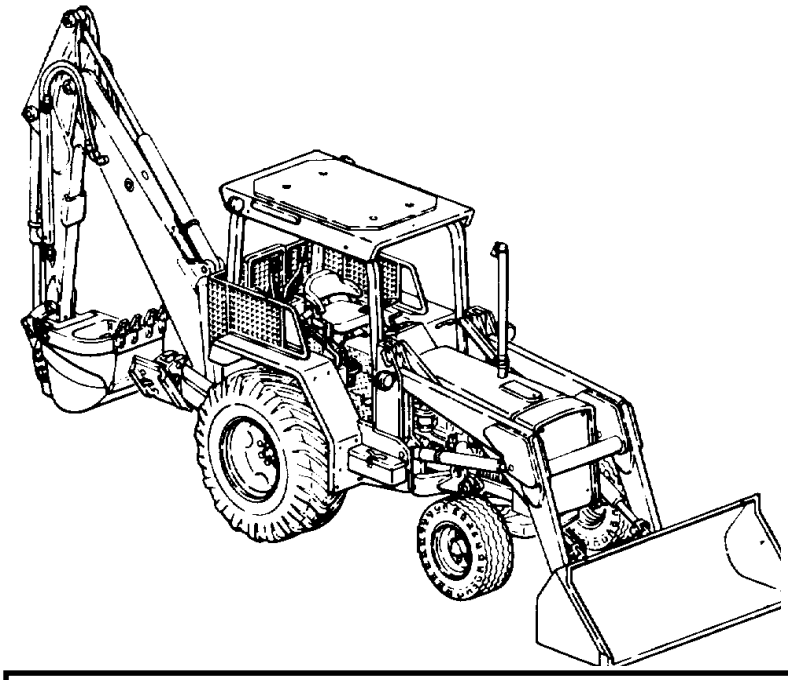
TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

VOLUME 1 OF 3



This copy is a reprint which includes current pages from Change 1.

TRACTOR, WHEELED (DED) LOADER BACKHOE W/HYDRAULIC IMPACT TOOL AND WIHYDRAULIC EARTH AUGER ATTACHMENT JOHN DEERE MODEL JD410 (CCE) W/WAIN-ROY BUCKET, HUGHES IMPACTOR AND DANUSER EARTH DRILL (NSN 2420-00-5671 035)

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

1 SEPTEMBER 1987

HEADQUARTERS, DEPARTMENT OF THE ARMY

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

WARNING

Do not smoke, use open flame, or allow sparks near batteries. The mixture of oxygen and hydrogen gases released from batteries is highly flammable and can explode causing serious injury or death.

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Failure to observe these precautions could cause serious injury.

WARNING

Be careful when removing radiator cap. If engine is hot, escaping steam could burn you. Use a rag to cover radiator cap to protect your hand. Unscrew cap just enough to allow any built-up steam to escape. When all pressure has been relieved, unscrew cap the rest of the way, and take it off of radiator.

WARNING

Keep clear of area between main frame and backhoe boom, and other backhoe components, when backhoe control levers are being operated. There is no clearance for personnel when boom is swung full-left or full-right.

WARNING

Avoid contact with live steam. Live steam can burn skin, cause blindness, and cause other serious injury. Be sure to wear protective apron, gloves, and safety goggles when using live steam.

WARNING

Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

Cleaning compound, trichlorotrifluoroethane, for electrical parts is toxic and flammable, and reacts violently with aluminum, titanium, barium, lithium, samarium, sodium, and potassium. Always wear protective goggles and rubber gloves, and use only In a well-ventilated area. DO NOT wear jewelry while using cleaning compound. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. Cleaning compound fumes or vapors can take the place of air and may become a cancer producing agent. DO NOT use near open flame or excessive heat. The compound's boiling point is 114°F (460C). If you become dizzy while using cleaning compound, immediately get fresh air and medical help. If compound contacts eyes, immediately wash your eyes with water and get medical aid.

WARNING

Do not touch heat shrinkable tubing for at least 30 seconds after heating. hot tubing can burn you.

WARNING

Although battery ground cable must be connected to test electrical circuit voltage, disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

WARNING

Be careful when heating fluids. Wear gloves to protect your hands from hot parts and fluids or severe burns could result.

WARNING

Be careful of moving parts when working near engine while it is running. Moving parts could catch on tools, clothing, or extremities causing serious injury.

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of this vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots. All contaminated air filters shall be placed into double-lined plastic bags and swiftly moved to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination, however, the Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP.

WARNING

Water soluble cleaning compound solvent is flammable and fumes are toxic. Flashpoint is 2200F (1040C). Boiling point is 212°F (1000C). Do not store in temperatures above 150°F (65°C) or below 35°F (2°C). Do not use near open flame or excessive heat. Do not wear jewelry. Wear rubber gloves and goggles, and use only in well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapors. Avoid contact with acids, aluminum, or zinc; chemical reaction may result. If you become dizzy while using cleaning compound solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

Speed control arms are under strong spring tension. Release tension slowly to avoid injury.

WARNING

Exhaust system parts become very hot when engine is running. Allow time for parts to cool before working on exhaust system. Hot exhaust system parts will cause serious burns.

WARNING

Draining hot cooling system is not recommended. If coolant must be drained with engine hot, use gloves to protect against hot coolant. Severe burns could result.

WARNING

Be careful when draining hot fluids. Wear gloves to protect your hands from hot parts and fluids or severe burns could result.

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 8 April 1992

ORGANIZATIONAL MAINTENANCE MANUAL

**TRACTOR, WHEELED,
DED, LOADER BACKHOE:
WITH HYDRAULIC IMPACT TOOL AND
WITH HYDRAULIC EARTH AUGER ATTACHMENT
JOHN DEERE MODEL JD410 (CCE)
WITH BUCKET, IMPACTOR,
AND EARTH DRILL
(NSN 2420-00-567-0135)**

TM 5-2420-222-20-1, 1 September 1987, is changed as follows:

1. Cover. The manual title is changed to read as shown above.

2. Remove old pages and insert new pages.

3. New or changed material is indicated by a vertical bar in the margin or by a vertical bar adjacent to the TA number.

Remove Pages	**Insert Pages**
a and b	*a and b*
i and ii	*i and ii*
1-1 through 1-4	*1-1 through 1-4*
2-49 and 2-50	*2-49 and 2-50*
2-161 and 2-162	*2-161 and 2-162*

4. File this change sheet in front of the publication for reference purposes. Approved for public release; distribution is unlimited.

Approved for public release; distribution is unlimited.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official: Milton H. Hamilton

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
00772

Distribution:
To be distributed in accordance with DA Form 12-25-E (Block 3692) Unit maintenance requirements for TM5-2420-222-20-1.

TECHNICAL MANUAL

NO. 52420-222-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *1 September 1987*

ORGANIZATIONAL MAINTENANCE MANUAL

TRACTOR, WHEELED, DED, LOADER BACKHOE: WI'TH HYDRAULIC IMPACT TOOL AND WITH HYDRAULIC EARTH AUGER ATTACHMENT JOHN DEERE MODEL JD410 (CCE) WITH BUCKET, IMPACTOR, AND EARTH DRILL (NSN 2420-00-567-0135)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, Ml 48397-5000. A reply will be sent to you.

TABLE OF CONTENTS

VOLUME 1 OF 3

*This manual supersedes Organizational portion of TM 5-2420-222-14&P1 and TM 5-2420-222-14&P2 dated October 1982, including all changes.

Approved for public release; distribution is unlimited.

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VOLUME 1 OF 3 - CONTINUED

TABLE OF CONTENTS - CONTINUED

VOLUME 3 OF 3 - CONTINUED

HOW TO USE THIS MANUAL

This manual is divided into three volumes: TM 5-2420-222-20-1, TM 5-2420-222-20-2 and TM 52220-222-20-3. It is designed to help you maintain the loader backhoe. Front cover Table of Contents for this volume is provided for quick reference to important information. There is also and index located in the final pages of each volume for use in locating specific items of information.

Measurements in this manual are given in both US standards and metric units. Metric to US standard conversion chart can be found on the inside back cover.

Read all preliminary information found at the beginning of each task. It has important information you must have before beginning the task.

Warning pages are located in the front of each volume for warnings used in that volume. You should learn warnings before doing maintenance on equipment.

Subject index appears at the beginning of each chapter listing sections that are included in that chapter. A more specific subject index is located at the beginning of each section to help you find the exact paragraph you're looking for.

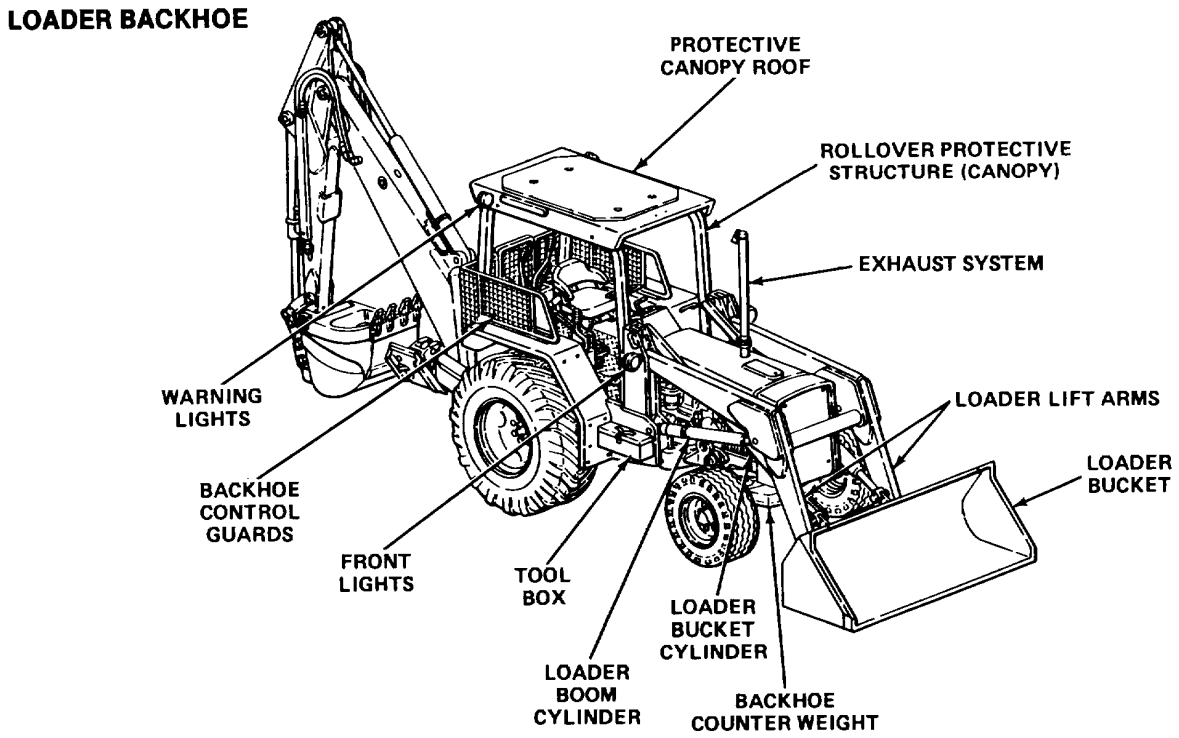
CHAPTER 1

INTRODUCTION

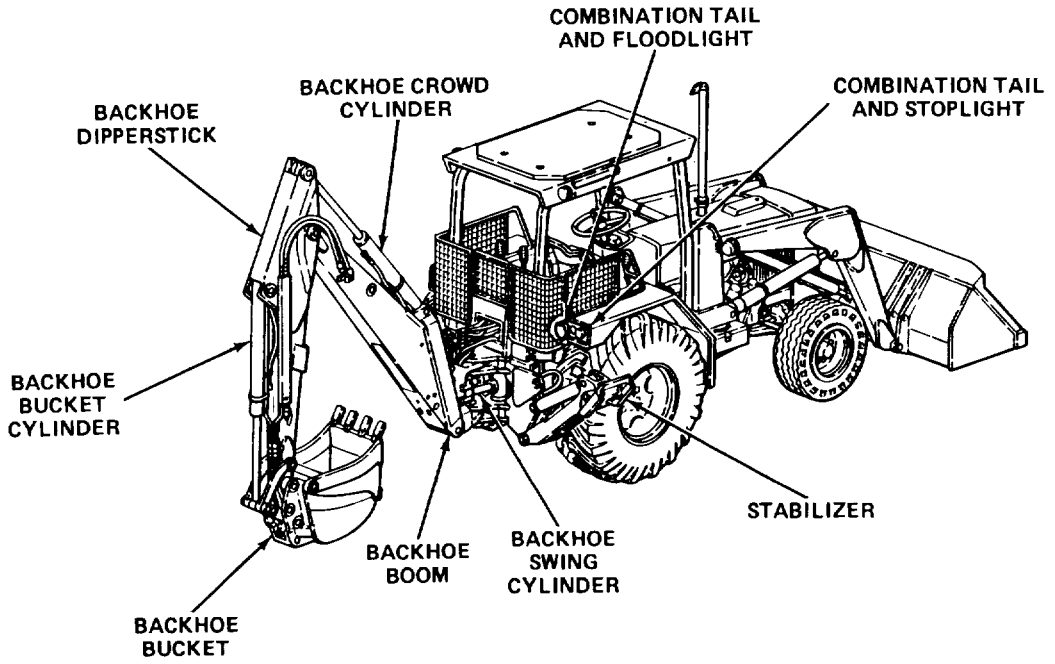
OVERVIEW

The purpose of this chapter is to give you general information and equipment specifications, and familiarize you with the principles of operation that you will need to refer to while performing organizational maintenance on the loader backhoe.

Section I. GENERAL INFORMATION



LOADER BACKHOE - CONTINUED



TA242673

SCOPE

Type of Manual: Organizational Maintenance

Model Number and Equipment Name: John Deere Model JD 410, Wheeled Tractor Loader Backhoe with Hydraulic Impact Tool and Hydraulic Earth Auger Attachment.

Short Item Name: Loader backhoe

Purpose of Equipment: Excavation for pipelines, building footings, drainage ditches and fortification, stockpiling, loading, transferring stockpiled materials, backfilling, rock and concrete breaking, tamping, asphalt cutting, earth boring and post driving.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-3 for instructions on the destruction of Army materiel to prevent enemy use.

EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD)

The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 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 43-0001-39 series contains Information on equipment improvements, minor alterations, proposed Modification Work Orders (MWO's), warranties (if applicable), actions taken on some of your DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this 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 Appendix A, References (page A-1), of this manual.

PREPARATION FOR STORAGE OR SHIPMENT

Refer to TM 740-90-1 for instructions on the administrative storage of Army materiel. Refer to Section XXV, Preparation for Storage and Shipment (page 2-1897) for special instructions for loader backhoe storage.

QUALITY ASSURANCEI/QUALITY CONTROL (QA/QC)

Make sure that you do all your work with quality of workmanship in mind. Use the following check list as a guide:

Always use the right tool for the job.

Make sure that calibration stickers on test equipment are current, not out of date.

Fill out all required forms and make sure all in-time inspections are properly stamped.

Have all your work checked by your supervisor.

If you have any doubts about performing a maintenance task, notify your supervisor.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If your loader backhoe 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 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank-Automotive Command, Attn.: AMSTA-MP, Warren, MI, 48397-5000. We'll send you a reply.

Section II. EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT DESCRIPTION

Refer to TM 5-2420-222-10 for a description of the loader backhoe.

DIFFERENCES BETWEEN MODELS

Although all model JD 410 loader backhoes covered by this manual have the same model number, there are significant differences in configuration. There are two basic configurations: early configuration, Serial Numbers 235786 thru 235999, and late configuration, Serial Numbers 319995 thru 342573. These two configurations differ mostly in transmission design and hydraulic line routing.

Throughout this manual, where differences in configuration or equipment affect operation or maintenance, they are shown in detail. If differences are minor and obvious (such as exact appearance or location), and operation and maintenance are not affected, typical equipment is shown.

EQUIPMENT DATA

Refer to TM 5-2420-222-10 for information on loader backhoe identification and data plates, and end item and component specifications.

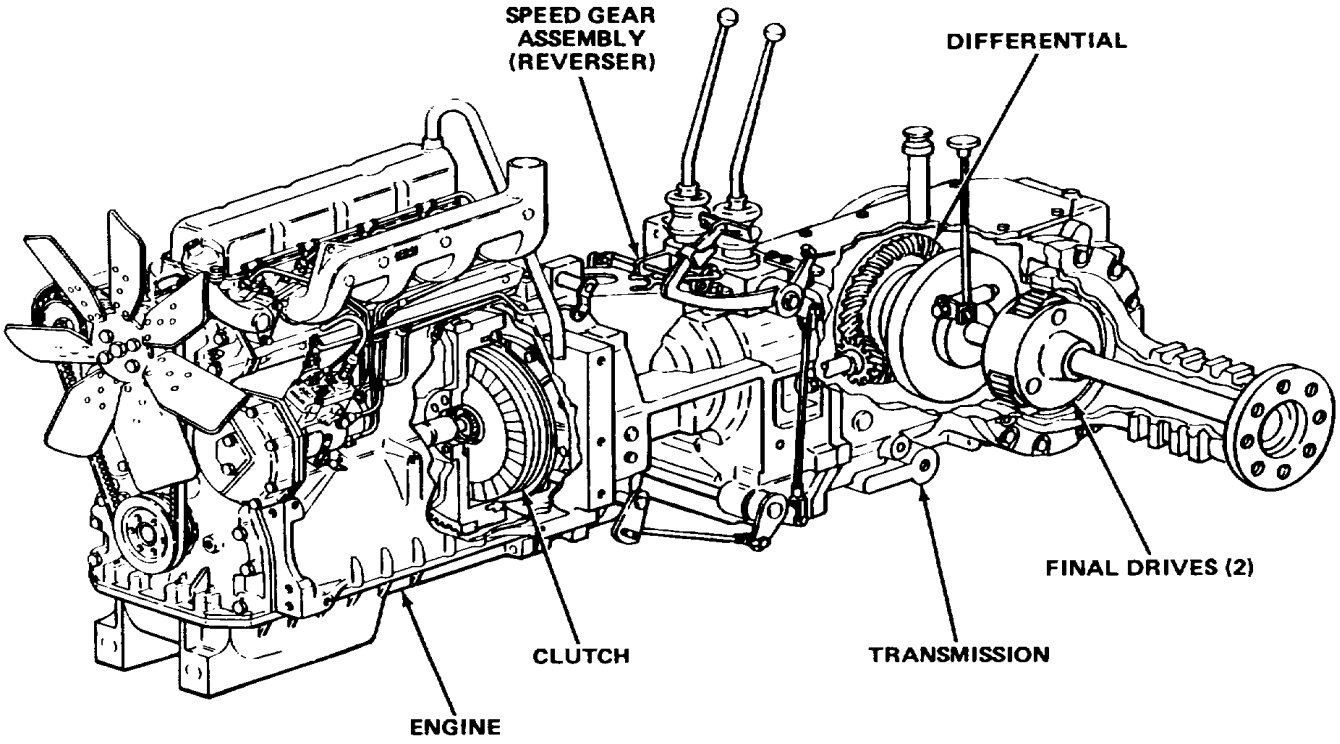
Section III. PRINCIPLES OF OPERATION

CAUTION

When Serial Number ranges are given, be sure to use proper parts for replacement. Although parts for both configurations may appear to be interchangeable, they may function differently. Use of wrong parts could cause equipment failure and serious damage.

GENERAL

The loader backhoe is made up of several systems or groups of components. These systems are put together to make an efficient earthmoving machine. Since each system is designed to work with the others, it cannot function on its own. The following paragraphs single out systems for the purpose of discussion.

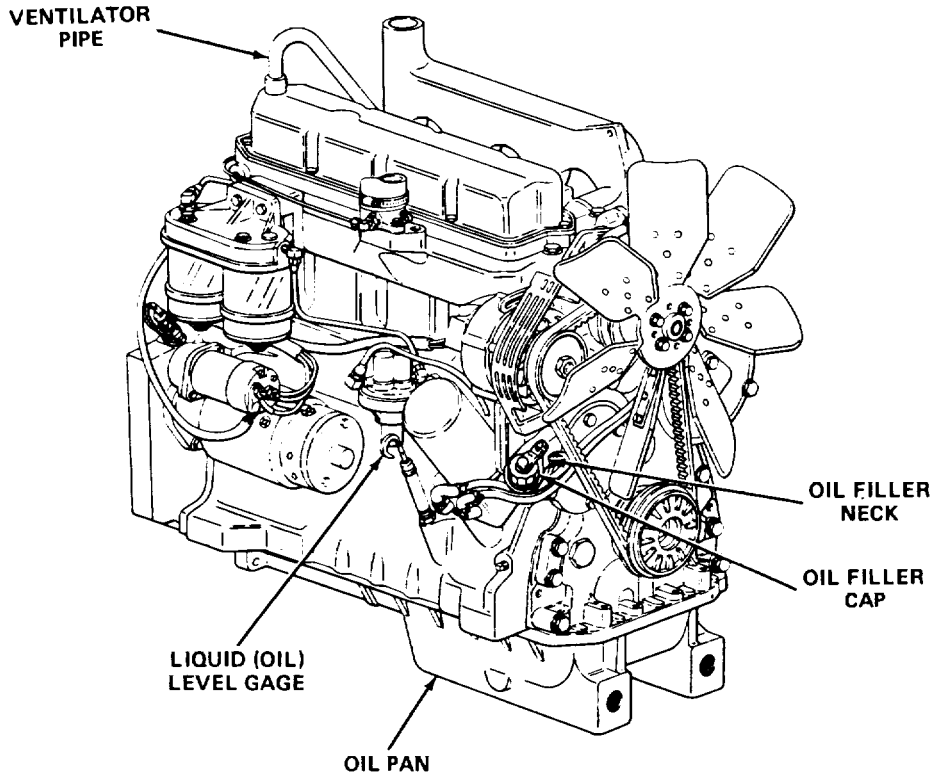


POWER TRAIN

- Engine, clutch, speed gear assembly (reverser), transmission, and drive train systems form the loader backhoe power train.
- Power developed by governed diesel engine speed is transmitted through clutch, speed gear assembly (reverser), transmission, differential, and final drives to drive rear wheels.

TA242674

LUBRICATION SYSTEM



OIL FILLER CAP

- Closes end of oil filler neck to keep dirt out of lubrication system.
- Allows access to oil filler neck.

OIL FILLER NECK

- Allows addition of lubricating oil to crankcase.

LIQUID (OIL) LEVEL GAGE

- Dipstick gage shows engine lubricating oil level.

VENTILATOR PIPE

- Allows hot gases to escape from crankcase during engine operation.
- Allows outside air to enter crankcase during engine cool down.
- Keeps pressure in crankcase the same as outside air pressure at all times.

OIL PAN

- Provides reservoir for lubricating oil to be circulated through the lubrication system.

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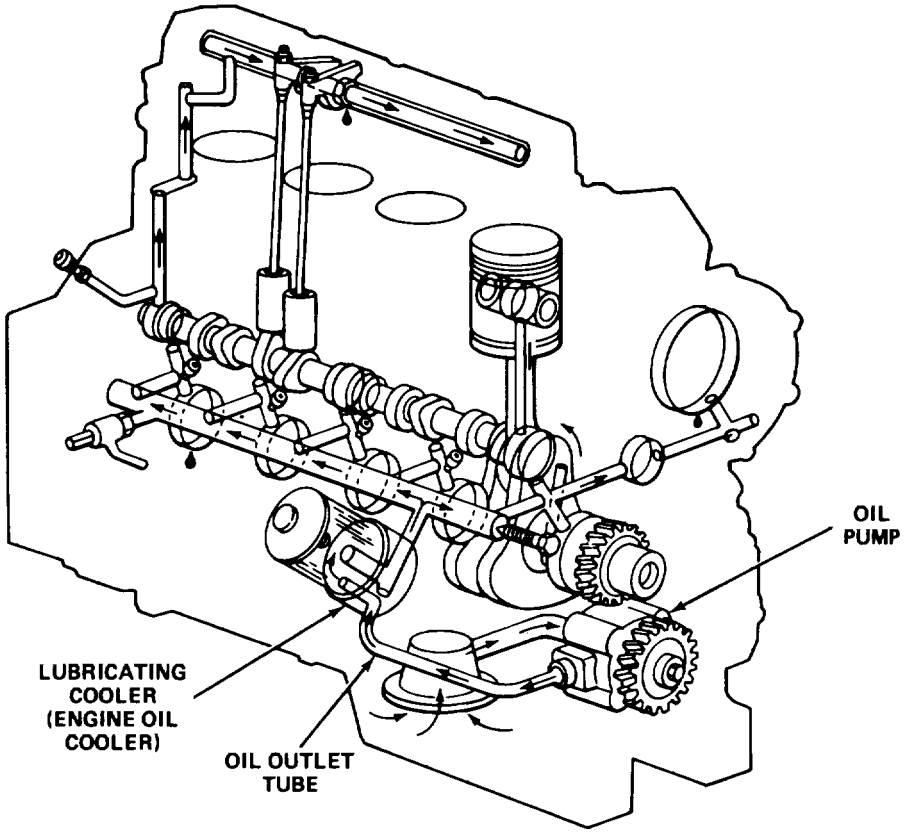
LUBRICATION SYSTEM - CONTINUED



OIL PUMP

- Mounted to bottom of engine block at rear of engine.
- Driven directly by crankshaft gear.
- Suction tube is submerged in lubricating oil in oil pan.
- Moves lubricating oil through lubrication system.

OIL OUTLET TUBE

- Routes lubricating oil from oil pump outlet to lubricating cooler (engine oil cooler), engine oil filter, and engine block oil passage.

LUBRICATING COOLER (ENGINE OIL COOLER)

- Uses coolant from engine cooling system to cool lubricating oil.
- Helps keep engine running below maximum operating temperature.
- If cooler clogs, bypass valve opens to keep full flow of lubricating oil through engine lubrication system.

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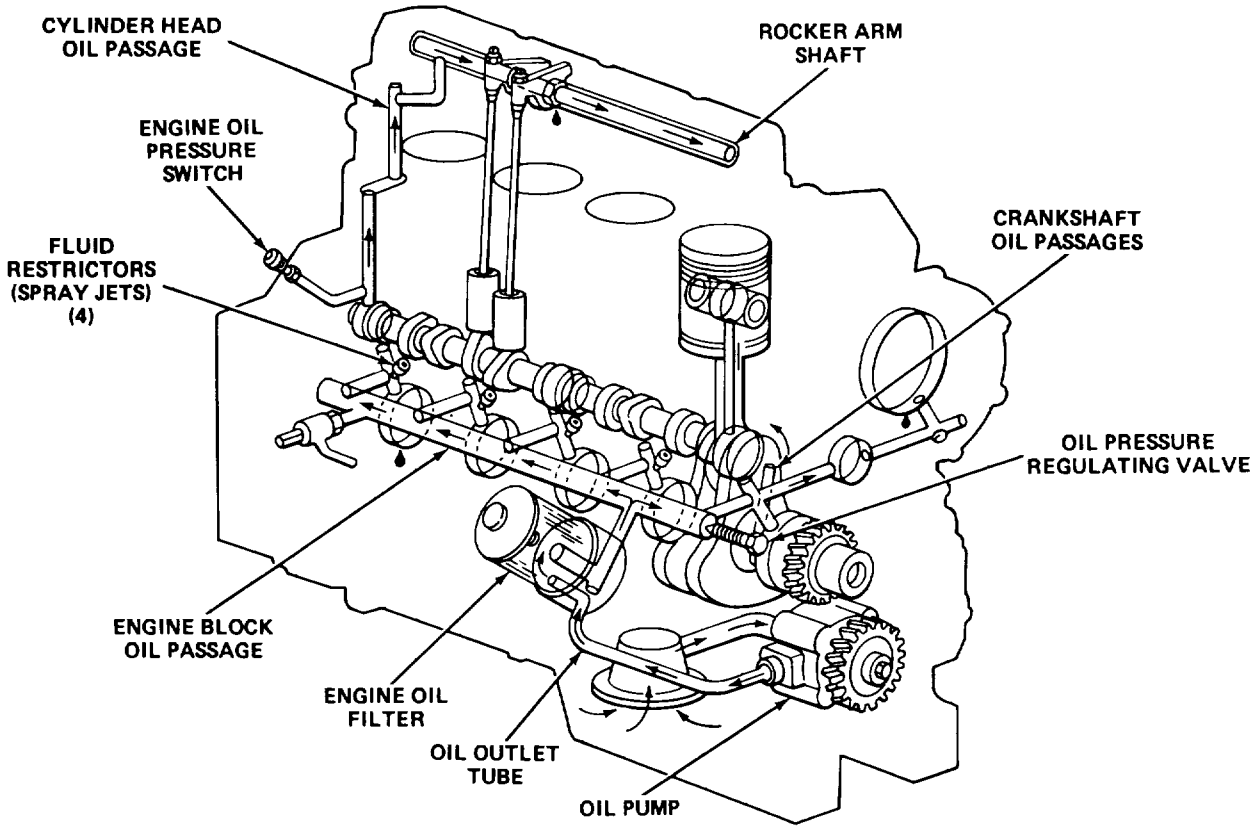
LUBRICATION SYSTEM - CONTINUED



ENGINE OIL FILTER

- Spin-on full-flow replaceable element mounted to top of lubricating cooler (engine oil cooler).
- Cleans all lubricating oil before it is distributed to the rest of the lubrication systems.
- If filter clogs, bypass valve in element opens to keep full flow of lubricating oil through engine lubrication system.

ENGINE BLOCK OIL PASSAGE

- Drilled passages in engine block distribute lubricating oil from oil filter to engine components.

OIL PRESSURE REGULATING VALVE

- Adjustable valve located at front end of main engine block oil passage.
- Controls lubrication system oil pressure.

FLUID RESTRICTORS (SPRAY JETS) (4)

- Fed by engine block oil passages.
- Spray bottom of pistons and connecting rods to cool and lubricate them.

TA242677

LUBRICATION SYSTEM - CONTINUED

CRANKSHAFT OIL PASSAGES

- Drilled passages in crankshaft route lubricating oil from crankshaft main bearings to connecting rod bearings.

ENGINE OIL PRESSURE SWITCH

- Sending unit considered part of electrical system.
- Activates low engine oil pressure indicator light on dash to alert operator when pressure drops below safe operating limit.

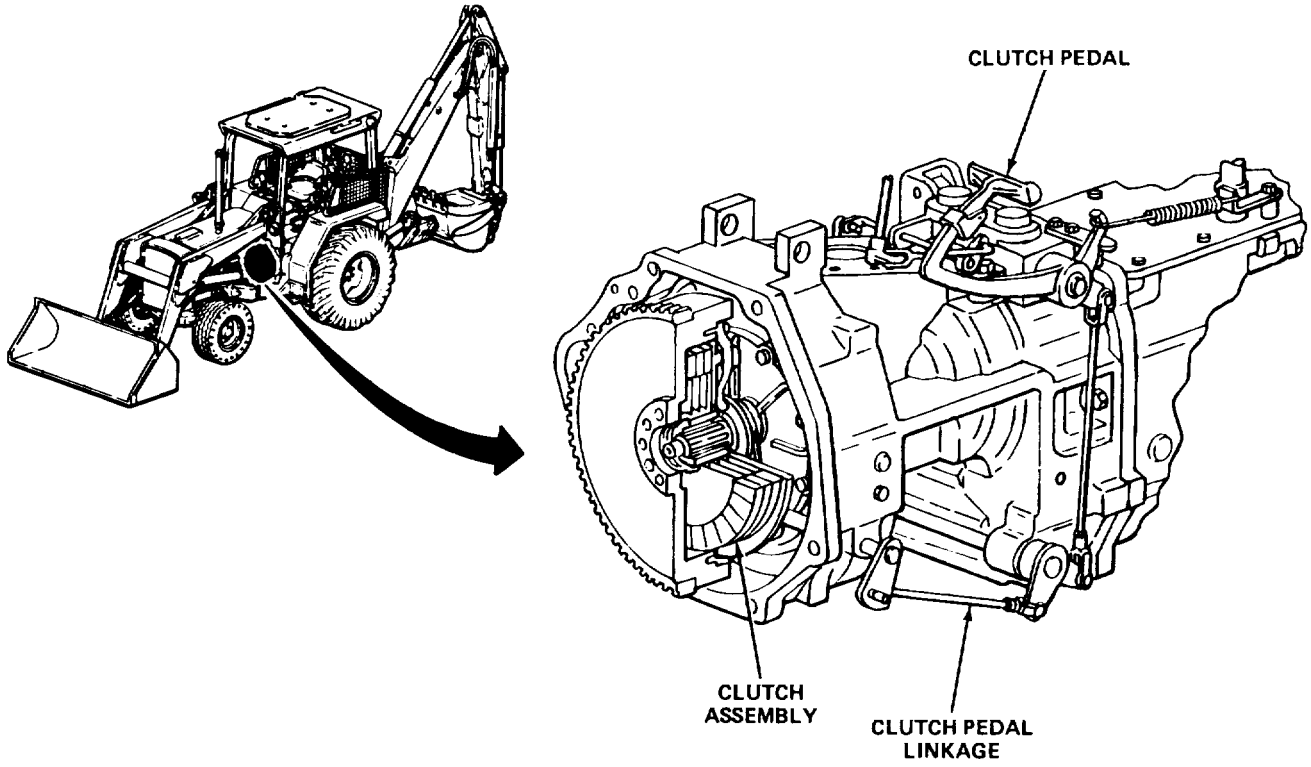
CYLINDER HEAD OIL PASSAGE

- Drilled passage in cylinder head routes lubricating oil from rear engine block oil passage to rocker arm shaft.

ROCKER ARM SHAFT

- Hollow shaft routes lubricating oil from cylinder head oil passage to rocker arms.

CLUTCH SYSTEM



CLUTCH PEDAL

- Provides operator with means to engage and disengage clutch.
- Connected by clutch pedal linkage to clutch assembly manual control lever.

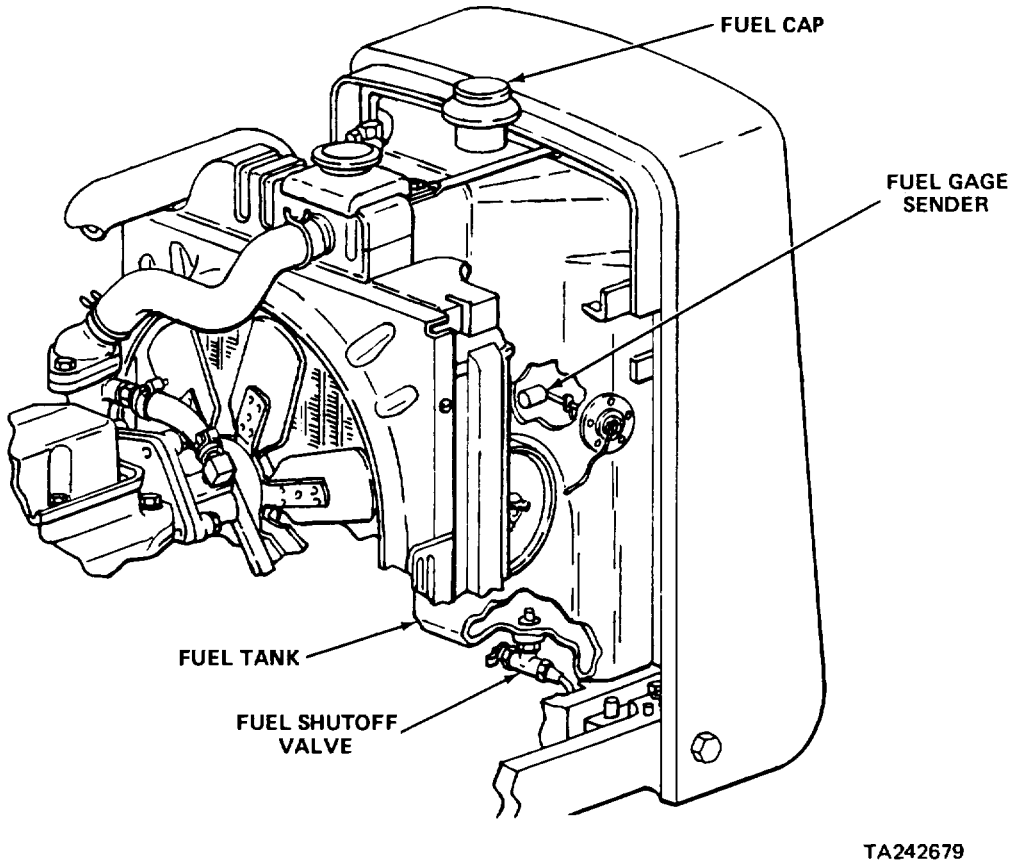
CLUTCH PEDAL LINKAGE

- Mechanical linkage connects clutch pedal to clutch assembly manual control lever.

CLUTCH ASSEMBLY

- Single-stage clutch assembly components are located between engine flywheel and reverser housing.
- Provides means to engage and disengage engine power from balance of power train.

FUEL SYSTEM



FUEL CAP

- Provides access for filling fuel tank.
- Keeps dirt out of fuel supply.
- Vents fuel tank to outside air.

FUEL TANK

- Provides safe clean storage for diesel fuel supply.

FUEL GAGE SENDER

- Considered part of electrical system.
- Float adjusts to fuel level and sets up resistance in sender which electric FUEL level gage reads and shows as quantity.

FUEL SHUTOFF VALVE

- Located at bottom of fuel tank.
- Allows fuel system maintenance, including water and sediment draining, without completely draining fuel tank.

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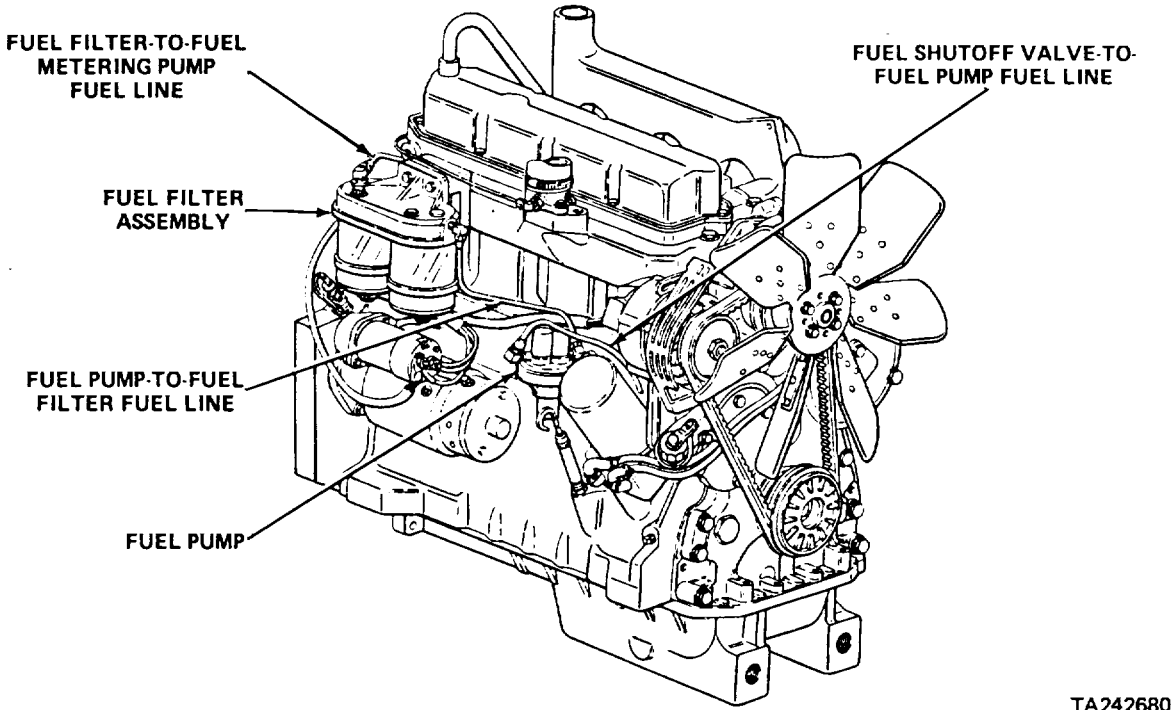
FUEL SYSTEM - CONTINUED



FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE

- Routes fuel from fuel shutoff valve at bottom of fuel tank to fuel pump.

FUEL PUMP

- Diaphragm type transfer pump.
- Lever actuated by engine camshaft lobe rotation.
- Draws gravity fed fuel from fuel tank through fuel shutoff valve-to-fuel pump fuel line.
- Forces fuel through fuel pump-to-fuel filter fuel line, fuel filter assembly, and fuel filter-to-fuel metering pump fuel line, to fuel metering pump.
- Hand primer lever allows bleeding of air from fuel system.

FUEL PUMP-TO-FUEL FILTER FUEL LINE

- Routes fuel from fuel pump to fuel filter assembly.

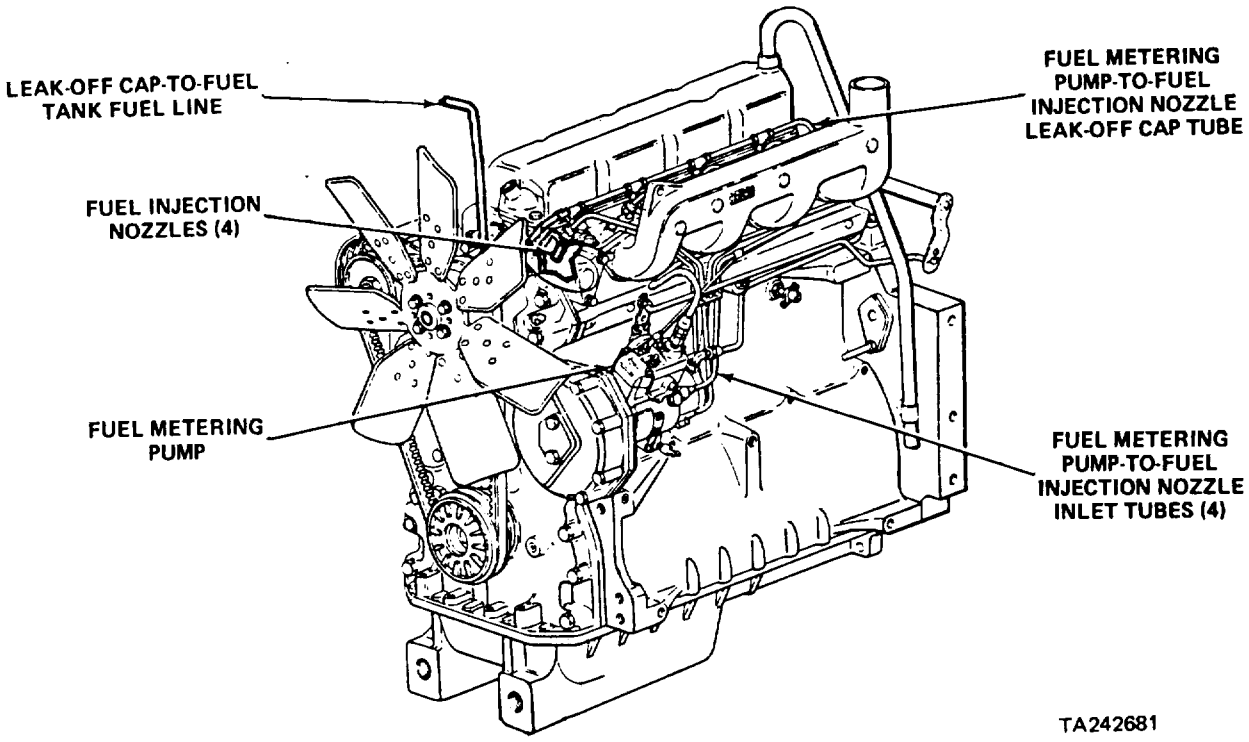
FUEL FILTER ASSEMBLY

- Dual stage filter.
- Cleans fuel to keep dirt from reaching fuel injection nozzles.
- Two sediment bowls allow draining of contaminated fuel.

FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE

- Routes fuel from fuel filter assembly to fuel metering pump.

FUEL SYSTEM - CONTINUED



FUEL METERING PUMP

- Distributor type injection pump driven by crankshaft through timing gear train.
- Delivers fuel under high pressure to each fuel injection nozzle at correct time for fuel burning efficiency at each cylinder.
- Houses fuel shutoff solenoid which cuts off fuel flow when ignition circuit is interrupted, to shut down engine.

FUEL METERING PUMP-TO-FUEL INJECTION NOZZLE INLET TUBES (4)

- Route pressurized fuel from fuel metering pump to four fuel injection nozzle inlets.

FUEL METERING PUMP-TO-FUEL INJECTION NOZZLE LEAK-OFF CAP TUBE

- Routes excess fuel and any air through fuel injection nozzle leak-off caps for return to fuel tank.

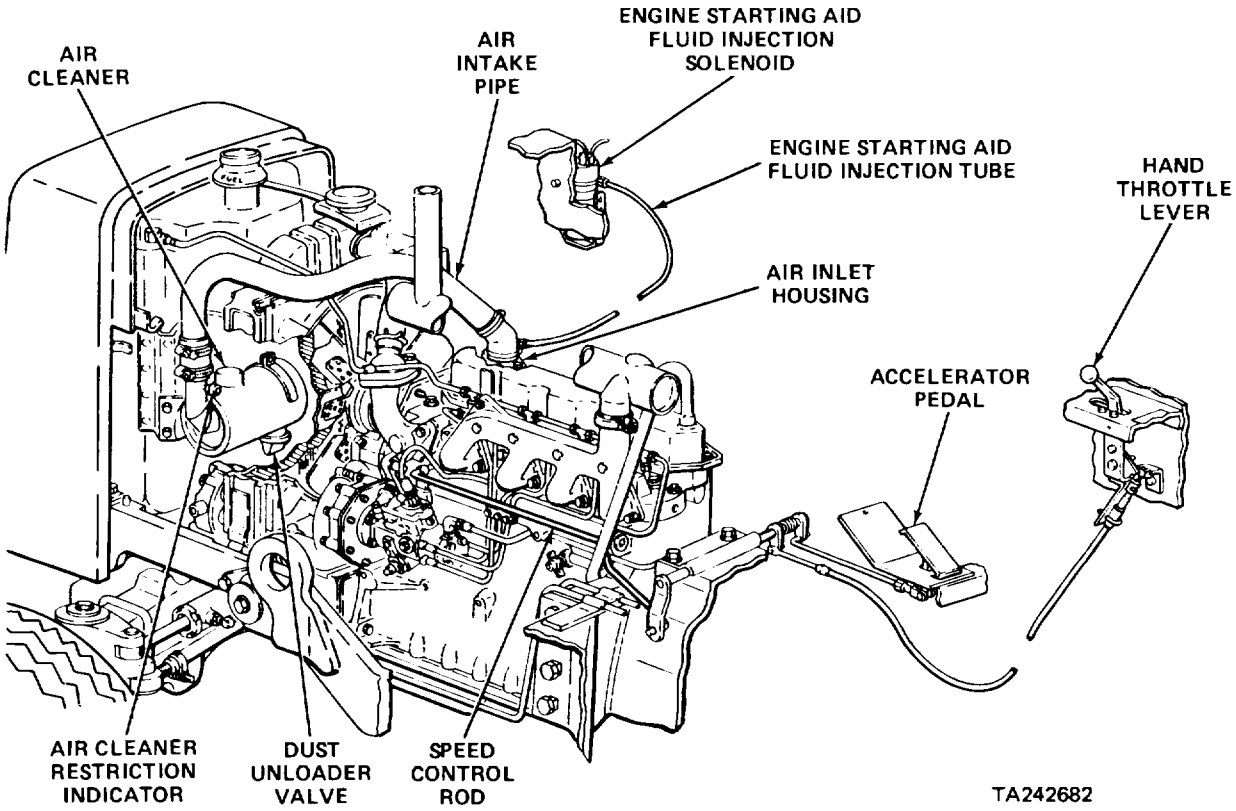
FUEL INJECTION NOZZLES (4)

- Activated by pressurized fuel distributed by fuel metering pump.
- Atomize fuel and spray it into combustion chambers of each cylinder in turn.
- Excess lubricating fuel is directed to leak-off caps for return to fuel tank.

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE

- Routes excess fuel from fuel injection nozzle leak-off caps back to fuel tank.

FUEL SYSTEM - CONTINUED



AIR CLEANER

- Dry type with replaceable filter element removes dirt from intake air.
- As air passes between filter fins, heavy particles of dirt strike fins and are slowed down and deposited in dust unloader valve.
- Small particles of dirt still present in air are filtered out as air passes through replaceable filter element.

DUST UNLOADER VALVE

- Allows removal of built-up dirt from bottom of air cleaner.

AIR CLEANER RESTRICTION INDICATOR

- Tells when air cleaner filter element is clogged with dirt by showing red in sight window.

AIR INTAKE PIPE

- Routes filtered air from air cleaner to air inlet housing.

TA242682

FUEL SYSTEM - CONTINUED

AIR INLET HOUSING

- Connects air intake pipe to air inlet port of cylinder head.
- Provides inlet for engine starting aid engine primer fluid to be injected into engine air supply for cold weather starts.

ENGINE STARTING AIR FLUID INJECTION TUBE

- Routes starting fluid from engine starting aid fluid injection solenoid to air inlet housing.

ENGINE STARTING AID FLUID INJECTION SOLENOID

- Holds replaceable canister of engine primer fluid.
- Connected by engine starting aid fluid injection tube to air inlet housing.
- Releases measured shots of engine primer fluid for cold weather starts when activated by pushing engine starting aid solenoid switch.

ACCELERATOR PEDAL

- Foot control for engine speed.
- Connected by linkage to speed control rod.

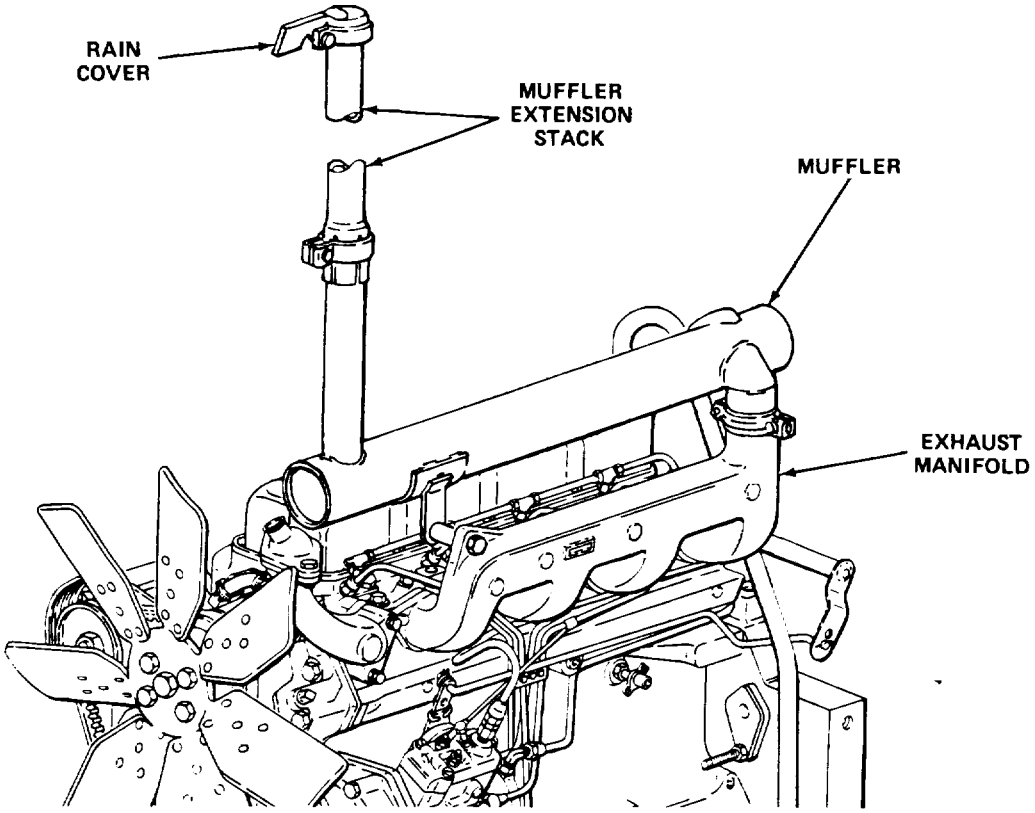
HAND THROTTLE LEVER

- Hand control for engine speed.
- Connected by hand throttle cable and linkage to speed control rod.

SPEED CONTROL ROD

- Connected at one end by linkage to accelerator pedal and by linkage and hand throttle cable to hand throttle.
- Connected at other end to fuel metering pump throttle lever.
- Allows control of engine speed by transmitting accelerator pedal and hand throttle lever movement to fuel metering pump.

EXHAUST SYSTEM



EXHAUST MANIFOLD

- Mounted to left side of diesel engine cylinder head.
- Routes engine exhaust gases from cylinder head to muffler.

MUFFLER

- Reduces engine exhaust noise.
- Routes engine exhaust gases from exhaust manifold to muffler extension stack.

MUFFLER EXTENSION STACK

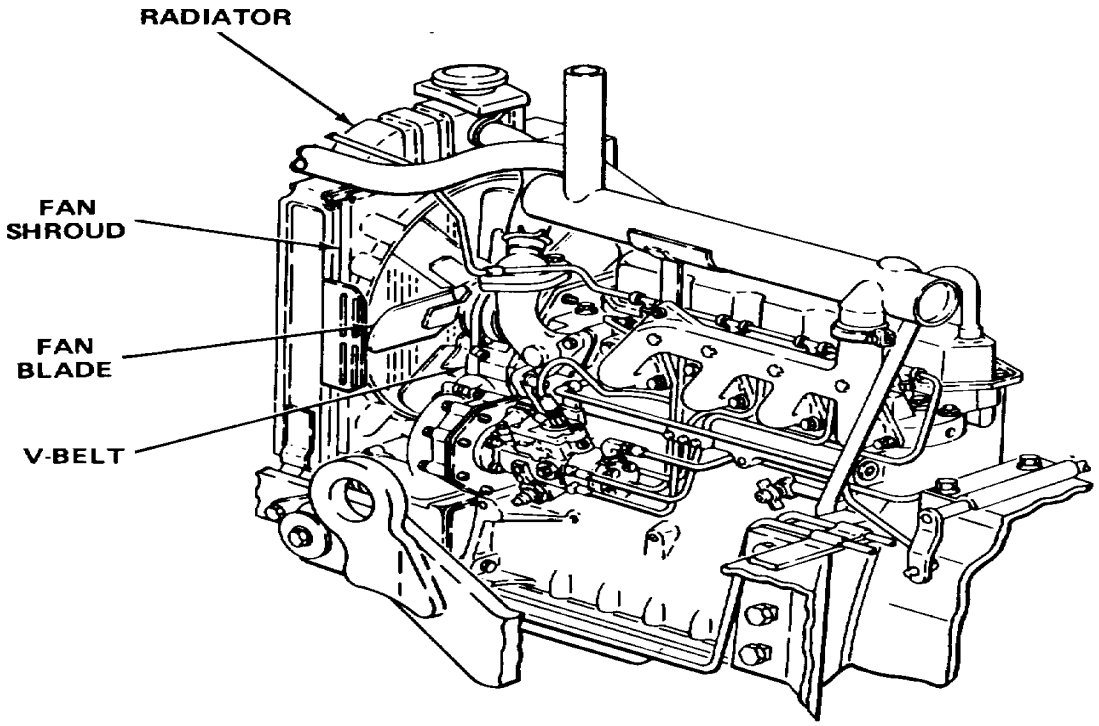
- Routes engine exhaust gases away from operator, above roof line of rollover protective structure (canopy).

RAIN COVER

- Mounted on top of muffler extension stack to keep rain water out when engine is not running.
- When engine is running, exhaust gas pressure lifts cover, allowing gases to escape.

TA242683

COOLING SYSTEM



FAN BLADE

- Fan pulley mounted to water pump shaft.
- Driven by V-belt from crankshaft pulley.
- Pulls air through radiator to cool engine coolant.

V-BELT

- Driven by crankshaft pulley.
- Drives water pump, fan blade, and ac generator.

FAN SHROUD

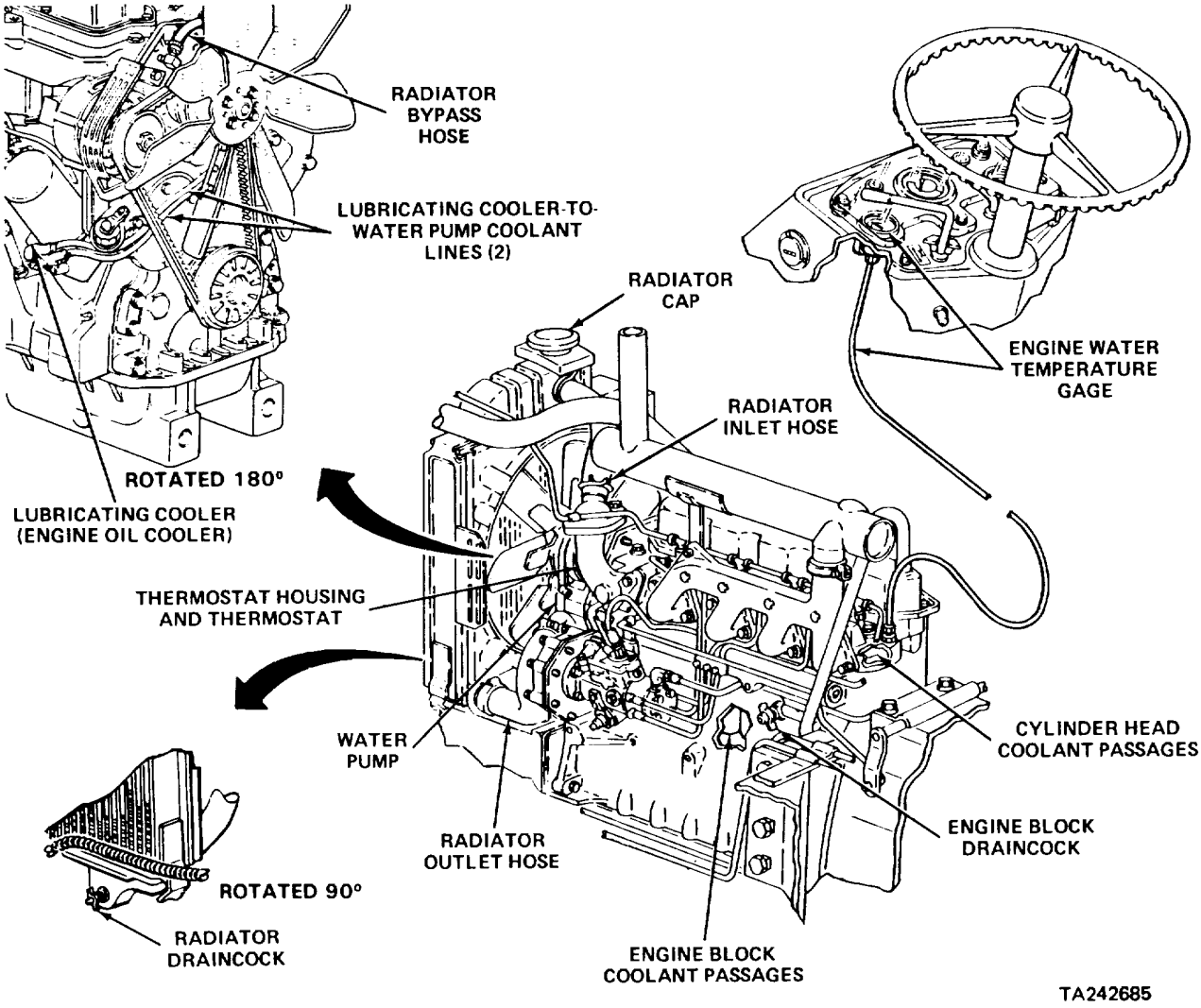
- Routes cooling air toward fan blade for more efficient cooling.
- Protects personnel from moving fan blade.

RADIATOR

- Air drawn through finned core of radiator by fan blade cools engine coolant circulated from top tank to bottom tank by water pump.

TA242684

COOLING SYSTEM - CONTINUED



RADIATOR CAP

- Pressure-type cap seals cooling system to keep dirt out.
- Maintains cooling system pressure between 6.25 and 7.50 psi (43.1 and 51.7 kPa).
- Allows addition of coolant to cooling system.

RADIATOR DRAINCOCK

- Located at lower-left front of bottom radiator tank.
- Allows draining of radiator.

RADIATOR OUTLET HOSE

- Routes coolant from lower radiator tank to water pump.

TA242685

COOLING SYSTEM - CONTINUED

WATER PUMP

- Centrifugal-type pump driven by V-belt from crankshaft pulley.
- Circulates coolant through cooling system.

LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES (2)

- Route coolant from water pump to lubricating cooler, and back to water pump.

LUBRICATING COOLER (ENGINE OIL COOLER)

- Considered part of engine lubrication system.
- Coolant passes through core, cooling engine lubricating oil.

ENGINE BLOCK COOLANT PASSAGES

- Cavities cast in engine block carry coolant around block components to cool them.
- Route coolant from water pump to cylinder head coolant passages.

ENGINE BLOCK DRAINCOCK

- Allows draining of engine block coolant passages on loader backhoes without optional engine coolant heater.

CYLINDER HEAD COOLANT PASSAGES

- Cavities cast in cylinder head carry coolant around head components to cool them.
- Route coolant from engine block coolant passages to thermostat housing.

ENGINE WATER TEMP. GAGE

- Senses engine coolant temperature at cylinder head and transmits this information through capillary tube to instrument panel gage for readout.

THERMOSTAT HOUSING AND THERMOSTAT

- Thermostat housing mounted to upper-left front of cylinder head.
- Spring loaded bellows-type thermostat remains closed, routing coolant through bypass hose directly back to water pump until coolant coming from cylinder head reaches minimum operating temperature. When this temperature is reached, thermostat begins to open, routing some or all coolant through radiator inlet hose to radiator for cooling.
- Shorten engine warmup time and maintain minimum operating temperature.

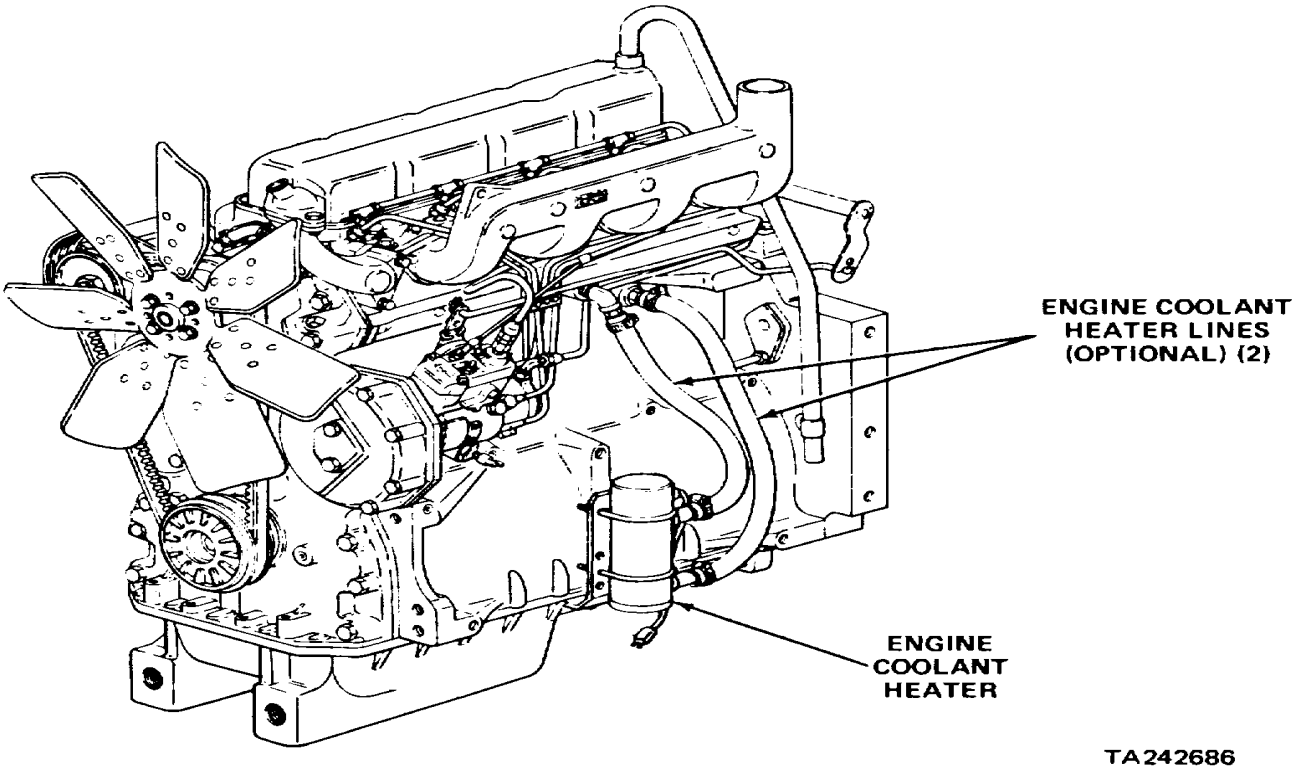
RADIATOR INLET HOSE

- Routes coolant from thermostat housing cover to top tank of radiator.

RADIATOR BYPASS HOSE

- Routes coolant from thermostat housing directly to water pump for re-circulation without passing through radiator until thermostat opens.

COOLING SYSTEM - CONTINUED



ENGINE COOLANT HEATER LINES (OPTIONAL) (2)

- Route coolant from engine block coolant passages to optional coolant heater, and back to cylinder head coolant passages.

ENGINE COOLANT HEATER (OPTIONAL)

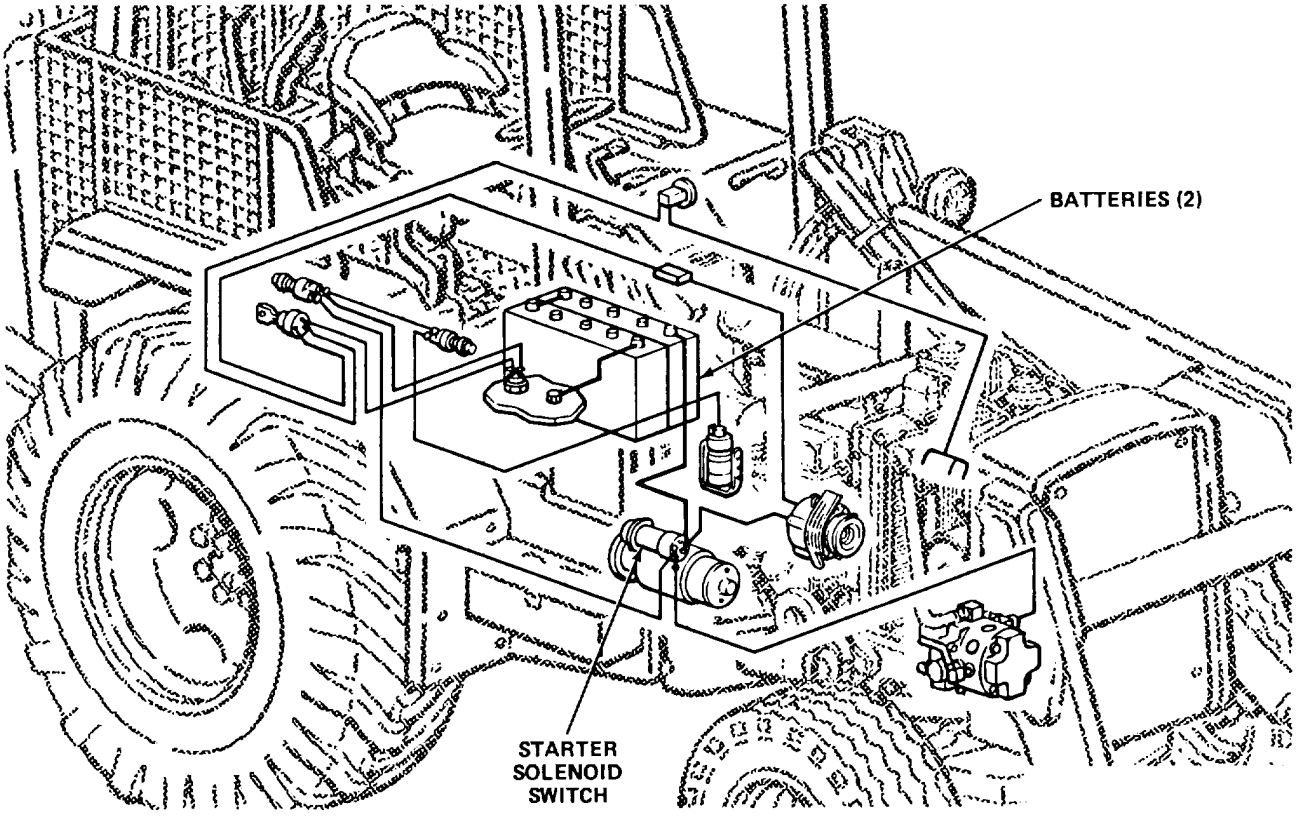
- Powered by external power cord connected to external 115-volt ac power source.
- Keeps coolant warm during extremely cold weather when engine is not running, to make it easier to start.

ELECTRICAL SYSTEM

To keep things simple, the following descriptions single out related items in the electrical system as separate circuits. Keep in mind that all of these circuits are interconnected with each other to form the entire electrical system. Electrical circuits for loader backhoes with Serial Numbers 319995 thru 342573 are shown, circuits for loader backhoes with Serial Numbers 235786 thru 235999 are similar. See Section XII, Electrical System (page 2-435), for electrical system schematic diagrams.

TA242686

ENGINE ELECTRICAL CIRCUITS



BATTERIES (2)

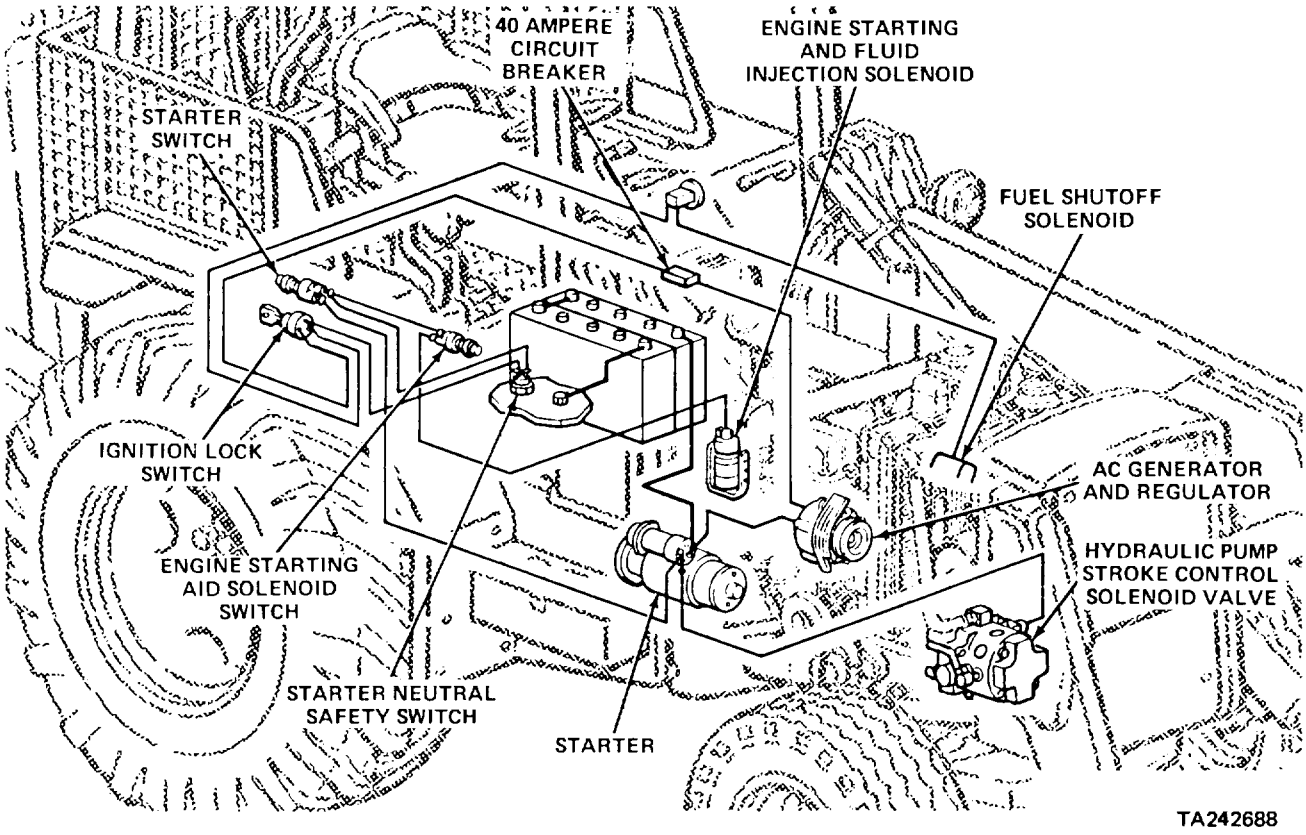
- Two 6volt automotive lead-acid batteries.
- Connected in series for combined voltage of 12-volts.
- Negative side of circuit connected by cable to ground at clutch pedal stop.
- Positive side of circuit connected by cable to starter solenoid switch battery terminal.
- Store electrical energy to operate electrical system components.

STARTER SOLENOID SWITCH

- Mounted to starter motor.
- Battery terminal connected by cable to positive side of battery circuit and output terminal of ac generator.
- B terminal connected by strap to motor positive terminal.
- S terminal connected by wires to starter switch negative terminal and hydraulic pump stroke control solenoid valve positive terminal.
- Grounded by mounting hardware to starter motor housing.
- Engages starter motor spur gear with flywheel ring gear and energizes starter motor to crank engine, when starter switch is pushed and range shift lever is in neutral.

TA242687

ENGINE ELECTRICAL CIRCUITS - CONTINUED



STARTER

- Positive terminal connected by strap to starter solenoid switch B terminal.
- Grounded by mounting hardware to starter solenoid switch and flywheel housing.
- Cranks engine when starter solenoid is energized.

AC GENERATOR AND REGULATOR

- Driven by belt from crankshaft pulley.
- Output terminal connected by wire to positive side of battery circuit.
- Grounded by mounting hardware to engine block.
- Regulator connected by wire to ac generator indicator light and horn switch.
- Produces electrical output when engine is running, to power electrical system components and change batteries.

IGNITION LOCK SWITCH

- BATT terminal connected by wire to positive side of battery circuit.
- IGN terminal connected by wire to starter switch terminal and other electrical system components.
- ACC terminal connected by wire to light circuits.
- Selects starting circuit, energizing starter switch and fuel shut off solenoid.

TA242688

ENGINE ELECTRICAL CIRCUITS - CONTINUED

40-AMPERE CIRCUIT BREAKER

- Connected by wire between ac generator output terminal and ignition lock switch BATT terminal.
- Protects starting circuit from excess voltage.

STARTER SWITCH

- Normally open switch.
- Connected by wire between starter neutral safety switch negative terminal and starter solenoid switch positive terminal.
- When pushed with range shift lever in neutral, activates starting circuit which energizes starter solenoid switch to activate starter motor and crank engine.

STARTER NEUTRAL SAFETY SWITCH

- Connected by wire between ignition lock switch IGN terminal and starter switch positive terminal.
- Closes to complete starting circuit when range shift lever is in neutral.
- Opens to interrupt starting circuit when range shift lever is not in neutral to prevent starting engine when loader backhoe is in gear.

HYDRAULIC PUMP STROKE CONTROL SOLENOID VALVE

- Normally closed solenoid is opened when starter switch is closed to bypass hydraulic pump discharge oil into pump crankcase during engine cranking.
- Reduces load on engine to make starting easier.

ENGINE STARTING AID SOLENOID SWITCH

- Connected by wire through positive side of starter switch to ignition lock switch IGN terminal.
- Normally open switch.
- When pushed to close, activates engine starting aid fluid injection solenoid to inject measured shots of engine primer fluid into engine air supply for cold weather starts.

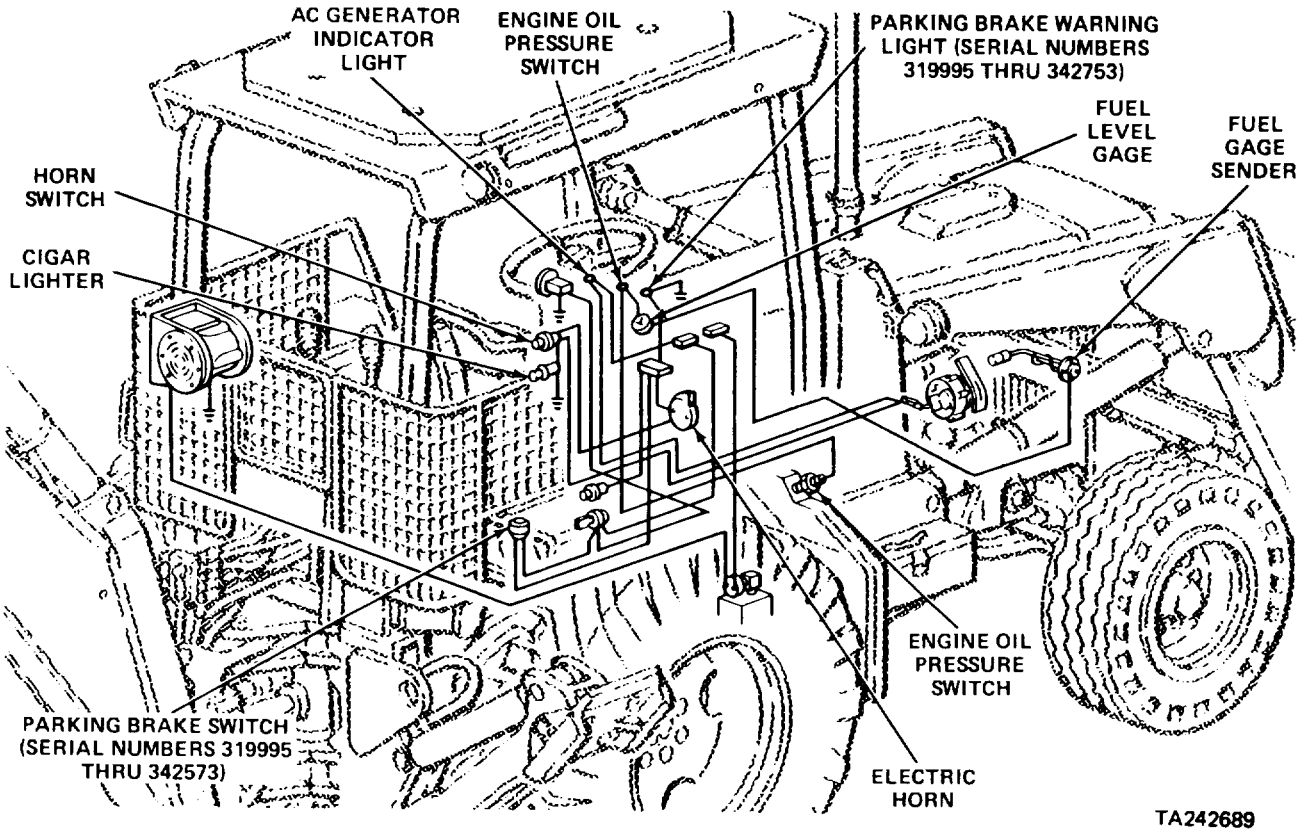
ENGINE STARTING AID FLUID INJECTION SOLENOID

- Considered part of fuel system.
- Holds replaceable cannister of engine primer fluid.
- Connected by engine starting aid fluid injection tube to air inlet housing.
- Releases measured shots of engine primer fluid for cold weather starts when activated by pushing engine starting aid solenoid switch.

FUEL SHUTOFF SOLENOID

- Normally open solenoid housed in fuel metering pump is considered part of fuel system.
- Connected by wire from ignition lock switch IGN terminal through time total meter positive terminal.
- Grounded by mounting hardware to engine cylinder block plate.
- Closes to allow fuel flow for engine operation when ignition circuit is energized.
- Opens to cut off fuel flow when ignition circuit is interrupted, to shut down engine.
- Keeps engine from starting when manually cranked if battery ground cable is disconnected.

INDICATOR AND WARNING ELECTRICAL CIRCUITS



AC GENERATOR INDICATOR LIGHT

- Negative terminal connected by wire to ac generator voltage regulator.
- Positive terminal connected by wire to battery and ac generator output voltage through ignition lock switch ACC terminal and 20 ampere circuit breaker, and to other indicators and light switch.
- Senses electrical system current and shows when ac generator is not charging.

ENGINE OIL PRESSURE INDICATOR LIGHT

- Positive terminal connected by wire to negative terminal of ac generator indicator light and positive terminal of FUEL level gage.
- Negative terminal connected by wire to positive terminal of engine oil pressure switch.
- Lights up to get operator's attention when engine oil pressure switch closes due to drop in engine oil pressure below a preset point during engine operation.

ENGINE OIL PRESSURE SWITCH

- Positive terminal connected by wire to negative terminal of engine oil pressure indicator light.
- Grounded through housing to flywheel housing.
- Normally closed switch is kept open by oil pressure during engine operation as long as engine lubrication system pressure is above a preset level. When engine oil pressure drops below preset level, switch closes and engine oil pressure indicator light lights up.

TA242689

INDICATOR AND WARNING ELECTRICAL CIRCUITS - CONTINUED

FUEL LEVEL GAGE

- Positive terminal connected by wire to positive terminal of engine oil pressure indicator light and positive terminal of alternator indicator light.
- Negative terminal connected by wire to positive terminal of fuel gage sender.
- Reads resistance set up by fuel gage sender to show fuel level.

FUEL GAGE SENDER

- Positive terminal connected by wire to negative terminal of FUEL level gage.
- Grounded through mounting hardware to fuel tank.
- Float adjusts to fuel level and sets up resistance in sender which FUEL level gage reads and shows as quantity.

HORN SWITCH

- Positive terminal connected by wire to output from ac generator voltage regulator and positive terminal of cigar lighter.
- Negative terminal connected by wire to positive terminal of electric horn.
- When pushed, completes horn circuit to sound electric horn.

ELECTRIC HORN

- Positive terminal connected by wire to negative terminal of horn switch and number 2 terminal of parking brake horn relay if present.
- Grounded through mounting hardware to flywheel housing.
- Sounds when operator pushes horn switch.
- Sounds when parking brake lever is engaged and range shift lever is not in neutral on Serial Numbers 319995 thru 342573.

CIGAR LIGHTER

- Positive terminal connected by wire to horn switch positive terminal.
- Grounded by wire to cowl.
- When pushed in, element heats up enough to light cigarettes and cigars.

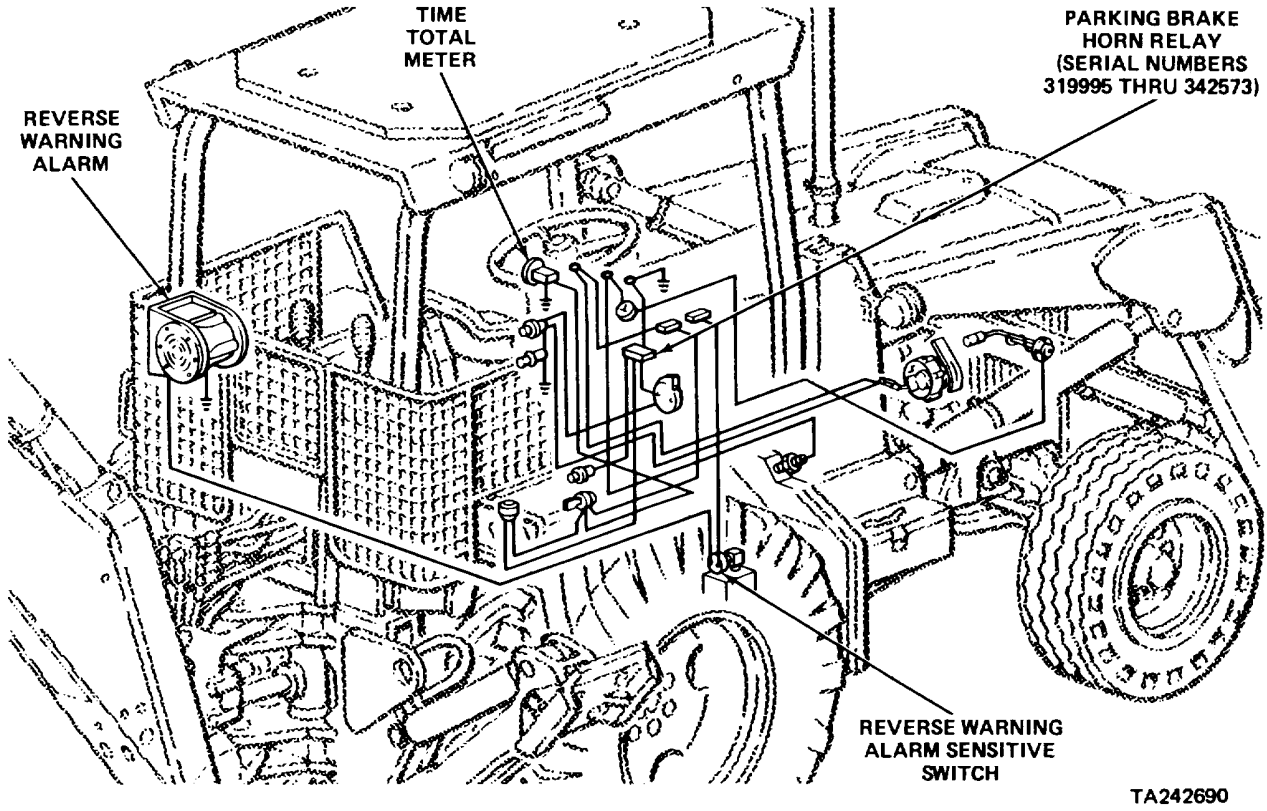
PARKING BRAKE SWITCH (SERIAL NUMBERS 319995 THRU 342573 ONLY)

- Positive terminal connected by wire to ignition lock switch IGN terminal.
- Negative terminal connected by wire to parking brake horn relay number 1 terminal.
- Normally closed switch is held open when parking brake lever is completely released.
- When parking brake lever is engaged, closed switch completes circuit to parking brake horn relay and parking brake warning light.

PARKING BRAKE WARNING LIGHT (SERIAL NUMBERS 319995 THRU 342573 ONLY)

- Positive terminal connected by wire to number 1 terminal of parking brake horn relay.
- Negative terminal connected by wire to ground.
- Glows when ignition lock switch is on and parking brake lever is engaged closing parking brake switch.

INDICATOR AND WARNING ELECTRICAL CIRCUITS - CONTINUED



PARKING BRAKE HORN RELAY (SERIAL NUMBERS 319995 THRU 342573)

- Number 1 terminal connected by wire to negative terminal of parking brake switch and positive terminal of parking brake warning light.
- Number 2 terminal connected by wire to electric horn positive terminal.
- Number 4 terminal connected by wire to ground.
- Number 5 terminal connected by wire to starter switch positive terminal.
- Normally closed relay solenoid is held open by voltage from negative side of closed neutral safety switch. If range shift lever is placed in gear, neutral safety switch opens and relay solenoid is no longer energized, allowing relay to close. If parking brake lever is-engaged, parking brake switch is closed and voltage flows through switch and relay to sound electric horn.
- Warns operator that parking brake is engaged when range shift lever is in gear.

TIME TOTAL METER

- Positive terminal connected by wire to ignition lock switch IGN terminal.
- Negative terminal connected by wire to ground.
- Operates whenever ignition lock switch is on to show total number of hours engine has run.

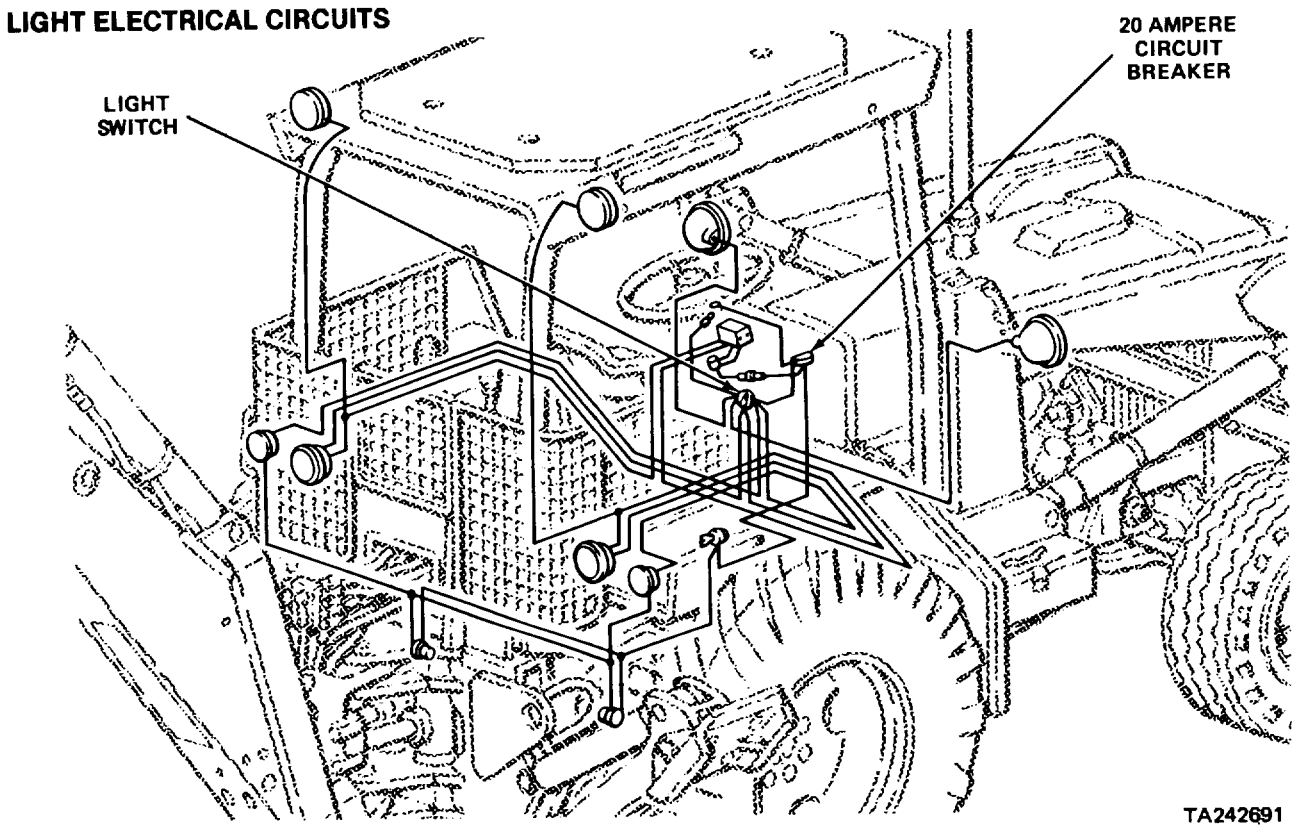
INDICATOR AND WARNING ELECTRICAL CIRCUITS - CONTINUED

REVERSE WARNING ALARM SENSITIVE SWITCH

- Positive terminal connected by wire to negative side of 40 ampere circuit breaker.
- Negative terminal connected by wire to positive terminal of reverse warning alarm.
- Senses pressure change at reverser valve when loader backhoe is operated in reverse, closing switch to complete circuit to sound reverse warning alarm.

REVERSE WARNING ALARM

- Positive terminal connected by wire to reverse warning alarm sensitive switch.
- Negative terminal connected by wire to ground.
- When circuit is completed by reverse warning alarm sensitive switch, sounds warning to nearby personnel that loader backhoe is backing up.



20 AMPERE CIRCUIT BREAKER

- Connected by wire between ignition lock switch ACC terminal, and light switch B terminal and alternator Indicator light positive terminal.
- Protects light switch, and indicator and warning electrical circuits.

LIGHT SWITCH

- B terminal connected by wire to battery voltage through ignition lock switch ACC terminal and 20 ampere circuit breaker
- Output terminals connected by wire to other light circuit components.
- Allows operator to select lighting functions according to conditions.

TA242691

LIGHT ELECTRICAL CIRCUITS - CONTINUED

FRONT LIGHTS (2)

- Positive terminals connected by wires to light switch HD terminal.
- Negative terminals grounded to housings.
- Light up area in front of loader backhoe for earthmoving operations at night when light switch lever is in second (F), third (H1), or fourth (H2) position.

DASH LIGHT

- Positive terminal connected by wire to light switch HD terminal.
- Grounded to dash through housing.
- Lights up dash to allow operator to read instruments during operations at night when light switch lever is in second (F), third (H1), or fourth (H2) position.

BRAKE LIGHT PRESSURE SWITCHES (2)

- Positive terminals connected by wire to ignition lock switch ACC terminal.
- Negative terminals connected by wire to stoplight circuit of combination tail and stoplights.
- Sense pressure increase when brakes are applied, closing electrical contacts to complete stoplight circuit.
- Light stoplight lamps in combination tail and stoplights when ignition lock switch is on and brakes are applied.

TA242692

LIGHT ELECTRICAL CIRCUITS - CONTINUED

COMBINATION TAIL AND STOPLIGHTS (2)

- Positive terminals of sockets connected by wires i separate circuits to light switch TL terminal and brake light pressure switch negative terminals.
- Negative terminals of each socket grounded to housings.
- Provide rear marking for night operation's when light switch lever is in third (H1) or fourth (H2) position.
- Indicate stop when ignition lock switch is on and brakes are applied.

TURN SIGNAL SWITCH IN-LINE FUSE

- One end connected by wire through positive side of 20 ampere circuit breaker to ignition lock switch ACC terminal.
- Other end connected by wire to warning light flasher X terminal.
- 14 ampere quick-blowing glass fuse protects warning light flasher, turn signal switch, and warning light and combination tail and floodlight taillight circuits.

WARNING LIGHT FLASHER

- X terminal connected by wire to turn signal switch in-line fuse.
- P terminal connected by wire to turn signal switch unused circuit input.
- L terminal connected by wire to turn signal switch operating circuit input.
- Provides on-off electrical pulse to flash warning lights and combination tail and floodlight taillights when Ignition lock switch is on and turn signal switch side buttons are pushed in.

TURN SIGNAL SWITCH

- Operating circuit input connected by wire to warning light flasher L terminal.
- Unused circuit input connected by wire to warning light flasher P terminal.
- Operating circuit outputs connected by wires in common circuits to warning lights and combination tail and floodlight taillights.
- Allows operator to operate warning lights and combination tail and floodlight taillights as turn signals or warning flashers.

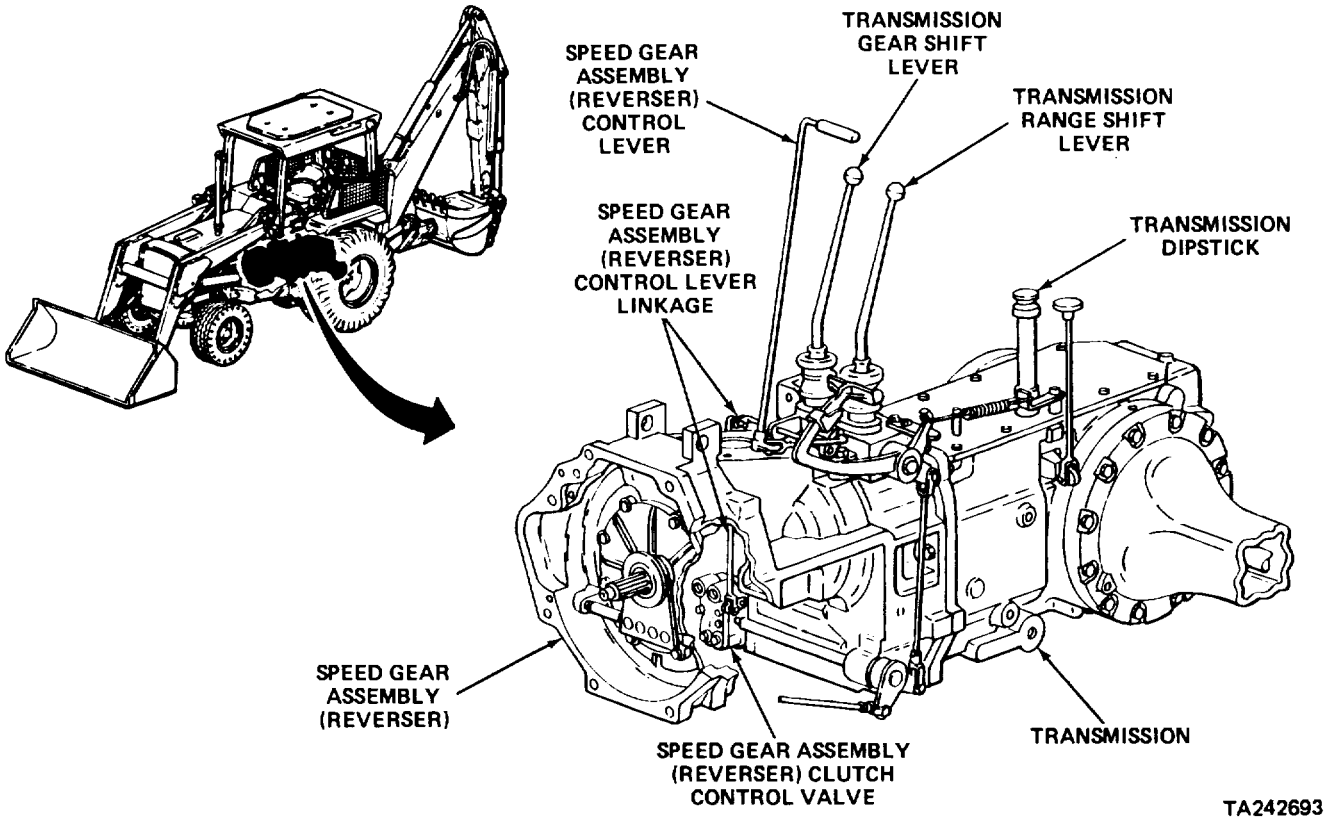
WARNING LIGHTS (2)

- Positive terminals of sockets connected by wires in common circuits with circuits of combination tail and floodlight taillights.
- Negative terminals of sockets grounded through housings.
- Flash at same time as combination tail and floodlight taillight lamps when ignition lock switch Is on and turn signal switch side buttons are pushed in.

COMBINATION TAIL AND FLOODLIGHTS (2)

- Positive terminals of floodlights connected by wires to light switch FL terminal.
- Positive terminals of taillight sockets connected by wires in circuits common with warning lights to turn signal switch output terminals.
- Negative terminals of each taillight socket and floodlight grounded to housings.
- Floodlights light up wide area behind loader backhoe for earthmoving operation's at night when light switch lever is in second (F) position.
- Taillight lamps flash through red window in floodlight reflector at same time as warning lights when Ignition lock switch is on and turn signal switch side buttons are pushed in.

TRANSMISSION SYSTEM



SPEED GEAR ASSEMBLY (REVERSER) CONTROL LEVER

- Connected by mechanical linkage to speed gear assembly (reverser) clutch control valve.
- Held in neutral when neutral latch is engaged.
- Selects forward drive when neutral latch is disengaged and lever is moved forward.
- Selects reverse drive when neutral latch is disengaged and lever is moved rearward.
- Allows operator to change direction of loader backhoe travel under full load without disengaging clutch or shifting transmission gears.

SPEED GEAR ASSEMBLY (REVERSER) CONTROL LEVER LINKAGE

- Connects speed gear assembly (reverser) control lever to speed gear assembly (reverser) control valve.
- When transmission range shift lever is in high range (II) on loader backhoes with Serial Numbers 235786 thru 235999, linkage is engaged by high speed lockout pin to prevent shifting speed gear assembly (reverser) into reverse drive.

SPEED GEAR ASSEMBLY (REVERSER) CLUTCH CONTROL VALVE

- Clutch control pressure valve spool connected by linkage to loader backhoe clutch pedal.
- When clutch pedal is pushed down to disengage engine flywheel clutch, clutch control pressure valve spool cuts off hydraulic pressure to clutch control shift valve spool and opens engaged clutch pack pressure line to sump to neutralize speed gear assembly (reverser) clutch packs, disengaging speed gear assembly (reverser).

TRANSMISSION SYSTEM -CONTINUED

- When clutch pedal is released to engage engine flywheel clutch, clutch control pressure valve spool routes hydraulic pressure to clutch control shift valve spool to engage selected speed gear assembly (reverser) clutch pack.
- Speed gear assembly (reverser) speed of shift can be adjusted by turning screw at adjustable accumulator charging orifice to change control valve accumulator charging rate. Adjusting orifice smaller shows pressure rise in selected speed gear assembly (reverser) clutch pack for smoother, softer shift. Adjusting orifice larger speeds pressure rise, Increasing torque under load but making shift sharper under no load.

SPEED GEAR ASSEMBLY (REVERSER)

- Connected in power train between clutch and transmission.
- Separate clutch packs for forward and reverse engagement allow constant mesh of gear train for change In direction under full load without shifting transmission gears.

TRANSMISSION RANGE SHIFT LEVER

- Reaches directly into transmission from operator's compartment.
- Allows operator to select low range (I) or high range (II). On loader backhoes with Serial Numbers 235786 thru 235999, speed gear assembly (reverser) control lever must be in forward drive position to operate transmission in high range (II).

TRANSMISSION GEAR SHIFT LEVER

- Reaches directly into transmission from operator's compartment.
- Allows operator to select gears 1 thru 4 when transmission range shift lever is in low range (I).
- Allows operator to select gears 5 thru 8 when transmission range shift lever is in high range (11).

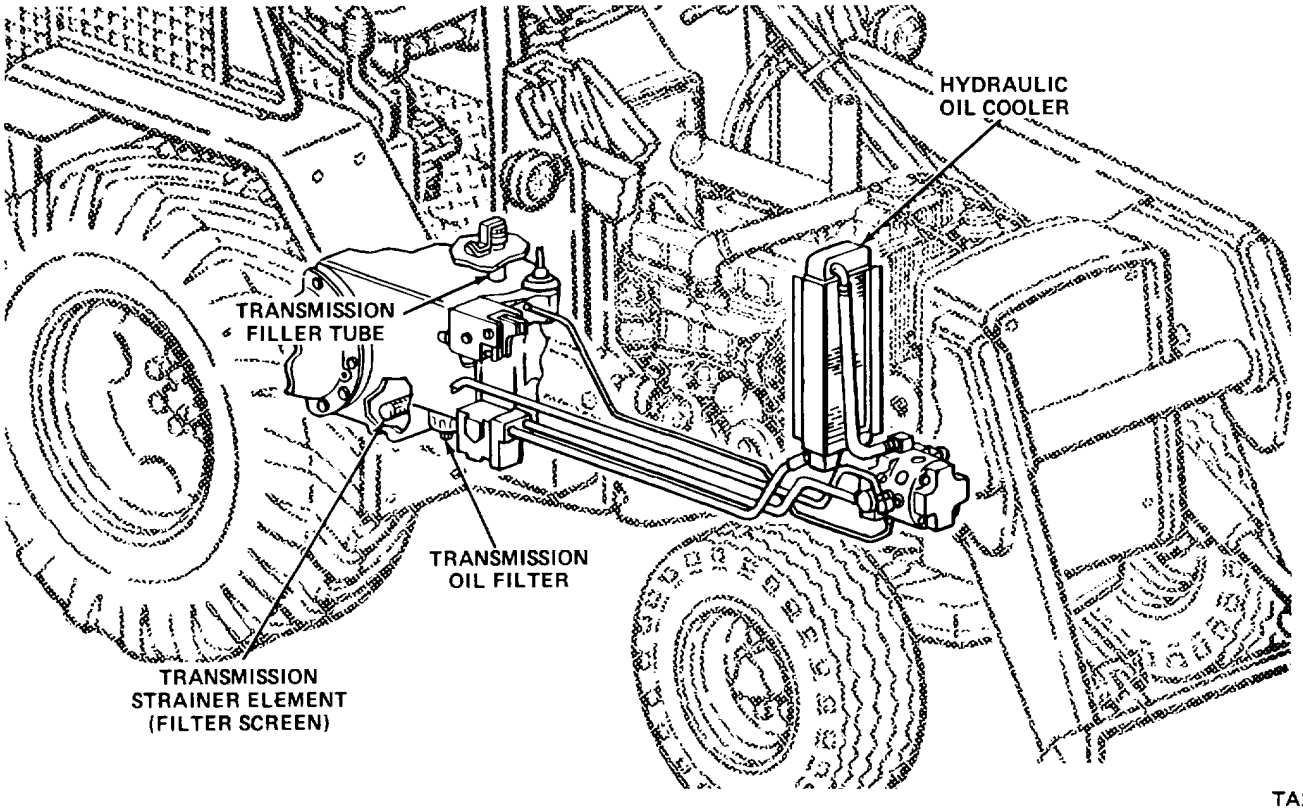
TRANSMISSION

- Connected in power train between speed gear assembly (reverser) and differential.
- Mechanical, collar shift type with helical gears in constant mesh. Depending upon transmission range and gear shift lever positions, some gears are allowed to idle on shafts while shifters engage others by forcing Internally splined shifter collars, geared to shafts by shifter gears, over short external splines on sides of gears to be driven. Different speed ratios are obtained by engaging different combinations of gears.
- Provides eight forward speeds.
- Provides four reverse speeds in low range (I) only on loader backhoes with Serial Numbers 235786 thru 235999, which are equipped with high speed lockout for reverse.
- Provides eight reverse speeds, including four in low range (I) and four in high range (II), only on loader backhoes with Serial Numbers 319995 thru 342573.
- Acts as hydraulic fluid reservoir for all hydraulic system components.

TRANSMISSION DIPSTICK

- Dipstick gage shows transmission hydraulic fluid level.
- Closes end of transmission filler tube to keep dirt out of tranmission system.

TRANSMISSION SYSTEM - CONTINUED



TRANSMISSION FILLER TUBE

- Allows addition of hydraulic fluid to transmission system.

TRANSMISSION STRAINER ELEMENT (FILTER SCREEN)

- Wire mesh screen.
- Filters transmission hydraulic fluid from transmission case reservoir to keep large particles of dirt out of transmission oil pump inlet.

TRANSMISSION OIL FILTER

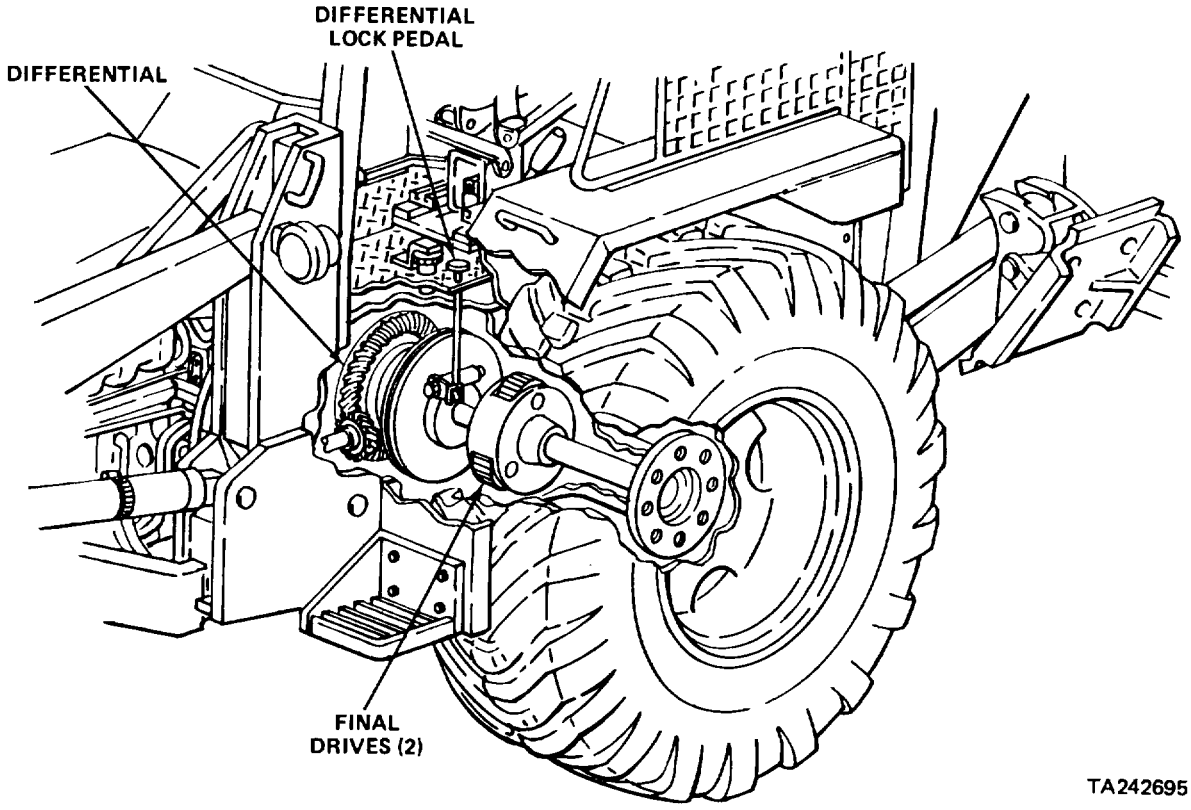
- Full-flow filter with bypass valve and replaceable element.
- Filters small particles of dirt out of transmission hydraulic fluid fed from transmission oil pump outlet before passing it on to rest of transmission and hydraulic systems.

HYDRAULIC OIL COOLER

- Mounted to right side of radiator.
- Finned core air cools transmission and hydraulic system hydraulic fluid routed to it through line from hydraulic pump.
- Cooled hydraulic fluid is routed from cooler through line to speed gear assembly (reverser) clutch control valve.

TA242694

DRIVE TRAIN SYSTEM



DIFFERENTIAL

- Housed in transmission case.
- Spiral bevel gear assembly transmits power from transmission drive shaft to axles.
- Distributes power in amount needed by each axle.
- Differential lock collar splined to left-hand final drive shaft gives effect of solid rear axle when differential lock pedal is pushed down to engage collar splines with splines on differential drive shaft hub.
- Parking brake drum is splined to differential drive shaft hub. When parking brake is engaged by pulling up on parking brake lever, brake band and lining clamp around drum to keep differential from moving, locking up drive train.

DIFFERENTIAL LOCK PEDAL

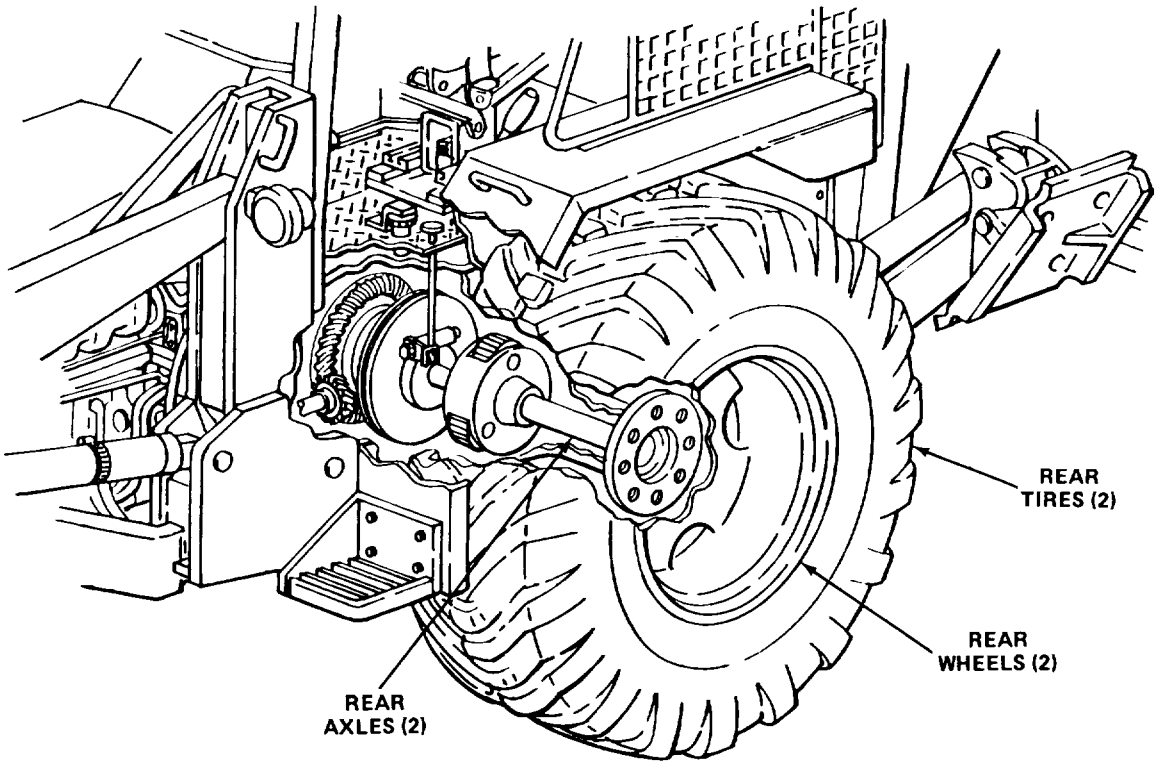
- Connected by mechanical linkage to differential splined collar.
- Allows operator to engage differential lock so both rear wheels drive equally for added traction.

FINAL DRIVES (2)

- Planetary gear trains housed in rear axle housings transmit power from differential to rear axles.
- Provide final gear reduction of 5 to 1.

TA242695

DRIVE TRAIN SYSTEM - CONTINUED



TA242696

REAR AXLES (2)

- Two flanged axle shafts, splined to planet pinion carriers.
- Transmit power from final drives to rear wheels.

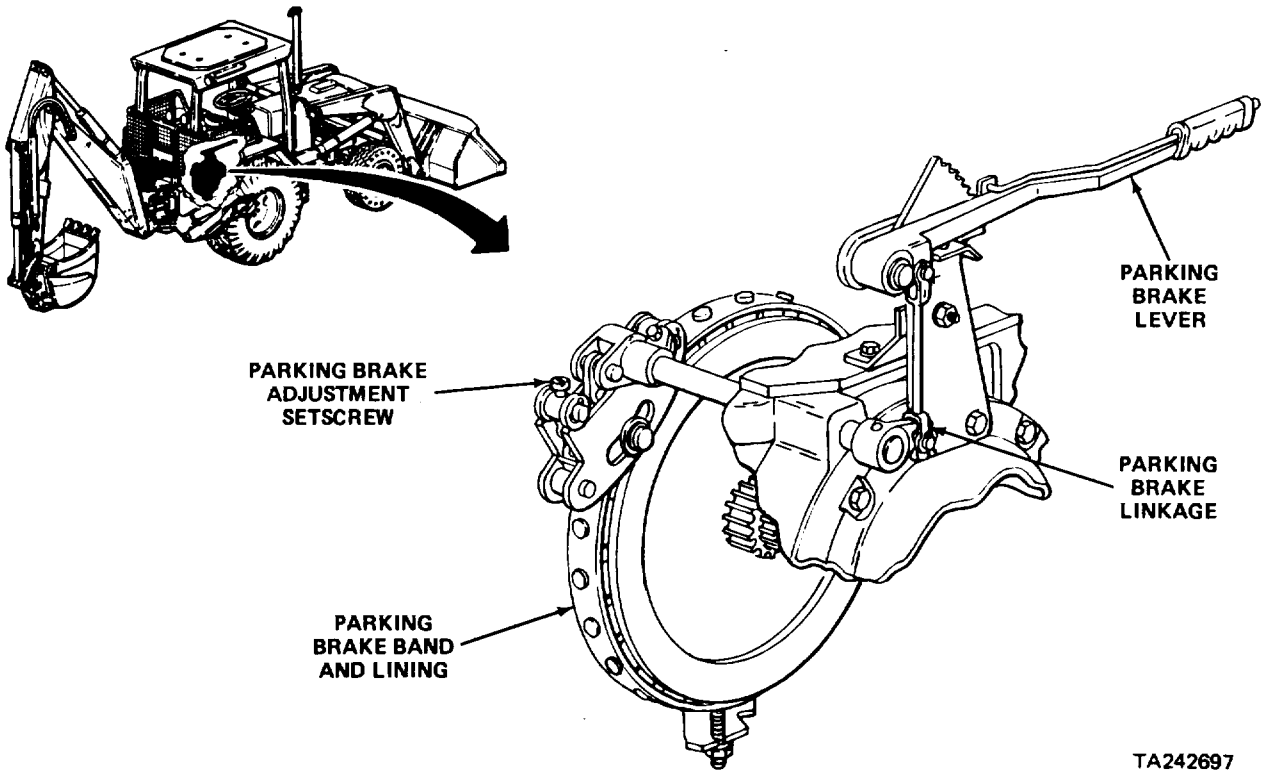
REAR WHEELS (2)

- Steel wheel assemblies secured to rear axle shaft flanges.
- Provide for mounting of rear tires.
- Transmit power from rear axles to tires.

REAR TIRES (2)

- Pneumatic tubeless type with heavy lugs for good traction on soft surfaces.
- Transmit power from wheels to ground, providing traction to move loader backhoe in direction and at speed selected by operator.

PARKING BRAKE



PARKING BRAKE LEVER

- Hand-operated lever mounted to platform at right of operator's seat.
- Connected through parking brake linkage to parking brake band and lining.
- Allows operator to engage parking brake when loader backhoe is stopped, to keep it from moving.

PARKING BRAKE LINKAGE

- Connects parking brake lever to parking brake band.

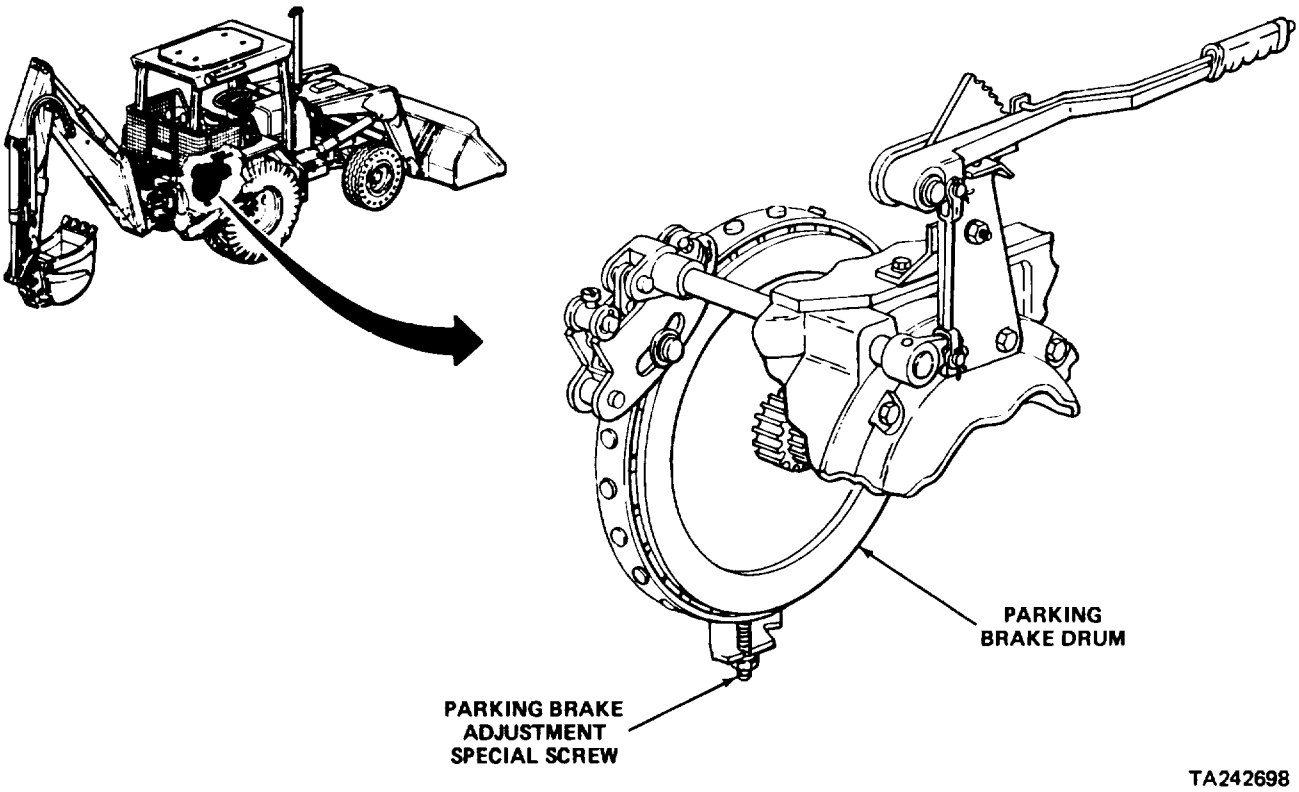
PARKING BRAKE BAND AND LINING

- When parking brake lever is engaged, band and lining are tightened around parking brake drum.
- When parking brake lever is released, band and lining release parking brake drum and allow it to rotate freely.

PARKING BRAKE ADJUSTMENT SETSCREW

- Secures ends of parking brake band and lining.
- Provides for Initial adjustment of parking brake.

PARKING BRAKE - CONTINUED



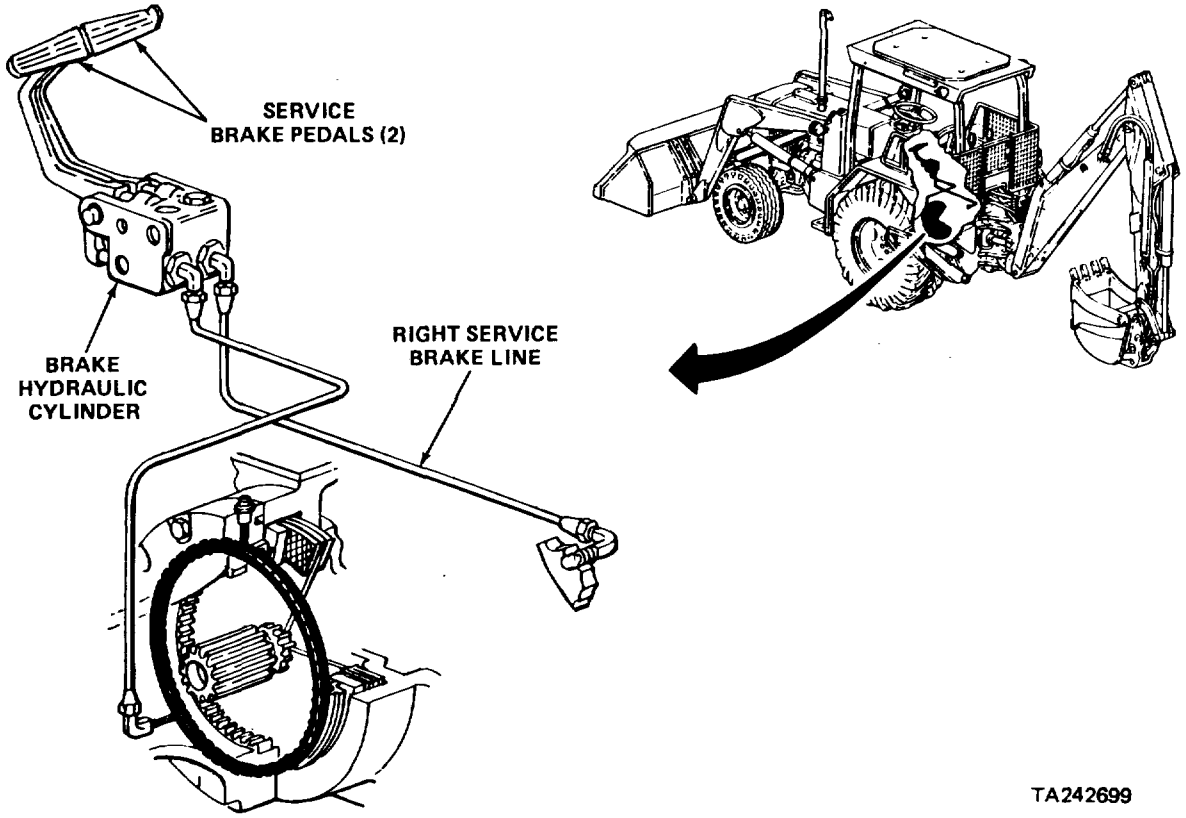
PARKING BRAKE ADJUSTMENT SPECIAL SCREW

- Located in bottom of transmission case.
- Provides for final adjustment of parking brake.

PARKING BRAKE DRUM

- Splined to left-hand differential drive shaft hub.
- Provides braking surface for parking brake band and lining to grip.
- When parking brake lever is engaged, locks up gear train to keep loader backhoe from moving.

SERVICE BRAKE SYSTEM



SERVICE BRAKE PEDALS (2)

- Directly connected to brake hydraulic cylinder.
- Left pedal moves brake hydraulic cylinder left piston to operate left service brake.
- Right pedal moves brake hydraulic cylinder right piston to operate right service brake.
- Both pedals can be pushed at the same time for even braking for both rear wheels.

BRAKE HYDRAULIC CYLINDER

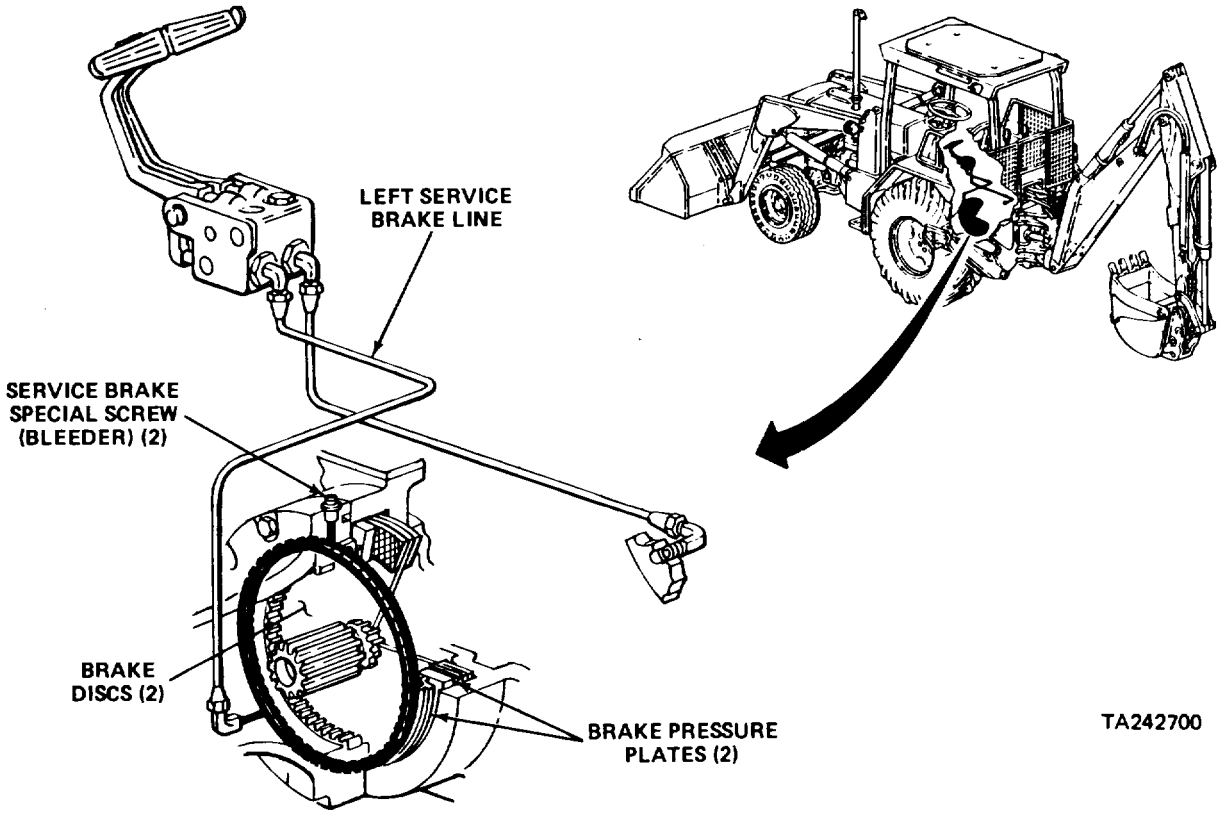
- Supplied hydraulic fluid from transmission case sump by transmission oil pump through lubrication circuit.
- Converts mechanical movement of service brake pedals to hydraulic pressure to operate service brakes.
- Two circuits allow operation of left or right service brake alone, or both service brakes at the same time.
- Equalizing valve adjusts for differences in pedal pressure for even braking when both pedals are pushed at the same time.

RIGHT SERVICE BRAKE LINE

- Routes hydraulic fluid from brake hydraulic cylinder to right rear axle housing.

TA242699

SERVICE BRAKE SYSTEM - CONTINUED



LEFT SERVICE BRAKE LINE

- Routes hydraulic fluid from brake hydraulic cylinder to left rear axle housing.

SERVICE BRAKE SPECIAL SCREW (BLEEDER) (2)

- Located in tops of rear axle housings.
- Allow bleeding of air from hydraulic brake system.

BRAKE PRESSURE PLATES (2)

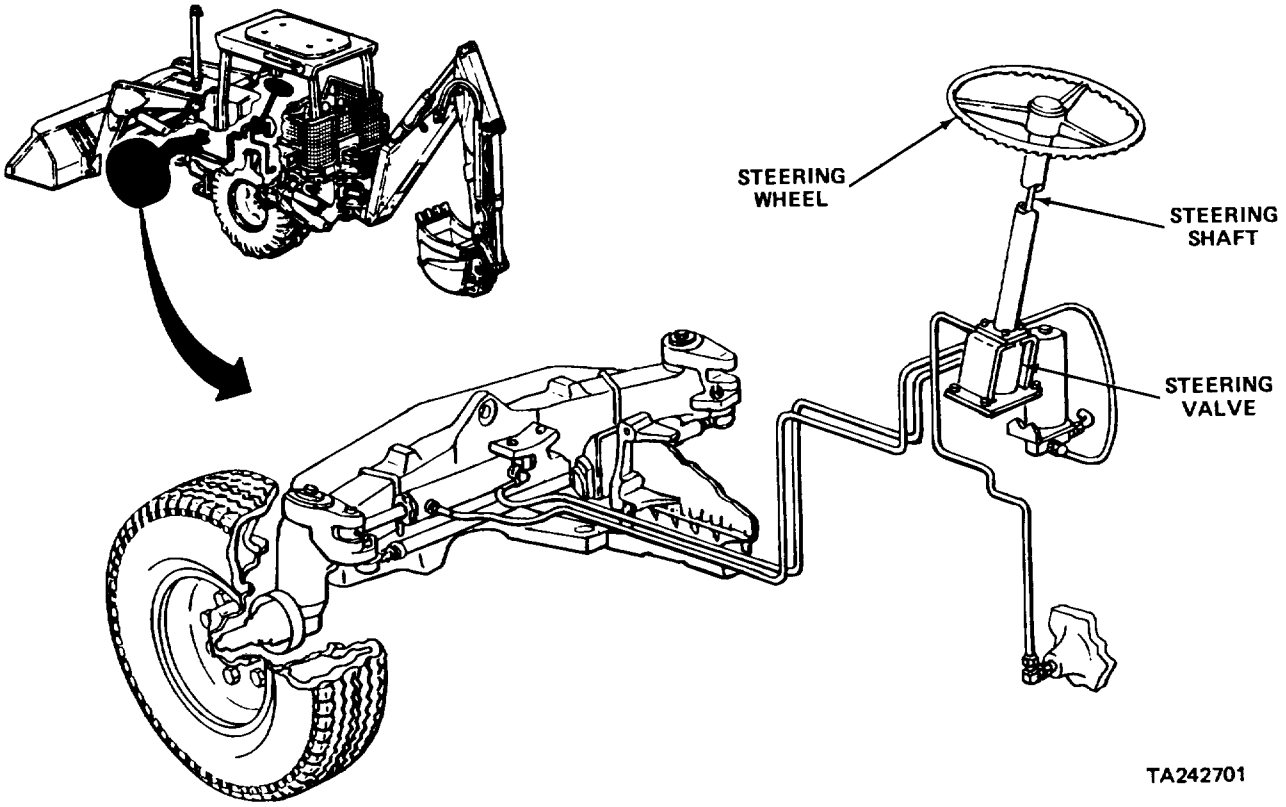
- Positioned between floating brake facings and rear axle housings.
- When service brake pedals are pushed, hydraulic pressure from brake hydraulic cylinder through service brake lines forces plates against floating brake facings, brake disks, and transmission housing to slow rotation of brake disks.

BRAKE DISKS (2)

- Splined to right and left final drive shafts.
- Combined with floating brake facings on either side of each disk, provide braking action to drive train when brake pressure plates force them against transmission housing.

TA242700

STEERING SYSTEM



NOTE

Steering systems on loader backhoes with Serial Numbers 235786 thru 235999 have two steering cylinders. Loader backhoes with Serial Numbers 319995 thru 342573 have one steering cylinder. Both steering systems operate the same way. Steering system for loader backhoes with Serial Numbers 319995 thru 342573 is shown.

STEERING WHEEL

- Allows operator to steer loader backhoe by direct mechanical link through steering shaft to steering valve.

STEERING SHAFT

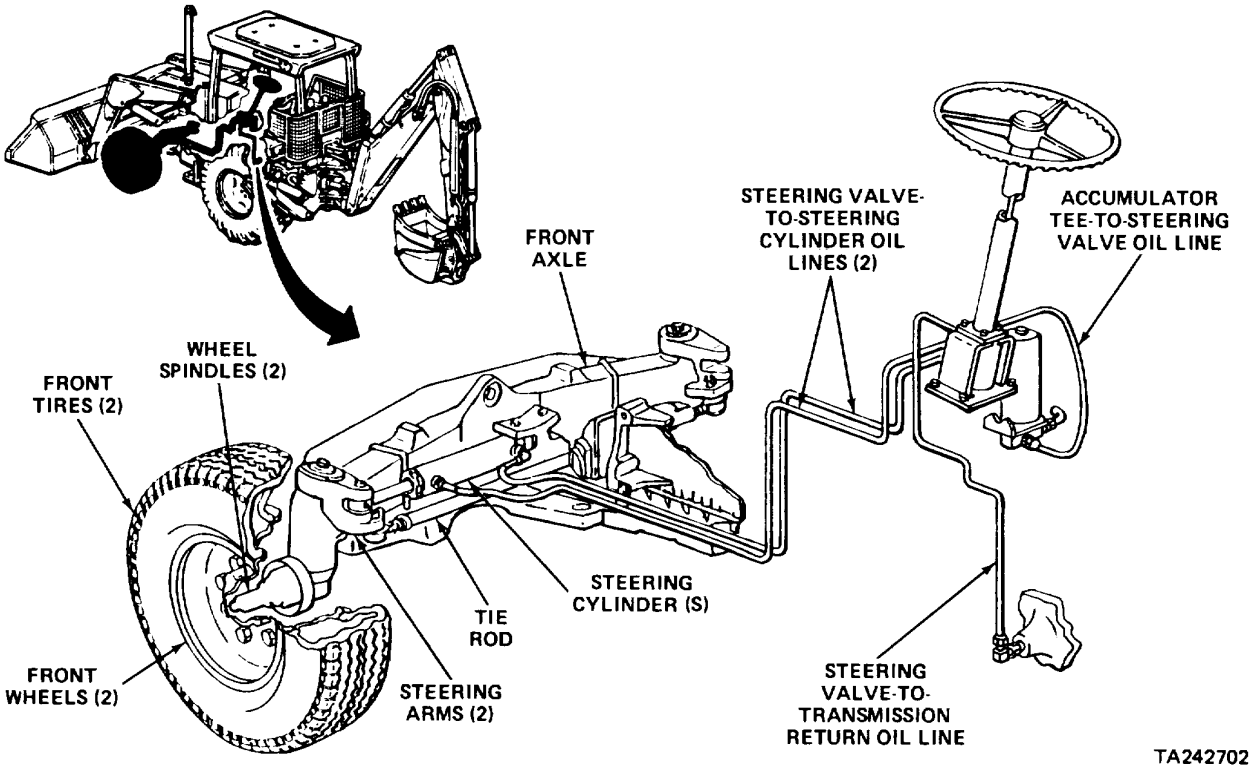
- Provides direct mechanical link between steering wheel and steering valve.

STEERING VALVE

- Consists of rotary spool and sleeve assembly in housing with gerotor gear set at one end.
- Controlled by steering wheel by direct connection through steering shaft.
- Directs flow of high pressure hydraulic fluid to one end of steering cylinder and routes return hydraulic fluid from other end back to transmission case sump.
- When high pressure hydraulic fluid is not available, such as when engine stalls, gerotor gear becomes hand-operated pump, forcing hydraulic fluid through system to provide manual steering.

TA 242701

STEERING SYSTEM - CONTINUED



ACCUMULATOR TEE-TO-STEERING VALVE OIL LINE

- Routes high pressure hydraulic fluid from accumulator tee to steering valve inlet.

STEERING VALVE-TO-TRANSMISSION RETURN OIL LINE

- Routes hydraulic fluid from steering valve back to transmission case sump.

STEERING VALVE-TO-STEERING CYLINDER OIL LINES (2)

- Route hydraulic fluid between steering valve and steering cylinder.

STEERING CYLINDER(S)

- Activated by steering valve with hydraulic pressure through steering valve-to-steering cylinder oil lines.
- Attached by pins through front frame at one end and steering arms(s) at other end.
- Provide turning force by moving steering arm(s) toward or away from front frame.

STEERING ARMS (2)

- Connect steering cylinder(s) and tie rod to wheel spindles.
- Provide lever action mechanical advantage to turn wheel spindles.

TA242702

STEERING SYSTEM - CONTINUED

TIE ROD
- Connects right and left steering arms.
- Maintains same steering force and direction at both front wheels.

WHEELS SPINDLES (2)

- Connect front wheels to front axle and steering arms.
- Provide for front wheel rotation and steering action.

FRONT AXLE

- Mounted by pivot pins to front support to keep both front tires on surface when moving over rough ground.
- Provides for mounting of wheel spindles at each end and steering cylinder(s) at center.
- Swept-back design provides short turning radius for sharp turns in close quarters.

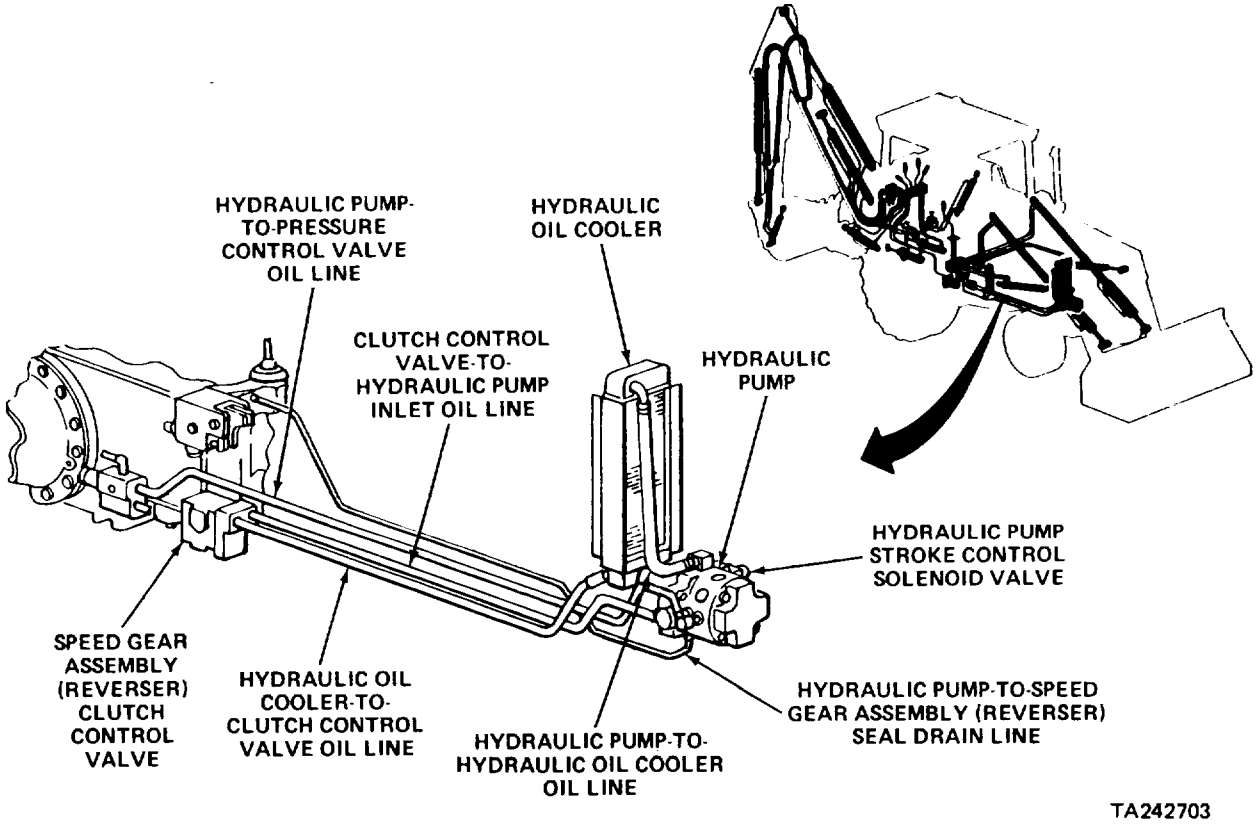
FRONT WHEELS (2)

- Steel wheel assemblies with tapered roller bearings secured through hubs to wheel spindles.
- Provide for mounting of front tires.
- Transmit steering direction from wheel spindles to front tires.

FRONT TIRES (2)

- Pneumatic tubeless type with deep tread pattern for good turning traction on soft surfaces.
- Transmit steering direction from front wheels to ground, providing traction to allow operator to steer loader backhoe in desired direction.

HYDRAULIC SYSTEM



NOTE

Hydraulic systems on all loader backhoes are similar and operate basically the same way. Hydraulic system for loader backhoes with Serial Numbers 319995 thru 342573 is shown. See Section XX, Hydraulic and Fluid Systems (page 2-1189), for hydraulic system diagrams.

TRANSMISSION CASE

- Considered part of transmission system.
- Acts as hydraulic fluid reservoir for all hydraulic system components.

SPEED GEAR ASSEMBLY (REVERSER) CLUTCH CONTROL VALVE

- Considered part of transmission system.
- Clutch pressure valve spool routes excess hydraulic fluid through oil line to hydraulic pump.

CLUTCH CONTROL VALVE-TO-HYDRAULIC PUMP INLET OIL LINE

- Routes hydraulic fluid from speed gear assembly (reverser) clutch control valve, and oil filter relief valve-to-clutch control valve adapter oil line, to hydraulic pump inlet.

TA242703

HYDRAULIC SYSTEM - CONTINUED

HYDRAULIC PUMP

- Variable displacement, constant pressure pump with eight radially arranged pistons.
- Inlet fed by hydraulic oil filter relief valve and speed gear assembly (reverser) clutch control valve through low pressure oil lines.
- High pressure output hydraulic fluid routed through high pressure oil lines to pressure control valve, hydraulic accumulator, and steering valve.
- Passes excess low pressure hydraulic fluid directly to hydraulic oil cooler through low pressure oil line.
- Excess hydraulic fluid from hydraulic pump shaft lubrication is routed to transmission case sump through drain line to protect pump shaft seal from pressure build-up.
- Delivers on demand to maintain hydraulic system pressure for operation of all hydraulic system components.

HYDRAULIC PUMP STROKE CONTROL SOLENOID VALVE

- Considered part of electrical system.
- Normally closed solenoid is opened when starter switch is closed to bypass hydraulic pump discharge oil into pump crankcase during engine cranking.
- Reduces load on engine to make starting easier.

HYDRAULIC PUMP-TO-SPEED GEAR ASSEMBLY (REVERSER) SEAL DRAIN LINE

- Routes excess hydraulic fluid from hydraulic pump shaft lubrication to transmission case sump.
- Protects hydraulic pump shaft seal from pressure build-up.

HYDRAULIC PUMP-TO-HYDRAULIC OIL COOLER OIL LINE

- Routes low pressure hydraulic fluid not needed by hydraulic pump directly to hydraulic oil cooler.

HYDRAULIC OIL COOLER

- Considered part of transmission system.
- Finned core air cools hydraulic fluid routed to it through low pressure oil line from hydraulic pump.
- Routes cooled hydraulic fluid through low pressure oil line to clutch control valve.

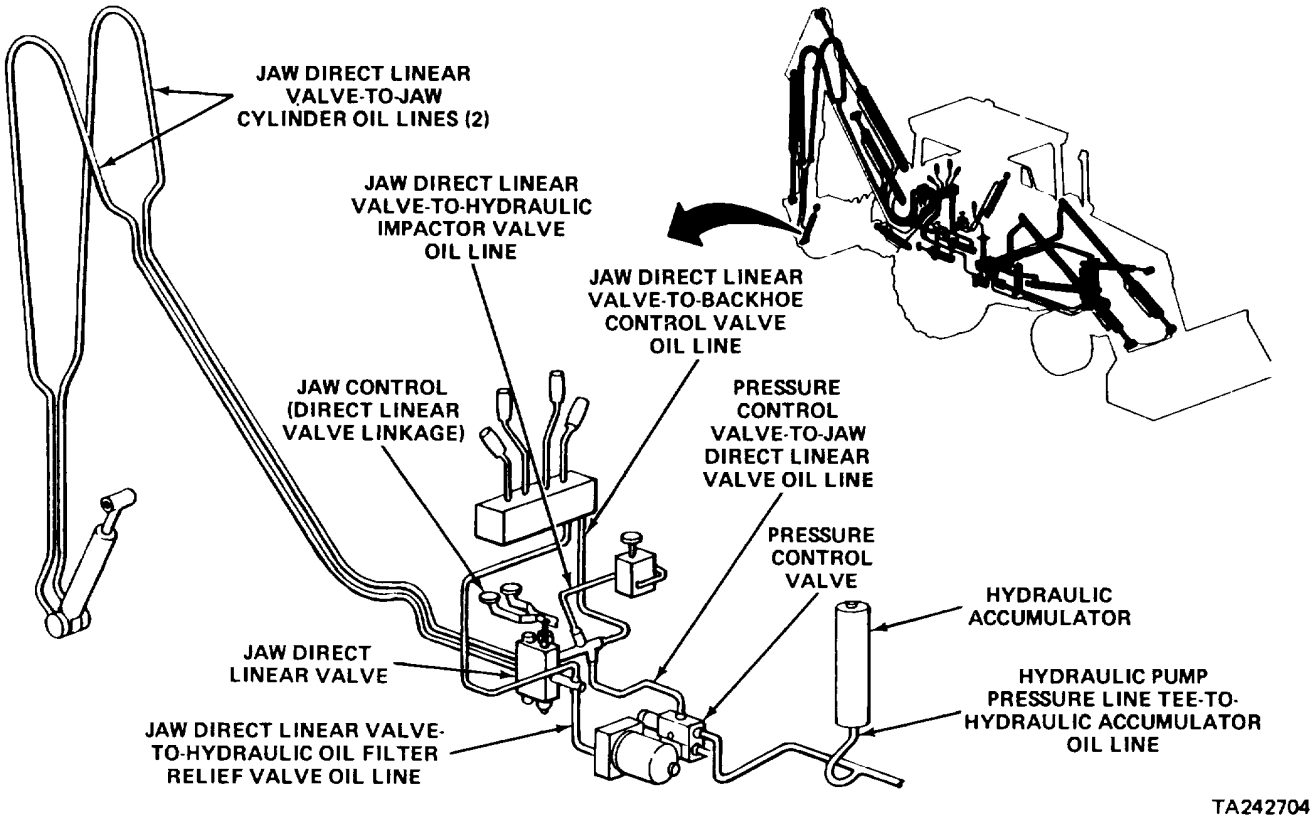
HYDRAULIC OIL COOLER-TO-CLUTCH CONTROL VALVE OIL LINE

- Routes cooled low pressure hydraulic fluid from hydraulic oil cooler to speed gear assembly (reverser) clutch control valve.

HYDRAULIC PUMP-TO-PRESSURE CONTROL VALVE OIL LINE

- Routes high pressure hydraulic fluid from hydraulic pump, to hydraulic pump pressure line tee-to-hydraulic accumulator oil line, and pressure control valve.

HYDRAULIC SYSTEM - CONTINUED



HYDRAULIC PUMP PRESSURE LINE TEE-TO-HYDRAULIC ACCUMULATOR OIL LINE

- Routes high pressure hydraulic fluid from hydraulic pump pressure line tee, through hydraulic accumulator tee, where it is connected to hydraulic accumulator and accumulator tee-to-steering valve oil line.

HYDRAULIC ACCUMULATOR

- Connected through high pressure oil lines to hydraulic pump, steering valve, and pressure control valve.
- Pressure tight cylinder with sealed floating piston.
- One side of floating piston is precharged with dry nitrogen.
- Other side of floating piston is filled with hydraulic fluid from hydraulic system.
- As hydraulic system fluid pressure builds up, dry nitrogen is compressed to equalize pressure on both sides of floating piston.
- Compressed dry nitrogen absorbs surge pressure when hydraulic cylinders reach end of travel or control valves are returned to neutral.
- When hydraulic fluid pressure drops due to demand on system or engine shutdown, dry nitrogen expands to slow pressure loss.
- During 0.2-second delay between demand on system and hydraulic pump start into stroke, dry nitrogen expansion discharges fluid under pressure into system, smoothing out operation.

TA242704

HYDRAULIC SYSTEM -CONTINUED

PRESSURE CONTROL VALVE

- Acts as flow divider of hydraulic fluid from hydraulic pump, steering valve, and hydraulic accumulator, to backhoe and loader hydraulics.
- Maintains hydraulic pressure available to steering and backhoe hydraulic components at expense - of loader hydraulic components.

PRESSURE CONTROL VALVE-TO-JAW DIRECT LINEAR VALVE OIL LINE

- Routes high pressure hydraulic fluid from pressure control valve to jaw direct linear valve, jaw direct linear valve-to-backhoe control valve oil line, and jaw direct linear valve-to-hydraulic Impactor valve oil line.

JAW DIRECT LINEAR VALVE-TO-BACKHOE CONTROL VALVE OIL LINE

- Routes high pressure hydraulic fluid from pressure control valve-to-jaw direct linear valve oil line at jaw direct linear valve, to backhoe control valve.

JAW DIRECT LINEAR VALVE-TO-HYDRAULIC IMPACTOR VALVE OIL LINE

- Routes high pressure hydraulic fluid from pressure control valve-to-jaw direct linear valve oil line at jaw direct linear valve, to hydraulic impactor valve.

JAW DIRECT LINEAR VALVE
- Fed by high pressure oil line from pressure control valve.
- Returns low pressure hydraulic fluid through oil line to hydraulic oil filter relief valve.
- Controlled by jaw control (direct linear) valve linkage.
- Controls operation of jaw cylinder through high pressure oil lines.

JAW DIRECT LINEAR VALVE CHECK VALVE (NOT SHOWN)

- Maintains hydraulic pressure in oil line to jaw cylinder rod end to keep jaw closed tight against bucket or attachment.

JAW DIRECT LINEAR VALVE-TO-HYDRAULIC OIL FILTER RELIEF VALVE OIL LINE

- Routes low pressure hydraulic fluid from backhoe control valve-to-jaw direct linear valve oil line and jaw direct linear valve, to hydraulic oil filter relief valve.

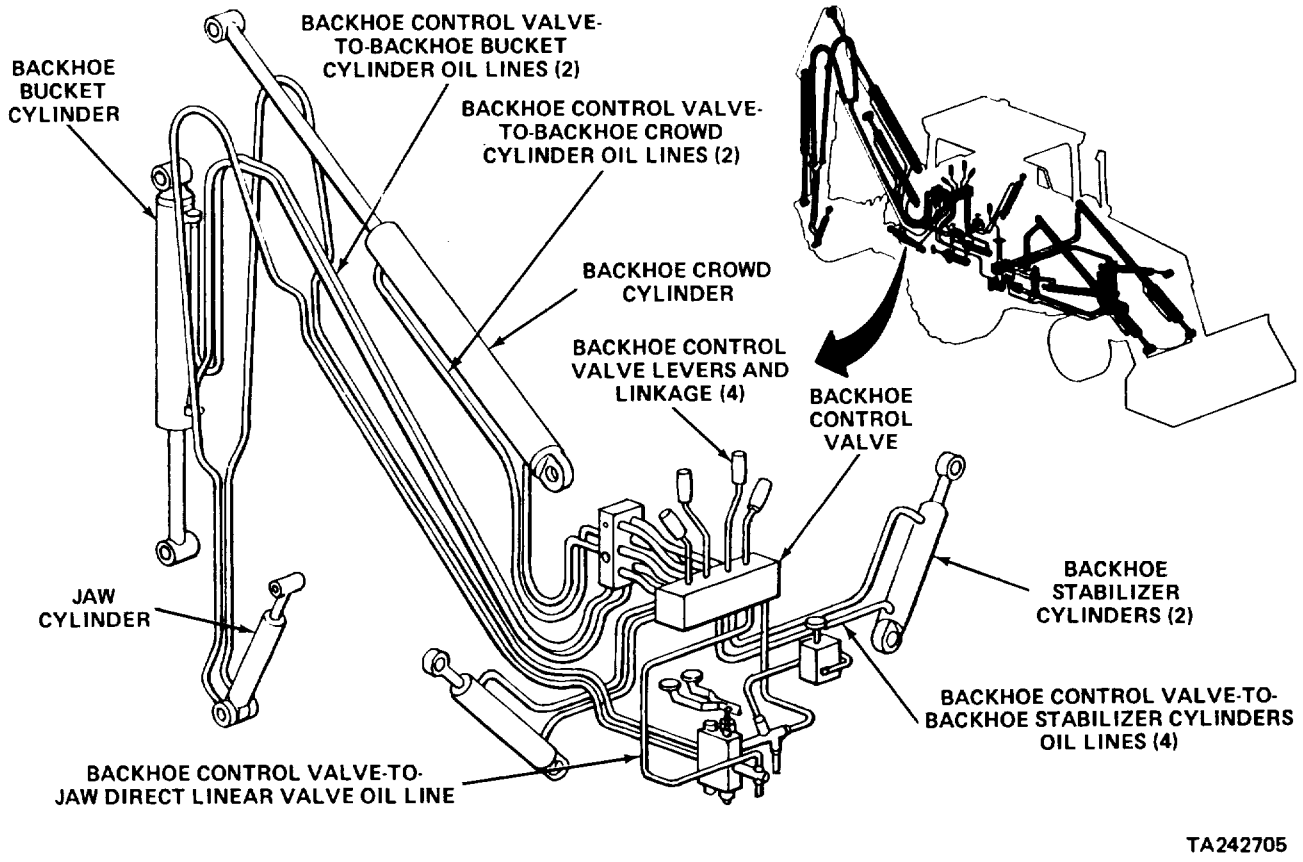
JAW CONTROL (DIRECT LINEAR) VALVE LINKAGE

- Mechanical linkage connected to jaw direct linear valve plunger.
- Short pedal allows operator to open backhoe bucket jaw.
- Long pedal allows operator to close backhoe bucket jaw.

JAW DIRECT LINEAR VALVE-TO-JAW CYLINDER OIL LINES (2)

- Route high pressure hydraulic fluid between jaw direct linear valve and jaw cylinder.

HYDRAULIC SYSTEM - CONTINUED



JAW CYLINDER

- Connected through high pressure oil lines to jaw direct linear valve.
- Opens and closes backhoe bucket jaw.

BACKHOE CONTROL VALVE

- Fed by high pressure oil line from pressure control valve via jaw direct linear valve.
- Returns low pressure hydraulic fluid through oil lines via jaw direct linear valve to hydraulic oil filter relief valve.
- Bank of six separate valves bolted together uses common hydraulic fluid supply and return oil lines.
- Closed center design. Hydraulic fluid flows through valve only when operated out of neutral by moving backhoe control valve levers.
- Controls operation of backhoe boom, swing, bucket, crowd, and stabilizer cylinders through high pressure oil lines.

BACKHOE CONTROL VALVE-TO-JAW DIRECT LINEAR VALVE OIL LINE

- Routes low pressure hydraulic fluid from backhoe control valve, to jaw direct linear valve-to-hydraulic oil filter relief valve oil line.

TA242705

HYDRAULIC SYSTEM - CONTINUED

BACKHOE CONTROL VALVE LEVERS AND LINKAGE (4)

- Four levers with mechanical linkage attached to six valve spool devises.
- Outboard levers allow operator to control backhoe control valve left and right stabilizer valves to move left and right stabilizers up and down separately.
- Left inboard lever (to operator's right when facing rear) allows operator to control backhoe control valve crowd and bucket valves to extend and retract dipperstick and backhoe bucket separately or at the same time. Also controls rotation of hydraulic earth drill auger when installed.
- Right inboard lever (to operator's left when facing rear) allows operator to control backhoe control valve boom and swing valves to extend or retract, and swing boom separately or at the same time.

BACKHOE CONTROL VALVE-TO-BACKHOE STABILIZER CYLINDER OIL LINES (4)

- Route high pressure hydraulic fluid between backhoe control valve left and right stabilizer valves, and left and right stabilizer cylinders.

BACKHOE STABILIZER CYLINDERS (2)

- Connected through high pressure oil lines to backhoe control valve left and right stabilizer valves.
- Separately raise and lower backhoe stabilizers.

BACKHOE CONTROL VALVE-TO-BACKHOE CROWD CYLINDER OIL LINES (2)

- Route high pressure hydraulic fluid between backhoe control valve crowd valve and backhoe crowd cylinder.

BACKHOE CROWD CYLINDER

- Connected through high pressure oil lines to backhoe control valve crowd valve.
- Extends and retracts backhoe dipperstick.

BACKHOE CONTROL VALVE-TO-BACKHOE BUCKET CYLINDER OIL LINES (2)

- Route high pressure hydraulic fluid between backhoe control valve bucket valve and backhoe bucket cylinder or hydraulic earth drill when Installed.

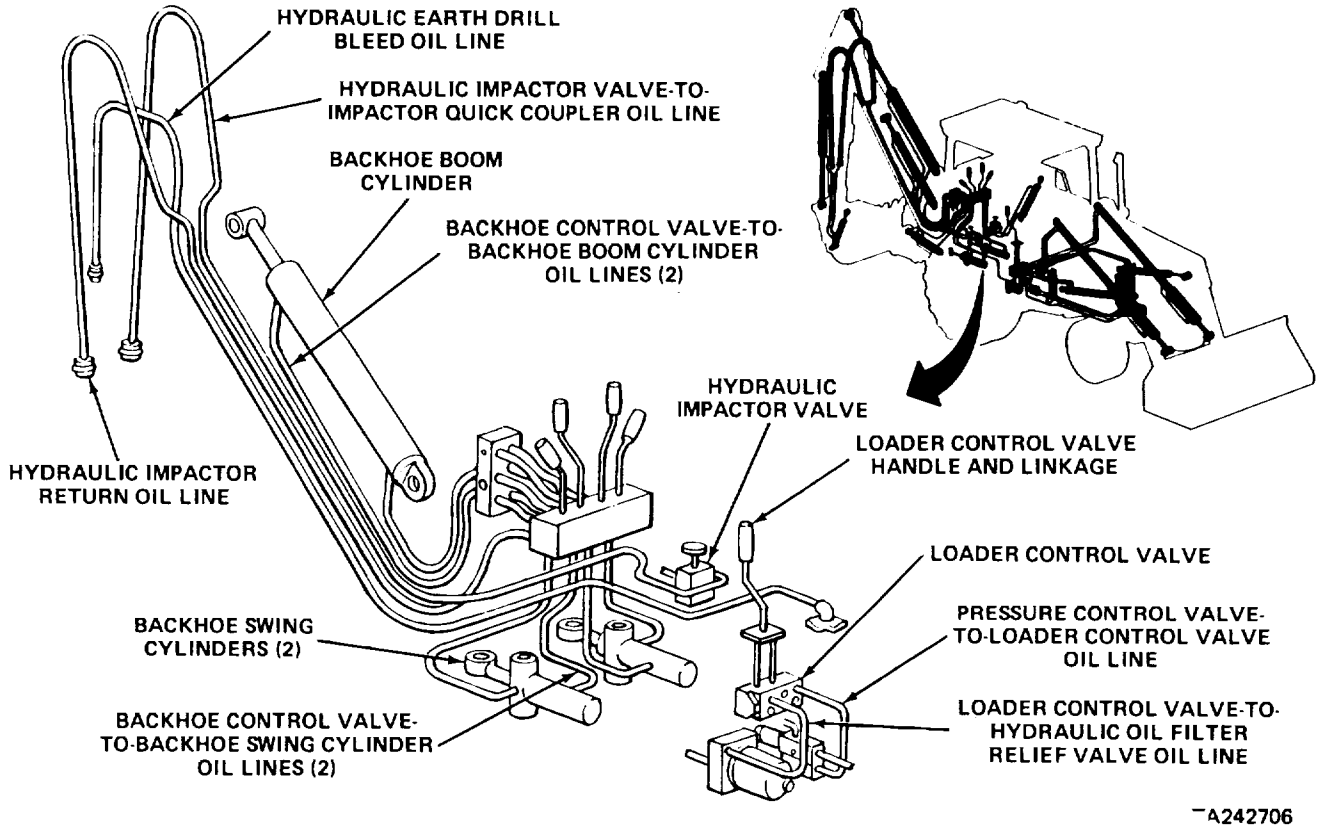
BACKHOE BUCKET CYLINDER

- Connected through high pressure oil lines to backhoe control valve bucket valve.
- Extends and retracts backhoe bucket.

HYDRAULIC EARTH DRILL (NOT SHOWN)

- Attachment clamped between backhoe bucket jaw and backhoe bucket when installed.
- Auger rotation powered by high pressure hydraulic fluid through backhoe control valve-to-backhoe bucket cylinder oil lines.

HYDRAULIC SYSTEM - CONTINUED



HYDRAULIC EARTH DRILL BLEED OIL LINE

- Routes excess hydraulic fluid from hydraulic earth drill hydraulic motor lubrication to transmission case sump.
- Protects hydraulic earth drill hydraulic motor seals from pressure build-up.

BACKHOE CONTROL VALVE-TO-BACKHOE BOOM CYLINDER OIL LINES (2)

- Route high pressure hydraulic fluid between backhoe control valve boom valve and backhoe boom cylinder.

BACKHOE BOOM CYLINDER

- Connected through high pressure oil lines to backhoe control valve boom valve.
- Extends and retracts backhoe boom.

BACKHOE CONTROL VALVE-TO-BACKHOE SWING CYLINDER OIL LINES (4)

- Hoses and manifold block route high pressure hydraulic fluid between backhoe control valve swing valve, and left and right backhoe swing cylinders.

BACKHOE SWING CYLINDERS (2)

- Connected through high pressure oil lines to backhoe control valve swing valve.
- When one cylinder extends the other retracts to swing backhoe boom from side to side.

HYDRAULIC SYSTEM - CONTINUED

HYDRAULIC IMPACTOR VALVE

- Fed high pressure hydraulic fluid through oil lines from pressure control valve.
- Pedal operated valve controls flow of high pressure hydraulic fluid through flow regulator and oil line to hydraulic impactor when installed.

HYDRAULIC IMPACTOR AND MOTOR ASSEMBLY (NOT SHOWN)

- Attachment clamped between backhoe bucket jaw and backhoe bucket when installed.
- High energy impact powered by high pressure hydraulic fluid through hydraulic impactor valve-to-impactor quick coupler oil line.

HYDRAULIC IMPACTOR VALVE-TO-IMPACTOR QUICK COUPLER OIL LINE

- Routes high pressure hydraulic fluid from hydraulic impactor valve-to-impactor quick coupler to operate hydraulic impactor when installed.

HYDRAULIC IMPACTOR RETURN OIL LINE

- Routes low pressure hydraulic fluid from hydraulic impactor, when installed, to backhoe control valve-to-jaw direct linear valve oil line at backhoe control valve from return to hydraulic oil filter relief valve.

PRESSURE CONTROL VALVE-TO-LOADER CONTROL VALVE OIL LINE

- Routes high pressure hydraulic fluid from pressure control valve to loader control valve.

LOADER CONTROL VALVE

- Fed by high pressure oil line from pressure control valve.
- Returns low pressure hydraulic fluid through oil line to hydraulic oil filter relief valve.
- Bank of two separate valves bolted together use common hydraulic fluid supply and return lines.
- Closed center design. Hydraulic fluid flows through valve only when operated out of neutral by moving loader control valve handle and linkage.
- Controls operation of loader boom and bucket cylinders through high pressure oil lines.

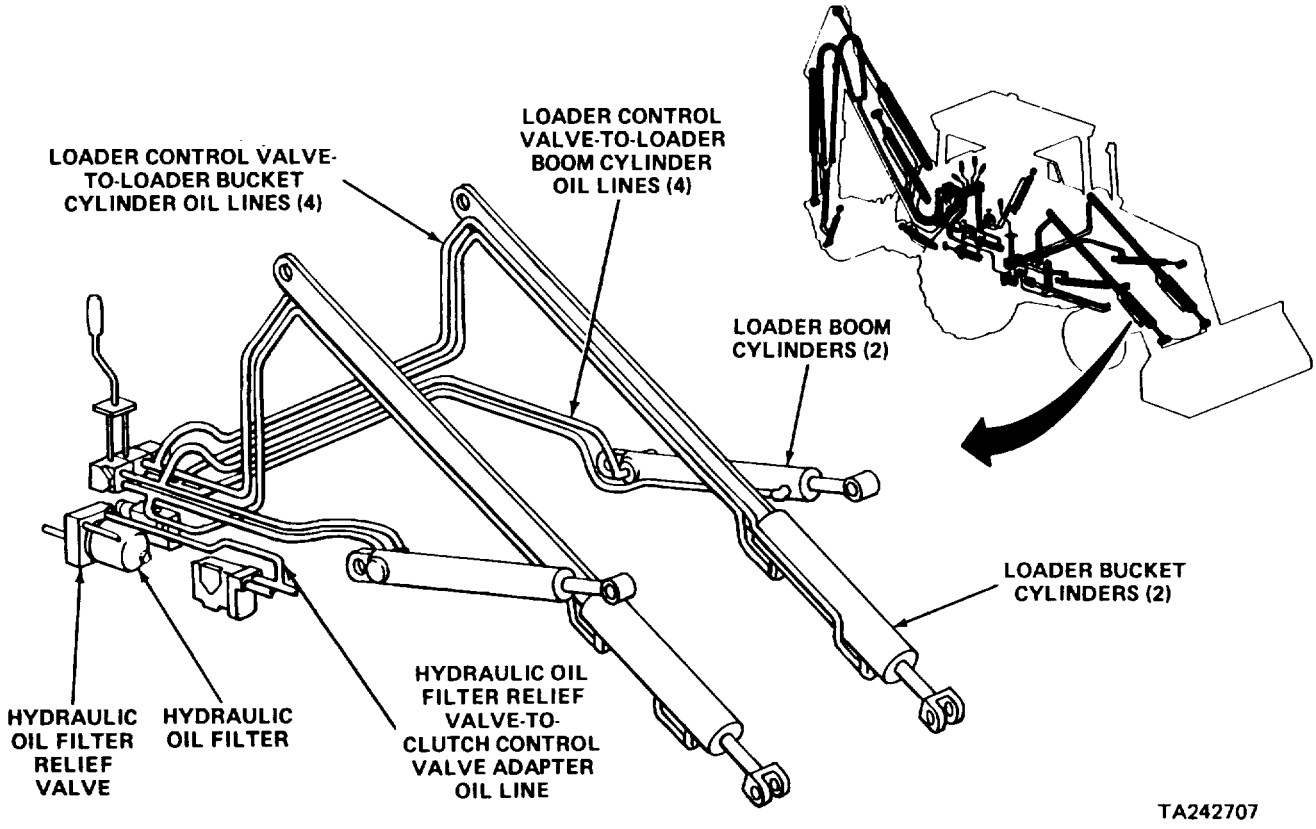
LOADER CONTROL VALVE-TO-HYDRAULIC OIL FILTER RELIEF VALVE OIL LINE

- Routes low pressure hydraulic fluid from loader control valve-to-hydraulic oil filter relief valve.

LOADER CONTROL VALVE HANDLE AND LINKAGE

- Handle with mechanical linkage attached to two valve spool devises.
- Allows operator to control loader control valve boom and bucket valves to raise or lower, and retract or dump loader bucket separately or at the same time.

HYDRAULIC SYSTEM - CONTINUED



LOADER CONTROL VALVE-TO-LOADER BUCKET CYLINDER OIL LINES (4)

- Routes high pressure hydraulic fluid between loader control valve and loader bucket cylinders.

LOADER BUCKET CYLINDERS (2)

- Connected through high pressure oil lines to loader control valve bucket valve.
- Retract and dump loader bucket.

LOADER CONTROL VALVE-TO-LOADER BOOM CYLINDER OIL LINES (4)

- Route high pressure hydraulic fluid between loader control valve and loader boom cylinders.

LOADER BOOM CYLINDERS

- Connected through high pressure oil lines to loader control valve boom valve.
- Raise and lower loader lift arms.

TA242707

HYDRAULIC SYSTEM - CONTINUED

HYDRAULIC OIL FILTER RELIEF VALVE

- Fed low pressure hydraulic fluid returning through oil lines from loader control valve, jaw direct linear valve, and backhoe control valve; and from hydraulic impactor if installed.
- Surge relief valve returns hydraulic fluid through return oil line to transmission case sump to protect hydraulic system when pressure is too high.
- Filter relief valve returns hydraulic fluid through return oil line to transmission case sump when fluid is heavy during warm-up or if filter element becomes clogged.
- Routes return hydraulic fluid through hydraulic oil filter and out through low pressure oil lines to hydraulic pump.

HYDRAULIC OIL FILTER

- Cleans return hydraulic fluid routed through it by hydraulic oil filter relief valve.

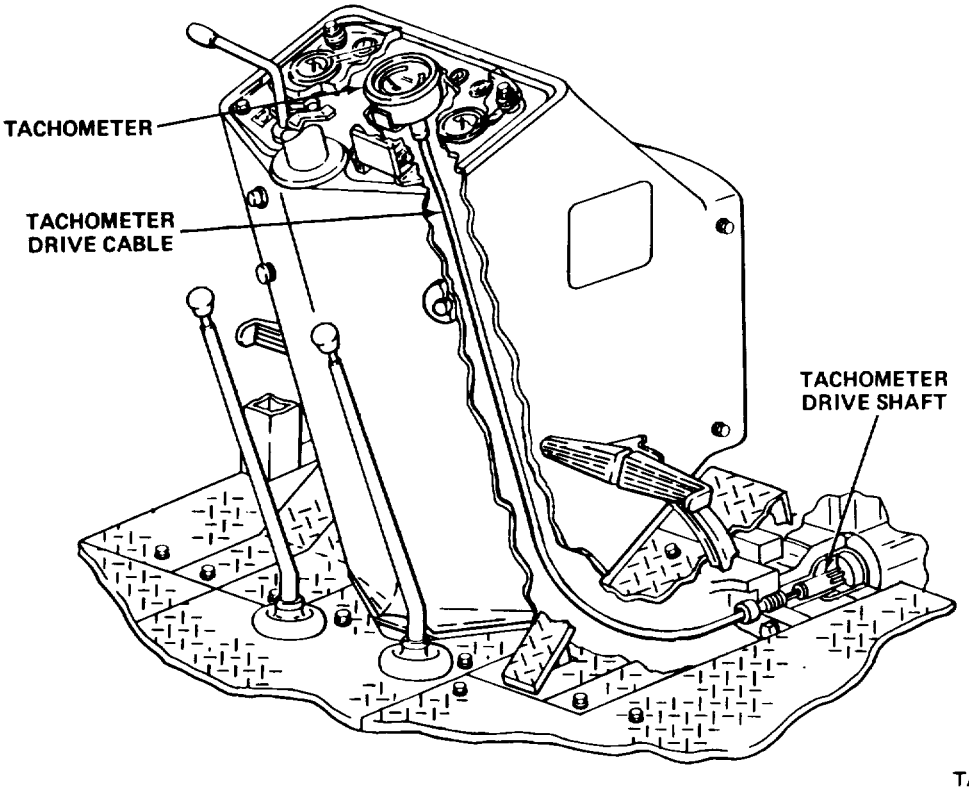
HYDRAULIC OIL FILTER RELIEF VALVE-TO-CLUTCH CONTROL VALVE ADAPTER OIL LINE

- Routes return hydraulic fluid from hydraulic oil filter relief valve, directly to clutch control valve-to-hydraulic pump inlet oil line.
- Protects hydraulic pump from cavitation damage.

HYDRAULIC OIL FILTER RELIEF VALVE-TO-TRANSMISSION CASE OIL HOSE (NOT SHOWN)

- Routes excess return hydraulic fluid from hydraulic oil filter relief valve to transmission strainer element (filter screen) in transmission case.

TACHOMETER AND TACHOMETER DRIVE COMPONENTS



TACHOMETER DRIVE SHAFT

- Considered part of engine.
- Splined to end of engine camshaft for direct drive of tachometer drive cable.

TACHOMETER DRIVE CABLE

- Connected at one end to tachometer.
- Connected at other end to reverser housing and tachometer drive shaft.
- Driven by tachometer drive shaft.
- Provides mechanical link between tachometer drive shaft and tachometer to transmit engine speed.

TACHOMETER

- Located on dash.
- Driven by tachometer drive cable.
- Allows operator to monitor engine speed during loader backhoe operation.

TA242708

CHAPTER 2 MAINTENANCE INSTRUCTIONS

OVERVIEW

This chapter contains detailed maintenance procedures that Organizational Maintenance may perform to maintain the loader backhoe.

Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

NOTE

This section contains references to documents which will help you find parts, tools, and equipment you will need to perform Organizational Maintenance on the loader backhoe.

COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to Modified Table of Organization and Equipment (MTOE) applicable to your unit.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

No special tools or equipment are required for the performance of Organizational Maintenance on the loader backhoe.

REPAIR PARTS

Repair parts are listed and illustrated in Repair Parts and Special Tools List (TM 5-2420-222-20P) covering Organizational Maintenance of the loader backhoe.

Section II. SERVICE UPON RECEIPT

NOTE

This section contains all information needed by Organizational Maintenance to prepare the loader backhoe for normal everyday use, after shipment or a period of storage.

SERVICE UPON RECEIPT

This task covers:

a. Depreservation (page 23)
b. Inspection (page 2-3)
c. Service (page 2-4)

INITIAL SETUP:

Materials/Parts	**Personnel Required**
Rags, wiping (item 21, Appendix C)	One

LOCATION	**ITEM**	**ACTION**	**REMARKS**

DEPRESERVATION

NOTE

If loader backhoe has been preserved, Depreservation Guide for Vehicles and Equipment, DA Form 2258, will be attached to controls.

In some Instances, loader backhoes may be prepared for shipment in accordance with a modified preservation plan. Should this be the case, some of the following procedures may not be required. Check areas around engine oil level gage and steering wheel for tags bearing special depreservation and unpacking instructions.

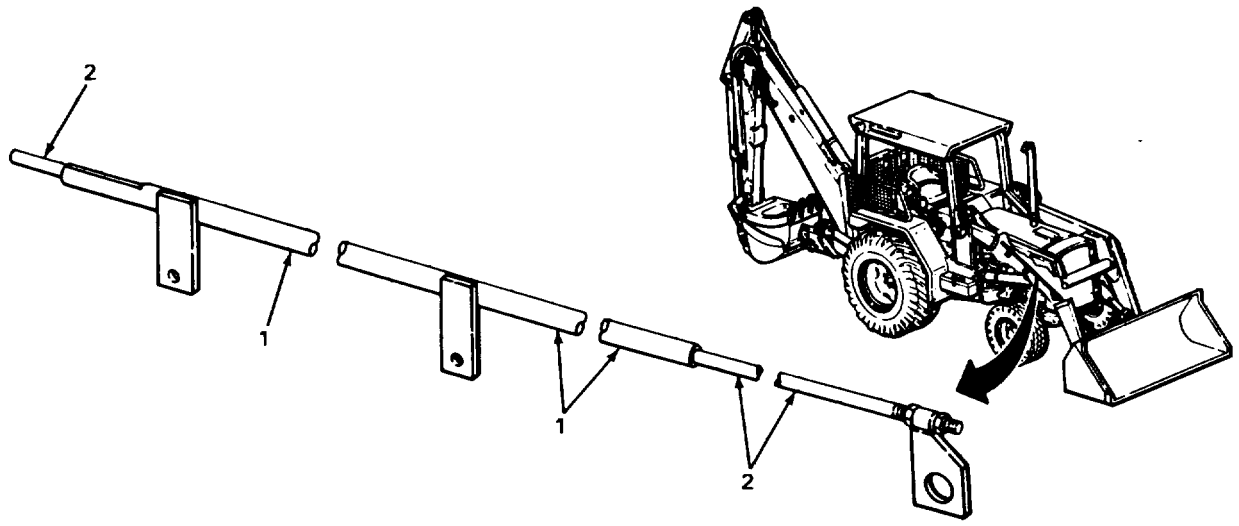
1.	Loader backhoe	Entire vehicle	Depreserve (DA Form 2258).

INSPECTION

2.	Loader backhoe	Unpacked equipment	a. Inspect equipment for damage Incurred during shipment. If equipment has been damaged, report damage on DD Form 6, Packaging Improvement Report. b. Check equipment against packing slip to see if shipment is complete. Report all discrepancies In accordance with Instructions of DA PAM 738750. c. Check to see if equipment has been modified.

SERVICE UPON RECEIPT

LOCATION	ITEM	ACTION REMARKS
3.	Components of end item and basic issue items	Refer to TM 5-2420-222-10, and make item and sure required tools, parts, publications, issue items and any basic issue items are included with loader backhoe.
SERVICE		
4. Loader backhoe	Batteries	Install (page 2-692).
5.	Fuel tank	Fill (TM 5-2420-222-10).
6. Engine	V-belt	Check tension and adjust, if necessary, as outlined in V-belt adjustment (page 2-427).
7. Level indicator (1)	Indicator rod (2)	If there is oil present, using clean, dry rags, wipe clean.



SERVICE UPON RECEIPT CONTINUED

LOCATION	ITEM	ACTION / REMARKS

SERVICE CONTINUED

8.	Loader backhoe	Entire vehicle	a. Perform all intervals of Operator/ Crew Preventive Maintenance Checks and Services (TM 5-2420-222-10). b. Perform 200 and 500 hour intervals of Organizational Preventive Maintenance Checks and Services (page 2-IV-1). c. Perform complete lubrication services (LO 5-2420-222-12). d. Check operation (TM 5-2420-222-10).

TASK ENDS HERE

Section III. LUBRICATION

NOTE

This section contains a reference only. There are no additional lubrication instructions contained in this section for the loader backhoe. Detailed procedures, such as Operator/Crew and Organizational Preventive Maintenance Checks and Services (PMCS), contain specific instructions for various lubrication services where those services are required within the tasks themselves.

REFERENCE

NOTE

Use the lubrication instructions in LO 5-2420-222-12 to service the loader backhoe.

TASK ENDS HERE

Section IV. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

NOTE

Perform Operator/Crew Preventive Maintenance Checks and Services (PMCS) (TM 52420-222-10) before or at the same time as Organizational PMCS.

PMCS PROCEDURES

Preventive maintenance is systematic care, inspection, and servicing of equipment to maintain it in serviceable condition and to prevent breakdowns. Regular performance of PMCS procedures will help provide safe and efficient operation of the loader backhoe at all times. While performing PMCS procedures, be alert to any other symptoms which could result in damage or failure of equipment. See appropriate troubleshooting and maintenance procedures in this manual to correct problems. Report symptoms outside the scope of this manual to your supervisor for corrective action.

SPECIAL INSTRUCTIONS

For 500 and 1000 hour interval PMCS, remove hood (page 2-1025) before starting. Disregard instructions in referenced maintenance procedures to install hood. After all 500 and 1000 hour interval PMCS procedures have been completed, install hood (page 2-1025).

EXPLANATION OF COLUMNS

ITEM NO.	This column shows sequence of checks and services. Use this number to identify equipment area on DA Form 2404, Equipment Inspection and Maintenance Worksheet, when something is wrong with that area.
INTERVAL	This column shows when checks and services should be done.
ITEM TO BE INSPECTED	This column identifies item, and shows checks and services to be done.

ORGANIZATIONAL PMCS

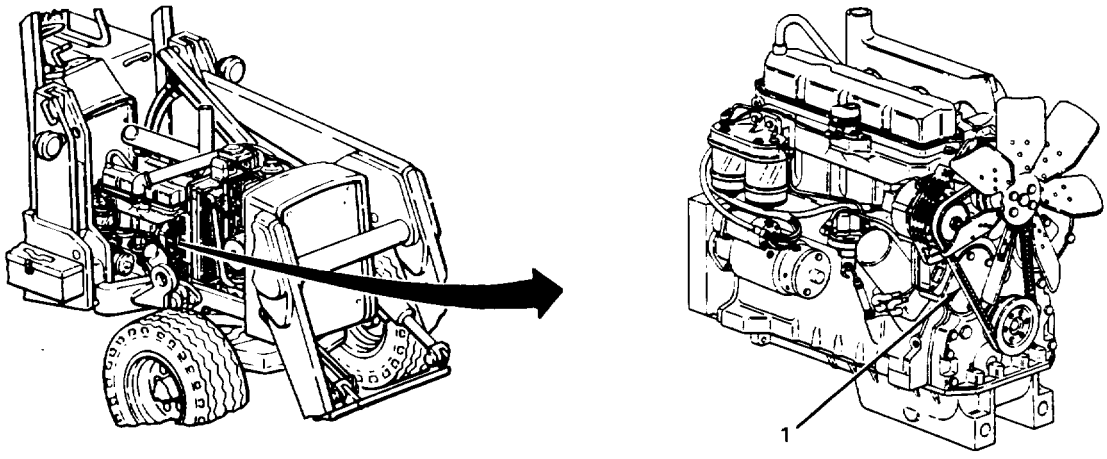
The following table provides complete information for performance of Organizational level preventive maintenance.

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) CONTINUED

B BIENNIALLY H HOURLY

ITEM NO.	INTERVAL B	INTERVAL H	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, REPLACED, OR ADJUSTED AS NEEDED
*1			ENGINE AND ENGINE OIL FILTER
			NOTE
			When changing engine oil, change engine oil filter element at the same time.
		200	OC or Drain crankcase (page 2-145). Remove engine oil filter element, and Install new element (page 2-168). Refill with proper amount and grade of engine oil (page 2-145).
2			**AIR CLEANER**
		200	Clean air cleaner element. Replace if element is damaged or does not respond to cleaning (TM 5-2420-222-10).
3			**V-BELT**
200			a. Check to see if V-belt (1) is frayed, cracked, or broken.

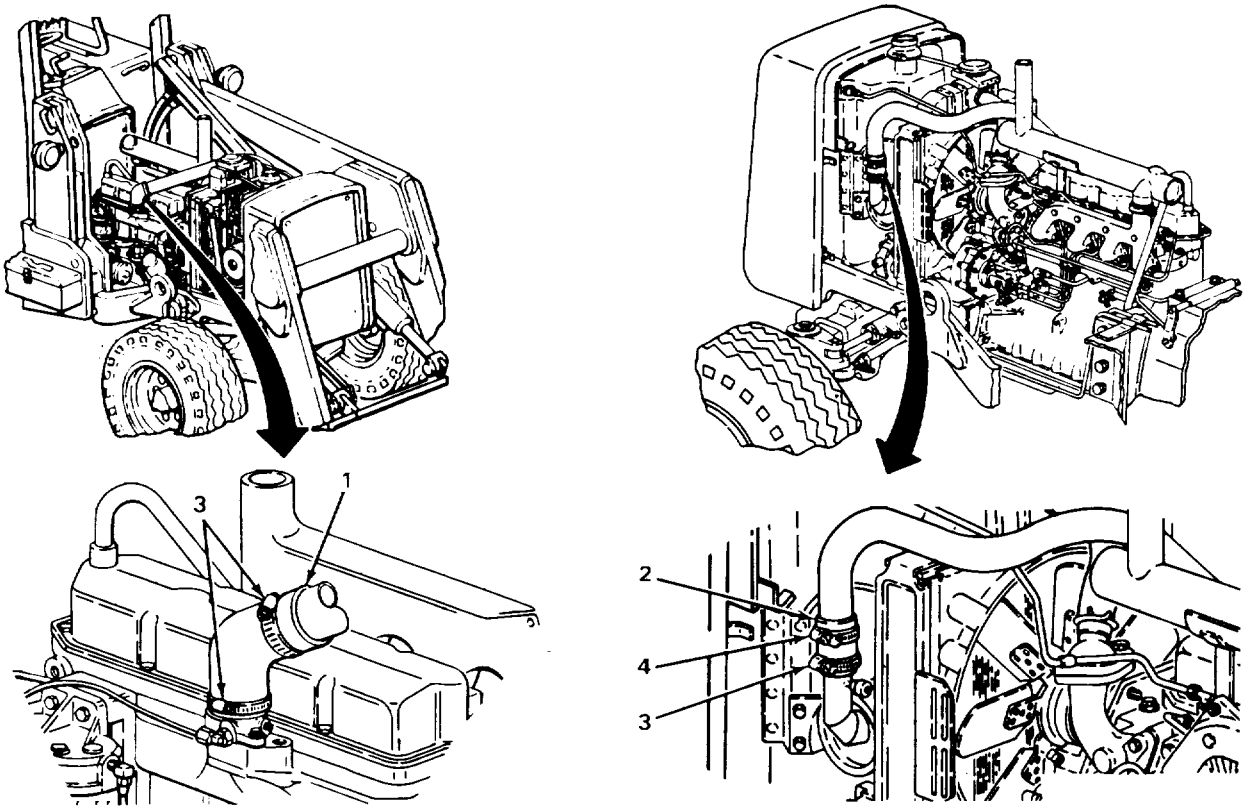
*On condition (OC) oil sample intervals shall be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory (LO 5-2420-222-12).



ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) CONTINUED

B BIENNIALLY H HOURLY

ITEM NO.	INTERVAL B	INTERVAL H	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, REPLACED, OR ADJUSTED AS NEEDED
3			**V-BELT CONTINUED**
		200	b. Check V-belt adjustment (page 2-427).
4			**AIR CLEANER HOSES**
		500	a. Check air cleaner hoses (1 and 2) for cracks and indications of rotting.
		500	b. Check hose clamps (3 and 4) for looseness. If loose, using 114inch flat-tip screwdriver, tighten clamps (3 and 4).



ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) CONTINUED

B BIENNIALLY H HOURLY

ITEM NO.	INTERVAL B	INTERVAL H	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, REPLACED, OR ADJUSTED AS NEEDED
5			**REAR AXLE**
		500	Lubricate bearings (LO 5-2420-222-12).
6			**VENTILATOR PIPE**
		500	Remove, clean, and install ventilator pipe (page 2-173).
7			**TRANSMISSION OIL FILTER**
		500	Remove oil filter element and install new element (page 2-836).
8			**HYDRAULIC OIL FILTER**
		500	Remove oil filter element and install new element (page 2-1698).
9			**TRANSMISSION**
		1000	a. Drain transmission (page 2-811).
		1000	b. Remove, clean, and install transmission filter screen (page 2-848).
		1000	c. Remove transmission oil filter element, and install new element (page 2436).
		1000	d. Remove hydraulic oil filter element, and Install new element (page 2-1698).
		1000	e. Fill transmission with proper amount and grade of hydraulic fluid (page 2-811).
10			**HYDRAULIC PUMP STROKE CONTROL VALVE**
		1000	Remove, clean, Inspect, and install pump stroke control valve filter element (page 2-1196).
11			**FRONT WHEELS**
		1000	Remove, clean, install, and adjust front wheel bearings (page 2-913).

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) CONTINUED

B BIENNIALLY H HOURLY

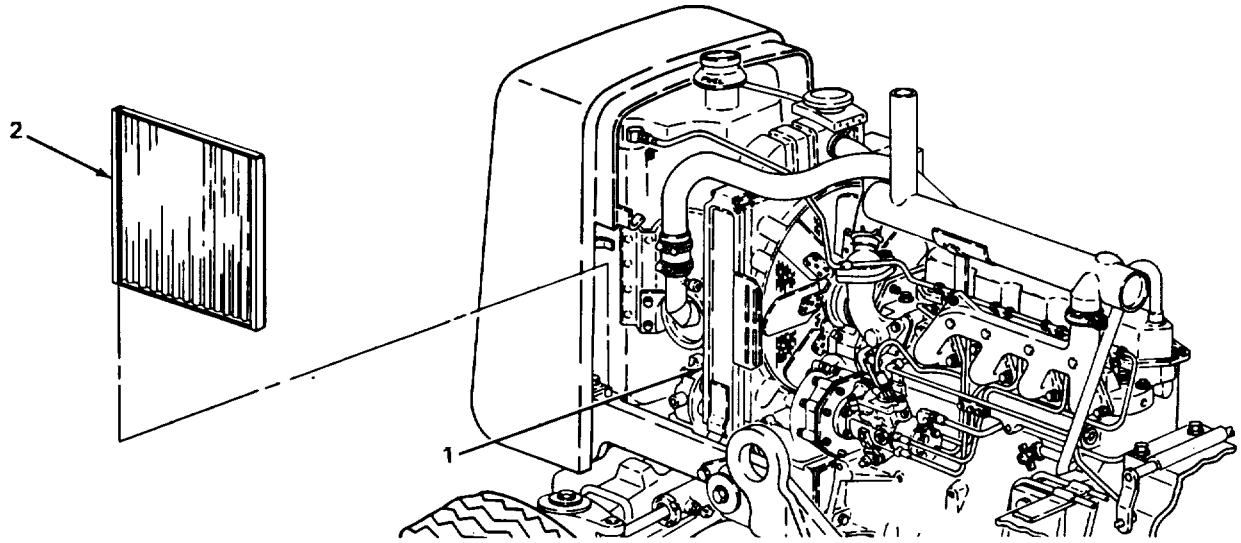
ITEM NO.	INTERVAL B	INTERVAL H	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, REPLACED, OR ADJUSTED AS NEEDED
12			**COOLING SYSTEM**
		•	a. Drain, flush, and fill cooling system (page 2-351).
		•	b. Clean radiator cooling fins and side grilles as follows: (1) Remove side grilles (TM 5-2420-222-10).

WARNING

Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

(2) Using reciprocating air compressor, air compressor hose, and air blow gun, blow out dirt and other debris from back to front of radiator (1) and inside to outside of two side grilles (2).

(3) Install side grilles (TM 5-2420-222-10).



Section V. ORGANIZATIONAL TROUBLESHOOTING

INTRODUCTION

This section contains the troubleshooting procedures that Organizational Maintenance can use to find and fix malfunctions which may occur while the loader backhoe is being operated or maintained. Perform Operator's PMCS and Troubleshooting (TM 5-2420-222-10), and Organizational PMCS (page 2-6), before performing Organizational Troubleshooting. If the problem cannot be found and corrected by Organizational Maintenance using these procedures, notify Direct Support Maintenance.

TROUBLESHOOTING

The Troubleshooting Table lists common malfunctions which you may find during the operation or maintenance of the loader backhoe or its components. You should perform the tests/inspections and corrective actions In the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or Is not corrected by listed corrective action, notify your supervisor.

EXPLANATION OF COLUMNS

MALFUNCTION	Visual or operational indication that something is wrong with equipment.
TEST OR INSPECTION	Procedure to isolate the problem to a component or system.
CORRECTIVE ACTION	Procedure to correct the problem.

SYMPTOM INDEX

This Symptom Index is provided as a quick way to get you to the part of the Troubleshooting Table that will help you solve the problem you are having. It lists all malfunctions covered in the Troubleshooting Table.

To use the Symptom Index, find the problem that you have with your loader backhoe in the Index. Then go to the page Indicated for the troubleshooting procedures to help you find and correct the problem.

SYMPTOM INDEX - CONTINUED

SYMPTOM INDEX - CONTINUED

TROUBLESHOOTING TABLE

The following table provides procedures that Organizational Maintenance can use to find and fix loader backhoe malfunctions.

ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

NOTE

Perform Operator PMCS and Troubleshooting (TM 5-2420-222-10), and Organizational PMCS (page 26), before performing Organizational Troubleshooting.

ENGINE

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED WARNING

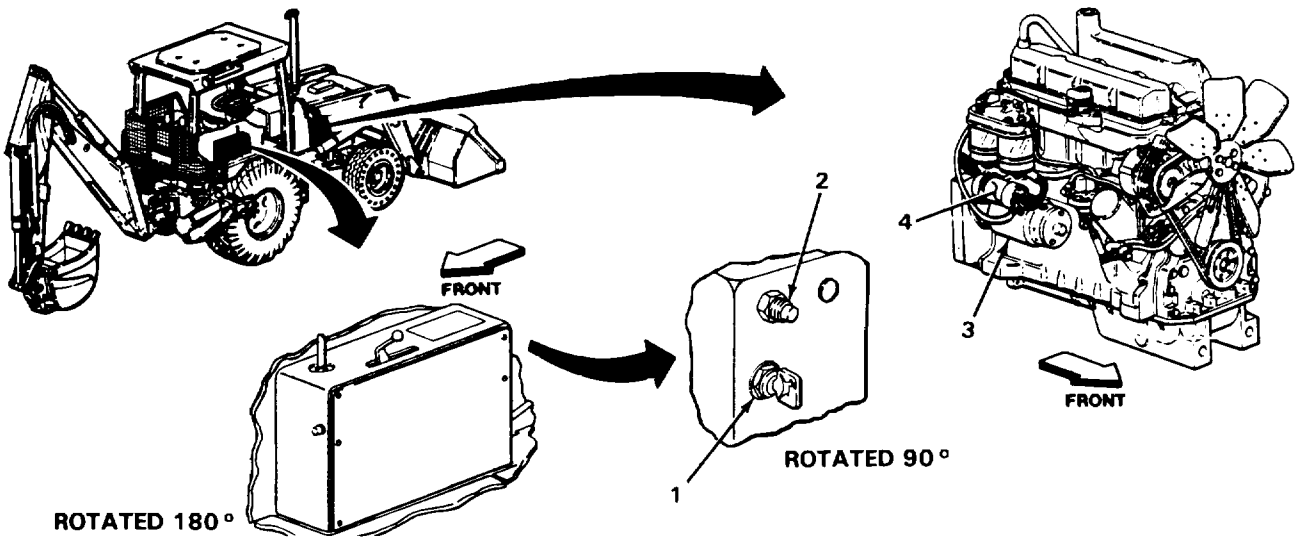
WARNING

Although Ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

CAUTION

Do not operate electric starting motor for more than 20 seconds at a time. Allow two minutes for cooling before using starter again to prevent overheating.

Step 1. Have assistant turn ignition lock switch (1) clockwise to ignition. Have assistant push in and hold starter switch (2) for a few seconds. Listen to starter (3) and solenoid (4) for grinding, thumping, or spinning noise. Turn ignition lock switch (1) counterclockwise to off.



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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

a. If starter (1) makes grinding noise or no sound is heard, go to step 2.

b. If solenoid (2) thumps but starter (1) does not spin, replace starter (page 2-460).

c. If starter (1) spins, go to step 23.

Step 2. Check Ignition lock switch IGN terminal (3) and BATT terminal (4) for loose, corroded, frayed, and broken connections.

a. If ignition wire terminal (5 or 6) or battery wire terminal (7) is loose, tighten nut (8 or 9) using 3/18-inch box wrench.

b. If switch terminal (3 or 4) or wire terminal (5 thru 7) is corroded, clean using wire brush.

c. If switch terminal (3 or 4) is broken, replace Ignition lock switch and key (page 2-565).

d. If ignition wire terminal (5 or 6) or battery wire terminal (7) is frayed or broken, repair (page 2-137).

Step 3. Check starter switch terminals (10 and 11) and connector (12) for loose, corroded, and broken connections.

a. If connector (12) is loose, push on all the way.

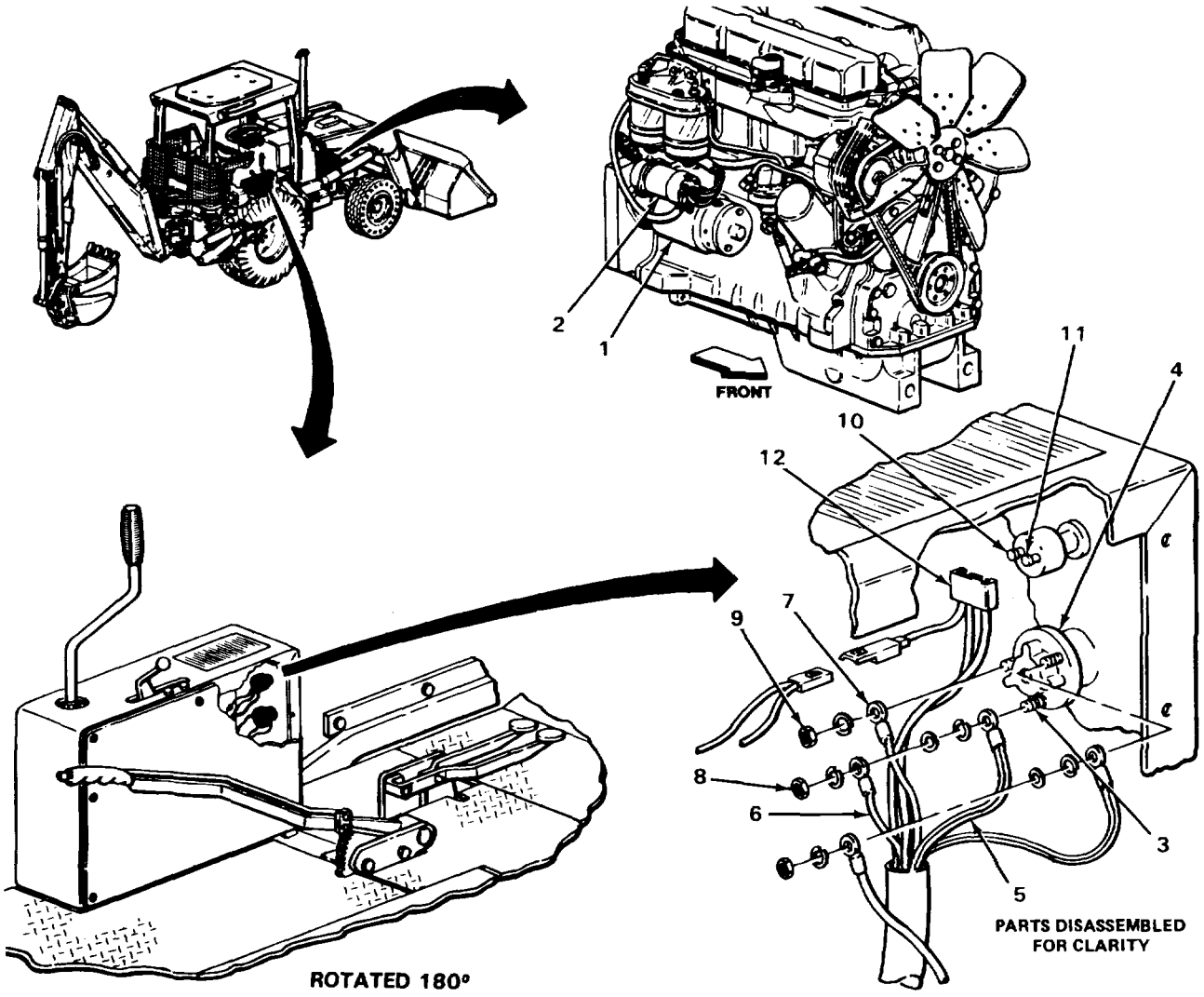
b. If terminals (10 or 11) or connector (12) are corroded, clean using wire brush.

ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

c. If terminal (10 or 11) is broken, replace starter switch (page 2-571).

d. If connector (12) is frayed or broken, repair (page 2-137).



TA242714

ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 4. Check solenoid terminals (1 and 2), battery cable terminal (3), wire terminals (4 and 5), starter to solenoid terminal (6), and connector (7) for loose, corroded, frayed, or broken connections.

a. If connections at terminals (1 thru 6) and connector (7) are not loose, corroded, frayed, or broken, go to step 5.

b. If connection at terminal (1) is loose, tighten nut (8) using 9/16-inch box wrench.

c. If connection at terminal (2) is loose, tighten nut (9) using 11/32-inch box wrench.

d. If connection at terminal (6) is loose, tighten nut (10) using 5/16-inch, 1/4-inch drive socket and ratchet handle and 6-inch extension.

e. If connections at terminals (1 thru 6) or connector (7) are corroded, clean using wire brush.

f. If terminal (1,2, or 6) or connector (7) is broken, replace starter (page 2-460).

g. If connection at battery cable terminal (3) is frayed or broken, replace battery starter cable (page 2-710).

h. If connections at terminals (4 and 5) are frayed or broken, repair (page 2-137).

Step 5. Check ac generator terminal (11), and wire terminal (12) for loose, corroded, frayed, or broken connections.

a. If connection at terminal (11) and wire terminal (12) is not. loose, corroded, frayed, or broken, go to step 6.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. If connection at terminal (11) is loose, tighten nut (13) using two 7/16-inch open-end wrenches.

c. If connection at terminal (11) and wire terminal (12) is corroded, clean using wire brush.

d. If terminal (11) is broken, replace ac generator (alternator) (page 2-436).

e. If connection at wire terminal (12) is frayed or broken, repair (page 137).

ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 6. Check battery ground cable terminal (1) for loose, corroded, frayed, or broken connection.

a. If connection at terminal (1) is not loose, corroded, frayed or broken, go to step 7.

b. If connection at terminal (1) is loose, tighten screw (2) using 9/16inch, 3/8-inch drive socket and ratchet handle.

c. If connection (1) is frayed or broken, replace battery ground cable (page 2-696).

Step 7. Check starter neutral safety switch terminals (3 and 4) and connector (5) for loose, corroded, frayed or broken connections.

a. If terminals (3 and 4) and connector (5) are not loose, corroded, frayed or broken, go to step 8.

b. If connections at terminals (3 and 4) are loose, push connector (5) on all the way.

c. If connections at terminals (3 and 4) and connector (5) are corroded, clean using wire brush.

d. If terminals (3 or 4) are broken, replace starter neutral safety switch (page 2-471).

e. If connection at connector (5) is frayed or broken, repair (page 2-137).

Step 8. Check 40 ampere circuit breaker terminals (6 and 7) and wire terminals (8 thru 10) for loose, corroded, frayed, or broken connections.

ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If terminals (6 and 7) and wire terminals (8 thru 10) are not loose, corroded, frayed or broken, go to step 9.

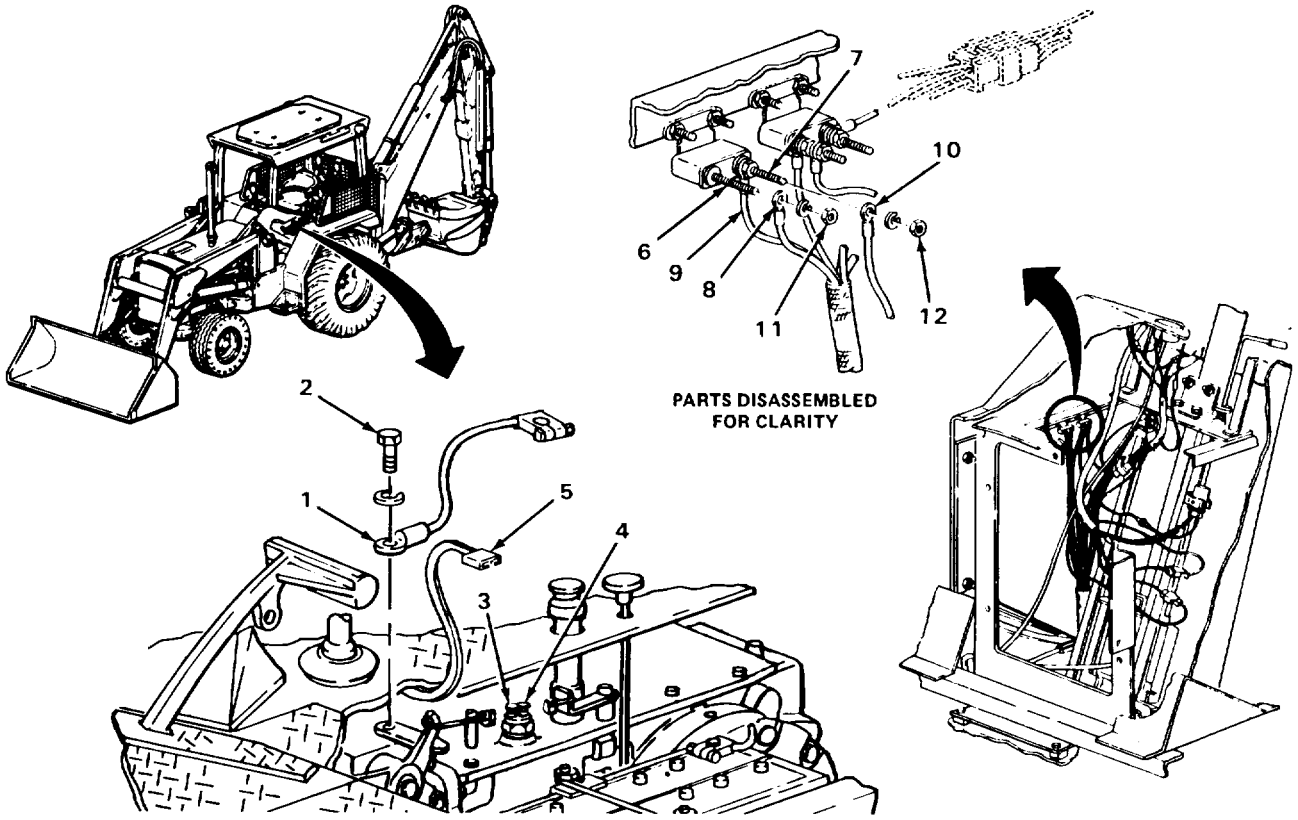
b. If connection on terminal (6) is loose, tighten nut (11) using 3/8 inch box wrench.

c. If connection on terminal (7) is loose, tighten nut (12) using 318 inch combination box and open-end wrench.

d. If connection on terminal (6 and 7) and wire terminals (8 thru 10) are corroded, clean using wire brush.

e. If terminals (6 or 7) are broken, replace 40 ampere circuit breaker (page 2-516).

f. If connection on wire terminals (8 thru 10) are frayed or broken, repair (page 2-137).



ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Do not smoke, use open flame, or allow sparks near batteries. The mixture of oxygen and hydrogen gases released from batteries is highly flammable and can explode causing serious injury or death.

Step 9. Using multimeter set to 30 vdc scale, place red probe on positive (+) battery terminal (1) and black probe on negative (-) battery terminal (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 10.

b. If multimeter reads less than 11 vdc, replace defective batteries (page 2-692).

Step 10. Using 1/2-inch open-end wrench and 1/2-inch box wrench, loosen nut (3). Take terminal clamp (4) off of negative (-) battery terminal (2). Using multimeter set to RXI scale, place red probe on terminal clamp (4) and black probe on terminal (5). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, place terminal clamp (4) onto negative (-) battery terminal (2) and tighten nut (3). Using 112-inch openend wrench and 1/2-inch box wrench. Go to step 11.

b. If multimeter reads more than 0 ohm, replace battery ground cable (2-696).

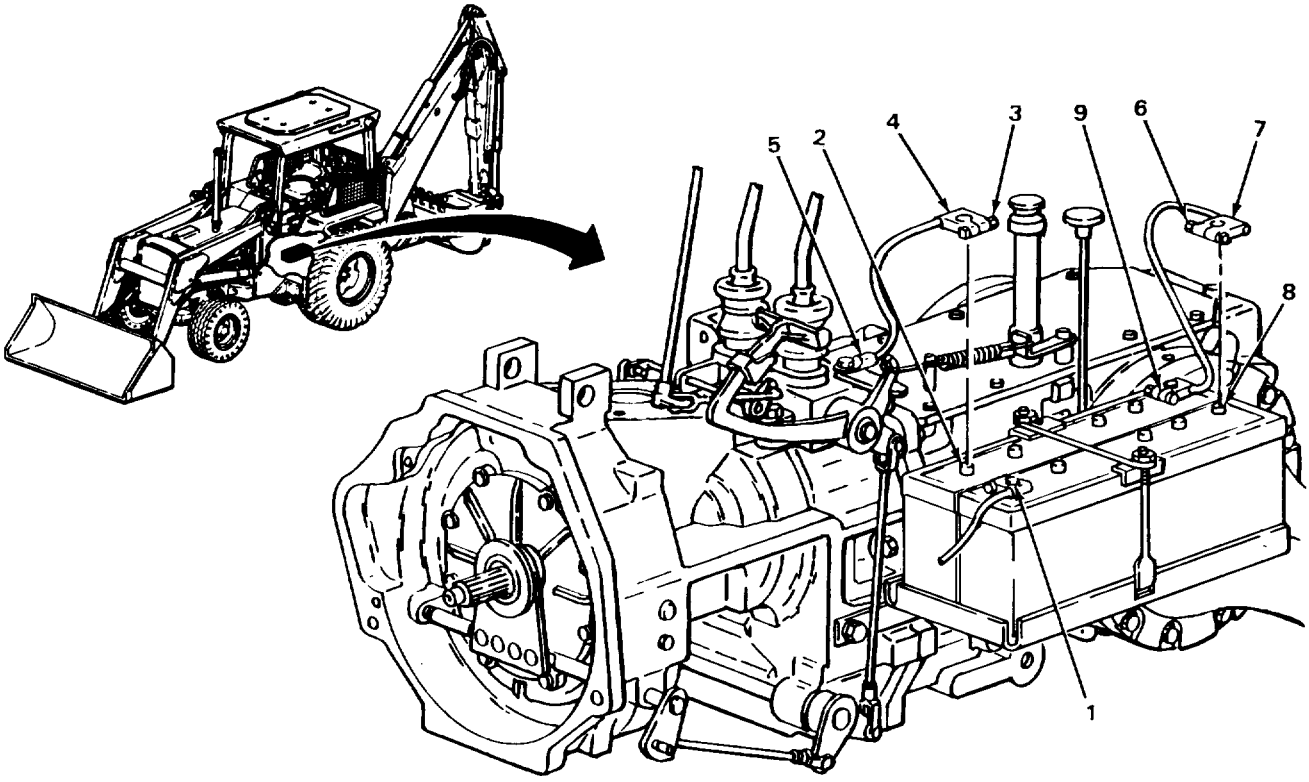
ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 11. Using 1/2-inch open-end wrench and 1/2-inch box wrench, loosen nut (6). Take terminal clamp (7) off of negative (-) battery terminal (8). Using multimeter set to Rx1 scale, place red probe on terminal clamp (7) and black probe on terminal clamp (9). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, place terminal clamp (7) onto negative (-) battery terminal (8) and tighten nut (6) using 1/2-inch open-end box wrench. Go to step 12.

b. If multimeter reads more than 0 ohm, replace battery connector cable (2-704).



ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 12. Using multimeter set to 30 vdc scale, place red probe on solenoid battery terminal (1) and black probe on engine block (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 13.

b. If multimeter reads less than 11 vdc, replace battery starter cable (page 2-710).

Step 13. Using multimeter set to 30 vdc scale, place red probe on solenoid terminal (3) and black probe on engine block (2). Have assistant turn ignition lock switch (4) clockwise to ignition, and push in and hold starter switch (5) for a few seconds. Check for 11 to 13 vdc on multimeter. Have assistant turn ignition lock switch (4) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, replace starter (page 2-460).

b. If multimeter reads less than 11 vdc, go to step 14.

Step 14. Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (6) and black probe on engine block (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 15.

b. If multimeter reads less than 11 vdc, repair wire (7) from ac generator to solenoid (page 2-137).

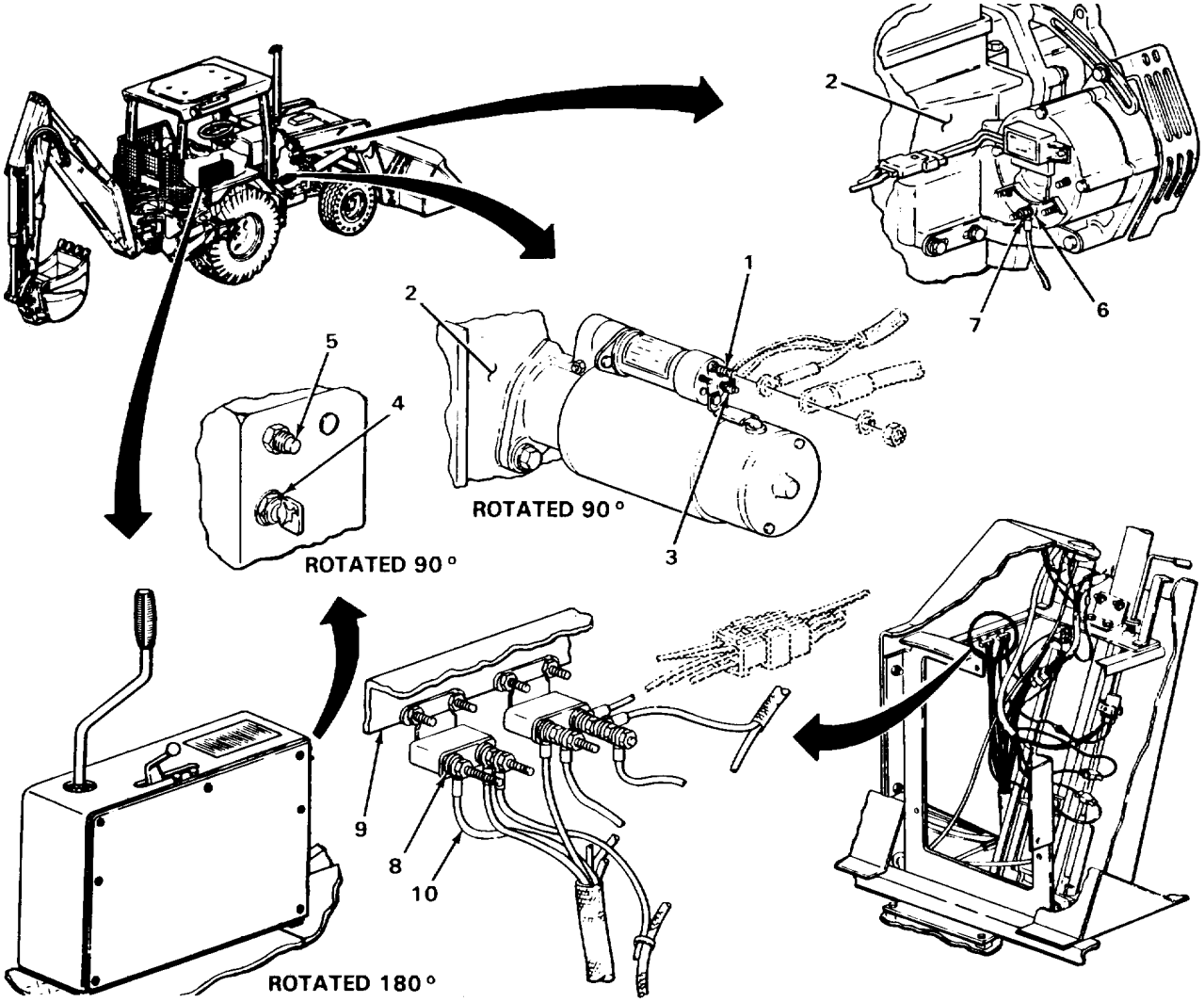
Step 15. Using multimeter set to 30 vdc scale, place red probe on 40 ampere breaker terminal (8) and black probe on cowl support (9). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 16.

ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

b. If multimeter reads less than 11 vdc, repair wire (10) from circuit breaker to ac generator (page 2-137).



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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 16. Using multimeter set to 30 vdc scale, place red probe on circuit breaker terminal (1) and black probe on cowl support (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 17.

b. If multimeter reads less than 11 vdc, replace 40 ampere circuit breaker (page 2-516).

Step 17 Using multimeter set to 30 vdc scale, place red probe on ignition lock switch BATT terminal (3) and black probe on box (4). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 18.

b. If multimeter reads less than 11 vdc, repair wire from ignition switch to circuit breaker (page 2-137).

Step 18. Using multimeter set to 30 vdc scale, place red probe on ignition lock switch IGN terminal (5) and black probe on box (4). Turn ignition lock switch (6) clockwise to ignition. Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 19.

b. If multimeter reads less than 11 vdc, turn ignition lock switch counterclockwise to off. Replace ignition lock switch and key (page 2-565).

Step 19. Using multimeter set to 30 vdc scale, place red probe on starter neutral safety switch terminal (7) and black probe on transmission case (8). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 20.

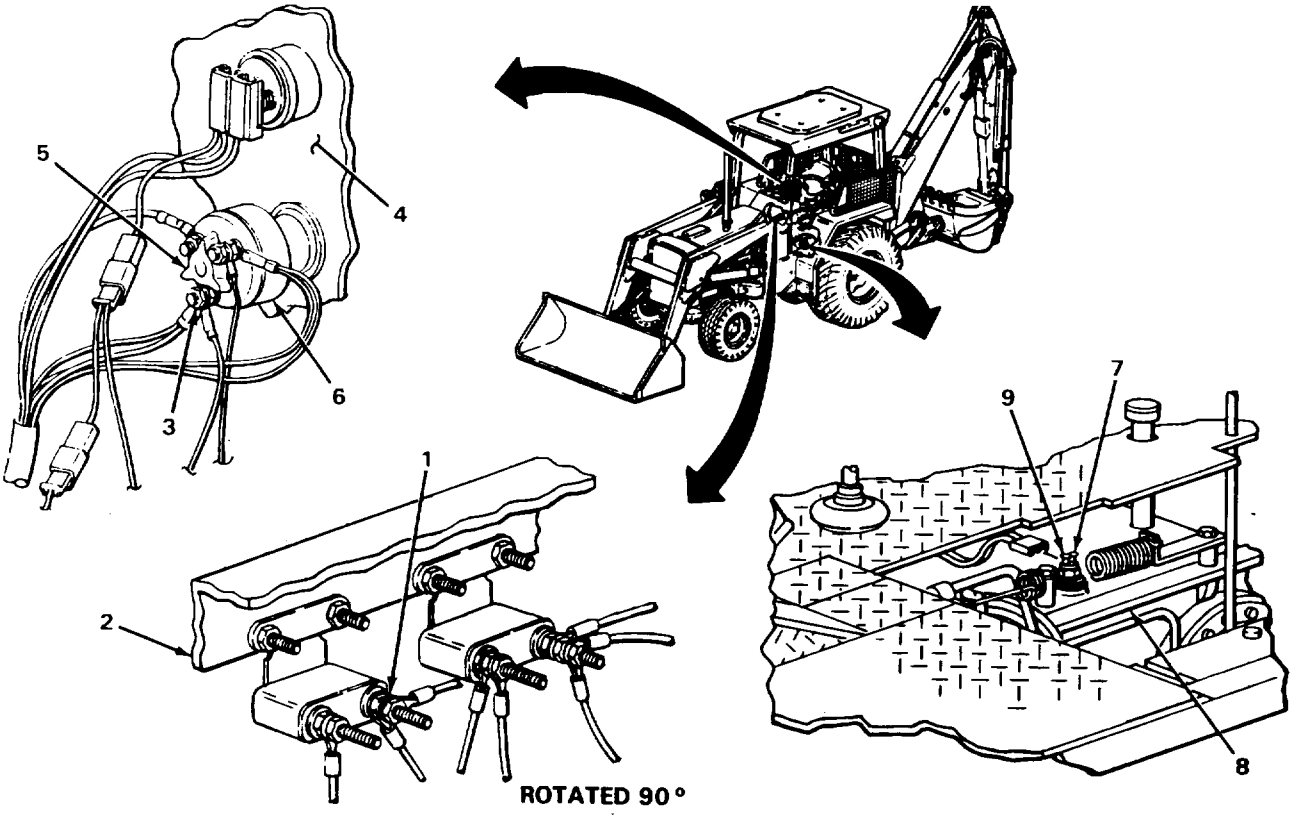
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. If multimeter reads less than 11 vdc, turn ignition lock switch (6) counterclockwise to off. Repair wire from starter neutral safety switch to ignition lock switch (page 2-137).

Step 20. Using multimeter set to 30 vdc scale, place red probe on starter neutral safety switch terminal (9) and black probe on transmission case (8). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 21.

b. If multimeter reads less than 11 vdc, turn ignition lock switch (6) counterclockwise to off. Replace starter neutral safety switch (page 2-471).



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ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK WHEN STARTER IS ENGAGED CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 21. Using multimeter set to 30 vdc scale, place red probe on starter switch terminal (1) and black probe on box (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 22.

b. If multimeter reads less than 11 vdc, turn ignition lock switch (3) counterclockwise to off. Repair wire from starter switch to starter neutral safety switch (page 2-137).

Step 22. Using multimeter set to 30 vdc scale, place red probe on starter switch terminal (4) and black probe on box (2). Have assistant push in and hold starter switch (5) for a few seconds. Check for 11 to 13 vdc on multimeter. Turn igni,ion lock switch (3) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, repair wire from starter switch to solenoid (page 2-137).

b. If multimeter reads less than 11 vdc, replace starter switch (page 2-571).

Step 23. Remove starter (page 2-460). Look for broken teeth on pinion (6). Check that pinion (6) turns only in one direction.

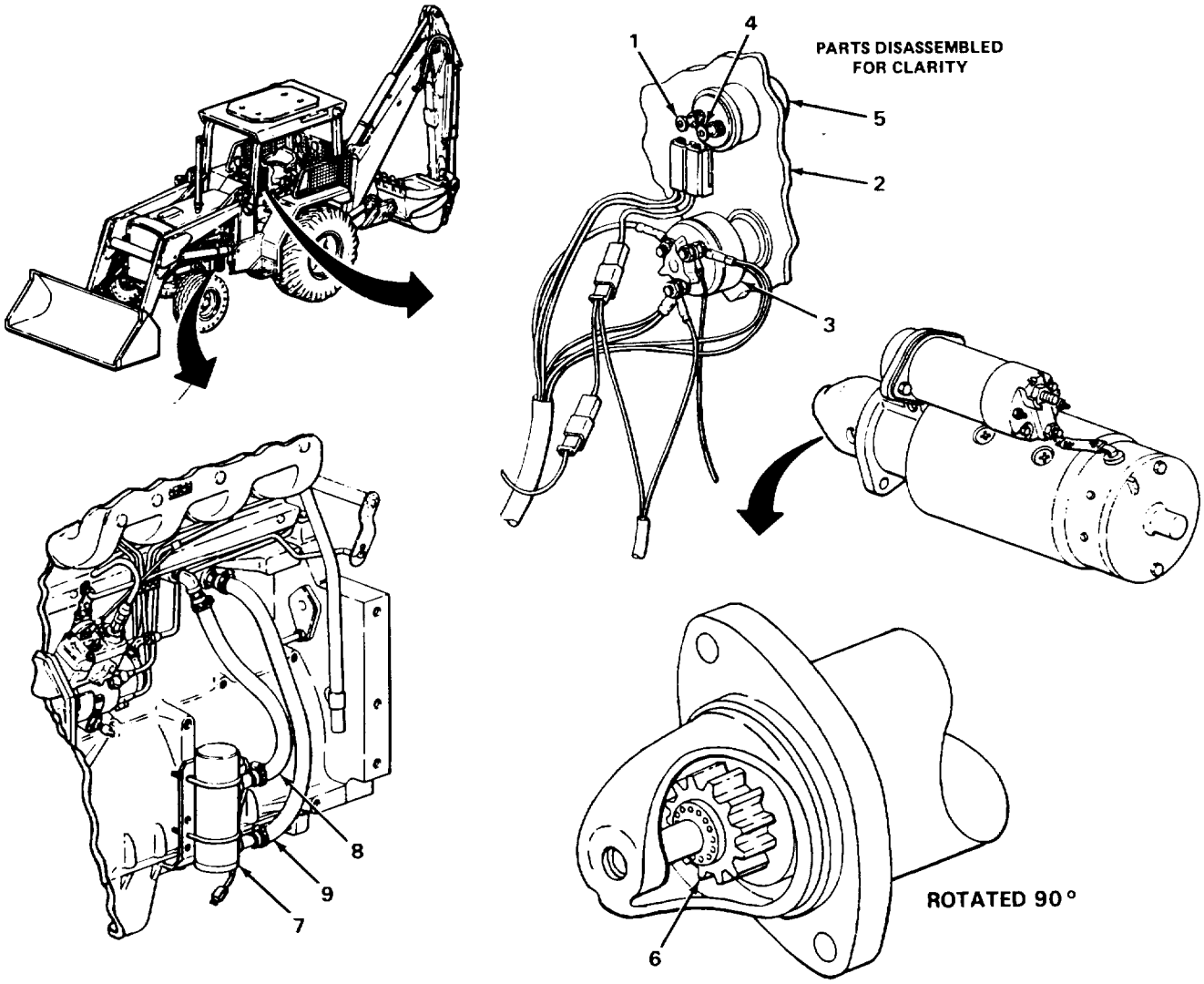
a. If teeth on pinion (6) are not broken and it turns only in one direction, notify Direct Support Maintenance.

b. If teeth on pinion (6) are broken or it turns in both directions, replace starter (page 2-460).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 32°F (0°C)

Step 1. In extreme cold on loader backhoes equipped with engine coolant heater (7) check to make sure it is working by touching engine coolant heater hoses (8 and 9). Warm hoses (8 and 9) show that engine coolant heater is working.



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ORGANIZATIONAL TROUBLESHOOTING CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 320F (OOC) CONTINUED

a. If coolant heater (1) is working, go to step 2.

b. If coolant heater (1) is not working, replace (page 2-356).

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

Step 2. Have assistant turn ignition lock switch (2) clockwise to ignition and press In and hold engine starting aid solenoid switch (3) for a few seconds. Listen to engine primer fluid (4) for hissing sound and solenoid (5) for click sound.

a. If click and hissing sounds are heard, go to step 14.

b. If click sound is heard, but no hissing sound is heard, have assistant turn ignition lock switch (2) counterclockwise to off and go to step 13.

c. If no click or hissing sound is heard, have assistant turn Ignition lock switch (2) to off and go to step 3.

Step 3. Check solenoid terminals (6 and 7) and connector (8) for loose, corroded, frayed, and broken connections.

a. If terminals (6 and 7) and connector (8) are not loose, corroded, frayed, or broken, go to step 4.

b. If connection on terminals (6 and 7) is loose, push connector (8) on all the way.

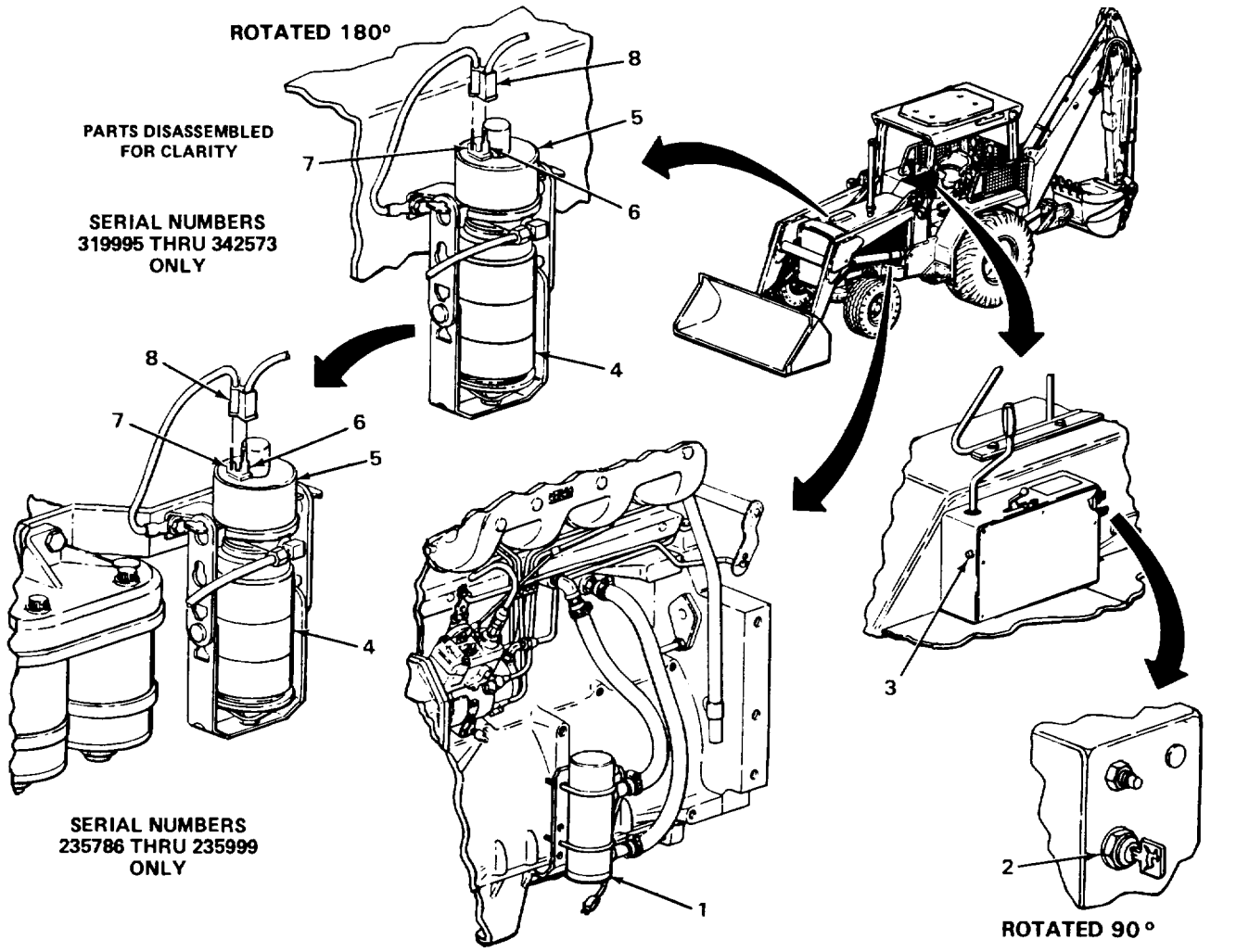
c. If connection on terminals (6 or 7) or connector (8) is corroded, clean using wire brush.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

d. If terminal (6 or 7) is broken, replace engine starting aid fluid injection solenoid (page 2-296).

e. If connection at connector (8) is frayed or broken, repair (page 2-137).



TA242721

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 320F (0°C) - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 4. Check connector wire terminal (1) for loose, corroded, frayed, and broken connections.

a. If connection at wire terminal (1) is not loose, corroded, frayed, or broken, go to step 5.

b. If connection at wire terminal (1) is loose, tighten nut (2 or 3) and screw (4 or 5) using 1/2-inch, 3/8-inch drive socket, ratchet handle, and 1/2-inch box-wrench.

c. If connection at wire terminal (1) is corroded, clean using wire brush.

d. If connection at wire terminal (1) is frayed or broken, repair (page 2-137).

Step 5. Check engine starting aid solenoid switch terminals (6 and 7) and connector (8) for loose, corroded, frayed, and broken connections.

a. If terminals (6 and 7) and connector (8) are not loose, corroded, frayed, or broken, go to step 6.

b. If connection on terminals (6 and 7) is loose, push connector (8) on all the way.

c. If terminal (6 or 7) or connector (8) is corroded, clean using wire brush.

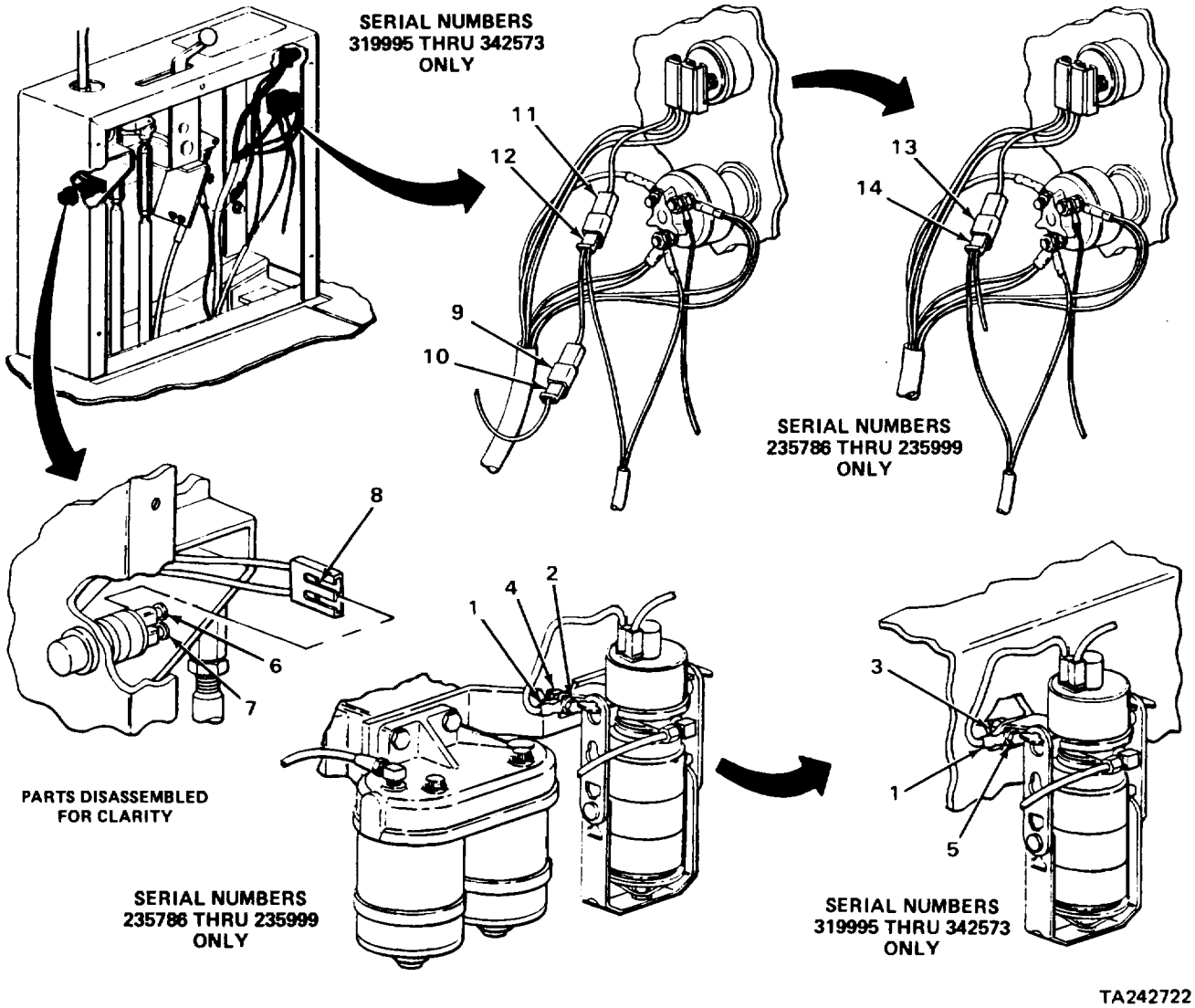
d. If terminal (6 or 7) is broken, replace engine starting aid solenoid switch (page 2-604).

e. If connection at connector (8) is frayed or broken, repair (page 2-137).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 6. Check wiring harness connectors (9 thru 12) or connectors (13 and 14) for loose, corroded, frayed, or broken connections.

a. If connectors (9 thru 12) or connectors (13 and 14) are not loose, corroded, frayed, or broken, go to step 7.



ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 320F (0°C) CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

b. If connection at connector (1, 2, or 3) is loose, push connector (4, 5, or 6) on all the way.

c. If connector (1, 2, or 3) or connector (4, 5, or 6) is corroded, clean using wire brush.

d. If connection at connector (1, 2, or 3) or connector (4, 5, or 6) is frayed or broken, repair (page 2-137).

Step 7. Using multimeter set to 30 vdc scale, place red probe on connector (2 or 3) and black probe on box (7). Turn ignition lock switch (8) clockwise to ignition. Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 8 or 9.

b. If multimeter reads less than 11 vdc, turn ignition lock switch (8) counterclockwise to off and repair wire from connector (2 or 3) to starter switch (9) (page 2-137).

NOTE

The following step only applies to loader backhoes with Serial Numbers 319995 thru 342573.

Step 8. Using multimeter set to 30 vdc scale, place red probe on connector (1) and black probe on box (7). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 9.

b. If multimeter reads less than 11 to 13 vdc, turn ignition lock switch (8) counterclockwise to off and repair wire between, wire harness connectors (3 and 4) (page 2-137).

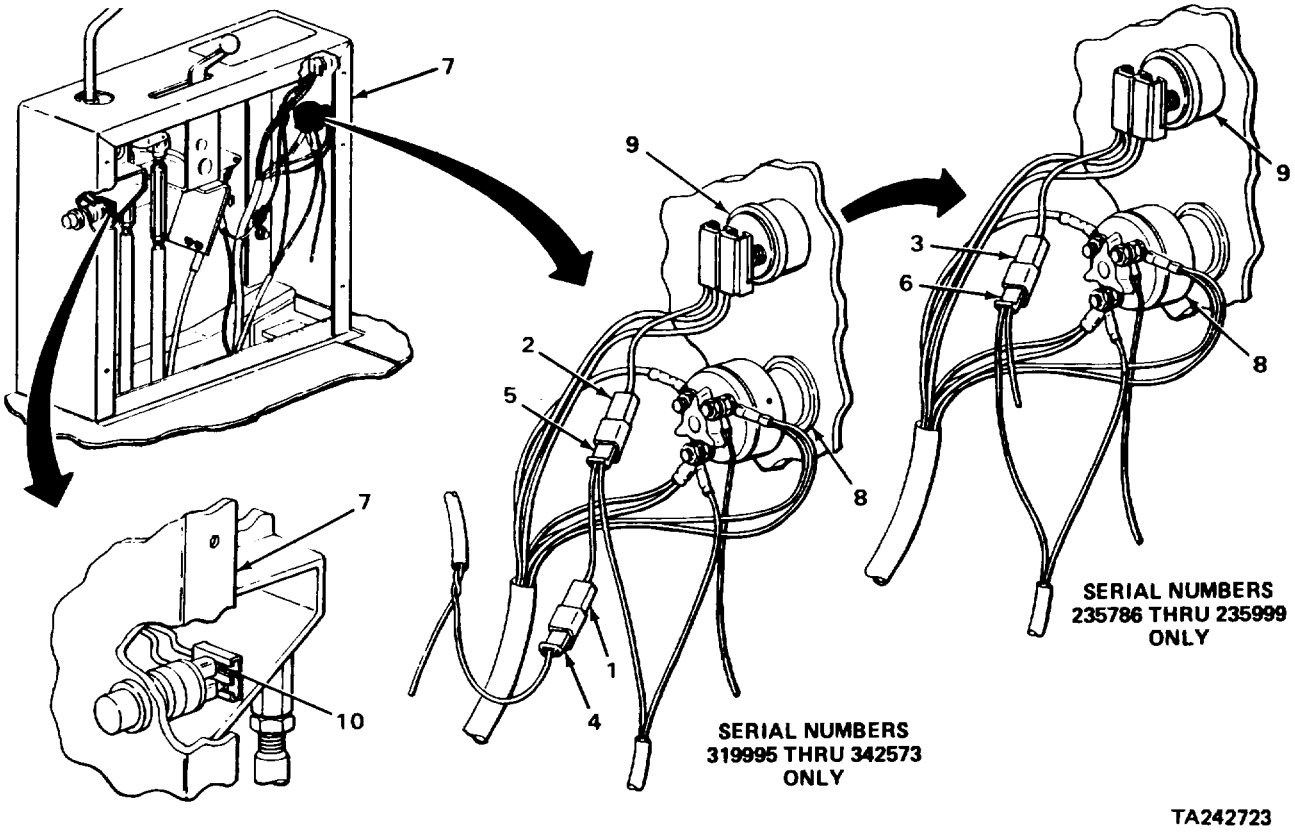
ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 9. Using multimeter set to 30 vdc scale, place red probe on connector terminal (10) and black probe on box (7). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 10.

b. If multimeter reads less than 11 vdc, turn Ignition lock switch (8) counterclockwise to off and repair wire between connector terminal (10) and connector (4 or 6) (page 2-137).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 32F (0°C) CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 10. Using multimeter set to 30 vdc scale, place red probe on engine starting aid solenoid connector terminal (1) and black probe on box (2). Have assistant press in and hold engine starting aid solenoid switch (3) for a few seconds. Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 11.

b. If multimeter reads less than 11 vdc, turn ignition lock switch (4) counterclockwise to off and replace engine starting aid solenoid switch (page 2-604).

Step 11. Using multimeter set to 30 vdc scale, place red probe on solenoid wire terminal (5) and black probe on cylinder head (6) or hood (7). Have assistant press in and hold engine starting aid solenoid switch (3) for a few seconds. Check for 11 to 13 vdc on multimeter. Have assistant turn ignition lock switch (4) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, go to step 12.

b. If multimeter reads less than 11 vdc, repair wire between terminal (5) and connector terminal (1) (page 2-137).

Step 12. Using multimeter set to Rxl scale, place red probe on solenoid wire terminal (8) and black probe on solenoid wire terminal (9). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, replace engine starting aid fluid injection solenoid (page 2-296).

b. If multimeter reads more than 0 ohm, repair wire between terminals (8 and 9) (page 2-137).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

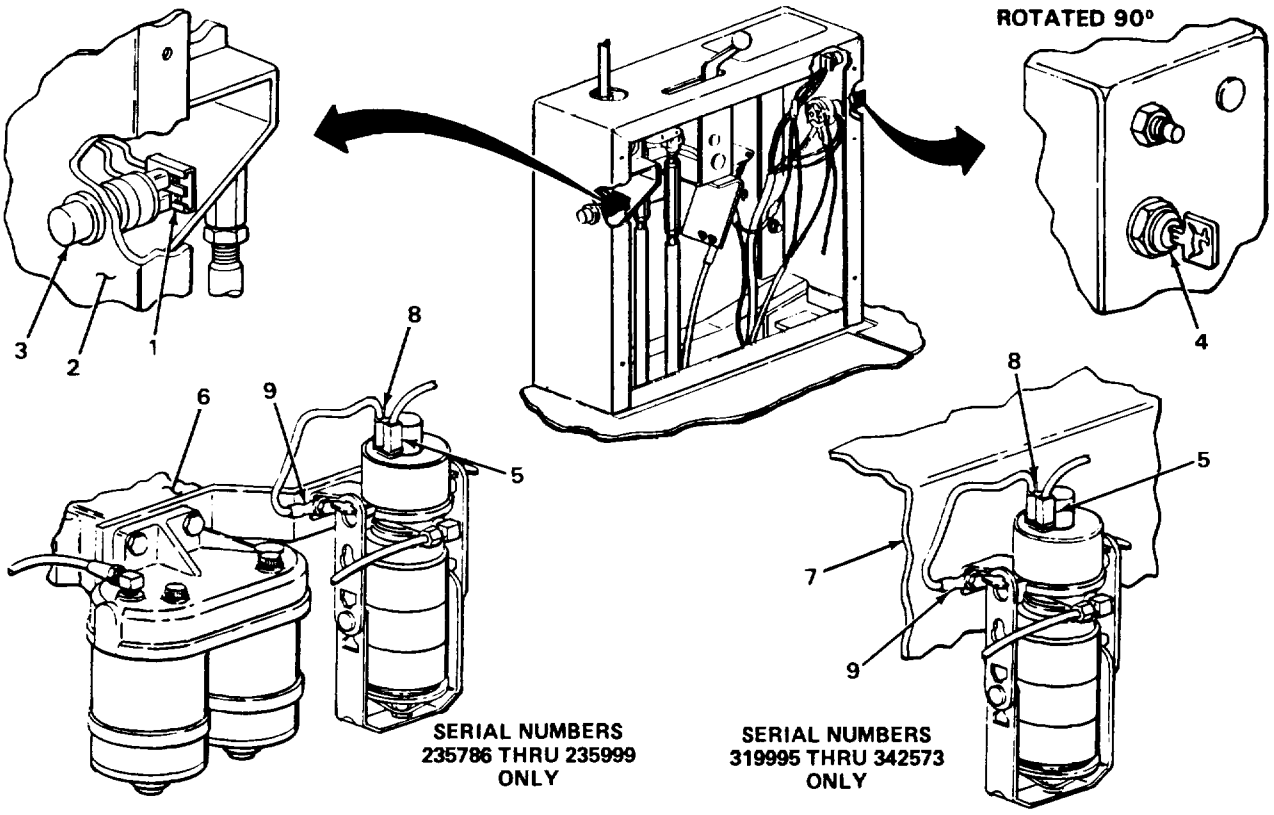
WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

Step 13. Remove and inspect engine primer fluid to see if it is empty (TM 5-2420-222-10).

a. If engine primer fluid is empty, replace (TM 5-2420-222-10).

b. If engine primer fluid is not empty, reinstall TM 5-2420-222-10) and go to step 14.



TA242724

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START BELOW 320F (0°C) CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

Step 14. Using 318-inch open-end wrench, unscrew tube (1) from elbow (2). Have assistant turn ignition lock switch (3) clockwise to ignition if not already on, and press in and release engine starting aid solenoid switch (4). Check to see if any fluid drains from tube (1).

a. If fluid drains from tube (1), go to step 15.

b. If fluid does not drain from tube (1), replace it as outlined in Engine Starting Aid Fluid Injection Tube and Fittings (page 2-306).

Step 15. Using 3/4-inch open-end wrench, unscrew and take spray nozzle holder (5) with assembled elbow (2) and spray nozzle (6) out of air inlet (7). Screw tube (1) onto elbow (2) and tighten using 318-inch open-end wrench. Have assistant press and release engine starting aid solenoid switch (4). Check to see if fluid sprays from spray nozzle (6). Have assistant turn ignition lock switch (3) counterclockwise to off.

a. If fluid sprays from spray nozzle (6), using 3/8-inch open-end wrench unscrew tube (1) and take off of elbow (2). Screw spray nozzle holder (5) with assembled elbow (2) and spray nozzle (6) into air inlet (7) and tighten using 3/4-inch open-end wrench. Screw tube (1) onto elbow (2) and tighten using 3/8 inch open-end wrench. Go to Engine Malfunction 3. Engine Cranks But Fails To Start Or Is Hard To Start Above 32°F (O °C) (page 2-39).

b. If fluid does not spray from spray nozzle (6), replace it as outlined in Engine Starting Aid Fluid Injection Tube and Fitting (page 2-306).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START ABOVE 32°F (0°C)

Step 1. Check engine oil for proper grade and type (TM 5-2420-222-10).

a. If engine oil is the proper grade and type, go to step 2.

b. If engine oil is not the proper grade or type, replace (page 2-145).

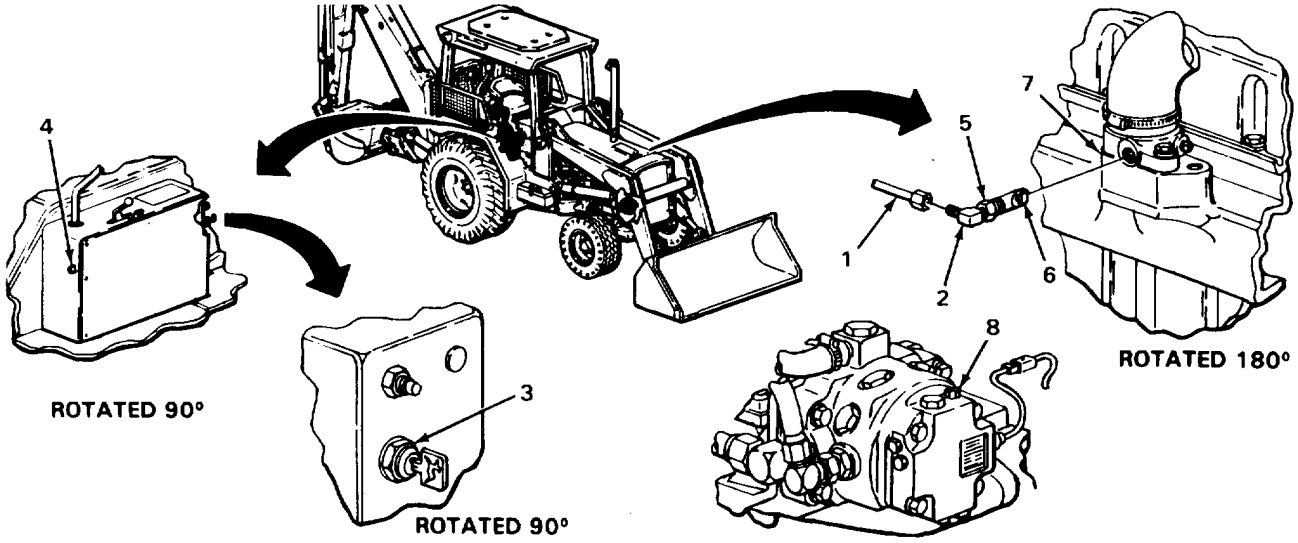
WARNING

]Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 2. Have assistant turn ignition lock switch (3) clockwise to ignition and press in and release starter switch. Listen to stroke control solenoid valve (8) for clicking noise.

a. If clicking noise is heard, go to step 4.

b. If no clicking noise is heard, go to step 3.



TA242725

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START ABOVE 320F (0°C) CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

CAUTION

Do not operate electric starting motor for more than 20 seconds at a time. Allow two minutes for cooling before using starter again to prevent overheating.

Step 3. Using multimeter set to 30 vdc scale, place red probe on stroke control solenoid valve connector (1) and black probe on hydraulic pump (2). Have assistant press in and hold starter switch (3) for a few seconds. Check for 11 to 13 vdc on multimeter. Have assistant turn ignition lock switch (4) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, notify Direct Support Maintenance.

b. If multimeter reads less than 11 vdc, repair wire from stroke control solenoid valve connector (1) to starter solenoid switch (page 2-137).

Step 4. Turn ignition lock switch (4) clockwise to ignition. Push in and hold starter switch (3) for a few seconds. Check to see if engine is turning over too slowly. Turn Ignition lock switch (4) counterclockwise to off.

a. If engine is not turning over too slowly, go to step 5.

b. If engine is turning over too slowly, go to Engine Malfunction 1: Engine Fails To Crank When Starter Is Engaged (page 2-15).

Step 5. Have assistant turn ignition lock switch (4) clockwise to ignition and counterclockwise to off. Listen to fuel metering pump (5) for clicking sound.

a. If clicking noise is heard, go to step 8.

b. If no clicking noise is heard, go to step 6.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 6. Check solenoid terminal (6), wire terminal (7), electrical lead terminal (8) and electrical lead (9) for loose, corroded, frayed, and broken connections.

a. If connections at terminals (6 thru 8) and electrical lead (9) are not loose, corroded, frayed, or broken, go to step 7.

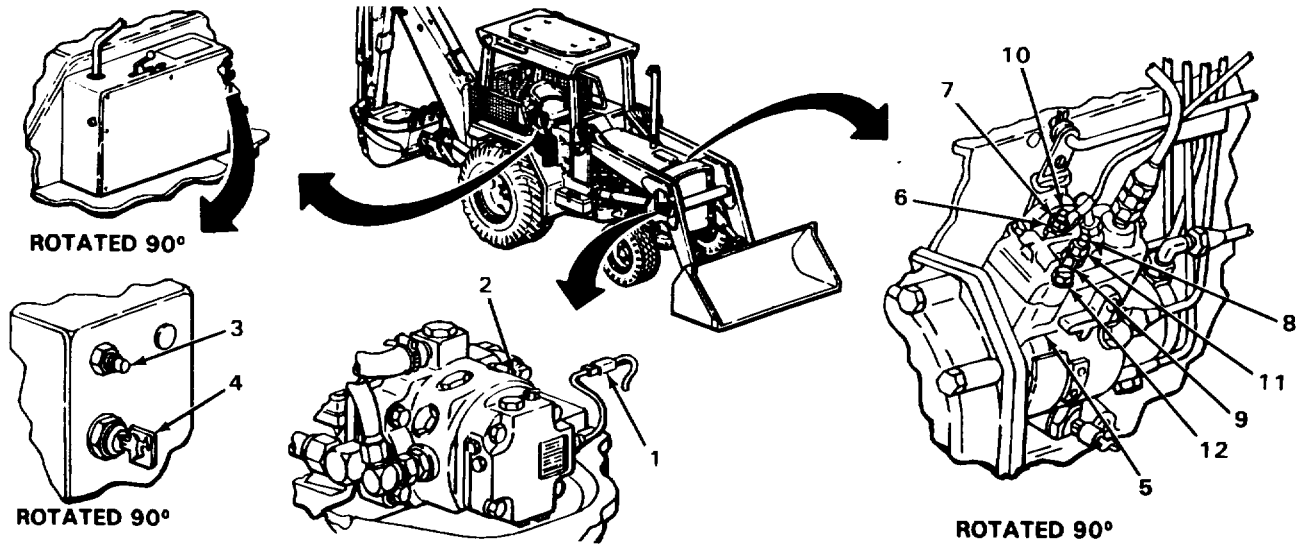
b. If connection at terminal (6 or 8) is loose, tighten nut (10 or 11), using 11/32-inch, 1/4-inch drive socket and ratchet handle.

c. If connection at electrical lead (9) is loose, tighten nut (12) using 5/16-inch, 1/4-inch drive socket, and 90 kgcm capacity torque driver wrench, tighten alternately to 51.96 kgcm (45 Inch-pounds, 5.1 N.m) torque.

d. If connection at terminal (6 or 8) or electrical lead (9) is corroded, clean using wire brush.

e. If terminal (6 or 8) or electrical lead (9) is broken, notify Direct Support Maintenance.

f. If connection at wire terminal (7) is frayed or broken, repair (page 2-137).



TA242726

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START ABOVE 320F (0°C) - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 7. Using multimeter set to 30 vdc scale, place red probe on solenoid terminal (1) and black probe on fuel metering pump (2). Have assistant turn ignition lock switch (3) clockwise to ignition. Check for 11 to 13 vdc on multimeter. Have assistant turn ignition lock switch (3) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, notify Direct Support Maintenance.

b. If multimeter reads less than 11 vdc, repair wire from solenoid terminal to ignition lock switch (page 2-137).

Step 8. Check for air in fuel system by priming fuel system (page 2-340).

a. If air was in fuel system, problem should be corrected.

b. If no air was in fuel system, go to step 9.

Step 9. Inspect fuel lines (4, 5, and 6) for kinks and sharp bends.

a. If fuel filter-to-fuel metering pump fuel line (4) has kinks or sharp bends, replace (page 2-292).

b. If fuel pump-to-fuel filter fuel line (5) has kinks or sharp bends, replace (page 2-288).

c. If fuel shutoff valve-to-fuel pump fuel line (6) has kinks or sharp bends, replace (page 2-264).

d. If all lines are undamaged, go to step 10.

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

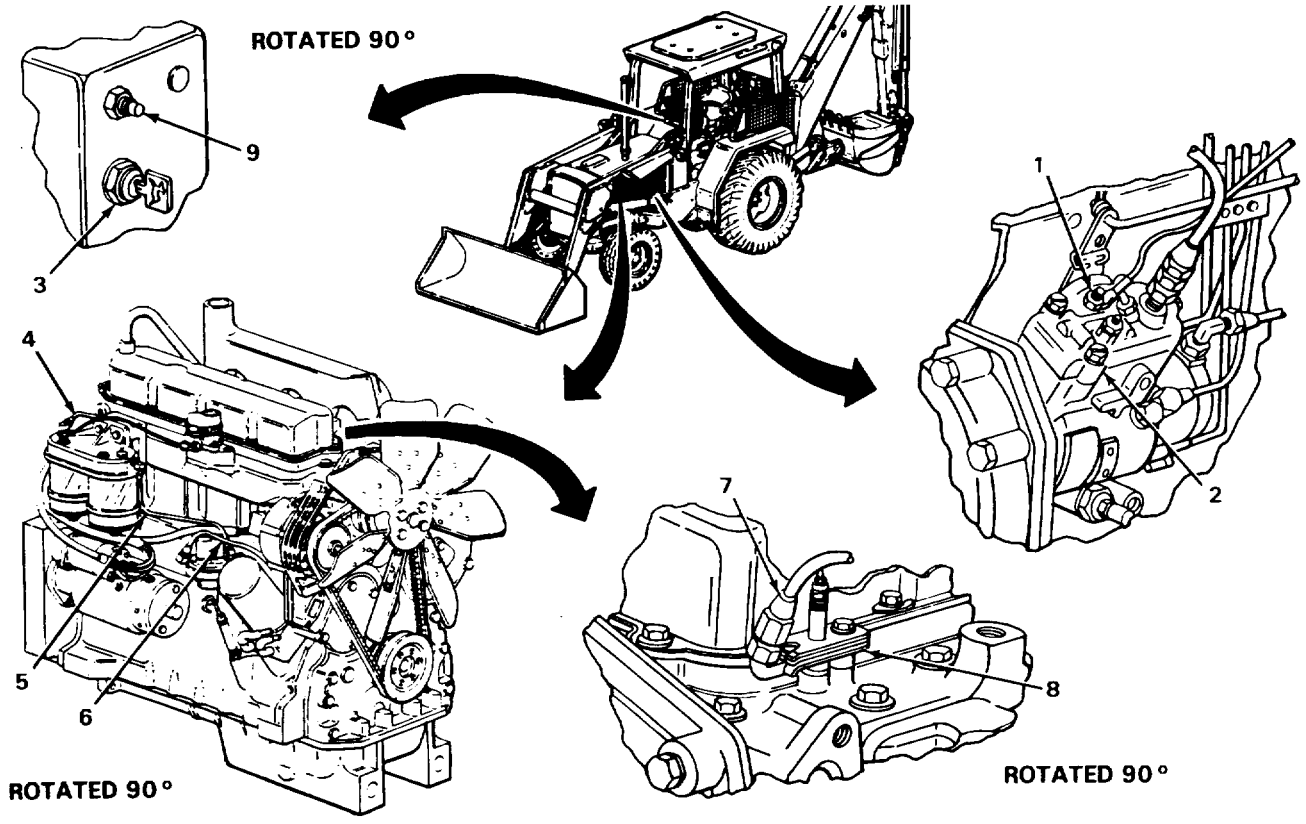
CAUTION

Do not operate electric starting motor for more than 20 seconds at a time. Allow two minutes for cooling before using starter again to prevent overheating.

Step 10. Using 9/16-inch and 314-inch open-end wrenches, unscrew tube (7) at fuel injection nozzle (8) approximately one-half turn. Have assistant turn ignition lock switch (3) clockwise to ignition and push in and hold starter switch (9) for a few seconds. Check that diesel fuel squirts out from between tube (7) and nozzle (8). Have assistant turn ignition lock switch (3) counterclockwise to off.

a. If diesel fuel squirted out from tube (7), go to Engine Malfunction 5: Engine Runs Unevenly (page 2-47).

b. If diesel fuel did not squirt out from tube (7), go to step 11.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START ABOVE 32°F (0°C) CONTINUED

Step 11. Remove and inspect fuel injection tube (page 2-213).

a. If fuel injection tube was plugged, remove and clean all remaining fuel injection tubes (page 2-213).

b. If fuel injection tube was not plugged, install (page 2-213) and notify Direct Support Maintenance.

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

Step 12. Using 5/8-inch open-end wrench, unscrew fuel line (1) from elbow (2) approximately one-half turn. Have assistant move primer lever (3) up and down. Check that diesel fuel squirts out from between fuel line (1) and elbow (2).

a. Using 518-inch open-end wrench, tighten line (1) to elbow (2) if diesel fuel squirts out from fuel line (1).

b. If diesel fuel does not squirt out from fuel line (1), go to step 13.

Step 13. Using 5/8-inch open-end wrench, unscrew fuel line (1) from elbow (4) approximately one-half turn. Move primer lever (3) up and down. Check that diesel fuel squirts out from between fuel line (1) and elbow (4).

a. If diesel fuel squirted out from fuel line (1), clean or replace fuel filter-to-fuel metering pump fuel line (page 2-292).

b. If diesel fuel does not squirt out from fuel line (1), tighten line (1) to elbow (4) using 518-inch open-end wrench. Go to step 14.

Step 14. Using 5/8-inch open-end wrench, unscrew fuel line (5) from elbow (6) approximately one-half turn. Move primer lever (3) up and down. Check that diesel fuel squirts out from between fuel line (5) and elbow (6). Using 5/8-inch open-end wrench, tighten line (5) to elbow (6).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

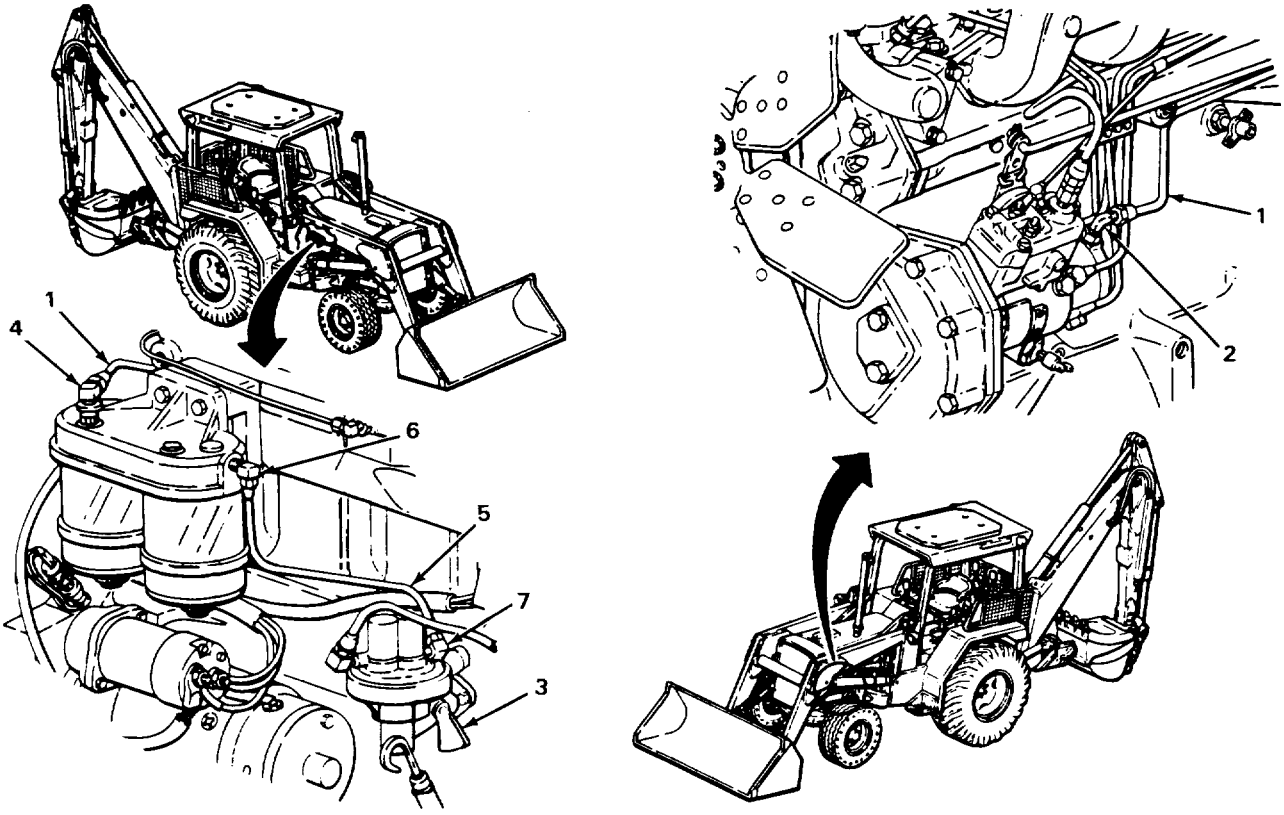
a. If diesel fuel squirted out from fuel line (5), replace fuel filter elements (page 2-284).

b. If diesel fuel does not squirt out from fuel line (5), go to step 15.

Step 15. Using 518-inch open-end wrench, unscrew fuel line (5) from elbow (7) approximately one-half turn. Move primer lever (3) up and down. Check that diesel fuel squirts out from between fuel line (5) and elbow (7).

a. If diesel fuel squirted out from fuel line (5), replace fuel pump-to-fuel filter fuel line (page 2-288).

b. If diesel fuel did not squirt out from fuel line (5), tighten line (5) to elbow (7) using 518-inch open-end wrench. Go to step 16.



TA242728

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE CRANKS BUT FAILS TO START OR IS HARD TO START ABOVE 320F (0°C) - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

Step 16. Using 5/8-inch open-end wrench, unscrew fuel line (1) from elbow (2) approximately one-half turn. Check that diesel fuel squirts out from between fuel line (1) and elbow (2).

a. If diesel fuel leaked out from fuel line (1), replace fuel pump (page 2-226).

b. If diesel fuel does not leak out from fuel line (1), go to step 17.

Step 17. Using 5/8-inch open-end wrench, unscrew fuel line (1) from fuel shutoff valve (3) approximately one-half turn. Check that diesel fuel squirts out from between fuel line (1) and fuel shutoff valve (3).

a. If diesel fuel leaked out from fuel line (1), replace fuel shutoff valve-to-fuel pump fuel line (page 2-264).

b. If diesel fuel does not leak out from fuel line (1), replace fuel shutoff valve (page 2-273).

4. ENGINE STARTS BUT WON'T CONTINUE TO RUN

Go to Engine Malfunction 3: Engine Cranks But Fails to Start Or Is Hard To Start Above 32°F (0°C), steps 8 thru 17 (page 2-42).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

5. ENGINE RUNS UNEVENLY

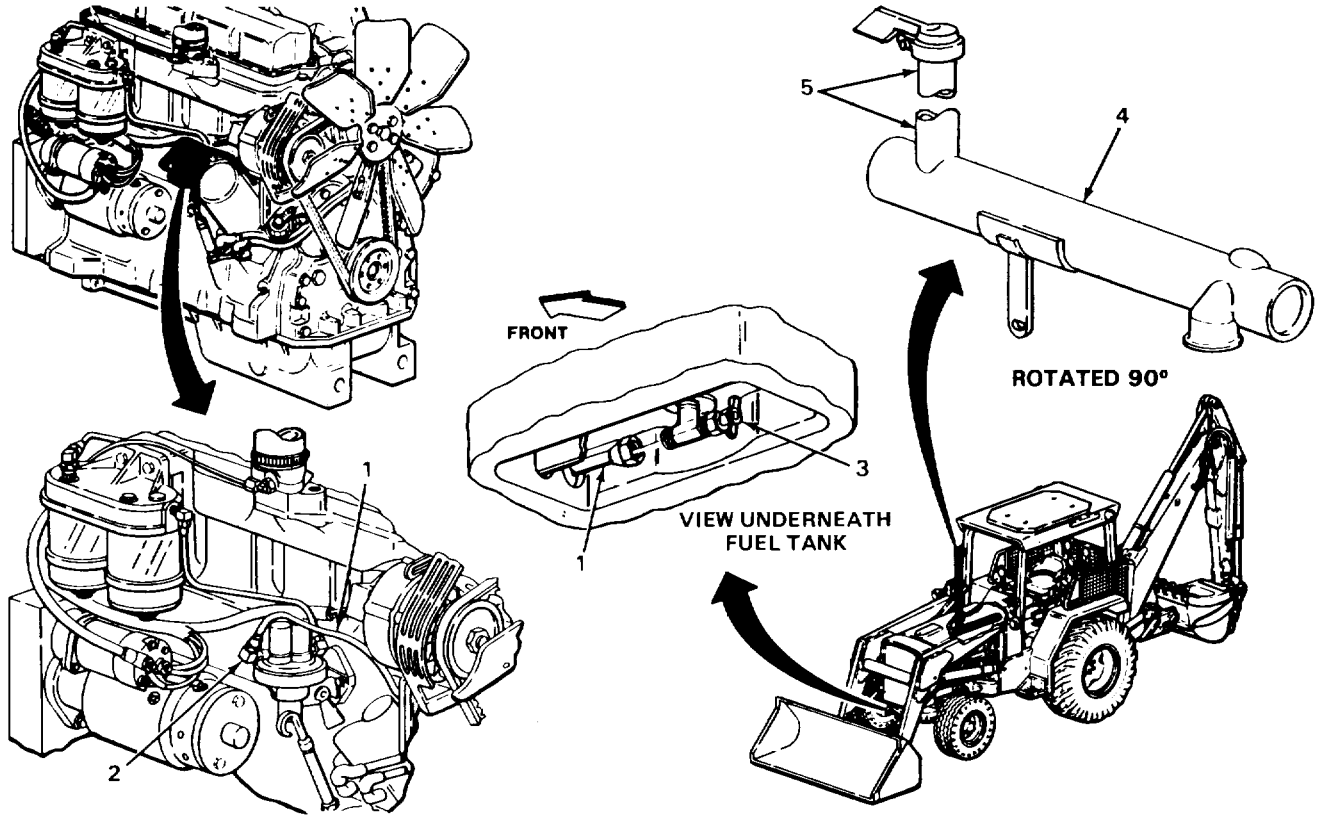
Step 1. Inspect exhaust system for dents and obstructions (page 2-343).

a. If muffler (4) and muffler extension stack (5) are not dented or obstructed, go to step 2.

b. If muffler (4) is dented, replace (page 2-343).

c. If muffler extension stack (5) is dented, replace (page 2-347).

d. If muffler (4) or muffler extension stack (5) is obstructed, remove obstructions.



TA242729

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ENGINE RUNS UNEVENLY - CONTINUED

Step 2.. Check valve adjustment (page 2-149).

a. If valves are properly adjusted, go to step 3.

b. If valves are not properly adjusted, adjust (page 2-149).

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Failure to observe these precautions could cause serious injury.

Step 3. Start and warm up engine (TM 5-2420-222-10). Have assistant operate engine at a speed which produces maximum miss or irregularity. Using 9116-inch and 3/4-inch open-end wrenches, unscrew tube (1) at fuel injection nozzle (2) part way until engine sound changes.

a. If engine sound does not change, fuel injection nozzle is defective. Shut down engine (TM 5-2420-222-10) and replace fuel injection nozzle (page 2-201).

b. If engine sound changes, fuel injection nozzle is operating properly. Repeat step 3 for remaining injection nozzles (3, 4, and 5) until engine sound does not change.

c. If all fuel injection nozzles are operating properly, notify Direct Support Maintenance.

6. ENGINE KNOCKS Go to Engine Malfunction 5: Engine Runs Unevenly, steps 2 and 3 (above).

7. ENGINE OIL PRESSURE LOW (INDICATOR LIGHT ON)

Step 1. Pull liquid level gage (6) out of nipple or adapter (7) and check for diesel fuel in lubricating oil. Push gage (6) into nipple or adapter (7) as far as it will go.

a. If diesel fuel is present in lubricating oil, go to Engine Malfunction 12: Engine Uses too Much Fuel (More Than 2.5 Gallons (9.5 Liters) Per Hour) (page 2-54).

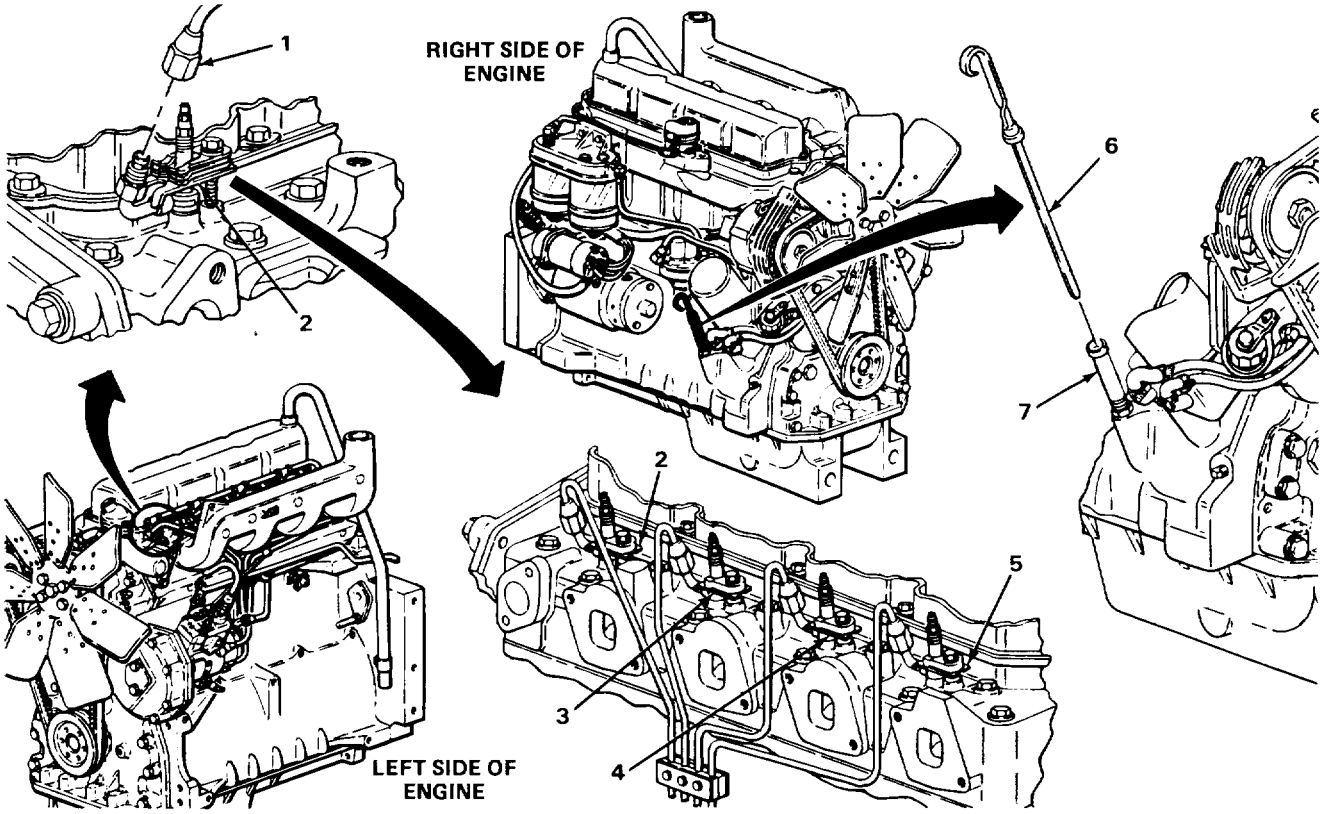
b. If diesel fuel is not present in lubricating oil, go to step 2.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Remove engine oil pressure switch (page 2-468). Connect Simplified Test Equipment For Internal Combustion Engines (STE/ICE) to flywheel housing. Start engine (TM 5-2420-222-10) and check for 35 to 65 psi (242 to 448 kPa) on the STE/ICE readout display. Shut down engine (TM 5-2420-222-10) and disconnect STE/ICE.

a. If display reads 35 to 65 psi (242 to 448 kPA), replace engine oil pressure switch (page 2-468).

b. If display reads less than 35 psi, install engine oil pressure switch (page 2-468). Go to step 3.



TA242730

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE OIL PRESSURE LOW (INDICATOR LIGHT ON) CONTINUED

Step 3. Remove and inspect engine oil filter element (page 2-168). Check for obstructions and damage.

a. If oil filter element was not obstructed or damaged, install engine oil filter element (page 2-168). Notify Direct Support Maintenance.

b. If engine oil filter element was obstructed or damaged, replace it (page 2-168).

8. ENGINE COOLANT TEMPERATURE TOO HIGH (GAGE READS IN OVERHEAT RANGE)

WARNING

Be careful when removing radiator cap. If engine is hot, escaping steam could burn you. Use a rag to cover radiator cap to protect your hand. Unscrew cap just enough to allow any built-up steam to escape. When all pressure has been relieved, unscrew cap the rest of the way, and take it off of radiator.

Step 1. Unscrew and remove radiator filler opening cap (1). Using flashlight, look into radiator (2). Check for rust, dirt, and lubricating oil in coolant.

a. If coolant is clean, replace radiator filler cap (1).

b. If coolant contains rust and dirt, clean cooling system (page 2-351).

c. If coolant contains lubricating oil, replace radiator filler cap (1) and notify Direct Support Maintenance.

Step 2. Remove ENGINE WATER TEMP. indicator (page 2-545). Using soldering torch kit, 1-quart of water In 1/2-gallon metal container, place bulb (3) in water. Heat water until it is boiling and check temperature indicator (4) for reading near upper end of green operating range, about 2120F (1000C).

a. If temperature indicator (4) reads properly, install ENGINE WATER TEMP. indicator (page 2-545), go to step 3.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. If temperature indicator (4) does not read properly, replace ENGINE WATER TEMP. indicator (page 2-545).

Step 3. Remove and test thermostat (page 2-396).

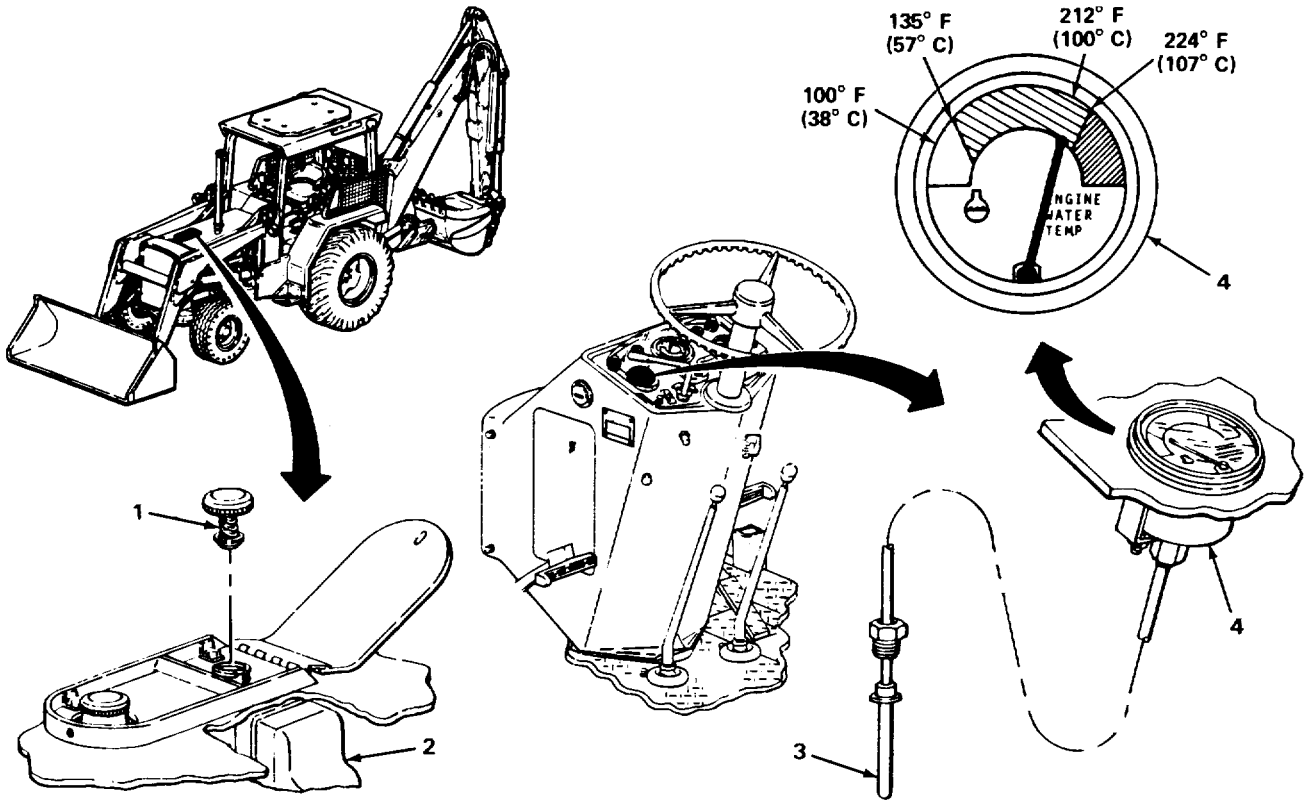
a. If thermostat opens properly, install (page 2-396) and go to step 4.

b. If thermostat does not open properly, replace (page 2-396).

Step 4. Unscrew and remove radiator filler opening cap (1). Start and warm up engine (TM 5-2420-222-10). Using flashlight, look into radiator (2) and check for coolant flow.

a. If coolant is not flowing, replace water pump (page 2-408).

b. If coolant is flowing replace radiator filler cap (1) and notify Direct Support Maintenance.



TA242731

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

9. ENGINE DOES NOT REACH NORMAL OPERATING TEMPERATURE (GAGE READS IN COLD RANGE)

Step 1. Remove and test thermostat (page 2-396).

a. If thermostat closes properly, install (page 2-396) and replace ENGINE WATER TEMP. indicator (page 2-545).

b. If thermostat does not close properly, replace (page 2-396).

10. ENGINE SMOKES Step 1. Start engine (TM 5-2420-222-10) and check color of exhaust smoke. Shut down engine (TM 5-2420-222-10).

a. If smoke is black or gray, go to step 2.

b. If smoke is white, go to step 5.

c. If smoke is blue, go to step 6.

Step 2. Check fuel tank for proper diesel fuel (TM 5-2420-222-10).

a. If proper diesel fuel is present, go to step 3.

b. If improper diesel fuel is present, drain fuel tank (page 2-250).

Step 3. Inspect exhaust system for dents and obstructions (page 2-343).

a. If muffler (1) and muffler extension stack (2) are not dented or obstructed, go to step 4.

b. If muffler (1) is dented, replace (page 2-343).

c. If muffler extension stack (2) is dented, replace (page 2-347).

d. If muffler (1) or muffler extension stack (2) is obstructed, remove obstructions.

Step 4. Check for dirty or damaged fuel injection nozzles (page 2-201).

a. If fuel injection nozzles are not dirty or damaged, go to step 5.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. If fuel injection nozzles are dirty or damaged, replace (page 2-201).

Step 5. Remove and test thermostat (page 2-396).

a. If thermostat does not close properly, replace (page 2-396).

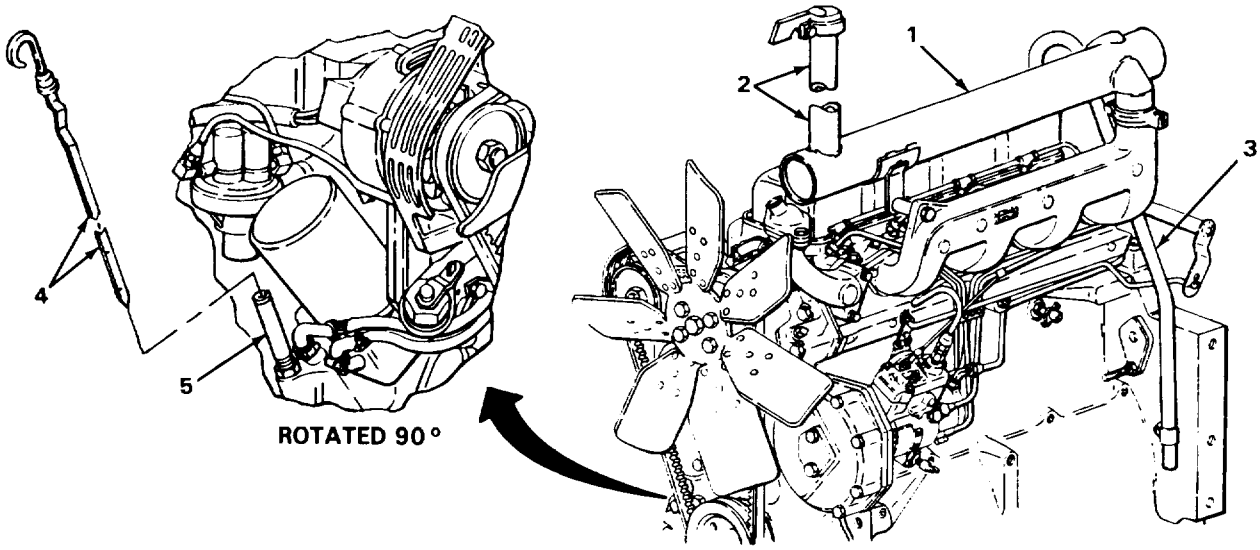
b. If thermostat does close properly, notify Direct Support Maintenance.

Step 6. Check ventilator pipe (3) for abnormal bends.

a. If ventilator pipe (3) does not have abnormal bends, go to step 7.

b. If ventilator pipe (3) has abnormal bend, replace (page 2-173).

Step 7. Pull liquid level gage (4) out of nipple or adapter (5) and check for diesel fuel in lubricating oil. If diesel fuel is present in lubricating oil, it will be thin and smell like fuel. Push gage (4) into nipple or adapter (5) as far as it will go.



TA242732

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

10. ENGINE SMOKES - CONTINUED

    a. If diesel fuel is present in lubricating oil, go to Engine Malfunction 12: Engine Uses Too Much Fuel (More Than 2.5 Gallons (9.5 Liters) Per Hour (below).

    b. If diesel fuel is not present in lubricating oil, notify Direct Support Maintenance.

11. ENGINE USES TOO MUCH OIL Check ventilator or pipe (1) for abnormal bends.

    a. If ventilator pipe (1) has abnormal bends, replace (page 2-173).

    b. If ventilator pipe (1) does not have abnormal bends, notify Direct Support Maintenance.

12. ENGINE USES TOO MUCH FUEL (MORE THAN 2.5 GALLONS (9.5 LITERS) PER HOUR)

    Step 1. Check fuel tank for proper diesel fuel (TM 5-2420-222-10).

    a. If proper diesel fuel is present, go to step 2.

    b. If improper diesel fuel is present, drain fuel tank (page 2-250).

    Step 2. Check valves adjustment (page 2-149).

    a. If valves are properly adjusted, go to step 3.

    b. If valves are not properly adjusted, adjust (page 2-149).

    Step 3. Check for dirty or damaged fuel injection nozzles (page 2-201).

    a. If fuel injection nozzles are not dirty or damaged, go to step 4.

    b. If fuel injection nozzles are dirty or damaged, replace (page 2-201).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Pull liquid level gage (2) out of nipple or adapter (3) and check for diesel fuel in lubricating oil. If diesel fuel is present in lubricating oil, it will be thin and smell like fuel. Push gage (2) into nipple or adapter (3) as far as it will go.

a. If diesel fuel is not present in lubricating oil, notify Direct Support Maintenance.

b. If diesel fuel is present in lubricating oil, go to step 5.

Step 5. Remove and inspect fuel pump (page 2-226).

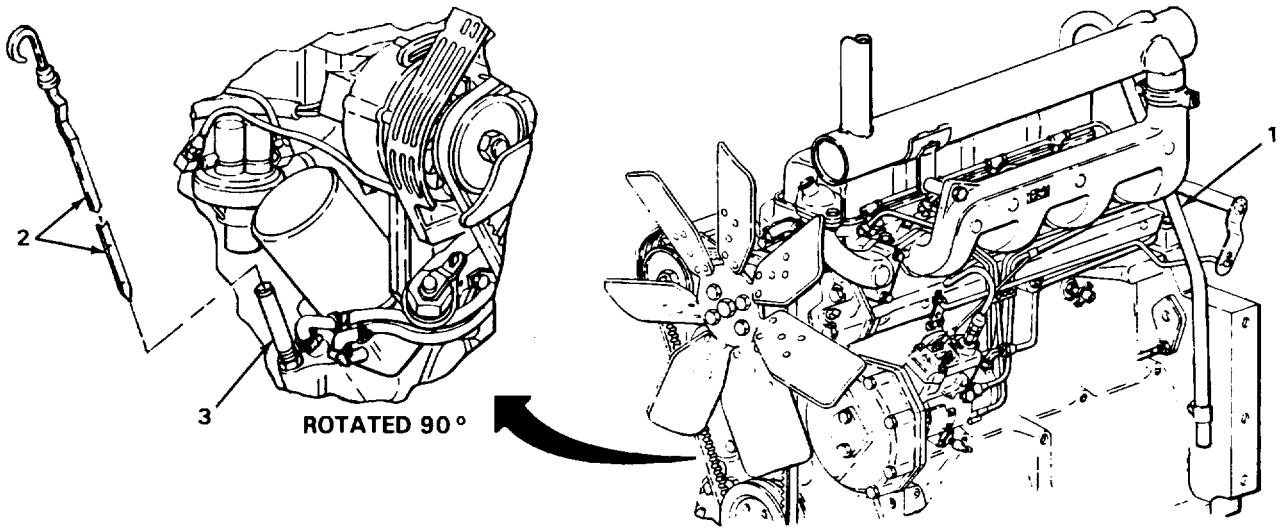
a. If fuel pump checks good, notify Direct Support Maintenance.

b. If fuel pump is defective, replace (page 2-226).

13. ENGINE LACKS POWER

Step 1. Check fuel metering pump adjustment (page 2-222).

a. If fuel metering pump does not need adjustment, go to step 2.



TA242733

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

13. ENGINE LACKS POWER - CONTINUED

b. If fuel metering pump needs adjustment, adjust (page 2-222).

Step 2. Check accelerator pedal, foot accelerator rod, and speed control arms adjustment (page 2-328).

a. If accelerator linkage is properly adjusted, go to step 3.

b. If accelerator linkage is improperly adjusted, adjust (page 2-328).

Step 3. Check speed control rod (1) for cracks, abnormal bends, and breaks.

a. If speed control rod (1) is not cracked, bent, or broken, go to step 4.

b. If speed control rod (1) is cracked, bent, or broken, replace (page 2-328).

Step 4. Check hand throttle lever and cable adjustment (page 2-311).

a. If hand throttle lever and cable have improper adjustment, adjust (page 2-311).

b. If hand throttle lever binds, replace (page 2-315).

c. If hand throttle cable binds, replace (page 2-322).

d. If hand throttle lever and cable checked good, go to step 5.

Step 5. Check valves adjustment (page 2-149).

a. If valves are properly adjusted, notify Direct Support Maintenance.

b. If valves are not properly adjusted, adjust (page 2-149).

14. COOLANT IN OIL

Check for leaking lubricating cooler (engine oil cooler) by doing the following. Replace lubricating cooler (engine oil cooler) (page 2-156), replace engine oil filter element (page 2-168) and change engine oil (page 2-145). Start engine (TM 5-2420-22-10) and run for 1/2-hour. Shut down engine (TM 5-2420-222-10). Check engine oil level (TM 5-2420-222-10).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If engine oil is clear, problem is solved. Get rid of old lubricating cooler (engine oil cooler).

b If engine oil is cloudy, notify Direct Support Maintenance.

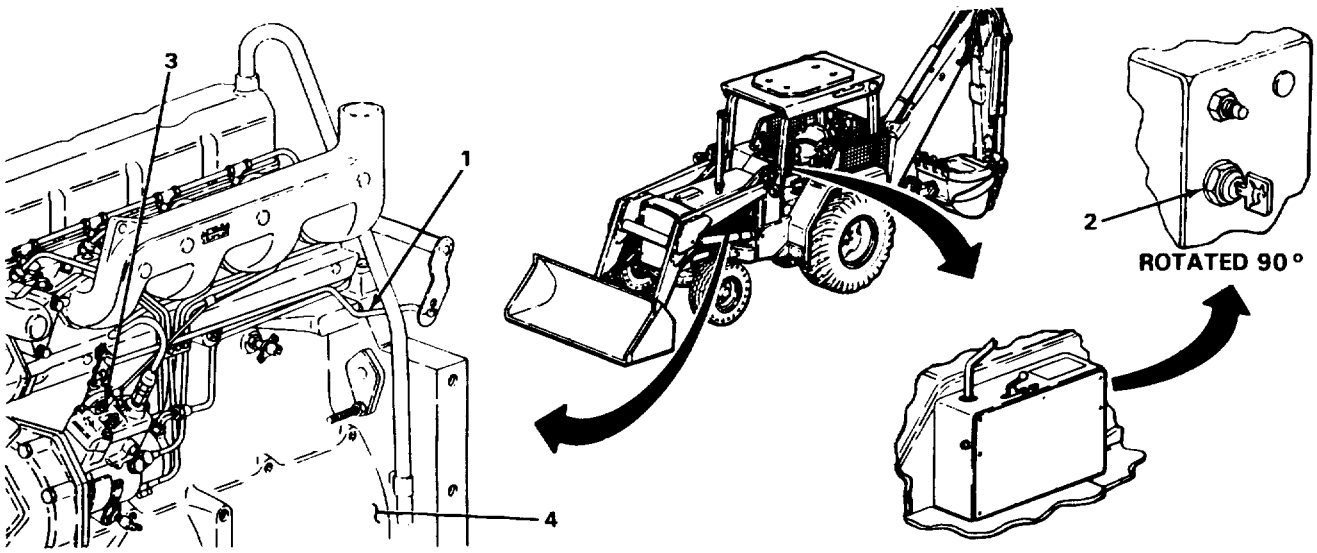
15. ENGINE USES TOO MUCH COOLANT

Go to Engine Malfunction 8: Engine Coolant Temperature Too High (Gage Reads In Overheat Range) (page 2-50).

16. ENGINE WILL NOT SHUT DOWN

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment. Turn ignition lock switch (2) counterclockwise to off. Using multimeter set to 30 vdc scale, place red probe on solenoid terminal (3) and black probe on engine block (4). Check for 11 to 13 vdc on multimeter.



TA242734

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. ENGINE WILL NOT SHUT DOWN - CONTINUED

    a. If multimeter reads 11 to 13 vdc, replace ignition lock switch and key (page 2-565).

    b. If multimeter reads less than 11 vdc, close fuel shutoff valve (TM 5-2420-222-10) to shut down engine and notify Direct Support Maintenance.

17. ENGINE SPEED IS ERRATIC (HUNTS OR SURGES)

    Go to Engine Malfunction 13: Engine Lacks Power (page 2-55).

18. ENGINE RUNS TOO FAST OR WILL NOT RETURN TO IDLE

    Go to Engine Malfunction 13: Engine Lacks Power (page 2-55).

CLUTCH

1. CLUTCH SLIPS

   Check clutch pedal linkage adjustment (page 2-186).

   a. If clutch pedal linkage is bent or binding, replace (page 2-186).

   b. If clutch pedal linkage is Improperly adjusted, adjust (page 2-186).

   c. If clutch pedal linkage is not bent, binding, or improperly adjusted, notify Direct Support Maintenance.

2. CLUTCH DOES NOT RELEASE PROPERLY

   Go to Clutch Malfunction 1: Clutch Slips (above).

3. CLUTCH PEDAL VIBRATES

   Check clutch pedal (1) for missing weak or broken clutch return spring (2).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

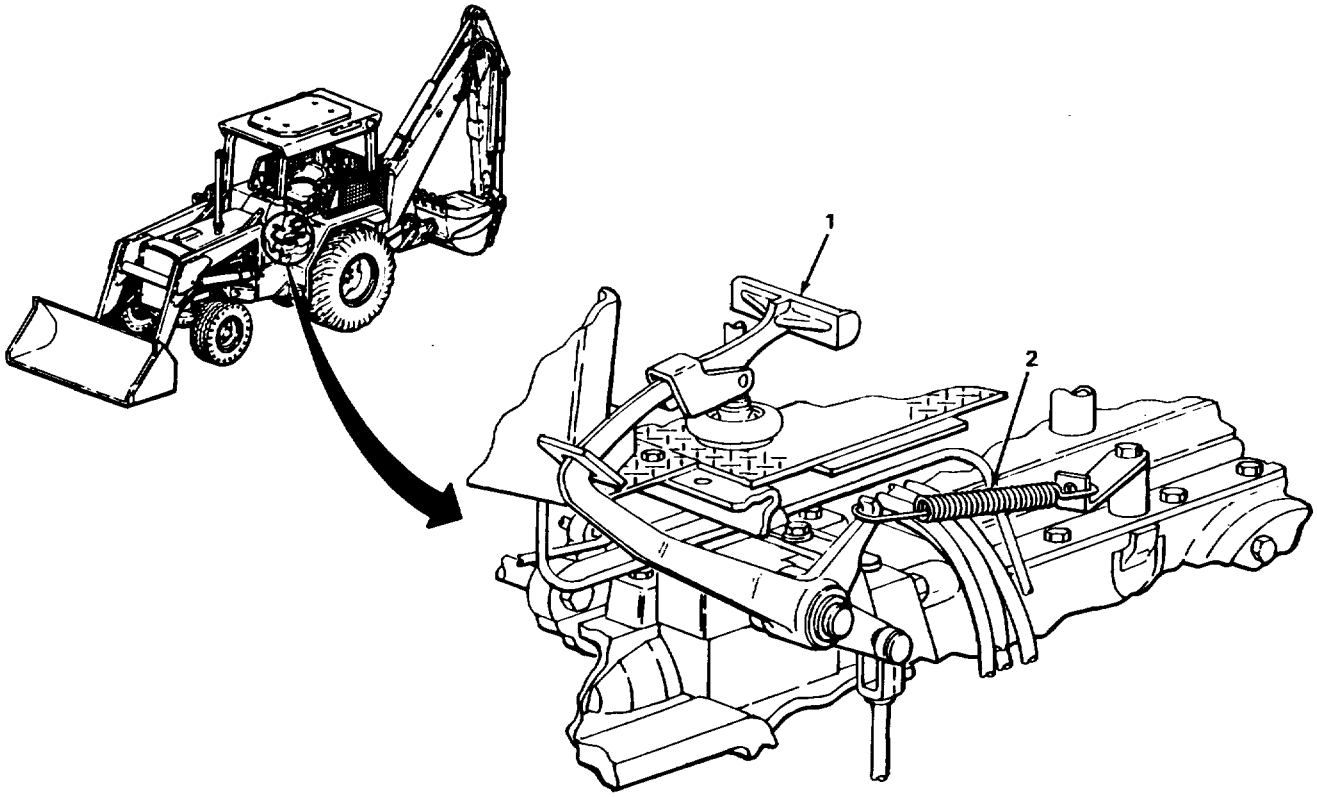
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If clutch return spring (2) is missing, weak, or broken, replace as outlined in clutch pedal (page 2-195).

b. If clutch return spring (2) is not missing, weak, or broken, notify Direct Support Maintenance.

4. CLUTCH MAKES NOISE WHILE ENGAGED

Go to Clutch Malfunction 1: Clutch Slips (page 2-58).



TA242735

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ELECTRICAL SYSTEM

1. BATTERIES WILL NOT HOLD A CHARGE

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Check for defective batteries (TM 9-6140-200-14).

a. If both batteries are serviceable, go to step 2.

b. If either battery is defective, replace (page 2-692).

Step 2. Check ac generator terminals (1, 2, 3, and 4), connectors (5, 6, and 7), voltage regulator leads (8, 9, and 10), and ac generator output wires (11 and 12) for loose corroded, frayed, or broken connections.

a. If terminals (1, 2, 3, and 4), connectors (5, 6, and 7), leads (8, 9, and 10), and wires (11 and 12) are not loose, corroded, frayed, or broken, go to step 3.

b. If connections on terminals (1 or 2) are loose, tighten nuts (13 and 14) using 3/8-inch open-end wrench.

c. If connections on terminal (3) are loose, tighten nut (15) using 7/16-inch open-end wrench.

d. If connectors (5 and 6) are loose or disconnected, push together until they lock.

e. If connector (7) is loose or disconnected from terminal (4), push on all the way.

f. If any connections are corroded, clean using wire brush.

g. If terminals (1, 2, 3, or 4) are broken, replace ac generator (page 2-436).

h. If leads (8, 9, or 10) are frayed or broken or if connector (4) is broken, replace voltage regulator (page 2-452).

i. If wires (11 or 12) are frayed or broken, repair (page 2-137).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (1) and black probe on ac generator terminal (2). Check for reading of 0 vdc on multimeter.

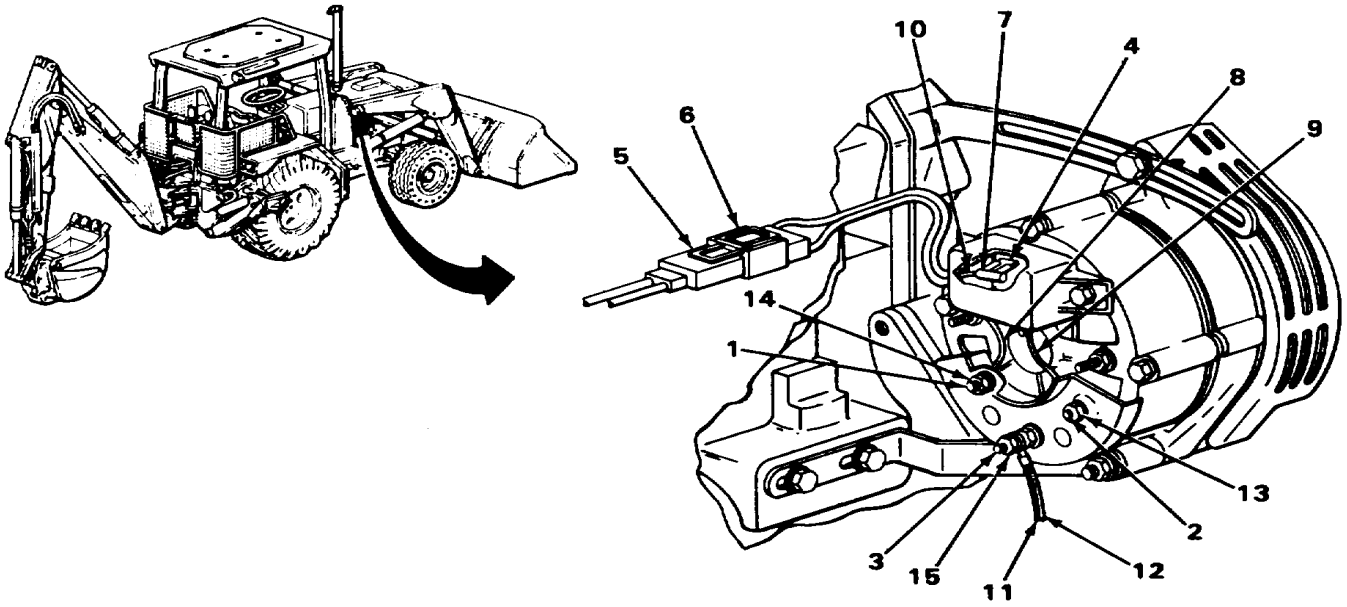
a. If multimeter reads 0 vdc, go to step 5.

b. If multimeter reads more than 0 vdc, record reading and go to step 4.

Step 4. Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (3) and black probe on ac generator terminal (1). Note reading on multimeter.

a. If multimeter reading Is same as recorded In step 3, replace ac generator (page 2-436).

b. If multimeter reading is not same as recorded in step 3, check loader backhoe for other electrical system malfunctions.



TA242736

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. BATTERIES WILL NOT HOLD A CHARGE - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 5. Turn ignition lock switch (1) clockwise to ignition. Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (2) and black probe on ac generator terminal (3). Check for reading of 1.5 to 2.0 vdc with 55 amp ac generator or 2.0 to 3.0 with 35 amp ac generator on multimeter.

a. If multimeter reads as specified, go to step 6.

b. If multimeter does not read as specified, go to step 7.

Step 6. Start and run engine at 1400 rpm for 15 minutes (TM 5-2420-222-10). Using thermometer and 6-inch machinist's steel rule, measure temperature 1-inch (25.4mm) from voltage regulator (4). Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (2) and black probe on ac generator terminal (3). Check for reading of 0.8 to 1.2 vdc plus temperature voltage correction from chart below. Move red probe to ac generator terminal (5) and check multimeter reading. Multimeter reading should be approximately 1 vdc less than reading obtained at ac generator terminal (2). Shut down engine (TM 5-2420-222-10).

Temperature	Voltage
40°F (4°C)	14.4 - 14.9 volts
60°F (16°C)	14.3 - 14.7 volts
80°F (27°C)	14.2 - 14.6 volts
100°F(38°C)	14.0 - 14.4 volts
120°F(49°C)	13.8 - 14.3 volts
140°F(60°C)	13.6 - 14.1 volts

a. If multimeter reading is not correct at ac generator terminal (2), go to step 7.

b. If multimeter reading is not correct at ac generator terminal (5), replace ac generator (page 2436).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

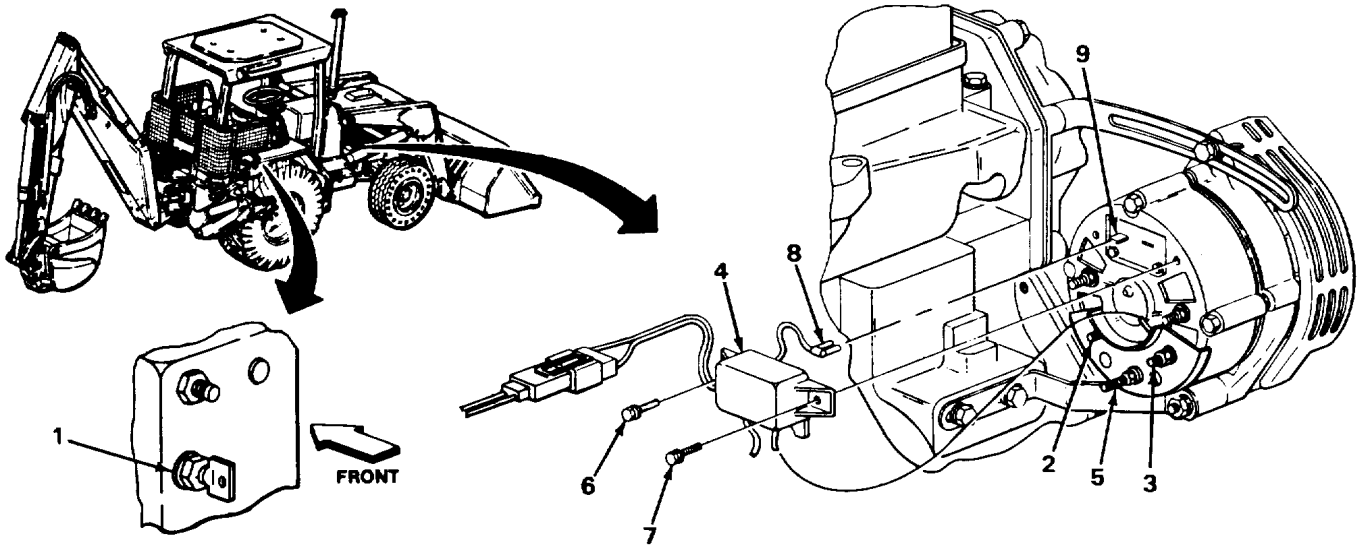
CAUTION

Do not ground voltage regulator to any ac generator terminal. Grounding voltage regulator to ac generator terminal may cause damage to parts.

Step 7. Using 5/16inch, 1/4inch drive socket and ratchet handle unscrew and take out two screws (6) and screw (7). Pull voltage regulator lead (8) off of ac generator terminal (9). Connect ac generator and voltage regulator test set to ac generator terminals (5 and 9). Check test set ammeter for reading of 1.9 to 2.6 amps for 35 amp ac generators, or 2.0 to 2.5 amps for 55 amp ac generators. Disconnect ac generator and voltage regulator test set.

a. If test set ammeter reads as specified, go to step 8.

b. If test set ammeter does not read as specified, replace ac generator (page 2-436).



TA242737

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. BATTERIES WILL NOT HOLD A CHARGE - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

NOTE

If batteries are not fully charged, it may be necessary to increase engine rpm slightly higher than specified to obtain desired reading on multimeter.

Step 8. Connect jumper wire between ac generator terminals (1 and 2) start engine and run at 800 rpm (TM 5242022210). Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (1) and black probe on ac generator terminal (3). Check for reading of 15 to 16 vdc. Shut down engine (TM 5-2420-222-10) and disconnect jumper wire.

a. If multimeter reads 15 to 16 vdc, replace voltage regulator (page 2-452).

b. If multimeter does not read 15 to 16 vdc, replace ac generator (alternator) (page 2-436).

2. FULLY CHARGED BATTERIES AND HIGH CHARGING RATE (BATTERIES OVERCHARGING)

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

NOTE

Voltage regulator must be checked with an ac generator that is serviceable. If ac generator condition is questionable, go to Electrical System Malfunction1: Batteries Will Not Hold A Charge, steps 3 thru 8 (page 2-61).

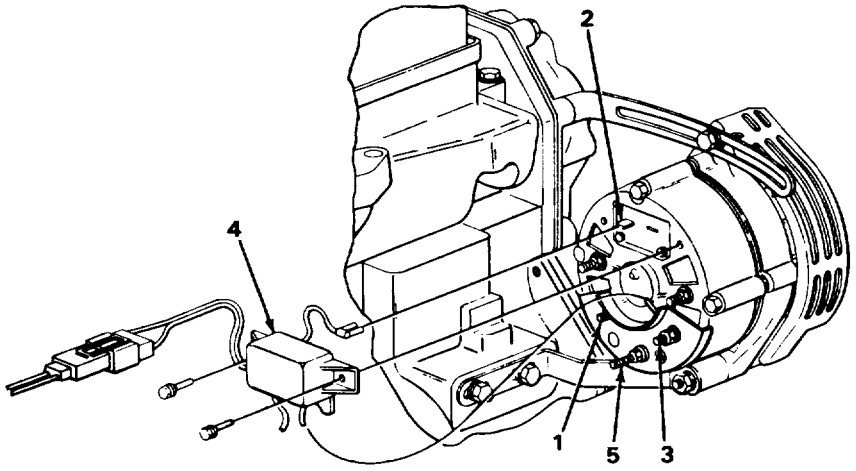
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Start and run engine at 1500 rpm for 15 minutes (TM 5242022210). Turn on front lights (TM 5242022210). Using thermometer and 6inch machinist's steel rule measure temperature 1inch (25.4mm) from voltage regulator (4). Using multimeter set to 30 vdc scale, place red probe on ac generator terminal (5) and black probe on ac generator terminal (3). Multimeter reading should be as specified in temperature voltage chart below. Turn off front lights and shut down engine (TM 5-2420-222-10).

Temperature	Voltage
40°F (4°C)	14.4 - 14.9 volts
60°F (16°C)	14.3 - 14.7 volts
80°F (27°C)	14.2 - 14.6 volts
100°F (38°C)	14.0 - 14.4 volts
120°F(49°C)	13.8 - 14.3 volts
40°F (60°C)	13.6 - 14.1 volts

a. If multimeter reading is correct at ac generator terminal (5), check loader backhoe for other electrical system malfunctions.

b. If multimeter reading Is not correct at ac generator terminal (5), replace voltage regulator (page 2-452).



PARTS DISASSEMBLED FOR CLARITY

TA242738

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ONE FRONT LIGHT DOES NOT WORK

Step 1. Check headlight (1) to see that it is tightly mounted.

a. If headlight (1) is tight, go to step 2.

b. If headlight (1) is loose, tighten nut (2) using 3/4-inch open-end wrench.

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 2. Pull connector (3) out of connector (4). Using multimeter set to RX1 scale, place red probe on connector (3) and black probe on front light bracket (5). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair pink wire in main and front lights wiring harness (page 2137). Plug connector (3) into connector (4).

b. If multimeter reads more than 0 ohm, plug connector (3) into connector (4) and go to step 3.

Step 3. Disassemble front light (page 2648). Using multimeter set to RX1 scale, place red probe on lamp positive terminal (6) and black probe on lamp ground terminal (7). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 4.

b. If multimeter reads more than 0 ohm, replace lamp and assemble front light (page 2-648).

Step 4. Check front light leads (8 and 9) for cracks, breaks, corrosion, and loose ground terminal (10).

a. If either lead (8 or 9) is cracked, broken, or corrode 1, replace (page 2-137). Assemble front light (page 2-648).

b. If ground connection is loose, solder ground terminal (10) using rosin core solder (item 26, Appendix C), long round-nose pliers, and soldering iron. Assemble front light (page 2-648).

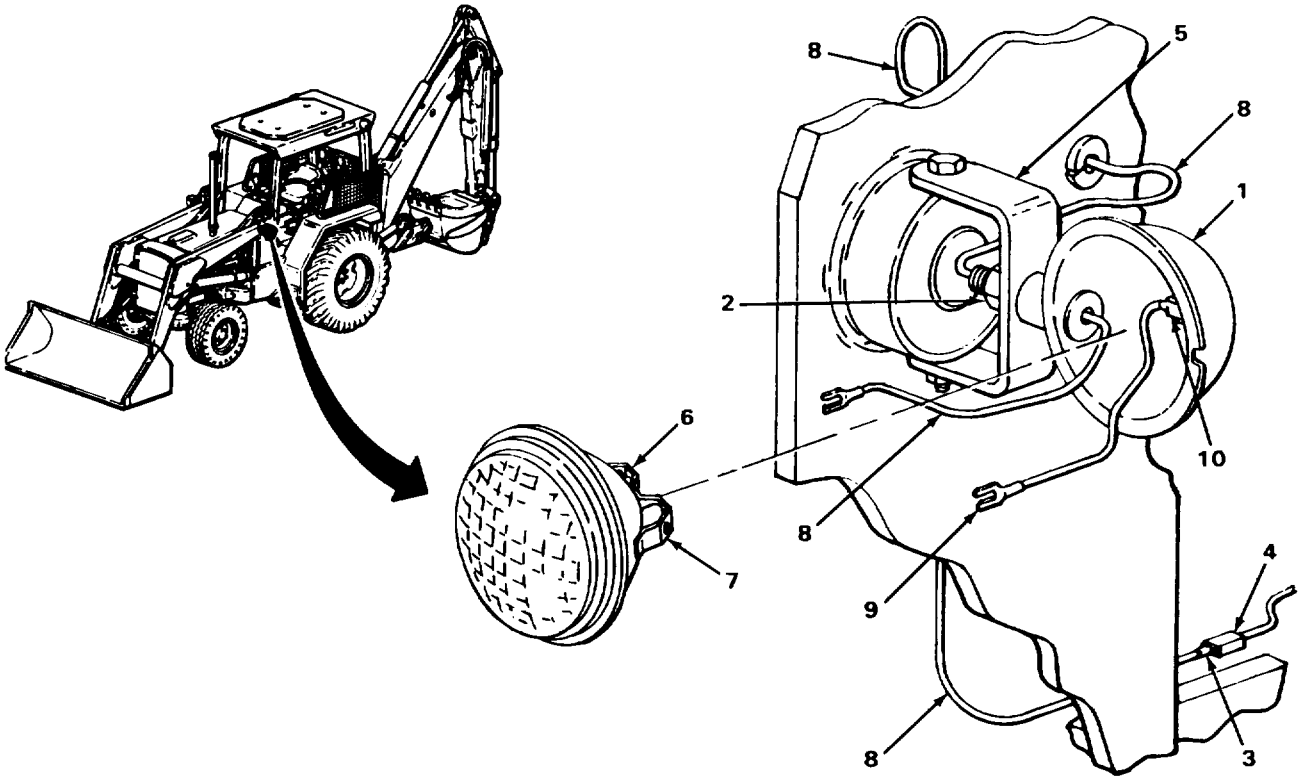
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. BOTH FRONT LIGHTS DO NOT WORK

Check to see if front light operation is affected by light switch position (TM 52420-222-10).

a. If front lights work in H1 or H2 position, but not both, replace light switch (page 2-589).

b. If front lights do not work in H1 and H2 positions, repair pink wire in main and front light wiring harness (page 2-137).



TA242739

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ONE COMBINATION TAIL AND FLOODLIGHT TAILLIGHT DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull yellow wire terminal (1) out of connector (2). Using multimeter set to RX1 scale, place red probe on yellow wire terminal (1) and black probe on taillight (3). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair yellow wire in rear light wiring harness (page 2-137). Plug terminal (1) into connector (2).

b. If multimeter reads more than 0 ohm, go to step 2.

Step 2. Disassemble combination tail and floodlight (page 2638). Using multimeter set to RX1 scale, place red probe on positive lamp terminal (4) and black probe on lamp base (5). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 3.

b. If multimeter reads more than 0 ohm, replace lamp and assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

Step 3. Check taillight positive lead (6), socket (7), and taillight ground lead (8) for cracked, corroded, or broken connections. Check for loose ground terminal (9).

a. If positive lead (6) or socket (7) is cracked or broken, replace socket with lead assembly and assemble combination tail and floodlight (page 2-638). Plug terminal (1) into connector (2).

b. If positive lead (6), socket (7), or ground lead (8) is corroded, clean using fine abrasive paper (item 20, Appendix C). Assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

c. If ground terminal (9) is loose, solder using rosin core solder (item 26, Appendix C), long round-nose pliers, and soldering iron. Assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

d. If ground lead is cracked or broken, replace it (page 2137). Assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

6. BOTH COMBINATION TAIL AND FLOODLIGHT TAILLIGHTS DO NOT WORK

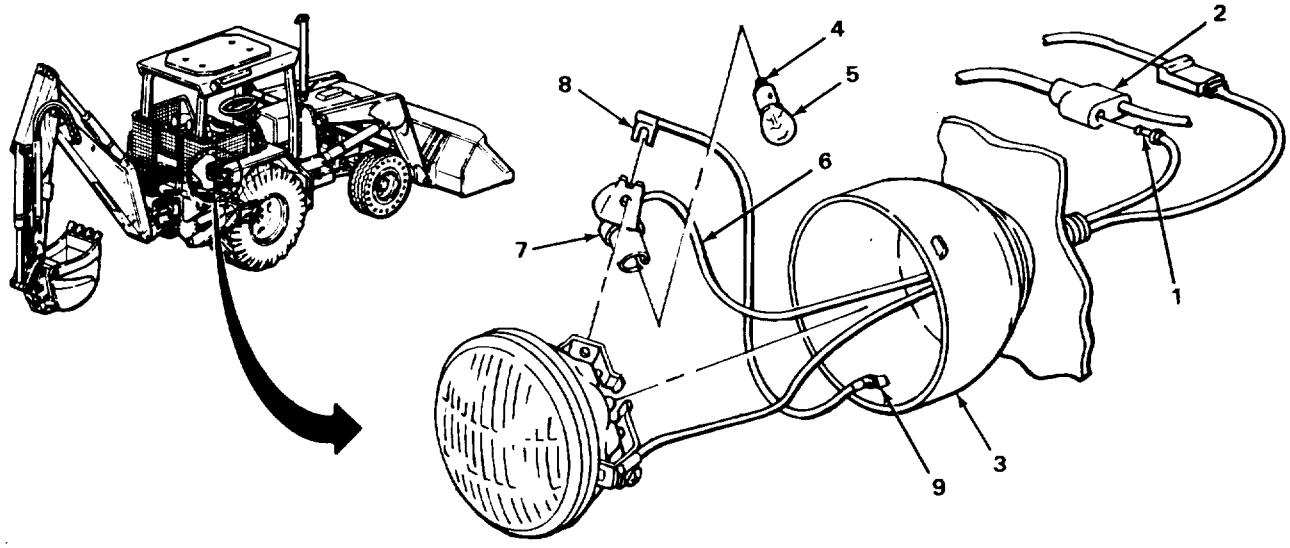
WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Check to see if taillights are affected by light switch position (TM 5-2420-222-10).

a. If taillight work in H1 or H2 positions, but not both, replace light switch (page 2-589).

b. If taillights do not work in H1 and H2 positions, repair yellow wire in rear light wiring harness (page 2-137).



TA242740

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ONE COMBINATION TAIL AND FLOODLIGHT FLOODLIGHT DOES NOT WORK

WARNING

Although Ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull blue wire terminal (1) out of connector (2). Using multimeter set to RX1 scale, place red probe on blue wire terminal (1) and black probe on taillight (3). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair blue wire in rear light wiring harness (page 2-137). Plug terminal (1) into connector (2).

b. If multimeter reads more than 0 ohm, go to step 2.

Step 2. Disassemble combination tail and floodlight (page 2638). Using multimeter set to RX1 scale, place red probe on positive unit terminal (4) and black probe on unit ground terminal (5). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 3.

b. If multimeter reads more than 0 ohm, replace sealed unit and assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

Step 3. Check floodlight positive lead (6) and ground lead (7) for cracked, corroded, or broken connections. Check for loose ground terminal (8).

a. If positive lead (6) or ground lead (7) is cracked or broken, replace it (page 2137) and assemble combination tail and floodlight (page 2-638). Plug terminal (1) into connector (2).

b. If positive lead (6) or ground lead (7) is corroded, clean using fine abrasive paper (item 20, Appendix C). Assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

c. If ground terminal (8) is loose, solder using rosin core solder (item 26, Appendix C), long round-nose pliers and soldering iron. Assemble combination tail and floodlight (page 2638). Plug terminal (1) into connector (2).

8. BOTH COMBINATION TAIL AND FLOODLIGHT FLOODLIGHTS DO NOT WORK

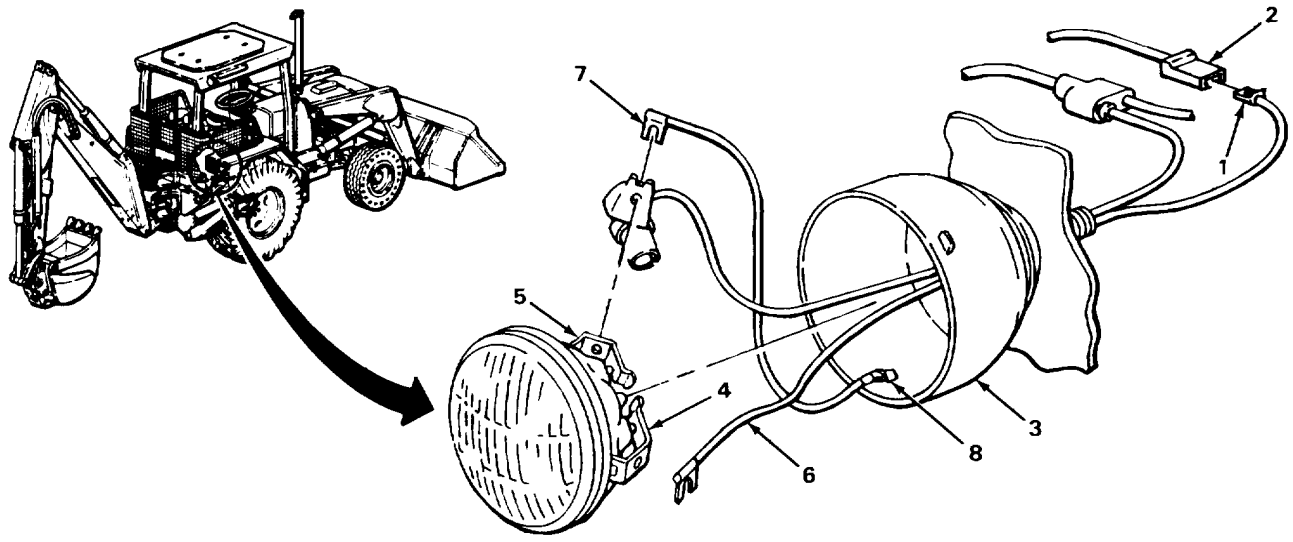
WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Check floodlight and front light operation (TM 5-2420-222-10).

a. If front lights worked during check, repair blue wire in rear light wiring harness (page 2-137).

b. If front lights did not work during check, replace light switch (page 2-589).



TA242741

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

9. ONE COMBINATION TAIL AND STOPLIGHT TAILLIGHT ON LOADER BACKHOES WITH SERIAL NUMBERS 319995 THRU 342573 DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull blue wire terminal (1) out of connector (2). Using multimeter set to RX1 scale, place red probe on blue wire terminal (1) and black probe on taillight (3). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair yellow wire in rear light wiring harness (page 2-137). Plug terminal (1) into connector (2).

b. If multimeter reads more than 0 ohm, go to step 2.

Step 2. Disassemble combination tail and stoplights (page 2633). Using multimeter set to RX1 scale, place red probe on lamp positive terminal (4) and black probe on lamp base (5). Check for 0 ohm on multimeter. Move red probe to the other lamp positive terminal (6). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm on both terminals (4 and 6), go to step 3.

b. If multimeter reads more than 0 ohms on either terminal (4 or 6), replace lamp and assemble combination tail and stoplights (page 2-633). Plug terminal (1) into connector (2).

Step 3. Check lamp socket (7) and two lamp leads (8 and 9) for cracks, breaks, and corrosion.

a. If lamp socket (7) or lamp leads (8 and 9) are corroded, clean using fine abrasive paper (item 20, Appendix C). Assemble combination tail and stoplights (page 2633). Plug terminal (1) into connector (2).

b. If lamp socket (7) is cracked or broken, replace combination tail and stoplight assembly (page 2-633).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

c. If leads (8 or 9) are cracked or broken, replace combination tail and stoplight plug and wire assembly (page 2746). Assemble combination tail and stoplight (page 2-633).

10. BOTH COMBINATION TAIL AND STOPLIGHT TAILLIGHTS ON LOADER BACKHOES WITH SERIAL NUMBERS 319995 THRU 342573 DO NOT WORK

Check to see if taillight operation Is affected by light switch position (TM 5-2420-222-10).

a. If taillights work in H1 or H2 position, but not both, replace light switch (page 2-589).

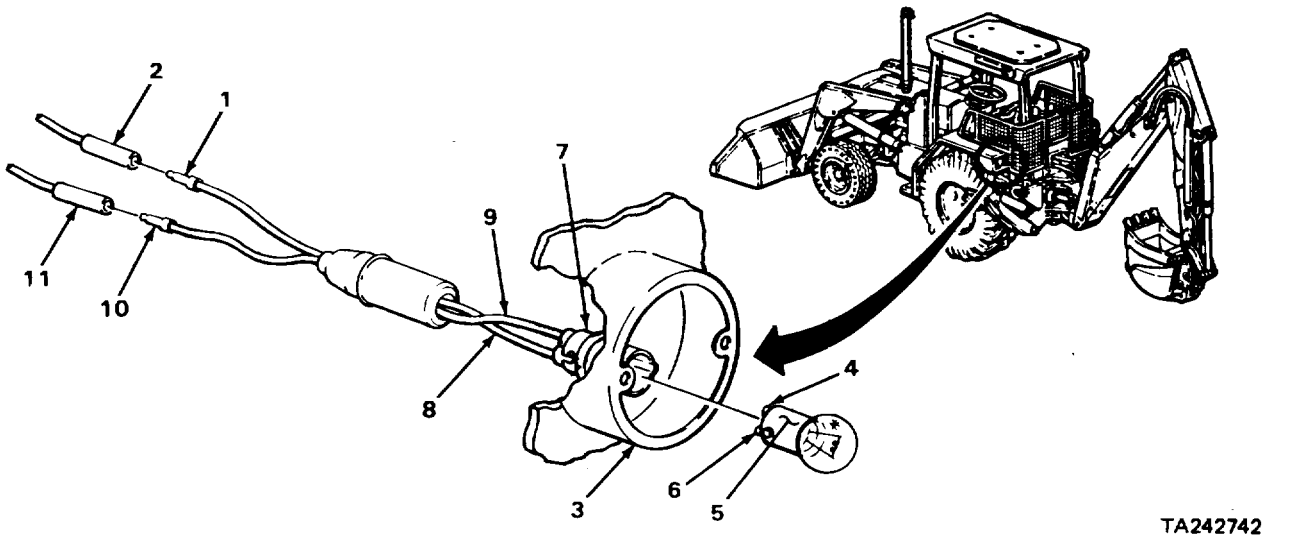
b. If taillights do not work in H1 and H2, repair yellow wire In rear light wiring harness (page 2-137).

11. ONE COMBINATION TAIL AND STOPLIGHT STOPLIGHT DOES NOT WORK

WARNING

Although Ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull brown wire terminal (10) out of connector (11). Using multimeter set to RX1 scale, place red probe on brown wire terminal (10) and black probe on taillight (3). Check for 0 ohm on multimeter.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. ONE COMBINATION TAIL AND STOPLIGHT STOPLIGHT DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

a. If multimeter reads 0 ohm, repair orange wire in rear light wiring harness (page 2137). Plug brown wire terminal (1) into connector (2).

b. If multimeter reads more than 0 ohm, go to Electrical Malfunction 9: One Combination Tail And Stoplight Taillight On Loader Backhoes With Serial Numbers 319995 Thru 342573 Does Not Work, steps 2 and 3 (page 2-72).

12. BOTH COMBINATION TAIL AND STOPPLIGHTSTOPLIGHTS DO NOT WORK WHEN ONLY ONE BRAKE IS APPLIED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. On side for which applied brake does not light stoplights, pull connector (3) off of brake light pressure switch terminals (4 and 5), connect jumper wire between red wire terminal (6) and orange wire terminal (7). Turn ignition lock switch (8) clockwise to ignition. Check to see if stoplights (9) are lit. Turn ignition lock switch (8) counterclockwise to off. Remove jumper wire.

a. If stoplights (9) light, replace brake light pressure switch (page 2-476).

b. If stoplights (9) do not light, go to step 2.

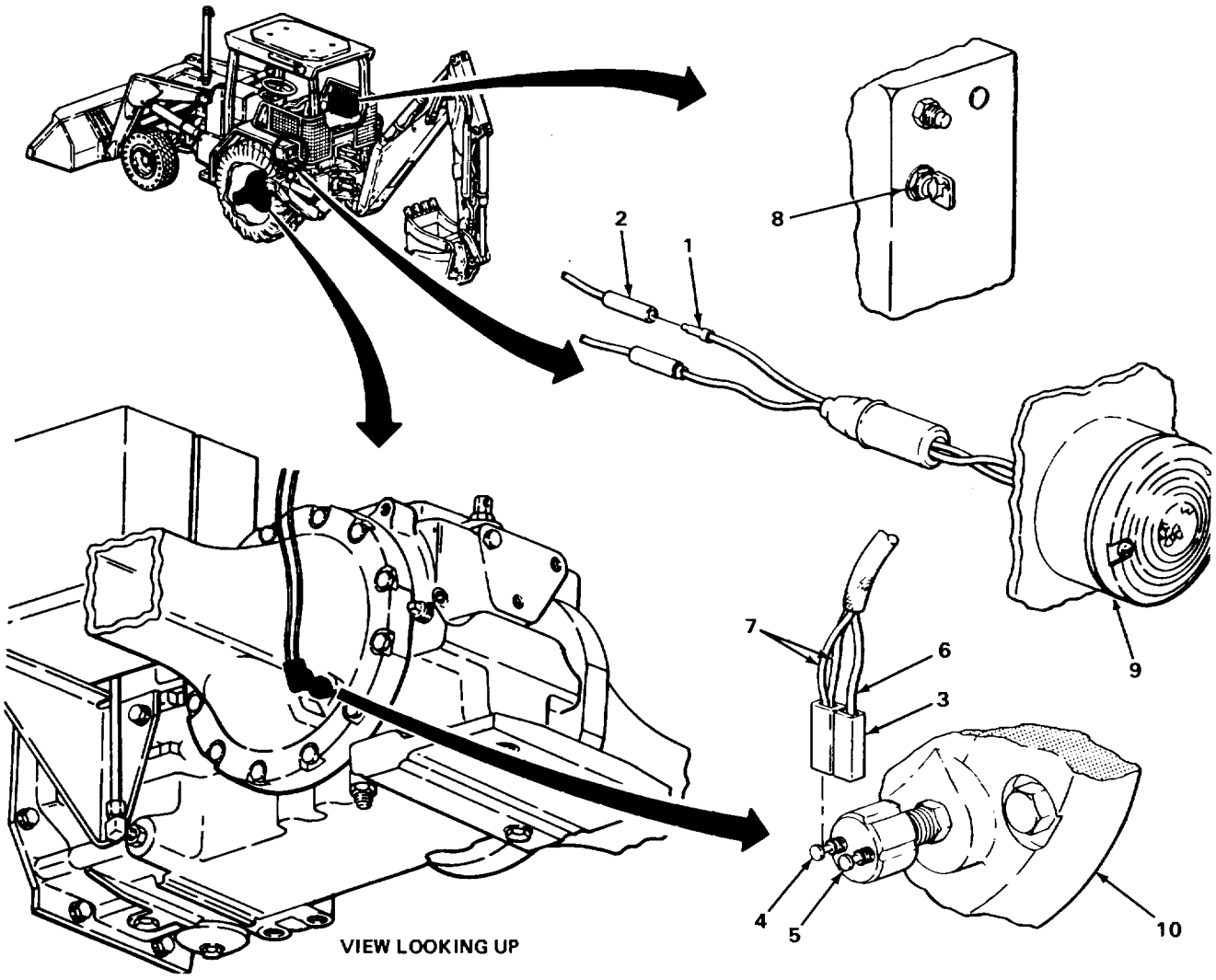
Step 2. Turn ignition lock switch (8) clockwise to ignition. Using multimeter set to 30 vdc, place red probe on red wire terminal (6) and black probe on rear axle housing (10). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch counterclockwise to off.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If multimeter reads 11 to 13 vdc, repair orange wire in rear light wiring harness (page 2137). Push connector (3) onto brake light pressure switch terminals (4 and 5).

b. If multimeter reads less than 11 vdc, repair red wire in rear light wiring harness (page 2137). Push connector (3) onto brake light pressure switch terminals (4 and 5).



TA242743

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

13. ALL FRONT LIGHTS, COMBINATION TAIL AND FLOODLIGHTS (AND COMBINATION TAIL AND STOPLIGHT TAILLIGHTS ON LOADER BACKHOE WITH SERIAL NUMBERS 319995 THRU 342573) DO NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Turn ignition lock switch (1) counterclockwise to accessory. Using multimeter set to 30 vdc scale, place red probe on light switch "B" terminal (2) and black probe to cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, replace light switch (page 2-589).

b. If multimeter reads less than 11 vdc, repair purple wire between light switch "B" terminal (2) and wiring harness connector (4).

14. ALL LIGHTS EXCEPT STOPLIGHTS DO NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Turn ignition lock switch (1) counterclockwise to accessory. Using multimeter set to 30 vdc, place red probe on circuit breaker terminal (5) and black probe to cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, repair brown wire between circuit breaker terminal (5) and wiring harness connector (4) (page 2-137).

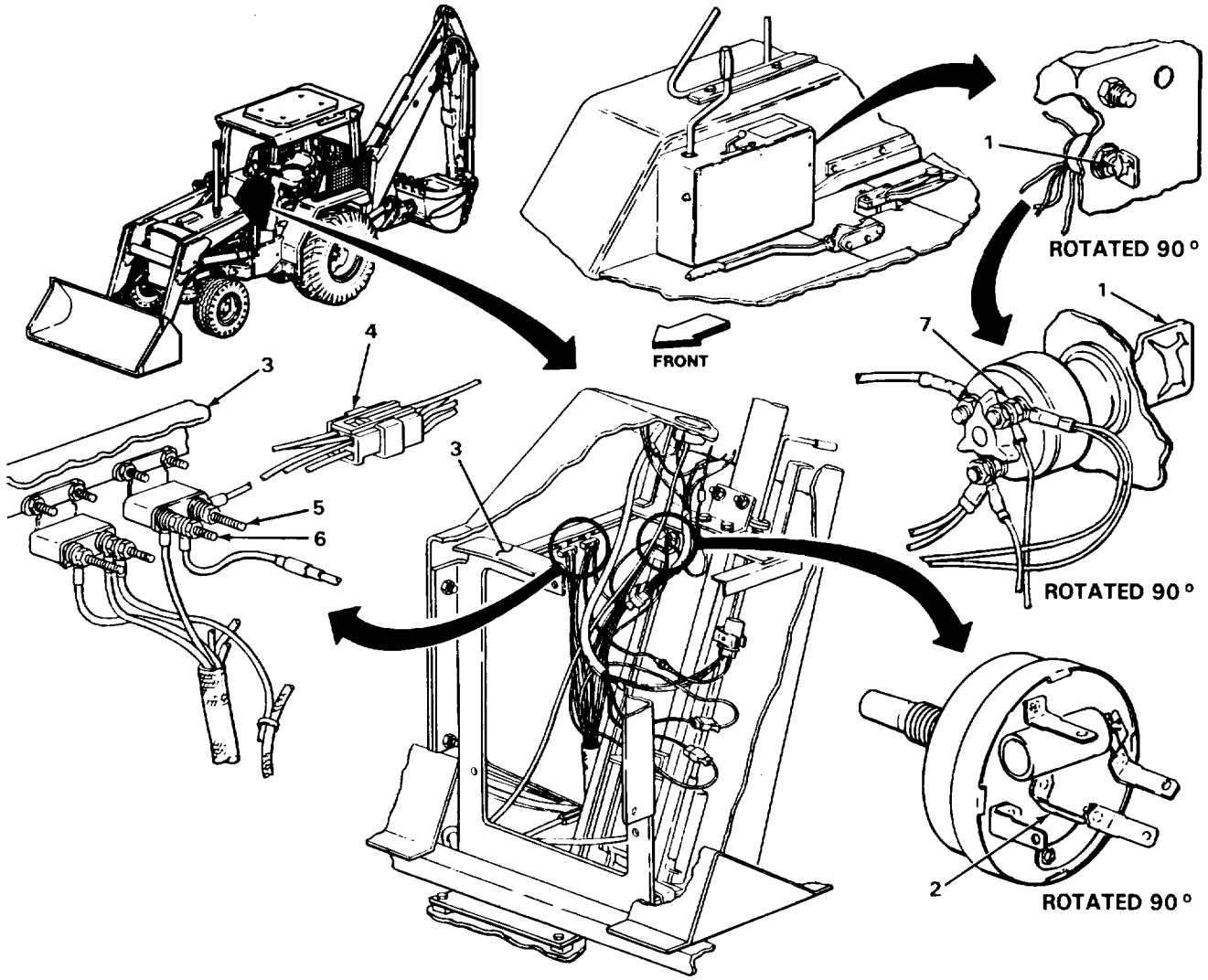
b. If multimeter reads less than 11 vdc, go to step 2.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Turn ignition lock switch (1) counterclockwise to accessory. Using multimeter set to 30 vdc scale, place red probe on circuit breaker terminal (6) and black probe on cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, replace circuit breaker (page 2-516).

b. If multimeter reads less than 11 vdc, repair red wire between circuit breaker terminal (6) and ignition lock switch JACC" terminal (7) (page 2-137).



TA242744

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

15. INSTRUMENT PANEL DASH LIGHT DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Check dash light (1) to see that it is tightly mounted.

a. If dash light (1) is tight, go to step 2.

b. If dash light (1) is loose, tighten nut (2) using 9/16inch open-end wrench.

Step 2. Pull cap (3) off of dash light (1). Push bulb (4) in, turn 1/4turn counterclockwise, and take out of dash light (1). Turn on service drive front and combination taillights (TM 5242022210). Using multimeter set to 30 vdc scale, place red probe on light positive terminal (5) and black probe on cowl support (6). Check for 11 to 13 vdc. Turn off service drive front and combination taillights (TM 5-2420-222-10).

a. If multimeter reads 11 to 13 vdc, place new bulb (4) into dash light (1), push down, and turn 1/4turn clockwise. Push cap (3) onto dash light (1).

b. If multimeter does not read 11 to 13 vdc, replace dash light (page 2-554).

16. ONE WARNING LIGHT DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Check to see that warning light (7) is tightly mounted.

a. If warning light (7) is tightly mounted, go to step 2.

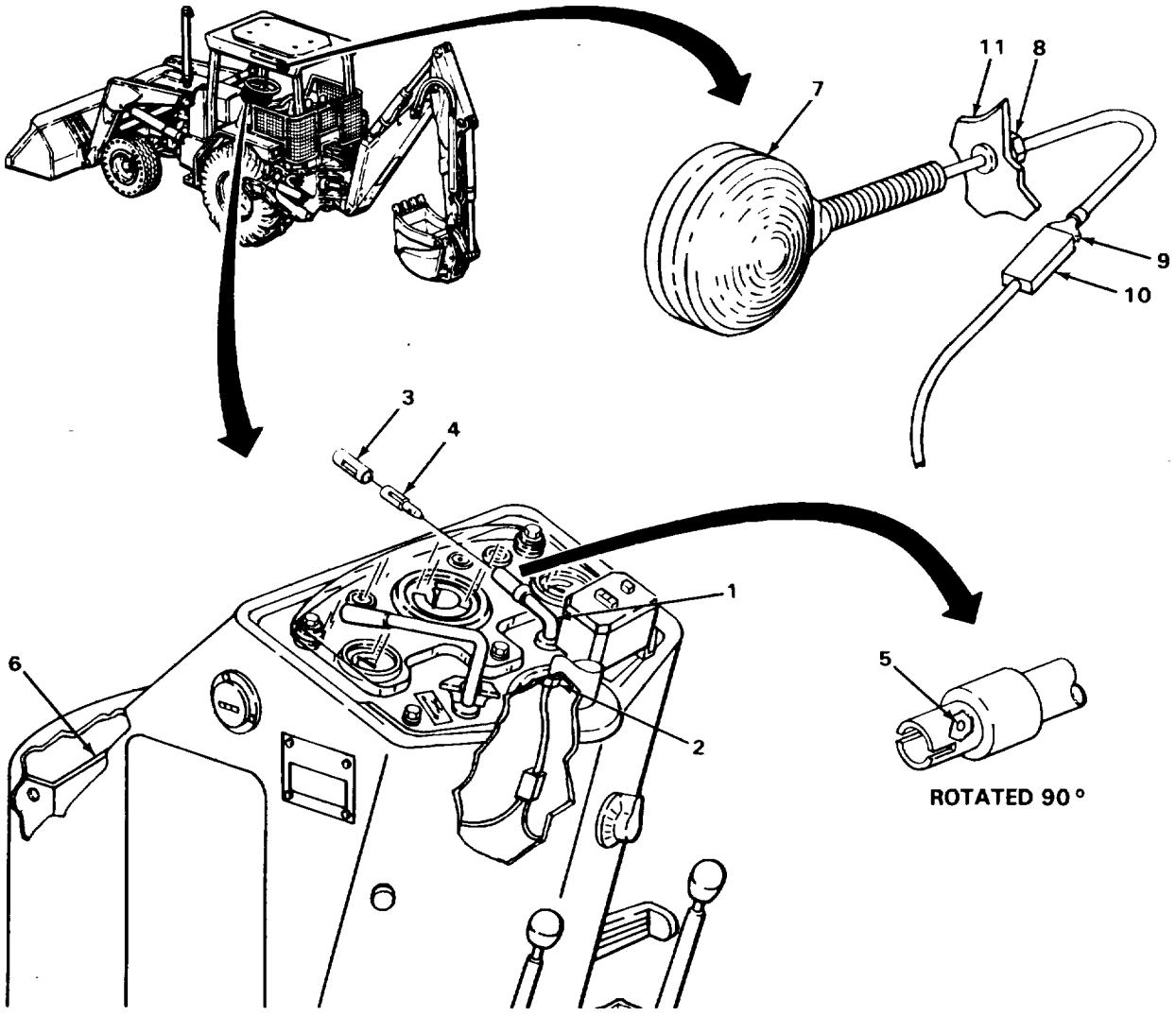
b. If warning light (7) is loose, tighten nut (8) using 9116-inch open-end wrench.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Pull black wire terminal (9) out of connector (10). Using multimeter set to RX1 scale, place red probe on black wire terminal (9) and black probe on canopy roof (11). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, plug terminal (9) into connector (10) and go to step 3.

b. If multimeter reads more than 0 ohm, go to step 5.



TA242745

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. ONE WARNING LIGHT DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 3. Pull warning light lead terminal (1) out of connector (2). Using multimeter set to RX1 scale, place red probe on warning light lead terminal (1) and black probe on fender (3). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 4.

b. If multimeter reads more than 0 ohm, replace warning light leads (page 2-766).

Step 4. If left warning light does not work, pull orange wire connector (4) out of white wire connector (5). If right warning light does not work, pull orange wire connector (6) out of yellow wire connector (7). Turn on emergency flashers (TM 5242022210). Using multimeter set to 30 vdc scale, place red probe on white or yellow wire connector terminal (8 or 9) and black probe on cowl support (10). Check for 11 to 13 vdc on multimeter. Turn off emergency flashers (TM 5-2420-222-10).

a. If multimeter reads 11 to 13 vdc, repair orange wire (page 2-137). Plug terminal (1) into connector (2). Plug Connector (4 or 6) into connector (5 or 7).

b. If multimeter reads less than 11 vdc, plug terminal (1) into connector (2) and replace turn signal switch (page 2-594).

Step 5. Disassemble warning lights (page 2626). Using multimeter set to RX1 scale, place red probe on lamp positive terminal (11) and black probe on lamp base (12). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 6.

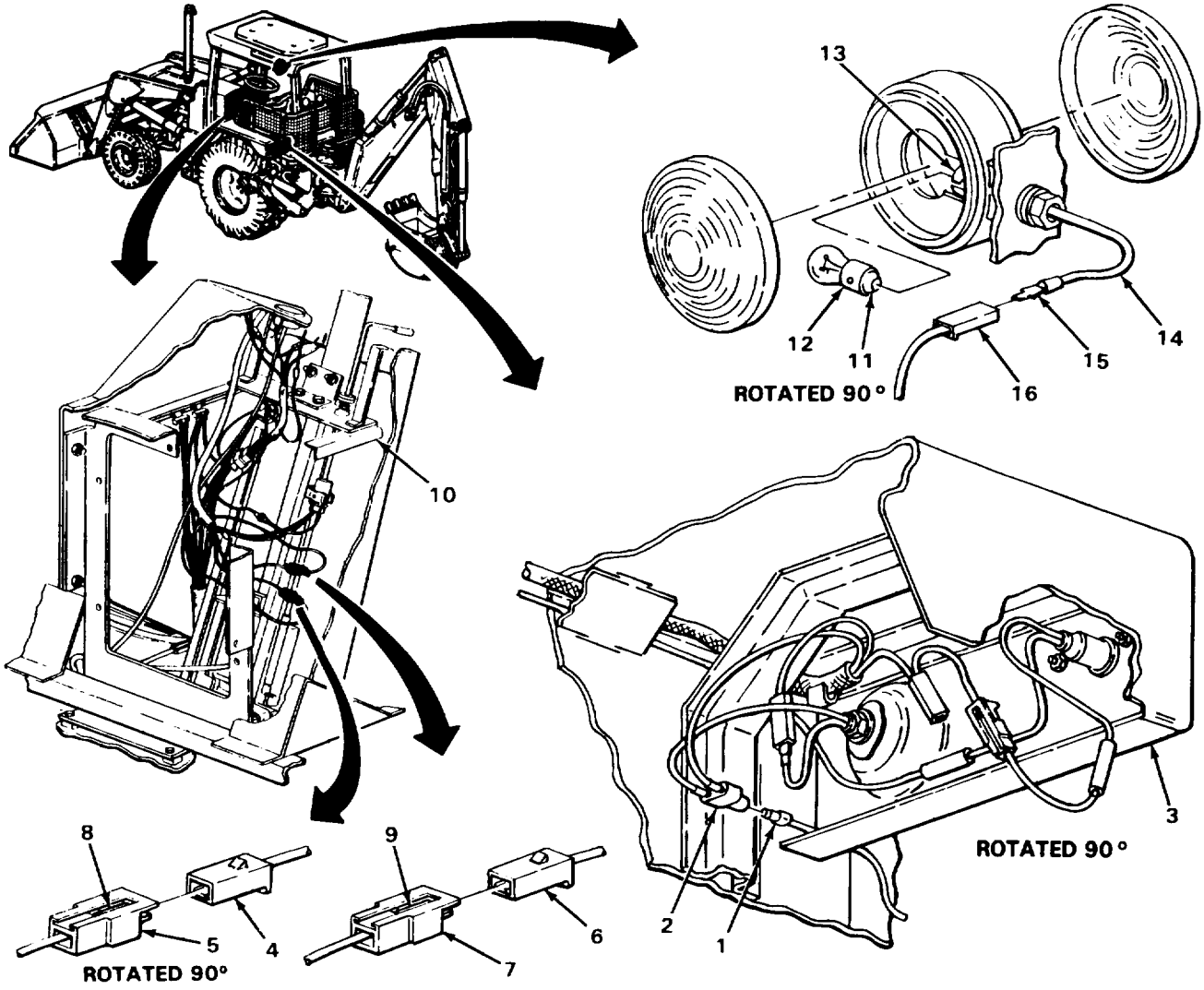
b. If multimeter reads more than 0 ohm, replace lamp and assemble warning light (page 2-626).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 6. Check warning light socket (13) and positive lead wire (14) for cracks, breaks, and corrosion.

a. If socket (13) or lead wire (14) are cracked or broken, replace warning light (page 2-626).

b. If socket (13) or lead wire (14) are corroded, clean using fine abrasive paper (item 20, Appendix C). Assemble warning light (page 2626). Plug black wire terminal (15) into connector (16).



TA242746

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

17. BOTH WARNING LIGHTS DO NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Test turn signal switch in-line fuse (page 2-602).

a. If fuse passes test or is not present, go to step 2.

b. If fuse fails test, replace turn signal switch in-line fuse (page 2-602).

Step 2. Turn on emergency flashers (TM 5242022210). Using multimeter set to 30 vdc scale, place red probe on blue wire terminal (1) and black probe on cowl support (2). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, turn off emergency flashers (TM 5-2420-222-10) and replace turn signal switch (page 2-594).

b. If multimeter reads less than 11 vdc, go to step 3.

Step 3. Using multimeter set to 30 vdc scale, place red probe on black wire terminal (3) and black probe on cowl support (2). Check for 11 to 13 vdc on multimeter. Turn off emergency flashers (TM 5-2420-222-10).

a. If multimeter reads 11 to 13 vdc, replace warning light flasher (page 2-657).

b. If multimeter reads less than 11 vdc, repair black wire (page 2-137).

18. ONE TURN SIGNAL DOES NOT WORK

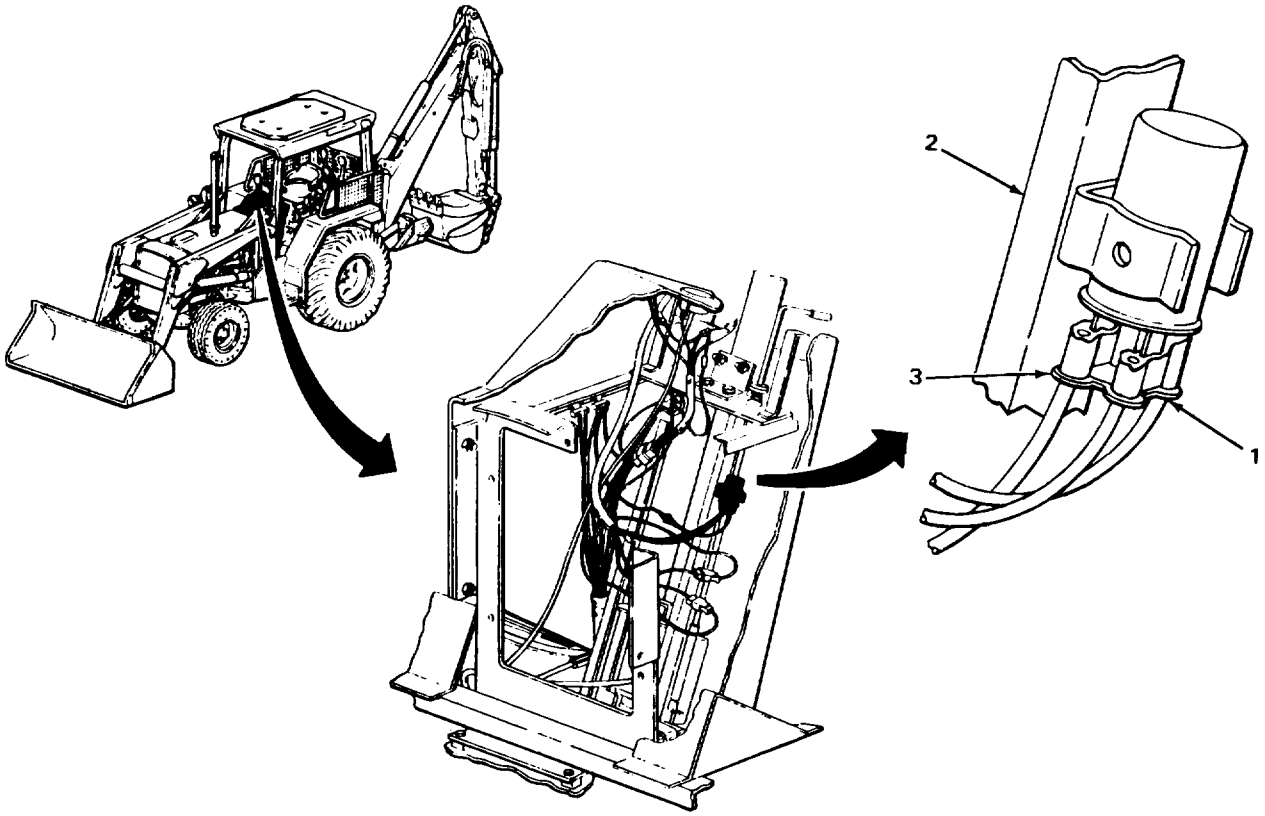
Check turn signal operation to see which light or lights do not work (TM 5-2420-222-10).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If warning light does not work, go to Electrical Malfunction 16: One Warning Light Does Not Work (page 2-78).

b. If combination tail and floodlight taillight on loader backhoes with Serial Numbers 319995 thru 342573 does not work, go to Electrical Malfunction 5: One Combination Tail and Floodlight Taillight Does Not Work (page 2-78).

c. If combination tail and floodlight taillight, and warning light on loader backhoes with Serial Numbers 319995 thru 342573 do not work, go to Electrical Malfunction 16: One Warning Light Does Not Work (page 2-78).



TA242747

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

19. LOW ENGINE OIL PRESSURE INDICATOR LIGHT DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull connector (1) off of terminal (2). Using multimeter set to RX1 scale, place red probe on terminal (3) and black probe on cowl support (4). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 2.

b. If multimeter reads more than 0 ohm, go to step 4.

Step 2. Remove indicator light (page 2550). Using multimeter set to RX1 scale, place red probe on bulb positive terminal (5) and black probe on bulb base (6). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 3.

b. If multimeter reads more than 0 ohm, replace bulb and install indicator light (page 2-550).

Step 3. Check light lead (7) for cracks, breaks, and corrosion.

a. If light lead (7) is cracked or broken, replace it. Install indicator light (page 2-550).

b. If light lead (7) is corroded, clean using fine abrasive paper (item 20, Appendix C). Install indicator light (page 2-550).

c. If light lead (7) is not cracked, broken, or corroded, repair pink wire in cowl wiring harness (page 2-137). Install indicator light (page 2-550).

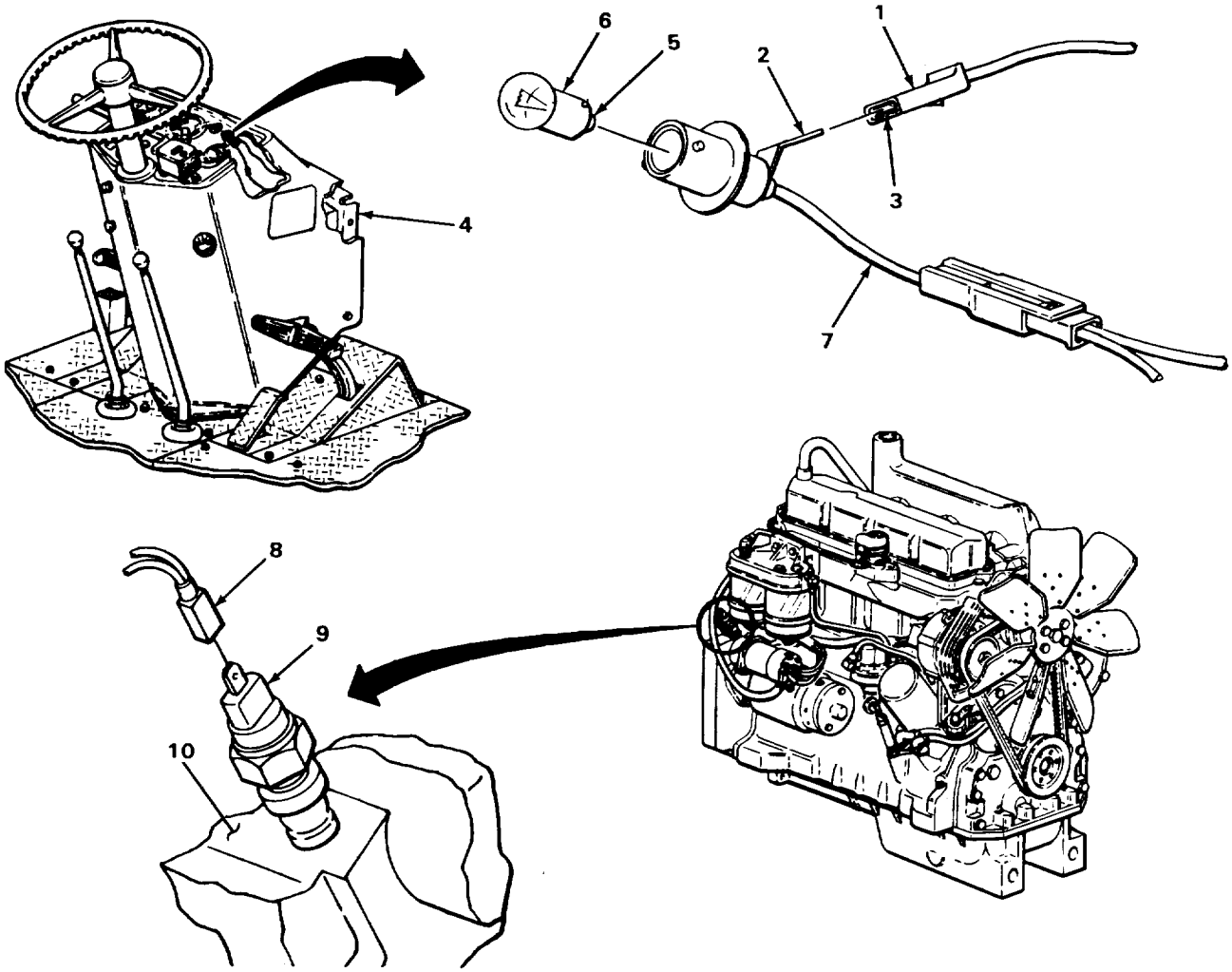
Step 4. Pull connector (8) off of terminal (9). Using multimeter set to RX1 scale, place red probe on terminal (9) and black probe on flywheel housing (10). Check for 0 ohm on multimeter.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If multimeter reads 0 ohm, plug connector (8) onto terminal (9) and go to step 5.

b. If multimeter reads more than 0 ohm, replace engine oil pressure switch (page 2-468).



TA242748

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

19. LOW ENGINE OIL PRESSURE INDICATOR LIGHT DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 5. Pull connector (1) off of connector (2). Using multimeter set to RX1 scale, place red probe on green wire terminal (3) and black probe on cowl support (4). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair green wire in cowl wiring harness (page 2-137). Plug connector (2) into connector (1).

b. If multimeter reads more than 0 ohm, repair green wire in main and front light wiring harness (page 2-137). Plug connector (2) into connector (1).

20. AC GENERATOR INDICATOR LIGHT DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Pull connector (5) off of terminal (6). Using multimeter set to RX1 scale, place red probe on terminal (7) and black probe on cowl support (4). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 2.

b. If multimeter reads more than 0 ohm, plug connector (5) onto terminal (6) and go to step 4.

Step 2. Remove Indicator light (page 2550). Using multimeter set to RX1 scale, place red probe on bulb positive terminal (8) and black probe on bulb base (9). Check for 0 ohm on multimeter.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If multimeter reads 0 ohm, go to step 3.

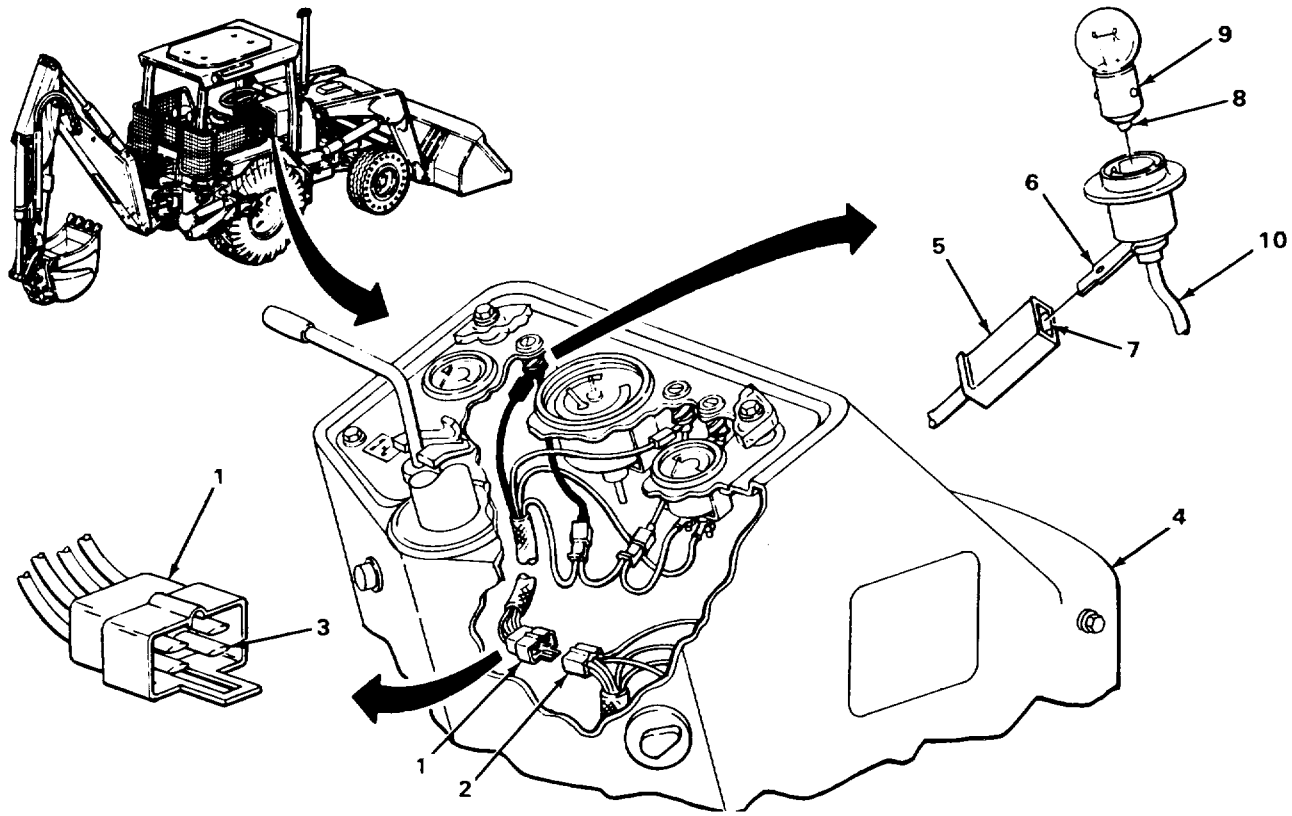
b. If multimeter reads more than 0 ohm, replace bulb and install indicator light (page 2-550).

Step 3. Check light lead (10) for cracks, breaks, and corrosion.

a. If light lead (10) is cracked or broken, replace it and install indicator light (page 2-550).

b. If light lead (10) is corroded, clean using fine abrasive paper (item 20, Appendix C). Install indicator light (page 2-550).

c. If light lead (10) is not cracked, broken, or corroded, repair pink wire in cowl wiring harness (page 2-137). Install indicator light (page 2-436).



TA242749

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

20. AC GENERATOR INDICATOR LIGHT DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 4. Pull connector (1) off of connector (2). Using multimeter set to RX1 scale, place red probe on orange wire terminal (3) and black probe on cowl support (4). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, replace voltage regulator (page 2-452).

b. If multimeter reads more than 0 ohm, plug connector (2) into connector (1) and go to step 5.

Step 5. Pull connector (5) off of connector (6). Using multimeter set to RX1 scale, place red probe on terminal (7) and black probe on cowl support (4). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair orange wire in main and front light wiring harness (page 2137). Plug connector (6) into connector (5).

b. If multimeter reads more than 0 ohm, repair orange wire In cowl wiring harness (page 2137). Plug connector (6) into connector (5).

21. AC GENERATOR LIGHT STAYS ON AFTER ENGINE IS STARTED

Go to Electrical System Malfunction 1 " Batteries Will Not Hold a Charge, steps 2 thru 8 (page 2-60).

22. FUEL LEVEL GAGE DOES NOT INDICATE PROPERLY

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

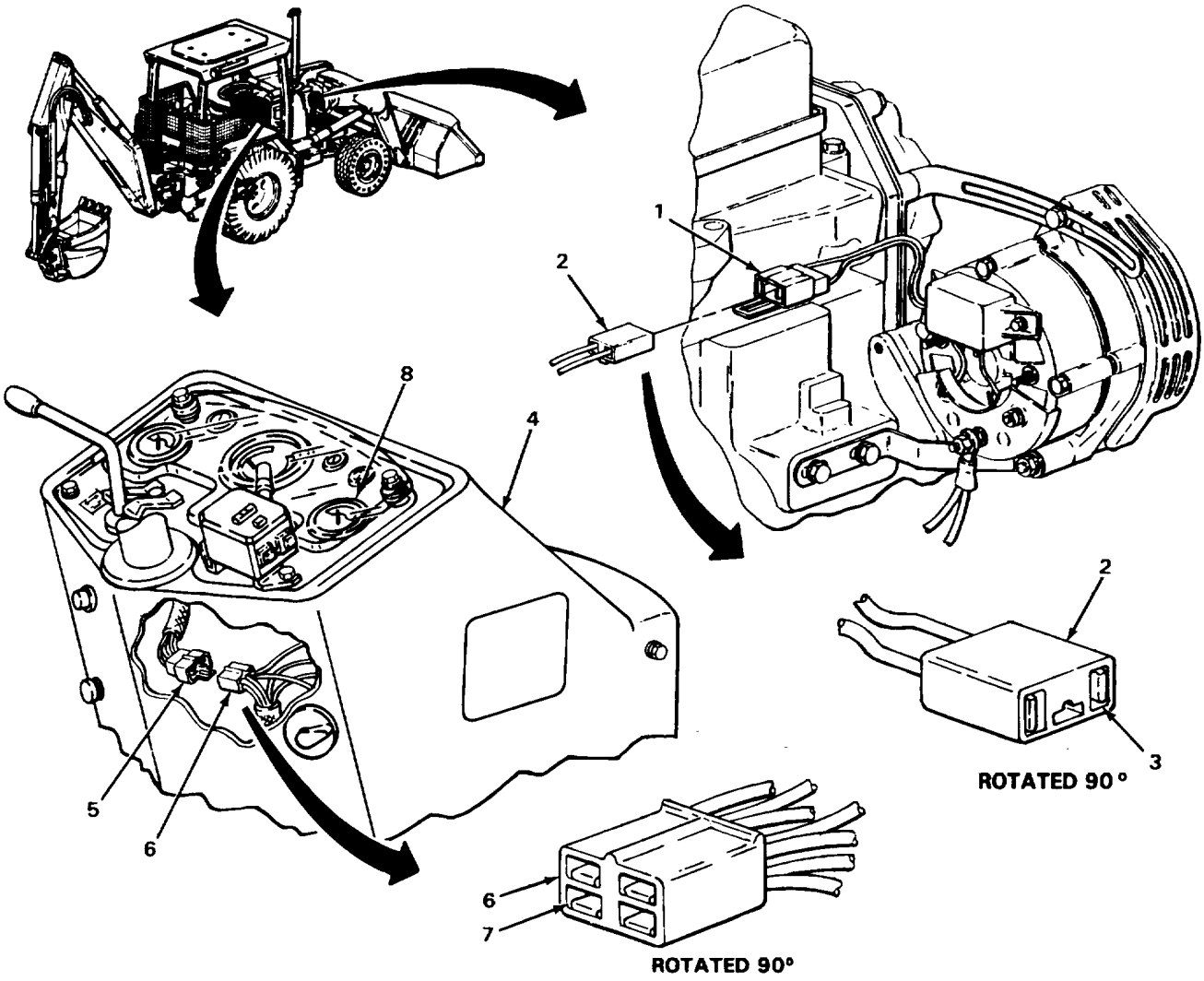
ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 1. Check fuel level gage operation (TM 5-2420-222-10).

a. If fuel level gage (8) always reads full, go to step 2.

b. If fuel level gage (8) always reads empty, go to step 5.



TA242750

22. FUEL LEVEL GAGE DOES NOT INDICATE PROPERLY - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 2. Using 114inch flat-tip screwdriver, loosen screw (1) and take off terminal (2). Turn ignition lock switch (3) counterclockwise to accessory. Note reading on fuel level gage (4). Turn ignition lock switch (3) clockwise to off.

a. If fuel level gage (4) reads empty, replace fuel gage sender (page 2-662).

b. If fuel level gage (4) reads full, place terminal (2) in position and tighten screw (1) using 1/4inch flat-tip screwdriver. Go to step 3.

Step 3. Pull connector (5) off of connector (6). Turn ignition lock-switch (3) counterclockwise to accessory. Note reading on fuel level gage (4). Turn ignition lock switch (3) clockwise to off.

a. If fuel level gage (4) reads empty, repair black wire in main and front light wiring harness (page 2137). Plug connector (6) into connector (5).

b. If fuel level gage (4) reads full, plug connector (6) into connector (5) and go to step 4.

Step 4. Using 318inch open-end wrench, unscrew and take nut (7) and lockwasher (8) off of terminal (9). Take terminal (10) off of terminal (9). Turn ignition lock switch (3) counterclockwise to accessory. Note reading on fuel level gage (4). Turn ignition lock switch (3) clockwise to off.

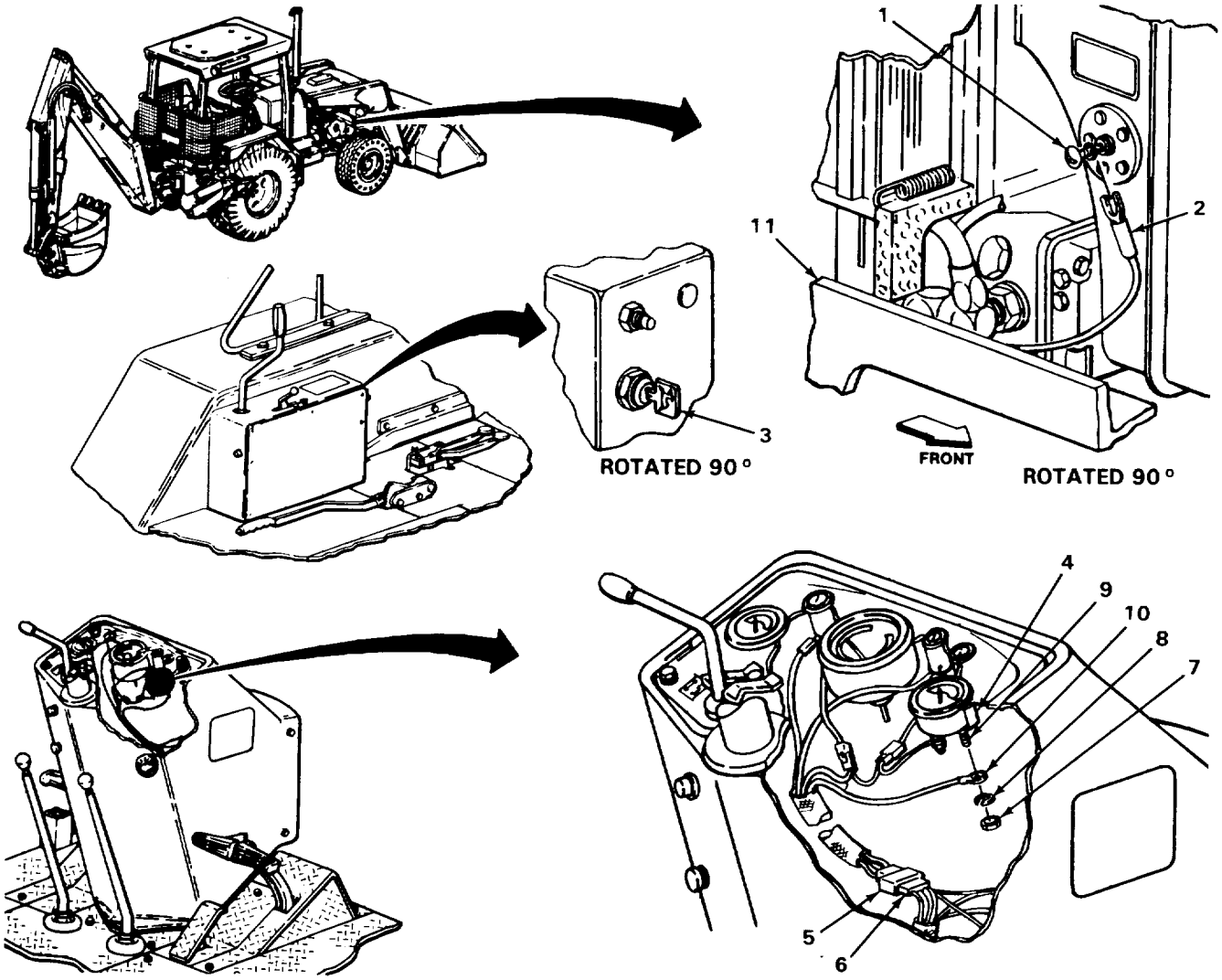
a. If fuel level gage reads empty, repair black wire in cowl wiring harness. Place terminal (10) on terminal (9). Screw on nut (7) and new lockwasher (8) onto terminal (9) and tighten using 318inch open-end wrench.

b. If fuel level gage reads full, replace (page 2-539).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 5. Using 1/4-inch flat-tip screwdriver, loosen screw (1) and take off terminal (2). Turn ignition lock switch (3) counterclockwise to accessory. Have assistant touch terminal (2) against front support (11) for a few seconds. Note reading on fuel level gage (4). Turn ignition lock switch (3) clockwise to off.



MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

22. FUEL LEVEL GAGE DOES NOT INDICATE PROPERLY - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

a. If fuel level gage (1) reads full, replace fuel gage sender (page 2-662).

b. If fuel level gage (1) reads empty, place terminal (2) in position and tighten screw (3) using 1/4-inch flat-tip screwdriver.

Step 6. Turn ignition lock switch (4) counterclockwise to accessory. Using multimeter set to 30 vdc scale, place red probe on fuel level gage pink wire terminal (5) and black probe on cowl support (6). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (4) clockwise to off.

a. If multimeter reads 11 to 13 vdc, go to step 7.

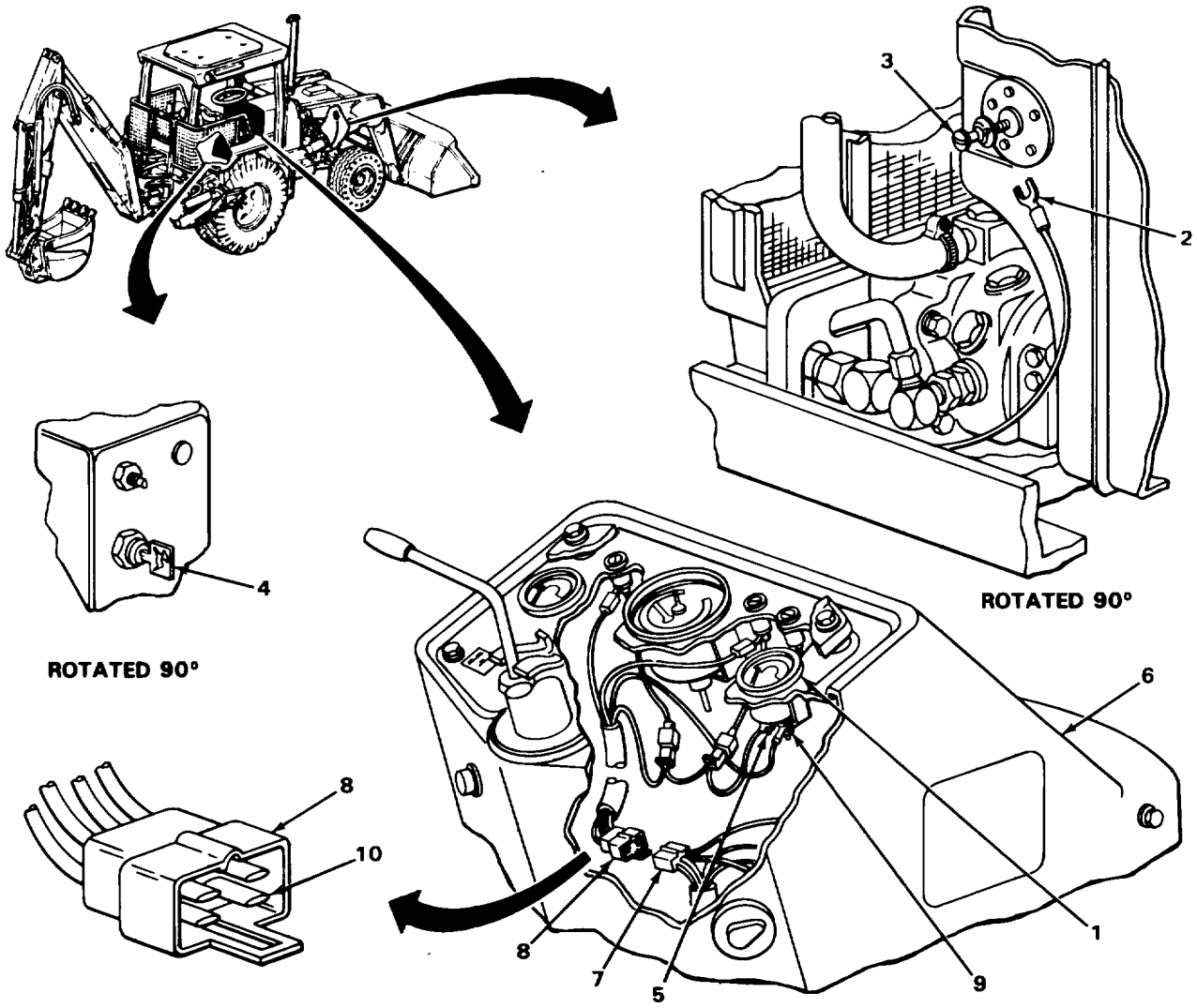
b. If multimeter reads less than 11 vdc, repair pink wire in cowl wiring harness (page 2-137).

Step 7. Pull connector (7) out of connector (8). using multimeter set to R x 1 scale, place red probe on fuel level gage black wire terminal (9) and black probe to black wire terminal (10). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair black wire in main and front light wiring harness. Plug connector (7) into connector (8).

b. If multimeter reads more than 0 ohm, repair black wire in cowl wiring harness (page 2-137). Plug connector (7) into connector (8).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

23. TIME TOTAL METER DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Using multimeter set to R x 1 scale, place red probe on time total meter black wire terminal (1) and black probe on cowl support (2). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 2.

b. If multimeter reads more than 0 ohm on loader backhoes with Serial Numbers 235786 thru 235999, replace time total meter lead (page 2-510).

c. If multimeter reads more than 0 ohm on loader backhoe with Serial Numbers 319995 thru 342573, repair black wire between time total meter terminal (1) and connector (3) (page 2-137).

Step 2. Turn ignition lock switch (4) clockwise to ignition. Using multimeter set to 30 vdc scale, place red probe on time total meter orange wire terminal (5) and cowl support (2). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (4) counterclockwise to off.

a. If multimeter reads 11 to 13 vdc, replace time total meter (page 2-510).

b. If multimeter reads less than 11 vdc, repair orange wire in main and front light wiring harness (page 2-137).

24. PARKING BRAKE WARNING LIGHT ON LOADER BACKHOES WITH SERIAL NUMBERS 319995 THRU 342573 DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting' shocked and prevent damage to parts and equipment.

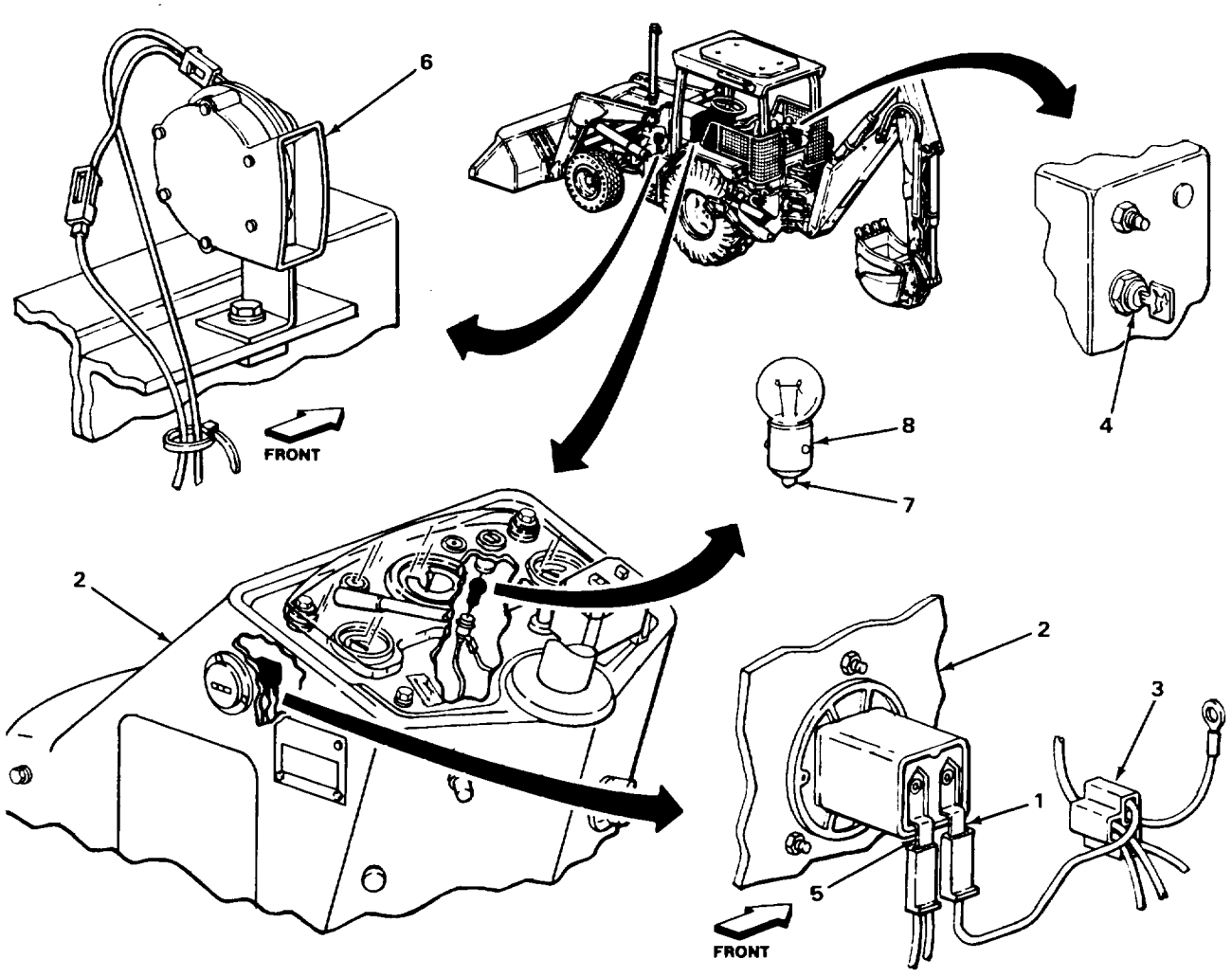
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 1. Start engine and shift transmission into any gear except neutral (TM 5-2420222-10). Listen for parking brake horn (6) to sound. Shut down engine (TM 5-2420-222-10).

a. If horn (6) sounded, go to step 2.

b. If horn (6) did not sound, go to Electrical Malfunction 25: Parking Brake Horn On Loader Backhoes With Serial Numbers 319995 thru 342573 Does Not Work (page 2-96).

Step 2. Remove parking brake indicator light (page 2-550). Using multimeter set to R x 1 scale, place red probe on bulb positive terminal (7) and black probe on bulb base (8). Check for 0 ohm on multimeter.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

24. PARKING BRAKE WARNING LIGHT ON LOADER BACKHOES WITH SERIAL NUMBER 319995 THRU 342573 DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

a. If multimeter reads 0 ohm, go to step 3.

b. If multimeter reads more than 0 ohm, replace bulb and install indicator light (page 2-550).

Step 3. Check indicator light lead (1) for cracks, breaks, and corrosion.

a. If lead (1) is cracked or broken, replace and install indicator light (page 2-550).

b. If lead (1) is corroded, clean with fine abrasive paper (item 20, Appendix C) and install indicator light (page 2-500).

c. If lead is not cracked, broken, or corroded, replace parking brake warning light ground wire (Serial Numbers 319995 thru 342573 only) (page 2-500).

25. PARKING BRAKE HORN ON LOADER BACKHOES WITH SERIAL NUMBERS 319995 THRU 342573 DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Operate electric horn (TM 5-2420-222-10).

a. If horn (2) sounds, go to step 2.

b. If horn (2) does not sound, replace (page 2-668).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. tart engine and shift transmission into any gear except neutral (TM 5-2420-222-10). Check to see if parking brake warning light (3) works. Shut down engine (TM 5-2420-222-10).

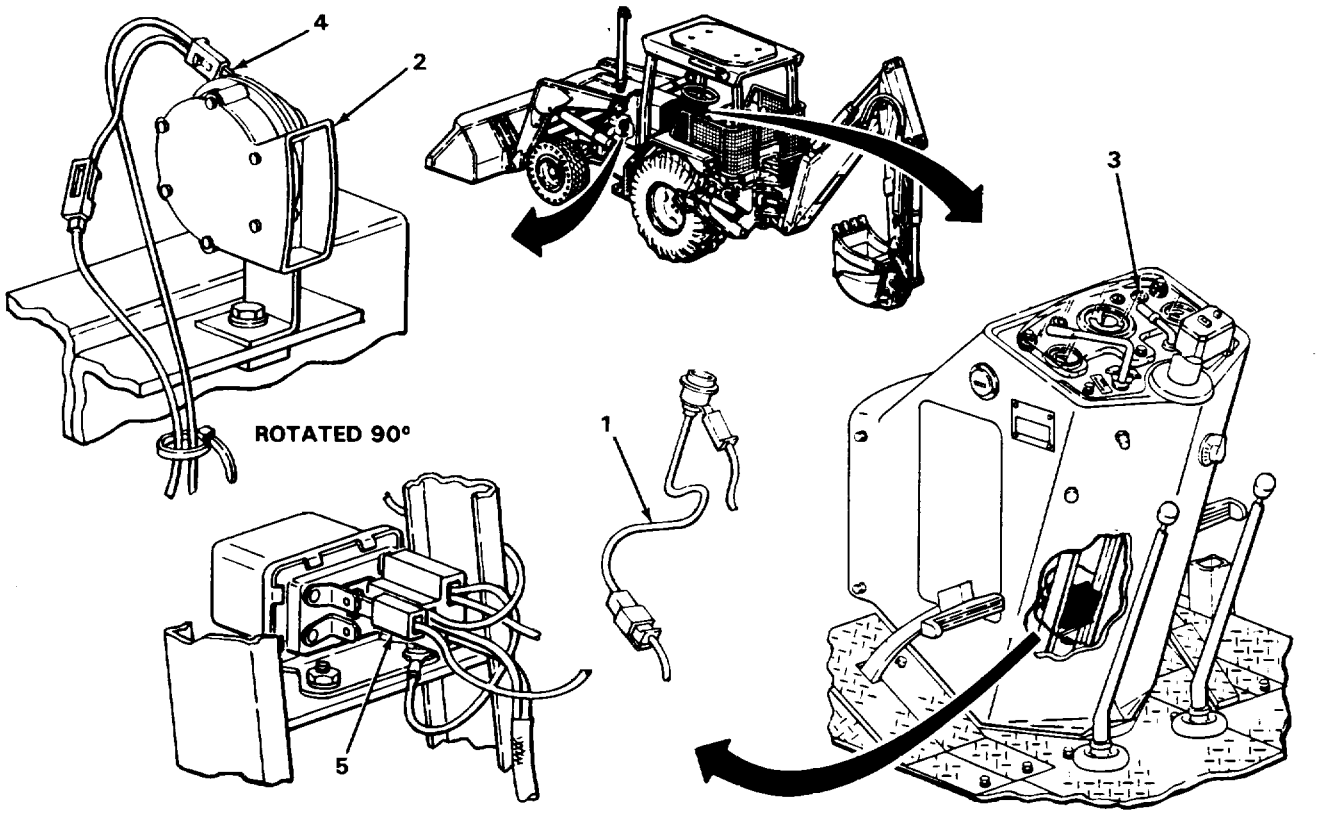
a. f light (3) works, go to step 3.

b. f light (3) does not work, go to step 4.

Step 3. sing multimeter set to RX1 scale, place red probe on electric horn brown wire terminal (4) and black probe on parking brake warning light brown wire terminal (5). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, replace parking brake horn relay (Serial Numbers 319995 thru 342573 only) (page 2-489).

b. If multimeter reads more than 0 ohm, replace parking brake horn-to-relay lead (Serial Numbers 319995 thru 342573 only) (page 2-505).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

25. PARKING BRAKE HORN ON LOADER BACKHOES WITH SERIAL NUMBERS 319995 THRU 342573 DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 4. Apply parking brake (TM 5-2420-222-10). Using multimeter set to RX1 scale, place red probe on parking brake warning switch terminal (1) and black probe on parking brake warning switch terminal (2). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, repair orange wire in parking brake wiring harness (page 2-137).

b. If multimeter reads more than 0 ohm, adjust or replace parking brake warning switch (Serial Numbers 319995 thru 342573 only) (page 2-482).

26. ELECTRIC HORN DOES NOT WORK

WARNING

Although Ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 1. Check to see if electric horn (3) and bracket (4) are tightly mounted.

a. If horn (3) and bracket (4) are tightly mounted, go to step 2.

b. If horn (3) is loose, turn clockwise until tight.

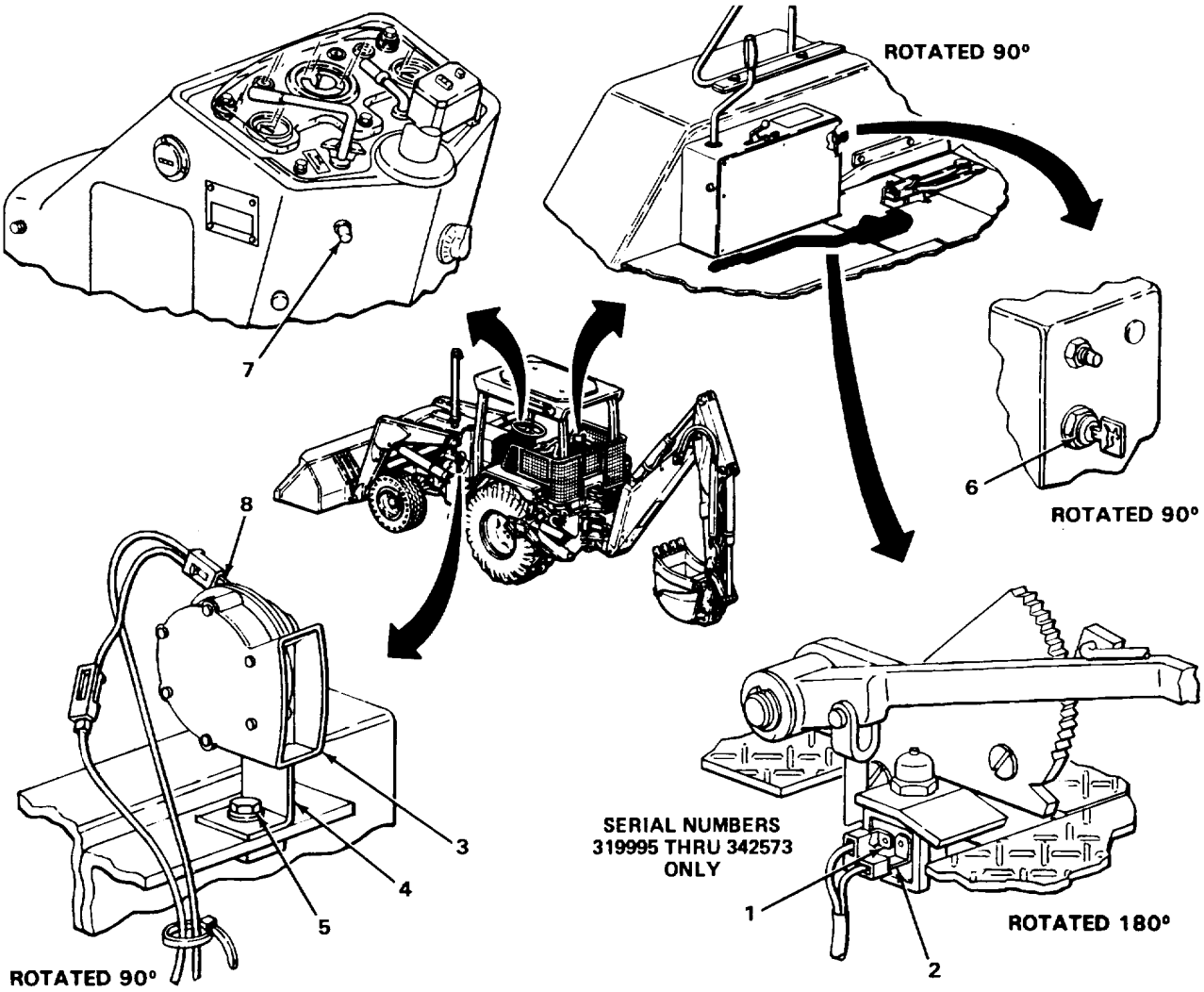
c. If bracket (4) is loose, tighten screw (5) using 9/16-inch open-end wrench.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Turn ignition lock switch (6) counterclockwise to accessory. While assistant presses horn switch (7) for a few seconds, using multimeter set to 30 vdc scale, place red probe on horn terminal (8) and black probe on bracket (4). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (6) clockwise to off.

a. If multimeter reads 11 to 13 vdc, replace electric horn (page 2-668).

b. If multimeter reads less than 11 vdc, go to step 3.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

26. ELECTRIC HORN DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 3. Turn ignition lock switch (1) counterclockwise to accessory. Using multimeter set to 30 vdc scale, place red probe on horn switch terminal (2) and black probe on cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, go to step 4.

b. If multimeter reads less than 11 vdc, repair purple wire in main and front light wiring harness (page 2-137).

Step 4. Turn ignition lock switch (1) counterclockwise to accessory. While assistant presses horn switch (4) for a few seconds, using multimeter set to 30 vdc scale, place red probe on horn switch terminal (5) and black probe on cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, replace horn switch (page 2-672).

b. If multimeter reads less than 11 vdc on loader backhoes with Serial Numbers 235786 thru 235999, repair black wire in horn wiring harness (page 2-137).

c. If multimeter reads less than 11 vdc on loader backhoes with Serial Numbers 319995 thru 342573, repair brown wire In main and front lights wiring harness (page 2-137).

27. CIGAR LIGHTER DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 1. Check circuit breaker (6) to see if it needs to be reset by inserting a 4-inch piece of non-electrical wire, (item 35, Appendix C), into hole in rear of circuit breaker (6).

a. Resetting circuit breaker (6) corrects the problem.

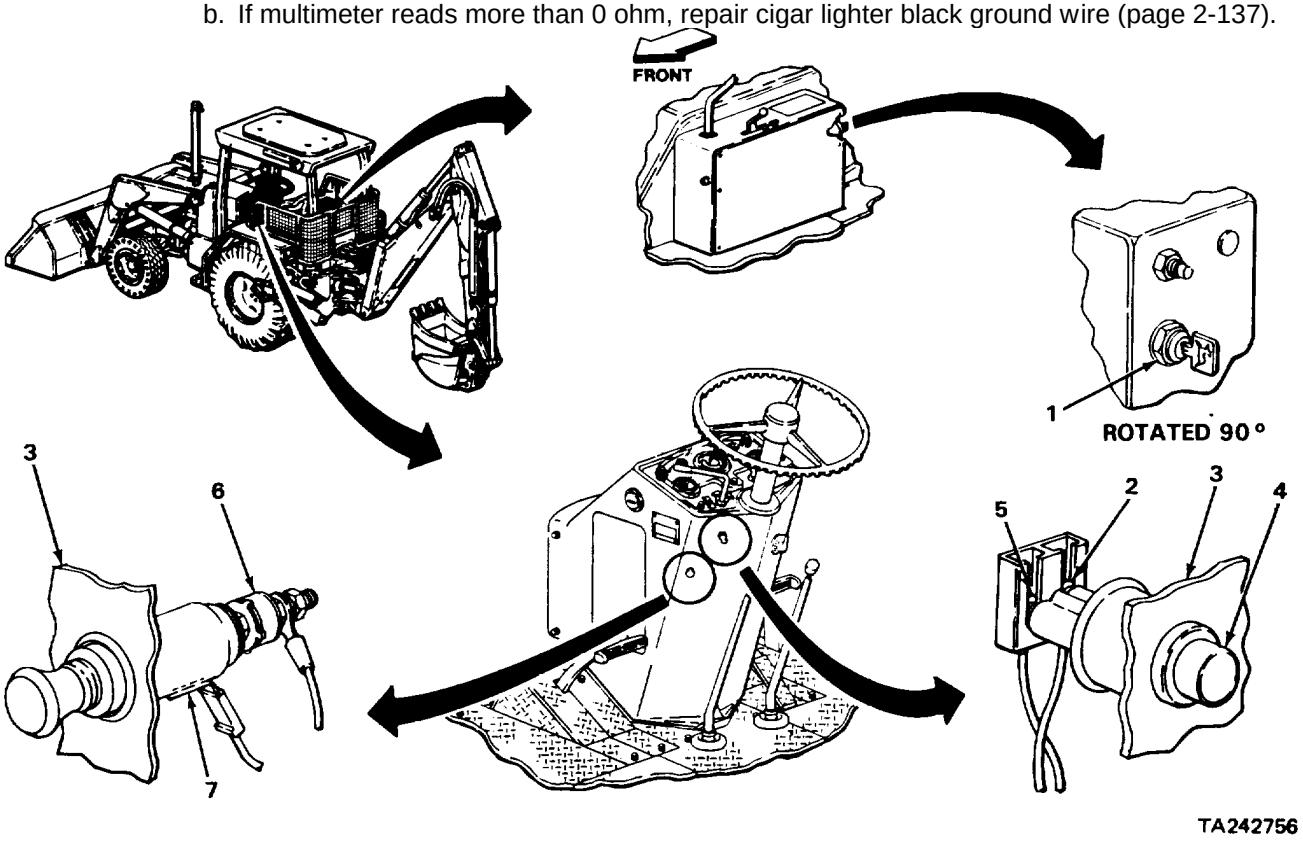
b. If circuit breaker (6) does not need to be reset, go to step 2.

c. If circuit breaker (6) cannot be reset, replace cigar lighter (page 2-619).

Step 2. Using multimeter set to RX1 scale, place black probe on cigar lighter ground terminal (7) and black probe on cowl support (3). Check for 0 ohm on multimeter.

a. If multimeter reads 0 ohm, go to step 3.

b. If multimeter reads more than 0 ohm, repair cigar lighter black ground wire (page 2-137).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

27. CIGAR LIGHTER DOES NOT WORK - CONTINUED

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Step 3. Turn ignition lock switch (1) counterclockwise to accessory. Using multimeter set to 30 vdc scale, place red probe on cigar lighter lead terminal (2) and black probe on cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, go to step 4.

b. If multimeter reads less than 11 vdc on loader backhoes with Serial Numbers 235786 thru 235999, repair cigar lighter black lead wire (page 2-137).

c. If multimeter reads less than 11 vdc on loader backhoes with Serial Numbers 319995 thru 342573, repair cigar lighter purple lead wire (page 2-137).

Step 4. Turn ignition lock switch (1) counterclockwise to accessory. Pull cigar lighter element (4) out of cigar lighter (5). Using multimeter set to 30 vdc scale, place red probe on cigar lighter center contact (6) and black probe on cowl support (3). Check for 11 to 13 vdc on multimeter. Turn ignition lock switch (1) clockwise to off.

a. If multimeter reads 11 to 13 vdc, replace element (4) and push it back into cigar lighter (5).

b. If multimeter reads less than 11 vdc, replace cigar lighter (page 2-619).

28. REVERSE WARNING ALARM DOES NOT WORK

WARNING

Although ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 1. Check to see that reverse warning alarm (7) is tightly mounted.

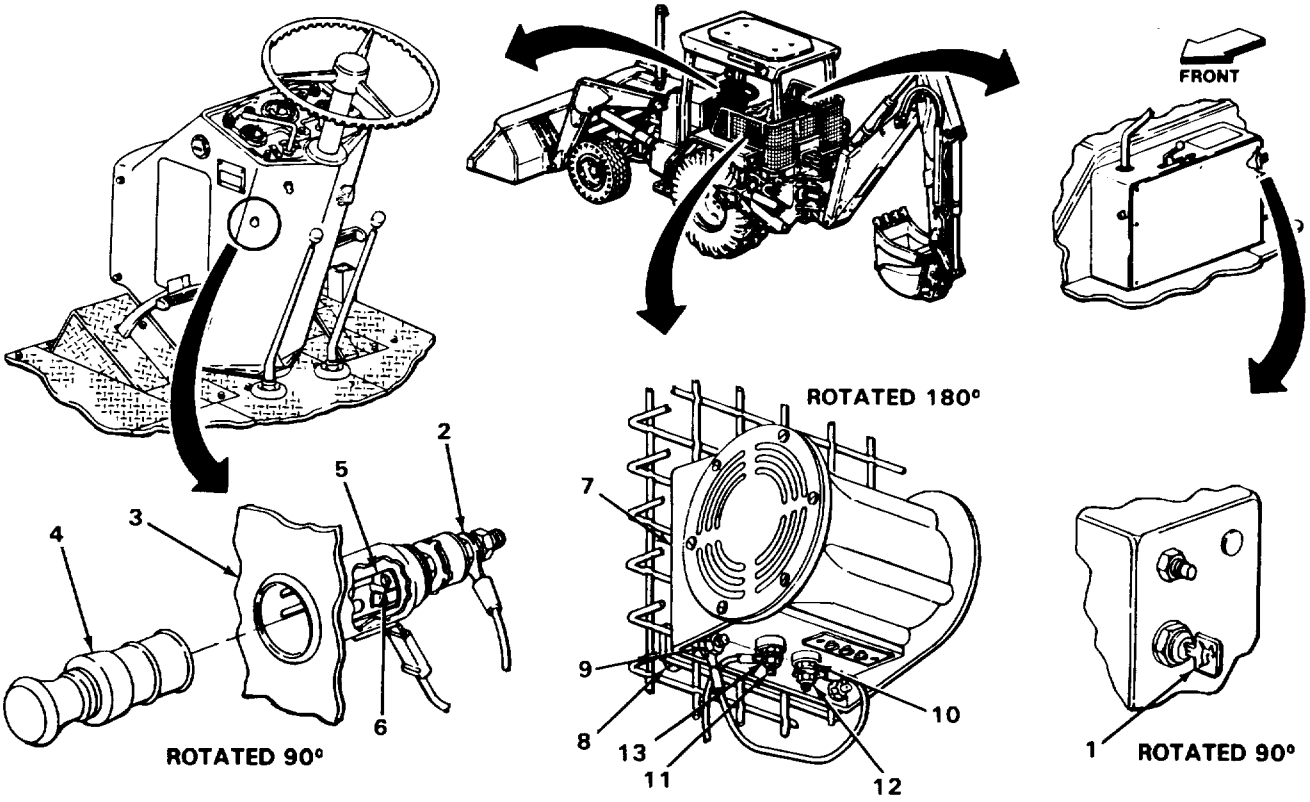
a. If alarm (7) is tightly mounted, go to step 2.

b. If alarm (7) is loose, tighten four screws (8) and four nuts (9) using 1/2-inch, 3/8-inch drive socket, ratchet handle, and 1/2-inch open-end wrench.

Step 2. Check reverse warning alarm terminals (10 and 11) for loose, frayed, corroded, or broken connections.

a. If connections at terminals (10 and 11) are not loose, frayed, corroded, or broken, go to step 3.

b. If connection at terminal (10 or 11) is loose, tighten nut (12 or 13) using 318-inch box wrench.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. REVERSE WARNING ALARM DOES NOT WORK - CONTINUED

WARNING

Although Ignition lock switch must be on and battery ground cable connected to test electrical circuit voltage, turn off ignition lock switch and disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

c. If connection at terminal (1 or 2) is corroded, clean using wire brush.

d. If connection at terminal (1) is frayed or broken, repair reverse warning alarm ground wire assembly (page 2-137).

e. If connection at terminal (2) is frayed or broken repair black wire in warning alarm wiring harness (page 2-137).

Step 3. Connect jumper wire between reverse warning alarm sensitive switch terminals (3 and 4). Listen for reverse warning alarm (5) to sound. Disconnect jumper wire from reverse warning alarm sensitive switch terminals (3 and 4).

a. If alarm (5) does not sound, go to step 4.

b. If alarm (5) sounds, replace reverse warning alarm sensitive switch (page 2-677).

Step 4. Using multimeter set to 30 vdc scale, place red probe on reverse warning alarm sensitive switch terminal (3) and black probe on reverse valve housing (6). Check for 11 to 13 vdc on multimeter.

a. If multimeter reads 11 to 13 vdc, go to step 5.

b. If multimeter reads less than 11 vdc, repair brown wire in warning alarm wiring harness (page 2-137).

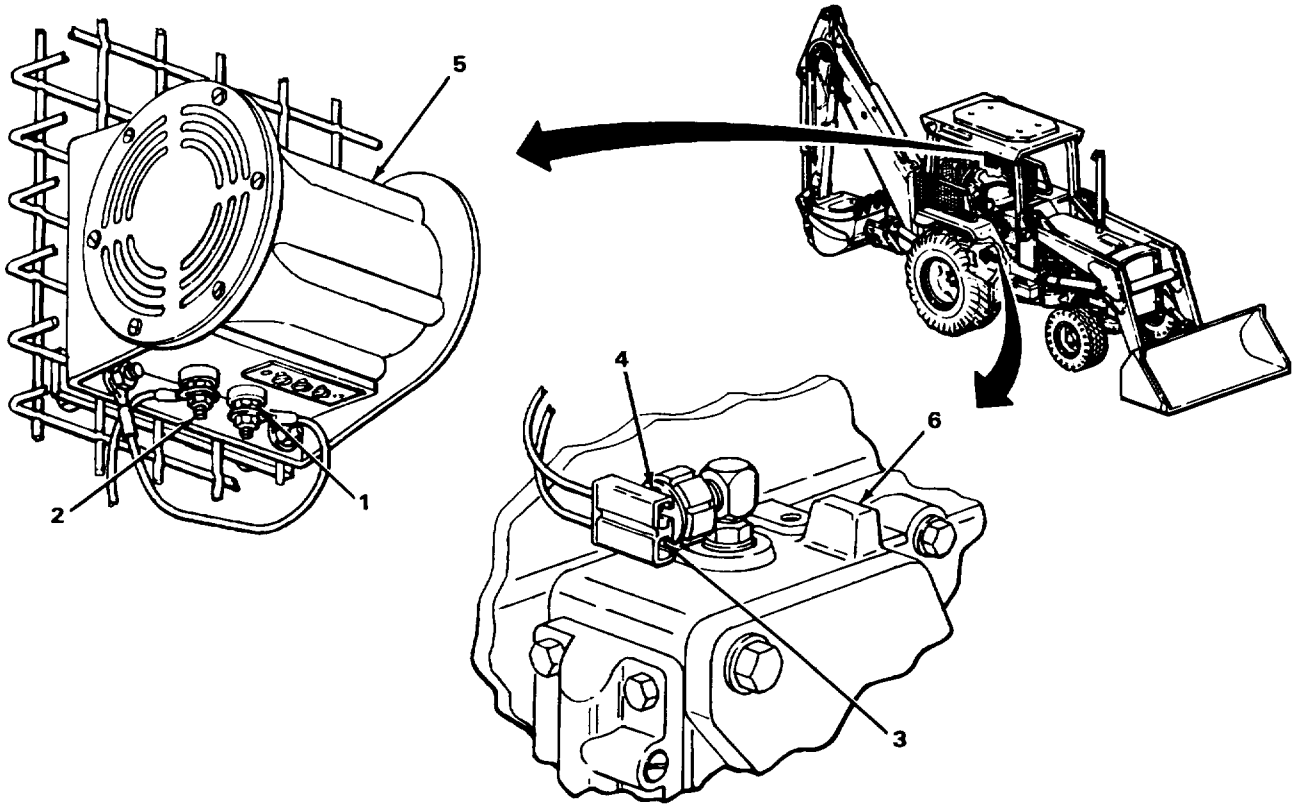
Step 5. Connect jumper wire between reverse warning alarm sensitive switch terminals (3 and 4). Using multimeter set to 30 vdc scale, place red probe on reverse warning alarm terminal (2) and black probe on reverse warning alarm terminal (1). Check for 11 to 13 vdc on multimeter. Disconnect jumper wire from reverse warning alarm sensitive switch terminals (3 and 4).

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If multimeter reads 11 to 13 vdc, replace reverse warning alarm (page 2482).

b. If multimeter reads less than 11 vdc, repair black wire in warning alarm wiring harness (page 2-137).



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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSMISSION

1. TRANSMISSION HAS EXCESSIVE GEAR CLASH WHEN SHIFTING

Check to see if transmission is being properly shifted (TM 5-2420-222-10).

a. If transmission is being shifted too fast, shift properly (TM 5-2420-222-10).

b. If transmission is being shifted correctly, go to Clutch, Malfunction 1: Clutch Slips (page 2-58).

2. TRANSMISSION SHIFTS TOO FAST OR TOO SLOW

Check speed of shift adjustment (page 2-834).

a. If speed of shift is improperly adjusted, adjust (page 2-834).

b. If speed of shift cannot be properly adjusted, notify Direct Support Maintenance.

3. TRASMISSION GEARS FAIL TO STOP WHEN CLUTCH PEDAL IS DEPRESSED

Go to Clutch Malfunction 1: Clutch Slips (page 2-58).

4. TRANSMISSION SLIPS UNDER LOAD

Step 1. Check speed gear assembly (reverser) control lever linkage adjustment (page 2-815).

a. If control lever linkage is bent or binding, replace (page 2-815).

b. If control lever linkage is improperly adjusted, adjust (page 2-815).

c. If control lever is not bent, binding, or imporperly adjusted, go to step 2.

Step 2. Check clutch pedal linkage adjustment (page 2-186).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If clutch pedal linkage is bent or binding, replace (page 2-186).

b. If clutch pedal linkage is improperly adjusted, adjust (page 2-186).

c. If clutch pedal linkage is not bent, binding, or Improperly adjusted, go to step 3.

Step 3. Go to Transmission Malfunction 2: Transmission Shifts Too Fast Or Too Slow (page 2-106).

BRAKES

1. ONE BRAKE DOES NOT WORK

Step 1. Check for air in system, contaminated fluid, and restrictions in hydraulic lines by bleeding hydraulic brake system (page 2-870).

a. Bleeding procedure removes air from brake system.

b. If air cannot be removed from system, or if fluid is contaminated, notify Direct Support Maintenance.

c. If there is poor or no fluid flow, go to step 2.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ONE BRAKE DOES NOT WORK - CONTINUED

Step 2. Check left (1) or right (2) service brake line for dents or kinks.

a. If left service brake line (1) is dented or kinked, replace (page 2-884).

b. If right service brake line (2) is dented or kinded, replace (page 2-879).

c. If left (1) or right (2) service brake line is not kinked or dented, notify Direct Support Maintenance.

2. BOTH BRAKES DO NOT WORK

Check for air in system, contaminated fluid, and restrictions in hydraulic lines by bleeding hydraulic brake system (page 2-870).

a. Bleeding procedure removes air from brake system.

b. If air cannot be removed from system, or if fluid is contaminated, notify Direct Support Maintenance.

3. BRAKES DRAGGING OR RUNNING HOT

Check service brake pedals adjustment (page 2-891).

a. If service brake pedals are improperly adjusted, adjust (page 2-891).

b. If service brake pedals are properly adjusted, notify Direct Support Maintenance.

4. EITHER BRAKE PEDAL MOVES MORE THAN 1-INCH (25.4 mm) WHEN PUSHED FOR ONE MINUTE AFTER INITIAL APPLICATION

Step 1. Check left (1) and right (2) service brake lines and fittings for external leakage.

a. If left brake line and fittings are leaking, repair (page 2-884).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. If right brake line and fittings are leaking, repair (page 2-879).

c. If left (1) and right (2) service brake lines and fittings are not leaking, **go** to step 2.

Step 2. Check for air in system, contaminated fluid, and restrictions in hydraulic lines by bleeding hydraulic brake system (page 2-870).

a. Bleeding procedure removes air from brake systems.

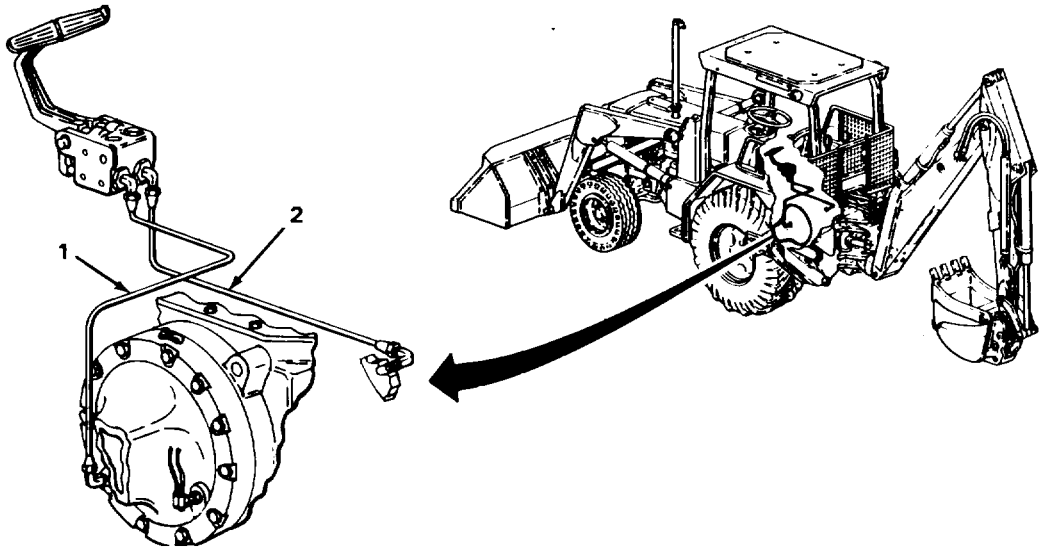
b. If air cannot be removed from system, or if fluid is contaminated, notify Direct Support Maintenance.

c. If no air is found in system, go to step 3.

Step 3. Go to Brake Malfunction 3: Brakes Dragging Or Running Hot (page 2-108).

5. BRAKES CHATTER

Go to Brake Malfunction 4: Either Brake Pedal Moves More Than l-Inch (25.4 mm) When Pushed For One Minute After Initial Application (page 2-108).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. PARKING BRAKE DOES NOT WORK

Check parking brake adjustment (page 2-867).

a. If parking brake lever or linkage is bent or broken, replace (page 24855).

b. If parking brake Is not properly adjusted, adjust (page 2-867).

c. If parking brake cannot be adjusted, notify Direct Support Maintenance.

STEERING

1. LOADER BACKHOE IS HARD TO STEER

Step 1. Check hydraulic system fluid level at transmission (TM 52420-222-10) and look for contaminated fluid on dipperstick.

a. If fluid is not contaminated, go to step 2.

b. If fluid is contaminated, notify Direct Support Maintenance.

Step 2. Check steering oil lines (1, 2, 3 and 4) for sharp bends, dents or kinks.

a. If steering oil lines (1, 2, 3 and 4) are not bent, dented, or kinked, go to step 3.

b. If steering valve oil line (1 or 2) is bent, dented, or kinked, replace (page 2-968).

c. If accumulator tee-to-steering valve oil line (3) is bent, dented, or kinked, replace (page 2-978).

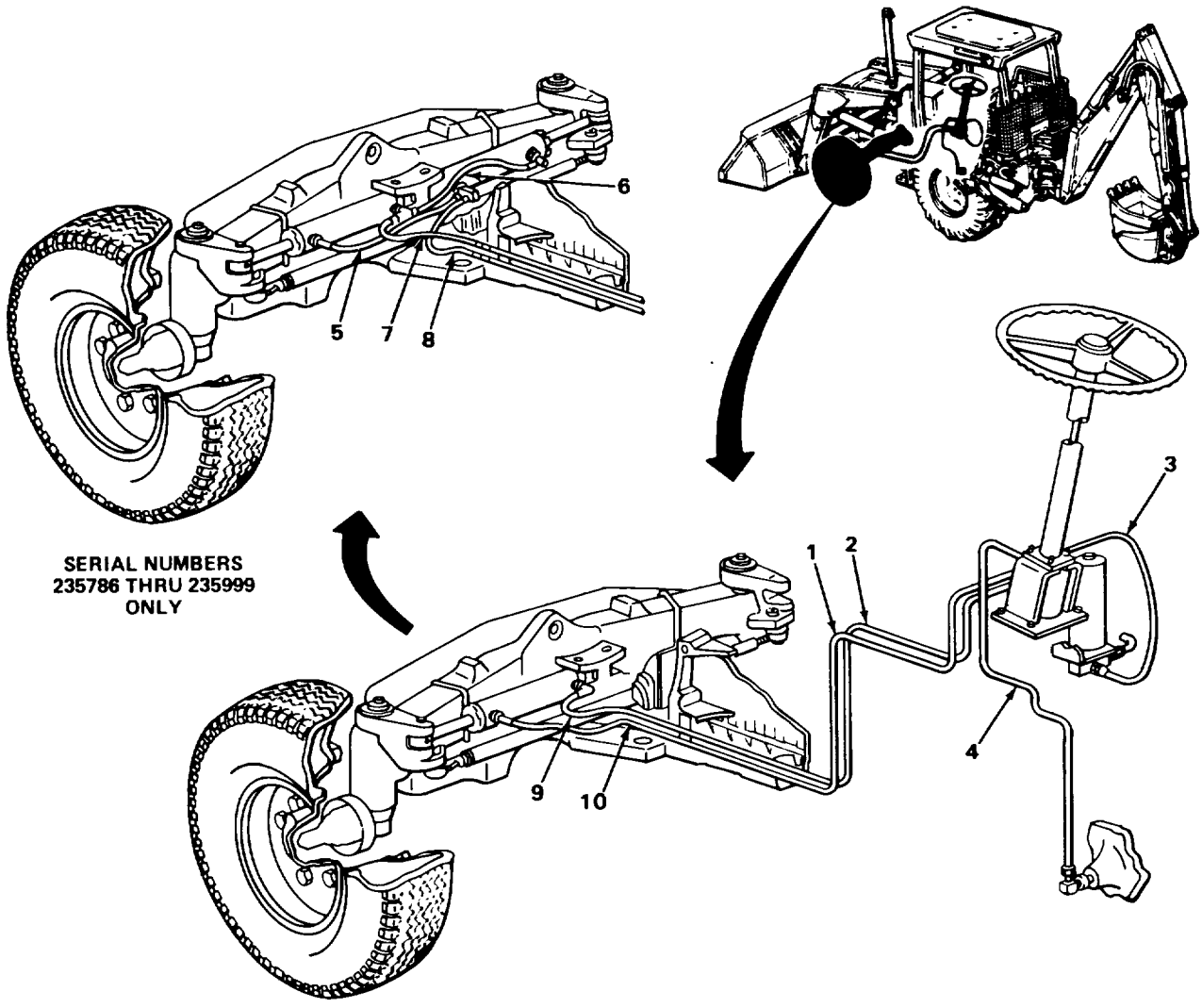
d. If steering valve-to-transmission return oil line (4) is bent, dented, or kinked, replace (page 2-986).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Check steering oil hoses (5, 6, 7 and 8,) or (9 and 10) for sharp bends or kinks.

a. If steering oil hoses (5, 6, 7 and 8) or (9 and 10) are not bent sharply or kinked, go to step 4.

b. If special elbow-to-left steering cylinder oil hose (Serial Numbers 235786 thru 235999 only) (5) is bent sharply or kinked, reroute or replace (page 2-950).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. LOADER BACKHOE IS HARD TO STEER - CONTINUED

c. If tee-to-right steering cylinder oil hose (Serial Number 235786 thru 235999 only) (1) is bent sharply or kinked, reroute or replace (page 2-958).

d. If steering valve oil line-to-left steering cylinder oil hose (Serial Numbers 235786 thru 235999 only) (2) is bent sharply or kinked, reroute or replace (page 2-954).

e. If steering valve oil line-to-right steering cylinder oil hose (Serial Numbers 235786 thru 235999 only) (3) is bent sharply or kinked, reroute or replace (page 2-944).

f. If steering valve oil lines-to-steering cylinder oil hoses (Serial Numbers 319995 thru 342573 only) (4 or 5) is bent sharply or kinked reroute or replace (page 2-963).

Step 4. Replace check valve as outlined in accumulator tee-to-steering valve oil line (page 2-978).

a. If new check valve corrects problem, get rid of old check valve.

b. If new check valve does not correct problem, notify Direct Support Maintenance.

2. LOADER BACKHOE DOES NOT TURN IN EITHER DIRECTION

Go to Steering System Malfunction 1: Loader Backhoe Is Hard To Steer (page 2-110).

3. WHEELS TURN IN OPPOSITE DIRECTION THAT STEERING WHEEL IS TURNED

Check hoses (2 and 3) or (4 and 5) for correct connections at steering valve oil lines (6 and 7).

a. If hoses are reversed, connect as outlined in steering valve oil lines (page 2-968).

b. If hose are correctly connected, notify Direct Support Maintenance.

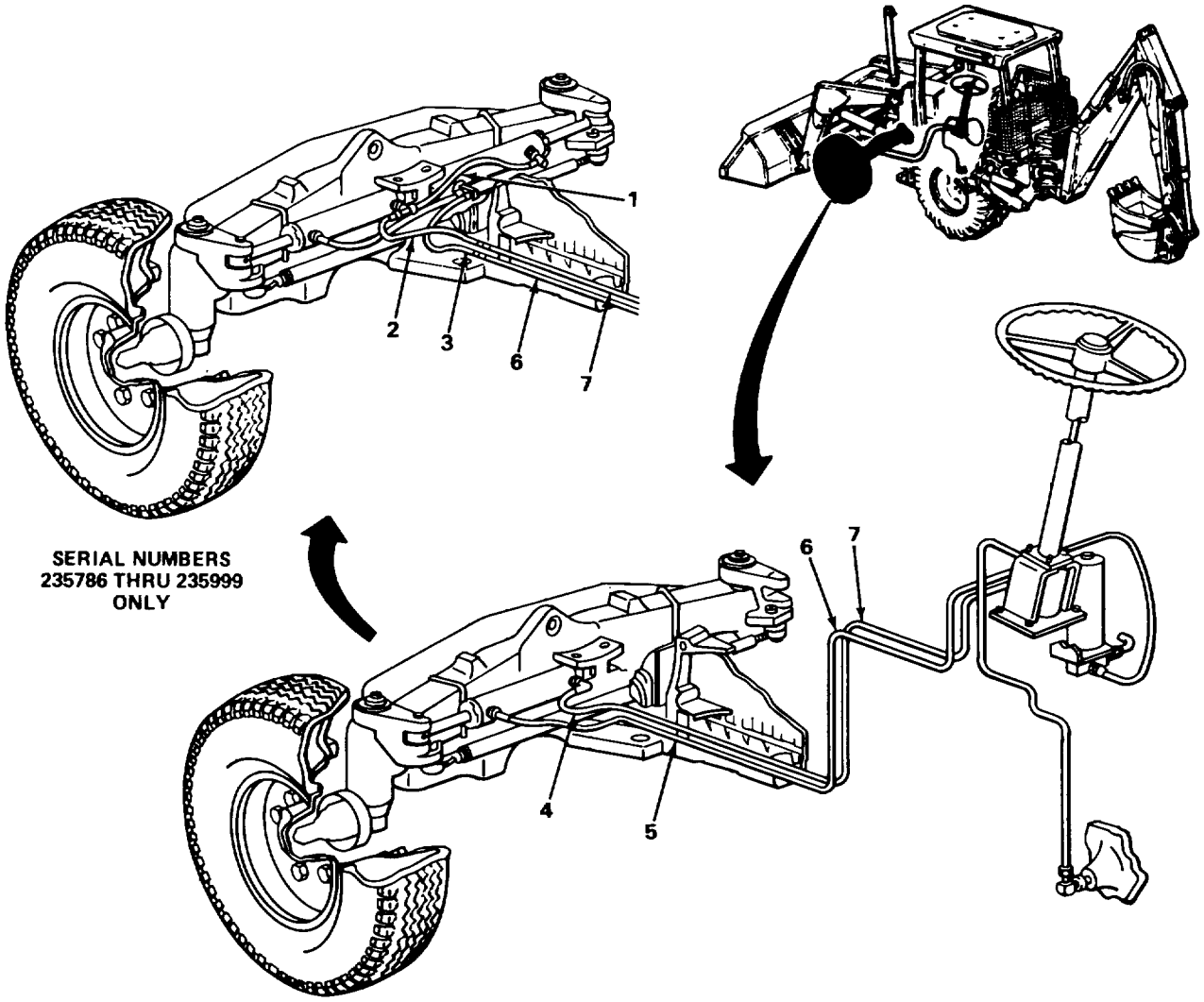
4. STEERING WHEEL KICKS WHEN WHEELS ARE TURNED

Replace check valve as outlined in accumulator tee-to-steering valve oil line (page 2-978).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If new check valve corrects problem, get rid of old check valve.

b. If new check valve does not correct problem, notify Direct Support Maintenance.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM

CAUTION

When Serial Number ranges are given, be sure to use proper parts for replacement. Although parts for both configurations may appear to be interchangeable, they may function differently. Use of wrong parts could cause equipment failure and serious damage.

1. HYDRAULIC SYSTEM DOES NOT WORK

Step 1. Remove and inspect hydraulic oil filter (page 2-1698) and pump stroke control valve filter element (page 2-1196).

a. If filter elements are not dirty, damaged, or clogged, install hydraulic oil filter (page 2-1698) and pump stroke control valve filter element (page 2-1196) and go to step 2.

b. If hydraulic oil filter element is dirty, damaged, or clogged, replace (page 2-1698).

c. If pump stroke control valve filter element is damaged or clogged, replace (page 2-1196).

d. If pump stroke control valve filter element is dirty, clean and install (page 2-1196).

Step 2. Check hydraulic pump-to-pressure control valve oil line (1) for sharp bends, dents, or kinks.

a. If hydraulic pump-to-pressure control valve oil line (1) has sharp bend, dent, or kink, replace (page 2-1375).

b. If hydraulic pump-to-pressure control valve oil line (1) does not have sharp bend, dent, or kink, go to step 3.

Step 3. Check pressure control valve adjustment (page 2-1200).

a. If pressure control valve is not properly adjusted, adjust (page 2-1200).

b. If pressure control valve cannot be adjusted, replace (page 2-1200).

c. If pressure control valve is properly adjusted, notify Direct Support Maintenance.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. HYDRAULIC OILTEMPERATURE TOO HIGH

Step 1. Check hand throttle lever and cable adjustment (page 2-311).

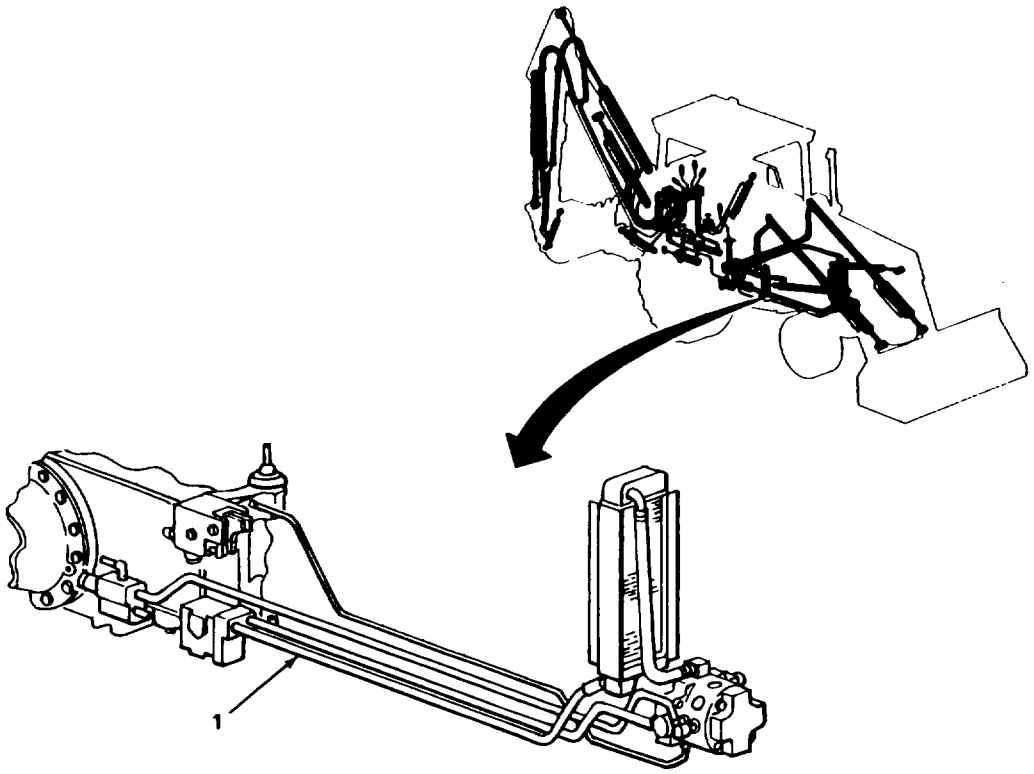
a. If hand throttle lever and cable are properly adjusted, go to step 2.

b. If hand throttle lever and cable are not properly adjusted, adjust (page 2-311).

Step 2. Replace hydraulic oil cooler (page 2-841).

a. If new hydraulic oil cooler corrects problem, get rid of old hydraulic oil cooler.

b. If new hydraulic oil cooler does not correct problem, notify Direct Support Maintenance.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. CYLINDER MOVEMENT IS SLOW

Go to Hydraulic System Malfjunction 1: Hydraulic System Does Not Work (page 2-114).

4. HYDRAULIC OIL FOAMS

Check clutch control valve-to-hydraulic pump inlet oil line (1) for loose connections and damage.

a. If clutch control valve-to-hydraulic pump inlet oil line (1) is loose or damaged, tighten or replace parts as outlined in clutch control valve-to-hydraulic pump inlet oil line (page 2-1352) and hydraulic oil filter relief valve-to-clutch control valve adapter oil line (page 2-1346).

b. If clutch control valve-to-hydraulic pump inlet oil line (1) is properly connected and not damaged, notify Direct Support Maintenance.

5. LOADER CONTROLVALVE HANDLE STICKS OR BINDS

Check loader control valve handle and linkage adjustment (page 2-1324).

a. If loader control valve handle and linkage is properly adjusted without sticking or binding, replace loader control valve (page 2-1285).

b. If loader control valve handle and linkage is sticking or binding, adjust or replace defective parts as needed (page 2-1324).

6. BACKHOE CONTROL VALVE LEVERS STICK OR BIND

Check backhoe control valve levers and linkage by doing the following: Using long roundnose pliers straighten ends of cotter pins (2) and take them out of pins (3) securing linkage in question. Take pins (3) out of spool devises (4) and connector links (5). Check linkage for sticking or binding.

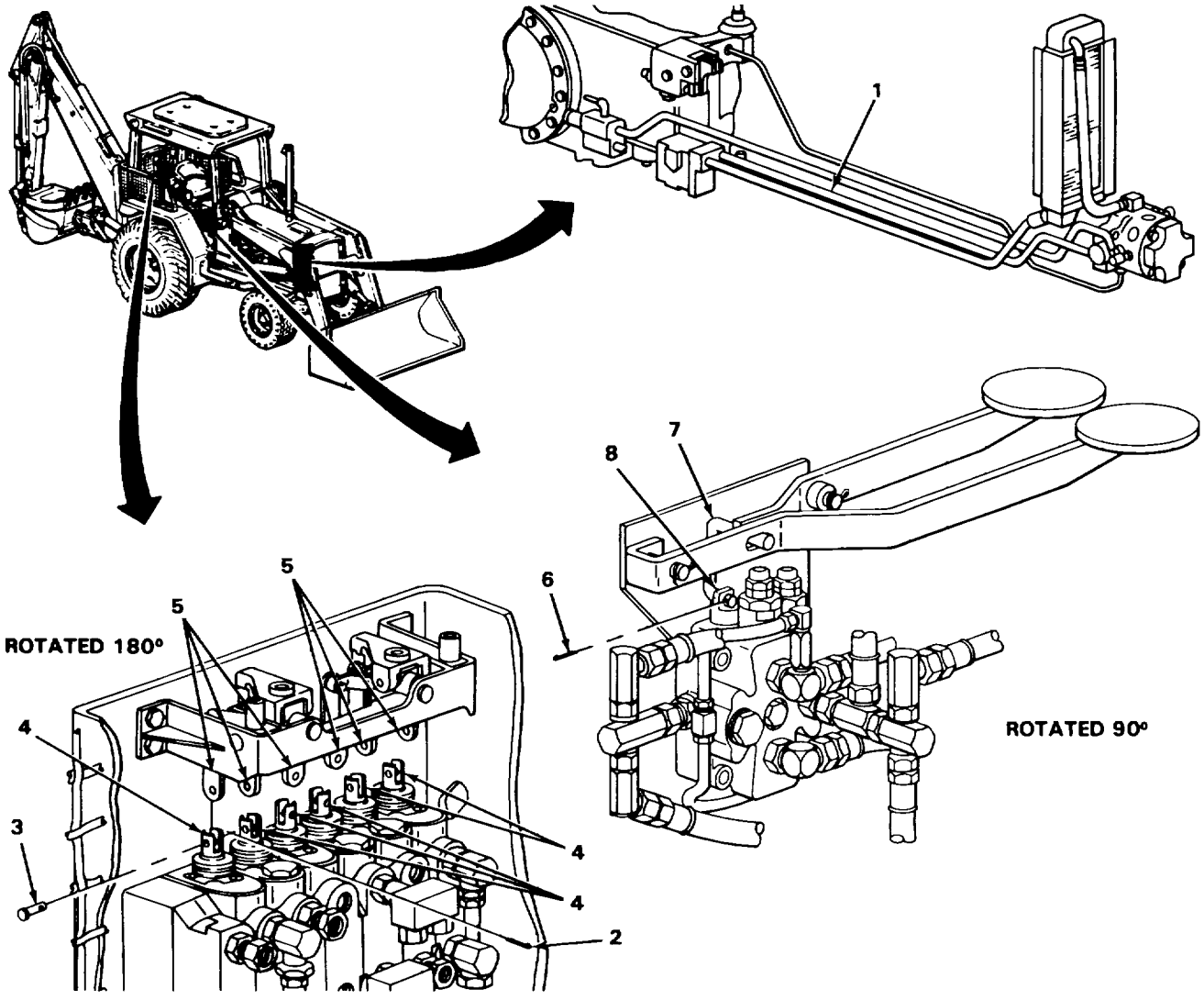
a. If backhoe control valve levers and linkage are not sticking or binding, replace backhoe control valve (page 2-1260).

b. If backhoe control valve levers and linkage are sticking or binding, replace defective parts as needed (Serial Numbers 235786 thru 235999 only, page 2-1302; Serial Numbers 319995 thru 342573 only, page 2-1314).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. JAW CONTROL (DIRECT LINEAR) VALVE LINKAGE STICKS OR BINDS

Check jaw control (direct linear) valve linkage by doing the following: Using long roundnose pliers, straighten ends of cotter pin (6) and take out of link (7). Take link (7) out of plunger (8). Check linkage for sticking or binding.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. JAW CONTROL (DIRECT LINEAR) VALVE LINKAGE STICKS OR BINDS - CONTINUED

a. If jaw control (direct linear) valve linkage is not sticking or binding, replace jaw control valve (Serial Numbers 235786 thru 235999 only, page 2-1242), or jaw direct linear valve (Serial Numbers 319995 thru 342573 only, page 2-1294).

b. If jaw control (direct linear) valve linkage is sticking or binding, replace defective parts as needed (page 2-1294).

8. HYDRAULIC IMPACTOR VALVE LINKAGE STICKS OR BINDS

Check hydraulic impactor valve pedal rod (1) and link(2) for bends, breaks, or signs of binding.

a. If hydraulic impactor valve pedal rod (1) or link (2) is not bent, broken, or binding, replace defective hydraulic impactor valve (page 2-1228).

b. If hydraulic impactor valve pedal rod (1) or link (2) is bent, broken, or binding, replace defective parts as outlined in hydraulic impactor valve (page 2-1228).

9. ONE LOADER BOOM CYLINDER DOES NOT WORK

Check loader check valve-to-loader boom cylinder oil lines (3 and 4) or (5 and 6) for sharp bends, dents, or kinks.

a. If loader control valve-to-loader boom cylinder oil lines (3 and 4) or (5 and 6) are not bent, dented, or kinked, replace loader boom cylinder (page 2-1770).

b. If loader control valve-to-loader boom cylinder head end oil line (3 or 5) has a sharp bend, dent or kink, replace (page 2-1679).

c. If loader control valve-to-loader boom cylinder rod end oil line (4 or 6) has a sharp bend, dent, or kink, replace (page 2-1688).

10. BOTH LOADER BOOM CYLINDERS DO NOT WORK,A

Check operations of loader bucket (TM 5-2420-222-20).

a. If loader bucket operates properly, replace loader control valve (page 2-1285).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. If loader bucket does not operate properly, go to Hydraulic Systems Malfunction 13: All Loader Bucket And Boom Cylinders Do Not Work (page 2-120).

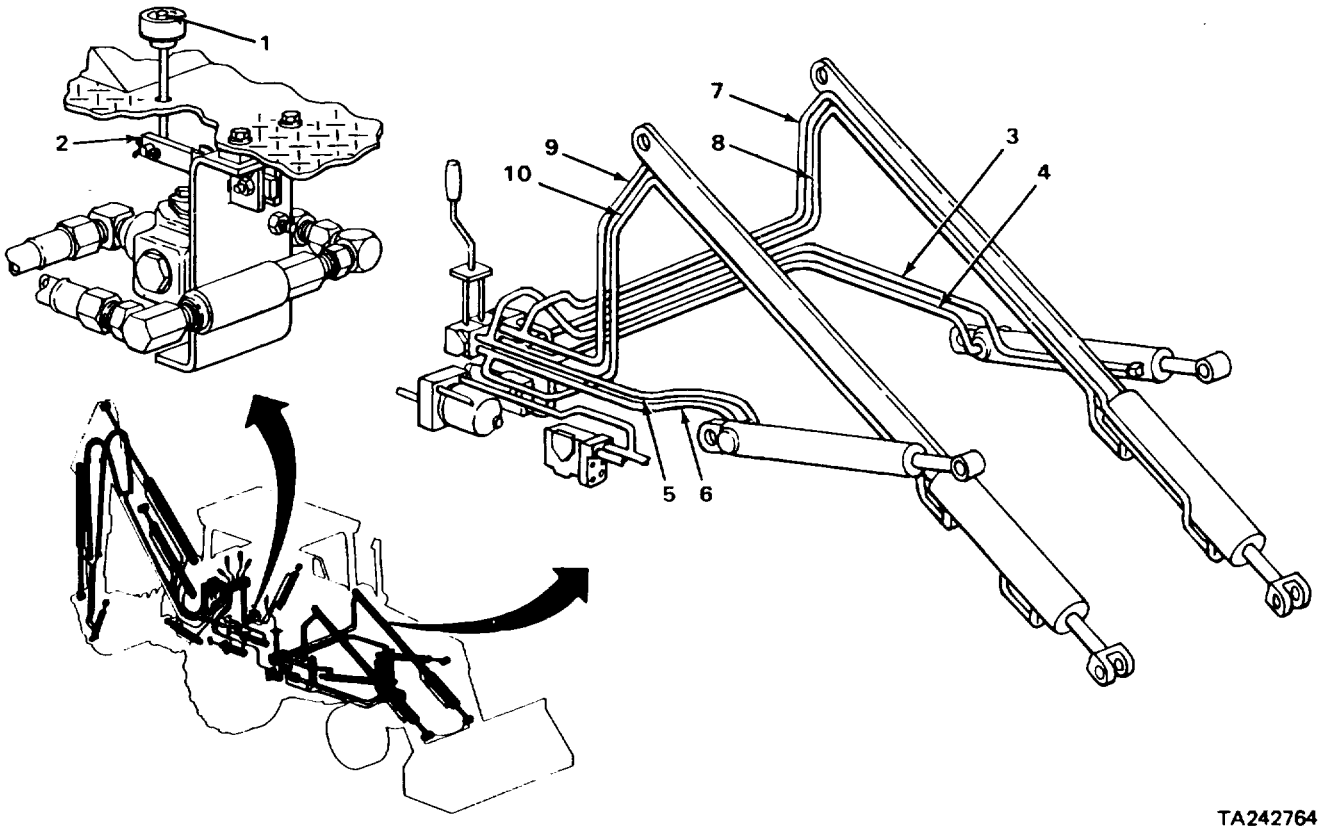
11. ONE LOADER BUCKET CYLINDER DOES NOT WORK

Check loader control valve-to-loader bucket cylinder oil lines (7 and 8) or (9 and 10) for sharp bends, dents, or kinks.

a. If loader control valve-to-loader bucket cylinder oil lines (7 and 8) or (9 and 10) are not bent, dented or kinked, replace loader bucket cylinder (page 2-1760).

b. If loader control valve-to-loader bucket cylinder head end oil line (7 or 9) has a sharp bend, dent, or kink, replace (page 2-1670).

c. If loader control valve-to-loader bucket cylinder rod end oil line (8 or 10) has a sharp bend, dent, or kink, replace (page 2-1670).



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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

12. BOTH LOADER BUCKET CYLINDERS DO NOT WORK

Check operation of loader boom (TM 5-2420-222-10).

a. If loader boom operates properly, replace loader control valve (page 2-1285).

b. If loader boom does not operate properly, go to Hydraulic Systems Malfunction 13: All Loader Bucket And Boom Cylinders Do Not Work, below.

13. ALL LOADER BUCKET AND BOOM CYLINDERS DO NOT WORK

Step 1. Check loader control valve-to-hydraulic oil filter relief valve oil line (1) for sharp bends, dents, or kinks.

a. If loader control valve-to-hydraulic oil filter relief valve oil line (1) is not bent, dented, or kinked, go to step 2.

b. If loader control valve-to-hydraulic oil filter relief valve oil line (1) has sharp bend, dent, or kink, replace (page 2-1653).

Step 2. Check pressure control valve-to-loader control valve oil line (2) for sharp bends, dents, or kinks.

a. If pressure control valve-to-loader control valve oil line (2) is not bent, dented, or kinked, replace loader control valve (page 2-1285)

b. If pressure control valve-to-loader control valve oil line (2) has a sharp bend, dent, or kink, replace (page 2-1647).

14. JAW CYLINDER DOES NOT WORK

Step 1. Check jaw direct linear valve-to-jaw cylinder oil lines (3 thru 6) for sharp bends, dents, or kinks.

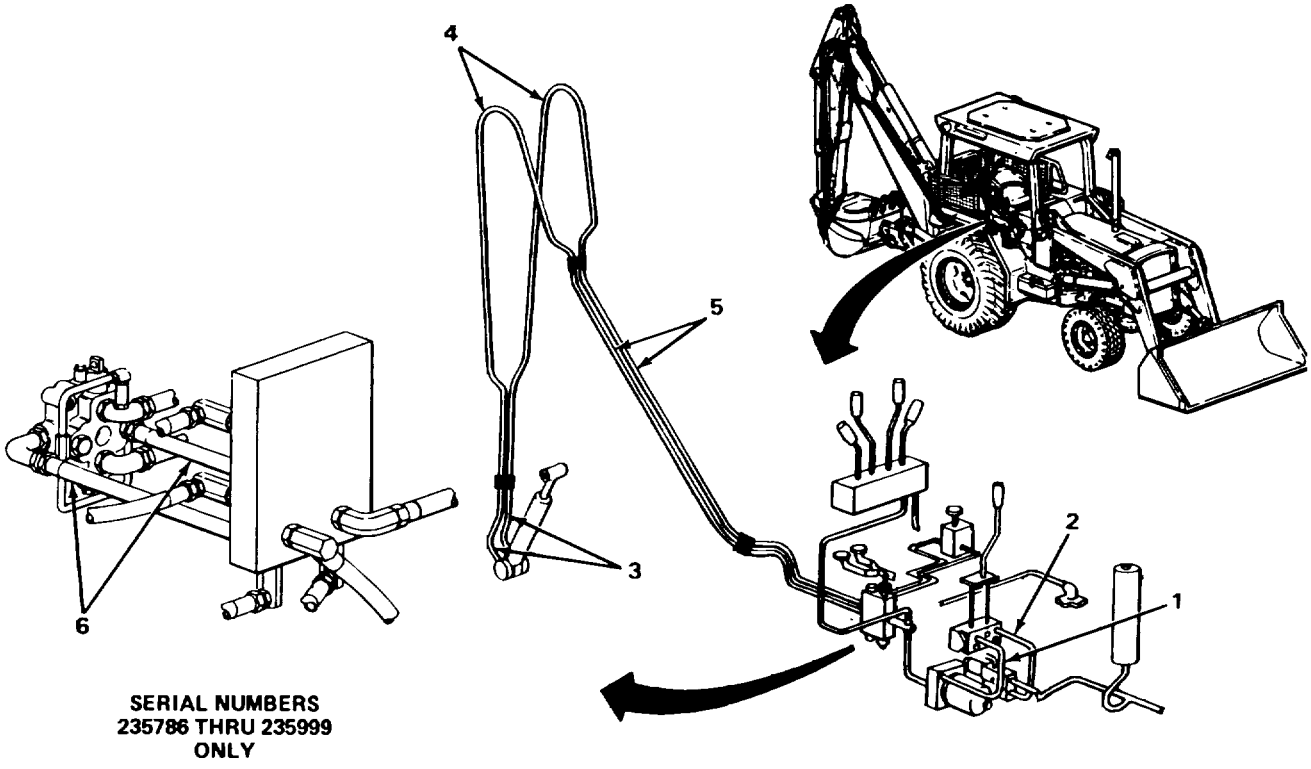
a. If jaw direct linear valve-to-jaw cylinder oil lines (3 thru 6) are not bent, dented, or kinked, go to step 2.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. If jaw cylinder oil hoses (3) have sharp bends or kinks, replace (page 2-1544).

c. If boom-to-jaw cylinder oil hose oil lines (4) have sharp bends, dents, or kinks, replace (Serial Numbers 235786 thru 235999 only, page 2-1532; or Serial Numbers 319995 thru 342573 only, page 2-1538).

d. If manifold block-to-boom jaw control oil hoses or tubes (5) have sharp bends, dents, or kinks, replace (Serial Numbers 235786 thru 235999 only, page 2-1522; or Serial Numbers 319995 thru 342573



SERIAL NUMBERS
235786 THRU 235999
ONLY

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

14. JAW CYLINDER DOEWS NOT WORK - CONTINUED
    e. If manifold-to-jaw control valve oil lines (1) (Serial Numbers 235786 thru 235999 only) have sharp bends, dents, or kinks, replace (page 2-1456).

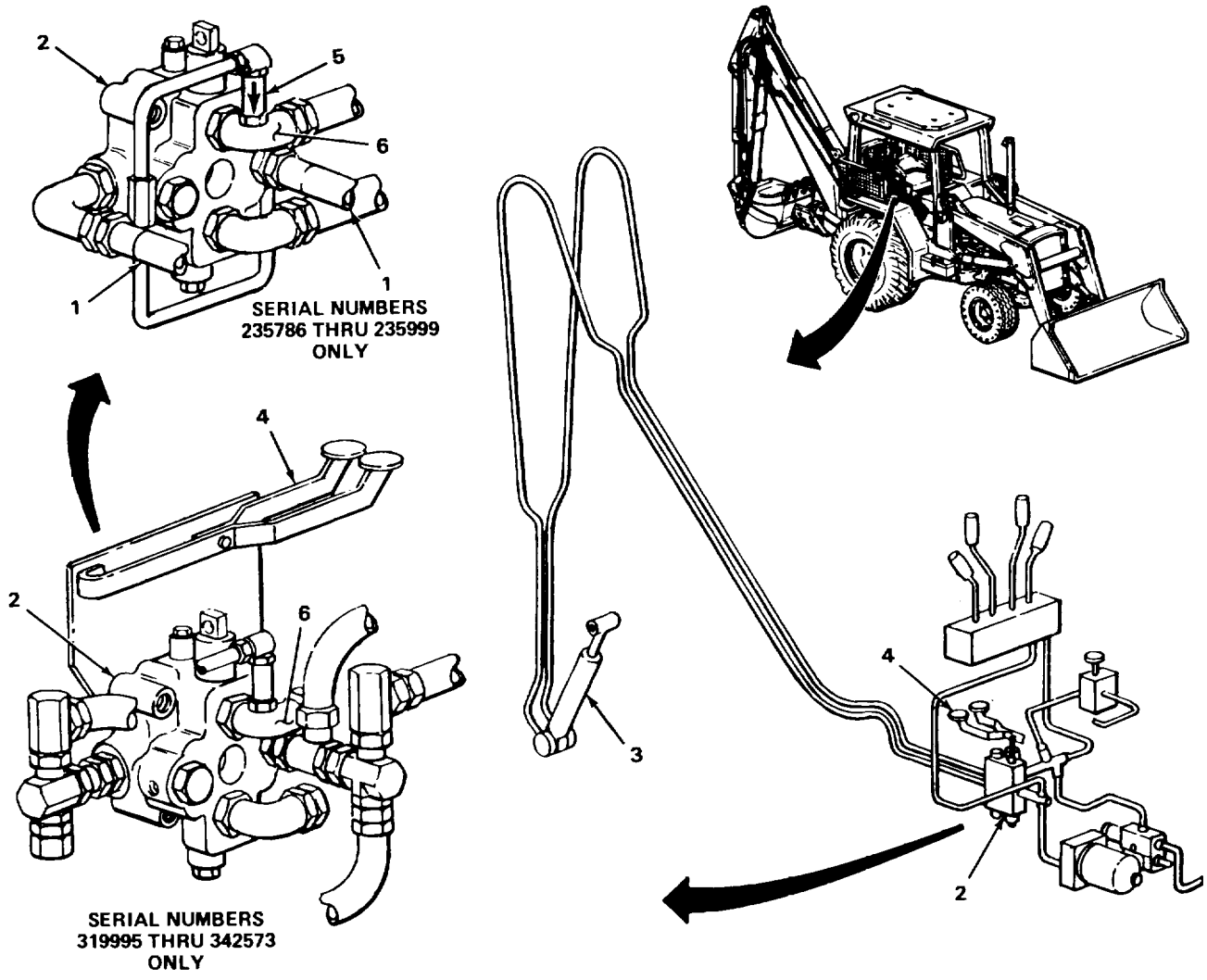
    Step 2. Connect hydraulic system test set between jaw control (direct linear) valve (2) and jaw cylinder (3). Have assistant start and run engine at 1,250 rpm (TM 5-2420-222-10). While assistant operates short jaw pedal (4), note reading on hydraulic system test set. Pressure gage reading should be 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10) and disconnect hydraulic system test set.
    a. If hydraulic system test set pressure gage reads 1700 to 1800 psi (11,645 thru 12,411 kPa), replace jaw cylinder (page 2-1703).
    b. If hydraulic system test set pressure gage reads less than 1700 psi (11,645 kPa), replace jaw control valve (Serial Numbers 235786 thru 235999 only) (page 2-1242); or jaw direct linear valve (Serial Numbers 319995 thru 342573 only) (page 2-1250).

15. JAW SECTION OF BACKHOE BUCKET WILL NOT STAY TIGHTLY CLOSED

    Step 1. Check to see if check valve (5) is properly installed. Arrow on check valve (5) must point toward jaw control (direct linear) valve-to-manifold block rod end oil line bulkhead elbow (6).
    a. If check valve (5) is properly installed, go to step 2.
    b. If check valve (5) is not properly installed, install as outlined in jaw control (direct linear) valve tubes and fittings (page 2-1391).

    Step 2. Replace check valve (5) as outlined in jaw control (direct linear) valve tubes and fittings (page 2-1391).
    a. If new check valve (5) corrects problem, get rid of old check valve (5).
    b. If new check valve (5) does not correct problem, go to Hydraulic System Malfunction 14: Jaw Cylinder Does Not Work, step 2, above.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. BACKHOE BOOM CYLINDER DOES NOT WORK

Step 1. Check backhoe control valve-to-backhoe boom cylinder oil lines (1 thru 4) for sharp bends, dents, or kinks.

a. If backhoe control valve-to-backhoe boom cylinder oil lines (1 thru 4) are not bent, dented, or kinked, go to step 2.
b. If manifold block-to-head end boom cylinder oil line (1) has sharp bend, dent, or kink, replace (page 2-1565).
c. If manifold block-to-rod end boom cylinder oil line (2) has sharp bend, dent, or kink, notify Direct Support Maintenance.
d. If backhoe control valve-to-manifold block oil lines (3 or 4) has a sharp bend, dent, or kink, replace (page 2-1558).

WARNING

Keep clear of area between main frame and backhoe boom, and other backhoe components, when backhoe control levers are being operated. There is no clearance for personnel when boom is swung full-left or full-right.

Step 2. Connect hydraulic system test set in backhoe control valve-to-manifold block oil line (3 or 4) between backhoe control valve (5) and manifold block (6). Have assistant start and run engine at 1,250 rpm (TM 5-2420-222-10). While assistant operates backhoe boom control lever (7), note reading on hydraulic system test set. Pressure gage reading should be 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10) and disconnect hydraulic system test set.

a. If hydraulic system test set pressure gage reads 1700 to 1800 psi (11,645 thru 12,411 kPa), notify Direct Support Maintenance.
b. If hydraulic system test set pressure gage reads less than 1700 psi (11,645 kPa), replace backhoe control valve (page 2-1260).

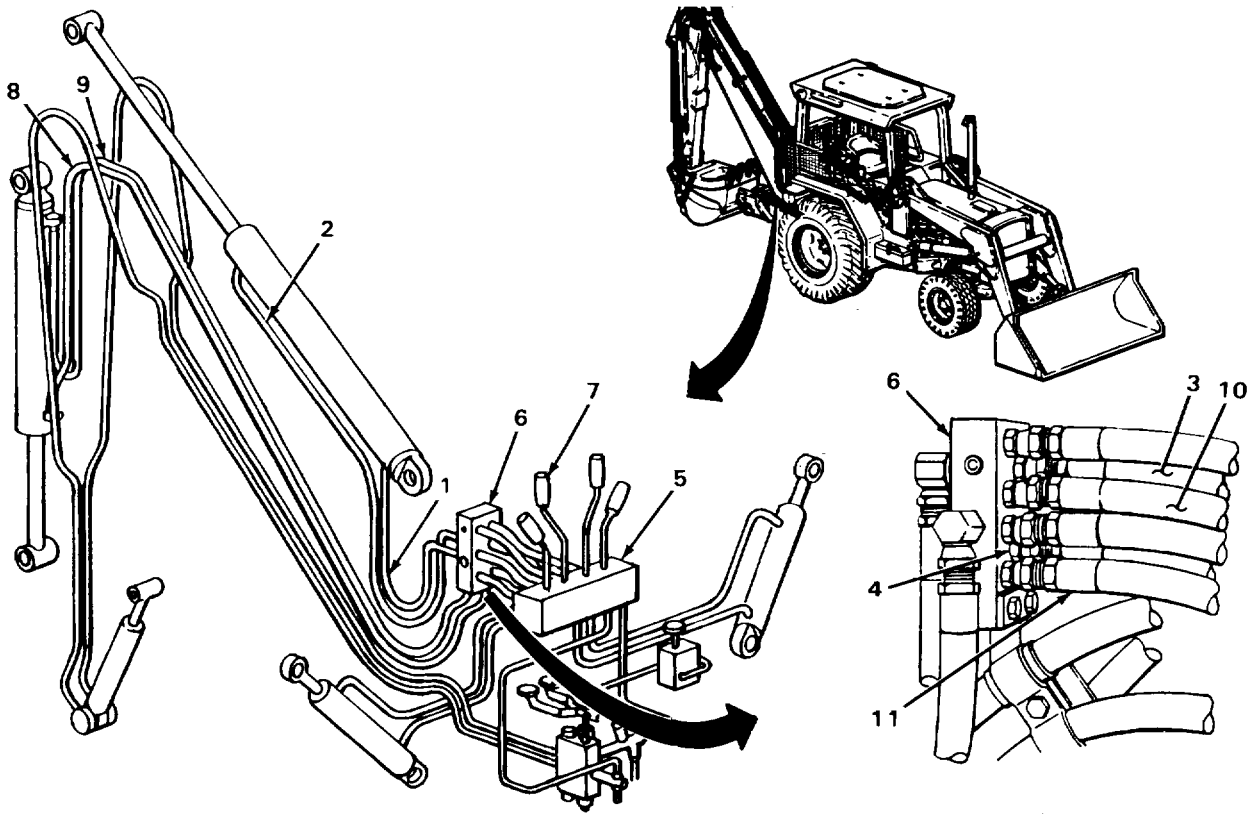
17. BACKHOE BUCKET CYLINDER DOES NOT WORK

Step 1. Check backhoe control valve-to-backhoe bucket cylinder oil lines (8 thru 11) for sharp bends, dents, or kinks.

a. If backhoe control valve-to-backhoe bucket cylinder oil lines (8 thru 11) are not bent, dented, or kinked, go to step 2.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. If manifold block-to-boom bucket cylinder oil line (8 or 9) has sharp bend, dent, or kink, replace (page 2-1590).
c. If backhoe control valve-to-manifold block oil line (10 or 11) has a sharp bend, dent, or kink, replace (page 2-1558).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

17. BACKHOE BUCKET CYLINDER DOES NOT WORK - CONTINUED

WARNING

Keep clear of area between main frame and backhoe boom, and other backhoe components, when backhoe control levers are being operated. There is no clearance for personnel when boom is swung full-left or full-right.

Step 2. Connect hydraulic system test set in backhoe control valve-to-manifold block oil line (1 or 2) between backhoe control valve (3) and manifold block (4). Have assistant start and run engine at 1,250 rpm (TM 5-2420-222-10). While assistant operates backhoe bucket and dipperstick control lever (5), note reading on hydraulic system test set. Pressure gage reading should be 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10) and disconnect hydraulic system test set.

a. If hydraulic system test set pressure gage reads 1700 to 1800 psi (11,645 thru 12,411 kPa), replace backhoe bucket cylinder (page 2-1726).
b. If hydraulic system test set pressure gage reads less than 1700 psi (11,645 kPa), replace backhoe control valve (page 2-1260).

18. BACKHOE CROWD CYLINDER DOES NOT WORK

Step 1. Check backhoe control valve-to-backhoe crowd cylinder oil lines (6 thru 9) for sharp bends, dents, or kinks.

a. If backhoe control valve-to-backhoe crowd cylinder oil lines (6 thru 9) are not bent, dented, or kinked, go to step 2.
b. If manifold block-to-crowd cylinder oil line (6 or 7) has a sharp bend, dent, or kink, replace (Serial Numbers 235786 thru 235999 only, page 2-1580; Serial Numbers 319995 thru 342573 only, page 2-1578).
c. If backhoe control valve-to-manifold block oil line (8 or 9) has sharp bend, dent, or kink, replace (page 2-1558).

WARNING

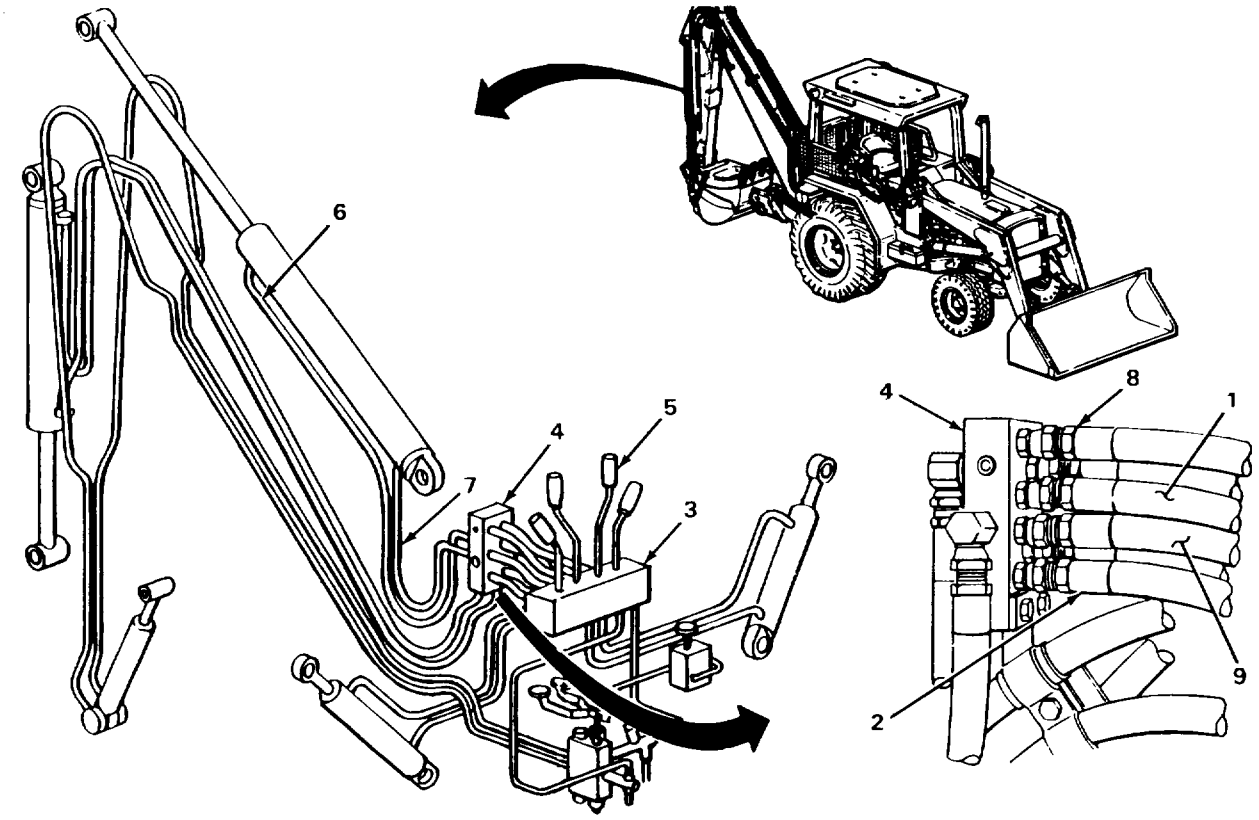
Keep clear of area between main frame and backhoe boom, and other backhoe components, when backhoe control levers are being operated. There is no clearance for personnel when boom is swung full-left or full-right.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Connect hydraulic system test set in backhoe control valve-to-manifold block oil line (8 or 9) between backhoe control valve (3) and manifold block (4). Have assistant start and run engine at 1,250 rpm (TM 5-2420-222-10). While assistant operates backhoe bucket and dipperstick control lever (5), note reading on hydraulic system test set. Pressure gage reading should be 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10) and disconnect hydraulic system test set.

a. If hydraulic system test set pressure gage reads 1700 to 1800 psi (11,645 thru 12,411 kPa), replace backhoe crowd cylinder (page 2-1740).

b. If hydraulic system test set pressure gage reads less than 1700 psi (11,645 kPa), replace backhoe control valve (page 2-1260).



ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

19. ONE BACKHOE SWING CYLINDER DOES NOT WORK
    Check backhoe control valve-to-backhoe swing cylinder oil lines (1 and 2) or (3 and 4) for sharp bends, dents, or kinks.
    a. If backhoe control valve-to-backhoe swing cylinder oil lines (1 and 2) or (3 and 4) are not bent, dented, or kinked, replace backhoe swing cylinder (page 2-1708).
    b. If backhoe control valve-to-backhoe swing cylinder oil line (1, 2, 3, or 4) has a sharp bend, dent, or kink, replace (page 2-1636).
20. BOTH BACKHOE SWING CYLINDERS DO NOTWORK
    Check other backhoe functions for proper operation (TM 5-2420-222-10).
    a. If other backhoe functions operate properly, replace backhoe control valve (page 2-1260).
    b. If other backhoe functions do not operate, go to hydraulic system malfunction 23: All Backhoe Cylinders Do Not Work (page 2-130).
21. ONE BACKHOE STABILIZER CYLINDER DOES NOT WORK
    Step 1. Check backhoe control valve-to-backhoe stabilizer cylinder oil lines (5 and 6) or (7 and 8) for sharp bends, dents, or kinks.
    a. If backhoe control valve-to-backhoe stabilizer cylinder oil lines (5 and 6) or (7 and 8) are not bent, dented, or kinked, go to step 2.
    b. If backhoe control valve-to-backhoe stabilizer cylinder oil line (5, 6, 7 or 8) has a sharp bend, dent, or kink, replace (page 2-1622).
    Step 2. Check other backhoe functions for proper operation (TM 5-2420-222-10).
    a. If other backhoe functions operate properly, go to step 3.

ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

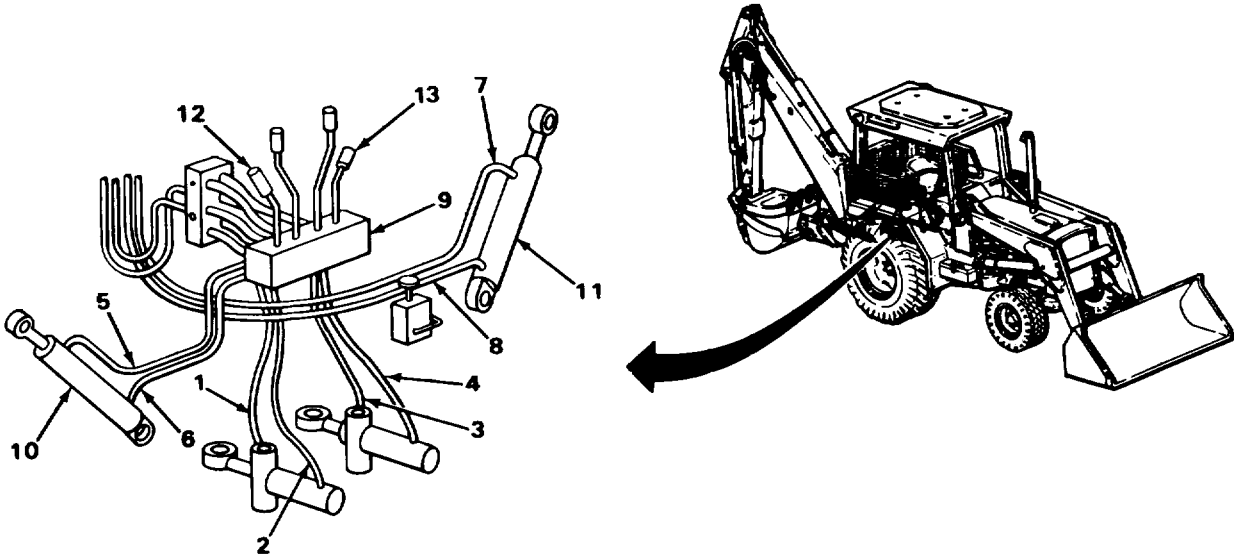
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. If other backhoe functions do not operate, go to Hydraulic System Malfunction 23: All Backhoe Cylinders Do Not Work (page 2-130).

Step 3. Connect hydraulic system test set between backhoe control valve (9) and backhoe stabilizer cylinder (10 or 11). Have assistant start and run engine at 1,250 rpm (TM 5-2420-222-10). While assistant operates stabilizer control lever (12 or 13), note reading on hydraulic system test set. Pressure gage reading should be 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10) and disconnect hydraulic system test set.

a. If hydraulic system test set pressure gage reads 1700 to 1800 psi (11,645 thru 12,411 kPa), replace backhoe stabilizer cylinder (page 2-1752).

b. If hydraulic system test set pressure gage reads less than 1700 psi (11,645 kPa), replace backhoe control valve (page 2-1260).



ORGANIZATIONAL TROUBLESHOOTING - CONTINUED

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

22. BOTH BACKHOE CYLINDERS DO NOT WORK
    Go to Hydraulic System Malfunction 23: All Backhoe Cylinders Do Not Work, below.
23. ALL BACKHOE CYLINDERS DO NOT WORK
    Check backhoe control valve-to-jaw control (direct linear) valve or manifold oil lines (1 and 2) or (3 and 4) for sharp bends, dents, or kinks.
    a. If backhoe control valve-to-jaw control (direct linear) valve or manifold oil lines (1 and 2) or (3 and 4) aren not bent, dented, or kinked, replace backhoe control valve (page 2-1260).
    b. If backhoe control valve-to-jaw direct linear valve oil line (1) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 2-1412).
    c. If jaw direct linear valve-to-backhoe control valve oil line (2) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 2-1436).
    d. If backhoe control valve-to-manifold oil line (3 or 4) on loader backhoes with Serial Numbers 235786 thru 235999 has sharp bend, dent, or kink, replace (page 2-1429).
24. ALL BACKHOE CYLINDERS, JAW CYLINDER, AND HYDRAULIC IMPACTOR (IF ATTACHED) DO NOT WORK
    Check pressure control valve-to-jaw direct linear valve or manifold oil line (5 or 6) and jaw direct linear valve or manifold-to-hydraulic oil filter relief valve oil line (7 or 8) for sharp bends, dents, or kinks.
    a. If pressure control valve-to-jaw direct linear valve oil line (5) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 2-1405).
    b. If pressure control valve-to-manifold oil line (6) on loader backhoes with Serial Numbers 235786 thru 235999 has sharp bend, dent, or kink, replace (page 2-1400).

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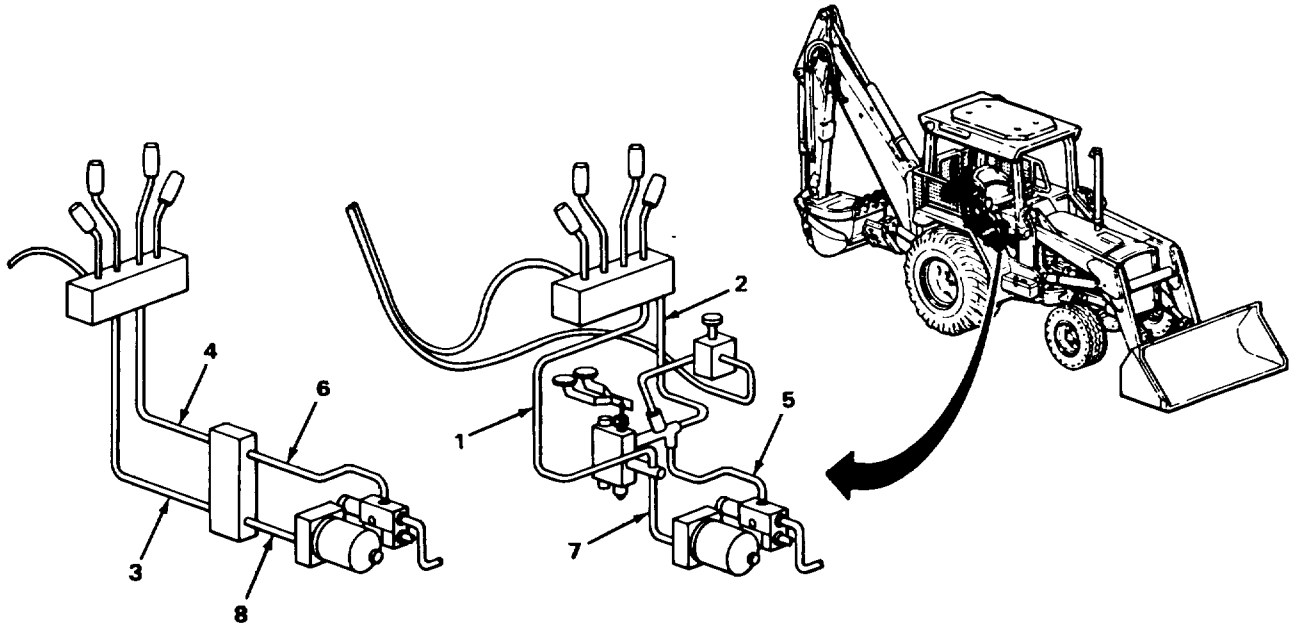
c. If jaw direct linear valve-to-hydraulic oil filter relief valve oil line (7) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 2-1464).
d. If manifold-to-hydraulic oil filter relief valve oil line (8) on loader backhoes with Serial Numbers 235786 thru 235999 has sharp bend, dent, or kink, replace (page 2-1450).



SERIAL NUMBERS 235786 THRU 235999 ONLY

SERIAL NUMBERS 319995 THRU 342573 ONLY

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

25. HYDRAULIC IMPACTOR DOES NOT WORK

Step 1. Check hydraulic impactor oil lines (1 thru 7) for sharp bends, dents, and kinks.

a. If hydraulic impactor oil lines (1 thru 7) are not bent, dented, or kinked, go to step 2.
b. If hydraulic impactor flow regulator-to-boom oil lines (1) has sharp bend, dent, or kink, replace (Serial Numbers 235786 thru 235999, page 2-1499; Serial Numbers 319995 thru 342573, page 2-1505).
c. If jaw direct linear valve-to-hydraulic impactor valve oil line (2) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 2-1421).
d. If manifold-to-hydraulic impactor valve oil line (3) on loader backhoes with Serial Numbers 235786 thru 235999 has sharp bend dent, or kink, replace (page 2-1444).
e. If boom-to-manifold hydraulic impactor return oil line (4) on loader backhoes with Serial Numbers 235786 thru 235999 has sharp bend, dent, or kink, replace (2-1483).
f. If boom-to-backhoe control valve hydraulic impactor return oil line (5) on loader backhoes with Serial Numbers 319995 thru 342573 has sharp bend, dent, or kink, replace (page 1489).
g. If quick coupler-to-boom oil line (6 or 7) has sharp bend, dent, or kink, replace (Serial Numbers 235786 thru 235999, page 2-1472; Serial Numbers 319995 thru 342573, page 2-1477).

Step 2. Remove hydraulic impactor flow regulator (8) (page 2-1237). Connect hydraulic system test set to hydraulic impactor flow regulator. Using hydraulic system test set, apply 1800 psi (12,411 kPa) and note reading on flow meter. Flow meter should read 25 gallons per minute (95 liters per minute). Disconnect hydraulic system test set from hydraulic impactor flow regulator.

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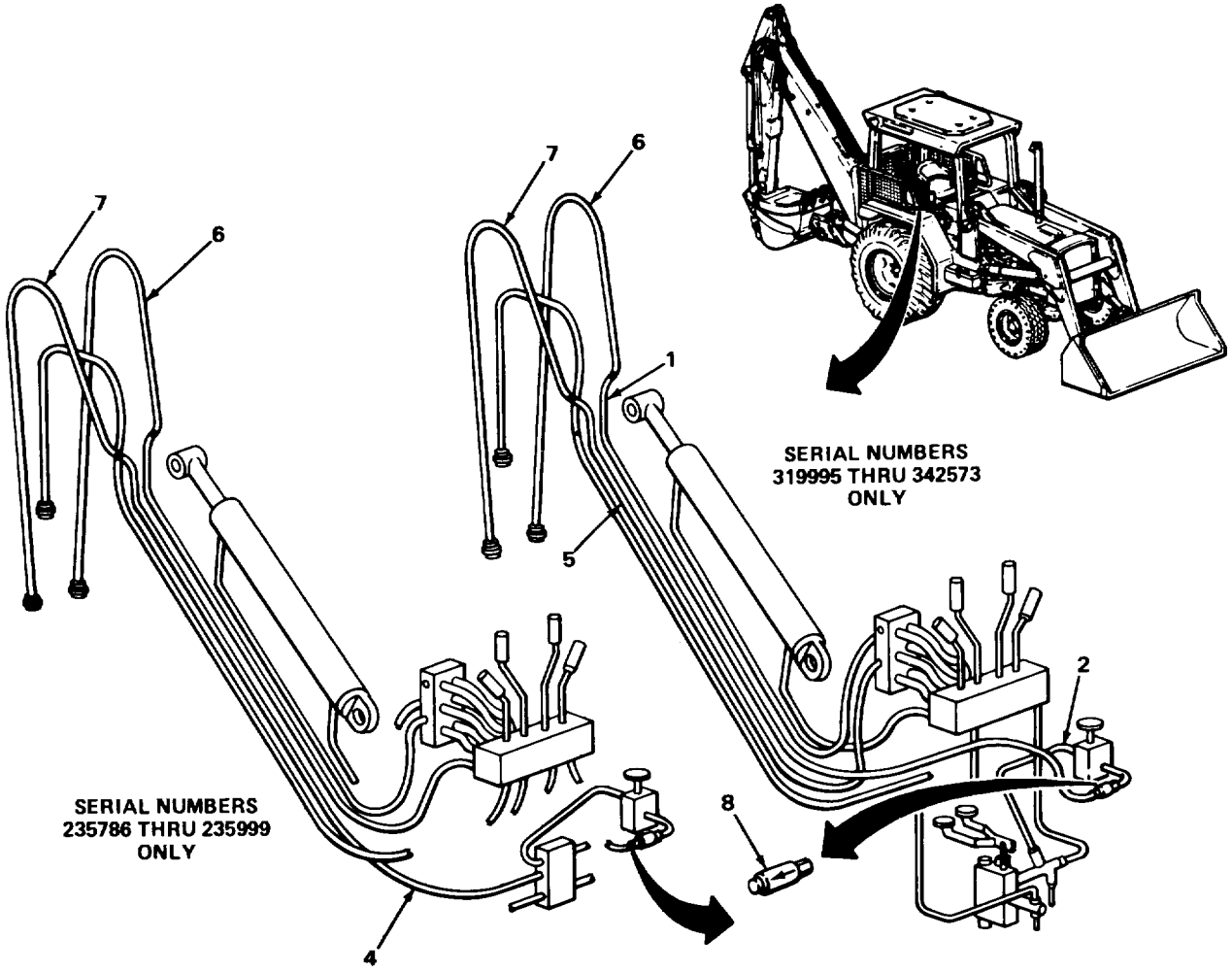
a. If flow meter reads 25 gallons per minute (95 liters per minute), go to step 3.
b. If flow meter reads less than 25 gallons per minute (95 liters per minute), replace hydraulic impactor flow regulator (page 2-1237).



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

25. HYDRAULIC IMPACTOR DOES NOT WORK - CONTINUED

Step 3. Connect hydraulic system test set between impactor valve (1) and backhoe control valve (2) or manifold (3). Have assistant start engine and run at high idle (TM 5-2420-222-10). While assistant operates hydraulic impactor valve actuating pedal (4), note reading on hydraulic system test set pressure gage. Pressure gage should read 1700 to 1800 psi (11,645 to 12,411 kPa). Shut down engine (TM 5-2420-222-10). Disconnect hydraulic system test set.

a. If pressure gage reads 1700 to 1800 psi (11,645 to 12,411 kPa), install hydraulic impactor flow regulator (page 2-1237) and replace hydraulic impactor and motor assembly (page 2-1893).
b. If pressure gage reads less than 1700 psi (11,645 kPa), replace hydraulic impactor valve (page 2-1228).

26. HYDRAULIC IMPACTOR WORKS TOO SLOWLY

Step 1. Check hydraulic impactor flow control pedal rod (5) and link (6) for abnormal bends and binding.

a. If rod (5) or link (6) are bent or binding replace as outlined in Hydraulic Impactor Valve (page 2-1228).
b. If rod (5) and link (6) are not bent or binding, go to step 2.

Step 2. Operate hydraulic impactor (TM 5-2420-222-10) and check for fluid leaks.

a. If hydraulic impactor has fluid leak, replace hydraulic impactor and motor assembly (page 2-1893).
b. If hydraulic impactor does not have fluid leak, got to step 3.

Step 3. Lubricate hydraulic Impactor (LO 5-2420-222-12).

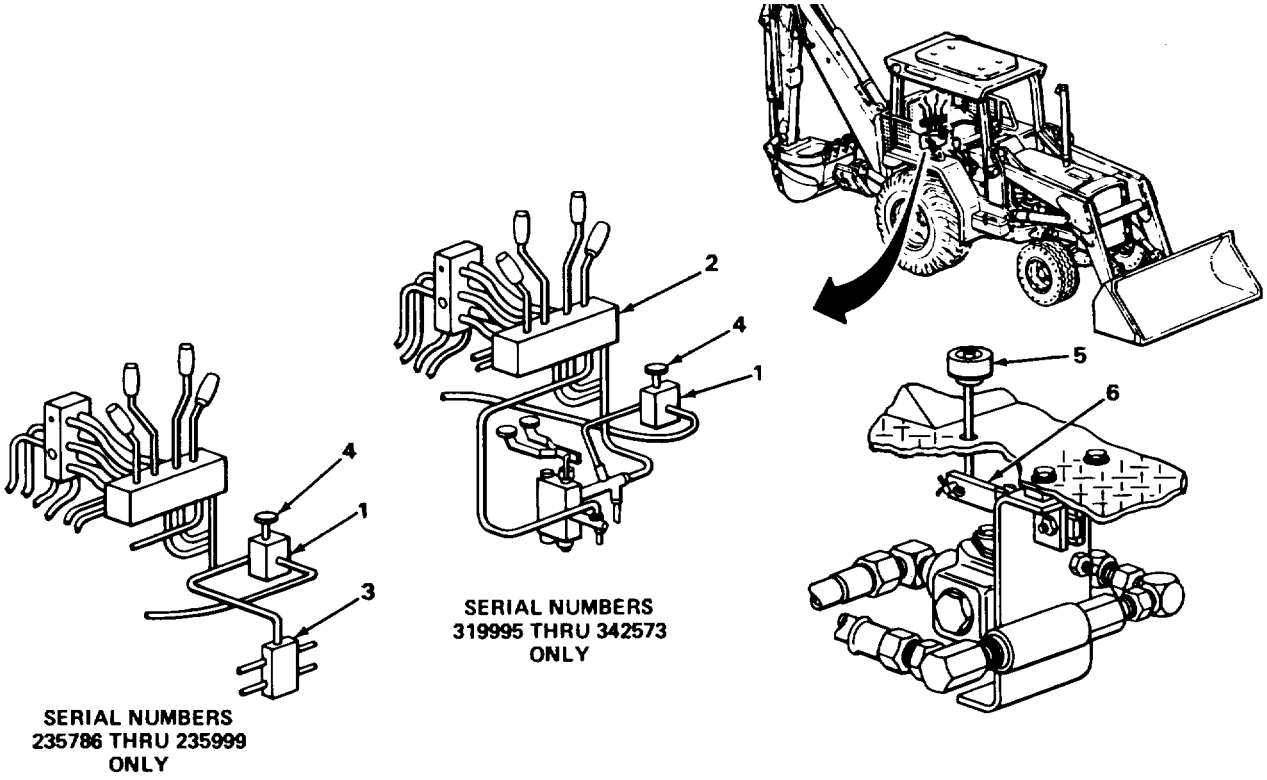
a. Lubricating hydraulic impactor corrects problem.
b. If lubricating hydraulic impactor does not correct problem, go to Hydraulic System Malfunction 25: Hydraulic Impactor Does Not Work (page 2-132).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

27. HYDRAULIC EARTH DRILL DOES NOT WORK

Operate backhoe bucket (TM 5-2420-222-10).

a. If backhoe bucket operates normally, replace hydraulic earth drill boring head (page 2-1870).
b. If backhoe bucket does not operate properly, 30 to Hydraulic System Malfunction 17: Backhoe Bucket Cylinder Does Not Work (page 2-124).

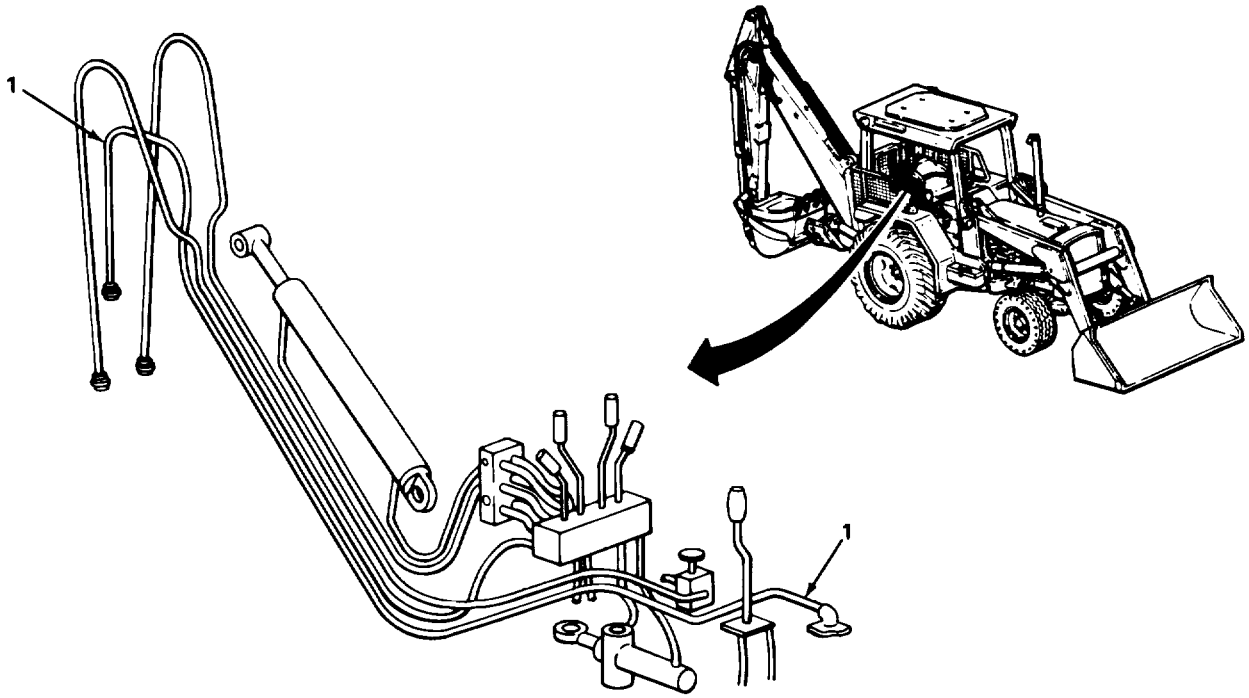


MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. HYDRAULIC EARTH DRILL OVERHEATS

Check hydraulic earth drill bleed oil line (1) for sharp bends and kinks.

a. If oil line (1) has sharp bend or kink, replace (page 2-1550).
b. If oil line (1) does not have sharp bend or kink, replace hydraulic earth drill boring head (page 2-1870).



Section VI. GENERAL MAINTENANCE INSTRUCTIONS

SCOPE

These General Maintenance Instructions contain general shop practices and specific techniques you must be familiar with to maintain the loader backhoe properly. You should read and understand the information provided here and in the operator's General Maintenance Instructions (TM 52420-222-10) before performing Organizational Maintenance tasks on the loader backhoe.

WORK SAFETY

Before you start a task, think about the risks and hazards to your personal safety and others. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, or gloves. Protect yourself against injury. Always clean up spilled fluids right away to avoid slipping hazard. When lifting heavy parts, have someone help you. Make sure that lifting/jacking tool is working properly, that it meets the weight requirement of the part to be lifted, and that it is securely fastened to the part. Always use power tools carefully.

Observe all WARNINGs and CAUTIONs.

PRESHOP ANALYSIS

The purpose of preshop analysis is to find out how much repair, modification, or replacement is needed to fix the equipment as outlined in this manual. Sometimes the reason for equipment failure can be seen right away and, therefore, complete teardown Is not necessary for repair. Disassemble equipment only as far as necessary to repair or replace broken parts.

All tags and forms attached to the equipment must be checked to find out the reason for removal from service. Also check all Modification Work Orders (MWO) and Technical Bulletins (TB) for equipment changes and updates.

In some cases you may damage a part just by removing it. If the part appears to be good, and other parts behind it are not defective, leave it on and continue with procedure. Here are a few simple rules:

1. Don't take out dowel pins unless bent, broken or damaged.

2. Don't pull bearings or bushings unless they are damaged. If you have to get at a damaged or defective part behind them, pull off bearings or bushings very carefully.

3. Replace all gaskets, lockwashers, self-locking nuts, self-locking screws and packings.

CLEANING

All parts must be cleaned before inspection, assembly and after repair. If part is to be removed, wipe off grease and grime before removal so particles will not fall into engine or hydraulic components.

WARNING

Avoid contact with live steam. Live steam can burn skin, cause blindness, and cause other serious injury. Be sure to wear protective apron, gloves, and safety goggles when using live steam.

When working on systems where cleanliness is required, steam clean parts and surrounding area before removal or disassembly. Hands should be kept clean and free of grease.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point is 100°F to 138°F (380C to 590C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Clean inner and outer surfaces of metal parts and all areas that get greasy or oily with drycleaning solvent (item 28, Appendix C). Clean out sludge and gum with stiff brush. Put small parts in wire mesh basket before immersing in solvent. Use steam cleaning to take off grease and dirt build-up. After drycleaning solvent has been applied, dry with clean rags (item 21, Appendix C).

WARNING

Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

Use clean water or detergent (item 7, Appendix C) to clean rubber or plastic material. Clean off rust with wire brush or crocus cloth (item 6, Appendix C). Use low pressure compressed air to blow away rust and cloth particles. Clean off solder with soldering iron. Hydraulic system components must be cleaned and dried carefully so that foreign particles cannot get into hydraulic fluid and contaminate it.

WARNING

Electrical parts solvent cleaning compound (trichlorotrifluoroethane) is flammable, and reacts violently with aluminum, titanium, barium, lithium, samarium, and sodium potassium. Cleaning compound fumes displace air and it may be carcinogenic. Boiling point is 114°F (460C). Do not wear jewelry. Wear rubber gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning compound, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

CLEANING - CONTINUED

WARNING

Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

Use clean rags dampened with electrical parts solvent cleaning compound (item 4, Appendix C) to clean dust, dirt, and grease off of electrical wiring harnesses and connectors. If parts are too dirty to wipe clean, dip them into cleaning compound, shake off excess, and wipe clean with clean dry rags. To get dirt out of recessed area, use a stiff brush. Wiring harnesses and connectors must be completely dry before use. Dry wiring harnesses and connectors with clean dry rags and allow to air dry. To speed up drying time, use dry compressed air.

Cover parts after cleaning to protect from dust and dirt.

The general cleaning covered by other manuals is as follows:

TM 9247: Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials, Including Chemicals.

TM 9214: Inspection, Care, and Maintenance of Antifriction Bearings.

TB 750-1047: Elimination of Combustables from Interiors of Metal or Plastic Gasoline and Diesel Fuel Tanks (TO 36Y31-3-6).

INSPECTION

The reason for parts inspection is to find out which parts can be used and which must be replaced. Specifications and tolerances are given in this manual, but sometimes, you, the inspector must make the decision which parts should be replaced.

To find out if you can use a part that is otherwise in good condition, check the clearance between mating surfaces. If clearance is within tolerance, reinstall part.

Inspect castings for wear, distortion, cracks and breaks in and around drilled and tapped holes. Look for damaged threads.

Carefully look at all machined surfaces and polished areas. Use a strong light to shine across polished surfaces to check for score marks, cracks, breaks and too much wear.

Inspect gears for cracked, nicked and chipped teeth. Look for metal to metal abrasion, pitting, and wear. When a gear is found to be defective, replace it and its mating gear.

SERVICE REPLACEMENT KITS

Many service replacement parts are available in various undersize and/or oversize, as well as standard sizes. Also, service kits for reconditioning certain parts and service sets which include all of the parts necessary to complete a task are available (TM 5-2420-222-20P).

TAGGING PARTS

Use cardboard tags with wire fasteners (item 30, Appendix C) to identify all electrical wires; hydraulic, fuel, oil, and coolant lines; and any other parts which may be hard to identify or place later. Fasten tags to parts during removal by wrapping wire fasteners around or through parts and twisting ends together. Position tags to be out of the way during cleaning, inspection, and repair. Mark tags with a pencil, pen, or felt-tip marker.

Identify electrical wires with number of terminal or wire to which it connects whenever possible, to avoid confusion. If no markings can be found, tag both wires or wire and terminal, and use the same identifying mark for both. If you cannot tag a wire because it must fit through a small hole or you cannot reach it, write down a description of the wire and the point to which it connects, and draw a simple diagram on paper. Be sure to write down enough information so you will be able to connect wires properly during assembly.

If you need to identify a loose wire, look for color of the wire. Compare this color to the wire colors on the appropriate electrical schematic in Section XII, Electrical System (page 2-435).

Identify hydraulic, fuel, coolant, and oil lines whenever you are taking off more than one line at the same time. Mark tags with the points to which lines and hoses must be connected. For example, "Bulkhead adapter to scarifier cylinder tube and adapters might be written on the tag for a hydraulic hose. If it is not obvious which end of a line goes where, tag each end of the line.

Identify other parts as necessary by name and installed location.

SOLDERING

CAUTION

Use a low-wattage soldering gun when soldering electrical wires, connectors, terminal lugs, and receptacles. A high-wattage soldering gun may damage parts by overheating them.

Solder connections must be bright and clean before soldering (see page 2-138 of this section for instructions on how to clean electrical parts). Solder must be non-acid type (item 26, Appendix C). Use rosin flux (item 12, Appendix C). All wires, parts, and soldering gun must be pre-tinned for good connection and maximum transfer of heat.

To prevent overheating damage to electrical parts when soldering and unsoldering connections, hold bare wire, lead, or terminal lug close to soldering point with long roundnose pliers. Pliers act as a heat sink, absorbing excess heat.

WARNING

Electrical parts solvent cleaning compound (trichlorotrifluoroethane) is flammable, and reacts violently with aluminum, titanium, barium, lithium, samarium, and sodium potassium. Cleaning compound fumes displace air and it may be carcinogenic. Boiling point is 114°F (460C). Do not wear jewelry. Wear rubber gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning compound, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Clean all solder joints with an acid swabbing brush and electrical parts solvent cleaning compound (item 4, Appendix C) after soldering to get a bright clean surface.

HEAT SHRINKABLE TUBING

Heat shrinkable tubing (item 15, Appendix C) Is used to Insulate soldered and crimped electrical connections as follows:

1. Cut desired length of new tubing twice the diameter of the connection to be covered.
2. Slide tubing onto wire and out of the way before making connection.
3. After making electrical connections, slide tubing Into place over it.

WARNING

Do not touch heat shrinkable tubing for at least 30 seconds after heating. Hot tubing can burn you.

4. Hold heat gun 4 to 5 inches away from tubing and apply heat for about 30 seconds. Stop applying heat as soon as tubing forms to shape of connection.

WIRE TERMINAL AND CONNECTOR REPLACEMENT

Replace wire terminals and connectors as follows:

1. Cut off damaged terminal or connector with diagonal-cutting pliers.
2. Slide new length of heat shrinkable tubing (item 15, Appendix C) onto wire if desired.
3. Using wire stripper, strip enough insulation from wire to allow bare wire to go all the way into hole In terminal or connector.
4. Select proper terminal or connector for wire size and terminal stud or other mating connector.
5. Insert bare end of wire all the way into hole in terminal or connector.
6. Crimp or solder terminal or connector to wire. Make sure that connection is tight.
7. If heat shrinkable tubing is used, shrink it around connection.

WIRE REPLACEMENT

WARNING

Although battery ground cable must be connected to test electrical circuit voltage, disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

Replace damaged electrical wires as follows:

1. If terminals or connections of wire to be replaced are covered with heat shrinkable tubing, cut off using sharp knife.

WIRE REPLACEMENT - CONTINUED

2. If a solder type terminal is in good condition, it can be unsoldered and reused.

3. Unsolder wires from soldered splice and terminal connections.

4. Cut new wire of same gage and type as wire being replaced to desired length using diagonal-cutting pliers.

5. Slide new lengths of heat shrinkable tubing (item 15, Appendix C) onto wire ends if desired. Always use heat shrinkable tubing around wire splices, or wrap them with electrical tape (item 32, Appendix C).

6. Connect terminals or connectors to wire by soldering or crimping as necessary. Make sure that connections are tight.

7. To splice two wires together, twist and tin end strands of each wire separately. After allowing tinned ends to cool, twist both ends together and reheat to fuse ends together.

8. If heat shrinkable tubing Is used, shrink it around connections.

ELECTRICAL GROUND POINTS

Many electrical problems are the result of poor ground connections. You can make sure that ground connections are good by doing the following:

WARNING

Although battery ground cable must be connected to test electrical circuit voltage, disconnect battery ground cable before doing resistance tests or replacing parts. This will keep you from getting shocked and prevent damage to parts and equipment.

1. Remove hardware connecting ground cable terminal to ground point.

WARNING

Electrical parts solvent cleaning compound (trichlorotrifluoroethane) is flammable, and reacts violently with aluminum, titanium, barium, lithium, samarium, and sodium potassium. Cleaning compound fumes displace air and it may be carcinogenic. Boiling point is 114°F (460C). Do not wear jewelry. Wear rubber gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning compound, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

2. Clean mounting hardware, ground cable terminal, and ground point with electrical parts solvent cleaning compound (item 4, Appendix C) and acid swabbing brush.

3. Remove any rust with wire brush and crocus cloth (item 6, Appendix C).

4. Look for cracks, loose terminals, and stripped threads. Replace any defective parts.

5. Install hardware connecting ground cable terminal to ground point. Make sure that all hardware Is tight.

LINES AND PORTS

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

1. Clean fittings and surrounding area before disconnecting lines.

2. Cover, cap, plug, or tape lines and ports right after disconnecting lines. Whenever possible, use protective plastic caps and plugs. When these are not available, use hand-carved wooden plugs, clean rags (item 21, Appendix C), duct tape (item 31, Appendix C), or similar materials to keep dirt out of fluid systems.

3. Make sure new and used parts are clean before installing them.

4. Wait to uncover, uncap, unplug, or remove tape from lines and ports until just before installing lines.

TUBES WITH COMPRESSION FITTINGS

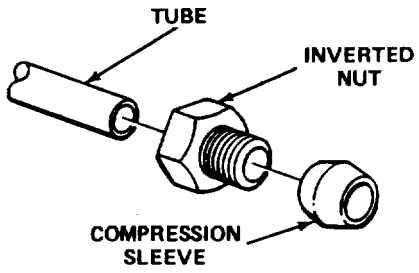
Tubes with inverted nuts and compression fittings are designed for one-time assembly. Once assembled, they must be replaced as a unit if any parts are found defective. Used parts may not seal properly when used with new ones. Used tube assemblies in good condition can be reinstalled to their original locations without leaking.

Assemble new tubes, compression sleeves, and inverted nuts as follows:

1. Slide inverted nut onto end of tube.

2. Slide compression sleeve onto end of tube.

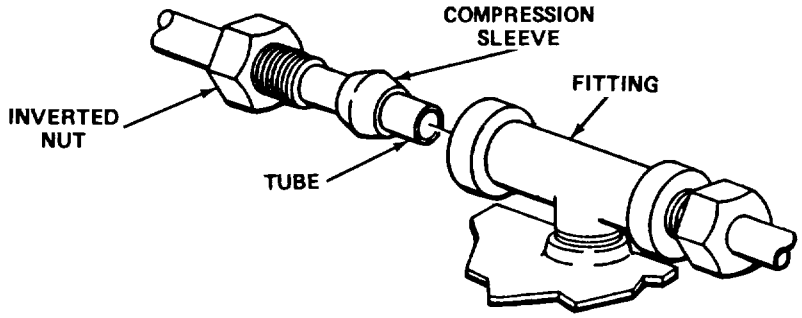
3. Repeat steps 1 and 2 for other end of tube if needed.



TUBES WITH COMPRESSION FITTINGS - CONTINUED

Proceed with Installation of assembled tube as follows:

1. Insert end of tube as far as it will go into fitting to which tube is being installed.
2. Screw Inverted nut into fitting and tighten it against compression sleeve using open-end or open-end box wrench. Compression sleeve will clamp down around tube and conform to internal surface of fitting and inverted nut.
3. Repeat steps 1 and 2 for other end of tube if needed.



OPERATIONAL AND LEAK CHECKS

After maintenance has been preformed, take a little time to make sure everything you repaired works properly.

If you have just repaired electrical wiring or replaced switches or other electrical parts, operate the repaired circuit for a few moments to make sure it works.

If you have Just Installed lubricant filters or drainplugs, or fuel, cooling, steering, or hydraulic system components or lines, run the engine and operate the circuit affected by maintenance for a few minutes. Make sure it works correctly and check for fluid leaks. if leaks are found, tighten parts using the same tools used to install them. If leaks don't stop, gaskets, packings, or other parts are defective and must be replaced. Be sure to check level of and, if necessary, fill a fluid system found leaking after all leaks have been repaired.

FLUID DISPOSAL

Get rid of contaminated drained fluids in accordance with your unit's Standard Operating Procedures (SOP).

TA242775

Section VII. ENGINE

ENGINE

This task covers:

a. Draining (page 2-145)
b. Cleaning (page 2-146)
c. Inspection/Replacement (page 2-146)
d. Filling (page 2-147)

INITIAL SETUP:

Tools
- Container, 10-gallon
- Wrench, open-end, 1 1/&inch

Materials/Parts
- Oil, engine (LO 52420222-12)
- Rags, wiping (item 21, Appendix C)

Materials/Parts - Continued
- Solvent, drycleaning (item 28, Appendix C)
- Washer, oil pan plug

Personnel Required
- One

LOCATION	ITEM	ACTION	REMARKS

DRAINING

1.	Loader backhoe	Engine	a. Start (TM 52420-222-10). b. Let run for several minutes until hot. c. Shut down (TM 52420-222-10).	

ENGINE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

DRAINING - CONTINUED

WARNING

Be careful when draining hot fluids. Wear gloves to protect your hands from hot parts and fluids or severe burns could result.

2	Oil pan (1)	Plug (2) and washer (3)	a. Place 10-gallon container underneath. b. Using 1 118-inch open-end wrench, unscrew and take out. c. Get rid of washer (3). d. Let oil drain completely. e. Get rid of drained oil (page 2-137).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

3.		Plug (2)	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

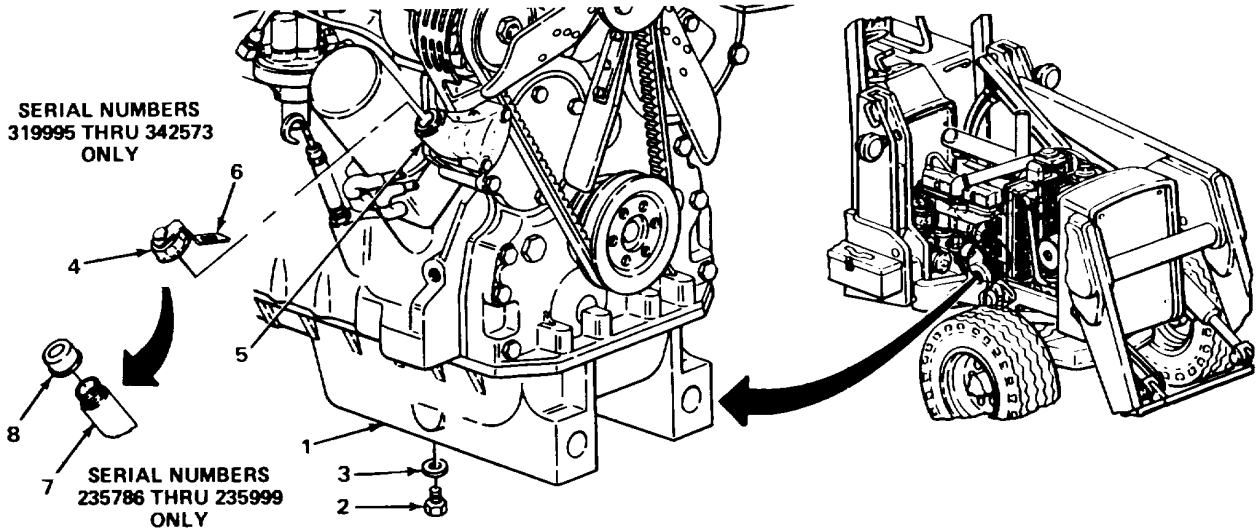
NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

4.		Plug (2)	a. Look for cracks and breaks. b. Look for damaged threads.

LOCATION	ITEM	ACTION REMARKS
FILLING		
5. Oil pan (1)	Plug (2) and new washer (3)	Screw in and tighten using 1 118-inch open-end wrench.
6. Cap (4) and filler neck (5)	Locking latch (6)	On loader backhoes with Serial Numbers 319995 thru 342573 only, pull up and move aside.
7. Filler neck (5or7)	Cap (4 or 8)	Unscrew and take off.
8. Engine block (9)	Filler neck (5 or 7)	Fill with proper amount and grade of engine oil (LO 5-2420-222-12).
9. Filler neck (5 or7)	Cap (4 or 8)	Screw on and tighten until snug.
10. Filler neck (5) and cap (4)	Locking latch (6)	On loader backhoes with Serial Numbers 319995 thru 342573 only, place In postion and push on.
11. Oil pan (1)	Plug (2) and washer (3)	a. Check for leaks. b. If leaking, tighten using 1 118-inch open-end wrench.



ENGINE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

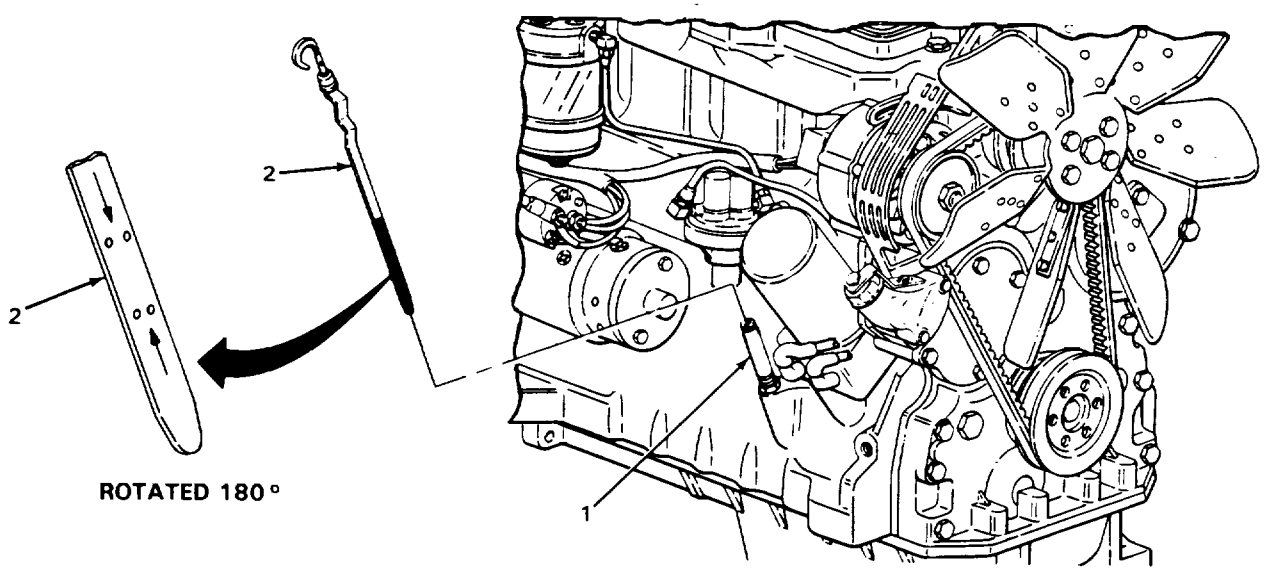
FILLING - CONTINUED

12.	Loader backhoe	Engine	a. Start (TM 5-2420-222-10). b. Let run for two minutes. c. Shut down (TM 52420-222-10). d. Allow oil to drain back into oil pan (1) for one minute.

NOTE

Liquid level gage nipple and adapter are similar and perform the same function. Adapter is shown.

13.	Nipple or adapter (1)	Gage (2)	a. Pull out. b. Using clean, dry rag, wipe off. c. Place in position. **Be sure gage is fully seated**. d. Pull out and read oil level. **Oil level should be between add and full marks**. e. Place in position. f. If engine oil level is too low, repeat steps 6 thru 10, and 13.



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TASK ENDS HERE

VALVES

This task covers:

Adjustment (page 2-149)

INITIAL SETUP:

Tools
- Gage, thickness
- Wrench, open-end, 1/2-inch
- Wrench, open-end, 3/4-inch
- Wrench, pipe adjustable, 1 to 2-inch

Personnel Required
- One

Equipment Condition
1. Radiator removed (page 2-371).
2. Rocker arm cover removed (page 2-153).

LOCATION	ITEM	ACTION	REMARKS

ADJUSTMENT

NOTE

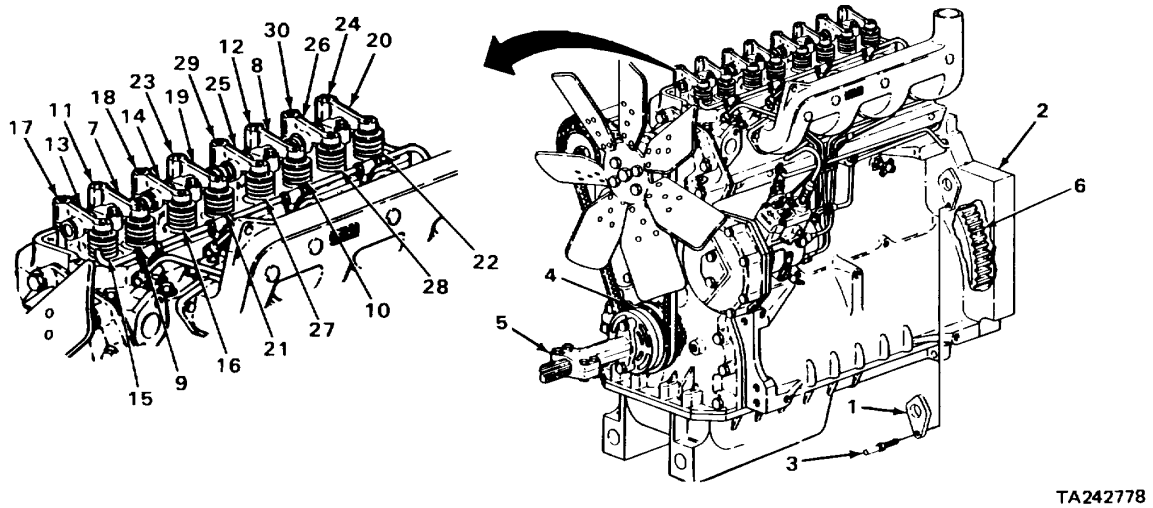
Engine may be hot or cold during valve adjustment.
Cylinders are numbered from one to four starting at fan end of engine.

VALVES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ADJUSTMENT - CONTINUED		
1. Cover (1) and housing (2)	Pin (3)	Using 314-inch open-end wrench, unscrew and take out.
2. Housing (2)	Cover (1)	Take off.
3. Crankshaft pulley (4)	Hydraulic pump drive shaft (5)	Using 1 to 2-inch adjustable pipe wrench, turn until number one cylinder is at top dead center. **Number one cylinder is at top dead center when both of Its valves are fully closed and hole In flywheel is alined with timing hole in housing.**
	NOTE	
	If pin cannot be Inserted all the way into flywheel, repeat step 3.	
4. Housing (2) and flywheel (6)	Pin (3)	Slide through timing hole in housing (2) until seated in hole in flywheel (6).
5. Number one and number three exhaust valve rocker arms (7 and 8)	Two valves (9 and 10) and two adjusting screws (11 and 12)	While measuring clearance between valves (9 and 10) and rocker arms (7 and 8) with thickness gage, using 1/2-inch open-end wrench, turn screws (11 and 12) in or out as needed to get correct clearance. **Correct clearance is 0.018 inch (0.46 mm).**
6. Number one and number two intake valve rocker arms (13 and 14)	Two valves (15 and 16) and two adjusting screws (17 and 18)	While measuring clearance between valves (15 and 16) and rocker arms (13 and 14) with thickness gage, using 112-inch open-end wrench, turn screws (17 and 18) in or out as needed to get correct clearance. **Correct clearance Is 0.014 Inch (0.36 mm).**
7. Housing (2) and flywheel (6)	Pin (3)	Take out.
8. Crankshaft pulley (4)	Hydraulic pump drive shaft (5)	Using 1 to 2-inch adjustable pipe wrench, turn until number four cylinder is at top dead center.

VALVES - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
8. Continued			**Number four cylinder Is at top dead center when both of its valves are fully closed and hole in flywheel is alined with timing hole in housing; one full turn of flywheel from number one cylinder top dead center position.**
		NOTE **If pin cannot be inserted all the way into flywheel, repeat step 8.**	
9. Housing (2) and flywheel (6)	Pin (3)	Slide through timing hole in housing (2) until seated in hole in flywheel (6).	
10. Number two and number four exhaust valve rocker arms (19 and 20)	Two valves (21 and 22) and two adjusting screws (23 and 24)	While measuring clearance between valves (21 and 22) and rocker arms (19 and 20) with thickness gage, using 1/2-inch open-end wrench, turn screws (23 and 24) in or out as needed to get correct clearance.	**Correct clearance is 0.018 inch (0.46 mm).**
11. Number three and number four intake valve rocker arms (25 and 26)	Two valves (27 and 28) and two adjusting screws (29 and 30)	While measuring clearance between valves (27 and 28) and rocker arms (25 and 26) with thickness gage, using 112-inch open-end wrench, turn screws (29 and 30) in or out as needed to get correct clearance.	**Correct clearance is 0.014 inch (0.36 mm).**



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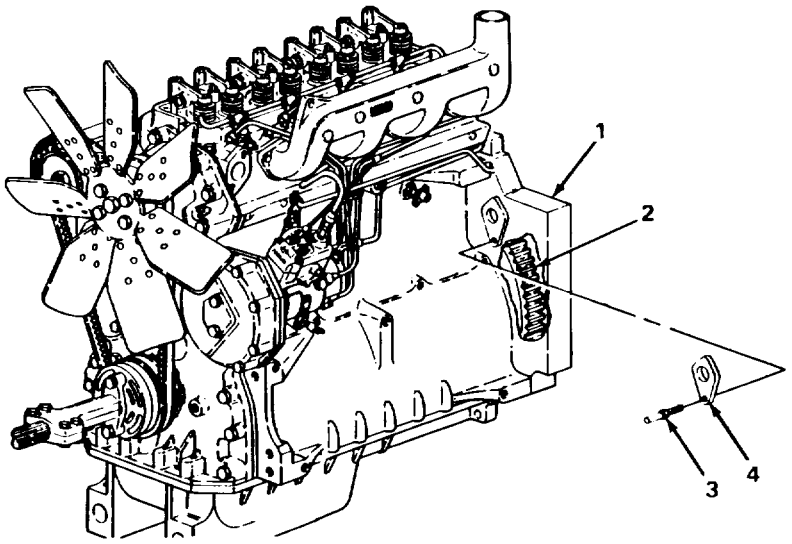
VALVES - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
12. Housing (1) and flywheel (2)	Pin (3)	Take out.	
13. Housing (1)	Cover (4)	Place in position.	
14. Housing (1) and cover (4)	Pin (3)	Screw in and tighten using 3/4-inch open-end wrench.	

NOTE

FOLLOW-ON MAINTENANCE:

1. Install radiator (page 2-371).
2. Install rocker arm cover (page 2-153).



TASK ENDS HERE

TA242779

ROCKER ARM COVER

This task covers:

a. Removal (page 2-153)
b. Cleaning (page 2-154)
c. Inspection/Replacement (page 2-154)
d. Installation (page 2-154)

INITIAL SETUP:

Tools

Extension, 3/&inch drive, 5inch
Handle, ratchet, 3/8-inch drive
Socket, 3/8-inch drive, 7/16-inch
Wrench, torque, 3/8-inch drive, 0 to 150 inch-pound capacity

Materials/Parts

Gasket, rocker arm cover
Ventilator pipe removed (page 2-173)

Materials/Parts - Continued

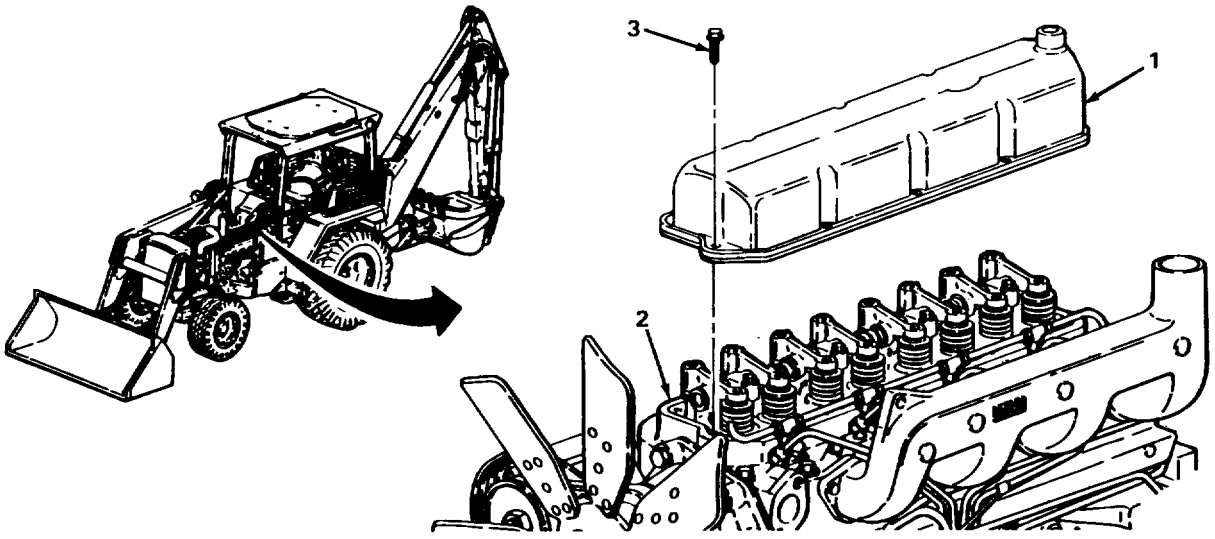
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

LOCATION	ITEM	ACTION / REMARKS
1. Cover (1) and cylinder head (2)	Eight assembled washer bolts (3)	Using 7116inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.



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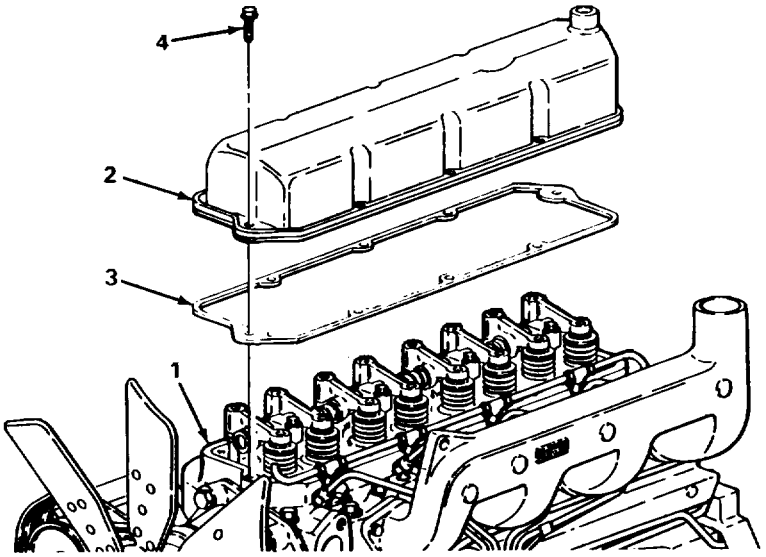
ROCKER ARM COVER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL - CONTINUED		
2. Cylinder head (1)	Cover (2) with gasket (3)	a. Take off. b. Get rid of gasket (3).
CLEANING		
	NOTE	
	For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
3.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
4.	Cover (2)	Look for cracks, bends, and breaks.
5.	Eight assembled washer bolts (4)	a. Look for cracks and breaks. b. Look for damaged threads.
INSTALLATION		
6. Cylinder head (1)	New gasket (3) and cover (2)	Place in position.

ROCKER ARM COVER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
7. Cylinder head (1) and cover (2)	Eight assembled washer bolts (4)	a. Screw in and tighten until snug using 7/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle. b. Using 7116-inch, 318-inch drive socket, 5-inch extension, and 0 to 150 Inch pound capacity torque wrench, tighten to 25 inch pounds (3 N•m) torque.



NOTE

FOLLOW-ON MAINTENANCE: Install ventilator pipe (page 2-173).

TASK ENDS HERE

TA242781

LUBRICATING COOLER (ENGINE OIL COOLER)

This task covers:

a. Removal (page 2-156)
b. Disassembly (page 2-157)
c. Cleaning (page 2-158)
d. Inspection/Replacement (2-158)
e. Repair (page 2-158)
f. Assembly (page 2-159)
g. Installation (page 2-160)

INITIAL SETUP:

Tools

Driftpin, brass-tipped, 3/4-inch
File, thread restorer
Harrlmer, ball-peen, 1-pound head
Hand pump, flow control valve, handle, and pressure gage
Handle, ratchet, 1/2-inch drive
Knife, pocket
Pan, drain
Puller kit, mechanical, slide hammer type
Screwdriver, flat-tip, 114-inch
Socket, 1/2-inch drive, 1 1116-inch
Thread set, pipe
Wrench, open-end, 5/16-inch
Wrench, torque, 112-inch drive, 0 to 150 foot-pound capacity

Materials/Parts

Packing, cooler
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

1. Radiator drained (page 2-368)
2. Engine oil filter element removed (page 2-168)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Cooler (1)	Plug (2)	a. Place drain pan underneath. b. Using 5/16-inch open-end wrench, unscrew and take out. c. Let oil drain completely. d. Get rid of drained oil (page 2-137).	
2. Two hoses (3)	Two clamps (4)	a. Place drain pan underneath. b. Using 1/4-inch flat-tip screwdriver, loosen.	
3. Cooler (1)	Two hoses (3) with assembled clamps (4)	a. Take off. b. Let coolant drain completely. c. Get rid of drained coolant (page 2-137).	

LUBRICATING COOLER (ENGINE OIL COOLER) - CONTINUED

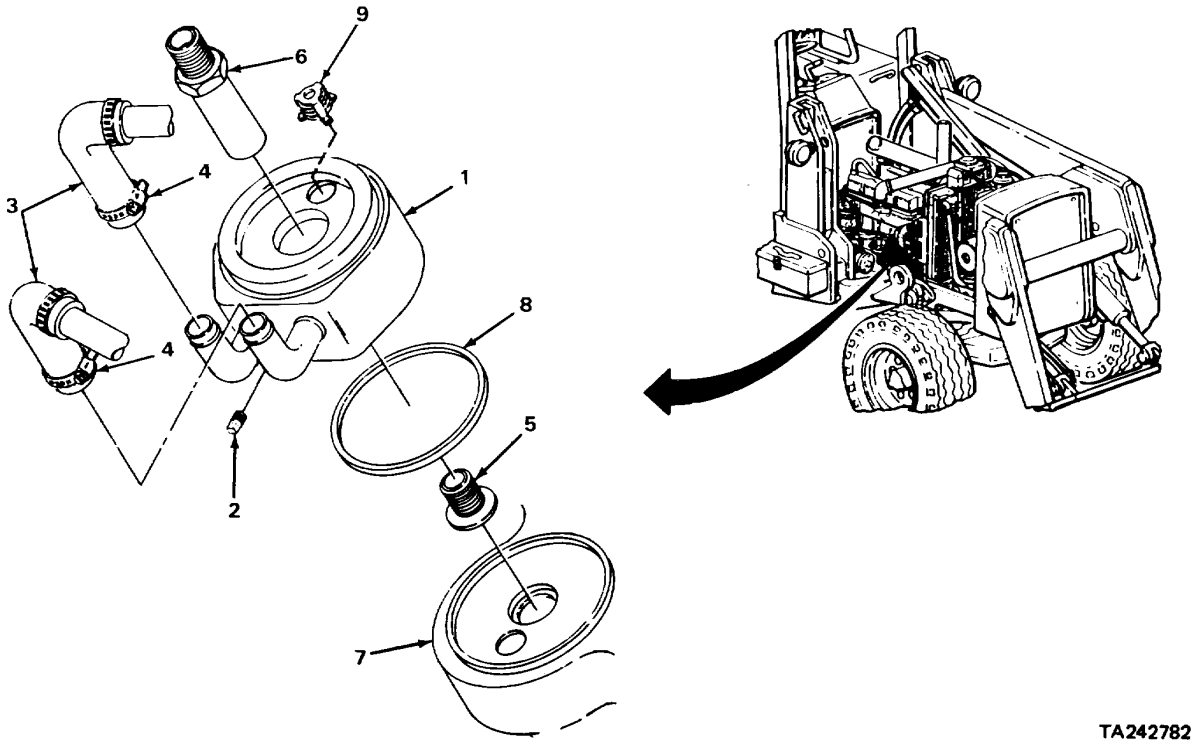
LOCATION	ITEM	ACTION REMARKS
4. Cooler (1) and nipple (5)	Nipple (6)	Using 1 1/16-inch, 1/2-inch drive socket and ratchet handle, unscrew and take out.
5. Engine block (7) and nipple (5)	Cooler (1) with assembled packing (8)	Take off.
6. Cooler (1)	Packing (8)	a. Using pocket knife, take off. b. Get rid of.

DISASSEMBLY

CAUTION

Do not remove valve or nipple unless inspection shows need for replacement. Removal may damage parts.

7. Cooler (1)	Valve (9)	Using 1/4-inch flat-tip screwdriver, pry out from bottom of cooler (1).
8. Engine block (7)	Nipple (5)	Using slide hammer type mechanical puller kit, take out.



TA242782

LUBRICATING COOLER (ENGINE OIL COOLER) - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING		
	NOTE	
	For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
9.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts that cannot be repaired.	
10.	All metal parts	Look for cracks, breaks, and abnormal bends.
11. Cooler (1)	Valve (2)	Using hand pump, flow control valve, handle, and pressure gage, measure opening pressure. **Valve should open at 12 to 15 psi (83 to 103 kPa).**
12	All threaded parts	Look for damaged threads.
REPAIR		
13.	Nipple (3) and cooler (1)	If threads are damaged, using pipe thread set, restore threads.

LUBRICATING COOLER (ENGINE OIL COOLER) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

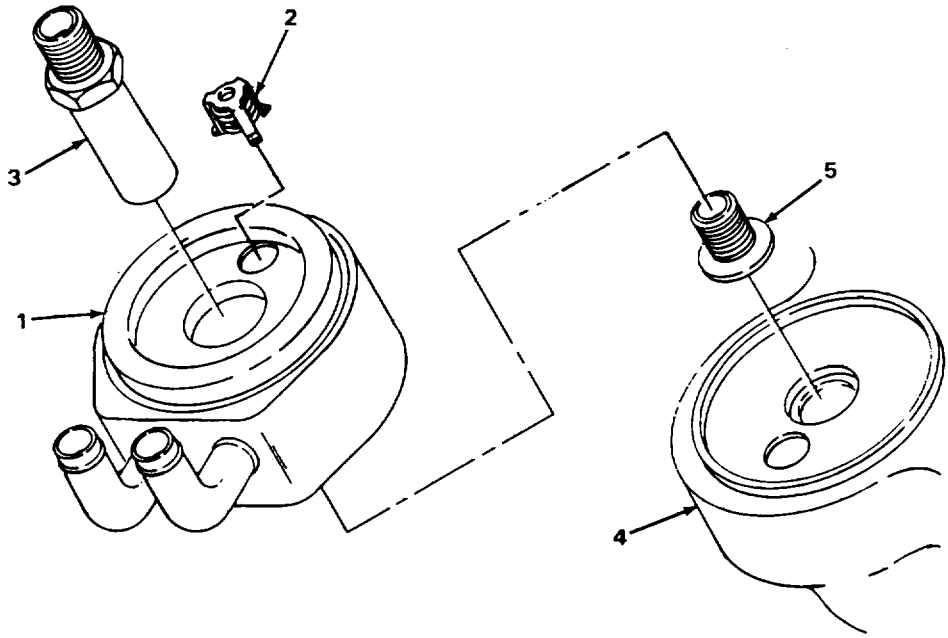
CAUTION

If threads on nipple are to be restored while it is installed in engine block, plug opening to keep out metal chips. Metal chips in lubrication system will damage parts.

14. Engine block (4)	Nipple (5)	a. If threads are damaged, plug opening (page 2-137). b. Using thread restorer file, restore threads. c. Unplug.

ASSEMBLY

15. Engine block (4)	Nipple (5)	If removed, using 1-pound head ball-peen hammer and 314-inch brass-tipped drift-pin, drive In.
16. Cooler (1)	Valve (2)	If removed, using 1-pound head ball-peen hammer, tap in.



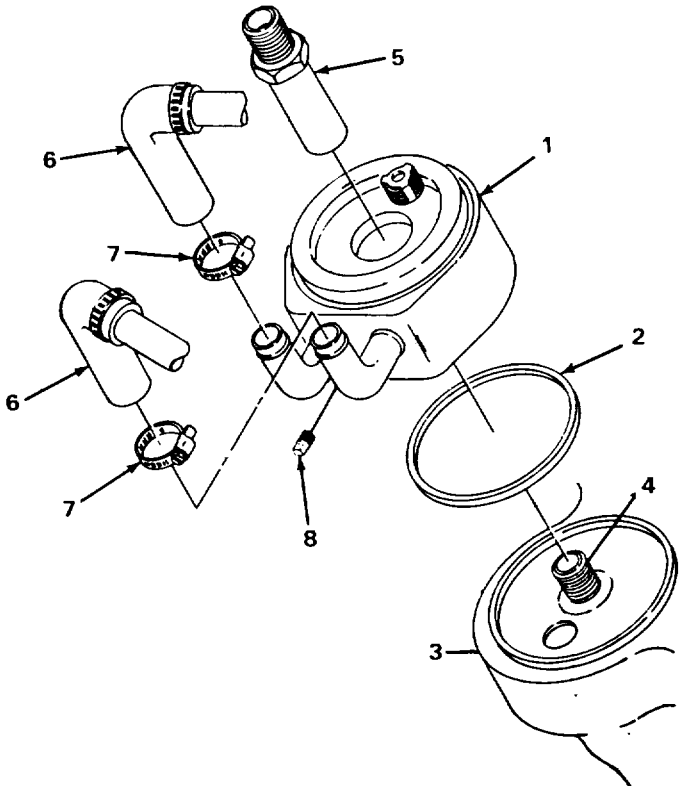
TA242783

LUBRICATING COOLER (ENGINE OIL COOLER) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION		
17. Cooler (1)	New packing (2)	Place In position.
18. Engine block (3) and nipple (4)	Cooler (1)	Place in position.
19. Cooler (1) and nipple (4)	Nipple (5)	a. Screw in and tighten until snug using 1 1/16-inch, 1/2-inch drive socket and ratchet handle. b. Using 1 1/16-inch, 112-inch drive socket and 0 to 150 foot-pound capacity torque wrench, tighten to 20 to 25 foot-pounds (27 to 34 N.m) torque.
20. Cooler (1)	Two hoses (6) with assembled clamps (7)	Place position.
21. Two hoses (6)	Two clamps (7)	Using 1/4-inch flat-tip screwdriver, tighten.
22. Cooler (1)	Plug (8)	Screw in and tighten using 5116-inch open-end wrench.
23. Loader backhoe	Radiator	Fill (page 2-368). **Do not start engine at this time.**
24.	Engine oil filter element	Install (page 2-168). **Do not shut down engine at this time.**
25.	Engine	Run at high idle (TM 5-2420-222-10).
26.	Engine lubricating cooler	a. Check for oil and coolant leaks. b. If coolant is found leaking at any connection tighten clamps (7) using 1/4-inch flat-tip screwdriver. c. If coolant leak does not stop or if oil leak is found, shut down engine (TM 5-2420-222-10) and replace defective packing or component as outlined in this task.

LUBRICATING COOLER (ENGINE OIL COOLER) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
27.	Radiator	If coolant leak was found, fill (page 2-368).
28.	Engine	If still running, shut down (TM 5-2420-222-10).



TA242784

TASK ENDS HERE

OIL FILLER CAP

This task covers:

- **a. Disassembly (page 2-162)**
- **b. Cleaning (page 2-162)**
- **c. Inspection/Replacement (page 2-163)**
- **d. Repair (page 2-163)**
- **e. Assembly (page 2-163)**

INITIAL SETUP:

Tools

File, thread restorer
Knife, pocket

Personnel Required

One

Materials/Parts

Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)

Equipment Condition

Oil filler cap removed
(TM 5-2420-222-10)

LOCATION	ITEM	ACTION	REMARKS

DISASSEMBLY

NOTE

Oil filler caps on all loader backhoes are maintained the same way. Oil filler cap used on loader backhoes with Serial Numbers 319995 thru 342573 is shown.

CAUTION

Do not remove disk unless inspection shows need for replacement. Removal may damage parts.

1.	Cap (1)	Disk (2)	Using pocket knife, take out.

CLEANING

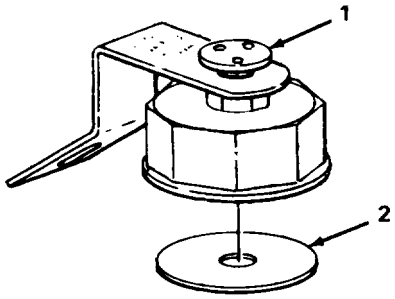
NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

2.		All parts	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.

OIL FILLER CAP - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts which cannot be repaired.	
3.	Cap (1)	a. Look for cracks bends, and breaks. b. Look for damaged threads.
4.	Disk (2)	Look for cracks and tears.
REPAIR		
5.	Cap (1)	If threads are damaged, using thread restorer file, restore threads.
ASSEMBLY		
6. Cap (1)	Disk (2)	If removed, place in position.



NOTE

FOLLOW-ON MAINTENANCE: Install oil filler cap (TM 52420-222-10).

TASK ENDS HERE

TA24278b

OIL FILLER NECK

This task covers:

a. **Removal (page 2-164)**
b. **Cleaning (page 2-165)**
c. **Inspection/Replacement (page 2-166**
d. **Repair (page 2-166)**
e. **Installation (page 2-166)**

INITIAL SETUP:

Tools
Tile, thread restorer
Handle, ratchet 318-inch drive
Socket, 3/8-inch drive, 9/16-inch

Materials/Parts
Gasket, filler neck
Lockwasher, filler neck screw (two required)
Rags, wiping (item 21, Appendix C)

Materials/Parts - Continued
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

Equipment Condition
Oil filler cap removed (TM 5-2420-222-10)

LOCATION	ITEM	ACTION	REMARKS

NOTE

Oil filler necks on all loader backhoes are maintained the same way. Oil filler neck used on loader backhoes with Serial Numbers 319995 thru 342573 is shown.

REMOVAL

1.	Filler neck (1), plate (2), and timing gear cover (3)	Long screw (4) and lockwasher (5)	a. Using 9116-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (5).
2.	Filler neck (1) and timing gear cover (3)	Short screw (6) and lockwasher (7)	a. Using 9116-inch, 3/8-inch drive socket and ratchet handle, unscrew and take b. Get rid of lockwasher (7).
3.	Filler neck (1) assembled parts	Plate (2) with	Take off.
4.	Timing gear cover (3)	Filler neck (1) and gasket (8)	a. Take off. b. Get rid of gasket (8).

OIL FILLER NECK - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

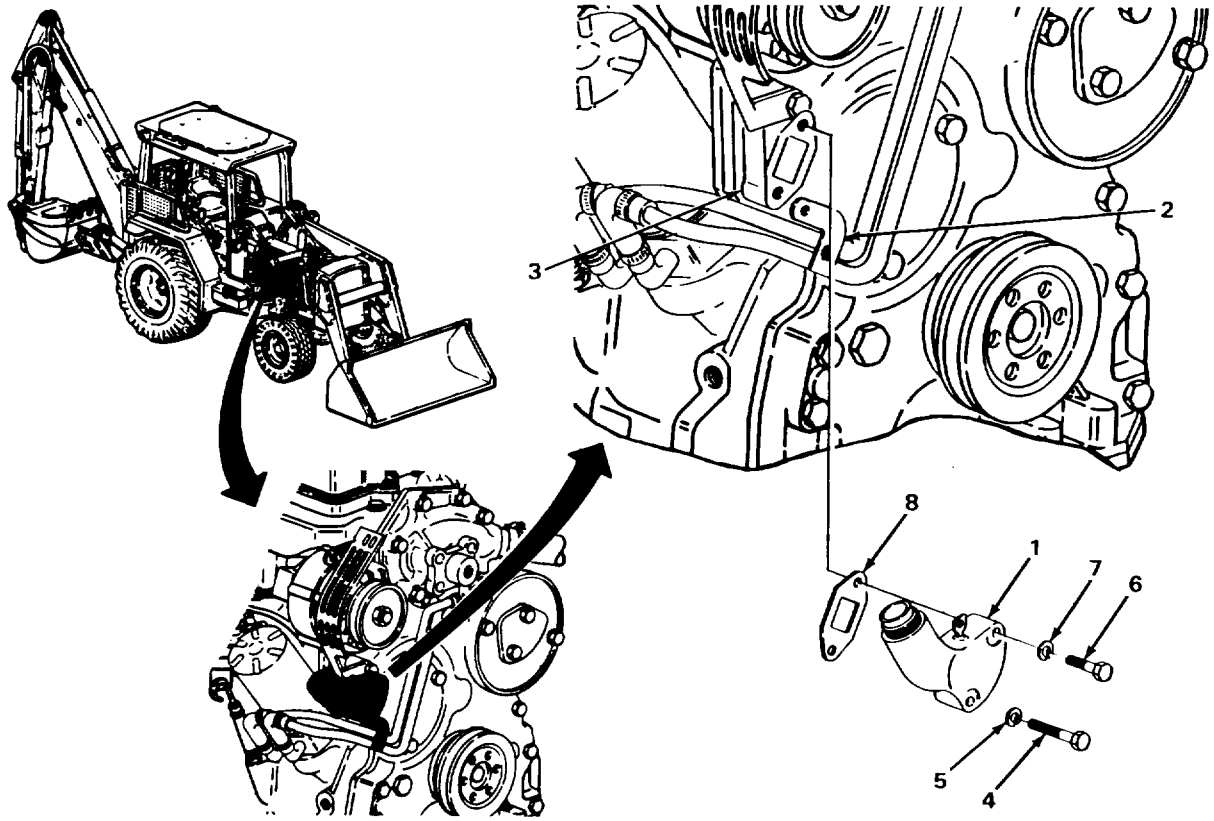
NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 59°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

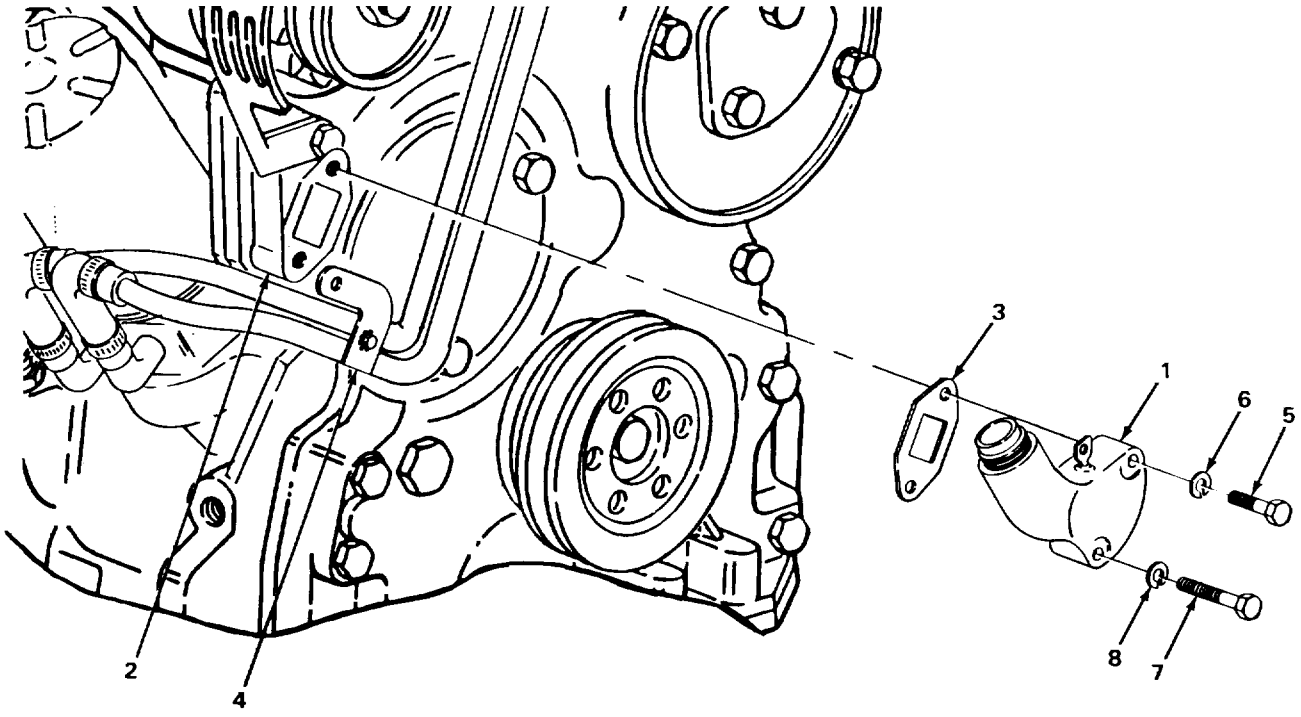
5.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.



TA242786

OIL FILLER NECK - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).** **Replace defective parts which cannot be repaired.**	
6.	Filler neck (1)	Look for cracks and breaks.
7.	All threaded parts	Look for damaged threads.
REPAIR		
8.	Filler neck (1)	If threads are damaged, using thread restorer file, restore threads.
INSTALLATION		
9. Timing gear cover (2)	Filler neck (1) and new gasket (3)	Place in position
10. Filler neck (1)	Plate (4) with assembled parts	Place In position.
11. Filler neck (1) and timing gear cover (2)	Short screw (5) and new lockwasher (6)	Screw in and tighten until snug.
12. Filler neck (1), plate (4), and timing gear cover (2)	Long screw (7) and new lockwasher (8)	Screw in and tighten until snug.
13. Filler neck (1), plate (4), and timing gear cover (2)	Short screw (5) and long screw (7)	Using 9/16-inch, 3/8-inch drive socket and ratchet, alternately tighten.



NOTE
FOLLOW-ON MAINTENANCE: Install oil filler cap (TM 5-2420222-10).

TASK ENDS HERE

TA242787

ENGINE OIL FILTER ELEMENT

This task covers:
- **a. Removal (page 2-168)**
- **b. Disassembly (page 2-168)**

INITIAL SETUP:

Tools
Handle, ratchet, 112-inch drive
Pan, drain
Removal tool, oil filter
Socket, 1/2-inch drive, 1-inch

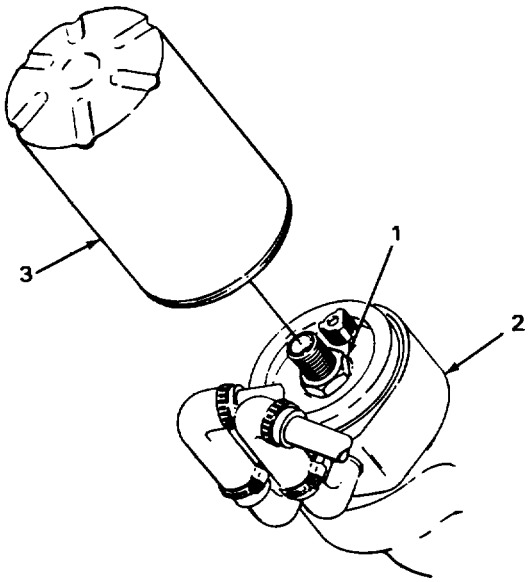
Materials/Parts
Filter element
Oil, engine (LO 52420-222-12)
Rags, wiping (item 21, Appendix C)

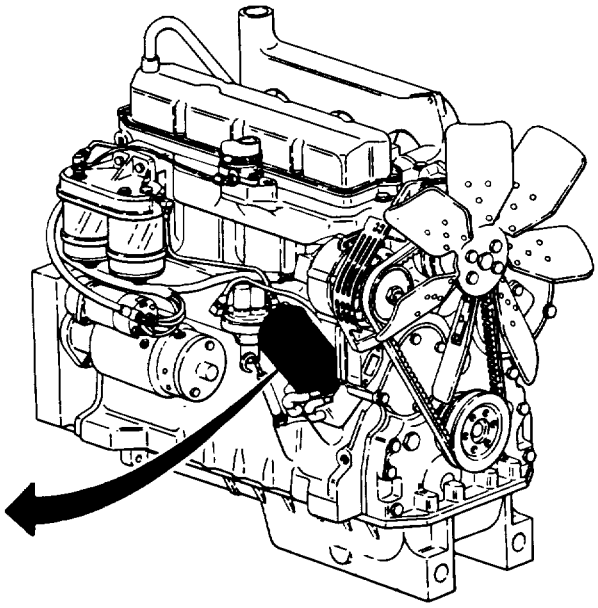
Personnel Required
One

LOCATION	ITEM	ACTION / REMARKS
REMOVAL		
1. Nipple (1) and cooler (2)	Filter element (3)	a. Place drain pan under cooler (2) to catch draining oil. b. Using oil filter removal tool, 1-inch, 1/2-inch drive socket and ratchet handle, unscrew and take out. c. Get rid of. d. 'Get rid of drained oil (page 2-168).
INSTALLATION		
	CAUTION **Do not overtighten filter element. Element may be damaged and leak.**	
2. Nipple (1) and cooler (2)	New filter element (3)	a. Using clean, dry rags, wipe sealing surfaces of cooler (2) clean. b. Apply thin film of engine oil to sealing ring. c. Screw on until sealing ring contacts cooler (2). d. Tighten one-half to three-quarter turn.
3. Loader backhoe	Engine	Check oil level and add proper amount and grade (page 2-168).

ENGINE OIL FILTER ELEMENT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
4.	Engine	Start and run at high idle for 5 minutes (TM 5-2420-222-10).
5. Engine	Filter element (3)	a. Check for leaks. b. If leaking, tighten only enough to stop leak. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace. d. If found leaking, repeat steps 3 thru 5.
6. Loader backhoe	Engine	a. If still running, shut down (TM 5-2420-222-10). b. Check oil level and, if necessary, add proper amount and grade (page 2-145).





TASK ENDS HERE

TA242788

LIQUID (OIL) LEVEL GAGE

This task covers:

a. Removal (page 2-170
b. Disassembly (page 2-171)
c. Cleaning (page 2-171)
d. Inspection/Replacement (page 2-172)
e. Repair (page 2-172)
f. Assembly (page 2-172)
g. Installation (page 2-172)

b. Disassembly

INITIAL SETUP:

Tools

Knife, pocket
Tape, measuring, 72-inch (1829 mm)
Threading set, screw
Wrench, open-end, 3/4-inch

Materials/Parts

Packing, nipple or adapter
Rags, wiping (item 21, Appendix C)

Materials/Parts - Continued

Sealing compound, thread (item 24, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

LOCATION	ITEM	ACTION	REMARKS

NOTE

Liquid level gage nipple and adapter are similar and perform the same function. Adapter is shown.

REMOVAL

1.	Nipple or adapter (1)	Gage(2)	a. Pull out. b. Using clean, dry rag, wipe off oil.

NOTE

If removing gage only, skip steps 2 thru 5.

2.	Nipple or adapter (1) and engine block (3)	Nut (4)	Using 314-inch open-end wrench, loosen.
3.	Engine block (3)	Nipple or adapter (1) with assembled parts	Unscrew and take out.

LIQUID (OIL) LEVEL GAGE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DISASSEMBLY		
4. Nipple or adapter (1)	Nut (4)	Unscrew and take off.
5. Packing (5)		a. Using pocket knife, take off. b. Get rid of.
CLEANING		

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

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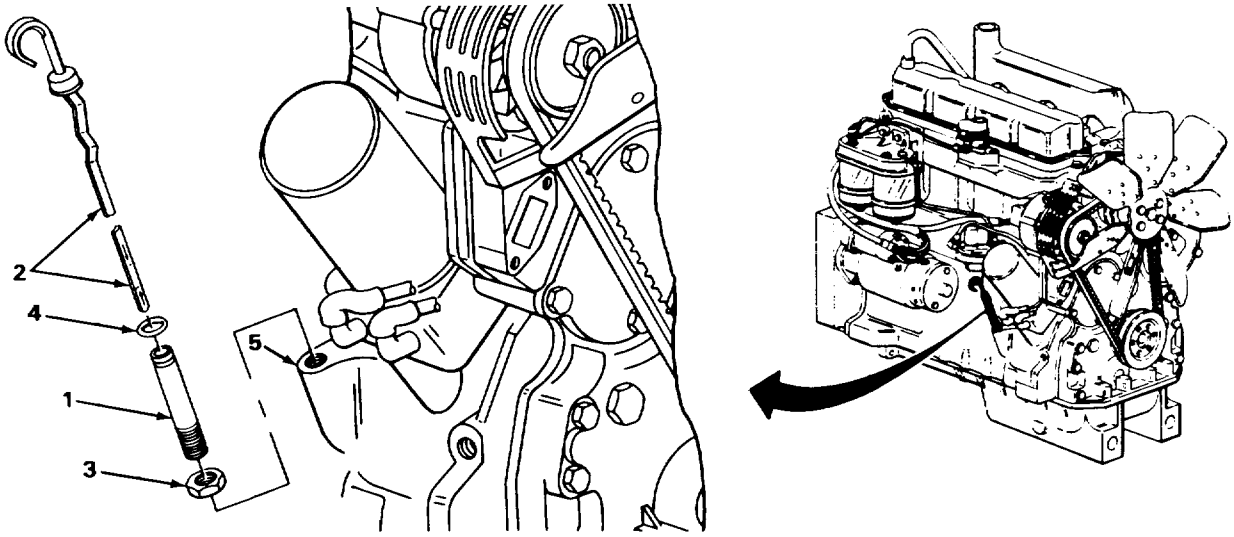
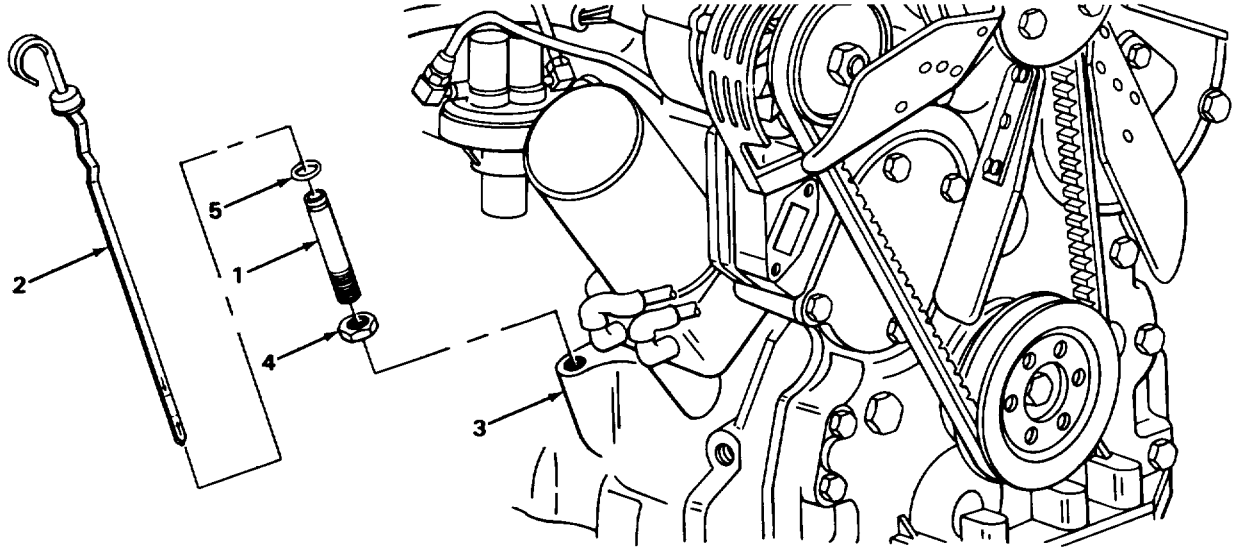
6.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.



TA242789

LIQUID (OIL) LEVEL GAGE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts which cannot be repaired.	
7.	Nipple or adapter (1) and gage (2)	Look for cracks, breaks, and abnormal bends.
8.	Nut (3)	Look for cracks and breaks.
9.	All threaded parts	Look for damaged threads.
REPAIR		
10.	Nipple or adapter (1)	If threads are damaged, using screw threading set, restore damaged threads.
ASSEMBLY		
	NOTE	
	if gage only was removed, skip steps 11 thru 14.	
11. Nipple or adapter (1)	New packing (4)	Place in position.
12.	Nut (3)	Screw on all the way.
INSTALLATION		
13. Engine block (5)	Nipple or adapter (1) with assembled parts	a. Apply thread sealing compound to threads. b. Using 72-inch (1829 mm) measuring tape to measure, screw in until distance from bottom of block (5) to top of nipple or adapter (1) is 8 inches (203 mm).
14. Engine block (5) and nipple or adapter (1)	Nut (3)	Using 3/4-inch open-end wrench, tighten 4- until seated against engine block (5).
15. Nipple or adapter (1)	Gage (2)	Push in all the way.i i Be sure gage is seated.



TASK ENDS HERE

VENTILATOR PIPE

This task covers:

a. Removal (PAGE 2-174
b. Cleaning (page 2-174)
c. Inspection/Replacement (page 2-175)
d. Installation (page 2-175)

INITIAL SETUP:

Tools

Handle, ratchet, 1/2-inch drive
Knife, pocket
Socket, 1/2-inch drive, 1/2-inch

Materials/Parts

Packing, pipe
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

Hood removed (page 2-1025)

VENTILATOR PIPE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
1. Clamp (1) and flywheel housing (2)	Screw (3) and washer (4)	Using 1/2-inch, 1/2-inch drive socket ratchet handle, unscrew and take out.
2. Pipe (5) and flywheel housing (2)	Clamp (1)	Take off.
3. Rocker arm cover (6) and packing (7)	Pipe (5)	Take out.
4. Rocker arm cover (6)	Packing (7)	a. Using pocket knife, take out. b. Get rid of.
CLEANING		

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

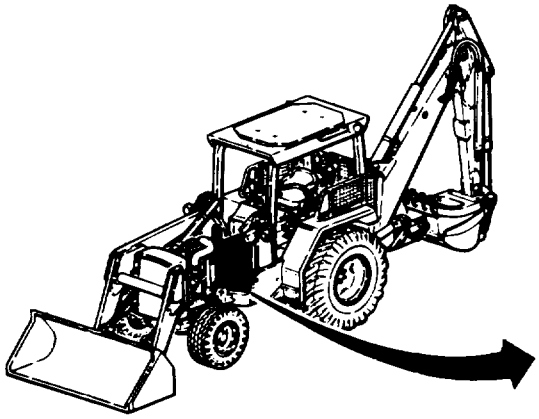
WARNING

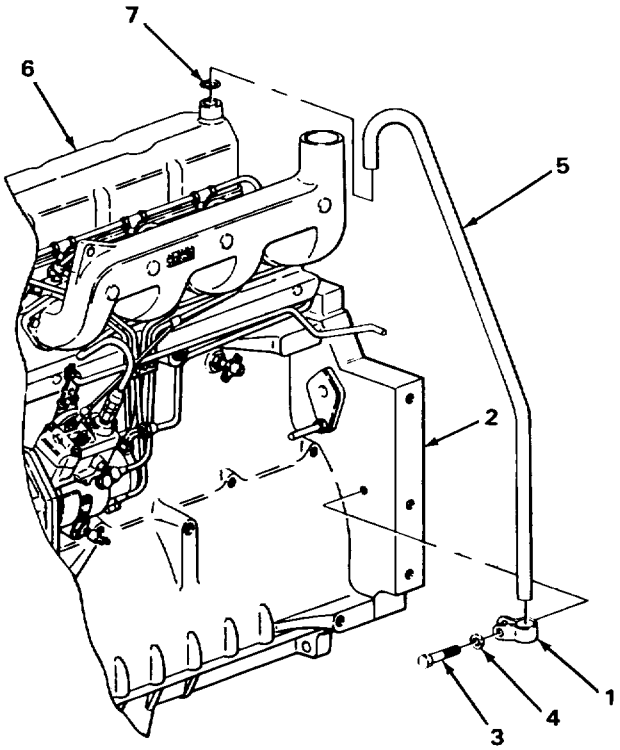
Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

5.	Pipe (5)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rag, wipe dry.
6.	All other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

VENTILATOR PIPE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
7.	All metal parts	Look for cracks and breaks.
8.	Pipe (5)	Look for abnormal bends which could restrict air flow.
9.	All threaded parts	Look for damaged threads.
INSTALLATION		
10. Rocker arm cover (6)	New packing (7)	Place in position. **Make sure it seats correctly.**

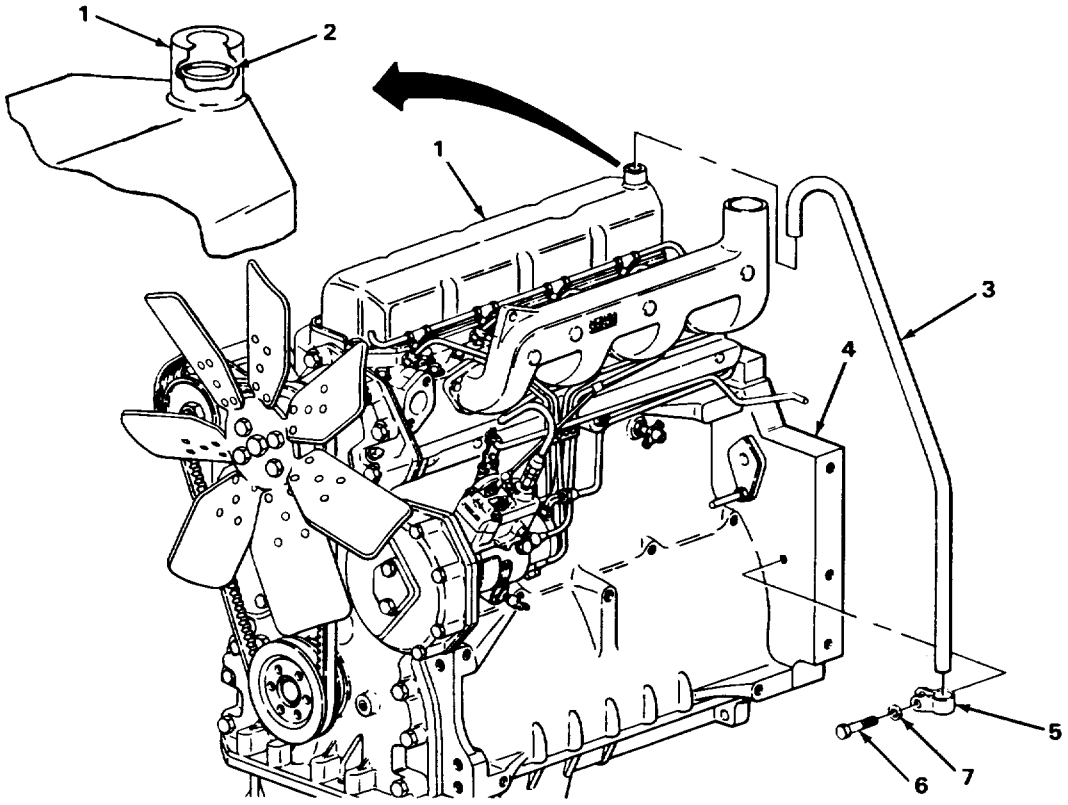




TA242791

VENTILATOR PIPE - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION - CONTINUED			
11. Rocker arm cover (1) and packing (2)	Pipe (3)	Put in.	
12. Pipe (3) and flywheel housing (4)	Clamp (5)	Place in position.	
13. Clamp (5) and flywheel housing (4)	Screw (6) and washer (7)	Screw In and tighten using 1/2-inch, 1/2-inch drive socket and ratchet handle.	



NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

TA242792

LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES

This task covers:

a. Removal (page 2-178)
b. Cleaning (page 2-178)
c. Inspection/Replacement (page 2-180)
d. Installation (page 2-180

INITIAL SETUP:

Tools

Handle, ratchet, 1/2-inch drive
Screwdriver, flat-tip, 1/4-inch
Socket, 1/2-inch drive, 9/16-inch

Materials/Parts

Detergent, GP (item 7, Appendix C)
Lockwasher, clamp screw
Lockwasher, plate screw

Materials/Parts - Continued

Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

Fan blade and pulley removed (page 2-431)

LOCATION	ITEM	ACTION	REMARKS

NOTE

Both lubricating cooler-to-water pump coolant lines are maintained the same way. One line Is shown. Repeat procedures for other line as needed.

LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL		
1. Plate (1) and filler neck (2) out.	Screw (3) and lockwasher (4)	a. Using 9/16-inch, 112-inch drive socket and ratchet handle, unscrew and take b. Get rid of lockwasher (4).
2. Plate (1) and clamp (5)	Screw (6) and lockwasher (7)	a. Using 1/4-inch flat-tip screwdriver, unscrew and take out. b. Get rid of lockwasher (7).
3. Two pipes (8 and 9) and filler neck (2)	Plate (1)	Take off.
4. Two pipes (8 and 9)	Clamp (5)	Take off.
5. Hose (10) loosen.	Two clamps (11)	Using 1/4-inch flat-tip screwdriver,
6. Cooler(12) and pipe (8)	Hose (10) with assembled two clamps (11)	Take off.
7. Hose(10)	Two clamps (11)	Slide off.
8. Hose (13)	Two clamps (14)	Using 114-inch flat-tip screwdriver, loosen.
9. Pipe (8)	Take out.	
10.	Two clamps (14)	Slide off.
11. Water pump tube (15)	Hose (13)	Take off.
CLEANING		

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

12. All rubber parts		a. Using clean rags dampened in solution of detergent and water, wipe clean. b. Using clean water, rinse. c. Using clean, dry rags, wipe dry.

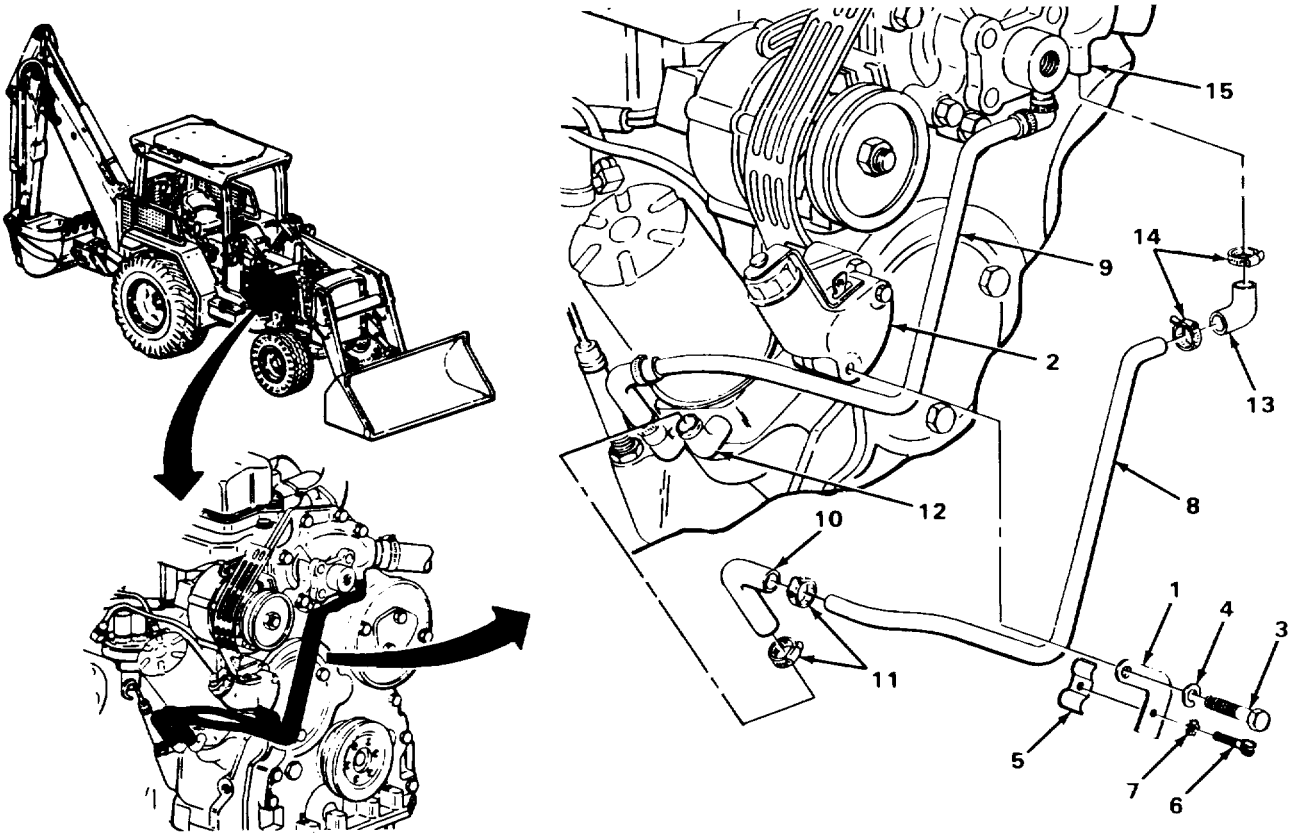
LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

WARNING

Drycleaning solvent P-D-80 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 59°C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

13.	Pipe (8)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.



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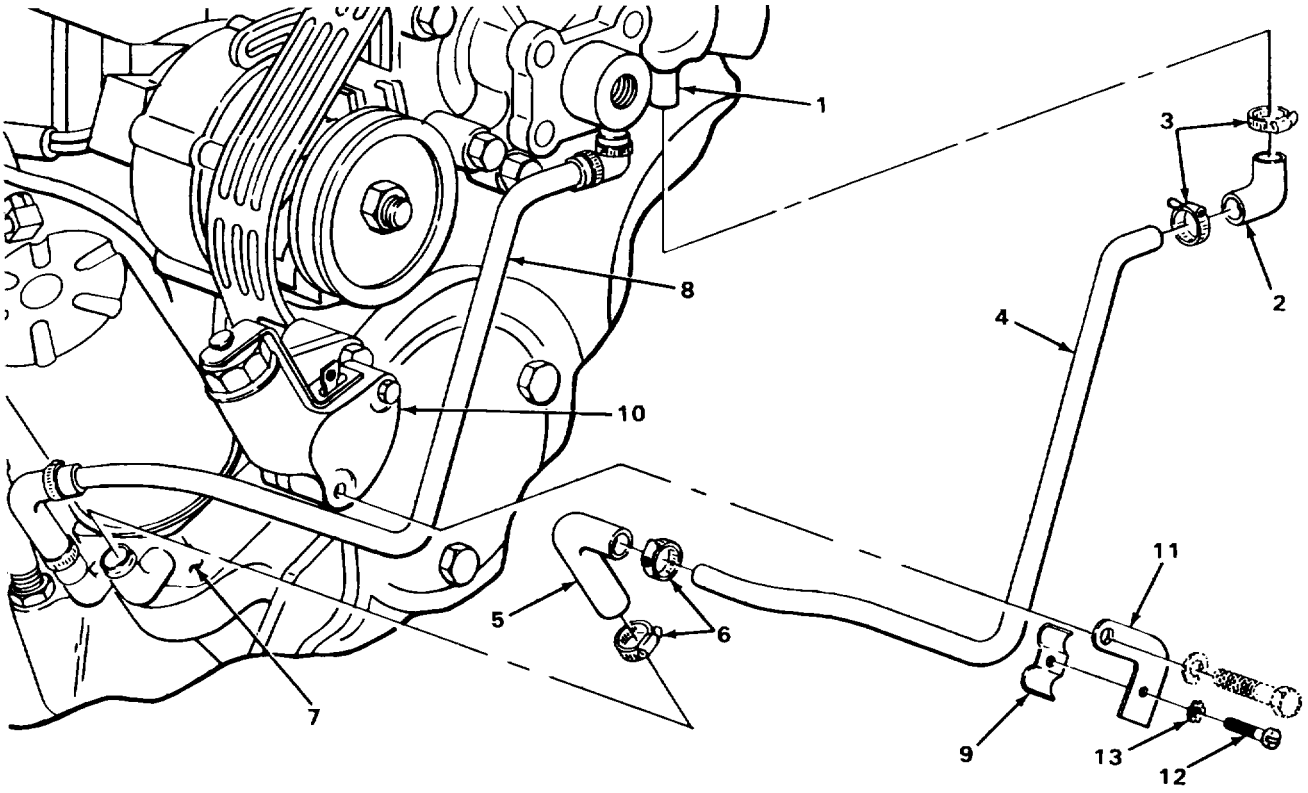
LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
CLEANING - CONTINUED		
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 138°F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
14.	All attaching hardware	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more Information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
15.	All metal parts	Look for cracks, breaks, and abnormal bends.
16.	All rubber parts	Look for cracks, breaks, and tears.
17.	All threaded parts	Look for damaged threads.
INSTALLATION		
18. Water pump tube (1)	Hose (2)	Slide on.
19. Hose (2)	Two clamps (3)	Slide on.
20.	Pipe (4)	Slide in.
21.	Two clamps (3)	Using 1/4-inch flat-tip screwdriver, tighten.

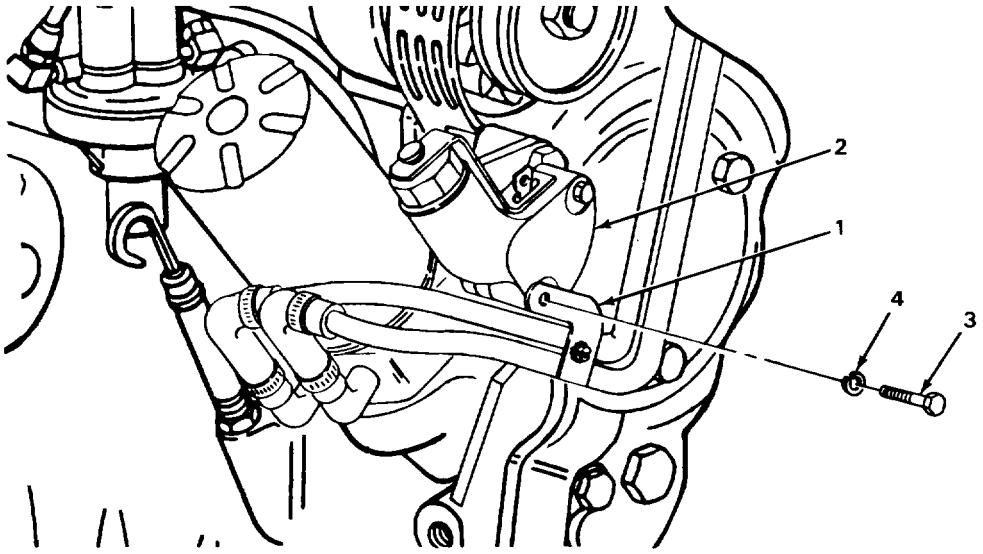
LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
22. Hose (5)	Two clamps (6)	Slide on.
23. Cooler (7) and pipe (4)	Hose (5) with assembled two clamps (6)	Slide on.
24. Hose (5)	Two clamps (6)	Using 1/4-inch flat-tip screwdriver, tighten.
25. Two pipes (4 and 8)	Clamp (9)	Place in position.
26. Two pipes (4 and 8) and filler neck (10)	Plate (11)	Place in position.
27. Plate (11) and clamp (9)	Screw (12) and new lockwasher (13)	Screw in and tighten using 1/4-inch flat-tip screwdriver.



LUBRICATING COOLER-TO-WATER PUMP COOLANT LINES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
28. Plate (1) and fillerneck (2)	Screw (3) and new lockwasher (4)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket and ratchet handle.
29. Loader backhoe	Fan blade and Pulley	Install (page 2-431).
		Do not shut down engine at this time.
30. Engine		Run at high idle (TM 5-2420-222-10).
31.	Lubricating cooler-to-water pump coolant lines	a. Check for leaks. b. If leaking at any connection, tighten clamp using 1/4-inch flat-tip screwdriver. c. If leaking does not stop, shut down engine (TM 52420-222-10) and replace defective component as outlined in this task.
32.	Radiator	If coolant leak was found, fill (page 2-368).
33.	Engine	If still running, shut down (TM 5-2420-222-10).



TASK ENDS HERE

EXHAUST MANIFOLD

This task covers:

a. **Removal (page 2-183)**
b. **Cleaning (page 2-184)**
c. **Inspection/Replacement (page 2-184)**
d. **Installation (page 2-184)**

INITIAL SETUP:

Tools
Extension, 1/2-inch drive, 5-inch
Handle, ratchet, 1/2-inch drive
Socket, 1/2-inch drive, 9/16-inch

Materials/Parts
Gasket, manifold (four required)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning
(item 28, Appendix C)

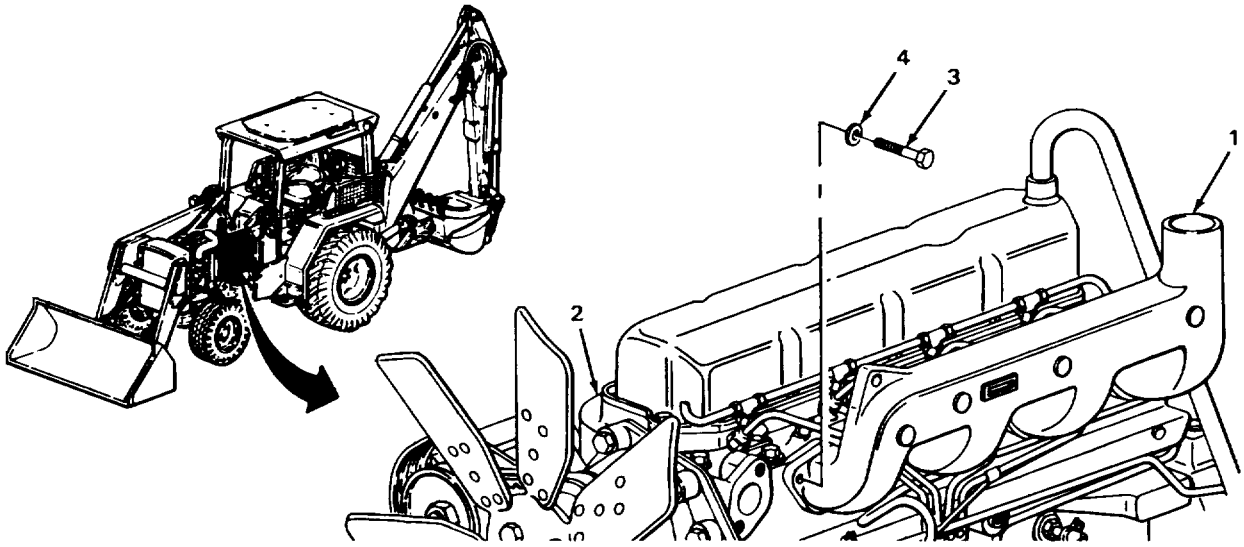
Personnel Required
One

Equipment Condition
1. Muffler removed (page 2-343)
2. Ventilator pipe removed (page 2-173)

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

1.	Manifold (1) and cylinder head (2)	Seven screws (3) and washers (4)	Using 9/16-inch, 1/2-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.



EXHAUST MANIFOLD - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL - CONTINUED		
2. Cylinder head (1), manifold (2), and clamp (3)	Screw (4) and washer (5)	Using 9/16-inch, 1/2-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.
3. Manifold (2)	Clamp (3)	Take off.
4. Cylinder head (1)	Manifold (2) and four gaskets (6)	a. Take off. b. Get rid of gaskets (6).
CLEANING		
	NOTE For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
	WARNING Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 59°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
5.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
6.	All metal parts	Look for cracks and breaks.
7.	All threaded parts	Look for damaged threads.
INSTALLATION		
8. Cylinder head (1)	Manifold (2) and four new gaskets (6)	Place in position.

EXHAUST MANIFOLD - CONTINUED

LOCATION	ITEM	ACTION REMARKS
9. Manifold	Clamp (3)	Place in position
10. Cylinder head (1), manifold (2), and clamp (3)	Screw (4) and washer (5)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket, 5-Inch extension, ratchet handle.
11. Manifold (2) and cylinder head (1) clamp (3)	Seven screws (7) and washers (8)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket, 5-inch extension, ratchet handle.

NOTE

FOLLOW-ON MAINTENANCE:

1. Install ventilator pipe (page 2-173).TA242797
2. Install muffler (page 2-343).

TASK ENDS HERE

Section VIII. CLUTCH

CLUTCH PEDAL LINKAGE

This task covers:

- **a. Removal (page 2-183)**
- **b Disassembly (page 2-188)**
- **b. Cleaning (page 2-184)**
- **c. Inspection/Replacement (page 2-190)**
- **e. Repair (page 2-190)**
- **f Assembly (page 2-190)**
- **g. Installation (page 2-184)**
- **h. Adjustment (page 2-192)**

INITIAL SETUP:

Tools
Caps, vise jaw (pair)
Hammer, ball-peen, 2-pound head
Pliers, slip-joint
Punch, drive-pin, straight, 1/8-inch
Punch, drive-pin, straight, 5/32-inch
Rule, steel, machinist's, 6-inch
Threading set, screw
Vise, machinist's
Wrench, adjustable,
0 to 1, 322-inch
Wrench, open-end, 9116-inch

Materials/Parts
Pin, cotter, pedal pin
Pin, cotter, rod (two required)
Pin, cotter, rod pin
Pin, cotter, rod end pin
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

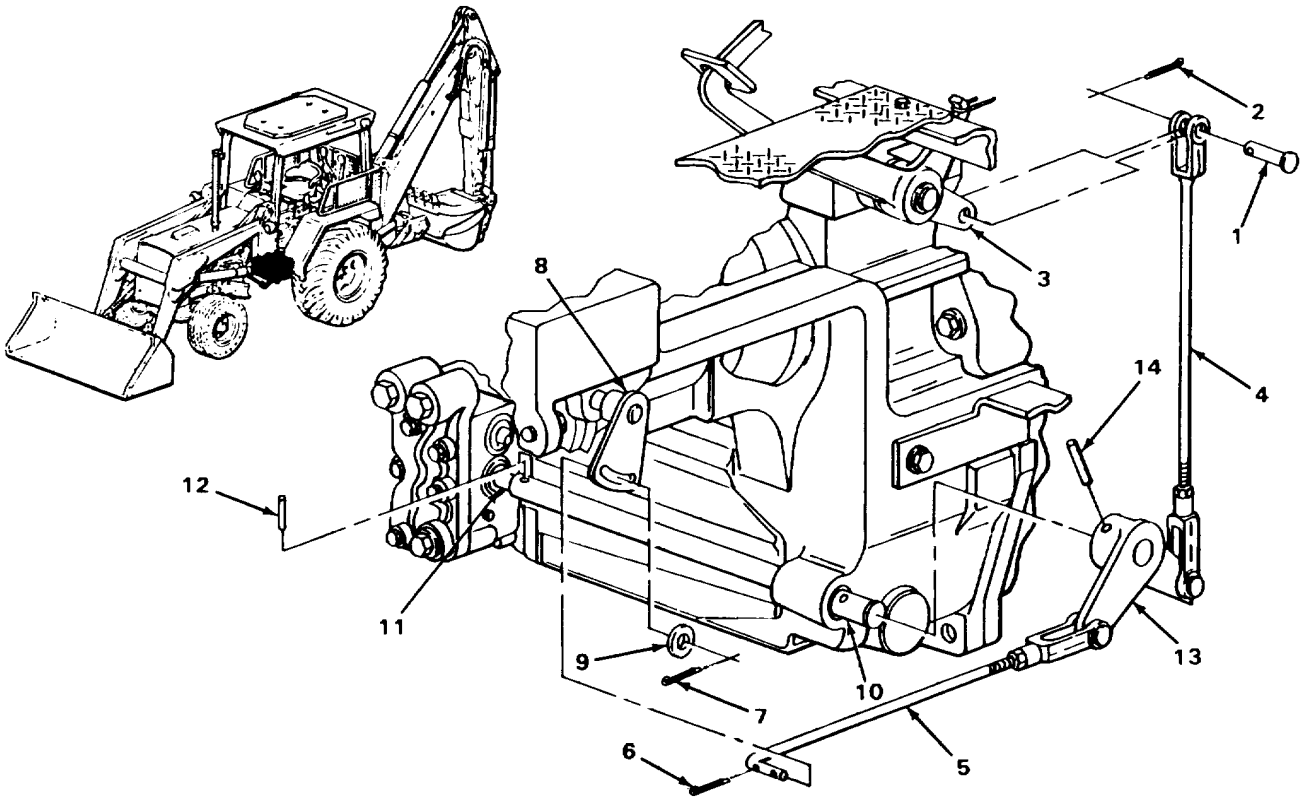
Two

Equipment Condition
Battery ground cable disconnected
(page 2-696)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Loader backhoe	Center platform	Remove (page 2-1002).	
2. Pin (1)	Cotter pin (2)	a. Using slip-joint pliers, straighten ends and take out. b. Get rid of.	
3. Pedal (3) and rod end (4)	Pin (1)	Pull out.	
4. Pedal (3)	Rod end (4)	Take off.	
5. Rod (5)	Two cotter pins (6 and 7)	a. Using slip-joint pliers, straighten ends and take out. b. Get rid of.	

CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
6. Rod (5) and lever (8)	Washer (9)	Slide off.
7. Shaft (10) and shaft (11)	Spring pin (12)	Using 2-pound head ball-peen hammer and 5/32-inch straight drive-pin punch, drive out.
8. Shaft (10) and bellcrank (13)	Spring pin (14)	Using 2-pound head ball-peen hammer and 1/8-inch straight drive-pin punch, drive out.
9. Lever (8) and shaft (10)	Rod (5) and bellcrank (13) with attached parts	Take off.



CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DISASSEMBLY		
10. Pin (1)	Cotter pin (2)	a. Using slip-joint pliers, straighten ends and take out. b. Get rid of.
11. Yoke or clevis (3) and bellcrank (4)	Pin (1)	Slide out.
12. Bellcrank (4)	Yoke or clevis (3)	Take off.
13. Yoke or clevis (3) and rod end (5)	Nut (6)	a. Place rod end (5) in machinist’s vise with vise jaw caps. b. Using 9/16-inch open-end wrench, loosen.
14. Rod end (5)	Yoke or clevis (3) and nut (6)	a. Note number of exposed threads on rod end (5) and relative position of yoke or clevis (3). b. Unscrew and take off. c. Take rod end (5) out of machinist’s vise with vise jaw caps.
15. Pin (7)	Cotter pin (8)	a. Using slip-joint pliers, straighten ends and take out. b. Get rid of.
16. Yoke or clevis (9) and bellcrank (4)	Pin (7)	Slide out.
17. Yoke or clevis (9)	Bellcrank (4)	Take off.
18. Yoke or clevis (3) and rod (10)	Nut (11)	a. Place rod (10) in machinist's vise with vise jaw caps. b. Using 9116-inch open-end wrench, loosen.
19. Rod (10)	Yoke or clevis (9) and nut (11)	a. Note number of exposed threads on rod (10)) and relative position of yoke or clevis (9). b. Unscrew and take off. c. Take rod (10) out of machinist's vise with jaw caps.

CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

CLEANING

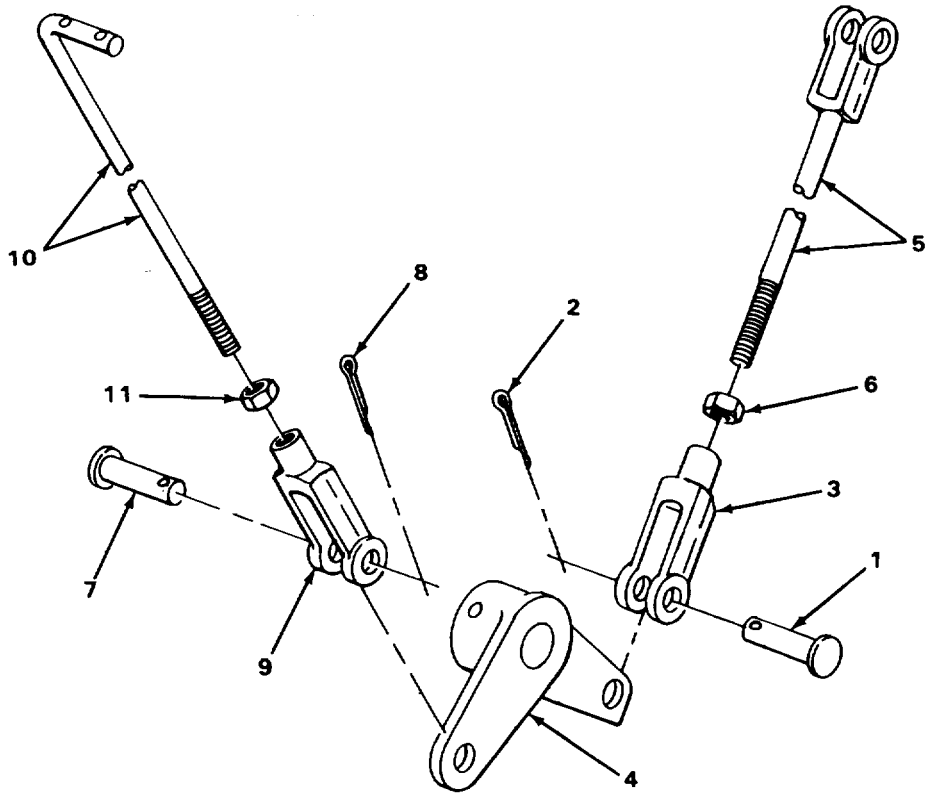
NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

20.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.	

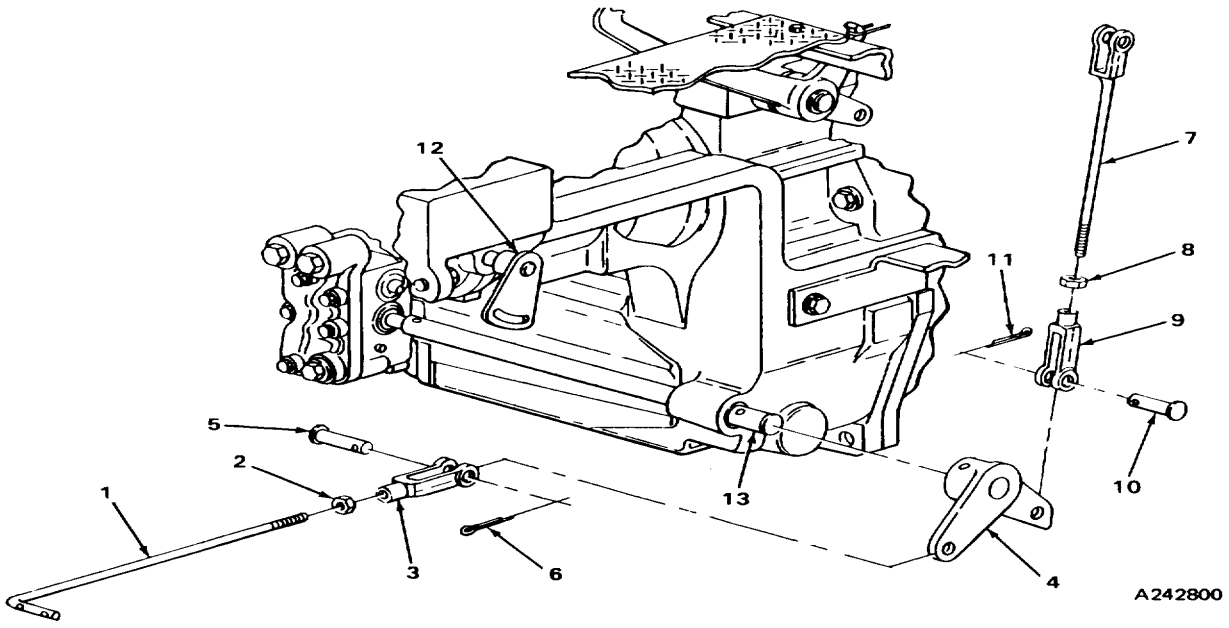


CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSPECTION/REPLACEMENT'		
	NOTE For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137). Replace defective parts which cannot be repaired.	
21.	All parts	Look for breaks, bends, and cracks.
22.	All threaded parts	Look for damaged threads.
REPAIR		
23.	All threaded parts except hardware	If threads are damaged, using screw threading set, restore threads.
ASSEMBLY		
24. Rod (1)	Nut (2) and yoke or clevis (3)	a. Place rod (1) in machinist's vise with vise jaw caps. b. Screw on until same number of exposed threads are showing on rod (11) and relative position of yoke or clevis (3) is same as noted during disassembly.
25. Rod (1) and yoke or clevis (3)	Nut (2)	a. Using 9/16-inch open-end and 0 to 1.322-inch adjustable wrenches, tighten until seated against yoke or clevis (3). b. Take rod (1) out of machinist's vise with vise jaw caps.
26. Yoke or clevis (3)	Bellcrank (4)	Place in position.
27. Yoke or clevis (3) and bellcrank (4)	Pin (5)	Slide in.
28. Pin (5) and yoke or clevis (3)	New cotter pin (6)	a. Push in. b. Using slip-joint pliers, bend ends back.
29. Rod end (7)	Nut (8) and yoke or clevis (9)	a. Place rod end (9) in machinist's vise with vise jaw caps.

CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
29. Continued		b. Screw on until same number of exposed threads are showing on rod end (7) and relative position of yoke or clevis (9) is same as noted during disassembly.
30. Rod end (7) and yoke or clevis (9)	Nut (8)	a. Using 9/16-inch open-end and, 0 to 1.322-inch adjustable wrenches, tighten until seated against yoke or clevis (9). b. Take rod end (7) out of machinist's vise with vise jaw caps.
31. Bellcrank (4)	Yoke or clevis (9)	Place In position.
32. Yoke or clevis (9) and bellcrank (4)	Pin (10)	Slide in.
33. Pin (10) and yoke or clevis (9)	New cotter pin (11)	a. Push in. b. Using slip-joint pliers, bend ends back.
INSTALLATION		
34. Lever (12) and shaft (13)	Rod (1) and bellcrank (4) with assembled parts	Slide on.



CLUTCH PEDAL LINKAGE - CONTINUED

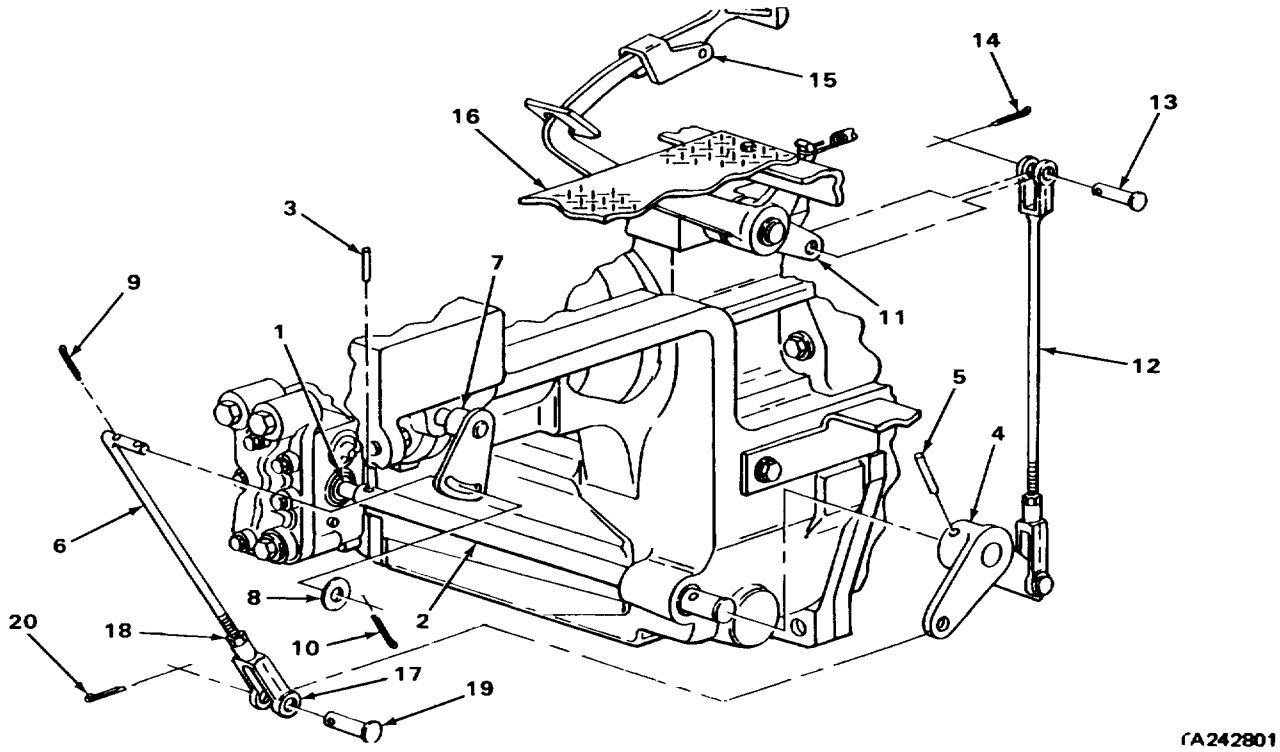
LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
35. Shaft (1) and shaft (2)	Spring pin (3)	a. Aline pin holes in shafts (1 and 2). b. Using 2-pound head ball-peen hammer, tap in.
36. Shaft (2) and bellcrank (4)	Spring pin (5)	a. Aline pin holes in shaft (2) and bellcrank (4). b. Using 2-pound head ball-peen hammer, tap in.
37. Rod (6) and lever (7)	Washer (8)	Slide on.
38. Rod (6)	Two new cotter pins (9 and 10)	a. Push in. b. Using slip-joint pliers, bend ends back.
39. Pedal (11)	Rod end (12)	Place in position.
40. Pedal (11) and rod end (12)	Pin (13)	Slide in.
41. Pin (13)	New cotter pin (14)	a. Push in. b. Using slip-joint pliers, bend ends back.
42. Cab	Center platform	Install (page 2-1002).
ADJUSTMENT		
43. Pedal (11)	Stop (15)	a. Place in down position. b. Depress pedal (11) by hand until heavy resistance is felt. **Thrust ball bearing is now in contact with clutch levers.** c. Using 6-inch machinist's steel rule, measure clearance between stop (15) and center platform (16). **Clearance must not be more than 314-inch (19 mm).**

NOTE

If adjustment is correct, skip steps 44 thru 54.

CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
44. Yoke or clevis (17) loosen.	Nut (18)	Using 9/16-inch open-end wrench,
45. Pin (19)	Cotter pin (20)	a. Using slip-joint pliers, bend ends straight and take out. b. If not just replaced during assembly, get rid of.
46. Yoke or clevis (17) and bellcrank (4)	Pin (19)	Pull out.
47 Center platform (16)	Pedal (11)	Have assistant press until stop (15) touches center platform (16).
48 Lever (7) and bellcrank (4)	Rod (6) and yoke or clevis (17)	Move forward away from bellcrank (4) to take up slack and allow adjustment.
49. Rod (6)	Yoke or clevis (17)	a. Screw out until holes line up with hole in bellcrank (4). b. Screw back in two and one-half turns. This will provide proper clearance.



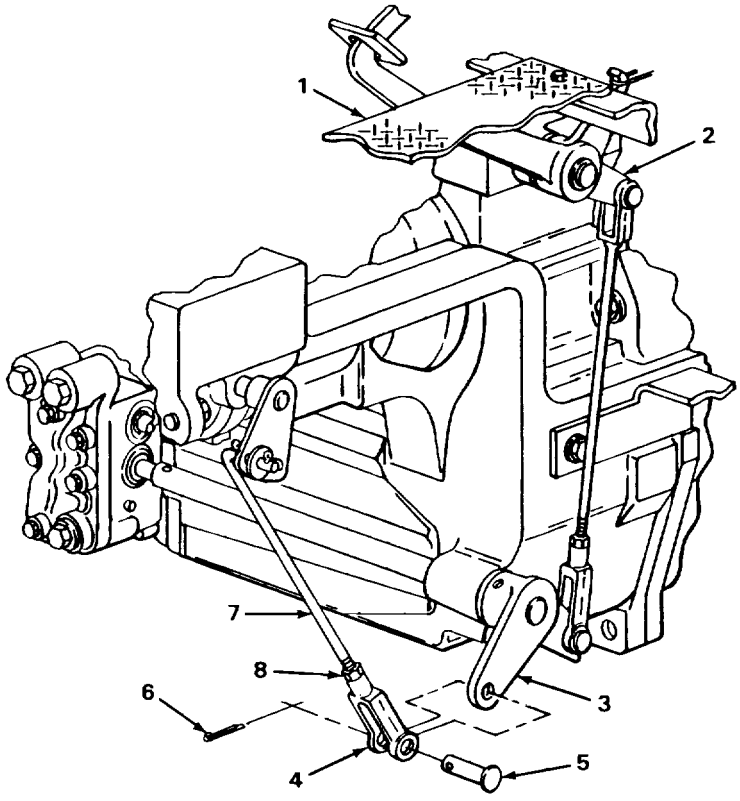
CLUTCH PEDAL LINKAGE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ADJUSTMENT - CONTINUED		
50. Center platform (1)	Pedal (2)	Have assistant release.
51. Bellcrank (3)	Yoke or clevis (4)	Place in position.
52. Yoke or clevis (4) and bellcrank (3)	Pin (5)	Push in.

NOTE

If cotter pin has just been replaced during assembly, it may be reused after adjustment. Otherwise, use new cotter pin.

53. Pin (5)	Cotter pin (6)	a. Push in. b. Using slip-joint pliers, bend ends back.
54. Rod (7)	Nut (8)	Using 9/16-inch open-end wrench, tighten until seated against yoke or clevis (4).



CLUTCH PEDAL LINKAGE - CONTINUED

NOTE
FOLLOW-ON MAINTENANCE: Connect battery ground cable (page 2-696).

TASK ENDS HERE

CLUTCH PEDAL

This task covers:

a. Removal (page 2-196)
b. Disassembly (page 2-196)
c. Cleaning (page 2-197)
c. Inspection/Replacement (page 2-198)
d. Assembly (page 2-198
f. Installation (page 2-199)

INITIAL SETUP

Tools
Hammer, ball-peen, 1-pound head
Handle, ratchet, 3/8-inch drive
Pliers, retaining ring
Pliers, slip-joint
Press, arbor
Punch, drive-pin, straight, 1/4-inch
Remover and installer, 1.0625-inch outside diameter
Socket, 3/8-inch drive, 9/16-inch

Materials/Parts
Detergent, GP (item 7, Appendix C)
Lockwasher, stop screw
Pin, cotter, rod end pin

Materials/Parts Continued
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

1. Battery ground cable removed (page 2-696)
2. Left outer platform ramp removed (page 2-1073)

CLUTCH PEDAL - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
1. Stop (1) and speed gear assembly (2)	Screw (3) and lockwasher (4)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (4).
2. Clamp (5), speed gear assembly (2) and pedal (6)	Stop (1)	Take off.
3. Pin (7)	Cotter pin (8)	a. Using slip-joint pliers, straighten ends and take out. b. Get rid of.
4. Pedal (6) and rod end (9)	Pin (7)	Take off.
5. Pedal (6)	Rod end (9)	Take off.
6. Pedal (6) and strap (10)	Helical spring (11)	Take off.
7. Shaft (12) and washer (13)	Ring (14)	Using retaining ring pliers, take off.
8. Shaft (12) and pedal (6)	Washer (13)	Take off.
9. Shaft (12)	Pedal (6) with assembled parts	Slide off.
DISASSEMBLY		
	CAUTION Do not remove bushing unless inspection shows need for replacement. Removal may damage parts.	
10. Pedal (6)	Bushing (15)	Using 1.0625-inch outside diameter remover and installer and arbor press, press out.
11.	Pad (16)	Slide off.

CLUTCH PEDAL - CONTINUED

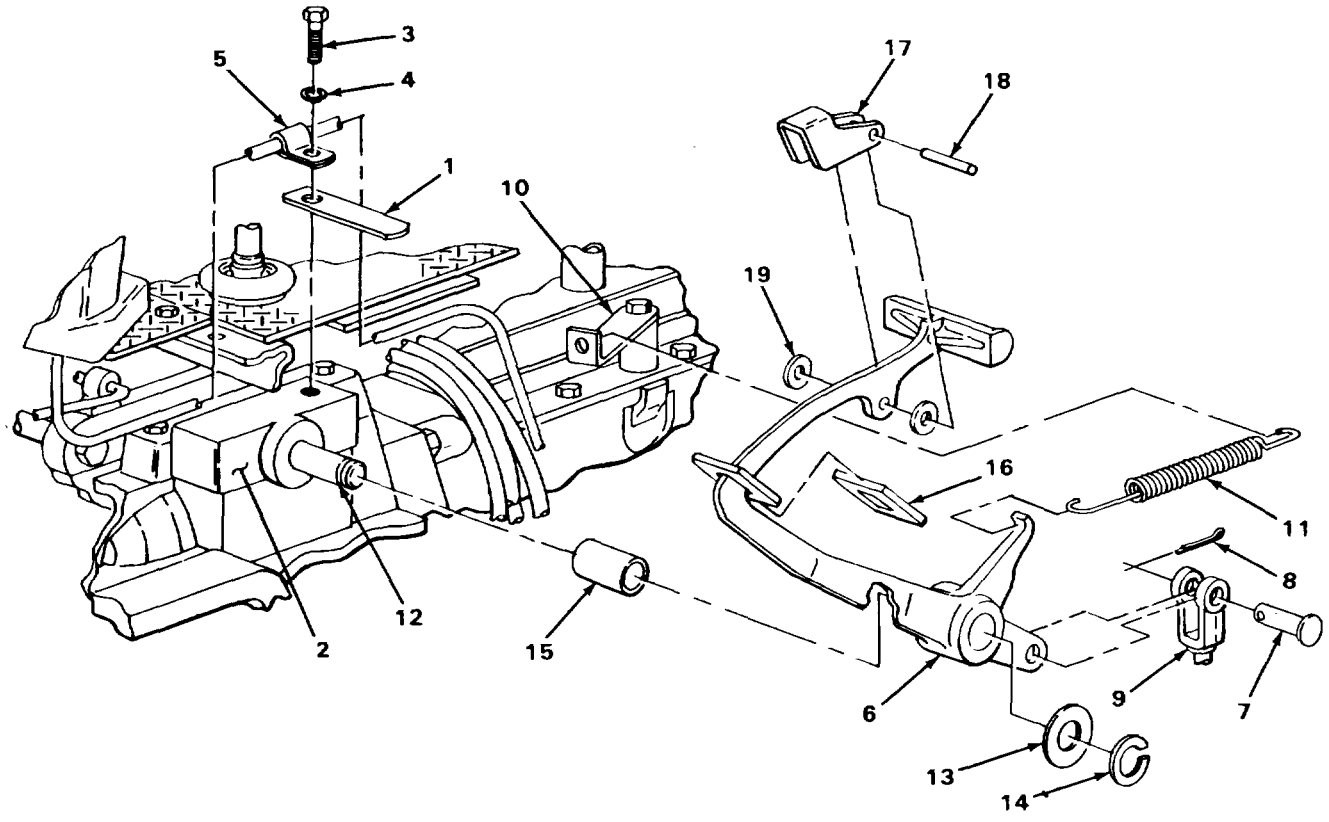
LOCATION	ITEM	ACTION REMARKS
12. Stop (17) and pedal (6)	Pin (18)	Using 1/4-inch straight drive-pin punch and 1-pound head ball-peen hammer, drive out.
13. Pedal (6)	Stop (17) and two washers (19)	Take off.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

14.	Pad (16)	a. Using clean rags dampened in solution of detergent and water, wipe clean. b. Using clean, dry rags, wipe dry.



CLUTCH PEDAL - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING - CONTINUED-

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

15.		All metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTIONIREPLACEMENT

NOTE

For more information on how to Inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

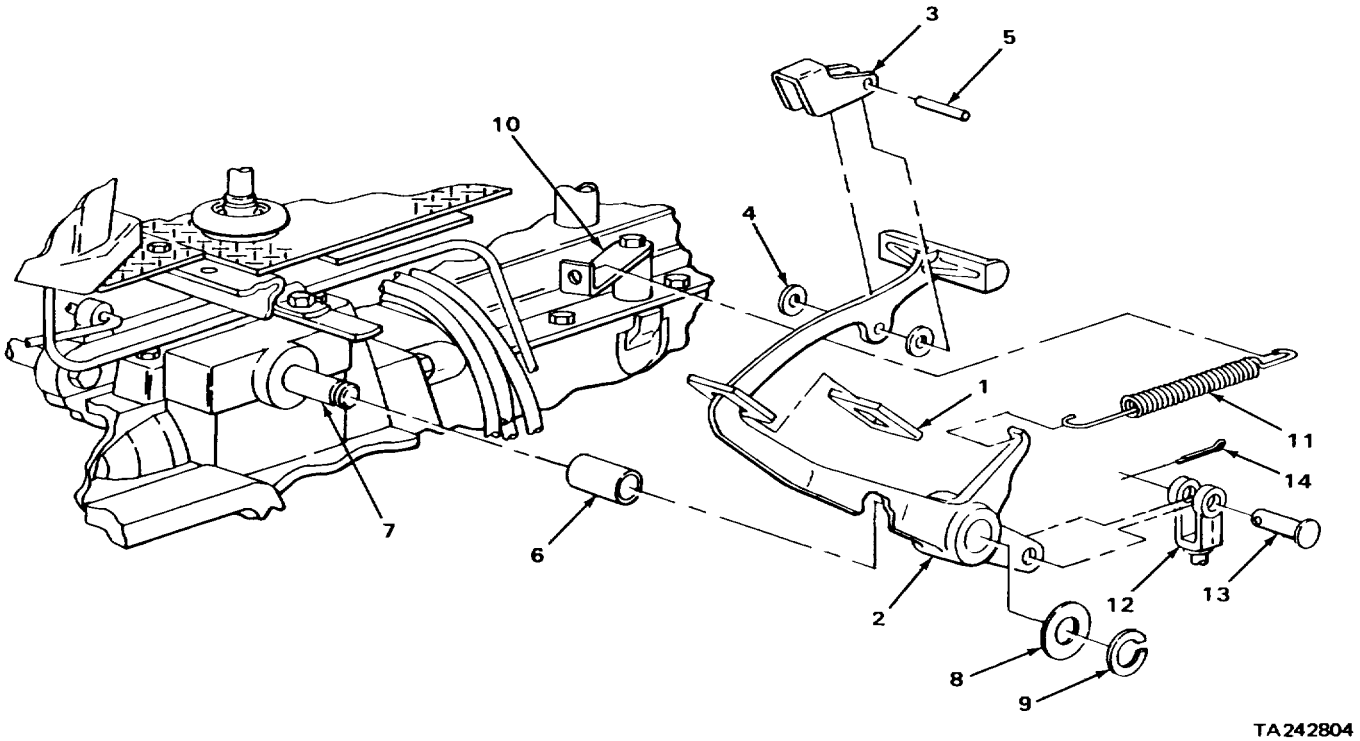
16.		Pad (1)	Look for tears and crumbling.
17.		All metal parts	Look for cracks, bends, and breaks.
18.		All threaded parts	Look for damaged threads.

ASSEMBLY

19.	Pedal (2)	Stop (3)	Place in position.
20.	Pedal (2) and stop (3)	Two washers (4)	Place in position.
21.	Pedal (2), stop (3), and two washers (4)	Pin (5)	a. Aline holes in pedal (2), stop (3) and two washers (4). b. Using 1-pound head ball-peen hammer, tap in.
22.	Pedal (2)	Pad (1)	Place In position.
23.		Bushing (6)	If removed, using 1.0625inch remover and installer and arbor press, press In.

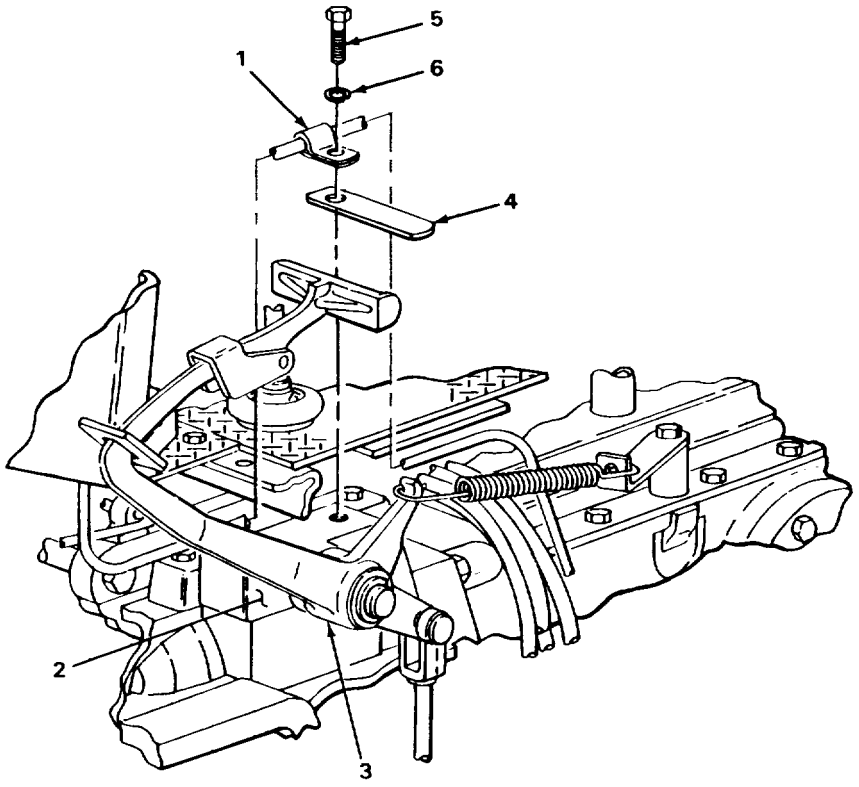
CLUTCH PEDAL - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION		
24. Shaft (7)	Pedal (2) with assembled parts	Slide on.
25. Shaft (7) and pedal (2)	Washer (8)	Slide on.
26. Shaft (7) and washer (8)	Snapring (9) position.	Using retaining ring pliers, place in
27. Pedal (2) and strap (10)	Helical spring (11)	Place in position.
28. Pedal (2)	Rod end (12)	Place in position.
29. Pedal (2) and rod end (12)	Pin (13)	Push in.
30. Pin (13)	New cotter pin (14)	a. Push in. b. Using slip-joint pliers, bend ends back.



CLUTCH PEDAL - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
31. Clamp (1), speed gear assembly (2), and pedal (3)	Stop (4)	a. Move pedal (3) forward. b. Place in position.
32. Stop (4) and speed gear assembly (2)	Screw (5) and new lockwasher (6)	Screw in and tighten using 9/116-inch, 318-inch drive socket and ratchet handle.



NOTE

FOLLOW-ON MAINTENANCE:

1.Install left outer platform ramp (page 2-1073).
2.Install battery ground cable (page 2-696).

TASK ENDS HERE

TA242805

Section IX. FUEL SYSTEM

FUEL INJECTION NOOZZLES

This task covers:

a. Removal (page 2-202)
b. Cleaning (page 2-202)
c. Inspection/Replacement (page 2-204)
d. Installation (page 2-204)

INITIAL SETUP

Tools

Adapter, socket wrench, 1/2-inch female to 3/8-inch male
Bar, pry, 15 to 16-inch
Container, 1-pint capacity
Crowfoot attachment, socket wrench, open-end, 3/8-inch drive, 9/16inch
Extension, 3/8-inch drive, 5-inch
Handle, ratchet, 3/8-inch drive
Knife, pocket
Socket, 3/8-inch drive, 112-inch
Wrench, open-end, 9/16-inch
Wrench, open-end, 3/4-inch
Wrench, torque, 1/2-inch drive 0 to 150 foot-pound capacity

Materials/Parts

Container, 1 pint
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)
Washer, nozzle (four required)

Personnel Required

One

Equipment Condition

Fuel injection caps and hoses removed (page 2-206)

FUEL INJECTION NOZZLES - CONTINUED

	LOCATION	ITEM	ACTION REMARKS

NOTE'

There are four fuel injection nozzle assemblies. One is shown. Repeat procedures for remaining fuel injection nozzle assemblies.

REMOVAL

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

1.	Three clamps (1), fuel injection nozzle (2), cylinder head (3), and spacer (4)	Screw (5) and spacer (6) unscrew and take off.	Using 1/2-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle,
2.	Fuel injection nozzle (2)	Three clamps (1)	Take off.
3.		Tube (7)	a. Using 9/16-inch and 3/4-inch open-end wrenches, unscrew and take off. b. Cap (page 2-137).
4.	Cylinder head (3)	Fuel injection nozzle (2) with attached parts	a. Using 15 to 16-inch pry bar, pry out. b. Plug cylinder head (3) (page 2-137).
5.		Spacer (4)	Take off.
6.	Fuel injection nozzle (2)	Washer (8)	a. Using pocket knife, take off. b. Get rid of.
7.		Washer (9)	Slide off.

FUEL INJECTION NOZZLES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING

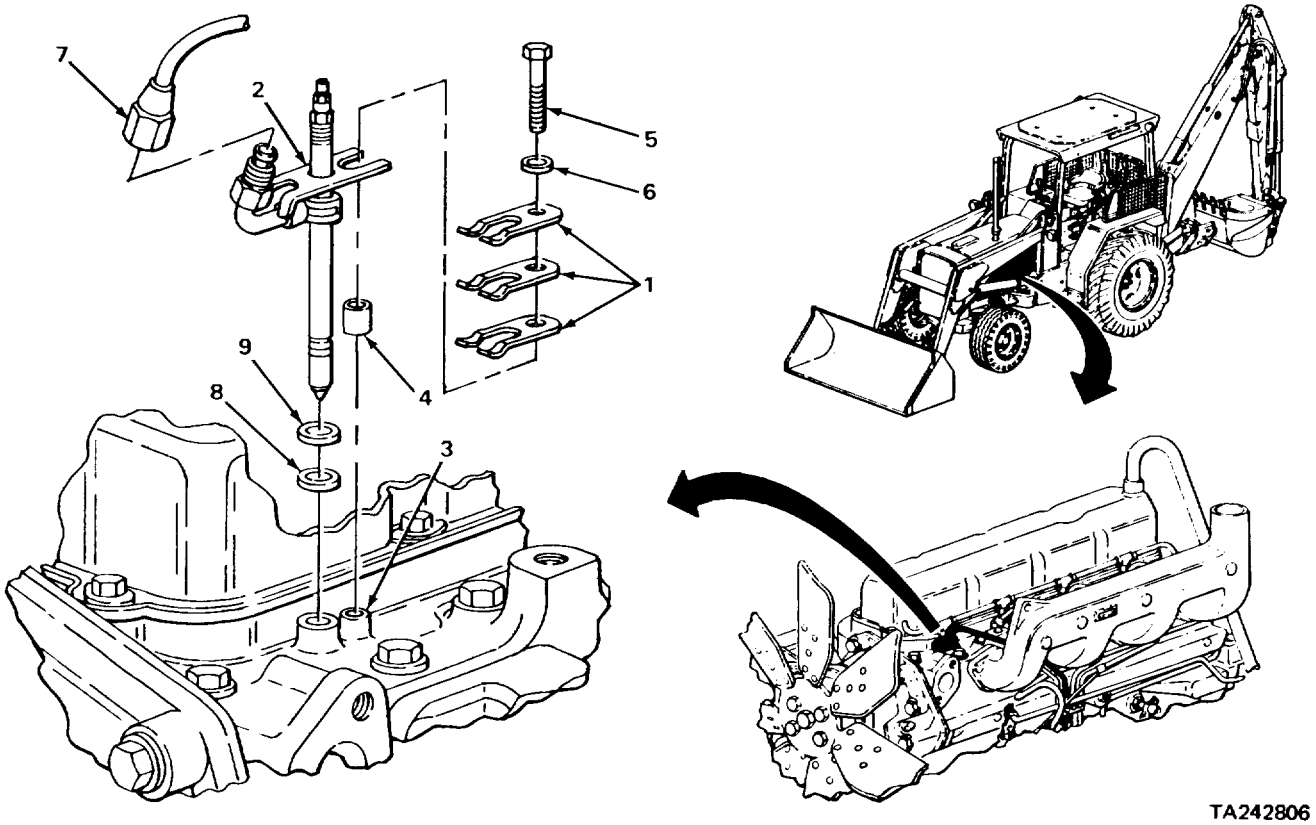
NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

8.	Fuel injection nozzle (2) and cylinder head (3)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
9.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

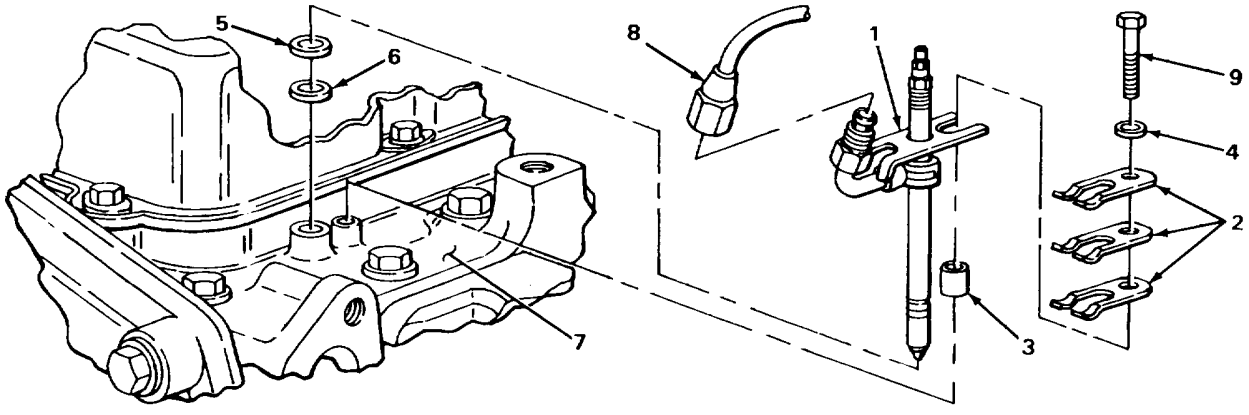


FUEL INJECTION NOZZLES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSPECTION/REPLACEMENT		
	NOTE For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137). Replace defective parts as needed.	
10.	Fuel injection nozzle (1), three clamps (2), and two spacers (3 and 4)	Look for cracks, bends, and breaks.
11.	All threaded parts	Look for damaged threads.
INSTALLATION		
	WARNING No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.	
12. Fuel injection nozzle (1)	Washer (5)	Slide on.
13.	New washer (6)	a. Soak in 1-pint capacity container of warm water until flexible. b. Slide on.
14. Cylinder head (7)	Spacer (3)	Place in position.
15.	Fuel injection nozzle (1) with assembled parts	a. Unplug cylinder head (7). b. Slide in.
16. Fuel injection nozzle (1)	Tube (8)	a. Uncap. b. Screw on and tighten until snug using 9/16-inch open-end wrench.'4, c. Using 9/16-inch, 3/8-inch drive open-end socket wrench crowfoot attachment, 5-inch extension, 112-inch female to 3/8-inch male socket wrench adapter,

FUEL INJECTION NOZZLES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
16. Continued		0 to 150 foot-pound capacity torque wrench, and 3/4-inch open-end wrench, tighten to 35 foot-pounds (47 N.m) torque.
17. Three clamps (2)	Place in position.	
18. Three clamps (2), fuel injection nozzle (1), spacer (3), and cylinder head (7)	Spacer (4) and screw (9)	a. Screw in and tighten until snug using 1/2-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle. b. Using 112-inch, 3/8-inch drive socket, 5-inch extension, 1/2-inch female to 3/8-inch male socket wrench adapter, and 0 to 150 foot-pound capacity torque wrench, tighten to 20 foot-pounds (27 N.m) torque.
19. Loader backhoe	Fuel injection caps and hoses	Install (page 2-206).
20.	Engine	Start and run at high idle (TM 5-2420-222-10).
21.	Fuel injection nozzles	a. Check for leaks. b. If leaking at any connection, shut down engine (TM 5-2420-222-10) and replace defective component as outlined in this task. c. If found leaking, repeat steps 21 and 20.
22.	Engine	Shut down (TM 5-2420-222-10).



TASK ENDS HERE

TA242807

FUEL INJECTION CAPS AND HOSES

This task covers:

INITIAL SETUP

Tools
Wrench, open-end, 9/16-inch
Wrench, open-end, 5/8inch

Materials/Parts

Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning
(item 28, Appendix C)

Personnel Required
One

Equipment Condition

1. Hood removed (page 2-1025)
2. Battery ground cable disconnected (page 2-696)

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

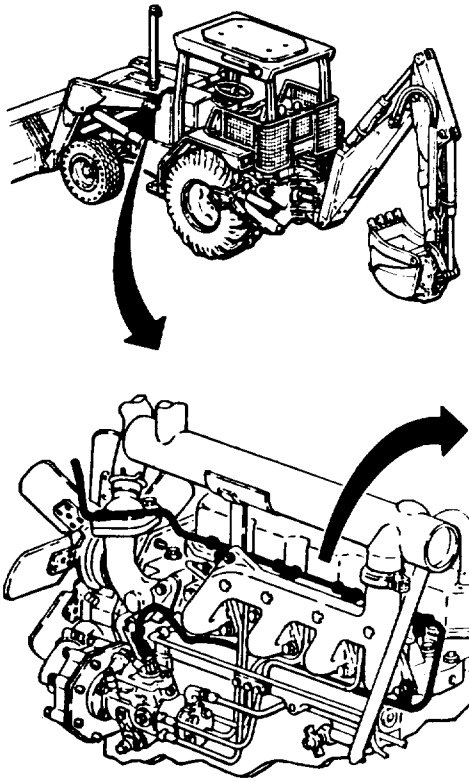
WARNING

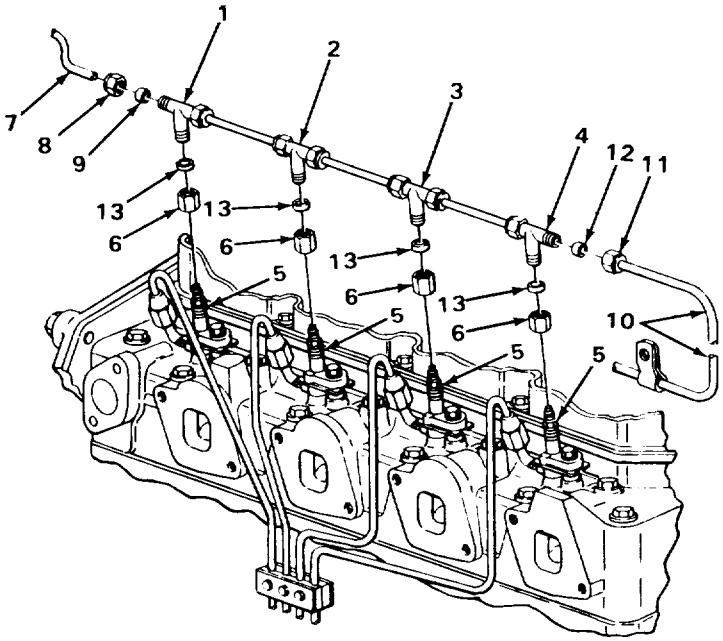
No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

1.	Four caps (1 thru 4) and nozzles (5)	Four nuts (6)	Using 5/8-inch open-end wrench, unscrew all the way.
2.	Cap (1) and tube (7)	Nut (8)	Using 9/16-inch open-end wrench, unscrew all the way.
3.	Cap (1)	Tube (7) with assembled parts	Take out.
4.	Tube (7)	Nut (8) and grommet (9)	Slide off.
5.	Cap (4) and tube (10)	Nut (11)	Using 9/16-inch open-end wrench, unscrew all the way.

FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
6. Cap (4)	Tube (10) with assembled parts	Take out.
7. Tube (10)	Nut (11) and grommet (12)	Slide off.
8. Four nozzles (5)	Four caps (1 thru 4) with assembled parts	a. Take off. b. Cap nozzles (5) (page 2-137).
9.	Four grommets (13) and nuts (6)	Slide off.





FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

DISASSEMBLY

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

NOTE

There are four caps and three hoses which connect in series. One connection Is shown. Repeat steps 10 thru 15 for remaining connections.

10.	Cap (1) and hose (2)	Nut (3)	Using 9/16-inch open-end wrench, unscrew all the way.
11.	Hose (2)	Cap (1)	Take off.
12.		Grommet (4) and nut (3)	Slide off
13.	Cap (5) and hose (2)	Nut (6)	Using 9/16-inch open-end wrench, unscrew all the way.
14.	Cap (5)	Hose (2)	Take off.
15.	Hose (2)	Grommet (7) and nut (6)	a. Slide off. b. Repeat steps 10 thru 15 for remaining connections.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

16.		All grommets	a. Clean in solution of detergent and water. b. Using clean water, rinse.:/ c. Using clean, dry rags, wipe dry.

FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only In a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

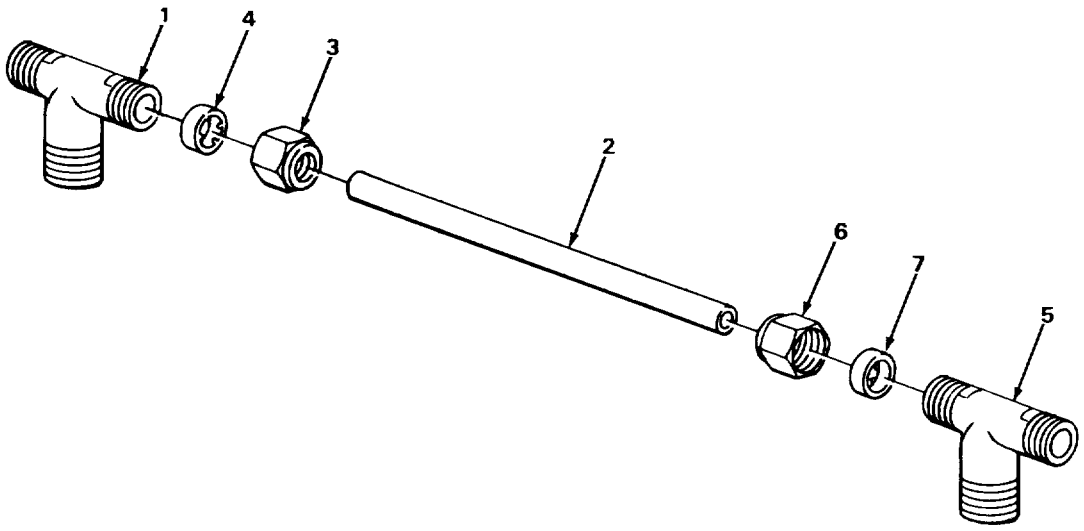
17.	All metal parts	a. Clean In drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137). Replace defective parts as needed.

18.	All metal parts	Look for cracks, bends, and breaks.
19.	All rubber parts	Look for cracks, breaks, and crumbling.



FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

ASSEMBLY

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

NOTE

There are four caps and three hoses which connect in series. One connection is shown. Repeat steps 20 thru 22 for remaining connections.

New hoses are manufactured to required length from bulk items. For more information on manufacturing new hoses, go to Appendix D.

20.	Hose (1)	Nut (2) and grommet (3)	Place in position.
21.	Cap (4)	Hose (1) with assembled parts	Place in position.
22.	Cap (4) and hose (1)	Nut (3)	a. Screw on and tighten using 9/16-inch open-end wrench. b. Repeat steps 20 thru 22 for remaining connections.

INSTALLATION

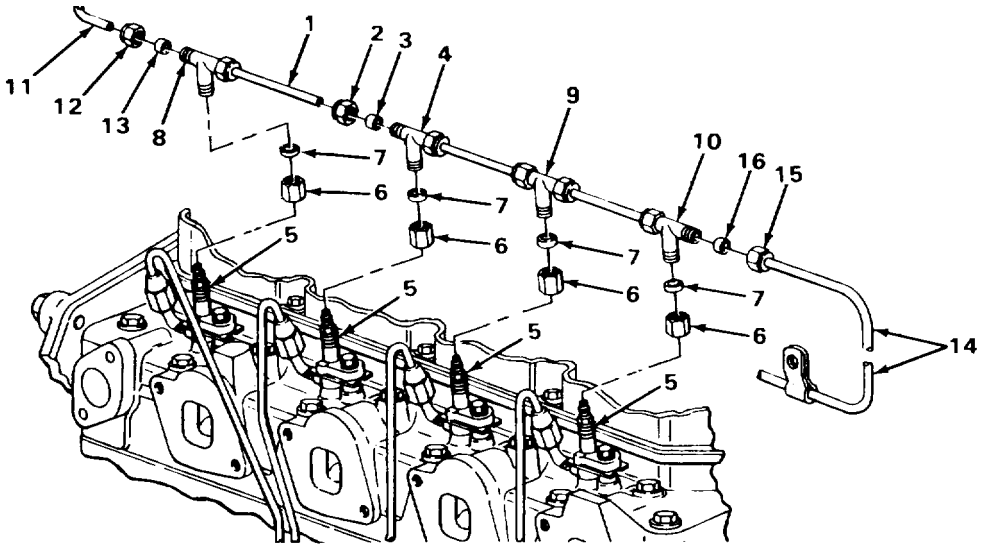
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

23.	Four nozzles (5)	Four nuts (6) and grommets (7)	a. Uncap nozzles (5). b. Place in position.
24.		Four caps (4, 8, 9, and 10) with assembled parts	Place in position.

FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
25. Four nozzles (5) and four caps (4,8,9, and 10)	Four nuts (6)	Screw on part way.
26. Tube (11)	Nut (12) and grommet (13)	Slide on.
27. Cap (8)	Tube (11) with assembled parts	Place in position.
28. Cap (8) and tube (11)	Nut (12)	Screw on and tighten using 9/16-inch open-end wrench.
29. Tube (14)	Nut (15) and grommet (16)	Slide on.
30. Cap (10)	Tube (14) with assembled parts	Place in position.
31. Cap (10) and tube (14)	Nut (15)	Screw on and tighten using 9/16-inch open-end wrench.
32. Four nozzles (5)	Four nuts (6)	Using 5/8-inch open-end wrench, tighten.



TA242810

FUEL INJECTION CAPS AND HOSES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
33. Loader backhoe	Battery ground Cable	Connect (page 2-696).
34. Loader backhoe	Fuel system	Prime (page 2-340).
35.	Engine	Start and run at high idle (TM 5-2420-222-10).
36.	Fuel injection caps and hoses	a. Check for leaks. b. If leaking at any connection, using 9/16-inch or 5/8-inch open-end wrench, tighten. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective component as outlined in this task. d. If found leaking, repeat steps 35 and 36.
37.	Engine	If still running, shut down (TM 5-2420-222-10).

NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

FUEL INJECTION TUBES

This task covers:

a. Removal (page 2-214)
b. Cleaning (page 2-216)
c. Inspection/Replacement (page 2-217)
d. Installation (page 2-217)

INITIAL SETUP

Tools

Adapter, socket wrench, 1/2-inch female to 318-inch male
Crowfoot attachment, socket wrench, open-end, 3/18-inch drive, 9/16-inch
Extension, 3/8-inch drive, 5-inch
Handle, ratchet, 3/8-inch drive
Socket, 3/8-inch drive, 9/16-inch
Wrench, box, 9/16-inch
Wrench, open-end, 5/16-inch
Wrench, open-end, 1/2-inch
Wrench, open-end, 9/16-inch
Wrench, open-end, 3/4-inch
Wrench, torque, 1/2-inch drive, 0 to 150 foot-pounds

Materials/Parts

Detergent, GP (item 7, Appendix C)
Lockwasher, strap screw (three required)
Protective cap (four required)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)
Washer, special (eight required)

Personnel Required

One

Equipment Condition

1. Hood removed (page 2-1025)
2. Battery ground cable disconnected (page 2-696)

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
1. Two straps (1 and 2) and two clamps (3)	Three screws (4) and lockwashers (5)	a Using 5116-inch open-end wrench, unscrew and take out. b Get rid of lockwashers (5).
2. Four tubes (6 thru 9)	Two straps (1 and 2) and two clamps (3)	Take off.

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

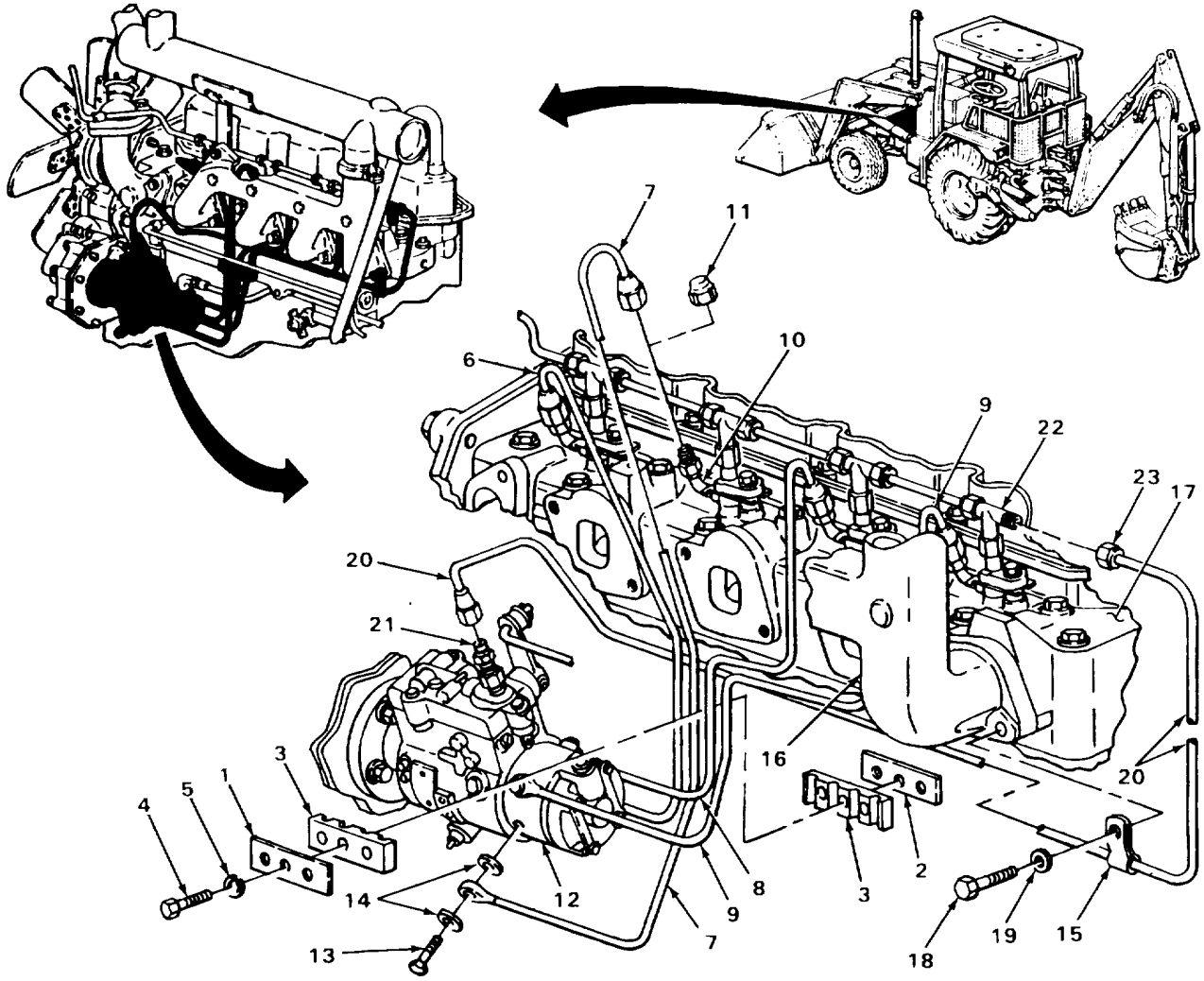
NOTE

Four tubes are removed the same way. One is shown. Repeat steps 3 thru 6 for remaining tubes.

3. Nozzle clamp (10)	Tube (7)	Using 9/16-inch and 3/4-inch open-end wrenches, unscrew and take off.
4. Protective cap (11)	Put on.	
5. Tube (7) and fuel metering pump head and rotor (12)	Screw (13)	Using 9/16-inch box wrench, unscrew and take out.
6. Fuel metering pump head and rotor (12)	Tube (7) and two washers (14)	a. Take off. b. Get rid of washers (14). c. Repeat steps 3 thru 6 for remaining tubes.
7. Clamp (15), exhaust manifold (16), and cylinder head (17)	Screw (18) and washer (19)	Using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.
8. Tube (20) and exhaust manifold (16)	Clamp (15)	Take off.

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
9. Adapter (21)	Tube (20)	Using 9/16-inch and 1/2-inch open-end wrenches, unscrew and take off.
10. Cap (22)	Nut (23)	Using 9/16-inch open-end wrench, unscrew all the way.
11.	Tube (20) with assembled parts	a. Take out. b. Cover cap (22) (page 2-137).



TA2422811

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

REMOVAL - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

12.	Tube (1)	Nut (2) and grommet (3)	Slide off.
13.	Fuel metering pump connector (4)	Adapter (5)	a. Using 1/2-inch open-end wrench, unscrew and take out. b. Plug connector (4) (page 2-137).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

14.	Two clamps (6)		a. Using clean rag dampened with solution of detergent and water, wipe clean. b. Using clean water, rinse. c. Using clean, dry rags, wipe dry.

WARNING

Drycleaning solvent PD680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

15.	All other parts		a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

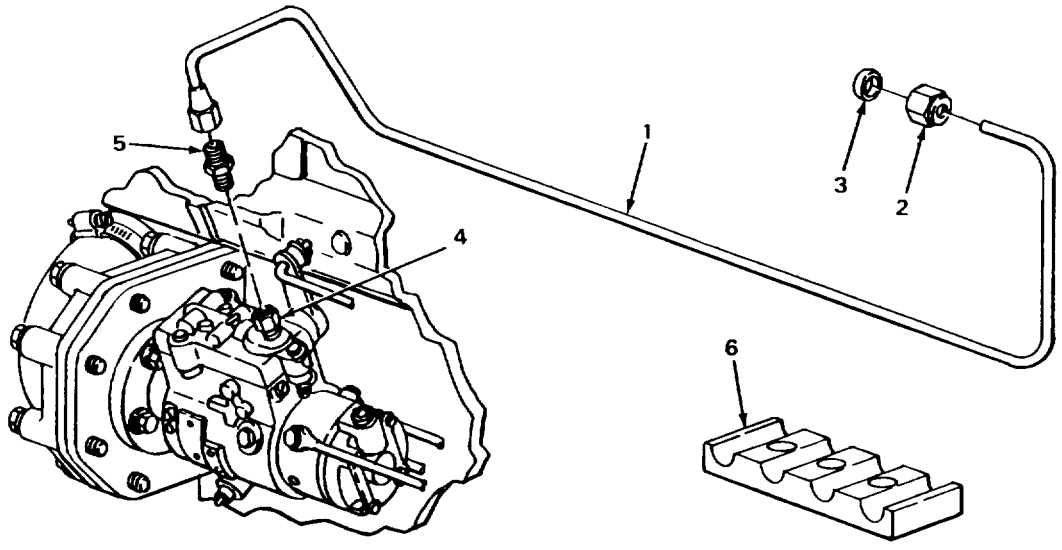
16.	All tubes	Look for abnormal bends which could restrict fuel flow.
17.	All parts	Look for cracks and breaks.
18.	All threaded parts	Look for damaged threads.

INSTALLATION

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel bums easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

19. Fuel metering pump connector (4) b. Screw in and tighten using 1/2-inch wrench	Adapter (5)	a. Unplug connector (4).



TA242812

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

INSTALLATION - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

20.	Tube (1)	Nut (2) and grommet (3)	Slide on.
21.	Cap (4)	Tube (1) with assembled parts	a. Uncap, cap (4). b. Place in position.
22.		Nut (2)	Screw on and tighten using 9/16-inch open-end wrench.
23.	Adapter (5)	Tube (1)	a. Screw on and tighten until snug using 9/16-inch open-end wrench. b. Using 9/16-inch, 3/8-inch drive open-end socket wrench crowfoot attachment, 1/2-inch female to 3/8-inch male socket wrench adapter, 0 to 150 foot-pound capacity torque wrench, and 112-inch open-end wrench, tighten to 20 foot-pounds (27 N•m) torque.
24.	Tube (1) and exhaust manifold (6)	Clamp (7)	Place in position.
25.	Clamp (7), exhaust manifold (6), and cylinder head (8)	Washer (9) and screw (10)	Screw in and tighten using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle.

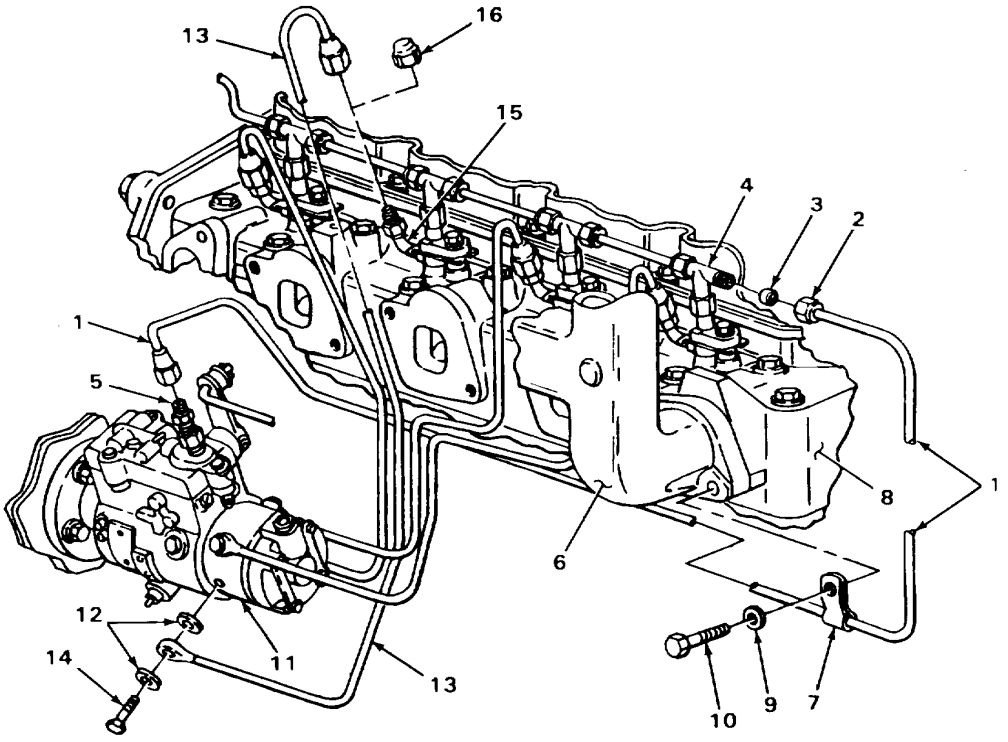
NOTE

Four tubes are installed the same way. One is shown. Repeat steps 26 thru 29 for remaining tubes.

26.	Fuel metering pump head and rotor (11)	Two new washers (12) and tube (13)	Place in position.
27.	Tube (13) and fuel metering pump head and rotor (11)	Screw (14)	a. Screw in and tighten until snug using 9/16-inch box wrench. b. Using 9/16-inch, 318-inch drive open-

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
27. Continued			end socket wrench crowfoot attachment, 1/2-inch female to 3/8-inch male socket wrench adapter, and 0 to 150 foot-pound capacity torque wrench, tighten to 35 foot-pounds (47 N•m) torque.
28. Nozzle clamp (15)	Protective cap (16)	Take off.	
29.	Tube (13)	a. Screw on and tighten until snug using 9/16-inch open-end wrench. b. Using 9/16-inch, 3/8-inch, 3/8-inch drive open-end socket wrench crowfoot attachment, 5inch extension, 112-inch female to 318-inch male socket wrench adapter, 0 to 150 foot-pound capacity torque wrench, and 3/4-inch open-end wrench, torque to 35 foot-pounds (47 N•m) torque. c. Repeat steps 26 thru 29 for remaining tubes.	

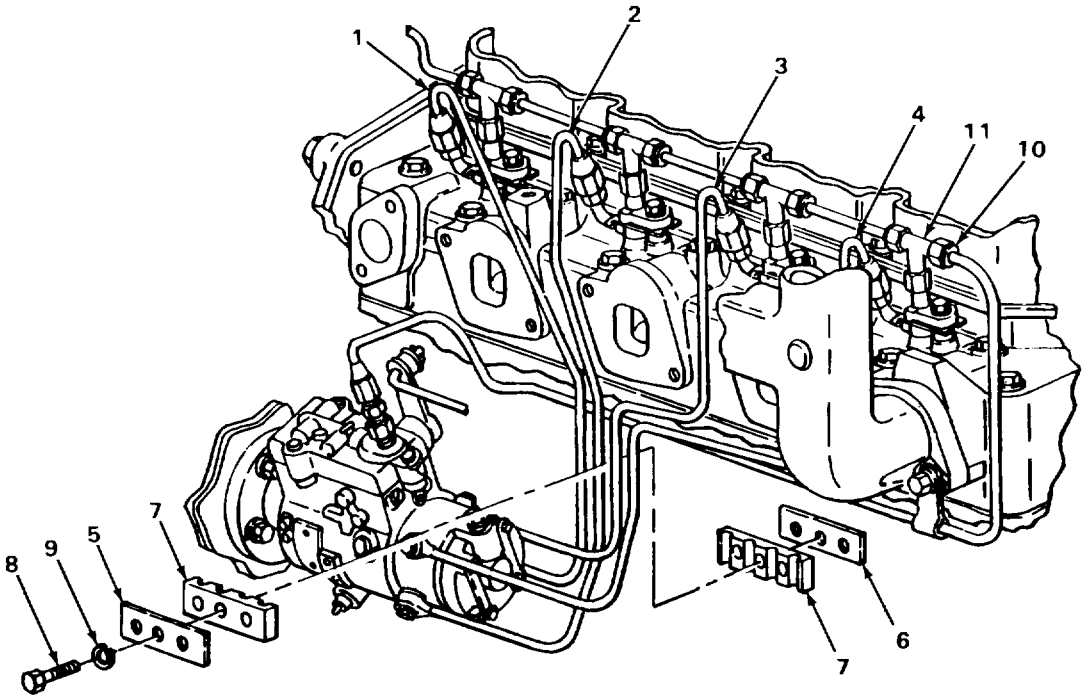


TA242813

FUEL INJECTION TUBES - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION		
30. Four tubes (1 thru 4)	Two straps (5 and 6) and two clamps (7)	Place position.
31. Two straps (5 and 6) and two clamps (7)	Three screws (8) and new lockwashers (9)	Screw in and tighten using 5116-inch open-end wrench.
32. Loader backhoe	Fuel system	Prime (page 2-340).
33.	Battery ground cable	Connect (page 2-696).
34.	Engine	Start and run at high idle (TM 52420-222-10).
35. Engine	Fuel injection tubes	a. Check for leaks. b. If leaking at nut (10) and cap (11), tighten using 9/16-inch open-end wrench. c. If leaking does not stop or if leaking at any other connection, shut down engine (TM 5-2420-222-10) and replace leaking connection grommet, washer, or tube as outlined in this task.
36. Loader backhoe	Engine	If still running, shut down (TM 5-2420-222-10).

FUEL INJECTION TUBES - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

TA242814

FUEL METERING PUMP ADJUSTMENT

This task covers:

INITIAL SETUP

Tools

Pliers, long round nose
Screwdriver, flat-tip, 3/16-inch
Wrench, open-end, 5/16-inch (two required)

Materials/Parts

Pin, cotter, speed control rod

Personnel Required

Two

LOCATION	ITEM	ACTION	REMARKS

ADJUSTMENT

1. Loader backhoe	Engine	Start and warm up (TM 5-2420-222-10).	

WARNING

Be careful of moving parts when working near engine while it is running. Moving parts could catch on tools, clothing, or extremities causing serious injury.

2. Speed control rod (1) and washer (2)	Cotter pin (3)	a. Using long round nose pliers, bend ends straight and pull out. b. Get rid of.	
3. Speed control rod (1) and lever (4)	Washer (2)	Take off.	
4. Lever (4)	Speed control rod (1)	Take out.	
5. Arm (5)	Lever (4)	a. Pull back as far as possible. b. Have assistant note engine speed on tachometer (6).	**Engine speed should be 2650 rpm.**

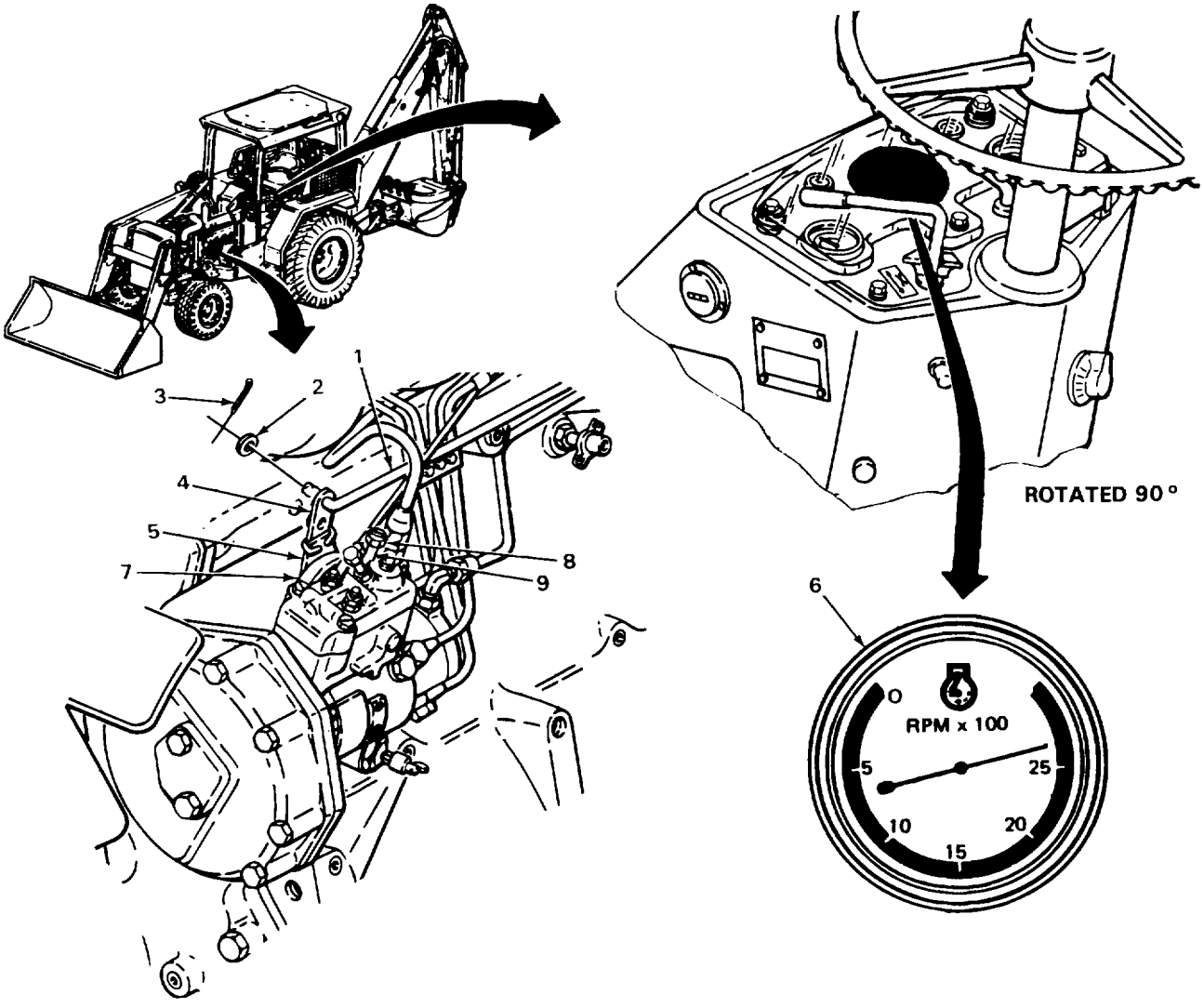
NOTE

If engine speed is correct, skip steps 6 thru 8.

6. Shaft (7) and high idle adjusting screw (8)	Nut (9)	Using 3/16-inch flat-tip screwdriver and 5/16-inch open-end wrench, loosen.	

FUEL METERING PUMP ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
7. Shaft (7) and nut (9)	High idle adjusting screw (8)	a. If engine speed noted in step 5 was less than 2650 rpm, using 3/16-inch flat-tip screwdriver, turn clockwise. b. If engine speed noted in step 5 was more than 2650 rpm, using 3116-inch flat-tip screwdriver, turn counter-clockwise.
8. Shaft (7) and high idle adjusting screw (8)	Nut (9)	a. Using 3/16-inch flat-tip screwdriver and 5116-inch open-end wrench, tighten. b. Repeat steps 5 thru 8.



TA242815

FUEL METERING PUMP ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION REMARKS

ADJUSTMENT - CONTINUED

WARNING

Be careful of moving parts when working near engine while it is running. Moving parts could catch on tools, clothing, or extremities causing serious injury.

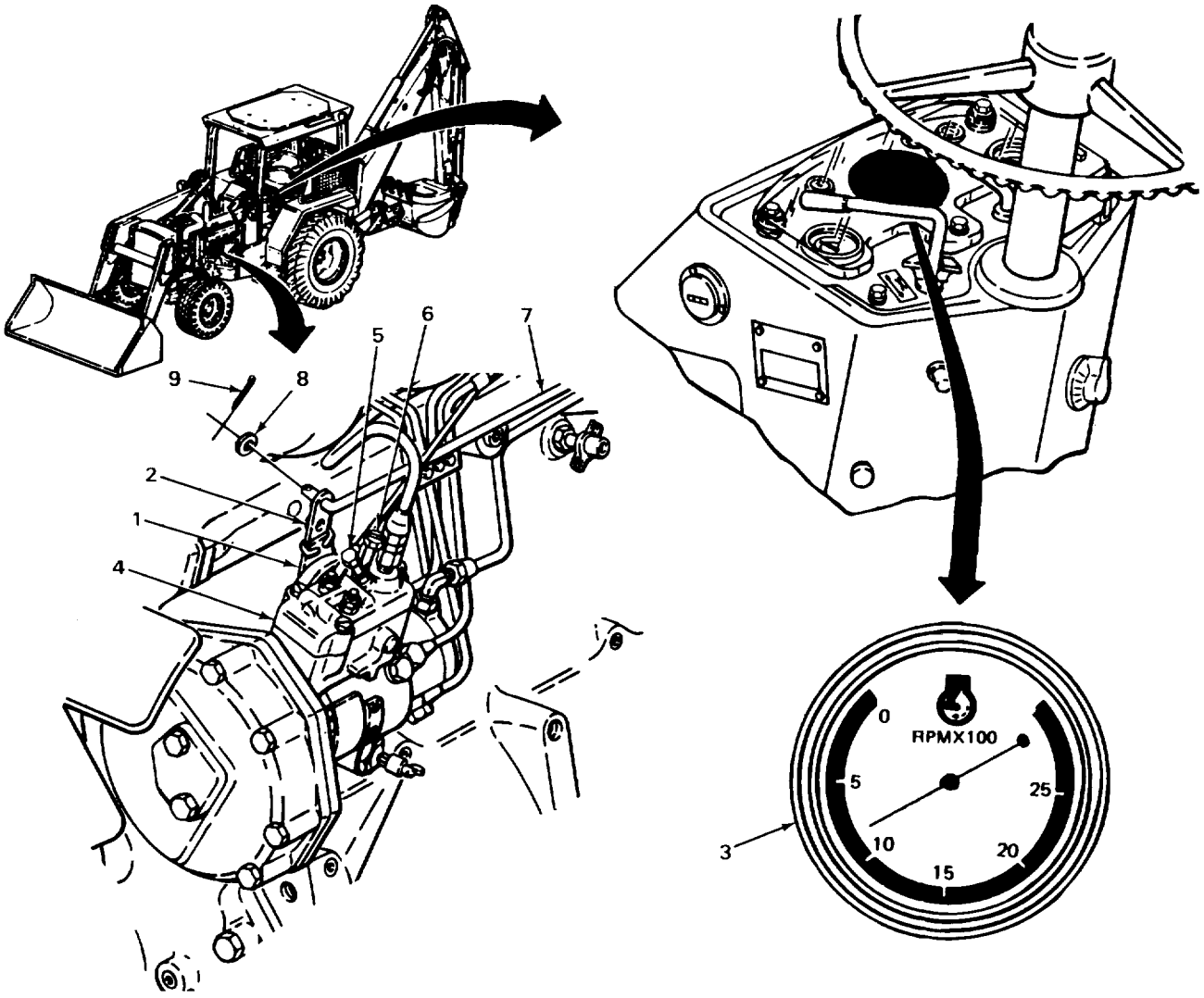
9.	Arm (1)	Lever (2)	a. Push forward all the way. b. Have assistant note engine speed on tachometer (3). **Engine speed should be 800 to 825 rpm.**

NOTE

If engine speed is correct, skip steps 10 thru 12.

10.	Cover (4) and low idle adjustment screw (5)	Nut (6)	Using two 5/16-inch open-end wrenches, loosen.
11.	Cover (4) and nut (6)	Low idle adjustment screw (5)	a. If engine speed noted in step 9 was less than 800 rpm, using 5/16-inch open-end wrench, turn clockwise. b. If engine speed noted in step 9 was more than 825 rpm, using 5/16-inch open-end wrench, turn counter-clockwise.
12.	Cover (4) and low idle adjustment screw (5)	Nut (6)	a. Using two 5/16-inch open-end wrenches, tighten. b. Repeat step 9 thru 12.
13.	Loader backhoe	Engine	Shut down (TM 5-2420-222-10).
14.	Lever (2)	Speed control rod (7)	Place in position.
15.	Speed control rod (7) and lever (2)	Washer (8)	Place in position.
16.	Speed control rod (7) and washer (8)	New cotter pin (9)	a. Place in position. b. Using long roundnose pliers, bend ends back.

FUEL METERING PUMP ADJUSTMENT - CONTINUED



TASK ENDS HERE

TA242816

FUEL PUMP

This task covers:

a. Removal (page 2-226)
b. Pre-Load Check of Bearing
c. Cleaning (page 2-228)
d. Inspection/Replacement (page 2-229)
e. Assembly (page 2-229)
f. Installation (page 2-230)

INITIAL SETUP:

Tools

Extension, 3/18-inch drive, 5-inch
Handle, ratchet, 3/8-inch drive
Knife, pocket
Socket, 3/8-inch drive, 1/2-inch
Universal joint, 3/8-inch drive
Wrench, adjustable 0 to 1.322-inch
Wrench, open-end, 5/8-inch

Materials/Parts

Gasket, fuel pump

Materials/Parts - Continued

Packing, fuel pump
Packing, lever
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

Battery ground cable disconnected (page 2-696)

LOCATION	ITEM	ACTION / REMARKS
		WARNING No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.
1. Two elbows (1)	Two tubes (2 and 3)	a. Using 5/8-inch open-end wrench, unscrew and take off. b. Cap (page 2-137).
2. Fuel pump (4) and engine block (5)	Two screws (6) and washers (7)	Using 1/2-inch, 3/8-inch drive socket, 5-inch extension, universal joint, and ratchet handle, unscrew and take out.

FUEL PUMP - CONTINUED

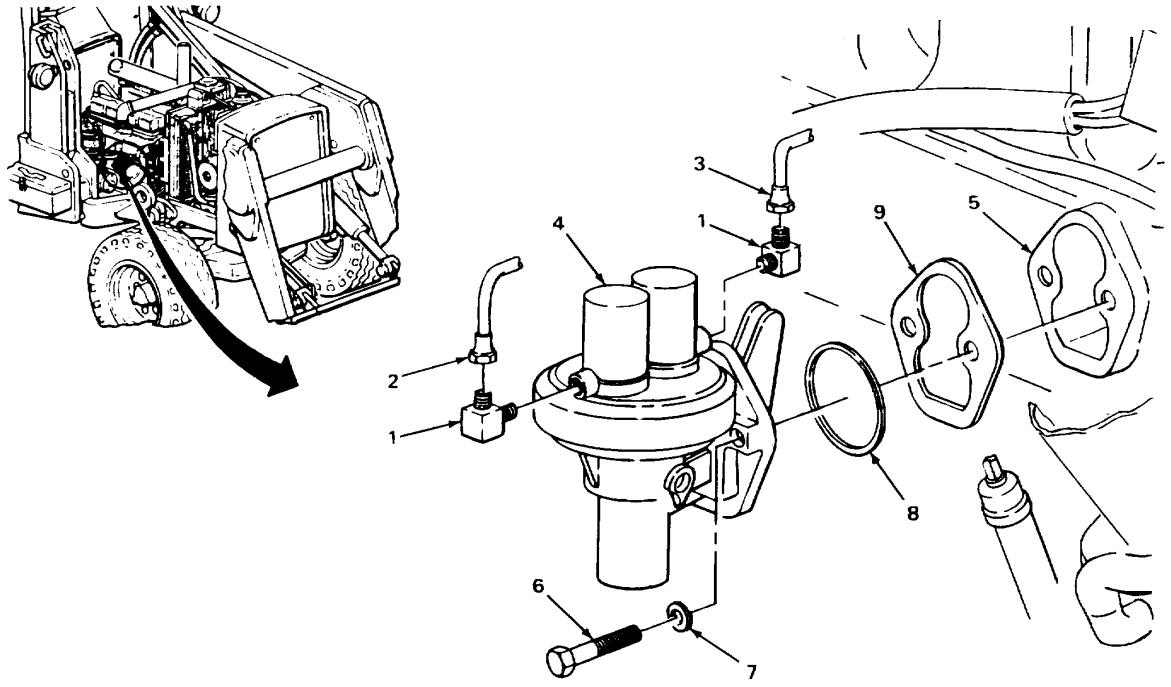
LOCATION	ITEM	ACTION REMARKS
3. Engine block (5)	Fuel pump (4) with assembled packing (8) and gasket (9)	a. Take off. b. Get rid of gasket (9).
4. Fuel pump (4)	Packing (8)	a. Using pocket knife, take off. b. Get rid of.

DISASSEMBLY

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

5. Fuel pump (4)	Two elbows (1)	Using 0 to 1.322-inch adjustable wrench, unscrew and take out.



TA242817

FUEL PUMP - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

DISASSEMBLY - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

6.	Fuel pump (1)	Lever (2) with assembled packing (3)	a. Press fuel pump rocker arm lever (4). b. Take out. c. Release fuel pump rocker arm lever.
7.	Lever (2)	Packing (3)	a. Using pocket knife, take off. b. Get rid of.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

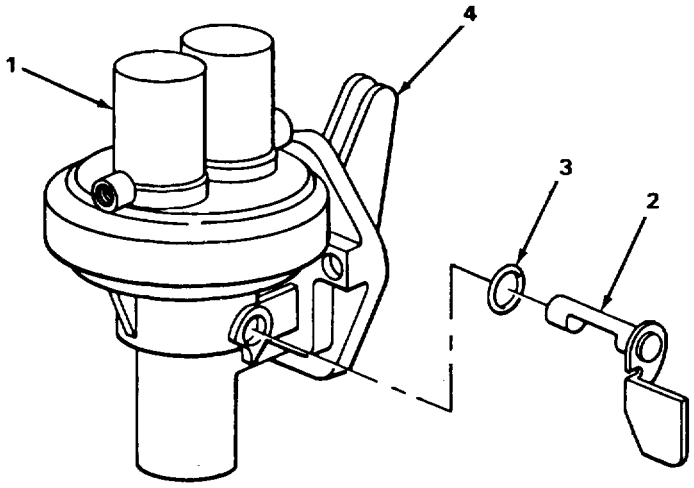
WARNING

Drycleaning solvent PD680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

8.		Fuel pump (1)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
9.		All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

FUEL PUMP - CONTINUEO

LOCATION	ITEM	ACTION / REMARKS
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
10.	Fuel pump (1) and lever (2)	Look for wear on levers (2 and 4).
11.	All metal parts dents.	Look for cracks, breaks, bends, and
12.	All thread parts	Look for damaged threads.
ASSEMBLY		
13. Lever(2)	New packing (3)	Place in position.
14. Fuel pump	Lever (2) with assembled packing (3)	a. Press rocker arm lever (4). b. Place in position. c. Release rocker arm lever (4).



TA242818

FUEL PUMP - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ASSEMBLY - CONTINUED		
15. Fuel pump (1)	Two elbows (2)	Screw in and tighten using 0 to 1.322-inch adjustable wrench.
INSTALLATION		

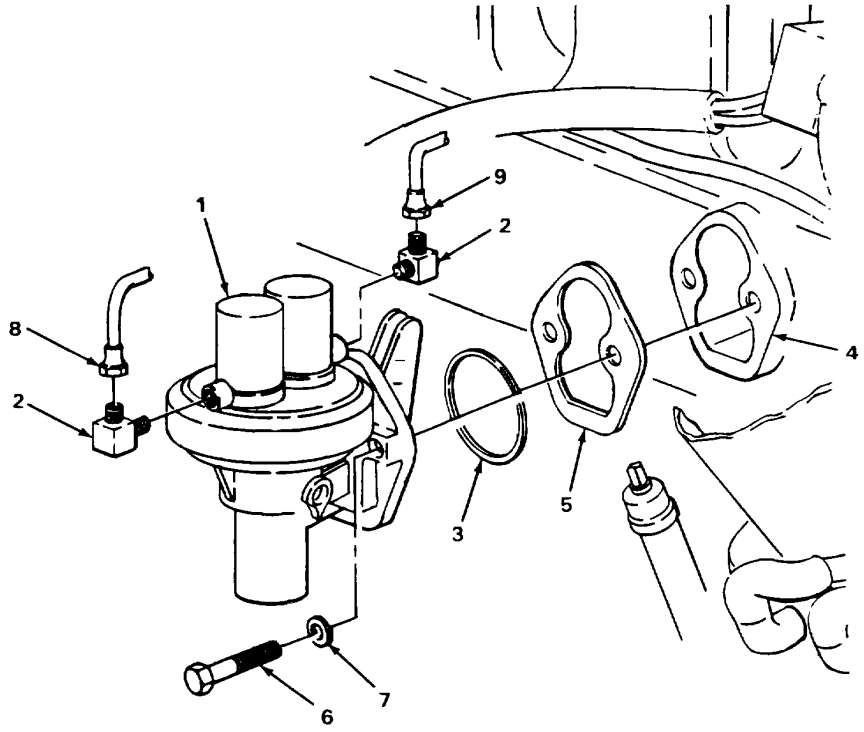
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

16. Fuel pump (1)	New packing (3)	Place in position.
17. Engine block (4)	Fuel pump (1) with assembled packing (3) and new gasket (5)	Place in position.
18. Fuel pump (1) and engine block (4)	Two screws (6) and washers (7)	Screw in and tighten using 1/2-inch, 3/8-inch drive socket, universal joint, 5-inch extension, and ratchet handle.
19. Two elbows (2)	Two tubes (8 and 9)	a. Uncap. b. Screw on and tighten using 5/8-inch open-end wrench.
20. Loader backhoe	Fuel system	Prime (page 2-340).
21.	Battery ground cable	Connect (page 2-696).
22.	Engine	Start and run at high idle (TM 5-2420-222-10).

FUEL PUMP - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
23. Engine	Fuel pump	a. Check for leaks. b. If leaking engine oil, tighten using 1/2-inch, 3/8-inch drive socket, universal joint, 5inch extension, and ratchet handle. c. If leaking fuel at any connection, tighten using 518-inch open-end or 0 to 1.322-inch adjustable wrench. d. If fuel or oil leaking does not stop, shut down engine (TM 5-2420-222-10), and replace leaking connection packing, gasket, fitting, or fuel pump as outlined in this task.
24. Loader backhoe	Engine	If still running, shut down (TM 5-2420-222-10).



TASK ENDS HERE

TA242819

AIR INLET HOUSING

This task covers:

a. **Removal (page 2-232)**
b. **Disassembly (page 2-233)**
c. **Cleaning (page 2-234)**
d. **Inspection/Replacement (page 2-234)**
e. **Repair (page 2-234)**
f. **Assembly (page 2-235)**
d. **Installation (page 2-235)**

INITIAL SETUP:

Tools
- Handle, ratchet, 1/2-inch drive
- Screwdriver, flat-tip, 1/4-inch
- Socket, 1/2-inch drive, 9/16-inch
- Thread set, pipe
- Wrench, open-end, 5/16-inch
- Wrench, open-end, 3/8-inch
- Wrench, open-end, 7/16-inch
- Wrench, open-end, 3/4-inch

Materials/Parts
- Gasket, air inlet
- Lockwasher, air inlet screw (two required)
- Rags, wiping (item 21, Appendix C)
- Solvent, drycleaning (item 28, Appendix C)

Personnel Required
- One

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Hose (1)	Two clamps (2)	Using 1/4-inch flat-tip screwdriver, loosen.	
2. Air inlet (3) and pipe (4)	Hose (1) with assembled two clamps (2)	Slide off.	

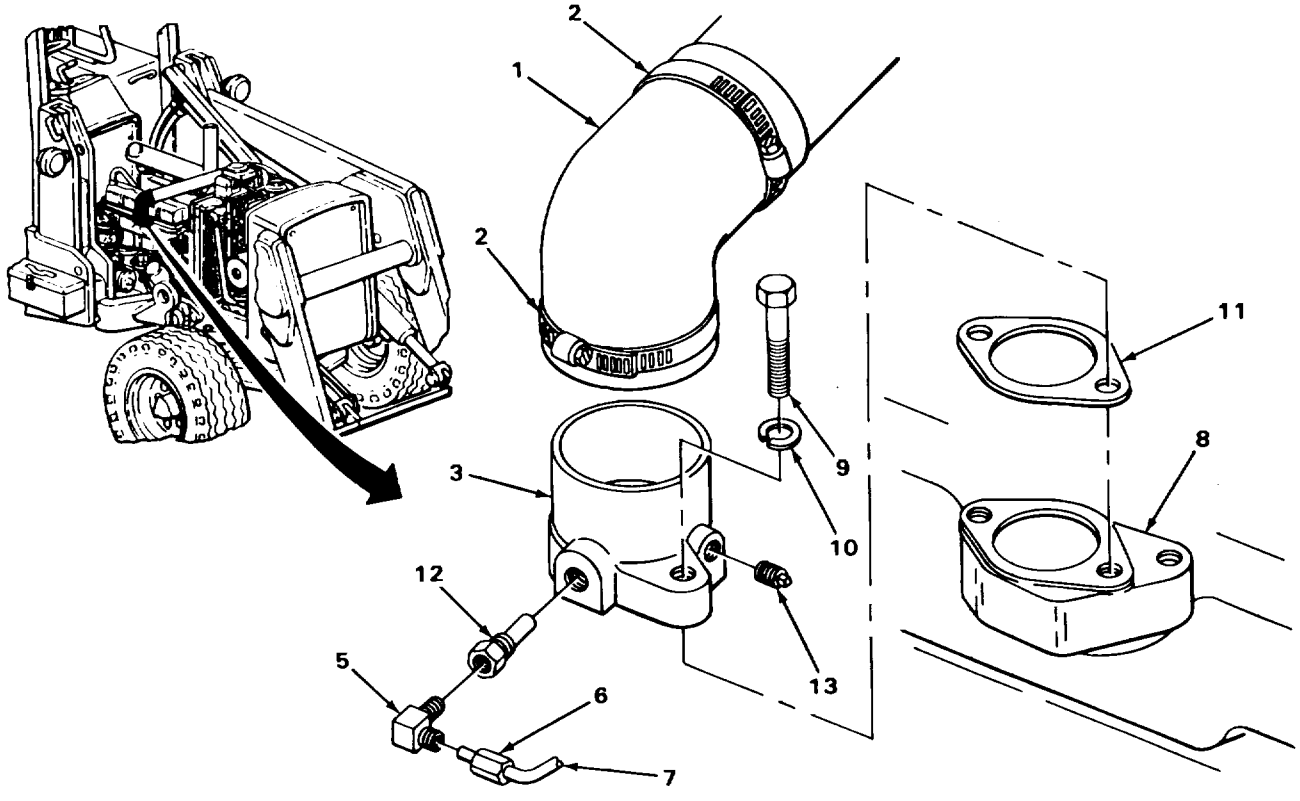
WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether In confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

3. Elbow (5)	Nut (6)	Using 3/8-inch open-end wrench, unscrew and take off.	
4.	Tube (7) with assembled nut (6)	Pull out.	

AIR INLET HOUSING - CONTINUED

LOCATION	ITEM	ACTION REMARKS
5. Air inlet (3) and cylinder head (8)	Two screws (9) and lockwashers (10)	a. Using 9/16-inch, 112-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwashers (10).
6. Cylinder head (8)	Air inlet (3) with assembled parts and gasket (11)	a. Take off. b. Get rid of gasket (11).
DISASSEMBLY		
7. Spray nozzle	Elbow (5) holder (12)	Using 7/16-inch and 3/4-inch open-end wrenches, unscrew and take out.
8. Air inlet (3)	Spray nozzle holder (12)	Using 3/4-inch open-end wrench, unscrew and take out.
9.	Plug (13)	Using 5/16-inch open-end wrench, unscrew and take out.



TA242820

AIR INLET HOUSING - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent PD680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 59°C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

10.	Air inlet (1)	a. Using clean rags dampened in drycleaning-solvent, wipe clean. b. Using clean, dry rags, wipe dry.
11.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts which cannot be repaired.

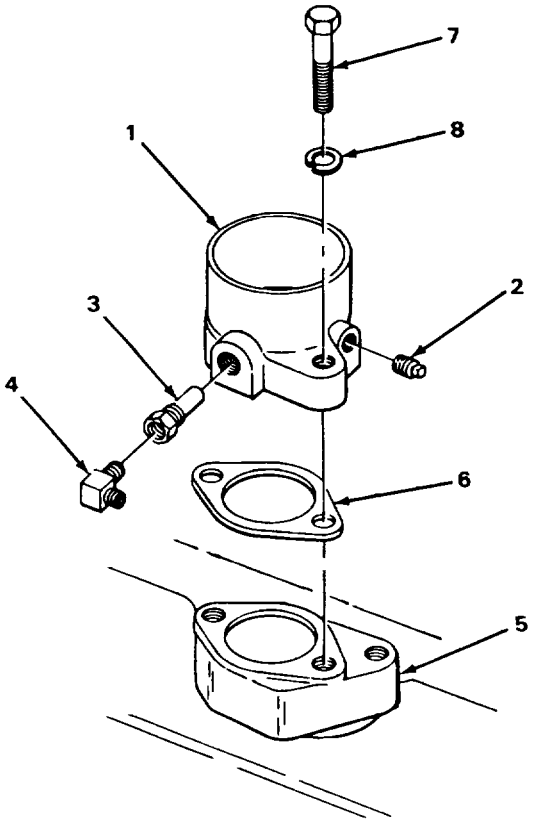
12.	All metal parts	Look for cracks and breaks.
13.	All threaded parts	Look for damaged threads.

REPAIR

14.	Air inlet (1)	If threads are damaged, using pipe thread set, restore threads.

AIR INLET HOUSING - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ASSEMBLY		
15. Air inlet (1)	Plug (2)	Screw in and tighten using 5116-inch open-end wrench.
16.	Spray nozzle holder (3)	Screw in and tighten using 3/4-inch open-end wrench.
17. Spray nozzle	Elbow (4) holder (3)	Screw in and tighten using 7/16-inch and 3/4-inch open-end wrenches.
INSTALLATION		
18. Cylinder head (5)	Air inlet (1) and new gasket (6)	Place in position.
19. Air inlet (1) and cylinder head (5)	Two screws (7) and new lockwashers (8)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket and ratchet handle.



TA242821

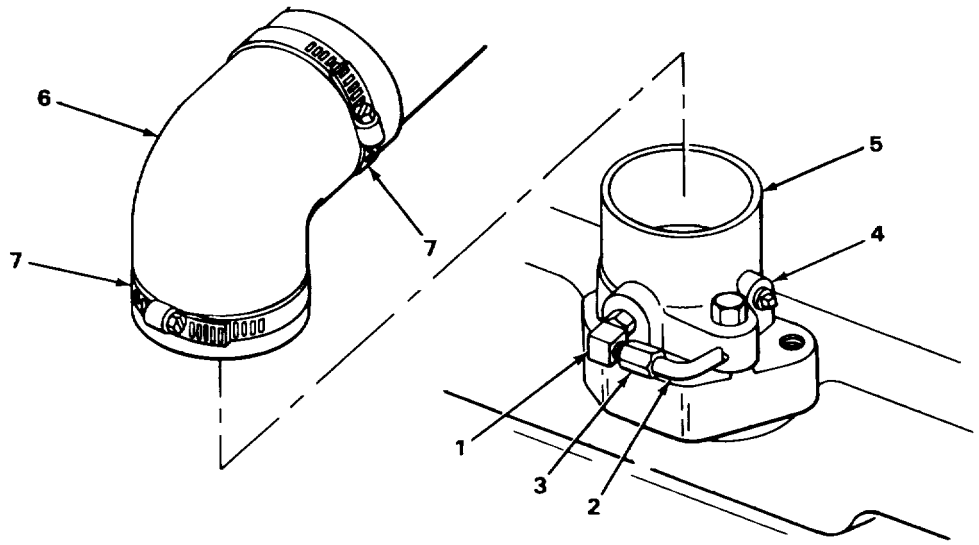
LOCATION	ITEM	ACTION	REMARKS

INSTALLATION - CONTINUED

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

20.	Elbow (1)	Tube (2) with assembled nut (3)	Place in position.
21.		Nut (3)	Screw on and tighten using 3/8-inch open-end wrench.
22.	Air inlet (4) and pipe (5)	Hose (6) with assembled two clamps (7)	Slide down.
23.	Hose (6)	Two clamps (7)	a. Place in position. b. Using 1/4-inch flat-tip screwdriver, tighten.



TASK ENDS HERE

TA242822

AIR CLEANER

This task covers:

a. Removal (page 2-238)
b. Disassembly (page 2-239)
c. Cleaning (page 2-240)
d. Inspection/Replacement (page 2-241)
e. Repair (page 2-241)
f. Assembly (page 2-242)
g. Installation (page 2-242)

INITIAL SETUP

Tools

Compressor, reciprocating air
Gun, air blow
Handle, ratchet, 1/2-inch drive
Hose, air compressor
Screwdriver, flat-tip, 1/4-inch
Socket, 1/2-inch drive, 9116-inch
Threading set, screw

Materials/Parts

Detergent, GP (item 7, Appendix C)
Lockwasher, air cleaner screw
(Two required)

Materials/Parts - Continued

Lockwasher, air cleaner screw
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

1. Side grilles removed (TM 52420-222-10)
2. Loader bucket support installed (page 2-1830)

AIR CLEANER - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

After Nuclear, Biological, or Chemical (NBC) exposure of this vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots. All contaminated air filters shall be placed into double-lined plastic bags and swiftly moved to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination, however, the Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP.

CAUTION

Never run engine without filter element or unloader valve. Engine parts can be damaged.

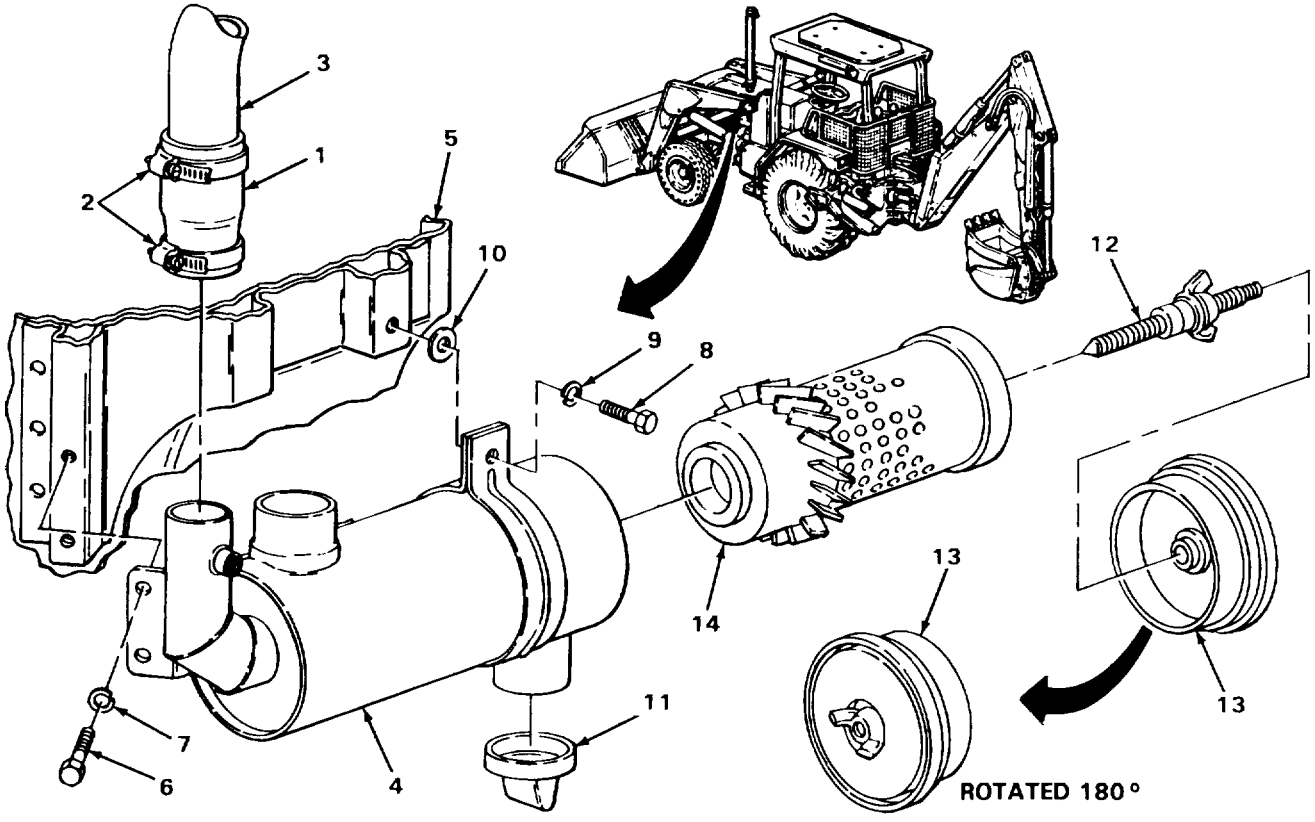
	LOCATION	ITEM	ACTION	REMARKS
1.	Hose (1)	Two clamps (2)	Using 1/4-inch flat-tip screwdriver, loosen.	
2.	Pipe (3) and air cleaner (4)	Hose (1) with assembled two clamps (2)	Slide off.	
3.	Air cleaner (4) and fuel tank (5)	Two screws (6) and lockwashers (7)	a. Using 9/16-inch, 1/2-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwashers (7).	
4.		Screw (8), lock-washers (9), and spacer (10)	a. Using 9/16-inch, 112-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwashers (9).	
5.	Fuel tank (5)	Air cleaner (4)	Take off.	

AIR CLEANER - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

DISASSEMBLY

6.	Air cleaner (4)	Unloader valve (11)	Pull off.
7.	Air cleaner (4) and special screw (12)	Cover with attached wingnut (13)	Unscrew and take off.
8.	Air cleaner (4) and air cleaner filter element (14)	Special screw (12)	Unscrew and take off.
9.	Air cleaner (4)	Air cleaner filter element (14)	Take out.
10.		Air cleaner restriction indicator	Remove (page 2-1792).



TA242823

AIR CLEANER - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Compressed air used for blowing away chips, dirt, etc., must leave nozzle at less than 30 psi (207 kPa) to prevent personal injury. Be certain that nozzle is rated to provide a maximum of 30 psi (207 kPa). Be sure to wear safety goggles or lenses when using compressed air. Compressed air and particles moved by compressed air can cause damage to your eyes.

CAUTION

Do not tap air cleaner element against hard surfaces. When cleaning air cleaner element, use 30 psi (207 kPa) or lower, compressed air. Element can be damaged by rough handling and high pressure compressed air.

11.	Air cleaner filter element (1)	a. Tap against hand several times to loosen dirt. b. Using reciprocating air compressor, air compressor hose, and air blow gun, blow out dirt.	
12.	Unloader valve (2) and special screw (3)	a. Using clean rags dampened with solution of detergent and water, wipe clean. b. Using clean water, rinse. c. Using clean, dry rags, wipe dry.	

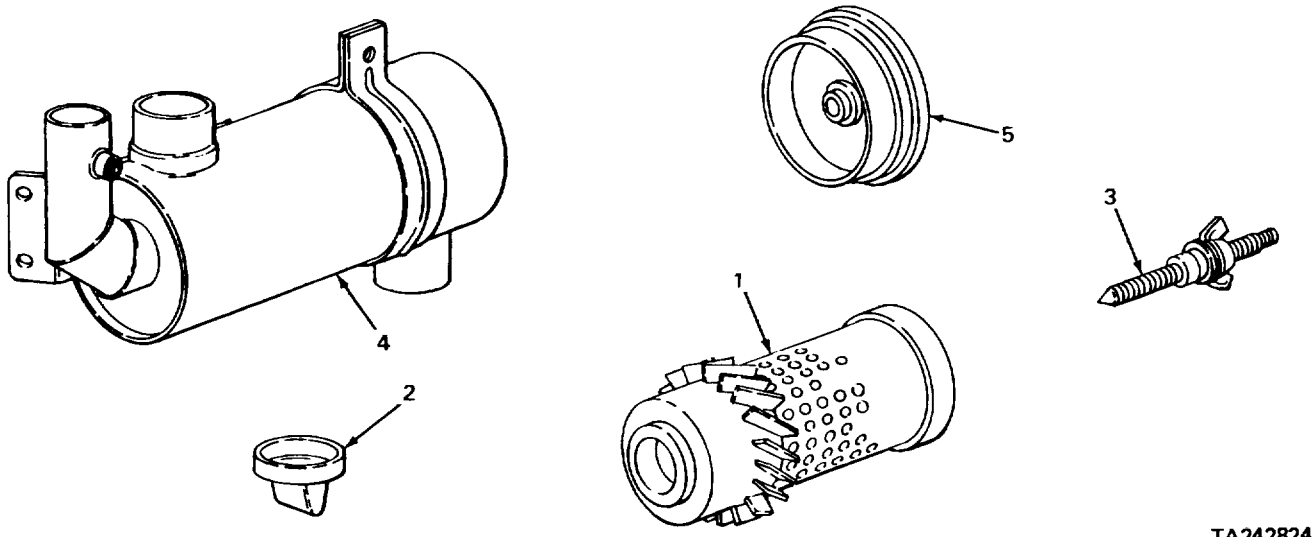
WARNING

Drycleaning solvent PD680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

13.	Air cleaner (4) and cover with attached wingnut (5)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.	

AIR CLEANER - CONTINUED

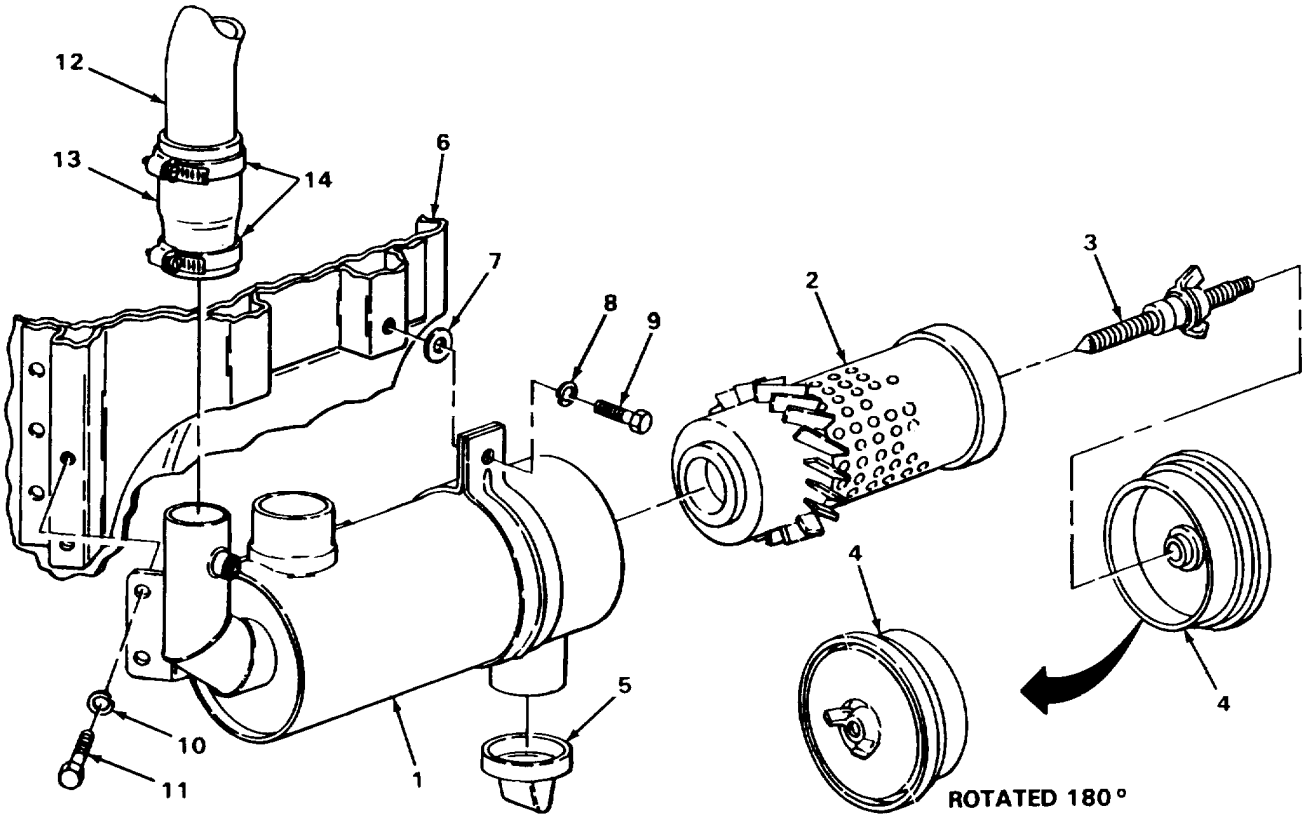
LOCATION	ITEM	ACTION REMARKS
14.	All attaching hardware except special screw (3)	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137). Replace defective parts which cannot be repaired.**	
15.	Air cleaner filter element (1)	Look for holes, tears, dented sealing surfaces, and excessive dirt.
16.	Unloader valve (2)	Look for cracks
17.	Air cleaner (4)	Look for bends and dents which could restrict air flow.
18.	All metal parts	Look for cracks and breaks.
19.	All threaded parts	Look for damaged threads.
REPAIR		
20.	Air cleaner (4), cover with attached wingnut (5), and special screw (3)	If threads are damaged, using screw threading set, restore threads.



AIR CLEANER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ASSEMBLY		
21. Air cleaner (1)	Air cleaner restriction indicator	Install (page 2-1792).
	NOTE	
	Air cleaner filter element must seal properly against air cleaner housing so that air restriction indicator will work.	
22.	Air cleaner filter element (2)	Place In position.
23. Air cleaner filter element (2) and air cleaner (1)	Special screw (3)	Screw in and tighten.
24. Air cleaner (1) and special screw (3)	Cover with attached wingnut (4)	a. Place in position. b. Screw on and tighten.
25. Air cleaner (1)	Unloader valve (5)	Place in position.
INSTALLATION		
26. Fuel tank (6)	Air cleaner (1)	Place in position.
27. Air cleaner (1) and fuel tank (6)	Spacer (7), new lockwasher (8), and screw (9)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket and ratchet handle.
28.	Two new lockwashers (10) and screws (11)	Screw in and tighten using 9/16-inch, 1/2-inch drive socket and ratchet handle.
29. Pipe (12) and air cleaner (1)	Hose (13) with assembled two clamps (14)	Slide down.
30. Hose (13)	Two clamps (14)	Using 1/4-inch flat-tip screwdriver, tighten.

AIR CLEANER - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE:
1. Remove loader bucket support (page 2-1830).
2. Install side grilles (TM 5-2420-222-10).

TASK ENDS HERE

TA242825

AIR CLEANER HOSES AND PIPES

This task covers:

a. **Removal (page 2-244)**
b. **Disassembly (page 2-245)**
c. **Cleaning (page 2-245)**
d. **Inspection/Replacement (page 2-247)**
e. **Assembly (page 2-248)**
f. **Installation (page 2-248)**

INITIAL SETUP:

Tools
Screwdriver, flat-tip, 1/4-inch

Materials/Parts
Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

NOTE

The following materials only apply to loader backhoes with Serial Numbers 319995 thru 342573.

Materials/Parts - Continued
Adhesive, metal bonding (item 1, Appendix C)
Solvent, cleaning compound (item 27, Appendix C)

Personnel Required
One

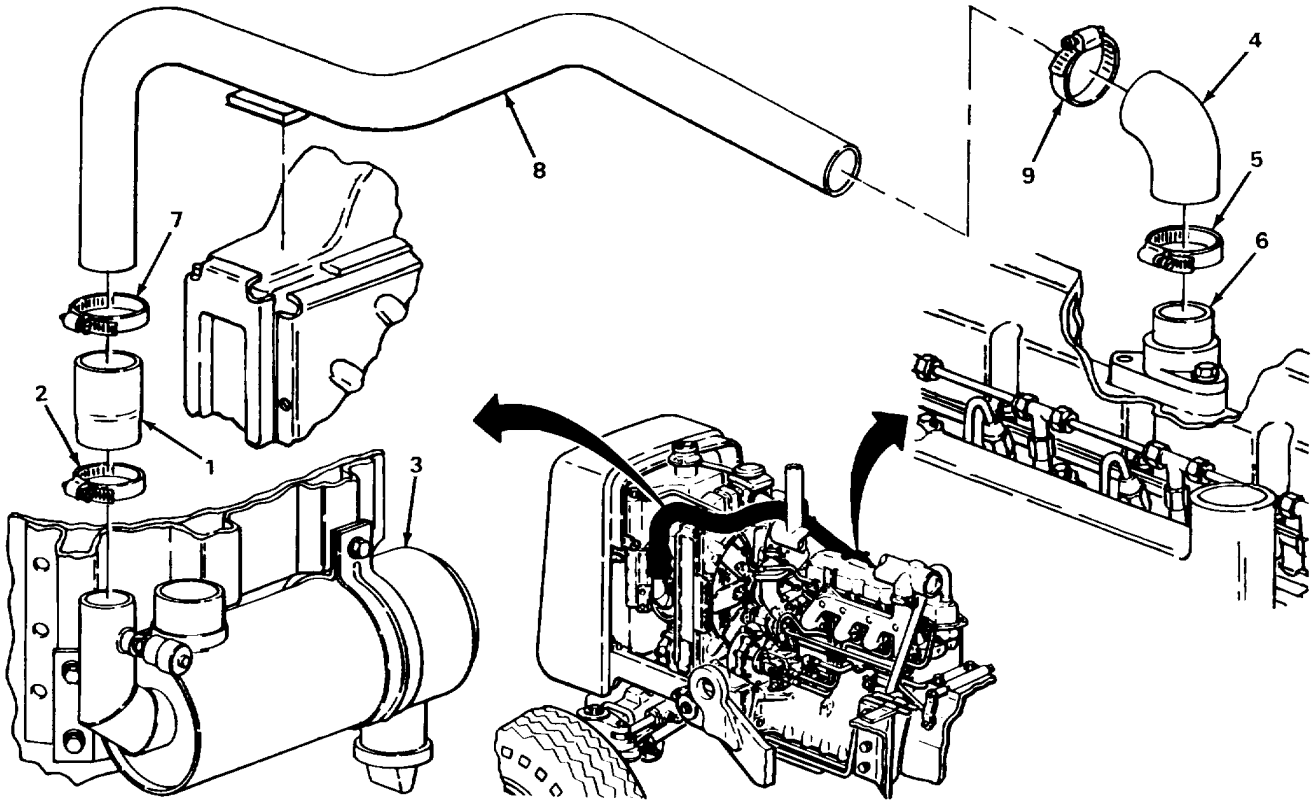
Equipment Condition

Hood removed (page 2-1025)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Hose (1)	Clamp (2)	Using 1/4-inch flat-tip screwdriver, loosen.	
2. Air cleaner (3)	Hose (1) with assembled parts	Pull off.	
3. Hose (4)	Clamp (5)	Using 1/4-inch flat-tip screwdriver, loosen.	
4. Air inlet (6)	Hose (4) with assembled parts	Pull off.	

AIR CLEANER HOSES AND PIPES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
DISASSEMBLY		
5. Hose (1)	Clamp (2)	Take off.
6.	Clamp (7)	a. Using 114-inch flat-tip screwdriver, loosen. b. Take off.
7. Pipe (8)	Hose (1)	Pull off.
8. Hose (4)	Clamp (5)	Take off.
9.	Clamp (9)	a. Using 1/4-inch flat-tip screwdriver, loosen. b. Take off.
10. Pipe (8)	Hose (4)	Pull off.



AIR CLEANER HOSES AND PIPES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

DISASSEMBLY - CONTINUED

WARNING

Water soluble cleaning compound solvent is flammable and fumes are toxic. Flashpoint is 2200F (1040C). Boiling point is 2120F (1000C). Do not store in temperatures above 150°F (65°C) or below 35°F (2°C). Do not use near open flame or excessive heat. Do not wear jewelry, wear rubber gloves and goggles, and use only in well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapors. Avoid contact with acids, aluminium, or zinc; chemical reaction may result. If you become dizzy while using cleaning compound solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

CAUTION

Do not remove cushion unless inspection shows need for replacement. Removal may damage parts.

11.	Pipe (1)	Cushion (2)	a. On loader backhoes with Serial Numbers 319995 thru 342573 only, note position for proper placement during assembly. b. Using cleaning compound solvent, dissolve adhesive and take off. c. Using clean rag soaked in cleaning compound solvent, remove all adhesive. d. Rinse with clean water. e. Using clean, dry rags, wipe dry.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

12		All rubber and cloth parts	a. Using clean rags dampened with solution of detergent and water, wipe clean. b. Rinse with clean water. c. Using clean, dry rags, wipe dry.

AIR CLEANER HOSES AND PIPES - CONTINUED

LOCATION	ITEM	ACTION REMARKS

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 138°F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

13.	Pipe (1)	a. Using clean rags dampened in drycleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
14.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

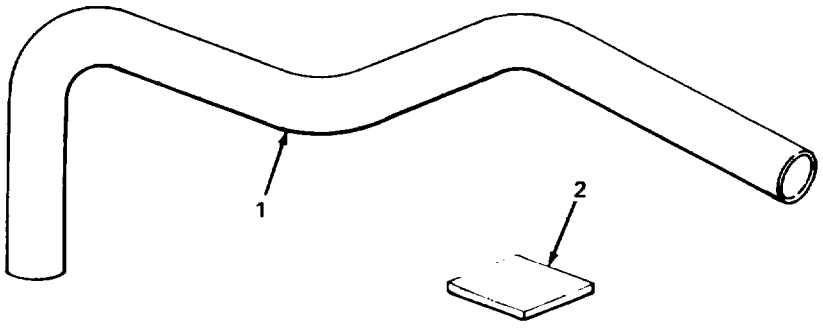
INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

15.	Pipe (1)	Look for cracks, breaks, and abnormal bends which could restrict air flow.
16.	All other metal parts	Look for cracks and breaks.
17.	All rubber and cloth parts	Look for holes, tears, cracks, and breaks.



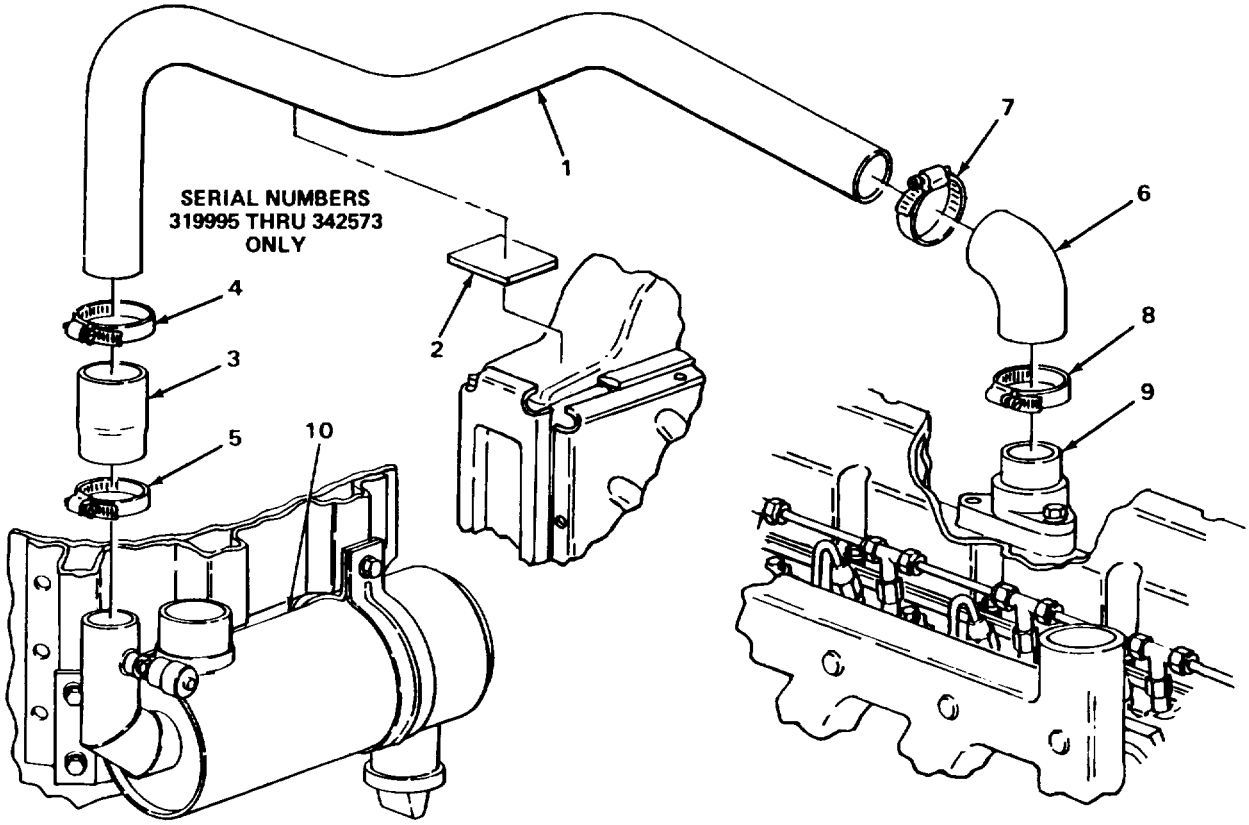
SERIAL NUMBERS 319995 THRU 342573 ONLY

AIR CLEANER HOSES AND PIPES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSPECTION/REPLACEMENT- CONTINUED		
18.	All threaded parts	Check for damaged threads.
ASSEMBLY		
19. Pipe (1)	Cushion (2)	a. If removed on loader backhoes with Serial Numbers 319995 thru 342573 only, apply metal adhesive in 0.06 to 0.18-inch (1.52 to 4.57 mm) wide beads in 2.00-inch (56.8 mm) or smaller squares. **Make sure that outside bead Is within 0.25-inch (6.35 mm) of edge with no gaps**. b. Place in position as noted during removal for a moment to transfer some metal adhesive to pipes (1). c. Take off and allow metal adhesive to set for about two minutes. d. Press firmly into place.
20.	Hose (3)	Slide on.
21. Hose (3)	Clamp (4)	a. Place in position. b. Using 114-inch flat-tip screwdriver, tighten.
22.	Clamp (5)	Place in position.
23. Pipe (1)	Hose (6)	Slide on.
24. Hose (6)	Clamp (7)	a. Place in position. b. Using 1/4-inch flat-tip screwdriver, tighten.
25.	Clamp (8)	Place in position.
INSTALLATION		
26. Air inlet (9)	Hose (6) with assembled parts	Slide on.
27. Hose (6)	Clamp (8)	Using 1/4-inch flat-tip screwdriver, tighten.

AIR CLEANER HOSES AND PIPES - CONTINUED

LOCATION	ITEM	ACTION REMARKS
28. Air cleaner (10)	Hose (3) with assembled parts	Slide on.
29. Hose (3)	Clamp (5)	Using 114-inch flat-tip screwdriver, tighten.



NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

TA242828

FUEL TANK DRAINING

This task covers:

a. Water and Sediment Draining (page 2-250)

b. Fuel Draining (page 2-251)

INITIAL SETUP:

Tools
- Container, 5-gallon
- Dispensing pump, hand driven
- Drum, 55-gallon
- Hose, rubber (Figure D-11, Appendix D)
- Wrench, open-end, 5/8-inch

Personnel Required
- Two

Equipment Condition
1. Fire extinguisher removed (TM 5-2420-222-10)
2. Battery ground cable disconnected (page 2-696)

LOCATION	ITEM	ACTION	REMARKS

WATER AND SEDIMENT DRAINING

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

	LOCATION	ITEM	ACTION	REMARKS
1.	Fuel tank (1)	Fuel shutoff valve (2)	a. Have assistant stand by with fire extinguisher. b. Turn clockwise to close.	
2.	Fuel shutoff valve (2)	Fuel line (3)	a. Place 5-gallon container underneath. b. Using 5/8-inch open-end wrench, unscrew and take off.	
3.	Fuel tank (1)	Fuel shutoff valve (2)	a. Connect rubber hose. b. Turn counterclockwise until water and sediment or fuel flows freely into container. c. When clean fuel flows freely, turn clockwise to close.	**Make sure fuel flow has stopped completely.**

FUEL TANK DRAINING - CONTINUED

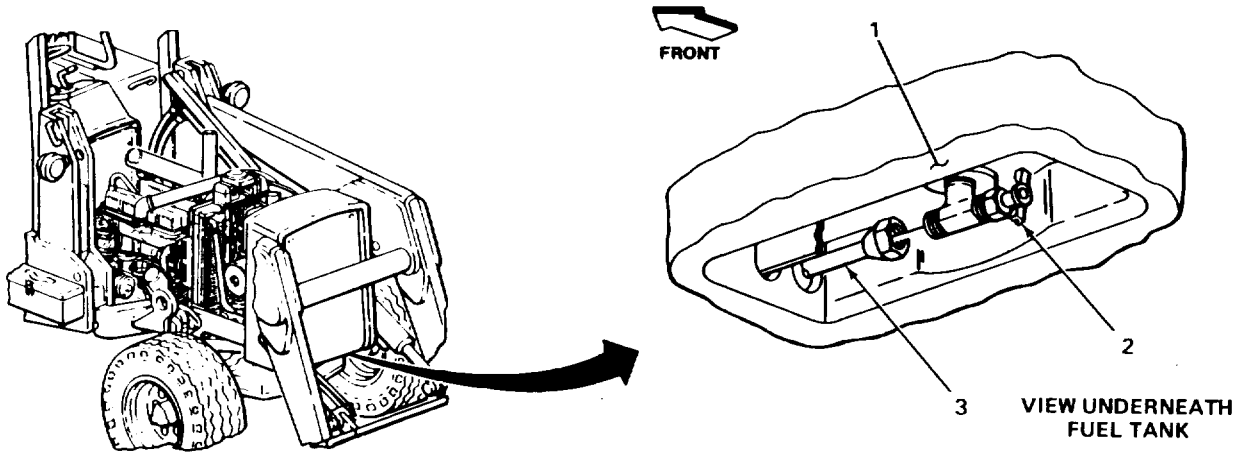
LOCATION	ITEM	ACTION REMARKS
3. Continued		d. Disconnect rubber hose. e. Get rid of drained fuel (page 2-137).
4. Fuel shutoff valve (2)	Fuel line (3)	Screw on and tighten using 5/8-inch open-end wrench.
5. Loader backhoe	Fuel tank	Fill (TM 5-2420-22-10).
6. Fuel tank (1)	Fuel shutoff valve (2)	a. Check for leaks. b. If leaking at any connection, tighten using 5/8-inch open-end wrench. c. If leaking does not stop, replace fuel shutoff valve (page 2-273) or fuel shutoff valve-to-fuel pump fuel line (page 2-264).

FUEL DRAINING

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

7.	Fuel tank	Fuel cap	Remove (TM 5-2420-222-10).



FUEL TANK DRAINING - CONTINUED

LOCATION	ITEM	ACTION REMARKS

FUEL DRAINING - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

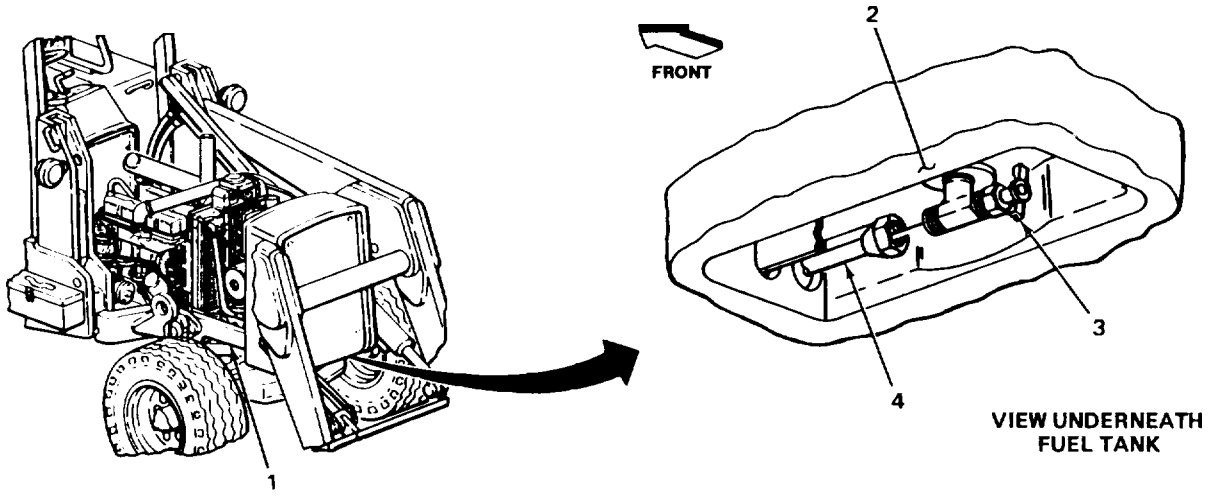
CAUTION

Fuel must be kept clean to prevent contamination of fuel system. Use clean tools and containers when handling fuel.

8.	Front support (1)	Fuel tank (2)	a. Have assistant stand by with fire extinguisher. b. Using hand driven dispensing pump inserted into filler neck, empty as much fuel as possible into 55-gallon storage drum. **Allow fuel to settle in storage drum for at least 24 hours before reuse.**
9.	Fuel tank (2)	Fuel shutoff valve (3)	Turn clockwise to close.
10.	Fuel shutoff valve (3)	Fuel line (4)	a. Place 5-gallon container underneath. b. Using 5/8-inch open-end wrench, unscrew and take off.
11.	Fuel tank (2)	Fuel shutoff valve (3)	a. Connect rubber drain hose. b. Turn counterclockwise until water and sediment, or fuel flows freely into container. c. When remaining fuel has been drained into container, turn clockwise to close. d. Disconnect rubber drain hose. e. Get rid of fuel from bottom of tank (2) (page 2-137). **Fuel at bottom of tank is likely to be contaminated.**

FUEL TANK DRAINING - CONTINUED

LOCATION	ITEM	ACTION REMARKS
12. Fuel shutoff valve (3)	Fuel line (4)	Screw on and tighten using 518-inch open-end wrench.
13. Front support	Fuel tank	Fill (TM 5-2420-222-10).
14. Fuel tank (2)	Fuel shutoff valve (3)	a. Check for leaks. b. If leaking at any connection, tighten using 518-inch open-end wrench. c. If leaking does not stop, replace fuel shutoff valve (page 2-273) or fuel shutoff valve-to-fuel pump fuel line (page 2-264).



NOTE

FOLLOW-ON MAINTENANCE: Connect battery ground cable (page 2696).

TASK ENDS HERE

TA242830

FUEL TANK

This task covers:

a. **Removal (page 2-254)**
b. **Disassembly (page 2-256)**
c. **Cleaning (page 2-256)**
d. **Inspection/Replacement (page 2-258)**
e. **Assembly (page 2-258)**
f. **Installation (page 2-259)**

INITIAL SETUP:

Tools
- Blocks, wood
- Handle, ratchet, 318-inch drive
- Pan, drain
- Screwdriver, flat-tip, 3/16-inch
- Socket, deep, 3/8-inch drive, 9/16-inch
- Wrench, open-end, 7/16-inch
- Wrench, open-end, 1/2-inch
- Wrench, open-end, 5/8-inch

Materials/Parts
- Detergent, GP (item 7, Appendix C)
- Lockwasher, terminal screw

Materials/Parts - Continued
- Rags, wiping (item 21, Appendix C)
- Solvent, drycleaning (item 28, Appendix C)
- Tags, marking (item 30, Appendix C)

Personnel Required
- One

Equipment Condition
1. Grille housing removed (page 2-1035)
2. Air cleaner removed (page 2-237)
3. Battery ground cable disconnected (page 2-396)

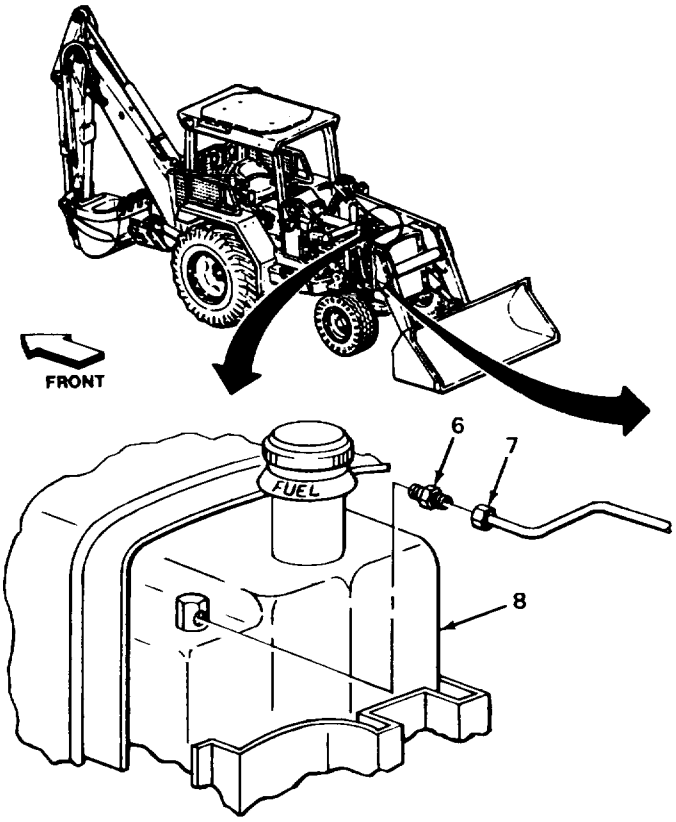
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Terminal (1) and fuel sender terminal (2)	Screw (3), lockwasher (4), and washer (5)	a. Using 3/16-inch flat-tip screwdriver, unscrew and take out. b. Get rid of lockwasher (4).	
2 Fuel sender terminal (2)	Terminal (1)	a. Take off. b. Tag (page 2-237).	

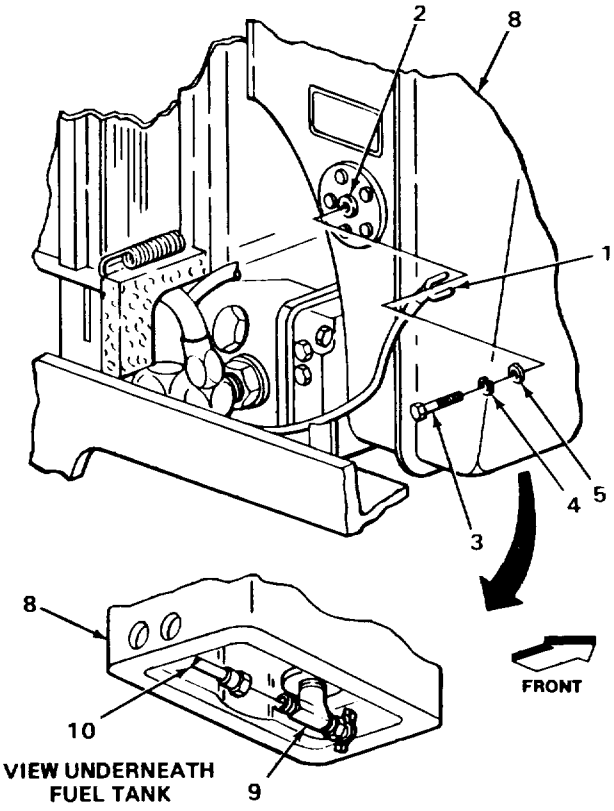
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION REMARKS
3. Connector (6)	Tube (7)	a. Place drain pan underneath to catch draining fuel. b. Using 7/16-inch and 1/2-inch openend wrenches, unscrew and take off. c. Cap (page 2-137).
4. Fuel tank (8)	Connector (6)	Using 7/16-inch open-end wrench, unscrew and take out.
5. Fuel shutoff valve (9)	Fuel line (10)	a. Move drain pan underneath to catch draining fuel. b. Using 5/8-inch open-end wrench, unscrew and take off. c. Cap (page 2-137). d. Get rid of drained fuel (page 2-137).





FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION REMARKS

REMOVAL - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

6.	Tie rod (1) and fuel tank (2)	Nut (3) and washer (4)	Using 9/16-inch, 3/8-inch drive deep socket and ratchet handle, unscrew and take off.
7.	Tie rod (1) and front support (5)	Fuel tank (2) with assembled parts	a. Take out. b. Place on wood blocks.
8.	Tie rod (1) and nut (6)	Washer (7)	Slide off.

DISASSEMBLY

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

9.	Fuel tank (2)	Fuel shutoff valve	Remove (page 2-273).
10.		Fuel gage sender	Remove (page 2-662).
11.		Fuel cap (8) and gasket (9)	Unscrew and take off.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

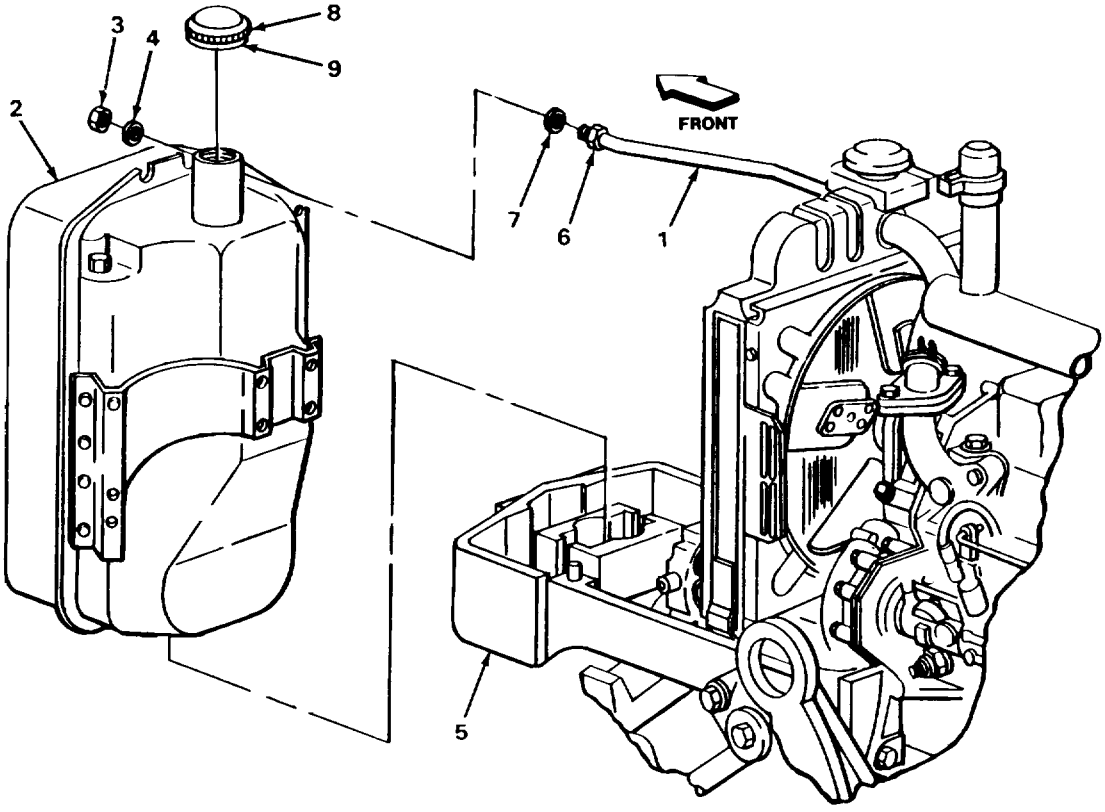
FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
12.	Fuel tank (2)	Have Direct Support Maintenance clean.	

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

13.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.	



FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING - CONTINUED		
14.	All non-metallic parts	a. Using clean rags, dampened in solution of detergent and water, wipe clean. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).** Replace defective parts as needed.	
15.	Fuel tank (1)	Have Direct Support Maintenance Inspect.
16.	All metal parts	Look for cracks, bends, and breaks.
17.	Grommet (2)	Look for cracks, tears, crumbling, and breaks.
18.	All threaded parts	Look for damaged threads.
ASSEMBLY		
	WARNING **No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.**	
19. Fuel tank (1)	Fuel cap (3) with assembled gasket (4)	Screw on and tighten.
20.	Fuel gage sender	Install (page 2-662).

FUEL TANK - CONTINUED

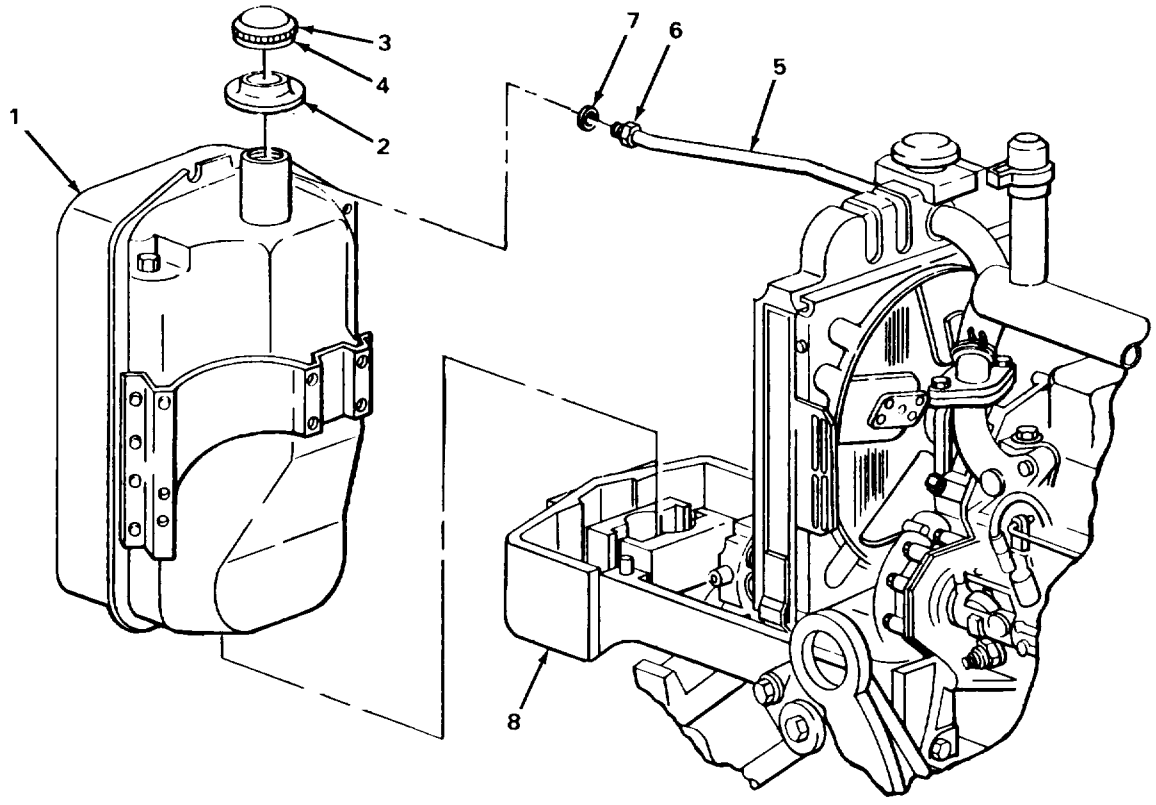
LOCATION	ITEM	ACTION / REMARKS
21.	Fuel shutoff valve	Install (page 2-273).

INSTALLATION

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

22.	Tie rod (5) and nut (6)	Washer (7)	Slide on.
23.	Front support (8) and tie rod (5)	Fuel tank (1)	Place in position.



FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION REMARKS

INSTALLATION - CONTINUED

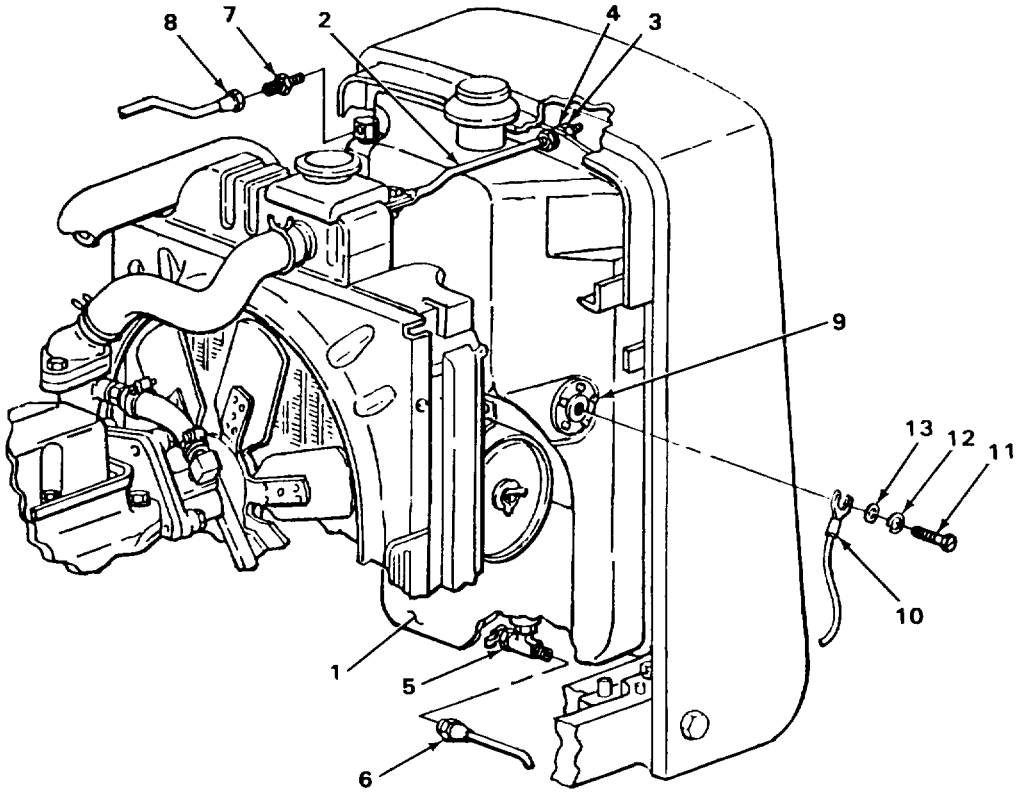
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

24.	Fuel tank (1) and tie rod (2)	Nut (3) and washer (4)	a. Hold rod (2) tightly against fuel tank (1). b. Screw on and tighten using 9/16-inch, 3/8-inch drive deep socket and ratchet handle.
25.	Fuel shutoff valve (5)	Fuel line (6)	a. Uncap. b. Screw on and tighten using 5/8-inch open-end wrench.
26.	Fuel tank (1)	Connector (7)	Screw in and tighten using 7/16-inch open-end wrench.
27.	Connector (7)	Tube (8)	a. Uncap. b. Screw on and tighten using 7116-inch and 1/2-inch open-end wrenches.
28.	Fuel sender terminal (9)	Terminal (10)	a. Take off tag. b. Place in position.
29.	Terminal (10) and fuel sender terminal (9)	Screw (11), new lockwasher (12), and washer (13)	Screw in and tighten using 3116-inch flat-tip screwdriver.
30.	Fuel tank and front support	Grille housing	Install (page 2-1035). **Do not install hood at this time**.
31.	Loader backhoe	Fuel system	Prime (2-340).
32.		Battery ground cable	Connect (page 2-396).
33.		Air Cleaner	Install (page 2-237).
34.		Engine	Start and run at high idle (TM 5-2420-222-10).

FUEL TANK - CONTINUED

LOCATION	ITEM	ACTION REMARKS
35.	Fuel tank (1)	a. Check for leaks. b. If leaking, shut down engine (TM 5-2420-222-10) and replace as outlined in this task.
36. Fuel tank (1)	Fuel shutoff valve (5), fuel line (6), connector (7), and tube (8)	a. Check for leaks. b. If leaking at any connection, using 7/16-inch, 1/2-inch, for 5/8-inch open-end wrench, tighten. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective parts as outlined in Fuel Shutoff Valve (page 2-273), Fuel Shutoff Valve-to-Fuel Pump Fuel Line (page 2-264), and Leak-Off Cap-to-Fuel Tank Fuel Line (page 2-268).
37. Loader backhoe	Engine	If still running, shut down (TM 5-2420-222-10).



NOTE
FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TA242834

TASK ENDS HERE

FUEL CAP

This task covers:

a. **Disassembly (page 2-262)**
b. **Cleaning (page 2-262)**
c. **Inspection/Replacement (page 2-263)**
d. **Installation (page 2-263)**

INITIAL SETUP:

Materials/Parts
Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

Equipment Condition
Fuel tank cap removed (TM 5-2420-222-10)

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
1. Fuel cap (1)	Gasket (2)	Take off.	
CLEANING			

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

2.	Fuel cap (1)	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.	

FUEL CAP - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
3.	Gasket (2)	a. Using clean rags dampened in solution of detergent and water, wipe clean. b. Rinse using clean water. c. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

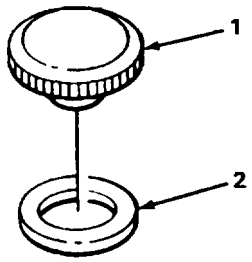
For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

4.	Fuel cap (1)	Look for cracks, bends, breaks, and holes.
5.	Gasket (2)	Look for cracks, tears, and crumbling.

ASSEMBLY

6.	Fuel cap (1)	Gasket (2)	Place in position.



NOTE

FOLLOW-ON MAINTENANCE: Install fuel cap (TM 52420-222-10).

TASK ENDS HERE

TA242835

FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE

This task covers:

a. Removal (page 2-264)
b. Cleaning (page 2-265)
c. Inspection/Replacement (page 2-266)
d. Installation (page 2-266)

INITIAL SETUP:

Tools
Extension, 3/8-inch drive, 5-inch
Handle, ratchet, 3/8-inch drive
Pan, drain
Socket, 3/8-inch drive, 1/2-inch
Wrench, adjustable, 0 to 1.322-inch
Wrench, open-end, 5/8-inch

Materials/Parts
Lockwasher, clip screw
Rags, wiping (item 21, Appendix C)

Materials/Parts - Continued
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

Equipment Condition
1. Right side grille removed (TM 5-2420-222-10)
2. Battery ground cable disconnected (page 2-696)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Front support (1) and clip (2)	Screw (3) and lockwasher (4)	a. Using 1/2-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out. b. Get rid of lockwasher (4).	
2. Front support (1) and fuel line (5)	Clip (2)	Take out.	
3. Fuel tank (6)	Fuel shutoff valve (7)	Turn clockwise to close.	

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

4. Fuel shutoff valve (7)	Fuel line (5)	a. Place drain pan underneath valve (7). b. Using 5/8-inch open-end wrench, unscrew and take off.	

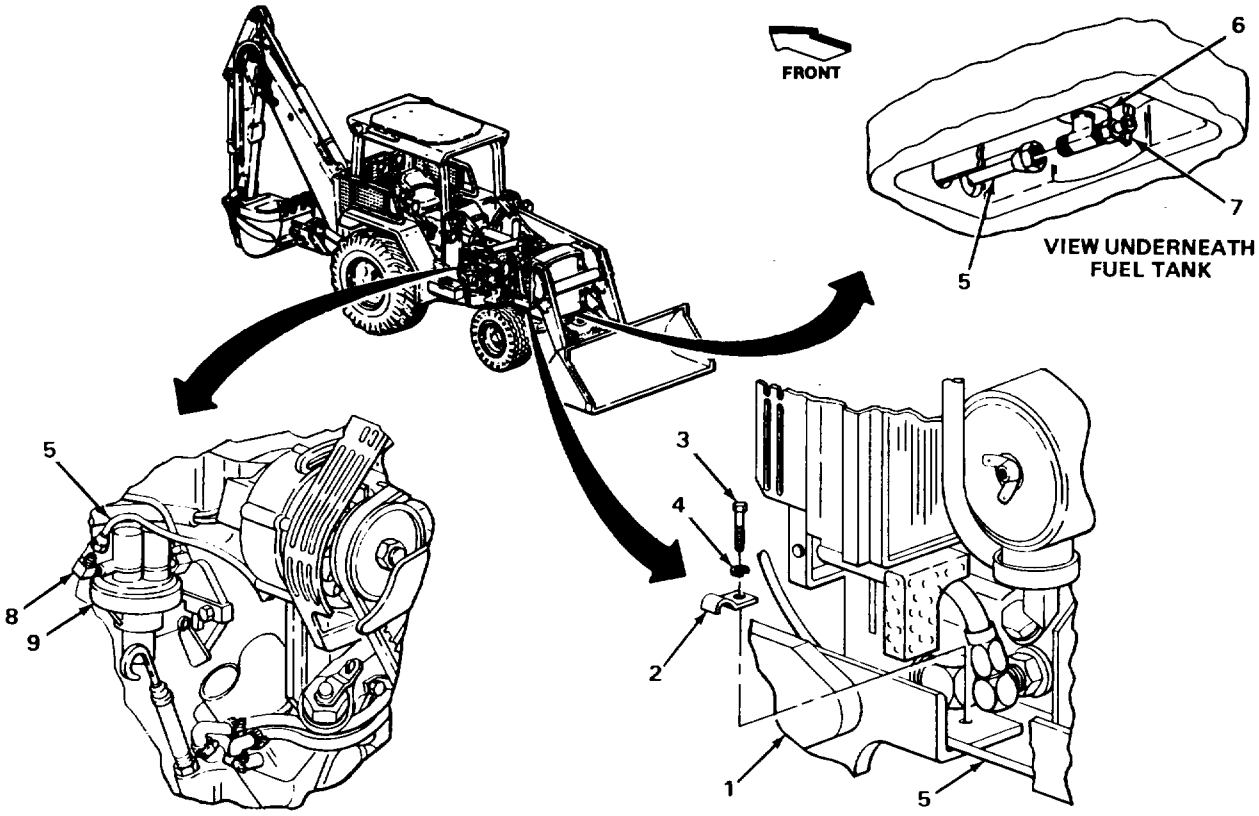
FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
4. Continued		c. Cap valve (7) (page 2-137).
5. Elbow (8)	Fuel line (5)	a. Move drain pan underneath elbow (8). b. Using 518-inch open-end wrench, unscrew and take off.
6. Fuel pump (9)	Elbow (8)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Plug pump (9) (page 2-137). d. Get rid of drained fuel (page 2-137).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).



FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING - CONTINUED

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

7.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

8.	All parts	Look for cracks, breaks, and abnormal bends.
9.	All threaded parts	Look for damaged threads.

INSTALLATION

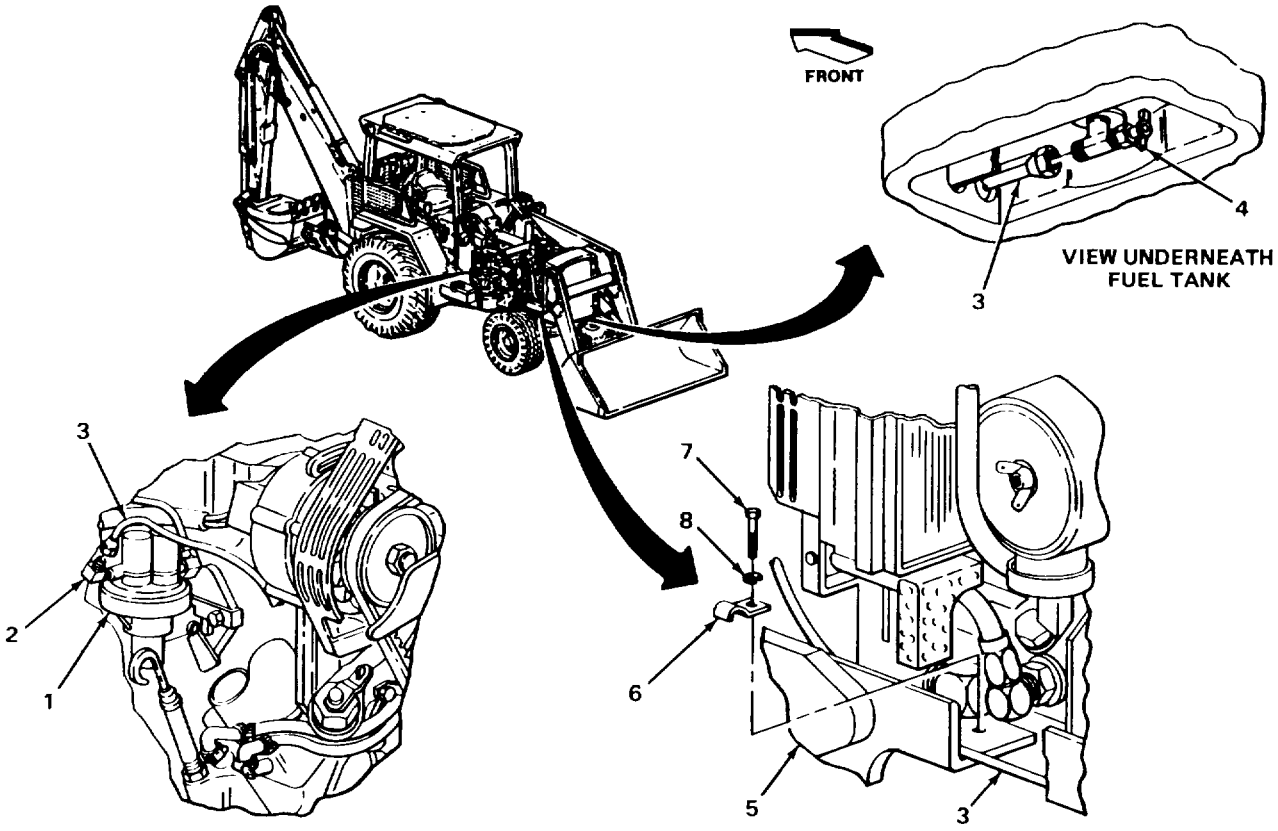
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

10.	Fuel pump (1)	Elbow (2)	a. Unplug pump (1). b. Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
11.	Elbow (2)	Fuel line (3)	Screw on and tighten using 5/8-inch open-end wrench.

FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
12. Fuel shutoff valve (4)	Fuel line (3)	a. Uncap valve (4). b. Screw on and tighten using 5/8-inch open-end wrench.
13. Front support (5) and fuel line (3)	Clip (6)	Place in position.
14. Front support (5) and clip (6)	Screw (7) and new lockwasher (8)	Screw in and tighten using 112-inch, 3/8-inch drive socket, 5inch extension, and ratchet handle.
15. Loader backhoe	Fuel system	Prime (page 2-340).
16.	Battery ground cable	Connect (page 2-696).
17.	Engine	Start and run at high idle (TM 5-2420-222-10).



FUEL SHUTOFF VALVE-TO-FUEL PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
18.	Fuel shutoff valve-to-fuel pump fuel line	a. Check for leaks. b. If leaking at any connection, tighten using 0 to 1.322-inch adjustable wrench or 5/8-inch open-end wrench. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace leaking connection parts as outlined in this task.
19.	Engine	If still running, shut down (TM 5-2420-222-10).

NOTE

FOLLOW-ON MAINTENANCE: Install right side grille (TM 5-2420-222-10)

TASK ENDS HERE

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE

This task covers:

a. Removal (page 2-269)
b. Cleaning (page 2-270)
c. Inspection/Replacement (page 2-270)
d. Installation (page 2-271)

INITIAL SETUP:

Tools
Pan, drain
Pliers, slip-joint
Wrench, open-end, 7/16-inch
Wrench, open-end, 1/2-inch
Wrench, open-end, 9/16-inch

Materials/Parts
Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

Equipment Condition

1. Hood removed (page 2-1025).
2. Battery ground cable disconnected (page 2-696)-J

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE - CONTINUED

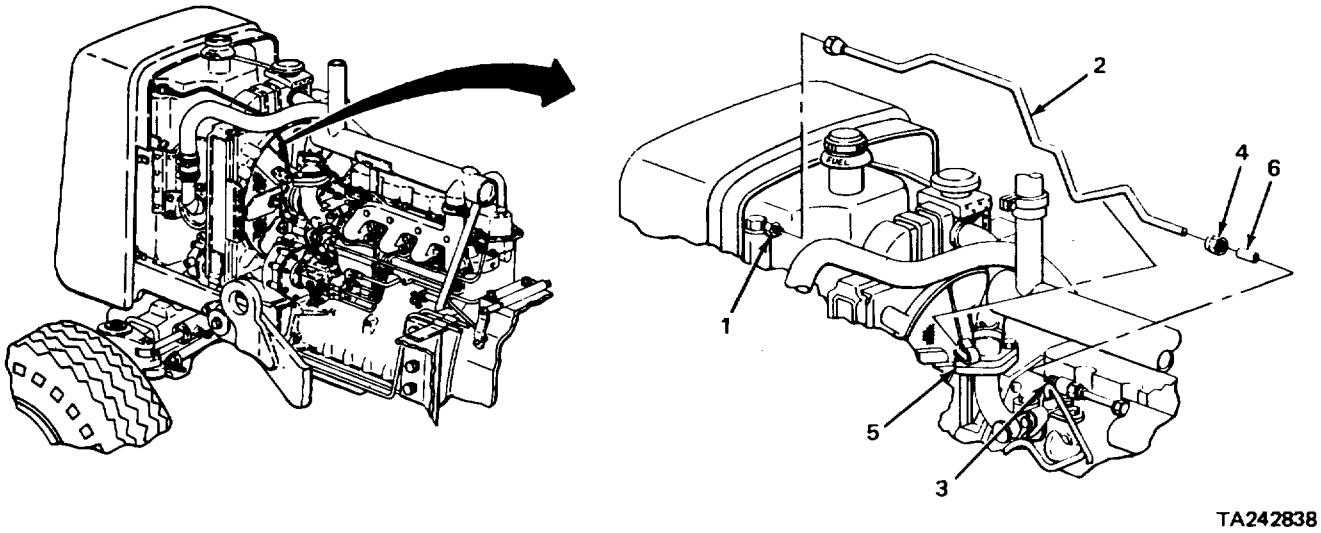
LOCATION	ITEM	ACTION / REMARKS

REMOVAL

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

1.	Connector (1)	Tube (2)	a. Place drain pan underneath connector (1). b. Using 7/16-inch and 1/2-inch open-end wrenches, unscrew and take off.
2.	Cap (3) and tube (2)	Nut (4)	a. Place drain pan underneath cap (3). b. Using 9/16-inch open-end wrench, unscrew and slide back.
3.	Cap (3)	Tube (2) with assembled parts	a. Take out. b. Cap, cap (3) (page 2-137).
4.	Tube (2)	Clamp (5)	Using slip-joint pliers, bend back.
5.	Clamp (5)	Tube (2) with assembled parts	a. Take off. b. Get rid of drained fuel (page 2-137).
6.	Tube (2)	Nut (4) and grommet (6)	Slide off.



LEAK-OFF CAP-TO-FUEL TANK FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS

REMOVAL- CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

7.	Fuel tank (1)	Connector (2)	a. Using 7/16-inch open-end wrench, unscrew and take off. b. Plug tank (1) (page 2-137).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-VI-1).

8.		Grommet (3)	a. Clean in solution of detergent and water. b. Using clean, dry rag, wipe dry.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

9.		All metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTIONIREPLACEMENT

NOTE

For more Information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

10.		Grommet (3)	Look for cracks, breaks, and crumbling.'

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE - CONTINUED

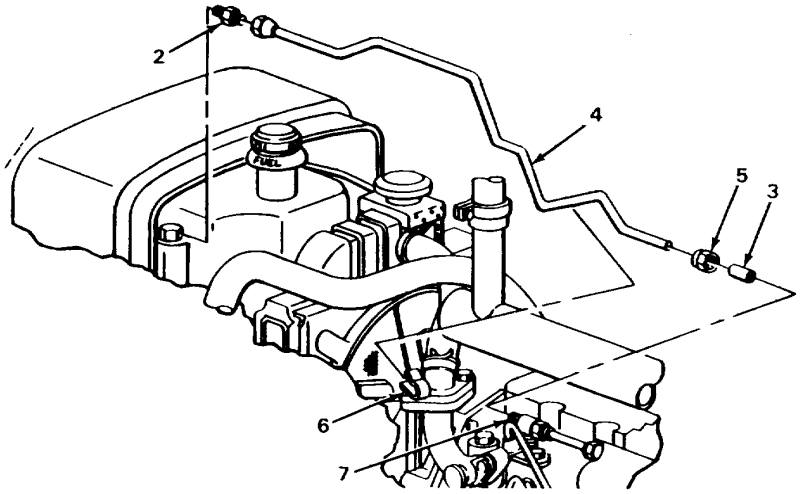
LOCATION	ITEM	ACTION REMARKS
11.	All metal parts	Look for cracks, breaks, and abnormal bends.
12.	All threaded parts	Look for damaged threads.

INSTALLATION

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

13. Fuel tank (1)	Connector (2)	a. Unplug tank (1). b. Screw in and tighten using 7/16-inch open-end wrench.
14. Tube (4)	Grommet (3) and nut (5)	Slide on.
15. Clamp (6)	Tube (4) with assembled parts	Place in position.
16. Tube (4)	Clamp (6)	Using slip-joint pliers, bend down.
17. Cap (7)	Tube (4) with assembled parts	a. Uncap cap. b. Place In position.



TA242839

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS

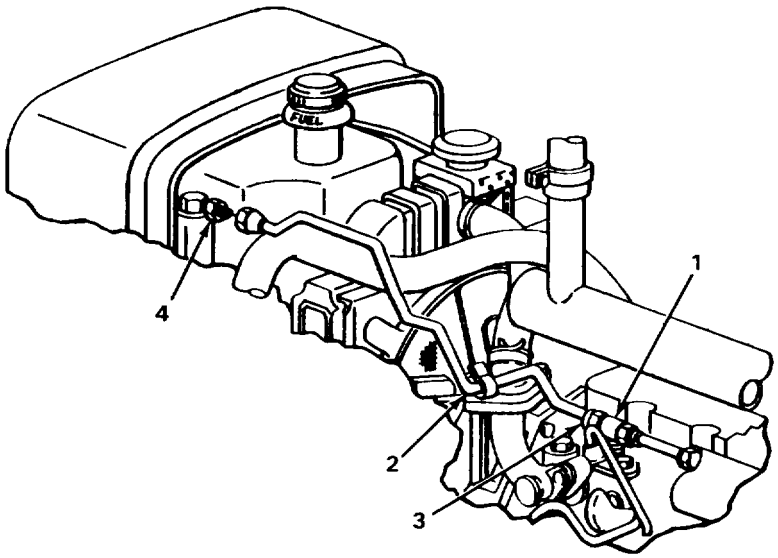
INSTALLATION - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

18.	Cap (1) and tube (2)	Nut (3)	Screw on and tighten using 9116-inch open-end wrench.
19.	Connector (4)	Tube (2)	Screw on and tighten using 1/2-inch open-end wrench.
20.		Loader backhoe	Fuel systemPrime (page 2-340).
21.		Battery ground	Connect (page 2-696).
22.		Engine	Start and run at high idle (TM 5-2420-222-10).
23.		Leak-off cap-to-fuel tank fuel line	a. Check for leaks. b. If leaking at any connection, tighten using 7/16-inch, 112-inch, or 9/16-inch open-end wrench. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace leaking connection parts as outlined in this task.
24.		Engine	If still running, shut down (TM 5-2420-222-10).

LEAK-OFF CAP-TO-FUEL TANK FUEL LINE - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

FUEL SHUTOFF VALVE

This task covers:

a. Removal (page 2-274)
b. Cleaning (page 2-274)
c. Inspection/Replacement (page 2-257)
d. Repair (page 2-276)
e. Installation (page 2-276)

INITIAL SETUP:

ToolsMaterials/Parts

Pliers, slip-joint, multiple tongue and groove
Thread set, pipe
Wrench, open-end, 5/8-inch
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

TA242840

FUEL SHUTOFF VALVE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
	WARNING **No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.**	
1. Loader backhoe	Fuel tank	Drain (page 2-250). Do not connect fuel line or battery cable at this time.
2. Fuel tank (1)	Fuel shutoff valve (2) and filter element (3)	a. Note relative position of valve (2) for proper placement during installation. b. Using multiple tongue and groove slip-joint pliers, unscrew and take out. c. Cap fuel tank (1) (page 2-137).
3. Fuel shutoff valve (2)	Filter element (3)	Take out.
CLEANING		
	NOTE **For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).**	
	WARNING **Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 138°F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.**	
4. All parts		a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

LOCATION	ITEM	ACTION	REMARKS

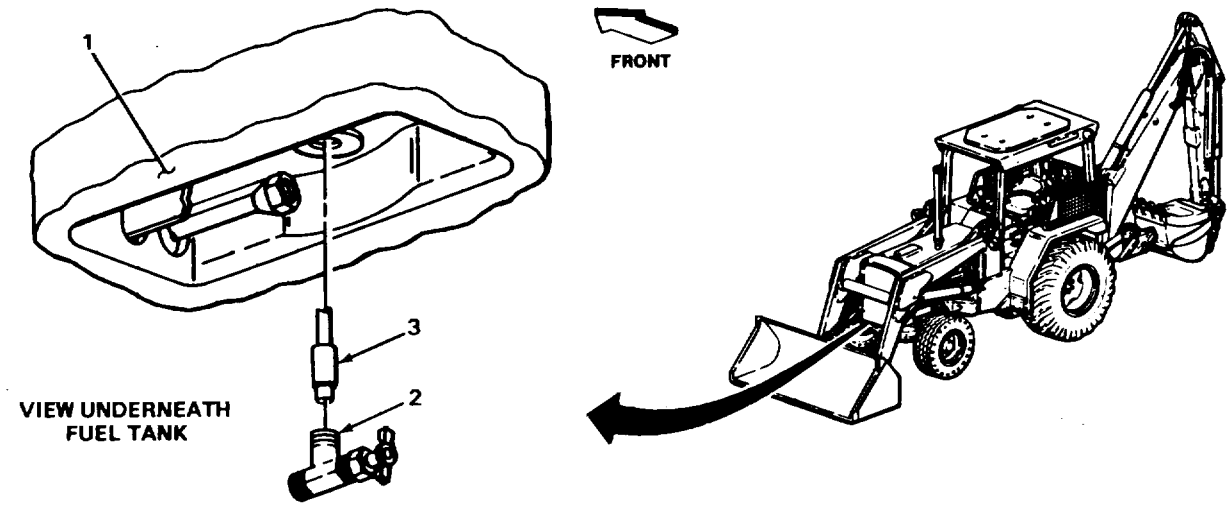
INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts which cannot be repaired.

5.	Fuel shutoff valve (2)	a. Look for cracks, bends, and breaks. b. Look for damaged threads.	
6.	Filter element (3)	Look for tears, bends, breaks.	



TA242841

FUEL SHUTOFF VALVE - CONTINUED

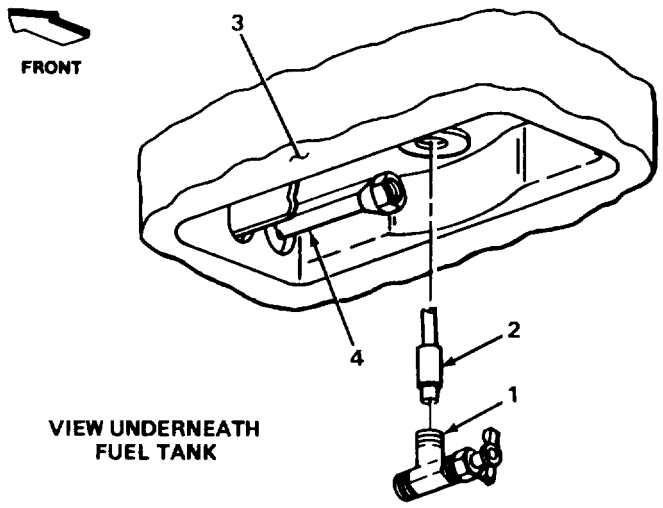
LOCATION	ITEM	ACTION REMARKS
REPAIR		
7.	Fuel shutoff valve (1)	If threads are damaged, using pipe thread set, restore threads.
INSTALLATION		

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

8. Fuel shutoff valve (1)	Filter element (2)	Place position.
9. Fuel tank (3)	Fuel shutoff valve (1) and filter element (2)	Screw in and tighten to position noted during removal using multiple tongue and groove slip-joint pliers.
10. Fuel shutoff valve (1)	Fuel line (4) end wrench.	Screw on and tighten using 5/8-inch open-
11. Loader backhoe	Fuel tank	Fill (TM 5-2420-222-10).
12.	Battery ground cable	Connect (page 2-696).
13. Fuel tank (3) and fuel line (4)	Fuel shutoff valve (1)	a. Check for leaks. b. If leaking at any connection, tighten using multiple tongue and groove slip-joint pliers or 5/8-inch open-end wrench. c. If leaking does not stop, replace fuel shutoff valve as outlined in this paragraph, Fuel Shutoff Valve-to-Fuel Pump Fuel Line (page 2-264) or Fuel Tank (page 2-254).

FUEL SHUTOFF VALVE - CONTINUED



TASK ENDS HERE

FUEL FILTER ASSEMBLY

This task covers:

- **a. Removal (page 2-278)**
- **b. Disassembly (page 2-279)**
- **c. Cleaning (page 2-280)**
- **d. Inspection/Replacement (page 2-280)**
- **e. Repair (page 2-280)**
- **f. Assembly (page 2-281)**
- **g. Installation (page 2-281)**

INITIAL SETUP

Tools

Extension, 3/8-inch drive, 5-inch
Handle, ratchet, 3/8-inch drive
Knife, pocket
Pan, drain
Pliers, slip-joint
Socket, 3/8-inch drive, 9/16-inch
Thread set, pipe
Wrench, adjustable, 0 to 1.322-inch
Wrench, open-end, 5/8-inch

Equipment Condition

Fuel filter elements removed (page 2-284)

Materials/Parts

Detergent, GP (item 7, Appendix C)
Packing, bleed plug (two required)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

FUEL FILTER ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
	WARNING	
	No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.	
1. Elbow (1)	Fuel line (2)	a. Place drain pan underneath. b. Using 5/8-inch open-end wrench, unscrew and take off. c. Cap (page 2-137).
2. Filter head (3)	Elbow (1)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out.
3. Elbow (4)	Fuel line (5)	a. Place drain pan underneath. b. Using 5/8-inch open-end wrench, unscrew and take off. c. Cap (page 2-137).
4. Filter head (3)	Elbow (1)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Get rid of drained fuel (page 2-137).
	NOTE	
	Only loader backhoes with Serial Numbers 235786 thru 235999 have engine starting aid bracket between fuel filter head and cylinder head.	
5. Filter head (3), cylinder head (6), and bracket (7), if present	Two screws (8)	Using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.
6. Cylinder head (6) or bracket (7)	Filter head (3)	Take off.

FUEL FILTER ASSEMBLY - CONTINUED

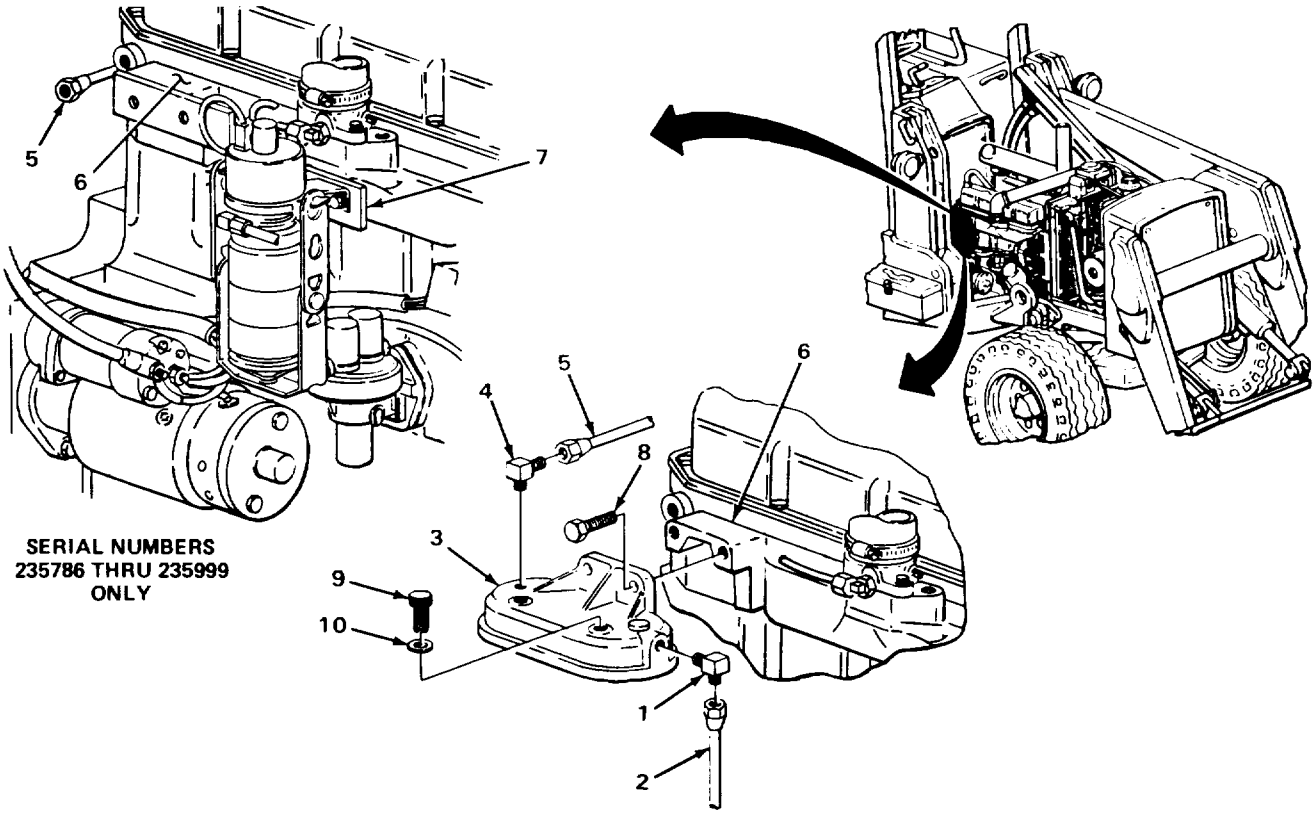
LOCATION	ITEM	ACTION / REMARKS

DISASSEMBLY

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

7. Filter head (3)	Two bleed plugs (9) with assembled packings (10)	Using slip-joint pliers, unscrew and take out.
8. Two bleed plugs (9)	Two packings (10)	a. Using pocket knife, take off. b. Get rid of.

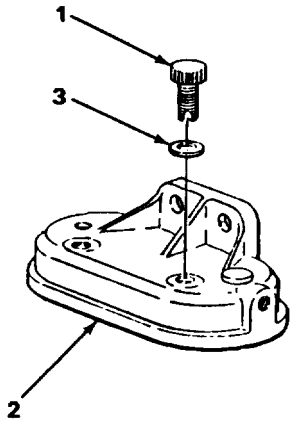


TA242843

FUEL FILTER ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING		
	NOTE	
	For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
9.	Two bleed plugs (1)	a. Clean in solution of detergent and water. b. Using clean, dry rags, wipe dry.
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
10.	All metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts which cannot be repaired.	
11.	All parts	Look for cracks and breaks.
12.	All threaded parts	Look for damaged threads.
REPAIR		
13.	Filter head (2)	If threads are damaged, using pipe thread set, restore threads.

LOCATION	ITEM	ACTION	REMARKS
ASSEMBLY			
		WARNING	
		No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.	
14. Two bleed plugs (1)	Two new packings (3)	Place in position.	
15. Filter head (2)	Two bleed plugs (1) with assembled packings (3)	Screw in and tighten using slip-joint pliers.	
INSTALLATION			
		NOTE	
		Only loader backhoes with Serial Numbers 235786 thru 235999 have engine starting aid bracket between fuel filter head and cylinder head.	



TA242844

FUEL FILTER ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		

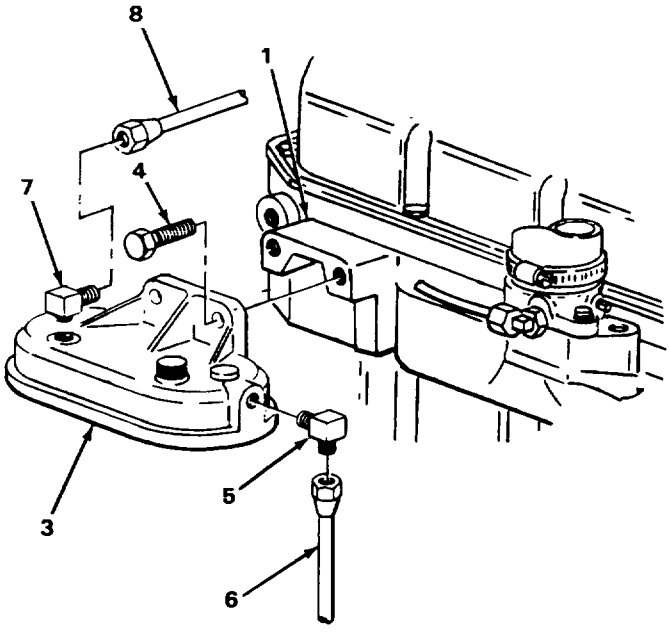
WARNING

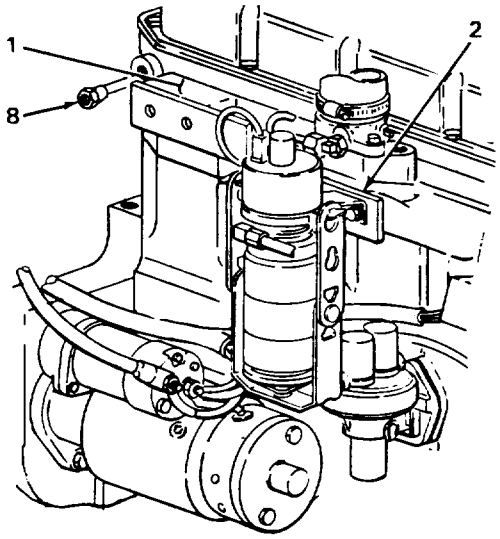
No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

16. Cylinder head (1) or bracket (2)	Filter head (3)	Place in position.
17. Filter head (3), cylinder head (1), and bracket (2), if present	Two screws (4)	Screw in and tighten using 9/16-inch, 3/8inch drive socket, 5-inch extension, and ratchet handle.
18. Filter head (3)	Elbow (5)	Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
19. Elbow (5)	Fuel line (6)	a. Uncap. b. Screw on and tighten using 518inch open-end wrench.
20. Filter head (3)	Elbow (7)	Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
21. Elbow (7)	Fuel line (8)	a. Uncap. b. Screw on and tighten using 5/8-inch open-end wrench.
22. Engine	Fuel filter elements	Install (page 2-284).
23. Loader backhoe	Engine	Start and run at high idle. (TM 5-2420-222-10).

FUEL FILTER ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
24.	Fuel filter assembly	a. Check for leaks. b. If leaking at any connection, tighten using slip-joint pliers, 0 to 1.322-inch adjustable wrench, or 5/8-inch open-end wrench. c. If leaking does not stop, shut down engine TM 5-2420-222-10) and replace defective fuel filter or component as outlined in this task.
25.	Engine	If still running, shut down (TM 5-2420-222-10).





SERIAL NUMBERS 235786 THRU 235999 ONLY

TA242845

FUEL FILTER ELEMENTS

This task covers:

a. Removal (page 2-284)
b. Cleaning (page 2-286)
c. Inspection/Replacement (page 2-286)
d. Installation (page 2-286)

INITIAL SETUP

Tools
Knife, pocket
Pan, drain
Pliers, slip-joint, multiple tongue and groove

Materials/Parts
Detergent, GP (item 7, Appendix C)
Filter element (two required)
Gasket, filter element (four required)
Gasket, filter screw (two required)
Packing, filter screw (two required)
Packing, drainplug (two required)

Materials/Parts - Continued
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

Equipment Condition
Battery ground cable disconnected
Page 2-696)

LOCATION	ITEM	ACTION	REMARKS

NOTE

Both fuel filter elements are maintained the same way. One is shown. Repeat procedures for other fuel filter element as needed.

REMOVAL

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

1. Filter screw (1)	Drainplug (2) with assembled packing (3)	a. Place drain pan under sediment bowl (4). b. Using multiple tongue and groove slip-joint pliers, unscrew and take off.	
2. Drainplug (2)	Packing (3)	a. Using pocket knife, take off. b. Get rid of.	

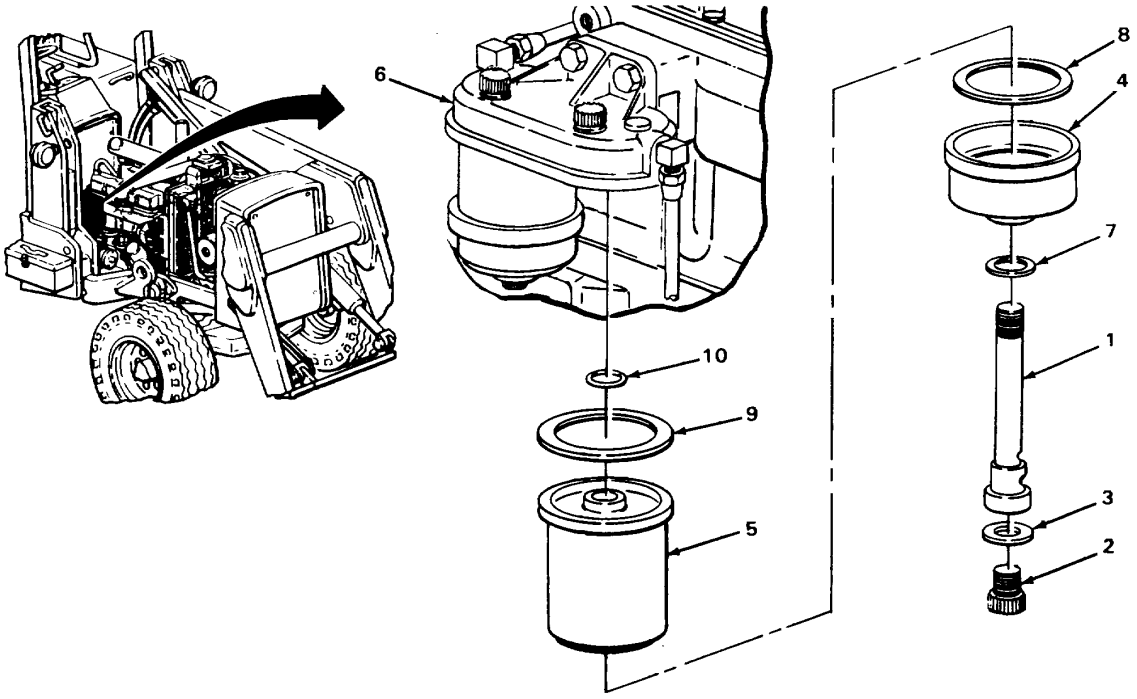
FUEL FILTER ELEMENTS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
3. Sediment bowl (4), element (5), and filter head (6)	Screw (1) and gasket (7)	a. Using multiple tongue and groove slip-joint pliers, unscrew and take off. b. Get rid of gasket (7).

NOTE

Some loader backhoes have two glass fuel filter sediment bowls, while others have one glass and one aluminum sediment bowl. Both types are maintained the same way.

4. Filter head (6) and element (5) with attached parts	Sediment bowl (4)	a. Take off. b. Pour any remaining fuel into drain pan. c. Get rid of drained fuel (page 2-137).
5. Sediment bowl (4)	Element (5) with assembled two gaskets (8 and 9) and packing (10)	a. Take off. b. Get rid of.



TA242846

FUEL FILTER ELEMENTS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

6.	Drainplug (1)	a. Clean in solution of detergent and water. b. Rinse In clean water. c. Using clean, dry rags, wipe dry.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

7.	All other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

8.	All parts	Look for cracks and breaks.
9.	All threaded parts	Look for damaged threads.

INSTALLATION

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

FUEL FILTER ELEMENTS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
10. Screw (2)	New gasket (3), sediment bowl (4), new element (5), two new gaskets (6 and 7) and new packing (8)	Place in position.
11. Filter head (9)	Screw (2) with assembled parts	Screw in and tighten using multiple tongue and groove slip-joint pliers.
12. Drainplug (1)	New packing (10)	Place in position.
13. Screw (2)	Drainplug (1) with assembled packing (10)	Screw in finger tight.
14. Loader backhoe	Fuel system	Prime (page 2-340).
15. Battery ground cable	Connect (page 2-696).	

TA242847

FUEL FILTER ELEMENTS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
16. Loader backhoe	Engine	Start and run at high idle (TM 5-2420-222-10).
17.	Fuel filter elements	a. Check for leaks. b. If leaking, tighten using multiple tongue and groove slip-joint pliers. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective packing, gasket or other component as outlined in this task.
18.	Engine	If still running, shut down (TM 5-2420-222-10).

TASK ENDS HERE

FUEL PUMP-TO-FUEL FILTER FUEL LINE

This task covers:

a. Removal (page 2-289)
b. Cleaning (page 2-290)
c. Inspection/Replacement (page 2-290)
d. Installation (page 2-290)

INITIAL SETUP:

Tools
Pan, drain
Wrench, adjustable, 0 to 1.322-inch
Wrench, open-end, 5/8-inch

Materials/Parts
(page 2-696)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning
(item 28, Appendix C)

Personnel Required
One

Equipment Condition
Battery ground cable disconnected

FUEL PUMP-TO-FUEL FILTER FUEL LINE - CONTINUED

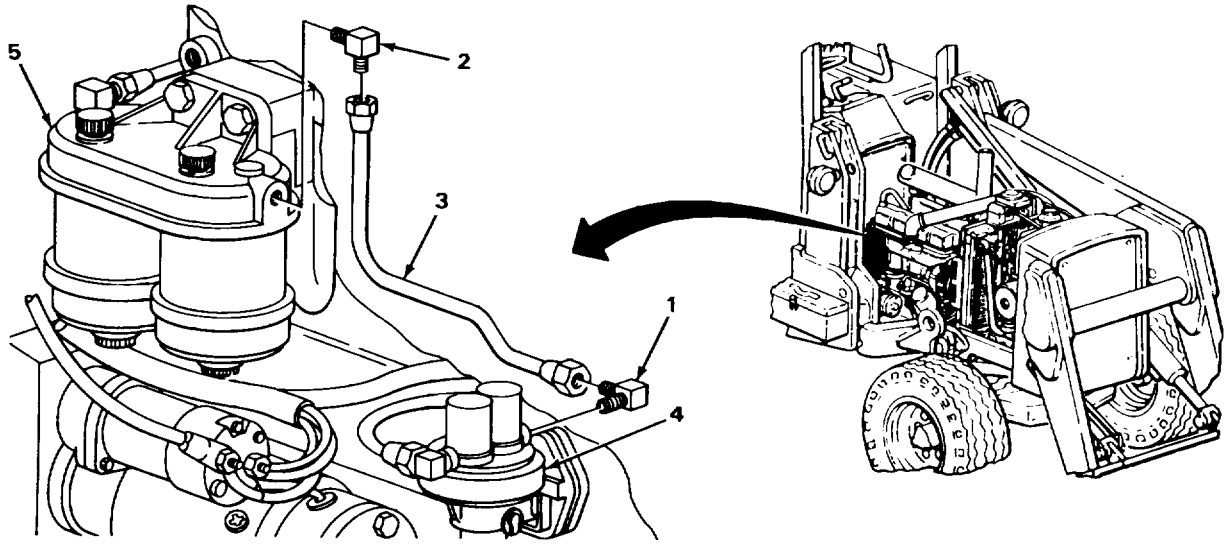
LOCATION	ITEM	ACTION REMARKS

REMOVAL

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

1. Elbow (1) and elbow (2)	Line (3)	a. Place drain pan underneath to catch draining fuel. b. Using 5/8-inch open-end wrench, unscrew and take off.
2. Fuel pump (4)	Elbow (1)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Plug fuel pump (4) (page 2-137).
3. Filter head (5)	Elbow (2)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Plug filter head (5) (page 2-137). d. Get rid of drained fuel (page 2-137).



TA242848

FUEL PUMP-TO-FUEL FILTER FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

4.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

5.	All parts	a. Look for cracks, breaks, and abnormal bends. b. Look for damaged threads.

INSTALLATION

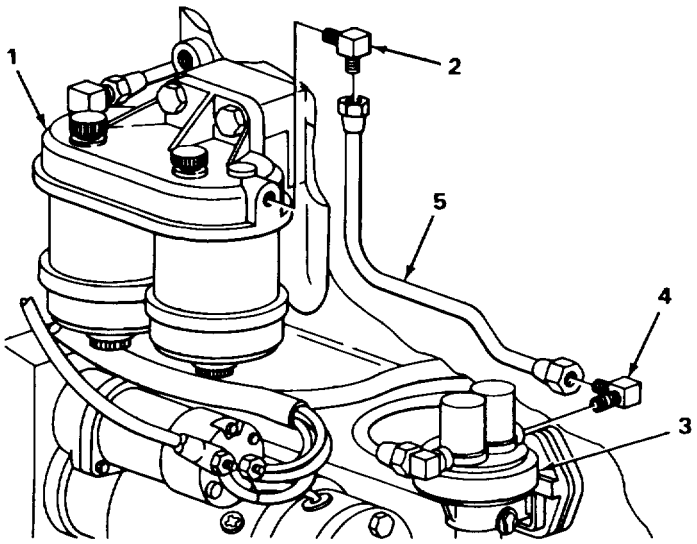
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

6. Filter head (1)	Elbow (2)	a. Unplug filter head (1). b. Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.

FUEL PUMP-TO-FUEL FUEL FILTER FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
7. Fuel pump (3)	Elbow (4)	a. Unplug pump (3). b. Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
8. Elbow (2) and elbow (4)	Line (5)	Screw on and tighten using 5/8-inch open-end wrench.
9. Loader backhoe	Fuel system	Prime (page 2-340).
10.	Battery ground cable	Connect (page 2696).
11.	Engine	Start and run at high idle (TM 5-2420-222-10).
12.	Fuel pump-to-fuel filter fuel line	a. Check for leaks. b. If leaking at any connection, tighten using 5/&inch open-end or 0 to 1.322-inch adjustable wrench. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective component as outlined in this task.
13.	Engine	If still running, shut down (TM 5-2420-222-10).



TASK ENDS HERE

TA242849

FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE

This task covers:

a. Removal (page 2-292) **c. Inspection/Replacement (page 2-294)**
b. Cleaning (page 2-293) **d. Installation (page 2-294)**

INITIAL SETUP:

Tools

Pan, drain
Wrench, adjustable, 0 to 1.322-inch
Wrench, open-end, 5/8-inch
Wrench, open-end, 3/4-inch

Materials/Parts

Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

Battery ground cable disconnected (page 2-696)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious injury.

1. Elbow (1)	Line (2)	a. Place drain pan underneath to catch draining fuel. b. Using 5/8-inch open-end wrench, unscrew and take off.	
2. Filter head (3)	Elbow (1)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Plug filter head (3) page 2-137).	
3. Elbow (4)	Line (2)	a. Place drain pan underneath to catch draining fuel. b. Using 5/8-inch open-end wrench, unscrew and take off.	

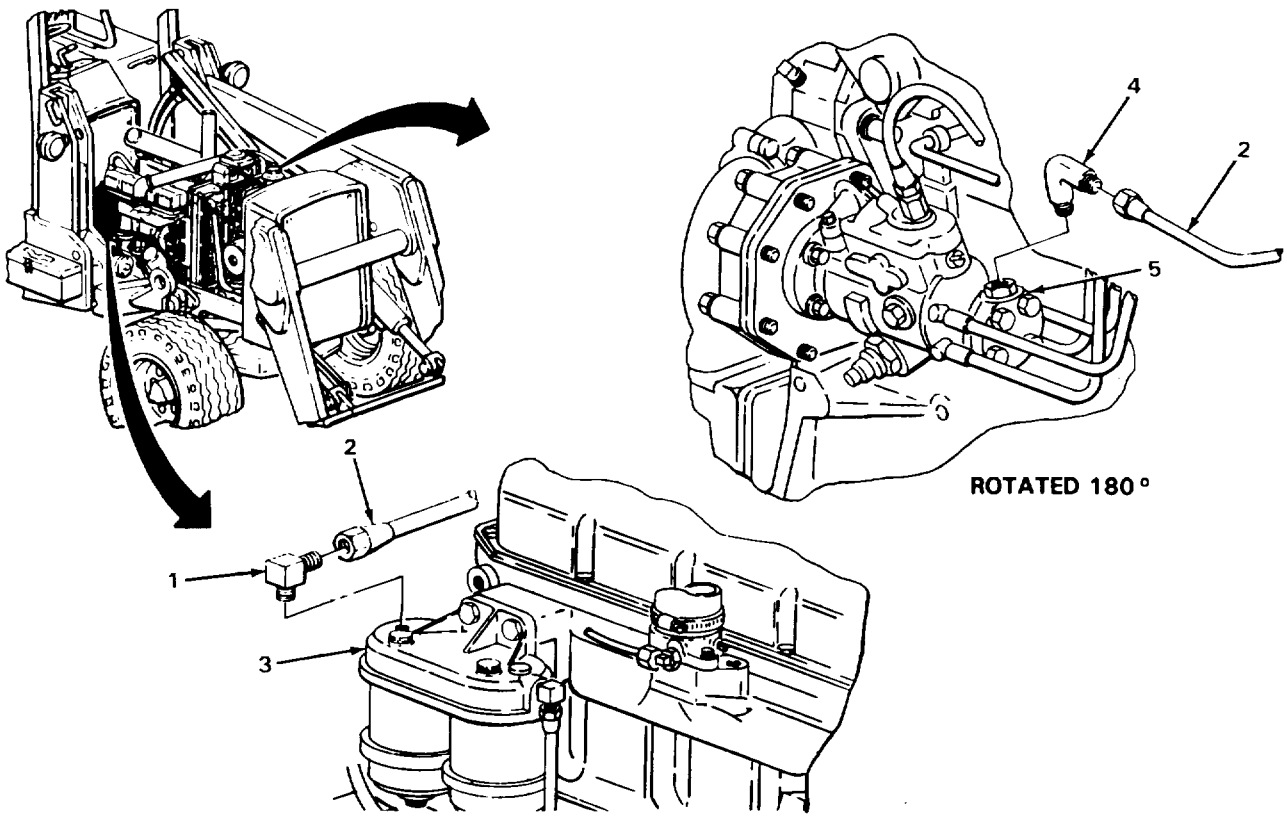
FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
4. Sleeve (5)	Elbow (4)	a. Note relative position for proper placement during installation. b. Using 0 to 1.322-inch adjustable wrench, unscrew and take out. c. Plug sleeve (5) (page 2-137). d. Get rid of drained fuel (page 2-137).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).



TA242850

FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING CONTINUED

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

5.		All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

6.		All parts	a. look for cracks, breaks, and abnormal bends. b. Look for damaged threads.

INSTALLATION

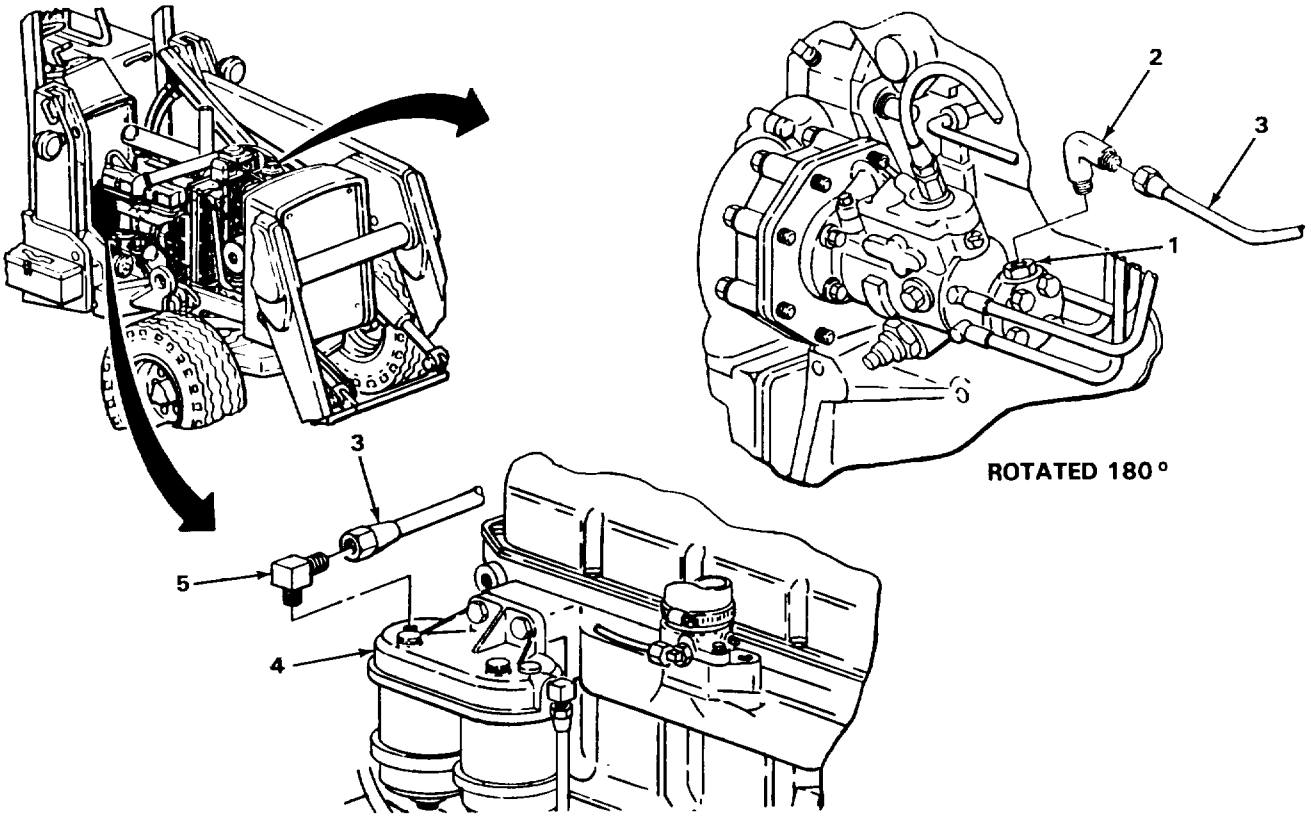
WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Keep battery disconnected. Failure to observe these precautions could cause serious Injury.

7.	Sleeve (1)	Elbow (2)	a. Unplug sleeve (1). b. Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
8.	Elbow (2)	Line (3)	Screw on and tighten using 5/8-inch open-end wrench.

FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE CONTINUED

LOCATION	ITEM	ACTION / REMARKS
9. Filter head (4)	Elbow (5)	a. Unplug filter head (4). b. Screw in and tighten to position noted during removal using 0 to 1.322-inch adjustable wrench.
10. Elbow (5)	Line (3)	Screw on and tighten using 5/8-inch open-end wrench.
11. Loader backhoe	Fuel system	Prime (page 2-340).
12.	Battery ground cable	Connect (page 2-696).
13.	Engine	Start and run at high idle (TM 5-2420-222-10).



TA242851

FUEL FILTER-TO-FUEL METERING PUMP FUEL LINE CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION CONTINUED		
14. Loader backhoe	Fuel filter-to-fuel metering pump fuel	a. Check for leaks. b. If leaking at any connection, tighten line using 5/8-inch open-end wrench, or 3/4-inch open-end wrench or 0 to 1.322-inch adjustable wrench. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective component as outlined in this task.
15.	Engine	If still running, shut down (TM 5-2420-222-10).

TASK ENDS HERE

ENGINE STARTING AID FLUID INJECTION SOLENOID

This task covers:

a. Removal (page 2-297)
b. Disassembly (page 2-299)
c. Cleaning (page 2-300)
d. Inspection/Replacement (page 2-302)
e. Assembly (page 2-302)
f. Installation (page 2-303)

INITIAL SETUP:

Tools

Handle, ratchet, 318-inch
Knife, pocket
Socket, 3/8-inch drive, 112-inch
Wrench, box, 1/2-inch
Wrench, open-end, 318-inch
Wrench, open-end, 7/16-inch

NOTE

The following tool only applies to loader backhoes with Serial Numbers 235786 thru 235999.

Extension, 3/8-inch, 5-inch 2-296

Materials/Parts

Cleaning compound, solvent (item 4, Appendix C)
Lockwasher, solenoid screw
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

ENGINE STARTING AID FLUID INJECTION SOLENOID CONTINUED

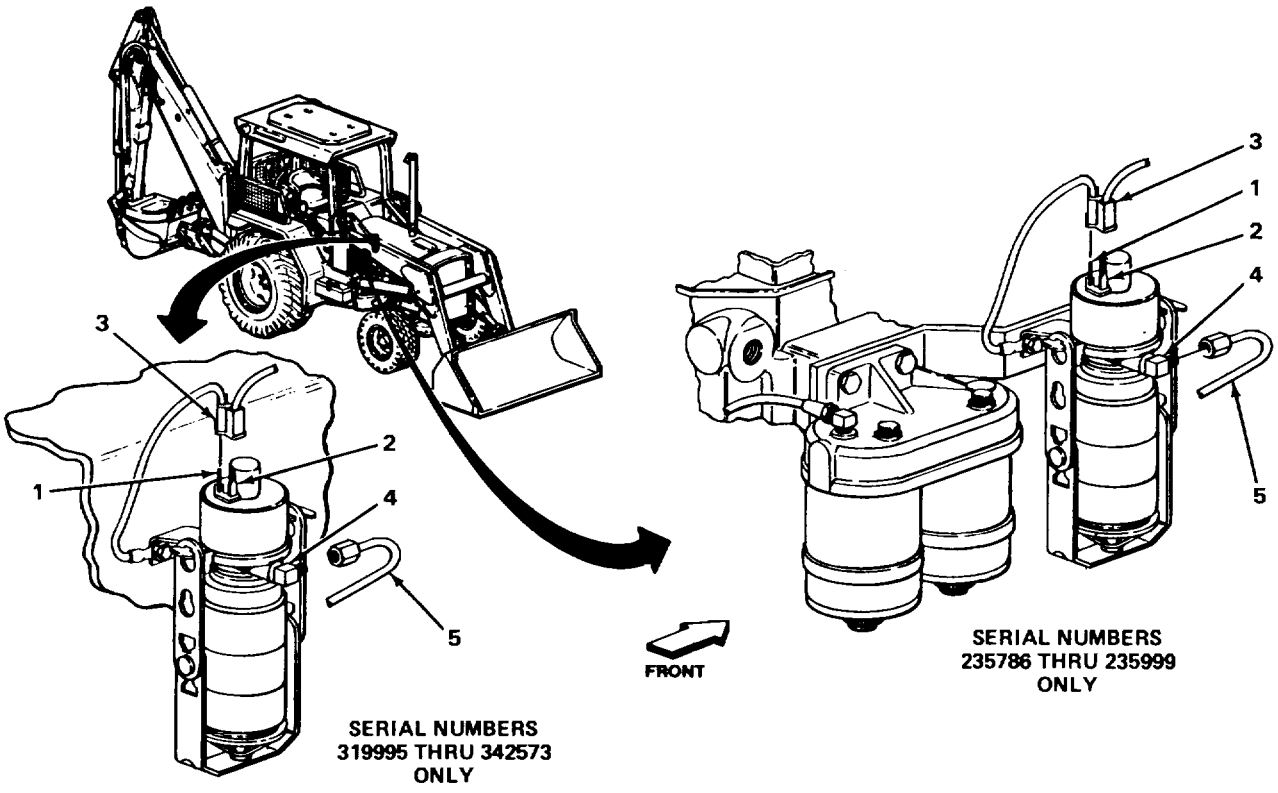
LOCATION	ITEM	ACTION REMARKS

REMOVAL

WARNING

Ether burns easily. If engine starting aid is not properly Installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder Is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

1.	Solenoid terminals (1 and 2)	Solenoid lead connector (3)	Pull off.
2.	Elbow (4)	Tube (5)	Using 318-inch open-end wrench, unscrew and take off.



TA242852

ENGINE STARTING AID FLUID INJECTION SOLENOID CONTINUED

LOCATION	ITEM	ACTION REMARKS

REMOVAL CONTINUED

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

NOTE

Steps 3 thru 6 only apply to loader backhoes with Serial Numbers 235786 thru 235999.

3.	Solenoid (1), bracket (2), and terminal (3)	Two screws (4), lockwashers (5), washers (6), and nuts (7)	a. Using 112-inch, 3/8-inch drive socket, 5-inch extension, ratchet handle, and 1/2-inch box wrench, unscrew and take apart. b. Get rid of lockwashers (5).
4.	Bracket (2) and terminal (3)	Solenoid (1) with assembled parts	Take off.
5.	Engine	Fuel filter assembly	Remove (page 2-277).
6.	Cylinder head (8)	Bracket (2)	Take off.

NOTE

Steps 7 and 8 only apply to loader backhoes with Serial Numbers 319995 thru 342573.

7.	Solenoid (1), hood (9), and terminal (3)	Two screws (10), lockwashers (11), washers (12), spacers (13), and nuts (14)	a. Using 112-inch, 318-inch drive socket, ratchet handle, and 112-inch box wrench, unscrew and take apart. b. Get rid of lockwashers (11).
8.	Hood (9) and terminal (3)	Solenoid (1) with assembled parts	Take off.

ENGINE STARTING AID FLUID INJECTION SOLENOID CONTINUED

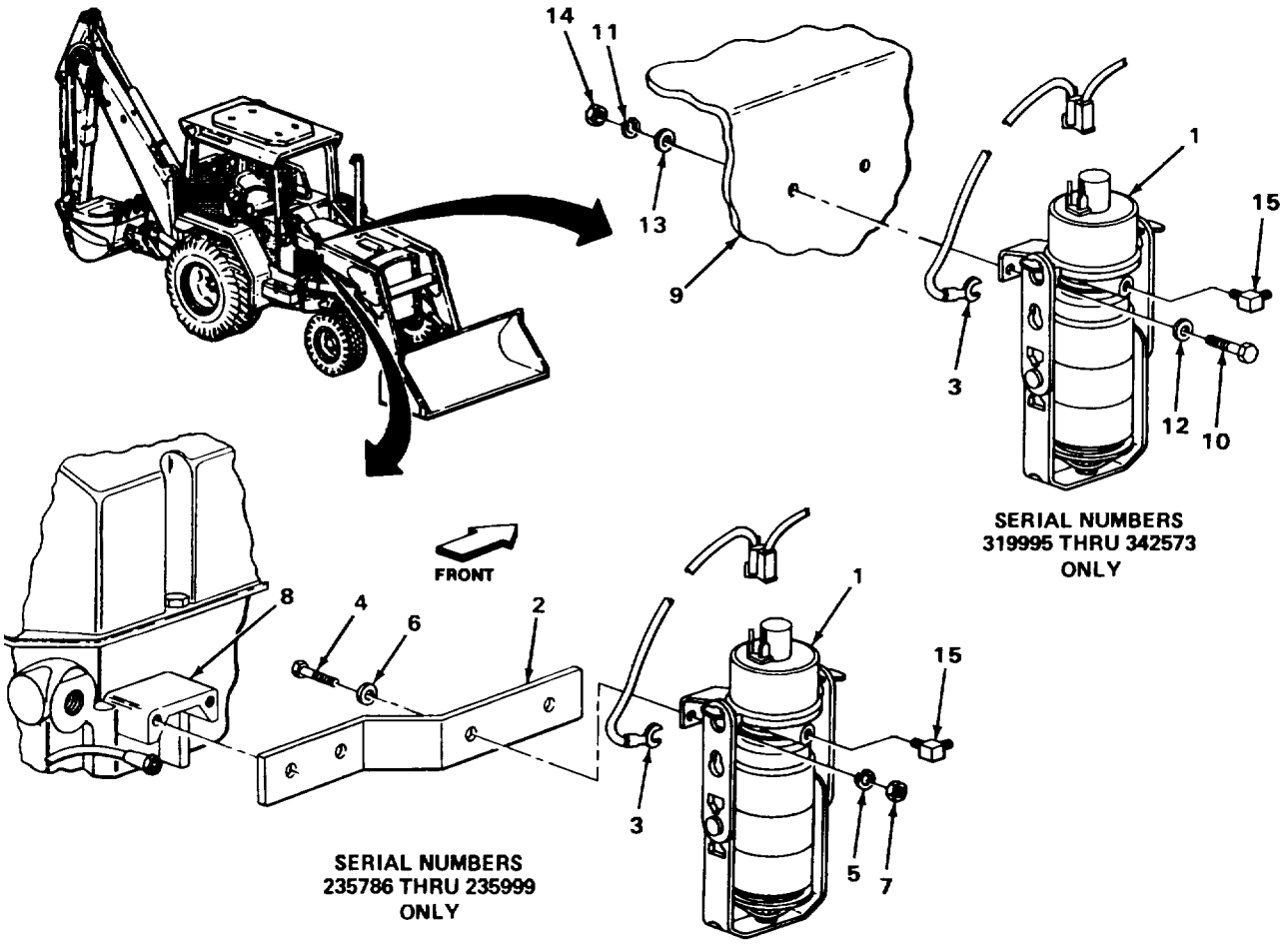
LOCATION	ITEM	ACTION REMARKS

DISASSEMBLY

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

9.	Solenoid (1)	Elbow (15)	Using 7/16-inch open-end wrench, unscrew and take out.



TA242853

ENGINE STARTING AID FLUID INJECTION SOLENOID CONTINUED

LOCATION	ITEM	ACTION REMARKS
DISASSEMBLY - CONTINUED		
	WARNING	
	Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it In fire.	
10. Bail (1) and engine primer fluid (2)	Base (3)	a. Unscrew by turning counterclockwise. b. Pull away from bottom of engine primer fluid (2).
11. Bail (1) and solenoid (4)	Engine primer fluid (2)	Take out.
12. Solenoid (4)	Bail (1)	Unhook and take off.
	CAUTION	
	Do not remove gasket from solenoid unless inspection shows need for replacement. **Removal may damage parts.**	
13.	Gasket (5)	Using pocket knife, pry out.
CLEANING		
	NOTE **For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).**	
	WARNING	
	Electrical parts solvent cleaning compound (trichlorotrifluoroethane) is flammable, and reacts violently with aluminum, titanium, barium, lithium, samarium, and sodium potassium. Cleaning compound fumes displace air and it may be carcinogenic. Boiling point is 114°F (460C). Do not wear jewelry. Wear rubber gloves and use only in well ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning compound, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
14.	Solenoid (4) and gasket (5)	a. Using clean, dry rags dampened with solvent cleaning compound, wipe clean. b. Using clean, dry rags, wipe dry.

ENGINE STARTING AID FLUID INJECTION SOLENOID - CONTINUED

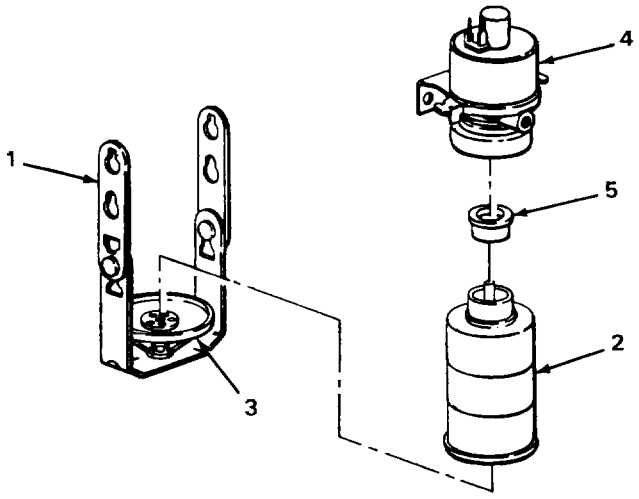
LOCATION	ITEM	ACTION / REMARKS

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Ether bums easily. If engine starting aid is not properly installed, do not release ether In confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

15.	Engine primer fluid (2)	a. Using clean, dry rags dampened with drycleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
16.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.



2-301

ENGINE STARTING AID FLUID INJECTION SOLENOID - CONTINUED

LOCATION	ITEM	ACTION REMARKS

INSPECTION/REPLACEMENT

NOTE

For more Information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

17.		Engine primer fluid (1)	a. Shake to see if empty. b. Look for cracks, dents, and bent valve stems.
18.		Solenoid (2)	a. Look for cracks, dents, bends, and breaks. b. Look for damaged electrical terminals.
19.		Gasket (3)	Look for cracks, breaks, and crumbling.
20.		All other parts	Look for cracks, bends, and breaks.
21.		All threaded parts	Look for damaged threads.

ASSEMBLY

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

22.	Solenoid (2)	Gasket (3)	If removed, place in position.
23.		Bail (4)	Place in position.
24.	Bail (4) and solenoid (2)	Engine primer Fluid (1)	Place in position.

ENGINE STARTING AID FLUID INJECTION SOLENOID - CONTINUED

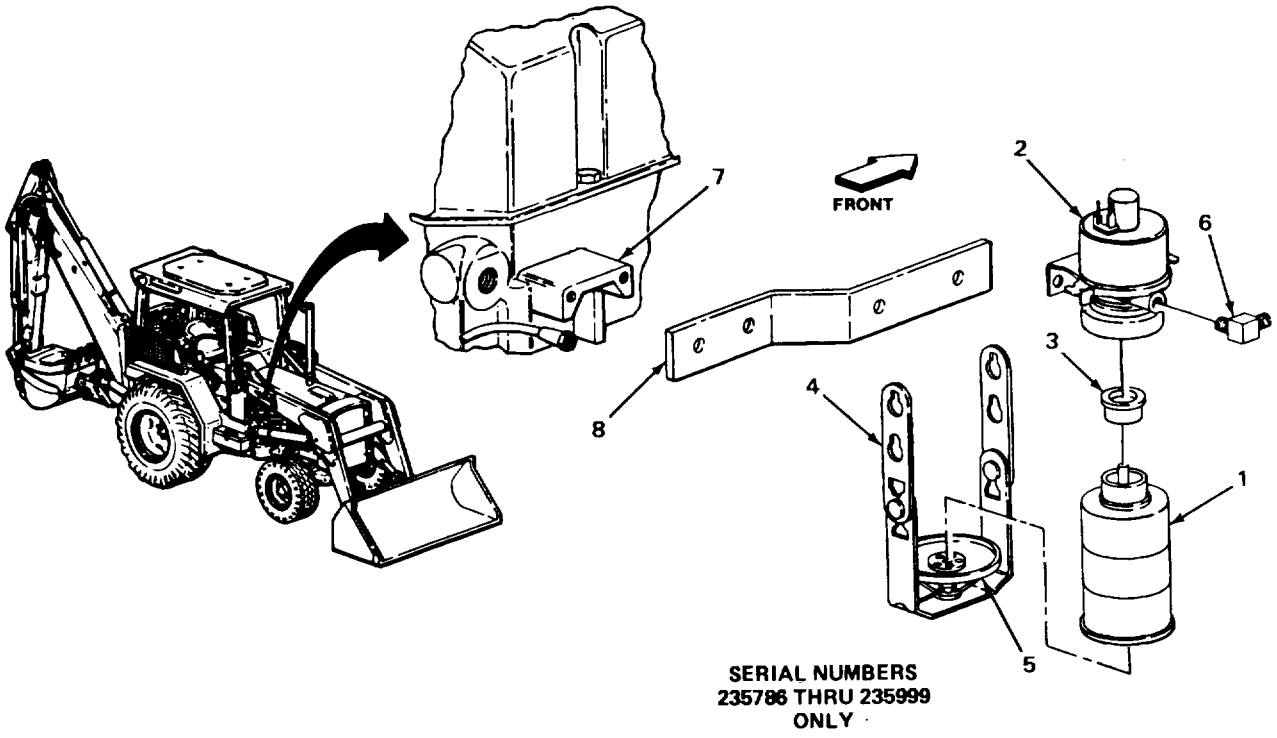
LOCATION	ITEM	ACTION REMARKS
25. Bail (4)	Base (5)	Screw on until tight by turning clockwise.
26. Solenoid (2)	Elbow (6)	Screw in and tighten using 7/16-inch open-end wrench. **Elbow should be positioned so that exposed threads point toward rear of vehicle when solenoid is installed.**

INSTALLATION

NOTE

Steps 27 thru 30 only apply to loader backhoes with Serial Numbers 235786 thru 235999.

27.	Cylinder head (7)	Bracket (8)	Place in position.



ENGINE STARTING AID FLUID INJECTION SOLENOID - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
28. Engine assembly	Fuel filter assembly	Install (page 2-277).

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

29. Bracket (1) and terminal (2)	Solenoid (3) with assembled parts	Place in position.
30. Bracket (1), solenoid (3), and terminal (2)	Two screws (4), new lockwashers (5), washers (6) and nuts (7)	Screw together and tighten using 1/2-inch, 3/8-inch drive socket, 5-inch extension, ratchet handle, and 1/2-inch box wrench.

NOTE

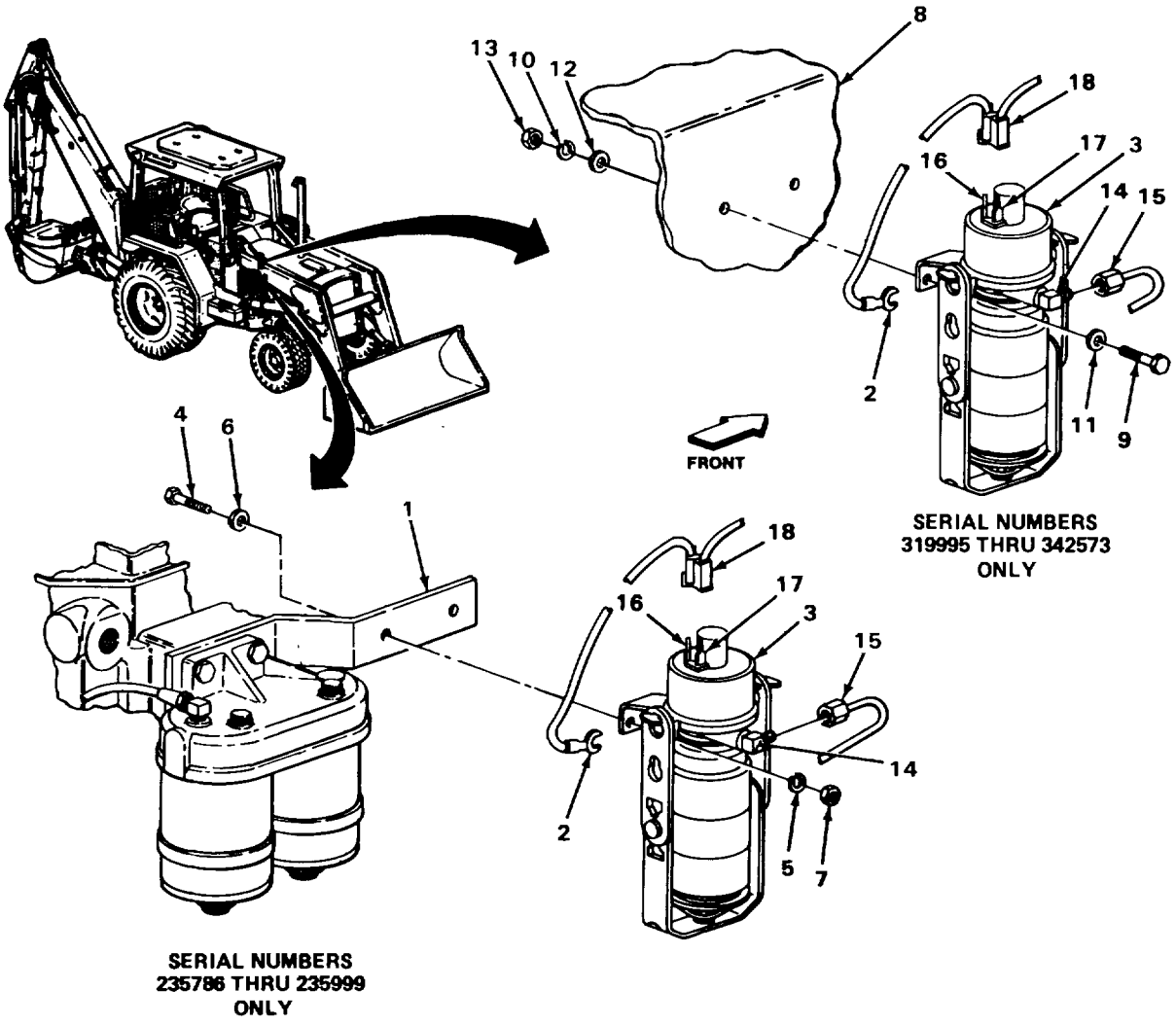
Steps 31 and 32 only apply to loader backhoes with Serial Numbers 319995 thru 342573.

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

31. Hood (8) and terminal (2)	Solenoid (3) with attached parts	Place in position.
32. Hood (8), solenoid (3), and terminal (2)	Two screws (9), new lockwashers (10), washers (11), spacers (12), and nuts (13)	Screw together and tighten using 1/2-inch, 3/8-inch drive socket, ratchet handle, and 1/2-inch box wrench.
33. Elbow (14)	Tube (15)	a. Uncap. b. Screw on and tighten using 3/8-inch open-end wrench.
34. Solenoid terminals (16 and 17)	Solenoid lead connector (18)	Push on.

ENGINE STARTING AID FLUID INJECTION SOLENOID - CONTINUED



TASK ENDS HERE

TA242856

ENGINE STARTING AID FLUID INJECTION TUBE AND FITTINGS

This task covers:

a. **Removal(page 2-306)**
b. **Cleaning (page 2-307)**
c. **Inspection/Replacement (page 2-308)**
d. **Installation (page 2-308)**

INITIAL SETUP:

Tools
Wrench, box, 1/4-inch
Wrench, box, 3/4-inch
Wrench, open-end, 3/8-inch
Wrench, open-end, 7/16-inch

Materials/Parts
Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

1.	Elbow (1)	Tube (2)	Using 3/8-inch open-end wrench, unscrew and take off.	
2.	Solenoid (3)	Elbow (1)	Using 7/16-inch open-end wrench, unscrew and take out.	
3.	Elbow (4)	Tube (2)	Using 3/8-inch open-end wrench, unscrew and take off.	
4.	Spray nozzle holder (5)	Elbow (4)	Using 7/16-inch open-end wrench, unscrew and take out.	
5.	Air inlet (6)	Spray nozzle holder (5)	Using 3/4-inch box wrench, unscrew and take out.	
6.	Spray nozzle holder (5)	Spray nozzle (7)	take out.	Using 1/4-inch box wrench, unscrew and

ENGINE STARTING AID FLUID INJECTION TUBE AND FITTINGS - CONTINUED

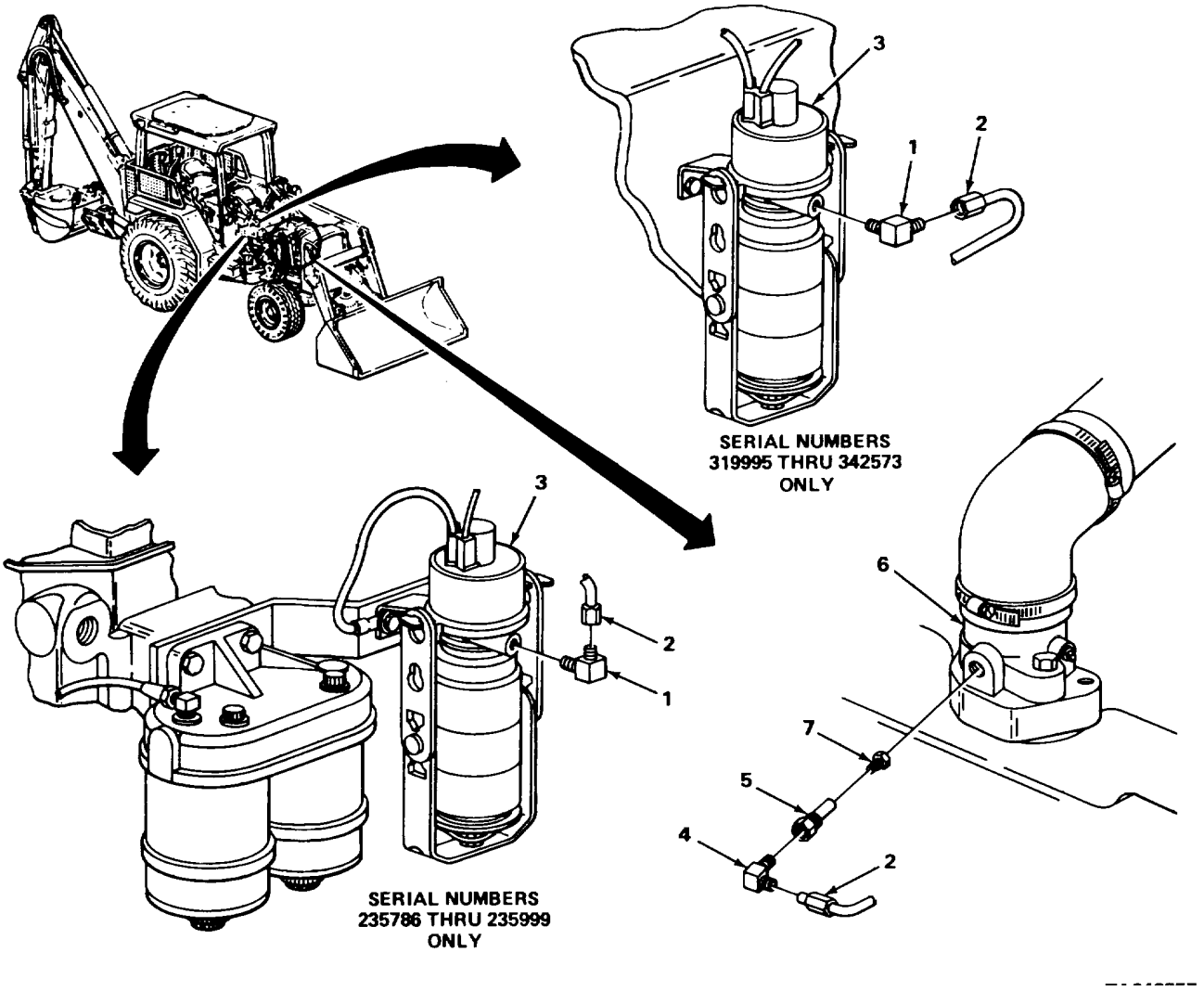
LOCATION	ITEM	ACTION REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

7.	Tube (2)	a. Using clean rags dampened with solution of detergent and water, wipe clean. b. Using clean, dry rags, wipe dry.



ENGINE STARTING AID FLUID INJECTION TUBE AND FITTINGS - CONTINUED

LOCATION	ITEM	ACTION REMARKS

CLEANING - CONTINUED

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

8.	All other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

9.	Tube (1)	Look for cracks, cuts, and breaks.
10.	All other parts	Look for cracks, bends, breaks, and other other physical damage.
11.	All threaded parts	Look for damaged threads.

INSTALLATION

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

12.	Spray nozzle holder (2)	Spray nozzle (3)	Screw in and tighten using 1/4-inch box wrench.
13.	Air Inlet (4)	Spray nozzle holder (2)	Screw in and tighten using 3/4-inch box wrench.

ENGINE STARTING AID FLUID INJECTION TUBE AND FITTINGS - CONTINUED

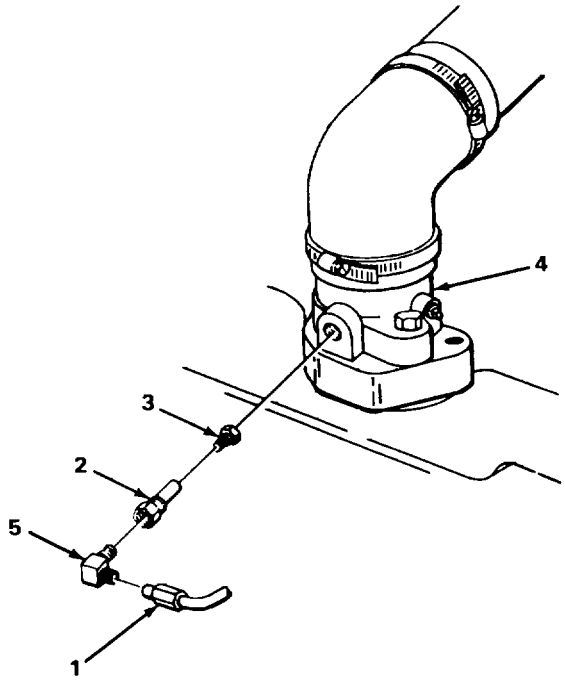
LOCATION	ITEM	ACTION REMARKS
14. Spray nozzle holder (2)	Elbow (5)	Screw in and tighten using 7116inch open-end wrench. **Exposed threads should point toward rear of vehicle.**

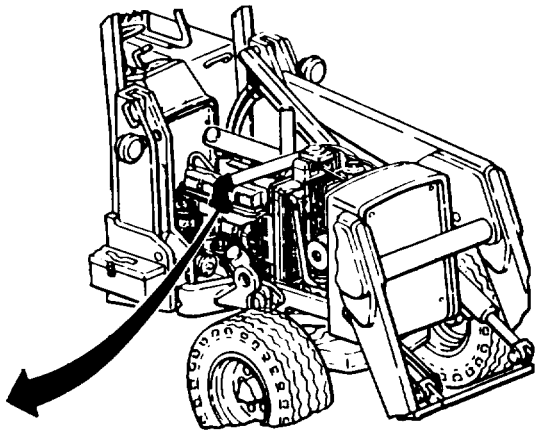
NOTE

New tubes for only loader backhoes with Serial Numbers 235786 thru 235999 are precut to the proper length; new tubes for only loader backhoes with Serial Numbers 319995 thru 342573 are manufactured from bulk items. for more information on manufacturing new tubes, go to Appendix D.

For Information on how to assemble new tubes with compression fittings, go to General Maintenance Instructions (page 2-137).

15	Elbow (5)	Tube (1)	Screw on and tighten using 3/8-inch open-end wrench.





ENGINE STARTING AID FLUID INJECTION TUBE AND FITTINGS - CONTINUED

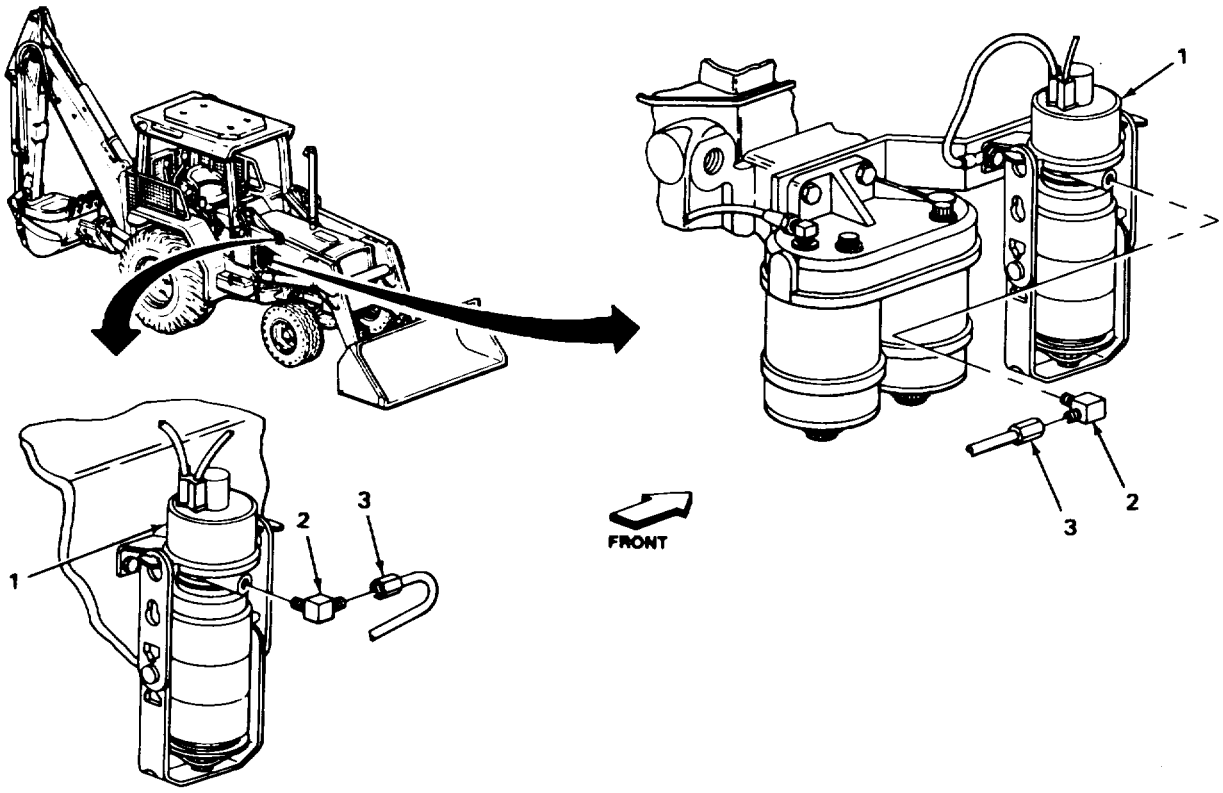
LOCATION	ITEM	ACTION / REMARKS

INSTALLATION - CONTINUED

WARNING

Ether burns easily. If engine starting aid is not properly installed, do not release ether in confined areas or near open flame. Engine primer fluid cylinder is pressurized to expel ether when fluid injection solenoid is activated. Do not heat engine primer fluid cylinder or place it in fire.

16.	Solenoid (1)	Elbow (2)	Screw in and tighten using 7/16-inch open-end wrench. **Exposed threads should point toward rear of vehicle.**
17.	Elbow (2)	Tube (3)	Screw on and tighten using 3/8inch open-end wrench.



TASK ENDS HERE

TA242859

HAND THROTTLE LEVER AND CABLE ADJUSTMENT

This task covers:
Adjustment (page 2-311)

INITIAL SETUP:

Tools
Pliers, slip-joint
Scale, dial indicating,
O to 50-pound range
Wrench, open-end, 7/16-inch
Wrench, open-end, 1/2-inch
Wrench, open-end, 9/16-inch

Materials/Parts
Pin, cotter, cable swivel

Personnel Required

One

Equipment Condition
Loader control box door removed
(page 2-1167)

LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT			
1. Engine assembly	Fuel metering pump	Adjust (page 2-222).	**Do not shut down engine at this time.**

HAND THROTTLE LEVER AND CABLE ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ADJUSTMENT - CONTINUED		
2. Loader control box (1)	Throttle lever (2)	a. Push all the way forward and note engine speed on tachometer (3). Engine speed should be 2650 rpm. b. Pull all the way back and note engine speed on tachometer (3). **Engine speed should be 800 to 825 rpm.**
	NOTE If engine speeds are correct, skip steps 3 thru 11.	
3. Swivel (4) and clip (5)	Cotter pin (6)	a. Using slip-joint pliers, straighten ends and pull out. b. If not just replaced, get rid of.
4. Swivel (4), throttle lever (2), and cable (7) MF	Clip (5) cable (7).	Using slip-joint pliers, unsnap from
5. Throttle lever (2) and clip (5)	Swivel (4) with attached cable (7)	Take out.
6. Throttle lever (2)	Clip (5)	Take off.
7. Throttle lever (2) and cable (7)	Swivel (4)	a. Make sure throttle lever (2) is all the way back. b. Using 112-inch open-end wrench, screw in or out until alined with throttle lever hole.
8. Throttle lever (2)	Clip (5)	Place in position.
9. Throttle lever (2) and clip (5)	Swivel (4) with attached cable (7)	Place in position.
10. Swivel (4), throttle lever (2), and cable (7)	Clip (5)	a. Snap onto cable (7). b. Repeat steps 2 thru 10.
	NOTE If cotter pin was just replaced during lever or cable installation, it may be reused.	

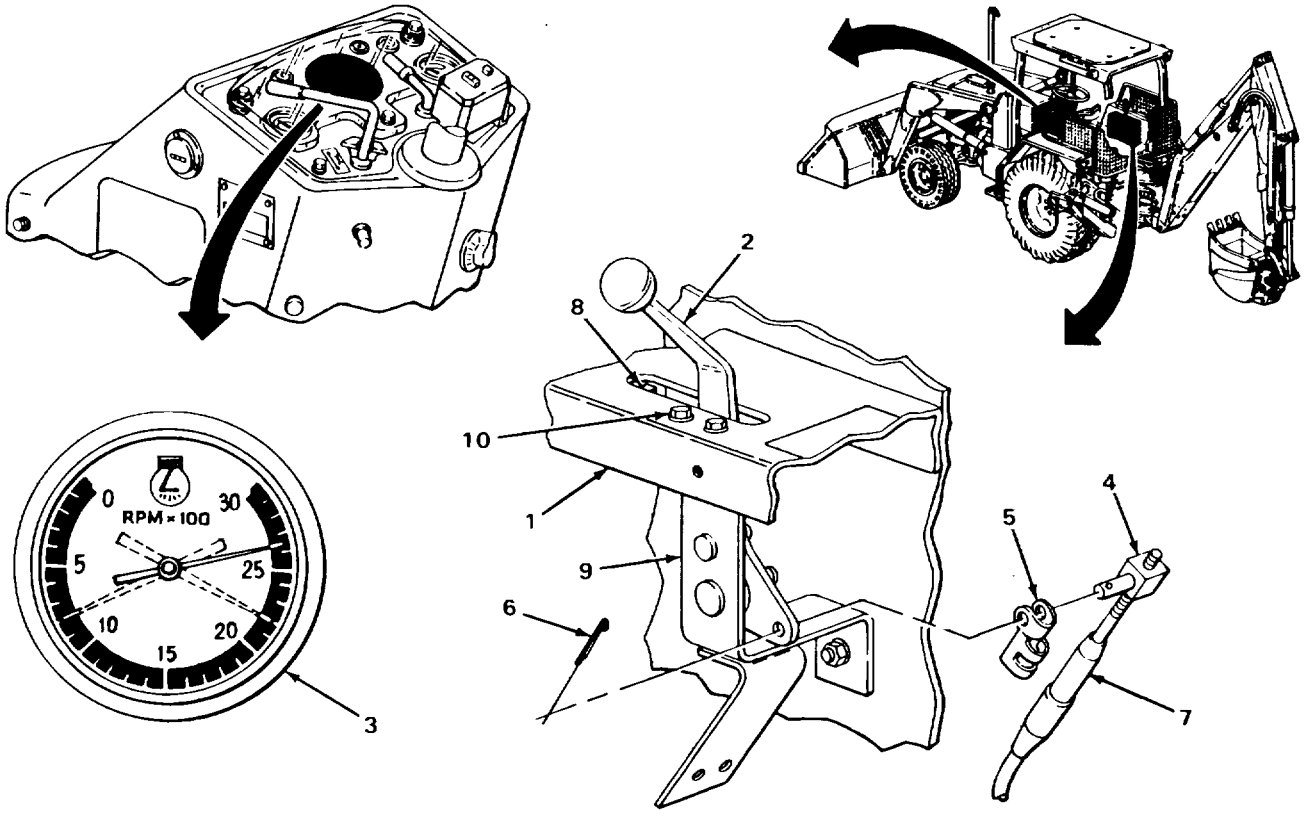
HAND THROTTLE LEVER AND CABLE ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
11. Swivel (4) and clip (5)	New cotter pin (6)	a. Place in position. b. Using slip-joint pliers, bend ends back.
12. Loader control box (1) and stop (8)	Throttle lever (2)	Push forward until it contacts stop (8) and note engine speed on tachometer (3). **Engine speed should be 2200 rpm.**

NOTE

If engine speed is correct, skip steps 13 thru 15.

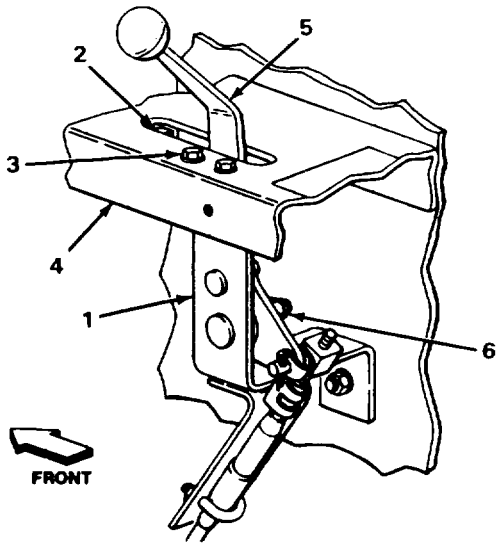
13. Bracket (9) and stop (8)	Two screws (10)	Using 7/16-inch open-end wrench, loosen.
14. Bracket (9) and two screws (10)	Stop (8)	a. If engine speed noted in step 12 was too low, move forward. b. If engine speed noted in step 12 was too high, move back.



HAND THROTTLE LEVER AND CABLE ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ADJUSTMENT - CONTINUED		
15. Bracket (1) and stop (2)	Two screws (3)	a. Using 7/16-inch open-end wrench, tighten. **There must be enough clearance between stop and loader control box to allow throttle lever to pass stop.** b. Repeat step 12 thru 15.
16. Loader backhoe	Engine asembly	Shut down (TM 5-2420-222-10).
17. Loader control box (4) and bracket (1)	Throttle lever (5)	Using 0 to 50-pound range dial indicating scale, measure force of pull required to move forward from slow idle position (rear) to throttle stop position (front). **Force of pull should measure 10 pounds (44 N).**
	NOTE If force of pull is correct, skip step 18.	
18. Bracket (1)	Nut (6)	a. If force of pull is more than 10 pounds (44 N), using 9/16-inch open-end wrench, loosen. b. If force of pull is less than 10 pounds (44 N), using 9/16-inch open-end wrench, tighten. c. Repeat steps 17 and 18.

HAND THROTTLE LEVER AND CABLE ADJUSTMENT - CONTINUED



NOTE
FOLLOW-ON MAINTENANCE: Install loader control box door (page 2-1167).

TASK ENDS HERE

HAND THROTTLE LEVER

This task covers:

a. Removal (page 2-316)
b. Disassembly (page 2-317)
c. Cleaning (page 2-317)
d. Inspection/Replacement (page 2-318)
e. Repair (page 2-318)
f. Assembly (page 2-318)
g. Installation (page 2-319)

INITIAL SETUP:

Tools
Handle, ratchet, 3/8-inch drive
Pliers, slip-joint
Socket, 3/8-inch, 7116-inch
Socket, 3/8-inch, 9/16-inch
Threading set, screw
Vise, machinist's

Materials/Parts
Detergent, GP (item 7, Appendix C)
Lockwasher, bracket bolt nut
Lockwasher, stop screw (two required)
Lockwasher, U-bolt nut (two required)

Materials/Parts - Continued
Nut, self-locking, bracket stud
Pin, cotter, cable swivel
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
Two

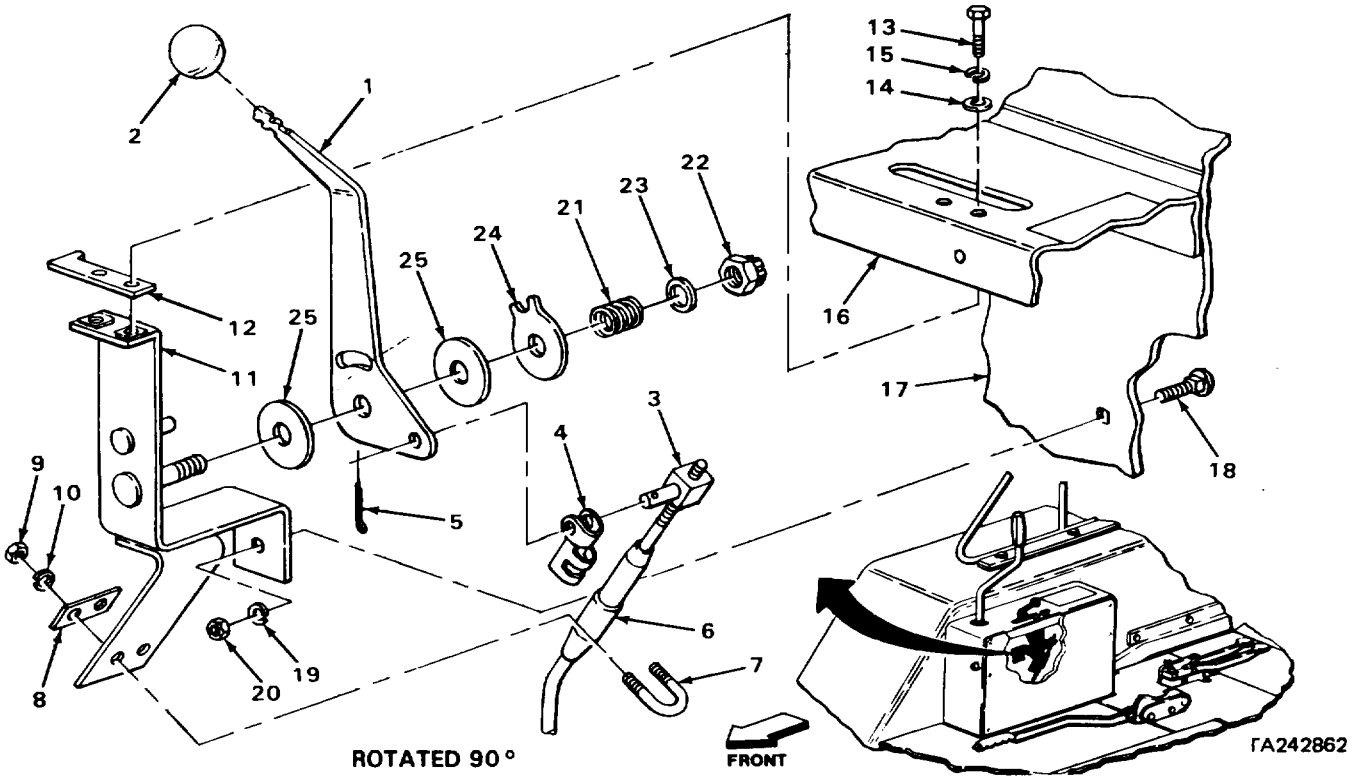
Equipment Condition
Loader control box door removed (page 2-1167)

HAND THROTTLE LEVER - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL		
1. Throttle lever (1)	Knob (2)	Unscrew and take off.
2. Swivel (3) and clip (4)	Cotter pin (5)	a. Using slip-joint pliers, straighten ends and pull out. b. Get rid of.
3. Swivel (3), throttle lever (1) and cable (6)	Clip (4)	Using slip-joint pliers, unsnap from cable (6).
4. Throttle lever (1) and clip (4)	Swivel (3) with assembled cable (6)	Take out.
5. Throttle lever (1)	Clip (4)	Take off.
6. U-bolt (7) and spacer (8)	Two nuts (9) and lockwashers (10)	a. Using 7/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take off. b. Get rid of lockwashers (10).
7. Cable (6) and bracket (11)	U-bolt (7) and spacer (8)	Take off.
8. Bracket (11)	Cable (6)	Take off.
9. Stop (12) and bracket (11)	Two screws (13), washers (14), and lockwashers (15)	a. Using 7/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take off. b. Get rid of lockwashers (15).
10. Bracket (11) and loader control box (16)	Stop (12)	Take out.
11. Bracket (11) and right fender (17)	Bolt (18), lock-washer (19), and nut (20)	a. With aid of assistant, using 9/16-inch, 3/8-inch drive socket, and ratchet handle, unscrew and take apart. b. Get rid of lockwasher (19).
12. Right fender (17)	Bracket (11) with assembled parts	Take off.

HAND THROTTLE LEVER - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY			
13. Bracket (11) and spring (21)	Self-locking nut (22) and washer (23)	a. Place bracket (11) In machinist's vise. b. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. c. Get rid of nut (22).	
14. Bracket (11)	Spring (21), plate (24), throttle lever (1), and two facings (25)	a. Slide off. b. Take bracket (11) out of machinist's vise.	
CLEANING			
		NOTE For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
15.	Knob (2) and two facings (25)	a. Using clean rags dampened In solution of detergent and water, wipe clean. b. Using clean, dry rags, wipe dry.	



2-317

HAND THROTTLE LEVER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING - CONTINUED

WARNING

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16.	Al other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts which cannot be repaired.

17.	Knob (1) and two facing (2)	Look for cracks and breaks.
18.	All other parts	Look for cracks, bends, and breaks.
19.	All threaded parts	Look for damaged threads.

REPAIR

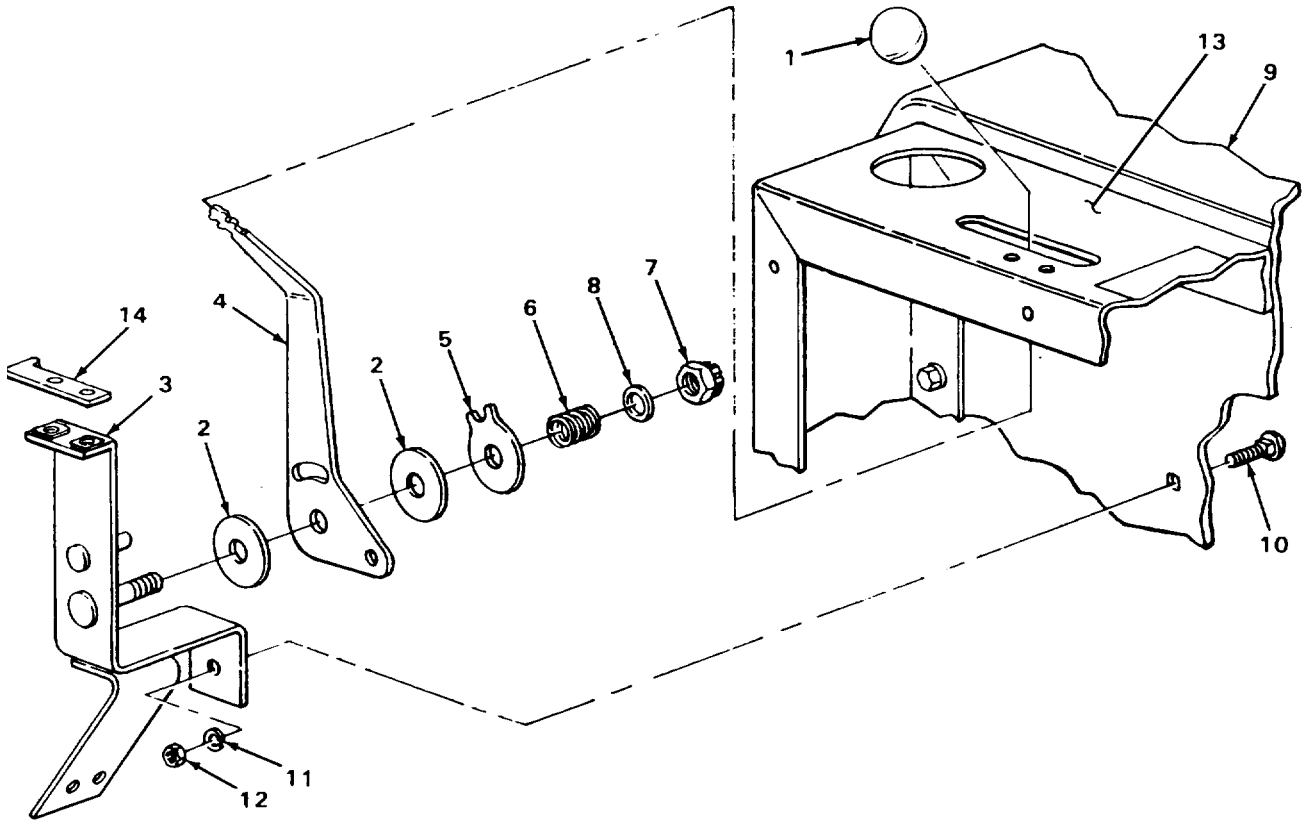
20.	Bracket (3)	If threads are damaged, using screw threading set, restore threads.

ASSEMBLY

21. Bracket (3)	Two facings (2), throttle lever (4), plate (5), and spring (6)	a. Place bracket (3) in machinist's vise. b. Slide on.

HAND THROTTLE LEVER - CONTINUED

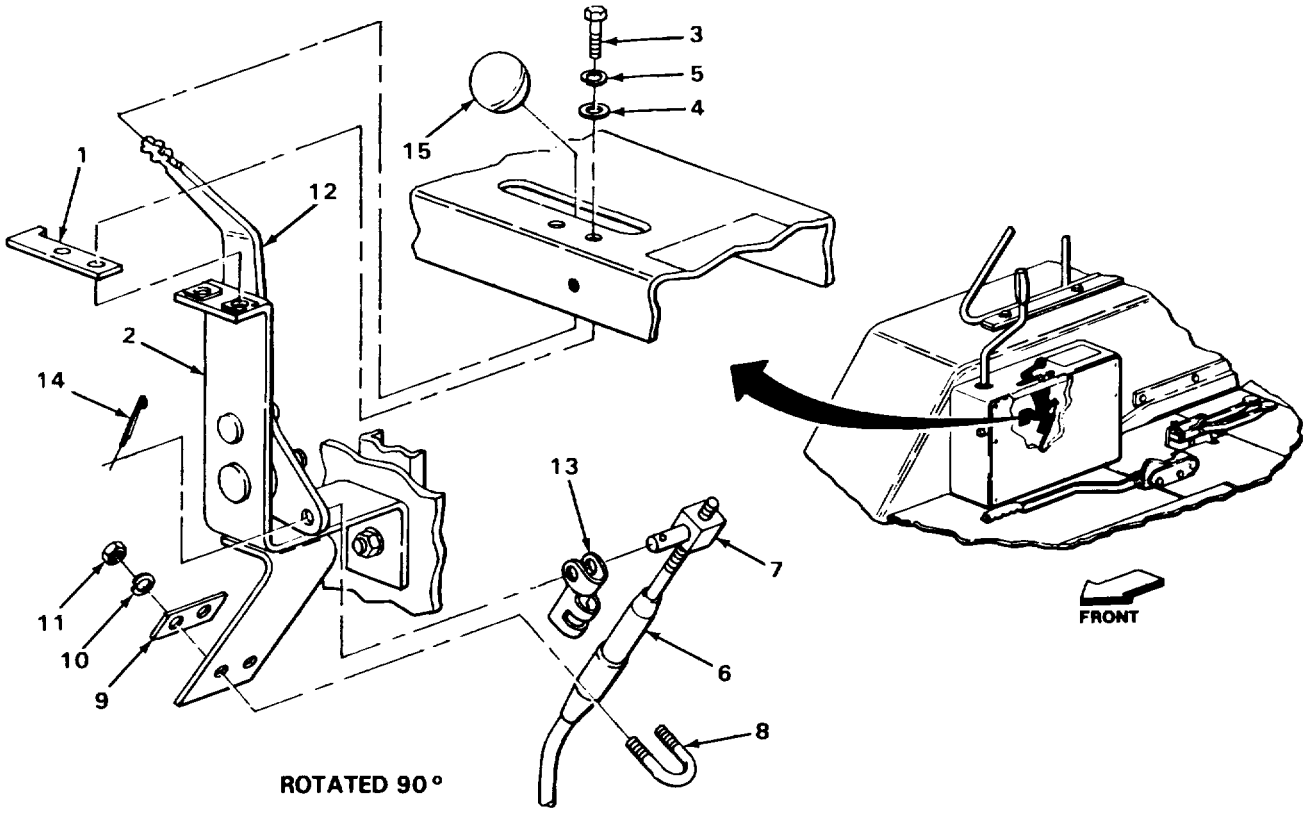
LOCATION	ITEM	ACTION / REMARKS
22. Bracket (3) and spring (6)	New self-locking nut (7), and washer (8)	a. Screw on until snug using 9116-inch, 3/8-inch drive socket and ratchet handle. b. Take bracket (3) out of machinist's vise.
INSTALLATION		
23. Right fender (9)	Bracket (3)	Place in position.
24. Bracket (3) and right fender (9)	Bolt (10), new lockwasher (11) and nut (12)	With aid of assistant, screw together and tighten using 9116-inch, 3/8-inch drive socket and ratchet handle.
25. Bracket (3) and loader control box (13)	Stop (14)	Place in position.



HAND THROTTLE LEVER - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
26. Stop (1) and bracket (2)	Two screws (3), washers (4), and new lockwashers (5)	Screw in and tighten using 7/16-inch, 3/8-inch drive socket and ratchet handle.
27. Bracket (2)	Cable (6) with assembled swivel (7)	Place in position.
28. Bracket (2) and cable (6)	U-bolt (8) and spacer (9)	Place in position.
29. U-bolt (8) and spacer (9)	Two nuts (10) and new lockwashers (11)	Screw on and tighten using 7/16-inch, 3/8-inch drive socket and ratchet handle.
30. Throttle lever (12)	Clip (13)	Place in position.
31. Throttle lever (12) and clip (13)	Swivel (7) with assembled cable (6)	Place in position.
32. Swivel (7) throttle lever (12), and cable (6)	Clip (13)	Snap onto cable (6).
33. Swivel (7) and clip (13)	New cotter pin (14)	a. Place in position. b. Using slip-joint pliers, bend ends back.
34. Throttle lever (12)	Knob (15)	Screw on.

HAND THROTTLE LEVER - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Adjust hand throttle control lever and cable (page 2-311).

TASK ENDS HERE

TA242864

HAND THROTTLE CABLE

This task covers:

INITIAL SETUP

Tools
Caps, vise jaw (pair)
Handle, ratchet, 3/8-inch
Pliers, slip-joint
Socket, 3/8-inch drive, 7116-inch
Socket, 3/8-inch drive, 9/16-inch
Threading set, screw
Vise, machinist's
Wrench, open-end, 112-inch

Materials/Parts
Lockwasher, bracket screw
Lockwasher, U-bolt nut (four required)

Materials/Parts - Continued
Pin, cotter, cable
Pin, cotter, cable swivel
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

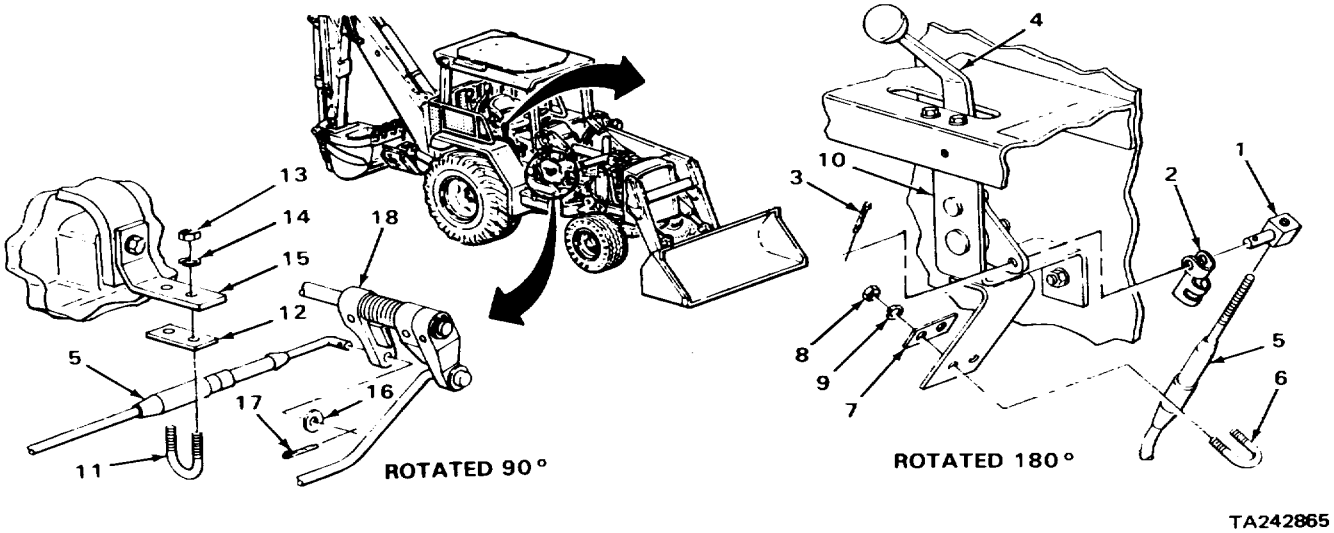
Personnel Required
One

Equipment Condition
1. Loader control box door removed (page 2-1167)
2. Right Inner platform ramp removed (page 2-1095)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Swivel (1) and clip (2)	Cotter pin (3)	a. Using slip-joint pliers, bend ends straight and pull out. b. Get rid of.	
2. Swivel (1), throttle lever (4) and cable (5)	Clip (2)	Using slip-joint pliers, unsnap from cable (5).	
3. Throttle lever (4) and clip (2)	Swivel (1) with attached cable (5)	Take out.	
4. Throttle lever (4)	Clip (2)	Take off.	

HAND THROTTLE CABLE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
5. U-bolt (6) and spacer (7)	Two nuts (8) and lockwashers (9)	a. Using 7/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take off. b. Get rid of lockwashers (9).
6. Cable (5) and bracket (10)	U-bolt (6) and spacer (7)	Take off.
7. Bracket (10)	Cable (5)	Take off.
8. U-bolt (11) and spacer (12)	Two nuts (13) and lockwashers (14)	a. Using 7116-inch, 3/8-inch drive socket and ratchet handle, unscrew and take off.
b. Get rid of lockwashers (14).		
9. Cable (5) and bracket (15)	U-bolt (11) and spacer (12)	Take off.
10. Bracket (15)	Cable (5)	Take off.
11. Cable (5) and washer (16)	Cotter pin (17)	a. Using slip-joint pliers, bend ends straight and take out. b. Get rid of.
12. Cable (5) and arm (18)	Washer (16)	Take off.
13. Arm (18)	Cable (5)	Take out.



TA242865

HAND THROTTLE CABLE - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL - CONTINUED		
14. Bracket (1) and cowl support (2)	Screw (3) and lockwasher (4)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (4).
15. Cowl support (2)	Bracket (1)	Take off.
DISASSEMBLY		
16. Cable (5)	Swivel (6)	a. Position cable (5) in machinist's vise with vise jaw caps. b. Note number of exposed threads on cable (5) for proper placement during installation. c. Using 1/2-inch open-end wrench, unscrew and take off. d. Take cable (5) out of machinist's vise with vise jaw caps.
CLEANING		

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

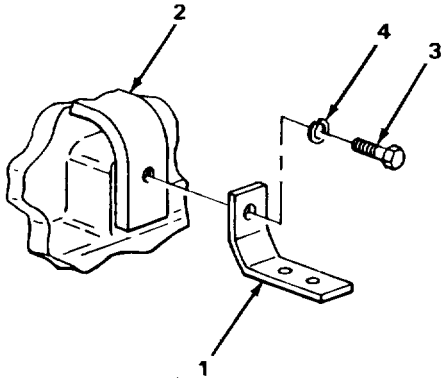
WARNING

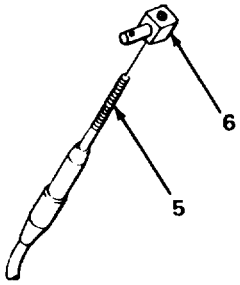
Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

17.	Cable (5)	a. Using clean rags dampened in dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
18.	All other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

HAND THROTTLE CABLE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSPECTION/REPLACEMENT		
	NOTE For more Information on how to Inspect parts, go to General Maintenance Instructions (page 2-137). Replace defective parts which cannot be repaired.	
19.	Cable (5)	Look for cracks, kinks, breaks, and binding.
20.	All other parts	Look for cracks, bends, and breaks.
21.	All threaded parts	Look for damaged threads.
REPAIR		
22.	Cable (5)	If threads are damaged, using screw threading set, restore threads.
ASSEMBLY		
23. Cable (5)	Swivel (6)	a. Position cable (5) in machinist's vise with vise jaw caps. b. Screw on until same number of threads are showing on cable (5) as noted during removal. c. Take cable (5) out of machinist's vise with vise jaw caps.

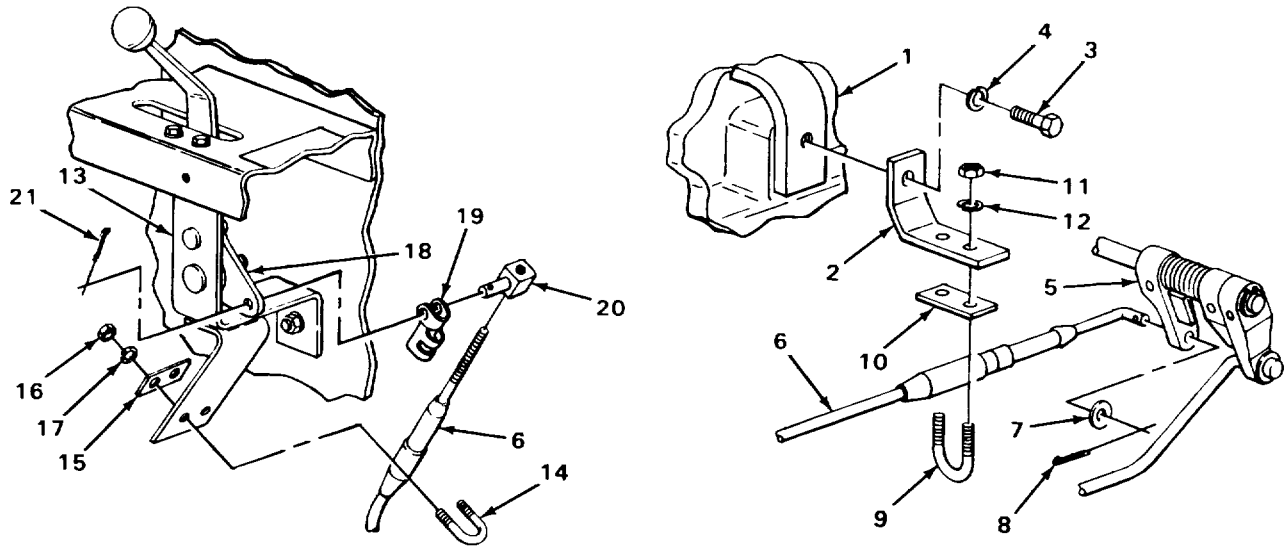




HAND THROTTLE CABLE - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION		
24. Cowl support (1)	Bracket (2)	Place In position.
25. Bracket (2) and cowl support (1)	Screw (3) and new lockwasher (4)	Screw in and tighten using 9/16-inch, 3/8-inch drive socket and ratchet handle.
26. Arm (5)	Cable (6)	Place in position.
27. Cable (6) and arm (5)	Washer (7)	Slide on.
28. Cable (6) and washer (7)	New cotter pin (8)	a. Place in position. b. Using slip-joint pliers, bend ends back.
29. Bracket (2)	Cable (6)	Place in position.
30. Cable (6) and bracket (2)	U-bolt (9) and spacer (10)	Place in position.
31. U-bolt (9) and spacer (10)	Two nuts (11) and new lockwashers (12)	Screw on and tighten using 7116-inch, 3/8-inch drive socket and ratchet handle.
32. Bracket (13)	Cable (6)	Place in position.
33. Cable (6) and bracket (13)	U-bolt (14) and spacer (15)	Place in position.
34. U-bolt (14) and spacer (15)	Two nuts (16) and new lockwashers (17)	Screw on and tighten using 7116-inch, 3/8-inch drive socket and ratchet handle.
35. Throttle lever (18)	Clip (19)	Place in position.
36. Throttle lever (18) and clip (19)	Swivel (20) with attached cable (6)	Place in position.
37. Swivel (20), throttle lever (18) and cable (6)	Clip (19)	Snap onto cable (6).
38. Swivel (20) and	New cotter pin (21) clip (19)	a. Place In position. b. Using slip-joint pliers, bend ends back.

HAND THROTTLE CABLE - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE:

1. Adjust hand throttle lever and cable (page 2-311).
2. Install right inner platform ramp (page 2-1095).

TASK ENDS HERE

ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS

This task covers:

INITIAL SETUP

Tools
Caps, vise jaw (pair)
Hammer, ball-peen, 1-pound head
Pliers, slip-joint
Punch, straight drive-pin, 1/8-inch
Rule, steel, machinist's, 6-inch
Screwdriver, flat-tip, 3/16-inch
Threading set, screw
Vise, machinist's
Wrench, adjustable, 0 to 0.760-inch
Wrench, open-end, 7/16-inch

Materials/Parts
Pin, cotter, control cable

Materials/Parts
Plate, locking, rod
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

Two

Equipment Condition

Right inner platform ramp removed (page 2-1095)

LOCATION	ITEM	ACTION / REMARKS
REMOVAL		
1. Cable (1) and washer (2)	Cotter pin (3)	a. Using slip-joint pliers, straighten ends and pull out. b. Get rid of.
2. Cable (1) and arm (4)	Washer (2)	Slide off.
3. Arm (4)	Cable (1)	Take out.
4. Arm (5) and rod (6)	Locking plate (7)	a. Using slip-joint pliers, take off. b. Get rid of.

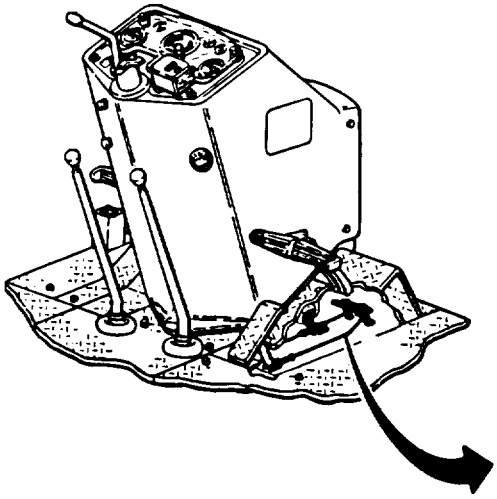
ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED

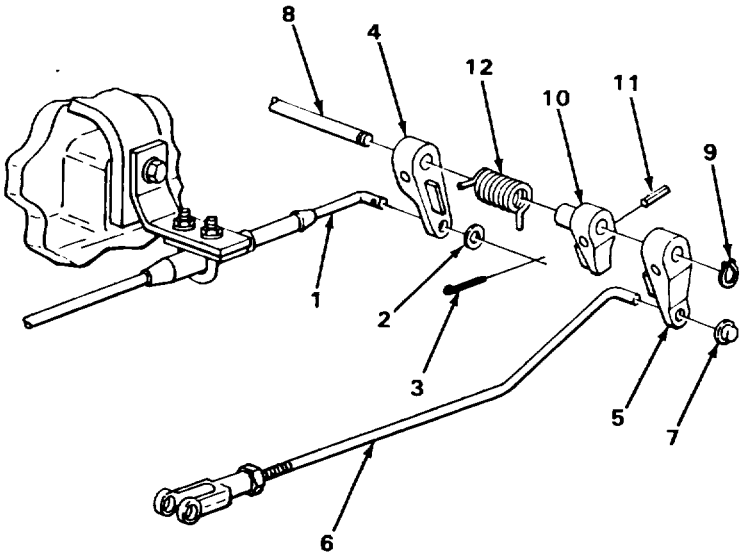
LOCATION	ITEM	ACTION REMARKS
5. Arm (5)	Rod (6) with assembled parts	Take out.
6. Shaft (8) and arm (5)	Ring (9)	Using 3/16-inch flat-tip screwdriver, take out.
7. Shaft (8)	Arm (5)	Slide off.
8. Shaft (8) and arm (10)	Spring pin (11)	Using 1/8-inch straight drive-pin punch and 1-pound head ball-peen hammer, drive out.

WARNING

Speed control arms are under strong spring tension. Release tension slowly to avoid injury.

9. Shaft (8)	Arm (10), spring (12), and arm (4)	Slide off.



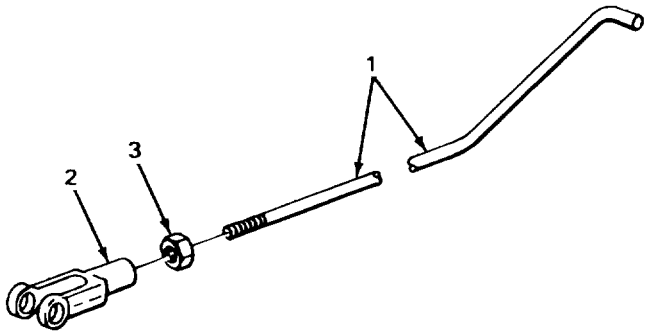


ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED

LOCATION	ITEM	ACTION REMARKS
DISASSEMBLY		
10. Rod (1) and yoke (2)	Nut (3) with vise jaw caps.	a. Position rod (1) in machinist's vise b. Using 7/16-inch open-end wrench, loosen.
11. Rod (1)	Yoke (2)	a. Note number of exposed threads on rod (1) and relative position of yoke (2) for proper placement during assembly. b. Unscrew and take off.
12.	Nut (3)	a. Unscrew and take off. b. Take rod (1) out of machinist's vise with vise jaw caps.
CLEANING		
	NOTE For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
	WARNING Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
13.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts which cannot be repaired.	

ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED

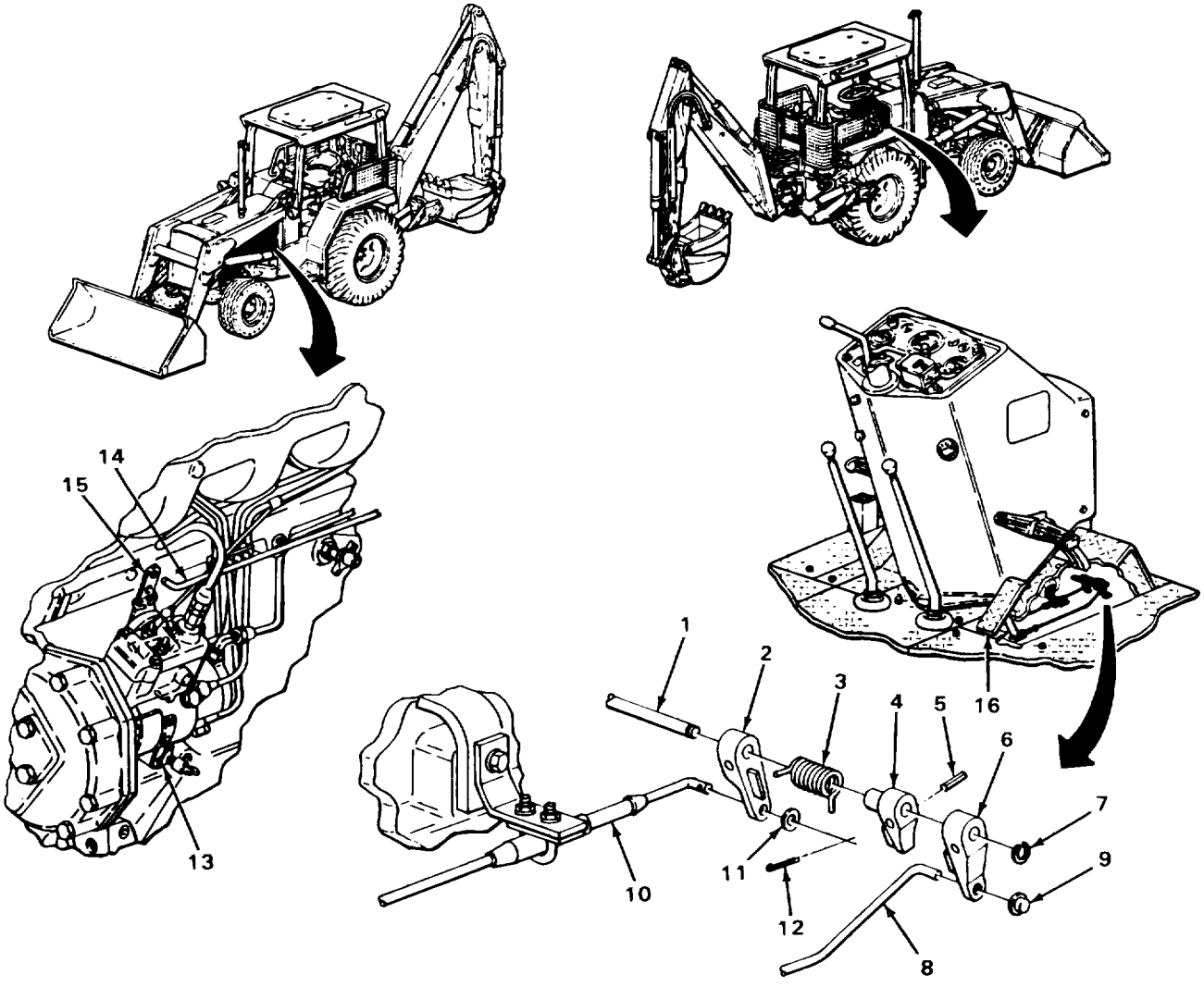
LOCATION	ITEM	ACTION REMARKS
14.	All parts	Look for cracks, bends, and breaks.
15.	All threaded parts	Look for damaged threads.
REPAIR		
16.	All threaded parts except hardware	If threads are damaged, using screw threading set, restore threads.
ASSEMBLY		
17. Rod (1)	Nut (3)	a. Position rod (1) in machinist's vise with vise jaw caps. b. Screw on all the way.
18.	Yoke (2)	Screw on until same number of threads is showing on rod (1) and yoke (2) is in same relative position as noted during disassembly.
19. Rod (1) and	Nut (3)	a. Using 7/16-inch open-end and 0 to yoke (2)0.760-inch adjustable wrenches, tighten until seated against yoke(2). b. Take rod (1) out of machinist's vise with vise jaw caps.



ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION		
20. Shaft (1)	Arm (2), spring (3), and arm (4)	Slide on.
21. Shaft (1) and arm (4)	Spring pin (5)	a. Aline holes in shaft (1) and arm (4). b. Using 1-pound head ball-peen hammer, drive in until same amount protrudes on each side of arm (4).
22. Shaft (1)	Arm (6)	Slide on.
23. Shaft (1) and arm (6)	Ring (7)	a. Place in position. b. Using slip-joint pliers, crimp on.
24. Arm (6)	Rod (8) with assembled parts	Place in position.
25. Arm (6) and rod (8)	New locking plate (9)	Using 1-pound head ball-peen hammer, tap on.
26. Arm (2)	Cable (10)	Place in position.
27. Cable (10) and arm (2)	Washer (11)	Slide on.
28. Cable (10) and washer (11)	New cotter pin (12)	a. Place in position. b. Using slip-joint pliers, bend ends back.
29. Operator compartment	Right inner platform ramp	Install (page 2-1095). **Do not install outer platform ramp at this time.**
ADJUSTMENT		
30.	Hand throttle lever and cable	Adjust (page 2-311).

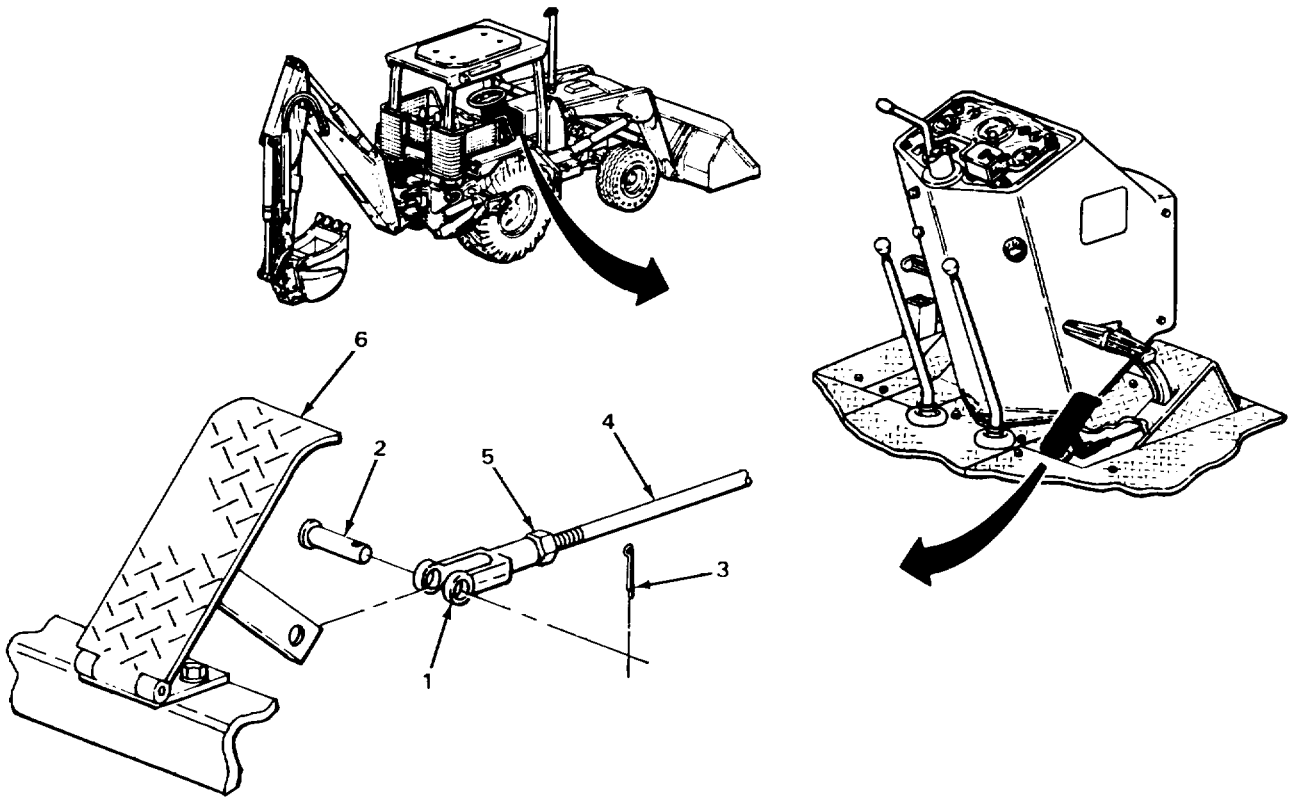
LOCATION	ITEM	ACTION / REMARKS
31. Fuel metering pump (13)	Arm (14) lever (15)	a. Have assistant press down accelerator pedal (16) all the way. b. Using 6-inch steel machinist's rule, measure distance between top of lever (15) and arm (14). **Distance should be 118 to 11/32-Inch (3 to 9 mm).**



ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ADJUSTMENT - CONTINUED		
	NOTE	
	If distance measured in step 31 was correct, skip steps 32 thru 40.	
32. Yoke (1) and pin (2)	Cotter pin (3)	a. If not already removed, using sllp-joint pliers, straighten ends and pull out. b. If not replaced during installation, get rid of.
33. Yoke (1) and rod (4)	Nut (5)	Using 7/16-inch open-end wrench, loosen.
34. Yoke (1) and pedal (6)	Pin (2)	Take out.
35. Pedal (6)	Yoke (1)	Take off.
36. Rod (4)	Yoke (1)	a. If distance measured in step 31 was less than 1/8-inch (3 mm), turn counterclockwise to lengthen linkage. b. If distance measured in step 31 was more than 11/32-inch (9 mm), turn clockwise to shorten linkage.
37. Pedal (6)	Yoke (1)	Place in position.
38 Yoke (1) and pedal (6)	Pin (2)	a. Push in. b. Repeat steps 31 thru 38.
	NOTE	
	If cotter pin has just been replaced during installation, it may be reused after adjustment, otherwise use new cotter pin.	
39. Yoke (1) and pin (2)	Cotter pin (3)	a. place in position. b. Using slip-joint pliers, bend ends back.
40. Yoke (1) and rod (4)	Nut (5)	Using 7/16-inch open-end wrench, tighten until seated against yoke (1).

ACCELERATOR PEDAL, FOOT ACCELERATOR ROD, AND SPEED CONTROL ARMS - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Install right outer platform ramp (page 2-1088).

TASK ENDS HERE

TA242871

SPEED CONTROL ROD

This task covers:

a. Removal (page 2-336)
b. Cleaning (page 2-336)
c. Inspection/Replacement (page 2-337)
d. Installation (page 2-338)

INITIAL SETUP:

Tools
Pliers, slip-joint

Materials/Parts
Pin, cotter, speed control rod (two required)

Materials/Parts - Continued
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required
One

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Rod (1) and washer (2)	Cotter pin (3)	a. Using slip-joint pliers, bend ends straight and pull out. b. Get rid of.	
2. Rod (1) and lever (4)	Washer (2)	Slide off.	
3. Lever (4)	Rod (1)	Take out.	
4. Rod (1) and washer (5)	Cotter pin (6)	a. Using slip-joint pliers, bend ends straight and take out. b. Get rid of.	
5. Rod (1) and shaft (7)	Washer (5)	Slide off.	
6. Shaft (7)	Rod (1)	Take out.	
CLEANING			

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

SPEED CONTROL ROD - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

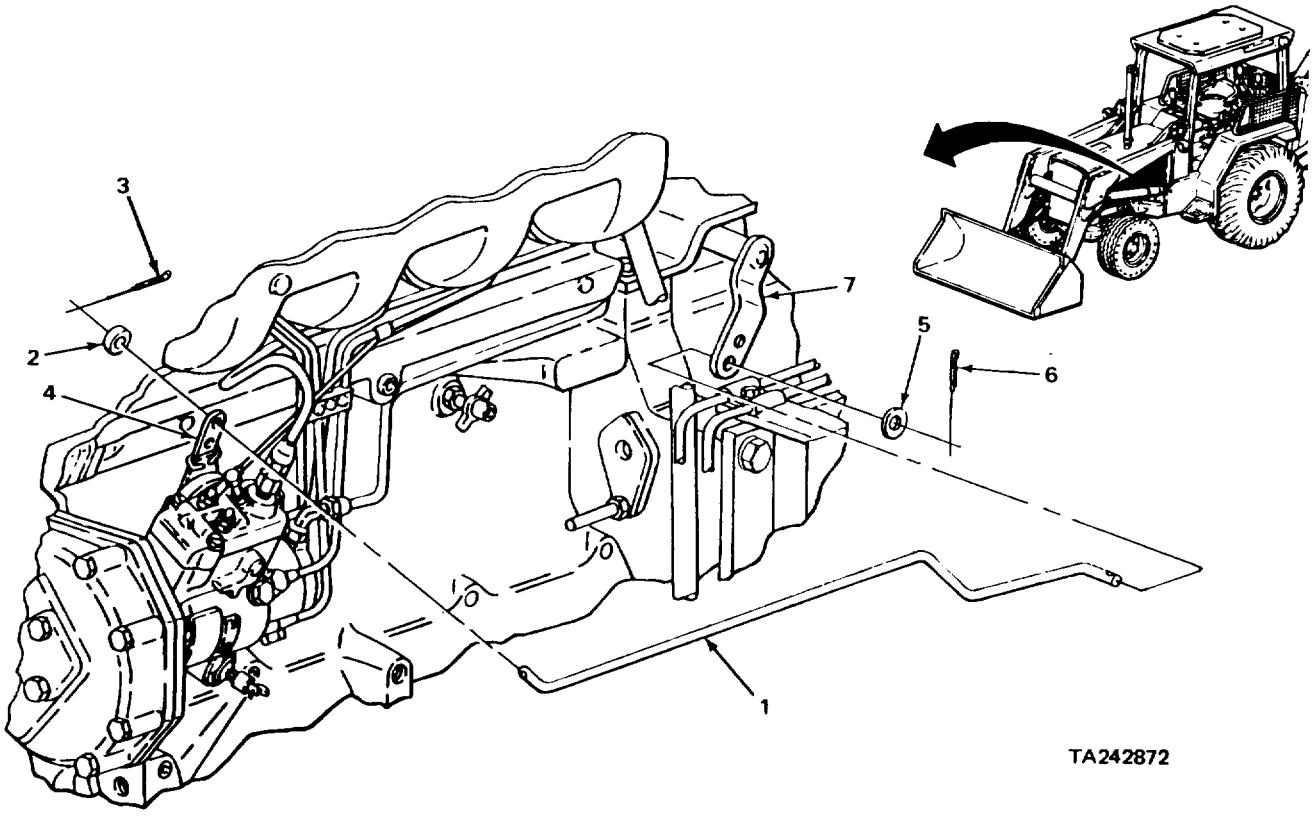
7.	All parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

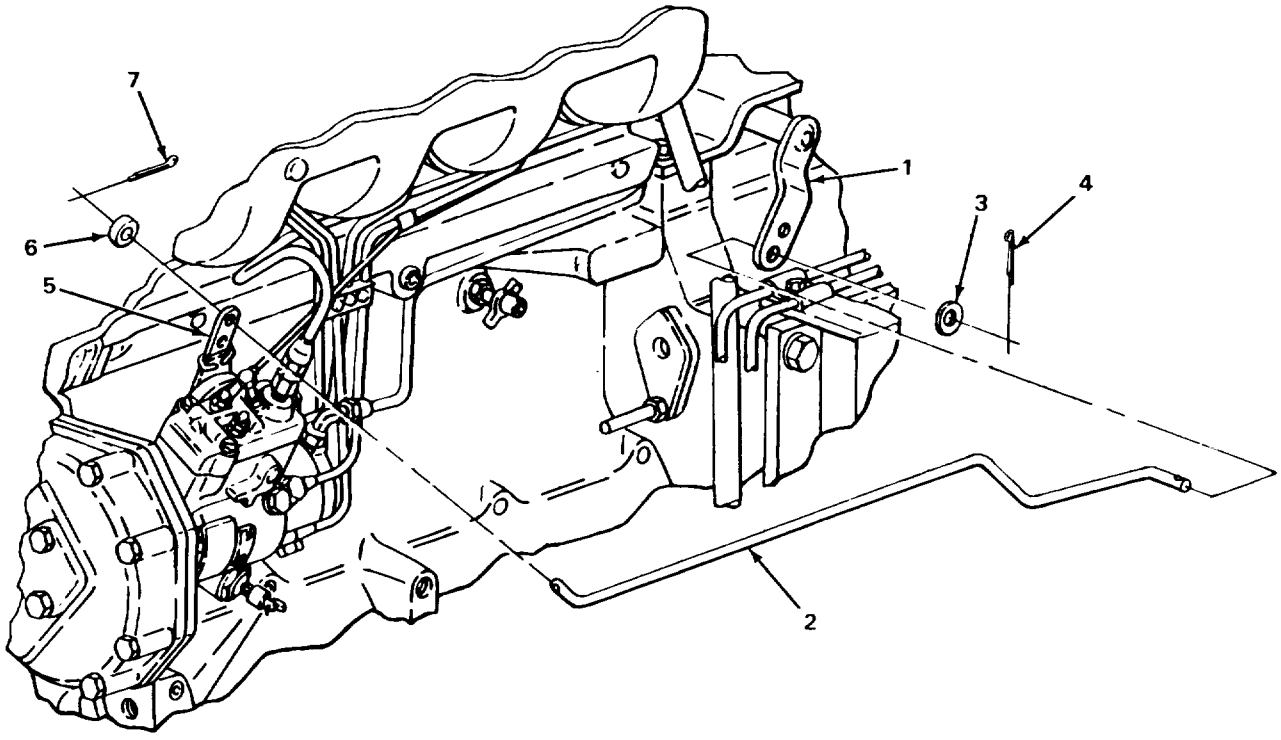
Replace defective parts as needed.



SPEED CONTROL ROD - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSPECTION/REPLACEMENT - CONTINUED		
8.	All parts	Look for cracks, abnormal bends, and breaks.
INSTALLATION		
9. Shaft (1)	Rod (2)	Place in position. **Rod Is Installed in shaft bottom hole.**
10. Rod (2) and shaft (1)	Washer (3)	Slide on.
11. Rod (2) and washer (3)	New cotter pin (4)	a. Place in position. b. Using slip-joint pliers, bend ends back.
12. Lever (5)	Rod (2)	Place in position. **Rod is Installed In lever upper hole.**
13. Rod (2) and lever (5)	Washer (6)	Slide on.
14. Rod (2) and washer (6)	New cotter pin (7)	a. Place In position. b. Using slip-joint pliers, bend ends back.

SPEED CONTROL ROD - CONTINUED



TA242873

NOTE

FOLLOW-ON MAINTENANCE: Adjust accelerator pedal, foot accelerator rod, and speed control arms (page 2-328).

TASK ENDS HERE

FUEL SYSTEM PRIMING

This task covers:

Priming (page 2-340)

INITIAL SETUP:

Tools
Pliers, slip-joint
Wrench, open-end, 518-inch

Personnel Required
Two

LOCATION	ITEM	ACTION	REMARKS

NOTE

Before priming fuel system, make sure that there is fuel in fuel tank.

PRIMING

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Failure to observe these precautions could cause serious injury.

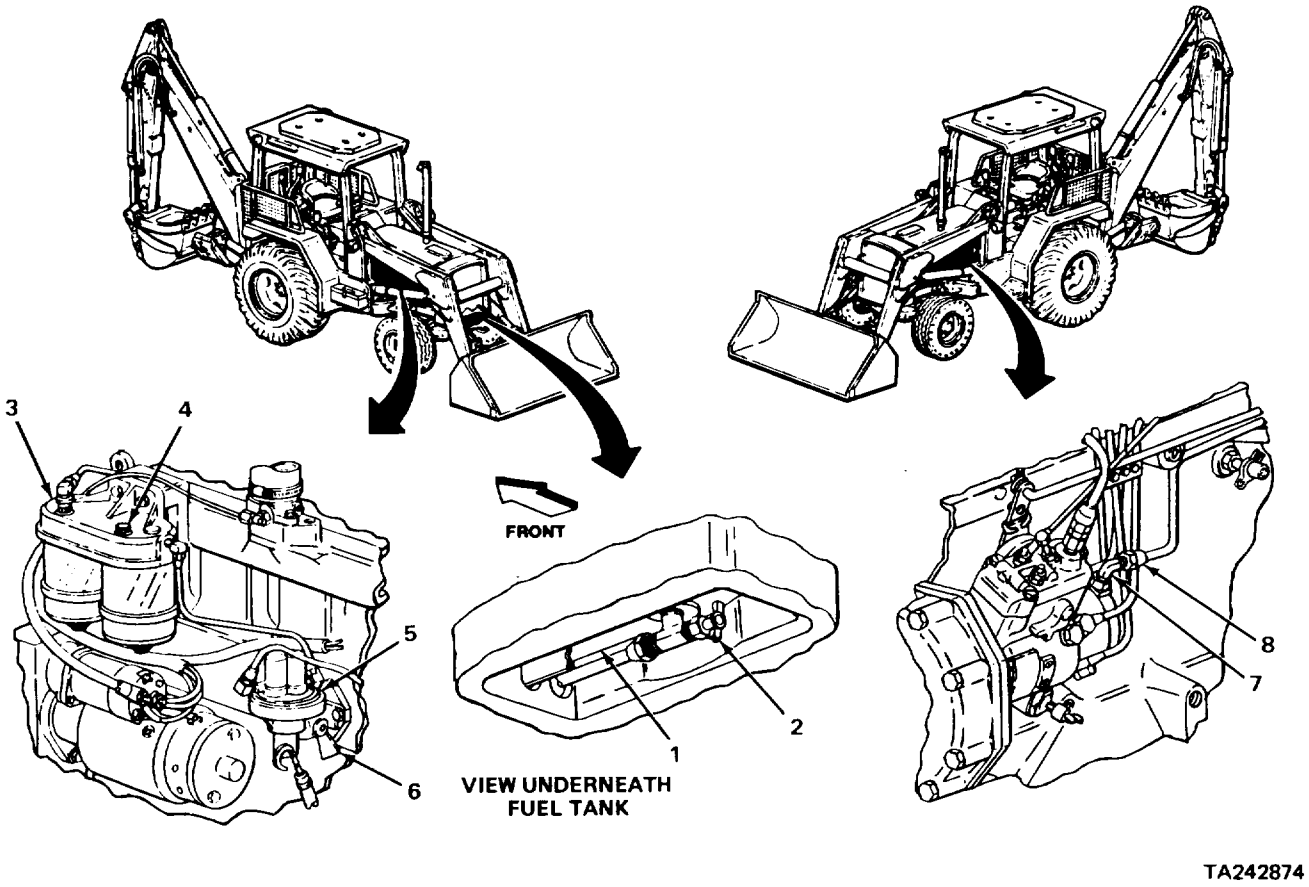
1.	Fuel tank (1)	Fuel shutoff valve (2)		If not already open, turn counterclockwise all the way to open.
2.	Fuel filter head (3)	Bleed plug (4)		Using slip-joint pliers, loosen.
3.	Fuel pump (5)	Primer lever (6)	a. b.	Move up and down until fuel comes out at bleed plug (4) without air bubbles. If no fuel comes out at bleed plug (4) crank engine using starter (TM 5-2420-222-10) and repeat step a. **Cranking engine will change position of fuel pump lobe on camshaft.**
4.	Fuel filter head (3)	Bleed plug (4)		Tighten finger tight.

NOTE

If fuel system is being primed because fuel filter elements were changed, skip steps 5 thru 7.

FUEL SYSTEM PRIMING - CONTINUED

LOCATION		ITEM	ACTION REMARKS
5.	Elbow (7)	Fuel line (8)	Using 518-inch open-end wrench, loosen.
6.	Fuel pump (5)	Primer lever (6)	a. Have assistant move up and down until fuel comes out at fuel line (8) without air bubbles. b. Have assistant push down into stowed position.
7.	Elbow (7)	Fuel line (8)	Using 5/8-inch open-end wrench, tighten.
8.	Loader backhoe	Engine	Start and run at fast idle (TM 5-2420-222-10).
9.	Fuel filter head (3)	Bleed plug (4)	a. Check for leaks. b. If leaking, tighten by hand. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective parts as outline In Fuel Filter Assembly (page 2-277).



FUEL SYSTEM PRIMING - CONTINUED

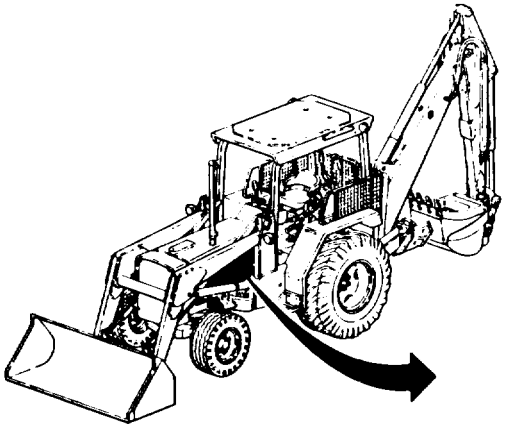
LOCATION	ITEM	ACTION REMARKS

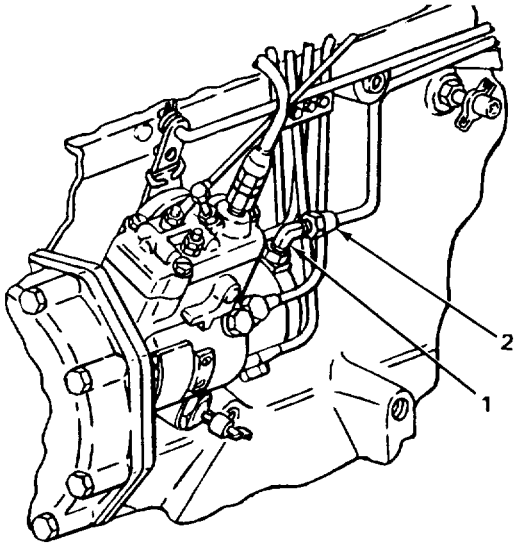
PRIMING - CONTINUED

WARNING

No open flames, welding, grinding, smoking, or use of heat producing devices permitted near fuel tank and fuel lines during maintenance unless the fuel tank has been cleaned and purged of all flammable liquids and vapors. Fuel burns easily and fumes are explosive. Failure to observe these precautions could cause serious injury.

10.	Elbow (1)	Fuel line (2)	a. Check for leaks. b. If leaking at any connection, using 5/8-inch open-end wrench, tighten. c. If leaking does not stop, shut down engine (TM 5-2420-222-10) and replace defective parts as outlined in Fuel Filter-to-Fuel Metering Pump Fuel line (page 2-292).
11.	Loader backhoe	Engine	If still running, shut down (TM 5-2420-222-10).





TA242875

Section X. EXHAUST SYSTEM

MUFFLER

This task covers:

a. Removal (page 2-344)
b. Cleaning (page 2-344)
c. Inspection/Replacement (page 2-344)
d. Installation (page 2-345)

INITIAL SETUP:

Tools
- Brush, wire
- Handle, hinged, 1/2-inch drive
- Handle, ratchet, 1/2-inch drive
- Socket, 1/2-inch drive, 1/2-inch
- Socket, 1/2-inch drive, 9116-inch
- Wrench, box, 1/2-inch
- Wrench, box, 9116inch

Materials/Parts
- Gasket, muffler
- Lockwasher, clamp screw nut (two required)
- Lockwasher, muffler screw nut

Personnel Required
- One

Equipment Condition
- Hood removed (page 2-1025)

MUFFLER - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Exhaust system parts become very hot when engine is running. Allow time for parts to cool before working on exhaust system. Hot exhaust system parts will cause serious burns.

1.	Two clamps (1)	Two screws (2), nuts (3), and lockwashers (4)	a. Using 1/2-inch box wrench, 1/2-inch, 1/2-inch drive socket, and hinged handle, unscrew and take off. b. Get rid of lockwashers (4).
2.	Muffler (5) and exhaust manifold (6)	Two clamps (1)	Take off.
3.		Screw (7), nut (8), lockwasher(9), and spacer (10)	a. Using 9/16-inch box wrench, 9/16-inch, 112-inch drive socket, and hinged handle, unscrew and take off. b. Get rid of lockwasher (9).
4.	Exhaust manifold (6)	Muffler (5) and gasket (11)	a. Take off. b. Get rid of gasket (11).

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

5.		All metal parts	Using wire brush, clean off dirt, loose rust, and scale.

INSPECTION/REPLACEMENT

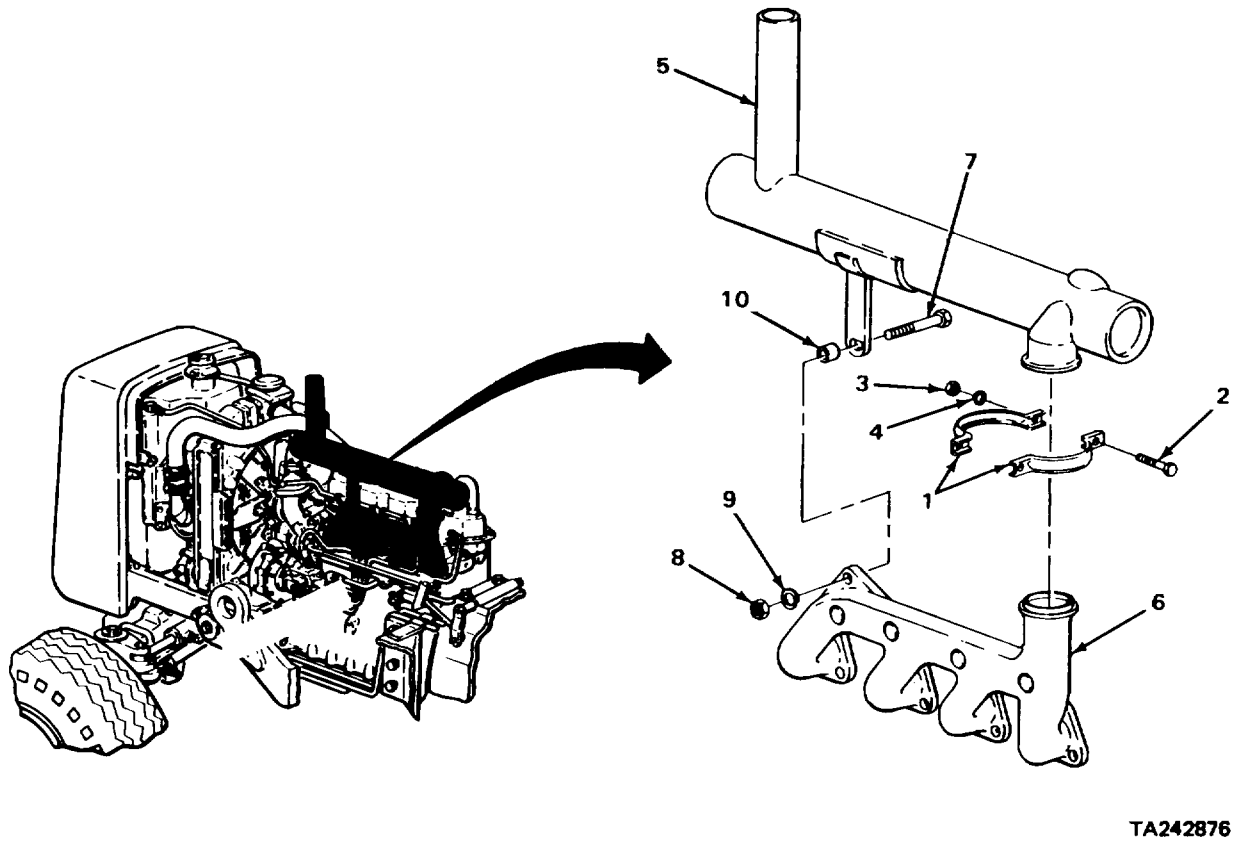
NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

MUFFLER - CONTINUED

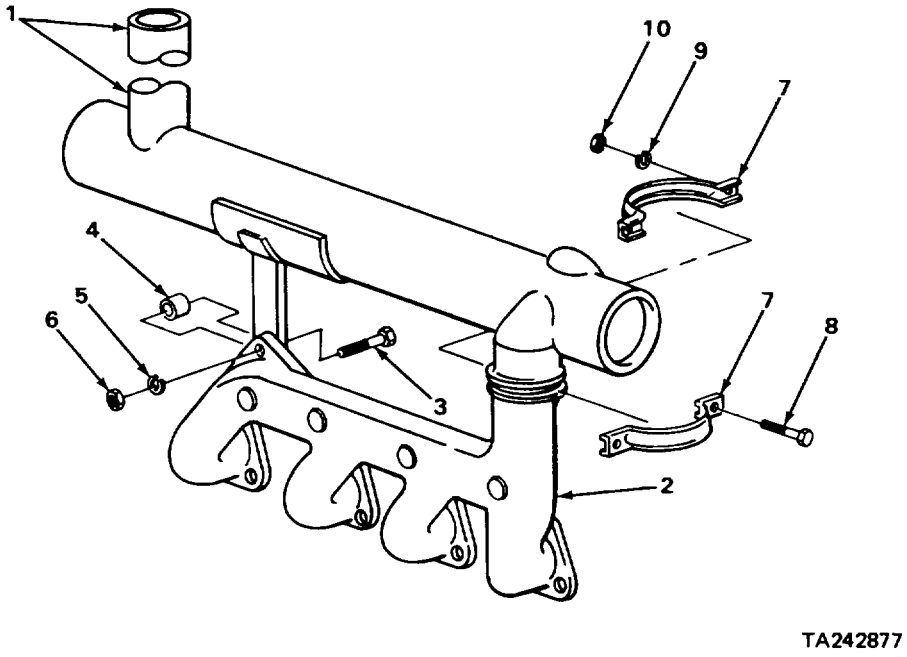
LOCATION	ITEM	ACTION / REMARKS
6.	All metal parts	Look for cracks, breaks, abnormal bends, and rust through. **Rust on exhaust system parts is permitted if there is solid metal underneath.**
7.	All threaded parts	Look for damaged threads.
8.	Muffler (5)	a. Look for holes. b. Look for dents and bends which could restrict exhaust flow.
INSTALLATION		
9. Exhaust manifold (6)	Muffler (5) and new gasket (11)	Put in place.



TA242876

MUFFLER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
10. Muffler (1) and	Screw (3), spacer exhaust manifold (2) (5), and nut (6)	Screw together part way. (4), new lockwasher
11.	Two clamps (7)	Put in place.
12. Two clamps (7)	Two screws (8), new lockwashers (9), and nuts (10)	Screw together and tighten using 1/2-inch box wrench, 1/2-inch, 1/2-inch drive socket, and ratchet handle.
13. Muffler (1) and exhaust manifold (2)	Screw (3) and nut (6)	Using 9/16-inch box wrench, 9116-inch, 1/2-inch drive socket, and ratchet handle, tighten.



TA242877

NOTE

FOLLOW-ON MAINTENANCE: Install hood (page 2-1025).

TASK ENDS HERE

TA242877

MUFFLER EXTENSION STACK ASSEMBLY

This task covers:

a. **Removal (page 2-347)**
b. Disassembly (page 2-348)
c. Cleaning (page 2-348)
d. **Inspection/Replacement (page 2-348)**
e. Assembly (page 2-349)
f. Installation (page 2-350)

INITIAL SETUP:

Tools
Brush, wire
Handle, hinged, 1/2-inch drive
Handle, ratchet, 1/2-inch drive
Socket, 1/2-inch drive, 112-inch
Socket, 1/2-inch drive, 9/16-inch
Wrench, box, 9/16-inch

Materials/Parts
Lockwasher, stack clamp screw nut

Personnel Required
One

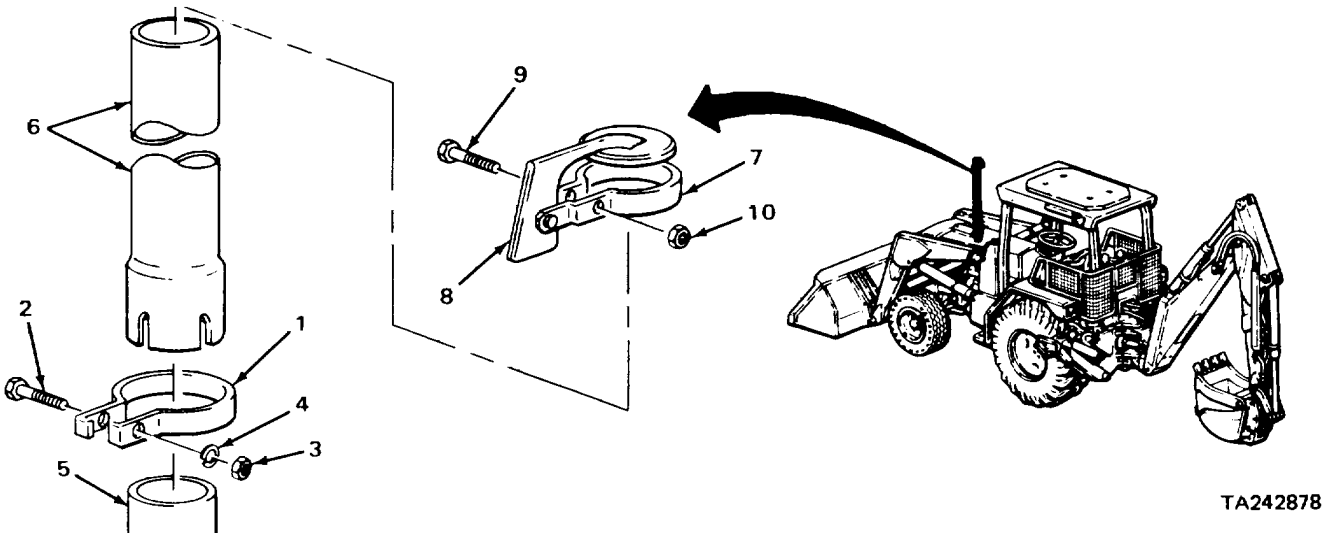
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Exhaust system parts become very hot when engine Is running. Allow time for parts to cool before working on exhaust system. Hot exhaust system parts will cause serious burns.

1.	Clamp (1)	Screw (2), nut (3) and lockwasher (4)	a. Using 9/16-inch box wrench, 9116-inch, 1/2-inch drive socket, and hinged handle, unscrew and take apart. b. Get rid of lockwasher.

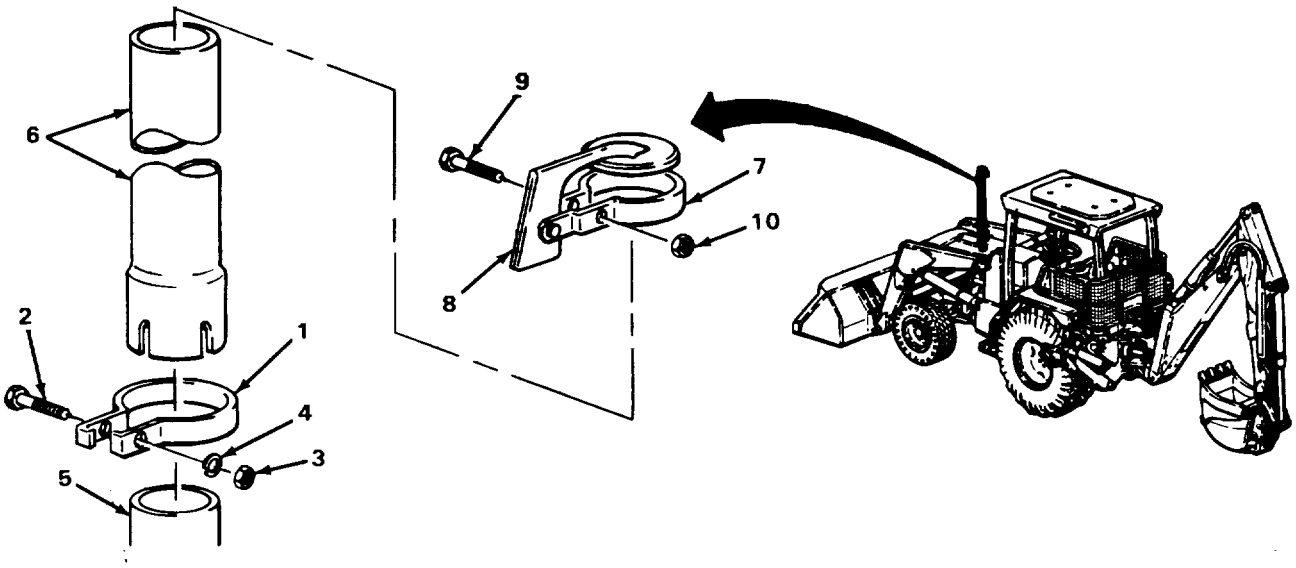


MUFFLER EXTENSION STACK ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL- CONTINUED		
2. Muffler (5)	Extension (6) with assembled clamp (1)	Take off.
3. Extension (6)	Clamp (1)	Take off.
DISASSEMBLY		
4. Clamp (7) and assembled cover (8)	Screw (9) and nut (10)	Using 1/2-inch, 112-inch drive socket and ratchet handle, unscrew and take apart.
5. Extension (6)	Clamp (7) with assembled cover (8)	Take off.
CLEANING		
	NOTE	
	For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
6.	All metal parts	Using wire brush, clean off dirt, loose rust, and scale.
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
7.	All metal parts	Look for cracks, breaks, abnormal bends, and rust through. **Rust on exhaust system parts is permitted if there is solid metal underneath.**
8.	All threaded parts	Look for damaged threads.

MUFFLER EXTENSION STACK ASSEMBLY - CONTINUED

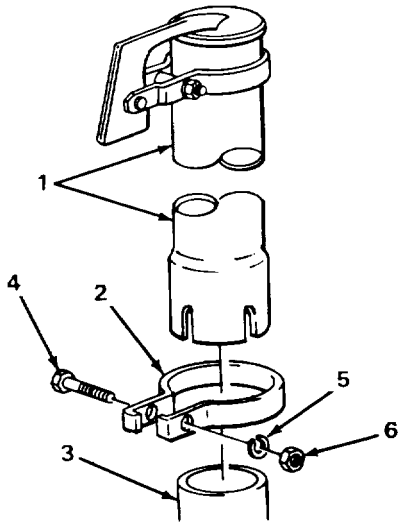
LOCATION	ITEM	ACTION REMARKS
9.	Extension (6)	a. Look for holes. b. Look for dents and bends which could restrict exhaust flow.
10. Clamp (7)	Cover (8)	Look for binding.
ASSEMBLY		
11. Extension (6)	Clamp (7) and assembled cover (8)	Put on.
12 Clamp (7)	Screw (9) and nut (10)	Screw together and tighten using 1/2-inch, 1/2-inch drive socket and ratchet handle.



TA242879

MUFFLER EXTENSION STACK ASSEMBLY - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION		
13. Extension (1)	Clamp (2)	Put on and slide above slots.
14. Muffler (3)	Extension (1) with assembled clamp (2)	a. Put on. b. Push down until seated.
15. Extension (1)	Clamp (2)	Slide into place.
16. Clamp (2)	Screw (4), new lockwasher (5), and nut (6)	Screw together and tighten using 9/16-inch box wrench, 9/16-inch, 1/2-inch drive socket, and ratchet handle.



TA242880

TASK ENDS HERE

Section XI. COOLING SYSTEM

COOLING SYSTEM

This task covers:

a. **Draining (page 2-352)**
b. **Cleaning (page 2-354)**
c. **Filling (page 2-354)**

INITIAL SETUP:

Tools
- Container, 5gallon
- Hose, rubber (Appendix D)
- Pliers, slip-joint
- Screwdriver, flat-tip, 3/16-inch
- Wrench, open-end, 5/16-inch

Materials/Parts
- Antifreeze (item 3, Appendix C)
- Rags, wiping (item 21, Appendix C)

Personnel Required
- One

Equipment Condition
- Left side grille removed (TM 5-2420-222-10)

COOLING SYSTEM - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DRAINING		
1. Hood (1)	Cover (2)	Open.

WARNING

Be careful when removing radiator cap. If engine is hot, escaping steam could burn you. Use a rag to cover radiator cap to protect your hand. Unscrew cap just enough to allow any built-up steam to escape. When all pressure has been relieved, unscrew cap the rest of the way, and take it off of radiator.

2.	Radiator (3)	Radiator filler opening cap (4)	a. Using rags over cap (4), unscrew. b. Push down, unscrew and take off.

WARNING

Draining hot cooling system is not recommended. If coolant must be drained with engine hot, use gloves to protect against hot coolant. Severe burns could result.

NOTE

If drained coolant Is not contaminated, save it for later use. If it is contaminated, get rid of it and use new coolant.

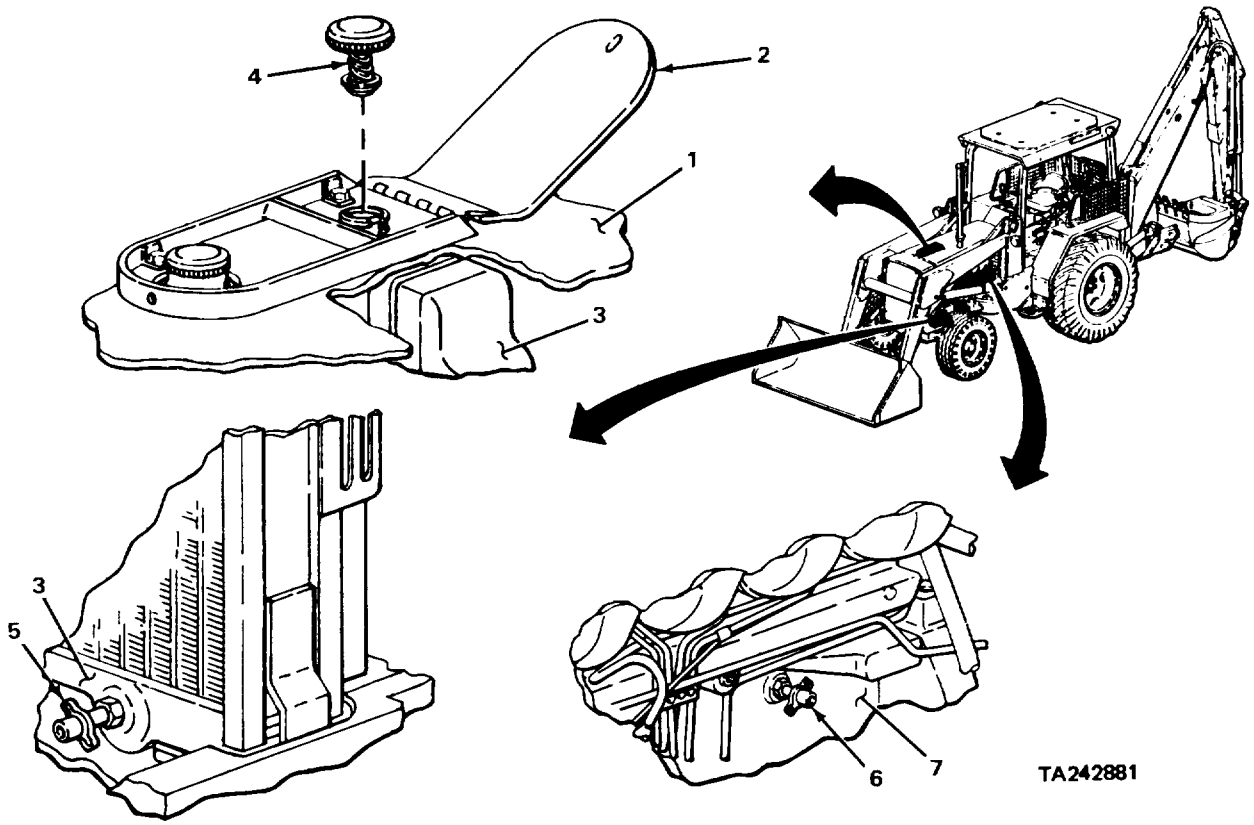
3.	Radiator (3)	Draincock (5)	a. Put 5-gallon container underneath. b. Push on rubber hose. c. Put other end of rubber hose Into 5-gallon container. d. If necessary, using slip-joint pliers, turn counterclockwise to loosen. e. Turning counterclockwise, open all the way. f. Drain coolant into 5-gallon container. g. Turn clockwise until seated to close. h. Take off rubber hose.

NOTE

If loader backhoe Is equipped with engine coolant heater, skip step 4.

COOLING SYSTEM - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
4. Engine block (6)	Draincock (7)	a. Put 5-gallon container underneath. b. Push on rubber hose. c. Put other end of rubber hose Into 5-gallon container. d. If necessary, using slip-joint pliers, turn counterclockwise to loosen. e. Turning counterclockwise, open all the way. f. Drain coolant into 5-gallon container. g. Turn clockwise until seated to close. h. Take off rubber hose.

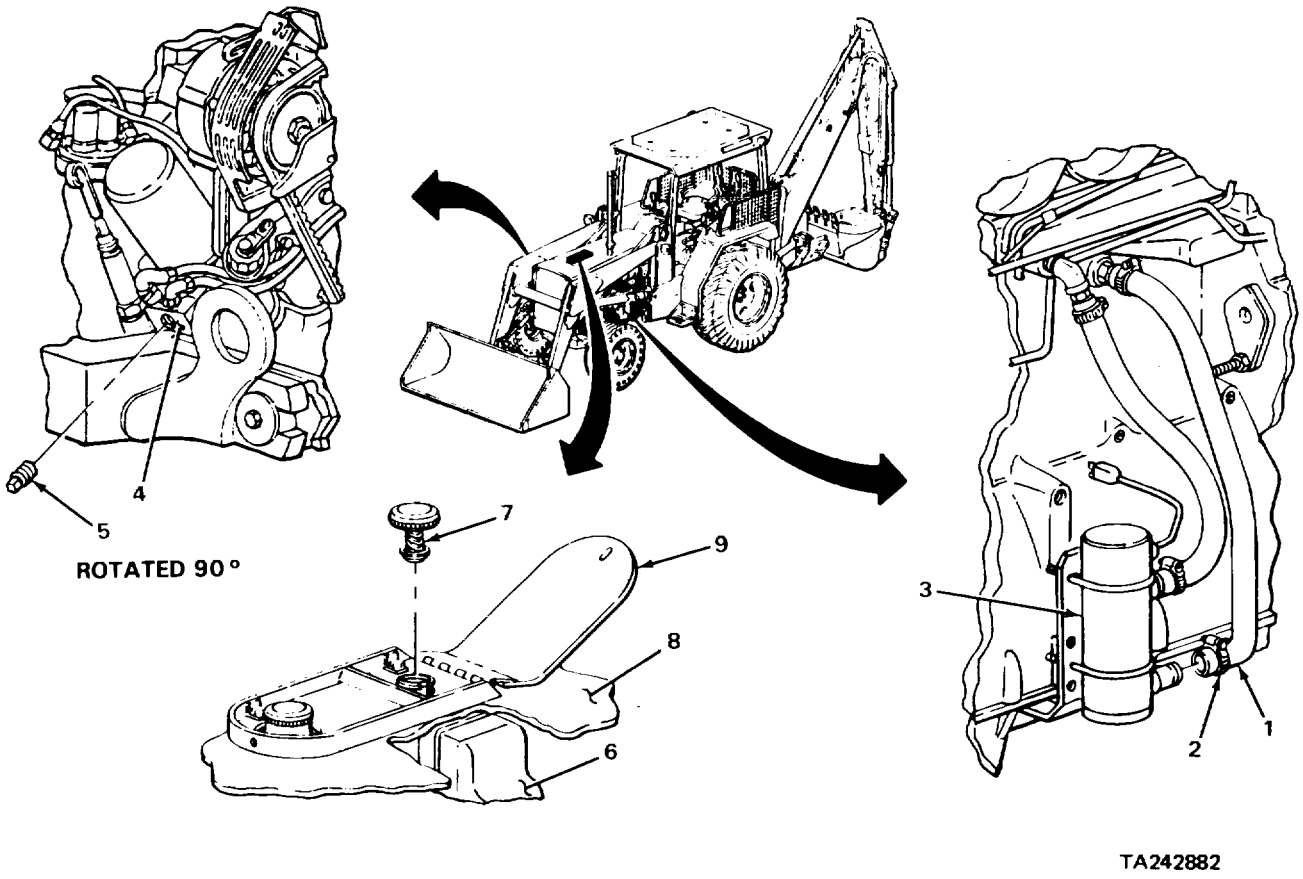


COOLING SYSTEM - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DRAINING - CONTINUED		
	NOTE	
	If loader backhoe is not equipped with engine coolant heater, skip steps 5 thru 7.	
5. Lower hose (1)	Clamp (2)	a. Put 5-gallon container underneath. b. Using 3116-inch inch flat-tip screwdriver, loosen.
6. Engine coolant heater (3)	Lower hose (1) with assembled clamp (2)	a. Pull off. b. Drain coolant into 5-gallon container. c. Place in position.
7. Lower hose (1)	Clamp (2)	Using 3/16-inch flat-tip screwdriver, tighten.
8. Oil cooler (4)	Plug (5)	a. Put 5-gallon container underneath. b. Using 5116-inch open-end wrench, unscrew and take out. c. Drain coolant into 5-gallon container. d. Screw in and tighten using 5116-inch open-end wrench. e. Get rid of or save drained coolant (page 2-137).
CLEANING		
9.	Cooling system	Clean (TM 750-254).
FILLING		
10. Engine Compartment	Radiator (6)	Fill with mixture of clean water and anti-freeze (TM 750-254). **Radiator should be filled to halfway point between radiator core and filler neck.**

COOLING SYSTEM - CONTINUED

LOCATION	ITEM	ACTION REMARKS
11. Radiator (6)	Radiator filler opening cap (7)	Screw on and tighten.
12. Hood (8)	Cover (9)	Close.



NOTE

FOLLOW-ON MAINTENANCE: Install left side grille (TM 5-2420-222-10).

TASK ENDS HERE

TA242882

ENGINE COOLANT HEATER (OPTIONAL)

This task covers:

a. **Removal (page 2-356)**
b. **Disassembly (page 2-357)**
c. **Cleaning (page 2-358)**
d. **Inspection/Replacement (page 2-358)**
e. **Assembly (page 2-359)**
f. **Installation (page 2-359)**

INITIAL SETUP:

Tools
- Container, 5-gallon
- Extension, 3/8-inch drive, 5-inch
- Handle, ratchet, 3/8-inch drive
- Screwdriver, flat-tip, 3/16-inch
- Socket, 3/8-inch drive, 9/16-inch
- Socket, deep, 3/8-inch drive, 1/2-inch

Materials/Parts
- Lockwasher, oil pan screw (two required)
- Rags, wiping (item 21, Appendix C)
- Solvent, drycleaning (item 28, Appendix C)

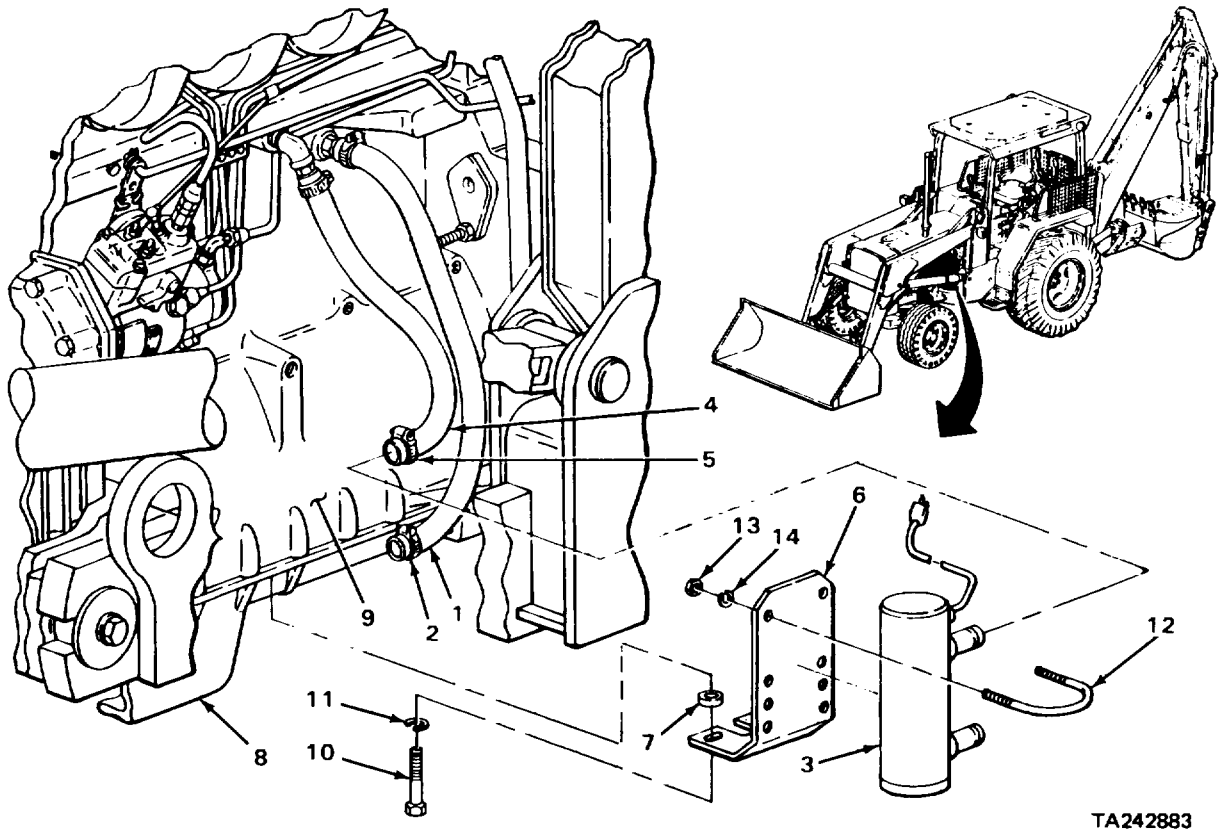
Personnel Required
- One

Equipment Condition
- Radiator drained (page 2-368)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Lower hose (1)	Clamp (2)	a. Put 5-gallon container underneath to catch draining coolant. b. Using 3/16-inch flat-tip screwdriver, loosen.	
2. Engine coolant heater (3)	Lower hose (1) with assembled clamp (2)	a. Pull off. b. Drain coolant into 5-gallon container. c. Get rid of drained fluid (page 2-137).	
3. Upper hose (4)	Clamp (5)	Using 3/16-inch flat-tip screwdriver, loosen.	
4. Engine coolant heater (3)	Upper hose (4) with assembled clamp (5)	Pull off	
5. Bracket (6), two spacers (7), oil pan (8), and engine block (9)	Two screws (10) and lockwashers (11)	a. Using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out. b. Get rid of lockwashers (11).	

ENGINE COOLANT HEATER (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION REMARKS
6. Oil pan (8)	Bracket (6) with assembled engine coolant heater (3) and two spacers (7)	Take off.
DISASSEMBLY		
7. Engine coolant heater (3) and bracket (6)	Two U-bolts (12), four nuts (13), and washers (14)	Using 112-inch, 3/8-inch drive deep socket and ratchet handle, unscrew and take apart.
8. Bracket (6)	Engine coolant heater (3)	Take off.



ENGINE COOLANT HEATER (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

9.	Engine coolant heater (1)	a. Using clean rag dampened with dry-cleaning solvent, wipe clean. b. Using clean water, flush coolant passage. c. Using clean, dry rags, wipe dry. ML
10.	All other parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

11.	All metal parts	Look for cracks, breaks, bends, and corrosion damage.
12.	All threaded parts	Look for damaged threads.
13.	Engine coolant heater (1)	a. Look for dents and excess build-up of deposits which would restrict coolant flow. b. Look at cord for cracks, bare wires, and loose or damaged plug.

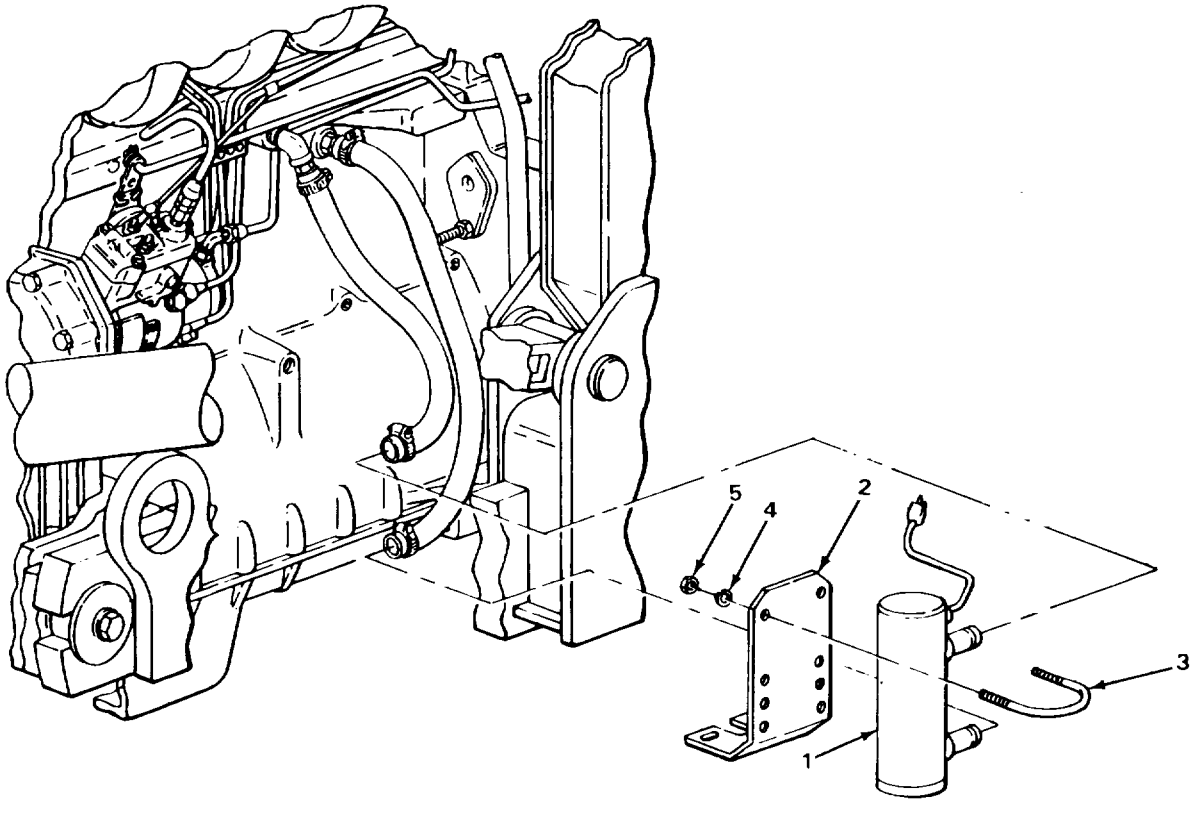
ENGINE COOLANT HEATER (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ASSEMBLY		
14. Bracket (2)	Engine coolant heater (1)	Put on.
15. Engine coolant heater (1) and bracket (2)	Two U-bolts (3), four washers (4), and nuts (5)	Screw together and tighten using 1/2-inch, 3/8-inch drive deep socket and ratchet handle.
INSTALLATION		

NOTE

If installing engine coolant heater on loader backhoe from which one has been removed, skip steps 16 and 17.

16.	Engine compartment	Engine coolant heater hoses and fittings	Install (page 2-362).

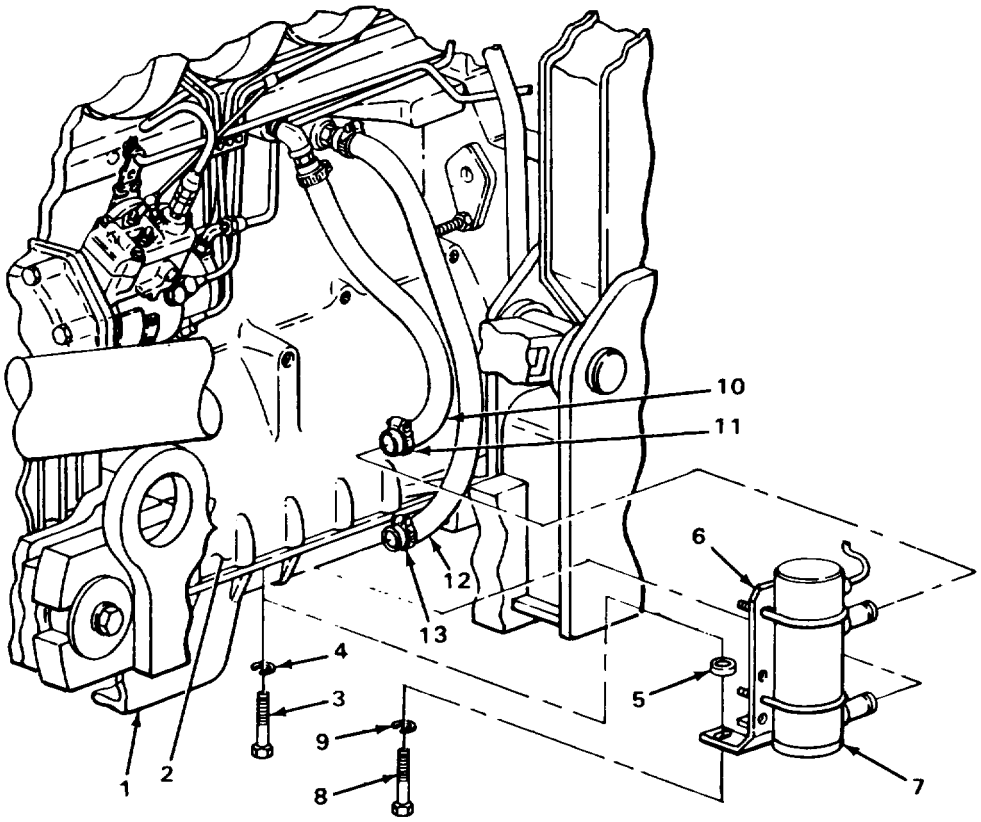


TA242884

ENGINE COOLANT HEATER (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
17. Oil pan (1) and engine block (2)	Two screws (3) and lockwashers (4)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of.
18. Oil pan (1)	Two spacers (5) and bracket (6) with assembled engine coolant heater (7)	Put on.
19. Bracket (6), spacers (5), oil pan (1), and engine block (2)	Two screws (8) and new lockwashers (9) and ratchet handle.	Screw in and tighten using 9/16-inch, 3/8-inch drive socket, 5-inch extension,
20. Engine coolant heater (7)	Upper hose (10) with assembled clamp (11)	Push on.
21. Upper hose (10)	Clamp (11)	Using 3/16-inch flat-tip screwdriver, tighten.
22. Engine coolant heater (7)	Lower hose (12) with assembled clamp (13)	Push on.
23. Lower hose (12)	Clamp (13)	Using 3116-inch flat-tip screwdriver, tighten.

ENGINE COOLANT HEATER (OPTIONAL) - CONTINUED



TA242885

NOTE

FOLLOW-ON MAINTENANCE: Fill radiator (page 2-368).

TASK ENDS HERE

ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL)

This task covers:

a. Removal (page 2-362)
b. Disassembly (page 2-364)
c. Cleaning (page 2-364)
d. Inspection/Replacement (page 2-364)
e. Assembly (page 2-365)
f. Installation (page 2-366)

INITIAL SETUP:

Tools
Container, 5-gallon
Key, socket-head screw, 114-inch
Screwdriver, flat-tip, 3/16-inch
Vise, machinist's
Wrench, open-end, 9116inch
Wrench, pipe, adjustable, 1/4 to 1-inch

Materials/Parts
Detergent, GP (item 7, Appendix C)

Materials/Parts - Continued
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

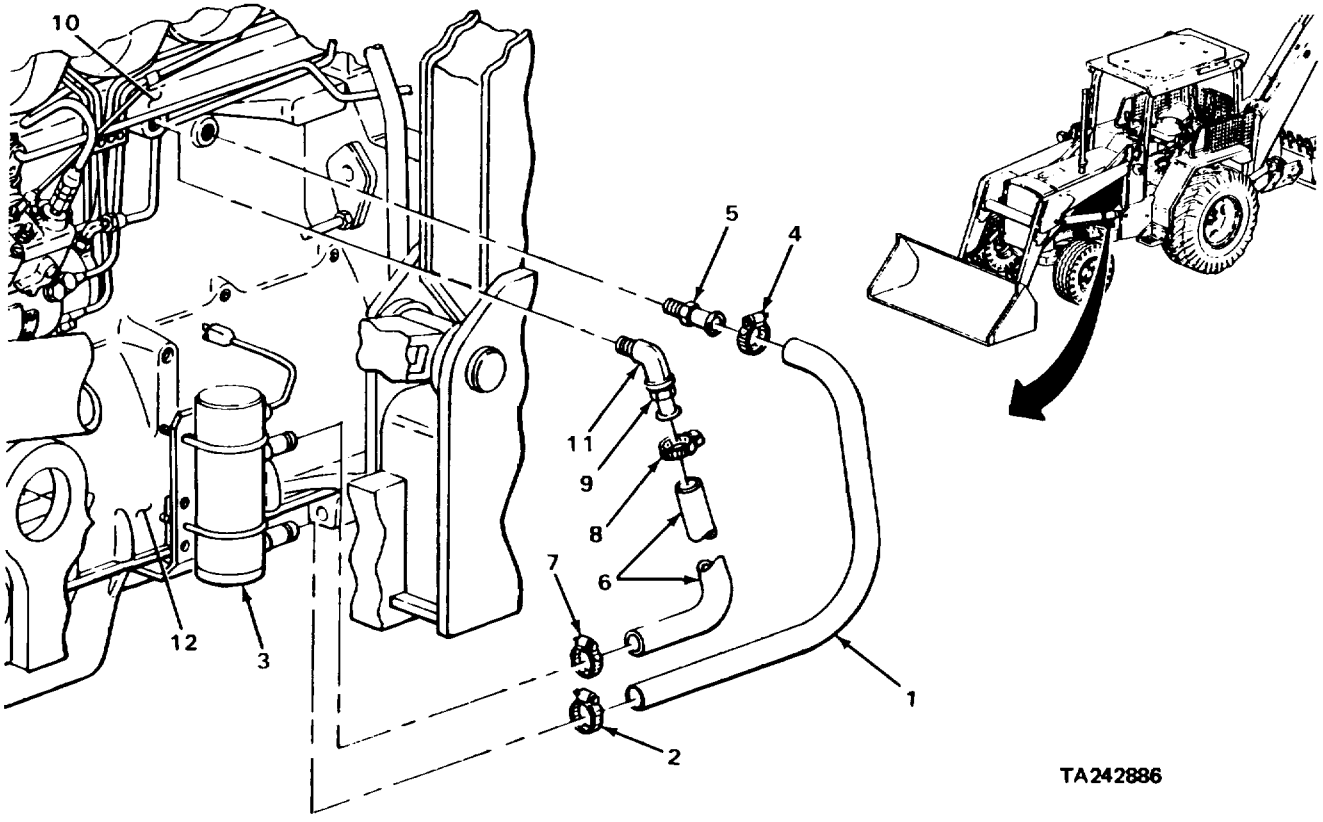
Personnel Required
One

Equipment Condition
Radiator drained (page 2-368)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Lower hose (1)	Clamp (2)	a. Put 5-gallon container underneath to catch draining coolant. b. Using 3116-inch flat-tip screwdriver, loosen.	
2. Engine coolant heater (3) clamp (2)	Lower hose (1) with assembled	a. Pull off. b. Drain coolant into 5-gallon container. c. Get rid of drained coolant (page 2-137).	
3. Lower hose (1)	Clamp (4)	Using 3/16-inch flat-tip screwdriver, loosen.	
4. Tube nipple (5)	Lower hose (1) with assembled two clamps (2 and 4)x	Pull off.	

ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION REMARKS
5. Upper hose (6)	Two clamps (7 and 8)	Using 3/16-inch flat-tip screwdriver, loosen.
6. Engine coolant heater (3) and tube nipple (9)	Upper hose (6) with assembled two clamps (7 and 8)	Pull off.
7. Upper hose (6) and lower hose (1)	Four clamps (2, 4, 7, and 8)	Slide off.
8. Cylinder head (10)	Elbow (11) with assembled tube nipple (9)	Using 114 to 1-inch adjustable pipe wrench, unscrew and take out.
9. Engine block (12)	Tube nipple (5)	Using open-end wrench, unscrew and take

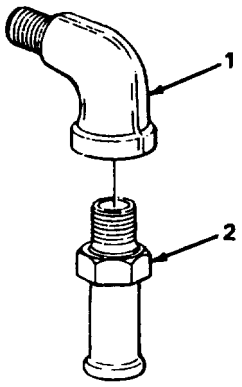


ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL) - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DISASSEMBLY		
10. Elbow (1)	Tube nipple (2)	a. Secure elbow (1) in machinist's vise. b. Using open-end wrench, unscrew and take out. c. Remove elbow (1) from machinist's vise.
CLEANING		
	NOTE For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).	
	WARNING Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 138°F (38° to 59°C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
11.	All metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
12.	All hoses	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	

ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL) - CONTINUED

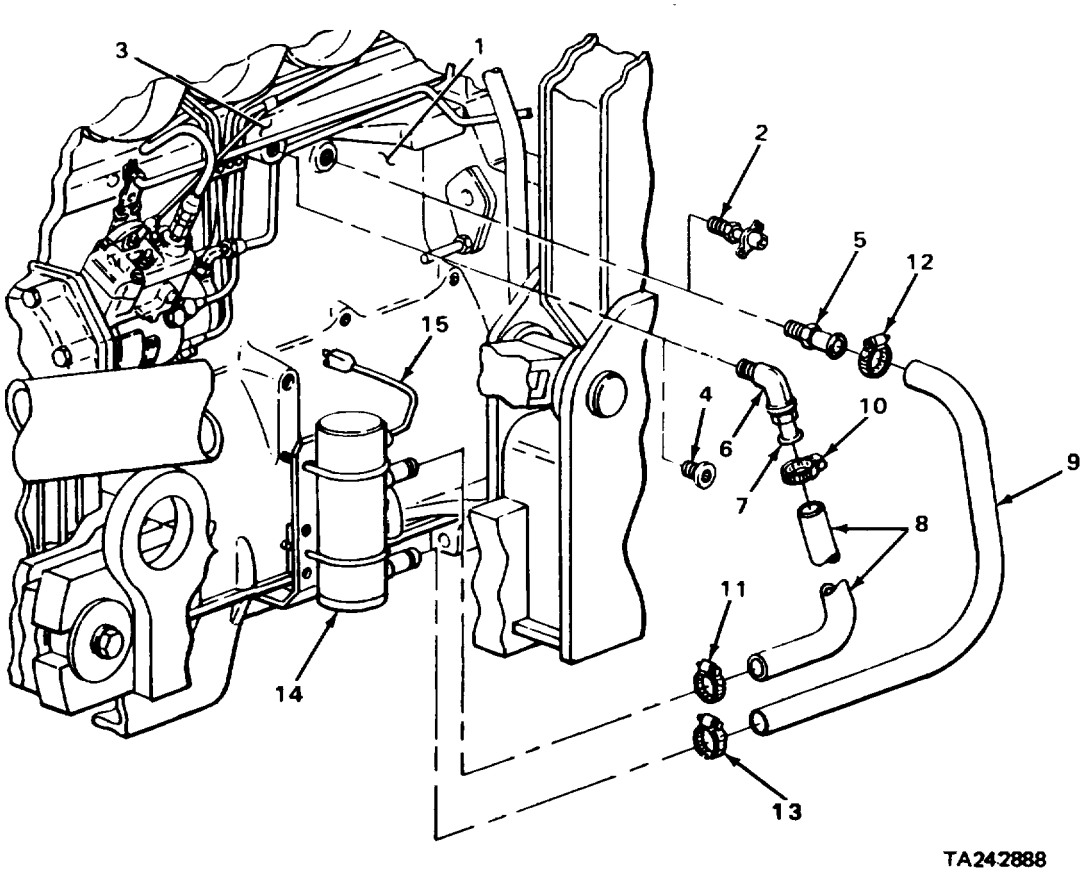
LOCATION	ITEM	ACTION REMARKS
12.	All hoses	Look for swelling, cracking, hardening, and separation inside and outside.
14.	All metal parts	Look for cracks, breaks, and corrosion damage.
15.	All threaded parts	Look for damaged threads.
ASSEMBLY		
16. Elbow (1)	Tube nipple (2)	a. Secure elbow (1) in machinist's vise. b. Screw in and tighten using open-end wrench. c. Remove elbow (1) from machinist's vise.



ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL) - CONTINUED

	LOCATION	ITEM	ACTION REMARKS
	INSTALLATION		
		NOTE If installing engine coolant heater hoses and fittings on loader backhoe from which they have been removed, skip steps 17 and 18.	
17.	Engine block (1)	Draincock (2)	a. Using 9/16-inch open-end wrench, unscrew and take out. b. Get rid of.
18.	Cylinder head (3)	Plug (4)	a. Using 1/4-inch socket-head screw key, unscrew and take out. b. Get rid of.
19.	Engine block (1)	Tube nipple (5)	Screw in and tighten using open-end wrench.
20.	Cylinder head (3)	Elbow (6) with assembled tube nipple (7)-	Screw in and tighten using 1/4 to 1-inch adjustable pipe wrench.
21.	Upper hose (8) and lower hose (9)	Four clamps (10, 11, 12, and 13)	Slide on.
22.	Engine coolant heater (14) and tube nipple (7)	Upper hose (8) with assembled two clamps (10 and 11)	Push on.
23.	Upper hose (8)	Two clamps (10 and 11)	Using 3/16-inch flat-tip screwdriver, tighten.
24.	Engine coolant heater (14) and tube nipple (5)	Lower hose (9) with assembled two clamps (12 and 13)	Push on.
25.	Lower hose (9)	Two clamps (12 and 13)	Using 3/16-inch flat-tip screwdriver, tighten.
26.	Engine coolant heater (14)	Cord (15)	Tie up out of the way.

ENGINE COOLANT HEATER HOSES AND FITTINGS (OPTIONAL) - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Fill radiator (page 2-368).247

TASK ENDS HERE

RADIATOR DRAINING AND FILLING

This task covers:

a. Draining (page 2-368)
b. Filling (page 2-370)

INITIAL SETUP

Tools
Container, 5-gallon
Hose, rubber drain (Figure D-11, Appendix D)
Pliers, slip-joint

Materials/Parts
Antifreeze (item 3, Appendix C)
Rags, wiping (item 21, Appendix C)

Personnel Required
One

Equipment Condition

Left side grille removed (TM 5-2420-222-10)

LOCATION	ITEM	ACTION	REMARKS

DRAINING

1.	Hood (1)	Cover (2)	Open.	

WARNING

Be careful when removing radiator cap. If engine is hot, escaping steam could burn you. Use a rag to cover radiator cap to protect your hand. Unscrew cap just enough to allow any built-up steam to escape. When all pressure has been relieved, unscrew cap the rest of the way, and take it off of radiator.

2	Radiator (3)	Radiator filler opening cap (4)	a. Using rags over cap (4), unscrew. b. Push down, unscrew and take off.	

RADIATOR DRAINING AND FILLING - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

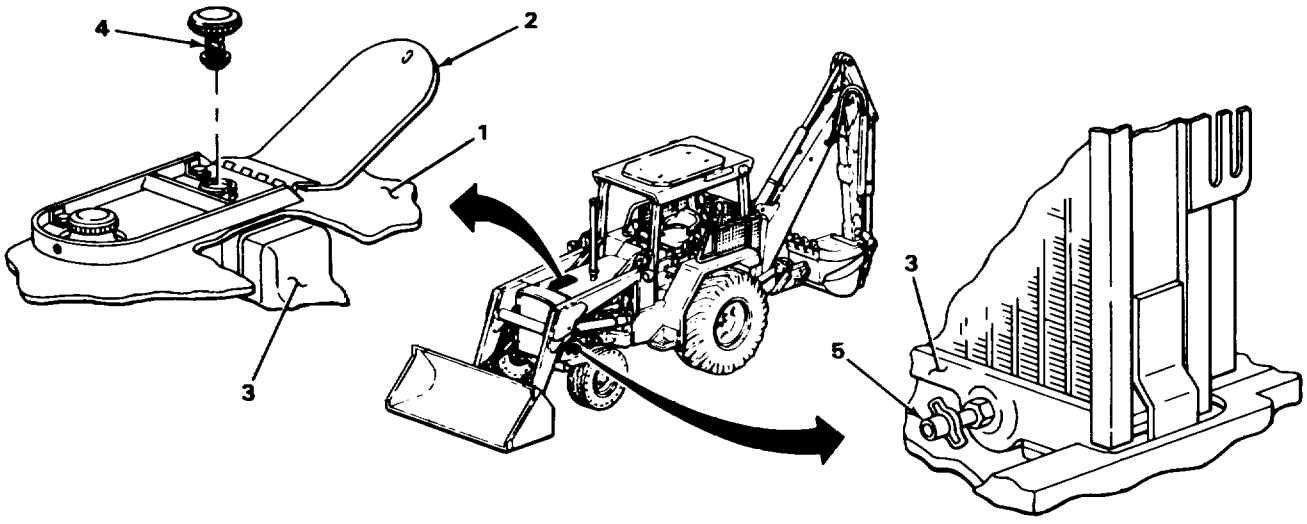
WARNING

Draining hot cooling system Is not recommended. If coolant must be drained with engine hot, use gloves to protect against hot coolant. Severe burns could result.

NOTE

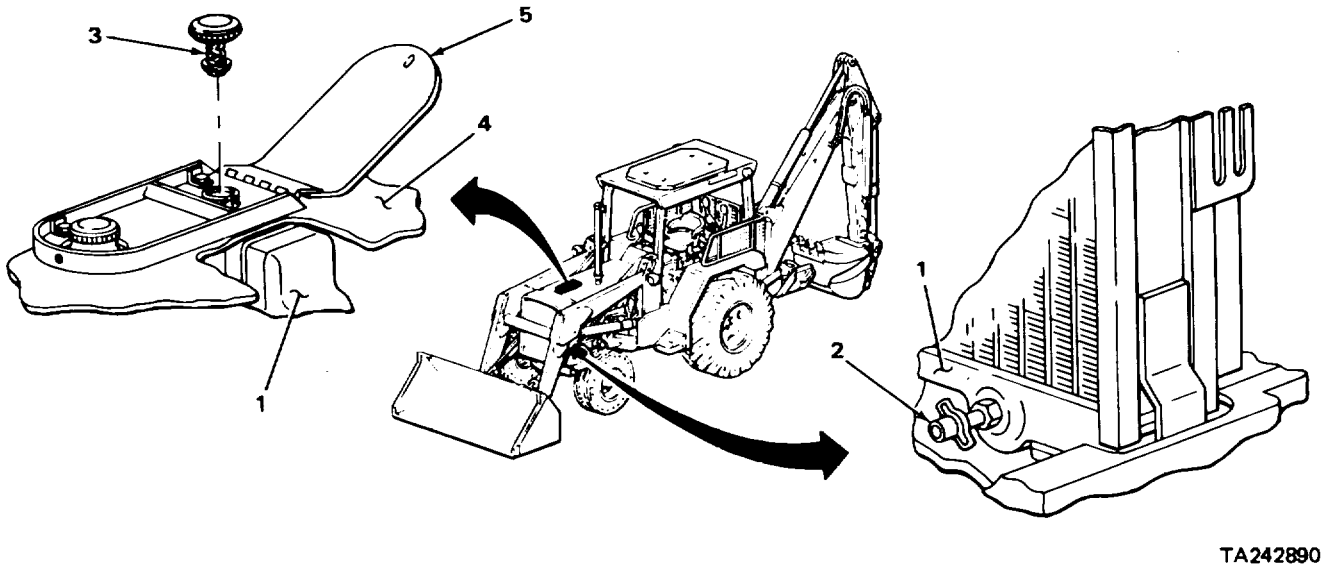
If drained coolant is not contaminated, save it for later use. If it is contaminated, get rid of it (page 2-137) and use new coolant.

3.	Radiator (3)	Draincock (5)	a. Put 5-gallon container underneath. b. Push on rubber hose. c. Put other end of rubber hose Into 5 gallon container. d. If necessary, using slip-joint pliers, turn counterclockwise to loosen. e. Turning counterclockwise, open all the way. f. Drain coolant into 5gallon container.



RADIATOR DRAINING AND FILLING - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
DRAINING - CONTINUED		
3. Radiator (1) Continued	Draincock (2)	g. Turn clockwise until seated to close. h. Take off rubber hose.
FILLING		
4. Engine compartment	Radiator (1)	Fill with mixture of clean water and anti-freeze (TM 750-254). **Radiator should be filled to half-way point between radiator core and filler neck.**
5. Radiator (1) opening cap (3)	Radiator filler	Screw on and tighten.
6. Hood (4)	Cover (5)	Close.



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NOTE

FOLLOW-ON MAINTENANCE: Install left side grille (TM 5-2420-222-10).

TASK ENDS HERE

RADIATOR

This task covers:

INITIAL SETUP

Tools
- Container, 1-gallon
- Extension, 3/8-inch drive, 5-inch
- Handle, ratchet, 3/8-inch drive
- Pan, drain
- Rule, steel, machinist's, 6inch
- Screwdriver, flat-tip, 3/16-inch
- Screwdriver, flat-tip, 7/32-inch, 1-inch blade
- Socket, 3/8-inch drive, 7116-inch
- Socket, 3/8-inch drive, 9/16-inch
- Socket, 3/8-inch drive, 3/4-inch
- Socket, deep, 3/8-inch drive, 9/16-Inch
- Vise, machinist's
- Wrench, box, 7/16-inch
- Wrench, open-end, 1/2-inch
- Wrench, open-end, 9116-inch

Materials/Parts
- Adhesive, metal bonding (item 1, Appendix C)
- Detergent, GP (item 7, Appendix C)

Materials/Parts - Continued
- Lockwasher, radiator stud nut (four required)
- Lockwasher, radiator tie rod nut
- Nut, special, radiator tie rod (two required)
- Rags, wiping (item 21, Appendix C)
- Solvent, cleaning compound (item 27, Appendix C)
- Solvent, drycleaning, (item 28, Appendix C)

Personnel Required
- Two

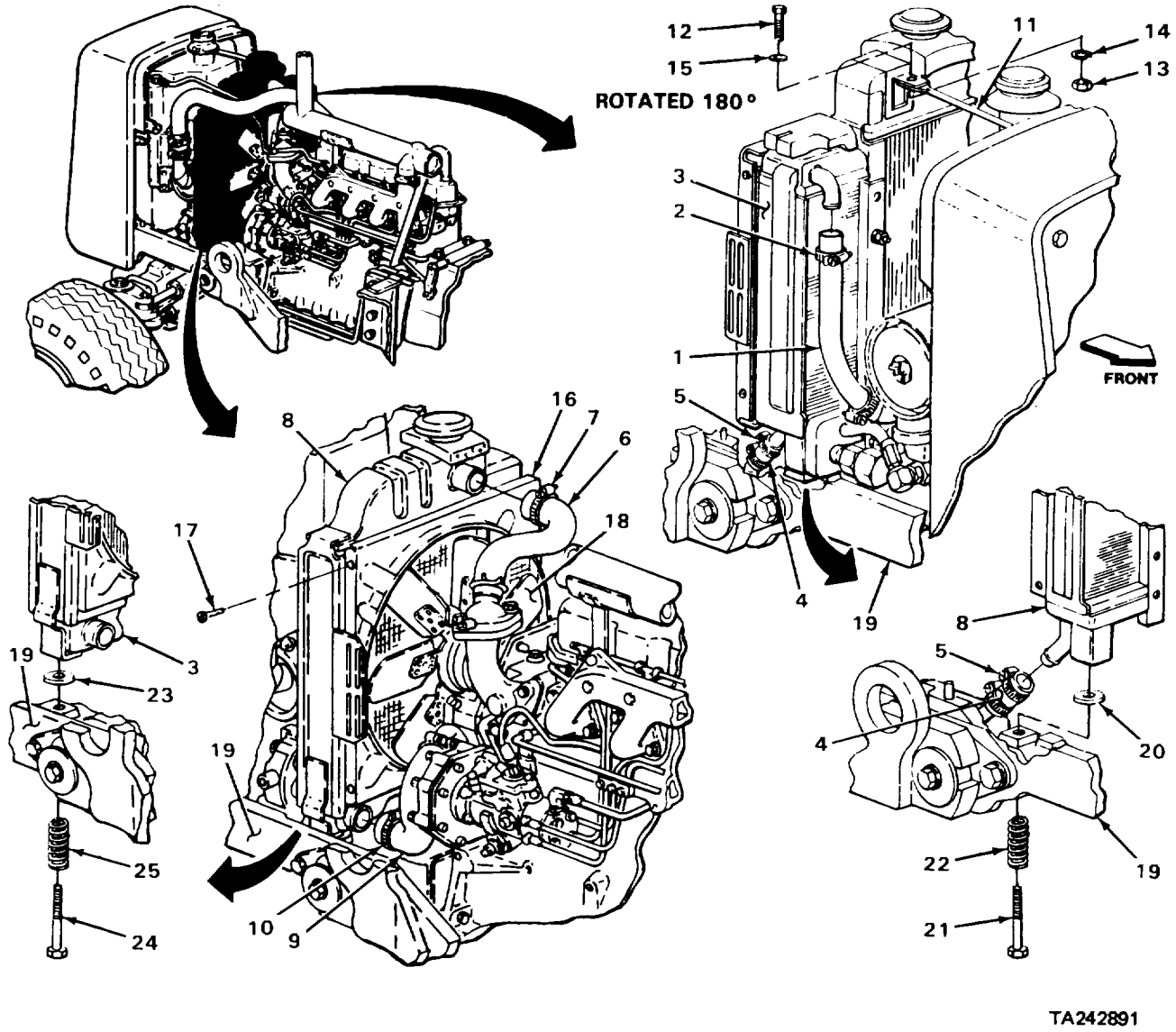
Equipment Condition
1. Air cleaner hoses and pipes removed (page 2-244)
2. Radiator drained (page 2-368)
3. Right side grille removed (TM 52420-222-10)
4. Leak-off cap-to-fuel tank fuel line removed (page 2-268)

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL		
1. Upper oil cooler hose (1)	Clamp (2)	a. Put drain pan underneath. b. Using 3/16-inch flat-tip screwdriver, loosen.
2. Oil cooler (3)	Upper oil cooler hose (1) with assembled clamp (2)	a. Pull off. b. Let oil drain into drain pan. c. Get rid of drained oil (page 2-137).
3. Lower oil cooler hose (4)	Clamp (5)	a. Put drain pan underneath. b. Using 3/16-inch flat-tip screwdriver, loosen.
4. Upper radiator hose (6)	Clamp (7)	Using 3/16-inch flat-tip screwdriver, loosen.
5. Radiator (8)	Upper radiator hose (6) with assembled clamp (7)	Pull off.
6. Lower radiator hose (9)	Clamp (10)	Using 1-inch long blade, 7/32-inch flat-tip screwdriver, loosen.
7. Radiator (8)	Lower radiator hose (9) with assembled clamp (10)	Pull off.
8. Tie rod (11) and radiator (8)	Screw (12), nut (13), lockwasher (14), and washer (15)	a. Using 7/16-inch box wrench, 7/16-inch, 3/8-inch drive socket, and ratchet handle, unscrew and take out. b. Get rid of lockwasher(14).
9. Radiator (8), oil cooler (3), and fan shroud (16)	Four screws (17)	Using 3/16-inch flat-tip screwdriver, unscrew and take out.
10. Radiator (8) and oil cooler (3)	Fan shroud (16)	Take off.
11. Fan (18)	Fan shroud (16)	Hang on.
12. Front support (19), rubber washer (20), and radiator (8)	Screw (21) with assembled spring (22)	Using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, unscrew and take out.
13. Screw (21)	Spring (22)	Take off.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
14. Front support (19), rubber washer (23), and oil cooler (3)	Screw (24) with assembled spring (25)	Using 9116-inch, 318-inch drive socket and ratchet handle, unscrew and take out.	
15. Screw (24)	Spring (25)	Take off.	



RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL - CONTINUED		
16. Front support (1), two rubber washers (2 and 3), and lower oil cooler hose (4)	Radiator (5) with assembled oil cooler (6)	a. Take out. b. Let oil from oil cooler drain into 1-gallon container. c. Get rid of oil (page 2-137).
17. Fan (7)	Fan shroud (8)	Take off.

NOTE

If removing radiator to access fan shroud, skip steps 18 thru 46.

18. Front support (1)	Two rubber washers (2 and 3)	Take off.

WARNING

Water soluble cleaning compound solvent is flammable and fumes are toxic. Flashpoint is 220°F (104°C). Boiling point is 212°F (100°C). Do not store in temperatures above 150°F (65°C) or below 35°F (20C). Do not use near open flame or excessive heat. Do not wear jewelry, wear rubber gloves and goggles, and use only in well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapors. Avoid contact with acids, aluminum, or zinc; chemical reaction may result. If you become dizzy while using cleaning compound solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

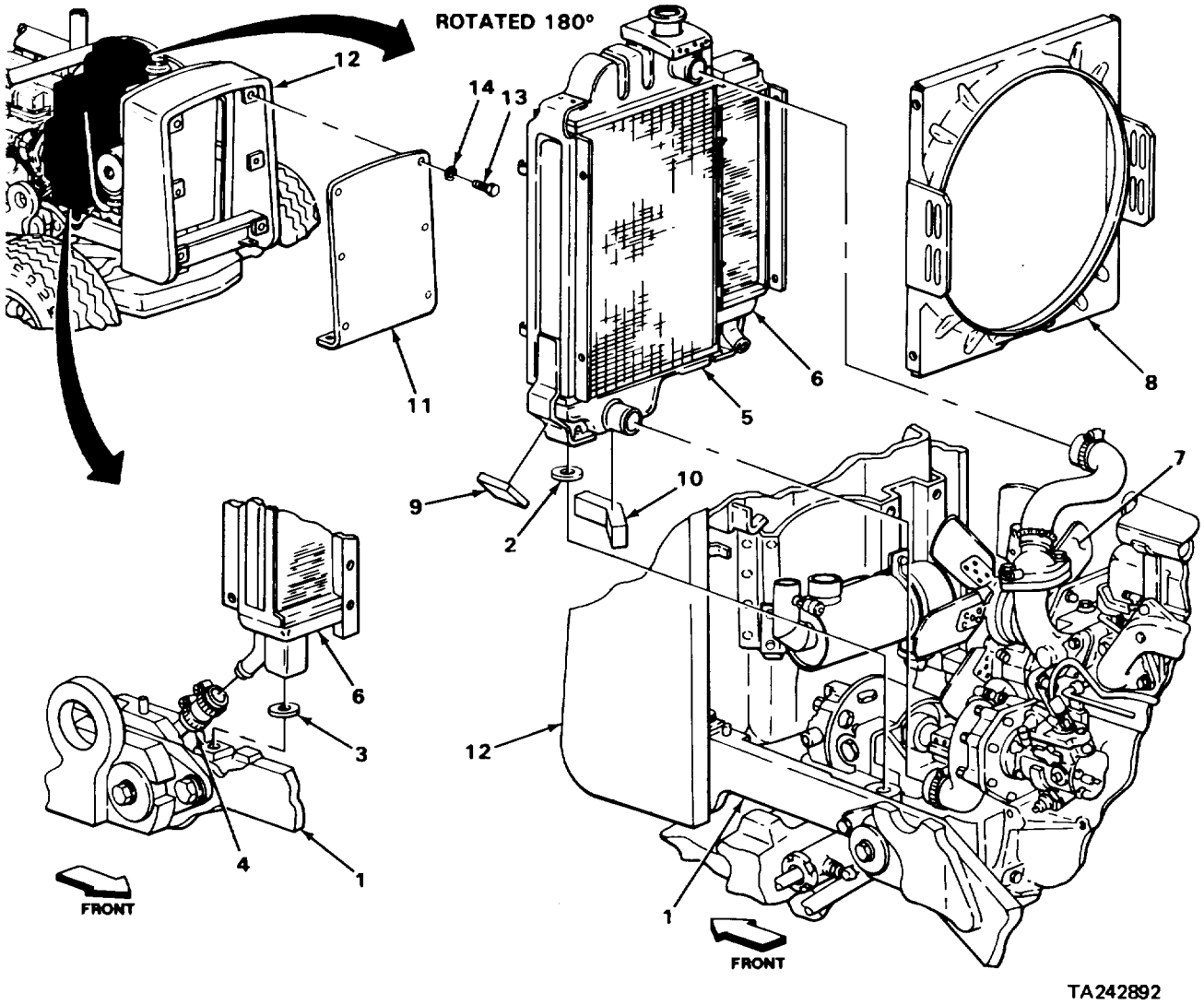
CAUTION

Do not remove packing and baffle unless inspection shows need for replacement. Removal may damage parts.

19. Front support (1)	Packing (9) and baffle (10)	a. Using cleaning compound solvent, dissolve adhesive and take off. b. Using clean rag soaked in cleaning compound solvent, remove all adhesive from support (1). c. Using clean rag dampened with clean water, rinse support (1). d. Using clean, dry rags, wipe support (1) dry.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
20. Front plate (11) and grille housing (12)	Eight screws (13) and washers (14)	a. Have assistant hold front plate (11). b. Using 3/4-inch, 318-/inch drive socket and ratchet handle, unscrew and take out.	
21. Grille housing (12)	Front plate (11)	With help of assistant, take out.	



RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL - CONTINUED		
22. Tie rod (1) and fuel tank (2)	Special nut (3) and washer (4)	a. Using 9/16-inch, 3/8-inch drive deep socket, 5-inch extension, and ratchet handle, unscrew and take out. b. Get rid of special nut (3).
23. Fuel tank (2)	Tie rod (1) with assembled parts	Take out.
DISASSEMBLY		
24. Radiator (5)	Packing (6)	Take off.
25. Oil cooler (7) and radiator (5)	Four nuts (8), lockwashers (9), and washers (10)	a. Using 1/2-inch open-end wrench, unscrew and take off. b. Get rid of lockwashers (9).
26. Radiator (5)	Oil cooler (7) with assembled parts	Take off.
27.	Draincock (11)	Using 9/16-inch open-end wrench, unscrew and take out.
28.	Overflow hose (12)	a. Pull off of radiator nipple. b. Take out of radiator clips.
29. Tie rod (1)	Special nut (13) and washer (14)	a. Secure tie rod (1) in machinist's vise. b. Using 9/16-inch open-end wrench, unscrew and take off. c. Take out of machinist's vise.

WARNING

Water soluble cleaning compound solvent is flammable and fumes are toxic. Flashpoint is 220°F (104°C). Boiling point is 212°F (100°C). Do not store in temperatures above 150°F (65°C) or below 35°F (2°C). Do not use near open flame or excessive heat. Do not wear Jewelry, wear rubber gloves and goggles, and use only in well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapors. Avoid contact with acids, aluminium, or zinc; chemical reaction may result. If you become dizzy while using cleaning compound solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

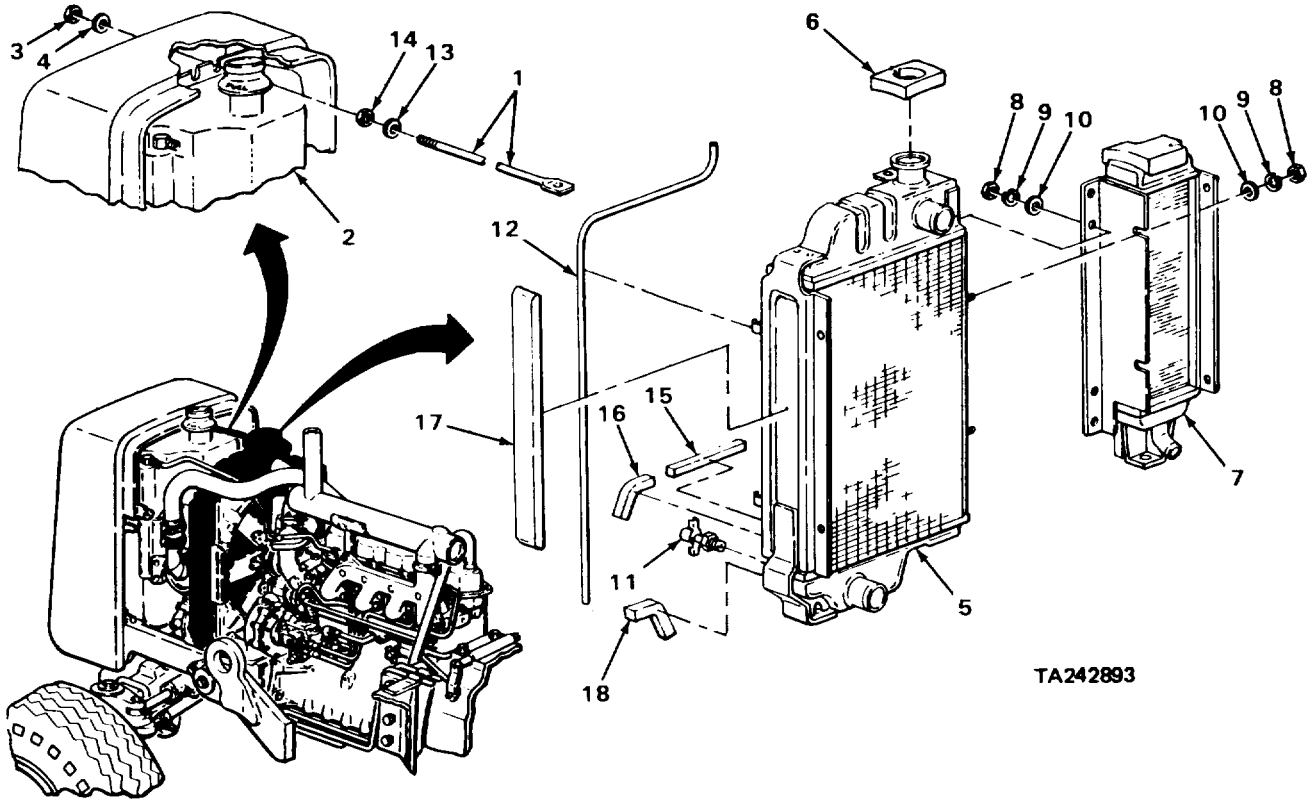
RADIATOR - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CAUTION

Do not remove packing strips unless inspection shows need for replacement. Removal may damage parts.

30.	Radiator (5)	Four packing strips (15, 16, 17, and 18)	a. Using cleaning compound solvent, dissolve adhesive and take off. b. Using clean rag soaked In cleaning compound solvent, remove all adhesive from radiator (5). c. Using clean rags dampened with clean water, rinse radiator. d. Using clean, dry rags, wipe dry.



RADIATOR - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

31.	Radiator	Clean (TM 750-254).

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 138°F (38° to 59°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

32.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
33.	All rubber parts	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.

INSPECTION/REPLACEMENT

NOTE

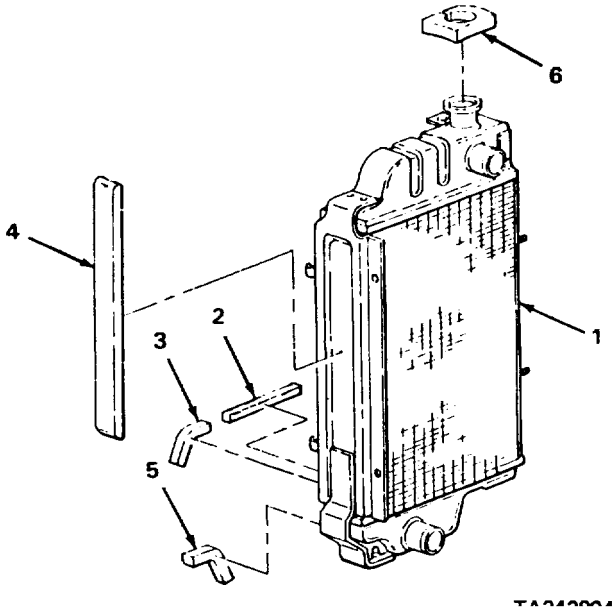
For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

34.	Radiator	Inspect (TM 750-254).
35.	All other metal parts	Look for cracks, breaks, and abnormal bends.
36.	All threaded parts	Look for damaged threads.
37.	All foam rubber parts	Look for tears, cracking and crumbling.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
ASSEMBLY		
38. Radiator (1)	Four packing strips (2, 3, 4, and 5)	a. If removed, apply metal adhesive In 0.06 to 0.18-inch (1.52 to 4.57 mm) wide beads, in 2.00-inch (50.8 mm) or smaller squares. **Make sure that outside beads are within 0.25-inch (6.35 mm) of where edge of packing will be.** b. Press against radiator (1) to transfer some metal adhesive. c. Take off and allow metal adhesive to set for two minutes. d. Press firmly into place.
39.	Packing (6)	Put into place on filler neck.

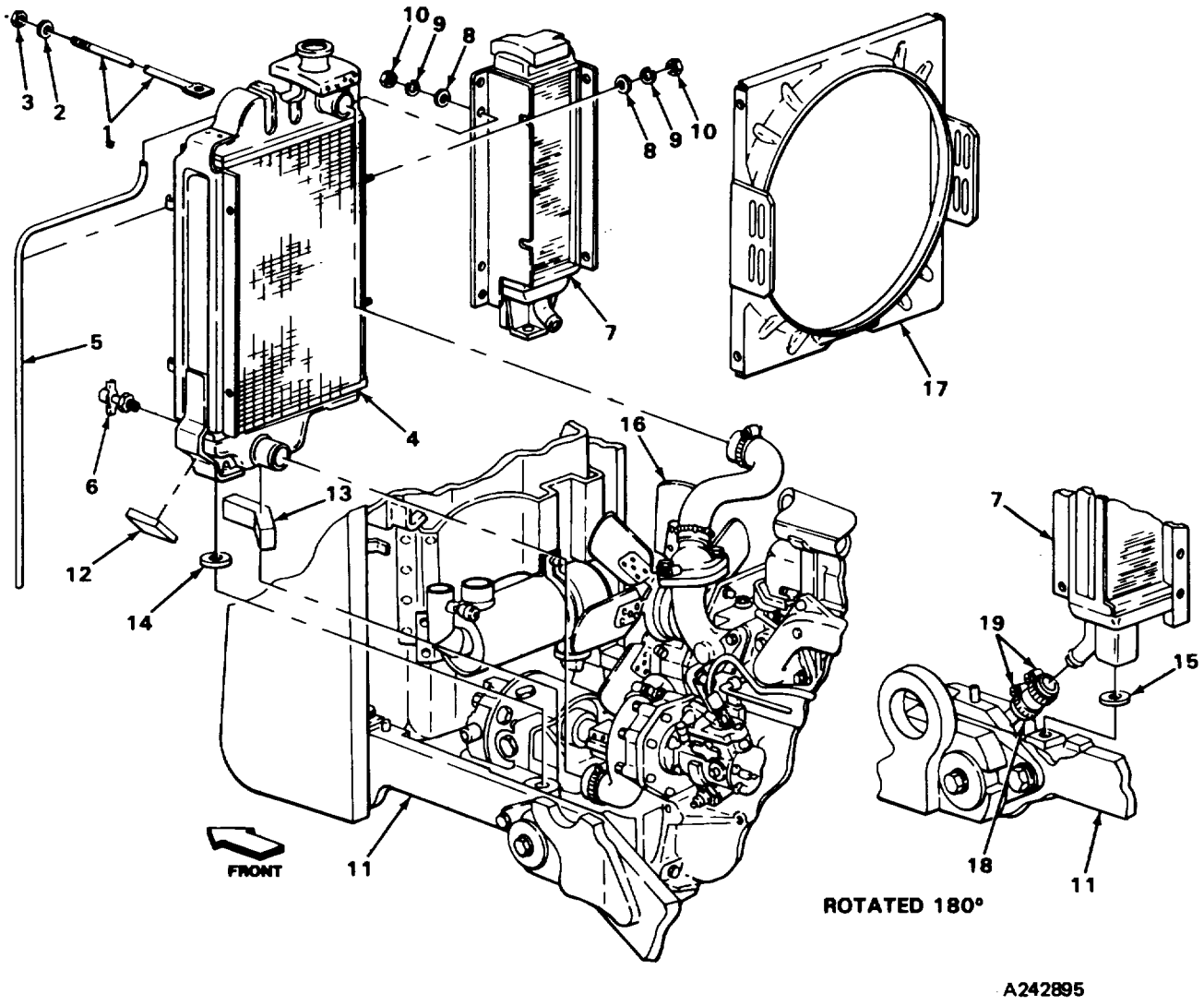


RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ASSEMBLY - CONTINUED		
40. Tie rod (1)	New special nut (2) and washer (3)	a. Secure tie rod (1) is machinist's vise. b. Using 9/16-inch open-end wrench, screw on all the way. c. Take tie rod (1) out of machinist's vise.
41. Radiator (4)	Overflow hose (5)	a. Push onto nipple on radiator neck. b. Push into clips.
42.	Draincock (6)	Screw in and tighten using 9/16-inch open-end wrench.
43.	Oil cooler (7) with assembled packings	Put on.
44. Oil cooler (7) and radiator (4)	Four washers (8), new lockwashers (9), and nuts (10)	Screw on and tighten using 1/2-inch open-end wrench.
INSTALLATION		
45. Front support (11)	Packing (12) and baffle (13)	a. If removed, apply metal adhesive in 0.06 to 0.18-inch (1.52 to 4.57 mm) wide beads. Make sure that outside beads are within 0.25-Inch (6.35 mm) of where edge of baffle will be. b. Press against front support (11) to transfer some metal adhesive. c. Take off and allow metal adhesive to set for two minutes. d. Press firmly into place.
46.	Two rubber washers (14 and 15)	Put in place.
47. Fan (16)	Fan shroud (17)	Hang on.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
48. Front support (11), two rubber washers (14 and 15), and lower oil cooler hose (18) with assembled clamp (19)	Radiator (4) with assembled oil cooler (7)	Put in.	

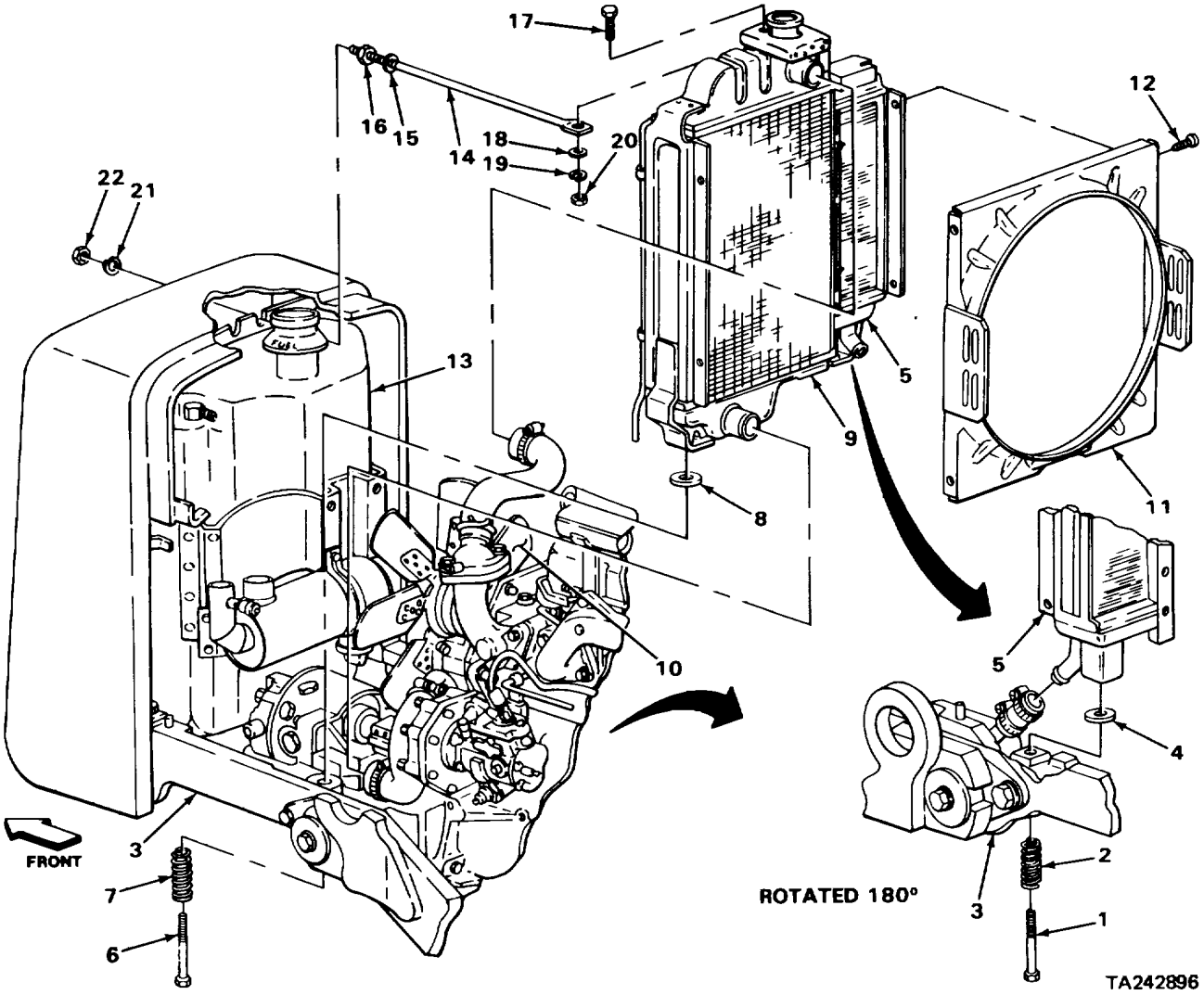


RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION		
49. Screw (1)	Spring (2)	Put in place.
50. Front support (3), rubber washer (4), and oil cooler (5)	Screw (1) with assembled spring (2)	Screw in but do not tighten.
51. Screw (6)	Spring (7)	Put in place.
52. Front support (3), rubber washer (8), and radiator (9)	Screw (6) with assembled spring (7)	Screw in and tighten using 9/16-inch, 318-inch drive socket, 5-inch extension and ratchet handle.
53. Front support (3), rubber washer (4), and oil cooler (5)	Screw (1) with assembled spring (2)	Using 9/16-inch, 3/8-inch drive socket, 5-inch extension, and ratchet handle, tighten.
54. Fan (10)	Fan shroud (11)	Take off.
55. Radiator (9) and oil cooler (5)	Fan shroud (11)	Put in place.
56. Fan shroud (11), radiator (9), and oil cooler (5)	Four screws (12)	Screw in and tighten using 3/16-inch flat-tip screwdriver.
57. Fuel tank (13) and radiator (9)	Tie rod (14) and assembled special nut (15) and washer (16)	a. Put in place. b. With washer (16) and nut (15) pushed against fuel tank flange and radiator held upright, using 6-inch steel machinist's rule, measure distance between hole in radiator bracket and hole in tie rod (14). c. Take out. d. Secure rod (14) In machinist's vise. e. Using 6-inch steel machinist's rule and 9/16-inch open-end wrench, screw out nut (15) same distance measured in b. above. f. Take rod (14) out of machinist's vise. g. Put in place.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
58. Tie rod (14) and radiator (9)	Screw (17), washer (18), new lockwasher (19), and nut (20)	Screw on and tighten using 7/16-inch box wrench, 7116-inch, 3/8-inch drive socket and ratchet handle.
59. Tie rod (14) and fuel tank (13)	Washer (21) and new special nut (22)	Screw on and tighten using 9/16-inch, 3/8-Inch drive deep socket, 5-inch extension, and ratchet handle.

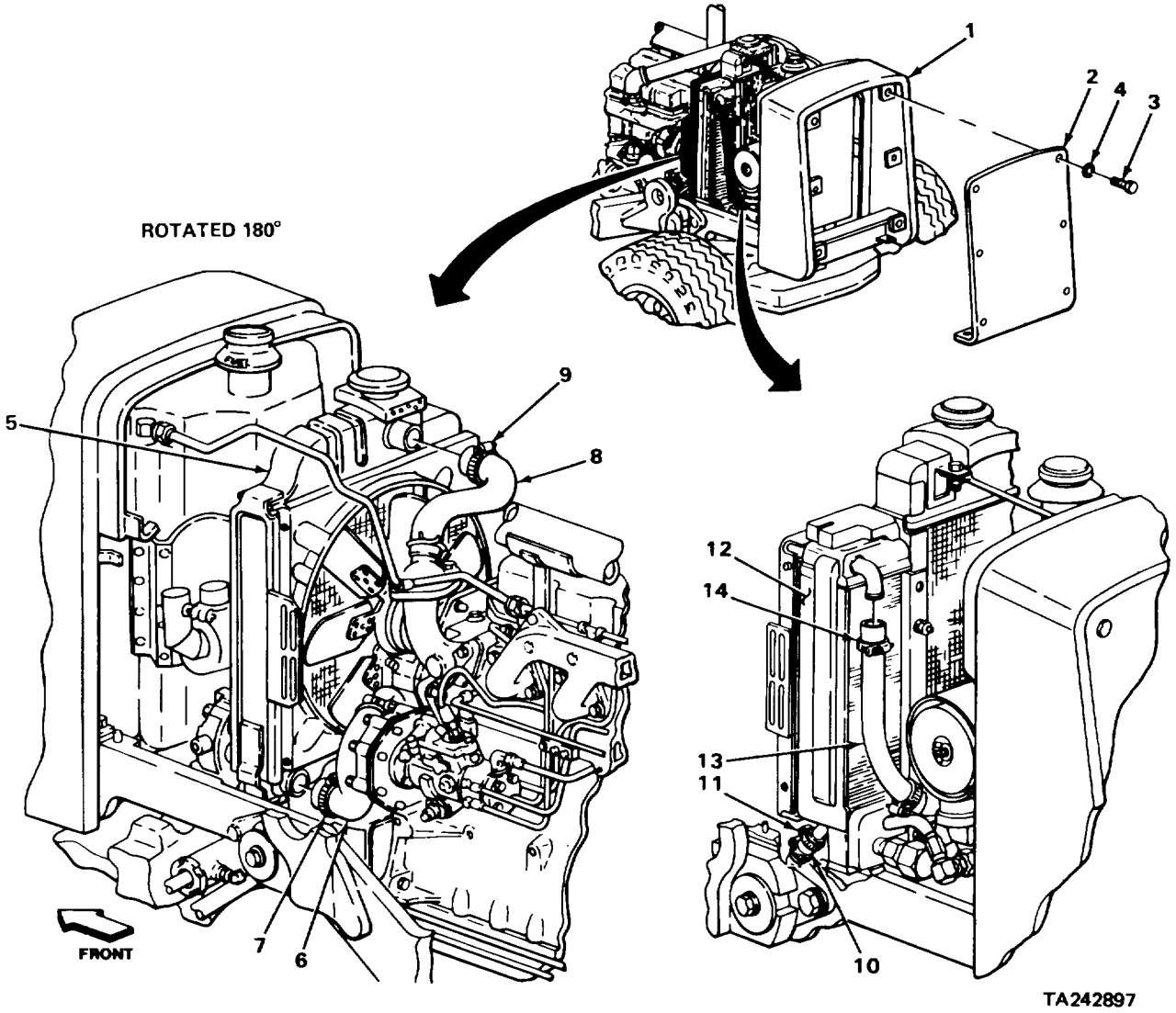


RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
60. Grille housing (1)	Front plate (2)	a. With help of assistant, put in place. b. Have assistant hold in place thru step 61.
61. Front plate (2) and grille housing (1)	Eight screws (3) and washers (4)	Screw in and tighten using 3/4-inch, 3/8-inch drive socket and ratchet handle.
62. Radiator (5)	Lower radiator hose (6) with assembled clamp (7)	Push on.
63. Lower radiator hose (6)	Clamp (7)	Using 1-inch long blade, 7/32-inch flat-tip screwdriver, tighten.
64. Radiator (5)	Upper radiator hose (8) with assembled clamp (9)	Push on.
65. Upper radiator hose (8)	Clamp (9)	Using 3/16-inch flat-tip screwdriver, tighten.
68. Lower oil cooler hose (10)	Clamp (11)	Using 3/16-inch flat-tip screwdriver, tighten.
67. Oil cooler (12)	Upper oil cooler hose (13) with assembled clamp (14)	Push on.
68. Upper oil cooler hose (13)	Clamp (14)	Using 3/16-inch flat-tip screwdriver, tighten.
69.	Air cleaner hoses and pipes	Install (page 2-244).
70.	Radiator	Fill (page 2-368).
71.	Transmission	Fill (page 2-811).
72.	Engine	If not all ready running, start and run at fast idle (TM 5-2420-222-10).
73.	Upper oil cooler hose (13) and lower oil cooler hose (10)	a. Check for leaks. b. If leaking at either connection, using 1-inch long blade, 7/32-inch flat-tip screwdriver or 3/16-inch flat-tip screwdriver, tighten.

RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
73. Continued		c. If leaking does not stop, shut down engine (TM 52420-22-10) and replace defective parts as outlined in Hydraulic Oil Cooler-to-Clutch Control Valve Oil Line (page 2-1361) and Hydraulic Pump-to-Hydraulic Oil Cooler Hose (Serial Numbers 319995 thru 342573 Only) (page 2-1338) or Hydraulic Pump-to-Hydraulic Oil Cooler Line (Serial Numbers 235786 thru 235999 Only) (page 2-1342).



RADIATOR - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
74. Loader backhoe	Engine	If not already off, shut down (TM 5-2420-222-10).

NOTE

FOLLOW-ON MAINTENANCE: Install right side grille (page TM 5-2420-222-10).

TASK ENDS HERE

RADIATOR STRIPS

This task covers:

a. Cleaning (page 2-386)
b. Inspection/Replacement (page 2-387)
c. Removal (page 2-388)
d. Installation (page 2-388)

INITIAL SETUP

Materials/Parts
Adhesive, metal bonding (item 1, Appendix C)
Detergent, GP (item 7, Appendix C)
Solvent, cleaning compound (item 27, Appendix C)

Personnel Required
One

Equipment Condition
Left side grille removed (TM 5-2420-222-10)

LOCATION	ITEM	ACTION REMARKS

NOTE

There are four radiator packing strips which are maintained the same way. One is shown. Repeat procedures for others as needed.

CLEANING

NOTE

For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

RADIATOR STRIPS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
1.	Radiator strip (1)	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.

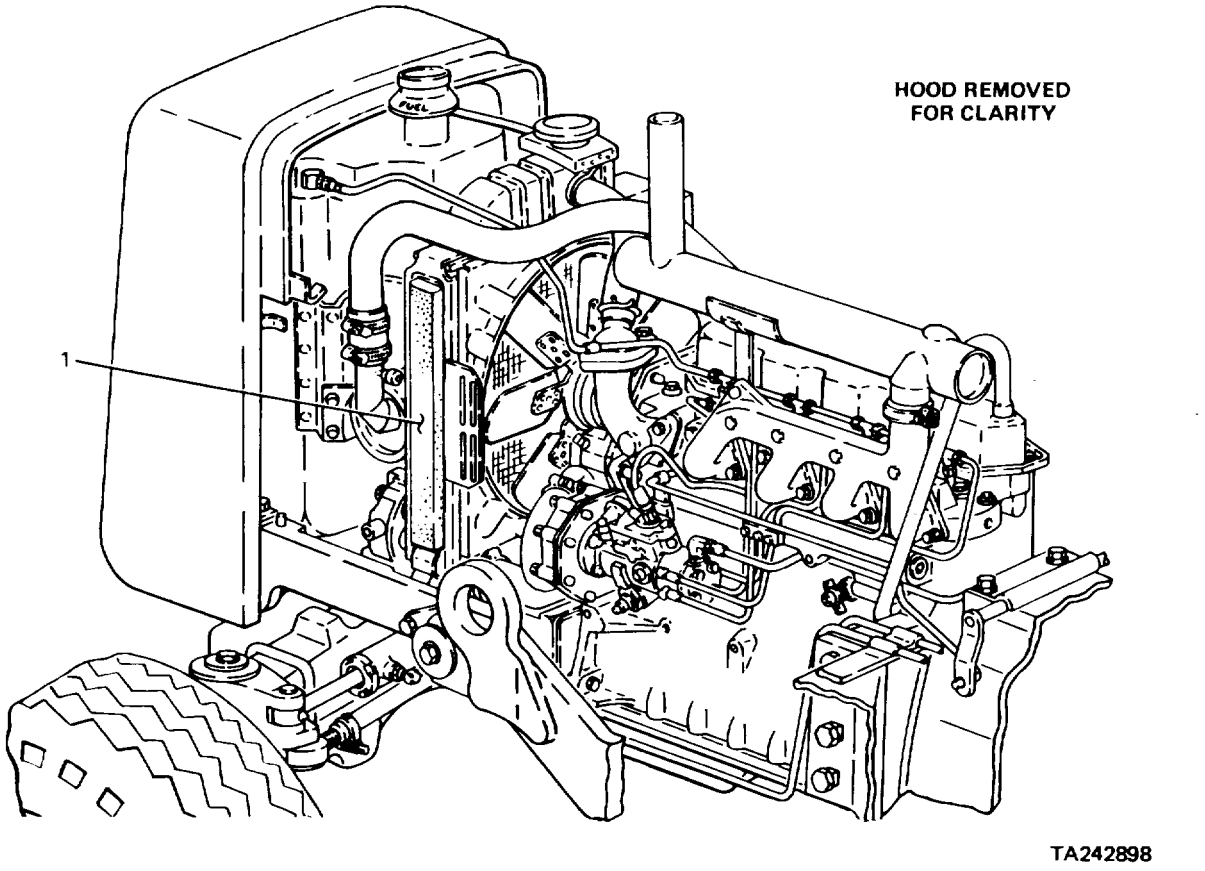
INSPECTION/REPLACEMENT

NOTE

For more Information on how to Inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts which cannot be repaired.

2.	Radiator strip (1)	Look for tears, cracking, and crumbling.



RADIATOR STRIPS - CONTINUED

LOCATION	ITEM	ACTION REMARKS

REMOVAL

CAUTION

Do not remove packing strips unless inspection shows need for replacement. Removal may damage parts.

NOTE

It may be necessary to remove radiator (page 2-371) to remove some packing strips.

WARNING

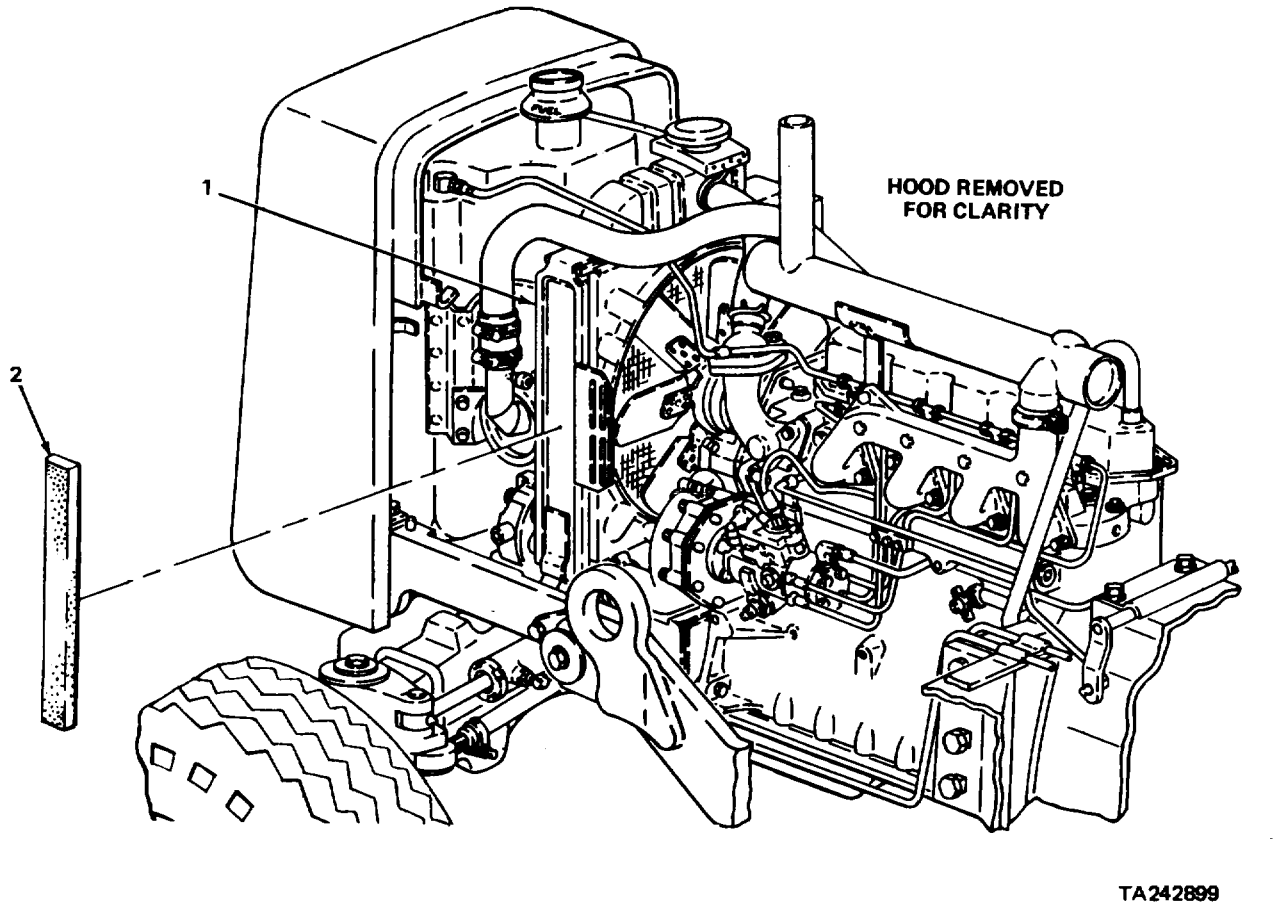
Water soluble cleaning compound solvent is flammable and fumes are toxic. Flashpoint is 2200F (1040C). Boiling point is 2120F (1000C). Do not store in temperatures above 1500F (650C) or below 350F (20C). Do not use near open flame or excessive heat. Do not wear jewelry, wear rubber gloves and goggles, and use only in well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapors. Avoid contact with acids, aluminium, or zinc; chemical reaction may result. If you become dizzy while using cleaning compound solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

3.	Radiator (1)	Packing strip (2)	a. Using cleaning compound solvent dissolve adhesive and take off. b. Using clean rag soaked in cleaning compound solvent, remove all adhesive from radiator (1). c. Using clean rags dampened with clean water, rinse radiator. d. Using clean, dry rags, wipe dry.

INSTALLATION

4.	Radiator (1)	Packing strip (2)	a. If removed, apply metal adhesive in 0.06 to 0.18-inch (1.52 to 4.57 mm) wide beads. **Make sure that outside beads are within 0.25-inch (6.35 mm) of where edge of strip will be.** b. Press against radiator (1) to transfer some metal adhesive. c. Take off and allow metal adhesive to set for two minutes. d. Press firmly Into place.

RADIATOR STRIP - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE: Install left side grille (TM 52420-222-10).

TASK ENDS HERE

RADIATOR FILLER OPENING CAP

This task covers:

Replacement (page 2-390)

INITIAL SETUP

Equipment Condition
Radiator filler cap removed, cleaned
and inspected (TM 5-2420222-10)

RADIATOR FILLER OPENING CAP - CONTINUED

REPLACEMENTI'

NOTE
If radiator filler cap is defective, it must be replaced.

FOLLOW-ON MAINTENANCE: Install radiator filler cap (TM 52420-222-10).

TASK ENDS HERE

FAN SHROUD

This task covers:

a. Cleaning (page 2-390)
b. Inspection/Replacement (page 2-391)

INITIAL SETUP:

Materials/Parts
Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)WY
Solvent, drycleaning
(item 28, Appendix C)

Personnel Required
One

Equipment Condition

LOCATION	ITEM	ACTION	REMARKS

CLEANING

NOTE
For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).

1.	Fan shroud (1)	a. Using solution of detergent and water, clean. b. Rinse with clean water. c. Using clean, dry rags, wipe dry.	

FAN SHROUD - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 100°F to 1380F (380 to 59°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

2.		Four screws (2)	a. Using drycleaning solvent, clean. b. Using clean, dry rags, wipe dry.

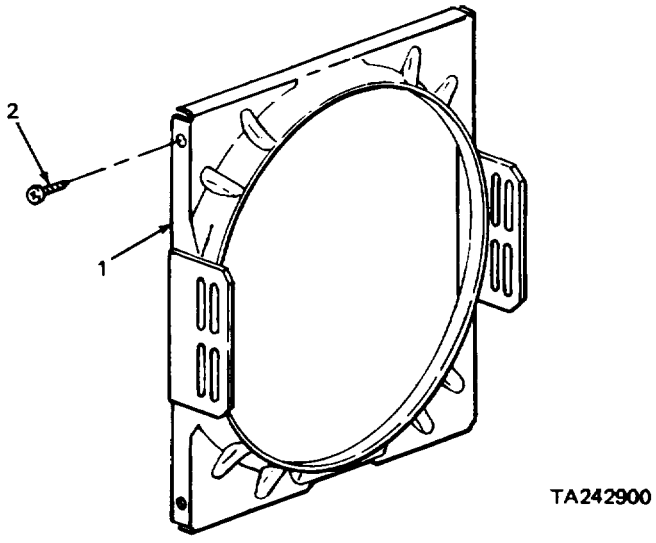
INSPECTION/REPLACEMENT

NOTE

For more Information on how to Inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

3.		Fan shroud (1)	Look for cracks, breaks, and abnormal bends.
4.		Four screws (2)	Look for damaged threads.



FAN SHROUD - CONTINUED

NOTE

FOLLOW-ON MAINTENANCE: Install radiator (page 2-371).

TASK ENDS HERE

THERMOSTAT HOUSING AND COVER

This task covers:

a. Removal (page 2-392)
b. Cleaning (page 2-393)
c. Inspection/Replacement (page 2-394)
d. Installation (page 2-394)

INITIAL SETUP:

Tools

Hammer, plastic-faced
Handle, ratchet, 3/8-inch drive
Knife, putty
Socket, 3/8-inch drive, 9116-inch
Vise, machinist's
Wrench, box, 5/18 inch
Wrench, torque, 3/8-inch drive, 0 to 60 N•m capacity

Materials/Parts

Gasket, thermostat housing
Lockwasher, thermostat housing screw (two required)

Materials/Parts - Continued

Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

1. Thermostat hoses and clamps removed (page 2-400)
2. Thermostat removed (page 2-396)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Thermostat housing (1) and cylinder head (2)	Two screws (3) and lockwashers (4)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwashers (4).	
2. Cylinder head (2)	Housing (1) and gasket (5)	a. Using plastic-faced hammer, tap loose. b. Take off. c. Get rid of gasket (5).	

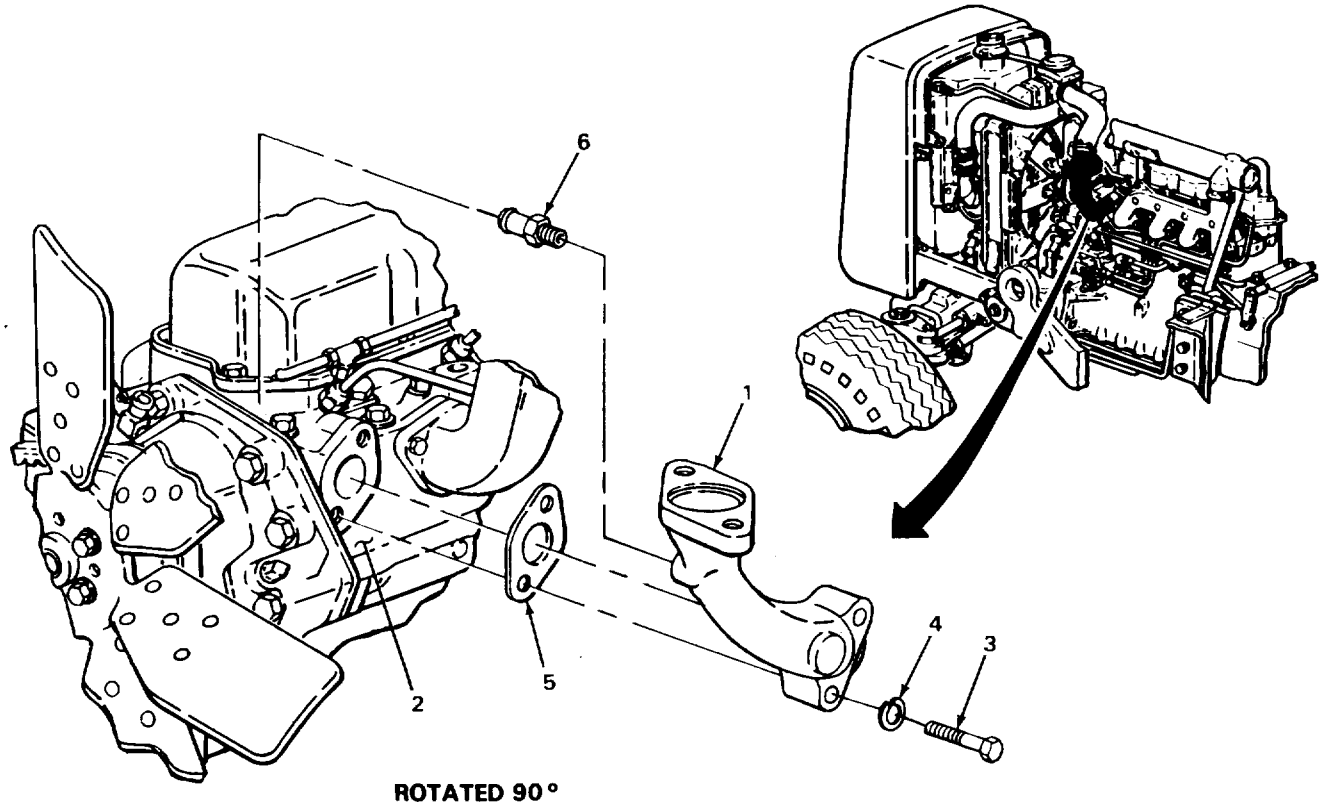
THERMOSTAT HOUSING AND COVER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
3. Housing (1)	Adapter (6)	a. Secure housing (1) in machinist's vise. b. Using 5/8-inch box wrench, unscrew and take out. c. Take housing (1) out of machinist's vise.

CLEANING

NOTE

For more Information on how to clean parts, go to General Maintenance Instructions (page 2-137).

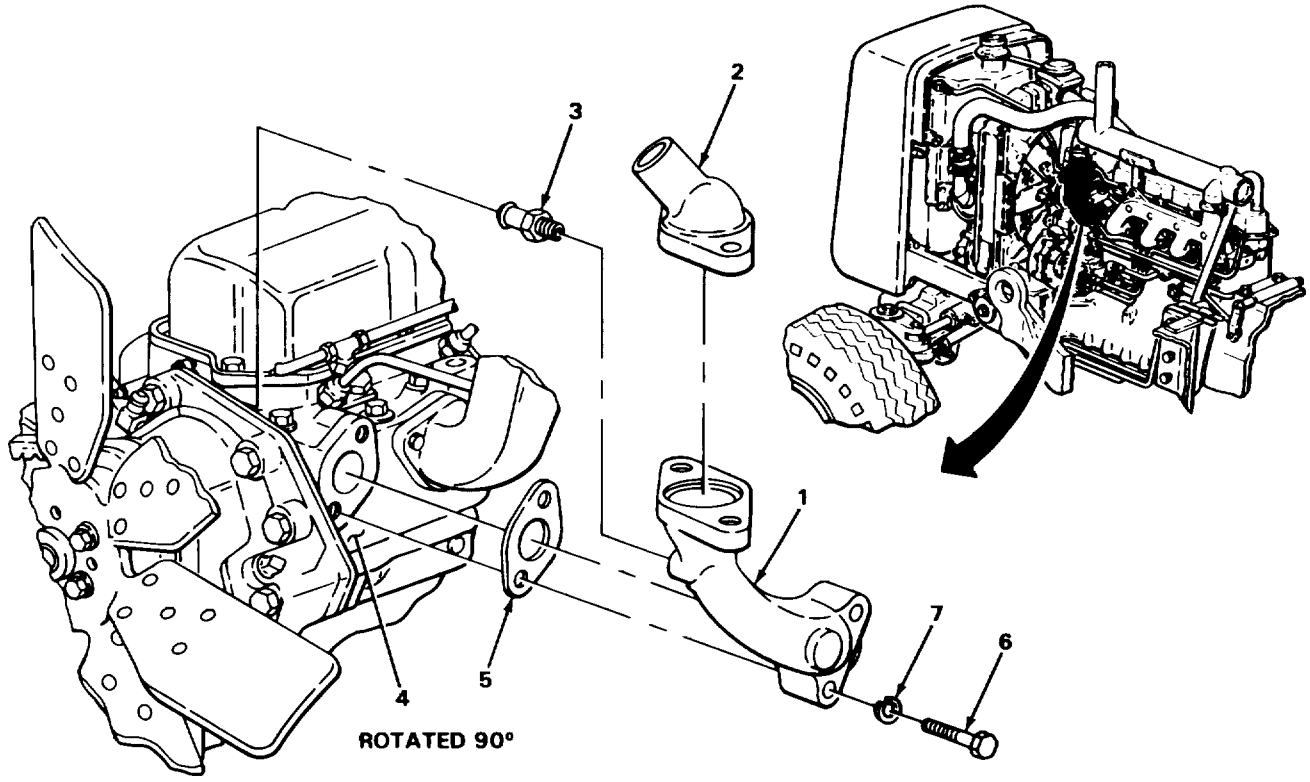


THERMOSTAT HOUSING AND COVER - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING - CONTINUED		
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
4.	Housing (1) and cover (2)	a. Using putty knife, scrape any trace of old gasket off. b. Clean In drycleaning solvent. c. Using clean dry rags, wipe dry.
5.	All attaching hardware	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
6.	Housing (1) and cover (2)	Look for damage to gasket surfaces which could cause leaks.
7.	All metal parts	Look for cracks and breaks.
8.	All threaded parts	Look for damaged threads.
INSTALLATION		
9. Housing (1)	Adapter (3)	a. Secure housing (1) in machinist's vise. b. Screw in and tighten using 518-inch box wrench. c. Take housing (1) out of machinist's vise.

THERMOSTAT HOUSING AND COVER - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
10. Cylinder head (4) housing (1)	Gasket (5) and	Put in place.
11. Housing (1) and cylinder head (4)	Two screws (6) and new lockwashers (7)	a. Screw In and alternately tighten until snug using 9/16-inch, 3/8-inch drive socket and ratchet handle. b. Using 0 to 60 N-m capacity, 3/8-inch drive torque wrench, alternately tighten to 20 foot-pounds (27.1 N.m) torque.



NOTE

FOLLOW-ON MAINTENANCE:

1. Install thermostat (page 2-396).
2. Install thermostat hoses and clamps (page 2400).

TASK ENDS HERE

THERMOSTAT

This task covers:

a. Removal (page 2-396)
b. Cleaning (page 2-397)
c. Inspection/Replacement (page 2-397)
d. Testing (page 2-398)
e. Installation (page 2-398)

INITIAL SETUP:

Tools
Handle, ratchet, 3/8-inch drive
Heating equipment
Screwdriver, flat-tip, 3/16-inch
Socket, 3/8-inch drive, 9/16-inch
Thermometer
Wrench, torque, 3/18-inch drive, 0 to 60 N.m capacity

Materials/Parts
Gasket, thermostat cover
Rags, wiping (item 21, Appendix C)

Personnel Required
One

Equipment Condition
1. Hood removed (page 2-1025)
2. Radiator drained (page 2-368)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Upper radiator hose (1)	Clamp (2)	Using 3116-inch flat-tip screwdriver, loosen.	
2. Cover (3)	Upper radiator hose (1) with assembled clamp (2)	Pull off.	
3. Cover (3), clamp (4), and thermostat housing (5)	Two screws (6)	Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out.	
4. Cover (3) and Injection leakoff fuel tube (7)	Clamp (4)	Take off.	
5. Thermostat housing (5)	Cover (3) and gasket (8)	a. Take off. b. Get rid of gasket (8).	
6.	Thermostat (9)	Take out.	

THERMOSTAT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

NOTE

For more Information on how to clean parts, go to General Maintenance Instructions (page 2-137).

7. Thermostat (9) Using clean, dry rags, wipe dry.

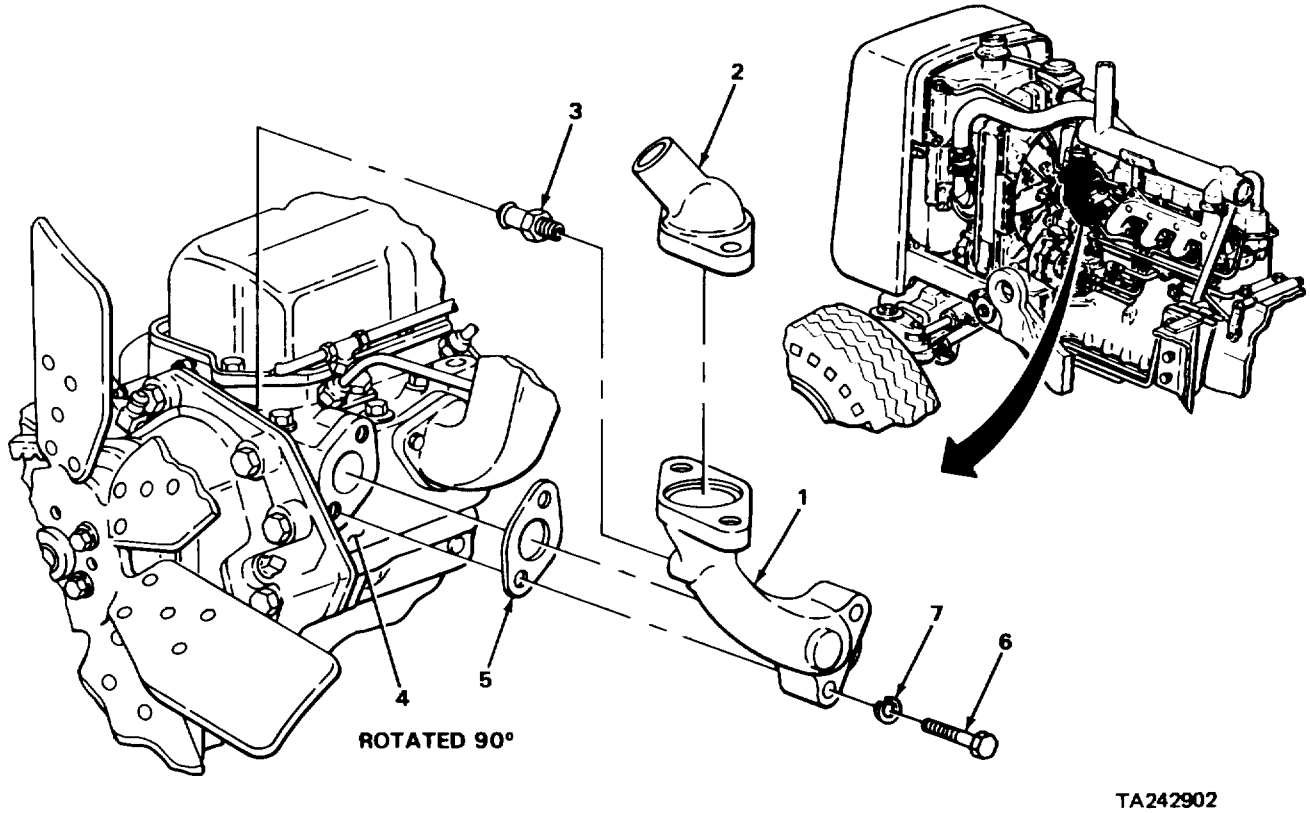
INSPECTION/REPLACEMENT

NOTE

For more information on how to Inspect parts, go to General Maintenance Instructions (page 2-137).

Replace defective parts as needed.

8. Thermostat (9) Look for cracks, breaks, and dents.

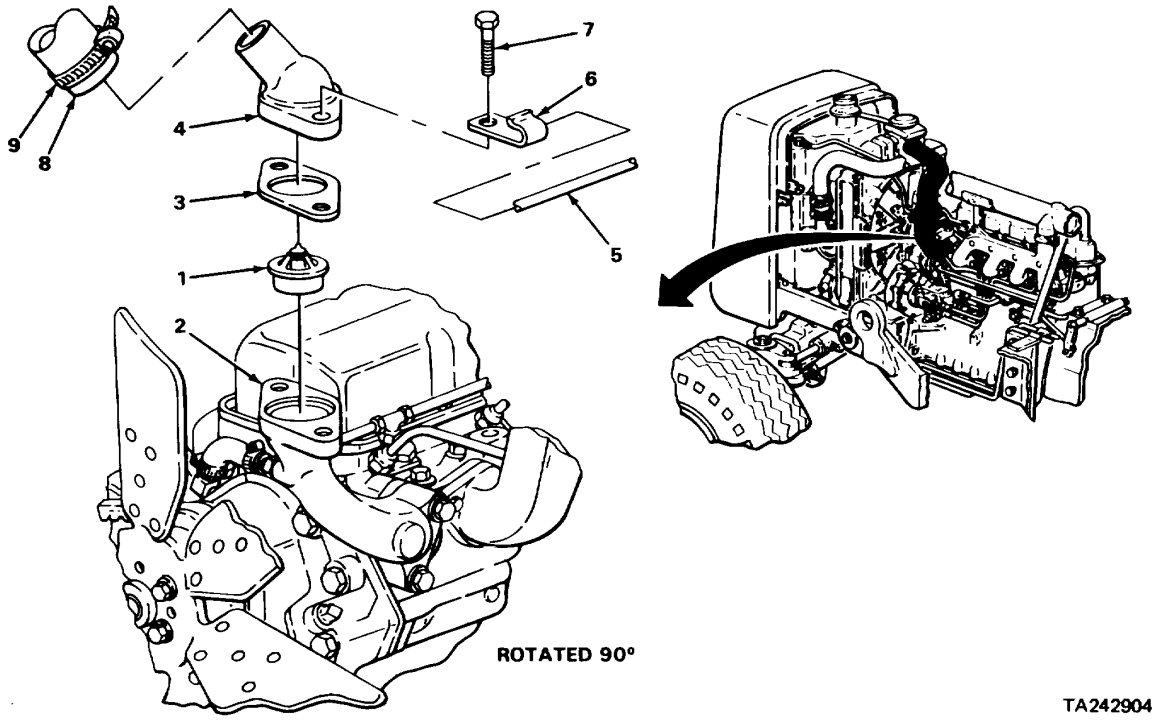


THERMOSTAT - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
TESTING			
		NOTE	
		Loader backhoe will have themostat with one of three temperature settings: 180°F (82°C), 192°F (89°C), or 205°F (96°C).	
		Replace defective parts as needed.	
		WARNING	
		Be careful when heating fluids. Wear gloves to protect your hands from hot parts and fluids or severe burns could result.	
9.	Thermostat (1)	a. Note temperature setting stamped on case. b. Along with thermometer, suspend in suitable heating equipment, two-thirds full of water. **Make sure neither thermostat nor thermometer touch sides or bottom of heating equipment.** c. At the same time, using suitable heating equipment, heat and stir water and watch both thermostat and thermometer. **Stirring helps maintain even temperature as water heats.** d. Note temperature at which thermostat is fully open. **Good 180°F (88°C) thermostat should be fully open between 1790 and 181 °F (870 and 890C).** **Good 1920F (89°C) thermostat should be fully open between 191 0 and 193°F (880 and 900C).** **Good 2050F (96 OC) thermostat should be fully open between 206° and 208°F (95° and 970C).** e. Take thermostat and thermometer out of water. **Thermostat should close as It cools.**	
INSTALLATION			
10. Thermostat housing (2)	Thermostat (1)	Put in.	

THERMOSTAT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
11.	New gasket (3) and cover (4)	Put in place.
12. Cover (4) and injection leakoff fuel tube (5)	Clamp (6)	Put in place.
13 Cover (4), clamp (6), and thermostat housing (2)	Two screws (7)	a. Screw In and alternately tighten until snug using 9/16-inch, 3/8-inch drive socket and ratchet handle. b. Using 0 to 60 N.m capacity 3/8-inch drive torque wrench, tighten to 20 foot-pounds (27.1 N.m) torque.
14. Cover (4)	Upper radiator hose (8) with assembled clamp (9)	Push on.
15. Upper radiator hose (8)	Clamp (9)	Using 3/16-inch flat-tip screwdriver, tighten.



THERMOSTAT - CONTINUED

INSTALLATION - CONTINUED

NOTE

FOLLOW-ON MAINTENANCE:

1. Fill radiator (page 2-368).
2. Install hood (page 2-1025).

TASK ENDS HERE

THERMOSTAT HOSES AND CLAMPS

This task covers:

a. Removal (page 2-400)
b. Cleaning (page 2-401)
c. Inspection/Replacement (page 2-402)
d. Installation (page 2-402)

INITIAL SETUP

Tools

Screwdriver, flat-tip, 3/16-inch

Personnel Required

One

Materials/Parts

Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Equipment Condition

1. Hood removed (page 2-1025)
2. Radiator drained (page 2-368)

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

NOTE

Serial Numbers 235786 thru 235999 use an L-shaped preformed hose. Serial Numbers 319995 thru 342573 use a straight hose.

1.	Preformed hose (1) or straight hose (2)	Two clamps (3)	Using 3/16-inch flat-tip screwdriver, loosen.

THERMOSTAT HOSES AND CLAMPS - CONTINUED

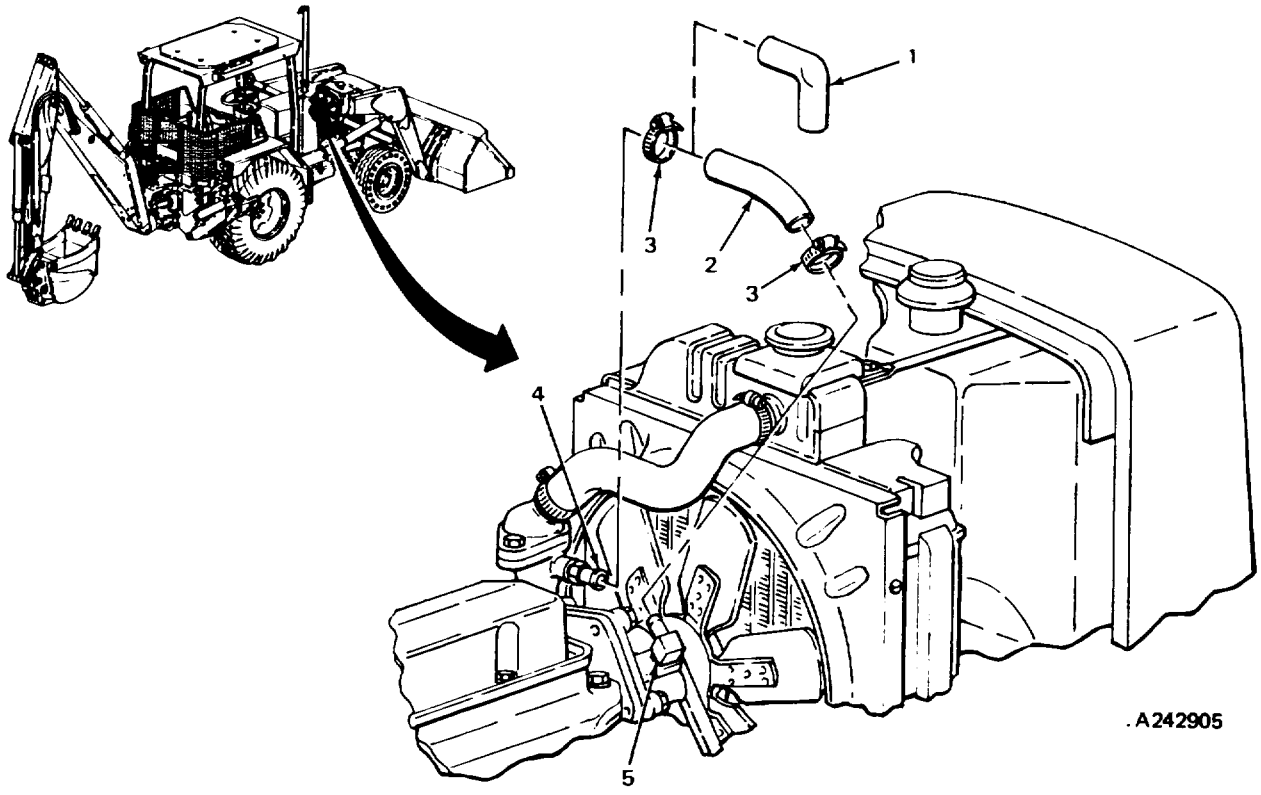
LOCATION	ITEM	ACTION REMARKS
2. Adapter (4) and elbow (5)	Preformed hose (1) or straight hose (2) with assembled two clamps (3)	Pull off.
3. Preformed hose (1) or straight hose (2)	Two clamps (3)	Slide off.

CLEANING

NOTE

For more Information on how to clean parts, go to General Maintenance Instructions (page 2-137).

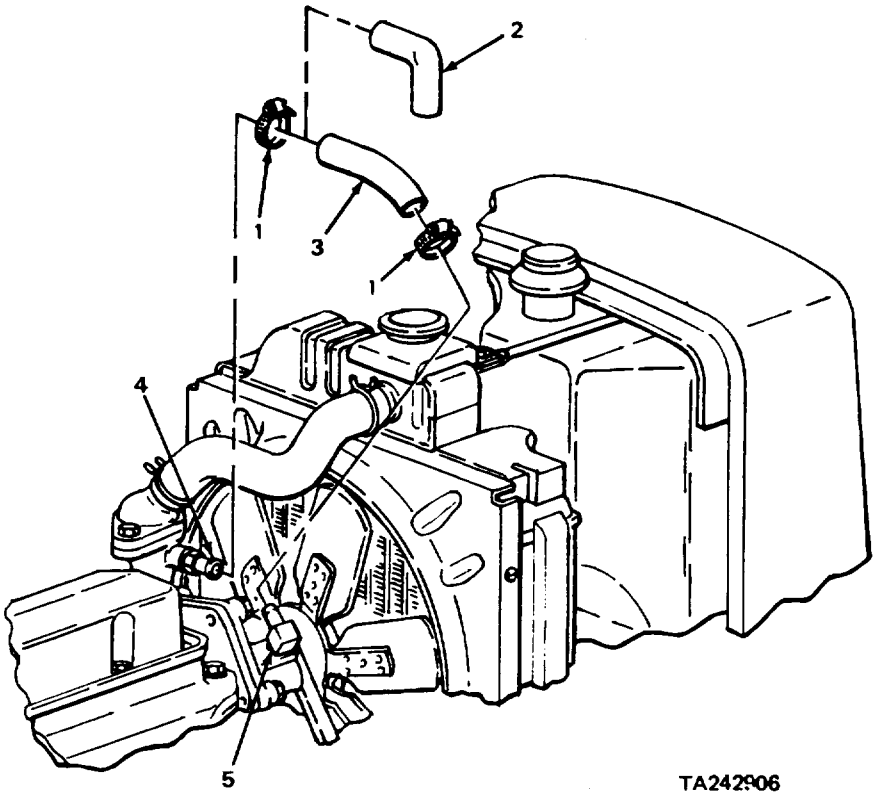
4.	Preformed hose (1) or straight hose (2)	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.



THERMOSTAT HOSES AND CLAMPS - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING - CONTINUED		
	WARNING **Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.**	
5.	Two clamps (1)	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).** **Replace defective parts as needed.**	
6.	Preformed hose (2) or straight hose (3)	Look for swelling, cracking, hardening, and separation inside and out.
7.	Two clamps (1)	Look for cracks, breaks, and damaged threads.
INSTALLATION		
8. Preformed hose (2) or straight hose (3)	Two clamps (1)	Slide on.
9. Adapter (4) and elbow (5)	Preformed hose (2) or straight hose (3) with assembled clamps (1)	Push on.
10. Preformed hose (2) or straight hose (3)	Two clamps (1) tighten.	Using 3/16-inch flat-tip screwdriver,

THERMOSTAT HOSES AND CLAMPS - CONTINUED



NOTE

FOLLOW-ON MAINTENANCE:

1. Fill radiator (page 2-368).
2. nstall hood (page 2-1025).

TASK ENDS HERE

RADIATOR HOSES AND CLAMPS

This task covers:

a. **Removal (page 2-404)**
b. **Cleaning (page 2-405)**
c. **Inspection/Replacement (page 2-406)**
d. **Installation (page 2-406)**

INITIAL SETUP:

Tools

Screwdriver, flat-tip, 3/16-inch
Screwdriver, flat-tip, 7/32-inch, 1-inch blade

Materials/Parts

Detergent, GP (item 7, Appendix C)
Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

Equipment Condition

1. Hood removed (page 2-1025)
2. Radiator drained (page 2-368)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Upper hose (1)	Two clamps (2)	Using 3/16-inch flat-tip screwdriver, loosen.	
2. Radiator (3) and thermostat cover (4)	Upper hose (1) with assembled two clamps (2)	Pull off.	
3. Upper hose (1)	Two clamps (2)	Pull off.	
4. Lower hose (5)	Clamp (6)	Using 3/16-inch flat-tip scrwdriver, loosen.	
5.	Clamp (7)	Using 3116-inch flat-tip screwdriver, loosen.	
6. Radiator (3) and water pump (8)	Lower hose (5) with assembled two clamps (6 and 7)	Pul off.	
7. Lower hose (5)	Two clamps (6 and 7)	Slide off.	

RADIATOR HOSES AND CLAMPS - CONTINUED

LOCATION	ITEM	ACTION / REMARKS

CLEANING

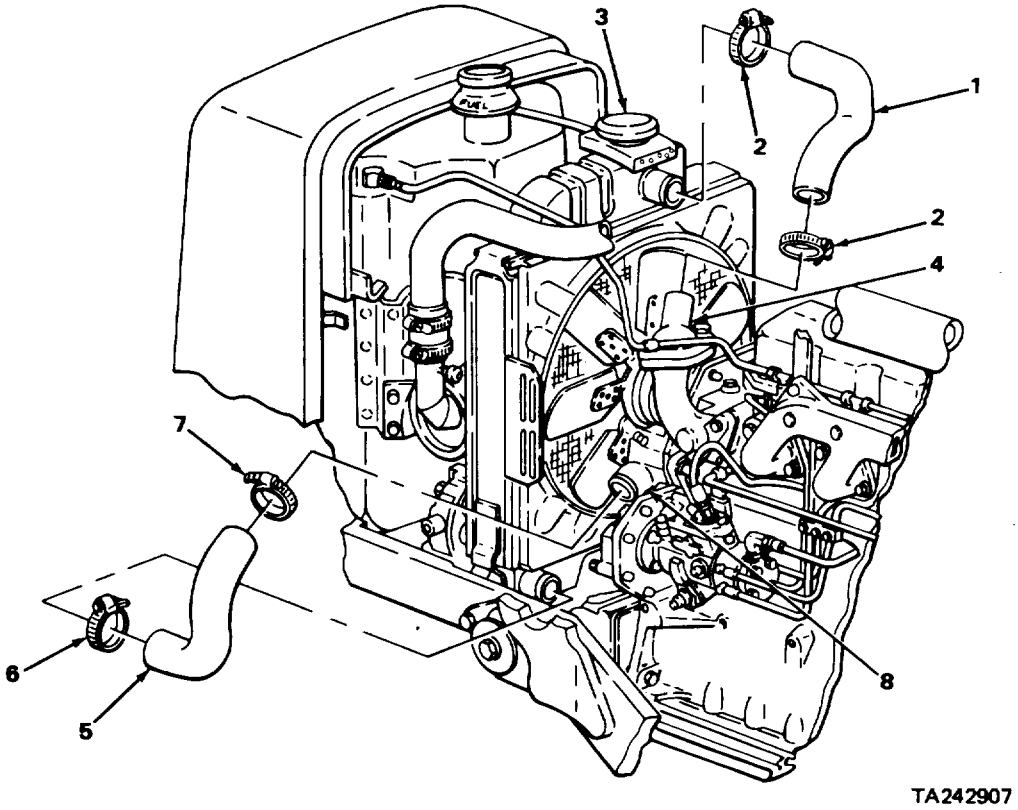
NOTE

For more Information on how to clean parts, go to General Maintenance Instructions (page 2-137).

WARNING

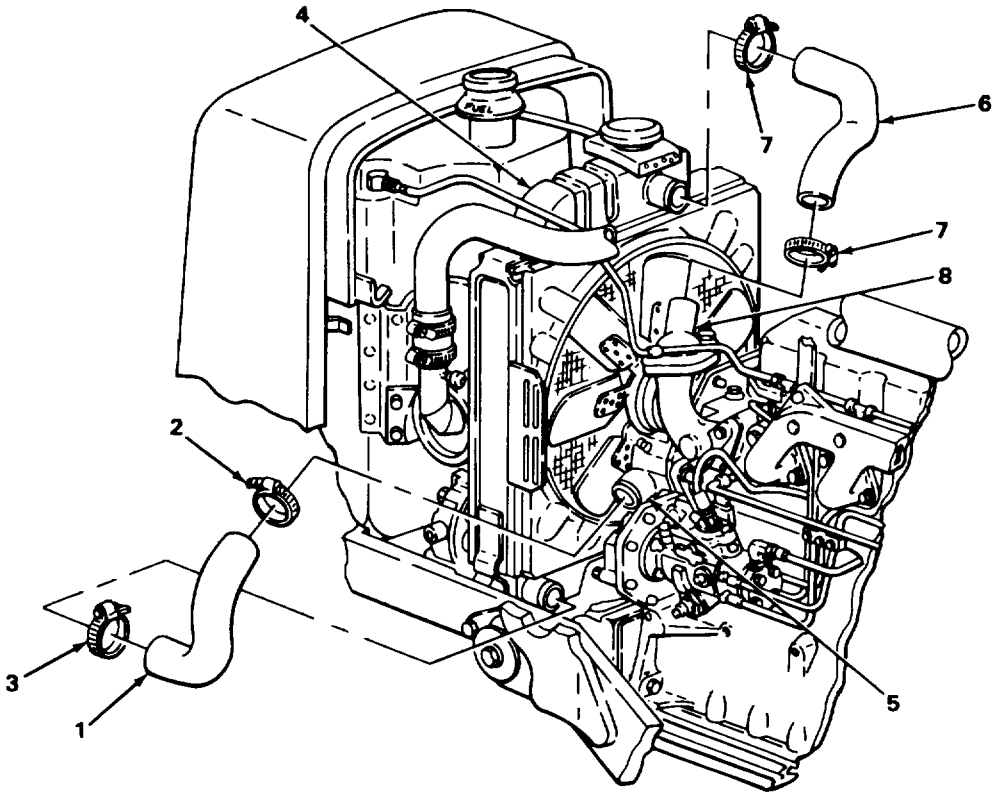
Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint Is 1000F to 1380F (380 to 590°C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid Immediately.

8.	All metal parts	a. Clean In drycleaning solvent. b. Using clean, dry rags, wipe dry.



RADIATOR HOSES AND CLAMPS - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING - CONTINUED		
9.	All hoses	a. Clean in solution of detergent and water. b. Rinse in clean water. c. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).** **Replace defective parts as needed.**	
10.	All hoses	Look for swelling, cracking, hardening, and separation, inside and outside.
11.	Clamps	Look for cracks, breaks, and damaged threads.
INSTALLATION		
12. Lower hose (1)	Two clamps (2 and 3)	Slide on.
13. Radiator (4) and water pump (5)	Lower hose (1) with assembled two clamps (2 and 3)	Push on.
14. Lower hose (1)	Clamp (2)	Using 3/16-inch flat-tip screwdriver, tighten.
15.	Clamp (3)	Using 1-inch blade, 7/32-inch flat-tip screwdriver, tighten.
16. Upper hose (6)	Two clamps (7)	Slide on.
17. Radiator (4) and thermostat cover (8)	Upper hose (6) with assembled two clamps (7)	Push on.
18. Upper hose (6)	Two clamps (7)	Using 3/16-inch flat-tip screwdriver, tighten.



RADIATOR HOSES AND CLAMPS - CONTINUED

NOTE

FOLLOW-ON MAINTENANCE:

1. Fill radiator (page 2-368).
2. Install hood (page 2-1025)

TA242908

TASK ENDS HERE

WATER PUMP

This task covers:

INITIAL SETUP

Tools

Extension, 3/8-inch drive, 6-inch
Handle, ratchet, 3/8-inch drive
Handle, ratchet, 112-inch drive
Remover and setter, stud
Screwdriver, flat-tip, 3/16-inch
Socket, 3/8-inch drive, 9/16-inch
Vise, machinist's
Wrench, open-end, 9/16-inch

Materials/Parts

Gasket, water pump
Lockwasher, water pump screws and nut (five required)

Materials/Parts - Continued

Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Personnel Required

One

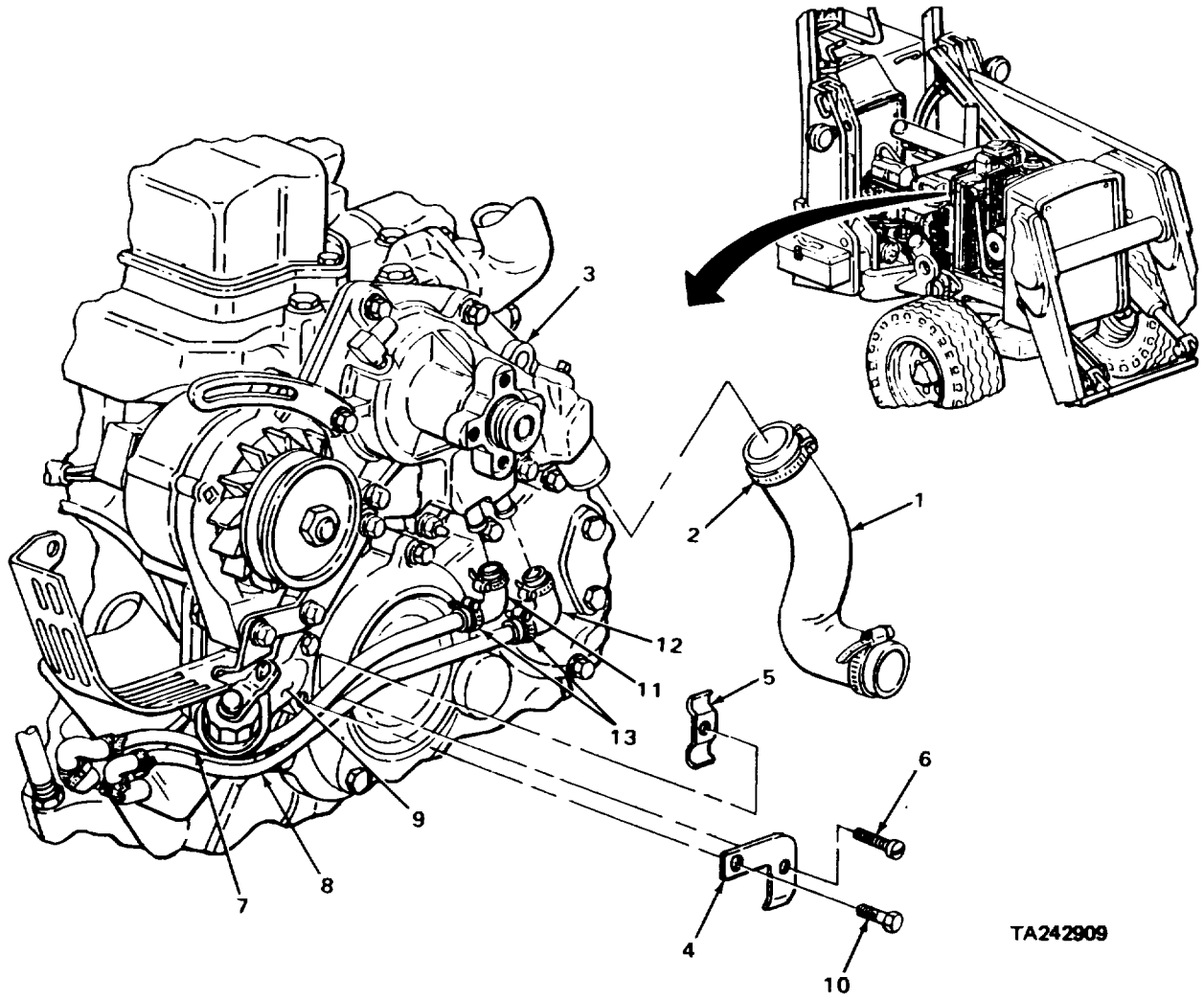
Equipment Condition

1. Fan blade and pulley removed (page 2-431)
2. Thermostat hoses and clamps removed (page 2-400)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Lower radiator hose (1)	Clamp (2)		Using 3/16-inch flat-tip screwdriver, loosen.
2. Water pump (3)	Lower radiator hose (1) with assembled clamp (2)		Pull off.
3. Clip plate (4) and clamp (5)	Screw (6)		Using 3116-inch flat-tip screwdriver, unscrew and take out.
4. Two pipes (7 and 8)	Clamp (5)		Take off.
5. Clip plate (4) and filler neck (9)	Screw (10)		Using 9/16-inch, 318-inch drive socket and ratchet handle, unscrew and take out.

WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
6. Filler neck (9)	Clip plate (4)	Take off.	
7. Two hoses (11 and 12)	Two clamps (13) loosen.	Using 3/16-inch flat-tip screwdriver,	
8. Water pump (3)	Two hoses (11 and 12) and assembled two clamps (13)	Pull off.	



WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL - CONTINUED		
9. Ac generator adjusting strap (1) and water pump (2)	Screw (3), lockwasher (4), and washer (5)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (4).
10. Water pump (2) and ac generator (6)	Ac generator adjusting strap (1)	Take off.
11. Water pump (2) and stud (7)	Nut (8) and lockwasher (9)	a. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (9).
12. Water pump (2) and engine block (10)	Three screws (11 and 12) and lockwashers (13)	a. Using 9/16-inch, 318-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwashers (13).
13. Engine block (10) and stud (7)	Water pump (2) and gasket (14)	a. Take off. b. Get rid of gasket (14).
	CAUTION **Do not remove stud unless inspection shows need for replacement. Stud may be damaged during removal.**	
14. Engine block (10)	Stud (7)	Using stud remover and setter and 1/2-inch drive ratchet handle, unscrew and take out.
DISASSEMBLY		
15. Water pump (2)	Elbow (15)	a. Secure pump (2) in machinist's vise. b. Noting position for assembly, using 9/16-inch open-end wrench, unscrew and take out.
16.	Pipe plug (16)	a. Using 9/16-inch open-end wrench, unscrew and take out. b. Take pump (2) out of machinist's vise.

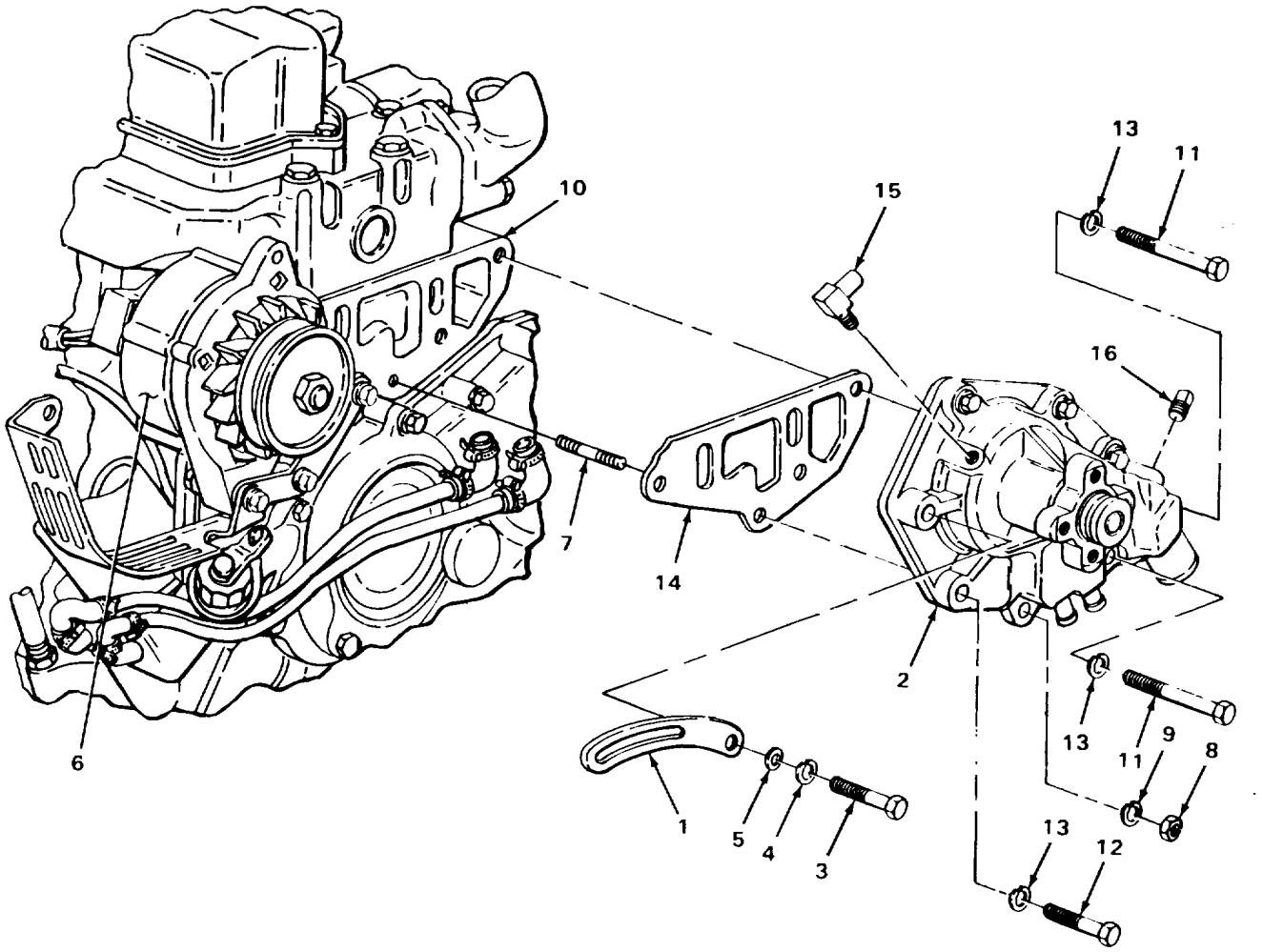
WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

CLEANING

NOTE

For more Information on how to clean parts, go to General Maintenance Instructions (page 2-137).

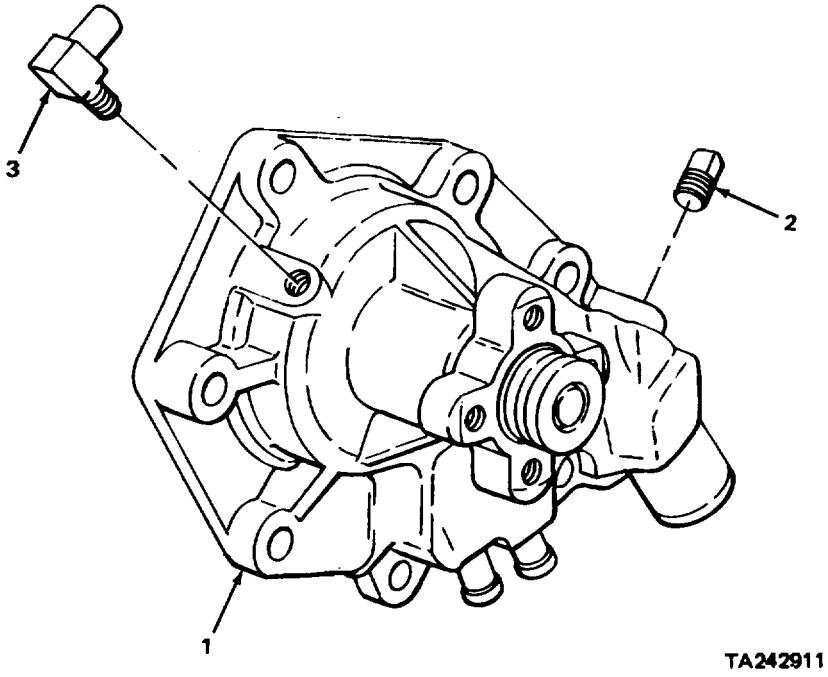


WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION REMARKS
CLEANING - CONTINUED		
	WARNING	
	Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 1000F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air Immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
17.	Water pump (1)	a. Using clean rags dampened with dry-cleaning solvent, wipe clean. b. Using clean, dry rags, wipe dry.
18.	All other metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE	
	For more Information on how to inspect parts, go to General Maintenance Instructions (page 2-137).	
	Replace defective parts as needed.	
19.	Water pump (1)	a. Look for signs of leaking at shaft and drain hole. **Leakage at drain hole Indicates defective Internal seal.** b. Turn shaft by hand. **Shaft should turn quietly with slight drag.** c. Look for cracks, breaks, and damaged gasket sealing surface.
20.	All other metal parts	Look for cracks, breaks, and abnormal bends.
21.	All threaded parts	Look for damaged threads.

WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
ASSEMBLY			
22. Water pump (1)	Pipe plug (2)	a. Secure pump (1) in machinist's vise. b. Screw In and tighten using 9116inch open-end wrench.	
23.	Elbow (3)	a. Screw In and tighten, to position noted during disassembly, using 9/16-Inch open-end wrench. b. Take pump (1) out of machinist's vise.	

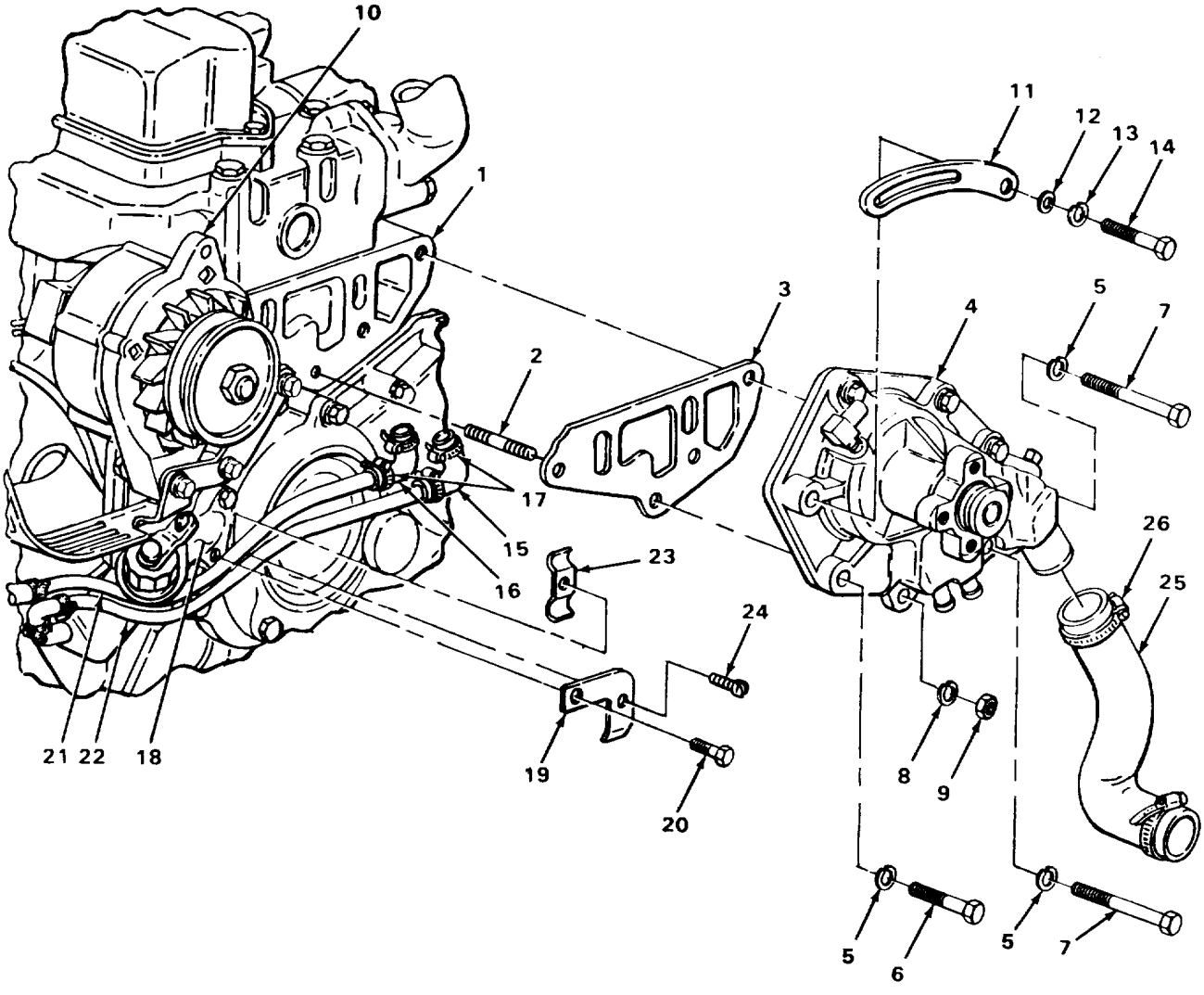


WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION		
24. Engine block (1)	Stud (2)	If removed, screw in and tighten using stud remover and setter and 1/2-inch drive ratchet handle.
25. Engine block (1) and stud (2)	New gasket (3) and water pump (4)	Put in place.
26. Water pump (4) and engine block (1)	Three new lock-washers (5) and screws (6 and 7)	Screw in but do not tighten.
27. Water pump (4) and stud (2)	New lockwasher (8) and nut (9)	Screw on but do not tighten.
28. Water pump (4), engine block (1) and stud (2)	Three screws (6 and 7) and nut (9) alternately tighten.	Using 9/16-inch, 318-inch drive socket, 6-inch extension, and ratchet handle,
29. Water pump (4) and ac generator (10)	Ac generator adjusting strap (11)	Put in place.
30. Ac generator adjust-ing strap (11) and water pump (4)	Washer (12), new lockwasher (13), and screw (14)	Screw in but do not tighten. Screw will be tightened during v-belt installation.
31. Water pump (4)	Two hoses (15 and 16) with assembled two clamps (17)	Push on.
32. Two hoses (15 and 16)	Two clamps (17) tighten.	Using 3/16-inch flat-tip screwdriver,
33. Filler neck (18)	Clip plate (19)	Put in place.
34. Clip plate (19) and filler neck (18) handle.	Screw (20)	Screw in and tighten using 9/16-inch, 3/8-inch drive socket and ratchet
35. Two pipes (21 and 22)	Clamp (23)	Put on..

WATER PUMP - CONTINUED

LOCATION	ITEM	ACTION REMARKS
36. Clip plate (19) and clamp (23)	Screw (24) flat-tip screwdriver.	Screw In and tighten using 3/16-inch
37. Water pump (4)	Lower radiator hose (25) with assembled clamp (26)	Push on.
38. Lower radiator	Clamp (26) hose (25)	Using 3/16-inch flat-tip screwdriver, tighten.



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WATER PUMP - CONTINUED

NOTE

FOLLOW-ON MAINTENANCE:

1. Install thermostat hoses and clamps (page 2-400).
2. Install fan blade and pulley (page 2-431).

TASK ENDS HERE

V-BELT

This task covers:

a. Removal (page 2-416)
b. Inspection/Replacement (page 2-420)
c. Installation (page 2-420)

INITIAL SETUP

Tools

Bar, pinch, 26-inch
Clamp, C, 4-inch
Handle, ratchet, 3/8inch drive
Socket, 3/18inch drive, 1/2-inch
Socket, 3/8-inch drive, 9/16-inch
Wrench, box, 9/16-inch
Wrench, torque, 3/8-inch drive, 0 to 60 N.m capacity

Materials/Parts

Lockwasher, alternator adjusting strap screw

Materials/Parts - Continued

NOTE

The following material only applies to loader backhoes with Serial Numbers 319995 thru 342573.

Sealing compound, thread (item 24, Appendix C)

Personnel Required

One

Equipment Condition

Radiator removed (page 2-371)

LOCATION	ITEM	ACTION	REMARKS

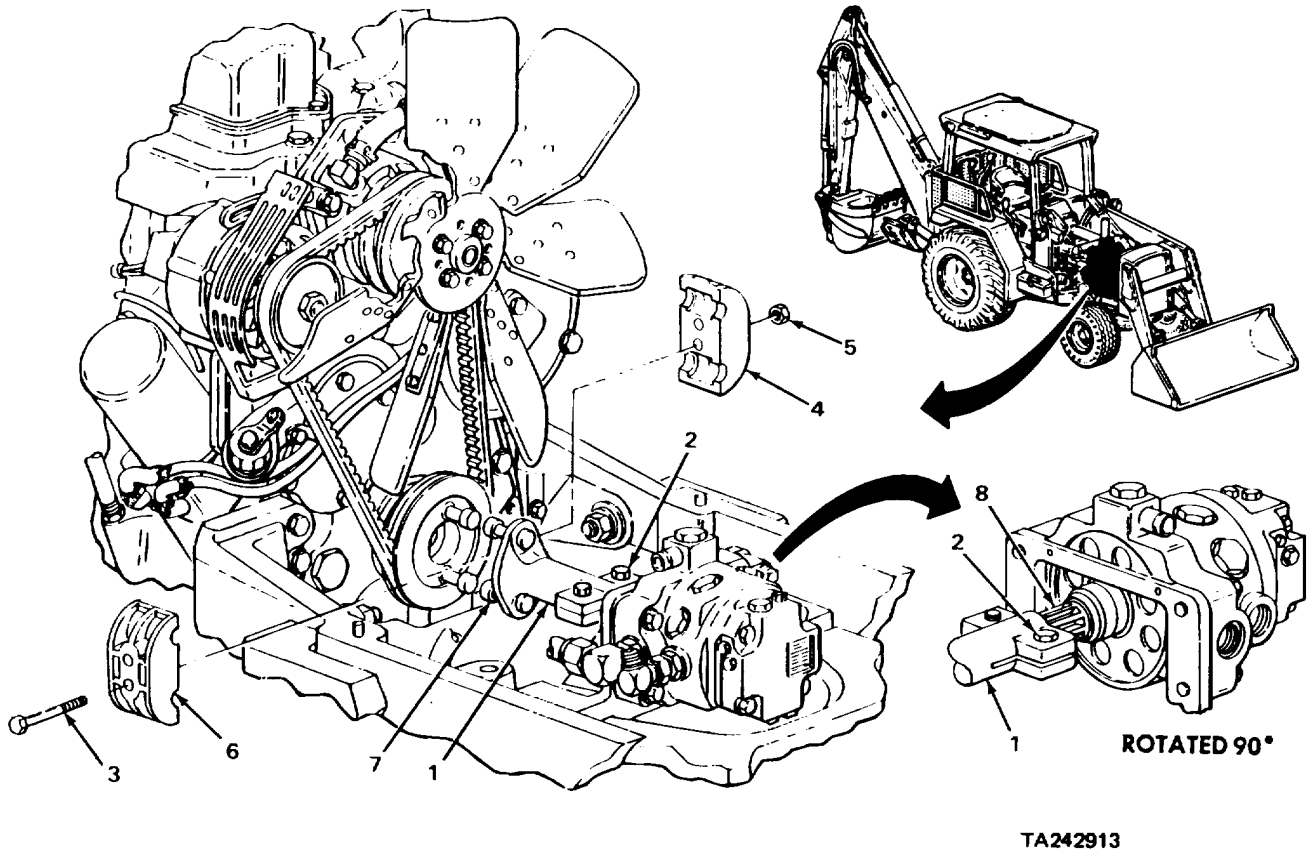
REMOVAL

NOTE

Steps 1 thru 5 only apply to loader backhoes with Serial Numbers 235786 thru 235999.

V.BELT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
1. Pump drive shaft (1)	Two screws (2)	Using 9/16-inch, 3/8-inch drive socket and ratchet handle, loosen.
2 Two screws (3) and half coupler (4)	Two special nuts (5)	Using 9/16-inch, 318-inch drive socket and ratchet handle, unscrew and take off.
3. Two half couplers (4 and 6)	Two screws (3)	Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out.
4. Four rubber sets (7)	Two half couplers (4 and 6)	Take off.
5. Hydraulic pump shaft (8)	Pump drive shaft (1)	Using 26-inch pinch bar, slide forward.



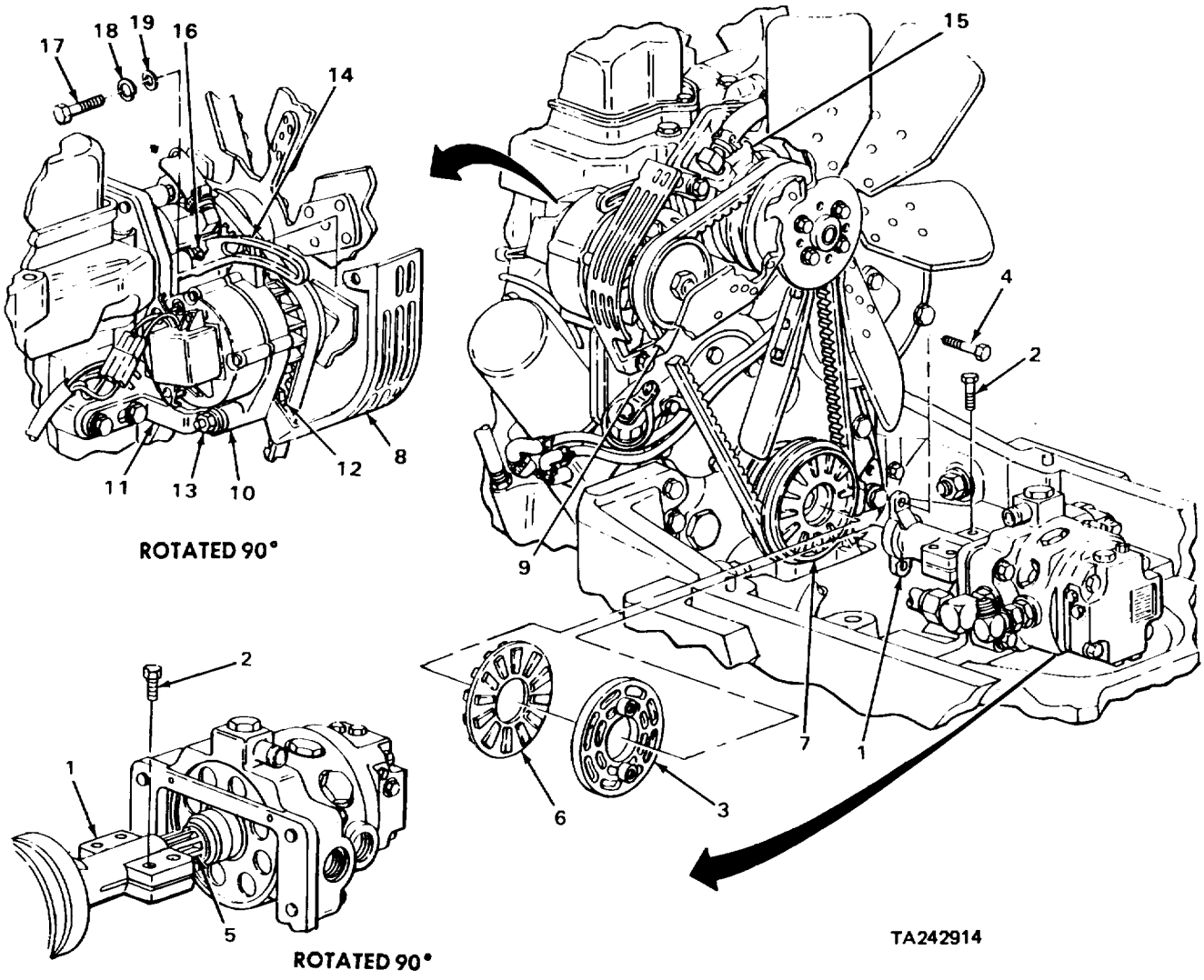
TA242913

V-BELT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
REMOVAL - CONTINUED		
	NOTE	
	Steps 6 thru 10 only apply to loader backhoes with Serial Numbers 319995 thru 342573.	
6. Pump drive shaft (1)	Four screws (2)	a. If necessary, using 26-inch pinch bar, rotate shaft (1) to access. b. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out.
7. Pump drive shaft (1) and coupling front half (3)	Two screws (4)	a. Using 26-inch pinch bar, hold shaft (1) to keep it from turning. b. Using 9/16-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out.
8. Hydraulic pump shaft (5) and coupling front half (3)	Pump drive shaft (1)	Using 26-inch pinch bar, slide forward along pump shaft (5).
9. Coupling cushion (6)	Coupling front half (3)	Take off.
10. Coupling rear half (7)	Coupling cushion (6)	Take off.
	NOTE	
	Some loader backhoes have ac generator fan and belt guard, some do not.	
11. Guard (8), if present, engine accessory bracket (9), ac generator (10), and double angle bracket (11)	Screw (12) and nut (13) loosen.	Using 9/16-inch box wrench, 9/16-inch, 3/18-inch drive socket, and ratchet handle,
12. Ac generator adjusting strap (14) and water pump (15)	Screw (16)	Using 9/16-inch box wrench, loosen.

V-BELT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
13. Ac generator adjusting strap (14) guard (8), if present, and ac generator (10)	Screw (17), lockwasher (18), and washer (19)	a. Using 1/2-inch, 3/8-inch drive socket and ratchet handle, unscrew and take out. b. Get rid of lockwasher (18).

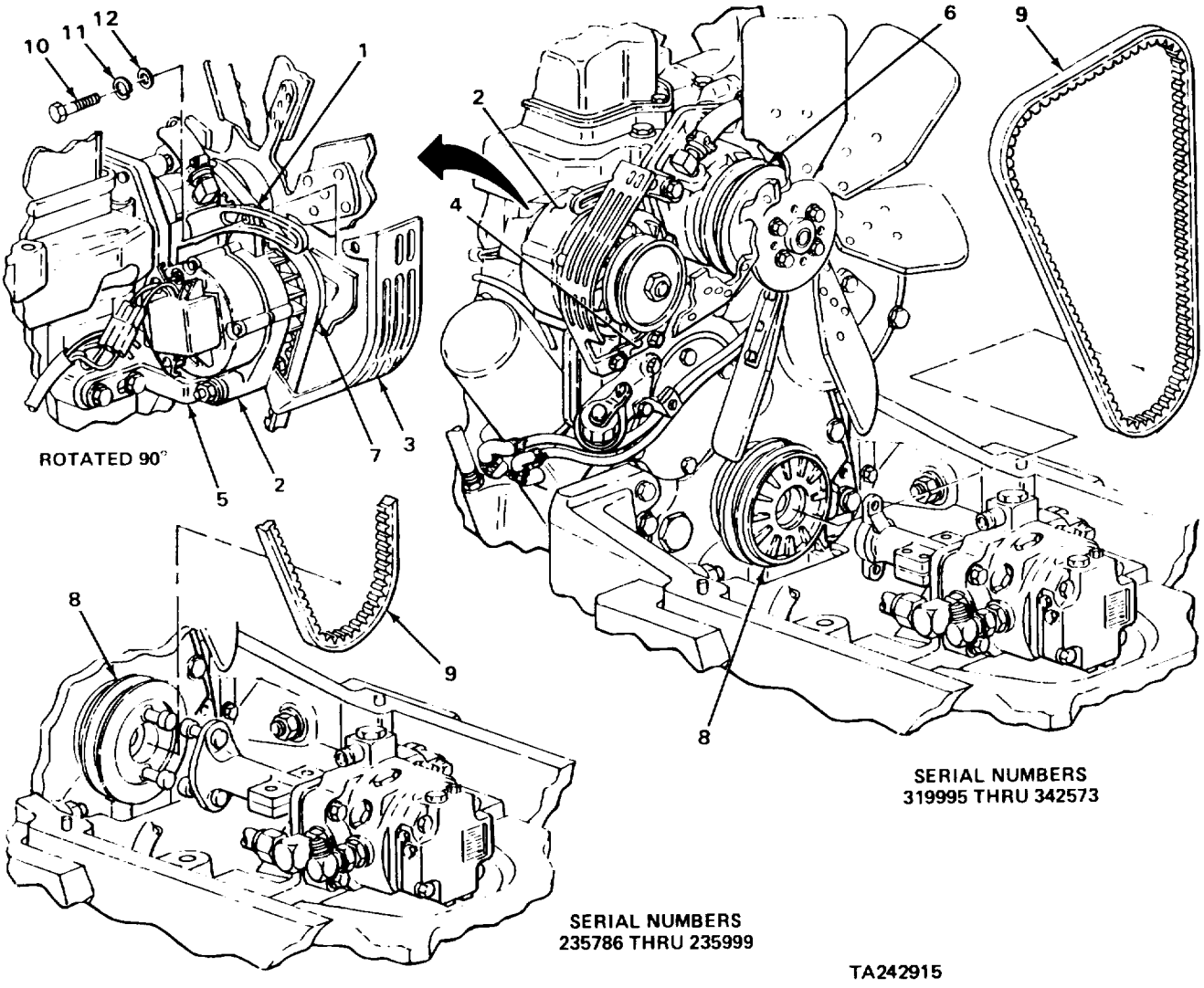


V-BELT - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
REMOVAL- CONTINUED		
14. Ac generator adjusting strap (1) and ac generator (2)	Guard (3), if present	Pivot away from.
15. Engine accessory bracket (4) and double angle bracket (5)	Ac generator (2)	Push toward fan pulley (6).
16. Ac generator pulley (7), fan pulley (6) and crankshaft pulley (8)	V-belt (9)	Take off.
INSPECTION/REPLACEMENT		
NOTE		
For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).		
Replace defective parts as needed.		
17.	V-belt (9)	Look for glazing, cracks, breaks, broken cords, separated plies, and signs of running in bottom of pulley grooves.
INSTALLATION		
18. Ac generator pulley (7), fan pulley (6), and crankshaft pulley (8)	V-belt (9)	Put in place in pulley grooves.
19. Engine accessory bracket (4) and double angle bracket (5)	Ac generator (2)	Pull away from fan pulley (6). **Make sure V-belt is properly seated In each pulley groove.**
NOTE		
Some loader backhoes have ac generator fan and V-belt guard, some do not.		

V-BELT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
20. Ac generator (2) and adjusting strap (1)	Guard (3), if present	Pivot up into place.
21. Ac generator adjusting strap (1), guard (3), if present, and ac generator (2)	Screw (10), new lockwasher (11), and washer (12)	Screw in but do not tighten.



V-BELT - CONTINUED

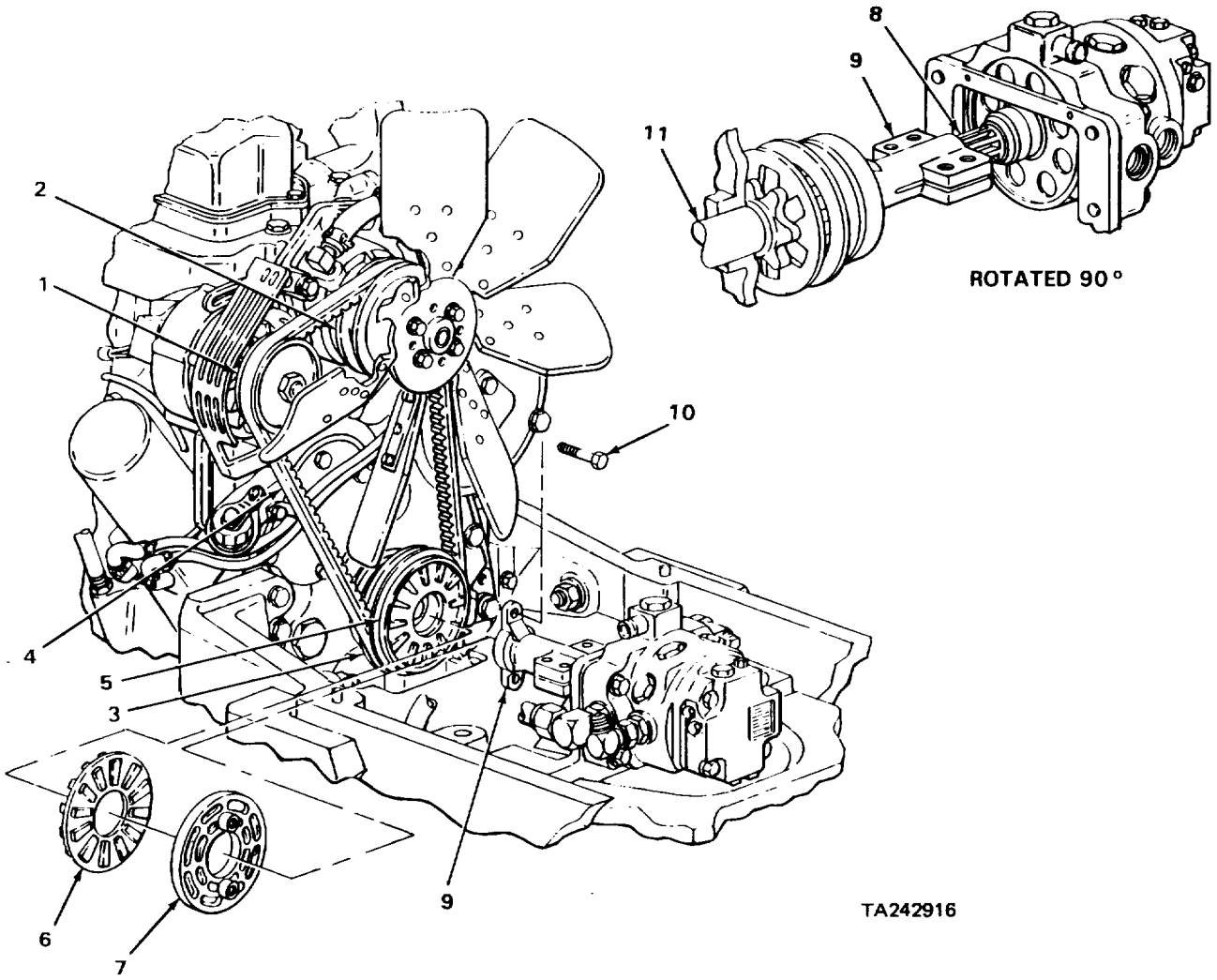
LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
22. Ac generatory pulley (1), fan pulley (2), and crankshaft pulley (3)	V-belt (4)	Adjust (page 2-427).
NOTE **Steps 23 thru 30 only apply to loader backhoes with Serial Numbers 319995 thru 342573.**		
23. Coupling rear half (5)	Coupling cushion (6)	Put on. **Make sure teeth in cushion engage teeth in coupling**.
24. Coupling cushion (6)	Coupling front half (7)	Put on. **Make sure teeth in coupling engage teeth in cushion**.
25. Hydraulic pump shaft (8) and coupling front half (7)	Pump drive shaft (9)	Using 26-inch pinch bar, slide toward rear along pump shaft (8) until up against coupling front half (7).
26. Pump drive shaft (8) and coupling front half (7)	Two screws (10)	a. Using 26-inch pinch bar, hold shaft (8) to keep it from turning. b. Screw in until snug using 9/16-inch, 3/8-inch drive socket and ratchet handle. c. Using 9/16-inch, 3/8-inch drive socket and 0 to 60 N•m capacity torque wrench, alternately tighten to 32 to 38 foot-pounds (44 to 51 N•m) torque.

CAUTION

Do not overtighten Cclamp holding coupling halves together or parts may be misalined causing vibration damage.

V-BELT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
27. Pump drive shaft (8) and crankshaft (11)	Coupling front half (7), coupling cushion (6), coupling rear half (5), and crankshaft pulley (3)	Using 4-inch C-clamp, clamp together. Tighten C-clamp Just tight enough to keep parts in place.

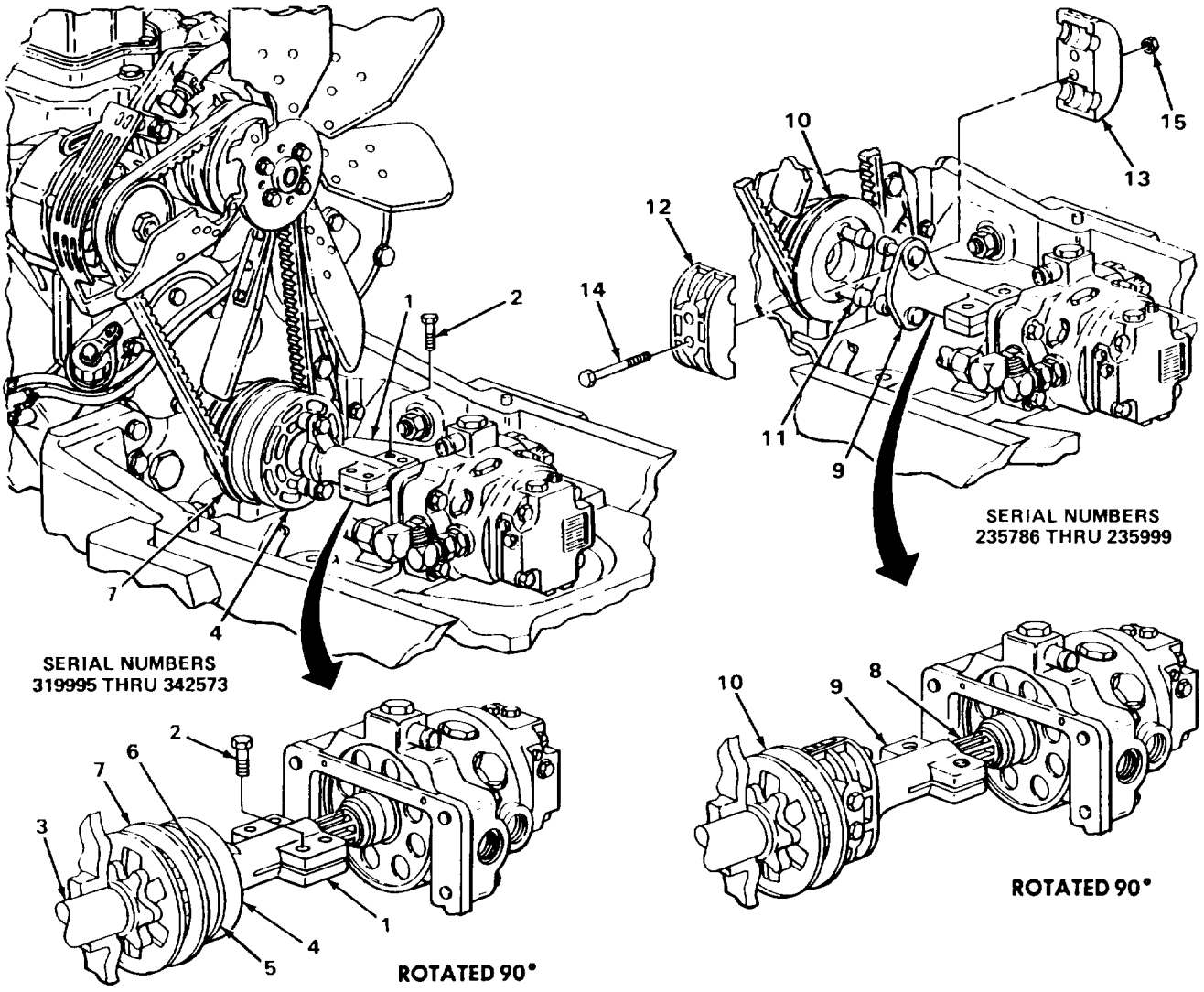


V-BELT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
INSTALLATION - CONTINUED		
28. Pump drive shaft (1)	Four screws (2)	a. If necessary, using 26-inch pinch bar, rotate shaft (1) to access. b. Apply 2 or 3 drops of thread sealing compound to screw threads. c. Screw in until snug using 9/16-inch, 3/8-inch drive socket and ratchet handle. d. Using 9/16-inch, 3/8-inch drive socket and 0 to 60 N•m capacity torque wrench, tighten to 32 to 38 foot-pounds (44 to 51 N•m) torque.
29. Pump drive shaft (1) and crankshaft (3)	Coupling front half (4), coupling cushion (5), coupling rear half (6), and crankshaft pulley (7)	Take off C-clamp.
	NOTE **Steps 30 thru 34 only apply to loader backhoes with Serial Numbers 235786 thru 235999.**	
30. Hydraulic pump shaft (8)	Pump drive shaft (9)	Using 26-inch pinch bar, slide toward rear along pump shaft (8) toward crankshaft pulley (10).
31. Four rubber sets (11)	Two half couplers (12 and 13)	Put on. **Rubber sets should seat in channels of half couplers with no metal to metal contact.**
32. Two half couplers (12 and 13)	Two screws (14)	a. Screw in and alternately tighten until snug using 9116-inch, 3/8-inch drive socket and ratchet handle. b. Using 9/16-inch, 3/8-inch drive socket and 0 to 60 N•m torque wrench, alternately tighten to 23 to 27 foot-pounds (32 to 36 N•m) torque.

V-BELT - CONTINUED

LOCATION	ITEM	ACTION	REMARKS
33. Two screws (14) and half coupler (13)	Two special nuts (15)	a. Screw on and alternately tighten until snug using 9/16-inch, 3/8inch drive socket and ratchet handle. b. Using 9/16-inch, 3/8inch drive socket and 0 to 60 N•m torque wrench, alternately tighten to 23 to 27 foot-pounds (32 to 36 N•m) torque.	

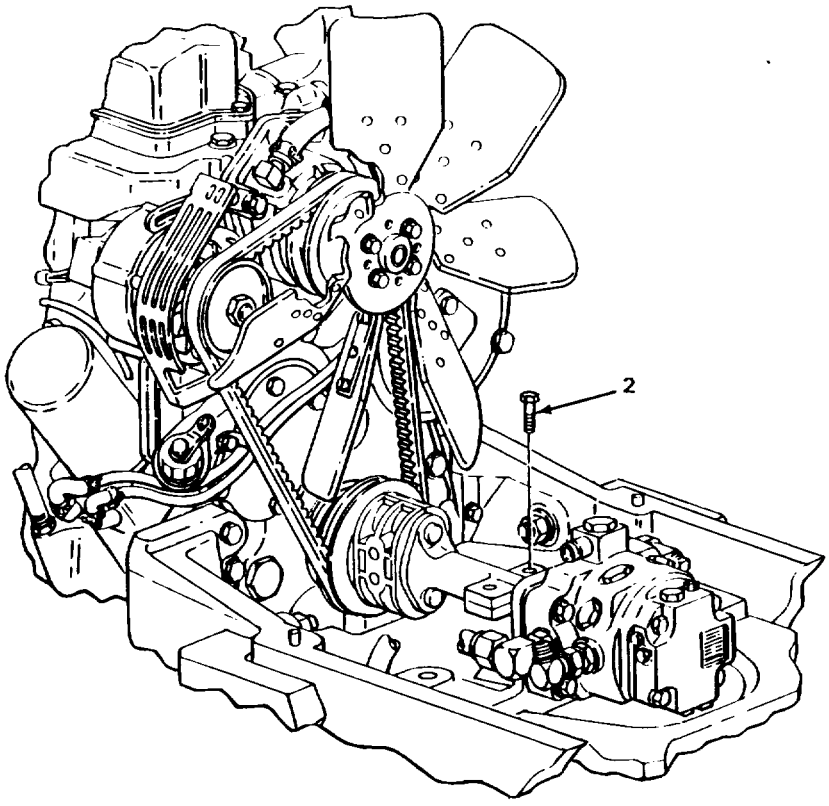


V-BELT - CONTINUED

LOCATION	ITEM	ACTION	REMARKS

INSTALLATION - CONTINUED

34.	Pump drive shaft (1)	Two screws (2)	a. Screw in and alternately tighten until snug using 9116-inch, 3/8-inch drive socket and ratchet handle. b. Using 9/16-inch, 38-inch drive socket and 0 to 60 N•m torque wrench, alternately tighten to 23 to 27 foot-pounds (32 to 36 N•m) torque.



TA242918

NOTE

FOLLOW-ON MAINTENANCE: Install radiator (page 2-371).

TASK ENDS HERE

TA242918

V-BELT ADJUSTMENT

This task covers:

Adjustment (page 2-427)

INITIAL SETUP:

Tools
- Handle, ratchet, 3/8-inch drive
- Rule, steel, machinist's, 6inch
- Scale, dial indicating, 0 to 50-pound range
- Socket, 3/8-inch drive, 1/2-inch
- Socket, 318-inch drive, 9/16-inch
- Wrench, box, 9/16-inch

Personnel Required
- One

LOCATION	ITEM	ACTION	REMARKS

ADJUSTMENT

NOTE

If installing V-belt, skip steps 1 thru 3.

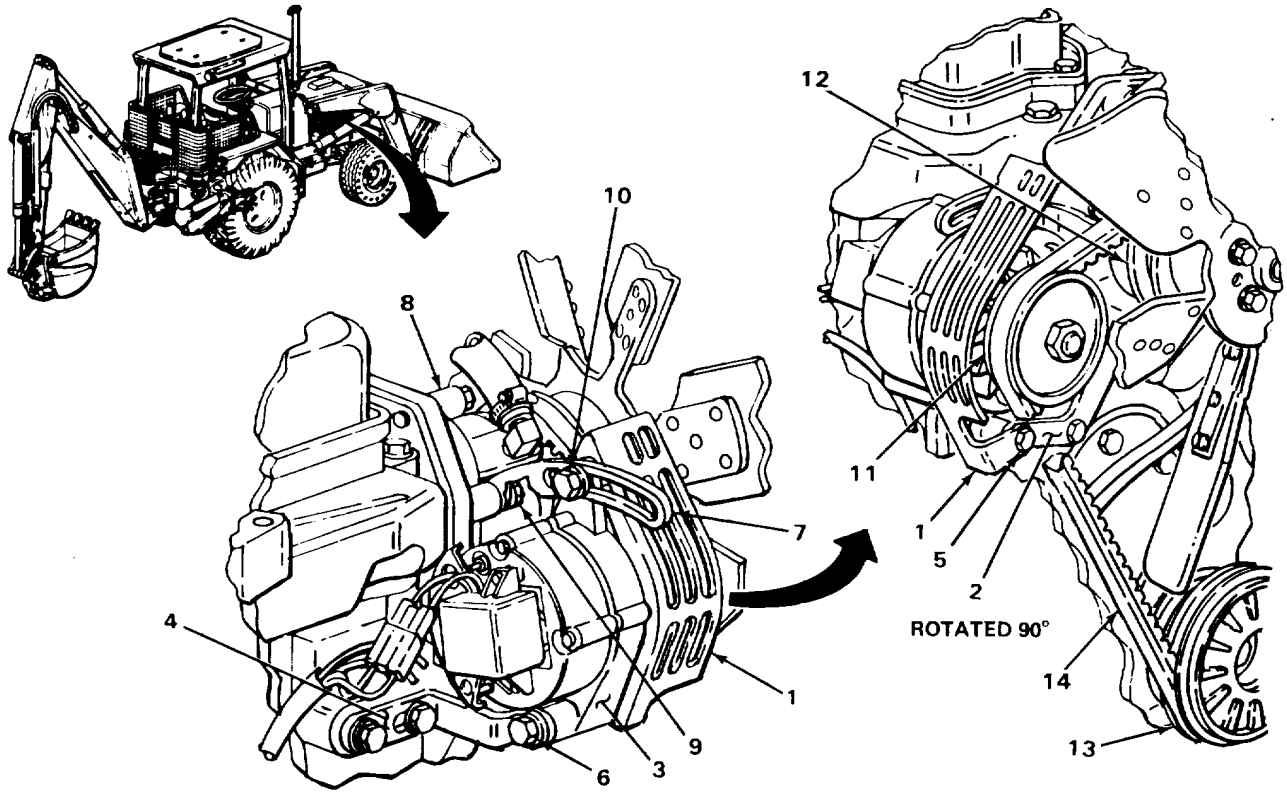
Some loader backhoes have ac generator fan and V-belt guard, some do not.

V-BELT ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ADJUSTMENT - CONTINUED		
1. Guard (1), if present, engine accessory bracket (2), ac generator (3), and double angle bracket (4)	Screw (5) and nut (6)	Using 9/16-inch box wrench, 9/16-Inch, 3/8-inch drive socket, and ratchet handle, loosen.
2. Ac generator adjusting strap (7) and water pump (8)	Screw (9)	Using 9/16-inch box wrench, loosen.
3. Ac generator adjusting strap (7), guard (1), if present, and ac generator (3)	Screw (10)	Using 1/2-inch, 3/8-inch drive socket and ratchet handle, loosen.
	CAUTION	
	Apply force to ac generator front husing only. Force applied to rear housing may damage parts.	
4. Ac generator adjusting strap (7), engine accessory bracket (2), and double angle bracket (4)	Ac generator (3)	a. Pull awayfromfan pulley (11), putting tension on V-belt (12). b. Hold in position. **Make sure V-belt is properly seated in each pulley groove.**
5. Ac generator adjusting strap (7), guard (1), if present, and ac generator (3)	Screw (10)	Using 1/2-inch, 3/8-inch drive socket and ratchet handle, tighten.
6. Ac generator pulley (13), fan pulley (11), and crankshaft pulley (14)	V-belt (12)	Using 0 to 50-pound range dial indicating scale and 6-inch machinist's steel rule, measure tension. **V-belt should deflect 3/4-nch (19 mm) with 20 pound (89 N) force applied midway between ac generator pulley and crankshaft pulley.**

V-BELT ADJUSTMENT - CONTINUED

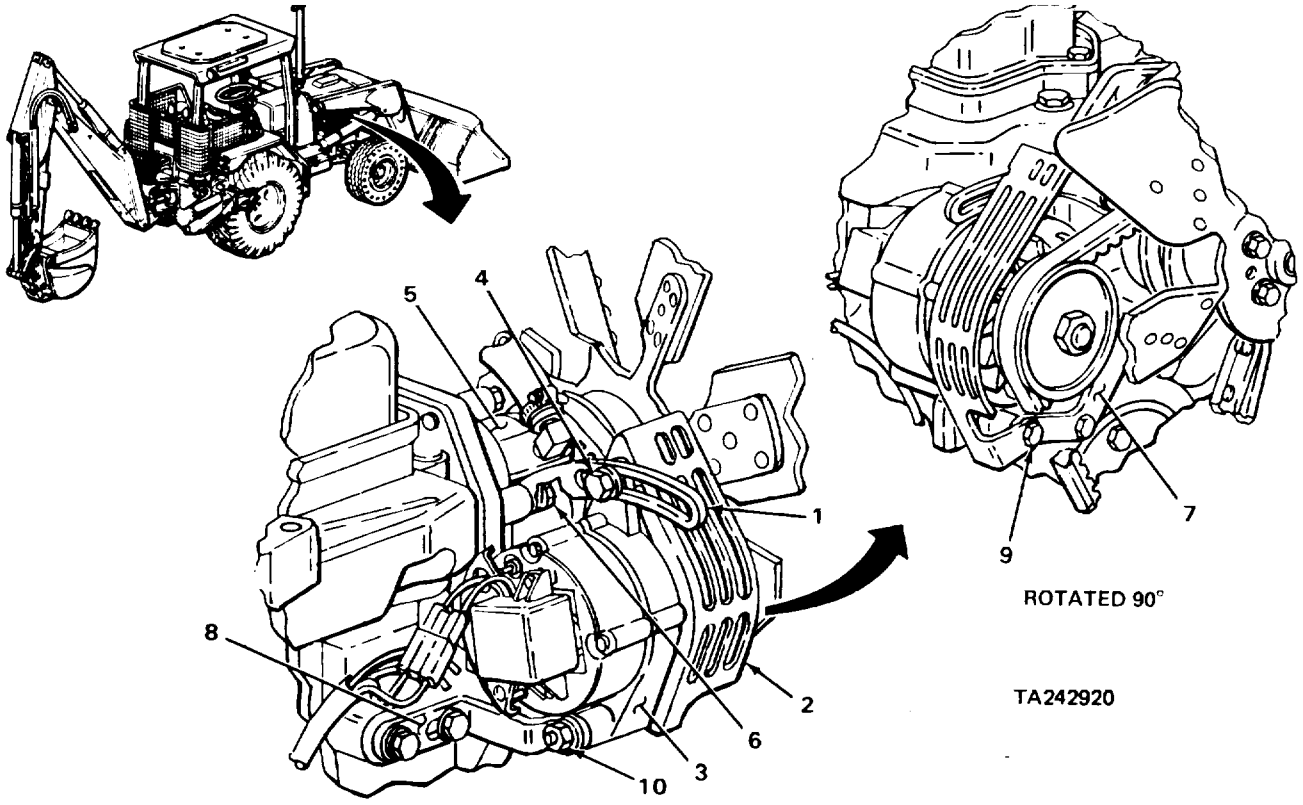
LOCATION	ITEM	ACTION / REMARKS
	NOTE	
	If V-belt tension is correct, skip steps 7 thru 9.	
7. Ac generator adjusting strap (7), guard (1), If present, and ac generator (3)	Screw (10)	Using 1/2-inch, 3/8-inch drive socket and ratchet handle, loosen.
8. Ac generator adjusting strap (7), engine accessory bracket (2), and double angle bracket (4)	Ac generator (3)	a. To increase V-belt tension, move farther away from fan pulley (11). b. To decrease V-belt tension, move closer to fan pulley (11). c. Hold in position while performing Step 9.



TA242919

V-BELT ADJUSTMENT - CONTINUED

LOCATION	ITEM	ACTION REMARKS
ADJUSTMENT - CONTINUED		
9. Ac generator adjusting strap (1), guard (2), if present, and ac generator (3)	Screw (4)	a. Using 1/2-inch, 3/8-inch drive socket and ratchet handle, tighten. b. Repeat steps 6 thru 8.
10. Ac generator adjusting strap (1) and water pump (5)	Screw (6)	Using 9/16-inch box wrench, tighten.
11. Guard (2), if present, engine accessory bracket (7), ac generator (3), and double angle bracket (8)	Screw (9) and nut (10)	Using 9/16-inch box wrench, 9/16-inch, 3/8-inch drive socket, and ratchet handle, tighten.



TASK ENDS HERE

FAN BLADE AND PULLEY

This task covers:

a. Removal (page 2-431)
b. Cleaning (page 2-432)
c. Inspection/Replacement (page 2-432)
d. Installation (page 2-433)

INITIAL SETUP:

Tools
Handle, ratchet, 3/&inch
Socket, 3/8&inch drive, 9/16-lnch
Wrench, torque, 3/8-inch drive, 0 to 60 N.m capacity

Materials/Parts

Rags, wiping (item 21, Appendix C)
Solvent, drycleaning (item 28, Appendix C)

Materials/Parts - Continued

NOTE

The following part only applies to loader backhoes with Serial Numbers 319995 thru 342573.

Lockwasher, fan screw (four required)

Personnel Required

One

Equipment Condition
V-belt removed (2-416)

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

NOTE

Loader backhoes with Serial Numbers 235786 thru 235999 do not use lockwashers on fan blade screws.

FAN BLADE AND PULLEY - CONTINUED

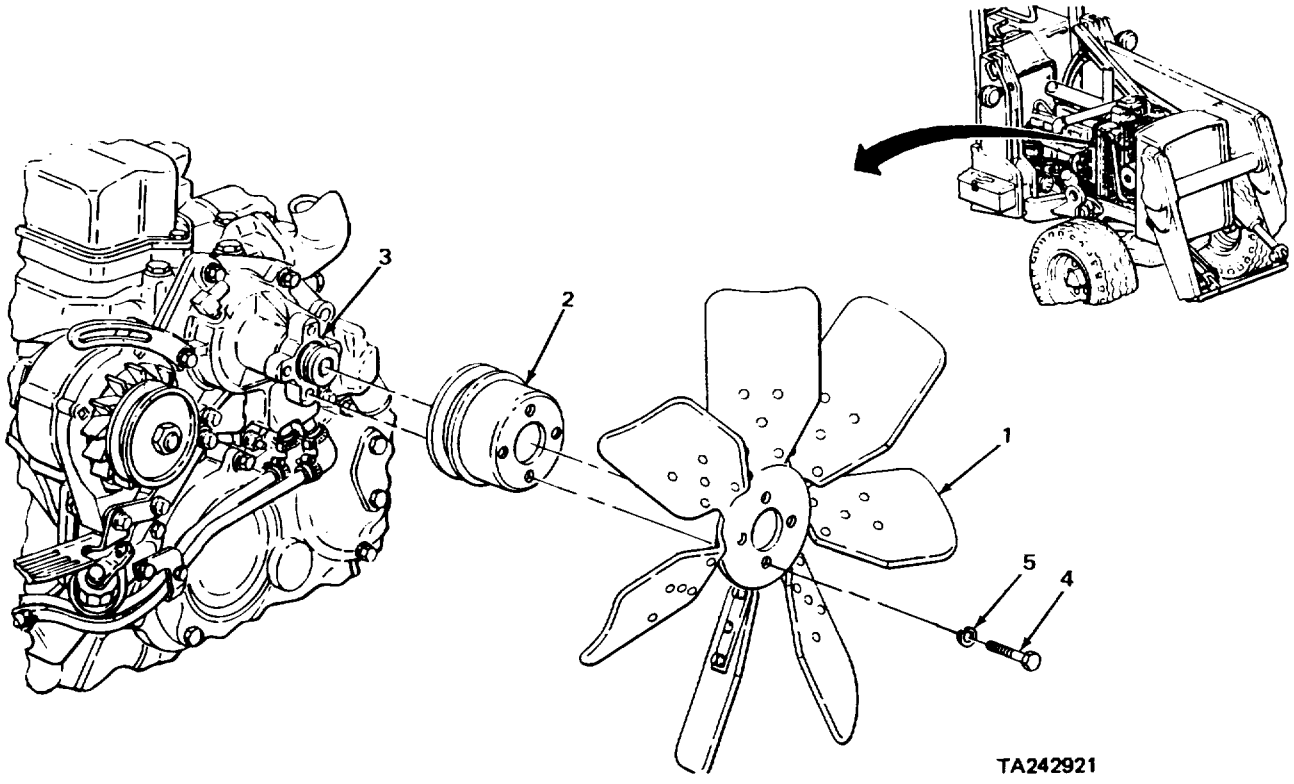
LOCATION	ITEM	ACTION REMARKS
REMOVAL - CONTINUED		
1. Fan blade (1), fan pulley (2), and fan hub (3)	Four screws (4) and lockwashers (5), if present	a. Hold fan blade to keep it from turning. b. Using 9/16-inch, 3/Sinch drive socket and ratchet handle, unscrew and take out. c. Get rid of lockwashers (5).
2. Fan hub (3) and fan pulley (2)	Fan blade (1)	Take off.
3. Fan hub (3)	Fan pulley (2)	Take off.
CLEANING		
	NOTE **For more information on how to clean parts, go to General Maintenance Instructions (page 2-137).**	
	WARNING **Drycleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flashpoint is 100°F to 1380F (380 to 590C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.**	
4.	All metal parts	a. Clean in drycleaning solvent. b. Using clean, dry rags, wipe dry.
INSPECTION/REPLACEMENT		
	NOTE **For more information on how to inspect parts, go to General Maintenance Instructions (page 2-137).**	
	Replace defective parts as needed.	
5.	All metal parts	Look for cracks, breaks, and abnormal bends.

FAN BLADE AND PULLEY - CONTINUED

LOCATION	ITEM	ACTION REMARKS
6.	All threaded parts	Look for damaged threads.
INSTALLATION		
7. Fan hub (3)	Fan pulley (2)	Put on.
8. Fan hub (3) and fan pulley (2)	Fan blade (1)	Put on.

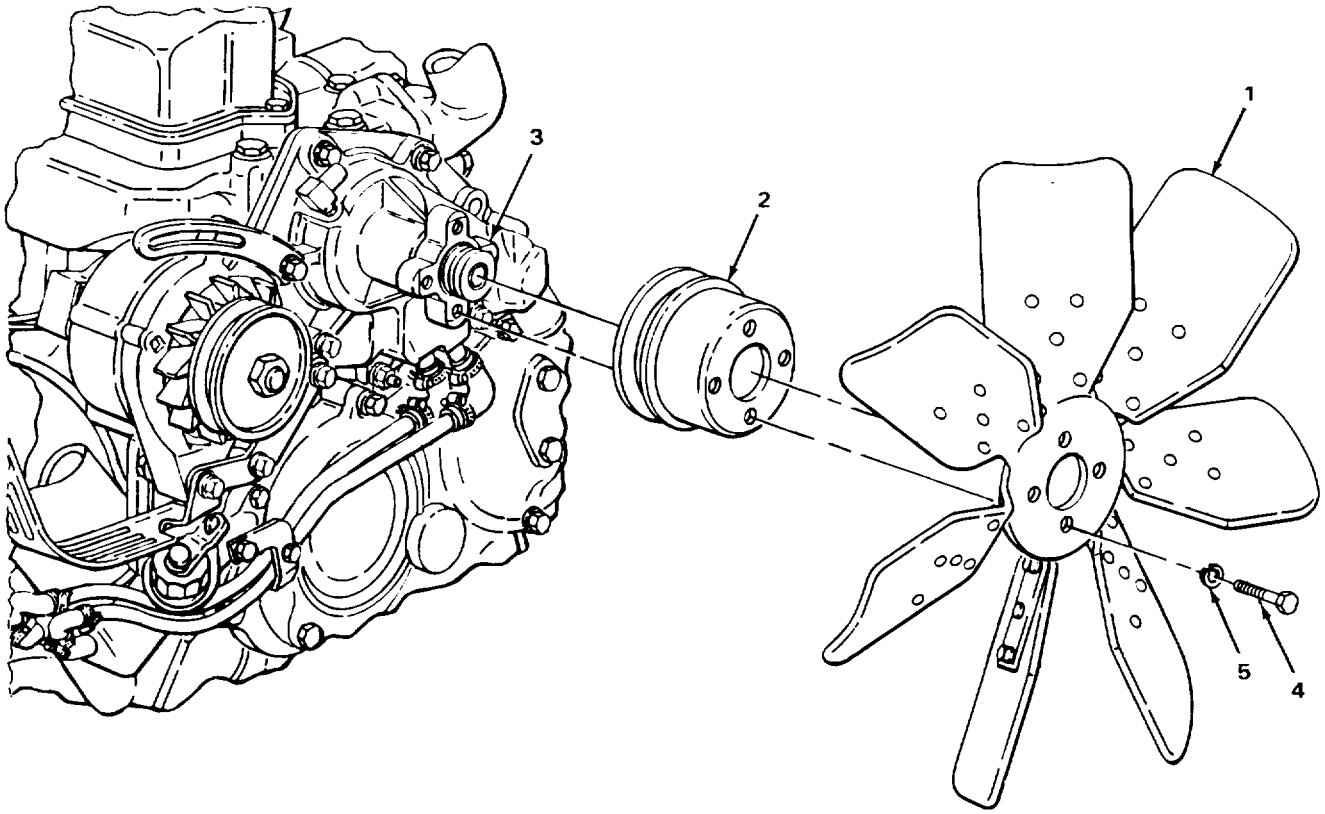
NOTE

Loader backhoes with Serial Numbers 235786 thru 235999 do not use lockwashers on fan blade screws.



FAN BLADE AND PULLEY - CONTINUED

LOCATION	ITEM	ACTION / REMARKS
INSTALLATION - CONTINUED		
9. Fan blade (1), fan pulley (2), and fan hub (3)	Four screws (4) and new lockwashers (5), if used	a. Hold fan (1) to keep it from turning. b. Screw in until snug using 9116-inch, 3/8-inch drive socket and ratchet handle. c. Using 9/16-inch, 3/8inch drive socket and 0 to 60 N•m capacity torque wrench, alternately tighten to 20 foot-pounds (27 N•m) torque.



TA242922

NOTE

FOLLOW-ON MAINTENANCE: Install V-belt (page 2-416).

TASK ENDS HERE

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By Order of the Secretary of the Army:

CARL E. VUONO
General United States Army
Chief of Staff

Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution: To be distributed in accordance with DA Form 12-25A, Unit Maintenance requirements for Tractor, Wheeled, Diesel, with Loader Backhoe, Model JD 410.

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P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches

1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches

1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches

1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet

1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches

1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

5/9 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

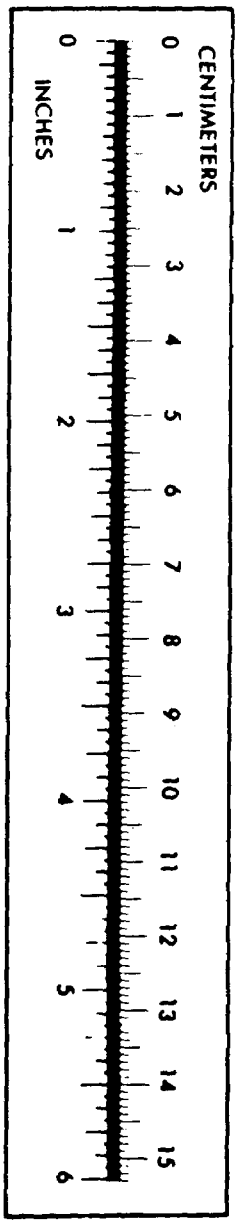
1 Kilogram = 1,000 Grams = 2.2 Lb.

1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square 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 Square 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
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square 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 Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



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