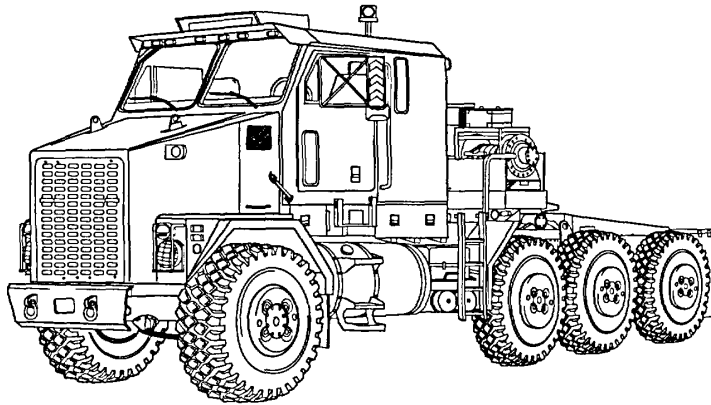


VOLUME NO. 2

TECHNICAL MANUAL
UNIT MAINTENANCE



TRUCK, TRACTOR, M1070, 8 X 8,
HEAVY EQUIPMENT TRANSPORTER (HET)
NSN 2320-01-318-9902
BODY ACCESSORY ITEMS
EIC:B5C

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HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1994

UNIT MAINTENANCE

**TRUCK, TRACTOR, M1070, 8 X 8,
HEAVY EQUIPMENT TRANSPORTER (HET)
(NSN 2320-01-318-9902)
EIC:B5C**

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 and Armaments Command, ATTN: AMSTA-IM-OPIT, Warren, MI 48397-5000. A reply will be furnished to you.

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**CHAPTER 3
ENGINE MAINTENANCE**

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Section I. INTRODUCTION

3-1. INTRODUCTION

This chapter contains instructions for replacement and repair of engine components at the Unit maintenance level. Some parts must be removed before engine components can be accessed. They are referenced to other paragraphs of this manual or TM 9-2320-360-10.

Section II. MAINTENANCE PROCEDURES

3-2. ROCKER COVER REPAIR

This task covers:

- | | |
|------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning/Inspection | f. Follow-On Maintenance |
-

INITIAL SETUP

Equipment Conditions

- Engine shut off (TM 9-2320-360-10).
- Parking brake on (TM 9-2320-360-10).
- Wheels chocked.
- Air intake hose removed (left rocker cover only) (para 4-4).
- Batteries disconnected (right rocker cover only) (para 7-61).
- Exhaust pipe removed (right rocker cover only) (para 5-2).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 54, Appendix F)
 - Socket Set, 3/8 In. Drive (Item 45, Appendix F)
 - Wrench, Torque, 0-200 Lb-In. (Item 72, Appendix F)
 - Wrench, Torque, 0-175 Lb-Ft (Item 73, Appendix F)
-

Materials/Parts

- Rags (Item 28, Appendix C)
- Solvent, Dry Cleaning (Item 31, Appendix C)
- Tie, Cable, Plastic (Item 34, Appendix C)
- Clamps (2) (Item 13, Appendix G)
- Gasket (Item 36, Appendix G)
- Gasket (Item 37, Appendix G)
- Locknuts (2) (Item 58, Appendix G)
- Locknut (Item 72, Appendix G)
- Lockwashers (2) (Item 104, Appendix G)
- Lockwasher (Item 103, Appendix G)
- Seal (Item 162, Appendix G)

NOTE

Both rocker covers are replaced in a similar manner. Right cover is shown.

a. Removal

WARNING

- Ensure engine is cool before performing maintenance. Failure to comply may result in severe burns.
- Use caution when working near hood mounting bracket that extends beyond firewall. Failure to comply may result in injury to personnel.

CAUTION

Clean around rocker cover before removing each cover from engine. This will keep dust or dirt from entering cylinder heads. Failure to comply will result in damage to equipment.

NOTE

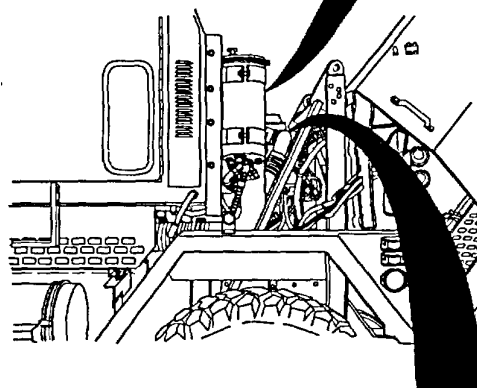
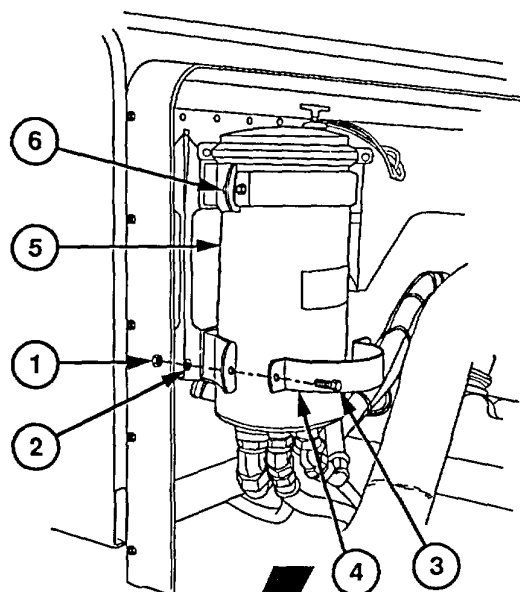
Do steps (1) thru (8) for right rocker cover only.

- (1) Remove two nuts (1), lockwashers (2), screws (3), and lower band (4) from steering reservoir (5). Discard lockwashers.

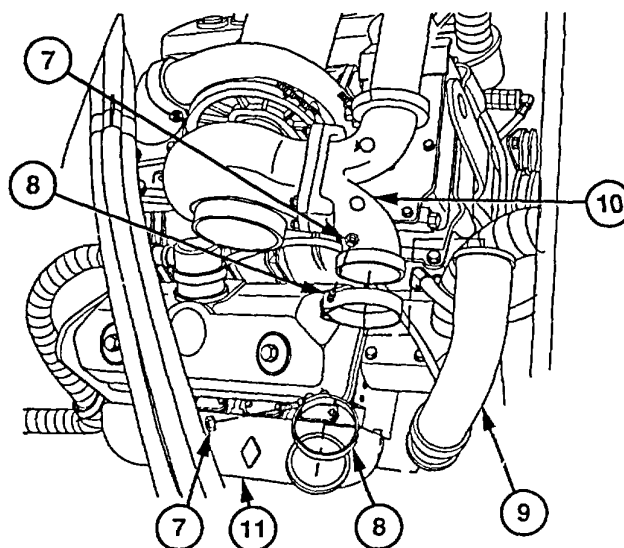
WARNING

Support steering reservoir before loosening band. Failure to comply may result in injury to personnel.

- (2) Loosen two nuts (6).
- (3) Raise steering reservoir (5) about 5 in. (13 cm) and support.
- (4) Tighten two nuts (6).



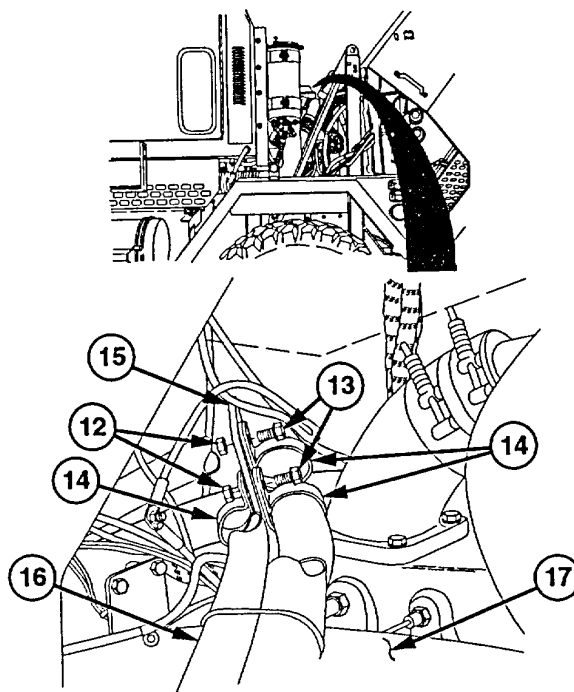
- (5) Remove two locknuts (7) and clamps (8) from exhaust tube (9). Discard locknuts and clamps.
- (6) Remove exhaust tube (9) from turbocharger (10) and exhaust manifold (11).



3-2. ROCKER COVER REPAIR (CONT)

(7) Remove two locknuts (12), screws (13), and three dips (14) from bracket (15). Discard locknuts.

(8) Secure power steering hoses (16) away from rocker cover (17).



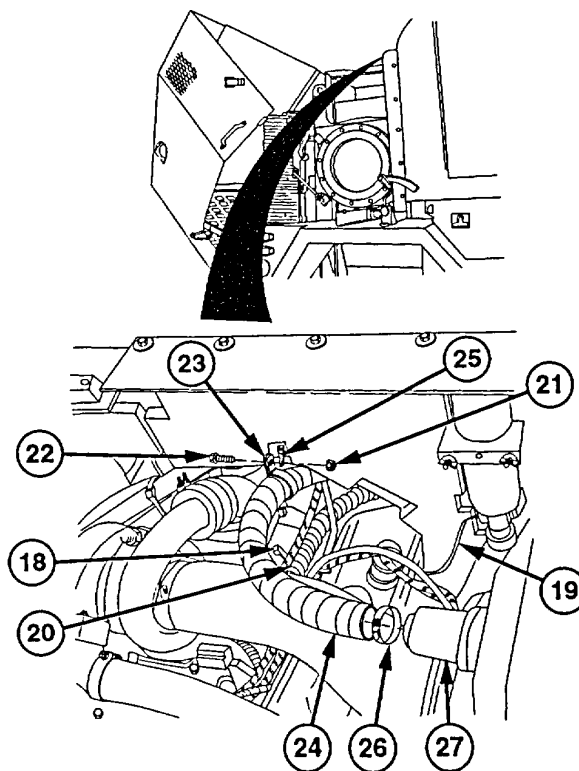
NOTE

- Location of plastic cable tie should be marked before removal.
- Do steps (9) thru (11) for left rocker cover only.

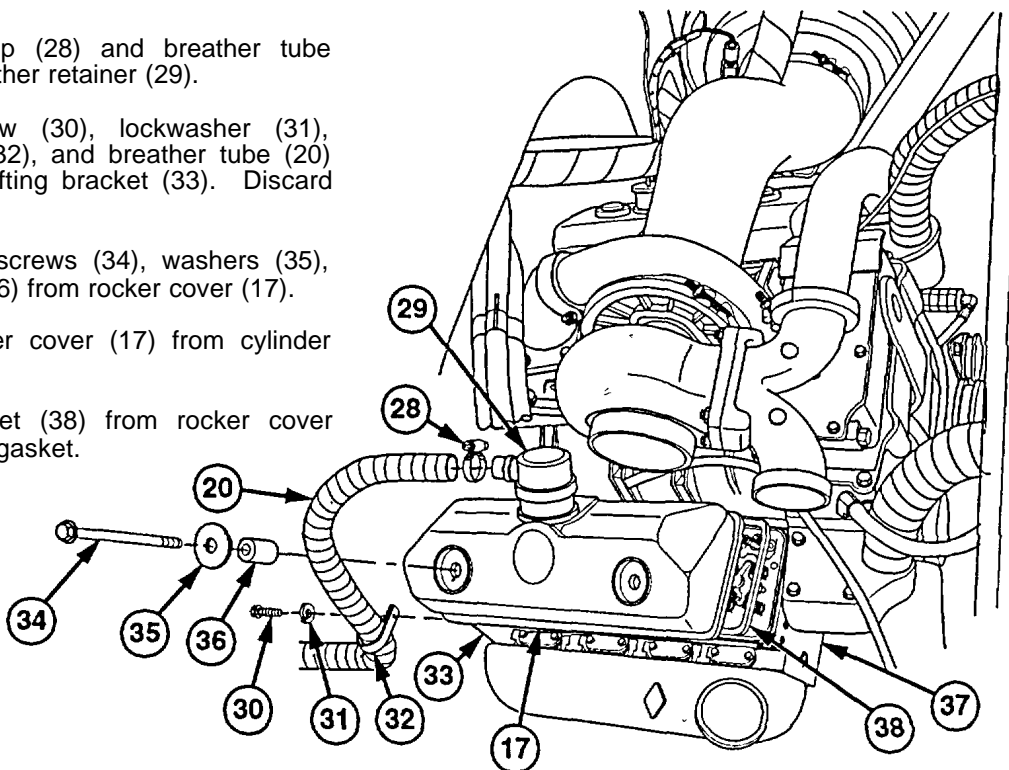
(9) Remove plastic cable tie (18) securing ether start hose (19) to breather tube (20).

(10) Remove locknut (21), screw (22), clip (23), and air aspiration hose no. 2938 (24) from standoff bracket (25). Discard locknut.

(11) Loosen clamp (26) and remove air aspiration hose no. 2938 (24) from air cleaner assembly (27).



- (12) Remove clamp (28) and breather tube (20) from breather retainer (29).
- (13) Remove screw (30), lockwasher (31), cushion clip (32), and breather tube (20) from engine lifting bracket (33). Discard lockwasher.
- (14) Remove two screws (34), washers (35), and mounts (36) from rocker cover (17).
- (15) Remove rocker cover (17) from cylinder head (37).
- (16) Remove gasket (38) from rocker cover (17). Discard gasket.

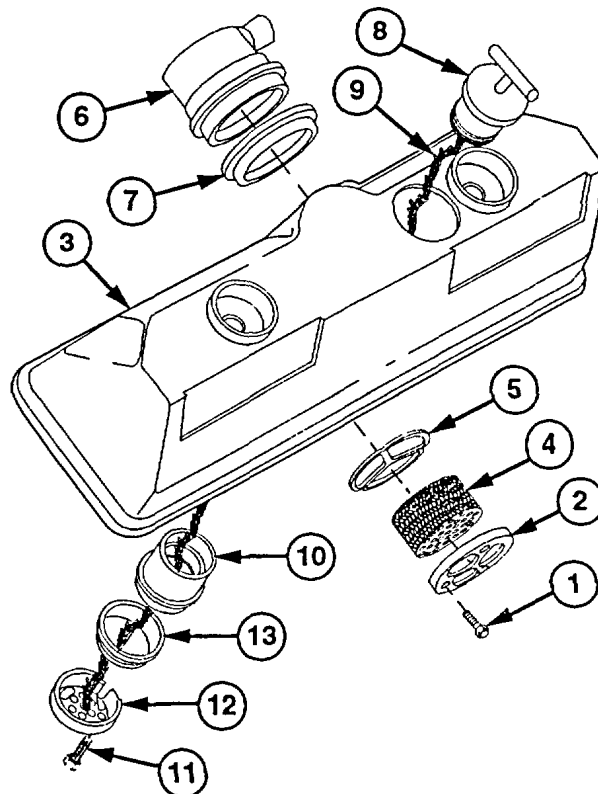


b. Disassembly

NOTE

- Both rocker covers are disassembled in a similar manner. Left rocker cover is shown.
- Fill plug is located on left rocker cover.

- (1) Remove three screws (1) and retainer (2) from rocker cover (3).
- (2) Remove filtering disk (4) and seal (5) from breather retainer (6).
- (3) Remove breather retainer (6) and seal (7) from rocker cover (3). Discard seal.



NOTE

Do steps (4) thru (6) for left valve cover only.

- (4) Remove filler opening cap (8) and chain hook (9) from oil filler tube (10).
- (5) Remove three screws (11) from strainer element (12).
- (6) Remove strainer element (12), oil filler tube (10), and gasket (13) from rocker cover (3). Discard gasket.

3-2. ROCKER COVER REPAIR (CONT)**c. Cleaning/inspection****WARNING**

Dry cleaning 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 100-138°F (38-59°C). If you become dizzy while using cleaning solvent, get fresh air immediately and medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

- (1) Clean metal parts with dry cleaning solvent.
- (2) Dry metal parts with rags.
- (3) Inspect all parts for cracks, pitting, or distortion.
- (4) Replace damaged parts.

d. Assembly**NOTE**

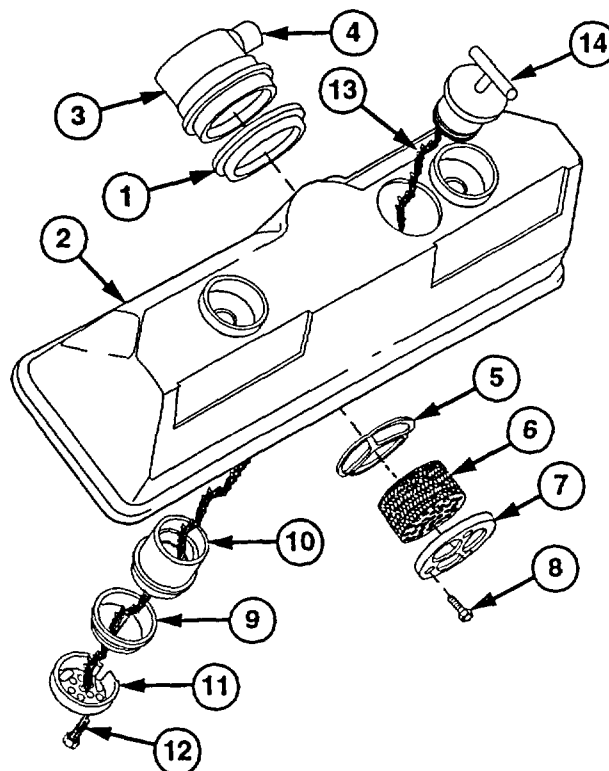
- Both rocker covers are assembled in a similar manner. Left rocker cover is shown.
- Fill plug is located on left rocker cover.

- (1) Install new seal (1) on rocker cover (2).
- (2) Install breather retainer (3) on seal (1) with stub (4) toward rear of engine.
- (3) Install seal (5) and filtering disk (6) on breather retainer (3).
- (4) Place retainer (7) over filtering disk (6). Install three screws (8).

NOTE

Do steps (5) thru (7) for left valve cover only.

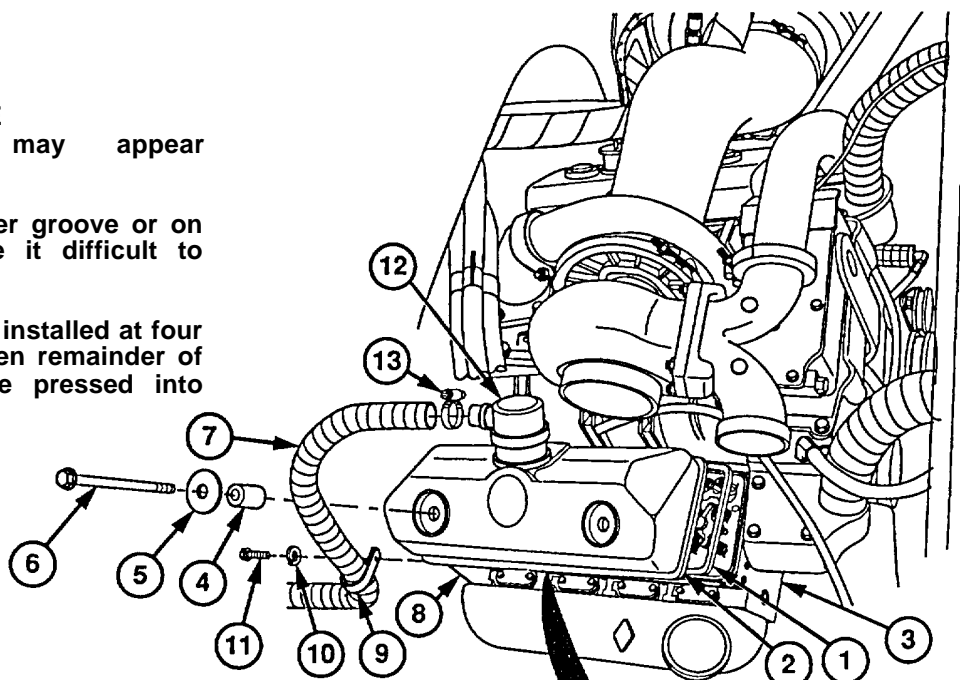
- (5) Install new gasket (9), oil filler tube (10), and strainer element (11) on rocker cover (2) with three screws (12).
- (6) Install chain hook (13) on filler opening cap (14). Crimp chain hook (13) to close gap.
- (7) Install filler opening cap (14) in oil filler tube (10).



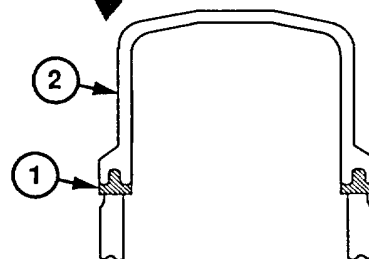
e. Installation

NOTE

- New gasket may appear oversized.
- Oil in rocker cover groove or on gasket will make it difficult to install.
- Gasket should be installed at four corners first. Then remainder of gasket should be pressed into place.



- (1) Install new gasket (1) in groove of rocker cover (2).
- (2) Install rocker cover (2) on cylinder head (3).
- (3) Install two mounts (4), washers (5), and screws (6). Torque to 15-20 lb-ft (20.3-27.1 N•m).
- (4) Install breather tube (7) on engine lifting bracket (8) with clip (9), new lockwasher (10), and screw (11).
- (5) Install breather tube (7) on breather retainer (12) with clamp (13).



NOTE

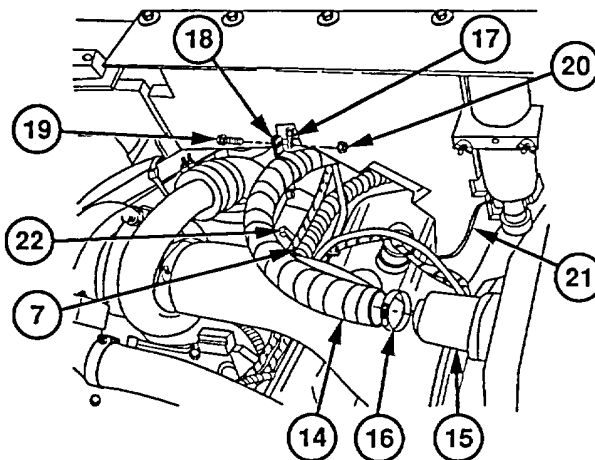
Do steps (6) thru (8) for left rocker cover only.

- (6) Install air aspiration hose no. 2938 (14) on air cleaner assembly (15) with clamp (16). Torque to 60 lb-in. (6.7 N•m).
- (7) Secure air aspiration hose no. 2938 (14) on standoff bracket (17) with clip (18), screw (19), and new locknut (20).

NOTE

Plastic cable tie should be positioned in location marked during removal.

- (8) Secure ether start hose (21) to breather tube (7) with plastic cable tie (22).

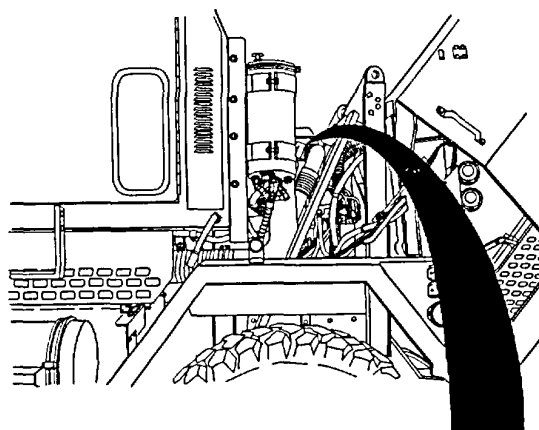
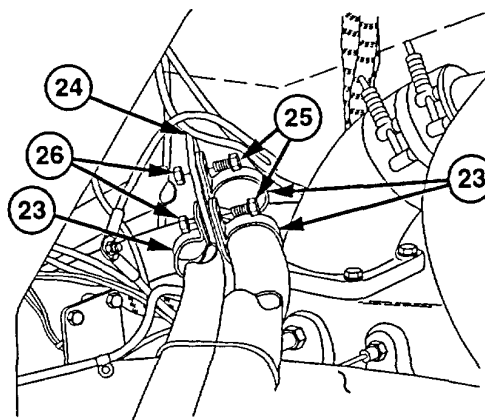


3-2. ROCKER COVER REPAIR (CONT)

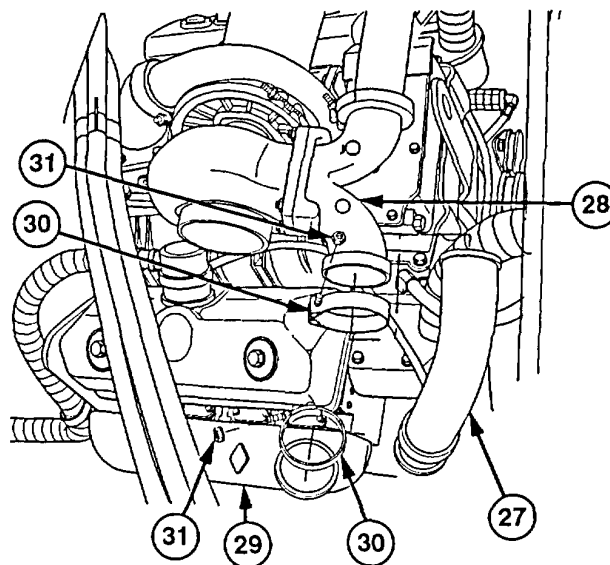
NOTE

Do steps (9) thru (15) for right rocker cover only.

- (9) Install three dips (23) on bracket (24) with two screws (25) and new locknuts (26).



- (10) Install exhaust tube (27) on turbocharger (28) and exhaust manifold (29) with two new clamps (30) and new locknuts (31).



- (11) Position lower band (32) on bracket (33) with two screws (34), new lockwashers (35), and nuts (36). Do not tighten.

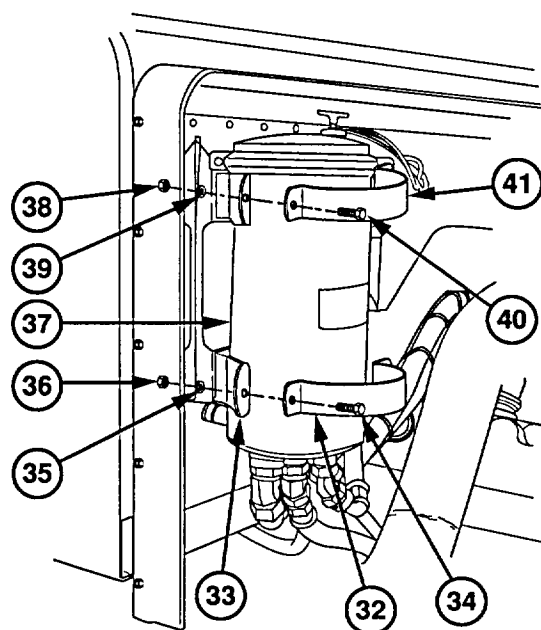
WARNING

Support steering reservoir. Failure to comply may result in injury to personnel.

NOTE

Ensure 0.5 in. (13 mm) of clearance is maintained between top of upper rear bracket and bottom of cover band clamp.

- (12) Lower steering reservoir (37) into lower band (32).
- (13) Tighten two nuts (36) to 30 lb-ft (41 N•m).
- (14) Remove two nuts (38), lockwashers (39), and screws (40) from upper band (41). Discard lockwashers.
- (15) Install two screws (40), new lockwashers (39), and nuts (38) on upper band (41). Torque to 30 lb-ft (41 N•m).



f. Follow-On Maintenance

- (1) Install exhaust pipe (para 5-2).
- (2) Install air intake hose (para 4-4).
- (3) Connect batteries (para 7-61).
- (4) Start engine (TM 9-2320-360-10).
- (5) Check for leaks around rocker cover gasket.
- (6) Shut off engine (TM 9-2320-360-10).
- (7) Remove wheel chocks.

3-3. ENGINE OIL FILTER ELEMENT REPLACEMENT

This task covers:

- a. Removal
- b. Installation

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Engine shut off (TM 9-2320-360-10).
- Parking brake on (TM 9-2320-360-10).
- Engine hood opened (TM 9-2320-360-10).
- Wheels chocked.

Materials/Parts

- Oil, Lubricating (Item 25, Appendix C)
- Rags, (Item 28, Appendix C)
- Element, Filter (Item 23, Appendix G)

Tools and Special Tools

- Tool Kit, Genl Mech (Item 54, Appendix F)
- Pan, Oil Drain (Item 26, Appendix F)
- Wrench, Oil Filter (Item 67, Appendix F)

a. Removal

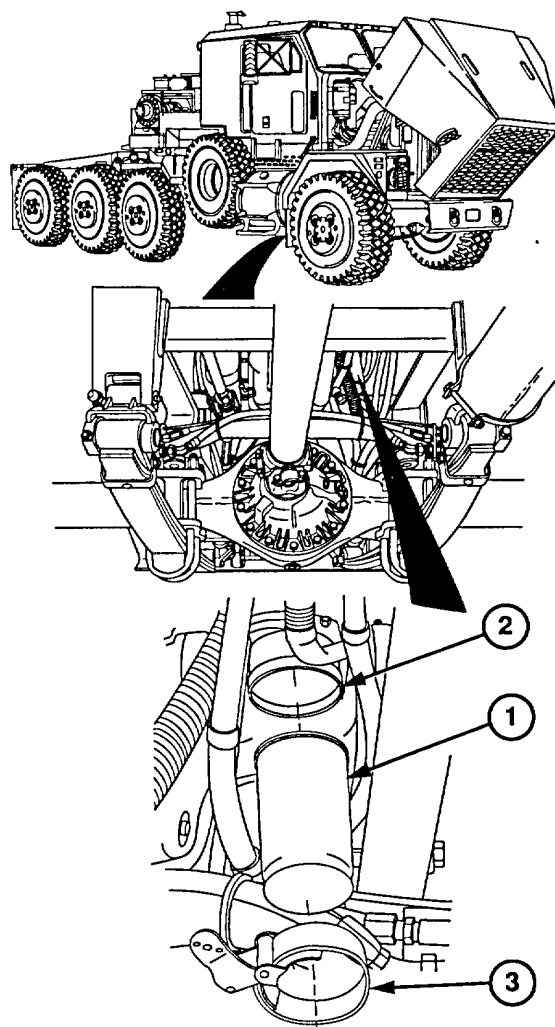
- (1) Place drain pan under oil filter element (1).

WARNING

- Use caution when draining hot oil. Oil may burn exposed skin and cause injury to personnel. If injured, seek medical attention immediately.
- When servicing this vehicle, performing maintenance, or disposing of materials such as engine oil, consult your Unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact the Army environmental hotline at 1-800-872-3845. Improper disposal of this material may result in damage to environment or injury to personnel.

- (2) Remove oil filter element (1) with gasket from fluid filter head (2) by turning counterclockwise using oil filter wrench (3). Discard filter element.

- (3) Clean fluid filter head (2) with lint-free cloth.



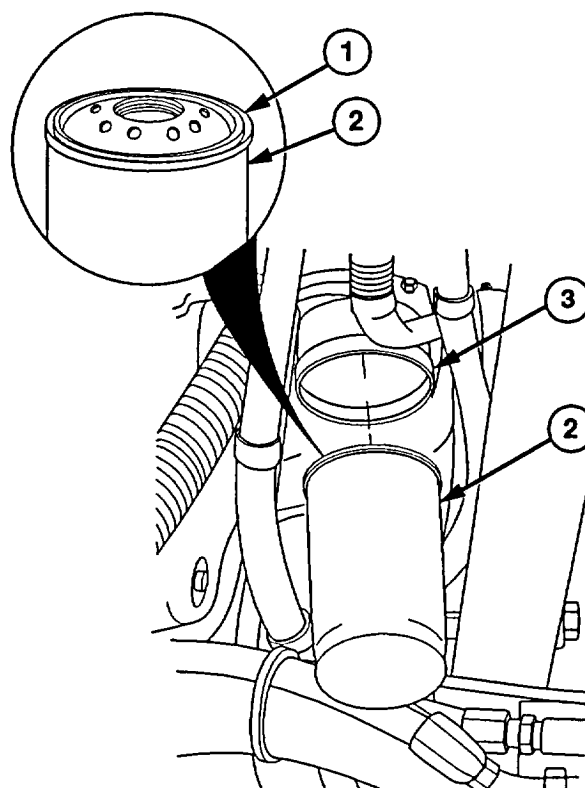
b. Installation

- (1) Coat new gasket (1) with clean oil.
- (2) Fill new oil filter element (2) with oil 2/3 full.

CAUTION

Do not install oil filter element with oil filter wrench. Handtighten only. Damage to oil filter element may result.

- (3) Install new oil filter element (2) on fluid filter head (3) by turning clockwise.
- (4) Turn clockwise until gasket (1) touches fluid filter head (3). Tighten additional 2/3 turn.

**c. Follow-On Maintenance**

- (1) Start engine (TM 9-2320-360-10).
- (2) Check for oil leaks (TM 9-2320-360-10).
- (3) Shut off engine (TM 9-2320-360-10).
- (4) Check oil level (TM 9-2320-360-10).
- (5) Close engine hood (TM 9-2320-360-10).
- (6) Remove wheel chocks.

3-4. ENGINE OIL DRAIN/FILL

This task covers:

- a. Drain
- b. Fill

c. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

- Engine shut off (TM 9-2320-360-10).
- Parking brake on (TM 9-2320-360-10).
- Wheels chocked.
- Engine hood opened (TM 9-2320-360-10).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 54, Appendix F)
- Funnel (Item 11, Appendix F)

Materials/Parts

- Rags (Item 28, Appendix C)
 - Compound, Sealing, Pipe Thread (Item 15, Appendix C)
-

a. Drain

WARNING

- Use caution when draining hot oil. Oil may burn exposed skin and cause injury to personnel. If injured, seek medical attention immediately.
- Never use magnetic plug in center of oil pan to drain oil. Failure to comply may result in injury to personnel and could cause oil to drain on vehicle components.

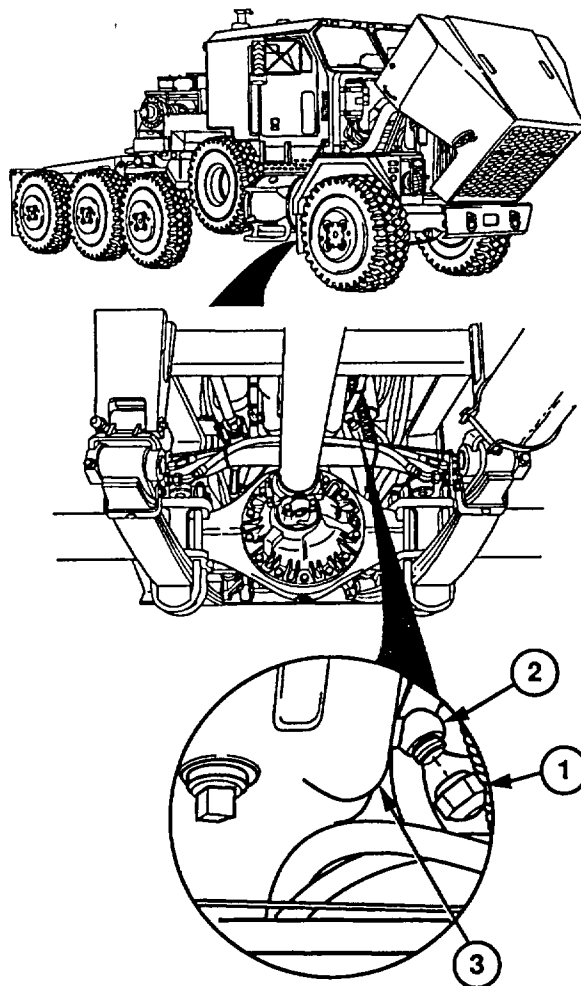
NOTE

- Engine oil capacity is approximately 28 qts (26.5 l).
- Drain engine oil when hot.
 - (1) Place drain pan under cap nut.
 - (2) Remove cap nut (1) from elbow (2) on engine oil pan (3) and completely drain engine oil.

NOTE

Oil filter should be changed (para 3-3) while engine oil is drained.

- (3) Install cap nut (1) on elbow (2).



- (4) Remove magnetic plug (4) from engine oil pan (3).

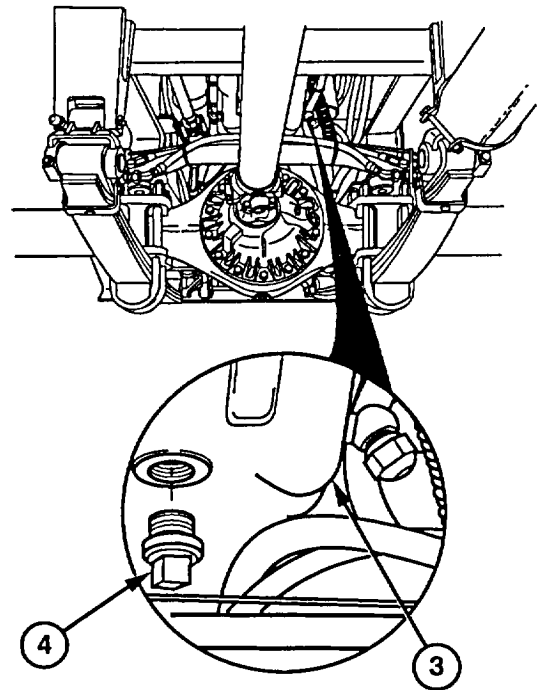
NOTE

Notify supervisor if magnetic plug contains metal particles. (5) Inspect magnetic plug (4) for metal particles.

WARNING

Pipe thread sealing compounds can burn easily, can give off harmful vapors, and is harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If pipe thread sealing compound gets on skin or clothing, wash immediately with soap and water.

- (6) Coat threads on magnetic plug (4) with pipe thread sealing compound.
- (7) Install magnetic plug (4) on engine oil pan (3).

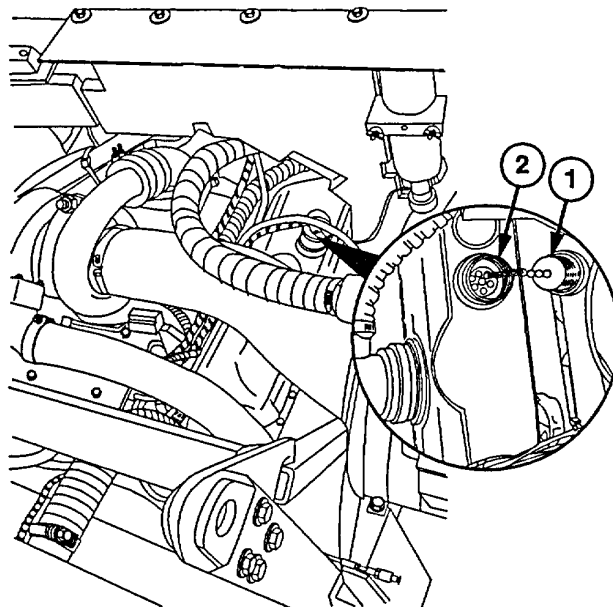


b. Fill

CAUTION

Do not overfill engine with oil. Serious damage to engine may occur.

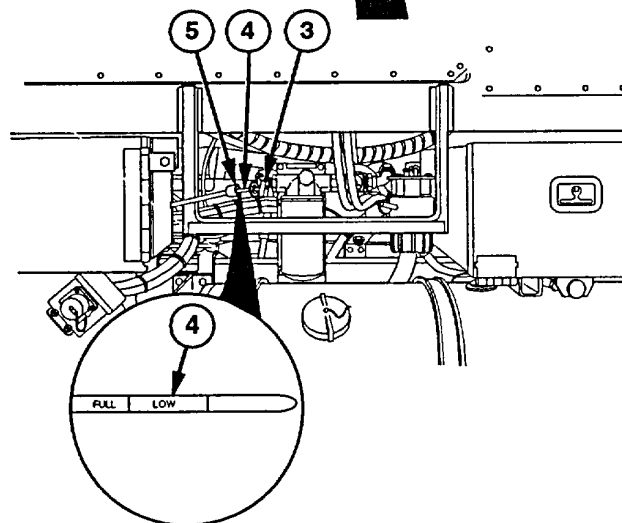
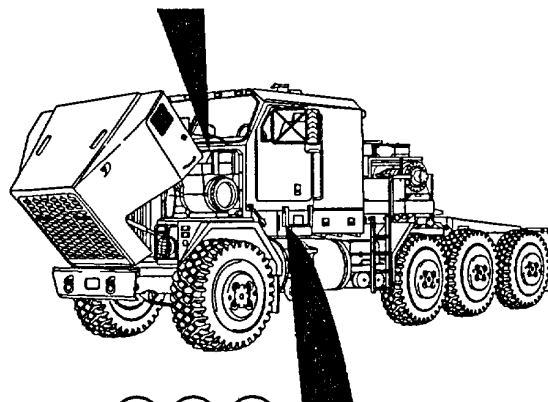
- (1) Remove oil filler cap (1) from rocker cover (2).
- (2) Place funnel in rocker cover (2).
- (3) Fill engine with clean engine oil through rocker cover (2).
- (4) Start engine (TM 9-2320-360-10) and let run for approximately 10 minutes.
- (5) Shut off engine (TM 9-2320-360-10).



NOTE

Let engine sit for approximately 15 minutes before checking oil level.

- (6) Turn dipstick handle (3) counterclockwise and remove dipstick (4) from dipstick tube (5).
- (7) Wipe off dipstick (4) with dean rag.
- (8) Install dipstick (4) completely into dipstick tube (5) and remove from dipstick tube.
- (9) Check oil level on dipstick (4).
- (10) Install dipstick (4) in dipstick tube (5) and turn handle (3) clockwise to secure.
- (11) Add oil as necessary.
- (12) Repeat steps (6) thru (11) until oil is at proper level.



c. Follow-On Maintenance

- (1) Check for leaks.
- (2) Close engine hood (TM 9-2320-360-10).
- (3) Remove wheel chocks.

3-5. OIL FILTER ADAPTER REPAIR

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning/Inspection
- d. Assembly
- e. Installation
- f. Follow-On Maintenance

INITIAL SETUP

Equipment Conditions

Engine oil filter element removed (para 3-3).

Tools and Special Tools

- Tool Kit, Genl Mech (Item 54, Appendix F)
- Compressor Unit, Air (Item 3, Appendix F)
- Goggles, Industrial (Item 14, Appendix F)
- Pan, Oil Drain (Item 26, Appendix F)
- Wrench, Torque, 0-200 Lb-In. (Item 72, Appendix F)
- Wrench, Torque, 0-175 Lb-Ft (Item 73, Appendix F)

Materials/Parts

- Compound, Sealing, Pipe Thread (Item 15, Appendix C)
- Solvent, Dry Cleaning (Item 31, Appendix C)
- Gasket (Item 40, Appendix G)
- Lockwashers (6) (Item 96, Appendix G)
- Lockwashers (4) (Item 102, Appendix G)

a. Removal

- (1) Remove four screws (1), lockwashers (2), washers (3), and splash guard (4) from hardlift bracket (5) and cab mount (6). Discard lockwashers.

