

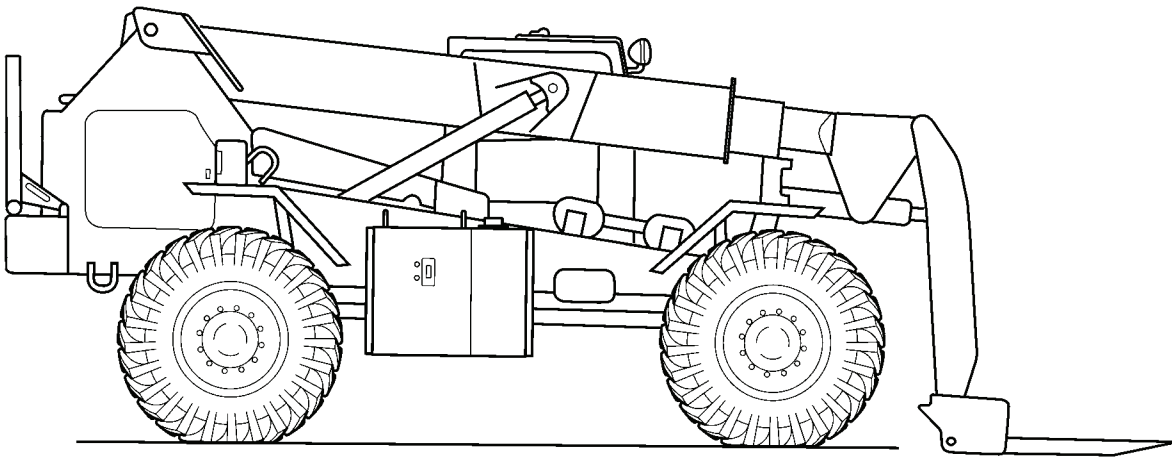
TM 10-3930-660-24-1

TECHNICAL MANUAL

Unit and Direct Support Maintenance

FOR

TRUCK, FORKLIFT; 6,000 LB. VARIABLE REACH, ROUGH TERRAIN (NSN 3930-01-158-0849)



SUPERSEDURE NOTICE - This manual supersedes TM 10-3930-660-20, dated 25 March 1993 and TM 10-3930-660-34, dated 30 March 1993.

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

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 2006

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in injury or death. 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.



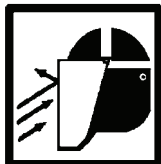
ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



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.



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.



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



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



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



HEAVY LIFTING - heavy object on human figure shows heavy parts back injury danger.



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

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



WARNING

CARBON MONOXIDE (EXHAUST GASES) CAN KILL!

- Carbon monoxide is a colorless, odorless, deadly poison which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.
 - Carbon monoxide occurs in exhaust fumes of internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure safety of personnel when engine of roller is operated.
1. DO NOT operate roller engine in enclosed areas.
 2. DO NOT idle roller engine without adequate ventilation.
 3. DO NOT drive roller with inspection plates or cover plates removed.
 4. BE ALERT for exhaust poisoning symptoms. They are:
 - Headache
 - Dizziness
 - Sleepiness
 - Loss of muscular control
 5. If you see another person with exhaust poisoning symptoms:
 - Remove person from area.
 - Expose to fresh air.
 - Keep person warm.
 - Do not permit physical exercise.
 - Administer cardiopulmonary resuscitation (CPR), if necessary.
 - Notify a medic.
 6. BE AWARE. The field protective mask for nuclear-biological-chemical (NBC) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation!



WARNING
BATTERIES



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

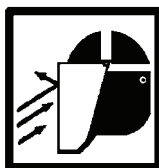


WARNING

CLEANING COMPOUND, SOLVENT



- Cleaning compound, solvent 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.
- NOTE: P-D-680 Type II is no longer in use and has been replaced by MIL-PRF-680 Type III.



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 cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.



WARNING

ELECTRICAL SYSTEM MAINTENANCE

Turn battery disconnect switch to OFF before working on any electrical system component. Failure to follow this warning could result in personal injury or damage to equipment.



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.



WARNING

EYE PROTECTION

- Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions could cause injury to personnel.

Some components are under spring tension. Wear eye protection and use caution when disassembling them, to avoid injury.



WARNING

FUEL HANDLING



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



WARNING

HAZARDOUS WASTE DISPOSAL

When servicing this vehicle, 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 vehicle or when working on vehicle while it is operating. Failure to wear hearing protection may cause hearing loss.



WARNING

HOT COMPONENTS



Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts.



WARNING

HYDRAULIC SYSTEM PRESSURE



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3000 psi (20,685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.



WARNING

LIFTING HEAVY PARTS



- Equipment used for lifting vehicle must be in good condition and of correct capacity. Failure to follow this warning may cause injury or death, or damage to equipment.
- Improper use of lifting equipment and improper attachment to vehicle can result in injury, or equipment damage. Observe all standard rules of safety.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.

WARNING

VEHICLE OPERATION

This vehicle must be operated only by authorized personnel who have satisfactorily completed a program of training which must include familiarity with safe operating procedures, characteristics and a knowledge of applicable codes, regulations and facilities directives. Untrained personnel subject themselves and others to the possibility of death or injury from the improper operation of this vehicle. Understand the equipment, its function and the controls before operation.

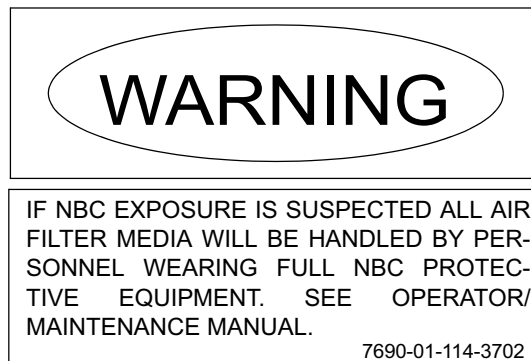


WARNING

NBC EXPOSURE



- If NBC exposure is suspected, personnel wearing protective equipment should handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.



To order this NBC decal use:

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



WARNING

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 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.

WARNING

TIRE REPLACEMENT WARNINGS

- Always inflate tires mounted on rims with aligning rings or lock rings in an inflation safety cage. Failure to follow this warning may cause injury or death.
- Improperly seated aligning rings or lock rings could blow off during inflation. Never attempt to seat aligning rings or lock rings during or after inflation. Failure to follow this warning may cause injury or death.
- Never over-inflate tires to seat tire beads. Failure to follow this warning may cause injury or death.
- When inflating tires in a safety cage, always use an airhose and gauge for safety cage use. Failure to follow this warning may cause injury.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 1 May 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 58 AND TOTAL NUMBER OF WORK PACKAGES IS 215 CONSISTING OF THE FOLLOWING:

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A/(B Blank)	0
i to xii	0
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WP 0320 00 to 0326 00	0
Sample DA Form 2028's	0
DA Form 2028's	0
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* Zero in this column indicates an original page or work package.

Unit and Direct Support Maintenance

FOR

TRUCK, FORKLIFT: 6,000 LB.
VARIABLE REACH, ROUGH TERRAIN
(NSN 3930-01-158-0849)

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://aeeps.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: TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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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 written in work package format and is designed to help you perform lubrication, troubleshooting and maintenance on the 6K Forklift.
2. This manual contains Unit (Field), Direct and General (Sustainment) Support Maintenance.
3. The 6K Forklift is normally equipped with the standard 152 horsepower engine; however, some vehicles may have been produced with or retrofitted with a 165 horsepower engine. Both engines are covered in this manual. Check the data plate on right-hand side of engine. The data plate will specify either 152 or 165 HP. Before performing engine-related maintenance tasks, be sure to check the title of the work package. It will tell you which of the two engines it covers.
4. 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.
5. Chapter 1, *Introductory Information with Theory of Information*, provides general information on the manual and the equipment.
6. 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.
7. Chapter 3 deals with Unit (Field) Maintenance Procedures: Major areas covered are Preventive Maintenance Checks and Services (PMCS), *Service Upon Receipt* and all maintenance procedures authorized by the MAC for this manual, organized in Functional Group Code (FGC) sequence. Refer to the *Table of Contents* for a complete listing of maintenance procedures.
8. Chapters divide the manual into major categories of information (e.g., *Introductory Information with Theory of Operation*, *Troubleshooting Procedures*, *Unit (Field) Maintenance*, *Direct and General Maintenance (Sustainment)*, and *Supporting Information*).
 - c. Each chapter is divided into work packages, which are identified by a 6-digit number (e.g., 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The work package page number (e.g., 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
 - d. If a Change Package is issued to this manual, added work packages use the 5th and 6th 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.
9. Read 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 machine.
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.

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6. Chapter 4 covers Direct Support Maintenance information work packages. Before performing any maintenance procedure, read WP 0312 00, *General Maintenance Instructions*, and/or WP 0313 00, *Electrical General Maintenance Instructions*.
7. Chapter 5 covers General Support Maintenance instruction.
8. Chapter 6 covers General Maintenance Instructions.
9. Chapter 7 includes *Supporting Information: References; Maintenance Allocation Chart (MAC) Introduction; Maintenance Allocation Chart (MAC); Expendable and Durable Items List; Tool Identification List; and Illustrated List of Manufactured Items*.

FEATURES OF THIS MANUAL

1. WARNINGS, CAUTIONS, NOTES, subject headings, and other important information are highlighted in **BOLD** print as a visual aid.

WARNING

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

CAUTION

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

NOTE

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

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

If you are told: "Replace engine oil filter (WP 0012 00)," go to Work Package 0012 00 in this manual for instructions on replacing the filter.
4. Illustrations are placed after, and 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., 409-001; 409-002, etc.) are art control numbers and are used for tracking purposes. Disregard these numbers.
6. Dashed leader lines used in the Lubrication Chart (WP 0010 00) indicate lubrication points that are located on both sides of the equipment.
7. 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 1
INTRODUCTORY INFORMATION WITH
THEORY OF OPERATION

SCOPE

1. **Type of Manual.** This manual contains unit maintenance instructions, at the organizational level, for the 6K Forklift.
2. **Model Number and Equipment Name.** The 6K Forklift, 6,000 Lb Variable Reach Rough Terrain Forklift Truck, equipped with Multiple Launch Rocket System (MLRS) lifting tool.
3. **Purpose of Equipment.** The 6K Forklift is designed for loading and unloading Multiple Launch Rocket System (MLRS) pods from transport vehicles and containers. The 6K Forklift is also designed for use as a standard rough terrain forklift.
4. **Special Limitations on Equipment.** The 6K Forklift has no special limitations. Normal limitations such as travel speed, lift capacity, etc. are given in WP 0002 00.

MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System (TAMMS).

DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Demolition of material to prevent enemy use shall be in accordance with the requirement of TM 750-244-3 (Procedures for Destruction of Equipment to Prevent Enemy Use for U.S. Army).

PREPARATION FOR STORAGE OR SHIPMENT

Refer to WP 0204 00, WP 0205 00, WP 0206 00, WP 0207 00 and WP 0208 00 for all storage and shipment instructions.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Not applicable.

OFFICIAL NOMENCLATURE, NAMES AND DESIGNATIONS

Refer to the nomenclature cross-reference list below. This listing gives nomenclature cross-references used in this manual. The common name is in the left column and the official name is in the right.

Common Name	Official Nomenclature
6K Forklift	6,000 Lb Variable Reach Rough Terrain Forklift Truck
MLRS	Multiple Launch Rocket System

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)

If your 6K Forklift truck needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, US Army Tank-Automotive Command, Attn: AMSTA-QRD, Warren, MI 48397-5000. We'll send you a reply.

EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD)

The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001 series contains information on equipment improvements, minor alternations, proposed Modification Work Orders (MWO's), warranties (if applicable), actions taken on some of your DA Forms 2028-2 (Recommended Changes to Publications), and advance information on proposed changes that may affect his manual. The information will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA PAM 310-1 Consolidated Index of Army Publications and Blank Forms, and References of this manual.

WARRANTY INFORMATION

Refer to the Warranty Technical Bulletin TB10-3930-660-14.

LIST OF ABBREVIATIONS

NOTE

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

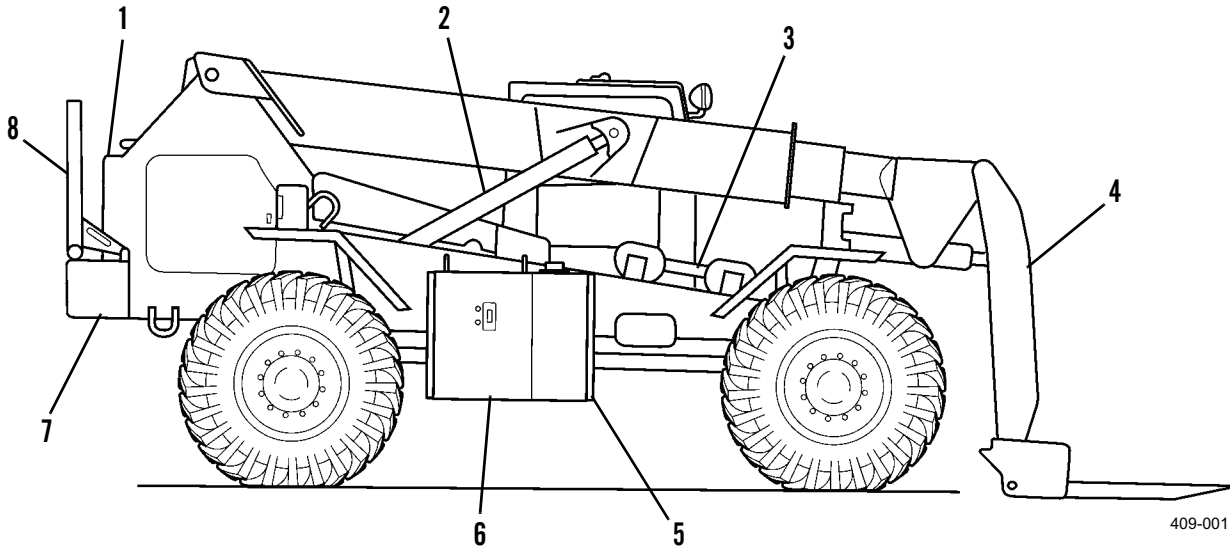
ABBREVIATION	DEFINITION
6K Forklift.....	Variable Reach, Rough Terrain Forklift Truck
AAL.....	Additional Authorization List
BII.....	Basic Issue Items
C.....	Centigrade or Celsius
cc.....	Cubic Centimeter
CCA.....	Cold Cranking Amps
cm.....	Centimeter
COEI.....	Components of End Item
DCA.....	Diagnostic Connector Assembly
F.....	Fahrenheit
FOPS.....	Falling Object Protective Structure
GVWR.....	Gross Vehicle Weight Rating
IAW.....	In Accordance With
kg.....	Kilogram
km.....	Kilometer
kPa.....	Kilopascal
kph.....	Kilometers per Hour
L.....	Liter
lb-ft.....	Pound Foot
LED.....	Light-Emitting Diode
MLRS.....	Multiple Launch Rocket System
mm.....	Millimeter
mph.....	Miles Per Hour
Nm.....	Newton Meter
oz.....	Ounce
PMCS.....	Preventive Maintenance Checks and Services
qt.....	Quart
ROPS.....	Roll Over Protective Structure
STE/ICE-R.....	Simplified Test Equipment for Internal Combustion Engines - Reprogrammable
TK.....	Transducer Kit
VTM.....	Vehicle Test Meter

END OF WORK PACKAGE

EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

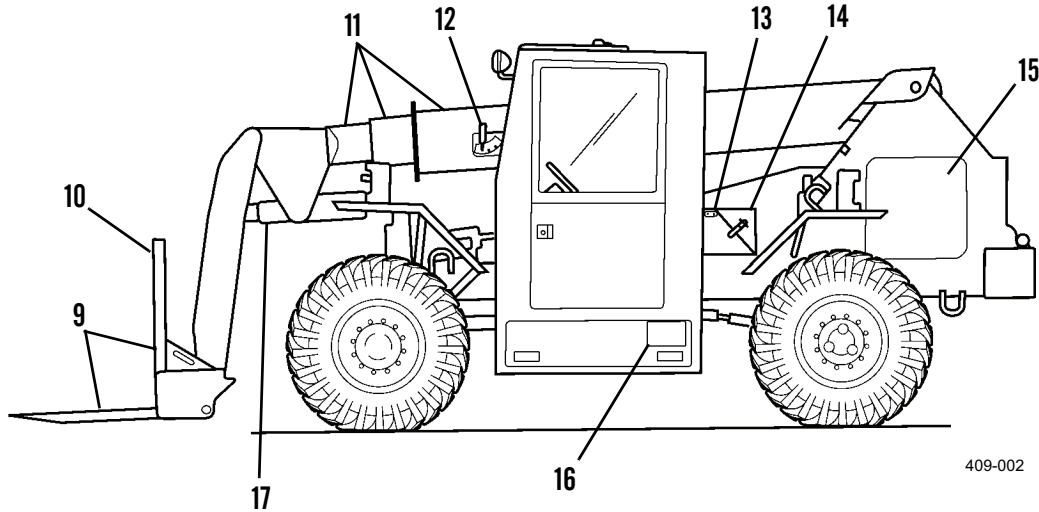
1. **Purpose.** The 6K Forklift is designed for loading and unloading munitions from transport vehicles and containers. Also, the 6K Forklift can be used as a forklift truck.
2. **Equipment Characteristics, Capabilities and Features.**
 - a. With the MLRS lifting tool and stop tube on the forks, the 6K Forklift can handle MLRS pods.
 - b. With the MLRS lifting tool and stop tube removed and the backrest installed on carriage, the 6K Forklift can handle boxes and palletized ammunition loads.
 - c. The lifting tool stop tube fits over the forks and prevents the lifting tool from moving too far back on the forks and prevents the MLRS pod from contacting the frame or vehicle wheels when in the carry position.
 - d. The vehicle frame can be tilted 9 degrees to left or right which allows vehicle to be level when traversing a sideslope.
 - e. The MLRS attachment can be raised to a horizontal position for loading and unloading munitions.
 - f. The forks tilt, level and side shift to maneuver loads.
 - g. Lift loads of 6,000 lb (2722 kg) to a height of 26 ft (7.9 m).
 - h. Can tow other vehicles weighing 27,100 lb (12292 kg) or less.
 - i. The operator can select one of three steering modes: two wheel, four wheel and crab steer.
 - j. All weather operational.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



KEY	COMPONENT	DESCRIPTION
1	Radiator	Contains coolant which provides engine cooling.
2	Boom Hoist Cylinder	Raises and lowers the boom.
3	Lifting Hook and Stop Assembly (shown in storage position)	The stop tube prevents the lifting hook from moving too far back on the forks and prevents the MLRS pod from contacting the frame or vehicle wheels when in the carry position.
4	Attachment	The attachment can be raised to a horizontal position, creating a low profile and extended reach configuration. This configuration is useful in loading and unloading munitions from transport vehicles and containers.
5	Fuel Tank	Contains diesel fuel for engine operation.
6	Hydraulic Oil Reservoir	Contains hydraulic oil for the hydraulic system.
7	Frame and Counterweight	The frame is a heavy-duty design constructed of 1-3/16 in. (30 mm) thick steel plates. The frame is equipped with tie-down lugs meeting air transport specifications, tow lugs, a pintle hook, and a 3,600 lb (1633 kg) counterweight.
8	Load Backrest (shown in storage position)	Used to rest a load during non-MLRS operations. The backrest can be attached to the fork carriage and serves as a backstop to support materials being carried on the forks.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



KEY	COMPONENT	DESCRIPTION
9	Forks and Carriage	Serve as an anchoring point of the forks. The fork carriage is also equipped with automatic fork leveling. Moving a switch will keep the forks level when raising or lowering the boom.
10	Load Backrest (Shown in fork carriage position)	Serves as a backstop or support for materials being carried on the forks.
11	Boom	The telescopic, three-stage boom is constructed of welded high strength steel. The boom will retract or extend the reach and height of the forks.
12	Boom Angle Indicator	Shows the angle of the boom relative to the horizon.
13	NATO Slave Receptacle	Connection point for starting a disabled vehicle or for receiving starting assistance when disabled.
14	Battery Box	Holds the batteries which provide current for the electric system.
15	Engine	Provides the necessary power to drive the transmission. The engine also contains sending units for the Simplified Test Equipment for Internal Combustion Engines (STE/ICE-R) diagnostics.
16	Tool Box	Storage area for tools and basic issue items.
17	Attachment Hoist Cylinder	Moves the attachment forward and back.

EQUIPMENT DESCRIPTION AND DATA - CONTINUED

0002 00

EQUIPMENT DATA

Engine:

6K

Model6BT5.9
 Manufacturer Cummins
 Horsepower (@ 2,500 RPM)..... 152 hp
 Number of Cylinders 6
 Displacement 359 in.³
 Weight 1,075 lb (401 kg)
 Engine Idle 850 to 950 RPM

Atlas

Model6BT5.9-C165
 Manufacturer Cummins
 Horsepower (@ 2,500 RPM)..... 165 hp
 Number of Cylinders 6
 Displacement 359 in.³
 Weight 930 lb (422 kg)
 Engine Idle 900 to 1,000 RPM

Transmission:

Model 1723
 Manufacturer Funk Manufacturing
 Powershift 3 speed forward and reverse
 Speed Range, First Gear 0-4 mph (0-6 kph), level surface
 Speed Range, Second Gear 0-8 mph (0-13 kph), level surface
 Speed Range, Third Gear 0-23 mph (0-37 kph), level surface
 Weight 846 lb (384 kg)

Axles and Brakes:

Model (Front) PSOC-205-HOB-205
 Model (Rear) PSOC-205-HOB-206
 Manufacturer Rockwell
 Weight - Axle Assembly (Front or Rear) 1,650 lb (748 kg)

EQUIPMENT DESCRIPTION AND DATA - CONTINUED

0002 00

EQUIPMENT DATA - CONTINUED

Dimensions and Weight:

Vehicle Operational Weight	27,100 lb (12292 kg)
Boom Assembly Weight	4,100 lb (1860 kg)
Inner Boom Weight	955 lb (433 kg)
Intermediate Boom Weight	830 lb (376 kg)
Outer Boom Weight	1,580 lb (717 kg)
Boom Extend Cylinder	537 lb (244 kg)
Length (Carry Position) Maximum	312 in. (7925 mm)
Width	102 in. (2591 mm)
Height (Maximum)	101 in. (2565 mm)
Wheelbase	124 in. (3150 mm)
Track Width (Tread)	81.3 in. (2065 mm)

Capacities:

Fuel Tank	44 gal. (166.5 L)
Cooling System	8 gal. (30 L)
Hydraulic Oil Reservoir	56.6 gal. (214 L)
Engine Crankcase	15 qt (14 L)
Transmission	5.5 gal. (21 L)

Miscellaneous:

Lift (Maximum)	6,000 lbs (2722 kg)
Lift Height	26 ft (7.9 m)
Boom Lift Angle (Maximum)	45 degrees
Maximum Reach from Load Center to Front Tires	24.16 ft (7.36 m)
Maximum Reach Below Grade	20 in. (508 mm)
Ground Clearance	14.3 in. (363.22 mm)
Turning Radius (Curb to Curb)	15 ft 4 in. (4.7 mm)
Frame Oscillation	9 degrees to the left or right
Fording Depth (Freshwater)	30 in. (762 mm)
Travel Speed (Maximum)	23 mph (37 kmh)

EQUIPMENT OPERATION

With a special lifting tool positioned on the forks, the 6K Forklift can load and unload Multiple Launch Rocket System (MLRS) pods from transport vehicles and containers. The tool which fits over the forks and allows the MLRS pods to be moved is called the MLRS lifting tool.

EQUIPMENT OPERATION - CONTINUED

The 6K Forklift can also be used for many standard rough terrain forklift tasks. When used as a standard forklift, the MLRS lifting tool is removed from the vehicle forks and placed in its storage position. A load backrest is then installed. In this configuration, the 6K Forklift can load and unload single and double stacked pallets from 20 ft (6.1 m) long ISO shipping containers. The containers can be on the ground or on trailers.

SAFETY, CARE AND HANDLING

Correct servicing procedures must be followed to ensure the safety of technicians working on the 6K Forklift. Refer to the warning summary of this manual for a list of safety precautions peculiar to this vehicle.

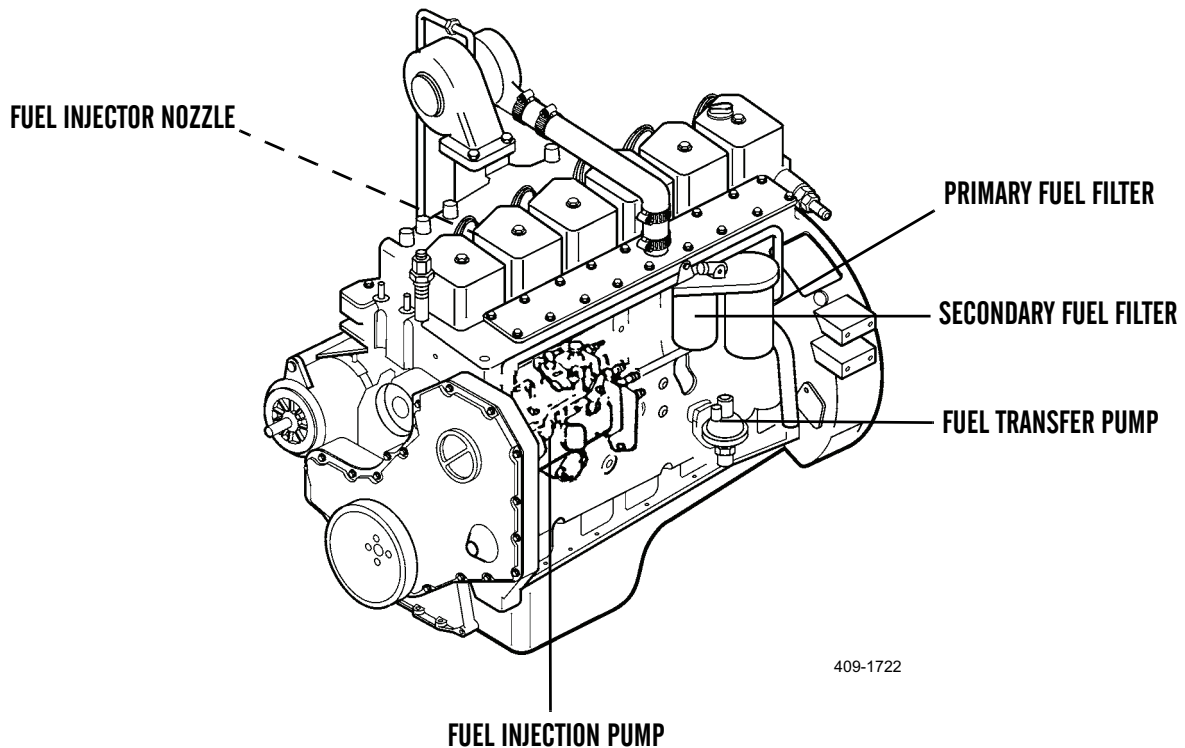
END OF WORK PACKAGE

INTRODUCTION

This section explains how components of the 6K Forklift work together. A functional description is given for the fuel system, engine lubrication system, engine cooling system, steering and brake system, electrical system, and hydraulic system.

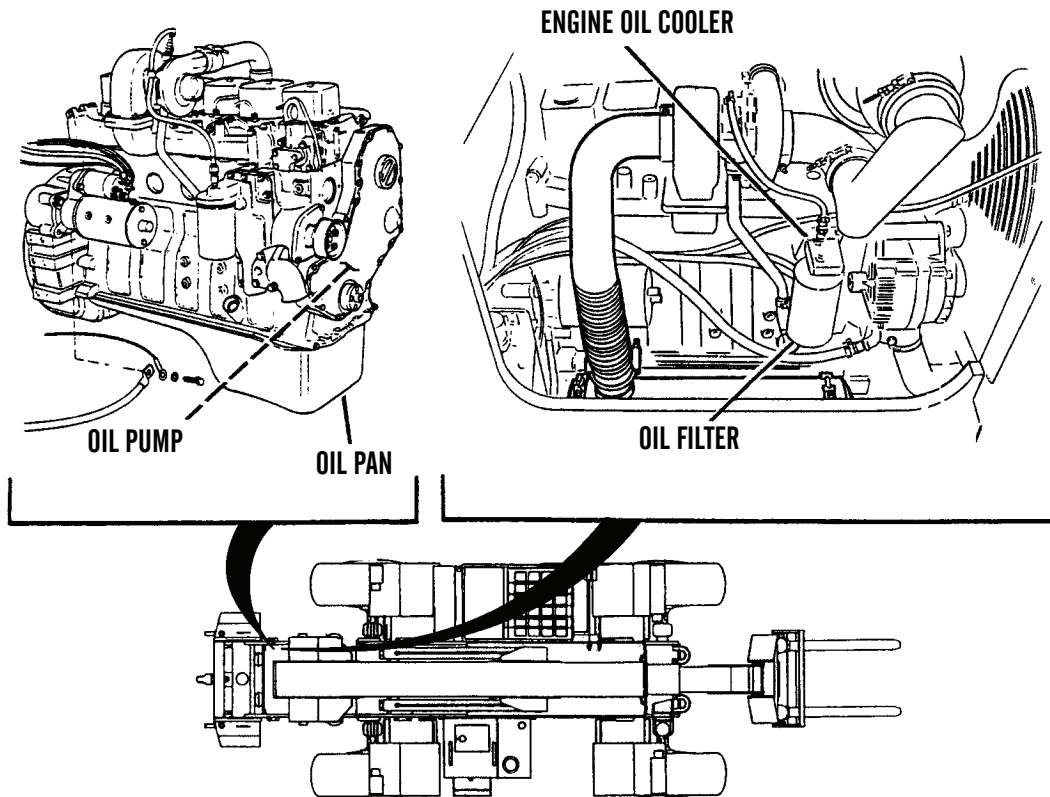
FUEL SYSTEM

1. **Water Separator.** Removes moisture from fuel.
2. **Fuel Filter.** Removes larger particles from fuel before it reaches the transfer pump. Consists of primary and secondary filter elements.
3. **Fuel Transfer Pump.** Pulls fuel from fuel tank through the fuel filter, and sends it to the fuel injection pump.
4. **Fuel Injection Pump.** Sends exact amount of fuel to the injector nozzles.
5. **Fuel Injection Nozzle.** Turns stream of fuel into a fine spray which permits good combustion in the cylinder. Each cylinder has one nozzle.



ENGINE LUBRICATION SYSTEMS

1. **Oil Pump.** Located on the front housing cover side. The pump draws oil from the oil pan, sends it through the oil cooler, and then through the oil filter. From the filter, oil enters the cylinder block to lubricate the engine and then returns to the oil pan. From the filter, oil is also sent through the turbocharger and then returned to the oil pan.
2. **Oil Pan.** Contains oil that lubricates moving parts in the engine. Located at the bottom of the engine.
3. **Engine Oil Cooler.** When the engine is warm, oil is sent through the oil cooler, which lowers oil temperature.
4. **Oil Filter.** Removes particles from oil which could cause damage to internal parts of engine.



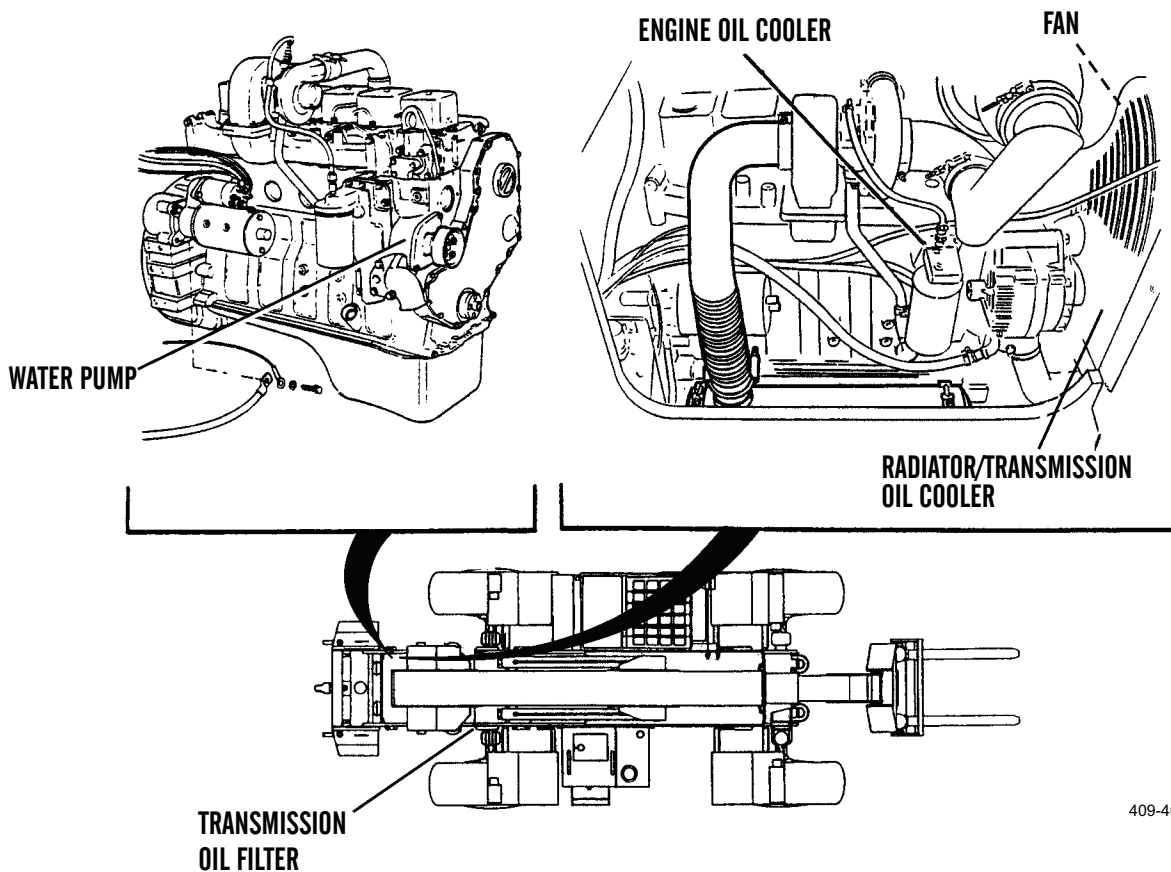
409-4014

ENGINE COOLING SYSTEM

1. **Water Pump.** Draws coolant from radiator and sends it through oil cooler cavity and cylinder block to cool engine. Coolant is then returned to radiator.
2. **Engine Oil Cooler.** The engine oil cooler baffle allows engine coolant to cool engine oil.
3. **Fan.** The fan is turned by the engine drive belt, creating air flow through the radiator to lower the temperature of the coolant as it passes through radiator.
4. **Radiator.** The 6K Forklift cooling system uses an overflow system. The system is full when 2 qt (1.9 L) of coolant are visible in the overflow bottle. Coolant circulates through the radiator to be cooled after leaving the cylinder block.

TRANSMISSION COOLING AND LUBRICATION SYSTEMS

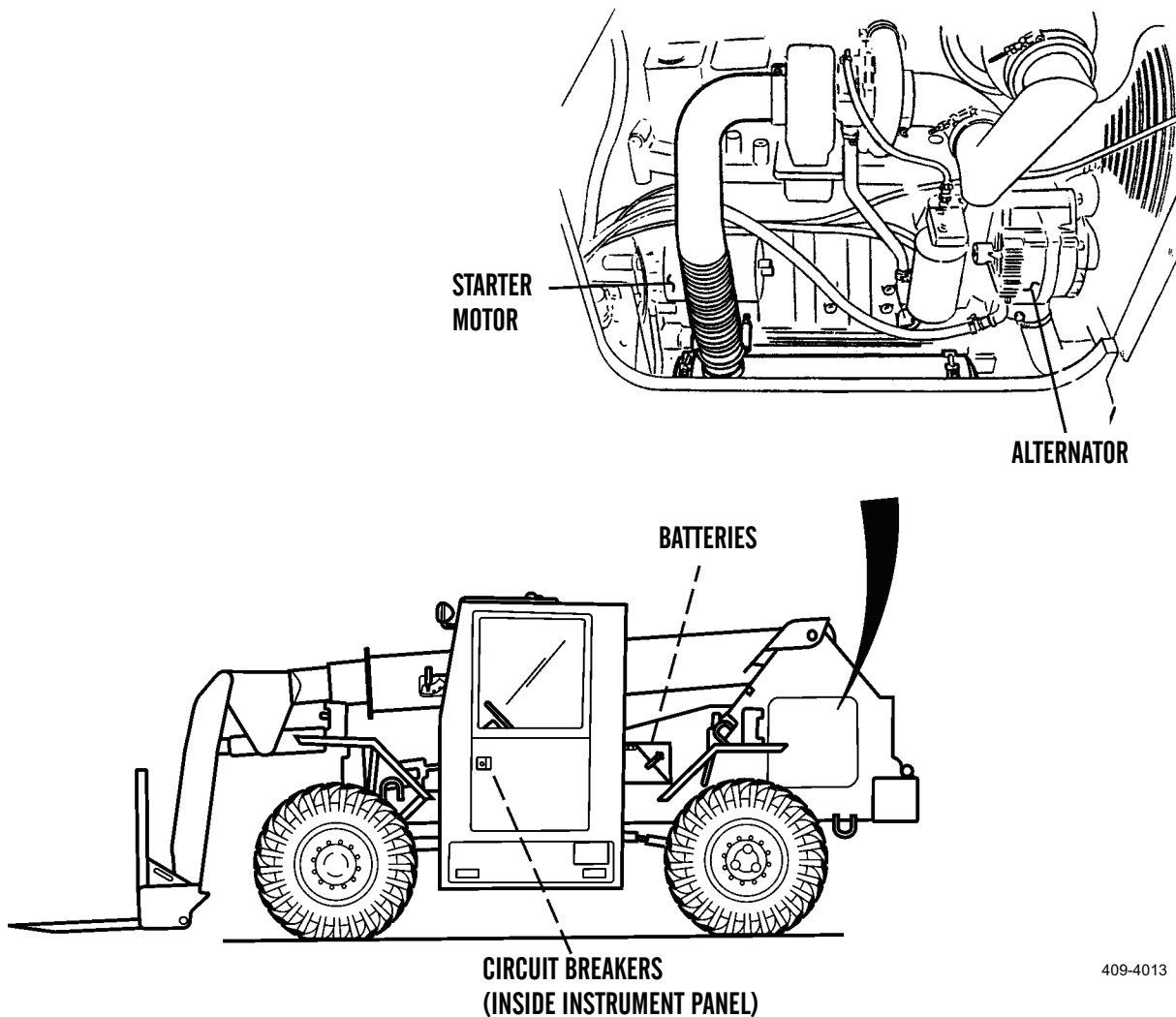
1. **Transmission Oil Cooler.** Cools transmission oil to help prevent transmission overheating. Oil is drawn through the cooler by the transmission.
2. **Transmission Oil Filter.** Removes particles from transmission oil which could cause damage to internal parts of transmission.



409-4015

ELECTRICAL SYSTEM

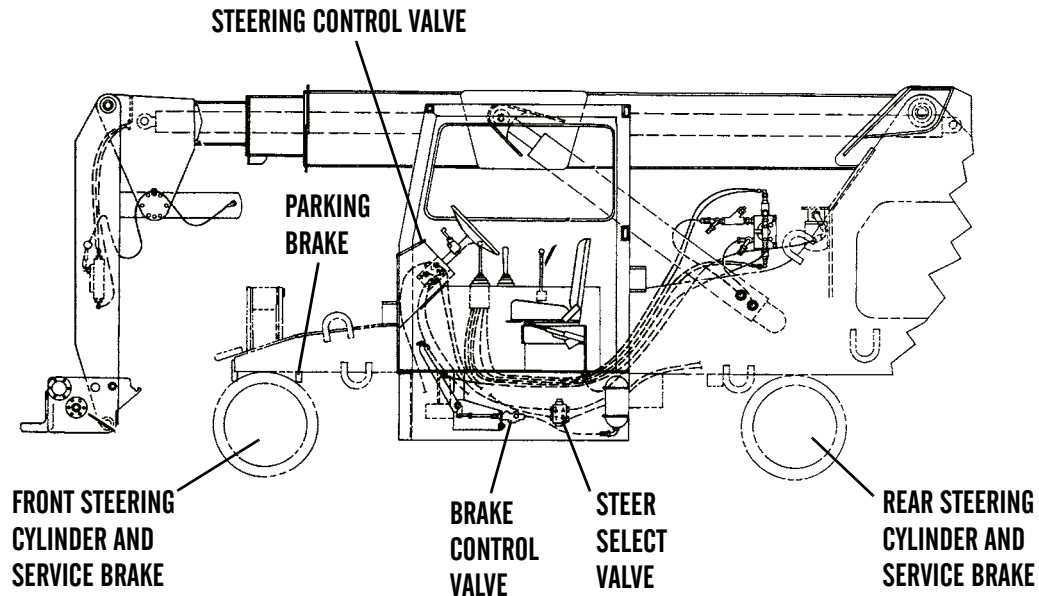
1. **Batteries.** Provide power for three circuits: charging, starting, and lighting. Two 12-volt batteries are connected in series to provide starting power.
2. **Alternator.** The 24-volt, 65-amp alternator, an integral part of the charging circuit, provides current to charge the batteries when the engine is running.
3. **Starter Motor.** Part of the starting circuit, the starter motor turns the engine flywheel fast enough to start the engine running.
4. **Circuit Breakers.** A switch that opens the battery circuit if there is a shorted, ground wire, or excessive current draw by a defective component in the corresponding circuit. The circuit breakers will reset once they cool. If a breaker continually trips, the electrical system requires repair.



409-4013

STEERING AND BRAKE SYSTEMS

1. **Steering Cylinders.** Two cylinders are mounted at each axle and controlled by the steering wheel.
2. **Steering Control Valve.** Connected directly to the steering wheel and located behind the instrument access panel. Controls the steering function.
3. **Steer Select Valve.** Externally mounted under the cab. Allows the selection of two wheel, four wheel or crab steering.
4. **Brake Control Valve.** Located under the cab. Provides a priority flow to the brake system. Excess flow is directed by the priority valve to the frame tilt system.
5. **Service Brakes.** Dry disc type brakes are mounted on all four wheels. The service brakes are hydraulically actuated. An accumulator in the braking system provides a limited number of stops without engine power.
6. **Parking Brake.** Mechanically actuated drum brakes are mounted on the front axle input shaft. A lever in the operator station engages and disengages the parking brake.

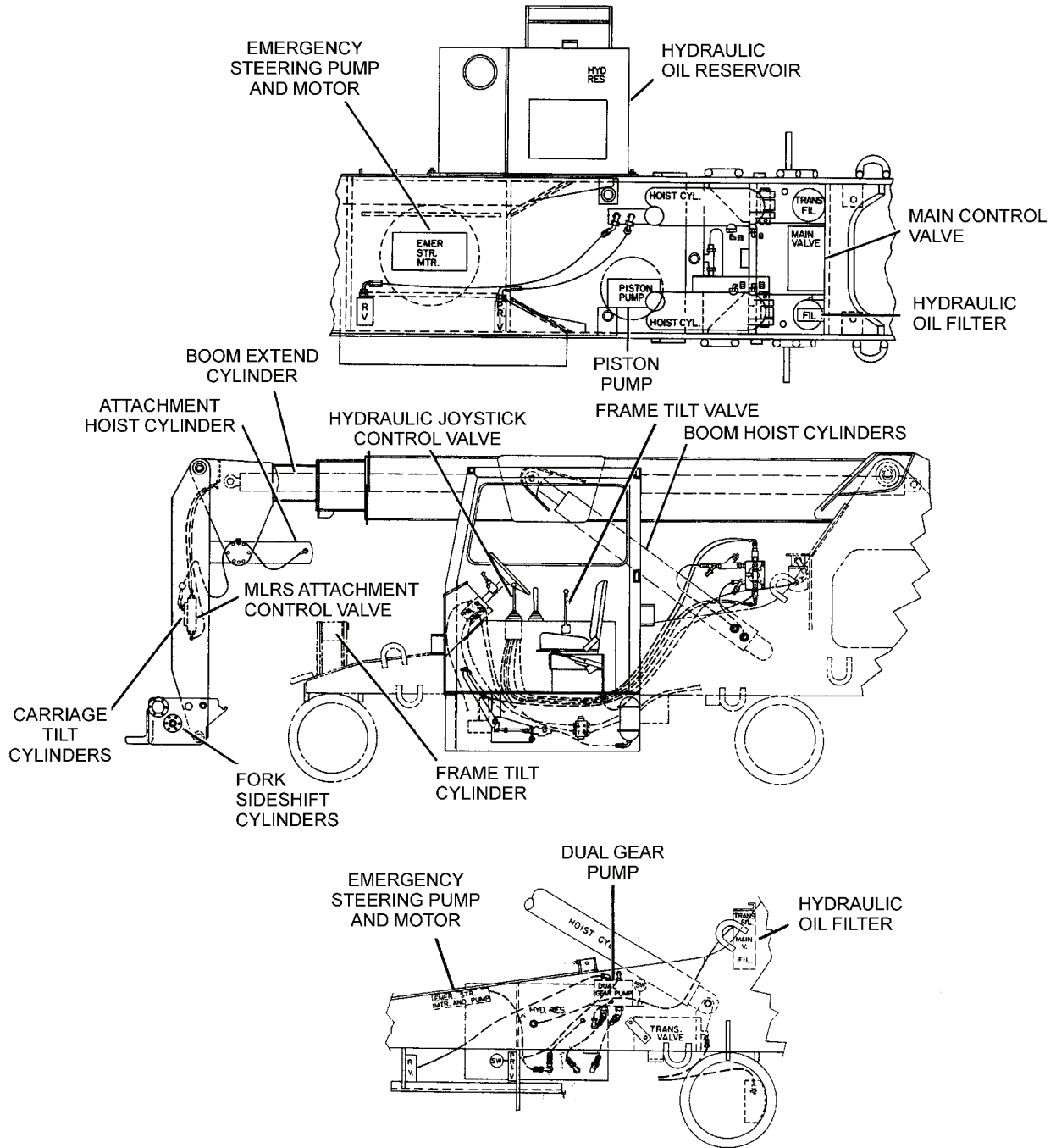


409-114

HYDRAULIC SYSTEM

1. **Hydraulic Oil Reservoir.** Contains oil for the entire hydraulic system.
2. **Hydraulic Oil Filter.** Removes smaller harmful particles from the oil before the oil is returned to the reservoir.
3. **Main Control Valve.** Located on the engine compartment bulkhead of the main frame (near back of transmission). Controls two boom functions: boom hoist/lowering and extend/retract.
4. **MLRS Attachment Control Valve.** Mounted on the attachment, controlled by an electrical joystick and electrical cable down the length of the boom. Controls three attachment functions: hoist/lowering, fork tilt, and fork side shift.
5. **Frame Tilt Valve.** Mounted inside the console located to the right of the operator seat. Controls tilting of vehicle frame.
6. **Hydraulic Joystick Control Valve.** Located on side console in cab. Controls boom functions: raise, lower, extend, and retract.
7. **Dual Gear Pump.** Mounted to the transmission. This two-section pump supplies functions: boom hoist, boom extend, steering, brake and frame tilt.
8. **Piston Pump.** Mounted to the transmission. This pump supplies the following functions: attachment hoist, fork tilt, left fork control, right fork control, load side shift control.
9. **Emergency Steering Pump and Motor.** Located in the vehicle forward of the transmission. This pump supplies 5 gpm (19 l/min) of emergency flow to the steering system whenever the ignition is on and there is a loss of hydraulic and engine oil pressure. The pump is driven by an electric motor.
10. **Fork Sideshift Cylinders.** These are two cylinders controlled by one joystick control. The joystick controls sideshift, the left fork and right fork functions. Both cylinders can be operated at the same time to sideshift forks left or right, to move forks together or apart. Also, the cylinders can be operated individually.
11. **Carriage Tilt Cylinders.** These are two cylinders controlled by the fork tilt joystick control. Moving the lever to the right causes the cylinders to extend and the fork tips to raise. Moving the lever to the left causes the cylinder to retract and the fork tips will lower.
12. **Attachment Hoist Cylinder.** This cylinder is controlled by the attachment hoist control joystick. When the lever is pushed forward, pressure oil from the hydraulic reservoir causes the cylinder to retract. When the lever is pulled back, the cylinder will extend and raise the MLRS attachment.
13. **Boom Extend Cylinder.** This cylinder is controlled by the boom extend and retract joystick control. Moving the lever to the left causes the cylinder to retract and moves the MLRS attachment near to the vehicle. Moving the lever to the right causes the cylinder to extend and increase the reach distance or the height of the forks, depending on the angle of the boom.
14. **Frame Tilt Cylinder.** This cylinder is controlled by the frame tilt control joystick. When the lever is moved forward, pressure oil from the hydraulic oil reservoir causes the cylinder to retract and tilt the vehicle to the left. Pulling the lever back causes the cylinder to extend and tilt the frame to the right.
15. **Boom Hoist Cylinders.** There are two cylinders controlled by the boom hoist control joystick. When the lever is moved forward, pressurized oil from the hydraulic oil reservoir causes the cylinder to retract. Moving the lever backward causes the cylinder to extend.

HYDRAULIC SYSTEM - CONTINUED



409-4016

END OF WORK PACKAGE

CHAPTER 2
TROUBLESHOOTING PROCEDURES

INTRODUCTION

1. Troubleshooting procedures in this chapter contain information you need to locate fault malfunctions on the 6K Forklift Variable Reach Rough Terrain Forklift and its components.
2. A *Troubleshooting Symptom Index* in WP 0005 00 is provided to aid in locating a malfunction or symptom and directs you to the appropriate troubleshooting procedure in WP 0006 00 and WP 0007 00.
3. Troubleshooting procedures in this manual cannot provide all the answers or correct all malfunctions encountered. However, these procedures are an organized step-by-step approach to a problem, that directs tests and inspections toward the source of the problem and its successful resolution.
4. If a malfunction is not listed in the *Troubleshooting Symptom Index* in WP 0005 00, or stated tests or inspections and corrective actions do not correct the problem, notify your supervisor.
5. Before performing troubleshooting, read and follow all safety instructions found in the Warning Summary at the front of this manual.
6. Troubleshooting procedures in WP 0006 00 are located as follows:
 - a. Table 1. Charging System Troubleshooting Procedures.
 - b. Table 2. Starting System Troubleshooting Procedures.
 - c. Table 3. Gauges and Meters System Troubleshooting Procedures.
 - d. Table 4. Lighting System Troubleshooting Procedures.
 - e. Table 5. Battery System Troubleshooting Procedures.
 - f. Table 6. Cab Group Troubleshooting Procedures.
 - g. Table 7. MLRS Attachment Group Troubleshooting Procedures.
 - h. Table 8. Engine System (Unit) Troubleshooting Procedures.
 - i. Table 9. Cooling System Troubleshooting Procedures.
 - j. Table 10. Transmission Troubleshooting Procedures.
 - k. Table 11. Axles and Differential Troubleshooting Procedures.
 - l. Table 12. Braking System (Unit) Troubleshooting Procedures.
 - m. Table 13. Hydraulic System (Unit) Troubleshooting Procedures.
 - n. Table 14. Engine System (DS) Troubleshooting Procedures.
 - o. Table 15. Powertrain System Troubleshooting Procedures.
 - p. Table 16. Steering System Troubleshooting Procedures.
 - q. Table 17. Braking System (DS) Troubleshooting Procedures.
 - r. Table 18. Hydraulic System (DS) Troubleshooting Procedures.
7. Troubleshooting procedures for STE/ICE-R are in WP 0007 00.

PRELIMINARY TROUBLESHOOTING PROCEDURES

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

PRELIMINARY TROUBLESHOOTING PROCEDURES - CONTINUED**NOTE**

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

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

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

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

- a. Visually check for ruptured fluid hoses or tubes and for Class II or Class III leaks.
 - b. Check for mechanical jamming or binding caused by rocks or other foreign matter.
 - c. Check fluid levels in subject area and service as required (TM 10-3930-660-10).
2. Ensure all applicable Operator Troubleshooting has been performed before proceeding.

EXPLANATION OF TROUBLESHOOTING TABLE COLUMNS

1. The columns in troubleshooting Tables in WP 0006 00 are defined as follows:

MALFUNCTION. Indicates fault that has occurred in system/equipment.

TEST OR INSPECTION. Indicates test or inspection to be performed to isolate probable cause for fault symptom.

CORRECTIVE ACTION. Indicates procedure to correct the problem.

2. Analyze the symptoms and conditions and to determine the most likely cause for the problem, then troubleshoot that circuit first. The more information you have concerning the problem, the easier it will be to troubleshoot.
3. Isolate to the subsystem level (in cases where more than one subsystem is involved); next isolate the problem to a single circuit within the subsystem; then, isolate the problem to the faulty component using the *Troubleshooting Symptom Index* (WP 0005 00).
4. Frayed, broken, loose or corroded wiring is a common source of problems in any electrical circuit. Always make visual inspection before starting detail troubleshooting. Observe in particular contacts to ground. Components with case grounds are especially troublesome.

CAUTION

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

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

END OF WORK PACKAGE

TROUBLESHOOTING SYMPTOM INDEX

0005 00

Malfunction/Symptom Troubleshooting Procedure Page

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STARTING SYSTEM

Starter Motor Keeps Running 0006 00-4

Starter Turns Engine Slowly 0006 00-3

Starting Motor Will Not Turn 0006 00-2

GAUGES AND METERS SYSTEM

A Temperature or Pressure Gauge Does Not Work 0006 00-5

All Gauges and Hourmeters Do Not Work 0006 00-5

Fuel Gauge and Level Gauge Do Not Work or Give Inaccurate Fuel Level Readings 0006 00-5

LIGHTING SYSTEM

Backup Alarm Does Not Sound 0006 00-9

Blackout Lights Do Not Work 0006 00-7

Floodlight(s) Do Not Work 0006 00-7

Floodlights, Horn and Backup Alarm Operate in Blackout Mode 0006 00-7

Horn Does Not Sound 0006 00-8

BATTERY SYSTEM

Low Battery Output 0006 00-10

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Engine Cranks But Will Not Start (No Smoke From Exhaust) 0006 00-15

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Engine Lubricating Oil Loss 0006 00-24

Engine Lubricating Oil Pressure Low 0006 00-23

Engine Lubricating Oil Pressure Too High 0006 00-23

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Malfunction/Symptom Troubleshooting **Procedure Page**

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Emergency Steering Pump Motor Will Not Start or Does Not Rotate Freely 0006 00-35

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END OF WORK PACKAGE

Table 2. Starting System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Starting Motor Will Not Turn.</p>	<ol style="list-style-type: none"> 1. Check for corroded or loose battery terminal or cable. 2. Check for low battery output with STE/ICE-R. 3. Check if circuit breaker (CB6) is tripped. <ol style="list-style-type: none"> a. The circuit breaker will trip if there is a shorted or grounded wire. b. The circuit breakers will automatically reset after cooling. They cannot be reset manually. c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00). 4. Check for continuity of start switch between CB6 and neutral safety switch (WP 0109 00). 5. Check for broken or disconnected wiring. 6. Check for operation of neutral safety switch. 7. Check for operation of starting relay. 	<p>Clean and tighten cables as required (WP 0107 00).</p> <p>Test battery voltage using STE/ICE-R Test 67. Battery voltage should be 24 volts or higher. Service or replace batteries as required if voltage is below minimum requirement (TM 9-6140-200-14).</p> <p>Replace if necessary (WP 0109 00).</p> <p>Test safety switch (WP 0066 00).</p> <p>Listen to relay for "click." If click is not heard, check coil continuity (WP 0081 00). Replace relay if necessary (WP 0081 00).</p>

Table 2. Starting System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>2. Starter Turns Engine Slowly.</p>	<p>1. Check for low battery output with STE/ICE-R.</p> <p>2. Check for proper starting system operation with STE/ICE-R.</p> <p>3. Check for proper engine oil.</p>	<p>Test battery voltage using STE/ICE-R Test 67. Battery voltage should be 24 volts or higher. Service or replace batteries as required if voltage is below minimum requirement (TM 9-6140-200-14).</p> <p>Test starting system using STE/ICE-R Tests 68, 69, 70, 71 and 72.</p> <ul style="list-style-type: none"> a. Results of Test 68 starter motor voltage test should be between 18 and 275 volts. b. Result of Test 69 starter negative cable voltage drop test should be between 0 and 3 volts. c. Result of Test 70 starter solenoid voltage test should be between 18 and 27.5 volts. d. Result of Test 89 starter solenoid voltage drop test should be less than 0.3 volts. e. Result of Test 71 starter current average test should be between 0 and 250 amps. f. Result of Test 72 starter current first peak test should be between 300 and 1000 amps. <p>If test parameters are not met, check for loose or corroded connections at battery and starting motor. Inspect, clean, and tighten all connections as required.</p> <p>Verify oil weight with oil sample (TM 10-3930-660-10). If incorrect, drain and add correct oil.</p>

Table 2. Starting System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Starter Motor Keeps Running.</p>	<ol style="list-style-type: none"> 1. Check for defective starter switch or short in wiring harness. 2. Check for defective starter relay. 	<p>Test starter switch and wiring harness for continuity (WP 0109 00 and WP 0110 00). Repair or replace as necessary (WP 0072 00, WP 0109 00 and WP 0110 00).</p> <p>Test starter relay for continuity. Replace if defective (WP 0081 00).</p>

Table 3. Gauges and Meters System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. All Gauges and Hourmeter Do Not Work.</p>	<p>1. Check if circuit breaker (CB1) is tripped.</p> <p>a. The circuit breaker will trip if there is a shorted or grounded wire.</p> <p>b. The circuit breakers will automatically reset after cooling. They cannot be reset manually.</p> <p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p> <p>2. Check for defective starter relay.</p>	<p>Check circuit for shorts, bad ground or defective electrical components. Refer to the <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Check if starter relay closes. If not, replace starter relay (WP 0081 00).</p>
<p>2. A Temperature or Pressure Gauge Does Not Work.</p>	<p>1. Check continuity of gauge wiring harness (WP 0109 00).</p> <p>2. Check for poor ground connection.</p> <p>3. Check for grounding of wire between gauge and sender.</p> <p>4. Check gauge and sender for defects.</p>	<p>Replace broken wires or tighten loose connections (WP 0109 00).</p> <p>Check for poor ground connection at sender.</p> <p>Inspect wire between gauge and sender for grounding. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Replace gauge and/or sender if defective (WP 0068 00, WP 0099 00 and WP 0100 00).</p>
<p>3. Fuel Gauge and Level Gauge Do Not Work or Give Inaccurate Fuel Level Readings.</p>	<p>1. Check continuity of gauge wiring harness (WP 0109 00).</p>	<p>Replace broken wires or tighten loose connections (WP 0109 00).</p>

Table 3. Gauges and Meters System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Fuel Gauge and Level Gauge Do Not Work or Give Inaccurate Fuel Level Readings - Continued.</p>	<p>2. Check for poor ground connection.</p> <p>3. Check for grounding wire between gauge and fuel level sender.</p> <p>4. Check for defective gauge, defective fuel level sender, or fuel-saturated float.</p>	<p>Make sure circuit has good ground connection at the sender. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Inspect wire between fuel level sender and gauge for grounding. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Replace gauge and/or fuel level sender if necessary (WP 0068 00 and WP 0102 00).</p>

Table 4. Lighting System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Blackout Lights Do Not Work.</p>	<p>1. Check for tripped circuit breaker (CB4), faulty switch, faulty wiring, or faulty circuit breaker (CB4).</p> <p>a. The circuit breaker will trip if there is a shorted or grounded wire.</p> <p>b. The circuit breakers will automatically reset after cooling. They cannot be reset manually.</p> <p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p> <p>2. Check circuit for shorts and bad grounds. Refer to the <i>Electrical Schematic</i> (WP 0326 00).</p>	<p>Replace defective electrical components as required (WP 0071 00, WP 0094 00, WP 0096 00 and WP 0097 00).</p>
<p>2. Floodlights, Horn, and Backup Alarm Operate in Blackout Mode.</p>	<p>Check for defective blackout light relay (RY 2).</p>	<p>Test and, if necessary, replace console-mounted blackout light relay (RY 2) (WP 0083 00).</p>
<p>3. Floodlight(s) Do Not Work.</p>	<p>1. Check that floodlight bulbs have not failed.</p> <p>2. Check if circuit breaker (CB 7) is tripped.</p> <p>a. The circuit breakers will trip if there is a shorted or grounded wire.</p> <p>b. The circuit breakers will automatically reset after cooling. They cannot be reset manually.</p>	<p>Replace bulbs if necessary (WP 0095 00).</p> <p>Check circuit breaker for shorts, broken wire, or bad ground. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p>

Table 4. Lighting System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Floodlight(s) Do Not Work - Continued.</p>	<p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p> <p>3. Check for bad ground connection, broken wire, loose connections, or faulty floodlight assembly.</p> <p>4. Check for defective light switches.</p>	<p>Test floodlight assembly and wires for continuity (WP 0109 00 and WP 0110 00). Replace if defective.</p> <p>Test for continuity in boom, front, and rear floodlight switches. Replace switches if defective (WP 0069 00).</p>
<p>4. Horn Does Not Sound.</p>	<p>1. Check if circuit breaker (CB 10) is tripped.</p> <p>a. The circuit breakers will trip if there is a shorted or grounded wire.</p> <p>b. The circuit breakers will automatically reset after cooling. They cannot be reset manually.</p> <p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p> <p>2. Check for defective horn button or wires.</p> <p>3. Check for defective light switch.</p> <p>4. Check blackout light switch.</p>	<p>Test circuit for shorts, broken wire or bad ground. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Test horn button and wires for continuity (WP 0109 00).</p> <p>Test horn, replace if necessary (WP 0105 00).</p> <p>Replace switch if defective (WP 0094 00).</p>

Table 4. Lighting System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>5. Backup Alarm Does Not Sound.</p>	<ol style="list-style-type: none"> 1. Check if circuit breaker (CB 2) is tripped. <ol style="list-style-type: none"> a. The circuit breakers will trip if there is a shorted or grounded wire. b. The circuit breaker will automatically reset after cooling. They cannot be reset manually. c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00). 2. Check for defective backup alarm switch, broken switch wires, or loose connections. 3. Check for defective backup alarm. 4. Check for defective blackout light switch. 5. Check for bad or weak cell in battery. 	<p>Check backup alarm circuit for shorts, broken wire, or bad ground. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Check switch and switch wires for continuity (WP 0109 00).</p> <p>Test backup alarm. Replace if defective (WP 0103 00).</p> <p>Replace switch if defective (WP 0094 00).</p> <p>Test battery using hydrometer (TM 9-6140-200-14).</p>

Table 5. Battery System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>Low Battery Output.</p>	<ol style="list-style-type: none"> 1. Check for low electrolyte level in battery. 2. Check for loose or corroded battery cables. 3. Check for bad or weak cell in battery. 	<p>Add distilled water to battery. Charge battery (WP 0106 00 and TM 9-6140-200-14).</p> <p>Clean and tighten cables (WP 0107 00).</p> <p>Test battery using hydrometer (TM 9-6140-200-14).</p>

Table 6. Cab Group Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Both Front and Rear Wipers and Washer Do Not Work.</p>	<p>1. Check if circuit breaker (CB 3) is tripped.</p> <p>a. The circuit breakers will trip if there is a shorted or grounded wire.</p> <p>b. The circuit breakers will automatically reset after cooling. They cannot be reset manually.</p> <p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p> <p>2. Check for faulty wiring in circuit.</p> <p>Check for poor ground connections. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>Check for broken wires and loose connections (WP 0109 00).</p> <p>3. Check for defective engine run relay.</p>	<p>Check circuit for shorts, bad ground, or defective electrical components. Refer to the <i>Electrical Schematic</i> (WP 0326 00). Replace defective components (WP 0071 00, WP 0109 00 and WP 0083 00).</p> <p>Test engine run relay and, if necessary, replace the relay (WP 0083 00).</p>
<p>2. Front Wiper, Rear Wiper or Washer Does Not Work.</p>	<p>1. Check for defective wiper or washer switch(es).</p> <p>2. Check for faulty wiring in the circuit.</p>	<p>Check the switch(es) for continuity. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>1. Check for poor ground connections. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p> <p>2. Check for broken wires and loose connections (WP 0109 00).</p>

Table 6. Cab Group Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>2. Front Wiper, Rear Wiper or Washer Does Not Work - Continued.</p>	<p>3. Check for defective wiper or washer motor(s).</p>	<p>Replace wiper motor or washer reservoir assembly if motor(s) are defective (WP 0163 00, WP 0164 00 and WP 0165 00).</p>
<p>3. Heater Fans and Cab Fans Do Not Work.</p>	<p>Check if circuit breaker (CB 8) is tripped.</p> <ul style="list-style-type: none"> a. The circuit breakers will trip if there is a shorted or grounded wire. b. The circuit breakers will automatically reset after cooling. They cannot be reset manually. c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00). 	<p>Check circuit for shorts, broken wire or bad ground. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p>
<p>4. Only One Heater Fan Works on High Speed.</p>	<p>Check for bad ground connection, loose connections or defective switch.</p>	<p>Check switch and wires for continuity (WP 0313 00 and WP 0109 00). Replace switch if required (WP 0069 00). If necessary, replace broken wire (WP 0109 00).</p>

Table 7. MLRS Attachment Group Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. One or More Fork, Carriage, or Attachment Functions Not Working.</p>	<ol style="list-style-type: none"> 1. Check for defective electrical joystick controller. 2. Check for shorted or damaged connector plug(s) on joystick harness and boom electric cable bulkhead connector at rear of boom, and for broken or damaged wire(s) and/or loose connections. 3. Check connections and wires for continuity. Check continuity between the electric joystick and MLRS valve. Refer to <i>Electrical Schematic</i> (WP 0326 00, WP 0109 00 and WP 0111 00). 	<p>Test and, if necessary, replace electric joystick assembly (WP 0078 00).</p> <p>Replace wires as necessary (WP 0109 00 and WP 0111 00).</p>
<p>2. Forks Will Not Auto Level.</p>	<ol style="list-style-type: none"> 1. Check that fork auto leveler switch is on. 2. Check fork auto leveler switch for defects. 3. Check for damaged or broken wire(s) from toggle switch to fork auto leveler switch. 4. Check for defective fork auto leveler switch or circuit board. 	<p>Move control to ON position (TM 10-3930-660-10).</p> <p>Replace fork auto leveler switch if defective (WP 0080 00).</p> <p>Repair or replace wire(s) as necessary (WP 0109 00 and WP 0110 00).</p> <p>Test fork auto leveler switch or circuit board and replace if defective (WP 0079 00 and WP 0080 00).</p>
<p>3. Fork Auto Leveling and Electric Joystick Do Not Work.</p>	<p>Check if circuit breaker (CB 5) is tripped.</p> <ol style="list-style-type: none"> a. The circuit breakers will trip if there is a shorted or grounded wire. b. The circuit breakers will automatically reset after cooling. They cannot be reset manually. 	<p>Check circuit for shorts, broken wires or bad ground. Refer to <i>Electrical Schematic</i> (WP 0326 00).</p>

Table 7. MLRS Attachment Group Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Fork Auto Leveling and Electric Joystick Does Not Work - Continued.</p>	<p>c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00).</p>	
<p>4. MLRS Attachment Hoist/Lower Function Does Not Work.</p>	<p>1. Check for defective electrical joystick assembly.</p> <p>2. Check for bad ground or loose connections.</p>	<p>Check electrical joystick assembly and replace if defective (WP 0078 00).</p> <p>Inspect wires and connections (WP 0109 00 and WP 0110 00).</p>

Table 8. Engine System (Unit) Troubleshooting Procedures.

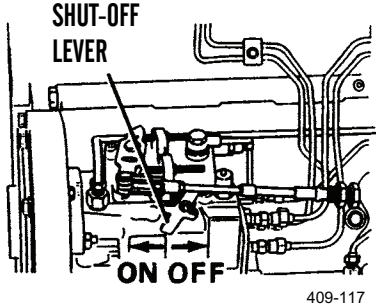
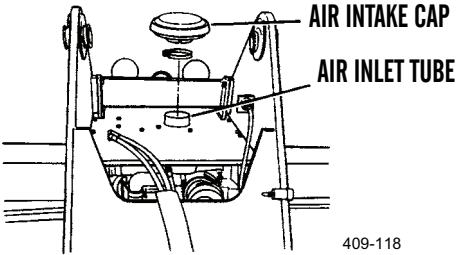
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Engine Cranks But Fails to Start.</p> <p>2. Engine Cranks But Will Not Start - No Smoke From Exhaust.</p>	<p>Refer to <i>Starting System</i> section of Electrical Troubleshooting, Table 1.</p> <p>1. Check for fuel in fuel tank.</p> <p>2. Check for fuel shutoff solenoid or manual fuel shutoff valve not open.</p>	<p>Add fuel if required (TM 10-3930-660-10).</p> <p>a. Tighten loose wires and verify that the fuel shutoff solenoid is functioning (WP 0020 00 or WP 0021 00).</p>
	<p>3. Check for plugged air intake or exhaust system.</p>	<p>b. Check that the mechanical shutdown lever is placed in ON position.</p> <p>a. Remove and clean air intake cap. Clean air inlet tube.</p>
	 <p>409-117</p>	
	 <p>409-118</p>	

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

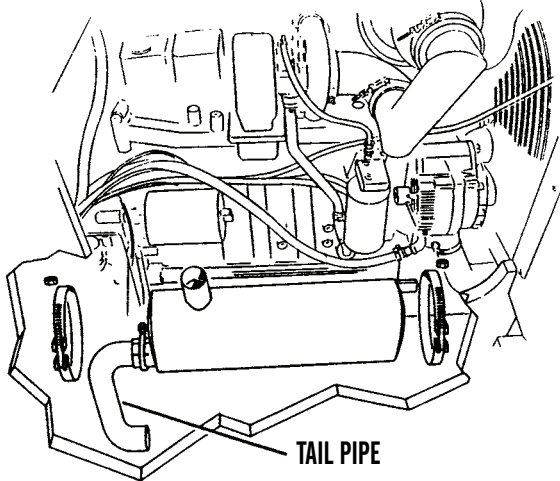
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>2. Engine Cranks But Will Not Start - No Smoke From Exhaust - Continued.</p>		<p>b. Remove and clean tail pipe.</p>
 <p>409-119</p>		
<p>3. Engine Hard to Start or Will Not Start - Smoke From Exhaust.</p>	<p>4. Check for plugged fuel filter.</p> <p>5. Check for lack of fuel at injection pump or aerated fuel.</p> <p>1. Check for cranking speed too slow.</p> <p>a. Check for low battery output with STE/ICE-R. Battery voltage should be 24 volts or higher.</p> <p>b. Check starting system. Refer to <i>Starting System</i> section of Electrical Troubleshooting Table 1.</p>	<p>Drain water separator or replace fuel filter head (TM 10-3930-660-10 and WP 0042 00 or WP 0043 00).</p> <p>Check for fuel flow from fuel transfer pump (WP 0022 00 or WP 0023 00).</p> <p>Service or replace batteries as required if voltage is below 24 volts (TM 9-6140-200-14).</p> <p>Repair and/or replace starting system components and wiring as necessary.</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Engine Hard to Start or Will Not Start - Smoke From Exhaust - Continued.</p>	<p>2. Check ether start aid operation.</p> <p>a. Remove ether start cartridge (WP 0045 00). Shake and listen for liquid splashing inside cartridge.</p> <div> </div> <p>b. Crank the engine and press the engine primer button for no longer than 5 seconds. Release the engine primer button and listen for ether start cartridge operation.</p> <p>c. If ether start aid operates, inspect ether start hose and atomizer for damage.</p> <p>d. If ether start aid is not operating, place starter-run control switch in the OFF position, and disconnect cable from negative (-) battery terminal.</p>	<p>If cartridge is empty, replace with a full one (WP 0045 00). Be sure to discard the old cartridge seal and install a new one.</p> <p>When primer button is released, a measured amount of starting fluid from the cartridge is injected into the engine.</p> <p>Replace if necessary (WP 0044 00).</p> <p>Inspect and check continuity of the ether start aid electrical wiring and thermostat. Refer to the <i>Electrical Schematic</i> (WP 0326 00). If necessary, replace broken wire(s) (WP 0109 00) or defective thermostat (WP 0046 00).</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>3. Engine Hard to Start or Will Not Start - Smoke From Exhaust - Continued.</p>	<p>3. Check for obstructions to intake air.</p>	<p>a. Remove and clean air cleaner intake cap. Clean air inlet tube.</p>
<p>4. Engine Surges (Speed Change).</p>	<p>4. Check for air in the fuel system for inadequate fuel supply.</p> <p>5. Check for contaminated fuel.</p> <p>1. If surging occurs at idle, check if idle speed is set too low for accessories.</p> <p>2. Check for high pressure fuel tank.</p>	<p>b. Service air cleaner elements (TM 10-3930-660-10).</p> <p>Bleed the fuel system (WP 0034 or WP 0035 00), or fill fuel tank as necessary (TM 10-3930-660-10).</p> <p>Obtain a sample (TM 10-3930-660-10). Verify by operating the engine with clean fuel from a temporary supply tank. Drain and flush the fuel supply tank.</p> <p>Adjust idle speed by adjusting accelerator cable as necessary (WP 0048 00 and WP 0049 00).</p> <p>Replace high pressure lines or tighten fittings, injector sealing washers or delivery valves (WP 0037 00).</p>

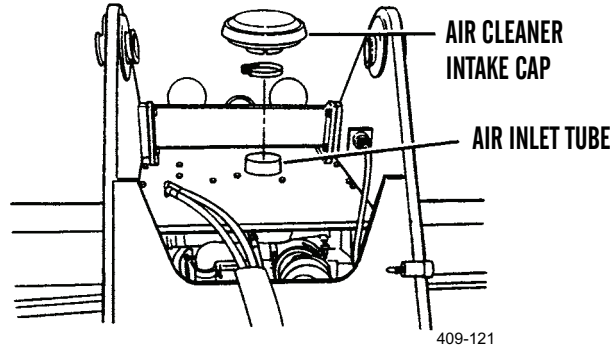


Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

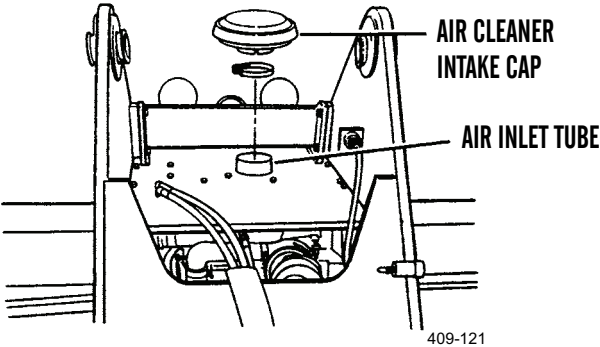
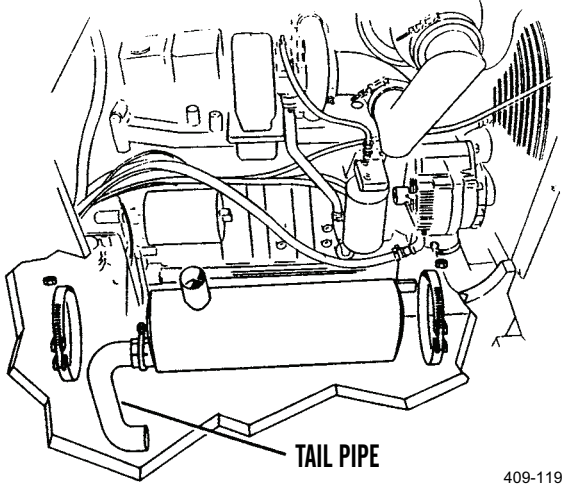
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>5. Engine Starts But Will Not Keep Running.</p>	<ol style="list-style-type: none"> 1. Check for idle speed too low for accessories. 2. Check for restrictions in intake air and exhaust systems. 	<p>Adjust idle speed by adjusting accelerator cable as necessary (WP 0048 00).</p> <ol style="list-style-type: none"> a. Remove and clean air cleaner intake cap. Clean air inlet tube.
 <p>A line drawing showing the top view of the engine's air intake system. A circular air cleaner intake cap is mounted on top of a cylindrical air inlet tube. The diagram is labeled with 'AIR CLEANER INTAKE CAP' and 'AIR INLET TUBE'. The part number '409-121' is located at the bottom right of the diagram.</p>		<ol style="list-style-type: none"> b. Remove and clean tail pipe.
 <p>A line drawing showing the engine's exhaust system. The tail pipe is shown extending from the engine block. The diagram is labeled with 'TAIL PIPE'. The part number '409-119' is located at the bottom right of the diagram.</p>		<ol style="list-style-type: none"> 3. Check for air in the fuel system or inadequate fuel supply. 4. Check for fuel waxing due to extremely cold weather. <p>Check the flow through the fuel filter and bleed the system (WP 0034 00 or WP 0035 00). Locate and correct the air leak.</p> <p>Inspect the fuel filter (WP 0042 00 or WP 0043 00). Clean the system and use climatized fuel.</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>5. Engine Starts But Will Not Keep Running - Continued.</p>	<p>5. Check for contaminated fuel.</p>	<p>Verify by operating the engine with clean fuel from a temporary supply tank. Drain and flush the fuel/hydraulic tank (WP 0032 00).</p>
<p>6. Rough Idle (Irregularly Firing or Engine Shaking).</p>	<p>1. Check for idle speeds too low for the accessories.</p> <p>2. Check for high pressure fuel leak.</p> <p>3. Check for air in the fuel system.</p>	<p>Adjust idle speed by adjusting accelerator cable as required (WP 0048 00 and WP 0049 00).</p> <p>Check for leaks in the high pressure lines, fittings, injection sealing washers or delivery valve seals. Replace defective parts as required (WP 0034 00 or WP 0035 00).</p> <p>Bleed the fuel system (WP 0034 00 or WP 0035 00). Locate and repair the leak.</p>
<p>7. Engine Runs Rough or Misfiring.</p>	<p>1. Fuel injection lines leaking.</p> <p>2. Check for air in the fuel or inadequate fuel supply.</p> <p>3. Check for contaminated fuel.</p>	<p>Inspect high pressure lines, fittings, injector sealing washers or delivery valves for leaks. Replace components as necessary (WP 0034 00 or WP 0035 00).</p> <p>Check for flow through the filter and bleed the system (WP 0034 00 or WP 0035 00). Locate and correct the air leak.</p> <p>Verify by operating the engine with clean fuel from a temporary tank. Drain and fill fuel/hydraulic tank if necessary (WP 0035 00).</p>
<p>8. Engine RPM Will Not Reach Rated Speed.</p>	<p>1. Check for overloaded engine.</p> <p>2. Check for accelerator linkage wear or incorrect adjustment.</p>	<p>Verify high idle speed without load. Investigate operation to be sure correct gear range is being used (TM 10-3930-660-10).</p> <p>Adjust accelerator cable linkage (WP 0048 00 or WP 0049 00).</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

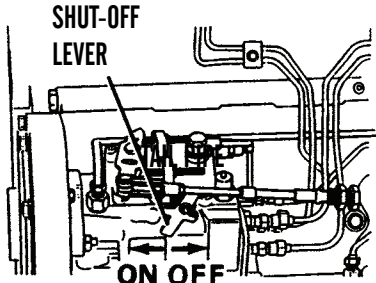
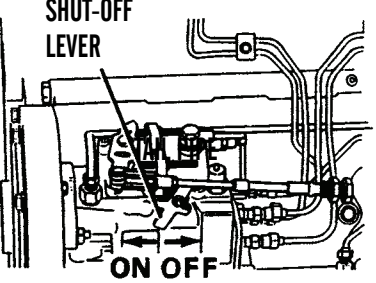
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>8. Engine RPM Will Not Reach Rated Speed - Continued.</p>	<p>3. Check for partially engaged manual fuel shutoff valve lever.</p>	<p>Check position of manual fuel shutoff valve lever. Be sure lever is placed in ON position.</p>
 <p>409-117</p>		
<p>9. Low Power.</p>	<p>4. Check for inadequate fuel supply.</p> <p>1. Check for fuel control lever not moving to full speed.</p> <p>2. Check for partially engaged manual fuel shutoff valve lever.</p>	<p>Check for and remove the source of fuel restriction (WP 0033 00 and WP 0042 00 or WP 0043 00).</p> <p>Adjust accelerator cable if necessary (WP 0048 00 or WP 0049 00).</p> <p>Verify that manual fuel shutoff valve lever is positioned fully in ON position.</p>
 <p>409-117</p>		
<p>3. Check for high oil level.</p> <p>4. Check for overloaded engine.</p> <p>Check for high oil level and drain oil if necessary (WP 0011 00).</p> <p>Check for added loading from malfunctioning accessories or driven units. Check for dragging brakes and other changes in vehicle loading.</p>		

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>9. Low Power - Continued.</p>	<p>5. Check for inadequate intake air and high or low temperature intake air.</p> <p>6. Check for high pressure fuel leak.</p> <p>7. Check for inadequate fuel supply.</p> <p>8. Check for poor quality fuel.</p> <p>9. Check for air leak between the turbocharger and the intake manifold.</p> <p>10. Check for leaks in the air crossover tube, hoses and through holes in the manifold cover. Replace parts as necessary (WP 0019 00 and WP 0028 00 or WP 0029 00).</p> <p>11. Check for leaks in the exhaust manifold or turbocharger gasket. Check for a cracked exhaust manifold. Replace parts as necessary (WP 0018 00 and WP 0026 or WP 0027 00).</p> <p>12. Check for excessive exhaust system restriction.</p>	<p>Inspect air cleaner element and replace if necessary. Check air intake system for other restrictions (WP 0024 00).</p> <p>Check for leaks in the high pressure lines and fittings. Replace components as necessary (WP 0034 00 or WP 0035 00).</p> <p>Check for clogged filter. Replace if necessary (WP 0042 00 and WP 0043 00).</p> <p>Check for poor quality fuel by operating vehicle from a temporary tank with good quality fuel. Drain and fill fuel/hydraulic tank if necessary (WP 0032 00).</p> <p>Remove restrictions as needed (WP 0051 00 and WP 0052 00).</p>
<p>10. Excessive Exhaust Smoke.</p>	<p>1. Check for engine running too cold (white smoke).</p>	<p>See troubleshooting for <i>Coolant Temperature Below Normal</i>, Cooling System Troubleshooting.</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. Excessive Exhaust Smoke - Continued.	2. Check for inadequate intake air and restrictions. 3. Check for air leak between the turbocharger and the exhaust manifold. 4. Check for air leaks in the air crossover tube, hoses and through holes in the manifold cover. 5. Check for leaks in the exhaust manifold. Inspect manifold for cracks. 6. Check for a malfunctioning turbocharger.	Inspect air cleaner and change elements if necessary (WP 0024 00). Clean or replace air intake system as necessary (WP 0024 00). Replace turbocharger gasket if necessary (WP 0026 00 or WP 0027 00). Replace parts as necessary (WP 0019 00, WP 0028 00 and WP 0029 00). Replace manifold if necessary (WP 0018 00). Replace turbocharger if necessary (WP 0026 00 or WP 0027 00).
11. Engine Lubricating Oil Pressure Low.	1. Check for low engine oil level. 2. Check engine oil for thin viscosity, diluted or wrong specification. 3. Check for malfunctioning pressure switch or gauge. 4. Check for plugged oil filter.	a. Replenish engine oil as necessary. b. Replace any lines found with oil leaks that could reduce oil pressure (WP 0030 00 or WP 0031 00). Verify that correct oil is being used. Check for oil dilution. Refer to Troubleshooting, <i>Contaminated Engine Lube Oil</i> , step 14 in this table. Replace engine oil pressure switch (WP 0073 00 or WP 0074) or gauge (WP 0083 00). Replace oil filter if plugged (WP 0012 00).
12. Engine Lubricating Oil Pressure Too High.	1. Check for malfunctioning engine oil pressure switch or gauge. 2. Check for engine running too cold.	Replace engine oil pressure switch (WP 0073 00 or WP 0074 00) and gauge (WP 0068 00). Refer to <i>Coolant Temperature Below Normal</i> , step 2 of Cooling System Troubleshooting.

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>12. Engine Lubricating Oil Pressure Too High - Continued.</p>	<p>3. Check engine oil for viscosity too thick.</p>	<p>a. Check that the correct engine oil is being used. b. Replace engine oil if necessary (WP 0012 00).</p>
<p>13. Engine Lubricating Oil Loss.</p>	<p>1. Check for external leaks. 2. Check crankcase for oil overfill. 3. Check for turbocharger oil leaking to the air intake.</p>	<p>Inspect engine for external oil leaks. Verify that the crankcase is not overfilled. Drain oil to correct level, if necessary (WP 0011 00). Verify that the oil is at correct mark on dipstick. Replace oil and lines or gaskets as necessary (WP 0030 00 or WP 0031 00).</p>
<p>14. Contaminated Engine Lube Oil.</p>	<p>1. Check for coolant in the engine oil, internal engine component leaks. 2. Check for excessive engine oil sludge. 3. Check for fuel in the engine oil, engine operating too cold.</p>	<p>Refer to Test 23, <i>Cooling System Troubleshooting, Coolant Loss</i> in this table. a. Replace engine oil and filter (WP 0012 00). b. Check that the correct engine oil is being used. If either condition is found, review vehicle operation for excessive idling resulting in the engine running below normal temperature.</p>
<p>15. Fuel or Oil Leaking From Exhaust Manifold.</p>	<p>1. Check for intake air restriction. 2. Check for obstructed turbocharger drain line(s). 3. Check turbocharger and gasket for leaking oil.</p>	<p>a. Clean or replace air cleaner filter element if necessary (TM 10-3930-660-10). b. Review vehicle operation for excessive idling. Remove and clean turbocharger drain line (WP 0030 00 or WP 0031 00). Replace turbocharger or gasket if necessary (WP 0026 00 or WP 0027 00).</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

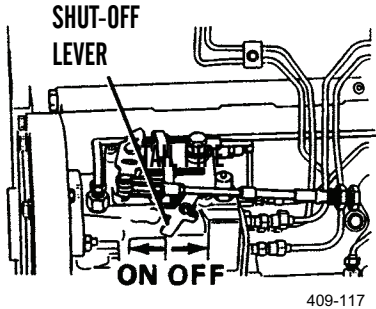
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>16. Compression Knocks.</p>	<ol style="list-style-type: none"> 1. Check for air in the fuel system. 2. Check for poor quality fuel. 3. Check for overloaded engine. 	<p>Bleed the fuel system (WP 0034 00 or WP 0035 00).</p> <p>Verify by operating from a temporary tank with good fuel. Clean and flush the fuel/hydraulic tank (WP 0032 00).</p> <p>Check that engine load rating is not being exceeded (WP 0002 00).</p>
<p>17. Excessive Fuel Consumption.</p>	<ol style="list-style-type: none"> 1. Check for additional loading from malfunctioning accessories. 2. Check for incorrect operator technique. 3. Check for poor quality fuel. 4. Check for exhaust restriction or inadequate intake air. 	<p>Check for malfunctioning accessories and vehicle components and repair or replace as necessary.</p> <p>Review vehicle operation for correct gear shifts, deceleration, and idling (TM 10-3930-660-10).</p> <p>Check that quality no. 2 fuel is being used.</p> <p>Refer to Step 10, <i>Excessive Exhaust Smoke</i> in this table.</p>
<p>18. Engine Will Not Shut Off.</p>	<ol style="list-style-type: none"> 1. Check for inoperative fuel shutoff solenoid. 	<p>Stop the engine mechanically with manual shutoff valve lever. Test fuel shutoff solenoid (WP 0020 00 or WP 0021 00).</p>
		
	<ol style="list-style-type: none"> 2. Check for engine running on fumes drawn into the air intake. 	<p>Check the air intake ducts for the source of the fumes.</p>

Table 8. Engine System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>19. Excessive Vibration.</p>	<ol style="list-style-type: none"> 1. Check for engine not running smoothly. 2. Check for loose or damaged fan. 	<p>Refer to Step 7, <i>Engine Runs Rough or Misfiring</i>, in this table.</p> <p>Check for loose fan mounting screws and, if necessary, torque to 6 lb-ft (8 Nm).</p>
<p>20. Excessive Engine Noise.</p>	<ol style="list-style-type: none"> 1. Check for drive belt squeal caused by insufficient belt tension or abnormally high loading. 2. Check for intake air or exhaust leaks. 	<p>Replace belt if necessary (WP 0061 00).</p> <p>Refer to Step 10, <i>Excessive Exhaust Smoke</i>, in this table.</p>

Table 9. Cooling System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Coolant Temperature Above Normal - Continued.</p>	<p>10. Check for overloaded engine.</p>	<p>Verify that the engine load rating is not being exceeded (WP 0002 00).</p>
<p>2. Coolant Temperature Below Normal.</p>	<p>1. Check for incorrect thermostat or faulty thermostat.</p> <p>2. Check temperature sender or gauge for malfunctions.</p> <p>3. Check if coolant is flowing by temperature sensor.</p>	<p>Test thermostat. Replace thermostat if required (WP 0055 00).</p> <p>Replace gauge and/or temperature sender if necessary (WP 0068 00 and WP 0100 00).</p> <p>Flush the engine cooling system with cleaning solution and fill cooling system with coolant (WP 0053 00).</p>
<p>3. Coolant Loss.</p>	<p>1. Check for radiator or cab heater leaking.</p> <p>2. Check for overheating or leaking compression gasses causing loss of coolant through the radiator overflow.</p> <p>3. Check for transmission cooler and transmission cooler lines leaks.</p>	<p>a. Inspect the radiator and cab heater hoses and connections for leaks (WP 0056 00 and WP 0170 00).</p> <p>b. If oil is present in the coolant, check for a transmission or lube oil cooler leak.</p> <p>Review the operation for overheating and low power. Refer to Step 1, <i>Coolant Temperature Above Normal</i>, in this table.</p> <p>Test combination radiator/transmission oil cooler, and if necessary, replace (WP 0053 00).</p>
<p>4. Contaminated Coolant.</p>	<p>Check for rusty coolant, operation without correct mixture of antifreeze and coolant. Review the coolant change interval.</p>	<p>Replace coolant if necessary (WP 0053 00).</p>

Table 10. Transmission Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Low Torque Converter Oil Pressure.</p>	<p>1. Check for low transmission oil level.</p> <p>2. Check for leakage in transmission oil cooler and cooler lines.</p> <p>3. Check for high transmission oil temperature.</p> <p>4. Check for foaming transmission oil.</p>	<p>Add oil as necessary (WP 0011 00).</p> <p>a. Replace cooler lines as necessary.</p> <p>b. Replace combination radiator/transmission cooler if necessary (WP 0053 00).</p> <p>Refer to Step 2, <i>High Transmission Oil Temperature</i>, in this table.</p> <p>Refer to Step 5, <i>Loss of Power</i>, in this table.</p>
<p>2. High Transmission Oil Temperature.</p>	<p>1. Check for low transmission oil level.</p> <p>2. Check for high transmission oil level.</p> <p>3. Check for low water level in engine cooling system.</p> <p>4. Check for low main pressure.</p> <p>5. Check for low torque converter oil pressure.</p> <p>6. Check for clogged or dirty transmission oil cooler/radiator.</p> <p>7. Check for operation of vehicle too slow for gear selected.</p>	<p>Add oil as necessary (WP 0011 00).</p> <p>If transmission oil level is too high, drain transmission oil down to the full mark (WP 0111 00).</p> <p>Add water to engine cooling system (WP 0053 00). Check for leaks in engine cooling system. Refer to Step 3 in Cooling System Troubleshooting Procedures.</p> <p>Refer to Step 7, <i>Low Main Pressure</i>, in this table.</p> <p>Refer to Step 1, <i>Low Torque Converter Oil Pressure</i>, in this table.</p> <p>Replace transmission oil cooler/radiator if necessary (WP 0053 00).</p> <p>Downshift transmission at a higher speed (TM 10-3930-660-10).</p>

Table 10. Transmission Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>2. High Transmission Oil Temperature - Continued.</p>	<p>8. Check for vehicle brakes dragging.</p> <p>9. Check for restricted oil lines to transmission oil filter and cooler.</p>	<p>Check parking and service brakes for dragging condition. Repair brakes as required. Refer to Steps 1 through 5 of Braking System (Unit) Troubleshooting Procedures.</p> <p>Clean or replace lines as necessary (WP 0120 00 and WP 0053 00).</p>
<p>3. High Engine Speed at Torque Converter Stall.</p>	<p>1. Check for low transmission oil level.</p> <p>2. Check for high transmission oil temperature, above 250°F (121°C).</p> <p>3. Check for foaming transmission oil.</p>	<p>Add oil as needed (WP 0011 00).</p> <p>Refer to Step 2, <i>High Transmission Oil Temperature</i>, in this table.</p> <p>Refer to Step 5, <i>Loss of Power</i>, in this table.</p>
<p>4. Low Engine Speed at Torque Converter Stall.</p>	<p>1. Check for low engine output torque.</p> <p>2. Check for transmission temperature not up to operating temperature.</p>	<p>Check engine for proper output torque and tune engine if necessary. Refer to Direct Support Maintenance.</p> <p>Check that transmission temperature is between 180°F and 210° F (82°C and 99°C).</p>
<p>5. Loss of Power.</p>	<p>1. Check for low engine speed at torque converter stall.</p> <p>2. Check for high engine speed at torque converter stall.</p> <p>3. Check for transmission control valve not positioned properly.</p> <p>4. Check for vehicle brakes dragging.</p>	<p>Refer to Step 4, <i>Low Engine Speed at Torque Converter Stall</i>, in this table.</p> <p>Refer to Step 3, <i>High Engine Speed at Torque Converter Stall</i>, in this table.</p> <p>Replace control valve linkage (WP 0122 00).</p> <p>Inspect parking and service brakes for dragging. Repair brakes if necessary. Refer to Steps 1 through 5 of Braking System (Unit) Troubleshooting Procedures.</p>

Table 10. Transmission Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>5. Loss of Power - Continued.</p>	<p>5. Check for foaming oil.</p> <p>a. Check oil for low transmission oil.</p> <p>b. Check for water in transmission oil.</p> <p>c. Check for high transmission oil level.</p> <p>d. Check for proper transmission oil. Check oil specifications.</p>	<p>Add oil as necessary (WP 0011 00).</p> <p>Find and repair leak. Drain and fill system (WP 0118 00).</p> <p>If too high, drain transmission oil to proper level (WP 0118 00).</p> <p>If incorrect, replace with proper oil (WP 0118 00).</p>
<p>6. No Power Transmitted in Any Range.</p>	<p>1. Check for drive line failure.</p> <p>2. Check for range selector valve not positioned properly.</p> <p>3. Check for low transmission oil level.</p> <p>4. Check for low main pressure.</p>	<p>Repair or replace transmission drive shaft or propeller shafts as necessary (WP 0119 00 or WP 0124 00).</p> <p>Replace control valve linkage as necessary (WP 0122 00).</p> <p>Add oil to transmission as necessary (WP 0011 00).</p> <p>Refer to Step 7, <i>Low Main Pressure</i>, in this table.</p>
<p>7. Low Main Pressure.</p>	<p>1. Check for low transmission oil level.</p> <p>2. Check for leaks in hydraulic system.</p>	<p>Add oil to transmission as necessary (WP 0011 00).</p> <p>Check vehicle to locate hydraulic oil leaks. Replace or repair hoses and lines as necessary (WP 0195 00).</p>
<p>8. No Power Transmitted in One Range.</p>	<p>Check for manual selector linkage out of adjustment.</p>	<p>Adjust selector linkage as necessary (WP 0114 00).</p>
<p>9. Slow Clutch Engagement.</p>	<p>1. Check for low transmission oil level.</p> <p>2. Check for foaming transmission oil.</p>	<p>Fill transmission to proper oil level (WP 0011 00).</p> <p>Refer to Step 5, <i>Loss of Power</i>, in this table.</p>

Table 11. Axles and Differential Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Continuous “Clicking” Sound From Front Axle When Moving in a Straight Line.</p>	<p>Check for incorrect front tires and/or unequal diameters of front tires.</p>	<p>Replace tire(s) or adjust tire pressures until both tire diameters are the same (WP 0135 00).</p>
<p>2. Slow Engagement of Front No Spin Differential Clutch Assemblies.</p>	<ol style="list-style-type: none"> 1. Inspect axle housing for contamination in oil. 2. Heavy gear lubricant. 	<p>Drain, clean and refill, if necessary (WP 0125 00).</p> <p>Change to appropriate lubricant (WP 0125 00).</p>

Table 12. Braking System (Unit) Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Parking Brake Will Not Hold Unit.</p>	<p>1. Check parking brake cable for proper adjustment.</p> <p>2. Inspect parking brake drum lining.</p> <p>3. Check for missing or damaged parking brake linkage.</p>	<p>Readjust as necessary (WP 0128 00).</p> <p>Replace if worn or glazed (WP 0127 00).</p> <p>Replace if necessary (WP 0128 00).</p>
<p>2. Parking Brake Will Not Release.</p>	<p>1. Check for out of adjustment parking brake linkage.</p> <p>2. Check for binding of internal parking brake mechanism.</p>	<p>Adjust or replace parking brake cable (WP 0128 00).</p> <p>Remove parking brake drum and inspect for wear or damage (WP 0127 00).</p>
<p>3. Poor or No Brakes.</p>	<p>1. Check for air in brake system.</p> <p>2. Check for leaking, damaged or obstructed brake lines.</p> <p>3. Check for low accumulator pressure caused by weak tandem gear pump output.</p> <p>4. Check for low accumulator charging pressure.</p> <p>5. Check for low nitrogen precharge or faulty accumulator.</p> <p>6. Check for leakage at service brake shoe calipers.</p> <p>7. Check for worn service brake shoes.</p> <p>8. Check for low hydraulic oil.</p>	<p>Bleed brake system (WP 0129 00).</p> <p>Repair or replace brake lines as necessary (WP 0133 00).</p> <p>Replace tandem gear pump if low flow and pressure is found (WP 0173 00).</p> <p>Adjust accumulator charging pressure as needed in brake control valve (WP 0131 00).</p> <p>Replace or repair accumulator if necessary (WP 0132 00).</p> <p>Inspect service brake shoe calipers for oil. Replace service brake shoe calipers (WP 0249 00).</p> <p>Replace service brake shoes if necessary (WP 0130 00).</p> <p>Add hydraulic oil to proper level (WP 0011 00).</p>
<p>4. Brakes Will Not Release.</p>	<p>1. Check that brake pedal is returning to full up position.</p> <p>2. Inspect pistons in service brake caliper for binding.</p> <p>3. Check for restrictions and excessive back pressure in return line.</p>	<p>Inspect brake linkage and spring. Replace linkage and spring if necessary (WP 0131 00).</p> <p>Replace service brake calipers if necessary (WP 0249 00).</p> <p>Remove restriction in return line. Replace or repair lines as necessary (WP 0133 00).</p>

Table 12. Braking System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>5. Engine Cannot Move Vehicle or Has Difficulty Moving Vehicle.</p>	<ol style="list-style-type: none"> 1. Check parking brake for dragging condition. 2. Check service brakes for dragging condition. 3. Check for a broken propeller shaft. 	<p>Inspect and adjust parking brake (WP 0128 00).</p> <p>Inspect and, if necessary, replace service brake caliper(s). Refer to Direct Support Maintenance.</p> <p>Replace propeller and/or U-joints (WP 0124 00).</p>
<p>6. Brakes Chatter or Are Noisy.</p>	<ol style="list-style-type: none"> 1. Check for air in brake system. 2. Check for loose or worn service brake shoes. 	<p>Bleed brake system to purge air from system (WP 0129 00).</p> <p>Replace service brake shoes if required (WP 0130 00).</p>
<p>7. Unit Pulls to the Right or Left When Moving Straight Ahead.</p>	<ol style="list-style-type: none"> 1. Check wheel adjustment. 2. Inspect steering cylinder for hydraulic oil leaking past cylinder piston. 3. Check for worn steering control valve. 4. Check for worn steering select valve. 5. Inspect service brake caliper and rotor for damage. 	<p>Adjust tie rod as necessary (WP 0138 00).</p> <p>Replace steering cylinder (WP 0141 00).</p> <p>Replace steering control valve (WP 0143 00).</p> <p>Test steering select valve. Replace steering select valve if defective (WP 0144 00).</p> <p>Repair or replace service brake caliper or rotor (WP 0247 00).</p>
<p>8. Vehicle Will Not Steer or is Hard to Steer.</p>	<ol style="list-style-type: none"> 1. Check for defective priority valve. 2. Inspect steering control valve for leakage. 3. Check for low tandem gear pump flow. 	<p>Replace priority valve if required (WP 0177 00).</p> <p>Replace steering control valve as required (WP 0144 00).</p> <p>Test large section of tandem gear pump for output. Replace if necessary (WP 0173 00).</p>
<p>9. Steering Wheel Kickback</p>	<ol style="list-style-type: none"> 1. Check for air in hydraulic system. 2. Check for leakage in steering control valve. 	<p>Check for leaks and loose connections on pump inlet lines. Purge air by operating hydraulic system (WP 0172 00).</p> <p>Replace steering control valve (WP 0144 00).</p>

Table 12. Braking System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>10. Emergency Steering Pump Motor Will Not Start or Does Not Rotate Freely.</p>	<ol style="list-style-type: none"> 1. Check for loose electrical connections. 2. Check for seized steering pump assembly. 3. Check for failure of steering pump-mounted relay. 	<p>Repair loose connections in wiring as necessary (WP 0110 00 and WP 0139 00).</p> <p>Inspect steering pump, replace if necessary (WP 0139 00).</p> <p>Inspect steering relay, replace if necessary (WP 0082 00).</p>
<p>11. Emergency Steering Pump Will Not Pump Oil But Motor Spins Freely.</p>	<ol style="list-style-type: none"> 1. Check that the fuel/hydraulic tank is filled with hydraulic oil. 2. Check that steering pump assembly is working properly. 	<p>Add oil to fuel/hydraulic tank as necessary.</p> <p>Replace steering pump assembly if necessary (WP 0139 00).</p>
<p>12. Emergency Steering Pump Does Not Develop Full Pressure or Flow.</p>	<p>Check for low battery output with STE/ICE-R.</p>	<p>Test battery voltage using STE/ICE-R test 67. Battery voltage should be 24 volts or higher. Service or replace batteries as required if voltage is below minimum requirement (TM 9-6140-200-14).</p>
<p>13. Steering Select Valve Does Not Work.</p>	<ol style="list-style-type: none"> 1. Check for tripped circuit breaker (CB 4). <ol style="list-style-type: none"> a. The circuit breakers will trip if there is a shorted or grounded wire. b. The circuit breakers will automatically reset after cooling. They cannot be reset manually. c. Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced (WP 0071 00). 	<p>Check circuit for shorts, bad ground, or defective steering select valve. Replace steering select valve if necessary (WP 0144 00). Refer to the <i>Electrical Schematic</i> (WP 0326 00).</p>

Table 12. Braking System (Unit) Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>13. Steering Select Valve Does Not Work - Continued.</p>	<p>2. Check for broken wires, loose connections and poor grounds.</p> <p>3. Check for defective run relay.</p> <p>4. Check for defective steering select switch.</p> <p>5. Check steering select valve.</p> <p>6. Check blackout light switch.</p>	<p>Replace wires if necessary (WP 0109 00 and WP 0110 00). Tighten connections.</p> <p>Check that run relay closes, if not, replace run relay (WP 0083 00).</p> <p>Check switch for continuity. Replace switch if defective (WP 0069 00).</p> <p>Test steering select valve. Replace valve if defective (WP 0144 00).</p> <p>Replace switch if defective (WP 0094 00).</p>
<p>14. No Power to One Wheel.</p>	<p>Check for steering universal (cardan) joint failure.</p>	<p>Inspect and replace steering universal joints if necessary (WP 0245 00 or WP 0247 00).</p>

Table 13. Hydraulic System (Unit) Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Hydraulic Functions Operate Slowly.</p>	<p>1. Cold hydraulic oil.</p> <p>2. Engine speed too low.</p> <p>3. Check oil level.</p> <p>4. Inspect hydraulic line(s) and tube(s) for damage.</p> <p>5. Check strainers and filter for obstructions.</p> <p>6. Check relief valve for defects.</p> <p>7. Check for worn or defective pumps.</p> <p>8. Check for proper hydraulic oil viscosity.</p>	<p>Operate hydraulic system until hydraulic oil warms up (TM 10-3930-660-10).</p> <p>Increase engine speed with accelerator pedal (TM 10-3930-660-10).</p> <p>Add hydraulic oil to proper level (WP 0011 00).</p> <p>Replace hose(s) and tube(s) as necessary (WP 0195 00 or WP 0196 00).</p> <p>Repair or replace filter (WP 0199 00), and/or inspect and clean tank strainers (WP 0198 00).</p> <p>Inspect relief valve in system with little or no pressure. Replace relief valve if necessary (WP 0178 00).</p> <p>Test pumps for proper operation and replace if necessary (WP 0173 00 and WP 0174 00).</p> <p>Verify oil weight with oil sample. If incorrect, drain hydraulic tank (WP 0032 00). Add correct oil.</p>
<p>2. Hydraulic Functions Move Erratically.</p>	<p>Check for air leak in hydraulic system.</p>	<p>Operate hydraulic system, purge air from hydraulic circuits. Check for leaks and loose connections on pump inlet lines (WP 0172 00).</p>
<p>3. Slow Boom or Extend Functions.</p>	<p>1. Check for pinched or kinked sections of pilot hoses.</p> <p>2. Check for defective hydraulic joystick control valve.</p>	<p>Replace pilot hoses as necessary from cab to control valve (WP 0195 00).</p> <p>Replace hydraulic joystick control valve if necessary (WP 0181 00).</p>
<p>4. Foamy Hydraulic Oil.</p>	<p>1. Check for water in hydraulic oil.</p> <p>2. Check oil level.</p>	<p>Determine where water entered system. Change oil (WP 0032 00). Repair leaks as necessary.</p> <p>Add oil as necessary (WP 0011 00).</p>

Table 14. Engine System (DS) Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Engine Will Not Crank.	<ol style="list-style-type: none"> 1. Perform the electrical system troubleshooting. 2. Check for engine seizure. 3. If crankshaft will not turn, engine has internal damage and requires internal repair. 	<ol style="list-style-type: none"> 1. Remove fuel nozzles (WP 0223 00). 2. Try to turn crankshaft manually. 3. If crankshaft turns and liquid is discharged from nozzle holes, determine if liquid is coolant or fuel. 4. If liquid is coolant, replace the cylinder head (WP 0211 00). 5. If liquid is fuel, test fuel injection nozzles (WP 0223 00). Replace defective nozzle(s) (WP 0223 00). <p>Remove engine (WP 0209 00 and WP 0210 00). Disassemble and check for bearing seizure (WP 0272 00) or piston seizure (WP 0276 00). Replace components as required.</p>
2. Engine Cranks But Will Not Start.	Check for possible dirty or damaged fuel injection nozzles.	Replace/repair fuel injection nozzles, if necessary (WP 0223 00).
3. Rough Idle (Irregularly Firing or Engine Shaking).	Check for overtightened, damaged or loose engine mounts.	Tighten, loosen or replace mounts as required (WP 0211 00).
4. Lubricating Oil Pressure Too Low.	Check relief valve (stuck open).	Replace relief valve (WP 0222 00).
5. Lubricating Oil Pressure Too High.	Check relief valve (stuck closed).	Replace relief valve (WP 0222 00).
6. Excessive Vibration.	Check for loose, overtightened or damaged engine mounts and vibration damper.	Replace damaged engine mounts (WP 0211 00).

Table 15. Table Powertrain System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Low Oil Pressure	Check for operation of transmission oil pump.	Replace or repair transmission oil pump (WP 0240 00).

Table 16. Steering System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. Steering Difficulty; Vehicle Pulls on Straight Forward Driving or Tends to Go Straight When Making Turns.</p>	<p>1. Check front differential for proper installation or component failure.</p>	<p>Remove, repair or install front differential (WP 0243 00).</p>
	<p>2. Check front axle for breakage.</p>	<p>Replace front axle shaft (WP 0241 00).</p>
<p>2. Front Differential is Binding in Turns.</p>	<p>1. Check front differential for proper installation or component failure.</p>	<p>Remove, repair or install front differential (WP 0243 00).</p>
	<p>2. Check front axle for breakage.</p>	<p>Replace front axle shaft (WP 0241 00).</p>
	<p>3. Check front axle and differential housing for bends.</p>	<p>Replace front axle (WP 0241 00) or front differential housing (WP 0243 00).</p>
	<p>4. Check for dirt or debris in the front differential housing.</p>	<p>Disassemble, clean and assemble front differential housing (WP 0243 00).</p>
	<p>5. Check for improper assembly of front differential.</p>	<p>Repair front differential (WP 0243 00).</p>
<p>3. Excessive Driveline Noise.</p>	<p>1. Check front differential for proper installation or component failure.</p>	<p>Remove, repair or install front differential (WP 0243 00).</p>
	<p>2. Check front axle for breakage.</p>	<p>Replace front axle (WP 0241 00).</p>
	<p>3. Check front axle and differential housing for bends.</p>	<p>Replace front axle (WP 0241 00) or front differential housing (WP 0243 00).</p>
	<p>4. Check wheel for proper alignment.</p>	<p>Align wheels (TM 10-3930-660-10).</p>
	<p>5. Check for dirt or debris in the front differential housing.</p>	<p>Disassemble, clean and assemble front differential housing (WP 0243 00).</p>
	<p>6. Check for improper assembly of front differential.</p>	<p>Repair front differential (WP 0243 00).</p>

Table 16. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>4. Front Differential Has Grinding Noises.</p>	<ol style="list-style-type: none"> 1. Check front differential for proper installation or component failure. 2. Check front axle and differential housing for bends. 3. Check front axle for breakage. 4. Check ring gear, pinion gear, bearings and seals for defects or wear. 5. Check for dirt or debris in the front differential housing. 6. Check for improper assembly of front differential. 7. Check front differential ring and pinion adjustment. 8. Check for worn driveline parts. 	<p>Remove, repair or install front differential (WP 0243 00).</p> <p>Replace front axle (WP 0241 00) or front differential housing (WP 0243 00).</p> <p>Replace front axle shaft (WP 0241 00).</p> <p>Repair front differential (WP 0243 00).</p> <p>Disassemble, clean and assemble front differential housing (WP 0243 00).</p> <p>Repair front differential (WP 0243 00).</p> <p>Adjust backlash of ring gear (WP 0243 00).</p> <p>Replace or repair transmission gears (WP 0243 00) and U-joints (WP 0124 00) as necessary.</p>
<p>5. Sluggish Re-Engagement of Front Differential Clutch Assemblies.</p>	<ol style="list-style-type: none"> 1. Check for dirt or debris in the front differential housing. 2. Check for improper assembly of front differential. 3. Check lubricant used on axles. 	<p>Disassemble, clean and assemble front differential housing (WP 0243 00).</p> <p>Repair front differential (WP 0243 00).</p> <p>Change axle oil for ambient temperature (WP 0118 00).</p>
<p>6. Erratic Operation of Front Differential; Premature Wear or Failure of Parts.</p>	<ol style="list-style-type: none"> 1. Check front differential for proper installation or component failure. 2. Check front axle for breakage. 3. Check front axle and differential housing for bends. 4. Check for dirt or debris in the front differential housing. 	<p>Remove, repair or install front differential (WP 0243 00).</p> <p>Replace front axle shaft (WP 0241 00).</p> <p>Replace front axle (WP 0241 00) or front differential housing (WP 0243 00).</p> <p>Disassemble, clean and assemble front differential housing (WP 0243 00).</p>

Table 16. Steering System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Erratic Operation of Front Differential; Premature Wear or Failure of Parts - Continued.	5. Check for improper assembly of front differential.	Repair front differential (WP 0243 00).
	6. Check ring gear, pinion gear, bearings and seals for defects or wear.	Repair front differential (WP 0243 00).
	7. Check front differential ring and pinion adjustment.	Adjust backlash of ring gear (WP 0243 00).
	8. Check for worn driveline parts.	Replace or repair transmission gears (WP 0243 00) and U-joints (WP 0241 00) as necessary.
7. Emergency Steering Pump Will Not Hold Pressure in Discharge Line.	Replace check valve to determine if faulty.	Replace check valve (WP 0252 00).
8. Emergency Steering Pump Will Not Develop Full Pressure or Flow.	Replace check valve to determine if faulty.	Replace check valve (WP 0252 00).

Table 17. Braking System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Brakes Will Not Release.	1. Check brake control valve for ball valve damage.	Repair brake control valve (WP 0299 00).
	2. Check for binding piston in brake control valve.	Repair brake control valve (WP 0299 00).
2. Insufficient Brakes.	1. Check pressure regulating spring in brake control valve for damage.	Repair brake control valve (WP 0299 00).
	2. Check boot on brake control valve for cuts.	Repair brake control valve (WP 0299 00).
3. Brakes Will Not Release Completely.	Check piston in brake control valve for sticking.	Repair brake control valve (WP 0299 00).
4. Excessive Braking.	Check for quantity of shims in brake control valve.	Repair brake control valve (WP 0299 00).
5. Brake Accumulator Charging Cycle Repeats Frequently When Brakes Are Not Being Used.	1. Check brake control valve poppet for leakage.	Repair brake control valve (WP 0299 00).
	2. Check brake valve seals and O-rings for leakage.	Repair brake control valve seals and O-rings (WP 0299 00).
	3. Check seating of ball valve in brake control valve.	Repair brake control valve (WP 0299 00).
	4. Check pilot valve for leakage of brake control valve.	Repair brake control valve (WP 0299 00).

Table 17. Braking System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>6. Brake Accumulator Charges Frequently While Brakes Are Being Held.</p>	<p>1. Check for seal damage in brake control valve.</p> <p>2. Check for seal damage on piston in brake control valve.</p>	<p>Repair brake control valve (WP 0299 00).</p> <p>Repair brake control valve (WP 0299 00).</p>
<p>7. Brake Accumulator Starts to Charge But Does Not Reach High Limit.</p>	<p>Check for seal damage in brake control valve.</p>	<p>Repair brake control valve (WP 0299 00).</p>
<p>8. Brake Accumulator Charging Time Too Long.</p>	<p>1. Check for broken spring in brake control valve.</p> <p>2. Check for dirt in filter of brake control valve.</p> <p>3. Check for sticking poppet in brake control valve.</p>	<p>Repair brake control valve (WP 0299 00).</p> <p>Repair brake control valve (WP 0299 00).</p> <p>Repair brake control valve (WP 0299 00).</p>
<p>9. Brake Accumulator Fails to Start Charging.</p>	<p>1. Check for broken springs in brake control valve.</p> <p>2. Check for seal damage in brake control valve.</p> <p>3. Check for dirt in filter of brake control valve.</p>	<p>Repair brake control valve (WP 0299 00).</p> <p>Repair brake control valve (WP 0299 00).</p> <p>Repair brake control valve (WP 0299 00).</p>
<p>10. Very Rapid Cycling of Brake Valve.</p>	<p>Check for pilot valve for wear in brake control valve.</p>	<p>Repair brake control valve (WP 0299 00).</p>

Table 18. Hydraulic System Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. MLRS Attachment or Main Control Valves Not Seating.	Inspect valve(s) for contamination.	Remove and disassemble valve(s) (WP 0303 00 and WP 0304 00).
2. Leakage Found Between Sections of MLRS Attachment or Main Control Valves.	1. Inspect seals.	Disassemble valve(s) and replace seals (WP 0303 00 and WP 0304 00).
3. Spools Binding in MLRS Attachment or Main Control Valves.	2. Check torque of tie rods on MLRS and main control valves.	Torque tie rods (WP 0303 00 and WP 0304 00).
4. Excessive Pressure in MLRS Attachment or Main Control Valves During Neutral Position.	Check movement of spools.	Repair valve(s) (WP 0303 00 and WP 0304 00).
5. Sticking Plungers of MLRS Attachment or Main Control Valves.	Check to see that spools are centered.	Repair valve(s) (WP 0303 00 and WP 0304 00).
6. Leaking Seals of MLRS Attachment or Main Control Valves.	1. Check valve for warpage from mounting. 2. Check plunger for bends. 3. Check return spring for damage. 4. Check spring or detent cap for binding. 5. Check valve for contamination. 6. Check plunger cap for oil.	Repair valve(s) (WP 0303 00 and WP 0304 00). Repair valve(s) (WP 0303 00 and WP 0304 00). Repair valve(s) (WP 0303 00 and WP 0304 00). Loosen cap, center and tighten parts (WP 0303 00 and WP 0304 00). Clean or repair valve (WP 0303 00 and WP 0304 00). Replace seals (WP 0303 00 and WP 0304 00).
7. Detent Control Fails to Hold Inside MLRS Attachment or Main Control Valves.	1. Check for paint or dirt on or under seals. 2. Check for scored plunger. 3. Check for loose seal plates. 4. Check for seal damage.	Replace seals (WP 0303 00 and WP 0304 00). Repair valve (WP 0303 00 and WP 0304). Repair valve (WP 0303 00 and WP 0304 00). Repair valve (WP 0303 00 and WP 0304 00).
7. Detent Control Fails to Hold Inside MLRS Attachment or Main Control Valves.	1. Check detent cam for wear. 2. Check spring or ball for damage or defects.	Repair valve (WP 0303 00 and WP 0304 00). Repair valve (WP 0303 00 and WP 0304 00).

Table 18. Hydraulic System Troubleshooting Procedures - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>8. The MLRS Attachment or Main Control Valve Will Not Hold Load.</p>	<p>Check port relief valve for hold.</p>	<p>Remove relief valve and clean (WP 0303 00 and WP 0304 00).</p>
<p>9. The MLRS Attachment or Main Control Valve Drops Load When Plunger Moves From Neutral.</p>	<p>1. Check for dirt in check valve.</p> <p>2. Check for scored check valve poppet or seat.</p>	<p>Repair and clean valve (WP 0303 00 and WP 0304 00).</p> <p>Repair valve (WP 0303 00 and WP 0304 00).</p>
<p>10. Erratic Pressure Found in MLRS Attachment or Main Control Relief Valves.</p>	<p>Check poppet seat for sticking or damage.</p>	<p>Repair valve (WP 0303 00 and WP 0304 00).</p>
<p>11. Relief Valve Leakage Found in MLRS Attachment or Main Control Valves.</p>	<p>1. Check for part damage or wear.</p> <p>2. Check for sticking parts.</p>	<p>Repair valve (WP 0303 00 and WP 0304 00).</p> <p>Repair valve (WP 0303 00 and WP 0304 00).</p>

END OF WORK PACKAGE

STE/ICE VEHICLE SYSTEM DIAGNOSTIC CHECK

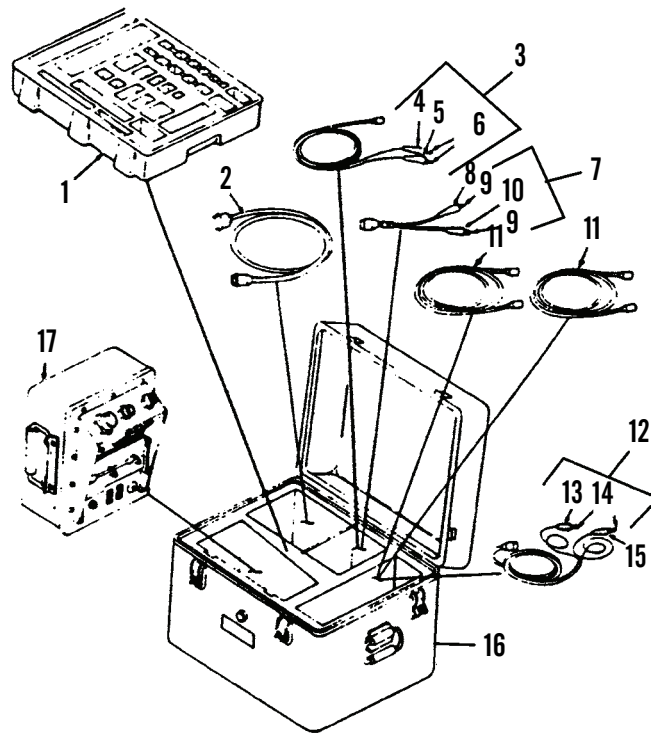
- a. General. This section contains information and tests which may be used with STE/ICE-R (Simplified Test Equipment) for Internal Combustion Engines - Reprogrammable) to locate malfunctions that may occur in the vehicle. The tests can be used during troubleshooting, corrective maintenance, and after routine adjustments.

The STE/ICE-R system is primarily used in conjunction with the vehicle electrical system. The test cannot cover all possible malfunctions that may occur. If a particular malfunction is not discussed, refer to the troubleshooting tables.

- b. Description and Operation. STE/ICE-R is portable and operates off of the vehicle 24 volt system. The STE/ICE-R kit consists of the following items:
 - (a) Vehicle Test Meter (VTM)
 - (b) Transducer Kit (TK)
 - (c) Four Electrical Cables (W1, W2, W3, and W4)
 - (d) Transit Case
 - (e) Technical Publications

STE/ICE-R KIT

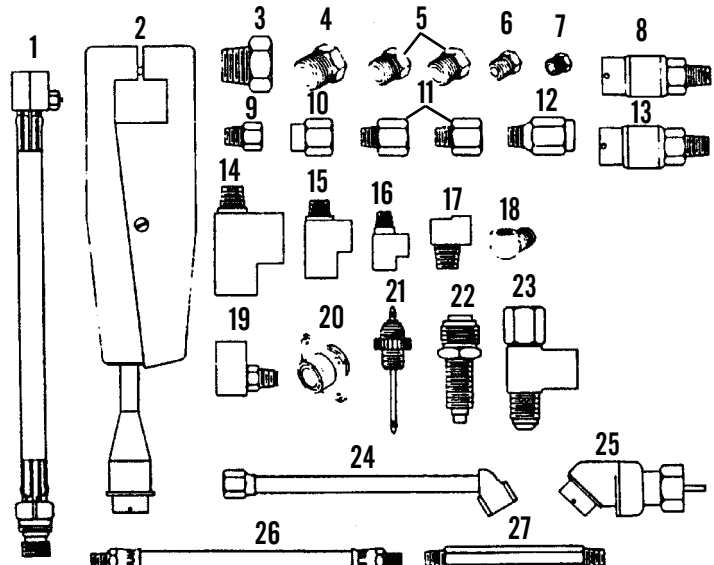
- | | |
|-----|-----------------------------|
| 1. | Tray, Transducer Kit |
| 2. | Cable Assembly, Power W1 |
| 3. | Cable Assembly, Special W2 |
| 4. | Shell, Electrical Connector |
| 5. | Shell, Electrical Connector |
| 6. | Clip, Electrical |
| 7. | Cable Assembly, Special W3 |
| 8. | Shell, Electrical Connector |
| 9. | Clip, Electrical |
| 10. | Shell, Electrical Connector |
| 11. | Cable Assembly, Power W4 |
| 12. | Cable Assembly, Power W5 |
| 13. | Shell, Electrical Connector |
| 14. | Clip, Electrical |
| 15. | Shell, Electrical Connector |
| 16. | Case, Test Set |
| 17. | STE/ICE-R Test Meter |



409-128

STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK - CONTINUED

TRANSDUCER KIT



409-129

Hose Assembly TK10		Tee, Pipe TK24
Prod, Test TK11		Tee TK25
Reducer, Pipe TK12		Elbow, Pipe TK26
Reducer, Pipe TK13		Elbow, Pipe TK27
Reducer, Pipe TK14		Tee, Pipe to Tube TK28
Plug, Pipe TK15		Adapter, Connector TK29
Plug, Pipe TK16		Adapter, Connector TK30
Transducer (Blue), 0 to 1000 psi TK 17		Adapter, Speedometer TK31
Adapter, Straight TK18		Tee, Pipe to Fuel Line TK32
Reducer, Pipe TK19		Chuck, Inflating TK33
Reducer, Pipe TK20		Tachometer, Pulse TK34
Dampener, Fluid TK21		Hose Assembly TK35
Transducer (Red), -30 in. hg to 25 psi TK22		Nipple, Pipe TK36
Tee, Pipe TK23		

STE/ICE-R VEHICLE SYSTEM DIAGNOSTIC CHECK - CONTINUED

Refer to the manual provided with the STE/ICE-R kit for description and operation of the Vehicle Test Meter (VTM) and the Transducer Kit (TK).

- c. STE/ICE-R Testing Procedures. The vehicle test procedures consist of two test sequences: GO-Chain sequences and NO-GO Chain sequences. A GO-Chain sequence is a logical sequence of tests performed to determine the general condition of the vehicle. If the vehicle fails any of the GO-Chain tests, the test will direct the user to a specific NO-GO test for further testing. The NO-GO tests are used to isolate what is wrong with the vehicle.

The GO and NO-GO-Chain sequences are presented as an illustrated flow chart with test branching controlled by YES and NO decisions. Generally, a YES determination leads to the next test; a NO determination leads to NO-GO testing and corrective action.

When the VTM interfaces with the vehicle through the Diagnostic Connector Assembly (DCA) the test is titled DCA Mode Testing. If the VTM interfaces with the vehicle through the use of the TK, the test is titled TK Mode Testing. The DCA and TK testing modes can be used at the same time.

Observe the following rules when using the GO-Chain test sequence:

- (1) Always start at GO1. Never enter the middle of a GO or NO-Go testing sequence unless directed by the flow chart.
- (2) Follow each instruction in a GO-Chain test sequence. Do not skip any instructions or procedures.
- (3) If a particular test is failed in a GO-Chain test sequence, proceed to the indicated NO-GO-Chain test sequence or to a higher level of maintenance.
- (4) After correcting a vehicle problem, repeat the testing beginning at GO1.
- (5) Each GO Chain testing sequence depends upon the completion of the previous test. Do not skip any tests.

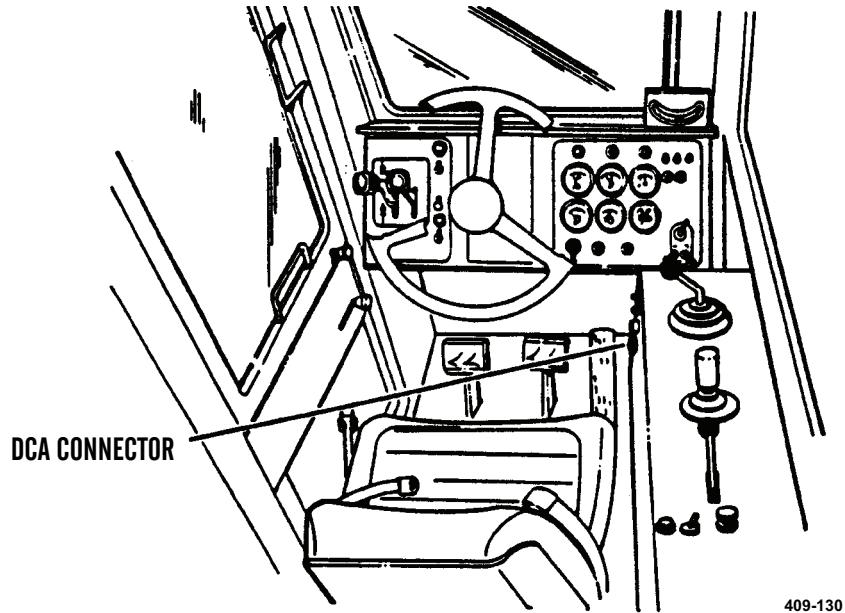
Use the GO, NO-GO flow charts for testing. As you become more familiar with the test procedures, you can use the Vehicle Test Cards as your sole reference. The flip cards on the VTM also can be used as you become familiar with the vehicle and STE/ICE-R equipment.

Prior to testing, make the following pre-test inspections:

- Check drive belt for proper tension. Replace cracked or frayed belt.
- Check for proper engine oil level. Add oil as necessary.
- Check that the fuel tank has enough fuel for testing.
- Check for proper engine coolant level. Add coolant as necessary.
- Check that the batteries are in good condition. Check for low electrolyte level and add distilled water as required.
- Check that emergency steering pump is turned off when required by test.

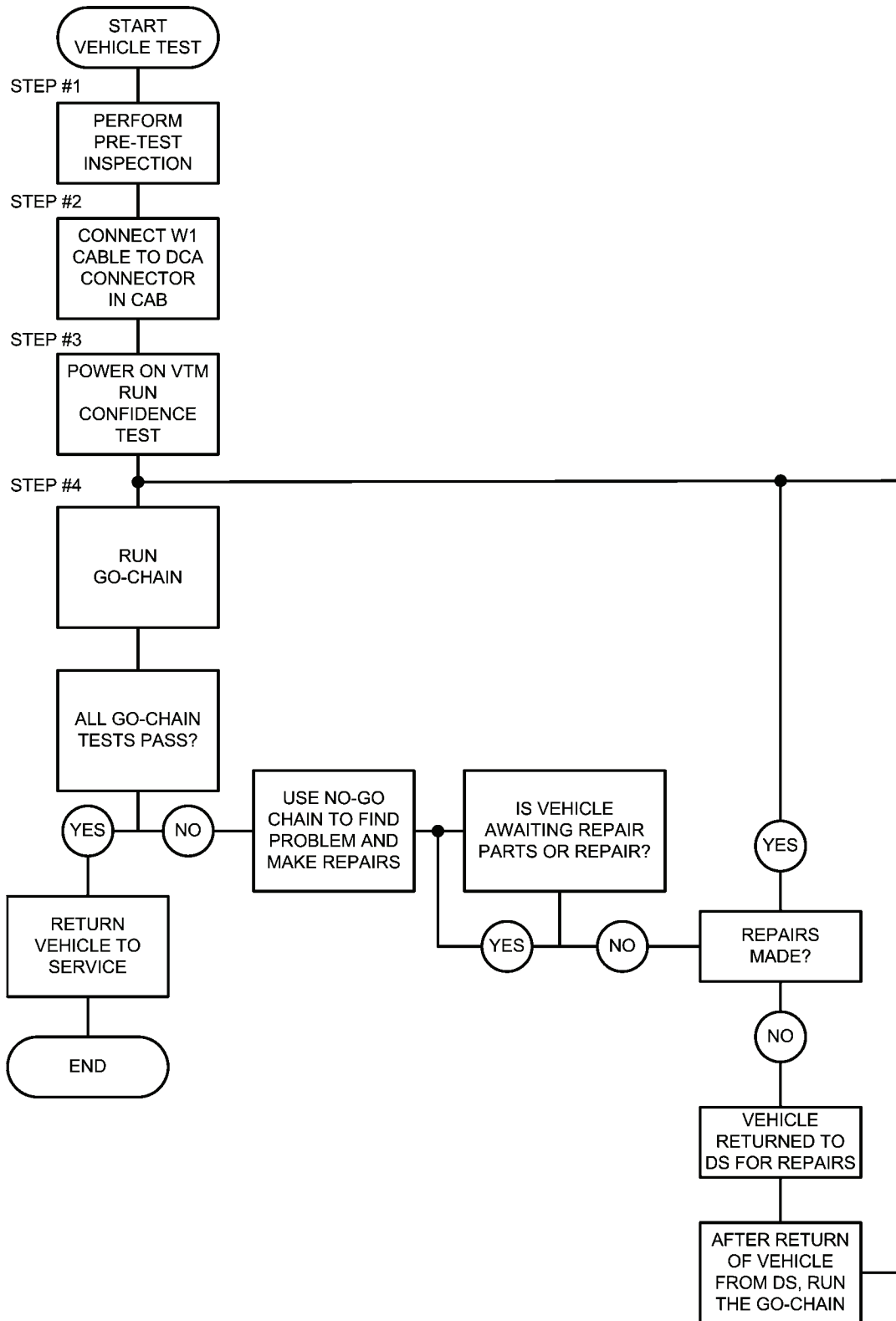
VEHICLE DIAGNOSTIC CONNECTOR ASSEMBLY (DCA)

The DCA connector of the vehicle is located on the panel to the right of the vehicle operator. Refer to the figure below for vehicle DCA location.



VEHICLE DCA CONNECTOR

STE/ICE-R GO-CHAIN TESTS



FC-001

STE/ICE GO-CHAIN TESTING SEQUENCE

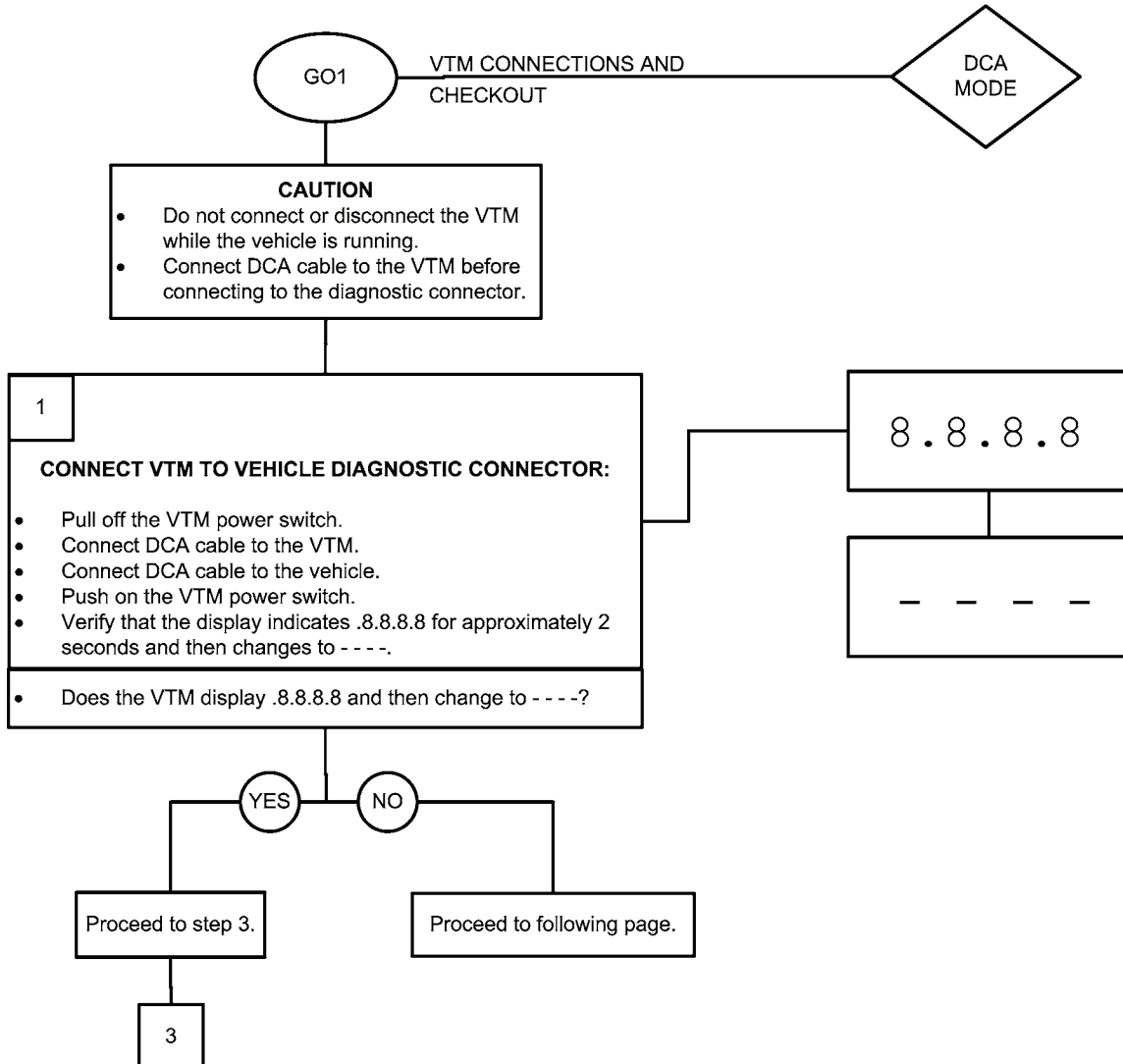
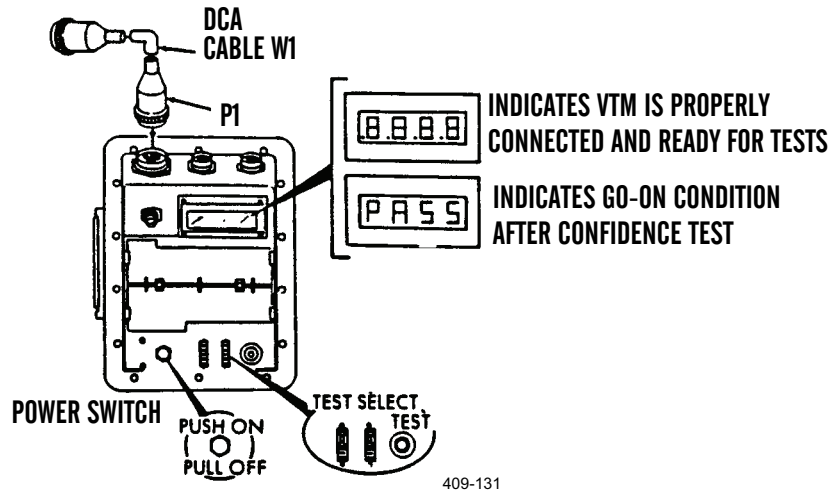
The following GO-Chain tests are made using the vehicle DCA connector. All tests must be performed sequentially. The following is a summary of each test.

GO TEST NUMBER	MODE	TEST TITLE	PAGE NUMBER
GO1	DCA	VTM Connections and Checkout	0007 00-7
GO2	DCA	First Peak Test-Starter Current	0007 00-11
GO3	DCA	Vehicle Gauges Check	0007 00-13
GO4	DCA	Vehicle Voltmeter	0007 00-16
GO5	DCA	Engine Temperature and Pressure Checks	0007 00-17
GO6	DCA	Engine Idle Speed Check	0007 00-19
GO7	DCA	Battery Voltage Check	0007 00-20
GO8	DCA-TK	Engine Oil Pressure Test	0007 00-21
GO9	DCA	Engine Power Test	0007 00-23
GO10	DCA-TK	Transmission Oil Pressure Test	0007 00-24
GO11	DCA-TK	Transmission Clutch Pressure Test	0007 00-26
GO12	DCA-TK	Transmission Converter Charger Pressure Test	0007 00-28
GO13	DCA-TK	Transmission Brake Cutoff Valve Pressure Test	0007 00-30
GO14	DCA-TK	Fuel Return Line Pressure Test	0007 00-32

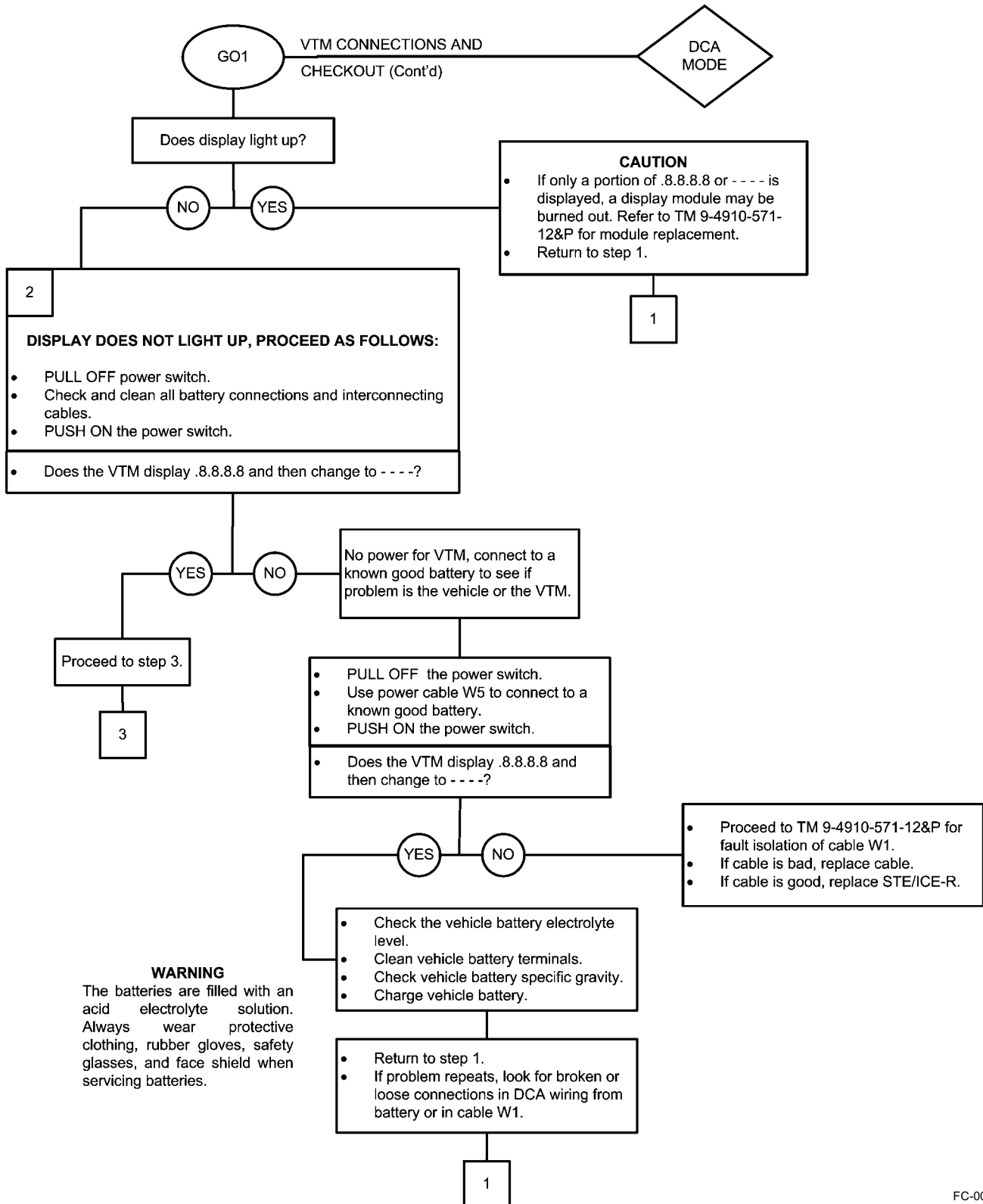
NOTE

Perform all GO steps until a NO-GO condition exists, then perform the NO-GO step indicated.

STE/ICE-R GO-CHAIN TESTS - CONTINUED

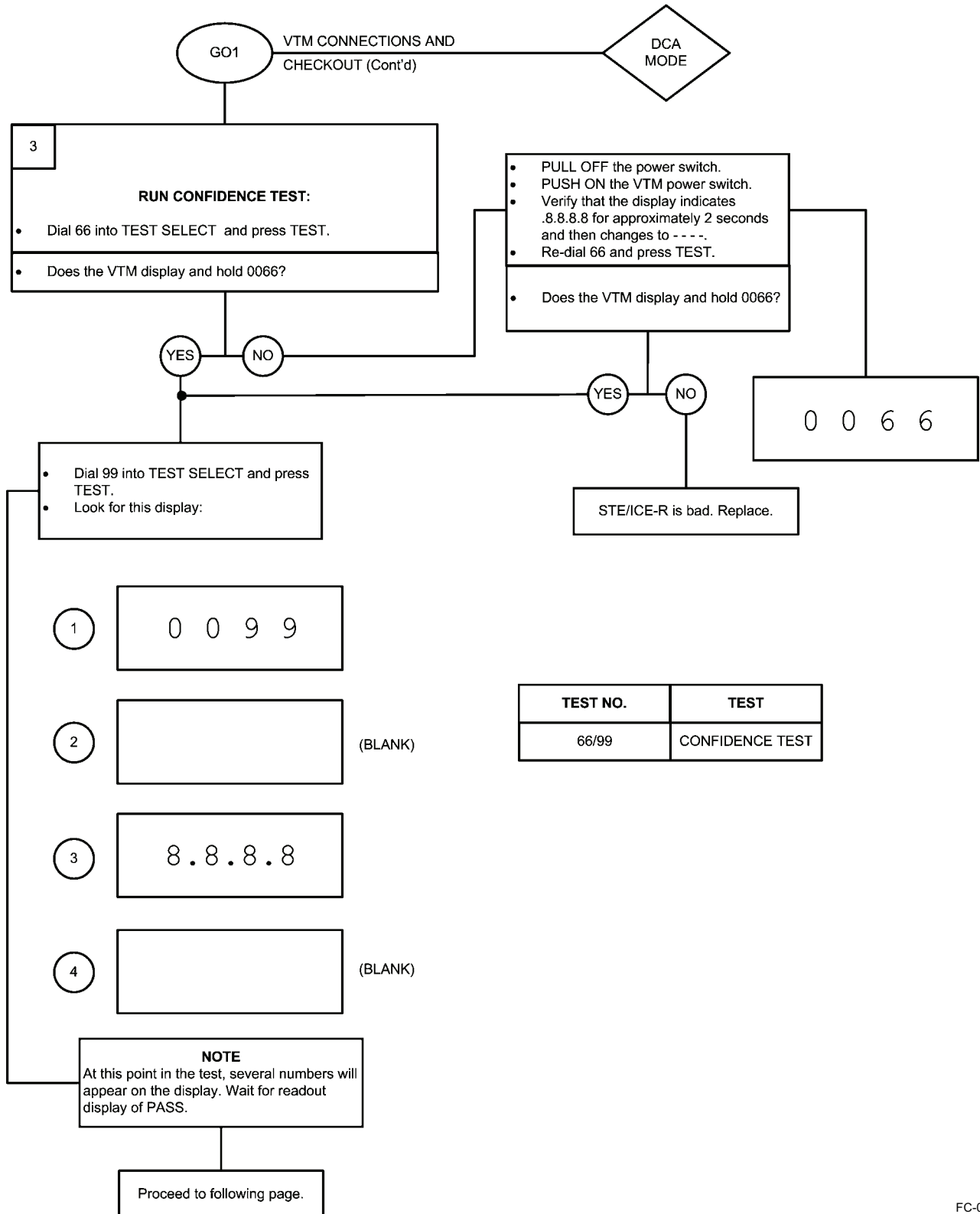


STE/ICE-R GO-CHAIN TESTS - CONTINUED

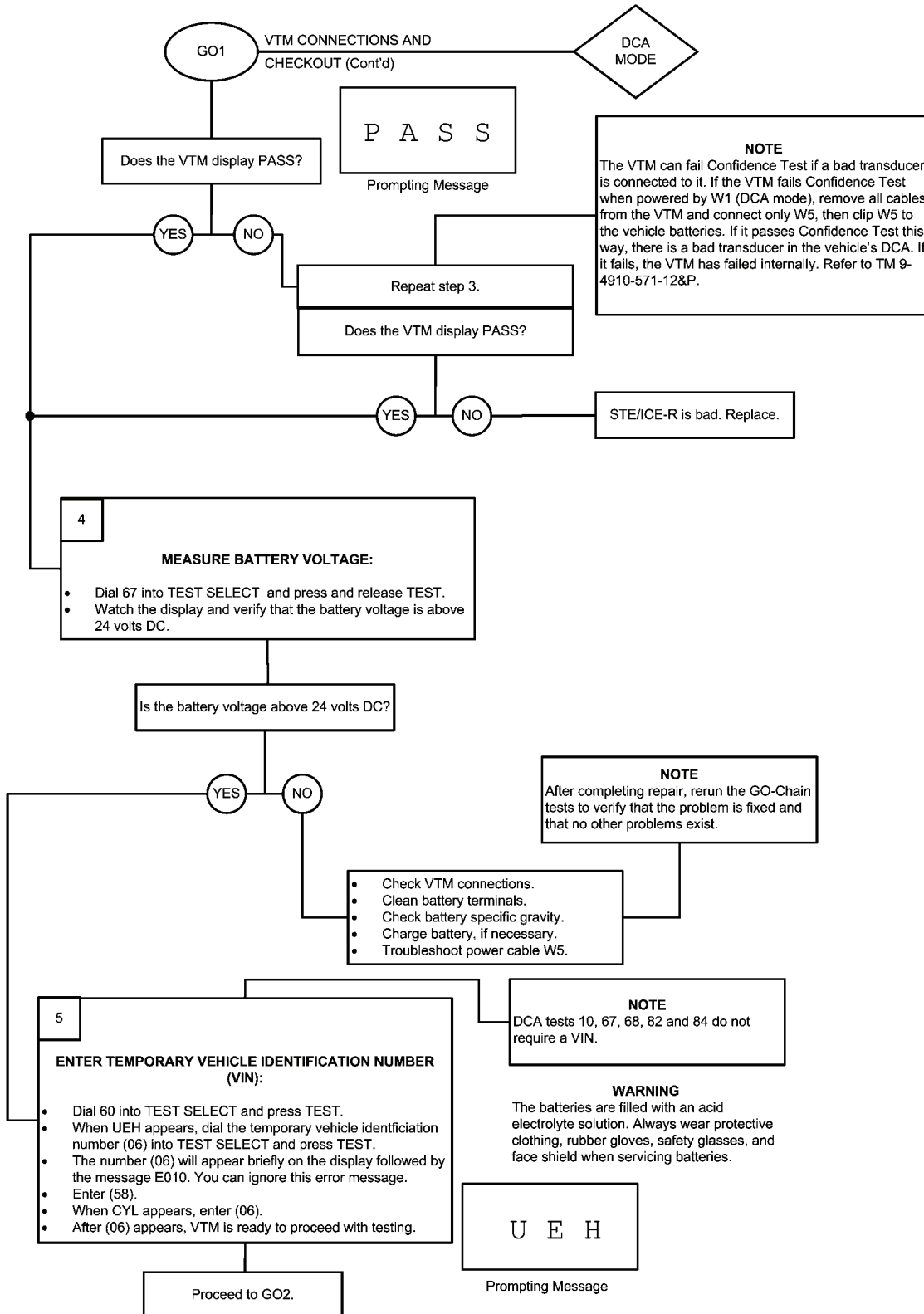


WARNING
The batteries are filled with an acid electrolyte solution. Always wear protective clothing, rubber gloves, safety glasses, and face shield when servicing batteries.

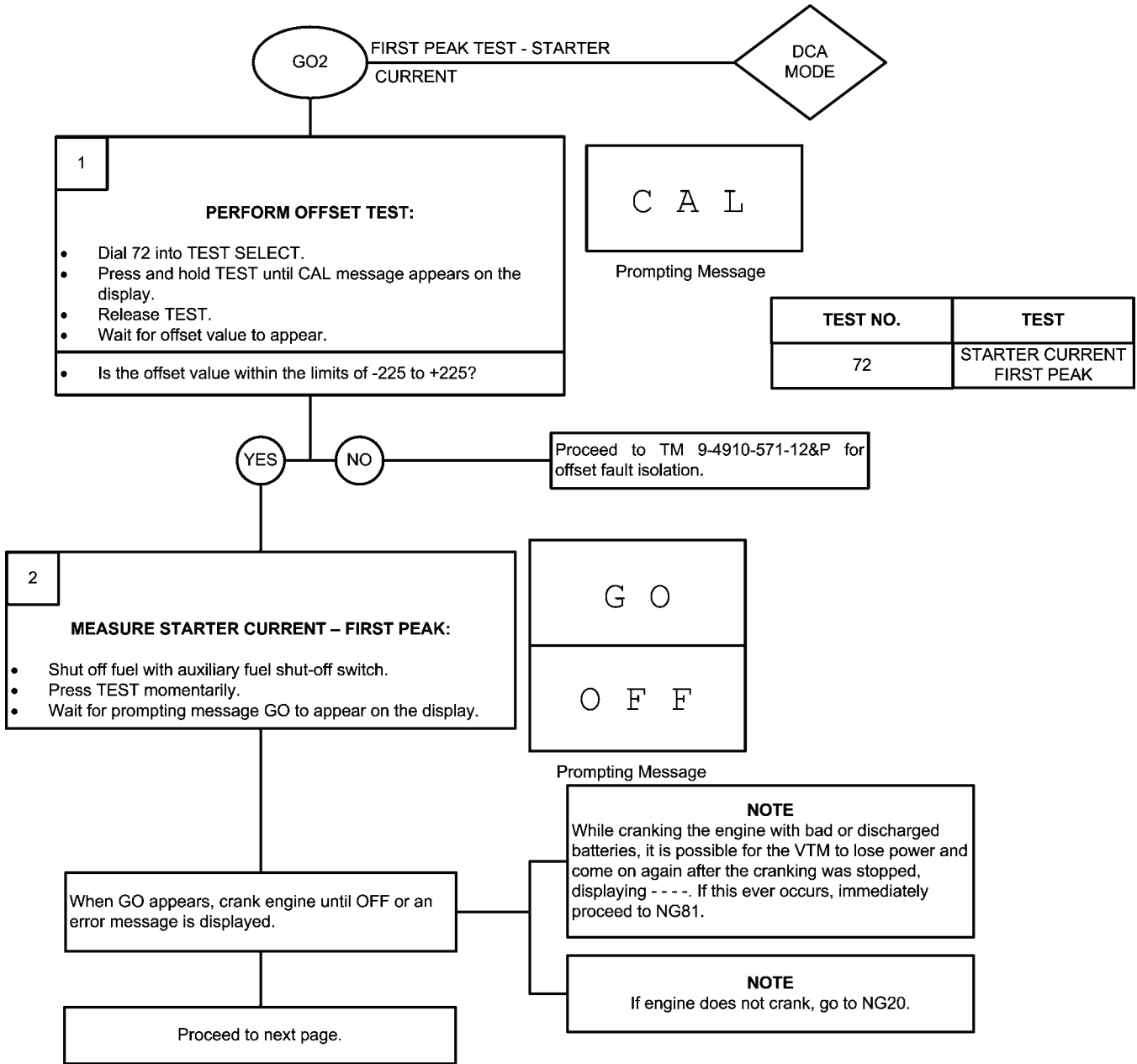
STE/ICE-R GO-CHAIN TESTS - CONTINUED



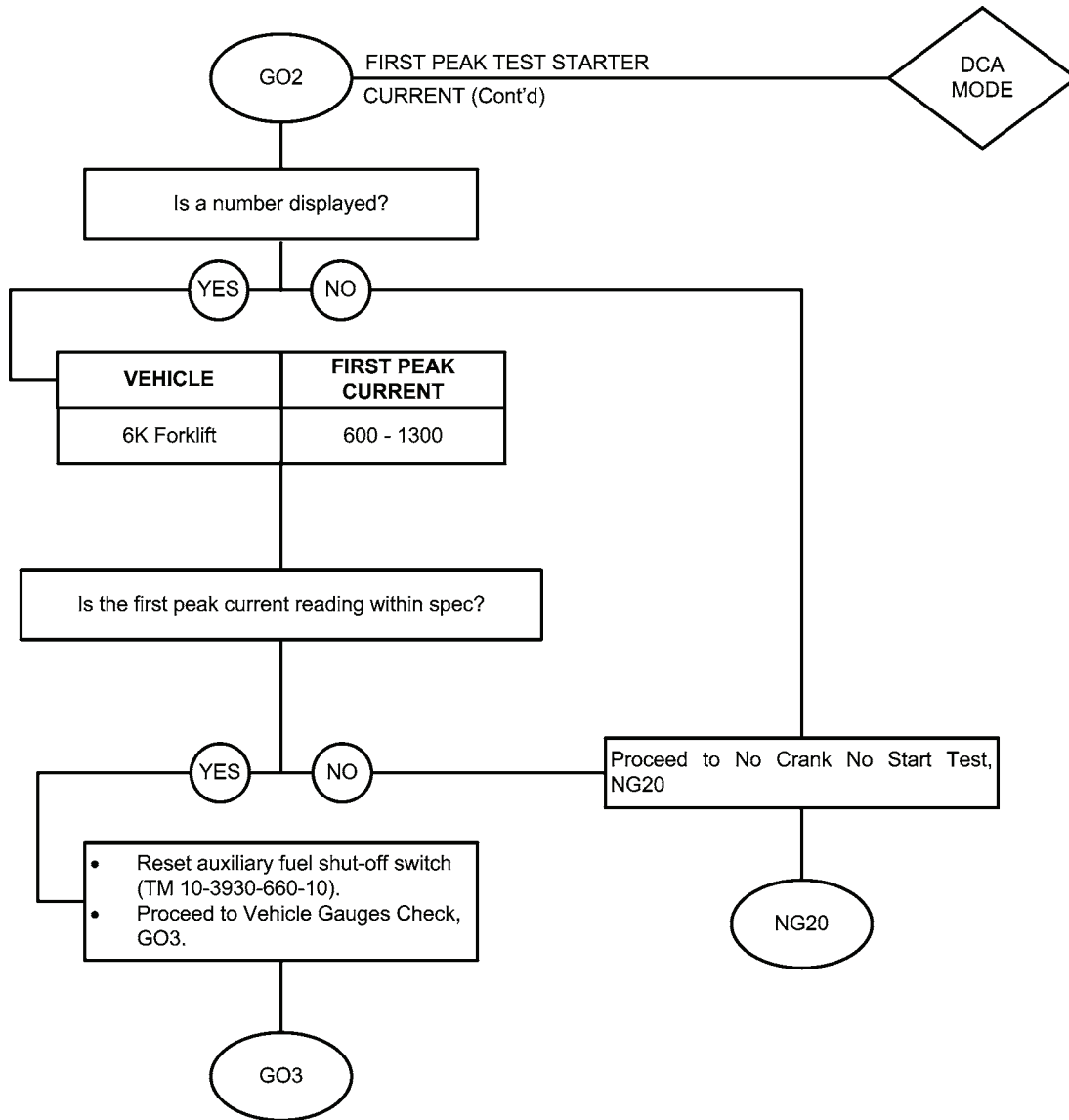
STE/ICE-R GO-CHAIN TESTS - CONTINUED



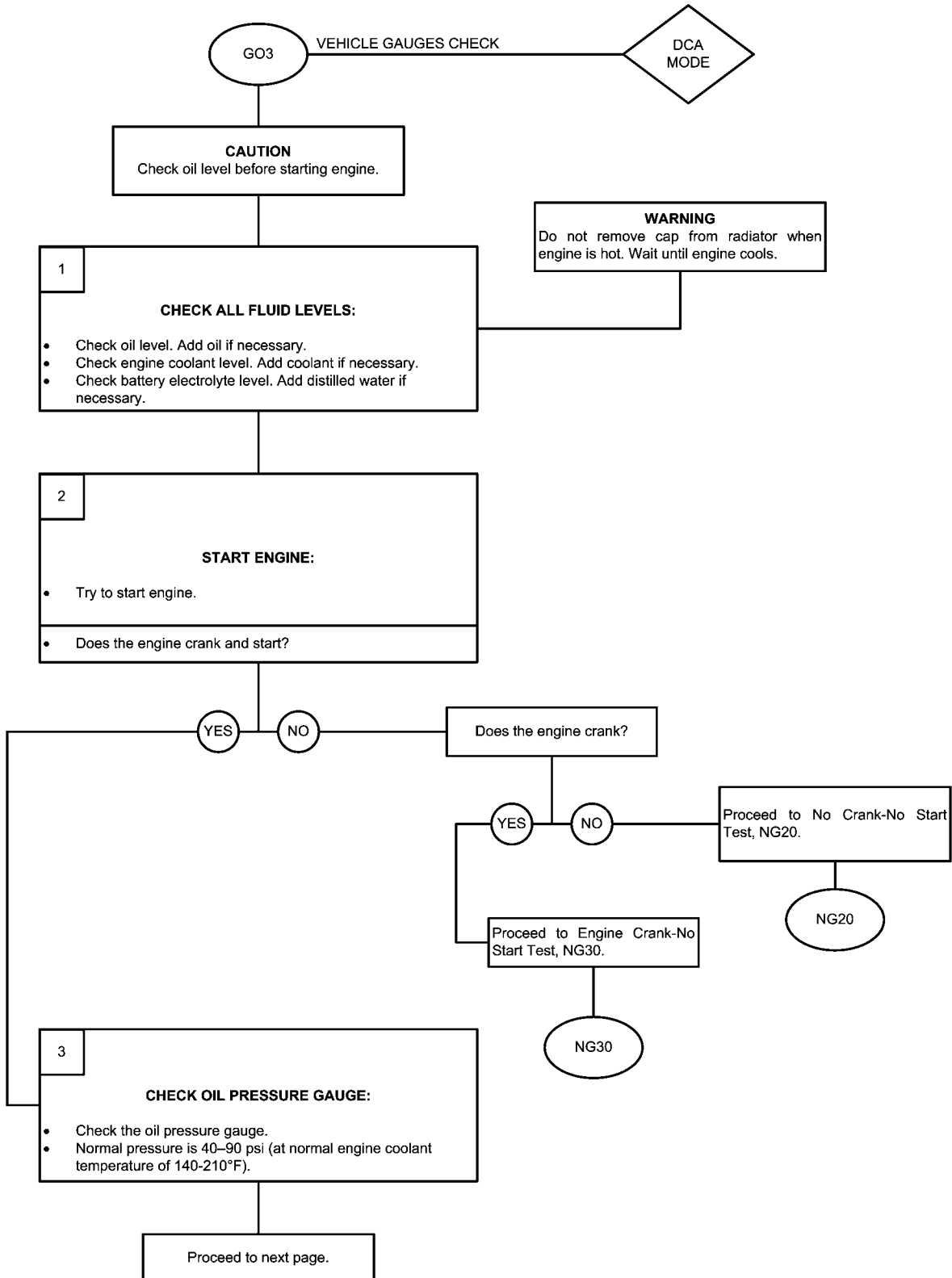
STE/ICE-R GO-CHAIN TESTS - CONTINUED



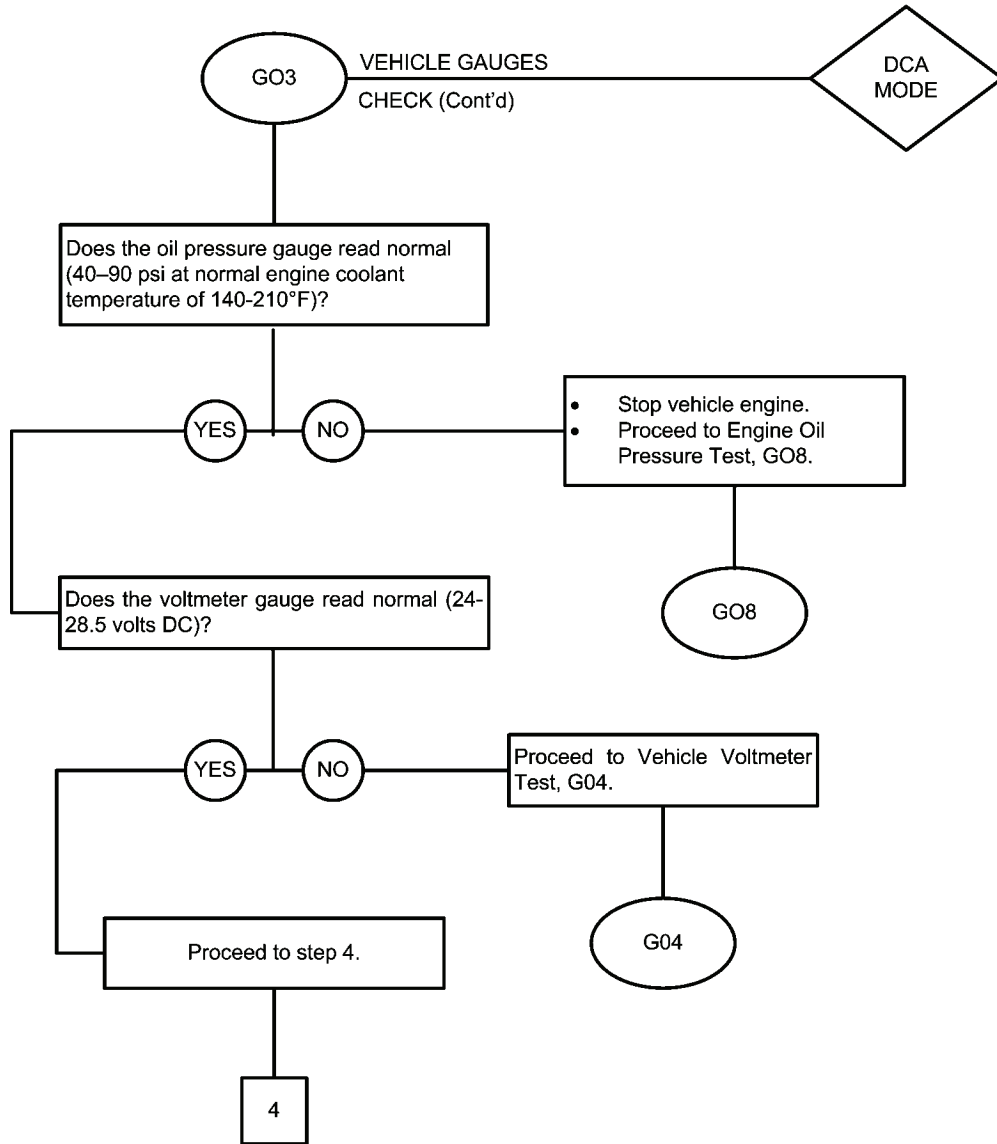
STE/ICE-R GO-CHAIN TESTS - CONTINUED



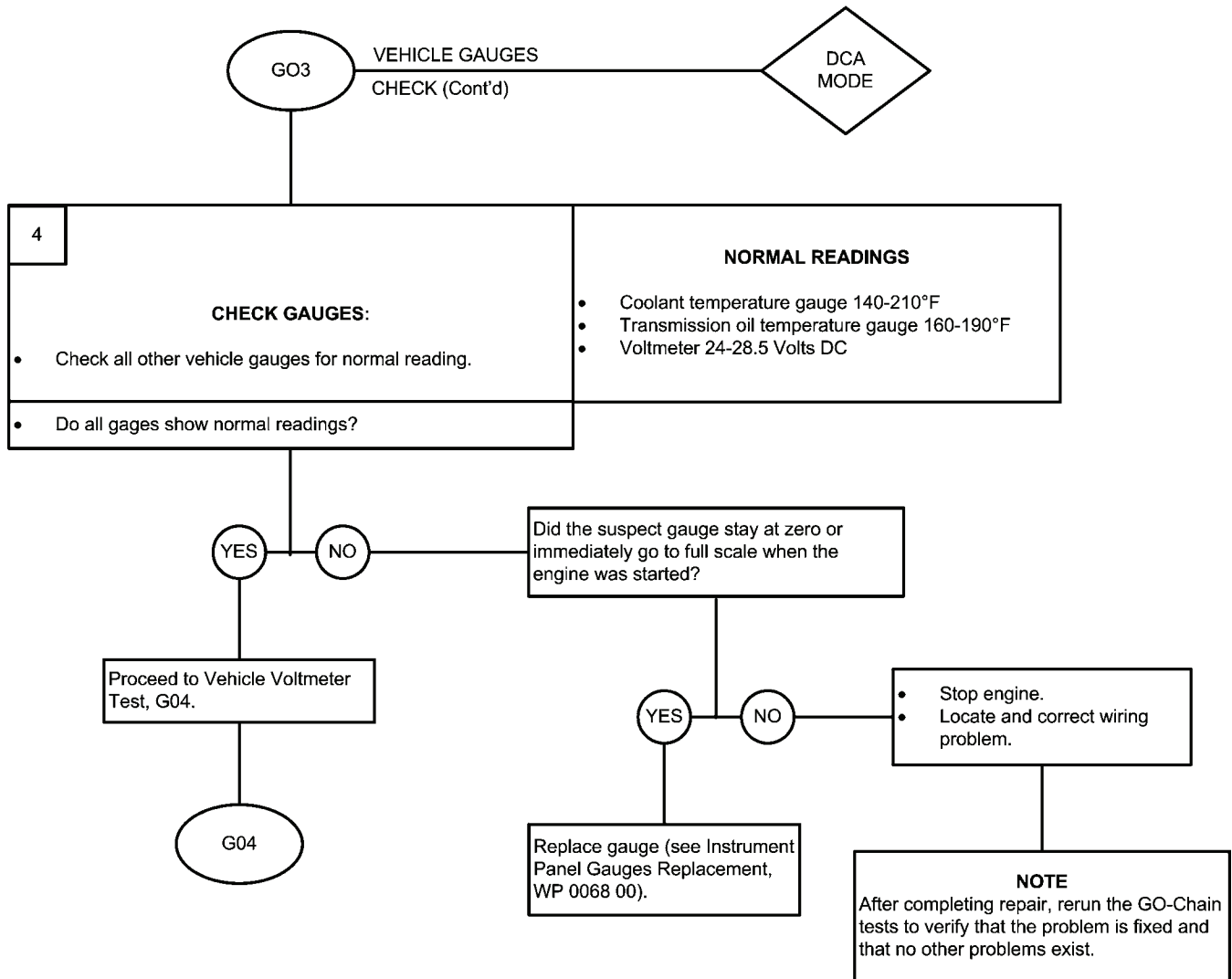
STE/ICE-R GO-CHAIN TESTS - CONTINUED



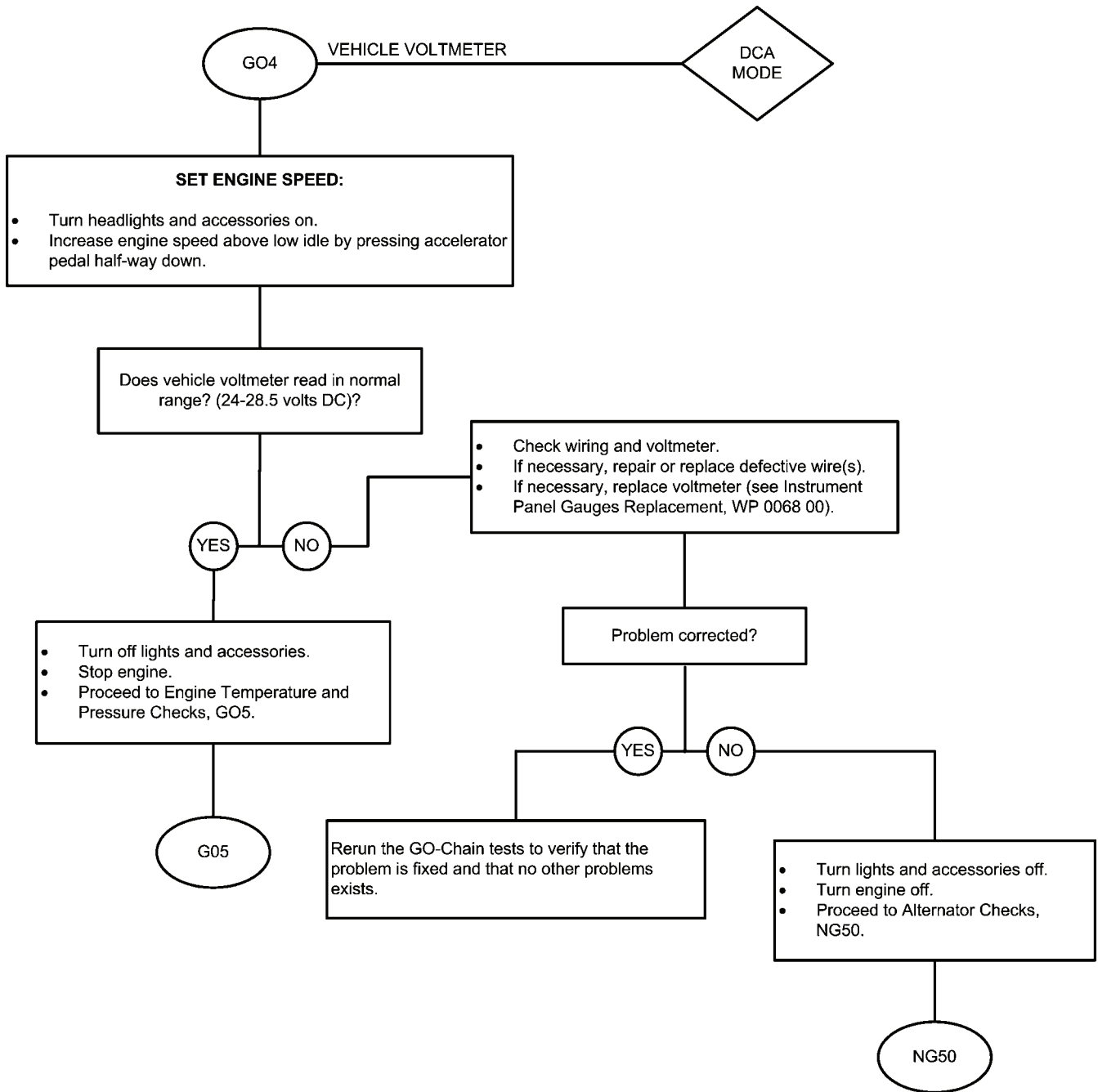
STE/ICE-R GO-CHAIN TESTS - CONTINUED



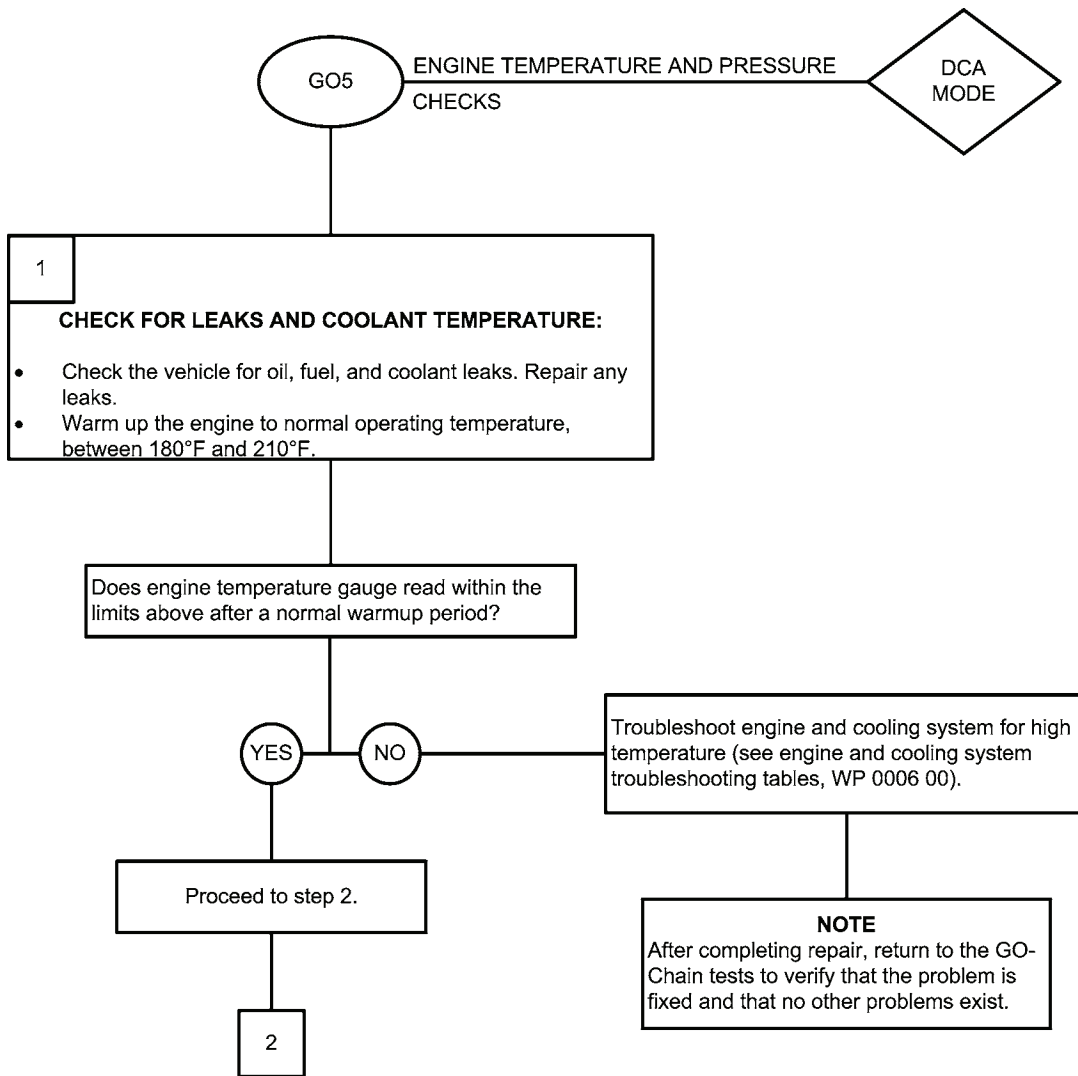
STE/ICE-R GO-CHAIN TESTS - CONTINUED



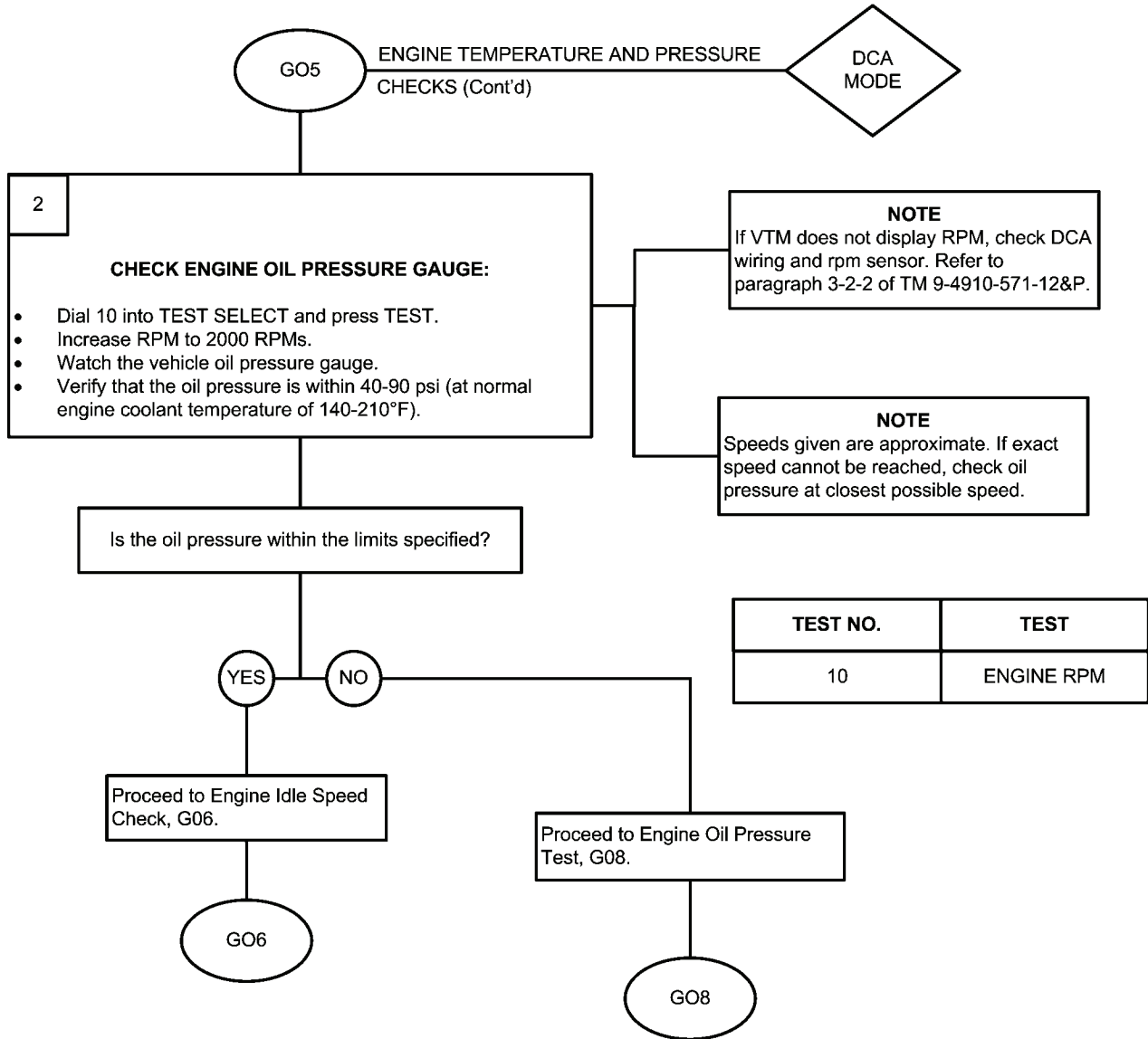
STE/ICE-R GO-CHAIN TESTS - CONTINUED



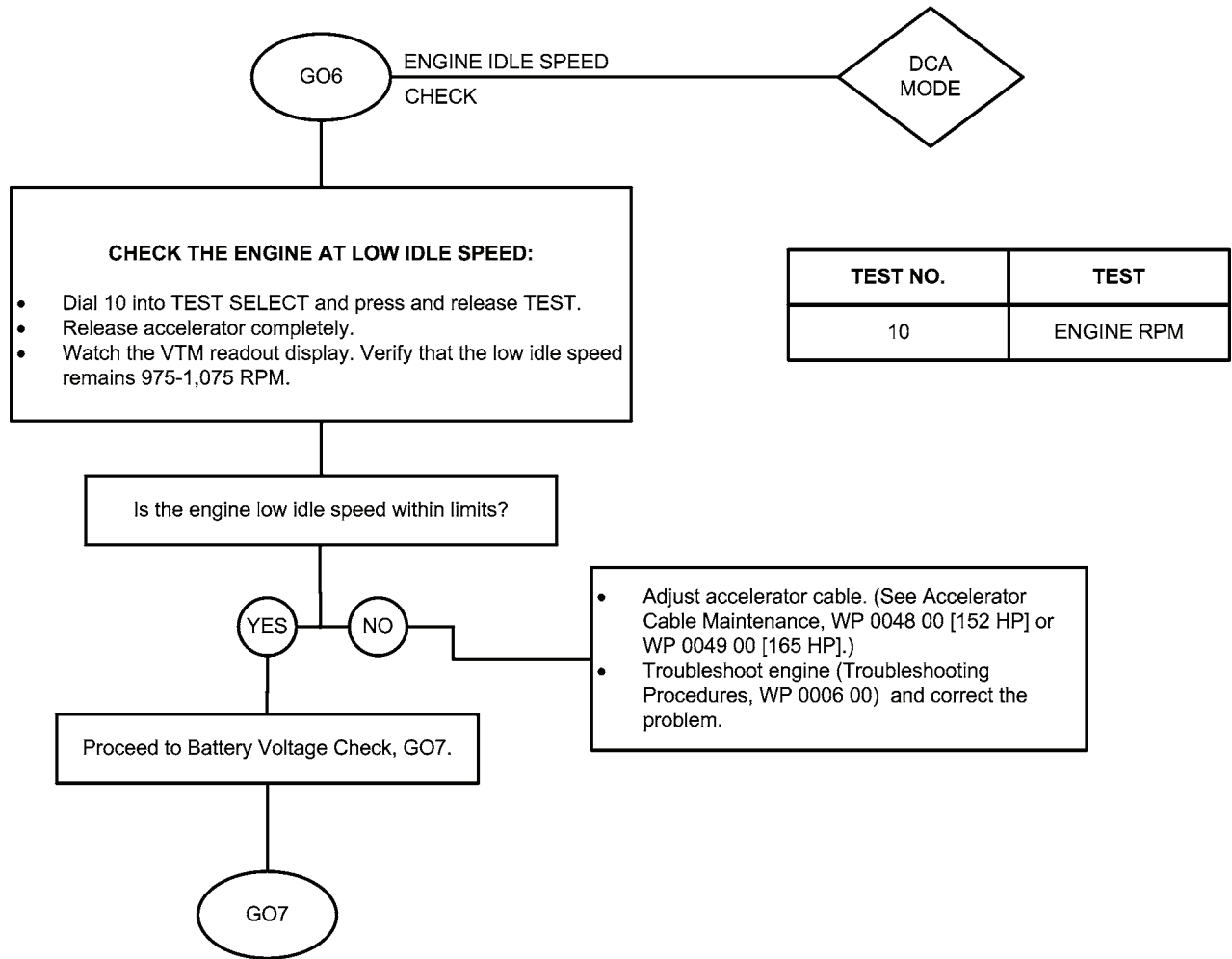
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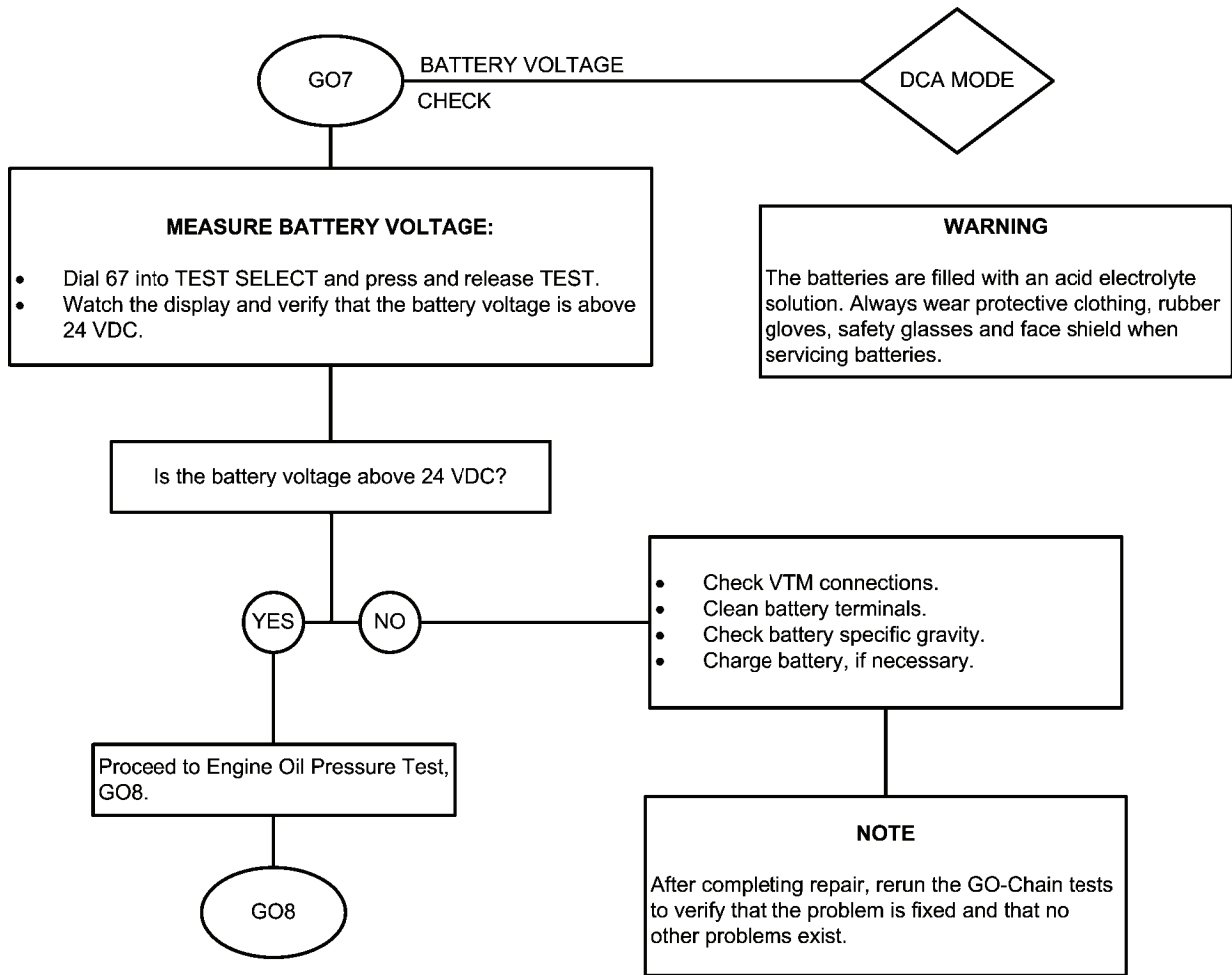
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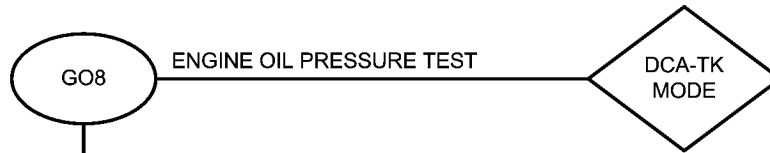
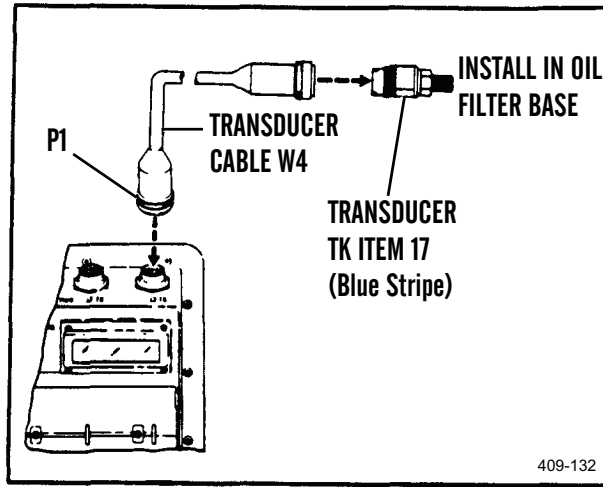
STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug in oil filter base.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

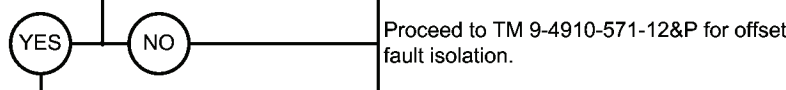
TEST NO.	TEST
01	INTERLEAVE
50	0-1,000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

- Is the offset value within the limits -150 to +150?

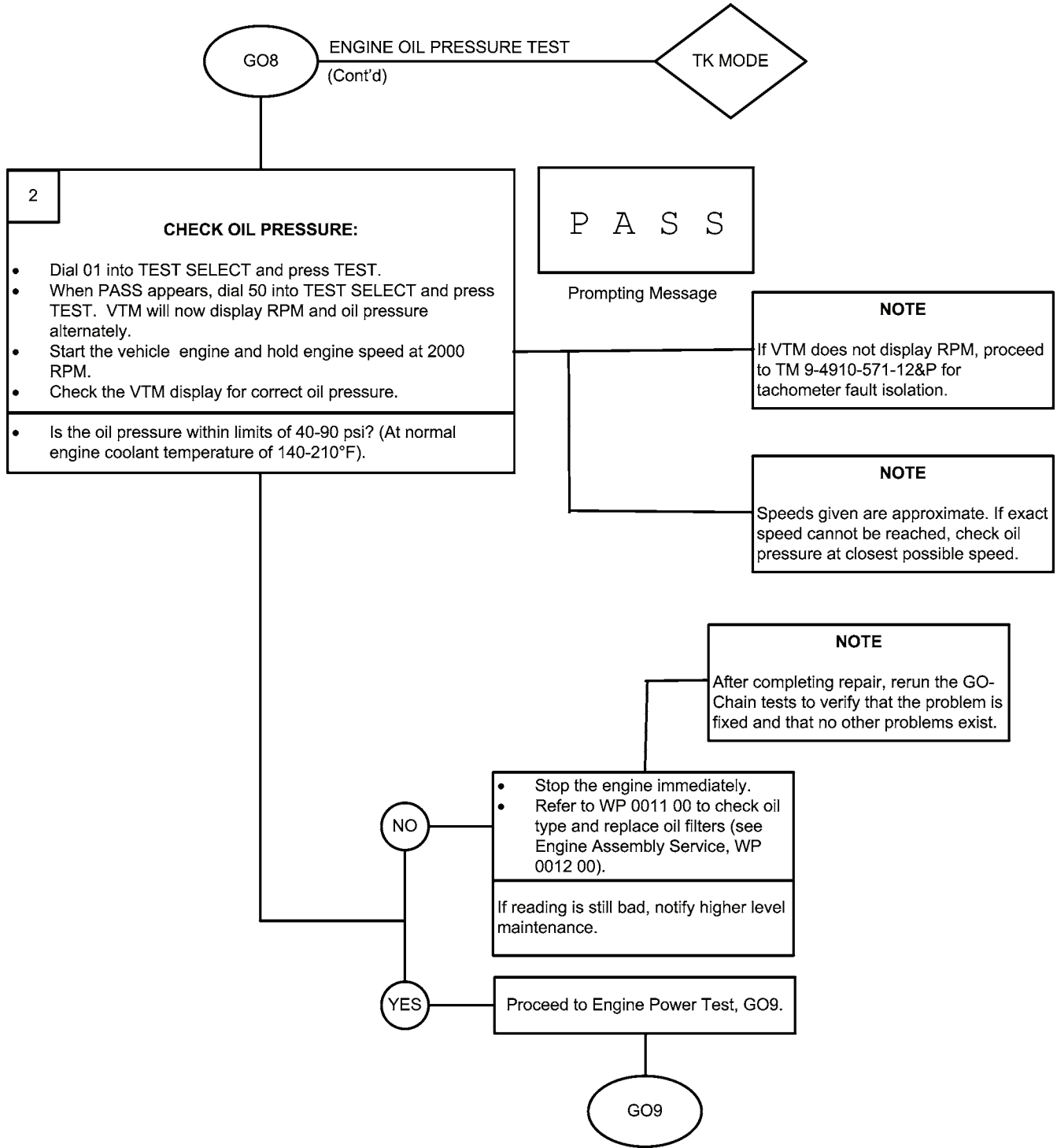
C A L

Prompting Message

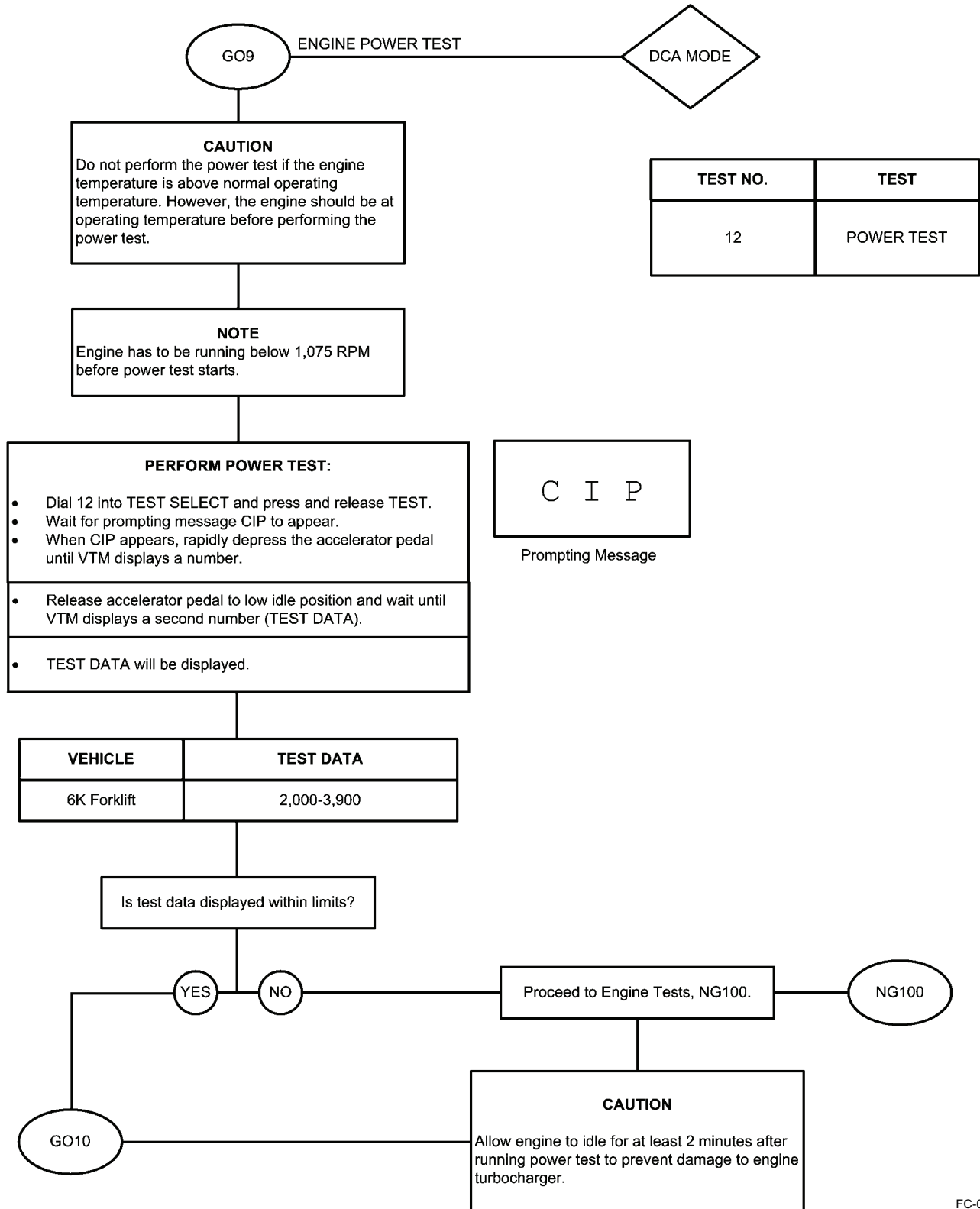


2

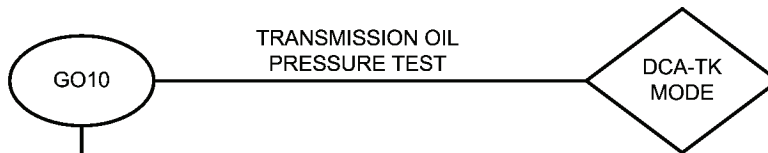
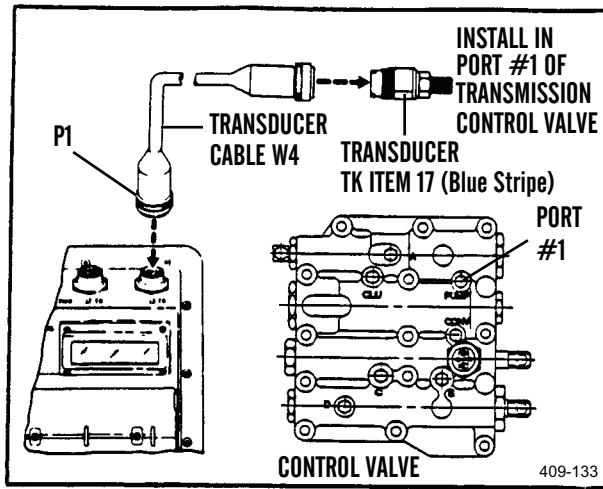
STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #1 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

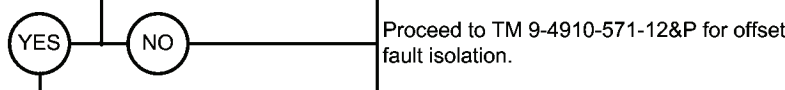
TEST NO.	TEST
01	INTERLEAVE
50	0-1,000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

- Is the offset value within the limits -150 to +150?

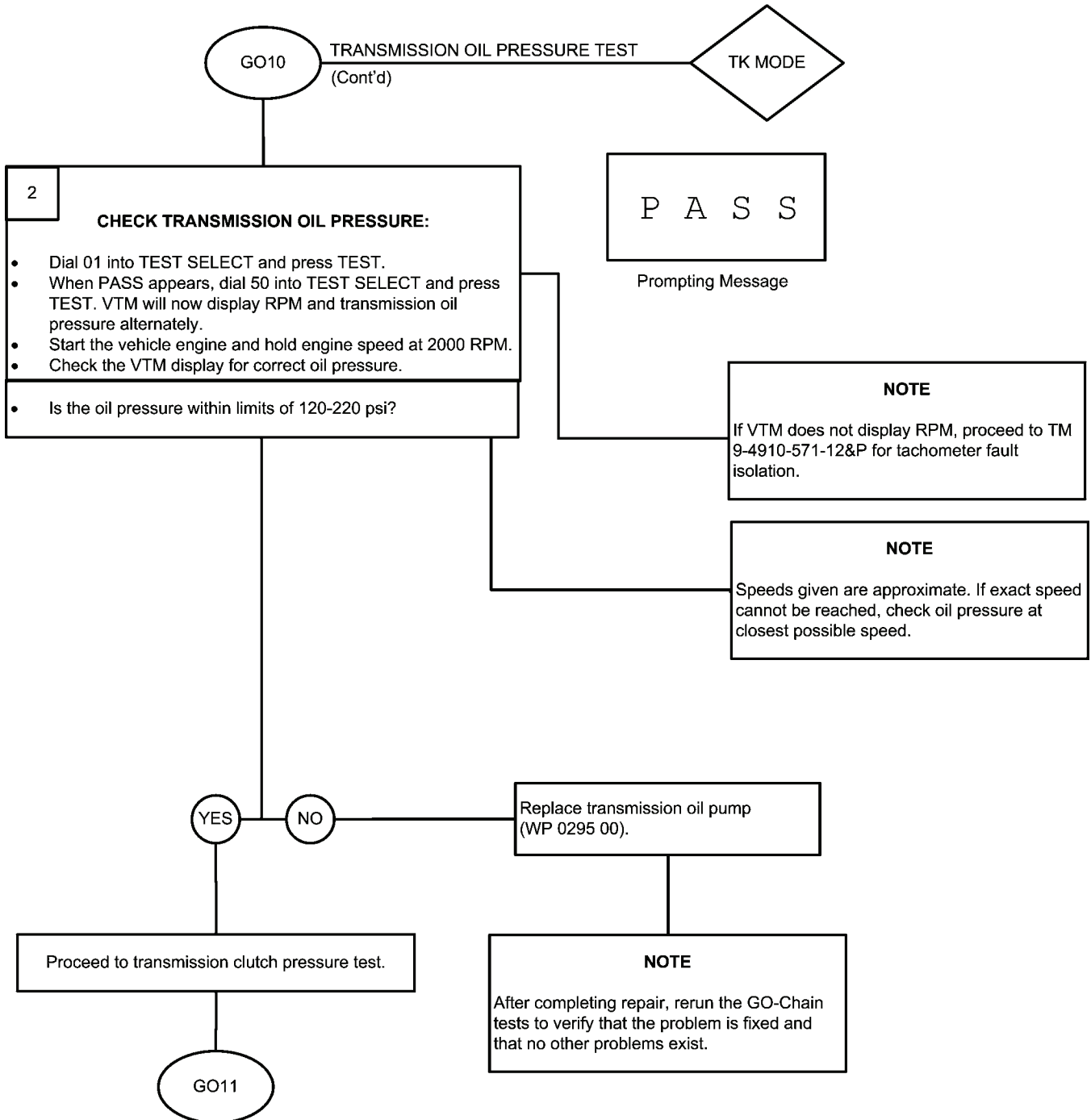
C A L

Prompting Message

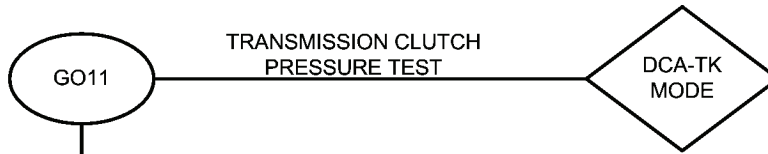
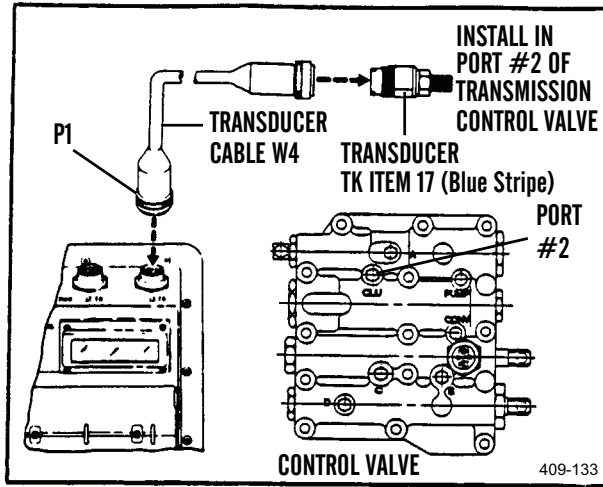


2

STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #2 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

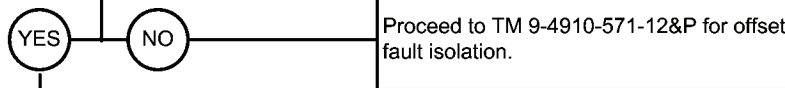
TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

Is the offset value within the limits -150 to +150?

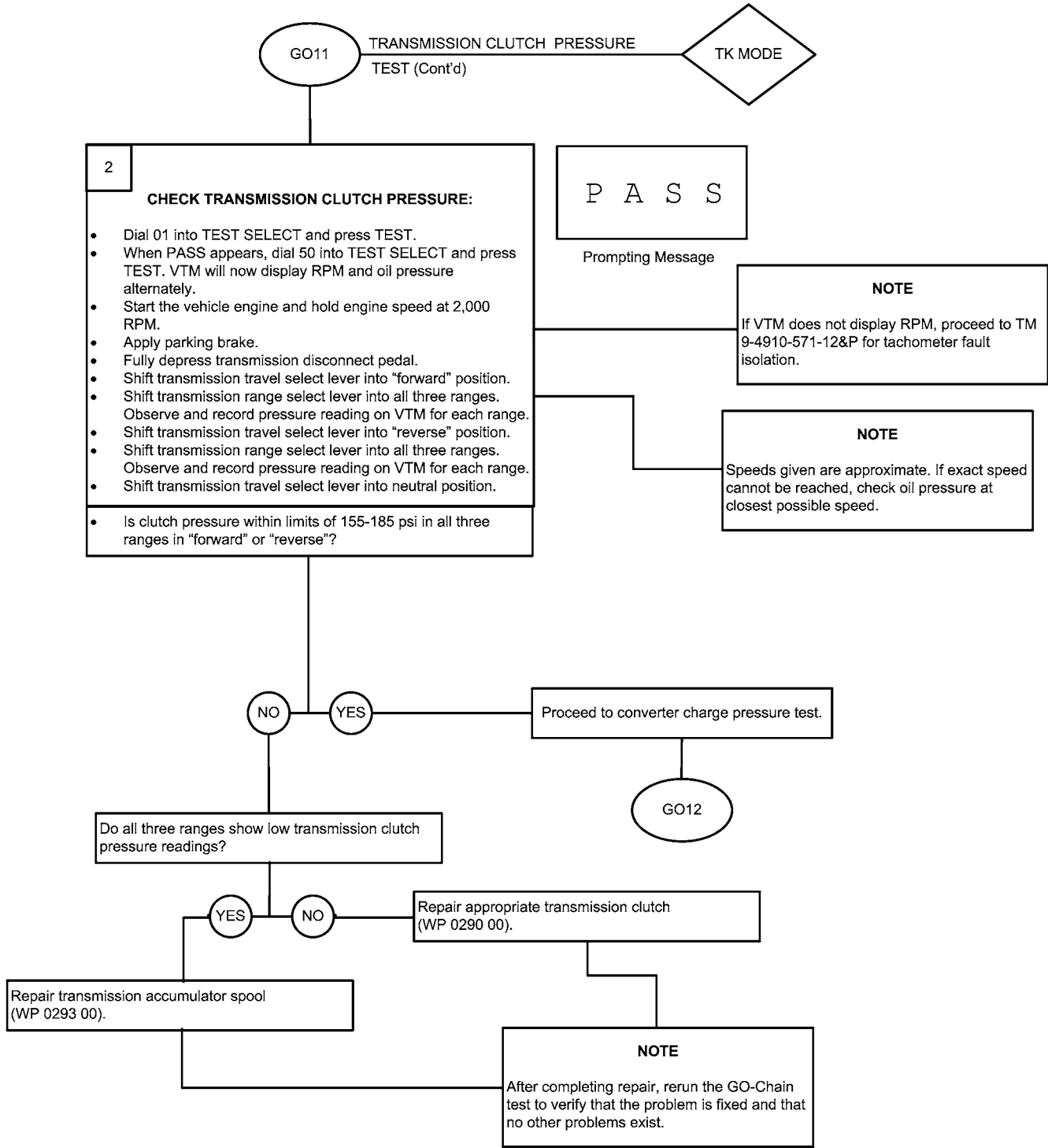
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Prompting Message

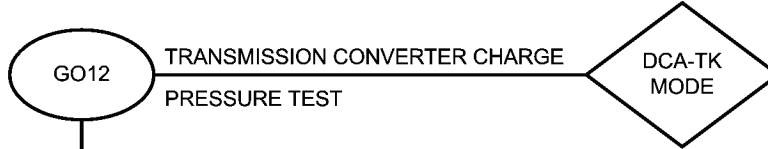
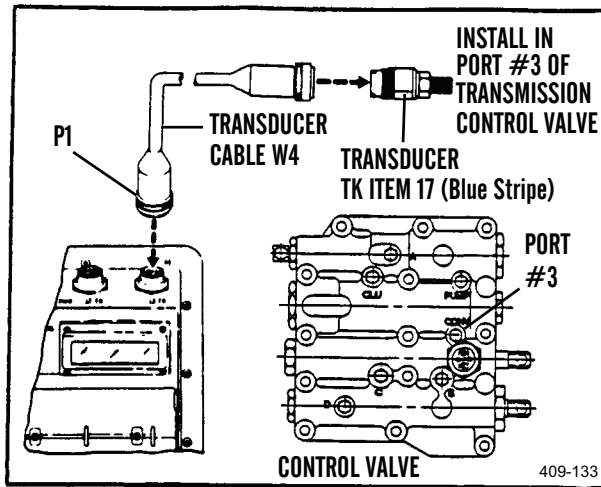


2

STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #3 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTM.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

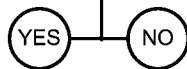
TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

- Is the offset value within the limits -150 to +150?

C A L

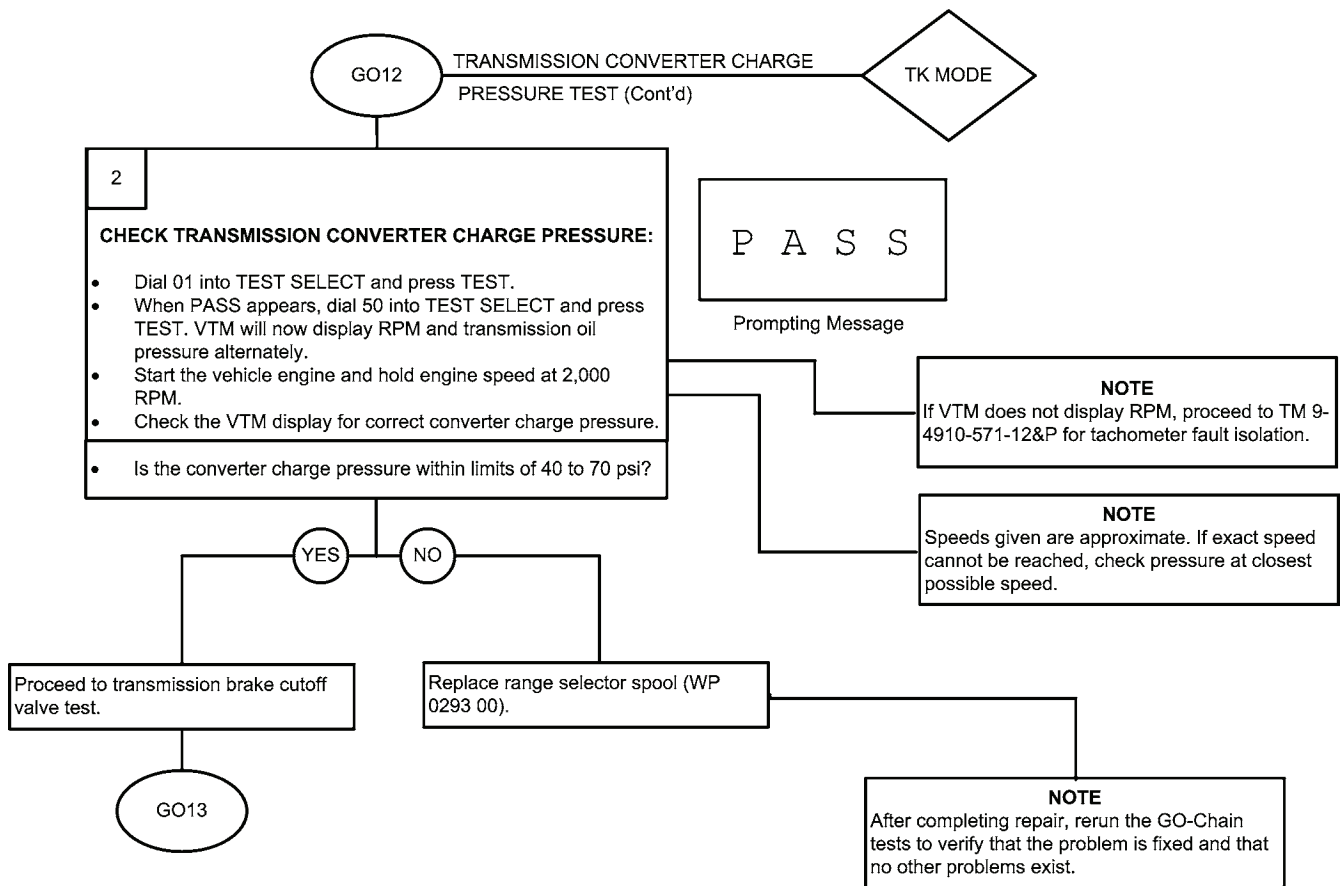
Prompting Message



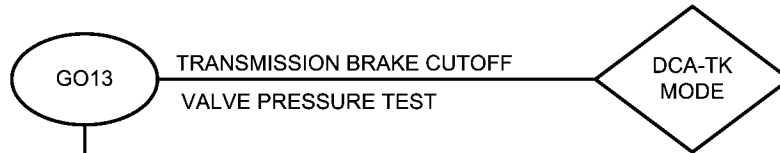
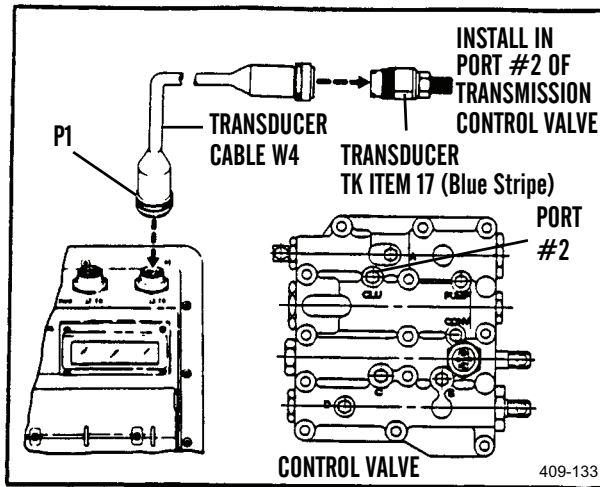
Proceed to TM 9-4910-571-12&P for offset fault isolation.

2

STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



1

INSTALL TRANSDUCER – DO OFFSET:

- Stop vehicle engine.
- Remove plug at port #2 of transmission control valve.
- Install pressure transducer TK item 17 (blue stripe).
- Connect P1 of the transducer cable W4 to J1 or J2 on the VTU.
- Connect P2 of the transducer cable to the connector on the pressure transducer (TK17).

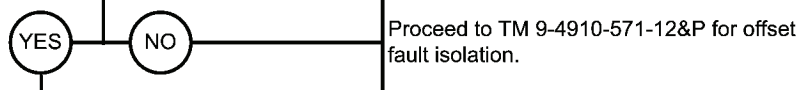
TEST NO.	TEST
01	INTERLEAVE
50	0-1,000 PSIG PRESSURE

- Dial 50 into TEST SELECT.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on the display.

Is the offset value within the limits -150 to +150?

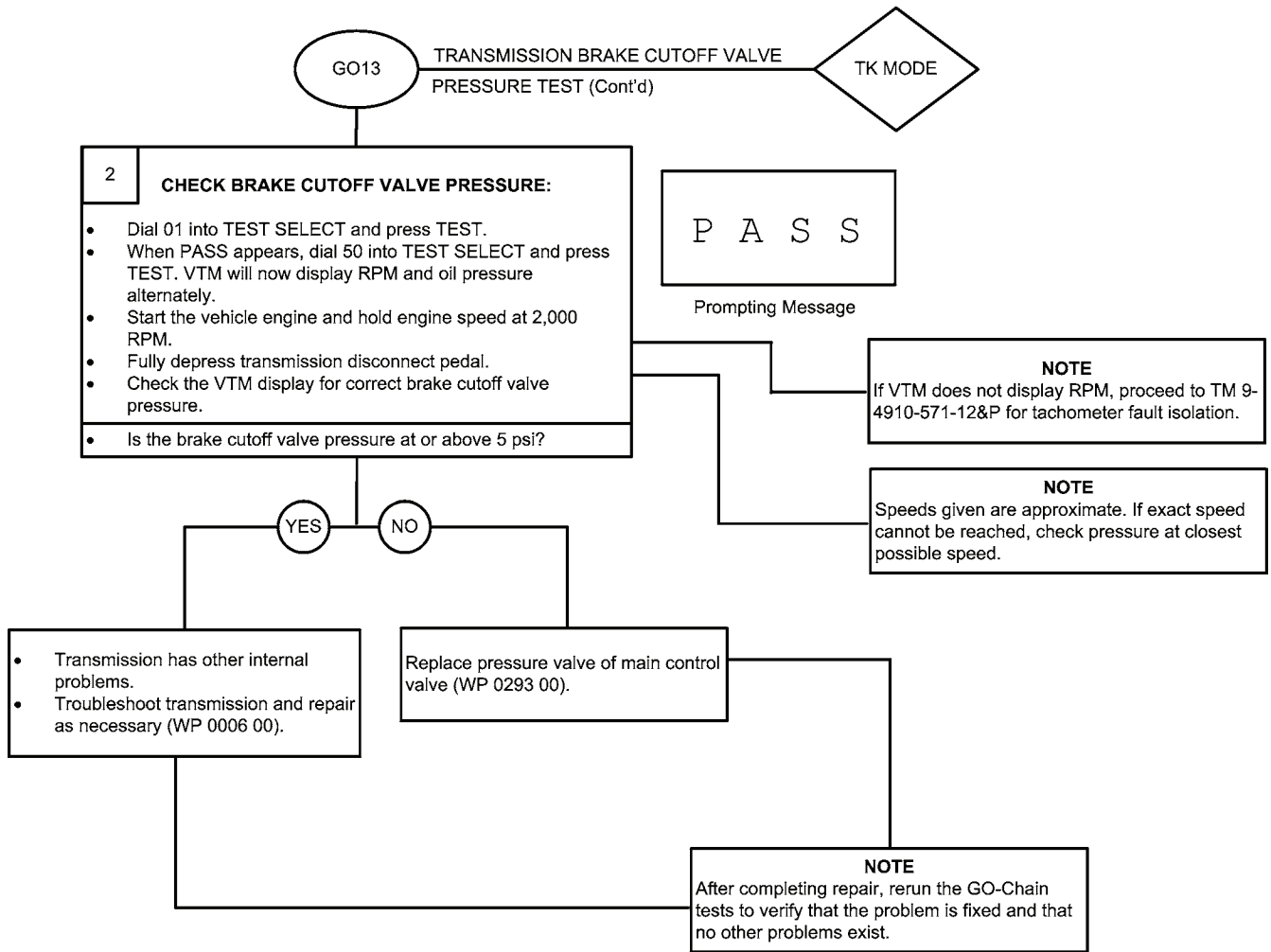
C A L

Prompting Message

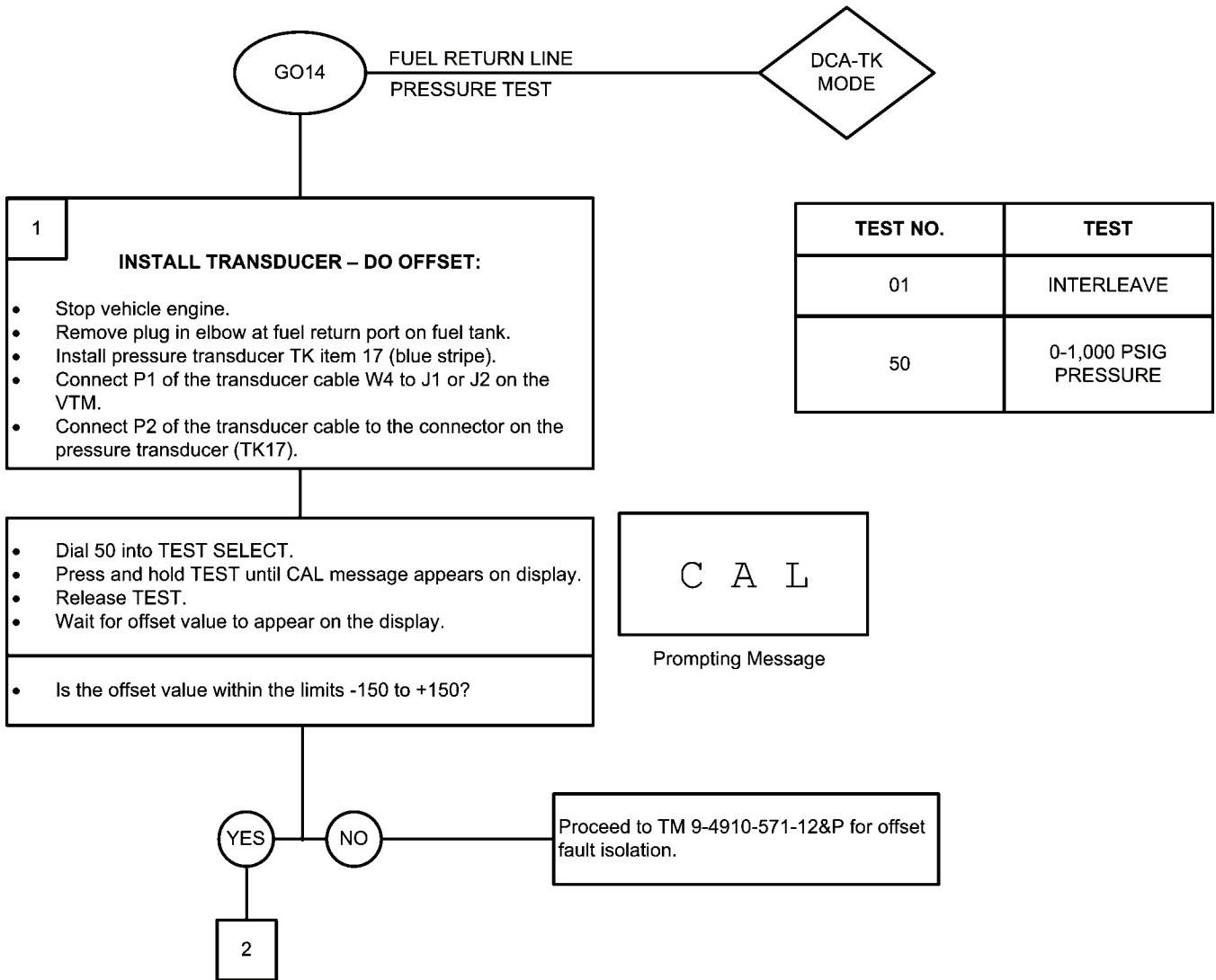


2

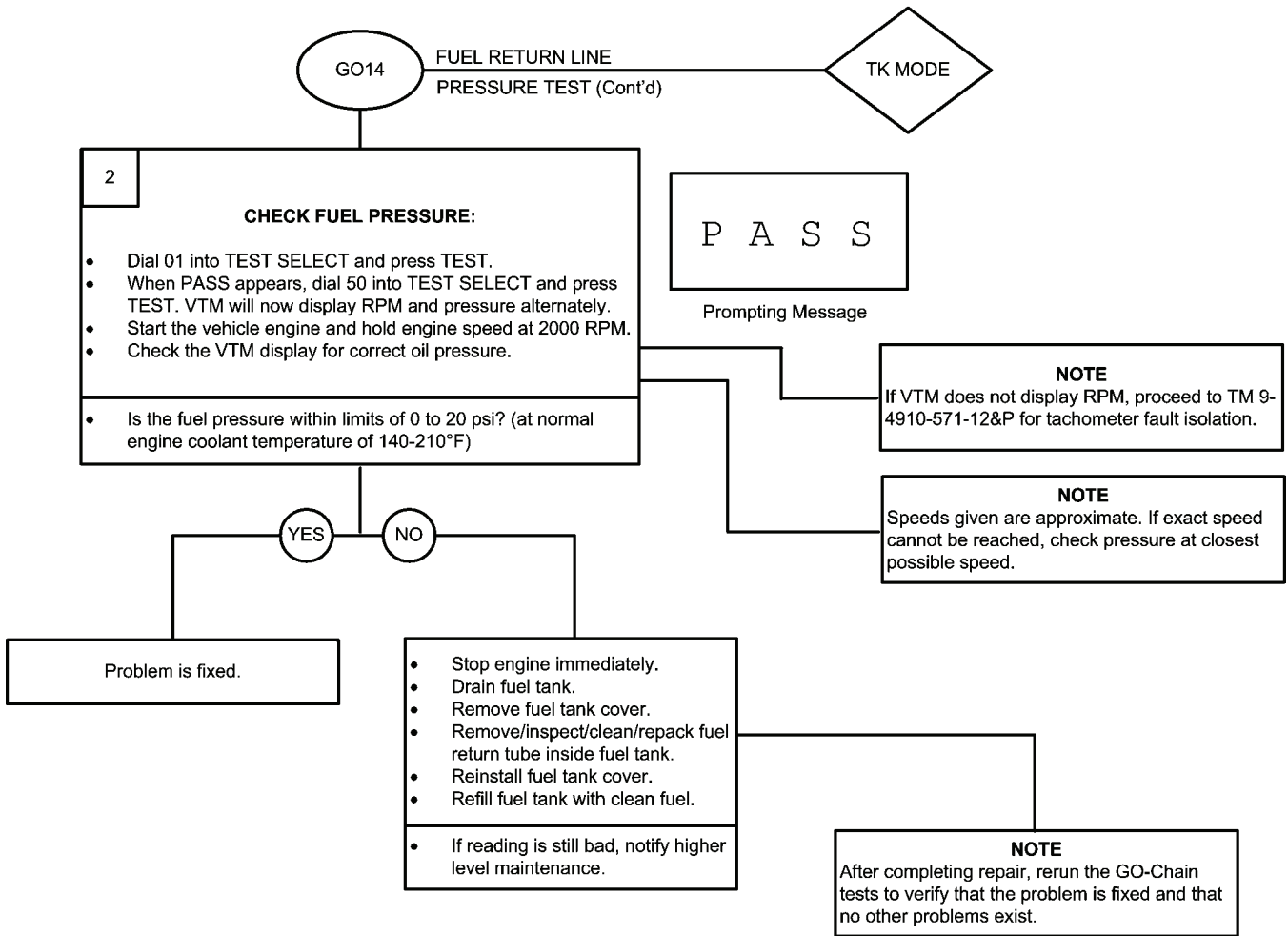
STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED



STE/ICE-R GO-CHAIN TESTS - CONTINUED

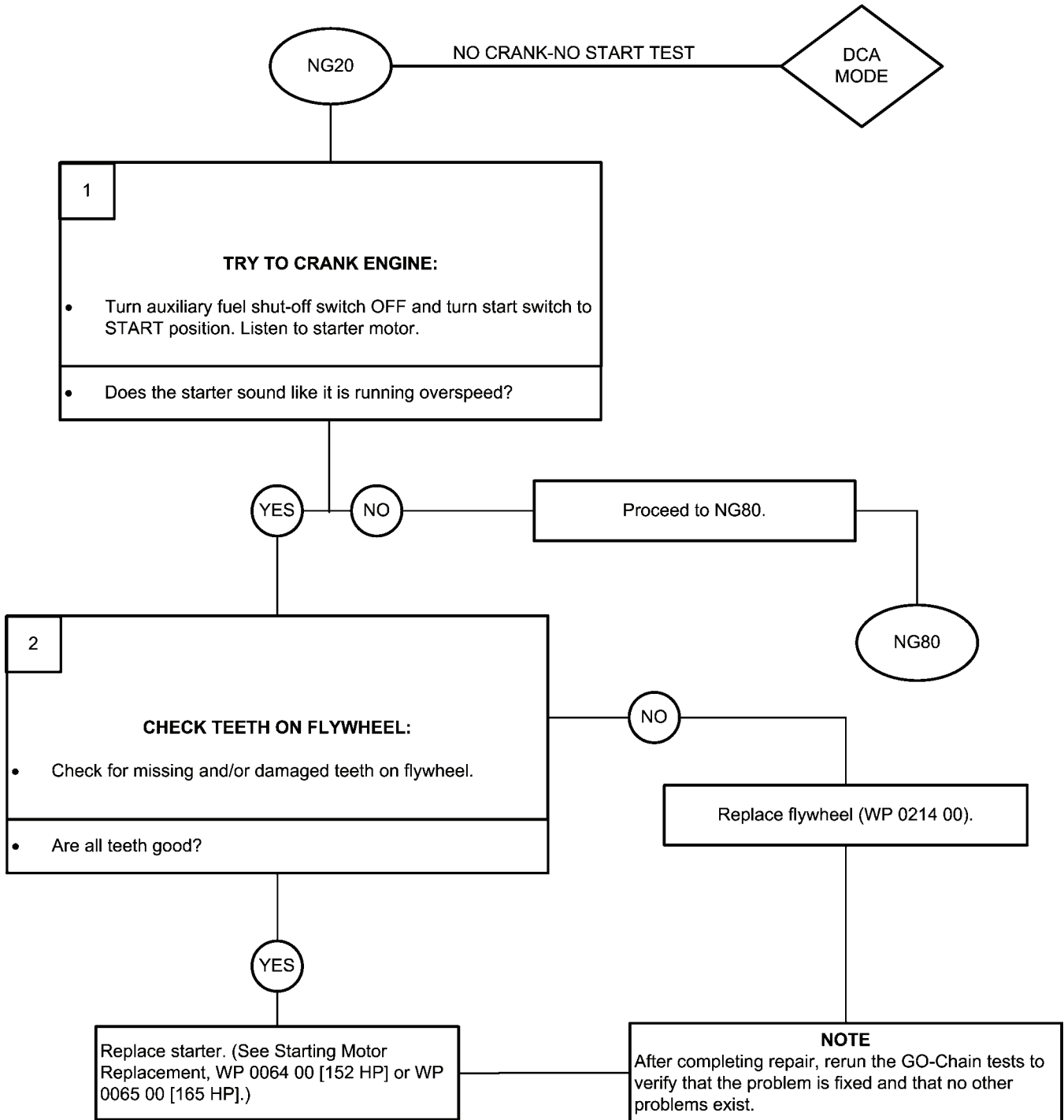


STE/ICE-R NO-GO-CHAIN TESTS

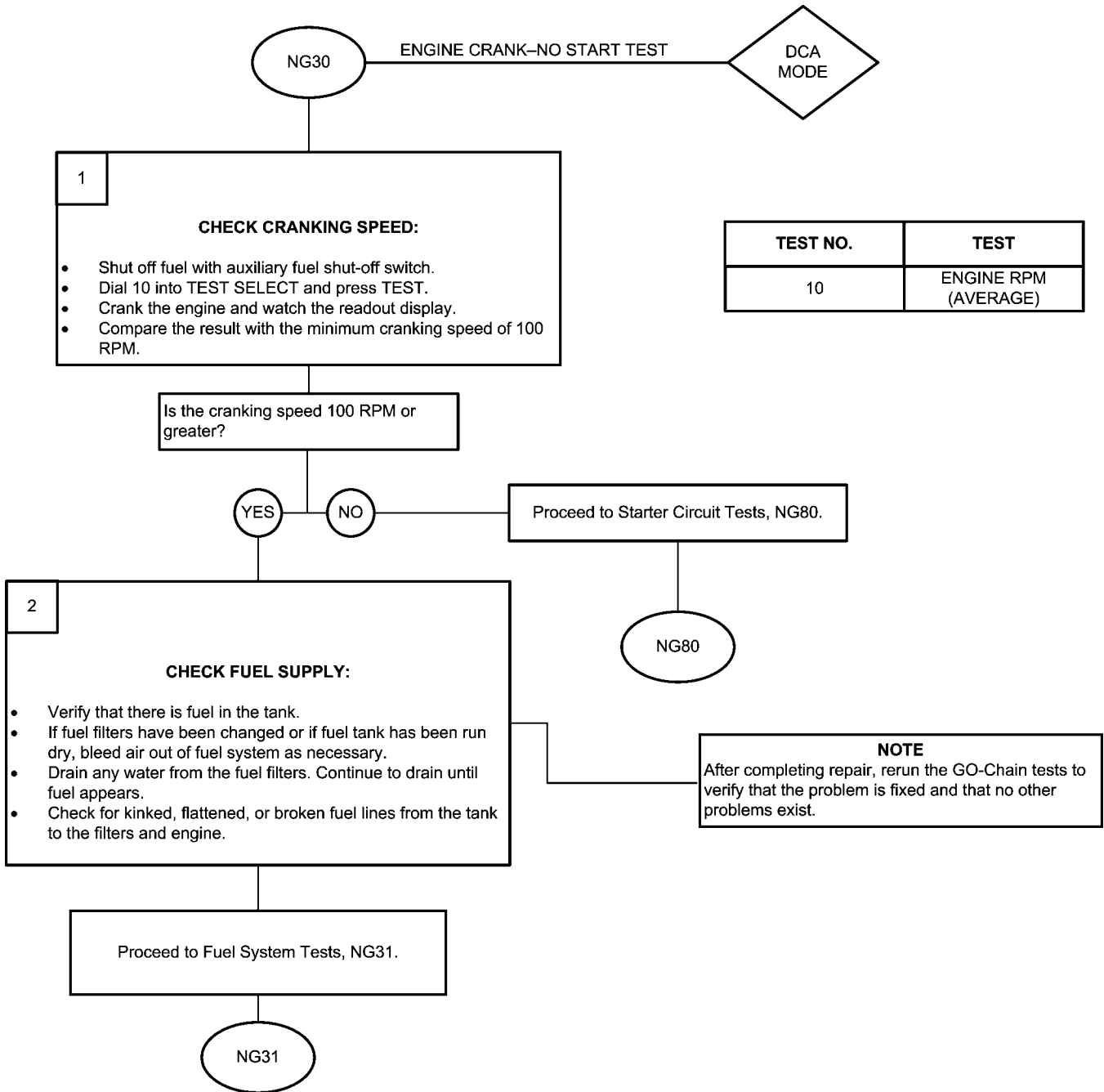
The following NO-GO-Chain tests are made using the vehicle DCA connector. Each test is referenced from the GO-Chain testing sequence. Do not perform any of these test unless you are instructed to by the GO-Chain testing. All testing is referenced by the NG (NO-GO) number. Refer to the following table for the NO-GO test index.

GO TEST NUMBER	MODE	TEST TITLE	PAGE NUMBER
NG20	DCA	No Crank-No Start Test	0007 00-35
NG30	DCA	Engine Crank-No Start Test	0007 00-36
NG31	DCA	Fuel System Tests	0007 00-37
NG50	DCA	Alternator Tests	0007 00-40
NG80	DCA	Starter Circuit Tests	0007 00-42
NG81	DCA	Battery Tests	0007 00-46
NG90	DCA	Starter Tests	0007 00-49
NG100	DCA	Engine Tests	0007 00-51
NG110	DCA	Starter Current Test	0007 00-53

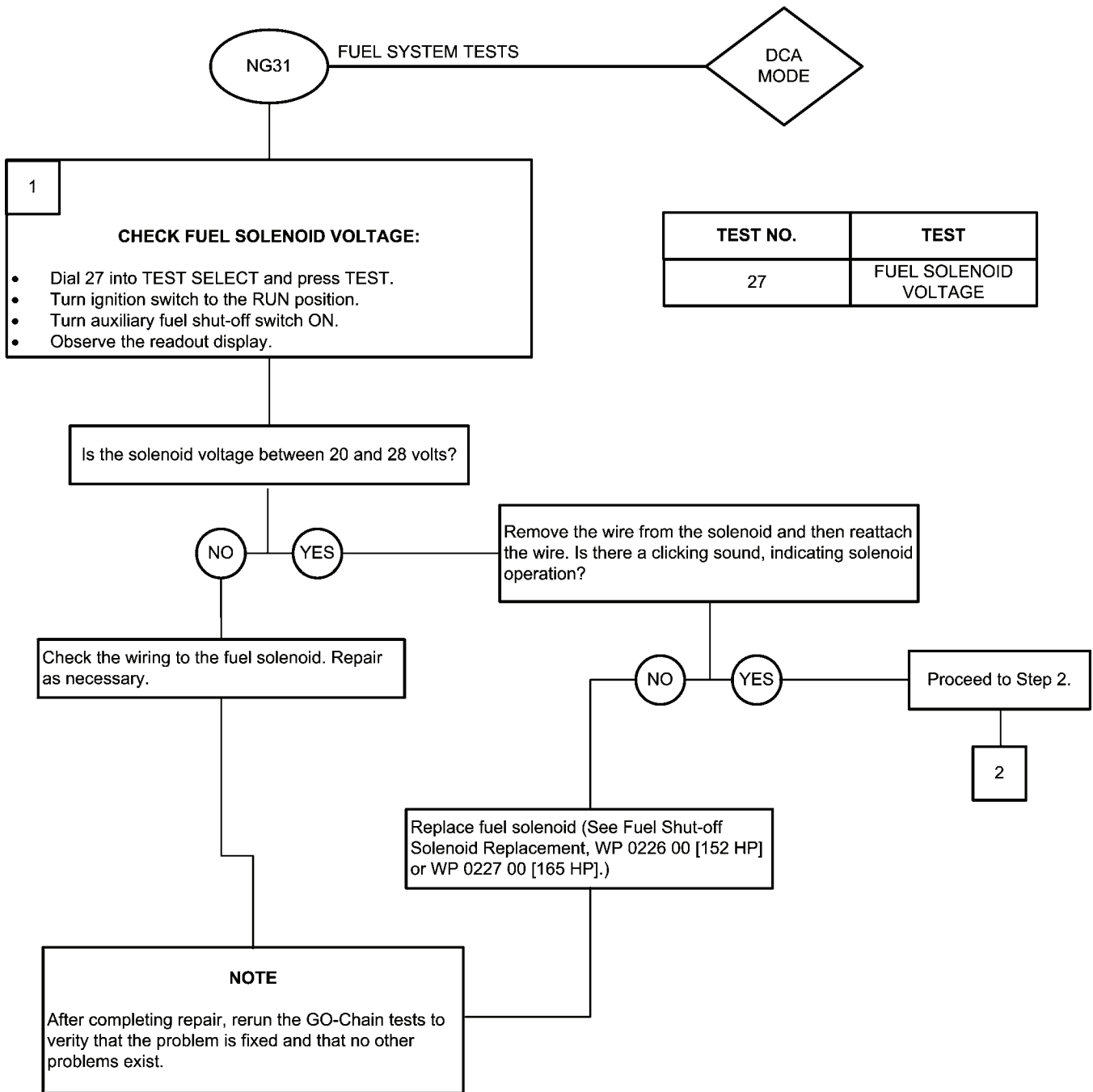
STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



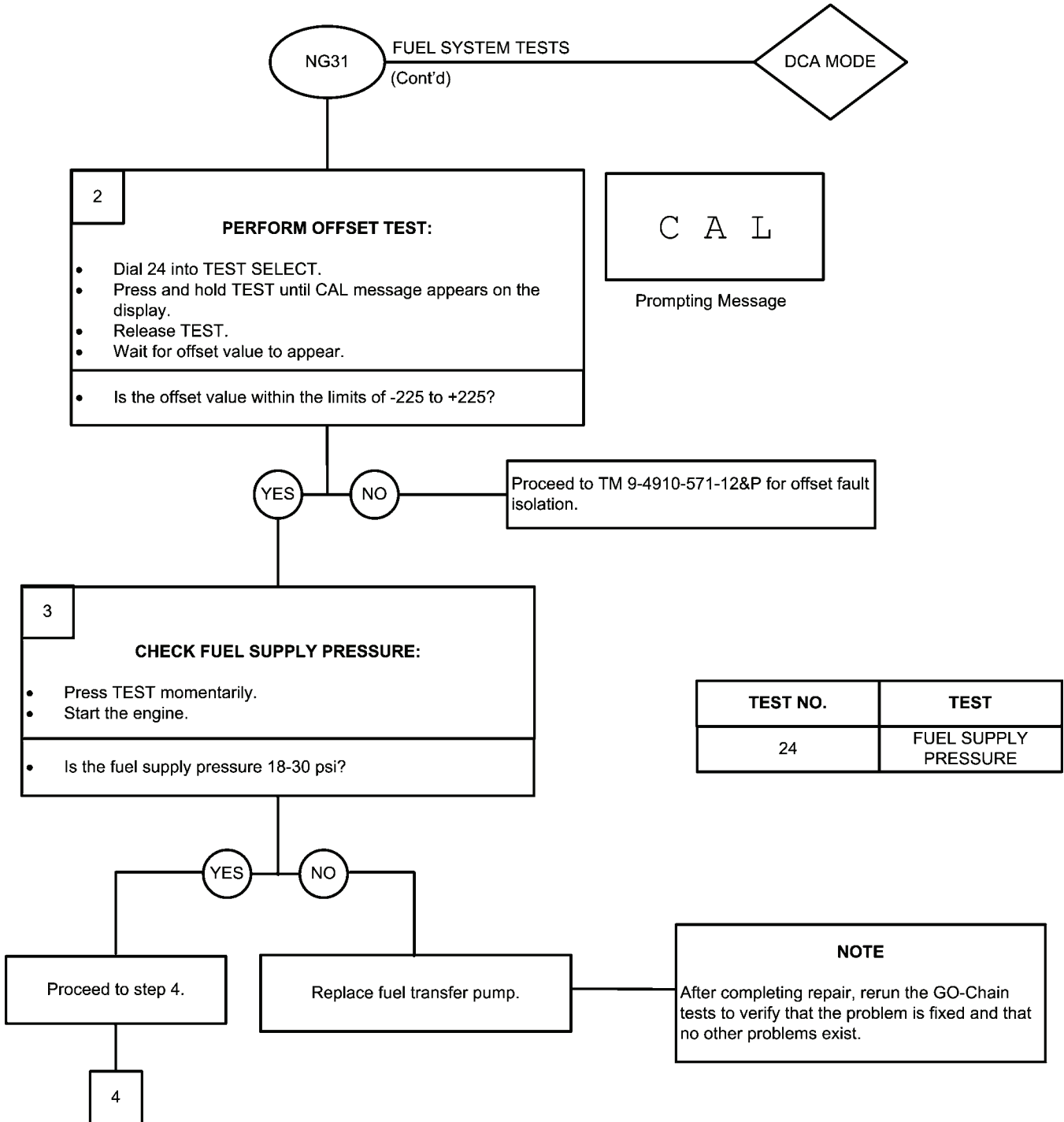
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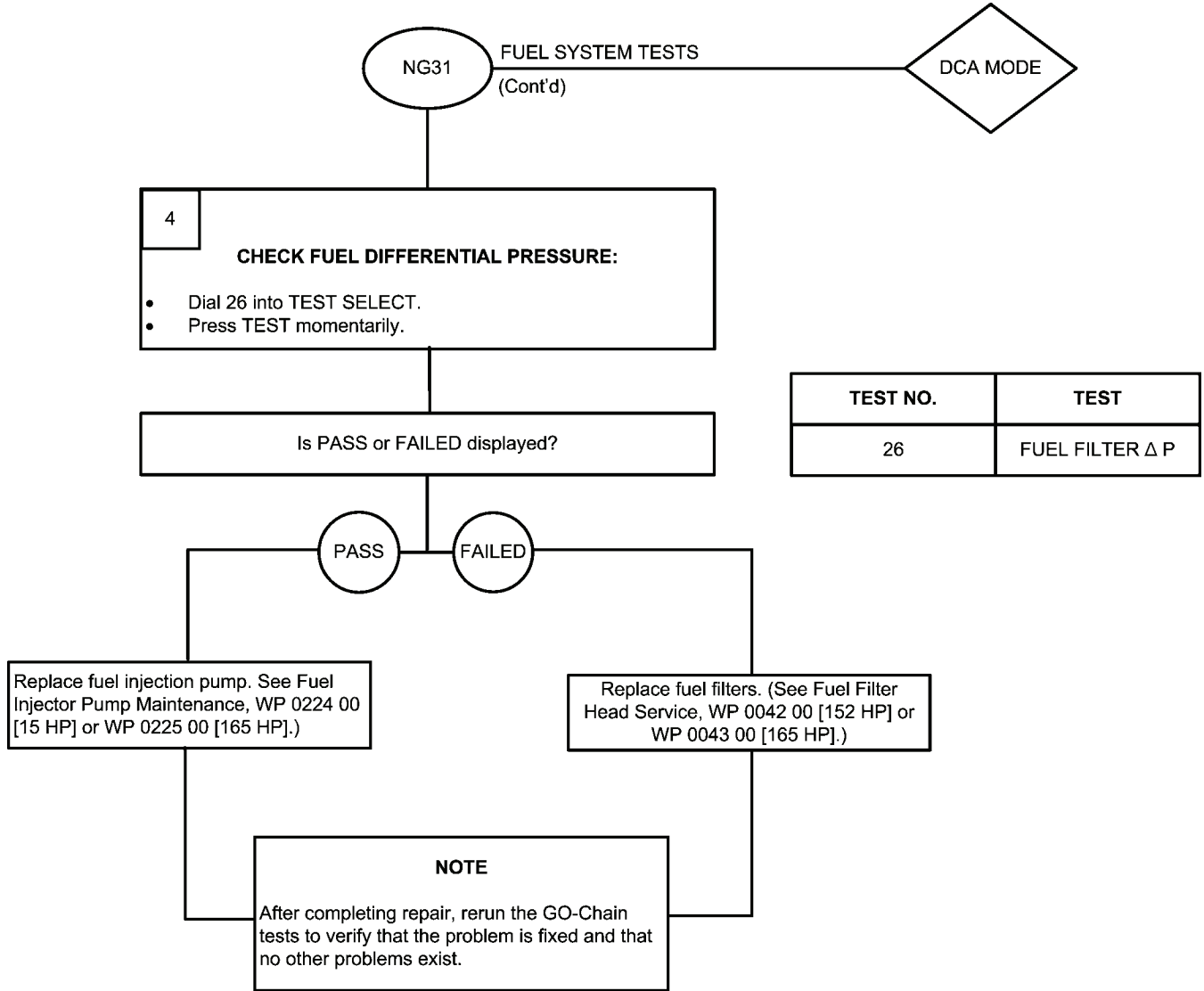
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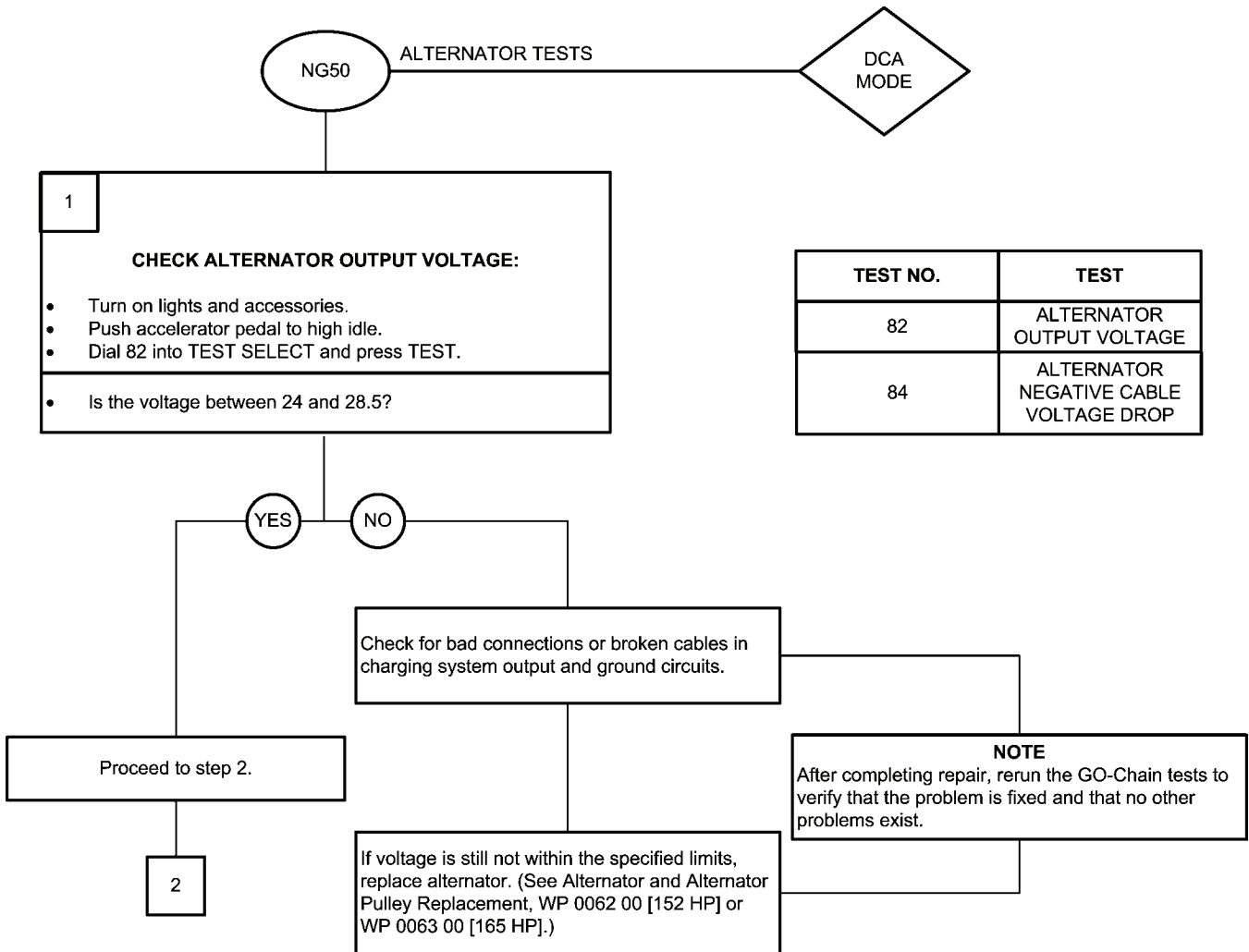
STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



YES NO

Proceed to step 2.

2

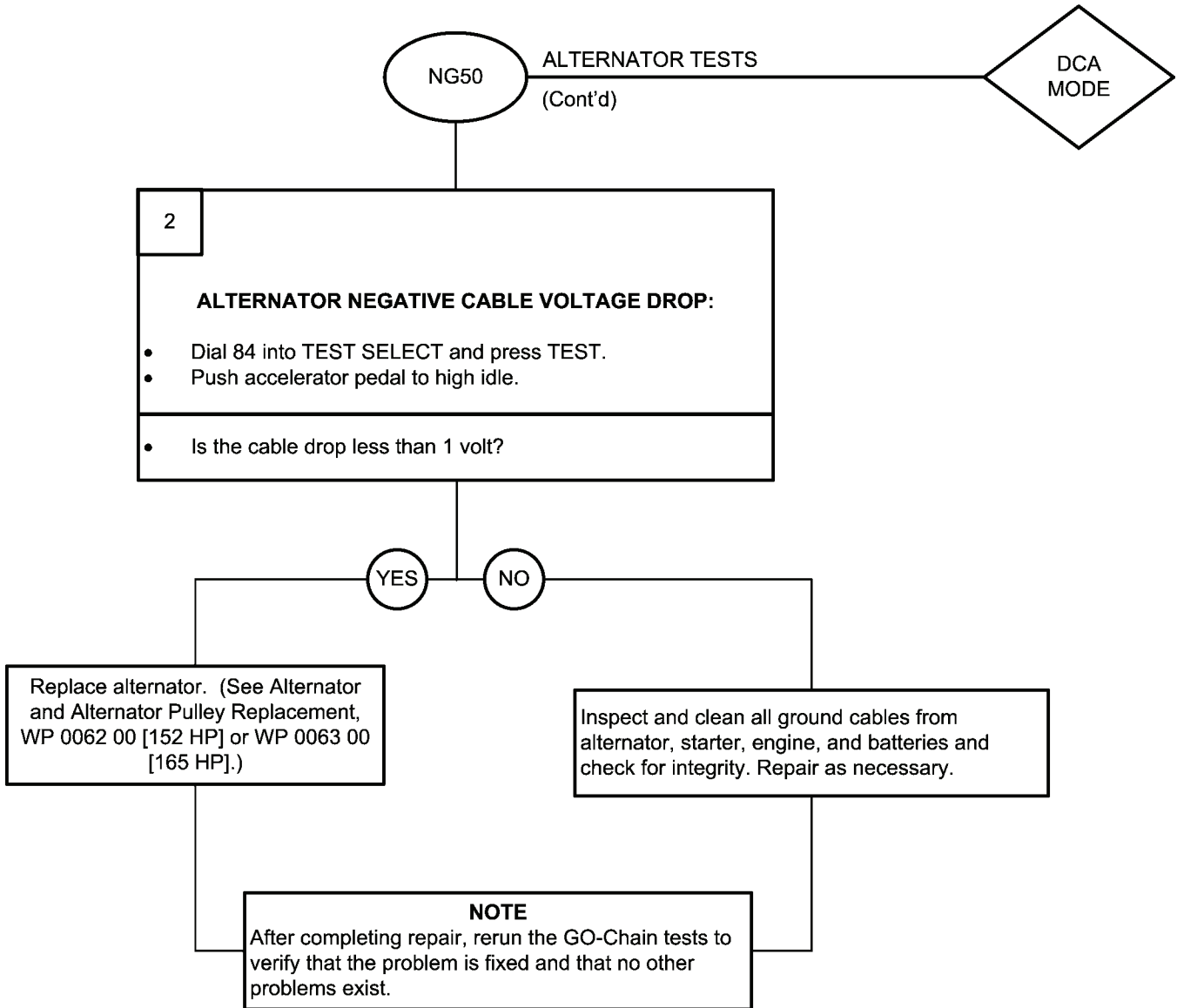
Check for bad connections or broken cables in charging system output and ground circuits.

NOTE

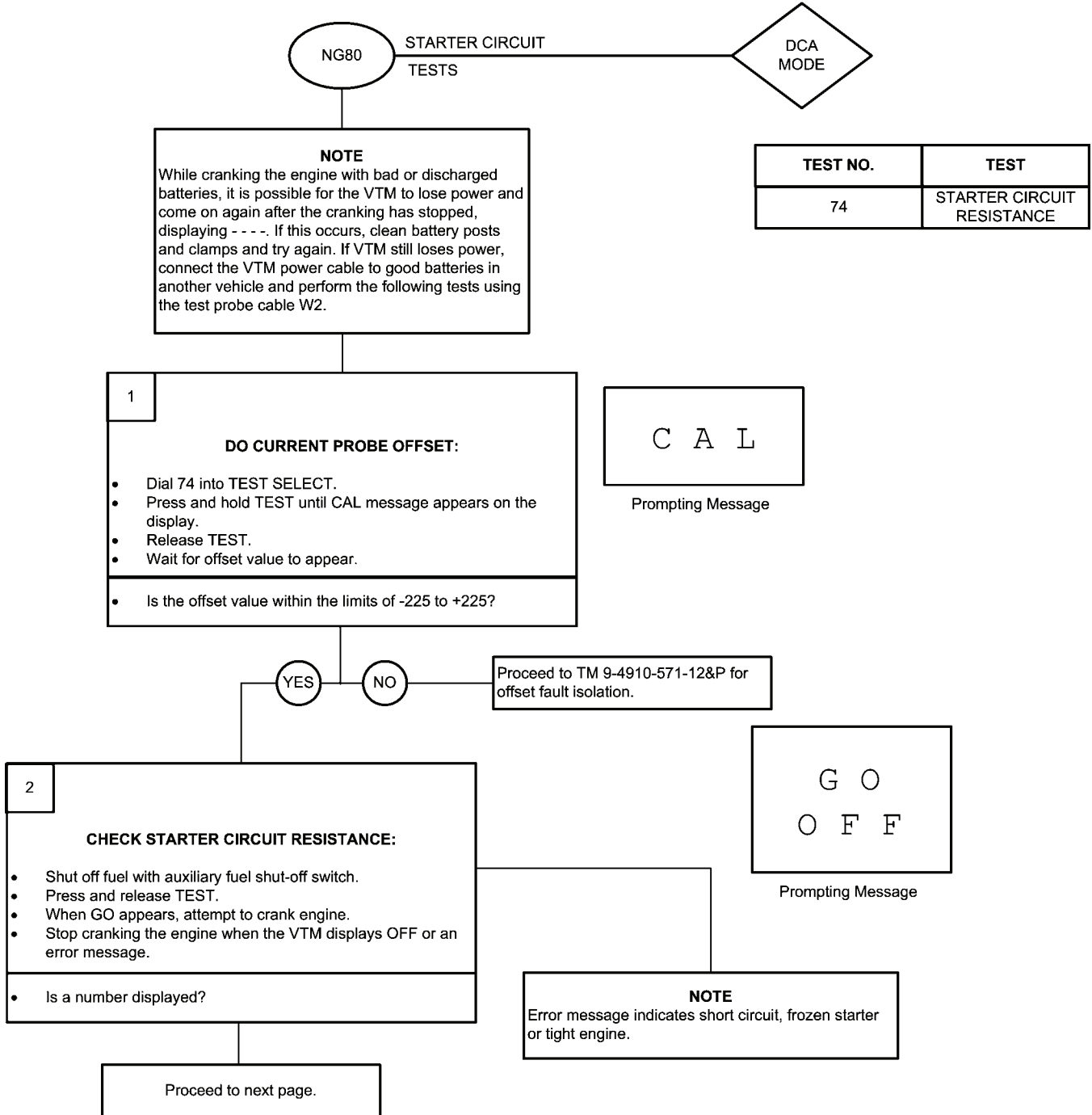
After completing repair, rerun the GO-Chain tests to verify that the problem is fixed and that no other problems exist.

If voltage is still not within the specified limits, replace alternator. (See Alternator and Alternator Pulley Replacement, WP 0062 00 [152 HP] or WP 0063 00 [165 HP].)

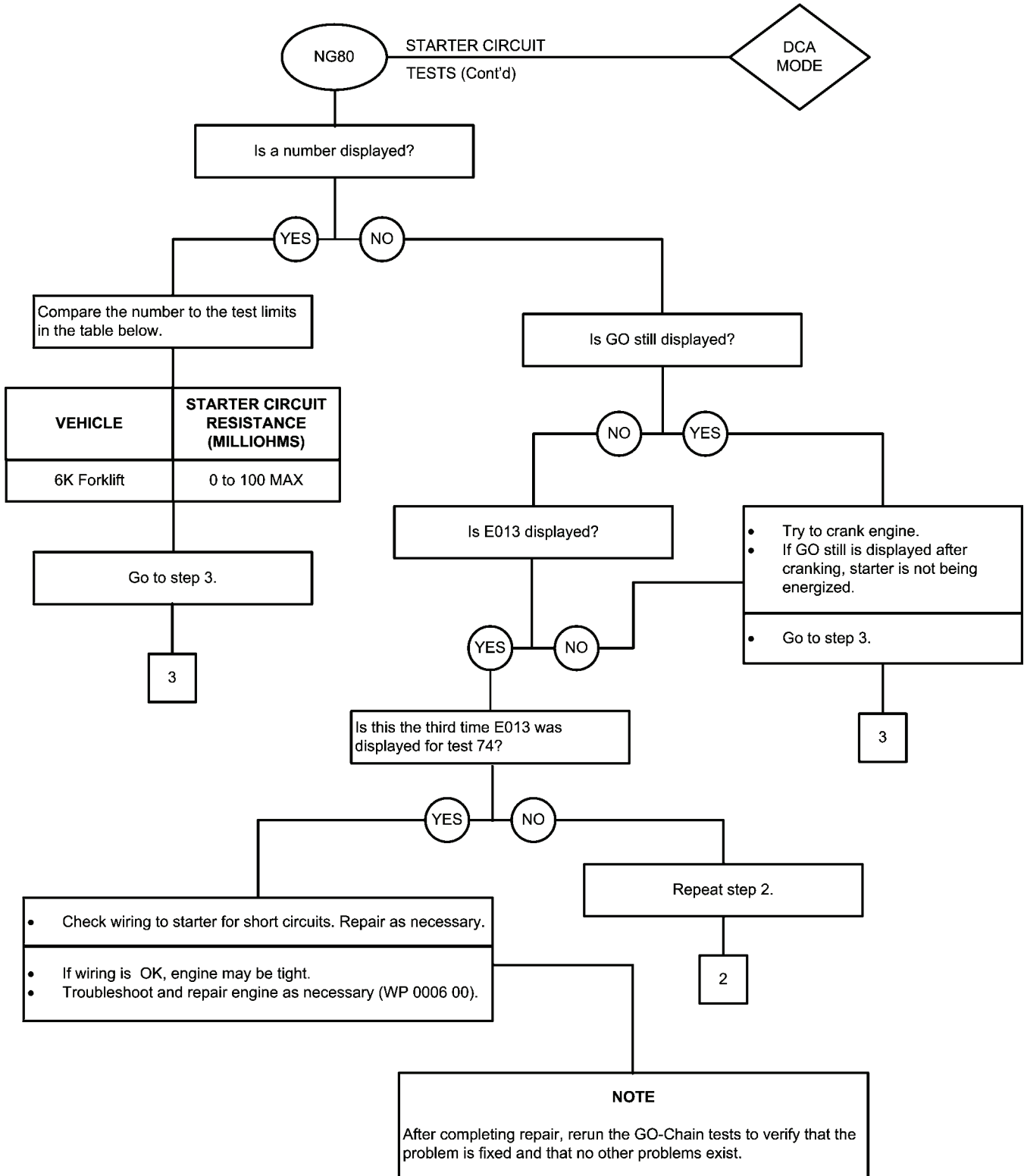
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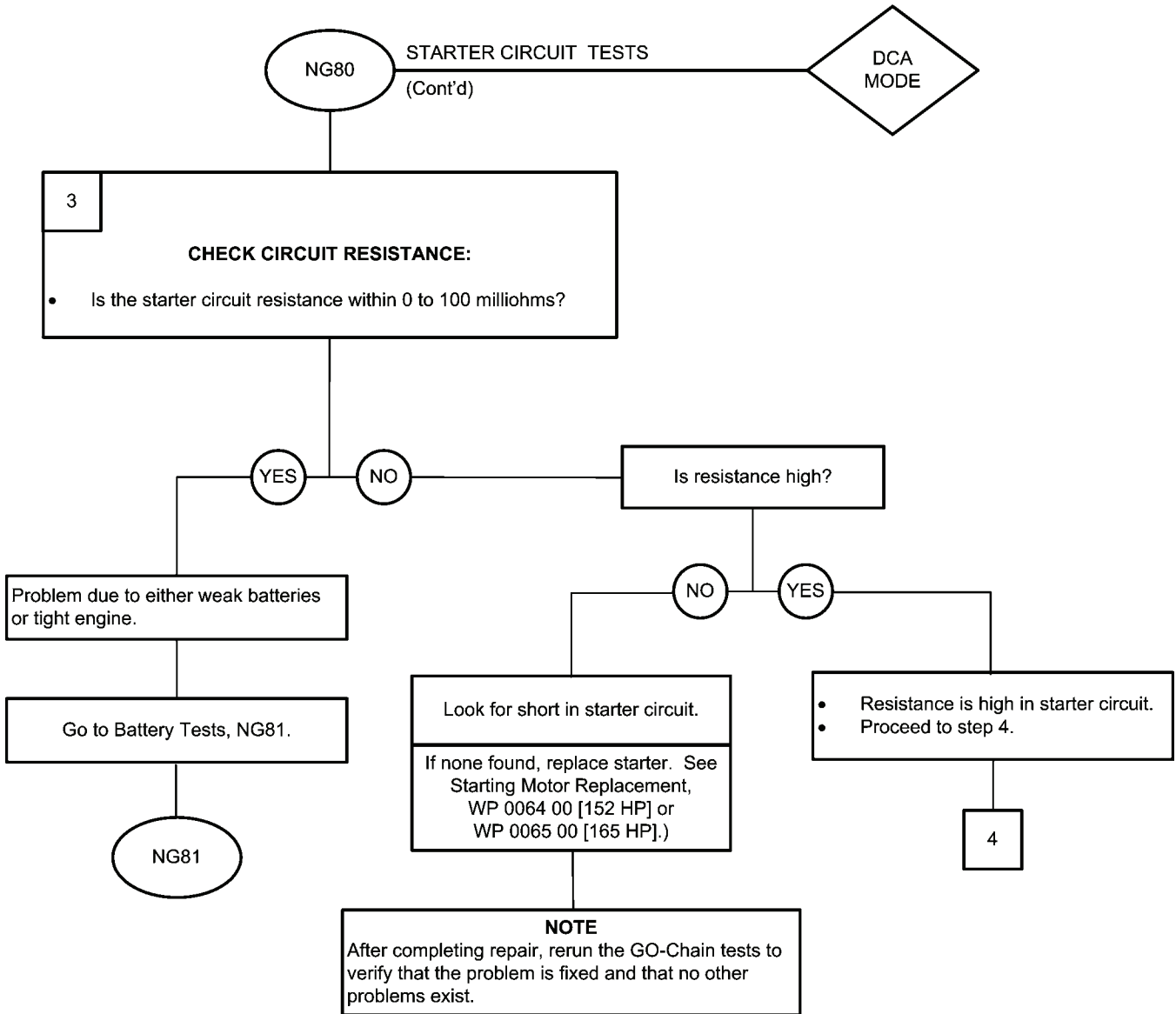
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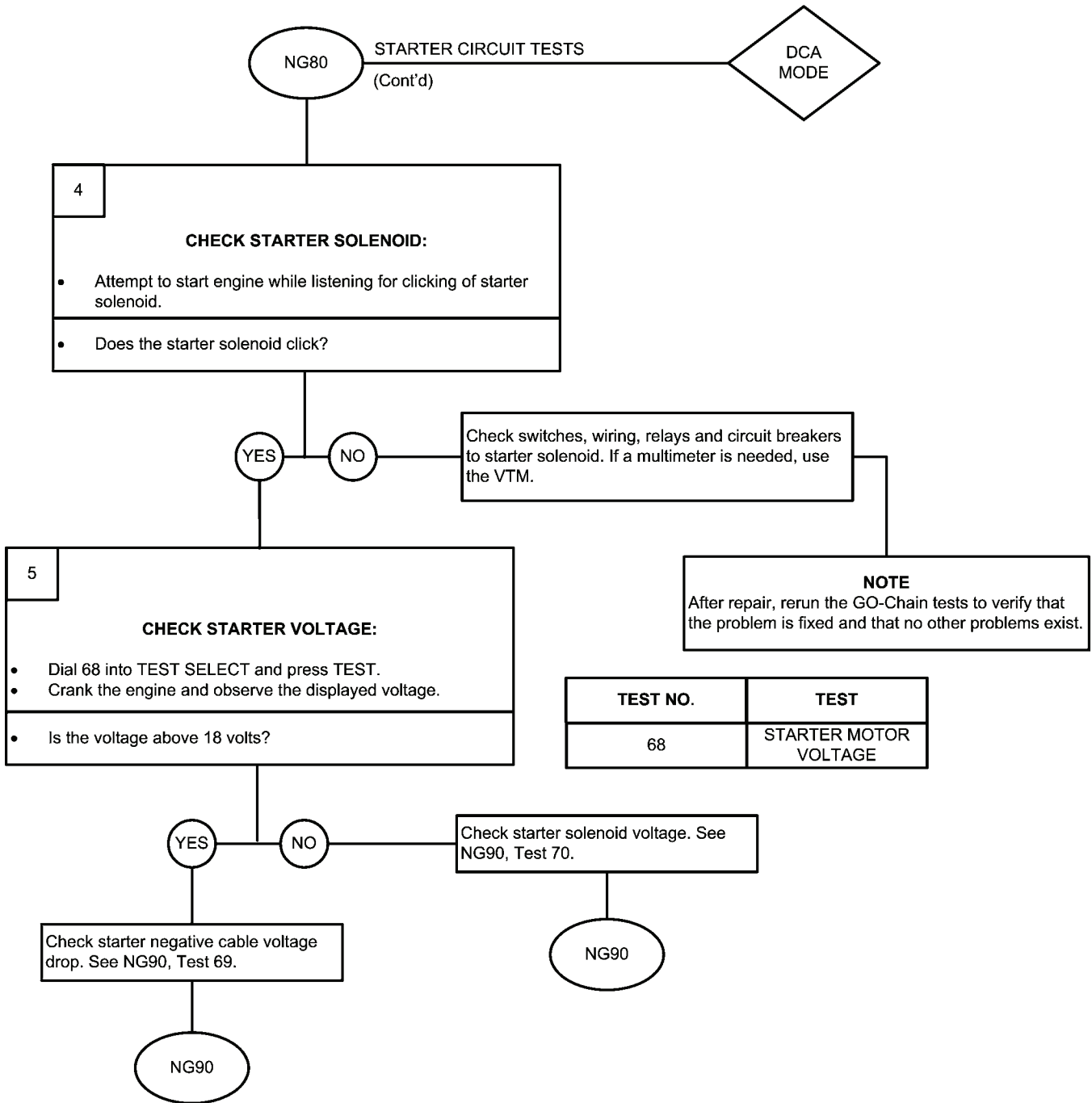
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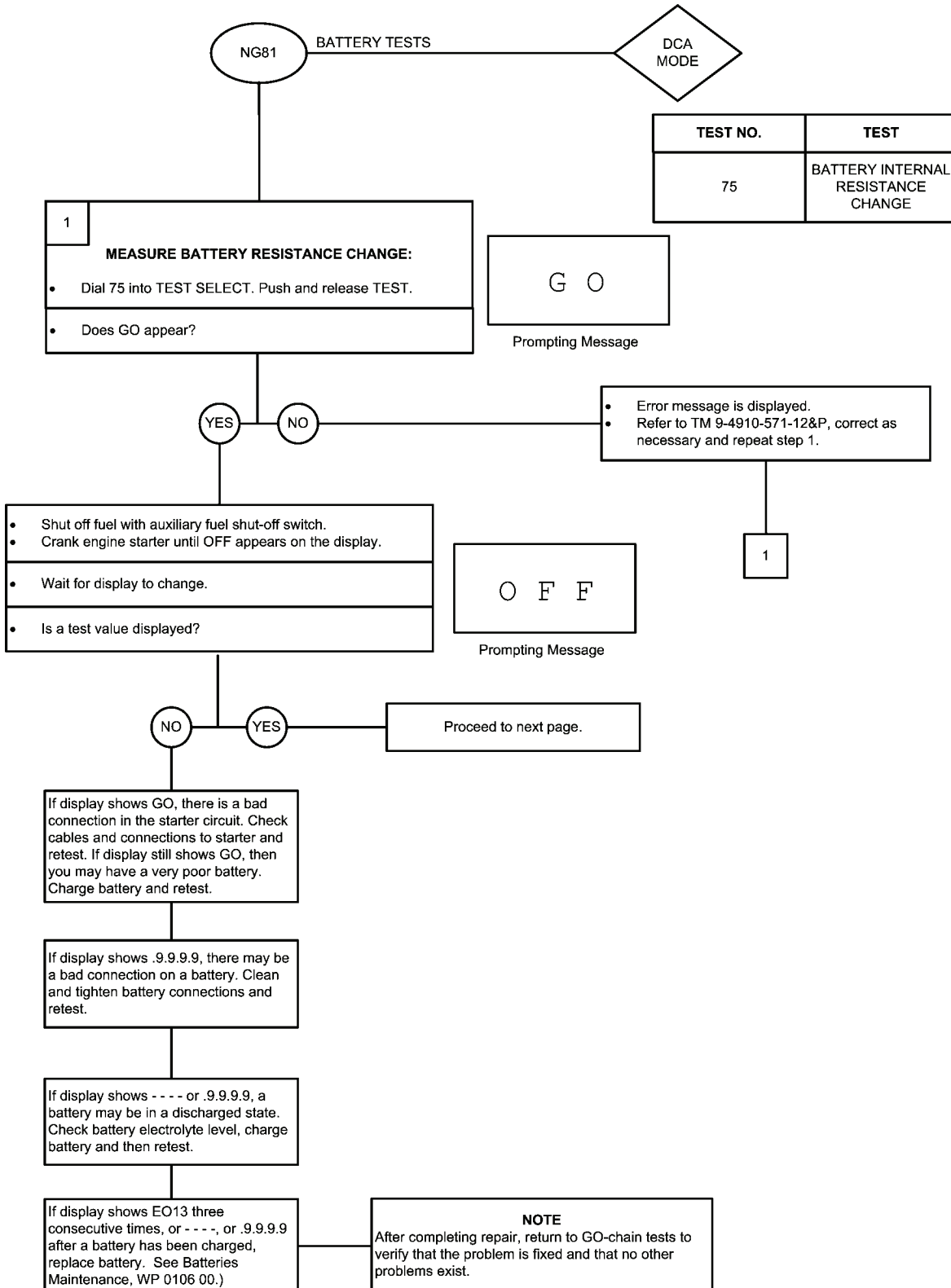
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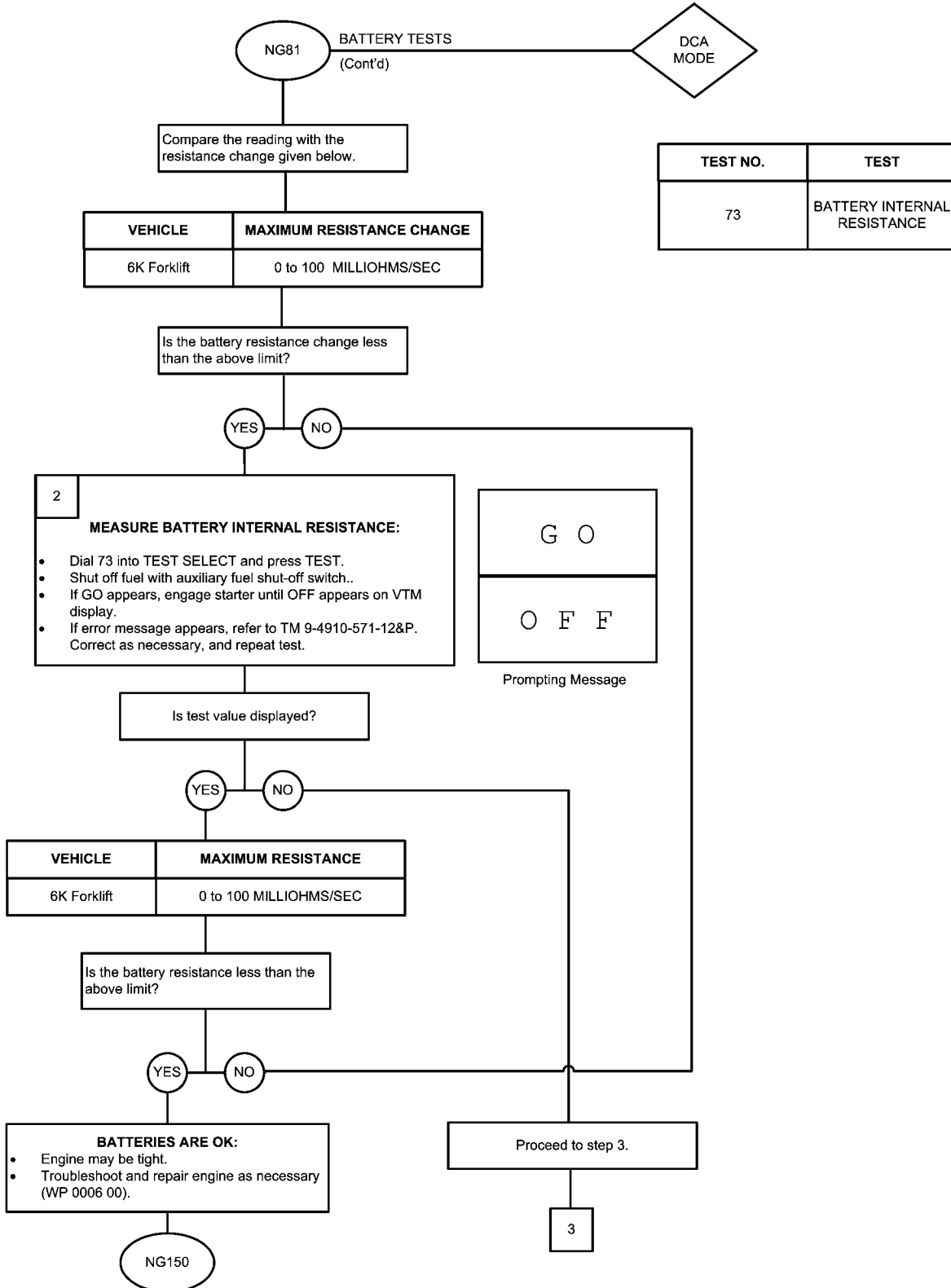
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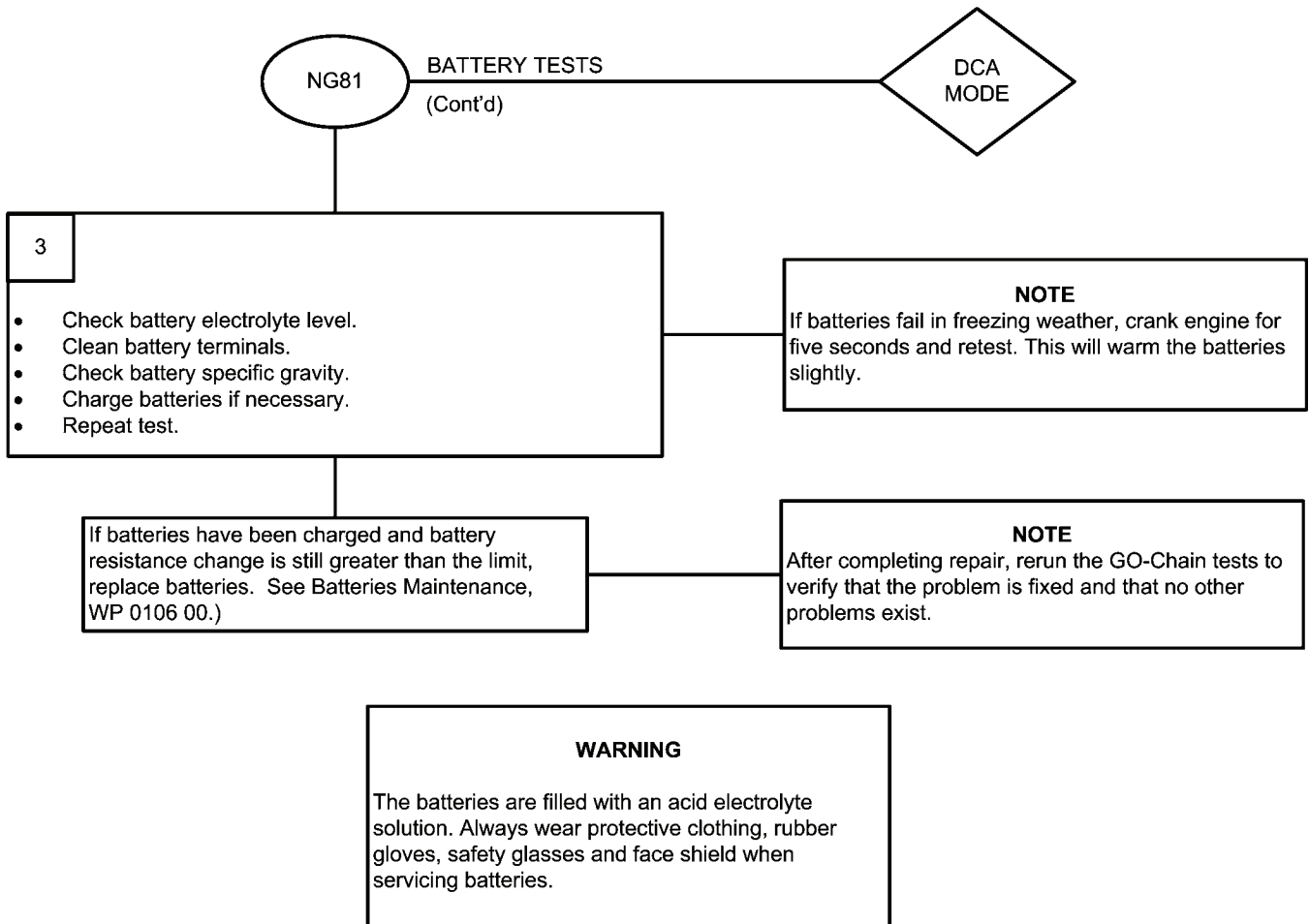
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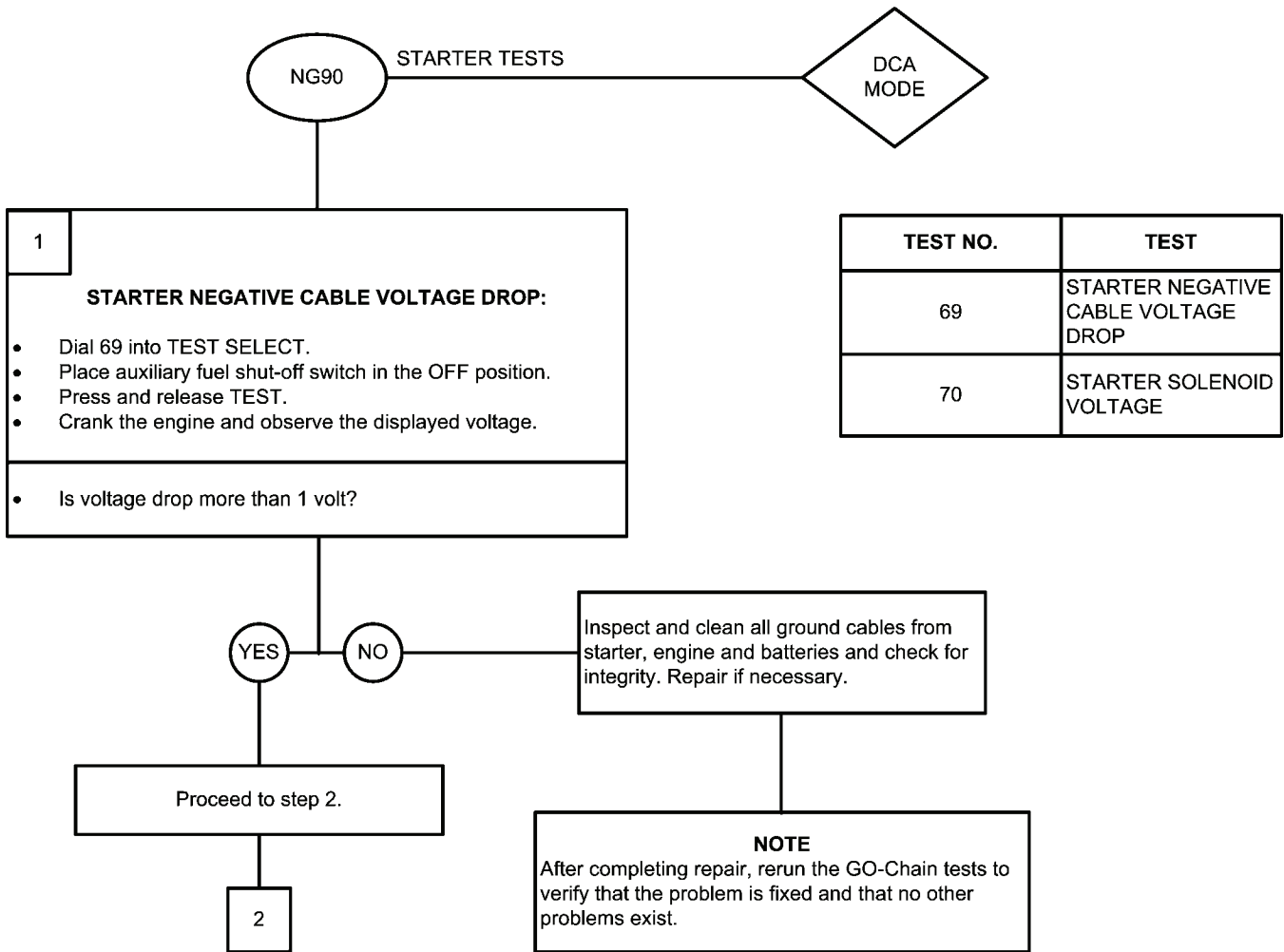
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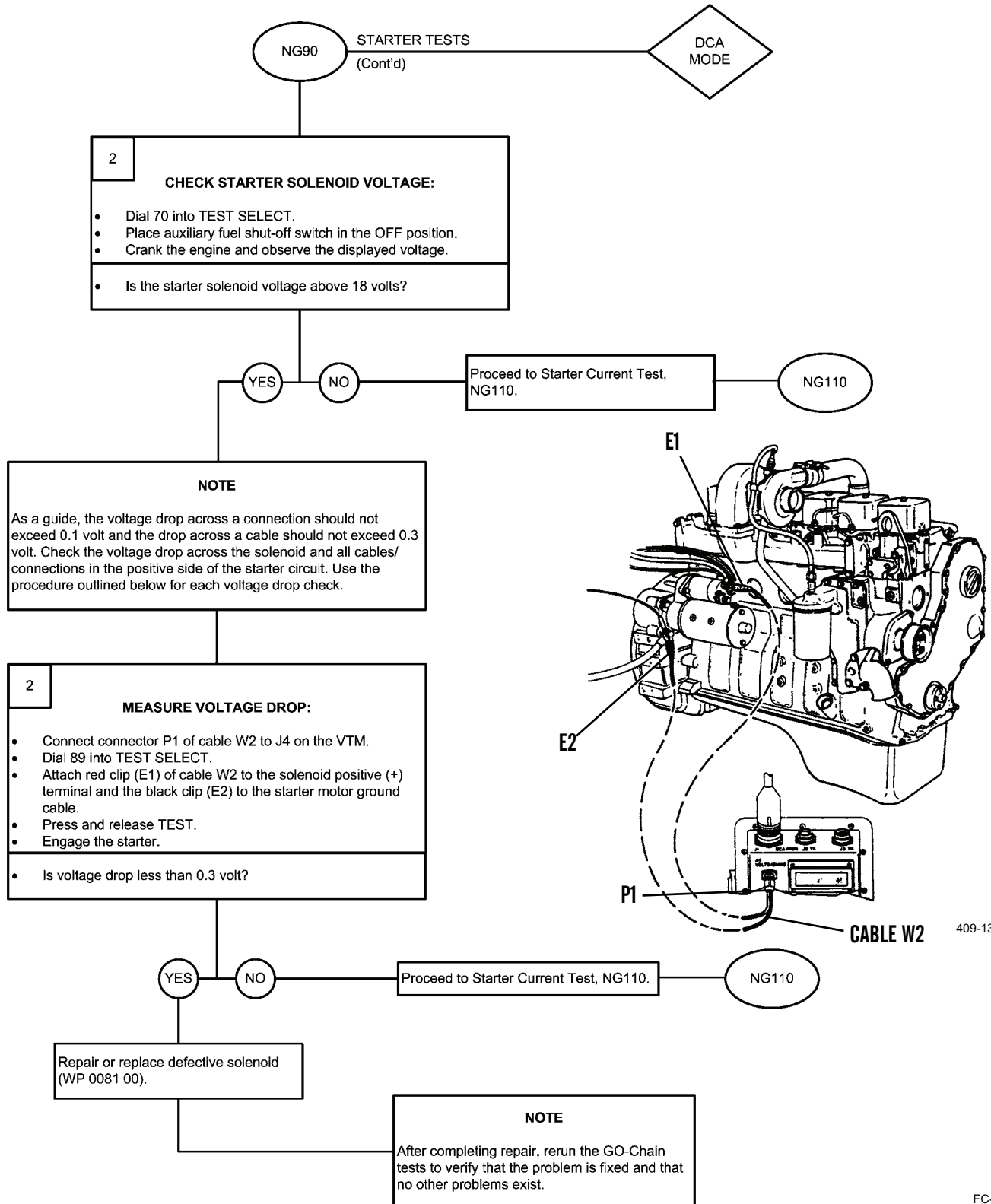
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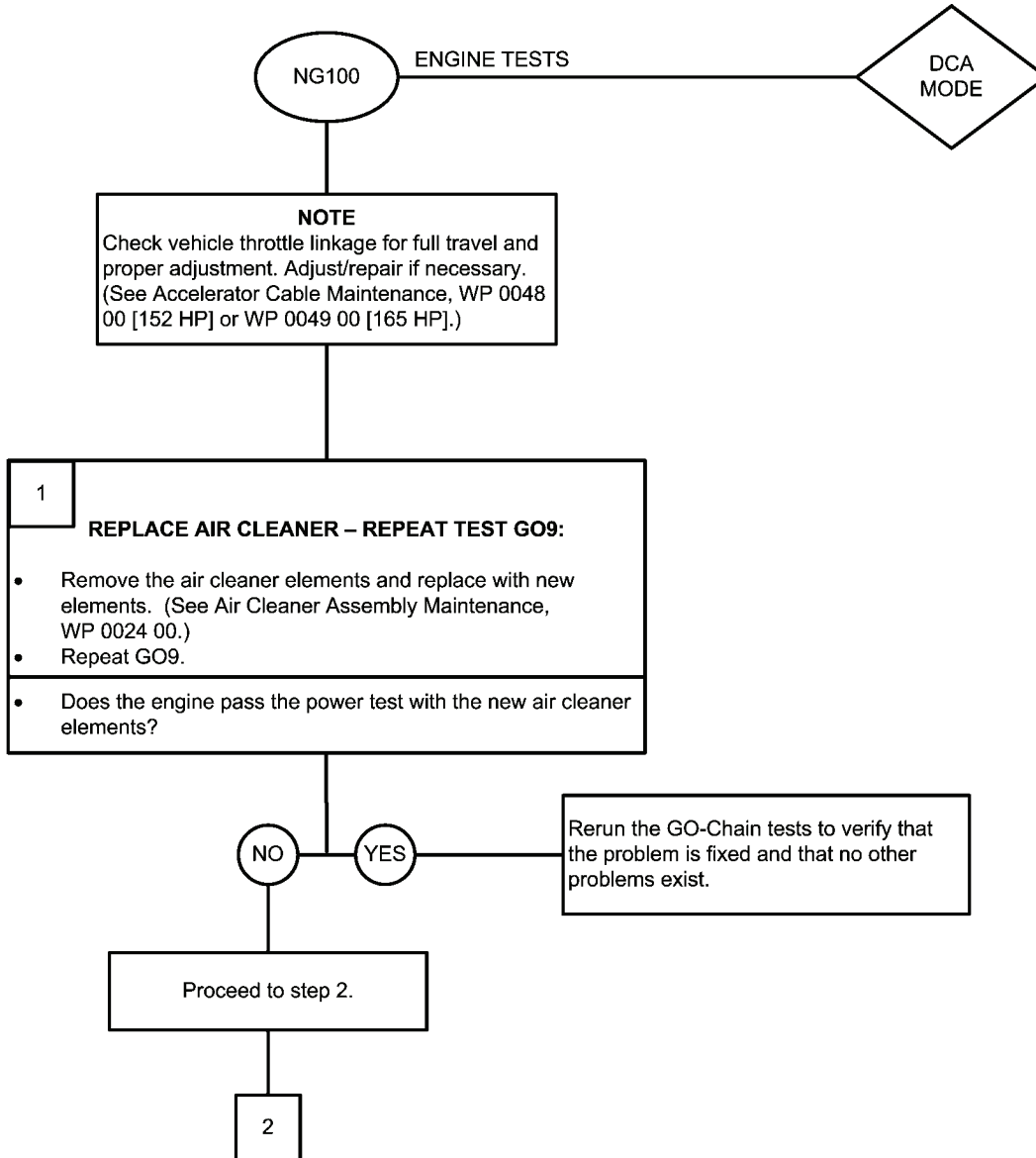
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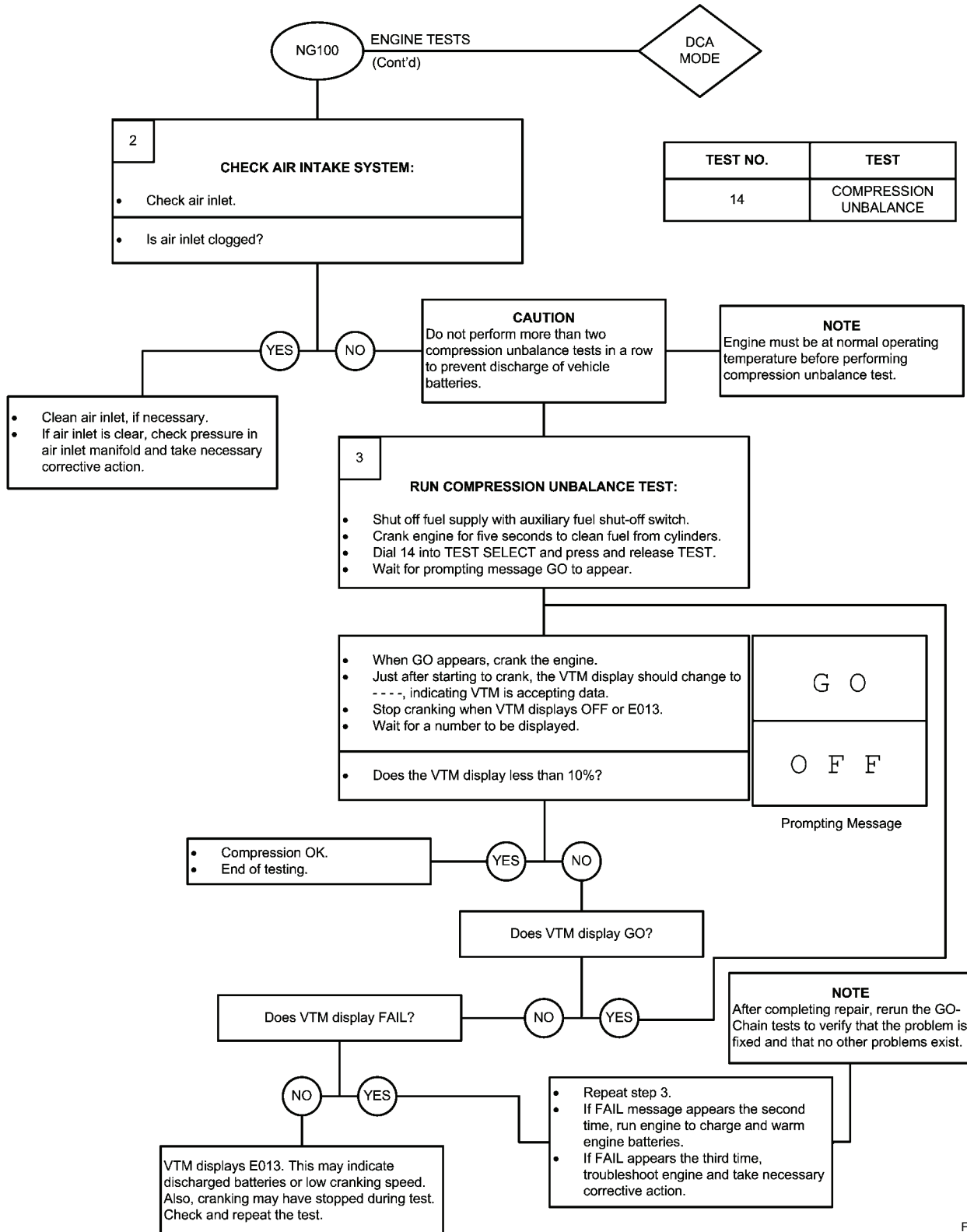
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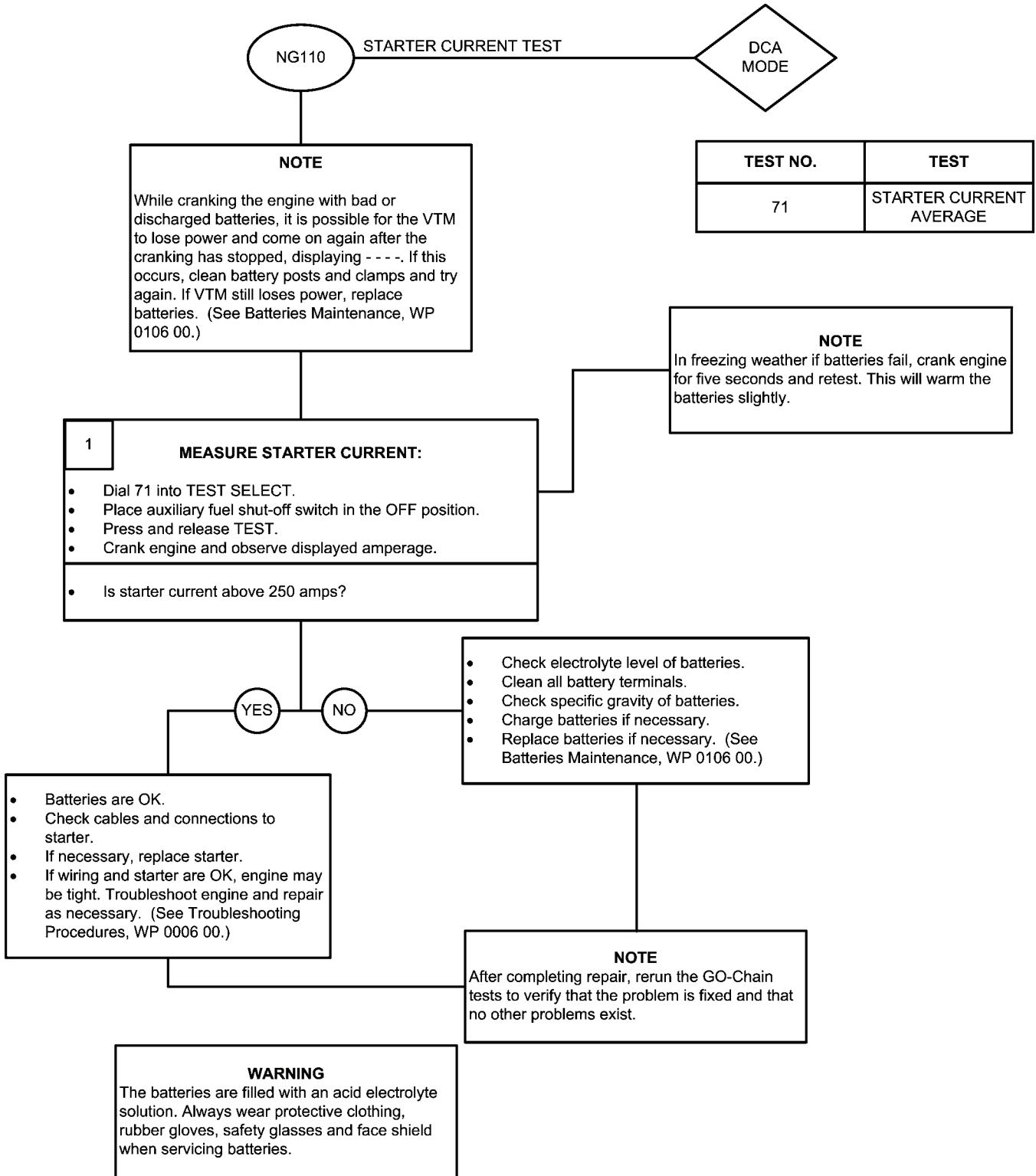
STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



STE/ICE-R NO-GO-CHAIN TESTS - CONTINUED



6K FORKLIFT TEST CARD

PRE-TEST INSPECTION

1. Fan Belts	4. Fuel Level
2. Oil Level	5. Batteries
3. Coolant Level	

POWERING UP VTM

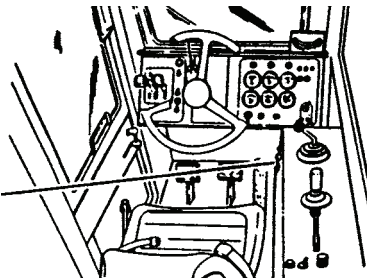
1. Connect VTM to W1 cable. W1 cable attaches to batteries.
2. Enter VID into VTM using test 60.
3. Perform confidence test, test 66. (second entry 99)

MEASUREMENT NAME	VTM TEST NO.	VTM OFFSET LIMITS	OPERATING CONDITION	SPECIAL CONNECTIONS REQUIRED	MIN	LIMITS NORM	MAX	UNITS
Engine RPM (Average)	10	—	Idle	DCA-CABLE W1	975	±50	1075	RPM Average
Power Test	12	—	Engine Warm	DCA-CABLE W1	2000	2000-3900	3900	— — —
Compression Unbalance	14	—	Warm Engine, Crank on GO	DCA-CABLE W1	0	0-10	10	%
Fuel Supply Pressure	24	—	Idle	DCA-CABLE W1	20	18-30	50	PSI
Fuel Filter Pressure Drop (PASS/FAIL)	26	—	Idle	DCA-CABLE W1				PASS/FAIL
Fuel Solenoid Voltage	27	—	Idle	DCA-CABLE W1	20	20-28	28	VOLTS DC
Engine Oil Pressure	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	40	40-90	90	PSI
Transmission Oil Pressure	50	±150	Engine Warm, Neutral	CABLES W1, W4 (FIG 2)	120	120-220	220	PSI
Transmission Clutch Pressure	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	155	155-185	185	PSI
Transmission Converter Charge	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	40	40-70	70	PSI
Transmission Brake Cutoff Valve	50	±150	Engine Warm	CABLES W1, W4 (FIG 1)	5	—	—	PSI
Battery Voltage	67	—	Engine Off	DCA-CABLE W1	24	24-27	27	VOLTS DC
Starter Motor Voltage	68	—	Cranking	DCA-CABLE W1	18	18-27.5	27.5	VOLTS DC
Starter Negative Cable Voltage Drop	69	—	Cranking	DCA-CABLE W1	0	0-3	1	VOLTS DC
Starter Solenoid Volts	70	—	Cranking	DCA-CABLE W1	18	18-27.5	27.5	VOLTS DC
Starter Current Average	71	—	Crank on the GO	DCA-CABLE W1	0	0-250	250	AMPS
Starter Current First Peak	72	±225	Crank on the GO	DCA-CABLE W1	600	600-1300	1300	AMPS (PEAK)
Battery Internal Resistance	73	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS
Starter Circuit Resistance	74	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS
Battery Resistance Change	75	±225	Crank on the GO	DCA-CABLE W1	0	0-100	100	MILLIOHMS/SECOND
Alternator Output Voltage	82	—	2,000 RPM	DCA-CABLE W1	24	24-28.5	28.5	VOLTS DC
Alternator Negative Cable Voltage Drop	84	—	Idle	DCA-CABLE W1	0	0-1	1	VOLTS DC
Fuel Return Pressure	50	±150	2,000 RPM	DCA-CABLE W1, W4	0	0-20	20	PSI

0007 00-54

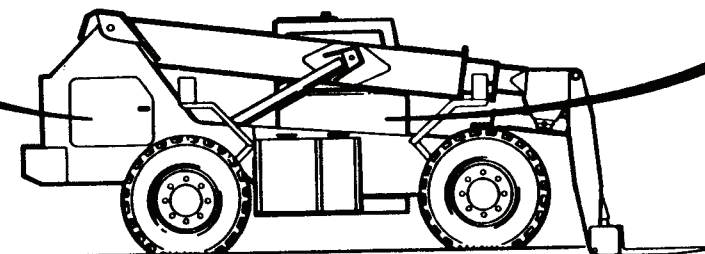
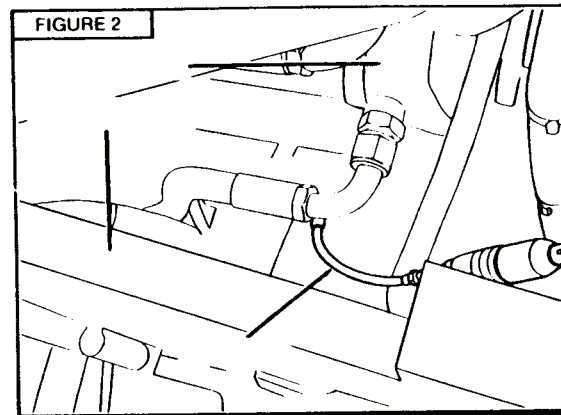
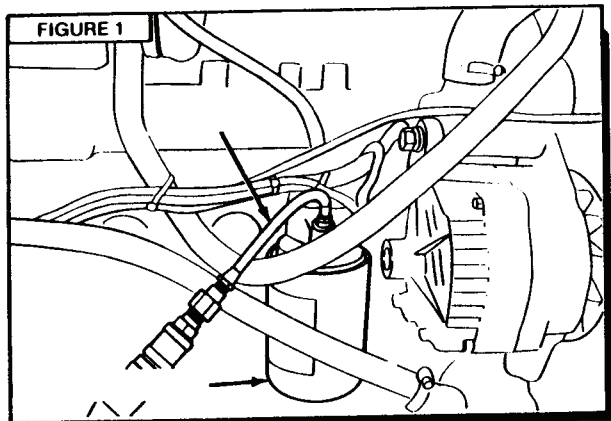
TM 10-3930-660-24-1

VEHICLE DIAGNOSTIC CONNECTOR ASSEMBLY



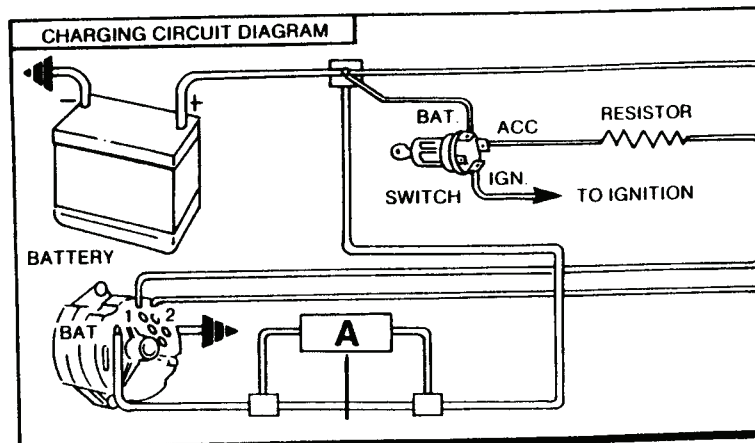
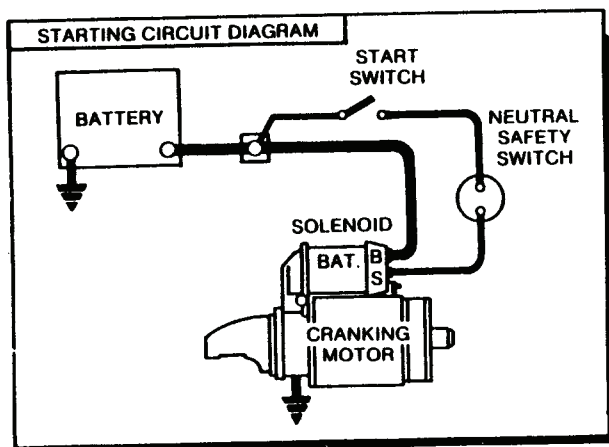
409-138

FORKLIFT VEHICLE TEST CARD
TK MODE TEST CONNECTIONS



0007 00-55

TM 10-3930-660-24-1



GENERAL

This section contains information and tests which may be used with STE/ICE-R (Simplified Test Equipment for Internal Combustion Engines - Reprogrammable) to locate malfunctions that may occur in the vehicle. The tests can be used during troubleshooting, corrective maintenance and after routine adjustments.

The STE/ICE-R system is primarily used in conjunction with the vehicle electrical system. The test cannot cover all possible malfunctions that may occur. If a particular malfunction is not discussed, refer to the *Troubleshooting* tables in WP 0006 00 and WP 0007 00.

NOTE

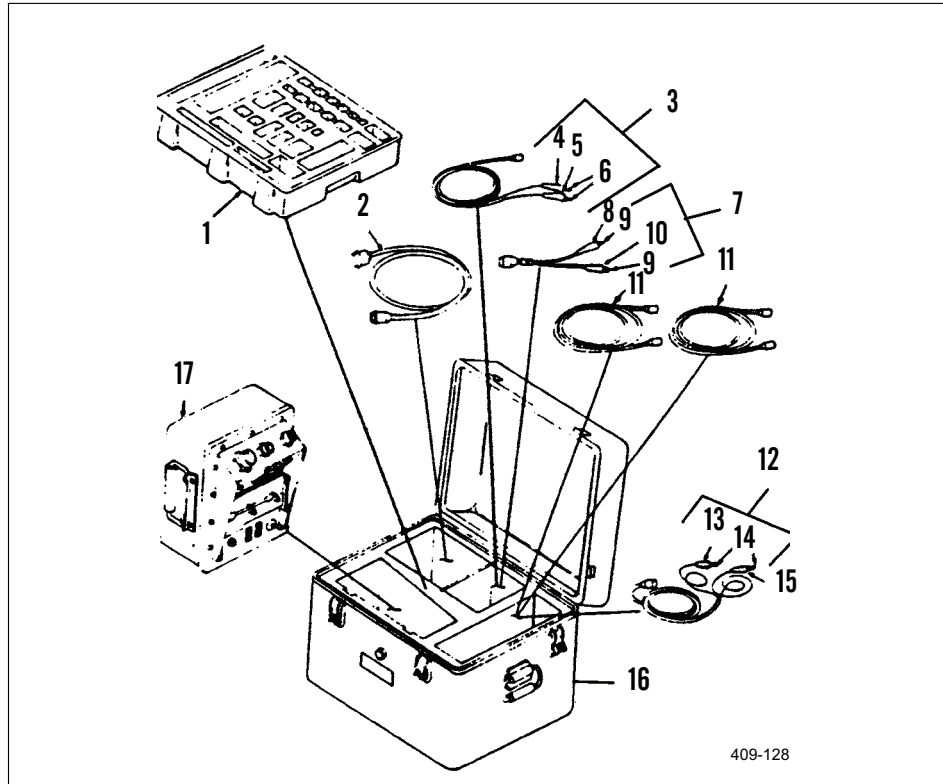
Refer to WP 0007 00 for a copy of the vehicle STE/ICE-R test card.

DESCRIPTION AND OPERATION

STE/ICE-R is portable and operates off of the vehicle 24-volt system. The STE/ICE-R kit consists of the following items: Vehicle Test Meter (VTM); Transducer Kit (TK); Four Electrical Cables (W1, W2, W3 and W4); Transit Case; and Technical Publications.

DESCRIPTION AND OPERATION - CONTINUED

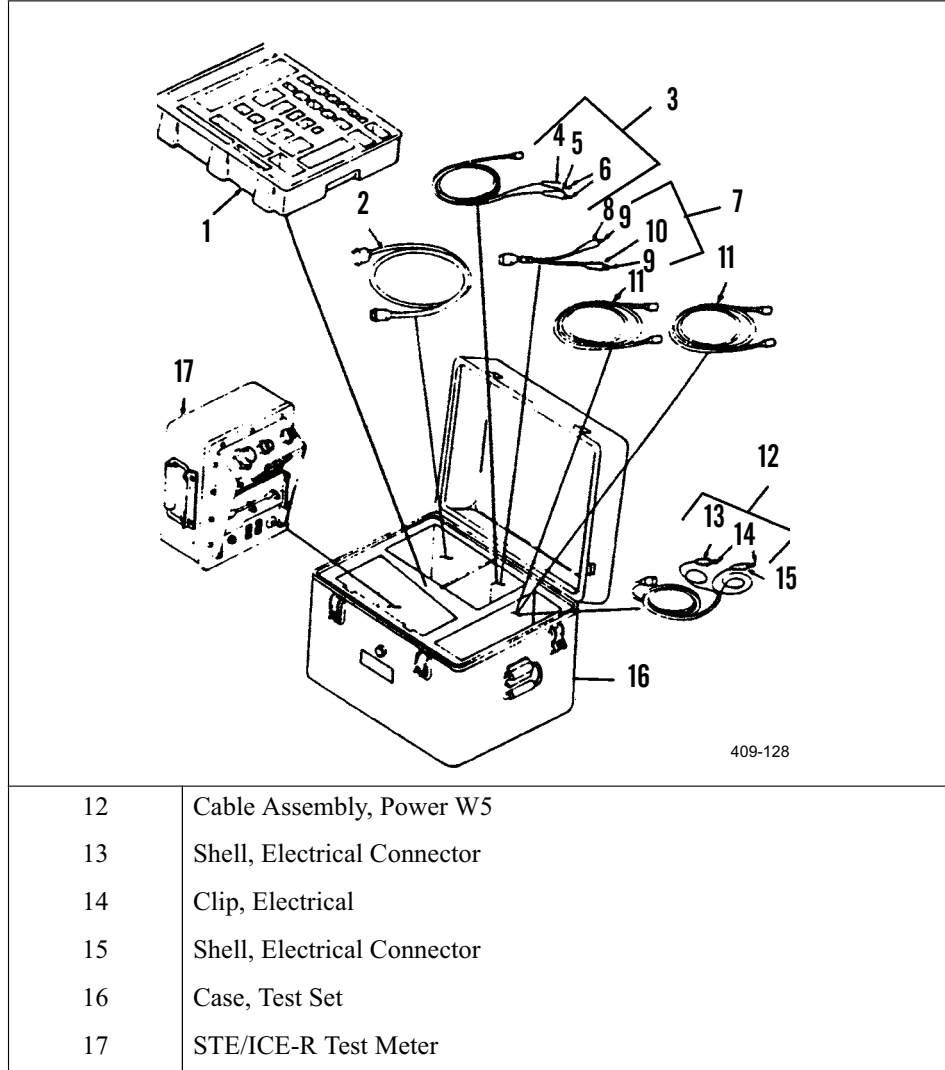
Table 1. STE/ICE-R Kit.



1	Tray, Transducer Kit
2	Cable Assembly, Power W1
3	Cable Assembly, Special W2
4	Shell, Electrical Connector
5	Shell, Electrical Connector
6	Clip, Electrical
7	Cable Assembly, Special W3
8	Shell, Electrical Connector
9	Clip, Electrical
10	Shell, Electrical Connector
11	Cable Assembly, Power W4

DESCRIPTION AND OPERATION - CONTINUED

Table 1. STE/ICE-R Kit - Continued.



DESCRIPTION AND OPERATION - CONTINUED

Table 2. Transducer Kit

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</p>	<p>Hose Assembly TK10 Test TK11 Reducer, Pipe TK12 Reducer, Pipe TK13 Reducer, Pipe TK14 Plug, Pipe TK15 Plug, Pipe TK16 Transducer (Blue), 0 to 1000 psi TK 17 Adapter, Straight TK18 Reducer, Pipe TK19 Reducer, Pipe TK20 Dampener, Fluid TK21 Transducer (Red), -30 in. hg to 25 psi TK22 Tee, Pipe TK23 Tee, Pipe TK24 Tee TK25</p>

DESCRIPTION AND OPERATION - CONTINUED

Table 2. Transducer Kit - Continued.

409-129	
<p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>26</p> <p>27</p> <p>28</p>	<p>Tee TK25</p> <p>Elbow, Pipe TK26</p> <p>Elbow, Pipe TK27</p> <p>Tee, Pipe to Tube TK28</p> <p>Adapter, Connector TK29</p> <p>Adapter, Connector TK30</p> <p>Adapter, Speedometer TK31</p> <p>Tee, Pipe to Fuel Line TK32</p> <p>Chuck, Inflating TK33</p> <p>Tachometer, Pulse TK34</p> <p>Hose Assembly TK35</p> <p>Nipple, Pipe TK36</p>

DESCRIPTION AND OPERATION - CONTINUED

Refer to the manual provided with the STE/ICE-R kit for description and operation of the VTM and the TK.

STE/ICE-R TESTING PROCEDURES

The vehicle test procedures consist of two test sequences; GO-Chain Sequences and NO-GO-Chain Sequences. A GO-Chain sequence is a logical sequence of tests performed to determine the general condition of the vehicle. If the vehicle fails any of the GO-Chain tests, the test will direct the user to a specific NO-GO test for further testing. The NO-GO tests are used to isolate what is wrong with the vehicle.

The GO and NO-GO-Chain sequences are presented as an illustrated flowchart with test branching controlled by YES or NO decisions. Generally, a YES test determination leads to the next test; a NO determination leads to NO-GO testing and corrective action.

When the VTM interfaces with the vehicle through the Diagnostic Connector Assembly (DCA) the test is titled DCA Mode Testing. If the VTM interfaces with the vehicle through the use of the transducer kit (TK), the test is titled TK Mode Testing. The DCA and TK testing modes can be used at the same time.

1. Always start at GO1. Never enter the middle of a GO or NO-GO testing sequence unless directed by the flow chart.
2. Follow each instruction in a GO-Chain Test Sequence. Do not skip any instructions or procedures.
3. If a particular test is failed in a GO-Chain test sequence, proceed to the indicated NO-GO-Chain test sequence or to a higher level of maintenance.
4. After correcting a vehicle problem, repeat the testing beginning at GO1.
5. Each GO-Chain testing sequence depends upon the completion of the previous test. Do not skip any tests.

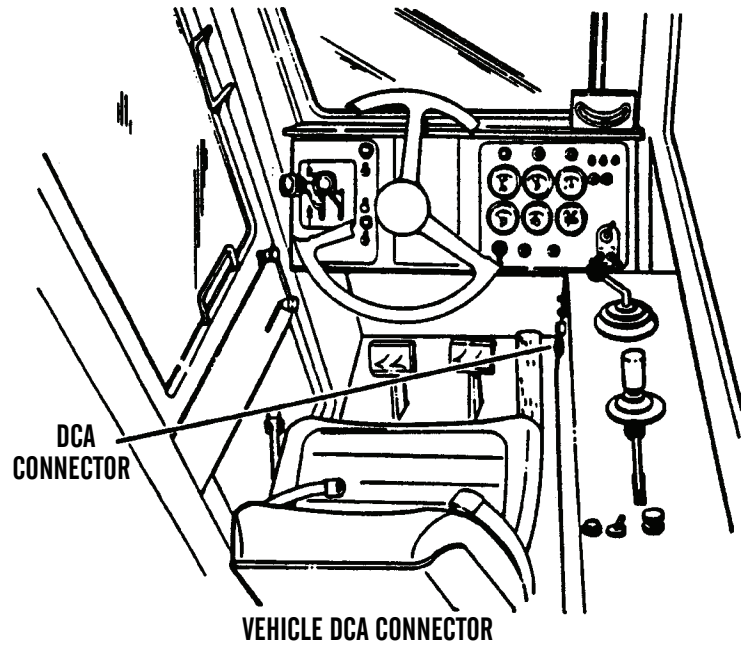
Use the GO, NO-GO flowcharts for testing. As you become more familiar with the test procedures, you can use the Vehicle Test Cards as your sole reference. The flip cards on the VTM can also be used as you become familiar with the vehicle and STE/ICE-R equipment.

Prior to testing, make the following pre-test inspections:

- Check fan belts for proper tension. Replace cracked or frayed belts.
- Check for proper engine oil level. Add oil as necessary.
- Check that the fuel tank has enough fuel for testing.
- Check for proper engine coolant level. Add coolant as necessary.
- Check that the battery is in good condition. Check for low electrolyte level and add distilled water as required.
- Check that emergency steering pump is turned off when required by test.

VEHICLE DIAGNOSTIC CONNECTOR ASSEMBLY (DCA)

The DCA connector of the vehicle is located on the panel to the right of the vehicle operator. Refer to the figure below for vehicle DCA location.



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END OF WORK PACKAGE

CHAPTER 3
UNIT MAINTENANCE

GENERAL

1. Remove any plastic tape, wrapping paper or any other shipping and protective items.

**WARNING**

- Cleaning compound, solvent MIL-PRF-680 Type III is an environmentally complaint 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.
2. Clean any exposed metal parts coated with rust preventive compound. Remove compound with solvent cleaning compound.
 3. Read and follow all instructions contained in DD Form 1397 attached to the 6K Forklift.
 4. Inspect equipment for damage incurred during shipping. If equipment has been damaged, report damage on DD Form 6, Packing Improvement Report.
 5. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with DA PAM 738-751.
 6. Clean all exterior surfaces.
 7. Touch up any paint scratches.

END OF WORK PACKAGE

GENERAL

1. To ensure that the forklift is ready for operation at all times, it must be lubricated and inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure or injury to personnel.
2. The *KEY* in this work package lists the types, amounts and temperature ranges of the lubricants required for specified intervals.
3. The Lubrication Charts at the end of this work package shows all lubrication points for the forklift.
4. Table 1 in WP 0011 00 contains systematic instructions on lubrications, inspections, adjustments and corrections to be performed by Unit Maintenance to keep the forklift in good operating condition and ready for its primary mission.
5. For information on Corrosion Prevention and Control (CPC), refer to TB 43-0213.

EXPLANATION OF TABLE ENTRIES

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

NOTE

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

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

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)
INTRODUCTION - CONTINUED**

0010 00

GENERAL LUBRICATION PROCEDURES**NOTE**

- Lubrication instructions contained in this PMCS are MANDATORY.
 - Refer to TM 10-3930-660-10 for Operator Maintenance level lubrication.
 - Dashed leader lines used in illustrations of lubrication points indicate that lubrication is required on both sides of the equipment.
1. Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, such as high or low temperatures or exposure to sand or dust, lubricants should always be changed more frequently. Lubricants that have become contaminated will be changed regardless of interval. When in doubt, notify your supervisor.

**WARNING**

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

2. Ensure that all fluids drained as a result of lubrication or maintenance are collected in a suitable container and disposed of in accordance with local policy and ordinances. Clean up any spills immediately.
3. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.
4. Maintain a good record of all lubrication performed and report any problem noted during lubrication. Refer to DA PAM 738-751 for maintenance forms and procedures to record and report any findings.

**WARNING**

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

5. Keep all external parts of equipment not requiring lubrication free of lubricants. Before lubrication, wipe lubrication fittings with a clean rag (Item 40, WP 0324 00) and solvent cleaning compound (Item 10, WP 0324 00). After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.
6. Refer to FM 9-207 for lubrication instructions in cold weather.
7. Refer to AR 70-12 for use of standardized fuels and lubricants.
8. Engine, transmission and hydraulic system oil filters shall be changed when:
 - a. they are known to be contaminated or clogged;

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)
INTRODUCTION - CONTINUED**

0010 00

GENERAL LUBRICATION PROCEDURES - CONTINUED

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

GENERAL PMCS PROCEDURES

1. Always perform PMCS in the same order so it gets to be a habit. Once you have had some practice, you will spot anything wrong in a hurry. If any deficiency is discovered, perform the appropriate troubleshooting task in Chapter 2 of this manual. If any component or system is not serviceable, or if the given service does not correct the deficiency, notify your supervisor.
2. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all tools needed to make all checks. Have several clean rags (Item 40, WP 0324 00) handy. Perform ALL inspections at the applicable interval.
 - a. **Keep It Clean.** Dirt, grease, oil and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use detergent (Item 17, WP 0324 00) and water when you clean.
 - b. **Rust and Corrosion.** Check metal parts for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of lubricating oil (Item 31, WP 0324 00). Report it to your supervisor.
 - c. **Bolts, Nuts and Screws.** Check bolts, nuts and screws for obvious looseness, missing, bent or broken condition. You can not try them all with a tool, but look for chipped paint, bare metal or rust around bolt heads. If you find one you think is loose, tighten it.
 - d. **Welds.** Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
 - e. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.
 - f. **Hydraulic Hoses and Lines.** Look for wear, damage, and signs of leaks. Ensure that clamps and fittings are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, correct it if authorized by the Maintenance Allocation Chart (WP 0323 00). If not authorized, notify your supervisor.
 - g. **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your vehicle. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your vehicle. Learn and be familiar with them, and remember - when in doubt, notify your supervisor.

Leakage Definitions for PMCS

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

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)
INTRODUCTION - CONTINUED**

0010 00

GENERAL PMCS PROCEDURES - CONTINUED**CAUTION**

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

INITIAL SETUP**General**

This setup lists tools, materials, and personnel required for Unit Maintenance PMCS and lubrication.

Tools (WP 0325 00)

Tool kit, general mechanic's (Item 39, WP 0325 00)

Shop equipment, common no.1 (Item 20, WP 0325 00)

Shop equipment, common no. 2 (Item 19, WP 0325 00)

Materials (WP 0324 00)

Anti-freeze (Item 5, WP 0324 00)

Cleaning compound, solvent (Item 10, WP 0324 00)

Materials (WP 0324 00) - Continued

Detergent (Item 17, WP 0324 00)

Grease, GAA (Item 20, WP 0324 00)

Oil, lubricating, OE/HDO-15W/40 (Item 30, WP 0324 00)

Oil, lubricating, OEA (Item 31, WP 0324 00)

Oil, lubricating, GO-80W/90 (Item 32, WP 0324 00)

Oil, lubricating, OE/HDO-10 (Item 33, WP 0324 00)

Petrolatum, technical (Item 37, WP 0324 00)

Rags (Item 40, WP 0324 00)

Cloth, abrasive, emery, fine

Oil sampling kit

Personnel

Driver/Operator

Unit Maintenance Mechanic

KEY

LUBRICANT/ COMPONENT	REFILL CAPACITY	EXPECTED TEMPERATURES*			INTERVALS
		Above +15°F (Above -9°C)	+40°F to -15°F (+4°C to -26°C)	+40°F to -65°F (+4°C to -54°C)	
OE/HDO Lubricating Oil, ICE, Tactical					D - Daily W - Weekly
OEA, Lubricating Oil, ICE, Arctic					
Engine Crankcase	15 qts. (14 L)		See Chart A		
Oil Can Points	As Req'd		See Chart A		
Transmission	5 gal. (19 L)		See Chart B		
Hydraulic Reservoir	56.6 gal. (93 L) System Capacity		See Chart C		
GO Lubricating Oil, Gear, Multipurpose					
Differentials (each of two)	10.6 qts. (10 L)		See Chart D		
Planetary Hubs (each of two)	2.7 qts. (2.5 L)		See Chart D		
GAA, Grease, Automot- ive and Artillery					
Carriage Tilt Cylinder & Carriage Pivot Pins	As Req'd		All Temperatures		
MLRS Hoist Cylinder & MLRS Attachment Pivot Pins	As Req'd		All Temperatures		
Propeller Shaft Slip Joints & U-Joints	As Req'd		All Temperatures		
Tie Rod Ends	As Req'd		All Temperatures		
Axle Carrier Pins	As Req'd		All Temperatures		
Steering Knuckle Bear- ings & U-Joints	As Req'd		All Temperatures		
Brake Pedal & Transmis- sion Disconnect Pedal Counter Shaft	As Req'd		All Temperatures		
Transmission Input Shaft Bearing, Slip Joint, & U- Joint	As Req'd		All Temperatures		
Boom Extend & Boom Retract Chain Sheaves	As Req'd		All Temperatures		
Boom Pivot & Boom Hoist Cylinder Pins	As Req'd		All Temperatures		
Frame Tire Cylinder Pin	As Req'd		All Temperatures		

Table 1. CHART A — ENGINE AND OIL CAN POINTS

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

Table 2. CHART B — TRANSMISSION

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

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

Table 3. CHART C — HYDRAULIC RESERVOIR

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

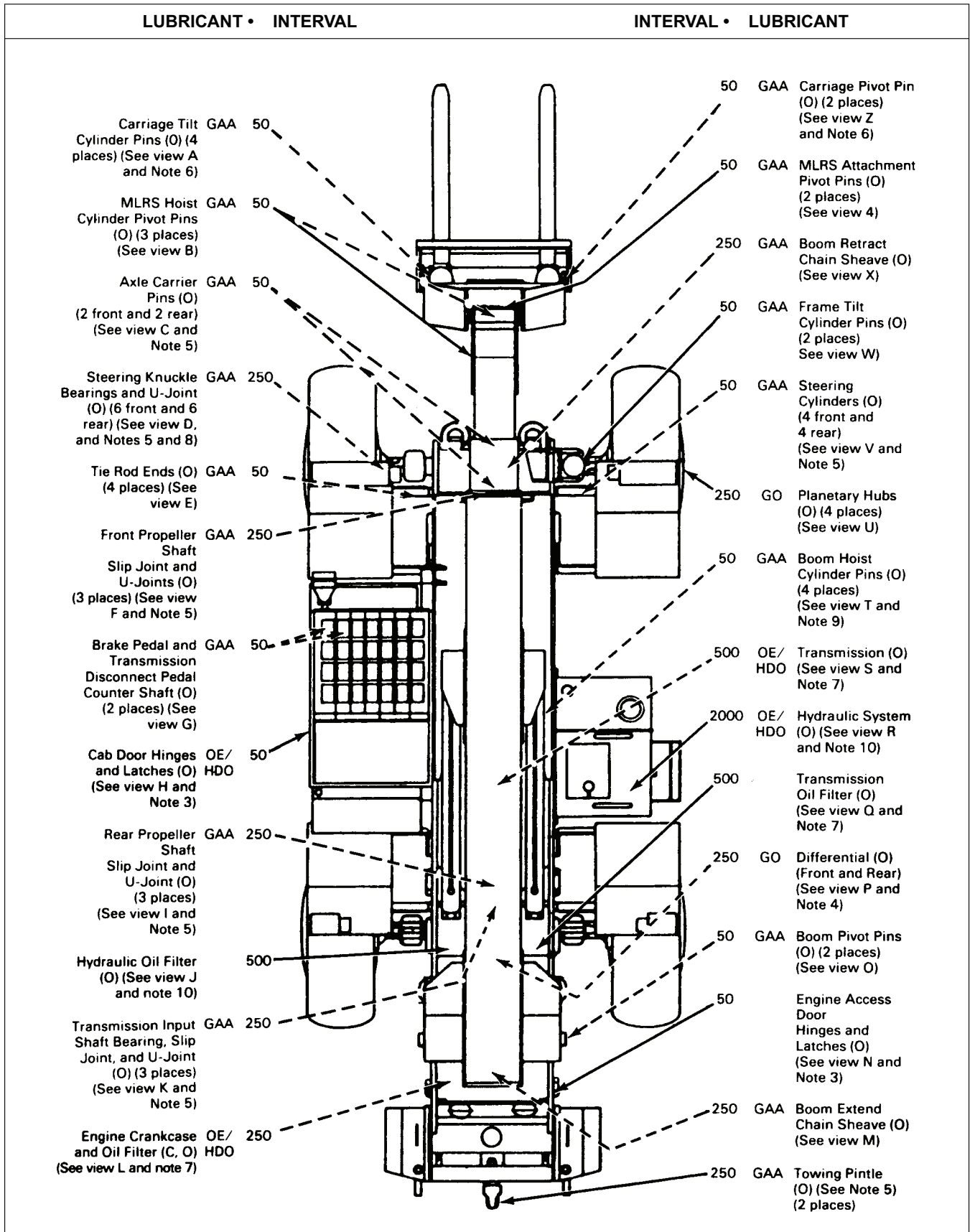
*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OEA/HDO 10 lubricant for all expected temperatures where OE/HDO-10 is specified.

Table 4. CHART D — DIFFERENTIALS AND PLANETARY HUBS

Lubricant	EXPECTED TEMPERATURES																					
	°F	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-68	-62	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
GO	Lubricating Oil, Gear, Multipurpose																					
GO-80W/90																						

Table 5. CHART E — ANTIFREEZE

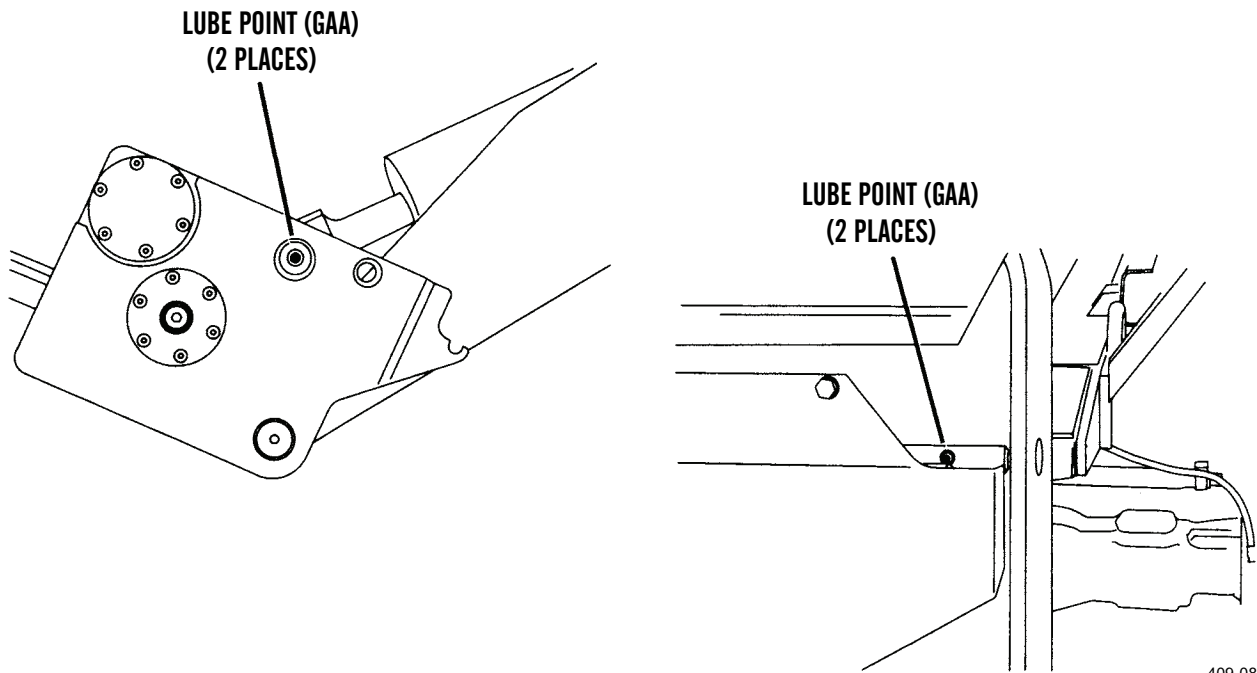
Lubricant	EXPECTED TEMPERATURES																						
	°F	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120	
	°C	-68	-62	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49	
ANTIFREEZE	Antifreeze, Ethylene Glycol, Inhibited, Heavy Duty										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



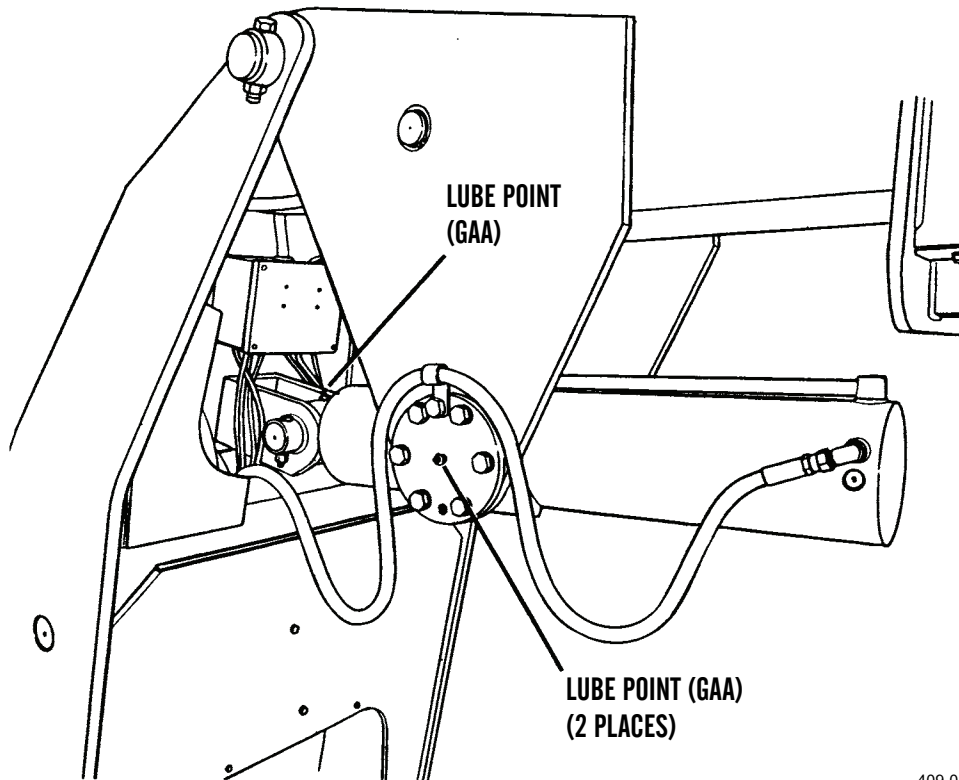
NOTES

1. LUBRICATION. During adverse weather or abnormal dusty conditions, lubrication may require daily servicing.
2. The lubricating points for the brake pedal and transmission disconnect pedal counter shaft are located under the cab (GAA).
3. Lubricate all hinges and door latches with a hand oiler (OE/HDO).
4. Check the differential oil levels while vehicle is on a level surface. Oil should be to the bottom of the check and fill hole (GO).
5. Lubricate after fording operations (GAA).
6. **WARNING - Do not stand under the attachment and carriage assembly during lubrication services.** To lube the carriage lube points and tilt cylinder lower points, raise the fork assembly 48 in. (122 cm) and tilt the carriage assembly forward 90 degrees. To lube the tilt cylinder's head pivot pin, place the level forks/carriage firmly on the ground (GAA).
7. During adverse weather, dusty or sandy conditions, change transmission oil and filter element at 250-hour intervals. For normal off-highway operation, for operation under rapid change in ambient temperature, or for operation in presence of chemical fumes, change at 375-hour intervals. Use MIL-L-2104D hydraulic transmission fluid when operating the vehicle in temperatures above -10 F (-23°C), and MIL-L-46167A transmission fluid when operating in temperatures below -10°F (-23°C).
8. To lube the steering knuckle joint, the vehicle may have to be moved forward or backward to align grease fitting with access hole. If the fitting is aligned with the access hole but grease gun will not go on fitting, turn the wheels right or left until grease gun fits on grease fitting (GAA).
9. Raise the boom to approximately 15 inches (38 cm) to lubricate the boom hoist cylinder pins (GAA).
10. Drain hydraulic reservoir every 2,000 hours. Change hydraulic oil filter and add oil (OE/HDO) to reservoir until oil is visible in sight gauge. Operate hydraulic system and check oil level again.

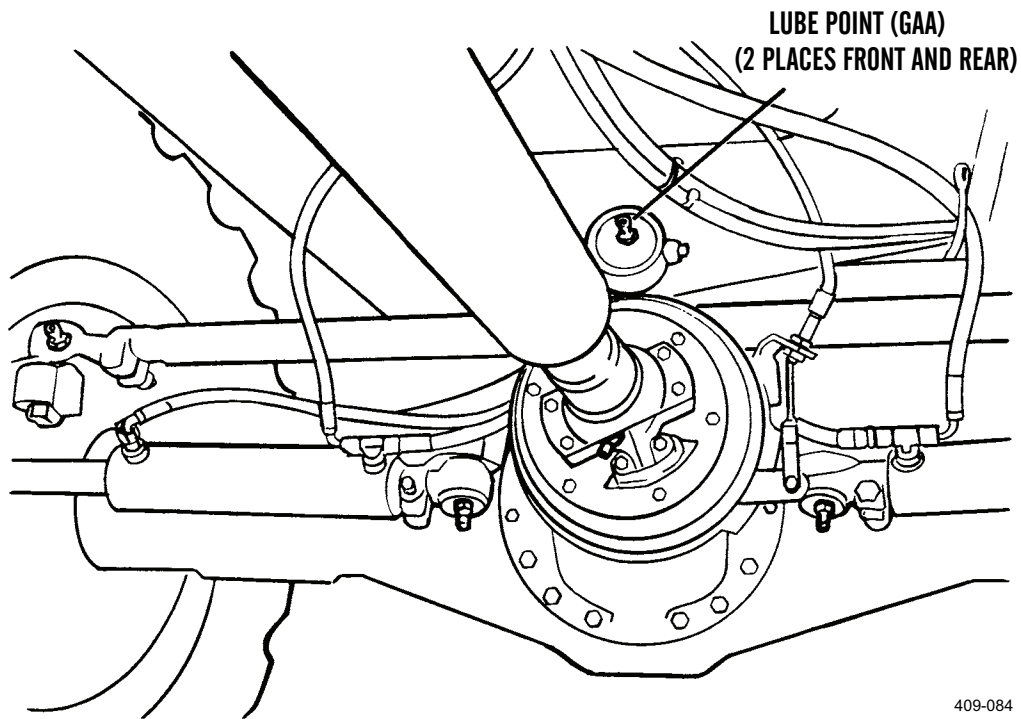
VIEW A - CARRIAGE TILT CYLINDER PINS



VIEW B - MLRS HOIST CYLINDER PIVOT PINS



VIEW C - AXLE CARRIER PIN FITTING

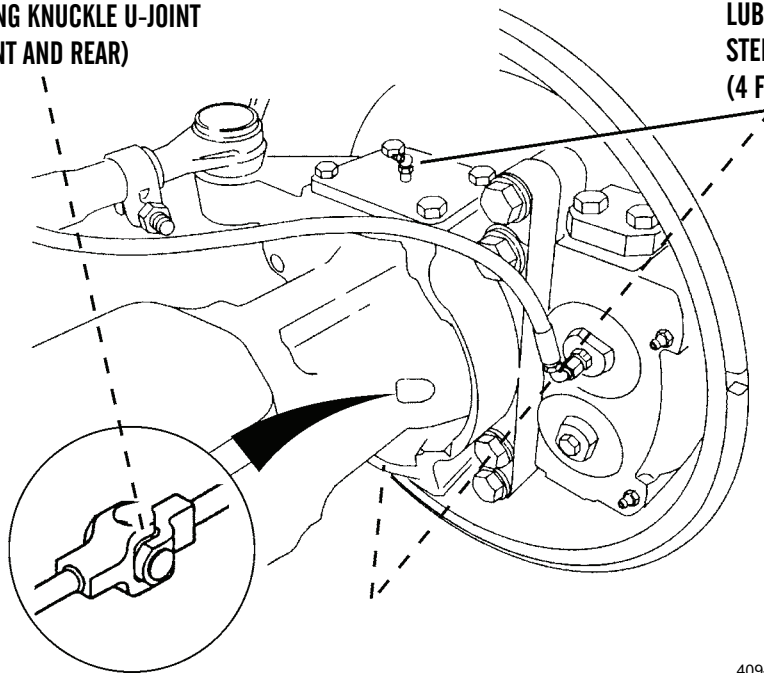


409-084

VIEW D - STEERING KNUCKLE BEARINGS AND U-JOINTS

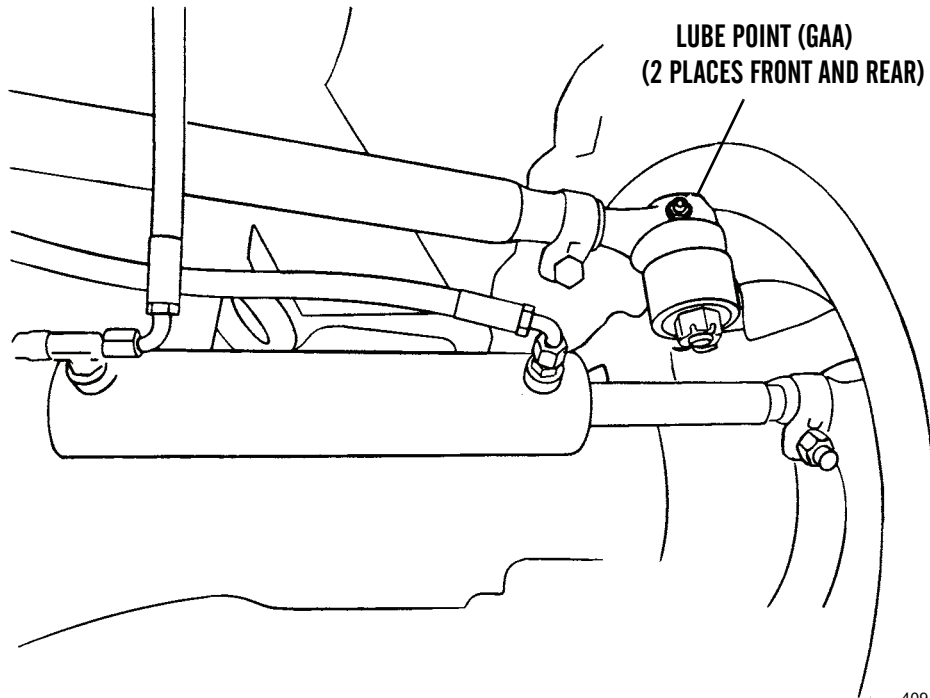
**LUBE POINT (GAA)
STEERING KNUCKLE U-JOINT
(2 FRONT AND REAR)**

**LUBE POINT (GAA)
STEERING KNUCKLE BEARINGS
(4 FRONT AND REAR)**

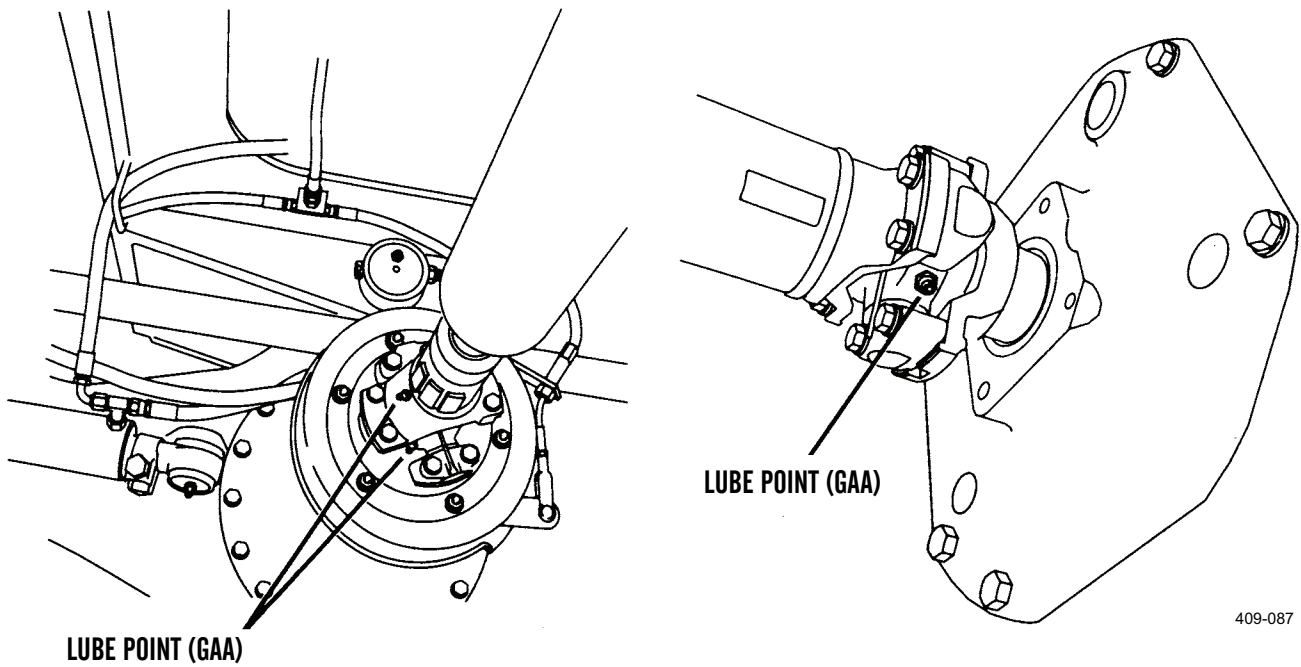


409-085

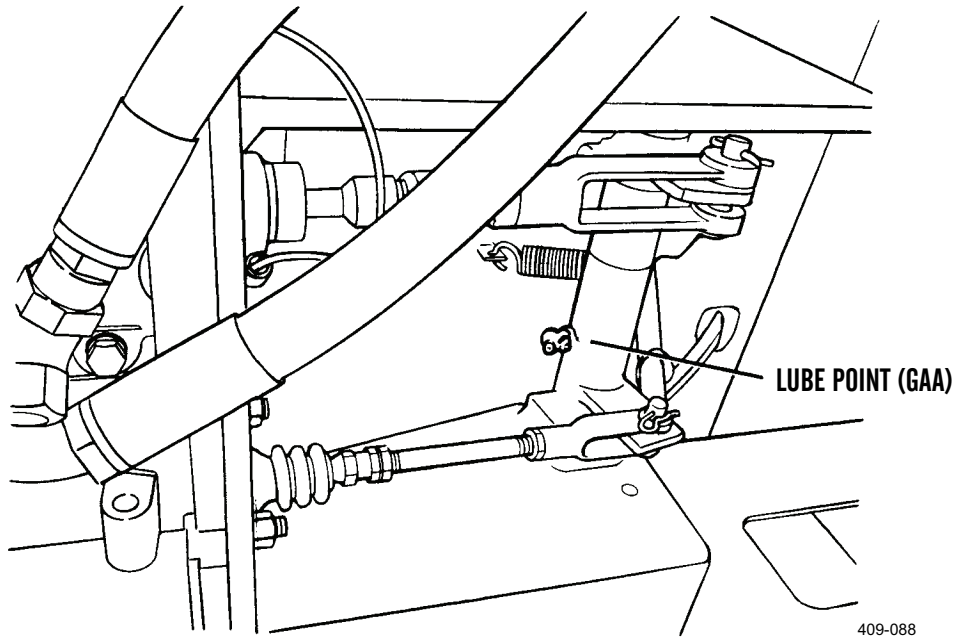
VIEW E - TIE ROD ENDS



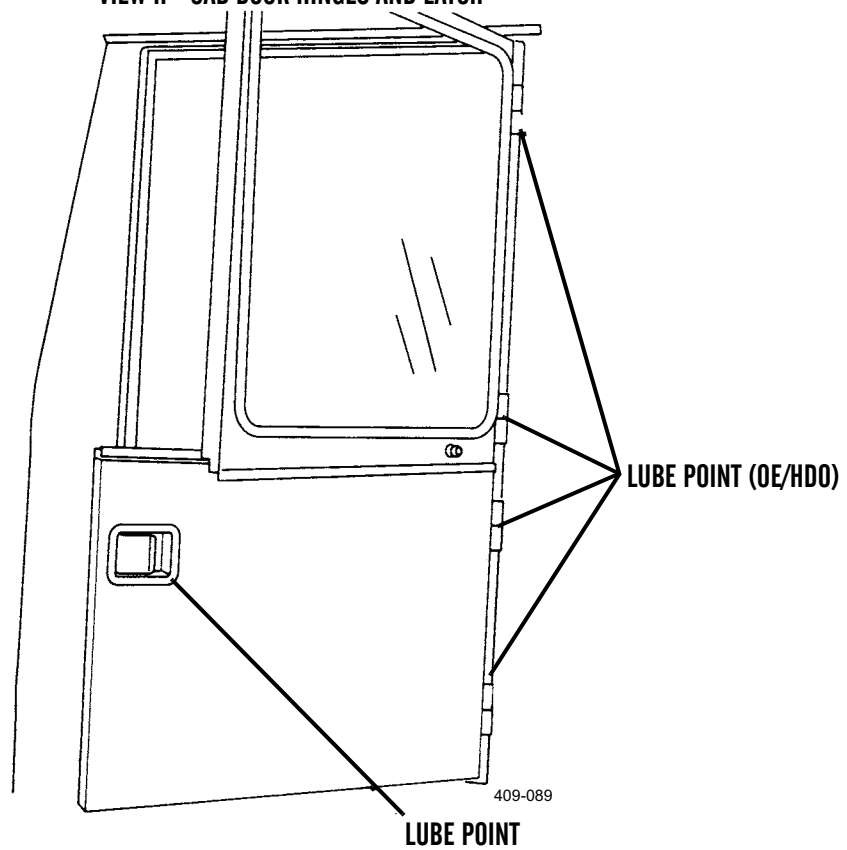
VIEW F - FRONT PROPELLER SHAFT SLIP JOINT AND U-JOINTS



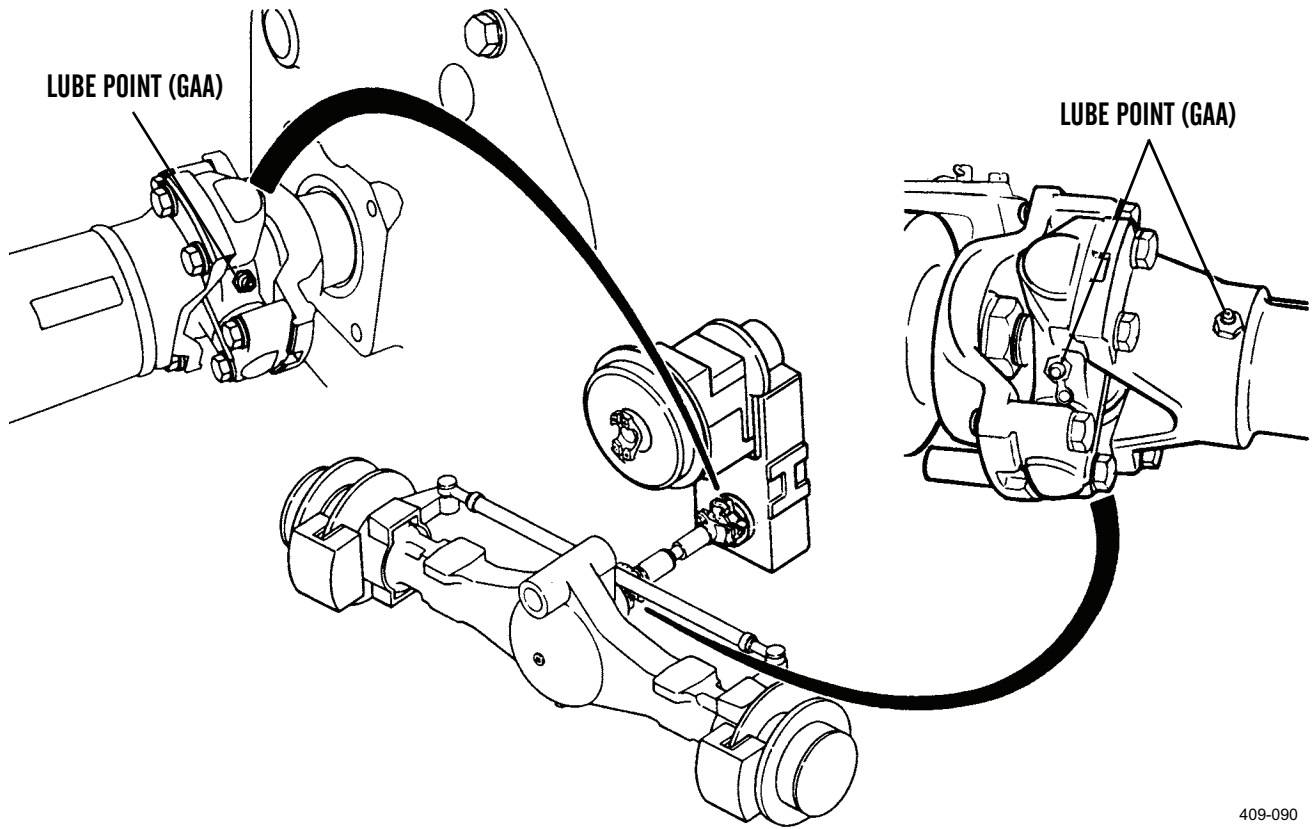
VIEW G - BRAKE PEDAL AND TRANSMISSION DISCONNECT PEDAL COUNTER SHAFT



VIEW H - CAB DOOR HINGES AND LATCH

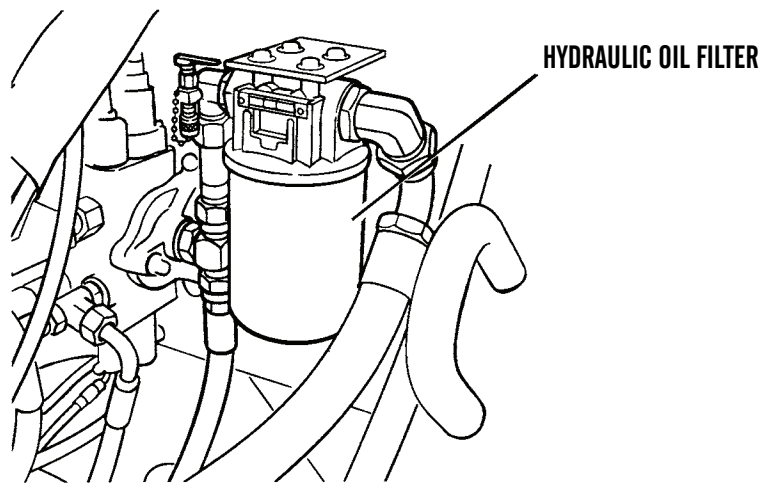


VIEW I - REAR PROPELLER SHAFT SLIP JOINT AND U-JOINT



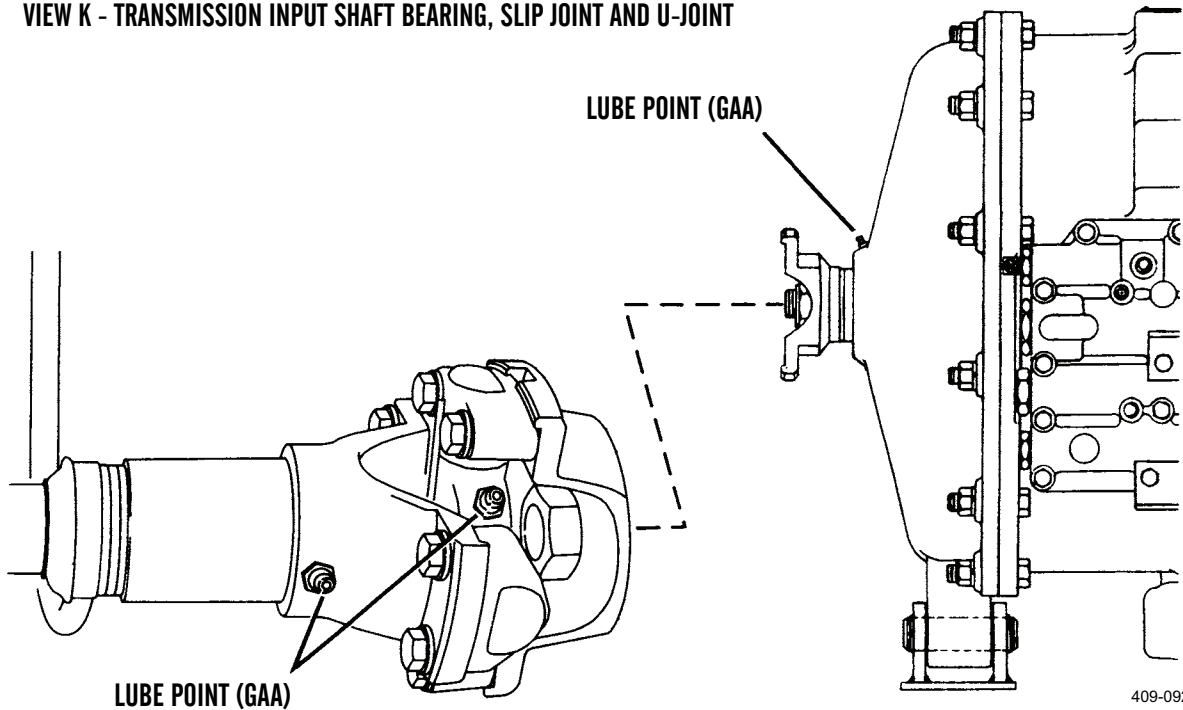
409-090

VIEW J - HYDRAULIC OIL FILTER

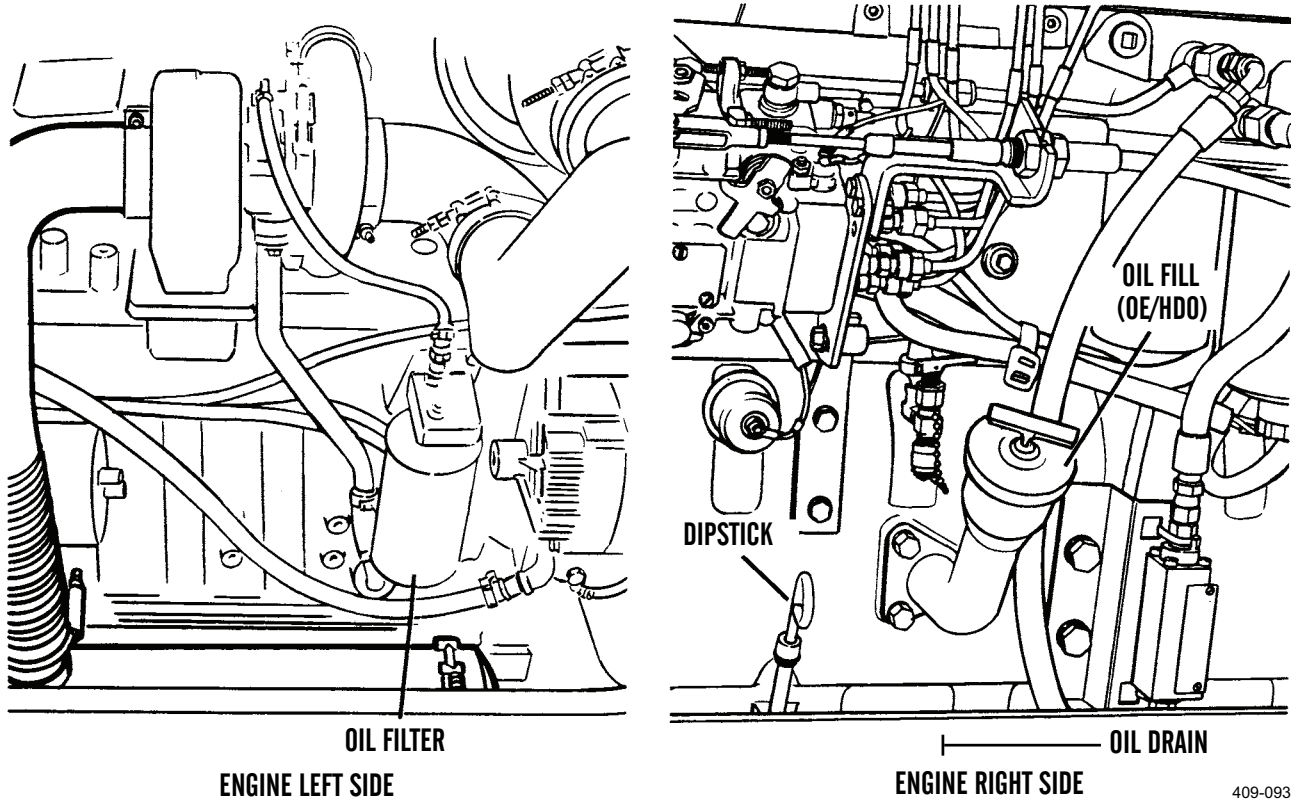


409-4011

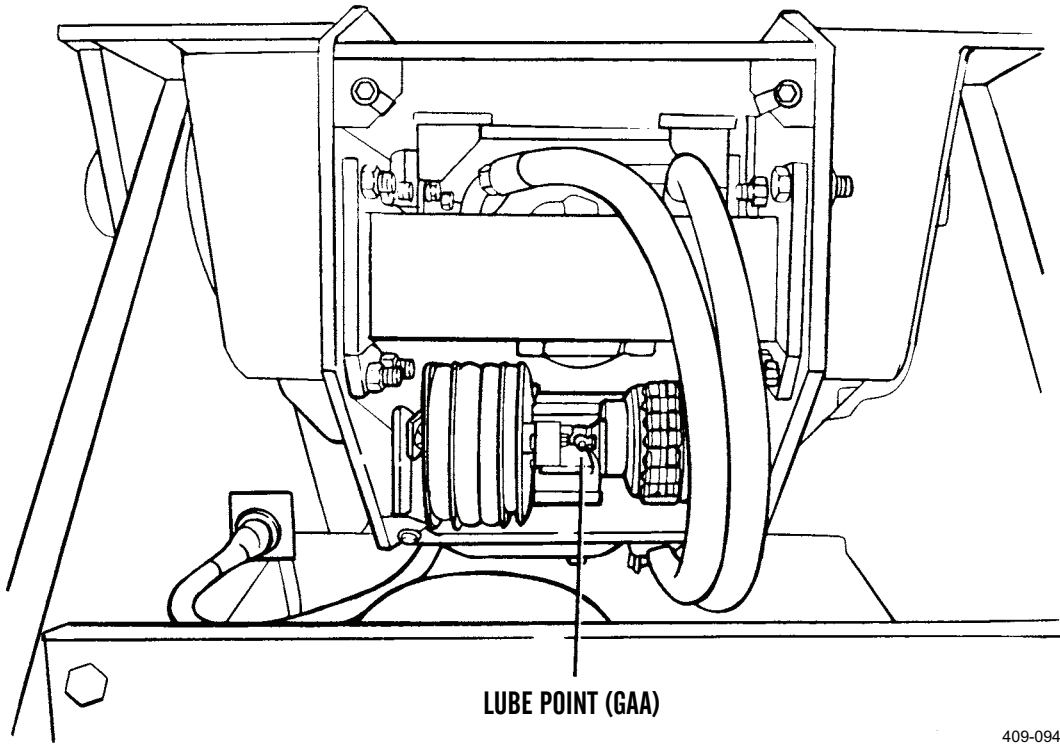
VIEW K - TRANSMISSION INPUT SHAFT BEARING, SLIP JOINT AND U-JOINT



VIEW L - ENGINE CRANKCASE AND OIL FILTER



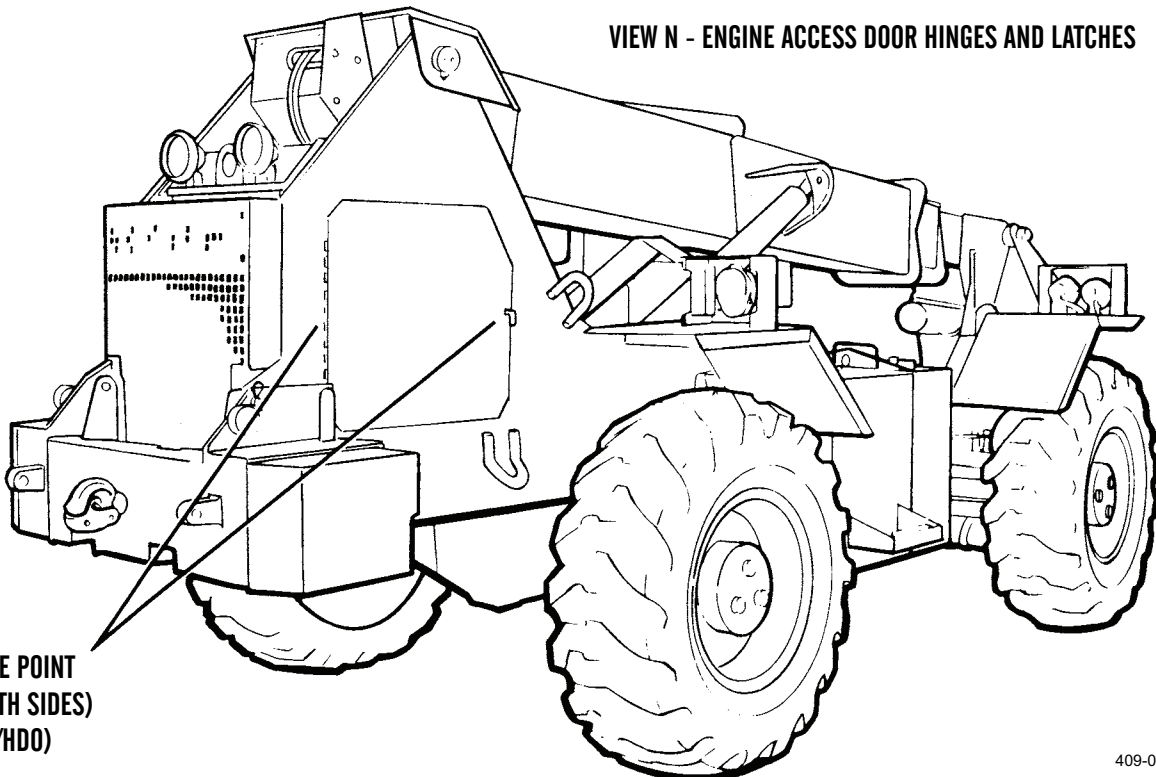
VIEW M - BOOM EXTEND CHAIN SHEAVE



LUBE POINT (GAA)

409-094

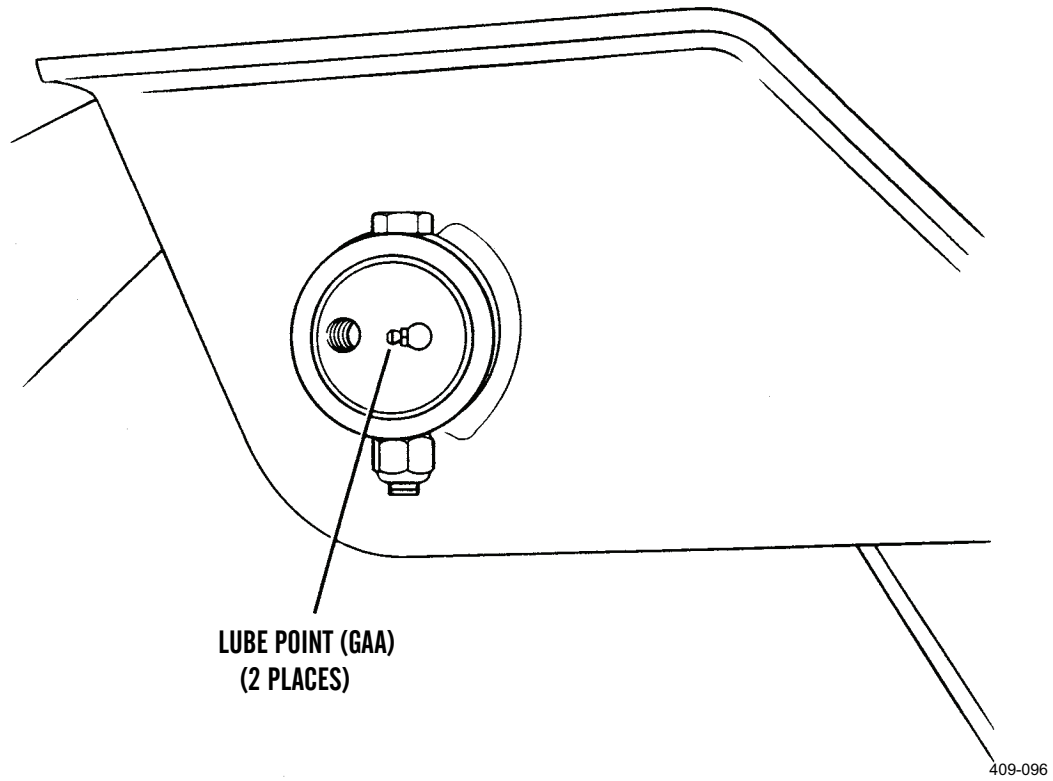
VIEW N - ENGINE ACCESS DOOR HINGES AND LATCHES



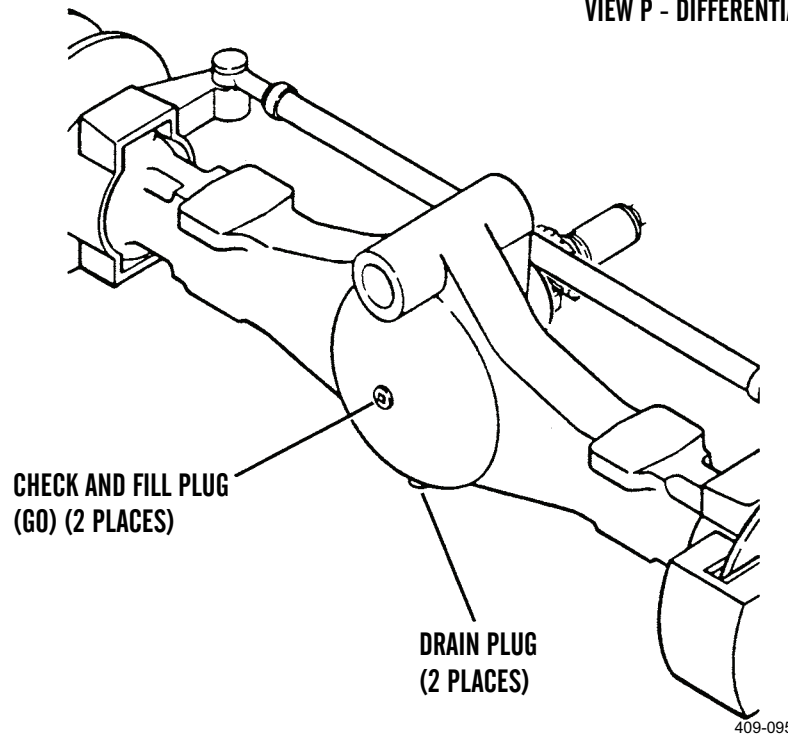
LUBE POINT
(BOTH SIDES)
(OE/HDO)

409-095

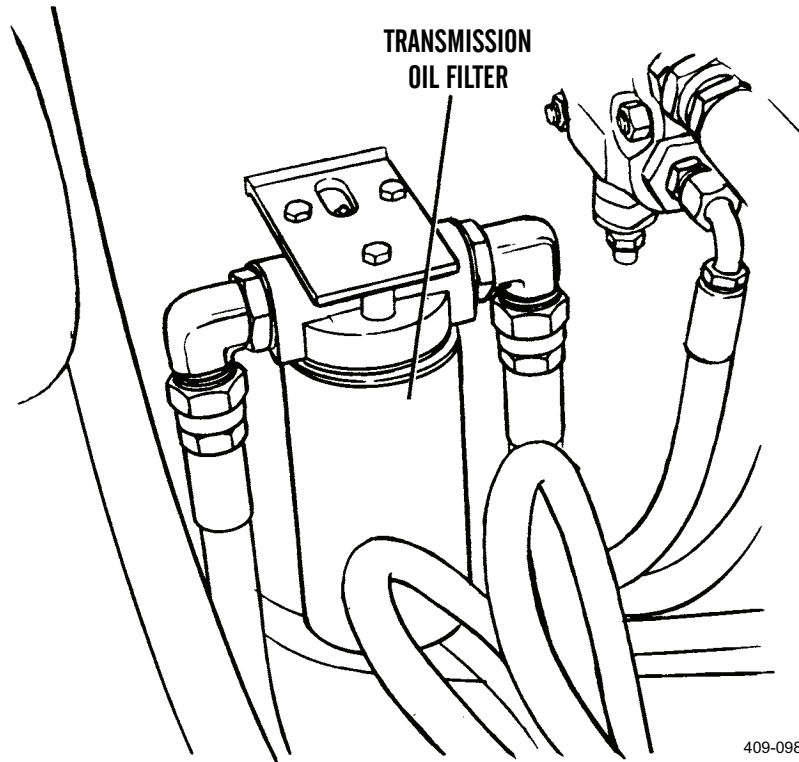
VIEW O - BOOM PIVOT PINS



VIEW P - DIFFERENTIAL



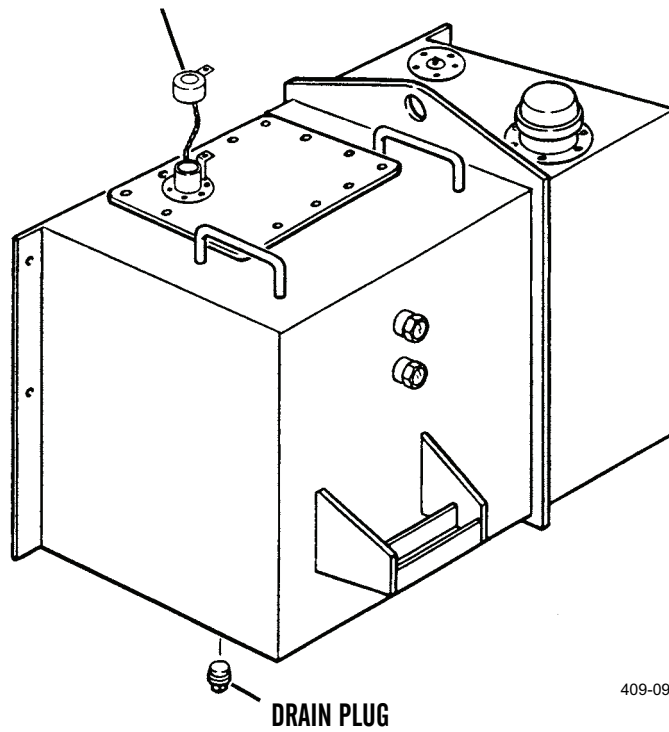
VIEW Q - TRANSMISSION OIL FILTER



409-098

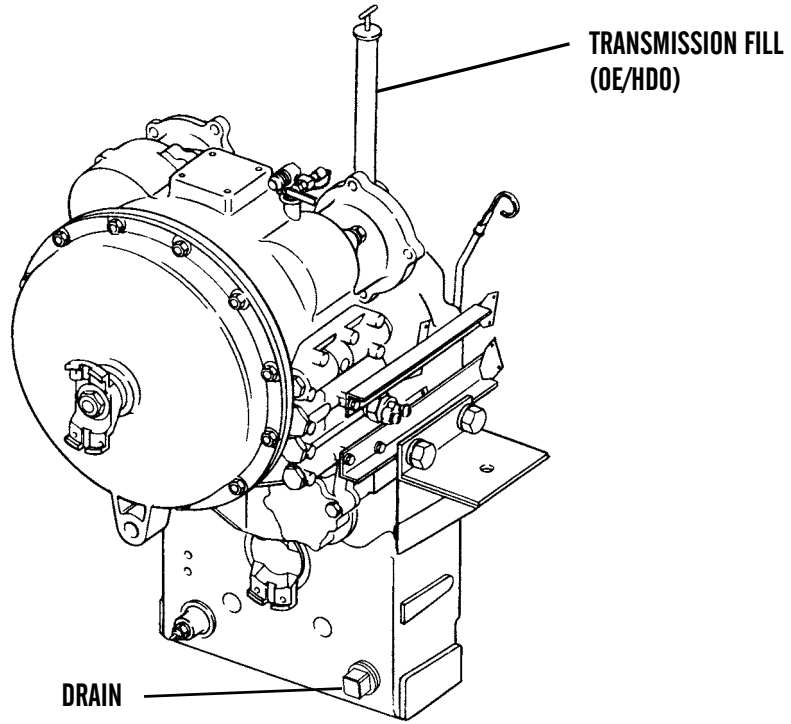
FILL CAP (OE/HDO)

VIEW R - HYDRAULIC SYSTEM



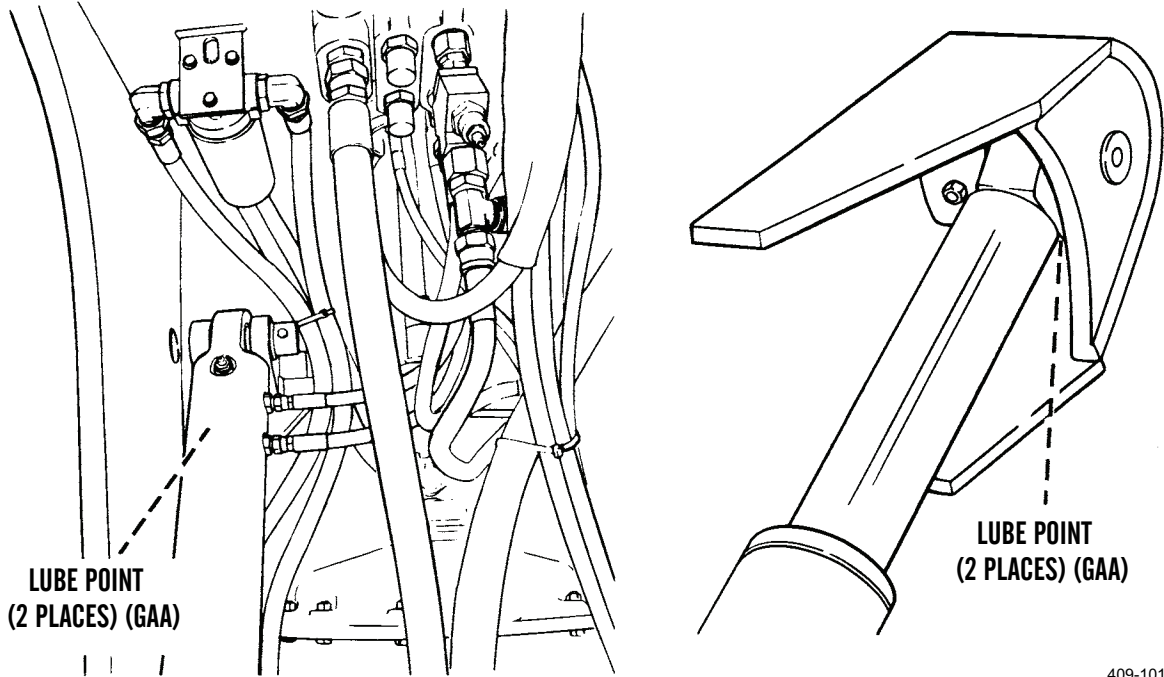
409-099

VIEW S - TRANSMISSION



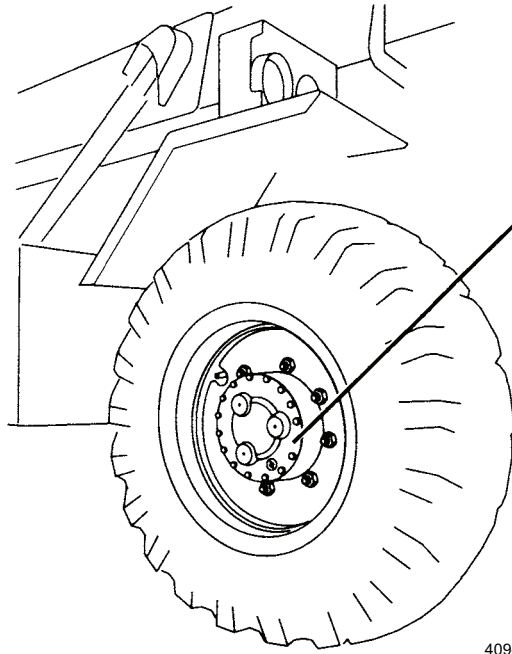
409-1915

VIEW T - BOOM HOIST CYLINDER PINS



409-101

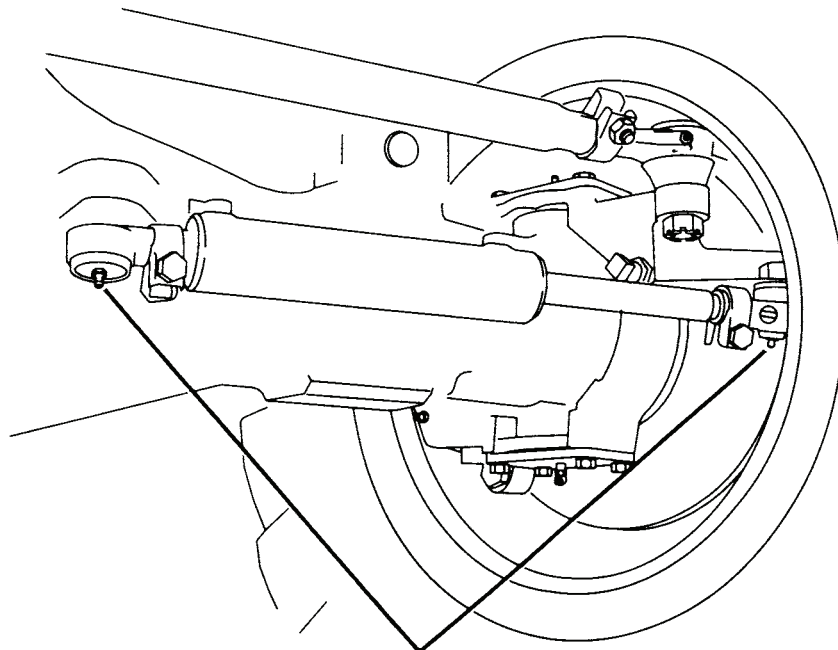
VIEW U - PLANETARY HUBS



**DRAIN AND FILL PLUG
(4 PLACES) (GO)**

409-102

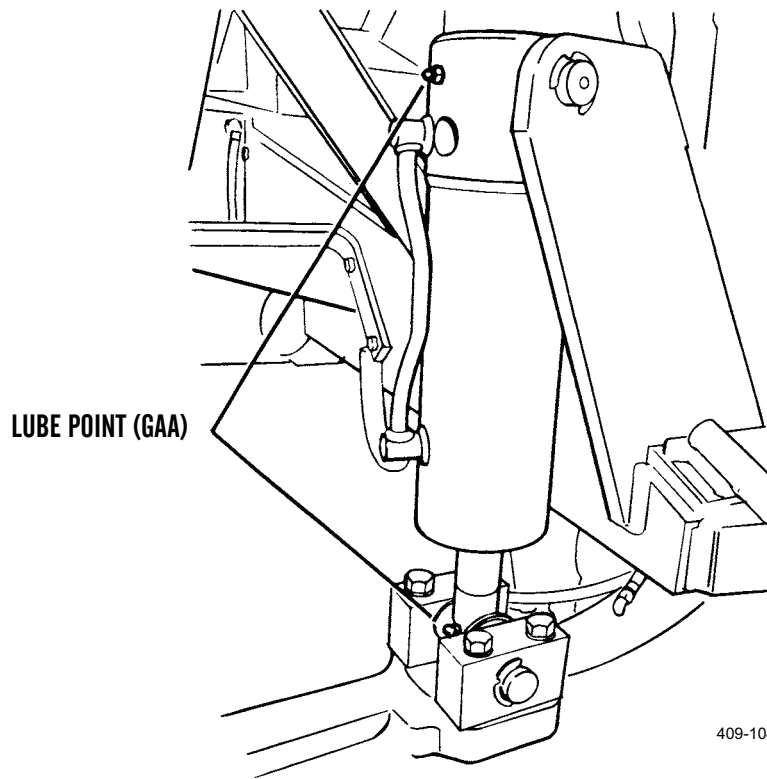
VIEW V - STEERING CYLINDERS



**LUBE POINT
(8 PLACES) (GAA)**

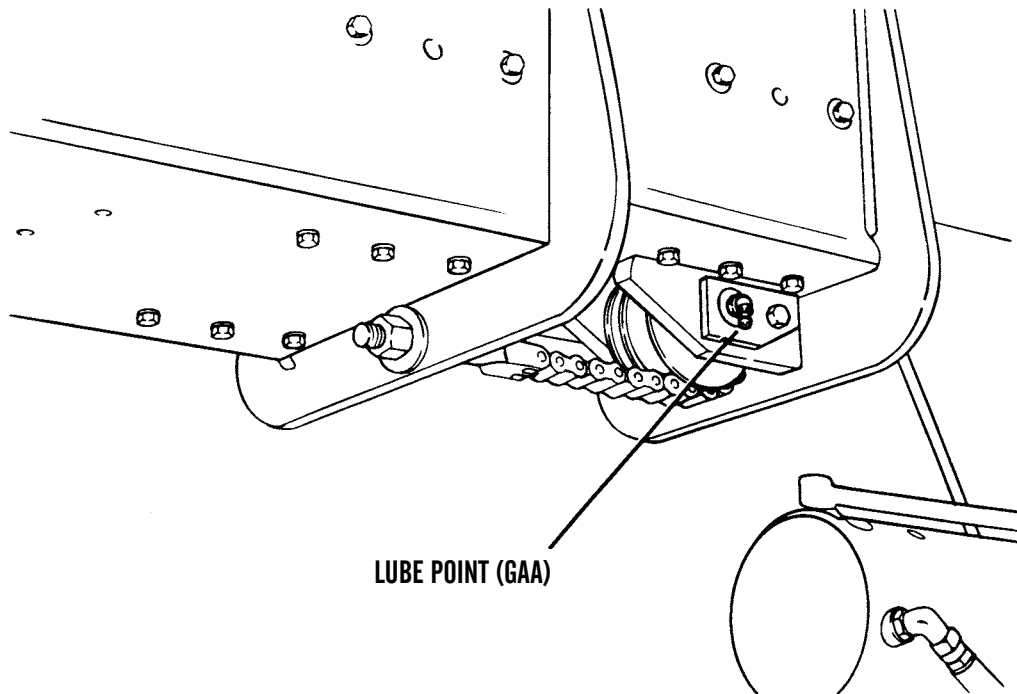
409-103

VIEW W - FRAME TILT CYLINDER PINS



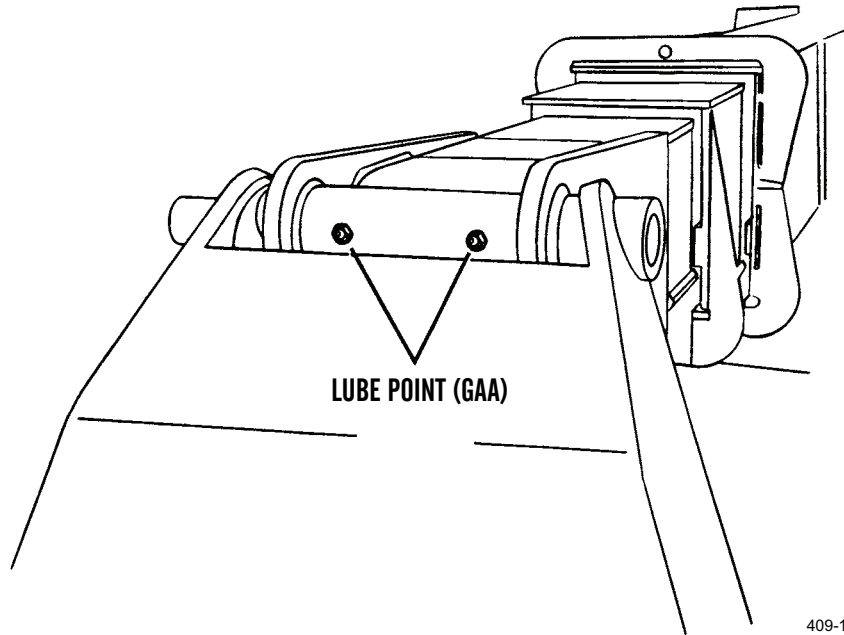
409-104

VIEW X - BOOM RETRACT CHAIN SHEAVE

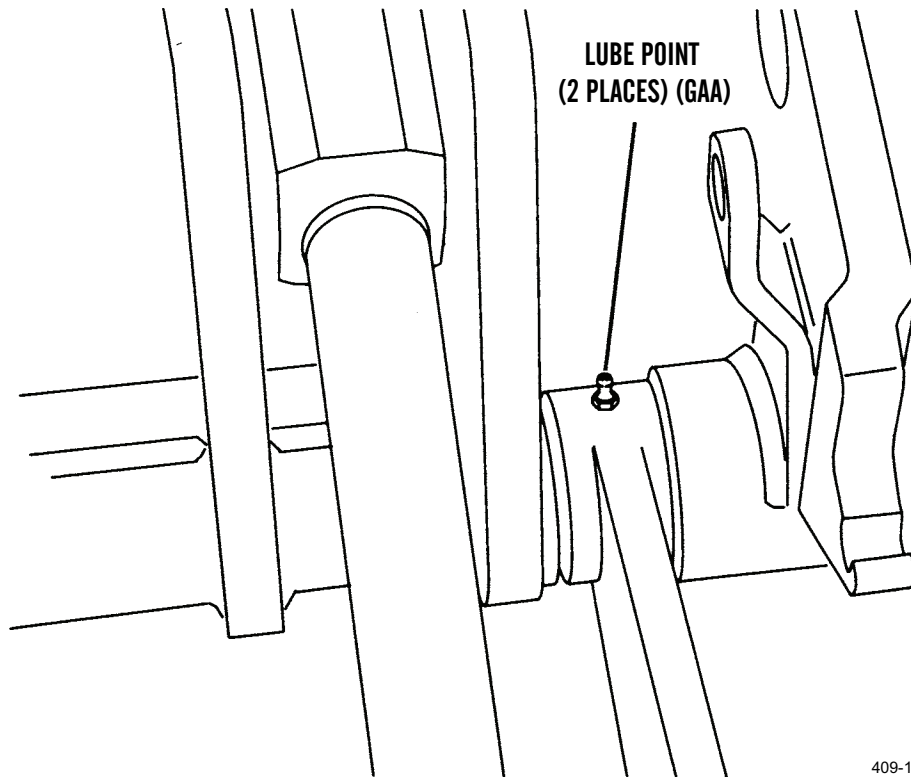


409-105

VIEW Y - MLRS ATTACHMENT PIVOT PINS



VIEW Z - CARRIAGE PIVOT PIN



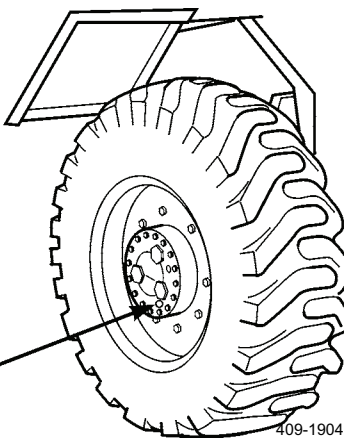
END OF WORK PACKAGE

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
				NOTE
				<ul style="list-style-type: none"> • Review all WARNINGS, CAUTIONS, and NOTES before performing PMCS on the forklift. • Unless otherwise indicated, perform all lubrication and preventive maintenance with forklift parked on level ground, parking brake applied, transmission in N (Neutral) and locked, forks lowered to the ground and engine OFF. • Perform Operator PMCS prior to or along with Unit PMCS if: <ul style="list-style-type: none"> a. There is a delay between daily operation of the forklift and unit PMCS. b. The regular operator is not assisting.
1	Initial 100 Hours or 100 Hours After Replacement		Boom Electrical Cable Tension	Adjust electrical cable tension (WP 0194 00).
2	Initial 100 Hours or 100 Hours After Replacement		Boom Hydraulic Hose Tension	Adjust hydraulic hose tension (WP 0194 00).
3	Monthly		Wheels and Tires	<ul style="list-style-type: none"> a. Inspect tires for general condition and proper inflation. Front tire pressure should be 45 psi (310 kPa). Rear tire pressure should be 40 psi (276 kPa). Replace any missing valve. b. Inspect tires for wear. If amount of tread wear would result in a serious loss of traction or an unsafe condition, replace tire (WP 0135 00). c. Check for loose or missing wheel nuts. Correct torque for wheel nuts is 470 lb-ft (637 Nm). d. Inspect brake discs for excessive scoring and pitting. Replace if excessively scored or pitted (WP 0249 00).
4	Monthly		Steering Cylinders	Check for excessive hydraulic oil leakage at seal. Some oil accumulation (and dripping) is normal. With engine running, turn wheels to far right, far left, then straight ahead. Additional drips or a steady drip indicates a defective seal. Refer to WP 0141 00 for replacement procedures.

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
5	Monthly	1.0 Hours	Planetary Hubs	<p>Check level of oil in each of four planetary hubs.</p> <ol style="list-style-type: none"> Position wheel with plug on horizontal centerline of axle. Clean area around plug. Remove plug. Maintain oil level to plug opening. If level is low, add gear oil (Item 33, WP 0323 00).



(GO)
DRAIN AND FILL PLUG
(4 PLACES)

409-1904

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
7	Monthly		Engine Oil and Filter	<p>NOTE</p> <ul style="list-style-type: none"> • Forklift should be parked on level ground with transmission in Neutral (N) and locked and parking brake applied. Shut down engine. • Drain crankcase while oil is warm. • Engine crankcase capacity is 15 qt (14.2 l). • Clean area around fill cap and drain plug before removing. <ol style="list-style-type: none"> a. Open right engine access door and remove engine oil fill cap. b. Under forklift, access right side of oil pan. c. Remove drain plug and drain oil into a suitable container. Dispose of drained oil in accordance with local policy and ordinances. Install drain plug. d. Open left engine access door and replace engine oil filter element (WP 0012 00). e. Add oil (Items 31 or 32, WP 0323 00) through oil fill tube until level on dipstick is between ADD and FILL lines on dipstick.

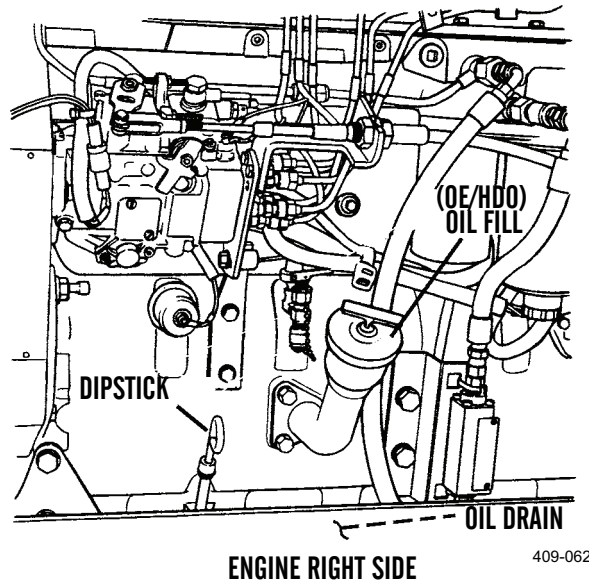


Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
8	Monthly		Radiator	Open right engine access door and check level of coolant in overflow tank. With engine warm, level should be between 1/3 and 2/3 full. a. If level is low, add a 50/50 mixture of antifreeze (Item 6, WP 0323 00) and water to overflow tank. b. If arctic grade antifreeze is required, add full strength arctic grade anti-freeze (Item 5, WP 0323 00) to over flow tank
9	Monthly		Drive Belt	Inspect drive belt for these conditions: a. Check for cracks, missing pieces, frayed areas and wear. Replace a worn or damaged belt (WP 0061 00). b. Check for a stretched belt by pressing midway between the longest span of the belt. Belt should deflect no more than 1/2 in. (12.7 mm). Replace belt if stretched. c. If a new belt still deflects more than 1/2 in. (12.7 mm), belt tensioner may be defective. Replace tensioner (WP 0061 00).
10	Quarterly		Hydraulic Oil Filter	Replace hydraulic oil filter (WP 0199 00).
11	Quarterly		Coolant	Check coolant in overflow tanks for proper 50/50 antifreeze and water mixture. Refer to MIL-A-46153. If mixture cannot easily be corrected, or if coolant appears contaminated, drain and refill coolant (WP 0053 00).
12	Quarterly		Boom Chain	Check tension in boom chain. With boom horizontal and fully extended, measure chain sag at middle of intermediate boom. Measurement should be 3 1/4 to 3 1/2 in. (8.3 to 8.9 mm) from bottom of boom to top of chain. Adjust chain tension if necessary (WP 0193 00).
13	Quarterly		Boom Electrical Cable and Hydraulic Hoses	Check and adjust tension in boom electrical cable and hydraulic hoses (WP 0194 00).
14	Quarterly		Fork Bushings and Wear Pads	Check fork bushings for excessive wear and damage. Replace if worn or damaged (WP 0187 00).
15	Semi-annual		Engine Mounts	Check engine mounts for cracks and damage. Replace a damaged engine mount (WP 0211 00).

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.



Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
16	Semi-annual		Batteries	<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>WARNING</p> <ul style="list-style-type: none"> • 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 battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel. • Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or serious injury to personnel. <p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • If battery box is corroded, it will be necessary to remove batteries then clean to remove acid residues and corrosion. • Buildup of dirt or corrosion on batteries may lead to electrical malfunctions. <p>Service batteries as follows:</p> <ol style="list-style-type: none"> a. Remove cover from battery box. b. Check battery hold-down for looseness, corrosion or damage. c. Clean top of batteries with a clean rag (Item 40, WP 0323 00). d. Inspect batteries for evidence of a cracked case and electrolyte leakage. e. Disconnect battery cables (WP 0107 00). <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • If forklift is equipped with original equipment maintenance-free batteries, batteries will have no filler caps; electrolyte level cannot be checked. • Skip steps f through i if batteries are maintenance-free. <p>f. Ensure all battery filler caps are present.</p> </div>  </div>

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
16 (Con't)	Semi-annual		Batteries	<p>g. Remove batteries (WP 0106 00).</p> <p>h. Remove filler caps and check electrolyte level in battery cells. Electrolyte level should be to bottom of filler openings. Add distilled water as required and reinstall filler caps snugly.</p> <p>i. As required, use a baking soda solution of 4 oz of baking soda with 1 qt (0.95 l) of clean water to remove any acid film from batteries. Rinse with clean water. Reinstall batteries (WP 0106 00).</p> <p>j. Clean battery terminals with a fine grade of sandpaper or emery cloth (Item 12, WP 0323 00).</p> <p>k. Connect battery cables (WP 0107 00). Coat terminal connections with petroleum jelly (Item 22, WP 0323 00).</p>

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
17	Semi-annual	1.0 Hours	Transmission	<p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Vehicle should be parked on level ground, with transmission in Neutral (N) and locked and parking brake applied. Shut down engine. • Transmission fluid drains quicker when warm. • Transmission fluid capacity is 5 gal. (19 L). • Clean area around fill cap and drain plug prior to removing. <p>a. Remove transmission cover (WP 0150 00).</p> <p>b. Remove cap from transmission fill.</p> <p>c. Under forklift, remove drain plug and O-ring from transfer case and drain transmission fluid into a suitable container. Dispose of fluid in accordance with local policy and ordinances. Discard drain plug O-ring. Clean drain plug and reinstall, using a new O-ring.</p> <p>d. Replace transmission oil filter (WP 0118 00).</p> <p>e. Remove, clean, and reinstall transmission oil suction screen and tube assembly (magnetic screen) (WP 0118 00).</p> <p>f. Remove, clean, dry, and reinstall transmission breather.</p> <p>g. Refill transmission with oil (Item 33, WP 0323 00) through fill opening until reading on dipstick is at COLD with engine cold.</p> <p>h. Start engine and bring transmission to operating temperature. Fluid level should be within cross-hatched area, between ADD and FULL marks on dipstick.</p>

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

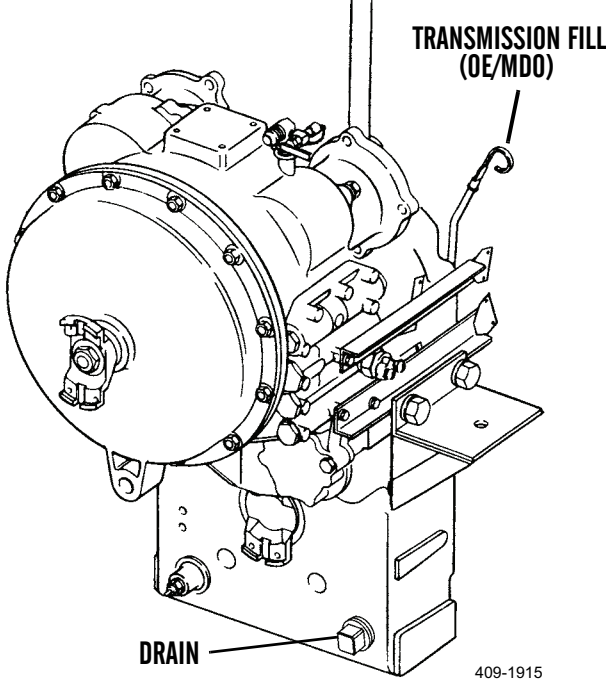
Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
17 (Con't)	Semi-annual	1.0 Hours	Transmission	
18	Semi-annual		Service Brakes	<p>a. Check brake pads for wear. If brake pads are worn to a thickness of 1/8 in. (3.175 mm), replace pads (WP 0249 00).</p> <p>b. Check brake discs for deep grooves, cracks and distortion. If discs are deeply grooved, cracked or distorted, replace discs (WP 0249 00).</p>
19	Semi-annual		Drive-shafts	<p>Test drive forklift and check driveshafts for noise and vibration. If noise or vibration is evident, determine cause. Replace driveshaft if necessary (WP 0124 00).</p>
20	Semi-annual		Boom Assembly	<p>Remove boom cover to access visible boom wear pads. For boom inspection procedures, refer to WP 0190 00. Replace worn boom wear pads (WP 0190 00).</p>
21	Semi-annual		Fuel System	<p>a. Open right engine access door and replace primary and secondary fuel filters (WP 0040 00).</p> <p>b. Remove filler cap from fuel tank. Clean cap and inspect gasket. Replace gasket if damaged.</p> <p>c. Remove strainer from top of fuel tank (WP 0033 00). Clean any debris from inside strainer. Replace strainer if damaged.</p>

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.





Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
22	Semi-annual		ROPS/FOPS	<p>a. Inspect for cracked weld, bends, breaks, chipped/missing paint or corrosion. Do NOT attempt to straighten ROPS/FOPS if damaged.</p> <p>b. Check for loose or missing mounting bolts, washers, and nuts. Install new mounting hardware or tighten as required. Apply torque of 375 lb-ft (508 Nm).</p>
23	Semi-annual		Seat Belts	<p>a. Inspect seat belt for security of mounting, worn or frayed strap webbing or worn or damaged buckle and anticreep slides. Replace seat belt if damaged (WP 0161 00).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Date label attached to seat belt indicates age of belt.</p> <p>b. Replace seat belt, regardless of condition, if it has been in service for three years (WP 0161 00).</p>
24	Annual		Drain Fuel	<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;">WARNING</div>  </div> <ul style="list-style-type: none"> • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel. • Operating personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing. <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Forklift should be parked on level ground with transmission in Neutral (N) and locked and parking brake applied. Shut down engine. • Fuel capacity of fuel/hydraulic tank is 44 gal. (167 L) when full. <p>a. Remove fuel tank filler cap.</p> <p>b. Place suitable container under fuel side of fuel/hydraulic tank.</p> <p>c. Remove drain plug from bottom of fuel/hydraulic tank and allow fuel and accumulated water and sediment to drain from tank.</p> <p>d. Clean drain plug and reinstall.</p> <p>e. Fill fuel tank with diesel fuel (Item 28 or 29, WP 0323 00).</p>

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
25	Annual		Drain Hydraulic Oil	<p>NOTE</p> <ul style="list-style-type: none"> Forklift should be parked on level ground with transmission in Neutral (N) and locked and parking brake applied. Retract hydraulic cylinders and shut down engine. Hydraulic oil capacity of fuel/hydraulic tank is 55 gal. (208 L). <ol style="list-style-type: none"> Remove hydraulic oil tank filler cap. Place container under hydraulic oil side of fuel/hydraulic tank. Remove drain plug from bottom of fuel/hydraulic tank and allow hydraulic oil and accumulated water and sediment to drain from tank. Clean drain plug and reinstall. Fill hydraulic tank with hydraulic oil (Item 33, WP 0323 00).
26	Annual		Planetary Hubs and Differentials	<p>NOTE</p> <ul style="list-style-type: none"> Forklift should be parked on level ground with transmission in Neutral (N) and locked, and park brake applied. Shut down engine. Planetary hub capacity is 2.7 qt (2.6 L). Differential capacity is 10.6 qt (10 L). Clean area around plug before removing. <ol style="list-style-type: none"> Position wheel with plug at bottom of axle at 6 o'clock position. Remove plug and drain oil into suitable container. Dispose of oil in accordance with local policy and ordinances. Position forklift so that planetary hub drain/fill hole is at 3 or 9 o'clock. Add oil (Item 33, WP 0323 00) to planetary hub until oil is level with opening. Clean plug and reinstall. Remove level/fill plug from differential. Remove drain plug and drain oil. Clean drain plug and reinstall. Add oil (Item 33, WP 0323 00) to differentials through level/fill hole until oil is level with opening. Clean plug and reinstall.
27	Annual		Road Test	Start forklift and road test. Operate all controls to ensure that forks, boom, steering and frame tilt are operating normally. Listen and feel for any abnormal noise or vibration. Ensure that engine, transmission and hydraulic system all function and respond to controls smoothly.

Table 1. Unit Preventive Maintenance Checks and Services (PMCS) for 6K Forklift - Continued.

Item No.	Interval	Man-Hours	Location	Procedure
			Item To Check/Service	
28	Biennial		Drain Cooling System	  <p>WARNING</p> <ul style="list-style-type: none"> • DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns. • DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Failure to follow this warning may cause serious burns. • Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury. <p>NOTE</p> <p>Cooling system capacity is 8 gal. (30 L).</p> <ul style="list-style-type: none"> • Drain, flush and fill cooling system (WP 0053 00). • Dispose of drained coolant in accordance with local policy and ordinance.
29	Biennial		Neutral Safety Switch	<ul style="list-style-type: none"> a. Put travel select lever in forward (F) position. b. With parking brake on and brake pedal depressed, try to start engine (TM 10-3930-660-10). Turn engine off immediately if it starts. c. Repeat step b with travel select lever in reverse (R) position (TM 10-3930-660-10). d. If engine started in either position, replace neutral safety switch (WP 0066 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Service

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Oil, lubricating (Item 31, WP 0323 00)

Materials/Parts - Continued

- Filter element (4)
- Flatwasher (2)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)

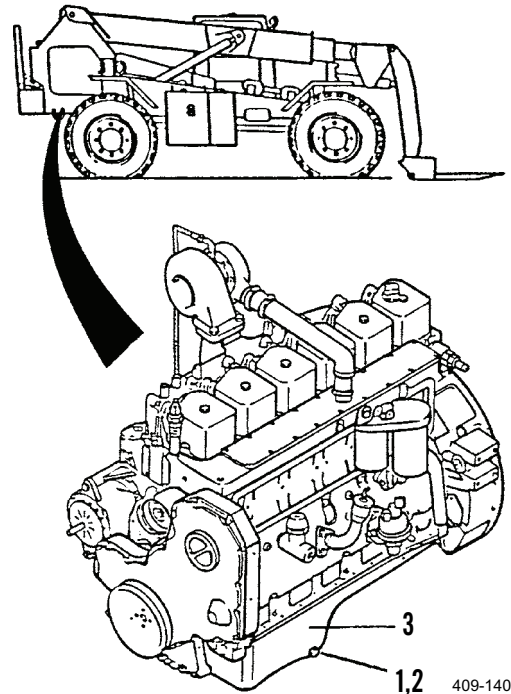


WARNING

Engine oil is slippery. Ensure any spills are wiped up. Discard oil in accordance with local ordinance.

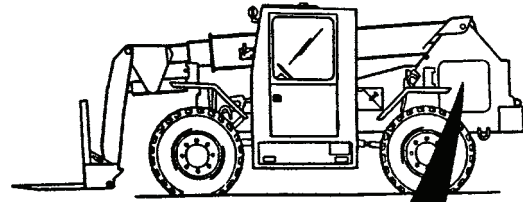
SERVICE

1. Start and run engine until water temperature gauge reading is between 180° and 210°F to (82°C and 99°C). Stop engine (TM 10-3930-660-10).
2. Place container under oil drain plug (1).
3. Remove oil drain plug (1) and flatwasher (2) from engine oil pan (3) and allow oil to drain completely. Discard flatwasher.



SERVICE - CONTINUED

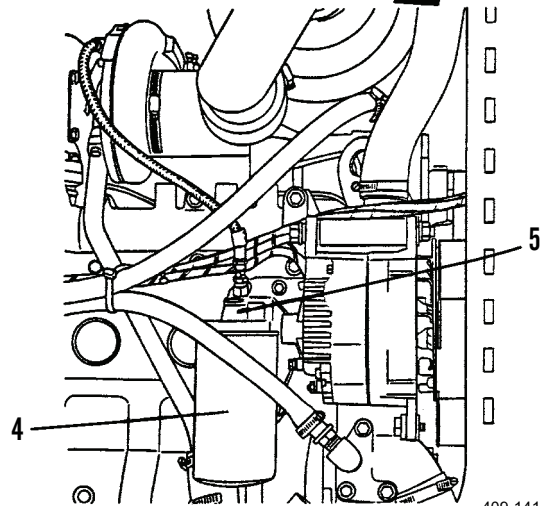
4. Place container under filter element (4).
5. Slowly unscrew and remove filter element (4) from filter head (5). Discard filter element.
6. Clean surface of filter head (5) to remove any possible contaminants.
7. Lubricate seal on new filter element (4) with clean oil.



CAUTION

Do not overtighten new filter element. Overtightening may distort the filter element threads and seal.

8. Screw new filter element (4) onto filter head (5) until top of element (4) makes contact with head (5). Tighten element (4) an additional 3/4 turn.



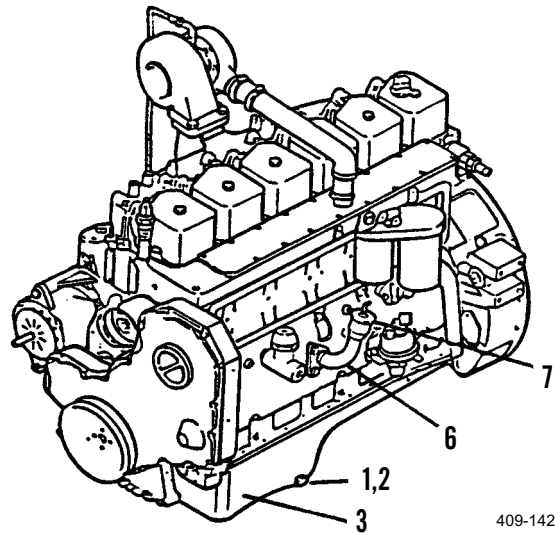
409-141

9. Install oil drain plug (1) and new flatwasher (2) to engine oil pan (3).

NOTE

Engine oil capacity is 15 qt (14.2 L) including filter element.

10. Remove cap (7) from engine oil filler (6) and add oil. Install cap (7).
11. Start engine and check for leaks (TM 10-3930-660-10).



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END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 2 (Item 19, WP 0324 00)

Personnel Required

Two

Equipment Condition

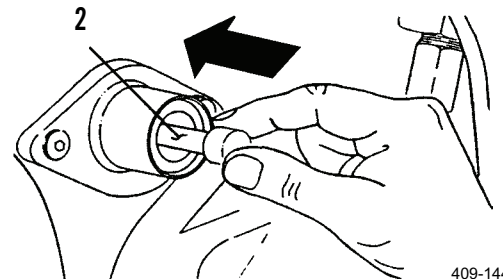
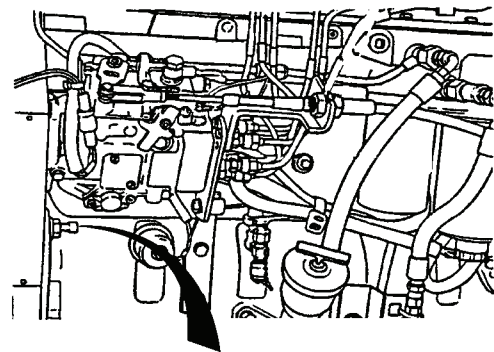
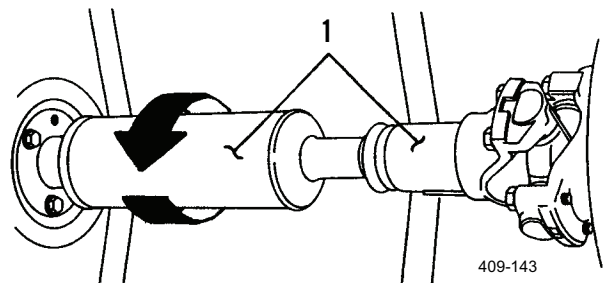
- Rocker lever covers removed (WP 0014 00)
- Engine cooled to temperature of 140°F (60°C) or less (TM 10-3930-660-10)
- Transmission cover removed (WP 0150 00)

ADJUSTMENT

1. Locate top dead center for no. 1 cylinder.
2. Rotate engine counterclockwise at universal joint of transmission input shaft (1) as assistant pushes on engine timing pin (2).

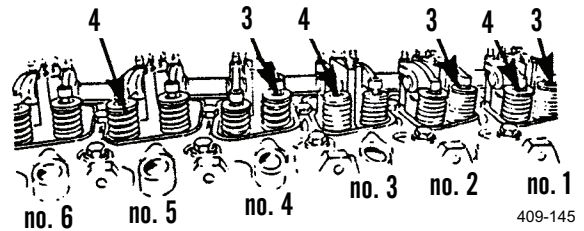
NOTE

Continue step 2 until engine timing pin moves inward and no. 1 cylinder is at top dead center.



ADJUSTMENT - CONTINUED

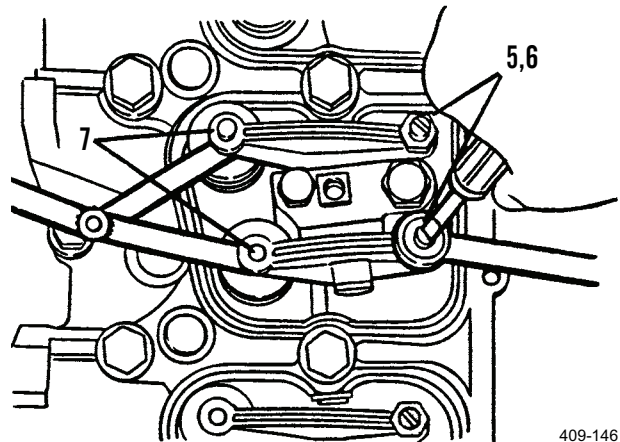
3. Adjust clearances of three intake valves (3) and three exhaust valves (4).



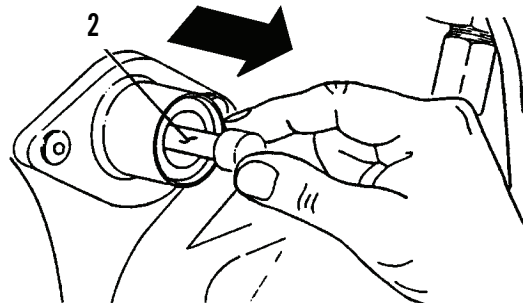
NOTE

- Intake valve clearance - 0.010 in. (0.254 mm).
- Exhaust valve clearance - 0.020 in. (0.508 mm).
- Clearance is correct when a slight pull is felt as feeler gauge is slipped between valve stem and rocker lever.

4. Loosen adjustment locknut (5). Adjust screw (6) as required until valve clearance is properly adjusted.
5. Tighten adjustment locknut (5) to 6 lb-ft (8 Nm) of torque. Then recheck valve clearance.

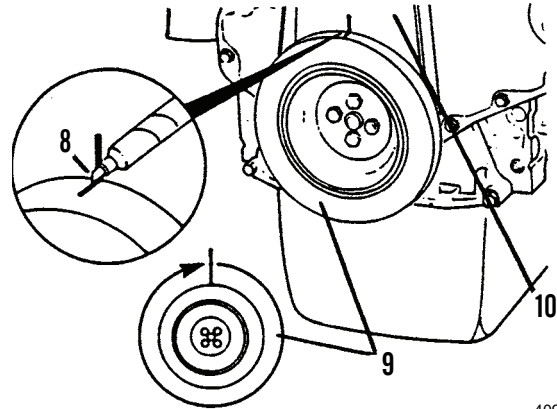


6. Disengage engine timing pin (2).



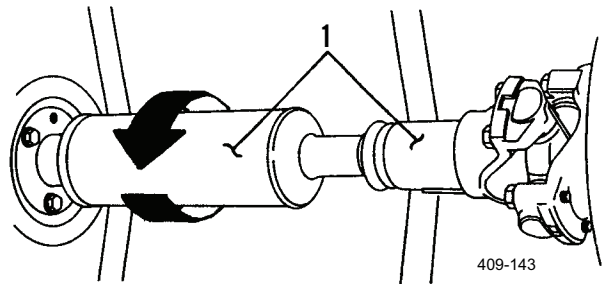
ADJUSTMENT - CONTINUED

7. Place match marks (8) on crankshaft pulley (9) and timing gear cover (10).
8. Locate top dead center for no. 6 cylinder.
9. Observe match marks (8) on crankshaft pulley (9) and timing gear cover (10).



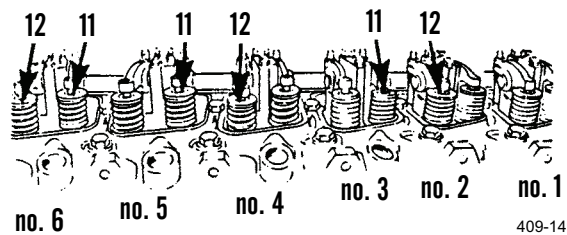
409-148

10. Have assistant rotate engine counterclockwise at universal joint of transmission input shaft (1) until crankshaft pulley (9) rotates 360 degrees. No. 6 cylinder is now at top dead center.



409-143

11. Adjust clearances of three intake valves (11) and three exhaust valves (12) by following steps 4 and 5.



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12. Install rocker lever covers (WP 0014 00).
13. Install transmission cover (WP 0150 00).

END OF WORK PACKAGE

ROCKER LEVER COVERS REPLACEMENT

0014 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Gasket (4)

Materials/Parts - Continued

O-ring (2)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

REMOVAL

NOTE

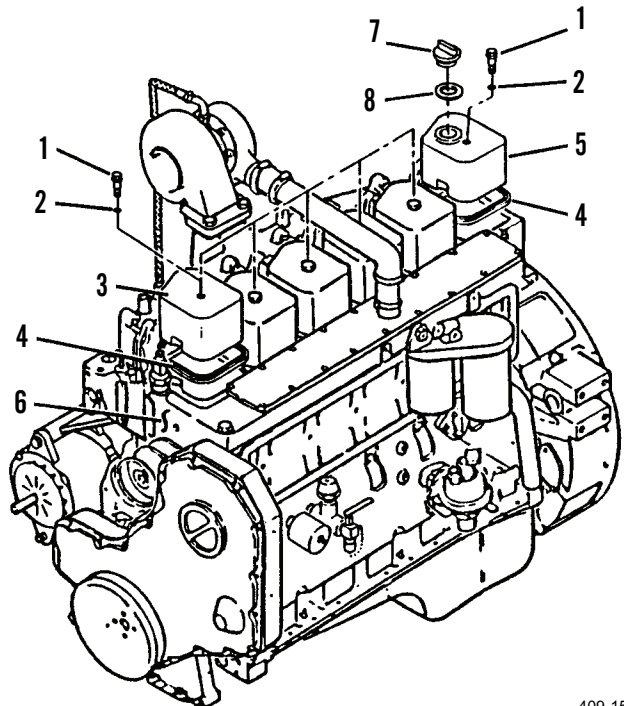
The rocker lever covers are accessed through the left and right-hand engine access doors.

1. Remove five capscrews (1), five O-rings (2) and five covers (3). Discard O-rings.
2. Remove five gaskets (4). Discard gaskets.

NOTE

Cover 5 is located furthest away from the fan side of the engine.

3. Remove capscrew (1) and O-ring (2) from cover (5).
4. Remove cover (5) and gasket (4) from engine (6). Discard gasket.
5. If necessary, remove cap (7) and seal (8) from cover (5).



409-150

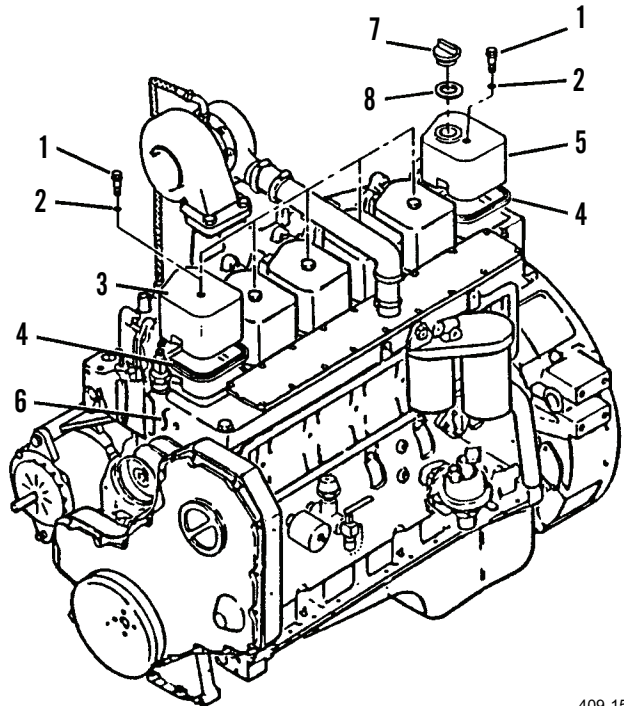
INSTALLATION

1. If removed, install seal (8) and cap (7) to cover (5).

NOTE

Cover is located furthest away from fan side of engine.

2. Install cover (5) and new gasket (4) to engine (6).
3. Install new O-ring (2), cover (5) and capscrew (1). Torque capscrew (1) to 6 lb-ft (8.1 Nm).
4. Place five new gaskets (4) and covers (3) on engine (6).
5. Install covers (3) with five new O-rings (2) and capscrews (1). Torque capscrews (1) to 6 lb-ft (8 Nm).



409-150

END OF WORK PACKAGE

ENGINE OIL LEVEL GAUGE REPLACEMENT

0015 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 46, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

Engine oil drained (WP 0012 00)

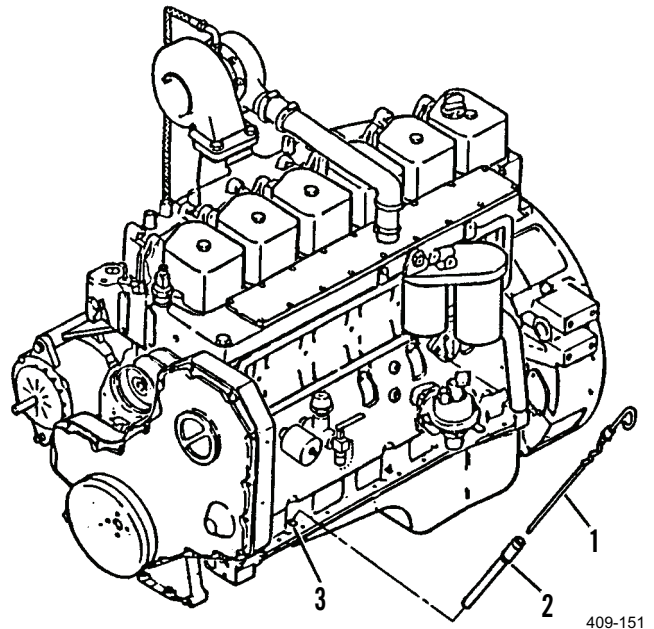
REMOVAL**NOTE**

The engine oil level gauge (dipstick and dipstick tube) is accessed through the right-hand engine access door.

1. Remove dipstick (1) from dipstick tube (2).
2. Pull and remove dipstick tube (2) from engine (3).

NOTE

If dipstick tube cannot be removed using this procedure, oil pan must be removed and dipstick tube must be pressed out of engine block.



409-151

INSTALLATION

1. Apply loctite to mounting surface of dipstick tube (2).
2. Install dipstick tube (2) in engine (3).
3. Insert dipstick (1) in dipstick tube (2).
4. Fill engine with oil (WP 0012 00).

END OF WORK PACKAGE

ENGINE OIL FILLER NECK REPLACEMENT

0016 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

O-ring (4)

Equipment Condition

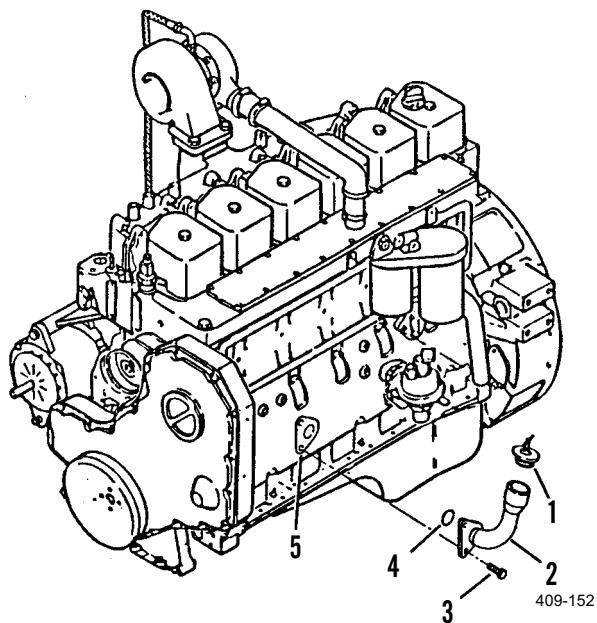
Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

REMOVAL**NOTE**

The engine oil filler neck is accessed through the right-hand engine access door.

1. Remove cap (1) from oil filler neck (2).
2. Support oil filler neck (2) and remove two capscrews (3).
3. Remove oil filler neck (2) and O-ring (4) from engine (5). Discard O-ring.

**INSTALLATION**

1. Align and support new O-ring (4) and oil filler neck (2) on engine (5).
2. Install oil filler neck (2) with two capscrews (3). Torque capscrews (3) to 32 lb-ft (43 Nm).
3. Install cap (1) on oil filler neck (2).

END OF WORK PACKAGE

ENGINE OIL SAMPLING VALVE REPLACEMENT

0017 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Engine off and cool (TM 10-3930-660-10)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

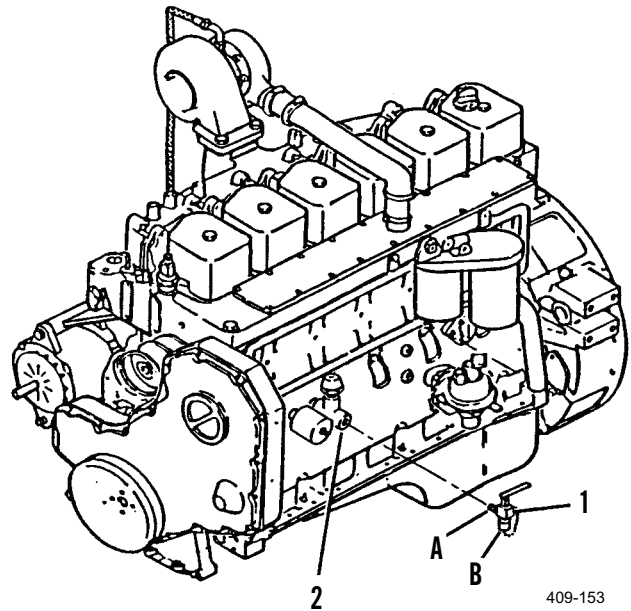
REMOVAL**NOTE**

The engine oil sampling valve is accessed through the right-hand engine access door.

Remove sampling valve (1) from fitting (2).

INSTALLATION

1. Apply loctite to valve threads (A).
2. Install sampling valve (1) into fitting. Make sure the drain end (B) of valve (1) is facing down.

**END OF WORK PACKAGE**

EXHAUST MANIFOLD REPLACEMENT

0018 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Gasket (4)

Personnel Required

Two

Equipment Condition

Turbocharger assembly removed (WP 0026 00)



WARNING

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

REMOVAL

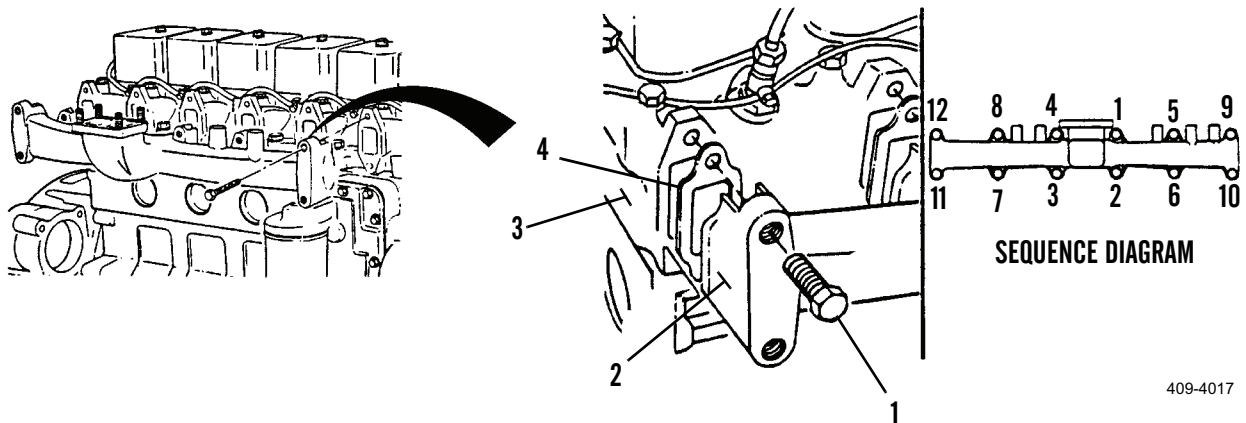
1. Remove twelve capscrews (1) holding exhaust manifold (2) to engine (3).
2. With assistance, remove manifold (2) and six gaskets (4) from engine (3). Discard gaskets.

INSTALLATION

NOTE

Ensure all gasket material is removed from cylinder head and exhaust manifold prior to installation.

1. With assistance, position manifold (2) and six new gaskets (4) in place on engine (3).
2. Use capscrews (1) to hold new gaskets (4) in position. Torque twelve capscrews (1), in order shown, to 32 lb-ft (43 Nm) each.
3. Install turbocharger assembly and new gasket (WP 0026 00).



409-4017

END OF WORK PACKAGE

INTAKE MANIFOLD COVER REPLACEMENT

0019 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)
 Gasket (4)

Equipment Condition

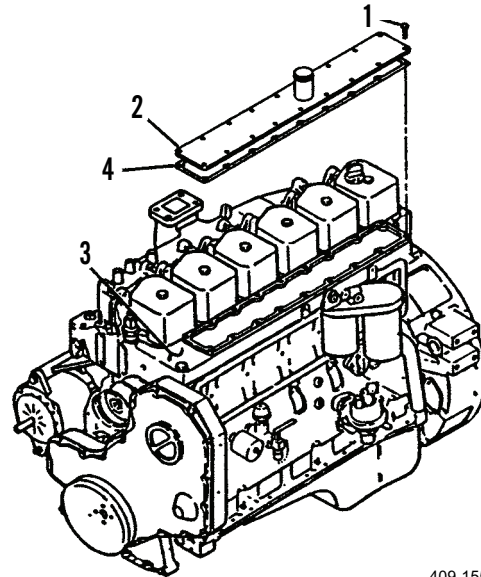
High pressure fuel lines removed (WP 0034 00 or WP 0035 00)
 Ether start hose disconnected (WP 0044 00)
 Air inlet pipe removed (WP 0028 00 or WP 0029 00)

REMOVAL

NOTE

Two of the fourteen capscrews may be removed with fuel injection lines.

1. Remove fourteen capscrews (1) holding manifold cover (2) to engine (3).
2. Remove manifold cover (2) and gasket (4). Discard gasket.



409-155

INSTALLATION

1. Clean gasket sealing surface on engine (3).
2. Position new gasket (4) on engine (3).
3. Position intake manifold cover (2) on engine (3).

CAUTION

Some of the capscrew holes are drilled through and must be sealed. Apply loctite to the capscrews.

4. Install twelve capscrews (1) and tighten to 6 lb-ft (8 Nm).
5. Install air inlet pipe (WP 0028 00 or WP 0029 00).
6. Connect ether start hose (WP 0044 00).
7. Install high pressure fuel lines (WP 0034 00 or WP 0035 00).

END OF WORK PACKAGE

FUEL SHUTOFF SOLENOID TESTING (152 HP)

0020 00

THIS WORK PACKAGE COVERS

Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

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

NOTE

- The fuel shutoff solenoid is located on the fuel injector pump and reached through the right-hand engine access door.
- If replacement is required, refer to WP 0226 00.

TESTING**NOTE**

- Be sure starter switch is in OFF position during step 1.
- Electrical leads are connected together with a jumper strap. Do not remove jumper strap when disconnecting electrical leads for this test.

1. Disconnect female spade connectors of two electrical leads R and 07 (1) from male spade connector of solenoid (2).
2. Place one probe of ohmmeter at terminal (A) of solenoid (2). Place other probe of ohmmeter at engine ground.

NOTE

Ohmmeter should read 29.5 ohms +/- 2.5 ohms during test in step 3. If ohms reading is not within acceptable limits, solenoid requires replacement (WP 0226 00).

3. Connect female spade connectors of two electrical leads R and 07 (1) to male spade connector of solenoid (2).

NOTE

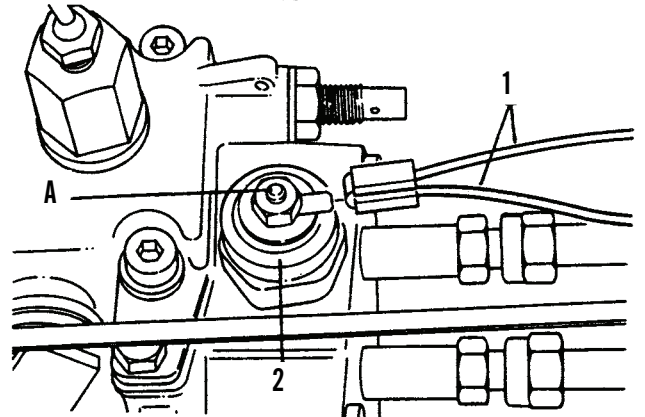
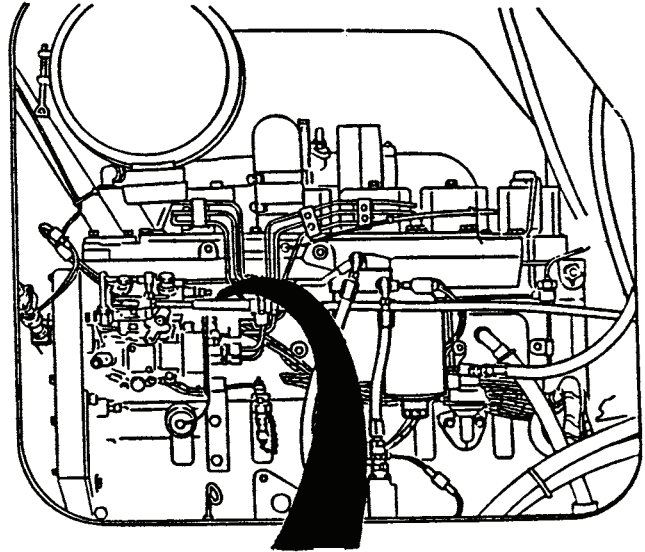
Be sure auxiliary fuel shutoff switch is in the ON position during step 5.

4. Test current draw of fuel shutoff solenoid.
5. Position clamps of ammeter around electrical leads (1).

NOTE

Ammeter should read approximately one ampere when starter switch is turned to the ON position. If reading is not correct, solenoid requires replacement (WP 0226 00).

6. Have an assistant turn engine start switch to the ON position without starting the engine.



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END OF WORK PACKAGE

FUEL SHUTOFF SOLENOID TESTING (165 HP)

0021 00

THIS WORK PACKAGE COVERS

Electrical Testing of Shutoff Solenoid

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

References

WP 0227 00



WARNING

- DO NOT smoke or permit any open flame in area of vehicle while you are servicing fuel system. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

NOTE

- If fuel shutoff solenoid replacement is required, refer to WP 0227 00.
- Ensure engine start switch is in the OFF position during step 1.

ELECTRICAL TESTING OF SHUTOFF SOLENOID**Test resistance of fuel shutoff solenoid**

1. Disconnect fuel shutoff solenoid connector (1) from main wiring harness (2).

NOTE

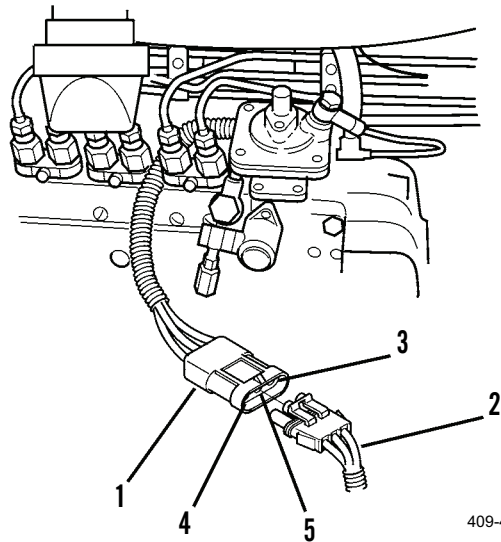
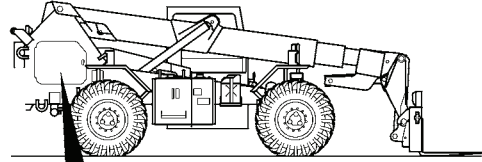
Multimeter resistance should read 41.3 ohms +/- 2.5 ohms during test in step 2. If reading is not within acceptable limits, solenoid requires replacement.

2. Place one probe of multimeter on red wire terminal (3) of fuel shutoff solenoid connector (1). Place other probe on black wire terminal (4) of fuel shutoff solenoid connector.

NOTE

Multimeter resistance should read 0.82 ohms +/- 0.50 ohms during test in step 3. If reading is not within acceptable limits, solenoid requires replacement.

3. Place one probe of multimeter on white wire terminal (5) of connector (1). Place other probe on black wire terminal (4) of connector.
4. Connect fuel shut-off connector (1) to main wiring harness connector (2).



409-4124

Test current draw of fuel shutoff solenoid

5. Disconnect fuel shutoff solenoid connector (1) from main wire harness connector (2).

NOTE

Ensure auxiliary fuel shutoff switch is in the ON position during step 6 below.

6. Place one probe of multimeter on red wire terminal (3) of wire harness connector (2). Place other probe on black wire terminal (4) of wire harness connector.

NOTE

Voltage should read 24.4 volts during test in step 7. If not, solenoid requires replacement. Refer to WP 0227 00.

7. Have assistant turn engine start switch to the ON position without starting engine.
8. Have assistant turn engine start switch to the OFF position.
9. Connect fuel shutoff solenoid connector (1) to main wire harness connector (2).

ELECTRICAL TESTING OF SHUT-OFF SOLENOID - CONTINUED

10. Have assistant start engine (TM 10-3930-660-10).
11. If switch arm moves 2 in. (51 mm) to rear of vehicle, switch functions correctly.
12. Observe movement of switch.
13. Turn engine off (TM 10-3930-660-10).

END OF WORK PACKAGE

FUEL TRANSFER PUMP MAINTENANCE (152 HP)

0022 00

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Gasket (6)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)



WARNING

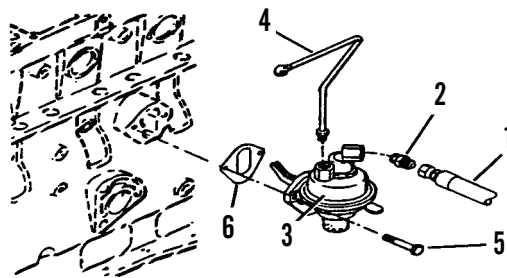
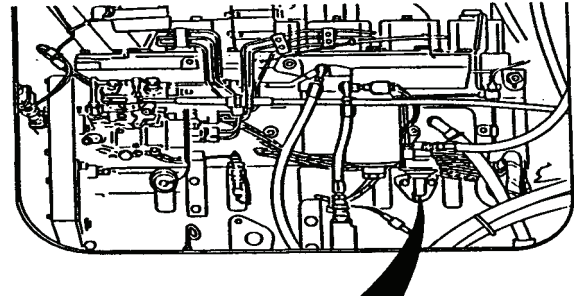
- DO NOT smoke or permit any open flame in area of vehicle while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks,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

REMOVAL

NOTE

The fuel transfer pump is reached through the right-hand engine access door.

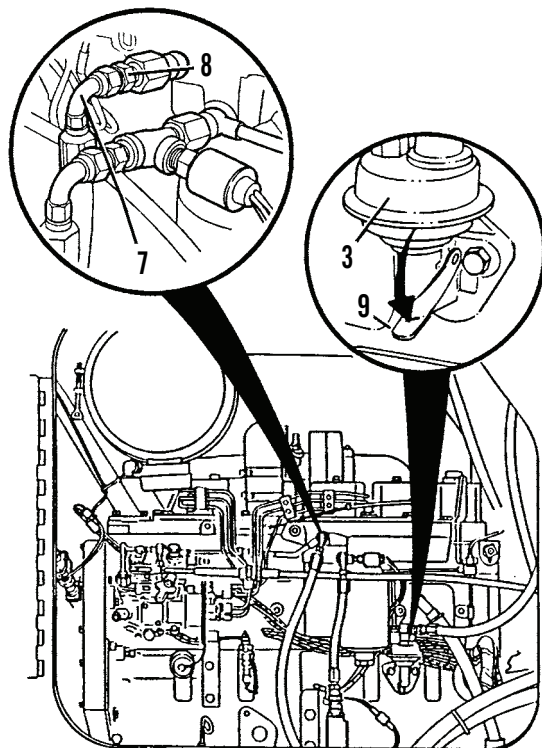
1. Remove fuel hose (1) from fitting (2) at transfer pump (3).
2. Disconnect fuel line (4) from transfer pump (3).
3. Remove two screws (5) and transfer pump (3) from engine.
4. Remove gasket (6) from engine and discard.
5. If necessary, remove fitting (2) from transfer pump (3).



409-157

INSTALLATION

1. If removed, install fitting (2) to transfer pump (3).
2. Clean mounting surface of engine.
3. Position new gasket (6) on engine.
4. Position transfer pump (3) on engine and torque screws (5) to 6 lb-ft (8 Nm).
5. Connect fuel line (4) to transfer pump (3).
6. Install fuel hose (1) to fitting (2) at transfer pump (3).
7. To bleed fuel line (4), loosen hose (7) at fitting (8).
8. Operate hand lever (9) on transfer pump (3) until fuel flowing from fitting (8) is free of air.
9. Tighten hose (7) at fitting (8).



409-158

TESTING

1. Place auxiliary fuel shut-off switch in OFF position (TM 10-3930-660-10).
2. Remove fuel line (4) from transfer pump (3).
3. Connect test hose to pump (3) at port where fuel line (4) was removed.
4. Position end of test hose in suitable container.

NOTE

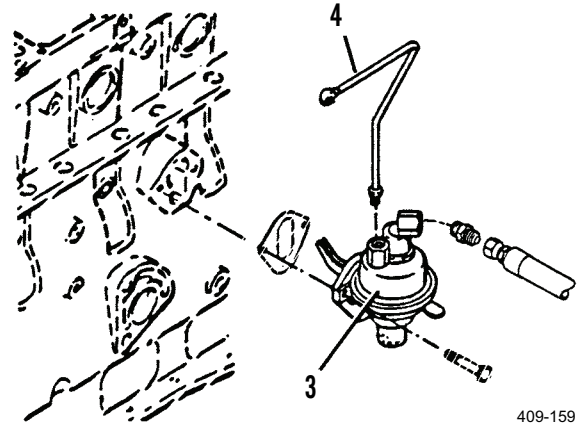
Transfer pump should produce at least 0.7 qt (0.66 L) of fuel in container during step 5. If fuel volume is too low, pump should be replaced. Refer to *Removal* and *Installation*.

5. Crank engine for 30 seconds.
6. Remove test hose from transfer pump (3).
7. Test transfer pump (3) for adequate pressure.
8. Connect pressure gauge to transfer pump (3) at port where fuel line (4) was removed.
9. Crank engine and observe reading on gauge.

NOTE

Transfer pump should provide 3-5 psi (21-34 kPa) when engine is cranked. If fuel pressure is too low, transfer pump should be replaced. Refer to *Removal* and *Installation*.

10. Remove pressure gauge from transfer pump (3).
11. Install fuel line (4) to transfer pump (3).
12. Bleed fuel line (4). Refer to step 7 of *Installation*.
13. Place auxiliary fuel shut-off switch in ON position (TM 10-3930-660-10).

END OF WORK PACKAGE

FUEL TRANSFER PUMP MAINTENANCE (165 HP)

0023 00

THIS WORK PACKAGE COVERS

Testing Fuel Transfer Pump Pressure and Flow, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 1 (Item 20, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Engine off and cool (TM 10-3930-660-10)

Materials/Parts

Gasket (7)

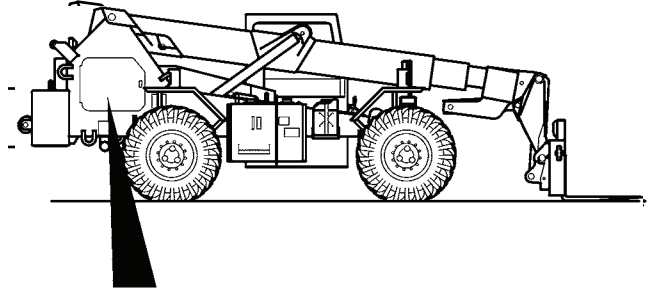


WARNING

- DO NOT smoke or permit any open flame in area of vehicle while you are servicing fuel system. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

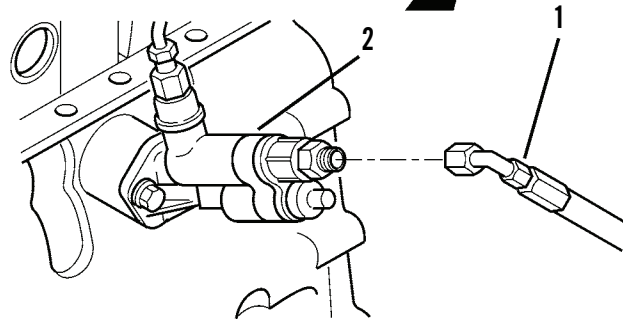
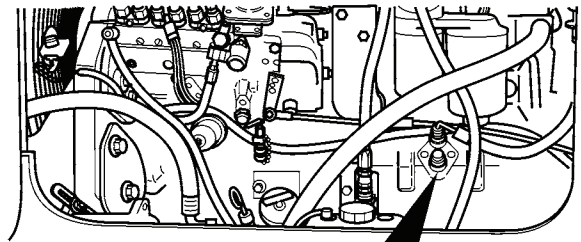
TESTING FUEL TRANSFER PUMP PRESSURE AND FLOW

1. Place auxiliary fuel shut-off switch in the OFF position (TM 10-3930-660-10).
2. Disconnect fuel hose (1) from fuel transfer pump (2).
3. To test fuel transfer pump (2) for adequate volume, connect test hose to fuel transfer pump at port where fuel hose (1) was removed.
4. Position end of test hose in suitable container.

**NOTE**

Fuel transfer pump should produce at least 0.7 qt (0.66 L) of fuel in container during step 5 below. If fuel volume is too low, replace fuel transfer pump (refer to *Removal* and *Installation* sections of this work package).

5. Crank engine for 30 seconds (TM 10-3930-660-10).
6. Remove test hose from fuel transfer pump (2).
7. Test fuel transfer pump (2) for adequate pressure by connecting pressure gage to fuel transfer pump at port where fuel hose (1) was removed.



409-1744

NOTE

Fuel transfer pump should provide 10 psi (69 kPa) during step 8 below. If fuel pressure is too low, replace fuel transfer pump (refer to *Removal* and *Installation* sections of this work package).

8. Crank engine and observe reading on gauge (TM 10-3930-660-10).
9. Remove pressure gage from fuel transfer pump (2).

NOTE

Perform steps 10-12 below only if fuel transfer pump is not being replaced.

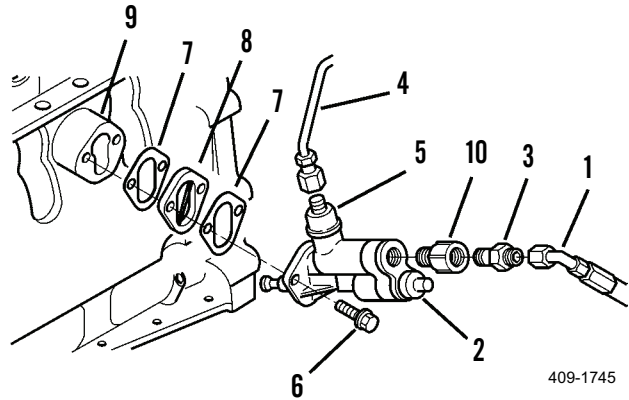
10. Install fuel hose (1) on fuel transfer pump (2).
11. Bleed fuel hose (1).
12. Place auxiliary fuel shut-off switch in ON position.

REMOVAL

NOTE

Perform step 1 below only if fuel transfer pump was not tested. If fuel transfer pump was tested, fuel line will already be disconnected.

1. Disconnect fuel hose (1) from adapter (3).
2. Remove fuel tube (4) from adapter (5).
3. Remove two screws (6), fuel transfer pump (2), two gaskets (7) and spacer (8) from engine block (9). Discard gaskets.



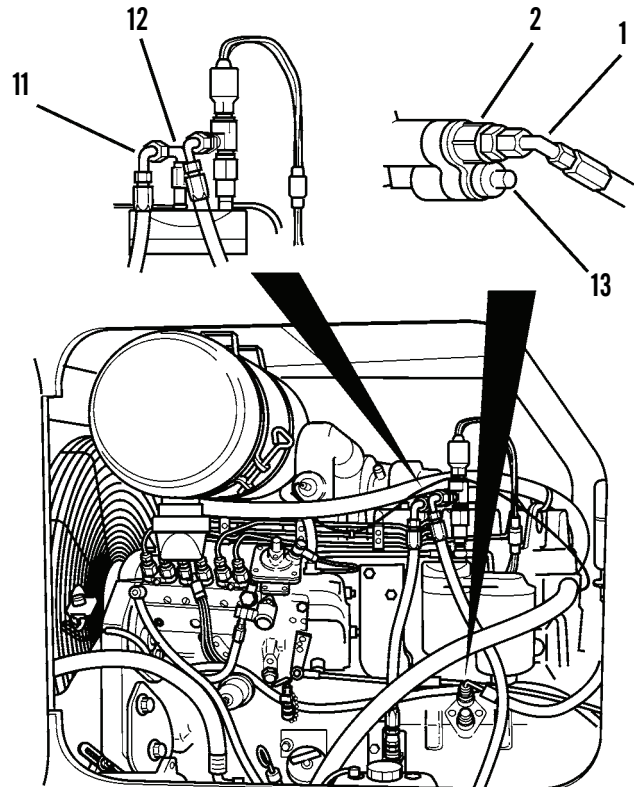
4. Remove adapters (3) and (10) from fuel transfer pump (2).

INSTALLATION

NOTE

Ensure gasket mating surface of engine block is clean prior to installation of transfer pump.

1. Install adapters (3 and 10) on fuel transfer pump (2).
2. Install new gaskets (7), spacer (8), and fuel transfer pump (2) on engine block (9) with two screws (6). Torque screws to 18 lb-ft (24 Nm).
3. Install fuel tube (4) on adapter (5).
4. Connect fuel hose (1) on adapter (3).
5. Bleed fuel hose (1).
6. Loosen hose (11) at elbow (12).
7. Operate button (13) on transfer pump (2) until fuel flowing from elbow (12) is free of air.
8. Tighten hose (11) on elbow (12).
9. Run engine and check for proper operation (TM 10-3930-660-10).



END OF WORK PACKAGE

AIR CLEANER ASSEMBLY MAINTENANCE

0024 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning, Inspection, Assembly, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (9, 15, 21, 22 and 27)

References

WP 0316 00

WP 0317 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

**WARNING**

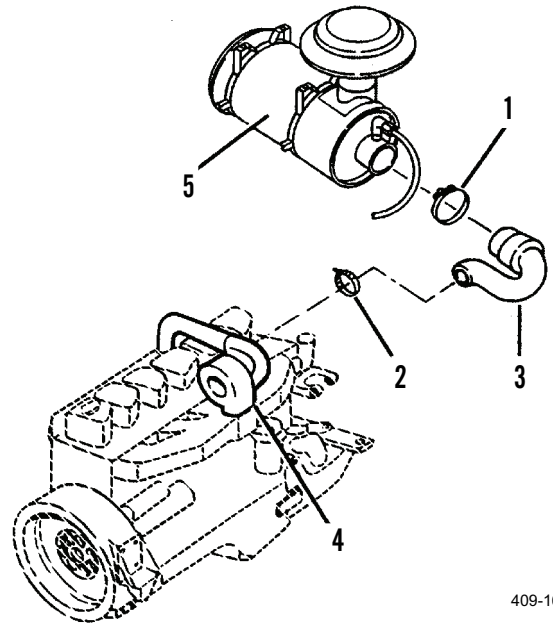
- If NBC exposure is suspected, personnel wearing protective equipment should handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- NBC contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.

NOTE

The air cleaner assembly is reached through the left and right-hand engine access doors.

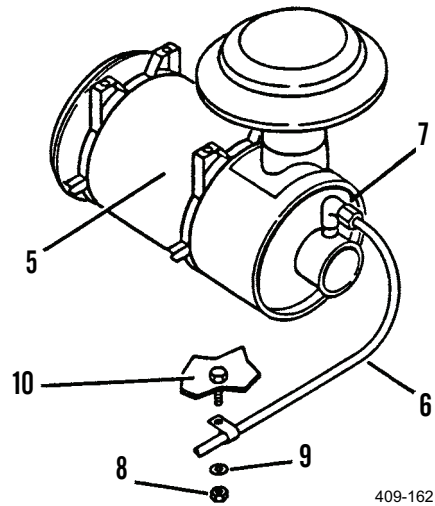
REMOVAL

1. Loosen clamps (1 and 2) securing hose (3), to turbocharger (4) and housing (5).
2. Remove hose (3) from housing (5) and turbocharger (4).



409-161

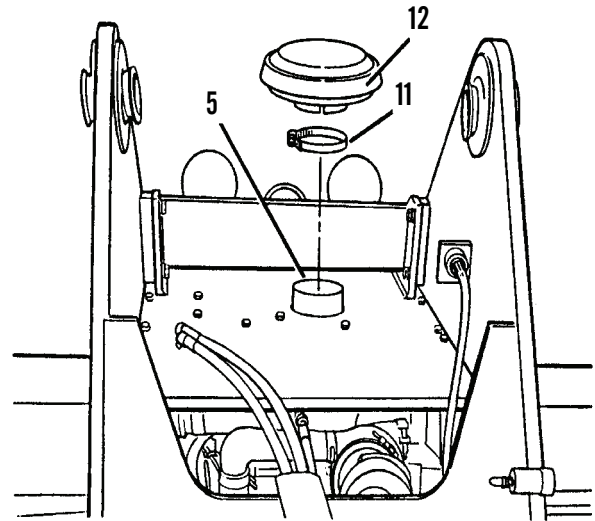
3. Disconnect tube (6) from elbow assembly (7) at housing (5).
4. Remove two nuts (8) and two lockwashers (9) securing tube (6) to underside of front engine cover (10). Discard lockwashers.



409-162

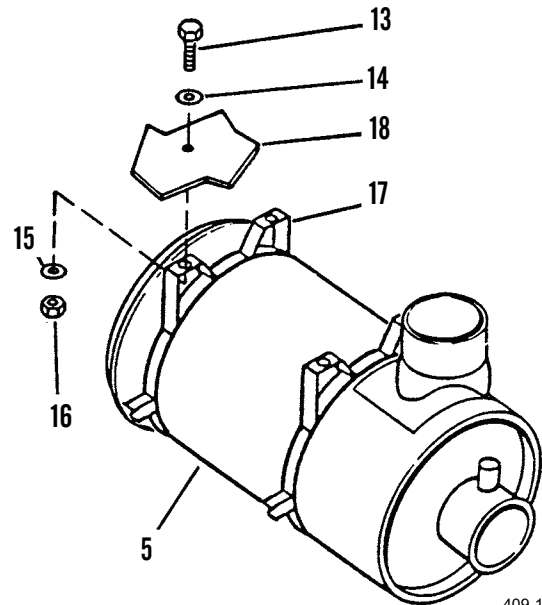
REMOVAL - CONTINUED

5. Loosen clamp (11) and remove cap (12) and clamp from housing (5).



409-163

6. With assistance, remove four capscrews (13), four flatwashers (14), four lockwashers (15), and four nuts (16) securing two clamps (17) and housing (5) to rear engine cover (18). Discard lockwashers.

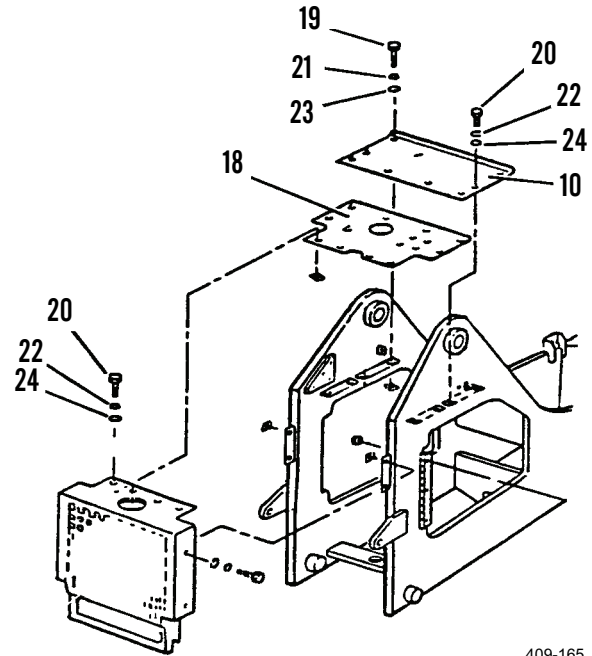


409-164

REMOVAL - CONTINUED**NOTE**

Bolts (19) are longer than other bolts used to secure left-hand side of engine cover. Note location of bolts for use during installation.

7. Remove 10 bolts (19 and 20), lockwashers (21 and 22) and flatwashers (23 and 24) securing front and rear engine covers (10 and 18). Discard lockwashers.
8. Lift front and rear engine covers (10 and 18), as required, to clean air inlet tube (25) welded to housing (5).

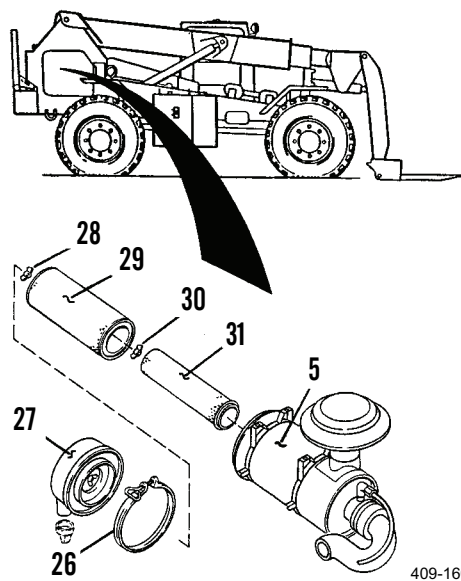


409-165

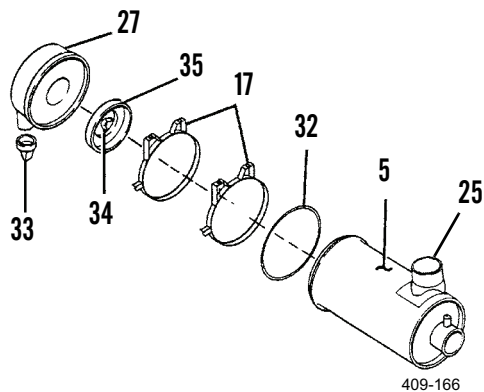
9. Rotate housing (5), as required, and remove housing through right-hand engine access door.

DISASSEMBLY

1. Loosen clamp (26) securing access cover (27) to housing (5).
2. Remove wingnut (28) and primary filter element (29) from housing (5).
3. Remove wingnut (30) and secondary filter element (31) from housing (5).



4. Remove O-ring (32) from housing (5).
5. Loosen and remove two clamps (17) from housing (5).
6. Remove vacuum diaphragm (33) from access cover (27).
7. Loosen captive wingnut (34) and remove baffle (35) from access cover (27).



CLEANING

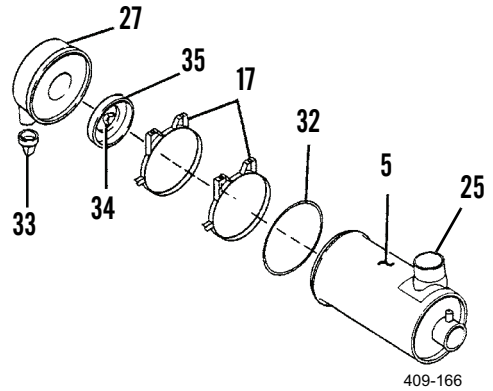
Refer to *Cleaning Instructions* (WP 0316 00).

INSPECTION

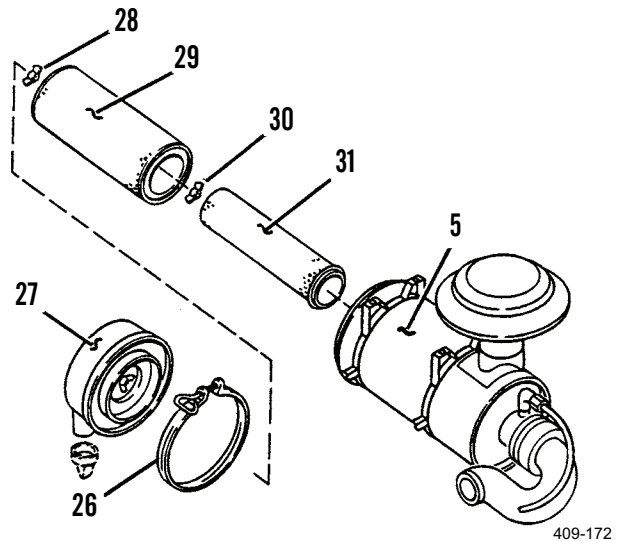
Refer to *Inspection Instructions* (WP 0317 00).

ASSEMBLY

1. Install baffle (35) to access cover (27) and tighten captive wingnut (34).
2. Install vacuum diaphragm (33) to access cover (27).
3. Install and tighten two clamps (17) to housing (5).
4. Install O-ring (32) to housing (5).



5. Position secondary filter element (31) in housing (5) and secure with wingnut (30).
6. Position primary filter element (29) in housing (5) and secure with wingnut (28).
7. Position access cover (27) on housing (5) and secure with clamp (26).



8. Reset air intake restriction indicator (TM 10-3930-660-10).

INSTALLATION**NOTE**

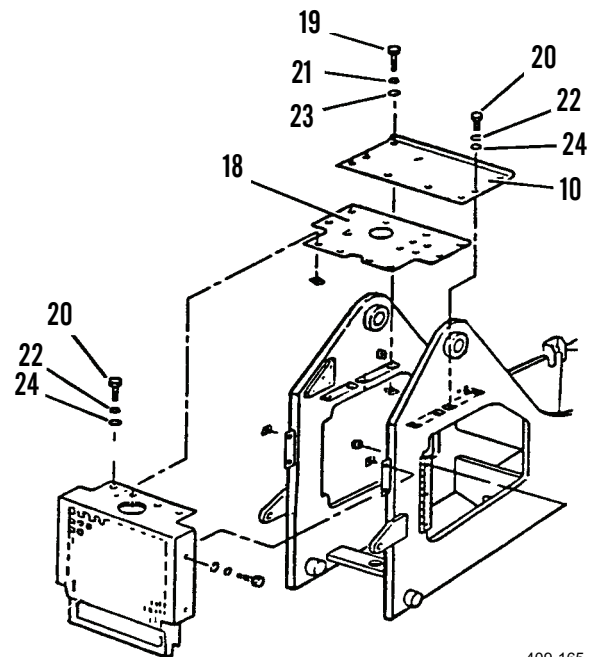
Apply loctite to all capscrews and bolts as they are installed.

1. Carefully position housing (5) through right-hand engine access door.
2. Lift front and rear engine covers (10 and 18) as required to clear air inlet tube (25) welded to housing (5).
3. Rotate housing into position and align air inlet tube (25) through hole in rear engine cover (18). Lower front and rear engine covers (10 and 18).

NOTE

Bolts (19) are longer than other bolts used to secure left-hand side of engine covers. Install bolts in location noted during removal.

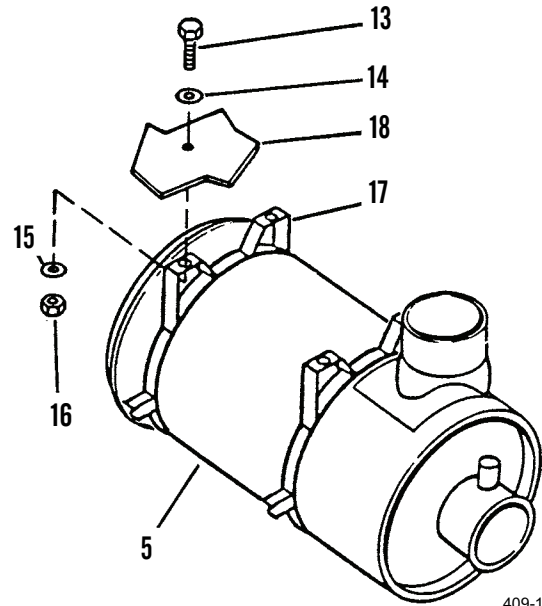
4. Install bolts (19), new lockwashers (21) and flatwashers (23) to secure left-hand side of front engine cover (16).
5. Install remaining bolts (20), new lockwashers (22) and flatwashers (24), to secure front and rear engine covers (10 and 18) to each other, to vehicle frame.



409-165

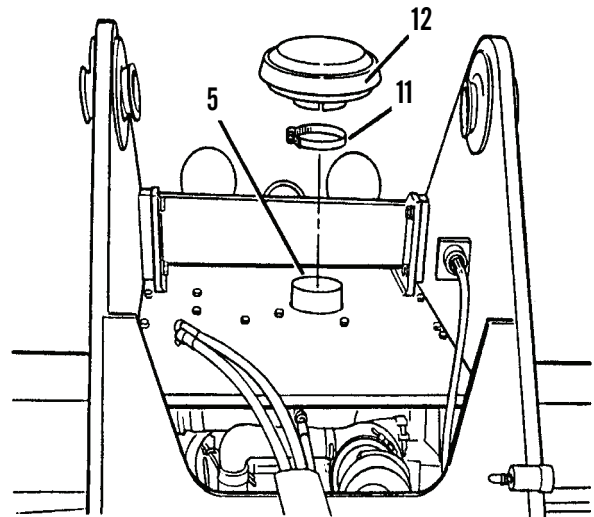
INSTALLATION

6. With assistance, install two clamps (17) and housing (5) to rear engine cover (18) with four capscrews (13), four flatwashers (14), four new lockwashers (15) and four nuts (16).



409-164

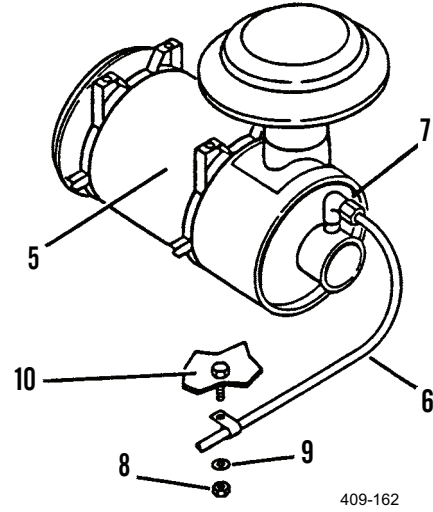
7. Position clamp (11) and air inlet cap (12) on housing (5).
8. Tighten clamp (11) to secure cap (12) to housing (5).



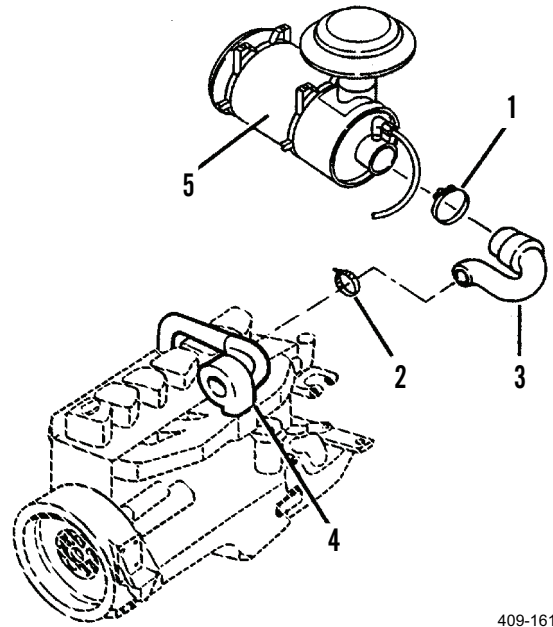
409-163

INSTALLATION - CONTINUED

9. Position tube (6) on underside of front engine cover (10) and secure with two flatwashers (9) and two nuts (8).
10. Connect tube (6) to elbow assembly (7) at housing (5).



11. Position hose (3) on turbocharger (4) and housing (5).
12. Tighten clamps (1 and 2) to 6 lb-ft (8 Nm).



END OF WORK PACKAGE

AIR CLEANER INTAKE CAP REPLACEMENT

0025 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

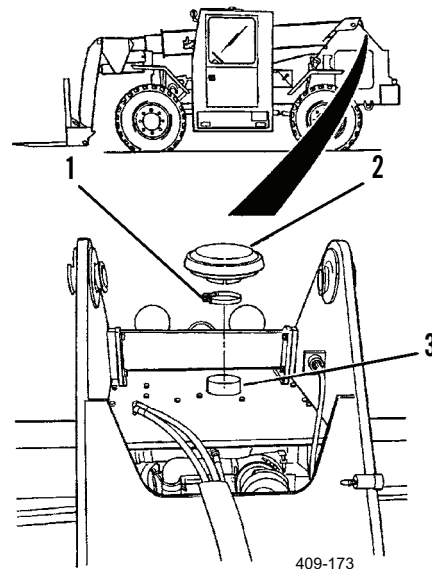
Engine off and cool (TM 10-3930-660-10)

REMOVAL

1. Loosen clamp (1) securing air cleaner intake cap (2).
2. Lift air cleaner intake cap (2) from air cleaner assembly (3).

INSTALLATION

1. Position air cleaner intake cap (2) on air cleaner assembly (3).
2. Tighten clamp (1) to secure air cleaner intake cap (2).

**END OF WORK PACKAGE**

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Oil, lubricating (Item 30, WP 0324 00)
- Gasket (3)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)
- Turbocharger air lines removed (WP 0028 00)
- Turbocharger oil lines removed (WP 0030 00)

REMOVAL

1. Remove four hex nuts (1).
2. Remove turbocharger (2).
3. Remove and discard turbocharger gasket (3).

INSTALLATION

CAUTION

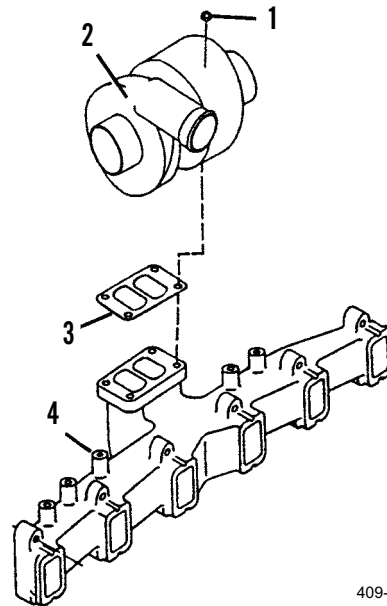
If the turbocharger is not to be installed immediately, cover opening in manifold. Failure to do so may cause engine damage.

1. Install new turbocharger gasket (3).
2. Position turbocharger (2) on manifold (4) and secure with four hex nuts (1). Torque nuts to 24 lb-ft (33 Nm).
3. Install turbocharger oil drain line (WP 0030 00).

CAUTION

A new turbocharger must be prelubricated before being operated. Failure to do so may cause damage to the turbocharger.

4. Pour 2 to 3 oz (60 to 80 cc) of clean engine oil into female fitting located on top of turbocharger (2). Rotate turbocharger by hand to allow oil to enter turbocharger.
5. Install turbocharger oil supply line (WP 0030 00).
6. Install turbocharger air lines (WP 0028 00).



409-174

END OF WORK PACKAGE

TURBOCHARGER ASSEMBLY REPLACEMENT (165 HP)

0027 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

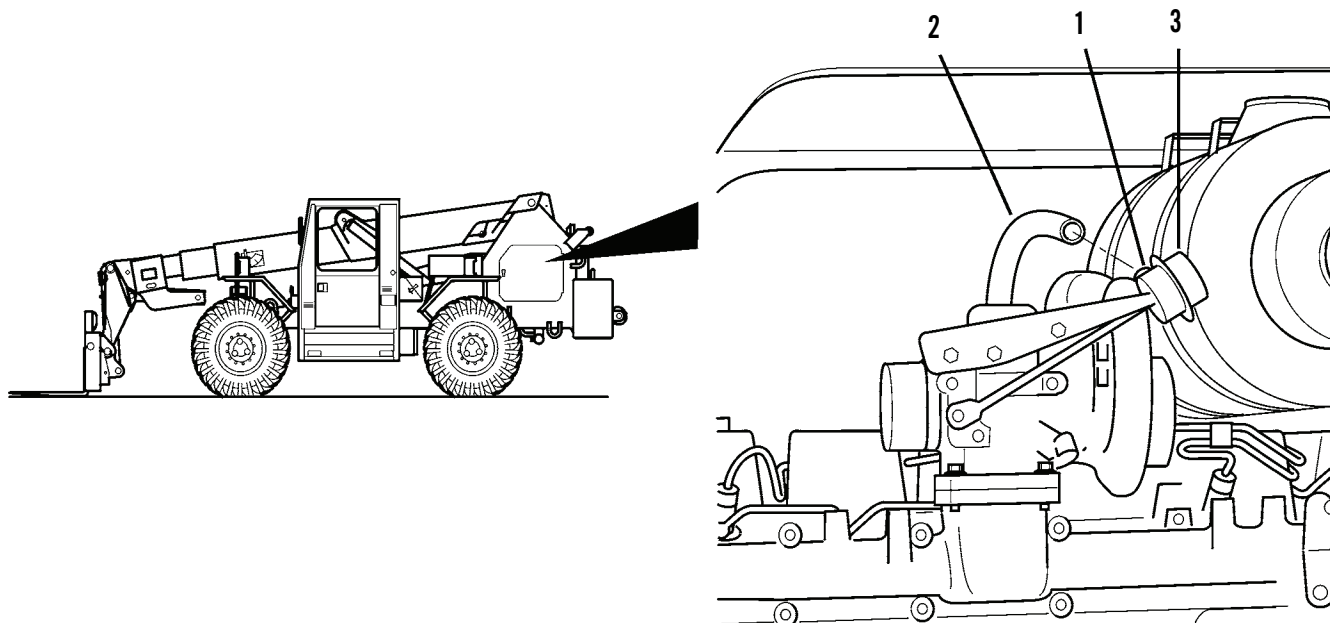
- Oil, lubricating (Item 30, WP 0323 00)
- Gasket (6)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)
- Turbocharger air lines removed (WP 0029 00)
- Turbocharger oil lines removed (WP 0031 00)

REMOVAL

1. Loosen clamp (1) and remove hose (2) from turbocharger wastegate capsule (3).



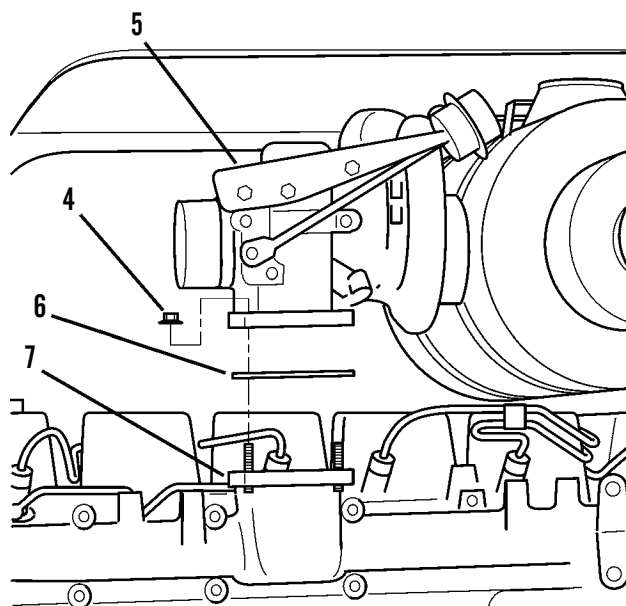
409-1748

REMOVAL - CONTINUED

2. Remove four nuts (4), turbocharger (5), and gasket (6) from manifold (7). Discard gasket.

CAUTION

If turbocharger is not to be reinstalled immediately, cover opening in manifold. Failure to do so may cause engine damage.



409-1749

INSTALLATION

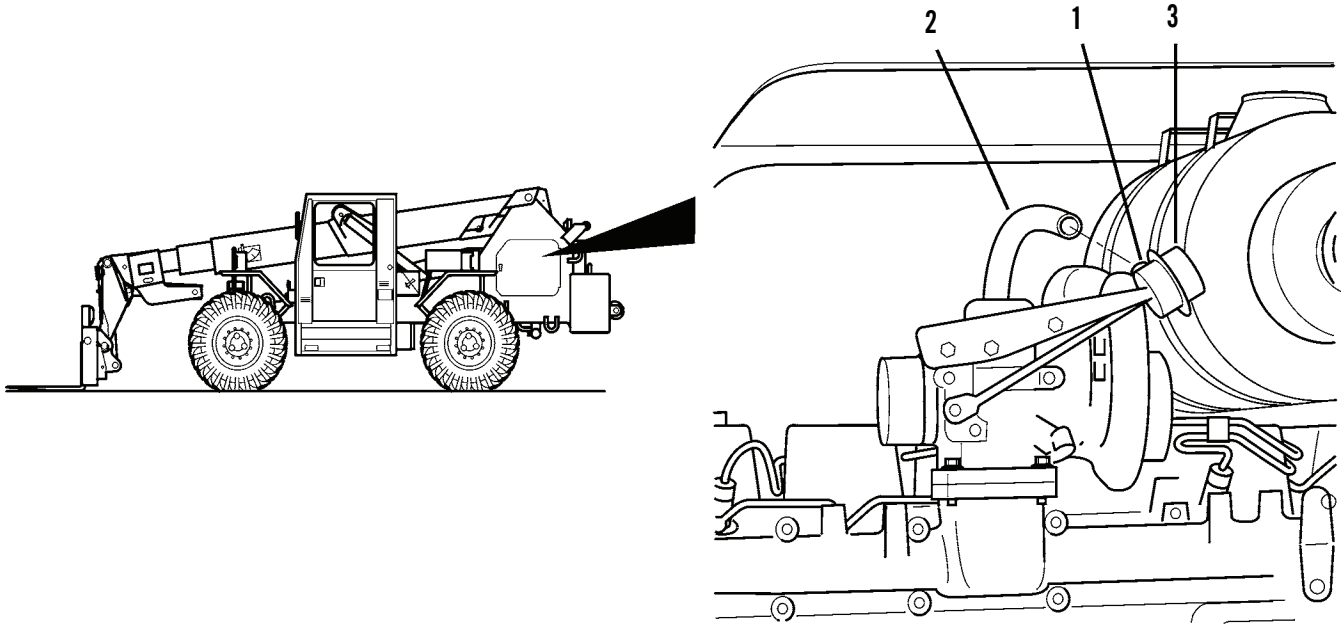
1. Install gasket (6) and turbocharger (5) on manifold (7) with four nuts (4). Torque nuts to 32 lb-ft (43 Nm).

CAUTION

A new turbocharger must be prelubricated before being operated. Failure to do so may damage turbocharger.

2. Connect hose (2) to turbocharger wastegate capsule (3) and tighten clamp (1).
3. Pour 2 to 3 oz (60 to 88 cc) of clean engine oil in fitting on top of turbocharger (5). Rotate turbocharger by hand to allow oil to enter turbocharger.

INSTALLATION



409-1748

4. Install turbocharger oil lines and tubes (WP 0031 00).
5. Install turbocharger air lines (WP 0029 00).

END OF WORK PACKAGE

TURBOCHARGER AIR LINES REPLACEMENT (152 HP)

0028 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

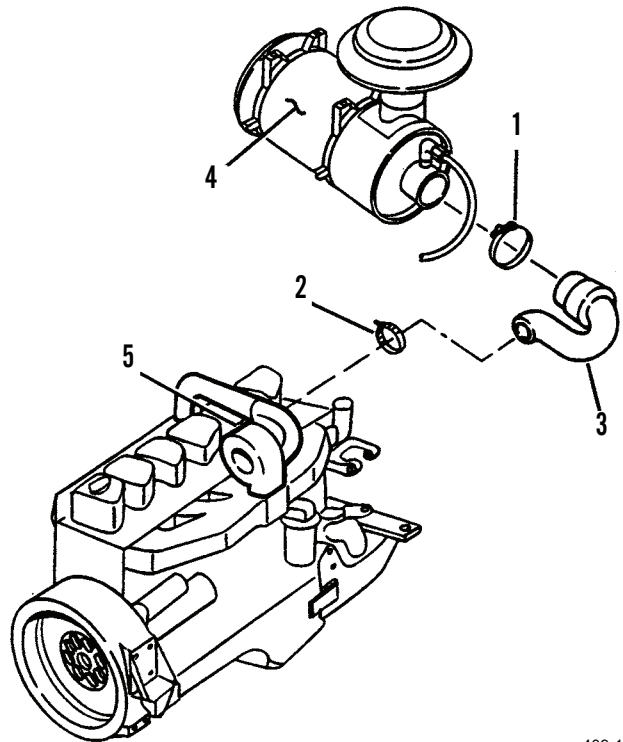
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

REMOVAL

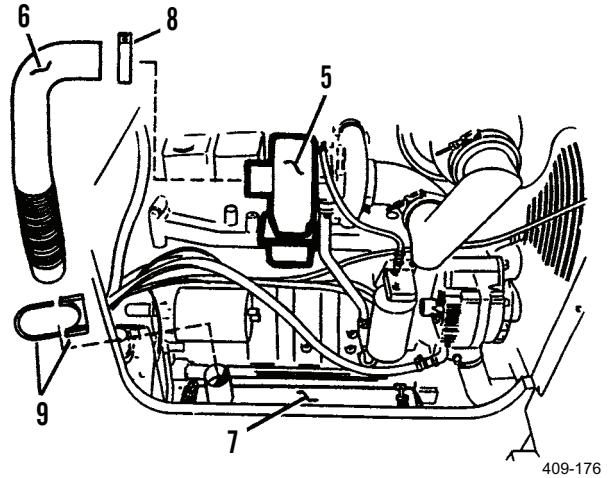
1. Loosen clamps (1) and (2) securing hose (3) to air cleaner housing (4) and turbocharger (5).
2. Remove hose (3) from air cleaner housing (4) and turbocharger (5).



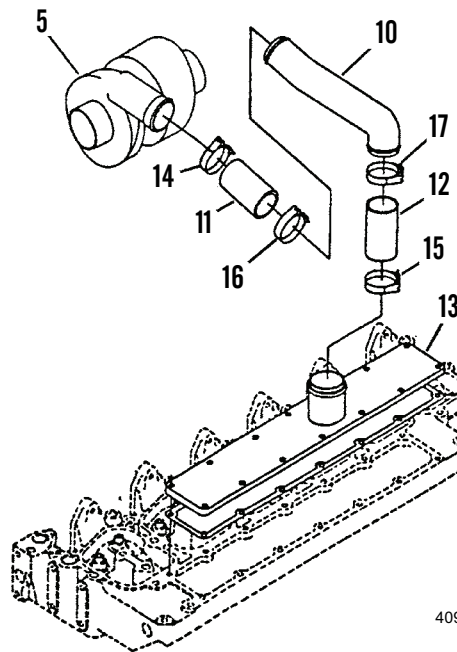
409-175

REMOVAL - CONTINUED

3. Remove exhaust pipe (6) from turbocharger (5) at muffler (7).
4. Loosen clamp (8) securing exhaust pipe (6) to turbocharger (5).
5. Loosen clamp (9) securing exhaust pipe (6) to muffler (7).
6. Remove exhaust pipe (6) from turbocharger (5) and muffler (7).



7. Remove air inlet pipe (10) and hoses (11) and (12) from turbocharger (5) and intake manifold cover (13) as an assembly.
8. Remove clamp (14) at turbocharger (5).
9. Remove clamp (15) at intake manifold cover (13).
10. Remove air inlet pipe (10) and hoses (11) and (12).
11. Remove clamp (16) at air inlet pipe (10).
12. Remove hose (11) from air inlet pipe (10).
13. Remove clamp (17) at air inlet pipe (10).
14. Remove hose (12) from air inlet pipe (10).

**INSTALLATION**

1. Install hose (12) on air inlet pipe (10).
2. Secure hose (12) with clamp (17). Torque clamp (17) to 6 lb-ft (8 Nm).
3. Install hose (11) on air inlet pipe (10).
4. Secure hose (10) with clamp (16). Torque clamp (16) to 6 lb-ft (8 Nm).
5. Install air inlet pipe (10) and hoses (11) and (12) to turbocharger (5) and intake manifold cover (13) as an assembly.

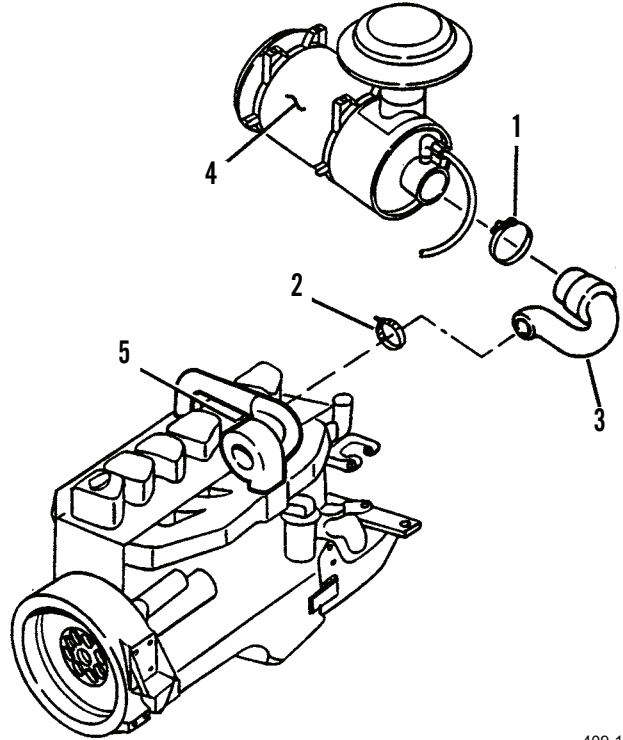
INSTALLATION - CONTINUED

6. Place air inlet pipe (10) in position.
7. Secure hose (12) at intake manifold cover (13) with clamp (15). Torque clamp (15) to 6 lb-ft (8 Nm).
8. Secure hose (11) at turbocharger (5) with clamp (14). Torque clamp (14) to 6 lb-ft (8 Nm).
9. Install exhaust pipe (6) to turbocharger (5) at muffler (7).

NOTE

Match groove on pipe with groove on turbocharger.

10. Position exhaust pipe (6) on turbocharger (5) and muffler (7).
11. Tighten clamp (9) securing exhaust pipe (6) to muffler (7).
12. Tighten clamp (8) securing exhaust pipe (6) to turbocharger (5).
13. Install hose (3) to air cleaner housing (4) and turbocharger (5).
14. Position hose (3) on turbocharger (5) and air cleaner housing (4). Torque clamps (2) and (1) to 6 lb-ft (8 Nm) to secure.



409-175

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

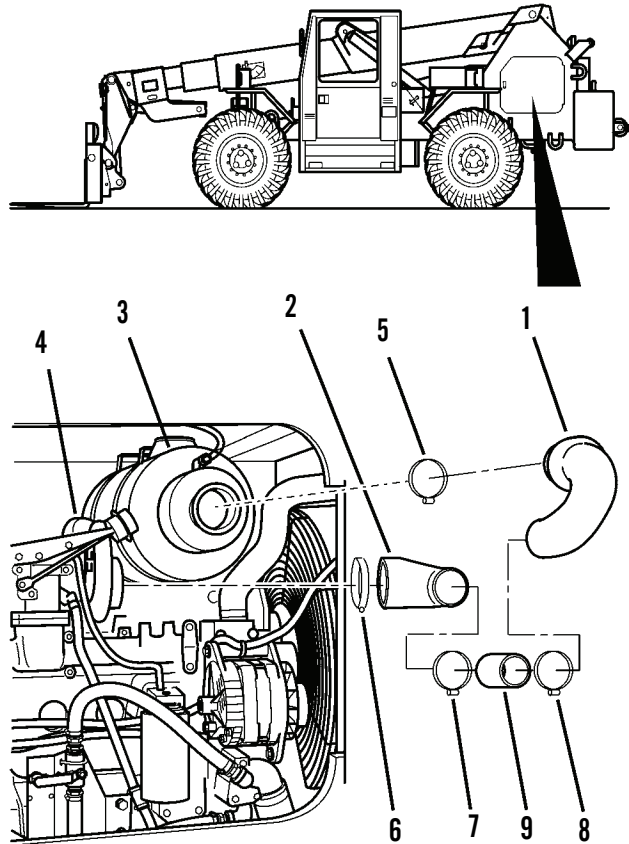
- Compound, sealing (Item 14, WP 0323 00)
- Strap, tie down (Item 56, WP 0323 00)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)
- Ether start hose and atomizer removed (WP 0044 00)

REMOVAL

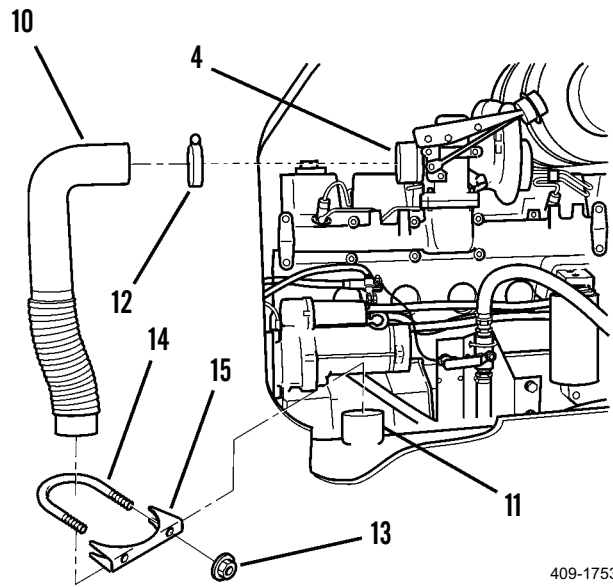
1. Remove two clamps (5 and 6) and hoses (1 and 2) from turbocharger (4) and housing (3).
2. Remove two clamps (7 and 8) and hoses (1 and 2) from sleeve (9).



409-1752

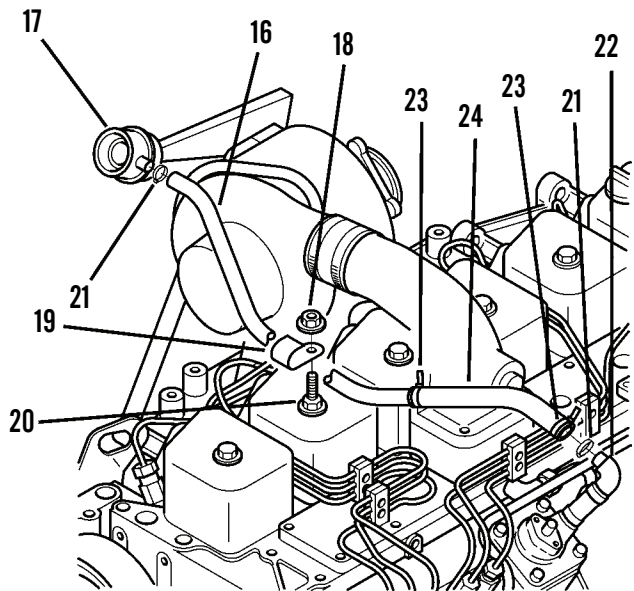
REMOVAL - CONTINUED

3. Loosen clamp (12) from exhaust pipe (10) and turbocharger (4).
4. Remove two nuts (13), U-bolt (14), and clamp (15) from exhaust pipe (10) and muffler (11).
5. Remove exhaust pipe (10) from turbocharger (4) and muffler (11).



409-1753

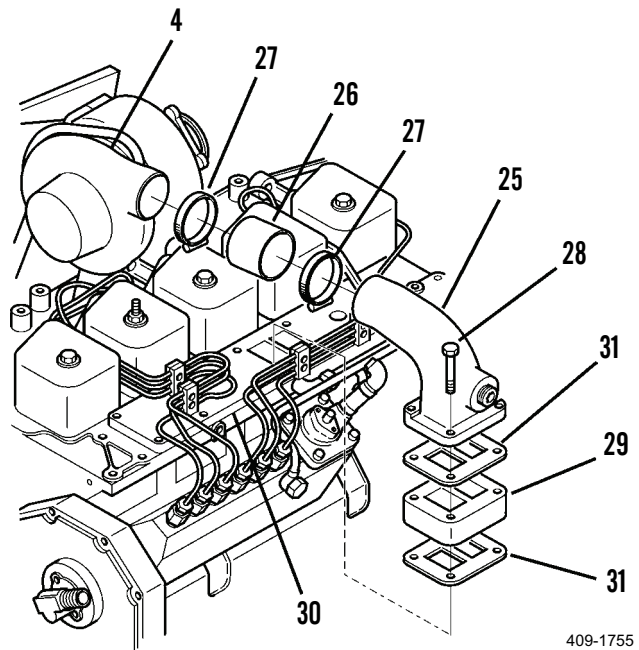
6. Remove nut (18) and clip (19) from special screw (20). Remove hose (16) from clip.
7. Remove two clamps (21) and hose (16) from elbow (22) and turbocharger wastegate capsule (17).
8. Remove two tie down straps (23) and conduit (24) from hose (16). Discard tie down straps.



409-1754

REMOVAL - CONTINUED

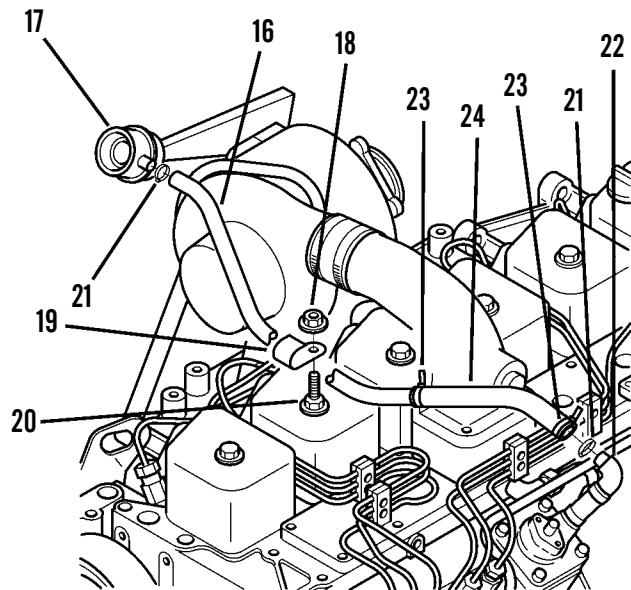
9. Remove two clamps (27) from hose (26) and turbocharger (4).
10. Remove four screws (28) from air crossover elbow (25), spacer (29), and intake manifold cover (30).
11. Remove air crossover elbow (25), hose (26), clamps (27), gasket (31), spacer (29), and other gasket (31) from turbocharger (4) and intake manifold cover (30).



409-1755

INSTALLATION

1. Position clamps (27) and hose (26) on air crossover elbow (25).
2. Position gasket (31), spacer (29), other gasket (31), air crossover elbow (25) and hose (26) on turbocharger (4) and intake manifold cover (30).
3. Coat threads of four screws (28) with sealing compound.
4. Install four screws (28) and tighten two clamps (25). Torque clamps to 6 lb-ft (8 Nm).
5. Install conduit (24) and two tie down straps (23) on hose (16).
6. Position two clamps (21) and hose (16) on elbow (22) and wastegate capsule (17).
7. Position hose (16) in clip (19). Install clip and nut (18) on special screw (20).



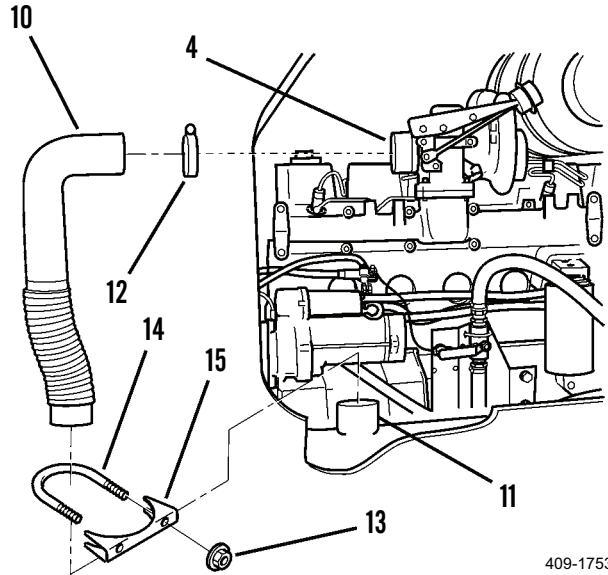
409-1754

INSTALLATION - CONTINUED

NOTE

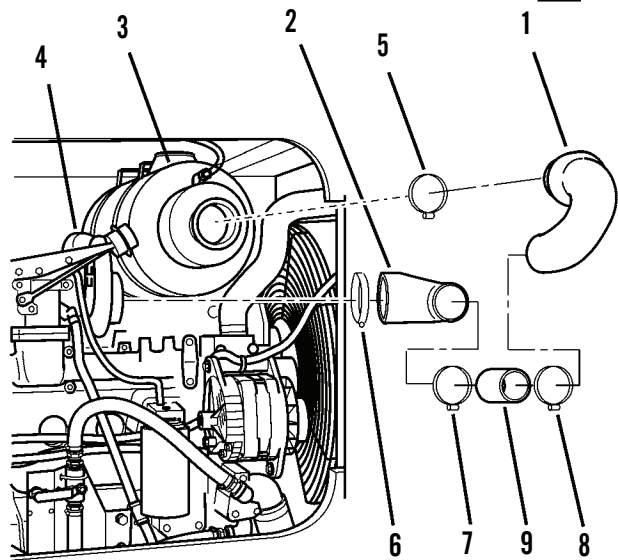
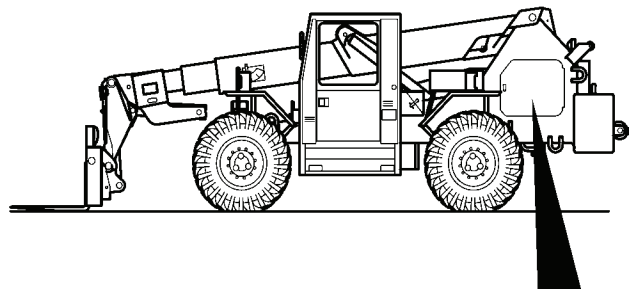
Match groove on pipe with groove on turbocharger.

8. Position clamp (12) on exhaust pipe (10) and exhaust pipe on turbocharger (4) and muffler (11).
9. Position U-bolt (14), clamp (15), and two nuts (13) on exhaust pipe (10).
10. Tighten clamp (12) and two nuts (13).



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11. Position two hoses (1 and 2) and clamps (7 and 8) on sleeve (9). Do not tighten clamps.
12. Position two hoses (1 and 2) and clamps (5 and 6) on turbocharger (4) and air cleaner housing (3). Torque clamps (5-8) to 6 lb-ft (8 Nm).
13. Install ether start hose and atomizer (WP 0044 00).
14. Start engine and check for leaks (TM 10-3930-660-10).



409-1752

END OF WORK PACKAGE

TURBOCHARGER OIL LINES REPLACEMENT (152 HP)

0030 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 48, WP 0323 00)
- Clamp (6)

Materials/Parts - Continued

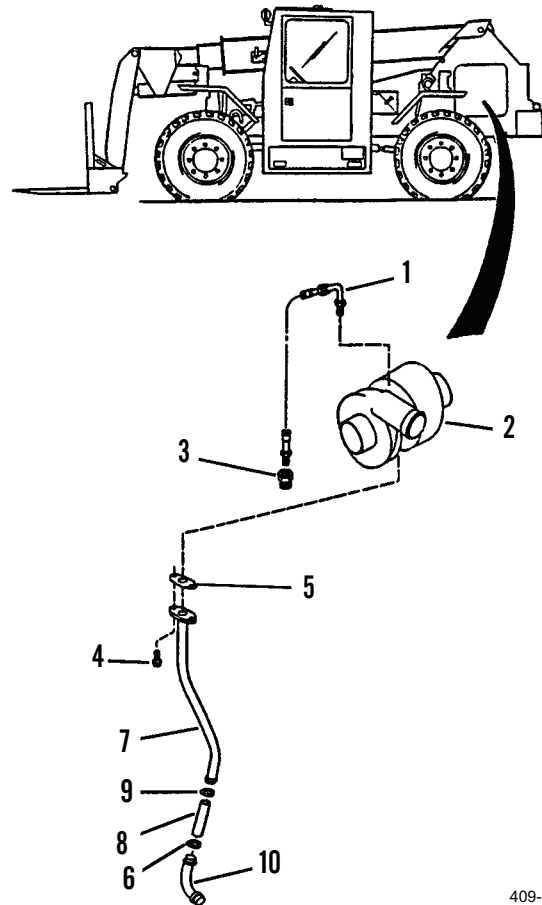
- Clamp (9)
- Oil drain gasket (5)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)

REMOVAL

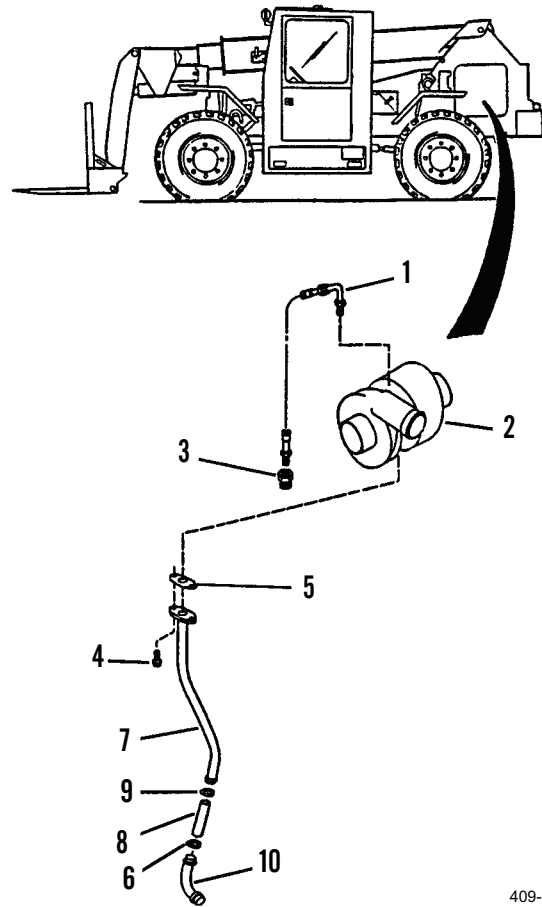
1. Disconnect turbocharger oil supply hose (1) from turbocharger (2).
2. Disconnect turbocharger oil supply hose (1) from adapter (3).
3. Remove turbocharger oil supply hose (1).
4. Remove two capscrews (4).
5. Remove and discard oil drain gasket (5).
6. Loosen clamp (6) and remove drain tube assembly parts (7 and 8). Remove and discard clamp.
7. If necessary, loosen clamp (9) and separate tubes (7 and 8). Remove and discard clamp.
8. If damaged, remove elbow (10) from engine block.



409-180

INSTALLATION

1. If elbow (10) was removed, apply loctite to engine block end of elbow.
2. Install elbow (10) into engine using a soft head hammer.
3. If separated, connect tubes (7 and 8) with new clamp (9). Torque clamp to 6 lb-ft (8 Nm).
4. Position drain tube assembly parts (7 and 8) on elbow (10) and install clamp (9). Torque clamp to 6 lb-ft (8 Nm).
5. Install new oil drain gasket (8).
6. Secure turbocharger oil drain tube assembly parts (7 and 8) with two capscrews (4). Torque capscrews to 18 lb-ft (24 Nm).
7. Connect turbocharger oil supply hose (1) to adapter (3).
8. Connect turbocharger oil supply hose (1) to turbocharger (2).
9. Start engine and check for leaks (TM 10-3930-660-10).



409-180

END OF WORK PACKAGE

TURBOCHARGER OIL HOSES AND TUBES REPLACEMENT (165 HP)

0031 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Compound, sealing (Item 14, WP 0323 00)

Oil drain gasket (7)

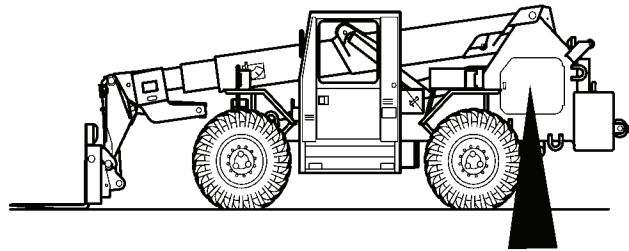
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

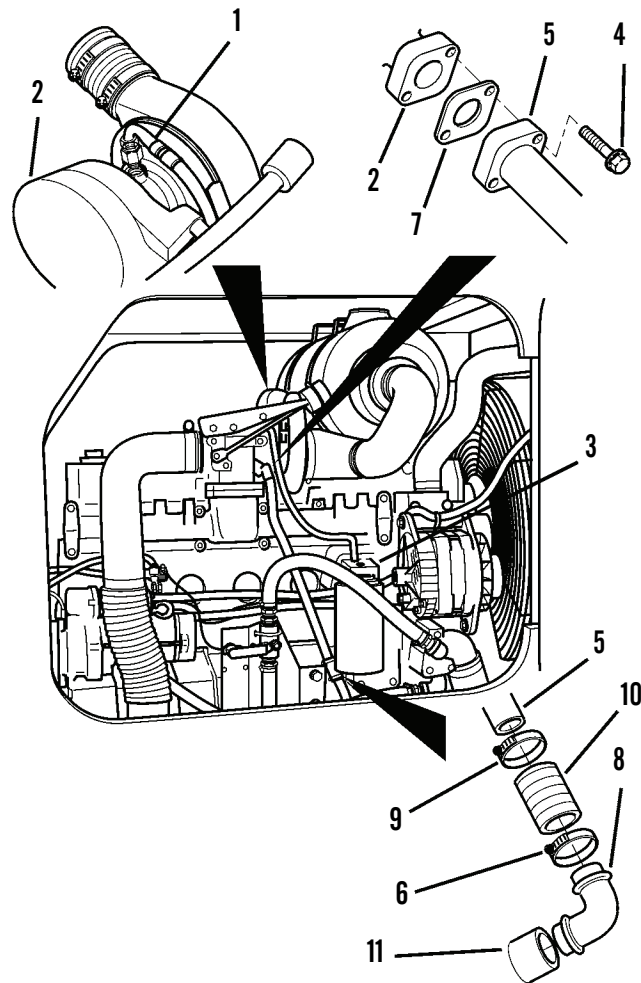
REMOVAL

1. Disconnect turbocharger oil supply hose (1) from turbocharger (2) and oil filter head adapter (3).
2. Remove two screws (4) from oil drain tube assembly (5) and turbocharger (2).
3. Remove clamp (6), drain tube assembly (5), and gasket (7) from pipe (8) and turbocharger (2). Discard gasket.
4. Remove clamp (9) and separate hose (10) from tube (5).
5. Remove pipe (8) from engine block (11).



INSTALLATION

1. Apply sealing compound to engine block end of pipe (8).
2. Install pipe (8) in engine block (11).
3. Install hose (10) on tube (5) with clamp (9). Torque clamp to 6 lb-ft (8 Nm).
4. Position gasket (7), clamp (9), and drain tube assembly (5) on turbocharger (2) and pipe (8).
5. Install two screws (4). Torque screws to 18 lb-ft (24 Nm). Torque clamp (6) to 6 lb-ft (8 Nm).
6. Connect turbocharger oil supply hose (1) to turbocharger (2) and oil filter head adapter (3).
7. Start engine (TM 10-3930-660-10) and check for leaks.



409-1760

END OF WORK PACKAGE

FUEL/HYDRAULIC TANK SERVICE

0032 00

THIS WORK PACKAGE COVERS

Service by Draining and Filling Tank with Fuel

Service by Draining and Filling Tank with Hydraulic Oil

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Fuel (Item 29, WP 0323 00)

Oil, hydraulic (Item 33, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)



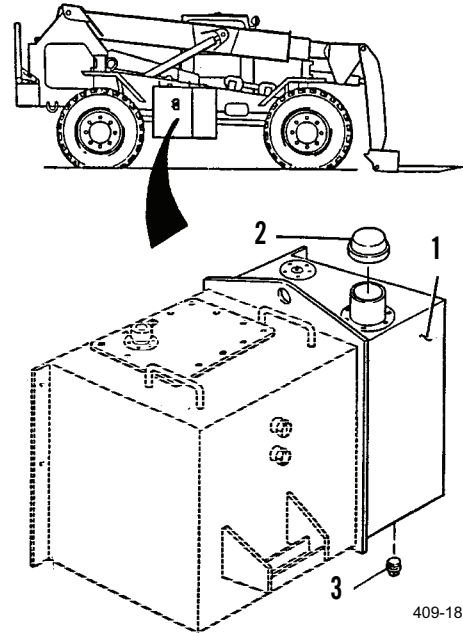
WARNING

- DO NOT smoke or permit any open flame in area of vehicle 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 or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

SERVICE BY DRAINING AND FILLING TANK WITH FUEL**NOTE**

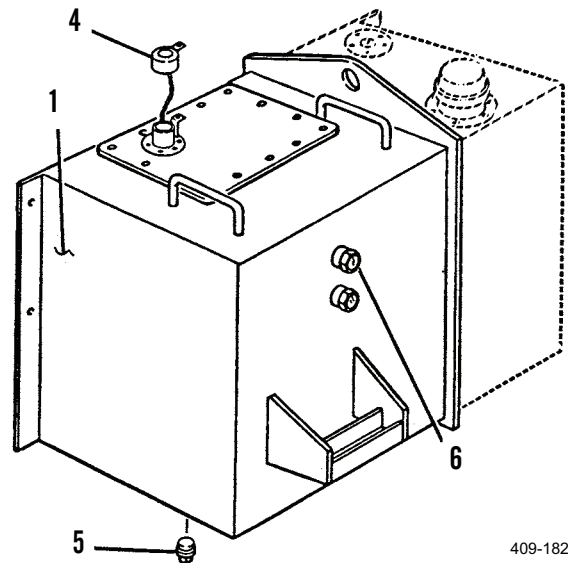
Fuel side of fuel/hydraulic tank contains 44 gal. (167 L) of fuel when full.

1. Place container under fuel side of fuel/hydraulic tank (1).
2. Remove cap (2) from top of fuel/hydraulic tank (1).
3. Remove drain plug (3) from fuel side of fuel/hydraulic oil tank (1) and allow fuel to drain.
4. Install drain plug (3) to fuel side of fuel/hydraulic tank (1).
5. Fill fuel side of fuel/hydraulic tank (1) with fuel.
6. Install cap (2) at top of fuel/hydraulic tank (1).

**SERVICE BY DRAINING AND FILLING TANK WITH HYDRAULIC OIL****NOTE**

Hydraulic side of fuel/hydraulic tank contains 56.6 gal. (214 L) of hydraulic oil when full.

1. Place all hydraulic cylinders in retracted position.
2. Place container under hydraulic oil side of fuel/hydraulic tank (1).
3. Remove cap (4) at top of fuel/hydraulic tank (1).
4. Remove drain plug (5) from hydraulic oil side of fuel/hydraulic tank (1) and allow hydraulic oil to drain.
5. Install drain plug (5) to hydraulic oil side of fuel/hydraulic tank (1).
6. Fill hydraulic oil side of fuel/hydraulic tank (1) with hydraulic oil until oil level is visible in the upper sight gauge (6).
7. Install cap (4) at top of fuel/hydraulic tank (1).



END OF WORK PACKAGE

FUEL STRAINER ASSEMBLY MAINTENANCE

0033 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Fuel drained from fuel/hydraulic tank (WP 0032 00)

Materials/Parts

Gasket (7)

Lockwasher (6)



WARNING

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

FUEL STRAINER ASSEMBLY MAINTENANCE - CONTINUED

0033 00

SERVICE

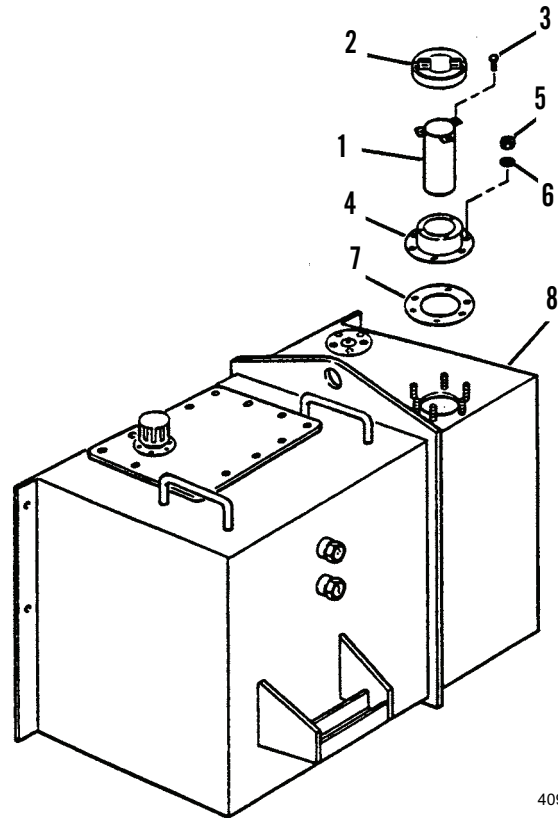
1. Remove fuel strainer assembly (1) as described in *Removal*.
2. Remove fuel sediment and foreign matter from fuel strainer assembly.
3. Install fuel strainer assembly (1) as described in *Installation*.

REMOVAL

1. Remove fuel cap (2).
2. Remove three screws (3) holding strainer assembly (1) in neck (4).
3. Lift strainer assembly (1) from neck (4).
4. If necessary, remove three nuts (5), three lockwashers (6), neck (4), and gasket (7). Discard lockwashers and gasket.

INSTALLATION

1. If removed, install new gasket (7), neck (4), three new lockwashers (6) and three nuts (5).
2. Lower strainer assembly (1) into tank (8) through neck (4).
3. Install strainer assembly (1) with three screws (3).
4. Install fuel cap (2) onto neck (4).
5. Fill fuel/hydraulic tank with fuel (WP 0032 00).



409-183

END OF WORK PACKAGE

HIGH PRESSURE FUEL LINES REPLACEMENT (152 HP)

0034 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 2 (Item 19, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Engine off and cool (TM 10-3930-660-10)

Materials/Parts

Tag, marker (Item 57 WP 0323 00)



WARNING

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

NOTE

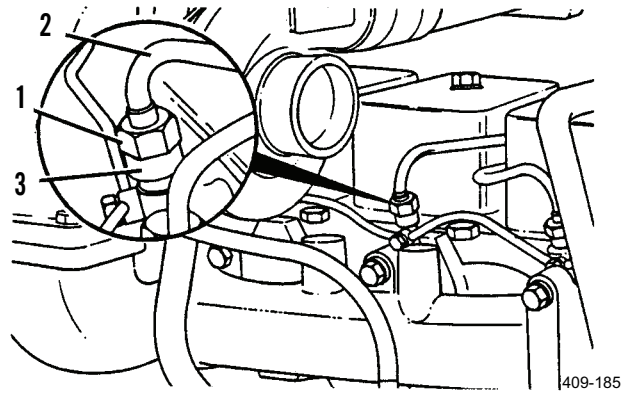
- Inspect fuel lines for cracks and other signs of deterioration as they are removed. Replace if necessary.
- Fuel lines are not interchangeable. Identify and tag lines prior to removal from fuel injectors and fuel injection pump.

REMOVAL

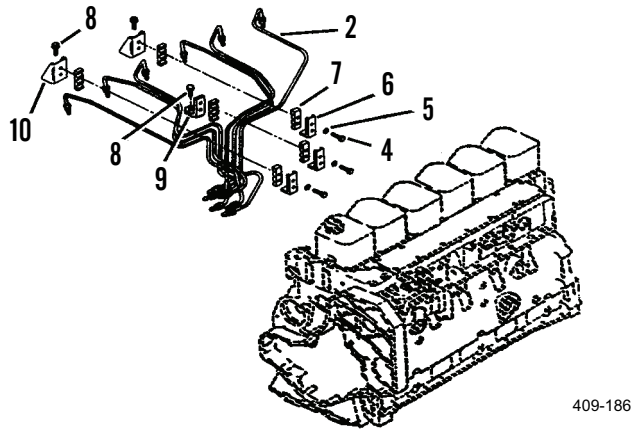
- Using two wrenches, loosen nuts (1) on fuel lines (2) and remove lines from fuel injectors (3).

NOTE

- Inspect seats of fuel lines for nicks, gouges, or burrs. Replace if necessary.
- If removal of lines as a unit is desired, skip step 2 and go on to step 3.



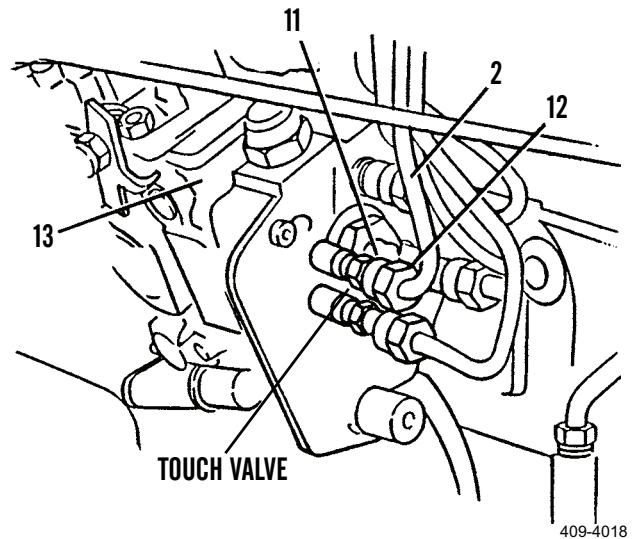
- Remove six capscrews (4), six flatwashers (5), three brackets (6), and six mounts (7) securing fuel lines (2).
- Remove three capscrews (8) securing bracket (9) and two brackets (10) to engine.



NOTE

Hold delivery valve stationary when loosening nuts on fuel lines at injection pump.

- Using two wrenches at delivery valves (11), loosen nuts (12) on fuel lines (2) and remove fuel lines from injection pump (13).



INSTALLATION**CAUTION**

To ensure proper engine operation, do not weld or substitute lines, or damage to equipment could result.

NOTE

- Fuel lines are not interchangeable. Connect fuel lines to fuel injectors and fuel injection pump ports as noted during removal. Use tags for identification.
 - Hold delivery valve stationary when tightening nuts on fuel lines at injection pump.
1. At delivery valves (11), position fuel lines (2) on injection pump (13), as tagged, and tighten nuts (12) using two wrenches to secure.

CAUTION

Fuel lines must be clamped securely and routed so they do not contact each other or any other component during engine operation.

2. Secure bracket (9) and two brackets (10) to engine with three capscrews (8). Torque capscrews to 6 lb-ft (8 Nm).
3. Secure fuel lines (2) with six mounts (7), three brackets (6), six flatwashers (5), and six capscrews (4).

NOTE

Install, but do not fully tighten, nuts in step 4. Nuts will be fully tightened during bleeding in step 5.

4. Position fuel lines (2) on fuel injectors (3), as tagged, and loosely install nuts (1) to secure.

WARNING

To prevent danger of fire caused by fuel spilling on hot exhaust manifold, do not bleed fuel lines if engine is hot.

5. Bleed fuel lines (2) at fuel injectors (3).

NOTE

Be sure auxiliary fuel shut-off switch is in the ON position (TM 10-3930-660-10).

6. Crank engine until fuel is flowing from all six lines (2) at injectors (3). Tighten all nuts (1) until snug, using two wrenches.
7. Bleed fuel lines (2) at injectors (3), one at a time, until engine starts and runs smoothly. Repeat steps 8 thru 10 for each fuel line as required.
8. Loosen nut (1).
9. Crank engine until fuel flows from line (2).
10. Tighten nut (1) until snug, using two wrenches.

END OF WORK PACKAGE

HIGH PRESSURE FUEL HOSES AND TUBES REPLACEMENT (165 HP)

0035 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 2 (Item 19, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Engine off and cool (TM 10-3930-660-10)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

**WARNING**

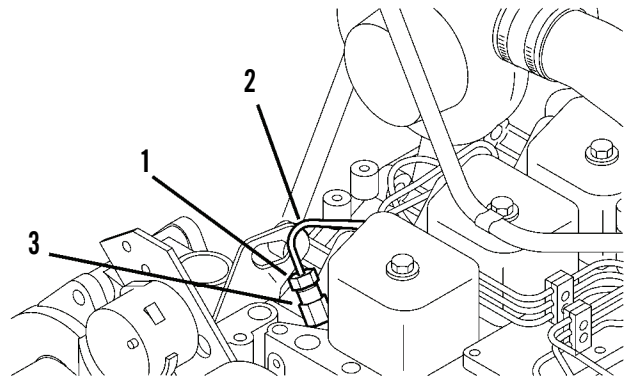
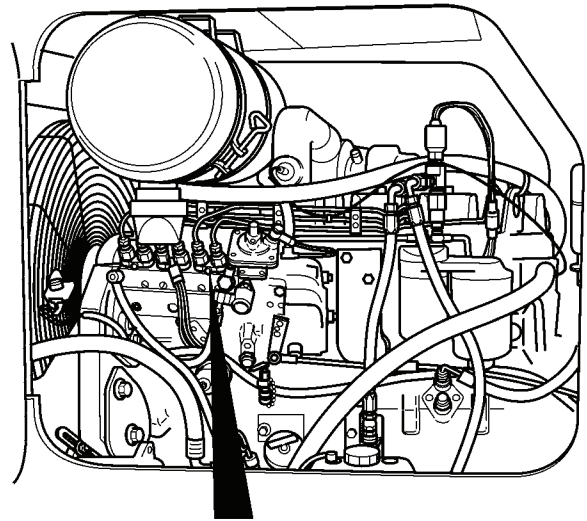
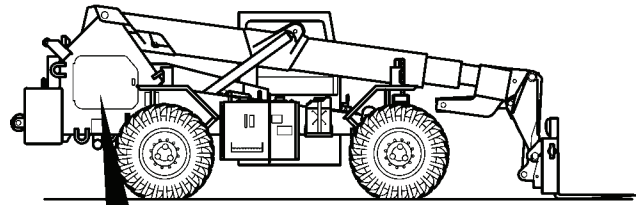
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

NOTE

- All six fuel tubes are removed the same way.
- Fuel tubes are not interchangeable. Tag and mark tubes prior to removal from fuel injectors and fuel injection pump.
- Inspect fuel tubes for cracks and other signs of deterioration as they are removed. Replace if necessary.
- Inspect seats of fuel tubes for nicks, gouges, or burrs. Replace if necessary.

REMOVAL

1. Using two wrenches, loosen six nuts (1) on fuel tubes (2). Remove fuel tubes from fuel injectors (3).



409-1762

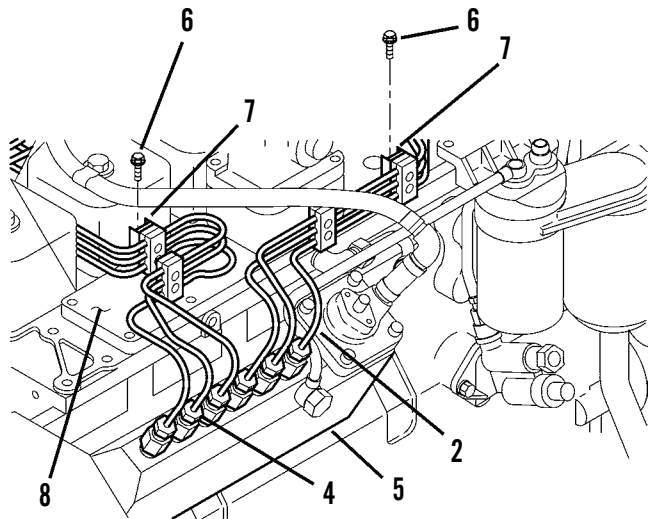
REMOVAL - CONTINUED

2. Using two wrenches, loosen six nuts (4) and remove fuel tubes (2) from fuel injection pump (5).

NOTE

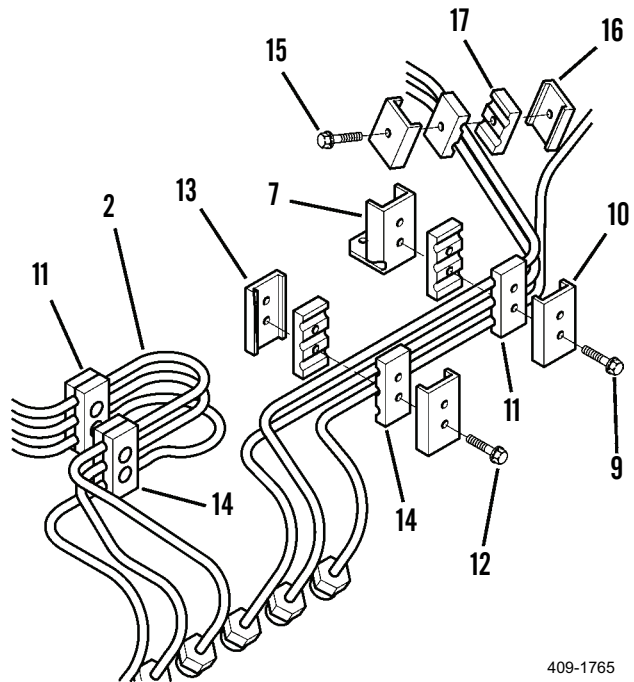
If removal of fuel tubes as a unit is required, go on to step 5 below.

3. Remove two screws (6) from brackets (7).



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4. Remove six fuel tubes (2) from engine (8) as an assembly.
5. Remove four screws (9), two brackets (10), two brackets (7) and four inner brackets (11) from six fuel tubes (2).
6. Remove four screws (12), four brackets (13) and eight inner brackets (14) from six fuel tubes (2).
7. Remove screw (15), two brackets (16) and two inner brackets (17) from two fuel tubes (2).



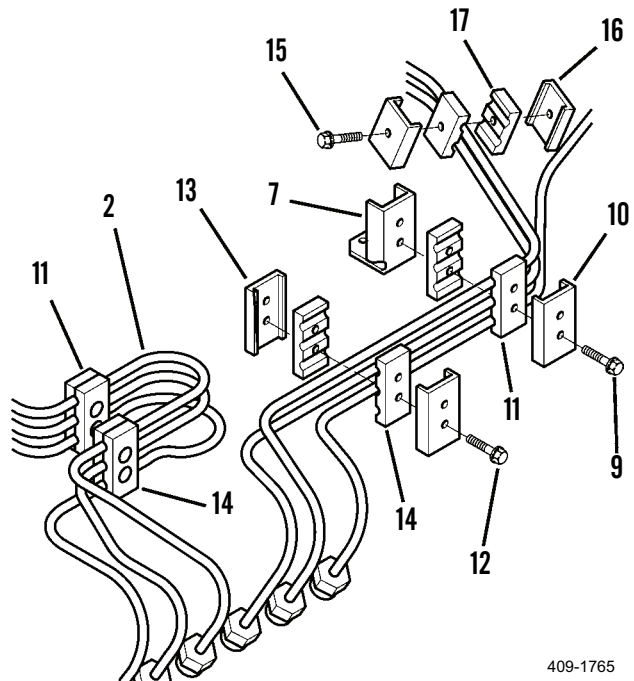
409-1765

INSTALLATION

CAUTION

Fuel tubes are not interchangeable. To ensure proper engine operation, connect fuel tubes to fuel injectors and fuel injection pump ports as noted during removal. Do not weld or substitute fuel tubes or damage to equipment could result.

1. Install two fuel tubes (2) in two inner brackets (17) and two brackets (16) with screw (15).
2. Install eight inner brackets (14) and four brackets (13) on six fuel tubes (2) with four screws (12).
3. Install four inner brackets (11), two brackets (7) and two brackets (10) on six fuel tubes (2) with four screws (9).



409-1765

CAUTION

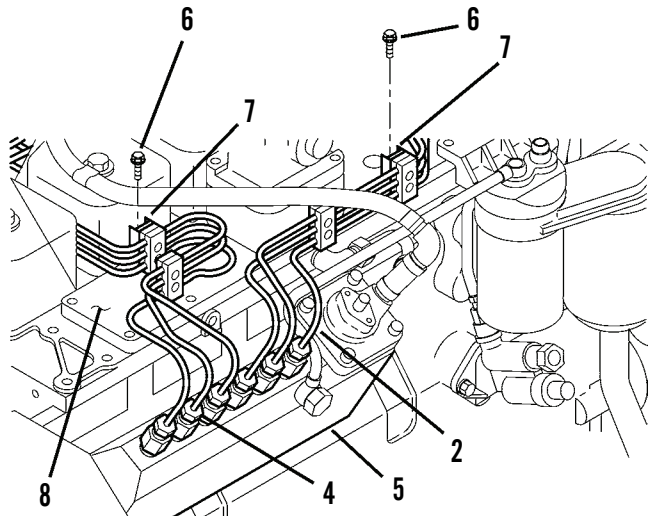
Fuel tubes must be clamped and routed so they do not contact each other or any other component during engine operation, or damage to equipment could result.

4. Position six fuel tubes (2) on engine (8) and install two screws (6) in brackets (7). Torque screws to 6 lb-ft (8 Nm).

NOTE

Install, but do not fully tighten, nuts in step 5 below. Nuts will be fully tightened in step 6.

5. Install six fuel tubes (2) on fuel injection pump (5) with nuts (4).
6. Position six fuel tubes (2) on fuel injectors (3) and loosely install nuts (1). Using wrench and torque wrench, torque nuts (4) to 18 lb-ft (24 Nm).



409-1764

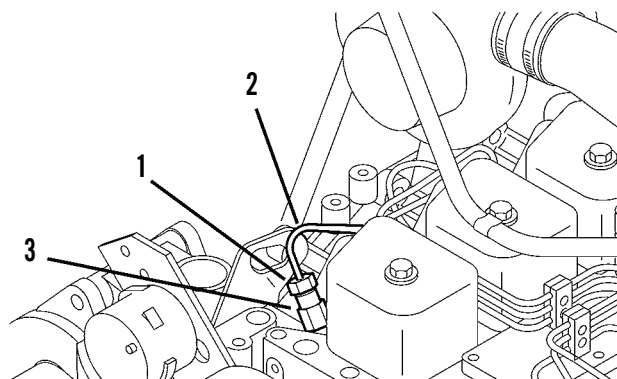
INSTALLATION - CONTINUED**WARNING**

- To prevent danger of fire caused by fuel spilling on hot exhaust manifold, do not bleed fuel tubes if engine is hot. Failure to observe this precaution could result in injury or death to personnel.
- Safety glasses must be worn when working on pressurized systems. Failure to observe this precaution could result in serious injury.

NOTE

Ensure auxiliary fuel shut-off switch is in the ON position.

7. Crank engine until fuel is flowing from all six fuel tubes (2) at injectors (3). Tighten six nuts (1).
8. Bleed fuel tubes (2) at injectors (3), one at a time, until engine starts and runs smoothly. Repeat steps 10-12 for each fuel tube as required.
9. Loosen nuts (1).
10. Crank engine until fuel flows from tube (2).
11. Using wrench and torque wrench, torque nuts (1) to 18 lb-ft (24 Nm).
12. Start engine, check for leaks and proper operation (TM 10-3930-660-10).



409-1763

END OF WORK PACKAGE

FUEL DRAIN LINES AND MANIFOLD REPLACEMENT (152 HP)

0036 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Grommet (5)

Seal (11)

Sealing washer (8)

References

WP 0055 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

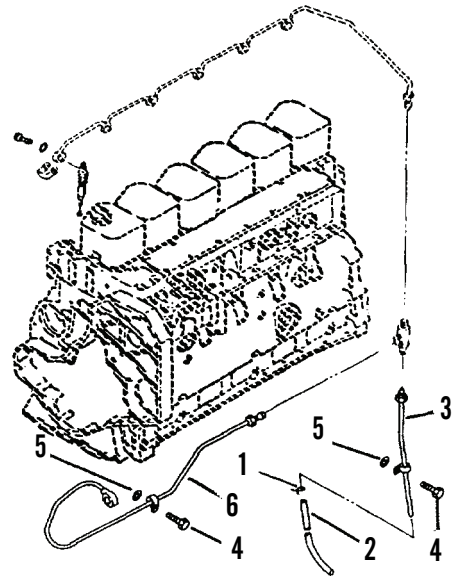


WARNING

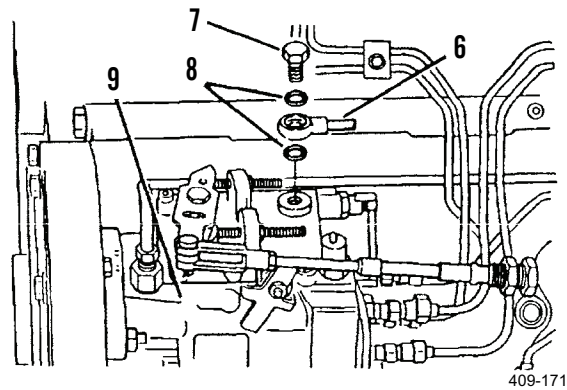
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

REMOVAL

1. Remove hose clamp (1) and hose (2) from fuel drain line (3).
2. Remove two capscrews (4) and two grommets (5) securing fuel drain line (3) and fuel drain line (6) to engine. Discard grommets.



3. Remove fluid passage bolt (7), two sealing washers (8) and fuel drain line (6) from injection pump (9). Discard sealing washers.



REMOVAL - CONTINUED**NOTE**

If necessary, remove engine lifting bracket, water outlet, and thermostat, as an assembly, to provide access to fuel injector closest to fan side of engine (WP 0055 00).

4. Remove fluid passage bolt (10) and seal (11) from fuel drain manifold (12) at each of the six injectors (13). Discard seals.
5. Disconnect fuel drain manifold (12) and fuel drain lines (3 and 6) from tee (14).

NOTE

Seals (15) are an integral part of lines. Inspect seal at end of each line and replace entire line if seal is damaged.

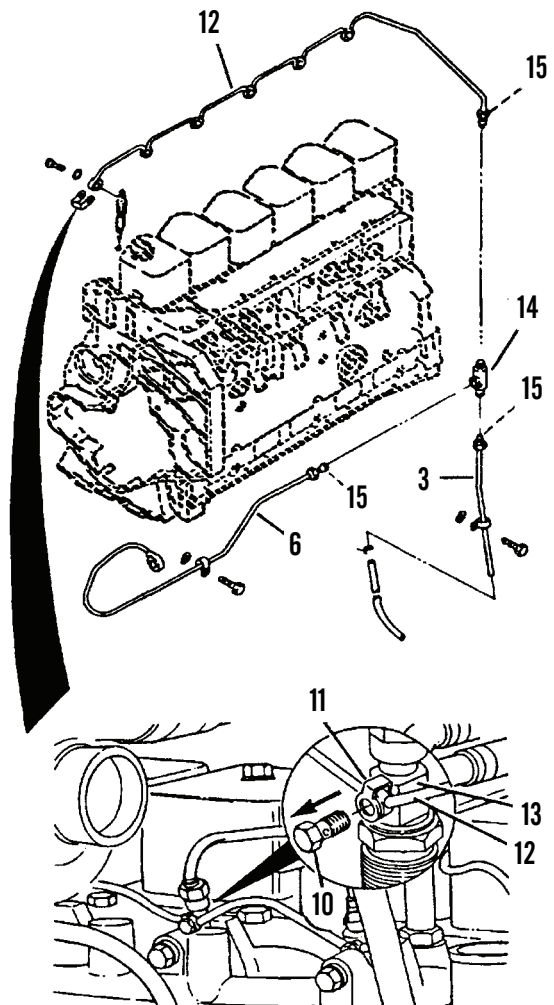
INSTALLATION

1. Connect fuel drain manifold (12) and fuel drain lines (3 and 6) to tee (14).
2. Install fluid passage bolt (10) and new seal (11) to fuel drain manifold (12) at each of the six injectors (13). Torque bolts to 6.5 lb-ft (8.8 Nm).

NOTE

If removed to provide access during removal, install engine lifting bracket, water outlet, and thermostat, as an assembly, to engine (WP 0055 00).

3. Connect fuel drain line (6) to injection pump (9) with fluid passage bolt (7) and two new sealing washers (8). Torque bolt to 32 lb-ft (43 Nm).
4. Connect fuel drain line (3) to fuel drain line manifold (6) to engine with two new grommets (5) and two cap-screws (4). Torque capscrews to 6 lb-ft (8 Nm).
5. Connect hose (2) to fuel drain line (3) with hose clamp (1).
6. Start engine and check for leaks (TM 10-3930-660-10).



409-188

END OF WORK PACKAGE

FUEL DRAIN TUBES AND MANIFOLD REPLACEMENT (165 HP)

0037 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Compound, sealing (Item 14, WP 0323 00)

Materials/Parts - Continued

Seal (16)

Seal (27)

Sealing washer (7)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

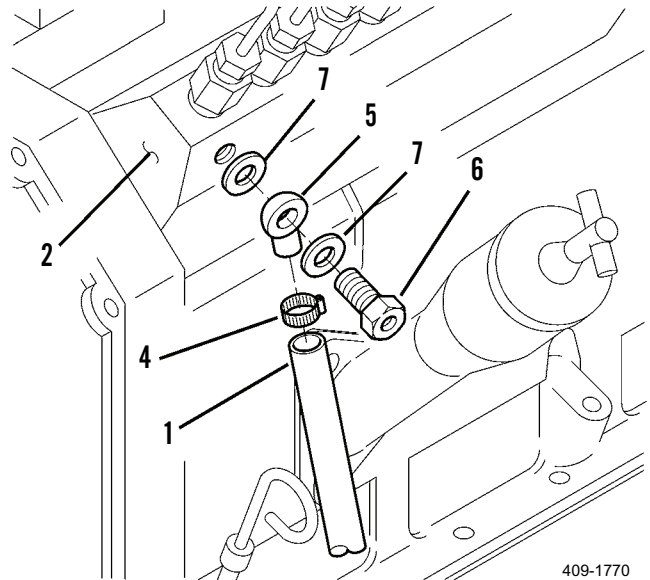
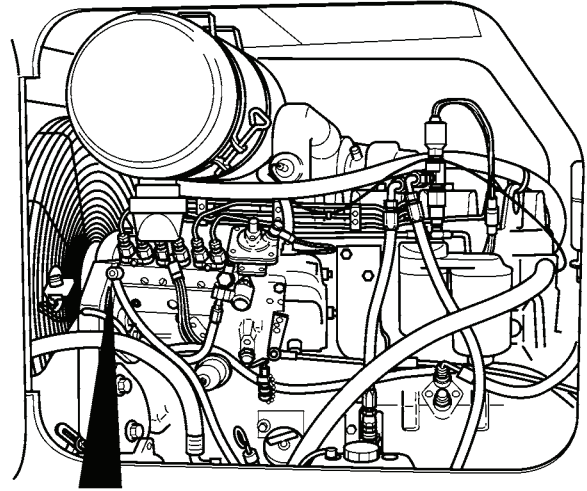


WARNING

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

REMOVAL

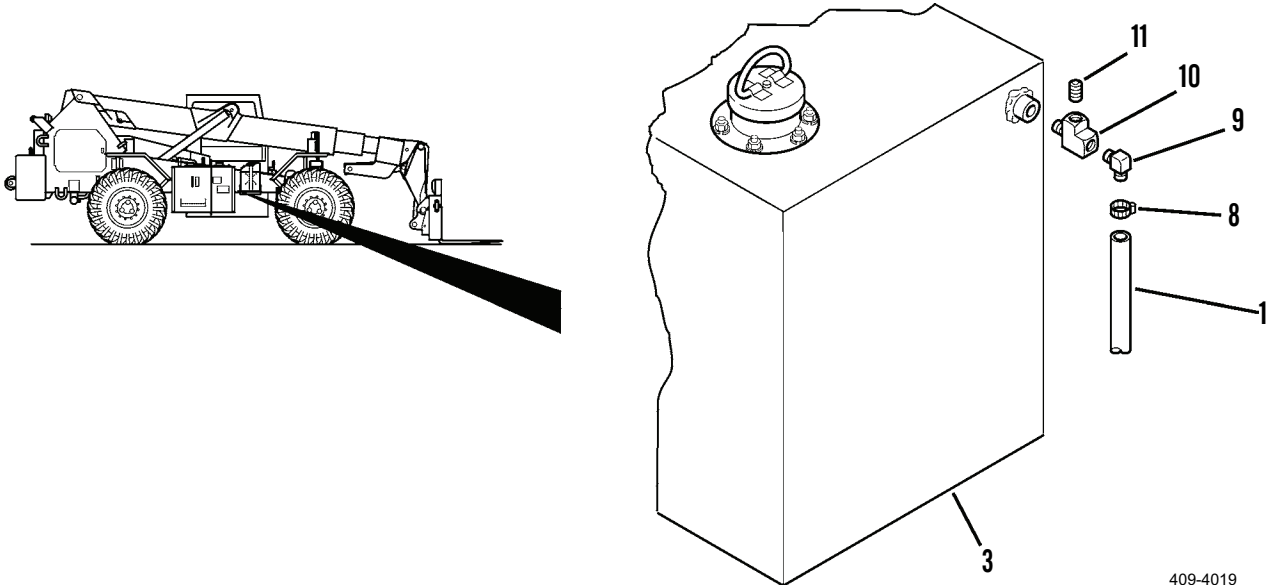
1. Disconnect fuel drain hose (1) from injection pump (2) and fuel tank (3).
2. Remove clamp (4) and fuel drain hose (1) from banjo fitting (5).
3. Remove fluid passage bolt (6), sealing washer (7), banjo fitting (5) and other sealing washer (7) from injection pump (2). Discard sealing washers.



409-1770

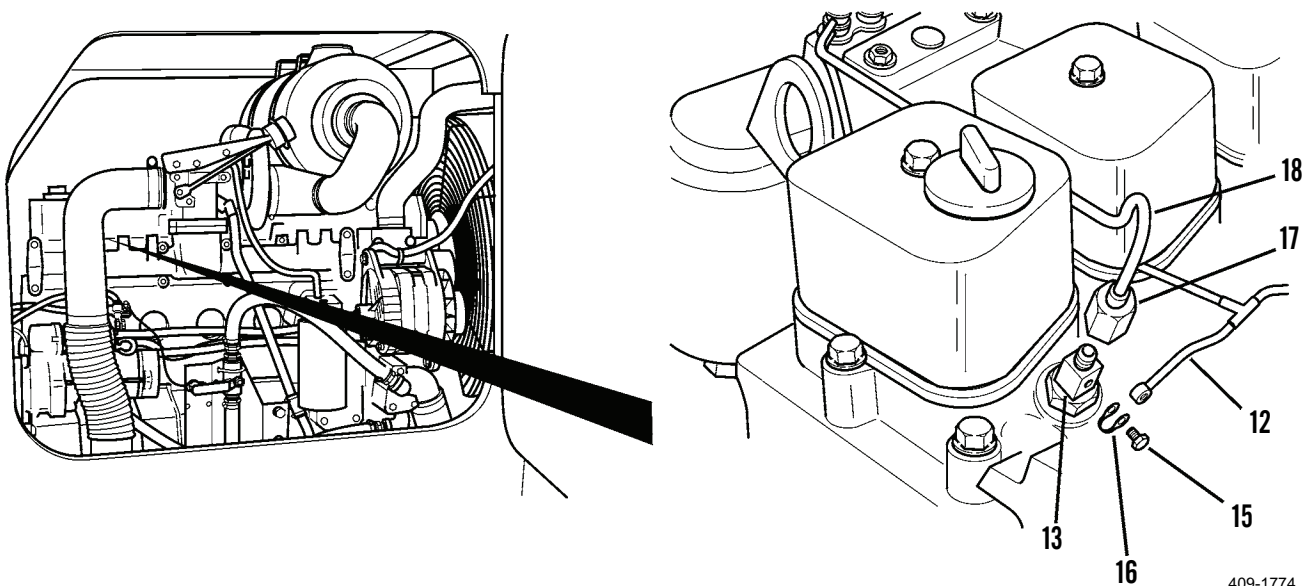
REMOVAL - CONTINUED

4. Remove clamp (8) and fuel drain hose (1) from elbow (9) on tank (3).
5. Remove elbow (9) from tee (10).
6. Remove plug (11) from tee (10) and tee from tank (3).
7. Note location and remove hose (1) from vehicle.



409-4019

8. Remove fuel drain manifold (12) from six fuel injectors (13) and gas filter manifold (14).
9. Remove six fluid passage bolts (15) and seals (16) from fuel injectors (13). Discard seals.
10. Loosen nut (17) so injector tube (18) can be raised in step 11.

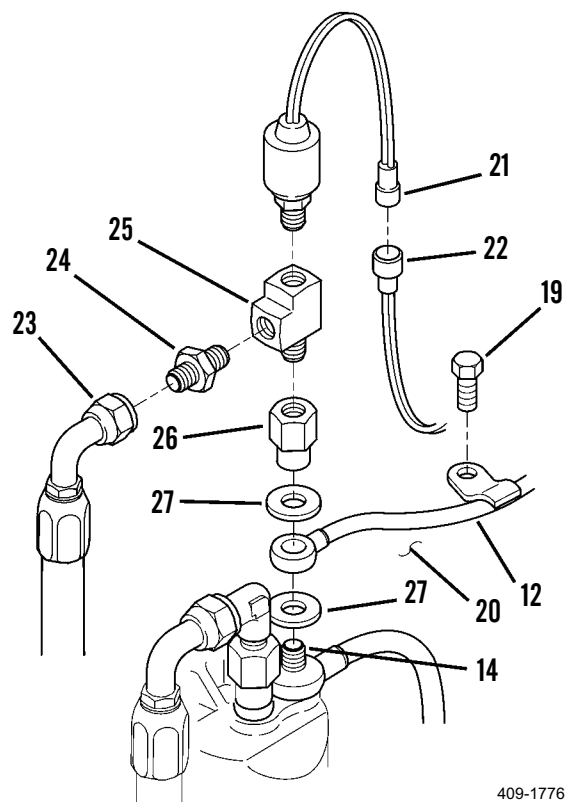
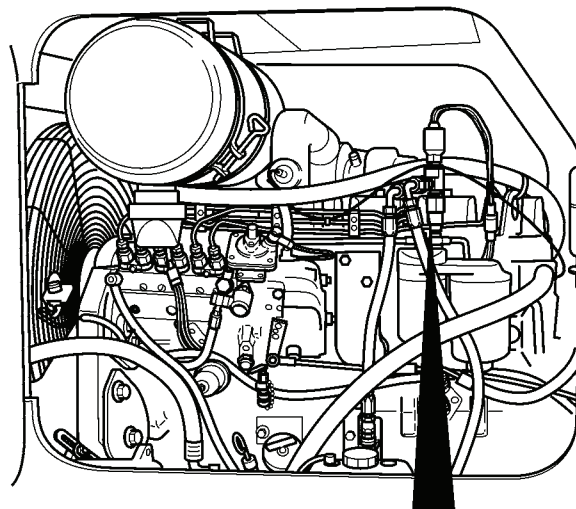


409-1774

REMOVAL - CONTINUED**NOTE**

Seals are an integral part of drain tubes. Inspect seal at end of each tube and replace entire tube if seal is damaged.

11. Raise tube (18) and remove screw (19) and fuel drain manifold (12) from manifold cover (20).
12. Disconnect connector (21) from connector (22).
13. Remove hose (23) from nipple (24).
14. Remove nipple (24) from tee (25).
15. Hold tee (25) and remove adapter (26) from gas filter manifold (14).
16. Remove seal (27), manifold (12), and other seal (27) from gas filter manifold (14). Discard seals.



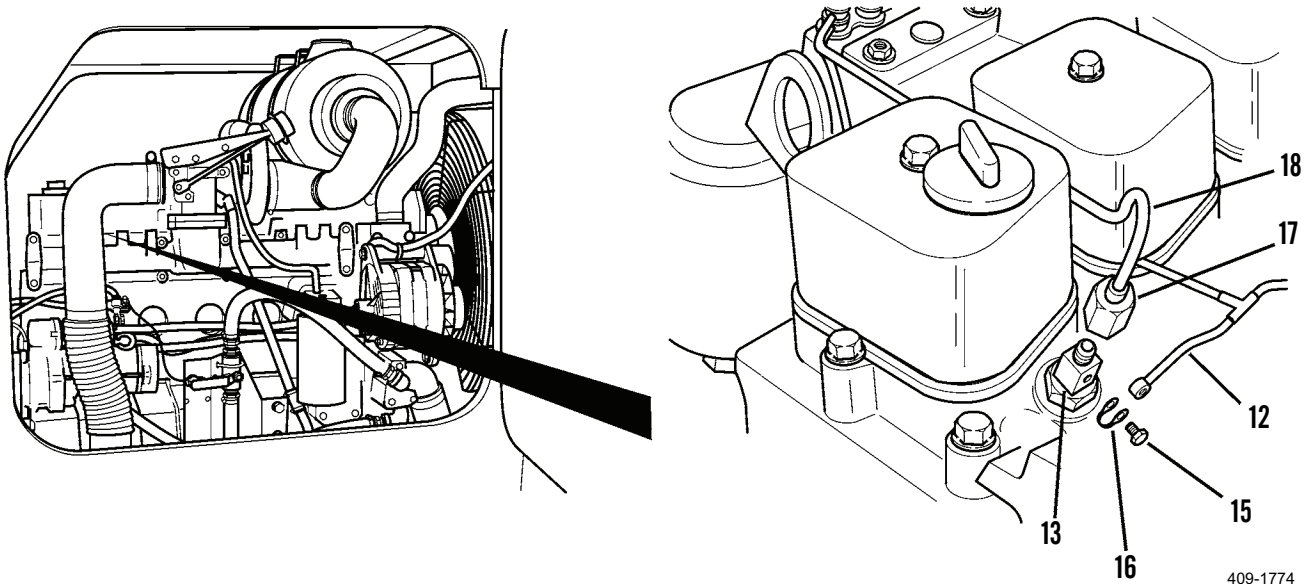
409-1776

INSTALLATION

1. Install fuel drain manifold (12) on six fuel injectors (13) and gas filter manifold (14).
2. Install new seal (27), manifold (12) and new seal (27) on gas filter manifold (14).
3. Hold tee (25) and install adapter (26) on gas filter manifold (14).

INSTALLATION - CONTINUED

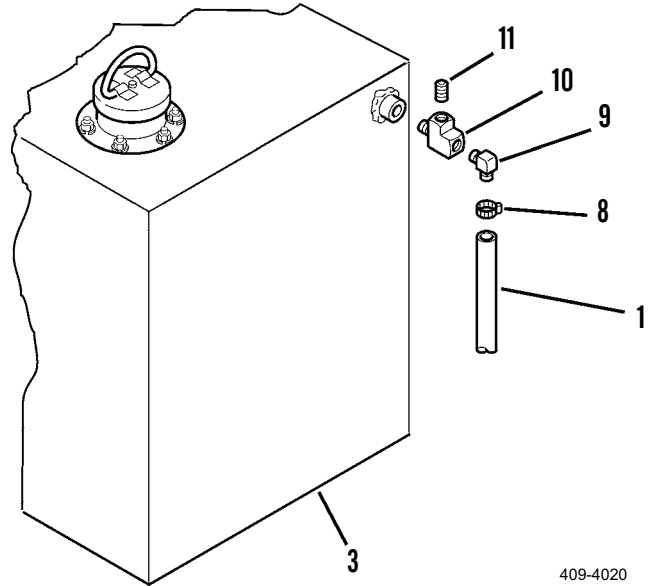
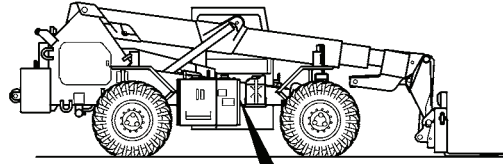
4. Coat threads of nipple (24) with pipe thread sealing compound and install in tee (25).
5. Install hose (23) on nipple (24).
6. Connect connector (21) to connector (22).
7. Raise tube (18) and install fuel drain manifold (12) on manifold cover (20) with screw (19).
8. Tighten nut (17) on injector tube (18).
9. Position fuel drain manifold (12) on six fuel injectors (13) and install new seals (16) and fluid passage bolts (15). Torque bolts to 6.5 lb-ft (8.8 Nm).



409-1774

INSTALLATION - CONTINUED

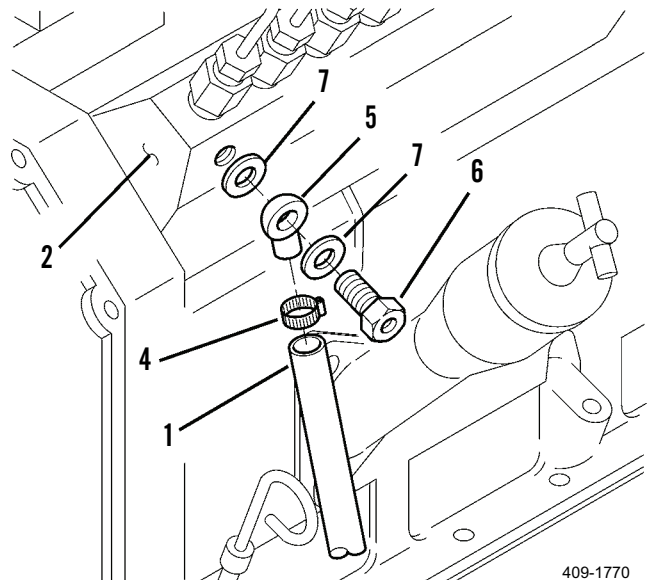
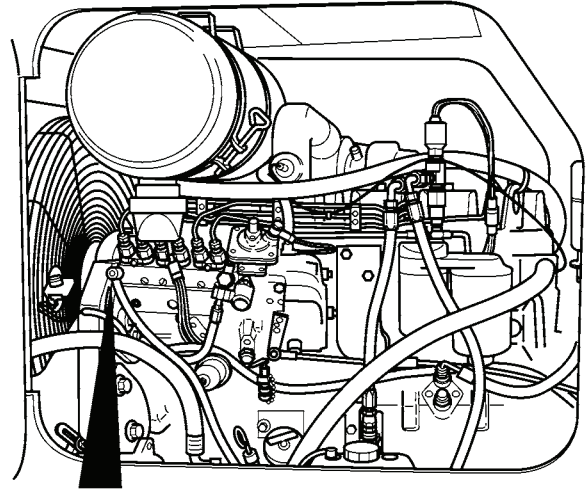
10. Install fuel drain hose (1) on injection pump (2) and fuel tank (3).
11. Position hose (1) on vehicle.
12. Install plug (11) in tee (10) and tee in tank (3).
13. Install elbow (9) in tee (10).
14. Connect hose (1) to elbow (9) with clamp (8).



409-4020

INSTALLATION - CONTINUED

15. Install new sealing washer (7), banjo fitting (5) and new sealing washer (7) on injection pump (2) with fluid passage bolt (6). Torque bolt to 32 lb-ft (43 Nm).
16. Install hose (1) on banjo fitting (5) with clamp (4).
17. Start engine and check for leaks (TM 10-3930-660-10).



409-1770

END OF WORK PACKAGE

FUEL SUPPLY LINES REPLACEMENT (152 HP)

0038 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Seal (20)

Sealing washer (10 and 15)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)



WARNING

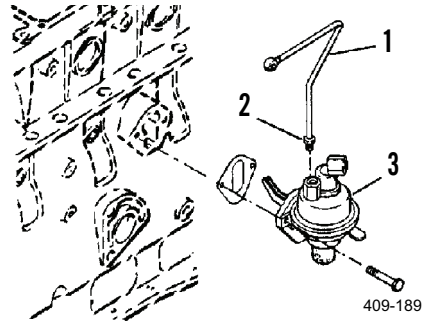
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

NOTE

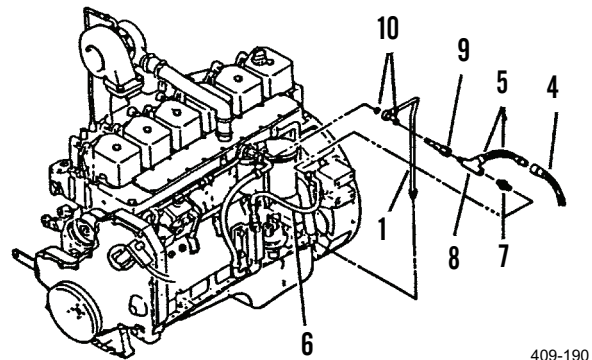
- Inspect fuel lines for cracks and other signs of deterioration as they are removed. Replace if necessary.
- Fuel lines are not interchangeable. Identify and tag lines prior to removal for use during installation.

REMOVAL

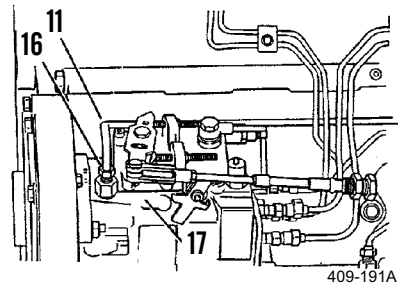
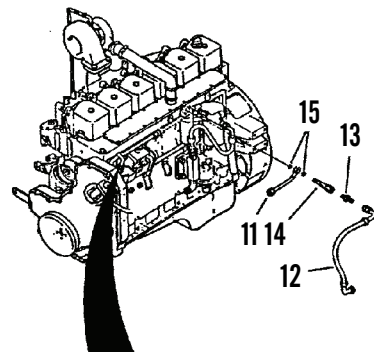
1. To remove supply line (1), loosen nut (2) on line (1) at pump (3).



2. Disconnect female plug of vehicle wiring harness (4) from male plug of fuel pressure sender (5).
3. Disconnect hose (6) from adapter (7). Remove sender (5) from tee (8). Remove adapter, tee and fluid passage bolt (9) as an assembly.
4. Remove supply line (1) from engine and pump (3). Remove and discard two sealing washers (10) at end of line.

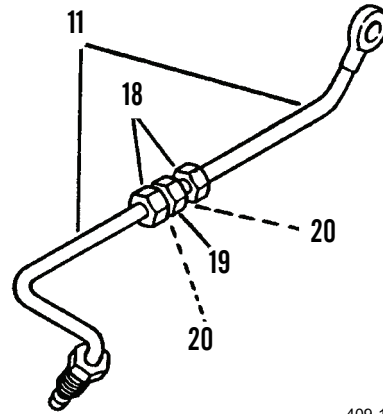


5. Remove hose (12) from adapter (13).
6. Remove fluid passage bolt (14) and adapter (13) as an assembly.
7. Remove and discard two sealing washers (15) at end of line (11).
8. Loosen nut (16) on line (11) and remove line from injection pump (17).



REMOVAL - CONTINUED

9. If necessary, loosen nuts (18) and remove halves of line (11) from union (19).
10. If necessary, remove and discard seals (20) from halves of line (11).



409-192

INSTALLATION

1. If removed, install two new seals (20) to halves of line (11).
2. If removed, position halves of line (11) on union (19) and tighten two nuts (18).
3. Position line (11) on injection pump (17) and tighten nut (16) to secure.
4. Place two new sealing washers (15) at end of line (11).
5. Install fluid passage bolt (14) and adapter (13) as an assembly.
6. Install hose (12) to adapter (13).
7. Place two new sealing washers (10) at end of line (1). Position line (1) on engine and pump (3).
8. Install adapter (7), tee (8), and fluid passage bolt (9) as an assembly.

NOTE

Apply loctite to sender.

9. Install sender (5) to tee (8).
10. Connect hose (6) to adapter (7).
11. Connect female plug of vehicle wiring harness (4) to male plug of fuel pressure sender (5) as tagged.
12. Tighten nut (2) on line (1) at pump (3).
13. Start engine and check for leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

FUEL SUPPLY HOSES AND TUBES REPLACEMENT (165 HP)

0039 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Compound, sealing (Item 14, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Seal (7, 10, 22 and 25)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)



WARNING

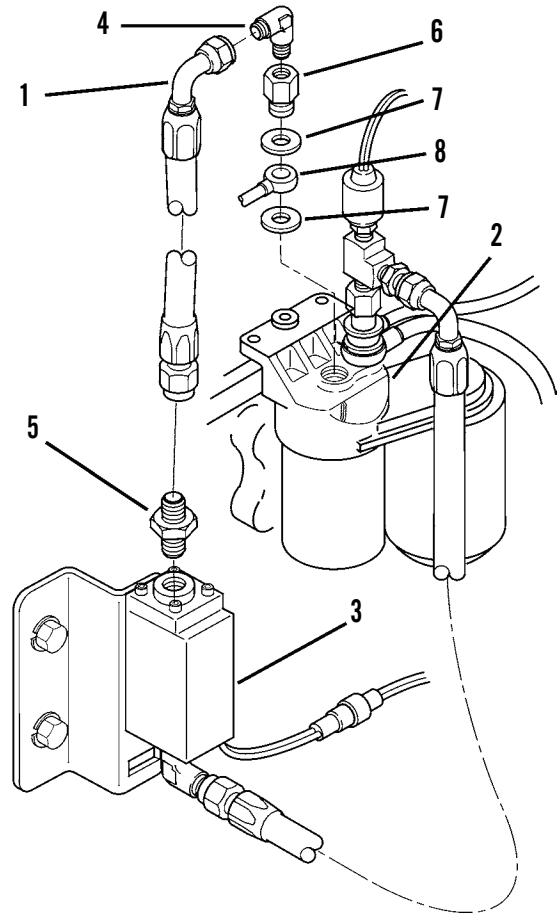
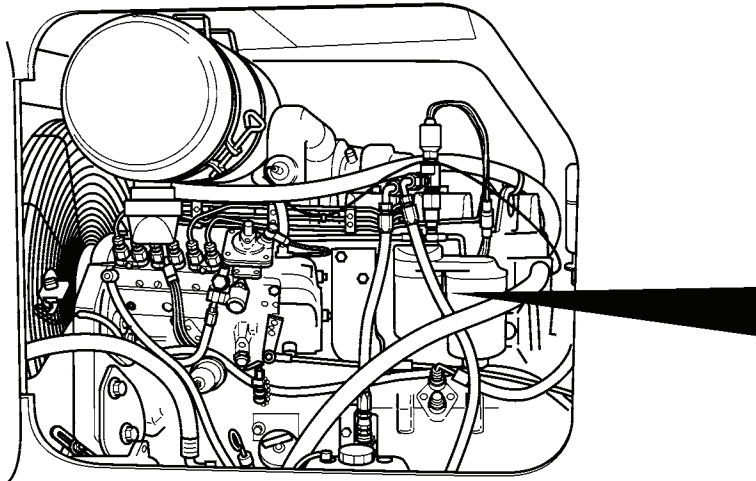
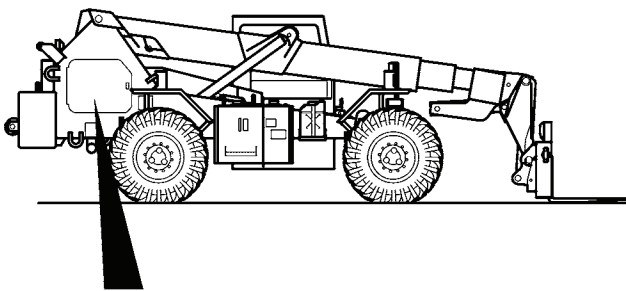
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

REMOVAL

NOTE

Tag all electrical connections before removing for use during installation.

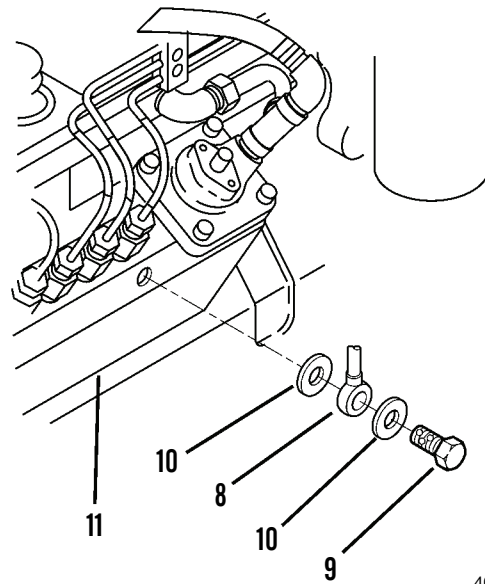
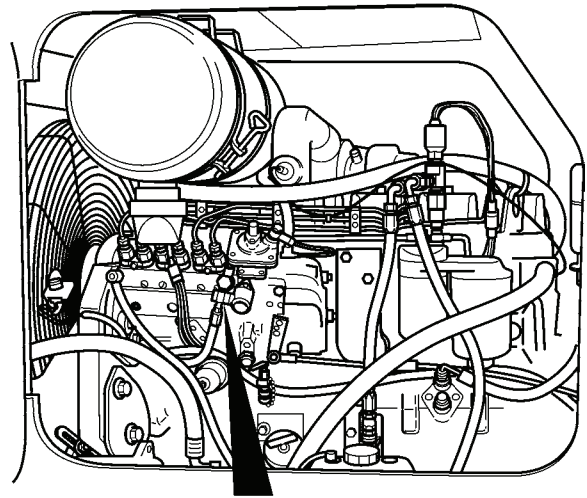
1. Remove fuel supply hose (1) from elbow (4) and adapter (5).
2. Remove adapter (6) and elbow (4) from filter head (2).
3. Remove seals (7), upper fuel tube (8) and lower seal (7) from filter head (2). Discard seals.
4. Remove adapter (5) from HI/LO pressure switch (3).



409-1750

REMOVAL - CONTINUED

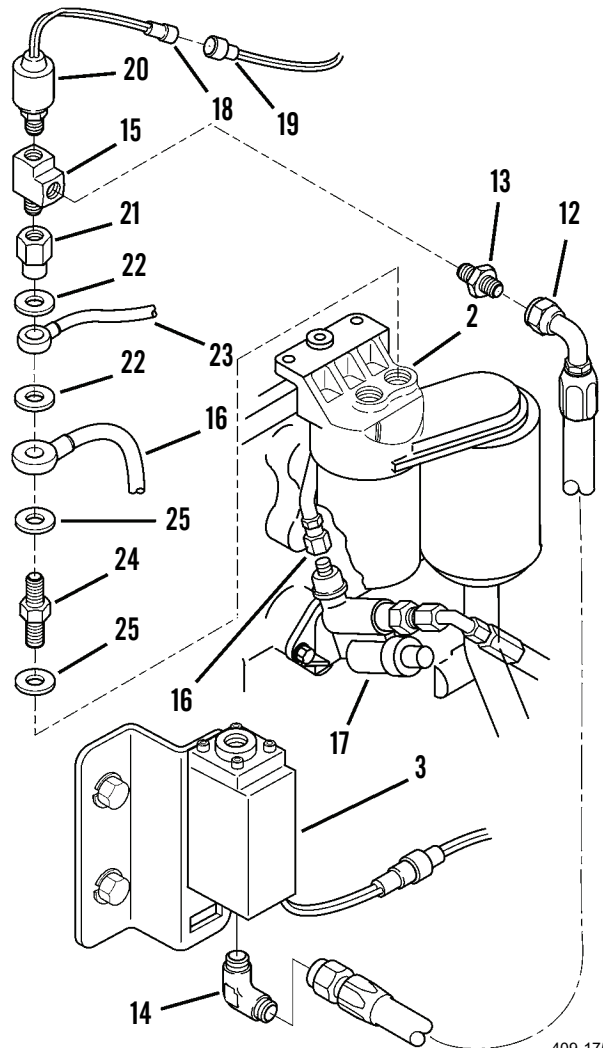
5. Remove fluid passage bolt (9), outer seal (10), fuel tube (8) and inner seal (10) from fuel injection pump (11). Discard seals.



409-1751

REMOVAL - CONTINUED

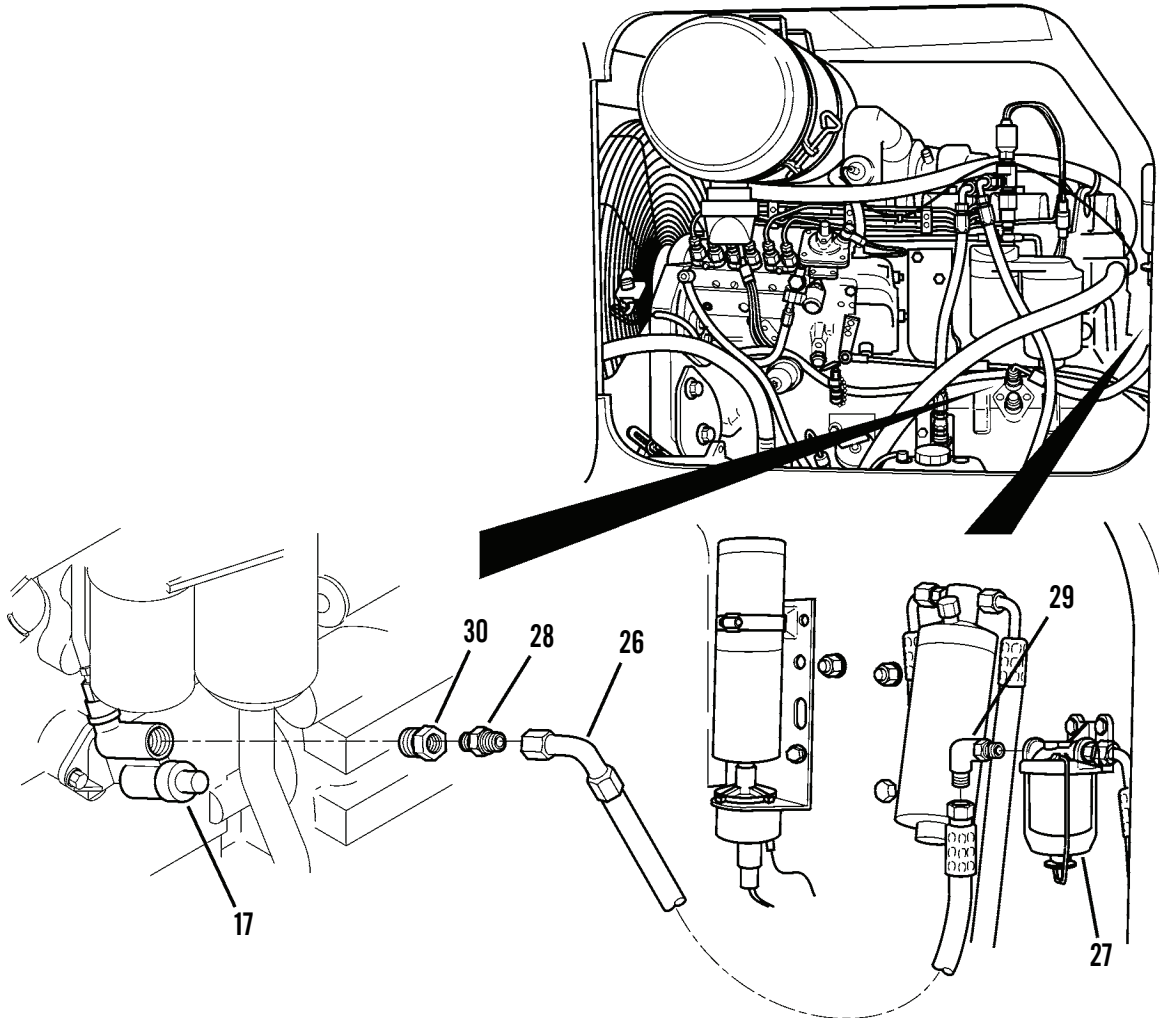
6. Remove fuel hose (12) from filter head (2) and HI/LO pressure switch (3).
7. Remove fuel hose (12) from adapter (13) and elbow (14).
8. Remove adapter (13) from tee (15) and elbow (14) from HI/LO pressure switch (3).
9. Remove fuel tube (16) from filter head (2) and fuel pump (17).
10. Remove connector (18) from connector (19).
11. Remove pressure sender (20) from tee (15).
12. Remove adapter (21), upper seal (22), fuel return manifold (23) and lower seal (22) from threaded adapter (24). Discard seals.
13. Remove threaded adapter (24), upper seal (25), fuel tube (16), and lower seal (25) from filter head (2). Discard seals.
14. Remove fuel tube (16) from fuel pump (17).



409-1756

REMOVAL - CONTINUED

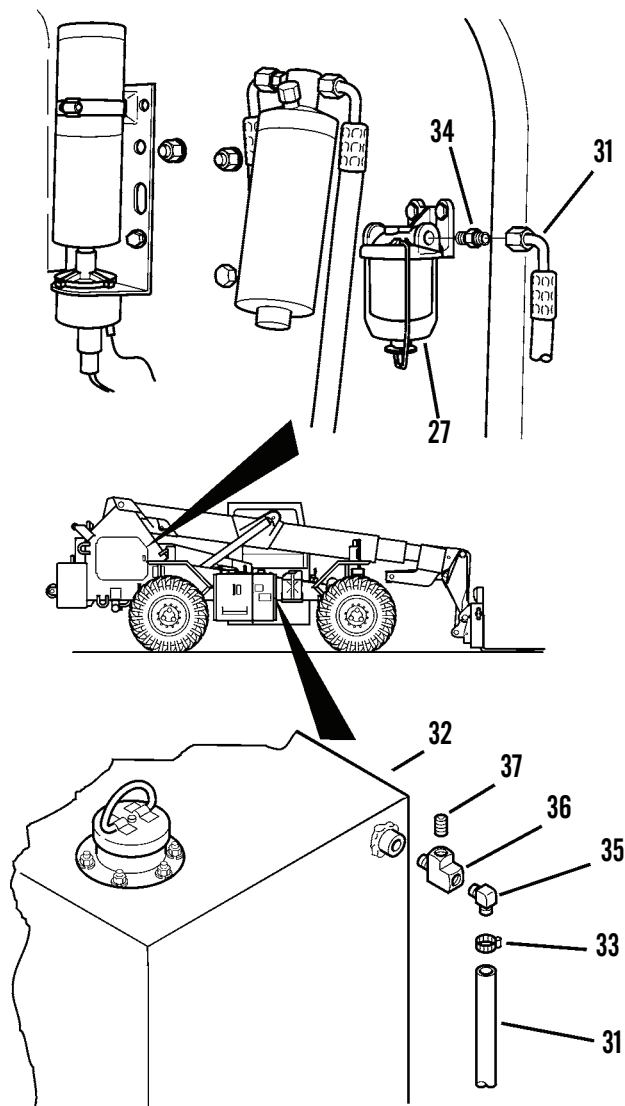
15. Remove fuel hose (26) from fuel pump (17) and water separator (27).
16. Remove fuel hose (26) from adapter (28) and elbow (29).
17. Remove adapter (28) and adapter (30) from fuel pump (17).
18. Remove elbow (29) from water separator (27).



409-1757

REMOVAL - CONTINUED

19. Remove fuel hose (31) from water separator (27) and fuel tank (32).
20. Remove fuel hose (31) from adapter (34).
21. Remove adapter (34) from water separator (27).
22. If required, remove clamp (33), hose (31), elbow (35), tee (36) and plug (37) from fuel tank (32).



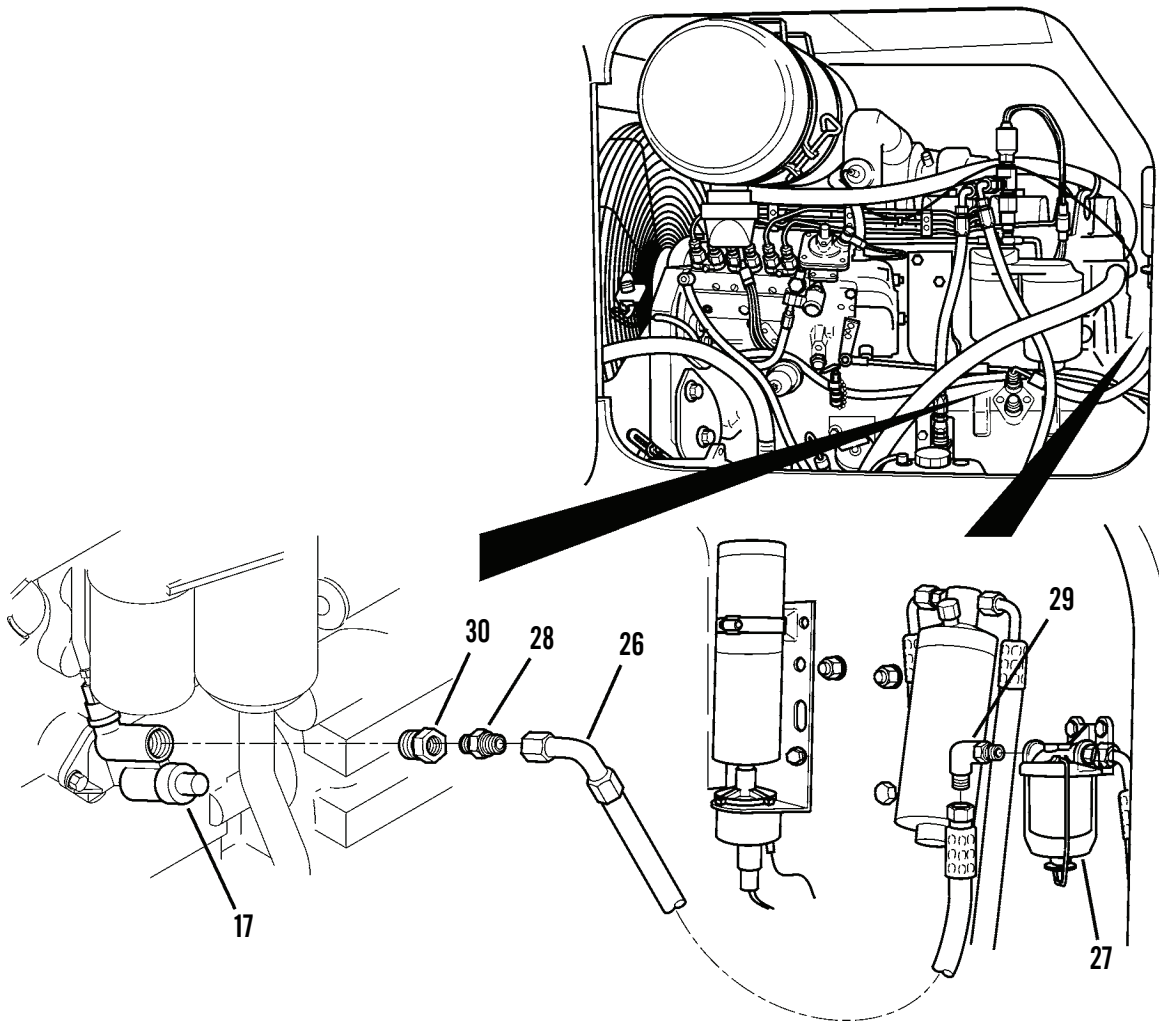
409-1758

INSTALLATION

1. If removed, install plug (37), tee (36), elbow (35), hose (31) and clamp (33).
2. Install adapter (34) on water separator (27).
3. Install fuel hose (31) on adapter (34).
4. Install fuel hose (31) on water separator (27) and fuel tank (32).

INSTALLATION - CONTINUED

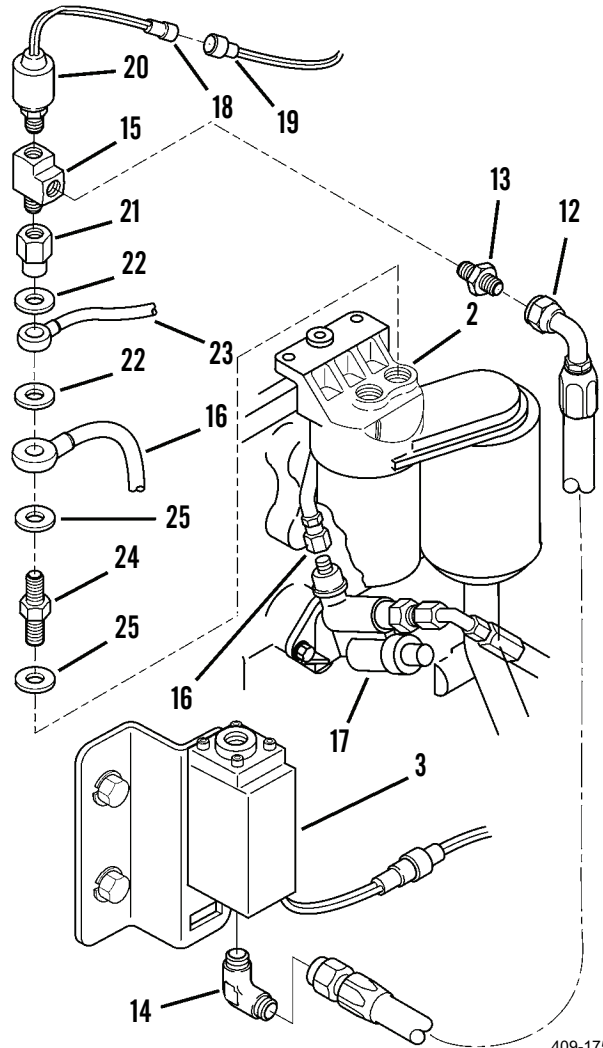
5. Install elbow (29) on water separator (27).
6. Install adapter (28) and adapter (30) on fuel pump (17).
7. Install fuel hose (26) on adapter (28) and elbow (29).



409-1757

INSTALLATION - CONTINUED

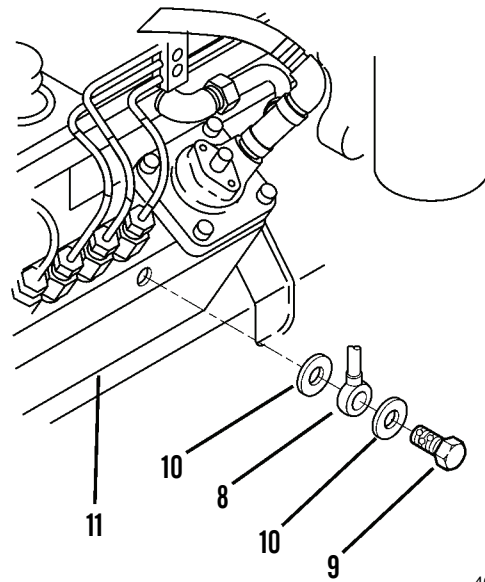
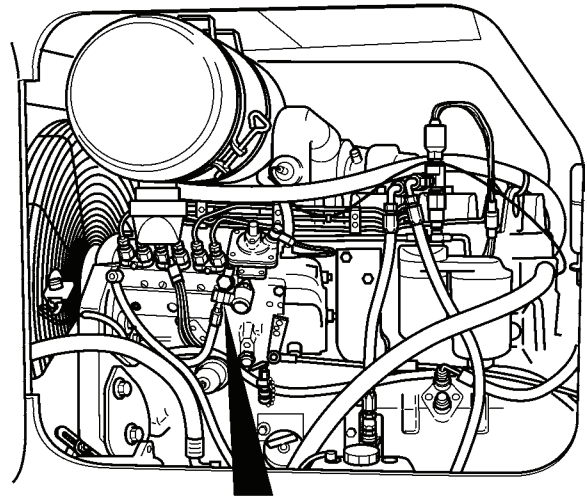
8. Install fuel tube (16) on fuel pump (17).
9. Install new lower seal (25), fuel tube (16), new upper seal (25) and threaded adapter (24) on filter head (2).
10. Install new lower seal (22), fuel return manifold (23) and new upper seal (22), and adapter (21) on threaded adapter (24).
11. Install pressure sender (20) on tee (15).
12. Connect connector (18) to connector (19).
13. Install fuel hose (12) on filter head (2) and HI/LO pressure switch (3).
14. Install adapter (13), tee (15) and elbow (14) on HI/LO pressure switch (3).
15. Install fuel hose (12) on adapter (13) and elbow (14).



409-1756

INSTALLATION - CONTINUED

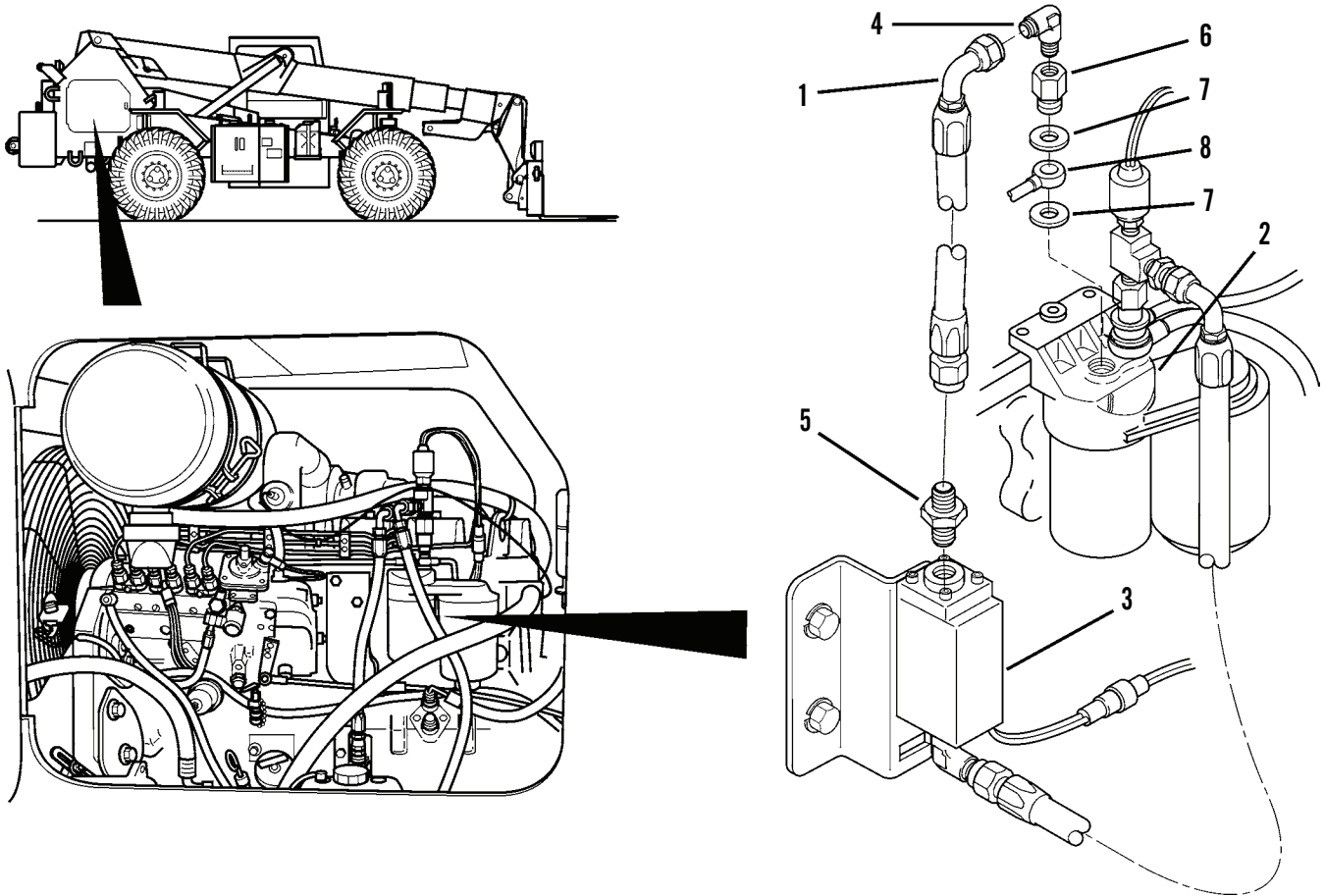
16. Install new outer seal (10), fuel tube (8), new inner seal (10), and fluid passage bolt (9) in fuel injection pump (11).



409-1751

INSTALLATION - CONTINUED

17. Install fuel supply hose (1) on fuel filter head (2) and HI/LO pressure switch (3).
18. Install adapter (5) in HI/LO pressure switch (3).
19. Install new lower seal (7), fuel tube (8), and new upper seal (7) in filter head (2).
20. Install elbow (4) and adapter (6) in filter head (2).
21. Install fuel supply hose (1) on elbow (4) and adapter (5).



409-1750

22. Start engine, check for proper operation and leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

FUEL/WATER SEPARATOR REPLACEMENT (152 HP)

0040 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (9)

Starwasher (10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Fuel/water separator drained (TM 10-3930-660-10)

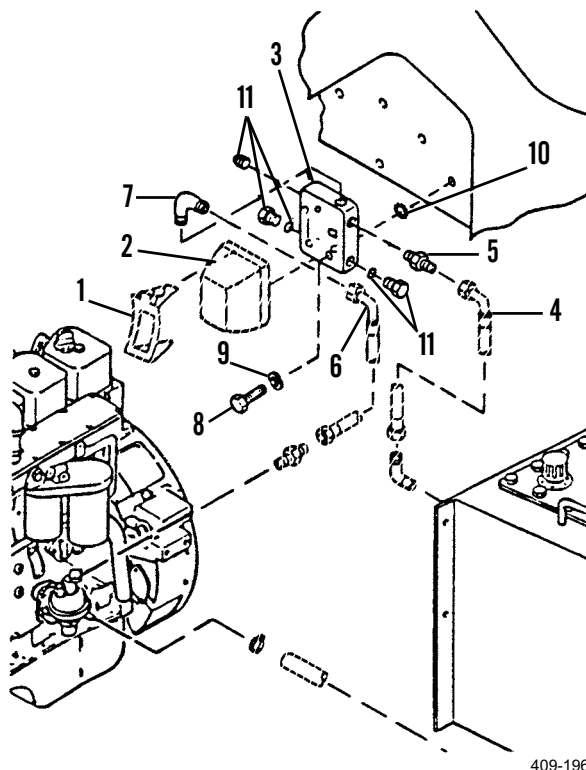


WARNING

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

REMOVAL

1. Remove clamp (1) and element (2) from base (3).
2. Remove hose (4) from adapter (5) at base (3).
3. Remove hose (6) from elbow (7) from base (3).
4. Remove two screws (8), two lockwashers (9), base (3) and two starwashers (10) from vehicle frame. Discard lockwashers and starwashers.
5. Remove plug kit components (11) from base (3).
6. Remove elbow (7) and adapter (5) from base (3).



409-196

INSTALLATION

1. Install plug kit components (11) to base (3).
2. Install elbow (7) and adapter (5) to base (3).
3. Install base (3) to machine frame with two new starwashers (10), two new lockwashers (9) and two screws (8).
4. Install hose (6) to elbow (7).
5. Install hose (4) to adapter (5).

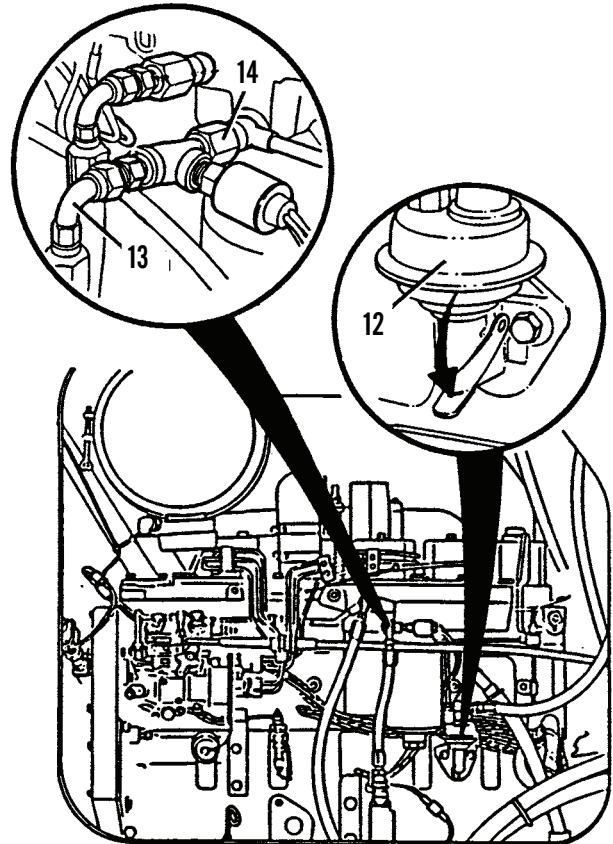
NOTE

Be sure clamp is securely engaged in both slots of base.

6. Position element (2) on base (3) and secure with clamp (1).

INSTALLATION - CONTINUED

7. Loosen hose (13) at fitting (14).
8. Operate hand lever on transfer pump (12) until fuel flowing from fitting (14) is free of air.
9. Tighten hose (13) at fitting (14).
10. Start engine (TM 10-3930-660-10) and check for leaks.



409-197

END OF WORK PACKAGE

FUEL/WATER SEPARATOR REPLACEMENT (165 HP)

0041 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Materials/Parts

Lockwasher (10)

Starwasher (11)

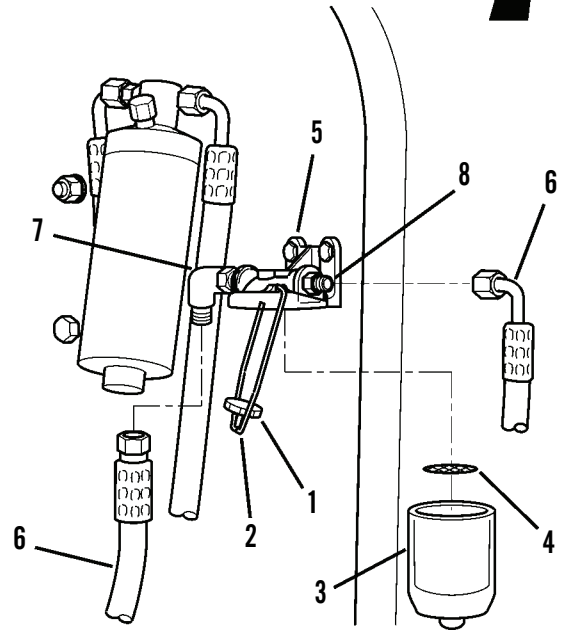
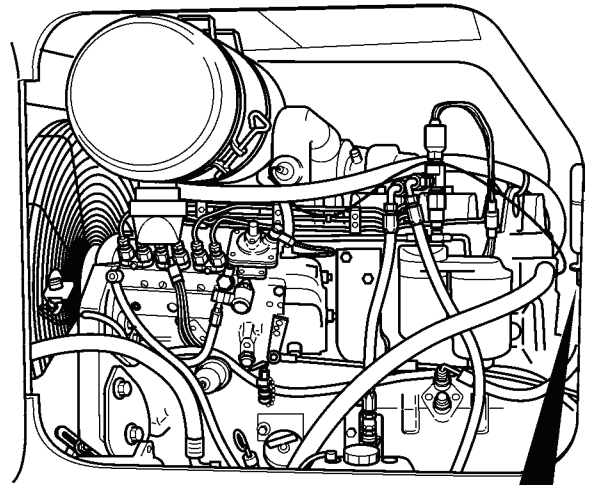


WARNING

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

REMOVAL

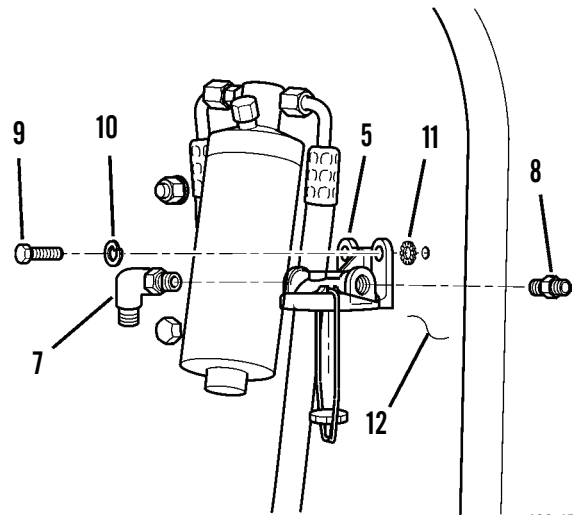
1. Loosen thumb screw (1) at bottom of fuel/water separator.
2. Pull retaining bracket (2) forward and remove sediment bowl (3).
3. Remove gasket with brass mesh screen (4) from fuel/water separator base (5).
4. Remove two hoses (6) from elbow (7) and adapter (8).



409-1759

REMOVAL - CONTINUED

5. Remove two screws (9), lockwashers (10), fuel/water separator base (5) and two starwashers (11) from frame (12). Discard lockwashers and starwashers.
6. Remove elbow (7) and adapter (8) from fuel/water separator base (5).



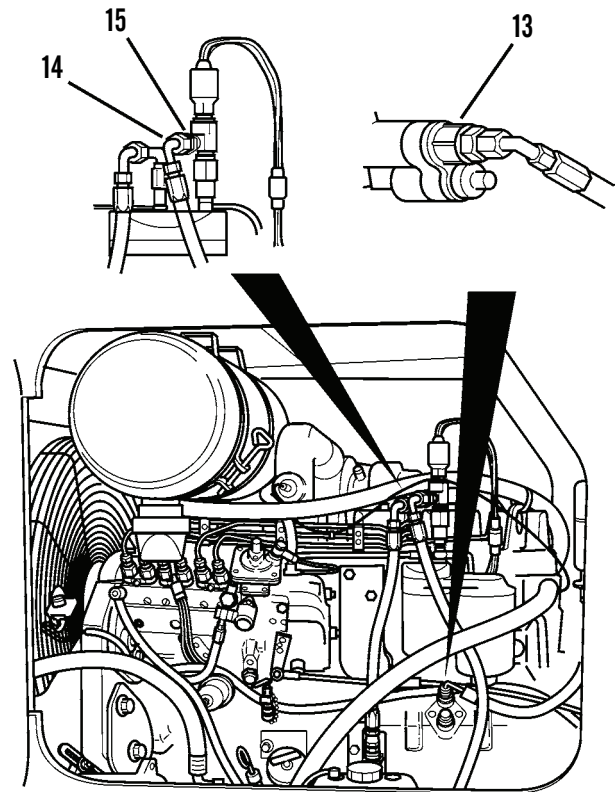
409-1761

INSTALLATION

1. Install elbow (7) and adapter (8) in fuel/water separator base (5).
2. Install two new starwashers (11) and fuel/water separator base (5) on frame (12) with two new lockwashers (10) and screws (9).
3. Install hoses (6) on elbow (7) and adapter (8).
4. Install gasket with brass mesh screen (4) in fuel/water separator base (5).
5. Pull retaining bracket (2) forward and insert sediment bowl (3) in fuel/water separator base (5).
6. Tighten thumb screw (1) against bottom of sediment bowl (3) to secure bowl.

INSTALLATION - CONTINUED

7. Loosen hose (14) at fitting (15).
8. Operate primer button on transfer pump (13) until fuel flowing from fitting (15) is free of air.
9. Tighten hose (14) on fitting (15).
10. Start engine (TM 10-3930-660-10), and check for leaks.



409-1766

END OF WORK PACKAGE

FUEL FILTER AND HEAD MAINTENANCE (152 HP)

0042 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Filter element (1 and 4)

Materials/Parts - Continued

Seal (6, 7, 11 and 12)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)



WARNING

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

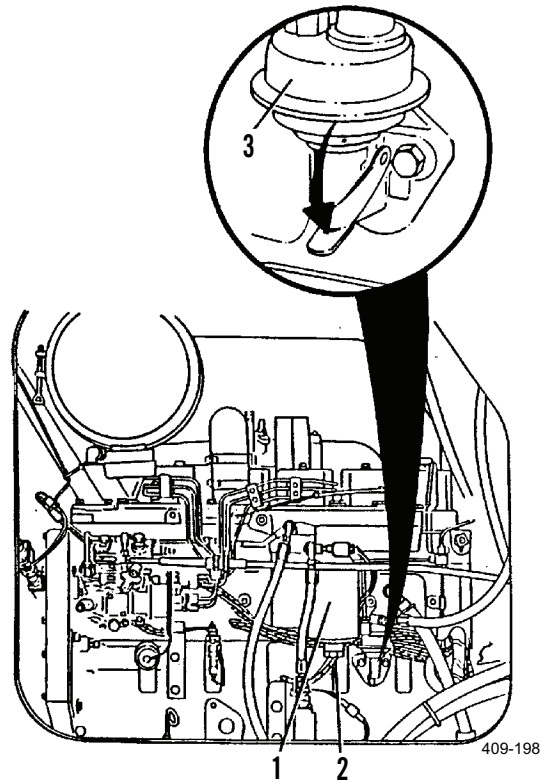
SERVICE

1. To drain primary filter element (1), open drain (2) at base.

NOTE

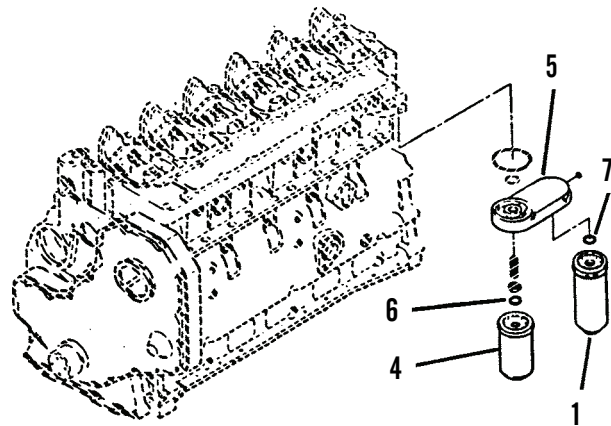
Drain primary fuel filter when water is present in fuel/water separator or after 50 hours of operation. Be sure fuel tank is at least 1/4 full.

2. Operate hand lever on fuel transfer pump (3) until all water is drained from primary filter element (1) and only diesel fuel is present.
3. Close drain (2) at base of primary filter element (1).



409-198

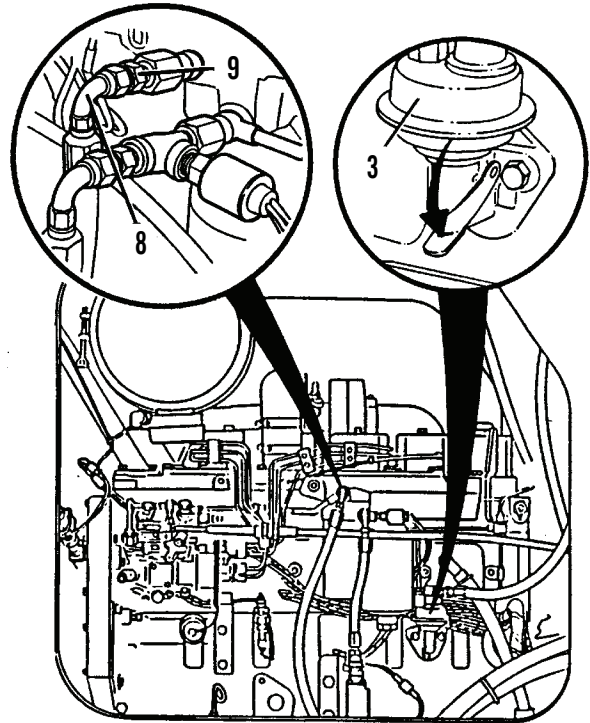
4. Turn primary filter element (1) counterclockwise and remove from fuel filter head (5).
5. Turn secondary filter element (4) counterclockwise and remove from fuel filter head (5).
6. Discard old filter elements (1 and 4).
7. Remove and discard seals (6 and 7) from filter head (5).
8. Clean fuel filter head (5) where old filter elements (1) and (4) were attached.
9. Install new seals (6 and 7) to filter head (5).
10. Fill new filter elements (1 and 4) with clean fuel. Lubricate outer seals on new filter elements (1 and 4) with clean oil.
11. Turn secondary new filter element (4) clockwise on fuel filter head (5) until tight.
12. Turn primary new filter element (1) clockwise on fuel filter head (5) until tight.



409-199

SERVICE - CONTINUED

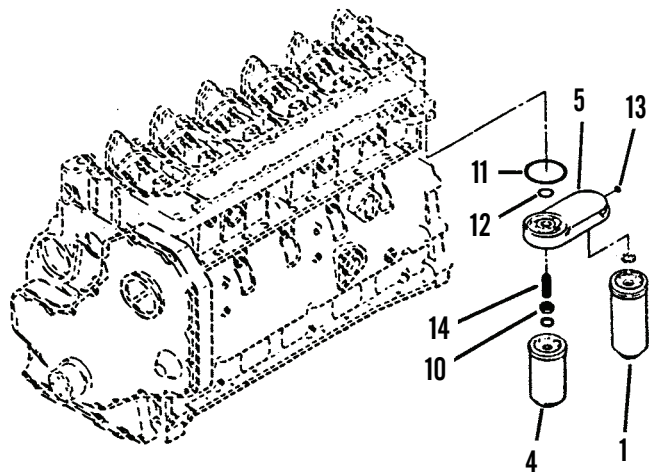
13. Loosen hose (8) at fitting (9).
14. Operate hand lever on fuel transfer pump (3) until fuel flowing from fitting (9) is free of air.
15. Tighten hose (8) at fitting (9).



409-200

REMOVAL

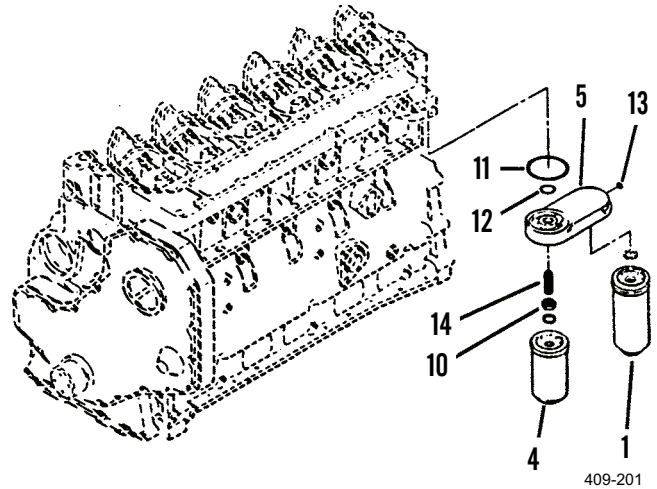
1. Remove filter elements (1 and 4) from filter head (5) as described in *Service* in this work package.
2. Remove nut (10) and filter head (5) from engine.
3. Remove and discard two seals (11 and 12) from filter head (5).
4. If necessary, remove expansion plug (13) from filter head (5).
5. If necessary, remove stud (14) from engine.



409-201

INSTALLATION

1. If removed, install stud (14) to engine.
2. If removed, install expansion plug (13) to filter head (5).
3. Install two new seals (12 and 11) to filter head (5).
4. Position filter head (5) on engine and secure with nut (10).
5. Install filter elements (1 and 4) to filter head (5) as described in *Service* in this work package.

**END OF WORK PACKAGE**

FUEL FILTER AND HEAD MAINTENANCE (165 HP)

0043 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Fuel (Item 29, WP 0323 00)

Oil, lubricating (Item 30, WP 0323 00)

Materials/Parts - Continued

Filter element (2 and 6)

Seal (7, 8, 13 and 14)

References

WP 0035 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)



WARNING

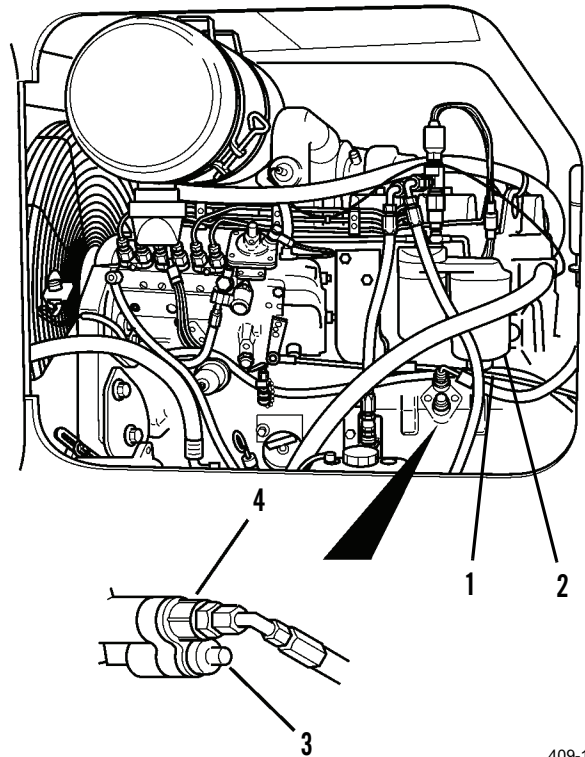
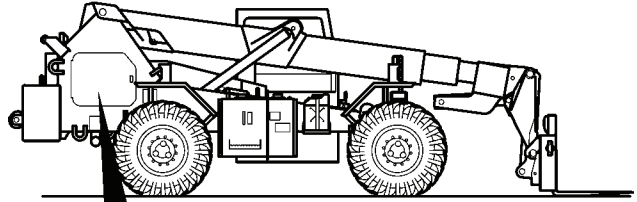
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

SERVICE

NOTE

Drain primary fuel filter into container when water is present in fuel/water separator or after 50 hours of operation. Be sure fuel tank is at least 1/4 full.

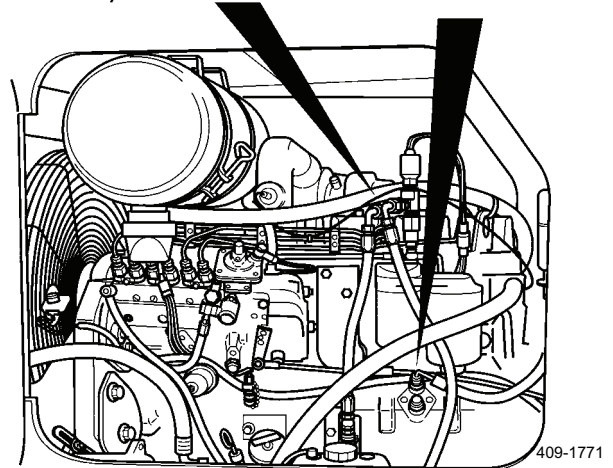
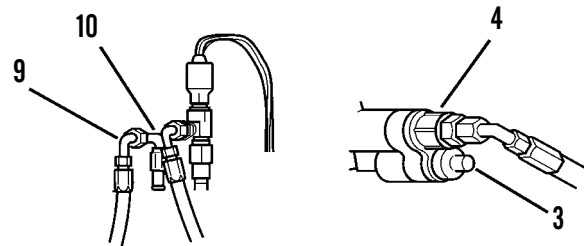
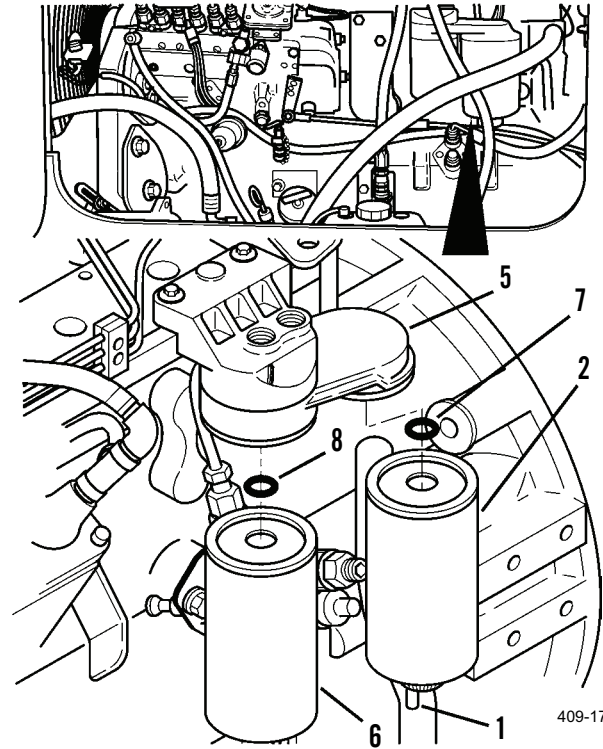
1. Open drain (1) at base of primary filter element (2).
2. Operate primer button (3) on fuel transfer pump (4) until all water is drained from primary filter element (2) and only diesel fuel is present.
3. Close drain (1) at base of primary filter element (2).



409-1767

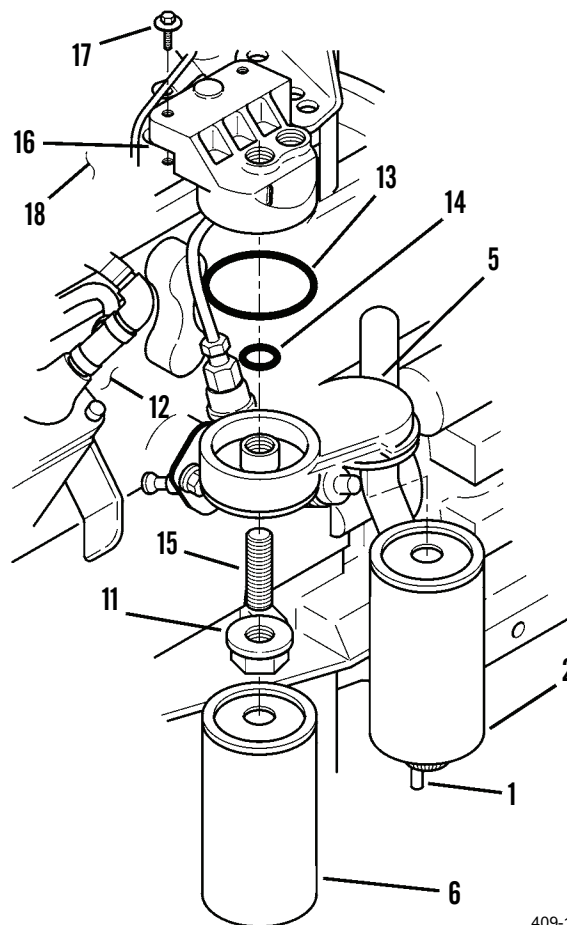
SERVICE - CONTINUED

4. Turn primary filter element (2) counterclockwise and remove from fuel filter head (5). Discard primary filter element.
5. Turn secondary filter element (6) counterclockwise and remove from fuel filter head (5). Discard secondary filter element.
6. Remove and discard seals (7 and 8) from filter head (6).
7. Clean fuel filter head (6) where filter elements (2 and 6) were installed.
8. Install seals (7 and 8) on filter head (5). Lubricate seals with clean oil.
9. Fill primary and secondary filter elements (2 and 6) with clean fuel.
10. Turn secondary filter element (6) clockwise on fuel filter head (5) until tight.
11. Turn primary filter element (2) clockwise on fuel filter head (5) until tight.
12. Loosen hose (9) at fitting (10).
13. Operate primer button (3) on fuel transfer pump (4) until fuel flowing from fitting (10) is free of air.
14. Tighten hose (9) on fitting (10).



REMOVAL - CONTINUED

3. Remove nut (11) and filter head (5) from engine (12).
4. Remove and discard two seals (13 and 14) from filter head (6).
5. Remove stud (15) from mounting bracket (16).
6. Remove two screws (17) and mounting bracket (16) from intake manifold cover (18).



409-1775

INSTALLATION

1. Install mounting bracket (16) on intake manifold cover (18) with two screws (17).
2. Install stud (15) in mounting bracket (16).
3. Install two new seals (13 and 14) on filter head (5).
4. Install filter head (5) on engine (12) with nut (11).
5. Install filter elements (2 and 6) on filter head (5) as described in *Service* in this work package.
6. Install high pressure fuel tubes (WP 0035 00).

END OF WORK PACKAGE

ETHER START HOSE AND ATOMIZER REPLACEMENT

0044 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Ether start cartridge removed (WP 0045 00)



WARNING



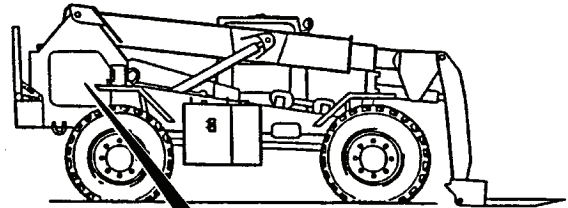
Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large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

REMOVAL

NOTE

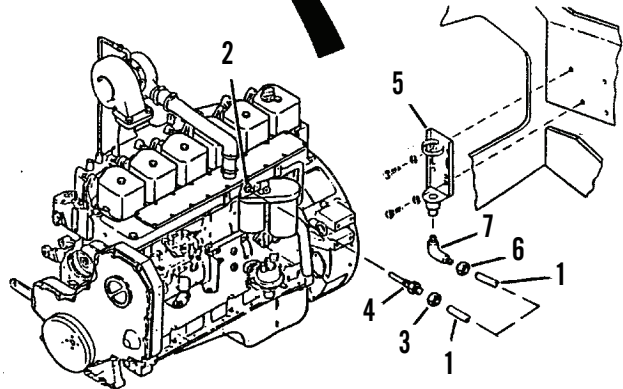
Hose is disconnected at engine through the right-hand engine access door. Other end of hose is disconnected at elbow through the left-hand engine access door.

1. To disconnect hose (1) at engine (2), loosen nut (3) to disconnect hose (1) from atomizer (4).
2. Remove atomizer (4) from engine (2).
3. To disconnect hose (1) at mounting bracket (5), loosen nut (6) to disconnect hose (1) from elbow (7).
4. Remove elbow (7) from bracket (5).



INSTALLATION

1. Install elbow (7) into bottom of bracket (5).
2. Connect hose (1) to elbow (7) with nut (6).
3. Install atomizer (4) into engine (2).
4. Connect hose (1) to atomizer (4) with nut.



409-202

5. Install ether start cartridge (WP 0045 00).

END OF WORK PACKAGE

ETHER START CARTRIDGE REPLACEMENT

0045 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cartridge (3)

Seal (4)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

**WARNING**

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

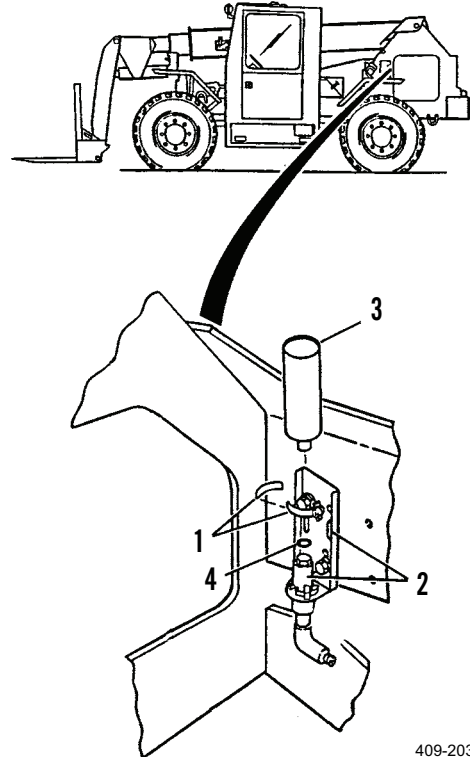
REMOVAL**NOTE**

The ether start cartridge is accessed through the left-hand engine access door.

1. Remove clamp (1) from mounting bracket (2).
2. Remove and discard cartridge (3) according to regulations for pressurized containers.
3. Remove and discard cartridge seal (4).

INSTALLATION

1. Install new cartridge seal (4).
2. Install new cartridge (3) into mounting bracket (2).
3. Secure cartridge (3) with clamp (1).



409-203

END OF WORK PACKAGE

ETHER START THERMOSTAT REPLACEMENT

0046 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (9)

Starwasher (7)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)



WARNING

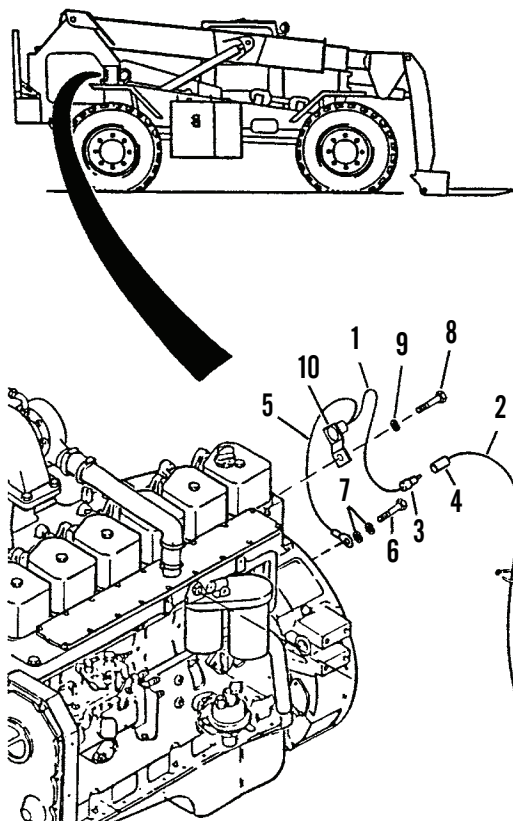


Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large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

REMOVAL**NOTE**

The ether start thermostat is accessed through the right-hand engine access door.

1. Disconnect electrical lead (1) from lead (2) by pulling male connector (3) from female connector (4).
2. Remove ground lead (5) by removing capscrew (6) and two starwashers (7). Discard starwashers.
3. Remove capscrew (8), lockwasher (9) and thermostat (10). Discard lockwasher.



409-204

INSTALLATION

1. Position thermostat (10) on engine and install new lockwasher (9) and capscrew (8).
2. Position ground wire (5), on engine and install two new starwashers (7) and capscrew (6).
3. Connect lead (1) to lead (2) by pushing male connector (3) into female connector (4).
4. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (11)

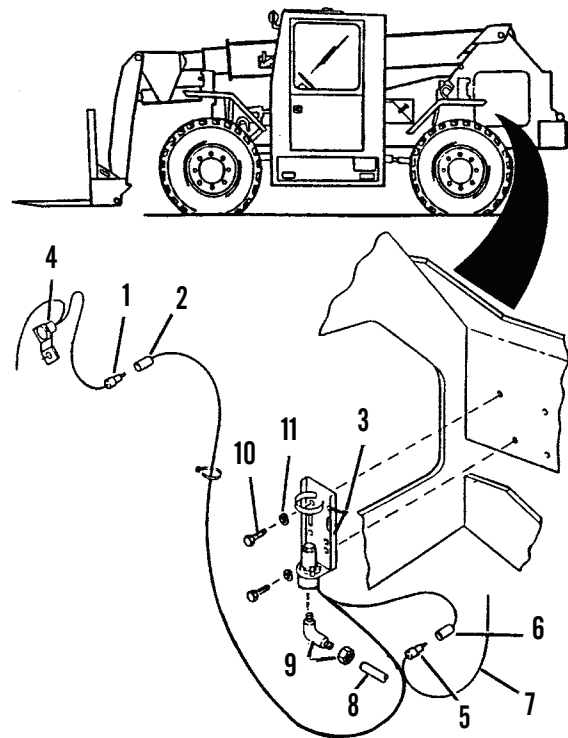
Equipment Condition

Ether start cartridge removed (WP 0045 00)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. Disconnect male and female connectors (1 and 2) on wiring that connect mounting bracket (3) to thermostat (4).
2. Disconnect male and female connectors (5 and 6) on wiring that connects mounting bracket (3) to engine wiring harness (7).
3. Remove hose (8) and elbow (9) from bottom of bracket (3).
4. Remove bracket (3) by removing two capscrews (10) and two lockwashers (11). Discard lockwashers.



INSTALLATION

1. Position bracket (3) on vehicle and install two new lockwashers (11) and two capscrews (10).
2. Install elbow (9) onto bracket (3). Attach hose (8) to elbow (9).
3. Connect male and female connectors (1 and 2) on the wiring from bracket (3) to thermostat (4).
4. Connect male and female connectors (5 and 6) on the wiring from bracket (3) to engine wiring harness (7).
5. Connect battery cables (WP 0107 00).
6. Install ether cartridge (WP 0045 00).

409-205

END OF WORK PACKAGE

ACCELERATOR CABLE MAINTENANCE (152 HP)

0048 00

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Simplified Test Equipment for Internal Combustion
Engines - Reprogrammable (STE/ICE-R) (Item
23, WP 0324 00)**Materials/Parts**

Cotter pin (12)

Locknut (8)

References

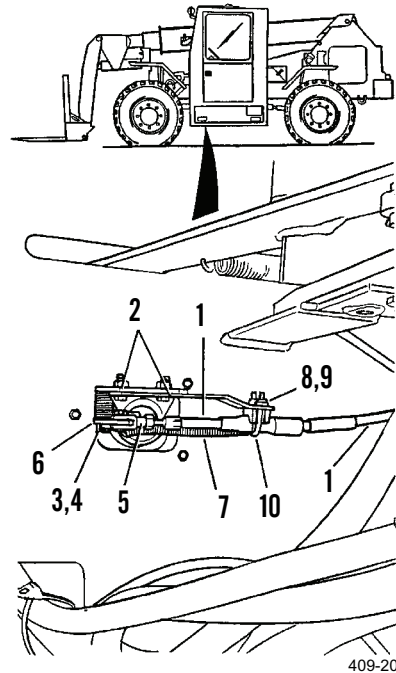
WP 0008 00

Equipment ConditionVehicle parked on level ground (TM 10-3930-660-
10)**WARNING**

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

REMOVAL

1. To remove accelerator cable (1) from accelerator pedal (2), remove spring clip (3) and clevis pin (4) securing clevis (5) to linkage (6).
2. Remove spring (7) from linkage (6).
3. Remove two locknuts (8), two flatwashers (9) and cable clamp (10). Discard locknuts.
4. At fuel injection pump (11), remove cotter pin (12) and clevis pin (13) securing clevis (14).
5. Loosen nut (16) and starwasher (17). Remove cable (1).



NOTE

Note routing of accelerator cable on vehicle frame for use during installation.

6. Remove accelerator cable (1) from vehicle frame.

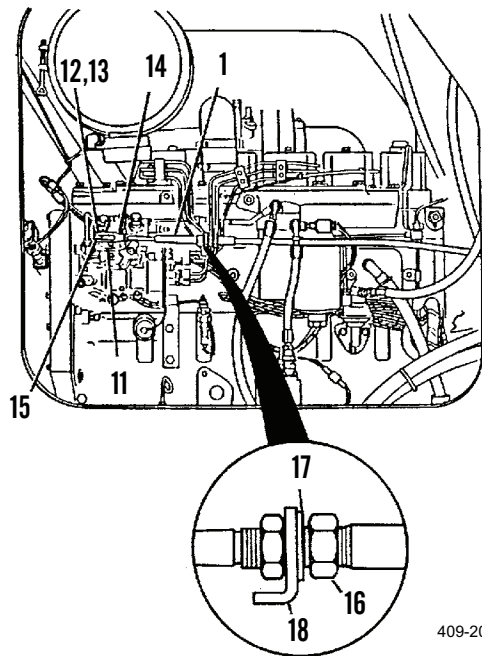
INSTALLATION

1. Position accelerator cable (1) on vehicle frame as noted during removal.
2. At fuel injection pump (11), install clevis (14) of cable (1) to linkage (15) with clevis pin (13) and new cotter pin (12).

NOTE

Position starwasher in front of bracket.

3. Position cable (1) on bracket (18) and install nut (16) and starwasher (17).

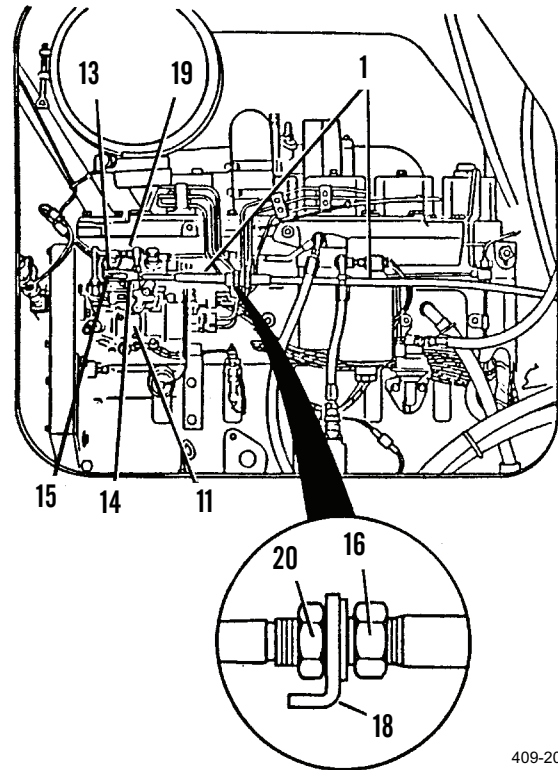


INSTALLATION - CONTINUED

4. At accelerator pedal (2), install clevis (5) of cable (1) to linkage (6) of pedal with clevis pin (4) and spring clip (3).
5. Install spring (7) to linkage (6).
6. Install cable (1) to pedal (2) with two new locknuts (8), two flatwashers (9) and cable clamp (10).
7. Check adjustment of accelerator cable (1) and adjust, if necessary. Refer to *Adjustment*.

ADJUSTMENT

1. With linkage (15) tight against the idle stop screw (19), clevis pin (13) should fit freely through clevis (14) of cable (1). If not, adjustment is required.
2. Loosen nuts (16 and 20) at bracket (18).
3. Reposition cable (1) until clevis pin (13) fits freely through holes in clevis (14) and linkage (15).
4. Tighten nuts (16 and 20) at bracket (18).



409-209

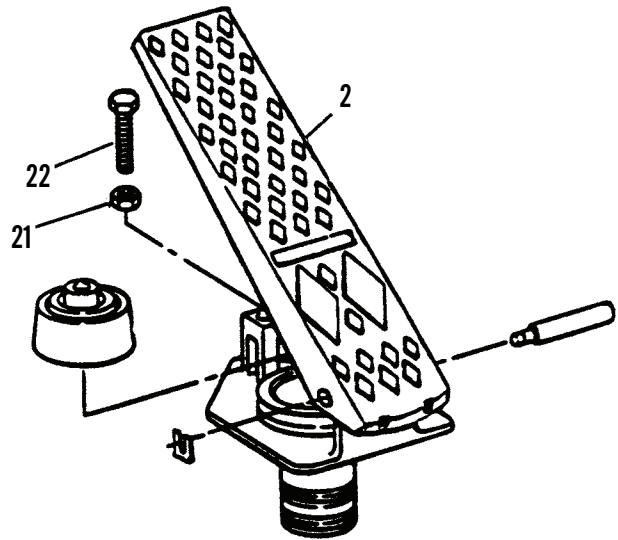
ADJUSTMENT - CONTINUED

5. Loosen jamnut (21) and turn stop screw (22) on accelerator pedal (2) fully clockwise.
6. Depress accelerator pedal (2) fully and hold. Turn stop screw (22) counterclockwise until head of stop screw touches pedal (2).
7. Release accelerator pedal (2) and tighten jamnut (21).

NOTE

Optimum engine idle range is 850 to 950 rpm.

8. Use STE/ICE-R to check engine rpm at idle and at full throttle (WP 0008 00). If necessary, readjust cable (1) and stop screw (22), as required, until engine rpm readings are within limits.



409-210

END OF WORK PACKAGE

ACCELERATOR CABLE MAINTENANCE (165 HP)

0049 00

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
Simplified Test Equipment for Internal Combustion
Engines - Reprogrammable (STE/ICE-R) (Item
23, WP 0324 00)

Materials/Parts

Locknut (7)
Lockwasher (18)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-
10)

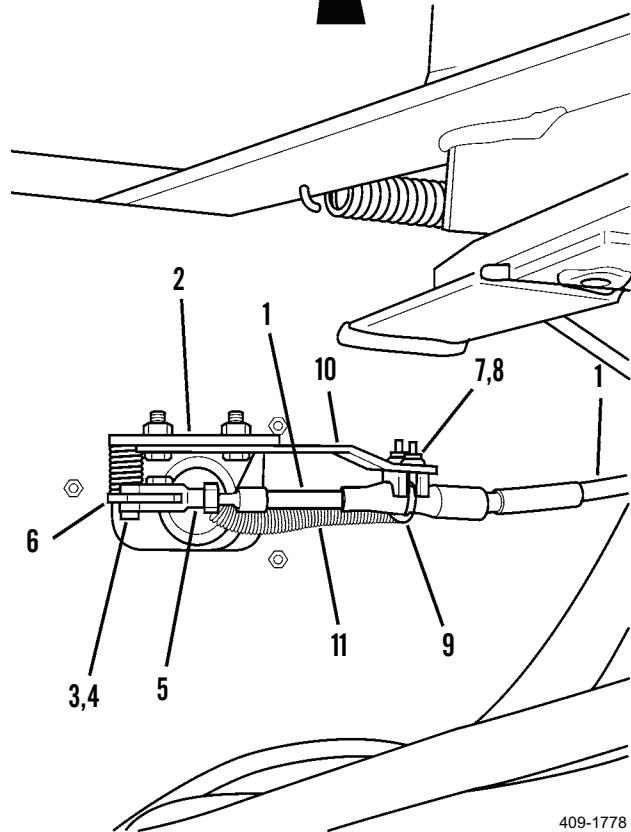
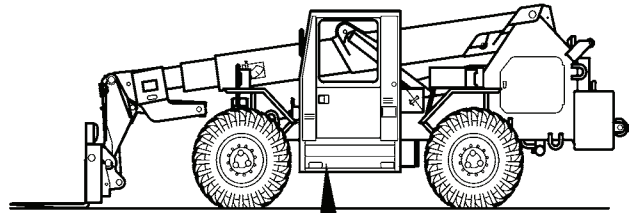


WARNING

- DO NOT smoke or permit any open flame in area of vehicle while you are servicing fuel system. Failure to follow this warning may result in injury or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death.

REMOVAL

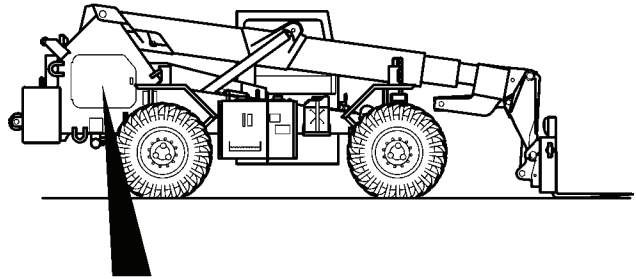
1. Remove accelerator cable (1) from accelerator pedal (2).
2. Remove spring clip (3) and clevis pin (4) from clevis (5) and accelerator pedal linkage (6).
3. Remove two locknuts (7), washers (8), cable clamp (9) and cable (1) from bracket (10). Discard locknuts.
4. Remove spring (11) from accelerator pedal linkage (6).



409-1778

REMOVAL - CONTINUED

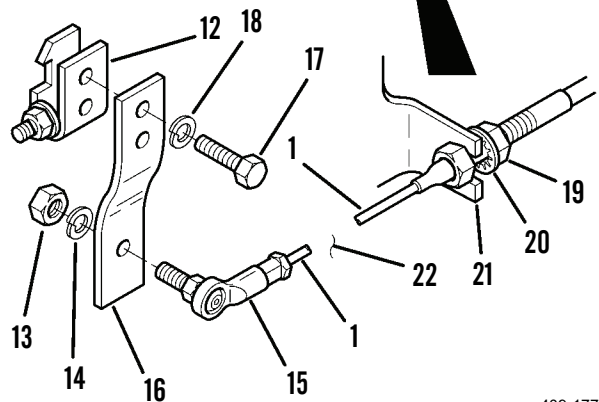
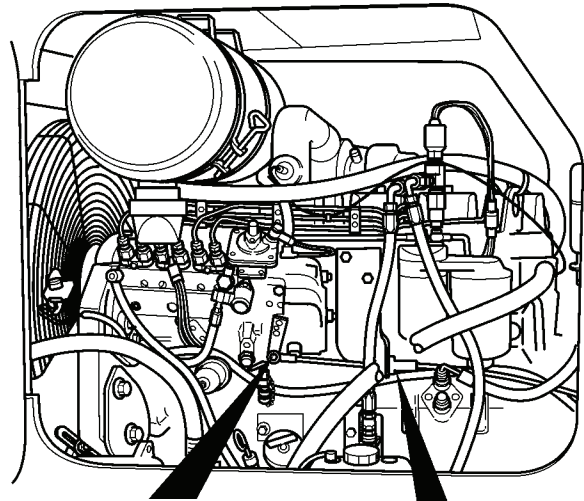
5. Remove accelerator cable (1) from fuel injection pump linkage (12).
6. Remove nut (13), lockwasher (14) and rod end connector (15) from bracket (16). Discard lockwasher.
7. Remove two screws (17), lockwashers (18) and bracket (16) from fuel injection pump linkage (12). Discard lockwashers.
8. Loosen nut (19) and starwasher (20). Remove cable (1) from bracket (21).



NOTE

Note routing of accelerator cable on vehicle frame for ease of installation. Cable is routed from engine compartment, along right frame and across to underside of cab floor.

9. Remove accelerator cable (1) from vehicle frame (22).



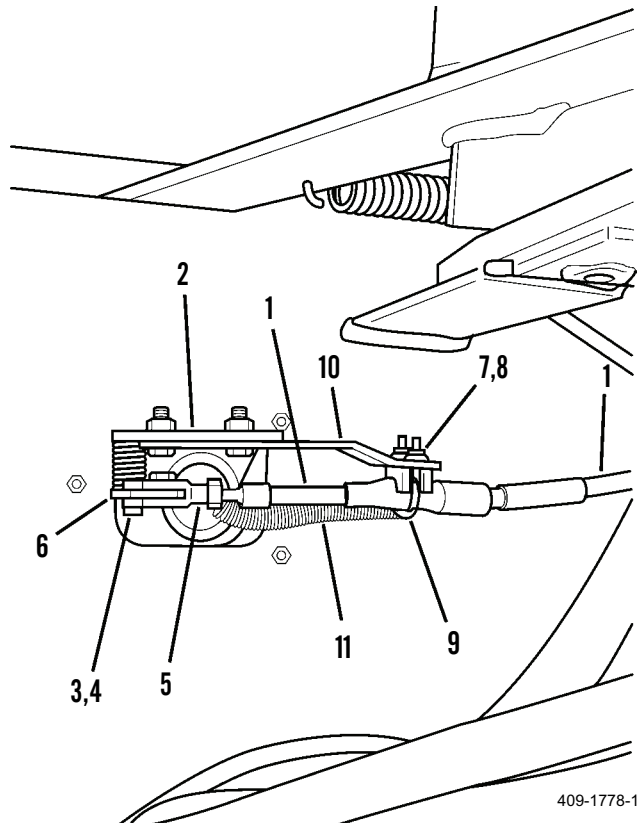
409-1779

INSTALLATION

1. Position accelerator cable (1) on vehicle frame (22).
2. Install accelerator cable (1) on fuel injection pump linkage (12).
3. Position cable (1) in bracket (21).
4. Install bracket (16) on fuel injection pump linkage (12) with two new lockwashers (18) and screws (17).
5. Install rod end connector (15) on bracket (16) with new lockwasher (14) and nut (13). Tighten starwasher (20) and nut (19).

INSTALLATION - CONTINUED

6. Install accelerator cable (1) on accelerator pedal (2).
7. Install clevis (5) on accelerator pedal linkage (6) with clevis pin (4) and spring clip (3).
8. Install spring (11) on accelerator pedal linkage (6).
9. Install cable (1) on bracket (10) with cable clamp (9), two washers (8) and new locknuts (7).
10. Check adjustment of accelerator cable (1). Adjust if necessary.



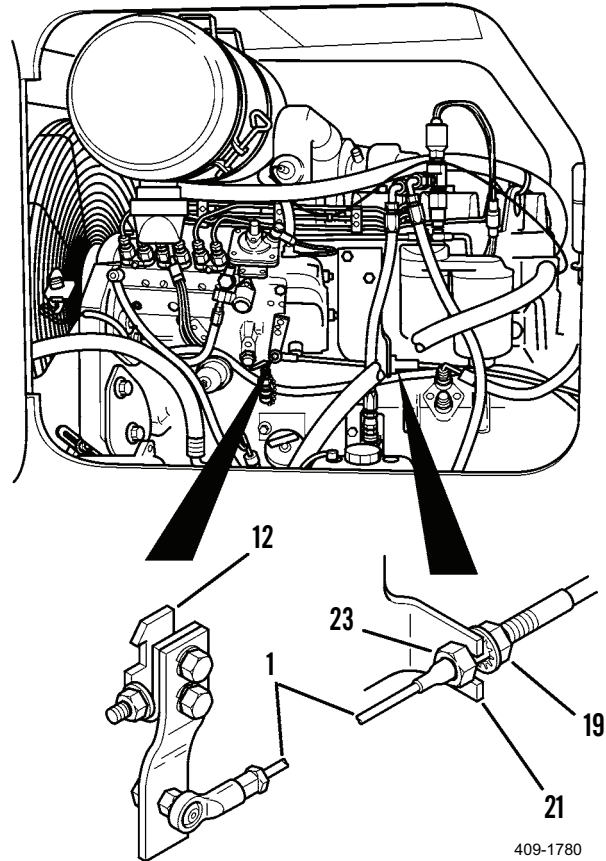
409-1778-1

ADJUSTMENT

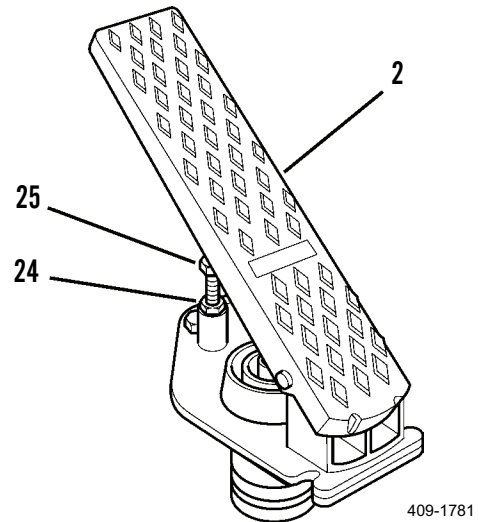
NOTE

With fuel injection pump linkage tight against idle stop screw, clevis pin should fit freely through clevis of cable. If not, adjust cable.

1. If necessary, adjust accelerator cable (1).
2. Loosen nuts (19) and (23) at bracket (21).
3. Reposition cable (1) until fuel injection pump linkage (12) is in neutral position.
4. Tighten nuts (19) and (23).



5. Loosen jamnut (24) and turn stop screw (25) on accelerator pedal (2) fully clockwise.
6. Depress accelerator pedal (2) fully and hold. Turn stop screw (25) counterclockwise until head of stop screw touches pedal.
7. Release accelerator pedal (2) and tighten jamnut (24).
8. Use STE/ICE-R to check engine rpm at idle and at full throttle (WP 0008 00). Readjust cable (1) and stop screw (25) as required until engine rpm readings are within limits.



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning, Inspection, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Simplified Test Equipment for Internal Combustion Engines - Reprogrammable (STE/ICE-R) (Item 23, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 40, WP 0323 00)
- Lockwasher (2 and 25)
- Bearing (17)
- Bearing (19)

References

- WP 0008 00
- WP 0316 00
- WP 0317 00

Equipment Condition

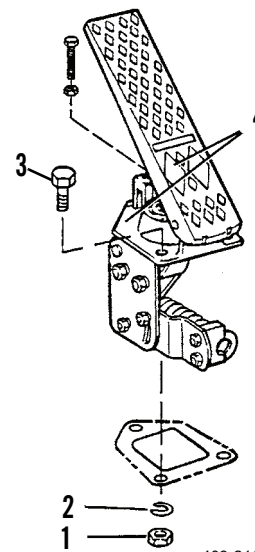
- Vehicle parked on level ground (TM 10-3930-660-10)
- Accelerator cable disconnected at pedal (WP 0048 00)

REMOVAL

NOTE

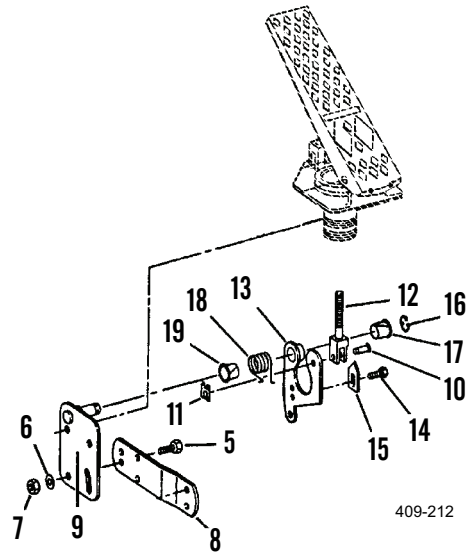
If necessary, have an assistant retain capscrews inside cab while nuts are removed.

1. Remove three nuts (1), three lockwashers (2) and three capscrews (3) securing accelerator pedal assembly (4) to cab. Discard lockwashers.
2. Remove accelerator pedal assembly (4) from cab.



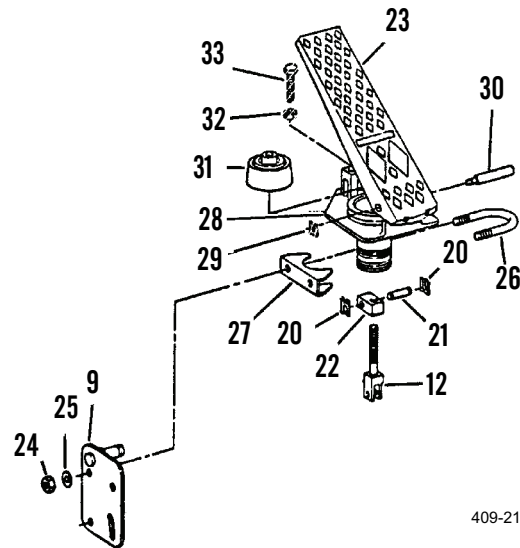
DISASSEMBLY

1. Remove screw (5), flatwasher (6) and nut (7), securing cable support bracket (8) to hanger plate assembly (9).
2. Remove pin (10) and spring clip (11) securing pushrod (12), to lever assembly (13).
3. Remove hex bolt (14) and travel stop (15) from lever assembly (13).
4. Remove circlip (16), bearing (17), lever assembly (13), spring (18) and bearing (19) from shaft of hanger plate assembly (9). Discard bearings.



409-212

5. Remove two spring clips (20) and long pin (21) securing block assembly (22) and pushrod (12) to pedal (23).
6. Remove pushrod (12) from block assembly (22).
7. Remove nut (24), lockwasher (25), U-bolt (26) and bracket (27) securing hanger plate assembly (9) to pedal base (28). Discard lockwasher.
8. Remove spring clip (29) and pivot pin (30) securing pedal (23) to pedal base (28).
9. Remove bellows (31) from pedal base (28).
10. Loosen jamnut (32) and remove capscrew (33) and jamnut from pedal base (28).



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CLEANING

Refer to *Cleaning Instructions* (WP 0316 00).

INSPECTION

Refer to *Inspection Instructions* (WP 0317 00).

ASSEMBLY

1. Install jamnut (32) and capscrew (33) to pedal base (28).
2. Install bellows (31) to pedal base (28).

ASSEMBLY - CONTINUED

3. Secure pedal (23) to pedal base (28) with pivot pin (30) and spring clip (29).
4. Install pushrod (12) to block assembly (22).
5. Secure block assembly (22) and pushrod (12) to pedal (23) with long pin (21) and two spring clips (20).
6. Secure hanger plate assembly (9) to pedal base (28) with U-bolt (26), bracket (27), new lockwasher (25) and nut (24).
7. Install new bearing (19), spring (18), lever assembly (13), new bearing (17) and circlip (16) on shaft of hanger plate assembly (9).
8. Secure travel stop (15) to lever assembly (13) with capscrew (14).
9. Secure pushrod (12) to lever assembly (13) with short pin (10) and spring clip (11).
10. Secure cable support bracket (8) to hanger plate assembly (9) with screw (5), flatwasher (6) and nut (7).

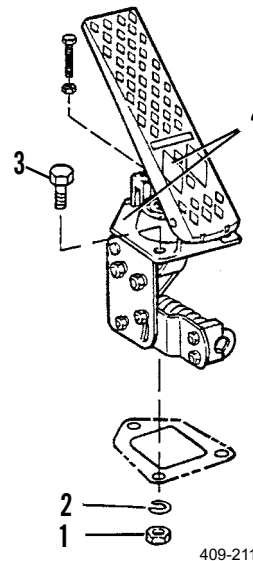
INSTALLATION

1. Position accelerator pedal assembly (4) on cab.

NOTE

Apply loctite to threads of capscrews. Have an assistant retain capscrews inside cab while nuts are installed.

2. Secure accelerator pedal assembly (4) to cab with three capscrews (3), three new lockwashers (2), and three nuts (1).
3. Connect accelerator cable to accelerator pedal (4) (WP 0048 00).



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4. Loosen jamnut (32) and turn capscrew (33) on accelerator pedal assembly (4) fully clockwise.
5. Depress accelerator pedal to the end of its travel and hold. Turn capscrew (33) counterclockwise until head of capscrew touches pedal.
6. Release accelerator pedal and tighten jamnut (32).
7. Use STE/ICE-R to check engine rpm at full throttle (WP 0008 00). If necessary, readjust capscrew (33), as required, until engine full throttle rpm is within limits.

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

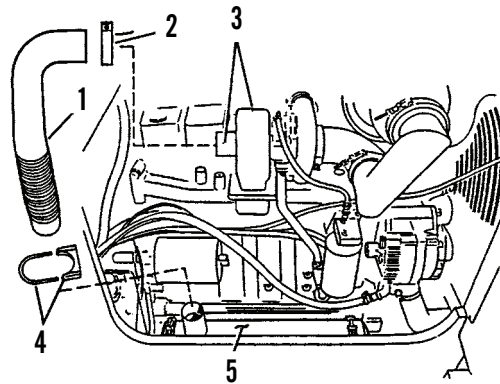
Engine off and cool (TM 10-3930-660-10)

REMOVAL

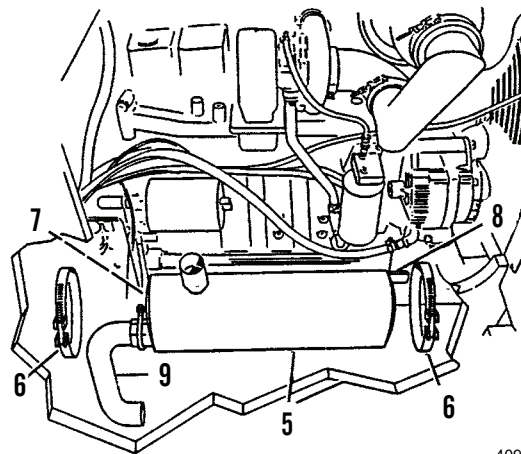
NOTE

- If desired, the tailpipe can be removed and installed without removing the muffler. Refer to step 3 of *Removal* and step 1 of *Installation*.
- The muffler and tailpipe are accessed through the left-hand engine door.

1. Remove clamp (2) at turbocharger (3).
2. Remove clamp (4) at muffler (5).
3. Remove exhaust pipe (1) from turbocharger (3) and muffler (5).
4. Remove two clamps (6) that secure muffler (5) to engine mounts (7 and 8).
5. Remove muffler (5) and tailpipe (9) as an assembly.



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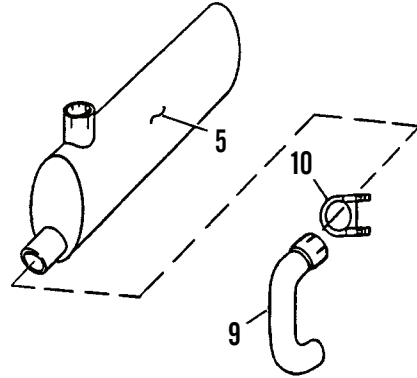
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REMOVAL - CONTINUED

6. Loosen clamp (10).
7. Remove tailpipe (9) from muffler (5).

INSTALLATION

1. Position clamp (10) and tailpipe (9) on muffler (5).
2. Tighten clamp (10).



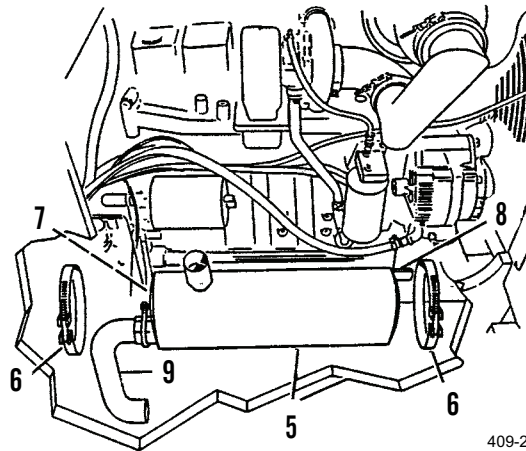
409-218

3. Loosen two clamps (6) and place clamps around muffler (5).
4. Position and support muffler (5) and tailpipe (9) as an assembly next to engine mounts (7 and 8).
5. Slide clamps (6) over engine mounts (7 and 8).

CAUTION

Springs on clamps must not be fully compressed or damage to muffler may result.

6. Tighten two clamps (6).



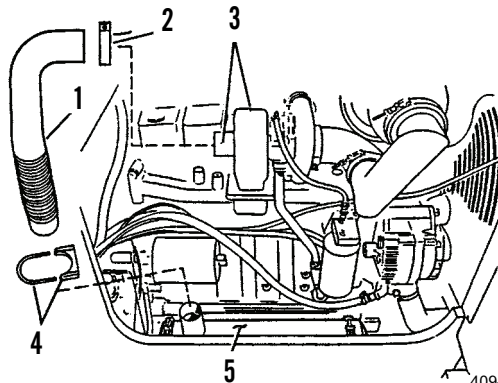
409-217

7. Place exhaust pipe (1) on openings of turbocharger (3) and muffler (5).

NOTE

To prevent exhaust leaks, be sure exhaust pipe is pushed far enough onto muffler opening.

8. Install and tighten clamp (4) at muffler (5).
9. Install and tighten clamp (2) at turbocharger (3).



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END OF WORK PACKAGE

EXHAUST PIPE REPLACEMENT

0052 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

REMOVAL**NOTE**

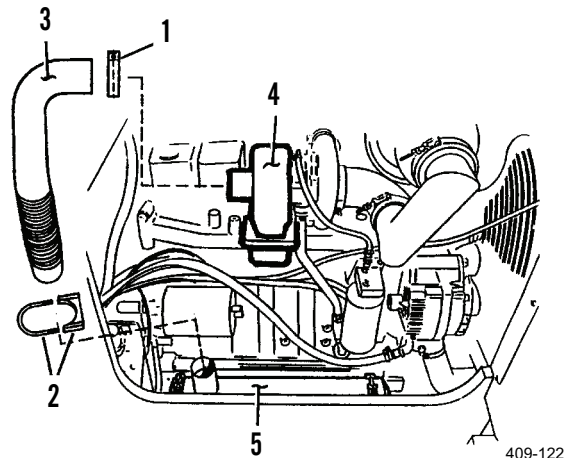
The exhaust pipe is accessed through the left-hand engine access door.

1. Loosen clamps (1 and 2) securing exhaust pipe (3) to turbocharger (4) and muffler (5).
2. Remove exhaust pipe (3) from openings on turbocharger (4) and muffler (5).

INSTALLATION**NOTE**

To prevent exhaust leaks, be sure exhaust pipe is pushed far enough onto the turbocharger and muffler.

1. Position exhaust pipe (3) on openings of turbocharger (4) and muffler (5).
2. Tighten clamps (1 and 2) to secure exhaust pipe (3) to turbocharger (4) and muffler (5).

**END OF WORK PACKAGE**

RADIATOR MAINTENANCE

0053 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation, Pressure Testing Cooling System

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Antifreeze (Item 6, WP 0323 00)

Sealant, Loctite (Item 44, WP 0323 00)

Clamp (9, 21 and 22)

Container, 10 gal.

Locknut (40 and 44)

Lockwasher (13, 30, 33 and 36)

References

WP 0145 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

Load backrest removed from storage position, if stored (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

**WARNING**

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

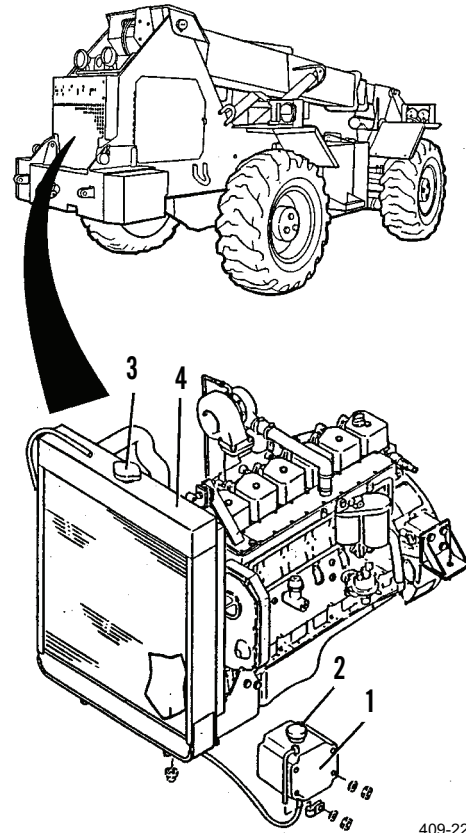
SERVICE

1. Check coolant level in the overflow tank (1). Tank should be 1/3 to 2/3 full.

NOTE

A 50-50 mixture of ethylene glycol and clean water is used in the 6K Forklift. Use of plain water coolant is not recommended. Never add coolant without first diluting to a 50-50 mixture.

2. If overflow tank (1) is between 1/3 full and empty, open overflow tank cap (2) and add 1 qt (0.95 L) of coolant. Close cap.
3. If overflow tank (1) is completely empty, open overflow tank cap (2) and add 2 qt (1.9 L) of coolant. Close cap. Slowly remove radiator cap (3) and allow pressure to escape. Add coolant to radiator (4), as necessary, until coolant level reaches bottom of filler neck. Install radiator cap.



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NOTE

Use containers to catch coolant when draining cooling system in steps 4 thru 8.

4. Open drain cock (5) at bottom of radiator (4).

NOTE

Open drain cock only enough to allow air into system.

5. Open drain cock (6) at top of engine where heater hose (7) attaches.
6. Disconnect hose (8) at bottom of overflow tank (1).
7. Remove two clamps (9) securing cab heater hoses (7 and 10) to two connectors (11). Tag and remove hoses from connectors (11). Discard clamps.
8. Allow all coolant to drain from the cooling system.
9. To flush engine cooling system, position cab heater hoses (7 and 10) on two connectors (11) as tagged and secure with two new clamps (9).
10. Connect hose (8) to bottom of overflow tank (1).
11. Close drain cock (5) at bottom of radiator (4).
12. Open cap (2) of overflow tank (1) and add 2 qt (1.9 L) of clean water. Close cap.

SERVICE - CONTINUED

13. Slowly fill the radiator (4) through the filler neck until water begins to run out of drain cock (6) at top front of engine.
14. Close drain cock (5). Continue filling radiator (4) until water level reaches filler neck.
15. Clean seal on radiator cap (3) and install radiator cap to radiator (4).

NOTE

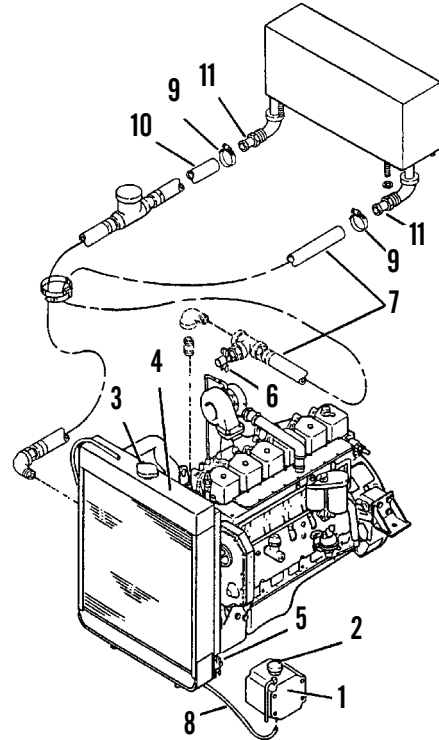
Check for cooling system leaks during step 16.

16. Start engine and allow to idle for 1/2 hour. Stop engine and allow to cool (TM 10-3930-660-10).
17. Slowly remove radiator cap (3) from radiator (4) and allow pressure to escape.

NOTE

Use containers to catch used water when draining cooling system in steps 18 thru 22.

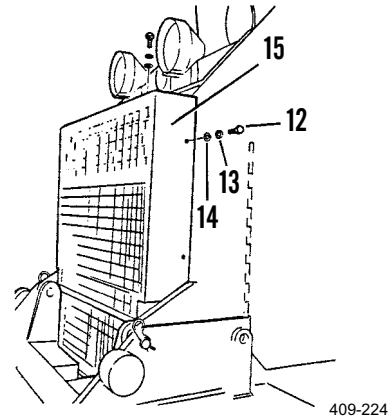
18. Open drain cock (6) at top of engine where heater hose (6) attaches to engine.
19. Open drain cock (5) at bottom of radiator (4).
20. Disconnect hose (8) at bottom of overflow tank (1).
21. Remove two clamps (9) securing cab heater hoses (7 and 10) to two connectors (11). Tag and remove hoses from connectors (11). Discard clamps.
22. Allow all used water to drain from the cooling system.
23. To fill engine cooling system with coolant, position cab heater hoses (7 and 10) on two connectors (11), as tagged, and secure with two new clamps (9).
24. Connect hose (8) to bottom of overflow tank (1).
25. Close drain cock (5) at bottom of radiator (4).
26. Open cap (2) of overflow tank (1) and add 2 qt (1.8 L) of coolant. Close cap.
27. Slowly fill the radiator (2) through the filler neck with coolant until coolant begins to run out of drain cock (6) at top front of engine. Close drain cock (5). Continue filling radiator until coolant level reaches filler neck.
28. Clean seal on radiator cap (3) and install radiator cap to radiator (4).
29. Run the engine until normal engine operating temperature is reached. Check for coolant leaks. Turn heater on and make sure heated air is being emitted.
30. Stop the engine and let it cool (TM 10-3930-660-10). Check coolant level at overflow tank (1) and add coolant, if necessary.
31. If removed from storage position, install the load backrest at rear of vehicle (TM 10-3930-660-10).



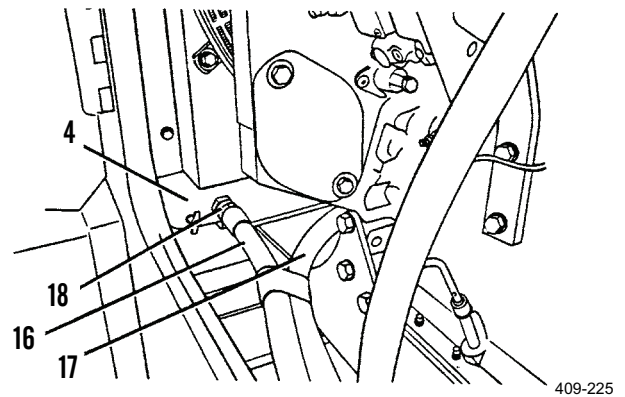
409-222

REMOVAL

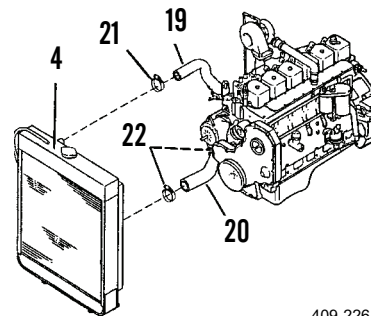
1. Remove counterweight (WP 0145 00).
2. Remove eight bolts (12), eight lockwashers (13) and eight flatwashers (14) securing radiator cover (15) to vehicle frame.
3. Remove radiator cover (15) from vehicle frame.



4. Drain cooling system as described in service section, steps 4 thru 8.
5. Tag and remove transmission oil cooler hoses (16 and 17), and two connectors (18) from bottom of radiator (4).

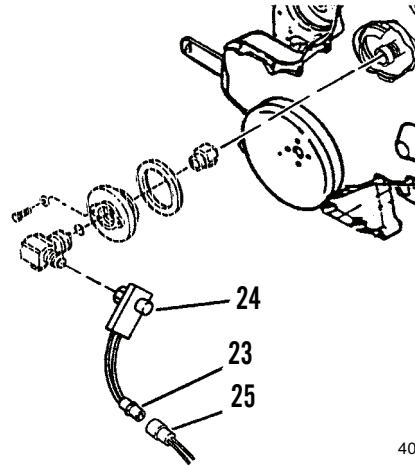


6. Remove engine cooling hoses (19 and 20) from radiator (4).
7. Remove clamp (21) securing upper engine cooling hose (19) and remove hose (19) from radiator (4). Discard clamp.
8. Remove two clamps (22) securing lower engine cooling hose (20) to radiator (4) and engine. Remove hose (20) from engine first and then from radiator (4). Discard clamps.



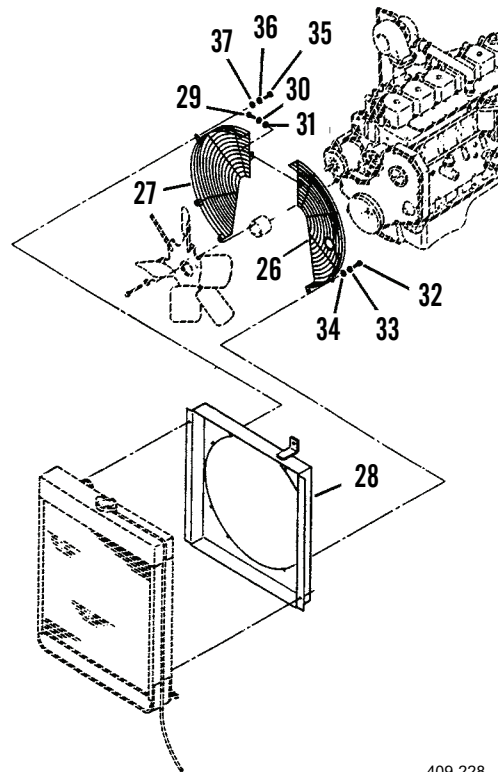
REMOVAL - CONTINUED

9. Pull and remove male connector (23) of pulse tachometer (24) from female connector (25) of vehicle wiring harness.



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10. Remove screw (29), lockwasher (30), and flatwasher (31) securing right-hand fan guard (26) to left-hand fan guard (27). Discard lockwasher.
11. Remove four screws (32), lockwashers (33), and flatwashers (34) retaining the right-hand fan guard (26) to radiator shroud (28). Discard lockwashers.
12. Remove right-hand fan guard (26) from engine compartment.
13. Remove four screws (35), lockwashers (36), and flatwashers (37) retaining left-hand guard (27) to radiator shroud (28). Discard lockwashers.
14. Remove left-hand fan guard (27) from engine compartment.



409-228

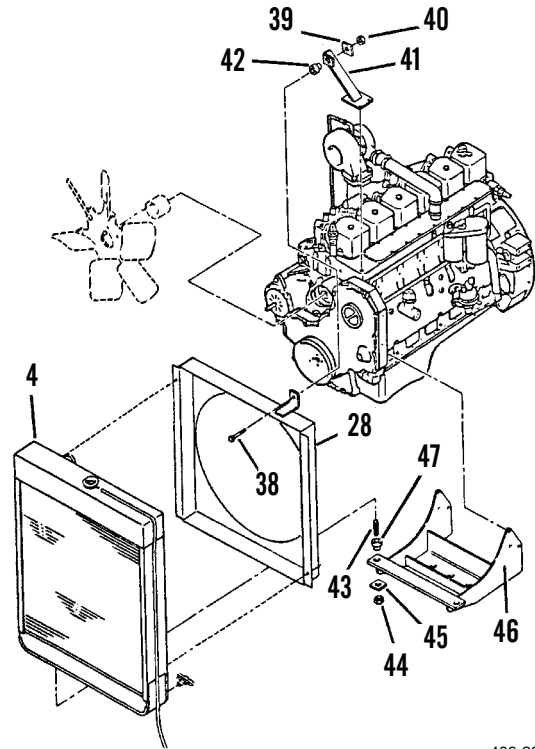
REMOVAL - CONTINUED

15. Remove capscrew (38), washer (39), and locknut (40) securing bracket (41) to radiator shroud (28). Leave rubber bushing (42) installed to bracket (41). Discard locknut.
16. Have an assistant support the radiator (4).

NOTE

Studs (43) may unscrew from radiator as nuts are removed.

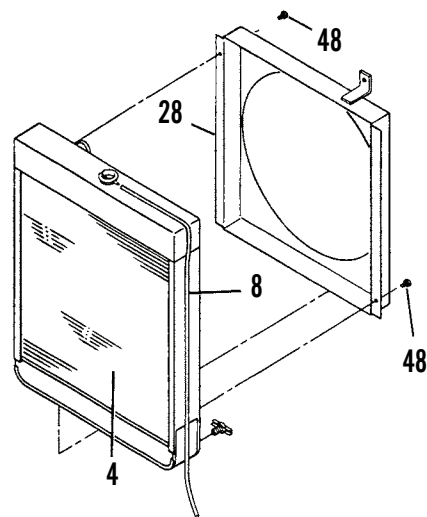
17. Remove two locknuts (44) and two rebound washers (45) securing radiator (4) to radiator support (46). Discard locknuts.
18. Remove radiator (4) from engine compartment.
19. Remove two rubber mounts (47) from radiator (4).
20. Remove radiator shroud (28) from radiator (4).
21. Remove eight capscrews (48), securing radiator shroud (28) to radiator (4).
22. Remove shroud (28) from radiator (4).
23. Remove overflow hose (8) from radiator (4).



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INSTALLATION

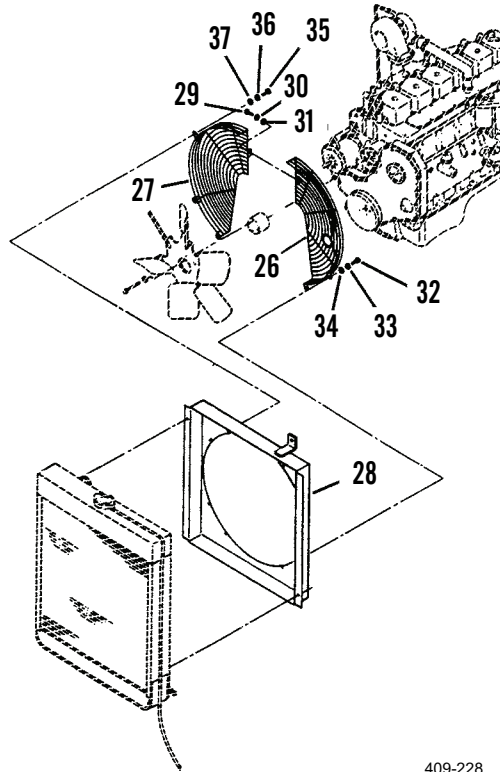
1. Install overflow hose (8) to radiator (4).
2. Install radiator shroud (28) to radiator (4).
3. (28) on radiator (4).
4. Secure shroud (28) to radiator (4) with eight capscrews (48).
5. If removed, install studs (43) to radiator (4).
6. Install two rubber mounts (47) to radiator (4).
7. Position radiator (4) on radiator support (46).
8. Install radiator (4) to radiator support (46) with two rebound support washers (45) and two new locknuts (44).
9. Install bracket (41) to radiator shroud (28) with cap-screw (38), washer (39) and new locknut (40).



409-230

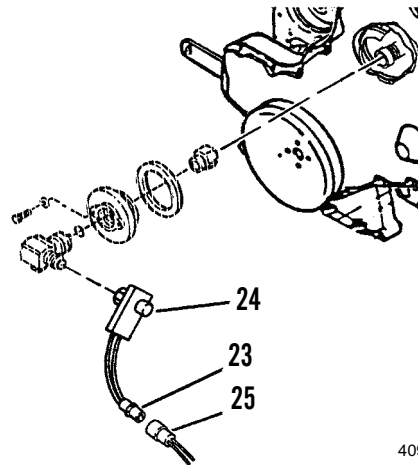
INSTALLATION - CONTINUED

10. Position shroud and position left-hand fan guard (27) on radiator shroud (28).
11. Secure left-hand fan guard (27) to radiator shroud (28) with four flatwashers (37), four new lockwashers (36) and four screws (35).
12. Position right-hand fan guard (26) on radiator shroud (28).
13. Install right-hand fan guard (26) to radiator shroud (28) with four flatwashers (34), four new lockwashers (33) and four screws (32).
14. Install right-hand fan guard (26) to left-hand fan guard (27) with flatwasher (31), new lockwasher (30) and screw (29).



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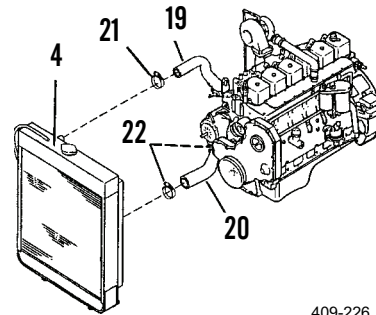
15. Push and install male connector (23) of pulse tachometer (24) into female connector (25) of vehicle wiring harness.



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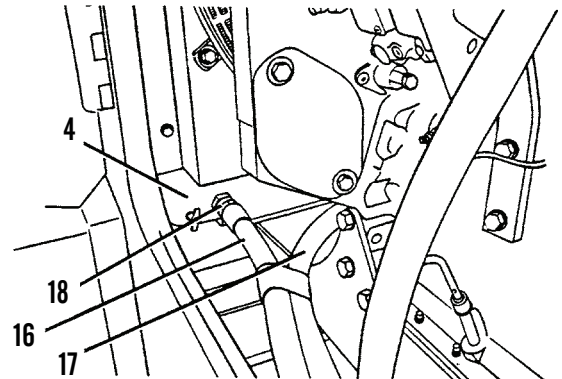
INSTALLATION - CONTINUED

16. Position upper engine cooling hose (19) on radiator (4) and secure with new clamp (21).
17. Position lower engine cooling hose (20) on engine first, then on radiator (4). Secure with two new clamps (22).



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18. Install transmission oil cooler hoses (16 and 17), and two connectors (18) to bottom of radiator (4).
19. Install counterweight (WP 0145 00).
20. Fill radiator (4) as described in *Service*.

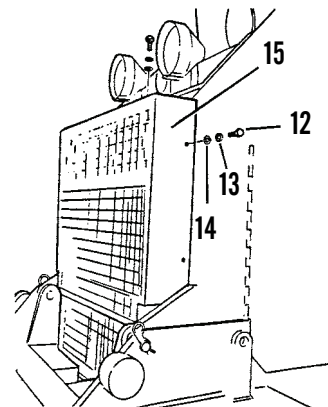


409-225

NOTE

Apply loctite to bolts.

21. Install radiator cover (15) to vehicle frame with eight flatwashers (14), eight new lockwashers (13), and eight bolts (12).



409-224

22. If removed from storage position, install the load backrest at rear of vehicle.
23. Connect battery cables (WP 0107 00).

PRESSURE TESTING COOLING SYSTEM**NOTE**

If cooling system pressure loss is suspected, check radiator cap first. Any foreign material or deposits on cap, cap seal, or radiator opening can cause pressure loss.

1. Remove radiator cap (3).

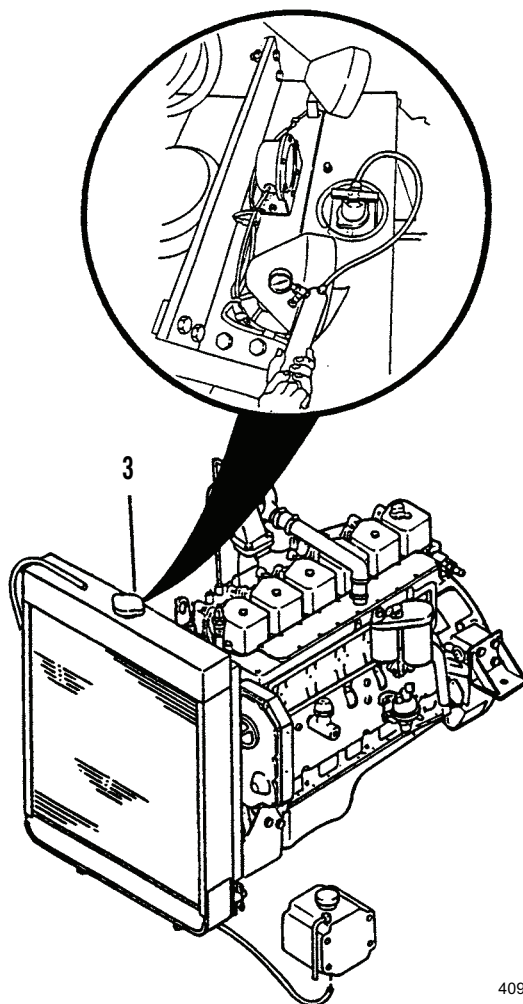
NOTE

Make sure the radiator is adequately filled.

2. Attach cooling system pressurizer to radiator filler neck.
3. Pressurize cooling system to between 8 and 10 psi (55 and 69 kPa).
4. Check cooling system for leakage.
5. Check radiator for visible leakage. Replace radiator if leaks are present. Refer to *Removal* and *Installation*.
6. Check all connections and hoses of cooling system for visible leakage.

NOTE

- If leakage is not observed in steps 5 and 6 above, continue to pressurize system for five minutes and observe pressure gage on cooling system pressurizer.
 - If pressure remains constant after five minutes of pressurization, radiator and cooling system do not have leakage.
 - If pressure lowers during five minutes of pressurization, internal cooling system leak in engine or transmission is present.
7. After test is completed, remove pressurizer from radiator filler neck and install radiator cap (3).
 8. If removed from storage position, install the load brackets at rear of vehicle (TM 10-3930-660-10).



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END OF WORK PACKAGE

COOLANT OVERFLOW TANK REPLACEMENT

0054 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Antifreeze (Item 6, WP 0323 00)

Container, 2 qt

Materials/Parts - Continued

Locknut (3)

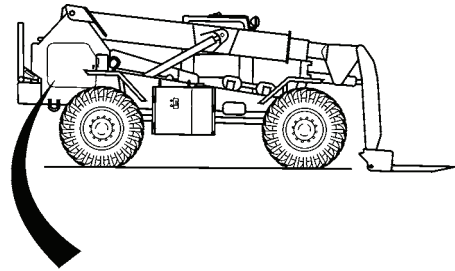
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

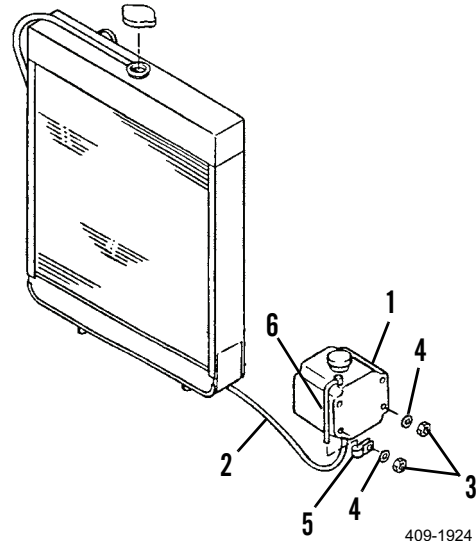
REMOVAL

1. Place container under tank (1).
2. Disconnect hose (2) from bottom of tank (1) and allow coolant to drain from tank.
3. Remove four locknuts (3), four flatwashers (4), clamp (5) and coolant overflow tank (1). Discard locknuts.



INSTALLATION

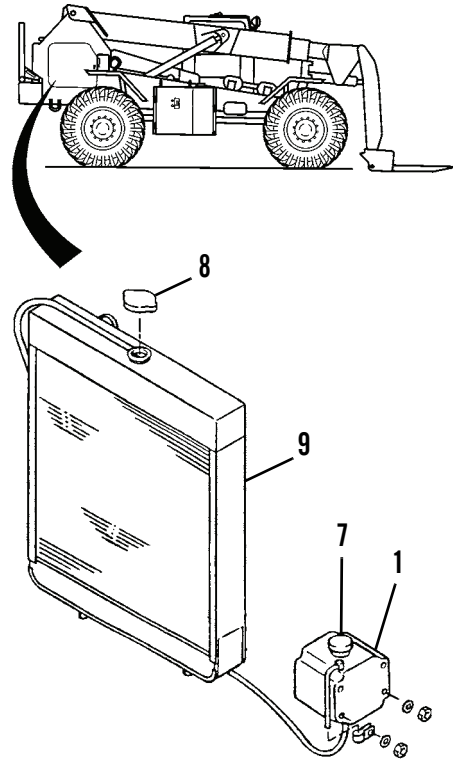
1. Position clamp (5) around discharge hose (6) of tank (1).
2. Position tank (1) on vehicle and install four flatwashers (4) and four new locknuts (3).
3. Connect hose (2) to bottom of tank (1).



INSTALLATION - CONTINUED**NOTE**

A 50-50 mixture of ethylene glycol and clean water is used in the 6K Forklift. Use of plain water coolant is not recommended. Never add coolant without first diluting to a 50-50 mixture.

4. To fill overflow tank (1), open overflow tank cap (7).
5. Add 2 qts of coolant to overflow tank (1).
6. Close overflow tank cap (7).
7. Slowly remove radiator cap (8) and allow pressure to escape.
8. Add coolant to radiator (9) as necessary, until coolant level reaches bottom of filler neck.
9. Install radiator cap (8).
10. Start engine and check for leaks (TM 10-3930-660-10).



409-4022

END OF WORK PACKAGE

THERMOSTAT AND WATER OUTLET REPLACEMENT

0055 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Clamp (7)

Gasket (10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

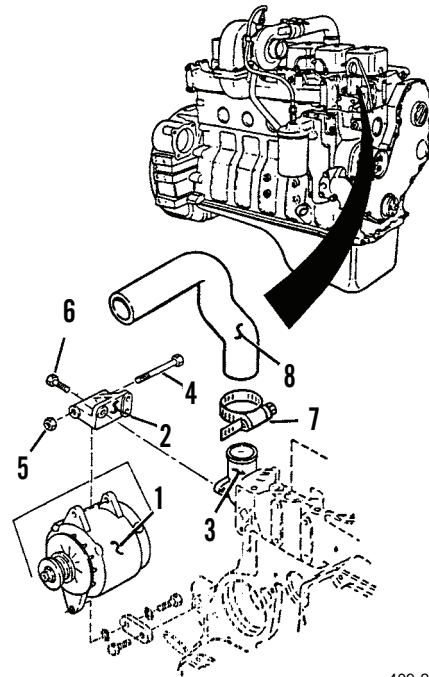
Coolant drained from engine cooling system (WP 0053 00)

Drive belt removed from alternator pulley (WP 0061 00)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. Remove alternator (1) from alternator support (2) and remove support from water outlet (3).
2. Remove capscrew (4) and nut (5) securing alternator (1) to support (2).
3. Position alternator (1) away from support (2).
4. Remove three capscrews (6) and support (2) from water outlet (3).
5. Remove clamp (7) and hose (8) from water outlet (3). Discard clamp.



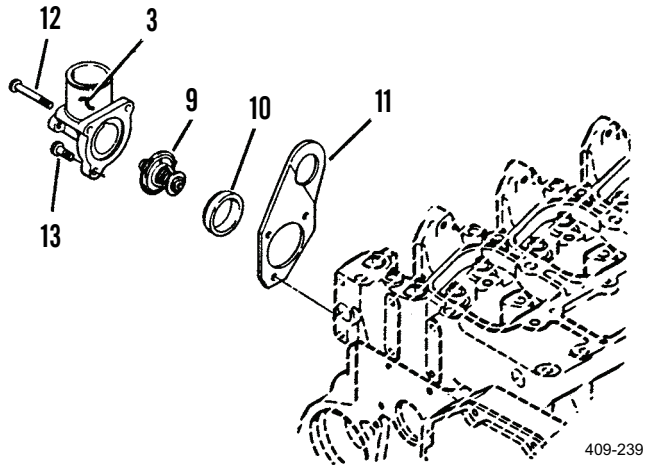
409-238

REMOVAL - CONTINUED

NOTE

Note position of thermostat and gasket in water outlet for use during installation.

6. Remove water outlet (3), thermostat (9), gasket (10) and lifting bracket (11) from engine. Discard gasket.
7. Remove two bolts (12) and one capscrew (13) from thermostat housing (3).
8. Remove water outlet (3), thermostat (9), gasket (10) and lifting bracket (11) from engine. Discard gasket.



INSTALLATION

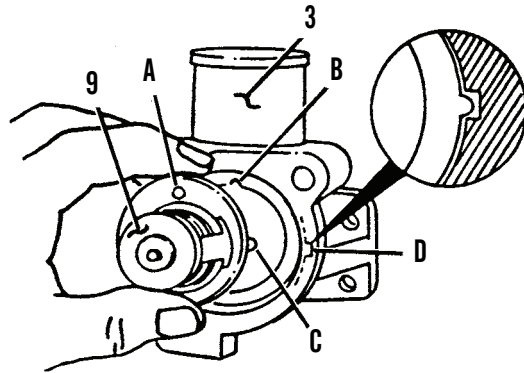
CAUTION

Make sure thermostat and gasket are properly positioned as noted during removal to avoid coolant leaks and thermostat malfunction.

NOTE

Clean all sealing surfaces thoroughly before installing thermostat, new gasket and water outlet.

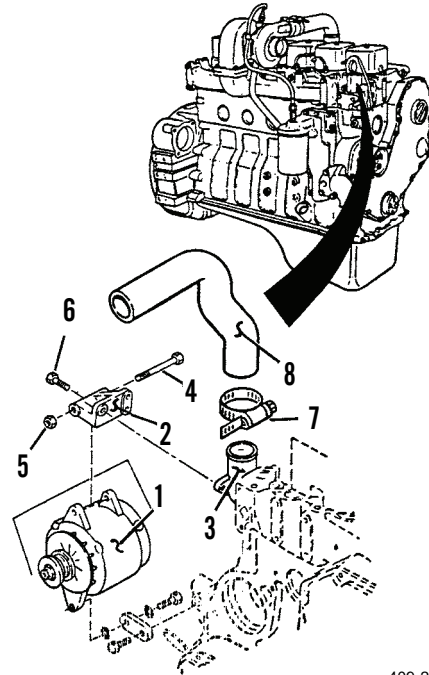
1. Install water outlet (3), thermostat (9), new gasket (10) and lifting bracket (11) to engine.
2. Position thermostat (9), in water outlet (3), with pin (A) in notch (B) and tang (C) in slot (D).



3. Position water outlet (3), thermostat (9), new gasket (10) and lifting bracket (11), on engine.
4. Install two bolts (12) and one capscrew (13) to water outlet (3). Torque bolts (12) and capscrew to 6 lb-ft (8 Nm).

INSTALLATION - CONTINUED

5. Position hose (8) on water outlet (3). Secure with new clamp (7).
6. Install alternator support (2) to water outlet (3) and install alternator (1) to support (2).
7. Position support (2) on water outlet (3) and secure with three capscrews (6). Torque capscrews to 6 lb-ft (8 Nm).
8. Align alternator (1) with support (2).
9. Secure alternator (1) to support (2) with capscrew (4) and nut (5).



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10. Install drive belt to alternator pulley (WP 0061 00).
11. Connect battery cables (WP 0107 00).
12. Fill engine cooling system with coolant (WP 0053 00).

END OF WORK PACKAGE

RADIATOR HOSES MAINTENANCE

0056 00

THIS WORK PACKAGE COVERSRemoval, Installation, Inspection

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Rag, wiping (Item 40, WP 0323 00)

Clamp (2 and 4)

Equipment Condition

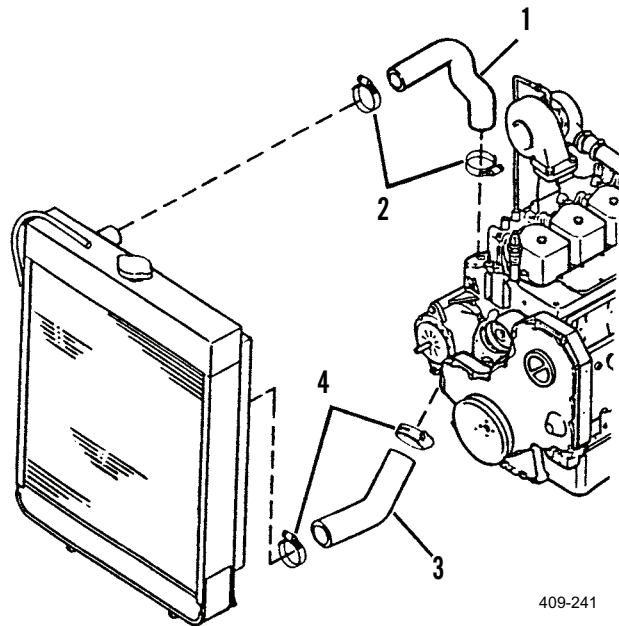
Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

Coolant drained from engine (WP 0053 00)

REMOVAL

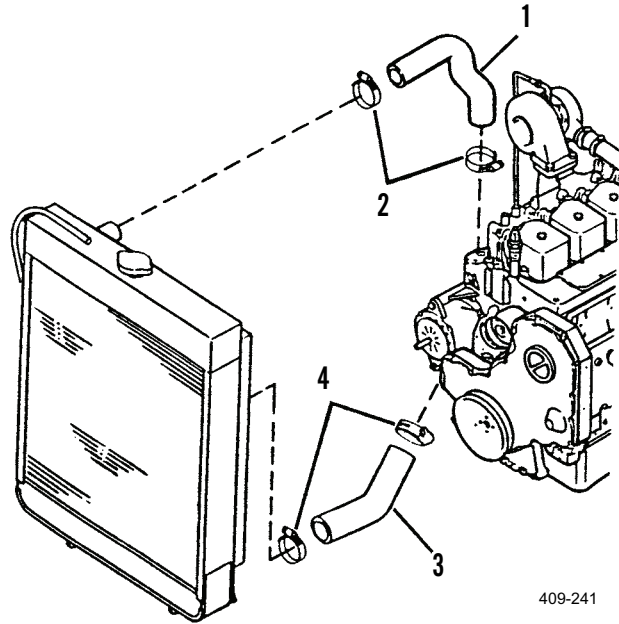
1. To remove upper radiator hose (1), loosen two clamps (2).
2. Remove upper radiator hose (1).
3. At lower radiator hose (3), loosen two clamps (4).
4. Remove lower radiator hose (3).
5. Remove and discard clamps (2 and 4).



INSTALLATION**NOTE**

Clean hose fittings on engine and radiator. Scrape all rubber residue from hose fittings to avoid coolant leaks.

1. Slide one end of upper hose (1) on engine water outlet.
2. Open two new clamps (2) and slide them on hose (1).
3. Slide other end of hose (1) on upper radiator fitting.
4. Position one new clamp (2) at each end of hose (1) and tighten clamps (2).
5. Slide one end of lower radiator hose (3) on lower radiator fitting.
6. Open two new clamps (4) and slide them on hose (3).
7. Slide other end of hose (3) on engine water inlet.
8. Position one new clamp (4) at each end of hose (3) and tighten clamps.



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9. Fill engine with coolant (WP 0053 00).

INSPECTION

1. Inspect upper (1) and lower (3) radiator hoses for cracks and cuts. Use mirror and flashlight to see backside of hoses.
2. Squeeze hoses (1 and 3) to check for soft spots.
3. If necessary, replace hoses (1 and 3). See *Removal* and *Installation*.

END OF WORK PACKAGE

WATER INLET MAINTENANCE

0057 00

THIS WORK PACKAGE COVERS

Removal, Installation, Inspection

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Clamp (2)

Seal (6)

Equipment Condition

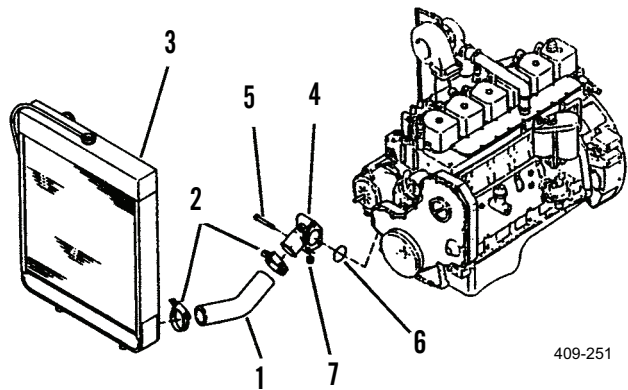
Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

Coolant drained from engine (WP 0053 00)

REMOVAL

1. To remove lower radiator hose (1), loosen two clamps (2) at lower radiator hose (1). Discard clamps.
2. Remove lower radiator hose (1) from radiator (3) and water inlet (4).
3. Remove water inlet (4).
4. Remove three bolts (5), water inlet (4) and seal (6) from engine. Discard seal.
5. If necessary, remove two plugs (7).



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INSTALLATION

NOTE

Clean hose fittings on engine and radiator. Scrape all rubber residue from hose fittings to avoid coolant loss.

1. If removed, install two plugs (7).
2. Install water inlet (4).
3. Position new seal (6) and water inlet (4) on engine.
4. Secure water inlet (4) with three bolts (5).
5. Install lower radiator hose (1).
6. Slide ends of lower radiator hose (1) on water inlet (4) and radiator (3).
7. Secure lower radiator hose (1) with two new clamps (2).
8. Fill coolant system with coolant (WP 0053 00).

END OF WORK PACKAGE

WATER PUMP REPLACEMENT

0058 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Gasket (4)

Equipment Condition

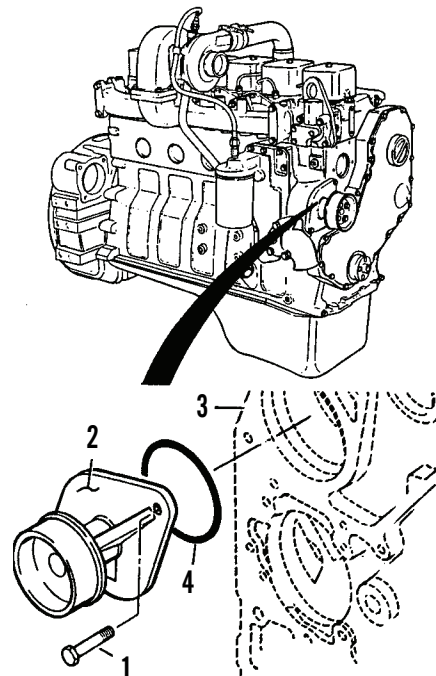
- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)
- Coolant drained (WP 0053 00)
- Left-hand fan guard removed (WP 0060 00)
- Drive belt removed (WP 0061 00)

REMOVAL

1. Remove two capscrews (1) holding water pump (2) to engine (3).
2. Remove water pump (2) and gasket (4). Discard gasket.

INSTALLATION

1. Clean sealing surface on engine (3) where water pump (2) attaches to engine (3).
2. Install new gasket (4) into groove on pump (2).
3. Install pump (2) using two capscrews (1). Tighten capscrews to 6 lb-ft (8 Nm).
4. Install new drive belt (WP 0061 00).
5. Install left-hand fan guard (WP 0060 00).
6. Fill radiator with coolant (WP 0053 00).



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END OF WORK PACKAGE

ENGINE COOLING FAN REPLACEMENT

0059 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 44, WP 0323 00)
- Locknut (3)
- Lockwasher (9)

References

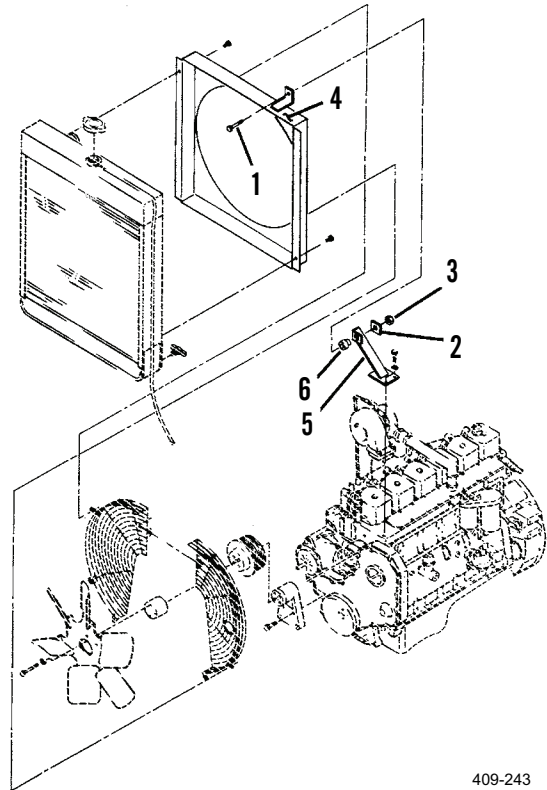
WP 0061 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Engine off and cool (TM 10-3930-660-10)

REMOVAL

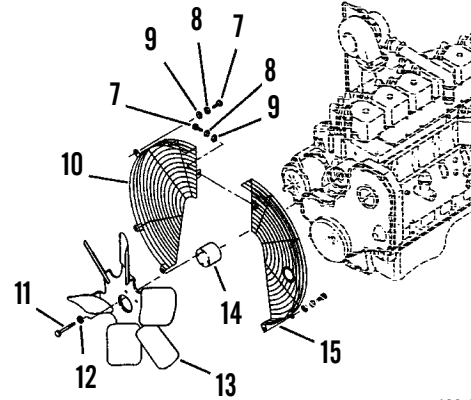
1. Remove drive belt from around alternator pulley to relieve belt tension (WP 0061 00).
2. Remove top radiator shroud capscrew (1), rebound washer (2) and locknut (3). Discard locknut.
3. Insert a prybar between radiator shroud (4) and bracket (5) and wedge the radiator shroud rearward. Leave the rubber mount (6) in bracket.



409-243

REMOVAL - CONTINUED

4. Remove five screws (7), five flatwashers (8) and five lockwashers (9) retaining the left half of the fan guard (10). Remove fan guard half (10). Discard lockwashers.
5. Remove four screws (11) and four flatwashers (12) from the fan (13).
6. Separate the fan (13) from the spacer (14). Rest the fan against the right half of the fan guard (15). Remove the spacer, then remove the fan and pulley (16).



409-244

INSTALLATION

CAUTION

To prevent damage to the engine, install the fan with the concave side of the blades toward the engine.

NOTE

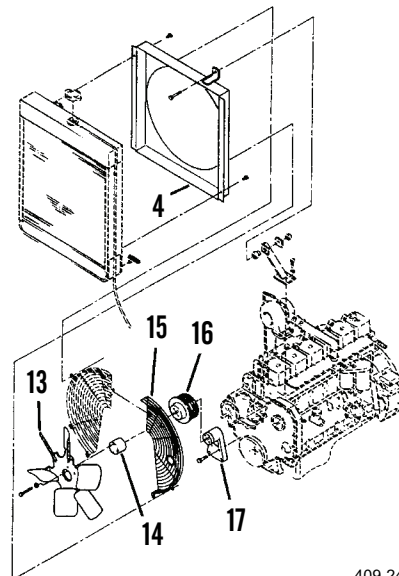
The prybar installed during removal may have to be loosened to install the fan.

1. Position the fan (13) loosely into the radiator shroud (4) opening. Rest fan on right guard (15).
2. Position pulley (16) and spacer (14) align bolt holes of fan (13), spacer and pulley.

CAUTION

Do not use lockwashers to secure the fan.
Use only flatwashers.

3. Apply loctite to threaded area of four screws (11). Install four screws and flatwashers (12) to secure fan (13). Torque to 6 lb-ft (8 Nm).

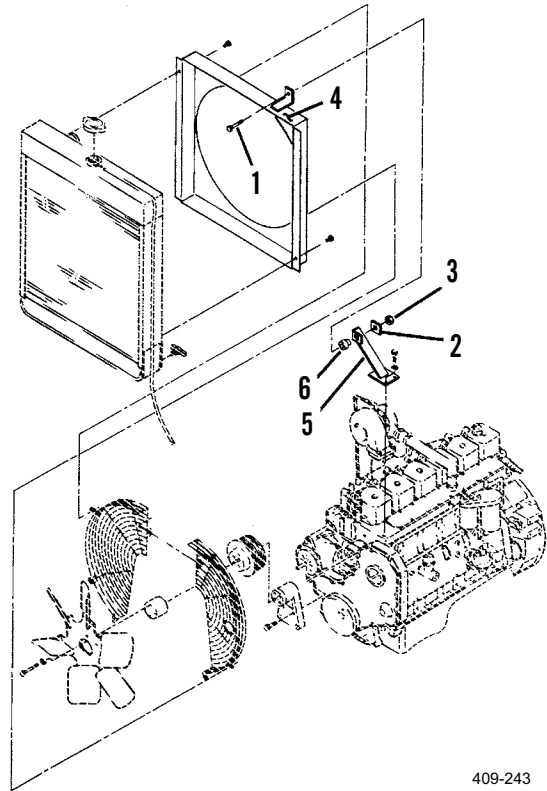


409-245

4. Install left guard half (10) using five screws (7), five flatwashers (8) and five new lockwashers (9).

INSTALLATION - CONTINUED

5. Remove prybar. Install capscrew (1), rebound washer (2) and new locknut (3). Torque to 23 lb-ft (31 Nm).
6. Install drive belt around alternator pulley. Be sure drive belt is routed properly around all engine pulleys (WP 0061 00).



409-243

END OF WORK PACKAGE

ENGINE COOLING FAN GUARDS REPLACEMENT

0060 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (3)

References

WP 0089 00

Equipment Condition

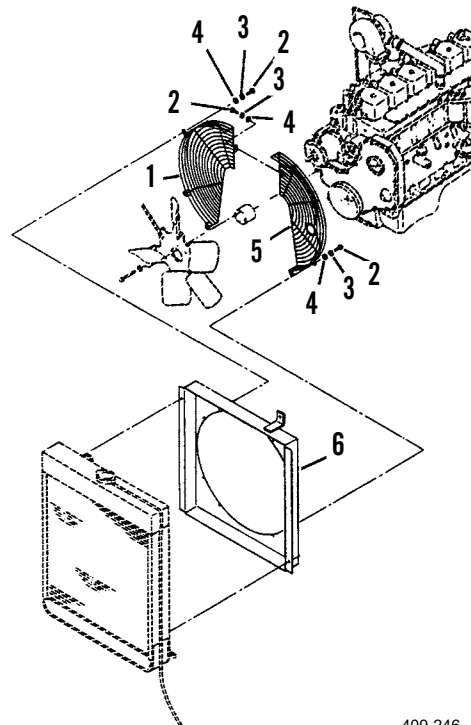
Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

REMOVAL**NOTE**

Right and left-hand fan guards may be removed and installed separately. If right-hand fan guard is to be removed, STE/ICE-R pulse tachometer must be removed first to provide clearance (WP 0089 00).

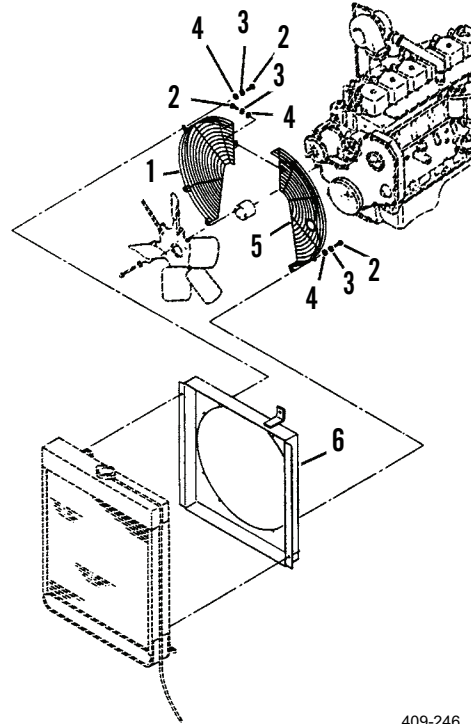
1. To remove left-hand fan guard (1), open left-hand engine access door, remove screw (2), lockwasher (3) and flatwasher (4) securing left-hand fan guard to right-hand fan guard (5). Discard lockwasher.
2. Remove four screws (2), lockwashers (3) and flatwashers (4) securing left-hand fan guard (1) to radiator shroud (6). Discard lockwashers.
3. Remove left-hand fan guard (1) from engine compartment.
4. To remove right-hand fan guard (5), open right-hand engine access door, remove four screws (2), lockwashers (3) and flatwashers (4) securing right-hand fan guard to radiator shroud (6). Discard lockwashers.
5. Remove right-hand fan guard (5) from engine compartment.



409-246

INSTALLATION

1. Through left-hand engine access door, position right-hand fan guard (5) on radiator shroud (6).
2. Secure right-hand fan guard (5) to radiator shroud (6) with four flatwashers (4), four new lockwashers (3) and four screws (2).
3. Through left-hand engine access door, position left-hand fan guard (1) on radiator shroud (6).
4. Secure left-hand fan guard (1) to radiator shroud (6) with four flatwashers (3), four new lockwashers (4) and four screws (2).
5. Secure left-hand fan guard (1) to right-hand fan guard (5) with flatwasher (4), new lockwasher (3) and screw (2).



409-246

6. If removed, install STE/ICE-R pulse tachometer (WP 0089 00).

END OF WORK PACKAGE

DRIVE BELT AND TENSIONER REPLACEMENT

0061 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 2 (Item 19, WP 0324 00)

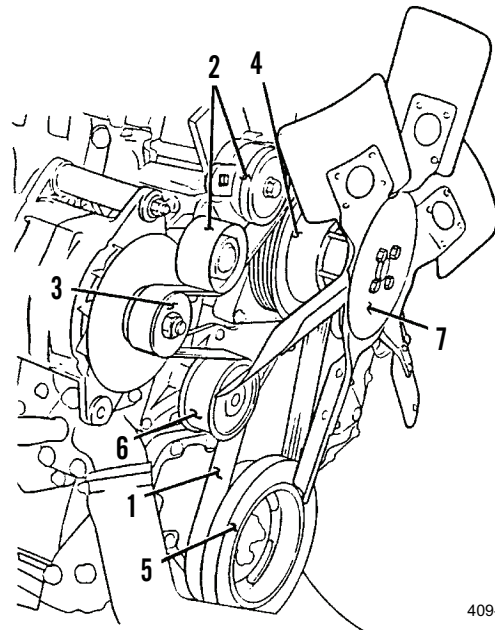
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Engine off and cool (TM 10-3930-660-10)
Fan guards removed (WP 0060 00)

REMOVAL**NOTE**

Drive belt deflection when measured mid-way between longest span of belt should be no greater than 1/2 in. (12.7 mm). If deflection is greater than 1/2 in. (12.7 mm), replace belt. Drive belt tension is not adjustable.

1. To remove drive belt (1), lift tensioner (2).
2. Remove belt (1) from alternator pulley (3), fan pulley (4), crankshaft pulley (5) and water pump pulley (6).
3. Remove belt (1) from around blades of fan (7) and remove from vehicle.
4. If necessary, remove tensioner (2).



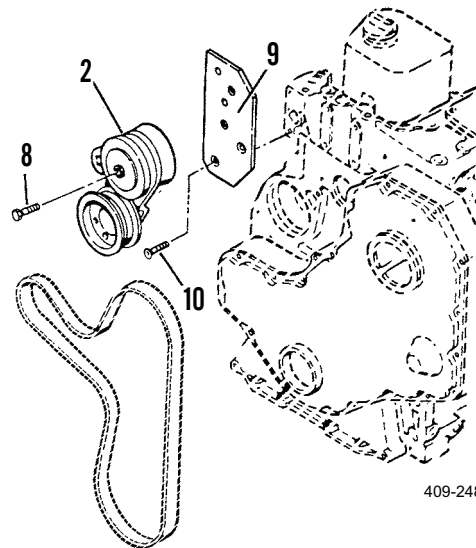
409-247

REMOVAL - CONTINUED

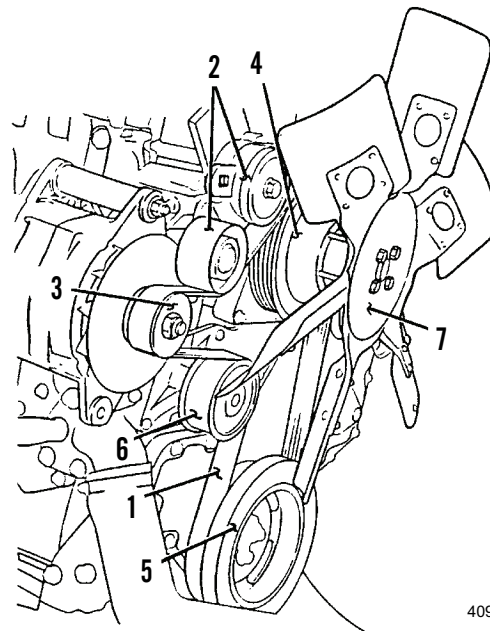
5. Remove capscrew (8) and tensioner (2) from bracket (9).
6. If necessary, remove two capscrews (10) and bracket (9) from engine.

INSTALLATION

1. If removed, install tensioner (2).
2. If removed, secure bracket (9) to engine with two capscrews (10). Torque capscrews to 6 lb-ft (8 Nm).
3. Align mounting hose on tensioner (2) with lower mounting hole on bracket (9).
4. Secure tensioner (2) to bracket (9) with capscrew (8). Torque capscrew to 32 lb-ft (43 Nm).
5. Install drive belt (1).



6. Position belt (1) around blades of fan (7).
7. Place belt (1) on crankshaft pulley (5), fan pulley (4) and water pump pulley (6).
8. Lift tensioner (2) and place belt (1) on alternator pulley (3) and under tensioner. Lower tensioner assembly (2).
9. Install fan guards (WP 0060 00).
10. Start engine and check for proper operation (TM 10-3930-660-10).



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)
 Starwasher (6, 8 and 13)

References

WP 0061 00

Equipment Condition

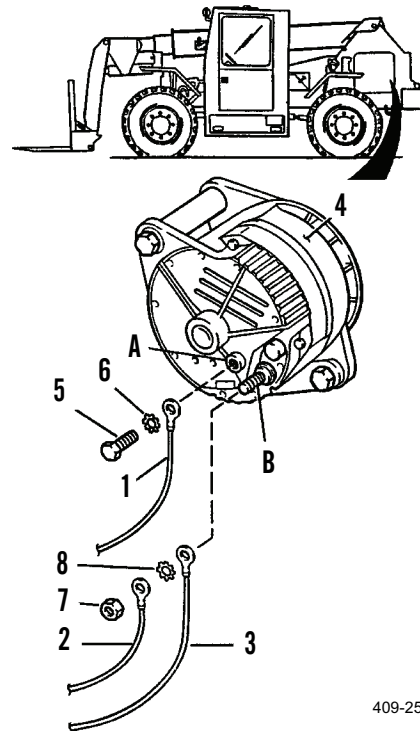
Machine parked on level ground (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)

REMOVAL

NOTE

Tag all electrical connections before removing for use during installation.

1. Tag and remove electrical leads (1 thru 3) from alternator (4).
2. Remove capscrew (5), starwasher (6) and electrical lead "P" (1) from terminal (A) of alternator (4). Discard starwasher.
3. Remove nut (7), electrical lead "N" (2), starwasher (8) and electrical lead "60" (3) from terminal (B) of alternator (4). Discard starwasher.



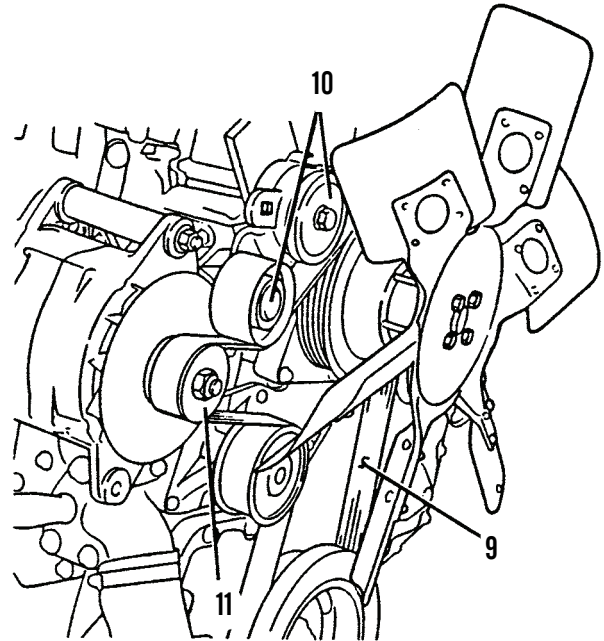
409-252

REMOVAL - CONTINUED

NOTE

Note positioning of drive belt around engine pulleys for use during installation.

4. Lift drive belt tensioner assembly (10) and remove drive belt (9) from alternator pulley (11).



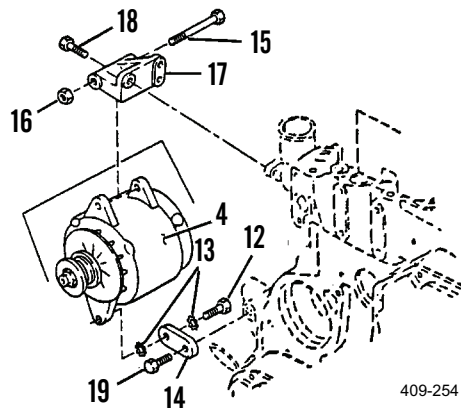
409-253

5. Remove capscrew (12), two starwashers (13) and alternator (4) to alternator brace (14). Discard starwashers.

NOTE

Support alternator so it does not drop during removal of capscrew and nut.

6. Remove capscrew (15) and nut (16) securing alternator (4) to alternator support (17) on engine.
7. If necessary, remove three capscrews (18) and alternator support (17) from engine.
8. If necessary, remove capscrew (19) and alternator brace (14) from engine.



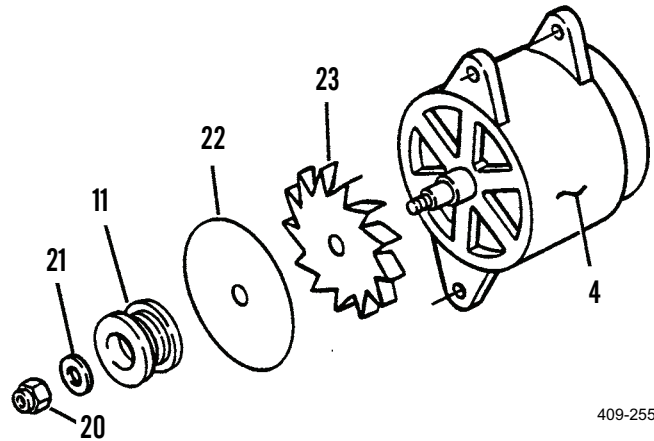
409-254

REMOVAL - CONTINUED

- If necessary, remove nut (20), flatwasher (21), alternator pulley (11), baffle (22) and fan (23) from alternator (4).

INSTALLATION

- If removed, position fan (23), baffle (22), and alternator pulley (11) on shaft of alternator (4) and secure with flatwasher (21) and nut (20). Torque nut (20) to 70-80 lb-ft (95-108 Nm).



409-255

- If removed, position alternator brace (14) on engine and secure with capscrew (19). Torque capscrew to 32 lb-ft (43 Nm).
- If removed, position alternator support (17) on engine and secure with three capscrews (18). Torque capscrews to 6 lb-ft (8 Nm).
- Secure alternator (4) to engine with mounting hardware.
- Align upper mounting holes of alternator (4) with alternator support (17) and secure with nut (16) and capscrew (15). Torque nut and capscrew to 57 lb-ft (77 Nm).

NOTE

If necessary, loosen capscrew to permit alignment of lower mounting hole of alternator and alternator brace.

- Align lower mounting hole of alternator (4) with alternator brace (14) and secure with two new starwashers (13) and capscrew (12). Torque capscrew to 60-70 lb-ft (81-95 Nm).
- If necessary, torque capscrew (19) to 32 lb-ft (43 Nm).

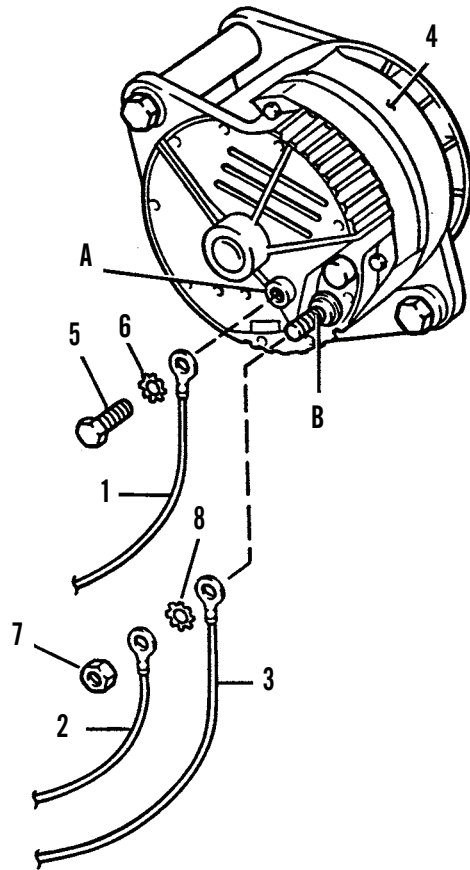
NOTE

Be sure drive belt is properly positioned around engine pulleys as noted during removal. Refer to WP 0061 00.

- Lift fan belt tensioner assembly (10) and install fan belt (9) on alternator pulley (11).

INSTALLATION - CONTINUED

9. Connect electrical leads (1 thru 3) to alternator (4).
10. Position electrical lead 60 (3), new starwasher (8) and electrical lead "N" (2) on terminal (B) of alternator (4) and secure with nut (7). Torque nut to 24-38 lb-in. (33-52 Nm).



409-257

11. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Tag, marker (Item 57, WP 0323 00)
- Lockwasher (9)
- Starwasher (2 and 16)

References

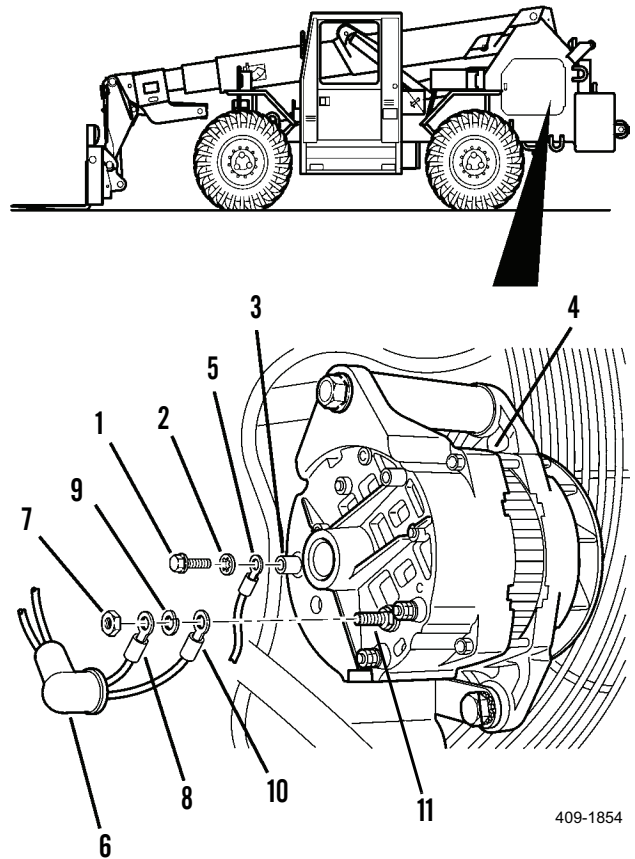
- WP 0061 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Battery cables disconnected (WP 0107 00)

REMOVAL

1. Remove screw (1) and starwasher (2) from terminal (3) of alternator (4). Tag, mark, and remove electrical wire (5). Discard starwasher.
2. Pull up boot (6) and remove nut (7). Tag, mark, and remove electrical wire (8), lockwasher (9), and electrical wire (10) from terminal (11) of alternator (4). Discard lockwasher.



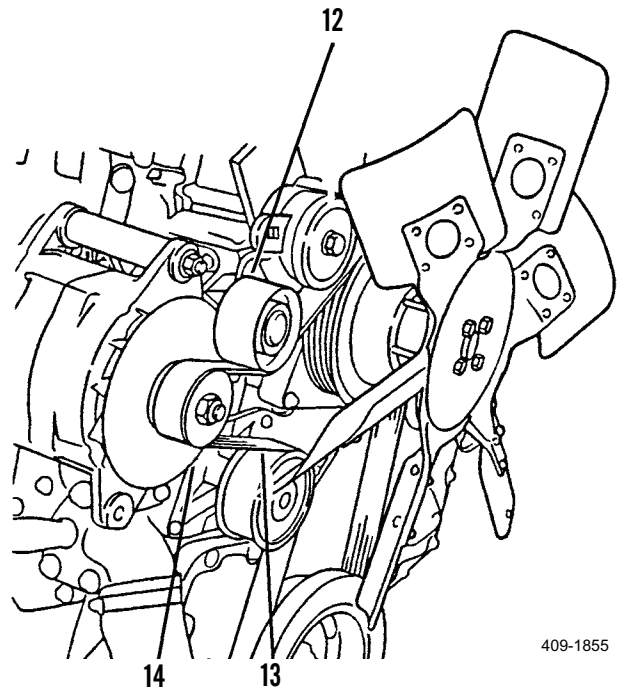
409-1854

REMOVAL - CONTINUED

NOTE

Note position of drive belt around engine pulleys for ease of installation.

3. Lift tensioner (12) and remove drive belt (13) from alternator pulley (14).



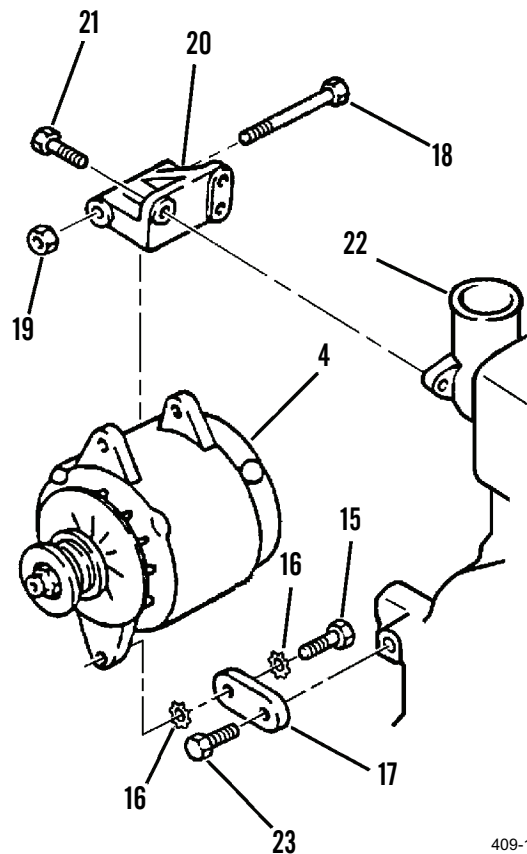
409-1855

4. Remove screw (15) and two starwashers (16) from alternator (4) and alternator brace (17). Discard starwashers.

NOTE

Support alternator so it does not drop during removal of screw and nut.

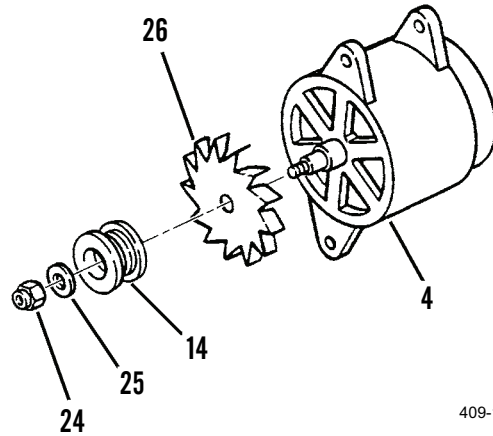
5. Remove screw (18), nut (19), and alternator (4) from alternator support (20).
6. Remove three screws (21) and alternator support (20) from engine (22).
7. Remove screw (23) and alternator brace (17) from engine (22).



409-1856

REMOVAL - CONTINUED

8. Remove nut (24), washer (25), alternator pulley (14) and fan (26) from alternator (4).



409-1857

INSTALLATION

1. Install fan (26) and alternator pulley (14) on shaft of alternator (4) with washer (25) and nut (24). Torque nut to 75 lb-ft (102 Nm).
2. Install alternator brace (17) on engine (22) with screw (23). Do not tighten.
3. Install alternator support (20) on engine (22) with three screws (21). Torque screws to 18 lb-ft (24 Nm).
4. Align upper mounting holes of alternator (4) with alternator support (20) and install screw (18) and nut (19). Do not tighten.
5. Align lower mounting hole of alternator (4) with alternator brace (17) and install two new starwashers (16) and screw (15). Torque screw to 60-70 lb-ft (81-95 Nm).
6. Torque screw (23) to 32 lb-ft (43 Nm).
7. Torque nut (19) to 57 lb-ft (77 Nm).

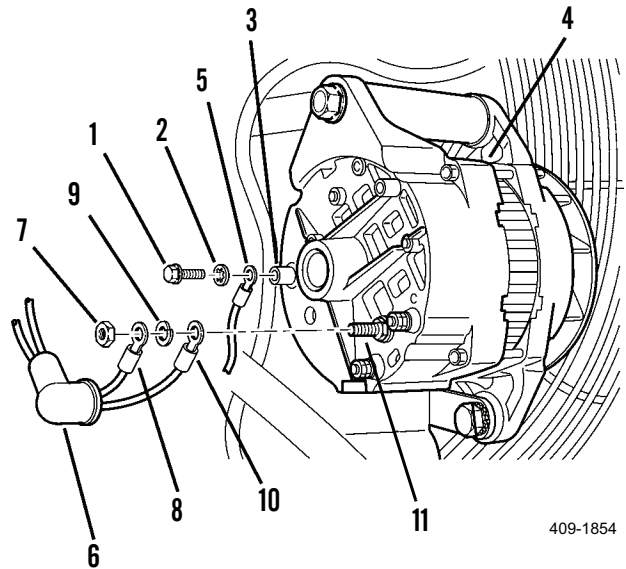
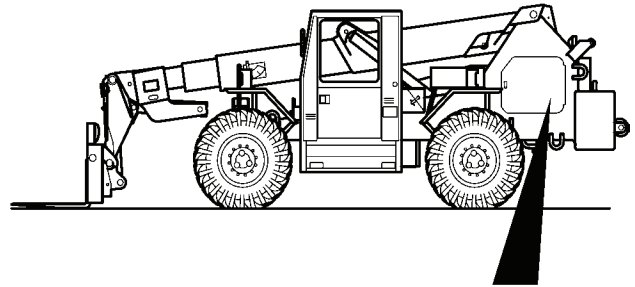
NOTE

Ensure drive belt is properly positioned around engine pulleys as noted during removal. If necessary, refer to WP 0061 00 for drive belt installation instructions.

8. Lift tensioner (12) and install drive belt (13) on alternator pulley (14).

INSTALLATION - CONTINUED

9. Install electrical wire (10), new lockwasher (9), and electrical wire (8) on terminal (11) of alternator (4) with nut (7). Torque nut to 2-3 lb-in (0.2-0.3 Nm) and install boot (6).
10. Install electrical wire (1) on terminal (7) of alternator (4) with new starwasher (2) and screw (1). Torque screw to 7-10 lb-in. (0.8-1.0 Nm).
11. Connect battery cables (WP 0107 00).
12. Run engine and check for proper operation (TM 10-3930-660-10).



409-1854

END OF WORK PACKAGE

STARTING MOTOR REPLACEMENT (152 HP)

0064 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Starwasher (2 and 12)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

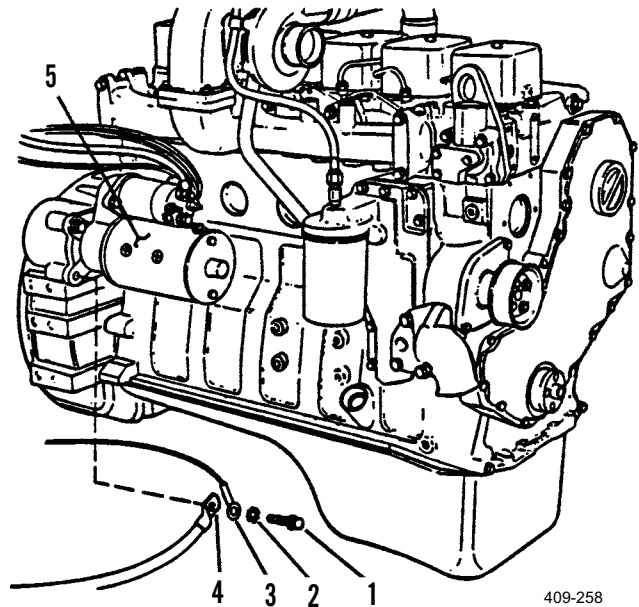
Exhaust pipe removed (WP 0052 00)

REMOVAL**WARNING**

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

NOTE

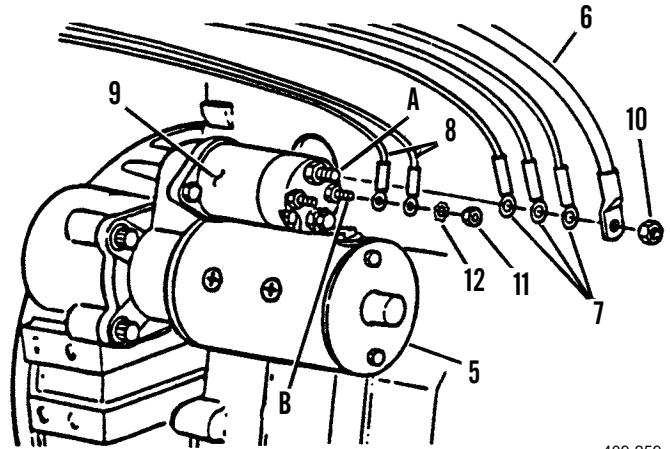
- The starting motor is accessed through the left-hand engine access door.
 - Tag all electrical connections before removing for use during installation.
1. Remove capscrew (1) and starwasher (2) securing electrical lead (3) and ground cable (4), to starting motor (5). Remove electrical lead and ground cable. Discard starwasher.



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REMOVAL - CONTINUED

2. Remove nut (10), securing one cable (6) and three electrical leads (7) to terminal (A) on starting motor solenoid (9).
3. Remove positive electrical cable (6) and electrical leads (7).
4. Remove nut (11) and starwasher (12), securing two electrical leads (8) to terminal (B) of solenoid (9). Discard starwasher.
5. Remove electrical leads (8).



409-259

CAUTION

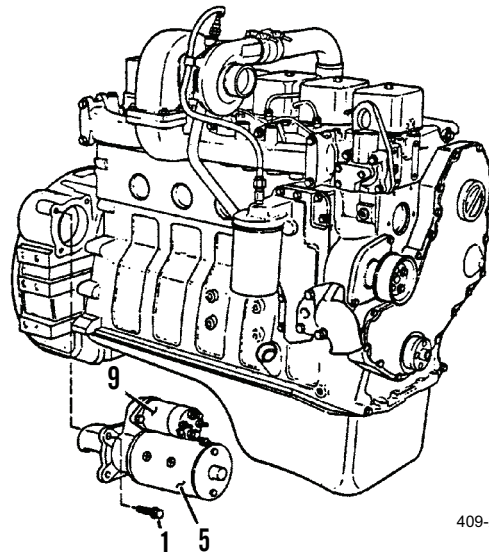
Support starting motor to prevent starting motor from dropping when capscrews are removed.

6. Remove two capscrews (1).
7. Use assistance to remove starting motor (5) and solenoid (9).

INSTALLATION**CAUTION**

Support starting motor during installation.

1. Use assistance to position starting motor (5) on engine.
2. Install two capscrews (1).

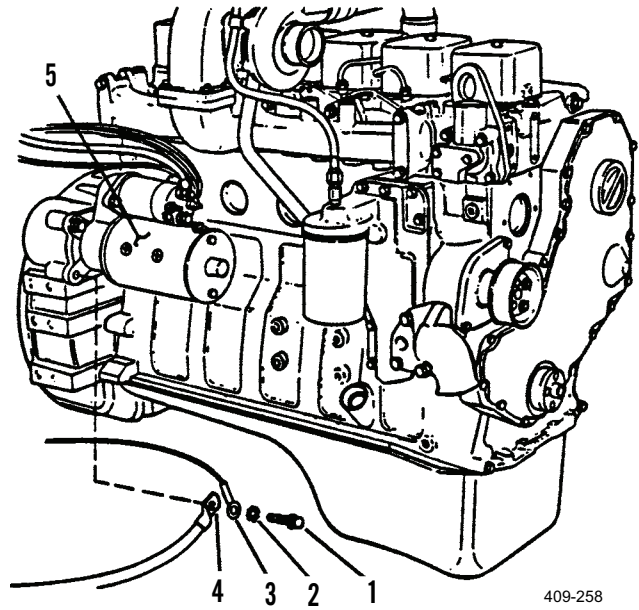


409-260

3. Position two electrical leads (8) on terminal (B) of solenoid (9). Secure with nut (11) and new starwasher (12).
4. Position three electrical leads (7) and positive electrical cable (6), on terminal (A) of starting motor solenoid (9) as tagged. Secure with nut (10).

INSTALLATION - CONTINUED

5. Position ground cable (4) and electrical lead (3) on lower mounting hole of starting motor (5) as tagged. Secure with capscrew (1) and new starwasher (2).
6. Tighten three capscrews (1) to 32 lb-ft (43 Nm).



7. Install exhaust pipe (WP 0052 00).
8. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)
 Lockwasher (21)
 Starwasher (6 and 15)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)
 Exhaust pipe removed (WP 0052 00)



WARNING

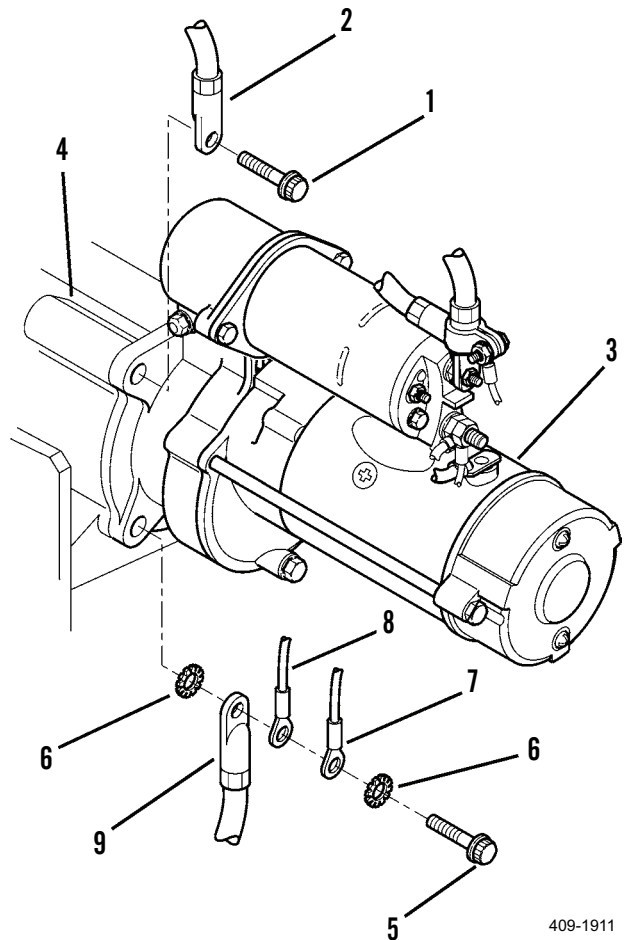
Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may cause injury.

REMOVAL

NOTE

- Tag all electrical connections before removing for use during installation.
- Perform step 1 below only if vehicle has auxiliary batteries.

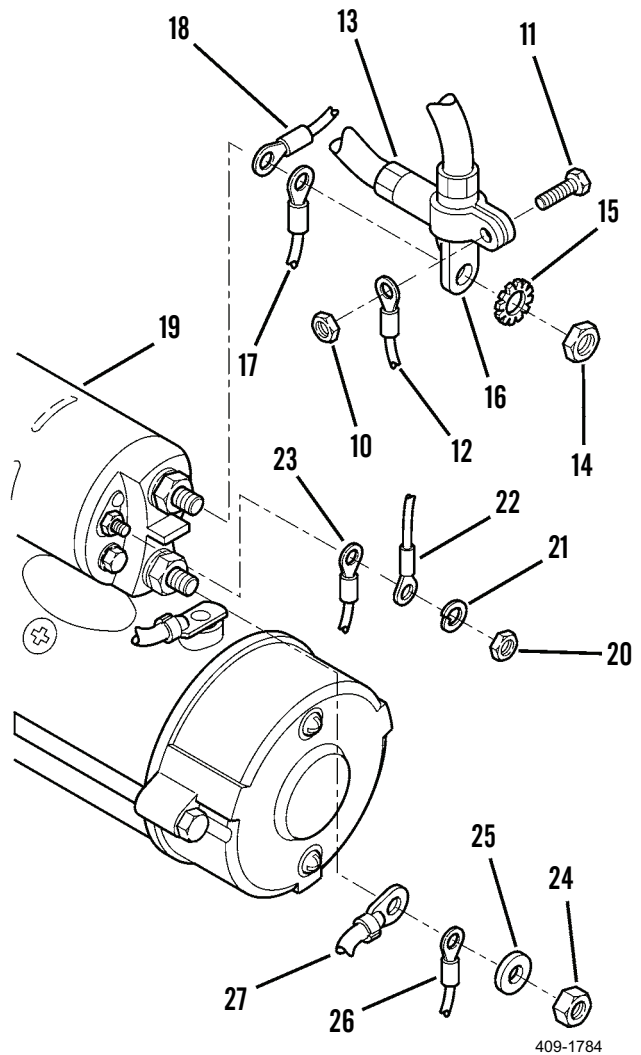
1. Remove screw (1) and auxiliary ground cable (2) from starting motor (3) and bell housing (4).
2. Remove screw (5) and starwasher (6). Remove two electrical wires (7 and 8), ground cable (9) and starwasher (6) from starting motor (3) and bell housing (4). Discard starwashers.



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REMOVAL - CONTINUED

3. Remove nut (10) from screw (11). Tag, mark and remove electrical wire (12) from auxiliary positive cable (13).
4. Remove nut (14) and starwasher (15). Tag, mark and remove positive cable (16) and two electrical wires (17 and 18) from starting motor solenoid (19). Remove auxiliary positive cable (13) from positive cable (16). Discard starwasher.
5. Remove nut (20) and lockwasher (21). Remove two electrical wires (22 and 23) from starting motor solenoid (19). Discard lockwasher.
6. Remove nut (24) and washer (25). Tag, mark and remove two electrical wires (26 and 27) from starting motor solenoid (19).

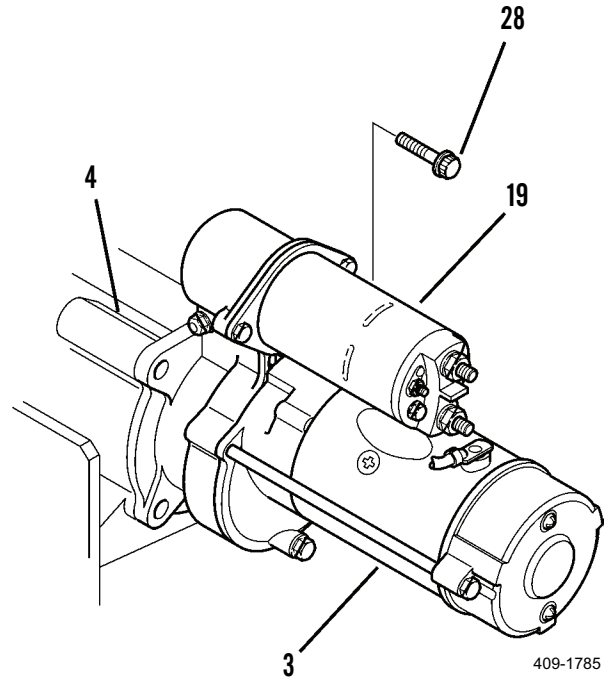


409-1784

REMOVAL - CONTINUED**CAUTION**

Support starting motor to prevent from dropping during removal.

- Use assistance to remove remaining screw (28) and starting motor (3) with starting motor solenoid (19) from bell housing (4) as an assembly.

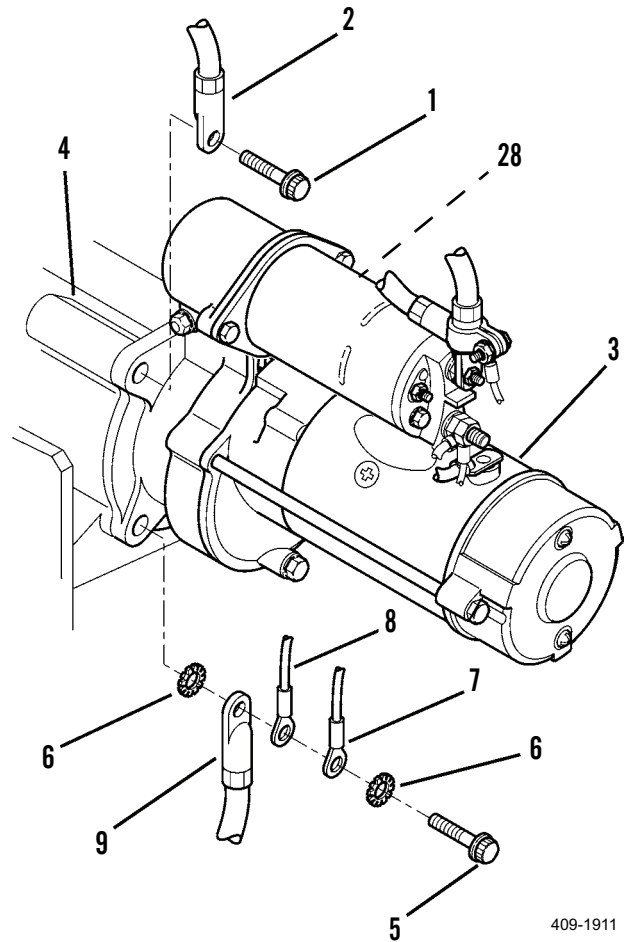
**INSTALLATION****CAUTION**

Support starting motor to prevent it from dropping during installation.

- Use assistance to install starting motor (3) with starting motor solenoid (19) on bell housing (4) with screw (28). Torque screw to 32 lb-ft (43 Nm).
- Install two electrical wires (26 and 27) on starting motor solenoid (19) with washer (25) and nut (24).
- Install two electrical wires (22 and 23) on starting motor solenoid (19) with lockwasher (21) and nut (20).
- Install two electrical wires (17 and 18) and positive cable (16) on starting motor solenoid (19) with starwasher (15) and nut (14).
- Install electrical wire (12) on auxiliary positive cable (13) with screw (11) and nut (10). Torque screw to 32 lb-ft (43 Nm).

INSTALLATION - CONTINUED

6. Install new starwasher (6), ground cable (9), two electrical wires (7 and 8) and new starwasher (6) on starting motor (3) and bell housing (4) with screw (5). Torque screw to 32 lb-ft (43 Nm).
7. Install auxiliary ground cable (2) on starting motor (3) and bell housing (4) with screw (1).
8. Torque screws (28), (5) and (1) to 32 lb-ft (43 Nm).
9. Install exhaust pipe (WP 0052 00).
10. Connect battery cables (WP 0107 00).
11. Start and shut off engine to check for proper operation (TM 10-3930-660-10).



409-1911

END OF WORK PACKAGE

NEUTRAL SAFETY SWITCH MAINTENANCE

0066 00

THIS WORK PACKAGE COVERSInspection, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (2)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

INSPECTION**WARNING**

Move vehicle to an open area to perform inspection. Alert personnel to stay away from front and rear of vehicle during inspection. Vehicle may start and move suddenly, possibly causing injury. Make sure wheels are straight before performing inspection.

NOTE

See TM 10-3930-660-10 for operating instructions.

1. Straighten wheels and turn engine off.
2. Put travel select lever in the forward (F) position.
3. With parking brake on and brake pedal depressed, try to start engine. Turn engine off immediately if it starts (TM 10-3930-660-10).
4. If engine started in step 3, replace neutral safety switch. See *Removal* in this work package. If engine did not start, go to next step.
5. Perform step 3, with travel select lever in the reverse (R) position.
6. If engine started in step 5, replace neutral safety switch.

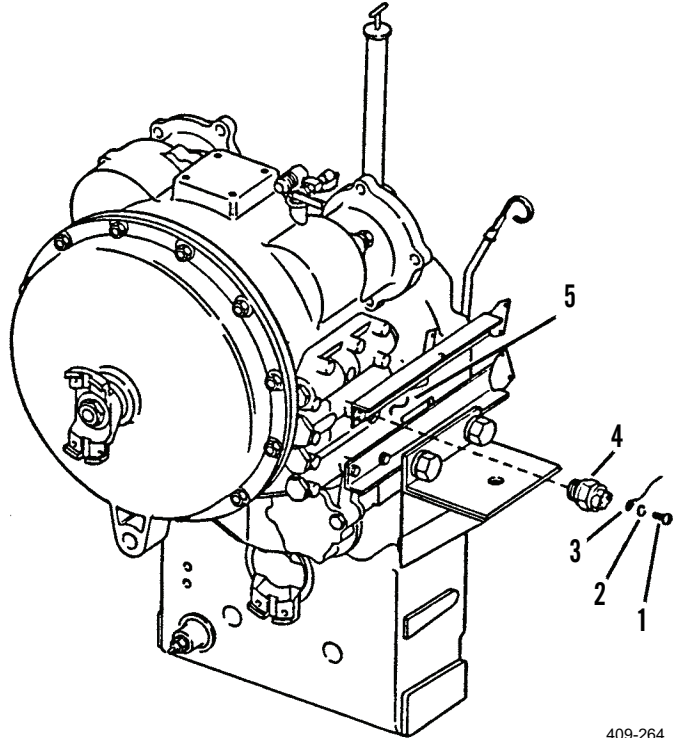
REMOVAL**NOTE**

The neutral safety switch is located on the right side of the transmission.

1. Disconnect battery cables (WP 0107 00).
2. Remove transmission cover (WP 0150 00).
3. Remove two screws (1), two lockwashers (2) and disconnect wiring (3) from neutral safety switch (4). Discard lockwashers.
4. Remove neutral safety switch (4) from the transmission control valve (5).

INSTALLATION

1. Install neutral safety switch (4) into the transmission control valve (5).
2. Install two screws (1) and two new lockwashers (2) to connect wiring (3) to neutral safety switch (4).



409-264

3. Install transmission cover (WP 0150 00).
4. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

References

WP 0068 00

WP 0069 00

References - Continued

WP 0070 00

WP 0072 00

WP 0092 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

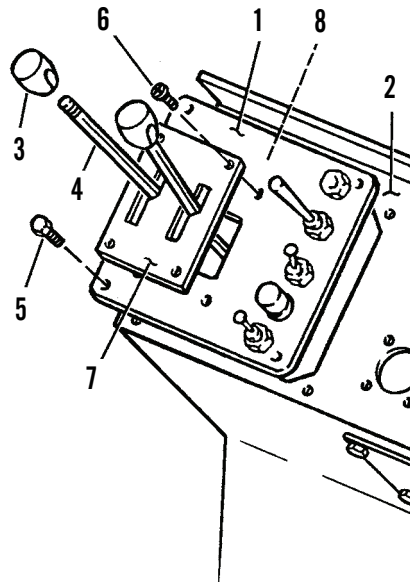
Battery cables disconnected (WP 0107 00)

REMOVAL

NOTE

- Tag all electrical connections before removing for use during installation.
- The left-hand instrument panel and the right-hand instrument panel can be removed and installed separately as required.

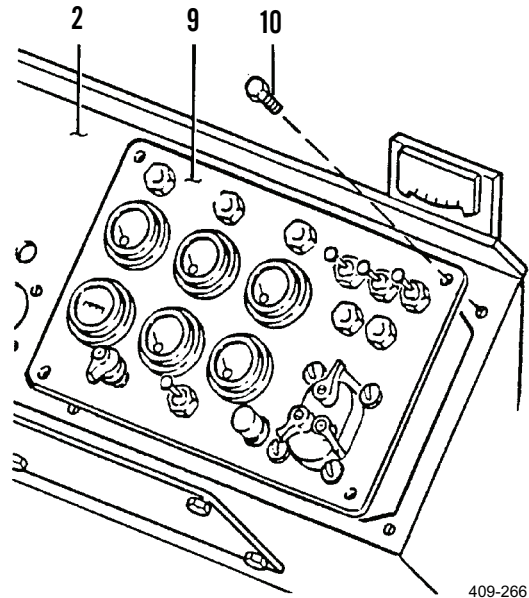
1. To separate left-hand instrument panel (1) from front console (2), use a suitable puller to remove two knobs (3) from shift levers (4).
2. Remove four capscrews (5) that secure panel (1) to console (2).
3. Remove four phillips-head screws (6) that secure panel (7) and lever housing (8) to panel (1).
4. Remove panel (7) from panel (1).
5. Separate panel (1) from console (2) by lifting left edge of panel at console (2).



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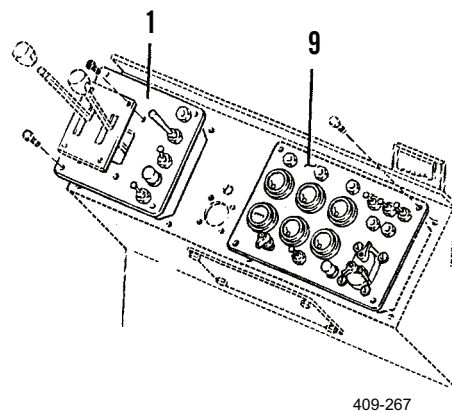
REMOVAL - CONTINUED

6. Separate right-hand instrument panel (9) from front console (2).
7. Remove four capscrews (10) from right-hand instrument panel (9).
8. Separate panel (9) from console (2) by lifting right edge of panel at console (2).

**NOTE**

If complete removal of one or both instrument panels from vehicle is required, follow steps 9 thru 13 below.

9. Disconnect electrical leads from components on instrument panels (1) and/or (9). Remove instrument panels from vehicle.
10. Tag and disconnect all electrical leads of vehicle wiring harness from components on instrument panels (1) and/or (9). Refer to component wiring removal instructions.
11. Remove instrument panels (1) and/or (9) from vehicle.
12. If necessary, remove components from instrument panel(s) (1) and/or (9) as required.
13. If necessary, remove components from instrument panels (1) and/or (9) as required. Note location of components for use during installation. Refer to WP 0068 00, WP 0069 00, WP 0070 00, WP 0072 00, and WP 0092 00.

**INSTALLATION**

1. If necessary, install components to instrument panels (1) and/or (9), as required. Locate components as noted during removal. Refer to WP 0068 00, WP 0069 00, WP 0070 00, WP 0072 00.
2. If removed, connect electrical leads as tagged to components on instrument panel(s) (1) and/or (9).

INSTALLATION - CONTINUED

3. Connect electrical leads of vehicle wiring harness to components on instrument panels (1) and/or (9) as tagged. Refer to WP 0068 00, WP 0069 00, WP 0070 00, WP 0072 00 and WP 0092 00.
4. Lower and align panel (9) on console (2).

NOTE

Apply loctite to threads of capscrews.

5. Secure panel (9) to console (2) with four capscrews (10).

NOTE

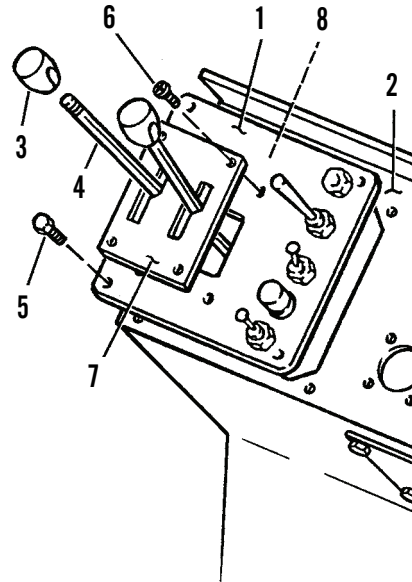
Apply loctite to threads of phillips-head screw.

6. Lower and align panel (1) on console (2).
7. Position panel (7) on panel (1). Secure panel (7) to panel (1) and lever housing (8) with four phillips-head screws (6).

NOTE

Apply loctite to threads of capscrews.

8. Secure panel (1) to console (2) with four capscrews (5).
9. Install new knobs (3) on shift levers (4) by pushing knobs (3) onto shift levers.
10. Connect battery cables (WP 0107 00).



409-265

END OF WORK PACKAGE

GAUGES REPLACEMENT

0068 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Starwasher (8 and 10)

References

WP 0070 00

Equipment Condition

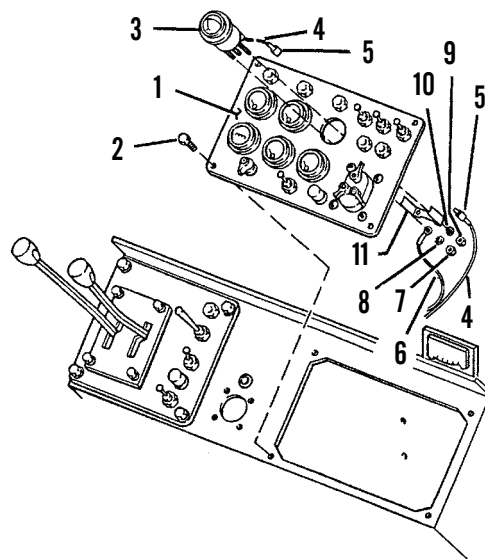
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL**NOTE**

- Tag all electrical connections before removing for use during installation.
- Replacement procedures for all panel-mounted gauges except the hourmeter are essentially similar.
- Removal of the transmission oil temperature gauge is shown in this work package.
- For hourmeter replacement, refer to WP 0070 00.

1. Raise right-hand instrument panel (1) and remove four capscrews (2) from right-hand instrument panel.
2. Raise panel (1) to provide access to rear of gauge (3) to be replaced.
3. Disconnect electrical leads at gauge (3).
4. Disconnect gauge light electrical lead (4) at spade connectors (5).



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GAUGES REPLACEMENT - CONTINUED

0068 00

REMOVAL - CONTINUED

5. Remove nuts (7), starwashers (8) and gauge electrical leads (6) from terminals of gauge (3) as required. Discard starwashers.
6. Remove gauge (3) from instrument panel (1).
7. Remove two nuts (9), two starwashers (10) and clamp (11) from instrument panel (1). Discard starwashers.
8. Slide gauge (3) out of mounting hole on instrument panel (1).

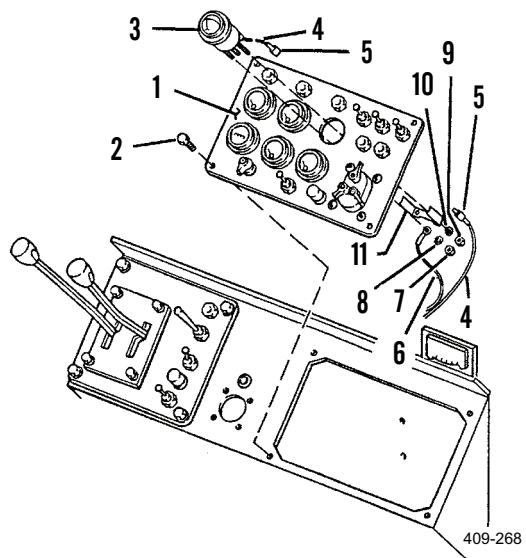
INSTALLATION

1. Slide gauge (3) in through mounting hole on instrument panel (1).
2. Position clamp (11) on instrument panel (1) and secure with two new starwashers (10) and two nuts (9).
3. Position gauge electrical leads (6) on terminals of gauge (3) as tagged.
4. Secure gauge electrical leads (6) to gauge (3) with new starwashers (8) and nuts (7).
5. Connect gauge light electrical lead (4) at spade connectors (5).

NOTE

Apply loctite to threads of capscrews.

6. Lower, align and secure right-hand instrument panel (1), with four capscrews (2).
7. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

409-268

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

References

WP 0072 00

Equipment Condition

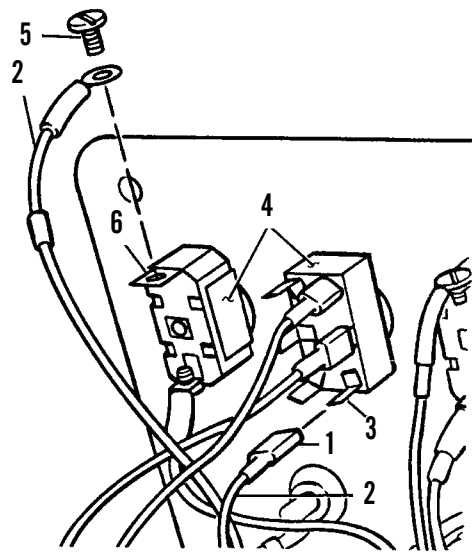
Vehicle parked on level ground (TM 10-3930-660-10)

Left and/or right-hand instrument panel removed as required (WP 0067 00)

REMOVAL**NOTE**

- Tag all electrical connections before removing for use during installation.
- Replacement procedures for all panel-mounted toggle and pushbutton switches are essentially similar.
- For ignition switch replacement, refer to WP 0072 00.

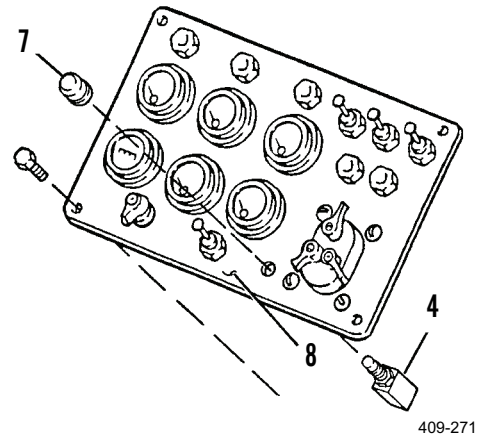
1. Pull and remove female connectors (1) of electrical leads (2) from male terminals (3) of switch (4).
2. For switches with screw-type terminals, remove screws (5) securing electrical leads (2) to terminals (6) of switch (4).
3. Remove electrical leads (2) from terminals (6) of switch (4).



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REMOVAL - CONTINUED

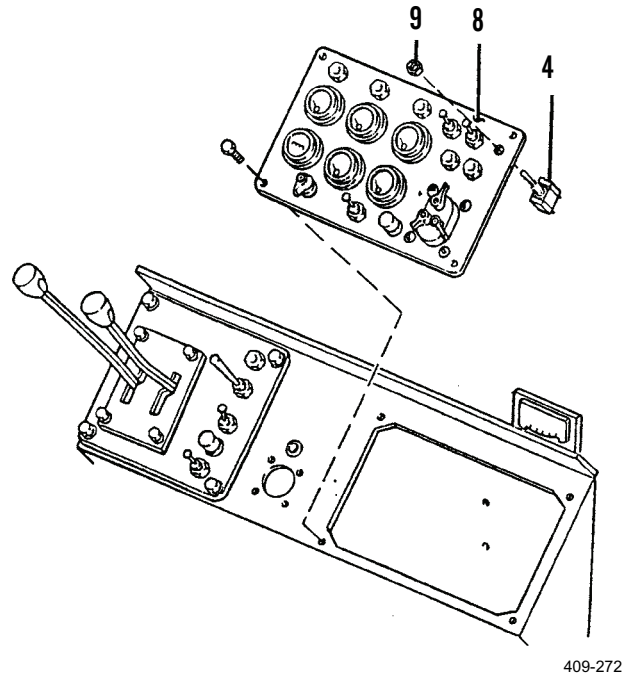
4. For pushbutton switches, remove nut and rubber cover assembly (7) from switch (4) at face of instrument panel (8).
5. Slide switch (4) out of mounting hole on instrument panel (8).



NOTE

Note orientation of toggle switches for use during installation.

6. For toggle switches, remove nut (9) from switch (4) at face of instrument panel (8).
7. Slide switch (4) out of mounting hole on instrument panel (8).



INSTALLATION

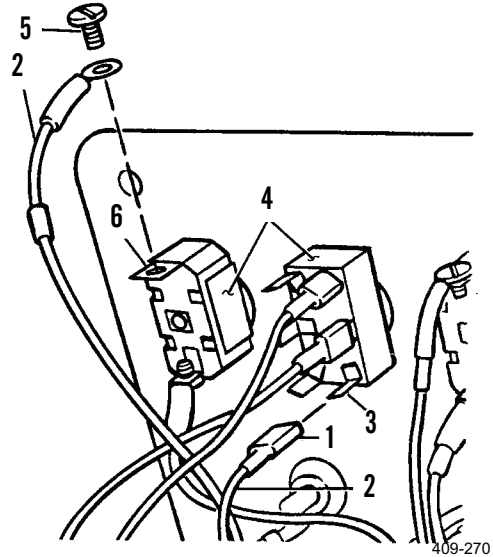
NOTE

Position toggle switches as noted during removal.

1. Slide switch (4) in through mounting hole on instrument panel (8).
2. Secure switch (4) at face of instrument panel (8) with nut (9).
3. For pushbutton switches, slide switch (4) in through mounting hole on instrument panel (8).

INSTALLATION - CONTINUED

4. Secure switch (4) at face of instrument panel (8) with nut and rubber cover assembly (7).
5. Connect electrical leads (2) to switch (4) as tagged.
6. For switches with screw-type terminals, position electrical leads (2) on terminals (6) of switch (4) as tagged, and secure with screws (5).
7. For switches with spade-type terminals, push female connectors (1) of electrical leads (2) on male terminals (3) of switches (4) as tagged.



8. Install left and/or right-hand instrument panel, as required (WP 0067 00).

END OF WORK PACKAGE

HOURLMETER REPLACEMENT

0070 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

References

WP 0068 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

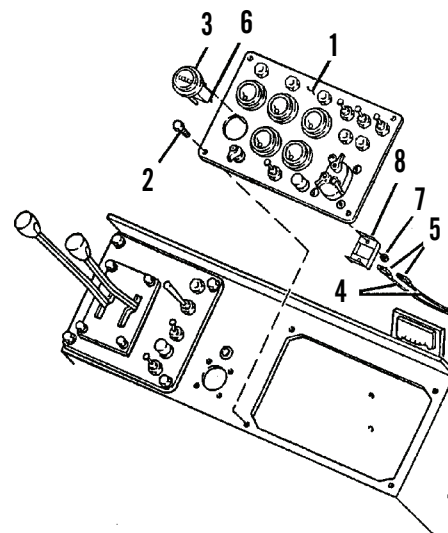
Battery cables disconnected (WP 0107 00)

REMOVAL

NOTE

- Tag all electrical connections before removing for use during installation.
- For replacement of other panel-mounted gauges, refer to WP 0068 00.

1. To raise right-hand instrument panel (1), remove four capscrews (2) from right-hand instrument panel and carefully raise instrument panel to provide access to rear of hourmeter (3).
2. Remove two electrical leads (4) from hourmeter (3).
3. Disconnect two female connectors (5) of electrical leads (4) from two male terminals (6) of hourmeter (3).
4. Remove hourmeter (3) from instrument panel (1).
5. Remove two nuts (7) and one clamp (8) securing hourmeter (3) to instrument panel (1).
6. Slide hourmeter (3) out of mounting hole on instrument panel (1).



409277

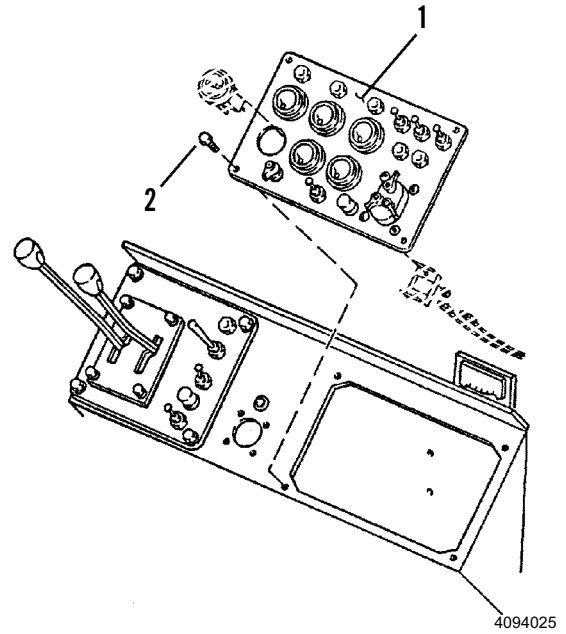
INSTALLATION

1. Install hourmeter (3) to instrument panel (1).
2. Slide hourmeter (3) in through mounting hole on instrument panel (1).
3. Secure hourmeter (3) to instrument panel (1) with clamp (8) and two nuts (7).
4. Connect two electrical leads (4) to hourmeter (3) as tagged.
5. Push two female connectors (5) of electrical leads (4) onto two male terminals (6) of hourmeter (3).
6. Lower and secure right-hand instrument panel (1).

INSTALLATION - CONTINUED**NOTE**

Apply loctite to threads of capscrews.

7. Carefully lower and align right-hand instrument panel (1). Secure panel with four capscrews (2).
8. Connect battery cables (WP 0107 00).



END OF WORK PACKAGE

CIRCUIT BREAKERS REPLACEMENT

0071 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Lockwasher (5 and 11)

Equipment Condition

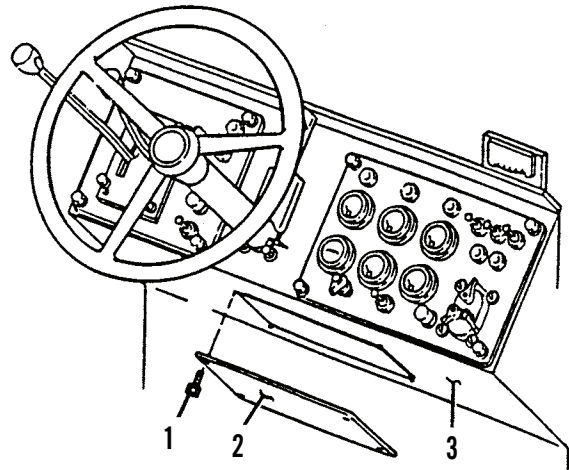
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL**NOTE**

- The circuit breakers are reached through the access hole at the base of the operator console.
- All ten circuit breakers are installed and removed in the same manner.
- The circuit breakers protect the entire electrical system except for the power circuit to the emergency steer pump.
- The circuit breakers will trip if there is a shorted or grounded wire.
- The circuit breakers will automatically reset after cooling. They cannot be reset manually.
- Under normal operating conditions, circuit breakers should never require replacement. However, if a circuit breaker does not reset after it has cooled, the circuit breaker is defective and must be replaced.

1. Remove four capscrews (1) and access cover (2) at base of operator console (3).



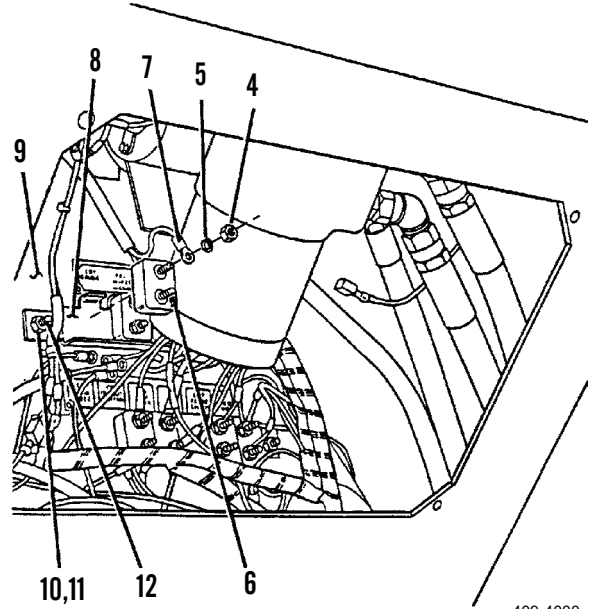
409-278

REMOVAL - CONTINUED

NOTE

Tag all wire leads and circuit breaker terminals for use during installation.

2. Remove two nuts (4) and two lockwashers (5) from circuit breaker (6). Remove wire lead (7) from circuit breaker. Discard lockwashers.
3. Remove circuit breaker (6) by pulling circuit breaker straight out of bracket (8).
4. If necessary, remove bracket (8) from cab (9).
5. Remove two nuts (10) and two lockwashers (11) securing each end of bracket (8). Remove bracket. Discard lockwashers.
6. From outside of cab (9) remove two screws (12).



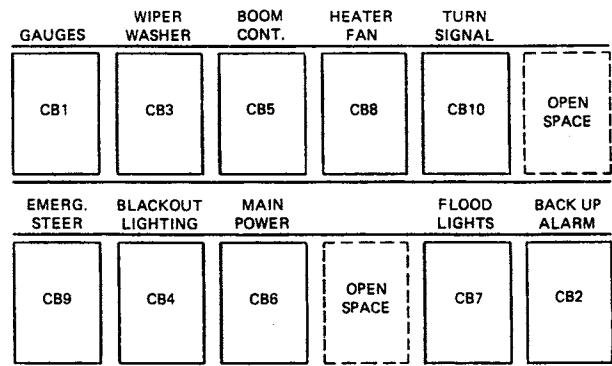
409-4000

INSTALLATION

NOTE

The circuit breakers are arranged as shown in the figure below.

Circuit Breakers	AMPS
CB1	6
CB2	6
CB3	6
CB4	15
CB5	6
CB6	40
CB7	10
CB8	10
CB9	6
CB10	10



409-280

INSTALLATION - CONTINUED

1. From outside of cab (9), install two screws (12).

NOTE

Apply loctite to threaded ends of screws.

2. From inside of cab (9), position bracket (8) on threaded ends of two screws (12). Secure bracket (8) with two new lockwashers (11) and two nuts (10).
3. Install circuit breakers (6) to bracket (8) as tagged. Refer to steps 5 and 6 below.
4. Install circuit breaker (6) by pushing circuit breaker (6) straight into bracket (8) until circuit breaker (6) snaps into place.

NOTE

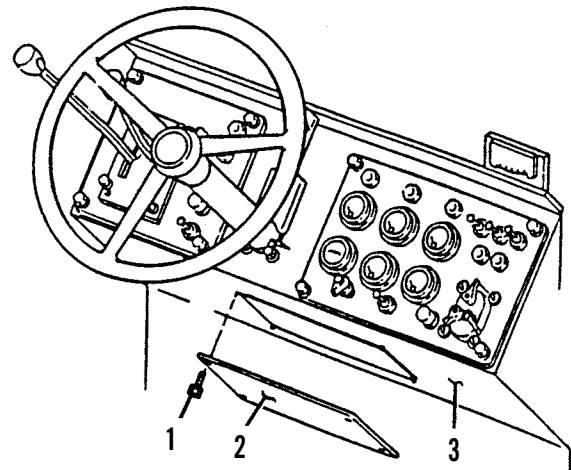
Install wire leads to circuit breaker terminals as tagged.

5. Position wire lead (7) onto circuit breaker (6). Secure with two nuts (4) and two new lockwashers (5).

NOTE

Apply loctite to threads of capscrews.

6. Position access cover (2) on base of operator console (3) and secure with four capscrews (1).
7. Connect battery cables (WP 0107 00).



409-278

END OF WORK PACKAGE

STARTER SWITCH REPLACEMENT

0072 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

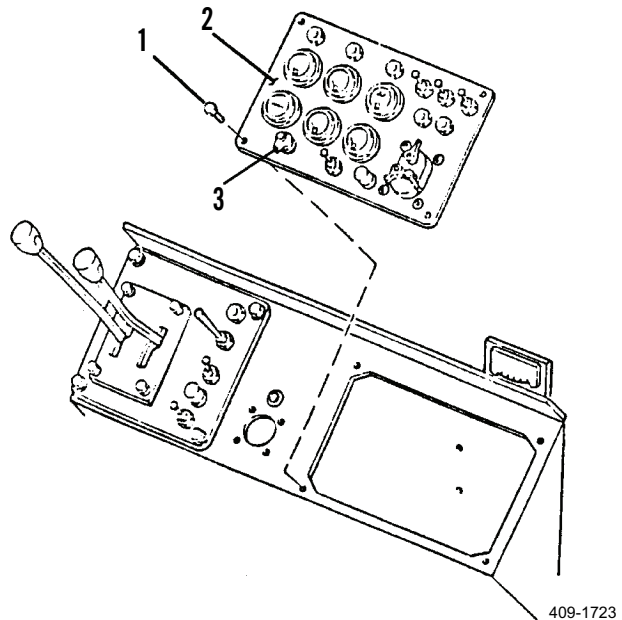
Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. Remove four capscrews (1) from right-hand instrument panel (2).
2. Raise panel (2) to provide access to rear of starter switch (3).



STARTER SWITCH REPLACEMENT - CONTINUED

0072 00

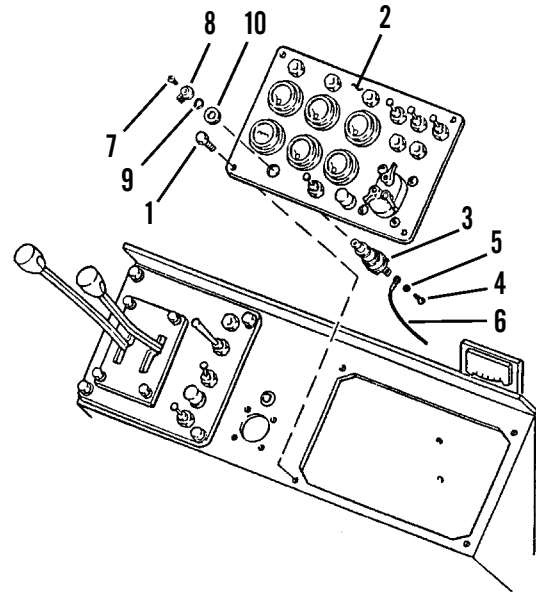
REMOVAL - CONTINUED

3. Remove five screws (4) and lockwashers (5) securing electrical leads (6). Remove electrical leads from switch (3). Discard lockwashers.
4. Remove starter switch (3) from instrument panel (2).

NOTE

Note orientation of starter switch and starter switch knob for use during installation.

5. Remove screw (7) and knob (8) from switch (3).
6. Remove retaining ring (9) and nut (10) securing switch (3) to instrument panel (2).
7. Slide switch (3) out through mounting hole on instrument panel (2).



409-4026

INSTALLATION**NOTE**

Position starter switch and starter switch knob as noted during removal.

1. Slide switch (3) in through mounting hole on instrument panel (2).
2. Secure switch (3) to instrument panel (1) with nut (10) and retaining ring (9).
3. Position knob (8) on switch (3) and secure with screw (7).
4. Connect electrical leads (6) to starter switch (3) as tagged.
5. Secure electrical leads (6) to switch (3) with five new lockwashers (5) and five screws (4).
6. Lower and align right-hand instrument panel (2).

NOTE

Apply loctite to threads of capscrews.

7. Secure right-hand instrument panel (2) with four capscrews (1).
8. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Simplified Test Equipment for Internal Combustion Engines - Reprogrammable (STE/ICE-R) (Item 23, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 49, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (2)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Battery cables disconnected (WP 0107 00)

REMOVAL

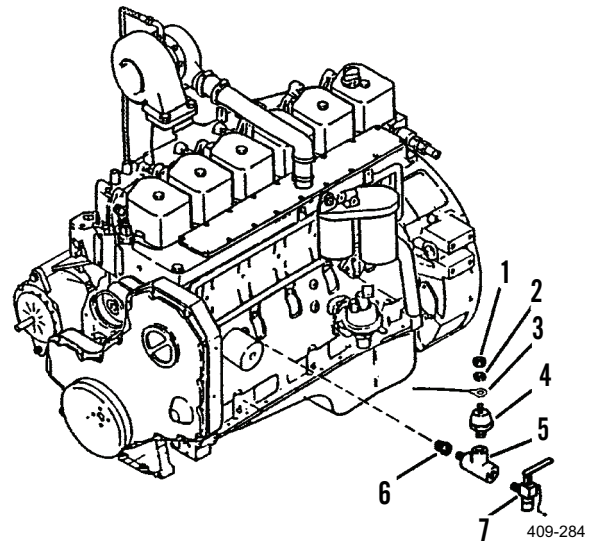
NOTE

The engine oil pressure switch is reached through the right-hand engine access door.

1. Remove nut (1), lockwasher (2) and electrical lead (3). Discard lockwasher.
2. Unscrew and remove engine oil pressure switch (4) from tee (5).
3. If necessary, remove tee (5), adapter (6) and valve (7).

INSTALLATION

1. If removed, install tee (5), adapter (6) and valve (7).
2. Apply loctite to threads of switch (4).
3. Install switch (4) into tee (5).
4. Secure electrical lead (3) to switch (4) with new lockwasher (2) and nut (1).
5. Connect battery cables (WP 0107 00).



TESTING

Monitor engine oil pressure with STE/ICE-R (WP 0008 00). Verify that oil pressure is within acceptable limits.

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
Simplified Test Equipment for Internal Combustion Engines - Reprogrammable (STE/ICE-R) (Item 23, WP 0324 00)

Materials/Parts

Compound, sealing (Item 14, WP 0323 00)

Materials/Parts - Continued

Starwasher (2)

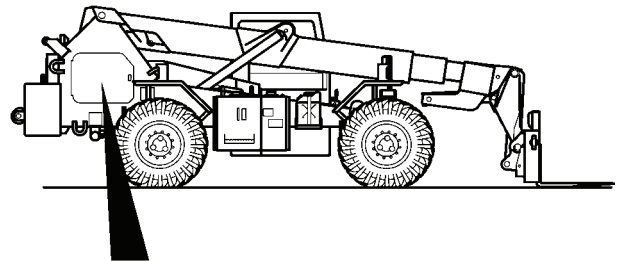
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

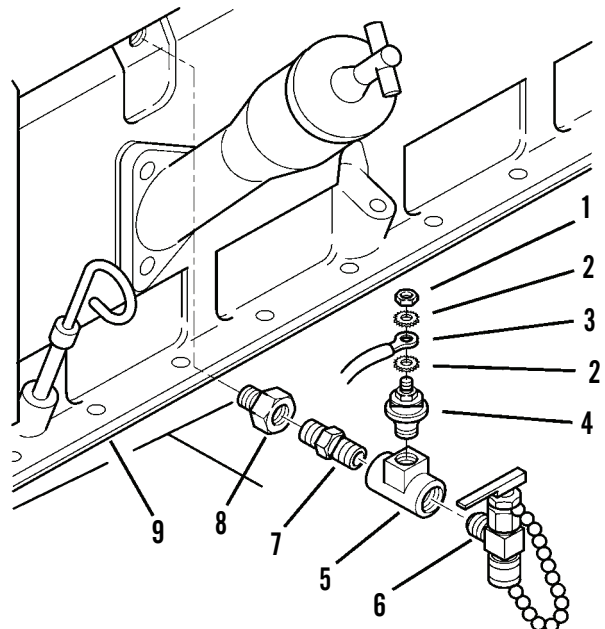
REMOVAL

1. Remove nut (1) and starwasher (2). Remove electrical wire (3) and other starwasher (2) from engine oil pressure switch (4). Discard starwashers.
2. Remove engine oil pressure switch (4) from tee (5).
3. Remove valve (6), tee (5), nipple (7), and adapter (8) from engine block (9).



INSTALLATION

1. Apply sealing compound on threads of adapter (8), tee (5), and valve (6).
2. Install adapter (8), tee (5), and valve (6) in engine block (9).
3. Apply sealing compound to threads of engine oil pressure switch (4).
4. Install engine oil pressure switch (4) in tee (5).
5. Install new starwasher (2), and electrical wire (3) on engine oil pressure switch (4) with new starwasher (2) and nut (1).
6. Connect battery cables (WP 0107 00).



TEST

Monitor engine oil pressure with STE/ICE-R (WP 0008 00). Verify that oil pressure is within acceptable limits.

END OF WORK PACKAGE

ENGINE WATER TEMPERATURE SWITCH REPLACEMENT

0075 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 49, WP 0323 00)

Lockwasher (2)

Equipment Condition

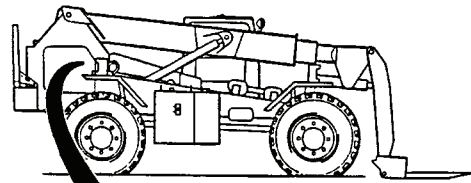
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

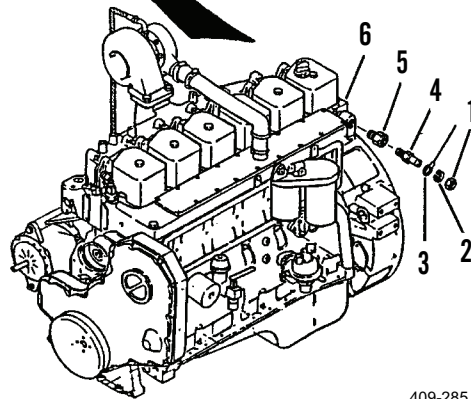
REMOVAL**NOTE**

The engine temperature switch is reached through the right-hand engine access door.

1. Remove nut (1), lockwasher (2) and electrical lead (3), from engine temperature switch (4). Discard lockwasher.
2. Remove switch (4) from bushing (5).
3. If necessary, remove bushing (5) from engine (6).

**INSTALLATION**

1. If removed, install bushing (5) to engine (6).
2. Apply loctite to threads of engine water temperature switch (4).
3. Install switch (4) into bushing (5).
4. Secure electrical lead (3) to switch (4) with new lockwasher (2) and nut (1).
5. Connect battery cables (WP 0107 00).



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END OF WORK PACKAGE

TRANSMISSION TEMPERATURE SWITCH REPLACEMENT

0076 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 49, WP 0323 00)

Oil, lubricating (Item 33, WP 0323 00)

Container, 6 gal.

Lockwasher (3)

References

WP 0118 00

Equipment Condition

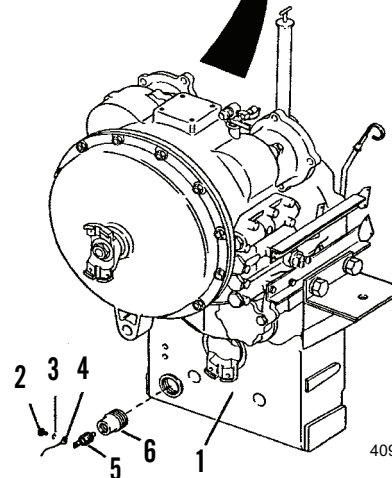
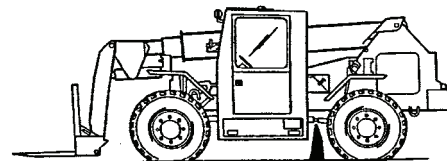
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL**NOTE**

- The transmission temperature switch is located under the vehicle on the transmission.
- Oil will spill out of transmission when temperature switch is removed from reducer.

1. Place container under transmission (1) to catch transmission oil.
2. Remove screw (2), lockwasher (3) and electrical lead (4) from switch (5). Discard lockwasher.
3. Remove switch (5) from reducer (6).
4. If necessary, remove reducer (6) from transmission (1).



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INSTALLATION

1. If removed, install reducer (6) to transmission (1).
2. Apply loctite to threads of switch (5).
3. Install switch (5) to reducer (6).
4. Secure wire lead (4) with new lockwasher (3) and screw (2).
5. Fill transmission (1) as necessary (WP 0118 00).
6. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Varnish, anti-fungus (Item 59, WP 0323 00)

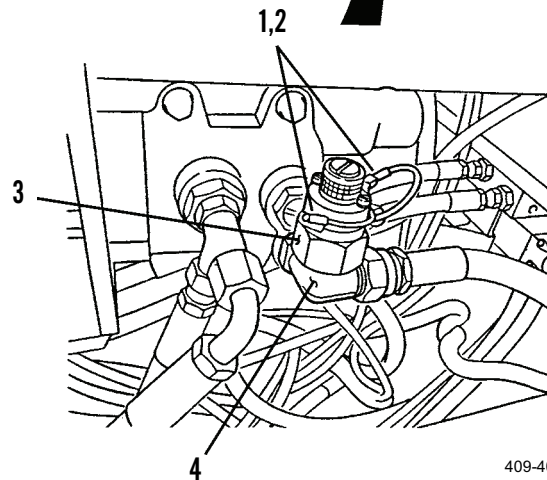
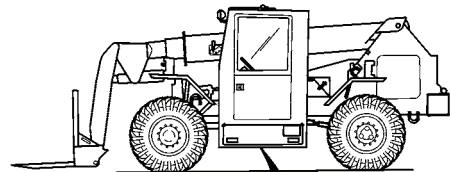
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)

REMOVAL

NOTE

- Tag all electrical connections before removing for use during installation.
 - The brake hydraulic pressure switch is located under the vehicle cab, mounted on an elbow attached to the brake control valve.
1. With the engine off, pump the brake pedal a minimum of 20 times to exhaust stored pressure in the brake system.
 2. Disconnect two female connectors (1) of vehicle wiring harness from two male connectors (2) at brake hydraulic pressure switch (3).
 3. Place a container to catch hydraulic oil that will briefly spill out of elbow (4) after switch (3) is removed.



409-4027

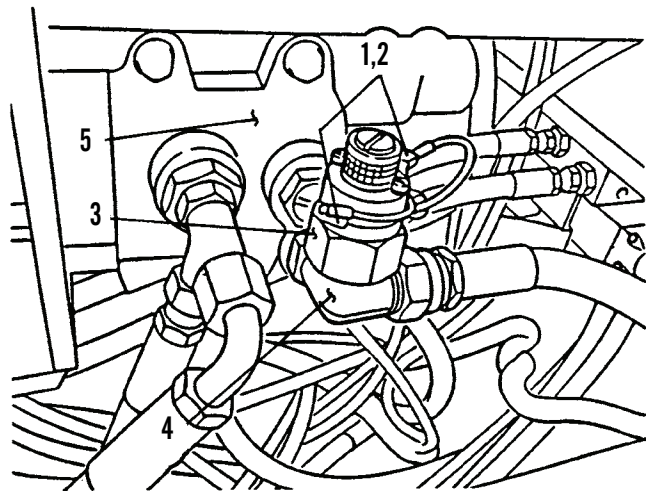
REMOVAL - CONTINUED**WARNING**

Be certain that step 1 of removal has been performed before performing step 4 below. Serious injury from hydraulic oil under pressure can result if step is not performed before removing switch in step 4.

4. Remove brake hydraulic pressure switch (3) from elbow (4) at brake control valve (5).

INSTALLATION

1. Apply loctite to threads of switch (3).
2. Install switch (3) into elbow (4).
3. Connect two female connectors (1) from vehicle wiring harness to two male connectors (2) on switch (3). Apply anti-fungus varnish to connectors (1) and (2).
4. Connect battery cables (WP 0107 00).



409-288

TESTING

1. Remove two female connectors (1) from male connectors (2) at brake hydraulic pressure switch (3).
2. Connect an ohmmeter across male connectors (2) of switch (3).
3. Test switch (3) for proper operation.
4. With the engine off, pump the brake pedal a minimum of 20 times to exhaust stored pressure in the brake system.
5. Observe the ohmmeter. It should indicate continuity.
6. Start the vehicle to allow the brake system accumulator to charge. The ohmmeter should indicate no continuity (TM 10-3930-660-10).
7. If switch (3) does not pass the continuity tests, the brake hydraulic system is malfunctioning and must be repaired.
8. If the brake hydraulic pressures are within the normal range, switch (3) is defective. Replace switch as described in *Removal* and *Installation*.

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Nylon washer (11)

Equipment Condition

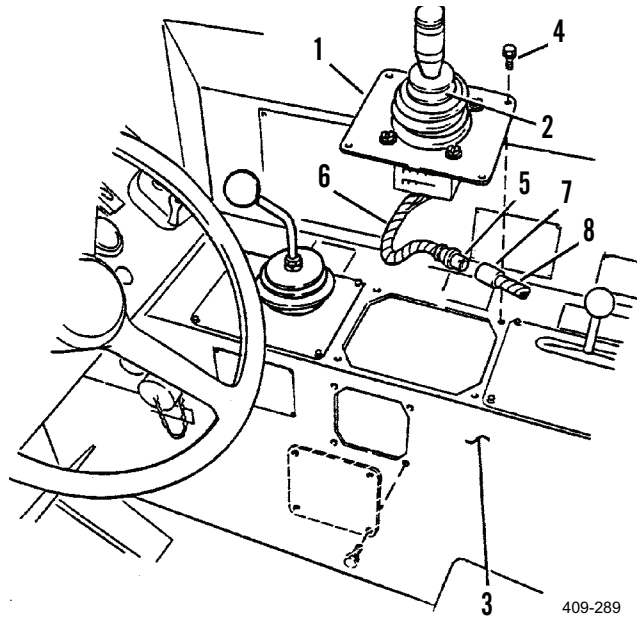
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL**NOTE**

Tag all electrical connections before removing for use during installation.

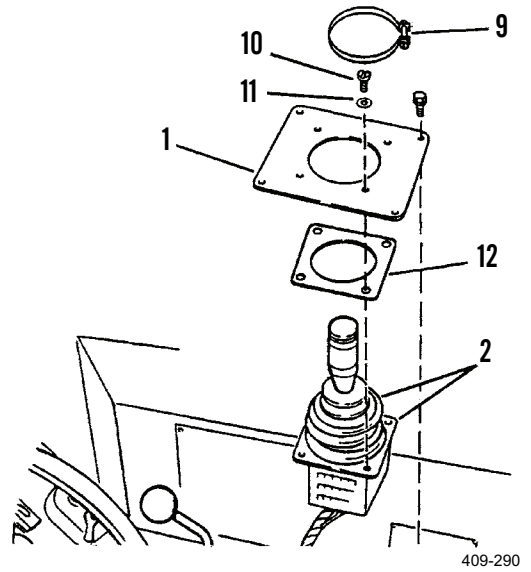
1. Remove cover plate (1) and joystick (2) as an assembly from the side console (3).
2. Remove four capscrews (4) from cover plate (1).
3. Lift cover plate (1) and joystick (2) from side console (3) as an assembly.
4. Unplug male plug (5) of joystick harness (6) from female plug (7) of vehicle wiring harness (8).
5. Remove cover plate (1) and joystick (2) from side console (3) as an assembly.



REMOVAL - CONTINUED**NOTE**

If necessary, perform the following steps to remove cover plate from joystick.

6. Remove clamp (9).
7. Remove four screws (10) and four nylon washers (11) securing joystick (2) and gasket (12) to cover plate (1). Discard nylon washers.
8. Remove cover plate (1) from joystick (2).



REMOVAL - CONTINUED

9. If necessary, disconnect joystick harness (6) from joystick (2).

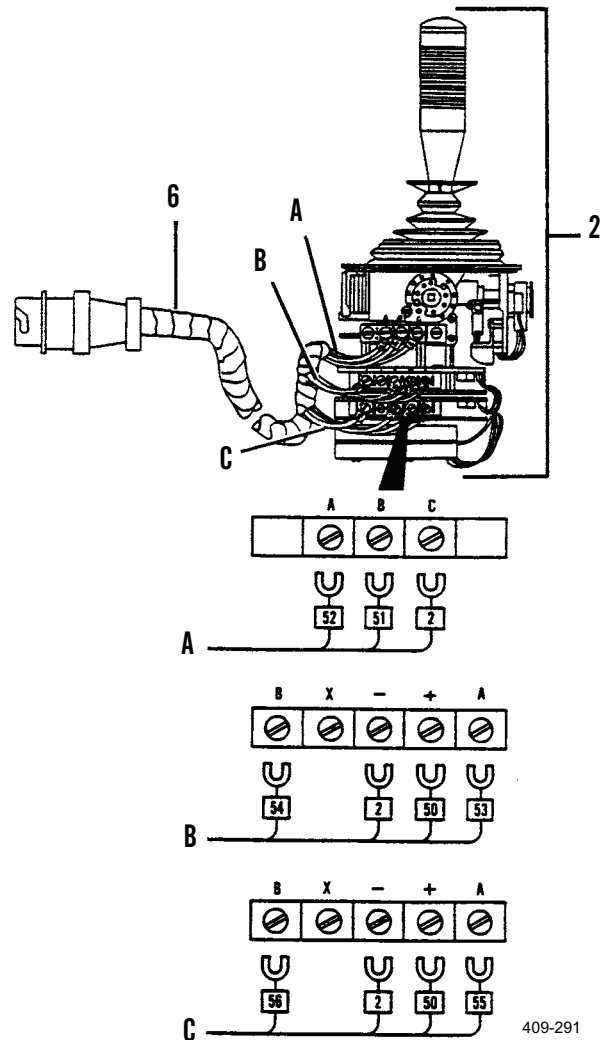
NOTE

Tag all leads as removed during steps 11 thru 13. Note location of all leads for use during installation.

10. Disconnect leads 52, 51 and 2 (A) from top terminal strip of joystick (2).
11. Disconnect leads 54, 2, 50 and 53 (B) from middle terminal strip of joystick (2).
12. Disconnect leads 56, 2, 50 and 55 (C) from bottom terminal strip of joystick (2).

NOTE

For repair of joystick harness, refer to Electrical General Maintenance Instructions (WP 0314 00).



409-291

INSTALLATION

1. If removed, connect joystick harness (6) to joystick (2).

CAUTION

Connect all leads as described in steps 2 through 4. Refer to figure below as necessary. Failure to properly connect leads may result in serious damage to joystick or electrical system.

2. Connect leads 52, 51 and 2 (A) to top terminal strip of joystick (2).
3. Connect leads 54, 2, 50 and 53 (B) to middle terminal strip of joystick (2).
4. Connect leads 56, 2, 50 and 55 (C) to bottom terminal strip of joystick (2).
5. If removed, secure joystick (2) to cover plate (1).
6. Position joystick (2) so that wide side of cover plate (1) is on same side as electrical terminals of joystick.

NOTE

Apply loctite to threads of screws.

7. Secure joystick (2) and gasket (19) to cover plate (1) with four new nylon washers (11) and four screws (10).
8. Install and tighten hose clamp (9).
9. Install cover plate (1) and joystick (2) as an assembly to the side console (3).
10. Support joystick (2) and cover plate (1) as an assembly over side console (3).
11. Plug male plug (5) of joystick harness (6) into female plug (7) of vehicle wiring harness (8).

NOTE

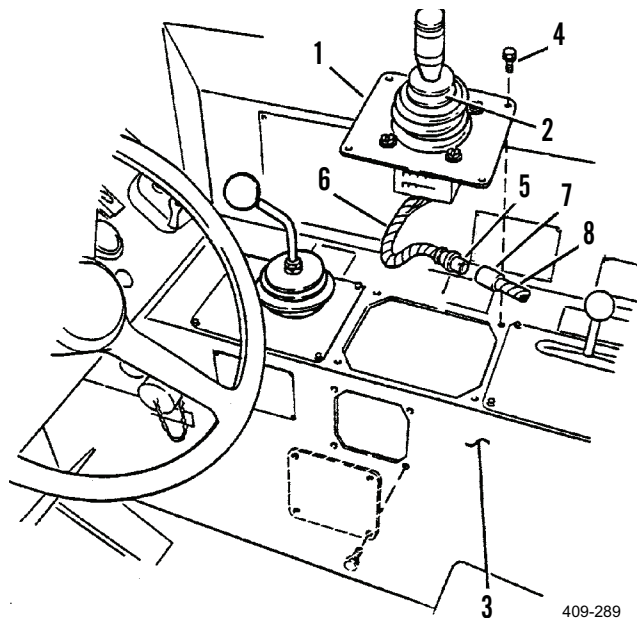
Make sure wide side of cover plate faces driver.

12. Position cover plate (1) and joystick (2) as an assembly into side console (3).

NOTE

Apply loctite to threads of capscrews.

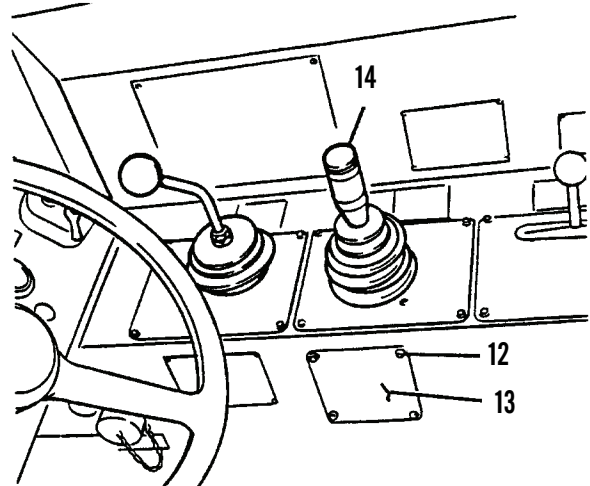
13. Install four capscrews (4) to secure cover plate (1) to side console (3).
14. Connect battery cables (WP 0107 00).



TESTING**NOTE**

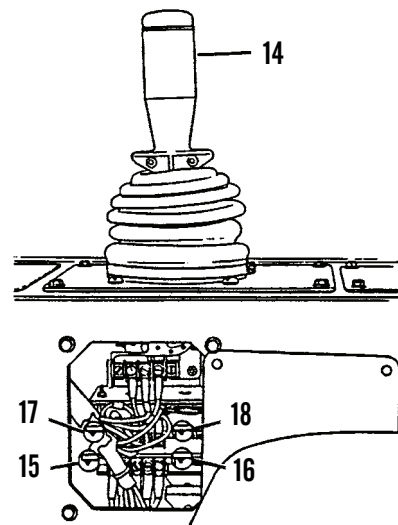
- Do not operate the engine while performing this test.
- The following test can be performed without removing the joystick from the vehicle.

1. Remove four capscrews (12) and plate (13).
2. Turn the ignition switch to the ON position but do not start the engine.



409-292

3. Perform operation test of electric joystick.
4. Move the electric joystick handle (14) fully forward and hold it in this position. Indicator light (15) should be on.
5. Move the electric joystick handle (14) fully rearward and hold it in this position. Indicator light (16) should be on.
6. Move the electric joystick handle (14) fully to the right and hold it in this position. Indicator light (17) should be on.
7. Move the electric joystick handle (14) fully to the left and hold it in this position. Indicator light (18) should be on.
8. If indicator lights (15 through 18) fail to illuminate as described in the above steps, replace the electric joystick as described in *Removal*.
9. After testing is completed, turn ignition switch to OFF position (TM 10-3930-660-10).
10. Install four capscrews (12) and plate (13).



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END OF WORK PACKAGE

FORK AUTO LEVELER CIRCUIT BOARD MAINTENANCE

0079 00

THIS WORK PACKAGE COVERSTesting, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
Protractor, circular (Item 16, WP 0324 00)
Template, level (Item 31, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)
Locknut (17)
Lockwasher (11)

References

WP 0080 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Battery cables disconnected (WP 0107 00)

NOTE

- Tag all electrical connections before removing for use during installation.
- The auto leveler circuit board is located at the top of the MLRS attachment, inside the boom electrical box.
- Potentiometers labeled "Hi A", "Hi B", "LO" and "RMP" on auto leveler circuit board are preset at the factory. Do not attempt to adjust them.

TESTING

1. Start engine. Raise forks approximately 1 ft (30 cm) off ground. Stop engine (TM 10-3930-660-10).
2. Loosen four screws (1) and separate cover (2) from boom electrical box (3) to provide access to auto leveler circuit board (4).

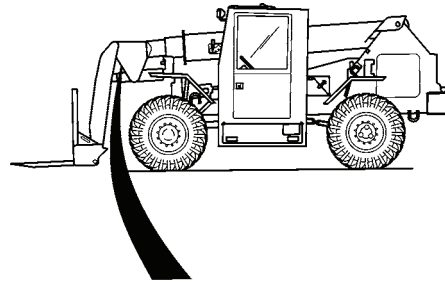
CAUTION

Support cover as required so that weight of cover and circuit board is not supported by electrical leads to board.

NOTE

There are two LED indicators on the auto leveler circuit board. One is labeled "Hi A" and the other is labeled "Hi B".

3. Check for proper adjustment of auto leveler switch.
4. Start engine (TM 10-3930-660-10).
5. Turn off auto leveler control in cab (TM 10-3930-660-10).
6. Place level on forks.
7. Raise forks to approximately a +6-degree inclination and observe "Hi A" LED indicator (5).



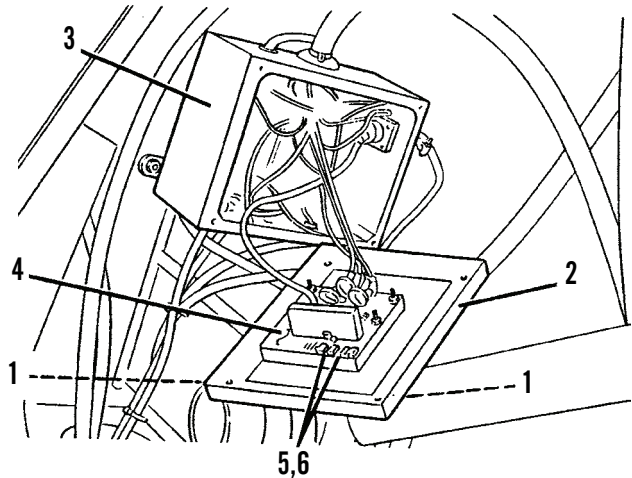
NOTE

The "Hi A" LED indicator should be illuminated after forks are raised.

8. Turn on auto leveler control in cab (TM 10-3930-660-10) and observe "Hi A" LED indicator (5).

NOTE

The "Hi A" LED indicator should remain illuminated as forks are lowering and go out when forks are level.



9. Turn off auto leveler control in cab and lower forks to approximately a -6-degree inclination. Observe "Hi B" LED indicator (6).

409-4028

NOTE

The "Hi B" LED indicator should be illuminated after forks are lowered.

10. Turn on auto leveler control in cab (TM 10-3930-660-10) and observe "Hi B" LED indicator (7).

NOTE

The "Hi B" LED indicator should remain illuminated as forks are raising and go out when forks are level.

TESTING - CONTINUED

11. If either LED indicator (5 or 6) remains illuminated when forks are level, fork auto leveler switch needs adjustment. Refer to WP 0080 00.
12. Remove level from forks.

NOTE

- If neither LED indicator illuminates during the tests above, check for voltage across “VS” and “GND” terminals on circuit board. If 24 VDC is not present, wiring supplying power to board is open.
- If voltage is present across “VS” and “GND” terminal, and neither LED indicator illuminates, the auto leveler switch and/or circuit board is defective.
- Refer to *Removal* and *Installation* for replacement of fork auto leveler circuit board. Refer to WP 0080 00 for replacement of fork auto leveler switch.

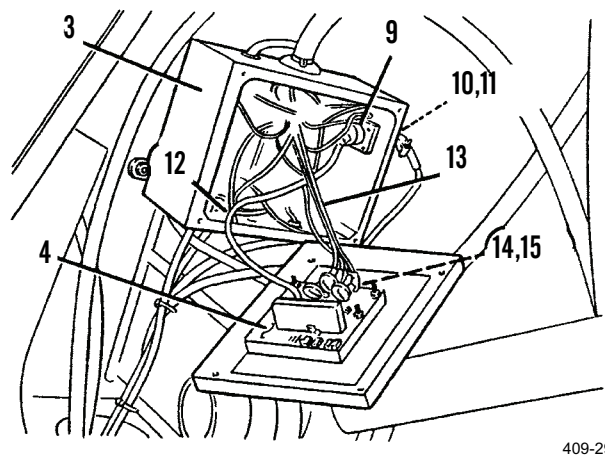
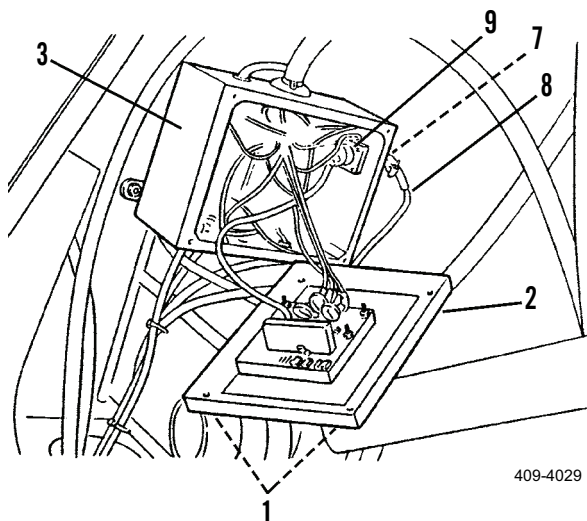
REMOVAL

1. Disconnect battery cables (WP 0107 00).
2. Loosen four screws (1) and pull cover (2) from box (3).

CAUTION

Support cover (2) so that weight of cover and circuit board is not supported by electrical leads attached to board.

3. Unscrew collar (7) on auto leveler cable (8) at box (3) and remove auto leveler cable from connector (9).
4. Remove four screws (10) and four lockwashers (11) securing connector (9) and electrical cable (12) to box (3). Discard lockwashers.



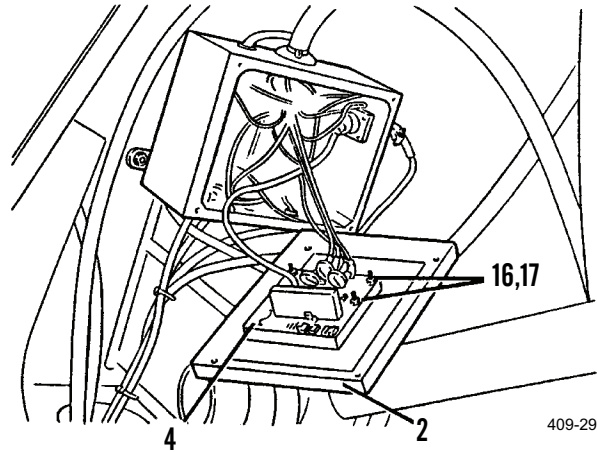
5. Locate four electrical leads (13) at terminal strip (14) of circuit board (4). Loosen four screws (15) on terminal strip and remove leads from terminal strip.

REMOVAL - CONTINUED

6. If necessary, remove four screws (16) and four locknuts (17) securing circuit board (4) to cover (2). Remove circuit board from cover. Discard locknuts.

INSTALLATION

1. If removed, place circuit board (4) on cover (2) and secure with four new locknuts (17) and four screws (16).

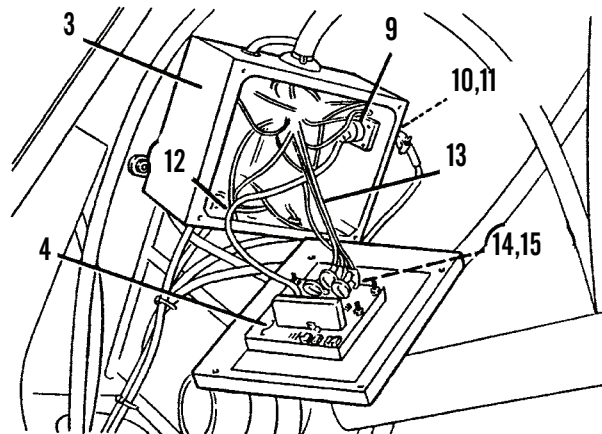


409-298

CAUTION

Support cover during steps 2 thru 4 so that weight of cover and circuit board is not supported by electrical leads.

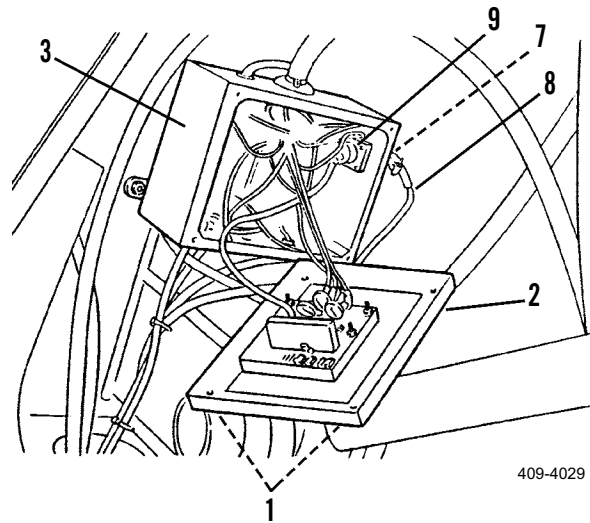
2. Place four electrical leads (13) on terminal strip (14) of circuit board (4) as tagged. Secure leads to terminal strip with four screws (15).
3. Secure connector (9) and electrical cable (12) to box (3) with four new lockwashers (11) and four screws (10).



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INSTALLATION - CONTINUED

4. Connect plug of auto leveler cable (8) to connector (9) on box (3) and secure with collar (7).
5. Place cover (2) on box (3) and secure with four screws (1).



409-4029

6. Connect battery cables (WP 0107 00).
7. Operate vehicle and check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Template, level (Item 31, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 44, WP 0323 00)
- Strap, tie down (Item 56, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (11, 20, 25, 29 and 33)

Equipment Condition

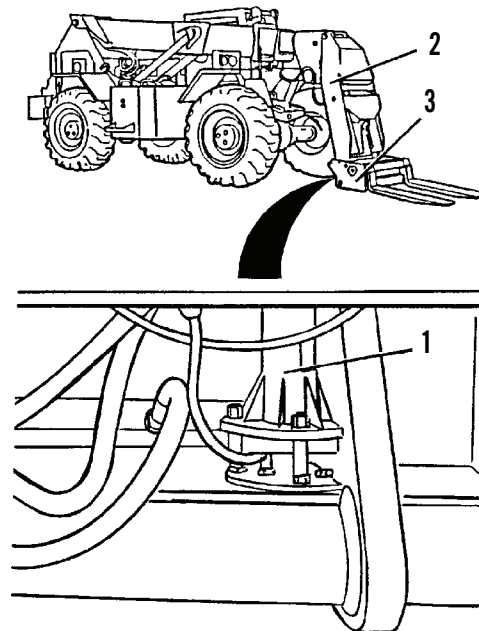
- Vehicle parked on level ground (TM 10-3930-660-10)
- Battery cables disconnected (WP 0107 00)

REMOVAL

NOTE

Tag all electrical connections before removing for use during installation.

1. Locate fork auto leveler switch (1), at the base of the MLRS attachment (2), on the carriage assembly (3).



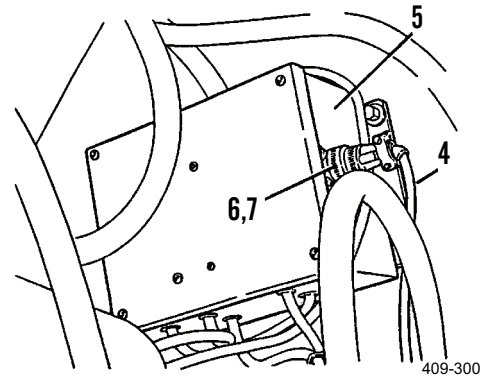
NOTE: COVER REMOVED FROM SWITCH IN THIS VIEW.

409-299

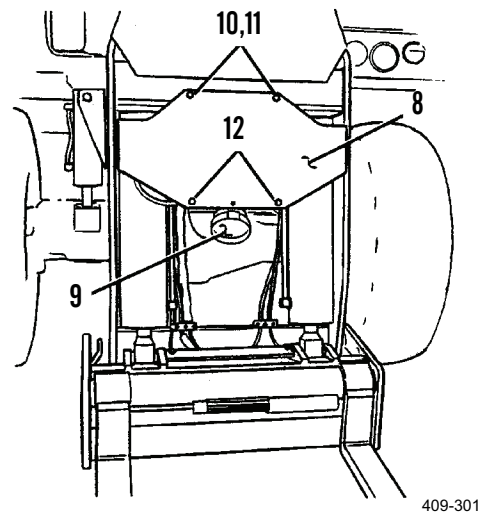
REMOVAL - CONTINUED**NOTE**

Be sure ignition switch is placed in the OFF position before removing auto leveler switch cable from boom electrical box.

2. Unscrew collar (6) and remove auto leveler switch cable (4) from connector (7) at boom electrical box (5).



3. Remove MLRS attachment valve cover (8).
4. Unplug two male plugs of vehicle wiring harness from two female plugs of light (9).
5. Remove two capscrews (10), two lockwashers (11), two nuts (12) and cover (8). Discard lockwashers.



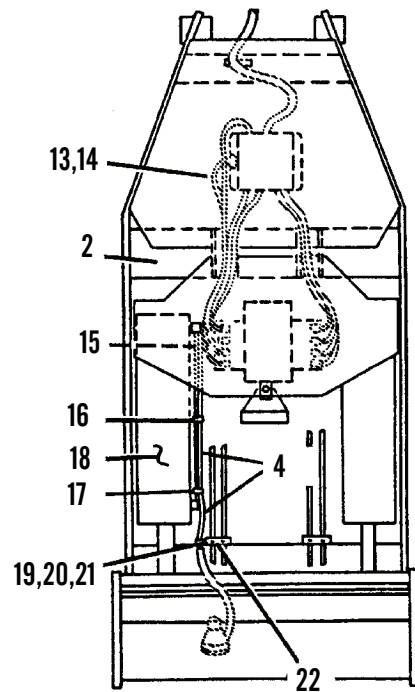
REMOVAL - CONTINUED

6. Remove fork auto leveler switch (1) and cable (4) from carriage assembly (3).

NOTE

Do not turn adjusting nuts on top of auto leveler switch.

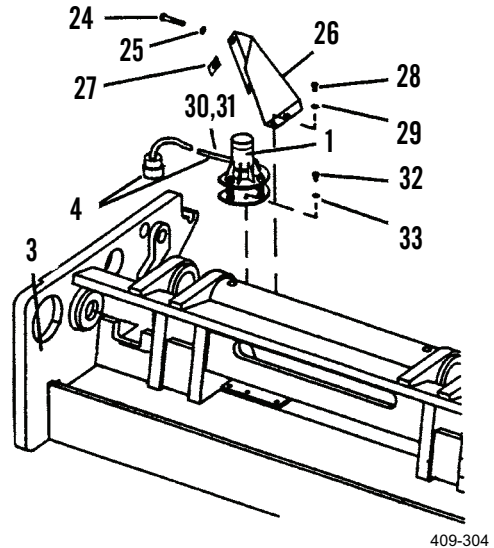
7. Remove and discard two tie down straps (13) securing auto leveler cable (4) to MLRS attachment valve cables (14).
8. Remove and discard tie down straps (15 thru 17) securing auto leveler cable (4) to tube of fork tilt cylinder (18).
9. Remove capscrew (19), lockwasher (20) and cable clamp (21) securing auto leveler cable (4) to clamp halves (22). If necessary, remove cable clamp from auto leveler cable (4). Discard lockwasher.



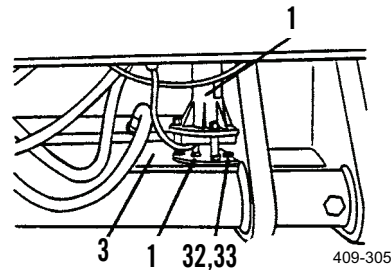
409-303

REMOVAL - CONTINUED

10. Remove two bolts (24) and two lockwashers (25) from switch cover (26). Discard lockwashers. If necessary, remove two retainer nuts (27) from switch cover.
11. Remove two capscrews (28) and two lockwashers (29) from switch cover (26). Remove switch cover from carriage assembly (3). Discard lockwashers.
12. Carefully remove auto leveler switch cable (4) and grommet (30) from notch in switch cover (26). If necessary, remove conduit (31) from auto leveler cable.



13. Remove four capscrews (32) and four lockwashers (33) securing switch (1) to carriage assembly (3). Remove switch from carriage assembly. Discard lockwashers.

**INSTALLATION****WARNING**

Failure to route auto leveler cable as described may result in damage to vehicle or its load due to malfunctioning of auto leveler system.

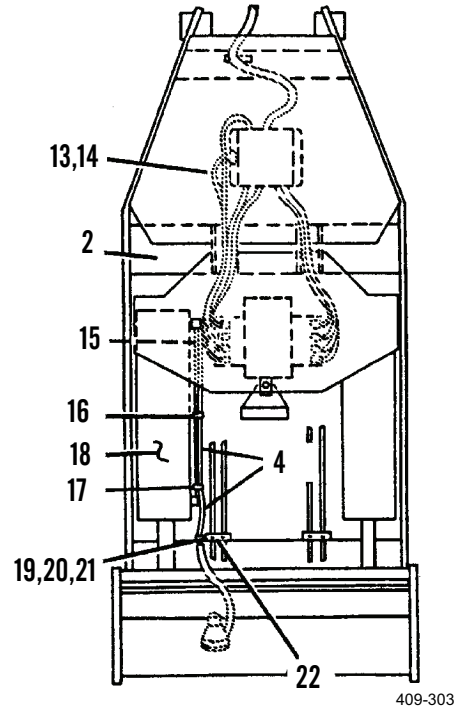
NOTE

- Auto leveler cable is part of auto leveler switch and is nonrepairable. If auto leveler cable is damaged, entire auto leveler switch must also be replaced.
- Apply loctite to all capscrews and bolts as they are installed.

1. Install fork auto leveler switch (1) and cable to carriage assembly (3).
2. Start engine. Position carriage assembly (3) in a down position so that carriage tilt cylinders are fully extended. Stop engine (TM 10-3930-660-10).
3. Position switch (1) on carriage assembly (3) and secure with four new lockwashers (33) and three capscrews (32).

INSTALLATION - CONTINUED

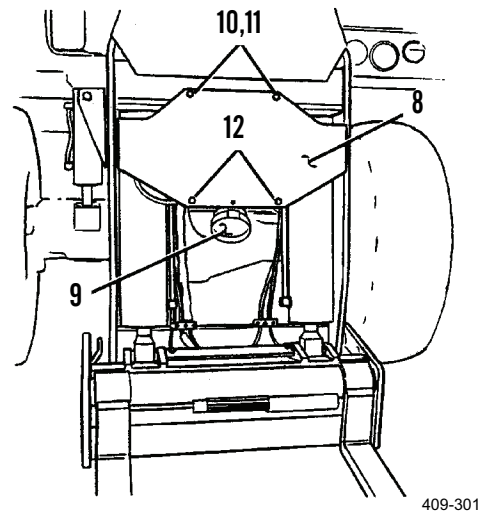
4. Carefully position auto leveler cable (4) and grommet (30) through notch in switch cover (26). If removed, install conduit (31) to auto leveler cable (4).
5. Position switch cover (26) on carriage assembly (3) and secure with two new lockwashers (29), two cap-screws (28), two retainer nuts (27), two new lock-washers (25) and two bolts (24).
6. If removed, install cable clamp (21) to auto leveler cable (4). Install, but do not tighten, capscrew (19) and new lockwasher (20).
7. Slide conduit (31) on auto leveler cable (4) so it is positioned between cable clamp (21) and cable grommet (30).
8. Route auto leveler cable (4) through cable clamp (21) and pull cable tight from top. Tighten capscrew (19) and new lockwasher (20) to secure cable clamp and autoleveler cable to clamp halves (22).
9. Pull auto leveler cable (4) tight from top and secure auto leveler cable to tube of fork tilt cylinder (18) with new tie down straps (15 thru 17).
10. Secure auto leveler cable (4) to MLRS attachment valve cables (14) with two new tie down straps (13).



NOTE

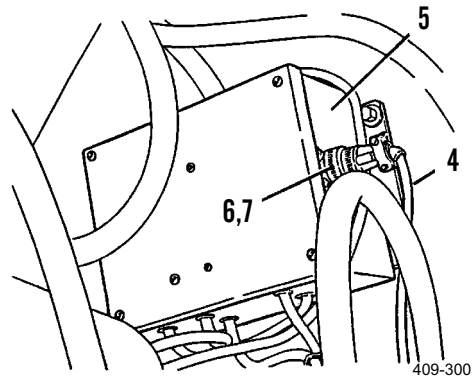
Any slack in auto leveler cable must be located at boom electrical box end of cable.

11. Install MLRS attachment valve cover (8).
12. Secure cover (8) with two capscrews (10), two new lockwashers (11) and two nuts (12).
13. Plug two male plugs of vehicle wiring harness into two female plugs of light (9) as tagged.



INSTALLATION - CONTINUED

14. Insert plug on auto leveler cable (4) into connector (7) on boom electrical box (5). Turn collar (6) until cable is secure.



15. Connect battery cables (WP 0107 00).
16. Adjust fork auto leveler switch (1). See *Adjustment* in this work package.

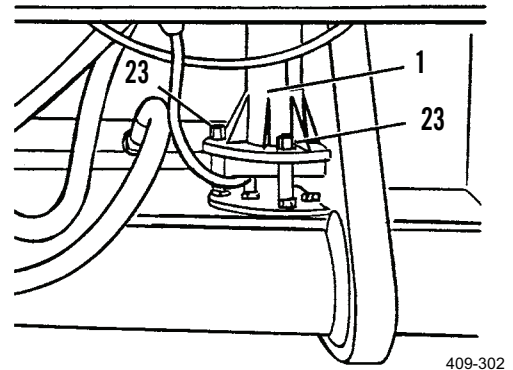
ADJUSTMENT

1. Remove switch cover from carriage assembly.
2. Start engine (TM 10-3930-660-10).
3. Turn on fork auto leveler control in cab.
4. Raise forks approximately 2 ft (61 cm) above ground.
5. Place level on forks and note level reading.

NOTE

Level reading should be within +/- 2 degrees of 0 if switch is properly adjusted. If necessary, refer to step 6 to adjust switch.

6. Turn three adjustment nuts (23) on switch (1), as required until 0 degree reading is obtained on level.
7. Turn off fork auto leveler control in cab and manually tilt carriage assembly up or down.
8. Turn on fork auto leveler control in cab and note level reading after forks have leveled.



NOTE

Reading will be within +/- 2 degrees of 0 if switch is properly adjusted.

9. If necessary, repeat steps 6 thru 8, as required until switch (1) is properly adjusted.
10. Stop engine (TM 10-3930-660-10).
11. Install switch cover to carriage assembly.

END OF WORK PACKAGE

STARTER RELAY MAINTENANCE

0081 00

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Lockwasher (2)

Materials/Parts - Continued

Starwasher (7 and 12)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

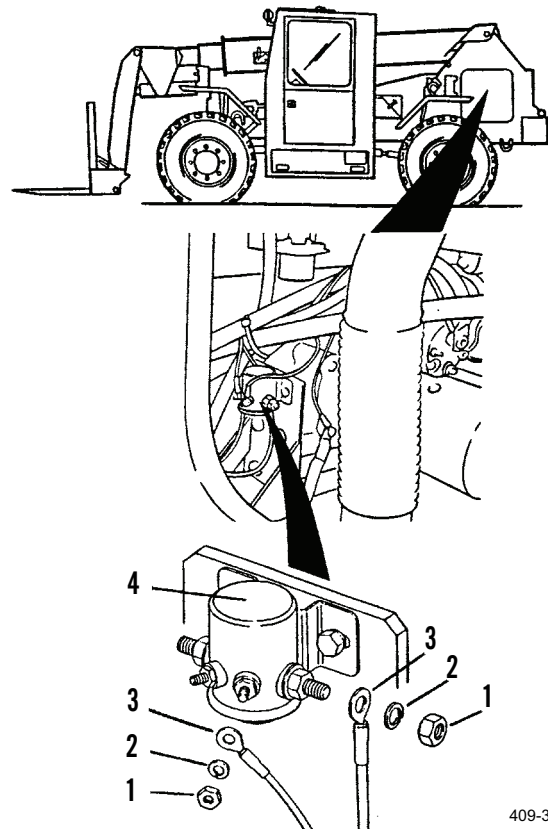
Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

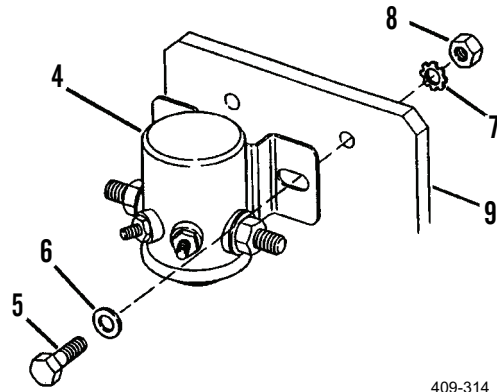
1. Remove four nuts (1) and four lockwashers (2), and disconnect four electrical leads (3) from starter relay (4). Discard lockwashers.



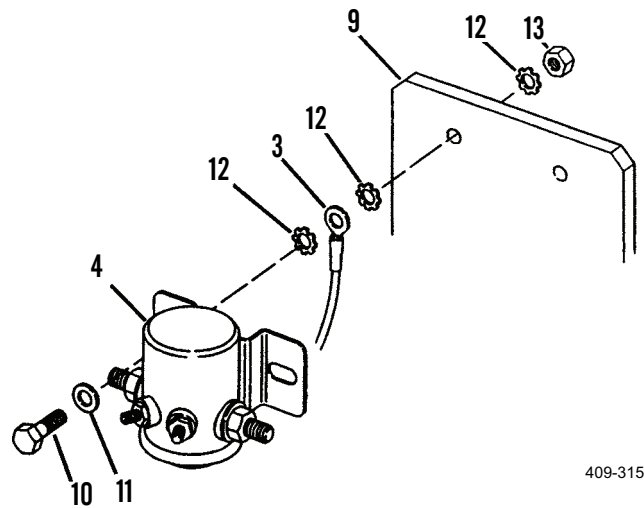
409-313

REMOVAL - CONTINUED

2. Remove bolt (5), flatwasher (6), starwasher (7) and nut (8) securing right-hand side of relay (2) to engine mount (9). Discard starwasher.



3. Remove bolt (10), flatwasher (11), three starwashers (12) and nut (13) securing electrical lead (3) and left-hand side of relay (4) to engine mount (9). Discard starwashers.



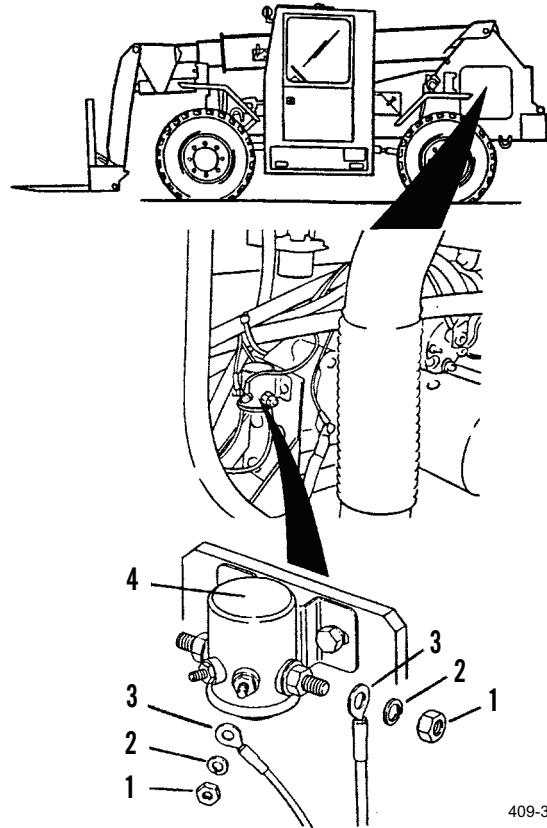
4. Remove relay (4) from engine mount (9).

INSTALLATION

1. Position relay (4) on engine mount (9).
2. Secure electrical lead (3) and left-hand side of relay (4) to engine mount (9) with nut (13), three new starwashers (12), flatwasher (11) and bolt (10).
3. Secure right-hand side of relay (4) to engine mount (9) with nut (8), new starwashers (7), flatwasher (6) and bolt (5).

INSTALLATION - CONTINUED

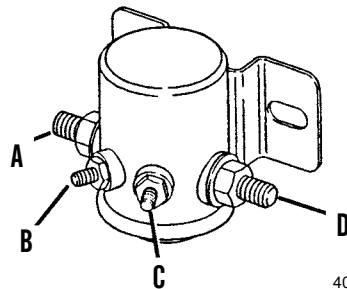
4. Connect four electrical leads (3) to starter relay (4) and secure with four new lockwashers (2) and four nuts (1).
5. Connect battery cables (WP 0107 00).



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TESTING

1. Disconnect electrical leads from starter relay as described in *Removal*.
2. To test relay for proper solenoid operation, apply 24 volts DC to terminals (B and C).
3. Listen for “click” when voltage is applied. If no “click” is heard, relay is defective and must be replaced. Refer to *Removal and Installation*.
4. To test relay for continuity, apply 24 volts DC to terminals (B and C) of relay.
5. Connect an ohmmeter across terminals (A and D) of relay.
6. Ohmmeter should indicate continuity across terminals (A and D).
7. Remove 24 volts DC from terminals (B and C).
8. Ohmmeter should indicate no continuity across terminals (A and D).



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STARTER RELAY MAINTENANCE - CONTINUED

0081 00

TESTING - CONTINUED

9. Replace relay if continuity requirements are not met in step 6 and 8. Refer to *Removal* and *Installation*.
10. Connect electrical leads to starter relay as described in *Installation*.
11. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

EMERGENCY STEERING PUMP RELAY (PUMP-MOUNTED) MAINTENANCE

0082 00

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)
 Lockwasher (2 and 6)

References

WP 0083 00

Equipment Condition

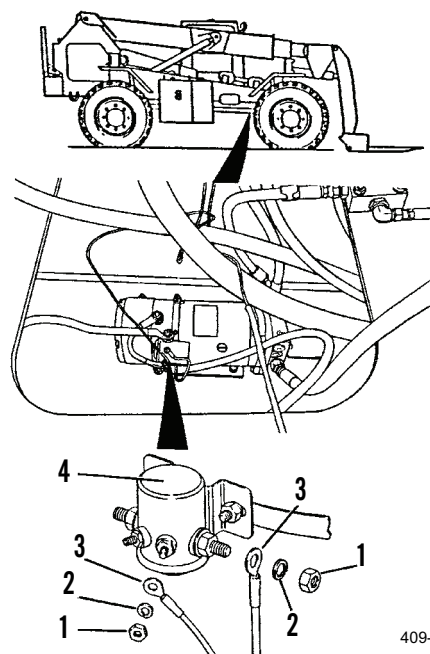
Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL**NOTE**

- Tag all electrical connections before removing for use during installation.
- There are two emergency steering pump relays. One is mounted under the vehicle on the emergency steering pump. The other is mounted inside the cab front console.
- For *Removal* and *Testing* of the console-mounted relay, refer to WP 0083 00.

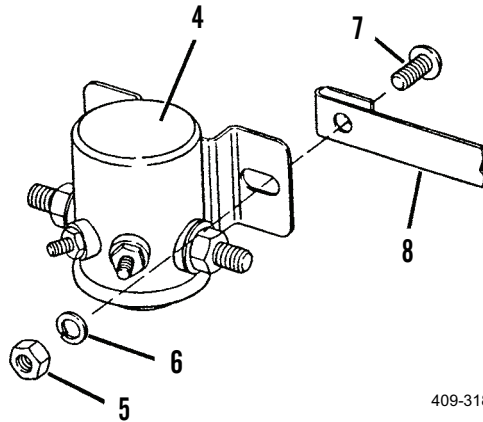
1. Remove four nuts (1) and four lockwashers (2), and disconnect electrical leads and cables (3) from relay (4). Discard lockwashers.



409-317

REMOVAL - CONTINUED

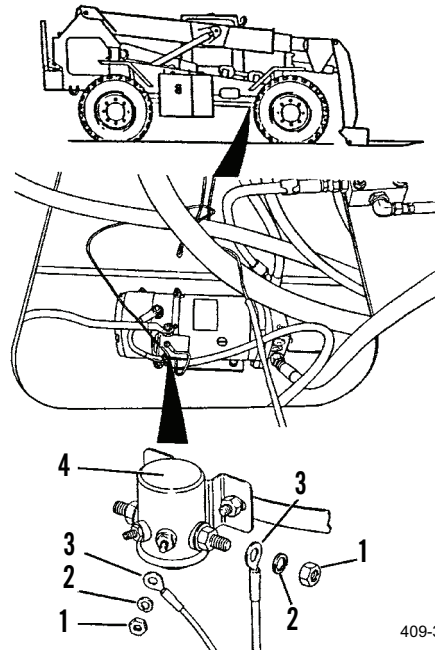
2. Remove two nuts (5), two lockwashers (6) and two screws (7) securing clamp (8) and relay (4) to emergency steering pump. Discard lockwashers.
3. Remove clamp (8) and relay (4) from emergency steering pump as an assembly.



409-318

INSTALLATION

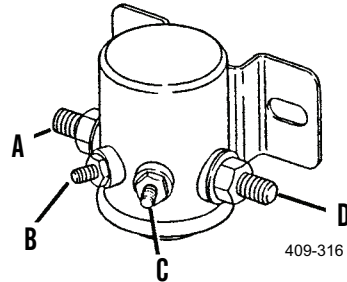
1. Position clamp (8) and relay (4) on emergency steering pump as an assembly.
2. Install two nuts (5), two new lockwashers (6) and two screws (7).
3. Connect electrical leads and cables (3) to relay (4) and secure with four new lockwashers (2) and four nuts (1).
4. Connect battery cables (WP 0107 00).



409-317

TESTING

1. Disconnect electrical leads and cables from relay as described in *Removal*.
2. To test relay for proper solenoid operation, apply 24 volts DC to terminals (B and C).
3. Listen for “click” when voltage is applied. If no “click” is heard, relay is defective and must be replaced. Refer to *Removal* and *Installation*.
4. To test relay for continuity, apply 24 volts DC to terminals (B and C).
5. Connect an ohmmeter across terminals (A and D).
6. Ohmmeter should indicate continuity across terminals (A and D).
7. Remove 24 volts DC from terminals (B and C).
8. Ohmmeter should indicate no continuity across terminals (A and D).
9. Replace relay if continuity requirements are not met in step 6 and 8. Refer to *Removal* and *Installation*.
10. Connect battery cables (WP 0107 00).

**END OF WORK PACKAGE**

CONSOLE-MOUNTED RELAYS MAINTENANCE

0083 00**THIS WORK PACKAGE COVERS**Removal, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (4 and 8)

References

WP 0082 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

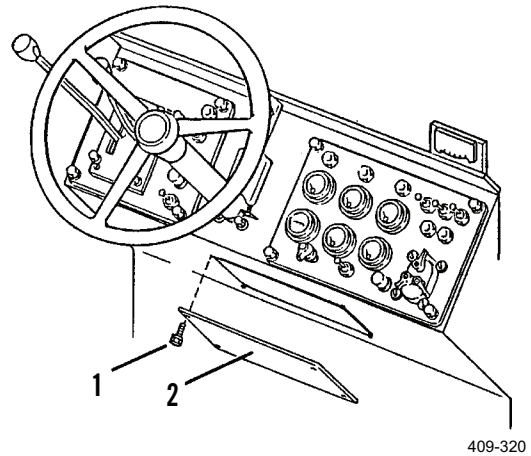
- Tag all electrical connections before removing for use during installation.
- There are four relays mounted inside the front console. These include two blackout headlight relays and one engine run relay and one emergency steering pump relay.
- Some relays have six electrical terminals and some relays have four electrical terminals.
- A second emergency steering pump relay is mounted on the emergency steering pump, under the vehicle.
- For removal and testing of the emergency steering pump-mounted relay, refer to WP 0082 00.

REMOVAL

NOTE

Removal of blackout headlight relay is shown. Removal and Installation procedures for all four relays are essentially similar.

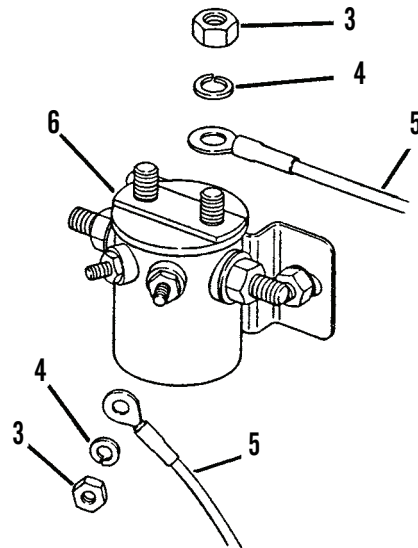
1. Remove four capscrews (1) and access panel (2).



NOTE

Tag electrical connections for relay as electrical leads are removed.

2. Remove six nuts (3) and six lockwashers (4), and disconnect electrical leads (5) from relay (6). Discard lockwashers.



REMOVAL - CONTINUED

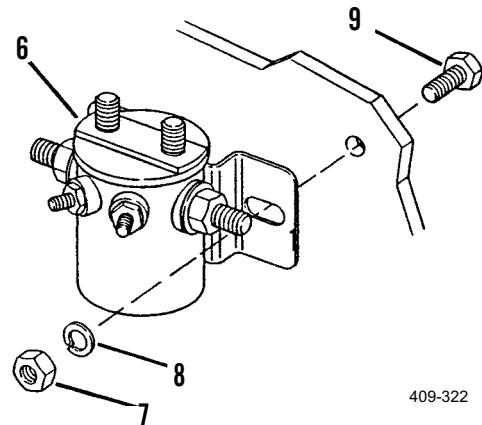
- Remove two nuts (7), two lockwashers (8) and two screws (9) securing relay (6) to vehicle. Remove relay from vehicle. Discard lockwashers.

INSTALLATION

NOTE

Apply loctite to screws as installed.

- Position relay (6) on vehicle and secure with two screws (9), two new lockwashers (8) and two nuts (7).

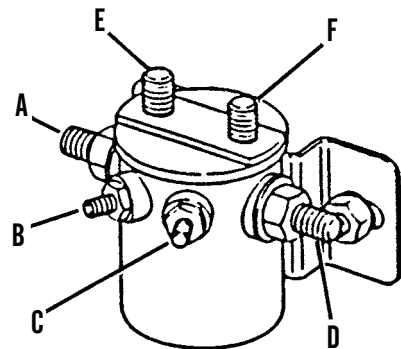


- Connect electrical leads (5) to terminals of relay (6) and secure with six new lockwashers (4) and six nuts (3).
- Secure access panel (2) with four capscrews (1).
- Connect battery cables (WP 0107 00).

TESTING

NOTE

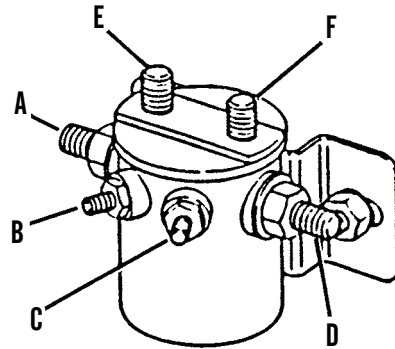
- Testing procedures for all relays covered in this work package are essentially similar.
- Terminals (A thru D) are present on all relays tested in this section. Terminals (E and F) appear only on the two blackout headlight relays.
- Disconnect electrical leads from relay as described in *Removal*.



- To test relay for proper solenoid operation, apply 24 volts DC to terminals (B and C).
- Listen for “click” when voltage is applied. If no “click” is heard, relay is defective and must be replaced. Refer to *Removal* and *Installation*.
- To test relay for continuity, apply 24 volts DC to terminals (B and C).
- Ohmmeter should indicate continuity across terminals (A and D).

TESTING - CONTINUED

5. Ohmmeter should indicate no continuity across terminals (E and F).
6. Remove 24 volts DC from terminals (B and C).
7. Ohmmeter should indicate no continuity across terminals (A and D).



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8. Ohmmeter should indicate continuity across terminals (E and F).
9. Replace relay if continuity requirements are not met in steps 4 through 8. Refer to *Removal and Installation*.
10. Connect electrical leads to relay as described in *Installation* section of this work package.
11. Connect negative battery cable (WP 0107 00).

END OF WORK PACKAGE

TURN SIGNAL FLASHER REPLACEMENT

0084 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Locknut (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

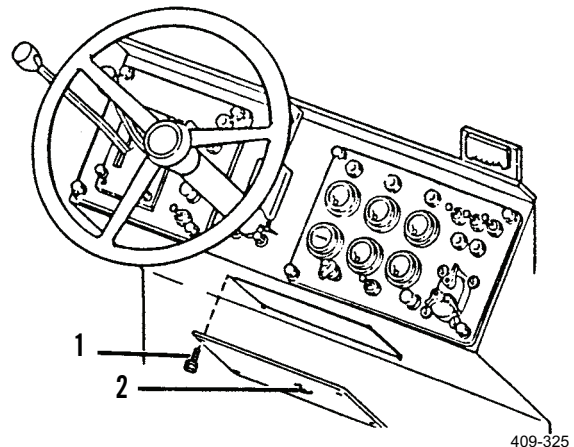
Battery cables disconnected (WP 0107 00)

NOTE

- Tag all electrical connections before removing for use during installation.
- The turn signal flasher is mounted inside the cab front console.

REMOVAL

1. Remove four capscrews (1) and access panel (2) from front console.

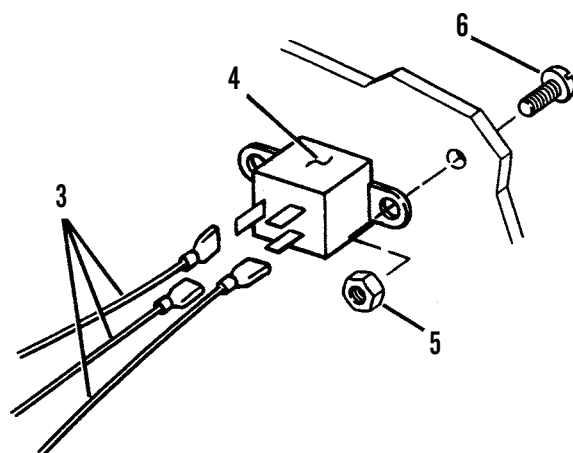


TURN SIGNAL FLASHER REPLACEMENT - CONTINUED

0084 00

REMOVAL - CONTINUED

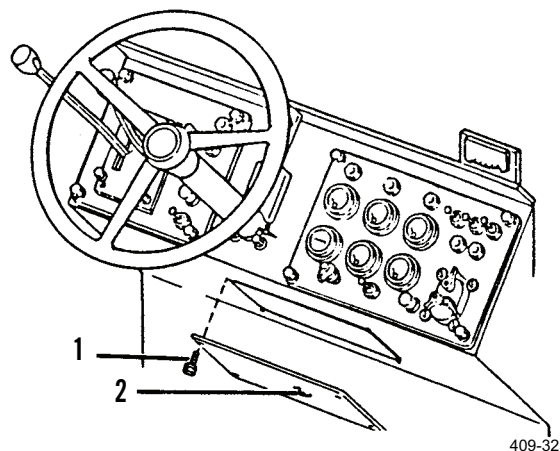
2. Disconnect three electrical leads (3) from flasher (4) at spade connectors.
3. Remove two locknuts (5) and two screws (6) securing flasher (4) to cab. Remove flasher from cab. Discard locknuts.



409-326

INSTALLATION

1. Position flasher (4) on cab and secure with two screws (6), and two new locknuts (5).
2. Connect three electrical leads (3) to flasher (4) at spade connectors.
3. Secure access panel (2) to front console with four cap-screws (1).



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4. Connect battery cables (WP 0107 00).
5. Turn engine start switch to ON position and check for proper operation of turn signals (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Strap, tie down (Item 56, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (24 and 30)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

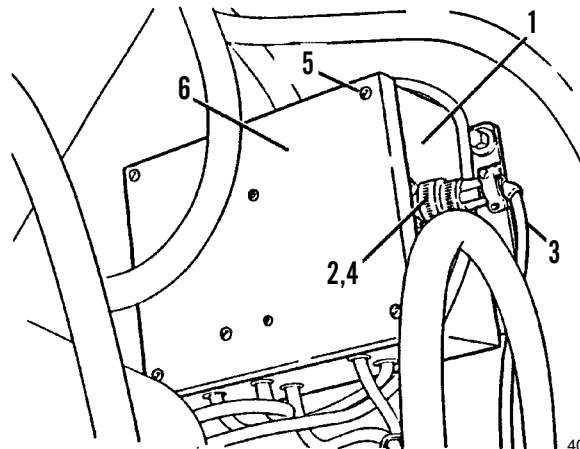
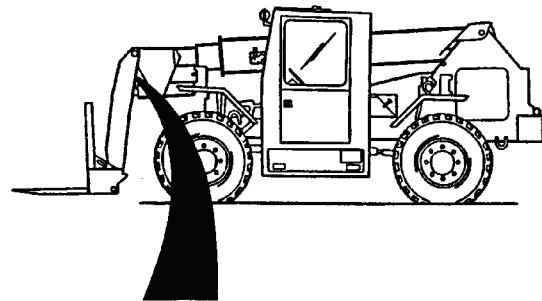
Battery cable disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. Extend boom as required (TM 10-3930-660-10) to allow access to the boom electrical junction box assembly (1).
2. Disconnect battery cables (WP 0107 00).
3. Unscrew collar (2) on auto leveler cable (3) at boom electrical junction box assembly (1) and remove auto leveler cable at connector (4).
4. Loosen four screws (5) and separate cover (6) from boom electrical junction box assembly (1).

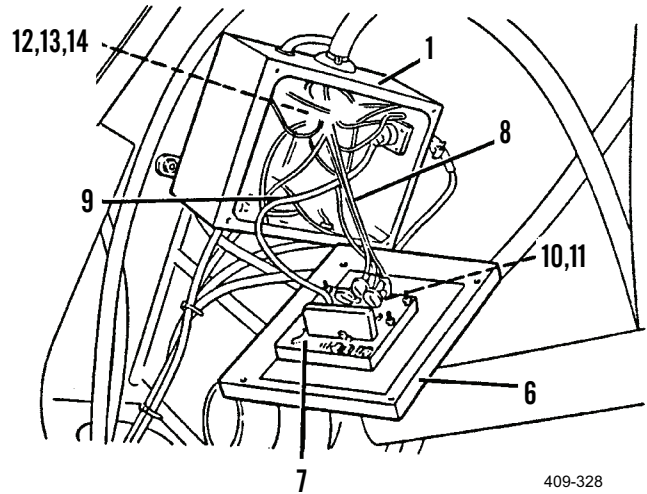


409-327

REMOVAL - CONTINUED**CAUTION**

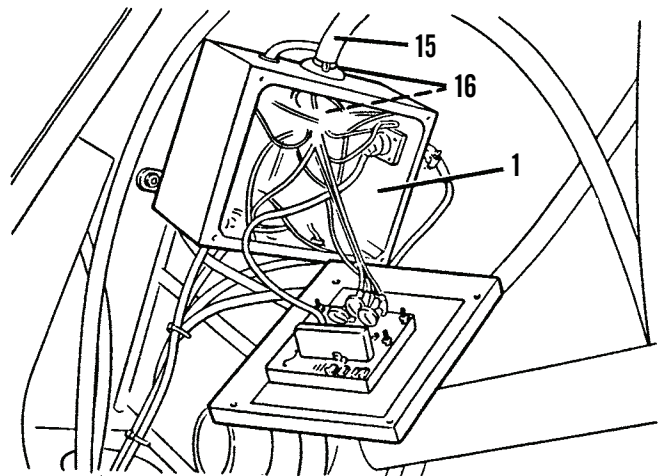
Support cover so that weight of cover and auto leveling circuit board is not supported by electrical leads or cable connected to board.

5. Disconnect four electrical leads (8) from auto leveler circuit board (7).
6. Loosen four screws (11) on terminal strip (10) and remove four electrical leads (8).
7. Disconnect leads (12) at terminal strips (13) inside box assembly (1).
8. Loosen screws (14) on terminal strips (13) and remove electrical leads (12).



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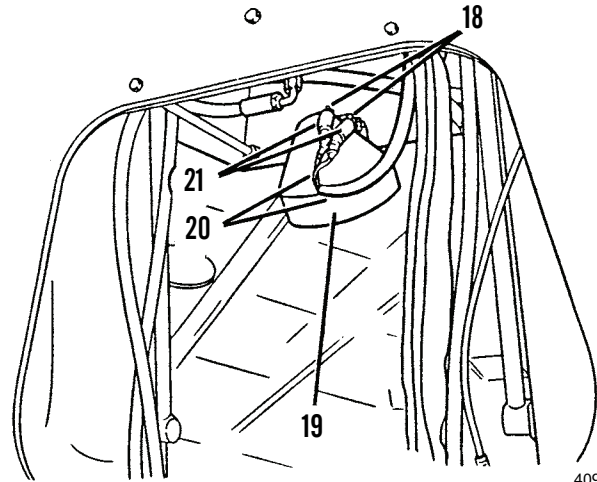
9. Remove boom electrical cable (15) at boom electrical junction box assembly (1).
10. Cut two tie straps (16) on boom electrical cable (15) where cable enters box assembly (1). Discard tie straps.
11. Carefully pull cable (15) from box assembly (1).



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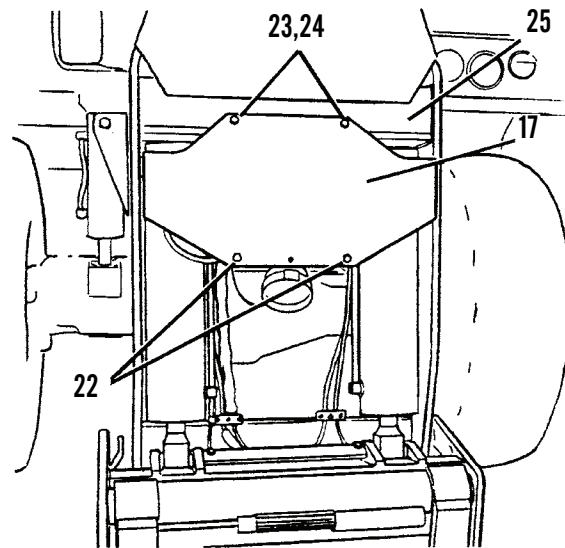
REMOVAL - CONTINUED

12. Disconnect two electrical leads (18) of headlight (19) from wiring harness (20) at plugs (21).



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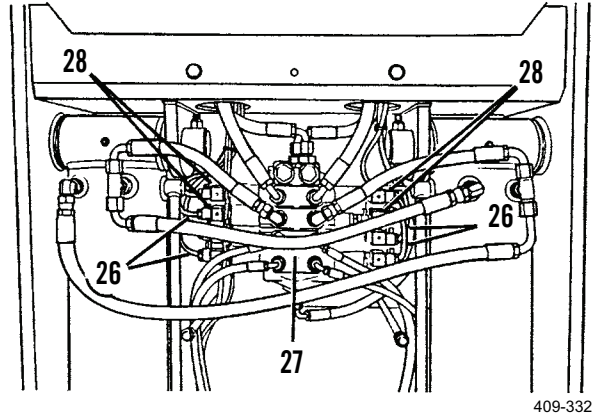
13. Remove two nuts (22), two capscrews (23), and two lockwashers (24) securing MLRS control valve cover (17) to MLRS attachment frame (25). Discard lockwashers.



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REMOVAL - CONTINUED

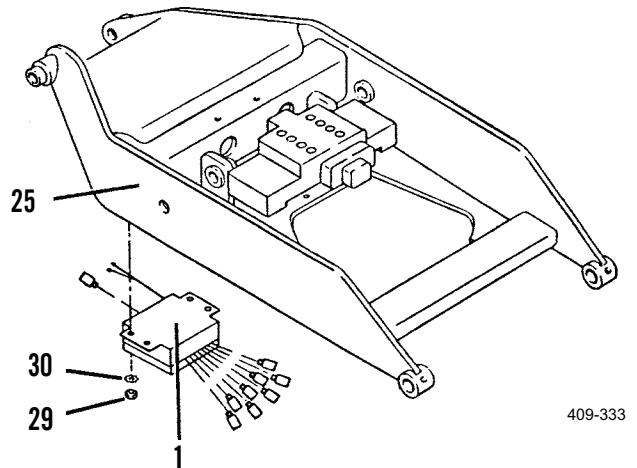
14. Remove eight electrical cables (26) from MLRS control valve (27) at plugs (28).



15. Remove four nuts (29), four lockwashers (30) and remove boom electrical junction box assembly (1) from MLRS attachment frame (25). Discard lockwashers.

INSTALLATION

1. Position boom electrical junction box assembly (1) on MLRS attachment frame (25) and secure with four new lockwashers (30) and four nuts (29).
2. Connect eight electrical cables (26) to MLRS control valve (27) at plugs (28).

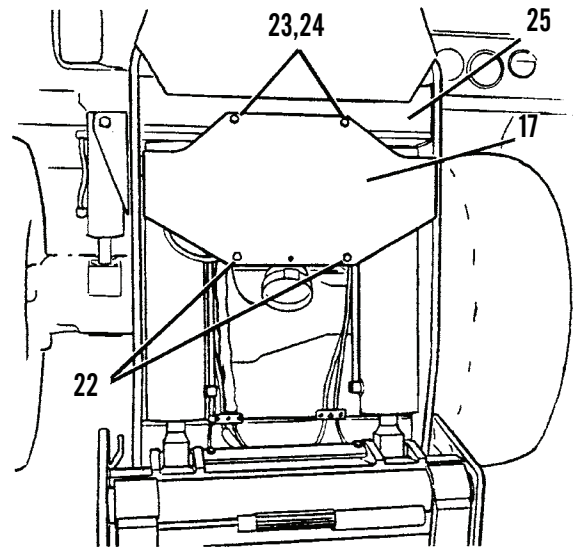


INSTALLATION - CONTINUED

NOTE

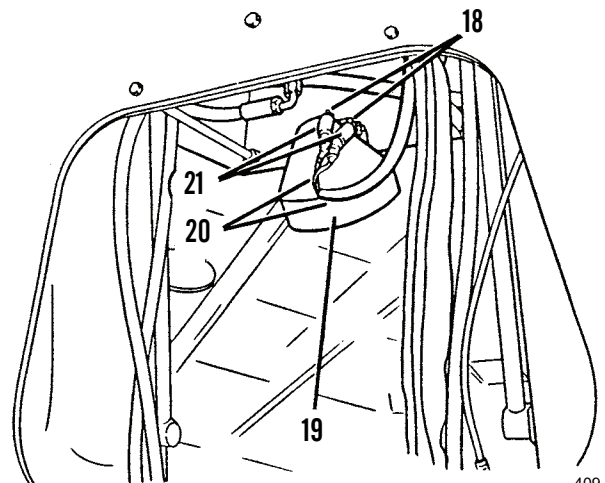
Apply loctite to threads of capscrews.

3. Position MLRS control valve cover (17) on MLRS attachment frame (25) and secure with two nuts (22), two capscrews (23) and two new lockwashers (24).



409-331

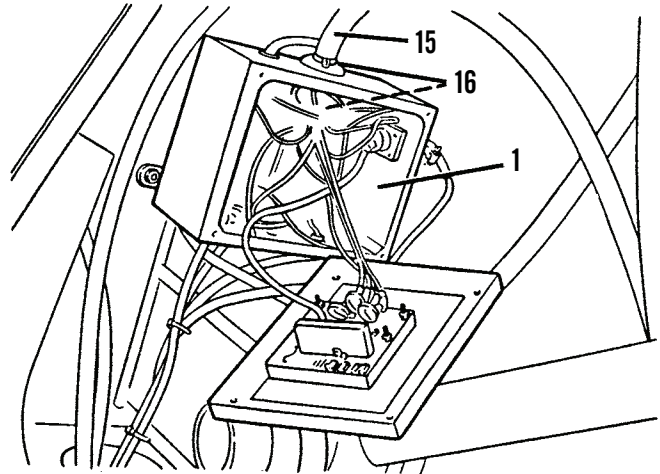
4. Connect two electrical leads (18) of headlight (19) to wiring harness (20) at plugs (21).



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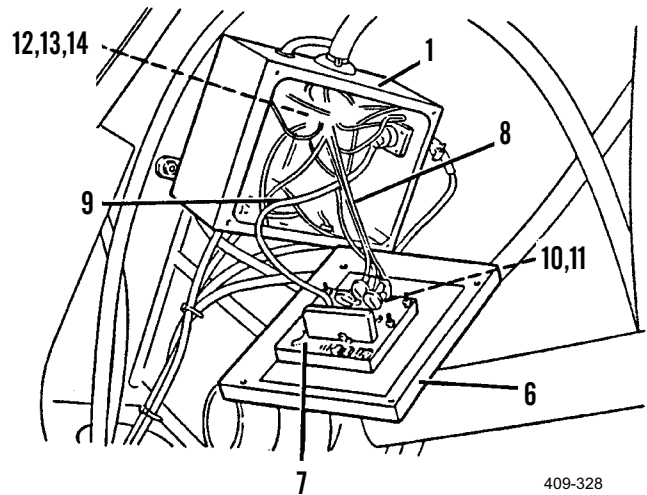
INSTALLATION - CONTINUED

5. Carefully position cable (15) through hole in box assembly (1).
6. Secure cable on both sides of hole with two new tie down straps (16).



409-329

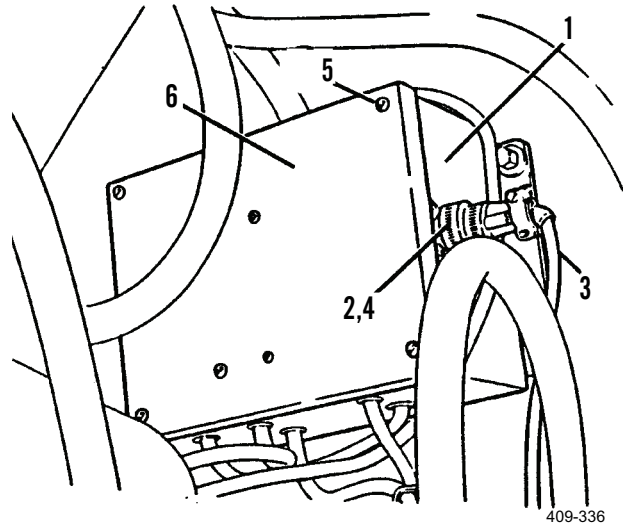
7. Place leads (12) on terminal strips (13) inside box assembly (1).
8. Tighten screws (14) on terminals strips (13) to secure leads (12).
9. Connect four electrical leads (8) at auto leveler circuit board (7).
10. Place four leads (8) on terminals strip (10) inside box assembly (1).
11. Tighten four screws (11) on terminal strip (10) to secure leads (8).



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INSTALLATION - CONTINUED

12. Place cover (6) on boom electrical box (1) and secure by tightening four screws (5).
13. Insert plug on auto leveler cable (3) into connector (4) at boom electrical box (1). Twist collar (2) until auto leveler cable (3) is secure.
14. Connect battery cables (WP 0107 00).



15. Check all MLRS attachment and fork auto leveler functions for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

STE/ICE-R RESISTOR ASSEMBLY REPLACEMENT**0086 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

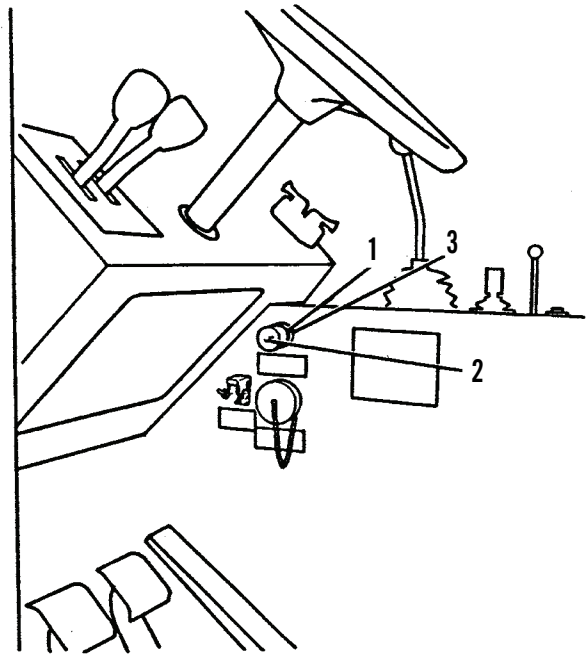
Battery cables disconnected (WP 0107 00)

REMOVAL

1. Turn locking collar (1) to the left to release resistor assembly (2) from receptacle (3).
2. Pull resistor assembly (2) from receptacle (3) to remove.

INSTALLATION

1. Push resistor assembly (2) into receptacle (3).
2. Turn locking collar (1) to the right to secure resistor assembly (2) to receptacle (3).
3. Connect battery cables (WP 0107 00).



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END OF WORK PACKAGE

STE/ICE-R FUEL PRESSURE SENDER REPLACEMENT

0087 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

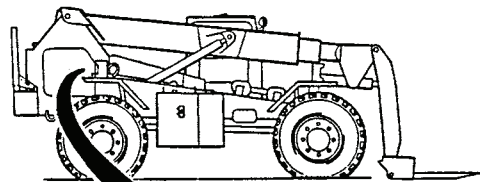
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. Remove female plug (1) of vehicle wiring harness (2) from male plug (3) of fuel pressure sender (4).
2. Unscrew fuel pressure sender (4) from tee (5).
3. Remove adapter (6), tee (5) and fluid passage bolt (7).

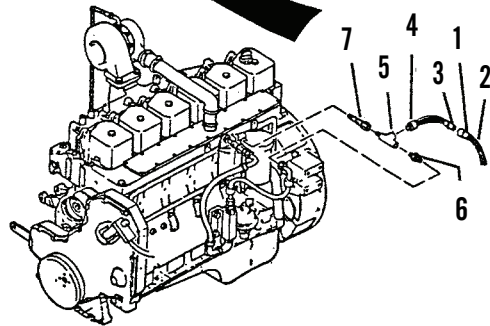


INSTALLATION

NOTE

Apply loctite to threaded end of tee, fuel pressure sender and adapter prior to installation.

1. Screw fuel pressure sender (4) into tee (5).
2. Insert male plug (3) of fuel pressure sender (4) into female plug (1) of vehicle wiring harness (2).
3. Connect battery cables (WP 0107 00).
4. Run engine and check for proper operation and leaks (TM 10-3930-660-10).



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END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

- Container, 1 qt
- Sealant, Loctite (Item 44, WP 0323 00)
- Strap, tie down (Item 56, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (12)
- Starwasher (13)

Equipment Condition

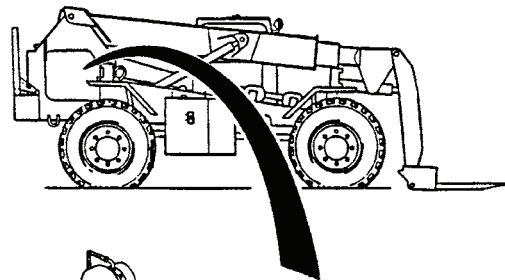
- Vehicle parked on level ground (TM 10-3930-660-10)
- Battery cables disconnected (WP 0107 00)

NOTE

Tag all fuel lines and electrical connections before removing for use during installation.

REMOVAL

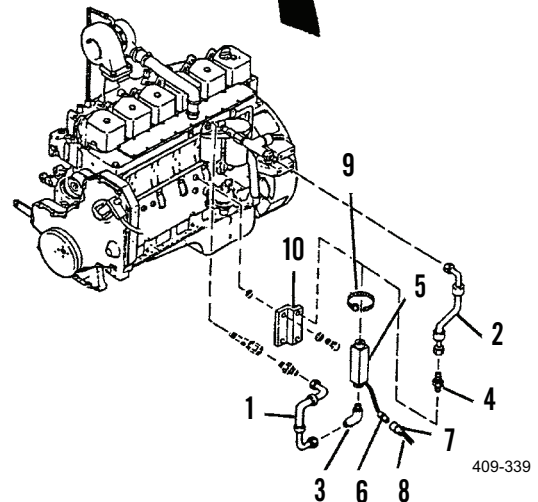
1. Place a container under two fuel lines (1) and (2) to catch fuel that may spill out of lines.
2. Disconnect two fuel lines (1) and (2) from elbow (3) and adapter (4) at fuel pressure differential pressure switch (5).
3. Pull and remove male plug (6) of switch (5) from female plug (7) of vehicle wiring harness (8).



NOTE

Note orientation of switch for use during removal.

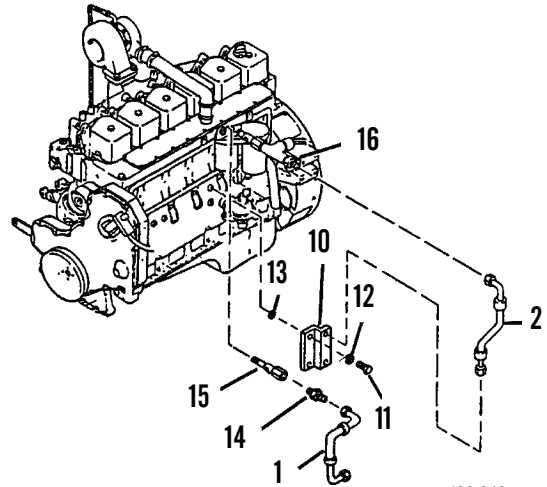
4. Cut two tie down straps (9) securing switch (5) to bracket (10). Remove switch (5) from bracket (10).
5. If necessary, remove elbow (3) and adapter (4) from switch (5).



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REMOVAL - CONTINUED

6. If necessary, remove two screws (11), two lockwashers (12), bracket (10), and two starwashers (13). Discard lockwashers (12) and starwashers (13).
7. If necessary, remove hose (1), adapter (14) and fluid passage bolt (15) from engine.
8. If necessary, remove hose (2) at adapter (16).



INSTALLATION

1. If removed, install hose (2) at adapter (16).

NOTE

During step 2, apply loctite to threaded end of adapter that screws into fluid passage bolt.

2. If removed, install fluid passage bolt (15), adapter (14) and hose (1).
3. If removed, position bracket (10) on engine and secure with two new starwashers (13), two new lockwashers (12) and two screws (11).

NOTE

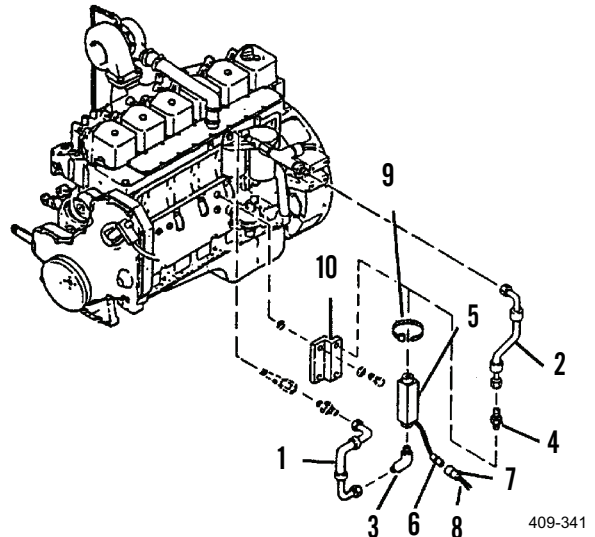
During step 4, apply loctite to threaded end of adapter and elbow that screws into switch.

4. If removed, install elbow (3) and adapter (4) to switch (5).

NOTE

Position switch on bracket as noted during removal.

5. Position switch (5) on bracket (10) and secure with two new tie straps (9).
6. Insert male plug (6) of switch (5) into female plug (7) of vehicle wiring harness (8).
7. Connect two fuel lines (1) and (2) to elbow (3) and adapter (4) at switch (5) as tagged.
8. Connect battery cables (WP 0107 00).



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Gasket (9 and 11)

References

WP 0060 00

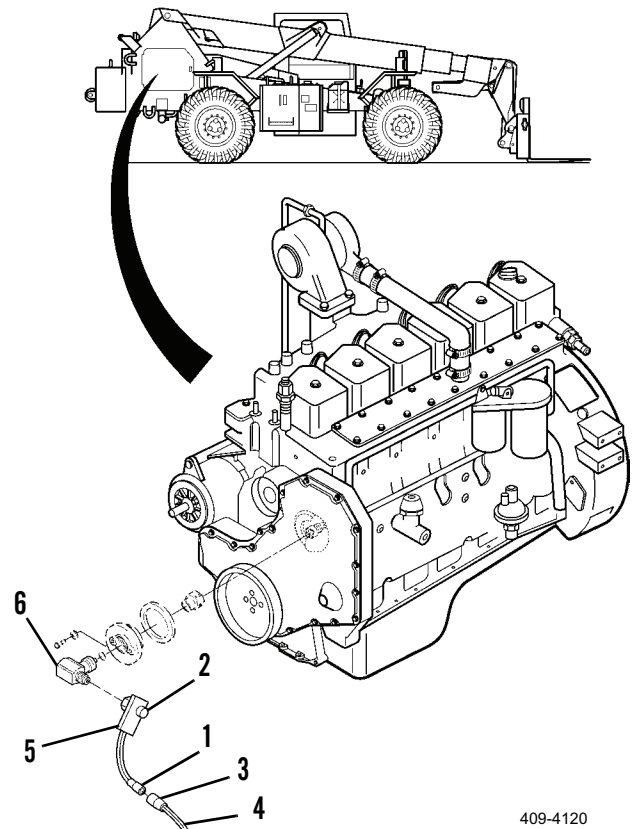
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. Remove male connector (1) of pulse tachometer (2) from female connector (3) of vehicle wiring harness (4).
2. Loosen nut (5) and remove pulse tachometer (2) from tachometer drive (6).



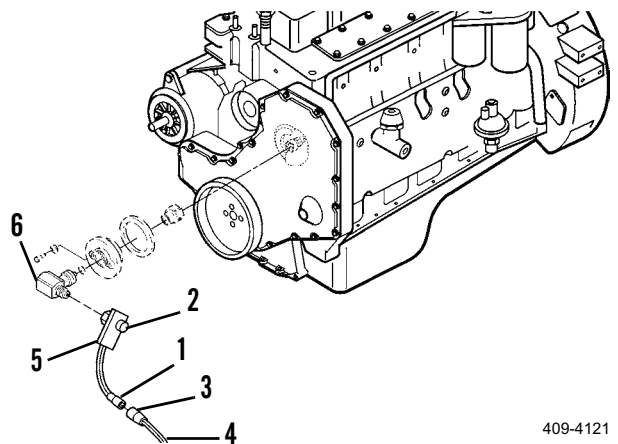
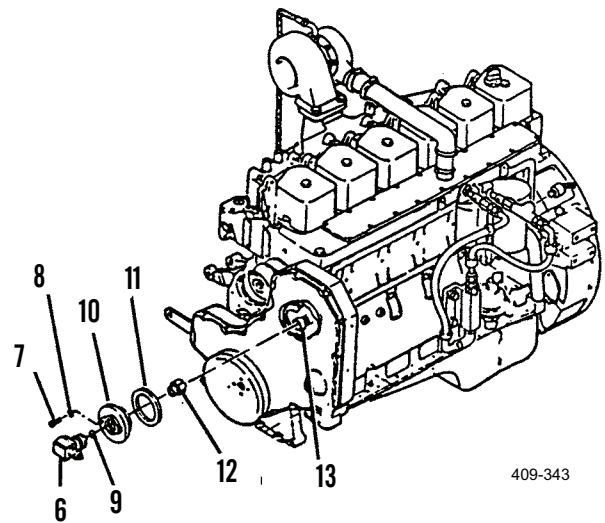
409-4120

REMOVAL - CONTINUED

3. Remove right-hand fan guard (WP 0060 00).
4. Remove two screws (7) and two flatwashers (8) securing tachometer drive (6).
5. Remove tachometer drive (6), gasket (9), cover (10) and gasket (11) from engine as an assembly. Discard gaskets.
6. If necessary, remove hub (12) from shaft (13).
7. If necessary, remove tachometer drive (6) and gasket (9) from cover (10). Discard gasket.

INSTALLATION

1. If removed, install hub (12) onto shaft (13).
2. If removed, install drive (6) and new gasket (9) to cover (10).
3. Position new gasket (11) on cover (10). Install new gasket, cover, new gasket (9) and tachometer drive (6) to engine as an assembly, and secure with two screws (7) and two flatwashers (8).
4. Install right-hand fan guard (WP 0060 00).
5. Insert pulse tachometer (2) into tachometer drive (6). Hand-tighten nut (5) on pulse tachometer (2) and then further tighten nut 1/4 to 1/2 additional turn.
6. Insert male connector (1) of pulse tachometer (2) into female connector (3) of vehicle wiring harness (4).
7. Connect negative battery cable (WP 0107 00).
8. Run engine and check for proper operation and leaks (TM 10-3930-660-10).



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (5, 8, 13, 17 and 21)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

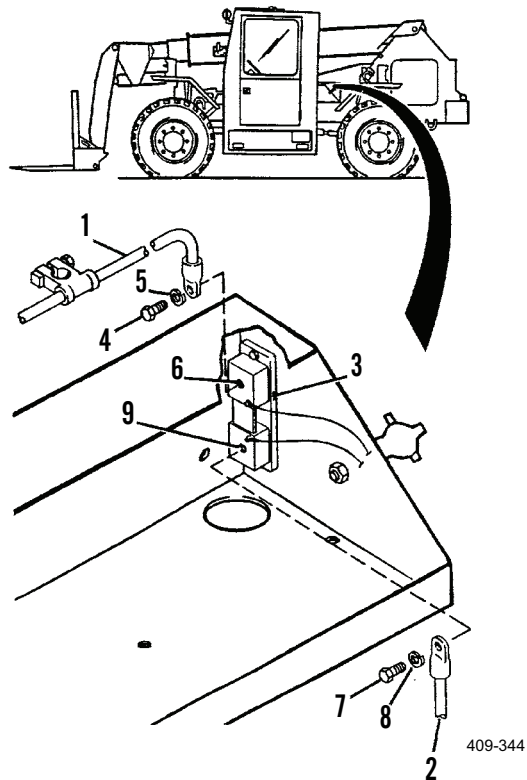
Batteries removed (WP 0106 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. Remove negative battery cable (1) and ground cable (2) from STE/ICE-R shunt (3).
2. Remove capscrew (4) and lockwasher (5) securing negative battery cable (1) to terminal (6) of STE/ICE-R shunt (3). Remove cable from terminal (6). Discard lockwasher.
3. Remove capscrew (7) and lockwasher (8) securing ground cable (2) to terminal (9) of STE/ICE-R shunt (3). Remove cable from terminal. Discard lockwasher.

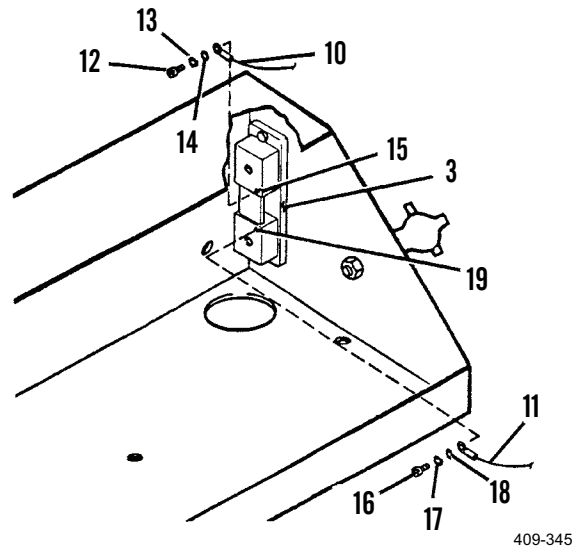


STE/ICE-R SHUNT REPLACEMENT - CONTINUED

0090 00

REMOVAL - CONTINUED

4. Remove two STE/ICE-R electrical wires (10 and 11) from STE/ICE-R shunt (3).
5. Remove screw (12), lockwasher (13), flatwasher (14) and STE/ICE-R electrical lead (10) from terminal (15) of STE/ICE-R shunt (3). Tag and remove electrical lead (10) from terminal. Discard lockwasher.
6. Remove screw (16), lockwasher (17) flatwasher (18) and STE/ICE-R electrical lead (11) from terminal (19) of STE/ICE-R shunt (3). Tag and remove electrical lead from terminal. Discard lockwasher.

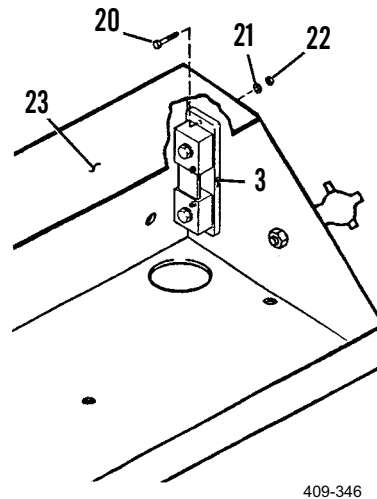


7. Remove two capscrews (20), two lockwashers (21) and two nuts (22) securing STE/ICE-R shunt (3) to battery box (23). Remove STE/ICE-R shunt (3) from battery box. Discard lockwashers.

INSTALLATION**NOTE**

Apply loctite to capscrews as installed.

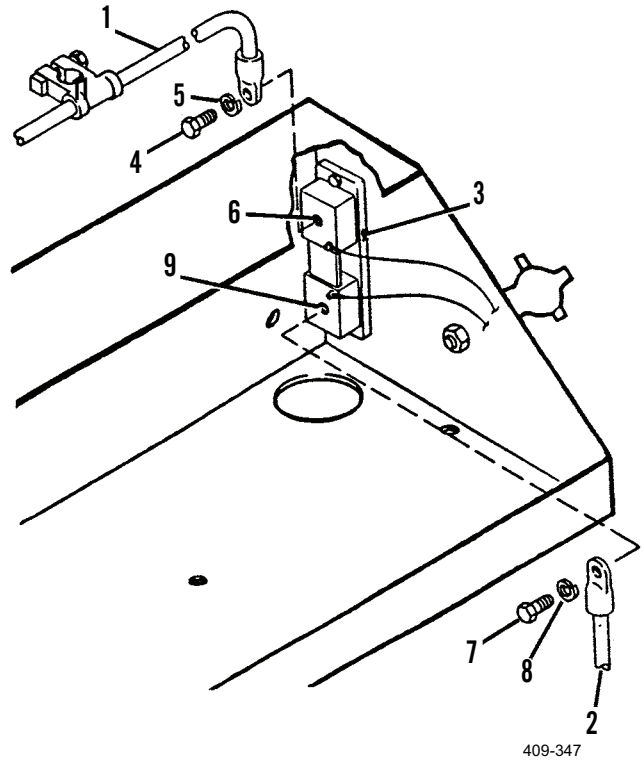
1. Support and position STE/ICE-R shunt (3) on battery box (23). Secure STE/ICE-R shunt to battery box with two capscrews (20), two new lockwashers (21) and two nuts (22).



2. Install two STE/ICE-R electrical wires (10 and 11) to STE/ICE-R shunt (3).
3. Position STE/ICE-R electrical lead (11) at terminal (19) of STE/ICE-R shunt (3). Secure electrical lead (11) to terminal (19) with flatwasher (18), new lockwasher (17) and screw (16).

INSTALLATION - CONTINUED

4. Position STE/ICE-R electrical lead (10) at terminal (15) of STE/ICE-R shunt (3). Secure electrical lead to terminal with flatwasher (14), new lockwasher (13) and screw (12).
5. Install ground cable (2) and negative battery cable (1) to STE/ICE-R shunt (3).
6. Position ground cable (2) at terminal (9) of STE/ICE-R shunt (3). Secure ground cable to terminal with new lockwasher (8) and capscrew (7).
7. Position negative battery cable (1) at terminal (6) of STE/ICE-R shunt (3). Secure negative battery cable to terminal (6) with new lockwasher (5) and capscrew (4).



8. Install batteries (WP 0106 00).

END OF WORK PACKAGE

HYDRAULIC BYPASS SWITCH MAINTENANCE

0091 00

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 44, WP 0323 00)

Rag, wiping (Item 40, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

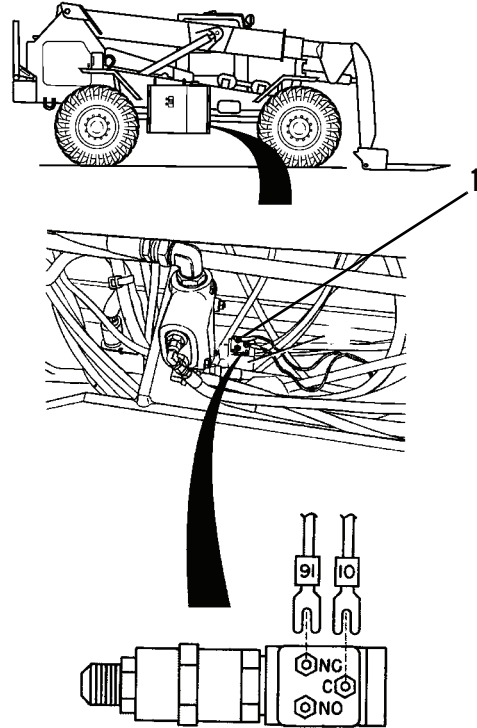
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

REMOVAL

NOTE

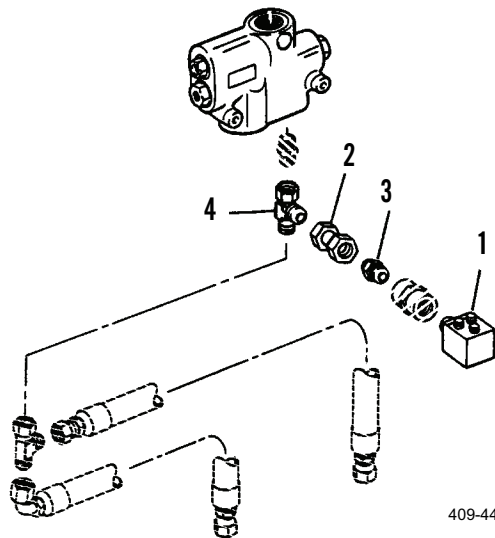
Tag all electrical connections before removing for use during installation.

1. Remove electrical lead 91 from terminal of switch (1).
2. Remove electrical lead 10 from other terminal of switch (1).



409-443

3. Remove tube assembly (2), adapter (3) and switch (1) as an assembly from tee (4).
4. Remove switch (1) from adapter (3).
5. If necessary, remove tube assembly (2) from adapter (3).



409-444

INSTALLATION**NOTE**

- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on switch and parts (2 through 5) clean and dry.
- To prevent sealant from contaminating the hydraulic system, apply sealant carefully to threads of switch before installation.

1. Install switch (1) to adapter (3).
2. If removed, install tube assembly (2) to adapter (3).
3. Install tube assembly (2) to tee (3).
4. Install electrical lead 91 to terminal of switch (1).
5. Install electrical lead 10 to other terminal of switch (1).

TESTING

1. Test for proper functioning of hydraulic bypass switch (1).
2. Place emergency steering switch in the ON position (TM 10-3930-660-10).
3. Place steer select control in the “2 wheel steer” position (TM 10-3930-660-10).

NOTE

Listen for the emergency steering pump during steps 4 through 7. The pump makes a high-pitched sound when it is running.

4. Place starter switch in the RUN position, but do not start the engine (TM 10-3930-660-10). Check that emergency steering pump is running.
5. Turn wheels fully to both sides and check that power assistance is present. Straighten wheels.

TESTING - CONTINUED**WARNING**

This machine must be operated only by authorized personnel who have satisfactorily completed a program of training which must include familiarity with safe operating procedures, characteristics and a knowledge of applicable codes, regulations and facilities directives. Untrained personnel subject themselves and others to the possibility of injury or death from the improper operation of this machine. Understand the equipment, its function and the controls before operation.

NOTE

To hear the emergency steering pump while the engine is running it may be necessary to go under the vehicle during step 6.

6. Have assistant start engine (TM 10-3930-660-10). Check that emergency steering pump stops running shortly after engine is started.

NOTE

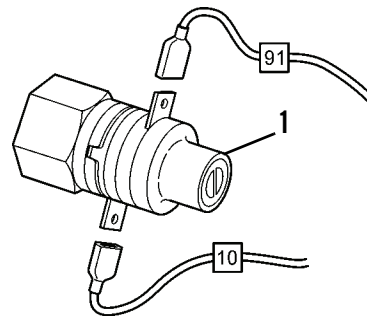
Leave engine start switch in RUN position during step 7.

7. Place auxiliary fuel shut-off switch in the OFF position (TM 10-3930-660-10). Check that emergency steering pump starts running after engine stops.
8. Place starter switch in the OFF position (TM 10-3930-660-10).
9. Place auxiliary fuel shut-off switch in the ON position (TM 10-3930-660-10).
10. Perform voltage tests on hydraulic bypass switch (1).

NOTE

Leave electrical leads 10 and 91 connected to switch during steps 11 thru 18.

11. Attach positive lead of voltmeter to terminal 91 of switch (1).
12. Attach negative lead of voltmeter to suitable ground.
13. Place starter switch in RUN position but do not start the engine (TM 10-3930-660-10).
14. Voltmeter should indicate approximately 24 volts.
15. Start engine (TM 10-3930-660-10).
16. Voltmeter should indicate approximately 0 volts.
17. Stop engine (TM 10-3930-660-10).
18. Remove voltmeter leads.



409-3014

TESTING - CONTINUED**NOTE**

If voltage requirements are not met in steps 11 thru 18, perform continuity tests in step 19 of this section.

19. Perform continuity tests on hydraulic bypass switch (1).

NOTE

Tag all electrical leads as removed.

20. Remove electrical lead 91 from terminal of switch (1).
21. Remove electrical lead 10 from terminal of switch (1).
22. Connect positive lead of ohmmeter to terminal of switch (1).
23. Connect negative lead of ohmmeter to other terminal of switch (1).
24. Ohmmeter should indicate continuity.
25. Start engine (TM 10-3930-660-10).
26. Ohmmeter should indicate no continuity.
27. Stop engine (TM 10-3930-660-10).

NOTE

If continuity requirements are not met in steps 20 thru 27, hydraulic bypass switch is defective and must be replaced. Refer to *Removal* and *Installation*.

28. Disconnect leads of ohmmeter from terminals of switch (1).
29. Connect electrical lead 10 to terminal of switch (1).
30. Connect electrical lead 91 to other terminal of switch (1).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

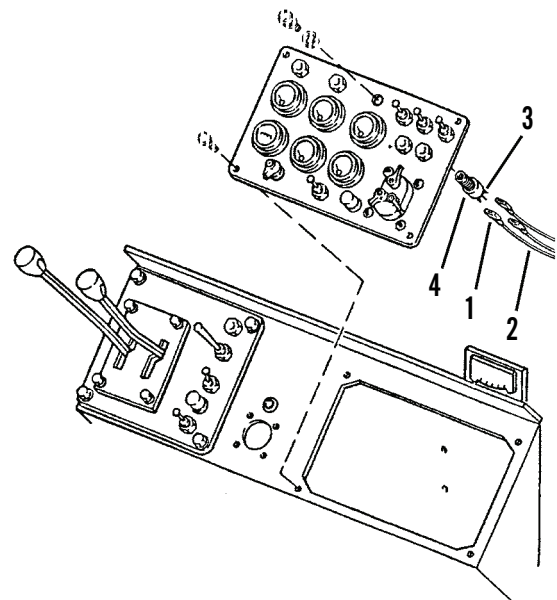
Left and/or right-hand instrument panel removed as required (WP 0067 00)

REMOVAL

NOTE

- Replacement procedures for all panel-mounted warning lights are essentially similar.
- Tag all electrical connections before removing for use during installation.

1. Disconnect three female connectors (1) of electrical leads (2) from three male terminals (3) of warning light socket (4).



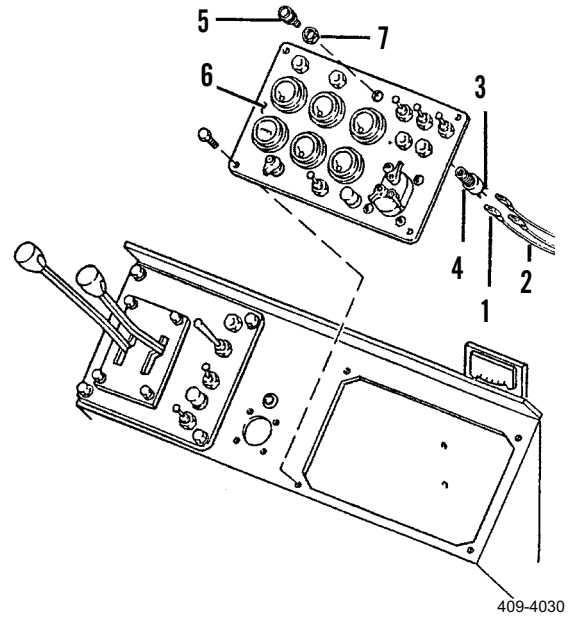
409-4030

REMOVAL - CONTINUED

2. Remove warning light lens/bulb assembly (5) from warning light socket (4) at face of instrument panel (6).
3. Remove nut (7) at face of instrument panel (6) securing warning light socket (4).
4. Remove warning light socket (4) from mounting hole on instrument panel (6).

INSTALLATION

1. Position warning light socket (4) through mounting hole on instrument panel (6).
2. Secure warning light socket (2) with nut (7).
3. Install warning light lens/bulb assembly (5) into warning light socket (4).
4. Connect three female connectors (1) of wire leads (2) on three male terminals (3) of warning light socket (4) as tagged.



5. Install instrument panel(s) (WP 0067 00).
6. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

TURN SIGNAL SWITCH REPLACEMENT

0093 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

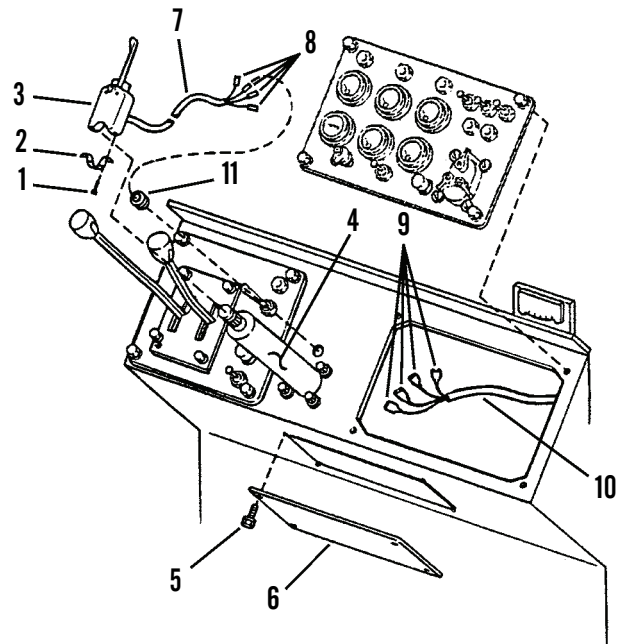
REMOVAL

1. Remove two screws (1), and clamp (2), securing switch (3) to steering column (4).
2. Remove four screws (5) and access cover (6).
3. Follow switch cable (7) as it passes through dashboard.
4. Disconnect four male connectors (8) on cable (7) from four female connectors (9) on vehicle wiring harness (10).

NOTE

Remove switch cable and switch as an assembly. Support turn signal switch so it does not drop during cable removal.

5. From top of dashboard, pull switch cable (7) through dashboard and remove turn signal switch (3) and cable.
6. If necessary, remove grommet (11) from dashboard.



409-4031

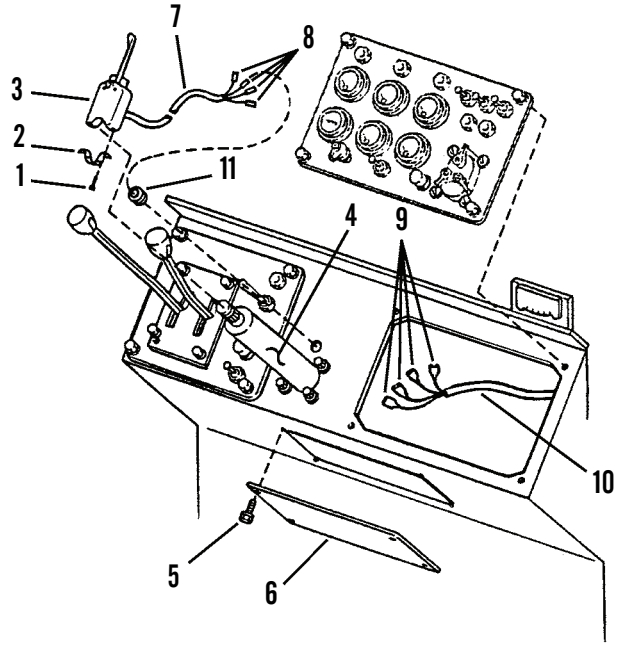
INSTALLATION

1. If removed, install grommet (11) to dashboard.
2. From top of dashboard, push turn signal switch cable (7) through grommet (11).
3. Connect male connectors (8) of cable (7) to female connectors (9) of vehicle wiring harness (10) as tagged during removal.

NOTE

Apply loctite to threads of screws.

4. Install dashboard access cover (6) with four screws (5).
5. Position and support turn signal switch (3) on steering column (4).
6. Secure switch (3) with clamp (2) and two screws (1).



409-4031

7. Connect battery cables (WP 0107 00).
8. Turn engine start switch to the ON position. DO NOT start the engine (TM 10-3930-660-10).
9. Move turn signal switch lever to the left. Check that turn signals on both front and rear left-hand fenders are flashing.
10. Move turn signal switch lever to the right. Check that turn signals on both front and rear right-hand fenders are flashing.
11. Turn engine start switch off (TM 10-3930-660-10).

END OF WORK PACKAGE

BLACKOUT/SERVICE LIGHT SWITCH REPLACEMENT

0094 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 44, WP 0323 00)

Lockwasher (8)

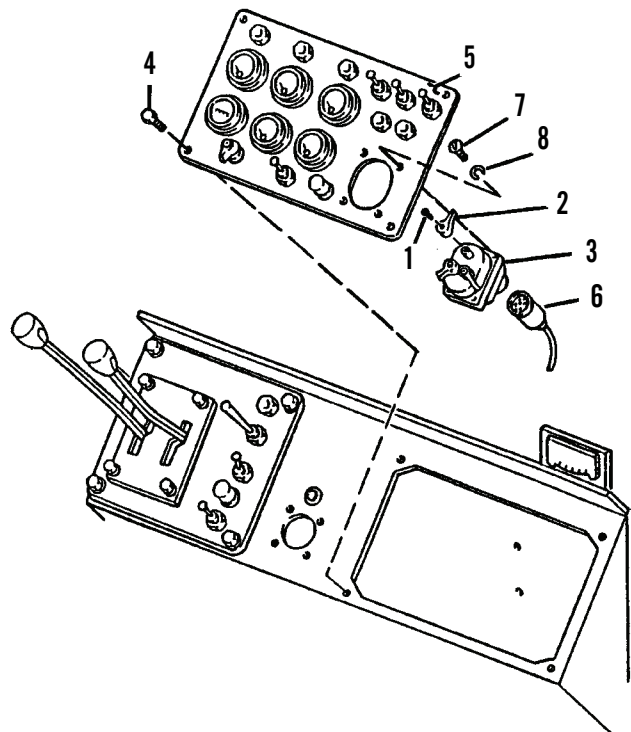
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. Remove three screws (1) and three handles (2) from light switch (3).
2. Remove four capscrews (4) from instrument panel (5).
3. Raise instrument panel (5) to provide access to rear of blackout/service light switch (3).
4. Disconnect harness plug (6) from rear of blackout/service light switch (3).
5. Remove four screws (7) and lockwashers (8) to separate switch from instrument panel (5). Discard lockwashers.



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BLACKOUT/SERVICE LIGHT SWITCH REPLACEMENT - CONTINUED

0094 00

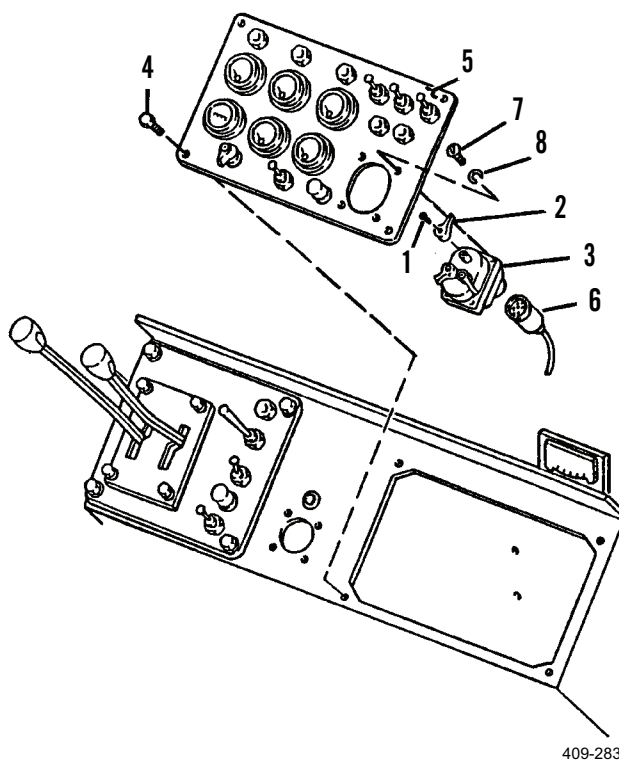
INSTALLATION

1. Position blackout/service light switch (3), to instrument panel (4).
2. Install four screws (7) and new lockwashers (8) to secure switch to instrument panel (4).
3. Connect harness plug (6) to rear of blackout/service light switch (3).

NOTE

Apply loctite to threads of capscrews.

4. Position instrument panel (5) and install four capscrews (4) to secure panel.
5. Position three handles (2) and secure with three screws (1).
6. Connect battery cables (WP 0107 00).
7. Verify that blackout/service lights are operating properly (TM 10-3930-660-10).



409-283

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal of Floodlights, Installation of Floodlights, Removal of Cab Spotlights, Installation of Cab Spotlights, Bulb Replacement of Floodlights, Bulb Replacement of Cab Spotlights

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Soap, liquid (Item 52, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Bulb, floodlight (23)

Bulb, spotlight (27)

Lockwasher (7 and 19)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

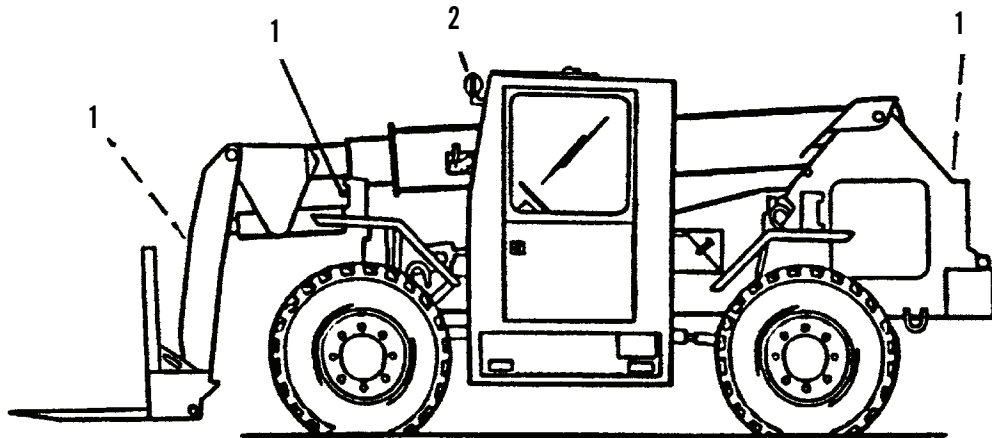
Battery cables disconnected (WP 0107 00)

NOTE

- There are a total of five floodlights. Two are located just above the radiator grille at the rear of the vehicle. Two are located at the front of the vehicle on each of the front fenders. One is located inside the MLRS attachment, also at the front of the vehicle.
- There are two spotlights. They are located at the top front of the cab on either side of the front windshield.
- Tag all electrical connections before removing for use during installation.

REMOVAL OF FLOODLIGHTS

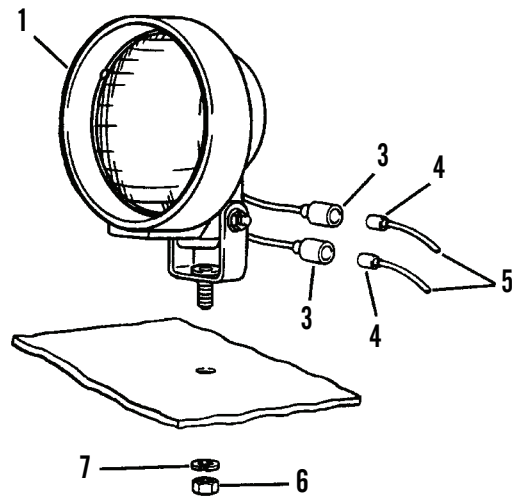
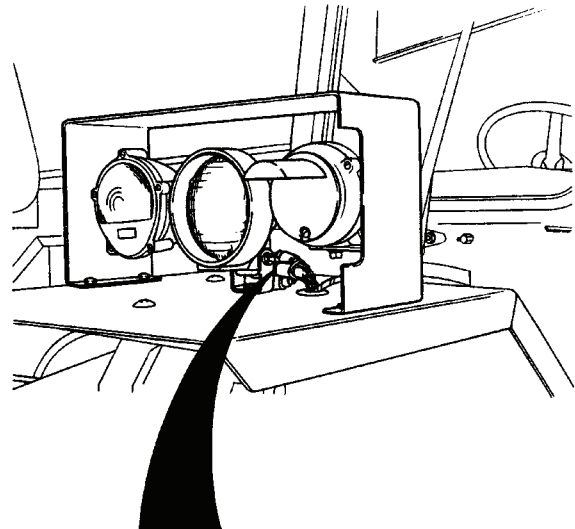
1. Locate five floodlights (1) and two spotlights (2).



409-348

REMOVAL OF FLOODLIGHTS - CONTINUED

2. Tag and disconnect two female plugs (3) of floodlight (1) from two male plugs (4) of vehicle wiring harness (5).
3. Support floodlight (1) so it does not drop when mounting hardware is removed.
4. Remove nut (6) and lockwasher (7), securing floodlight (1) to vehicle. Discard lockwasher.
5. Remove floodlight (1).



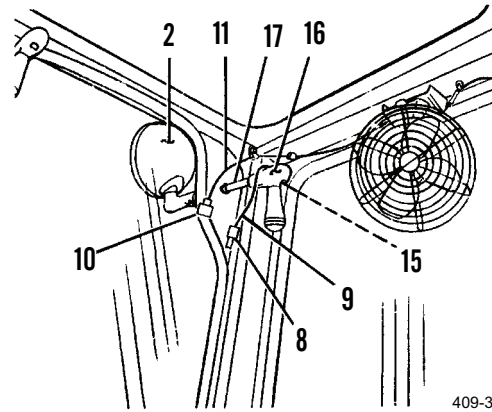
409-349

INSTALLATION OF FLOODLIGHTS

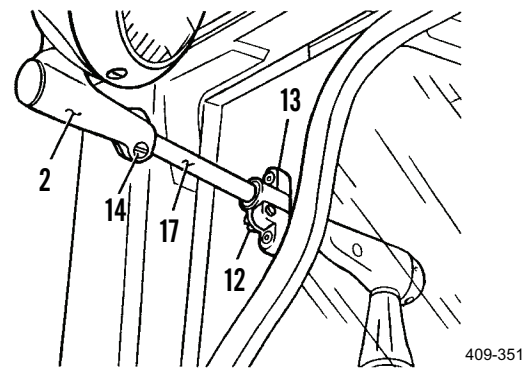
1. Position and support floodlight (1) on vehicle.
2. Secure floodlight to vehicle with new lockwasher (7) and nut (6).
3. Connect two female plugs (3) of floodlight (1) on two male plugs (4) of vehicle wiring harness (5).
4. Connect battery cables (WP 0107 00).

REMOVAL OF CAB SPOTLIGHTS

1. Disconnect male plug (8) of spotlight electrical lead (9) from female plug (10) of vehicle wiring harness (11).



2. From outside of cab, loosen setscrew (12) on bracket (13). Loosen setscrew (14) on spotlight (2).
3. From inside of cab, loosen bolt (15) and pull handle (16) of spotlight (2) off shaft (17).
4. Remove spotlight (2) with shaft (17) from outside of cab as an assembly.
5. If necessary, remove light bracket (13) and mounting hardware.
6. From inside of cab, remove two nuts (18), lockwashers (19) and flatwashers (20). Discard lockwashers. Loosen and remove retainer (21).
7. From outside of cab, remove two screws (22) and bracket (13).



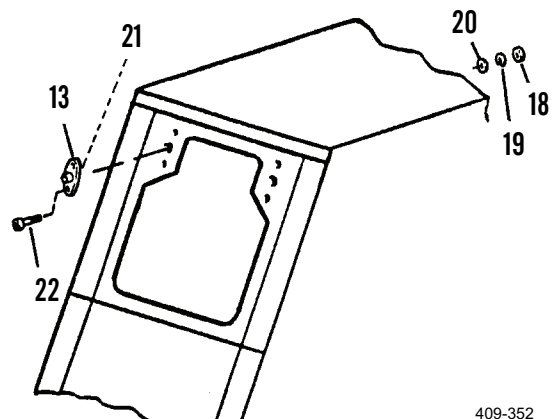
INSTALLATION OF CAB SPOTLIGHTS

1. If removed, install light bracket (13) and mounting hardware.

NOTE

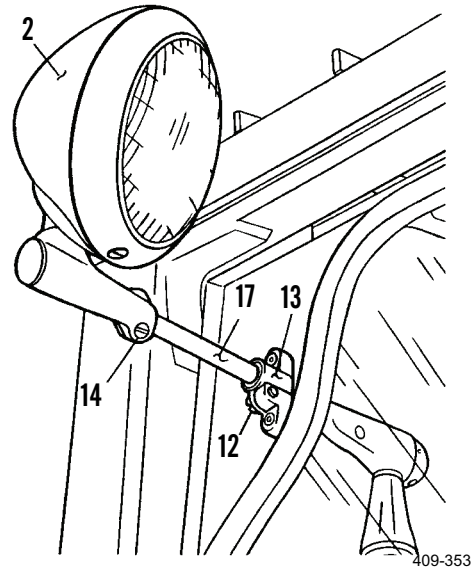
Apply loctite to threads of screws.

2. Position bracket (13) and two screws (22) on outside of cab.
3. From inside cab, secure bracket (13) with two flatwashers (20), two new lockwashers (19) and two nuts (18). Install and tighten retainer (21).

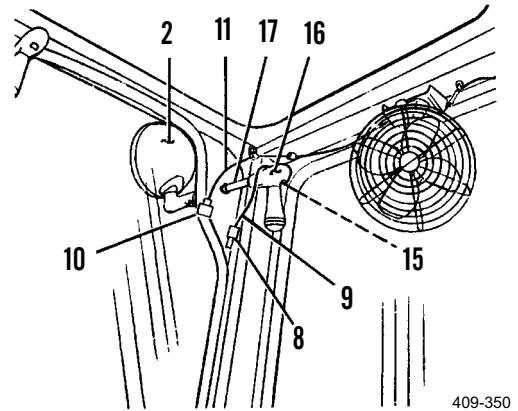


INSTALLATION OF CAB SPOTLIGHTS - CONTINUED

4. From outside of cab, push shaft (17) of spotlight (2) through hole in bracket (13) until shaft is protruding through hole inside cab.
5. From inside cab, position handle assembly (16) of spotlight (2) on shaft (17). Twist handle on shaft until it slides into place.
6. Tighten bolt (15) on handle (16).
7. From outside of cab, tighten setscrew (14) on spotlight (2). Tighten setscrew (12) on bracket (13) so that spotlight (2) is secure but moveable.



8. Connect male plug (8) of spotlight electrical lead (9) to female plug (10) of vehicle wiring harness (11).

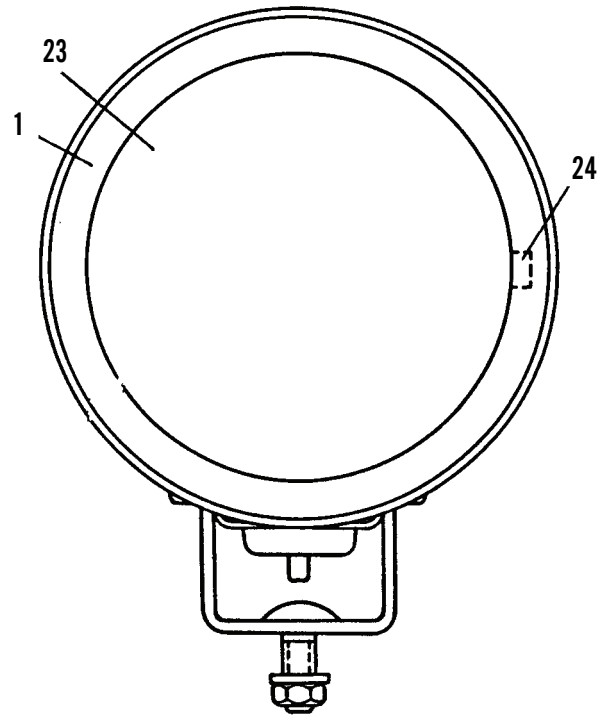


9. Connect battery cables (WP 0107 00).

BULB REPLACEMENT OF FLOODLIGHTS**WARNING**

To prevent personal injury from accidental glass breakage, wear a pair of heavy leather gloves or other suitable hand protection when replacing sealed beam bulbs.

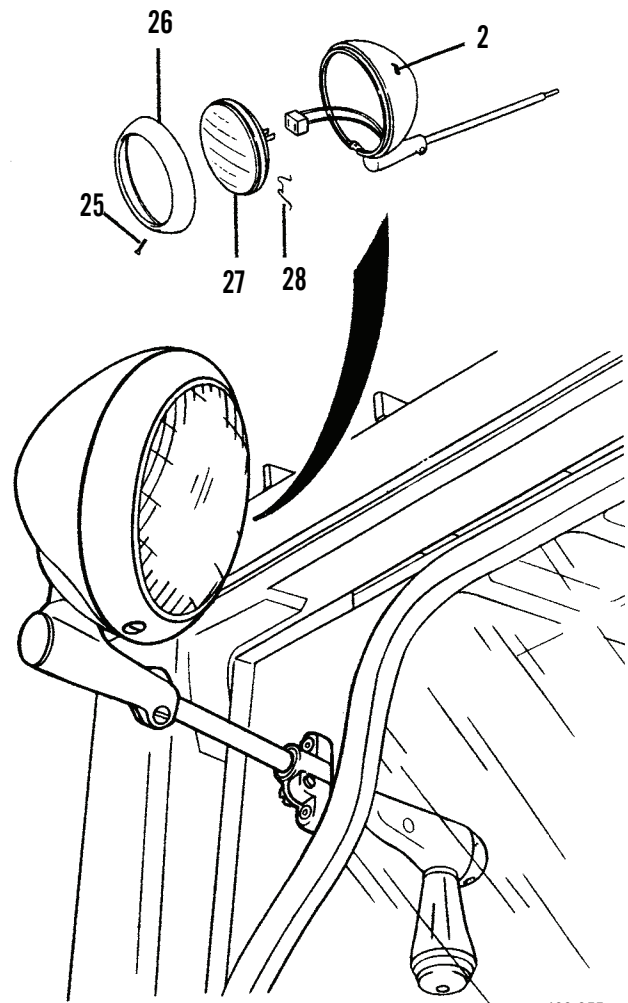
1. Using two screwdrivers, carefully pry flexible housing of floodlight assembly (1) from around old sealed beam bulb (23) until old bulb is free of housing.
2. Unplug old sealed beam bulb (23) from floodlight assembly (1). Discard old bulb.
3. Plug new sealed beam bulb (23) into floodlight assembly (1).
4. Moisten edges of new sealed beam bulb (23) and housing of floodlight assembly (1) with soap and water solution.
5. Position new sealed beam bulb (23) so that notch (24) of new bulb is oriented as shown. Carefully press new bulb into housing of floodlight assembly (1) until new bulb is seated in place.
6. Connect battery cables (WP 0107 00).



409-354

BULB REPLACEMENT OF CAB SPOTLIGHTS

1. Remove screw (25) from retaining ring (26). Separate retaining ring and old sealed beam bulb (27) as an assembly from spotlight (2).
2. Unplug old sealed beam bulb (27) from spotlight (2).
3. Remove four spring clips (28) securing old sealed beam bulb (27) to retaining ring (26). Remove and discard old bulb.
4. Place new sealed beam bulb (27) in retaining ring (26) and secure with four spring clips (28).
5. Plug new sealed beam bulb (27) into spotlight (2).
6. Place retaining ring (26) and new sealed beam bulb (27) on spotlight (2) as an assembly. Secure retaining ring to spotlight with screw (25).
7. Connect battery cables (WP 0107 00).



409-355

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Bulb Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Bulb (10)

Lockwasher (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

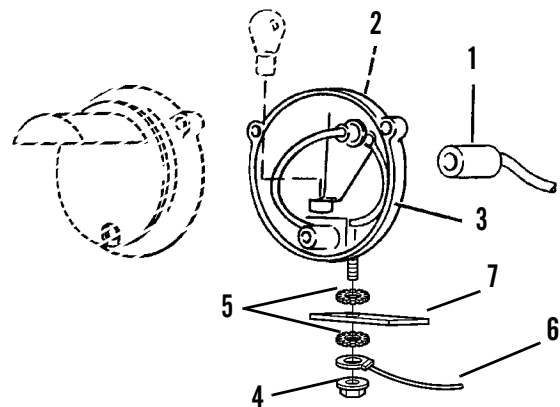
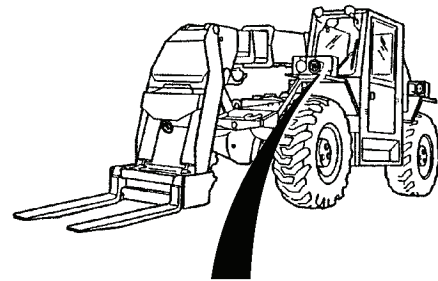
Tag all electrical connections before removing for use during installation.

REMOVAL

1. Disconnect female plug (1) from connector (2) at rear of blackout headlight assembly (3).
2. Remove nut (4), lockwasher (5), ground lead (6) and second lockwasher (5). Discard lockwashers.
3. Remove headlight assembly (3) from light bracket (7).

INSTALLATION

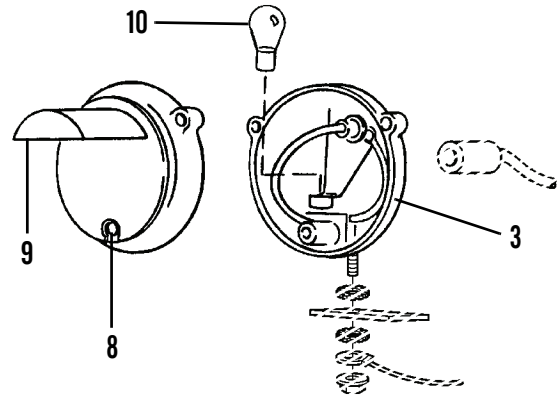
1. Position headlight assembly (3) on light bracket (7).
2. Secure with new lockwasher (5) ground lead (6), new lockwasher (5) and nut (4).
3. Connect female plug (1) to connector (2) at rear of blackout headlight assembly (3).
4. Connect battery cables (WP 0107 00).



409-4122

BULB REPLACEMENT

1. Loosen three captive screws (8) and remove lens (9) from headlight assembly (3).
2. Carefully push and twist the old bulb (10) counterclockwise until it releases from the socket. Discard the old bulb.
3. Carefully push and twist new bulb (10) clockwise in the socket until it locks into place.
4. Align lens (9) on headlight assembly (3) and tighten three captive screws (8).
5. Connect battery cables (WP 0107 00).
6. Verify headlight operates (TM 10-3930-660-10).



409-4123

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Bulb Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Strap, tie down (Item 52, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Bulb (14)

Materials/Parts - Continued

Starwasher (7 and 10)

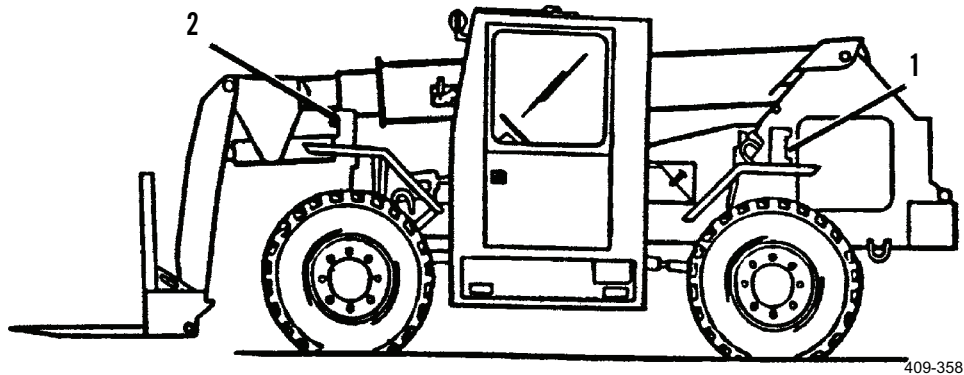
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

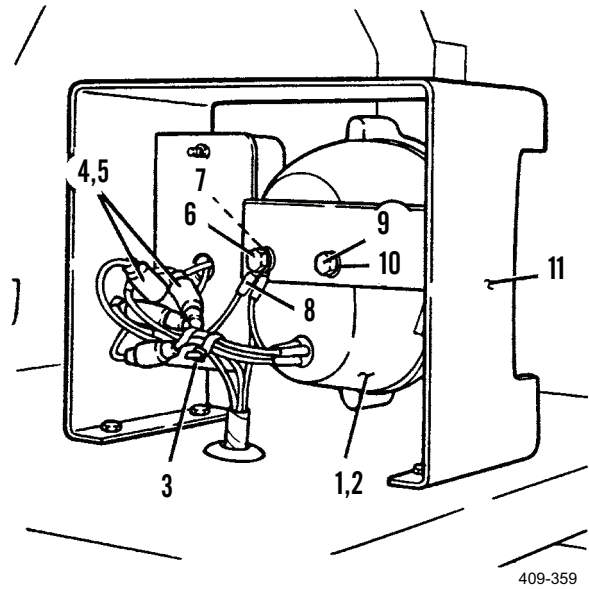
- Removal, installation and repair procedures are essentially similar for the rear composite blackout/tail/stop lights (1) and the front composite blackout/turn signal/parking lights (2).
- The rear composite blackout/tail/stop lights (1) have four bulbs and four female connector plugs.
- The front composite blackout/turn signal/parking lights (2) have three bulbs and three female connector plugs.
- Tag all electrical connections before removing for use during installation.



409-358

REMOVAL

1. Remove and discard tie down strap (3).
2. Disconnect male and female connector plugs (4 and 5) at rear of light assembly (1 or 2).
3. On front light assemblies (2), remove capscrew (6), starwasher (7), one wire lead (8) and starwasher (7). Discard starwashers.
4. On rear light assemblies (1), remove capscrew (6), starwasher (7), two wire leads (8) and starwasher (7). Discard starwashers.
5. Support light assembly (1 or 2) so it does not drop. Remove capscrew (9), starwasher (10) and light assembly (1 or 2) from light bracket (11). Discard starwasher.



409-359

INSTALLATION**NOTE**

Apply loctite to capscrews as installed.

1. Align light assembly (1 or 2) with holes on light bracket (11). Secure with new starwasher (10) and capscrew (9).
2. On front light assemblies (2), install new starwasher (7), one wire lead (8), new starwasher (7) and capscrew (6).
3. On rear light assemblies (1), install new starwasher (7), two wire leads (8), new starwasher (7) and capscrew (6).
4. Connect male and female connector plugs (4 and 5) at rear of light assembly (1 or 2) as tagged.
5. Install new tie down strap (3).
6. Connect battery cables (WP 0107 00).
7. Verify composite lights operate (TM 10-3930-660-10).

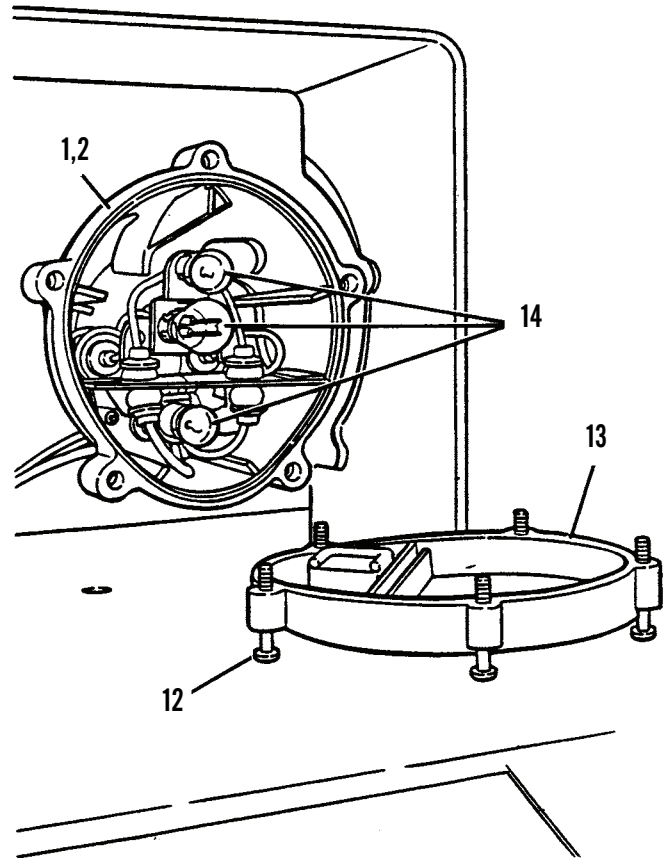
BULB REPLACEMENT

1. Loosen five screws (12) and remove lens (13) from light assembly (1 or 2).

NOTE

All bulbs used in the light assemblies covered in this work package are removed and installed as described in steps 2 and 3 below.

2. Carefully push and twist old bulb (14) counterclockwise until it releases from socket and discard.
3. Carefully push and twist new bulb (14) into socket until it locks into place.
4. Align lens (13) on light assembly (1 or 2) and tighten five screws (12).
5. Connect battery cables (WP 0107 00).
6. Verify composite lights operate (TM 10-3930-660-10).



409-361

END OF WORK PACKAGE

REAR TURN SIGNAL LIGHTS REPLACEMENT

0098 00

THIS WORK PACKAGE COVERS

Removal, Installation, Bulb Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Strap, tie down (Item 56, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Bulb (16)

Lockwasher (11)

Starwasher (7)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

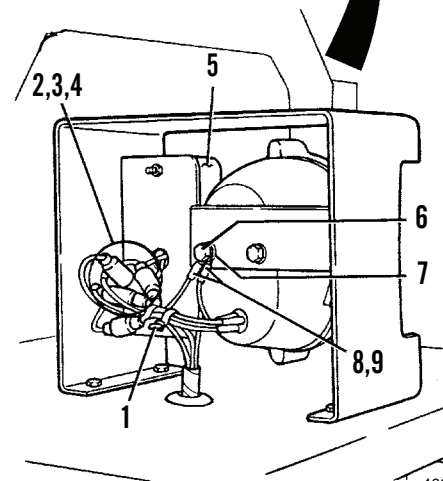
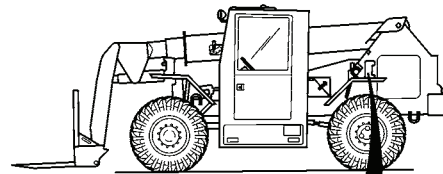
REMOVAL

1. Remove and discard tie down strap (1).
2. Disconnect male plug (2) from female plug (3) connecting electrical lead (4) from vehicle wiring harness to rear turn signal light assembly (5).

NOTE

One wire lead disconnected in step 3 below is part of the rear turn signal light assembly. The other wire lead is part of the vehicle wiring harness.

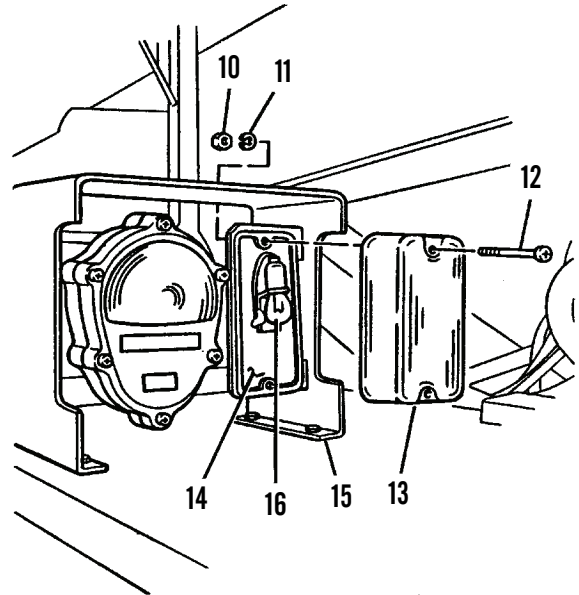
3. Remove capscrew (6) and starwasher (7). Disconnect two wire leads (8 and 9). Remove second starwasher (7). Discard starwashers.



409-362

REMOVAL - CONTINUED

4. Remove two nuts (10) and two lockwashers (11). Discard lockwashers.
5. Remove two screws (12) from lens (13) and pull lens from socket plate assembly (14).
6. Pull socket plate assembly (14) from light bracket (15).



INSTALLATION

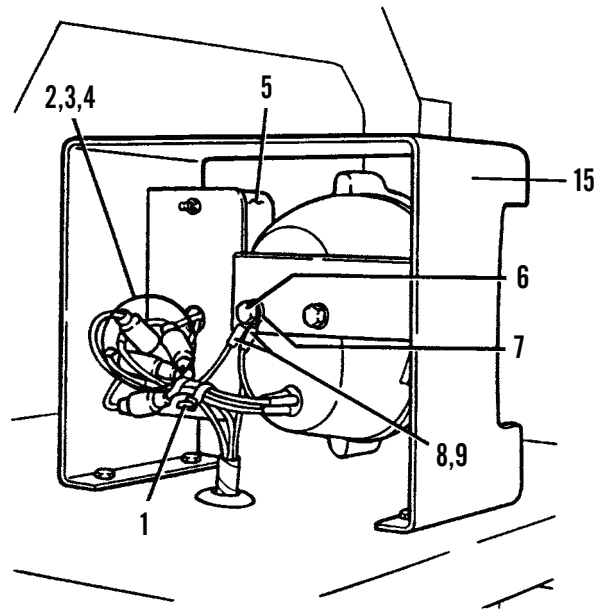
1. Position socket plate assembly (14) on light bracket (15).
2. Position lens (13) on socket plate assembly (14).
3. Secure lens (13) and socket plate assembly (14) to light bracket (15) with two screws (12), two new lockwashers (11) and two nuts (10).

409-363

NOTE

- One wire lead connected in step 4 below is part of the rear turn signal light assembly. The other wire lead is part of the vehicle wiring harness.
- Apply loctite to capscrew as installed.

4. Install new starwasher (7), two wire leads (8 and 9) and second new starwasher (7). Secure with capscrew (6).
5. Connect electrical lead (4) from vehicle wiring harness to rear turn signal light assembly (5) by connecting male plug (3) to female plug (2).
6. Install new tie down strap (1).
7. Connect battery cables (WP 0107 00).



409-364

BULB REPLACEMENT

1. Remove two nuts (10) and two lockwashers (11). Discard two lockwashers.
2. Remove two screws (12) from lens (13) and pull lens from socket plate (14).
3. Carefully push and twist old bulb (16) counterclockwise until it releases from the socket.
4. Remove and discard old bulb (16).
5. Carefully push and twist new bulb (16) clockwise in the socket until it locks into place.
6. Align lens (13) on socket plate (14). Position two screws (12) through holes on lens.
7. Secure lens (13) with two new lockwashers (11) and nuts (10).
8. Connect battery cables (WP 0107 00).
9. Verify signal lights operate properly (TM 10-3930-660-10).

END OF WORK PACKAGE

ENGINE OIL PRESSURE SENDER MAINTENANCE

0099 00

THIS WORK PACKAGE COVERS

Removal, Installation, Testing

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Loctite (Item 43, WP 0323 00)

Lockwasher (2)

Equipment Condition

Battery cables disconnected (WP 0107 00)

NOTE

The engine oil pressure sender is accessed through the right-hand engine access door.

REMOVAL**NOTE**

Perform step 1 for both the 152 hp and 165 hp engines.

1. Remove nut (1) and lockwasher (2) to disconnect electrical lead (3) at sender (4). Discard lockwasher.

NOTE

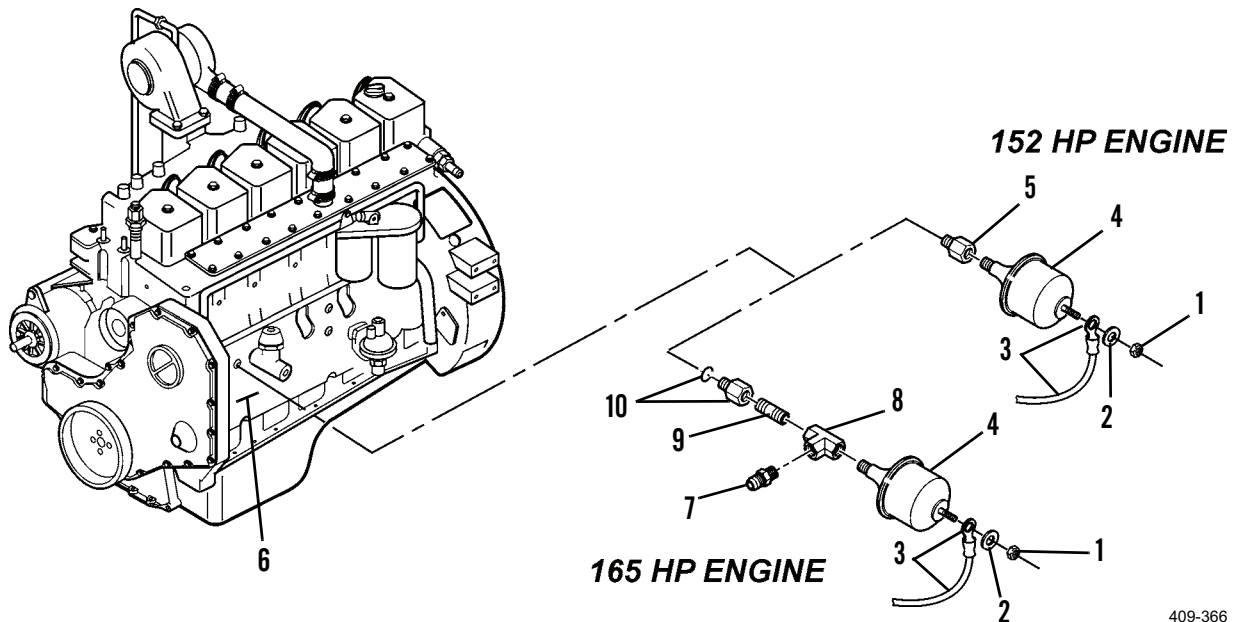
Perform steps 2 and 3 for the 152 hp engine.

2. Remove sender (4) from fitting (5).
3. If necessary, remove fitting (5) from engine (6).

NOTE

Perform steps 4 through 6 for the 165 hp engine.

4. Remove sender (4) and adapter (7) from tee (8).
5. Remove tee (8) and nipple (9) from adapter (10).
6. If necessary, remove adapter (10) from engine (6).



409-366

INSTALLATION**NOTE**

Perform steps 1 through 3 for the 165 hp engine.

1. Apply loctite to threads of adapter (10) and install adapter into engine (6).
2. Apply loctite to threads of nipple (9) and tee (8) and install nipple and tee to adapter (10).
3. Apply loctite to threads of adapter (7) and sender (4) and install adapter and sender to tee (8).

INSTALLATION - CONTINUED

NOTE

Perform steps 4 through 6 for the 152 hp engine.

4. Apply loctite to threads of fitting (5) and install fitting into engine (6).
5. Apply loctite to threads of sender (4).
6. Install sender (4) into fitting (5).

NOTE

Perform step 7 for both engines.

7. Connect electrical lead (3) with new lockwasher (2) and nut (1).
8. Connect battery cables (WP 0107 00).

TESTING

1. Remove nut (1) and lockwasher (2) to disconnect electrical lead (3) at sender (4). Discard lockwasher.

NOTE

Do not remove sender from engine.

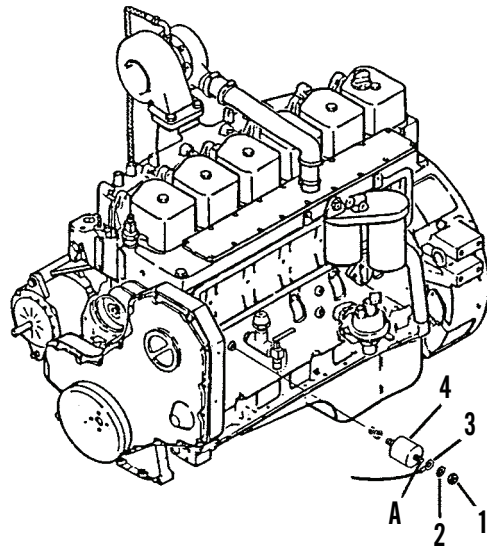
2. Connect one ohmmeter lead to the sender terminal (A) and the other lead to the engine ground.
3. Use STE/ICE-R to monitor engine oil pressure. See STE/ICE-R procedures (WP 0008 00).
4. Start the engine and observe both the STE/ICE-R oil pressure readout and the ohmmeter. The pressure sender (4) should have the following resistance readings.

NOTE

The 0 psi reading should be done at a decreasing pressure. The 40 psi reading should be read on an increasing pressure.

Oil Pressure	Resistance
0 psi	227-257 ohms
40 psi	92-114 ohms

5. Replace sender (4) if resistance requirements are not met. See *Installation*.
6. Connect electrical lead (3) at sender (4). Install new lockwasher (2) and nut (1).



409-367

END OF WORK PACKAGE

WATER TEMPERATURE SENDER REPLACEMENT

0100 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (2)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Engine off and cool (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

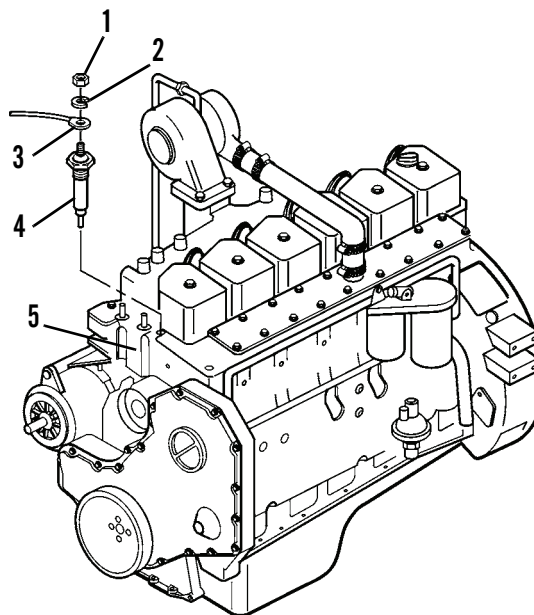
The water temperature sender is accessed through the left-hand engine access door.

REMOVAL

1. Remove nut (1), lockwasher (2) and electrical lead (3) from temperature sender (4). Discard lockwasher.
2. Remove temperature sender (4) from engine (5).

INSTALLATION

1. Apply loctite to threads of temperature sender (4).
2. Install temperature sender (4) on engine (5).
3. Install electrical lead (3), new lockwasher (2) and nut (1) onto temperature sender (4).
4. Connect battery cables (WP 0107 00).
5. Run engine and check for proper operation and leaks (TM 10-3930-660-10).



409-4003

END OF WORK PACKAGE

TRANSMISSION TEMPERATURE SENDER REPLACEMENT

0101 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (2)

References

TM 10-3930-660-10

Equipment Condition

Battery cables disconnected (WP 0107 00)

Transmission cover removed (WP 0150 00)

NOTE

The transmission temperature sender is located on the left side of the transmission.

REMOVAL

1. Remove nut (1), lockwasher (2) and disconnect lead (3) from sender (4). Discard lockwasher.
2. Remove sender (4) from elbow (5).
3. If necessary, remove elbow (5) from transmission (6).

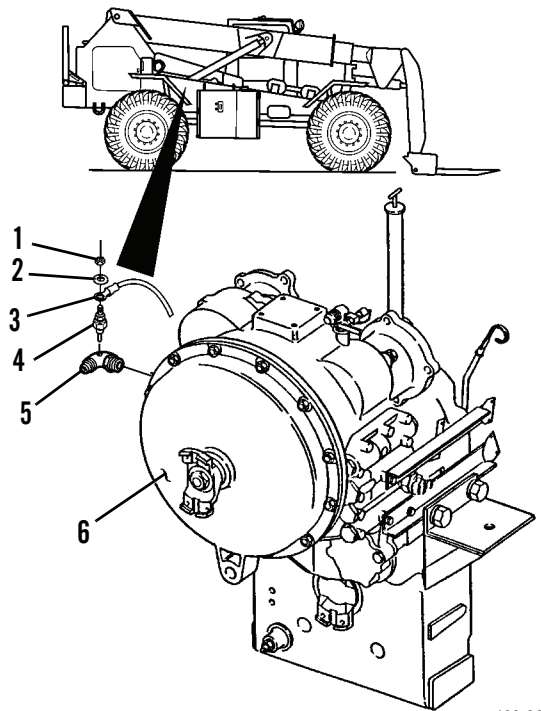
INSTALLATION

1. If necessary, install elbow (5) to transmission (6).

NOTE

Apply loctite to threads of sender.

2. Install sender (4) into elbow (5).
3. Install lead (3), new lockwasher (2) and nut (1), onto sender (4).
4. Connect battery cables (WP 0107 00).
5. Install transmission cover (WP 0150 00).
6. Run engine and check for proper operation and leaks (TM 10-3930-660-10).



409-369

END OF WORK PACKAGE

FUEL LEVEL SENDER MAINTENANCE

0102 00

THIS WORK PACKAGE COVERS

Removal, Cleaning, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Gasket (8)
 Lockwasher (2 and 6)

References

TM 10-3930-660-10

Equipment Condition

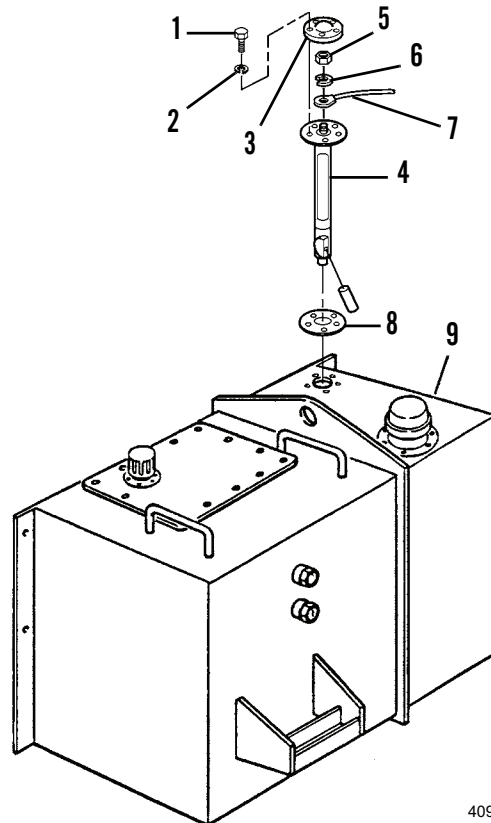
Battery cables disconnected (WP 0107 00)

**WARNING**

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

REMOVAL

1. Remove five capscrews (1), five lockwashers (2) and cap (3) from sender (4). Discard lockwashers.
2. Remove nut (5), lockwasher (6) and lead (7) from sender (4). Discard lockwasher.
3. Remove sender (4) and gasket (8) from fuel tank (9). Discard gasket.



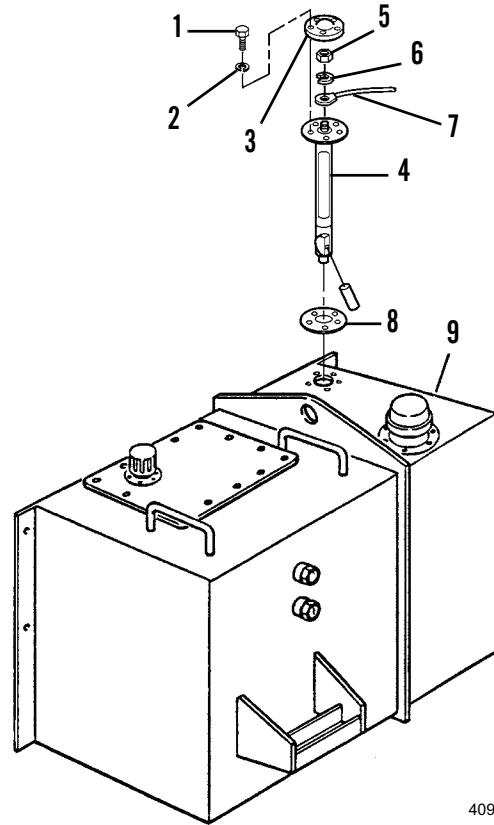
409-4004

CLEANING

Remove residue of old gasket (8) from mating surfaces of sender (4) and fuel tank (9).

INSTALLATION

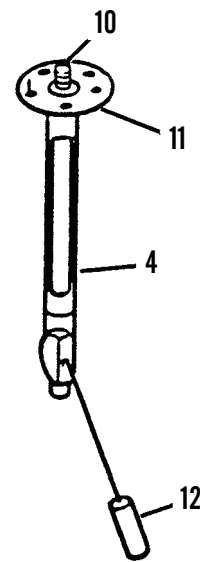
1. Insert sender (4) with new gasket (8) into fuel tank (9).
2. Secure lead (7) with nut (5) and new lockwasher (6).
3. Secure sender (4) and cap (3) with five capscrews (1) and five new lockwashers (2).
4. Connect battery cables (WP 0107 00).
5. Operate vehicle. Check for proper operation and leaks (TM 10-3930-660-10).



409-4004

TESTING

1. Remove the sender (4). See *Removal*.
2. Connect one ohmmeter lead to the sender terminal (10) and the other lead to the metal flange of the sender (11).
3. Move the float (12) up and down while observing the ohmmeter.
4. Resistance should change from approximately 30-240 ohms.
5. Replace sender (4) if the resistance is not within specifications.
6. Install the sender (4). See *Installation*.



409-371

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Lockwasher (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

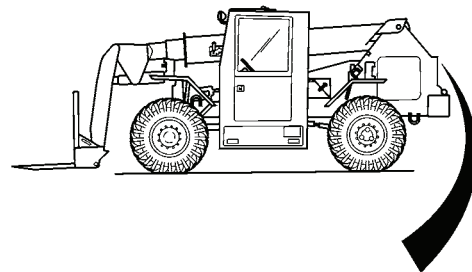
Load backrest removed from storage position (TM 10-3930-660-10)

NOTE

Tag all electrical connections before removing for use during installation.

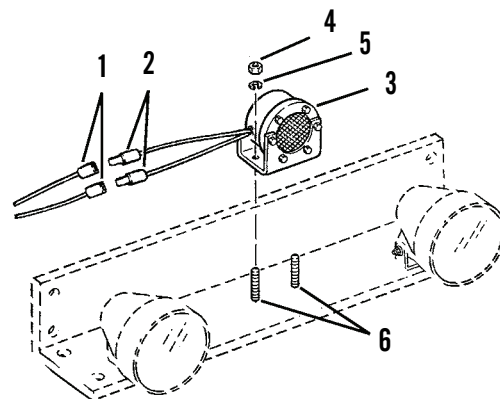
REMOVAL

1. Disconnect two female spade connectors (1) of vehicle wiring harness from two male spade connectors (2) of back-up alarm (3).
2. Remove nuts (4), lockwashers (5) and back-up alarm (3) from studs (6). Discard lockwashers.



INSTALLATION

1. Position back-up alarm (3) on studs (6).
2. Install new lockwashers (5) and nuts (4) to secure back-up alarm (3) to studs (6).
3. Insert two male spade connectors (2) of back-up alarm (3) into two female spade connectors (1) of vehicle wiring harness.
4. Connect battery cables (WP 0107 00).
5. Install load backrest in storage position on vehicle (TM 10-3930-660-10).
6. Position travel select lever in reverse and check alarm for proper operation (TM 10-3930-660-10).



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END OF WORK PACKAGE

BACK-UP ALARM SWITCH MAINTENANCE

0104 00

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cotter pin (9)

Lockwasher (13)

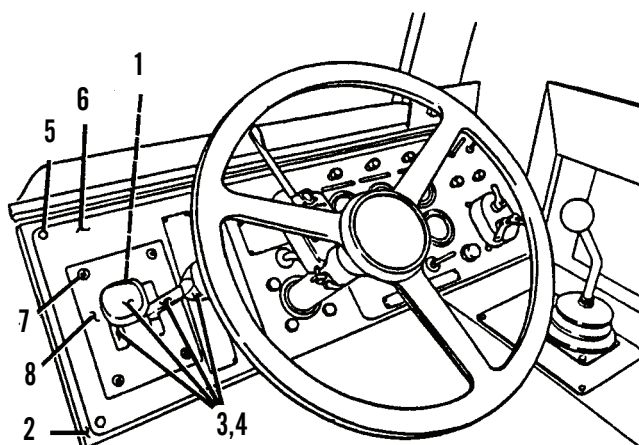
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

REMOVAL

1. To lift lever housing (1) from console (2), pull and remove two knobs (3) from shift levers (4).
2. Remove four capscrews (5) which secure panel (6) to console (2).
3. Remove four capscrews (7) which secure panel (8) and lever housing (1) to panel (6). Remove panel.
4. Lift up panel (6) to provide access to lever housing (1).



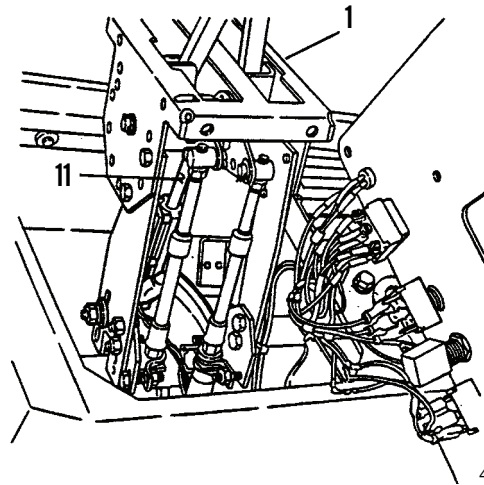
409-374

BACK-UP ALARM SWITCH MAINTENANCE - CONTINUED

0104 00

REMOVAL - CONTINUED

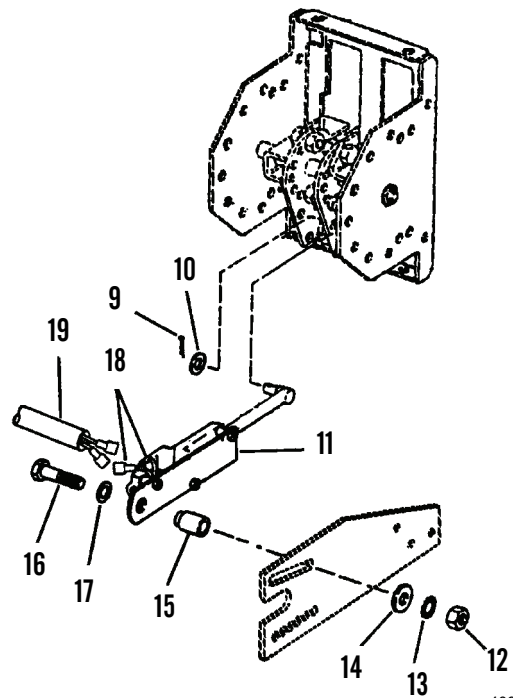
5. At lever housing (1), remove cotter pin (9) and washer (10), which secure top end of back-up alarm switch (11). Discard cotter pin.
6. Remove nut (12), lockwasher (13), washer (14), switch spacer (15), capscrew (16), washer (17) and back-up alarm switch (9). Discard lockwasher.
7. Disconnect two electrical leads (18) connecting switch (9) to vehicle wiring harness (19).



409-375

INSTALLATION

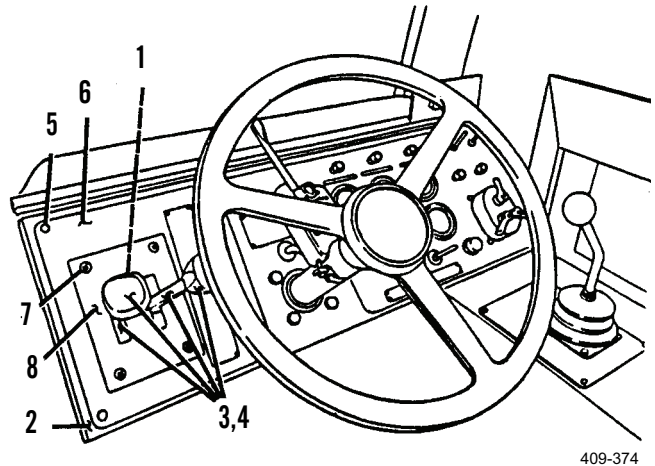
1. Connect electrical leads (18) from switch (9) to vehicle wiring harness (19).
2. Position back-up alarm switch (9) and switch spacer (15) on lever housing (1). Secure bottom end of switch (9) with washer (17), capscrew (16), washer (14), new lockwasher (13) and nut (12).
3. Secure top end of switch (9) with washer (11) and new cotter pin (10).
4. Adjust back-up alarm switch (9) as described in *Adjustment*.



409-376

INSTALLATION - CONTINUED

5. Position lever housing (1) inside console (2).
6. Lower panel (6) to console (2).
7. Position panel (8) on panel (6). Secure panel (8) and lever housing (1) to panel (6) with four capscrews (5).
8. Secure panel (6) to console (2) with four capscrews (5).
9. Install two knobs (3) on shift levers (4).
10. Connect battery cables (WP 0107 00).



409-374

ADJUSTMENT

NOTE

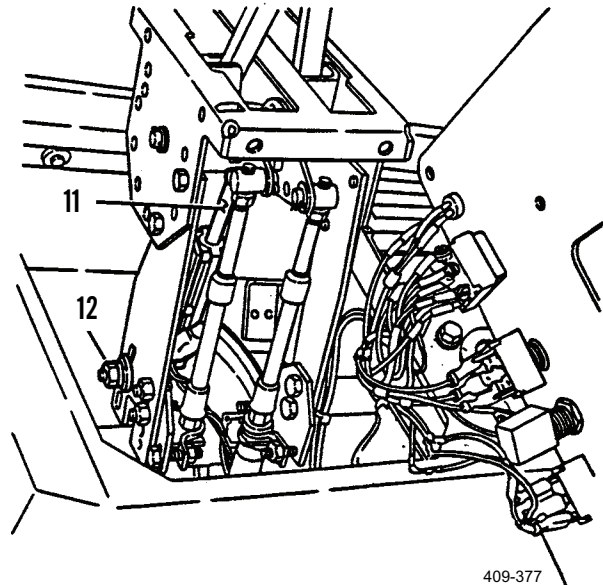
Back-up alarm switch should be adjusted so that back-up alarm sounds only when travel select lever is in reverse position.

1. Turn engine start switch to the ON position, but do not start engine.

NOTE

Be sure blackout lights are switched OFF.

2. Loosen nut (12).
3. Move back-up alarm switch (11) up or down as required so that back-up alarm only sounds when travel select lever is in "Reverse" position.
4. Tighten nut (12).



409-377

END OF WORK PACKAGE

HORN REPLACEMENT

0105 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Lockwasher (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

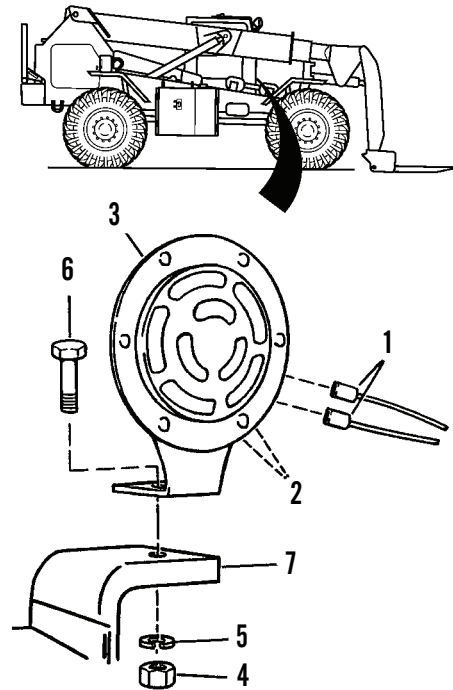
Tag all electrical connections before removing for use during installation.

REMOVAL

1. Remove female connectors (1) from male connectors (2) at rear of horn (3).
2. Remove nut (4), lockwasher (5), screw (6) and horn (3) from horn bracket (7). Discard lockwasher.

INSTALLATION

1. Position horn (3) on horn bracket (7).
2. Secure horn (3) with screw (6), new lockwasher (5) and nut (4).
3. Push female connectors (1) onto male connectors (2) at rear of horn (3).
4. Connect battery cables (WP 0107 00).
5. Operate horn and check for proper operation (TM 10-3930-660-10).



409-378

END OF WORK PACKAGE

BATTERIES MAINTENANCE**0106 00****THIS WORK PACKAGE COVERS**

Service, Removal, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Jelly, petroleum (Item 22, WP 0323 00)

Soda, baking (Item 53, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Water, distilled (Item 60, WP 0323 00)

References

WP 0008 00

TM 9-6140-200-14

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

- 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. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury.
- Sulfuric acid contained in batteries can cause burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or injury.
 - 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.

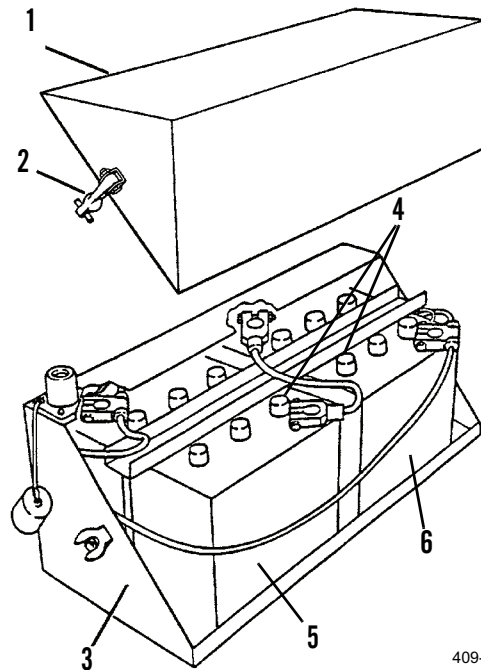
NOTE

Tag all electrical connections before removing for use during installation.

SERVICE**WARNING**

- Always check the electrolyte level with the engine stopped. Do not smoke when checking the battery. Do not use an exposed flame to check battery levels. Protect the eyes when checking the battery level.
- Do not overfill batteries so that water splashes acid from cell openings. Battery acid can cause skin irritations or burns.

1. To remove battery box cover (1), remove two straps (2) securing battery box cover to battery box.
2. Lift and remove battery box cover (1) from battery box (3).
3. Remove fill plugs (4) from batteries (5 and 6).
4. Fill each cell to top of ledge in filler neck with distilled water.
5. Install fill plugs (4) on batteries (5 and 6).
6. To clean exterior surface and terminals of batteries (5 and 6), remove cables from batteries as described in *Removal*.
7. Remove batteries (5 and 6) from vehicle as described in *Removal*.

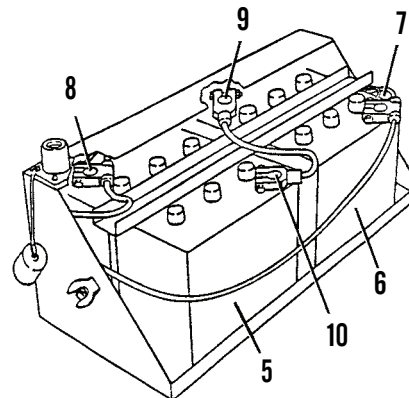


409-4127

CAUTION

Make sure baking soda and water solution does not enter cells of batteries during cleaning. Be sure fill plugs are installed.

8. Clean exterior surface and terminals (7 thru 10) of batteries (5 and 6) with baking soda and water solution.
9. Rinse batteries (5 and 6) with clean water.
10. Apply a light coating of petroleum jelly to terminals (7 thru 10).
11. If removed, install batteries (5 and 6) to vehicle as described in *Removal*.
12. Install cables to batteries (5 and 6) as described in *Removal*.



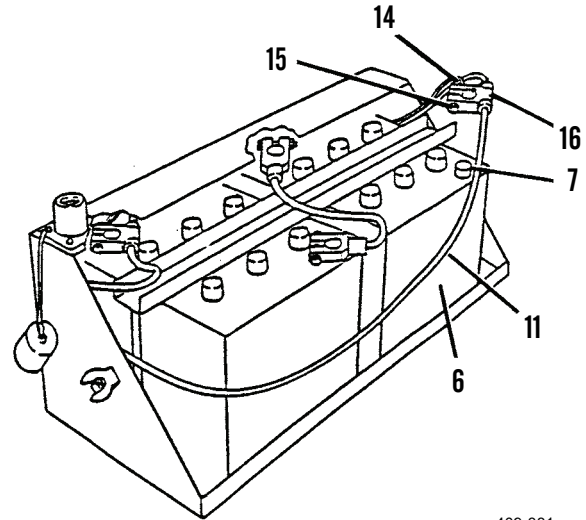
409-380

SERVICE - CONTINUED

13. Position battery box cover (1) on battery box (3).
14. Secure battery box cover (1) to battery box (3) with two straps (2).

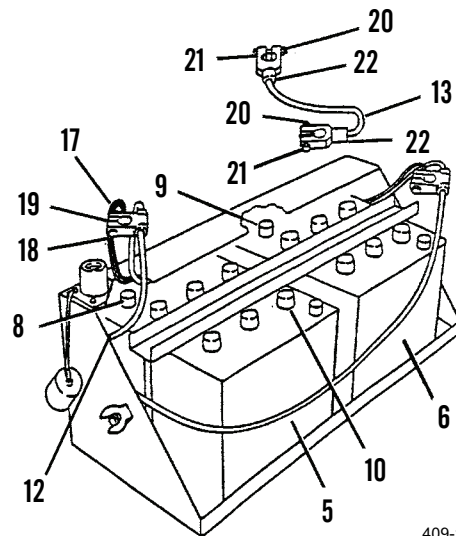
REMOVAL

1. Remove battery box cover as described in *Service*.
2. To remove battery cables (11 thru 13), loosen nut (14) and capscrew (15) at clamp (16) securing negative battery cable (11) to negative terminal (7) of right-hand battery (6). Remove negative battery cable (11) from terminal (7).



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3. Loosen nut (17) and bolt (18) at clamp (19) securing positive battery cable (12) to positive battery terminal (8) of left-hand battery (5). Remove positive battery cable (12) from terminal (8).
4. Loosen two nuts (20) and bolts (21) at two clamps (22) securing crossover battery cable (13) to positive terminal (9) of right-hand battery (6) and to negative terminal (10) of left-hand battery (5). Remove crossover battery cable (13) from terminals (9 and 10).



409-1736

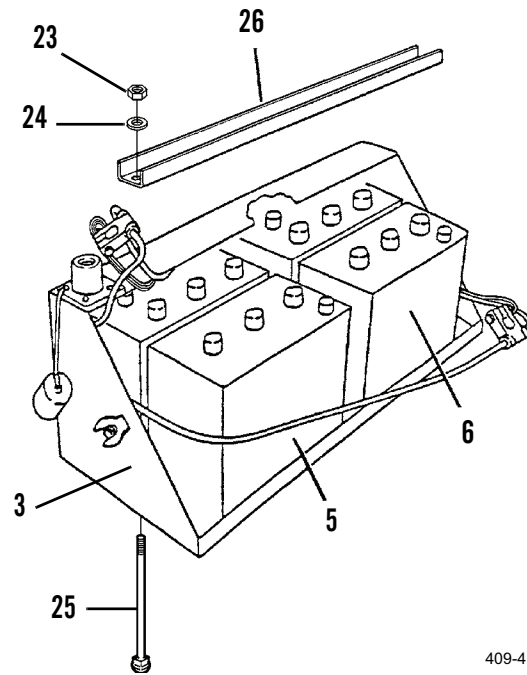
REMOVAL - CONTINUED

5. Remove three locknuts (23), washers (24) and retaining capscrews (25) securing the battery retaining bar (26). Remove battery retaining bar.
6. Remove left-hand battery (5) and right-hand battery (4) from battery box (3).

INSTALLATION**NOTE**

- If old batteries are to be reinstalled, clean the tops and terminals of batteries. Refer to *Service*. Use wire brush on clamps and terminals as required.
- Batteries should be installed so the positive terminal of each battery is oriented toward the left and front of battery box.

1. Install left-hand battery (5) and right-hand battery (6) in battery box (3).
2. Position battery retaining bar (26) across batteries (4 and 6). Install three retaining capscrews (25) from under the battery box (3). Push retaining capscrew (25) up until threads of capscrews (25) are positioned through holes in battery retaining bar (26).
3. Secure battery retaining bar (26) to retaining capscrew with three washers (24) and three locknuts (23).
4. Apply a thin coat of petroleum jelly on all battery terminals and clamps to retard corrosion.

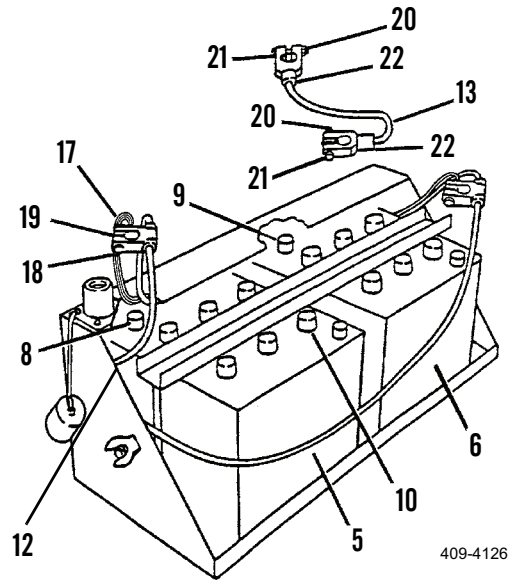


409-4125

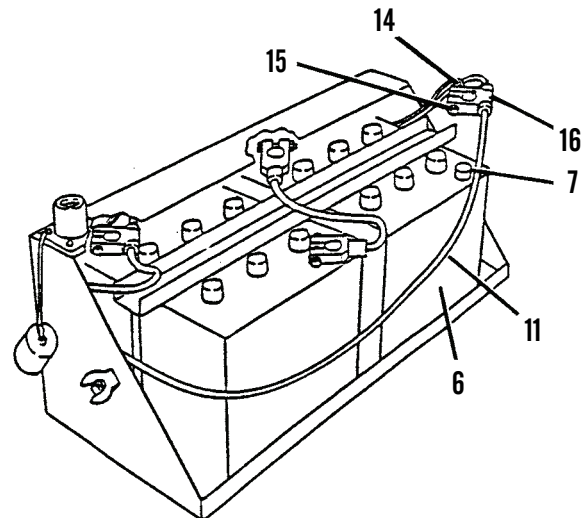
INSTALLATION - CONTINUED**WARNING**

To avoid sparks when installing battery cables, always install positive cable last. Failure to do so could cause serious injury or death.

5. Position two clamps (22) of crossover battery cable (13) on positive terminal (9) of right-hand battery (6) and on negative terminal (10) of left-hand battery (5).
6. Secure crossover battery cable (13) by tightening two nuts (20) and capscrew (21) on two clamps (22).
7. Position clamp (19) from positive battery cable (12) on positive battery terminal (8) on left-hand battery (5).
8. Secure positive battery cable (12) by tightening nut (17) and bolt (18) on clamp (19).



9. Position clamp (16) from negative battery cable (11) on negative terminal (7) of right-hand battery (6).
10. Secure negative battery cable (11) by tightening nut (14) and capscrew (15) on clamp (16).
11. Install battery box cover as described in *Service*.



TESTING

NOTE

Never disconnect any charging unit circuit or battery circuit cable from battery when the charging unit is operating. A spark can cause an explosion from the flammable vapor mixture of hydrogen and oxygen that is released through the battery outlets. Injury to personnel can result.

The battery voltage test can be done on the engine. Refer to WP 0008 00. If the on-engine test shows a defect, remove batteries for further testing. For additional testing requirements refer to TM 9-6140-200-14.

END OF WORK PACKAGE

BATTERY CABLES AND TERMINALS MAINTENANCE

0107 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Petroleum jelly (Item 22, WP 0323 00)
 Soda, baking (Item 53, WP 0323 00)
 Strap, tie down (Item 56, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Lockwasher (37)
 Starwasher (29 and 34)

Equipment Condition

Vehicle parked on level ground

**WARNING**

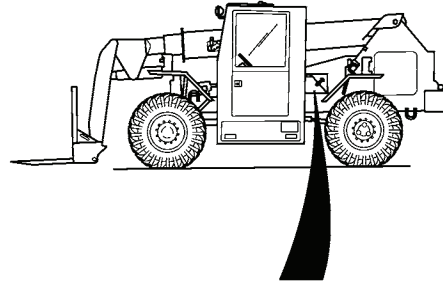
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury. Remove all jewelry such as rings, ID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

NOTE

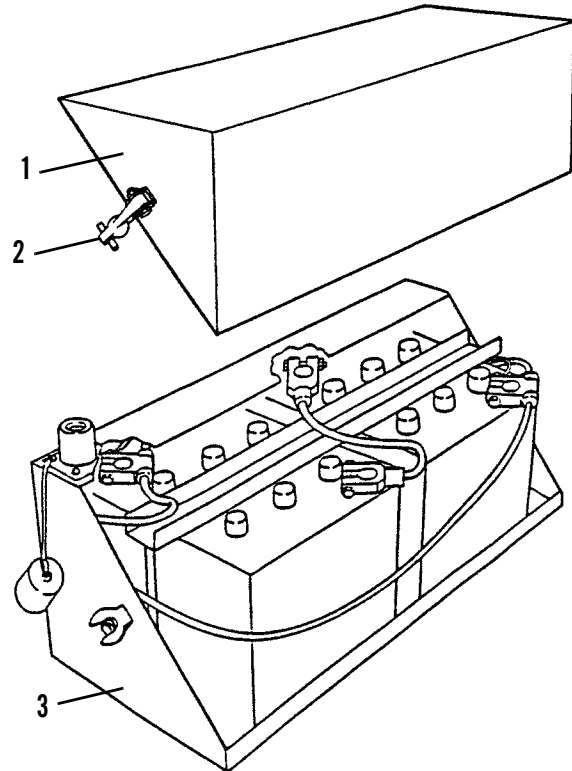
- To disconnect batteries prior to servicing vehicle, refer to steps 3 and 4 of *Removal*.
- To reconnect batteries after servicing is completed, refer to steps 23 thru 27 of *Installation*.
- Tag all electrical connections before removing for use during installation.

SERVICE

1. To remove battery box cover and disconnect cables from battery terminals, refer to appropriate steps in *Removal*.
2. Use a wire brush to clean battery terminals and cable clamps. Wipe clean with a dry rag.
3. Apply a thin coat of petroleum jelly on battery terminals and cable clamps to retard corrosion.
4. Connect cables to battery terminals and install battery box cover. Refer to appropriate steps in *Installation*.

**REMOVAL**

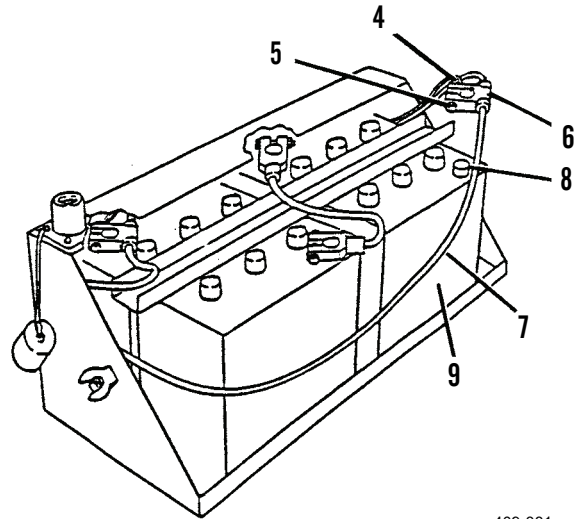
1. To remove battery box cover (1), remove two straps (2) securing battery box cover to battery box (3).
2. Lift and remove battery box cover (1) from battery box (3).



409-386

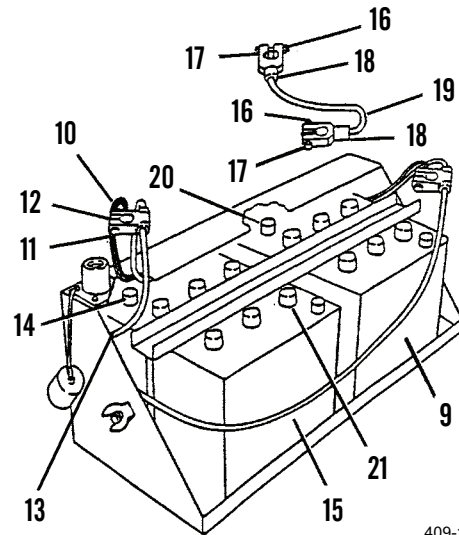
REMOVAL - CONTINUED

3. Loosen nut (4) and bolt (5) at clamp (6) securing negative battery cable (7) to negative terminal (8) of right-hand battery (9).
4. Remove clamp (6) from terminal (8).



409-381

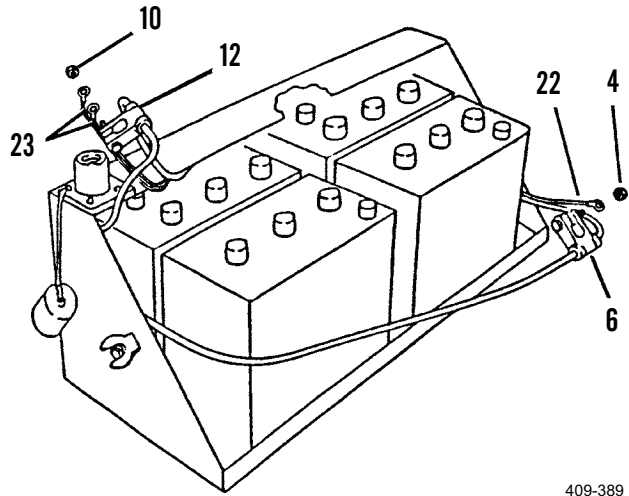
5. Loosen nut (10) and capscrew (11) at clamp (12) securing positive battery cable (13) to positive battery terminal (14) of left-hand battery (15).
6. Remove clamp (12) from terminal (14).
7. Loosen two nuts (16) and capscrews (17) at two clamps (18) securing crossover battery cable (19) to positive terminal (20) of right-hand battery (9) and to negative terminal (21) of left-hand battery (15).
8. Remove clamps (18) from terminals (20 and 21).



409-1735

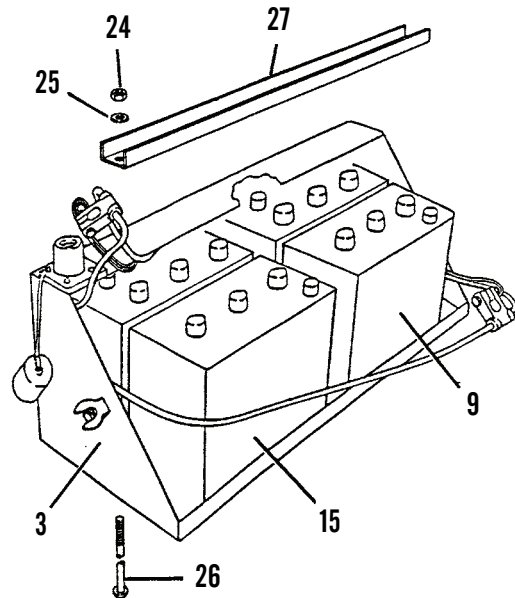
REMOVAL - CONTINUED

9. Remove nut (4) from clamp (6) securing STE/ICE-R electrical lead (22) to clamp.
10. Remove STE/ICE-R electrical lead (22) at clamp (6).
11. Remove nut (10) at clamp (12) securing two STE/ICE-R electrical leads (23) to clamp.
12. Remove two STE/ICE-R electrical leads (23) at clamp (12).



409-389

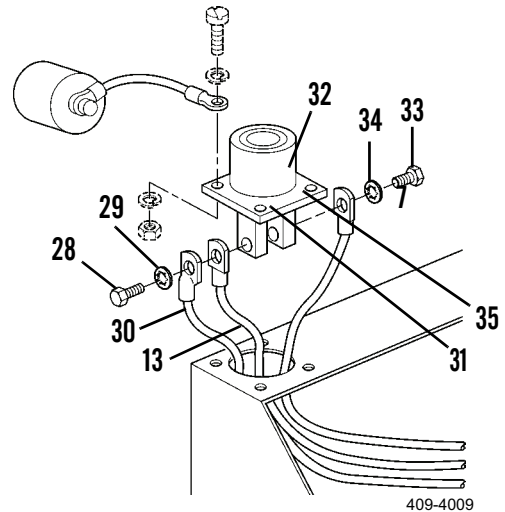
13. Remove three nuts (24), washers (25) and retaining bolts (26) securing the battery retaining bar (27). Remove battery retaining bar.
14. Remove left-hand battery (15) and right-hand battery (9) from battery box (3).



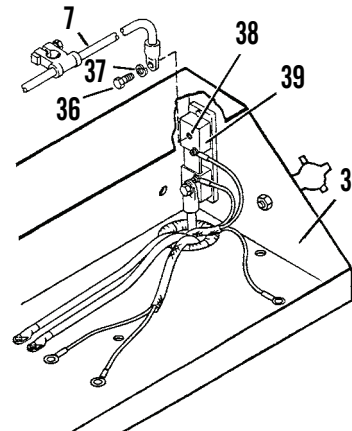
409-384

REMOVAL - CONTINUED

15. Remove capscrew (28) and starwasher (29) securing positive battery cable (13) and positive emergency steering pump power cable (30) to positive terminal (31) of slave receptacle (32). Discard starwasher.
16. Remove cables (13 and 30) from terminal (31).
17. Remove capscrew (33) and starwasher (34) securing negative battery cable (7) to negative terminal (35) of slave receptacle (32). Discard starwasher.
18. Remove cable (7) from terminal (35).

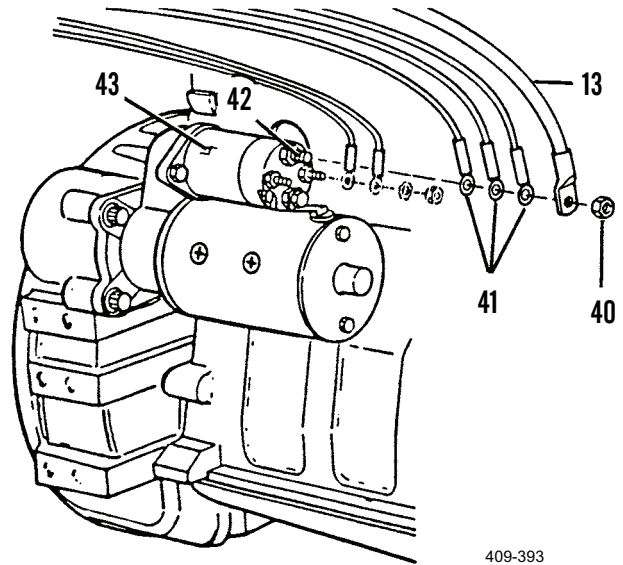


19. Remove capscrew (36) and lockwasher (37) securing negative battery cable (7) to terminal (38) of STE/ICE-R shunt (39). Remove negative battery cable (7) from terminal. Discard lockwasher.
20. Remove negative battery cable (7) from machine.



REMOVAL - CONTINUED

21. Remove nut (40) securing positive battery cable (13) and three electrical leads (41) to terminal (42) on starting motor solenoid (43).
22. Remove positive battery cable (13) and three electrical leads (41) from terminal (42).

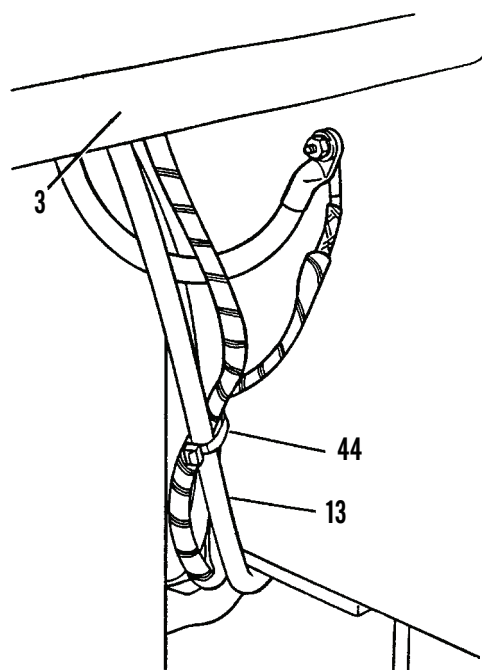


23. To remove positive battery cable (13) from vehicle, cut tie down strap (44), under battery box (3), securing positive battery cable to other electrical cables.

NOTE

Note routing of positive battery cable on vehicle for use during installation.

24. Pull positive battery cable (13) out of engine compartment and battery box from underneath vehicle.



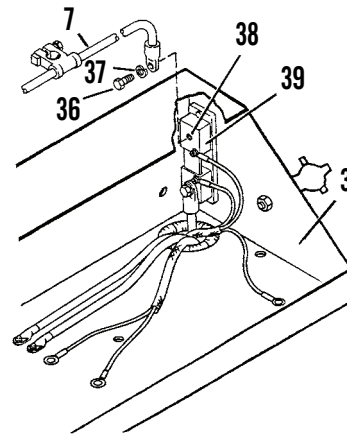
409-394

INSTALLATION

NOTE

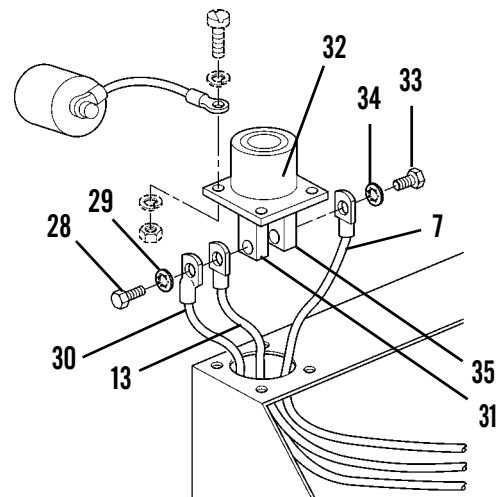
Route positive battery cable on vehicle as noted during removal.

1. Position ends of positive battery cable (13) in engine compartment and through hole at base of battery box (3).
2. Under battery box (3), secure positive battery cable (13) to other electrical cables with new tie down strap (44).
3. Position three electrical leads (41) and positive battery cable (13) on terminal (42) at starting motor solenoid (43) as tagged.
4. Secure three leads (41) and positive battery cable (13) to terminal (42) with nut (40).
5. Position negative battery cable (7) in battery box (3).
6. Position short end of negative battery cable (7) on terminal (38) of STE/ICE-R shunt (39) and secure with capscrew (36) and new lockwasher (37).



409-392

7. Position negative battery cable (7) on negative terminal (35) of slave receptacle (32).
8. Secure cable (7) to terminal (35) with capscrew (32) and new starwasher (34).
9. Position positive emergency steering pump power cable (30) and positive battery cable (13) on positive terminal (31) of slave receptacle (32).
10. Secure cables (30 and 13) with capscrew (28) and new starwasher (29).



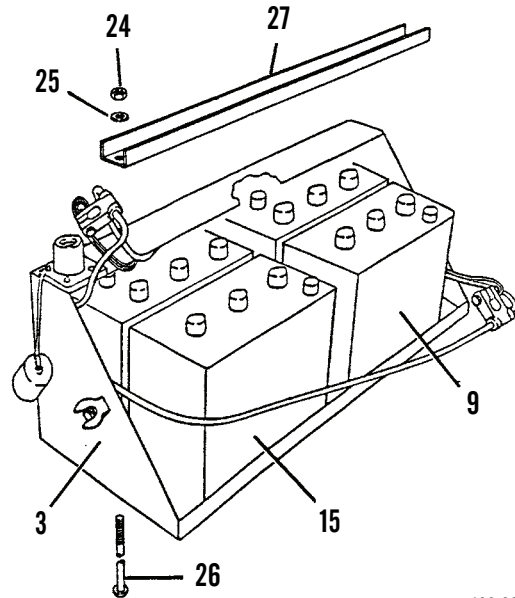
409-4009

INSTALLATION - CONTINUED

NOTE

- Clean battery cable clamps and terminals as required with baking soda and water solution with wire brush.
- Batteries should be installed so the positive terminal of each battery is oriented toward the left and front of battery box.

11. Position left-hand battery (15) and right-hand battery (9) in battery box (3).
12. Position battery retaining bar (27) across tops of batteries (9 and 15). Install three retaining bolts (26) from under the battery box (3).

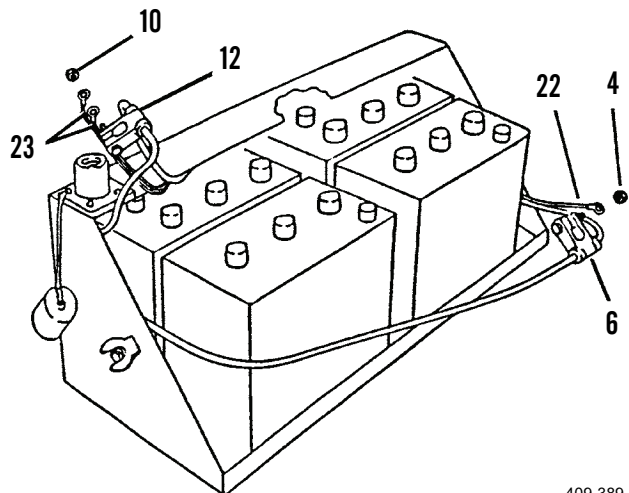


409-384

NOTE

Push retaining bolts up until threads of bolts are positioned through holes in battery retaining bar.

13. Secure battery retaining bar (27) to three retaining bolts (26) with three washers (25) and nuts (24).
14. Install STE/ICE-R electrical leads (22 and 23) at clamps (6 and 12) as tagged.
15. Position two STE/ICE-R electrical leads (23) on clamp (12).
16. Secure two STE/ICE-R electrical leads (23) to clamp (12) with nut (13).
17. Position STE/ICE-R electrical lead (22) on clamp (6).
18. Secure STE/ICE-R electrical lead (22) to clamp (6) with nut (4).

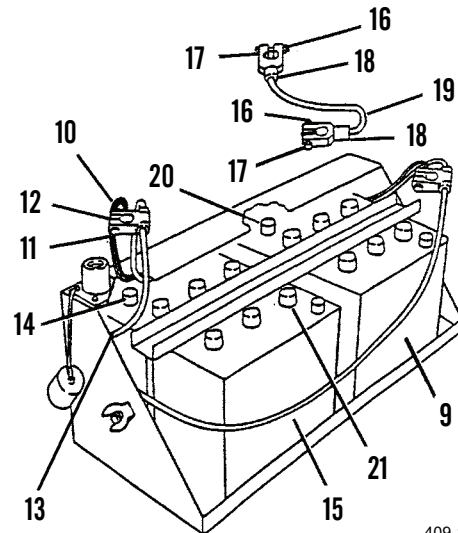


409-389

INSTALLATION - CONTINUED**NOTE**

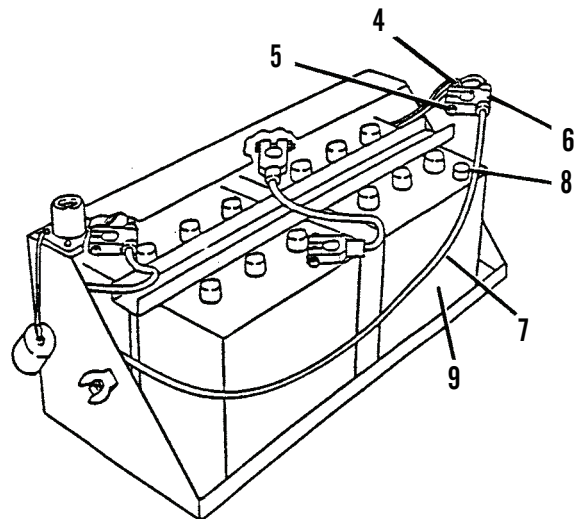
To retard corrosion, apply a thin coat of petroleum jelly on all battery terminals and clamps prior to installing battery cables.

19. Position two clamps (18) of crossover battery cable (19) on positive terminal (20) of right-hand battery (9) and on negative terminal (21) of left-hand battery (15).
20. Secure crossover battery cable (19) by tightening two nuts (16) and capscrews (17) on two clamps (18).
21. Install positive battery cable (13) to battery (15).
22. Position clamp (12) from positive battery cable (13) on positive battery terminal (14) of left-hand battery (15).
23. Secure battery cable (13) by tightening nut (10) and capscrew (11) on clamp (12).



409-1735

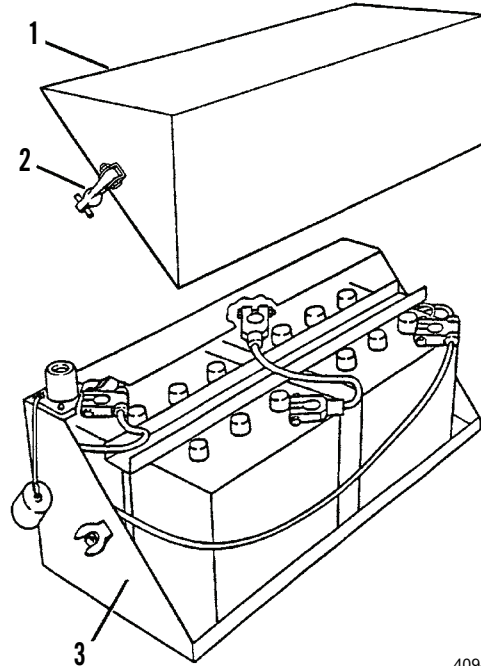
24. Position clamp (6) from negative battery cable (7) on negative battery terminal (8) of right-hand battery (9).
25. Secure negative battery cable (7) by tightening nut (4) and bolt (5) on clamp (5).



409-381

INSTALLATION - CONTINUED

26. Position battery box cover (1) on battery box (3).
27. Secure battery box cover (1) to battery box (3) with two straps (2).



409-4127

END OF WORK PACKAGE

BATTERY BOX AND COVER REPLACEMENT

0108 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Batteries removed (WP 0106 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Locknuts (24, 36, 38 and 41)

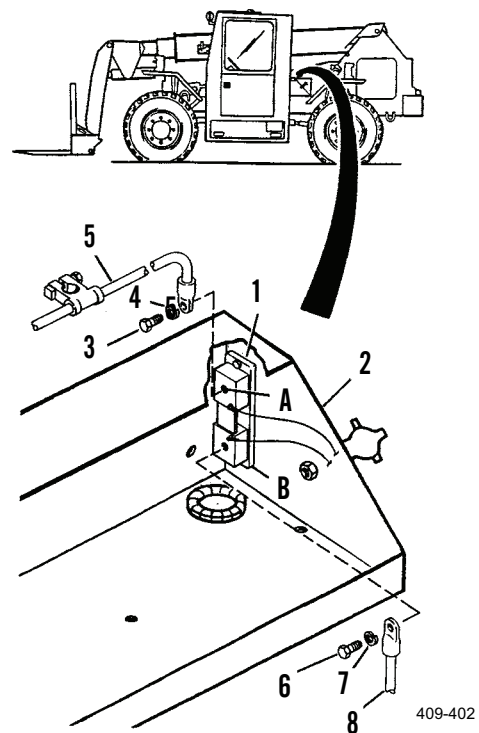
Lockwasher (4, 7, 10, 14 and 31)

Starwasher (21 and 23)

REMOVAL**NOTE**

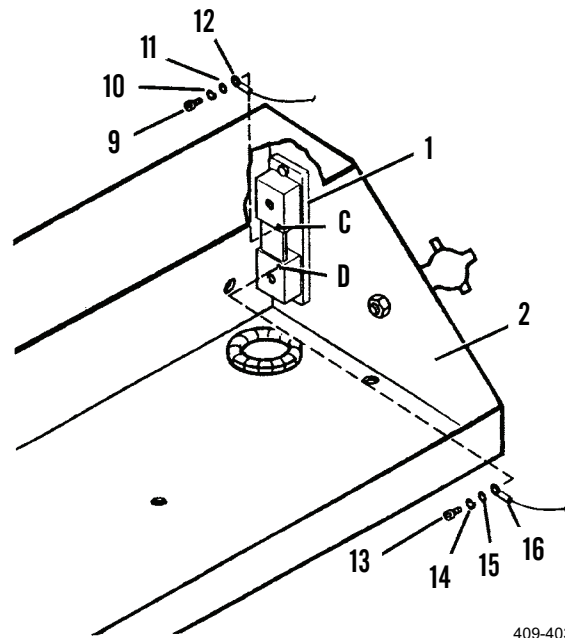
- Tag all electrical connections before removing for use during installation.
- The STE/ICE-R shunt is located inside the battery box, on the right-hand side.

1. To disconnect wiring at STE/ICE-R shunt (1) inside battery box (2), remove capscrew (3) and lockwasher (4).
2. Remove negative battery cable (5) from terminal (A) of STE/ICE-R shunt (1). Discard lockwasher.
3. Remove capscrew (6) and lockwasher (7). Tag and remove ground cable (8) from terminal (B) of STE/ICE-R shunt (1). Discard lockwasher.



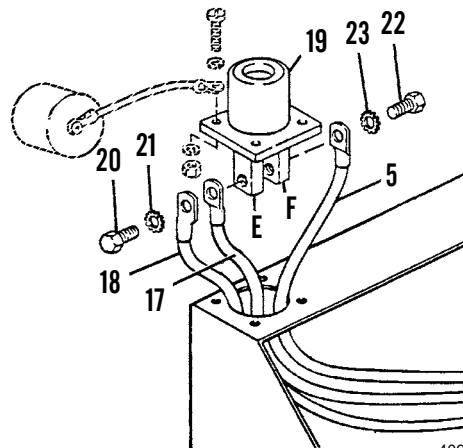
REMOVAL - CONTINUED

4. Remove screw (9), lockwasher (10) and flatwasher (11). Remove STE/ICE-R electrical lead (12) from terminal (C) of STE/ICE-R shunt (1). Discard lockwasher.
5. Remove screw (13), lockwasher (14) and flatwasher (15). Remove STE/ICE-R electrical lead (16) from terminal (D) of STE/ICE-R shunt (1). Discard lockwasher.



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6. Remove capscrew (20) and starwasher (21) securing positive battery cable (17) and positive emergency steering pump power cable (18) to positive terminal (E) of slave receptacle (19). Discard starwasher.
7. Remove cables (17) and (18) from terminal (E).
8. Remove capscrew (22) and starwasher (23) securing negative battery cable (5) to negative terminal (F) of slave receptacle (19). Discard starwasher.
9. Remove negative battery cable (5) from terminal (F).



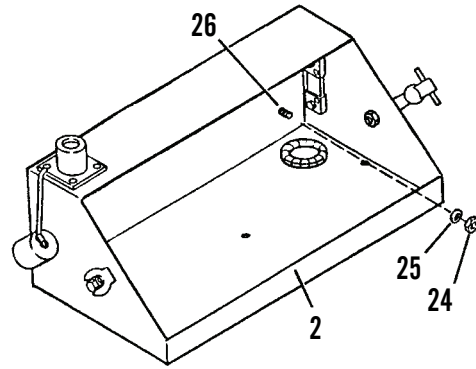
409-404

REMOVAL - CONTINUED

NOTE

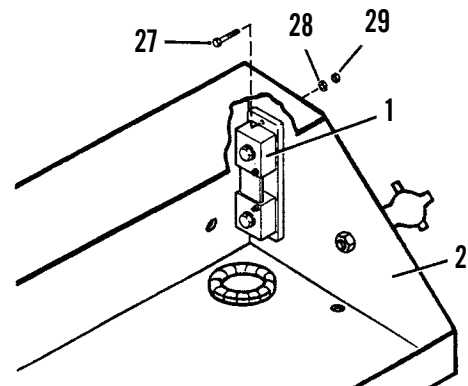
Remove all electrical leads and cables through hole at base of battery box prior to performing step 11.

10. Remove four locknuts (24) and washers (25) securing battery box (2) to four mounting studs (26) on back of cab. Discard locknuts.



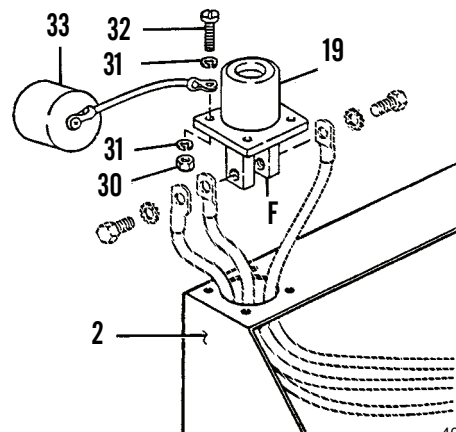
409-405

11. Remove battery box (2) from mounting studs (26).
12. If necessary, remove STE/ICE-R shunt (1) from battery box (2).
13. Remove two bolts (27), two flatwashers (28) and two nuts (29) securing STE/ICE-R shunt (1) to battery box (2).
14. Remove STE/ICE-R shunt (1) from battery box (2).



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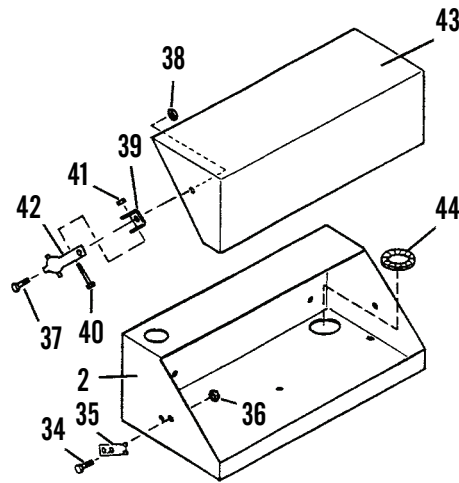
15. If necessary, remove slave receptacle (19) from battery box (2).
16. Remove four nuts (30), eight lockwashers (31) and four screws (32) securing slave receptacle (19) and cap (33) to battery box (2). Discard lockwashers.
17. Remove slave receptacle (19) and cap (33) from battery box (2).



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REMOVAL - CONTINUED

18. Remove four screws (34), two catch clamps (35) and four locknuts (36) from battery box (2). Discard locknuts.
19. Remove two bolts (37), two locknuts (38) and two brackets (39) from battery box cover (43). Discard locknuts.
20. Remove two capscrews (40), two locknuts (41) and two retaining straps (42) from two brackets (39). Discard locknuts.
21. If necessary, remove conduit (44) from battery box (2).



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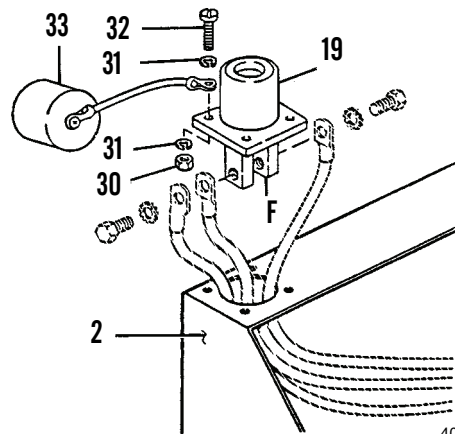
INSTALLATION

1. If removed, install conduit (44) to battery box (2).
2. Secure two retaining straps (42) to two brackets (39) with two capscrews (40) and two new locknuts (41).
3. Secure two brackets (39) to battery box cover (43) with two bolts (37) and two new locknuts (38).
4. Secure two catch clamps (35) to battery box (2) with four screws (34) and four locknuts (36).

NOTE

When positioning slave receptacle on battery box, be sure negative terminal (F) is facing toward center of vehicle.

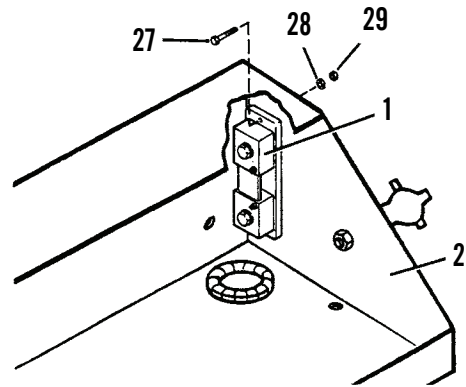
5. If removed, install slave receptacle (19) on battery box (2).
6. Position slave receptacle (19) on battery box (2).
7. Secure slave receptacle (19) and cap (33) to battery box (2) with four screws (32), eight new lockwashers (31) and four nuts (30).



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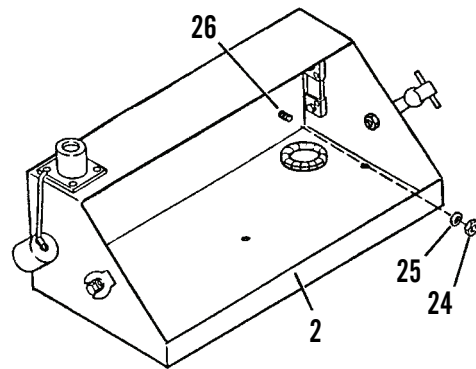
INSTALLATION - CONTINUED

8. Position STE/ICE-R shunt (1) on battery box (2).
9. Secure STE/ICE-R shunt (1) to battery box (2) with two nuts (29), two flatwashers (28) and two capscrews (27).
10. Position battery box (2) on mounting studs (26) at back of cab.



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11. Secure battery box (2) to mounting studs (26) with four washers (25) and four new locknuts (24).

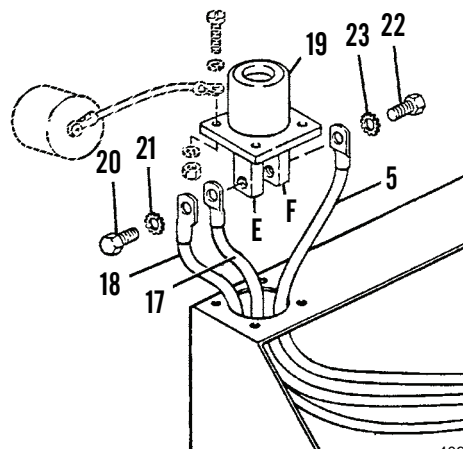


409-405

NOTE

Insert electrical leads and cables through hole at base of battery box prior to performing step 13.

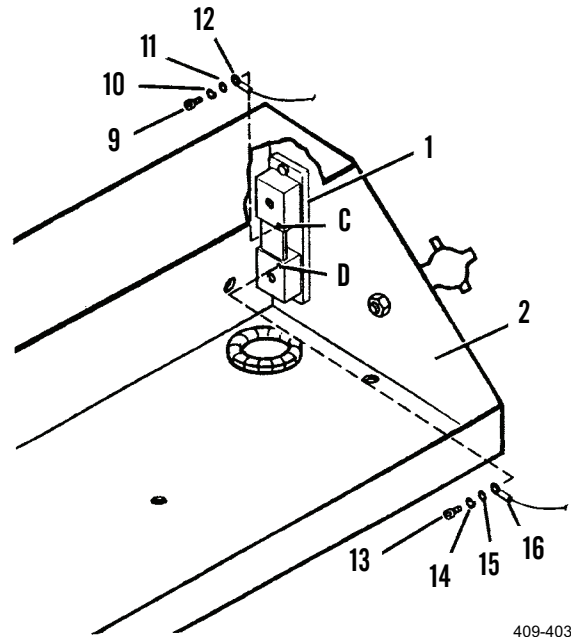
12. Position negative battery cable (5) on negative terminal (F) of slave receptacle (19).
13. Secure negative battery cable (5) to negative terminal (F) with capscrew (22) and new starwasher (23).
14. Position positive emergency steering pump power cable (18) and positive battery cable (17) on positive terminal (E) of slave receptacle (19).
15. Secure cables (18) and (17) with capscrew (20) and new starwasher (21).



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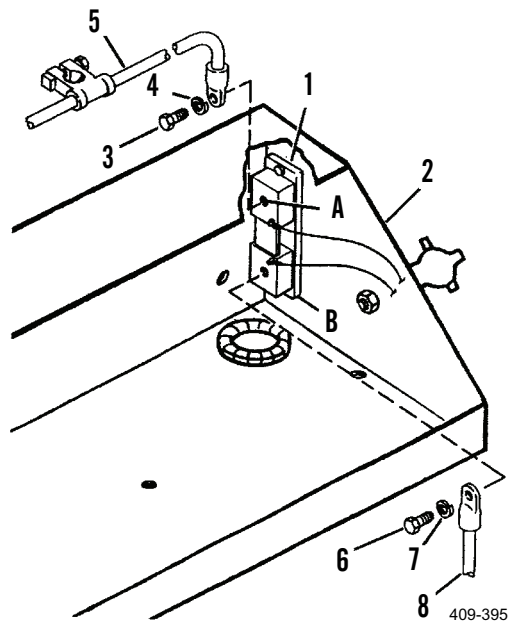
INSTALLATION - CONTINUED

16. Position STE/ICE-R electrical lead (16) on terminal (D) of STE/ICE shunt (1) as tagged during removal and secure with flatwasher (15), new lockwasher (14) and screw (13).
17. Position STE/ICE-R electrical lead (16) on terminal (C) of STE/ICE-R shunt (1) as tagged during removal and secure with flatwasher (11), new lockwasher (10) and screw (9).



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18. Position ground cable (8) on terminal (B) of STE/ICE-R shunt (1) as tagged during removal and secure with new lockwasher (7) and capscrew (6).
19. Position short end of negative battery cable (5) on terminal (A) of STE/ICE-R shunt (1) as tagged during removal and secure with new lockwasher (4) and cap-screw (3).



409-395

20. Install batteries (WP 0106 00).

END OF WORK PACKAGE

CAB WIRING HARNESSES MAINTENANCE

0109 00

THIS WORK PACKAGE COVERS

Testing, Repair, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Strap, tie down (Item 56, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Tape, electrical (Item 58, WP 0323 00)

References

WP 0326 00

Equipment ConditionBattery cables disconnected (WP 0107 00)

NOTE

- Tag all electrical connections before removing for use during installation.
- The following procedures apply to cab main wiring harness, cab rear wiring and electric joystick controller wiring harness.

TESTING**NOTE**

Failure of an electrical device to function is more likely due to a faulty switch (actuator), or to a faulty device itself, than to a broken wire in wiring harness. Do not assume that a broken wire exists until related electrical device and actuator have been checked.

1. Inspect wires for poor connections at terminals, cuts or other defects.
2. Check wire continuity to determine if hidden breaks exist.
3. Use electrical schematic to trace path of wire (WP 0326 00).
4. Connect ohmmeter leads to each end of wire.
5. An infinite resistance reading indicates a broken wire.

REPAIR**NOTE**

If three or more of the wires in a wiring harness have been repaired or replaced, replace complete harness.

1. Replace any broken terminal rings or connectors.
2. Disconnect broken wire at both ends.
3. Cut insulation back approximately 4 in. (102 mm).
4. Cut replacement wire to required length and install proper terminals.
5. Route replacement wire along wiring harness, securing wire with tie wraps or electrical tape.
6. Connect replacement wire to original connection points.
7. Test circuit function.

REMOVAL**NOTE**

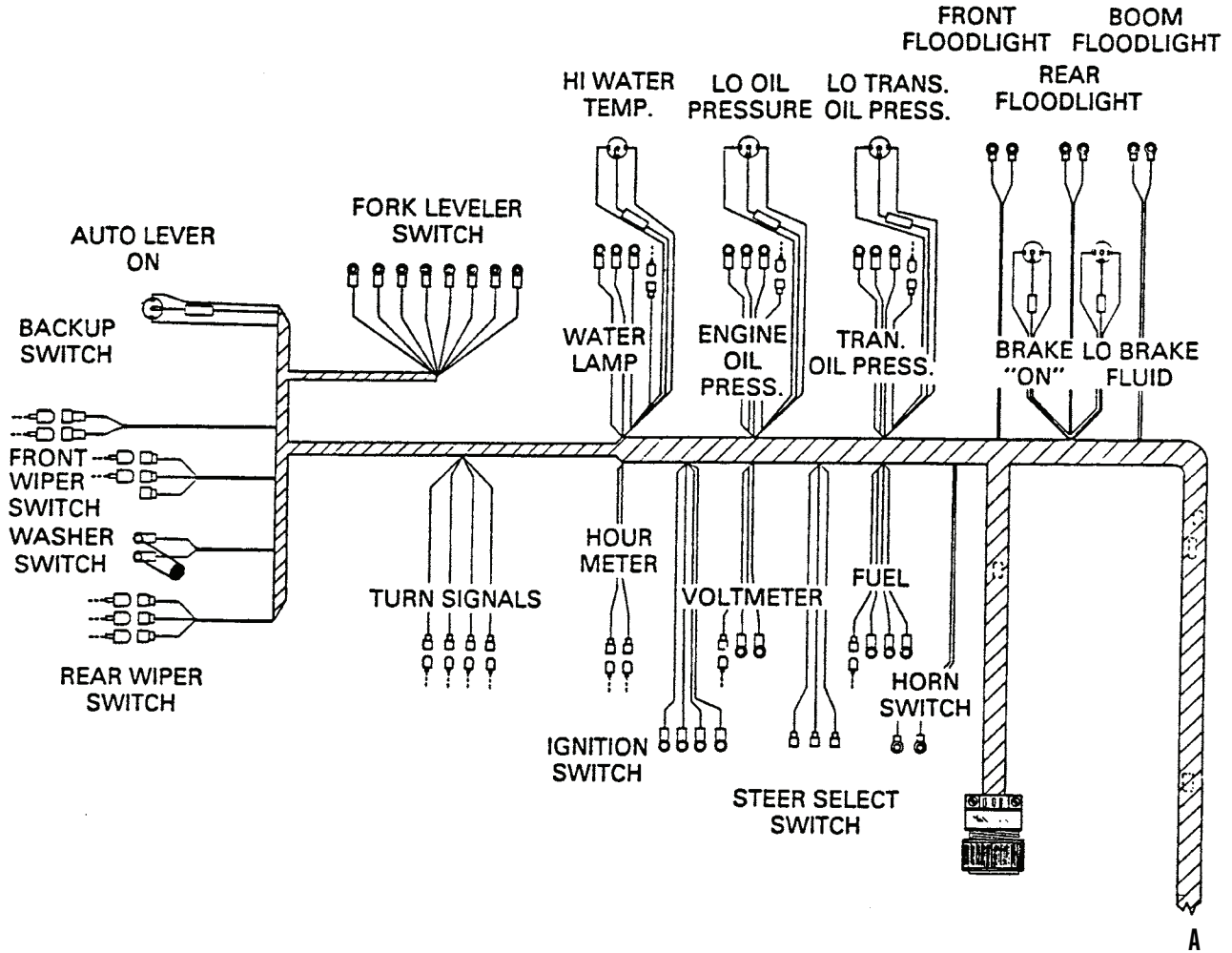
If an individual wire in a wiring harness is broken, it is not necessary to replace entire harness. Refer to *Repair*.

1. Note connection points of all terminal rings and single connectors on wiring harness. Disconnect terminal rings and single connectors.
2. Disconnect four plug-type connectors.
3. Remove all clamps that secure wiring harness to cab structure.

INSTALLATION

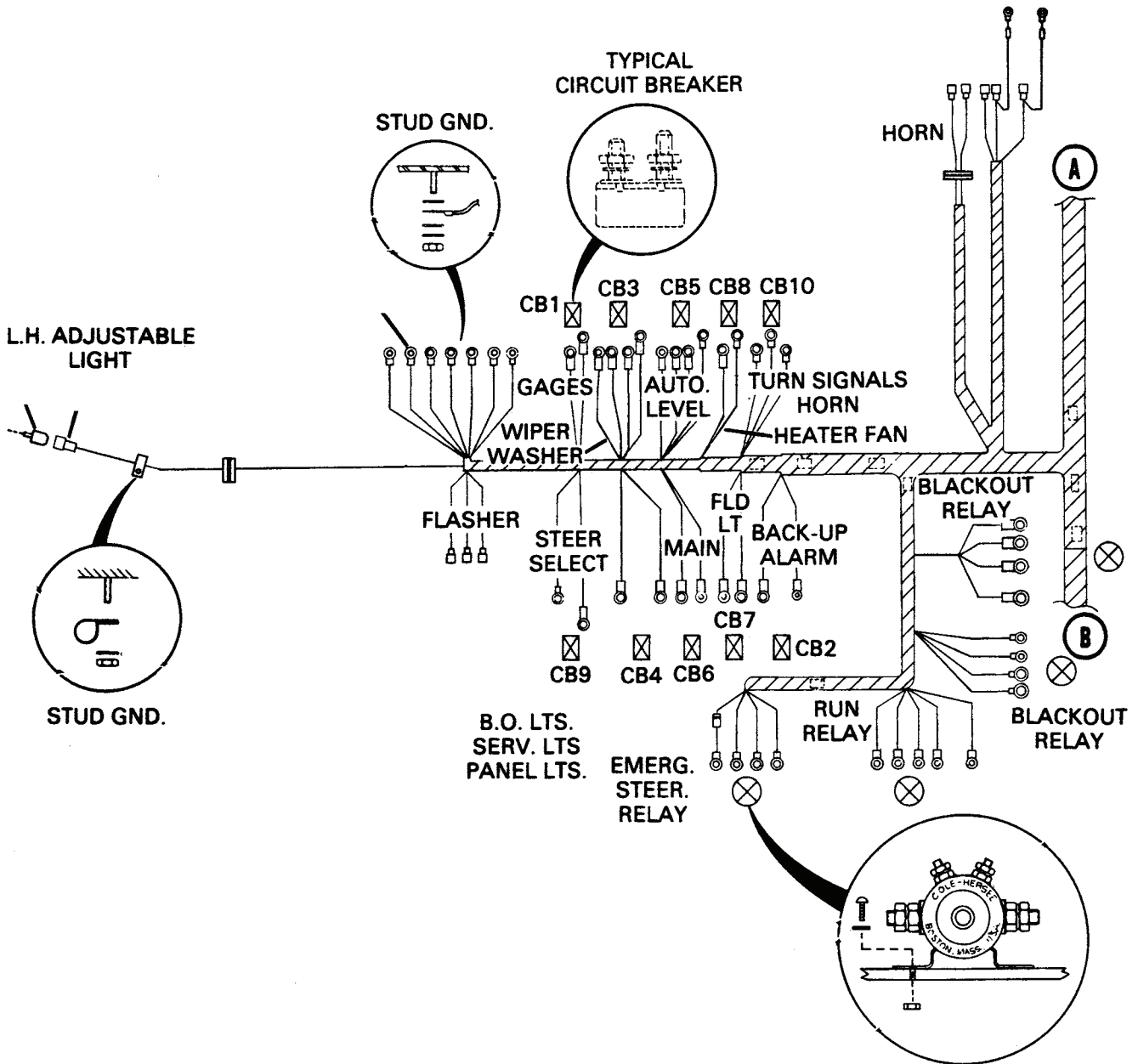
1. Route new wiring harness in same path as old wiring harness.
2. Install cable clamps in original locations.
3. Connect four plug-type connectors.
4. Connect individual terminal rings and single connectors as tagged during removal. Refer to *Schematic Diagram* (WP 0326 00) for wire numbers and connection points.
5. Connect battery cables (WP 0107 00).
6. Test all circuits to confirm proper installation of wiring harness.

INSTALLATION - CONTINUED

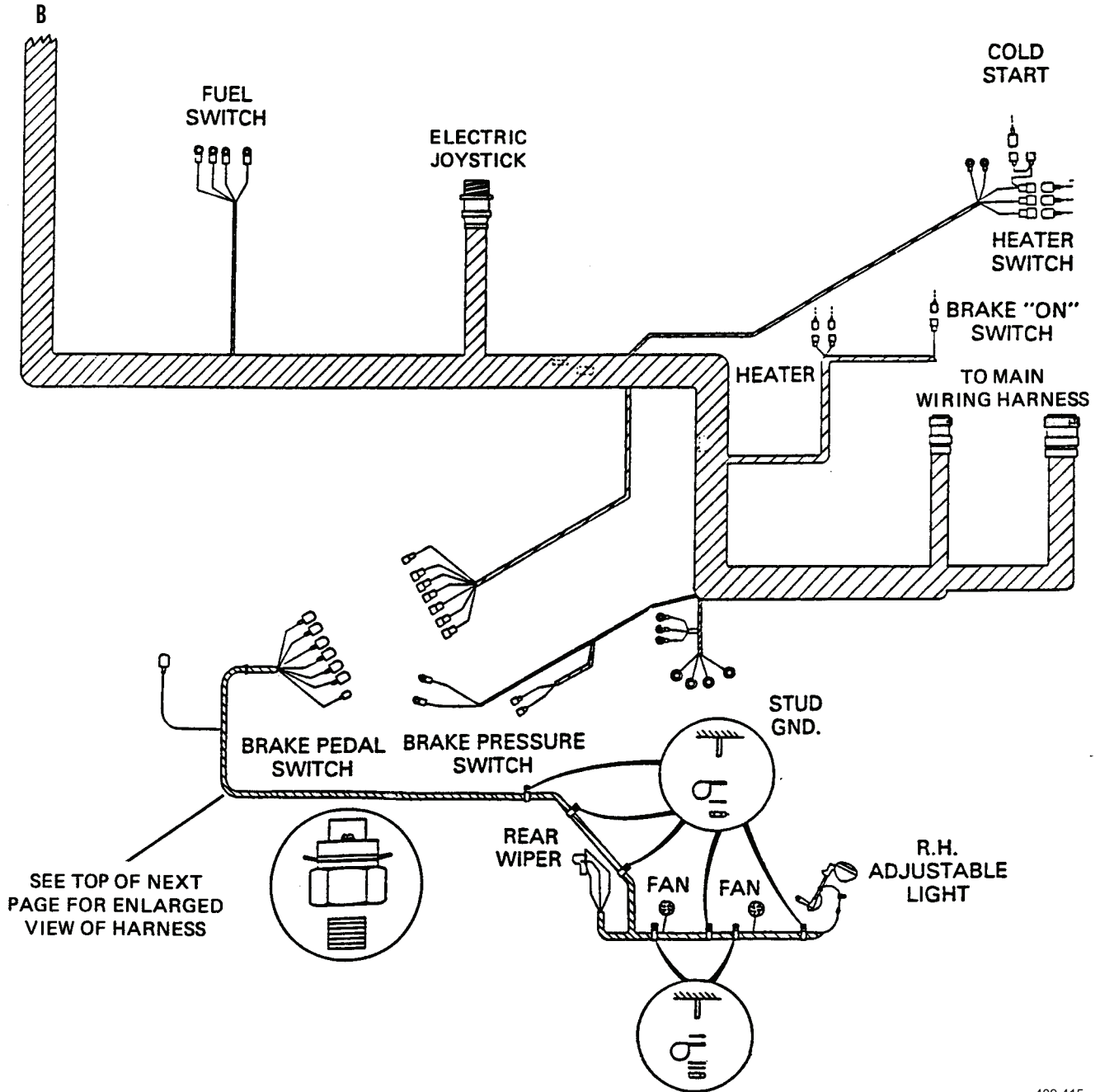


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INSTALLATION - CONTINUED

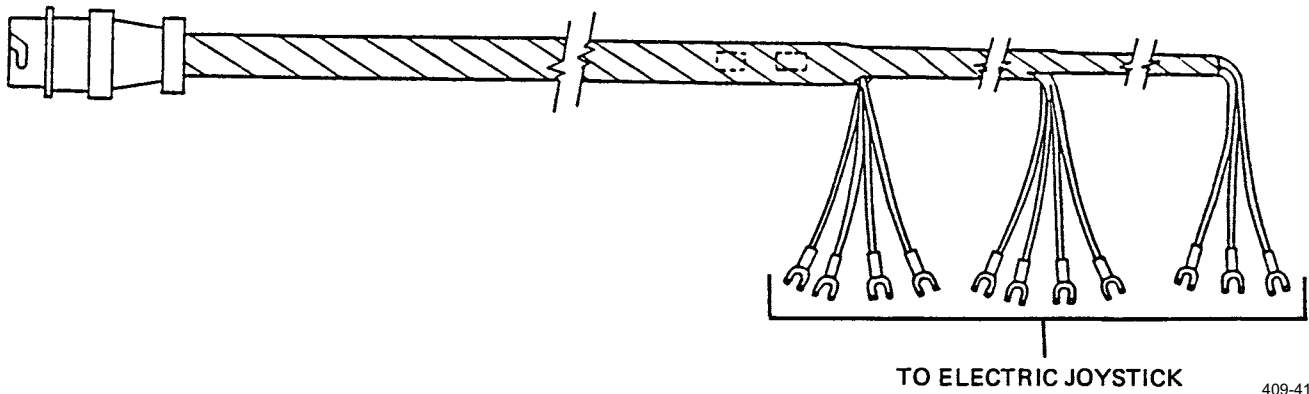
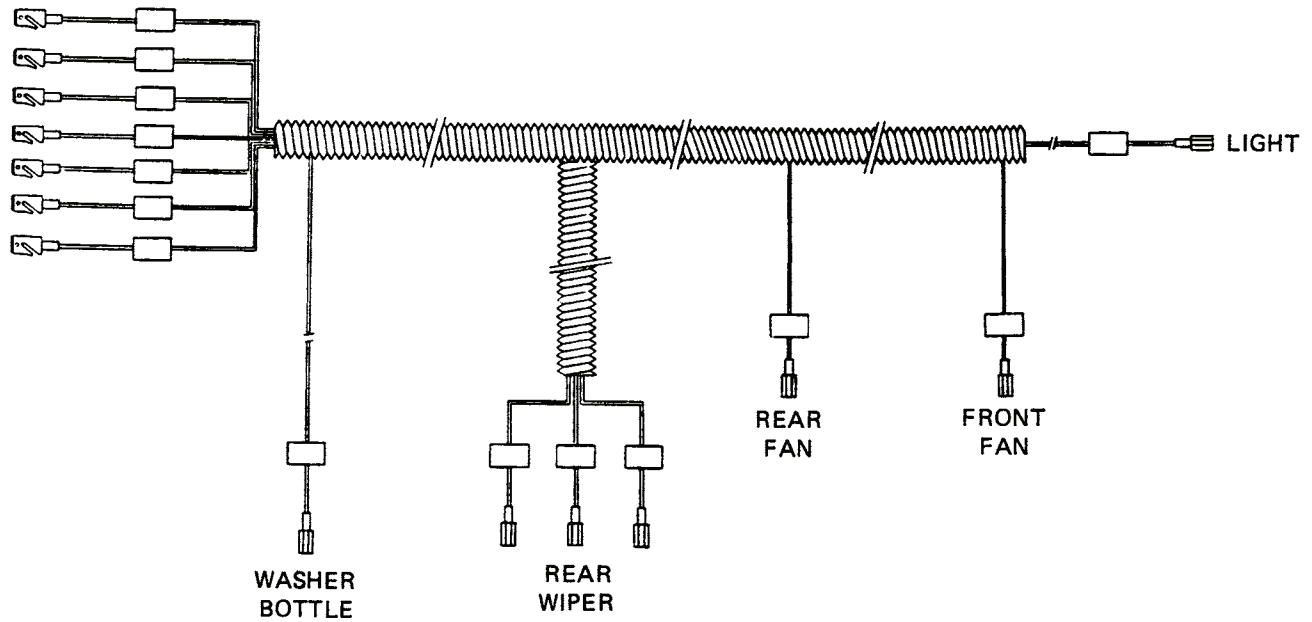


INSTALLATION - CONTINUED



409-415

INSTALLATION - CONTINUED



409-416

END OF WORK PACKAGE

MAIN WIRING HARNESS MAINTENANCE**0110 00****THIS WORK PACKAGE COVERS**

Testing, Repair, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Strap, tie down (Item 56, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Tape, electrical (Item 58, WP 0323 00)

References

WP 0326 00

Equipment Condition

Battery cables disconnected (WP 0107 00)

TESTING**NOTE**

Failure of an electrical device to function is more likely due to a switch (actuator) or to a device itself, than to a broken wire in wiring harness. Do not assume that a broken wire exists until related electrical device and actuator have been checked.

1. Inspect wires for poor connections at terminals, cuts or other defects.
2. Check continuity of wires to determine if hidden breaks exist.
3. Use electrical schematic to trace path of wire.

NOTE

A zero reading indicates a broken wire.

4. Connect ohmmeter leads to each end of wire.
5. Disconnect suspected wire and an adjacent wire. At one end of wires, connect the two wire terminals together. At the other end of the wires, connect ohmmeter leads to terminals of these two wires at other ends.

REPAIR**NOTE**

If three or more wires in a wiring harness have been repaired or replaced, replace complete harness.

1. Replace any broken terminal rings or connectors.
2. Disconnect faulty wire at both ends.
3. Cut insulation back approximately 4 in. (102 mm).
4. Cut replacement wire to required length and install proper terminals.
5. Route replacement wire along wiring harness, securing wire with tie down straps or electrical tape.
6. Connect replacement wire to original connection points.
7. Test circuit function.

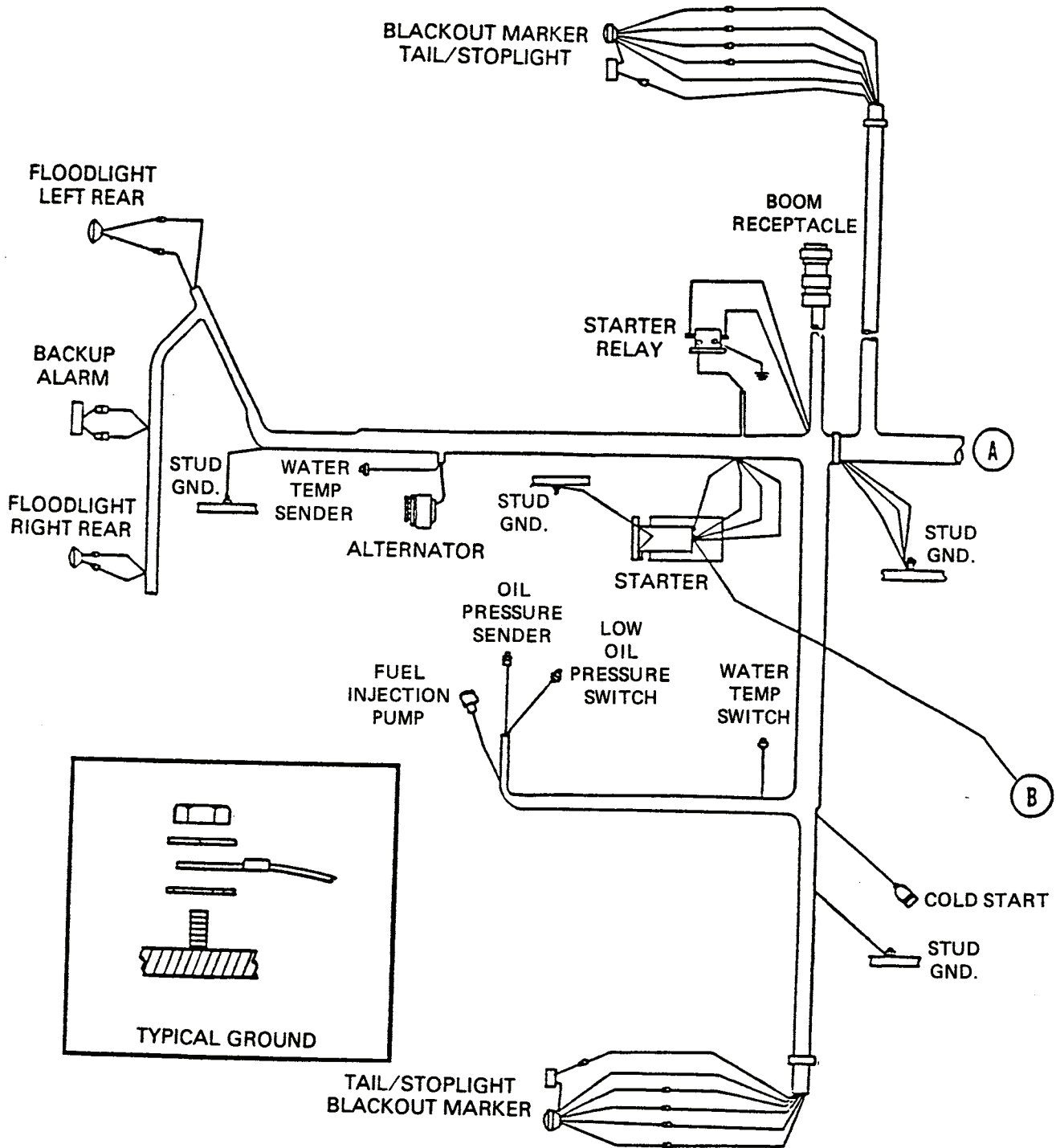
REMOVAL**NOTE**

- If an individual wire in a wiring harness is broken, it is not necessary to replace entire wiring harness. Refer to *Repair*.
 - Tag all electrical connections before removing for use during installation.
1. Note connection points of all terminal rings and single connectors on wiring harness. Disconnect terminal rings and single connectors.
 2. Disconnect three plug-type connectors.
 3. Remove all clamps that secure wiring harness to frame or boom structure.

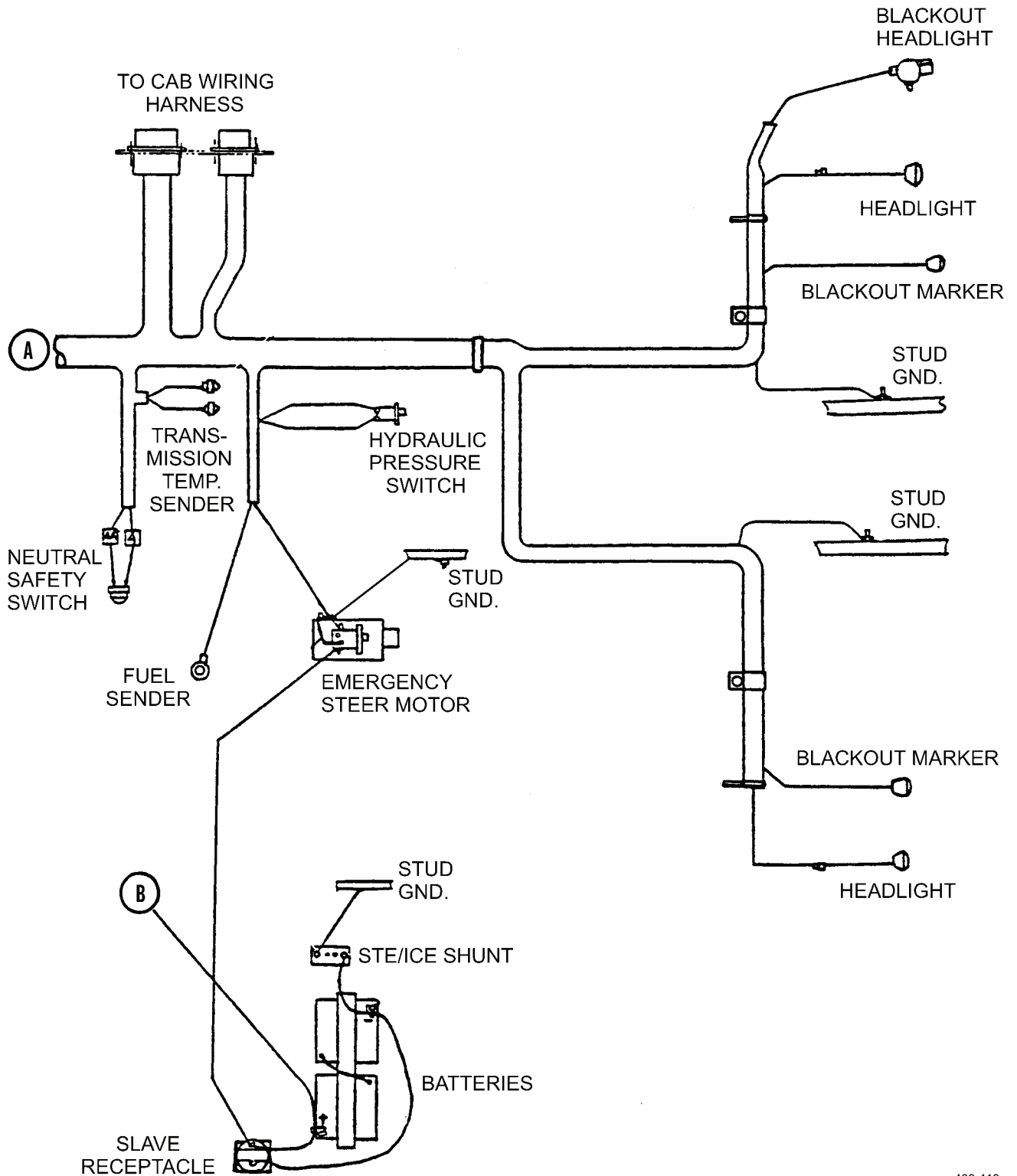
INSTALLATION

1. Route new wiring harness in same path as old wiring harness.
2. Install cable clamps in original locations.
3. Connect three plug-type connectors.
4. Connect individual terminal rings and single connectors according to notes taken during removal. Refer to *Schematic Diagram* (WP 0326 00) for wire numbers and connection points.
5. Connect battery cables (WP 0107 00).
6. Test all circuits to confirm proper installation of wiring harness.

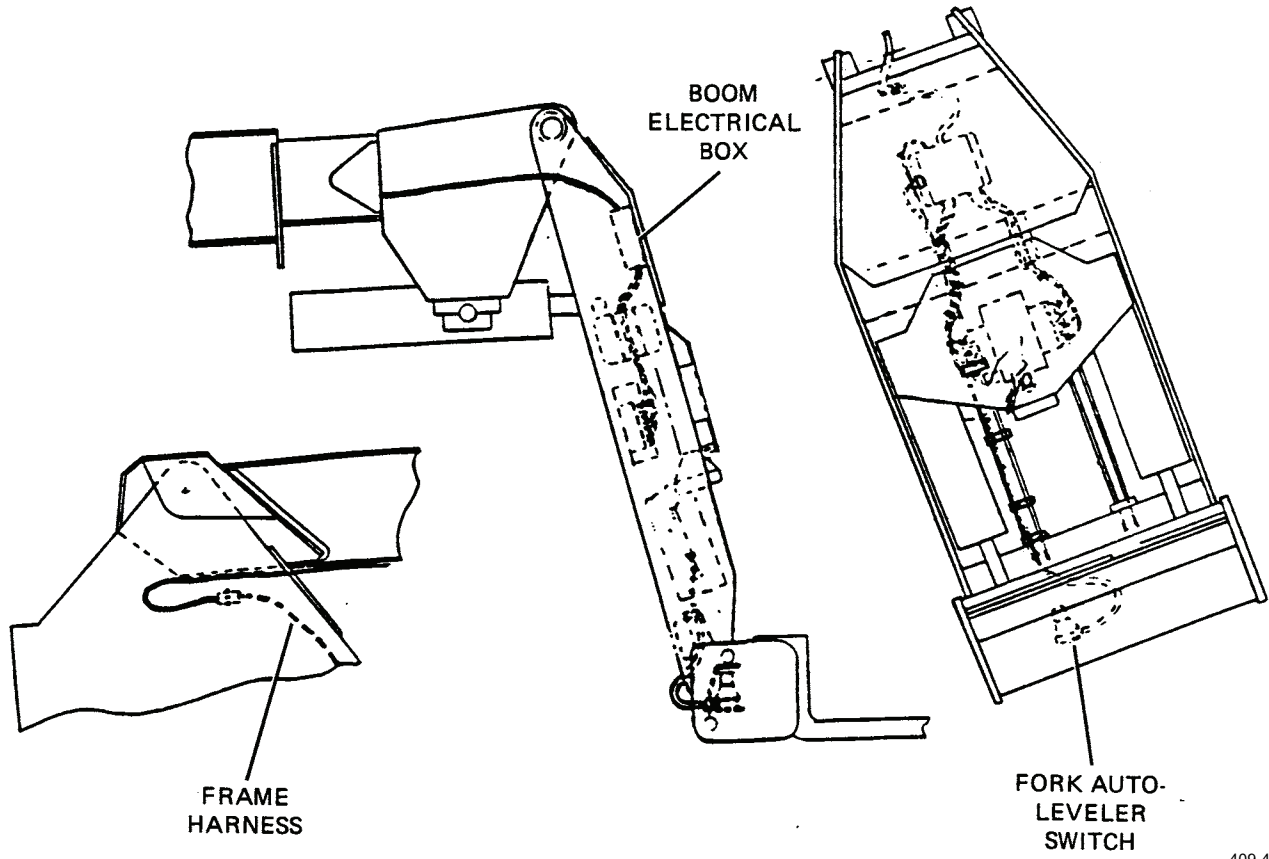
INSTALLATION - CONTINUED



INSTALLATION - CONTINUED



INSTALLATION - CONTINUED



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END OF WORK PACKAGE

BOOM ELECTRICAL CABLE MAINTENANCE

0111 00

THIS WORK PACKAGE COVERS

Testing, Repair

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Personnel Required

Two

Materials/Parts

Strap, tie down (Item 56, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)
 Tape, electrical (Item 58, WP 0323 00)
 Rope, 25 ft

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)
 Load backrest removed from MLRS attachment, if stored (TM 10-3930-660-10)

TESTING

NOTE

Failure of an electrical device to function is more likely due to a faulty switch (actuator) or to a faulty device itself, than to a broken wire in wiring harness. Do not assume that a broken wire exists until related electrical device and actuator have been checked.

1. Inspect wires for poor connections at terminals, cuts or other defects.
2. Check continuity of suspected wires to determine if hidden breaks exist.
3. Use electrical schematic to locate both terminals of suspected wire.

NOTE

A zero reading indicates a broken wire.

4. Connect ohmmeter leads to each end of wire.
5. Disconnect suspected wire and an adjacent wire. At one end of wires, connect the two wire terminals together. At the other end of the wires, connect ohmmeter leads to terminals of these two wires at other ends.

REPAIR**NOTE**

If three or more of the wires in a wiring harness have been repaired or replaced, replace complete harness.
Three spare wires are included in wiring harness to be used if required.

1. Replace any broken terminal rings or connectors.
2. Disconnect faulty wire at both ends.
3. Cut insulation back approximately 4 in. (102 mm).
4. Cut replacement wire to required length and install proper terminals.
5. Route replacement wire along wiring harness, securing wire with tie down straps or electrical tape.
6. Connect replacement wire to original connection points.
7. Test circuit function.

END OF WORK PACKAGE

STE/ICE-R WIRING HARNESS MAINTENANCE

0112 00

THIS WORK PACKAGE COVERS

Testing, Repair, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Strap, tie down (Item 56, WP 0323 00)

Materials/Parts - Continued

Tag, marker (Item 57, WP 0323 00)

Tape, electrical (Item 58, WP 0323 00)

Lockwasher (4 and 8)

Equipment Condition

Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

TESTING

1. Inspect wires for poor connections, cuts or other defects.
2. Check continuity of wires.
3. Connect ohmmeter leads to each end of wire.
4. A zero reading indicates a broken wire.

REPAIR**NOTE**

If three or more of the wires in a wiring harness have been repaired or replaced, replace complete harness.

1. Replace individual terminal rings and connectors if contact is broken.
2. Disconnect faulty wire at both ends.
3. Cut insulation back approximately 4 in. (102 mm).
4. Cut replacement wire to required length and install proper terminals.
5. Route replacement wire along wiring harness, securing wire with tie straps or electrical tape.
6. Connect replacement wire to original connection points.
7. Test circuit function.

REMOVAL**NOTE**

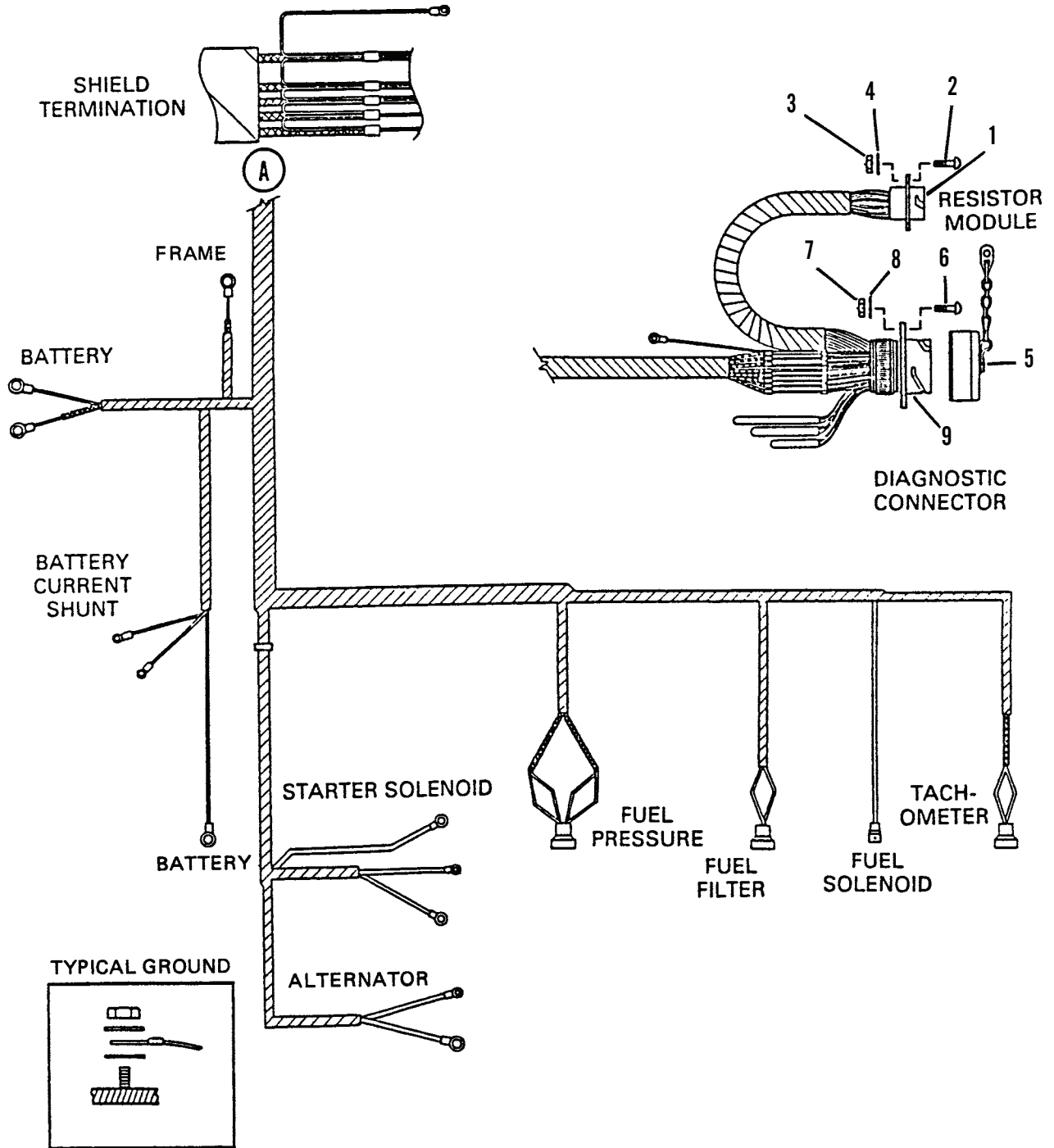
If an individual wire is broken, it is not necessary to replace entire wiring harness. Refer to *Repair*.

1. Note connection points of all terminal rings and single connectors on wiring harness.
2. Disconnect terminal rings and single connectors.
3. Disconnect plug-type connector (1) from resistor module. Remove four screws (2), nuts (3) and lockwashers (4) to detach connector (1). Discard lockwashers.
4. Remove cap (5).
5. Remove four screws (6), nuts (7) and lockwashers (8) to detach diagnostic connector (9). Discard lockwashers.
6. Disconnect plugs from fuel pressure, fuel filter, fuel solenoid and tachometer jacks.
7. Remove 12 tie down straps, as required, that secure wiring harness. Remove wiring harness. Discard tie down straps.

INSTALLATION

1. Route new wiring harness in same path as old wiring harness.
2. Install new tie down straps, as required, in original locations.
3. Connect fuel pressure, fuel filter, fuel solenoid and tachometer connectors.
4. Attach diagnostic connector (9) using four screws (6), nuts (7) and new lockwashers (8). Install cap (5).
5. Attach plug-type connector (1) using four screws (2), nuts (3) and new lockwashers (4).
6. Connect individual terminal rings and single connectors according to notes taken during removal.
7. Connect battery cables (WP 0107 00).
8. Test all circuits to ensure proper connection of wiring harness.

INSTALLATION - CONTINUED



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END OF WORK PACKAGE

SLAVE RECEPTACLE REPLACEMENT

0113 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Lockwasher (9)

Starwasher (6)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

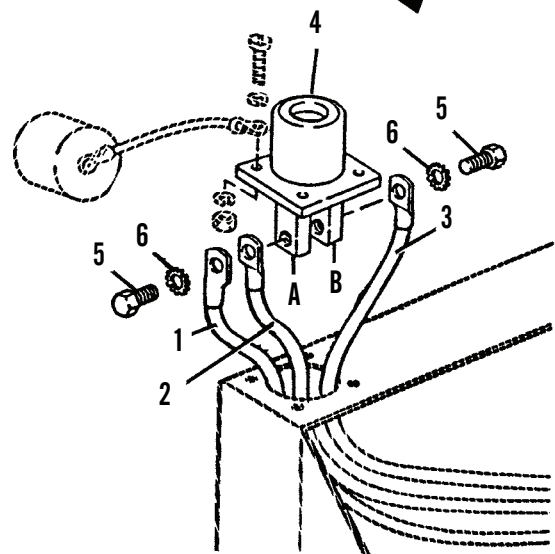
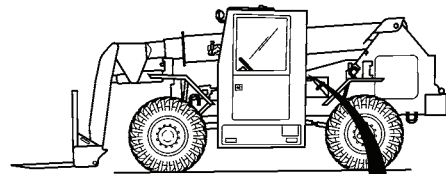
Left-hand battery removed (WP 0106 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. To remove electrical cables (1 thru 3) from slave receptacle (4), remove capscrew (5) and starwasher (6), securing electrical cables (1 and 2) to positive terminal (A) of slave receptacle (4).
2. Remove electrical cables (1 and 2). Discard starwasher.
3. Remove capscrew (5) and starwasher (6), securing electrical cable (3) to negative terminal (B) of slave receptacle (4). Remove electrical cable (3). Discard starwasher.

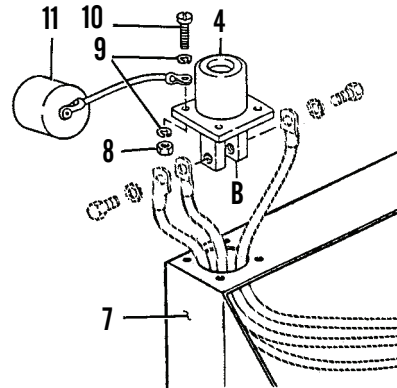


409-440

REMOVAL - CONTINUED**NOTE**

Note orientation of slave receptacle on battery box for use during installation.

4. Remove four nuts (8), eight lockwashers (9) and four screws (10) securing slave receptacle (4) and cap (11) to battery box (7). Discard lockwashers.
5. Remove slave receptacle (4) and cap (11) from battery box (7).

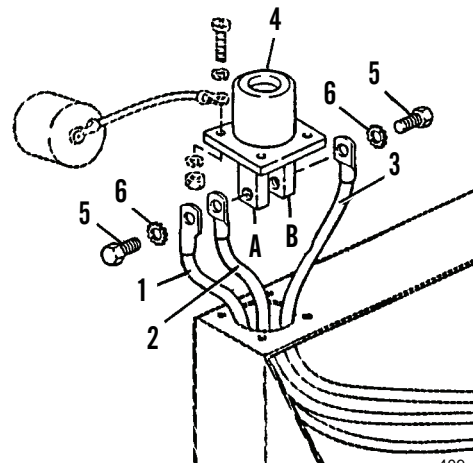


409-441

INSTALLATION**NOTE**

When positioning slave receptacle on battery box, be sure negative terminal B is facing toward center of vehicle.

1. Position slave receptacle (4) on battery box (7).
2. Secure slave receptacle (4) and cap (11) to battery box (7) with four screws (10), eight new lockwashers (9) and four nuts (8).
3. Position electrical cable (3) on negative terminal (B) of slave receptacle (4). Secure electrical cable (3) to negative terminal (B) with one new starwasher (6) and one capscrew (5).
4. Position electrical cables (2 and 1) on positive terminal (A) of slave receptacle (4). Secure electrical cables (2 and 1) to positive terminal (A) with one new starwasher (6) and one capscrew (5).



409-442

5. Install left-hand battery (WP 0106 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Grease, GAA (Item 20, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Cotter pins (5, 13 and 34)

Materials/Parts - Continued

Locknut (8 and 24)

Lockwasher (20, 27 and 30)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

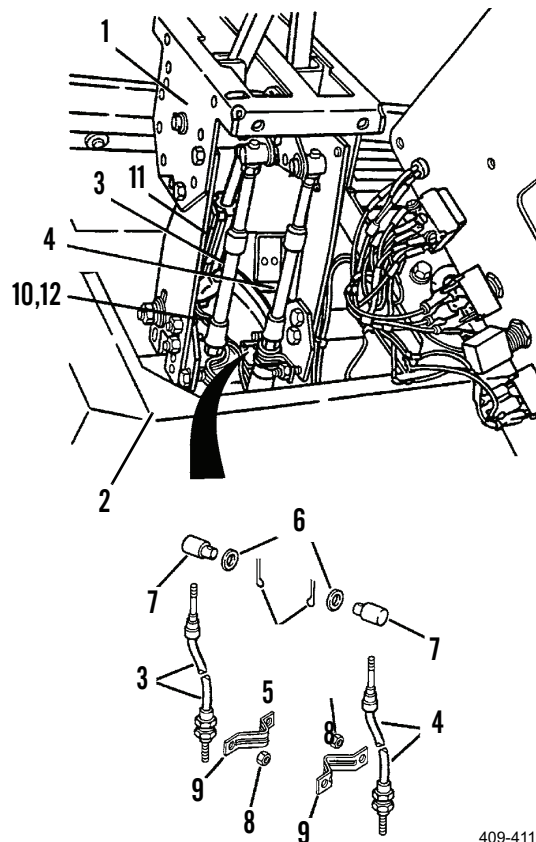
Left-hand instrument panel separated from front console and shifter (WP 0067 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

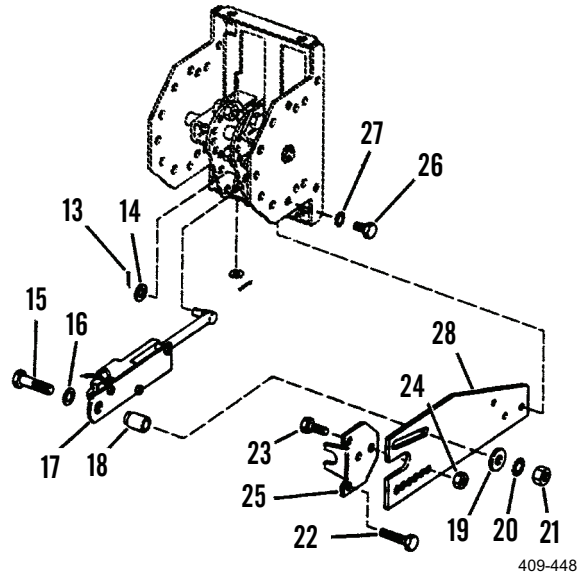
1. To lift transmission shifter (1) out of front console (2), remove transmission cable assemblies (3 and 4) from shifter (1).
2. Remove cotter pins (5) and washers (6) securing universal swivels (7) of cable assemblies (3 and 4) to shifter (1). Discard cotter pins.
3. Remove locknuts (8) and clamps (9) securing cable assemblies (3 and 4) to shifter (1). Discard locknuts.
4. Remove cable assemblies (3 and 4) from shifter (1).
5. Disconnect two electrical leads (10) of back-up alarm switch (11) from vehicle wiring harness (12).
6. Raise and remove shifter (1) from front console (2).



409-4119

REMOVAL - CONTINUED

7. Remove cotter pin (13) and washer (14). Discard cotter pin.
8. Remove capscrew (15), washer (16), back-up alarm switch (17), spacer (18), washer (19), lockwasher (20) and nut (21). Discard lockwasher.
9. Remove two capscrews (22), two capscrews (23), two locknuts (24) and bracket (25). Discard locknuts.
10. Repeat step 9 for other side of shifter.
11. Remove two capscrews (26), two lockwashers (27) and bracket (28). Discard lockwashers.
12. Remove two capscrews (29), two lockwashers (30) and bracket (31). Discard lockwashers.
13. Remove two pins (32), two washers (33) and two cotter pins (34). Discard cotter pins.
14. Remove two levers (35), two springs (36), two disks (37) and two bearings (38).
15. Remove knobs (39) from levers (35).
16. Remove four capscrews (40), four retainers (41) and plate (42).



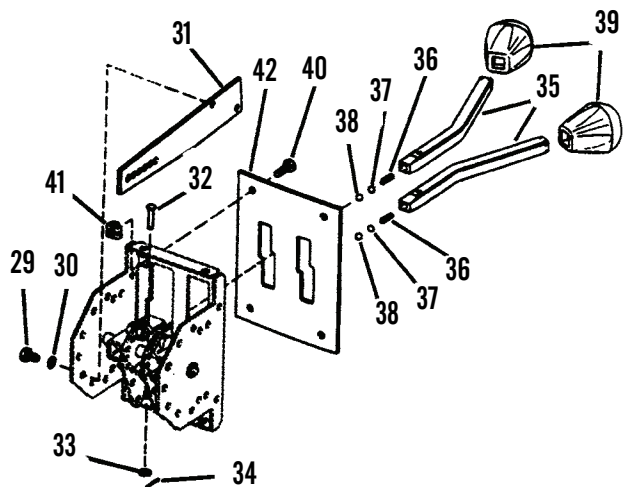
INSTALLATION

1. Secure plate (42) with four capscrews (40) and four retainers (41).
2. Install knobs (39) to levers (35).

NOTE

Apply grease to items as installed.

3. Install two bearings (38), two disks (37), two springs (36) and two levers (35). Secure with two pins (32), two washers (33) and two new cotter pins (34).
4. Secure bracket (31) with two capscrews (29) and two new lockwashers (30).
5. Secure bracket (28) with two capscrews (26) and two new lockwashers (27).
6. Secure bracket (25) with two capscrews (23) and two new locknuts (24). Install two capscrews (22).
7. Repeat step 6 for other side of shifter.
8. Position back-up alarm switch (17) on shifter. Secure with capscrew (15), washer (16), spacer (18), washer (19), new lockwasher (20) and nut (21).
9. Install washer (14) and new cotter pin (13).



INSTALLATION - CONTINUED

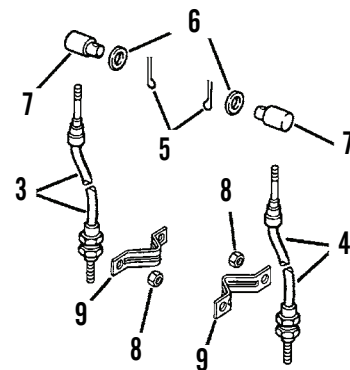
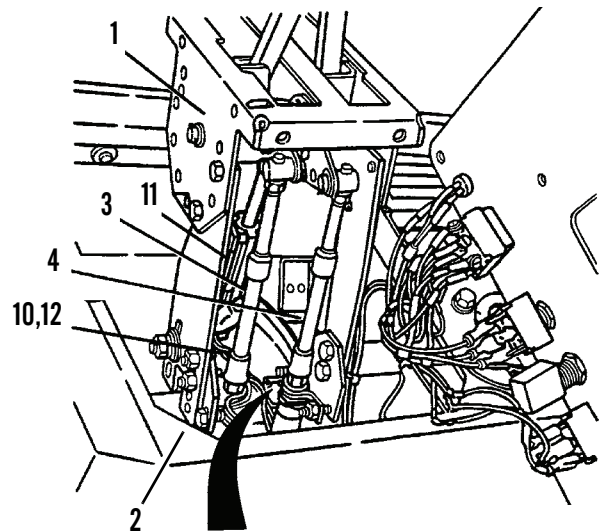
10. Support and position shifter (1) over front console (2).
11. Connect two electrical leads (10) of back-up alarm switch (11) to vehicle wiring harness (12) as tagged in Removal.
12. Position transmission cable assemblies (3 and 4) on shifter (1) under clamps (9) as tagged in Removal.
13. Secure cable assemblies (3 and 4) to shifter (1) with clamps (9) and new locknuts (8).
14. Position universal swivels (7) of cable assemblies (3 and 4) on shifter (1) and secure with washers (6) and new cotter pins (5).
15. Install left-hand instrument panel and transmission shifter to front console (WP 0067 00).

ADJUSTMENT

NOTE

Shifter adjustment procedures for the travel select cable assembly and the range select cable assembly are essentially similar. Adjustment shown below.

1. Remove left-hand instrument panel and transmission shifter from front console (WP 0067 00).
2. Remove cotter pin (5) and washer (6) from universal swivel (7) of cable assembly (3). Remove universal swivel from shifter (1). Discard cotter pin.
3. Loosen jamnut (43) and turn universal swivel (7) in or out as required for proper adjustment. Tighten jamnut.
4. Position universal swivel (7) of cable assembly (3) on shifter (1) and secure with washer (6) and new cotter pin (5).
5. Verify that shifter (1) operates properly (TM 10-3930-660-10). Readjust cable assembly (3), if necessary.



409-4119

6. Install left-hand instrument panel and transmission shifter to front console (WP 0067 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Cotter pin (4)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Left-hand instrument panel removed from front console (WP 0067 00)

Transmission shifter disconnected (WP 0114 00)

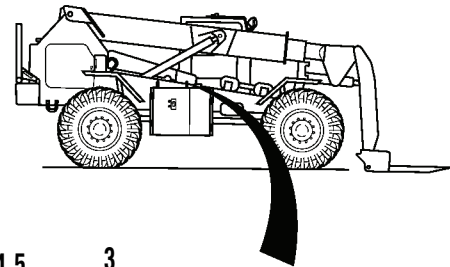
Transmission cover removed (WP 0150 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

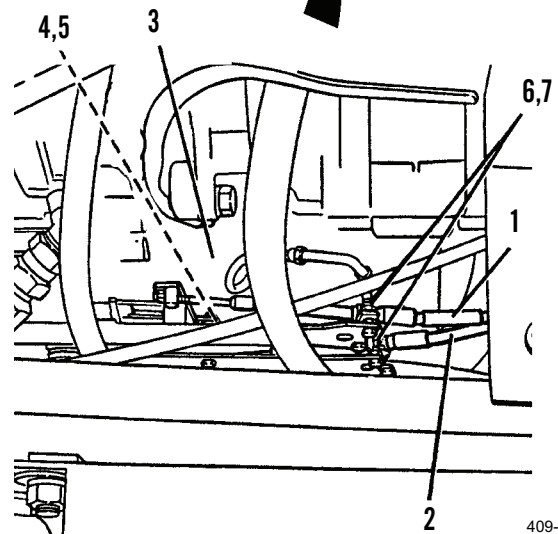
1. To remove transmission cable assemblies (1 and 2) from transmission (3), disconnect cotter pin (4) and washer (5) from end of each cable assembly (1) and (2) at transmission (3). Discard cotter pin.
2. Remove nuts (6) and clamps (7) securing each cable assembly (1 and 2) to transmission (3). Remove cable assemblies (1 and 2).



NOTE

Note routing of cable assemblies through vehicle cab and frame for use during installation.

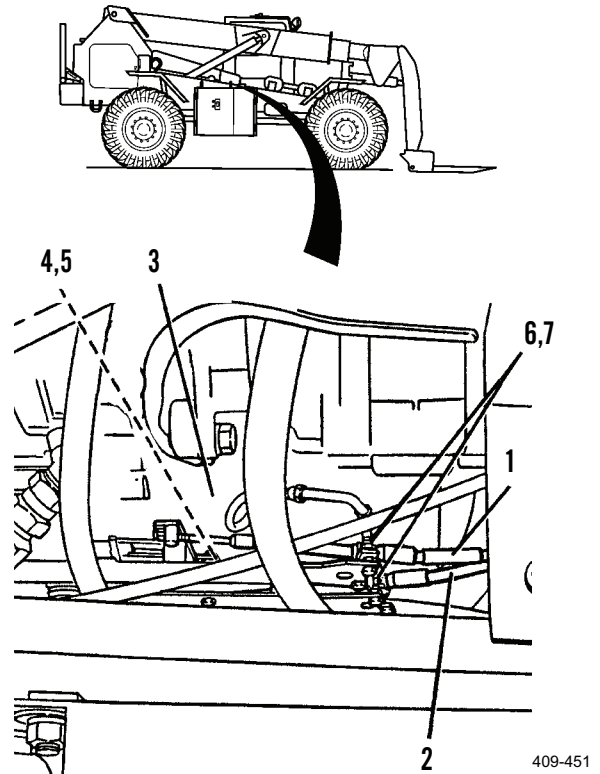
3. Remove cable assemblies (1 and 2) from cab and frame of vehicle.



409-451

INSTALLATION

1. Install cable assemblies (1 and 2) to cab and frame of vehicle as noted during *Removal*.
2. Position cable assemblies (1 and 2) on transmission (3) as tagged and secure each cable assembly with clamps (7) and nuts (6).
3. Position ends of cable assemblies (1 and 2) on transmission (3) and secure each cable assembly with washer (5) and new cotter pin (4).
4. Install transmission shifter. Verify that shifter positions correspond with transmission ranges and adjust cable assemblies at shifter if required (WP 0114 00).



5. Install transmission cover (WP 0150 00).
6. Install left-hand instrument panel to front console (WP 0067 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment of Transmission Disconnect Pedal Linkage, Adjustment of Transmission Disconnect Setting, Adjustment of Brake Pedal Linkage

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Cotter pin (17 and 18)

Materials/Parts - Continued

Gasket kit

Lockwasher (7, 9 and 21)

Equipment Condition

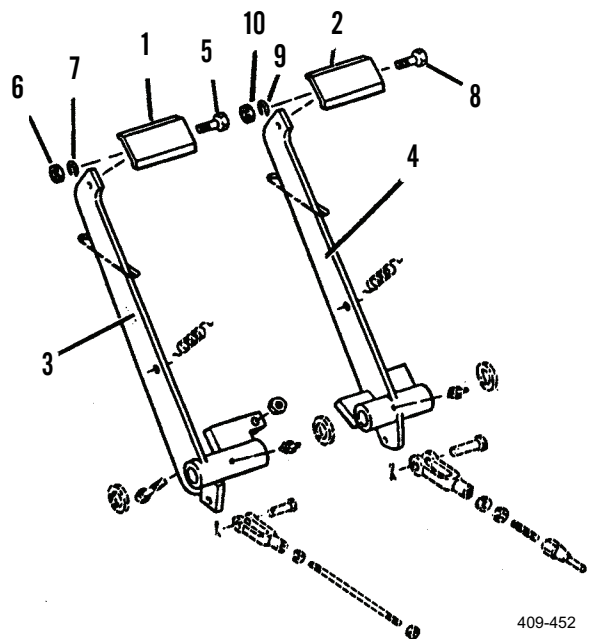
Vehicle parked on level ground (TM 10-3930-660-10)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. To remove pads (1 and 2) from pedal arms (3 and 4), remove capscrew (5), nut (6) and lockwasher (7) securing pad (1) to pedal arm (3). Discard lockwasher.
2. Remove capscrew (8), lockwasher (9) and nut (10) securing pad (2) to pedal arm (4). Discard lockwasher.



409-452

REMOVAL - CONTINUED

3. Remove return springs (11 and 12), from pedal arms (3 and 4).

CAUTION

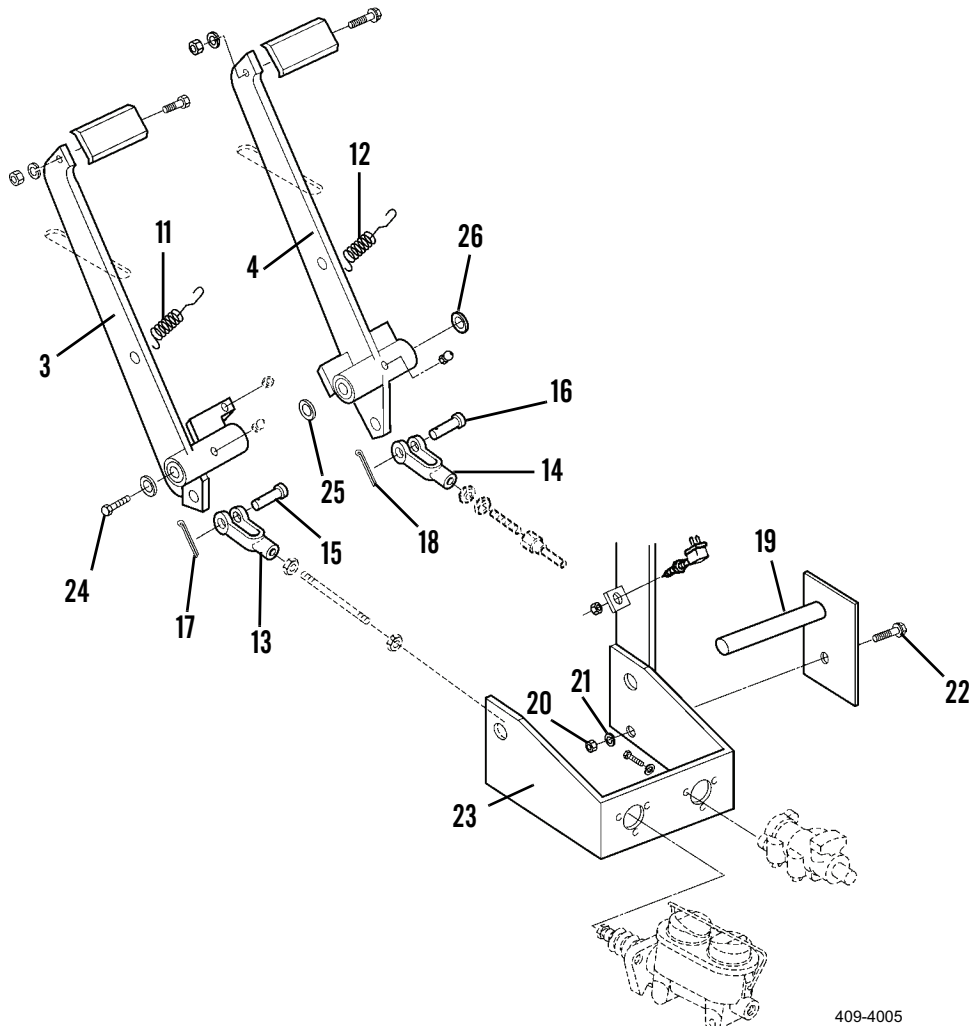
Be careful that clevis and attached pedal linkages do not drop when clevis pins are removed.

4. Remove and discard cotter pins (17 and 18). Remove clevis pins (15 and 16) securing clevis (13 and 14) to pedal arms (3 and 4).

CAUTION

To prevent possible damage, do not allow pedal arms to drop when shaft is removed.

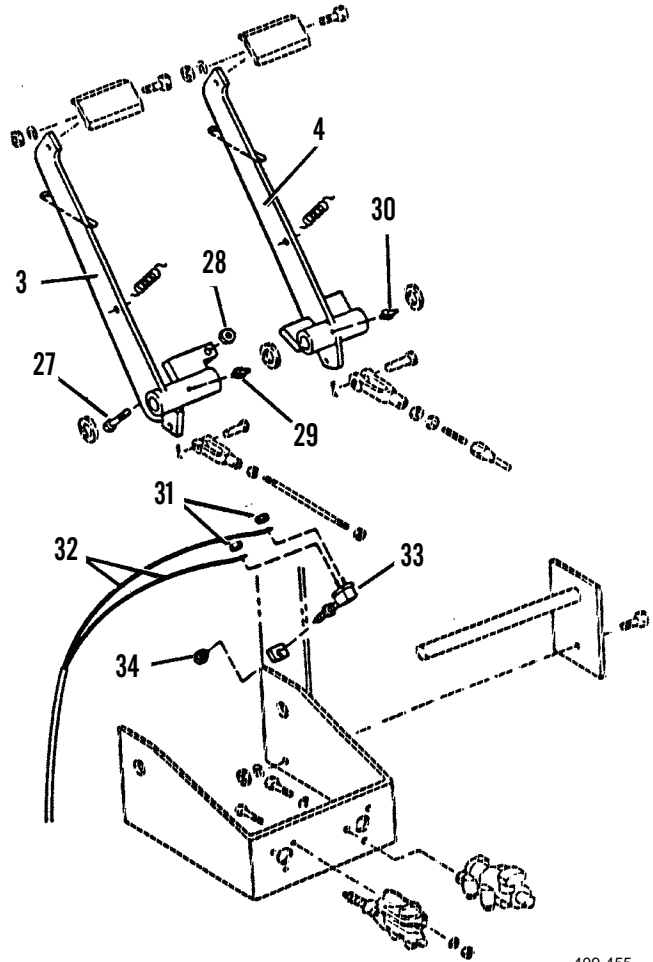
5. Remove nut (20), lockwasher (21) and capscrew (22) securing shaft (19) to bracket (23). Discard lockwasher.
6. Slowly slide shaft (19) toward center of vehicle and remove washer (24), pedal arm (3) and washer (25) from shaft (19).
7. Continue sliding shaft (19) toward center of vehicle and remove pedal arm (4) and washer (26) from shaft (19).
8. Pull shaft (19) through hole on right-hand side of bracket (23).



409-4005

REMOVAL - CONTINUED

9. Remove capscrew (27), nut (28) and lubrication fitting (29) from pedal arm (3).
10. Remove lubrication fitting (30) from pedal arm (4).
11. Remove two nuts (31), securing two electrical leads (32) to brake light switch (33). Remove nut (34) and brake light switch (33) from vehicle.



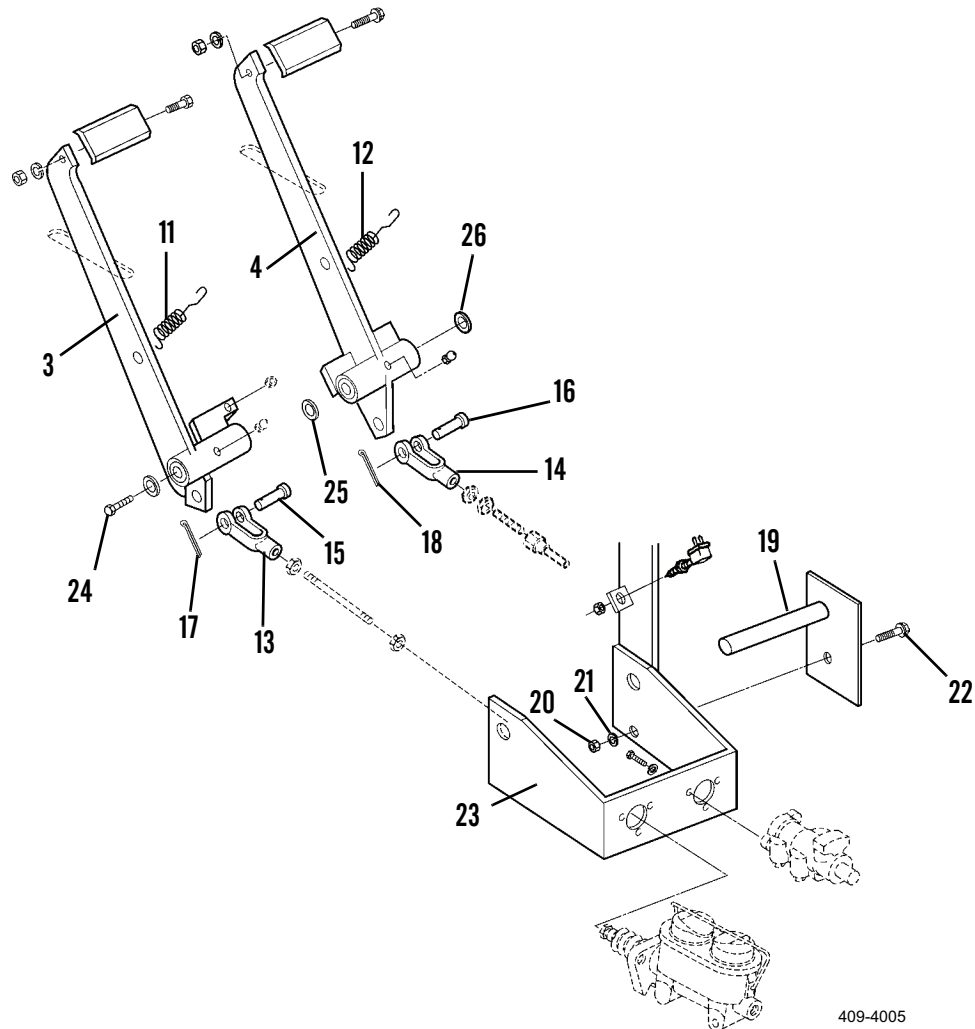
409-455

INSTALLATION

1. Position brake light switch (33) on vehicle and secure with nut (34). Position two electrical leads (32) on brake light switch (33) as tagged and secure with two nuts (31).
2. Install lubrication fitting (30) to pedal arm (4).
3. Install capscrew (27), nut (28) and lubrication fitting (29) to pedal arm (3).

INSTALLATION - CONTINUED

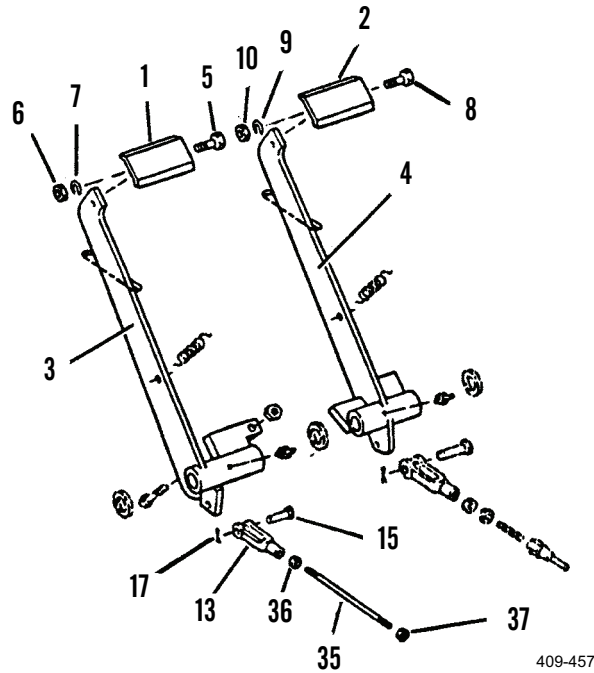
4. Position shaft (19) through hole on right-hand side of bracket (23).
5. Install pedal arms (3 and 4) on shaft (19).
6. Slowly slide shaft (19) through bracket (23) and position washer (26) and pedal arm (4) on shaft (19).
7. Continue sliding shaft (19) through bracket (23) and position washer (25), pedal arm (3) and washer (24) on shaft (19).
8. Position shaft (19) into hole on left-hand side of bracket (23) and secure with nut (20), new lockwasher (21) and bolt (22).
9. Install clevis pins (15 and 16) to secure pedal arms (3 and 4) to clevis (13 and 14). Install new cotter pins (17 and 18).
10. Install return springs (11 and 12) to pedal arms (3 and 4).
11. Position pad (1) on pedal arm (3) and secure with capscrew (5), new lockwasher (7) and nut (6).
12. Position pad (2) on pedal arm (4) and secure with capscrew (8), new lockwasher (9) and nut (10).



409-4005

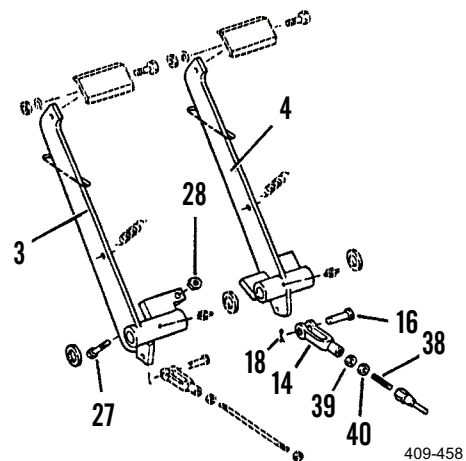
ADJUSTMENT OF TRANSMISSION DISCONNECT PEDAL LINKAGE

1. Remove cotter pin (17) and clevis pin (15) securing clevis (13) to pedal arm (3). Discard cotter pin.
2. Loosen jamnuts (36 and 37) on pushrod (35).
3. Rotate pushrod pin (35) and/or clevis (13) in or out as required until clevis pin (15) fits freely through holes on clevis (13) and pedal arm (3).
4. Secure clevis (13) to pedal arm (3) with clevis pin (15) and new cotter pin (17).
5. Tighten jamnuts (36 and 37).



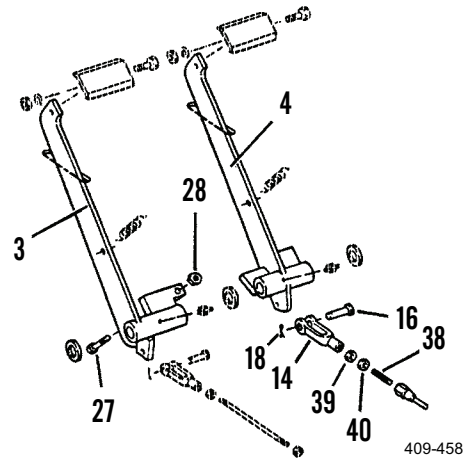
ADJUSTMENT OF TRANSMISSION DISCONNECT SETTING

1. With pedal arm (3) and pedal arm (4) in full up position, check for a 0.06 in. (1.52 mm) gap between head of capscrew (27) and pedal arm (3).
2. If necessary, loosen nut (28) and adjust screw (27) until proper gap is achieved. Tighten nut (28) after making adjustment.



ADJUSTMENT OF BRAKE PEDAL LINKAGE

1. Remove cotter pin (18) and clevis pin (16) securing clevis (14) to pedal arm (4). Discard cotter pin.
2. Loosen jamnuts (39 and 40) on pushrod pin (38).
3. Rotate pushrod pin (38) and/or clevis (14) in or out, as required, until clevis pin (16) fits freely through holes on clevis (14) and pedal arm (4).
4. Secure clevis (14) to pedal arm (4) with clevis pin (16) and new cotter pin (18).



5. Tighten jamnuts (39 and 40).

END OF WORK PACKAGE

TRANSMISSION DISCONNECT MASTER CYLINDER ASSEMBLY REPLACEMENT

0117 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Cotter pin (4)

Materials/Parts - Continued

Lockwasher (9)

Equipment Condition

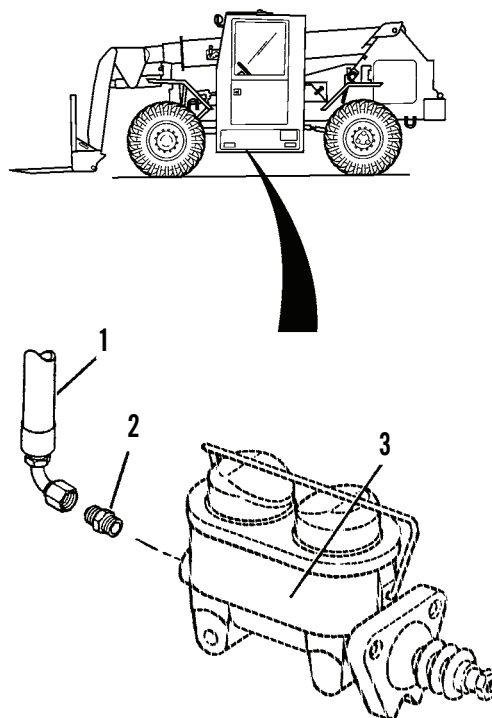
Vehicle parked on level ground (TM 10-3930-660-10)

NOTE

The transmission disconnect master cylinder is located under the cab.

REMOVAL

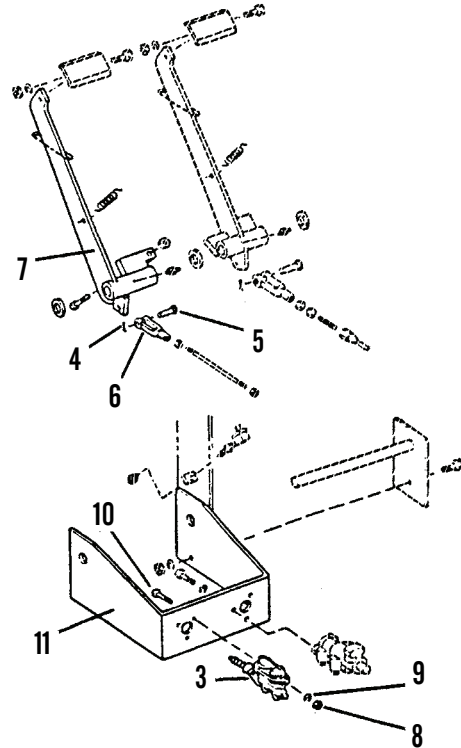
1. Disconnect hydraulic hose (1) and adapter (2) from transmission disconnect master cylinder assembly (3). Plug open holes on master cylinder assembly and hose (1).



409-459

REMOVAL - CONTINUED

2. Remove cotter pin (4) and clevis pin (5) securing clevis (6) to pedal arm (7). Discard cotter pin.
3. Remove three nuts (8), lockwashers (9) and capscrews (10), securing master cylinder assembly (3) to bracket (11). Remove master cylinder assembly (3) from vehicle. Discard lockwashers.
4. Remove linkage from master cylinder assembly (3).
5. Loosen jamnut (12) on pushrod pin (13). Remove clevis (6) and jamnut (12) from pushrod pin (13).
6. Loosen jamnut (14) on pushrod pin (13). Remove pushrod pin (13) from master cylinder assembly (3). Remove jamnut (14) from pushrod pin (13).



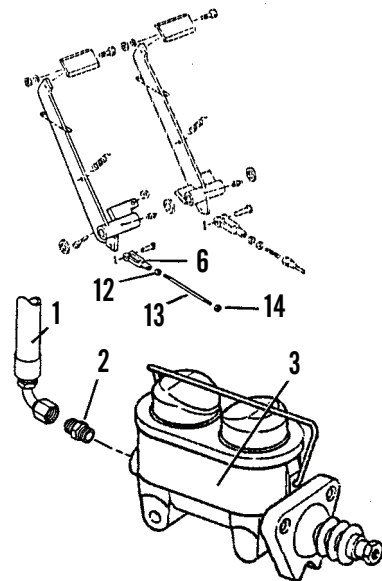
409-460

INSTALLATION

NOTE

Do not tighten parts (6, 12, 13 or 14) at this time.

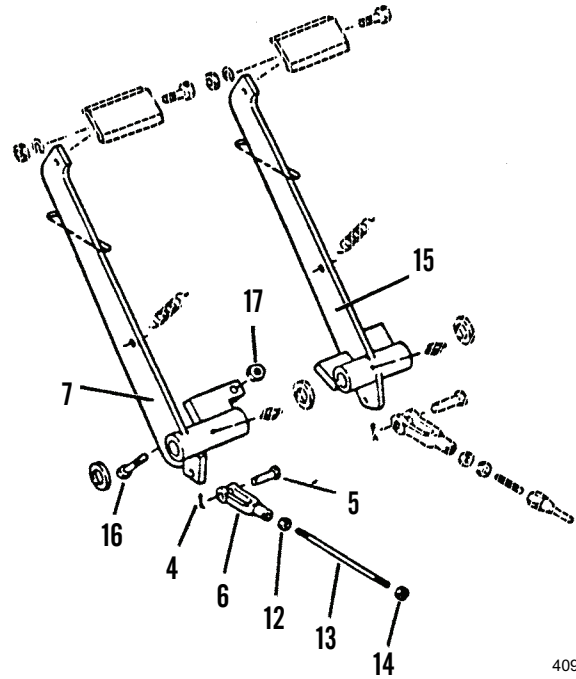
1. Install jamnut (14) on pushrod pin (13). Install pushrod pin (13) to master cylinder assembly (3).
2. Install jamnut (12) and clevis (6) on pushrod pin (13).
3. Position master cylinder assembly (3) on bracket (11) and secure with three nuts (8), three new lockwashers (9) and three capscrews (10).
4. Remove plugs from holes on hose (1) and master cylinder assembly (3). Connect hydraulic hose and adapter (2) to master cylinder assembly.
5. Check oil level of master cylinder assembly and add oil as required.



409-462

INSTALLATION - CONTINUED

6. Install clevis pin (5) and new cotter pin (4) to secure clevis (6) to pedal arm (7).
7. Rotate pushrod (13) and/or clevis (6) in or out as required until clevis pin (5) fits freely through holes on clevis (6) and pedal arm (7).
8. Secure clevis pin (5) to clevis (6) and pedal arm (7) with new cotter pin (4).
9. Tighten jamnuts (12 and 14).
10. With pedal (7) and pedal (15) in full up position, check for a 0.06 in. (1.52 mm) gap between head of cap-screw (16) and pedal arm (15), adjust if necessary.
11. If necessary, loosen nut (17) and turn capscrew (16) until proper gap is achieved. Tighten nut (17) after making adjustment.



409-464

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Servicing by Draining and Filling Transmission with Oil, Testing of Transmission Hydraulics

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)
- Simplified Test Equipment for Internal Combustion Engines - Reprogrammable (STE/ICE-R) Item 23, WP 0324 00)

Materials/Parts

- Oil, lubricating (Item 33, WP 0323 00)
- Gasket (4)

References

- WP 0008 00
- WP 0120 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Transmission cover removed (WP 0150 00)

SERVICE BY DRAINING AND FILLING TRANSMISSION WITH OIL

NOTE

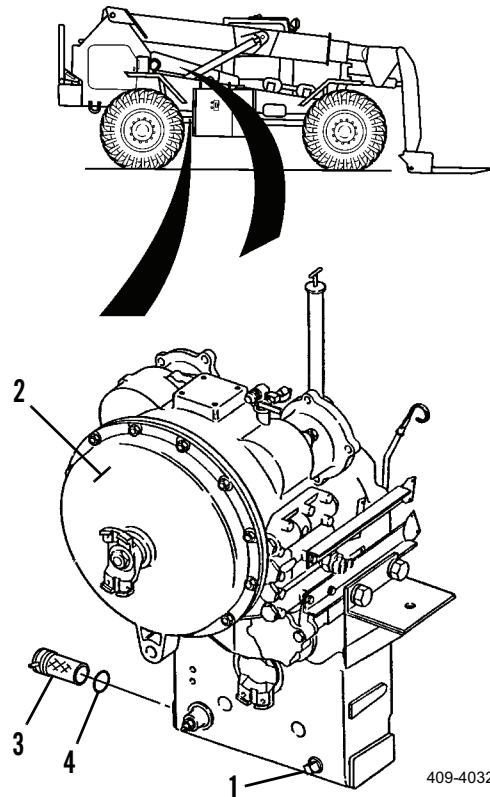
Start and run engine until transmission temperature is between 160° and 190°F (71-88°C). Stop engine.

1. Remove drain plug (1) from bottom of transmission (2) and allow transmission oil to drain into container.
2. Remove strainer (3) and gasket (4) from transmission (2). Discard gasket.

NOTE

Transmission contains approximately 5 gal. (19 L) of oil when filled.

3. Allow transmission oil to drain from transmission (2) completely. Install drain plug (1).



SERVICE BY DRAINING AND FILLING TRANSMISSION WITH OIL - CONTINUED

4. Replace transmission oil filter element (WP 0120 00).
5. Clean strainer (3). Install new gasket (4) and strainer. Securely tighten strainer.

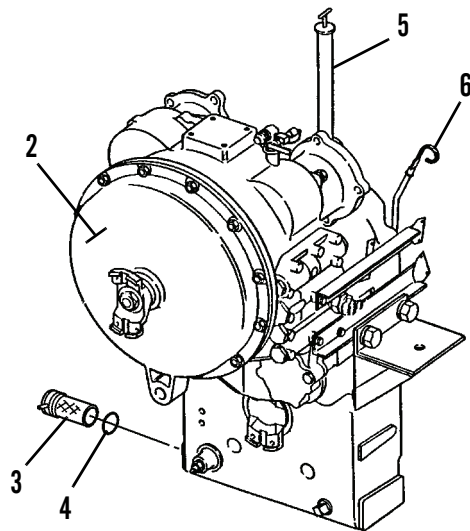
NOTE

Transmission contains approximately 5 gal. (19 L) of oil when filled.

6. Remove cap of filler tube (5) and fill transmission (2) with 4 gal. (15 L) of oil.
7. Start and run engine (TM 10-3930-660-10) at idle speed with transmission travel select lever in neutral for two full minutes to allow transmission hydraulic system to charge.

NOTE

- Full at 104°F (40°C) is the low mark (cold).
 - Full at 176°F (80°C) is the high mark (hot).
8. With engine still running at idle speed, check transmission oil level of transmission (2) with dipstick (6). If oil level is low, add additional oil until level reaches full mark on dipstick.
 9. Check for leaks at strainer (3), transmission oil filter element, drain plug and at all transmission hose connections.



409-4033

10. Stop engine (TM 10-3930-660-10).
11. Install transmission cover (WP 0150 00).

TESTING OF TRANSMISSION HYDRAULICS

Refer to *STE/ICE-R Testing* (WP 0008 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Grease, GAA (Item 20, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Materials/Parts - Continued

Lockwasher (4 and 14)

Seal (17)

Equipment Condition

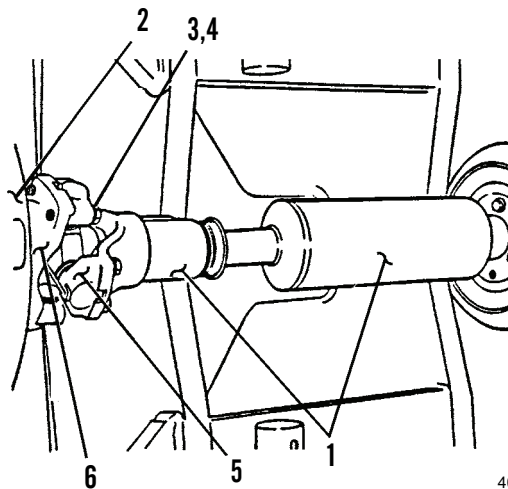
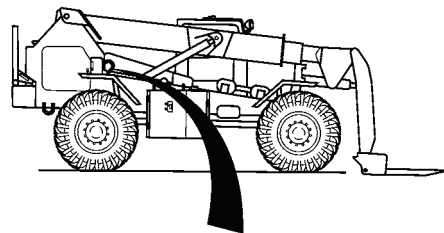
Vehicle parked on level ground (TM 10-3930-660-10)

Transmission cover removed (WP 0150 00)

Battery cables disconnected (WP 0107 00)

REMOVAL

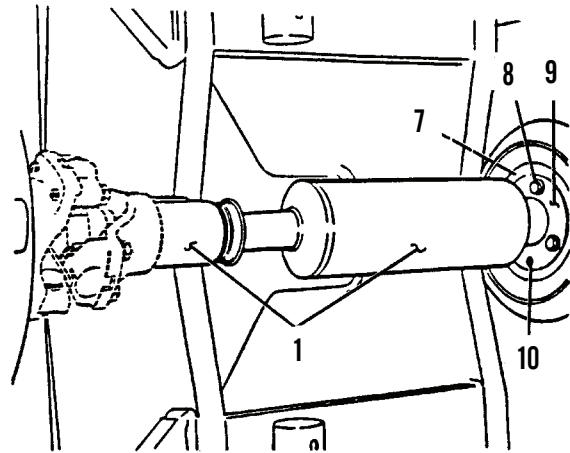
1. To remove driveshaft assembly (1) from transmission (2), remove four capscrews (3) and four lockwashers (4) securing universal joint (5) of driveshaft assembly to input yoke (6) of transmission (2). Discard lockwashers.



409-480

REMOVAL - CONTINUED

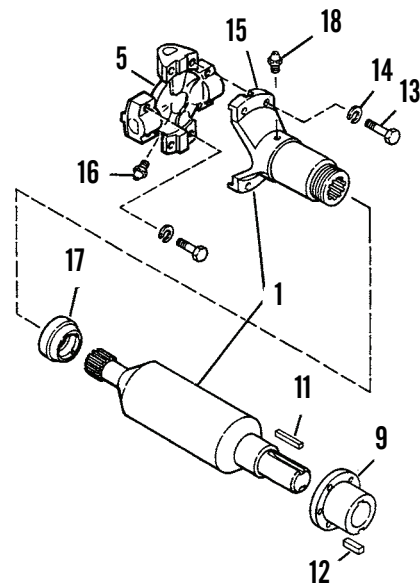
2. Remove driveshaft assembly (1) from engine dampener (7).
3. Remove three capscrews (8) from engine coupling (9).
4. Temporarily install two of the capscrews (8) removed in step 3 into two jacking holes (10) of engine coupling (9).
5. Tighten two capscrews (8) evenly until driveshaft assembly (1) and engine coupling (9) separate from engine dampener (7).
6. Remove coupling (9) and driveshaft assembly (1) from vehicle as an assembly.



409-481

DISASSEMBLY

1. Remove two capscrews (8) from jacking holes (10).
2. Tap and remove coupling (9) from driveshaft assembly (1).
3. Remove key (11) from keyway of driveshaft assembly (1).
4. If necessary, remove key (12) from coupling (9).
5. Remove four capscrews (13) and four lockwashers (14) securing universal joint (5) to yoke (15) of drive shaft assembly (1). Discard lockwashers.
6. Separate universal joint (5) from yoke (15).
7. If necessary, remove lubrication fitting (16) from universal joint (5).
8. Slide engine end of driveshaft assembly (1) out of transmission end of driveshaft assembly (1).
9. Remove seal (17) from transmission end of driveshaft assembly (1). Discard seal.
10. If necessary, remove lubrication fitting (18) from transmission end of driveshaft assembly (1).



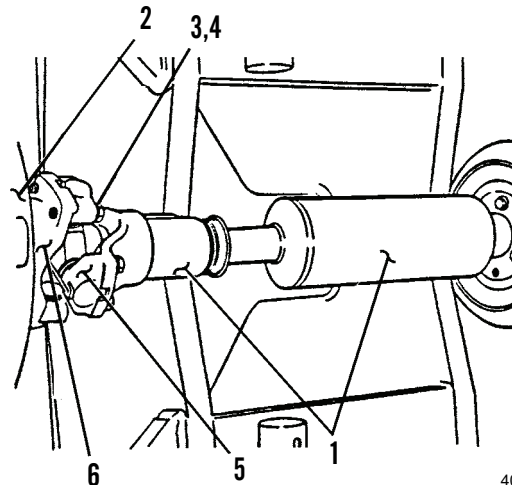
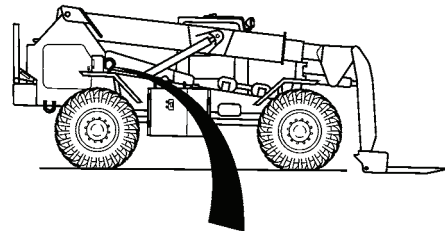
409-482

ASSEMBLY

1. If removed, install lubrication fitting (18) to transmission end of driveshaft assembly (1).
2. Position new seal (17) on engine end of driveshaft assembly (1).
3. Slide transmission end of driveshaft assembly (1) into engine end of driveshaft assembly (1).
4. Tighten new seal (17) on threads of transmission end of driveshaft assembly (1).
5. If removed, install fitting (16) to universal joint (5).
6. Align universal joint (5) with yoke (15) on transmission end of driveshaft assembly (1).
7. Apply loctite to four capscrews (13). Secure universal joint (5) to yoke (15) with four new lockwashers (14) and four capscrews (13). Torque capscrews (13) to 41 lb-ft (56 Nm).
8. Install key (11) in groove on driveshaft assembly (1).
9. Push coupling (9) on driveshaft assembly (1).
10. Install key (12) in groove on engine coupling (9).

INSTALLATION

1. Position engine coupling (9) with driveshaft assembly (1) into engine dampener (7).
2. Apply loctite to three capscrews (8) and secure coupling (9) to engine with capscrews (8). Torque capscrews to 25 lb-ft (34 Nm).
3. Apply loctite to four capscrews (3). Secure universal joint (5) of driveshaft assembly (1) to input yoke (6) of transmission (2) with four capscrews (3) and four new lockwashers (4). Torque capscrews (3) to 41 lb-ft (55 Nm).
4. Apply grease to lubrication fittings.
5. Install transmission cover (WP 0150 00).
6. Connect battery cables (WP 0107 00).
7. Start engine and check for proper operation (TM 10-3930-660-10).



409-480

END OF WORK PACKAGE

TRANSMISSION OIL FILTER HEAD ASSEMBLY REPLACEMENT

0120 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
Oil, lubricating (Item 33, WP 0323 00)
Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Transmission oil filter element (1)
Lockwasher (8)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Transmission cover removed (WP 0150 00)

CAUTION

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

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

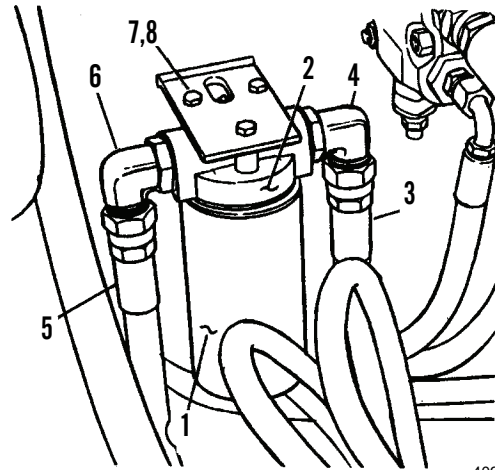
REMOVAL

1. Unscrew and remove transmission oil filter element (1) from transmission oil filter head (2). Discard transmission oil filter element.
2. Remove hose (3) and elbow (4) from filter head (2).
3. Remove hose (5) from elbow (6) from filter head (2).

NOTE

Support filter head (2) so it does not drop during hardware removal.

4. Remove three screws (7) and lockwashers (8). Discard lockwashers.
5. Remove filter head (2) from vehicle.



409-469

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on filter head and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

1. Position and support filter head (2) on vehicle. Secure filter head with three new lockwashers (8) and three screws (7).
2. Install elbow (6) and hose (5) to filter head (2).
3. Install elbow (4) and hose (3) to filter head (2).
4. Apply a thin coating of fresh oil to the seal on the new transmission oil filter element (1) and on the threads of filter head (2).
5. Screw on the new transmission oil filter element (1) until seal of new transmission oil filter element (1) contacts filter head (2).
6. Tighten new transmission oil filter element (1) one-half turn.
7. Start engine and check for leaks at filter head and at hydraulic connections (TM 10-3930-660-10).
8. Install transmission cover (WP 0150 00).

END OF WORK PACKAGE

TRANSMISSION OIL SAMPLING VALVE REPLACEMENT

0121 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

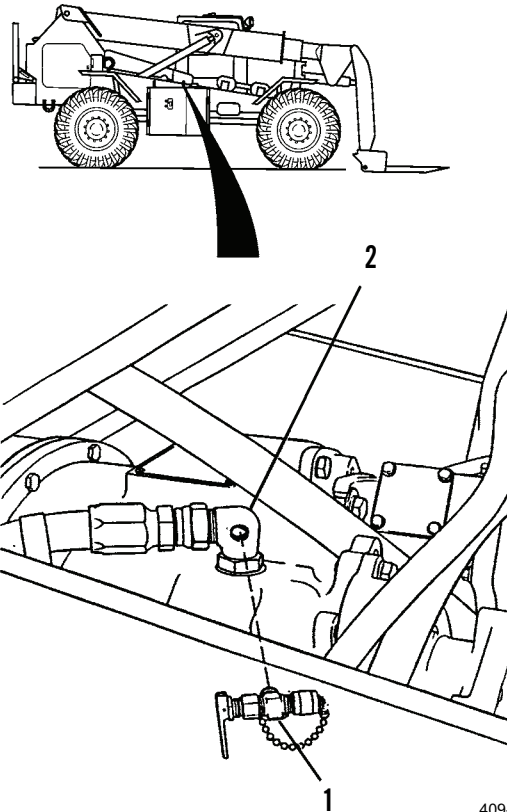
Transmission cover removed (WP 0150 00)

REMOVAL

Remove sampling valve (1) from fitting (2).

INSTALLATION

1. Apply loctite to valve threads.
2. Install valve (1) into fitting (2) with drain end of valve facing down.
3. Install transmission cover (WP 0150 00).

**END OF WORK PACKAGE**

TRANSMISSION CONTROL VALVE LINKAGE REPLACEMENT

0122 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwashers (6, 10 and 21)

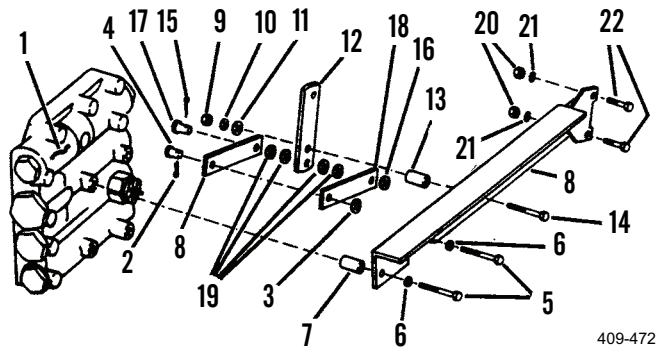
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Transmission cable assemblies removed at transmission control valve (WP 0115 00)

REMOVAL

1. To remove transmission control valve (1), remove cotter pin (2), flatwasher (3) and pin (4) from upper control valve linkage.
2. Remove two bolts (5), two lockwashers (6) and two spacers (7) securing bracket (8). Discard lockwashers.
3. Remove nut (9), lockwasher (10) and flatwasher (11). Discard lockwasher.
4. Remove rocker arm (12), spacer (13) and bolt (14).
5. Remove cotter pin (15), flatwasher (16) and pin (17).
6. Separate two links (18), four flatwashers (19) and rocker arm (12).
7. Remove two nuts (20), two lockwashers (21) and two bolts (22). Discard lockwashers.
8. Repeat steps 1 thru 7 for lower control valve linkage parts.

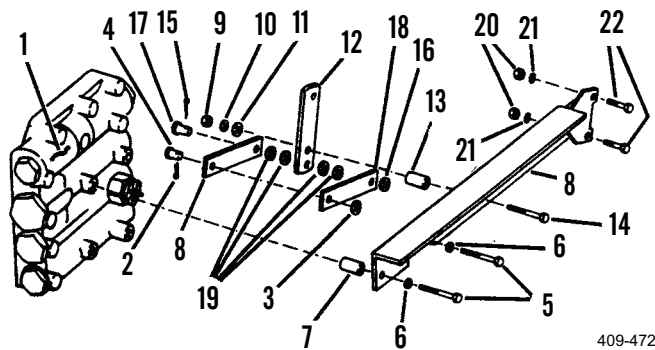


**UPPER CONTROL VALVE LINKAGE SHOWN
LOWER CONTROL VALVE LINKAGE SIMILAR.**

409-472

INSTALLATION

1. Install two bolts (22), two new lockwashers (21) and two nuts (20).
2. Secure two links (18), four flatwashers (19) and rocker arm (12) with pin (17), flatwasher (16) and new cotter pin (15).
3. Position bolt (14), spacer (13) and rocker arm (12) on bracket (8).
4. Secure with flatwasher (11), new lockwasher (10) and nut (9).



409-472

**UPPER CONTROL VALVE LINKAGE SHOWN
LOWER CONTROL VALVE LINKAGE SIMILAR.**

5. Position upper control valve linkage parts (2 thru 22) on transmission control valve (1).
6. Secure each bracket (8) with four spacers (7), four new lockwashers (6) and four bolts (5).
7. Install pin (4), flatwasher (3) and new cotter pin (2).
8. Repeat steps 1 thru 7 for lower control valve linkage.
9. Install transmission cable assemblies to transmission control valve (WP 0115 00).

END OF WORK PACKAGE

TRANSMISSION BREATHER REPLACEMENT

0123 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cleaning compound, solvent (Item 10, WP 0323 00)

References

TM 10-3930-660-10

Equipment Condition

Vehicle parked on level ground

Transmission cover removed (WP 0150 00)

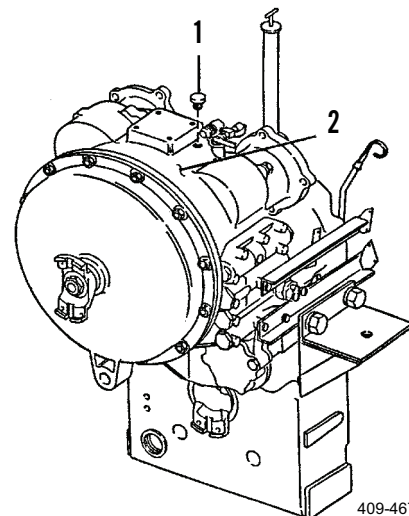
REMOVAL

Remove breather (1) from transmission (2).

INSTALLATION**WARNING**

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

1. Inspect breather (1) for damage or defects. Discard and replace with new breather, if necessary.
2. If necessary, clean breather in cleaning compound and blow-dry with air hose.
3. Install breather (1) to transmission (2).
4. Install transmission cover (WP 0150 00).
5. Start engine and check for proper operation (TM 10-3930-660-10).



409-467

END OF WORK PACKAGE

PROPELLER SHAFTS, FRONT AND REAR DIFFERENTIAL MAINTENANCE

0124 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Grease, GAA (Item 20, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Materials/Parts - Continued

Lockwasher (3, 9, 14 and 18)

Seal (21)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

**WARNING**

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

NOTE

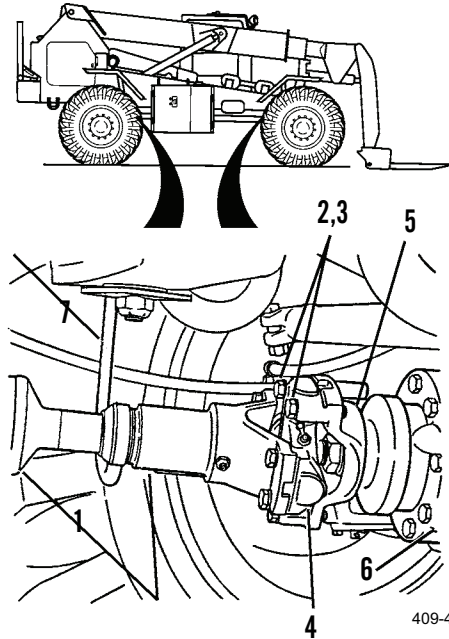
Removal, Disassembly, Assembly and Installation procedures are similar for both front and rear differential propeller shafts.

REMOVAL

NOTE

Support shaft so it does not drop when bolts and lockwashers are removed.

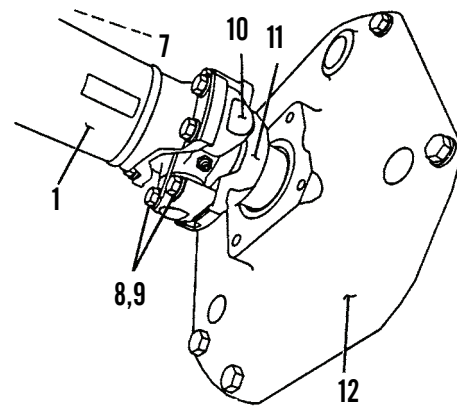
1. To remove propeller shaft (1), remove four capscrews (2) and four lockwashers (3) securing universal joint (4) of shaft (1) to yoke (5) of axle (6). Discard lockwashers.
2. Hang axle end of shaft (1) on hook (7) of vehicle frame.



NOTE

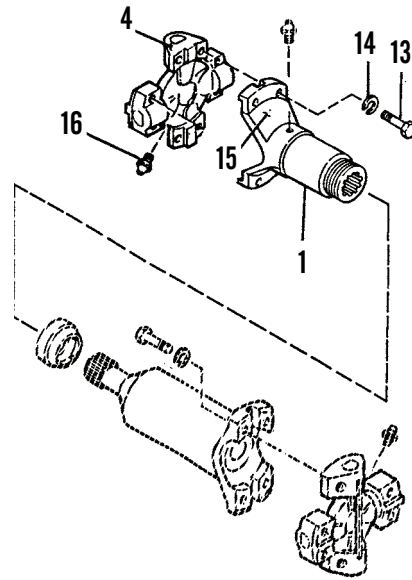
Support shaft so it does not drop when capscrews and lockwashers are removed.

3. Remove four capscrews (8) and four lockwashers (9) securing universal joint (10) of shaft (1) to yoke (11) of transmission (12). Discard lockwashers.
4. Lift to remove shaft (1) from hook (7) on vehicle frame.



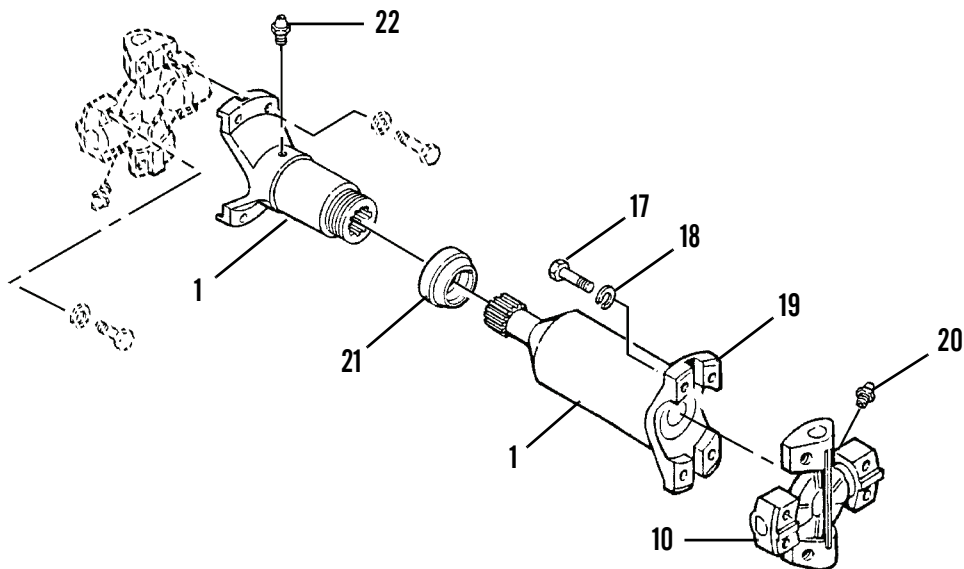
DISASSEMBLY

1. Remove four capscrews (13) and four lockwashers (14) securing universal joint (4) to yoke (15) on axle end of shaft (1). Discard lockwashers.
2. Separate universal joint (4) from yoke (15).
3. If necessary, remove lubrication fitting (16) from universal joint (4).



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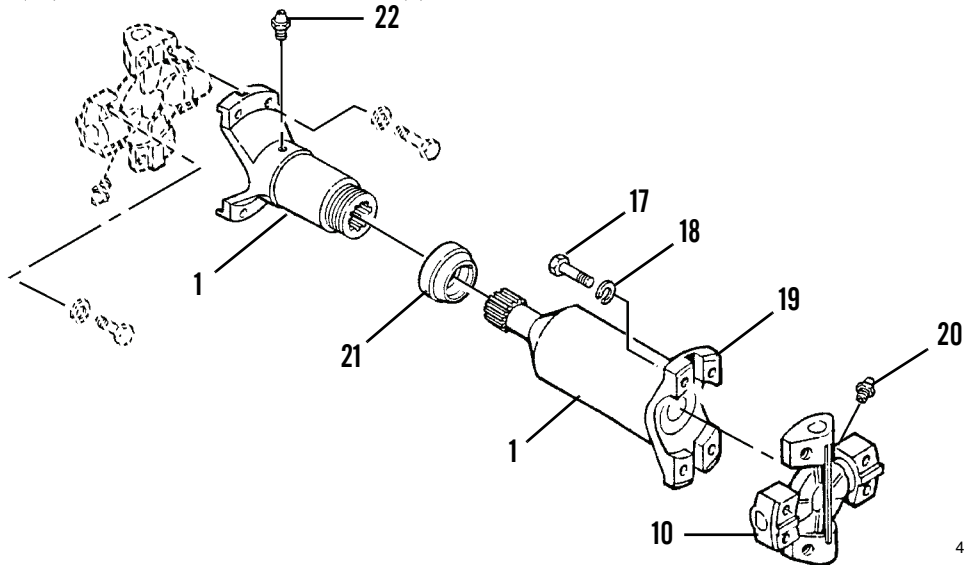
4. Remove four capscrews (17) and four lockwashers (18) securing universal joint (10) to yoke (19) on transmission end of shaft (1). Discard lockwashers.
5. Separate universal joint (10) from yoke (19).
6. If necessary, remove lubrication fitting (20) from universal joint (10).
7. Turn seal (21) counterclockwise from axle end of shaft (1).
8. Remove axle end of shaft (1) from transmission end of shaft (1). Discard seal.
9. If necessary, remove lubrication fitting (22) from axle end of shaft (1).



409-4034

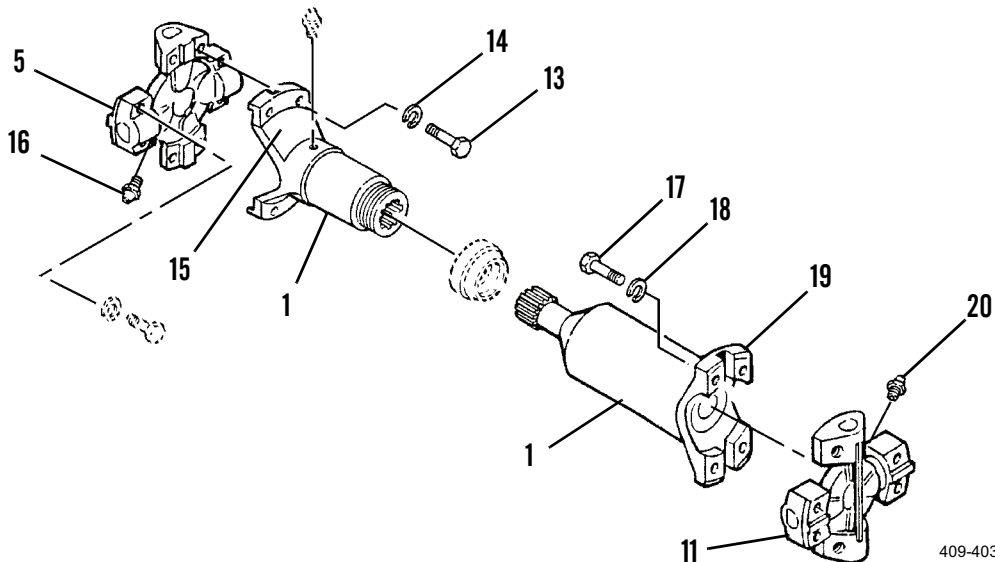
ASSEMBLY

1. If removed, install lubrication fitting (22) to axle end of propeller shaft (1).
2. Carefully position new seal (21) on transmission end of shaft (1).
3. Install transmission end of shaft (1) into axle end of shaft (1).
4. Install new seal (21) on threads of axle end of shaft (1).



409-4034

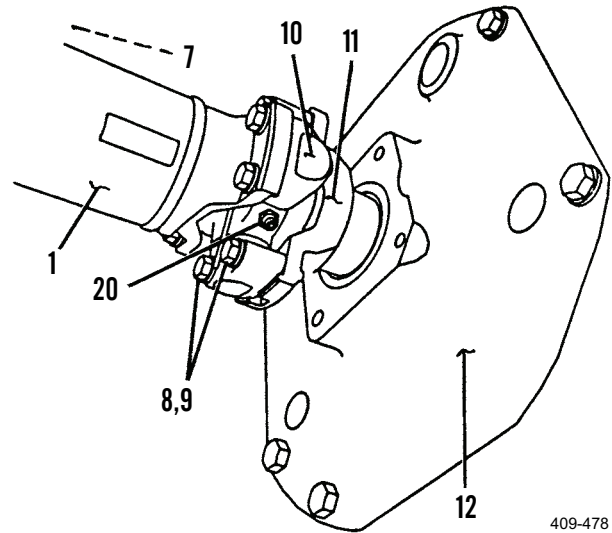
5. If removed, install lubrication fitting (20) to universal joint (11).
6. Align universal joint (10) with yoke (19) on transmission end of shaft (1).
7. Apply loctite to four capscrews (17). Secure universal joint (10) to yoke (19) with four new lockwashers (18) and four capscrews (17). Torque capscrews (17) to 44 lb-ft (60 Nm).
8. If removed, install lubrication fitting (16) to universal joint (4).
9. Align universal joint (4) with yoke (15) on axle end of shaft (1).
10. Apply loctite to four capscrews (13). Secure universal joint (4) to yoke (15) with four new lockwashers (14) and four capscrews (13). Torque capscrews to 41 lb-ft (56 Nm).



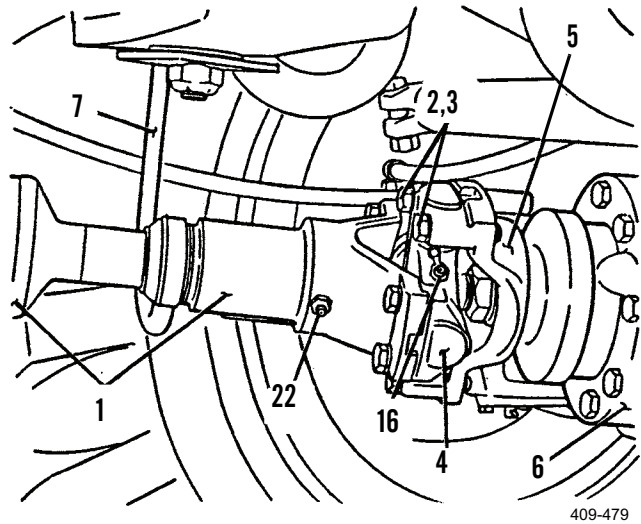
409-4035

INSTALLATION

1. Position shaft (1) so it is partially supported by hook (7) on frame of vehicle.
2. Apply loctite to four capscrews (8). Secure universal joint (10) of shaft (1) to yoke (11) of transmission (12) with four capscrews (8) and four new lockwashers (9). Torque capscrews to 41 lb-ft (56 Nm).



3. Lift and remove axle end of shaft (1) from hook (7) on vehicle frame.
4. Apply loctite to four capscrews (2). Secure universal joint (4) of shaft (1) to yoke (5) on axle (6) with four capscrews (2) and four new lockwashers (3). Torque capscrews to 41 lb-ft (56 Nm).
5. Apply grease to lubrication fittings (16, 20 and 22).



6. Connect battery cables (WP 0107 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Service

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Oil, lubricating (Item 33, WP 0323 00)
Lockwasher (5)

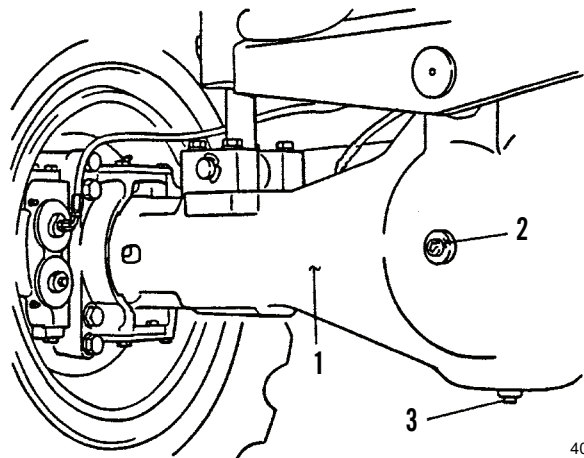
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

SERVICE**NOTE**

Service procedures for both front and rear axles are similar.

1. To check oil level of axle (1), remove oil level check plug (2) from axle (1).
2. Check that oil level is up to bottom of check plug hole. If not, add oil as described in steps 3 thru 5, below.
3. Slowly add new oil to axle (1) through check plug hole until oil begins to flow back out of hole.
4. Recheck oil level and add more oil, if necessary, until oil level is up to bottom of check plug hole.
5. Install oil level check plug (2) to axle (1). Front axle shown, rear axle similar.
6. If necessary, drain and refill axle (1) with oil.



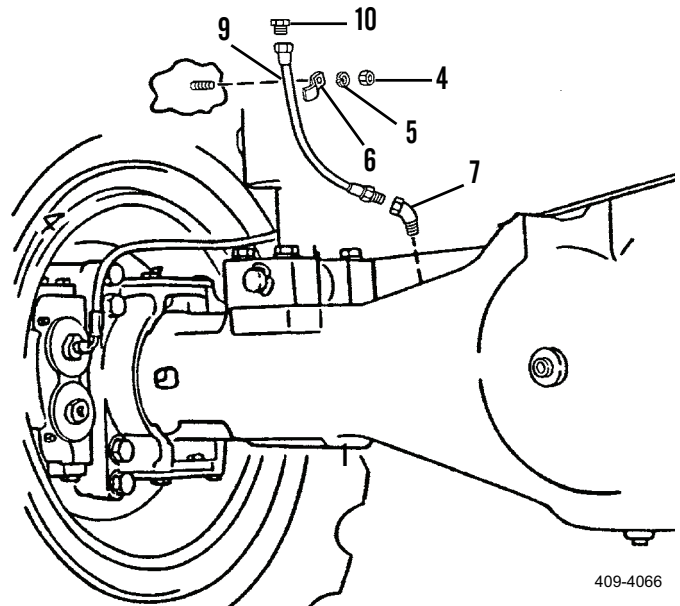
409-484

7. Place a suitable container under axle drain plug (3).
8. Remove axle drain plug (3) from the bottom of axle (1) and allow oil to drain from axle (1) completely.
9. Install axle drain plug (3) to axle (1).
10. Add oil to axle (1) as described in steps 1 thru 5, above.

SERVICE - CONTINUED**NOTE**

- The axles are vented to release pressure caused by axle oil expansion.
- A venting hole is located at the top of each axle. On the rear axle, the venting hole is on the left-hand side. On the front axle, the venting hole is on the right-hand side.
- Each venting hole is connected by a hose to a frame-mounted breather.
- Cleaning procedures for both front and rear axle venting hoses are similar.

11. Remove nut (4) and lockwasher (5) securing hose support (6) to vehicle frame stud. Discard lockwasher.
12. Remove elbow (7), hose support (6), hose (9) and breather (10) from vehicle frame stud and axle (1) as an assembly.
13. Remove elbow (7), breather (10) and hose support (6) from hose (9).
14. Inspect hose (9) for obstructions. If present, clear obstructions from hose.
15. Install elbow (7), breather (10) and hose support (6) to hose (9).
16. Position elbow (7), hose (9), hose support (6) and breather (10) as an assembly on axle (1) and vehicle frame stud.
17. Secure hose support (6) to vehicle frame stud with nut (4) and new lockwasher (5).

**END OF WORK PACKAGE**

THIS WORK PACKAGE COVERS

Service

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Oil, lubricating (Item 32, WP 0323 00)

Equipment Condition

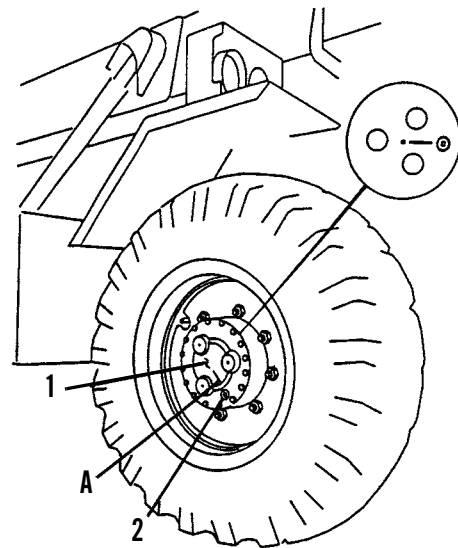
Vehicle parked on level ground (TM 10-3930-660-10)

SERVICE

NOTE

The procedure for servicing each of the four planetary wheel ends is the same.

1. Start engine and move vehicle forward or backward, as required, until embossed oil level line (A) on planetary cover (1) is horizontal.
2. Set parking brake and stop engine.
3. Remove oil level check plug (2) from planetary cover (1).
4. Check that oil level is up to bottom check plug hole.
5. If necessary, add new oil through oil level check plug hole until oil level reaches bottom of check plug hole. Do not overfill.
6. Install oil level check plug (2) to planetary cover (1).
7. If necessary, drain and refill planetary wheel end (1) with oil.
8. Start engine and move vehicle forward or backward, as required, until embossed oil level line (A) on planetary cover (1) is vertical.
9. Set parking brake and stop engine. Place container under the oil check plug (2).
10. Remove oil level check plug (2) from planetary cover (1) and allow oil to drain completely.
11. Add oil to planetary wheel end (1) as described in step 1.



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END OF WORK PACKAGE

PARKING BRAKE ASSEMBLY REPLACEMENT

0127 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)
Cotter pin (5)
Rivet (13)
Seal (22)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
Wheels chocked
Front propeller shaft removed (WP 0124 00)

REMOVAL

WARNING

Be sure wheels are chocked before removing parking brake assembly.

NOTE

The parking brake is disassembled at removal. Parking brake cannot be removed as an assembly.

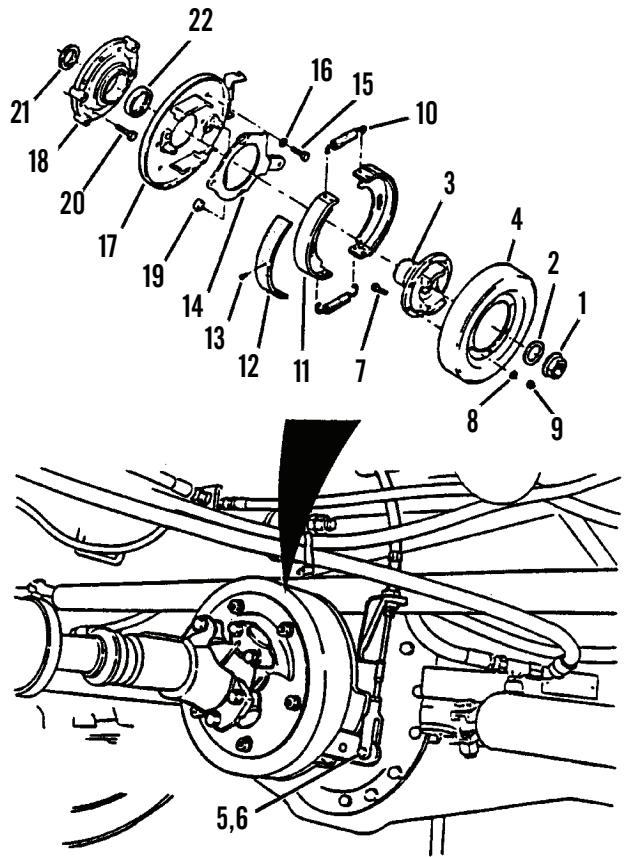
REMOVAL - CONTINUED

1. Remove nut (1) and washer (2). Remove flange (3) and drum (4).
2. Release parking brake (TM 10-3930-60-10). Remove cotter pin (5) and pin (6). Discard cotter pin.
3. Remove six capscrews (7), six washers (8) and six nuts (9) from drum (4).
4. Separate drum (4) from flange (3).

**WARNING**

Springs are under tension. Always wear eye protection when working on springs under tension. Use care when removing springs from brake shoes. Failure to follow these precautions could result in injury.

5. Remove two shoe return springs (10).
6. Remove two brake shoes (11) and two linings (12).
7. If necessary, remove ten rivets (13) securing two linings (12). Discard rivets.
8. Remove parking brake assembly lever (14).
9. Remove four capscrews (15), four washers (16) and backing plate (17) from plate (18).
10. Remove spacer (19).
11. Remove eight capscrews (20) and plate (18).
12. Remove one thrust washer (21).
13. Remove and discard seal (22).



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INSTALLATION

1. Install new seal (22).
2. Install thrust washer (21).
3. Install plate (18) and secure with eight capscrews (20).
4. Install spacer (19).
5. Install backing plate (17) to plate (18) and secure with four washers (16) and four capscrews (15).
6. Install parking brake assembly lever (14).
7. If removed, install two linings (12) with ten new rivets (13).
8. Place two brake shoes (11) and linings (12) in position. Install two shoe return springs (10) in holes closest to backing plate (17). Move lever (14), as needed, to facilitate shoe installation.
9. Position drum (1) on flange (2).
10. Secure drum (4) to flange (3) with six capscrews (7), six washers (8) and six nuts (9).
11. Install pin (6) and new cotter pin (5). Set parking brake (TM 10-3930-660-10).
12. Apply loctite to threaded area of differential pinion.
13. Position flange (3) and drum (4) on parking brake assembly and secure with washer (2) and nut (1). Torque nut between 300 and 400 lb-ft (407 and 543 Nm).
14. Install front propeller shaft (WP 0124 00).
15. Place parking brake in ON position and remove wheel chocks.

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment of Parking Brake Cable

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Strap, tie down (Item 56, WP 0323 00)

Cotter pin (1 and 10)

Lockwasher (14, 15, 23 and 24)

Equipment Condition

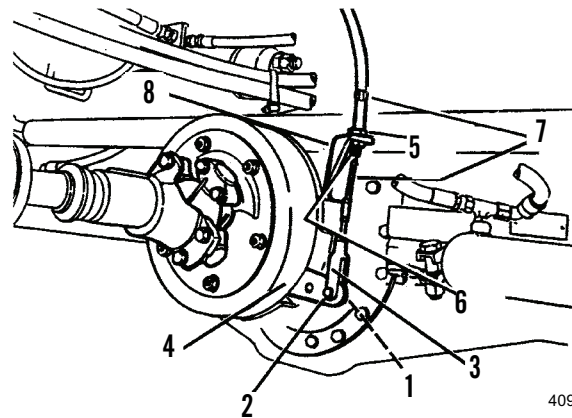
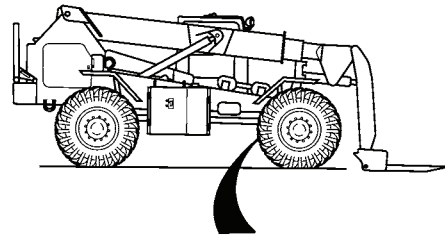
Vehicle parked on level ground (TM 10-3930-660-10)

Wheels chocked

Battery cables removed (WP 0107 00)

REMOVAL

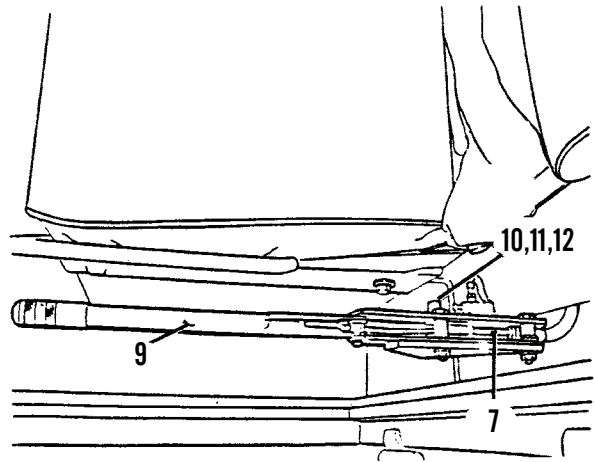
1. Place parking brake lever in the OFF position (TM 10-3930-660-10).
2. Remove cotter pin (1) and clevis pin (2) securing clevis (3) to parking brake assembly (4). Discard cotter pin.
3. Loosen nuts (5 and 6) pull cable (7) out of mounting bracket (8).



409-490

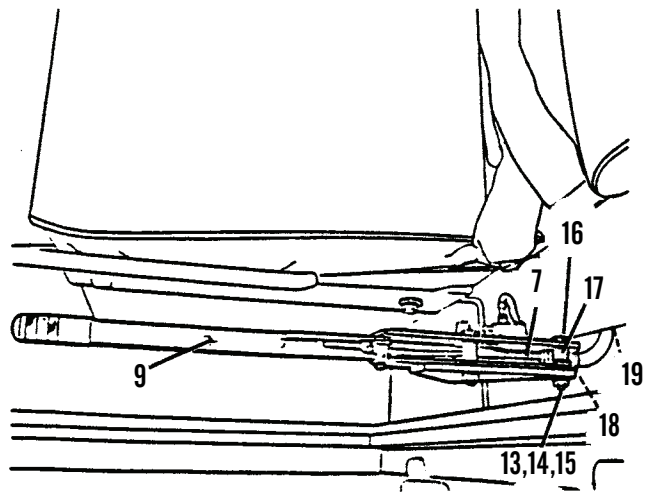
REMOVAL - CONTINUED

4. At parking brake lever (9), remove cotter pin (10), washer (11) and clevis pin (12). Discard cotter pin.
5. Remove nut (13), lockwasher (14), lockwasher (15), capscrew (16) and spacer (17). Discard lockwashers.



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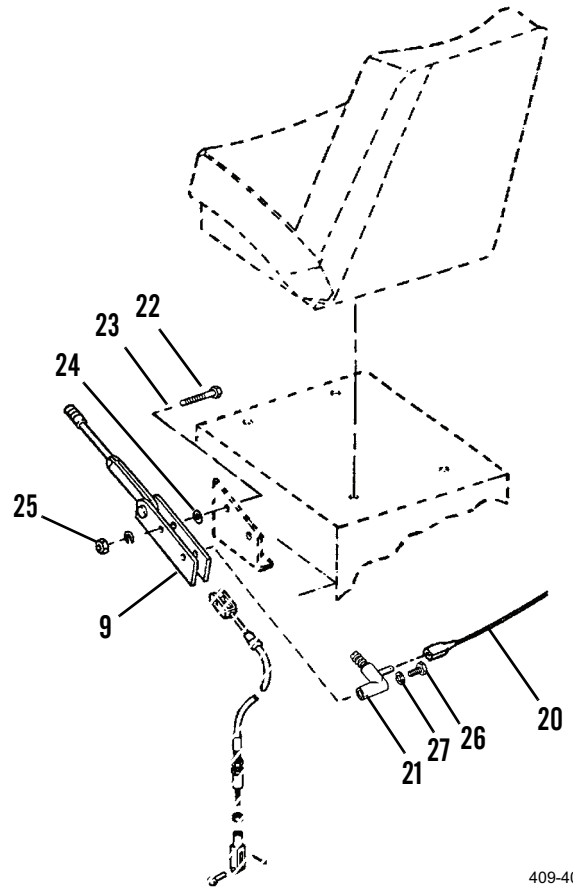
6. Remove cable clamp (18) from cable (7).
7. Cut and remove tie down straps (19) securing cable (1), as necessary. Note tie down strap locations for use during *Installation*.
8. Note routing of cable (7) on cab and frame for use during installation and remove cable from vehicle.



409-492

REMOVAL - CONTINUED

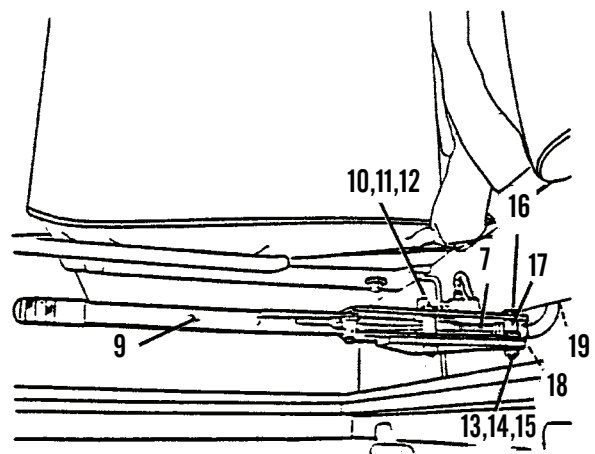
9. Remove electrical lead (20) from switch (21).
10. Remove two nuts (22), two lockwashers (23), two lockwashers (24) and two capscrews (25) securing lever (9) to cab. Discard lockwashers.
11. Remove capscrew (26), flatwasher (27) and switch (21) from lever (9).



409-4036

INSTALLATION

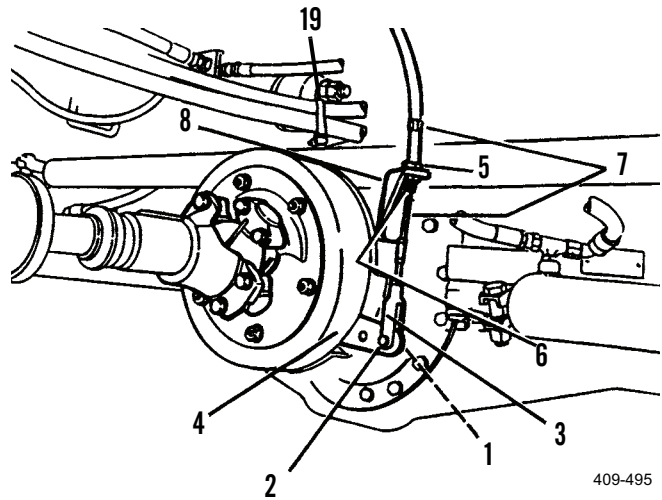
1. Position switch (21) on lever (9) and secure with flatwasher (27) and capscrew (26).
2. Position lever (9) on cab and secure with two capscrews (25), two new lockwashers (24), two new lockwashers (23) and two nuts (22).
3. Connect electrical lead (20) to switch (21).
4. Position cable (7) on vehicle cab and frame as noted during removal.
5. Position cable clamp (18) on cable (7).
6. Insert cable clamp (18) and cable (7) into lever (9). Install spacer (17) and capscrew (16) through clamp (18). Install new lockwasher (15), new lockwasher (14) and nut (13).
7. Install pin (12), washer (11) and new cotter pin (10).



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INSTALLATION - CONTINUED

8. Secure clevis (3) to parking brake assembly (4) with clevis pin (2) and new cotter pin (1).
9. Position cable (7) in mounting bracket (8) and tighten nuts (5 and 6).
10. Install new tie down straps (19) and secure cable (7) as noted during removal.
11. Adjust cable (1). Refer to *Adjustment*.



409-495

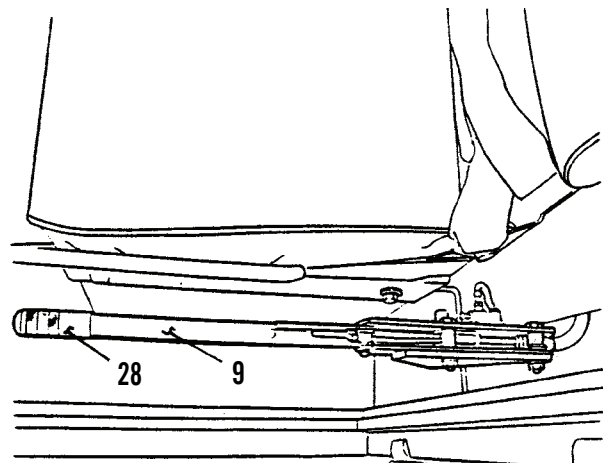
12. Connect battery cables (WP 0107 00).

ADJUSTMENT OF PARKING BRAKE CABLE

NOTE

Minor adjustments of parking brake cable can be made by turning knob on lever in cab. A major adjustment is required if parking brake cannot be adjusted with the major adjustment.

1. Turn adjustment knob (28) on end of lever (9) in or out as required until approximately 50 lb (23 kg) of force is required to set the parking brake.

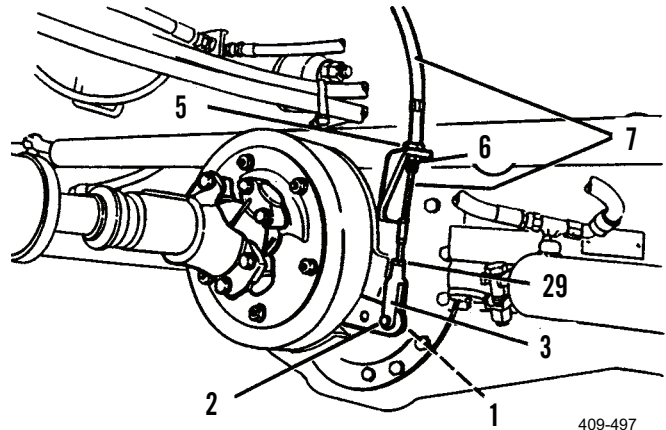


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ADJUSTMENT OF PARKING BRAKE CABLE - CONTINUED**NOTE**

If turning of knob cannot bring parking brake cable into adjustment, perform major adjustment as described in steps 2 thru 8 of this procedure.

2. Place lever (9) in the OFF position.
3. Turn knob (28) on lever (9) so knob is approximately at middle of its full travel.
4. Loosen jamnut (5) on cable (7).
5. Tighten adjusting nut (6) on cable (7) approximately two turns.



6. Pull lever (9) to the ON position. It should take about 50 lb (23 kg) of pulling force to set parking brake.
7. If necessary, repeat steps 2 thru 6 until a 50 lb (23 kg) pull on lever (9) is obtained.
8. Tighten jamnut (5).

NOTE

If necessary, adjust clevis.

9. Remove cotter pin (1) and clevis pin (2). Discard cotter pin.
10. Loosen locknut (29). Turn clevis in or out as required. Tighten locknut.
11. Install new cotter pin (1) and clevis pin (2).
12. Place parking brake in on position and remove wheel chocks.

END OF WORK PACKAGE

BLEEDING BRAKE SYSTEM

0129 00

THIS WORK PACKAGE COVERS

Bleeding

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Oil, lubricating (Item 32, WP 0323 00)

Container, 1 qt.

Two hoses, 1/4 I.D. x 18 in.

References

WP 0032 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Parking brake engaged (TM 10-3930-660-10)

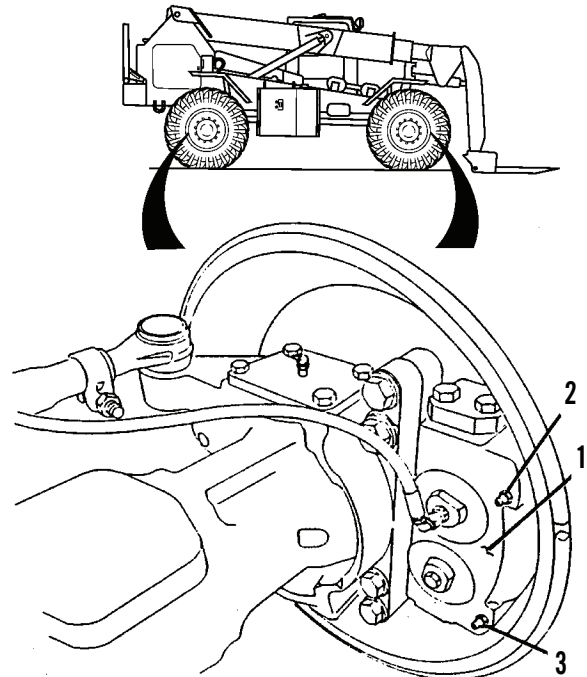
BLEEDING

1. To bleed brake caliper (1), place transmission in NEUTRAL and start engine (TM 10-3930-660-10).

NOTE

Bleed each brake caliper separately. If bleeding of more than one caliper is necessary, always begin with caliper furthest away from service brake control valve and work in to the closest.

2. Install one transparent hose over each brake bleeder valve (2 and 3). Place hose ends in clear container half filled with hydraulic oil.



409-498

BLEEDING - CONTINUED**WARNING**

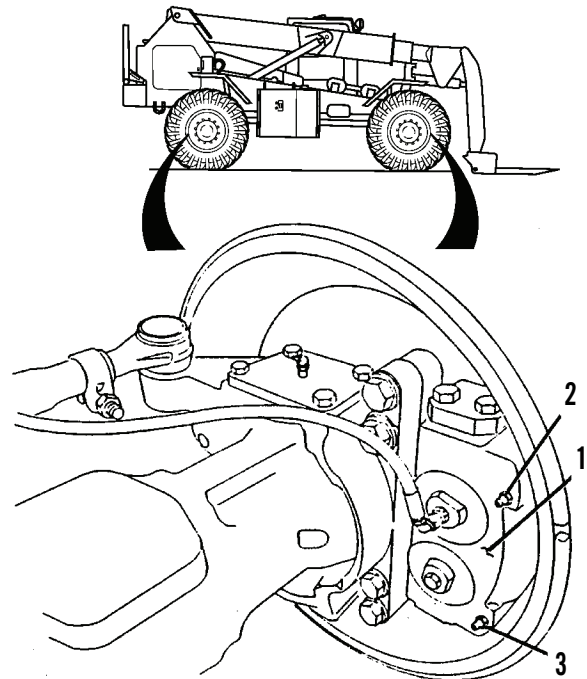
Do not bleed without bleeder hoses over brake bleeder valves. The vehicle is equipped with a power braking system. Without bleeder hoses attached, hydraulic oil can shoot considerable distances and cause injury. Always wear proper eye protection when bleeding brakes.

3. Loosen each bleeder valve (2 and 3) one full turn.

NOTE

Do not release brake pedal until end of step 5.

4. Have an assistant depress brake pedal slowly and steadily until no air bubbles appear in oil draining from bleeder valves (2 and 3).
5. Tighten bottom bleeder valve (3) and top bleeder valve (2). Have assistant release brake pedal.
6. Remove hoses from brake bleeder valves (2 and 3).
7. Stop engine (TM 10-3930-660-10).
8. If necessary, repeat steps 1 thru 7 at other brake calipers (1) on vehicle as required.



409-498

9. Check oil level in hydraulic reservoir. Add hydraulic oil if necessary (WP 0032 00).

END OF WORK PACKAGE

BRAKE SHOES MAINTENANCE

0130 00

THIS WORK PACKAGE COVERS

Removal, Inspection, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Alcohol, denatured (Item 2, WP 0323 00)

Sealant, Loctite (Item 45, WP 0323 00)

Container, 1 qt.

Materials/Parts - Continued

Shoe (1)

Wood block

References

WP 0129 00

WP 0249 00

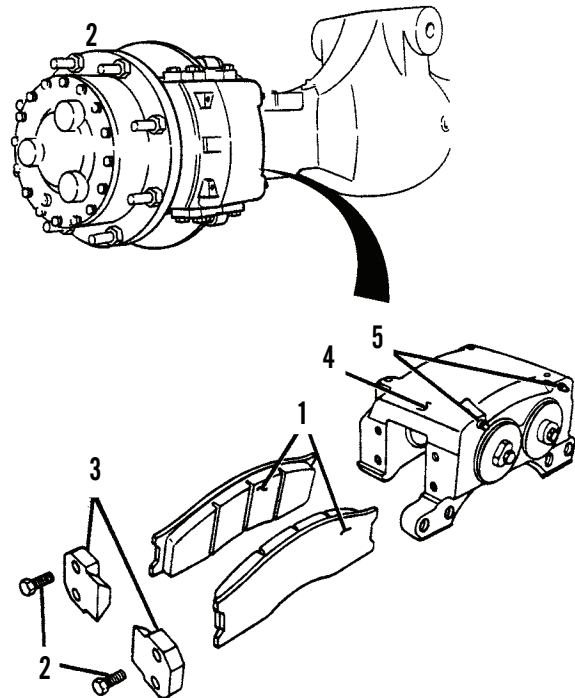
TM 10-3930-660-10

Equipment Condition

Wheel assembly removed (WP 0134 00)

REMOVAL

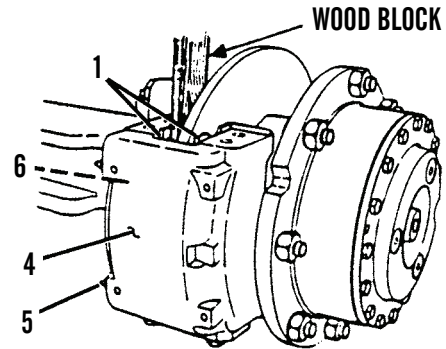
1. To remove shoes (1), remove four capscrews (2) and two brackets (3) from brake housing (4).
2. Loosen bleeder valves (5) to release hydraulic pressure in brake housing (4).



409-499

REMOVAL - CONTINUED

3. Use wood block against shoes (1) to push pistons (6) completely into brake housing (4).
4. Tighten bleeder valves (5).
5. Remove shoes (1) from brake housing (4).



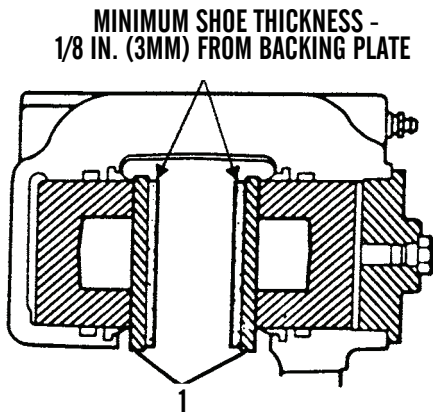
409-500

INSPECTION

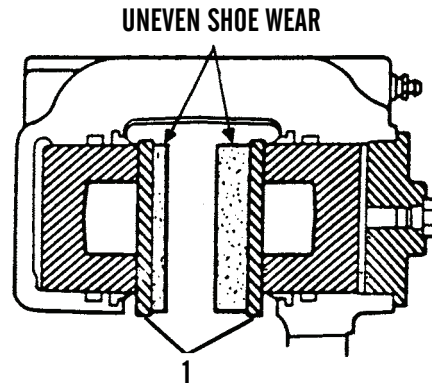
1. Inspect shoes (1) for wear. Replace shoes if thickness is less than 1/8 in. (0.8 cm).
2. Inspect shoes (1) for uneven wear. Replace shoes if thickness varies between linings.

NOTE

If shoes are worn unevenly, check pistons for correct operation. Replace pistons that are locked in the bore. Check that the disc surface is flat and parallel to the linings (WP 0249 00).



409-501



409-502

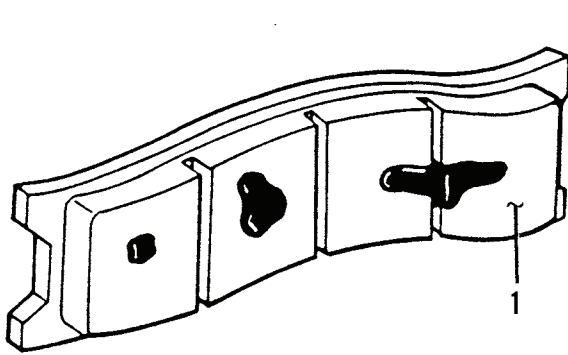
INSPECTION - CONTINUED

3. Check shoes (1) for oil or grease. Clean shoes with denatured alcohol or by burnishing. Replace shoes if grease or oil cannot be removed.

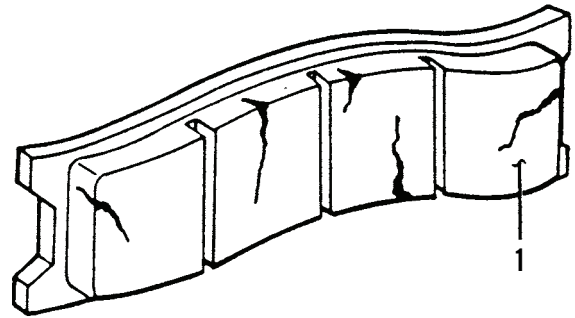
NOTE

Cracks on surface of shoes are normal when brakes are used under high temperature conditions.

4. Check shoes (1) for cracks. Replace shoes if necessary.



409-503



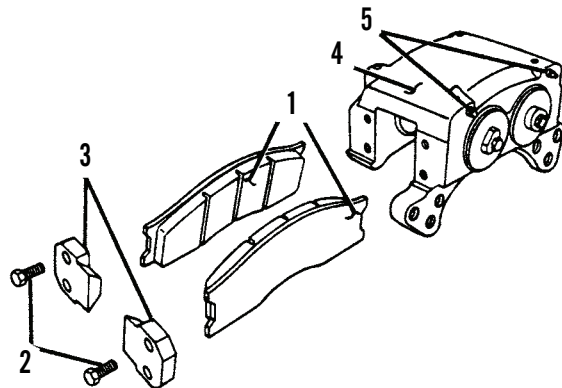
409-504

INSTALLATION

CAUTION

Always replace both shoes as a set. If only one shoe is replaced, possible disc damage can occur.

1. Position shoes (1) in brake housing (4).
2. Position brackets (3) on brake housing (4).
3. Apply loctite to threads of four capscrews (2) and secure brackets (3) with capscrews. Torque capscrews to 170 lb-ft (230 Nm).
4. Ensure that shoes (1) move freely in housing (4).
5. Bleed air from brake system (WP 0129 00).
6. Apply and release brake three times to ensure that brake system operates correctly (TM 10-3930-660-10). Check for fluid leaks. Ensure that shoes (1) move freely in housing.



409-505

7. Install wheel assembly (WP 0134 00).

END OF WORK PACKAGE

BRAKE CONTROL VALVE MAINTENANCE

0131 00

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment of Accumulator Charging Pressure

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)
- Charging kit, pressure (Item 5, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)
- Oil, lubricating (Item 33, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)
- Cotter pin (1)
- Lockwasher (20)

References

- WP 0129 00
- WP 0132 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Wheels chocked
- Brake hydraulic pressure switch disconnected (WP 0077 00)
- Hydraulic oil drained from fuel/hydraulic tank (WP 0032 00)

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

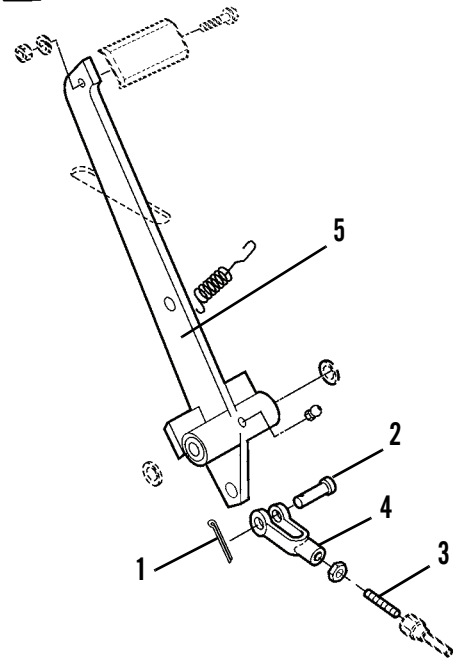
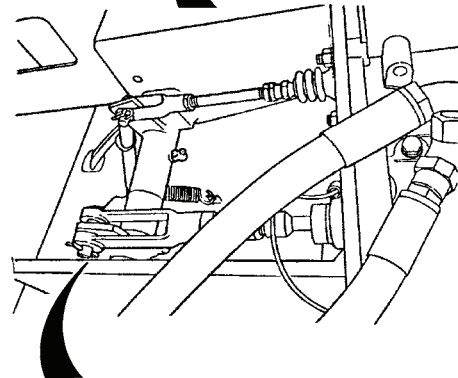
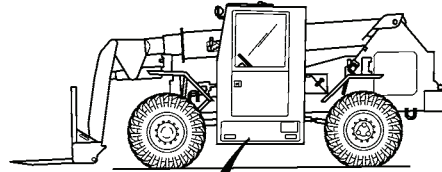
Wipe area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, tag and mark lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL - CONTINUED

1. Pump brake pedal to relieve accumulator pressure.
2. With the engine stopped, pump the brake pedal until no power assistance is felt through the pedal. This will require approximately 20 depressions of the brake pedal.
3. From under the cab, remove cotter pin (1) and clevis pin (2) securing push rod pin (3) and clevis (4) to the brake pedal arm (5). Remove clevis from brake pedal arm. Discard cotter pin.



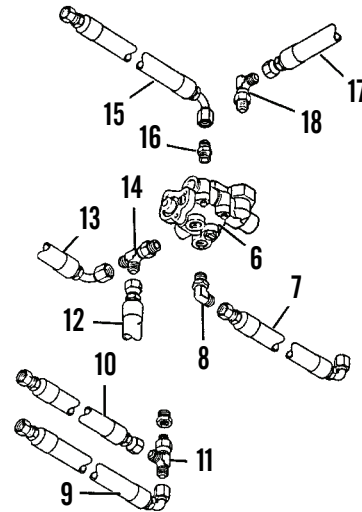
409-506

REMOVAL - CONTINUED

NOTE

Hose is connected directly to accumulator. Plug hose with a #12 plug immediately after disconnecting from valve.

4. At service brake control valve (6), tag and disconnect hose (7) from elbow (8).
5. Tag and disconnect hose (9 and 10) from tee (11) at valve (6).
6. Tag and disconnect hose (12 and 13) from tee (14) at valve (6).
7. Tag and disconnect hose (15) from adapter (16) at valve (6).
8. Tag and disconnect hose (17) from elbow (18) at valve (6).

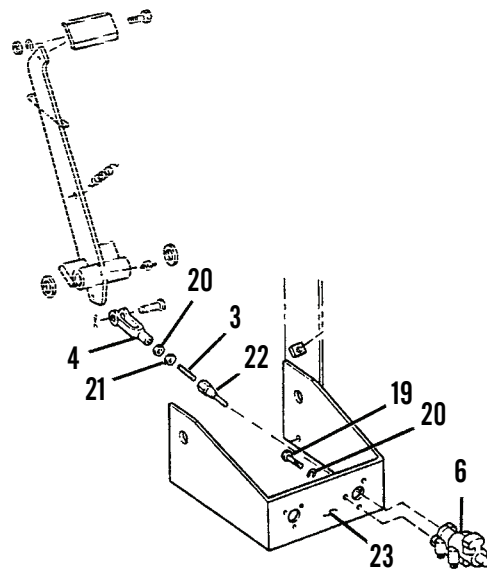


409-507

NOTE

Support service brake control valve so it does not drop during hardware removal.

9. Remove three screws (19) and three lockwashers (20) securing valve (6) to bracket (23). Discard lockwashers.
10. Remove valve (6) from bracket (23).
11. Loosen nuts (20 and 21) on pushrod pin (3).
12. Remove clevis (4) from pushrod pin (3).
13. Remove pushrod pin (3) from pushrod (22).
14. Remove nuts (20) and (21) from pushrod pin (3).
15. Tag and remove elbow (8) from valve (6).
16. Tag and remove tee (14) from valve (6).
17. Tag and remove adapter (16) from valve (6).
18. Tag and remove elbow (18) from valve (6).



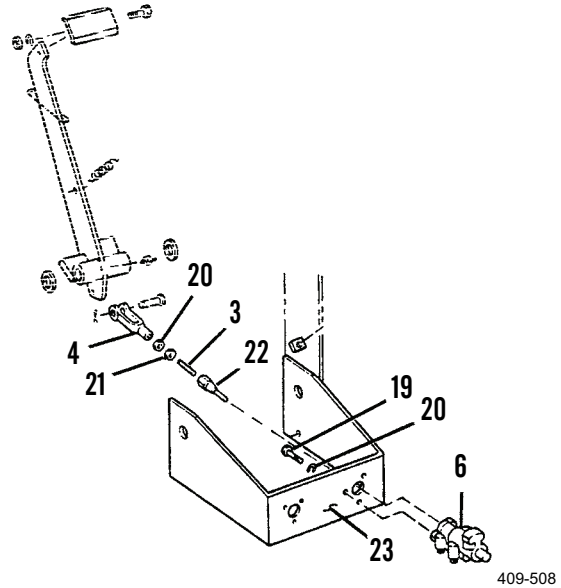
409-508

INSTALLATION

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

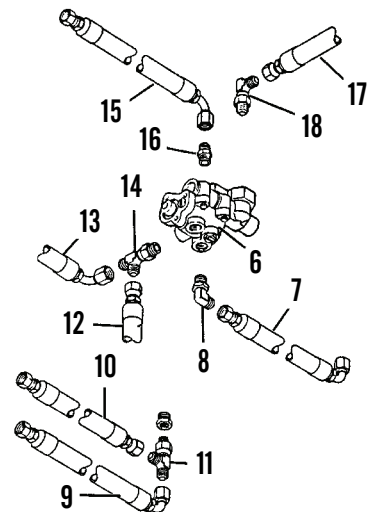
1. Install elbow (18) to valve (6).
2. Install adapter (16) to valve (6).
3. Install tee (14) to valve (6).
4. Install elbow (8) to valve (6).
5. Install jamnuts (20 and 21) to pushrod pin (3).
6. Install pushrod pin (3) to pushrod (22).
7. Install clevis (4) to pushrod pin (3).
8. Position and support valve (6) on bracket (23).



NOTE

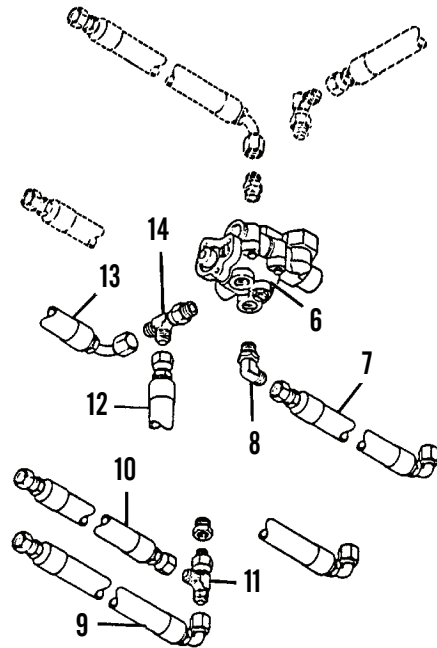
Apply loctite to threads of screws.

9. Secure valve (6) to bracket (23) with three screws (19) and three new lockwashers (20).
10. Connect hose (17) to elbow (18) at valve (6) as tagged.
11. Connect hose (15) to adapter (16) at valve (6) as tagged.



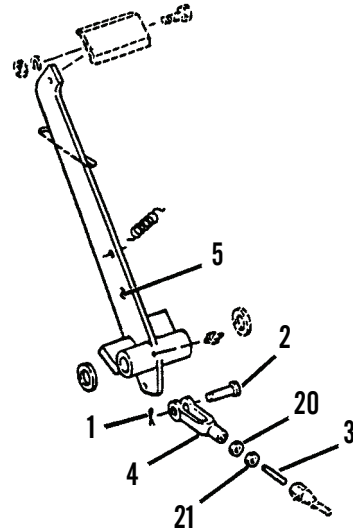
INSTALLATION - CONTINUED

12. Connect hose (12 and 13) to tee (14) at valve (6) as tagged.
13. Connect hose (9 and 10) to tee (11) at valve (6) as tagged.
14. Connect hose (7) to elbow (8) at valve (6) as tagged.
15. Rotate pushrod pin (3) and/or clevis (4) in or out as required until clevis pin (2) fits freely through holes on clevis (4) and brake pedal arm (5).
16. Secure clevis (4) to brake pedal arm (5) with clevis pin (2) and new cotter pin (1).



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17. Tighten jamnuts (20 and 21) on pushrod pin (3).



409-512

18. Connect hydraulic pressure switch (WP 0077 00).
19. Fill the hydraulic tank (WP 0032 00).

CAUTION

The brake system and hydraulic accumulator must be bled as soon as the brake control valve is installed. If this is not done, air in the system may not allow the brakes to release and may cause severe brake system damage.

20. Bleed the hydraulic accumulator (WP 0132 00).
21. Bleed the brake system (WP 0129 00).

ADJUSTMENT OF ACCUMULATOR CHARGING PRESSURE**NOTE**

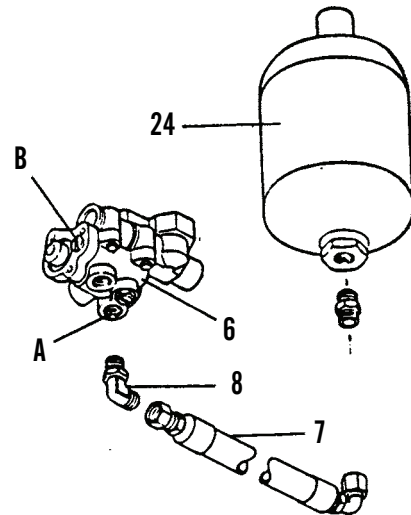
The accumulator charging pressure is adjusted at the brake control valve.

1. Pump the brake pedal to relieve pressure in accumulator (24).
2. With the engine stopped, pump brake pedal until no power assistance is felt. This will require approximately 20 brake pedal depressions.
3. Disconnect hose (7) and elbow (8) at service brake control valve (6).
4. Install pressure gauge to accumulator port (A) on service brake control valve (6).

NOTE

Note pressure gauge reading when click is heard in step 5.

5. Start engine and listen for click caused by shifting of accumulator charging valve inside service brake control valve (6).
6. If necessary, adjust accumulator charging pressure.
7. If pressure is less than 1,700-1,800 psi (11721-12411 kPa) at time the click is heard, turn adjusting plug (B) on valve (6) clockwise until pressure is within specifications.
8. If pressure is greater than 1,700-1,800 psi (11721-12411 kPa) at time click is heard, turn adjusting plug (B) on valve (6) counterclockwise until pressure is within specifications.
9. Remove pressure gauge from accumulator port (A) on service brake control valve (6).
10. Connect elbow (8) and hose (7) at service brake control valve (6).
11. Bleed the brake system (WP 0129 00).



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END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation, Testing

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Charging kit, pressure (Item 5, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Oil, lubricating (Item 32, WP 0323 00)

Materials/Parts - Continued

Soap, liquid (Item 52, WP 0323 00)

Equipment Condition

Machine parked on level ground (TM 10-3930-660-10)
 Wheels chocked

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

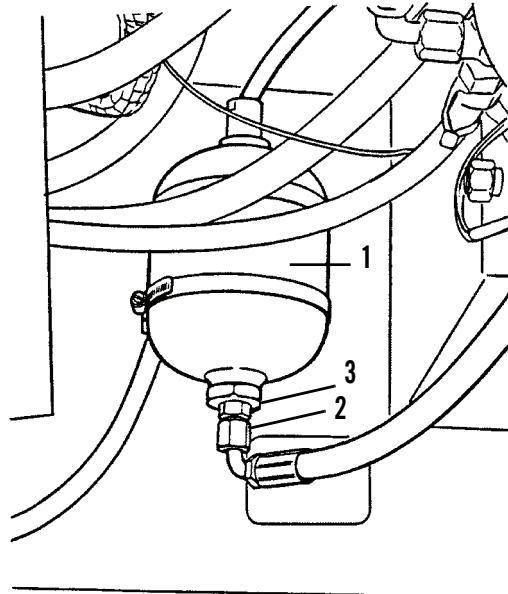
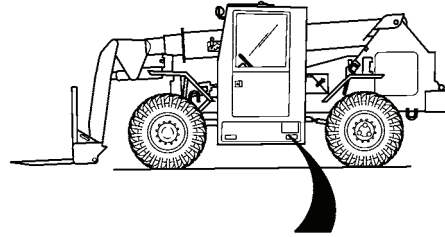
REMOVAL - CONTINUED

1. With the engine stopped, pump brake pedal until no power assistance is felt through pedal. This will require approximately 20 depressions of brake pedal.

NOTE

The accumulator is located under cab, behind tool box.

2. Disconnect hydraulic hose (2) from adapter (3) at bottom of accumulator (1).
3. Allow accumulator (1) to drain completely.

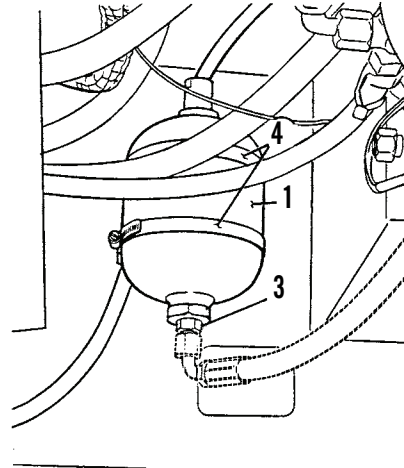


409-514

REMOVAL - CONTINUED**CAUTION**

Support accumulator so it does not drop when clamps are removed.

4. Loosen clamp (4) securing service brake hydraulic accumulator (1) to cab and remove accumulator (1) from vehicle.
5. If necessary, remove adapter (3) from service brake hydraulic accumulator (1).

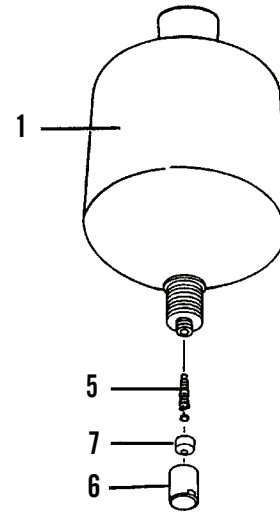


409-515

DISASSEMBLY**NOTE**

The accumulator may be repaired by replacing gas valve core and caps. No other repairs should be attempted.

1. Remove outer gas valve cap (6) and inner gas valve cap (7) from service brake hydraulic accumulator (1).
2. Remove gas valve core (5) from service brake hydraulic accumulator (1).



409-516

ASSEMBLY

1. Install gas valve cap (5) to service brake hydraulic accumulator (1). Torque gas valve core (5) to 2.6 lb-in (0.3 Nm).

NOTE

Accumulator must be precharged prior to bleeding and installation on vehicle.

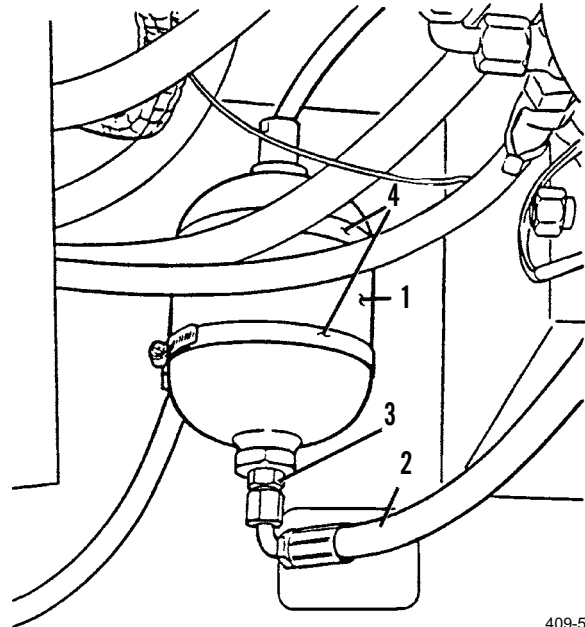
2. Precharge service brake hydraulic accumulator (1) with nitrogen gas and install caps (7 and 6). Refer to *Testing*.

INSTALLATION

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hydraulic components and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

1. If removed, install adapter (3) to service brake hydraulic accumulator (1).
2. Bleed service brake hydraulic accumulator (1).
3. Connect hose (2) to accumulator (1) at connector (3).
4. Position accumulator (1) so it is lower than brake control valve.
5. Start engine and allow fifteen seconds for accumulator (1) to charge. Stop engine.
6. Loosen hose (2) at adapter (3) and bleed accumulator (1) until pressure escapes and hydraulic oil appears. Tighten hose (2).
7. Repeat steps 7 and 8 two additional times.
8. Position service brake hydraulic accumulator (1) on cab and secure with clamp (4).



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TESTING

1. With engine stopped, pump brake pedal until no power assistance is felt through pedal. This will require approximately 20 depressions of brake pedal.

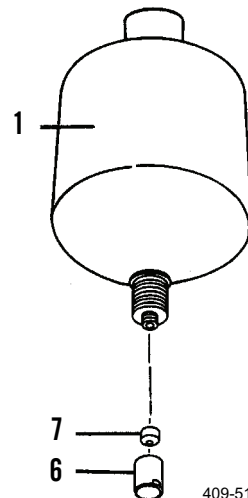
CAUTION

Support accumulator so it does not drop when clamps are removed.

NOTE

It is not necessary to disconnect hydraulic hose from accumulator when testing or adjusting accumulator precharge pressure.

2. Remove clamps (4) securing service brake hydraulic accumulator (1) to cab and lower service brake hydraulic accumulator (1) to ground.
3. Install charging and gauging assembly to service brake hydraulic accumulator (1).
4. Remove outer gas valve cap (6) and inner gas valve cap (7) from accumulator (1).



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TESTING - CONTINUED**NOTE**

Do not connect nitrogen bottle to charging and gauging assembly at this time.

5. Install charging and gauging assembly in place of cap (7) on accumulator (1).
6. Open isolator valve on charging and gauging assembly by turning valve clockwise to a full stop.
7. Depress and hold push button on top of charging and gauging assembly until pressure reading is obtained on gauge.

NOTE

The pressure reading obtained in step 7 is the accumulator precharge pressure. This reading must be 650-900 psi (4882-6205 kPa).

8. If precharge pressure reading observed in step 7 is too low, add nitrogen to service brake hydraulic accumulator (1).
9. Connect nitrogen charging bottle to charging and gauging assembly.
10. Turn isolating valve on and admit nitrogen into diaphragm of accumulator (1). Do this slowly, checking the pressure gauge reading at regular intervals.
11. Repeat step 10 as necessary until precharge pressure is 650-900 psi (4882-6205 kPa).
12. If precharge pressure reading observed in step 7 is too high, bleed nitrogen from service brake hydraulic accumulator (1).
13. Open bleeder valve on charging and gauging assembly to vent nitrogen from the accumulator diaphragm as required. Leave the bleeder valve open for only a short period and then close it.
14. Check the precharge pressure.
15. Repeat steps 13 and 14 as necessary until precharge pressure is 650-900 psi (4882-6205 kPa).
16. Remove charging and gauging assembly from service brake hydraulic accumulator (1).
17. Close isolator valve by turning valve counterclockwise to a full stop.
18. Remove charging and gauging assembly from accumulator (1).
19. Install inner gas valve cap (7) and outer gas valve cap (6) to accumulator (1). Torque outer gas valve cap to 15-30 lb-ft (20.3-40.7 Nm).
20. Brush a soap solution on and around outer gas valve cap (6) and verify that no air bubbles are present.

NOTE

Air bubbles indicate nitrogen leakage. Correct any leakage before installing accumulator to vehicle.

21. Secure service brake hydraulic accumulator (1) to cab with clamps (4).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Repair, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

References

WP 0129 00
 TM 9-4940-468-13

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Oil, lubricating (Item 32, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Wheels chocked

REMOVAL



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

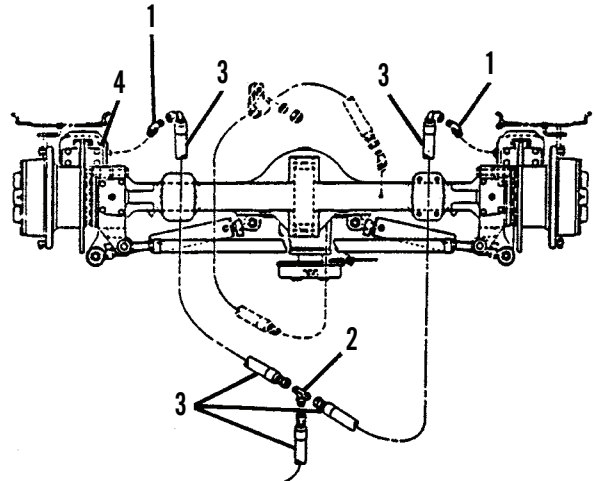
NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- Removal and installation procedures for front and rear brake system hoses, lines and fittings are similar.
- Tag all electrical connections before removing for use during installation.

REMOVAL - CONTINUED**NOTE**

Note routing of hoses on machine for use during installation.

1. Disconnect hose (3) from elbow (1) on service brake caliper (4).
2. Loosen and remove elbow (1) from service brake caliper (4).
3. Loosen and remove hoses (3) from tee (2).
4. Carefully remove hoses (3) from vehicle as required.



**FRONT BRAKE CONNECTIONS SHOWN -
REAR BRAKE SYSTEM CONNECTIONS ARE IDENTICAL**

409-521

REPAIR**NOTE**

Brake system hydraulic hoses can be repaired by installing new end fittings.

Refer to TM 9-4940-468-13 for instructions on how to repair hydraulic hoses.

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on brake components and hoses clean and dry. Apply film of clean hydraulic oil to all sealing surfaces as hoses are connected.

1. Install elbow (1) to service brake caliper (4).
2. Connect hose (3) to elbow (1).
3. Connect hoses (3) to tee (2).
4. Bleed service brake system (WP 0129 00).
5. Remove wheel chocks.

END OF WORK PACKAGE

WHEEL ASSEMBLY REPLACEMENT

0134 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Jack stand, 7,000 lb capacity

Materials/Parts

Wood blocks

References

WP 0135 00

Personnel Required

Two

Equipment Condition

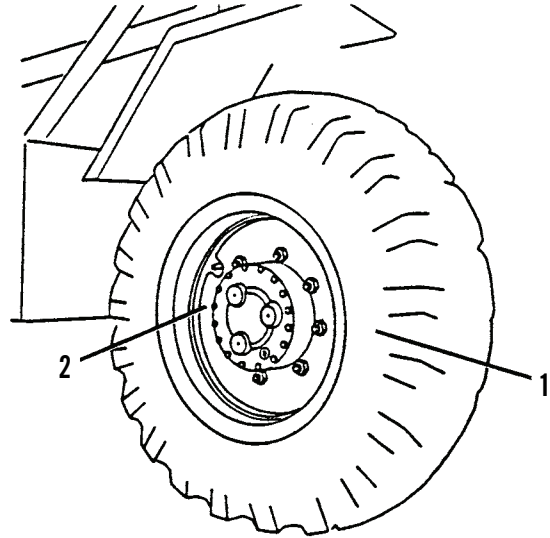
Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

- Equipment used for lifting vehicle must be in good condition and of correct capacity. Failure to follow this warning may result in injury or death and damage to equipment.
- Improper use of lifting equipment and improper attachment to vehicle can result in injury to personnel and equipment damage. Observe all standard rules of safety.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury.
- Always place blocking material between rear axle housing and frame rear axle housing stops before raising vehicle with floor jack. If blocking material is not used, vehicle will tip to left or right when front axle housing is raised, possibly resulting in injury to personnel or damage to vehicle.
- In addition, if blocking material is not used, rear axle housing will oscillate on its pivot pin when rear wheel assembly is removed, possibly resulting in injury to personnel or damage to vehicle.

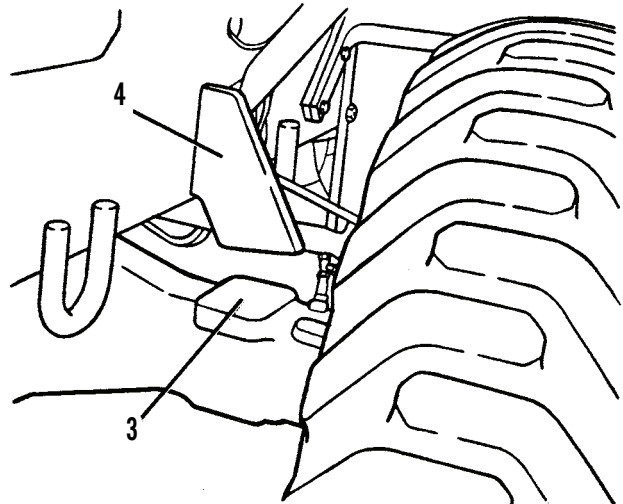
REMOVAL

1. Place wheel chocks on tires (1) of wheel assemblies (2) that are not being removed.



409-522

2. Place blocking material between rear axle housing (3) and both frame rear axle housing stops (4).
3. Loosen but do not remove eight wheel nuts (5).



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REMOVAL - CONTINUED**NOTE**

For axle replacement, position floor jack under differential housing.

- Place floor jack under appropriate axle housing, on same side as wheel assembly (2) to be removed. Raise vehicle until tire (1) is off the ground.

NOTE

For axle replacement, position jack stand under frame to the inside of axle being removed.

- Place jack stand under appropriate axle housing, on same side as wheel assembly (2) to be removed.

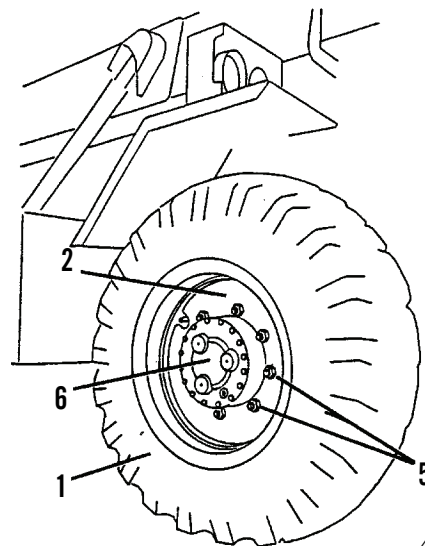
**WARNING**

- Lifting equipment used for lifting vehicle must be in good condition and of suitable load capacity. Failure to follow this warning may cause injury or death, or damage to equipment.
- Two personnel are required to remove wheel assembly from wheel hub of vehicle. Failure to follow this instruction could result in serious injury or death.

NOTE

Weight of wheel assembly is approximately 465 lb (211 kg).

- Lower vehicle with floor jack until axle housing is supported by jack stand.
- Remove eight wheel nuts (5) and wheel assembly (2) from wheel hub (6).

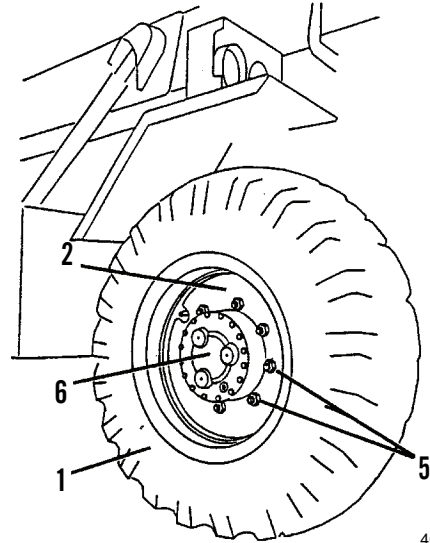


409-524

INSTALLATION**NOTE**

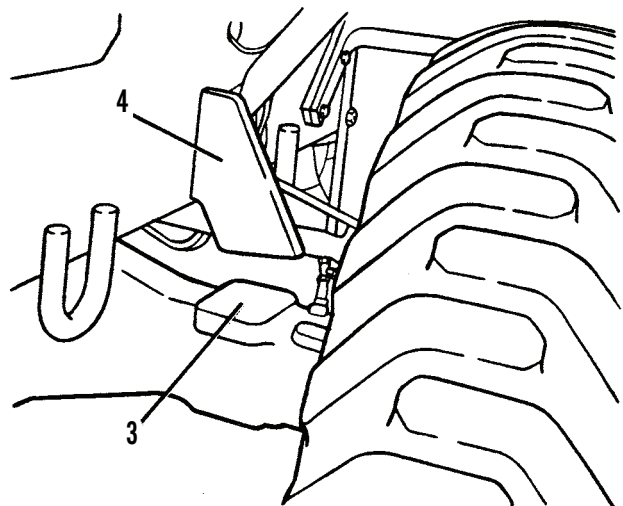
- Repair of wheel assembly is limited to replacing valve stem and valve core (WP 0135 00).
- Two personnel are required to position wheel assembly on wheel hub of vehicle.

1. Place floor jack under appropriate axle housing, on same side as wheel assembly (2) to be installed. Raise vehicle as required until appropriate axle is off of jack stand and wheel hub (6) is high enough for installation of wheel assembly (2).
2. Place wheel assembly (2) on wheel hub (6). Install but do not tighten eight wheel nuts (5) until nuts are seated.
3. Remove jack stand from under axle.
4. Lower vehicle with floor jack until tire (1) is just resting on ground.
5. Torque wheel nuts (5) to 470 lb-ft (637 Nm).
6. Completely lower vehicle with floor jack.



409-524

7. Remove blocking material from between rear axle housing (3) and both frame stops (4).



409-523

8. Remove wheel chocks from tires (1) as required.

END OF WORK PACKAGE

TIRES REPLACEMENT

0135 00

THIS WORK PACKAGE COVERS

Demounting, Mounting

INITIAL SETUP**Tools and Special Tools**

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Lubricant, Ru-glide rubber (Item 25, WP 0323 00)

Lockscrew (10)

O-ring (9)

Materials/Parts - Continued

Rubber grommet (12)

References

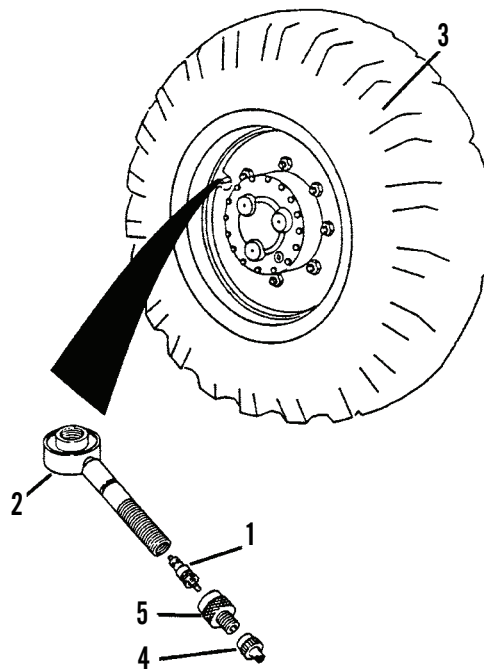
TM 9-2160-200-24

Equipment Condition

Wheel assembly and tire removed from vehicle (WP 0134 00)

DEMOUNTING

1. Remove valve core (1) from valve stem (2) and deflate tire (3) completely.
2. Remove cap (4) from adapter (5).
3. Remove adapter (5) from valve stem (2).
4. Completely deflate tire (3) by removing valve core (1) from valve stem (2) with valve core extractor.
5. Install adapter (5) onto valve stem (2) finger-tight to protect threads of valve stem (2).
6. Install head (4) onto adapter (5) finger-tight to protect threads of adapter (5).



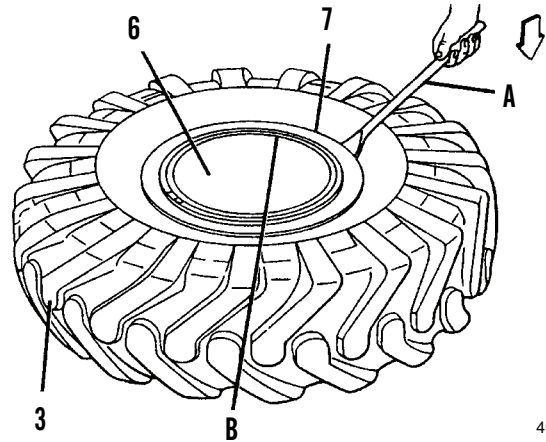
409-525

DEMOUNTING - CONTINUED

- Place wheel assembly (6) and tire (3) flat on floor with aligning ring (7) facing up.

WARNING

When dislodging tire beads, lock rings, or aligning rings, be absolutely certain no air pressure remains in tire. Failure to follow this warning may cause injury or death.



409-526

CAUTION

Use care when demounting tires to avoid damaging tire beads or bead seats.

- Loosen outer tire bead from aligning ring (7) by inserting curved bead breaker tire iron (A) between tire bead and aligning ring (7).

NOTE

Rim B is part of wheel assembly.

- Work progressively around rim (B) rotating tire iron (A) down, until tire bead is completely free of aligning ring (7).

DEMOUNTING - CONTINUED**NOTE**

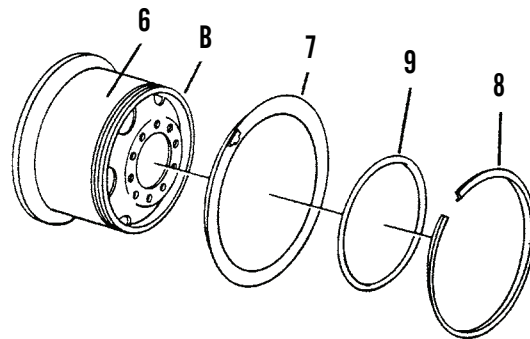
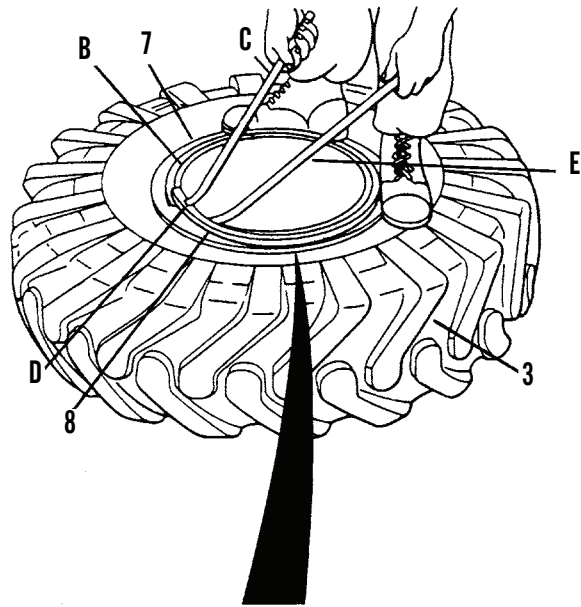
The aligning ring encircles the lock ring which prevents unintended lock ring removal. An O-ring positioned between aligning ring and rim (B) creates an airtight seal.

10. Force outer tire bead and aligning ring (7) down towards center of wheel assembly (6) by standing on tire (3) and aligning ring (7).
11. Remove lock ring (8) by inserting lock ring tire iron (C), curved side up, into prying notch (D) on lock ring (8) and gutter of rim (B).
12. Pry lock ring (8) out enough to insert flat tire iron (E), adjacent to tire iron (C), between lock ring (8) and base of rim (B).
13. Work both tire irons (C and E) progressively around rim (B) until lock ring (8) is completely removed.
14. With lock ring (8) removed, hold aligning ring (7) down to remove and discard O-ring (9) from rim (B).

NOTE

If aligning ring becomes cocked on rim (B), its removal will be difficult.

15. Slide aligning ring (7) off rim (B) by lifting flange of aligning ring (7) straight up.



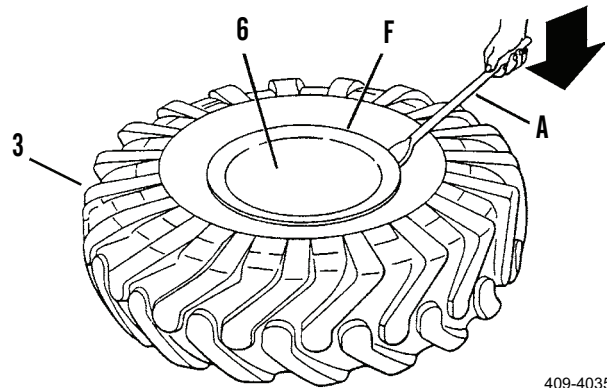
409-4037

DEMOUNTING - CONTINUED

NOTE

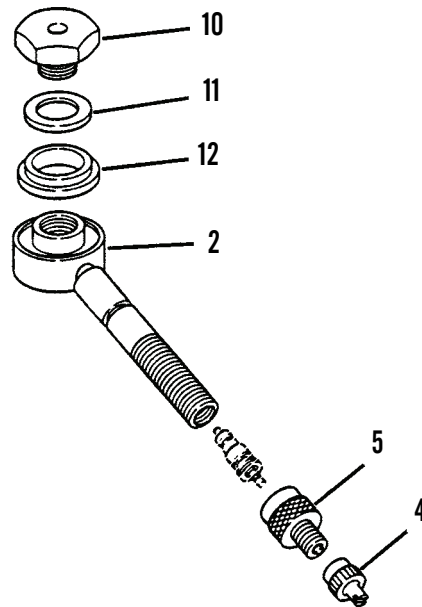
Rim flange (F) is an integral part of wheel assembly.

16. Turn tire (3) and wheel assembly (6) over and loosen inner tire bead from rim flange (F) by inserting a curved bead-breaker tire iron (A) between tire bead and rim flange (F).
17. Work progressively around rim flange (F), rotating tire iron (A) down, until inner tire bead is completely free to rim flange (F).



409-4035

18. Lift wheel assembly (6) completely out of tire (2).
19. If necessary, remove valve stem (2) from wheel assembly (6).
20. Remove cap (4) from adapter (5).
21. Remove adapter (5) from valve stem (2).
22. Remove lock screw (10) and spacer (11) securing valve stem (2) to wheel assembly (6). Remove valve stem (2). Discard lock screw.
23. If necessary, remove and discard rubber grommet (12) from valve stem (2).



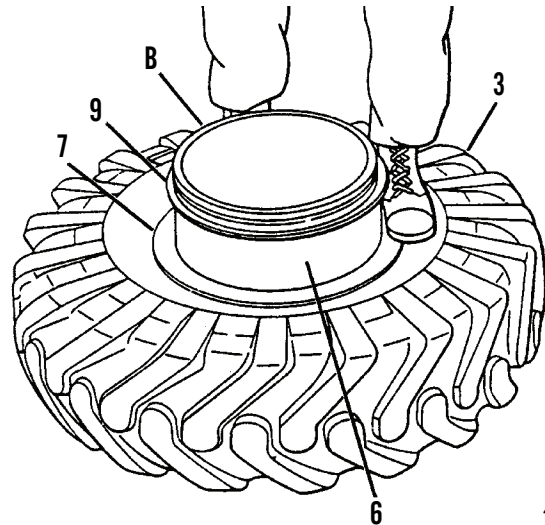
409-529

MOUNTING

1. If removed, install new rubber grommet (12) to valve stem (2).
2. Position valve stem (2) on wheel assembly (6) and secure with spacer (11) and new lock screw (10).

MOUNTING - CONTINUED

3. Install adapter (5) onto valve stem (2) to protect threads of valve stem (2).
4. Install head (4) onto adapter (5) to protect threads of adapter.
5. Place wheel assembly (6) flat on floor with demounting side facing up.
6. Place tire (3) with properly lubricated tire bead on wheel assembly (6).

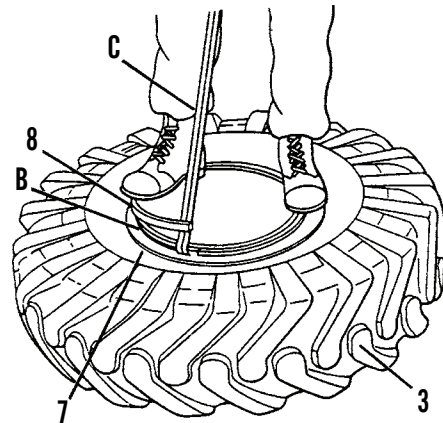


409-530

NOTE

- If aligning ring becomes cocked, installing the flange will be difficult.
- Rim B is part of wheel assembly.

7. Force aligning ring (7) down towards center of rim (B) base.
8. Hold aligning ring (7) down and install new O-ring (9) on rim (B).
9. Align prying notch of lock ring (8) opposite of valve stem.
10. Install lock ring (8) by placing end without prying notch into gutter of rim (B).
11. Using a lock ring tire iron (C), pry lock ring (8) over edge of rim (B).
12. Work progressively around rim (B) prying with tire iron (C), stepping on lock ring (8) and forcing it down into gutter of rim (B) until completely installed.



409-531

CAUTION

Use care when assembling rim components to avoid dislodging the O-ring.

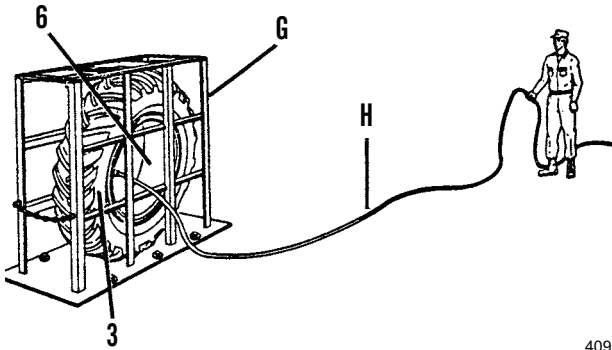
13. Allow aligning ring (7) to come up over O-ring (9) and onto lock ring (8).
14. Temporarily inflate tire (3) and check for proper seating of tire beads, aligning ring (7) and lock ring (8).

WARNING

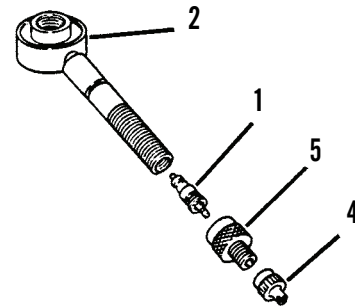
- Always inflate tires mounted on rims with aligning rings or lock rings in an inflation safety cage. Failure to follow this warning may cause injury or death.
- Improperly seated aligning rings or lock rings could blow off during inflation. Never attempt to seat aligning rings or lock rings during or after inflation. Failure to follow this warning may cause injury or death.
- Never over-inflate tires to seat tire beads. Failure to follow this warning may cause injury or death.
- When inflating tires in a safety cage, always use an airhose and gauge for safety cage use. Failure to follow this warning may cause injury.

MOUNTING - CONTINUED

15. Place wheel assembly (6) and tire (3) in inflation safety cage (G).
16. Remove cap (4) from adapter (5).
17. Using an airhose and gauge (H) for safety cage use, inflate tire (3) enough to seat both tire beads. Tire beads should seat before reaching maximum tire pressure of 45 psi (310 kPa).
18. Remove airhose and allow tire to completely deflate. Visually inspect tire beads, aligning ring (7) and lock ring (8) to see that they are properly seated.
19. Install valve core (1) to valve stem (2) and inflate tire (3) to proper pressure.
20. Remove adapter (5) from valve stem (2).
21. Install valve core (1) into valve stem (2) with valve core extractor.



409-532

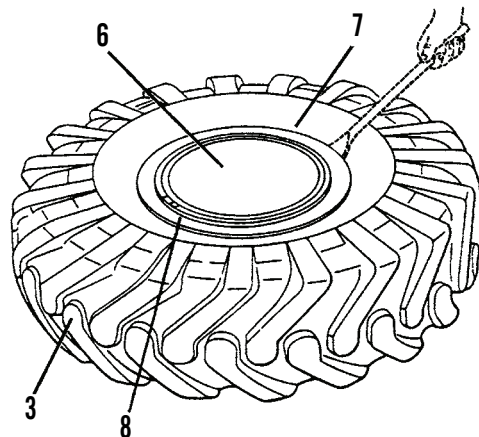


409-533

NOTE

Inflate tires for front axle to 45 psi (310 kPa). Inflate tires for rear axle to 40 psi (276 kPa).

22. Inflate tire (3) to normal operating pressure and visually inspect tire beads, aligning ring (7) and lock ring (8) to see that they are properly seated.
23. Install cap (4) onto adapter (5) finger-tight and remove wheel assembly (6) from inflation safety cage (G).



409-534

24. Install wheel assembly to vehicle (WP 0134 00).

END OF WORK PACKAGE

STEERING WHEEL REPLACEMENT

0136 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Equipment Condition

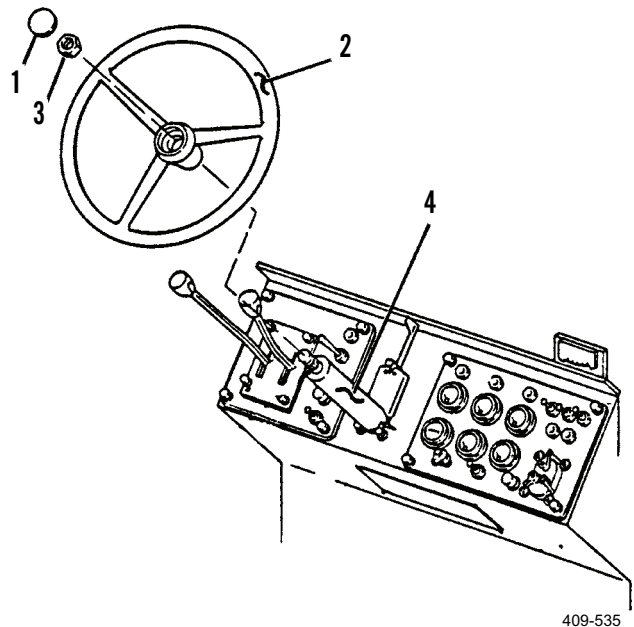
- Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL

1. Pry off cap (1) from center of steering wheel (2).
2. Remove nut (3) securing steering wheel (2) to steering column (4).
3. Pull wheel (2) off steering column (4) using a puller.

INSTALLATION

1. Position steering wheel (2) on steering column (4).
2. Secure steering wheel (2) with nut (3). Tighten nut to 50 lb-ft (68 Nm).
3. Push cap (1) onto steering wheel (2).

**END OF WORK PACKAGE**

STEERING COLUMN REPLACEMENT

0137 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (2)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

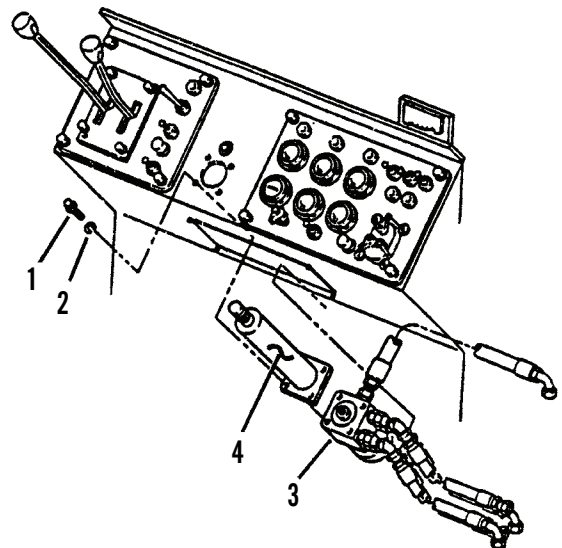
Turn signal switch removed (WP 0093 00)

Steering wheel removed (WP 0136 00)

REMOVAL**CAUTION**

Support steering control valve and steering column as necessary during removal so these parts do not drop when bolts and lockwashers are removed.

1. Remove four capscrews (1) and four lockwashers (2) securing steering column valve (3) and steering column (4). Discard lockwashers.
2. Separate steering control valve (3) from steering column (4). Push steering control valve to one side to provide room for removal of column.
3. Remove steering column (4) through access hole at base of dashboard.



409-536

INSTALLATION**NOTE**

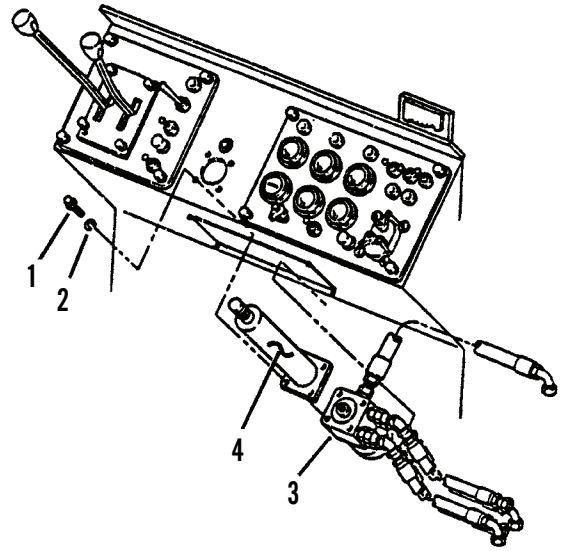
Support steering control valve and steering column as necessary during installation so these parts do not drop prior to installation of capscrew and lockwasher.

1. If necessary, push steering control valve (3) to one side to provide room for installation of steering column (4).
2. Carefully position steering column (4) through access hole at base of dashboard and through column hole on dashboard.

NOTE

Hose connections for control valve are on the right side.

3. Position steering control valve (3) on steering column (4). Turn steering column shaft as necessary to engage splines.
4. Align capscrew holes on valve (3) and column (4).



409-536

NOTE

Apply loctite to threads of capscrews.

5. Secure steering control valve (3) and column (4) to dashboard with four new lockwashers (2) and four capscrews (1). Torque capscrews in a crisscross pattern to 15 lb-ft (20 Nm).
6. Install steering wheel (WP 0136 00).
7. Install turn signal switch (WP 0093 00).

END OF WORK PACKAGE

TIE ROD ADJUSTMENT

0138 00

THIS WORK PACKAGE COVERS

Adjustment

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 38, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

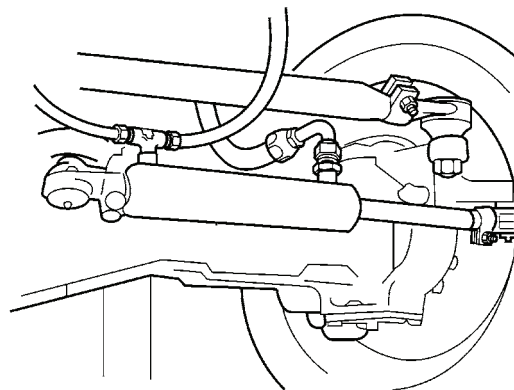
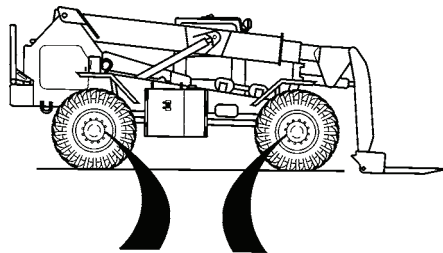
Parking brake applied (TM 10-3930-660-10)

NOTE

The following adjustment procedures apply to both the front and rear tie rods.

ADJUSTMENT

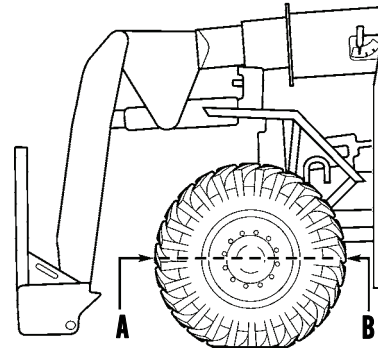
1. Measure toe-in of wheels.
2. Start engine and straighten wheels on axle. Stop engine (TM 10-3930-660-10).



409-4099

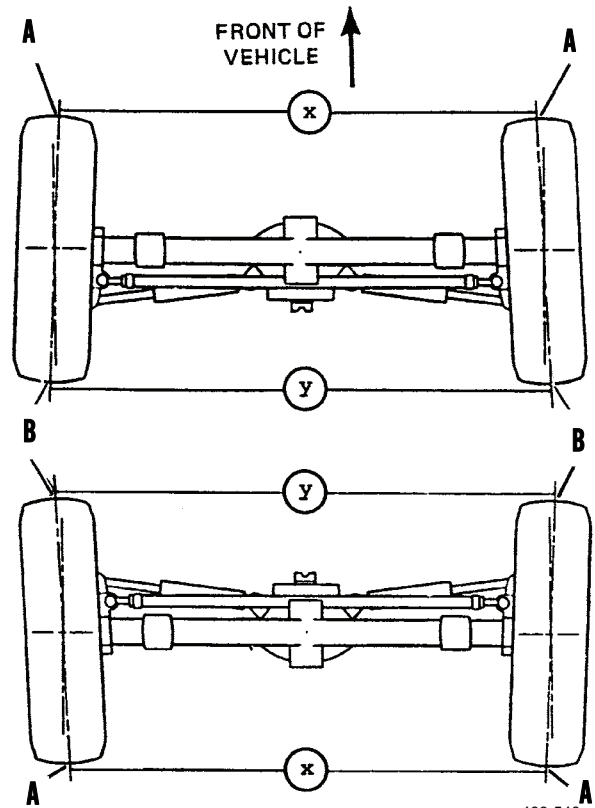
ADJUSTMENT - CONTINUED

3. Mark front tread surface (A) of each tire on the axle with mark centered on tread width and at same level as distance from ground to center of axle hub.
4. Mark rear tread surface (B) of each tire on the axle with mark centered on tread width and at same level as distance from ground of center of axle hub.
5. Measure the distance (X) between the two marks on the front tread surfaces (A) of tires made in step 3.



409-539

6. Measure the distance (Y) between the two marks on the rear tread surfaces (B) of tires made in step 4.
7. Distance (X) between marks on front of tires should measure 0 to 1/8 in. (0 to 3.175 mm), less than distance (Y) between marks on rear of tires.

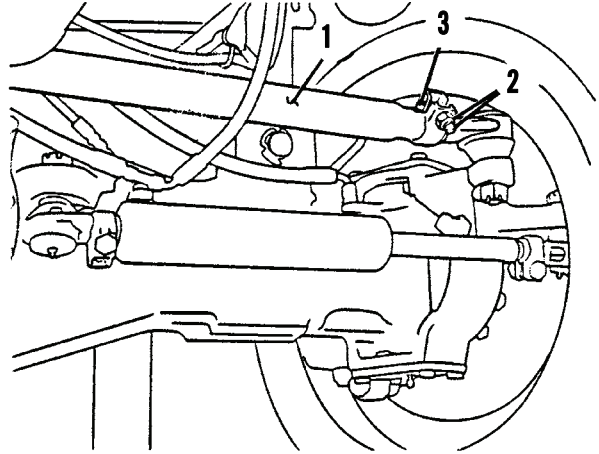


409-540

8. If toe-in specifications outlined in step 7 are not met, adjust tie rod as described in step 9 thru 12.

ADJUSTMENT - CONTINUED

9. If necessary, adjust tie rod (1) for proper toe-in measurements.
10. Loosen nut and capscrew (2) at clamps (3) on each end of tie rod (1).
11. Turn tie rod (1) as required until proper toe-in measurements are achieved, as described in step 7.



409-541

12. Torque nut and capscrew (2) at clamps (3) on each end of tie rod (1) to 50-65 lb-ft (68-88 Nm).

END OF WORK PACKAGE

EMERGENCY STEERING PUMP REPLACEMENT

0139 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)
 Container, 6 gal.
 Lockwasher (16)

References

WP 0172 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

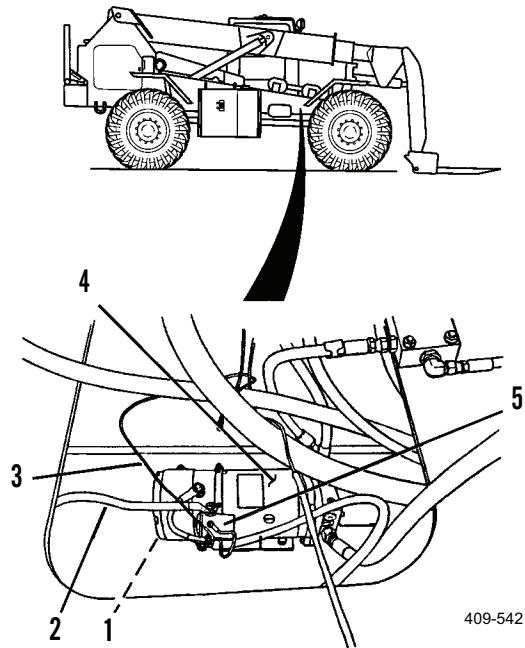
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug hoses after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- The emergency steering pump is located under the vehicle frame.

REMOVAL - CONTINUED

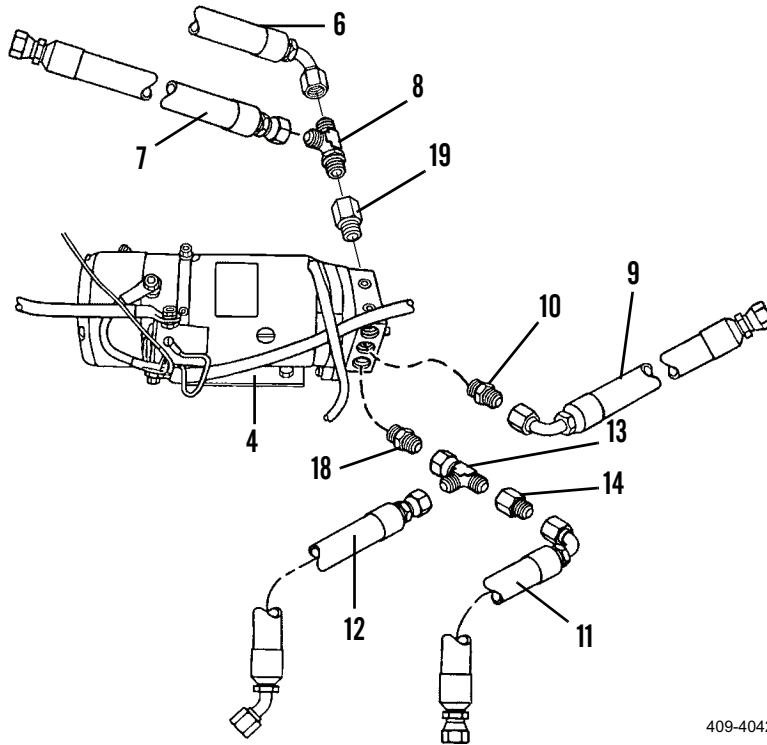
1. Disconnect power cable (1) and negative cable (2) from pump (4).
2. Disconnect electrical lead (3) from relay (5).

**NOTE**

Hose is connected directly to hydraulic reservoir. When disconnecting any hose directly connected to reservoir at pump end, hose must be elevated, plugged and tied in an up position above the level of fluid in the reservoir.

3. Disconnect and plug hoses (6 and 7) from tee (8).
4. Disconnect and plug hose (9) from adapter (10).
5. Disconnect and plug hoses (11 and 12) from tee (13) and adapter (14).

REMOVAL - CONTINUED



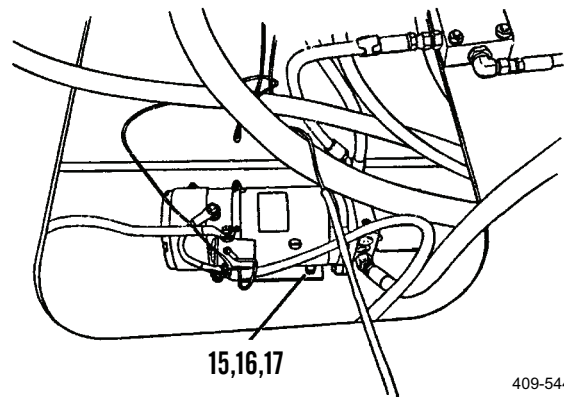
WARNING

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

NOTE

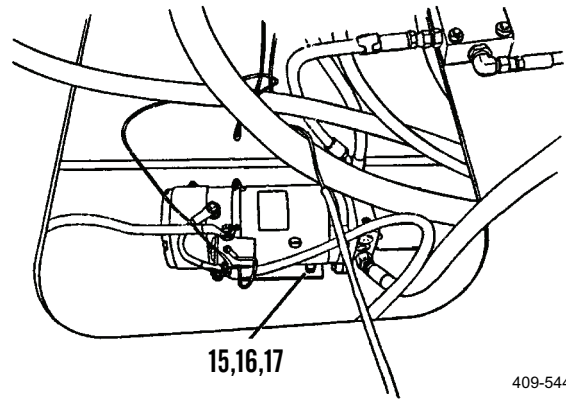
Weight of pump is 47 lb (21 kg).

6. With assistance, remove four capscrews (15), four lockwashers (16), four nuts (17), and carefully remove pump (4) from vehicle frame. Discard lockwashers.
7. Remove adapter (10) from pump (4).
8. Remove adapter (14), tee (13) and adapter (18) from pump (4).
9. Remove tee (8) and check valve (19) from pump (4).



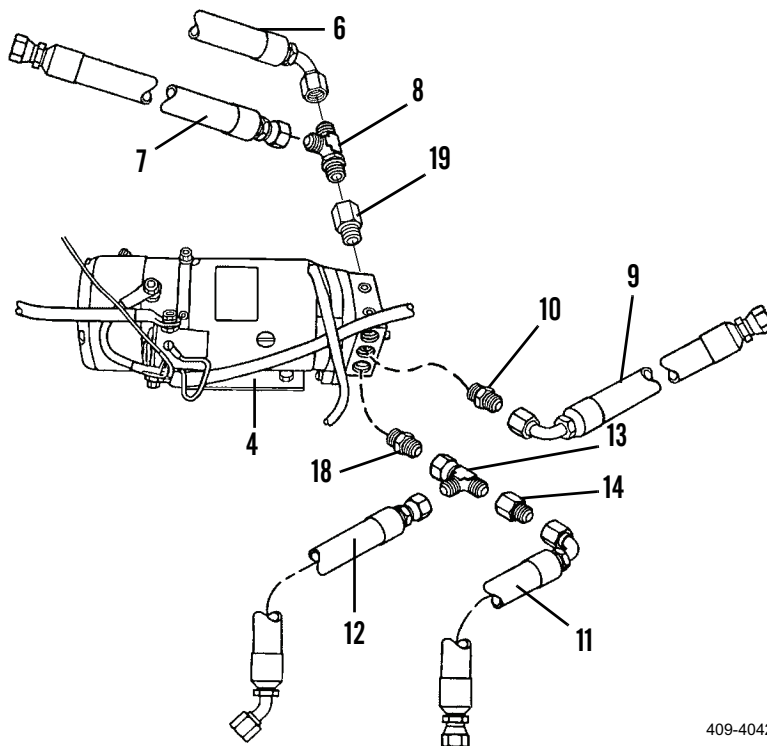
INSTALLATION

1. Install check valve (19) and tee (8) to pump (4).
2. Install adapter (18), tee (13) and adapter (14) to pump (4).
3. Install adapter (10) to pump (4).
4. With assistance, support and position pump (4) on vehicle frame and secure with four nuts (17), four new lockwashers (16) and four capscrews (15).



409-544

5. Connect hoses (11 and 12) to adapter (14) and tee (13) as tagged.
6. Connect hose (9) to adapter (10) as tagged.

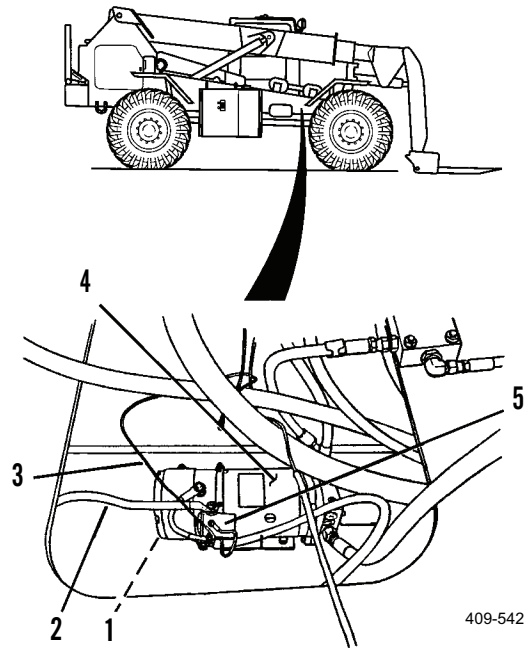


409-4042

7. Connect hoses (6 and 7) to tee (8) as tagged.

INSTALLATION - CONTINUED

8. Connect power cable (1) and negative cable (2) to pump (4) as tagged.
9. Connect electrical lead (3) to relay (5) on pump (4) as tagged.



10. Connect battery cables (WP 0107 00).
11. Start engine and check for leaks (TM 10-3930-660-10).
12. Check emergency steering pump for proper operation.
13. Move emergency steering switch to the ON position.
14. Turn starter switch to the ON position but do not start the engine.
15. Turn steering wheel and verify that wheels on vehicle move left to right.
16. Turn starter switch to the OFF position and move emergency steer switch to the OFF position.
17. If necessary, purge air from hydraulic system (WP 0172 00).

END OF WORK PACKAGE

STEERING HOSES, LINES AND FITTINGS REPLACEMENT

0140 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

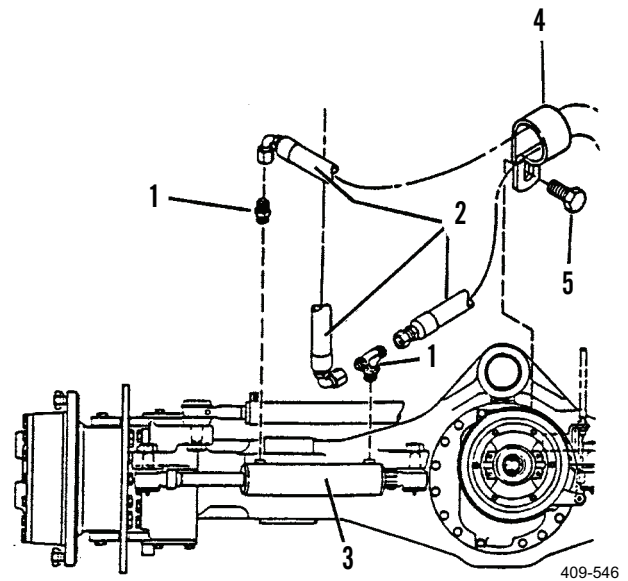
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug openings after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

REMOVAL - CONTINUED

1. Remove fittings (1) and hoses (2) at hydraulic components (3) as required.
2. Loosen and remove hoses (2) from fittings (1).
3. Loosen and remove fittings (1), from hydraulic components (3).



AXLE ASSEMBLY HOSES AND FITTINGS

409-546

NOTE

Note location of clamps for use during installation.

4. Remove clamps (4) and mounting hardware (5) from hoses (2) as required.

NOTE

Note routing of hoses on vehicle for use during installation.

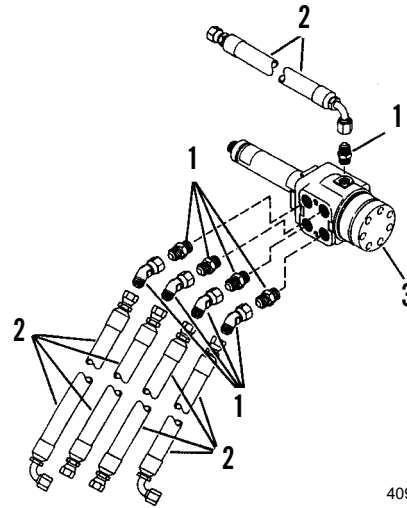
5. Carefully remove hoses (2) from vehicle frame as required.

INSTALLATION

NOTE

- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hydraulic components and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.
- The hydraulic lines must be mounted (indexed) in such a way to allow movement of the lines during steering without rubbing, crimping or exceeding the minimum bend radius.

1. Carefully position hoses (2) on vehicle frame as noted during removal.
2. Install fittings (1) and hoses (2) at hydraulic components (3).
3. Install fittings (1) to hydraulic components (3).
4. Install hoses (2) to fittings (1).



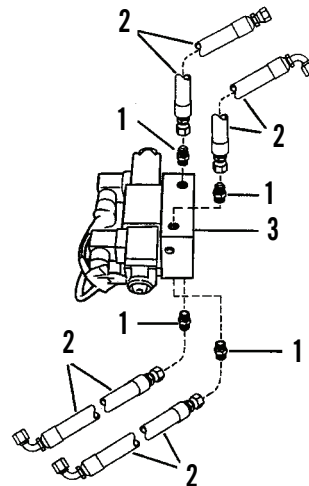
409-547

STEERING CONTROL VALVE HOSES AND FITTINGS

NOTE

Install clamps at locations noted during removal.

5. Install clamps (4) and mounting hardware (5) to hoses (2).
6. Start engine and operate steering. Check for proper operation and leaks (TM 10-3930-660-10).
7. With assistance, operate the forklift through the full steering range; checking to ensure freedom of movement of all lines.



409-548

STEERING SELECT VALVE HOSES AND FITTINGS

END OF WORK PACKAGE

STEERING CYLINDERS REPLACEMENT**0141 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)
 Cotter pin (7)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Parking brake applied (TM 10-3930-660-10)
 Wheel assembly removed (WP 0134 00)

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

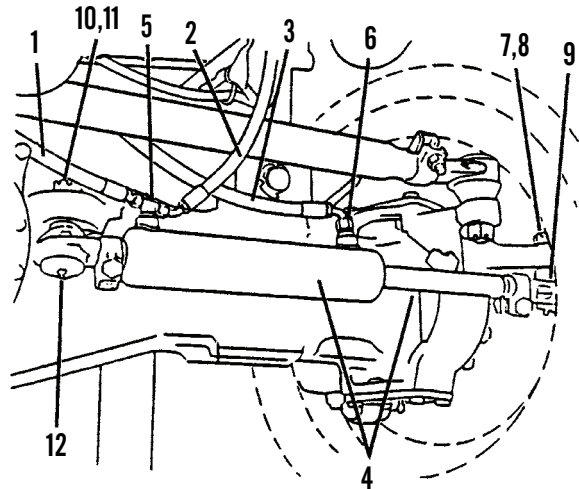
CAUTION

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

REMOVAL - CONTINUED**NOTE**

- There are two configurations for the cylinders; left front and right rear use the same cylinder. The right front and left rear use the other cylinder.
- The steering cylinder must be adjusted after the knuckle is inspected or after the tie rod is moved to adjust the toe.
- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.

1. To disconnect three hydraulic hoses (1 thru 3) at steering cylinder (4), remove hoses (1 and 2) from tee (5).
2. Remove hose (3) from adapter (6).
3. Remove tee (5) and adapter (6) from ports of cylinder (4).
4. On one side of machine, remove cotter pin (7) and nut (8). Discard cotter pin.
5. Using a pickle fork or equivalent, separate steering cylinder (4) from ball joint end cap assembly (9).



409-549

CAUTION

Do not strike nut or ball joint to remove steering cylinder. Damage to ball joint end cap assembly may occur.

6. Remove nut (9).
7. Repeat steps 4-6 to remove items (10 thru 12) at other end of steering cylinder (4) and remove cylinder from axle.

INSTALLATION

1. Place steering cylinder ball joint end cap assembly (12) into tapered hose on axle.
2. Install nut (11). Torque to 250 lb-ft (339 Nm).
3. Install new cotter pin (10). If necessary, tighten nut until holes align. Do not loosen nut (11) to install cotter pin (10).
4. Place steering cylinder ball joint end cap assembly (9) into tapered hose at wheel end.
5. Install nut (8). Torque to 250 lb-ft (339 Nm).

NOTE

Do not loosen nut to install cotter pin.

6. Install new cotter pin (7). If necessary, tighten nut (8) until holes align.

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hydraulic components and hoses clean and dry.

7. Install tee (5) and adapter (6) to ports of cylinder (4).
8. Install hose (3) to adapter (6).
9. Install hose (1 and 2) to tee (5).

INSTALLATION - CONTINUED

NOTE

Perform the following steps to bleed air from steering system.

10. Install wheel assembly (WP 0134 00).
11. Start engine (TM 10-3930-660-10).
12. Place steering select control in crab position (TM 10-3930-660-10).
13. Turn wheels fully to one side and fully to the other side five times.
14. Place steering select control in 4-wheel position (TM 10-3930-660-10).
15. Turn wheels fully to one side and fully to the other side five times.
16. Stop engine (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Personnel Required

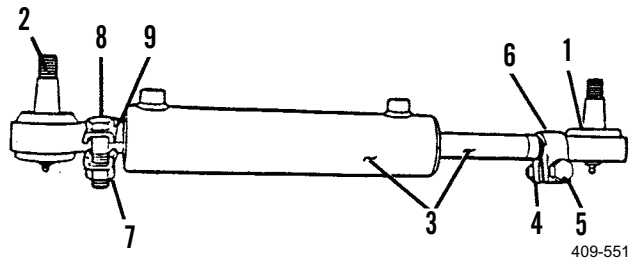
Two

Equipment Condition

Steering cylinder removed (WP 0141 00)

REMOVAL

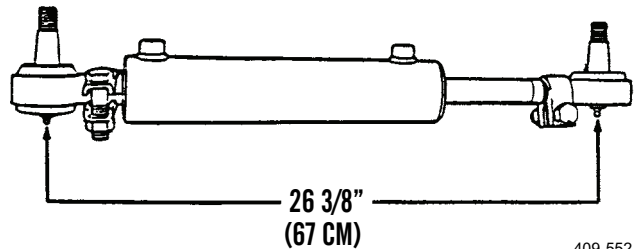
1. To remove ball joint end cap assemblies (1) and (2) from steering cylinder (3), loosen nut (4) and cap-screw (5) on clamp (6).
2. Unscrew ball joint end cap (1) from steering cylinder (3).
3. Loosen nut (7) and capscrew (8) on clamp (9).
4. Unscrew ball joint end cap (2) from steering cylinder (3).



409-551

INSTALLATION

1. Install ball joint (2) on steering cylinder (3). Screw ball joint (2) onto steering cylinder (3) until it stops.
2. Tighten nut (7) and capscrew (8) on clamp (9).
3. Install ball joint end cap (1) on steering cylinder (3).
4. Pull out rod of steering cylinder (3) until it is fully extended.
5. Rotate ball joint end cap (1) as required until distance between grease fittings on ball joints (1) and (2) is 26-3/8 in. (67 cm).
6. Tighten nut (4) and capscrew (5) on clamp (6).
7. Install steering cylinder (WP 0141 00).



409-552

END OF WORK PACKAGE

STEERING CONTROL VALVE REPLACEMENT**0143 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Turn signal switch removed (WP 0093 00)

Steering wheel removed (WP 0136 00)

Steering column removed (WP 0137 00)

Personnel Required

Two

REMOVAL**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

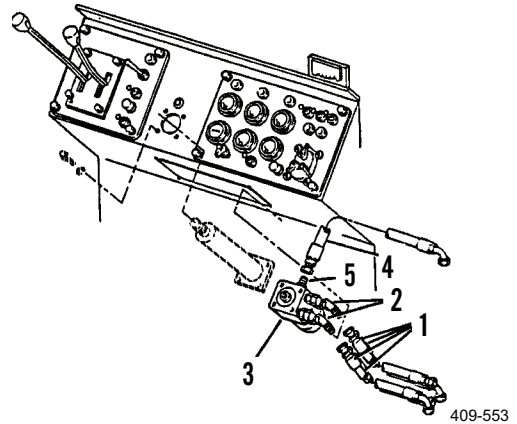
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL - CONTINUED

1. Disconnect four steering hoses (1) from four elbows (2) at steering control valve (3).
2. Remove pilot pressure hose (4) from adapter (5).
3. If necessary, remove four elbows (3), four adapters (6) and adapter (5) from steering control valve (3).

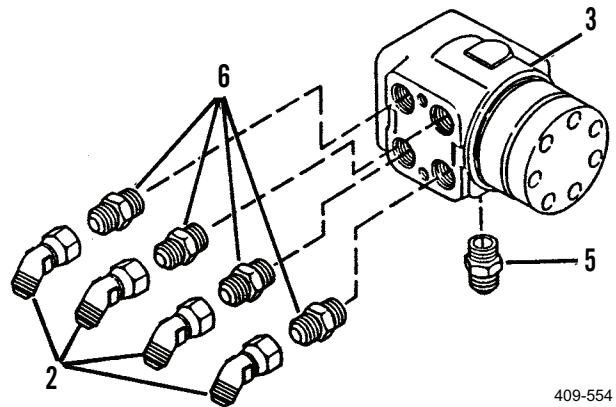


INSTALLATION

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

1. If removed, install four elbows (2), four adapters (6) and adapter (5) to steering control valve (3).
2. Connect hydraulic hoses (1) to steering control valve (3).
3. Connect pilot pressure hose (4) to adapter (5) at steering control valve (3).
4. Connect four steering hoses (1) to four elbows (2) at valve (3).



5. Install steering control valve (3) to steering column (4).
6. Install steering column (WP 0137 00).
7. Install turn signal switch (WP 0093 00).
8. Install steering wheel (WP 0136 00).
9. Start engine (TM 10-3930-660-10).
10. With engine running, cycle steering wheel five complete turns right and left to bleed air from control valve (TM 10-3930-660-10).
11. Check for proper operation and leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Oil, lubricating (Item 32, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (6 and 9)
- O-ring (13 and 16)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Batteries cables disconnected (WP 0107 00)

REMOVAL



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

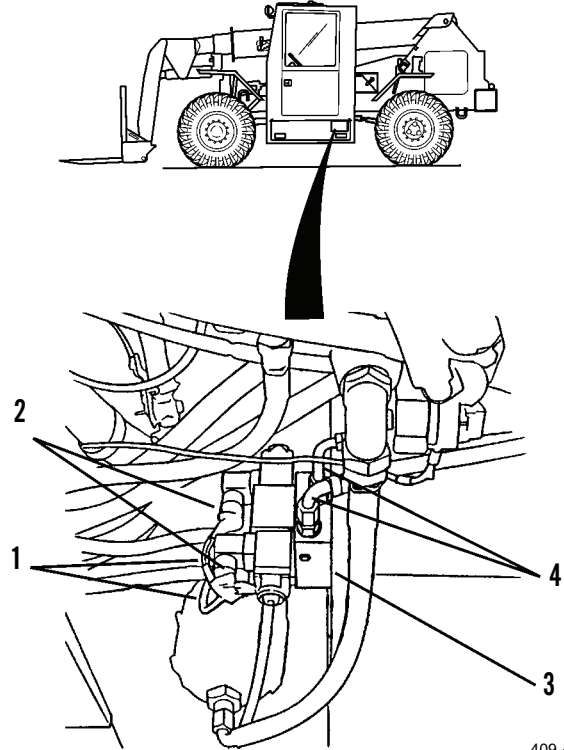
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug openings after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL - CONTINUED

1. Tag and remove two electrical leads (1) at plugs (2) from steering select valve (3).
2. Tag and disconnect four hydraulic hoses (4) from valve (3).

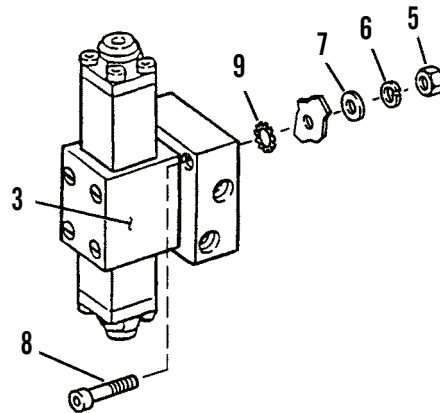


409-4010

NOTE

- Note position of valve as mounted on vehicle for use during installation.
- Note that nuts, lockwashers and washer are accessed from inside cab tool box. Lockwashers are located between valve and backside of cab tool box.

3. Remove two nuts (5), lockwashers (6), washers (7), capscrews (8) and lockwashers (9) securing valve (3) to the vehicle. Discard lockwashers.
4. Remove valve (3) from the vehicle.



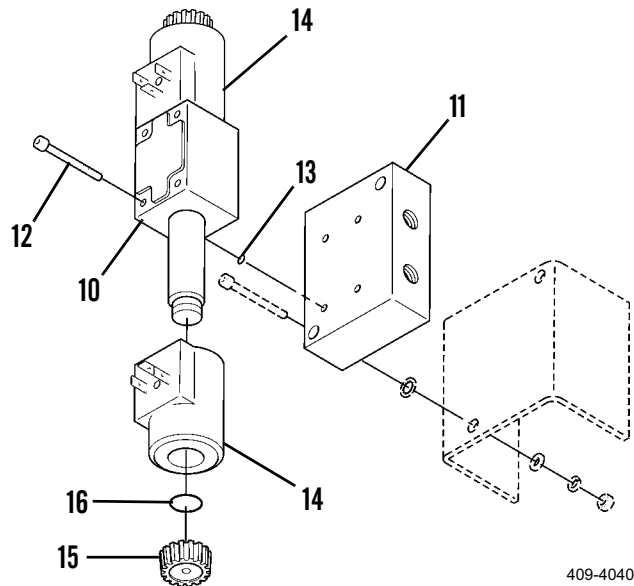
409-557

DISASSEMBLY

1. Remove four capscrews (12) and separate valve body (10) from valve plate (11).
2. Remove and discard four O-rings (13) from between ports of valve body (10) and valve plate (11).
3. Separate solenoids (14) from valve body (10).
4. Remove and discard O-ring (16) from between each solenoid (14) and knob (15).

ASSEMBLY

1. Position one new O-ring (16) between each solenoid (14) and knob (15).



2. Secure each solenoid (14) to valve body (10).
3. Position four new O-rings (13) between ports of valve body (10) and valve plate (11).
4. Secure valve body (10) to valve plate (11) with four capscrews (12).

INSTALLATION**NOTE**

- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.
- Position valve on vehicle as noted during removal.
- Note that nuts, lockwashers and washers are accessed from inside the cab tool box. Lockwashers are located between valve and backside of tool box.

1. Position valve (3) on vehicle.
2. Secure with two lockwashers (9), two capscrews (8), two washers (7), two new lockwashers (6) and two nuts (5).
3. Connect four hydraulic hoses (4) as tagged.
4. Connect two electrical leads (1) at plugs (2) of steering select valve (3).
5. Insert plugs (2) of two electrical leads (1) into two socket terminals of steering select valve (3) as tagged.
6. Connect battery cables (WP 0107 00).
7. Bleed the steering system hydraulic circuit by selecting four-wheel steering and cycling the steering cylinders five times (TM 10-3930-660-10).

END OF WORK PACKAGE

COUNTERWEIGHT REPLACEMENT

0145 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Load backrest removed from storage position (TM 10-3930-660-10)

REMOVAL



WARNING

Use extreme caution when lifting counterweight with a forklift. Never allow forks to tip forward. Counterweight top mount pin holes must be fastened to the lifting forklift when counterweight is not supported by vehicle being worked on.

CAUTION

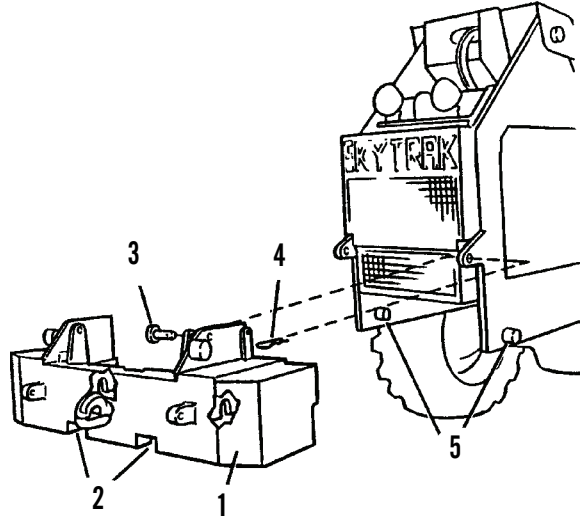
When placing forks in counterweight, tips of forks must not protrude past front of counterweight. Possible damage to vehicle engine from forks may result.

NOTE

Weight of counterweight is 3,600 lb (1633 kg). Use a forklift of at least 4,000 lb (1814 kg) capacity for lifting the counterweight.

REMOVAL - CONTINUED

1. Position forklift forks in counterweight pockets (2) and raise forks just enough to release tension from pins (3).
2. Remove two lockpins (4) and two straight pins (3).
3. Fasten counterweight (1) to forklift using chain or cable.
4. Lift counterweight (1) approximately one in. (25 mm) and then tilt fork tips up just enough to clear counterweight from vehicle frame mounts (5).
5. Carefully remove counterweight (1) from the vehicle.
6. Back lifting forklift away from the vehicle and then lower counterweight (1) to the ground.



409-562

INSTALLATION**WARNING**

Use extreme care when lifting counterweight with a forklift. Never allow forks to tip downward. Always tie counterweight top mount pin holes to the lifting forklift. Failure to follow this warning may allow counterweight to slide forwards off forks resulting in damage to equipment and injury or death to personnel.

CAUTION

When placing forks in counterweight, tips of forks must not protrude past front of counterweight. Protruding fork tips may damage engine area of vehicle.

NOTE

Weight of counterweight is 3,600 lb (1633 kg). Use a forklift of at least 4,000 lb (1814 kg) capacity for lifting the counterweight.

1. Position lifting forklift forks in pockets (2) of counterweight (1).
2. Use a chain or cable to fasten counterweight top mount pin holes to forklift.

INSTALLATION - CONTINUED

3. Carefully lift the counterweight (1) and move it to rear of vehicle to which counterweight is to be attached.
4. Align the counterweight (1) with the vehicle frame.
5. Raise the counterweight until the pin holes in counterweight top mounts are approximately 3 in. (7.6 cm) above pin holes in vehicle frame top mounts.
6. Carefully move the counterweight toward the vehicle until the counterweight pockets are directly over vehicle frame mounting pins (5).

CAUTION

Make sure the counterweight bottom mount pockets fully engage around vehicle frame mounting pins at the rear of the vehicle. If pockets are not engaged, counterweight could tip causing damage to rear of vehicle.

7. Carefully lower the counterweight (1) until the counterweight pockets engage vehicle frame mounting pins (5).
8. Remove chain or cable securing counterweight to the lifting forklift.
9. Install two straight pins (3) and two lock pins (4) to secure counterweight (1) to vehicle.
10. Carefully lower and remove forks of lifting forklift from under counterweight (1).
11. If necessary, install load backrest to storage position (TM 10-3930-660-10).

END OF WORK PACKAGE

PINTLE HOOK MAINTENANCE

0146 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cotter pin (1 and 7)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Load backrest removed from storage position, if stored (TM 10-3930-660-10)

REMOVAL

1. Remove cotter pin (1) and castle nut (2) securing pintle hook (3) in counterweight (4). Discard cotter pin.



WARNING

Use caution when removing pintle hook from counterweight to avoid injury or damage to equipment.

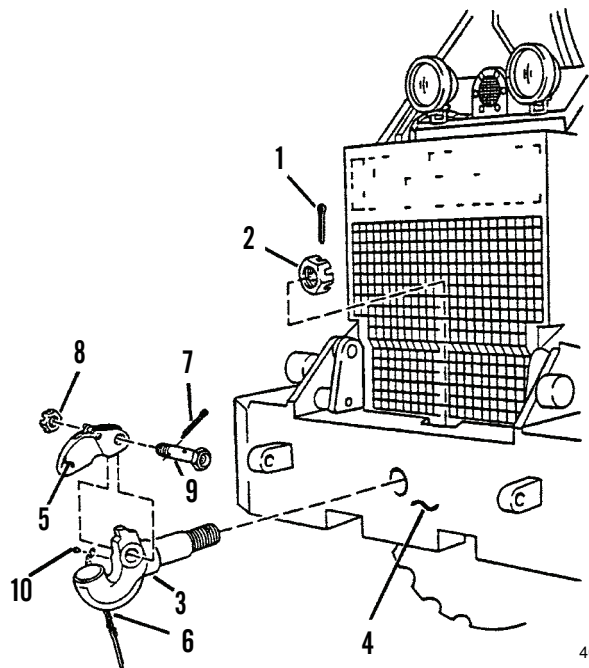
NOTE

Pintle hook weighs 36 lb (16 kg).

2. Remove pintle hook (3) from counterweight (4).

DISASSEMBLY

1. At latch (5), remove chain and pin assembly (6).
2. Pull cotter pin (7) out of castle nut (8) and bolt (9). Discard cotter pin.
3. Remove castle nut (8) and bolt (9) and latch (5) from pintle hook (3).
4. Remove castle nut (18), bolt (9) and latch (5) from pintle hook (3).
5. Remove screw (10) and chain and pin assembly (6) from latch (5).



409-563

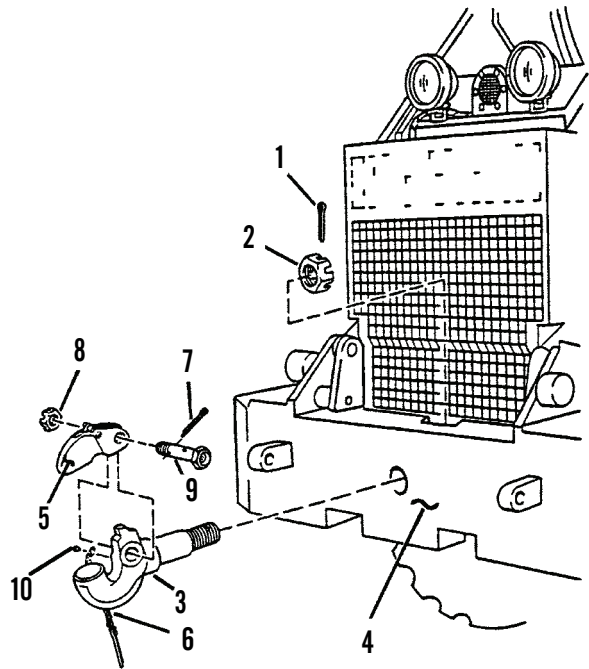
ASSEMBLY

1. Install chain and pin assembly (6) to latch (5) with screw (10).
2. Place latch (5) in position on pintle hook (3) and insert bolt (10).
3. Secure bolt (10) and latch (5) with castle nut (9) and new cotter pin (7).

INSTALLATION**NOTE**

Pintle hook weighs 36 lb (16 kg).

1. Position pintle hook (3) into hole of counterweight (4).
2. Secure pintle hook (3) in counterweight (4) with castle nut (2) and new cotter pin (1).



409-563

3. If necessary, install load backrest in storage position (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (4)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Equipment Condition - Continued

Air cleaner intake removed (WP 0025 00)

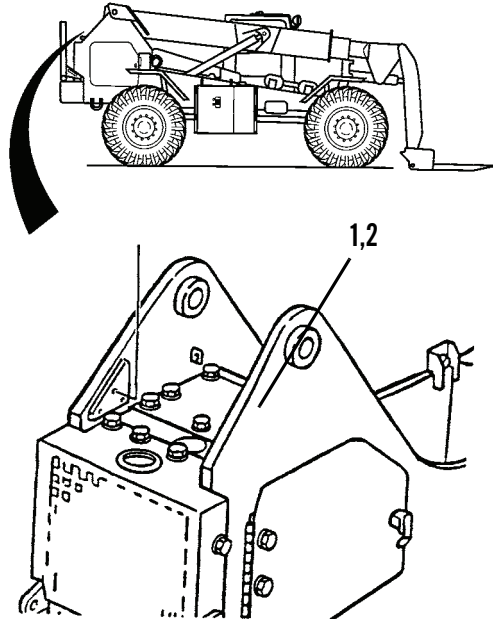
Air cleaner assembly removed (WP 0024 00)

Air cleaner restriction indicator tube removed from underside of front engine cover (WP 0203 00)

Load backrest removed from storage position (TM 10-3930-660-10)

REMOVAL

1. Locate front engine cover (1) and rear engine cover (2).



409-564

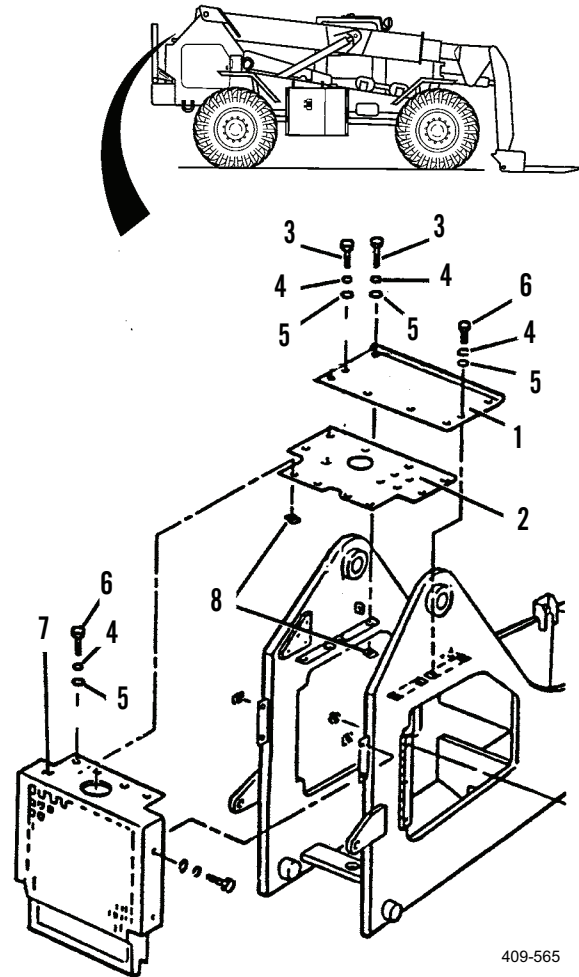
REMOVAL - CONTINUED**NOTE**

Two capscrews (3) are longer than other capscrews used to secure engine covers. Note location of capscrews for use during installation.

2. Remove two capscrews (3), two lockwashers (4) and two flatwashers (5) securing left-hand side of front engine cover (1). Discard lockwashers.
3. Remove remaining twelve capscrews (6), twelve lockwashers (4) and twelve flatwashers (5), securing front engine cover (1) and rear engine cover (2) to each other, to vehicle frame and to radiator cover (7). Discard lockwashers.
4. If necessary, remove fourteen retainer nuts (8) from vehicle frame and rear engine cover (2).

INSTALLATION

1. If removed, install fourteen retainer nuts (8) to vehicle frame and rear engine cover (2).
2. Position front engine cover (1) and rear engine cover (2) on vehicle frame.



409-565

NOTE

- Capscrews (3) are longer than other capscrews used to secure engine covers. Install capscrews as noted during removal.
 - Apply loctite to capscrews as installed.
3. Install two capscrews (3), two new lockwashers (4) and two flatwashers (5) on left-hand side of front engine cover (1).
 4. Install remaining twelve capscrews (6), twelve new lockwashers (4) and twelve flatwashers (5) to secure front engine cover (1) and rear engine cover (2) to each other, to vehicle frame and to radiator cover (7).
 5. Install air cleaner assembly (WP 0024 00).
 6. Install air cleaner restriction indicator tube (WP 0203 00).
 7. Install air cleaner (WP 0025 00).
 8. Install load backrest in storage position, if necessary (TM 10-3930-660-10).

END OF WORK PACKAGE

RADIATOR COVERS REPLACEMENT

0148 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Load backrest removed from storage position (TM 10-3930-660-10)

Materials/Parts

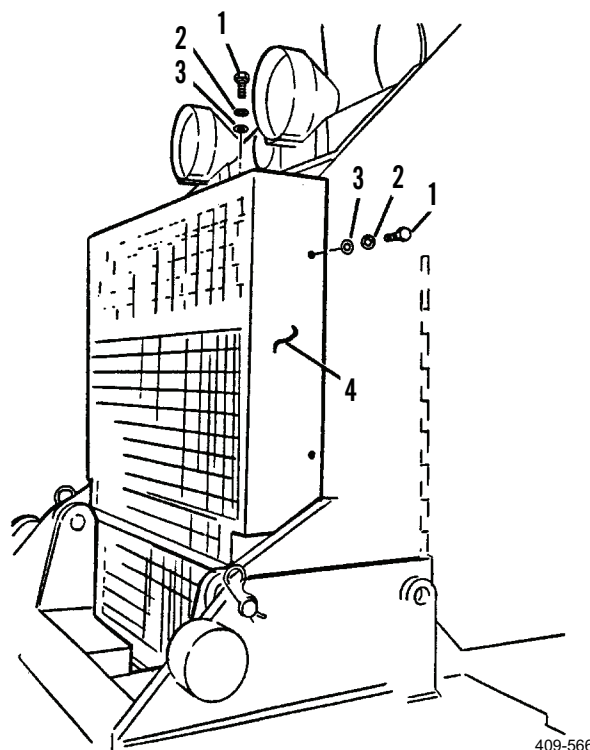
Lockwasher (2)

REMOVAL

1. Remove eight capscrews (1), eight lockwashers (2) and eight flatwashers (3) securing the radiator cover (4). Discard lockwashers.
2. Remove radiator cover (4).

INSTALLATION

1. Position radiator cover (4) on the vehicle.
2. Install eight capscrews (1), eight new lockwashers (2) and eight flatwashers (3) on cover (4).
3. Install load backrest in storage position (TM 10-3930-660-10).



409-566

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)
Lockwasher (4, 8 and 10)

Equipment Condition

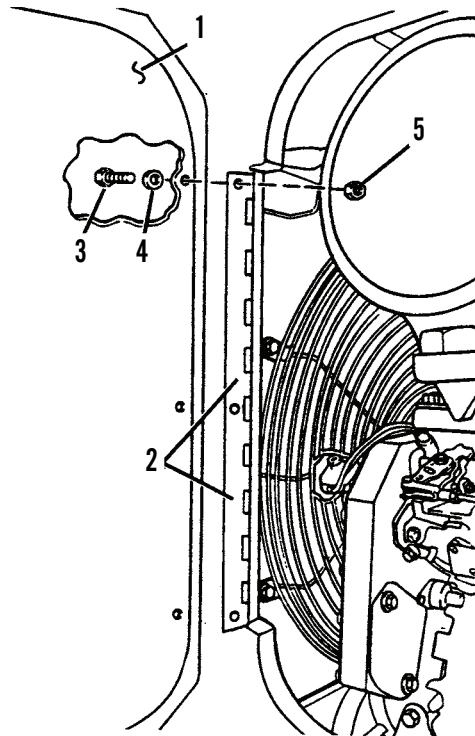
Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL

NOTE

Support engine door panel so door does not drop when mounting hardware is removed.

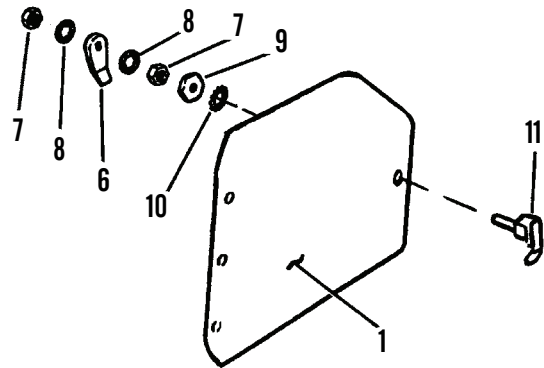
1. Remove engine door panel (1) from hinge (2) by removing three capscrews (3), three lockwashers (4) and three nuts (5). Discard lockwashers.



409-567

REMOVAL - CONTINUED

2. Measure position of latching lever (6) on shaft. Record measurement for reference during installation.
3. Remove jamnut (7), lockwasher (8), latching lever (6), second lockwasher (8) and second jamnut (7). Discard lockwashers.
4. Remove hex nut (9), lockwasher (10) and handle (11). Discard lockwashers.



409-568

INSTALLATION

1. Secure handle (11) with new lockwasher (10) and hex nut (9).

NOTE

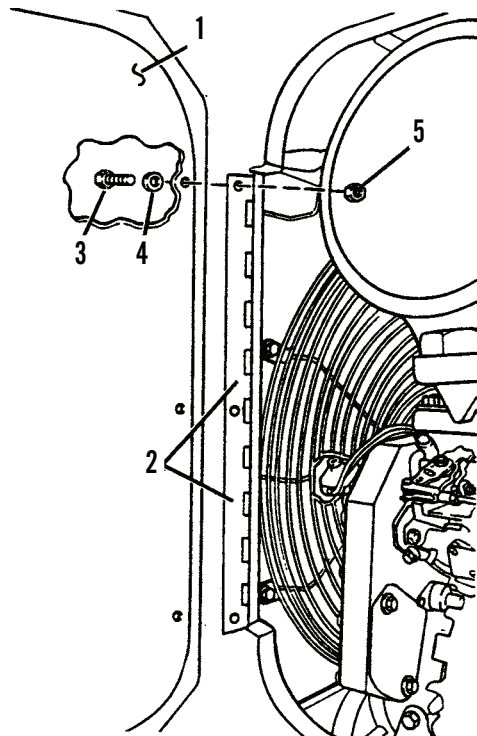
Install jamnuts so that latching lever is properly positioned on shaft. Refer to measurement taken in step 2 of *Removal*.

2. Install jamnut (7), new lockwasher (8), latching lever (6), second new lockwasher (8) and second jamnut (7).

NOTE

Apply loctite to threads of capscrews.

3. Position engine door panel (1) on hinge (2) and secure with three capscrews (3), three new lockwashers (4) and three nuts (5).



409-567

END OF WORK PACKAGE

TRANSMISSION COVER REPLACEMENT

0150 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

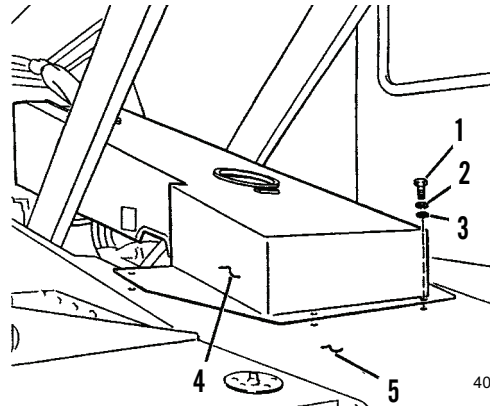
Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (2)

REMOVAL

1. Remove six capscrews (1), six lockwashers (2) and six flatwashers (3) which secure transmission cover (4). Discard lockwashers.
2. Lift cover (4) off of frame (5).
3. If necessary, remove moldings parts (6 thru 10) from cover (4).



409-571

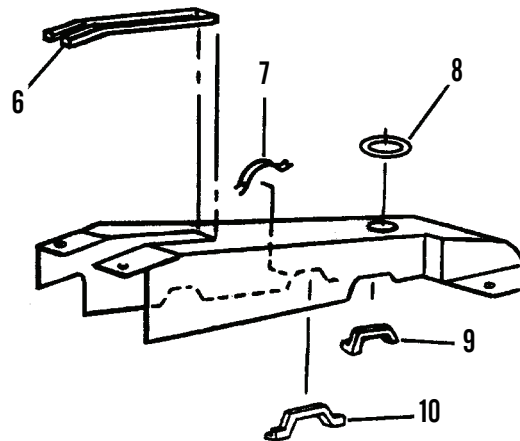
INSTALLATION

1. If removed, install moldings parts (6 thru 10) to cover (4).
2. Position cover (4) on the frame (5).

NOTE

Apply loctite to threads of capscrews.

3. Secure cover (4) using six flatwashers (3), six new lockwashers (2) and six capscrews (1).



409-572

END OF WORK PACKAGE

CAB DOORS MAINTENANCE

0151 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation, Repair

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

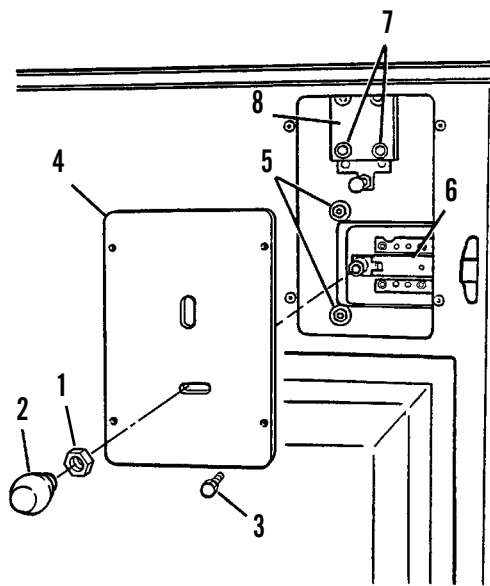
Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Lockwasher (18)

SERVICE

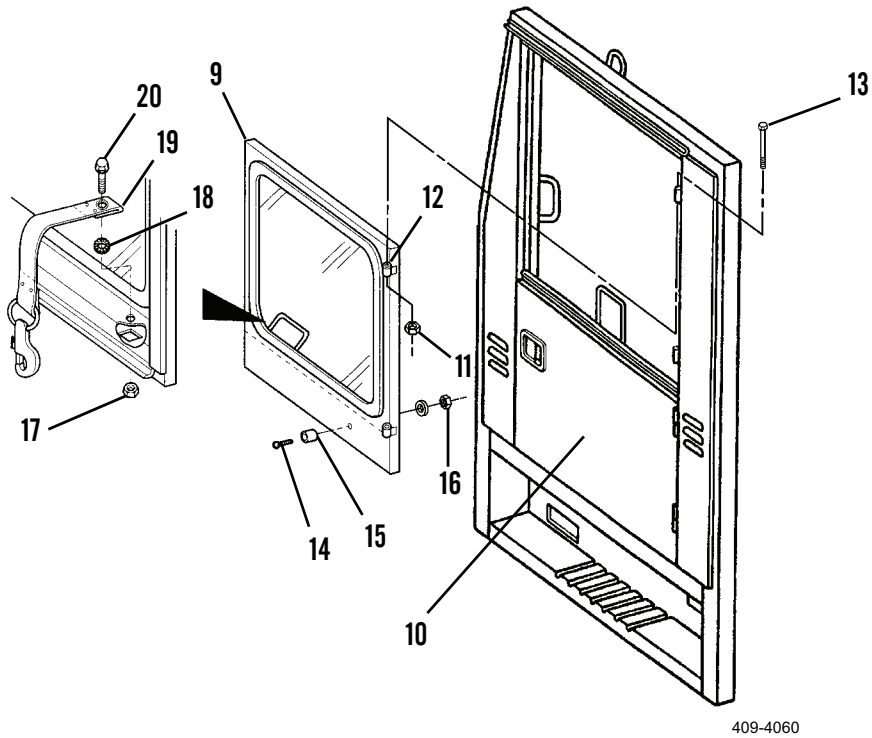
1. Loosen nut (1) and remove knob (2) and nut from stud.
2. Remove four screws (3) and remove access cover (4).
3. Loosen four nuts (5) and reposition lower door latch (6) as required. Tighten nuts.
4. Loosen four screws (7) and reposition upper door latch (8) as required. Tighten screws.
5. Align cover plate (4) and install four screws (3).
6. Apply loctite to stud and install nut (1) and knob (2).
7. Tighten nut (1) against knob (2).



409-4043

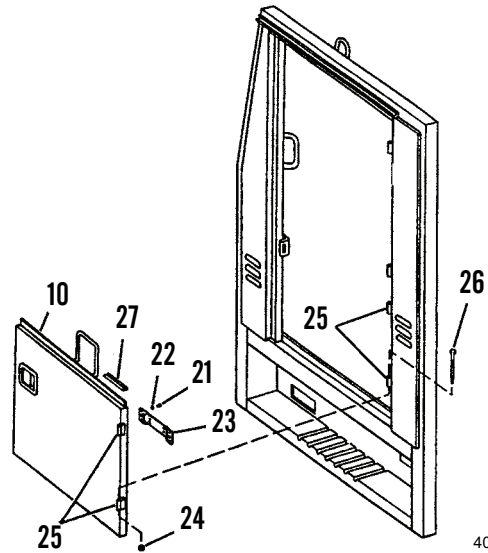
REMOVAL

1. Trip door latch which secures upper door (9) to the lower door (10).
2. Remove two nuts (11) on upper door hinges (12).
3. Swing upper door (9) open, lift door up to remove.
4. Remove capscrews (13).
5. If necessary, remove capscrew (14), nut (16) and door holder (15).
6. If necessary, remove nut (17), lockwasher (18), door strap (19) and screw (20). Discard lockwasher.



REMOVAL - CONTINUED

7. Remove four capscrews (21), four flatwashers (22) and holding strap (23) from lower door (10) and cab.
8. Remove two nuts (24) on lower door hinges (25).
9. Swing lower door (10) open, lift door up, and remove lower door.
10. Remove capscrews (26).
11. If necessary, remove weatherstripping (27).



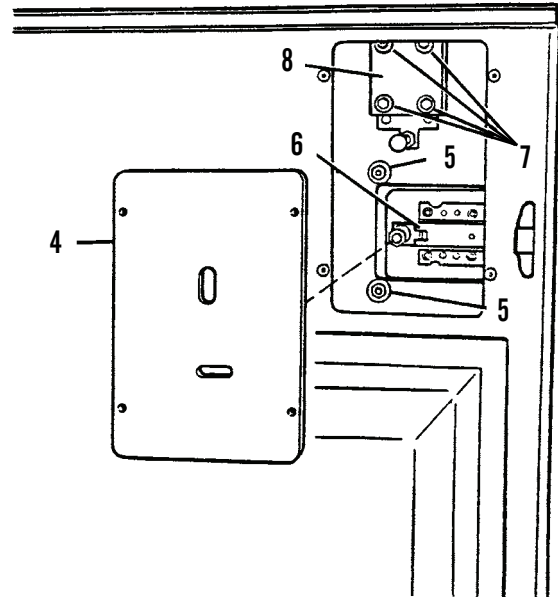
409-575

INSTALLATION

1. Position lower door (10) on lower door hinges (25) and install capscrews (26).
2. Install two nuts (24).
3. Secure holding strap (23) to lower door (10) and cab with four capscrews (21) and four flatwashers (22).
4. If removed, install weatherstripping (27).
5. If removed, install door strap (19) to upper door (9) with screw (20), new lockwasher (18) and nut (17).
6. Position upper door (9) on upper door hinges (12) and install capscrews (13).
7. Install two nuts (11).
8. Latch upper door (9) and lower door (10) together.
9. If removed, install door holder (15) with screw (14) and nut (16).

REPAIR

1. To remove upper (8) or lower (6) door latch, first remove the access cover (4) as described in *Service*.
2. To remove upper door latch (8), remove four screws (7) and pull latch out through access hole.
3. To remove lower door latch (6), remove four nuts (5) and remove latch from outside of lower door.
4. To install lower door latch (6), position latch (6) on door and secure with four nuts (5).
5. To install upper door latch, position latch (8) on door and secure with four nuts (7).
6. Adjust upper and lower door latches (8) and (6) as described in *Service*.
7. Install access cover as described in *Service*.



409-578

END OF WORK PACKAGE

FIRE EXTINGUISHER BRACKET REPLACEMENT

0152 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Locknut (2)

Sealant, Loctite (Item 43, WP 0323 00)

Equipment Condition

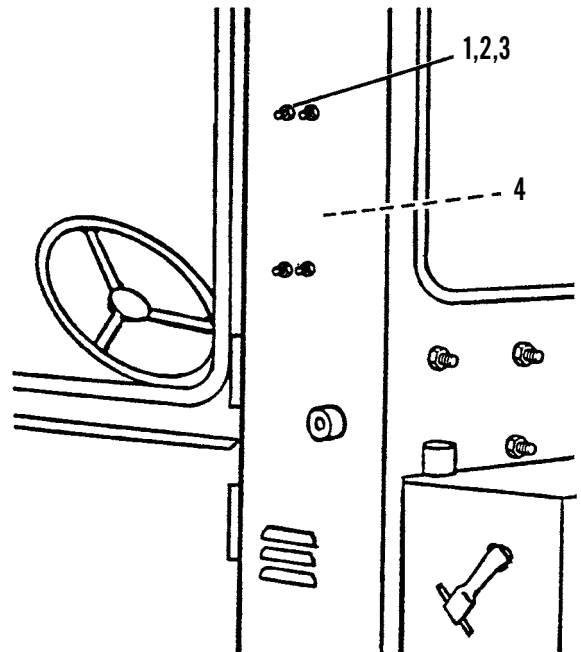
Fire extinguisher removed from bracket (TM 10-3930-660-10)

REMOVAL

1. Remove four screws (1) and four locknuts (2). Discard locknuts.
2. Remove fire extinguisher brackets (4) from wall of cab.

INSTALLATION

1. Apply loctite to threads of screws (1).
2. Position fire extinguisher bracket (4) on left, rear corner of cab.
3. Install four screws (1) and four new locknuts (2).



409-594

END OF WORK PACKAGE

TOOL BOX DOOR LATCH REPLACEMENT

0153 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (4 and 6)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL

1. Open tool box door (1).
2. Measure position of latching lever (2) on shaft. Record measurement for reference during installation.
3. Remove jamnut (3), lockwasher (4), latching lever (2), second lockwasher (4) and second jamnut (3) from tool box door (1). Discard lockwasher.
4. Remove hex nut (5), lockwasher (6) and handle (7). Discard lockwasher.

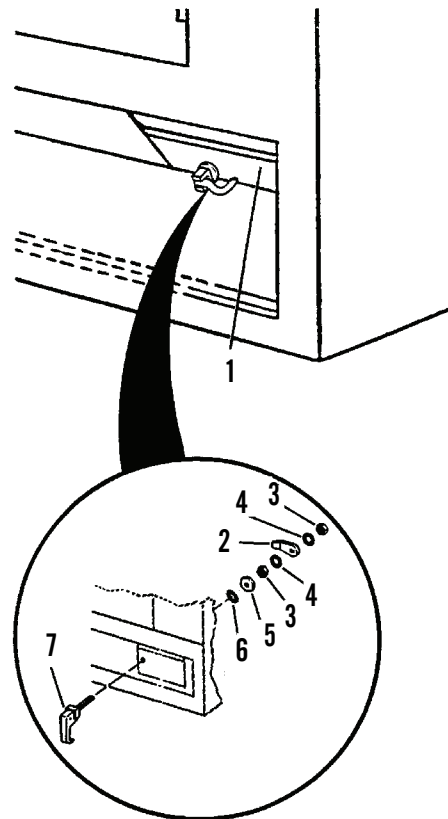
INSTALLATION

1. Secure handle (7) with new lockwasher (6) and hex nut (5).

NOTE

Install nuts so that latching lever is properly positioned on shaft. Refer to measurement taken in step 2 of *Removal*.

2. Install jamnut (3), new lockwasher (4), latching lever (2), second new lockwasher (4) and second jamnut (3).



409-595

END OF WORK PACKAGE

CAB FLOOR MAT REPLACEMENT

0154 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Equipment Condition

Cab heater removed (WP 0168 00)

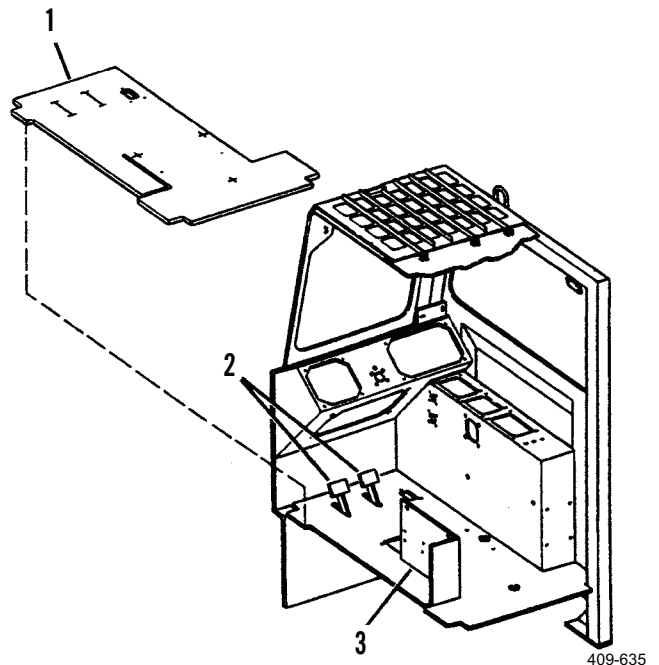
Accelerator pedal removed (WP 0050 00)

REMOVAL

1. Remove mat (1) from around transmission disconnect and brake pedals (2).
2. Remove mat from around seat base weldment (3).

INSTALLATION

1. Place mat (1) around seat base weldment (3).
2. Place mat around transmission disconnect and brake pedals (2).
3. Check that mat (1) is positioned properly on cab floor. Smooth out any wrinkles.
4. Install accelerator pedal (WP 0050 00).
5. Install cab heater (WP 0168 00).

**END OF WORK PACKAGE**

FENDERS REPLACEMENT

0155 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

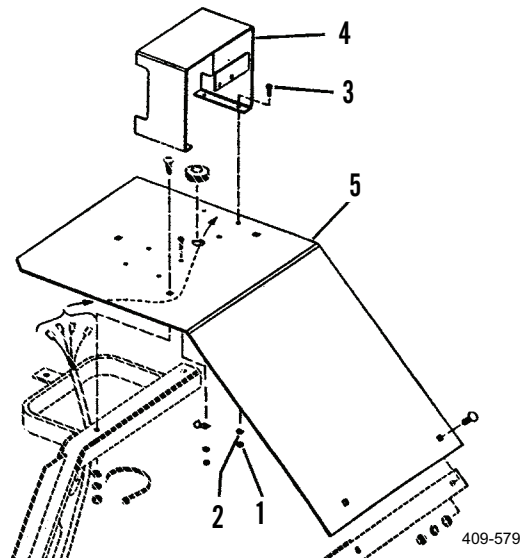
- Sealant, Loctite (Item 43, WP 0323 00)
- Lockwasher (2, 7 and 14)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Blackout headlight assembly removed, as required (WP 0096 00)
- Front headlights removed, as required (WP 0095 00)
- Rear turn signal lights removed, as required (WP 0098 00)
- Rear blackout/tail/stop lights removed, as required (WP 0097 00)
- Front blackout/turn signal/parking lights removed, as required (WP 0097 00)

REMOVAL

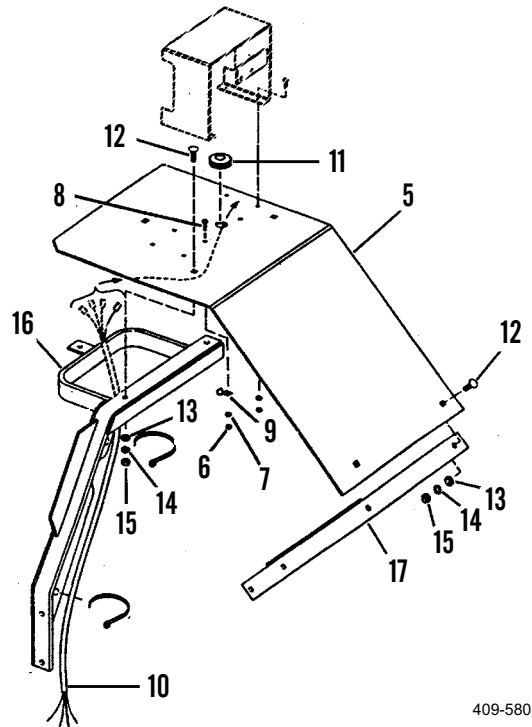
1. Remove four nuts (1), lockwashers (2) and capscrews (3). Discard lockwashers.
2. Remove light bracket (4) from fender (5).



LEFT REAR FENDER SHOWN - OTHER FENDERS SIMILAR.

REMOVAL - CONTINUED

3. Remove nut (6), lockwasher (7), capscrew (8) and clamp (9) securing wiring harness (10) to underside of fender (5). Discard lockwasher.
4. Pull harness (10) out of grommet (11) and remove grommet.
5. Remove five carriage bolts (12), five flatwashers (13), five lockwashers (14) and five nuts (15). Discard lockwashers.
6. Remove fender (5) from braces (16 and 17).



409-580

LEFT REAR FENDER SHOWN - OTHER FENDERS SIMILAR.**INSTALLATION**

1. Install fender (5) on braces (16 and 17).

NOTE

Apply loctite to threads of carriage bolts.

2. Install five carriage bolts (12), five flatwashers (13) and five new lockwashers (14). Install five nuts (15) and torque to 30 to 35 lb-ft (41 to 47 Nm).
3. Install grommet (11) and position harness (10) through grommet.
4. Position clamp (9) under fender (5) on wiring harness (10). Secure clamp with capscrew (8), new lockwasher (7) and nut (6).

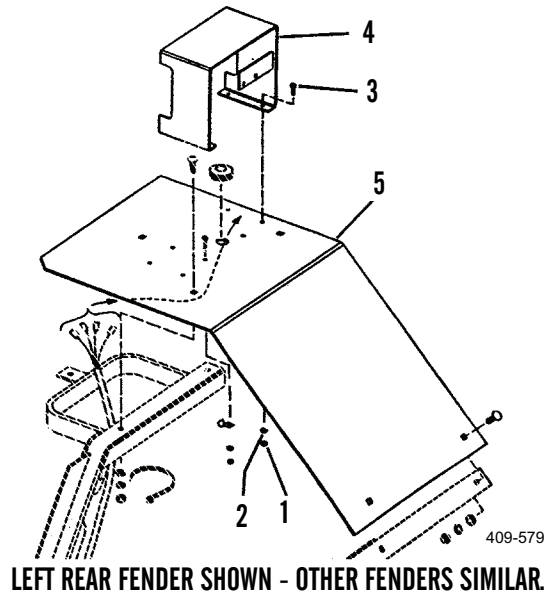
INSTALLATION - CONTINUED

5. Position light bracket (4) on fender (5).

NOTE

Apply loctite to threads of capscrews.

6. Secure light bracket (4) with four capscrews (3), four new lockwashers (2) and four nuts (1).



7. Install front blackout/turn signal/parking lights, if removed (WP 0097 00).
8. Install rear blackout/tail/stop lights, if removed (WP 0097 000).
9. Install rear turn signal lights, if removed (WP 0098 00).
10. Install front headlights, if removed (WP 0095 00).
11. Install blackout headlight assembly, if removed (WP 0096 00).

END OF WORK PACKAGE

FENDER BRACES REPLACEMENT**0156 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Strap, tie down (Item 56, WP 0323 00)

Materials/Parts - Continued

Lockwasher (5 and 7)

Vibration pad (9)

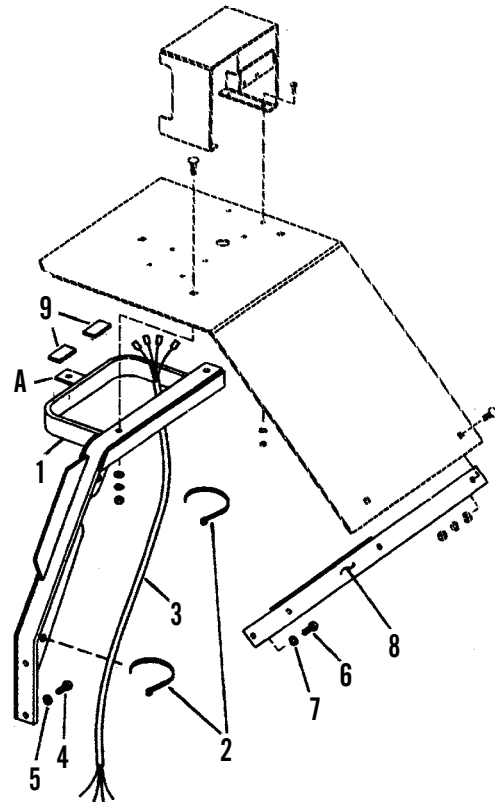
Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Fender removed (WP 0155 00)

REMOVAL

1. To remove fender brace (1), remove and discard two tie down straps (2) securing wire harness (3) to fender brace (1).
2. Remove two capscrews (4) and two lockwashers (5) to remove fender brace (1). Discard lockwashers.
3. Remove two capscrews (6) and two lockwashers (7) to remove fender brace (8). Discard lockwashers.
4. On rear fender braces only, remove and discard vibration pads (9) from each side of mounting tab (A), if damaged or worn.

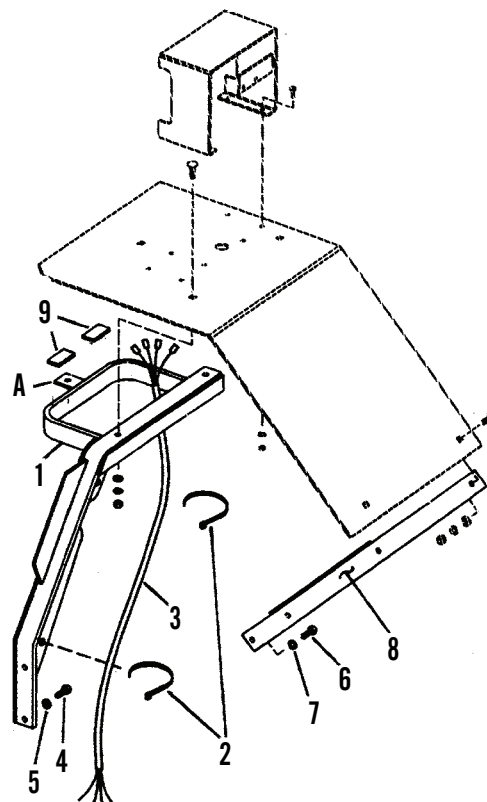
**LEFT-REAR FENDER BRACES SHOWN - OTHERS SIMILAR.**

409-581

INSTALLATION**NOTE**

Apply loctite to threads of all capscrews before installation.

1. Install fender brace (8) with two new lockwashers (7) and two capscrews (6).
2. Position brace (1) on vehicle and secure with two new lockwashers (5) and two capscrews (4).
3. Install two new tie down straps (2) securing wire harness (3) to fender brace (1).
4. If necessary, install new vibration pads (9) on rear fender braces (1) only.
5. Remove plastic backing from back of vibration pads (9).
6. Install two new vibration pads (9) on each rear brace, one on each side of mounting tab (A).



LEFT-REAR FENDER BRACES SHOWN - OTHERS SIMILAR.

409-581

7. Install fender (WP 0155 00).

END OF WORK PACKAGE

CAB WINDSHIELD AND WINDOWS REPLACEMENT

0157 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Grease, silicone (Item 21, WP 0323 00)

Soap, liquid (Item 52, WP 0323 00)

Equipment Condition

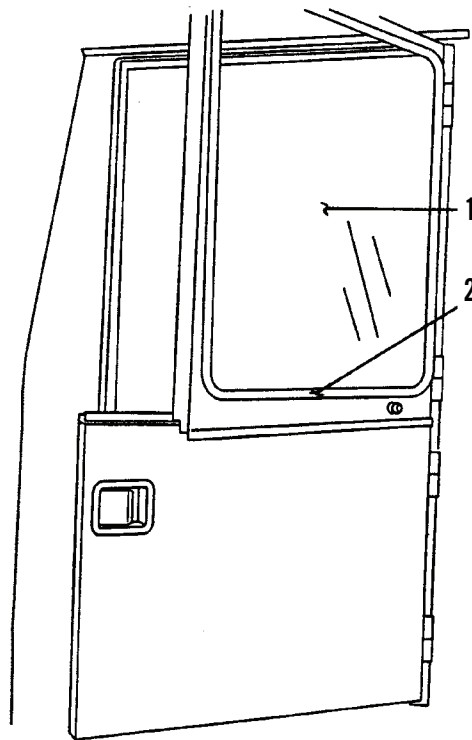
Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL**WARNING**

To avoid possible injury, replace broken window glass carefully. Wear a pair of heavy leather gloves or other suitable hand protection. Support window glass during removal and installation as required so it does not drop.

NOTE

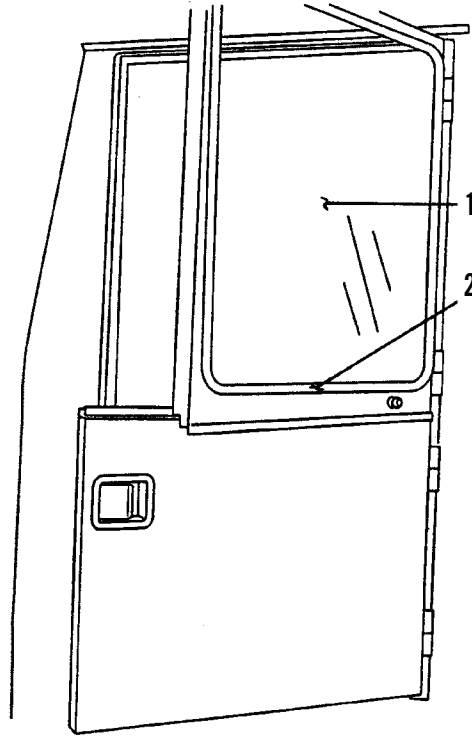
- Removal and installation procedures for cab front windshield, cab right-hand window and cab upper door window are essentially similar.
 - The window seal does not need to be removed from window opening when removing window glass.
1. At window (1), separate halves of seal (2) at base of window opening where seal ends meet and begin opening seal.
 2. Open seal (2) around entire perimeter of window (1).
 3. Carefully remove window (1) from seal (2).
 4. If necessary, remove seal (2) from window opening of cab or cab door.



409-582

INSTALLATION

1. If removed, install seal (2) in window opening of cab or cab door. Be sure ends of seal meet at bottom of window opening.
2. Apply a light coating of silicone grease or soapy water to the inside of seal (2).
3. Carefully position window (1) in seal (2).
4. Press inner part of window seal (2) against glass around entire perimeter of window (1). Start at split at bottom center of seal and work outward.



409-582

END OF WORK PACKAGE

CAB SKYLIGHT GUARD AND WINDOW REPLACEMENT

0158 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Ammonia (Item 4, WP 0323 00)

Primer, metal (Item 39, WP 0323 00)

Sealer, ribbon (Item 51, WP 0323 00)

Caulk, silicone (Item 9, WP 0323 00)

Materials/Parts - Continued

Lockwasher (6)

Tape seal (8)

Sealing washer (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-24)

WARNING

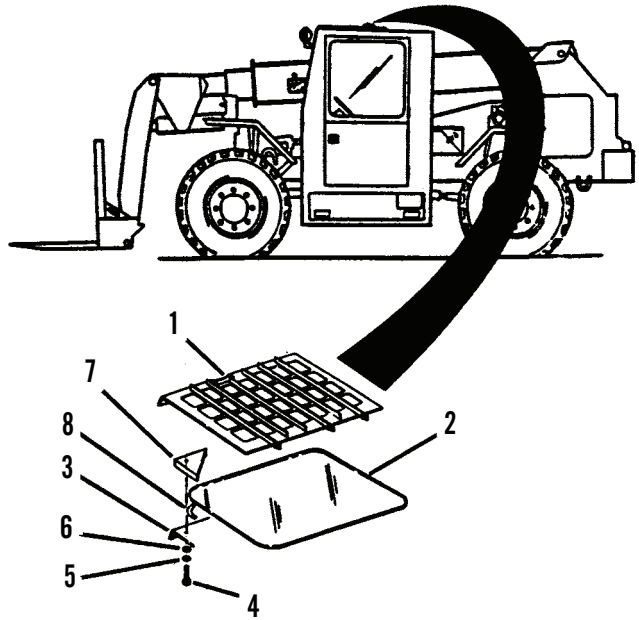
To avoid injury, replace broken window glass carefully. Wear a pair of heavy leather gloves or other suitable hand protection. Support window glass during removal and installation, as required, so it does not drop.

REMOVAL

NOTE

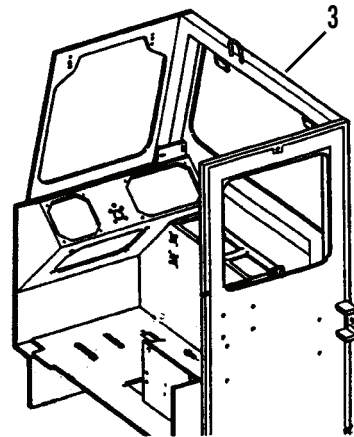
Step 2 is for removal of skylight window and step 4 is for skylight window guard.

1. Unlatch and open skylight window guard (1) to remove hardware securing skylight window (2) from cab (3).
2. Remove four capscrews (4), four sealing washers (5), four lockwashers (6) and four window frames (7) securing skylight window (2) to cab (3). Discard sealing washers and lockwashers.
3. Carefully remove skylight window (2) and tape seal (8) from cab (3). Discard tape seal.



409-583

4. If necessary, remove skylight window guard (1) from cab (3).
5. To prevent guard (1) from falling during removal, place guard over skylight window opening.



409-584

REMOVAL - CONTINUED

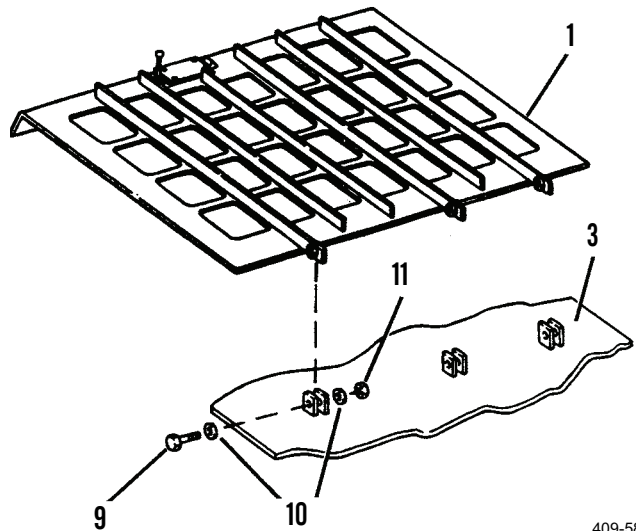
6. Remove three capscrews (9), six flatwashers (10) and three nuts (11) securing guard (1) to cab (3).
7. Remove guard (1) from cab (3).

INSTALLATION

NOTE

Perform steps 3 thru 11 for skylight window installation. Perform step 2 for skylight window guard installation.

1. If removed, place guard (1) over skylight window opening.
2. Secure skylight window guard (1) to cab (3) with three nuts (11), six flatwashers (10) and three capscrews (9).
3. Clean and prepare surface of cab (3) and skylight window (2).
4. If necessary, remove pieces of old tape seal (8) from surface of cab (3) around skylight window opening. Be sure surface is clean and dry.
5. Apply metal primer with brush to surface around skylight window opening of cab. Allow ten minutes for primer to dry.
6. Thoroughly clean skylight window (2) with ammonia.



409-585

7. Apply ribbon sealer to skylight window (2) even with the outside edge of glass.
8. Place new tape seal (8) around skylight window opening of cab (3).
9. Place skylight window (2) on new tape seal (8).

CAUTION

To avoid breakage of skylight window, do not over-tighten capscrews.

10. Install four window frames (7), four new lockwashers (6), four new sealing washers (5) and four capscrews (4) to secure skylight window (2) to cab (3).
11. Apply clear silicone caulk around capscrews (4) and around perimeter of skylight window (2).
12. Place skylight window guard over skylight window (2) and lock guard in place.
13. Check skylight window for leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

CAB REAR WINDOW REPLACEMENT

0159 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Locknut (3 and 12)

Lockwasher (4)

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Rear window assembly unlocked (TM 10-3930-660-10)

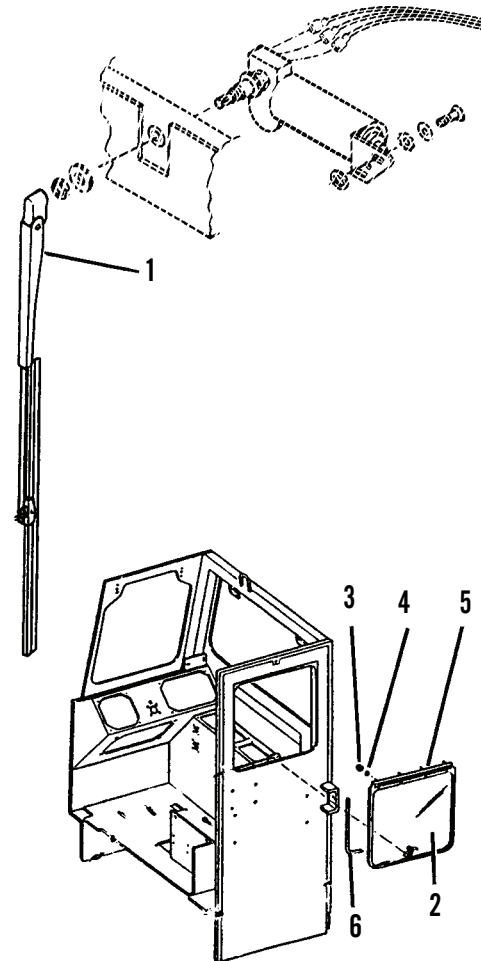
REMOVAL

1. Pry rear wiper arm (1) from shaft of wiper motor.
2. Lift rear window (2) approximately 30 degrees and slide window to the left to remove window.

WARNING

To avoid possible injury, replace broken window glass carefully. Wear a pair of heavy leather gloves or other suitable hand protection.

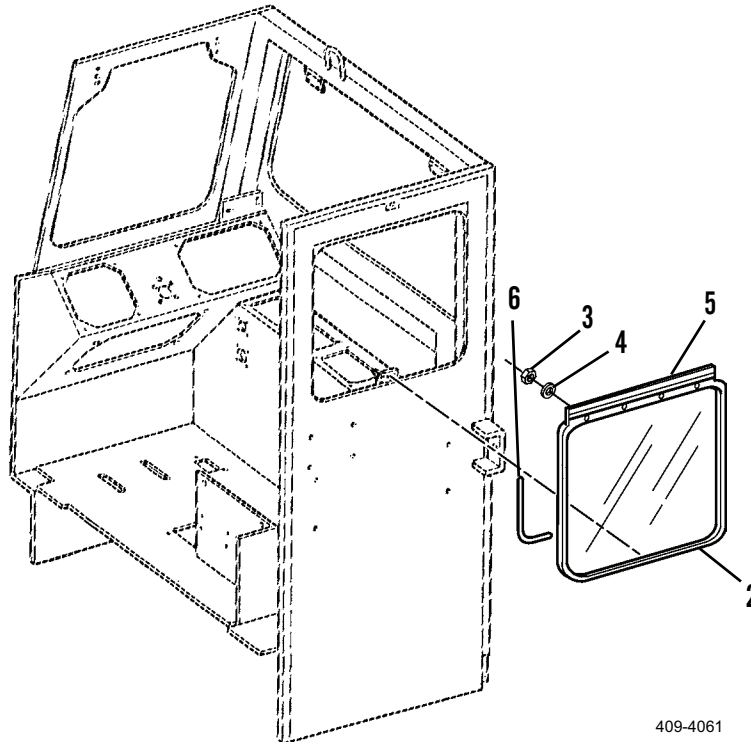
3. Remove four locknuts (3) and four lockwashers (4) securing rear window hinge (5) to cab. Discard locknuts and lockwashers.
4. If necessary, remove seal (6) from cab openings.



409-1913

INSTALLATION

1. If removed, install new seal (6) to cab opening.
2. Install four new lockwashers (4) and four new locknuts (3) to secure rear window hinge (5) to cab.
3. With assistance, hold rear window (2) to left of cab opening at approximately 30 degree angle. Slide top of window into hinge (5).
4. Lock rear window (2) (TM 10-3930-660-10).
5. Install rear wiper arm (1) on shaft of wiper motor.

**END OF WORK PACKAGE**

THIS WORK PACKAGE COVERS

Removal, Disassembly, Cleaning, Inspection, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, automotive maintenance (Item 21, WP 0324 00)

References

WP 0316 00
 WP 0317 00

Materials/Parts

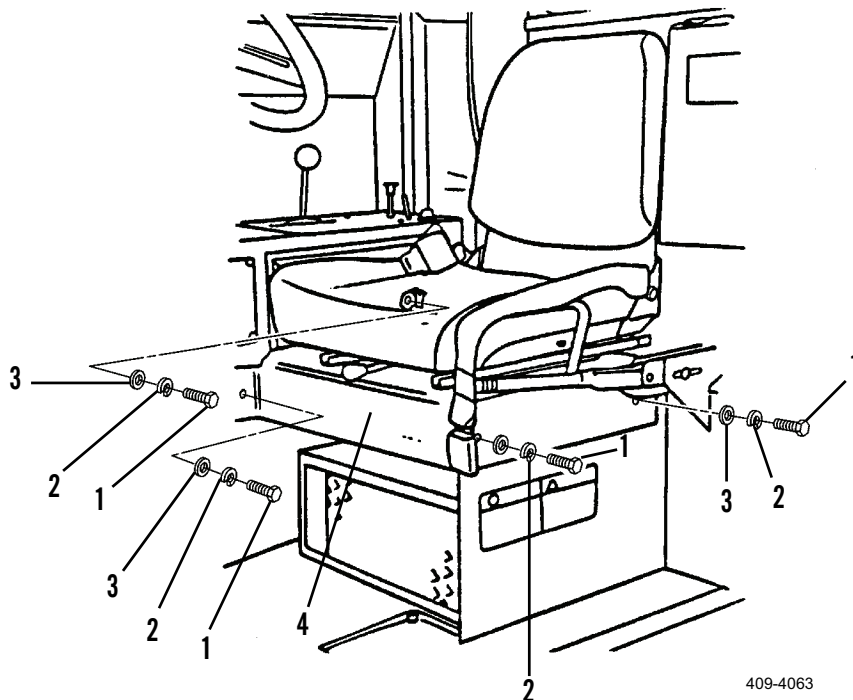
Sealant, Loctite (Item 43, WP 0323 00)
 Lockwasher (2 and 6)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-24)

REMOVAL

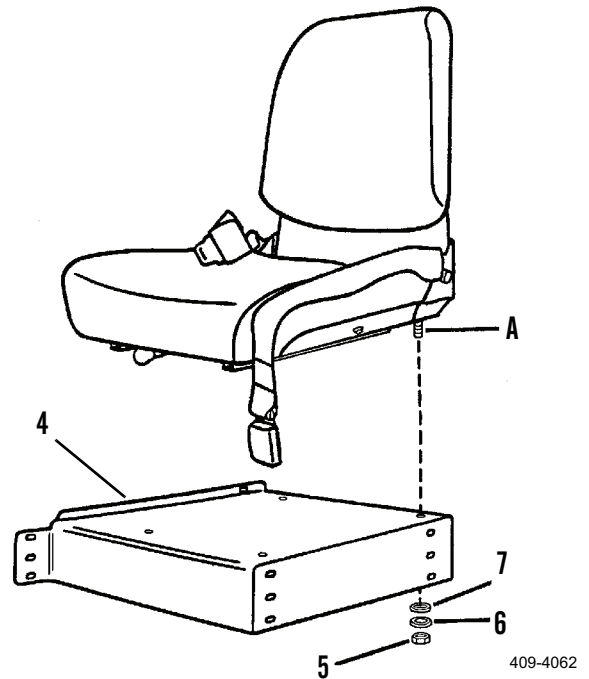
1. Remove four capscrews (1), four lockwashers (2) and four flatwashers (3) that secure seat deck (4) to cab. Discard lockwashers.
2. Remove seat deck (4) with seat from cab.



409-4063

REMOVAL - CONTINUED

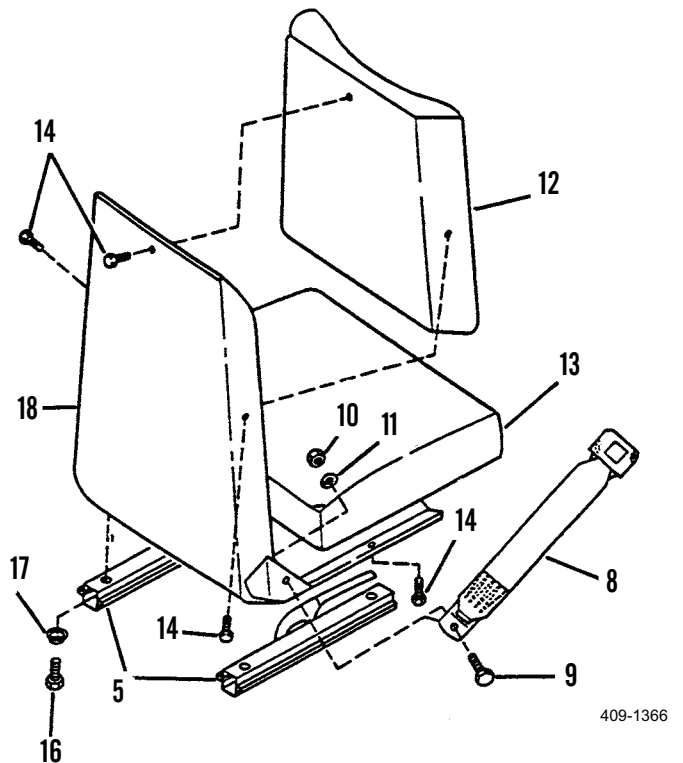
3. Remove four nuts (5), four lockwashers (6) and four flatwashers (7) securing seat to seat deck (4). Discard lockwashers.



A

DISASSEMBLY

1. Remove seat belts (8) by removing two capscrews (9), two nuts (10) and two lockwashers (11) which retain the belts. Discard lockwashers.
2. Remove seat cushions (12 and 13) by removing five capscrews (4) which retain seat cushions.
3. Remove seat adjuster (15) by removing four capscrews (16) and four cupwashers (17) from seat shell (18).



CLEANING

See *Cleaning* instructions (WP 0316 00).

INSPECTION

See *Inspection* instructions (WP 0317 00).

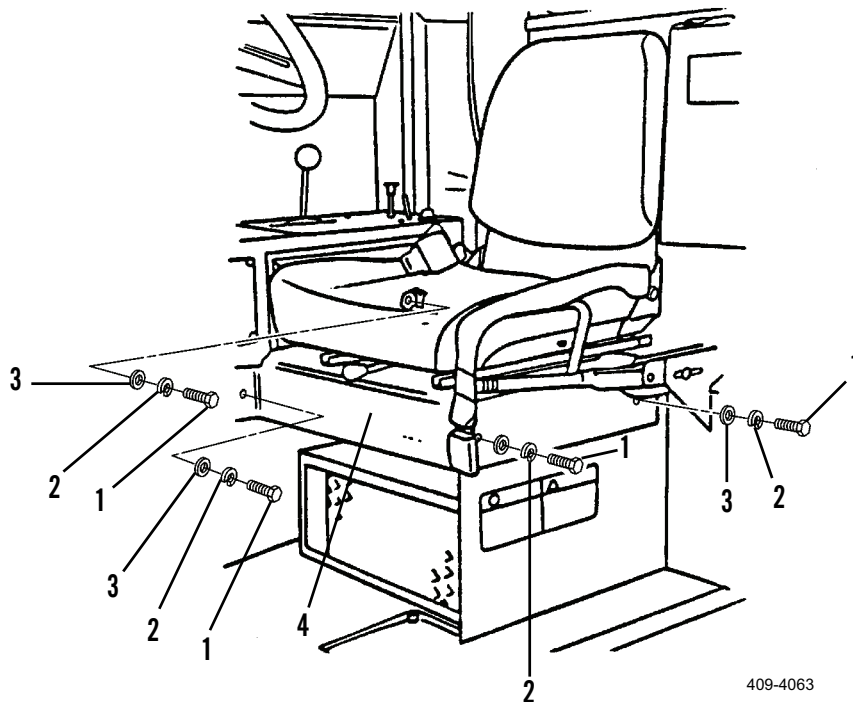
NOTE

Apply loctite to threads of capscrews as installed.

1. Install four cupwashers (17) and seat adjuster (15) onto seat shell (18) and retain with four capscrews (16).
2. Install seat cushions (12 and 13) and retain with five capscrews (14).
3. Install seat belts (8) and retain with two capscrews (9), two nuts (10) and two new lockwashers (11).

INSTALLATION

1. Position seat deck (4) on mounting studs (A) of seat.
2. Apply loctite to four nuts (5).
3. Install four nuts (5), four new lockwashers (6) and four flatwashers (7) to secure seat to seat deck (4).
4. Position seat deck (4) and seat as an assembly inside cab.
5. Apply loctite to four capscrews (1).
6. Install four flatwashers (3), four new lockwashers (2) and four capscrews (1) to secure seat deck (4) to cab.



END OF WORK PACKAGE

SEAT BELTS REPLACEMENT

0161 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Lockwasher (3)

Equipment Condition

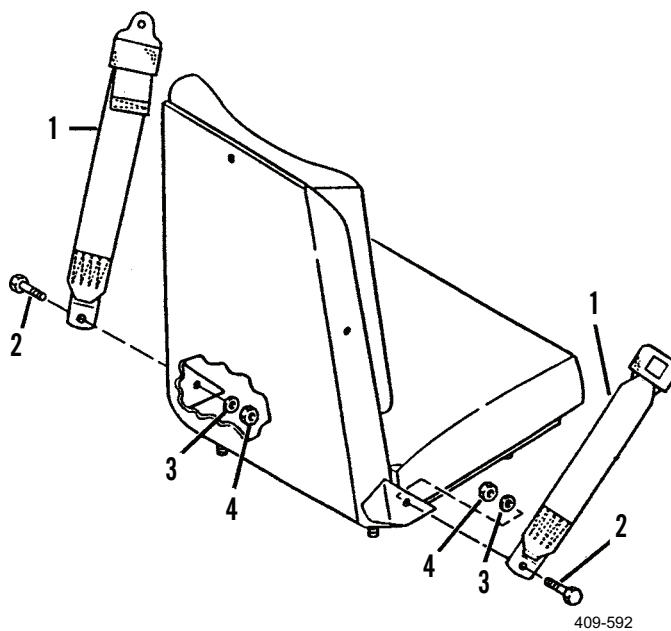
Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL

Remove seat belts (1) by removing two capscrews (2), two lockwashers (3) and two nuts (4) which retain the belts (1). Discard lockwashers.

INSTALLATION

Install seat belts (1) with two capscrews (2), two new lockwashers (3) and two nuts (4).

**END OF WORK PACKAGE**

ACCESSORIES STORAGE BOX REPLACEMENT

0162 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Locknut (3)

Equipment Condition

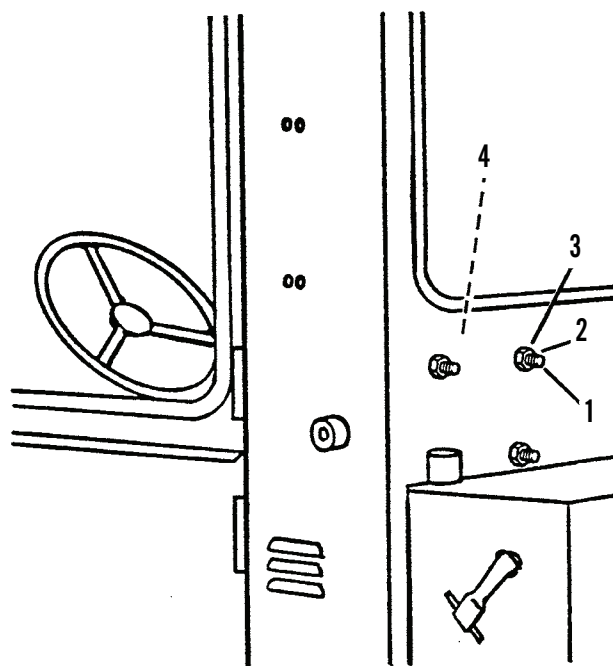
Accessories removed from storage box (TM 10-3930-660-10)

REMOVAL

1. Remove four screws (1), four flatwashers (2) and four locknuts (3) that attach accessories storage box (4) to back wall of cab. Discard locknuts.
2. Remove accessories storage box (4).

INSTALLATION

1. Apply loctite to threads of four screws (1).
2. Position accessories storage box (4) against inside back wall of cab.
3. Align four mounting holes and install four screws (1), four flatwashers (2) and four new locknuts (3).
4. Place accessories in storage box (TM 10-3930-660-10)



409-593

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Gasket (26)

Lockwasher (7, 24 and 27)

Equipment Condition

Vehicle parked on level ground

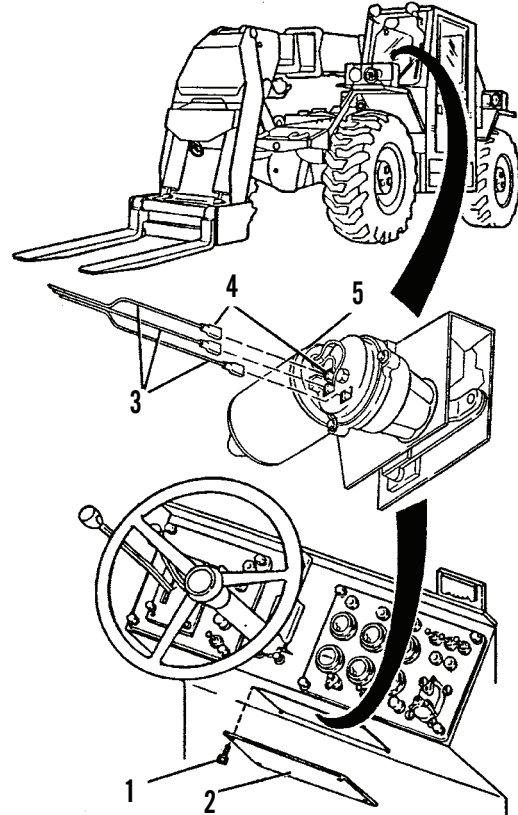
Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

1. Remove four screws (1) and access panel (2).
2. Through access hole, disconnect three electrical leads (3) from three terminals (4) of front wiper motor assembly (5).

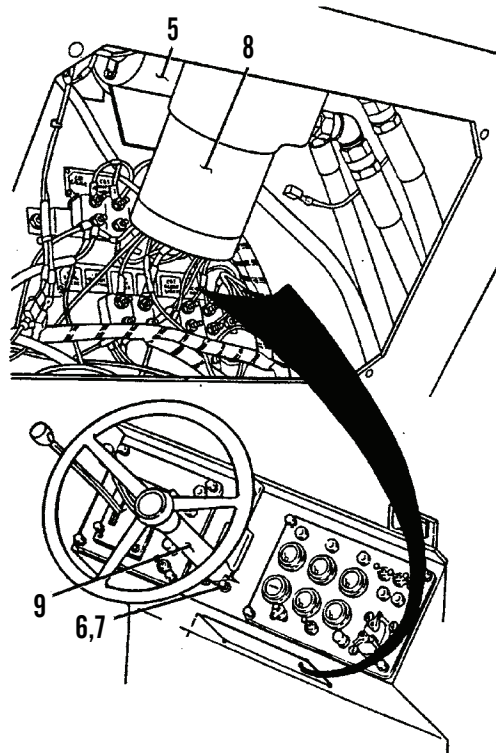


409-596

REMOVAL - CONTINUED

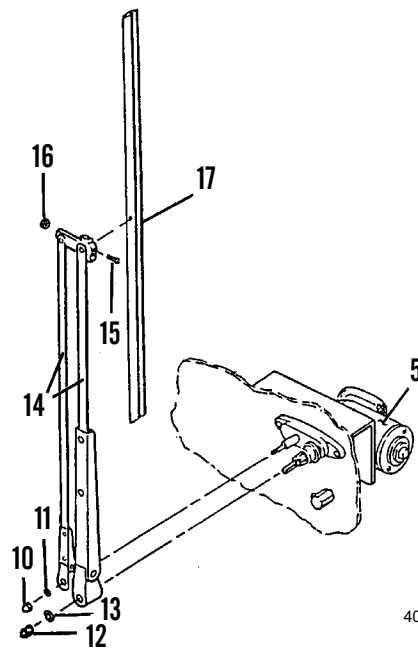
NOTE

- Remove steering control valve from steering column to provide room for removal of front wiper motor assembly.
 - Do not remove hydraulic hoses from valve.
3. Remove four capscrews (6) and four lockwashers (7), securing steering control valve (8) to steering column (9). Discard lockwashers.
 4. Separate steering control valve (8) from steering column (9). Push steering control valve aside to provide room for removal of front wiper assembly (5).



409-597

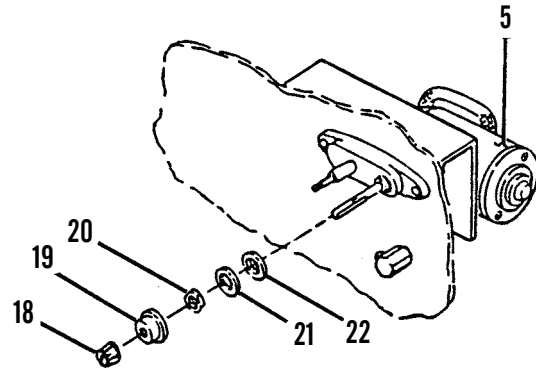
5. Remove capnut (10), washer (11), capnut (12) and washer (13). Remove wiper arms (14).
6. Remove screw (15), nut (16) and wiper blade (17) from wiper arms (14).



409-598

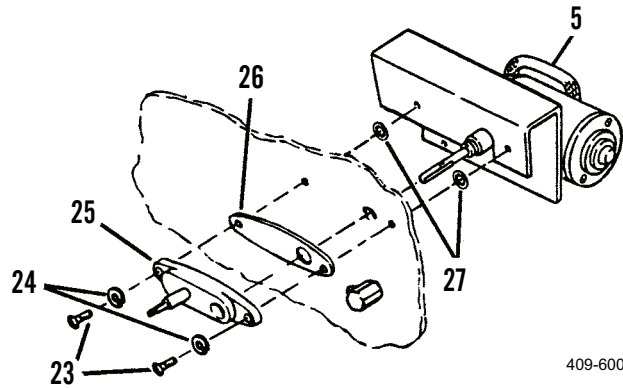
REMOVAL - CONTINUED

7. Pry off collar (18) and remove cap (19), nut (20), washer (21) and washer (22).



409-599

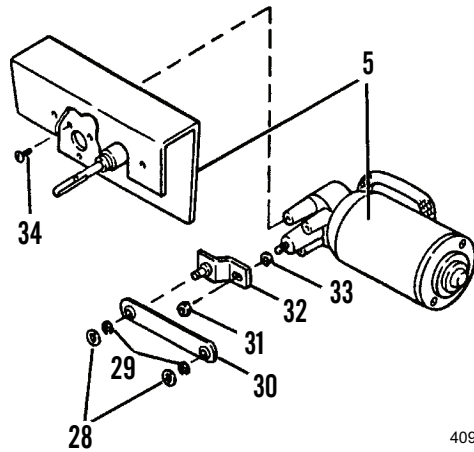
8. Remove two screws (23), two lockwashers (24), base (25), gasket (26) and lockwashers (27). Discard lockwashers and gasket.
9. Remove front wiper assembly (5) from cab through access hole at base of dashboard.



409-600

DISASSEMBLY

1. Remove two spring clips (28), two spacing washers (29) and connecting link (30).
2. Remove nut (31), drive arm (32) and washer (33).
3. Remove three screws (34) and separate motor bracket components.



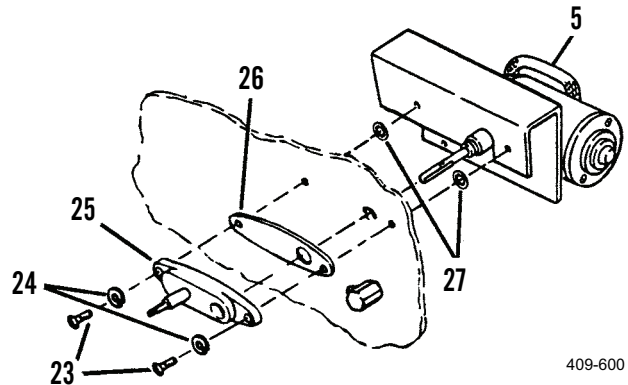
409-601

ASSEMBLY

1. Position bracket and motor components of wiper motor assembly (5) together, and secure with three screws (34).
2. Install washer (33) and drive arm (32). Secure with nut (31).
3. Install connecting link (30) and secure with two spacing washers (29) and spring clips (28).

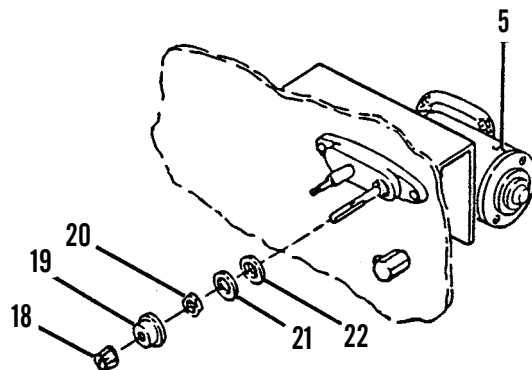
INSTALLATION

1. Position front wiper assembly (5) on cab.
2. Position new gasket (26) and base (25) on cab. Secure with two new lockwashers (27), two new lockwashers (24) and two screws (23).



409-600

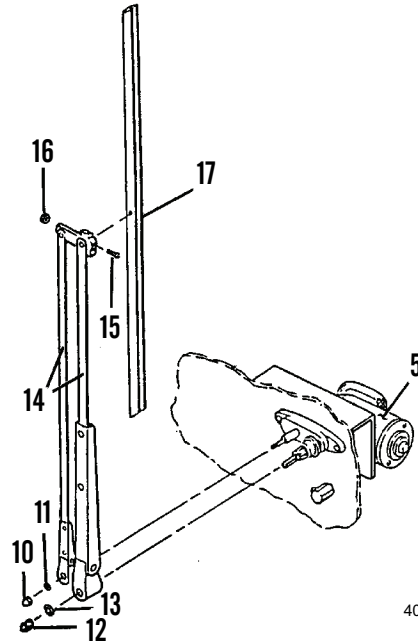
3. Install washer (22), washer (21), nut (20), cap (19) and collar (18).



409-599

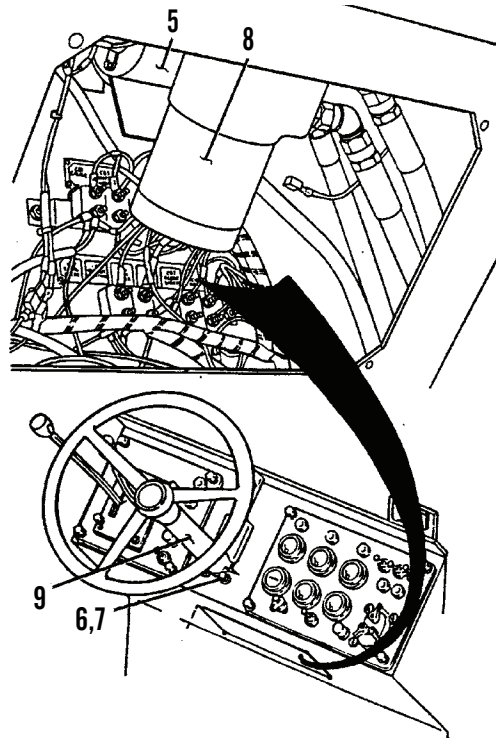
INSTALLATION - CONTINUED

4. If removed, position wiper blade (17) on wiper arms (14) and secure with nut (16) and screw (15).
5. Secure wiper arms (14) with washer (13), capnut (12), washer (11) and capnut (10).



409-598

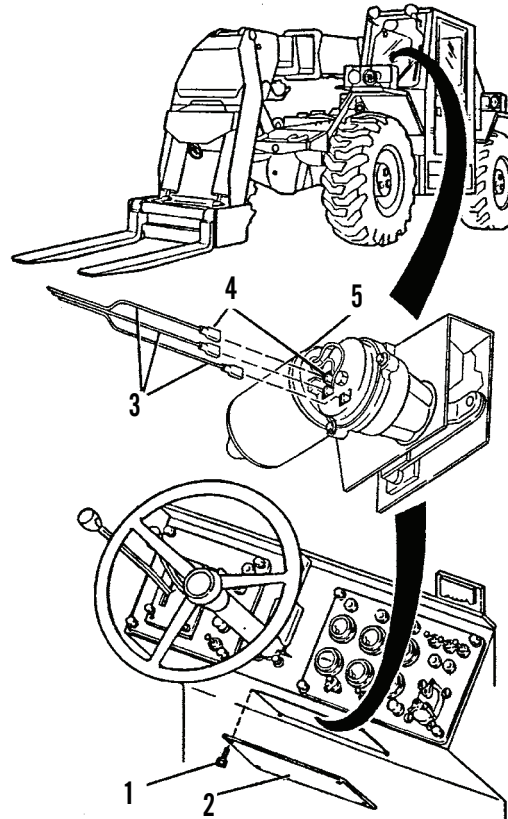
6. Position steering control valve (8) on steering column (9). Turn steering wheel until steering shaft engages with steering control valve. Install four new lockwashers (7) and four capscrews (6).
7. Connect battery cables (WP 0107 00).
8. Start engine (TM 10-3930-660-10). Turn steering wheel left and right and check for leaks at steering control valve (8). Stop engine.



409-597

INSTALLATION - CONTINUED

9. Through access hole, connect three leads (3) from vehicle wiring harness to three terminals (4) of front wiper motor assembly (5).
10. Position access panel (2) and secure with four screws (1).



409-596

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Tag, marker (Item 57, WP 0323 00)

Lockwasher (10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

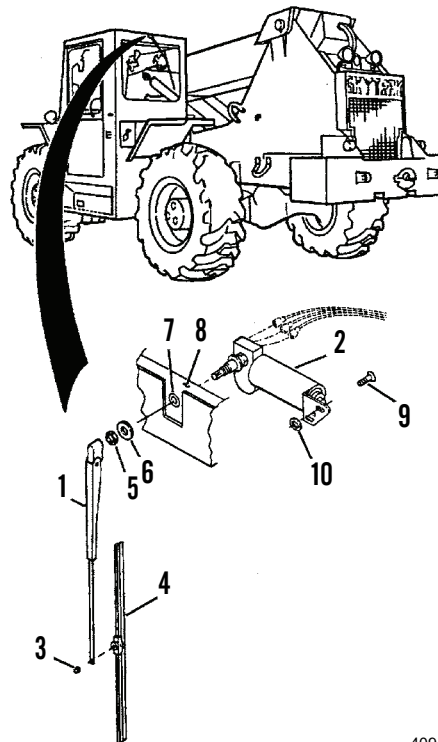
REMOVAL

1. Pry and remove wiper arm (1) from shaft of motor (2).
2. If necessary, remove nut (3) and wiper blade (4) from wiper arm (1).
3. Remove hex nut (5) and washer (6). Leave fiber washer (7) on cab (8).

NOTE

Support motor so it does not drop when mounting hardware in step 4 is removed.

4. Remove screw (9) and lockwasher (10) from motor (2). Discard lockwasher.



409-607

REMOVAL - CONTINUED

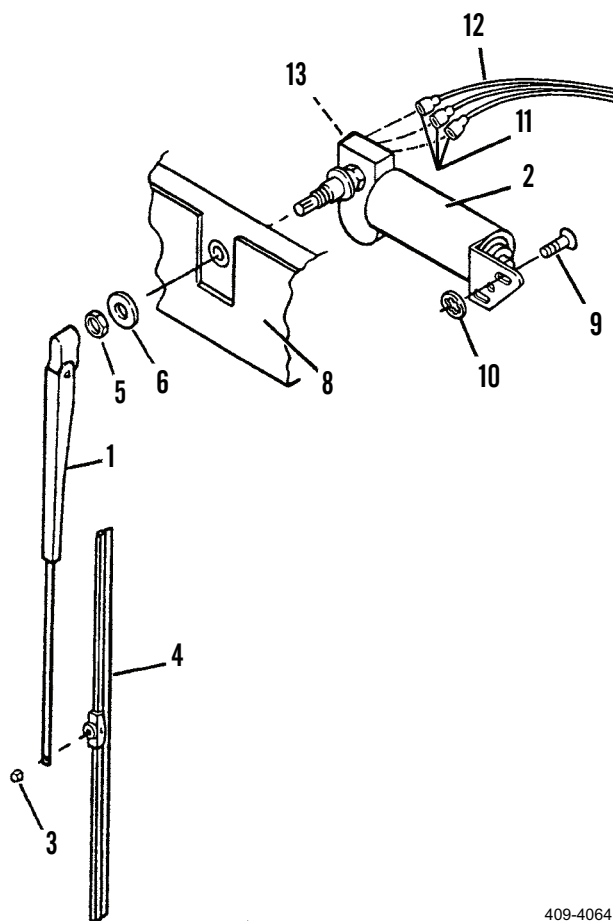
5. Disconnect three female spade connectors (11) of wiring harness (12) from three male spade connectors (13).
6. Remove motor (2) from cab (8).

INSTALLATION

NOTE

Electrical connections to motor must be made before mounting motor on cab.

1. Connect three female spade connectors (11) of vehicle wiring harness (12) to three male spade connectors (13) of motor (2).
2. Position and support motor (2) on cab (8).
3. Install new lockwasher (10) and screw (9) to secure motor (2) to cab (8).
4. Install washer (6) and hex nut (5).
5. If removed, install wiper blade (4) to wiper arm (1) with nut (3).
6. Push wiper arm (1) on shaft of rear wiper motor (2).



409-4064

7. Connect battery cables (WP 0107 00).
8. Apply water to windshield glass and operate the wipers to check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Fluid, windshield washer (Item 17, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Locknut (13)

Lockwasher (11)

Materials/Parts - Continued

Rubber washer (21)

Starwasher (6 and 20)

References

WP 0325 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

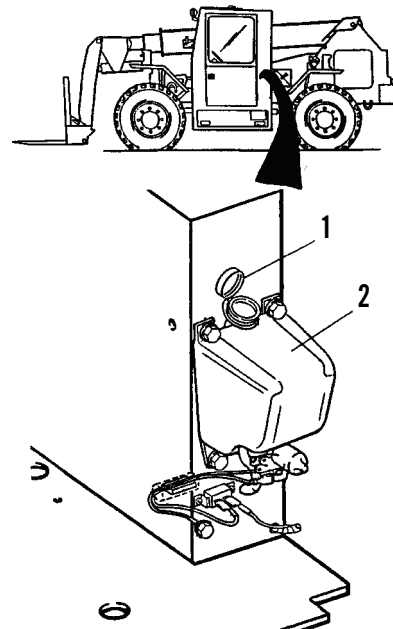
Battery cables disconnected (WP 0107 00)

NOTE

- The windshield washer reservoir assembly is located to the right of the operator seat, at the rear of the side console.
- Tag all electrical connections before removing for use during installation.

SERVICE

1. Open cap (1) of reservoir assembly (2).
2. Add washer fluid, as required, until fluid level reaches filler neck of reservoir assembly (2).
3. Close cap (1) of reservoir assembly (2).



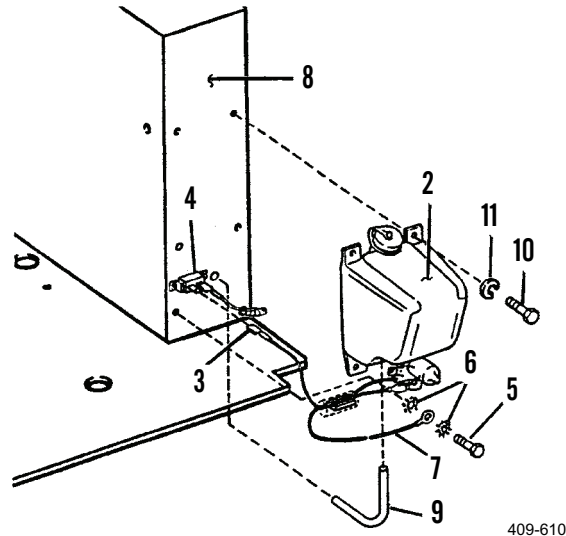
409-609

REMOVAL

NOTE

To prevent spillage of washer fluid, be sure reservoir assembly is emptied of fluid before removal.

1. Disconnect female spade connector of electrical lead (3) from male spade connector on resistor assembly (4).
2. Remove capscrew (5), starwasher (6), electrical lead (7) and second starwasher (6) from side console (8). Discard starwashers.
3. Pull hose (9) from fitting at bottom of reservoir assembly (2).



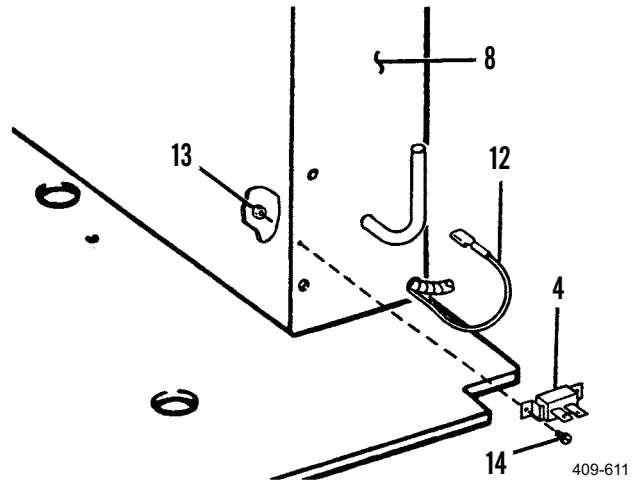
409-610

4. Remove four screws (10), four lockwashers (11) and reservoir assembly (2) from side console (8). Discard lockwashers.
5. Disconnect female spade connector of electrical lead (12) from male spade connector on resistor assembly (4).

NOTE

Nuts are accessed through opening in side console. Remove electric joystick if necessary (WP 0235 00).

6. Remove two locknuts (13), two screws (14) and resistor assembly (4) from side console (8). Discard locknuts.



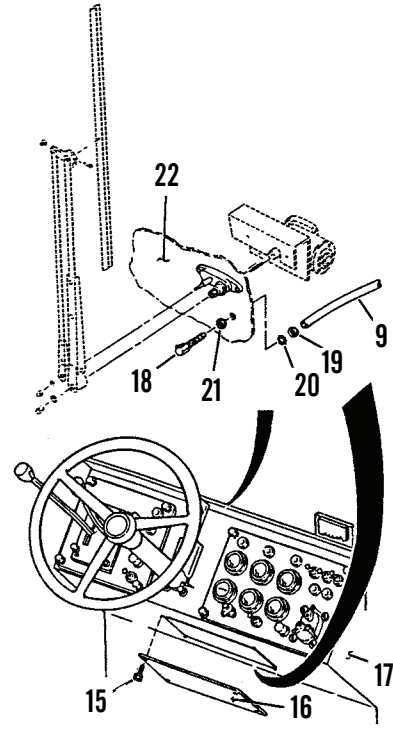
409-611

REMOVAL - CONTINUED

NOTE

The washer nozzle is located on the cab below the base of the front windshield wiper.

7. Remove four capscrews (15) and dashboard access panel (16) from front console (17).
8. From inside front console (17), pull and remove hose (9) from washer nozzle (18). Remove nut (19) and starwasher (20) from washer nozzle (18). Discard starwasher.
9. From outside machine, remove washer nozzle (18) and rubber washer (21) from cab (22). Discard rubber washer.



409-613

10. Pull hose (9) out from hole at rear of side console (8).

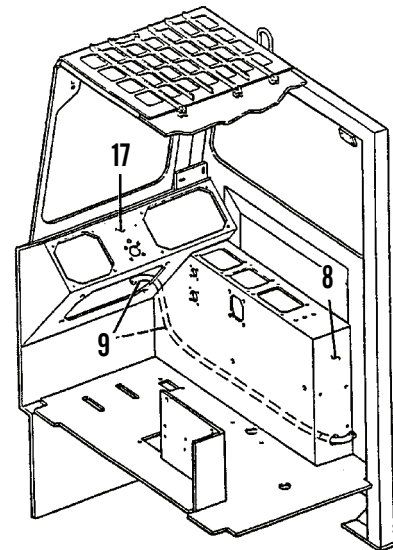
INSTALLATION

1. Push hose (9) into hole at rear of side console (8).

NOTE

For easier installation of hose, electric joystick may be removed, if necessary (WP 0233 00).

2. Continue to push hose (9) through side console (8) until end of hose appears inside front console (17).
3. From outside vehicle, position washer nozzle (18) and new rubber washer (21) on cab (22).
4. From inside dashboard, secure washer nozzle (18) with new starwasher (20) and nut (19). Push hose (9) onto washer nozzle.
5. Secure dashboard access panel (16) to front console (17) with four capscrews (15).



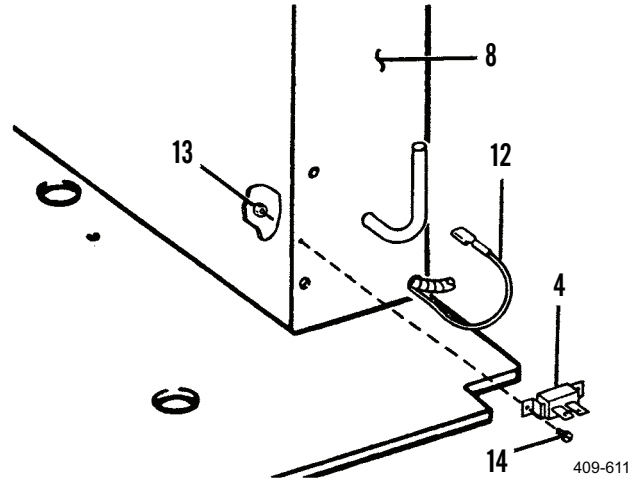
409-614

INSTALLATION - CONTINUED

NOTE

Apply loctite to screws as installed.

6. Position resistor assembly (4) on side console (8) and secure with two new locknuts (13) and two screws (14).
7. Connect female spade connector of electrical lead (12) to male spade connector on resistor assembly (4) as tagged.



NOTE

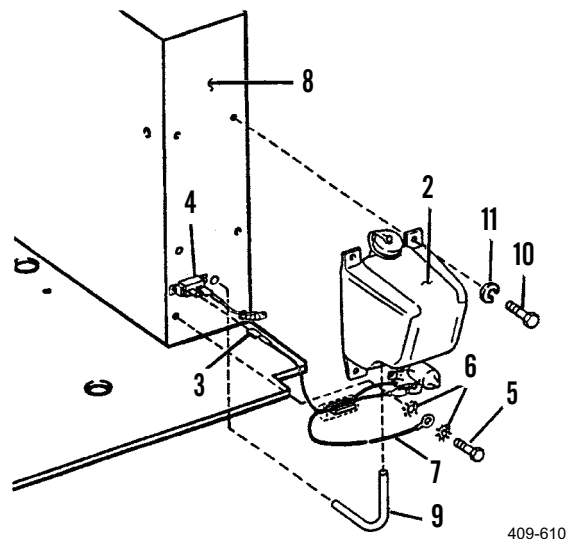
Apply loctite to threads of screws.

8. Position reservoir assembly (2) on side console (8) and secure with four new lockwashers (11) and four screws (10).
9. Push hose (9) on fitting at bottom of reservoir assembly (2).

NOTE

Apply loctite to threads of capscrew.

10. Secure electrical lead (7) to side console (8) with two new starwashers (6) and capscrew (5).
11. Connect female spade connector of electrical lead (3) to male spade connector on resistor assembly (4) as tagged.
12. Fill reservoir assembly (2) with washer fluid as described in *Service*.



NOTE

Install electric joystick if removed (WP 0235 00).

13. Connect battery cables (WP 0107 00).
14. Check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

MIRROR REPLACEMENT

0166 00

THIS WORK PACKAGE COVERS

Removal and Installation of Mirror Assembly, Removal and Installation of Mirror Face

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Locknut (5, 6 and 20)

Materials/Parts - Continued

Lockwasher (10 and 14)

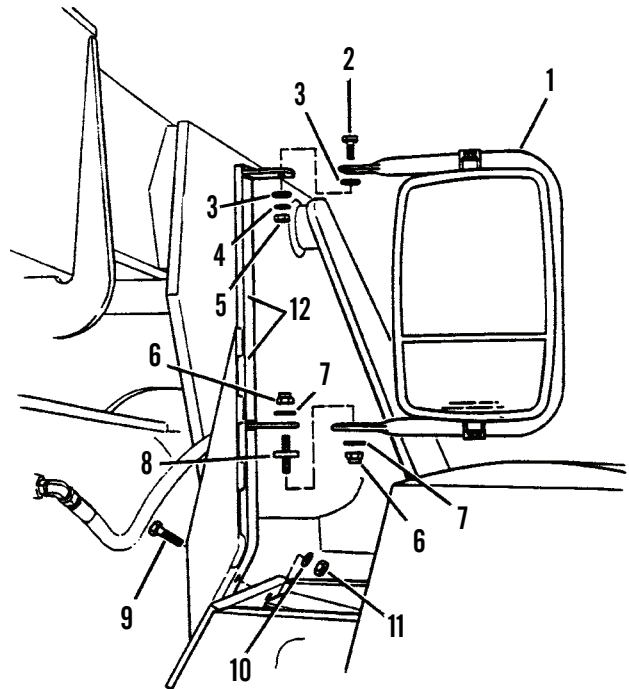
Nylon washer (3)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL AND INSTALLATION OF MIRROR ASSEMBLY

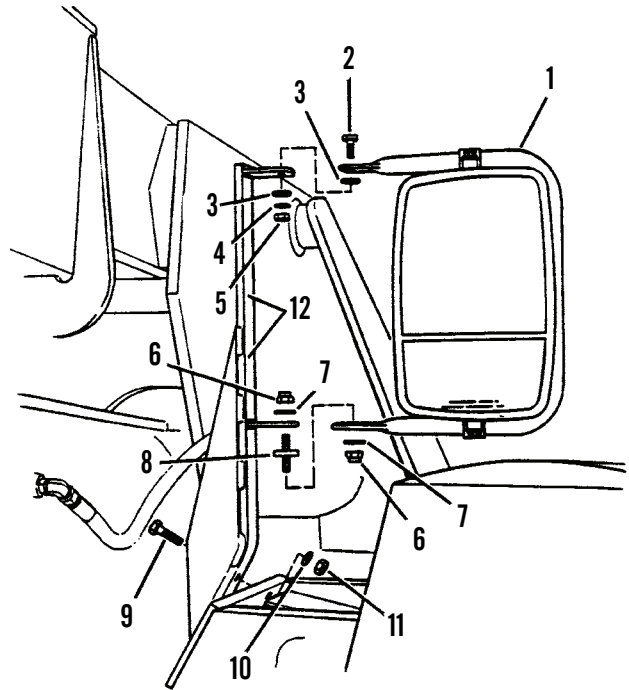
1. At top of mirror bracket (1), remove capscrew (2), two nylon washers (3), flatwasher (4) and locknut (5). Discard nylon washers and locknut.
2. Remove two locknuts (6), two flatwashers (7), locking device (8) and mirror bracket (1).
3. Remove two capscrews (9), two lockwashers (10) two nuts (11), and mounting bracket (12). Discard lockwashers.



409-617

REMOVAL AND INSTALLATION OF MIRROR ASSEMBLY - CONTINUED

4. Install vehicle mounting bracket (12) to vehicle.
5. With two capscrews (9), two new lockwashers (10) and two nuts (11).
6. Align mirror bracket (1) on mounting bracket (12).
7. Install locking device (8), two flatwashers (7) and two new locknuts (6).
8. Install new locknut (5), flatwasher (4), two new nylon washers (3) and capscrew (2).



409-617

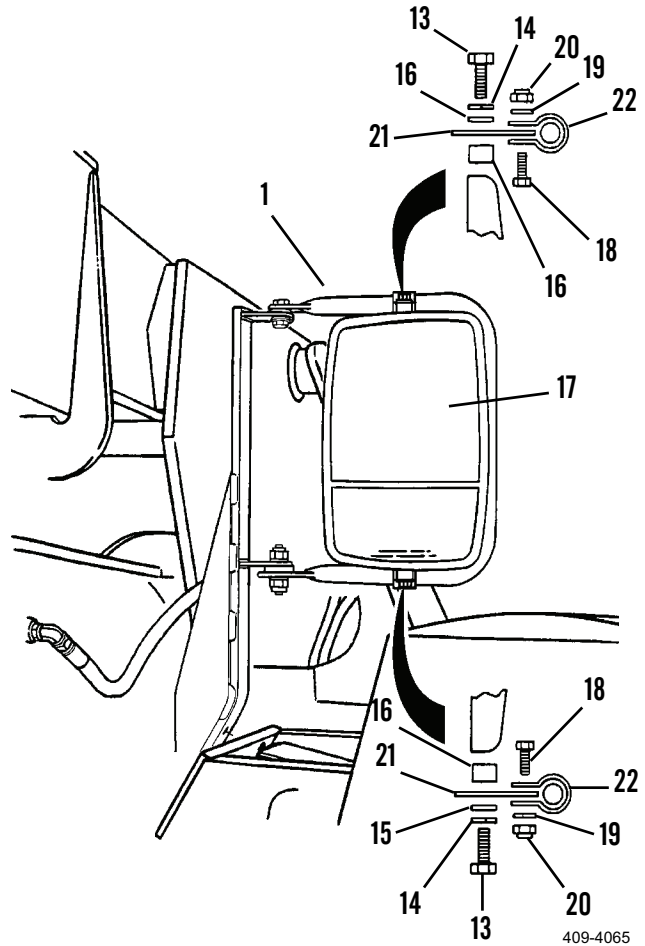
MIRROR REPLACEMENT - CONTINUED**0166 00****REMOVAL AND INSTALLATION OF MIRROR FACE**

1. Remove two capscrews (13), two lockwashers (14), two flatwashers (15), two spacers (16) and mirror face (17) from mirror bracket (1). Discard lockwashers.
2. If necessary, remove two capscrews (18), two flatwashers (19), two locknuts (20), two slotted brackets (21) and two clamps (22). Discard locknuts.
3. If removed, install two clamps (22), two slotted brackets (21), two new locknuts (20), two flatwashers (19) and two capscrews (18).

NOTE

Check that mirror face is properly positioned before tightening capscrews in step 4.

4. Secure mirror face (17) with two spacers (16), two flatwashers (15), two new lockwashers (14) and two capscrews (13).



409-4065

END OF WORK PACKAGE

CAB DEFROSTER FANS REPLACEMENT

0167 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (6, 9 and 10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

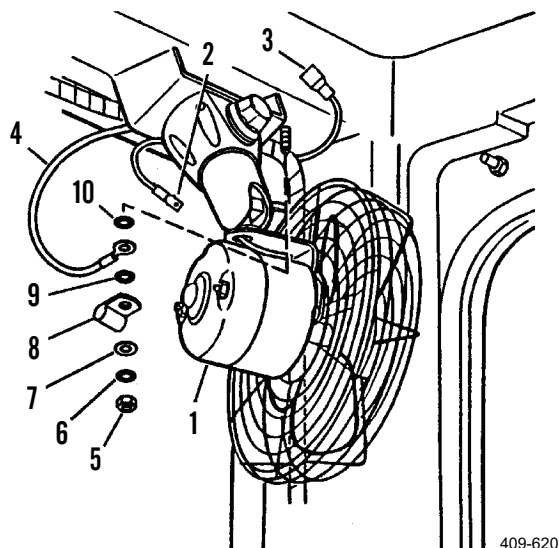
Battery cables disconnected (WP 0107 00)

NOTE

Tag all electrical connections before removing for use during installation.

REMOVAL

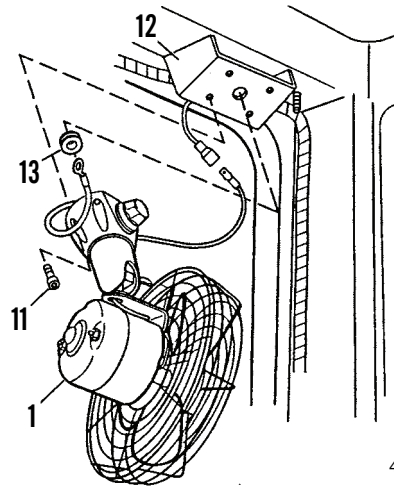
1. To remove fan (1), disconnect male connector (2) from cab harness female connector (3).
2. Disconnect fan ground wire (4) by removing nut (5), lockwasher (6), flatwasher (7), clamp (8), lockwasher (9), ground wire (4) and lockwasher (10). Discard lockwashers.



409-620

REMOVAL - CONTINUED

3. Remove four screws (11) and fan (1) from fan mount (12).
4. If necessary, remove grommet (13).



409-621

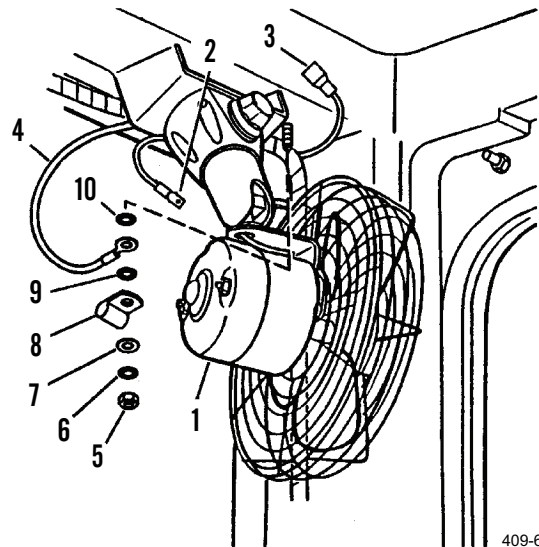
INSTALLATION

1. If removed, install grommet (13).

NOTE

Apply loctite to threads of screws.

2. Install fan (1) on fan mount (12) with four screws (11).
3. Connect fan (1) wiring.
4. Install new lockwasher (10), ground wire (4), new lockwasher (9), clamp (8), flatwasher (7), new lockwasher (6) and secure with nut (5).
5. Connect male connector (2) to cab harness female connector (3).



409-620

6. Connect battery cables (WP 0107 00).
7. Check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

CAB HEATER REPLACEMENT

0168 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (8)

Starwasher (6)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Seat removed (WP 0160 00)

Battery cables disconnected (WP 0107 00)

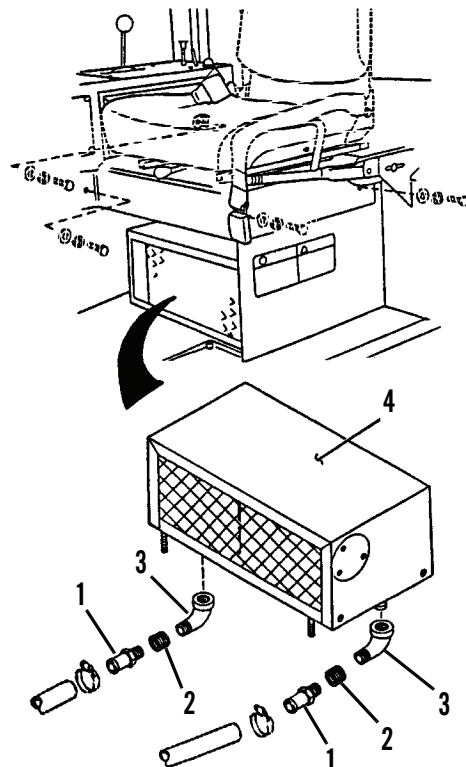
Engine coolant drained (WP 0053 00)

NOTE

- The cab heater is located inside the cab under the seat. Heater hoses and attaching hardware are accessed from under the cab.
- Tag all electrical connections before removing for use during installation.

REMOVAL

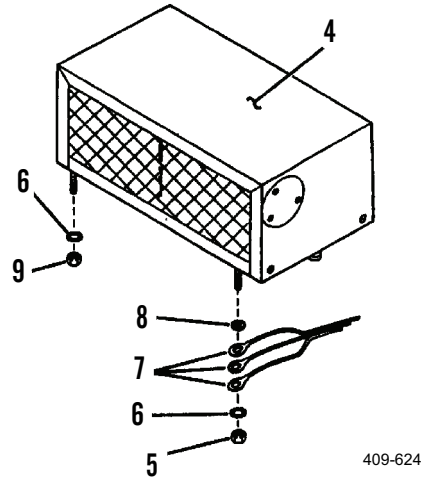
1. Remove two connectors (1), two connector bushings (2) and two elbows (3) from ports of heater (4) under cab.



409-623

REMOVAL - CONTINUED

2. Remove nut (5), starwasher (6), three ground leads (7) and lockwasher (8) from left-front mounting stud of heater (4). Discard starwasher and lockwasher.
3. Remove nuts (9) and starwashers (6) at three remaining mounting studs of heater (4). Discard starwashers.
4. Disconnect two electrical leads (10) of heater (4) at spade connectors (11) inside cab.
5. Lift and remove heater (4) from cab floor.

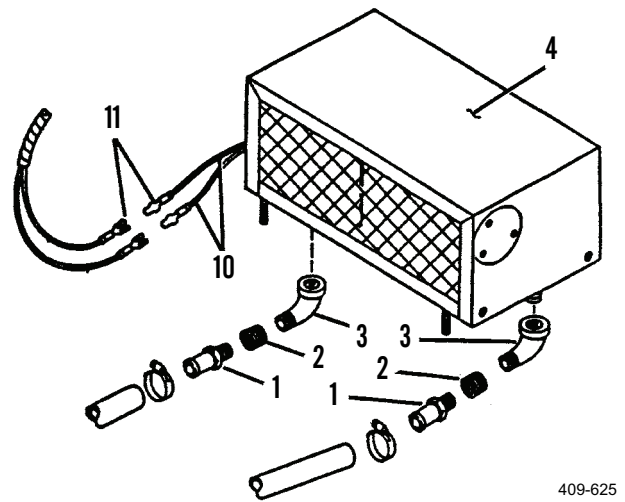


INSTALLATION

NOTE

Apply loctite to male threads of connectors, elbows and heater.

1. Position heater (4) so that mounting studs fit through holes in cab floor.
2. Connect two electrical leads (10) of heater (4) at spade connectors (11) inside cab, as tagged.
3. Position new lockwasher (8), three ground leads (7) and new starwasher (6) on left-front mounting stud of heater (4) under cab. Secure with nut (5).
4. Install nuts (9) and new starwashers (6) on three remaining mounting studs of heater (4).
5. Install two connectors (1), connector bushings (2) and elbows (3) to ports of heater (4).



6. Fill engine cooling system with coolant (WP 0053 00).
7. Connect battery cables (WP 0107 00).
8. Install seat (WP 0160 00).

END OF WORK PACKAGE

HEATER TEMPERATURE CONTROL VALVE AND CABLE REPLACEMENT

0169 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

Clamp (4)

References

WP 0077 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

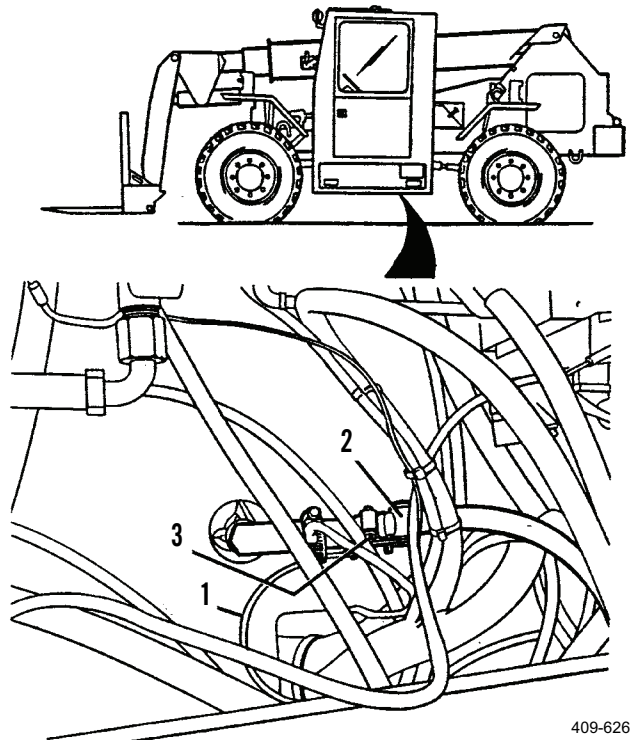
Engine coolant drained (WP 0053 00)

NOTE

- The heater temperature control valve is located under the cab.
- The heater control valve cable is mounted in the side console.

REMOVAL

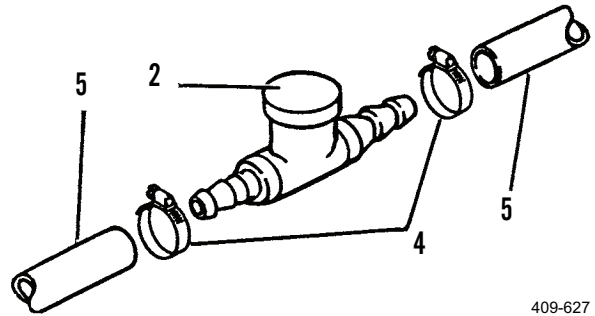
1. To remove heater control valve cable (1) from heater temperature control valve (2), loosen setscrew (3) securing cable to valve.
2. Pull end of cable (1) from valve (2).



409-626

REMOVAL - CONTINUED

3. Remove clamps (4) securing heater hoses (5) to ends of valve (2). Discard clamps.
4. Remove hoses (5) from ends of valve (2).
5. If necessary, remove electric joystick (WP 0077 00) to provide access to nut (6).
6. Remove nut (6) securing cable (1) to side console (7).



7. Pull cable (1) out through hole in console (7).

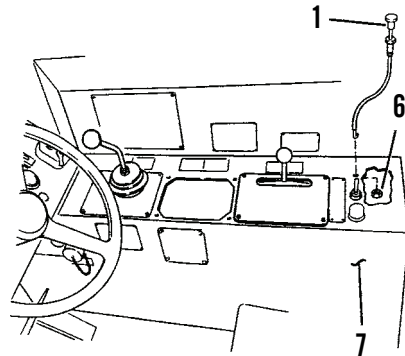
INSTALLATION

1. Push end of cable (1) through hole in side console (7) and through center of nut (6).
2. Push cable (1) through hole in cab floor above heater temperature control valve (2).

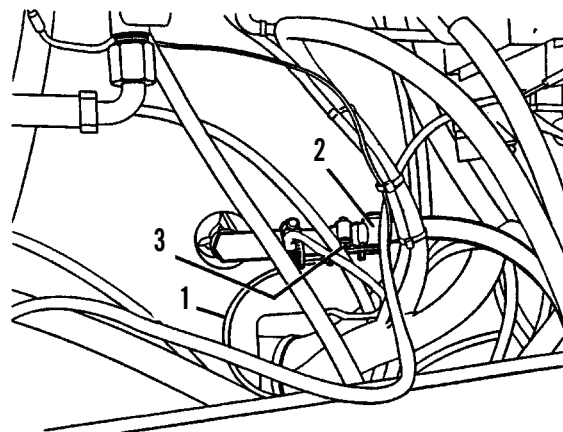
NOTE

Apply loctite to threads of nut.

3. Secure cable (1) to side console (7) with nut (6).



4. If removed, install electric joystick (WP 0077 00).
5. Position hoses (5) on ends of valve (2).
6. Secure hoses (5) to valve (2) with new clamps (4).
7. Position end of cable (1) on valve (2).
8. Tighten setscrew (3) to secure cable (1) to valve (2).
9. Fill engine cooling system with coolant (WP 0053 00).



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

Strap, tie down (Item 56, WP 0323 00)

Clamp (1, 4, 7, 9, 11 and 13)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

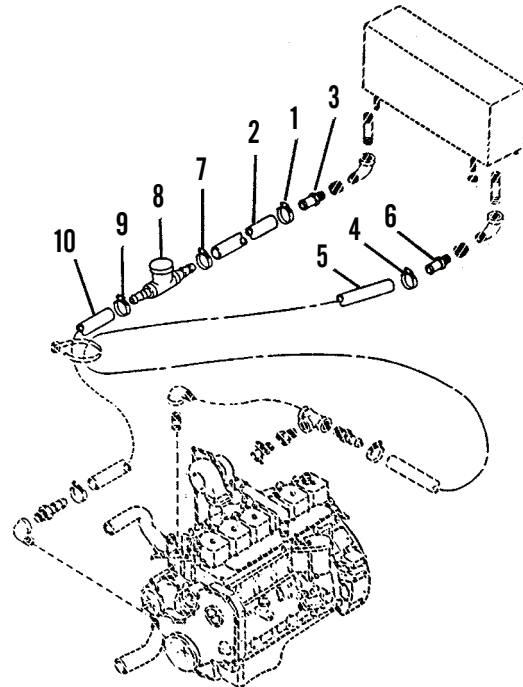
Engine cooling system drained (WP 0053 00)

REMOVAL

NOTE

Remove tie down straps from heater hoses as required. Note location of straps for use during installation.

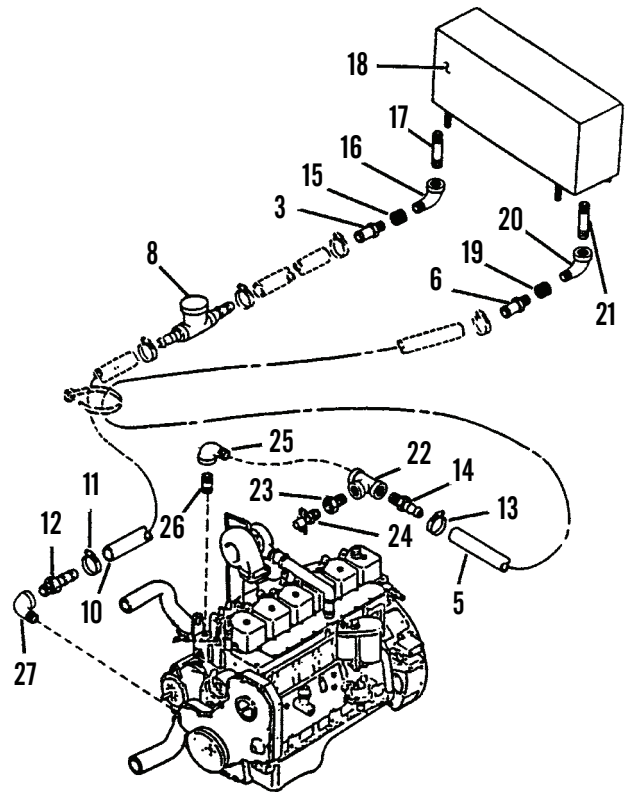
1. Remove clamp (1) and hose (2) at connector (3). Discard clamp.
2. Remove clamp (4) and hose (5) at connector (6). Discard clamp.
3. Remove clamp (7) and hose (2) at heater control valve (8). Discard clamp.
4. Remove clamp (9) and hose (10) at heater control valve (8). Discard clamp.



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REMOVAL - CONTINUED

5. Remove clamp (11) and hose (10) at adapter (12). Discard clamp.
6. Remove clamp (13) and hose (5) at adapter (14). Discard clamp.
7. Remove connector (3), bushing (15), elbow (16) and nipple (17) at heater (18).
8. Remove connector (6), bushing (19), elbow (20) and nipple (21) at heater (18).
9. Remove cable from heater control valve (8) and remove heater control valve (8).
10. Remove adapter (14), tee (22), bushing (23), drain cock (24), elbow (25) and nipple (26) at engine.
11. Remove adapter (12) and elbow (27) at engine.



409-632

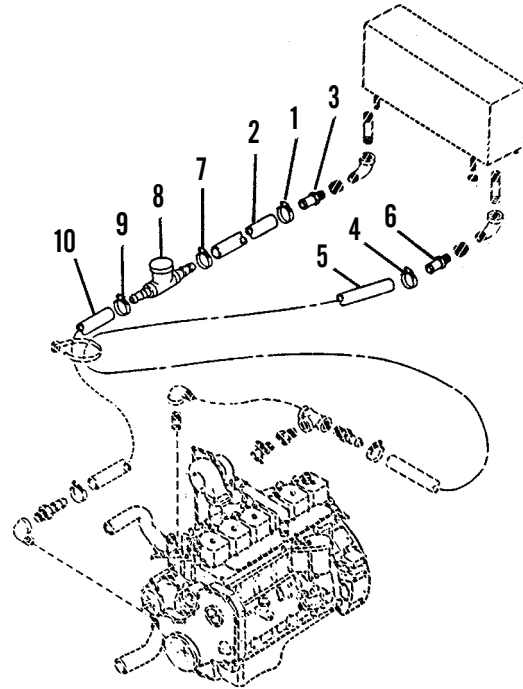
INSTALLATION**NOTE**

- Apply loctite to male threads on fittings as installed.
- Install new tie down straps around heater hoses as noted during removal.

1. Install elbow (27) and adapter (12) at engine.
2. Install nipple (26), elbow (25), drain cock (24), bushing (23), tee (22) and adapter (14) at engine.
3. Position heater control valve (8) under vehicle and connect cable to valve (8).
4. Install nipple (21), elbow (20), bushing (19) and connector (6) at heater (18).
5. Install nipple (17), elbow (16), bushing (15) and connector (3).
6. Position hose (5) on adapter (14) and install new clamp (13).
7. Position hose (10) on adapter (12) and install new clamp (11).

INSTALLATION - CONTINUED

8. Install hose (10) on heater control valve (8) and install new clamp (9).
9. Install hose (2) on heater control valve (8) and install new clamp (7).
10. Position hose (5) on connector (6) and install new clamp (4).
11. Position hose (2) on connector (3) and install new clamp (1).



409-631

12. Fill engine cooling system with coolant (WP 0053 00).
13. Run engine and check heater hoses, lines and fittings for leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

DATA PLATES REPLACEMENT

0171 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

- Adhesive (Item 1, WP 0323 00)
- Drive pin (1)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)

NOTE

This is a general procedure that applies to data plates mounted with drive pins on vehicle.

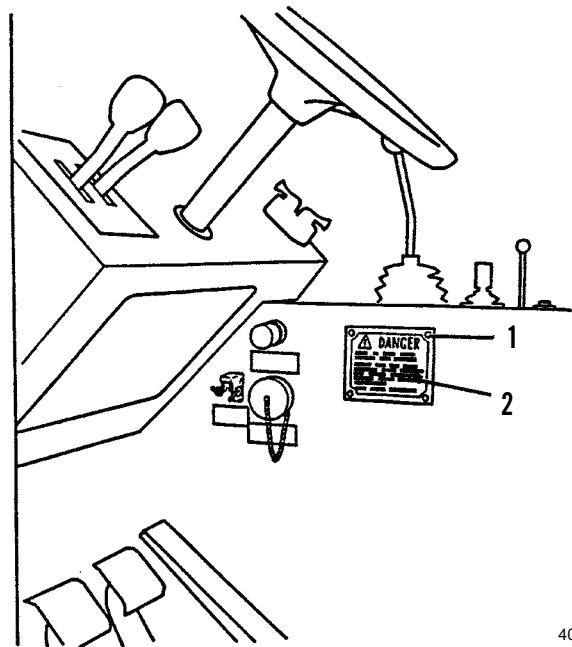
REMOVAL

1. Use drill to remove drive pins (1) securing data plate (2). Discard drive pins.
2. Remove data plate (2) from vehicle.

INSTALLATION**NOTE**

- Be sure vehicle mounting surface and back of data plate are clean and dry.
- Data plate on fuel tank adjacent to fuel filler has self-adhesive back and does not require drive pin or additional adhesive for installation.

1. Apply adhesive to back of data plate (2).
2. Position data plate (2) on vehicle.
3. Secure data plate (2) to vehicle with new drive pins (1).



409-634

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Purging Air From Piston Pump and Tandem Gear Pump

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Oil, lubricating (Item 32, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

References

WP 0005 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Transmission cover removed (WP 0150 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hydraulic components and hoses clean and dry. Apply film of clean hydraulic oil to all seals, if present, as they are installed.

NOTE

Purging air from the piston pump or tandem gear pump is normally necessary only under the following conditions:

- When hoses between pumps and the hydraulic reservoir are disconnected.
- When the hydraulic reservoir is drained and refilled.
- When it is suspected that air in pump cavities is causing hydraulic system malfunction.

PURGING AIR FROM PISTON PUMP AND TANDEM GEAR PUMP**CAUTION**

To prevent internal damage to piston pump, be sure pump housing is filled with oil before beginning purging procedures.

NOTE

The piston pump supplies hydraulic pressure to the MLRS attachment cylinder assembly, to the carriage tilt cylinders and to the fork sideshift cylinders.

1. At piston pump (1) loosen, but do not remove, hose (2) from reducer (3) at tee (4).

NOTE

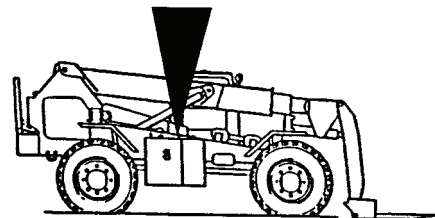
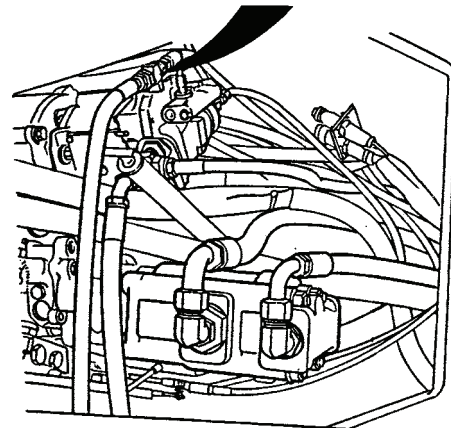
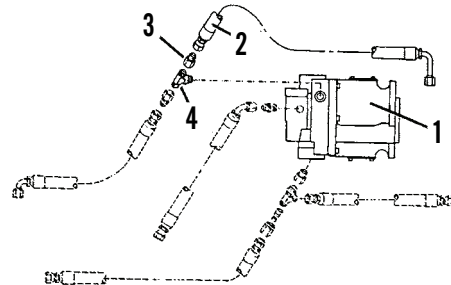
Place container under pump to catch any oil lost during the purging process.

2. Place auxiliary fuel shut-off switch in the OFF position (TM 10-3930-660-10).

NOTE

A solid stream of fluid will flow out of loosened hose when air is purged from pump.

3. Crank engine until solid stream of fluid is flowing from hose (2) at reducer (3). While continuing to crank engine, have assistant tighten hose (2).
4. Stop cranking engine. Place auxiliary fuel shut-off switch in the ON position (TM 10-3930-660-10).



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PURGING AIR FROM PISTON PUMP AND TANDEM GEAR PUMP - CONTINUED**NOTE**

If pump will not pump oil after purging, further troubleshooting is required.

5. Check hydraulic oil level, fill hydraulic reservoir as required, and check for leaks (TM 10-3930-660-10).

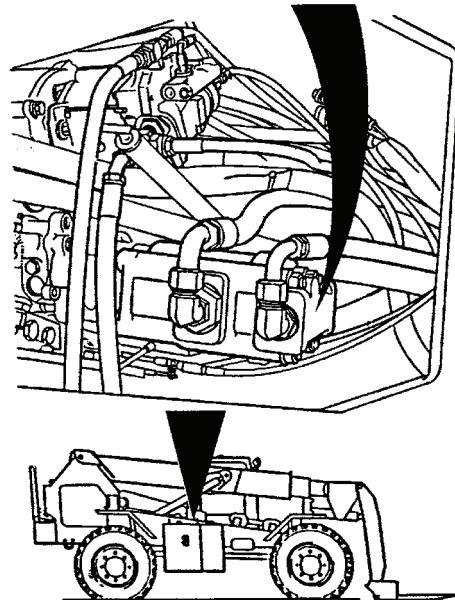
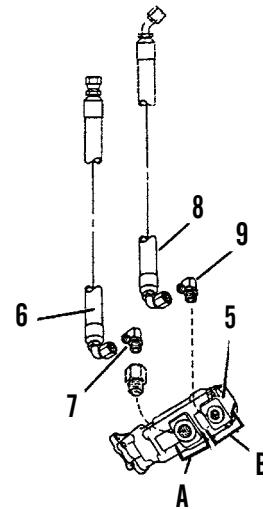
CAUTION

Do not attempt to purge sections (A and B) separately. Always purge both sections of pump whenever purging is necessary. Failure to follow purging directions may cause severe damage to pump.

NOTE

- The hydraulic tandem gear pump (5) has two sections, large and small.
- The large section (A) supplies hydraulic pressure to the boom extend cylinder, boom hoist cylinder and steering system.
- The small section (B) supplies hydraulic pressure to the brake system and the frame tilt cylinder.

6. At tandem gear pump (5), loosen but do not remove hose (6) at elbow (7).
7. Loosen but do not remove hose (8) at elbow (9).



409-637

PURGING AIR FROM PISTON PUMP AND TANDEM GEAR PUMP - CONTINUED

NOTE

Place container under pump to catch any oil lost during purging process.

8. Place auxiliary fuel shut-off switch in the OFF position (TM 10-3930-660-10).

NOTE

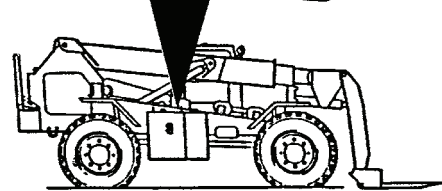
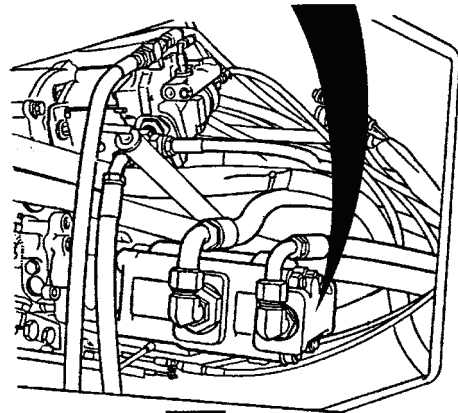
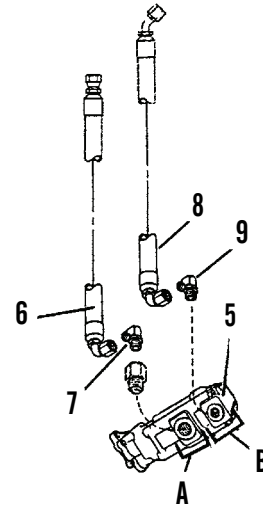
A solid stream will flow out of both loosened hoses when air is purged from pump.

9. Crank engine until solid stream of fluid is flowing from both hoses (6 and 8). While continuing to crank engine, have assistant tighten hoses (6 and 8).
10. Stop cranking engine. Place auxiliary fuel shut-off switch in the ON position (TM 10-3930-660-10).

NOTE

If pump will not pump oil after purging, further troubleshooting is required (WP 0005 00).

11. Check hydraulic oil level, fill hydraulic reservoir as required, and check for leaks (TM 10-3930-660-10).
12. Install transmission cover (WP 0150 00).



409-637

END OF WORK PACKAGE

TANDEM GEAR PUMP REPLACEMENT

0173 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Oil, lubricating (Item 32, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (11)
- O-ring (13)

References

- WP 0173 00

Personnel Required

- Two

Equipment Condition

- Vehicle parked on level ground
- Boom raised and supported (TM 10-3930-660-10)
- Transmission cover removed (WP 0150 00)

REMOVAL



WARNING



- When working under the boom, always use blocks or other supports. Combined weight of boom and MLRS attachment is approximately 6,300 lb (2,856 kg). Failure to adequately support the boom could result in severe injury or death.
- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

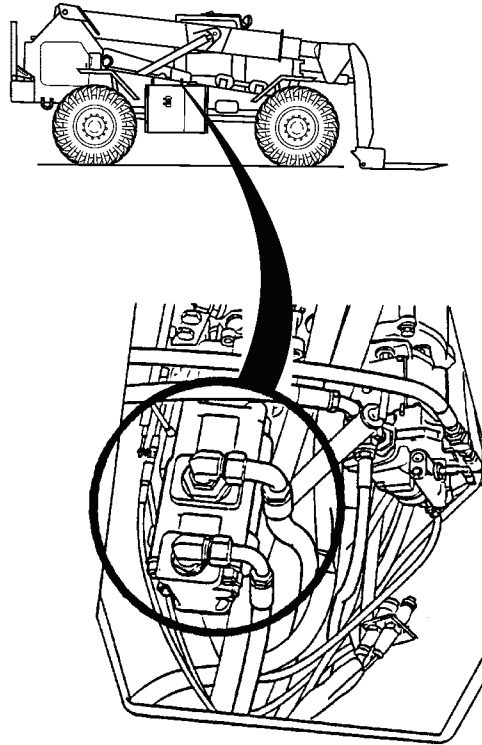
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

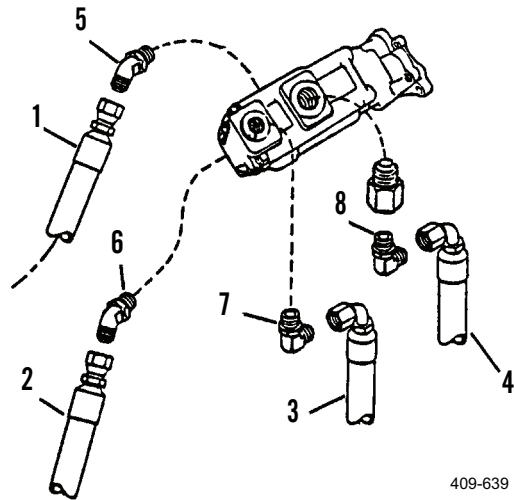
- Tag all hydraulic connections before removing for use during installation.
- Use suitable container to catch any hydraulic oil that may drain from system.

REMOVAL - CONTINUED

1. Remove four hydraulic hoses (1 thru 4) from elbows (5 thru 8).



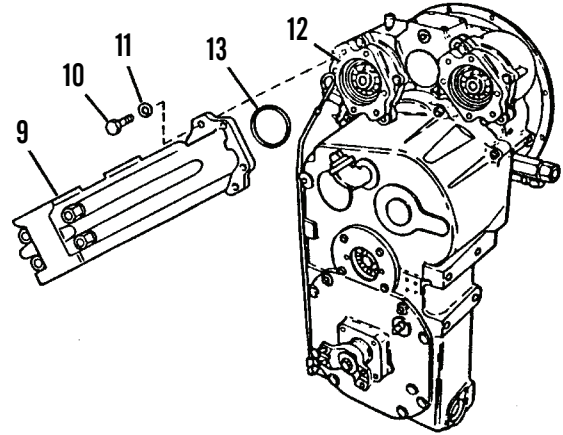
409-638



409-639

REMOVAL - CONTINUED

2. To remove pump (9), remove two capscrews (10) and two lockwashers (11) and remove pump (9) from transmission mounting (12). Discard lockwashers.
3. Remove and discard mounting O-ring (13).
4. If necessary, remove elbows (5 thru 8), and reducer (14) from pump (9).



409-640

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

1. If removed, install reducer (14) and elbows (5 thru 8) to pump (9).
2. Install new mounting O-ring (13).

NOTE

Apply loctite to threads of capscrews.

3. Position pump (9) on transmission mounting (12) and secure with two new lockwashers (11) and two capscrews (10).
4. Connect four hydraulic hoses (1 thru 4) to elbows (5 thru 8) as tagged.

NOTE

Tandem gear pump must be purged of air before engine is started. Refer to WP 0173 00. Failure to purge air as directed may result in severe damage to tandem gear pump.

5. Purge air from tandem gear pump (WP 0173 00).
6. Start engine, check for leaks and proper operation (TM 10-3930-660-10).
7. Install transmission access cover (WP 0150 00).

END OF WORK PACKAGE

PISTON PUMP REPLACEMENT

0174 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Oil, lubricating (Item 32, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)
- Lockwasher (19)
- O-ring (21)

References

WP 0174 00

Personnel Required

Two

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Boom raised (TM 10-3930-660-10)
- Transmission cover removed (WP 0150 00)

REMOVAL



WARNING



- When working under the boom, always use blocks or other supports. Combined weight of boom and MLRS attachment is approximately 6,300 lb (2858 kg). Failure to adequately support the boom could result in severe injury or death.
- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

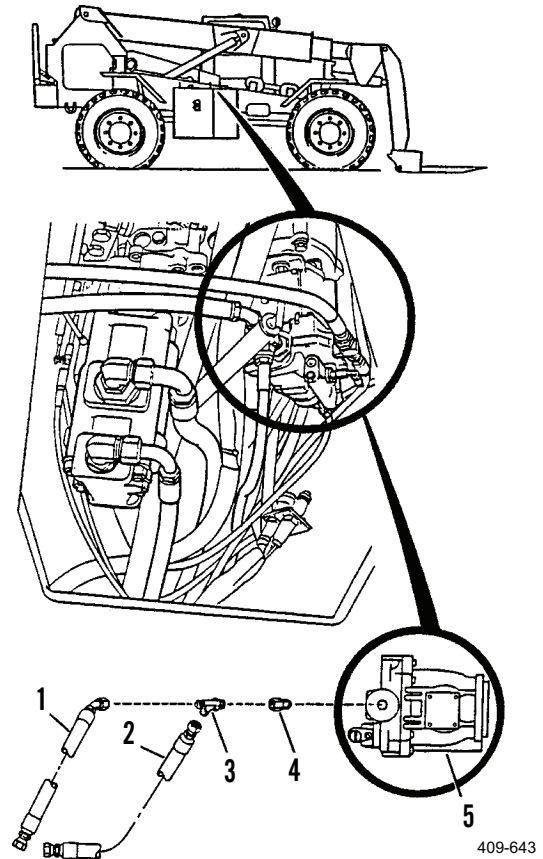
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Contamination of the hydraulic system could result in premature failure.

NOTE

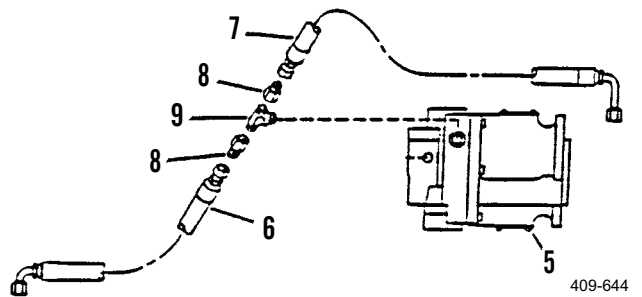
If more than one hydraulic line is to be removed, tag lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.

REMOVAL - CONTINUED

1. Disconnect hoses (1 and 2), from tee (3). Leave tee and reducer (4) assembled to pump (5).



2. Disconnect hoses (6 and 7) from two reducers (8). Leave tee (9) and reducers assembled to pump (5).

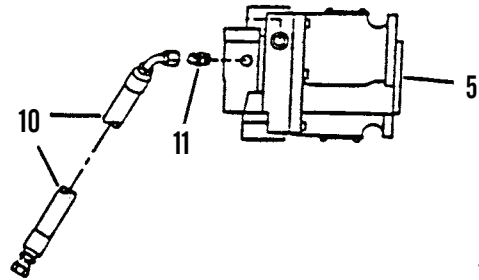


PISTON PUMP REPLACEMENT - CONTINUED

0174 00

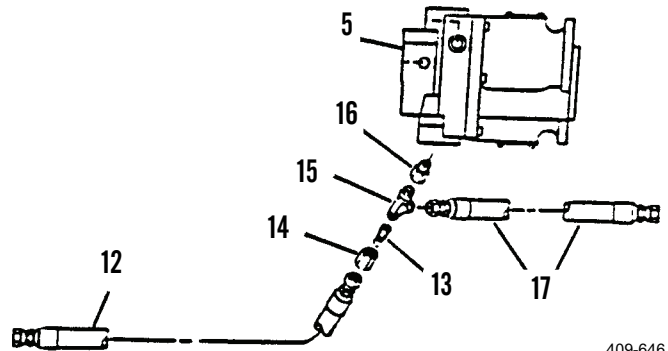
REMOVAL - CONTINUED

3. Disconnect hose (10) from adapter (11). Leave adapter assembled to pump (5).



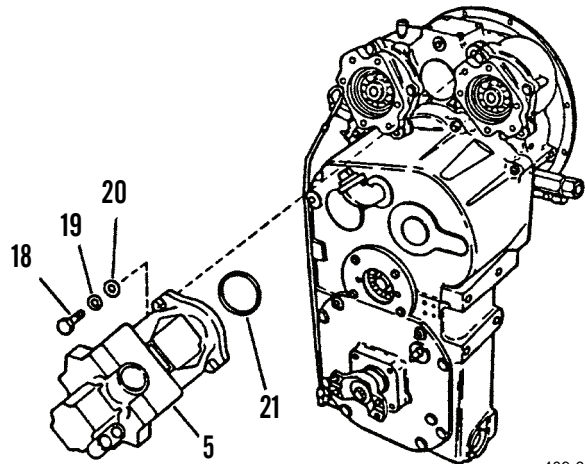
409-645

4. Disconnect hose (12) from reducer (13). Leave nut (14), reducer (13), tee (15) and reducer (16) assembled to valve (5).
5. Disconnect hose (17) from tee (15).



409-646

6. Support pump (5) and remove two bolts (18), lockwashers (19) and flatwashers (20). Discard lockwashers.
7. Remove pump (5) from the vehicle.
8. Remove and discard O-ring (21).
9. Remove tee (3) and reducer (4).
10. Remove two reducers (8) and tee (9).
11. Remove adapter (11).
12. Remove reducer (13), nut (14), tee (15) and reducer (16).



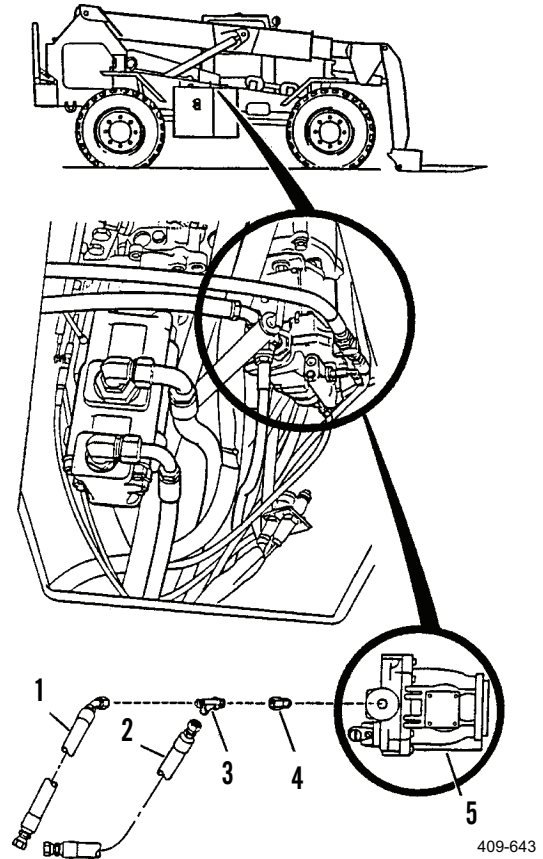
409-647

INSTALLATION

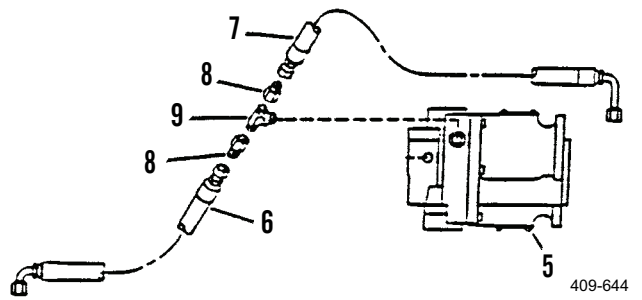
NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

1. Install tee (3) and reducer (4) on pump (5).

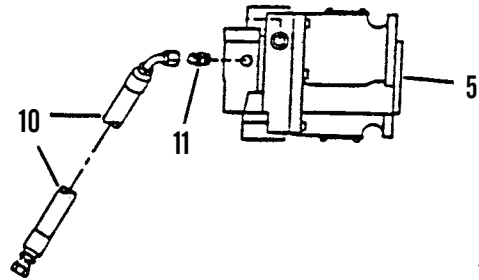


2. Install two reducers (8) and tee (9).



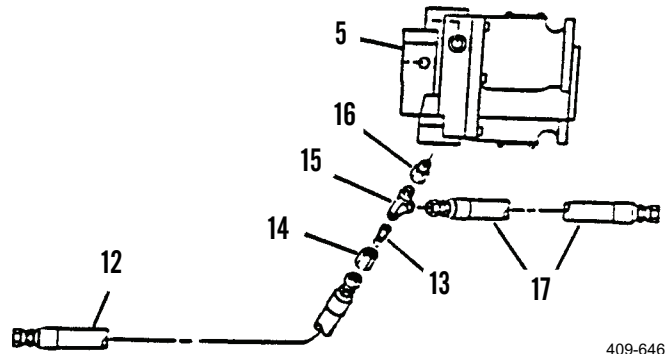
INSTALLATION - CONTINUED

3. Install adapter (11).



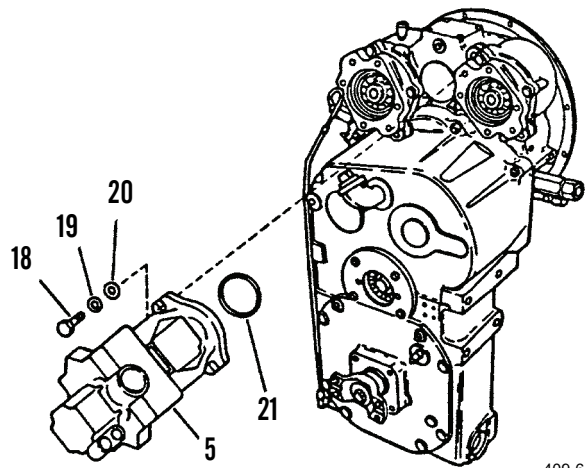
409-645

4. Install reducer (13), nut (14), tee (15) and reducer (16).



409-646

5. Install new O-ring (21).
6. Position pump (5) on the transmission and install two bolts (18), two new lockwashers (19) and two flat-washers (20).



409-647

7. Connect hose (17) to tee (15).
8. Connect hose (12) to reducer (13).
9. Connect hose (10) to adapter (11).
10. Connect hoses (6) and (7) to two reducers (8).
11. Connect hose (1) and hose (2) to tee (3).

INSTALLATION - CONTINUED

CAUTION

Piston pump must be purged of air before engine is started. Refer to WP 0174 00. Failure to purge air as directed may result in severe damage to piston pump.

12. Purge air from the piston pump (WP 0174 00).
13. Remove supporting material from boom.
14. Install transmission cover (WP 0150 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment of Main Relief Valve, Adjustment of Boom Extend Relief Valve, Adjustment of Boom Hoist Relief Valve, Adjustment of Boom Lower Relief Valve

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Sealant, Loctite (Item 43, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)
 Lockwasher (5)

Personnel Required

Two

Equipment Condition

Vehicle on level ground (10-3930-660-10)
 Boom placed in horizontal position and supported with rigid chocking (TM 10-3930-660-10)
 Transmission cover removed (WP 0150 00)



WARNING



- When working under the boom, always use blocks or other supports. Combined weight of boom and MLRS attachment is approximately 6,300 lb (2858 kg). Failure to adequately support the boom could result in severe injury or death.
- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

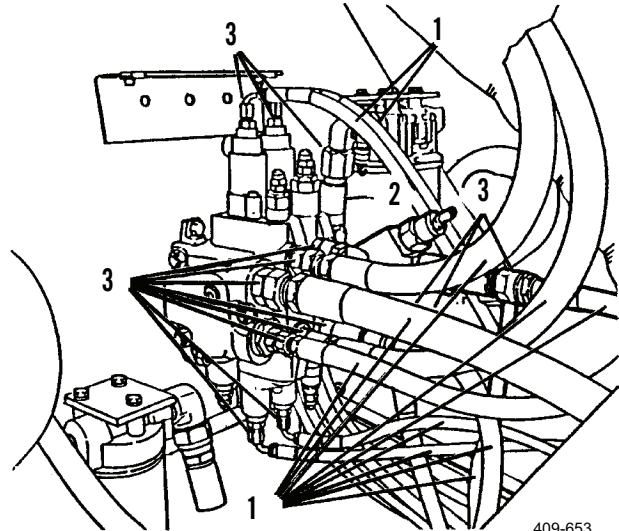
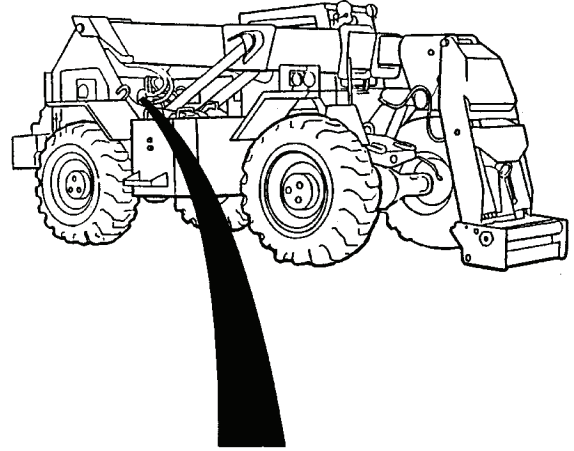
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

- Tag all electrical connections before removing for use during installation.
- If more than one hydraulic line is to be removed, tag and identify lines to assure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

1. Disconnect thirteen hydraulic hoses (1) and one tube (2) at fittings (3).
2. Cap hydraulic hose and tube fittings (3).



409-653

NOTE

Main control valve weighs 60 lb (27 kg). When performing the following procedure, grasp the valve so it does not drop when fasteners are removed.

3. Remove three nuts (4), three lockwashers (5) and three capscrews (6) that secure valve. Discard lockwashers.
4. Remove control valve (7).

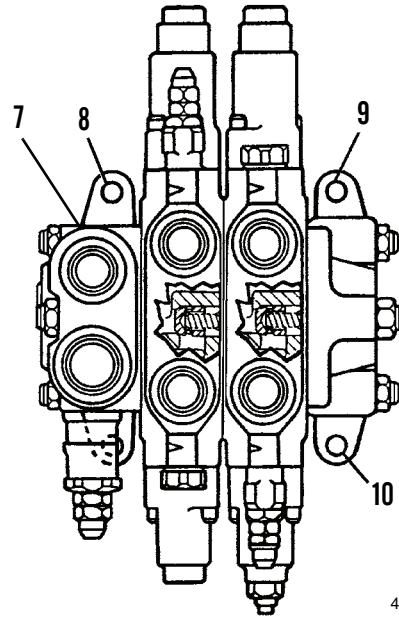
INSTALLATION

1. Position control valve (7) on compartment wall.

NOTE

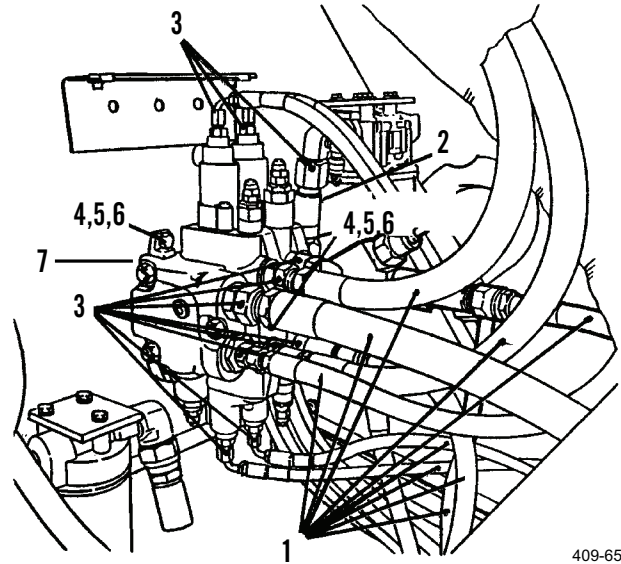
Apply loctite to threads of capscrews.

2. Place a capscrew (6) through compartment wall and valve flange (8). Place a new lockwasher (5) and a nut (4) on end of capscrew. Hand-tighten nut.
3. Place remaining two capscrews through compartment wall and valve flanges (9 and 10) and secure with new lockwashers (5) and nuts (4).
4. Tighten all nuts (4).



409-4067

5. Remove caps from all hydraulic hoses (1) and tube (2).
6. Connect thirteen hydraulic hoses (1) and one tube (2) to fittings (3).
7. Start engine (TM 10-3930-660-10).
8. Cycle boom hoist and extend functions five times.
9. Shut off engine and check for leaks (TM 10-3930-660-10).



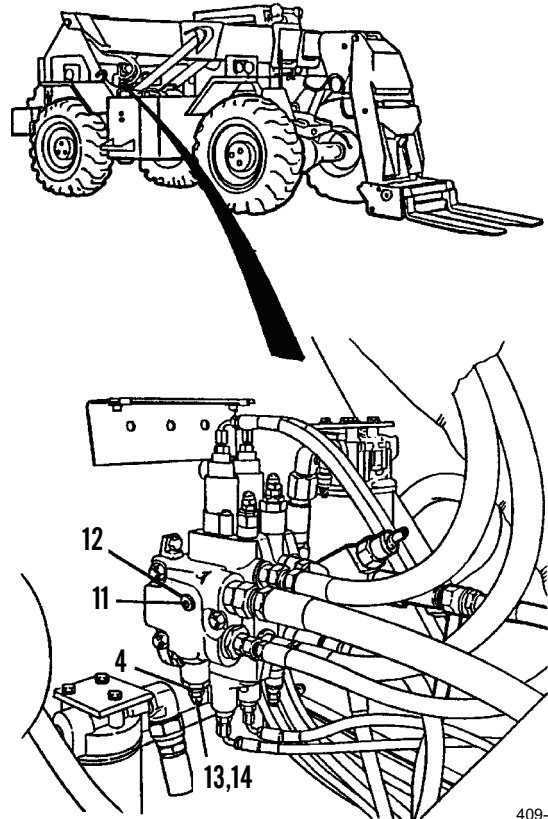
409-655

10. Install transmission cover (WP 0150 00).

ADJUSTMENT OF MAIN RELIEF VALVE**NOTE**

Adjustment of main control valve assembly is limited to adjustment of relief valves. There are a total of four relief valves on the main control valve assembly.

1. Remove main relief valve plug (11) from relief valve port (12).
2. Connect 0 to 5,000 psi (0 to 34474 kPa) pressure gauge to relief valve port (12).
3. Start engine (TM 10-3930-660-10).
4. Operate boom hoist, lower, extend or retract function until cylinder bottoms out and hydraulic oil is passing over relief valve. Continue to hold hydraulic lever in that position so oil passes over relief valve during relief valve adjustment.



409-656

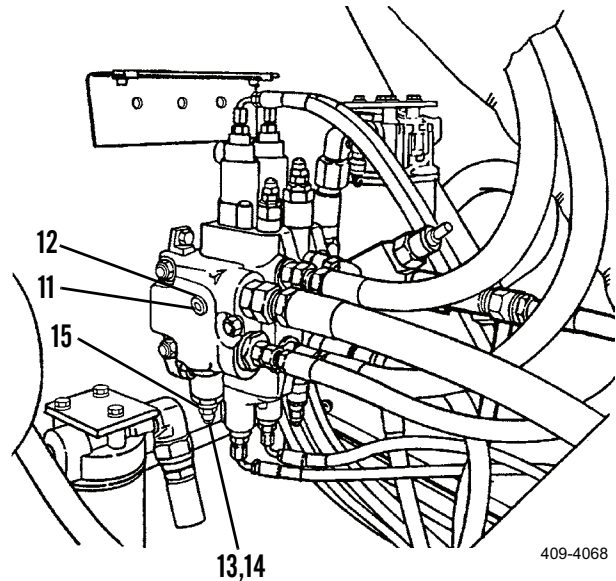
NOTE

Engine may be operated at idle or full throttle when performing tests/adjustments.

5. Read relief valve pressure on gauge. Pressure range is 2,750 to 2,850 psi (18961 to 19650 kPa). If relief valve pressure is not within specifications, continue with steps 6 thru 12.
6. Remove acorn nut (13) covering slotted head adjusting screw (14).
7. While holding adjusting screw (14), loosen and back off jamnut (15) which secures adjusting screw.
8. To increase relief pressure, turn adjusting screw (14) clockwise (in). To decrease pressure, turn adjusting screw (14) counterclockwise (out).
9. When desired relief pressure is obtained, hold adjusting screw (14) in position and tighten jamnut (15). Install acorn nut (13).
10. Stop engine (TM 10-3930-660-10).

ADJUSTMENT OF MAIN RELIEF VALVE - CONTINUED

11. Disconnect pressure gauge from main relief valve port (12).
12. Install main relief valve plug (11) into port (12) and tighten.
13. Replace transmission cover (WP 0150 00).

**ADJUSTMENT OF BOOM EXTEND RELIEF VALVE****NOTE**

The main relief valve pressure must be adjusted above normal operating pressure to permit the boom extend relief valve pressure to be adjusted. Main relief valve pressure is then returned to normal operating pressure at the end of this procedure.

1. Remove main relief valve plug (11) from relief valve port (12).
2. Connect 0 to 5,000 psi (0 to 34474 kPa) pressure gauge to relief valve port (12).
3. Remove acorn nut (13) covering slotted head adjusting screw (14).
4. While holding adjusting screw (14), loosen and back off jamnut (15) which secures adjusting screw.

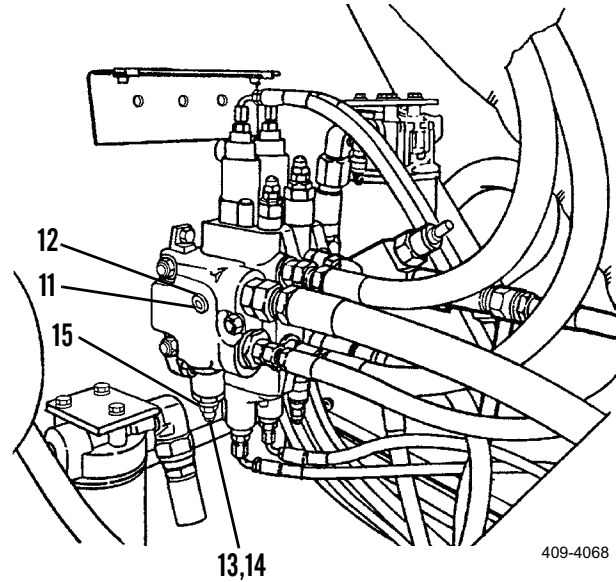
NOTE

Engine may be operated at idle or full throttle when performing pressure tests.

5. Start engine (TM 10-3930-660-10).
6. Operate boom extend, retract, hoist or lower function until hydraulic oil is passing over relief valve. Continue to hold hydraulic lever in that position so oil passes over relief valve during relief valve adjustment.
7. Turn adjusting screw (14) clockwise (in) until pressure on gauge reads 3,100 psi (21374 kPa).

ADJUSTMENT OF BOOM EXTEND RELIEF VALVE - CONTINUED

8. Release hydraulic lever (TM 10-3930-660-10).
9. Remove acorn nut (16) covering slotted head adjusting screw (17).
10. While holding adjusting screw (17), loosen and back off jamnut (18) which secures adjusting screw.
11. Operate boom extend function until boom is fully extended. Continue to hold boom control lever in extend position so hydraulic oil passes over relief valve (TM 10-3930-660-10).
12. To increase relief pressure, turn adjusting screw clockwise (in). To decrease pressure, turn adjusting screw counterclockwise (out).
13. Adjust boom extend relief valve pressure between 2,950 to 3,050 psi (20340 to 21029 kPa).
14. When desired relief pressure is obtained, release boom extend lever.
15. Hold adjusting screw (17) in position and tighten jamnut (18).
16. Install acorn nut (16).
17. Perform steps 4 through 13 of adjustment of main relief valve.



409-4068

ADJUSTMENT OF BOOM HOIST RELIEF VALVE**NOTE**

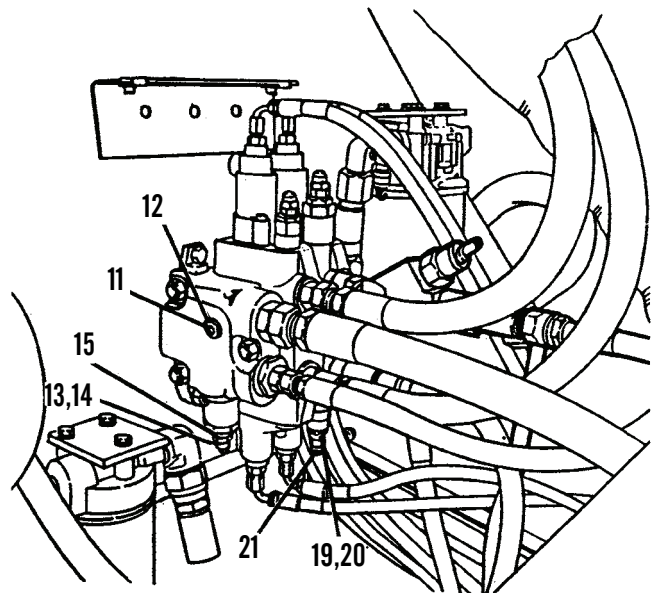
The main relief valve pressure must be adjusted above normal operating pressure to permit the boom hoist relief valve pressure to be adjusted. Main relief valve pressure is then returned to normal operating pressure at the end of this procedure.

1. Remove main relief valve plug (11).
2. Connect 0 to 5,000 psi (0 to 34474 kPa) pressure gauge to plug port (12).
3. Remove acorn nut (13) covering slotted head adjusting screw (14).
4. While holding adjusting screw (14), loosen and back off jamnut (15) which secures adjusting screw.

NOTE

Engine may be operated at idle or full throttle when performing pressure tests.

5. Start engine (TM 10-3930-660-10).
6. Operate boom extend, retract, hoist or lower function until hydraulic oil is passing over relief valve. Continue to hold hydraulic lever in that position so oil passes over relief valve during relief valve adjustment.
7. Turn adjusting screw (14) clockwise (in) until pressure on gauge reads 3,100 psi (21374 kPa).
8. Release hydraulic function lever.
9. Remove acorn nut (19) covering slotted head adjusting screw (20).
10. While holding adjusting screw (20), loosen and back off jamnut (21) which secures adjusting screw.
11. Operate boom hoist function until boom is fully raised. Continue to hold boom control lever in position so hydraulic oil passes over relief valve. Read relief valve pressure on pressure gauge.
12. Adjust boom hoist relief valve pressure between 2,950 to 3,050 psi (20340 to 21029 kPa).
13. To increase relief pressure, turn adjusting screw (18) clockwise (in). To decrease pressure, turn adjusting screw counter-clockwise (out).
14. Hold adjusting screw (20) in position and tighten jamnut (21). Install acorn nut (19).
15. Perform steps 4 through 13 of *Adjustment of Main Relief Valve*.



409-659

ADJUSTMENT OF BOOM LOWER RELIEF VALVE**NOTE**

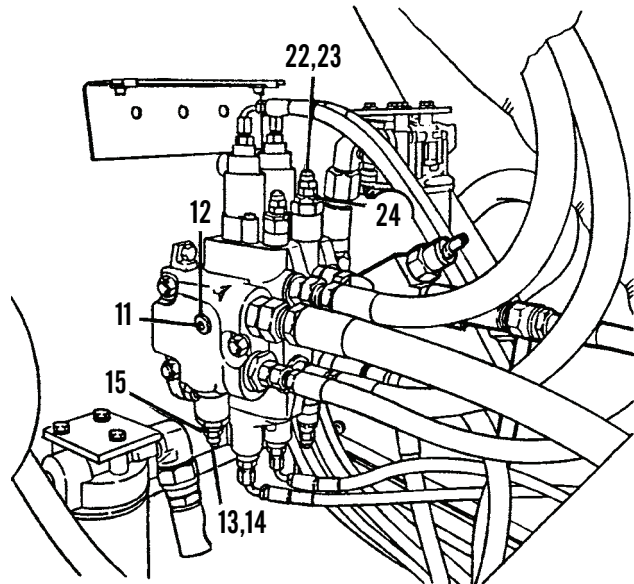
The main relief valve pressure must be adjusted above normal operating pressure to permit the boom lower relief valve pressure to be adjusted. Main relief valve pressure is then returned to normal operating pressure at the end of this procedure.

1. Remove main relief valve plug assembly (11).
2. Connect 0 to 5,000 psi (0 to 34474 kPa) pressure gauge to plug port (12).
3. Remove acorn nut (13) covering slotted head adjusting screw (14).
4. While holding adjusting screw (14), loosen and back off jamnut (15) which secures adjusting screw.

NOTE

Engine may be operated at idle or full throttle when performing pressure tests.

5. Start engine (TM 10-3930-660-10).
6. Operate boom extend, retract, hoist or lower function until hydraulic oil is passing over relief valve. Continue to hold hydraulic lever in that position so oil passes over relief valve during relief valve adjustment.
7. Turn adjusting screw (14) clockwise (in) until pressure on gauge reads 3,100 psi (21374 kPa).
8. Release hydraulic function lever.
9. Remove acorn nut (22) covering slotted head adjusting screw (23).
10. While holding adjusting screw (23), loosen and back off jamnut (24) which secures adjusting screw.
11. Operate boom lower function until boom is fully lowered. Continue to hold boom control lever in position so hydraulic oil passes over relief valve.
12. Read relief valve pressure on pressure gauge.
13. Adjust boom lowering relief valve pressure between 1,000 to 1,100 psi (6895 to 7584 kPa), when desired relief pressure is obtained, release boom hoist lever (TM 10-3930-660-10).
14. To increase relief pressure, turn adjusting screw (23) clockwise (in). To decrease pressure, turn adjusting screw counterclockwise (out).
15. Hold adjusting screw (23) in position and tighten jamnut (24). Install acorn nut (22).
16. Perform steps 4 through 13 of *Adjustment of Main Relief Valve*.



409-661

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Lockwasher (4 and 15)

Equipment Condition

Vehicle parked on level ground (10-3930-660-10)

Parking brake set (TM 10-3930-660-10)

MLRS attachment fully lowered (TM 10-3930-660-10)

Forks level and resting on ground (TM 10-3930-660-10)

Battery cables disconnected (WP 0107 00)



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

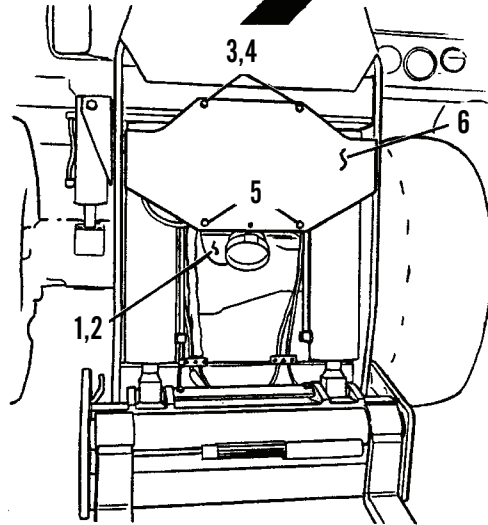
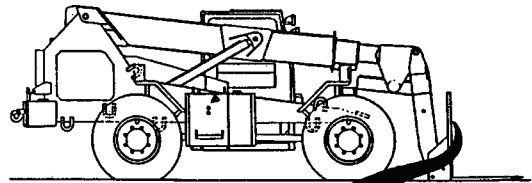
Wipe all areas clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- Tag all electrical connections before removing for use during installation.

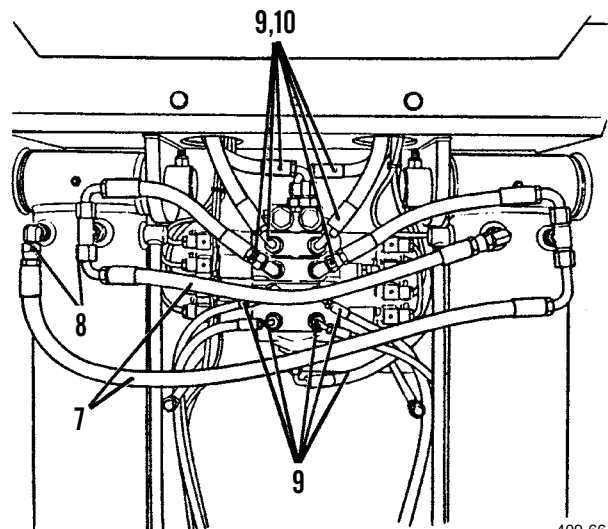
REMOVAL

1. Disconnect floodlight electrical leads (1 and 2) at plugs.
2. Remove two capscrews (3), two lockwashers (4) and two nuts (5) that secure attachment valve cover (6). Discard lockwashers.
3. Remove attachment cover (6).



409-663

4. Tag both crossover hoses (7).
5. Disconnect and remove crossover hoses (7) at fittings (8).
6. Disconnect eleven hydraulic hoses (9) at fittings (10) and remove from valve.



409-664

REMOVAL - CONTINUED

7. Tag eight electrical connectors (11).
8. Loosen eight connector retaining screws (12).

NOTE

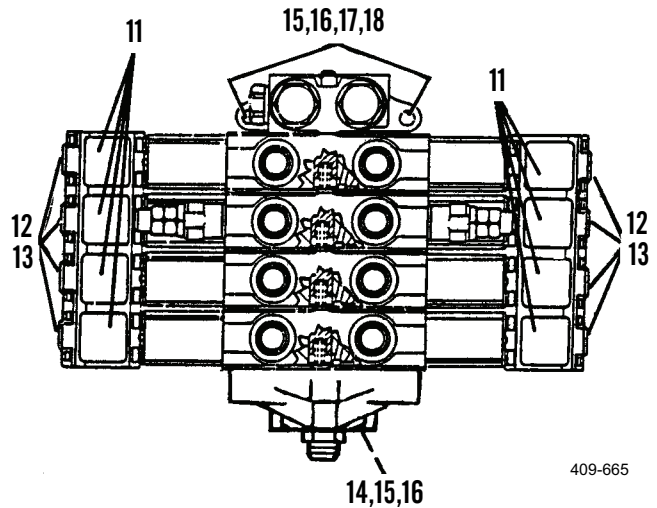
Gaskets (13) placed between connectors and valve may drop out when connectors are unplugged.

9. Unplug eight electrical connectors (11) from valve.

NOTE

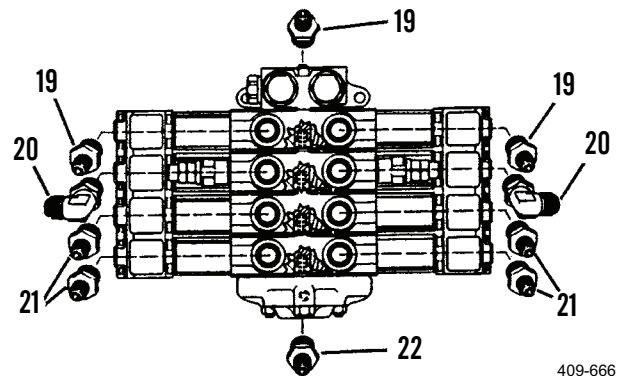
Secure valve during the following procedure so it does not drop.

10. Remove bottom capscrew (14), lockwasher (15) and spacer (16). Discard lockwasher.
11. Remove top two hex nuts (17), lockwashers (15), spacers (16) and capscrews (18). Discard lockwashers.
12. Remove three adapters (19) from valve.
13. Remove two elbows (20) from valve.
14. Remove four adapters (21) from valve.
15. Remove adapter (22) from valve.



INSTALLATION

1. Install adapter (22) to valve.
2. Install four adapters (21) to valve.
3. Install two elbows (20) to valve.
4. Install three adapters (19) to valve.
5. Position and support valve on vehicle.
6. Apply loctite to two capscrews (18). Install two spacers (16), two capscrews (18), two new lockwashers (15) and two nuts (17).
7. Apply loctite to capscrew (14). Install spacer (16), new lockwasher (15) and capscrew (14).



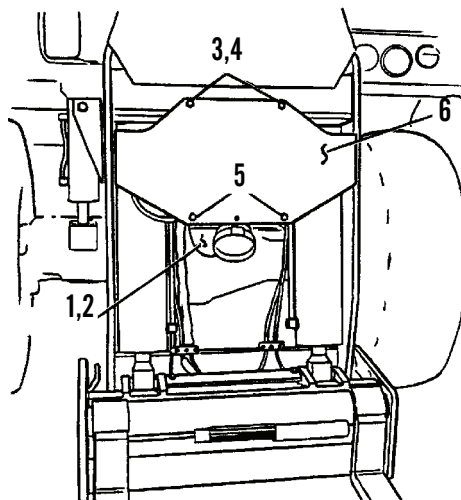
NOTE

Install gasket (13) on each electrical connector before installing connector to valve.

8. Connect eight electrical connectors (11) as tagged and tighten eight connector retaining screws (12), to secure electrical connectors.
9. Connect eleven hydraulic hoses (9) to valve fittings (10) as tagged.

INSTALLATION - CONTINUED

10. Connect two crossover hoses (7) to carriage tilt cylinder fittings (8) as tagged.
11. Position cover (6) over valve and align mounting holes.
12. Apply loctite to two capscrews (3) and two nuts (5).
13. Secure cover (6) with two nuts (5), two capscrews (3) and two new lockwashers (4).
14. Connect floodlight electrical leads (1) and (2) as tagged.



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NOTE

White lead of floodlight connects to lead 71 of vehicle wiring harness. Black lead of floodlight connects to lead 02 of vehicle wiring harness.

15. Connect battery cables (WP 0107 00).
16. Purge air from hydraulic system by cycling each MLRS attachment function five times (TM 10-3930-660-10).

NOTE

Excessive air in hydraulic system may temporarily prevent MLRS attachment functions from operating. Attempt to operate MLRS attachment functions as required until each function operates smoothly and completely (TM 10-3930-660-10).

END OF WORK PACKAGE

PRIORITY VALVE REPLACEMENT

0177 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Lockwasher (6)

References

- WP 0091 00

Equipment Condition

- Vehicle parked on level ground (10-3930-330-24)
- Parking brake set, wheels chocked (TM 10-3930-660-10)



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

NOTE

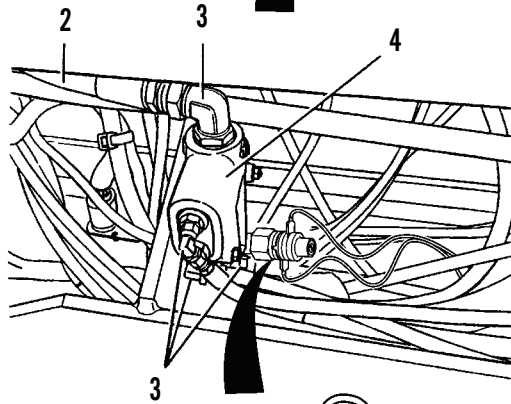
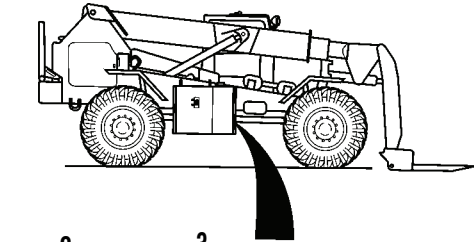
- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.
- Tag all hydraulic connections before removing for use during installation.

REMOVAL

NOTE

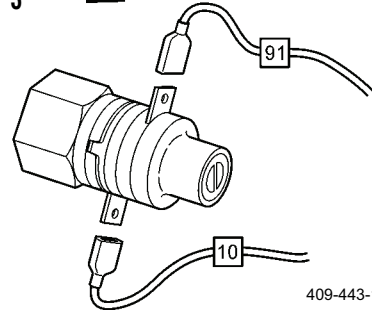
The priority valve is located under the vehicle toward the rear of the cab mounting shelf.

1. Remove electrical lead 91 from terminal of switch (1).
2. Remove electrical lead 10 from other terminal of switch (1).
3. Disconnect six hydraulic hoses (2) at fittings (3) of valve (4).



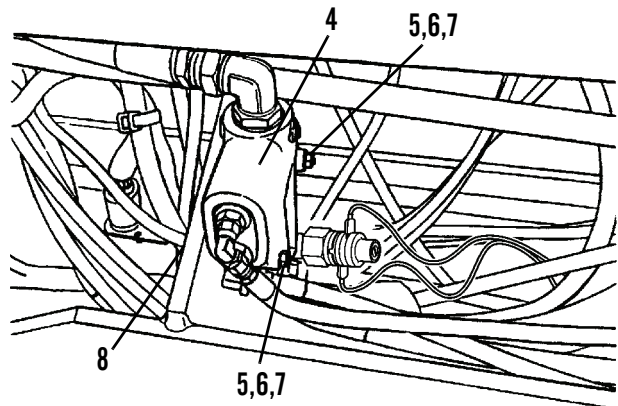
NOTE

- Cap or plug all open hydraulic fittings.
- Note orientation of valve before removing it.
- When performing the following procedure, grasp the valve so it does not drop when fasteners are removed.



409-443-1

4. Remove two nuts (5).
5. Remove and discard two lockwashers (6).
6. Remove two bolts (7) from bracket holes (8).



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REMOVAL - CONTINUED

7. Remove priority valve (4).
8. If necessary, remove hydraulic bypass switch (1) from priority valve (4) (WP 0091 00).

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. If removed, install hydraulic bypass switch (1) to valve (4) (WP 0091 00).
2. Position valve (4) on mounting bracket.
3. Install two bolts (7) through holes (8) on mounting bracket and push bolts through valve body.
4. Place new lockwasher (6) on end of each bolt (7).

NOTE

Apply loctite to bolts as nuts are installed.

5. Place nut (5) on end of each bolt (7). Tighten both nuts (5) to secure valve.
6. Connect six hydraulic lines (2) at fittings (3) of priority valve (4).
7. Connect electrical lead 10 to terminal of switch (1).
8. Connect electrical lead 91 to other terminal of switch.
9. Remove wheel chocks and check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

RELIEF VALVE, FRAME TILT/BRAKES REPLACEMENT**0178 00****THIS WORK PACKAGE COVERS**

Removal, Installation, Testing and Adjustment

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Lockwasher (4)

References

WP 0172 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Parking brake set (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

NOTE

- If more than one hydraulic line is to be removed, tag lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.
- The relief valve is located under the vehicle, near the forward end of the cab.

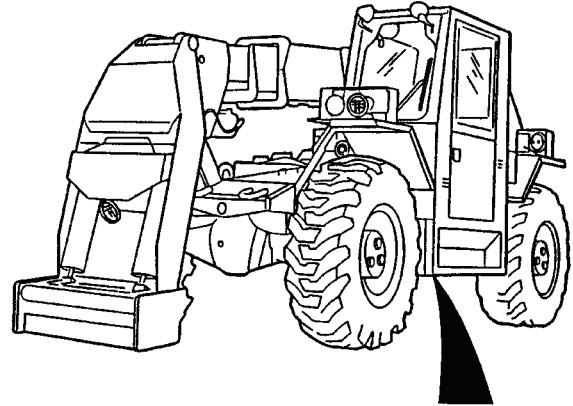
REMOVAL

1. Disconnect five hydraulic hoses (1) from relief valve (2).

NOTE

Secure valve so it does not fall when mounting hardware is removed.

2. Remove two nuts (3), two lockwashers (4) and two capscrews (5) that secure relief valve (2) to mounting bracket. Discard lockwashers.
3. Remove relief valve (2) from vehicle.



INSTALLATION

NOTE

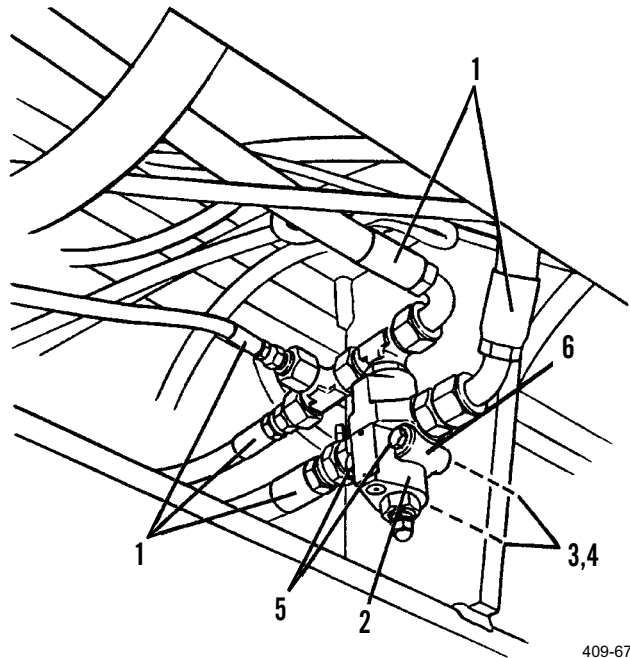
Remove cap and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. Position relief valve (2) so holes on valve flange (6) line up with mounting bracket holes.

NOTE

Apply loctite to threads of all capscrews as installed.

2. Place two mounting capscrews (5) through valve flange (6) and mounting bracket hole.
3. Install two new lockwashers (4) and nuts (3) on cap-screw (5) and tighten mounting nuts (3) securely.
4. Connect five hydraulic hoses (1) to relief valve (2) as tagged and tighten securely.



409-671

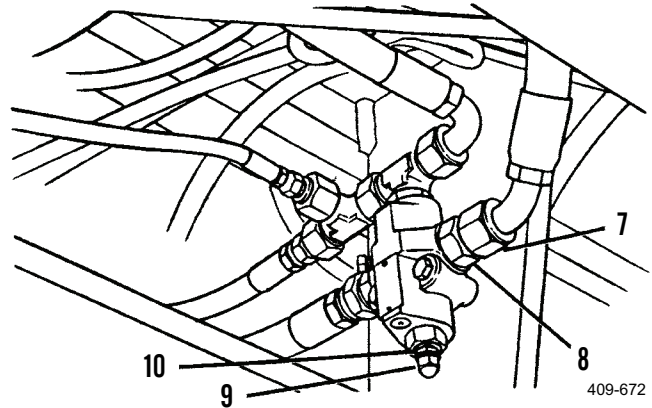
NOTE

Any time the hydraulic oil has been drained and changed or maintenance has been done on the hydraulic system, it is possible that the hydraulic pumps have air in the pump cavities. This air must be purged from the cavity before the pump will operate. If necessary refer to WP 0172 00.

5. To bleed air from frame tilt and brake hydraulic circuit, start engine (TM 10-3930-660-10).
6. Operate frame tilt function and tilt vehicle from side to side five times.
7. Stop engine and relieve hydraulic pressure by operating frame tilt controls (TM 10-3930-660-10).
8. Repeat steps 5-7 until frame tilt and brake hydraulic circuit is completely bled of air.
9. Operate equipment, check for leaks and proper operation (TM 10-3930-660-10).

TESTING AND ADJUSTMENT

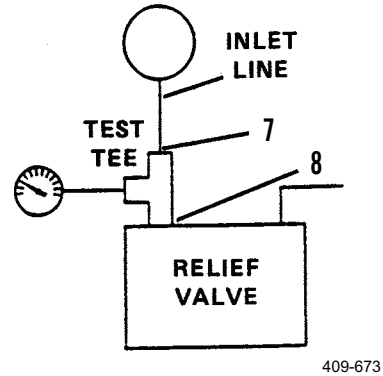
1. Remove relief valve inlet line (7).
2. Connect a test tee to inlet line (7).
3. Connect other side of test tee to relief valve inlet port (8).
4. Connect 0 to 5000 psi (34474 kpa) pressure gauge to test tee.
5. Start engine (TM 10-3930-660-10).



NOTE

Engine may be operated at idle or full throttle when performing pressure tests.

6. Read relief valve pressure on gauge. Pressure range is 1,700-1,800 psi (11721-12410 kPa). If relief valve pressure is not within specifications, adjust as follows:
 - a. Remove acorn nut (9) covering slotted head adjusting screw.
 - b. While holding adjusting screw, loosen and back off jamnut (10) which secures adjusting screw.
 - c. To increase relief pressure, turn adjusting screw clockwise (in). To decrease pressure, turn adjusting screw counterclockwise (out).
 - d. When desired relief pressure is obtained, hold adjusting screw in position and tighten jamnut (10). Install acorn nut (9).
7. Stop engine (TM 10-3930-660-10).
8. Remove pressure gauge (TM 10-3930-660-10).
9. Remove pressure gauge from test tee.
10. Remove test tee.
11. Remove test tee from relief valve.
12. Remove inlet hydraulic hose from test tee.
13. Connect inlet hydraulic hose to relief valve.
14. Connect inlet hydraulic hose (7) to relief valve. Tighten securely.



END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)

Materials/Parts - Continued

- Tag, marker (Item 57, WP 0323 00)
- Lockwasher (5 and 7)

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Parking brake set (TM 10-3930-660-10)



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

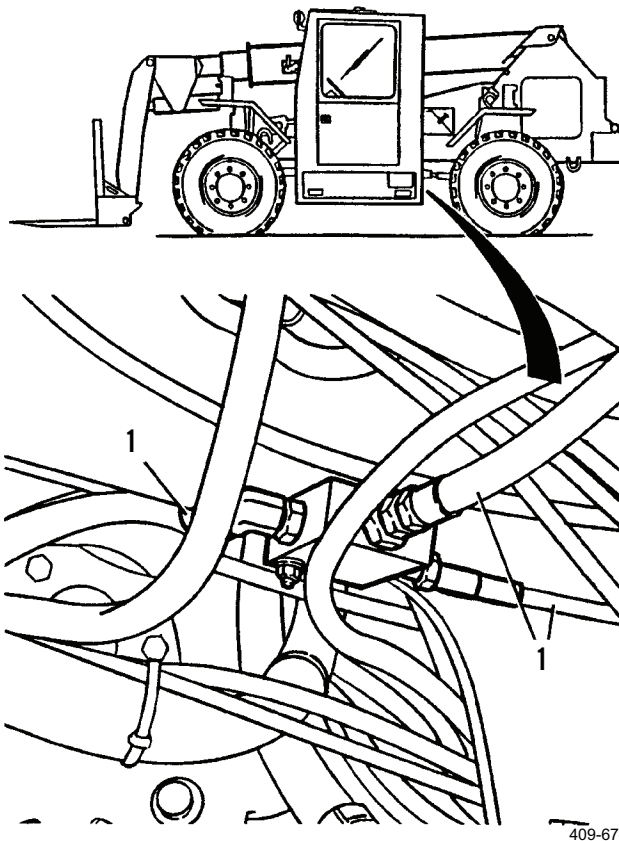
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.
- The shuttle valve is located on the vehicle frame, forward of the transmission.

REMOVAL

1. Disconnect three hydraulic lines (1).

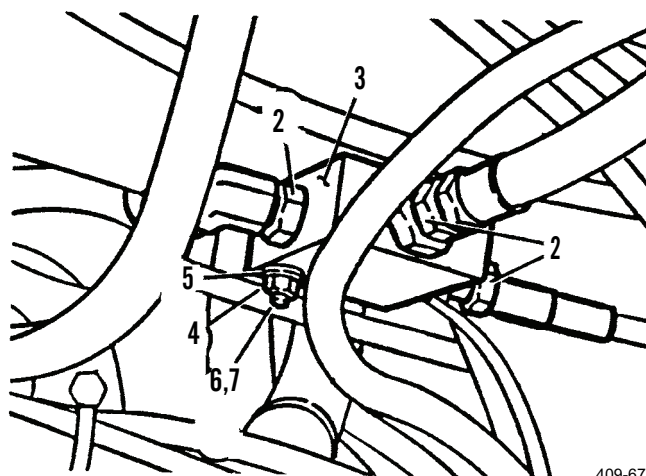


2. Unscrew three hydraulic line fittings (2) at shuttle valve (3).

NOTE

- Grasp valve so it does not drop when mounting hardware is removed.
- Note orientation of shuttle valve for use during installation.

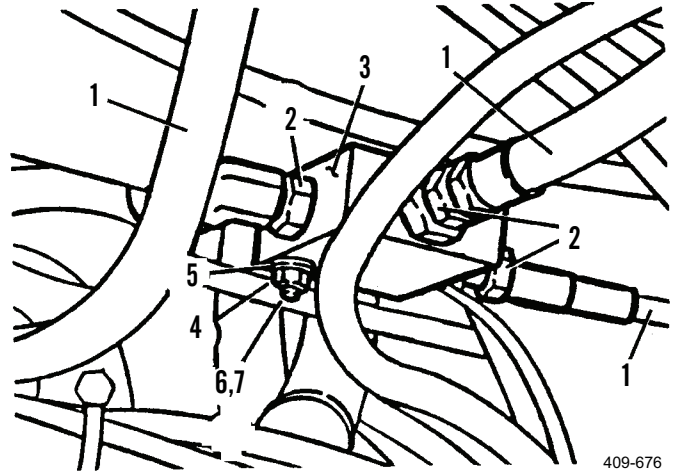
3. Remove two nuts (4), two lockwashers (5), two bolts (6), two lockwashers (7) and shuttle valve (3). Discard lockwashers.



INSTALLATION**NOTE**

Apply loctite to threads of bolts.

1. Position valve (3) as noted during installation.
2. Secure valve (3) with two bolts (6), two new lockwashers (7), two new lockwashers (5) and two nuts (4).



3. Remove plugs from hydraulic line fittings (2).
4. Attach three hydraulic lines (1) to shuttle valve (3) as tagged.
5. Tighten hydraulic fittings (2) securely.
6. Remove wheel chocks, operate engine and check for leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

FRAME TILT VALVE REPLACEMENT**0180 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Sealant, Loctite (Item 43, WP 0323 00)

Materials/Parts - Continued

Tag, marker (Item 57, WP 0323 00)
 Lockwasher (10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Parking brake set (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

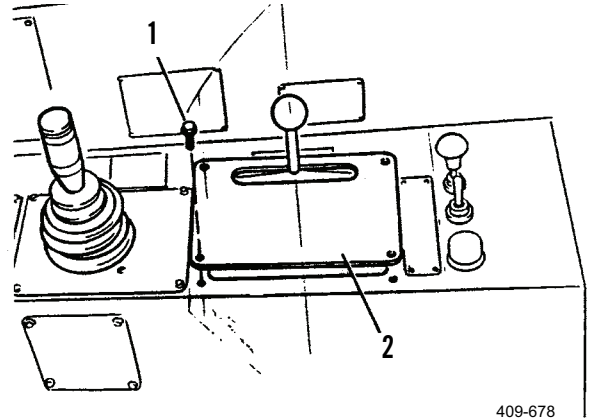
Wipe are clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

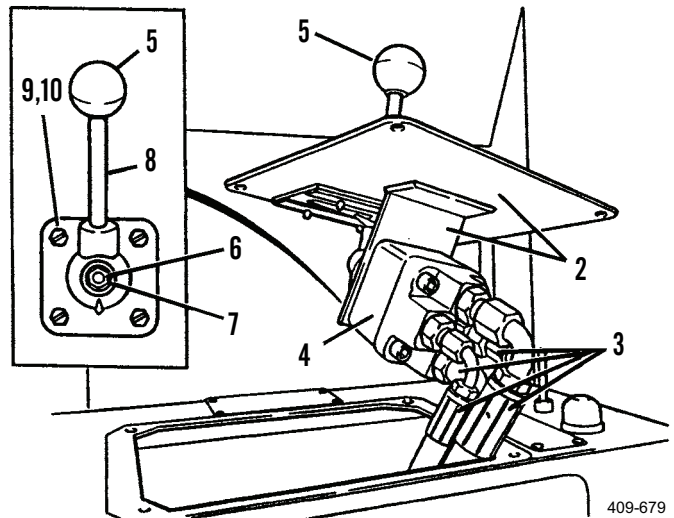
If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

1. Remove four capscrews (1) which secure cover (2).



2. Lift cover (2) to access hydraulic hoses (3).
3. Remove hydraulic hoses (3) at frame tilt valve (4).
4. Remove frame tilt valve (4).
5. Remove knob (5) and remove nut (6), washer (7) and handle (8).



REMOVAL - CONTINUED

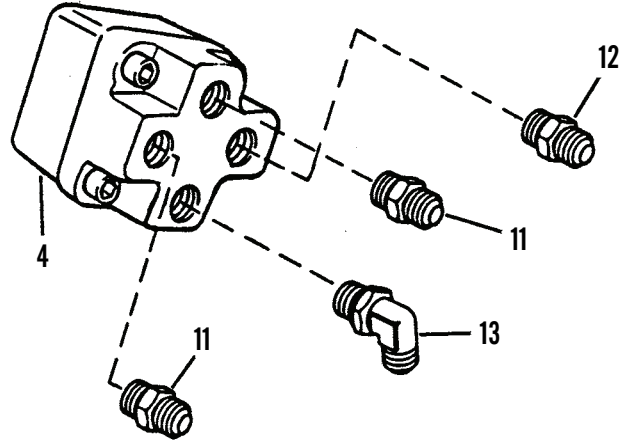
6. Remove four screws (9) and lockwashers (10) to remove valve (4) from cover (2). Discard lockwashers.
7. Remove two adapters (11), adapter (12) and elbow (13) from valve (4).

INSTALLATION

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. Install elbow (13), two adapters (11) and adapter (12) to valve (4).



NOTE

Apply loctite to screws as installed.

2. Position valve (4) on cover (2) and secure with four new lockwashers (10) and four screws (11).
3. Install handle (8) to valve (4) with nut (6) and washer (7).
4. Install knob (5) onto end of handle (8).
5. Connect four hoses (3) as tagged to valve (4).

409-680

NOTE

Apply loctite to threads of capscrews.

6. Lower cover (2) and install to cab with four capscrews (1).
7. Bleed air from system by operating frame tilt function five times (TM 10-3930-660-10).

END OF WORK PACKAGE

HYDRAULIC JOYSTICK CONTROL VALVE REPLACEMENT**0181 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Sealant, Loctite (Item 43, WP 0323 00)

Materials/Parts - Continued

Tag, marker (Item 57, WP 0323 00)
 Lockwasher (10)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Transmission cover removed (WP 0150 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

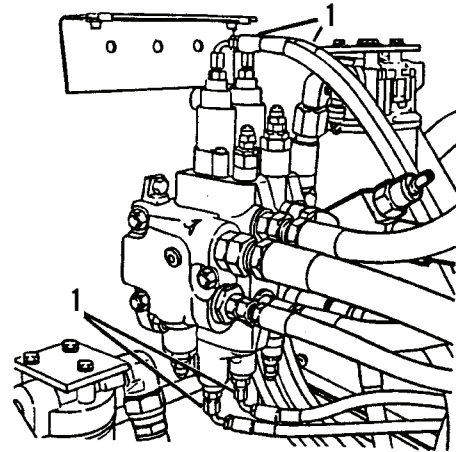
Wipe are clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

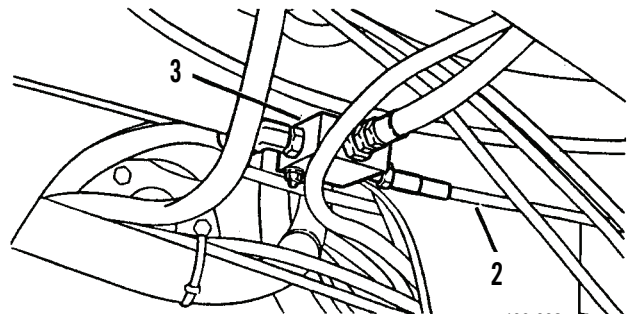
REMOVAL

1. Remove transmission cover (WP 0150 00).
2. Disconnect four pilot lines (1). Allow hydraulic oil to drain from lines into a container as lines are disconnected.



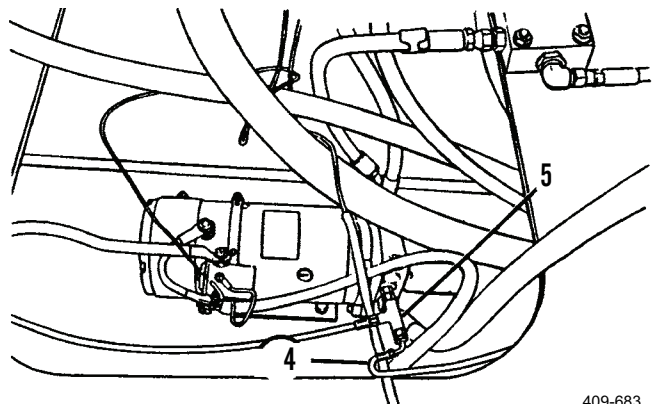
409-681

3. Disconnect line (2) from shuttle valve (3). Allow hydraulic oil to drain from line into a container as line is disconnected.



409-682

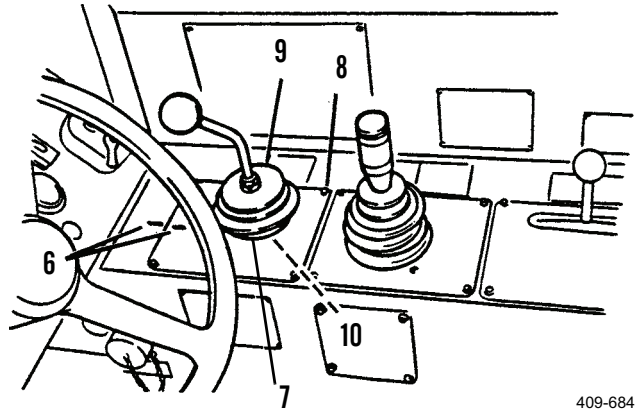
4. Disconnect line (4) from emergency steering pump tee fitting (5). Allow hydraulic oil to drain from line into a container as line is disconnected.



409-683

REMOVAL - CONTINUED

5. Place marks (6) on joystick mounting plate (7) and on shelf so joystick can be installed in same orientation.
6. Remove four screws (8) attaching mounting plate (7) to shelf.
7. Lift mounting plate (7) off of shelf and disconnect six hydraulic lines from ports on bottom of joystick control valve (9).
8. Match mark joystick control valve assembly (9) and mounting plate (7) to ensure proper orientation during installation.



409-684

9. Remove four screws, nuts and lockwashers (10) and separate joystick assembly (9) from mounting plate (7). Discard lockwashers.

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. Install joystick control valve assembly (9).
2. Attach joystick control valve assembly (9) to mounting plate (7) using four screws, nuts and new lockwashers (10). Observe match marks made in step 8 of *Removal*.
3. Connect six hydraulic lines to ports on bottom of joystick control valve assembly (9).
4. Position joystick assembly (9) and mounting plate (7) on shelf, using marks (6) for orientation.

NOTE

Apply loctite to threads of screws.

5. Install and tighten four screws (8).
6. Connect line (4) to emergency steering pump tee fitting (5).
7. Connect line (2) to shuttle valve (3).
8. Connect four pilot lines (1) to main control valve ports, as tagged during removal.
9. Install transmission cover (WP 0150 00).
10. Start engine, check for proper operation and leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Boom fully lowered and MLRS attachment resting on ground (TM 10-3930-660-10)

Transmission cover removed (WP 0150 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20684 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- When working underneath the boom, always support the boom using blocks, jackstands or other rigid and stable supports. Combined weight of boom and MLRS attachment is approximately 6,300 lb (2858 kg). Failure to adequately support the boom could result in severe injury or death.

CAUTION

Wipe are clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

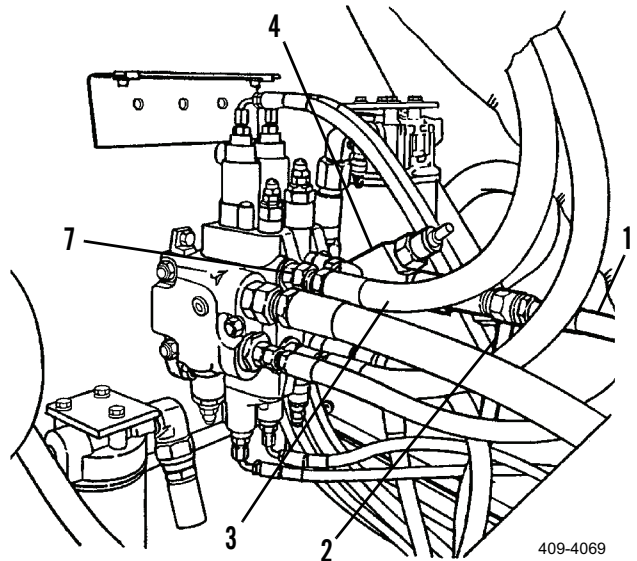
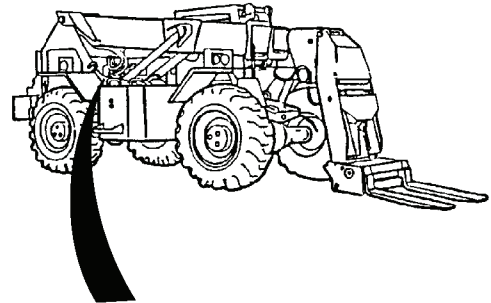
If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

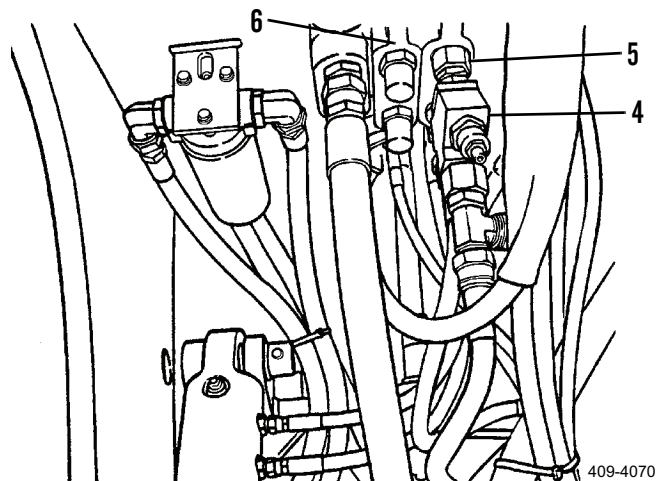
NOTE

The flow control valve is mounted on the main boom control valve.

1. To disconnect hydraulic hoses (1 and 2), unscrew hydraulic hoses (1 and 2) from flow control valve (4).
2. Remove hydraulic hoses (3) to gain access to flow control valve (4).



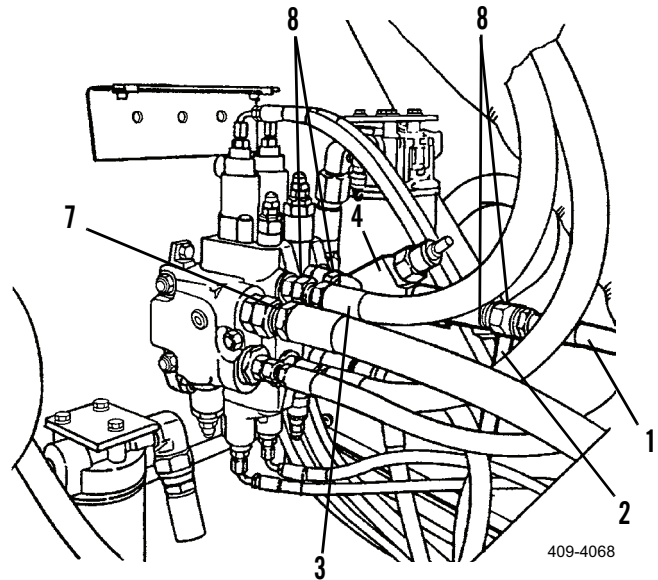
3. Remove hydraulic hose (3) from fitting (7).
4. Remove valve (4) from main control valve (6).
5. Retain reducer (5) and remove flow control valve (4) from main control valve (6).



INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. Connect flow control valve (4) into reducer (5) of main control valve (6) and tighten securely.
2. Connect hydraulic hoses (3) as tagged.
3. Connect hydraulic hose (3) to fitting (7).
4. Connect hoses (1) and (2) to flow control valve (4).
5. Tighten all fittings (8) securely.



6. Install transmission cover (WP 0150 00).

NOTE

It is possible that the hydraulic pumps have air in the pump cavities. This air must be purged from the cavity before the pump will operate.

7. Start engine, check for leaks and proper operation (TM 10-3930-660-10).
8. Purge air from hydraulic circuit by raising and lowering boom five times.
9. Stop engine and relieve hydraulic pressure by operating boom raise and lower controls (TM 10-3930-660-10).

END OF WORK PACKAGE

FRAME TILT CYLINDER REPLACEMENT

0183 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Compound, anti-seize (Item 11, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Lockwasher (10)

Wood block

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Parking brake set (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

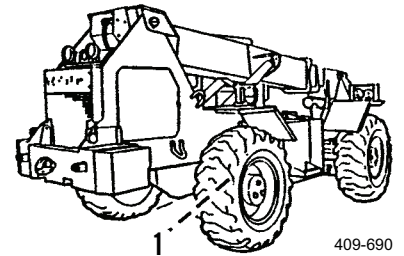
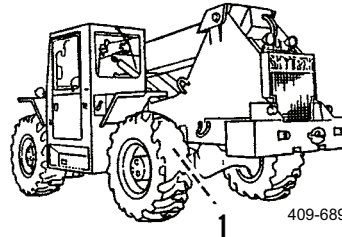
REMOVAL

1. Use frame tilt function to level the vehicle (TM 10-3930-660-10).

NOTE

Frame tilt stop pads are located on each side of the rear axle.

2. Insert blocking (1) between both rear frame tilt stop pads (1) and rear axle housing.
3. Remove retaining ring (2) from base pivot pin (3).

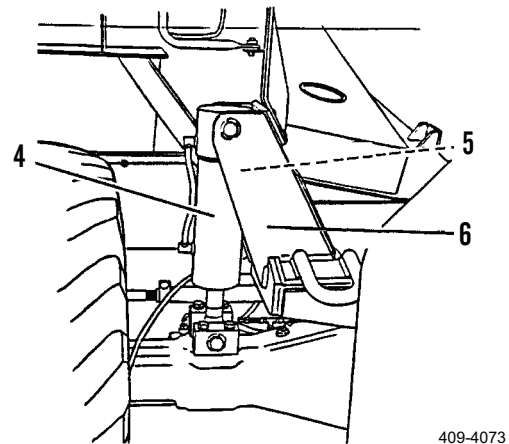
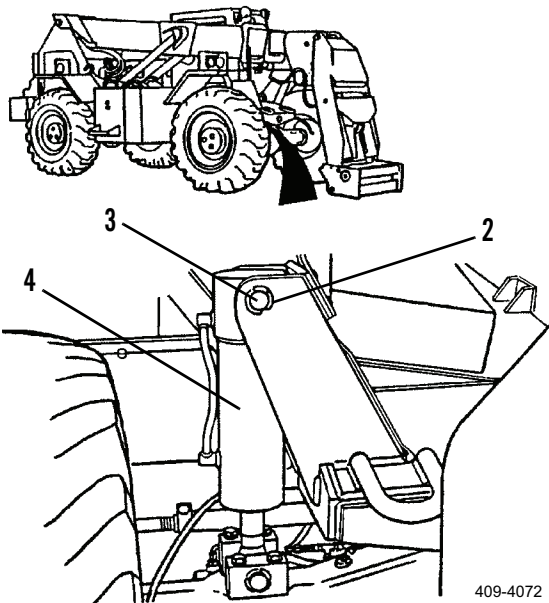


4. With assistance, support frame tilt cylinder (4) and remove base pivot pin (3).
5. Start engine and retract frame tilt cylinder (4) by moving frame control to the right (TM 10-3930-660-10).
6. Stop the engine (TM 10-3930-660-10).

NOTE

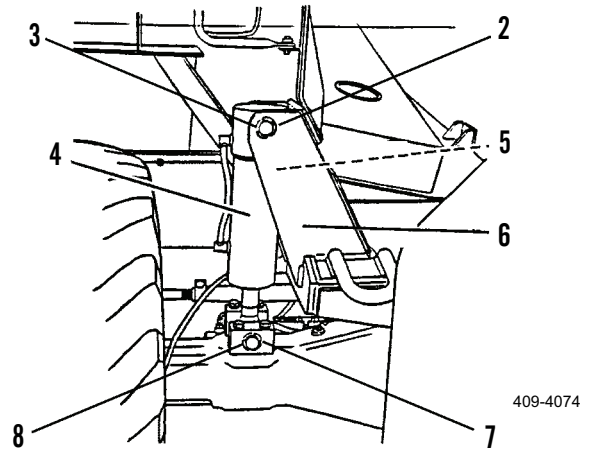
If more than one hydraulic line is to be removed, identify lines to assure proper installation. Use container to catch any hydraulic oil that may drain from system.

7. Disconnect two hydraulic lines (5) located between frame tilt cylinder (4) and cylinder support bracket (6).

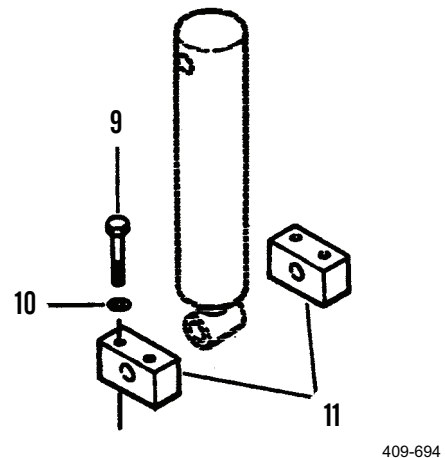


REMOVAL - CONTINUED

8. Remove retaining ring (7).
9. With assistance, support cylinder and remove rod pivot pin (8).
10. Remove frame tilt cylinder (4) from vehicle.



11. If necessary, remove four capscrews (9), four lockwashers (10) and two brackets (11) from axle. Discard lockwashers.

**INSTALLATION**

1. If removed, secure two brackets (11) to axle with four new lockwashers (10) and four capscrews (9).

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on cylinder and hoses clean and dry.

2. Position frame tilt cylinder (4) on vehicle so holes for rod pivot pin line up.

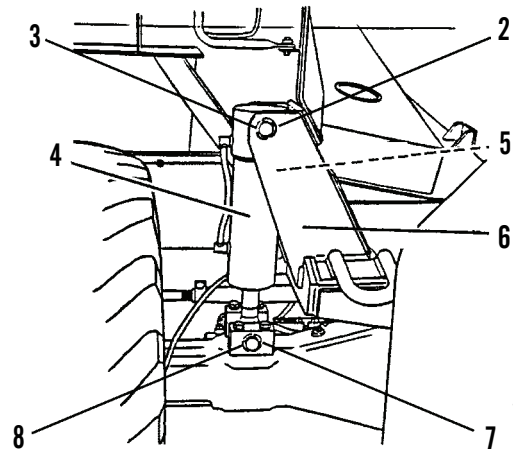
NOTE

Apply anti-seize compound to rod pivot pin as installed.

3. Install rod pivot pin (8).
4. Install retaining ring (7) on rod pivot pin (8).

INSTALLATION - CONTINUED

5. Connect two hydraulic hoses (5) to frame tilt cylinder (4) as tagged.
6. Align and connect base pivot pin (3).
7. Start engine, check for proper operation and leaks (TM 10-3930-660-10).
8. Extend frame tilt cylinder (4) to align rod end hole and upper bracket hole.
9. Stop engine (TM 10-3930-660-10).

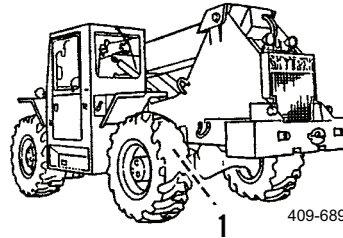


409-4074

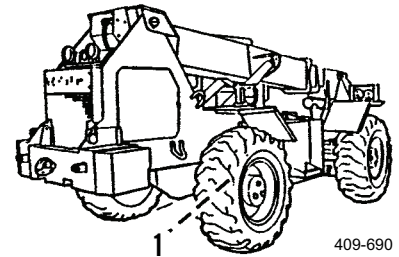
NOTE

Apply anti-seize compound to base pivot pin as installed.

10. Install base pivot pin (3).
11. Install retaining ring (2).
12. Remove blocking from between both rear frame tilt stop pads (1) and rear axle housing.



409-689



409-690

13. Start engine (TM 10-3930-660-10).
14. Purge air from frame tilt cylinder hydraulic circuit by operating frame tilt function five times.
15. Stop engine and relieve hydraulic pressure by operating frame tilt controls (TM 10-3930-660-10).

END OF WORK PACKAGE

CARRIAGE TILT CYLINDER REPLACEMENT

0184 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)
- Lifting device, 200 lb capacity

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Compound, anti-seize (Item 11, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

- Locknut (9 and 14)
- Lockwasher (5)

References

WP 0167 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Parking brake set (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

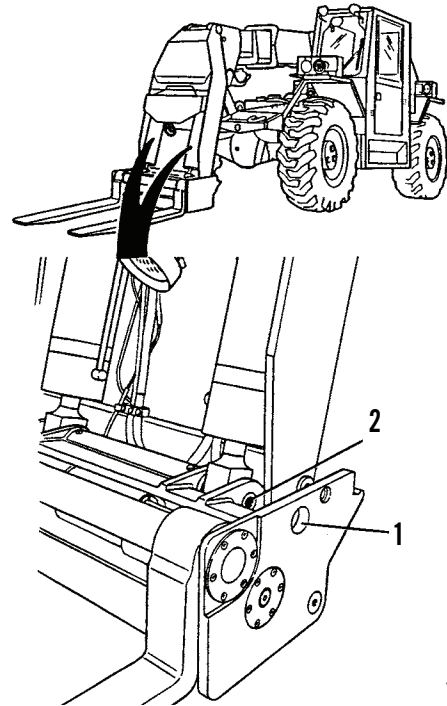
- Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.
- Always retract a hydraulic cylinder prior to removal. This will protect the cylinder rod.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.

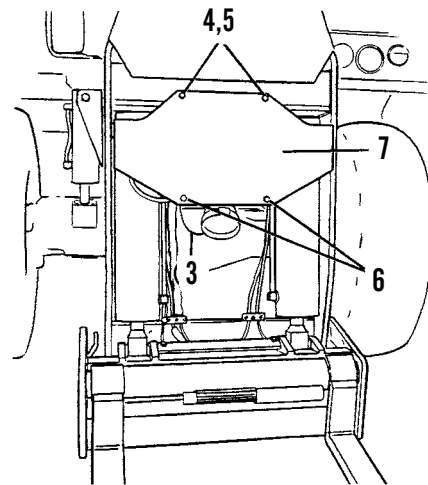
REMOVAL

1. Place MLRS attachment in fully lowered position (TM 10-3930-660-10).
2. Lower boom until forks are approximately three feet off ground.
3. Tilt forks down so access hole (1) lines up with cylinder rod pivot pin (2).



409-697

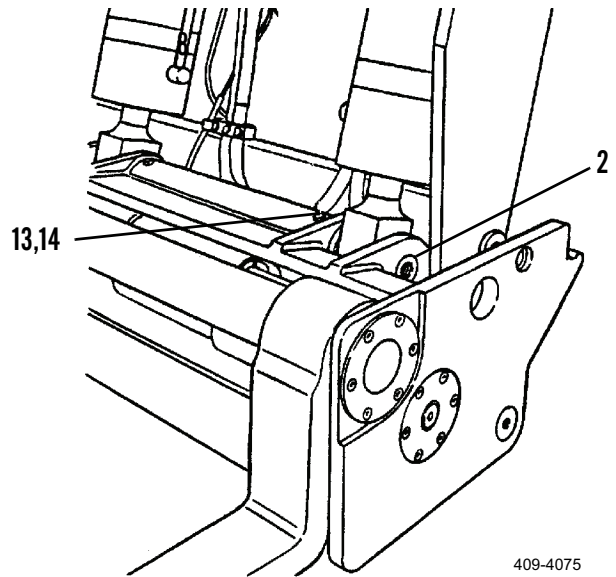
4. Disconnect two light wires (3).
5. Remove two bolts (4), two lockwashers (5) and two nuts (6) which secure MLRS control valve cover (7). Discard lockwashers.
6. Remove MLRS cover (7).
7. Determine which carriage tilt cylinder is to be removed.



409-698

REMOVAL - CONTINUED

8. Remove bolt (13) and locknut (14) which secure cylinder rod pivot pin (2). Discard locknut.
9. Remove rod pivot pin (2).
10. Retract carriage tilt cylinder.
11. Move MLRS joystick to carriage UP position to retract cylinder (TM 10-3930-660-10).



NOTE

Return joystick to neutral position as soon as disconnected cylinder is fully retracted. This will prevent the carriage from being tilted by the other attached cylinder.

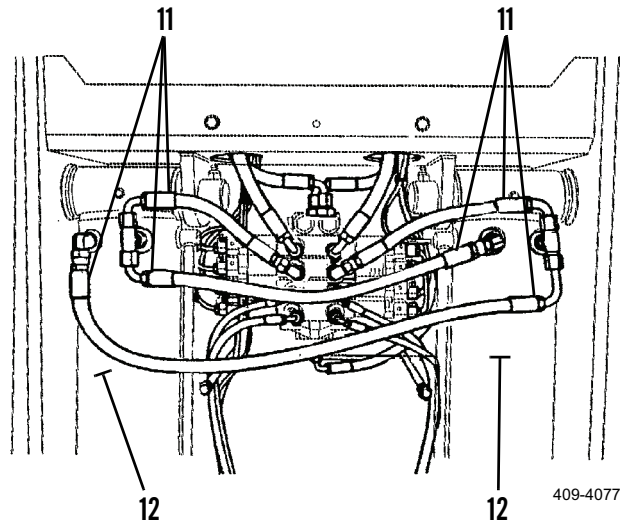
12. Disconnect three hydraulic hoses (11) from carriage tilt cylinder (12) to be removed.



WARNING

Lifting equipment used for lifting cylinder must be in good condition and suitable load capacity. Failure to follow this warning may cause injury or damage to equipment.

13. Support base end of carriage tilt cylinder with a hoist and sling.

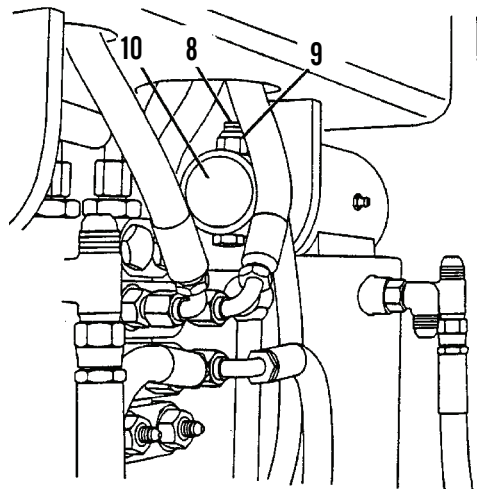


CARRIAGE TILT CYLINDER REPLACEMENT - CONTINUED

0184 00

REMOVAL - CONTINUED

14. Remove locknut (9) and retaining bolt (8) from carriage tilt cylinder base pin (10). Discard locknut.
15. Carefully drive pin (10), from inside MLRS attachment, through cylinder base mounting point and through access hose on side of MLRS attachment.
16. Remove cylinder (12).



409-701

INSTALLATION**WARNING**

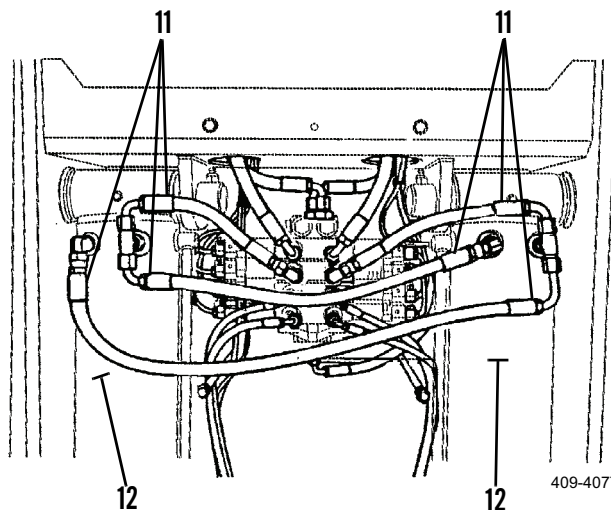
Lifting equipment used for lifting cylinder must be in good condition and suitable load capacity. Failure to follow this warning may cause injury or damage to equipment.

1. Position carriage tilt cylinder (12) in MLRS carriage using hoist and sling.
2. Install cylinder base retaining pin (10).
3. Install retaining bolt (8).
4. Install new locknut (9).

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

5. Connect three hydraulic lines (11) to hydraulic cylinder (12) as tagged.
6. Extend cylinder to align pin hole.



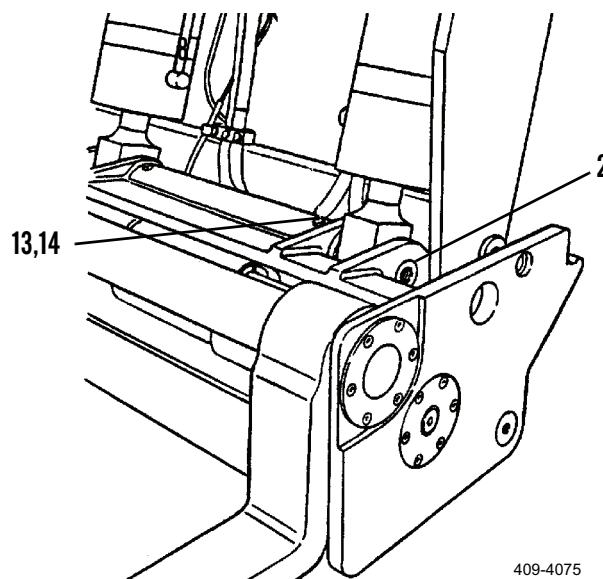
409-4077

7. Start vehicle and extend tilt cylinder to align cylinder rod eye and pin access hole (TM 10-3930-660-10).

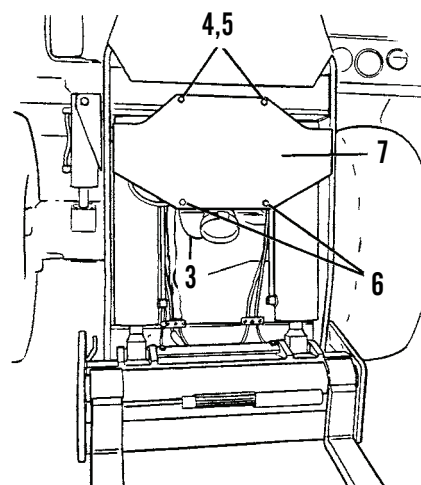
INSTALLATION - CONTINUED**NOTE**

Apply anti-seize compound to pin as installed.

8. Stop engine and install cylinder rod pivot pin (2).
9. Install retaining bolt (13) and new locknut (14).
10. Position MLRS valve cover (7) on attachment.



11. Apply loctite to nut (6) threads.
12. Place new lockwashers (5) over bolts (4).
13. Secure cover with nuts (6) and bolts (4).
14. Connect floodlight.
15. Connect wires (3) to MLRS floodlight as tagged.
16. Purge air by cycling carriage tilt function five times.
17. Start engine, check for proper operation and leaks (TM 10-3930-660-10).

**NOTE**

Anytime the hydraulic oil has been drained and changed or maintenance has been done on the hydraulic system, it is possible that the hydraulic pumps have air in the pump cavities. This air must be purged from the cavity before the pump will operate (WP 0167 00).

18. Purge air from carriage tilt cylinder hydraulic circuit by operating carriage tilt function five times.
19. Stop engine and relieve hydraulic pressure by operating carriage tilt controls (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 2 (Item 19, WP 0324 00)
- Lifting device, 4,000 lb capacity

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Compound, anti-seize (Item 11, WP 0323 00)
- Sealant, Loctite (Item 43, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)
- Locknut (9)
- Lockwasher (2, 4 and 12)

Personnel Required

Three

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Parking brake set (TM 10-3930-660-10)
- Boom extended approximately 3 ft (TM 10-3930-660-10)
- MLRS attachment cylinder fully retracted (TM 10-3930-660-10)
- MLRS attachment forks level (TM 10-3930-660-10)
- MLRS attachment approximately 2 in. (5 cm) off ground (TM 10-3930-660-10)



WARNING



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

NOTE

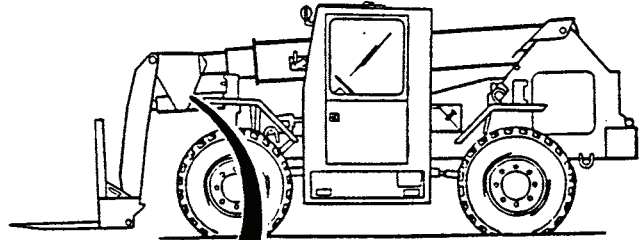
- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.
- Remove caps and plugs as holes are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

MLRS ATTACHMENT CYLINDER REPLACEMENT - CONTINUED

0185 00

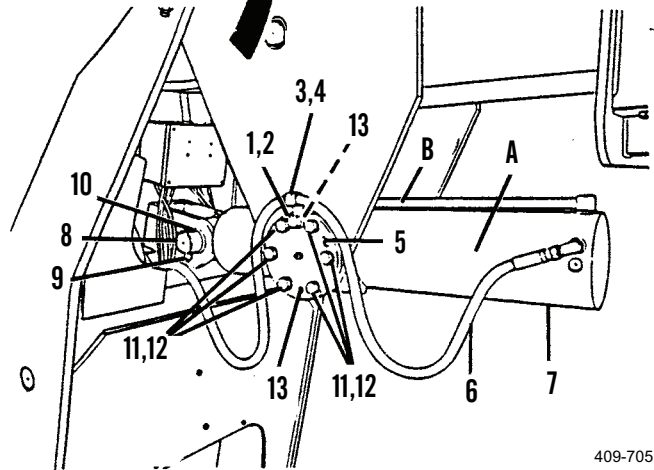
REMOVAL

1. Remove capscrew (1), lockwasher (2), clamp (3) and lockwasher (4) from each of the two bearing caps (5). Discard lockwashers.
2. Disconnect two hydraulic lines (6).
3. Support rear portion of MLRS attachment cylinder (7) using a hoist and sling or equivalent supporting device.

**WARNING**

Failure to support rear portion A of MLRS attachment cylinder when removing pivot pin may cause severe personal injury and damage to cylinder.

4. Remove locknut (9) and bolt (10). Discard locknut.
5. Remove pivot pin (8).



409-705

**WARNING**

Failure to support cylinder during removal may cause severe personal injury and damage to equipment.

NOTE

If desired, use a hoist with slings of appropriate length in place of personnel to support cylinder in steps 6 thru 15. Slings must be long enough to lower cylinder to ground without interference from boom.

6. Support MLRS attachment cylinder (7) using two people.
7. Remove six bolts (11) and six lockwashers (12). Discard lockwashers.
8. Temporarily insert two bolts (11) into two jack bolt holes (13).
9. Tighten two bolts (11) evenly until bearing cap (5) is loosened.
10. Remove two bolts (11) from jack bolt holes (13).
11. Remove bearing cap (5) using a small pry bar.
12. Repeat steps 7 thru 11 for other bearing cap (5).
13. Remove MRLS attachment cylinder (7). If necessary, lift MLRS attachment away from forward end of MLRS attachment cylinder (6).

INSTALLATION**WARNING**

Failure to support cylinder during installation may cause severe personal injury or damage to equipment.

NOTE

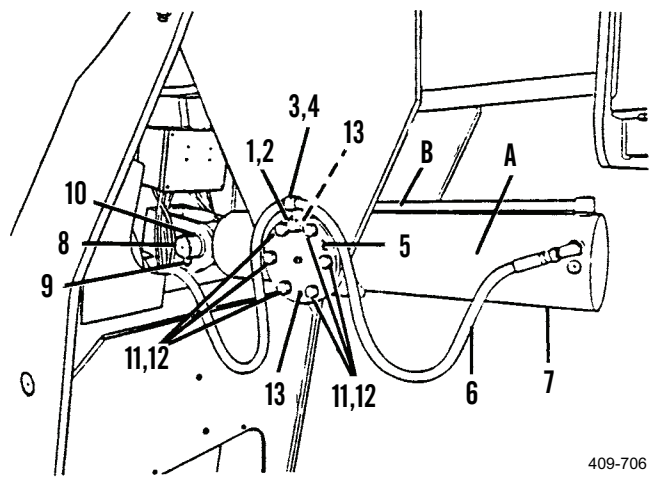
If desired, use a hoist with slings of appropriate length in place of personnel to support cylinder in steps 2 thru 6. Slings must be long enough to lower cylinder to ground without interference from boom.

1. Support MRLS attachment cylinder (7) using two people.
2. Install two bearing caps (5) and MLRS attachment cylinder (7).

NOTE

Install bearing caps so that jack bolt holes are positioned as shown. Position cylinder with the rod end oil feed tube (B) up.

3. Apply loctite to six bolts (11).
4. Install six bolts (11) and six new lockwashers (12).
5. Repeat steps 3 and 4 for other bearing cap (5).

**WARNING**

Failure to support rear portion A of MLRS attachment cylinder when installing pivot pin may cause personal injury and damage to cylinder.

6. Support rear portion of MLRS attachment cylinder (7) using a hoist and sling or other suitable lifting device.

NOTE

Apply anti-seize compound to pivot pin.

7. Install pivot pin (8).
8. Secure pivot pin (8) with bolt (10) and new locknut (9).
9. Raise or lower MLRS attachment cylinder (7) as needed to ease pivot pin (8) installation.
10. Install two hydraulic lines (6). Use tags to identify connections.
11. Install new lockwasher (4), clamp (3), new lockwasher (2) and capscrew (1) to each of the two bearing caps (5).

INSTALLATION - CONTINUED

NOTE

- Position hydraulic lines in clamps so cylinder can fully extend.
 - Excessive air in hydraulic system may temporarily prevent cylinder from operating. Attempt to cycle cylinder as required until its operation is smooth and it fully extends and retracts.
12. Cycle MLRS attachment cylinder (7) five times to bleed any air in hydraulic system, check for proper operation and leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

FORKS REPLACEMENT**0186 00**

THIS WORK PACKAGE COVERSRemoval, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Lifting device, 5-ton capacity

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Cotter pin (3)

References

WP 0080 00

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Parking brake set (TM 10-3930-660-10)

Forks level and waist high (TM 10-3930-660-10)

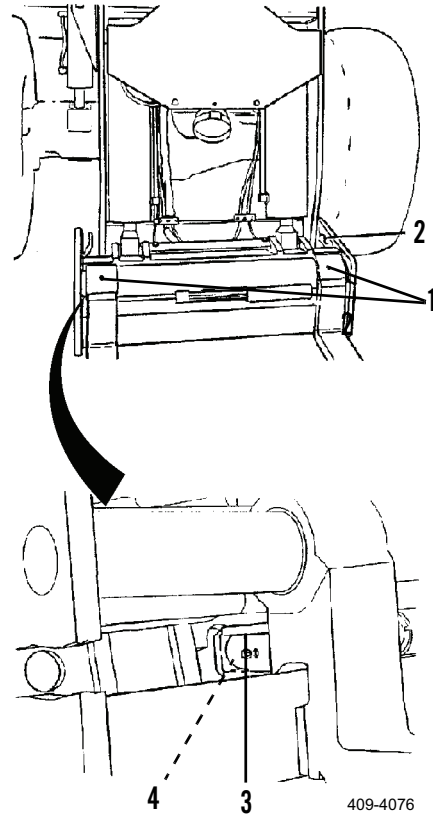
REMOVAL**WARNING**

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

REMOVAL - CONTINUED**NOTE**

Combined weight of boom and MLRS attachment is approximately 6,300 lb (2858 kg).

1. Start engine (TM 10-3930-660-10).
2. Sideshift both forks (1) until they are approximately 12 in. (30 cm) from sides of fork carriage (2).
3. Stop engine (TM 10-3930-660-10).
4. Remove cotter pins (3) which secure fork attaching pins (4) to forks (1). Discard cotter pins.

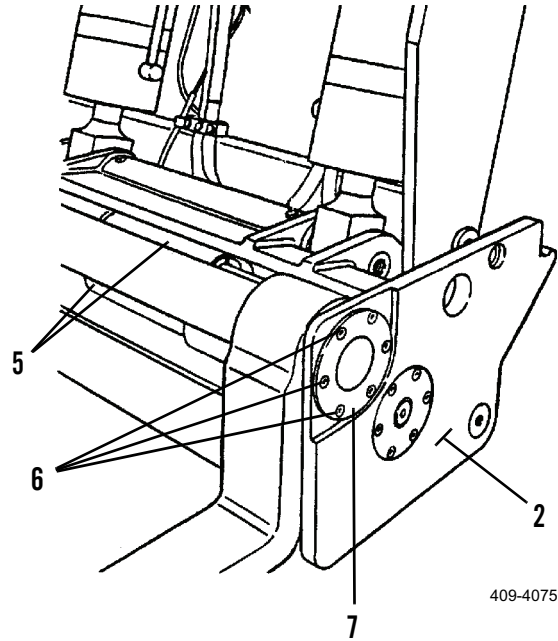


5. For removal of right-hand fork, remove fork auto leveler switch (WP 0080 00).
6. Start engine (TM 10-3930-660-10).
7. Sideshift right fork until pin (4) in right fork is aligned with access hole in fork carriage (2).
8. Stop engine (TM 10-3930-660-10).
9. Use a slide hammer to remove pin (4), from rear of fork carriage (2), through the access hole.

REMOVAL - CONTINUED**NOTE**

The thread size of hole in end of pin is 1/4-20.

10. For removal of left-hand fork, start engine (TM 10-3930-660-10), sideshift left fork to align left-hand fork (1) with left notch in fork carriage (2).
11. Stop engine (TM 10-3930-660-10).
12. Remove pin (4) from left fork sideshift cylinder (5).
13. Start engine (TM 10-3930-660-10).
14. Retract sideshift cylinders (5) by actuating electric joystick.
15. Lower forks (1) until they are touching the ground but not supporting weight of MLRS attachment.
16. Stop engine (TM 10-3930-660-10).
17. Remove six socket head screws (6).
18. Remove fork shaft cap (7).



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REMOVAL - CONTINUED**WARNING**

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

CAUTION

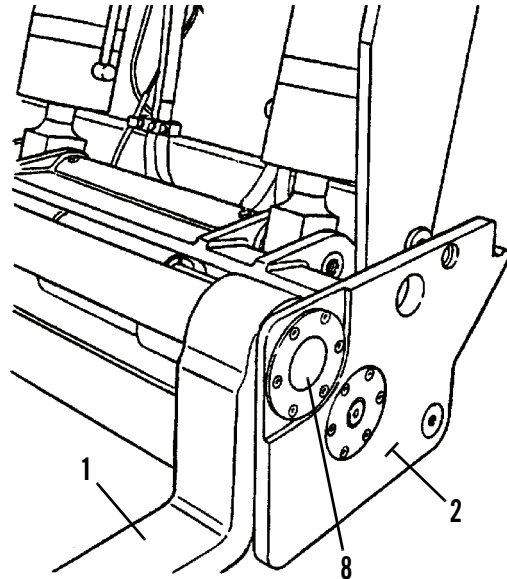
Use care not to damage finish on fork shaft during removal.

19. Slide fork shaft (8) partially out of fork carriage (2).
20. Support fork shaft (8) with hoist and sling. Completely remove fork shaft from fork carriage (2) and place on suitable supports.

NOTE

Each fork weighs 125 lbs (57 kg). Remove forks one at a time.

21. Attach hoist and sling to fork (1) and lift fork straight up and out of fork carriage (2).



409-4075

INSTALLATION**WARNING**

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

NOTE

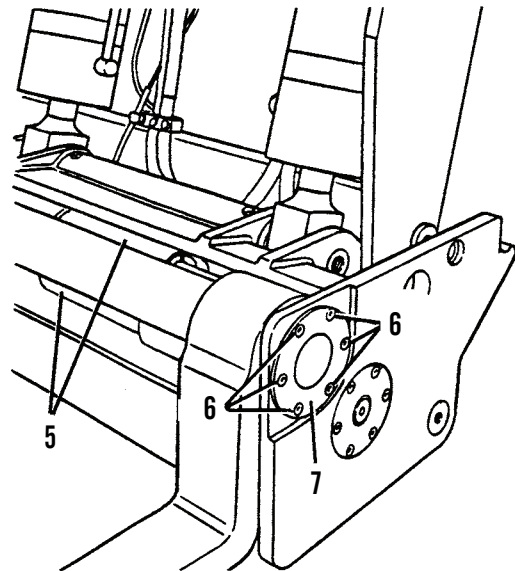
Each fork weighs 125 lbs (57 kg). Install forks one at a time.

1. Attach hoist and sling to fork (1) and raise fork over fork carriage (2). Lower fork straight into fork carriage (2).
2. Align holes on forks (1) with hole at left-hand side of fork carriage (2).

CAUTION

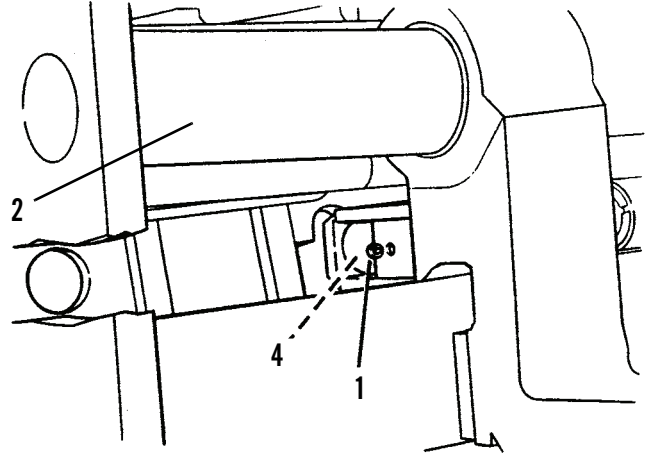
Use care not to damage finish on fork shaft during installation.

3. Insert fork shaft (8) through fork carriage (2) and fork holes.
4. Support fork shaft (8) with hoist and sling. Align end of shaft with hole on left-hand side of fork carriage (2).
5. Insert fork shaft (8) through fork carriage (2) and fork holes.
6. Apply loctite to six socket head screws (6).
7. Install fork shaft cap (7) with six socket head screws (6).
8. Secure forks (1) to fork sideshift cylinders (5) with attaching pins (4).
9. Using hoist and sling, align left-hand fork (1) with left notch in fork carriage (2).
10. Using hoist and sling, position right-hand fork (1) so attaching pin (4) hole in fork is aligned with access hole in fork carriage.
11. Secure forks (1) to fork sideshift cylinders (5) with attaching pins (4).



INSTALLATION - CONTINUED

12. Start engine (TM 10-3930-660-10).
13. Sideshift both forks (1) until they are approximately 1 ft (30 cm) from sides of fork carriage (2).
14. Install new cotter pins (1) to secure attaching pins (4).
15. Stop engine (TM 10-3930-660-10).



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16. Install fork auto leveler switch if right-hand fork (1) was removed (WP 0080 00).
17. Operate forks and check for proper operation (TM 10-3930-660-10).

END OF WORK PACKAGE

FORK BUSHINGS REPLACEMENT**0187 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Paper, emery grit 80 (Item 36, WP 0323 00)
- Sealant, Loctite (Item 47, WP 0323 00)
- Solvent, chlorinated (Item 54, WP 0323 00)

Equipment Condition

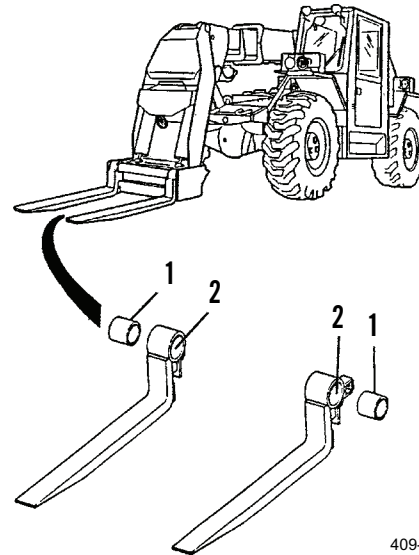
- Forks removed (WP 0186 00)

REMOVAL

Carefully and slowly apply hydraulic pressure to push fork bushing (1) from fork bore (2).

INSTALLATION

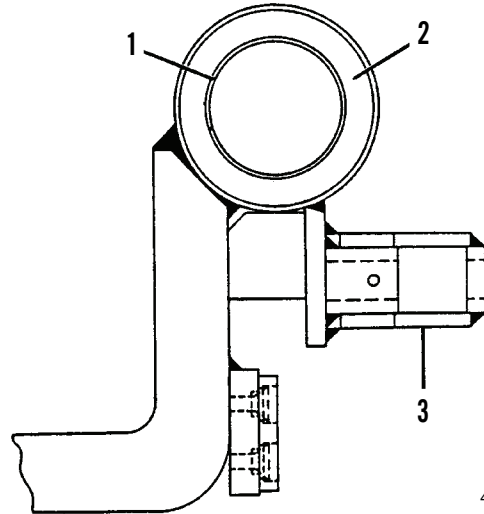
1. Using 80 grit emery paper, rough up tinned outside diameter of fork bushing (1).
2. Clean inside diameter of fork bore (2).



409-712

INSTALLATION - CONTINUED

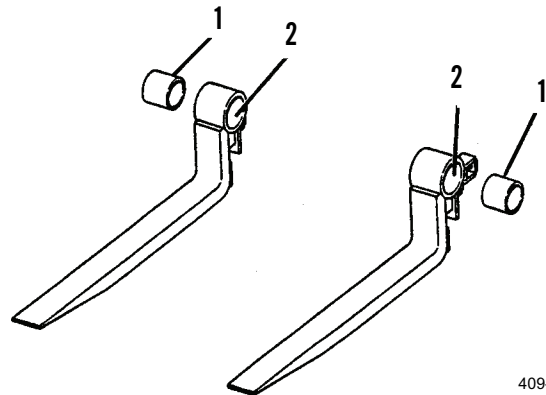
3. Using chlorinated solvent, clean inside diameter of fork bore (2).
4. Using chlorinated solvent, clean outside diameter of fork bushing (1).
5. Align and level fork bore (2) in a hydraulic press with cylinder rod weldment (3) facing down.
6. Apply a 1/8 in. (3.175 mm) wide bead of loctite around the center of the inside diameter of the fork bore (2).
7. Apply a 1 in. (25.4 mm) wide bead of loctite at the lead edge of fork bushing (1).
8. Apply a 1/2 in. (12.7 mm) wide bead of loctite around the outside diameter of fork bushing (1) at the center of the bushing.
9. Align and level fork bushing (1) on fork bore (2) and insert appropriate mandrel.



409-4081

NOTE

- Prior to inserting fork bushing into fork bore, position bushing so that bushing gap is oriented to fork.
 - When inserting fork bushing into fork bore, continue to apply pressure until the lead edge of the bushing is 3/16 in. (4.8 mm) below the face of the fork bore.
10. Carefully and slowly apply hydraulic pressure to push fork bushing (1) into fork bore (2) in one continuous motion. Do not skew or cock bushing.
 11. Wipe excess loctite from fork bushing (1) and fork bore (2).



409-714

CAUTION

Do not load fork for 72 hours after installation of fork bushing.

12. Install forks (WP 0186 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)
 Lifting sling, 300 lb capacity
 Lifting device, 10,000 lb capacity

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Compound, antiseize (Item 11, WP 0323 00)

Materials/Parts - Continued

Sealant, Loctite (Item 43, WP 0323 00)
 Strap, tie down (Item 56, WP 0323 00)
 Locknut (26 and 29)
 Lockwasher (12, 18 and 20)

Equipment Condition

Boom extended approximately 3 ft (TM 10-3930-660-10)
 Battery cables disconnected (WP 0107 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug hoses after removing lines. Contamination of the hydraulic system could result in premature failure. Use metal caps when specified.

NOTE

- If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.
- Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hydraulic components and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

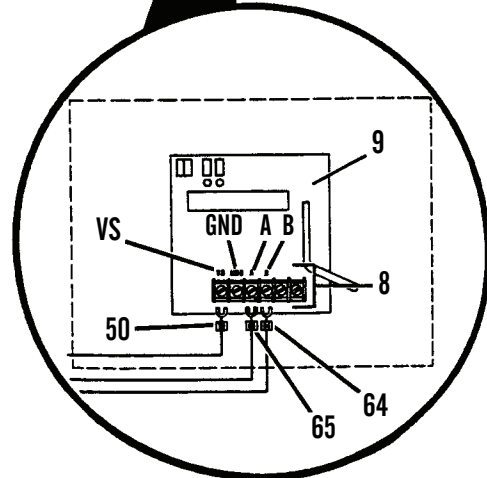
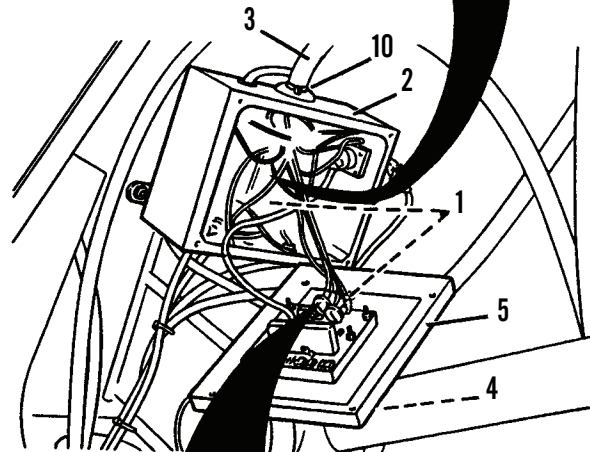
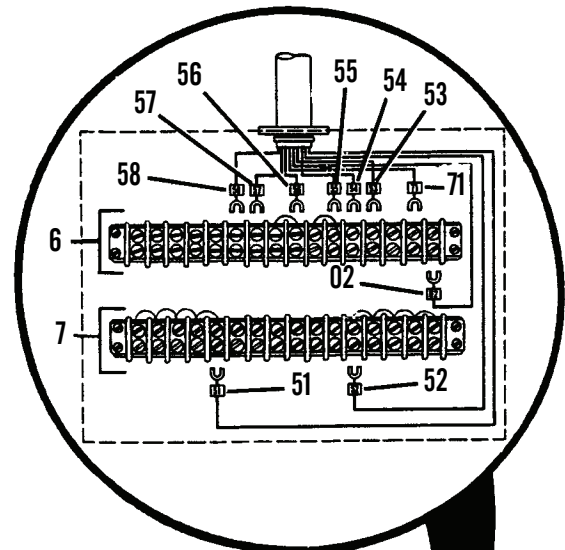
REMOVAL

1. Disconnect boom electrical cable leads (1) at junction box (2) and remove boom electrical cable (3).
2. Loosen four screws (4) and separate cover (5) from box (2).

NOTE

- Only disconnect electrical leads of boom electrical cable during steps 3 thru 5. Do not disconnect any other electrical leads inside box during these steps.
- Tag screw terminals on terminal strips as electrical leads are removed for use during installation. Note that terminals on strips and are not marked.

3. Loosen screws on strip (6) and remove electrical leads 58, 57, 56, 55, 54, 53 and 71 at top terminal strip of box (2).
4. Loosen screw on strip (6) and remove electrical lead 02 at bottom of terminal strip.
5. Loosen screws on strip (7) and remove electrical leads 51 and 52, at bottom terminal strip of box (2).
6. Loosen screws on strip (8) and remove leads 50, 64, and 65 at terminal strip on auto leveler circuit board (9).
7. Cut two tie down straps (10) where cable (3) enters box (2). Discard tie down straps.



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REMOVAL - CONTINUED

8. Remove nut (11), lockwasher (12), washer (13) and clamp (14). Move hoses (15) out of the way. Discard lockwasher.
9. Carefully pull cable (3) from box (2).
10. Secure cover (5) to box (2) by tightening four screws (4).
11. Support MLRS attachment (16) using lifting device.



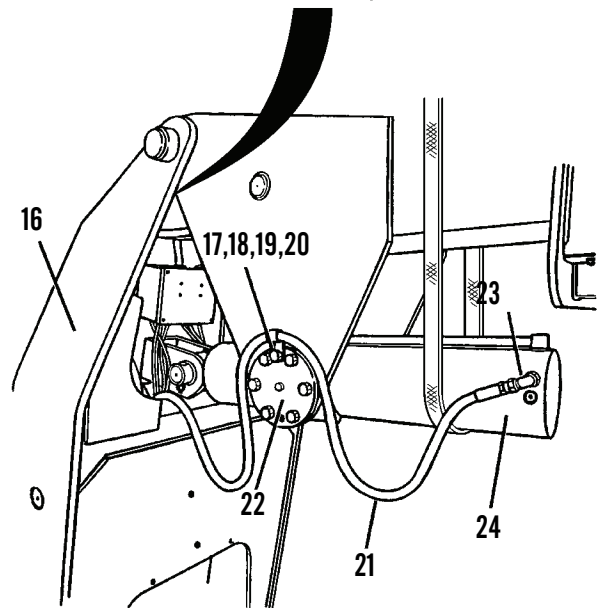
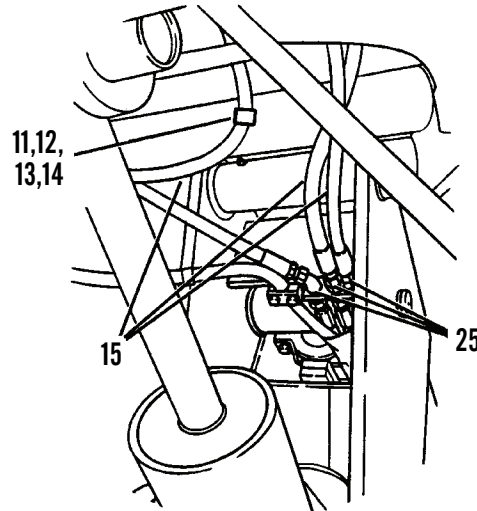
WARNING

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

NOTE

- MLRS attachment weighs approximately 2,500 lb (1134 kg) when all components, including forks, remain installed.
- Place container under disconnected hoses to catch hydraulic oil.

12. Remove bolt (17), lockwasher (18), clamp (19) and lockwasher (20) securing each hose (21) to each end-plate (22). Discard lockwashers.
13. Disconnect two hoses (21) from two elbows (23) on cylinder (24).
14. Disconnect three hydraulic hoses (15) from boom fittings (25) at front of boom. Cap open boom fittings with metal caps.



409-4045

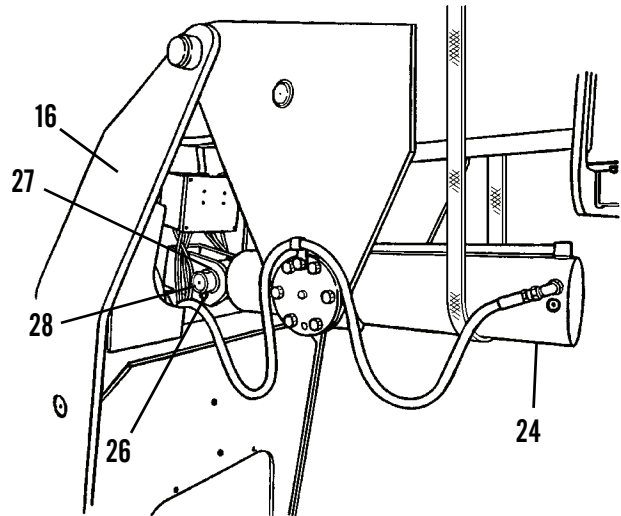
REMOVAL - CONTINUED**WARNING**

- Support rear of cylinder with chain prior to removing pivot pin. Failure to do so may cause personal injury and damage to cylinder.
- Be certain that metal caps are installed on fittings at front of boom as instructed in step 14. Failure to do so could result in personal injury caused by pressurized hydraulic oil spraying out of open fittings when engine is started.

NOTE

Adjust fitting device as required to take weight off pivot pin during removal.

15. Remove locknut (26), capscrew (27) and pivot pin (28), securing MLRS attachment hoist cylinder (24) to MLRS attachment (16). Discard locknut.



409-4046

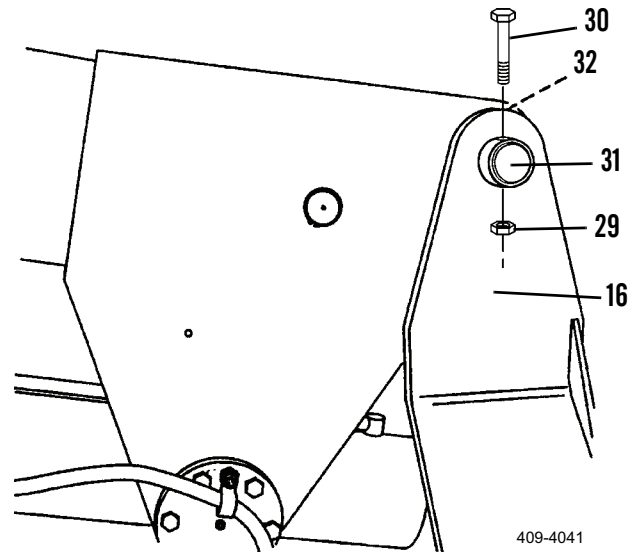
REMOVAL - CONTINUED

16. Remove locknut (29), capscrew (30), pivot pin (31) and two spacer rings (32), securing attachment (16) to boom. Discard locknut.

NOTE

Spacer rings are used as required and may not be present on all vehicles.

17. Connect battery cables (WP 0107 00).
18. Start engine (TM 10-3930-660-10) and carefully move vehicle rearward to separate MLRS attachment (16) from boom. Stop engine (TM 10-3930-660-10).



19. Place attachment (16) on suitable supports and remove lifting device.

INSTALLATION**WARNING**

- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.
- Be certain that metal caps are installed on fittings at front of boom as instructed in step 14 of *Removal*. Failure to do so could result in personal injury caused by pressurized hydraulic oil spraying out of open fittings when engine is started.
- Support rear of cylinder with chain prior to installing MLRS attachment. Failure to do so may cause personal injury and damage to cylinder.

NOTE

MLRS attachment weighs approximately 2,500 lb (1134 kg) when all components, including forks, remain installed.

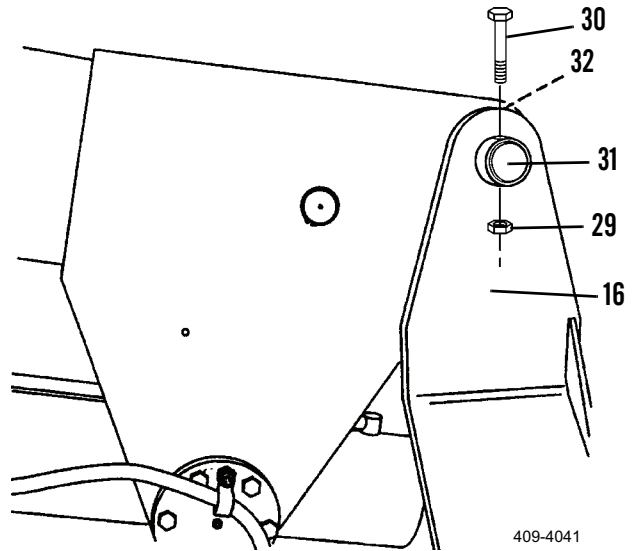
1. Attach lifting device to attachment (16) and raise attachment to height required to align mounting holes of attachment with holes in boom.
2. Start engine (TM 10-3930-660-10) and carefully move vehicle toward MLRS attachment (16). Stop engine when mounting holes are aligned. Stop engine (TM 10-3930-660-10).

INSTALLATION - CONTINUED

NOTE

Spacer rings are used as required and may not be present on all vehicles. Install spacer rings only if removed during removal.

3. Secure attachment (16) to boom with two spacer rings (32), pivot pin (31), capscrew (30) and new locknut (29).

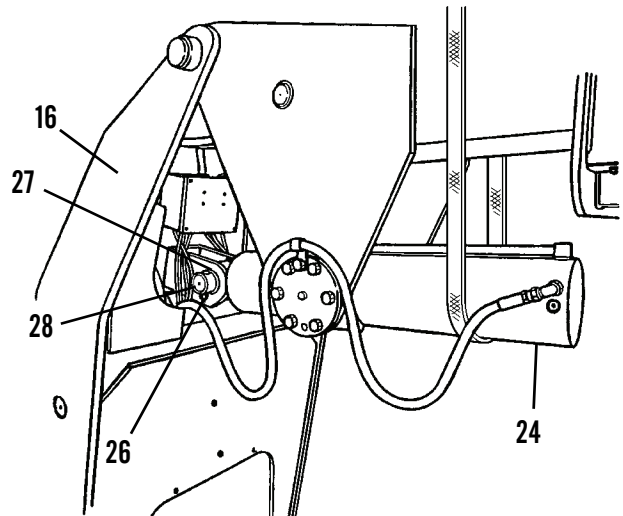


WARNING

Continue to support rear of cylinder with chain until pivot pin is installed. Failure to do so may cause personal injury and damage to cylinder.

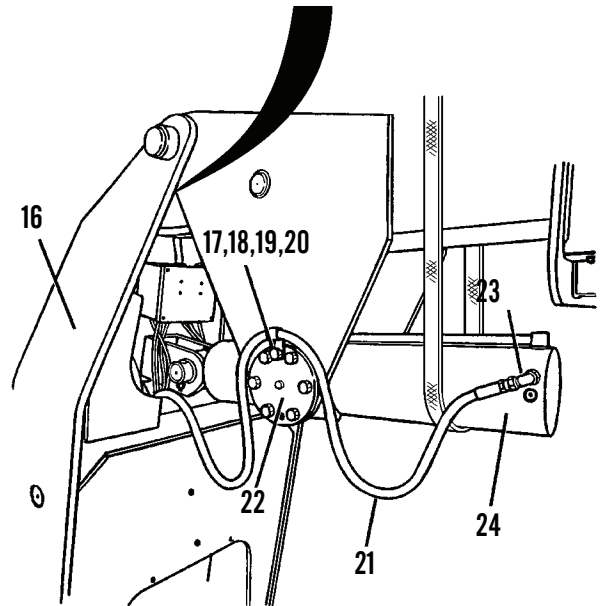
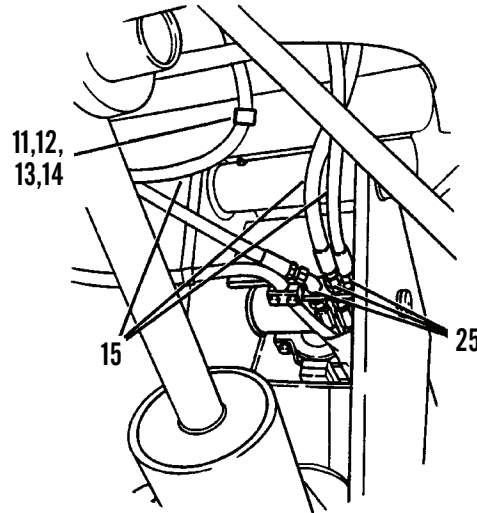
NOTE

- Adjust lifting device as required to take weight off of pivot pin during installation.
 - Apply antiseize compound to pin as installed.
4. Install pivot pin (28), capscrew (27) and new locknut (26) to secure MLRS attachment hoist cylinder (24) to MLRS attachment (16).



INSTALLATION - CONTINUED

5. Uncap boom fittings (25) and connect three hydraulic hoses (15) at front of boom as tagged.
6. Connect two hoses (21) to two elbows (23) on cylinder (24) as tagged.
7. Apply loctite to bolts (17). Secure each hose (21) to each endplate (22) with new lockwasher (20), clamp (19), new lockwasher (18) and bolt (17).
8. Remove lifting device from attachment (16).
9. Install hose (15) to MLRS attachment (16) with clamp (14), washer (13) new lockwasher (12) and nut (11).



409-4045

INSTALLATION - CONTINUED

10. Install boom electrical cable (3) and connect electrical leads (1) at electrical junction box (2).
11. Loosen four screws (4) and separate cover (5) from box (2).
12. Carefully position cable (3) through hole in box (2).

CAUTION

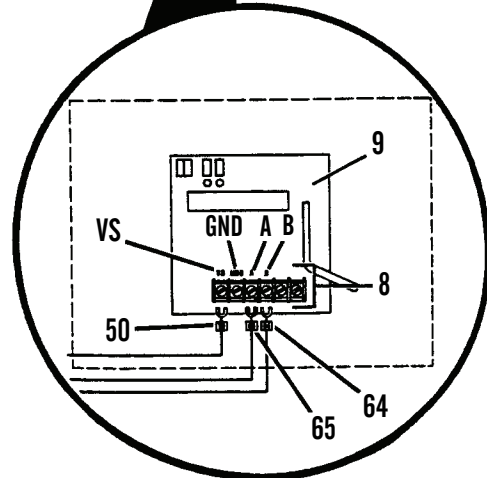
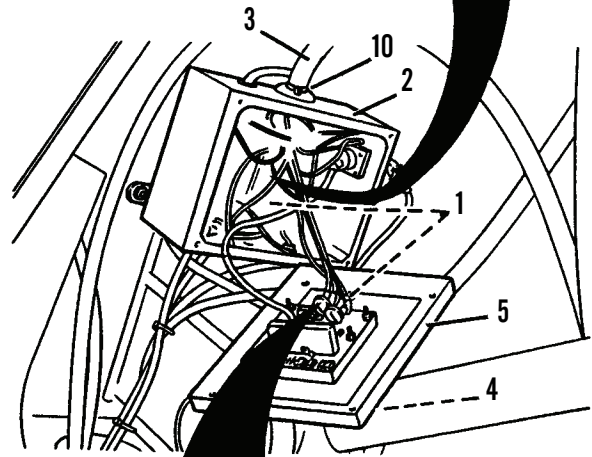
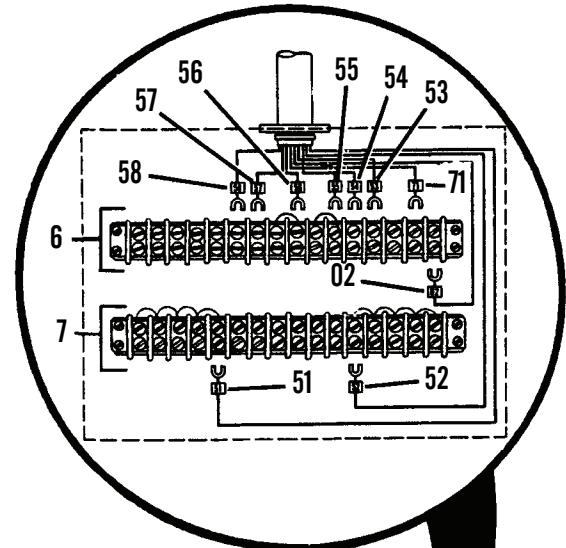
Connect electrical leads to auto leveler circuit board as described in steps 13 thru 15. Failure to follow instructions in these steps may result in damage to circuit board.

13. Connect electrical lead 50 to terminal VS of auto leveler circuit board (9). Tighten screw on strip (8) to secure lead 50.
14. Connect electrical lead 65 to terminal A of auto leveler circuit board (9). Tighten screw on strip (8) to secure lead 65.
15. Connect electrical lead 64 to terminal B of auto leveler circuit board (9). Tighten screw on strip (8) to secure lead 64.

NOTE

Terminals on (6) and (7) are not marked. Refer to tags on terminal screws when installing electrical leads to terminal strips.

16. Connect electrical leads 51 and 52 (1) at bottom terminal strip (7) of box (2). Tighten screws on strip to secure leads.
17. Connect electrical lead 02 at bottom terminal strip (6) of box (2). Tighten screw on strip to secure lead 02.
18. Connect electrical leads 58, 57, 56, 55, 54, 53 and 71, at top terminal strip (6) of box (2). Tighten screws on strip (6) to secure leads.
19. Attach two new tie down straps (10) where cable (3) enters box (2).
20. Position cover (5) on box (2) and tighten four screws (4).



409-716

INSTALLATION - CONTINUED

21. Purge air from MLRS attachment hoist cylinder and lines (TM 10-3930-660-10).
22. Start engine, check for proper operation and leaks (TM 10-3930-660-10).
23. Cycle MLRS attachment hoist cylinder five times (TM 10-3930-660-10).

NOTE

Excessive air in hydraulic system may temporarily prevent MLRS attachment functions from operating. Attempt to operate MLRS attachment functions as required until air is bled from system and each function operates smoothly and completely.

24. Stop engine and relieve hydraulic pressure by operating MLRS attachment hoist controls (TM 10-3930-660-10).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Lubrication

INITIAL SETUP

Tools and Special Tools

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Grease (Item 20, WP 0323 00)

References

WP 0265 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

LUBRICATION

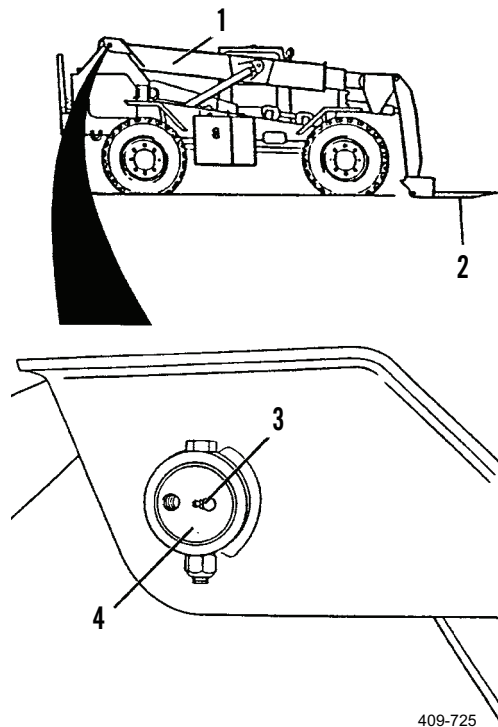
CAUTION

To ensure adequate lubrication of boom pivot pins, be sure that steps 1 and 2 are performed prior to applying lubrication. Inadequate lubrication of boom pivot pins could result in excessive wear and damage to vehicle or load.

NOTE

For replacement of boom pivot pin, refer to WP 0265 00).

1. Fully retract boom (1).
2. Position forks (2) so they are resting on the ground.
3. Apply lubrication to two grease fittings (3), one on each boom pivot pin (4).



409-725

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Inspection

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Lifting device, 10,000 lb capacity

References

WP 0266 00

Materials/Parts

- Sealant, Loctite (Item 42, WP 0323 00)
- Lockwasher (7)

Equipment Condition

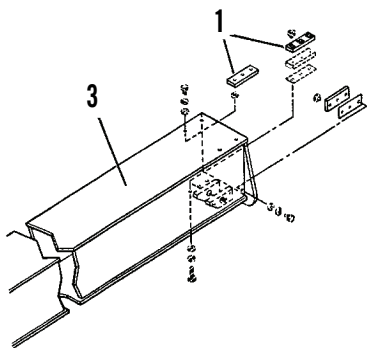
Vehicle parked on level ground (TM 10-3930-660-10)

INSPECTION

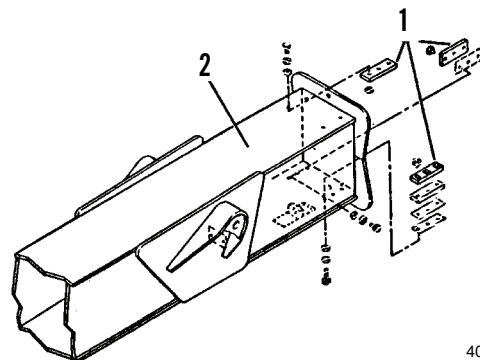
NOTE

Boom wear pads must be at least 3/8 in. (9.5 mm) thick. Any boom wear pads under 3/8 in. (9.5 mm) thick must be replaced. Refer to *Boom Wear Pads Replacement*, WP 0266 00.

1. Inspect wear pads (1) at front of outer boom (2) and intermediate boom (3).
2. Start engine (TM 10-3930-660-10).
3. Move boom sections in or out as required to provide access.
4. Stop engine (TM 10-3930-660-10).



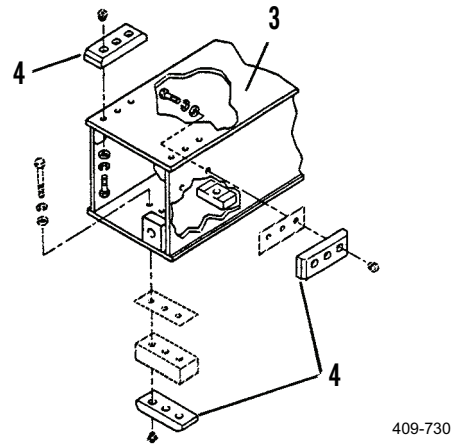
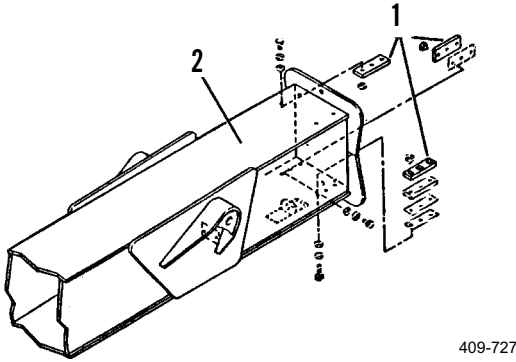
409-726



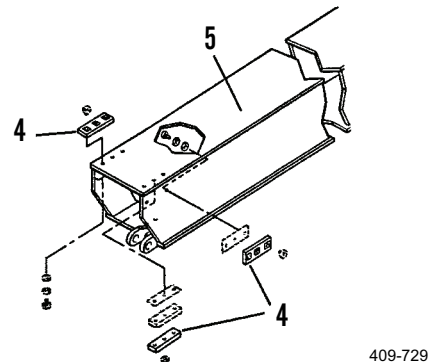
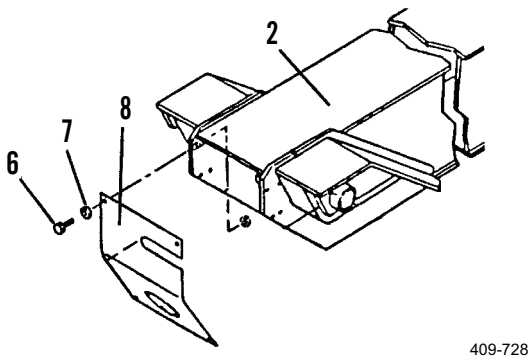
409-727

INSPECTION - CONTINUED

5. Measure thickness of wear pads (1). If worn refer to *Boom Wear Pads Replacement*, (WP 0266 00).
6. Inspect wear pads (4) at rear of intermediate boom (3) and inner boom (5).



7. Start engine (TM 10-3930-660-10).
8. Fully retract boom sections.
9. Stop engine (TM 10-3930-660-10).
10. Remove four screws (6), four lockwashers (7) and boom cover (8) from outer boom (2) to provide access. Discard lockwashers.
11. Measure thickness of wear pads (4). If worn, refer to *Boom Wear Pad Replacement*, WP 0266 00.



NOTE

Apply loctite to threads of screws.

12. Install cover (8) to outer boom with four new lockwashers (7) and four screws (6).
13. If necessary, check for proper wear pad clearances.

BOOM WEAR PADS INSPECTION - CONTINUED

0190 00***INSPECTION - CONTINUED***

14. Start engine (TM 10-3930-660-10).
15. Fully extend inner boom (5).
16. Stop engine (TM 10-3930-660-10).
17. Use lifting device to move inner boom (5) up and down and from side to side. Check for clearance of 0.01 to 0.13 in. (0.254 to 3.302 mm) between wear pads and surfaces of inner and intermediate booms. Remove lifting device after measuring clearance.
18. Start engine (TM 10-3930-660-10).
19. Fully extend intermediate boom (3).
20. Stop engine (TM 10-3930-660-10).
21. Use lifting device to move intermediate boom (3) up and down and from side to side. Check for clearance of 0.01 to 0.13 in. (0.254 to 3.302 cm) between wear pads and surfaces of intermediate and outer booms.

NOTE

If clearances measured in steps 17 and 21 are not within limits, wear pads are worn or quantity of wear pad shims is incorrect. Refer to WP 0266 00).

END OF WORK PACKAGE

BOOM HOSE PULLEY REPLACEMENT

0191 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Rope, 20 ft

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Materials/Parts - Continued

Locknut (23 and 27)

Lockwasher (8, 17, 29 and 33)

References

WP 0107 00

WP 0193 00

WP 0194 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

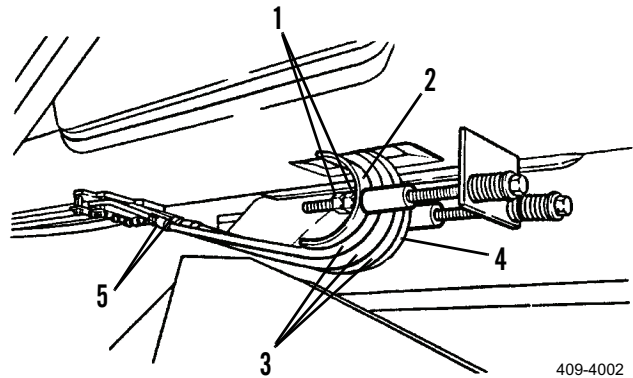
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

1. Fully retract, then extend boom several inches (TM 10-3930-660-10).
2. Disconnect battery cables (WP 0107 00).
3. Loosen jamnuts (1) at tensioner (2) to relieve tension on three hydraulic hoses (3) and boom electrical cable (4).
4. Disconnect three hydraulic hoses (3) at fittings (5) behind tensioner (2).

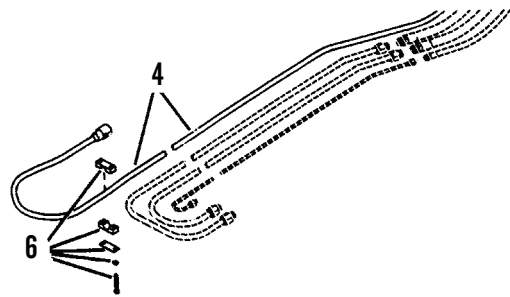


409-4002

NOTE

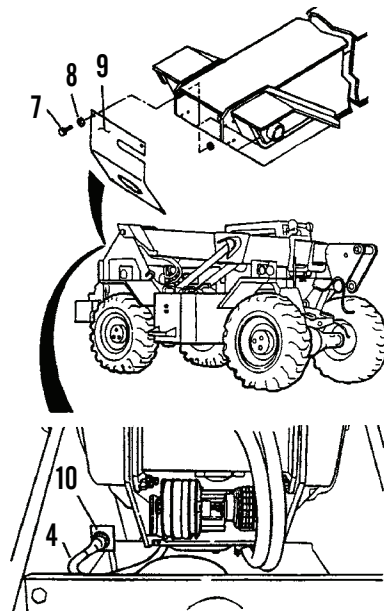
Rope is used to pull hoses out of boom during installation.

5. Tie a rope around ends of disconnected hydraulic hoses (3).
6. Remove four clamp assemblies (6) securing boom electrical cable (4) to underside of boom.



409-732

7. Remove four capscrews (7), four lockwashers (8) and access cover (9). Discard lockwashers.
8. Disconnect boom electrical cable (4) at plug (10).



409-733

REMOVAL - CONTINUED

NOTE

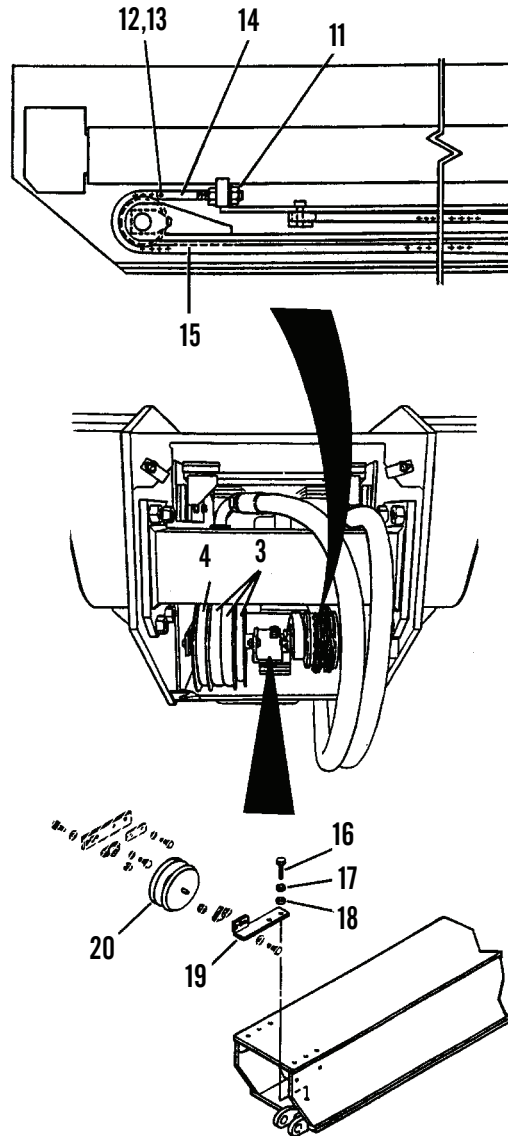
Loosen nut (11) as needed during step 9.

9. Remove two retainer rings (12) and clevis pin (13) from clevis (14).
10. Separate extend chain (15) from clevis (14).

NOTE

Loosen hoses and boom electrical cable as required during removal of pulley.

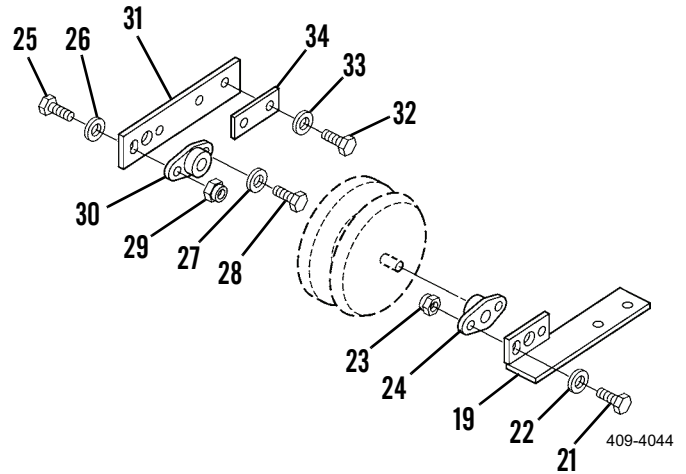
11. Remove two capscrews (16), two lockwashers (17) and two flatwashers (18). Discard lockwashers.
12. Remove pulley support (19) and pulley (20).



409-734

REMOVAL - CONTINUED

13. Remove two capscrews (21), two flatwashers (22) and two locknuts (23) from bearing (24). Discard locknuts.
14. Remove bearing (24) from pulley support (19).
15. Remove capscrew (25), flatwasher (26) and locknut (27). Discard locknut.
16. Remove capscrew (28), lockwasher (29) and bearing (30) from pulley support (31). Discard lockwasher.
17. Remove two capscrews (32), two lockwashers (33), spacer (34) and pulley support (31). Discard lockwashers.

**INSTALLATION**

1. Install two capscrews (32), two new lockwashers (33), spacer (34) and pulley support (31).
2. Install capscrew (28), new lockwasher (29) and bearing (30) to pulley support (31).
3. Install capscrew (25), flatwasher (26) and new locknut (27).
4. Secure bearing (24) to pulley support (19) with two capscrews (21), two flatwashers (22) and two new locknuts (23).

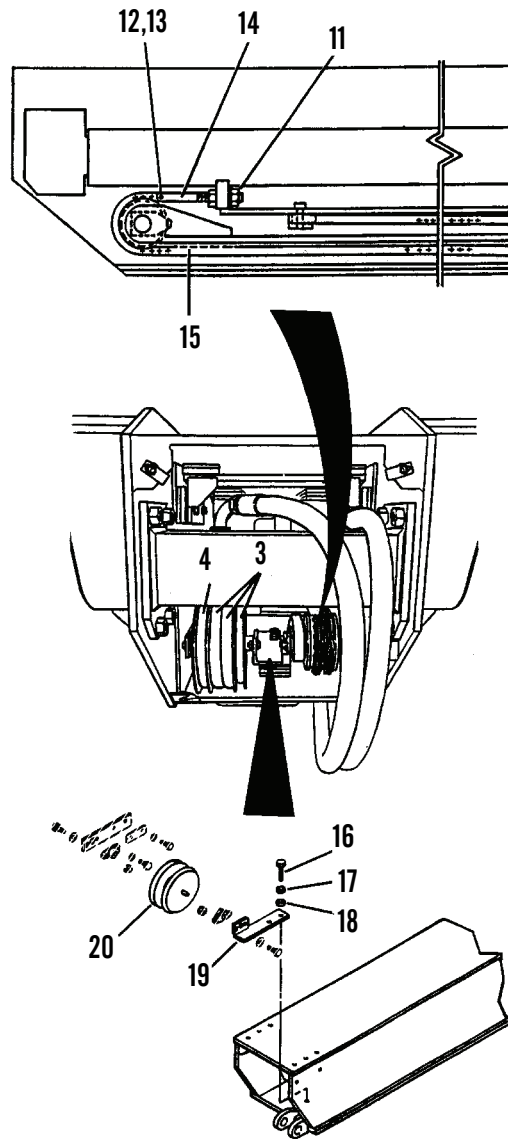
INSTALLATION - CONTINUED

5. Position pulley (20) and pulley support (19) on boom.

NOTE

- Capscrews fasten to wear pad on underside of intermediate boom section. Align wear pad as required during step 6.
- Apply loctite to threads of capscrews.

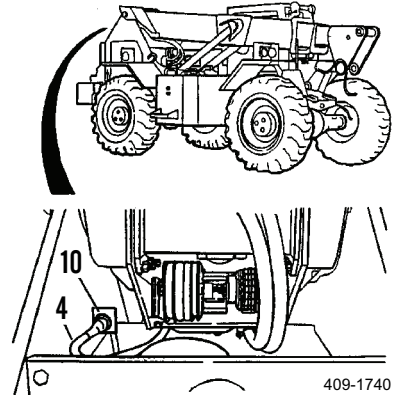
6. Install with two capscrews (16), two new lockwashers (17) and two flatwashers (18).
7. Using rope, pull three hydraulic hoses (3) and boom electrical cable (4) through opening at tensioner (2) until they are snug around boom hose pulley (20). Remove rope from hoses (3).
8. Align extend chain (15) with clevis (14).
9. Secure extend chain (15) to clevis (14) with clevis pin (13) and two retainer rings (12).



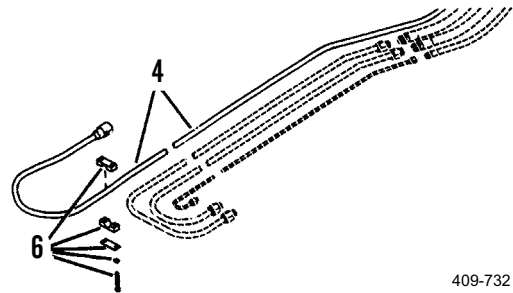
409-734

INSTALLATION - CONTINUED

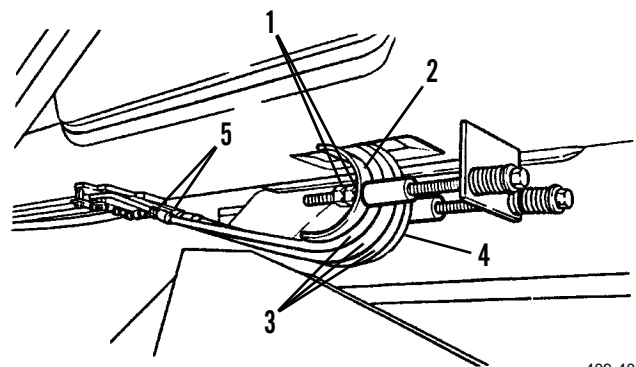
10. Connect boom electrical cable (4) at plug (10).



11. Install four clamp assemblies (6) to secure boom electrical cable (4) to underside of boom.



12. Connect three hydraulic hoses (3) at fittings (5) behind tensioner (2).



INSTALLATION - CONTINUED

13. Connect negative battery cables (WP 0107 00).

CAUTION

Always check adjustment of chains, boom electrical cable and boom hoses whenever boom hose pulley is replaced. Refer to WP 0193 00 and WP 0194 00. Failure to follow this instruction will result in damage to boom electrical cable or hydraulic hoses.

14. Check/adjust chain adjustment (WP 0193 00).
15. Check/adjust tension of hydraulic hoses and boom electrical cable (WP 0194 00).

END OF WORK PACKAGE

BOOM CHAIN PULLEYS REPLACEMENT

0192 00

THIS WORK PACKAGE COVERS

Removal of Retract Chain Pulley, Installation of Retract Chain Pulley, Removal of Extend Chain Pulley, Installation of Extend Chain Pulley

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

- Sealant, Loctite (Item 43, WP 0323 00)
- Lockwasher (6, 8, 21 and 26)

References

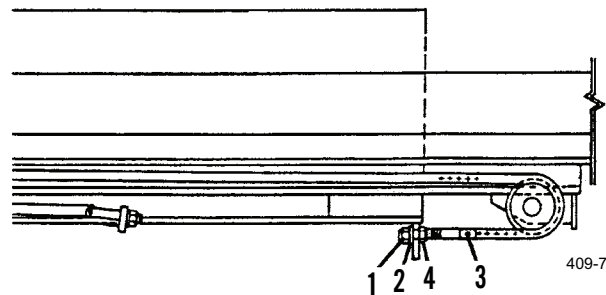
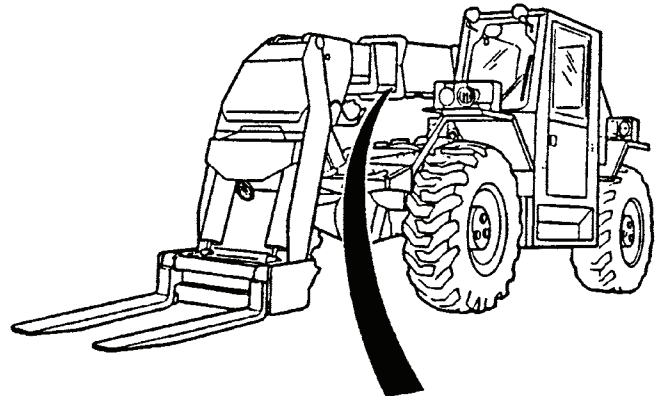
- WP 0193 00
- WP 0194 00

Equipment Condition

- Vehicle parked on level ground (TM 10-3930-660-10)
- Boom lowered/retracted (TM 10-3930-660-10)

REMOVAL OF RETRACT CHAIN PULLEY

1. Remove nut (1) and washer (2).
2. Remove retract chain clevis (3). Do not change the position of locknut (4).



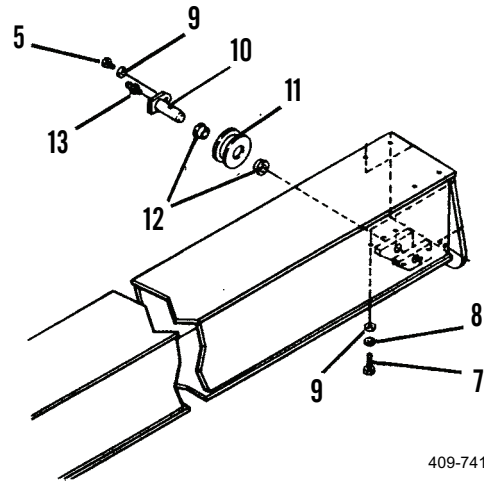
409-740

BOOM CHAIN PULLEYS REPLACEMENT - CONTINUED

0192 00

REMOVAL OF RETRACT CHAIN PULLEY - CONTINUED

3. Remove capscrew (5) and lockwasher (6). Discard lockwasher.
4. Remove capscrews (7), lockwashers (8) and washers (9) securing bottom wear pad at front of intermediate boom. Discard lockwashers.
5. Remove pulley pin (10).
6. Remove chain pulley (11) and bushings (12).
7. Remove lubrication fitting (13), if necessary.



409-741

INSTALLATION OF RETRACT CHAIN PULLEY

1. Install lubrication fitting (13), if removed.
2. Install chain pulley (11), with bushings (12) on the boom and install the pulley pin (10).

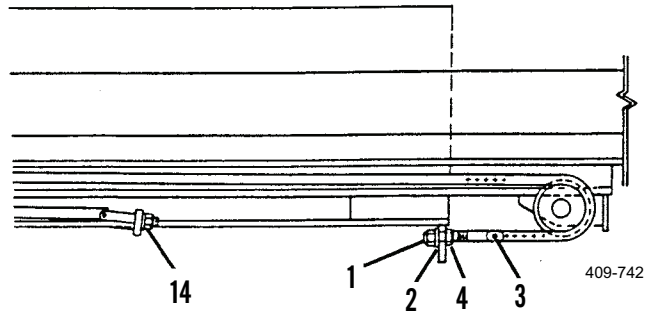
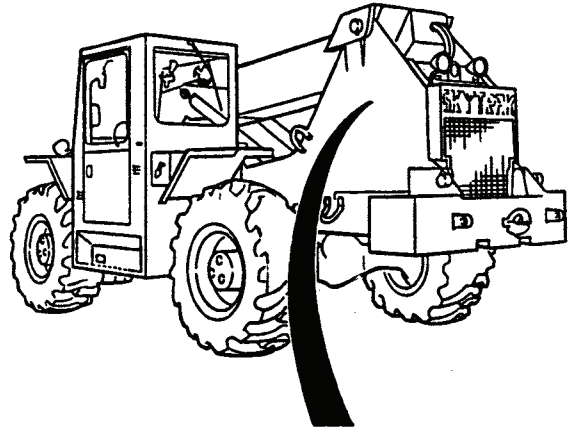
NOTE

Apply loctite to capscrew as installed in steps 3 and 4.

3. Secure pulley pin with new lockwasher (6) and capscrew (5).
4. Install capscrews (7), new lockwashers (8) and washers (9) to secure bottom wear pad at front of intermediate boom.

INSTALLATION OF RETRACT CHAIN PULLEY - CONTINUED

5. Install retract chain clevis (3) with washer (2) and nut (1). Tighten nut until locknut (4) is tight against boom.
6. Check/adjust chain adjustment (WP 0193 00).
7. Check/adjust hydraulic hoses and electrical cable (WP 0194 00).



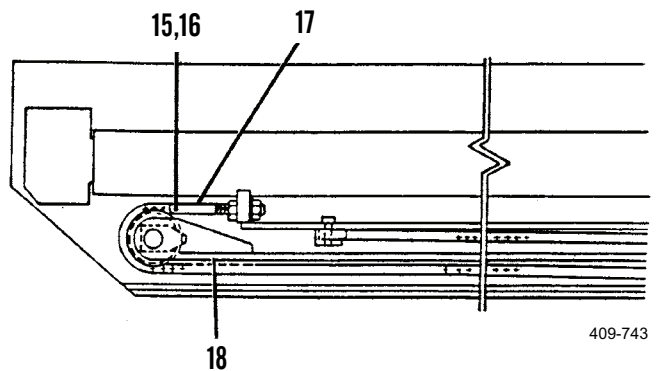
REMOVAL OF EXTEND CHAIN PULLEY

1. Fully retract, then extend boom several inches (TM 10-3930-660-10).

NOTE

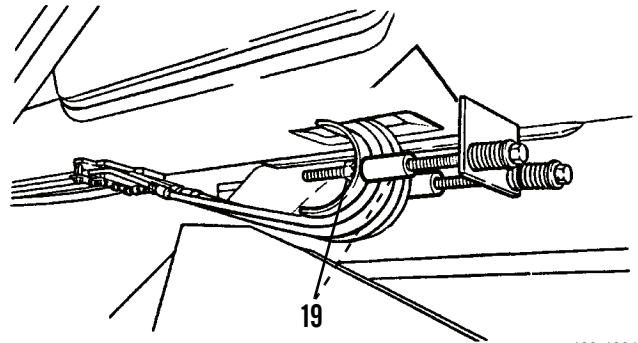
Loosen locknut (4) as needed to reduce chain tension during clevis pin removal.

2. Remove retainer rings (15) and clevis pin (16) from extend chain clevis (17).
3. Separate chain (18) from clevis (17).



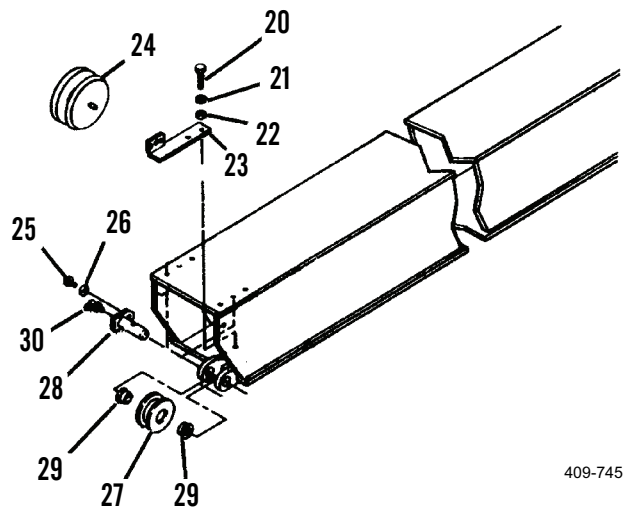
REMOVAL OF EXTEND CHAIN PULLEY - CONTINUED

4. Loosen jamnuts (19).



409-4001

5. Remove two capscrews (20), two lockwashers (21) and two flatwashers (22). Discard lockwashers.
6. Remove pulley support (23) and pulley (24) to provide workroom.
7. Remove capscrew (25) and lockwasher (26). Discard lockwasher.
8. Support chain pulley (27). Remove pulley pin (28).
9. Remove chain pulley (27) and two bushings (29).
10. Remove lubrication fitting (30), if necessary.



409-745

INSTALLATION OF EXTEND CHAIN PULLEY

1. Install lubrication fitting (30), if removed.
2. Position chain pulley (27) with two bushings (29) on the boom.
3. Install pulley pin (28).

NOTE

Apply loctite to threads of capscrew as installed in step 4 thru 8.

4. Secure pulley pin (28) with new lockwasher (26) and capscrew (25).

BOOM CHAIN PULLEYS REPLACEMENT - CONTINUED

0192 00

INSTALLATION OF EXTEND CHAIN PULLEY - CONTINUED

5. Install pulley (24) and pulley support (23) on boom.
6. Install two flatwashers (22), two new lockwashers (21) and two capscrews (20).
7. Check/adjust chain adjustment (WP 0193 00).
8. Check/adjust hydraulic hoses and electrical cable (WP 0194 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Inspection and Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

References

WP 0194 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

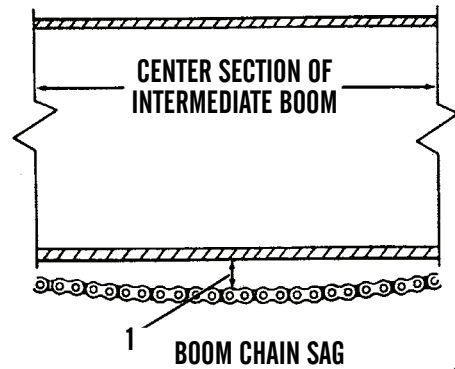
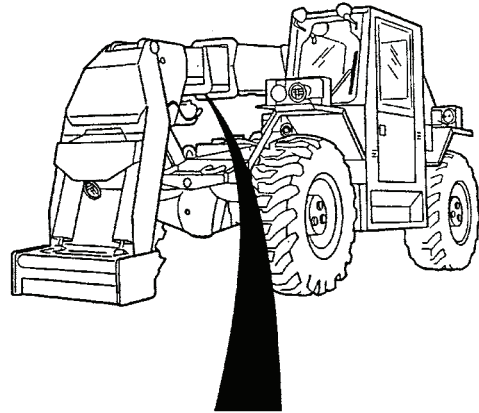
INSPECTION AND ADJUSTMENT

1. Fully extend boom (TM 10-3930-660-10).
2. Place boom in horizontal position.

NOTE

Adjusting the tension of the boom retract chain will also adjust the tension in the boom extend chain.

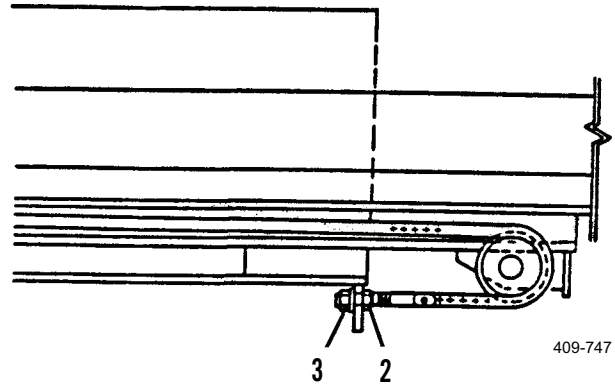
3. Measure retract chain sag (1) at middle of intermediate boom section.
4. Chain sag (1) should be approximately 3-1/4 to 3-1/2 in. (8.3 to 8.9 cm) from top of chain to bottom of boom.



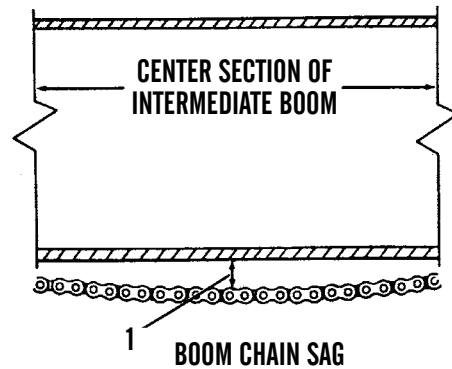
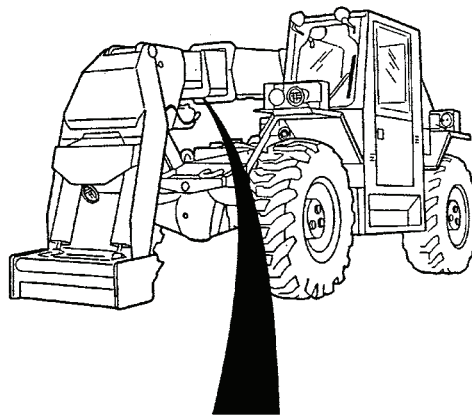
409-746

INSPECTION AND ADJUSTMENT - CONTINUED

5. Loosen jamnut (2).
6. Loosen or tighten adjusting locknut (3) until chain sag (1) is within specifications.
7. Tighten jamnut (2).
8. Retract and extend boom several times (TM 10-3930-660-10).



9. Recheck chain sag (1).
10. Chain sag (1) should be approximately 3-1/4 to 3-1/2 in. (8.3 to 8.9 cm) from top of chain to bottom of boom.



11. Check tension of hydraulic hoses and boom electrical cable (WP 0194 00).

END OF WORK PACKAGE

THIS WORK PACKAGE COVERS

Checking and Adjusting

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 43, WP 0323 00)

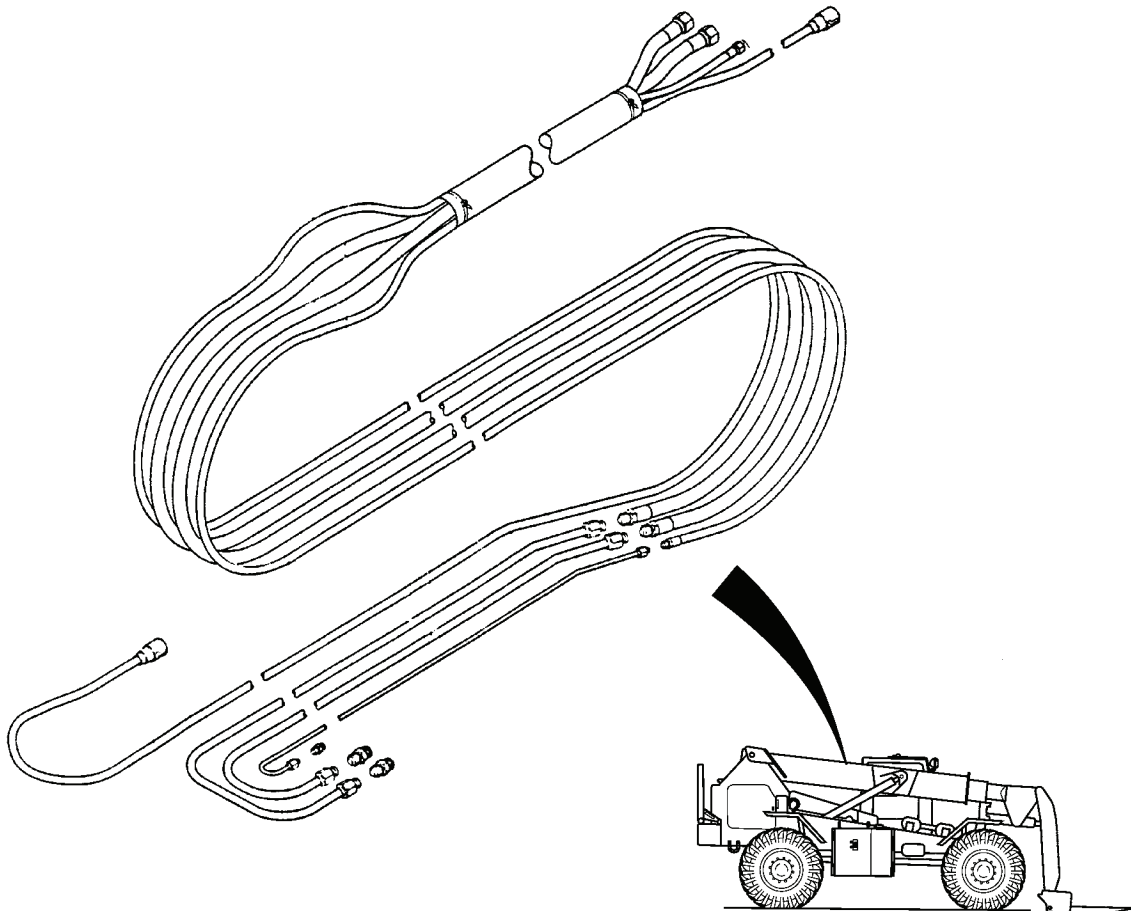
Lockwasher (2)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Extend and retract the boom to ensure chain sag is within specifications (WP 0193 00)

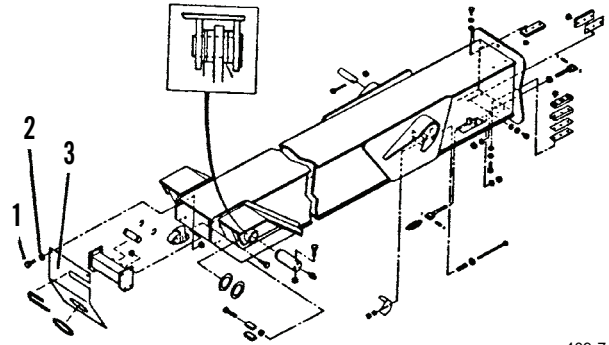
CHECKING AND ADJUSTING



409-748

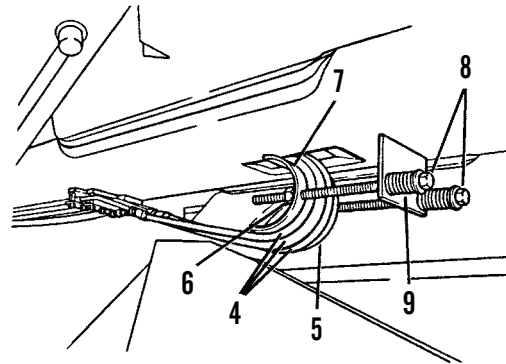
CHECKING AND ADJUSTING - CONTINUED

1. Fully extend boom and place in horizontal position (TM 10-3930-660-10).
2. Remove four bolts (1), four lockwashers (2) and boom cover (3) from rear of boom. Discard lockwashers.



409-749

3. Check tension of boom hydraulic hoses (4) and electrical cable (5).
4. Loosen two jamnuts (6) at hose tension plate (7).
5. Adjust hose tension bolts (8) at hose tension plate (7) until compressed length of hose tension springs (9) is 2-1/4 to 2-1/2 in. (5.7 to 6.4 cm) long.

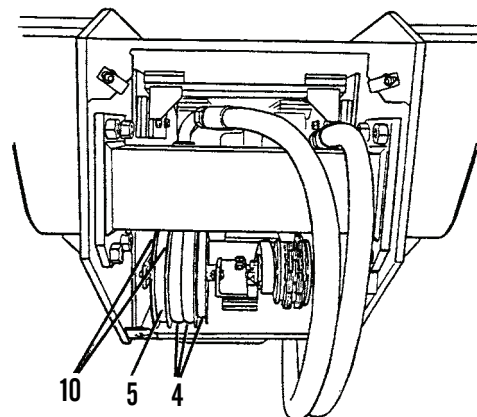


409-750

NOTE

- Ensure that boom hydraulic hoses and boom electrical cable are routed properly over hose tension plate and over pulley assembly at rear of boom.
- Two of the three hydraulic hoses are identical in size. Ensure that these hoses are not crossed inside the boom.

6. Pull on hydraulic hoses (4) at pulley assembly (10) and at hose tension plate (7) to check for slack in hoses (4).
7. Pull on boom electrical cable (5) at pulley assembly (10) and at tension plate (7) to check for slack in cable (5).
8. If slack is found in steps 6 and/or 7, adjust tension of boom hydraulic hoses (4) and boom electrical cable (5).

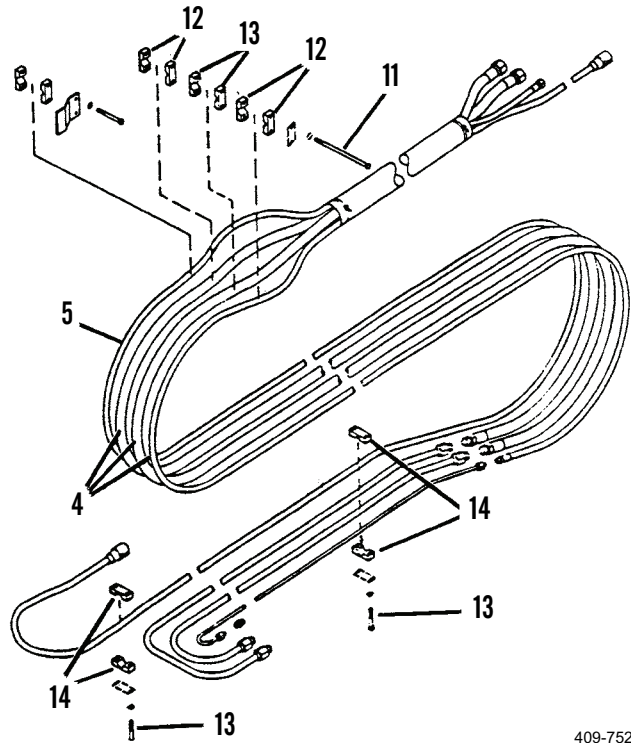


409-751

CHECKING AND ADJUSTING - CONTINUED**NOTE**

Loosen hose tension bolts at hose tension plate as required to temporarily relieve tension on boom hydraulic hoses during steps 9 thru 11.

9. Loosen capscrews (11) on clamp halves (12) securing boom hydraulic hoses (1) inside boom.
10. Pull boom hydraulic hoses (4) forward of clamp halves (12) until hoses (4) are snug against pulley assembly (10) and hose tension plate (7).
11. Tighten capscrews (11) on clamp halves (12) to secure hydraulic hoses (4) inside boom.
12. Check for proper routing of hydraulic hoses (4) around pulley assembly (10) and hose tension plate (7).
13. Adjust hose tension bolts (8) at hose tension plate (7) until length of hose tension springs (9) is 2- 1/4 to 2- 1/2 in. (5.7 to 6.4 cm) long.
14. Loosen capscrews (13) securing four sets of clamp halves (14) and boom electrical cable (5) to underside of boom.
15. Pull boom electrical cable (2) rearward at set of clamp halves (14) closest to hose tension plate (7) until cable (2) is snug against pulley assembly (10) and hose tension plate (7).
16. Tighten capscrews (13) on set of clamp halves (14) closest to hose tension plate (7).
17. Check for proper routing of boom hydraulic hoses (4) and boom electrical cable (5) around pulley assembly (10) and hose tension plate (7).
18. Check that length of hose tension springs (9) at hose tension plate (7) is 2-1/4 to 2-1/2 in. (5.7 to 6.4 cm) long. If necessary, readjust hose tension bolts (8) as required.
19. Tighten two jamnuts (6) at hose tension plate (7).
20. Pull boom electrical cable (2) rearward at set of clamp halves (14) farthest from hose tension plate (7) until cable (5) is snug.
21. Secure boom electrical cable (5) to underside of boom by tightening capscrews (13) on remaining three sets of clamp halves (14).
22. Apply loctite to four bolts (1). Position boom cover (3) on rear of boom and secure with four new lockwashers (2) and four bolts (1).
23. Retract boom (TM 10-3930-660-10).



409-752

END OF WORK PACKAGE

HYDRAULIC HOSES, LINES AND FITTINGS REPLACEMENT

0195 00

THIS WORK PACKAGE COVERS

Removal, Inspection, Installation

INITIAL SETUP

Tools and Special Tools

- Tool kit, general mechanic's (Item 39, WP 0324 00)
- Shop equipment, common no. 1 (Item 20, WP 0324 00)
- Tool kit, machinist's (Item 40, WP 0324 00)
- Tool outfit, HSTRU (Item 41, WP 0324 00)

Materials/Parts

- Cap and plug set (Item 8, WP 0323 00)
- Oil, lubricating (Item 30, WP 0323 00)
- Oil, lubricating (Item 33, WP 0323 00)
- Strap, tie down (Item 56, WP 0323 00)
- Tag, marker (Item 57, WP 0323 00)

References

- WP 0032 00
- WP 0131 00
- WP 0139 00

References - Continued

- WP 0172 00
- WP 0173 00
- WP 0174 00
- WP 0175 00
- WP 0176 00
- WP 0177 00
- WP 0178 00
- WP 0180 00
- WP 0184 00
- WP 0189 00
- WP 0199 00
- WP 0200 00

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)



WARNING



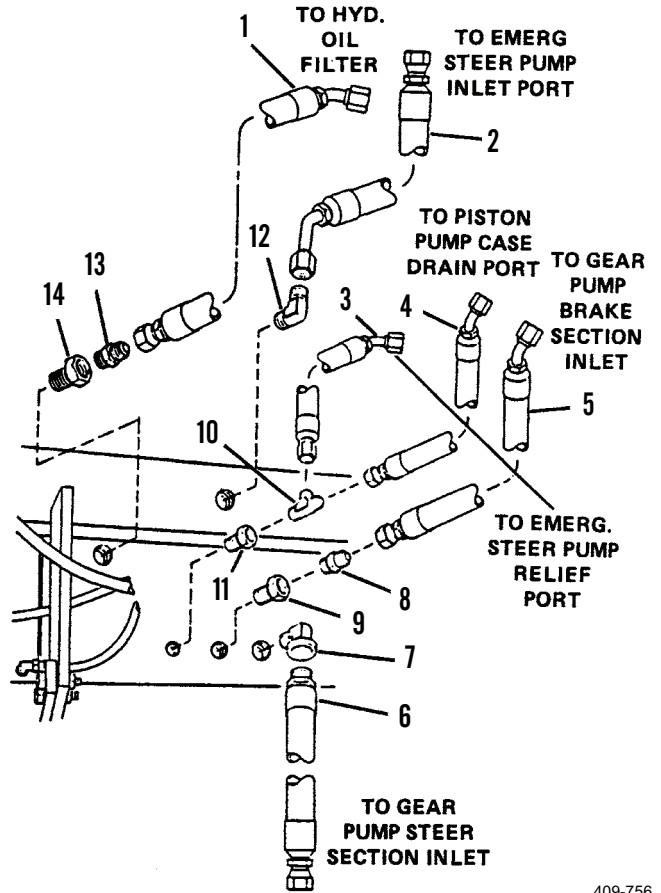
- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

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

REMOVAL

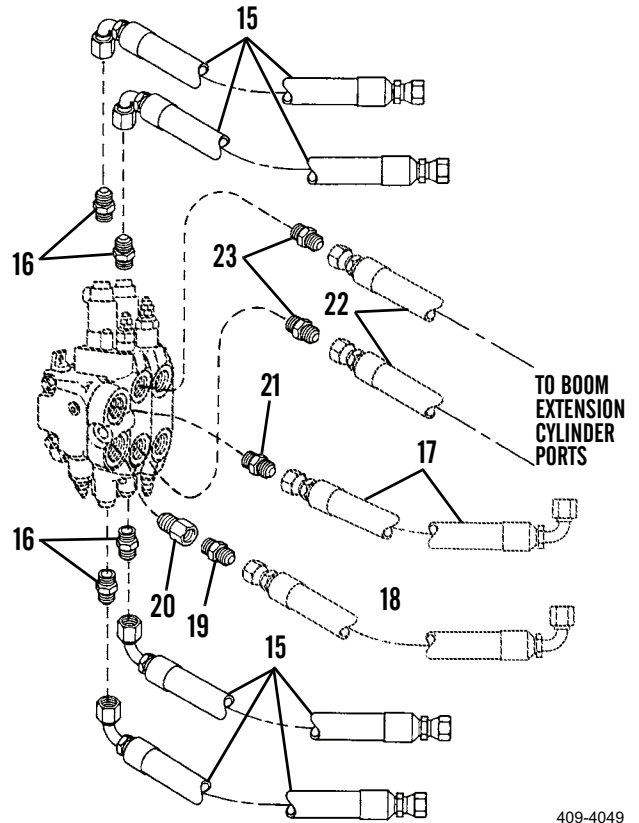
1. Drain reservoir (WP 0032 00).
2. Disconnect hose assemblies (1 thru 6).
3. Remove fittings (7 thru 14).



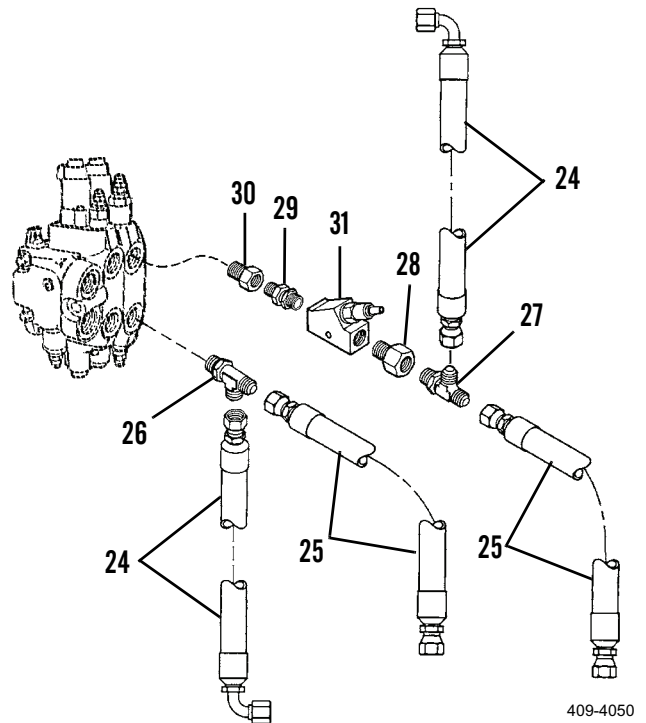
409-756

REMOVAL - CONTINUED

4. Disconnect four pilot circuit hose assemblies (15).
5. Remove fittings (16).
6. Remove two inlet section lines (17 and 18).
7. Remove fittings (19 thru 21).
8. Remove two boom extension control section hoses (22) and fittings (23) (WP 0175 00).

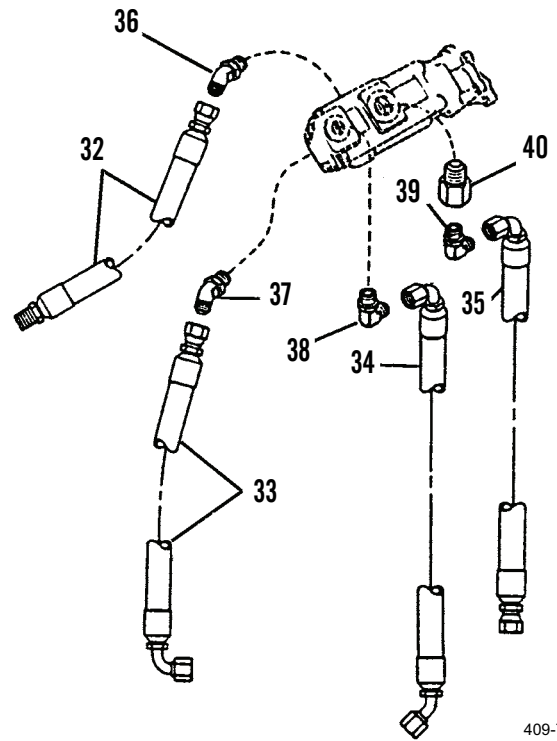


9. Remove two hose assemblies (24) and two hose assemblies (25) from main control valve boom hoist section as applicable.
10. Remove fittings (26 thru 30) and flow control valve (31) as necessary.



REMOVAL - CONTINUED

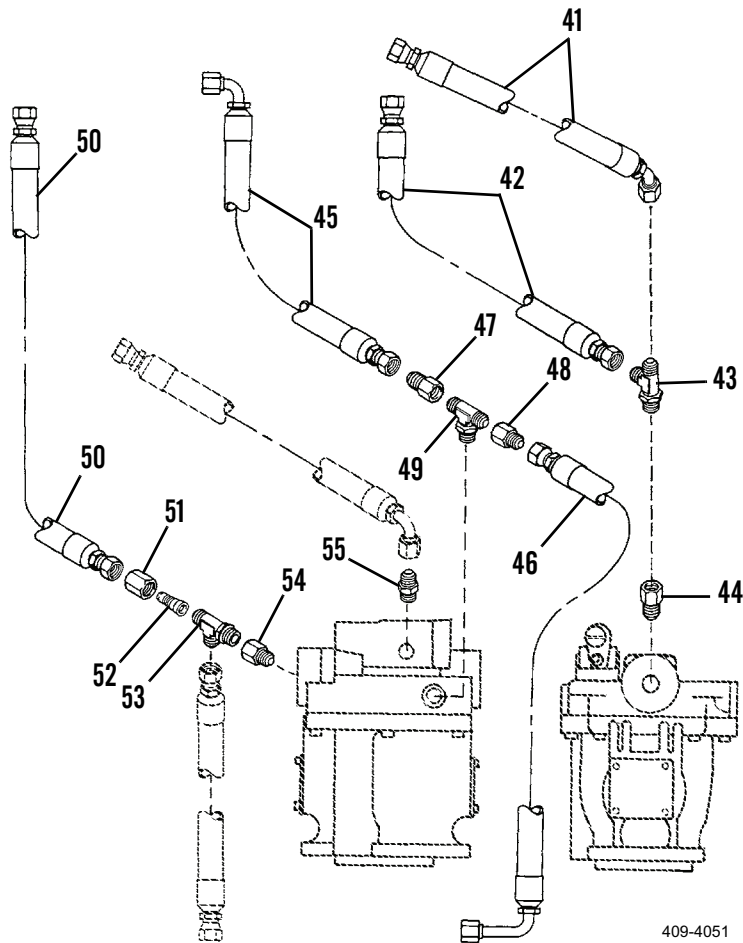
11. Disconnect hose assemblies (32 thru 35) as applicable.
12. Remove fittings (36 thru 40) (WP 0173 00).



409-759

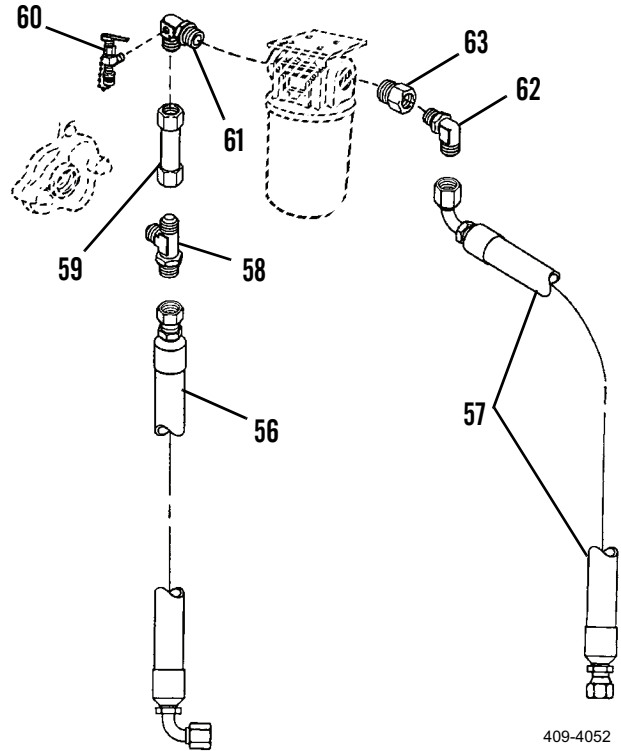
REMOVAL - CONTINUED

13. Disconnect hose assemblies (41 and 42).
14. Remove fittings (43 and 44).
15. Disconnect hose assemblies (45 and 46).
16. Remove fittings (47 thru 49).
17. Disconnect hose assembly (50).
18. Remove fittings (51 thru 55) (WP 0174 00).

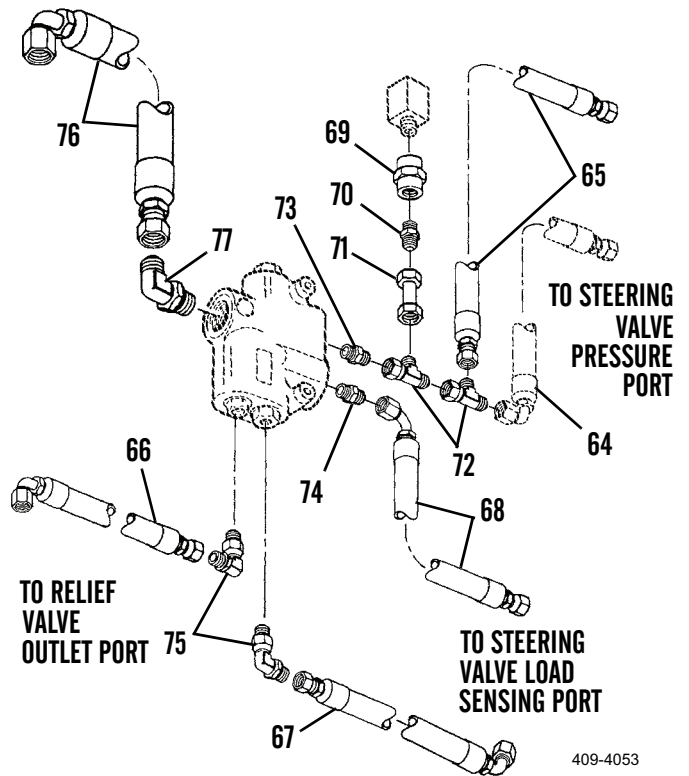


REMOVAL - CONTINUED

19. Disconnect hose assemblies (56 and 57).
20. Remove fittings (58 thru 63) as necessary (WP 0199 00).

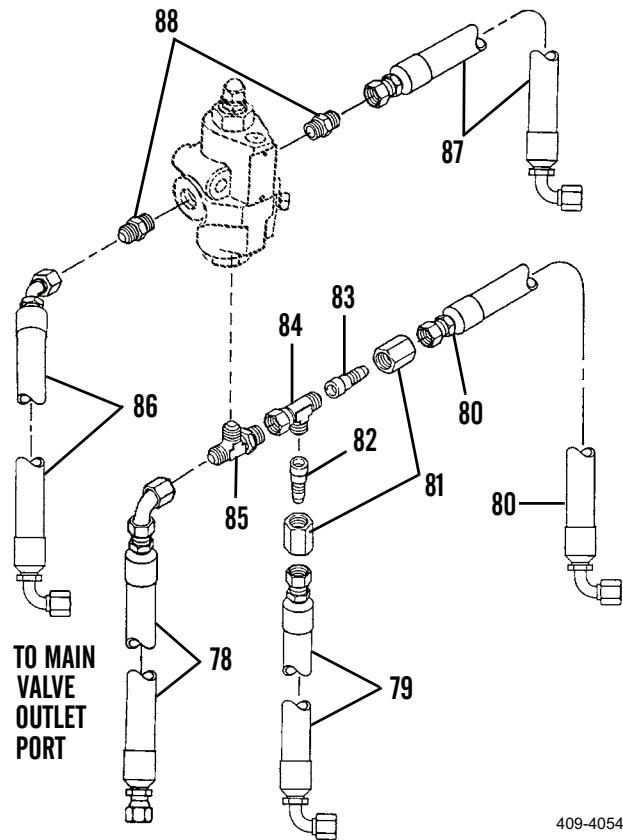


21. Disconnect hose assemblies (64 and 68) as applicable.
22. Remove fittings (69 thru 75).
23. Disconnect hose assembly (76).
24. Remove fitting (77) (WP 0177 00).



REMOVAL - CONTINUED

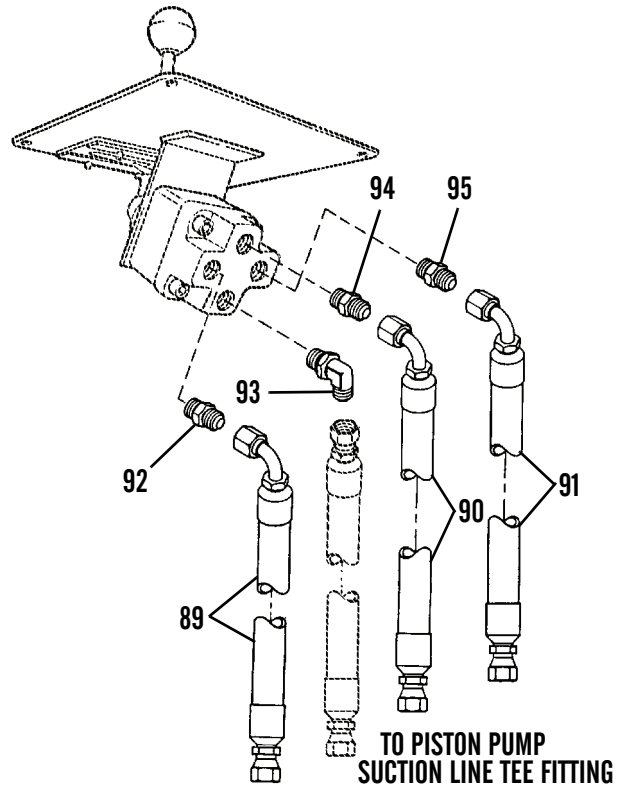
25. Disconnect relief valve hose assemblies (78 thru 80).
26. Remove fittings (81 thru 85).
27. Disconnect hose assemblies (86 and 87).
28. Remove fittings (88) (WP 0178 00).



409-4054

REMOVAL - CONTINUED

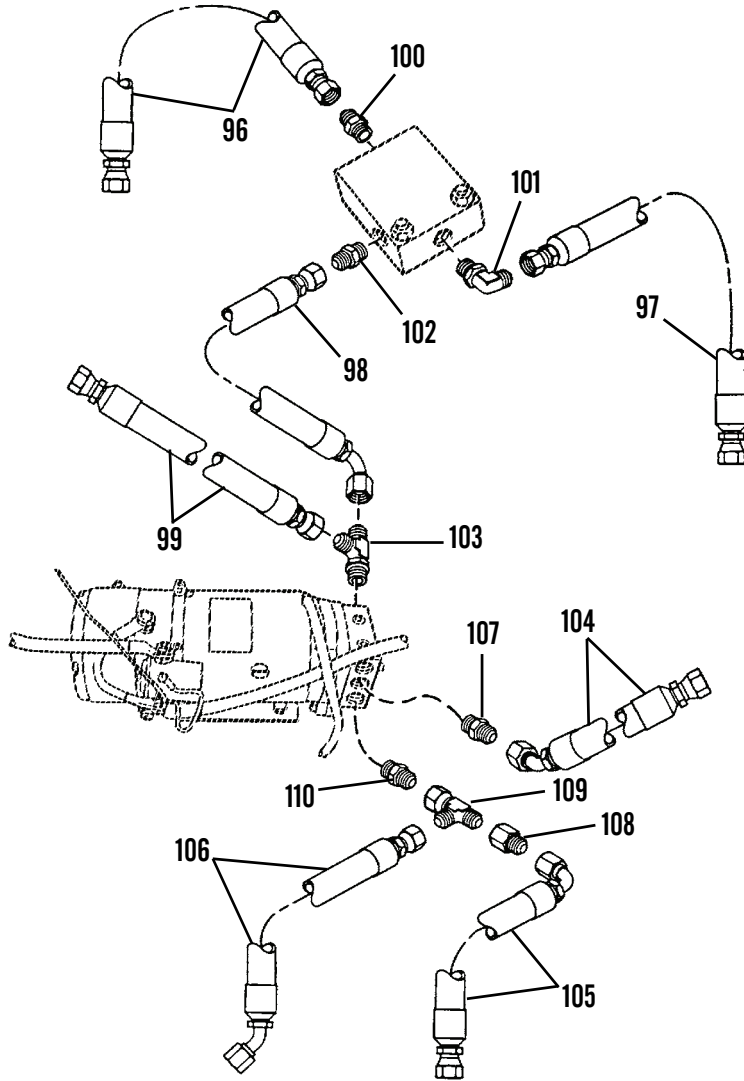
29. Disconnect frame tilt valve hose assemblies (89 thru 91).
30. Remove fittings (92 thru 95) as necessary (WP 0180 00).



409-4055

REMOVAL - CONTINUED

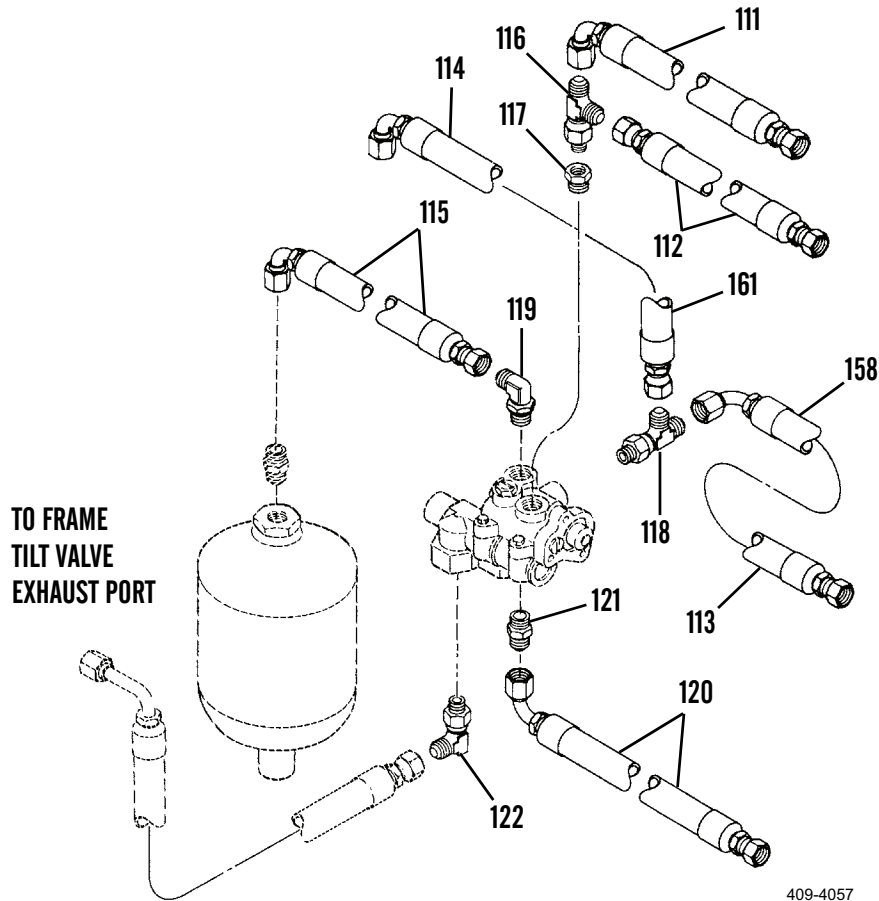
31. Disconnect emergency steering pump and shuttle valve hose assemblies (96 thru 99) from emergency steering pump.
32. Remove fittings (100 thru 103).
33. Disconnect hose assemblies (104 thru 106) from shuttle valve.
34. Remove fittings (107 thru 110) (WP 0139 00).



409-4056

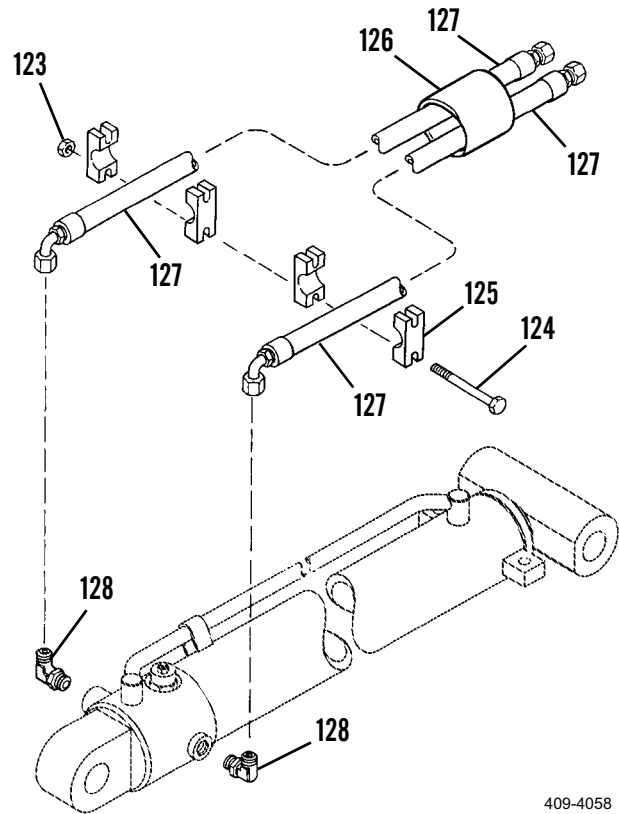
REMOVAL - CONTINUED

35. Disconnect brake valve and accumulator hose assemblies (111 thru 115).
36. Remove fittings (116 thru 119).
37. Disconnect hose assembly (120).
38. Remove fittings (121 and 122) (WP 0131 00).



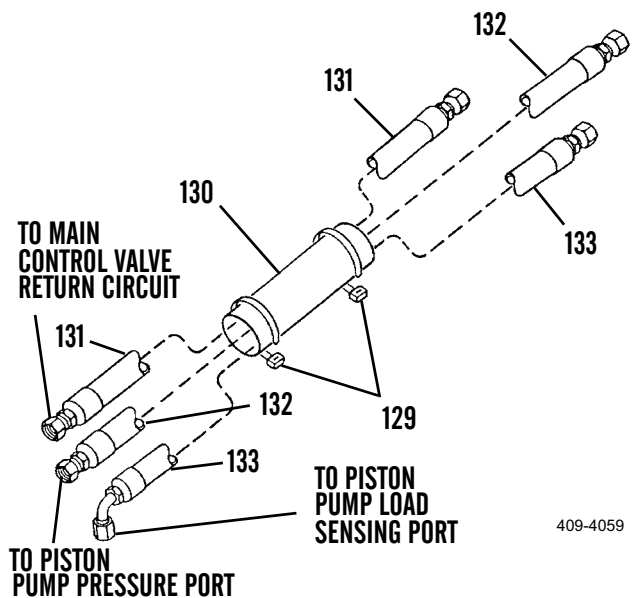
REMOVAL - CONTINUED

- 39. Remove two nuts (123), two capscrews (124) and four clamp halves (125).
- 40. Remove tie down straps (not shown) and protective sleeve (126). Discard tie down straps.
- 41. Remove two boom extension cylinder hose assemblies (127) and two elbows (128) (WP 0189 00).



409-4058

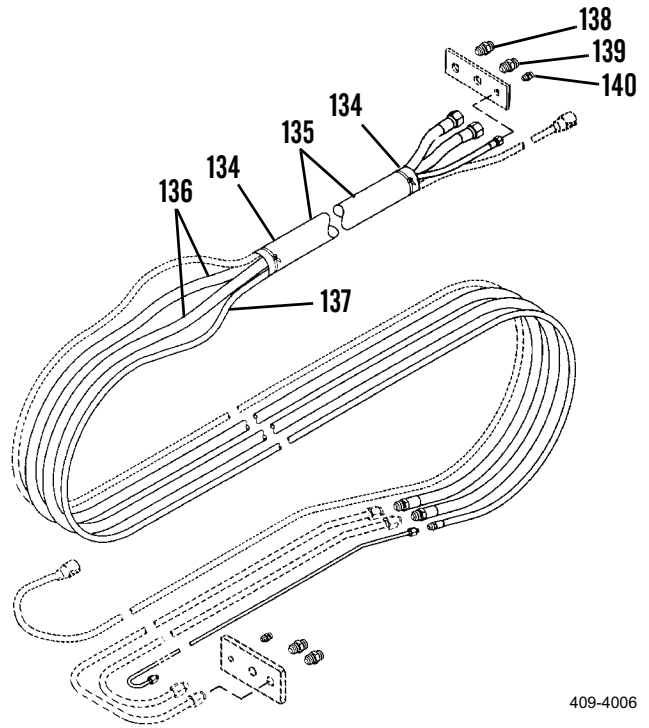
- 42. Remove two tie down straps (129) and protective sleeve (130). Discard tie down straps.
- 43. Remove MLRS attachment hose assemblies (131 thru 133).



409-4059

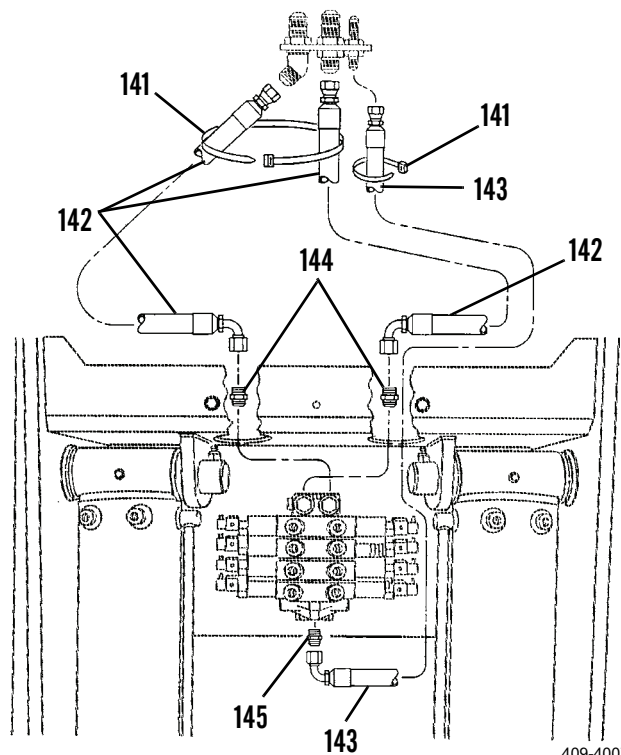
REMOVAL - CONTINUED

44. Remove two tie down straps (134) and protective sleeve (135). Discard tie down straps.
45. Remove boom hydraulic hose assemblies (136 and 137).
46. Remove fittings (138 thru 140).



409-4006

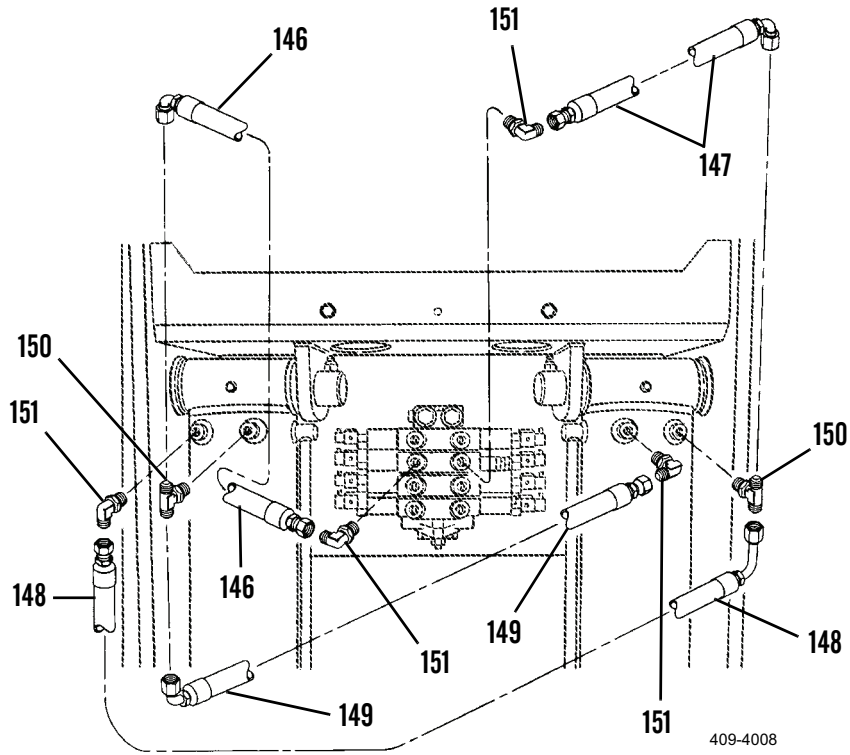
47. Remove two tie down straps (141). Discard tie down straps.
48. Remove attachment control valve hose assemblies (142 and 143) as applicable.
49. Remove fittings (144 and 145), refer to WP 0176 00.



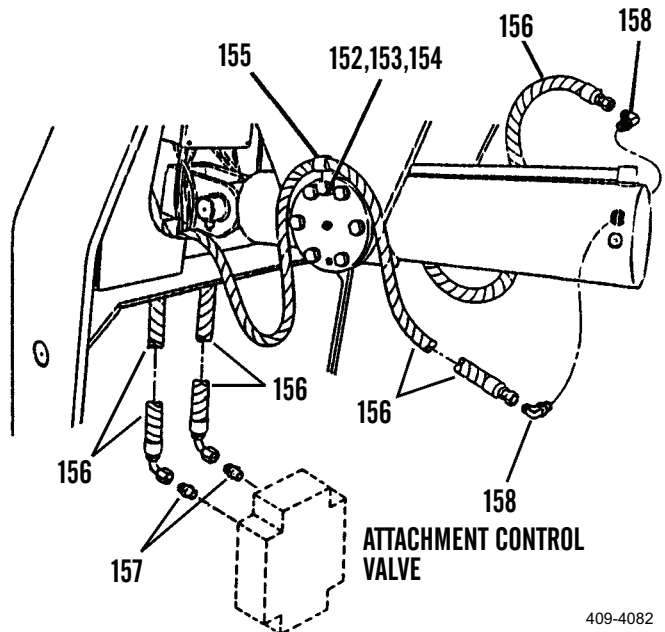
409-4007

REMOVAL - CONTINUED

- 50. Remove fork tilt cylinders hose assemblies (146 thru 149).
- 51. Remove two tee fittings (150) and four elbows (151) (WP 0184 00).

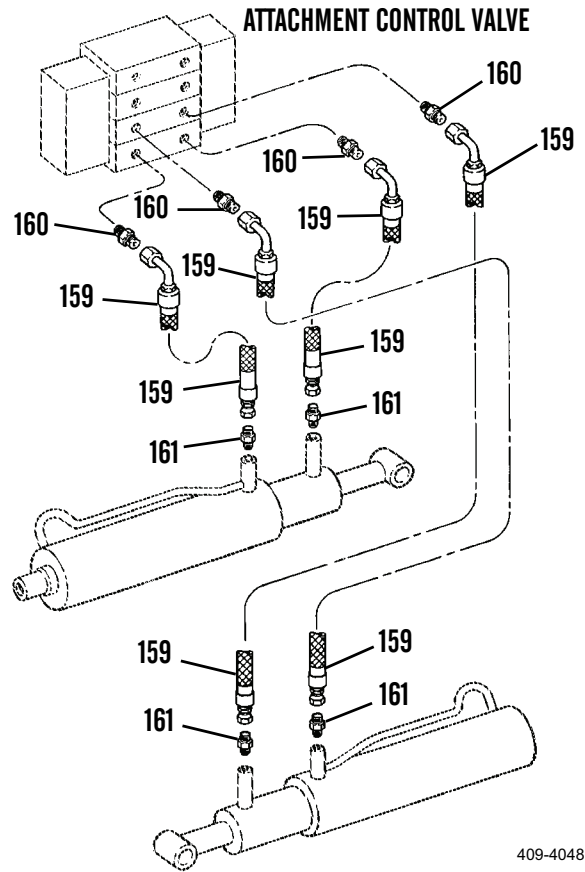


- 52. Remove two capscrews (152), two flatwashers (153), two lockwashers (154) and two hose supports (155). Discard lockwashers.
- 53. Remove two attachment tilt cylinder hose assemblies (156).
- 54. Remove fittings (157 and 158) (WP 0172 00).



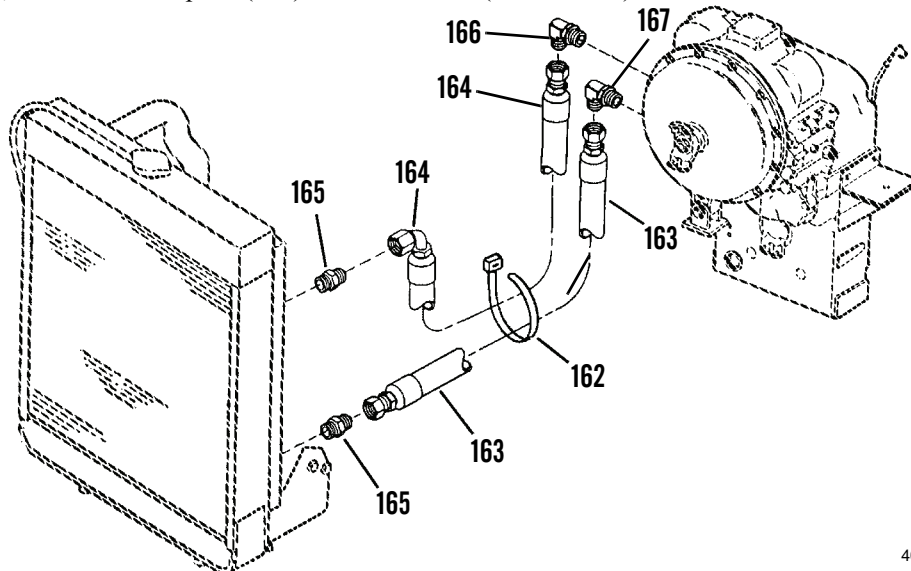
REMOVAL - CONTINUED

- 55. Remove four fork sideshift cylinders hose assemblies (159).
- 56. Remove fittings (160 and 161) (WP 0200 00).



409-4048

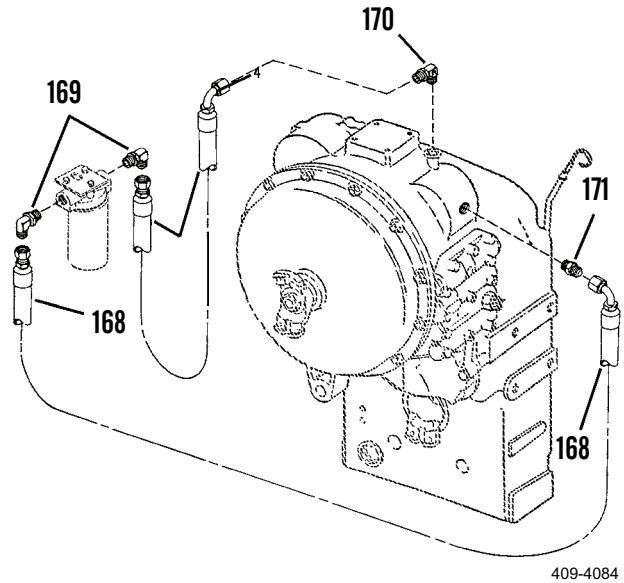
- 57. Remove tie down straps (162). Discard tie down straps.
- 58. Remove two transmission oil cooler hose assemblies (163 and 164).
- 59. If necessary, remove two adapters (165) and two elbows (166 and 167).



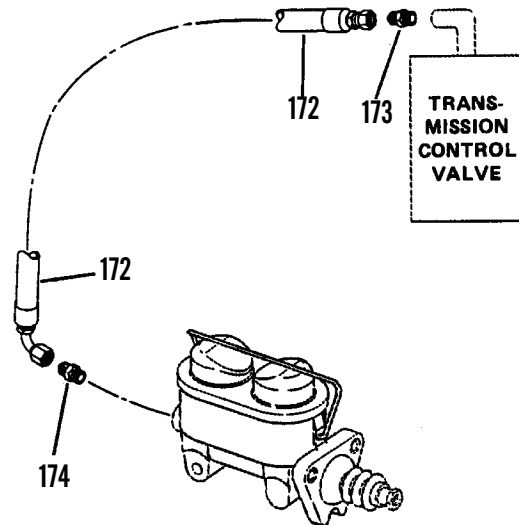
409-4083

REMOVAL - CONTINUED

- 60. Remove two transmission oil filter hose assemblies (168).
- 61. If necessary, remove two elbows (169), elbow (170) and adapter (171).



- 62. Remove hose assembly (172) at transmission control valve.
- 63. Remove hose transmission disconnect assembly (172) at transmission disconnect master cylinder.
- 64. If necessary, remove fittings (173 and 174).



INSPECTION

1. Inspect all fittings for damaged threads and for damaged or otherwise damaged O-ring seals, if so equipped.
2. Inspect hose assemblies for cuts, breaks and for signs of deterioration that could lead to leaks.

INSTALLATION**CAUTION**

If removed, torque elbow and adapter to 55 lb-ft (75 Nm) during installation. Do not overtighten. Failure to follow this instruction could result in damage to transmission hose ports.

NOTE

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on hoses, and components to which they connect, clean and dry. Apply a film of clean hydraulic oil to all O-ring seals on fittings as fittings are installed.

1. Install fittings and hose assemblies (1 thru 174) as applicable.
2. If installing a fitting equipped with an O-ring, first apply clean hydraulic oil to O-ring.
3. If previously drained, refill hydraulic reservoir to proper level (WP 0032 00).
4. Start engine and operate all hydraulic systems in which hose assemblies and/or fittings have been replaced. Check carefully for leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

HYDRAULIC TUBING REPLACEMENT

0196 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Materials/Parts - Continued

Tag, marker (Item 57, WP 0323 00)

Lockwasher (5)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

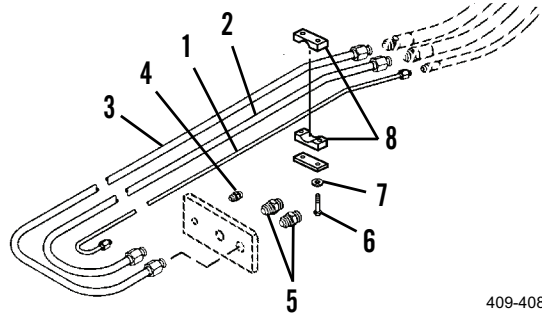
Wipe area clean around all hydraulic connections to be opened during removal. Cap lines and plug openings after removing lines. Contamination of hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

1. Disconnect tubing assemblies (1, 2, and 3) from hose assemblies.
2. Disconnect opposite ends of tubing assemblies (1 thru 3) from bulkhead fittings (4 and 5).
3. Loosen capscrews (6) and lockwashers (7) securing four sets of clamp halves (8) to underside of boom. Discard lockwashers.
4. Remove tubing assemblies (1 thru 3) from vehicle.



409-4086

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. Loosely connect tubing assemblies (1 thru 3) to respective hose assemblies and to bulkhead fittings (4 and 5).
2. Secure tubing assemblies (1 thru 3) using capscrews (6), new lockwashers (7) and clamps (8).
3. Ensure tubing assemblies (1 thru 3) are not binding at either end. Tighten connections securely.
4. Start engine, check for proper operation and leaks (TM 10-3930-660-10).

END OF WORK PACKAGE

HYDRAULIC OIL SAMPLING VALVE REPLACEMENT

0197 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 48, WP 0323 00)

Equipment Condition

Engine off and cool (TM 10-3930-660-10)

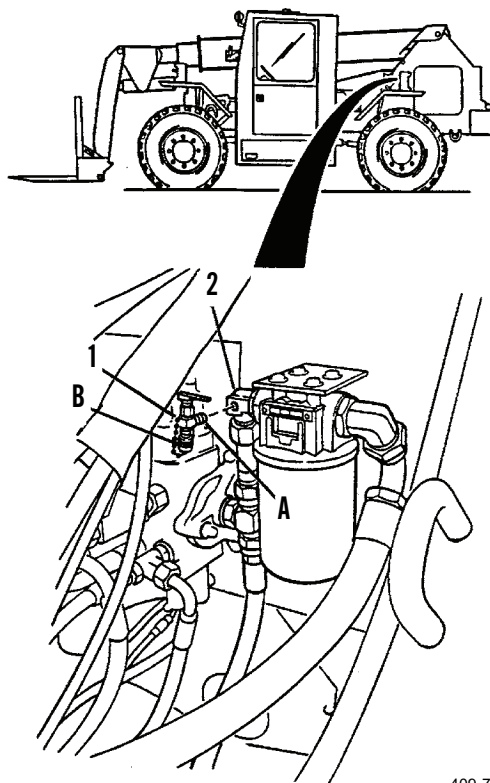
Transmission cover removed (WP 0150 00)

REMOVAL

1. Remove hydraulic oil sampling valve (1) from elbow (2).
2. Plug open hole in elbow (2).

INSTALLATION

1. Apply loctite to threads (A) of sampling valve (1).
2. Remove plug from elbow (2) and install hydraulic oil sampling valve (1) into elbow. Ensure drain end (B) of valve is facing down.
3. Install transmission cover (WP 0150 00).



409-778

END OF WORK PACKAGE

HYDRAULIC OIL STRAINERS MAINTENANCE

0198 00

THIS WORK PACKAGE COVERS

Service, Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Cleaning compound, solvent (Item 10, WP 0323 00)

Materials/Parts - Continued

Gasket (8)

Lockwasher (4)

Equipment Condition

Hydraulic tank drained (WP 0032 00)

**WARNING**

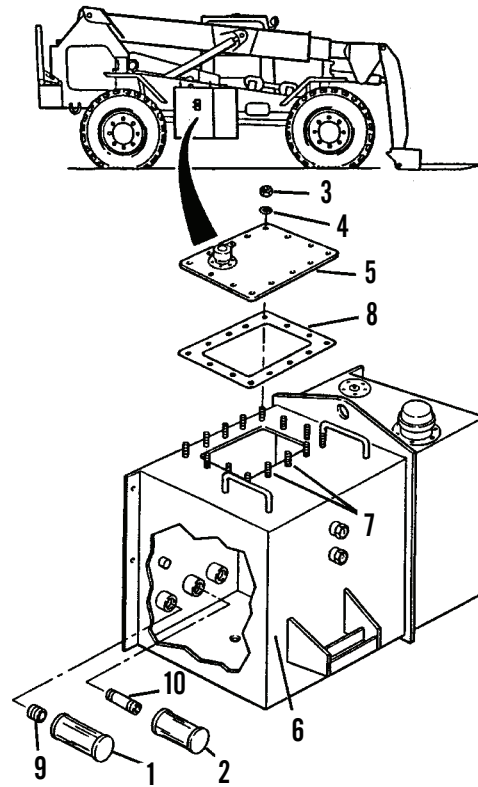
Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. The use of protective gloves and goggles is suggested. Use in well-ventilated areas. Keep away from open flames and other sources of ignition.

SERVICE

1. Remove strainers (1 and 2). See *Removal*.
2. Clean the strainers (1 and 2) using solvent cleaning compound.
3. Install strainers (1 and 2). See *Installation*.

REMOVAL

1. Remove fourteen nuts (3) and fourteen lockwashers (4) that secure access cover (5) to hydraulic tank (6). Discard lockwashers.
2. Lift access cover (5) off of studs (7).
3. Remove and discard gasket (8).
4. If necessary, remove strainers (1 and 2) from nipples (9 and 10) inside tank (6).
5. If necessary, remove nipples (9 and 10) from tank (6).



409-779

INSTALLATION

1. If removed, install nipples (9 and 10) into tank (6).
2. Install strainers (1 and 2) onto nipples (9 and 10).
3. Position new gasket (8) and cover (5) on studs (7).
4. Secure cover (5) with fourteen new lockwashers (4) and fourteen nuts (3).
5. Fill hydraulic tank with hydraulic oil (WP 0032 00).

END OF WORK PACKAGE

HYDRAULIC OIL FILTER REPLACEMENT**0199 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Oil, lubricating (Item 33, WP 0323 00)
 Sealant, Loctite (Item 43, WP 0323 00)
 Sealant, Loctite (Item 48, WP 0323 00)

Materials/Parts - Continued

Tag, marker (Item 57, WP 0323 00)
 Filter element (1)
 Lockwasher (9)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Transmission cover removed (WP 0150 00)
 Hydraulic tank drained (WP 0032 00)

**WARNING**

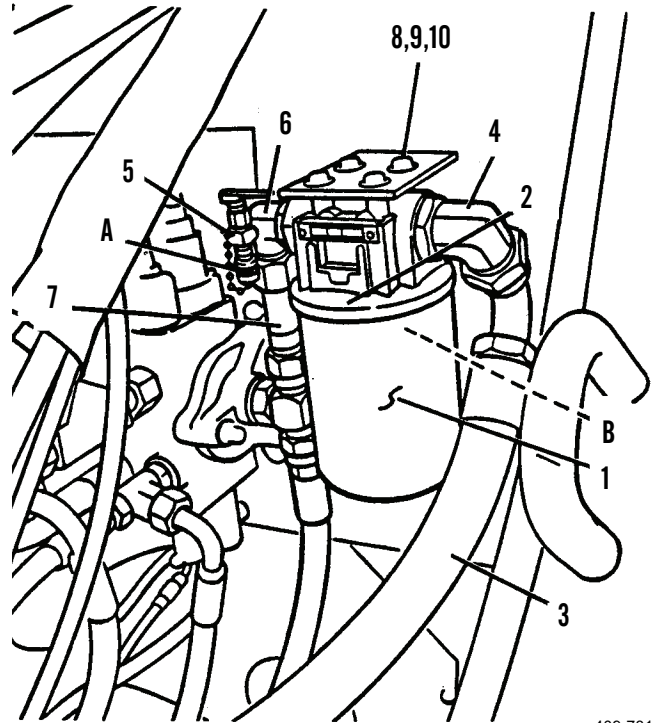
- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure. Use metal caps when specified.

REMOVAL

1. Remove hydraulic filter element (1) from filter base (2). Discard filter element.
2. At hydraulic filter base (2), remove hose (3) and elbow (4) from filter base. Plug hose.
3. Remove sampling valve (5) from elbow (6).
4. Remove elbow (6).
5. Remove four screws (8), lockwashers (9) and flatwashers (10). Discard lockwashers.
6. Remove filter base (2) from the vehicle.



409-781

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry. Apply film of clean hydraulic oil to all seals as they are installed.

NOTE

Apply loctite 242 to threads of screws as installed.

1. Support and position filter base (2) on vehicle. Install four flatwashers (10), four new lockwashers (9) and four screws (8) to secure filter base to vehicle.
2. Install elbow (6).
3. Apply loctite 59241 to threads of sampling valve (5) and install sampling valve into elbow (6). Be sure drain end of valve (A) is facing down.
4. Install elbow (4) and hose (3) to filter base (2).
5. Lubricate the seal (B) on filter element (1) with a thin coat of clean oil.
6. Install new filter element (1) onto base (2).
7. Start and run engine for one minute. Check for leaks at filter assembly and at hydraulic connections (TM 10-3930-660-10).
8. Refill hydraulic tank (WP 0032 00).
9. Install transmission cover (WP 0150 00).

END OF WORK PACKAGE

FORK SIDESHIFT CYLINDERS REPLACEMENT**0200 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Shop equipment, common no. 2 (Item 19, WP 0324 00)

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)

Sealant, Loctite (Item 43, WP 0323 00)

Tag, marker (Item 57, WP 0323 00)

Cotter pin (4 and 12)

Thrust bushing (15)

References

WP 0172 00

Personnel Required

Two

Equipment Condition

Machine parked on level ground (TM 10-3930-660-10)

Parking brake set (TM 10-3930-660-10)

Boom supported in horizontal position (TM 10-3930-660-10)

Fork auto leveler switch and cover removed (WP 0080 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

CAUTION

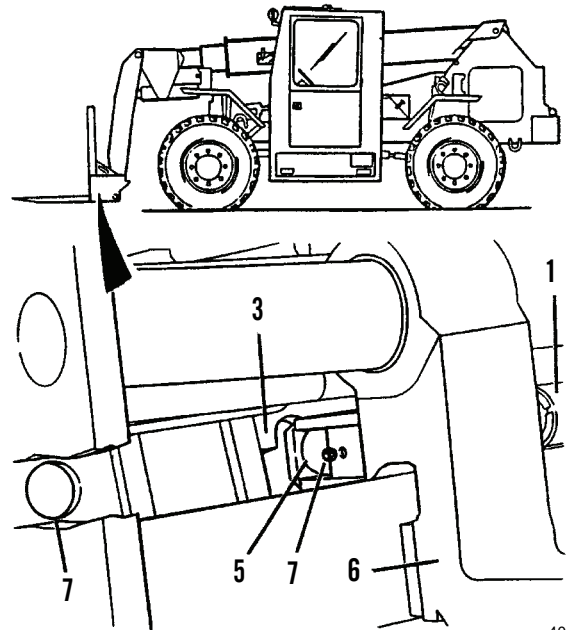
Wipe the area clean around all hydraulic connections to be opened during removal and disassembly. Cap oil lines and plug holes after removing lines. Contamination of the hydraulic system could result in premature failure.

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use container to catch any hydraulic oil that may drain from system.

REMOVAL

1. To remove right fork sideshift cylinder (1), shift left fork (2) to left side of fork carriage (3), (TM 10-3930-660-10).
2. Remove cotter pin (4) from right fork sideshift cylinder (1). Discard cotter pin.
3. With assistance, align pin (5) in right fork (6) with access hole (7) in fork carriage.
4. Use a slide hammer to remove pin (5) through access hole (7).



409-782

NOTE

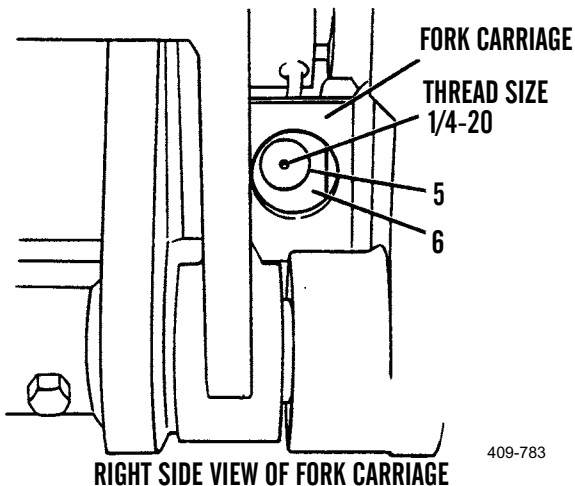
The thread size of hole in end of pin is 1/4-20.

5. Operate controls to shift right fork (6) to left side of fork carriage (3). The right fork will not move, but right fork sideshift cylinder (1) will be fully retracted.

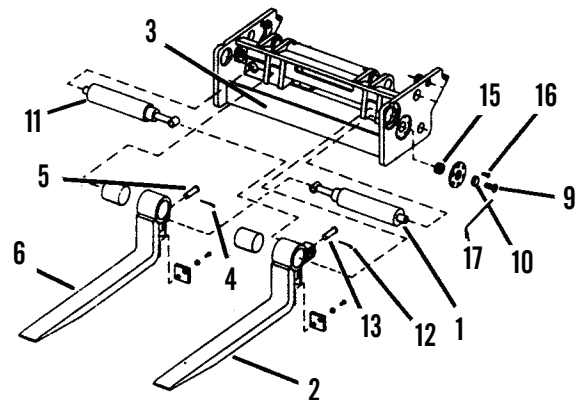
NOTE

Tag hydraulic lines to aid in installation.

6. Disconnect two hydraulic lines (8) from right fork sideshift cylinder (1). Plug and/or cap all hydraulic fittings.
7. Remove socket head screw (9) and retainer (10) from left side of fork carriage (3).
8. Lift right fork sideshift cylinder (1) from fork carriage (3).
9. To remove left fork sideshift cylinder (11) align left fork (2) with left notch in fork carriage (3).
10. Remove cotter pin (12) and pin (13) from left fork sideshift cylinder (11). Discard cotter pin.



409-783



409-784

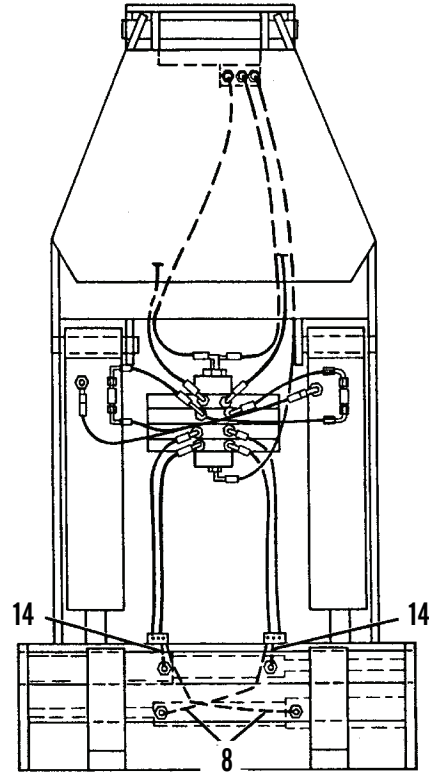
REMOVAL - CONTINUED

11. Operate controls to shift left fork (2) to right side of fork carriage (3). The left fork will not move, but left fork sideshift cylinder (11) will be fully retracted.

NOTE

Tag hydraulic lines to aid in installation.

12. Disconnect two hydraulic lines (14) from left fork sideshift cylinder (11). Plug and/or cap all hydraulic fittings.
13. Remove socket head screw (9) and retainer (10) from right side of fork carriage (3).
14. Remove left fork sideshift cylinder (11) from fork carriage (3).
15. To remove thrust bushings (15), remove six screws (16).
16. Remove thrust bushing retainer (17).
17. Push thrust bushing (15) to inside of fork carriage (3) to remove. Discard thrust bushing.
18. Repeat steps 15 thru 17 for other thrust bushing (15).



409-785

INSTALLATION**NOTE**

Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on valve and hoses clean and dry.

1. If removed, press new thrust bushing (15) into position from inside of fork carriage (3).
2. Install thrust bushing retainer (17).

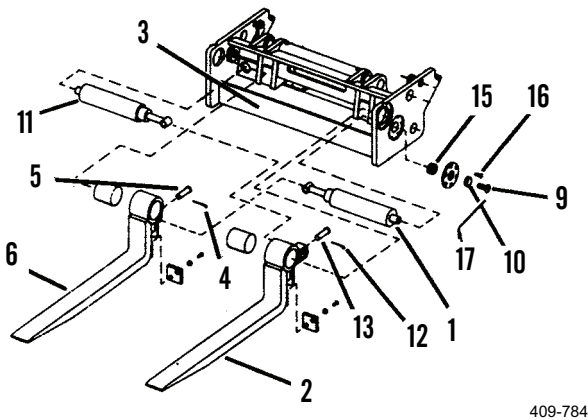
NOTE

Apply loctite to threads of screws as installed.

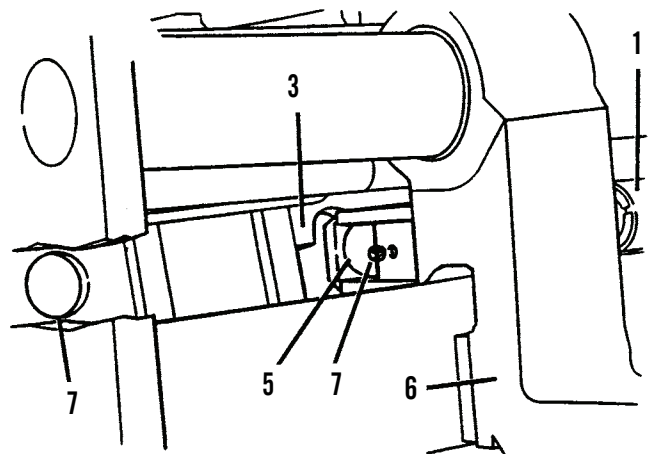
3. Install six screws (16).
4. Repeat steps 1 thru 3 for other new thrust bushing (15).
5. Place left fork sideshift cylinder (11) in fork carriage (3).
6. Apply loctite to threads of socket head screw (9).
7. Install socket head screw (9) and retainer (10) in right side of fork carriage (3). Torque socket head screw to 46 lb-ft (62 Nm).
8. Install two hydraulic lines (14) on left fork sideshift cylinder (11) as tagged.

INSTALLATION - CONTINUED

9. Align left fork (2) with left notch in fork carriage (3).
10. Extend left fork sideshift cylinder (11) until it aligns with left fork (2) (TM 10-3930-660-10).
11. Install pin (13) in left fork sideshift cylinder (11).
12. Install new cotter pin (12) in right side of pin (13).
13. Place right fork sideshift cylinder (1) in fork carriage (3).
14. Apply loctite to threads of socket head screw (9).
15. Install socket head screw (9) and retainer (10) in left side of fork carriage (3). Torque socket head screw to 46 lb-ft (62 Nm).
16. Install two hydraulic lines (8) on right fork sideshift cylinder (1) as tagged.
17. Shift left fork (2) to left side of fork carriage (3).
18. Align pin (5) hole in right fork (6) with access hole (7) in fork carriage (3).
19. Extend right forks sideshift cylinder (1) until it aligns with access hole (7) in fork carriage end pin (5) hole in right fork (6).
20. Install pin (5) in right fork sideshift cylinder (1).
21. Install new cotter pin (4) in left side of pin (5).
22. Install fork auto leveler switch and cover (WP 0080 00).
23. Start engine (TM 10-3930-660-10).
24. Operate fork sideshift function and sideshift forks five times. Check for proper operation and leaks (TM 10-3930-660-10).
25. Stop engine and relieve hydraulic pressure by operating frame tilt controls (TM 10-3930-660-10).
26. If necessary, bleed hydraulic pumps (WP 0172 00).



409-784



409-787

END OF WORK PACKAGE

BOOM HOIST CYLINDERS REPLACEMENT

0201 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)
 Shop equipment, common no. 1 (Item 20, WP 0324 00)
 Lifting device, 10,000 lb capacity
 Lifting device, 200 lb capacity

Materials/Parts

Cap and plug set (Item 8, WP 0323 00)
 Compound, antiseize (Item 11, WP 0323 00)
 Tag, marker (Item 57, WP 0323 00)
 Locknut (3 and 8)

Materials/Parts - Continued

Wood block, 1 x 4
 Wood board, 2 x 4

Personnel Required

Two

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)
 Parking brake set (TM 10-3930-660-10)
 Transmission cover removed (WP 0150 00)

**WARNING**

- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 3,000 psi (20685 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.
- If inner or intermediate sections of boom have been removed, cap three hydraulic lines at underside of outer boom with metal caps. If MLRS attachment has been removed, cap three hydraulic hoses at front of boom with metal caps. Failure to do so may result in personal injury caused by hydraulic oil spraying out of open hoses or lines when engine is started.

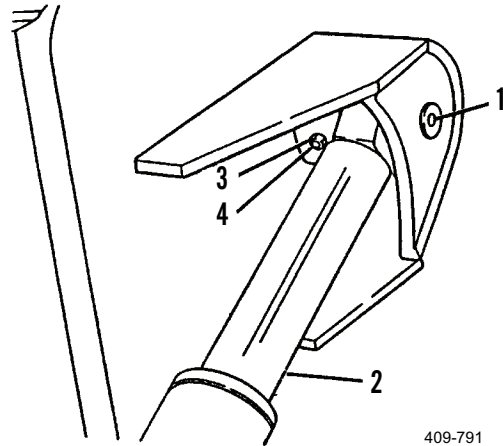
REMOVAL**CAUTION**

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

NOTE

If more than one hydraulic line is to be removed, identify lines to ensure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.

1. Start engine (TM 10-3930-660-10).
2. Raise boom so boom hoist cylinder upper pivot pins (1) are above cab.



3. Stop engine (TM 10-3930-660-10).

**WARNING**

- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death.
- Be sure boom is supported with lifting device before upper pivot pins are removed. Failure to support boom during removal of upper pivot pins could result in personal injury or death.

NOTE

Combined weight of boom and MLRS attachment is 6,300 lb (2858 kg). Weight of boom is approximately 4,100 lb (1860 kg).

4. Support boom with lifting device.
5. Place wood block under cylinder and behind cab on vehicle deck to support cylinder (2) when it is lowered.
6. Place wood block under rod eye of cylinder (2) to prevent accidental damage to cylinder rod eye during removal.
7. Use lifting device to support cylinder (2) to be removed.
8. Remove locknut (3), screw (4) and pivot pin (1) using pin puller. Discard locknut.

NOTE

- If removing one cylinder, have assistant signal operator when cylinder is fully retracted.
 - If removing both cylinders at the same time, note that one cylinder will fully retract before other cylinder begins to retract. Have assistant signal operator when both cylinders are fully retracted.
9. Start engine and run at full throttle (TM 10-3930-660-10).

REMOVAL - CONTINUED

10. Using boom hoist joystick control valve, fully retract cylinder (2).
11. Stop engine (TM 10-3930-660-10).

**WARNING**

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

NOTE

Weight of each boom hoist cylinder is approximately 182 lb (83 kg).

12. Carefully lower cylinder (2), using lifting device, until cylinder (2) is resting on board placed on main deck.

CAUTION

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

NOTE

If more than one hydraulic line is to be removed, identify lines to assure proper installation. Use suitable container to catch any hydraulic oil that may drain from system.

13. Disconnect hydraulic lines (5 and 6) from cylinder ports.
14. To remove boom hoist cylinder lower pivot pin (7), remove locknut (8) and screw (9). Discard locknut.
15. Remove lower pivot pin (7) using pin puller.
16. Move lifting device to cylinder balance point and carefully lift cylinder (2) off vehicle.

INSTALLATION**NOTE**

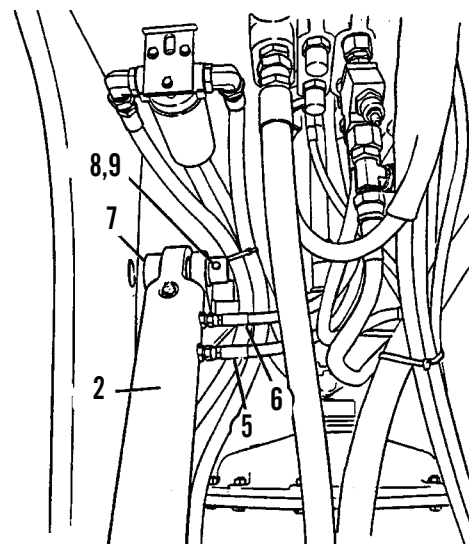
Remove caps and plugs as hoses are installed. Wipe all sealing surfaces on cylinder and hoses clean and dry.

1. Carefully lower cylinder (2) onto board placed on main deck using lifting device.

NOTE

Apply antiseize compound to lower pivot pin as installed.

2. Align cylinder base lower mounting holes and install lower pivot pin (7), screw (9) and new locknut (8).
3. Connect hydraulic lines (5 and 6) as tagged during cylinder (2) removal.
4. Carefully raise cylinder (2) using lifting device until rod eye of cylinder (2) is aimed at pivot pin mounting hole on boom.



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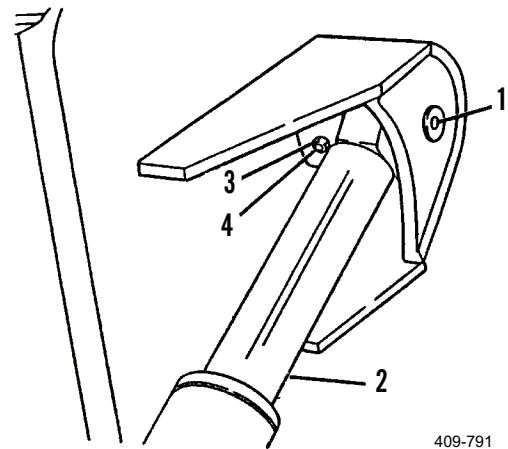
INSTALLATION - CONTINUED**NOTE**

- Have assistant signal operator when rod eye of cylinder is aligned with boom pivot pin hole.
 - If installing both cylinders at the same time, note that in step 5 one cylinder will extend and the other will remain stationary.
 - Cylinder that has extended must be aligned and then secured to boom with pivot pin.
 - When cylinder that extended is secured to boom, other cylinder will respond to controls, and can be extended as well.
5. Start engine and run at full throttle (TM 10-3930-660-10).
 6. Extend cylinder rod until upper pivot pin (1) can be installed. Reposition cylinder (2), as necessary, using lifting device.
 7. Stop engine (TM 10-3930-660-10).

NOTE

Apply antiseize compound to upper pivot pin as installed.

8. Install upper pivot pin (1), screw (4) and new locknut (3).
9. Disconnect lifting device from cylinder (2) and boom. Remove board from across vehicle deck.
10. To bleed air from hydraulic system, start engine (TM 10-3930-660-10).
11. Operate boom hoist functions. Raise and lower boom five times (TM 10-3930-660-10).
12. Stop engine and relieve hydraulic pressure by operating boom hoist functions of hydraulic joystick (TM 10-3930-660-10).
13. Install transmission cover (WP 0150 00).



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END OF WORK PACKAGE

HYDRAULIC OIL SIGHT GAUGES REPLACEMENT**0202 00****THIS WORK PACKAGE COVERS**

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

Sealant, Loctite (Item 48, WP 0323 00)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

Hydraulic tank drained below level of lower sight gauge (WP 0032 00)

NOTE

To prevent spillage of hydraulic oil, the hydraulic tank must be partially drained until the hydraulic oil level is lower than the sight gauge being replaced (WP 0032 00).

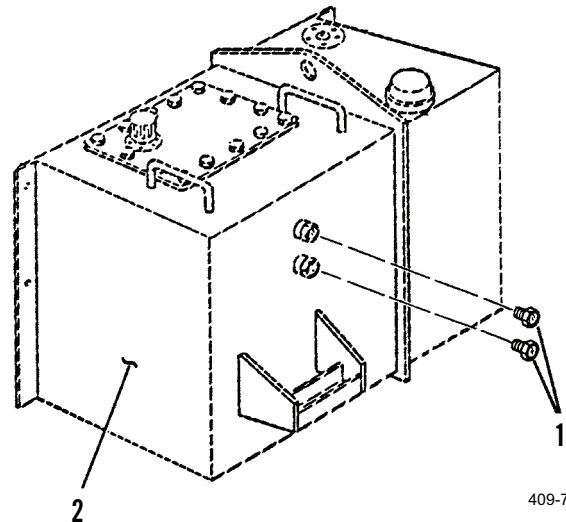
REMOVAL

Remove sight gauges (1) from side of hydraulic tank (2).

INSTALLATION**NOTE**

Apply loctite to sight gauges as installed.

1. Install two sight gauges (1) into side of hydraulic tank (2).
2. Fill hydraulic tank (2) (WP 0032 00).

**END OF WORK PACKAGE**

AIR CLEANER RESTRICTION INDICATOR REPLACEMENT

0203 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP**Tools and Special Tools**

Tool kit, general mechanic's (Item 39, WP 0324 00)

Materials/Parts

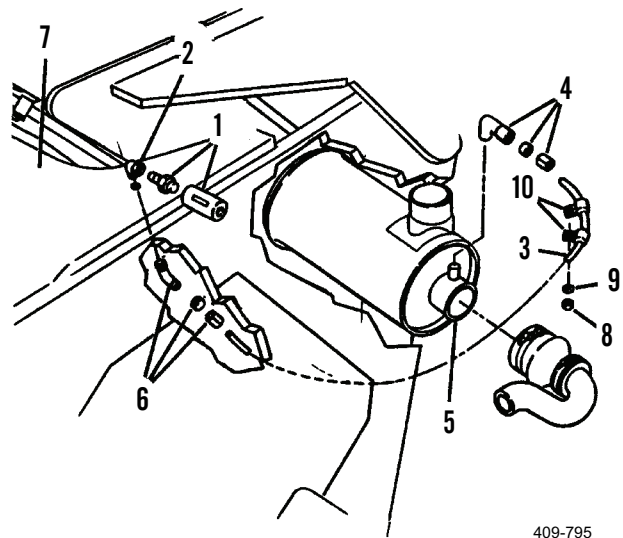
Lockwasher (9)

Equipment Condition

Vehicle parked on level ground (TM 10-3930-660-10)

REMOVAL

1. Remove air cleaner restriction indicator (1) from elbow (2).
2. Disconnect tube (3) from elbow (4) at air cleaner (5).
3. Disconnect tube (3) from elbow (6) on frame (7).
4. Remove two nuts (8) and two lockwashers (9) from two clamps (10). Discard lockwashers.
5. Remove tube (3) from clamps (10).
6. Remove elbow (2) and elbow (6) from vehicle frame (7).
7. Remove elbow (4) from air cleaner (5).



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INSTALLATION

1. Install elbow (4) into air cleaner (5).
2. Install elbow (2) and elbow (6) into frame (7).
3. Screw tube (3) into elbow (4) at air cleaner (5).
4. Connect tube (3) into elbow (6) on vehicle frame (7).
5. Position tube (3) in clamps (10) and secure to frame (7) with two new lockwashers (9) and two nuts (8).
6. Install air cleaner restriction indicator (1) into elbow (2).

END OF WORK PACKAGE

INTRODUCTION

NOTE

- Refer to this work package if the 6K Forklift is to be stored for two weeks or less.
 - Refer to WP 0205 00 if the 6K Forklift is to be stored for longer than two weeks.
1. Thoroughly clean the vehicle.
 2. Perform the Operator Preventive Maintenance Checks and Services (PMCS) contained in TM 10-3930-660-10.
 3. Perform the Field Maintenance Preventive Maintenance Checks and Services (PMCS) contained WP 0012 00.
 4. Perform the lubrication as described in TM 10-3930-660-10.
 5. Schedule the next preventive maintenance checks and services (PMCS) on DD Form 314.
 6. Store the vehicle indoors in a dry, protected area with the boom lowered and retracted, and with forks resting on the ground. Cycle the controls after engine shutdown to relieve any pressure in the hydraulic circuits.
 7. When moderate temperatures are expected, the batteries may be left in place. If extreme cold is expected, remove the batteries and store them in a protected area.
 8. Use an accurate hydrometer to check engine coolant. Make sure the coolant has the proper mixture for expected temperatures. Refer to Table 2-1 in WP 0205 00.
 9. Seal all openings in the engine including the air intake, exhaust outlet and crankcase breather tube.
 10. Fill the fuel tank completely to prevent condensation from forming. Drain water and sediment from the fuel/water separator and primary fuel filter element.
 11. Ensure that all the cab windows and doors are closed and latched.

Table 1. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials.

Lowest Expected Ambient Temperature °F (°C)	Pints (Liters) of Inhibited Glycol Per Gal. (Liters) of Coolant	Compound, Antifreeze Arctic	Ethylene Coolant Solution Specific Gravity at 68°F (20°C)
+20 (-7)	1.5 (0.71)	Issued full strength and ready mixed for 0 to -65°F (-18 to -54°C) temperatures for both initial installation and replenishment of losses. DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE.	1.022
+10 (-12)	2.0 (0.95)		1.036
0 (-18)	2.75 (1.30)		1.047
-10 (-23)	3.25 (1.54)		1.055
-20 (-29)	3.50 (1.66)		1.062
-30 (-34)	4.0 (1.90)		1.073
-40 (-40)	4.25 (2.01)		
-50 (-46)	Arctic antifreeze		
-60 (-51)	preferred		
-75 (-60)			

12. Ensure that the cab skylight guard is positioned over the cab skylight and latched.

PREPARATION FOR SHORT-TERM STORAGE - CONTINUED

0204 00

INTRODUCTION - CONTINUED

13. Ensure that the engine access doors are closed and latched.
14. Fill in DD Form 1397 completely and attach to a conspicuous part of the vehicle.

END OF WORK PACKAGE

INTRODUCTION

1. Perform the Operator Preventive Maintenance Checks and Services (PMCS) contained in TM 10-3930-660-10.
2. Perform the Field Maintenance Preventive Maintenance Checks and Services (PMCS) contained in WP 0012 00.
3. Perform the lubrication as described in TM 10-3930-660-10.
4. Thoroughly clean the vehicle. Use touch-up paint where necessary to prevent rust.
5. Coat all exposed areas of the cylinder rods with grease to protect polished surfaces.

NOTE

If the vehicle has accumulated very low miles since the last scheduled lubrication service, do not drain and refill the transmission or axles (skip step 6).

6. Drain and refill the transmission and axles with new oil.
7. Schedule the next Preventive Maintenance Checks and Services (PMCS) on DD Form 314.
8. Store the vehicle indoors in a dry, protected area with the boom lowered and retracted and with the forks resting on the ground. Cycle controls after engine shutdown to relieve any pressure in the hydraulic circuits.
9. Completely drain the crankcase and refill with recommended oil.
10. Completely drain the fuel tank. Mix a solution of diesel fuel and flushing oil per instructions supplied with the flushing oil. Pour the solution into the fuel tank. Run the engine for at least 10 minutes on this solution.
11. Before stopping the engine, treat upper cylinders by spraying recommended engine oil into the air intake for about two minutes. Then open the throttle momentarily, shut the engine off and continue spraying oil into the air intake as the engine comes to a stop.
12. Use an accurate hydrometer to check engine coolant. Make sure the coolant has the proper mixture for expected temperatures. Refer to Table 2-1 in WP 0204 00.
13. Seal all openings in the engine including the air intake, exhaust outlet and crankcase breather tube.
14. Lift the fan belt tensioner and remove the engine drive belt from around the alternator pulley.
15. Remove and thoroughly clean the batteries and ensure that they are fully charged. Store the batteries in a cool, dry place at above freezing temperatures. Periodically charge the batteries during storage.
16. Completely drain the fuel tank.
17. Ensure that all cab windows and doors are closed and latched.
18. Ensure that the engine access doors are closed and latched.
19. Ensure that the cab skylight guard is positioned over the cab skylight and latched.
20. Place blocking under the axles to remove weight from the tires.
21. Fill in DD Form 1397 completely and attach to a conspicuous part of the vehicle.

END OF WORK PACKAGE

INTRODUCTION

1. Inflate the tires to the recommended pressures and remove blocking from under axles.
2. Fill the fuel tank with fuel. Check the oil level in the crankcase, axles, transmission, hydraulic reservoir and wheel ends.
3. Check the radiator coolant level.
4. Install fully charged batteries.
5. Lift the fan belt tensioner and position the engine drive belt around the alternator pulley. Ensure that the belt is properly positioned around all other pulleys.
6. Remove the seals from all engine openings, including the air intake, exhaust outlet and crankcase breather tube.
7. Crank the engine with the auxiliary fuel shut-off switch in the OFF position until the oil pressure gauge registers oil pressure. Place the auxiliary fuel shut-off switch in the ON position.
8. Bleed the fuel lines and start the engine. Allow the engine to idle for a few minutes and ensure that it is receiving lubrication.
9. Drive the vehicle without load and check the engine, transmission, brakes and steering for proper operation. Check all hydraulic functions and electrical accessories for proper operation.

END OF WORK PACKAGE

INTRODUCTION

1. Remove the seals from all engine openings, including the air intake, exhaust outlet and crankcase breather tube.
2. If removed, install batteries.
3. Fill the fuel tank with fuel. Check the oil level in the crankcase, axles, transmission, hydraulic reservoir and wheel ends.
4. Check the radiator coolant level.
5. Crank the engine with the auxiliary fuel shut-off switch in the OFF position, until the oil pressure gauge registers oil pressure. Place the auxiliary fuel shut-off switch in the ON position.
6. Start the engine. Allow the engine to idle for a few minutes and ensure that it is receiving lubrication.
7. Drive the vehicle without a load and check the engine, transmission, brakes and steering for proper operation. Check all hydraulic functions and electrical accessories for proper operation.

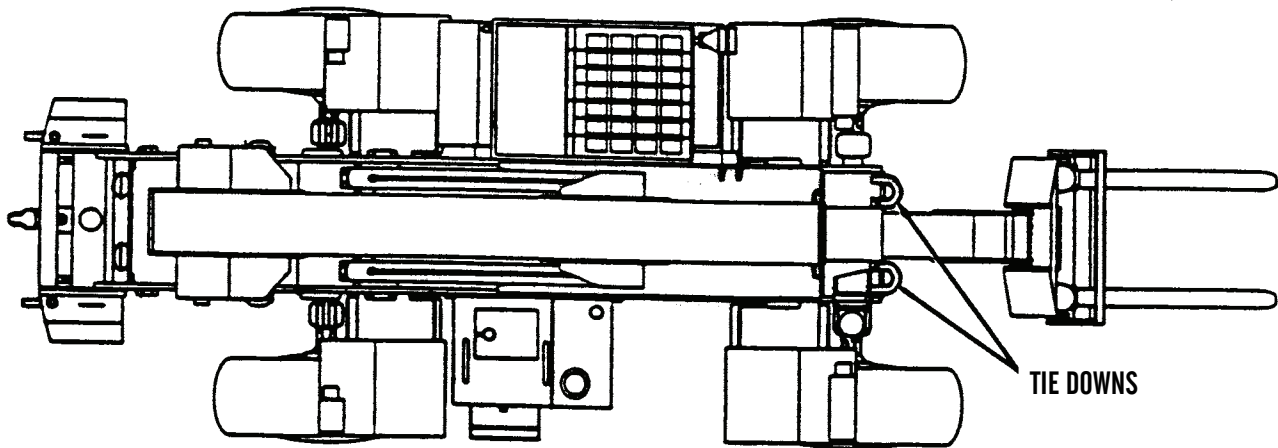
END OF WORK PACKAGE

INTRODUCTION

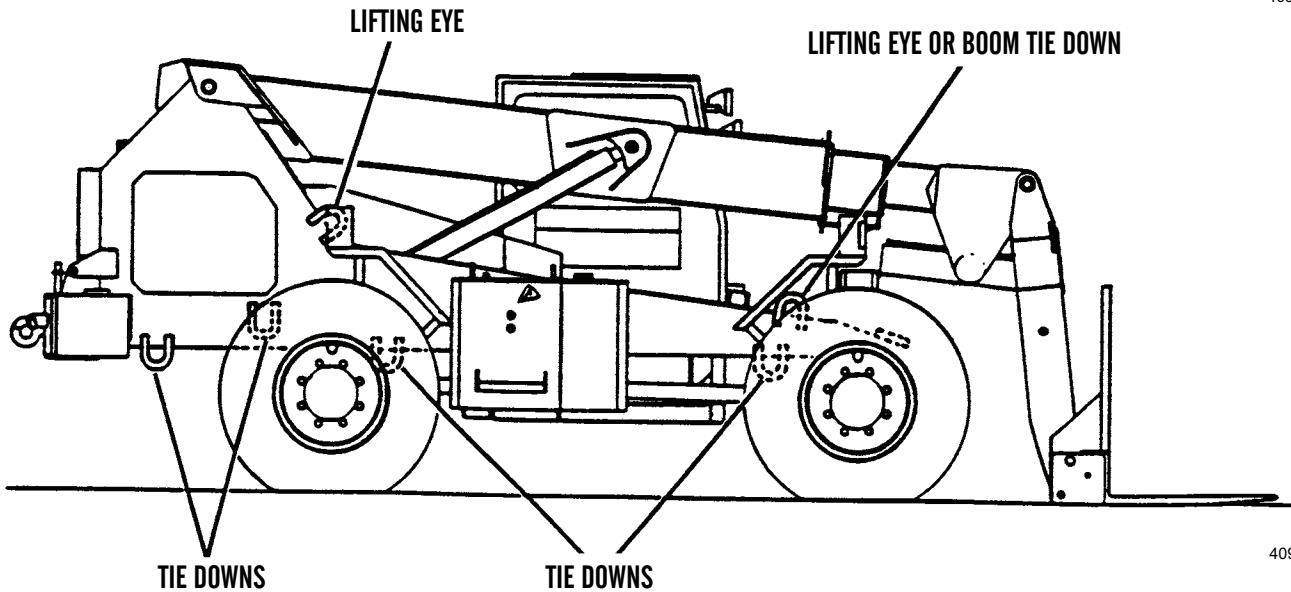
1. Block the trailer or rail car wheels before loading. Carefully back the vehicle on the trailer or rail car.
2. Move the travel select lever to neutral and set the parking brake.
3. Block the wheels and secure the vehicle with tie-downs. Use as many of the tie down locations as possible. Refer to figure below.
4. Seal all openings in the engine including the air intake, exhaust outlet and crankcase breather tube.
5. Use an accurate hydrometer to check engine coolant. Make sure the coolant has the proper mixture for expected temperatures. Refer to Table 2-1 in WP 0204 00.
6. Check state and local laws governing weight, width and length of load.

WARNING

Check travel route for overpass clearances. Ensure that there will be adequate clearance.



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END OF WORK PACKAGE

CHAPTER 7
SUPPORTING INFORMATION

SCOPE

This work package lists forms, field manuals, technical manuals and other publications that are referenced in this manual and which apply to unit maintenance, intermediate direct support and general support maintenance of the 6K Forklift.

PUBLICATION INDEXES

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

- Consolidated Army Publications and Forms Index DA PAM 25-30
- Functional User’s Manual for The Army Maintenance Management System DA PAM 738-751

FORMS

Refer to DA PAM 738-751, Functional User’s Manual for *The Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

- Equipment Inspection and Maintenance Worksheet DA Form 2404, DA Form 5988-E
- Maintenance Request DA Form 2407
- Organizational Control Record for Equipment DA Form 2401
- Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines DD Form 1397
- Product Quality Deficiency Report SF Form 368
- Recommended Changes to Publications and Blank Forms DA Form 2028

FIELD MANUALS

- Basic Cold Weather Manual FM 31-70
- Camouflage, Concealment and Decoys FM 20-3
- Desert Operations FM 90-3
- First Aid FM 4-25.11
- Metal Body Repair and Related Operations TC 9-510
- Mountain Operations FM 3-97.6
- Northern Operations FM 31-71

TECHNICAL BULLETINS

- Equipment Improvement Report and Maintenance Digest (US Army Tank-Automotive Command)
 Tank-Automotive Equipment TB 430001-39 series
- Use of Anti-Freeze Solutions and Cleaning Compounds in Engine Cooling System TB 750-651

TECHNICAL MANUALS

- Operator’s Manual for All Terrain Lifter Army System (ATLAS) Clean Burn Diesel
 10,000 lb (4536 kg) Capacity Model Skytrak 10000M TM 10-3930-673-10
- Maintenance Manual for All Terrain Lifter Army System (ATLAS) Clean
 Burn Diesel 10,000 lb (4536 kg) Capacity Model Skytrak 10000M TM 10-3930-673-20
- Unit Maintenance, Intermediate Direct Support and Intermediate General Support Maintenance
 Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special
 Tools List) for All Terrain Lifter Army System (ATLAS) Clean Burn Diesel 1,0000 lb (4536 kg)
 Capacity Model Skytrak 10000M TM 10-3930-673-24P
- Inspection Care and Maintenance of Antifriction Bearings TM 9-214
- Operator’s Circular Welding Theory and Application TC 9-237

TECHNICAL MANUALS - CONTINUED

Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals TM 9-247

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Simplified Test Equipment for Internal Combustion Engines (STE/ICE-R) (NSN 4910-01-124-2554) TM 9-4910-571-12&P

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

Operator's, Unit and Direct Support Maintenance Manual for Tool Outfit, Hydraulic Systems Test and Repair Unit (HSTRU) (NSN 4940-01-036-5784) TM 9-4940-468-13

SPECIFICATIONS AND STANDARDS

Dry Cleaning Solvent Fed Spec P-D-680

Methyl Ethyl Ketone, Technical TT-M-261

Human Engineering Design Criteria for Military Systems, Equipment and Facilities MIL-STD-1472

OTHER PUBLICATIONS

Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items) CTA 50-970

Army Medical Department Expendable/Durable Items CTA 8-100

END OF WORK PACKAGE

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 0322 00) in column (4) as:

Field - includes subcolumns:

- C - Operator/Crew
- O - Unit
- D - Direct Support

Sustainment - includes subcolumns:

- H - General Support
- D - Depot

3. The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.
4. The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
9. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

MAINTENANCE FUNCTIONS - CONTINUED**NOTE**

The following definitions are applicable to the “repair” maintenance function:

- Services - Inspect, test, service, adjust, align, calibrate, and/or replace.
 - Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
 - Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item and to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
 - Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.
10. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
11. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1

1. **Column (1) - Group Number.** Column (1) lists Group numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).
2. **Column (2) - Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
3. **Column (3) - Maintenance Function.** Column (3) lists the functions to be performed on the item listed in Column (2). (For a detailed explanation of these functions refer to “Maintenance Functions” outlined above).
4. **Column (4) - Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:

- C - Operator/Crew Maintenance
- O - Unit Maintenance
- D - Direct Support Maintenance

Sustainment:

- H - General Support Maintenance
- D - Depot Maintenance

MAINTENANCE FUNCTIONS - 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, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.
6. **Column (6) - Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries (Table 3).

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, TABLE 2

1. **Column (1) - Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.
2. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
3. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.
4. **Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.
5. **Column (5) - Tool Number.** The manufacturer's part number, model number, or type number.

EXPLANATION OF COLUMNS IN THE REMARKS, TABLE 3

1. **Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC)

0322 00

Table 1. MAC for the 6K Forklift.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
01	ENGINE							A	
0100	Engine Assembly	Inspect	0.1						
		Test	0.1	1.5			19,22,36	C,I	
		Service		1.0			19,36	B	
		Replace			7.0		20,36		
		Repair			10.0				
		Overhaul					40.0	12,20,31, 37,16	
	Engine Mounts	Inspect		0.1					
		Replace			2.0			20,36	
	Lifting Brackets	Replace			1.0			20,36,37,16	
0101	Crankcase, Cylinder Block, and Head Assembly								
	Cylinder Block	Replace				30.0		1	
		Repair				8.0		5,6	
	Cylinder Head Assembly with Valves	Adjust		2.0				19,36	
		Replace			2.0			20,36	
		Repair				8.0		37,39,40,41	
0102	Crankshaft:								
	Crankshaft	Replace				8.0		1	
		Repair					8.0	20,37	
	Crankshaft Main Bearings	Replace				8.0		20,37	
	Oil Seals	Replace				4.0		17,20,36,16	
	Vibration Damper	Replace				4.0		19,36	
0103	Flywheel Assembly:								
	Flywheel	Replace			4.0			20,32,36	
	Housing Flywheel and Cover	Replace			4.0			1,2,9,20,36	
0104	Pistons, Connecting Rods:								
	Pistons, Piston Pins and Rings	Replace				10.0		20,37	
	Connecting Rods and Bearings	Replace				10.0		20,37	

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
01	ENGINE - Continued							A	
0105	Valves, Camshaft and Timing System:								
	Rocker Lever Covers	Replace		1.0				18,36	
	Rocker Lever Assembly	Replace			4.0			20,36	
		Repair			2.0			20,37	
	Tappet, Valve	Replace			4.0			20,36	
	Gear and Bearing	Replace				24.0		20,36	
	Front Housing and Cover	Replace				8.0		3,4,20,36	
	Push Rod Cover	Replace			1.0			36	
0106	Engine Lubrication System:								
	Oil Pan	Inspect	0.1						
		Replace			4.0			19,36	
	Oil Pump Inlet Tube	Replace			1.0			20,36	
	Oil Pump	Replace			1.0			20,36	
	Oil Filter	Replace		0.2				19,36	
	Oil Filter Base	Replace			0.5			20,36	
	Oil Level Gage	Replace		0.1				36	
	Oil Sampling Valve	Service	0.1						
		Replace		0.1				36	
	Oil Cooler	Replace			1.0			20,36	
0108	Manifolds								
	Exhaust Manifold	Replace		1.0				19,36	
	Intake Manifold Cover	Replace		1.0				36	
03	FUEL SYSTEM								
0301	Fuel Injector								
	Injector, Nozzle	Test			0.5			20,36,37	
		Replace			1.0			20,36	
0302	Fuel Pump								
	Fuel Injection Pump	Test			0.5			21,31,36	
		Adjust			2.0			36	
		Replace			4.0			20,36	
		Overhaul					8.0	20,21,37	
								G	

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
03	FUEL SYSTEM - Continued								
	Fuel Shutoff Valve	Replace			0.5			36	
		Testing			0.2			19,36	
	Fuel Transfer Pump	Test		0.5				22,36	
		Replace		1.0				18,36	
0304	Air Cleaner								
	Air Cleaner Assembly	Replace		0.7				36	
		Repair		1.0				18,36	
	Air Cleaner Elements	Service	0.2	0.2				36	
		Replace		0.2				18,36	
	Air Inlet Cap	Replace		0.2				36	
	Air Inlet Tubing	Replace		0.5				18,36	
0305	Turbocharger								
	Turbocharger Assembly	Replace		2.0				19,36	
		Repair				4.0		20,37	
	Turbocharger Air Lines	Replace		1.0				36	
	Turbocharger Oil Line	Replace		0.2				18,36	
0306	Tanks, Lines and Fittings								
	Fuel/Hydraulic Tank	Inspect	0.1						
		Service	0.2	1.5				19,36	
		Replace			2.0			36	
		Repair			2.0			34,37	
	Fuel Strainer	Inspect	0.1						
		Service		0.5				36	
		Replace		0.5				36	
	Fuel Lines Fittings and Manifold	Inspect	0.1						
		Replace		1.0				18,36	
	Water Separator Assembly	Service	0.1						
		Replace		0.5				36	
0309	Fuel Filter and Head Assemblies	Service		0.5				36	
		Replace		0.5				19,36	
0311	Engine Starting Aids								
	Ether Start Kit	Replace		0.7				36	
		Repair		1.0				36	

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
03	FUEL SYSTEM - Continued								
	Ether Cartridge	Replace		0.2				36	
	Thermostat, Ether Start	Test		1.0				18,36	
		Replace		1.0				36	
	Bracket, Mounting	Replace		0.3				36	
0312	Accelerator Controls								
	Accelerator Cable	Adjust		0.5				36	
		Replace		2.0				36	
	Accelerator Pedal and Linkage	Inspect	0.1						
		Replace		2.0				36	
		Repair		1.0				36	
04	EXHAUST SYSTEM							36	
	Muffler	Replace		0.7				36	
	Tail Pipe	Replace		0.5				36	
	Exhaust Pipe	Replace		0.3				36	
05	COOLING SYSTEM								
0501	Radiator								
	Radiator Assembly	Inspect	0.1						
		Test				0.5		36	
		Service		0.5				36	
		Replace		2.0				36	
		Repair				2.0		20	
	Coolant Overflow Tank	Replace		0.5				36	
0503	Water Manifold, Headers, Thermostats, Housing Gasket								
	Thermostat	Replace		0.5				18,36	
	Housing	Replace		1.0				36	
	Radiator Hoses	Inspect	0.1						
		Replace		0.5				36	
	Water Inlet	Replace		0.5				18,36	
0504	Water Pump	Replace		2.0				18,36	

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
05	COOLING SYSTEM - Continued								
0505	Fan Assembly								
	Fan Blade and Spacer	Inspect Replace	0.1	1.5				36	
	Fan Guard	Inspect Replace	0.1	1.0				36	
	Drive Belt	Inspect Replace	0.1	1.0				36 18,36	
06	ELECTRICAL SYSTEM								
0601	Alternator								
	Alternator and Alternator Connections	Replace Repair		0.4		4.0		18,36 37	
	Pulley	Replace		0.5				36	
0603	Starter								
	Starting Motor and Switch	Replace Repair		0.4		4.0		18,36 36,37	
	Neutral Safety Switch	Inspect Replace		0.2 0.5				36	
0607	Instrument Panel								
	Instrument Panel	Replace		4.0				36	
	Gauges, Switches, Lights	Inspect Replace	0.1	0.5				36	
	Hour Meter	Replace		0.5				36	
	Circuit Breakers	Replace		0.2				36	
	Turn Signal Flasher	Replace		0.5				36	
	Relays	Replace		0.5				36	
0608	Miscellaneous Electrical Components								
	Blackout/Service Light Switch	Inspect Replace	0.1	0.5				36	
	Temperature and Pressure Switches	Test Replace		0.5 0.2				36 36	

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
06	ELECTRICAL SYSTEM - Continued								
	Turn Signal Lights	Inspect	0.1						
		Replace		0.5			36		
0610	Sending Units and Warning Switches	Repair		0.5				36	
		Oil Pressure Sender	Test		0.5			19,36	
			Replace		0.1			36	
0611	Water Temperature Sender	Replace		0.1				36	
		Transmission Temperature Sender	Replace		0.1			36	
		Fuel Level Sender	Test		0.5			19,36	
0612	Horn, Siren	Replace		0.7				19,36	
		Back-up Alarm	Inspect	0.1					
			Replace		0.1			19,36	
0611	Back-up Switch	Adjust	0.1						
		Replace		1.0				36	
		Horn	Inspect	0.1					
0612	Batteries	Replace		0.1				36	
		Inspect	0.1						
		Test		0.5				19,36	
0612	Batteries	Service		0.5				36	
		Replace		0.5				36	
		Battery Cables	Service		0.1				36
0612	Battery Cables	Inspect	0.1						
		Replace		0.2				36	
		Battery Boxes	Replace		0.5				36
0612	Battery Boxes	Repair			0.5			20,36	
		NATO Receptacle	Replace		0.3				36

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
06	ELECTRICAL SYSTEM - Continued								
0613	Wiring Harnesses								
	Cab Wiring Harness	Test Replace Repair		0.5 1.0				22,36 19,36 20,36	
	Main Wiring Harness	Inspect Test Replace Repair	0.1	0.5 2.0		8.0		18,22,36 18,36 20,36	
	Boom Electrical Cable	Test Adjust Replace Repair		0.5 0.1 4.0 4.0				22,36 1 20,36 20,36	
	STE/ICE-R Harness	Test Replace Repair		0.5 4.0 4.0				19,22,36 19,36 1	
	Electric Joystick Harness	Test Replace Repair		0.5 1.0 0.5				22,36 36 20,36	
07	TRANSMISSION								
0705	Transmission Shifting Components								
	Transmission Shifter	Adjust Replace Repair		1.0 2.5 2.5				36 36	
	Transmission Cables	Replace		2.5				36	
	Transmission Disconnect Pedal	Adjust Replace		1.0 2.0				36 36	
	Transmission Disconnect Master Cylinder	Replace		2.0				36	
0708	Torque Converter	Replace Repair Overhaul			8.0		8.0	18,36 20,36	
0710	Transmission								

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks		
			Field		Sustainment						
			Unit		DS	GS	DEPOT				
			C	O	F	H	D				
07	TRANSMISSION - Continued										
	Transmission Assembly	Inspect Service Test Replace Repair Overhaul	0.1 0.1 0.5 0.5							F C, J	
					8.0						
						8.0		40.0			
		Mounting Brackets	Replace			2.0				19,36	
		Front Cover Assembly	Replace Repair			2.0				20,36 20	
		Clutch Packs	Replace Repair				4.0 3.0			20,35 20,37	
		Output Shaft	Replace Repair				4.0 3.0			36 20,37	
		Front Housing	Replace Repair				2.0 2.0			37 37	
		Input Shaft	Replace Repair				4.0 1.0			36 20,37	
		Case and Covers	Replace Repair				6.0 4.0			20 20,36	
	0714	Servo Unit									
		Control Valve	Replace Repair				2.0 4.0			36 36,37	
	0721	Coolers, Pumps, Motors									
		Transmission Oil Pump	Replace Repair				4.0 1.5			1 4, 26	
		Breather	Replace		0.5					36	
		Oil Filter and Head Assembly	Replace		0.5					19,36	
		Valve, Oil Sampling	Service Replace	0.1	0.1					36	

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
09	PROPELLER AND PROPELLER SHAFTS								
0900	Front and Rear Propeller Shafts	Service Replace Repair		0.1 0.3 0.3				36 18,36 18,36	
	Transmission Propeller Shaft	Service Replace Repair		0.1 1.0 1.0				3 18,36 18,36	
10	FRONT AXLE								
1000	Front Axle Assembly	Inspect Service Replace Repair		0.1 0.1					
		Overhaul			2.0	8.0		19,36 20,36 7,8,16,20,36	
							14.0	7,8,12,16,20,37	
	Pin, Axle Carrier	Service Replace		0.1				36 18,36	
1002	Front Differential Carrier Assembly	Service Replace Repair		0.3	4.0	2.0		36 18,36 20,37	
1003	Front Planetary Wheel Ends	Service Replace Repair		0.3	1.0	4.0		19,36 20,37 37	
11	REAR AXLE								
1100	Rear Axle Assembly	Inspect Service Replace Repair Overhaul	0.1	0.1	2.0	8.0	14.0	36 18,36 20,36 37	
	Pin, Axle Carrier	Service Replace		0.1	0.7			36 20,36	
1102	Rear Differential Carrier Assembly	Service Replace Repair		0.3	4.0	2.0		36 20,36 7,20,37	

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
11	REAR AXLE - Continued								
1103	Rear Planetary Wheel Ends	Service Replace Repair		0.3	1.0		4.0	36 20,36 7,20,37	M
12	BRAKES								
1201	Hand Brakes Parking Brake Assembly	Inspect Adjust Replace Repair	0.1	1.0 1.0	2.0			36 19,36 37	S
	Lever and Cable	Inspect Adjust Replace	0.1	1.0 1.0				36 36	
1202	Service Brakes: Disc Brake Assembly	Service Replace Repair		0.5	1.0 1.5			36 20,36 20,36	
	Brake Pads	Inspect Replace		0.5 1.0				36	
1204	Hydraulic Brake System Brake Control Valve	Replace Repair		1.0		1.5		36 20,37	
	Accumulator	Test Replace Repair		0.2 0.5 0.5				19,36 19,36	
	Lines and Fittings	Inspect Replace	0.1	1.0					
13	WHEELS AND TRACKS								
1311	Wheel Assembly	Inspect Replace Repair	0.1	1.0 1.0				18,36 18,36	
1313	Tire	Inspect Service Replace	0.1 0.1	1.0				19,36 19,36	

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
14	STEERING								
1401	Steering Gear Assembly								
	Steering Wheel	Replace		0.5				18,36	
	Steering Column	Replace		1.0				18,36	
	Steering Knuckle	Service		0.2				36	
		Adjust			1.0			20,36	
		Replace			2.0			20,36	
	Tie Rod	Service		0.2				19,36	
		Adjust		0.5				36	
		Replace		1.5				20,36	
	Universal(Cardan)Steering Joints	Replace		1.5				19,36	
1410	Hydraulic Pump								
	Emergency Steering Pump	Test	0.1	0.2				19,36	
		Replace		1.0				19,36	
		Repair			2.0			3	
1411	Hoses, Lines, Fittings	Inspect	0.1						
		Replace		0.5				19,36	
		Repair		0.5				20,36,38	
1412	Hydraulic Cylinders								
	Steering Cylinders	Inspect	0.2						
		Service		0.1				36	
		Replace		1.0				19,36	
1414	Steering System Valves								
	Steering Valve, Control	Replace		1.0				19,36	
		Repair				1.5		37	
	Valve, Steering Select, Solenoid	Replace		1.0				18,36	
15	FRAME, TOWING ATTACHMENTS AND DRAWBARS								
1501	Frame Assembly	Repair				2.0		20,34,36	
1502	Counterweight	Replace		0.3				18,36	

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
15	FRAME, TOWING ATTACHMENTS AND DRAWBARS - Continued								
1503	Pintle Hook	Inspect	0.1						
		Service		0.1			19,36		
		Replace		0.3			36		
		Repair		0.5			36		
18	BODY, CAB, HOOD AND HULL								
1801	Body, Cab, Hood and Hull Assemblies								
	Engine Covers	Replace		0.3			36		
	Radiator Cover	Replace		0.5			36		
	Engine Door Panel	Replace		0.1			36		
	Transmission Cover	Replace		0.1			36		
	Cab Assembly with ROPS/ FOPS	Inspect	0.2						
		Replace			8.0		20,36	N	
		Repair			1.5		20,34,36	L	
	Sound Suppression Panels	Replace			1.0		36		
	Doors	Service		0.1			36		
		Replace		0.2			36		
		Repair		1.0			34	L	
	Accessories Storage Box	Replace		0.1			36		
	Fire Extinguisher Bracket	Replace		0.1			36		
	Tool Box Door Latch	Replace		0.1			36		
	Cab Floor Mat	Replace		1.0			36		
1802	Fenders, Running Boards, Windshield Glass								
	Fenders	Replace		0.2			19,36		
	Fender Braces	Replace		0.6			19,36		
	Cab Windows	Replace		2.0			36		

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
18	BODY, CAB, HOOD AND HULL - Continued								
1806	Seat								
	Seat Assembly	Inspect Replace Repair	0.1	1.0 1.0			36 20,36		
	Seat Belts	Inspect Replace	0.1	0.2			36		
22	BODY, CHASSIS AND HULL, AND ACCESSORY ITEMS								
2202	Accessory Items								
	Wiper Assemblies	Inspect Replace Repair	0.1	1.0 0.5			36 36		
	Windshield Washer Assembly	Inspect Service Replace Repair	0.1	0.2 0.5 0.5			36 36 36		
	Mirror	Inspect Replace	0.1	0.5			36		
	Fans, Ventilation	Inspect Replace	0.1	0.5			36		
2207	Winterization Equipment								
	24V Heater Assembly	Inspect Replace Repair	0.1	1.0 1.5	1.5		36 20,36		
	Temperature Control Valve	Inspect Replace	0.1	1.0			36		
	Heater hose, Lines and Fittings	Inspect Replace	0.1	1.0			36		
2210	Data Plates	Replace		0.2			36		

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
24	HYDRAULIC FLUID SYSTEMS								
2401	Drive Pump Assemblies								
	Tandem Gear Pump	Service		0.5				36	
		Test		0.5				18,22,36,38	
		Replace		1.5				36	
		Repair			2.0			16,20,36	
	Piston Pump	Service		0.5				36	
		Test		0.5				19,36	
		Replace		1.0				20,36	
2402	Control Valves								
	Main Control Valve Assembly	Adjust		0.5				19,36	
		Replace		2.0				19,36	
		Repair			2.0	2.0		37	
	MLRS Attachment Control Valve Assembly	Replace		1.0				19,36	
		Repair			2.0			37	
	Priority Valve	Replace		0.5				19,36	
		Repair			1.0			36	
	Relief Valve, Frame Tilt/ Brakes	Test		0.5				36	
		Replace		0.5				19,36	
		Repair			1.0			37	
	Shuttle Valve	Replace		0.5				19,36	
	Frame Tilt Valve	Replace		0.5				19,36	
		Repair			1.5			20,24,36	
	Boom Cylinder Flow Control Valve	Replace		0.4				19,36	
	Hydraulic Joystick	Replace		1.0				36	
		Repair				1.5		37	
2404	Tilt Cylinder								
	Frame Tilt Cylinder	Service		0.3				36	
		Replace		0.7				20,36	
		Repair			1.0	1.0		20,23,36,37	
	Carriage Tilt Cylinder	Service		0.3				36	
		Replace		1.0				20,36	
		Repair			1.0	1.0		20,24,36,37	

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

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Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
24	HYDRAULIC FLUID SYSTEMS - Continued								
2405	Attachment								
	Carriage Assembly	Inspect	0.1						
		Service		0.3				36	
		Replace			1.5			20,36	
		Repair				2.0		37	
	Forks	Inspect	0.1						
		Replace		1.0				19,36	
	Fork Bushings	Inspect	0.1						
		Replace		0.5				19,36	
	MLRS Lifting Tool	Inspect	0.1						
		Replace	0.2	0.2				36	
	MLRS Attachment	Inspect	0.1						
		Service		0.3				36	
		Replace		0.5				19,36	
		Repair				2.0		34	
	Backrest	Inspect	0.1						
		Replace	0.1	0.1				36	
		Repair			1.0			34	
	Boom Assembly	Inspect		0.5					
		Service		0.2				36	
		Replace			5.0			20,36	
		Repair			8.0			37	
	Boom Pivot Pins	Inspect	0.1						
		Service		0.1				36	
		Replace			1.0			20,36	
	Wear Pads	Inspect		0.5				36	
		Replace			8.0			20,36	
	Pulley	Replace		1.0				19,36	
	Sheave	Replace		1.0				19,36	
	Extend and Retract Chains	Inspect		0.1				36	
		Adjust		0.5				20,36,38	
		Replace			4.0				

MAINTENANCE ALLOCATION CHART (MAC) - CONTINUED

0322 00

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
24	HYDRAULIC FLUID SYSTEMS - Continued								
2406	Strainers, Filters, Lines and Fittings								
	Hoses, Lines and Fittings	Inspect	0.1					F	
		Adjust		1.0			1		
		Replace		1.0			20,36		
		Repair			0.5		20,36,38		
	Tubing	Inspect	0.1						
		Replace		0.5			18,36		
	Oil Sampling Valve	Service	0.1						
		Replace		0.1			36		
	Strainer	Service		0.2			36		
		Replace		0.5			36		
	Oil Filter	Replace		0.2			19,36		
2407	Hydraulic Cylinders								
	Boom Extend Cylinder	Inspect	0.2						
		Replace			3.0		20,36		
		Repair			1.5	1.5	20,23,36		
	Fork Sideshift Cylinders	Inspect	0.2						
		Replace		1.0			20,36		
		Repair			1.0	1.0	20,25,36		
	Boom Hoist Cylinders	Inspect	0.2						
		Service		0.1			36		
		Replace		1.0			20,36		
		Repair			1.5	1.5	20,23,36		
	MLRS Attachment Cylinder	Inspect	0.2						
		Service		0.1			36		
		Replace		1.5			20,36		
		Repair			1.5	1.5	20,24,35,36		
31	BASIC ISSUE ITEMS, MANUFACTURED INSTALLED								
3100	Basic Issue Items								
	Emergency Boom Lift Kit	Replace		0.2			36		

Table 1. MAC for the 6K Forklift - Continued.

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	DEPOT		
			C	O	F	H	D		
47	GAUGES (NON-ELECTRICAL)								
4702	Gauges, Mountings, Lines and Fittings								
	Sight Gauges	Inspect Replace	0.1	0.5				36	
	Air Cleaner Restrictions Indicator	Inspect Replace	0.1	0.5				36	

Table 2. Tools and Test Equipment Requirements for The 6K Forklift.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	F	Adapter, (1/2 to 3/4 in. drive)		
2	F	Alignment, Tool		
3		Bearing Driver, Insert	5120-01-311-7242	8801803
4		Bearing Driver, Insert	5120-01-311-7243	8801804
5	O	Charging Kit, Pressure	4940-01-046-7109	8762813
6		Clutch Pack, Lift	5120-01-311-9161	8801802
7		Differential Resistance Tool		
8		Drive Gear Installation Tool		
9	F	Driver, Group		
10	F	Drivershaft/Pump Housing Bearing Installation Tool		
11	F	Driveshaft/Pump Housing Bearing Removal Tool		
12	F	Housing Bearing Race Installation Tool		
13		Housing Bearing Race Removal Tool		
14	F	Planetary Hub Drag Tool		
15	O	Protractor, Circular	6675-00-599-8859	1931A6
16	F	Seal Removal Tool		
17	O,F	Shaft Seal Driver		
18	O	Shop Equipment, Automotive Maintenance, Common No. 2 Less Power SC 4910-95-CL-A72	4910-00-754-0650	W32730
19	O	Shop Equipment, Automotive Maintenance and Repair, Common No. 1 Less Power SC4910-95-CL-A74	4910-00-754-0654	W32593
20	F	Shop Equipment, Automotive Maintenance and Repair, Field Maintenance, Basic, Less Power SC4910-95-CL-A31	4910-00-754-0705	T24660

Table 2. Tools and Test Equipment Requirements for The 6K Forklift - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
21	F	Shop Equipment, Fuel and Electrical System Engine: Field Maintenance Basic, Less Power SC4910-95-CL-A01	4910-00-754-0714	T30414
22	O,F	Simplified Test Equipment for Internal Combustion Engines (STE/ICE-R) TM 9-4910-571-34&P	4910-00-124-2554	
23	H	Spanner Wrench, Boom Lift Cylinder and Boom Extend Cylinder	5120-01-368-1826	34-307
24	H	Spanner Wrench, Carriage Tilt and Attachment Hoist Cylinder	5935-00-478-0129	608862
25	H	Spanner Wrench, Fork Sideshift Cylinder - Inner Gland	5120-01-309-2047	6608872
26	H	Spanner Wrench, Fork Sideshift Cylinder - Outer Gland	5999-00-572-8870	608882
27	H	Spanner Wrench, Fork Sideshift Cylinder - Outer Piston	5120-01-309-2045	6608892
28		Spanner Wrench, Frame Tilt Cylinder		608852
29	O	Template, Fuel Pump	4910-01-074-0020	
30	O	Template, Level		
31	F	Test Set, Diesel Injector	4910-00-317-8265	5910359
32	F	Tool Barring		
33	F	Tool, Engine Barring, Bore Adapter	5120-01-285-5195	377371
34	F	Tool Kit, Body and Fender Repair SC5180-90-CL-N34	5180-00-754-0643	W33689
35	H	Tool Kit, Clutch Aligning	5180-01-307-9395	8801801
36	O	Tool Kit, General Mechanic's, SC5180-95-CL-N26	5180-00-177-7033	W33004
37	F,H	Tool Kit, Machinists: Post, Camp and Station SC5280-95-CL-A02	5280-00-511-1950	W44512

Table 2. Tools and Test Equipment Requirements for The 6K Forklift - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
38	O	Tool Outfit, Hydraulic System Test and Repair (HSTRU) SC4940-95-CL-B07	4940-01-036-5784	13221E6850
39	H	Valve Block Bearing Race Installation Tool		
40	H	Valve Block Bearing Race Removal Tool		
41	H	Valve Seat Installation Staking Tool		
42	O	Wrench, Pipe	5120-00-776-1840	W18-36
43	F	Wrench Set, Spanner		609911
44	F	Yoke Nut Tool		

Table 3. Remarks for the 6K Forklift.

(1) REFERENCE CODE	(2) REMARKS
A	Engine assembly is manufactured to metric measure.
B	STE/ICE-R tests.
C	Service by changing oil and filter.
D	Consists of valve clearance adjustment.
E	Oversize/undersize replacement bearings are available.
F	Inspect for leakage.
G	Includes timing the injection pump using a timing pin method.
H	Consists of cleaning element with compressed air, if appropriate. Crew can remove and clean inner element.
I	Fuel and hydraulic tanks are incorporated in one assembly.
J	Crew adds oil or fuel; Organizational drains, cleans and refills the tank/reservoir.
K	Fuel control lever travel adjustment.
L	May be repaired by welding.
M	Front and rear differential carriers and planetaries are identical, except No-Spin differential is used on front axle.
N	Includes replacement of instrument panels, seat, etc.
O	Only inspect wear pads that are visible at boom ends.
P	End play adjustment.
Q	Crew can remove and install only.
R	Organizational uses built-in indicator lights to test joystick functions. Direct support tests joystick functions with ammeter.
S	Repair by replacement of down parts.

SCOPE

This work package lists expendable and durable items you will need to maintain the 6K Forklift. This listing is for information only and is not authorized to requisition the listed items. These items are authorized to you by CTA 50-970, *Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items)*, or CTA 8-100, *Army Medical Department Expendable/Durable Items*.

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item [e.g., Use Adhesive, 3-M, (Item 1, WP 0323 00)].
2. **Column (2) - Level.** This column identifies the lowest level of Field Maintenance that requires the listed item.
 - C - Operator/Crew
 - O - Unit Maintenance
 - F - Direct Support Maintenance
3. **Column (3) - National Stock Number.** This is the NSN assigned to the item which you can use to requisition it.
4. **Column (4) - Description, Commercial and Government Entity Code (CAGEC), and Part Number.** This provides the other information you need to identify the item.
5. **Column (5) - Unit of Measure (U/M).** This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1	O	8010-01-260-5915	ADHESIVE, 3-M, No. 80 (04963) (TRAK 8526038) 1 Can	OZ
2	O	6810-00-543-7415	ALCOHOL, Denatured (OMU53) 27 CFR 21,35	GAL
3	F	6810-00-543-7415	ALUMILASTIC	OZ
4	O	6810-00-527-2476	AMMONIA	QT
5	O		ANTIFREEZE, Permanent Arctic, MIL-A-11755 (81349)	
6	O	6850-00-174-1806	55 Gallon Drum	GAL
			ANTIFREEZE: Permanent, Ethylene Glycol, Inhibited (81349) MIL-A-46153	
		6850-00-181-7929	1 Gallon Can	GAL
		6850-00-181-7933	5 Gallon Can	GAL
		6850-00-181-7940	55 Gallon Drum	GAL
7	O		BARRIER MATERIAL: Grade A (81349) MIL-B-121 300 Foot Roll	EA
8	O	5340-00-450-5718	CAP and PLUG Set (19207) 10935405	
9	O	6850-01-080-2387	CAULK, Silicone, Clear	TU
10	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
11	O		COMPOUND, Anti-seize MIL-T-83483 (81349)	
		8030-00-293-3285	1 Can	LB
12	F	5350-00-584-4654	CLOTH, Medium Grit, Emery	OZ
13	F	8010-00-664-1414	COMPOUND, Prussian Blue Marking (58536) AA3108-2A-001Q 1 Quart Can	QT
14		8040-00-851-0211	COMPOUND, Sealing RTV-732 Black (71794)	TU

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
15	F	5350-01-010-7007	COMPOUND, Valve Lapping (1PQB8) 80037 Box of 12; 3 Ounce Tubes	OZ
16	F	5330-01-221-0872	CROCUS, Cloth	
17	F		DETERGENT, Laundry (81346) ASTM D 496 (81346) 7930-00-634-3935 200 Pound Drum	LB
18	O	6850-00-926-2276	FLUID, Windshield Washer	QT
19	F		GLOVES, Insulated	PR
20			GREASE, Automotive and Artillery GAA, MIL-G-10924 (81349) (SAE-J-310)	
	O	9150-00-935-1017	14 oz. Cartridge	OZ
	O	9150-00-190-0905	6 Pound Can	LB
	O	9150-00-190-0907	35 Pound Can	LB
21	O	9150-00-735-1800	GREASE, Silicone	TU
22	O	9150-00-250-0933	JELLY, Petroleum	LB
23	F	8040-00-264-3860	K & W Copper Coat 1504	OZ
24	F		LUBRICANT, Delco-Remy 1948791, AMOCO 1272	OZ
25	O	2640-00-256-5526	LUBRICANT, Ru-Glide Rubber	LB
26	F	7050-00-961-7663	LUBRIPLATE No. 105 ST40334 (90536)	CN
27			OIL, Fuel, Diesel, DF-1 Winter VVF800 (81349)	
	O	9140-00-286-5287	5 Gallon Can	GAL
	O	9140-00-286-5288	55 Gallon Drum	GAL
	O	9140-00-286-5286	Bulk	GAL
28			OIL, Fuel, Diesel, DF-2 Regular VVF800 (81349)	
	O	9140-00-286-5295	5 Gallon Can	GAL
	O	9140-00-286-5296	55 Gallon Drum	GAL
	O	9140-00-286-5294	Bulk	GAL
29			OIL, Fuel, Diesel, DF-A Arctic WF800 (81349)	
	O	9140-00-286-5282	5 Gallon Can	GAL
	O	9140-00-286-5284	55 Gallon Drum	GAL
	O	9140-00-286-5283	Bulk	GAL

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
30		9150-01-152-4117 9150-01-152-4118 9150-01-152-4119	OIL, Lubricating OE/HDO-15/40, MIL-PRF-2104 (81349) 1 Quart Can 5 Gallon Can 55 Gallon Drum	QT GAL GAL
31	O O O	9150-00-402-4478 9150-00-402-2372 9150-00-491-7197	OIL, Lubricating, Engine Arctic OEA, MIL-L-46167 (81349) 1 Quart Can 5 Gallon Can 55 Gallon Drum	QT GAL GAL
32	O O O	9150-01-035-5392 9150-01-035-5393 9150-01-035-5394	OIL, Lubricating, Gear Multipurpose GO 80/90 MIL-L-2105D (81349) 1 Quart Can 5 Gallon Can 55 Gallon Drum	QT GAL GAL
33	O O	9150-00-189-6727 9150-00-191-2772	OIL, Lubricating, Transmission/Hydraulic OE/HDO-10 MIL-L-2140D (81349) 1 Quart Can 55 Gallon Drum	QT GAL
34	O	9150-00-889-3523 9150-00-985-7293 9150-00-407-0973	OIL, Preservative (MIL-P-46093) 1 Quart Can 5 Gallon Can 55 Gallon Drum	QT GAL GAL
35	F		PADS, Scotch Brite	
36	O	5350-00-619-9167	PAPER, Emery, Grit #80	PCS
37	O	9150-00-250-0926	PETROLATUM - Technical 82146 (14P1) 1.75 Pound Can	LB
38		5210-00-640-6176 5210-00-640-6177 5210-00-640-6178	PLASTIGAGE 0.004-0.009 Inch Clearance Range (74069) HPB1 Blue Color, Box of 12 0.001-0.003 Inch Clearance Range (74069) HPG1 Green Color, Box of 12 0.002-0.006 Inch Clearance Range (74069) HPR1 Red Color, Box of 12	BX BX BX

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
39	O	8010-00-159-4518	PRIMER, Metal	QT
40	O	7920-00-205-3570	RAG, Wiping A-A-531 (58536)	LB
41	F	5350-00-619-9166	SANDPAPER No. 100	
42	F	8030-01-126-9460	SEALANT, Loctite 222 (05972) 222	OZ
43	O	8030-01-014-5869	SEALANT, Loctite 242 MIL-S-46163 Type II Grade N (80244)	OZ
44	F	8030-01-142-3131	SEALANT, Loctite 262 (05972) 26241 250 Cubic Centimeter Bottle	CC
45	O	8030-01-158-6070	SEALANT, Loctite 271 MIL-S-46163 Type I Grade L (80244)	OZ
46	O	8030-01-063-7510	SEALANT, Loctite 277 MIL-S-46163 Type I Grade L (80244)	OZ
47	O	8030-00-180-6150	SEALANT, Loctite 609 MIL-R-46082B Type I (05962)	OZ
48	O	8030-00-204-9149	SEALANT, Loctite 59241	OZ
49	F	8030-00-251-3980	SEALANT, Loctite 767-64	OZ
50	F	8030-00-656-1426	SEALANT, Permatex, Aviation Form A Gasket No. 3, MIL-S-45180C (77247), 1 Tube	TU
51	O	8030-00-111-2762	SEALER, Ribbon (05972) 29031 50 Cubic Centimeter Bottle	CC
52	O	7930-00-282-9699	SOAP, Liquid (83421) 7930-00-282-9699 1 Gallon Can	GAL
53	O	6810-00-264-6618	SODA, Baking	OZ
54	O		SOLVENT, Chlorinated	QT
55	F		SOLVENT, Rust Penetrating	

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED

0323 00

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
56	O	5975-00-903-2284	STRAP, Tie Down (96906) MS3367-4-0 4 Inch Length, Black Package of 100	EA
	O	5975-00-984-6582	(96906) MS3367-1-0 6 Inch Length, Black Package of 100	EA
	O	5975-00-935-5946	(96906) MS3367-2-1 13.35 Inch Minimum Length, Brown Package of 100	EA
57			TAG: Marker (64067) 9905-00-537-8954	
	O	9905-00-989-1485	Package of 50	EA
58			TAPE, Electrical	
	O	5970-00-989-1485	(75037) 33 260 Inch Roll	IN
59	O	8010-00-180-6343	VARNISH, Anti-Fungus	QT
60	O	6810-00-356-4936	WATER, Distilled	GAL

END OF WORK PACKAGE

TOOL IDENTIFICATION LIST

0324 00**SCOPE**

This work package lists all common tools and supplements and special tools/fixtures needed to maintain the 6K Forklift.

EXPLANATION OF COLUMNS IN THE TOOL IDENTIFICATION LIST

1. **Column (1) - Item Number (No.)**. This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Tool kit, general mechanic's, Item 39, WP 0324 00).
2. **Column (2) - Item Name**. This column lists the item by noun nomenclature and other descriptive features (e.g., Cutter, tube).
3. **Column (3) - National Stock Number**. This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.
4. **Column (4) - Part Number/CAGEC**. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.
5. **Column (5) - Reference**. This column identifies the authorizing supply catalog or RPSTL for selected tool.

TOOL IDENTIFICATION LIST

Table 1. Tool Identification List for the 6K Forklift.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	F	Adapter, (1/2 to 3/4 in. drive)		
2	F	Alignment, Tool		
3		Bearing Driver, Insert	5120-01-311-7242	8801803
4		Bearing Driver, Insert	5120-01-311-7243	8801804
5	O	Charging Kit, Pressure	4940-01-046-7109	8762813
6		Clutch Pack, Lift	5120-01-311-9161	8801802
7		Differential Resistance Tool		
8		Drive Gear Installation Tool		
9	F	Driver, Group		
10	F	Driveshaft/Pump Housing Bearing Installation Tool		
11	F	Driveshaft/Pump Housing Bearing Removal Tool		
12		Heat Gun, Electric		
13	F	Housing Bearing Race Installation Tool		
14		Housing Bearing Race Removal Tool		
15	F	Planetary Hub Drag Tool		
16	O	Protractor, Circular	6675-00-599-8859	1931A6
17	F	Seal Removal Tool		
18	O,F	Shaft Seal Driver		
19	O	Shop Equipment, Automotive Maintenance, Common No. 2 Less Power SC 4910-95-CL-A72	4910-00-754-0650	W32730
20	O	Shop Equipment, Automotive Maintenance and Repair, Common No. 1 Less Power SC4910-95-CL-A74	4910-00-754-0654	W32593
21	F	Shop Equipment, Automotive Maintenance and Repair, Field Maintenance, Basic, Less Power SC4910-95-CL-A31	4910-00-754-0705	T24660

Table 1. Tool Identification List for the 6K Forklift - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
22	F	Shop Equipment, Fuel and Electrical System Engine: Field Maintenance Basic, Less Power SC4910-95-CL-A01	4910-00-754-0714	T30414
23	O,F	Simplified Test Equipment for Internal Combustion Engines (STE/ICE-R) TM 9-4910-571-34&P	4910-00-124-2554	
24	H	Spanner Wrench, Boom Lift Cylinder and Boom Extend Cylinder	5120-01-368-1826	34-307
25	H	Spanner Wrench, Carriage Tilt and Attachment Hoist Cylinder	5935-00-478-0129	608862
26	H	Spanner Wrench, Fork Sideshift Cylinder - Inner Gland	5120-01-309-2047	6608872
27	H	Spanner Wrench, Fork Sideshift Cylinder - Outer Gland	5999-00-572-8870	608882
28	H	Spanner Wrench, Fork Sideshift Cylinder - Outer Piston	5120-01-309-2045	6608892
29		Spanner Wrench, Frame Tilt Cylinder		608852
30	O	Template, Fuel Pump	4910-01-074-0020	
31	O	Template, Level		
32	F	Test Set, Diesel Injector (Use with Item 33)	4910-00-317-8265	5910359
33		Oil, Preservative MIL-P-46093 1-Quart Can	9150-00-889-3523	QT
34	F	Tool Barring		
35	F	Tool, Engine Barring, Bore Adapter	5120-01-285-5195	377371
36	H	Tool, Special Lifting		
37	F	Tool Kit, Body and Fender Repair SC5180-90-CL-N34	5180-00-754-0643	W33689
38	H	Tool Kit, Clutch Aligning	5180-01-307-9395	8801801
39	O	Tool Kit, General Mechanic's, SC5180-95-CL-N26	5180-00-177-7033	W33004

Table 1. Tool Identification List for the 6K Forklift - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
40	F,H	Tool Kit, Machinist's: Post, Camp and Station SC5280-95-CL-A02	5280-00-511-1950	W44512
41	O	Tool Outfit, Hydraulic System Test and Repair (HSTRU) SC4940-95-CL-B07	4940-01-036-5784	13221E6850
42	H	Valve Block Bearing Race Installation Tool		
43	H	Valve Block Bearing Race Removal Tool		
44	H	Valve Seat Installation Staking Tool		
45	O	Wrench, Pipe	5120-00-776-1840	W18-36
46	F	Wrench Set, Spanner		609911
47	F	Yoke Nut Tool		

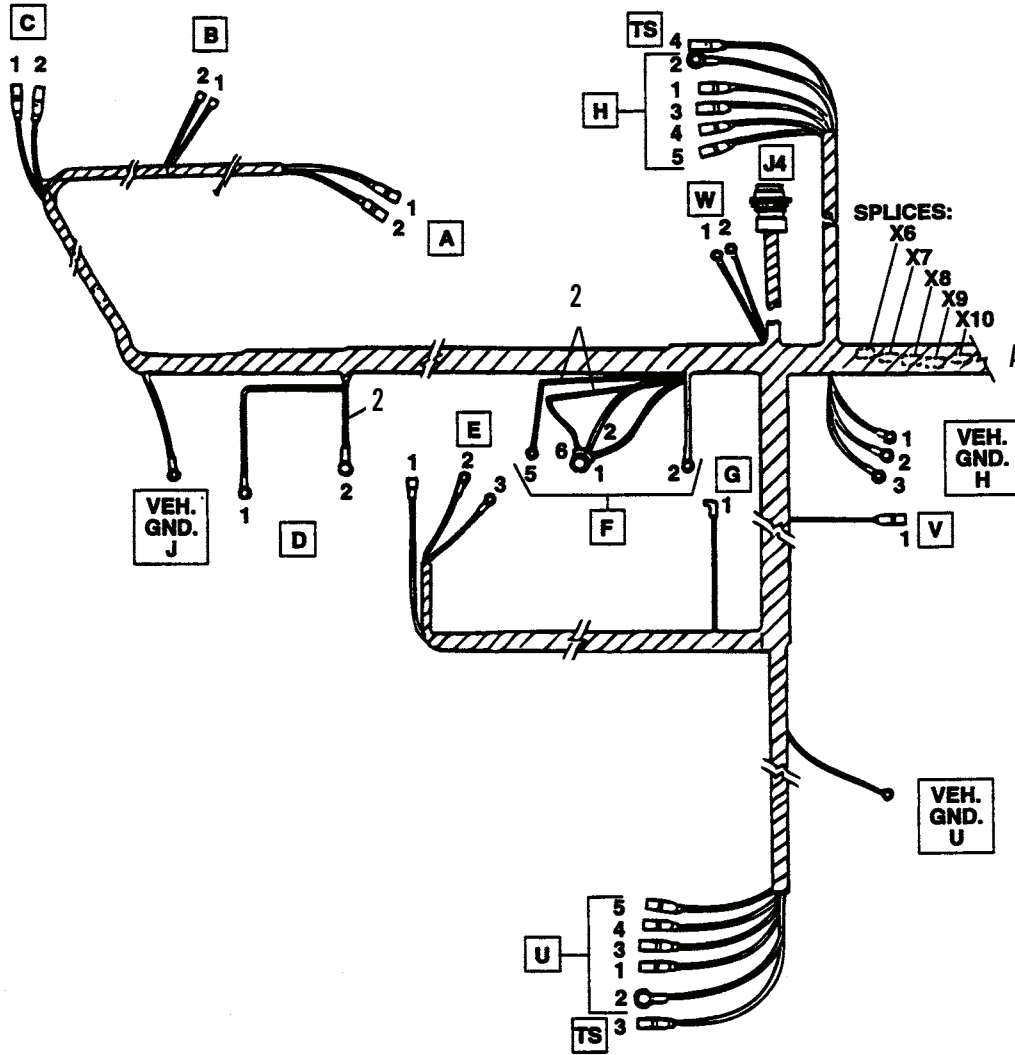
END OF WORK PACKAGE

INTRODUCTION

1. This work package includes complete instructions for making items authorized to be manufactured or fabricated at the Unit, Direct Support and General Support Maintenance levels.
2. A part number index (Table 1. Manufactured Items Part Number Index) in alphanumeric order is provided for cross-referencing part number of manufactured item to figure where fabrication criteria is covered.
3. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

MAIN WIRING HARNESS

Main Wiring Harness.



409-125

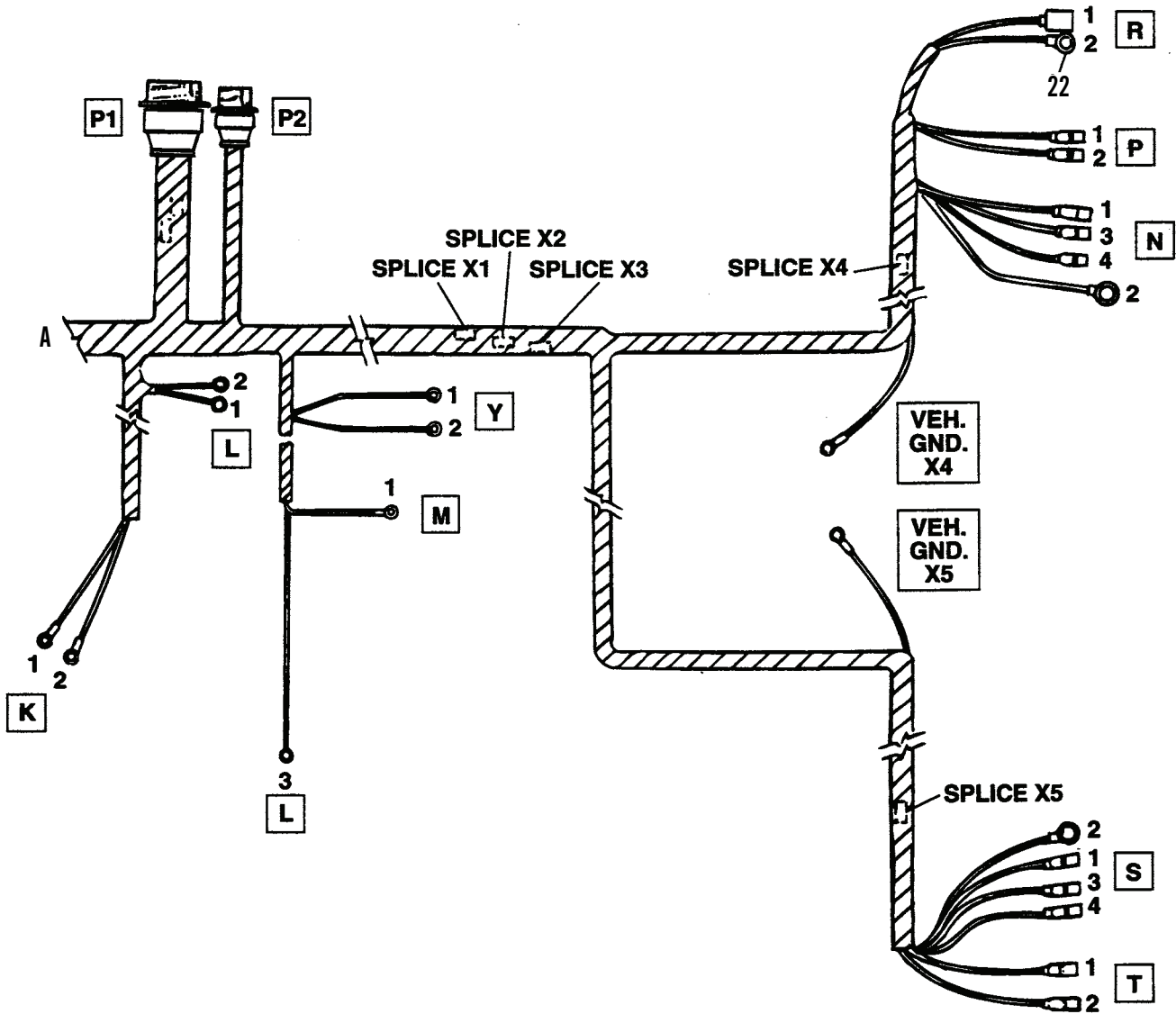
NOTE

All wires are 16 AWG (Item 1) unless otherwise indicated.

Item	Cage	Part No.	Description	QTY
--	3Y949	6602745	Frame Wiring Harness	1
1	64488	81163S	Wire, 16 AWG	AR
2	64488	81103S	Wire, 10 AWG	AR

MAIN WIRING HARNESS - CONTINUED

Main Wiring Harness.



409-126

NOTE

All wires are 16 AWG (Item 1) unless otherwise indicated.

MAIN WIRING HARNESS - CONTINUED

Component Identification

- | | |
|--|--|
| A . . . Left Rear Floodlight | L-1 . . Transmission Temperature Sender |
| B . . . Backup Alarm | L-2 . . Transmission Temperature Switch |
| C . . . Right Rear Floodlight | L-3 . . Fuel Level Sender |
| D-1 . . Water Temperature Sender | M . . . Emergency Steering Motor |
| D-2 . . Alternator | N . . . Left Front Blackout/Turn Signal/
. Parking Light Assembly |
| E-1 . . Fuel ON/OFF Switch (Injector Pump) | P Left Headlight |
| E-2 . . Oil Pressure Sender | R Blackout Headlight |
| E-3 . . Low Oil Pressure Switch | S Right Front Blackout/Turn Signal/Parking
. Light Assembly |
| F . . . Starter | T Right Headlight |
| G . . . Water Temperature Switch | U Right Rear Blackout/Tail/Stop Light Assembly |
| H . . . Left Rear Blackout/Tail/Stop
. Light Assembly | V Cold Start Circuit |
| J4 . . Boom Receptacle | W . . . Start Relay |
| K . . . Neutral Safety Switch | Y Hydraulic Pressure Switch |

Table 1. Wire List.

Connection Points	Wire No.	Length: in. (cm)
A-1 to X10	73	AR
A-2 to X13	2	AR
B-1 to P1-19	21	177.0 (150.0)
B-2 to X13	2	AR
C-1 to X10	73	AR
C-2 to X13	2	AR
D-1 to P1-10	15	143.0 (363.5)
D-2 to F-3	9	53.0 (135.0)
E-1 to P1-17	7	151.0 (383.5)
E-2 to P1-12	17	151.0 (383.5)
E-3 to P1-13	16	151.0 (383.5)
F-1 to P2-1	9	112.0 (284.5)
F-2 to K-1	4A	124.0 (315.0)
F-3 to D-2	9	53.0 (135.0)
F-5 to W-1	38	29.0 (74.0)

MAIN WIRING HARNESS - CONTINUED**Table 1. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
F-6 to W-2	39	AR
G-1 to P1-11	14	128.0 (325.5)
H-1 to X6	45	AR
H-2 to VEH. GND H-2	2	73.0 (185.5)
H-3 to X7	43	AR
H-4 to X8	44	AR
H-5 to X9	46	AR
J4		
-A to P1-30	54	141.0 (358.5)
-C to VEH. GND H-3	2	86.0 (218.5)
-H to P1-28	52	141.0 (358.5)
-J to P1-29	53	141.0 (358.5)
-K to P1-27	51	141.0 (358.5)
-L to P1-32	56	141.0 (358.5)
-M to P1-33	57	141.0 (358.5)
-N to P1-37	50	141.0 (358.5)
-P to P1-35	65	141.0 (358.5)
-R to P1-36	64	141.0 (358.5)
-S to P1-34	58	141.0 (358.5)
-W to P1-25	71	141.0 (358.5)
-X to P1-31	55	141.0 (358.5)
K-1 to F-2	4A	124.0 (315.0)
K-2 to P1-18	4	87.0 (221.0)
L-1 to P1-14	19	67.0 (170.5)
L-2 to P1-15	18	67.0 (170.5)
L-3 to P1-16	12	96.0 (244.0)
M-1 to P1-21	92	57.0 (145.0)
N-1 to X2	48	AR
N-2 to X4	2	AR
N-3 to X1	45	AR
N-4 to X11	27	AR
P-1 to X3	49	AR

MAIN WIRING HARNESS - CONTINUED**Table 1. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
P-2 to X4	2	AR
P1		
-1 Blank		
-2 to X3	49	AR
-3 to R-1	47	285.0 (724.0)
-4 to X2	48	AR
-5 to X1	45	AR
-6 to X7	43	AR
-7 to X8	44	AR
-8 to X9	46	AR
-9 to X11	27	AR
-10 to D-1	15	143.0 (363.5)
-11 to G-1	14	128.0 (325.5)
-12 to E-2	17	151.0 (383.5)
-13 to E-3	16	151.0 (383.5)
-14 to L-1	19	67.0 (170.5)
-15 to L-2	18	67.0 (170.5)
-16 to L-3	12	96.0 (244.0)
-17 to E-1	7	151.0 (383.5)
-18 to K-2	4	87.0 (221.0)
-19 to B-1	21	177.0 (450.0)
-20 to V-1	8	111.0 (282.0)
-21 to M-1	92	57.0 (145.0)
-22 to Y-2	91	31.0 (79.0)
-23 to Y-1	10	31.0 (79.0)
-24 to X10	73	AR
-25 to J4-W	71	141.0 (358.5)
-26 to X12	28	AR
-27 to J4-K	51	141.0 (358.5)
-28 to J4-H	52	141.0 (358.5)
-29 to J4-J	53	141.0 (358.5)
-30 to J4-A	54	141.0 (358.5)

MAIN WIRING HARNESS - CONTINUED**Table 1. Wire List - Continued.**

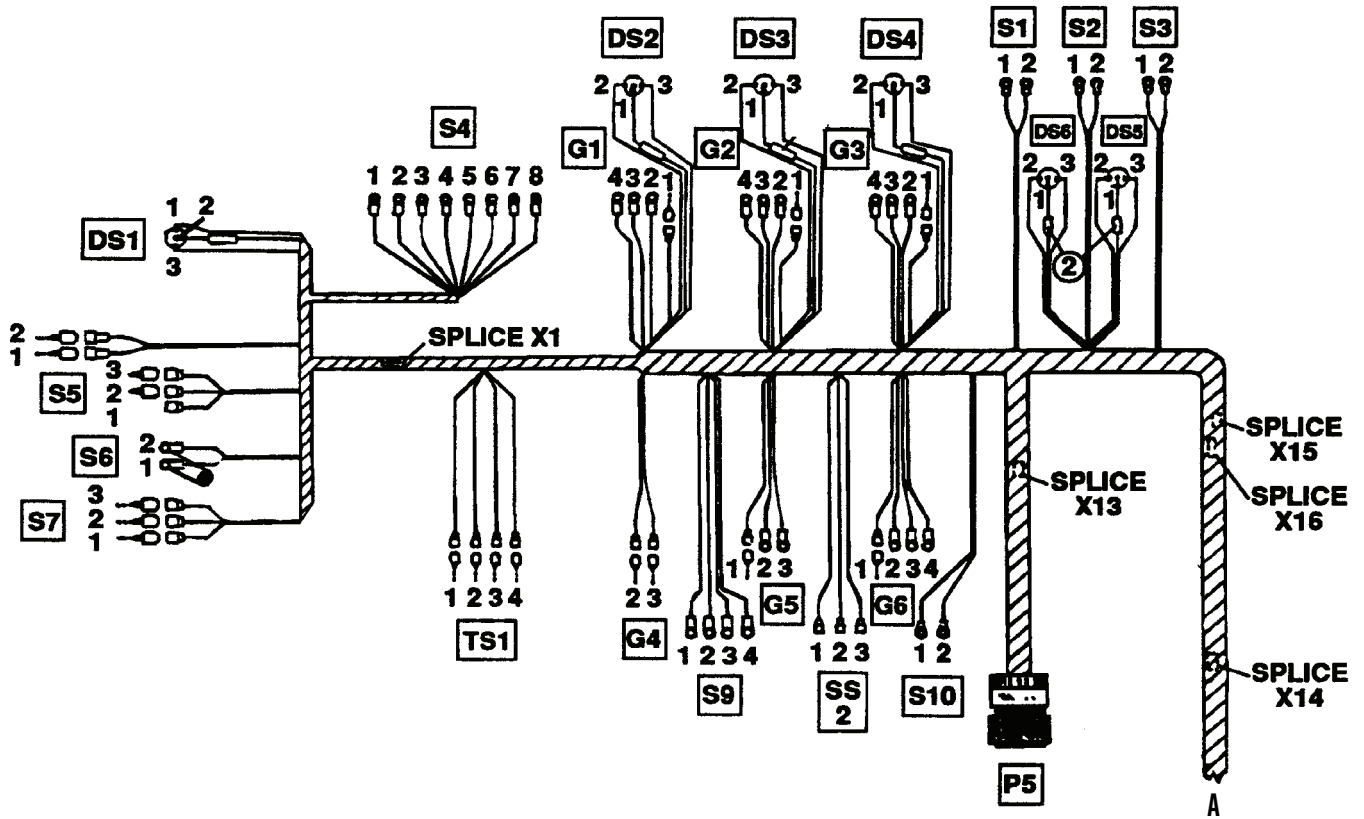
Connection Points	Wire No.	Length: in. (cm)
-31 to J4-X	55	141.0 (358.5)
-32 to J4-L	56	141.0 (358.5)
-33 to J4-M	57	141.0 (358.5)
-34 to J4-S	58	141.0 (358.5)
-35 to J4-P	65	141.0 (358.5)
-36 to J4-R	64	141.0 (358.5)
-37 to J4-N	50	141.0 (358.5)
PS		
-1 to F-1	9	112.0 (284.5)
-2 to VEH. GND. H-1	2	84.0 (213.5)
-3 Blank		
R-1 to P1-3	47	285.0 (724.0)
R-2 to X4	2	AR
S-1 to X2	48	AR
S-2 to X5	2	AR
S-3 to X1	45	AR
S-4 to X12	28	AR
T-1 to X3	49	AR
T-2 to X5	2	AR
TS-3 to X12	28	AR
TS-4 to X11	27	AR
U-1 to X6	45	AR
U-2 to VEH. GND. U	2	63.0 (160.0)
U-3 to X7	43	AR
U-4 to X8	44	AR
U-5 to X9	46	AR
V-1 to P1-20	8	111.0 (282.0)
W-1 to F-5	38	29.0 (74.0)
W-2 to F-6	39	
Y-1 to P1-23	10	31.0 (79.0)
Y-2 to P1-22	91	31.0 (79.0)

MAIN WIRING HARNESS - CONTINUED**Table 1. Wire List - Continued.**

Connection Points	Wire No.	Length (Inches)
Splice-to-Splice Connections		
X1 to X6	45	AR
Splice-to-Vehicle Ground Connections		
X4 to VEH. GND. X4	2	AR
X5 to VEH. GND. X5	2	AR
X13 to VEH. GND. J	2	AR

CAB WIRING HARNESS

Cab Wiring Harness.



409-178

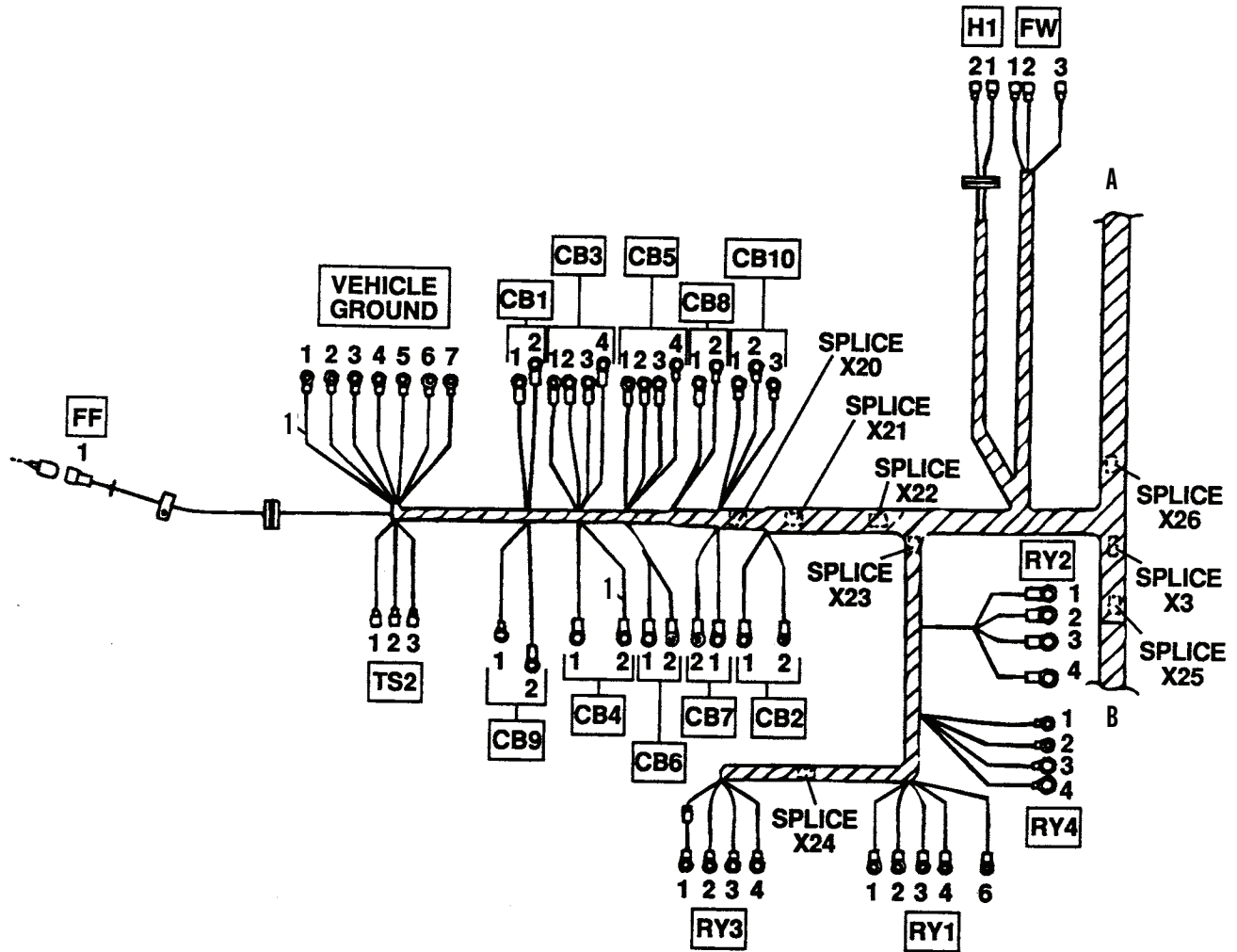
NOTE

All wires are 16 AWG, single conductor (item 3) unless otherwise noted.

Item	Cage	Part No.	Description	QTY
--	3Y949	6602765	Cab Wiring Harness	1
1	64488	81083S	Wire, 8 AWG	AR
2	64488	81143S	Wire, 14 AWG	AR
3	64488	81163S	Wire, 16 AWG	AR

CAB WIRING HARNESS - CONTINUED

Cab Wiring Harness - Continued.



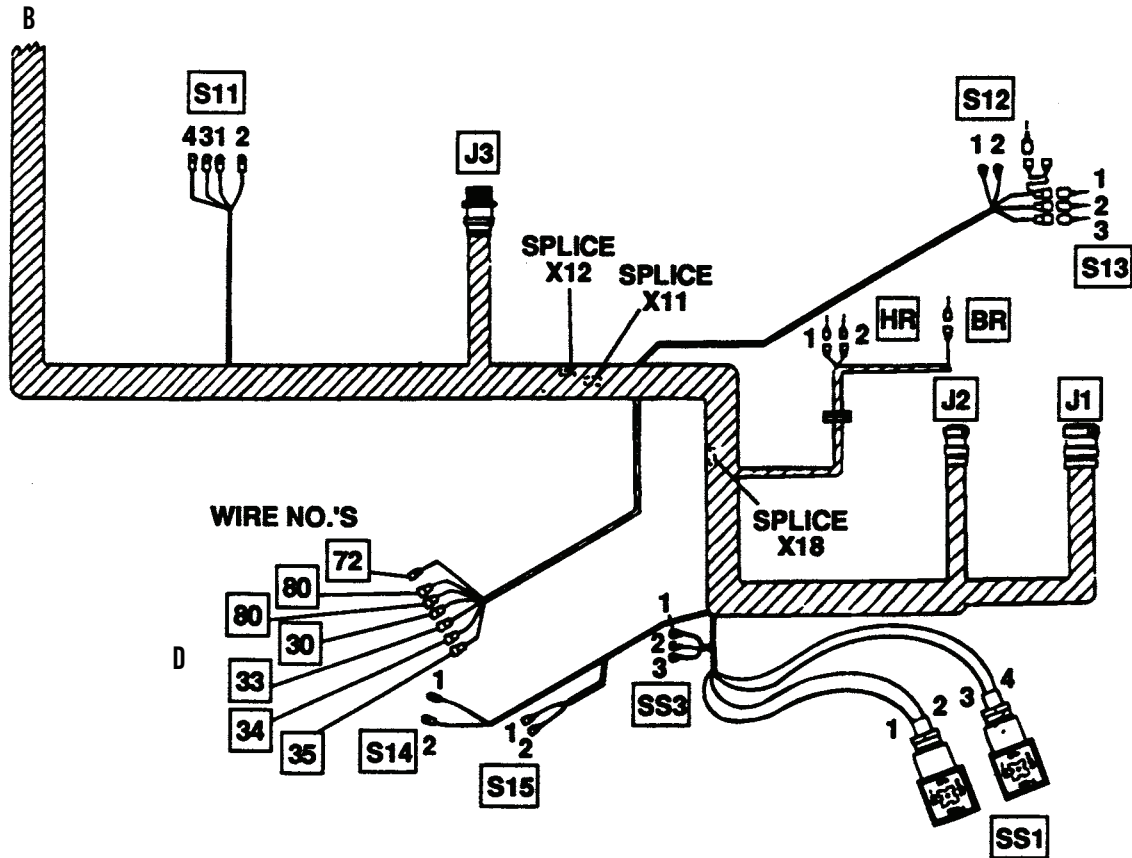
409-179

NOTE

All wires are 16 AWG (item 3) unless otherwise indicated.

CAB WIRING HARNESS - CONTINUED

Cab Wiring Harness - Continued.



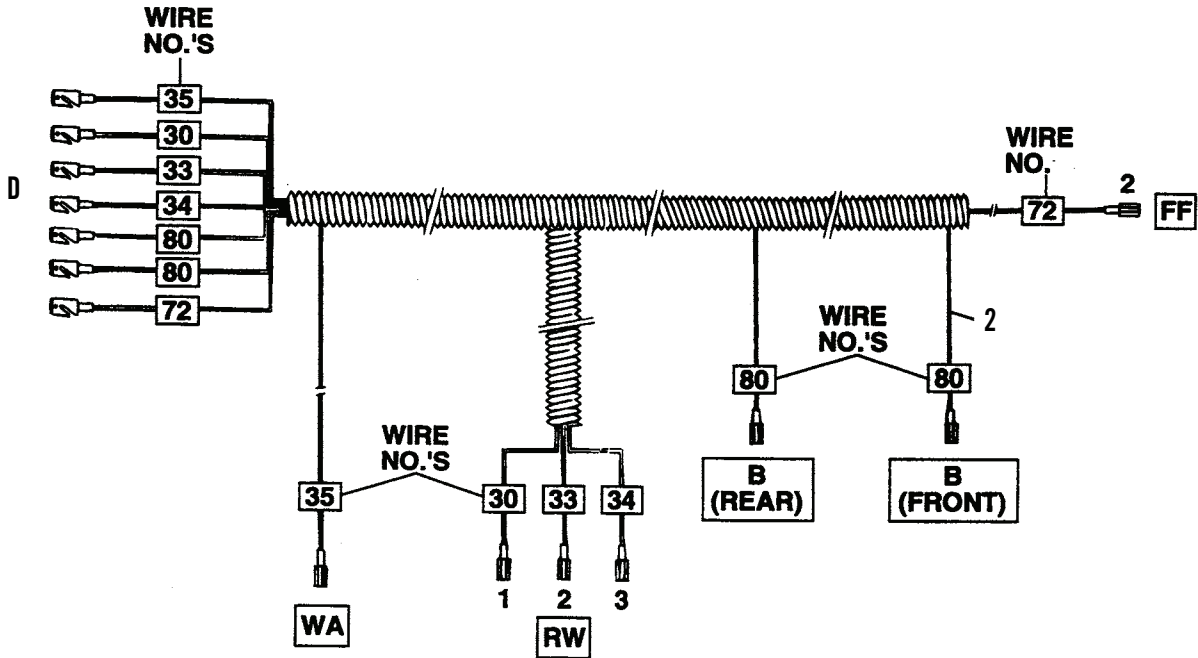
409-193

NOTE

All wires are 16 AWG (item 3) unless otherwise indicated.

CAB WIRING HARNESS - CONTINUED

Cab Wiring Harness - Continued.



409-194

NOTE

All wires are 16 AWG (item 3) unless otherwise indicated.

CAB WIRING HARNESS - CONTINUED

Component Identification

B . . . Cab Fans	BR . . Brake On Switch
<u>Circuit Breakers</u>	
CB1 . . Gauges	RW . . Rear Windshield Wiper
CB2 . . Backup Alarm	RY1 . . Run Relay
CB3 . . Wiper/Washer	RY2 . . Blackout Relay
CB4 . . Blackout/Service/Panel Lights	RY3 . . Emergency Steering Relay
CB5 . . Auto Leveler	RY4 . . Blackout Relay
CB6 . . Main	S1 . . . Front Floodlight Switch
CB7 . . Floodlights	S2 . . . Boom Floodlight Switch
CB8 . . Heater Fans	S3 . . . Boom Floodlight Switch
CB9 . . Steer Select	S4 . . . Fork Leveler Switch
CB10. Turn Signals/Horn	S5 . . . Front Windshield Wiper Switch
DS1 . . Fork Auto Level On Indicator	S6 . . . Windshield Washer Switch
DS2 . . High Water Temperature Indicator	S7 . . . Rear Windshield Wiper Switch
DS3 . . Low Oil Pressure Indicator	S8 . . . Backup Alarm Switch
DS4 . . Low Transmission Oil Pressure Indicator	S9 . . . Ignition Switch
DS5 . . Low Brake Fluid Indicator	S10 . . Horn Switch
DS6 . . Brake On Indicator	S11 . . Fuel Shutoff/Emergency Steering Switch
FF . . . Front Floodlight	S12 . . Cold Start Switch
FW . . Front Windshield Wiper	S13 . . Heater Switch
G1 . . . Water Temperature Gauge	S14 . . Brake Switch
G2 . . . Engine Oil Pressure Gauge	S15 . . Low Brake Pressure Switch
G3 . . . Transmission Oil Pressure Gauge	SS1 and SS3 Steering Select Circuit
G4 . . . Hourmeter	SS2 . . Steering Select Circuit
G5 . . . Voltmeter	TS1 . . Turn Signal Switch
G6 . . . Fuel Gauge	TS2 . . Flasher
H1 . . . Horn	WA . . Windshield Washer
HR . . Heater	

Table 2. Wire List.

Connection Points	Wire No.	Length: in. (cm)
B-1 to X18	80	AR
B-2 to X18	80	AR
BR to DS6-2	23	131.5 (334.0)
CB1-1 to X14	10	AR

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
CB1-2 to X20	3	9.0 (23.0)
CB2-1 to S8-1	20	59.5 (151.5)
CB2-3 to X21	5	5.0 (13.0)
CB3-1 to X1	30	AR
CB3-2 to RW-1	30	80.0 (203.5)
CB3-3 to FW-1	30	27.0 (69.0)
CB3-4 to X20	3	8.0 (20.5)
CB4-1 to P5-F	40	44.0 (112.0)
CB4-2 to X20	3	AR
CB5-1 to J3-1	50	70.0 (178.0)
CB5-2 to DS1-1	50	58.0 (147.5)
CB5-3 to J1-37	50	107.5 (273.5)
CB5-4 to X20	3	7.0 (18.0)
CB6-1 to J2-1	9	105.0 (267.0)
CB6-2 to X22	1	9.0 (23.0)
CB7-1 to X16	70	AR
CB7-2 to X21	5	6.0 (15.5)
CB8-1 to X18	80	AR
CB8-2 to X20	3	6.0 (15.5)
CB9-1 to SS2-2	83	49.5 (126.0)
CB9-2 to X20	3	4.0 (10.5)
CB10-1 to TS2-1	24	16.0 (41.0)
CB10-2 to RY4-4	29	20.5 (52.5)
CB10-3 to S10-1	20	42.5 (108.0)
DS1-1 to CB5-2	50	58.0 (147.5)
DS1-2 to S4-8	59	9.5 (24.5)
DS1-3 to X15	2	21.0 (53.5)
DS2-1 to X14	10	AR
DS2-2 to J1-11	14	125.5 (319.0)
DS2-3 to X15	2	21.0 (53.5)
DS3-1 to X14	10	AR
DS3-2 to J1-13	16	114.5 (291.0)

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
DS3-3 to X15	2	12.0 (30.5)
DS4-1 to X14	10	AR
DS4-2 to J1-15	18	121.5 (309.0)
DS4-3 to X15	2	9.0 (23.0)
DS5-1 to X14	10	AR
DS5-2 to S15-1	11	106.5 (270.5)
DS5-3 to X15	2	11.0 (28.0)
DS6-1 to X14	10	AR
DS6-2 to BR	23	131.5 (334.0)
DS6-3 to X15	2	AR
FF-1 to X26	72	AR
FF-2 to X26	72	AR
FW-1 to CB3-3	30	27.0 (69.0)
FW-2 to FW-4	31	6.5 (16.5)
FW-2 to S5-2	31	53.5 (136.0)
FW-3 to FW-5	32	6.5 (16.5)
FW-3 to S5-3	32	53.5 (136.0)
G1-1 to X13	13	AR
G1-2 to X14	10	AR
G1-3 to X15	2	AR
G1-4 to J1-10	15	123.5 (314.0)
G2-1 to X13	13	AR
G2-2 to X14	10	AR
G2-3 to X15	2	AR
G2-4 to J1-12	17	122.5 (311.0)
G3-1 to X13	13	AR
G3-2 to X14	10	AR
G3-3 to X15	2	AR
G3-4 to J1-14	19	119.5 (303.5)
G4-2 to X14	10	AR
G4-3 to X15	2	AR
G5-1 to X13	13	AR

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
G5-2 to X14	10	AR
G5-3 to X15	2	AR
G6-1 to X13	13	AR
G6-2 to X14	10	AR
G6-3 to X15	2	AR
G6-4 to J1-16	12	119.5 (303.5)
H1-1 to S10-2	22	45.5 (116.0)
H1-2 to VEH. GND. -5	2	32.0 (81.5)
HR-1 to S13-3	82	61.0 (155.0)
HR-2 to S13-2	81	61.0 (155.0)
J1		
-1 Blank		
-2 to P5-M	49	118.5 (301.0)
-3 to P5-D	47	118.5 (301.0)
-4 to P5-L	48	118.5 (301.0)
-5 to X3	45	AR
-6 to P5-C	43	118.5 (301.0)
-7 to P5-N	44	118.5 (301.0)
-8 to P5-H	46	118.5 (301.0)
-9 to TS1-3	27	129.5 (329.0)
-10 to G1-4	15	123.5 (314.0)
-11 to DS2-2	14	125.5 (319.0)
-12 to G2-4	17	122.5 (311.5)
-13 to X25	16	AR
-14 to G3-4	19	118.5 (301.0)
-15 to DS4-2	18	121.5 (309.0)
-16 to G6-9	12	119.5 (303.5)
-17 to S11-1	7	84.5 (215.0)
-18 to S9-3	9	126 (320.0)
-19 to S8-2	21	137.5 (349.5)
-20 to S12-1	8	70.5 (179.5)
-21 to S11-4	92	84.5 (215.0)

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
-22 to X24	91	AR
-23 to X14	10	AR
-24 to S2-1	73	117.0 (297.5)
-25 to S3-1	71	115.5 (293.5)
-26 to TS1-4	28	129.5 (329.0)
-27 to J3-8	51	61.5 (156.5)
-28 to J3-5	52	61.5 (156.5)
-29 to X12	53	AR
-30 to X11	54	AR
-31 to J3-9	55	61.5 (156.5)
-32 to J3-6	56	61.5 (156.5)
-33 to S4-5	57	135.5 (344.5)
-34 to S4-2	58	135.5 (344.5)
-35 to S4-3	65	135.5 (344.5)
-36 to S4-6	64	135.5 (344.5)
-37 to CB5-3	50	107.5 (273.5)
J2		
-1 to CB6-1	9	105.0 (267.0)
-2 to VEH. GND-1	2	111.0 (282.0)
J3		
-1 to CB5-1	50	60.0 (152.5)
-2 Blank		
-3 to VEH. GND.-2	2	60.0 (152.5)
-4 to X11	54	AR
-5 to J1-28	52	61.5 (156.5)
-6 to J1-32	56	61.5 (156.5)
-7 to X12	53	AR
-8 to J1-27	51	61.5 (156.5)
-9 to J1-31	55	61.5 (156.5)
P5		
-A to S14-1	41	117.0 (297.5)
-B to X13	13	AR

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
-C to J1-6	43	118.5 (301.0)
-D to J1-3	47	118.5 (301.0)
-E to X3	45	AR
-F to CB4-1	40	44.0 (112.0)
-H to J1-8	46	118.5 (301.0)
-J Blank		
-K S14-2	42	117.0 (297.5)
-L J1-4	48	118.5 (301.0)
-M J1-2	49	118.5 (301.0)
-N J1-7	44	118.5 (301.0)
RW-1 to CB3-2	30	80.0 (203.5)
RW-2 to S7-2	33	105.5 (268.0)
RW-3 to S7-3	34	105.5 (268.0)
RY1-1 to X22	1	11.0 (28.0)
RY1-2 to X20	3	15.0 (38.5)
RY1-3 to S9-2	6	49.5 (126.0)
RY1-4 to S12-2	6	44.0 (112.0)
RY1-6 to X23	2	12.0 (30.5)
RY2-1 to X20	3	11.0 (28.0)
RY2-2 to X21	5	11.0 (28.0)
RY2-3 to X3	45	AR
RY2-4 to X23	2	9.0 (23.0)
RY3-1 to X25*	16	23.5 (60.0)
RY3-2 to X24	91	12.0 (30.5)
RY3-3 to X14	10	36.0 (91.5)
RY3-4 to X24	91	12.0 (30.5)
RY4-1 to VEH. GND.-7	2	27.5 (70.0)
RY4-2 to X3	45	AR
RY4-3 to X22	1	AR
RY4-4 to CB10-2	29	20.5 (52.5)
S1-1 to X26	72	AR
S1-2 to X16	70	AR

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
S2-1 to J1-24	73	117.0 (297.5)
S2-2 to X16	70	AR
S3-1 to J1-25	71	115.5 (293.5)
S3-2 to X16	70	AR
S4-1 to X11	54	AR
S4-2 to J1-34	58	135.5 (344.5)
S4-3 to J1-35	65	135.5 (344.5)
S4-4 to X12	53	AR
S4-5 to J1-33	57	135.5 (344.5)
S4-6 to J1-36	64	135.5 (344.5)
S4-7 to VEH. GND.-4	2	64.5 (164.0)
S4-8 to DS1-2	59	9.5 (24.5)
S5-1 to X1	30	AR
S5-2 to FW-2	31	53.5 (136.0)
S5-3 to FW-3	32	53.5 (136.0)
S6-1 to X1	30	AR
S6-2 to WA	35	104.0 (264.5)
S7-1 to X1	30	AR
S7-2 to RW-2	33	105.5 (268.0)
S7-3 to RW-3	34	105.5 (268.0)
S8-1 to CB2-1	20	59.5 (151.5)
S8-2 to J1-19	21	137.5 (349.5)
S9-1 to X22	1	40.0 (102.0)
S9-2 to RY1-3	6	49.5 (126.0)
S9-3 to J1-18	4	126.0 (320.0)
S9-4 to S11-2	36	75.5 (192.0)
S10-1 to CB10-3	20	42.5 (108.0)
S10-2 to H1-1	22	45.5 (116.0)
S11-1 to J1-17	7	84.5 (215.0)
S11-2 to S9-4	36	75.5 (192.0)
S11-3 to X24	91	60.0 (152.5)
S11-4 to J1-21	92	84.5 (215.0)

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

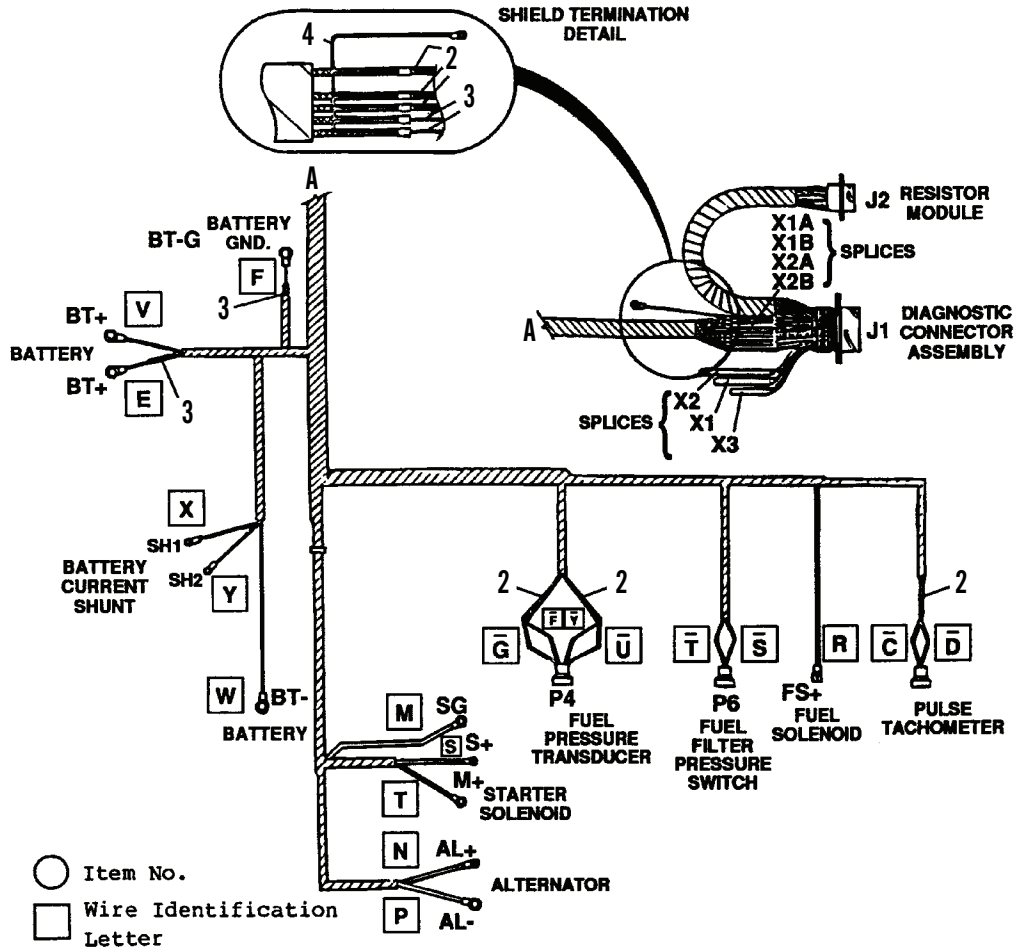
Connection Points	Wire No.	Length: in. (cm)
S12-1 to J1-20	8	70.5 (179.5)
S12-2 to RY1-4	6	44.0 (112.0)
S13-1 to X18	80	AR
S13-2 to HR-2	81	61.0 (155.0)
S13-3 to HR-1	82	61.0 (155.0)
S14-1 to P5-A	41	117.0 (297.5)
S14-2 to P5-K	42	117.0 (297.5)
S15-1 to DS5-2	11	106.5 (271.0)
S15-2 to SS3-1	2	40.0 (102.0)
SS1-1 to SS2-1	84	110.5 (281.0)
SS1-2 to SS3-2	2	16.0 (41.0)
SS1-3 to SS2-3	85	110.5 (281.0)
SS1-4 to SS3-3	2	16.0 (41.0)
SS2-1 to SS1-1	84	110.5 (281.0)
SS2-2 to CB9-1	83	49.5 (126.0)
SS2-3 to SS1-3	85	110.5 (281.0)
SS3-1 to S15-2	2	40.0 (102.0)
SS3-2 to SS1-2	2	16.0 (41.0)
SS3-3 to SS1-4	2	16.0 (41.0)
TS1-1 to TS2-2	25	60.0 (152.5)
TS1-2 to TS2-3	26	60.0 (152.5)
TS1-3 to J1-9	27	129.5 (329.0)
TS1-4 to J1-26	28	129.5 (329.0)
TS2-1 to CB10-1	24	16.0 (41.0)
TS2-2 to TS1-1	25	60.0 (152.5)
TS2-3 to TS1-2	26	60.0 (152.5)
Vehicle Ground (VEH. GND.)		
-1 to J2-2	2	111.0 (282.0)
-2 to J3-3	2	60.0 (152.5)
-3 to X15	2	AR
-4 to S4-7	2	64.5 (164.0)
-5 to H1-2	2	32.0 (81.5)

CAB WIRING HARNESS - CONTINUED**Table 2. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
-6 to X23	2	AR
-7 to RY4-1	2	27.5 (70.0)
WA to S6-2	35	104.0 (264.5)

STE/ICE-R WIRING HARNESS

STE/ICE-R Wiring Harness.



409-215

NOTE

- All wire letters with a bar over them are lower case letters; i.e., A = a.
- All wires are 16 AWG, single conductor, (item 1) unless otherwise noted.

Item	Cage	Part No.	Description	QTY
--	3Y949	6602045	STE/ICE-R Wire Harness	1
1	64488	81163S	Wire, 1-Conductor, 16 AWG	AR
2			Wire, 2-Conductor Shielded, 16 AWG	AR
2			Wire, 1-Conductor Shielded, 16 AWG	AR
4	64488	81203S	Wire, 1-Conductor, 20 AWG	AR

STE/ICE WIRING HARNESS- CONTINUED**NOTE**

All wire numbers (letters) with a bar over them are lower case letters; i.e., A = a.

Table 3. Wire List.

Connection Points	Wire No.	Length: in. (cm)
Alternator		
ALT+ to J1-N	N	162.0 (411.5)
ALT- to J1-P	P	162.0 (411.5)
Battery		
BT+ to J1-V	V	114.0 (290.0)
BT+ to J1-E	E	114.0 (290.0)
BT- to J1-W	W	99.0 (251.5)
BT-G to J1-F	F	91.0 (231.5)
Battery Current Shunt		
SH1 to J1-X	X	95.0 (241.5)
SH2 to J1-Y	Y	95.5 (243.0)
Fuel Solenoid		
FS+ to J1-R	R	176.0 (447.5)
Starter Solenoid		
M+ to J1-T	T	144.0 (366.0)
S+ to J1-s	S	144.0 (366.0)
SG to J1-M	M	144.0 (366.0)
J1		
-a to X3	a	6.0 (15.5)
-AA to X1	AA	7.0 (18.0)
-AB to X2	AB	8.0 (20.5)
-AC to X1	AC	7.0 (18.0)
-AD to X2	AD	8.0 (20.5)
-b to X3	b	6.0 (15.5)
-c to P5-1	c	182.0 (462.5)
-D to J2-H	D-H	18.0 (46.0)
-d to P5-2	d	182.0 (462.5)
-E to BT+	E	114.0 (290.0)
-F to BT-G	F	91.0 (231.5)
-f to X1B	f	3.0 (8.0)

STE/ICE WIRING HARNESS - CONTINUED**Table 3. Wire List - Continued.**

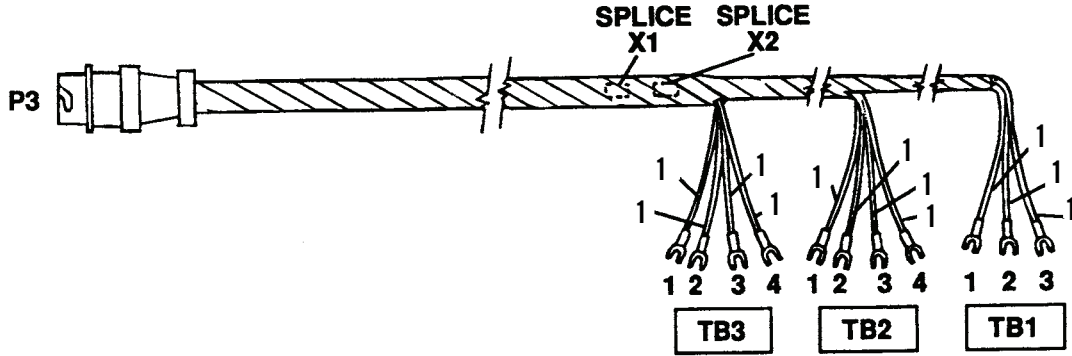
Connection Points	Wire No.	Length (Inches)
J1 - Continued		
-g to X1	g	7.0 (18.0)
-h to J2-d	h-D	12.0 (30.5)
-j to J2-E	j-E	12.0 (30.5)
-k to X1	k	7.0 (18.0)
-M to SG	M	144.0 (366.0)
-m to X2	m	8.0 (20.5)
-N to ALT+	N	162.0 (411.5)
-n to X1	n	7.0 (18.0)
-O to X3	O	6.0 (15.5)
-P to ALT-	P	162.0 (411.5)
-p to X2	p	8.0 (20.5)
R to FS+	R	176.0 (447.5)
-S to S+	S	144.0 (366.0)
-s to X2A	s	3.0 (8.0)
-T to M+	T	144.0 (366.0)
-t to X2B	t	3.0 (8.0)
-U to X3	U	6.0 (15.5)
-u to P4-3	u	160.0 (406.5)
-V to BT+	V	114.0 (290.0)
-v to P4-4	v	160.0 (406.5)
-W to BT-	W	99.0 (251.5)
-w to X1	w	7.0 (18.0)
-X to SH-1	X	95.0 (241.5)
-s to X2	x	8.0 (20.5)
-Y to SH-2	Y	95.0 (241.5)
-y to X1	y	7.0 (18.0)
-Z to X3	Z	6.0 (15.5)
-z to X2	z	8.0 (20.5)
J2		
-A to X1B	A	12.0 (30.5)
-C to X2	C	17.0 (43.5)

STE/ICE WIRING HARNESS - CONTINUED**Table 3. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
J2 - Continued		
-D to J1-h	h-D	12.0 (30.5)
-E to J1-j	j-E	12.0 (30.5)
-F to X2B	F	12.0 (30.5)
-G to X2A	G	12.0 (30.5)
-H to J1-D	D-H	18.0 (46.0)
-J to X1	J	16.0 (41.0)
P4		
-1 to X1B	f	155.0 (394.0)
-2 to X1A	g	155.0 (394.0)
-3 to J1-u	u	160.0 (406.5)
-4 to J1-v	v	160.0 (406.5)
P5		
-1 to J1-c	c	182.0 (462.5)
-2 to J1-D	d	182.0 (462.5)
P6		
-1 to X2B	t	165.0 (419.5)
-2 to X2A	s	165.0 (419.5)
Splice to Splice Connections		
X1 to X1A	X1	6.0 (15.5)

ELECTRIC JOYSTICK

Electric Joystick.



409-219

Item No.	Cage	Part No.	Description	QTY
--	3Y949	6602583	Joystick Wire Harness	1
1	64488	81163S	Wire, 1-Conductor, 16 AWG	AR

Table 4. Wire List.

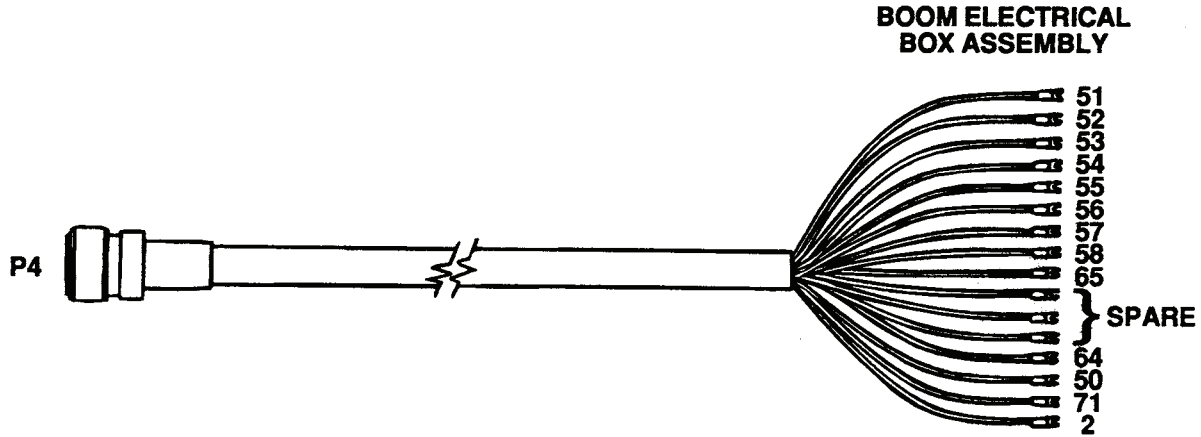
Connection Points	Wire No.	Length: in. (cm)
P3		
-1 to X2	50	11.0 (28.0)
-2 (Not Used)		
-3 to X1	2	9.0 (23.0)
-4 to TB2-2	54	16.0 (41.0)
-5 to TB1-3	52	17.0 (43.5)
-6 to TB3-2	56	15.0 (38.5)
-7 to TB2-3	53	16.0 (41.0)
-8 to TB1-2	51	17.0 (43.5)
-9 to TB3-3	55	15.0 (38.5)
TB1		
-1 to X1	2	8.0 (20.5)
-2 to P3-8	51	17.0 (43.5)
-3 to P3-5	52	17.0 (43.5)

ELECTRIC JOYSTICK - CONTINUED**Table 4. Wire List - Continued.**

Connection Points	Wire No.	Length: in. (cm)
TB2		
-1 to X1	2	7.0 (18.0)
-2 to P3-4	54	16.0 (41.0)
-3 to P3-7	53	16.0 (41.0)
-4 to X2	50	5.0 (13.0)
TB3		
-1 to X1	2	6.0 (15.5)
-2 to P3-6	56	15.0 (38.5)
-3 to P3-9F	55	15.0 (38.5)
-4 to X2	50	4.0 (10.5)

BOOM ELECTRICAL CABLE

Boom Electrical Cable.



409-220

NOTE

All wires are 18 AWG.

Item No.	Cage	Part No.	Description	QTY
--	3Y949	6602733	Boom Cable Wiring Harness	1
--	64488	81183S	Wire, 18 AWG, 16 X 0.010 strand	AR

Table 5. Wire List.

Connection Points	Wire No.	Length: in. (cm)
P4		
-A to Boom Electrical Box Assy.	54	483 (1227.0)
-C to Boom Electrical Box Assy.	2	483 (1227.0)
-F to Boom Electrical Box Assy.	Spare	483 (1227.0)
-H to Boom Electrical Box Assy.	52	483 (1227.0)
-J to Boom Electrical Box Assy.	53	483 (1227.0)
-K to Boom Electrical Box Assy.	51	483 (1227.0)
-L to Boom Electrical Box Assy.	56	483 (1227.0)
-M to Boom Electrical Box Assy.	57	483 (1227.0)
-N to Boom Electrical Box Assy.	50	483 (1227.0)
-P to Boom Electrical Box Assy.	65	483 (1227.0)
-R to Boom Electrical Box Assy.	64	483 (1227.0)
-S to Boom Electrical Box Assy.	58	483 (1227.0)
-T to Boom Electrical Box Assy.	Spare	483 (1227.0)

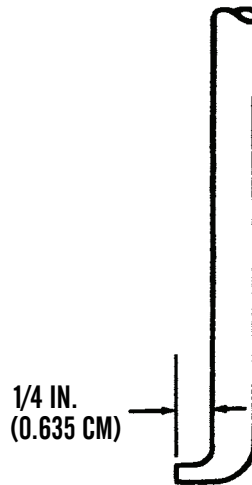
BOOM ELECTRICAL CABLE - CONTINUED

Table 5. Wire List - Continued.

Connection Points	Wire No.	Length: in. (cm)
P4 - Continued		
-U to Boom Electrical Box Assy.	Spare	483 (1227.0)
-W to Boom Electrical Box Assy.	71	483 (1227.0)
-X to Boom Electrical Box Assy.	55	483 (1227.0)

TANDEM GEAR PUMP

Tandem Gear Pump Seal Removal Tool.

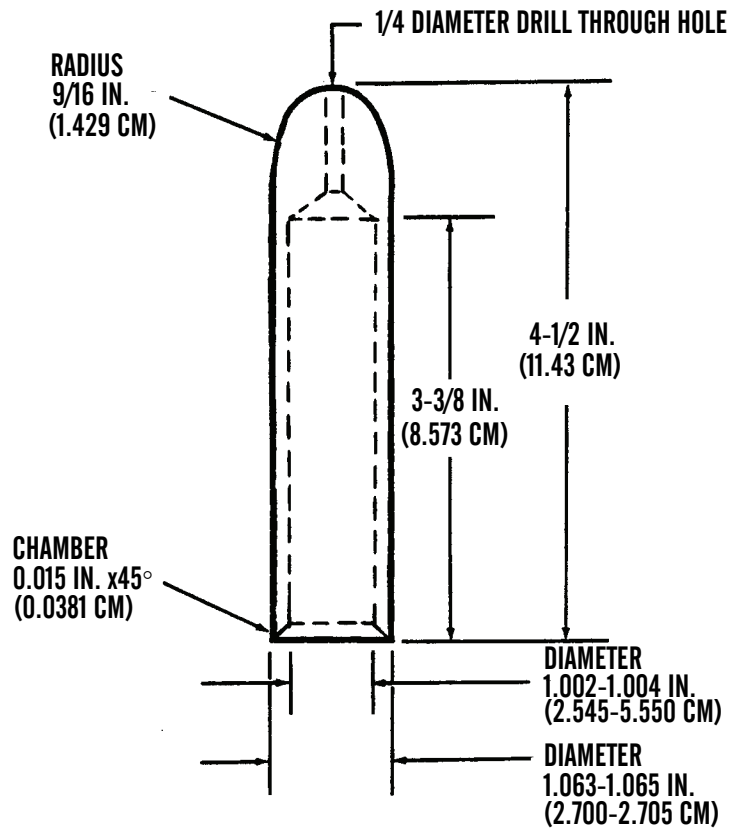


409-1488

1. Fabricated from a screwdriver.
2. Heat screwdriver tip and bend as shown.
3. Grind tip to fit notch behind shaft seal.

TANDEM GEAR PUMP - CONTINUED

Tandem Gear Pump Drive Gear Installation Tool.

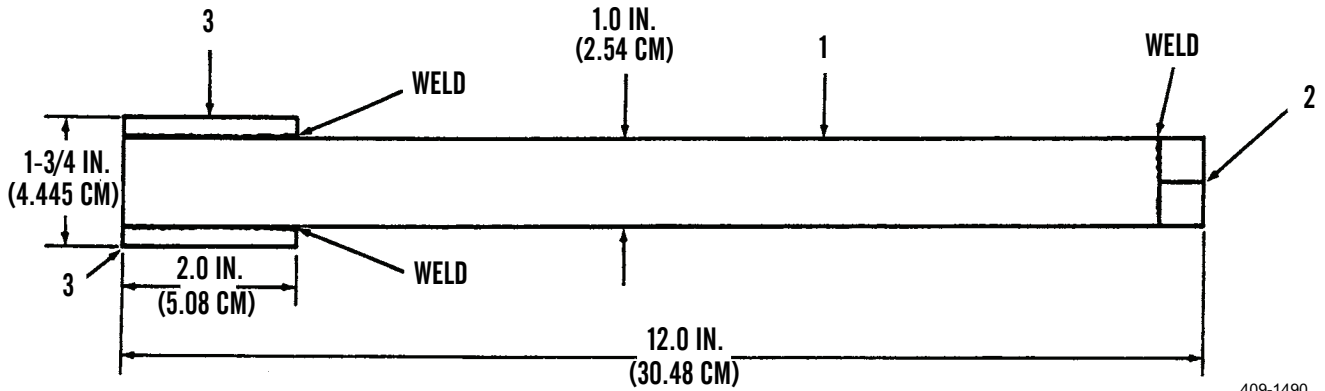


409-1489

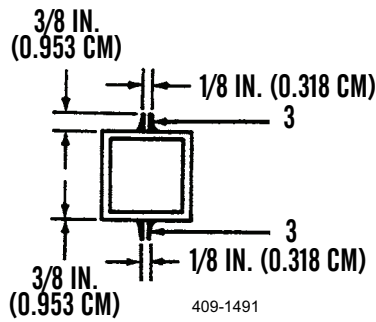
1. Fabricate from steel bar stock, 1-1/8 or 1-1/4 in. dia x 4-5/8 in. long (2.86 or 3.18 cm dia x 11.75 cm long).
2. All dimensions shown are in inches.
3. All external surfaces must be free of scratches and burrs.

DIFFERENTIAL RESISTANCE

Differential Resistance Tool.



409-1490



409-1491

Item	Description
1	Round Steel Stock, NSN 9150-00-199-1084
2	Hexagon Nut, NSN 5310-00-763-8920
3	Flat Bar Stock, NSN 9515-00-204-3972 (2)



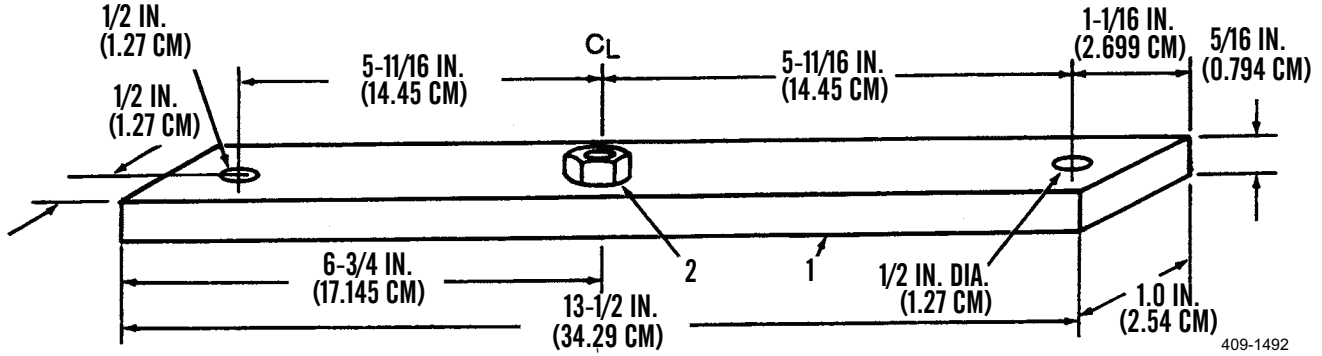
WARNING

Wear eye shields and protective gloves when fabricating this tool. Failure to do so may result in serious personal injury.

1. Fabricate as shown in illustration.
2. All dimensions are in inches.

PLANETARY HUB DRAG

Planetary Hub Drag Tool.



Item	Description
1	Steel Bar Stock, 5/16 in. (0.794 cm) x 1 in. (2.54 cm) x 13-1/2 in. (34.29 cm)
2	Hexagon Nut, 1/2-16, NSN 5310-01-270-173



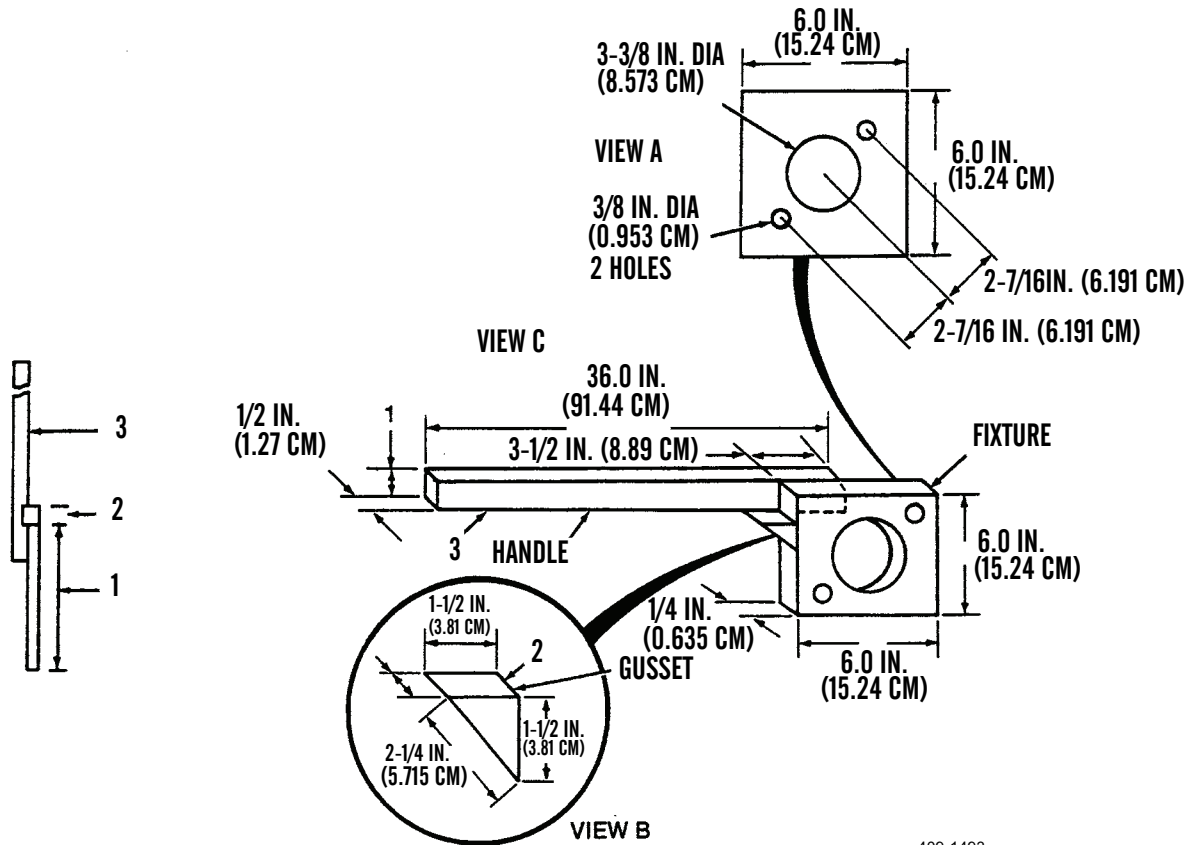
WARNING

Wear eye shields and protective gloves when drilling holes in the bar stock. Heated and flying metal parts may cause serious personal injury.

1. Drill two 1/2 in. (1.27 cm) diameter holes in the bar stock at the locations shown in the above illustration.
2. Remove burrs with a hand file.
3. Center hexagon nut (2) on bar stock (1) at location shown in above illustration.
4. Hold nut in place with a C-clamp and weld a single layer bead around the circumference of the nut.

YOKE

Yoke Tool Nut.



409-1493

Item	Description
1	Steel Plate, 1/4 in. (0.635 cm) x 6 in. (15.24 cm) x 6 in. (15.24 cm)
2	Steel Bar Stock, 1-1/2 in. (3.81 cm) x 1-1/2 in. (3.81 cm) x 3/8 in. (0.953 cm)
3	Steel Bar Stock, 1/2 in. (1.27 cm) x 1 in. (2.54 cm) x 36 in. (91.44 cm)

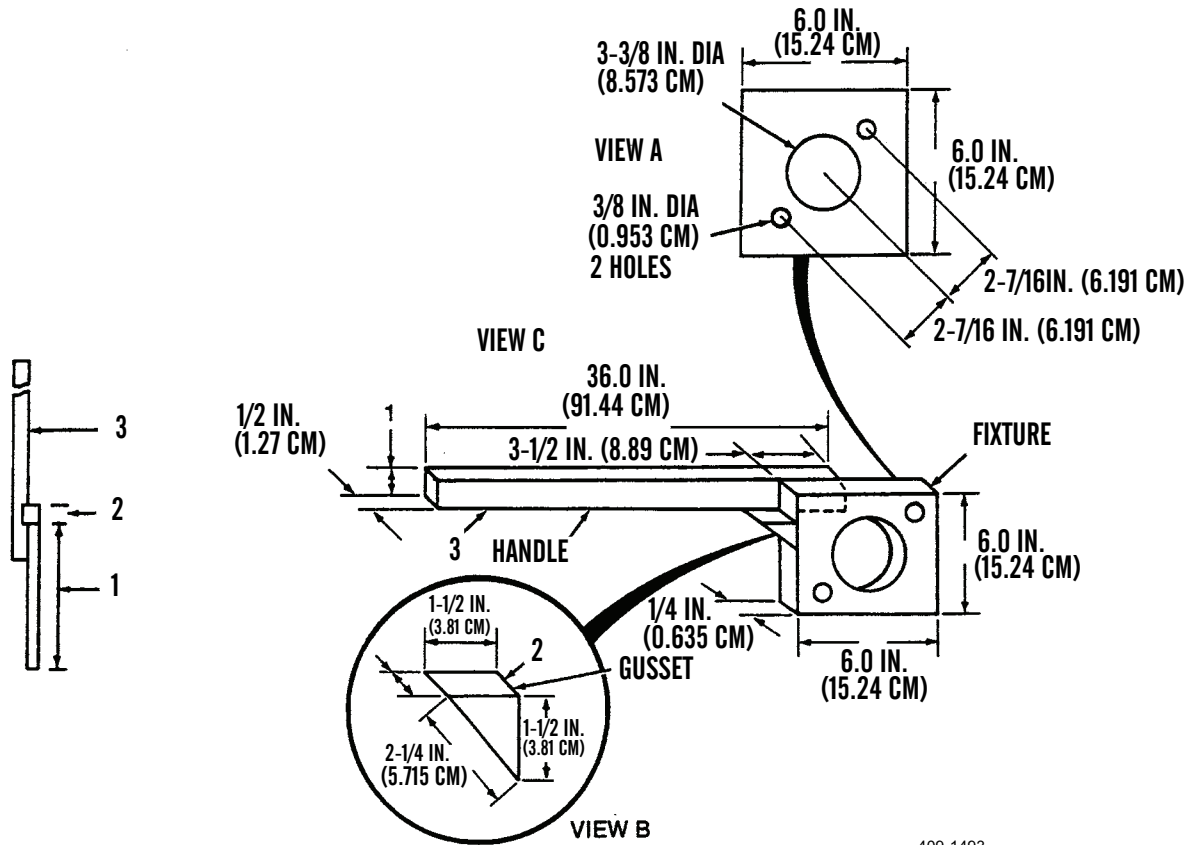


WARNING

Wear eye shields and protective gloves when fabricating the yoke nut tool. Flying metal particles and heated metal may cause serious personal injury.

1. Cut steel plate (1) to size 6 in. x 6 in. square as shown in view A. Remove all burrs and sharp edges with a hand file.
2. Drill two 3/8 in. holes in plate as shown in view A.
3. Cut out a 3-3/8 in. diameter hole in plate as shown in view A.

YOKE - CONTINUED

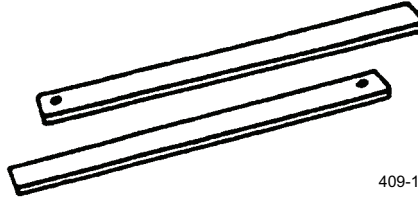


409-1493

4. Build a gusset, as shown in view B, from steel bar stock (2).
5. Hold bar stock (2) to steel plate (1), as shown in view C, with a C-clamp, and spot weld the two parts together.
6. Place gusset (view B) in the area shown in view C.
7. Weld a single bead over all adjoining metal.

TRANSMISSION ALIGNMENT BARS

Transmission Alignment Bars.



409-1494

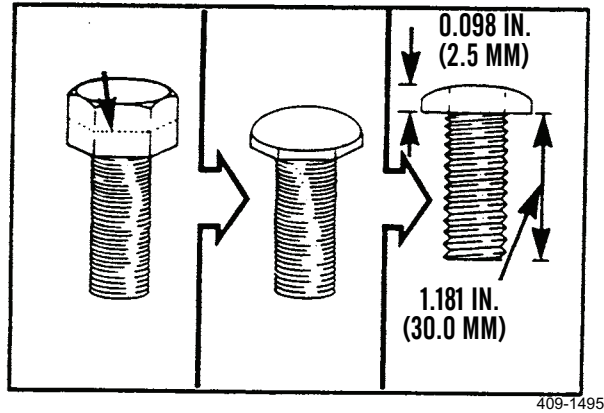
Table 6. Alignment Bars Dimension Data.

Bars Used* At	Bar Size			Number of Bars Required
	Width: in. (cm)	Length: in. (cm)	Height: in. (cm)	
First Stage Clutch Pack, Engine Side	2 (5.08)	12 (30.48)	5/8 (1.59)	2
First Stage Clutch Pack, Non-Engine Side	2 (5.08)	12 (30.48)	1/8 (0.32)	2
Second Stage Clutch Pack, Engine Side	2 (5.08)	12 (30.48)	1/8 (0.32)	2
Second Stage Clutch Pack, Non-Engine Side	2 (5.08)	12 (30.48)	1/4 (0.64)	2
Third Stage Clutch Pack, Engine Side Only	2 (5.08)	12 (30.48)	1/16 (0.16)	2
*Engine and non-engine side designations refer to clutch pack orientation when transmission is installed in vehicle.				

1. Fabricate bars from steel bar stock to the dimensions shown above.

BEARING

Bearing Removal/Installation Tool.



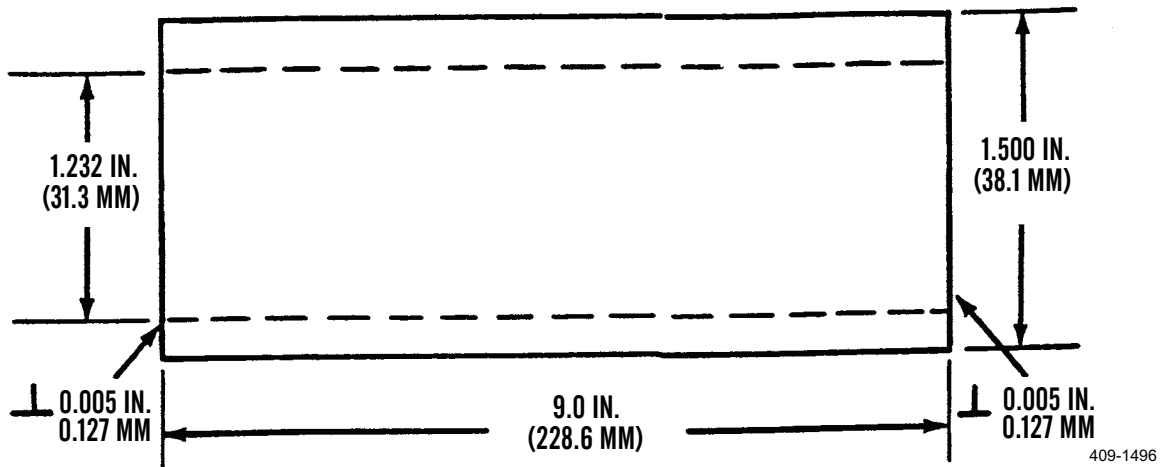
WARNING

Wear eye shields and protective gloves when fabricating the bearing removal/installation tool. Flying metal particles and heated metal may cause serious personal injury.

1. Fabricated from 0.236 in. (6 mm) capscrew.
2. All external surfaces must be free of scratches and burrs.

HYDRAULIC PISTON PUMP

Driveshaft/Pump Housing Bearing Removal Tool.



HYDRAULIC PISTON PUMP - CONTINUED

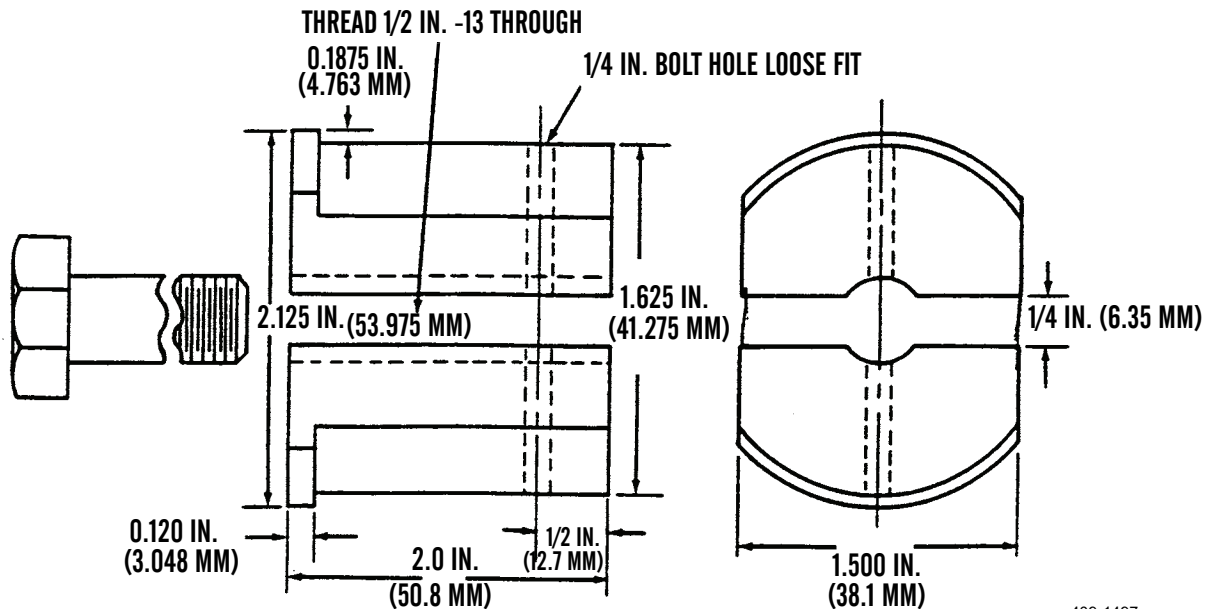


WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine removal tool from 1-1/2 in. (38.1 mm) steel pipe per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges.

Housing Bearing Race Removal Tool.



409-1497



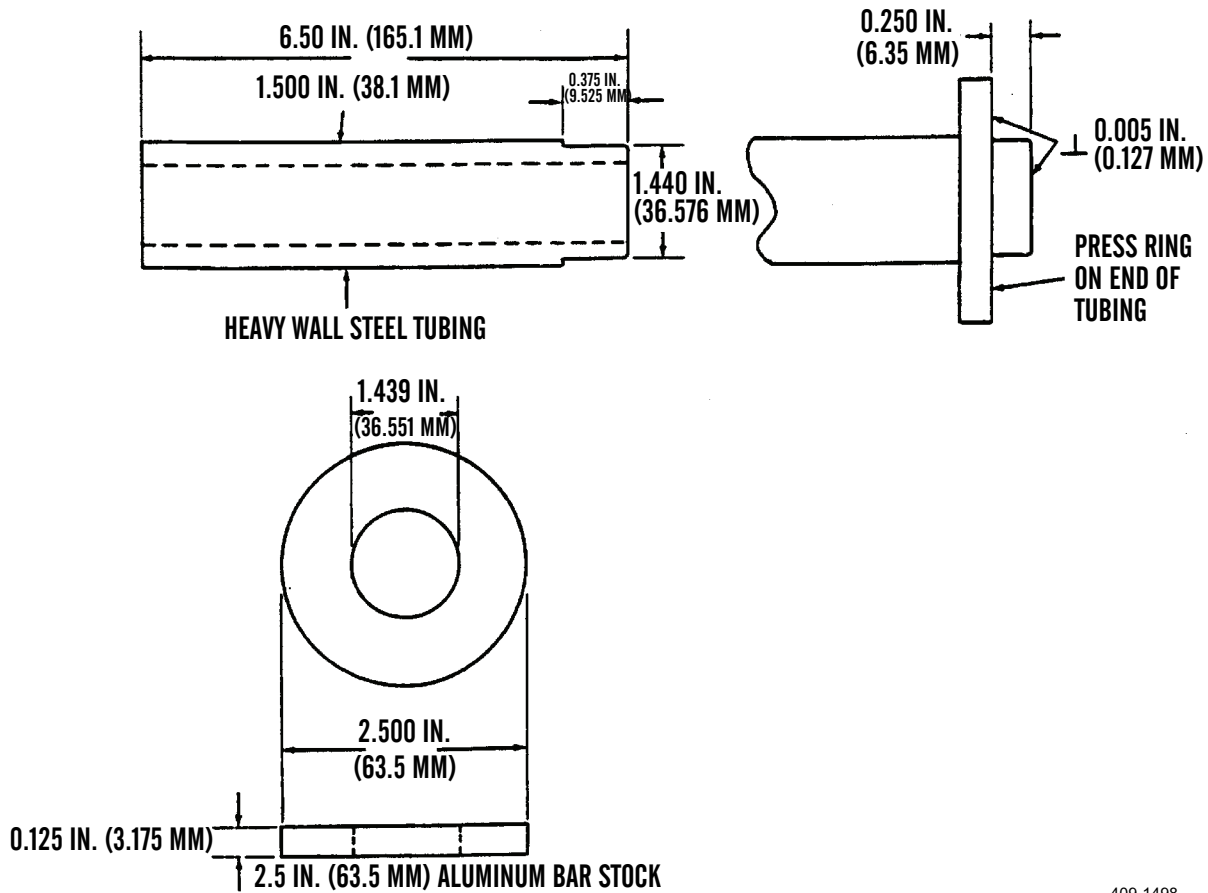
WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine removal tool from 2 in. (50.8 mm) long steel bar stock per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges. Use a 5 in. (127.0 cm) long 1/2-13 hex head screw with this tool.

HYDRAULIC PISTON PUMP - CONTINUED

Shaft Seal Driver.



409-1498



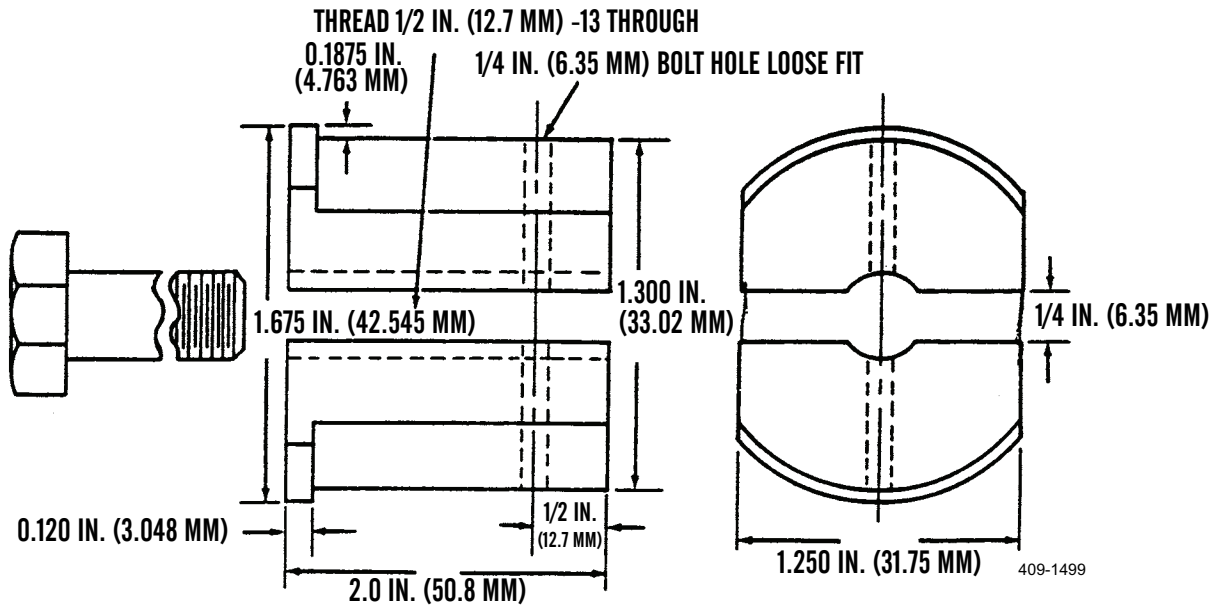
WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine installation tool from heavy wall steel tubing and aluminum bar stock per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges.

HYDRAULIC PISTON PUMP - CONTINUED

Valve Block Bearing Race Removal Tool.

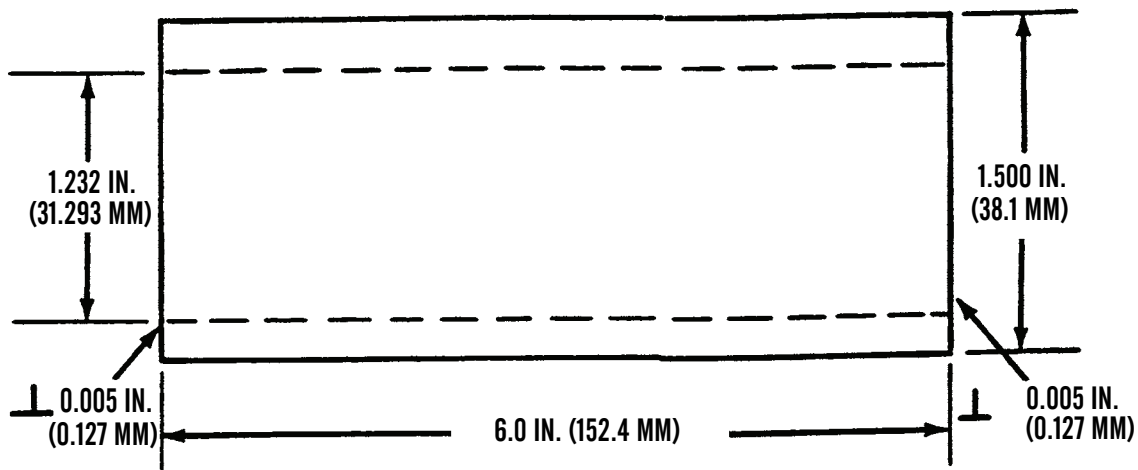


WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine removal tool from 2 in. (50.8 mm) long steel bar stock per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges. Use a 5 in. (127 mm) long 1/3-13 hex head screw with this tool.

Driveshaft/Pump Housing Bearing Installation Tool.



409-1500

HYDRAULIC PISTON PUMP - CONTINUED

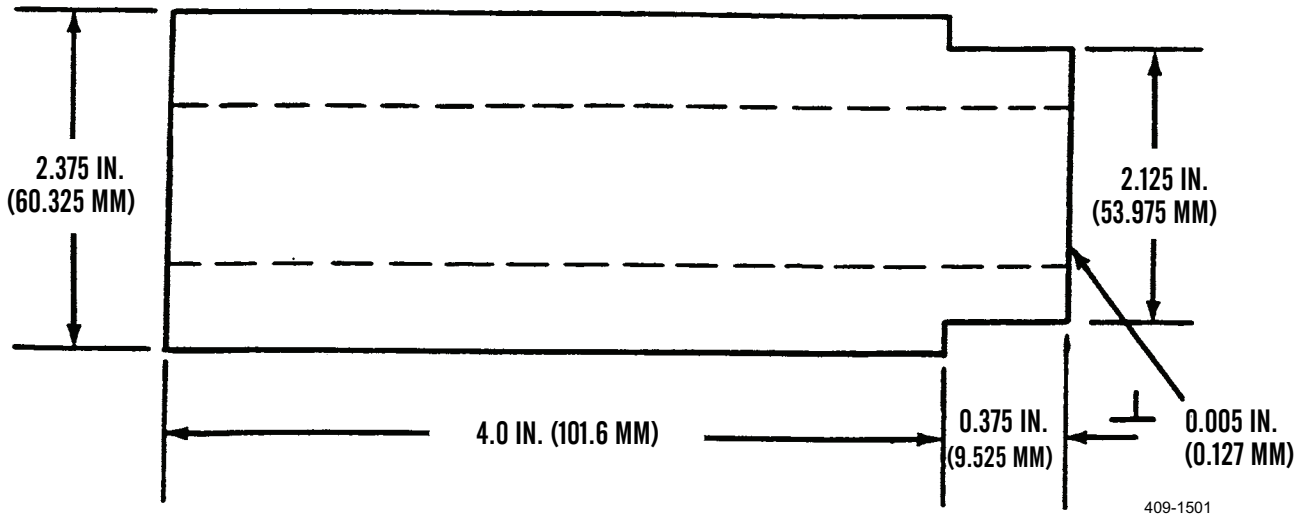


WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine installation tool from 1-1/2 in. (38.1 mm) steel pipe per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges.

Housing Bearing Race Installation Tool.



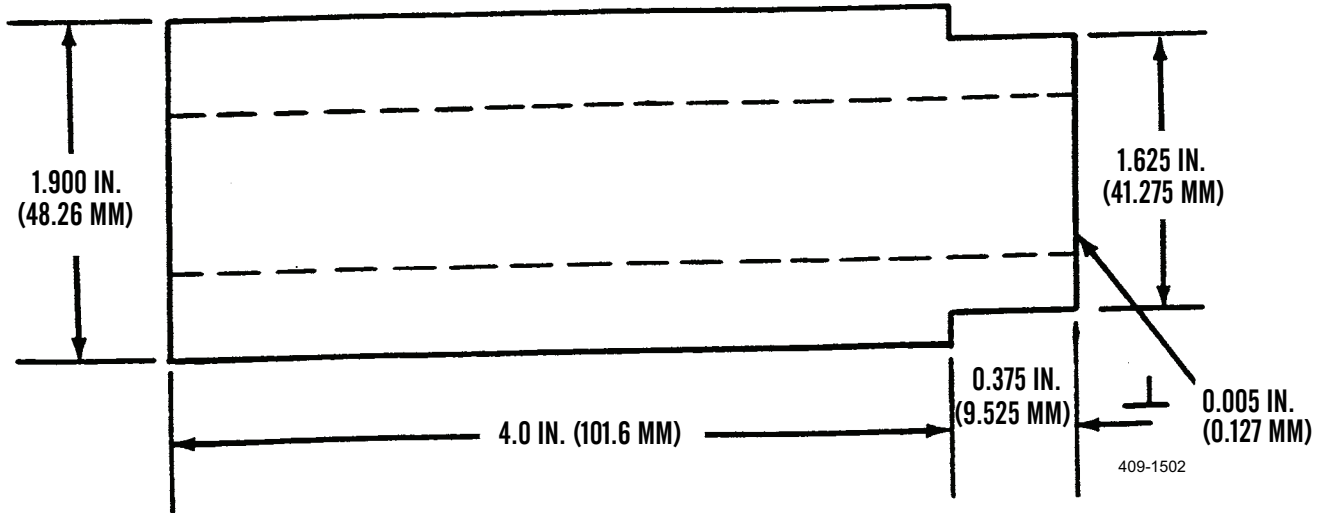
WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine installation tool from schedule 80 steel pipe per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges.

HYDRAULIC PISTON PUMP - CONTINUED

Valve Block Bearing Race Installation Tool.



WARNING

Wear eye shields and protective gloves when fabricating this tool. Flying metal particles and heated metal may cause serious personal injury.

Machine installation tool from schedule 80 steel pipe per the dimensions on sketch. All surfaces are to be smooth and flat. Radius or chamfer all sharp edges.

END OF WORK PACKAGE

6000M EPA ENGINE RETROFIT INSTALLATION INSTRUCTIONS

FOR KIT #6623292

6000M EPA Engine Retrofit Installation Instructions

For Kit #6623292

B
SER
1/04

6623293

JLG®

1. ENGINE OIL PRESSURE SENDER REPLACEMENT (new engine)

REMOVAL (Figure 1)

- Tag, mark and disconnect hose (1) from tee (2) on new engine block.
- Remove tee (2) and bushing (3) from new engine block. Discard tee and bushing.

INSTALLATION (Figure 2)

- (From the kit) install adapter # 8770065 (2) in new engine.
- (From the kit) apply sealing compound on threads of nipple # 8530027 (3) and install nipple in adapter (2).
- (From the kit) Apply sealing compound on threads of adapter # 8760011 (4) and tee # 8530028 (5).
- Install tee (5) on nipple (3) and adapter (4) on tee (5).
- Apply sealing compound to threads of old engine oil pressure sender (6) and install sender in tee (5).
- Connect hose (1) from new engine block on adapter (4).

AFTER INSTALLATION OF NEW ENGINE (Figure 2)

- Install electrical wire No. "17" (7) on old engine oil pressure sender with lockwasher and nut.

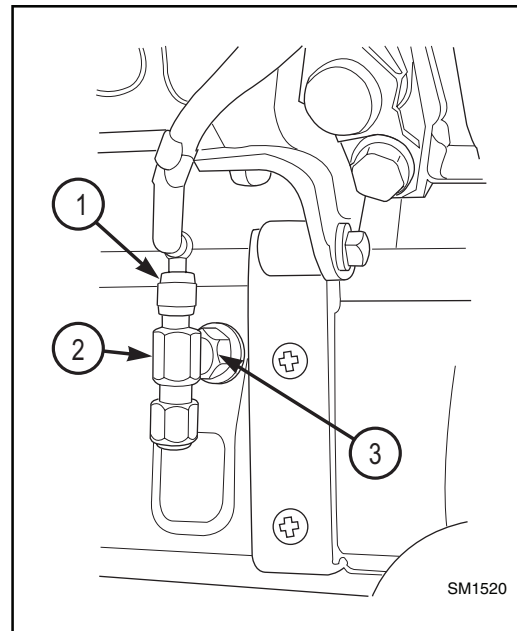


Figure 1

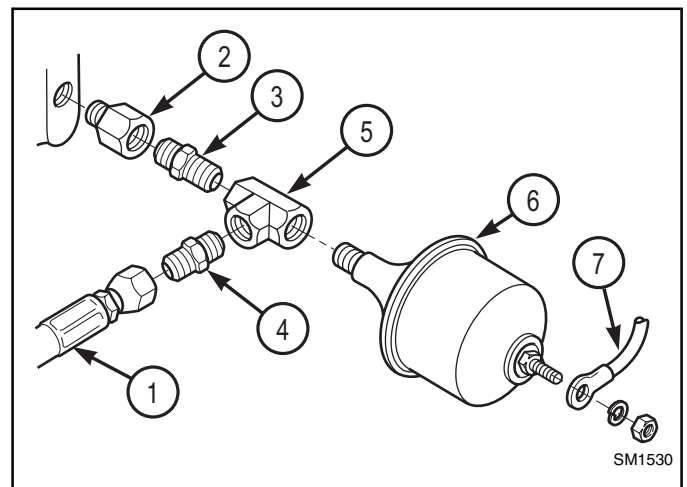


Figure 2

2. ENGINE OIL PRESSURE SWITCH REPLACEMENT (new engine)

REMOVAL (Figure 3)

- a. Remove plug (1) from new engine block. Discard plug.

INSTALLATION (Figure 4)

- a. (From the kit) apply sealing compound on threads of adapter # 8770065 (1) nipple # 8530027 (2) and tee # 8530028 (3).
- b. Install adapter (1) nipple (2) and tee (3) in new engine block.
- c. Apply sealing compound to threads of old engine oil pressure switch and old valve.
- d. Install old engine oil pressure switch (4) and old valve (5) on tee (3).

AFTER INSTALLATION OF NEW ENGINE (Figure 4)

- a. Install starwasher, electrical wire No."16" (6), on old engine oil pressure switch (4) with starwasher and nut.
- b. Remove oil sampling decal plate from old engine and install decal plate on new engine.

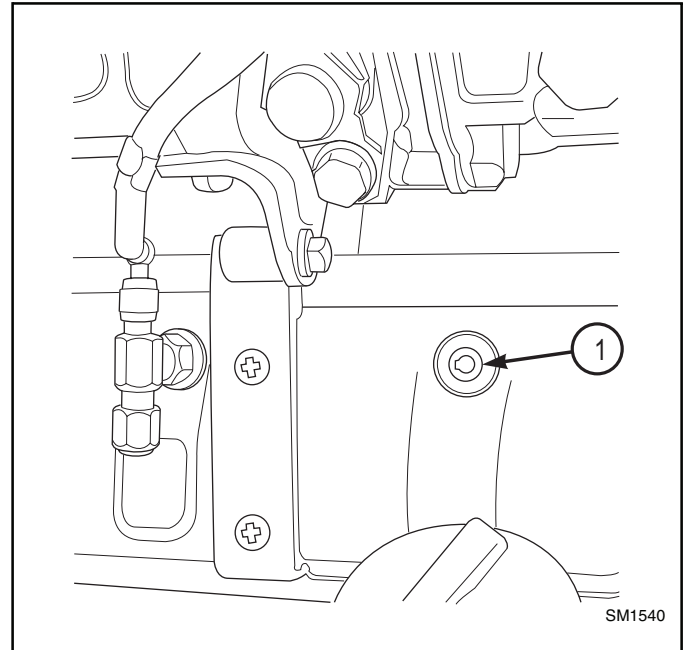


Figure 3

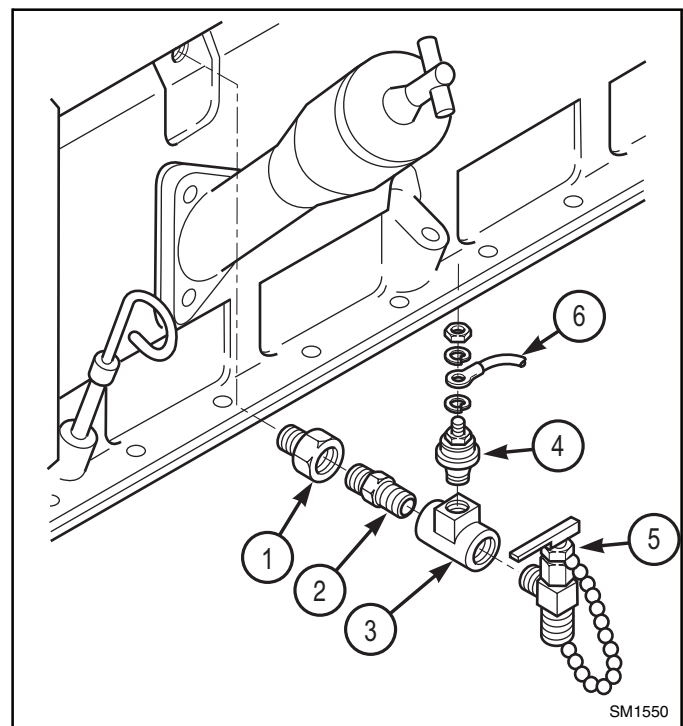


Figure 4

3. STE/ICE FUEL PRESSURE SENDER AND STE/ICE FUEL FILTER DIFFERENTIAL PRESSURE SWITCH REPLACEMENT. (new engine)

REMOVAL (Figure 5)

- a. Remove capscrew (1) banjo inlet screw (2) and washer (3) from fuel filter system of the new engine block. Discard capscrew and banjo inlet screw.
- b. Remove capscrew (4) and washer (5) from fuel filter system of the new engine block. Discard capscrew.

INSTALLATION

- a. Install washer (3) see removal (Figure 5) and (from the kit) the banjo inlet screw #6618322 (1) in the fuel filter system (5) of the new engine block. (Figure 6).
- b. (From the kit) apply sealing compound to threads on elbow #8760220 (2) and install on banjo inlet screw (1). (Figure 6).
- c. Install washer (5) see removal and old engine banjo inlet screw (4) in the fuel filter system (5) of the new engine block. (Figure 7).
- d. Apply sealing compound to tee (6), fuel pressure sender (7) and adapter (8) of the old engine. (Figure 7).
- e. Install tee (6), fuel pressure sender (7) and adapter (8) on old engine banjo inlet screw (4). (Figure 7).
- f. Install two starwasher (9), bracket (10), lockwashers (11) and screws (12) on new engine block. Tighten to 50 lb-ft. (Figure 7).
- g. Apply sealing compound to threads of elbow (14) (Figure 6) and adapter (13). (Figure 6)
- h. Install elbow (14) and adapter (13) on fuel differential pressure switch (15). (Figure 6).

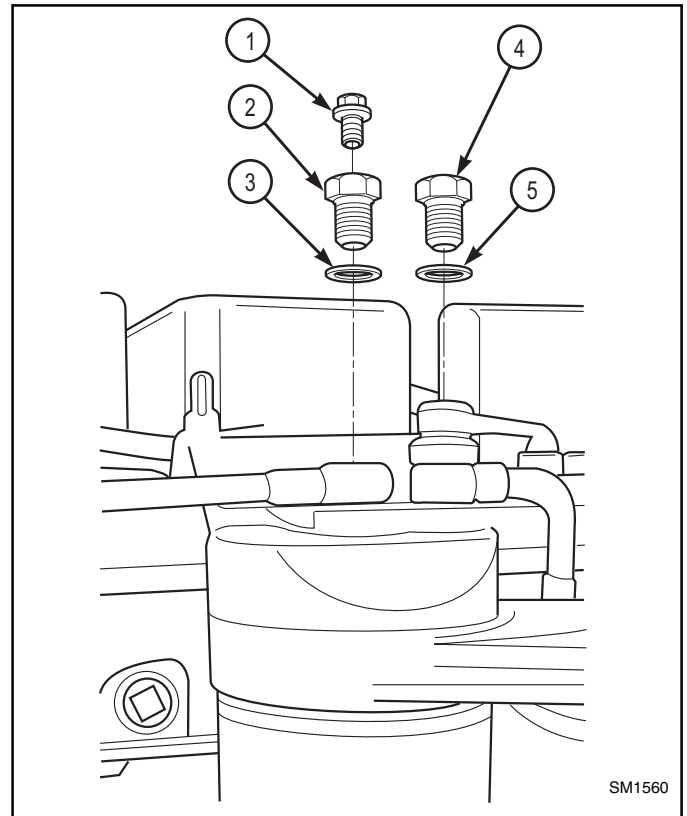


Figure 5

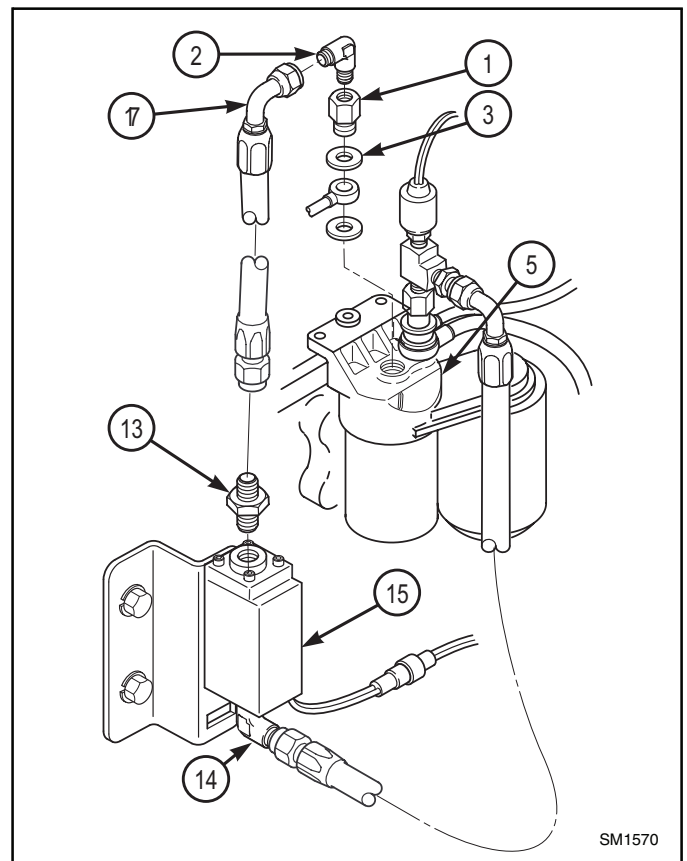


Figure 6

3. STE/ICE FUEL PRESSURE SENDER AND STE/ICE FUEL FILTER DIFFERENTIAL PRESSURE SWITCH REPLACEMENT. (new engine) (cont.)

- i. Install fuel differential pressure switch (15) on bracket (10) with (from the kit) two tie straps #8584001 (16). (Figure 7).
- j. Install (from the kit) hose #2714342 (17) on elbow (2) and adapter (13). (Figure 6).
- k. Install (from the kit) hose #2714352 (18) on elbow (14) and adapter (8). (Figure 7).

AFTER INSTALLATION OF NEW ENGINE (Figure 7)

- a. Connect switch connector (19) on vehicle wire harnesses connector (20) of old vehicle.

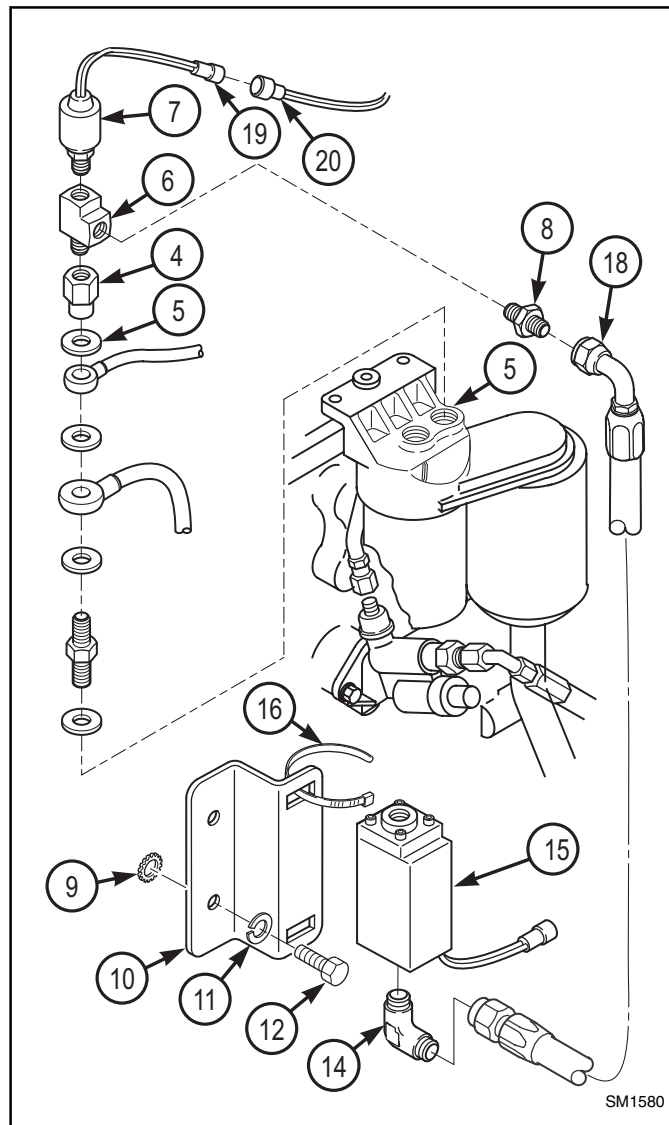


Figure 7

4. FUEL DRAIN TUBE REPLACEMENT (new engine)

AFTER INSTALLATION OF NEW ENGINE

REMOVAL

- Remove plastic cap (1) from banjo fitting (2) on new engine block. Discard plastic cap. (Figure 8).
- Loosen banjo fitting (2) and position it at 45 degree angle. Tighten fitting. (Figure 8).
- Remove and discard one hose clamp (3) and fuel drain line (4) from vehicle. (Figure 9).
- Remove and discard elbow (5) from vehicle fuel tank. (Figure 9).

INSTALLATION (Figure 10)

- Apply sealing compound on threads of elbow # 8430039 (1) (From the kit) and install on vehicle fuel tank. (Figure 10).
- (From the kit) position fuel drain line # 6620181(2) on vehicle. (Figure 10).
- Install fuel drain line (2) (Figure 10) on banjo fitting (2) see removal (Figure 8) and elbow (1) with 2 clamp # 8405009 (3) (From the kit). (Figure 10).

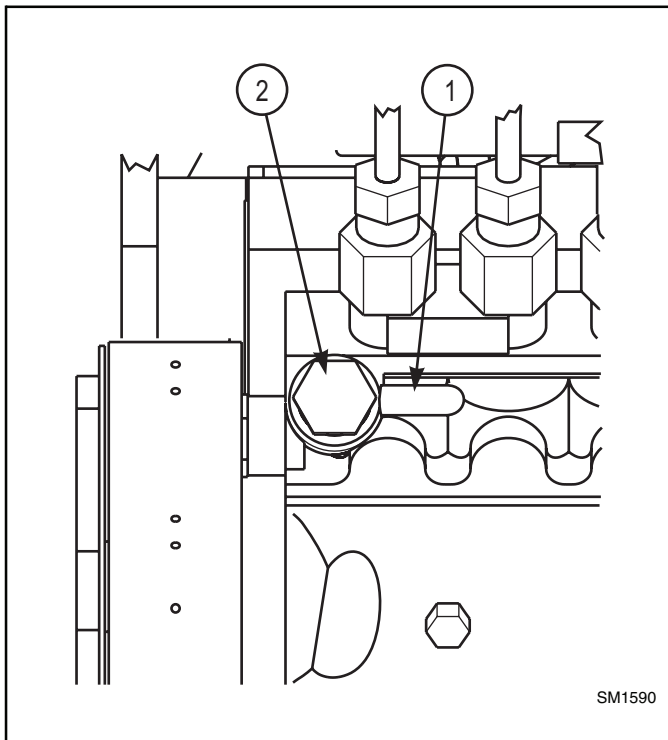


Figure 8

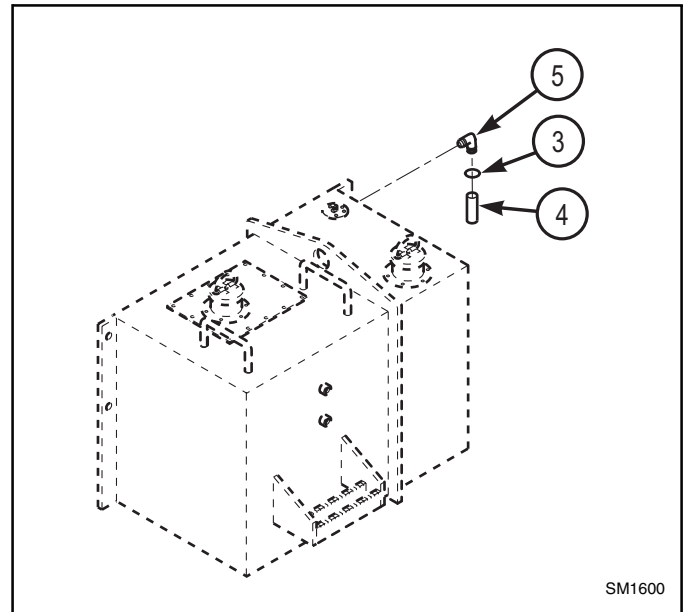


Figure 9

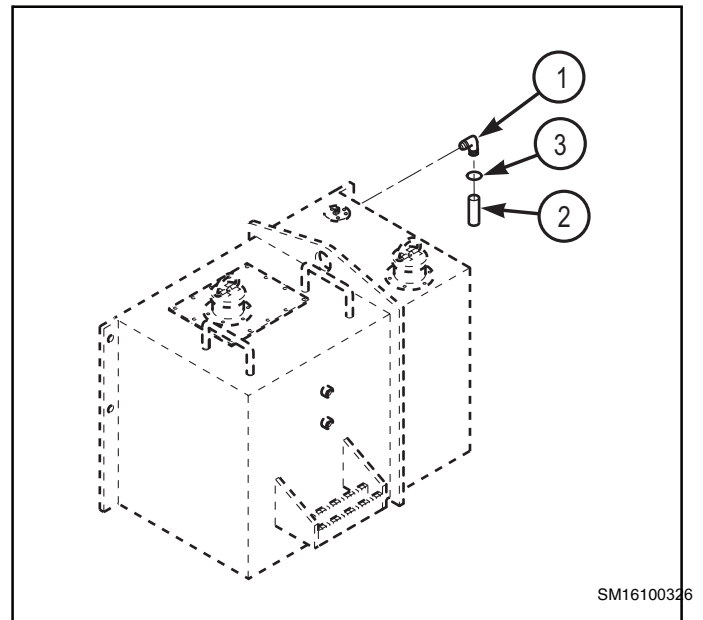


Figure 10

5. AIR CLEANER REPLACEMENT/REPAIR (new engine)

AFTER INSTALLATION OF NEW ENGINE

INSTALLATION (Figure 11)

- a. (From the kit) position hose # 8273124 (1) and hose # 6618383 (2) on sleeve # 6618462 (3).
- b. Position two hoses (1 and 2) on turbocharger (5) and housing (6).
- c. (From the kit) install 2 clamps #8410010 (4).
- d. (From the kit) install clamp #8405404 (7) and clamp (8) from the removal procedure. Tighten clamps to 216 lb-in.

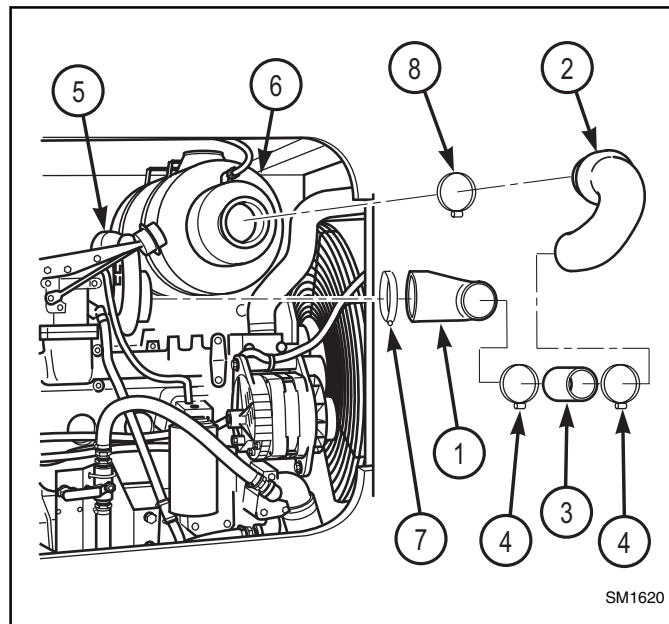


Figure 11

6. ENGINE WATER TEMPERATURE SWITCH REPLACEMENT (new engine)

REMOVAL (Figure 12)

- a. Remove plug (1) from new engine block. Discard plug.

INSTALLATION (Figure 13)

- a. (From the kit) apply sealant compound 592 to the threads of bushing #6618362 (1) and install into the new engine block.
- b. Apply sealing compound to threads of the old engine water temperature switch (2) and install on bushing (1).

AFTER INSTALLATION OF NEW ENGINE

- a. Install electrical wire No. "14" (3) on old engine water temperature switch and secure with lockwasher and nut.

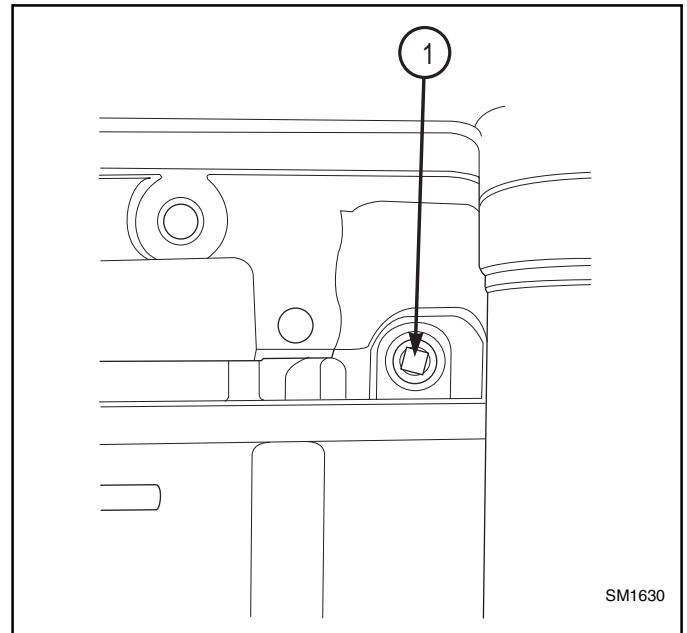


Figure 12

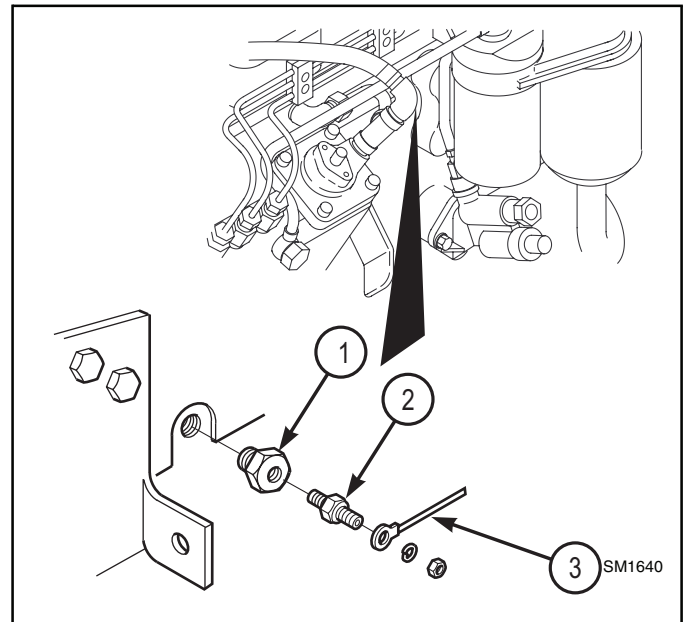


Figure 13

7. FUEL TRANSFER PUMP REPLACEMENT (new engine)

REMOVAL (Figure 14)

- a. Remove plug (1) from fuel transfer pump (2) on new engine block. Discard plug.

INSTALLATION (Figure 15)

- a. (From the kit) apply sealant compound 592 on the threads of reducer # 8540023 (1) and connector # 8760030 (2) and install on fuel transfer pump (3) of the new engine block.

AFTER INSTALLATION OF NEW ENGINE (Figure 15)

- a. Connect fuel hose (4) from old engine on adapter (2).

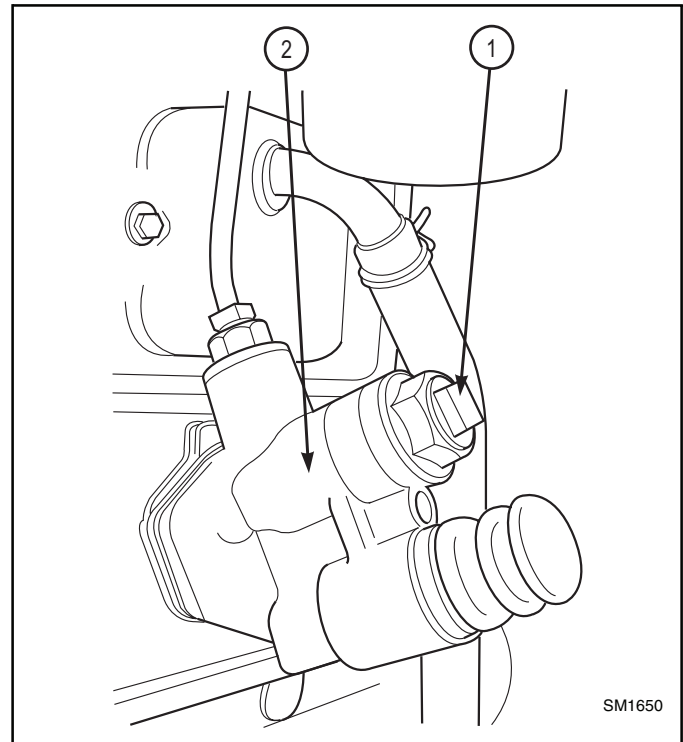


Figure 14

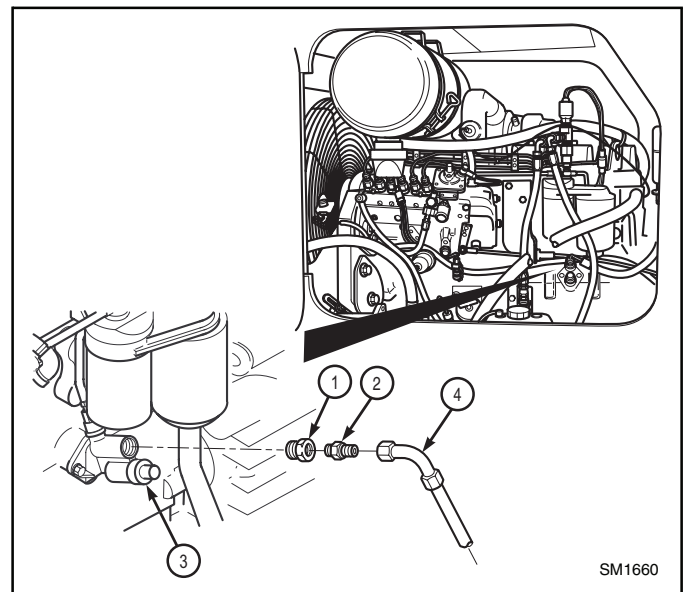


Figure 15

8. TURBOCHARGER AIR HOSE AND TUBES REPLACEMENT (new engine)

INSTALLATION (Figure 16)

- a. (From the kit) install conduit # 7125811 (1) and two ties wraps # 8584001 (2) on hose (3).

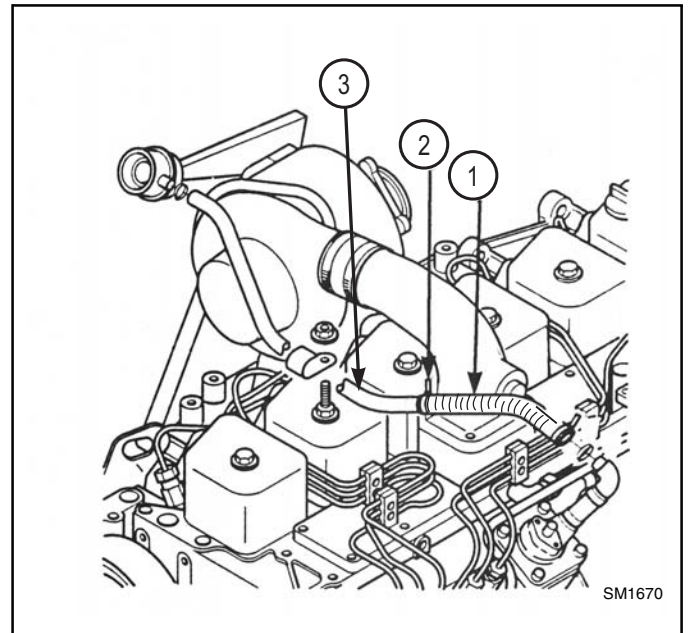


Figure 16

9. ACCELERATOR BRACKET AND CABLE REPLACEMENT (new engine)

INSTALLATION

- (From the kit) position the relay # 8225114 (1) on the throttle plate # 6617802 (2) and secure with screw # 8310016 (3) washer # 8307111 (4) lockwasher # 8307003 (5) and nut # 8305002 (6). (Figure 17).
- Position throttle plate (2) on new engine block and (From the kit) install with two lockwashers # 8307025 (7) and screws # 8310304 (8). (Figure 17).
- (From the kit) install throttle strip bracket #6617792 (9) on fuel injection pump linkage (10) of new engine block with two lockwashers # 8307024 (11) and screws # 8310034 (12). (Figure 18).
- (From the kit) temporarily install rod end # 8340034 (13) on throttle strip bracket (9) with locknut # 8305650 (14). (Figure 18).

AFTER INSTALLATION OF ENGINE

REMOVAL

- Remove old engine securing clevis from accelerator cable. Discard securing clevis.

INSTALLATION (Figure 18)

- Position accelerator (15) on throttle plate (2).
- Remove rod end (13) and nut (14) from throttle strip bracket (9) and install rod end (13) on accelerator cable (15).
- Reinstall rod end (13) and nut (14) on throttle strip bracket (9). Tighten nut.

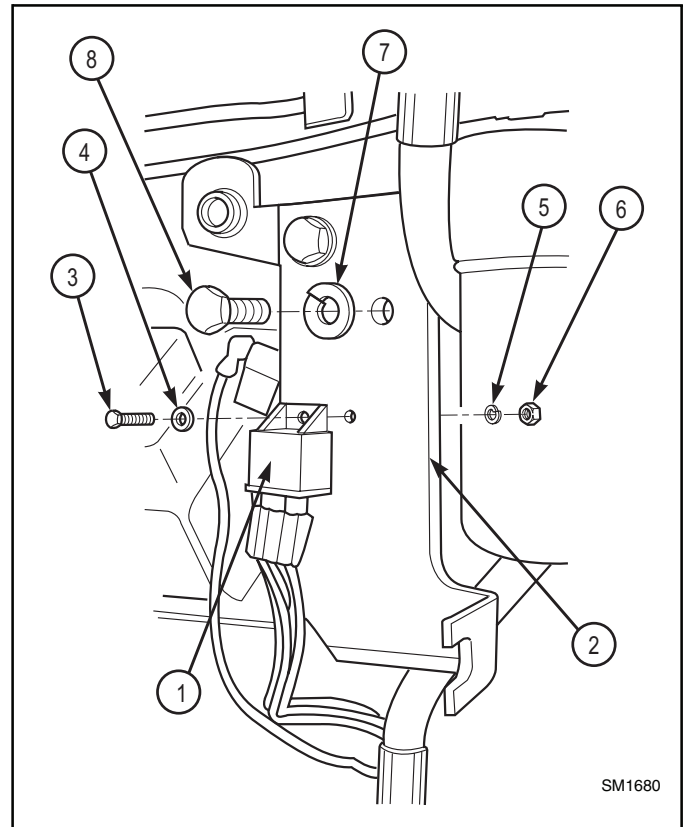


Figure 17

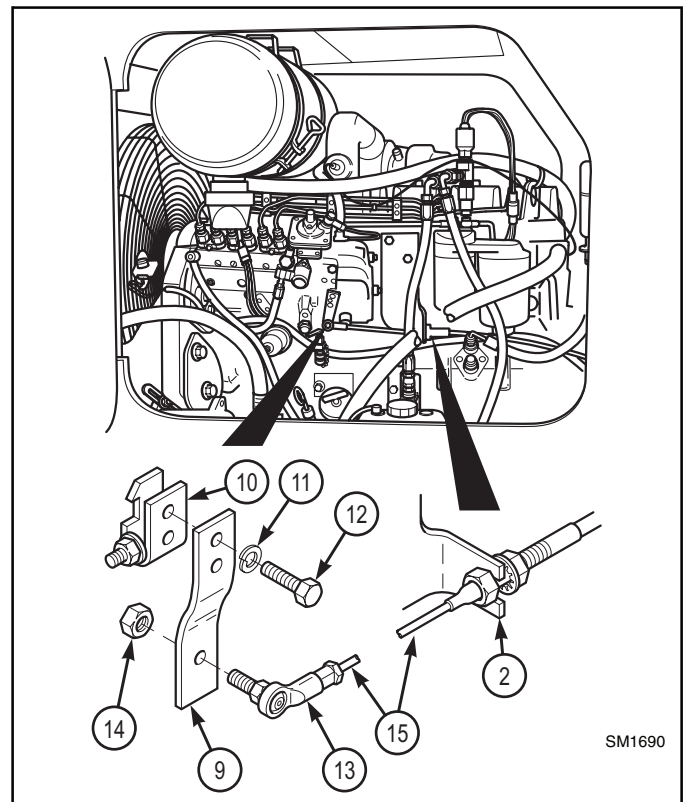


Figure 18

10. EPA ENGINE STARTER REPLACEMENT (new engine is not supplied with a starter)

REMOVAL

- Remove all wires from the starter motor and the starter solenoid from the original engine.
- Remove the three capscrews securing the starter motor assembly to the original engine bell housing. Discard the capscrews.
- Remove the starter motor assembly from the original engine bell housing.

INSTALLATION

- Install the starter to the bell housing on the new engine.
- Line up the mounting holes of the starter with the mounting holes in the bell housing.
- Secure in place with new capscrews (from the kit). DO NOT install the lower left side mounting capscrew at this time. Torque the other two mounting capscrews to 32 lb-ft (43,4 Nm).

11. EPA ENGINE HARNESS RETROFIT REPLACEMENT (new engine)

INSTALLATION

Note: Install tie wraps as necessary

- Route wiring EPA Engine Harness (1) on new engine block. (Figure 19).
- Connect electrical connector (2) to new fuel shut off connector (3). (Figure 19).
- Connect electrical connector (4) to relay (5). (Figure 20).

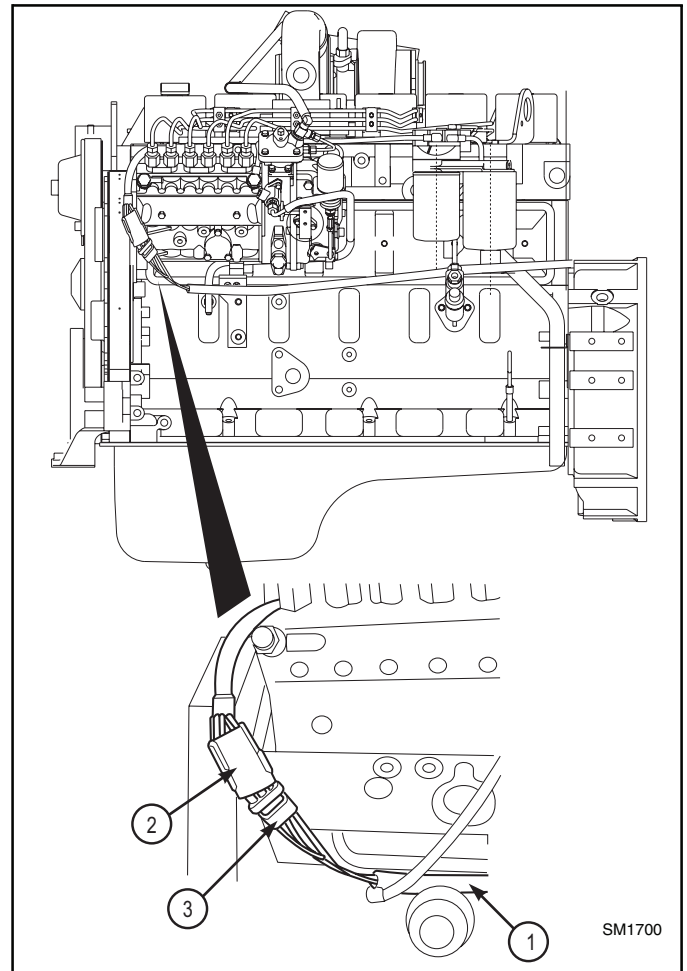


Figure 19

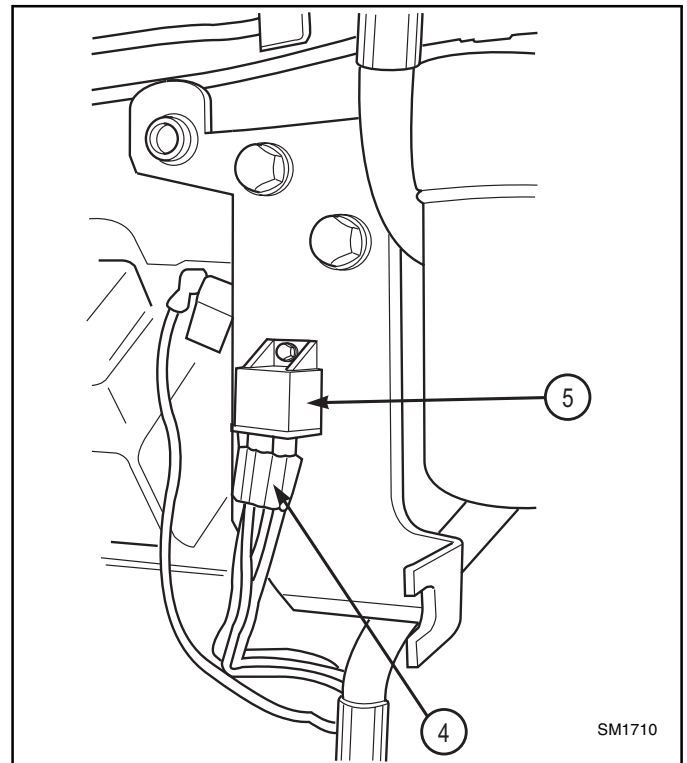


Figure 20

11. EPA ENGINE HARNESS RETROFIT REPLACEMENT (new engine) (cont)

- d. (From the kit) install lockwasher #8310016 (6), terminal strap #6621412 (7), wires "9," "9," "T" & "39" to the starter solenoid (+) stud (8) with lockwasher #8310046 (6) and nut #8305438 (10). Tighten to 12 lb-ft. (Figure 21).
- e. Attach positive battery cable "POS" with (from the kit) screw #8303620 (11), lockwashers #8307026 (12), on terminal strap (7) and nut #8305008 (13). (Figure 21).
- f. Attach wires "38" and "S" onto the starter solenoid (14) with (from the kit) lockwasher #8307052 (15) and nut #8310077 (16). Tighten to 25 lb-in. (Figure 21).
- g. Attach wire "9A" and white ground cable "WHT," from the starter ground (-) stud (17). Tighten to 6 lb-ft. (Figure 21).

AFTER INSTALLATION OF ENGINE

- a. Connect new harness fuel shut off electrical wire "7" to original fuel shut off electrical wire "7," that was connected to the old engines fuel shut off solenoid (Not shown).
- b. Attach wire "M" along with the frame ground cable "GND" to the lower left starter mount capscrew (18). (Figure 21). Torque the lower left capscrew to 32 lb-ft (43,4 Nm).
- c. Connect new electrical wire "2" to any frame engine mount capscrew; for grounding the new EPA wire harness (Not shown).

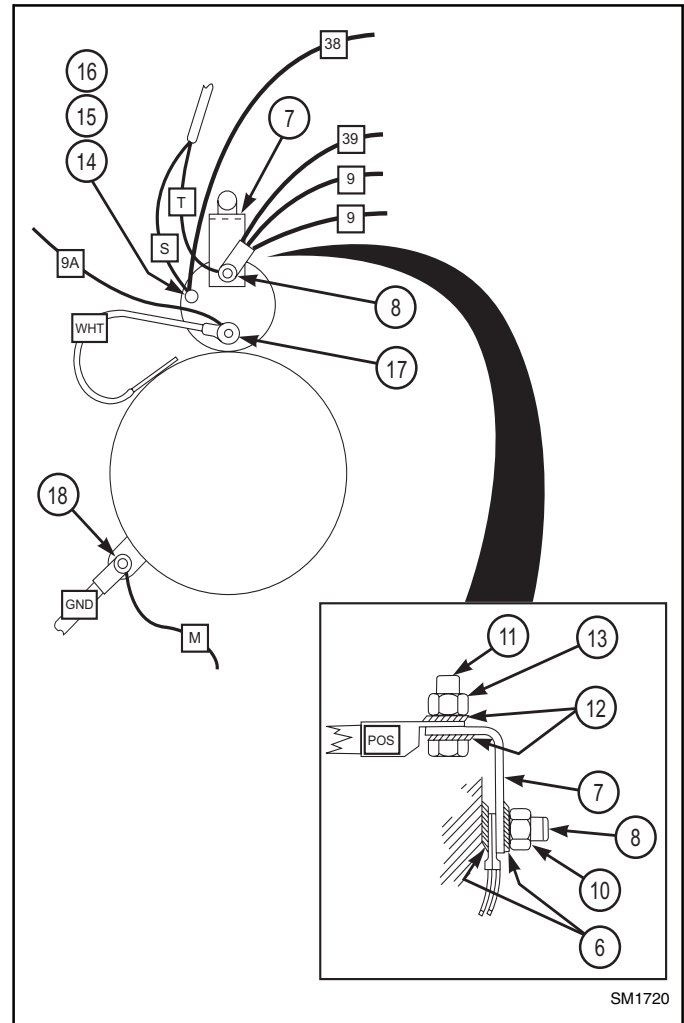


Figure 21

12. ETHER START ATOMIZER REPLACEMENT (new engine)

AFTER INSTALLATION OF NEW ENGINE REMOVAL (Figure 22)

- a. Remove plug (1) from new engine block.

INSTALLATION (Figure 23)

Note: Install tie wraps as necessary.

- a. Apply sealing compound to threads of (From the kit) Bushing #8530024 (2) and install on new engine block.

Note: Punch mark on hex must be located on the bottom side of atomizer when tight.

- b. Apply sealing compound to threads of (from the kit) atomizer #8277101 (3) and install into bushing (2) on new engine block. Tighten to 25 lb-in.
- c. Connect hose (4) to atomizer (3).

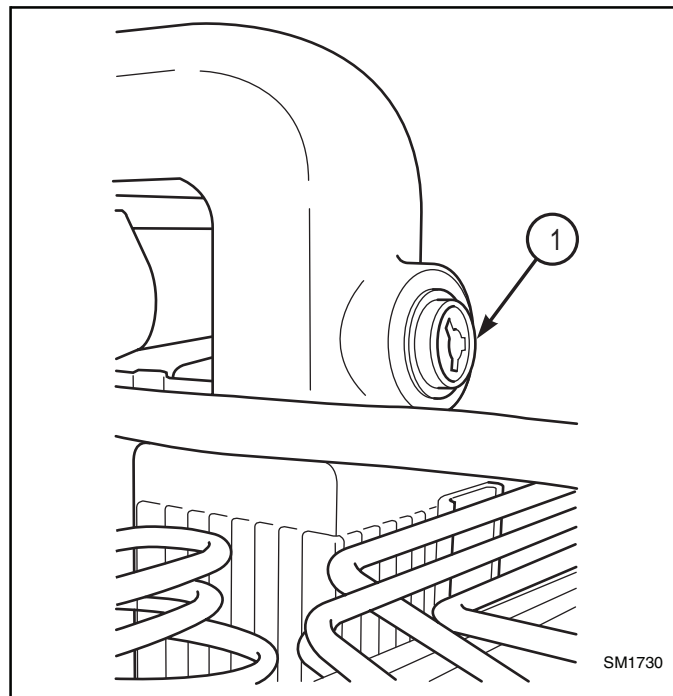


Figure 22

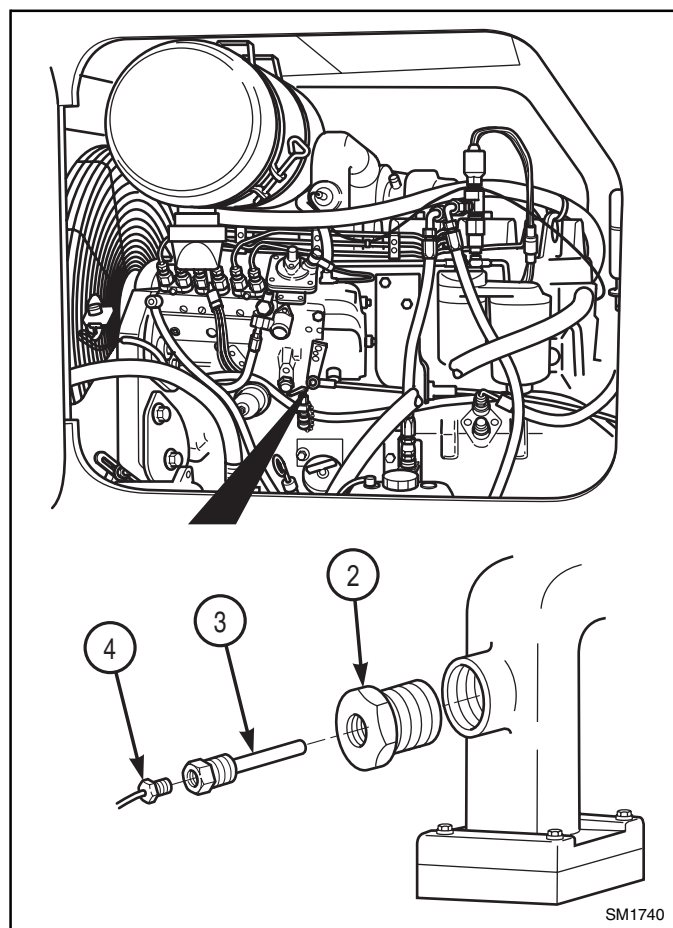
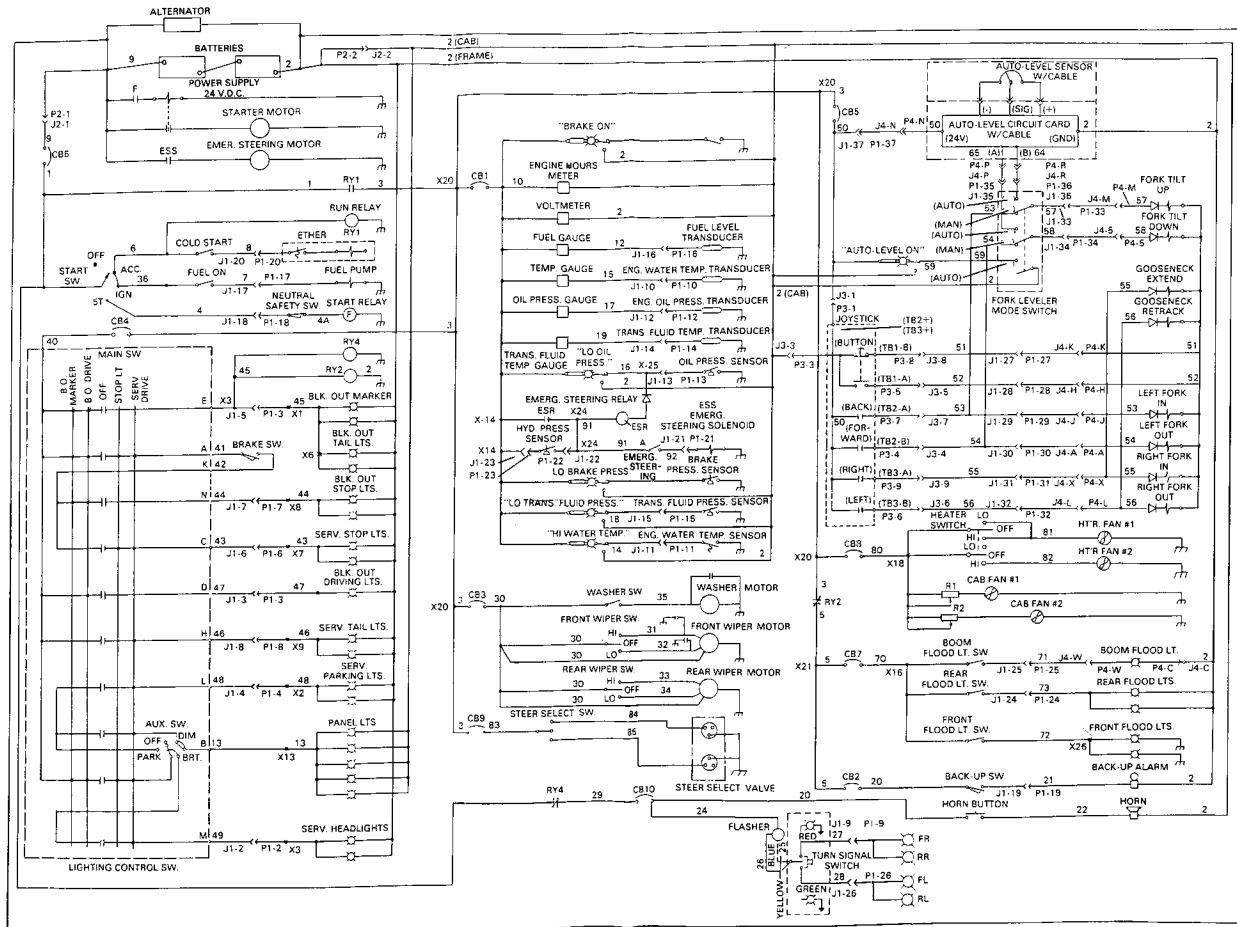


Figure 23



Electrical Schematic

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SIGNATURE

THE METRIC SYSTEM AND EQUIVALENTS

<p>Linear Measure</p> <p>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</p> <p>Weights</p> <p>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</p> <p>Liquid Measure</p> <p>1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces</p>	<p>Square Measure</p> <p>1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles</p> <p>Cubic Measure</p> <p>1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet</p> <p>Temperature</p> <p>$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$ 212° Fahrenheit is equivalent to 100° Celsius 90° Fahrenheit is equivalent to 32.2° Celsius 32° Fahrenheit is equivalent to 0° Celsius $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$</p>
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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

