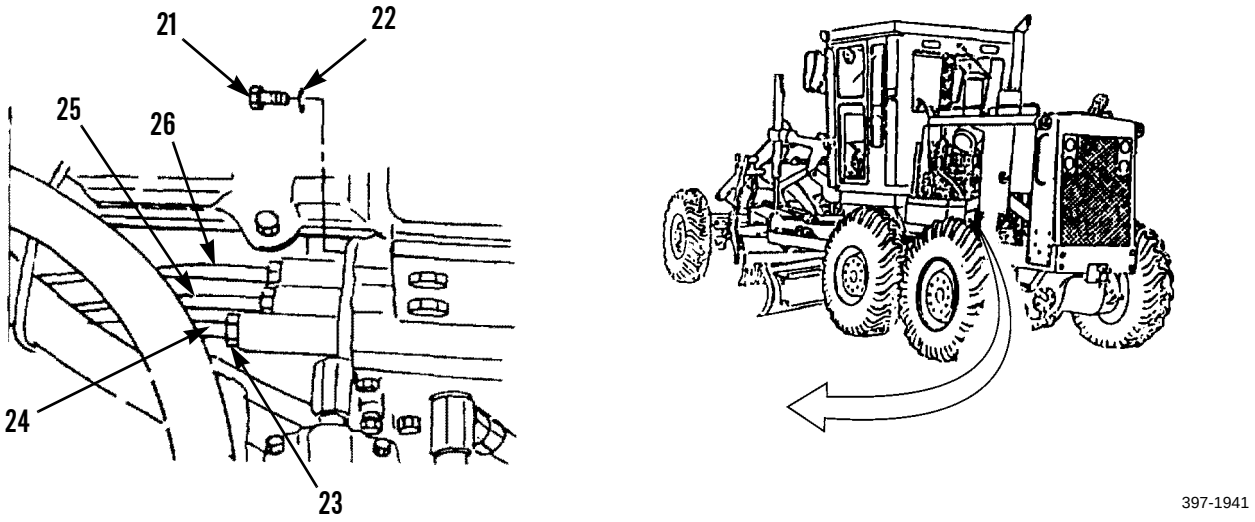


397-1940

FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0324 00

REMOVAL - CONTINUED

5. Remove two bolts (21) and washers (22).
6. Loosen three nuts (23) and slide back on control cable assemblies (24, 25, and 26).

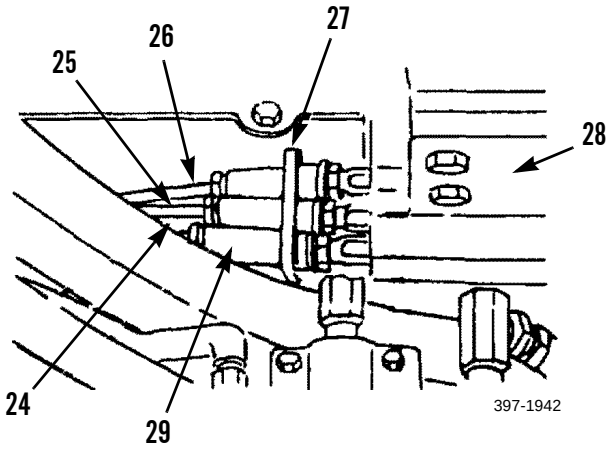


7. Slide back retainer (27) and three couplings (29) on cable assemblies (24, 25, and 26).

NOTE

Tag wire, cable, and harness assemblies before disconnecting to aid in installation.

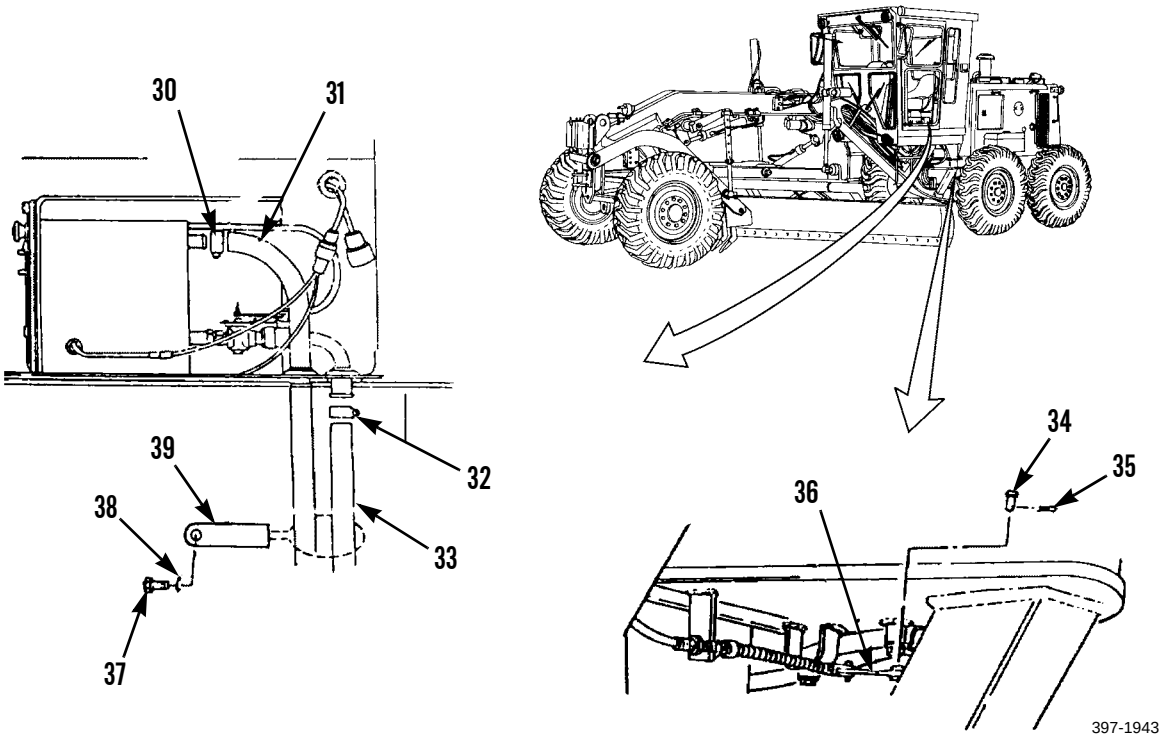
8. Separate three cable assemblies (24, 25, and 26) from transmission control valves (28) (WP 0152 00).
9. Pull cable assemblies (24, 25, and 26) forward from engine compartment and position cable assembly (26) alongside left side of cab and cable assemblies (24 and 25) alongside right side of cab.



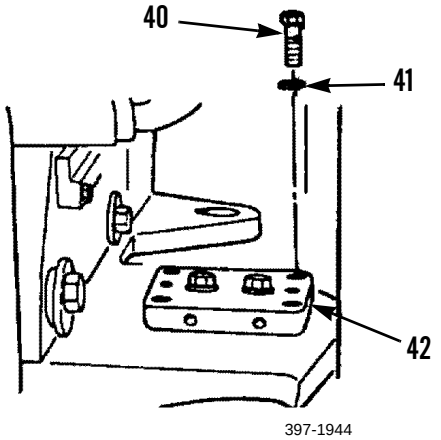
FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED **0324 00**

REMOVAL - CONTINUED

10. Remove bolt (37), washer (38), and clip (39) (WP 0212 00).
11. Remove clamp (32) and position heater hose (33) to rear of machine.
12. Remove clamp (30) and position heater hose (31) to rear of machine.
13. Remove cotter pin (35) and pin (34) from articulation indicator linkage (36). Discard cotter pin.



14. Position forklift at rear frame of machine.
15. Position two jack stands under operator's platform on each side of machine.
16. Position all wire, cable, and harness assemblies on front of machine.
17. Position all hose assemblies on rear of machine.
18. Position wood blocks under front wheels so that wheels cannot move.
19. Remove four bolts (40) and lockwashers (41) from four corners of plate (42). Discard lockwashers.



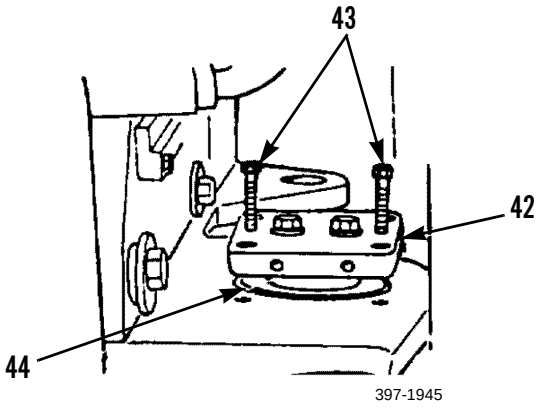
REMOVAL - CONTINUED

20. Install two 3/8-16NC pusher bolts (43) in plate (42) and pin (44). Tighten pusher bolts alternately to remove pin and plate

NOTE

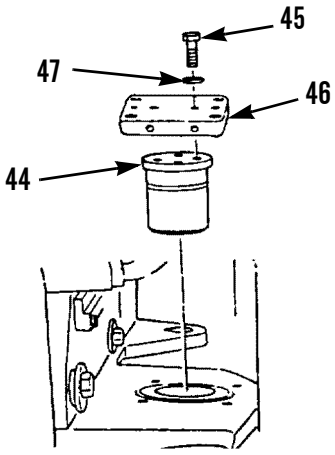
Lift or lower rear frame with forklift to remove any pressure from pin assembly.

21. Remove two 3/8-16NC pusher bolts (43).



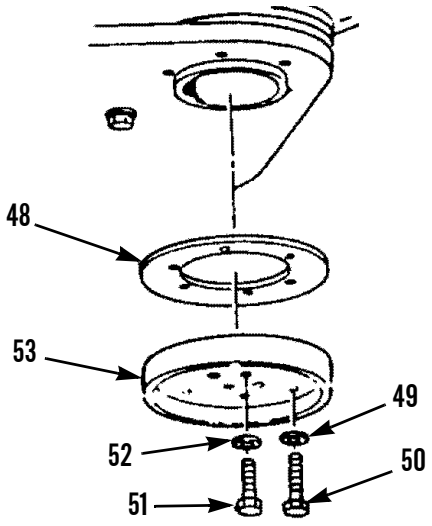
397-1945

22. Remove two bolts (45), lockwashers (47), and plate (46) from pin (44). Discard lockwashers.



397-1946

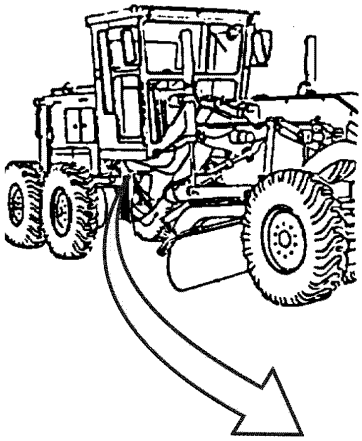
23. Remove four bolts (51), lockwashers (52), six bolts (50), lockwashers (49), plate (53), and shim(s) (48). Tie shim(s) together and tag for identification. Discard lockwashers.

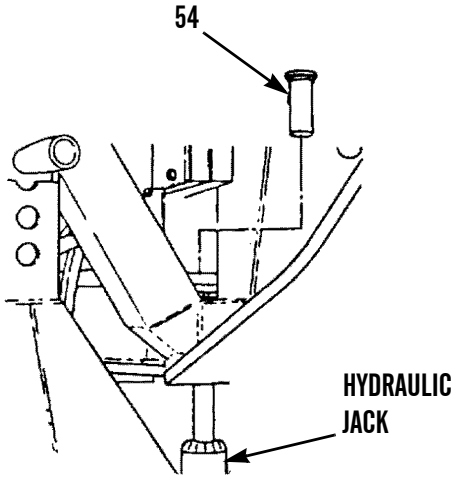


397-1947

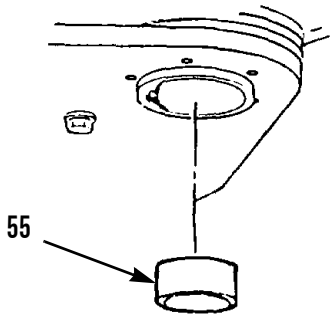
REMOVAL - CONTINUED

24. Use a hydraulic jack to remove bottom pin (54).





25. Remove spacer (55).



REMOVAL - CONTINUED

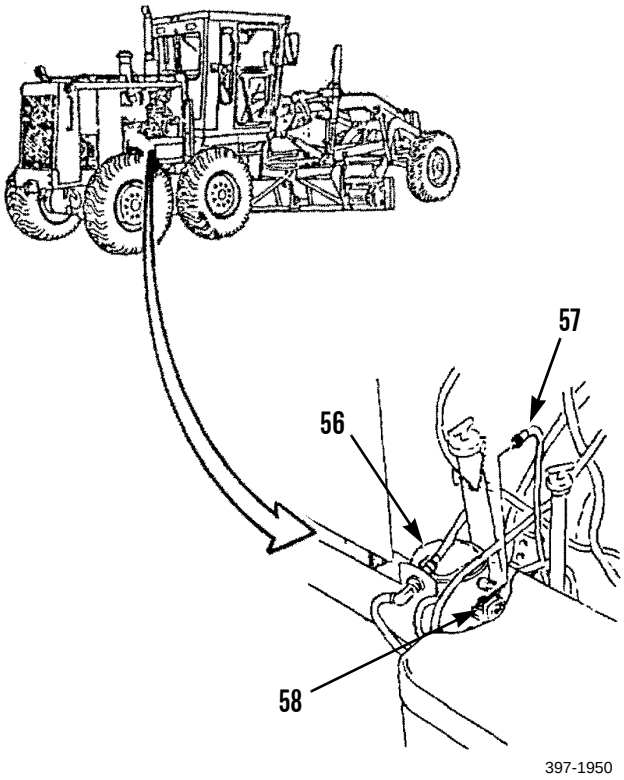
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

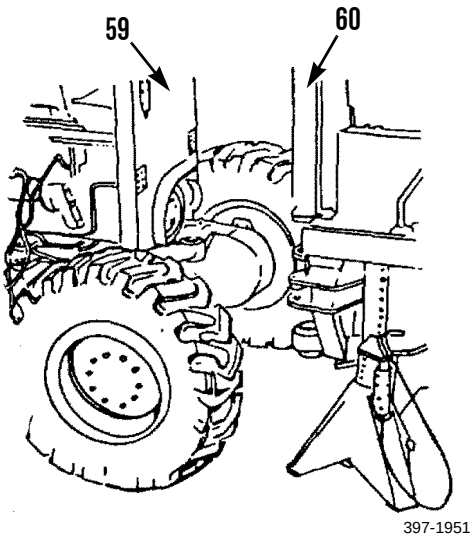
- Separation of frames is not possible until spacer has been removed.
- Tag hose assemblies before disconnecting to aid in installation.

26. Disconnect hose (57) and attach shop air supply line to elbow (58) on parking brake actuator (56).
27. Release parking brake by applying air pressure to parking brake actuator (56).



397-1950

28. Separate rear frame (59) from front frame (60) by moving rear frame rearward with forklift.
29. Install jack stands under radiator end of rear frame and remove forklift.
30. Remove shop air supply line.



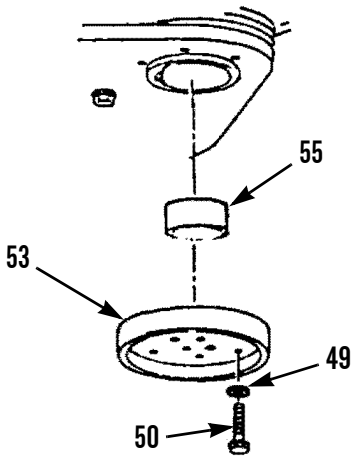
397-1951

CLEANING AND INSPECTION

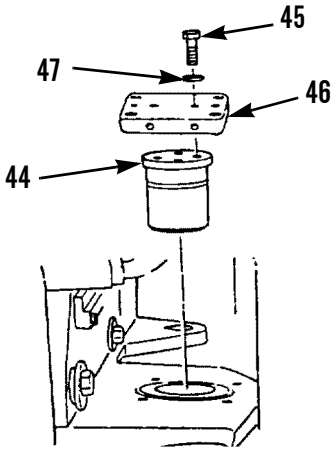
Clean and inspect all parts in accordance WP 0020 00.

INSTALLATION

1. Position forklift under rear frame and remove jack stands.
2. Apply shop air supply line to elbow (58) on parking brake actuator (56) and release parking brake
3. Move rear frame (59) into position on front frame (60) using forklift.
4. Use forklift to lift or lower rear frame (59) and hydraulic jack to move frame from side to side. Align bottom pin bore of rear frame with pin bore of front frame (60).



397-1953



397-1946

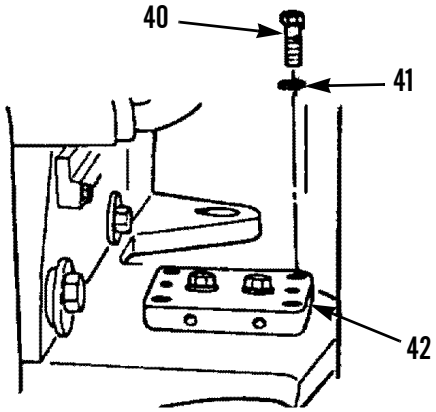
NOTE

Install plate to hold spacer in place.

5. Install spacer (55), plate (53), six bolts (50), and new lockwashers (49).
6. Lower temperature of pin (44) and install plate (46), two new lockwashers (47), and bolts (45).

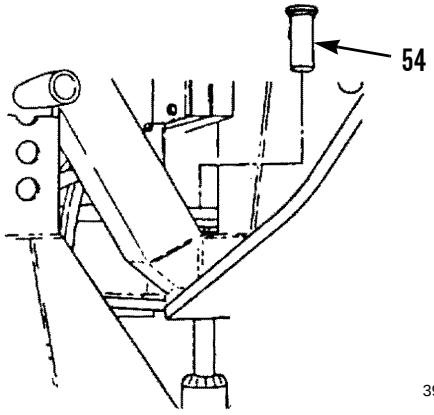
INSTALLATION - CONTINUED

7. Install four new lockwashers (41) and bolts (40). Cross tighten four bolts to 75 lb-ft (102 Nm). Tighten one of four bolts to 75 lb-ft (102 Nm). Tighten one of four bolts in the upper right corner of plate (42), then tighten the next of four bolts in the lower left corner. Tighten two remaining of four bolts.



397-1944

8. Position pin (54).



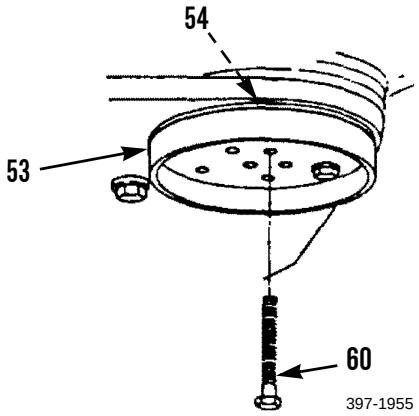
397-1954

INSTALLATION - CONTINUED

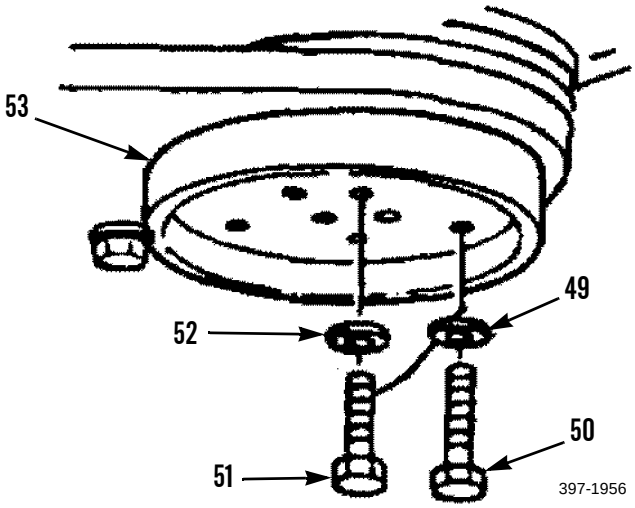
NOTE

Use two 5/8-11NC x 6 bolts to keep holes in bottom of pin in alignment with holes in plate.

9. Install two 5/8-11NC x 6 bolts (60), through plate (53) and into pin (54).
10. Install pin (54) completely.
11. Remove two 5/8-11NC x 6 bolts (60).



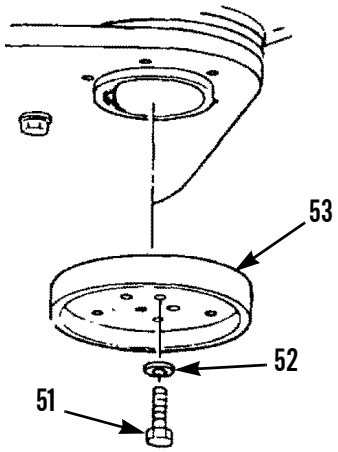
12. Install six bolts (50), lockwashers (49), and plate (53). Discard lockwashers.
13. Install four new lockwashers (52), bolts (51), and plate (53). Tighten bolts to 100 lb-ft (136 Nm).



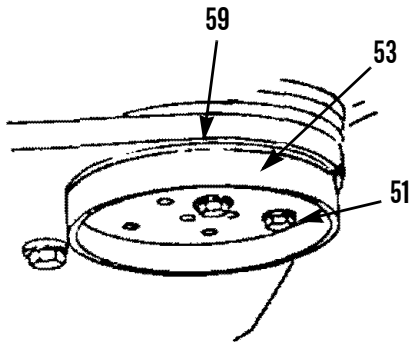
FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0324 00

INSTALLATION - CONTINUED

14. Measure distance between plate (53) and rear frame (59) with a feeler gauge. Measure distance at each of four bolt locations.
15. Remove four bolts (51), lockwashers (52), and plate (53). Discard lockwashers.

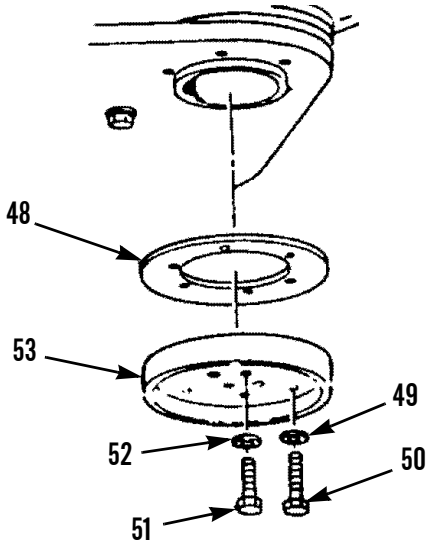


397-1958



397-1957

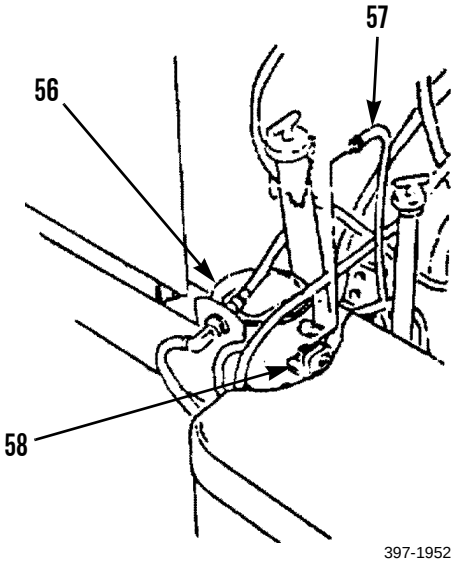
16. Install a thickness of shim(s) (48) (same as minimum distance measured in step 14 minus 0.010 in. [0.25 mm], plate (53), six new lockwashers (49), bolts (50), four new lockwashers (52), and bolts (51).



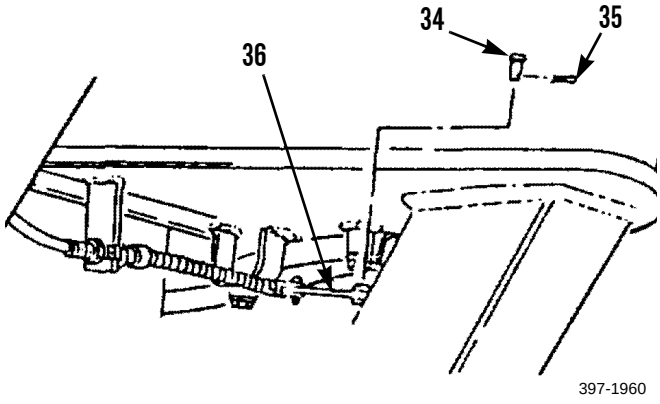
397-1947

INSTALLATION - CONTINUED

17. Disconnect shop air supply line from elbow (58) on parking brake actuator (56) and connect hose (57).



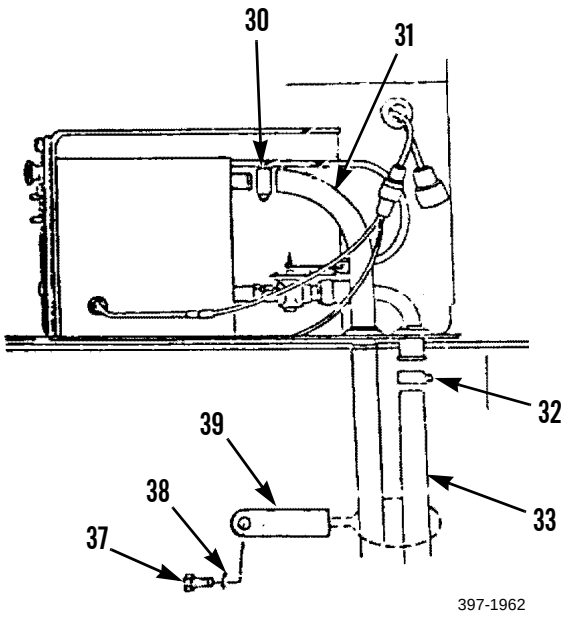
18. Remove jack stands and forklift from machine.
19. Install pin (34) and new cotter pin (35) on articulation indicator linkage (36).



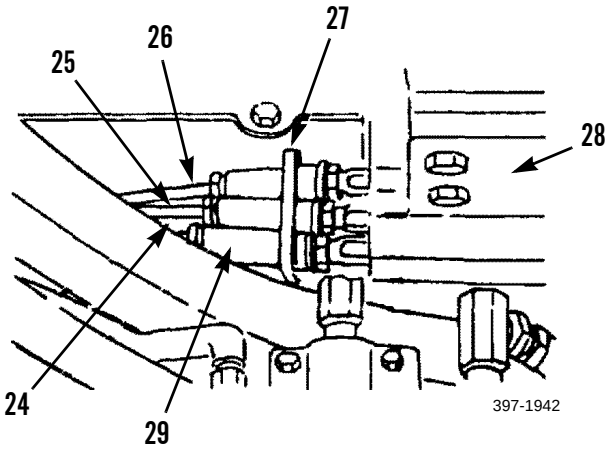
FRAME SEPARATION AND CONNECTION REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0324 00

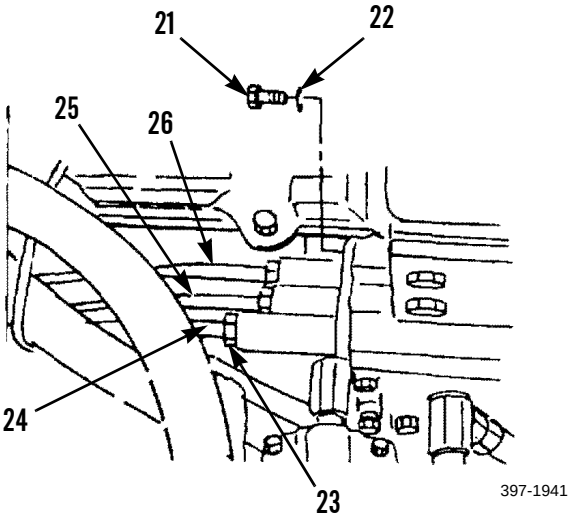
INSTALLATION - CONTINUED

20. Position heater hose (31) on heater and install clamp (30) (WP 0192 00).
21. Position heater hose (33) and install clamp (32).
22. Install clip (39), washer (38), and bolt (37).



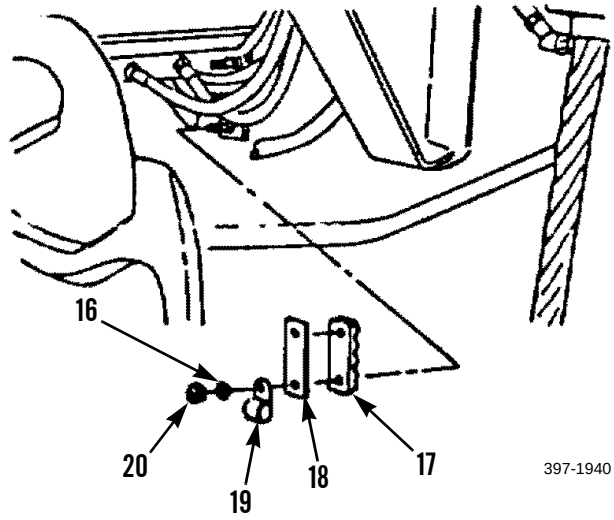
23. Position cable assemblies (24, 25, and 26) on machine (WP 0152 00).
24. Set cable assemblies (24, 25, and 26) into transmission control valves (28).
25. Move three couplings (29) forward on cable assemblies (24, 25, and 26) and position over transmission control valves (28).
26. Slide retainer (27) forward.
27. Install three nuts (23). Tighten three nuts.
28. Install two washers (22) and bolts (21).



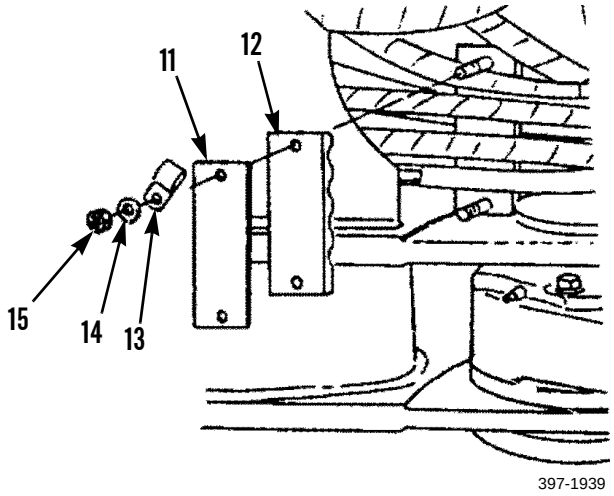


INSTALLATION - CONTINUED

29. Install clamp (17), plate (18), clip (19), two washers (16), and nuts (20) under right-rear of cab.

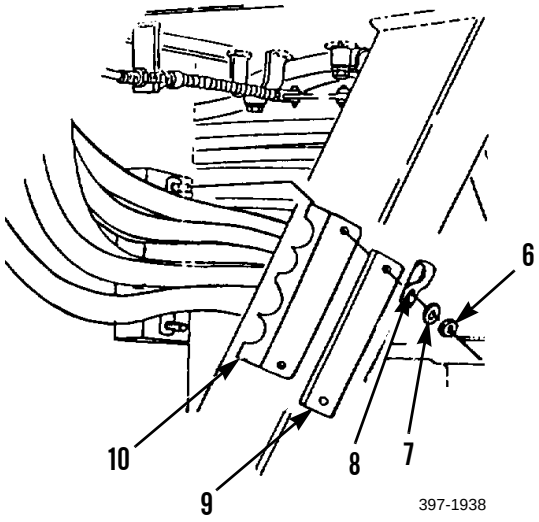


30. Install clamp (12), plate (11), clip (13), two washers (14), and nuts (15) under right-front of engine compartment.

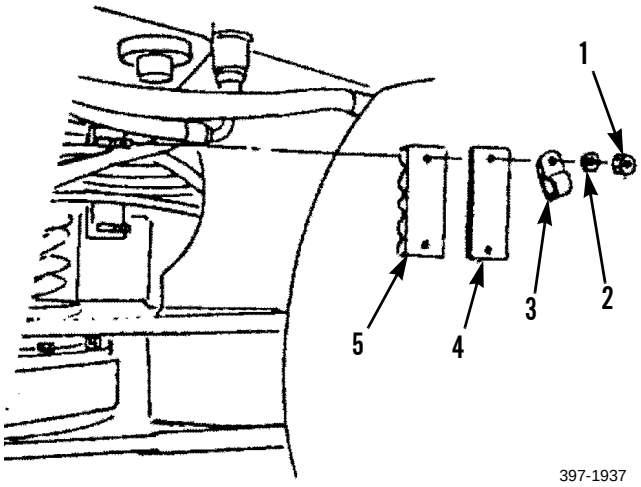


INSTALLATION - CONTINUED

31. Install clamp (10), plate (9), clip (8), two washers (7), and nuts (6) under left-rear of cab.



32. Install clamp (5), plate (4), clip (3), two washers (2), and nuts (1) under left-front of engine compartment.



INSTALLATION - CONTINUED

33. Connect front pin of articulation cylinder (WP 0336 00).
34. Connect air brake lines to brake control valve (WP 0161 00).
35. Install mounting hardware and connect EMS harness to all items in engine compartment (WP 0291 00).
36. Install mounting hardware and connect supplemental steering harness to all items in engine compartment (WP 0290 00).
37. Install mounting hardware and connect blackout light harness to all items in engine compartment (WP 0287 00).
38. Install mounting hardware and connect main harness to all items in engine compartment (WP 0286 00).
39. Install mounting hardware and connect disconnect switch cable at starting motor (WP 0142 00).
40. Connect hydraulic line at relief valve (WP 0250 00).
41. Connect oil cooler to hydraulic pump relief valve (WP 0250 00).
42. Connect hydraulic hose at hydraulic tank (WP 0250 00).
43. Connect supplemental steering lines to hydraulic tank (WP 0172 00 and WP 0173 00).
44. Fill engine coolant (WP 0024 00).
45. Install seat (WP 0200 00).
46. Install hydraulic pump drive shaft (WP 0232 00).
47. Remove wheel lean lock bolt (TM 5-3805-261-10).
48. Connect battery cables (WP 0125 00).
49. Install left and right side engine panels (WP 0182 00).

END OF WORK PACKAGE

ARTICULATION HITCH BEARING REPLACEMENT (CCE AND TYPE I MACHINES) 0325 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, mechanical puller (Item 2, WP 0348 00)

Adapter, mechanical puller (Item 3, WP 0348 00)

Adapter, mechanical puller (Item 4, WP 0348 00)

Adapter, mechanical puller (Item 5, WP 0348 00)

Bolt, machine (2) (Item 14, WP 0348 00)

Nut, plain, hexagon (Item 46, WP 0348 00)

Puller, hydraulic (Item 59, WP 0348 00)

Puller, hydraulic (Item 60, WP 0348 00)

Ring installer (Item 68, WP 0348 00)

Washer flat (Item 91, WP 0348 00)

Materials/Parts

Grease (Item 17, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Lockwasher (7)

Seal (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

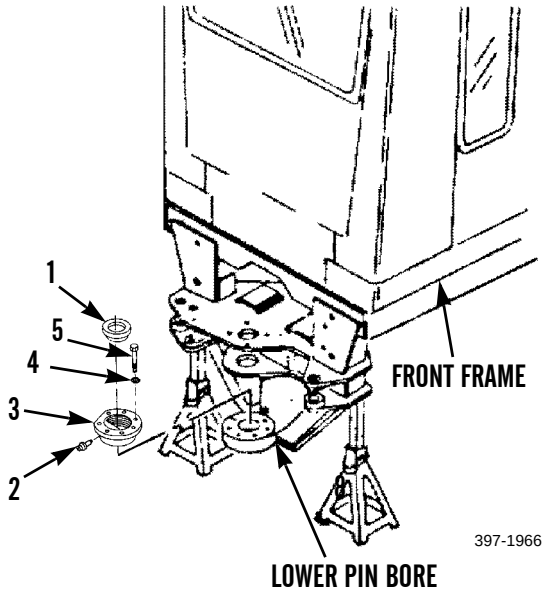
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Frame halves separated (WP 0324 00)

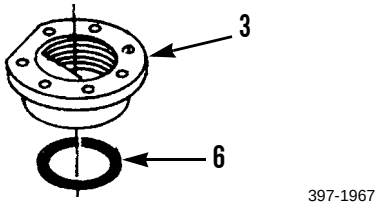
ARTICULATION HITCH BEARING REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0325 00

REMOVAL

1. Remove fitting (2), spacer (1), seven bolts (5), lockwashers (4), and cap (3). Discard lockwashers.



2. Remove and discard seal (6) from cap (3).

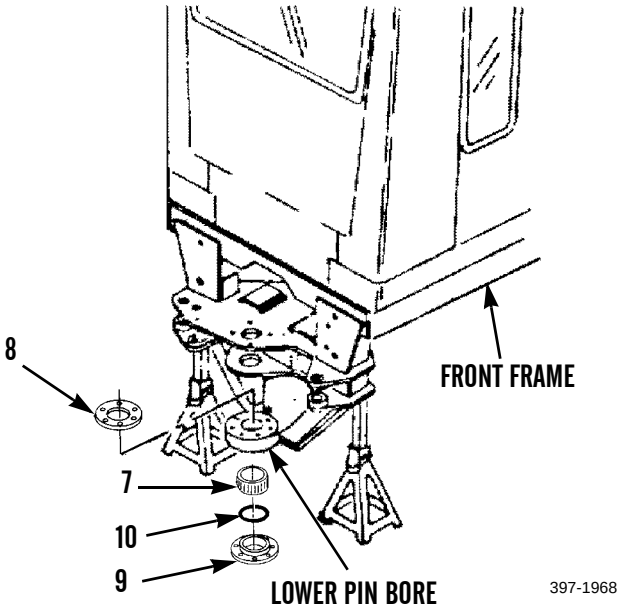


REMOVAL - CONTINUED

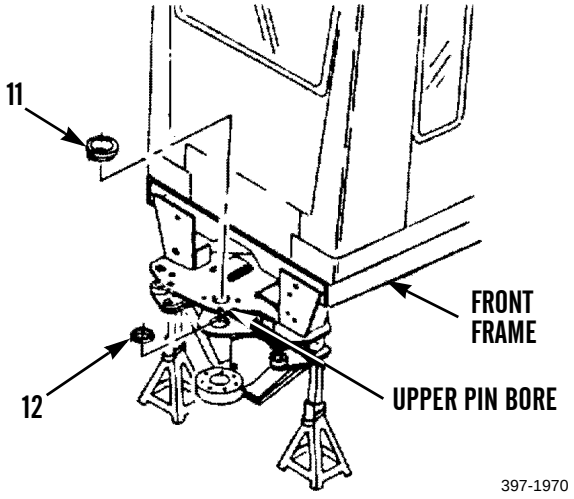
NOTE

- Tie shim(s) together and tag for identification to aid in installation.
- Inspect bearings before removing. Remove bearings only if inspection indicates replacement is necessary.

3. Remove shim(s) (8) and bearing (7).
4. Remove cap (9) and seal (10) from bottom of lower pin bore. Discard seal.

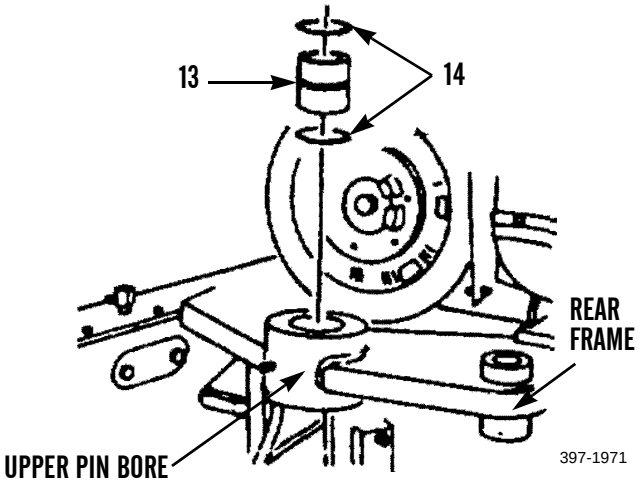


5. Use puller adapters, nut, washer, hydraulic puller, and ring installer to remove collar (11) from upper pin bore of front frame.
6. Inspect bearing (12). Replace if cracked, broken, distorted, gouged, or excessively worn.
7. Use puller adapters, nut, washer, hydraulic puller, and two bolts to remove bearing (12), if necessary.



REMOVAL - CONTINUED

8. Remove and discard two seals (14) from upper pin bore of rear frame.
9. Inspect bearing (13). Replace if cracked, broken, distorted, gouged, or excessively worn.
10. Use nut, washer, hydraulic puller, ring installer, and puller assembly to remove bearing (13), if necessary.

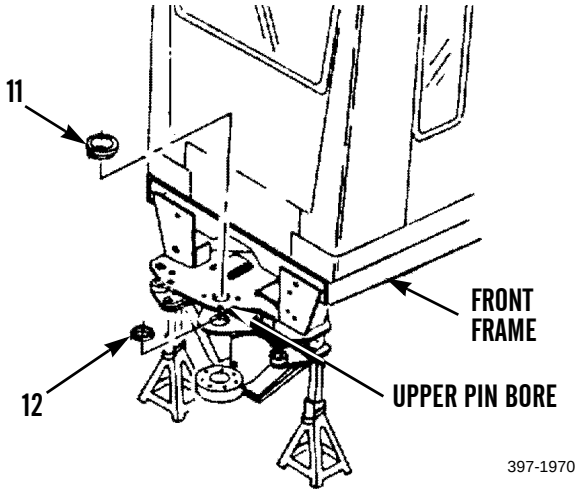


CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

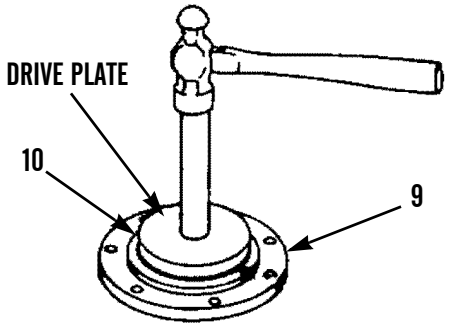
1. Use hydraulic puller, puller assembly, washer, and nut to install new bearing (13), if removed, to a depth of 0.5 in. (13 mm) from each surface of upper pin bore of rear frame.
2. Use clean grease to lubricate two new seals (14).
3. Use drive plate and hammer to install two new seals (14) with lips toward the outside surface in upper pin bore of rear frame.
4. If bearing (12) was removed, lower temperature of new bearing (12).
5. Use puller adapter, hydraulic puller, washer, nut, two bolts, and two adapters to install new bearing (12), if removed, in upper pin bore of front frame.
6. Use hydraulic puller, puller assembly, washer, nut, two bolts, and two adapters to install collar (11) in upper pin bore of front frame.



ARTICULATION HITCH BEARING REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0325 00

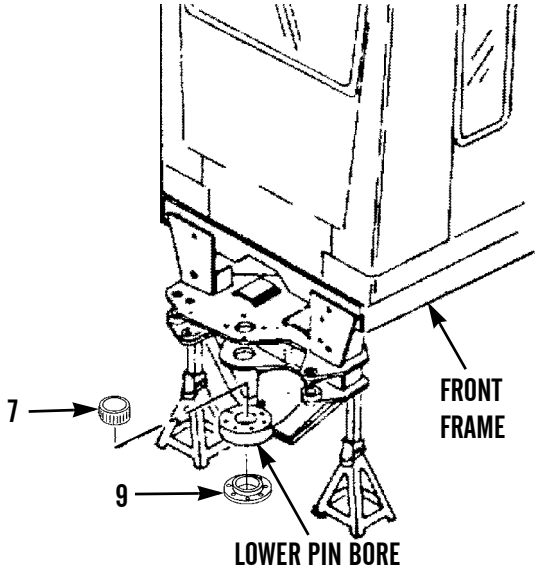
INSTALLATION - CONTINUED

7. Use clean grease to lubricate new seal (10) and position with lip facing down on cap (9).
8. Use drive plates and hammer to install new seal (10) on cap (9).



397-1972

9. Install bearing (7) in cap (9) and position under lower pin bore of front frame.

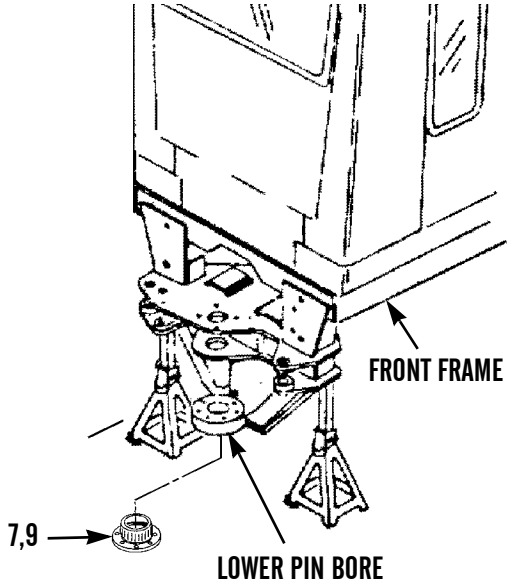


397-1973

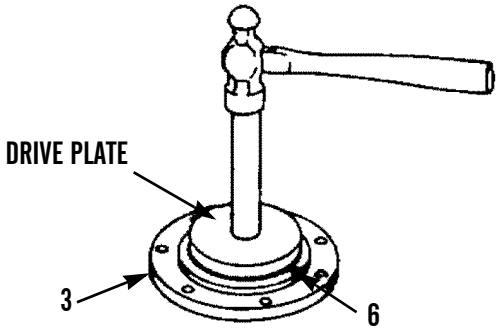
ARTICULATION HITCH BEARING REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0325 00

INSTALLATION - CONTINUED

10. Install bearing (7) and cap (9), together, in lower pin bore.



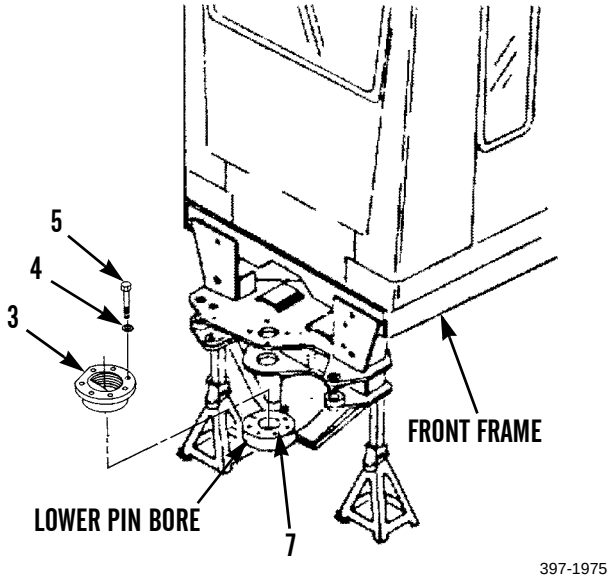
11. Use clean grease to lubricate new seal (6) and position with lip facing down on cap (3).
12. Use drive plates and hammer to install new seal (6) on cap (3).



ARTICULATION HITCH BEARING REPLACEMENT (CCE AND TYPE I MACHINES) - CONTINUED 0325 00

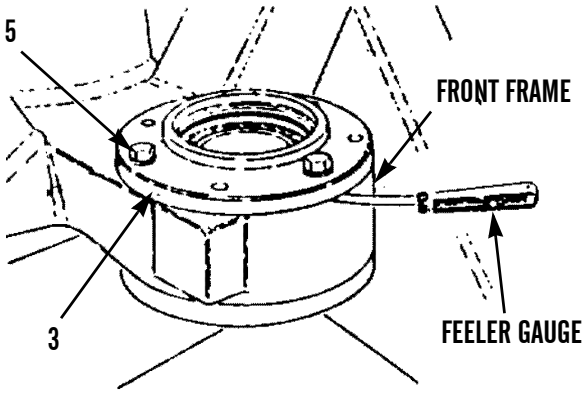
INSTALLATION - CONTINUED

13. Position cap (3) over bearing (7) on top of lower pin bore of front frame.
14. Install three of seven new lockwashers (4) and three of seven bolts (5) through caps (3). Ensure there is at least one hole between each of the three bolts (5).
15. Position cap (3) on bearing (7). Do not install shims at this time.
16. Evenly and gradually tighten each bolt (5) to 65 lb-ft (88 Nm).
17. Ensure cap (3) is even with bottom of frame.



397-1975

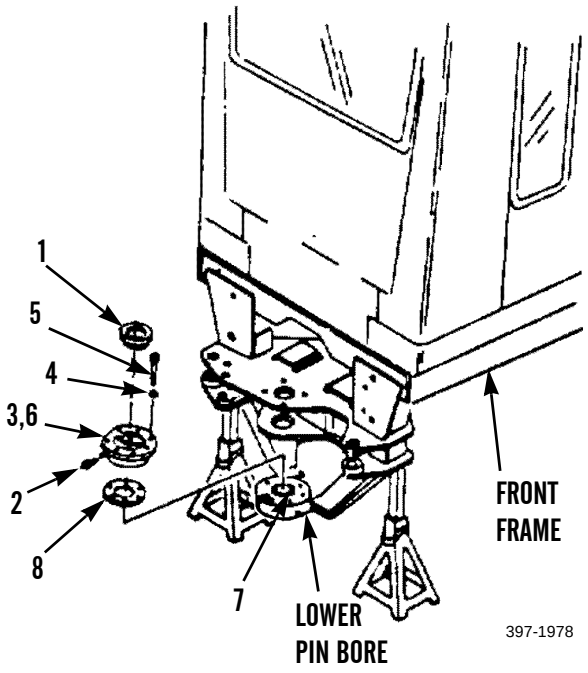
18. Use feeler gauge to measure distance between front frame and upper cap (3). Check distance at each bolt (5) location.



397-1976

INSTALLATION - CONTINUED

19. Install next three of seven bolts (5) and new lockwashers (4) to cap (3).
20. Install shim(s) (8) equal to smallest measurement.
21. Position cap (3) over bearing (7) on top of lower pin bore of front frame.
22. Install last of seven bolts (5) and new lockwasher (4).
23. Evenly and gradually tighten seven bolts (5) to 75 lb-ft (102 Nm).
24. Install spacer (1) on bearing (7).
25. Install fitting (2).
26. Use clean grease to lubricate fitting (2) (WP 0020 00).



27. Connect assembly frame halves (WP 0324 00).

END OF WORK PACKAGE

ARTICULATION HITCH BEARING REPLACEMENT (TYPE II MACHINE) 0326 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Lockwasher (17)

Seal (4)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

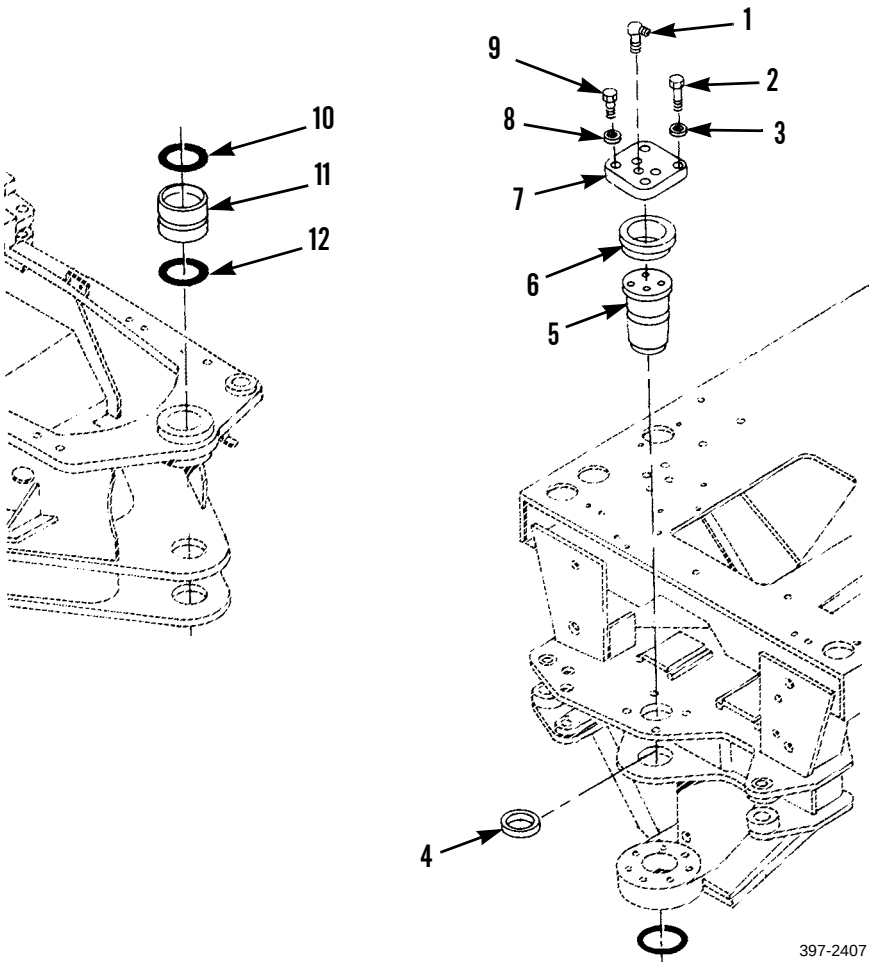
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Machine sectionalized (TM-5-3805-261-10)

ARTICULATION HITCH BEARING REPLACEMENT (TYPE II MACHINE) - CONTINUED 0326 00

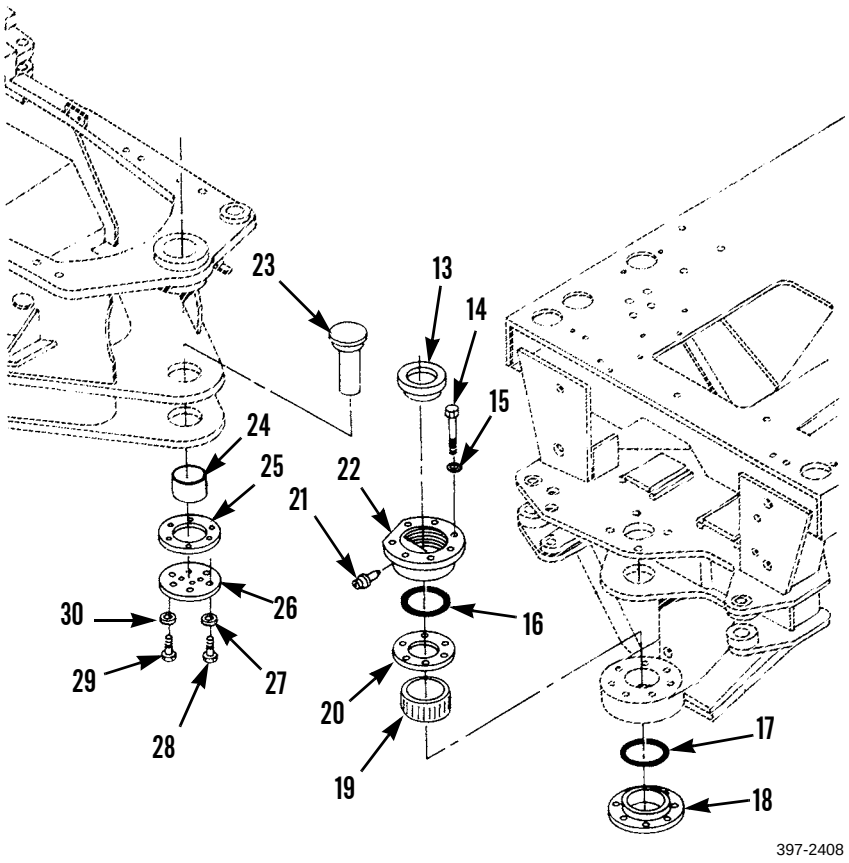
DISASSEMBLY

1. Remove fitting (1), bolts (2 and 9), lockwashers (3 and 8), and cover (7). Discard lockwashers.
2. Remove collar (6) and pin (5).
3. Remove shim (4).
4. Remove seals (10 and 12) and bearing (11). Discard seals.



5. Remove bolts (28 and 29), lockwashers (27 and 30), retaining plate (26), shim (25), sleeve spacer (24), and pin (23). Discard lockwashers.
6. Remove bolts (14), lockwashers (15), cap and fitting (21 and 22), spacer (13), seal (16), shim (20), bearing (19), seal (17) and cap (18). Discard seals and lockwashers.

DISASSEMBLY - CONTINUED



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install cap (18), new seal (17), bearing (19), shim (20), new seal (16), spacer (13), cap and fitting (21 and 22), new lockwashers (15), and bolts (14).
2. Install pin (23), sleeve spacer (24), shim (25), retaining plate (26), new lockwashers (27 and 30), and bolts (28 and 29).
3. Install bearing (11) and new seals (10 and 12).
4. Install shim (4).
5. Install pin (5) and collar (6).
6. Install cover (7), new lockwashers (3 and 8), bolts (2 and 9), and fitting (1).
7. Reassemble machine (TM 5-3805-261-10).

END OF WORK PACKAGE

ROPS REPLACEMENT (CCE MACHINE) 0327 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Branch, link (Item 12, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Eyebolt, (2) 3/4-10

Lifting device, 3,000-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

References

WP 0020 00

Personnel Required

Three

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery cables disconnected (WP 0125 00)

Dome light resistor removed (WP 0100 00)

Front work lights removed (WP 0105 00)

Cab signal lights removed (WP 0107 00)

Dome light removed (WP 0111 00)

Equipment Conditions - Continued

Blade float valve harness removed (WP 0133 00)

Front defroster lead removed (WP 0134 00)

Rear defroster lead removed (WP 0135 00)

Front work light lead removed (WP 0136 00)

Cab signal light lead removed (WP 0107 00)

Dome light resistor harness removed (WP 0140 00)

Right and left blade float harness removed (WP 0144 00)

Front lower cab windows removed (WP 0186 00)

Left and right cab doors removed (WP 0188 00)

Lower front and rear cab sound suppression panels removed (WP 0190 00)

Ceiling cab sound suppression panels removed (WP 0191 00)

Rear cab sound suppression panels removed (WP 0192 00)

Lower front wiper removed (WP 0206 00)

Upper front wipers removed (WP 0207 00)

Rear wiper removed (WP 0208 00)

Windshield washers removed (WP 0209 00)

Front and rear defroster fans removed (WP 0210 00)

Outside sideview mirror removed (WP 0214 00)

ROPS accessories removed (WP 0185 00)

Cab storage compartment removed (WP 0189 00)

Cab main harness removed (WP 0292 00)

REMOVAL

1. Install two 3/4-10 eyebolts (1) in top of ROPS (2).

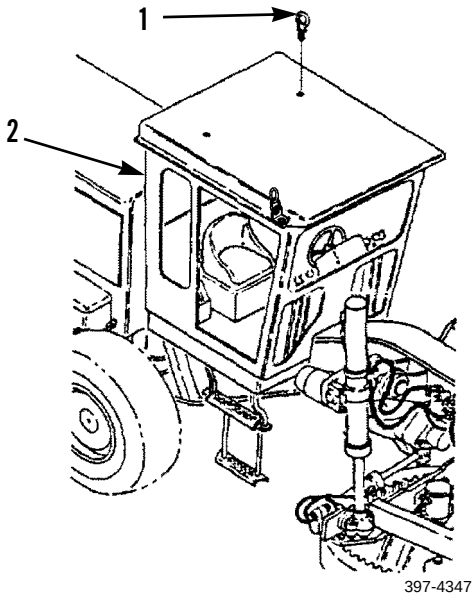
WARNING

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

NOTE

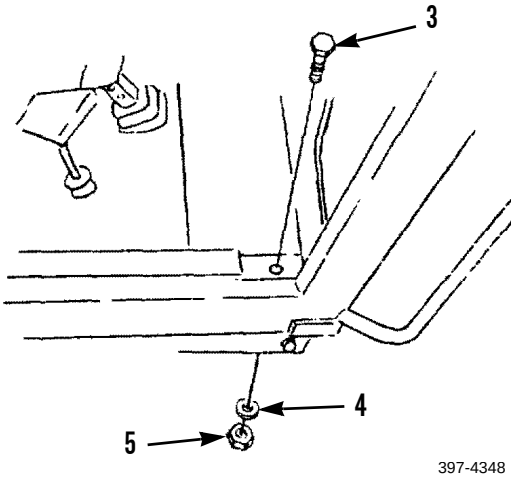
ROPS weighs 2,058 lb (934 kg).

2. Attach sling to two 3/4-10 eyebolts (1) on front of ROPS (2).



397-4347

3. Remove two nuts (5), washers (4), and bolts (3) from two front corners of operator's cab.

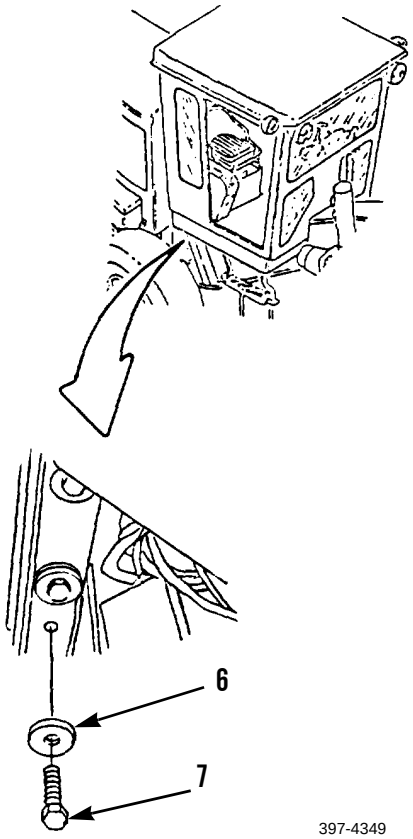


397-4348

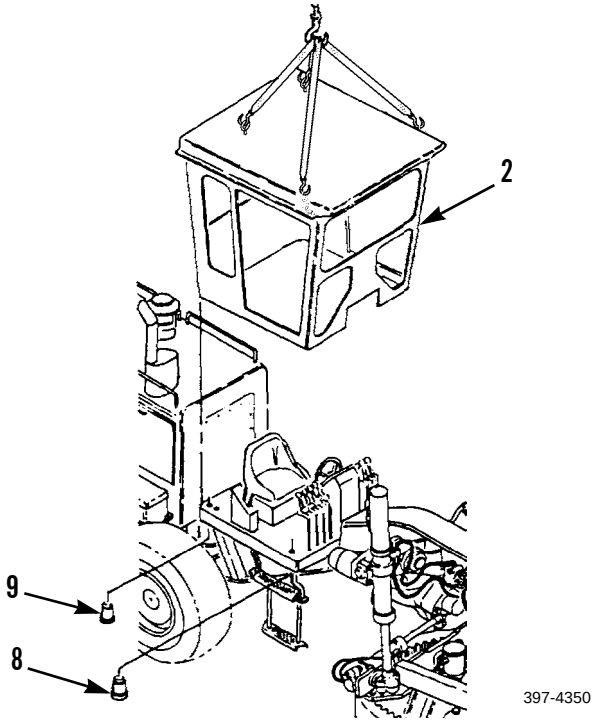
ROPS REPLACEMENT (CCE MACHINE) - CONTINUED 0327 00

REMOVAL - CONTINUED

4. Remove six bolts (7) and retainers (6) from right and left sides of cab.

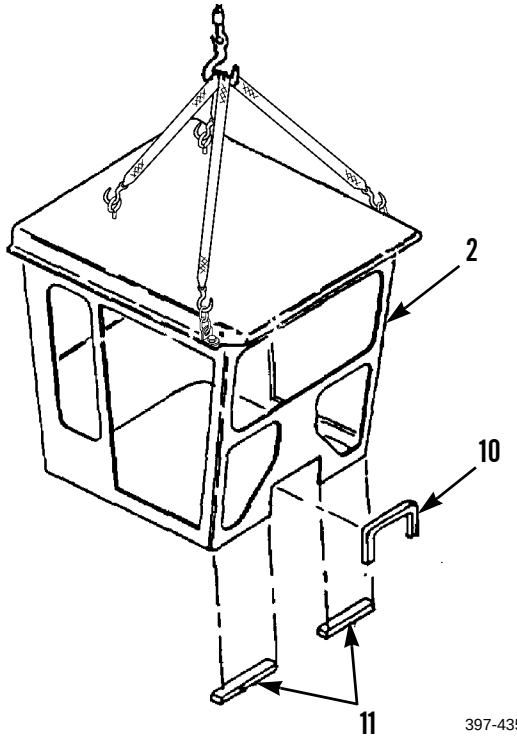


5. Install two link brackets to ROPS (2).
6. Use sling to remove ROPS (2).
7. Remove four mounts (9) and two bushings (8).

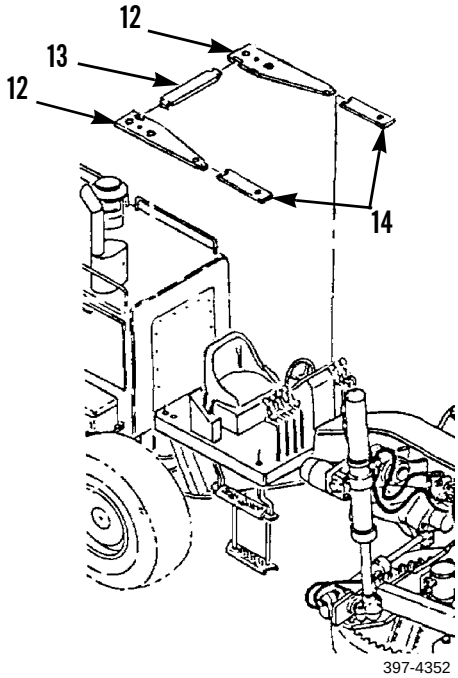


REMOVAL - CONTINUED

8. Inspect two pads (11) and pad (10).
9. Remove two pads (11) and pad (10) from ROPS (2). Discard pads if damaged.
10. Lower ROPS (2) onto level surface.



11. Remove sling.
12. Inspect two pads (12 and 14) and pad (13).
13. Remove two pads (12 and 14) and pad (13). Discard two pads (12 and 14) if damaged.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Position pad (13) and two pads (12 and 14).

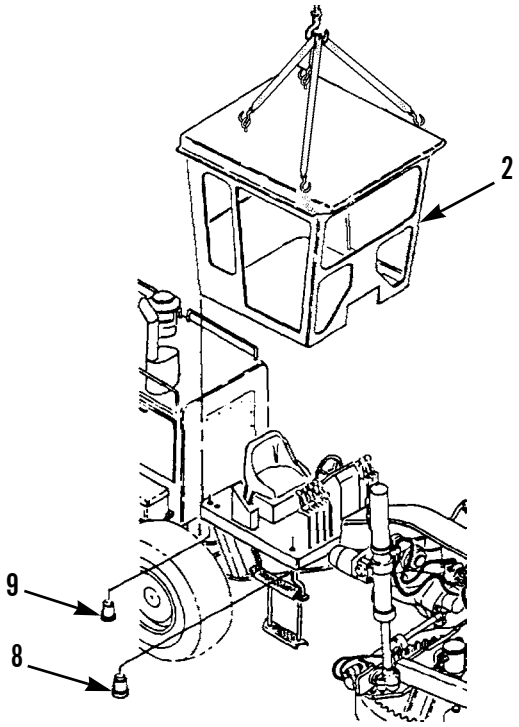
WARNING

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

NOTE

ROPS weigh 2,058 lb (964 kg).

2. Attach sling to ROPS (2).
3. Raise ROPS (2).
4. Install pad (10) and two pads (11).
5. Position two bushings (8) and four mounts (9).
6. Lower ROPS (2) to within 0.5 in. (12.7 mm) of operator's platform.



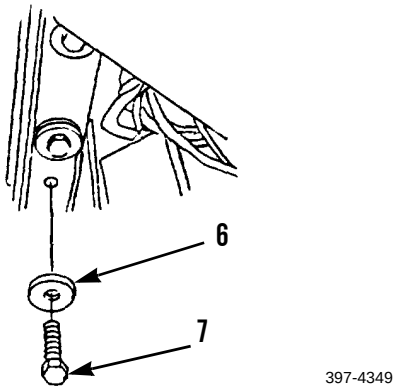
397-4350

INSTALLATION - CONTINUED

CAUTION

Do not lower ROPS onto operator's platform and slide to align bolts. This improper procedure could result in damage to pads. Any significant damage to pads could cause high sound levels for the operator.

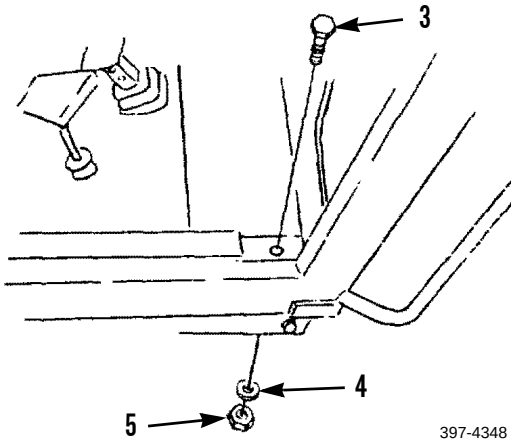
7. Install six bolts (7) and retainers (6), starting six bolts by hand and partially tightening.



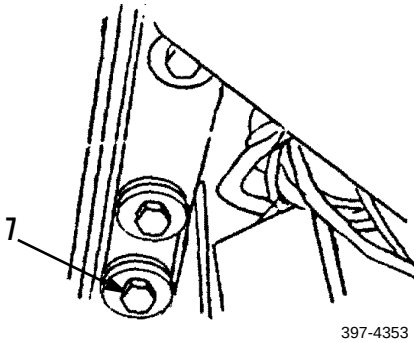
NOTE

Holes for two bolts must be aligned before bolts can be tightened to proper torque.

8. Install two bolts (3), washers (4), and nuts (5) in two front corners of cab. Tighten bolts to 870 lb-ft (1,180 Nm).

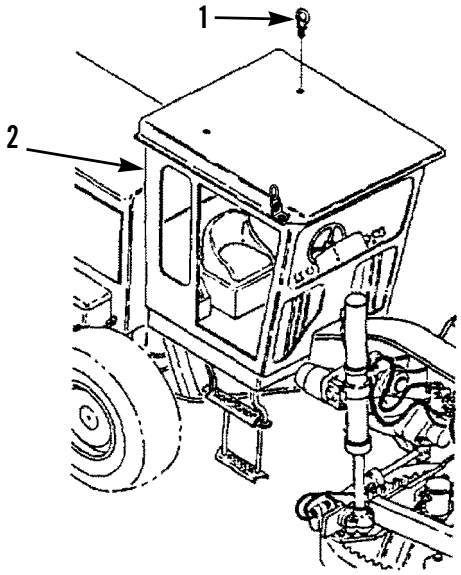


9. Tighten six bolts (7) to 870 lb-ft (1,180 Nm).



INSTALLATION - CONTINUED

10. Remove sling.
11. Remove two 3/4-10 eyebolts (1) from ROPS (2).
12. Remove two link brackets



397-4347

13. Install cab main harness (WP 0292 00).
14. Install cab storage compartment (WP 0189 00).
15. Install ROPS accessories (WP 0185 00).
16. Install outside sideview mirror (WP 0214 00).
17. Install front and rear defroster fans (WP 0210 00).
18. Install windshield washers (WP 0209 00).
19. Install rear wiper (WP 0208 00).
20. Install upper front wipers (WP 0207 00).
21. Install lower front wiper (WP 0206 00).
22. Install rear cab sound suppression panels (WP 0192 00).
23. Install ceiling cab sound suppression panels (WP 0191 00).
24. Install lower front and rear cab sound suppression panels (WP 0190 00).
25. Install left and right cab doors (WP 0188 00).
26. Install front lower cab windows (WP 0186 00).
27. Install right and left blade float harness (WP 0144 00).
28. Install dome light resistor harness (WP 0140 00).
29. Install cab signal light lead (WP 0107 00).
30. Install front work light lead (WP 0136 00).
31. Install rear defroster lead (WP 0135 00).
32. Install front defroster lead (WP 0134 00).
33. Install blade float valve harness (WP 0133 00).
34. Install dome light (WP 0111 00).

INSTALLATION - CONTINUED

35. Install cab signal lights (WP 0107 00).
36. Install front work lights (WP 0105 00).
37. Install dome light resistor (WP 0100 00).
38. Connect battery cables (WP 0125 00).

END OF WORK PACKAGE

OPERATOR'S PANEL CONSOLE BASE REPLACEMENT 0328 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Operator's panel console removed (WP 0193 00)

Transmission control group assembly removed (WP 0151 00)

OPERATOR'S PANEL CONSOLE BASE REPLACEMENT - CONTINUED 0328 00

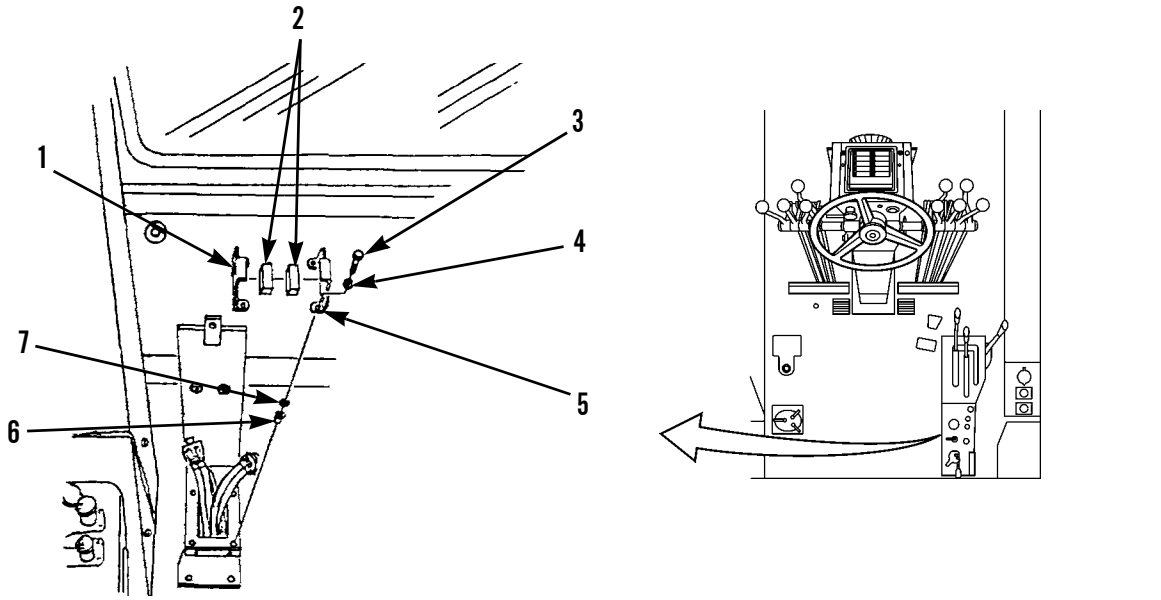
REMOVAL

1. Remove four bolts (3), washers (4), and brackets (1 and 5).
2. Remove four spacers (6 and 7).

NOTE

Remove seals only if inspection indicates replacement is necessary.

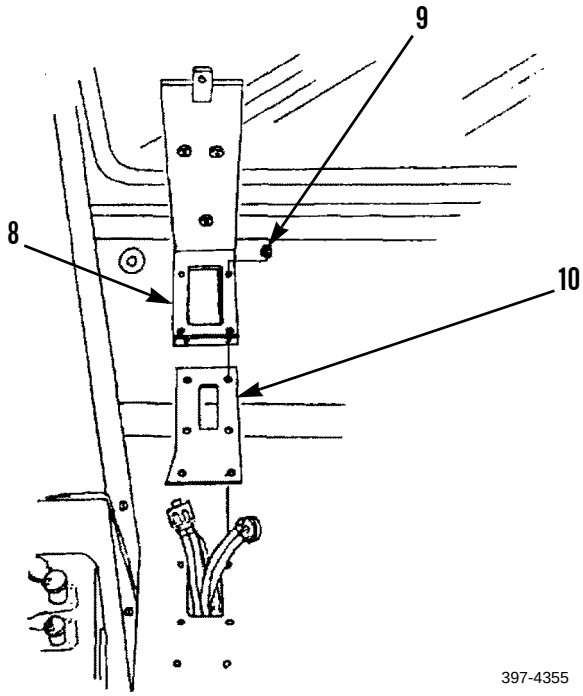
3. If necessary, remove two seals (2).



397-2361

REMOVAL - CONTINUED

4. Remove base (8) and four mountings (9).
5. Remove pad (10).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install pad (10).
2. Install four mountings (9) and base (8).
3. Install two new seals (2), if removed.
4. Install four spacers (6 and 7).
5. Install brackets (5 and 1), four washers (4), and bolts (3).
6. Install operator's panel console (WP 0193 00).
7. Install transmission control group assembly (WP 0151 00).

END OF WORK PACKAGE

HYDRAULIC PUMP ASSEMBLY AND MOUNTING REPLACEMENT 0329 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Lifting device, 200-lb capacity

Wood blocks

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Cleaning compound, solvent (Item 8, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Packing, preformed (6)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Machine articulated right (TM 5-3805-261-10)

Install pivot locking pin (TM 5-3805-261-10)

Hydraulic tank removed (WP 0339 00)

Hydraulic pump drive removed (WP 0232 00)

REMOVAL

1. Remove four bolts (8), washers (7), and two flange halves (6) from hydraulic pump assembly (4).

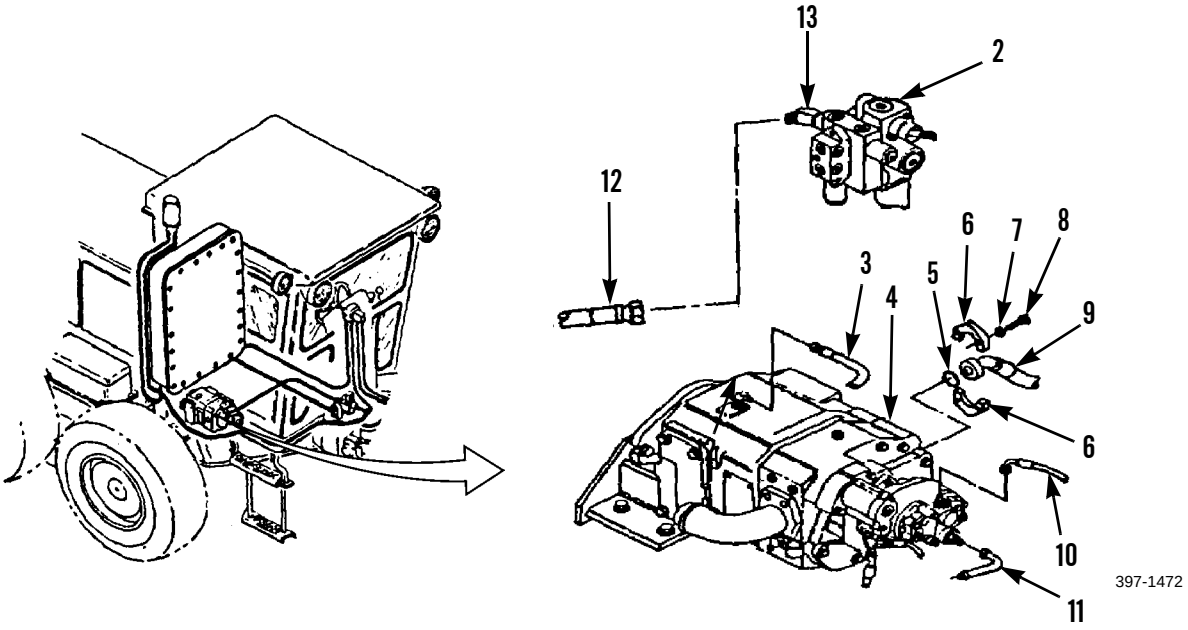
CAUTION

Cap hose ends and plug open ports to prevent contamination.

NOTE

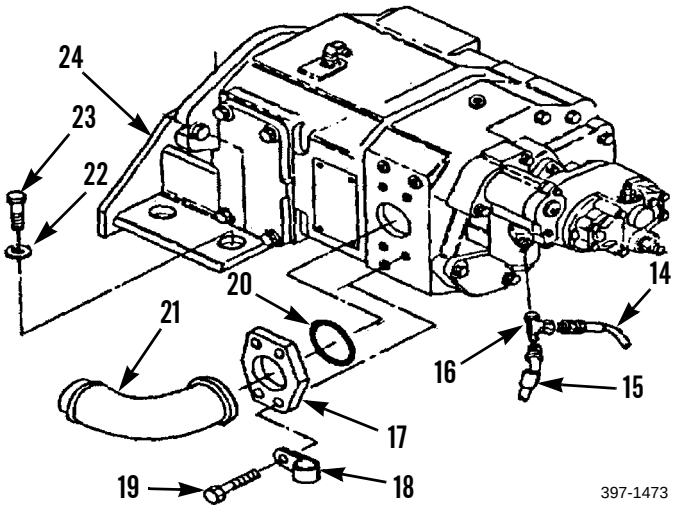
Tag hose assemblies before disconnecting to aid in installation.

2. Remove hose assembly (9) from hydraulic pump assembly (4).
3. Remove and discard preformed packing (5).
4. Disconnect hose assemblies (10 and 11) from front of hydraulic pump assembly (4).
5. Remove hose assembly (12) from elbow (13) of combination valve (2).
6. Disconnect hose assembly (3) from top of hydraulic pump assembly (4).



REMOVAL - CONTINUED

7. Remove four bolts (23) and washers (22) from mounting bracket (24).
8. Disconnect hose assemblies (14 and 15) from tee (16).
9. Remove tee (16).
10. Remove four bolts (19), clip (18), flange (17), tube assembly (21), and preformed packing (20). Discard preformed packing.



11. Position hydraulic pump assembly (4) on left side of pivot area. Slide pump and mounting bracket (24) as an assembly from underneath cab into a position where sling can be attached.

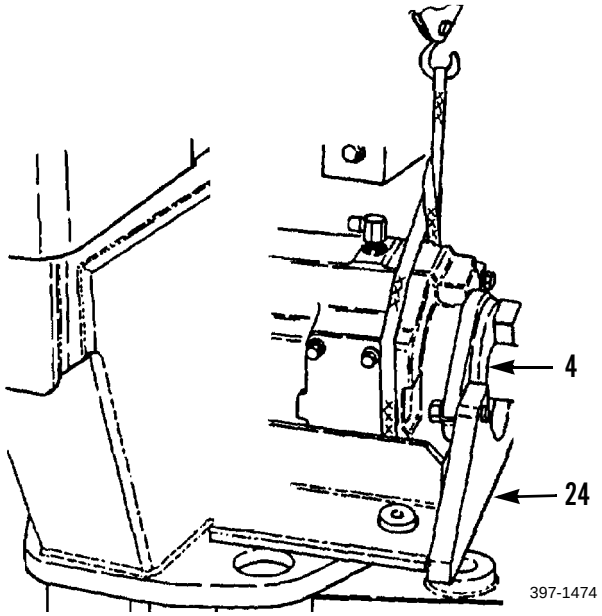
WARNING

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

NOTE

Hydraulic pump assembly weighs 159 lb (72 kg).

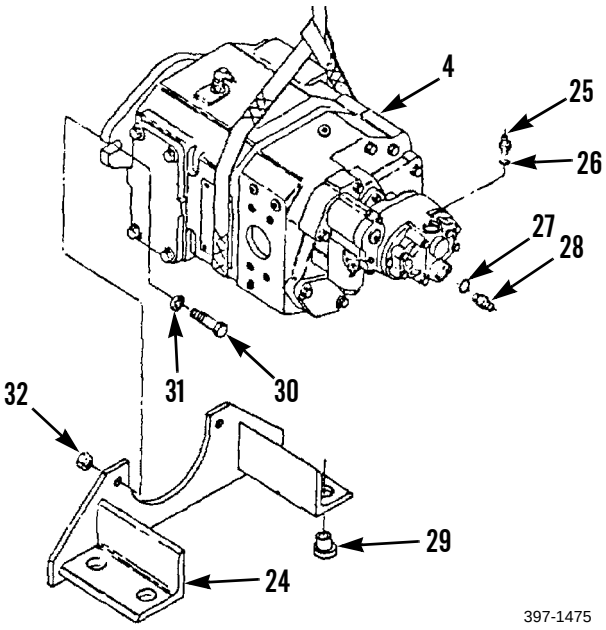
12. Attach sling to pump (4) and mounting bracket (24) as an assembly and take up slack.
13. Remove pump (4) and mounting bracket (24) as an assembly from machine.
14. Place pump (4) on wood blocks.



HYDRAULIC PUMP ASSEMBLY AND MOUNTING REPLACEMENT - CONTINUED 0329 00

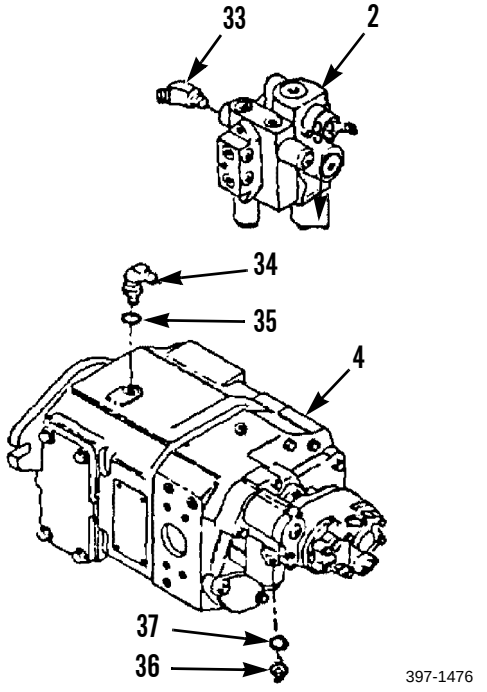
REMOVAL - CONTINUED

15. Remove two nuts (32), screws (30), and washers (31).
16. Separate and remove hydraulic pump assembly (4) from mounting bracket (24).
17. Remove sling from hydraulic pump assembly (4).
18. Remove four mounts (29) from mounting bracket (24).
19. Remove connector (28) and preformed packing (27) from hydraulic pump assembly (4). Discard preformed packing.
20. Remove connector (25) and preformed packing (26). Discard preformed packing.



397-1475

21. Remove elbow (33) from combination valve (2).
22. Remove elbow (34) and preformed packing (35) from hydraulic pump assembly (4). Discard preformed packing.
23. Remove connector (36) and preformed packing (37). Discard preformed packing.



397-1476

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install new preformed packing (37) and connector (36) on hydraulic pump assembly (4).
2. Install new preformed packing (35) and elbow (34).
3. Install elbow (33) on combination valve (2).
4. Install new preformed packing (26) and connector (25).
5. Install new preformed packing (27) and connector (28).
6. Install four mounts (29) on mounting bracket (24).
7. Position mounting bracket (24) on machine so hydraulic pump assembly (4) can be slid into mounting position.

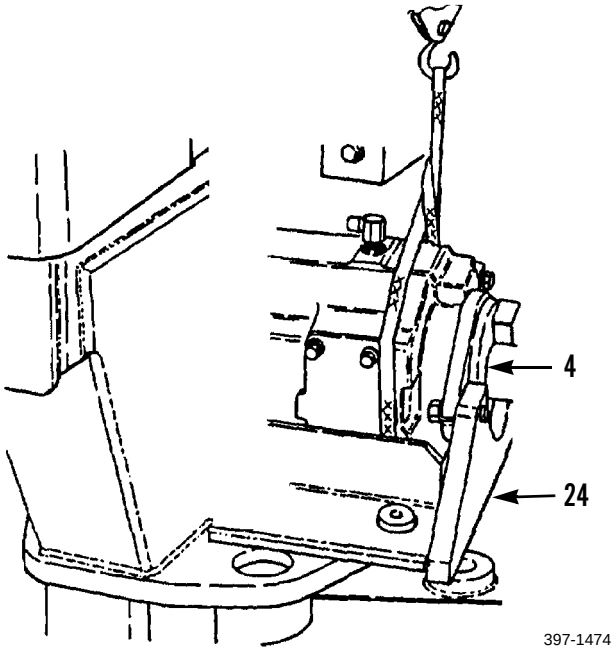
WARNING

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

NOTE

Hydraulic pump assembly weighs 159 lb (72 kg).

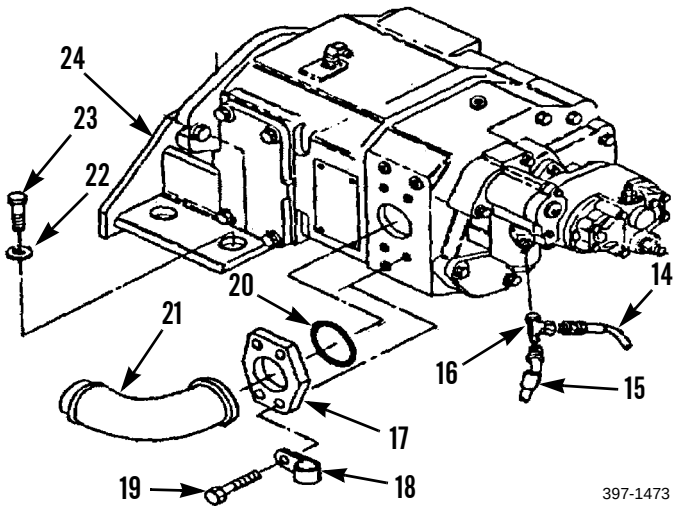
8. Use sling to position hydraulic pump assembly (4) on mounting bracket (24).
9. Install two washers (31), screws (30), and nuts (32).
10. Position pump (4) and mounting bracket (24) over mounting holes.
11. Remove sling.



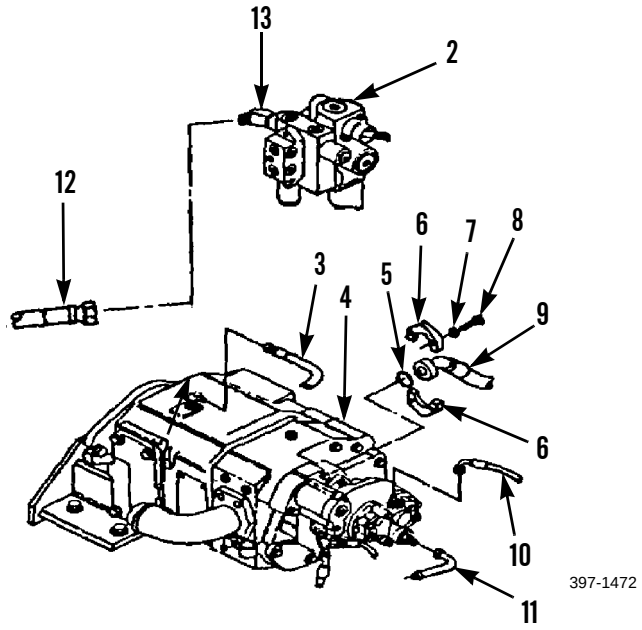
HYDRAULIC PUMP ASSEMBLY AND MOUNTING REPLACEMENT - CONTINUED 0329 00

INSTALLATION - CONTINUED

12. Install new preformed packing (20), tube assembly (21), flange (17), clip (18), and four bolts (19).
13. Install tee (16).
14. Connect hose assemblies (15 and 14) to tee (16).
15. Install four washers (22) and bolts (23) on mounting bracket (24). Tighten bolts to 34 lb-ft (46 Nm).



16. Connect hose assembly (3) to top of hydraulic pump assembly (4).
17. Install hose assembly (12) on elbow (13) of combination valve (2).
18. Connect hose assemblies (11 and 10) to front of hydraulic pump assembly (4).
19. Install new preformed packing (5), hose assembly (9), two flange halves (6), four washers (7), and bolts (8) on left side of hydraulic pump assembly (4).



20. Install hydraulic pump drive (WP 0232 00).
21. Install hydraulic tank (WP 0339 00).
22. Remove pivot locking pin (TM 5-3805-261-10) and straighten machine.

END OF WORK PACKAGE

HYDRAULIC PUMP ASSEMBLY REPAIR 0330 00

THIS WORK PACKAGE COVERS

Disassembly, Cleaning and Inspection, Assembly, Break-In

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Block (Item 13, WP 0348 00)

Maintenance fixture, automotive (Item 43, WP 0348 00)

Plate, protective (Item 52, WP 0348 00)

Rod, guide (2) (Item 69, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Wrench, torque (Item 94, WP 0348 00)

Materials/Parts

Adhesive (Item 4, WP 0349 00)

Cloth, emery (Item 9, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Sealing compound (Item 38, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Materials/Parts - Continued

Ball (2)

Diaphragm

Gasket (2)

Lockwasher (19)

Packing, preformed (32)

Ring, retaining (13)

Seal (3)

Spring (2)

References

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

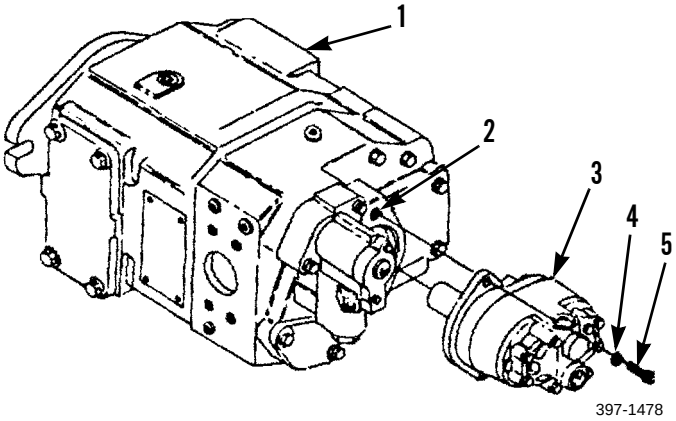
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

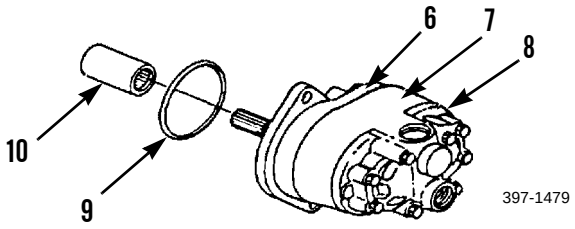
Hydraulic pump assembly removed (WP 0329 00)

DISASSEMBLY

1. Remove two bolts (5), lockwashers (4), and hydraulic rotary pump (3) from head (2) of hydraulic axial pump (1). Discard lockwashers.



2. Remove preformed packing (9) and coupling (10). Discard preformed packing.
3. Matchmark back plate (8), body (7), and front plate (6) to aid in assembly.



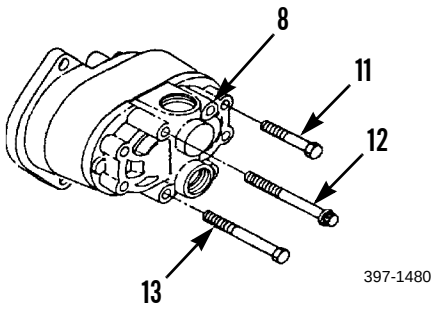
CAUTION

Do not pry pump sections apart. Do not lay machined surfaces on unprotected surfaces. Scratches or grooves will cause destruction of part.

NOTE

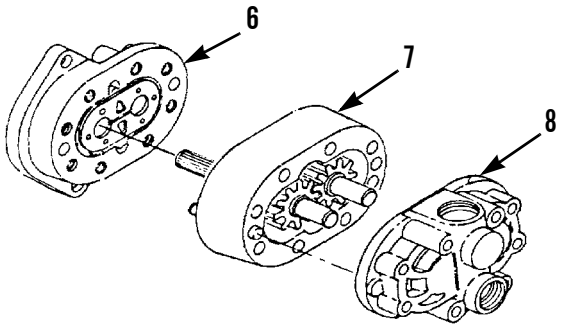
Tag bolts before removing to aid in installation.

4. Remove four bolts (11), two bolts (12), and bolts (13) from back plate (8).



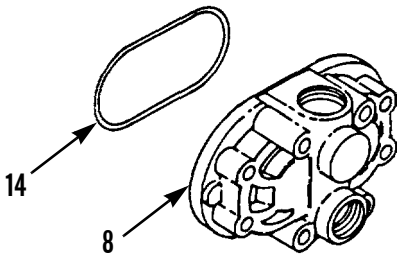
DISASSEMBLY - CONTINUED

5. Separate back plate (8), body (7), and front plate (6).



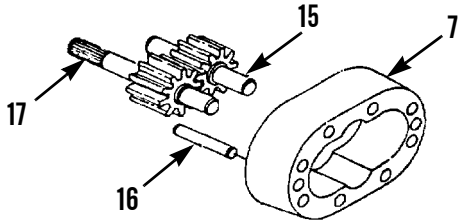
397-1481

6. Remove and discard preformed packing (14) from back plate (8).



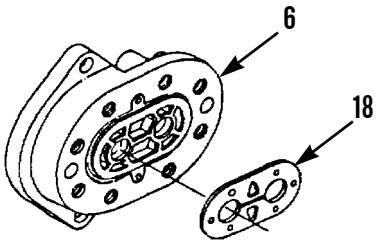
397-1482

7. Remove drive gear (17), idler gear (15), and two dowels (16) from body (7).



397-1483

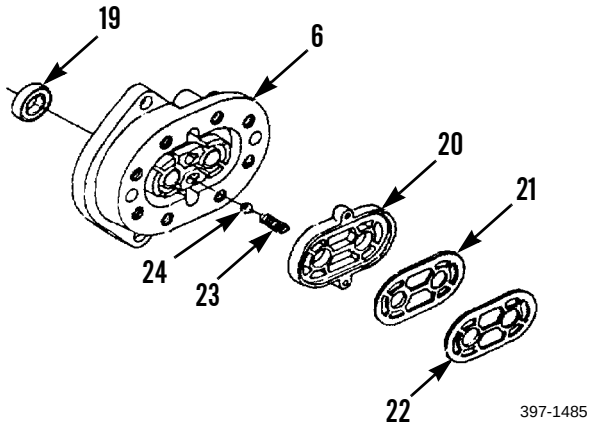
8. Remove and discard diaphragm (18) from front plate (6).



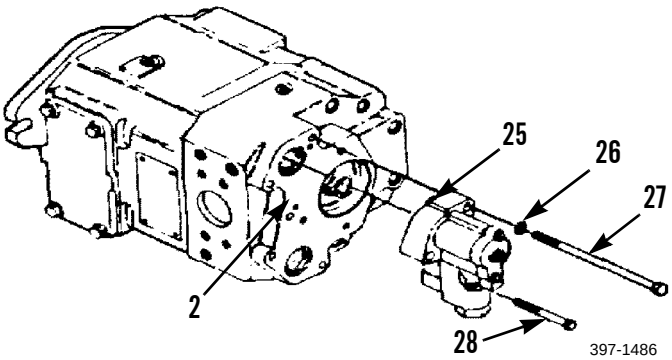
397-1484

DISASSEMBLY - CONTINUED

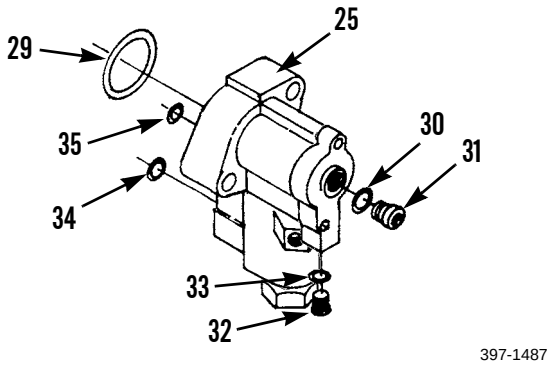
9. Remove and discard two springs (23) and balls (24).
10. Remove and discard gaskets (22 and 21) and seal (20).
11. Remove seal (19) from front plate (6). Discard seal.



12. Remove bolt (28), two bolts (27), lockwashers (26), and housing (25) from head (2). Discard lockwashers.

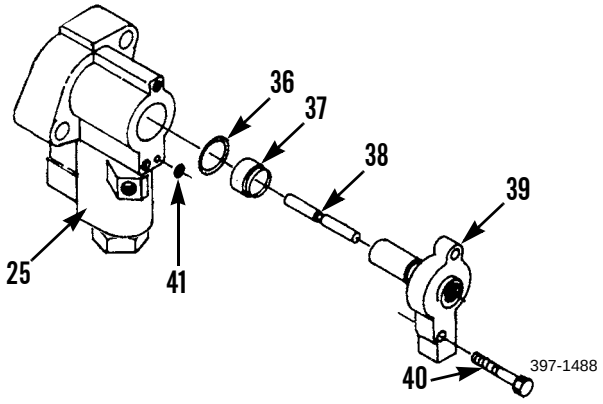


13. Remove and discard preformed packings (29, 34, and 35) from housing (25).
14. Remove plug (31), preformed packing (30), plug (32), and preformed packing (33). Discard preformed packings.

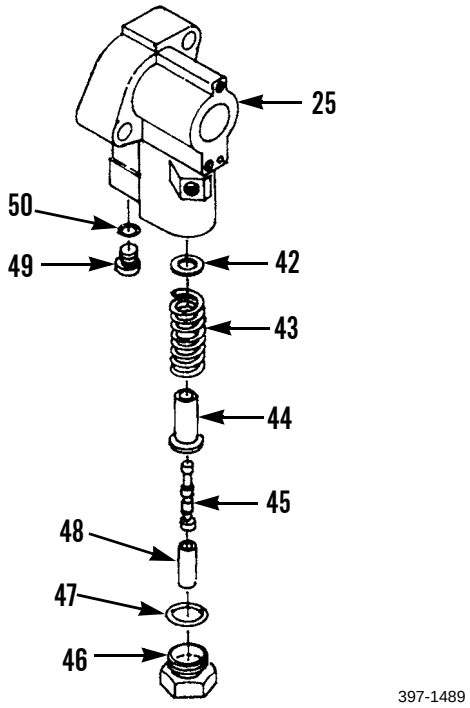


DISASSEMBLY - CONTINUED

15. Remove two bolts (40), cover (39), piston (38), spacer (37), and preformed packings (36 and 41) from housing (25). Discard preformed packings.

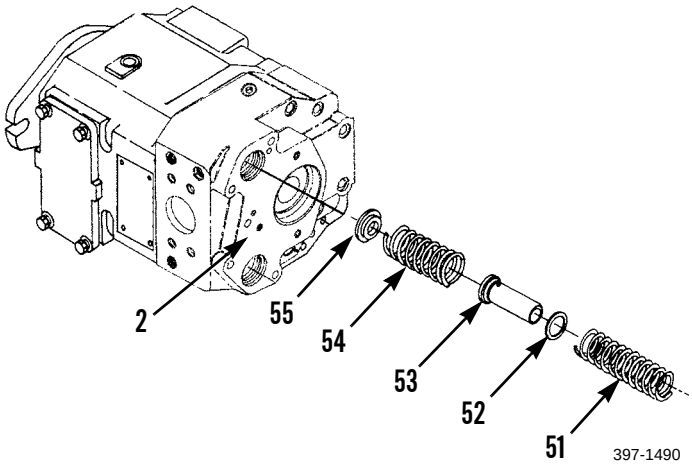


16. Remove plug (46), preformed packing (47), spacer (48), piston (45), retainer (44), spring (43), and two shims (42) from housing (25). Discard preformed packing.
17. Remove plug (49) and preformed packing (50). Discard preformed packing.

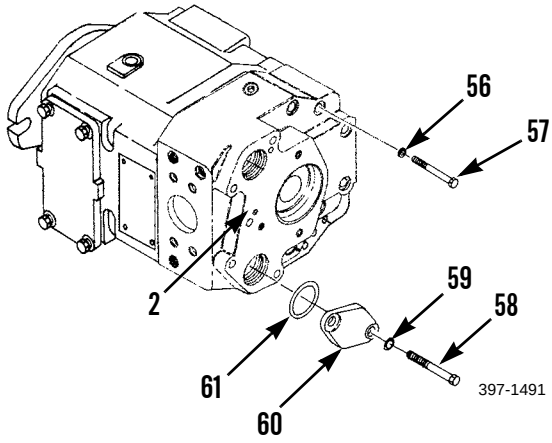


DISASSEMBLY - CONTINUED

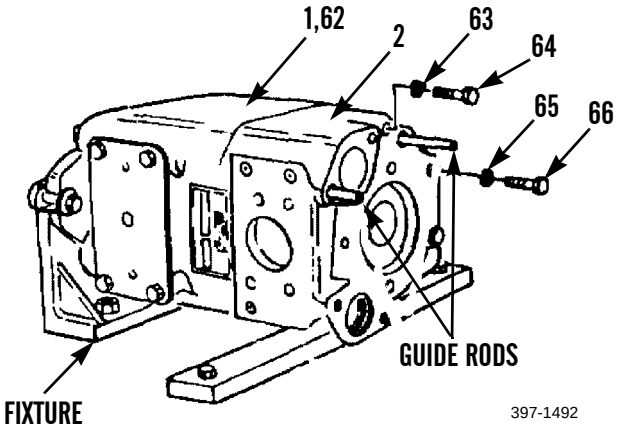
18. Remove spring (51), three washers (52), seat (53), spring (54), and spacer (55) from head (2).



19. Remove two bolts (58), lockwashers (59), cover (60), and preformed packing (61). Discard lockwashers and preformed packing.
20. Remove bolt (57) and lockwasher (56) from head (2). Discard lockwasher.



21. Install hydraulic axial pump (1) in fixture.
22. Install two guide rods into head (2) and body (62).
23. Remove three bolts (64), lockwashers (63), two bolts (66), and lockwashers (65). Discard lockwashers.
24. Separate head (2) from body (62) by sliding head over guide rods.
25. Remove two guide rods.



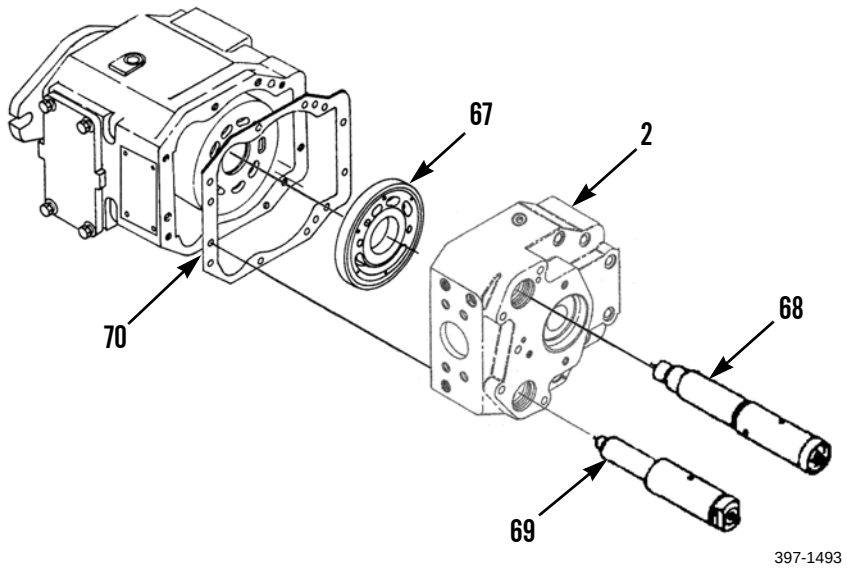
DISASSEMBLY - CONTINUED

26. Remove and discard gasket (70).
27. Remove plate (67) from head (2).

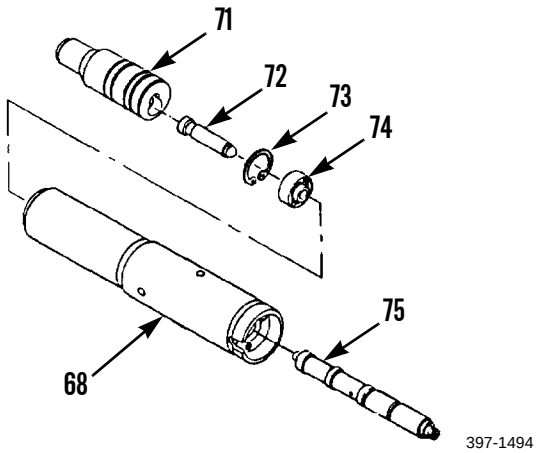
NOTE

Tag cartridge assemblies before removing to aid in installation.

28. Remove cartridge assemblies (68 and 69) from head (2).

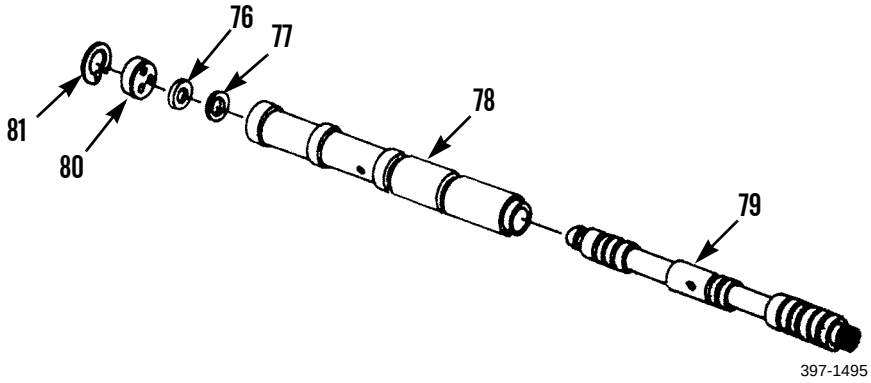


29. Remove piston assemblies (71 and 75) from cartridge assembly (68).
30. Remove retaining ring (73), insert (74), and piston (72). Discard retaining ring.
31. Remove valve assembly (75) from cartridge (68).



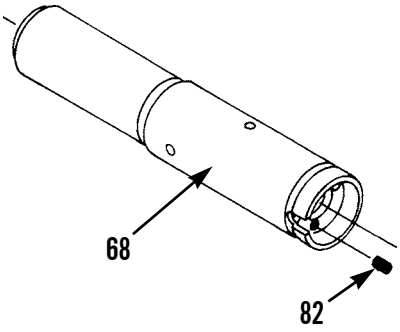
DISASSEMBLY - CONTINUED

32. Remove retaining ring (81), spacer (80), ring (76), and stop (77). Discard retaining ring.
33. Remove spool (79) from sleeve (78).



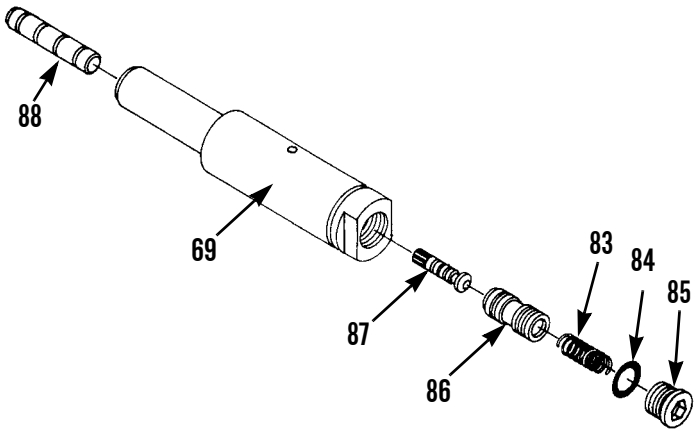
397-1495

34. Remove setscrew (82) from cartridge (68).



397-1496

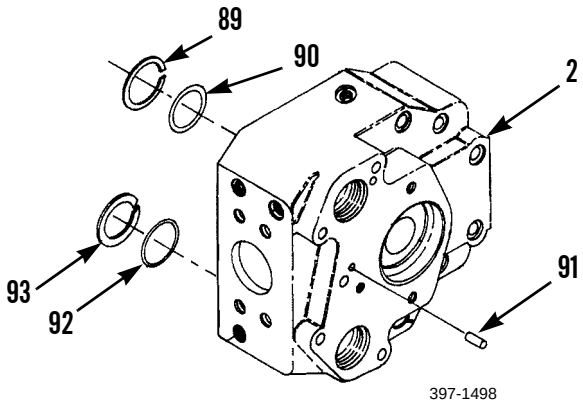
35. Remove piston (88) from cartridge (69).
36. Remove plug (85).
37. Remove preformed packing (84). Discard preformed packing.
38. Remove spring (83) and pistons (86 and 87) from cartridge (69).



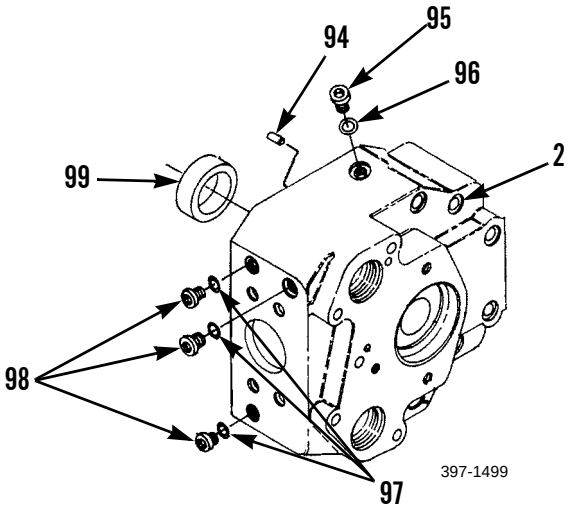
397-1497

DISASSEMBLY - CONTINUED

39. Remove two pins (91) from head (2).
40. Remove four retaining rings (89), preformed packings (90), three rings (93), and preformed packings (92). Discard preformed packings and retaining rings.



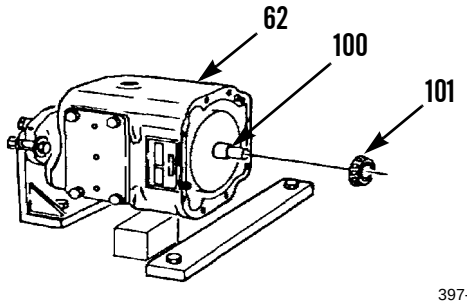
41. Remove bearing cup (99) from head (2).
42. Remove three plugs (98), preformed packings (97), five plugs (95), and preformed packings (96) from head (2). Discard preformed packings.
43. Remove two dowels (94) from head (2).



CAUTION

Protective plate must be used to prevent damage to the highly finished face of barrel when removing bearing.

44. Use protective plate and puller to remove bearing (101) from shaft (100) of body (62).
45. Remove body (62) from fixture and install on block.

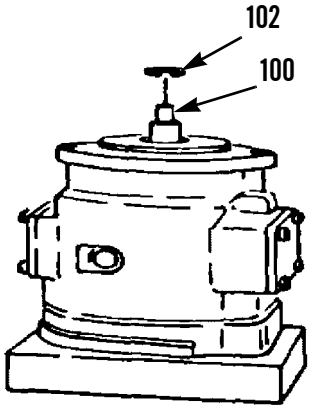


DISASSEMBLY - CONTINUED

WARNING

Do not remove second ring. Large spring in center of barrel is under compression and release of spring by removal of second ring may cause injury to personnel.

46. Remove retaining ring (102) from shaft (100). Discard retaining ring.



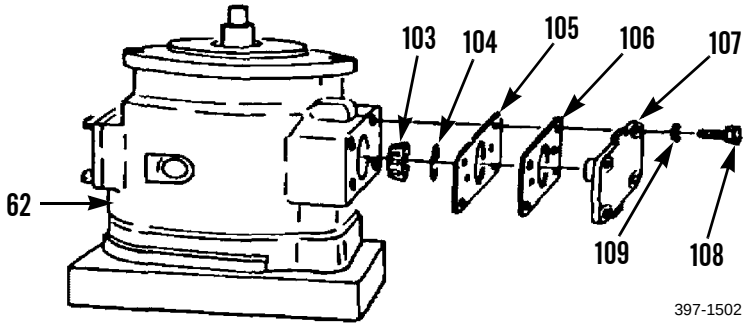
397-1501

NOTE

- Perform steps 47 and 48 at each side of body.
- Shims must be kept with the cover they were removed with.

47. Remove four bolts (108), lockwashers (109), cover (107), shims (105 and 106), and preformed packing (104) from body (62). Discard lockwashers and preformed packings.

48. Remove bearing (103).



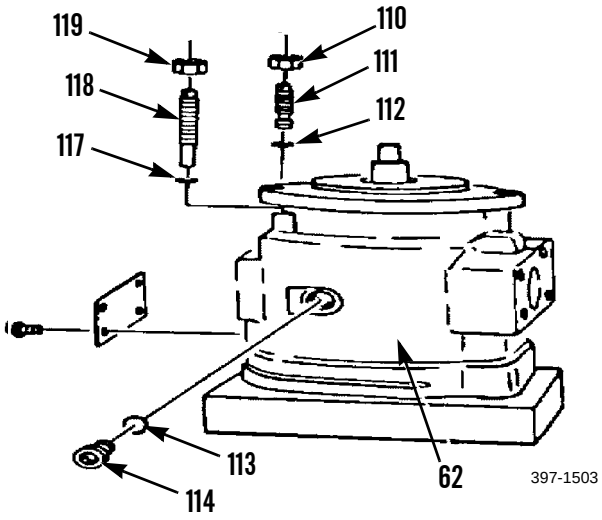
397-1502

DISASSEMBLY - CONTINUED

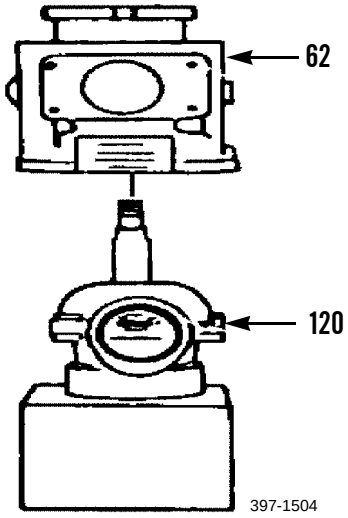
NOTE

Tag bolts before removing to aid in assembly.

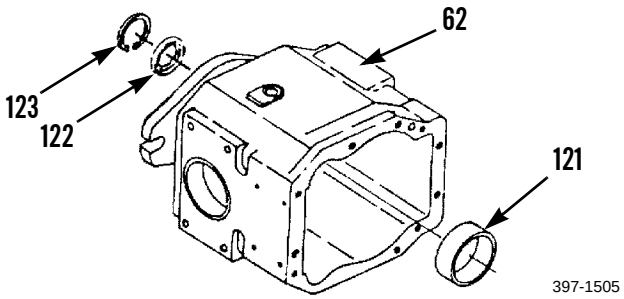
49. Remove nut (119), bolt (118), preformed packing (117), nut (110), bolt (111), and preformed packing (112) from body (62). Discard preformed packings.
50. If required, remove four screws (116) and plate (115).
51. Remove two plugs (114) and preformed packings (113). Discard preformed packings.



52. Separate body (62) from housing (120) assembly.

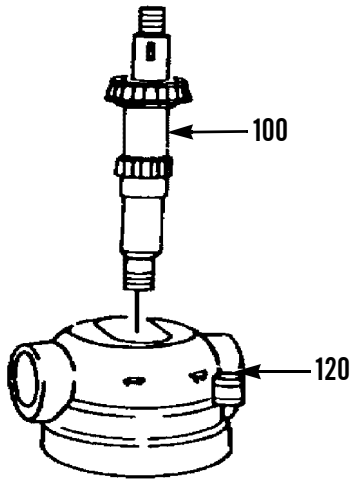


53. Remove and discard retaining ring (123).
54. Remove and discard seal (122).
55. Remove bearing cup (121) from body (62).



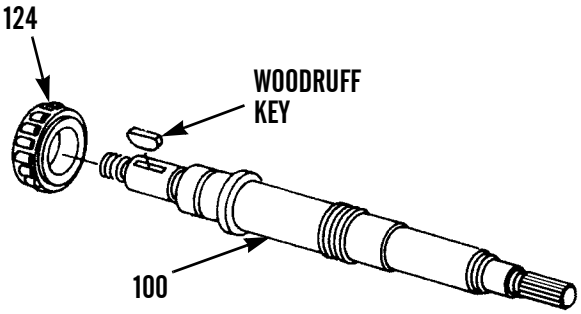
DISASSEMBLY - CONTINUED

56. Remove shaft (100) from housing (120).



397-1506

57. Remove woodruff key and bearing (124) from shaft (100).



397-1507

CAUTION

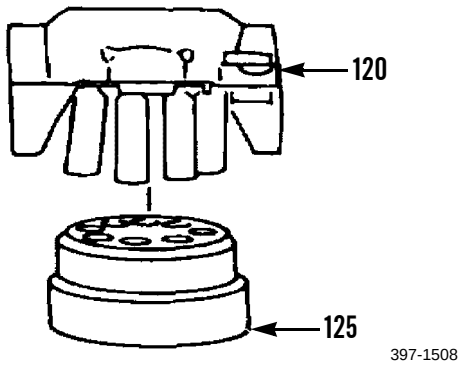
Use extreme caution not to damage the highly machined surfaces of pistons or barrel. Scratches or gouges in the surfaces will destroy parts.

NOTE

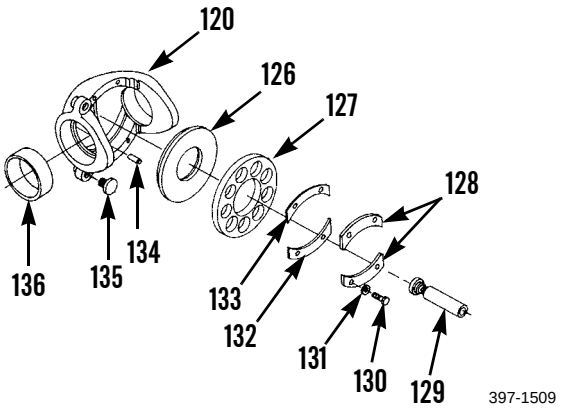
Tag pistons before removing to aid in assembly.

DISASSEMBLY - CONTINUED

58. Remove housing (120) from barrel (125).



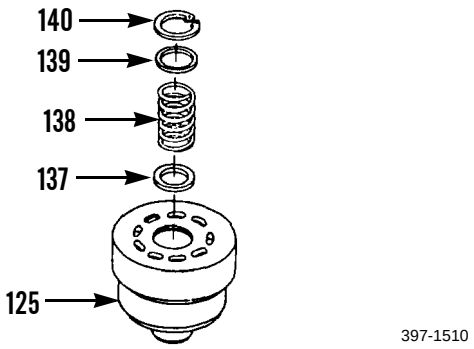
59. Remove four lockbolts (130), washers (131), two bearing plates (128), shims (132 and 133), and spacer plate (127).
60. Remove nine pistons (129), plate (126), dowel (134), two stops (135), and bearing cups (136) from housing (120).



WARNING

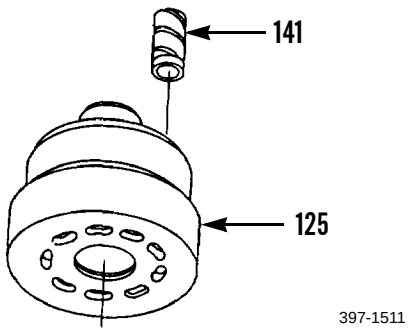
Spring is under extreme pressure and care must be used when removing. Use an arbor press and proper diameter driver to compress spring.

61. Place protective plate over barrel (125) and remove retaining ring (140), spacer ring (139), spring (138), and spacer ring (137). Discard retaining ring.



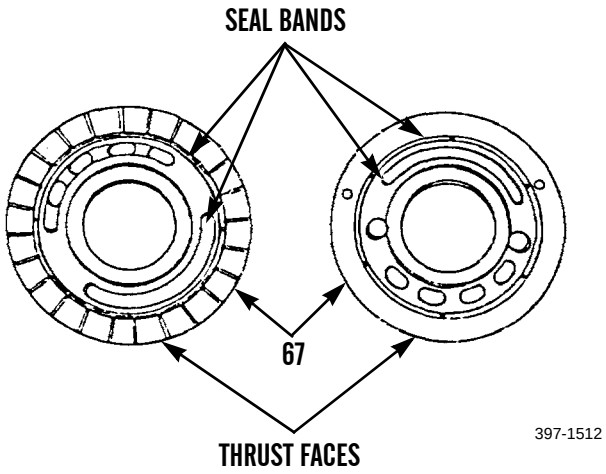
DISASSEMBLY - CONTINUED

62. Remove nine bearings (141) from barrel (125).



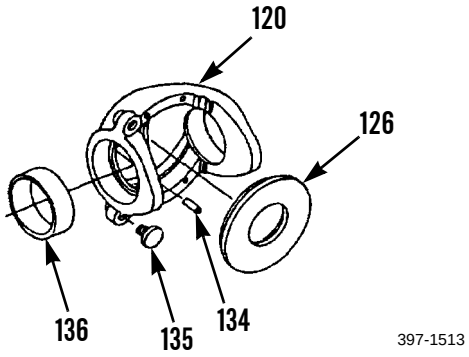
CLEANING AND INSPECTION

1. Inspect plate (67). Use touch lapping procedure if polished in the seal band area, minor erosion, or scratches. Use emery cloth and cleaning compound for touch lapping. Replace if cracked, broken, erosion across seal bands, deep scratches in seal bands or ports, or scratches that can be felt in the seal band area or thrust faces with fingernail or pencil.
2. Clean and inspect all other parts in accordance with WP 0020 00.



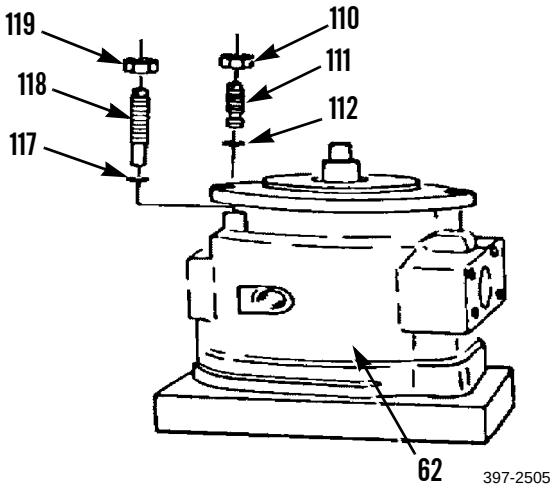
ASSEMBLY

1. Apply thin coat of clean oil on all parts.
2. Install dowel (134) on housing (120).
3. Lower temperature of two bearing cups (136) and press bearing cups into housing (120).
4. Install two stops (135).
5. Install spacer plate (126) into housing (120) with hole in plate in alignment with dowel (134).



ASSEMBLY - CONTINUED

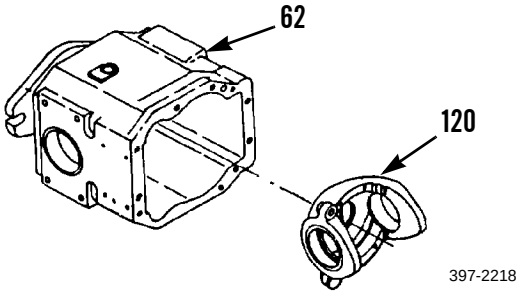
6. Install new preformed packing (117), bolt (118), and nut (119) in body (62). Bolt is the maximum stop bolt and must be installed in the same hole from which it was removed. Do not tighten nut.
7. Install new preformed packing (112), bolt (111), and nut (110). Bolt is the minimum stop bolt and must be installed in the same hole from which it was removed. Do not tighten nut.



NOTE

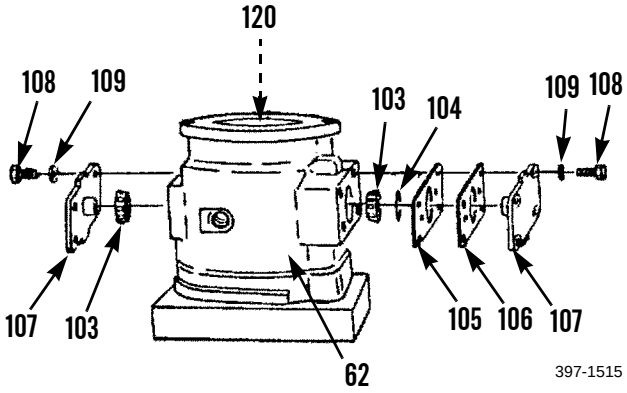
Perform steps 8 through 13 to adjust two stop bolts that will control pump output.

8. Turn pump housing (62) over so that two adjustment bolts (111 and 118) are at bottom.
9. Ensure nuts (110 and 119) are loosened and all gasket material is removed from top surface of body (62).
10. Use depth gauge set to a dimension of 5.381 in. (13.67 cm) to adjust maximum angle stop bolt (118) until gauge is flush with top surface of body (62) and end of stop bolt.
11. Hold stop bolt (118) and tighten nut (119) to 125 lb-ft (169 Nm).
12. Use depth gauge set to a dimension of 6.140 in. (15.60 cm) to adjust minimum angle stop bolt (111) until gauge is flush with top surface of body (62) and end of stop bolt.
13. Hold stop bolt (111) and tighten nut (110) to 125 lb-ft (169 Nm).
14. Position pump housing (120) into body (62).

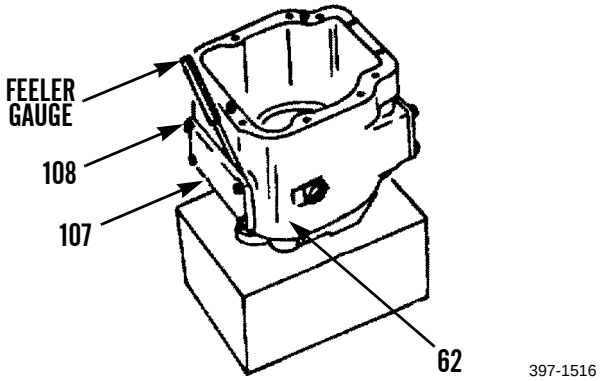


ASSEMBLY - CONTINUED

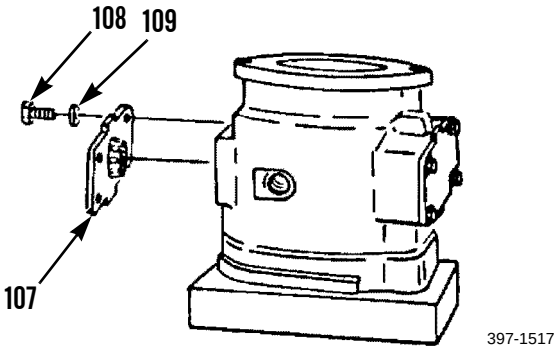
15. Install two bearings (103) in oil on two covers (107).
16. Install one of two new preformed packings (104) and enough shims (105 and 106) to obtain a shim thickness of 0.015 in. (0.38 mm) on one of two covers (107).
17. Position one cover (107) on body (62).
18. Install four of eight lockwashers (109) and bolts (108). Tighten bolts to 32 lb-ft (43 Nm).
19. Position second cover (107) on opposite side of body (62) with shim(s) (105 and 106).
20. Install remaining four of eight lockwashers (109) and bolts (108). Tighten bolts evenly in a clockwise direction to 40 lb-in. (4.5 Nm) in steps of 10 lb-in (1.1 Nm). Move pump housing (120) back and forth while tightening bolts.



21. Use feeler gauge to measure gap between body (62) and cover (107) without shims. Measure at four bolt (108) locations. Note the average thickness and add 0.008 in (0.02 mm). This will be the total shim thickness to be added to cover without shims. If the thickness of shims required is less than 0.005 in. (0.13 mm) and more than 0.025 in. (0.64 mm), add thickness of the shims required from feeler gauge measurement plus 0.008 in. (0.02 mm) to the 0.015 in. (0.38 mm) shim thickness of the other cover. Divide the total thickness of the shims evenly and install the same thickness of shims on each cover.



22. Remove four bolts (108), lockwashers (109), and cover (107) without shims.



ASSEMBLY - CONTINUED

NOTE

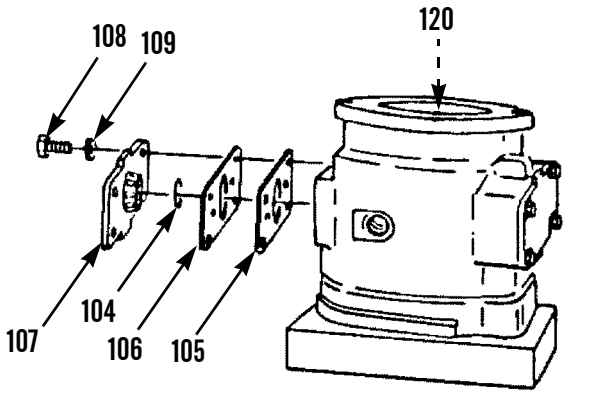
Thickness of one shim is 0.00473 in. (0.1201 mm) and thickness of other shim is 0.00197 in. (0.0500 mm).

23. Position shims (105 and 106) on cover (107) at thickness determined in step 21.
24. Install remaining new preformed packing (104), cover (107), four new lockwashers (109), and bolts (108). Tighten bolts to 32 lb-ft (43 Nm). Pump housing (120) must move freely after four bolts are tightened.

NOTE

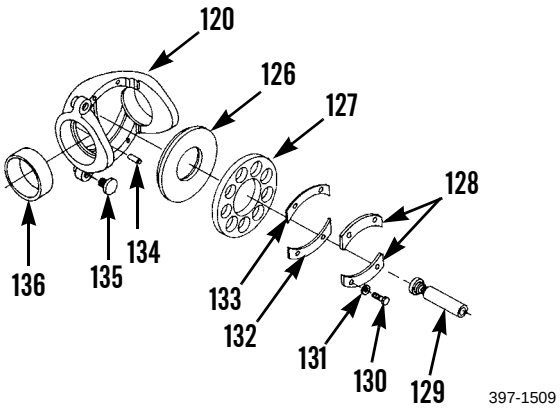
Shims must be installed with the cover they were removed with.

25. Remove eight bolts (108), washers (109), two covers (107), and shims (105 and 106).
26. Remove pump housing (120) assembly.



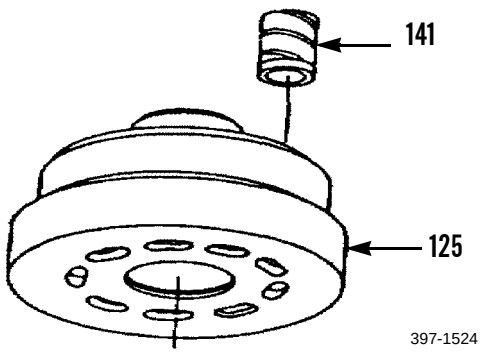
397-1518

27. Install nine pistons (129), plate (127), shim(s) (132 and 133), two bearing plates (128), four washers (131), and lockbolts (130) in pump housing (120). Tighten lockbolts to 100 lb-in. (11 Nm).
28. Use feeler gauge to measure clearance between plate (126) and nine pistons (129). Add or remove shim(s) (133 and 132) until a clearance of 0.003 in. (0.08 mm) is obtained.



397-1509

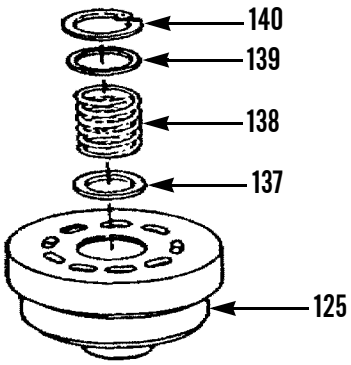
29. Install nine bearings (141) in barrel (125).



397-1524

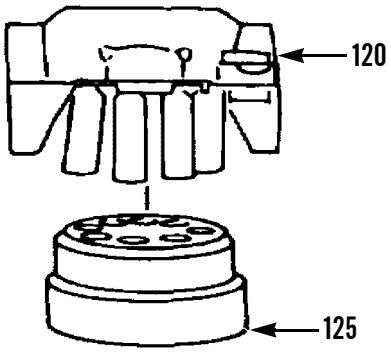
ASSEMBLY - CONTINUED

30. Use protective plate and arbor press to install spacer (137), spring (138), spacer (139), and new retaining ring (140) on barrel (125).



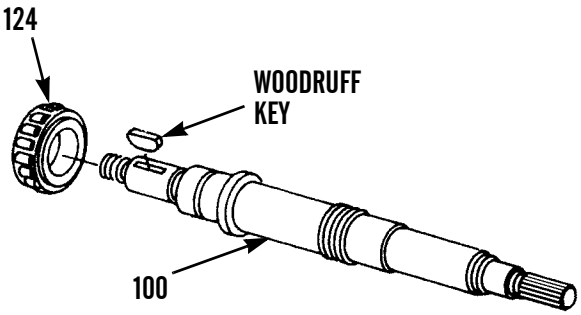
397-1525

31. Position barrel (125) assembly on block.
32. Install pump housing (120) to barrel (125) assembly.



397-1508

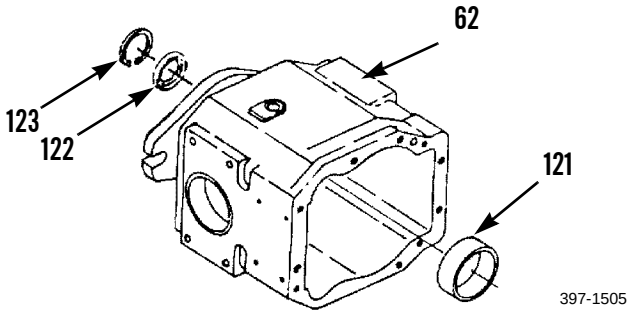
33. Install woodruff key and bearing (124) in oil on shaft (100).



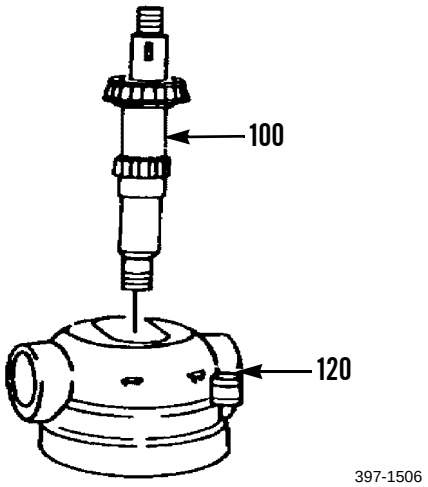
397-1507

ASSEMBLY - CONTINUED

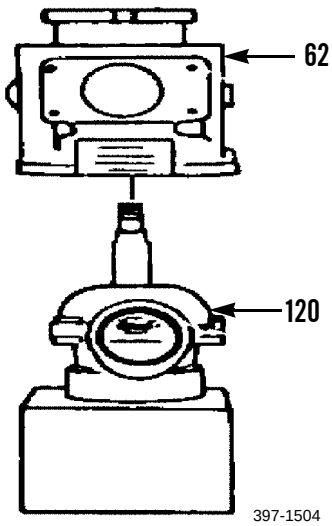
34. Install new seal (122) and new retaining ring (123) in body (62).
35. Lower temperature of bearing cup (121) and press bearing cup into body (62).



36. Install shaft (100) into housing assembly (120).

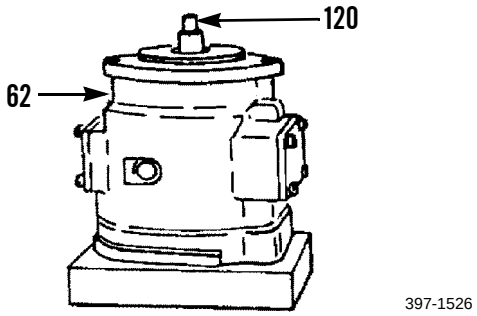


37. Position housing (120) on block.
38. Position body (62) onto housing (120).

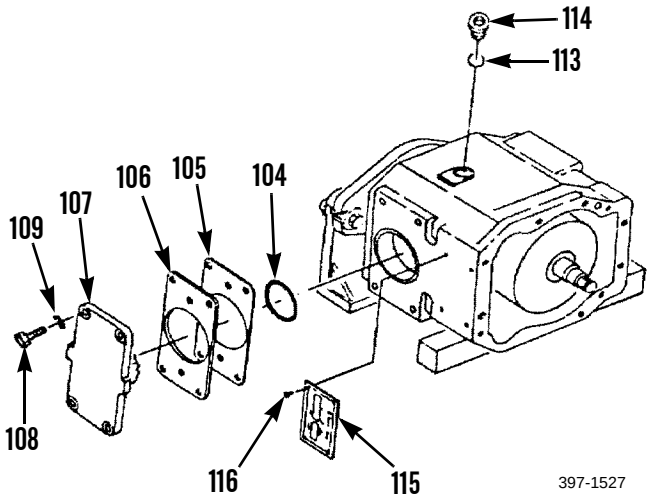


ASSEMBLY - CONTINUED

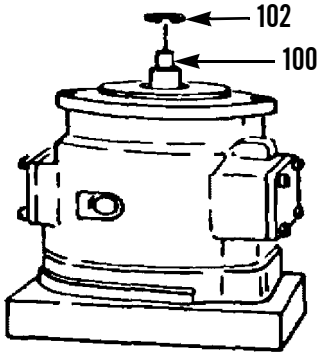
39. Remove block and push housing (120) into body (62).



40. Install two new preformed packings (113) and two plugs (114).
41. If removed, install plate (115) with four screws (116).
42. Lubricate two new preformed packings (104) with clean hydraulic oil.
43. Install two new preformed packings (104), correct amount of shims (105 and 106), two covers (107), eight new lockwashers (109), and bolts (108).

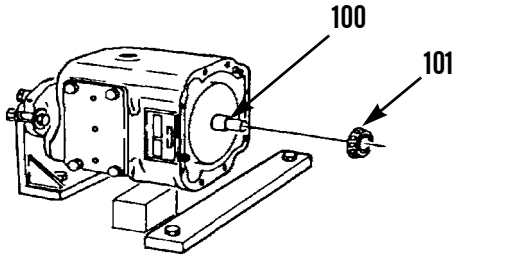


44. Install new retaining ring (102) on shaft (100).

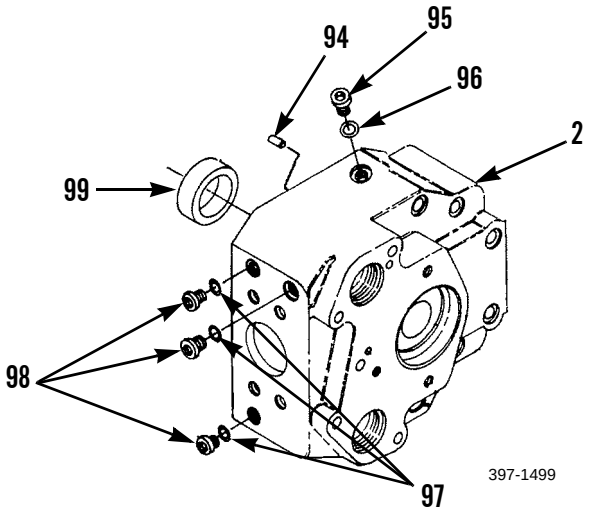


ASSEMBLY - CONTINUED

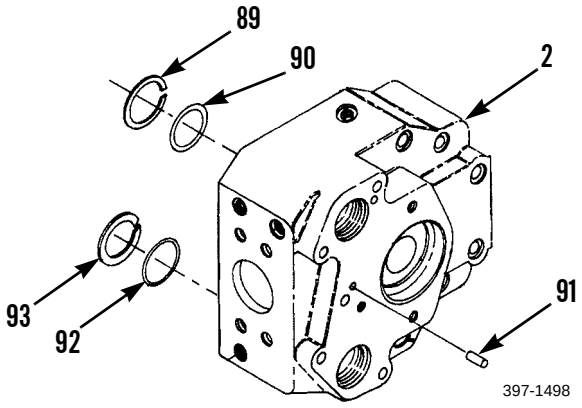
45. Install bearing (101) on shaft (100) using protective plate and puller.



46. Install two dowels (94) in head (2).
47. Install five new preformed packings (96), plugs (95), three new preformed packings (97), and plugs (98).
48. Lower temperature of bearing cup (99) and install in head (2).

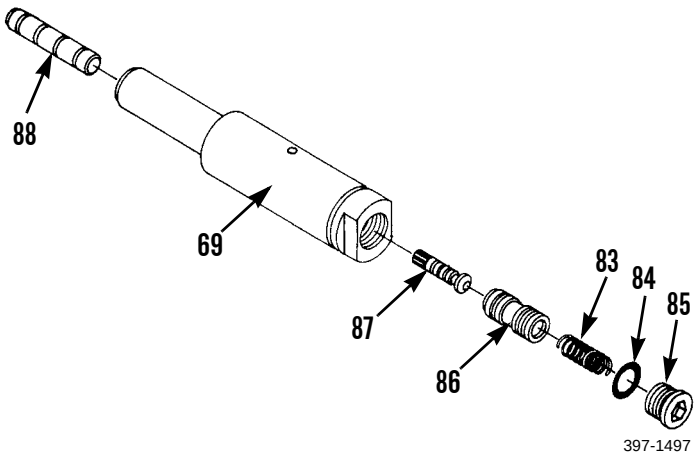


49. Install three new preformed packings (92), new retaining rings (93), four new preformed packings (90), and new retaining rings (89) in head (2).
50. Install two pins (91).



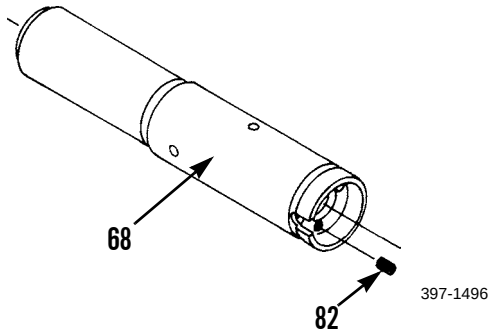
ASSEMBLY - CONTINUED

51. Install pistons (86 and 87) and spring (83) in cartridge (69).
52. Install new preformed packing (84) and plug (85).
53. Install piston (88).



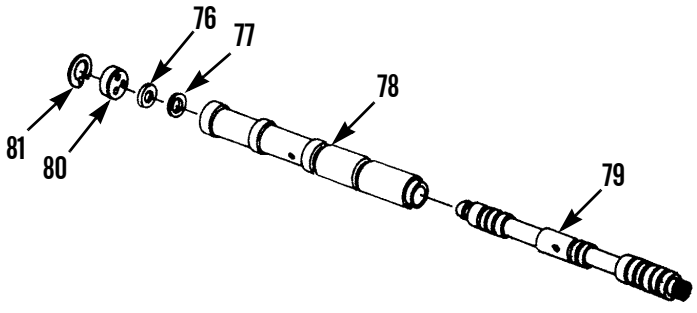
397-1497

54. Apply sealing compound to setscrew (82) and install in cartridge (68).



397-1496

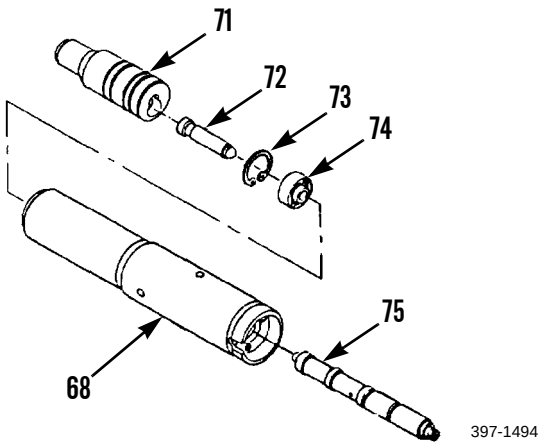
55. Install spool (79) in sleeve (78).
56. Install stop (77), ring (76), spacer (80), and new retaining ring (81).



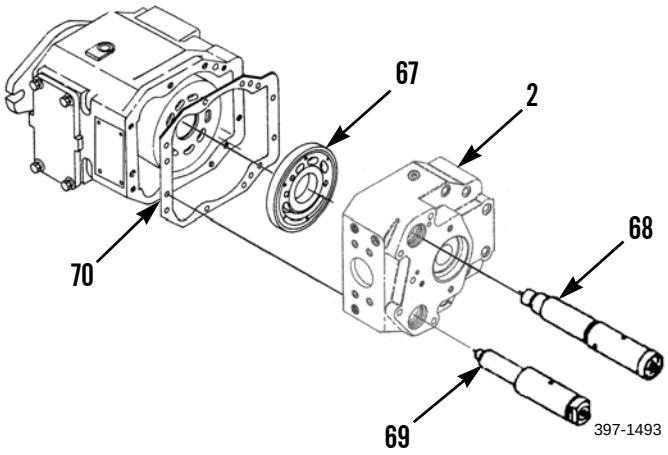
397-1495

ASSEMBLY - CONTINUED

57. Install piston assembly (75) in cartridge (68).
58. Install insert (74) and new retaining ring (73) in cartridge (68).
59. Install pistons (71 and 72) in cartridge (68).

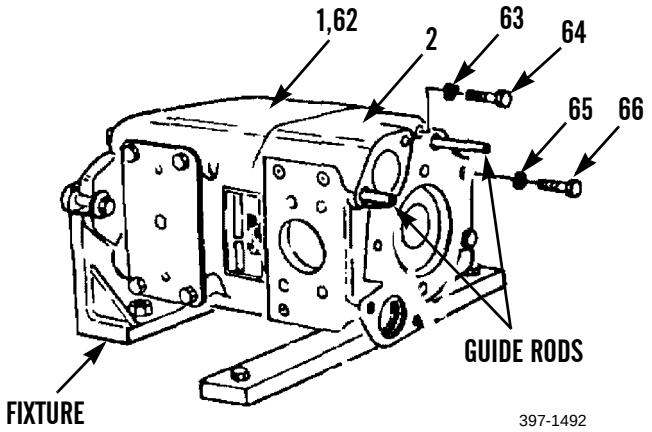


60. Install cartridge assemblies (68 and 69) in head (2).
61. Install plate (67) and new gasket (70).

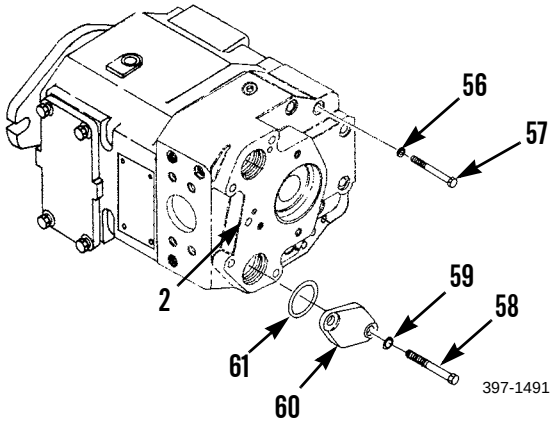


ASSEMBLY - CONTINUED

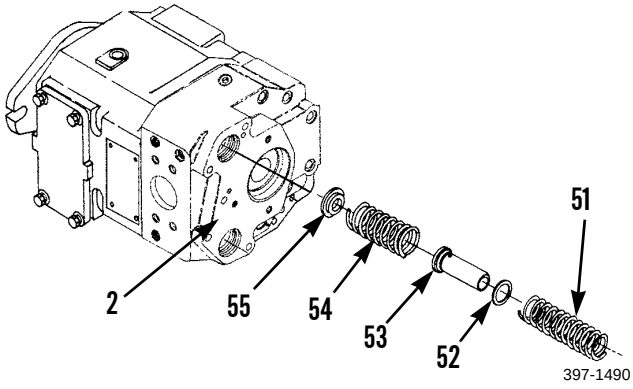
62. Install two guide rods in body (62).
63. Position head (2) on guide rods.
64. Install two lockwashers (65), bolts (66), three new lockwashers (63), and bolts (64).
65. Remove two guide rods.



66. Install new lockwasher (56) and bolt (57).
67. Install new preformed packing (61), cover (60), two new lockwashers (59), and bolts (58).

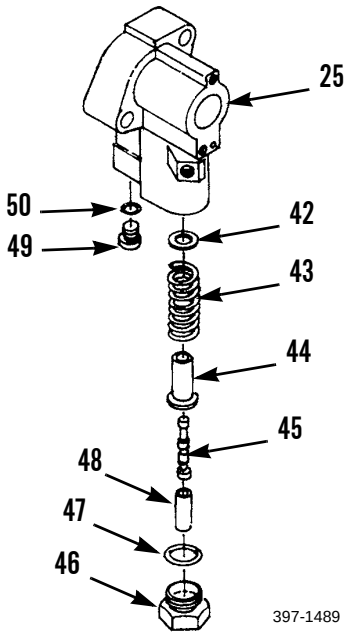


68. Install spacer (55), spring (54), seat (53), three washers (52), and spring (51) in head (2).

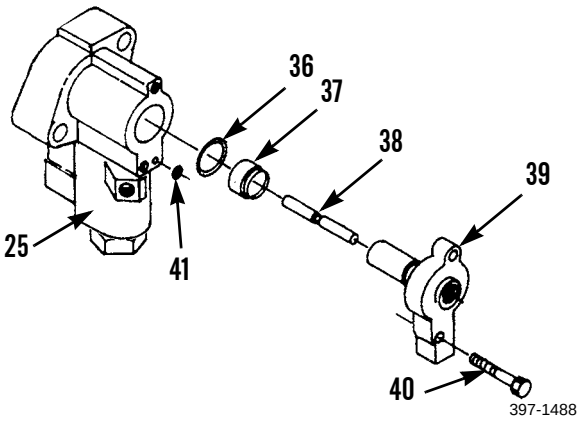


ASSEMBLY - CONTINUED

69. Install new preformed packing (50) and plug (49) in housing (25).
70. Install two shims (42), spring (43), retainer (44), piston (45), spacer (48), new preformed packing (47), and plug (46) into housing (25).

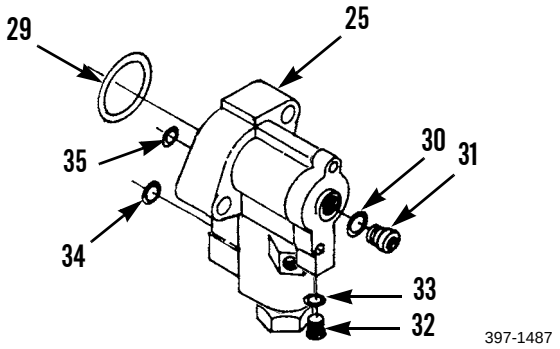


71. Install new preformed packings (36 and 41), spacer (37), piston (38), cover (39), and two bolts (40) in housing (25).

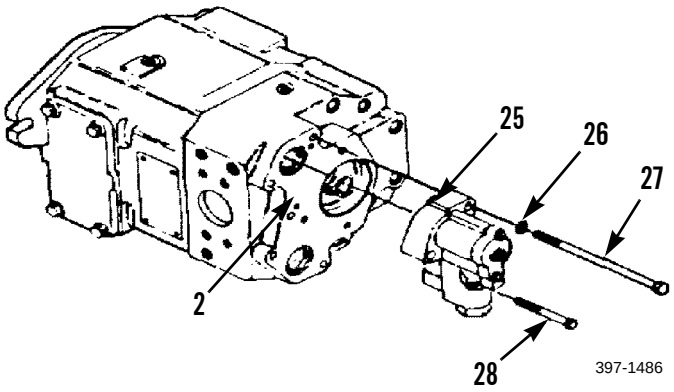


ASSEMBLY - CONTINUED

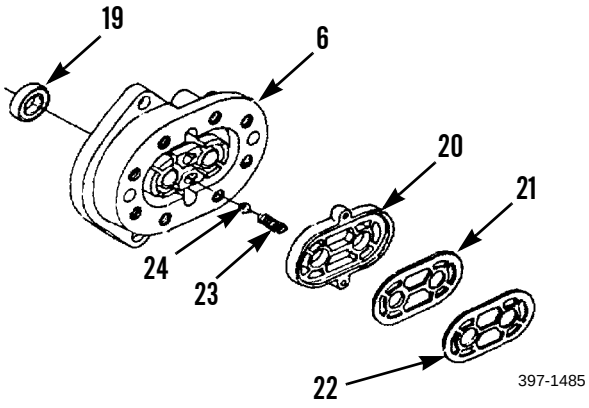
72. Install new preformed packing (33), plug (32), new preformed packing (30), and plug (31) in housing (25).
73. Install new preformed packings (29, 34, and 35).



74. Install housing (25) assembly, two new lockwashers (26), bolts (27), and bolt (28) on head (2).

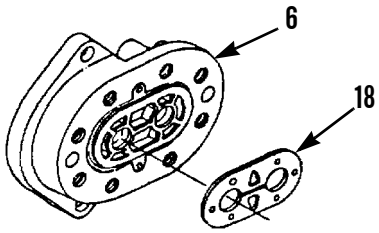


75. Install new seal (19) on front plate (6).
76. Install new seal (20) and new gaskets (21 and 22).
77. Install two new balls (24) and new springs (23).



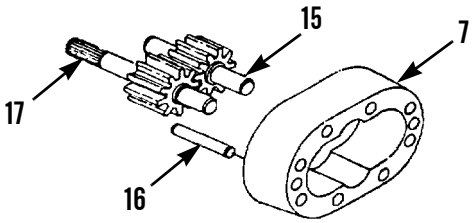
ASSEMBLY - CONTINUED

78. Install new diaphragm (18) on front plate (6).



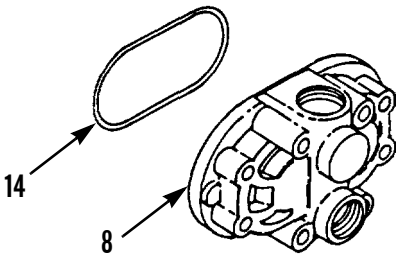
397-1484

79. Install two dowels (16), idler gear (15), and drive gear (17) in body (7).



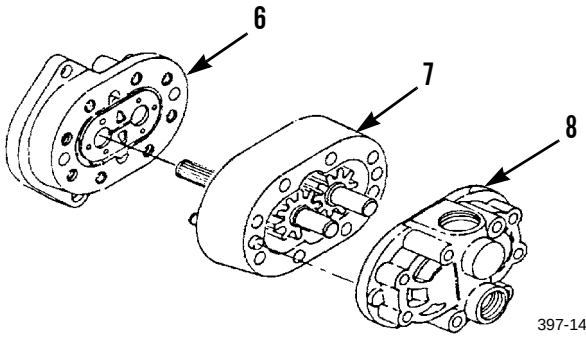
397-1483

80. Install new preformed packing (14) on back plate (8).



397-1482

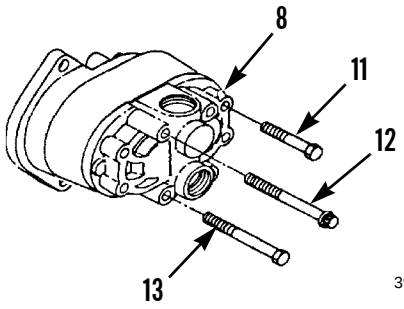
81. Position front plate (6), body (7), and back plate (8).



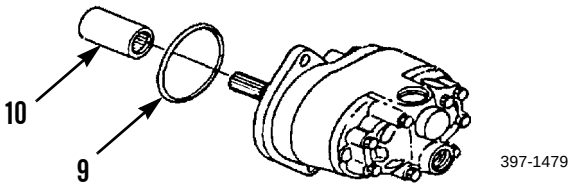
397-1481

ASSEMBLY - CONTINUED

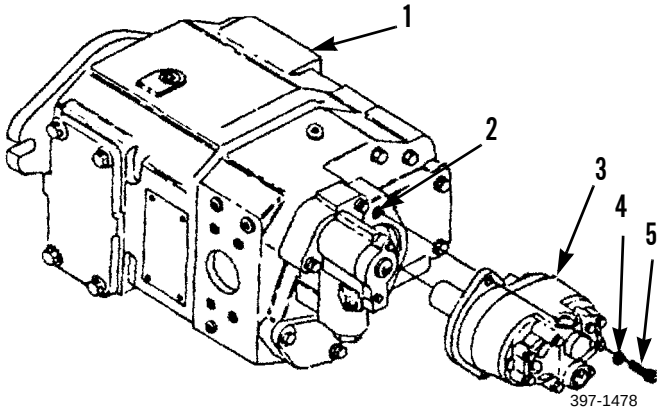
82. Install two bolts (13), bolts (12), and four bolts (11) on backplate (8).



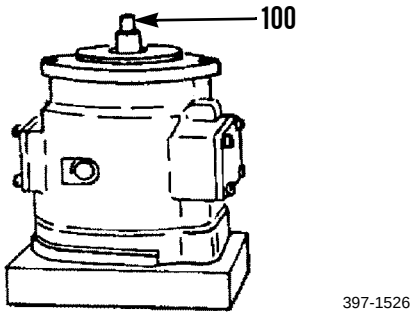
83. Install coupling (10) and new preformed packing (9).



84. Install hydraulic rotary pump (3) on head (2) of hydraulic axial pump (1) with two new lockwashers (4) and bolts (5).



85. Fill pump half full with hydraulic oil (WP 0216 00). Turn pump shaft (100) with a torque wrench. Not more than 120 lb-in. (14 Nm) must be used to start shaft turning and 84 lb-in. (10 Nm) should be needed to keep pump turning. If torque required exceeds these specifications, pump must be disassembled to locate the problem.



86. Install hydraulic pump assembly (WP 0329 00).

BREAK-IN

CAUTION

- Ensure that hydraulic tank has been filled.
- Cap of hydraulic tank must be loosened.

1. Slightly loosen, but not remove, discharge hose of hydraulic pump (WP 0329 00).
2. With machine throttle in OFF position, prime hydraulic pump by cranking engine (TM 5-3805-261-10) until oil seeps from loosened discharge connection.
3. Fully tighten discharge hose and hydraulic tank cap.
4. Disengage unloader valve and start engine (TM 5-3805-261-10). Run engine at low idle until hydraulic oil system is warmed to approximately 125°F (52°C).
5. With engine remaining at low idle, carefully release unloader valve and operate blade up and down (TM 5-3805-261-10) for approximately 10 minutes. Take care not to reach end of cylinder travel.
6. Increase engine speed to approximately 1,500 RPM and operate circle drive back and forth (TM 5-3805-261-10) for approximately 15 minutes. Stop engine.
7. Check hydraulic oil level and fill as necessary (WP 0216 00).

END OF WORK PACKAGE

CIRCLE DRIVE MOTOR REPAIR 0331 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed (3)

Ring, retaining

Seals (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

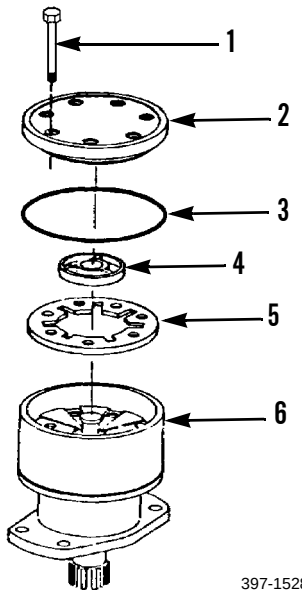
Circle drive motor removed (WP 0217 00)

DISASSEMBLY

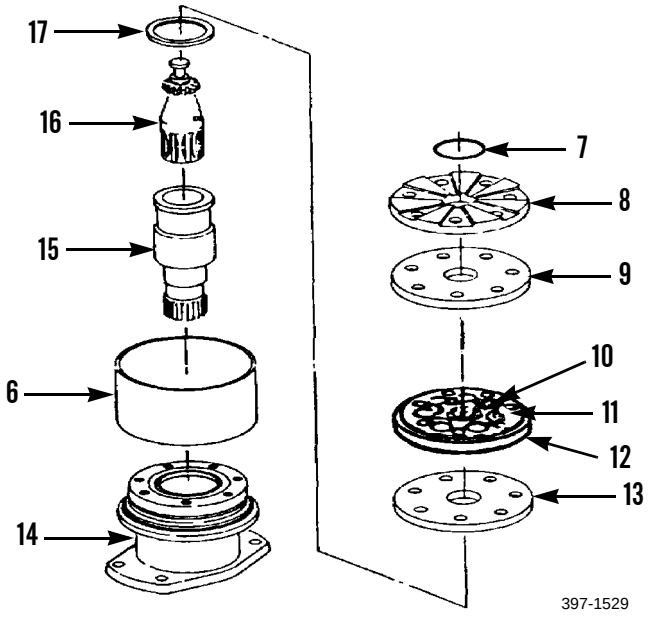
CAUTION

Use care to prevent damage to housing.

1. Remove seven screws (1), cover (2), and preformed packing (3) from circle drive motor. Discard preformed packing.
2. Remove commutator inner plate (4) and outer plate (5) from sleeve (6).

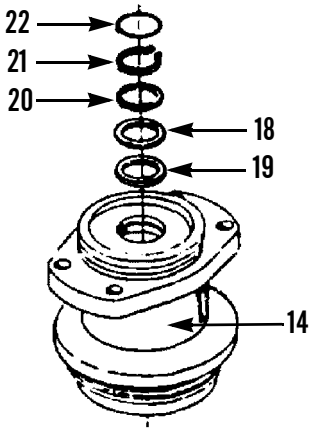


3. Remove and discard preformed packing (7).
4. Remove manifold (8) and spacer plate (9).
5. Remove inner rotor (10), seven pins (11), and outer rotor (12) as an assembly.
6. Remove spacer plate (13).
7. Remove bearing (17) and shaft (16).
8. Remove sleeve (6) and coupling (15) from housing (14).



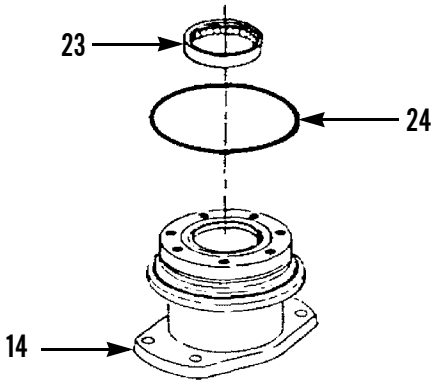
DISASSEMBLY - CONTINUED

9. Remove seal (22) from housing (14). Discard seal.
10. Remove retaining ring (21). Discard retaining ring.
11. Remove spacer ring (20), shim (18), and seal (19). Discard seal.



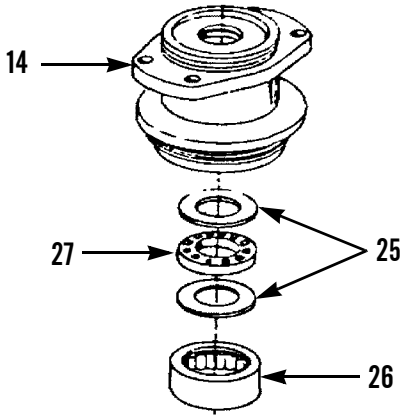
397-1530

12. Remove bearing (23) and preformed packing (24) from housing (14). Discard preformed packing.



397-1531

13. Use arbor press to remove bearing (26), two bearing seats (25), and bearing (27) from housing (14).



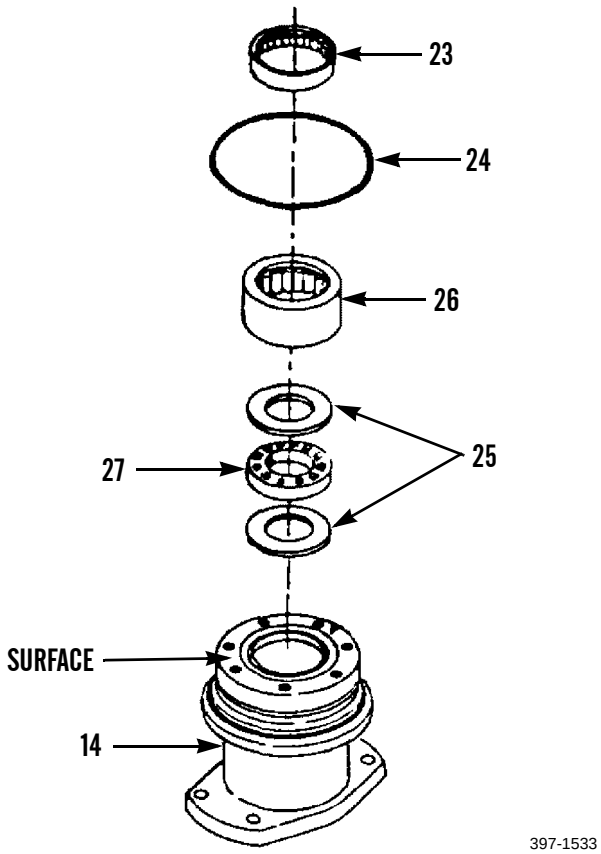
397-1532

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

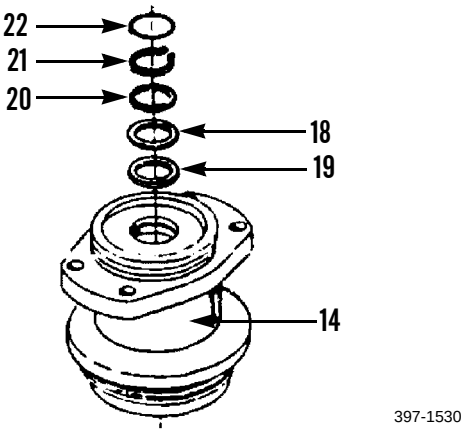
ASSEMBLY

1. Install two bearing seats (25) and bearing (27) in housing (14).
2. Install bearing (26) in housing (14). Set to depth of 2.41 in. (61.2 cm) below surface noted.
3. Install new preformed packing (24).
4. Install bearing (23) in housing (14). Set to depth of 0.10 in. (2.5 mm) below surface noted.



397-1533

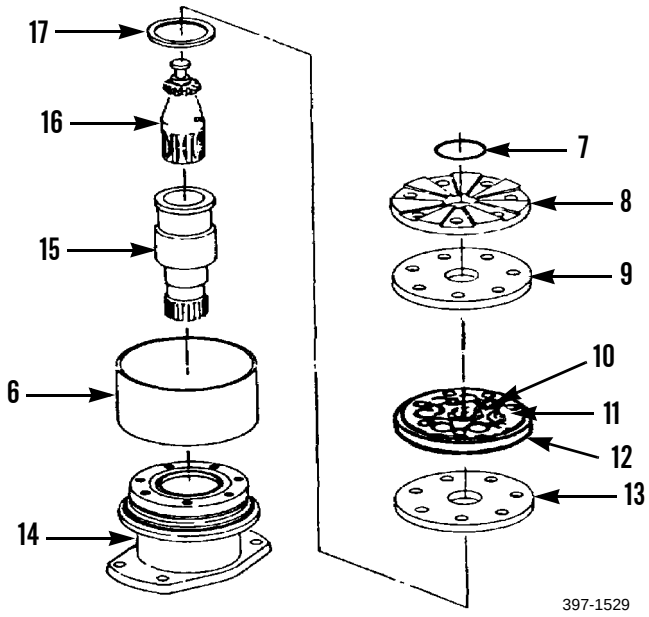
5. Install new seal (19), shim (18), and spacer (20) in housing (14).
6. Install new retaining ring (21).
7. Install new seal (22).



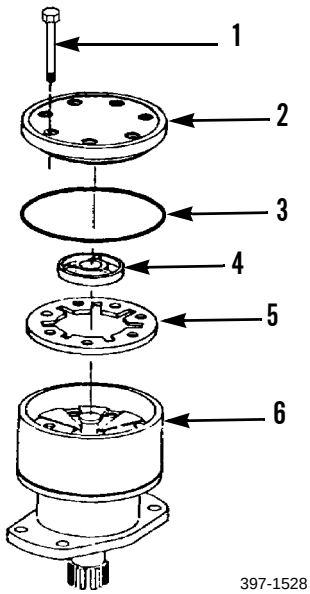
397-1530

ASSEMBLY - CONTINUED

8. Install coupling (15) and sleeve (6) on housing (14).
9. Install shaft (16) and bearing (17).
10. Install plate (13).
11. Install outer rotor (12), seven pins (11), and inner rotor (10) as an assembly.
12. Install plate (9) and manifold (8).
13. Install new preformed packing (7).



14. Install commutator outer plate (5) and inner plate (4) into sleeve (6).
15. Install new preformed packing (3) and cover (2) with seven screws (1). Tighten screws to 50 lb-ft (68 Nm).



16. Install circle drive motor (WP 0217 00).

END OF WORK PACKAGE

HYDRAULIC CONTROL VALVES REPAIR 0332 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Wrench, torque (Item 94, WP 0348 00)

Materials/Parts

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Lockwasher (3)

Packing, preformed (19)

Seal (41)

8/32-2B screw

Personnel Required

Two

References

WP 0020 00

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-2805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

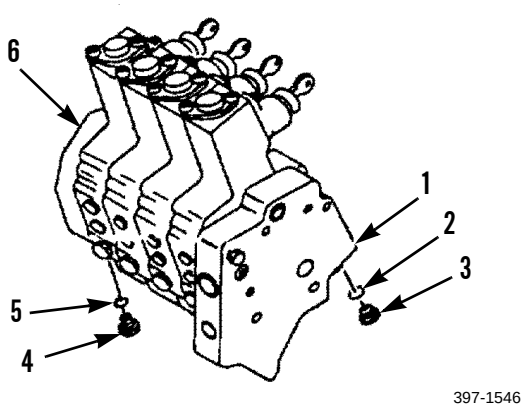
Hydraulic control valves removed (WP 0249 00)

DISASSEMBLY

NOTE

Perform the following steps to disassemble the left or right side control valve assembly. The left control valve assembly is shown.

1. Remove plug (3) and preformed packing (2) from housing (1). Discard preformed packing.
2. Remove plug (4) and preformed packing (5) from housing (6). Discard preformed packing.



397-1546

NOTE

Control valve assembly must be matchmarked if entire control valve is disassembled to ensure proper placement of each valve in assembly.

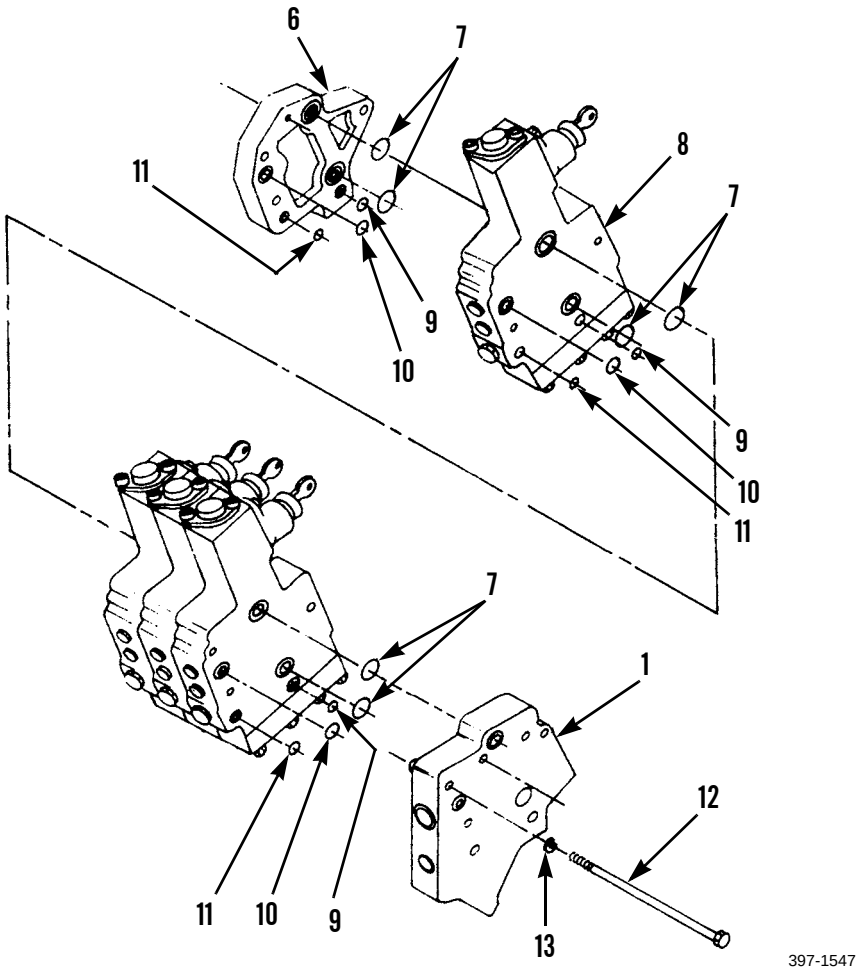
3. Matchmark housings (1 and 6) and valves (8).
4. Remove three bolts (12) and lockwashers (13). Discard lockwashers.

DISASSEMBLY - CONTINUED

CAUTION

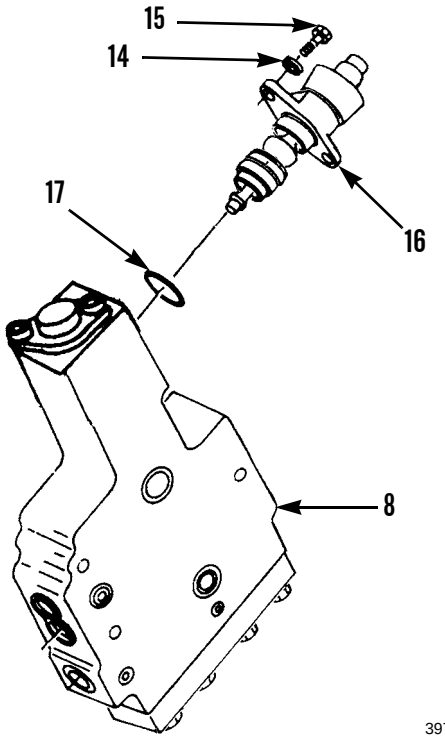
Do not place machined surfaces of manifolds or valves on unprotected surface. Scratches or nicks will permit valve leakage.

5. Separate housings (1 and 6) and valve (8) assemblies.
6. At each separation surface, remove and discard two preformed packings (7), seal (9), and preformed packings (10 and 11).



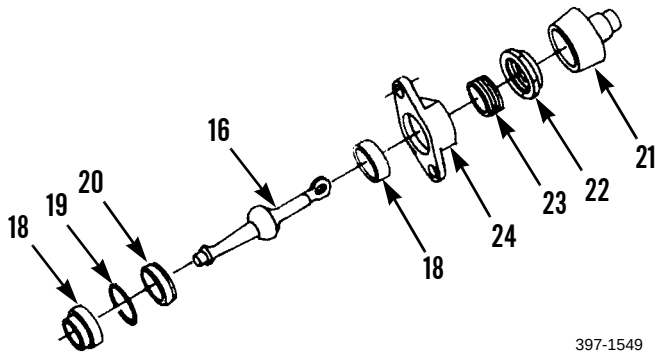
DISASSEMBLY - CONTINUED

7. Remove two bolts (15), washers (14), and lever (16) assembly from valve (8) assembly.
8. Remove and discard preformed packing (17).



397-1548

9. Remove boot (21).
10. Remove nut (22) and ring (23).
11. Remove two bearings (18), preformed packing (19), seal (20), and lever (16) from plate (24). Discard preformed packing.



397-1549

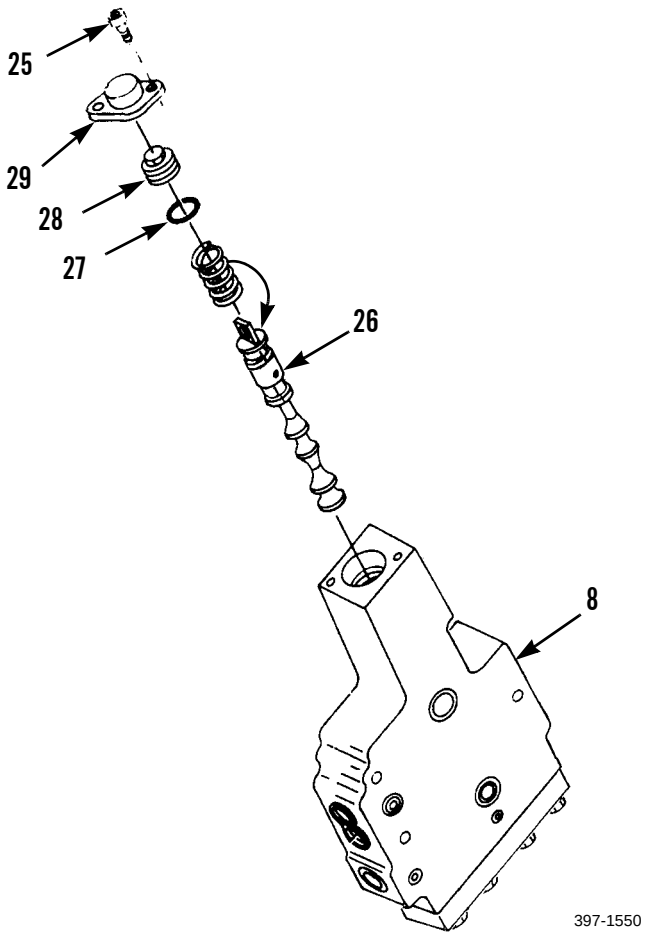
DISASSEMBLY - CONTINUED

12. Remove two screws (25) and lock (29) from valve (8).

WARNING

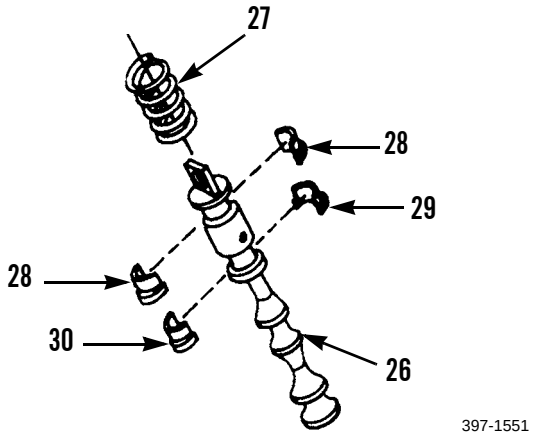
Spring is under pressure. Loosen plug carefully to relieve pressure of spring. Failure to follow this warning may cause injury to personnel.

13. Remove plug (28) and preformed packing (27). Discard preformed packing.
14. Remove valve (26) assembly from valve (8) assembly.



DISASSEMBLY - CONTINUED

15. Compress spring (27).
16. Remove two retainers (28).
17. Remove spring (27) and two bushings (29 and 30) from valve (26).



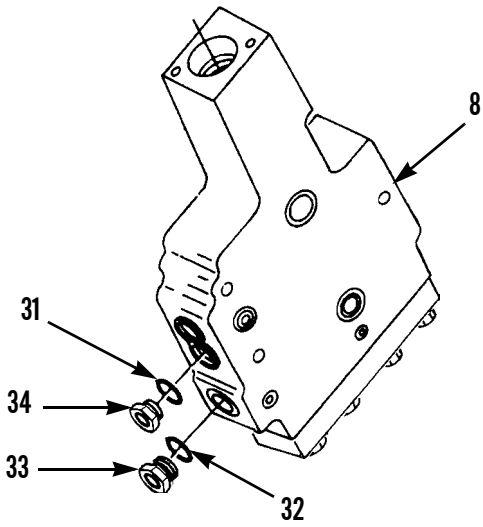
397-1551

18. Remove two plugs (34) and preformed packings (31) from valve (8) assembly. Discard preformed packings.

WARNING

Spring is under pressure. Loosen plug carefully to relieve pressure of spring. Failure to follow this warning may cause injury to personnel.

19. Remove plug (33) and preformed packing (32). Discard preformed packing.



397-1552

DISASSEMBLY - CONTINUED

20. Remove spring (36) and ball (37) from valve (8) assembly.
21. Use 3/8 in. hex key to remove seat (38) and remove preformed packing (39). Discard preformed packing.

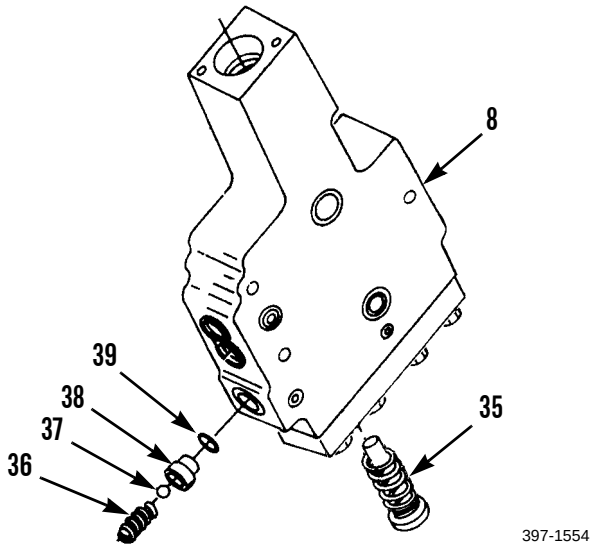
WARNING

Spring is under pressure. Loosen plug carefully to relieve pressure of spring. Failure to follow this warning may cause injury to personnel.

CAUTION

Do not allow shim(s) and washers to fall from plug.

22. Remove plug (35) assembly from valve (8) assembly.

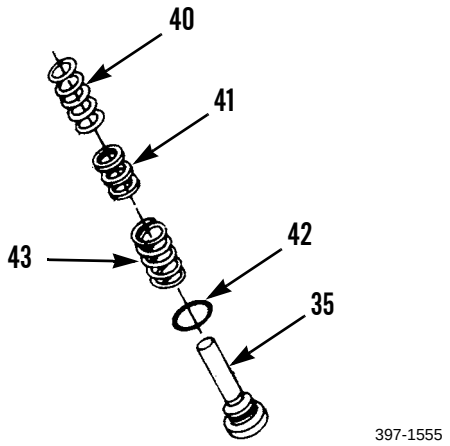


DISASSEMBLY - CONTINUED

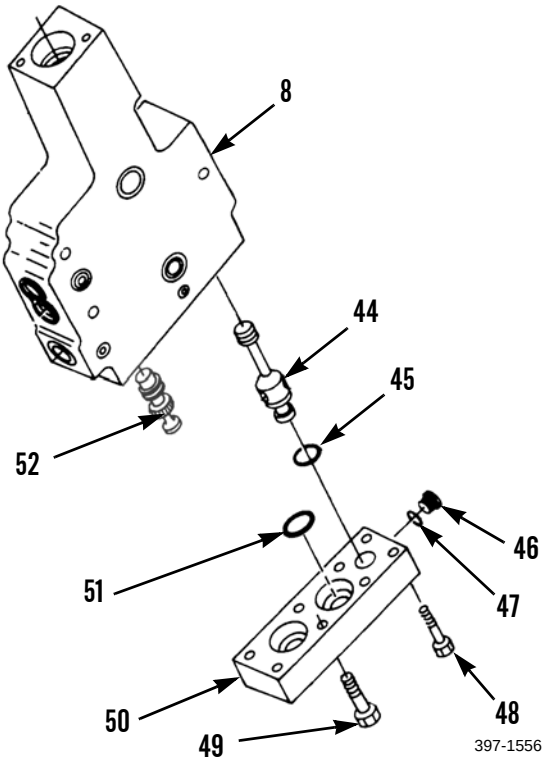
CAUTION

Keep shims and washers together as removed.

23. Remove shim(s) (40), washer(s) (41), spring (43), and preformed packing (42) from plug (35). Discard preformed packing.

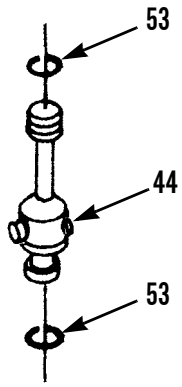


24. Remove plug (46) and preformed packing (47). Discard preformed packing.
25. Remove four bolts (48 and 49) and cover (50) from valve (8).
26. Remove and discard two preformed packings (51) and preformed packing (45).
27. Remove valve (52).
28. Use 8/32-2B screw and puller to remove sleeve (44) assembly.



DISASSEMBLY - CONTINUED

29. Remove and discard two preformed packings (53) from sleeve assembly (44).



397-1557

CLEANING AND INSPECTION

Clean all parts in accordance with WP 0020 00.

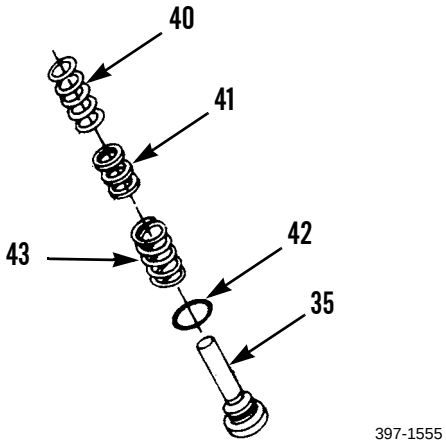
ASSEMBLY

1. Install two new preformed packings (53) on sleeve assembly (44).
2. Apply thin coat of clean oil to two preformed packings (53).
3. Install sleeve (44) assembly in valve (8).
4. Install valve (52) in valve (8) assembly.
5. Install new preformed packing (45) and two new preformed packings (51) in cover (50).
6. Install cover (50) to valve (8) with four bolts (48 and 49).
7. Install new preformed packing (47) and plug (46).

Valve (105) Assembly	Quantity of Shims (40)	Quantity of Washers (41)
Scarifier	5	4
Blade life, R.H.	5	4
Wheel lean	6	3
Centershift	6	3
Articulation	2	4
Blade tip	5	3
Circle drive	1	3
Sideshift	5	4
Blade lift, L.H.	5	4

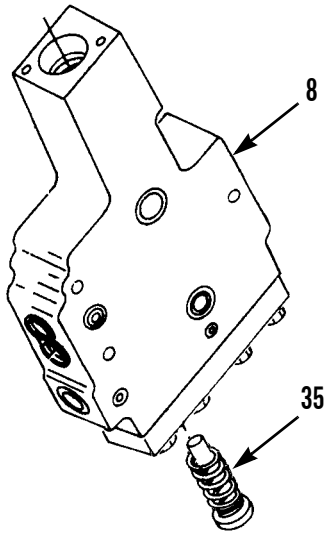
ASSEMBLY - CONTINUED

8. Install new preformed packing (42), spring (43), washers (41), and shim(s) (40) on plug (35). Install correct quantities of shim(s) and washers. Refer to chart above.



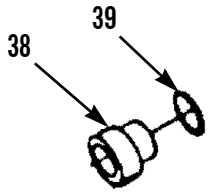
397-1555

9. Install plug (35) assembly in valve (8) assembly. Tighten to 35 lb-ft (47 Nm).



397-1558

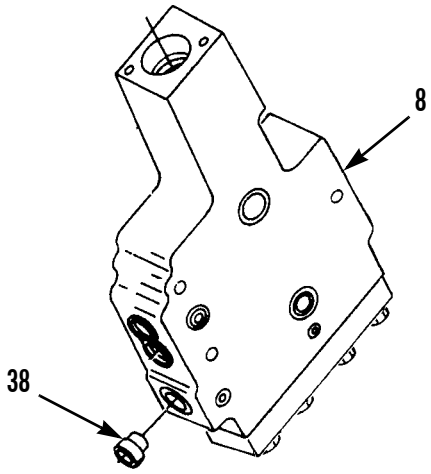
10. Install new preformed packing (39) on valve seat (38).



397-1559

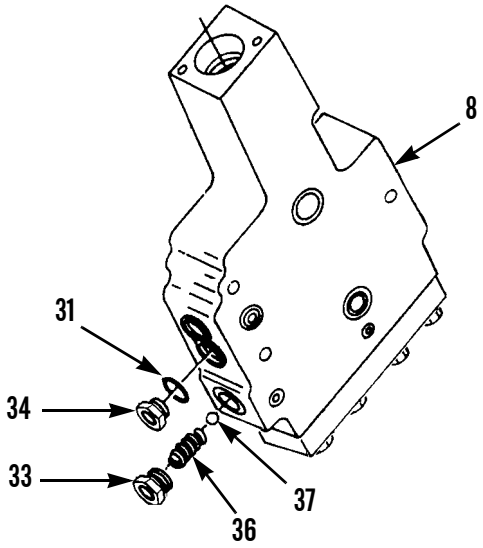
ASSEMBLY - CONTINUED

11. Lubricate outer diameter of preformed packing (39) lightly with clean oil. Screen in seat must be clean before installing.
12. Install valve seat (38) in valve (8) assembly. Tighten to 10 to 16 lb-ft (14 to 21 Nm).



397-1560

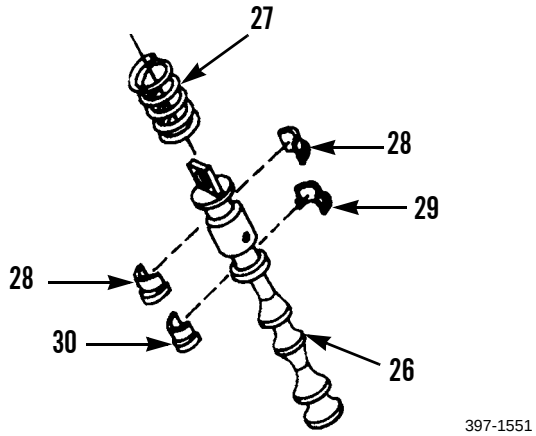
13. Install ball (37), spring (36), and plug (33) in valve (8) assembly.
14. Install two new preformed packings (31) and plugs (34).



397-1562

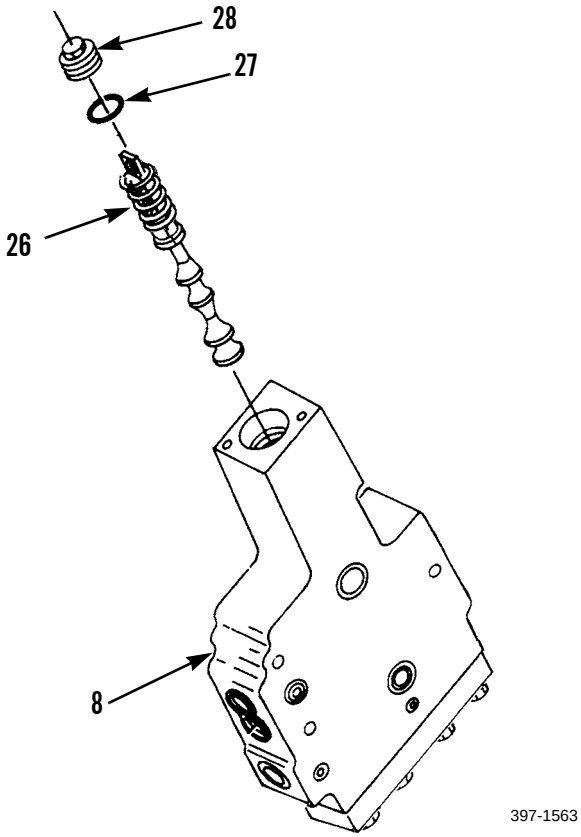
ASSEMBLY - CONTINUED

15. Install two bushings (29 and 30) and spring (27) on valve (26).
16. Compress spring (27).
17. Install two retainers (28).
18. Release spring (27).



397-1551

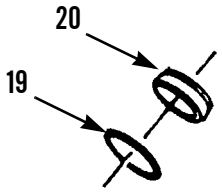
19. Install valve assembly (26) in valve (8) assembly while aligning hole in valve with hole for lever assembly.
20. Loosely install new preformed packing (27) and plug (28).



397-1563

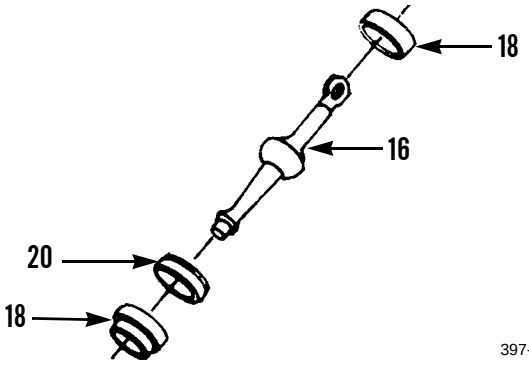
ASSEMBLY - CONTINUED

21. Install new preformed packing (19) on seal (20).



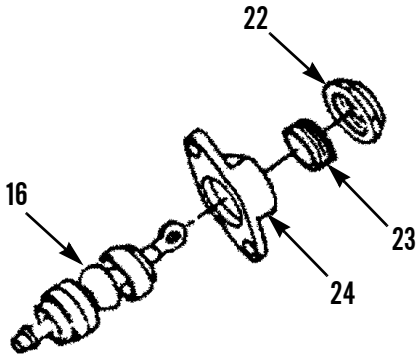
397-1565

22. Position seal (20) and two bearings (18) on lever (16).



397-1566

23. Position lever (16) assembly into plate (24).
24. Loosely install ring (23) and nut (22).



397-1567

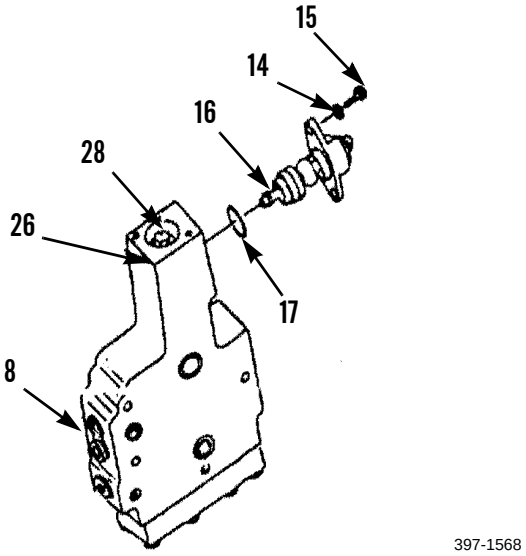
ASSEMBLY - CONTINUED

25. Install new preformed packing (17) to lever (16) assembly.
26. Position lever (16) assembly to valve (8) assembly. Insert end of lever in hole valve (26).
27. Install two washers (14) and bolts (15).

NOTE

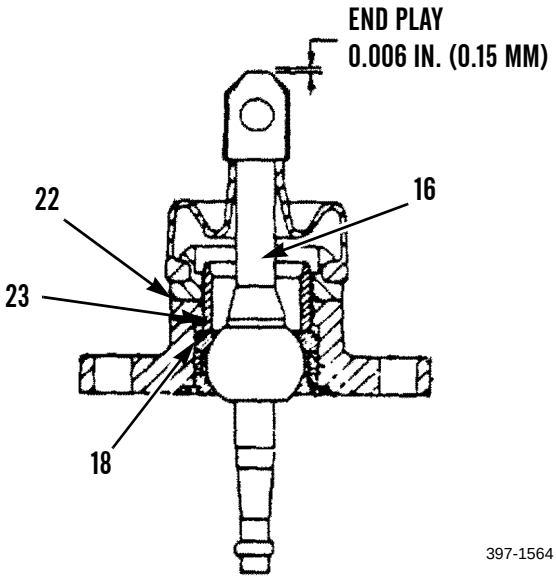
- Perform steps 28 through 30 to adjust end play of valve.
- While moving lever (16) back and forth slightly, tighten plug just until there is no play. Do not overtighten plug.

28. Tighten plug (28) to remove end play of valve (26).



397-1568

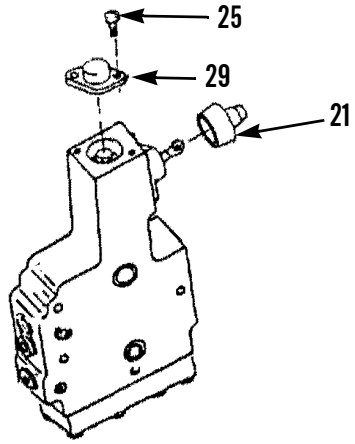
29. With nut (22) loosened, rotate ring (23) until it contacts bearing (18), then turn to left 45 degrees to obtain lever (16) end play of 0.006 in. (0.15 mm) using dial indicator.
30. Hold ring (23) and tighten nut (22) to 25 lb-ft (34 Nm).



397-1564

ASSEMBLY - CONTINUED

31. Install lock (29) with two screws (25).
32. Install boot (21).

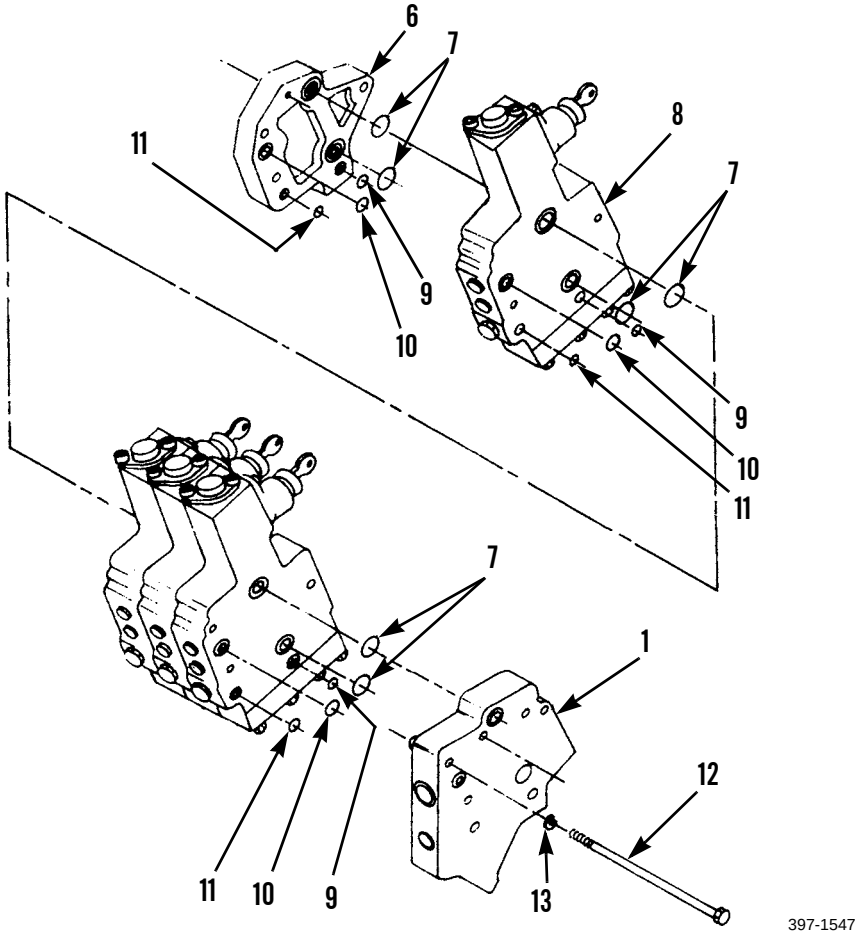


397-1569

NOTE

Perform the following steps to assemble the left or right side control valve assembly. The left control valve assembly is shown.

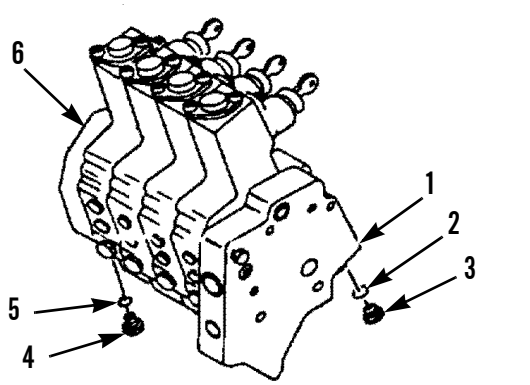
33. At each surface to be joined, install new preformed packing (11 and 10), seal (9), and two new preformed packings (7).
34. Position valve (8) assemblies and manifolds (1 and 6) as matchmarked.
35. Install three new lockwashers (13) and bolts (12).



397-1547

ASSEMBLY - CONTINUED

36. Install new preformed packing (5) and plug (4) in manifold (6).
37. Install new preformed packing (2) and plug (3) in manifold (1).
38. Install hydraulic control valves (WP 0249 00).



397-1546

END OF WORK PACKAGE

CENTERSHIFT CYLINDER REPAIR 0333 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Seal (3)

Seal assembly (4)

Washers, lock (4)

Personnel Required

Two

References

WP 0020 00

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

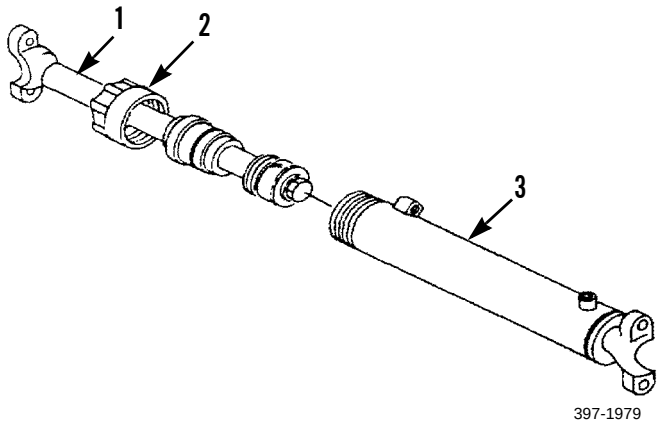
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Centershift cylinder removed (WP 243 00)

DISASSEMBLY

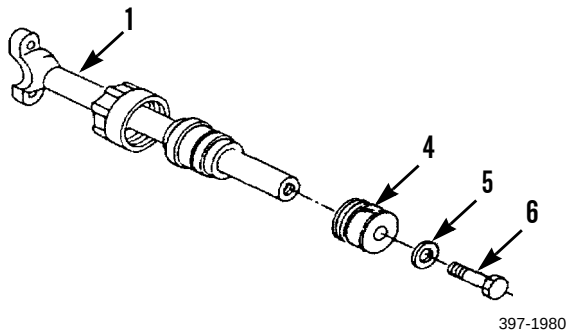
1. Loosen hub (2) from cylinder (3).
2. Remove rod (1) assembly from cylinder (3).



397-1979

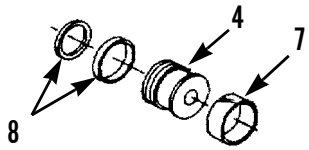
DISASSEMBLY - CONTINUED

3. Remove bolt (6) and washer (5) from end of rod (1).
4. Remove piston (4) assembly from rod (1).



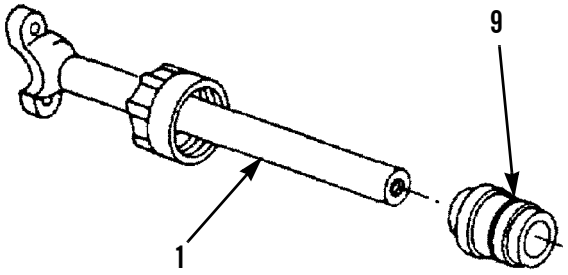
397-1980

5. Remove bushing (7) and seal assembly (8) from piston (4). Discard seal assembly.



397-1981

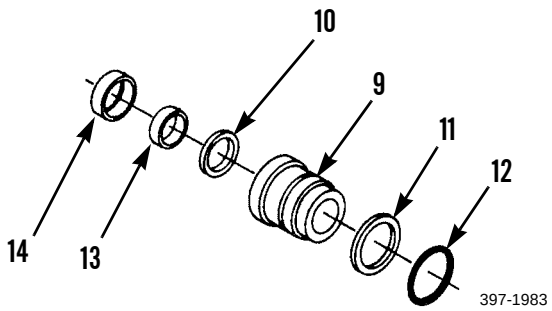
6. Remove head (9) assembly from rod (1).



397-1982

DISASSEMBLY - CONTINUED

7. Remove packing retainer (11), preformed packing (12), and seals (10, 13, and 14) from head (9). Discard preformed packing and seals.



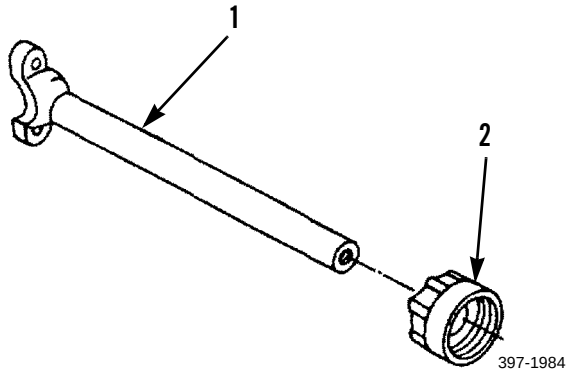
8. Remove hub (2) from rod (1).

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

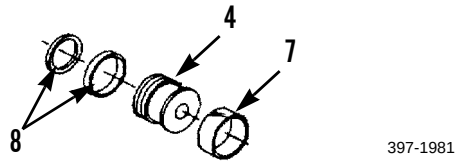
1. Position hub (2) on rod (1).



2. Apply thin coat of clean oil to new seals (10, 13, and 14), new preformed packing (12), and packing retainer (11).
3. Use a seal installer to install new seals (10, 13, and 14) into head (9). Lips of seals (10 and 13) is toward inside of head. Lip of seal (14) is toward outside of head.
4. Install packing retainer (11) and new preformed packing (12) on head (9).
5. Install head (9) assembly on rod (1).

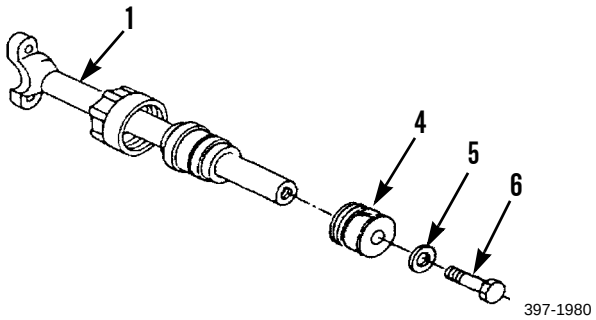
ASSEMBLY - CONTINUED

6. Using seal expander, install new seal assembly (8) and bushing (7) on piston (4).



397-1981

7. Install piston (4) assembly on rod (1).
8. Apply thin coat of thread lubricant to threads of bolt (6) and install washer (5) and bolt to end of rod (1). Tighten bolt to 800 lb-ft (1,085 Nm).



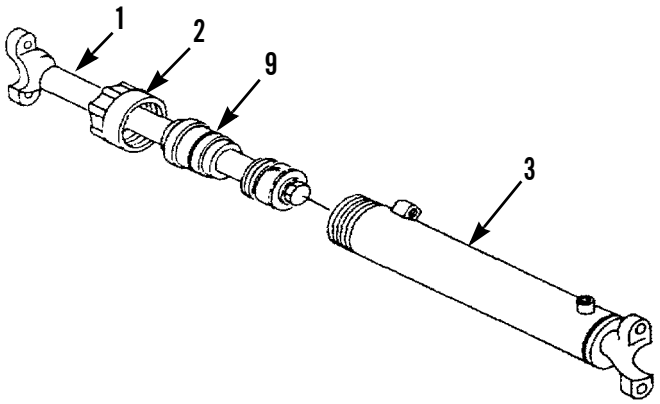
397-1980

9. Apply clean oil to outside of head (9), inside of hub (2), and inside of cylinder (3).
10. Install rod (1) assembly into cylinder (3).

NOTE

When tightening hub, ensure that rod is fully extended. This will keep cylinder, piston, and head aligned.

11. Install hub (2) on cylinder (3). Tighten to 450 lb-ft (610 Nm).



397-1979

12. Install centershift cylinder (WP 0243 00).

END OF WORK PACKAGE

BLADE TIP CYLINDER REPAIR 0334 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Shop equipment, contact truck (Item 77, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Bearing (2)

Gasket

Packing, preformed

Materials/Parts - Continued

Seal (6)

Seal assembly

Personnel Required

Two

References

WP0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

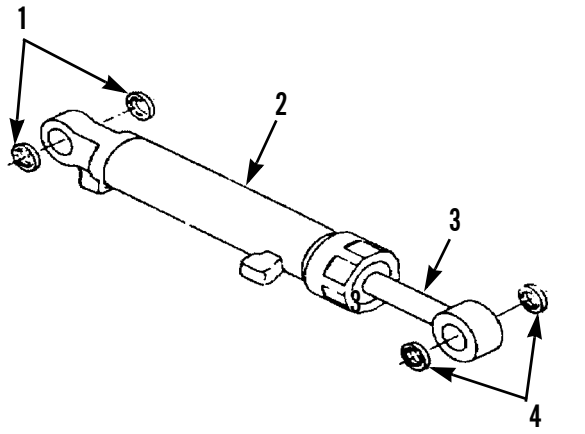
Blade tip cylinder removed (WP 0244 00)

DISASSEMBLY

CAUTION

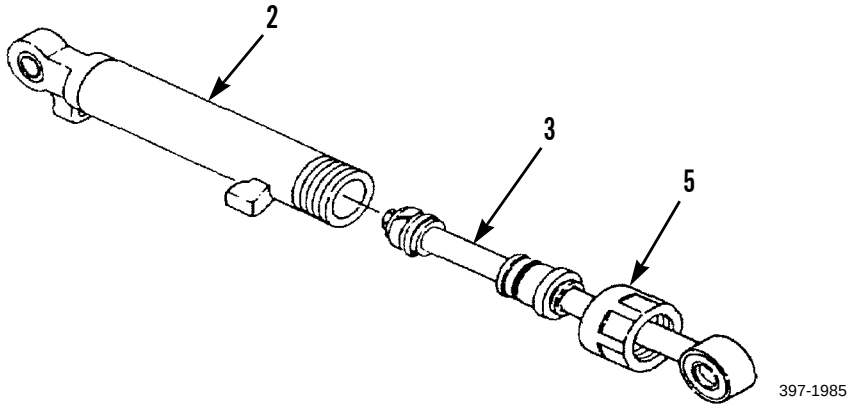
Use care not to remove or damage bearings or rings which remain in cylinder.

1. Remove and discard two seals (1) from cylinder (2).
2. Remove and discard two seals (4) from rod (3).



397-1598

3. Loosen sleeve (5).
4. Remove rod (3) assembly from cylinder (2).

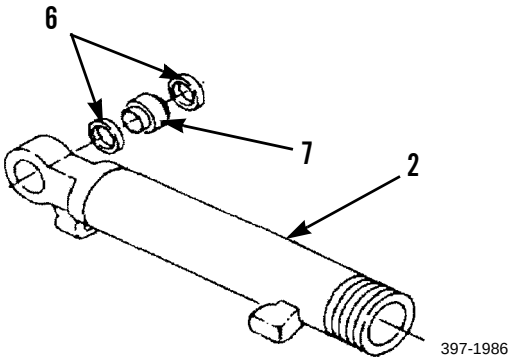


397-1985

NOTE

Inspect rings and bearings before removal and replace only if damaged.

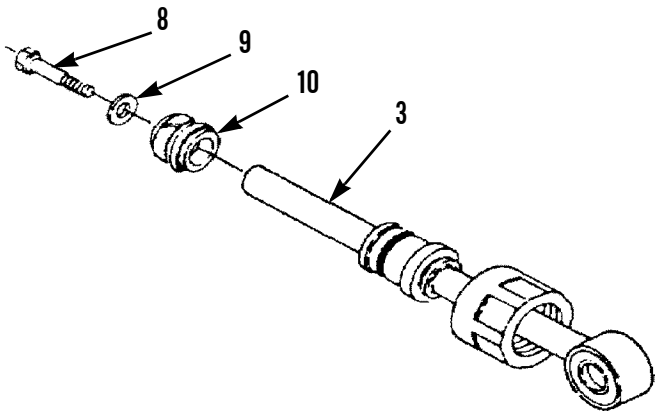
5. Remove two rings (6) and bearing (7) from cylinder (2). Discard bearing.



397-1986

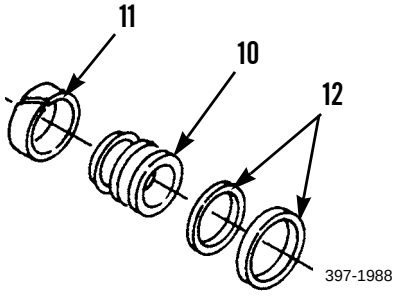
DISASSEMBLY - CONTINUED

6. Remove bolt (8) and washer (9).
7. Remove piston (10) assembly from rod (3).



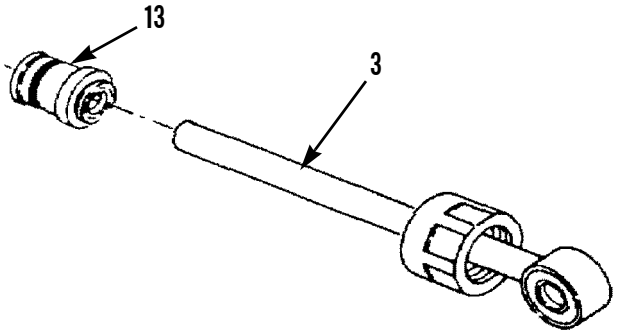
397-1987

8. Remove ring (11) and seal assembly (12) from piston (10). Discard seal assembly.



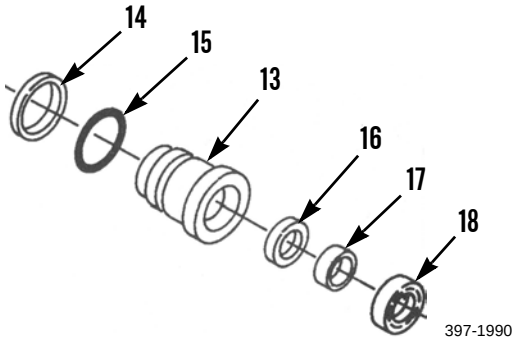
397-1988

9. Remove head (13) assembly from rod (3).



397-1989

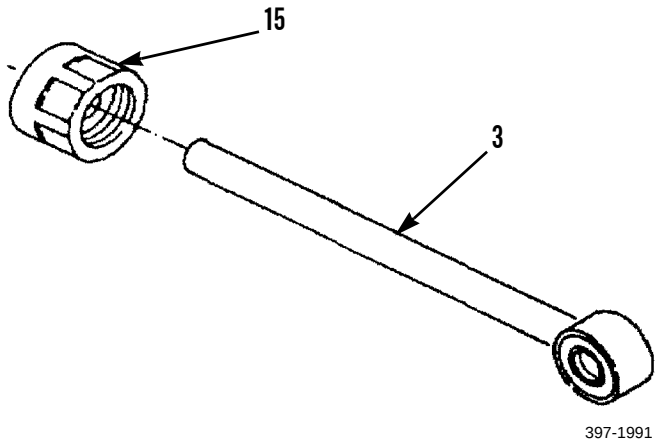
10. Remove packing retainer (14), preformed packing (15), seals (18 and 17), and gasket (16) from head (13). Discard preformed packing, seals, and gasket.



397-1990

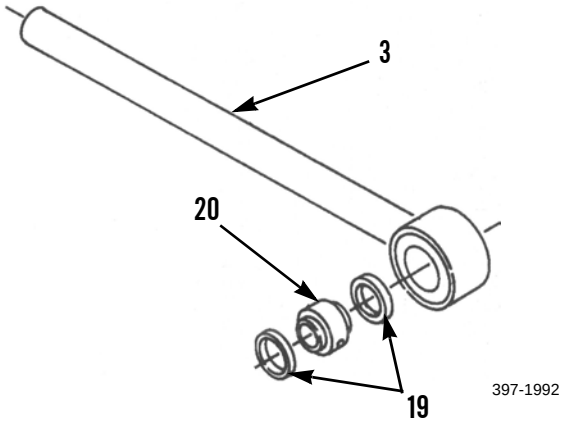
DISASSEMBLY - CONTINUED

11. Remove sleeve (15) from rod (3).



397-1991

12. Remove two rings (19) and bearing (20) from rod (3). Discard bearing.



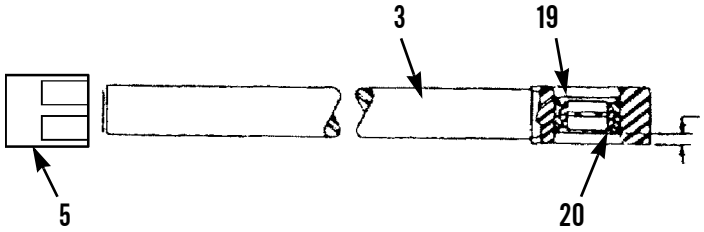
397-1992

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

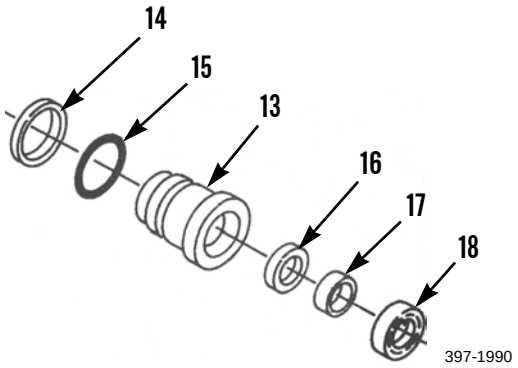
1. Install one ring (19) to a depth of 0.29 in. (7.4 mm) from the outer surface of rod (3).
2. Install new bearing (20) in rod (3).
3. Install other ring (19) next to bearing (20) to a depth of 0.29 in. (7.4 mm) from outer surface of rod (3) assembly .
4. Position sleeve (5) on rod (3).



397-1993

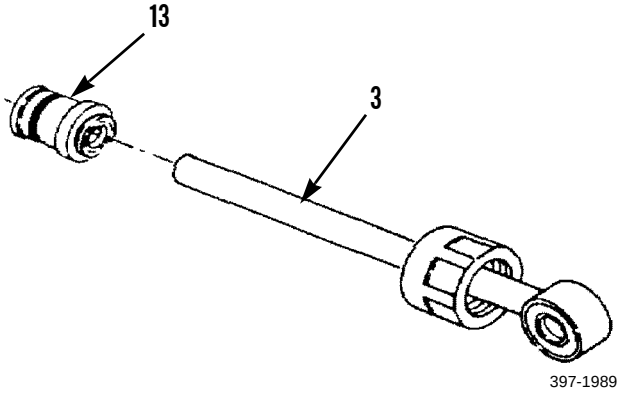
ASSEMBLY - CONTINUED

5. Apply thin coat of clean oil to packing retainer (14), new preformed packing (15), new gasket (16), and new seals (17 and 18).
6. Use a seal installer to install new gasket (16) and two new seals (17 and 18). Lip of seal (17) is toward inside of head (13). Lip of seal (18) is toward outside of head.
7. Install new preformed packing (15) and packing retainer (14) to head (13).



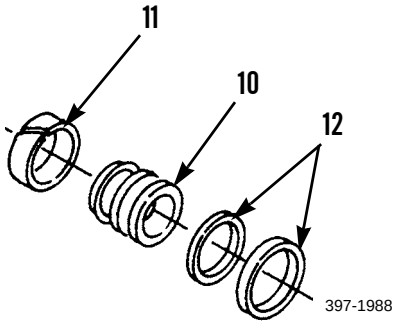
397-1990

8. Install head (13) assembly on rod (3).



397-1989

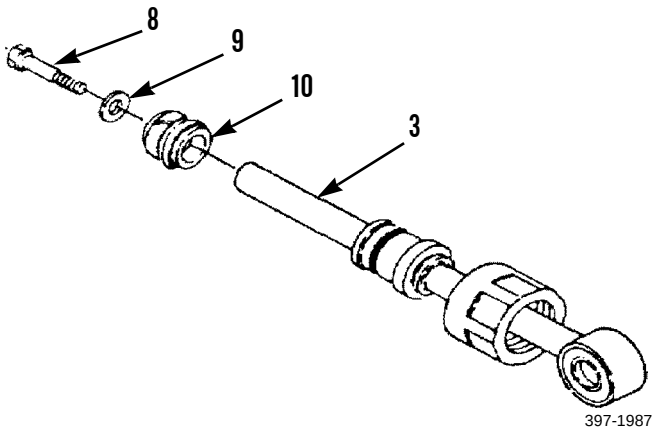
9. Use a seal expander to install new seal assembly (12) and ring (11) on piston (10).



397-1988

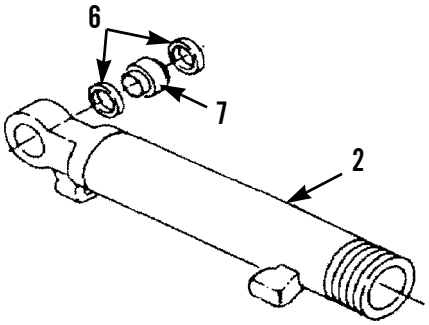
ASSEMBLY - CONTINUED

10. Install piston (10) assembly on rod (3).
11. Apply thin coat of thread lubricant to threads of bolt (8) and install washer (9) and bolt to end of rod (3). Tighten bolt to 800 lb-ft (1,085 Nm).



397-1987

12. If removed, install one of two rings (6) to a depth of 0.15 in. (3.8 mm) from outer surface of cylinder (2).
13. If removed, install new bearing (7) in center of cylinder (2).
14. If removed, install other ring (6) next to bearing (7). Depth of ring to outer surface of cylinder (2) should be 0.15 in. (3.8 mm).



397-1986

NOTE

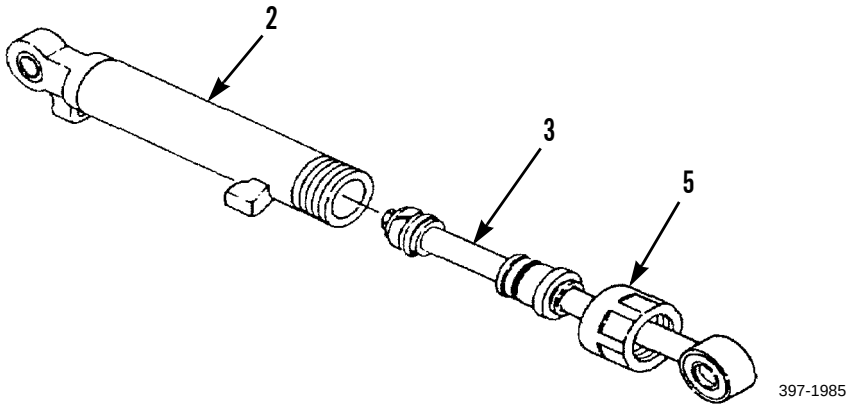
Apply thin coat of grease to outside of head assembly, inside of sleeve and inside of cylinder.

15. Install rod cylinder (3) assembly into cylinder (2).

NOTE

Tighten sleeve with rod assembly fully extended. This will keep cylinder, piston, and head in alignment.

16. Install sleeve (5) on cylinder (2). Tighten sleeve to 450 lb-ft (610 Nm).



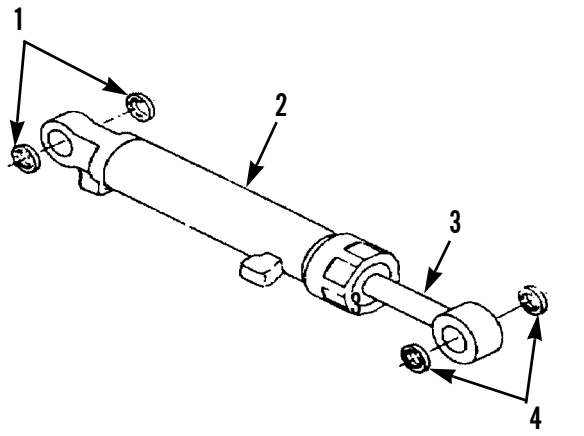
397-1985

ASSEMBLY - CONTINUED

NOTE

Seals can be damaged by careless handling during installation. Driving tools must not strike bearings or rings which remain in rod and cylinder assembly.

17. Install two new seals (4) with lips toward outside and even with outer surface of rod (3).
18. Install two new seals (1) in end of cylinder (2).



397-1598

19. Install blade tip cylinder (WP 0244 00).

END OF WORK PACKAGE

BLADE LIFT CYLINDER REPAIR 0335 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Retainer, packing

Seal (5)

Seal assembly

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

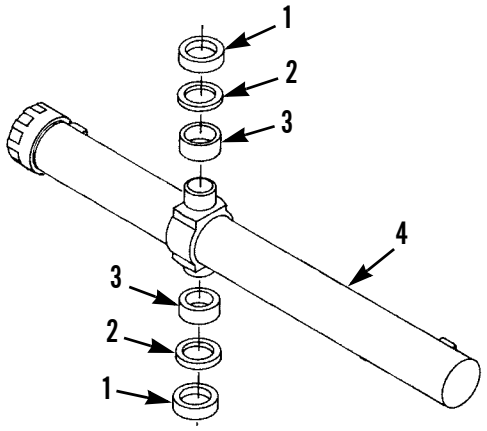
Blade lift cylinder removed (WP 0245 00)

DISASSEMBLY

NOTE

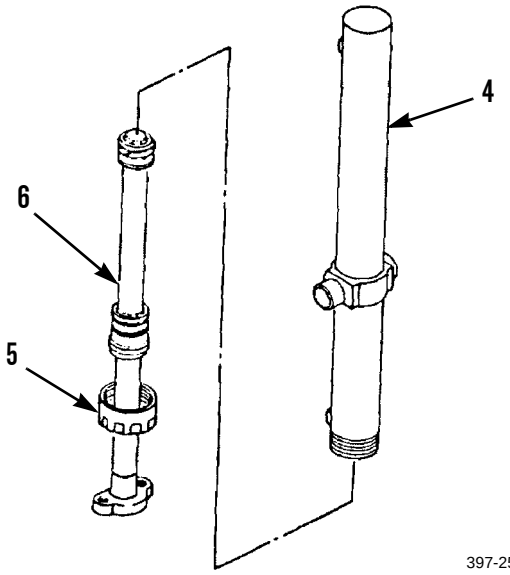
Each of these two sleeve bearings may have already been removed with caps.

1. Use a puller to remove two sleeve bearings (1) and seals (2). Discard seals.
2. Use a puller to remove two sleeve bearings (3), if necessary, from cylinder (4).



397-1603

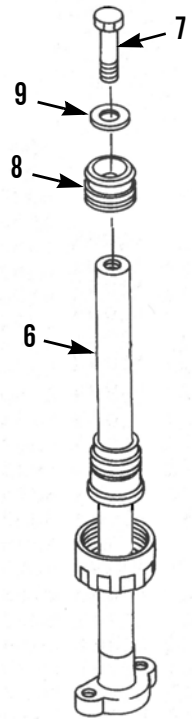
3. Loosen hub (5) of cylinder (4).
4. Remove rod (6) assembly from cylinder (4).



397-2501

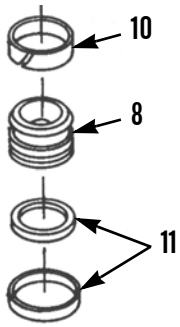
DISASSEMBLY - CONTINUED

5. Remove bolt (7), washer (9), and piston (8) assembly from rod (6) assembly.



397-1996

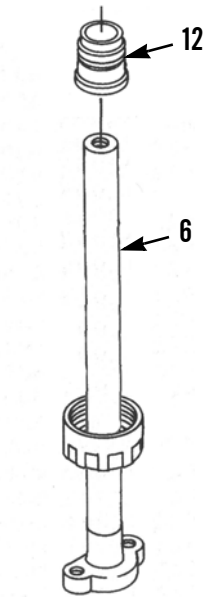
6. Remove seal assembly (11) and bushing (10) from piston (8). Discard assembly.



397-1997

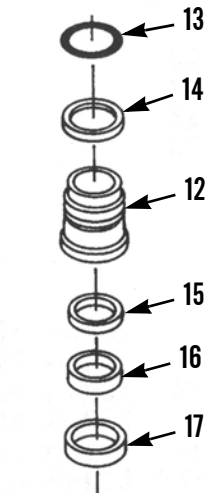
DISASSEMBLY - CONTINUED

7. Remove head (12) assembly from rod (6).



397-1998

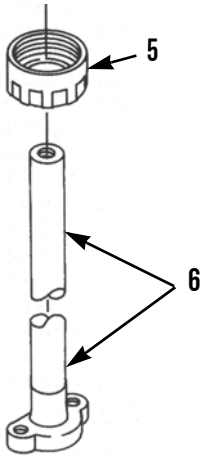
8. Remove and discard preformed packing (13), packing retainer (14), and seals (15, 16, and 17) from head (12).



397-1999

DISASSEMBLY - CONTINUED

9. Remove hub (5) from rod (6).



397-2000

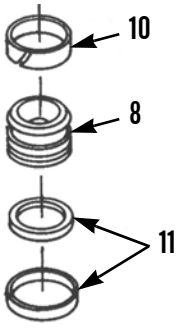
CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Position hub (5) on rod (6).
2. Apply thin coat of clean oil to new seals (15, 16, and 17).
3. Use seal installer to install seals (15, 16, and 17) in head (12). Lip on inner seal (15) and center seal (16) face inside head (12). Lip on outside seal (17) faces outside head.
4. Install new preformed packing (13) and new packing retainer (14) on head (12).
5. Position head (12) assembly on rod (6).

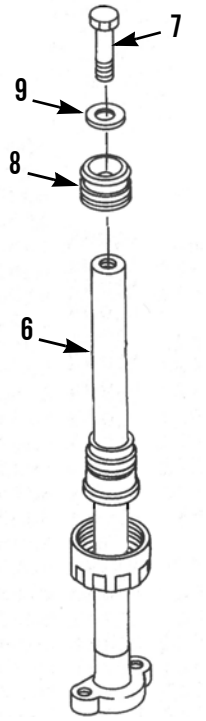
6. Use a seal expander to install bushing (10) and new seal assembly (11) on piston (8).



397-1997

ASSEMBLY - CONTINUED

7. Install piston (8) assembly on rod (6).
8. Apply thin coat of thread lubricant to threads of bolt (7) and install washer (9) and bolt to end of rod (6). Tighten bolt to 800 lb-ft (1,085 Nm).



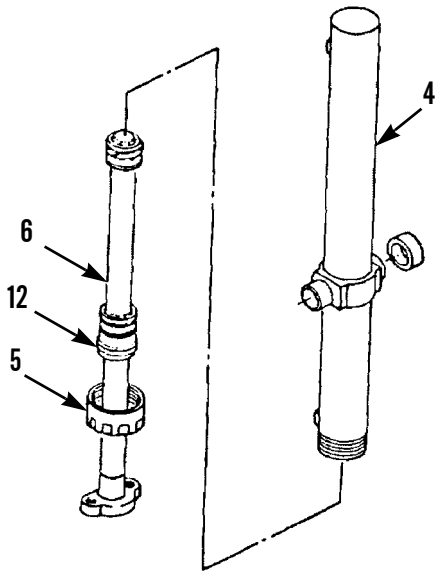
397-1996

9. Apply thin coat of grease to outside of head (12) and inside of hub (5).
10. Install rod (6) assembly into cylinder (4).

NOTE

Tighten hub with rod assembly fully extended. This will keep cylinder, piston, and head in alignment.

11. Install hub (5) to cylinder (4). Tighten hub to 450 lb-ft (610 Nm).



397-1995

12. Install blade lift cylinder (WP 0245 00).

END OF WORK PACKAGE

ARTICULATION CYLINDER REPAIR 0336 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Ring

Seal (2)

Personnel Required

Two

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hydraulic pressure relieved (WP 0020 00)

Articulation cylinder removed (WP 0246 00)

DISASSEMBLY

1. Remove and discard four seals (2) from articulation cylinder (3) assembly.

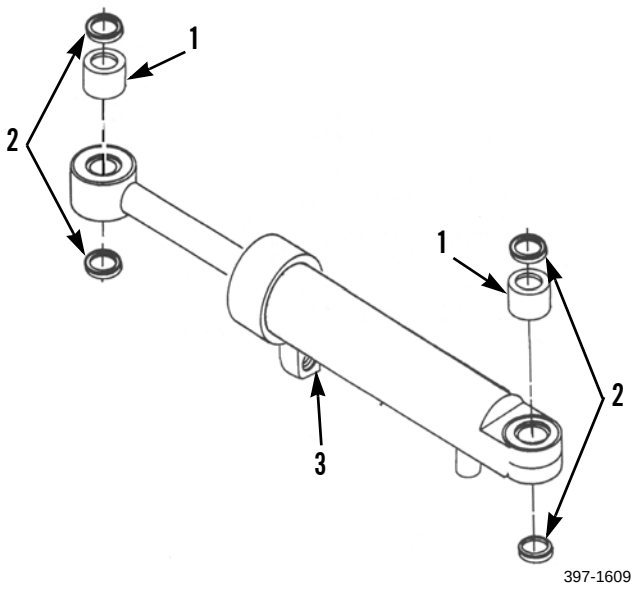
CAUTION

Removal of bearings from cylinder can cause destruction of bearings. Remove bearings only if inspection indicates replacement is necessary.

NOTE

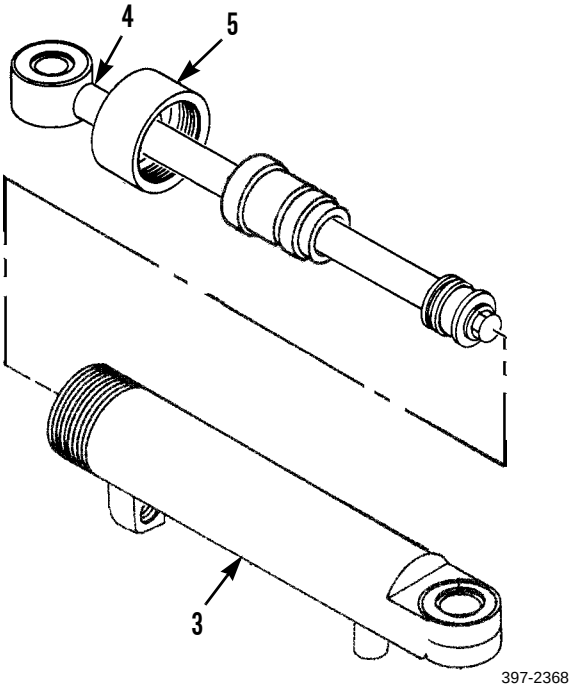
Use a driver and press to remove two bearings, if necessary, from cylinder.

2. Inspect two bearings (1). Replace if cracked, broken, distorted, grooved, or worn.



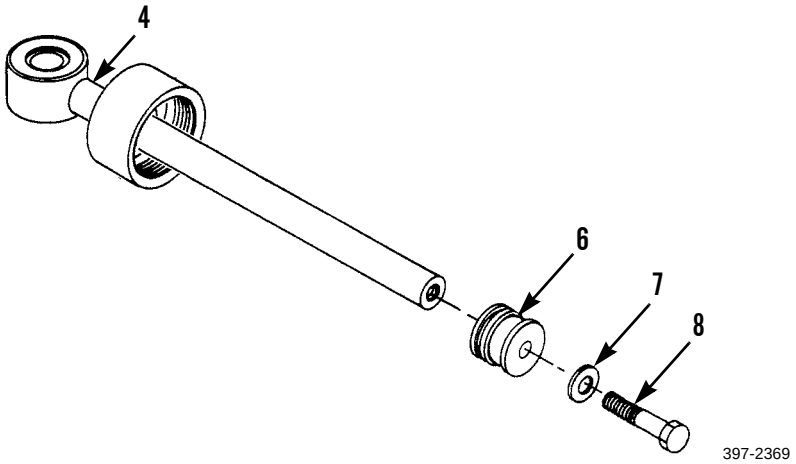
DISASSEMBLY - CONTINUED

3. Loosen cap (5) of cylinder (3).
4. Remove rod (4) assembly from cylinder (3).



397-2368

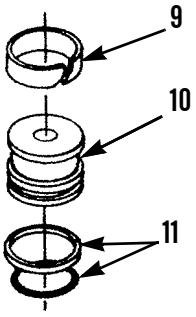
5. Remove bolt (8), washer (7), and piston (6) from rod (4).



397-2369

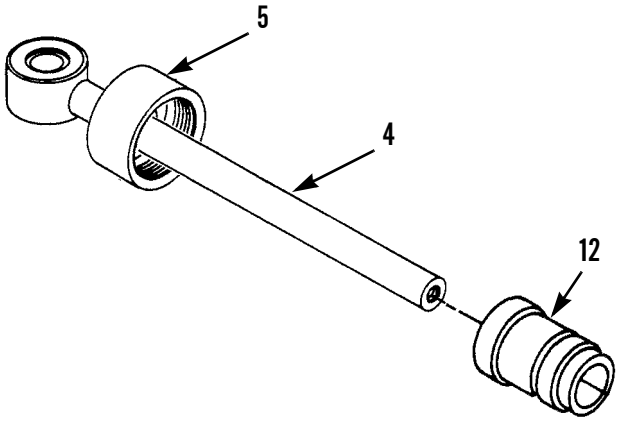
DISASSEMBLY - CONTINUED

6. Remove seal assembly (11) and bushing (9) from piston (10). Discard seal assembly.



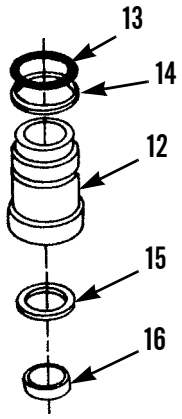
397-2370

7. Remove housing (12) assembly and cap (5) from rod (4).



397-2371

8. Remove and discard ring (13), preformed packing (14), seal (16), and seal (15) from housing (12).



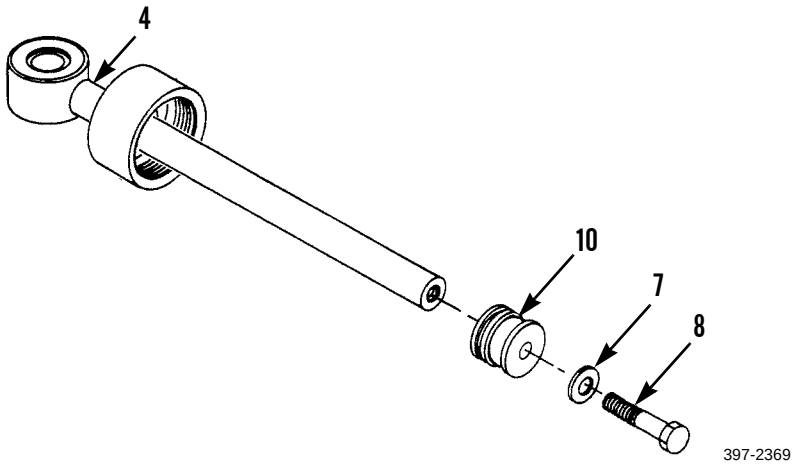
397-2372

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

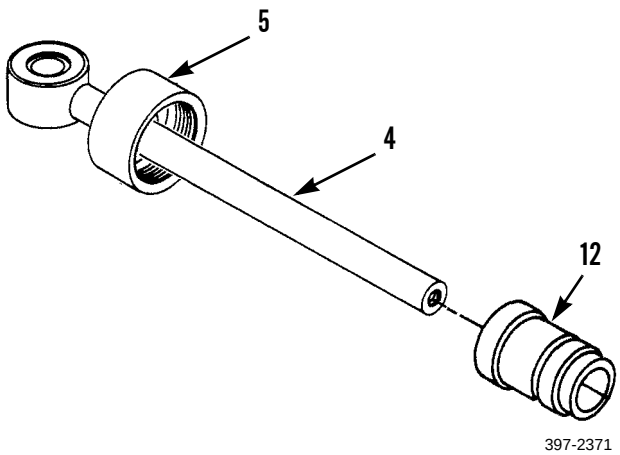
ASSEMBLY

1. Apply thin coat of clean oil to new seals (15 and 16), new ring (13), and new preformed packing (14).
2. Use a seal installer to install new seals (15 and 16) into housing (12).
3. Install preformed packing (14) and ring (13).
4. Position cap (5) and housing (12) assembly on rod (4).
5. Use seal expander to install ring (9) and new seal assembly (11) on piston (10).
6. Install piston (10) assembly on rod (4).
7. Apply thin coat of thread lubricant to threads of bolt (8) and install washer (7) and bolt to end of rod (4). Tighten bolt to 800 lb-ft (1,085 Nm).



ASSEMBLY - CONTINUED

8. Apply thin coat of grease to outside of head (12) and inside of cap (5).



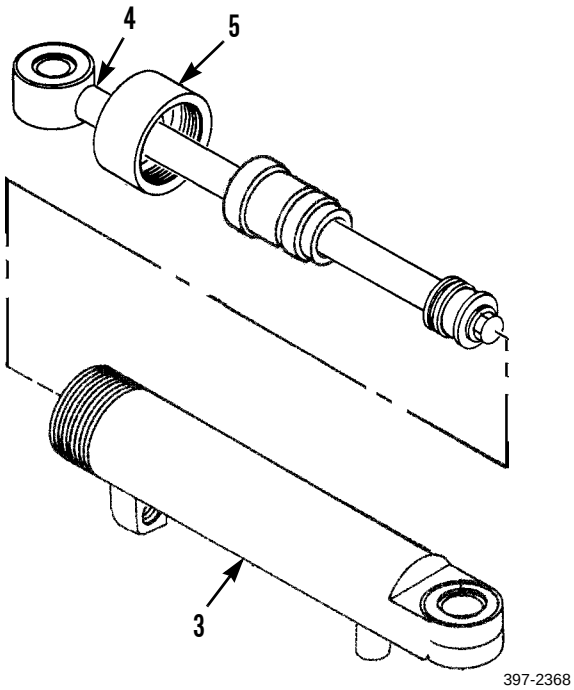
397-2371

9. Install rod (4) assembly into cylinder (3).

NOTE

Tighten cap with rod assembly fully extended. This will keep cylinder, piston, and housing in alignment.

10. Install cap (5) to cylinder (3). Tighten cap to 450 lb-ft (610 Nm).



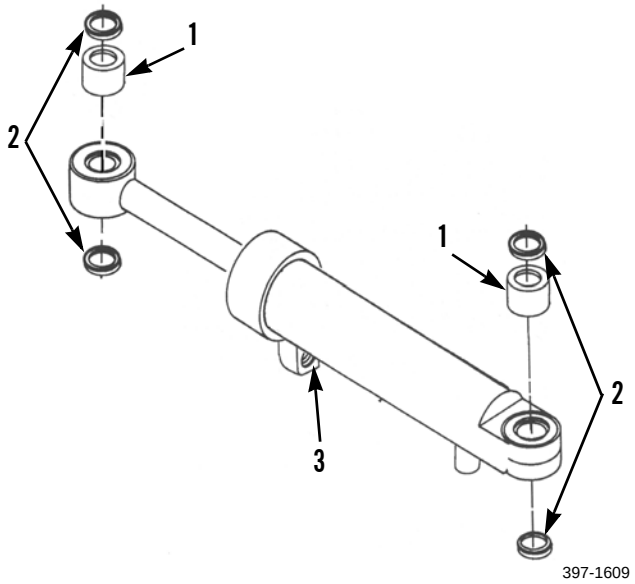
397-2368

ASSEMBLY - CONTINUED

NOTE

Perform step 1 if bearings were removed from cylinder.

11. Install two bearings (1) into articulation cylinder (3).
12. Install new seals (2) in each end of cylinder (3) with lip side facing outward.



13. Install articulation cylinder (WP 0246 00).

END OF WORK PACKAGE

SIDESHIFT CYLINDER REPAIR 0337 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Packing, preformed

Ring

Seal assembly

Seal (3)

Personnel Required

Two

References

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

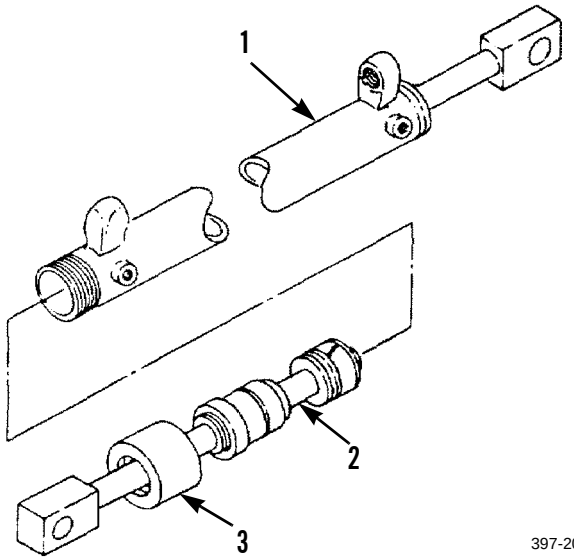
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Sideshift cylinder removed (WP 0247 00)

SIDESHIFT CYLINDER REPAIR - CONTINUED 0337 00

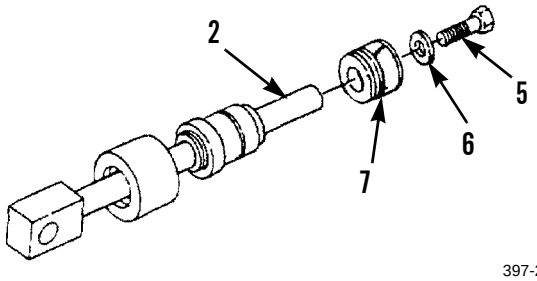
DISASSEMBLY

1. Loosen cap (3) of side shift cylinder (1) assembly.
2. Remove rod (2) assembly from cylinder (1).



397-2001

3. Remove bolt (5) and washer (6) from end of rod (2).
4. Remove piston (7) assembly from rod (2).

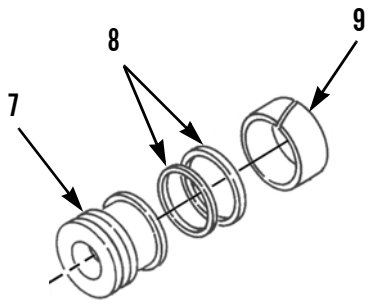


397-2002

SIDESHIFT CYLINDER REPAIR - CONTINUED 0337 00

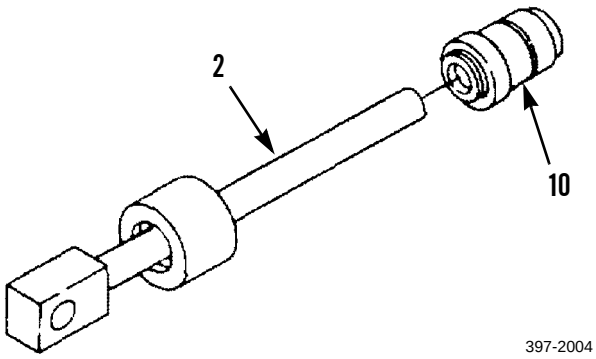
DISASSEMBLY - CONTINUED

5. Remove ring (9) and seal assembly (8) from piston (7). Discard seal assembly.



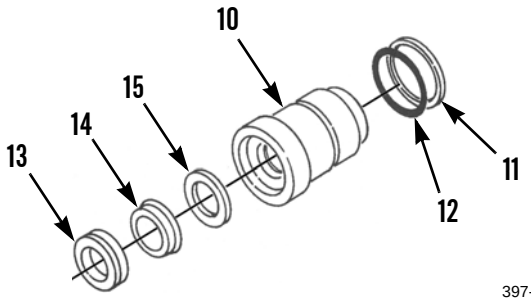
397-2003

6. Remove housing (10) assembly from rod (2).



397-2004

7. Remove ring (11), preformed packing (12), and seals (13, 14, and 15) from housing (10). Discard preformed packing and seals.



397-2005

DISASSEMBLY - CONTINUED

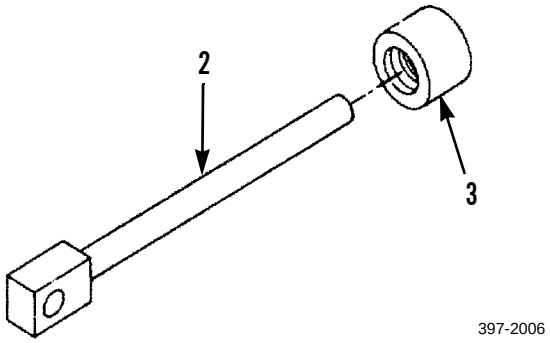
8. Remove cap (3) from rod (2).

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

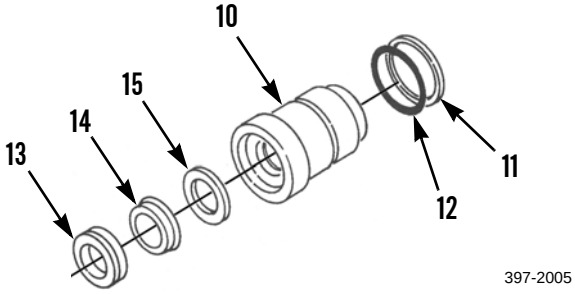
ASSEMBLY

1. Position cap (3) on rod (2).



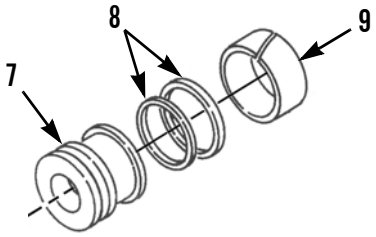
397-2006

2. Apply thin coat of clean oil to new seals (13, 14, and 15), new preformed packing (12), and ring (11).
3. Use a seal installer to install new seals (13, 14, and 15) in housing (10). Lip of seal (14) is toward inside of housing. Lip of seal (13) is toward outside of housing.
4. Install new preformed packing (12) and ring (11) to housing (10).



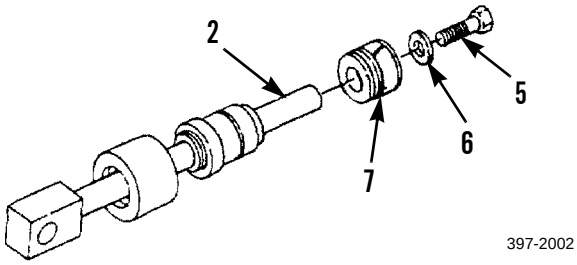
397-2005

5. Install housing (10) assembly on rod (2).
6. Use a seal expander to install new seal assembly (8) and ring (9) on piston (7).



397-2003

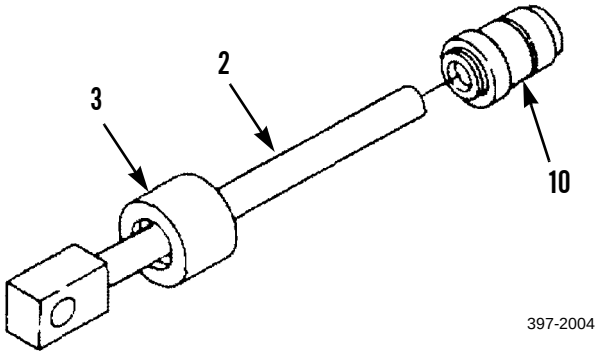
7. Install piston (7) assembly on rod assembly (2).
8. Apply thin coat of thread lubricant to threads of bolt (5) and install washer (6), and bolt to end of rod (2). Tighten bolt to 800 lb-ft (1,085 Nm).



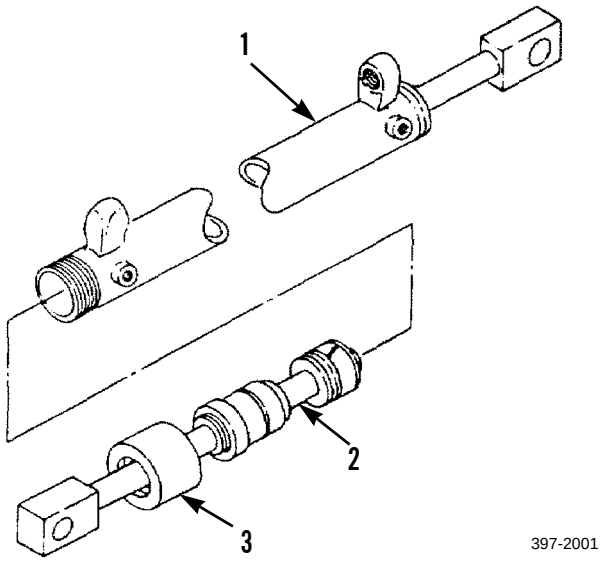
397-2002

ASSEMBLY - CONTINUED

9. Apply thin coat of grease to outside of housing (10), inside of cap (3), and inside of cylinder (1).



10. Install rod (2) assembly into cylinder (1).



NOTE

Tighten cap with rod assembly fully extended. This will keep cylinder, piston, and housing in alignment.

11. Install cap (3) on cylinder (1). Tighten cap to 450 lb-ft (610 Nm).
12. Install sideshift cylinder (WP 0247 00).

SCARIFIER CYLINDER REPAIR 0338 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Wrench, torque (Item 101, WP 0348 00)

Materials/Parts

Cap set, protective (Item 7, WP 0349 00)

Grease, GAA (Item 17, WP 0349 00)

Lubricant, thread (Item 22, WP 0349 00)

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Strap, tie (Item 43, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Materials/Parts - Continued

Packing, preformed

Seal (7)

Seal assembly

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Scarifier cylinder removed (WP 0248 00)

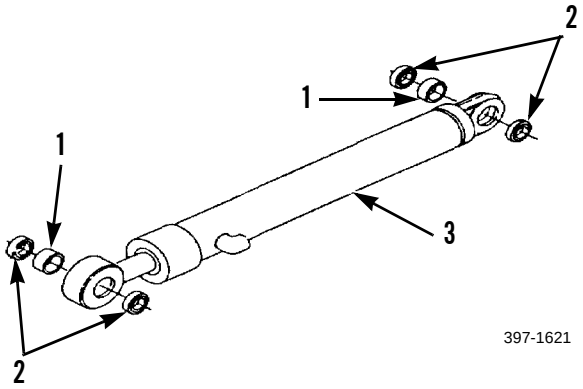
DISASSEMBLY

1. Remove and discard four seals (2) from scarifier cylinder (3) assembly.

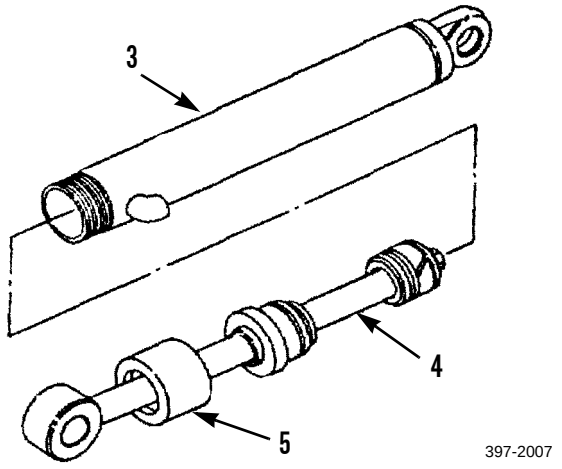
CAUTION

Removal of bearings from cylinder can cause destruction of bearings. Remove bearings only if inspection indicates replacement is necessary.

2. Inspect two bearings (1). Remove if cracked, broken, distorted, grooved, or worn.

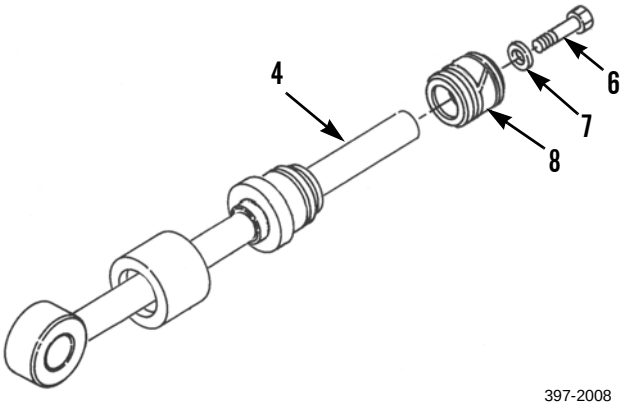


3. Loosen cap (5) of scarifier cylinder (3) assembly.
4. Remove rod (4) assembly from cylinder (3).



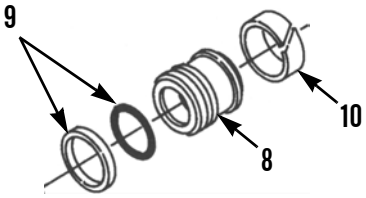
DISASSEMBLY - CONTINUED

5. Remove bolt (6) and washer (7) from end of rod (4).
6. Remove piston (8) assembly from rod (4).



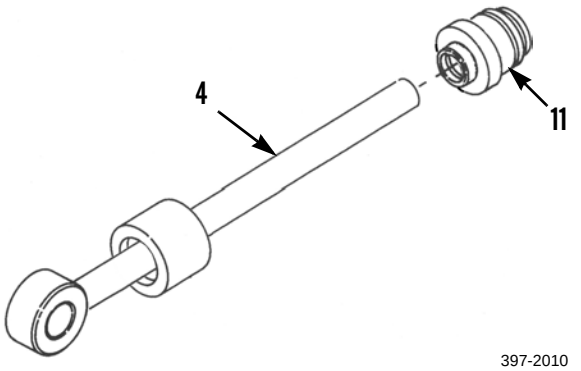
397-2008

7. Remove seal assembly (9) and ring (10) from piston (8). Discard seal assembly.



397-2009

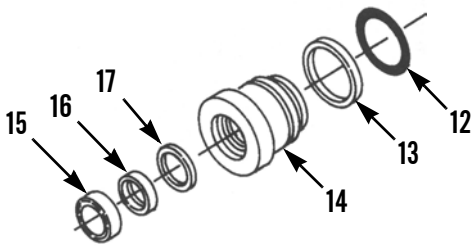
8. Remove housing (11) assembly from rod (4).



397-2010

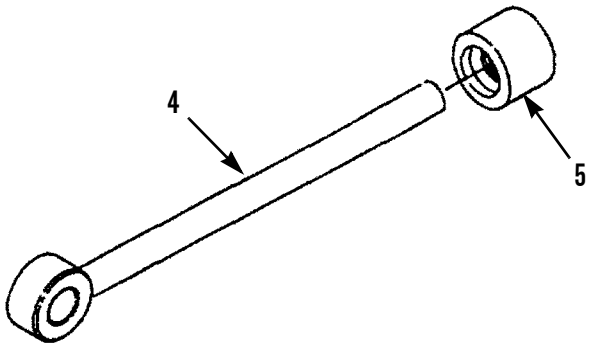
DISASSEMBLY - CONTINUED

9. Remove and discard seals (15, 16, and 17), preformed packing (12), and ring (13) from housing (14).



397-2011

10. Remove cap (5) from rod (4).



397-2012

CLEANING AND INSPECTION

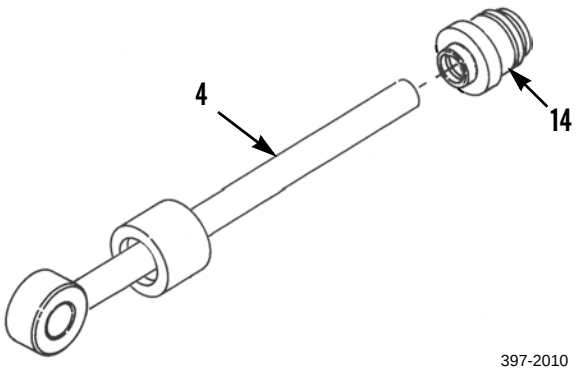
Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Position cap (5) on rod (4).
2. Apply thin coat of clean oil to new seals (17, 16, and 15), new ring (13), and new preformed packing (12).
3. Use a seal installer to install new seals (17, 16, and 15) on housing (14). Lip on center seal (16) faces inside housing. Lip on outside seal (15) faces outside housing.
4. Install new preformed packing (12) and new ring (13) on housing (14).

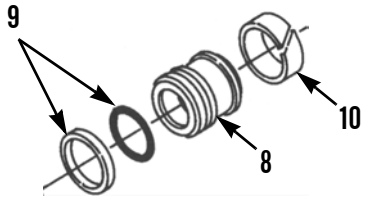
ASSEMBLY - CONTINUED

5. Install housing (14) assembly on rod (4).



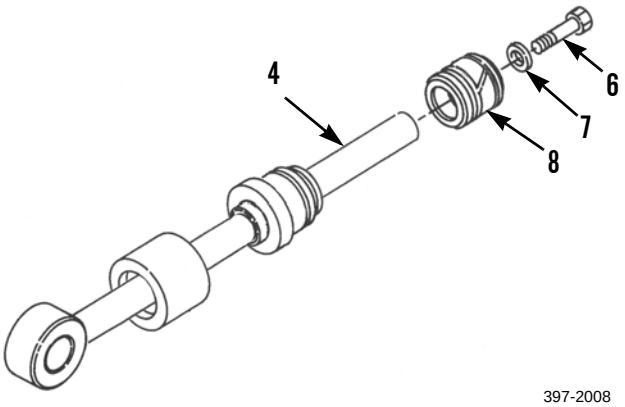
397-2010

6. Use a seal expander to install ring (10) and new seal assembly (9) on piston (8).



397-2009

7. Install piston (8) assembly on rod (4).
8. Apply thin coat of thread lubricant to threads of bolt (6) and install washer (7) and bolt to end of rod (4). Tighten bolt to 800 lb-ft (1,085 Nm).



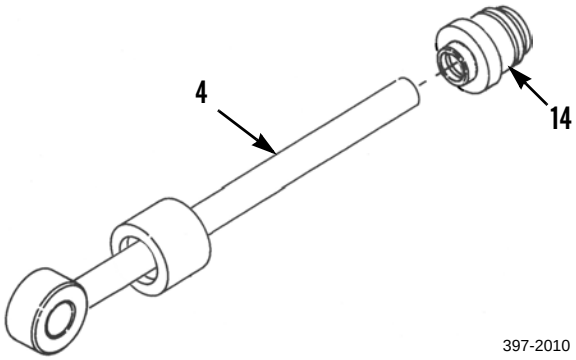
397-2008

ASSEMBLY - CONTINUED

NOTE

Apply thin coat of grease to outside of housing (14) and inside of cap (5).

9. Install rod (4) assembly into cylinder (3).

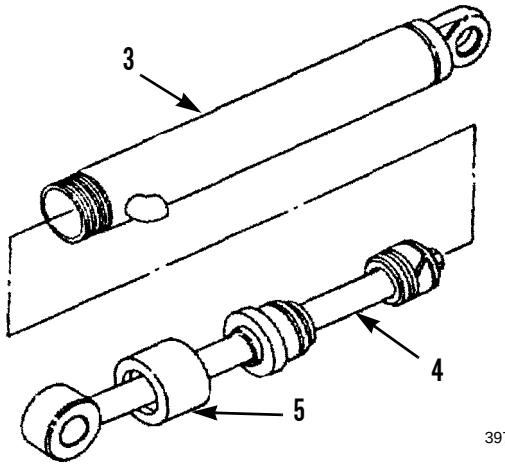


397-2010

NOTE

Tighten cap with rod assembly fully extended. This will keep cylinder, piston, and housing in alignment.

10. Install cap (5) on cylinder (3) and tighten to 450 lb-ft (610 Nm).

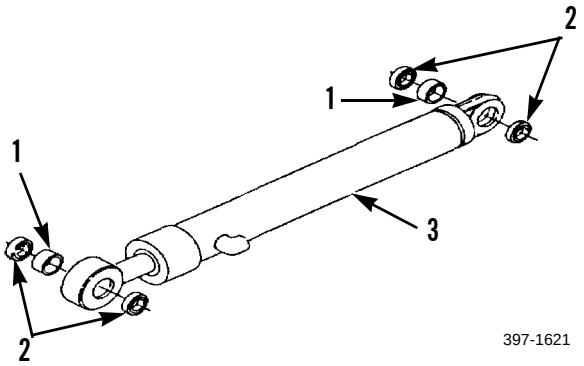


397-2007

NOTE

Perform step 11 if bearings were removed from cylinder.

11. Install two bearings (1) into scarifier cylinder (3) assembly.
12. Install four new seals (2) in cylinder (3) with lips toward outside. Lips must be approximately even with outer surface cylinder.
13. Install scarifier cylinder (WP 0248 00).



397-1621

END OF WORK PACKAGE

HYDRAULIC TANK AND MOUNTING MAINTENANCE 0339 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 96, WP 0348 00)

Lifting device, 300-lb capacity

Materials/Parts

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Gasket

Locknut

Nut (6)

Packing, preformed

Personnel Requested

Two

References

WP 0216 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Hydraulic tank drained (WP 0216 00)

Hydraulic tank lines and fittings removed (WWP 0250 00)

Oil temperature switch removed (WP 0116 00)

Hydraulic tank filters removed (WP 0231 00)

REMOVAL

WARNING

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

NOTE

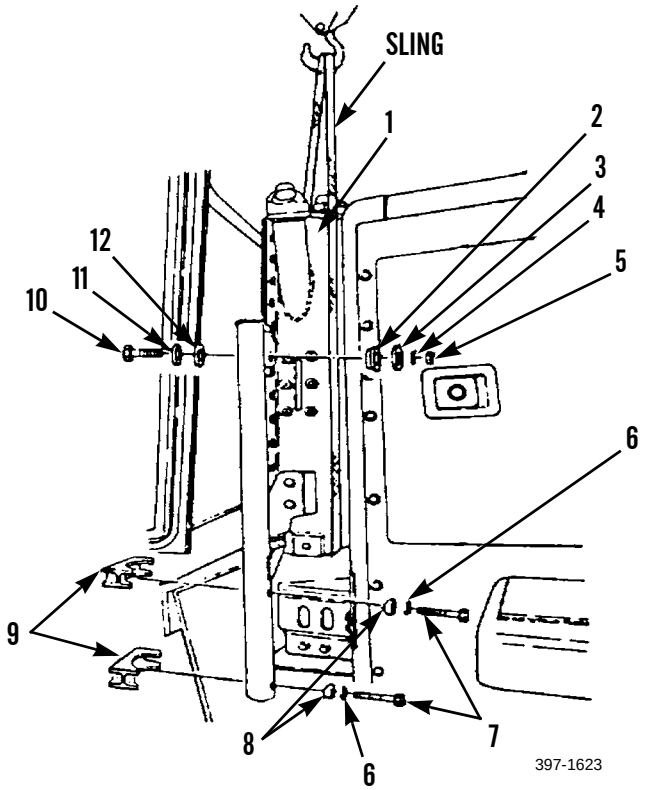
Hydraulic tank weighs 250 lb (113 kg).

1. With assistance, attach sling to hydraulic tank (1). Remove slack from sling.

NOTE

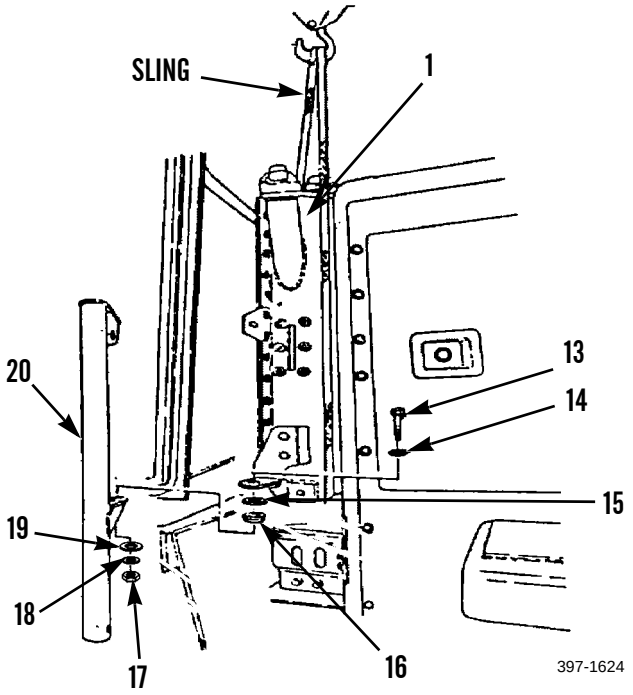
Steps 2 through 4 cover the left support and hardware. Follow these instructions for the right support and hardware.

2. Remove two bolts (7), washers (6), spacers (8), and brackets (9).
3. Remove nut (5), washers (4 and 3), mount (2), washers (12 and 11), and bolt (10).



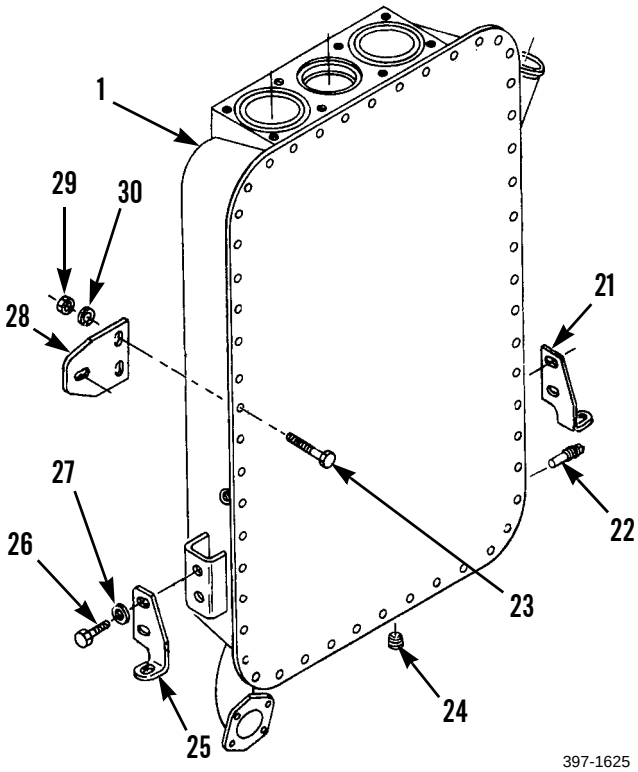
REMOVAL - CONTINUED

4. Remove nut (17), washers (18 and 19), mount (16), washers (15 and 14), bolt (13), and support (20).
5. Use sling to remove hydraulic tank (1) from machine and place hydraulic tank in work area.
6. Remove sling.



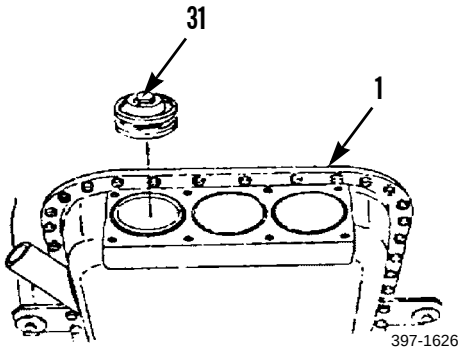
DISASSEMBLY

1. Remove two bolts (23), nuts (29), washers (30), and plate (28) from hydraulic tank (1).
2. Remove four bolts (26), washers (27), and angle brackets (25 and 21).
3. Remove plugs (22 and 24).



REMOVAL - CONTINUED

4. Remove two seat (31) assemblies from top of hydraulic tank (1).



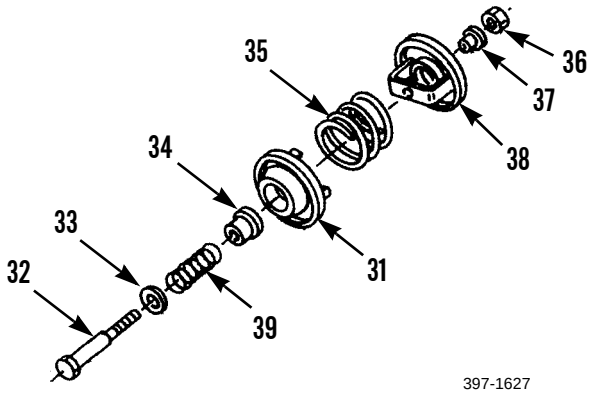
WARNING

Springs are under pressure. Loosen nut carefully to relieve pressure of springs. Failure to follow this warning may cause injury to personnel.

NOTE

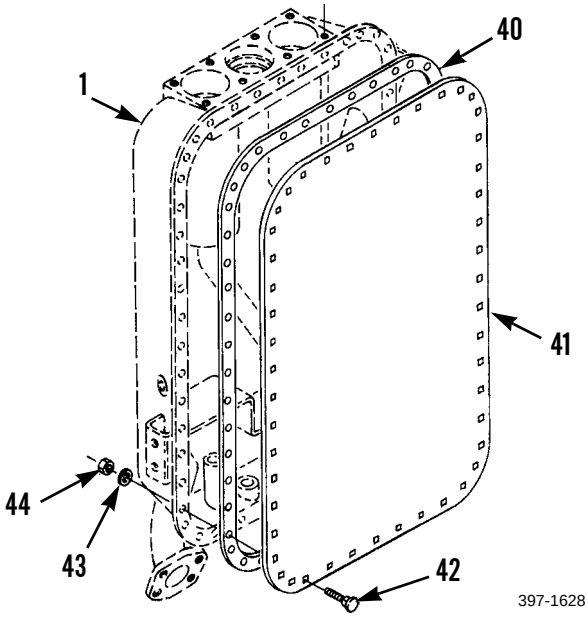
Perform step 5 for each of two valve assemblies.

5. Remove locknut (36), spacer (37), retainer (38), spring (35), seat (31), valve (34), spring (39), and washer (33) from bolt (32). Discard locknut.



REMOVAL - CONTINUED

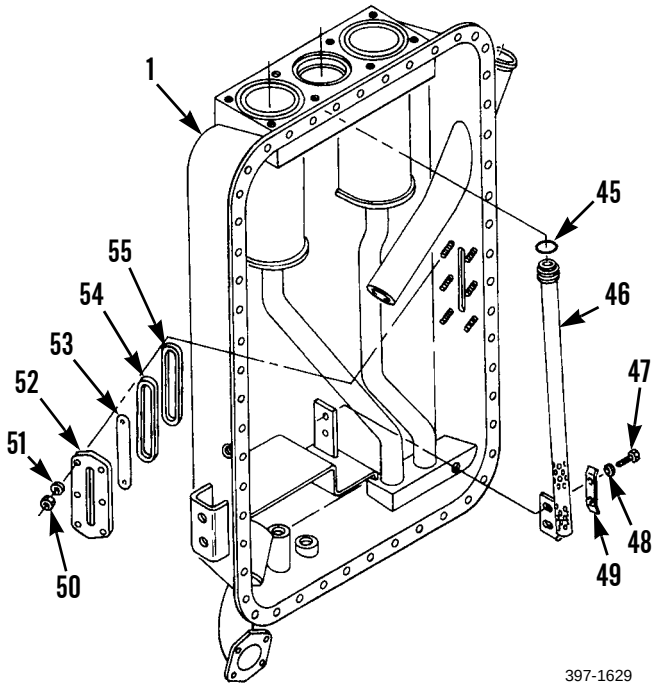
6. Remove 48 nuts (44), washers (43), bolts (42), and cover (41) from hydraulic tank (1). Matchmark cover to aid in installation.
7. Remove and discard gasket (40).



NOTE

Inspect grommet if sight gauge is removed and replace grommet if damaged.

8. Remove six nuts (50), washers (51), retainer (52), plate (53), grommet (54), and window (55) from hydraulic tank (1). Discard nuts.
9. Remove two bolts (47), washers (48), plate (49), tube (46), and preformed packing (45). Discard preformed packing.

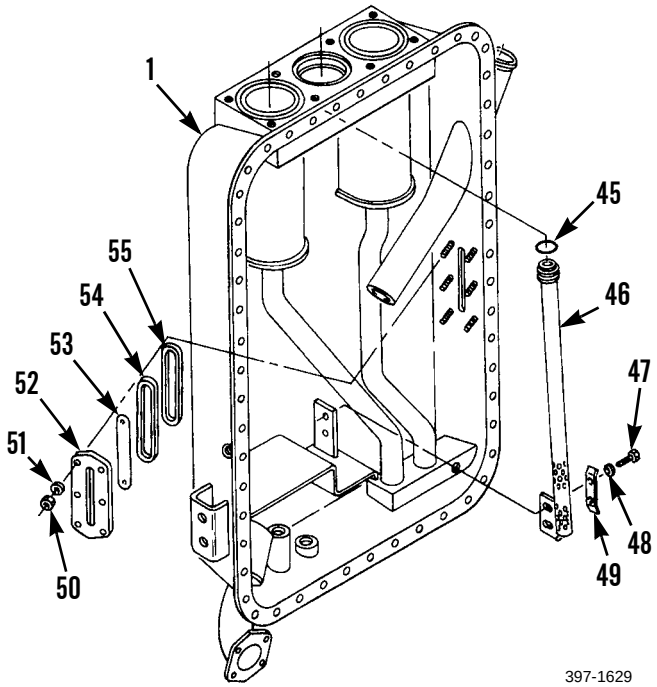


CLEANING AND INSPECTION

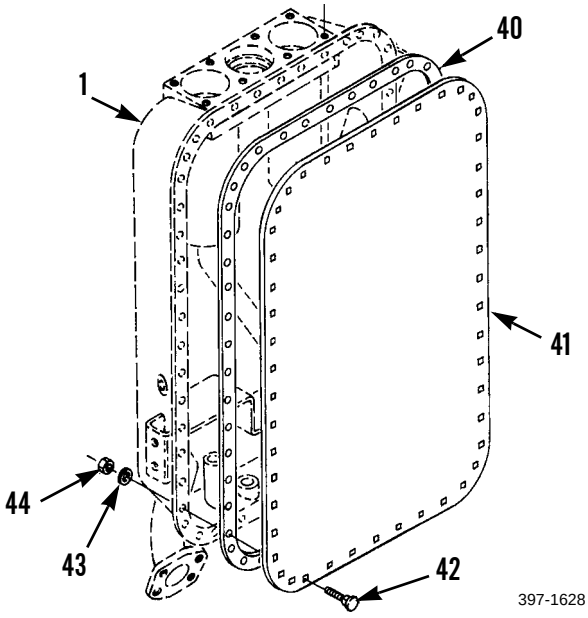
Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install new preformed packing (45), tube (46), plate (49), two washers (48), and bolts (47) on hydraulic tank (1).
2. Install window (55), grommet (54), plate (53), retainer (52), six washers (51), and new nuts (50).



3. Install new gasket (40) on hydraulic tank (1).
4. Align matchmarks and install cover (41), 48 bolts (42), washers (43), and nuts (44). Tighten nuts to 28 lb-ft (38 Nm).

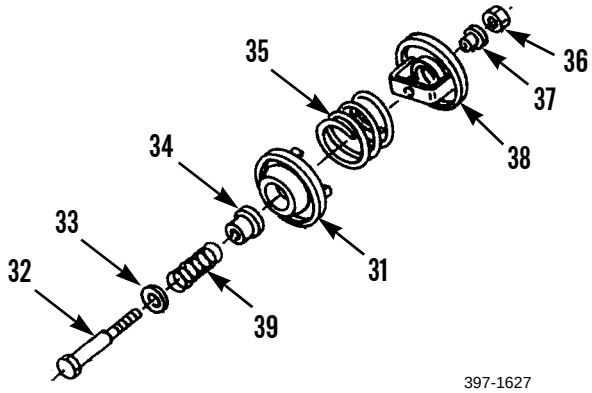


ASSEMBLY - CONTINUED

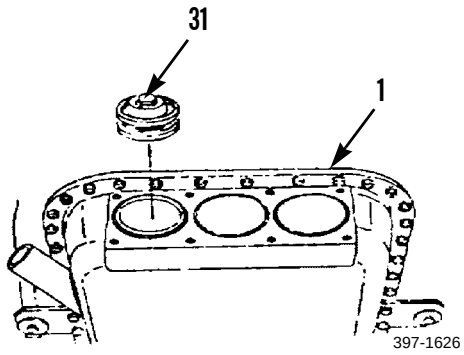
NOTE

Perform step 5 for each of two valve assemblies.

5. Install washers (33), spring (39), valve (34), seat (31), spring (35), retainer (38), spacer (37), and new locknut (36) on bolt (32).

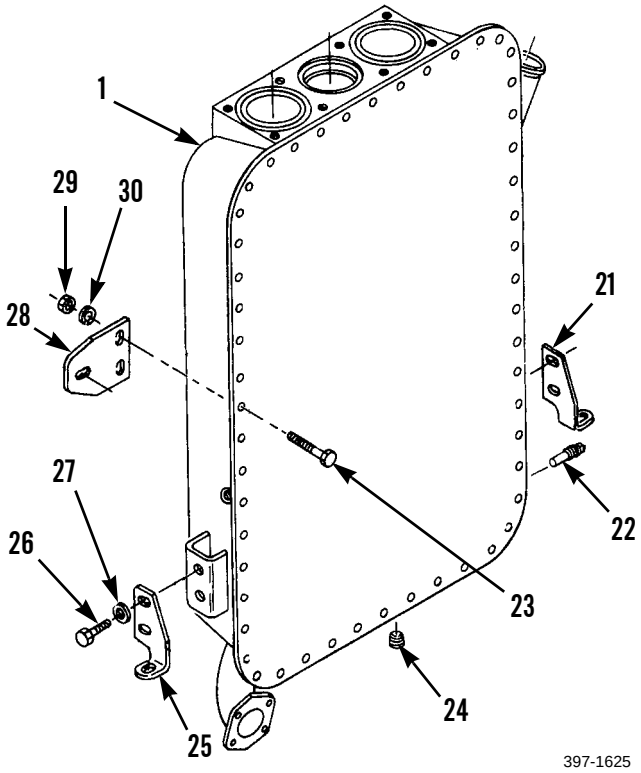


6. Install two seat (31) assemblies on top of hydraulic tank (1).



ASSEMBLY - CONTINUED

7. Install plugs (24 and 22).
8. Install bracket (25 and 21), four washers (27), and bolts (26).
9. Install plate (28), two washers (30), nuts (29), and bolts (23). Tighten two nuts to 28 lb-ft (38 Nm).



INSTALLATION

WARNING

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

NOTE

Hydraulic tank weighs 250 lb (113 kg).

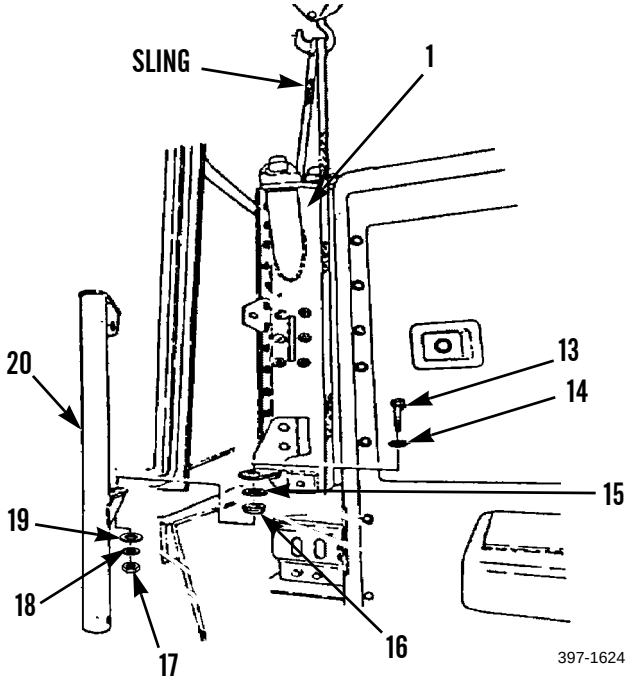
INSTALLATION - CONTINUED

1. With assistance, attach sling to hydraulic tank (1).
2. Position hydraulic tank (1) on machine.

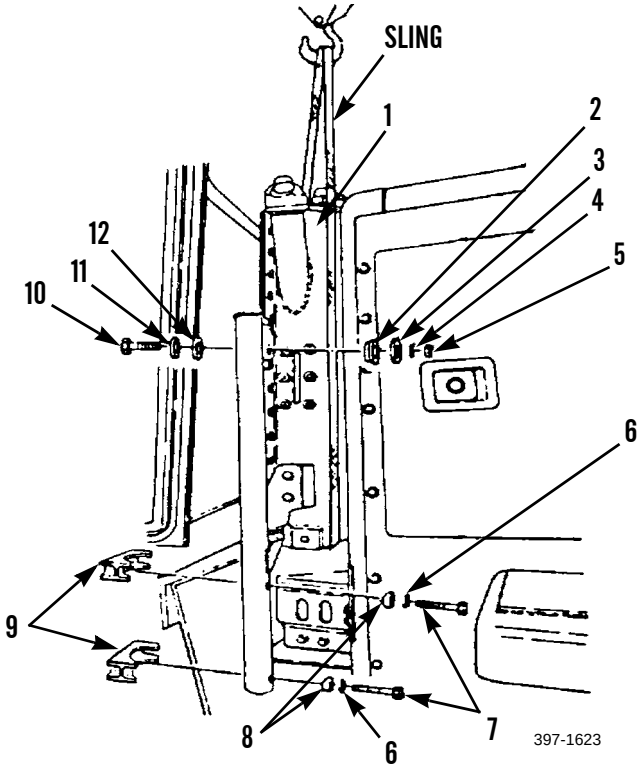
NOTE

Steps 3 through 5 cover the left support and hardware. Follow these instructions for the right support and hardware.

3. Install support (20), bolt (13), washers (14 and 15), mount (16), washers (18 and 19), and nut (17). Tighten nut to 40 lb-ft (54 Nm).



4. Install bolt (10), washers (11 and 12), mount (2), washers (3 and 4), and nut (5). Tighten nut to 40 lb-ft (54 Nm).
5. Install two brackets (9), spacers (8), washers (6), and bolts (7).
6. Remove sling from hydraulic tank (1).



INSTALLATION - CONTINUED

7. Install hydraulic tank filters (WP 0231 00).
8. Install oil temperature switch (WP 0116 00).
9. Install tank lines and fittings (WP 0250 00).
10. Fill hydraulic tank (WP 0216 00).
11. Start engine (TM 5-3805-261-10). Run engine 1 minute to allow air to bleed from hydraulic system.
12. Stop engine and check for leaks.
13. Check hydraulic oil level and fill as necessary (WP 0216 00).

END OF WORK PACKAGE

BLADE LIFT BAR ASSEMBLY MAINTENANCE 0340 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning and Inspection, Assembly, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)
Adapter, puller (Item 10, WP 0348 00)
Nut, fastener (Item 47, WP 0348 00)
Puller, hydraulic (Item 59, WP 0348 00)
Puller, hydraulic (Item 60, WP 0348 00)
Sling (Item 78, WP 0348 00)
Stud, plain (Item 86, WP 0348 00)
Washer (Item 91, WP 0348 00)
Lifting device, 300-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)
Bearing (6)
Lockwasher (3)
Seal (9)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Centershift lock assembly removed (WP 0260 00)

BLADE LIFT BAR ASSEMBLY MAINTENANCE - CONTINUED 0340 00

REMOVAL

WARNING

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

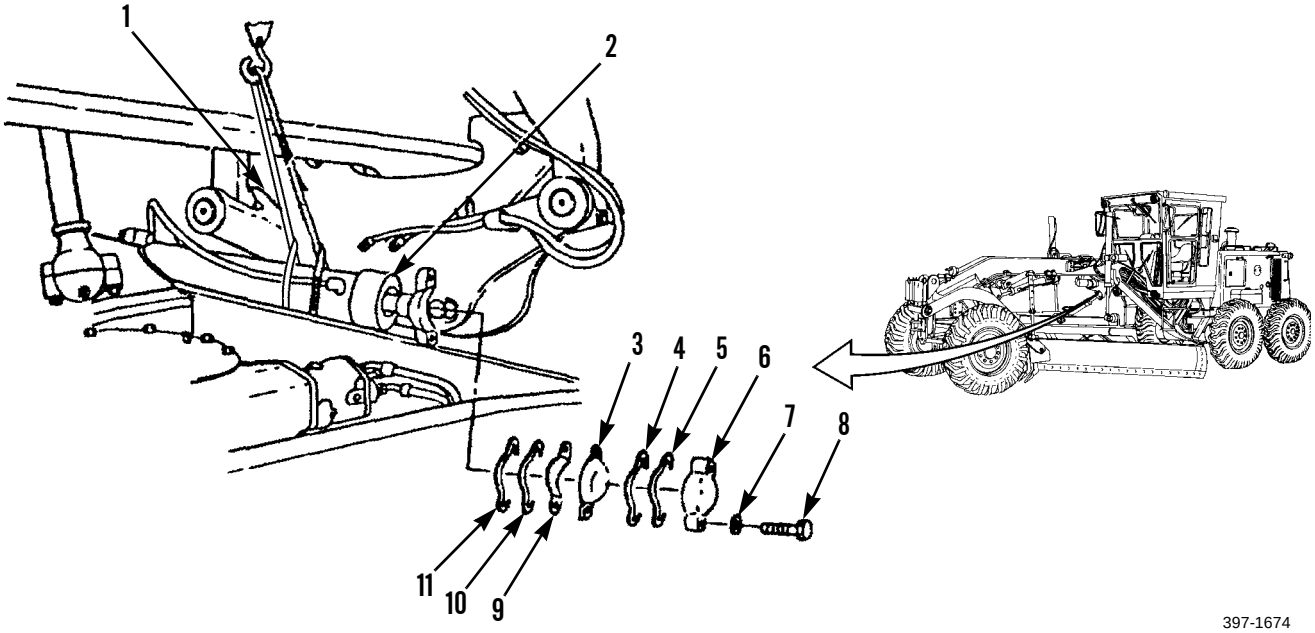
NOTE

Centershift cylinder weighs 40 lb (18 kg).

1. Attach sling to centershift cylinder (2).
2. Remove two bolts (8), lockwashers (7), cap (6), shim(s) (4 and 5), inserts (3 and 9), and shim(s) (10 and 11). Move centershift cylinder (2) clear of blade lift bar (1). Discard lockwashers.
3. Remove sling.

NOTE

- Left side blade lift cylinder not shown for clarity.
- Place centershift lock assembly hoses on top of frame.



397-1674

REMOVAL - CONTINUED

4. Remove bolt (14), lockwasher (13), and clip (12) from blade lift bar (1) and move hose assembly (23) to one side. Discard lockwasher.

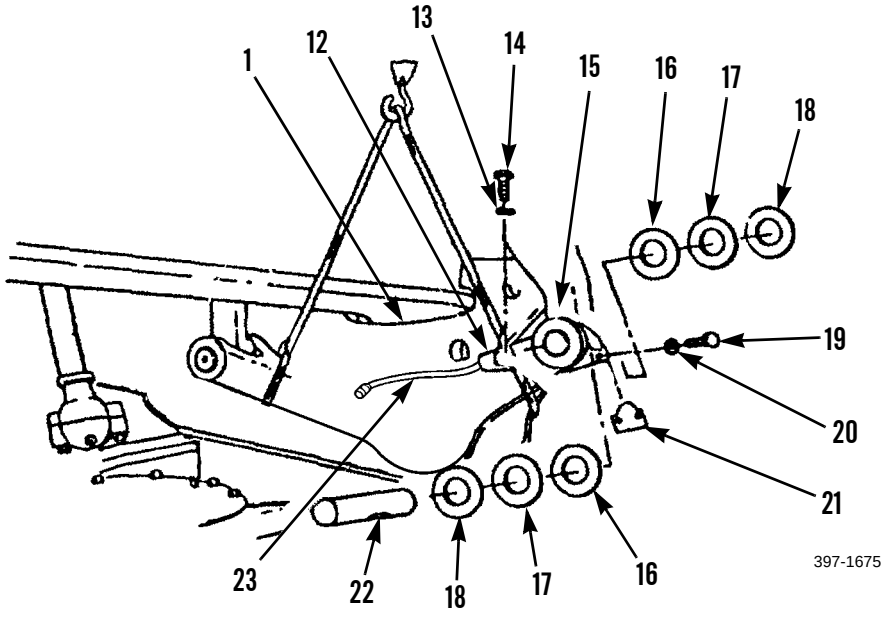
WARNING

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

NOTE

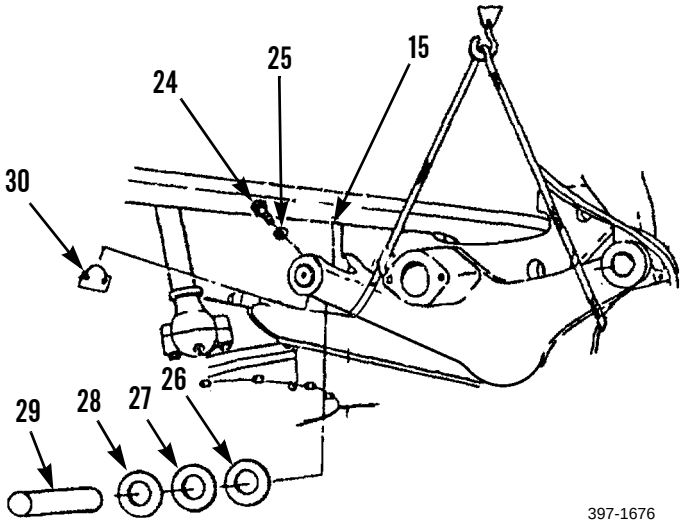
Blade lift bar weighs 200 lb (91 kg).

5. Attach sling to blade lift bar (1).
6. Remove two bolts (19), washers (20), and lock (21) from left side of blade lift arm (15).
7. Remove pin (22) and two washers (16, 17, and 18).



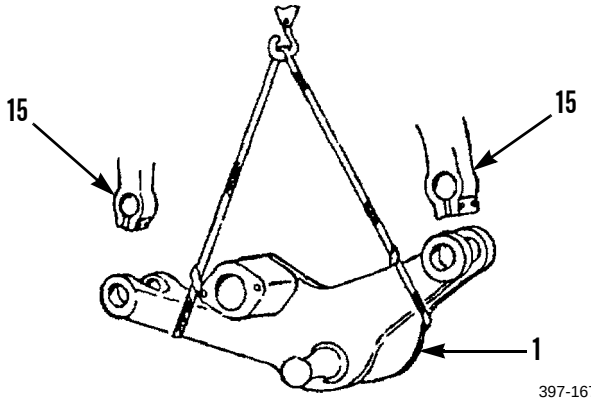
REMOVAL - CONTINUED

8. Remove two bolts (24), washers (25), and lock (30) from right side blade lift arm (15).
9. Remove pin (29) and washers (26, 27, and 28).



397-1676

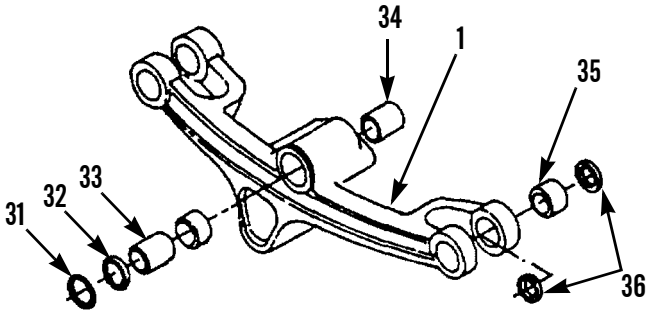
10. Remove blade lift bar (1) from blade lift arms (15) and place in work area.
11. Remove sling.



397-1677

DISASSEMBLY

1. Use adapter puller to remove eight seals (36) and four bearings (35). Discard seals and bearings.
2. Use adapter puller to remove seal (31), ring (32), bearing (33), and bearing (34) from blade lift bar (1). Discard seal and bearings.



397-1678

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

ASSEMBLY

1. Install ring (32) in blade lift bar (1).
2. Use adapter puller, stud, nut, washer, and both hydraulic pullers to install new bearing (34), and new bearing (33). Bearings must seat on ring (32)

ASSEMBLY - CONTINUED

3. Use driver to install new seal (31). Lip of seal should be toward outside surface. Seal should contact ring (32).
4. Use adapter puller, stud, nut, washer, and both hydraulic pullers to install four new bearings (35). Four bearings should be at a depth of 0.390 to 0.422 in. (9.91 to 10.72 mm) from outside surfaces of blade lift bar (1).
5. Install eight new seals (36). Lip of eight seals should be toward outside of bore. Eight seals should be even with outside surface of blade lift bar (1).

INSTALLATION

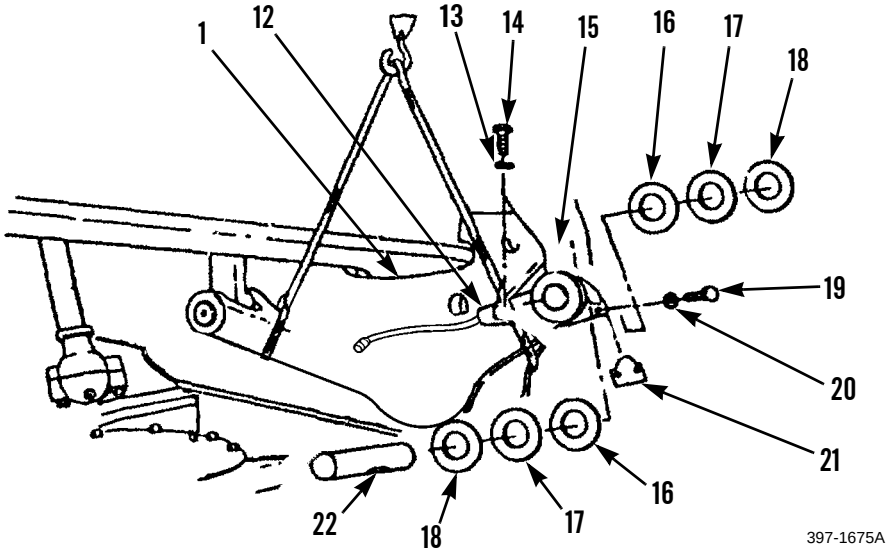
WARNING

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

NOTE

Blade lift bar weighs 200 lb (91 kg).

1. Attach sling to blade lift bar (1).
2. Position blade lift bar (1) at blade lift arms (15).
3. Install two washers (26, 27, and 28) between blade lift bar (1) and blade lift arms (15).
4. Install pin (29). Groove in pin must align with opening in blade lift arm (15).
5. Install lock (30), two washers (25), and bolts (24).
6. Install washers (16, 17, and 18) between blade lift bar (1), and blade lift arms (15).
7. Install pin (22). Groove in pin must align with opening in blade lift arm (15).
8. Install lock (21), two washers (20), and bolts (19).
9. Remove sling from blade lift bar (1).
10. Install clip (12), new lockwasher (13), and bolt (14) in blade lift bar (1).



INSTALLATION - CONTINUED

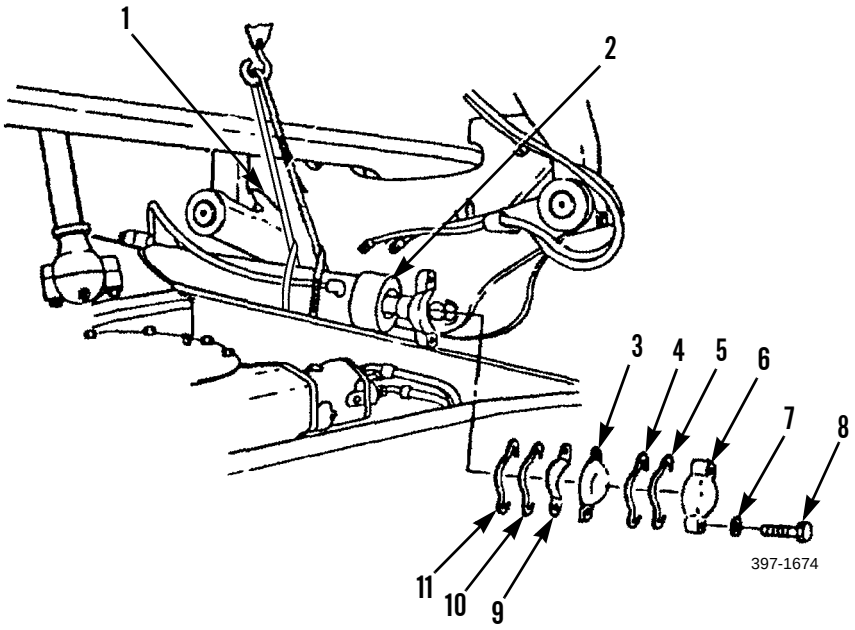
WARNING

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

NOTE

Centershift cylinder weighs 40 lb (18 kg).

11. Attach sling to center shift cylinder (2).
12. Position centershift cylinder (2).
13. Install shim(s) (10 and 11), inserts (3 and 9), shim(s) (4 and 5), cap (6), two new lockwashers (7), and bolts (8).
14. Remove sling.



15. Install centershift lock assembly (WP 0260 00).

END OF WORK PACKAGE

BLADE LIFT ARM REPLACEMENT 0341 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Adapter, puller (Item 4, WP 0348 00)

Adapter, puller (Item 6, WP 0348 00)

Driver set, bushing (Item 22, WP 0348 00)

Expander assembly (Item 23, WP 0348 00)

Nut (Item 48, WP 0348 00)

Puller, hydraulic (Item 61, WP 0348 00)

Pump, hydraulic ram (Item 65, WP 0348 00)

Screw (Item 72, WP 0348 00)

Sling (Item 78, WP 0348 00)

Washer (Item 92, WP 0348 00)

Lifting device, 300-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Seal (8)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Blade lift cylinders removed (WP 0335 00)

Blade lift bar assembly removed (WP 0340 00)

REMOVAL

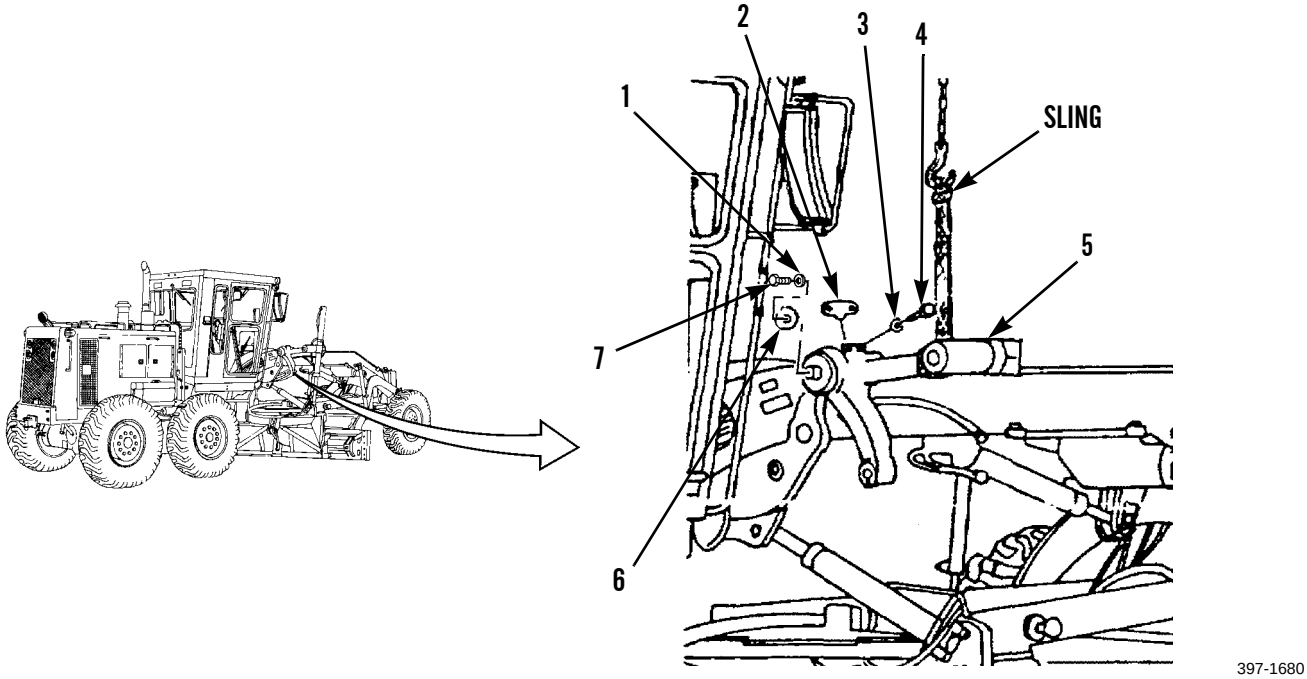
WARNING

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

NOTE

- Blade lift arm weighs 200 lb (91 kg).
- This procedure covers replacement of right side blade lift arm. Follow these instructions for left side blade lift arm, except as noted.

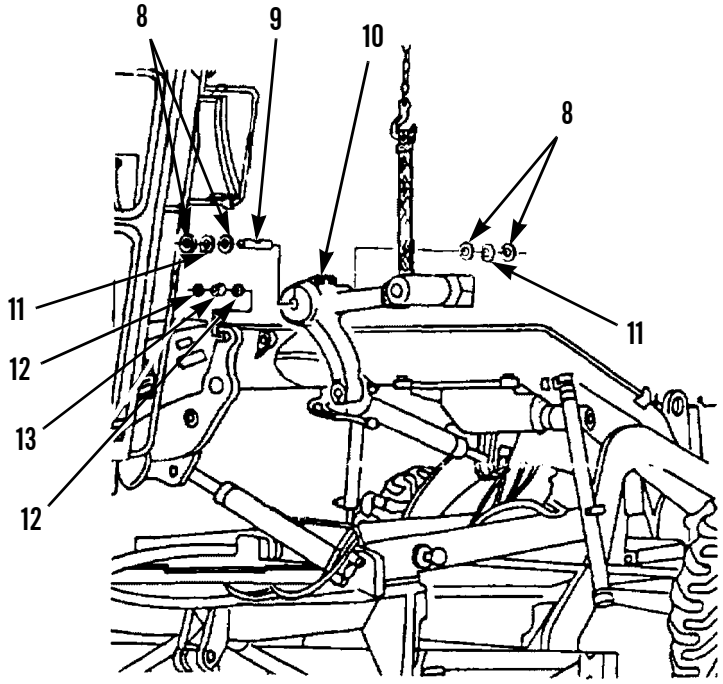
1. Attach sling to blade lift arm (5) in center of machine frame.
2. Remove two bolts (4), washers (3), and locks (2).
3. Remove bolt (7), washer (1), and plate (6) from right side blade lift arm (5) only.



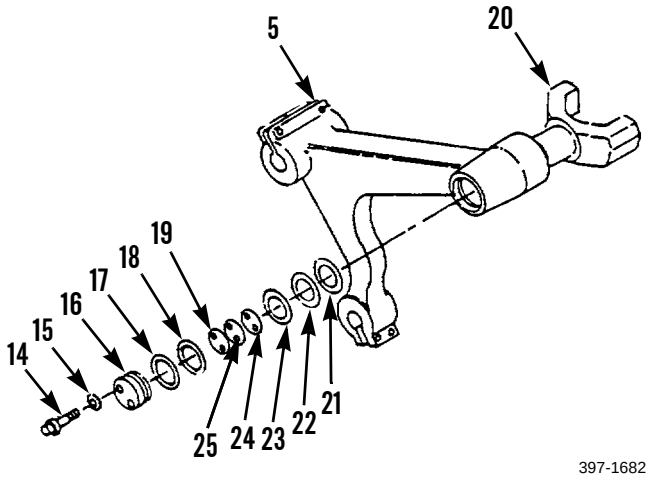
BLADE LIFT ARM REPLACEMENT - CONTINUED 0341 00

REMOVAL - CONTINUED

4. Remove pin (9), four washers (8), two washers (11), and blade lift arm (10).
5. Remove sling.
6. Remove four seals (12) and two bearings (13). Discard seals.



7. Remove two bolts (14), washers (15), retainer (16), seals (17 and 18), shim(s) (19, 24, and 25), and washers (21, 22, and 23) from arm (5) and yoke (20). Discard seals.



REMOVAL - CONTINUED

WARNING

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

NOTE

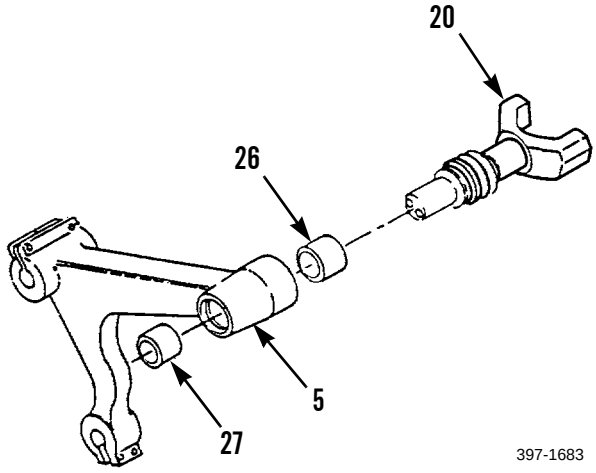
Weight of yoke is 40 lb (18 kg).

8. Remove yoke (20) from blade lift arm (5).

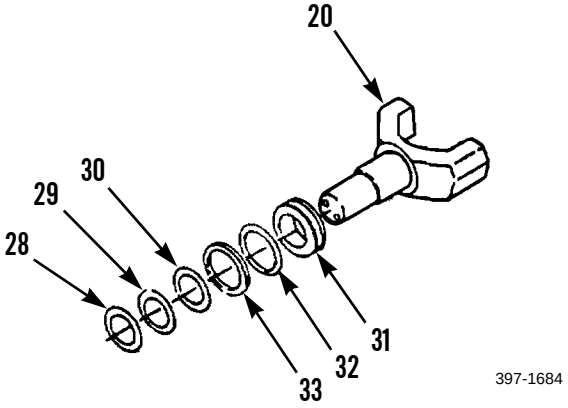
CAUTION

Use saw to cut down length of each bearing. Be careful not to cause damage to inside surface of lift arm.

9. Remove and discard bearings (26 and 27).



10. Remove washers (28, 29, and 30), seals (32 and 33), and ring (31) from yoke (20). Discard seals.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

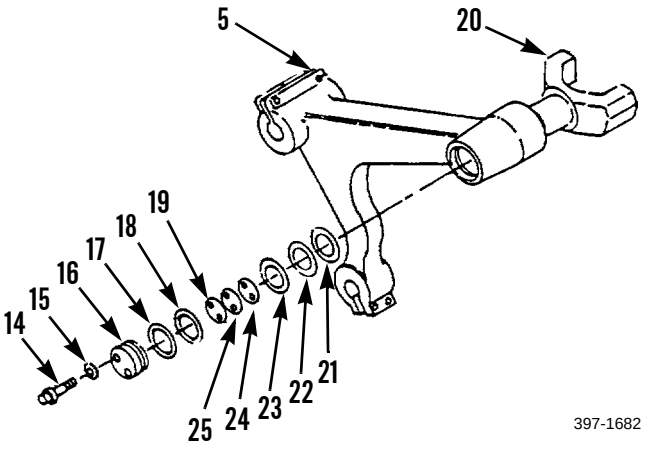
INSTALLATION

1. Install ring (31), new seals (32 and 33), and washers (28, 29, and 30) on yoke (20). Use expander assembly to install seals.

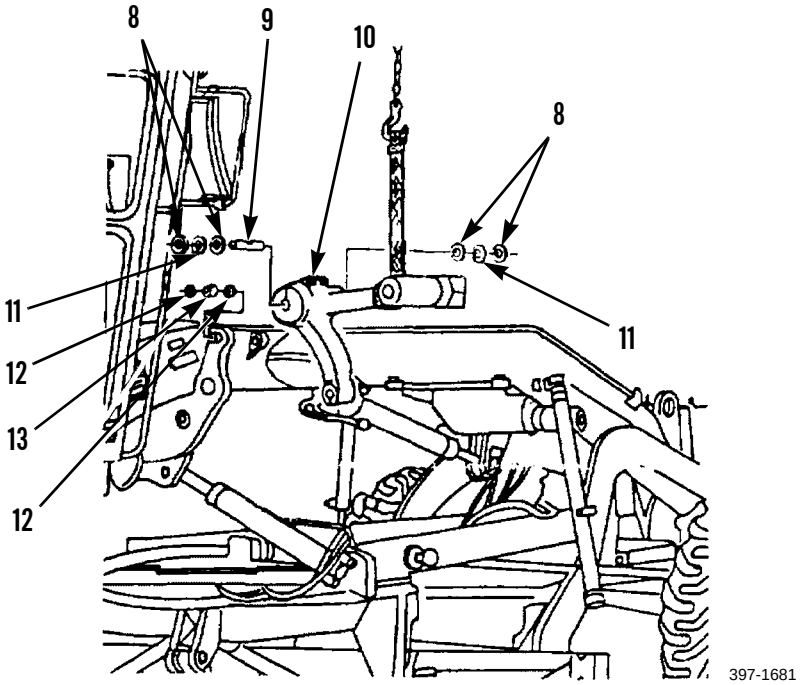
NOTE

Install bearings so contact is made with shoulders in arm.

2. Use puller adapter, hydraulic pump, screw, puller adapter, nut, and washer to install new bearings (26 and 27) in blade lift arm (5).
3. Install yoke (20) in blade lift arm (5).
4. Install washers (21, 22, and 23), shims (19, 24, and 25), new seals (17 and 18), retainer (16), two washers (15), and bolts (14). Use shims (19, 24, and 25) to get 0.01 in. (0.3 mm) maximum end clearance of yoke (20). Yoke must rotate freely on blade lift arm (5).



5. Use puller adapter, hydraulic pump, screw, puller adapter, nut, and washer to install two new bearings (13) in center of machine frame. Install bearings to a depth of 0.359 to 0.391 in. (9.12 to 9.93 mm).
6. Use bushing driver set to install four new seals (12). Lips of seals must be toward outside and even with outside surface.
7. Attach sling to blade lift arm (10) and position on frame.
8. Install blade lift arm (10), two washers (11), four washers (8), and pin (9).

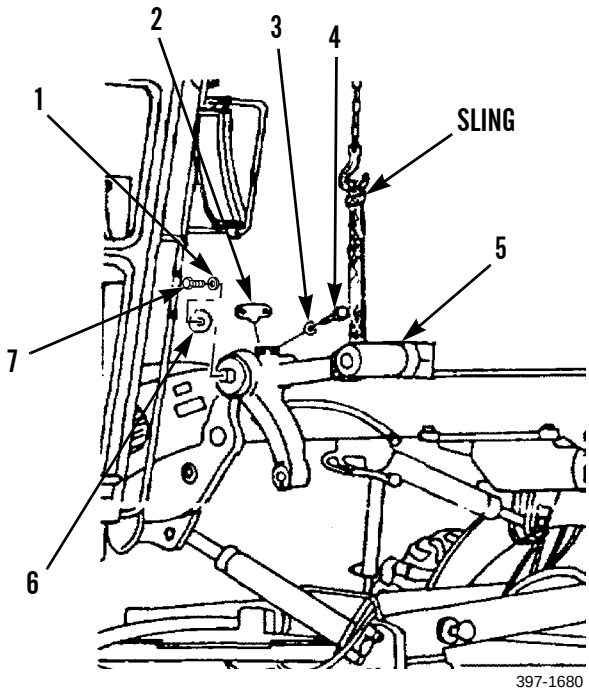


INSTALLATION - CONTINUED

NOTE

Groove in pin must align with opening in blade lift arm.

9. Install plate (6), washer (1), and bolt (7) on right side blade lift arm (5) only.
10. Install two lock (2), washers (3), and bolts (4).
11. Remove sling.



397-1680

12. Install blade lift bar assembly (WP 0340 00).
13. Install blade lift cylinders (WP 0335 00).

END OF WORK PACKAGE

DRAWBAR ASSEMBLY REPLACEMENT 0342 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Shop, equipment, contact torch (Item 77, WP 0348 00)

Jack stand (3) (Item 84, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Lifting device, 500-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Personnel Required

Two

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Circle drive motor removed (WP 0217 00)

Circle drive motor lines removed (WP 0225 00)

Centershift cylinder lines removed (WP 0226 00)

Toolbox removed (WP 0202 00)

Centershift cylinder disconnected (WP 0243 00)

Circle assembly removed (WP 0344 00)

Scarifier removed (WP 0264 00)

DRAWBAR ASSEMBLY REPLACEMENT - CONTINUED 0342 00

REMOVAL

WARNING

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

NOTE

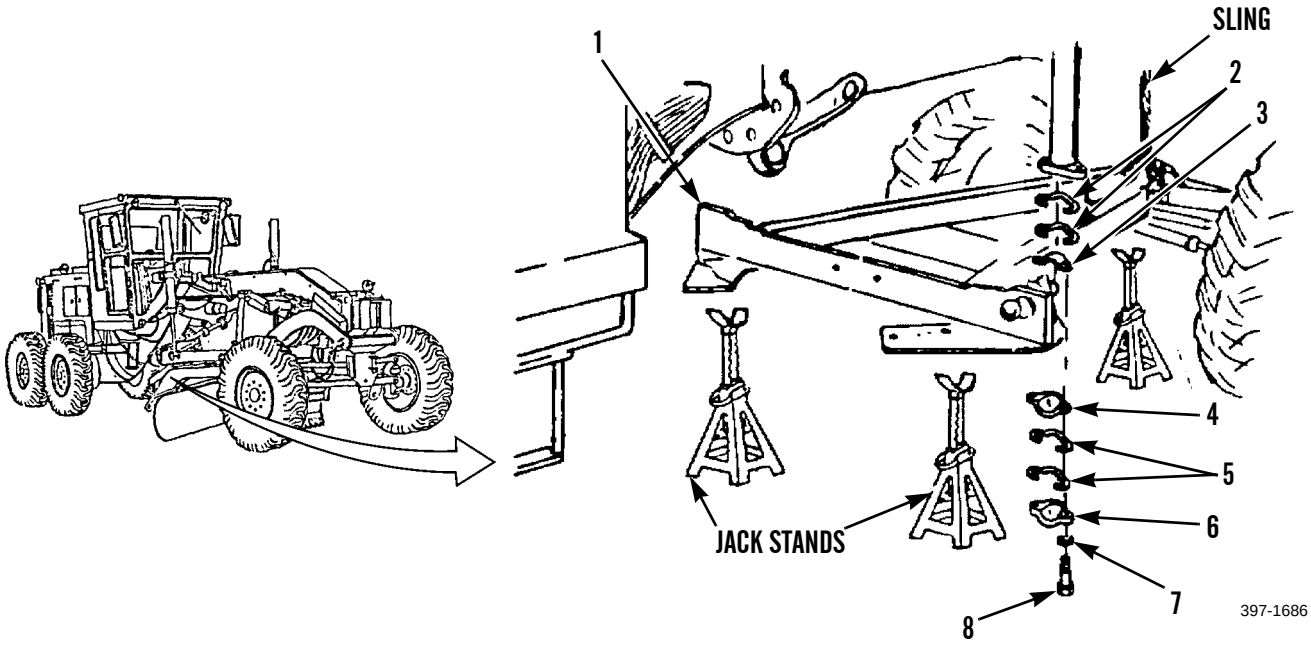
Drawbar weighs 500 lb (227 kg).

1. Attach sling to front of drawbar (1).
2. Position jack stands under three corners of drawbar (1).

NOTE

This procedure covers replacement of the right drawbar assembly. Follow these instructions for the left drawbar assembly.

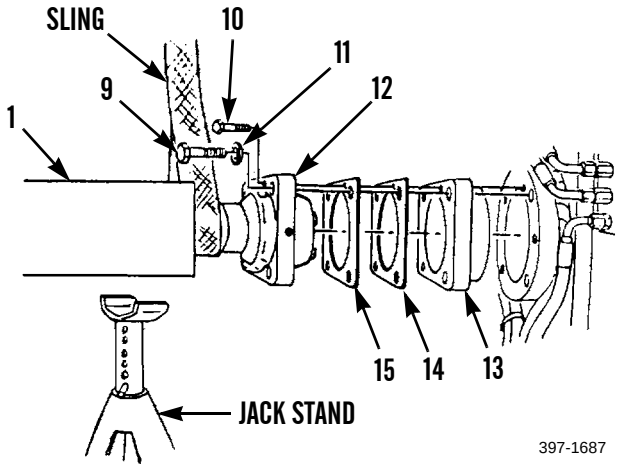
3. Use hydraulics to lower rear of drawbar (1) onto jack stands.
4. Remove two bolts (8), washers (7), cap (6), two shims (5), inserts (3 and 4), and two shims (2) from rear corners of drawbar (1).



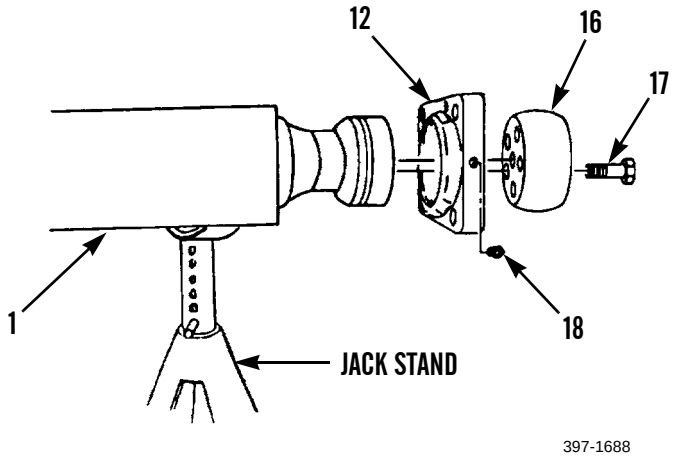
DRAWBAR ASSEMBLY REPLACEMENT - CONTINUED 0342 00

REMOVAL - CONTINUED

5. Remove four bolts (9), washers (11), and two bolts (10) at front of drawbar (1).
6. Slide cap (12) onto drawbar (1).
7. Lower front of drawbar (1) onto jack stands with sling.
8. Remove sling.
9. Remove adapter (13) and shims (14 and 15) from front corner of drawbar (1).



10. Remove five bolts (17), ball (16), fitting (18), and cap (12) from drawbar (1).



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Install cap (12), fitting (18), ball (16), and five bolts (17) on front cover of drawbar (1).
2. Measure end play between ball (16) and face of cap (12). Clearance must be 0.0 to 0.02 in. (0.0 to 0.5 mm).
3. Install shims (14 and 15) and adapter (13).

INSTALLATION - CONTINUED

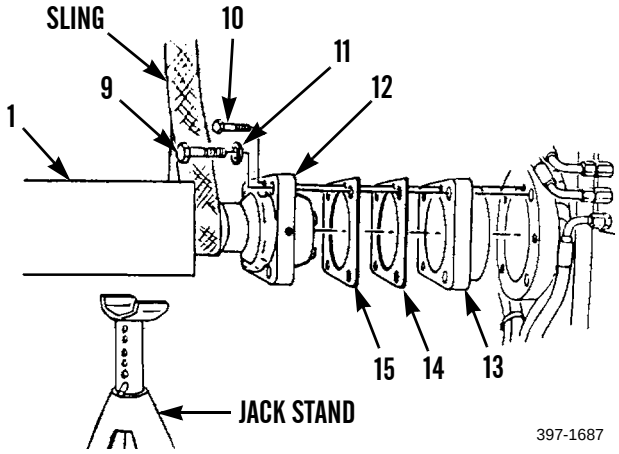
WARNING

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

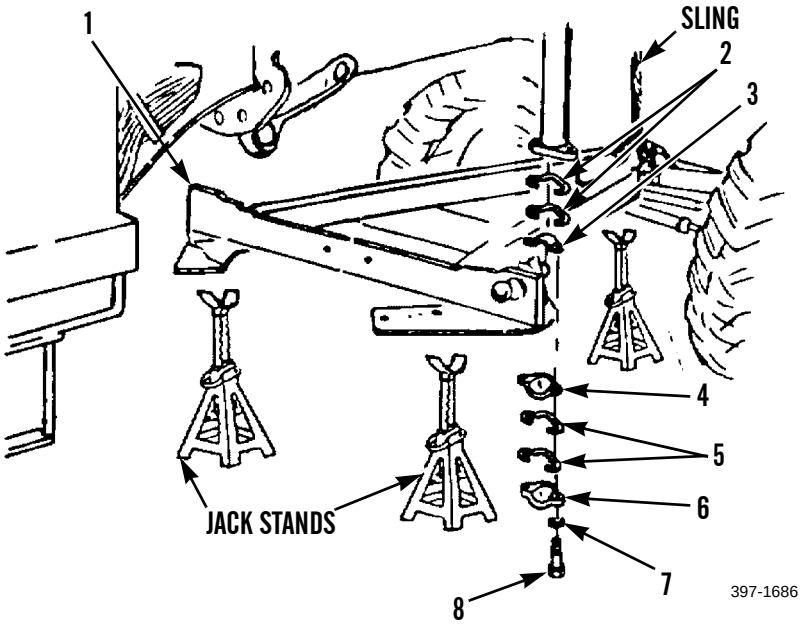
NOTE

Drawbar weighs 500 lb (227 kg).

4. Attach sling to front of drawbar (1).
5. Raise front of drawbar (1) into mounting position.
6. Install two bolts (10), four washers (11), and bolts (9) in cap (12) at front corner of drawbar (1). Tighten bolts to 367 to 397 lb-ft (498 to 538 Nm).



7. Remove sling.
8. Install two shims (2), inserts (3 and 4), two shims (5), cap (6), two washers (7), and bolts (8) in rear corners of drawbar (1).
9. Use hydraulics to raise rear of drawbar (1).
10. Remove jack stands.



INSTALLATION - CONTINUED

11. Install circle assembly (WP 0344 00).
12. Connect centershift cylinder (WP 0320 00).
13. Install tool box (WP 0202 00.
14. Install centershift cylinder lines (WP 0226 00).
15. Install circle drive motor lines (WP 0225 00).
16. Install circle drive motor (WP 0217 00).
17. Install scarifier (WP 0208 00).

END OF WORK PACKAGE

BLADE BRACKETS REPLACEMENT 0343 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 100, WP 0348 00)

Lifting device, 100-lb capacity

Rope

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Pin, cotter

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Blade assembly removed (WP 0259 00)

Blade tip cylinder removed (WP 0334 00)

Side shift cylinder removed (WP 0337 00)

BLADE BRACKETS REPLACEMENT - CONTINUED 0343 00

REMOVAL

1. Support bar (10) by tying both ends to frame with rope.

WARNING

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

NOTE

Old style bracket weighs 72 lb (33 kg); new style bracket weighs 50 lb (23 kg).

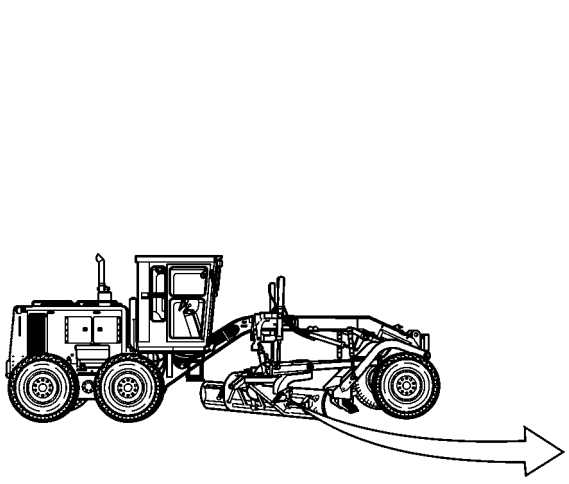
2. Attach sling to bracket (1).

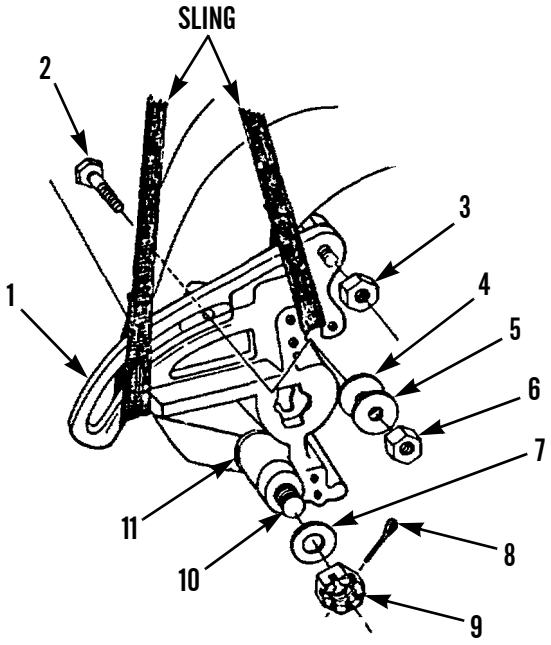
NOTE

New style bracket does not have nut (6) and washers (4 and 5).

3. Remove cotter pin (8), nut (9), washer (7), nuts (3 and 6), washers (4 and 5), bolt (2), and bracket (1). Discard cotter pin.

4. Remove two washers (11).



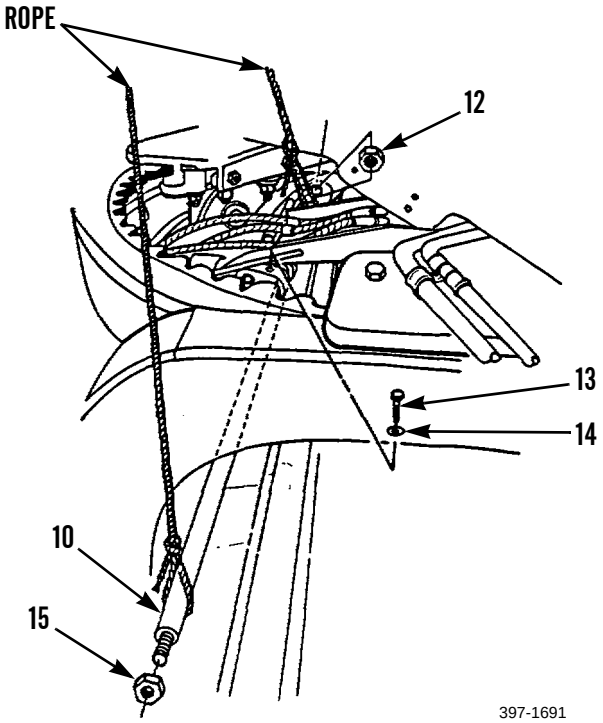


OLD STYLE BRACKET SHOWN

397-1690

REMOVAL - CONTINUED

5. Remove sling.
6. Remove nuts (12 and 15).
7. Remove two bolts (13) and washers (14).
8. Remove bar (10) and attached rope.
9. Remove rope from bar (10).



NOTE

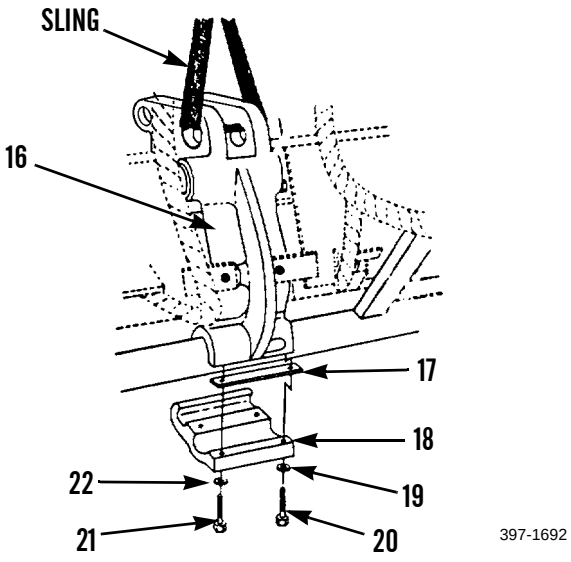
Bracket weighs 68 lb (31 kg).

10. Attach sling to bracket (16).

NOTE

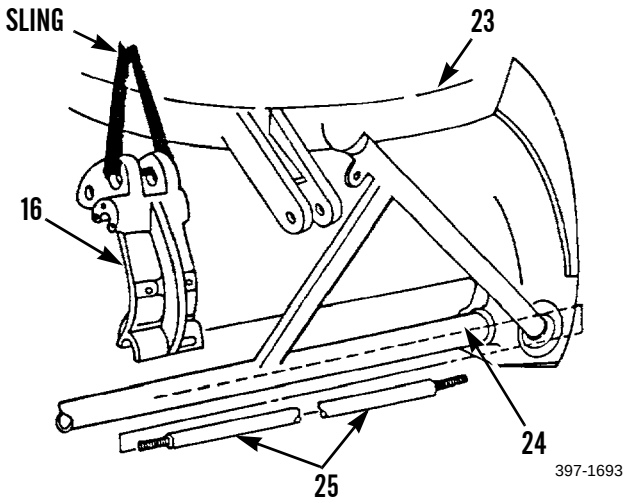
Tie shims together and tag for identification.

11. Remove two bolts (21), washers (22), bolts (20), washers (19), cap (18), and ten shims (17) from bracket (16).



REMOVAL - CONTINUED

12. Remove bracket (16) from circle (23).
13. Remove shaft (25) from pipe (24).
14. Remove sling.



CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

1. Position shaft (25) in pipe (24) at bottom rear of circle (23).

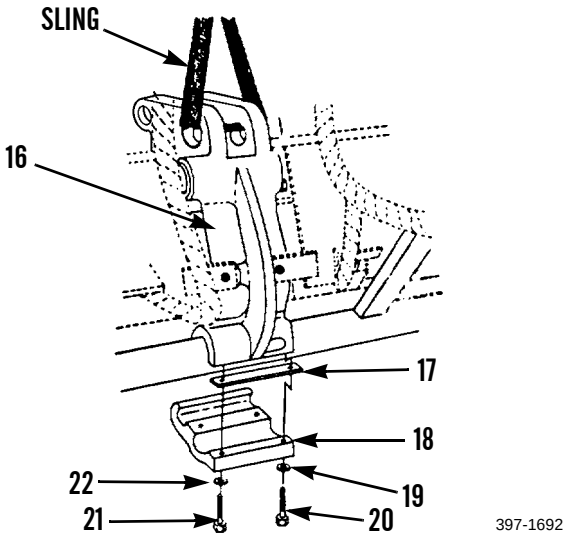
WARNING

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

NOTE

Bracket weighs 68 lb (31 kg).

2. Attach sling to bracket (16).
3. Install bracket (16) in circle (23).
4. Install ten shims (17), cap (18), two washers (19), bolts (20), washers (22), and bolts (21).
5. Remove sling from bracket (16).
6. Install bar (10). Align tapped holes in bar with holes in bracket (16).
7. Support bar (10) by tying both ends to frame with rope.
8. Install two washers (14) and bolts (13).
9. Install nuts (12 and 15).

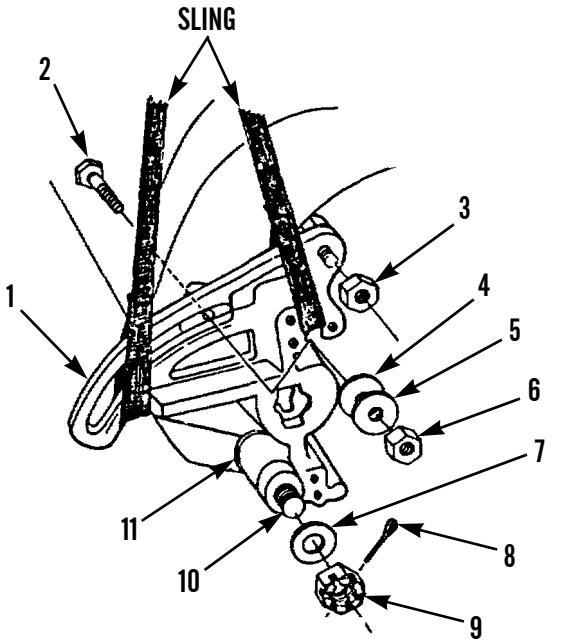


INSTALLATION - CONTINUED

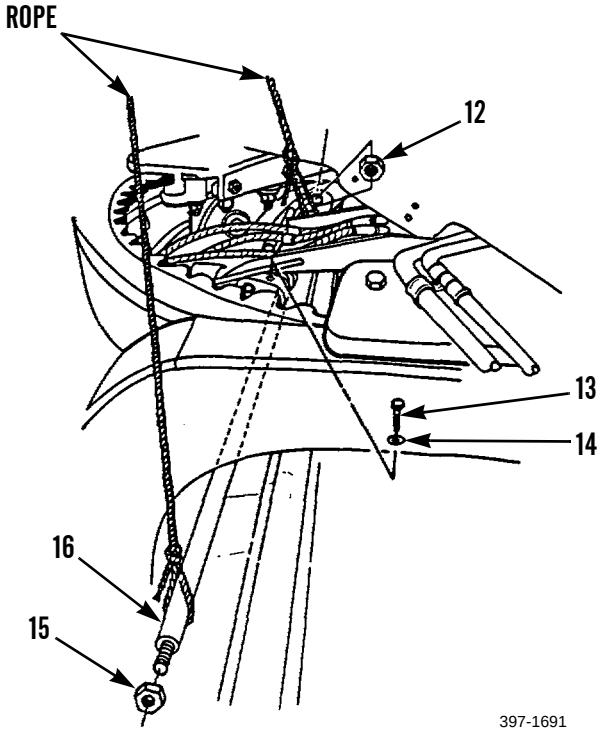
NOTE

Old style bracket weighs 72 lb (33 kg); new style bracket weighs 50 lb (23 kg).

10. Attach sling to bracket (1).
11. Install two washers (11). Use washers as required to get sliding fit of bracket (1) with maximum 0.07 in. (1.8 mm) clearance between bracket and circle wear plate.
12. Install bracket (1).
13. Install bolt (2), washers (4 and 5), and nut (6).
14. Back out nut (12) to make contact with bracket (1).
15. Install nut (3) and tighten to 1,200 lb-ft (1,627 Nm).
16. Install washer (7) and nut (9) to bar (10). Tighten nut to remove any clearance, then back off enough to permit installation of new cotter pin (8).
17. Install new cotter pin (8).
18. Remove rope and sling.
19. Install side shift cylinder (WP 0337 00).
20. Install blade tip cylinder (WP 0334 00).
21. Install blade assembly (WP 0259 00).



OLD STYLE BRACKET SHOWN 397-1690



397-1691

END OF WORK PACKAGE

CIRCLE ASSEMBLY REPLACEMENT 0344 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Maintenance Level

Direct Support

Tools and Special Tools

Tool kit, general mechanic's (Item 89, WP 0348 00)

Shop equipment, contact truck (Item 77, WP 0348 00)

Jack stand (2) (Item 84, WP 0348 00)

Sling (Item 78, WP 0348 00)

Wrench, torque (Item 102, WP 0348 00)

Lifting device, 1,600-lb capacity

Materials/Parts

Rag, wiping (Item 35, WP 0349 00)

Tag, marker (Item 44, WP 0349 00)

Materials/Parts - Continued

Locknut (8)

Pin, cotter (2)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

Engine off (TM 5-3805-261-10)

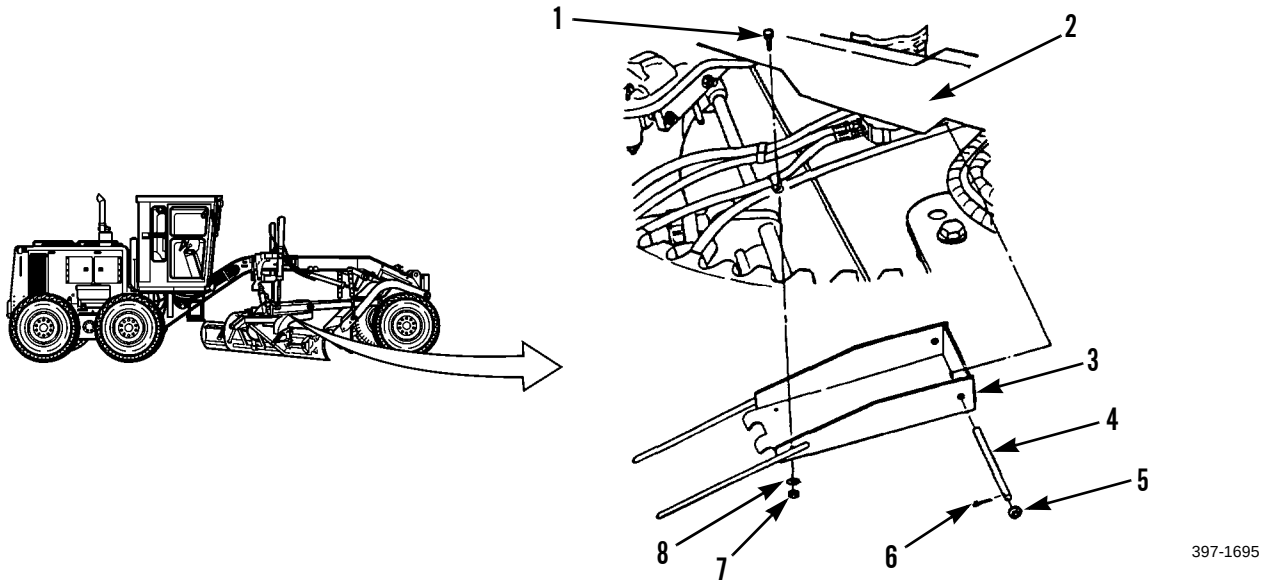
Battery disconnect switch in OFF position (TM 5-3805-261-10)

Blade brackets removed (WP 0343 00)

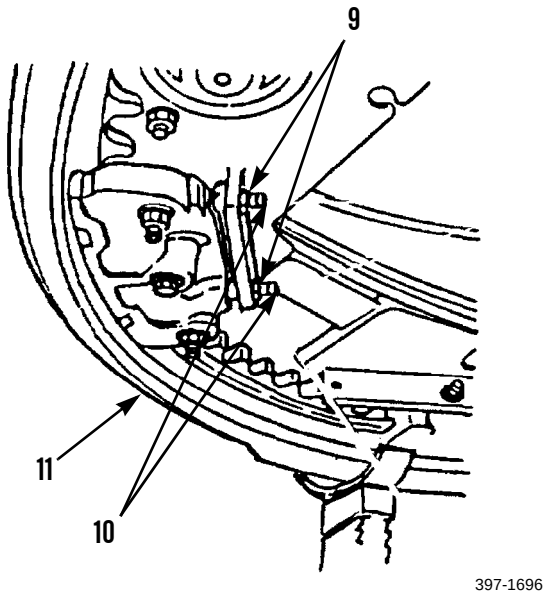
CIRCLE ASSEMBLY REPLACEMENT - CONTINUED 0344 00

REMOVAL

1. Remove two nuts (7), washers (8), and bolts (1) from drawbar assembly (2).
2. Remove two cotter pins (6), washers (5), pin (4), and guide (3). Discard cotter pins.



3. Use jack stands to support circle (11).
4. Loosen eight nuts (9).
5. Turn eight setscrews (10) all the way down.

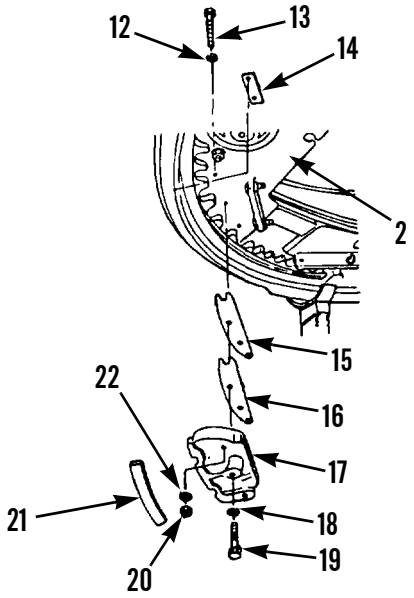


REMOVAL - CONTINUED

NOTE

Tag and bundle shims to aid in installation.

6. Remove 8 locknuts (20), washers (22), bolts (13), washers (12), 4 bolts (19), washers (18), shoes (17), 24 shims (16), 28 shims (15), 8 strips (14), and 4 strips (21) from drawbar assembly (2). Discard locknuts.



397-1697

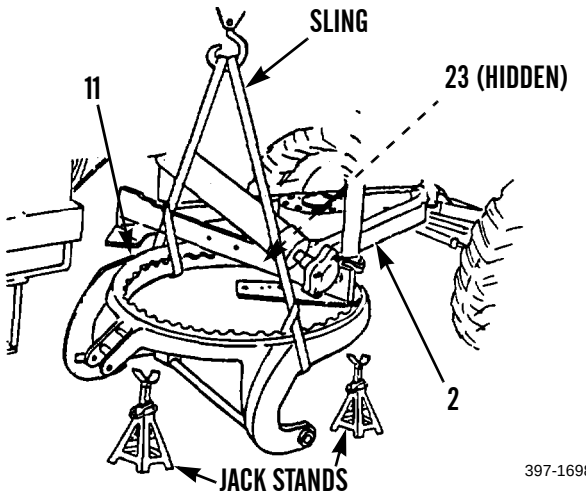
WARNING

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

NOTE

Circle weighs 1,050 lb (476 kg).

7. Attach sling to circle (11).
8. Remove jack stands.
9. Turn battery disconnect switch to the ON position and start engine (TM 5-3805-261-10).
10. Move machine back to remove circle drive motor pinion (23) from engagement in circle (11). Lift drawbar assembly (2) away from circle.
11. Stop engine.
12. Lower circle (11) to ground.
13. Remove circle (11) from under machine.
14. Remove sling.



397-1698

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

INSTALLATION

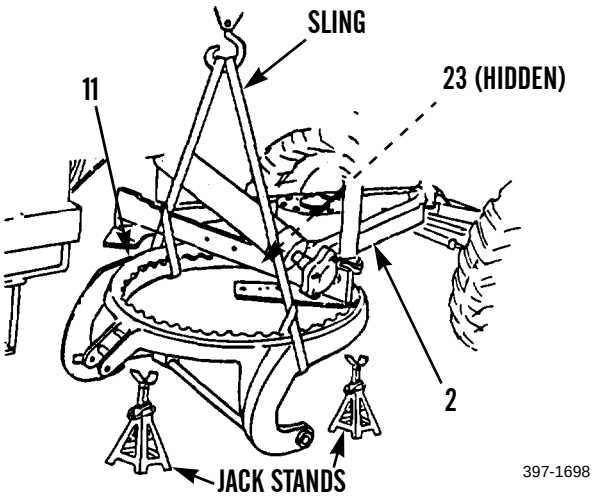
WARNING

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

NOTE

Circle weighs 1,050 lb (476 kg).

1. Attach sling to circle (11) under machine.
2. Raise circle (11) into mounting position under machine.
3. Support circle (11) with jack stands.
4. Turn battery disconnect switch to the ON position and start engine (TM 5-3805-261-10).
5. Lower drawbar assembly (2) into position over circle (11). Move machine slowly forward to engage circle drive motor pinion (23) into circle (11).
6. Stop engine.

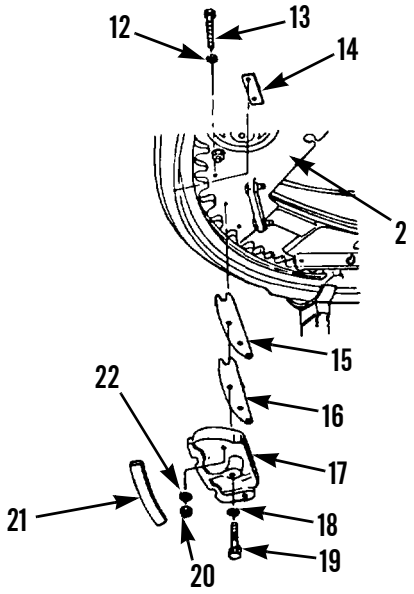


INSTALLATION - CONTINUED

NOTE

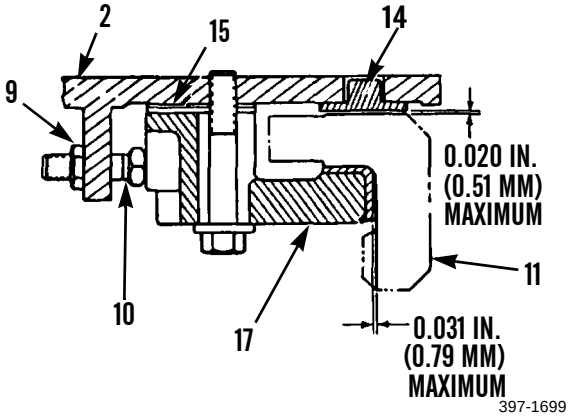
- Be sure jack stand is not supporting circle when measuring clearance.
- Do not tighten bolts. Use shim(s) as required to obtain 0.020 in. (0.51 mm) maximum clearance between drawbar, strip, and circle at each shoe.

7. Install 4 strips (21), 8 strips (14), 28 shims (15), 24 shims (16), 4 shoes (17), washers (18), bolts (19), 8 washers (12), bolts (13), washers (22), and new locknuts (20) on drawbar assembly (2).
8. Remove sling.



397-1697

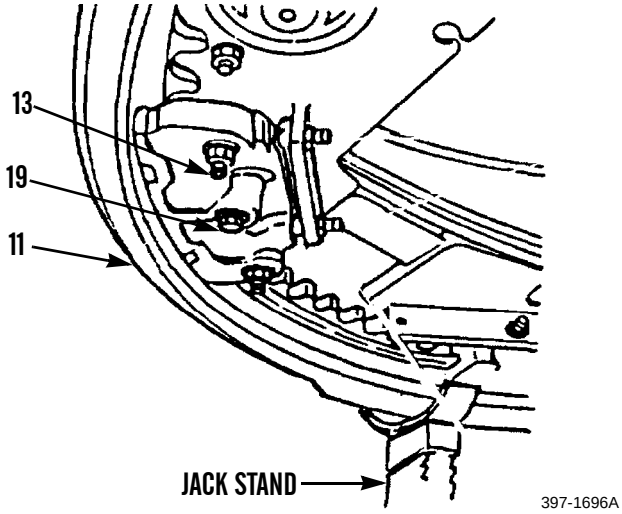
9. With shoes (17) and shims (15) in position on drawbar assembly (2), adjust four shoes.
10. Loosen eight nuts (9) on setscrews (10).
11. Tighten setscrews (10) until shoes are against inside of circle (11).
12. Loosen setscrews (10) until circle (11) is just free to turn.
13. Tighten nuts (9) on setscrews (10).



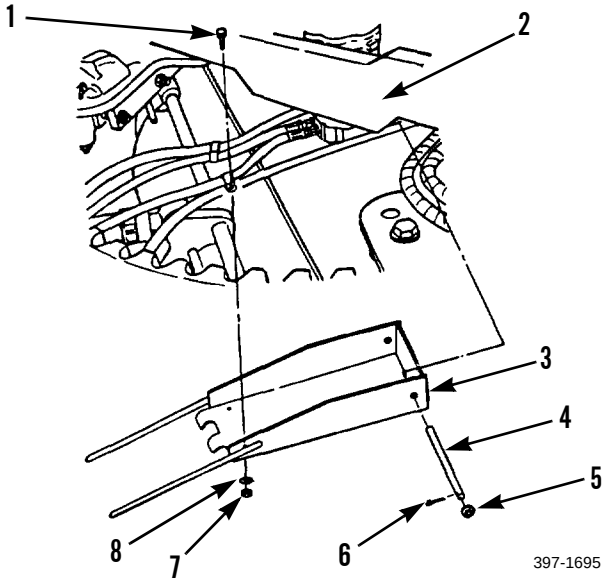
397-1699

INSTALLATION - CONTINUED

14. Tighten four bolts (19) and eight bolts (13) to 310 to 340 lb-ft (420 to 461 Nm). Recheck clearances and adjustments.
15. Remove jack stands from under circle (11).



16. Install guide (3), pin (4), two washers (5), and new cotter pins (6).
17. Install two bolts (1), washers (8), and nuts (7).



18. Install blade brackets (WP 0343 00).

END OF WORK PACKAGE

CIRCLE DRIVE SWIVEL ASSEMBLY REPAIR 0345 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 89, WP 0348 00)

Shop equipment, field maintenance (Item 74, WP 0348 00)

Puller attachment, bearing (Item 55, WP 0348 00)

Materials/Parts

Oil, lubricating (Item 27, WP 0349 00)

Rag, wiping (Item 35, WP 0349 00)

Lockwasher (4)

Packing, preformed (11)

Seal (11)

References

WP 0020 00

Equipment Conditions

Machine parked on level ground (TM 5-3805-261-10)

Parking/emergency brake applied (TM 5-3805-261-10)

Implements lowered to ground (TM 5-3805-261-10)

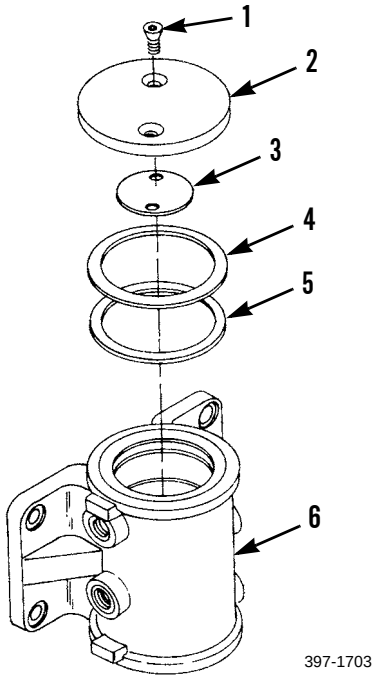
Engine off (TM 5-3805-261-10)

Battery disconnect switch in OFF position (TM 5-3805-261-10)

Circle drive swivel assembly removed (WP 0263 00)

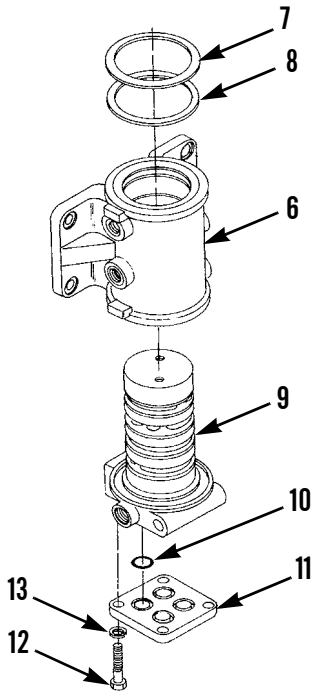
DISASSEMBLY

1. Remove two screws (1), retainer (2), and shim(s) (3) from body (6).
2. Remove and discard seals (4 and 5).



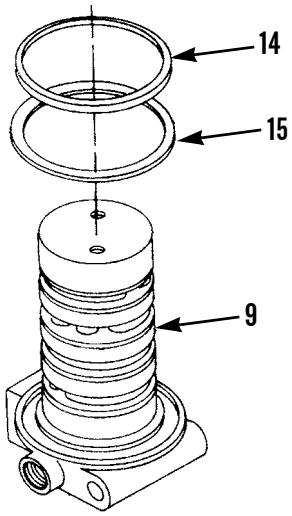
DISASSEMBLY - CONTINUED

3. Remove four bolts (12), lockwashers (13), and cover (11) from body (6). Discard lockwashers.
4. Remove and discard four preformed packings (10).
5. Use bearing puller attachment to remove rotor (9) from body (6).
6. Remove and discard seven seals (7) and preformed packings (8).



397-1704

7. Remove and discard seals (14 and 15) from rotor (9).



397-1705

CLEANING AND INSPECTION

Clean and inspect all parts in accordance with WP 0020 00.

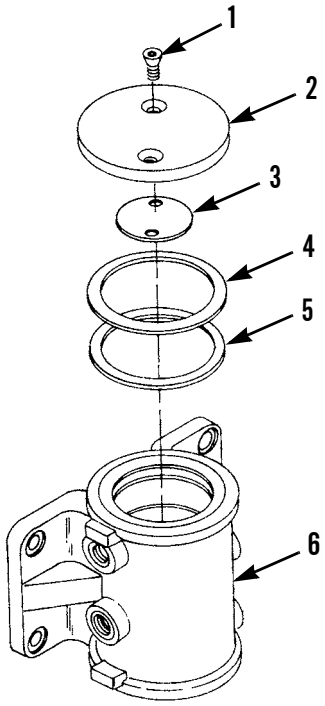
ASSEMBLY

1. Lubricate new seals (14 and 15) with clean oil and install on rotor (9).
2. Lubricate seven new preformed packings (8) and new seals (7) with clean oil and install in body (6).
3. Install rotor (9) in body (6).
4. Lubricate four new preformed packings (10) with clean oil and install in cover (11).
5. Install cover (11), four new lockwashers (13), and bolts (12) in body (6).
6. Lubricate new seals (4 and 5) with clean oil.

NOTE

Add or remove shim(s) to obtain required gap.

7. Install seals (4 and 5), shim (s) (3), retainer (2), and two screws (1) in body (6).
8. Use feeler gauge to measure gap between retainer (2) and body (6). Gap should be 0.005 to 0.020 in. (0.13 to 0.51 mm).



397-1703

9. Install circle drive swivel assembly (WP 0263 00).

END OF WORK PACKAGE

CHAPTER 5
SUPPORTING INFORMATION

REFERENCES 0346 00

SCOPE

This work package lists all publication indexes, forms, field manuals, technical bulletins, technical manuals and other publications referenced in this manual and which apply to maintenance of the 130G Grader.

PUBLICATION INDEXES

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Army Publications and Forms Index. . . . . DA PAM 25-30

Functional Users Manual for the Army Maintenance Management System (TAMMS) . . . . . PAM 750-8

FORMS

NOTE

Refer to PAM 750-8, *Functional Users Manual for the Army Maintenance Management System (TAMMS),* for instructions on the use of maintenance forms.

Accident Identification Card . . . . . DD Form 518

Equipment Inspection and Maintenance Worksheet . . . . . DA Form 2404, DA Form 5988-E

Maintenance Request . . . . . DA Form 2407

Motor Vehicle Accident Report. . . . . SF Form 91

Product Quality Deficiency Report . . . . . SF Form 368

Recommended Changes to Publications and Blank Forms. . . . . DA Form 2028

Uncorrected Fault Record . . . . . DA Form 2408-14

FIELD MANUALS

Army Motor Transport Unit and Operations. . . . . FM 55-30

Basic Cold Weather Manual . . . . . FM 31-70

Chemical and Biological Contamination Avoidance . . . . . FM 3-11.3

Desert Operations . . . . . FM 90-3

First Aid. . . . . FM 4-25.11

NBC Decontamination . . . . . FM 3-11.5

NBC Field Handbook . . . . . FM 3-7

Northern Operations . . . . . FM 31-71

Nuclear Contamination Avoidance . . . . . FM 3-3-1

Operations and Maintenance of Ordnance Materiel in Cold Weather . . . . . FM 9-207

Recovery and Battlefield Damage Assessment and Repair . . . . . FM 9-43-2

Rigging Techniques, Procedures, and Applications . . . . . FM 5-125

TECHNICAL BULLETINS

CARC Spot Painting . . . . . TB 43-0242

Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment and Materials Handling Equipment. . . . . TB 43-0209

Solder and Soldering . . . . . TB SIG 222

REFERENCES - CONTINUED **0346 00**

TECHNICAL BULLETINS - CONTINUED

Use of Antifreeze Solutions, Antifreeze Extender, Cleaning Compounds and Test Kit in Engine Cooling Systems . . . . . TB 750-651

TECHNICAL MANUALS

Inspection, Care, and Maintenance of Antifriction Bearings . . . . . TM 9-214
Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materiels Including Chemicals . . . . . TM 9-247
Operator's and Organizational Maintenance Manual Including RPSTL for STE/ICE-R. . . . . TM 9-4910-571-12&P
Operator's Manual for the 130G Grader . . . . . TM 5-3805-261-10
Operator's, Unit, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14
Painting Instructions for Army Materiel . . . . . TM 43-0139
Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command) . . . . . TM 750-244-3
Transportability Guidance for the 130G Grader . . . . . TM 55-3805-261-14
Unit, Direct Support and General Support Including Depot Maintenance RPSTL for the 130G Grader. . . TM 5-3805-261-24P

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
Fuels and Lubricants Standardization Policy for Equipment . . . . . AR 70-12
Operator's Circular for Welding Theory and Application . . . . . TC 9-237

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION 0347 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 this 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 0348 00) in column (4) as:

   Field - includes subcolumns:

   C - Operator/Crew
   O - Unit
   F - Direct Support

   Sustainmant - 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), preserve, drain, paint, or replenish fuel, lubricants, chemical fluids, or gases.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to 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. Calibration 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. Installation may be the act of emplacing or seating a spare, repair part, or module (component or assembly) into position 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. Replacement is authorized by the MAC and the assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
9. **Repair.** Repair is 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 - Inspecting, testing, service, adjustment, alignment, calibration, and/or replacement.
- Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
- Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, assigned a 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
F - Direct Support Maintenance

Sustainment:

H - General Support Maintenance
D - Depot Maintenance

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1- CONTINUED

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" 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 Reference Code.** Column (5) specifies, by code, common tool sets (not individual tools), common Test, Measurement, and Diagnostic Equipment (TMDE), special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.
6. **Column (6) - Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries (Table 3).

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, TABLE 2

1. **Column (1) - Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.
2. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
3. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.
4. **Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.
5. **Column (5) - Tool Number (ICAGEC).** The manufacturer's part number, model number, or type number. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.

EXPLANATION OF COLUMNS IN THE REMARKS, TABLE 3

1. **Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader .

(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		
01	**ENGINE**								
0100	Engine Assembly	Test		1.0				12,75,89	
		Service		1.0				75,89	A
		Replace			14.0			74,78,85,89, 96,100	
		Repair			3.0	95.0			B
0101	Crankcase, Block, Cylinder Head:								
	Cylinder Block	Inspect			0.8			62,74, 89,94,96	
	Cylinder Head	Inspect			4.0				
	Assembly and Spacer	Replace			8.0			74,78,89,96,101	
	Plate	Repair			2.0			74,89	C
0102	Crankshaft:								
	Crankshaft Hub	Replace			1.5			54,74,89,101	
	Crankshaft Assembly	Inspect				0.5			
		Replace				35.0			
0103	Flywheel Assembly:								
	Flywheel	Replace			16.0			15,74,78,89,101	
	Flywheel Housing	Replace			10.0			18,74,78,89	
		Repair			2.0			74,89	D
0104	Pistons, Connecting Rods:								
	Piston Assemblies	Replace				14.0			
0105	Valves, Camshafts, and Timing System:								
	Rocker Arm	Adjust			1.0			28,31,74,89,96	
	Assembly	Replace			3.0			28,31,74,89,101	
		Repair			1.0			28,31,74,89,101	C
	Valves	Replace			4.0			19,20,25,74,88, 89	
0106	Engine Lubrication System:								
	Oil Pan	Replace			2.0			74,89	
	Engine Oil Pump	Replace			4.0			74,89,96	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
03	**FUEL SYSTEM**								
0301	Fuel Injector Nozzle	Test			1.0			87	
		Replace			1.0			8,58,74,89	
0302	Governor and Fuel Injection Pump Assembly	Adjust			2.0			74,89	
		Replace			2.0			74,89	
		Repair				4.0			
0304	Air Cleaner	Service	0.3	0.5				75,89,96	A
		Replace		0.5				89	
0305	Turbocharger	Replace			1.5			74,89,96	
		Repair				2.0			
0306	Tanks, Lines, and Fittings Headers:								
	Fuel Tank	Service	0.3						A
		Replace		2.0				75,78,89,96	
		Repair		2.0				89	D
0308	Engine Speed Governor and Controls	Adjust			1.0			74,89	
		Replace			2.0			74,89,96	
		Repair				3.0		74,89	E
0309	Fuel Filters:								
	Primary Fuel Filter	Service	0.2	0.3				75,89,96	
		Replace		0.5				75,89,96	
	Secondary Fuel Filter	Service	0.2	0.3				75,89	
		Replace		0.5				75,89,96	
0311	Engine Starting Aids	Service		0.5				89	A
		Replace		1.0				89	
		Repair		1.0				89	
04	**EXHAUST SYSTEM**								
0401	Muffler and Pipes	Replace		2.0				75,89	
05	**COOLING SYSTEM**								
0501	Radiator Assembly	Inspect	0.2						
		Service		1.0				75,89	A
		Replace		3.0				16,78,89	
		Repair		3.0				89	D
0504	Water Pump:								
	Water Pump Assembly	Replace		2.5				89	
		Repair				1.0		74,89,96	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - Continued.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
05	**COOLING SYSTEM - Continued**								
0505	Fan Assembly:								
	Fan Drive	Service	0.2						A
		Replace		1.0				75,89	
		Repair		0.5				75,89	
	Fan Belts	Inspect	0.1	0.1					
		Adjust		0.2				75,89	
		Replace		0.5				75,89	
06	**ELECTRICAL SYSTEM**								
0601	Alternator	Test		0.5				12,75,89	
		Replace		1.5				89	
		Repair				2.0		74,89	F
0603	Starting Motor:	Test		0.5				12,75,89	
		Replace		1.0				75,89,96	
		Repair				2.0		74,89,94,96	G
0607	Instrument or Engine Control Panel:								
	Instrument Panel/ Electronic Monitoring System (EMS)	Test	0.1						
		Replace		1.0				75,89,94	
		Repair			1.0			75,89,94	
	Operator's Console Assembly	Replace		0.4				89	
		Repair		1.0				89	
0608	Miscellaneous Items:								
	Switches	Replace		0.3				89	
	Fuse Box and Fuses	Replace		0.5				89	
	NATO Slave Receptacle	Replace		0.5				89	
0609	Lights:								
	Headlights	Test	0.1						
		Replace		0.5				89	
	Turn Signal Lights	Test	0.1						
		Replace		0.5				89	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
06	**ELECTRICAL SYSTEM - Continued**								
	Taillights	Test	0.1						
		Replace		0.5				89	
	Floodlights	Test	0.1						
		Replace		0.5				89	
0610	Sending Units and Warning Switches	Replace		0.5				75,89,96	
0612	Batteries, Storage:								
	Batteries	Inspect	0.2						
		Test		0.5				12,75	
		Service		0.5				75,89	A
		Replace		0.5				75,89	
	Battery Boxes	Replace		0.5				89	
		Repair		0.5				89	D
	Battery Cables	Replace		0.3				89	
0613	Hull or Chassis Wiring Harness:								
	Small Harness (Lights etc.)	Test		1.0				75,89	
		Replace		0.5	2.5			74,75,89	
		Repair		1.0				75,89	
07	**TRANSMISSION**								
0705	Transmission Shifting Components	Adjust		0.5				89	
		Replace		1.5				75,89,96	
0710	Transmission Assembly and Associated Parts:								
	Transmission Assembly	Inspect	0.2						
		Test		0.2					
		Service		0.5				75,89	A
		Replace			8.0			37,74,89	
		Repair			3.0	29.0		16,17,18, 56,62,74, 89,93	
0714	Servo Unit:								
	Control Valve Assembly	Test			0.5			74,89	
		Replace			1.0			66,74	
0719	Transfer Shaft, Engine-to-Transmission	Replace			2.0			37,74,89	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
07	**TRANSMISSION - Continued**								
0721	Oil Cooler, Pump, and Filters:								
	Oil Coolers	Replace			1.0			89	
		Repair			1.0			89	D
	Oil Pump	Replace			2.0			37,74,89	
	Oil Filter	Service		0.3				75,89	A
		Replace		0.7				75,89	
10	**FRONT AXLE**								
1000	Front Axle Assembly	Service		0.3					A
		Replace			3.0			9,44,60,65, 71,74,75,84, 89,92	
		Repair			5.0				E
1004	Steering and Leaning	Service	0.4						A
	Wheel:	Replace			3.0			33,36,39,53,64, 74,77,89,100	
		Repair			5.0			33,36,39,53,64, 74,77,89,100	E
	Steering Arm	Adjust			0.3			37,74,84,89,96	
	Assemblies	Replace			5.0			11,37,40,49,57, 61,63,65,73,78, 80,82,84,89,92, 96,100	
		Repair			2.0			11,37,40,49,57, 61,63,65,73,78, 80,82,84,89,92, 96,100	
	Leaning Wheel	Adjust			2.0			74,89	
	Mechanism	Replace			4.0			1,9,45,50,65,66, 71,74,78,82,89, 100	
	Leaning Wheel	Replace		0.5				74,78,89	
	Cylinder	Repair			2.0			23,34,74,89,102	H
11	**REAR AXLE**								
1100	Rear Axle Assembly:	Service		0.3				75,89	A
		Replace			10.0			74,89	
		Repair			2.0	32.0		74,89	I

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
11	**REAR AXLE - Continued**								
	Differential	Service		0.5				75,89	A
		Replace			10.0			74,78,89	
	Differential Lock Control	Service		0.5					A
		Replace			1.0			74,89	
		Repair			1.0			74,89	
1103	Final Drive Assembly	Service		0.5					A
		Replace			18.0			7,17,37,41,51, 55,56,62,66,70, 74,77,78,79,83, 89,90,93,102	
1105	Tandem Drive and Chain Assemblies:								
	Tandem Drive Housing	Service		0.3				75,89	A
		Replace			8.5			66,74,78,89,100	
		Repair			8.0			75,89	D
	Chain Assemblies	Replace			4.5			38,56,66,74,89	
		Repair			3.0			38,56,74,89	
12	**BRAKES**								
1201	Handbrakes:								
	Parking Brake Control Handle	Replace		1.0				89	
	Parking Brake Actuator Assembly	Adjust		0.5				89	
		Replace		1.0				74,89	
		Repair			1.0			58,63,74,81, 89	
1202	Service Brakes	Adjust			0.8			74,89	
		Replace			1.5			17,33,55,56,74, 78,89,96,100	
1206	Mechanical Brake System:								
	Air Brake Pedal and Linkage	Adjust		0.5				89	
		Replace		1.5				89	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
12	**BRAKES - Continued**								
1208	Airbrake System:								
	Brake Control Valve	Replace		0.3				74,89	
	Air Reservoir	Service	0.3						A
		Replace		0.8				89	
		Repair			2.0			89	D
1209	Air Compressor Assembly	Replace			4.0			74,89	
		Repair				2.0		74,89,96	
13	**WHEELS**								
1311	Wheel Assembly (Front)	Replace		1.0				37,75,77,78,84, 89,102	
	Wheel Assembly (Rear)	Replace		1.0				37,75,77,78,84, 89,101	
1313	Tires	Service	0.3						A
		Replace		2.0				75,79,89	
		Repair		1.0				89	
14	**STEERING**								
1410	Hydraulic Pump or Fluid Motor Assembly:								
	Steering Control Pump and Steering Wheel	Replace		1.5				74,89	
		Repair			2.0			74,89,94,96	
	Supplemental Steering Pump and Motor	Replace		4.0				74,89	
1411	Hoses, Lines, and Fittings	Replace		2.0				89	
1412	Hydraulic Cylinder	Replace		0.5				74,89,100	
		Repair			2.0			74,89,101	H
1414	Relief Valve	Test			1.0			74,88,89	
		Replace			0.8			74,89	
		Repair			3.0			32,74,89	H

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
15	**FRAME, TOWING ATTACHMENTS, DRAWBARS, AND ARTICULATION SYSTEMS**								
1501	Frame Assembly:								
	Front Frame Assembly	Repair			3.0			74,89	D
	Frame and Case Assembly, Rear	Repair			3.0			74,89	D
1503	Pintles and Towing Attachments:								
	Articulation Hitch	Service	0.2	0.5				89	A
		Repair			2.0			2,3,4,5, 46,59,60,65, 68,74,89,91, 96	
18	**BODY, CAB, HOOD, AND HULL**								
1801	Body, Cab, Hood, and Hull Assemblies:								
	Hood Assemblies	Replace		1.0				75,78,89	
	ROPS/Cab Assembly	Replace		4.0				75,78,89	
	(Types I & II)	Repair		2.0				75,78,89	
	ROPS/Cab Assembly	Replace			8.0			75,78,89	
	(CCE)	Repair			4.0			75,78,89	
	Seat Assembly	Replace		0.8				89	
	Seat Belt	Inspect	0.2						
		Replace		0.3				89	
1808	Toolboxes	Replace		0.3				89	
21	**BUMPERS, GUARDS, AND MARINE FENDERS**								
	Bumper	Replace			1.0			78,89	
22	**BODY, CHASSIS AND HULL ACCESSORY ITEMS**								
2202	Accessory Items:								
	Windshield Wiper	Replace		1.0				75,89	
	Assembly	Repair		2.0				75,89	D

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
22	**BODY, CHASSIS AND HULL ACCESSORY ITEMS - Continued**								
	Defroster Fans	Replace		1.0				89	
		Repair		1.0				89	
	Heater Assembly	Replace		1.5				89	
		Repair		1.5				89	
	Data Plates and Decals	Replace		0.2				30,89	
24	**HYDRAULIC AND FLUID SYSTEMS**								
2401	Hydraulic Pump Assembly:	Test			0.4				
		Service		0.3				89	
		Replace			2.5			74,78,89,96	
		Repair			3.0			13,43,52,69,74, 89,94,96	E
	Circle Drive Motor	Replace		1.0				89	
		Repair			3.0			74,89,96	
2402	Pilot Check and Pressure Control Valve Assemblies	Adjust			1.0				
		Replace			3.0			74,89	
		Repair			2.5			74,89,94,96	E
2403	Hydraulic Control Levers and Linkage	Adjust		1.5				89	
		Replace		2.0				89	
2406	Strainers, Filters, Lines, and Fittings, Etc.:	Inspect	0.2						
		Replace		2.0				74,89	
	Oil Cooler Assembly	Replace		2.0				74,89	
2407	Hydraulic Cylinders	Replace		1.5				74,78,89,100	
		Repair			3.0			74,89,101	H
2408	Hydraulic Tank and Mounting Assembly	Inspect	0.2						
		Service		0.2				75,89	A
		Replace			2.0			74,78,89,96	
		Repair			2.0			74,89,96	
47	**GAUGES (NON-ELECTRICAL)**								
	Gauges: Pressure, Temperature, and Articulation Indicator	Replace		0.5				89	

Table 1. Maintenance Allocation Chart (MAC) for the 130G Series Grader - 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		
74	**CRANES, SHOVELS, AND EARTHMOVING EQUIPMENT COMPONENTS**								
7435	Moldboard Assembly:	Inspect	0.2						
		Service		0.3					A
		Replace		3.0				17,78,89	
		Repair			2.0			74,89	D
	Cutting Edges	Inspect	0.1						
		Replace		2.0				75,89	
	End Bits	Inspect	0.1						
		Replace		1.5				75,89	
7436	Moldboard Lift Arms and Pivot Assembly	Service	0.3	0.3					A
		Replace			2.4			4,6,22,23, 48,61,65,72, 74,78,89,92	
		Repair			3.0			10,47,60,74, 86,89,91	
7438	Circle and Drawbar Assembly:								
	Drawbar Assembly	Service	0.3						A
		Replace			2.4			74,78,89,101	
		Repair			3.4			74,89	
	Circle Turn Assembly	Inspect	0.1						
		Service		0.3				75,89	A
		Replace			2.0			74,77,78,84,89, 101	
		Repair			3.0			74,78,89,100	
7439	Centershift Lock Assembly	Replace		1.0				89	
		Repair			1.5			89	
7440	Scarifier Assembly	Inspect	0.1						
		Service	0.3						A
		Replace		2.0				74,78,89	
		Repair		3.0				74,78,89	

Table 2. Tools and Test Equipment Requirements for the 130G Series Grader .

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) ITEM NAME	(4) NATIONAL STOCK NUMBER	(5) PART NUMBER/ CAGEC
1	F	Adapter, Bearing Remover	5120-01-300-4502	1P1832 (11083)
2	F	Adapter, Mechanical Puller	5120-00-357-5181	8B7555 (11083)
3	F	Adapter, Mechanical Puller	5120-01-286-8431	1P1838 (11083)
4	F	Adapter, Mechanical Puller	5120-01-286-8432	1P1837 (11083)
5	F	Adapter, Mechanical Puller	5120-01-288-2717	5P4184 (11083)
6	F	Adapter, Mechanical Puller	5120-01-286-8435	1P1835 (11083)
7	F	Adapter, Mechanical Puller	5120-00-316-9172	8B7556 (11083)
8	F	Adapter, Nozzle	5120-01-345-4526	FT1533 (11083)
9	F	Adapter, Puller	5120-01-286-8433	1P1833 (11083)
10	F	Adapter, Puller	5120-01-286-8434	1P1834 (11083)
11	F	Adapter, Puller	5120-01-295-3618	5F7340 (11083)
12	O	Analyzer Set, Engine	4910-00-124-2554	2389409 (16331)
13	F	Block		FT1017 (11083)
14	F	Bolt, Machine		0S1602 (11083)
15	F	Bracket, Lifting	5340-01-336-2459	FT0120 (11083)
16	O	Bracket, Link	5120-01-451-1401	1387575 (11083)
17	O	Bracket, Link	5340-01-476-1734	1387574 (11083)
18	F	Bracket, Link	4940-01-268-2201	1387573 (11083)
19	F	Bushing Driver, Valve	5120-01-030-1625	7S8858 (11083)
20	F	Compressor, Valve Spring	5120-00-314-6138	5S1330 (11083)
21	O	Driver Bit, T-15 TORX		1943532 (11083)
22	F	Driver Set, Bushing	5120-01-030-1626	1P0510 (11083)
23	F	Expander Assembly	5120-00-489-8167	4S9181 (11083)
24	O	Extractor, Tool	2520-01-201-4146	5R7047 (11083)
25	F	Extractor, Valve Group	4910-01-296-3862	1667441 (11083)
26	F	Gage, Profile	5220-01-296-4296	6V7058 (11083)
27	F	Gage, Profile	5220-01-296-4297	6V7068 (11083)

Table 2. Tools and Test Equipment Requirements for the 130G Series Grader - Continued.

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) ITEM NAME	(4) NATIONAL STOCK NUMBER	(5) PART NUMBER/ CAGEC
28	F	Gear, Engine Turning	4910-01-137-0662	5P7305 & 5P7306 (11083)
29	O	Guard, Safety, Tire Inflation	4910-00-025-0623	64E33077 (80049)
30	O	Heater, Gun-Type, Electric	4940-01-028-7493	EP-5UL (59164)
31	F	Housing, Gear Shaft	5120-01-119-1747	5P7306 (11083)
32	F	Indicator, Dial	5210-01-354-9255	6V3075 (11083)
33	F	Inserter, Seal	5120-01-122-6012	1U8698 (11083)
34	F	Inserter, Seal	5120-01-288-2777	5P2980 (11083)
35	O	Installer Tool, Seal		5H4845 (11083)
36	F	Jack Group		5P2968 (11083)
37	O	Jack, Dolly Type, Hydraulic: 10-ton capacity	4910-00-289-7233	93660 (36251)
38	F	Leg		7S7786 (11083)
39	F	Leg		4S5415 (11083)
40	F	Leg, Mechanical Puller	5120-01-345-5328	1H3109 (11083)
41	F	Leg, Puller	5120-01-275-9480	8B7549 (11083)
42	F	Leveler, Load	3950-01-263-9513	6V3145 (11083)
43	F	Maintenance Fixture, Automotive	4910-01-286-8364	2P5573 (11083)
44	F	Nut		1P544 (11083)
45	F	Nut		5P0637 (11083)
46	F	Nut, Plain, Hexagon	5310-00-404-3787	7H7539 (11083)
47	F	Nut, Fastener	5310-01-483-6594	1P-0544 (11083)
48	F	Nut		5S7351 (11083)
49	F	Nut, Plain, Hexagon	5310-00-656-6973	5F7351 (11083)
50	F	Nut, Plain, Round	5310-01-480-6692	1P-0543 (11083)
51	F	Pin	5315-01-270-2832	8S7615 (11083)
52	F	Plate, Protective	5120-01-288-242	5P975 (11083)
53	F	Plate, Step		8B7560 (11083)
54	F	Puller		FT0530 (11083)
55	F	Puller Attachment, Bearing	5120-00-288-6756	8B7551 (11083)

Table 2. Tools and Test Equipment Requirements for the 130G Series Grader - Continued.

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) ITEM NAME	(4) NATIONAL STOCK NUMBER	(5) PART NUMBER/ CAGEC
56	F	Puller Attachment, Cup	5120-00-293-1430	8B7554 (11083)
57	F	Puller Attachment, Mechanical	5120-00-288-6756	8B7551 (11083)
58	F	Puller Group, Nozzle	2910-01-250-1608	6V6980 (11083)
59	F	Puller, Hydraulic	5130-01-294-0717	6V3170 (11083)
60	F	Puller, Hydraulic	5130-01-296-4277	6V3175 (11083)
61	F	Puller, Hydraulic	5130-00-363-6680	6V3160 (11083)
62	F	Puller, Mechanical	5120-00-633-5085	GGG-P-781 (11083)
63	F	Puller, Mechanical	5120-00-633-5074	939 (45225)
64	F	Puller, Mechanical	5120-00-600-3306	1P2322 (11083)
65	F	Pump, Hydraulic Ram, Hand Driven	4320-00-374-1403	4C4865 (11083)
66	F	Ratchet Assembly	5120-01-275-2286	8S9906 (11083)
67	O	Removing Tool, Scarifier Tooth	3805-00-423-9746	6B3260 (11083)
68	F	Ring Installer		2P5498 (11083)
69	F	Rod, Guide		FT1016 (11083)
70	F	Saddle	2510-01-264-8424	8S8048 (11083)
71	F	Screw		8S6586 (11083)
72	F	Screw		8S6585 (11083)
73	F	Screw, Machine	5305-01-295-3554	5F7366 (11083)
74	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	SC4910-95CLA31 (19204) (LIN: W32593)
75	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1, Less Power	4910-00-754-0654	SC 4910-95CLA74 (19204) (LIN: W32593)
76	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2, Less Power	4910-00-754-0650	SC4910-95CLA72 (19204)
77	O	Shop Equipment, Contact Maintenance: Truck Mounted	4940-00-294-9518	MILS45854 (81349)
78	O	Sling	2835-01-078-2081	4-8FTX2IN (91796)
79	F	Socket, Spanner	5120-01-288-2545	5P4204 (11083)

Table 2. Tools and Test Equipment Requirements for the 130G Series Grader - Continued.

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) ITEM NAME	(4) NATIONAL STOCK NUMBER	(5) PART NUMBER/ CAGEC
80	F	Spacer		L-1774 (11083)
81	F	Spacer, Puller Screw	5120-00-423-8162	0T0774 (11083)
82	F	Spacer, Sleeve	5365-01-288-2658	5P4197 (11083)
83	F	Stand, Lifting and B	5120-01-134-8085	4C6486 (11083)
84	O	Stand, Maintenance, Automotive Axle: 24,000 lb capacity, height range 19–29-1/2 in.	4910-01-480-0147	1778A (45225)
85	F	Stand, Maintenance, Automotive Engine	4910-01-117-4344	1750A (45225)
86	F	Stud, Plain	5307-01-485-7432	4C-9634 (11083)
87	F	Tester Group, Nozzle	4320-01-263-9716	5P4150 (11083)
88	F	Tester, Spring Resiliency	6635-01-124-1771	8S2263 (11083)
89	O	Tool Kit, General Mechanic's: Automotive	5180-01-454-3787	12B470000 (59678)
90	F	Tool, Special	4910-01-265-0428	8S7611 (11083)
91	F	Washer, Flat	5310-01-526-7006	3H-0467 (11083)
92	F	Washer	5310-01-485-7439	5F7353 (11083)
93	F	Wrench, Ratchet	5120-01-350-5274	8H684 (11083)
94	F	Wrench, Torque: 3/8 in. drive, 0-150 lb-in.	5120-00-230-6380	TQ12B (55719)
95	O	Wrench, Torque: 3/8 in. drive, 0-200 lb-in.	5120-00-853-4538	
96	O	Wrench, Torque, 3/8 in. drive, 0-75 lb-ft	5120-00-554-7292	GGG-W-00686 (81348)
97	O	Wrench, Torque, 3/8 in. drive, 5-75 lb-ft	5120-01-355-1734	
98	F	Wrench, Torque: 1/2 in. drive, 0-300 lb-in.	5120-00-247-2563	
99	O	Wrench, Torque: 1/2 in. drive, 50-250 lb-ft	5120-01-399-5604	TVW250 (76377)
100	F	Wrench, Torque: 1/2 in. drive, 50-250 lb-ft	5120-01-042-0982	
101	O	Wrench, Torque: 3/4 in. drive, 0-600 lb-ft	5120-01-113-9564	7379 (45225)
102	O	Wrench, Torque: 3/4 in. drive, 120-600 lb-ft	5120-01-399-5605	TWZ600 (76377)

Table 3. Remarks for the 130G Series Grader.

(1) REFERENCE CODE	(2) REMARKS
A	Preventive Maintenance Checks and Services (PMCS)
B	Limited Field Repair Authorized (Seals, Gaskets, Bearings, Plugs, and Cylinder Head)
C	Limited Field Repair Authorized (Seals, Gaskets, Injectors, Springs, and Valves)
D	Limited Field Repair Authorized (Replacement of Broken or Missing Parts and/or Minor Welding)
E	Limited Field Repair Authorized (Seals, Gaskets, and Bearings)
F	Limited Field Repair Authorized (Seals, Gaskets, Bearings, and Brushes)
G	Limited Field Repair Authorized (Seals, Gaskets, Bearings, Brushes, and Starter Gear)
H	Limited Field Repair Authorized (Seals, Gaskets, Wipers, and Rings)
I	Limited Field Repair Authorized (Seals, Gaskets, and Missing/Broken Parts)
J	Refer to TM 9-2610-200-14

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST 0349 00

SCOPE

This work package lists expendable and durable items you will need to maintain the 130G Grader. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, *Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items)*, or CTA 8-100, *Army Medical Department Expendable/Durable Items*.

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item [e.g., Use antifreeze (Item 5, WP 0349 00)].
2. **Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.

   C - Operator/Crew

   O - Unit Maintenance

   F - Direct Support Maintenance
3. **Column (3) - National Stock Number.** This is the National Stock Number assigned to the item which you can use to requisition it.
4. **Column (4) - Description, CAGEC, and Part Number.** This provides the other information you need to identify the item.
5. **Column (5) - Unit of Measure (U/M).** This column shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED 0349 00

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1	O	8040-01-023-4173	ADHESIVE (1A9T3) EC-1300	PT
2	O		ADHESIVE (81348) MMM-A-1617	
		8040-00-262-9025	4 Ounce Tube	TU
		8040-00-262-9026	1/2 Pint Can	CN
3	O		ADHESIVE: PVC (25472) A541B	
		8040-00-573-1502	1 Pint Can	
4	O	8040-01-250-3969	ADHESIVE: Type 2 (05972) 242	BT
5	C		ANTIFREEZE: Permanent, Ethylene Glycol, Inhibited (58536) AA52624-1-A	
		6850-01-441-3218	1 Gallon Can	CN
		6850-01-441-3223	55 Gallon Drum	DR
6	O		ANTISEIZE COMPOUND (05972) 76764	
		8030-00-251-3980	1 Pound Tube or Can	TU or CN
7	O	5340-00-450-5718	CAP SET, PROTECTIVE, DUST AND MOISTURE (19207) 10935405	EA
8	C		CLEANING COMPOUND: Solvent, Type III (81349) MIL-PRF-680	
		6850-01-474-2318	1 Gallon Can	CN
		6850-01-474-2320	5 Gallon Can	CN
		6850-01-474-2321	55 Gallon Drum	DR
9	O		CLOTH: Abrasive, Emery, Fine (80204) ANSI B74.18	
		5350-00-584-4654	50 Sheet Package	PG
10	O		COMPOUND, RETAINING MIL-R-46082A	
11	C		DETERGENT: General Purpose, Liquid (83421) 7930-00-282-9699	
		7930-00-282-9699	1 Gallon Can	CN

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED **0349 00**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
12	O		FLUX: Soldering (58536) A-A-51145TY FORM A	
		3439-00-255-9935	1 Pound Can	CN
13	C		FUEL: Diesel, DF-1 Grade, Winter (81346) ASTM D 975	
		9140-00-286-5286	Bulk	GL
		9140-00-286-5287	5 Gallon Can	CN
		9140-00-286-5288	55 Gallon Drum	DR
14	C		FUEL: Diesel, DF-2 Grade (81346) ASTM D 975	
		9140-00-286-52	Bulk	GL
		9140-00-286-52	5 Gallon Can	CN
		9140-00-286-52	55 Gallon Drum	DR
15	C		FUEL, TURBINE: Aviation (81349) MILT83133 GR JP8	
		9130-01-031-5816	Bulk	GL
16	O		GASKET CEMENT (11083) 5H2471	
		8040-01-038-5043	8 Ounce Can	CN
17	C		GREASE: Automotive and Artillery, GAA	
		9150-01-197-7688	(81349) M-10924-A 2-1/4 Ounce Tube	TU
		9150-01-197-7690	(81349) M-10924-C 1-3/4 Pound Can (81349)	CN
		9150-01-197-7692	(81349) M-10924-E 35 Pound Pail	CN
		9150-01-197-7693	(81349) M-10924-B 14 Ounce Cartridge	CA
18	O	9150-01-361-8919	GREASE, ELECTRICALLY CONDUCTIVE (53711) 5190179	OZ
19	O		INSULATING SLEEVING, ELECTRICAL (11530) 08-196485-06	
		5970-00-815-1295	250 Foot Spool	FT

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED **0349 00**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
20	O		INSULATING VARNISH, ELECTRICAL (75037) 1602	
		5970-00-476-6717	13 Ounce Aerosol Can	CN
21			LUBRICANT: Rubber (11083) 5P-3975	
			1 Gallon Can	CN
22			LUBRICANT, THREAD (11083) 2P2506	
23	O		LUBRICATING OIL, GEAR: GO 75 (81349) MIL-PRF-2105	
		9150-01-035-5390	1 Quart Can	CN
		9150-01-035-5391	5 Gallon Can	CN
24	O		LUBRICATING OIL, GEAR: GO 80/90 (81349) MIL-PRF-2105	
		9150-01-035-5392	1 Quart Can	CN
		9150-00-001-9395	5 Gallon Can	CN
		9150-01-035-5394	55 Gallon Drum	DR
25	O		LUBRICATING OIL: Molybdenum Disulfide, Silicone (81349) DOD-L-25681	
		9150-00-543-7220	1 Pound Can	CN
26	C		OIL, LUBRICATING: OEA, Arctic (81349) MIL-L-46167	
		9150-00-402-4478	1 Quart Can	CN
		9150-00-402-2372	5 Gallon Can	CN
		9150-00-491-7197	55 Gallon Drum	DR
27	C		OIL, LUBRICATING: OE/HDO-10 (81349) MIL-PRF-2104	
		9150-00-189-6727	1 Quart Can	CN
		9150-00-186-6668	5 Gallon Can	CN
		9150-00-191-2772	55 Gallon Drum	DR
28		9150-00-247-0481	OIL, LUBRICATING: OE/HDO-10/30 (2R128) BRAYCO413J	QT
29	C		OIL, LUBRICATING: OE/HDO-30 (81349) MIL-PRF-2104	
		9150-00-186-6681	1 Quart Can	CN
		9150-00-188-9858	5 Gallon Can	CN

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED **0349 00**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
30	C		OIL, LUBRICATING: OE/HDO-15/40 (81349) MIL-PRF-2104	
		9150-01-152-4117	1 Quart Can	CN
		9150-01-152-4118	5 Gallon Can	CN
		9150-01-152-4119	55 Gallon Drum	DR
31	F	5350-00-619-9167	PAPER, ABRASIVE: 80 Grit, 9x11 Sheets (80204) ANSI B74.18	PG
32	O	9150-00-905-1387	PENETRATING OIL: AEROKROIL (13868)	
			10 Ounce Can, Pressurized	CN
33			PETROLATUM, TECHNICAL (81348) VV-P-236	
		9150-00-250-0933	7.5 Pound Can	CN
34	O		PIGMENT, PAINT PRODUCTS: Prussian Blue (58536) AA3108-2A-001Q	
		8010-00-664-1414	1 Quart Can	CN
35			RAG, WIPING (80244) 7920-00-205-1711	
		7290-00-205-1711	50 Pound Bale	BL
36	O		ROPE	
37	O		SANDPAPER: No. 00	
38			SEALING COMPOUND (05972) 26241	
		8030-01-142-3131	250 CC Bottle	BT
39	O, F		SEALING COMPOUND MIL-S-22473	
40	O	6920-01-239-1562	SEALANT, THREAD: 11784488 (19200)	TV
41	F		SILICONE COMPOUND (19207) 12273204	
		6850-00-927-9461	5 Ounce Tube	TU
42	O		SOLDER: Lead-Tin Alloy, Rosin Core (81346) SN60WRP2 0.032 1LB	
		3439-00-555-4629	1 Pound Spool	LB

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
43			STRAP, TIEDOWN, ELECTRICAL COMPONENTS	
		5975-00-903-2284	4 Inch Length, Black, Package of 100 (96906) MS3367-4-0	HD
		5975-00-984-6582	6 Inch Length, Black, Package of 100 (96906) MS3367-1-0	HD
		5975-00-935-5946	13.35 Inch Minimum Length, Brown (96906) MS3367-2-1	EA
44			TAG, MARKER (64067) 9905-00-537-8954	
		9905-00-537-8954	Bundle of 50	BD
45			TAPE, DUCT 2 Inches Wide (39482) 1791K70	
		5640-00-103-2254	60 Yard Roll	RL
46			WIRE, NONELECTRICAL (81346) ASTM A641	
		9905-00-596-0191	283 Foot Coil	CL

END OF WORK PACKAGE

ILLUSTRATED LIST OF MANUFACTURED ITEMS 0350 00

INTRODUCTION

1. This work package includes complete instructions for making items authorized to be manufactured by maintenance personnel.
2. An index, in alphabetical order by nomenclature, is provided for cross-referencing the item to be manufactured to the Figure number and page number where manufacturing instructions are located. Refer to Table 1 below.
3. Manufacture from steel or aluminum stock to specifications on the illustrations.
4. All dimensions on illustrations are in standard units.

Table 1. Manufactured Items Cross-Reference Index.

NOMENCLATURE	FIGURE NUMBER	PAGE NUMBER
Adapter Tool	Figure 1	0325 00-1
Interference Block	Figure 2	0325 00-2

MANUFACTURING INSTRUCTIONS

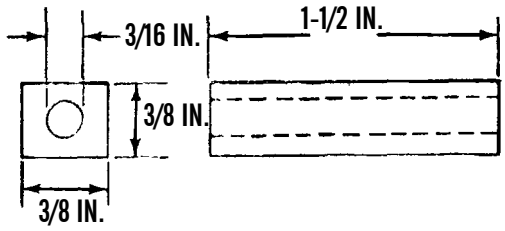


Figure 1. Adapter Tool.

MANUFACTURING INSTRUCTIONS - CONTINUED

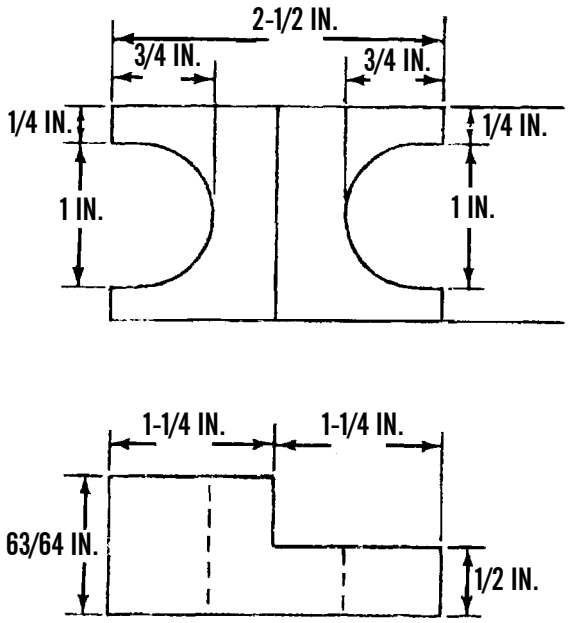


Figure 2. Interference Block.

END OF WORK PACKAGE

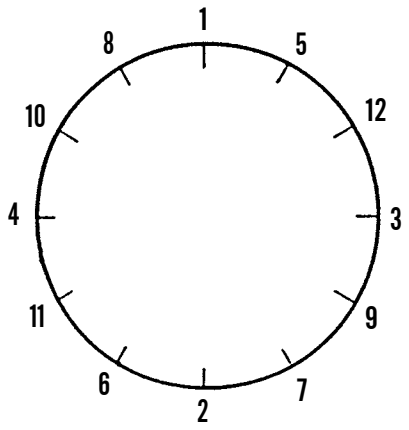
TORQUE LIMITS 0351 00

SCOPE

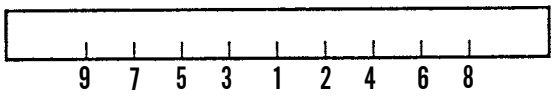
This work package lists standard torque values and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

GENERAL

1. Always use torque values listed in Tables 1 and 2 when a maintenance procedure does not give a specific torque value.
   a. Table 1 provides torque limits for SAE standard fasteners.
   b. Table 2 provides torque limits for metric fasteners.
2. Unless otherwise indicated, standard torque tolerance shall be ± 10%.
3. Torque values listed are based on clean, dry threads. Reduce torque by 10% when engine oil is used as a lubricant. Reduce torque by 20% if new plated capscrews are used.
4. If the maintenance procedures do not specify a tightening order, use the following guides:
   a. Unless otherwise specified, lubricate threads of fasteners with oil (OE/HDO-10 or OEA-30).
   b. When tightening fasteners above 30 lb-ft (41 Nm), use the torque pattern but only tighten to 70% of final value (multiply final value by 0.7). Repeat pattern until final value is reached.
   c. Tighten circular patterns using circular torque pattern and tighten straight patterns using straight torque pattern.



CIRCLULAR TORQUE PATTERN



STRAIGHT TORQUE PATTERN

CAUTION

If replacement capscrews are of higher grade than originally supplied, use torque specifications for the original. This will prevent equipment damage due to overtorquing.

Table 1. Torque Limits - SAE Standard Fasteners.

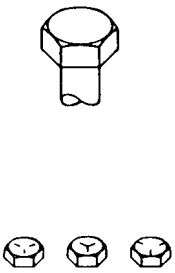
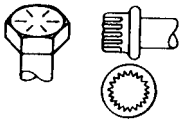
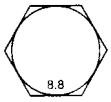
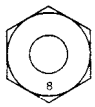
Current Usage	Much Used	Much Used	Used at Times	Used at Times
QUALITY OF MATERIAL	**INDETERMINATE**	**MINIMUM COMMERCIAL**	**MEDIUM COMMERCIAL**	**BEST COMMERCIAL**
SAE Grade Number	1 or 2	5	6 or 7	8
Cap Screw Head Markings Manufacturer's marks may vary These are all SAE Grade 5 (3 line)				
CAP SCREW BODY SIZE IN. - THREAD	**TORQUE LB-FT (NM)**	**TORQUE LB-FT (NM)**	**TORQUE LB-FT (NM)**	**TORQUE LB-FT (NM)**
1/4 20	5 (7)	8 (11)	10 (14)	12 (16)
28	6 (8)	10 (14)		14 (19)
5/16 18	11 (15)	17 (23)	19 (26)	24 (33)
24	13 (18)	19 (26)		27 (37)
3/8 16	18 (24)	31 (42)	34 (46)	44 (60)
24	20 (27)	35 (47)		49 (66)
7/16 14	28 (38)	49 (66)	55 (75)	70 (95)
20	30 (41)	55 (75)		78 (106)
1/2 13	39 (53)	75 (102)	85 (115)	105 (142)
20	41 (56)	85 (115)		120 (163)
9/16 12	51 (69)	110 (149)	120 (163)	155 (210)
18	55 (75)	120 (163)		170 (231)
5/8 11	83 (113)	150 (203)	167 (226)	210 (285)
18	95 (129)	170 (231)		240 (325)
3/4 10	105 (142)	270 (366)	280 (380)	375 (508)
16	115 (156)	295 (400)		420 (569)
7/8 9	160 (217)	395 (536)	440 (597)	605 (820)
14	175 (237)	435 (590)		675 (915)
1 8	235 (319)	590 (800)	660 (895)	910 (1234)
14	250 (339)	660 (895)		990 (1342)

Table 2. Torque Limits - Metric Fasteners.

Torque values for metric thread fasteners with lubricated* or plated threads†				
Thread Diameter-Pitch	 **Class 8.8 Bolt**	 **Class 8 Nut**	 **Class 10.9 Bolt**	 **Class 10 Nut**
	Torque: lb-ft (Nm)		**Torque: lb-ft (Nm)**	
M6 M8 M8 x 1	5 (7) 12 (16) 13 (18)		7 (9) 17 (23) 18 (24)	
M10 M10 x 1.25	24 (33) 27 (37)		34 (46) 38 (52)	
M12 M12 x 1.5	42 (57) 43 (58)		60 (81) 62 (84)	
M14 M14 x 1.5	66 (89) 72 (98)		95 (129) 103 (140)	
M16 M16 x 1.5	103 (140) 110 (149)		148 (201) 157 (213)	
M18 M18 x 1.5	147 (199) 165 (224)		203 (275) 229 (310)	
M20 M20 x 1.5	208 (282) 213 (313)		288 (390) 320 (434)	
M22 M22 x 1.5	283 (384) 315 (427)		392 (531) 431 (584)	
M24 M24 x 2	360 (488) 392 (531)		498 (675) 542 (735)	
M27 M27 x 2	527 (715) 569 (771)		729 (988) 788 (1068)	
M30 M30 x 2	715 (969) 792 (1074)		990 (1342) 1096 (1486)	

* All plated and unplated fasteners should be coated with oil before installation.

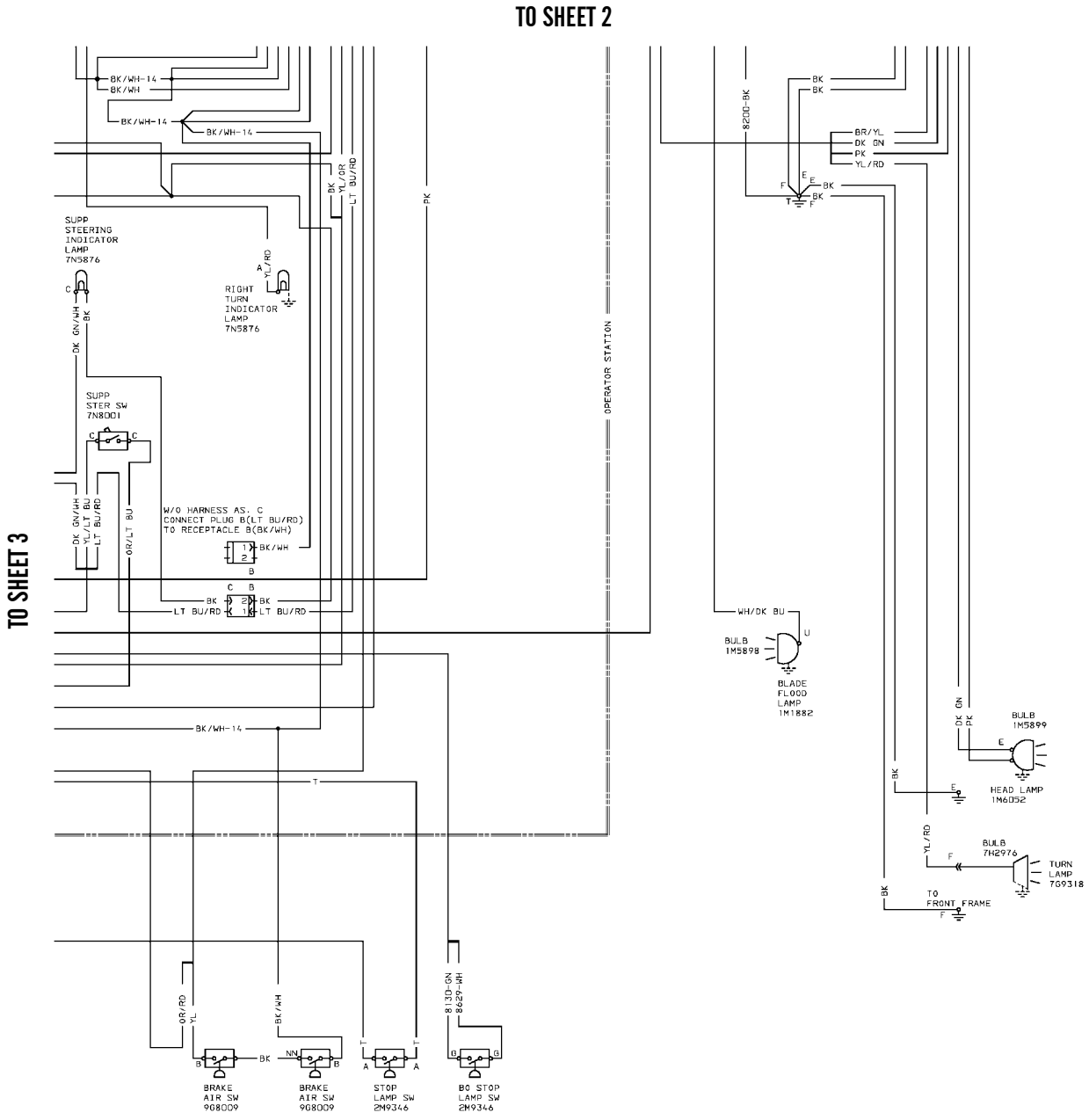
† Use these torque values if either the bolt or nut is lubricated or plated (zinc-phosphate conversion-coated, cadmium-plated, or waxed).

END OF WORK PACKAGE

SCHEMATIC DIAGRAMS 0352 00

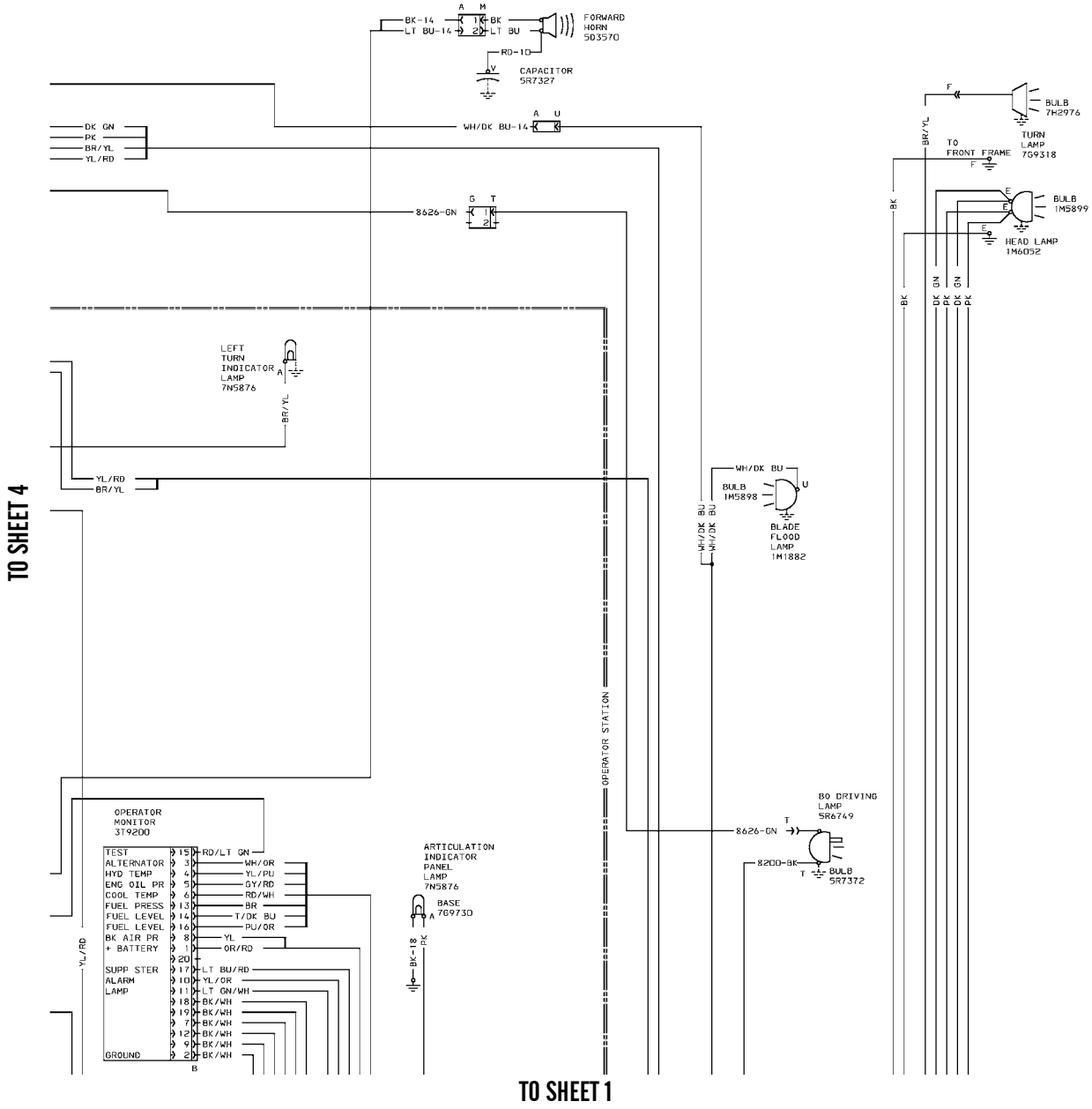
INTRODUCTION

1. This work package contains schematic diagrams for the 130G Series Grader.
2. The following schematic diagrams are included in this work package:



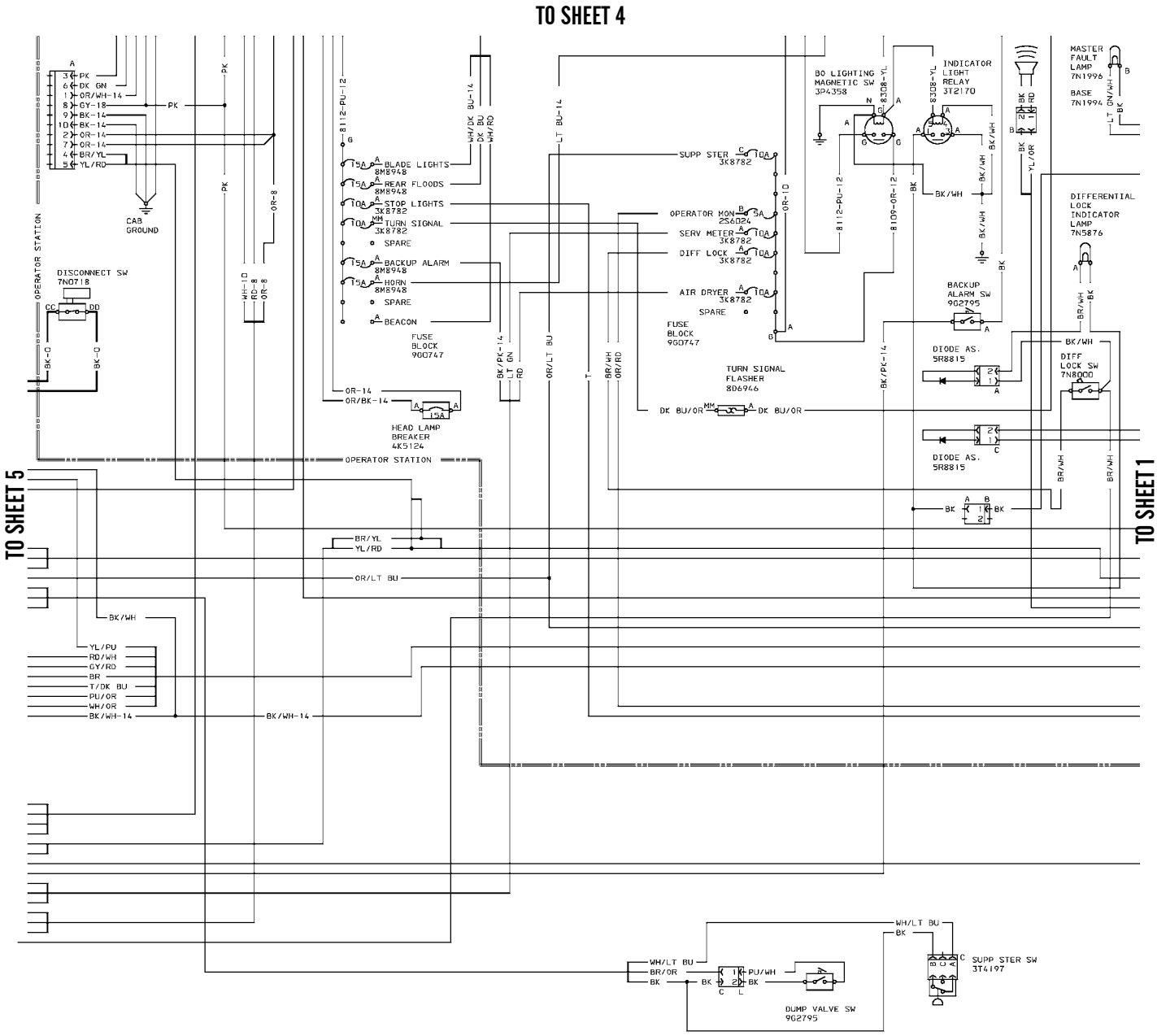
397-4365

Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 1 of 6).



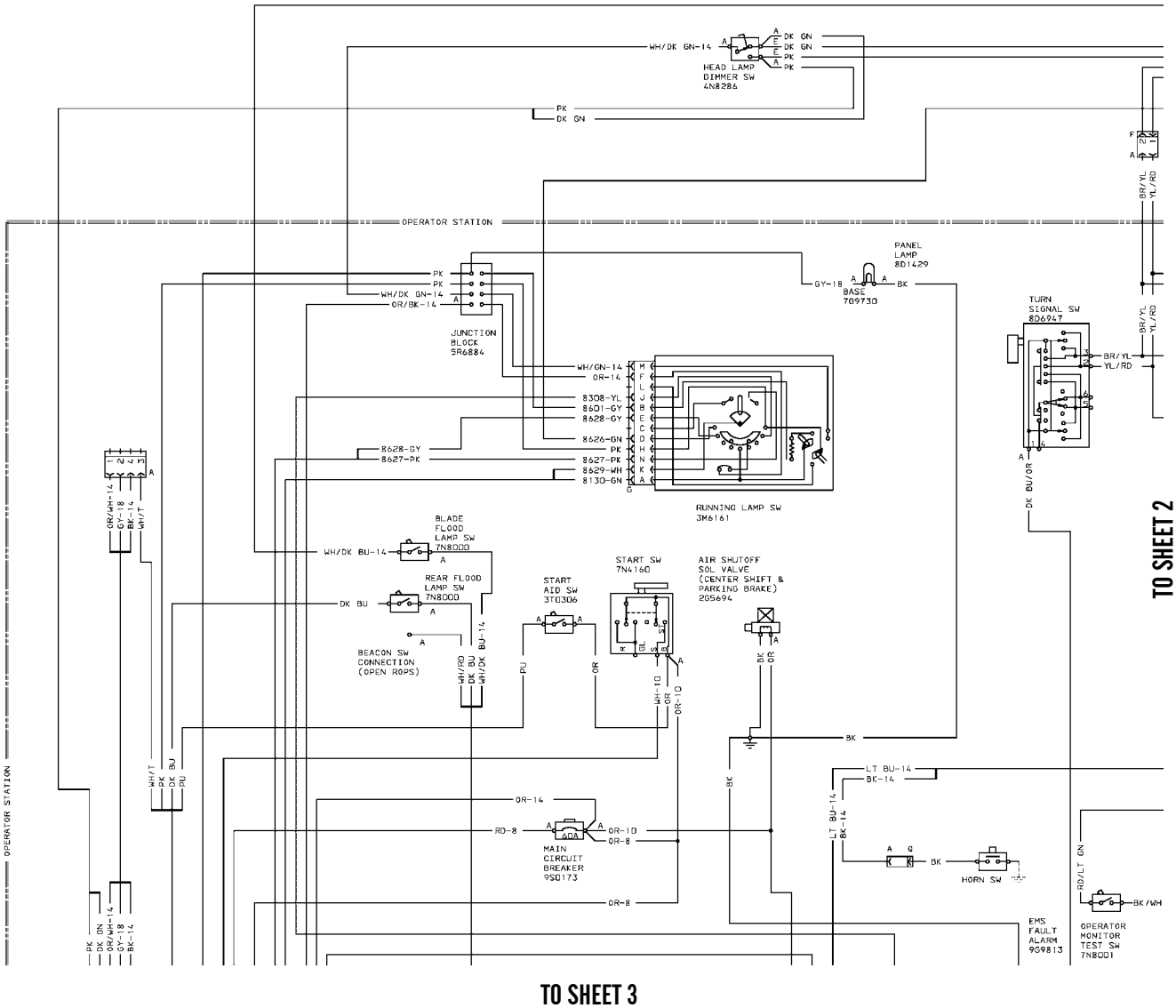
397-4366

Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 2 of 6).



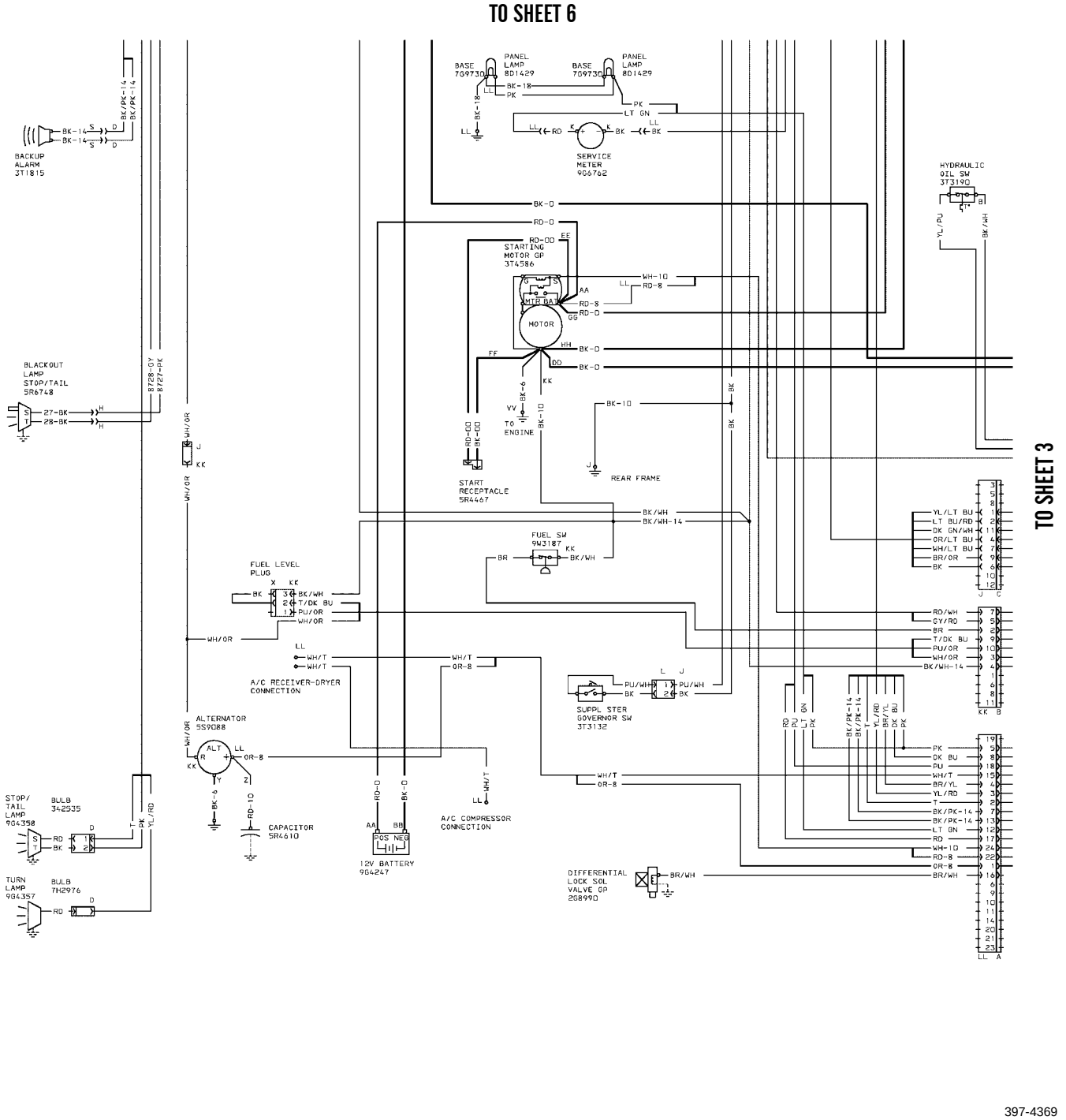
397-4367

Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 3 of 6).



397-4368

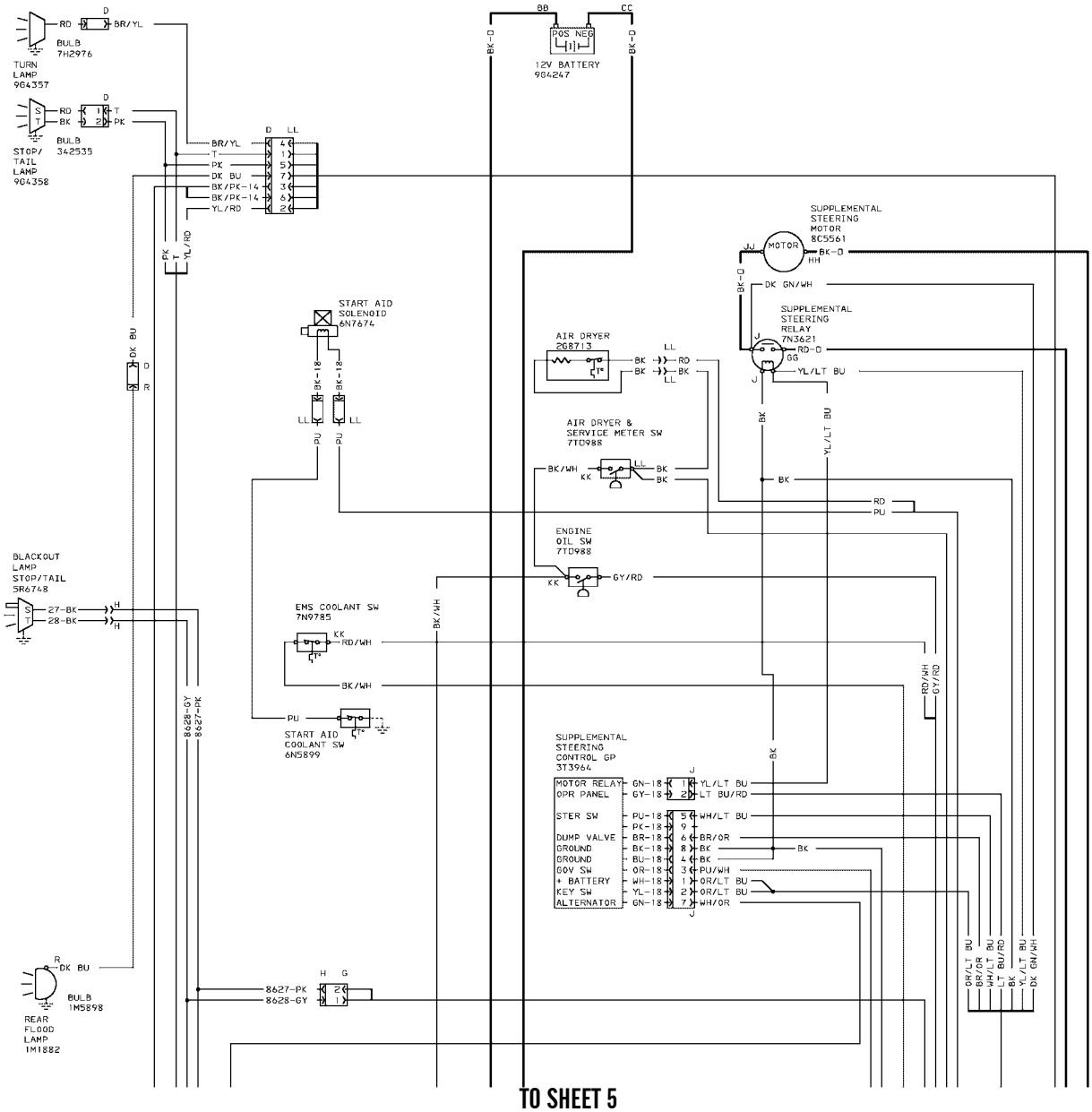
Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 4 of 6).



397-4369

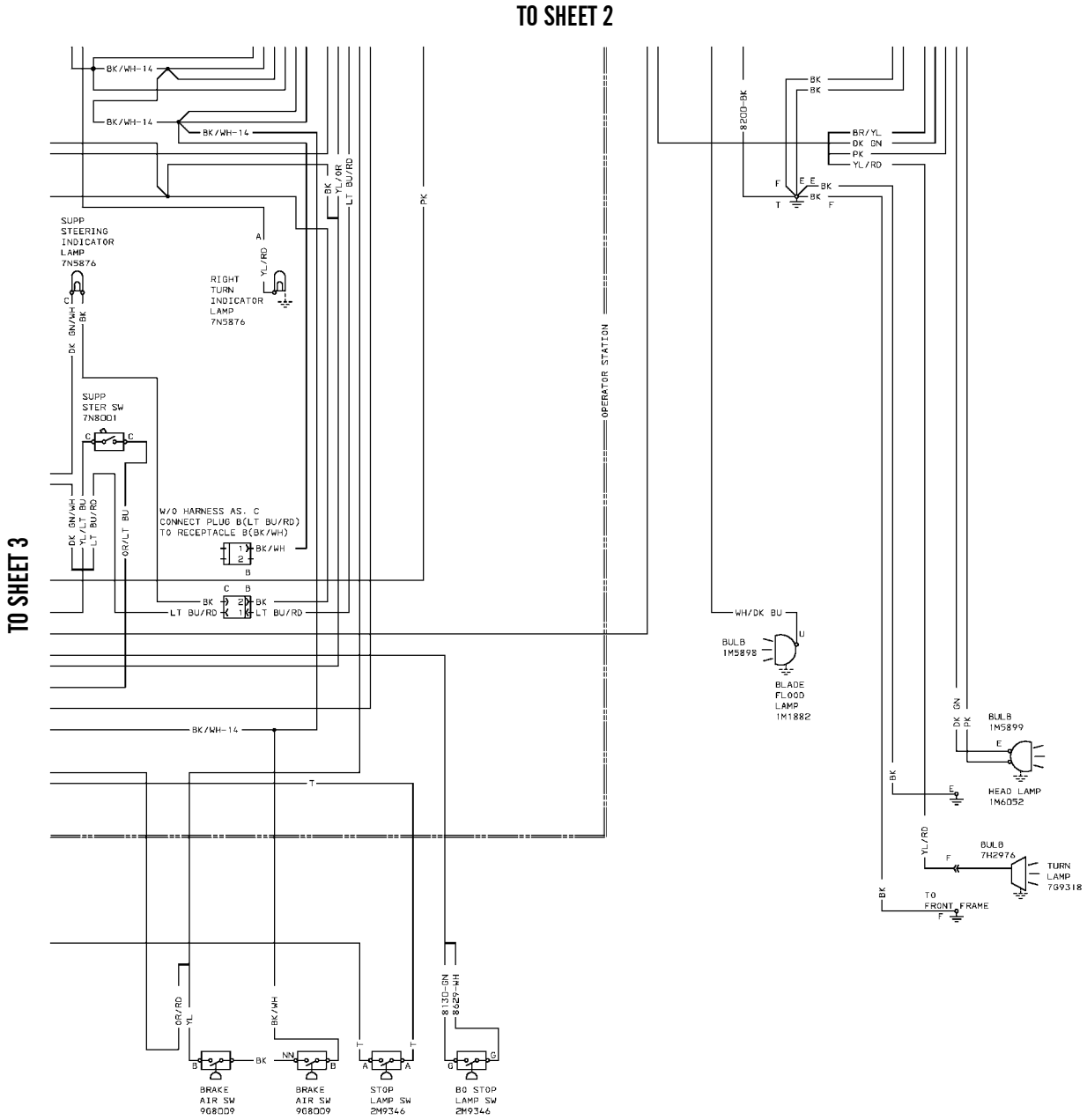
Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 5 of 6).

SCHEMATIC DIAGRAMS - CONTINUED 0352 00



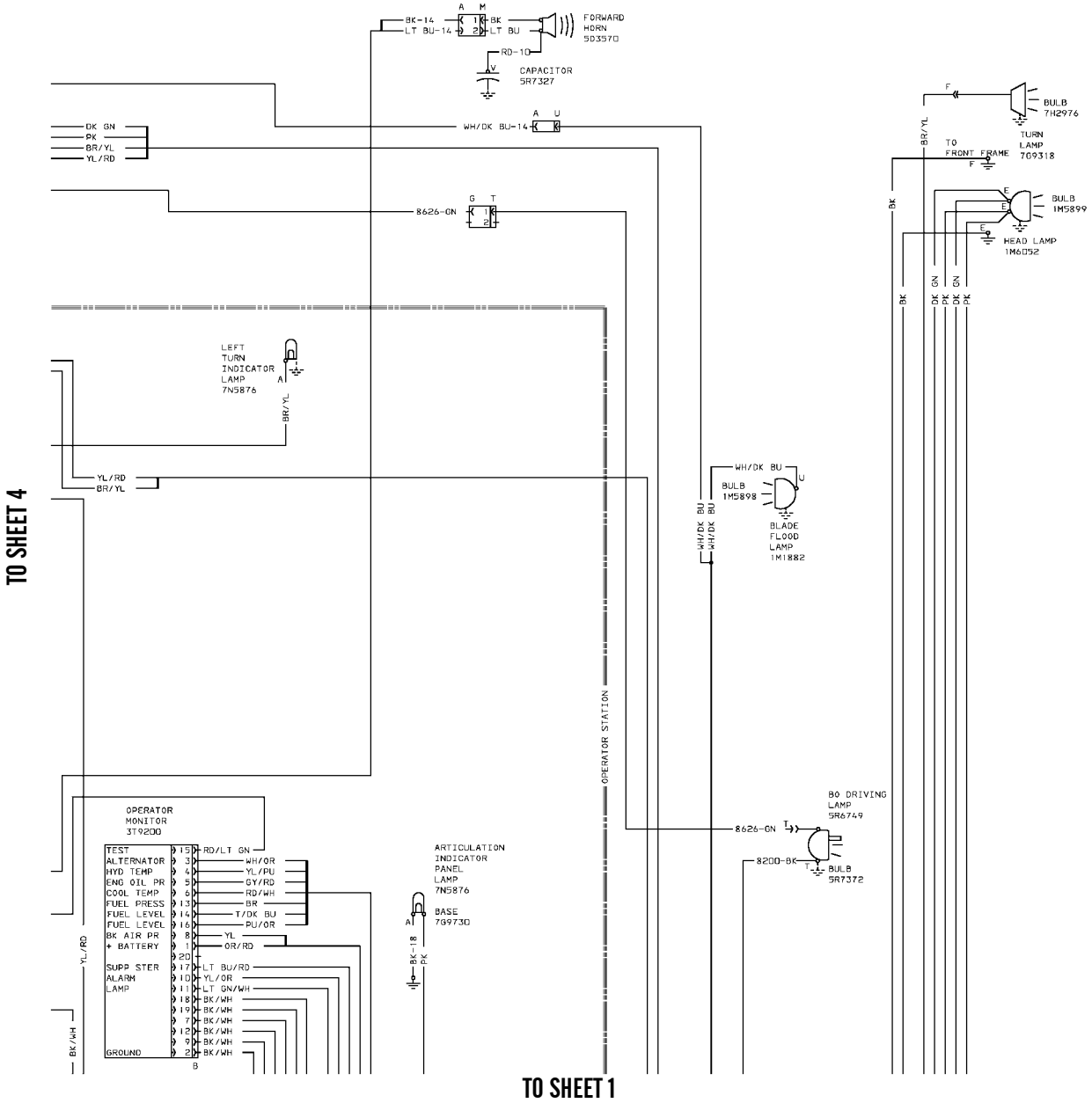
397-4370

Figure 1. 130GNS and 130GNSCE Electrical Schematic (Sheet 6 of 6).



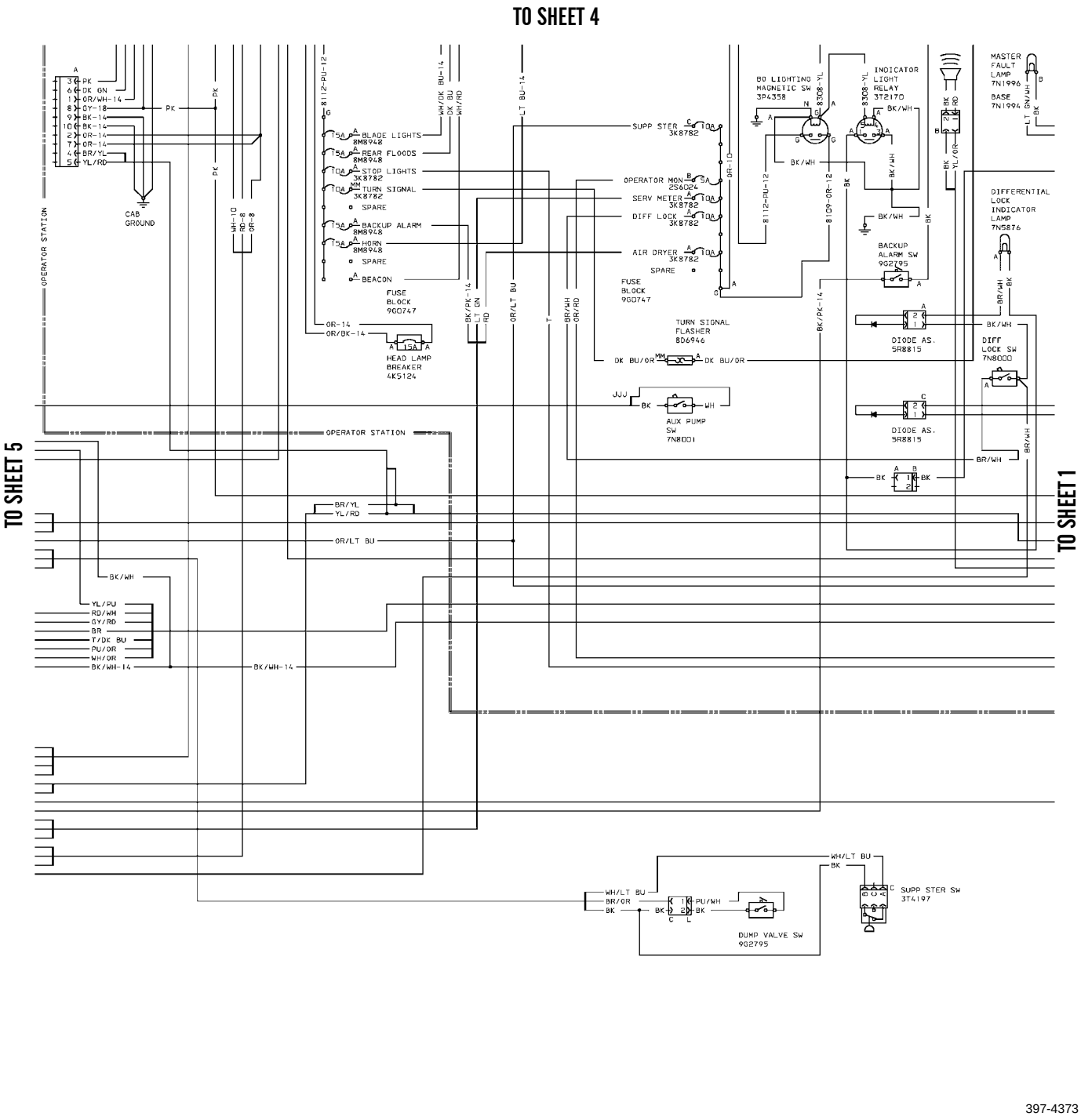
397-4371

Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 1 of 6).



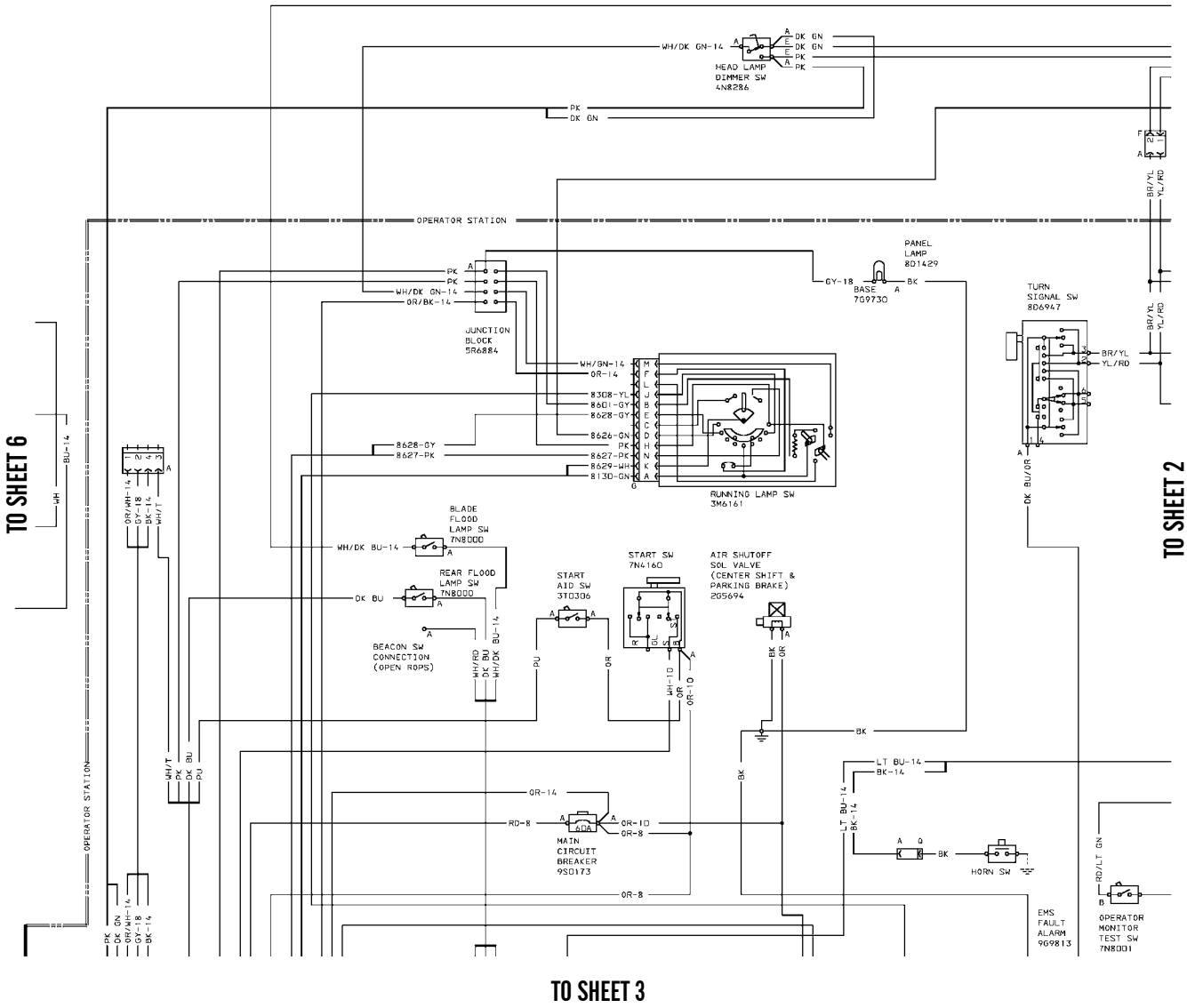
397-4372

Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 2 of 6).



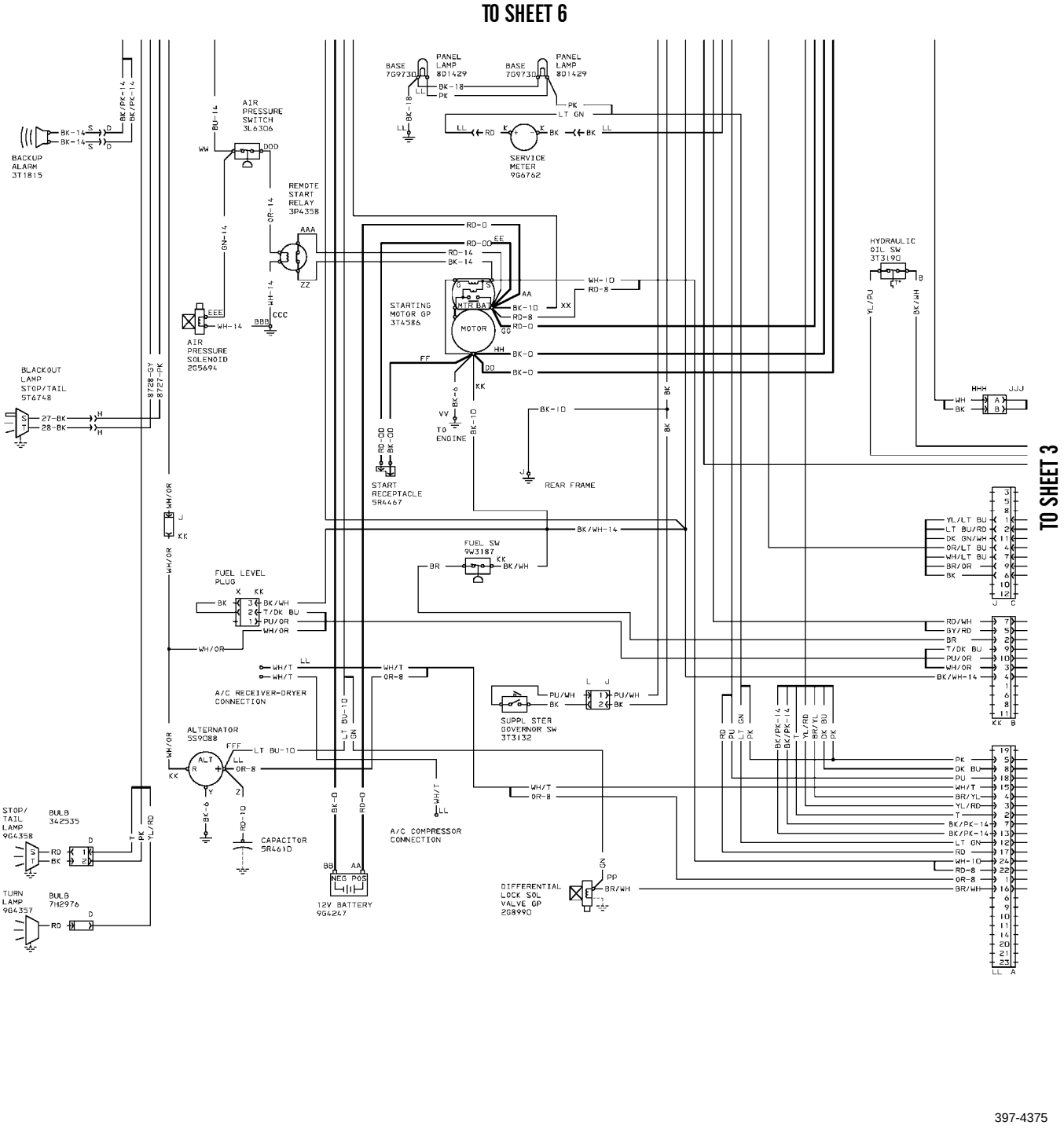
397-4373

Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 3 of 6).



397-4374

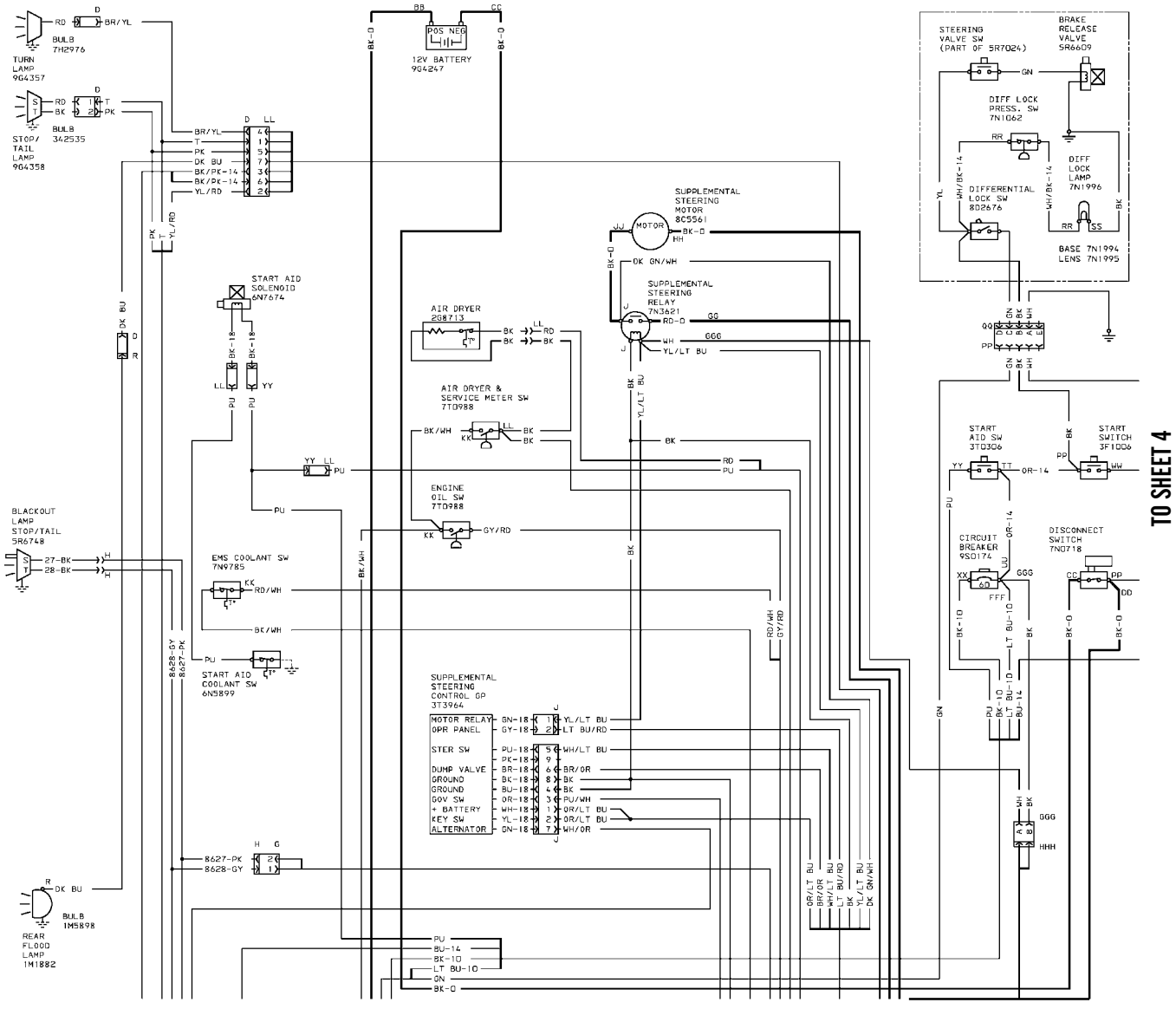
Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 4 of 6).



397-4375

Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 5 of 6).

SCHEMATIC DIAGRAMS - CONTINUED 0352 00



397-4376

Figure 2. 130GS and 130GSCE Electrical Schematic (Sheet 6 of 6).

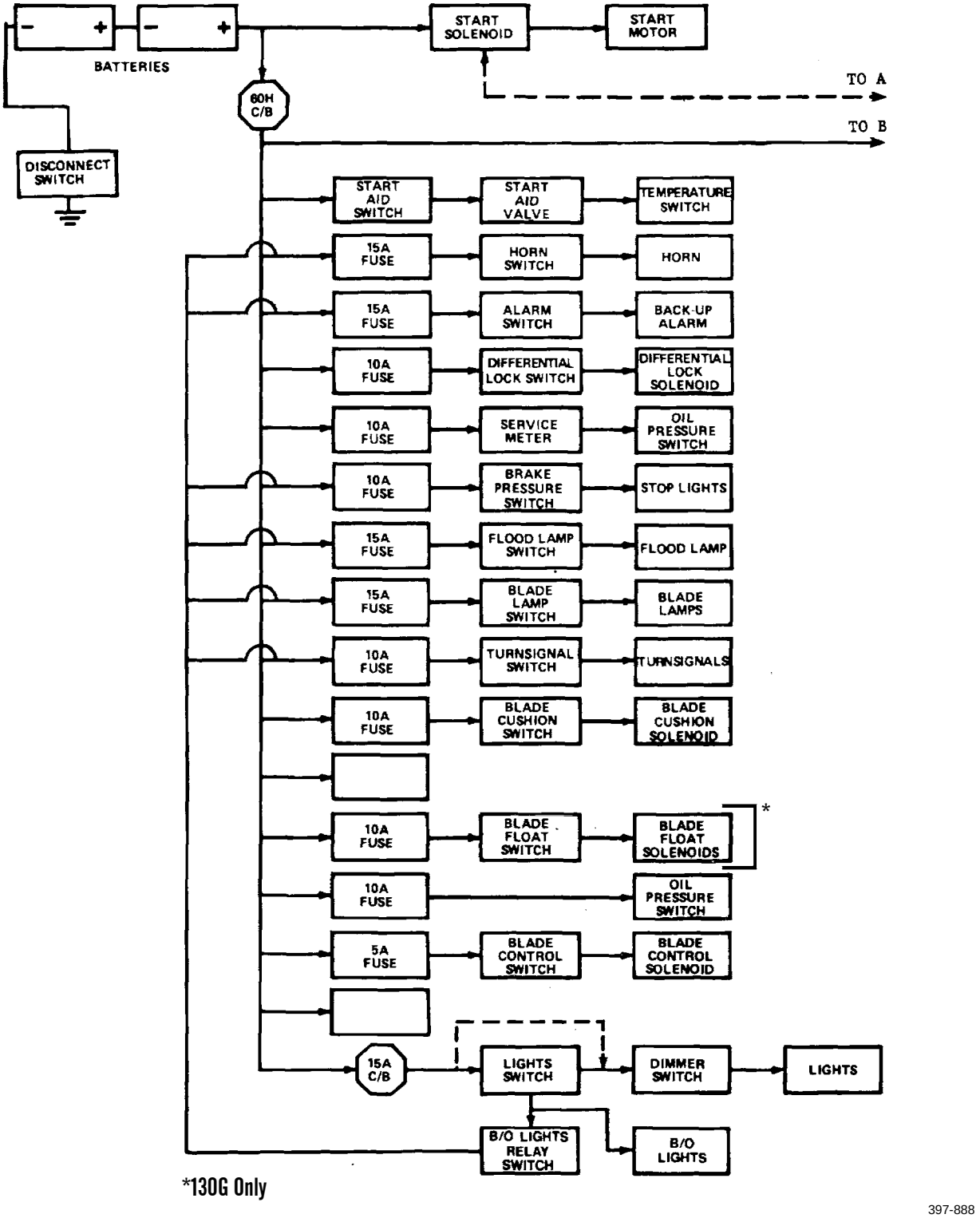


Figure 3. Fuse and Switch Logic Schematic (Sheet 1 of 2).

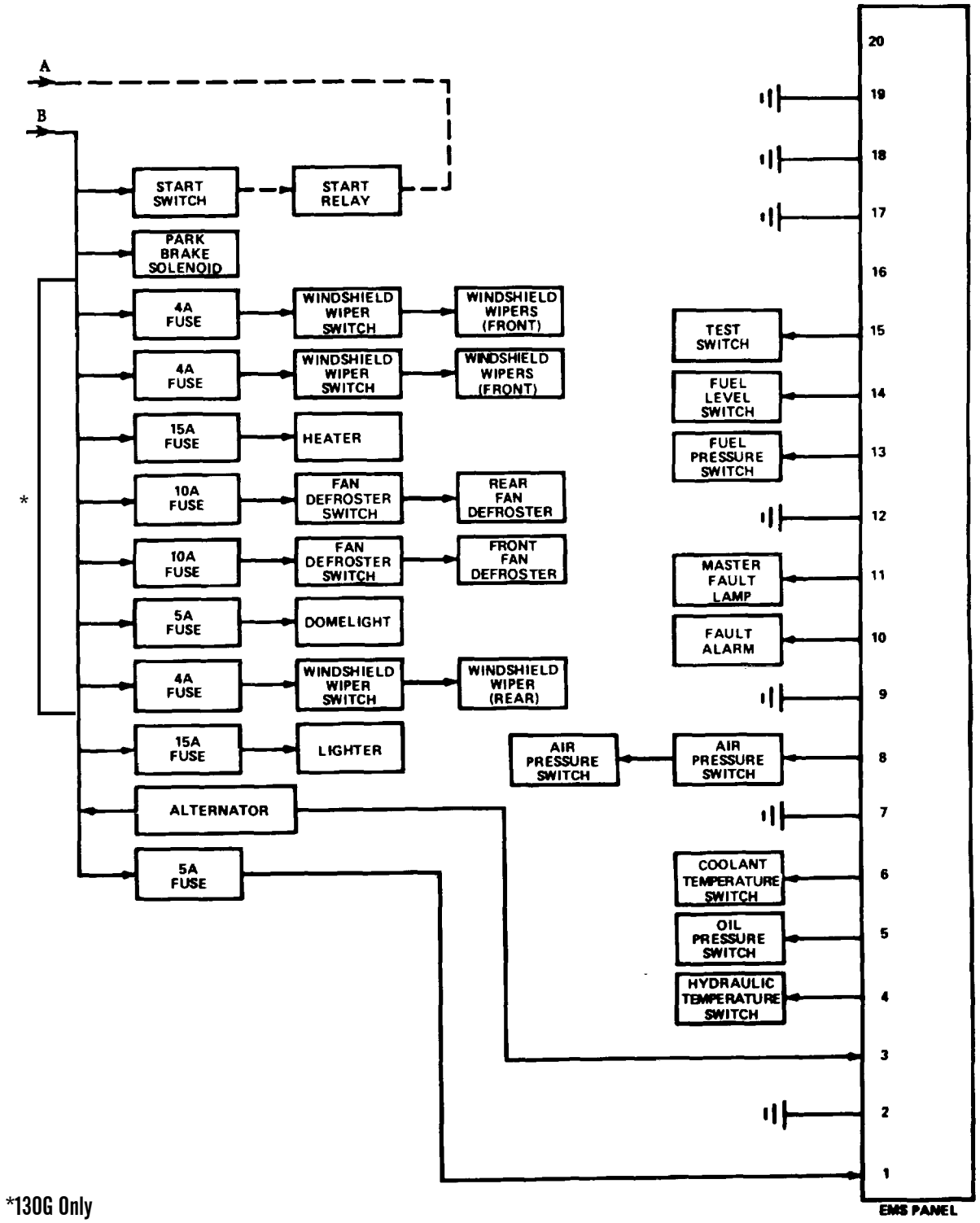
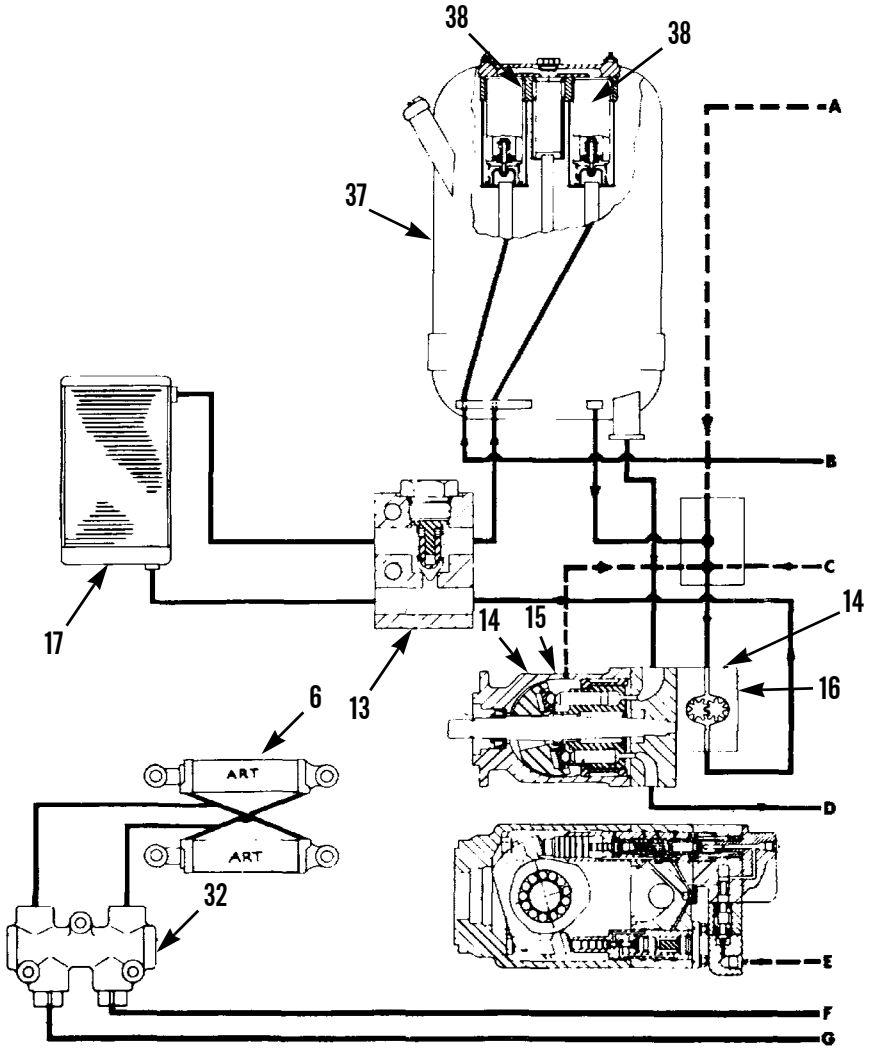


Figure 3. Fuse and Switch Logic Schematic (Sheet 2 of 2).

LEGEND

1. Cylinder for leaning wheel
2. Cylinder for center shift
3. Cylinders for blade lift
4. Cylinder for blade side shift
5. Cylinder for blade tip
6. Cylinders for articulation
7. Cylinder for steering (L.H.)
8. Cylinder for steering (R.H.)
9. Metering pump for steering
10. Combination valve
11. Relief and reducing valve
12. Unloading valve
13. Relief valve for cooler
14. Implement pump
15. Variable displacement pump
16. Pump for cooling
17. Cooler
18. Control valve group
19. Control valve group
20. Valve for articulation
21. Valve for center shift
22. Valve for wheel lean
23. Hydraulic pump relief valve
24. Valve for scarifier
26. Valve for blade tip
27. Valve for circle drive
28. Valve for blade side shift
31. Lock check valve
32. Lock check valve
33. Lock check valve
34. Relief valves for steering
35. Hydraulic motor for circle drive
37. Hydraulic tank
38. Filters
39. Swivel
41. Lock check valve
45. Cylinder for scarifier
46. Lock check valve (with relief)
47. Pilot valve (solenoid operated)
48. Lock check valves (pilot operated)
49. Supplemental steering



397-890

Figure 4. Hydraulic System Schematic (Sheet 1 of 5).

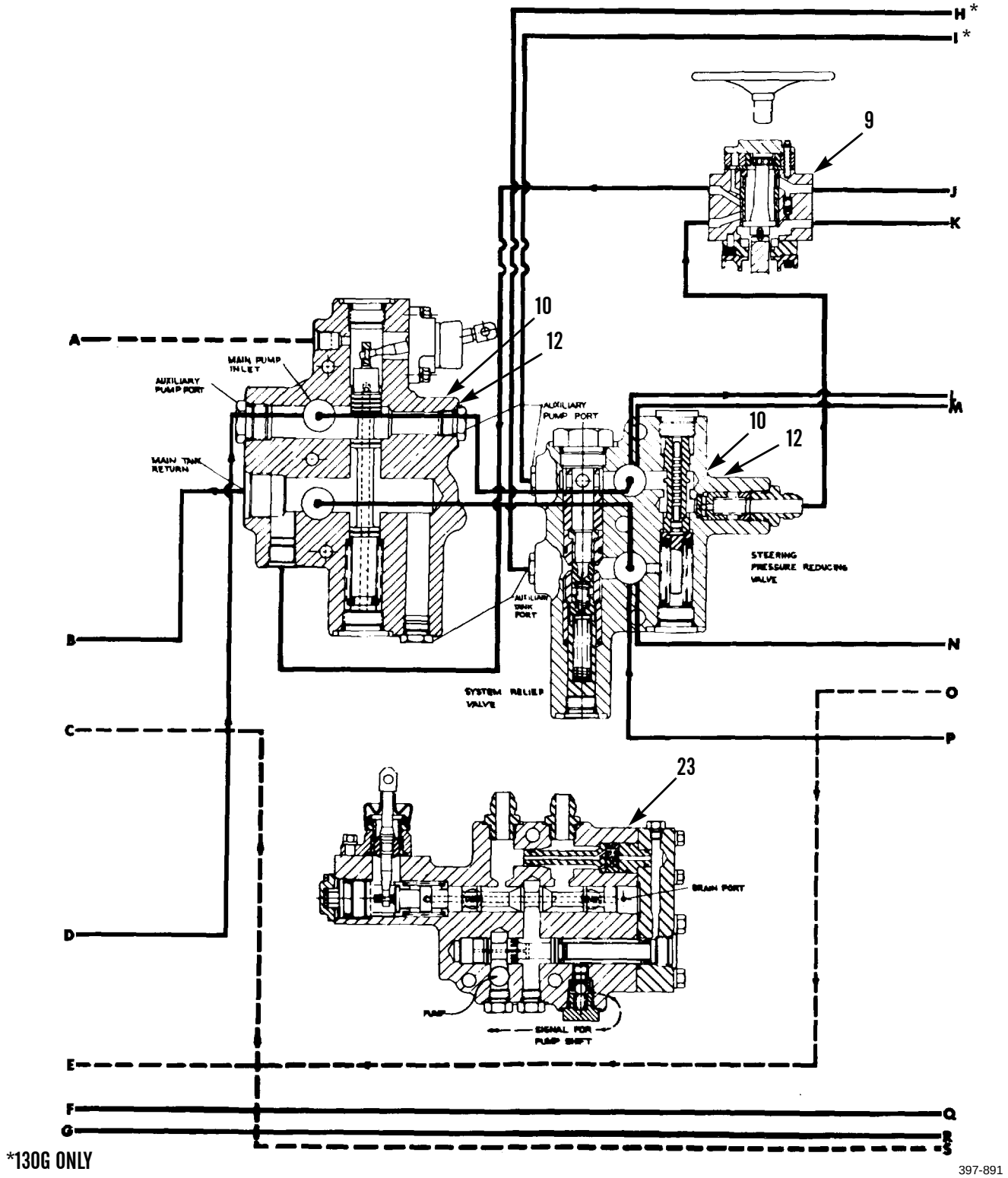


Figure 4. Hydraulic System Schematic (Sheet 2 of 5).

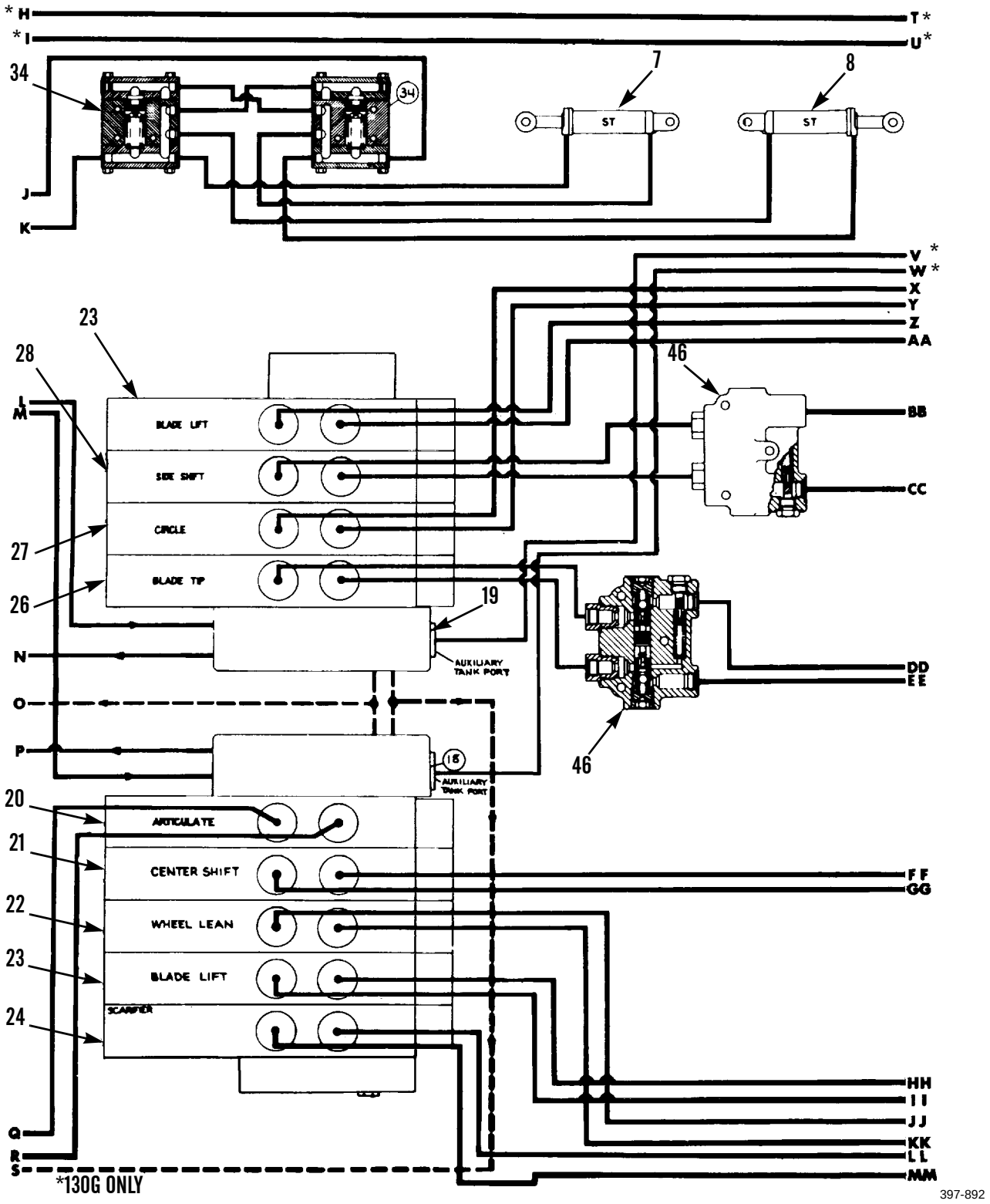


Figure 4. Hydraulic System Schematic (Sheet 3 of 5).

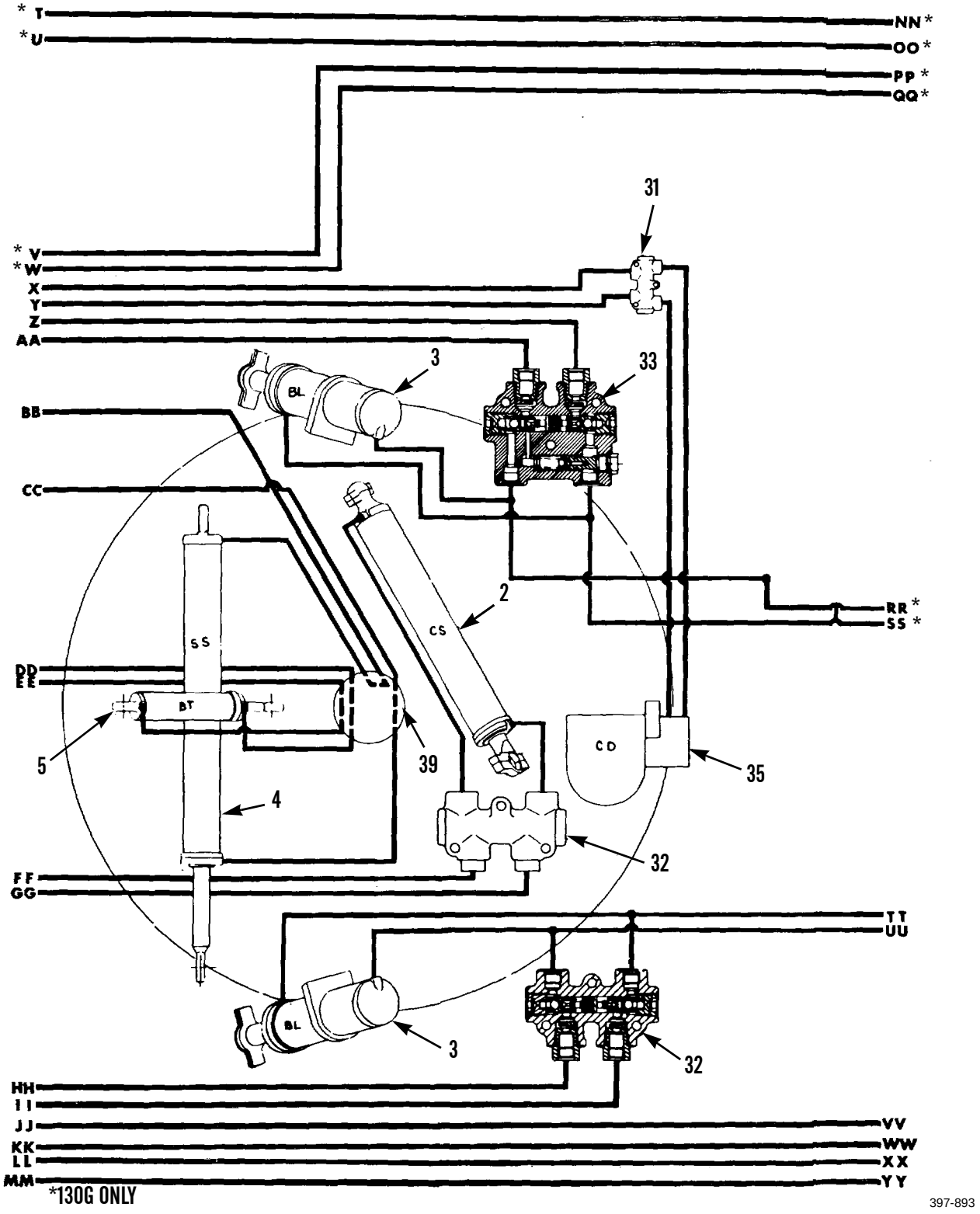


Figure 4. Hydraulic System Schematic (Sheet 4 of 5).

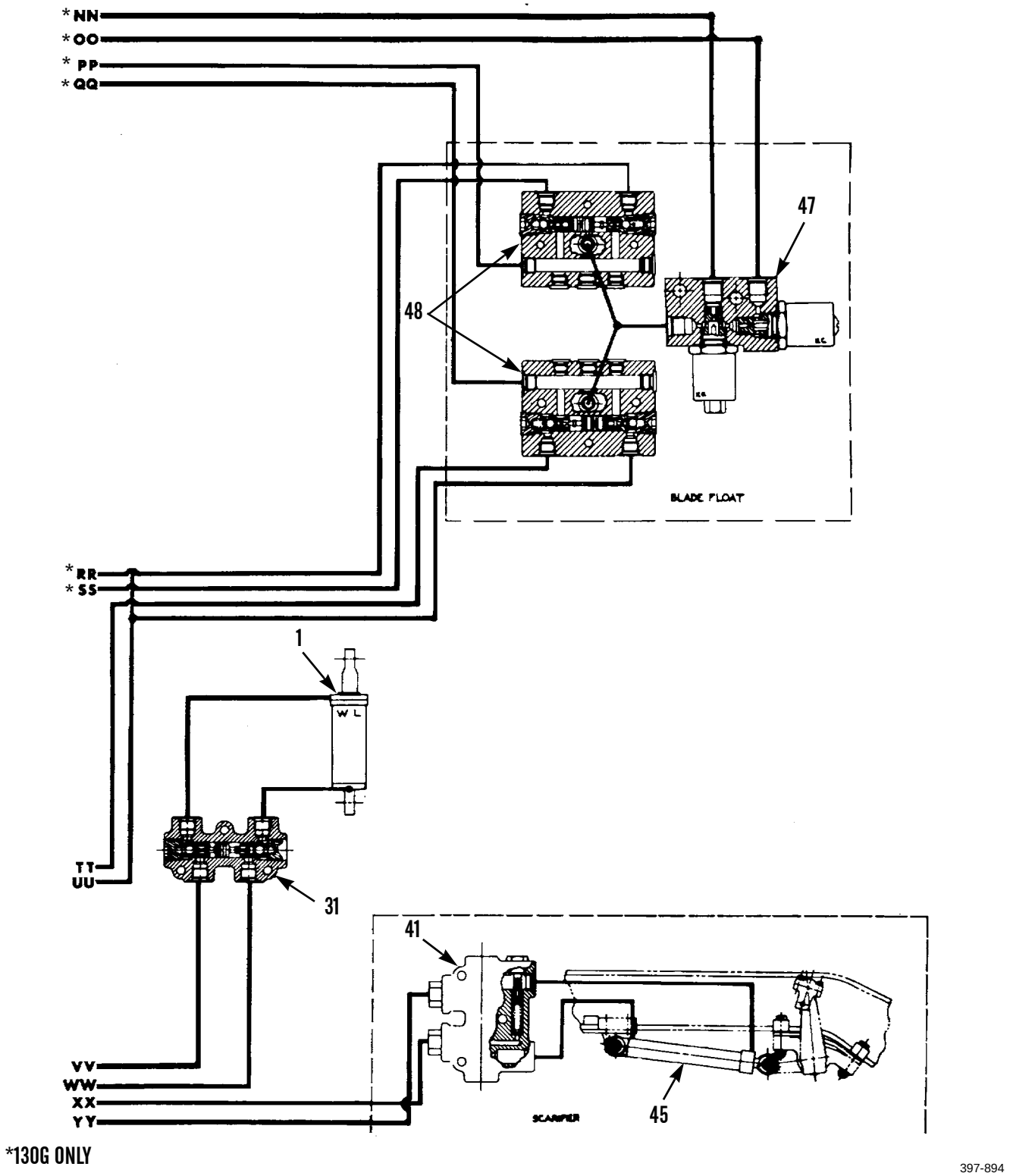


Figure 4. Hydraulic System Schematic (Sheet 5 of 5).

LEGEND

1. Steering wheel
2. Crossover relief valve
3. Crossover relief valve
4. Plug
5. Oil return line to tank
6. Steering metering pump
7. Plug
8. Shims
9. Shims
10. Oil supply line from pump
11. Left steering cylinder
12. Right steering cylinder
13. Oil return line to tank
14. Shims
15. Steering pressure reducing valve
16. Plug

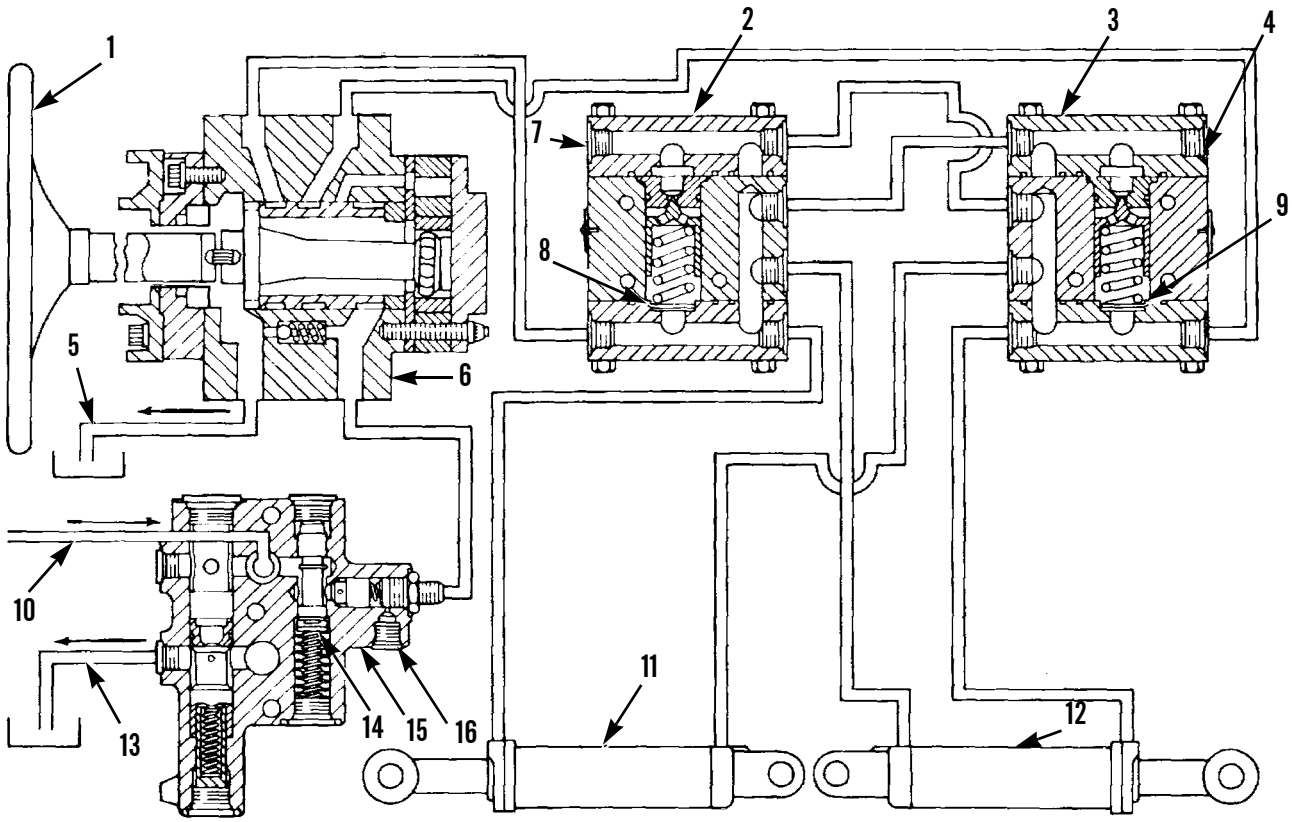
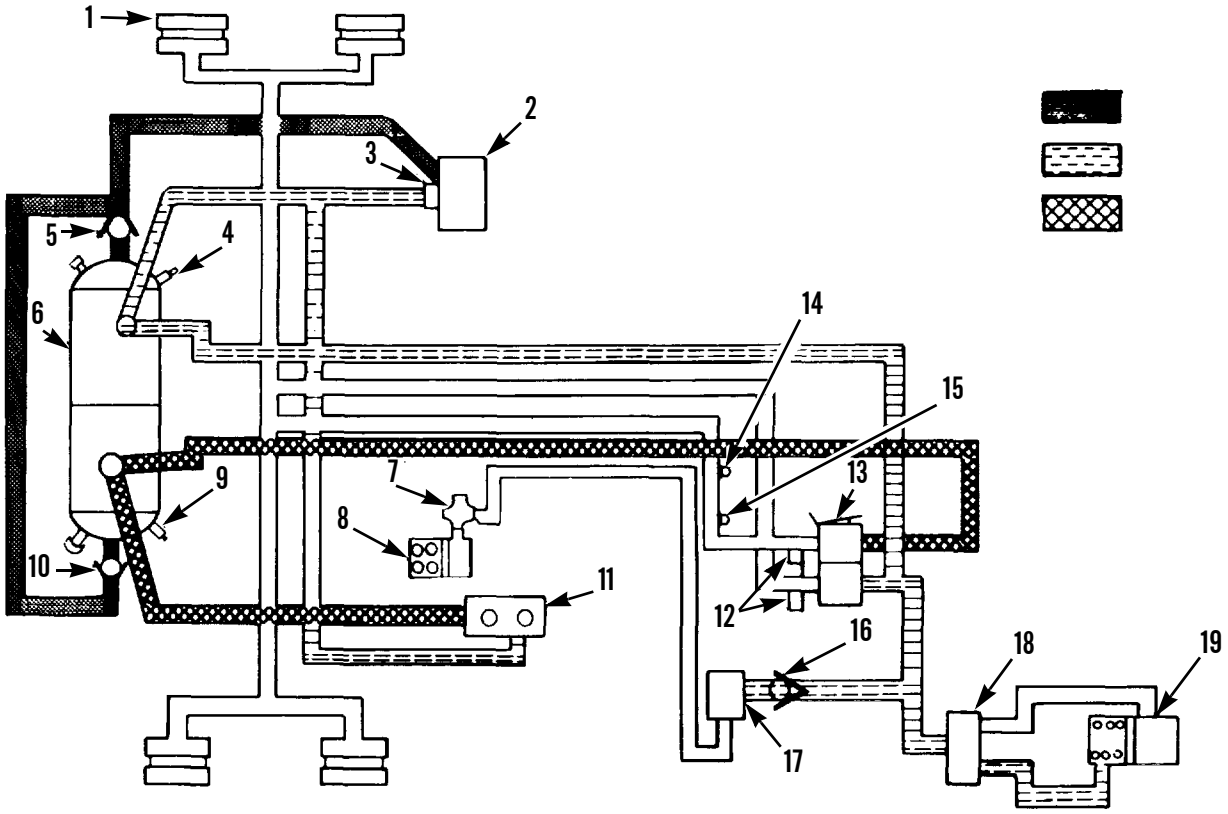


Figure 5. Steering System Schematic.

LEGEND

A. System pressure
B System pressure from left section of air tank
C. System pressure from right section of air tank
1. Service brakes (four)
2. Air compressor
3. Air compressor governor
4. Safety relief valve
5. One-way check valve
6. Air tank with two sections
7. Quick release valve
8. Rotochamber for parking brake
9. Safety relief valve
10. One-way check valve
11. Air pressure gauges
12. Low air pressure sending units (to EMS)
13. Control valve for service brakes
14. Blackout stoplight switch
15. Stoplight switch
16. Onew-way check valve
17. Control valve for parking brake
18. Center shift control valve
19. Center shift lock pin



397-896

Figure 6. 130G, 130GNS, and 130GNSCE Air Brake System Schematic.

LEGEND

1. Remote control panel
2. Control valve (4-way)
3. Solenoid (24V, N.O.)
4. Check valve
5. Check valve
6. Brake (service)
7. Brake (service)
8. Dual brake control valve (service) (in cab)
9. Relay valve
10. Relay valve
11. Quick release valve
12. Actuator (parking brake)
13. Solenoid (24V, N.C.)
14. Pressure switch (6-8 psi, N.C.)
15. Parking brake valve (in cab)
16. Air reservoir (service)
17. Air gauges
18. Air compressor governor
19. Air compressor
20. Disconnect plate
21. Pressure switch (60 psi, N.C.)
22. Parking brake valve
23. Pressure regulator

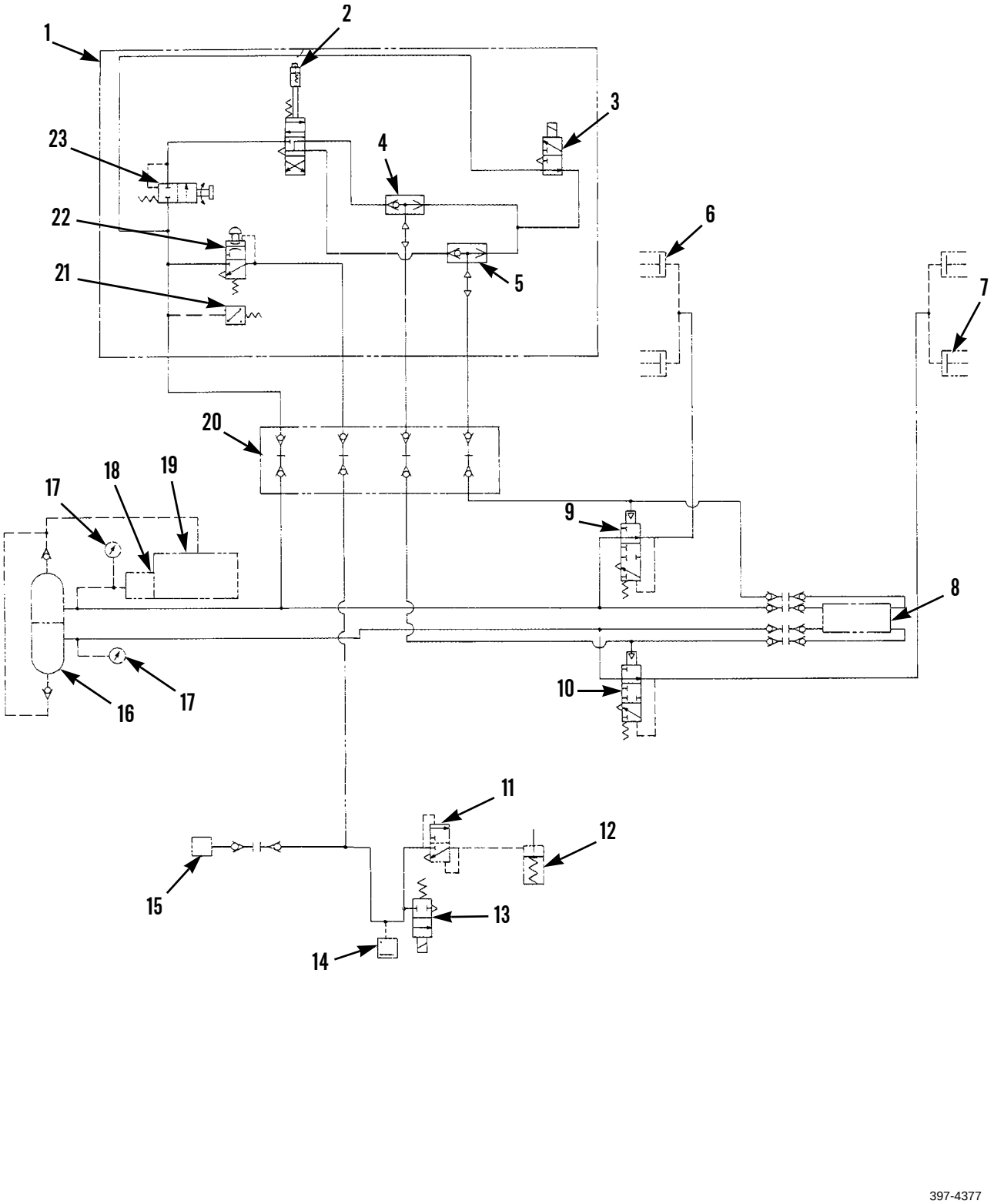
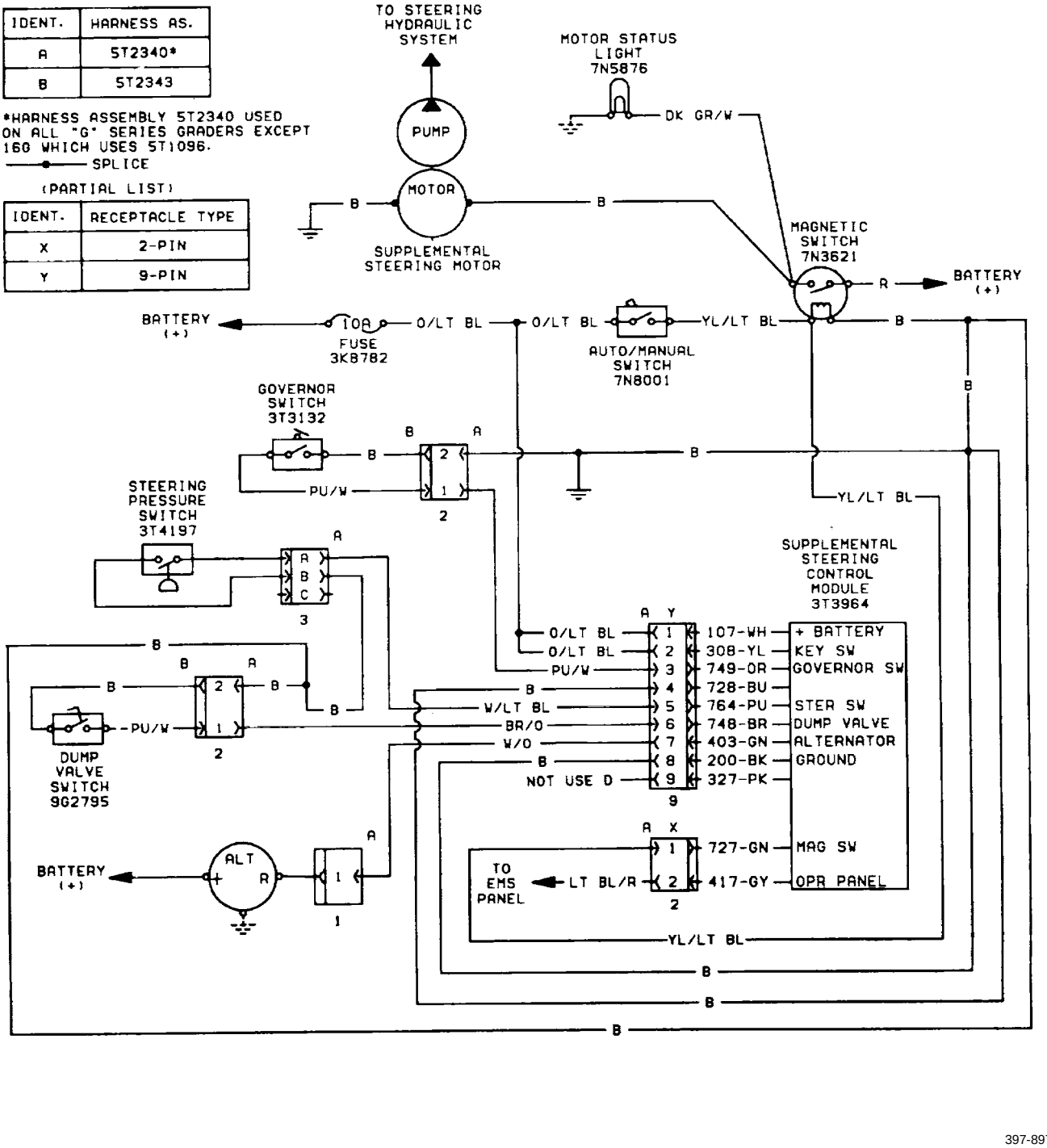
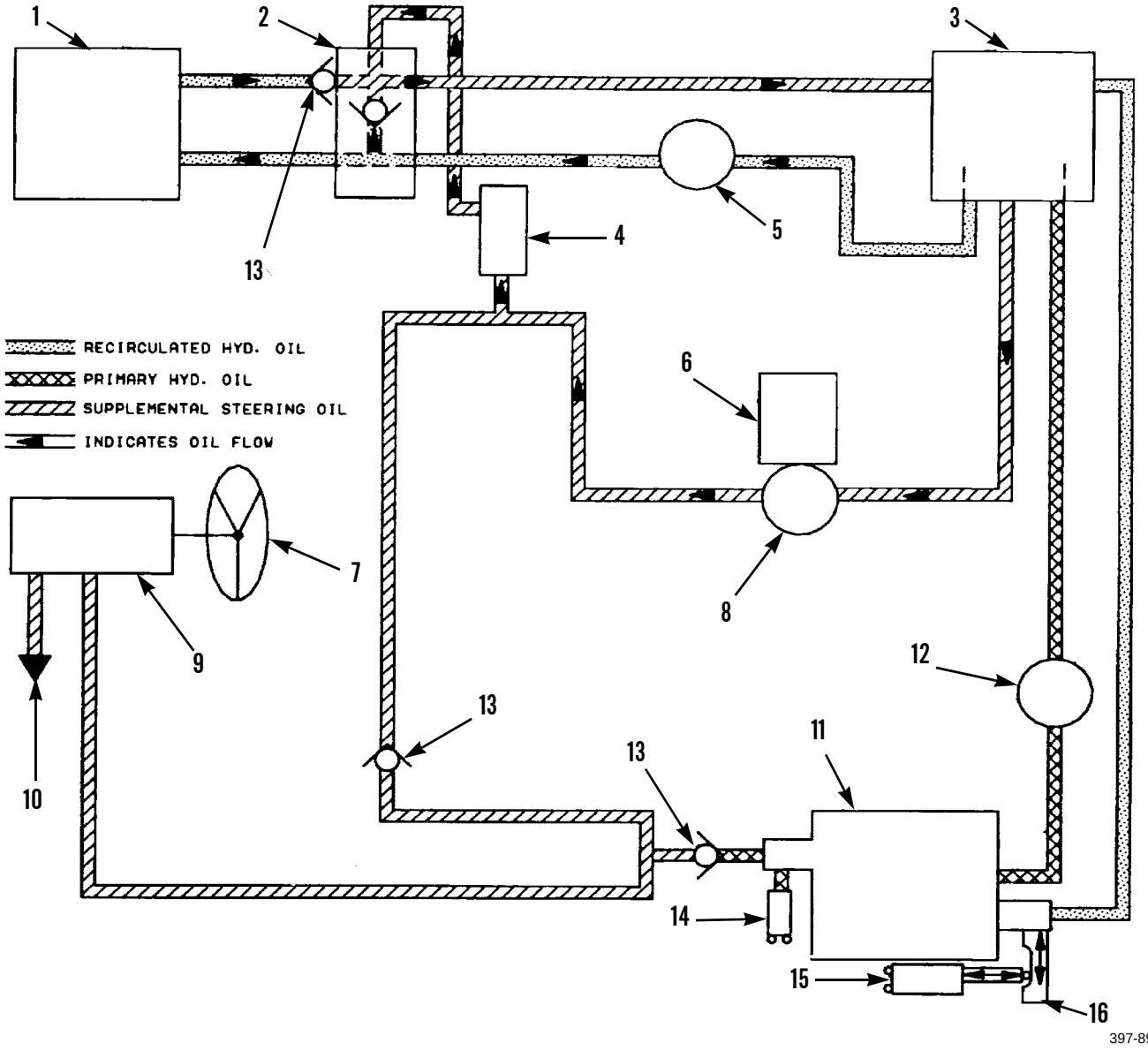


Figure 7. 130GS and 130GSCE Air Brake System Schematic.



397-897

Figure 8. Supplemental Steering Electrical Schematic.



LEGEND

1. Cooler for hydraulic oil
2. By-pass valve for oil cooler
3. Hydraulic tank
4. Relief valve (supplemental steering)
5. Pump for oil to oil cooler
6. Electric motor
7. Steering wheel
8. Supplemental steering pump
9. Metering valve for steering
10. Flow to relief valves and steering cylinder
11. Combination valve
12. Implement pump
13. Check valves
14. Pressure sensing switch
15. Dump valve switch
16. Dump valve

Figure 9. Supplemental Steering Hydraulic Schematic (Non-actuated).

LEGEND

1. Cooler for hydraulic oil
2. By-pass valve for oil cooler
3. Hydraulic tank
4. Relief valve (supplemental steering)
5. Pump for oil to oil cooler
6. Electric motor
7. Steering wheel
8. Supplemental steering pump
9. Metering valve for steering
10. Flow to relief valves and steering cylinders
11. Combination valve
12. Implement pump
13. Check valves
14. Pressure sensing switch
15. Dump valve switch
16. Dump valve

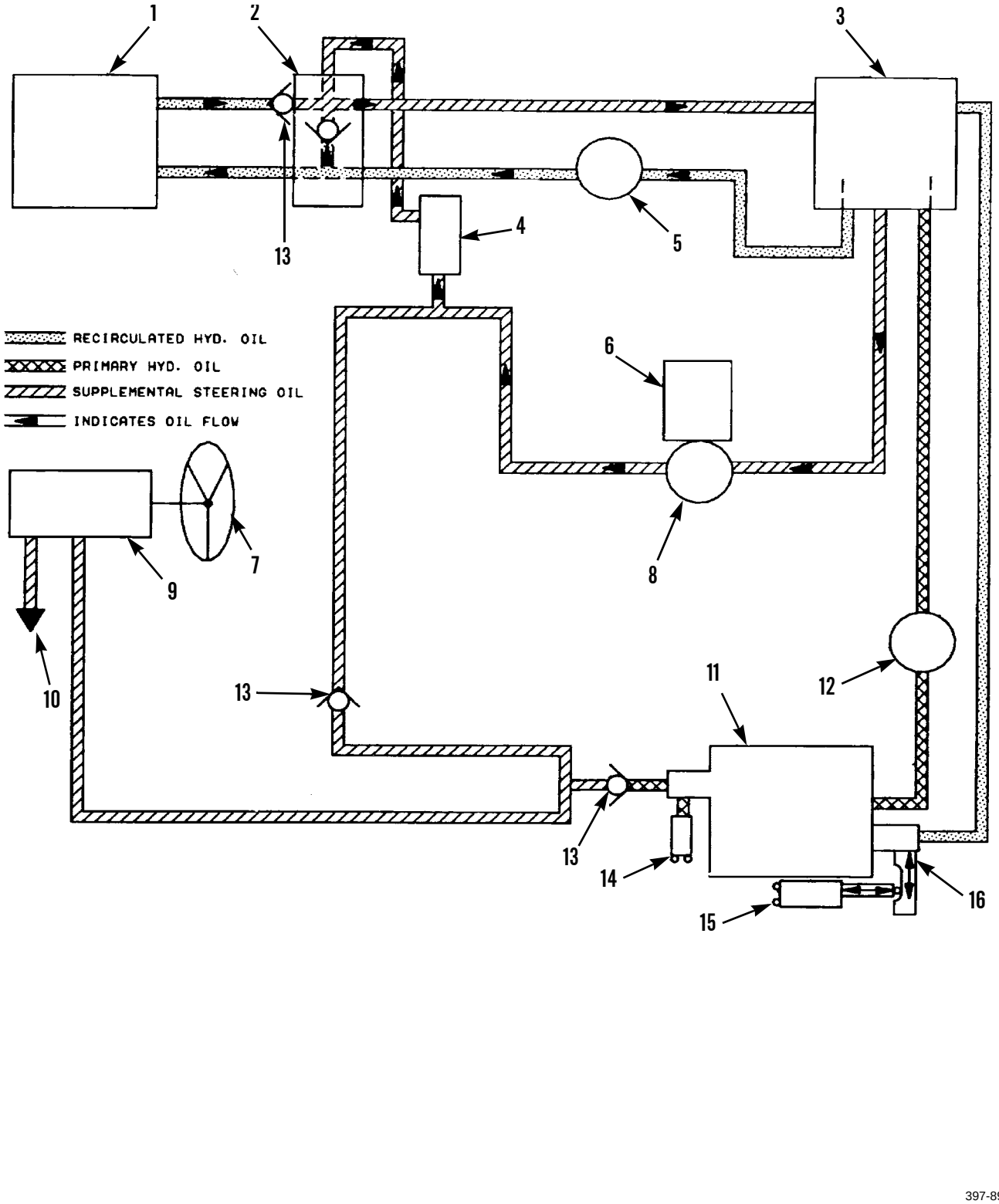
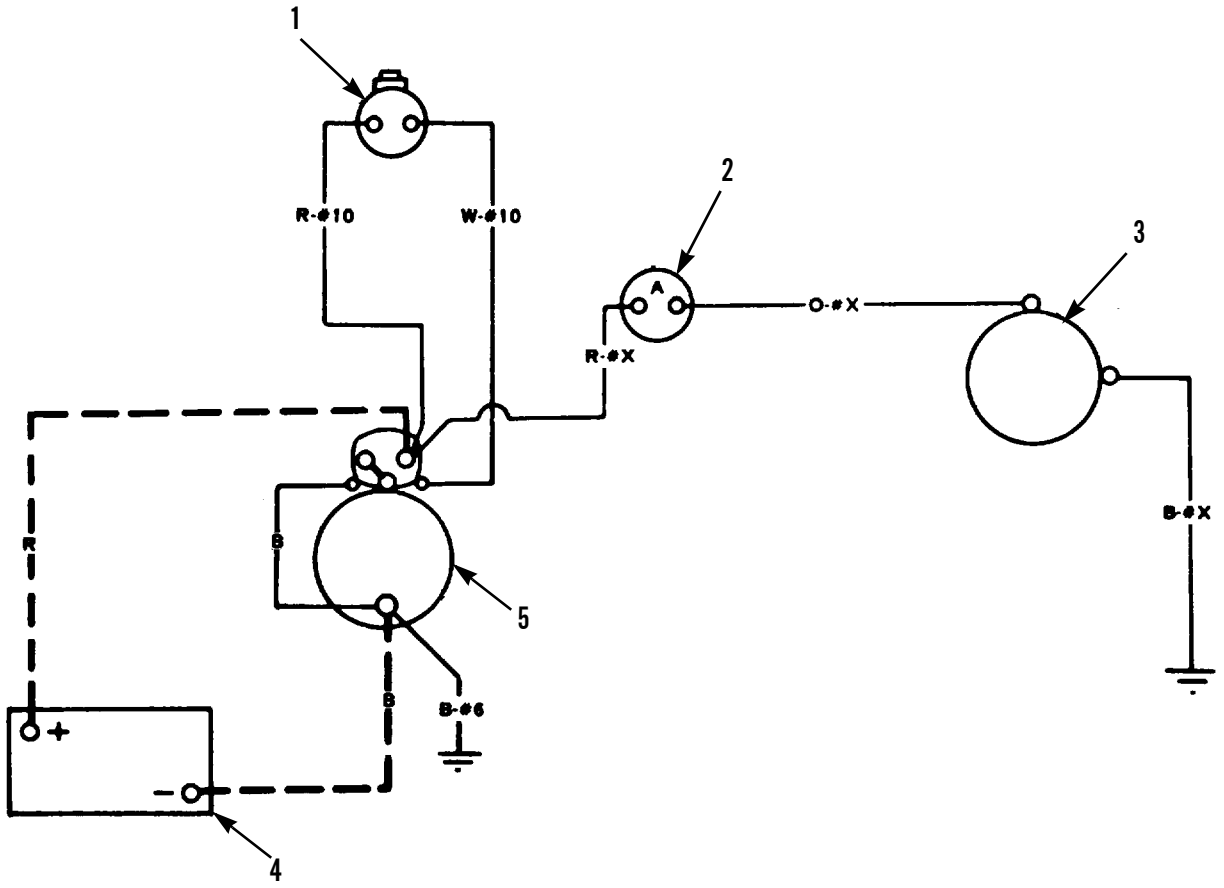


Figure 10. Supplemental Steering Hydraulic Schematic (Actuated).

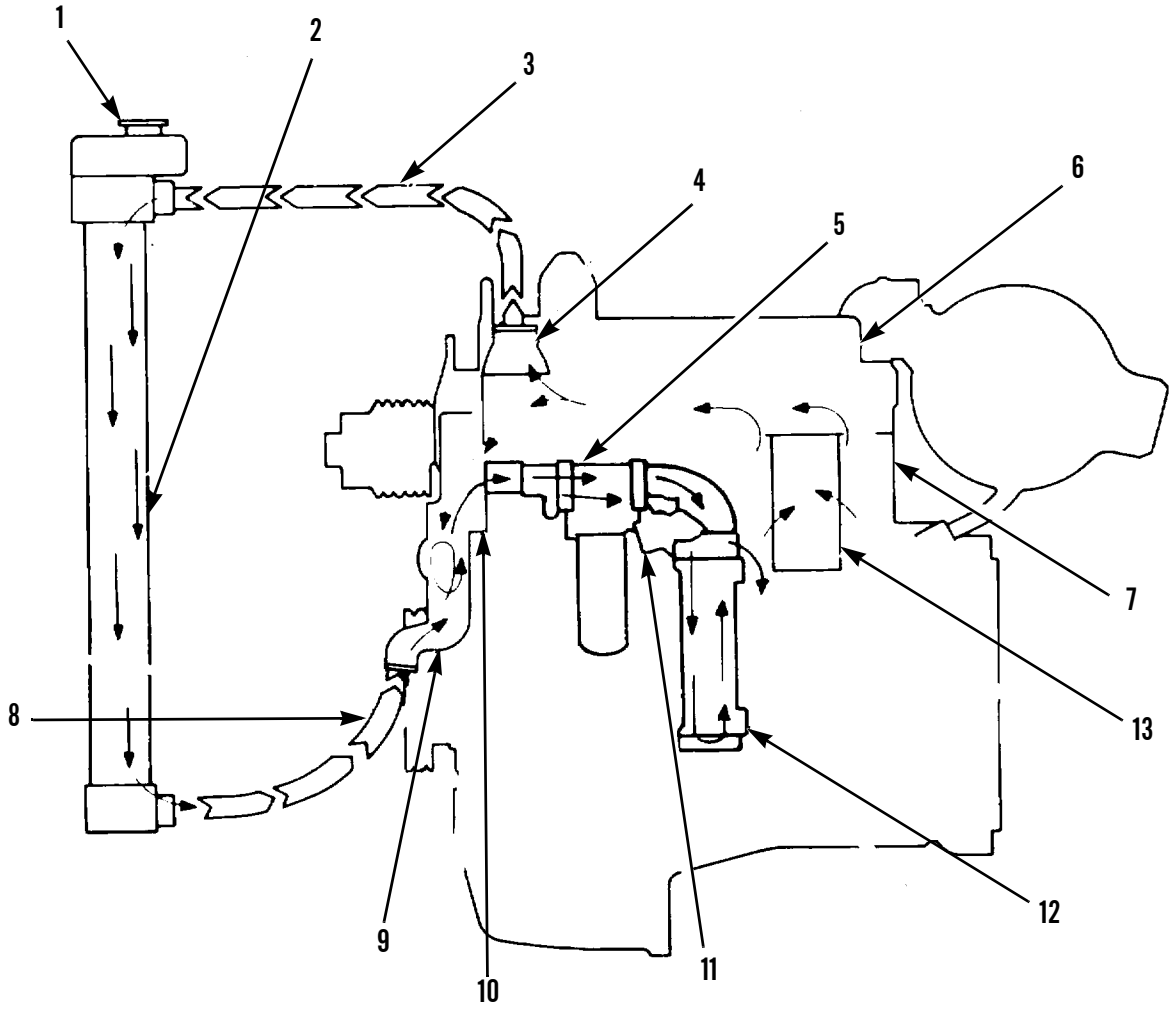


LEGEND

1. Start switch
2. Ammeter
3. Alternator
4. Battery
5. Starting motor

397-900

Figure 11. Charging System Schematic.



LEGEND

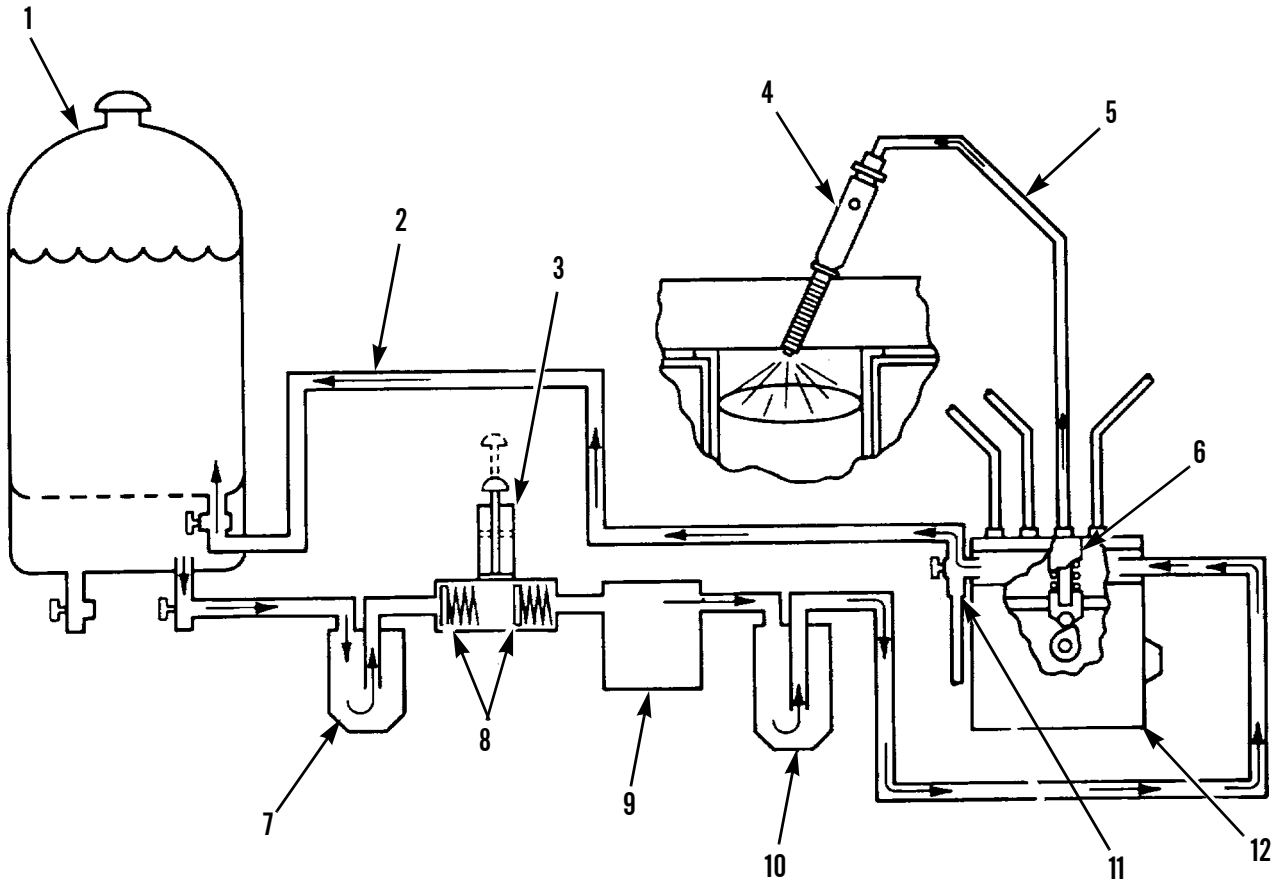
1. Filler cap
2. Radiator
3. Inlet line for radiator
4. Water temperature regulator
5. Engine oil cooler
6. Cylinder head
7. Cylinder block
8. Inlet line for water pump
9. Water pump
10. Internal bypass
11. Bonnet
12. Transmission oil cooler
13. Cylinder liner

397-901

Figure 12. Cooling System Schematic.

LEGEND

1. Fuel tank
2. Fuel return line
3. Priming pump
4. Fuel injection nozzle
5. Fuel injection line
6. Fuel injection pump
7. Primary fuel filter
8. Check valves
9. Fuel transfer pump
10. Secondary fuel filter
11. Constant bleed valve
12. Fuel injection pump housing



397-902

Figure 13. Fuel System Schematic.

LEGEND

1. Oil pressure connection
2. Piston cooling orifices
3. Oil supply for turbocharger
4. Oil passage through rocker shaft to rocker arms
5. Oil pressure connection
6. Camshaft bores
7. Oil manifold
8. Filter bypasss
9. Turbocharger
10. Oil filter
11. Oil cooler
12. Oil sump
13. Oil pump
14. Oil cooler bypass
15. Balancer shaft bores

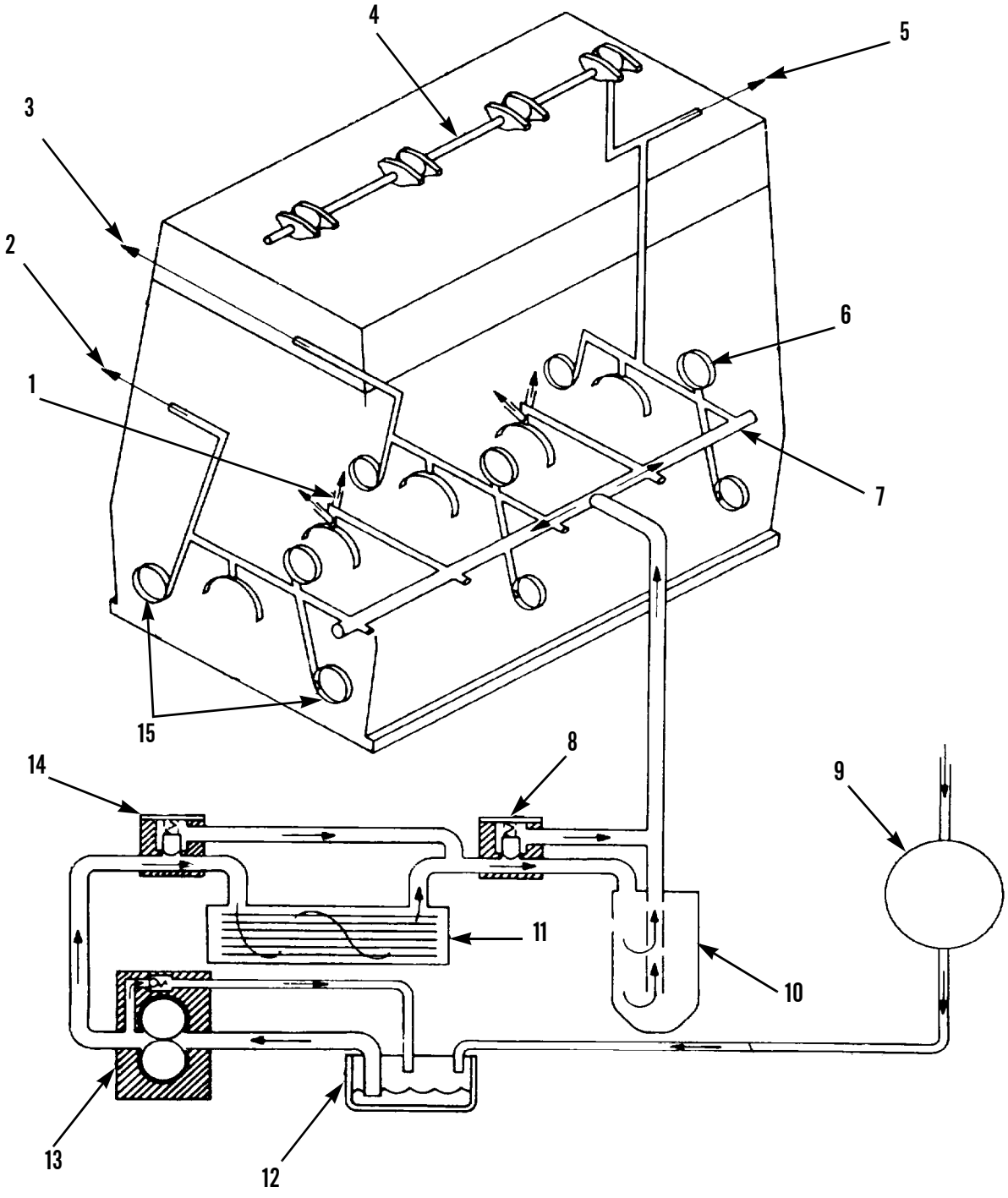


Figure 14. Lubrication System Schematic.

LEGEND

1. Oil filter
2. No. 1 clutch lubrication passage
3. No. 2 clutch lubrication passage
4. Main relief valve
5. Oil cooler
6. Housing for transfer gears
7. Oil pump
8. Planetary transmission
9. Differential lock valve
10. Selector valve group
11. Transmission reservoir
12. Main reservoir in intermediate housing
13. Differential reservoir
14. Magnetic screen filter
15. Magnetic screen filter
16. No. 1 direction clutch
17. No. 2 direction clutch

397-884

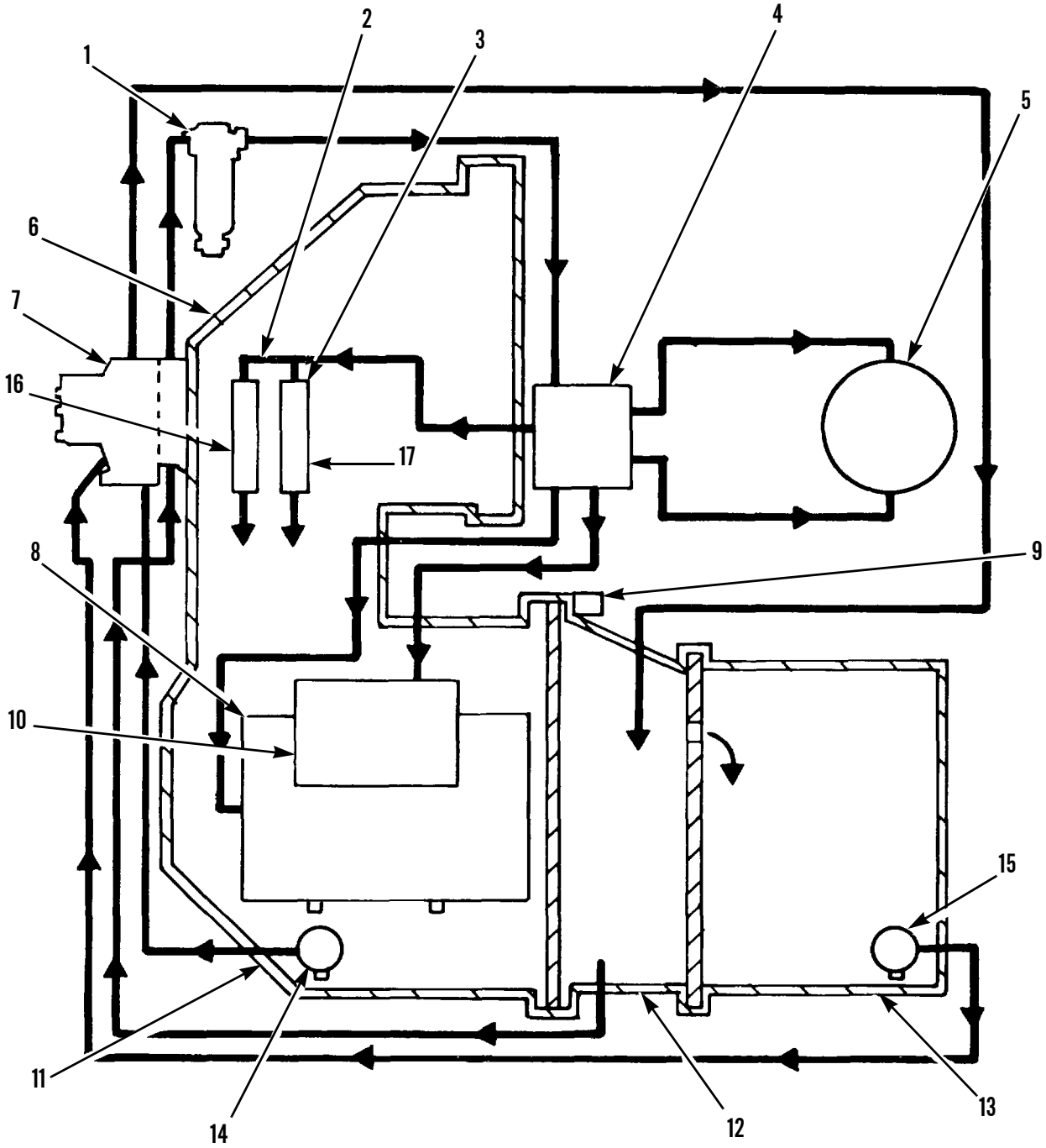
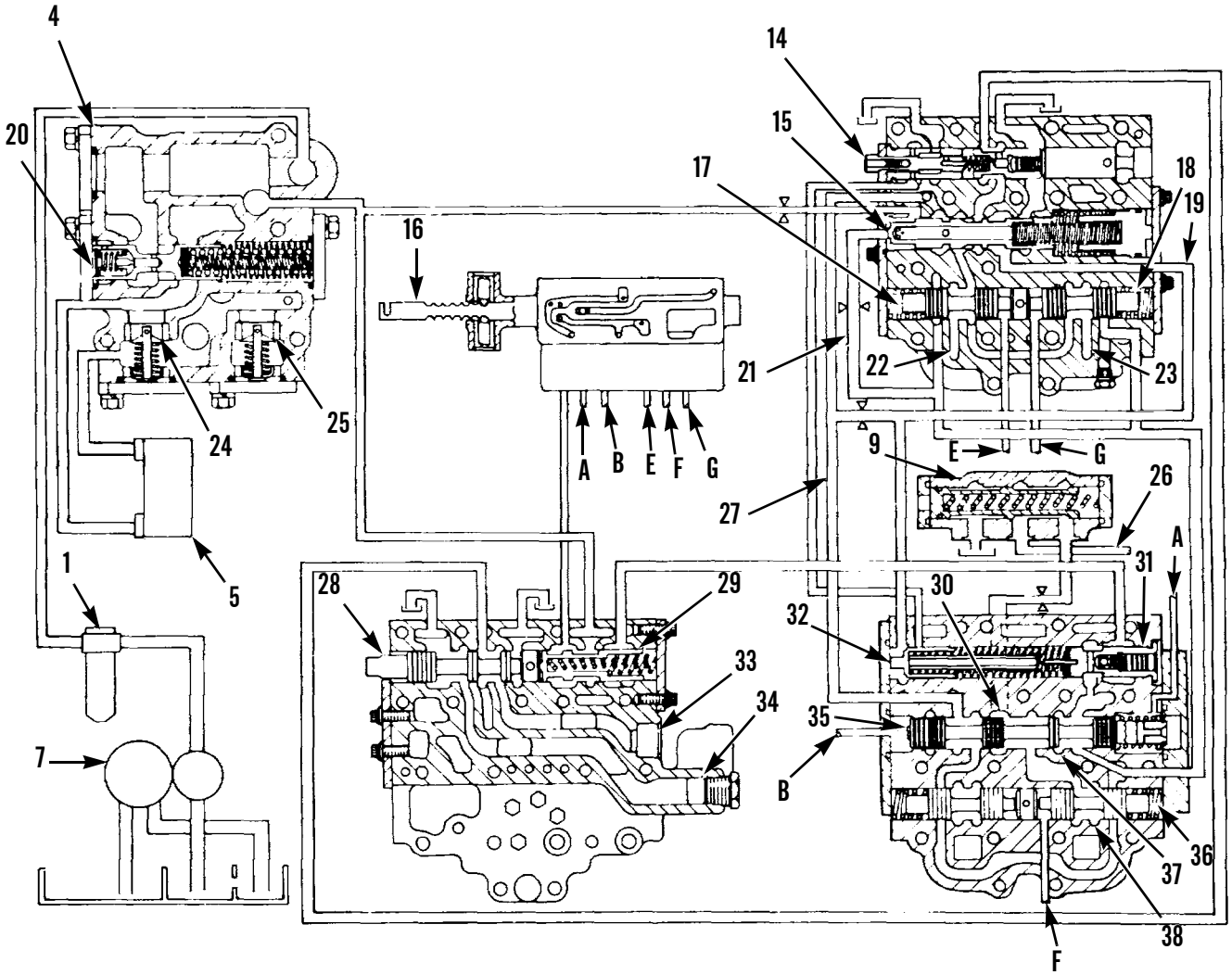


Figure 15. Transmission Hydraulic Schematic.

LEGEND

A. Passage for signal pressure
B. Passage for signal pressure
E. Passage for signal pressure
F. Passage for signal pressure
G. Passage for signal pressure
1. Oil filter
4. Main relief valve
5. Oil cooler
7. Oil pump
9. Differential lock valve
14. Manual modulation valve
15. Differential, check and safety spool
16. Pilot selector spool
17. Speed selector spool (No. 4 clutch)
18. Speed selector spool (No. 5 clutch)
19. Passage from load piston
20. Relief valve
21. Passage to differential, check and safety valve
22. Passage to No. 4 clutch
23. Passage to No. 5 clutch
24. Cooler bypass valve
25. Lubrication relief valve
26. Passage to differential lock clutch
27. Passage to differential, check and safety valve
28. Direction selector valve
29. Priority reducing valve
30. Passage to No. 6 clutch
31. Modulating reducing valve
32. Load piston
33. Passage to No. 1 clutch (FORWARD)
34. Passage to No. 2 clutch (REVERSE)
35. Speed selector spool (No. 6 and No. 7 clutches)
36. Speed selector spool (No. 3 clutch)
37. Passage to No. 7 clutch
38. Passage to No. 3 clutch



397-905

Figure 16. Transmission Control Valves Schematic.

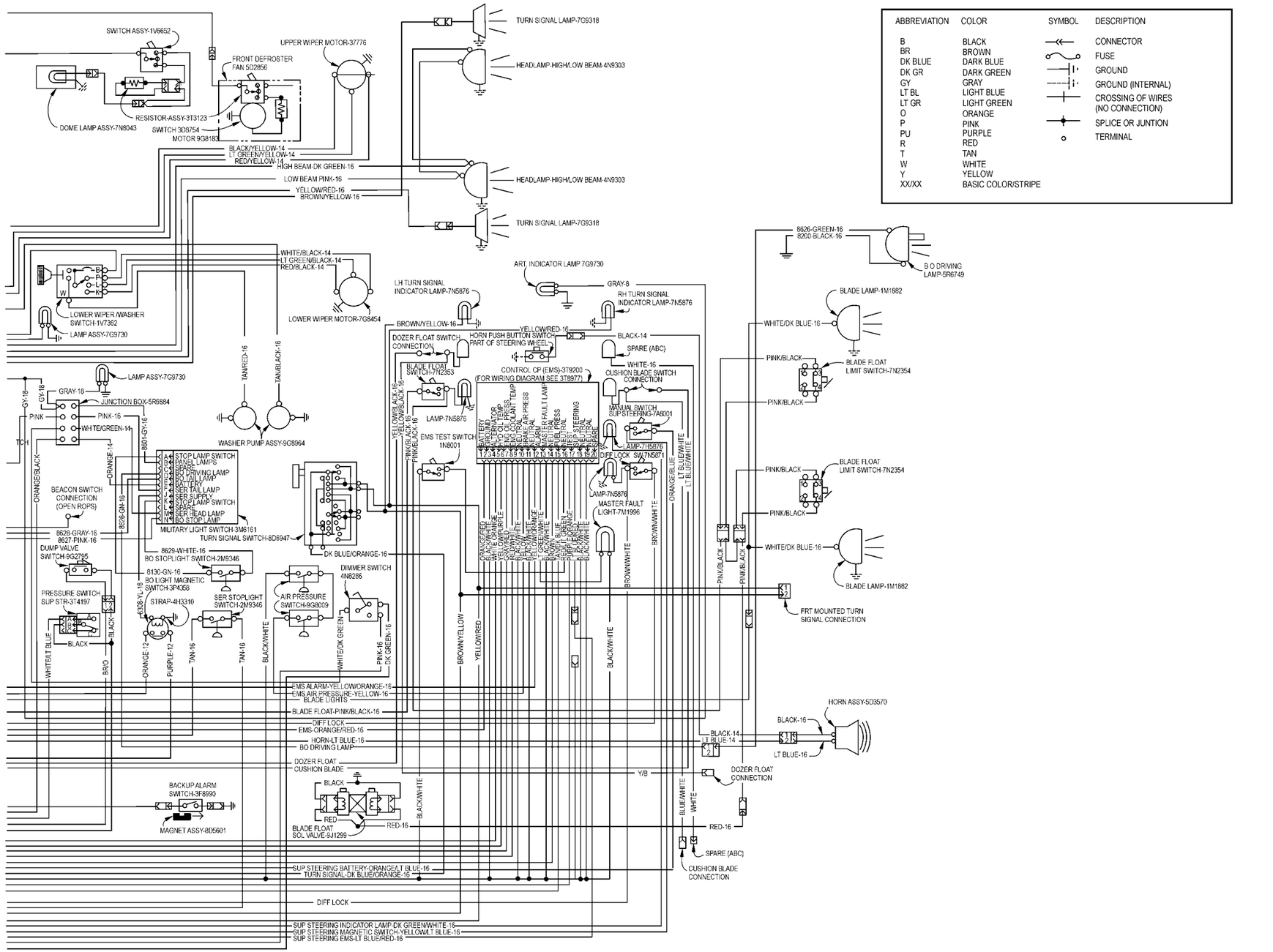


Figure 17. 130G Electrical Schematic (Sheet 1 of 2).

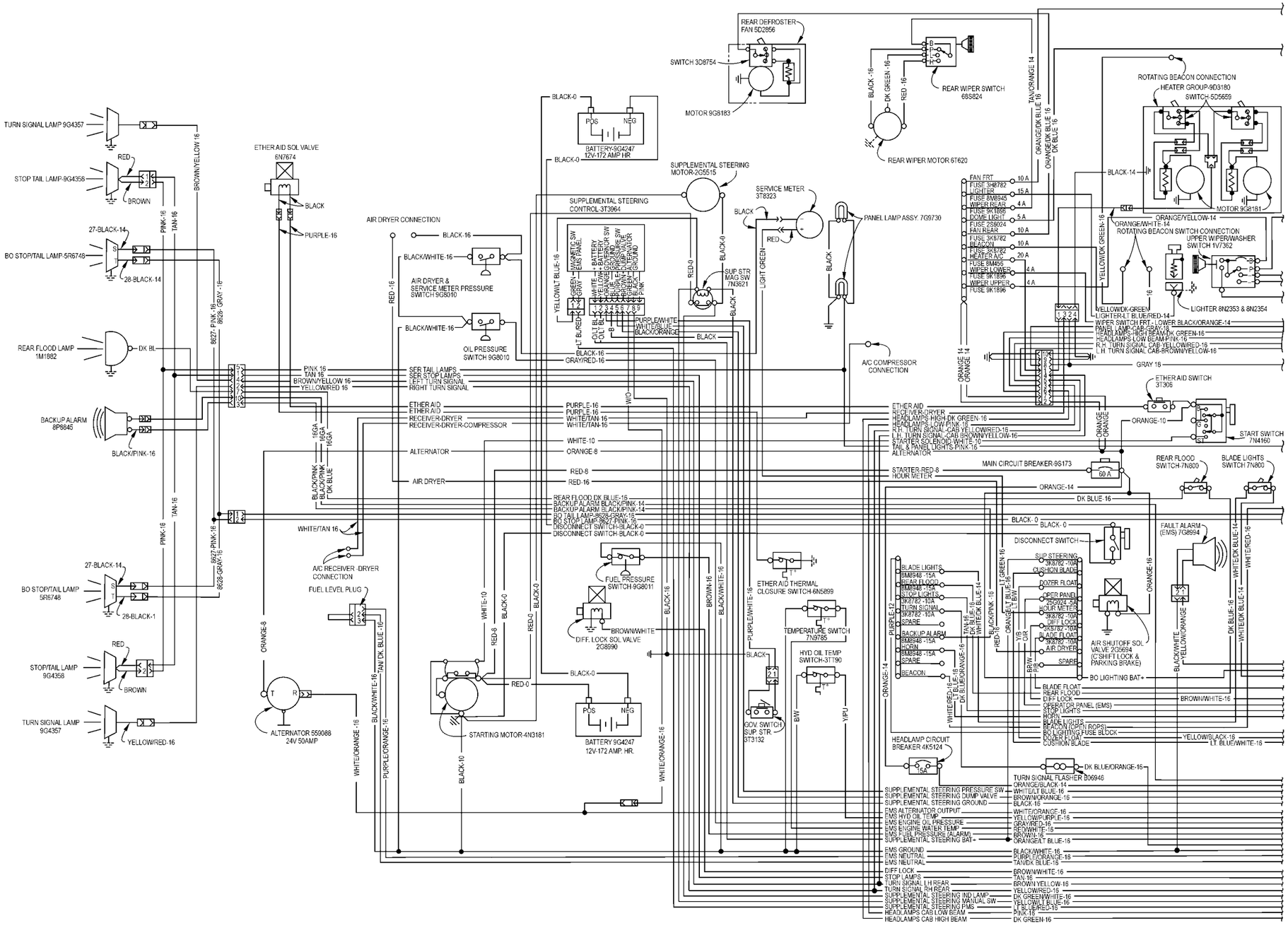


Figure 17. 130G Electrical Schematic (Sheet 2 of 2).

INDEX

INDEX - Continued

Subject *Work Package/Page*

C - Continued

D

E

INDEX - Continued

INDEX - Continued

INDEX - Continued

INDEX - Continued

Subject *Work Package/Page*

W - Continued

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General, United States Army
Chief of Staff

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Secretary of the Army
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PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3805-261-23-2	February 2007	Field Maintenance Manual (Includes Unit and DS Maintenance) for Grader, Road, Motorized, DED Heavy CCE

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0017 00-2					Part number supplied for item 2 is incorrect.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE

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

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARK[illegible] *[illegible] ge[illegible] [illegible]rks [illegible] [illegible]enda[illegible]s, or sug[illegible] f[illegible]ement of publications and [illegible]k fo[illegible]. Au[illegible]ona[illegible] la[illegible] s[illegible]ets [illegible] be used [illegible] spa[illegible] [illegible]eded.)*

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APD V4.00

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)* AMSTA-LC-LMIT/TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)*

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-3805-261-23-2	28 February 2007	Field Maintenance Manual (Includes Unit and DS Maintenance) for Grader, Road, Motorized, DED Heavy CCE

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

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

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THE METRIC SYSTEM AND EQUIVALENTS

Linear Measure

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

Weights

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Pounds
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

Liquid Measure

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

Square Measure

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.0386 Sq Miles

Cubic Measure

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

Temperature

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

PIN: 083034-000