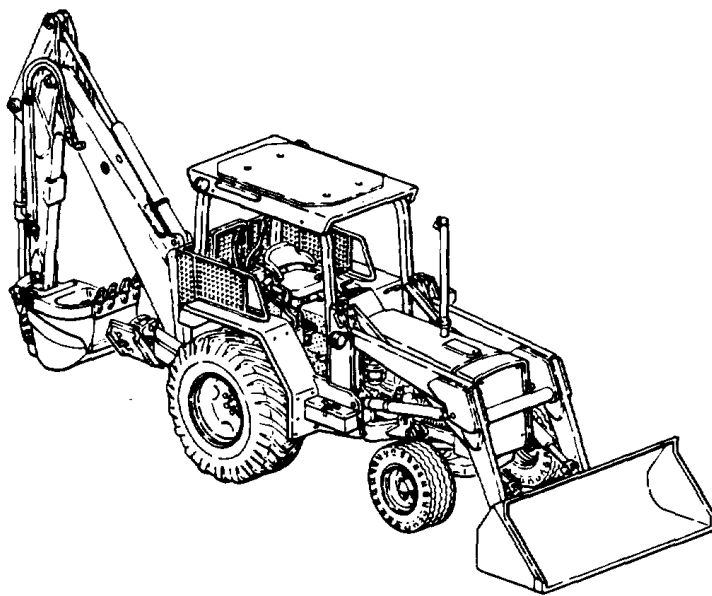


TECHNICAL MANUAL

**DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL**

FOR

**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)**



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This manual and LO 5-2420-222-12, TM 5-2420-222-20P, and TM 5-2420-222-34P supersede TM 5-2420-222-14&P-1, dated 1 January 1987, and TM 5-2420-222-14&P-2, dated 1 November 1986, including all changes.

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

26 AUGUST 1992

FOR INFORMATION ON FIRST AID, REFER TO FM 21-11.

WARNING

CARBON MONOXIDE EXHAUST GASES CAN KILL!

Carbon monoxide is a colorless, odorless, deadly poisonous gas which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in exhaust fumes of internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure safety of personnel when engine of loader backhoe is operated for any purpose.

- (1) DO NOT operate loader backhoe engine in enclosed areas.
- (2) DO NOT idle loader backhoe engine without ventilator blower operating.
- (3) BE ALERT at all times for exhaust odors.
- (4) BE ALERT for exhaust poisoning symptoms. They are:
 - Headache
 - Dizziness
 - Sleepiness
 - Loss of muscular control
- (5) If you see another person with exhaust poisoning symptoms:
 - Remove person from area.
 - Expose to fresh air.
 - Keep person warm.
 - Do not permit physical exercise.
 - Administer artificial respiration, if necessary.
 - Notify a medic.
- (6) BE AWARE: The field protective mask for chemical-biological-radiological (CBR) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation.

WARNING**ASBESTOS HAZARD**

DO NOT handle clutch assembly components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean clutch assembly components. Dust may be removed using an Industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.

WARNING**CLEANING AGENTS**

- Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138 F (38° C-59° C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.
- 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 (46° C). 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.
- Denatured alcohol is highly flammable and poisonous. Drinking this alcohol can cause blindness and death. Avoid inhaling its fumes. Keep away from open flames. Failure to follow this warning may result in serious injury or death to personnel.

WARNING**COMPRESSED AIR**

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

WARNING**ELECTRICAL SYSTEM**

- When troubleshooting an electrical malfunction or performing electrical maintenance, ALWAYS disconnect the battery cables. Failure to do so may result in injury or death due to electric shock.
- Battery acid (electrolyte) is extremely dangerous. Use care when removing battery caps. Serious injury to personnel may result if battery acid contacts skin or eyes.

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WARNING**HANDLING HEAVY COMPONENTS**

Use extreme caution when handling heavy parts. Lifting device is required when parts weigh over 50 lb (23 kg) for a single person lift, over 100 lb (45 kg) for a two person lift, and over 150 lb (68 kg) for a three or more person lift. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause serious injury or death to personnel.

WARNING**LIVE STEAM**

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

WARNING**NBC HAZARD**

If NBC exposure is suspected, all engine air cleaner air filter media should be handled by personnel wearing protective equipment. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.

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**DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL**

FOR

**TRACTOR, WHEELED,
DED, LOADER BACKHOE:
WITH HYDRAULIC IMPACT TOOL AND
WITH HYDRAULIC EARTH AUGER ATTACHMENT
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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, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

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*This manual and LO 5-2420-222-12, TM 5-2420-222-10, TM 5-2420-222-20-1, -20-2, -20-3, TM 5-2420-222-20P, and TM 5-2420-222-34P supersede TM 5-2420-222-14&P-1, dated 1 January 1987, and TM 5-2420-222-14&P-2, dated 1 November 1 1986, including all changes.

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HOW TO USE THIS MANUAL

This manual is designed to help maintain the John Deere Model JD410 Wheeled Tractor Loader Backhoe. This manual describes in detail the Direct Support and General Support Maintenance prescribed by the Maintenance Allocation Chart (see TM 5-2420-222-20) and Source, Maintenance, and Recoverability (SMR) Codes (see TM 5-2420-222-34P).

FEATURES OF THIS MANUAL:

- Bleed-to-edge indicators on the cover and on the edge of the applicable manual pages provide quick access to chapters most often used.
- A table of contents is provided for all chapters and sections.
- WARNINGS, CAUTIONS, NOTES, subject headings, and other important information are highlighted in bold print as visual aids.
- Statements and words of particular importance are printed in capital letters to create emphasis.
- Instructions are located together with illustrations that show the specific task or, which the technician is working
- An alphabetical index is provided at the end of the manual to assist in locating information not readily found in the table of contents.
- Technical instructions include metric units in addition to standard units. A metric conversion chart is provided on the inside back cover.

FOLLOW THESE GUIDELINES WHEN YOU USE THE MANUAL:

- Read through this manual and become familiar with its contents before proceeding to specific maintenance warning summary is provided at the beginning of this manual and should be read before performing any maintenance tasks.
- In the actual maintenance tasks, follow all WARNINGS, CAUTIONS, and NOTES. These are given immediately preceding the procedural steps to which they apply. If these instructions are not followed or care is not taken, injury to personnel or equipment damage may result.
- Within a chapter, section, or paragraph, headings are used to help group the material and assist in quickly finding tasks. Read all preliminary information found at the beginning of each task. After completing a task, ALWAYS perform the follow-on maintenance at the end of the task.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

Paragraph Number	Paragraph Title	Page Number
1-1	Scope	1-1
1-2	Maintenance Forms, Records, and Reports	1-1
1-3	Destruction of Army Materiel To Prevent Enemy Use.....	1-1
1-4	Reporting Equipment Improvement Recommendations (EIRs)	1-1

1-1. SCOPE.

This manual describes the troubleshooting and maintenance of the John Deere Model JD410 Wheeled Tractor Loader Backhoe for Direct Support and General Support Maintenance mechanics.

1-2. 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).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-3.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

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. Put it on an SF Form 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

Paragraph Number	Paragraph Title	Page Number
1-5	Differences Between Models	1-2
1-6	Equipment Data	1-2

1-5. DIFFERENCES BETWEEN MODELS.

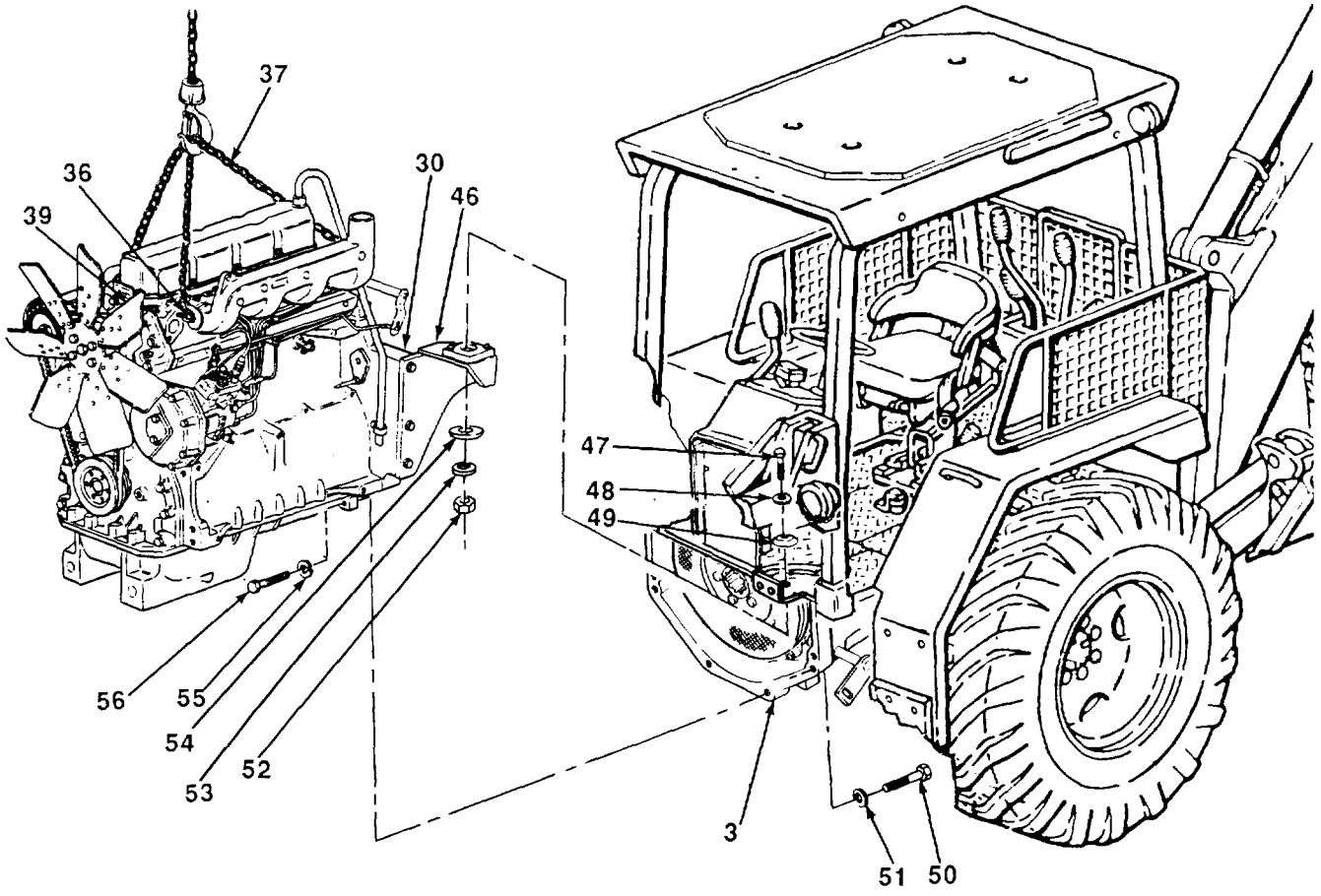
WARNING

Pay close attention to serial numbers when performing maintenance on this equipment. Installation of Incorrect part numbers may result in injury to personnel or damage to equipment.

Although all loader backhoes covered in this manual have the same model number, there are differences in configuration depending on the loader backhoe serial number. The two serial number breaks are 235786-235999 and 319995-342573. These two configurations differ primarily in transmission design and hydraulic line routing. Throughout this manual, where differences in configuration or equipment affect the maintenance, they are shown in detail. If the differences are minor or obvious, such as differences in exact appearance or location, and maintenance is not affected, typical equipment is shown.

1-6. EQUIPMENT DATA.

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

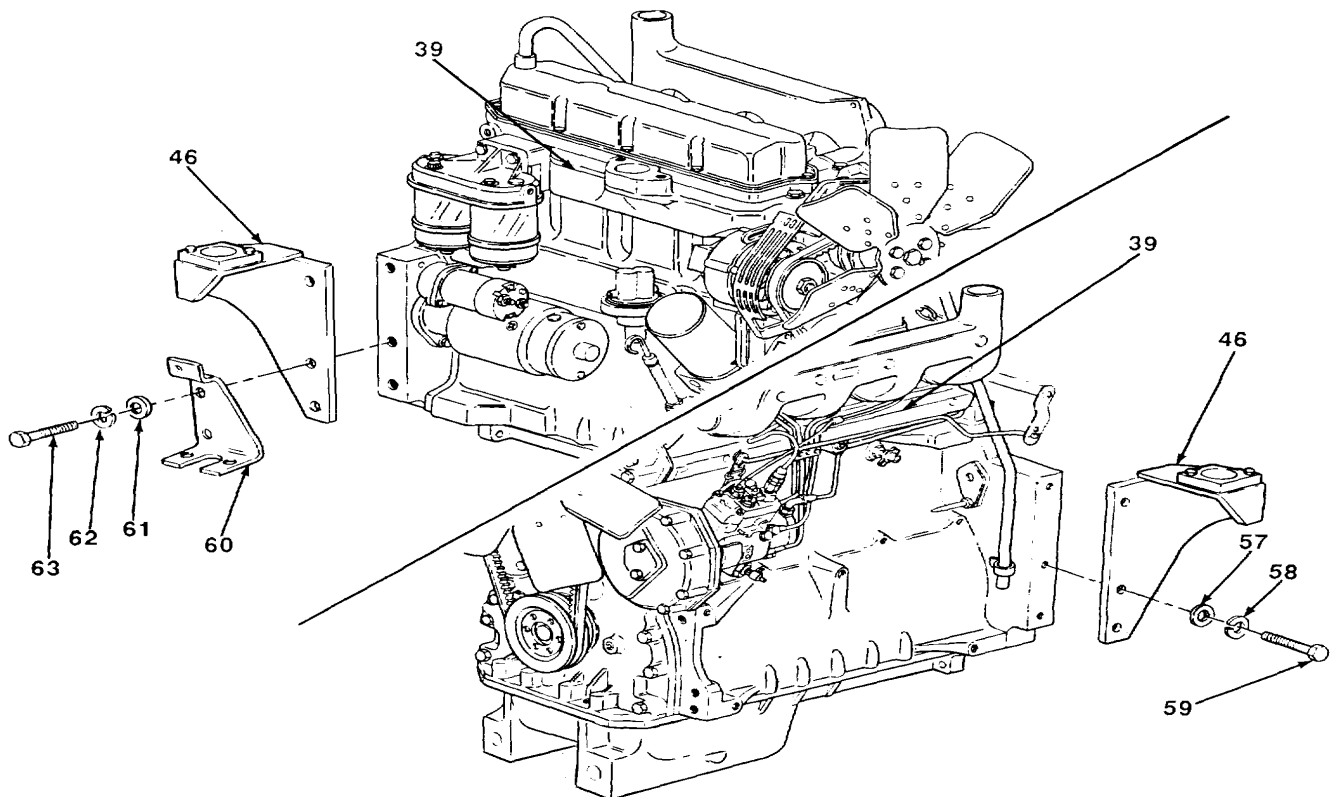


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3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).**NOTE**

**Loader backhoes with serial numbers 319995-342573 have washers.
Loader backhoes with serial numbers 235786-235999 do not have washers.**

22. Remove three screws (63), lockwashers (62), washers (61), accumulator bracket (60), and right bracket (46) from engine assembly (39). Discard lockwashers.
23. Remove three screws (59), lockwashers (58), washers (57), and left bracket (46) from engine assembly (39). Discard lockwashers.

**b. INSTALLATION****NOTE**

**Loader backhoes with serial numbers 319995-342573 have washers.
Loader backhoes with serial numbers 235786-235999 do not have washers.**

1. Install left bracket (46) on engine assembly (39) with three screws (59), new lockwashers (58), and washers (57).
2. Install right bracket (46) and accumulator bracket (60) on engine assembly (39) with three screws (63), new lockwashers (62), and washers (61). Torque screws (59 and 63) to 170 lb.-ft. (230 N•m).

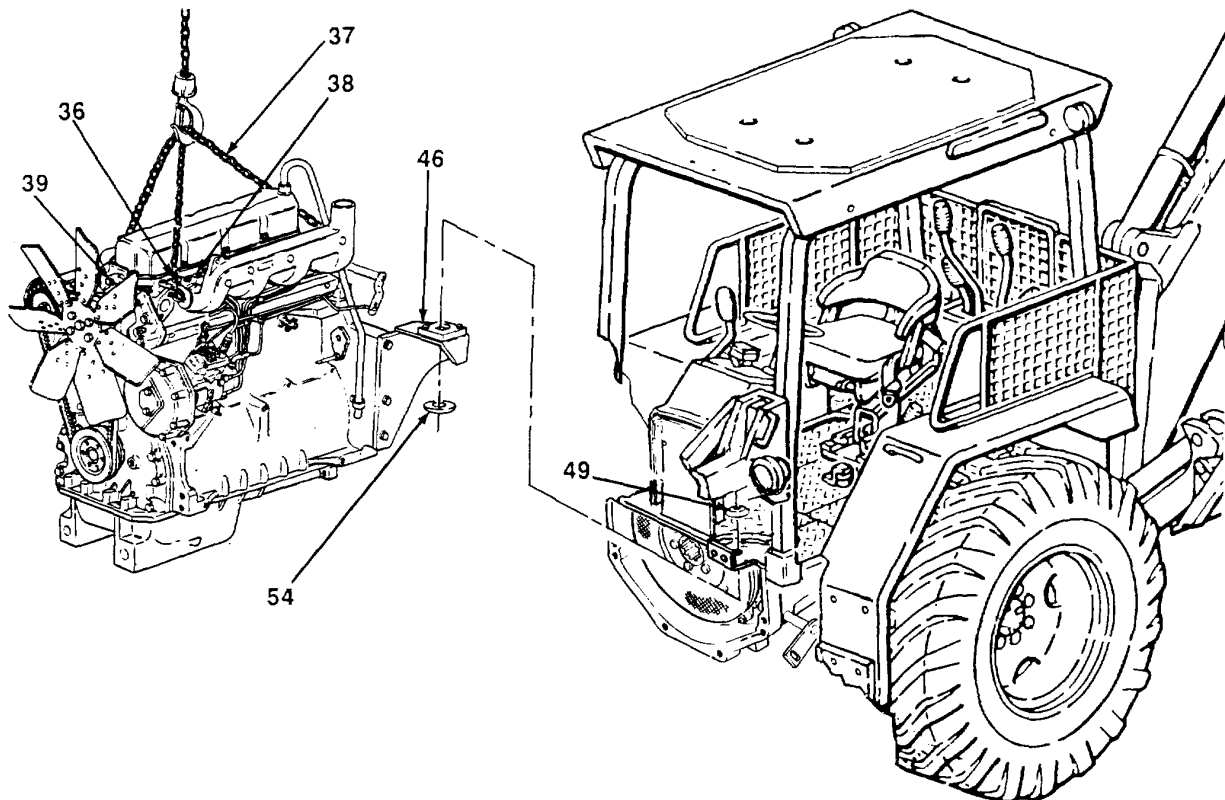
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3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).

3. Install three ½ in. -13 UNC threaded eyebolts (36) in lift points of cylinder head (38).
4. Position lifting device over engine assembly (39). Connect engine and transmission sling (37) to eyebolts (36) and to lifting device.

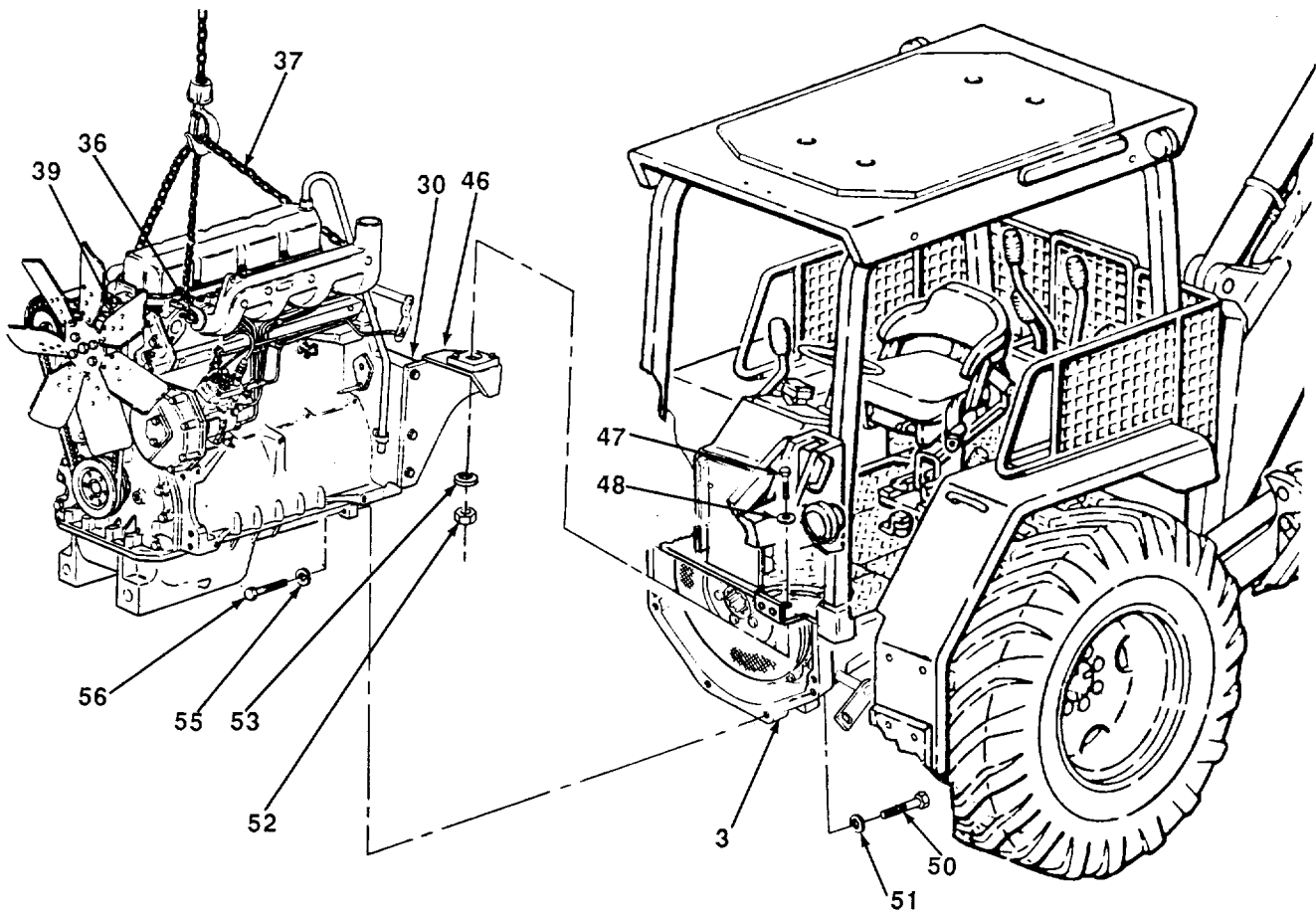
WARNING

- Use extreme caution when handling heavy parts. Lifting device is required when parts weigh over 50 lb (23 kg) for a single person lift, over 100 lb (45 kg) for a two person lift, and over 150 lb (68 kg) for a three or more person lift. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause serious injury or death to personnel.
 - Parts of clutch assembly will be coated with asbestos dust. Breathing this dust may be hazardous to your health. Use an approved filter mask for use against asbestos dust. Never use compressed air or a dry brush to clean these parts. Dust must be removed with an industrial-type vacuum cleaner equipped with a high efficiency filter system.
5. Using lifting device, raise engine assembly (39) off engine stand or wood blocks and position over loader backhoe.
 6. Install upper engine mount (49) and lower engine mount (54) in left and right brackets (46).



3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).

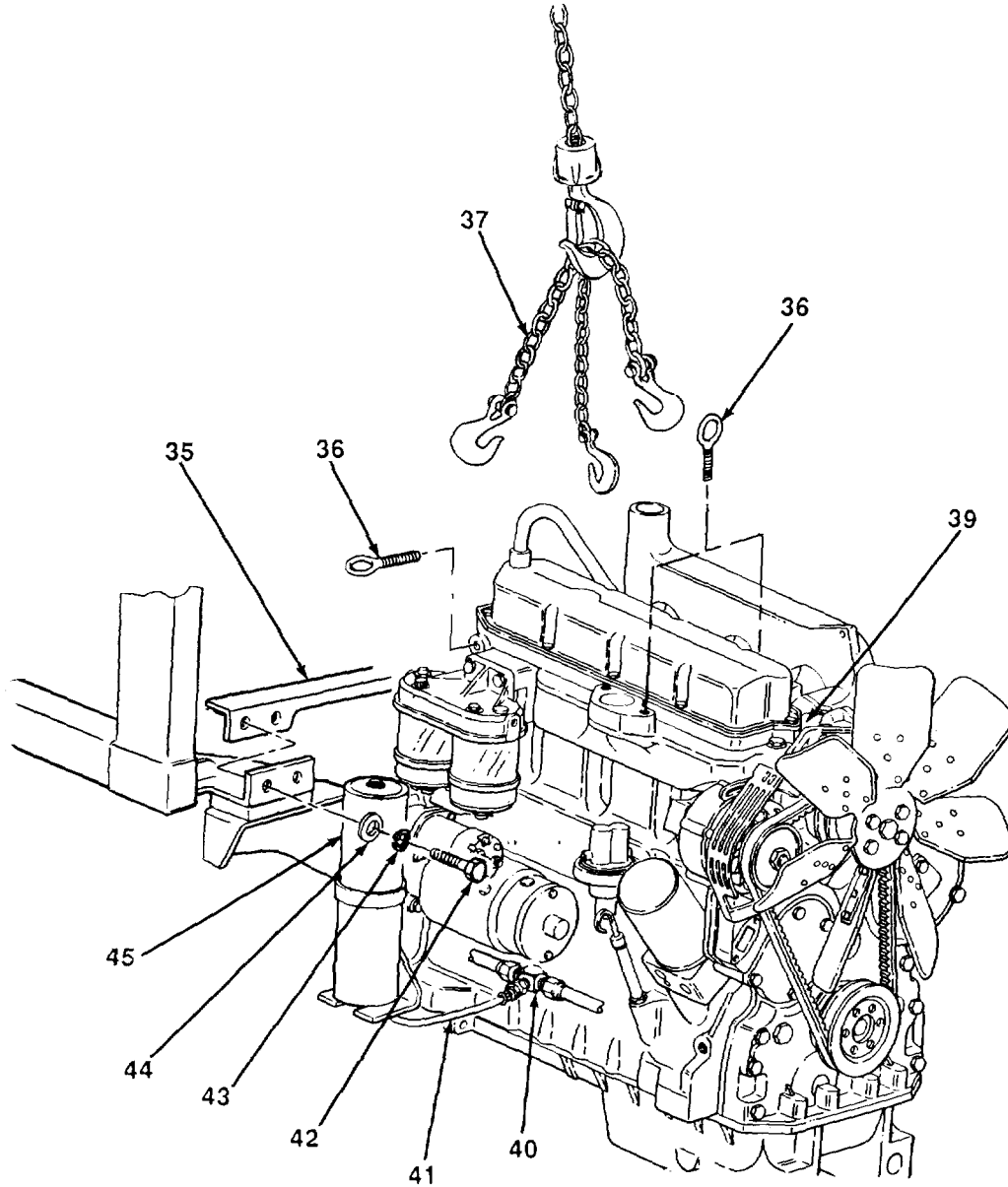
7. With two assistants, lower lifting device until engine assembly (39) is alined with reverser housing (3). Move lifting device rearward until engine assembly engages reverser housing.
8. Install two screws (47), new lockwashers (53), washers (48), and nuts (52) in left and right brackets (46).
9. Install two screws (56) and new lockwashers (55) in engine oil pan, flywheel housing (30) and reverser housing (3). Torque screws to 250 lb.-ft. (339 Nom).
10. Install four screws (50) and washers (51) in flywheel housing (30) and reverser housing (3). Torque screws to 250 lb.-ft. (339 N•m).
11. Position wood block under engine assembly (39). Remove lifting device, engine and transmission sling (37), and three eyebolts (36) from engine assembly.



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3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).

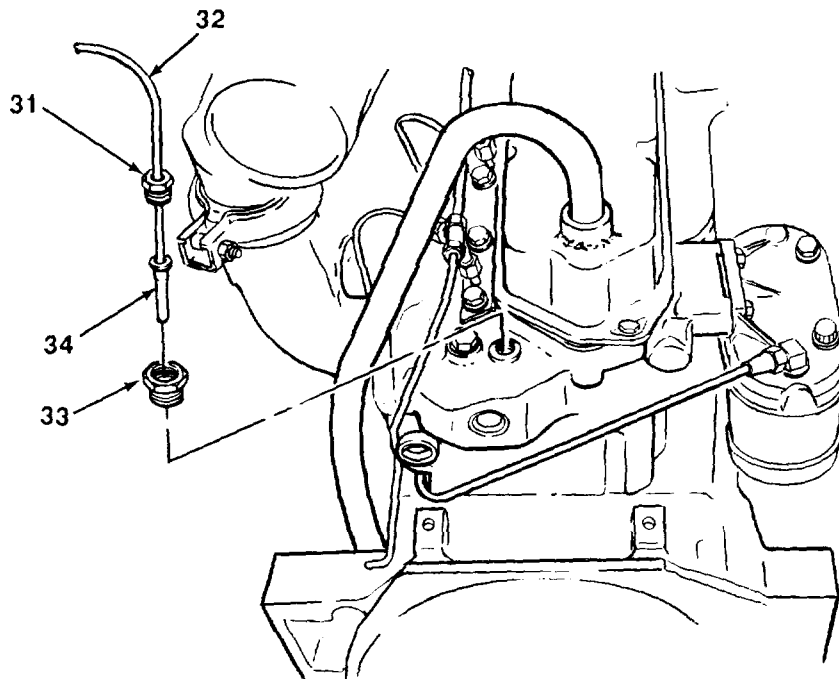
12. Position front crossmember (35) in place on canopy. Install four screws (42), new lockwashers (43), and washers (44).
13. Uncap tee (40) and remove plug from accumulator (45). Install pump pressure line-to-accumulator hose (41) to



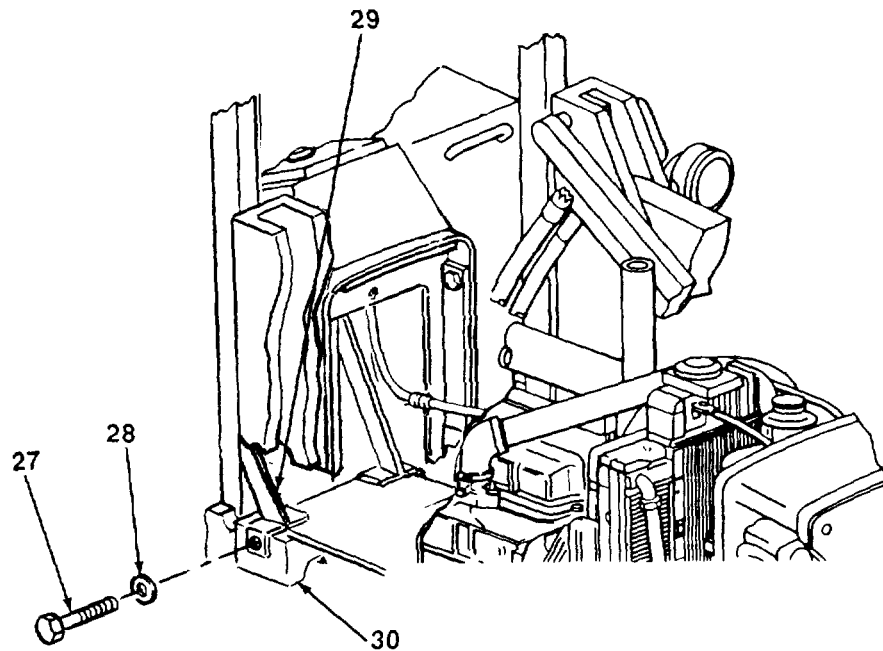
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3-3. ENGINE ASSEMBLY REPLACEMENT (Con't)

14. Install capillary tube (32) and water temperature sensor (34) in adapter (33). Tighten jamnut (31).

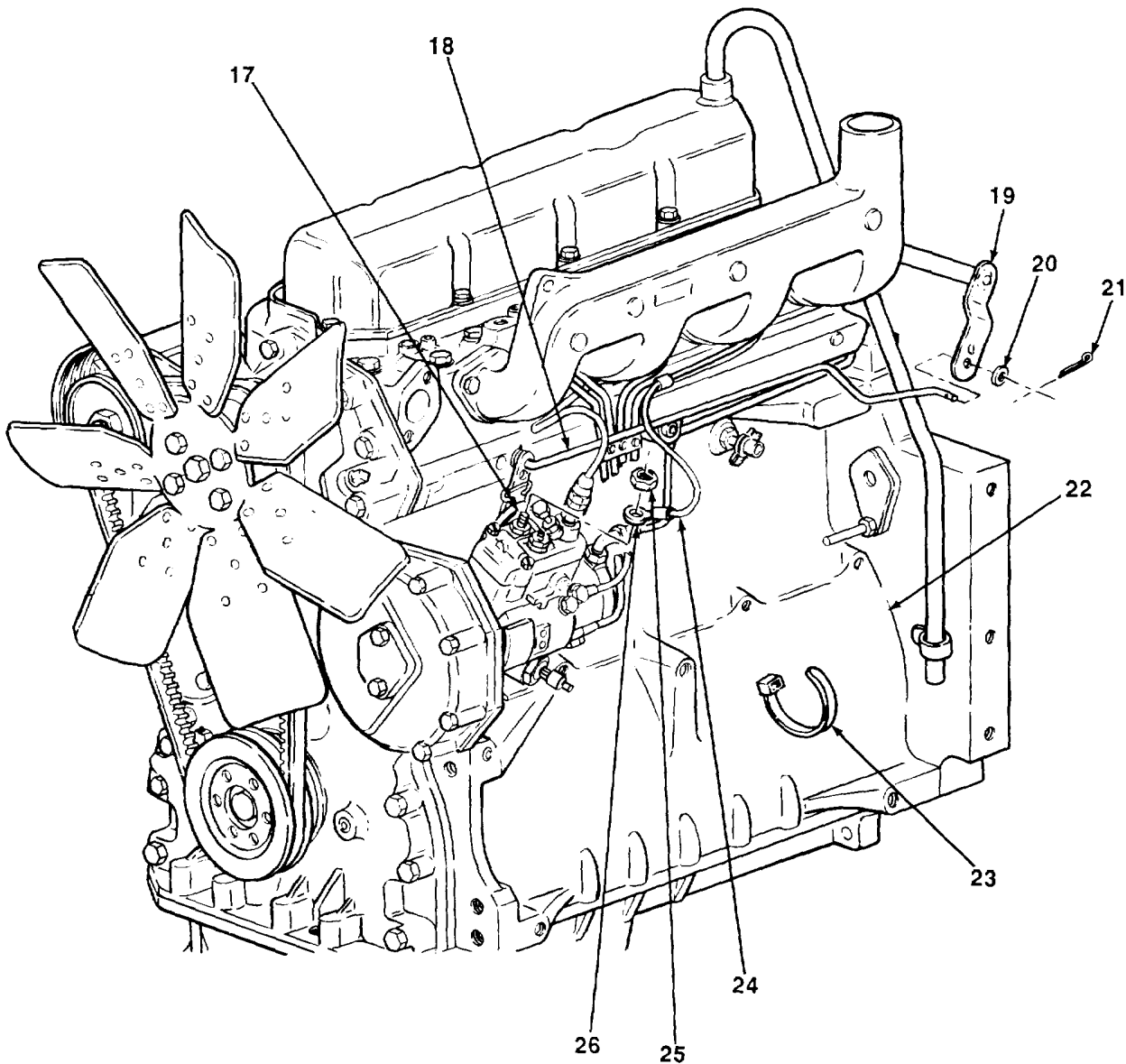


15. Install two screws (27) and new lockwashers (28) in flywheel housing (30) and cowl support (29).



3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).

16. Install main wiring harness fuel shutoff lead (24) in place on engine block (22). Install new tie-down bands (23) on main wiring harness fuel shutoff lead.
17. Position wiring harness terminal (26) in place on fuel injection pump shutoff solenoid terminal (17) and install new self-locking nut (25).
18. Remove adhesive tape from speed control rod (18) and engine block (22). Position speed control rod and washer (20) on shaft (19). Install new cotter pin (21) in shaft.

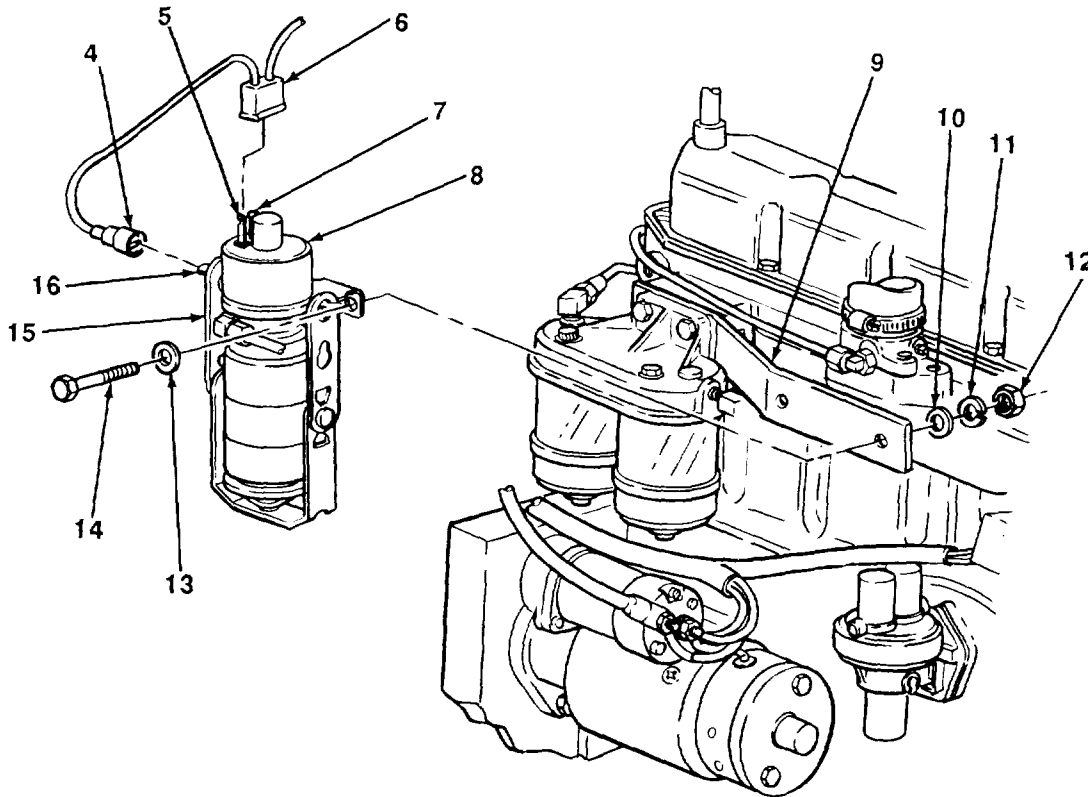


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3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).**NOTE**

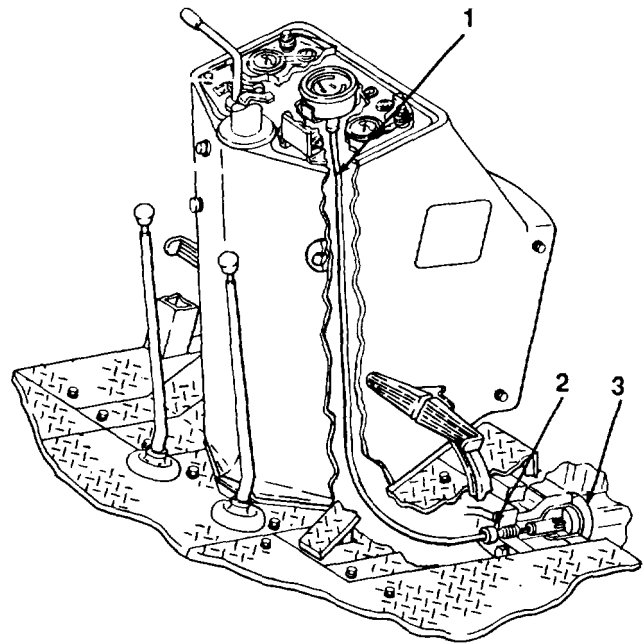
Steps 19 and 20 apply only to loader backhoes with serial numbers 235786-235999.

19. Position engine starting aid fluid injection solenoid (8) and bracket (15) on solenoid bracket (9) and secure with two screws (14), washers (10 and 13), new lockwashers (11), and nuts (12). Connect ground terminal (4) to terminal (16).
20. Install solenoid lead terminal (6) on engine starting aid fluid injection solenoid terminals (5 and 7).



3-3. ENGINE ASSEMBLY REPLACEMENT (Con't).

21. Install tachometer drive cable (1) and new gasket (2) in reverser housing (3).

**FOLLOW-ON TASKS:**

- Connect starter (see TM5-2420-222-20).
- Connect alternator (see TM5-2420-222-20).
- Install right inner platform ramp (see TM5-2420-222-20).
- Install accumulator tee-to-steering valve oil line (see TM5-2420-222-20).
- Install electric horn and bracket (see TM5-2420-222-20).
- Install steering valve oil lines (see TM5-2420-222-20).
- Install muffler (see TM5-2420-222-20).
- Install frame assembly front support (see paragraph 12-1).

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3-4. ENGINE BLOCK MAINTENANCE.*This Task Covers:*

- | | |
|----------------------------|-------------|
| a. Disassembly | c. Repair |
| b. Cleaning and Inspection | d. Assembly |

*Initial Setup:***Equipment Conditions:****NOTE**

Perform the following only on loader backhoes equipped with engine coolant heater.

- Engine coolant heater hoses and fittings removed (see TM5-2420-222-20).
- Engine coolant heater removed (see TM5-2420-222-20).

NOTE

Perform the following on all loader backhoes.

- Engine assembly removed (see paragraph 3-3).
- Cylinder block plate removed (see paragraph 3-7).
- Starter removed (see TM5-2420-222-20).
- Lubricating cooler (engine oil cooler) removed (see TM 5-2420-222-20).
- Flywheel housing removed (see paragraph 3-10).
- Cylinder sleeves removed (see paragraph 3-5).
- Crankshaft removed (see paragraph 3-8).
- Liquid level gage removed (see TM 5-2420-222-20).

Materials/Parts:

- Engine oil (Item 25, Appendix B)
- Rags (Item 28, Appendix B)
- Dry cleaning solvent (Item 31, Appendix B)
- Nonelectrical wire (Item 44, Appendix B)
- One crankshaft
- One rear bearing

Tools/Test Equipment:

- General mechanic's tool kit
- Field automotive shop set

Personnel Required: Two**General Safety Instructions:**

- Dry cleaning solvent is flammable and must not be used near open flame. Use only in a well ventilated area.
- Compressed air used for cleaning purposes should never exceed 30 psi (207 kPa).
- Avoid contact with live steam.

a. DISASSEMBLY

1. Remove four pipe plugs (14) from engine block (1).

NOTE

For loader backhoes equipped with engine coolant heater, skip step 2.

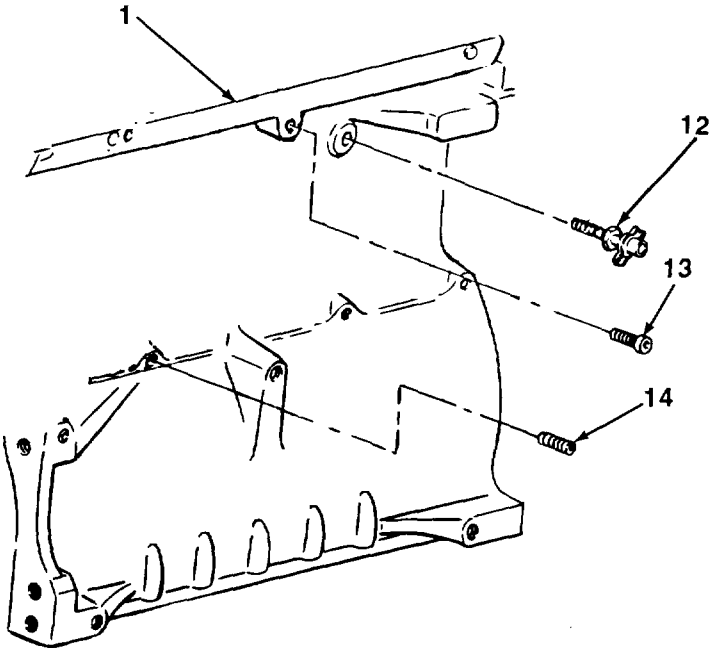
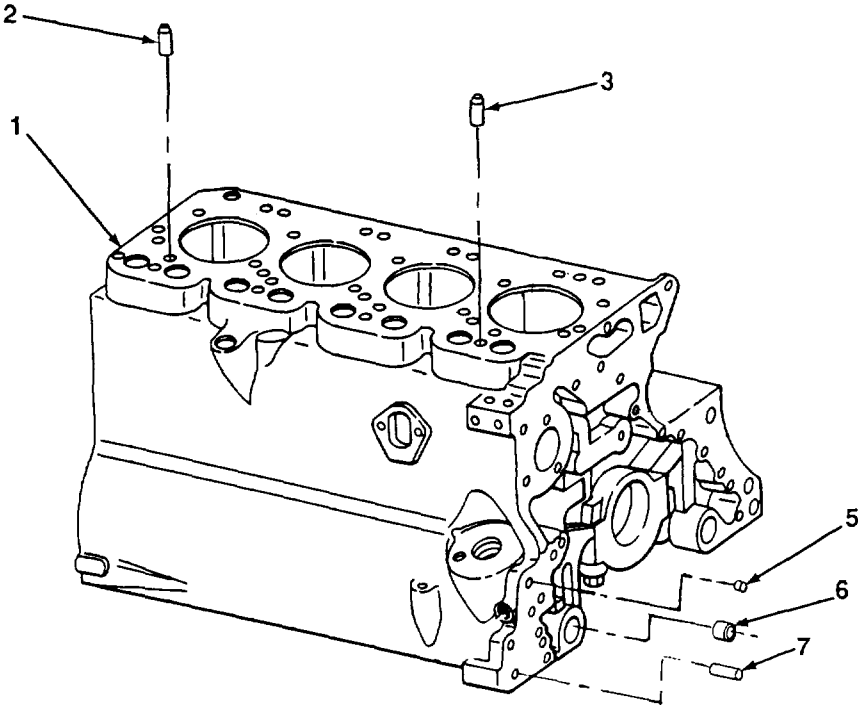
2. Remove pipe plug (13) and draincock (12) from engine block (1).

CAUTION

Do not remove pins, Studs, plugs, or sleeve bushing in steps 3 through 7 unless damaged. Removal may damage parts.

3. Remove two pins (2 and 3) from engine block (1).
4. Remove two plugs (5) from engine block (1).
5. Using gear and bearing mechanical puller, remove sleeve bushing (6) from engine block (1).
6. Remove two pins (7) from engine block (1).

3-4. ENGINE BLOCK MAINTENANCE (Con't).



3-4. ENGINE BLOCK MAINTENANCE (Con't).

7. Remove three studs (4) from engine block (1).
8. Remove side plug (8) from engine block (1).
9. Remove four fluid restrictors (11) from engine block (1).
10. Remove pipe plug (10) from engine block (1).

CAUTION

Do not remove pins unless damaged. Removal may damage parts.

11. Remove two pins (9) from engine block (1).

b. CLEANING AND INSPECTION**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.

1. Using steam cleaner, clean all internal passages and external holes and recesses of engine block free of corrosion, scaling, and foreign matter.

WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

2. Turn engine block so deposits will run out. Flush internal passages and external holes and recesses with clean water. Dry engine block with compressed air.

WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

3. Remove all gasket material from gasket surfaces, then wipe clean with dry cleaning solvent and rags.
4. Clean all other metal parts with dry cleaning solvent, then dry with rags.
5. Clean four fluid restrictors with dry cleaning solvent. Clear oil passages with nonelectrical wire. Wipe dry.



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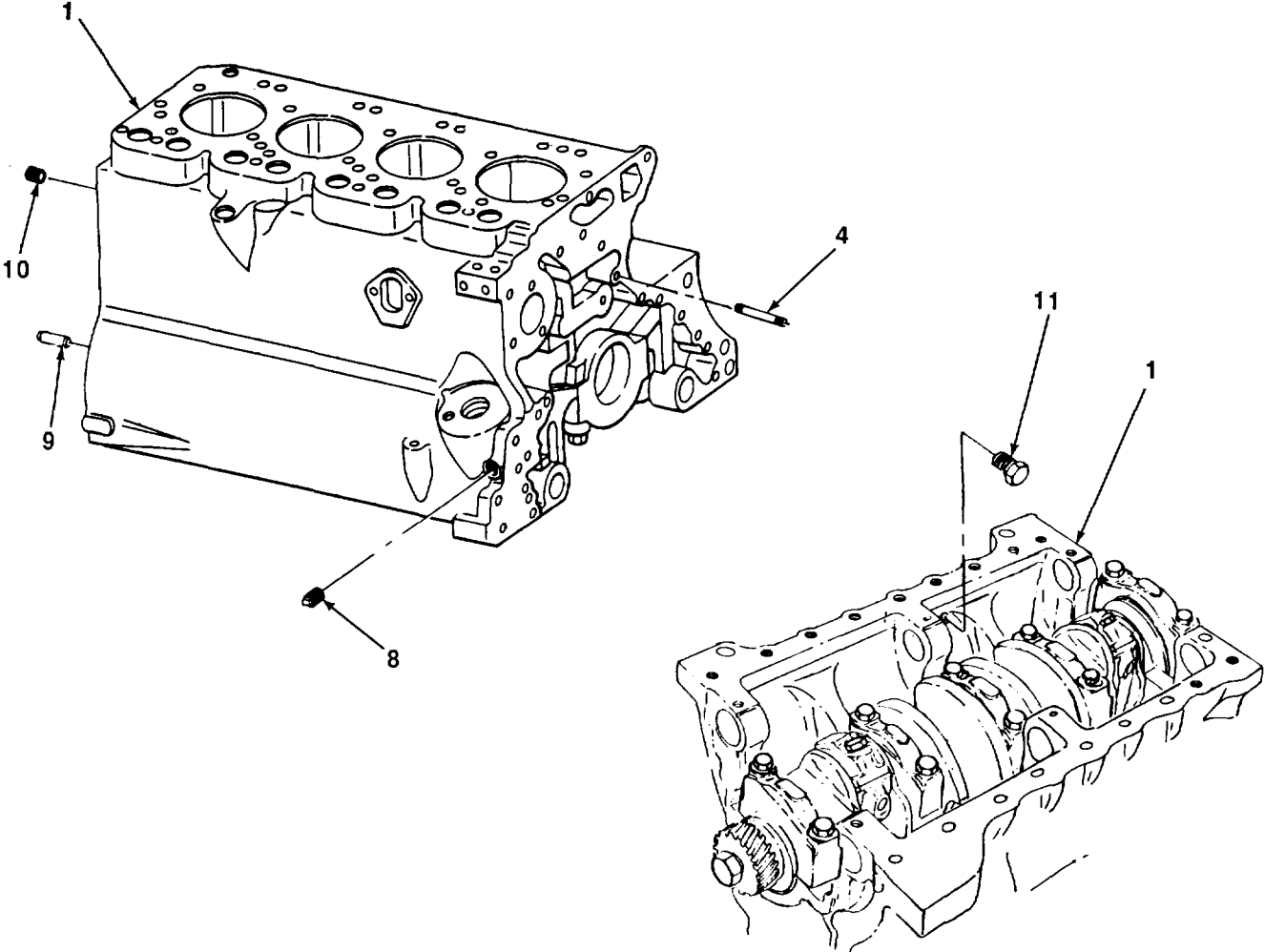
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3-4. ENGINE BLOCK MAINTENANCE (Con't).



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