SERVICE REPAIR

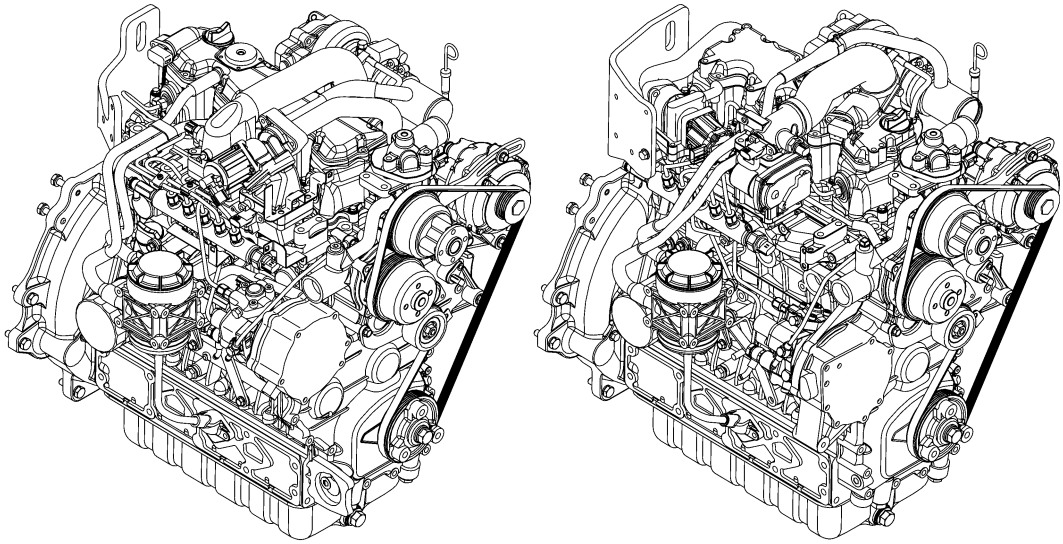
MANUAL

Hyster F024 (S135FT, S155FT) Forklift Service Repair Manual

HYSTER

KUBOTA DIESEL 3.8L ENGINES

H4.0FT5, H4.0FT6, H4.5FTS5, H4.5FT6, H5.0FT, H5.5FT (H80-120FT) [R005, S005, U005]; S6.0FT, S7.0FT (S135FT, S155FT) [F024, G024]



HYSTER

PART NO. 4047206 **0600 SRM 1557**

SAFETY PRECAUTIONS
MAINTENANCE AND REPAIR

- The Service Manuals are updated on a regular basis, but may not reflect recent design changes to the product. Updated technical service information may be available from your local authorized Hyster® dealer. Service Manuals provide general guidelines for maintenance and service and are intended for use by trained and experienced technicians. Failure to properly maintain equipment or to follow instructions contained in the Service Manual could result in damage to the products, personal injury, property damage or death.
- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the Operating Manual or the Periodic Maintenance section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use HYSTER APPROVED parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the WARNING and CAUTION notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

NOTE: The following symbols and words indicate safety information in this manual:

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.

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This section is for the following models:

H4.0FT5, H4.0FT6, H4.5FTS5, H4.5FT6, H5.0FT, H5.5FT (H80-120FT) [R005, S005, U005];
S6.0FT, S7.0FT (S135FT, S155FT) [F024, G024]

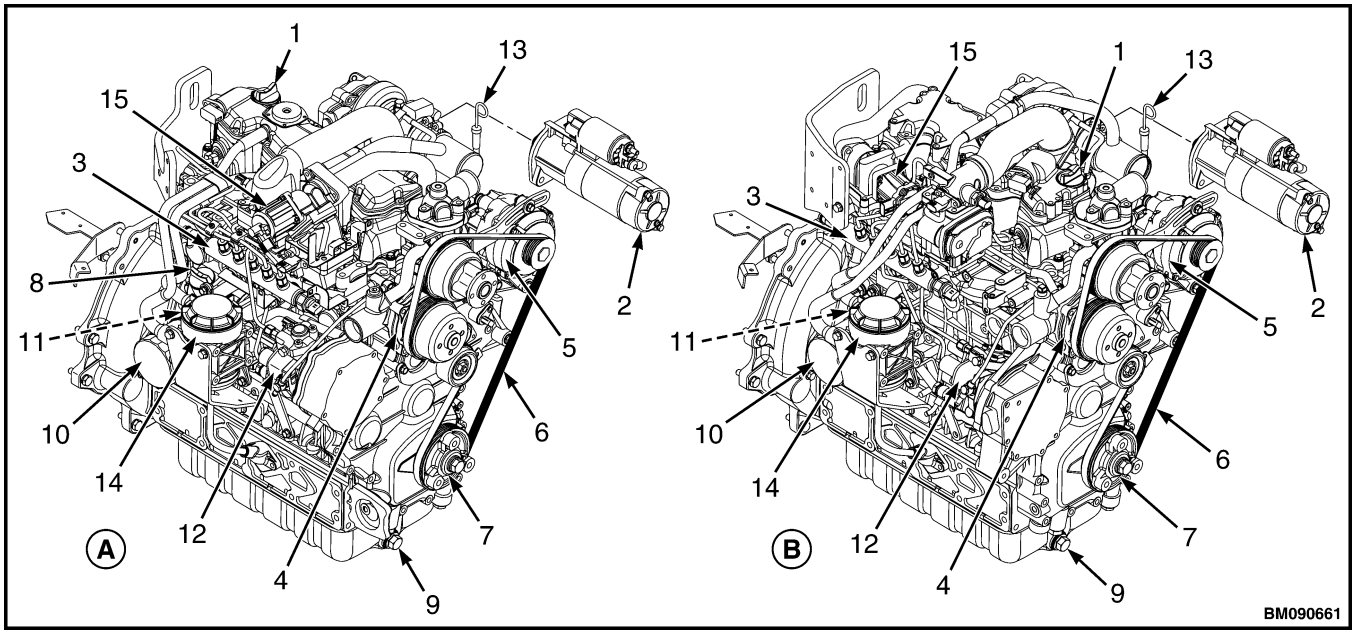
General

This section has repair instructions for Kubota diesel engines.

ENGINE IDENTIFICATION

Major Engine Component Identification

Figure 1 shows where major engine components are located.



A. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024)

1. TOP FILLER PORT (ENGINE OIL)
2. STARTER MOTOR
3. FUEL RAIL/INJECTORS/FUEL LINES
4. WATER PUMP
5. ALTERNATOR
6. SERPENTINE BELT
7. CRANKSHAFT PULLEY
8. SIDE FILLER PORT (ENGINE OIL)

B. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

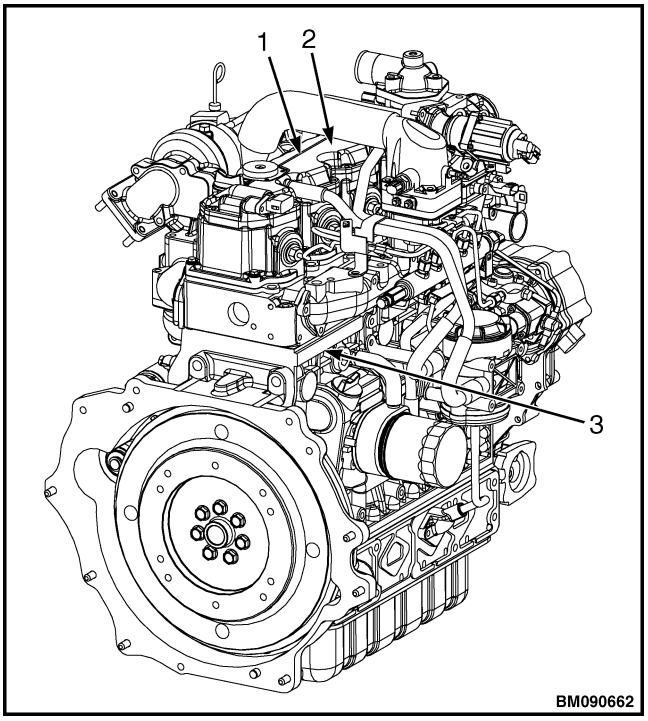
9. DRAIN PLUG
10. ENGINE OIL FILTER
11. ENGINE OIL COOLER
12. FUEL INJECTION PUMP
13. DIPSTICK (ENGINE OIL)
14. CRANKCASE BREATHER FILTER
15. EGR VALVE

Figure 1. Major Engine Components

Location of Labels

The typical location of emission control information label is shown in Figure 2.

The typical location of engine nameplate is shown in Figure 2. The engine nameplate is shown in Figure 3.



NOTE: ILLUSTRATION USED FOR REFERENCE ONLY. ACTUAL ENGINE MAY BE SLIGHTLY DIFFERENT.

1. ENGINE NAMEPLATE
2. EMISSION CONTROL INFORMATION LABEL
3. ENGINE SERIAL NUMBER

Figure 2. Typical Location of Engine Labels

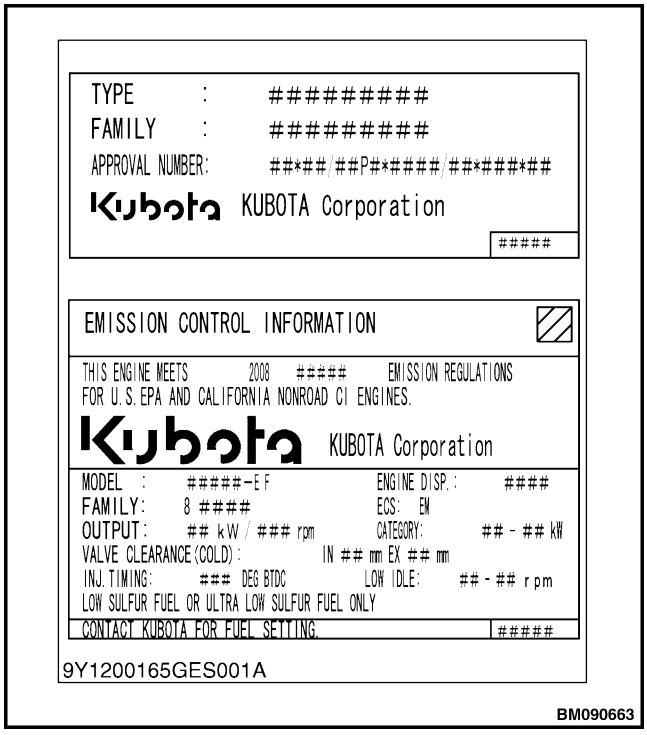


Figure 3. Engine Nameplate (Typical)

CRANKCASE DESCRIPTION

The Kubota diesel engine utilizes a split crankcase to produce greater durability and operate more quietly. The crankcase is split into two parts, crankcase 1, which houses combustion components and crankcase 2, which completes crankcase 1 and acts as noise reduction baffle. See Figure 4.

The Kubota Diesel engine utilizes a hanger type crankshaft support which allows for easy disassembly/assembly and a linerless type piston cylinder which allows for good cooling performance and excellent resistance to wear. See Figure 4.

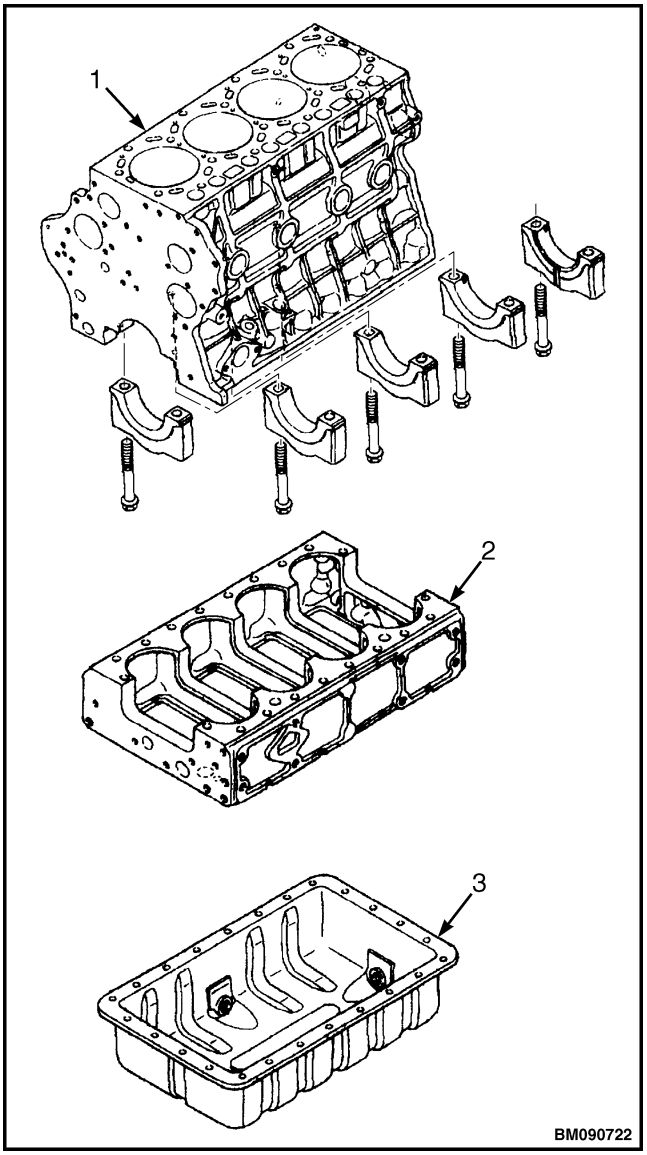


Figure 4. Kubota Diesel Crankcase Components

Legend for Figure 4

1. CRANKCASE 1
2. CRANKCASE 2
3. OIL PAN

Engine Removal and Installation

The procedures to remove and install engine are not included in this section. For procedures refer to

Frame 0100SRM1316 for lift truck models

- S6.0-7.0FT (S135-155FT) (F024, G024)

Frame 0100SRM1243 for lift truck models

- H4.0FT5, H4.0FT6, H4.5FTS5, H4.5FT6, H5.0FT, H5.5FT (H80-120FT) (R005, S005)

Frame 0100SRM1891 for lift truck models

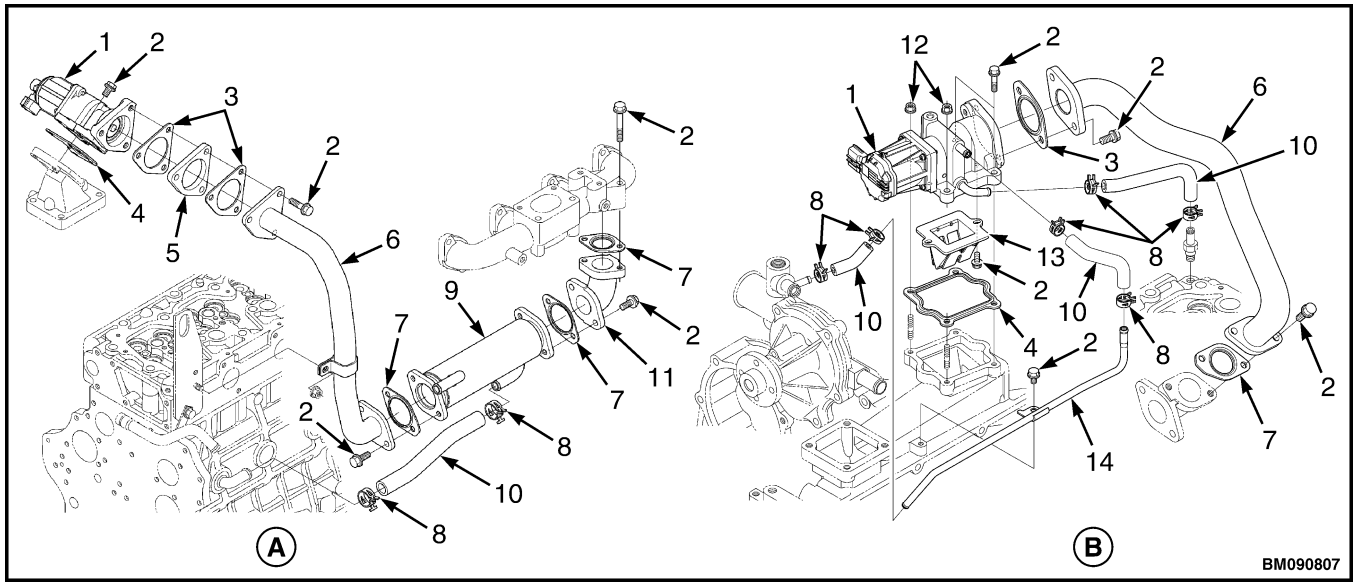
- H4.0FT5, H4.0FT6, H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (U005)

Cylinder Head Assembly Repair

VALVE COVERS AND FUEL INJECTORS

Remove

1. Disconnect negative battery cable at battery.
2. Loosen hose clamps and disconnect breather tube from bottom of crankcase breather filter and lower block. See Figure 6.
3. Disconnect breather tubes from upper cylinder head cover and turbo air inlet pipe. See Figure 6.
4. Loosen hose clamps and remove turbo outlet hose from turbo charger and air inlet elbows. See Figure 6.
5. Remove capscrews from back of EGR valve assembly. See Figure 5.
6. Remove any nuts capscrews and clamps holding EGR gas pipe to engine. See Figure 5.
7. Remove capscrews from EGR gas pipe and EGR cooler. See Figure 5.
8. Remove EGR gas pipe and gaskets. Discard gaskets. See Figure 5.
9. Remove EGR gas pipe from back of EGR valve and EGR cooler. See Figure 5.



A. EGR SYSTEM FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024)

1. EGR VALVE ASSEMBLY
2. CAPSCREW
3. EGR VALVE GASKET
4. EGR VALVE GASKET (TO MANIFOLD)
5. SPACER
6. EGR GAS PIPE
7. EGR COOLER GASKET

B. EGR SYSTEM FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

8. CLAMP
9. EGR COOLER
10. HOSE
11. EGR COOLER FLANGE
12. NUTS
13. LEAD VALVE
14. PIPE

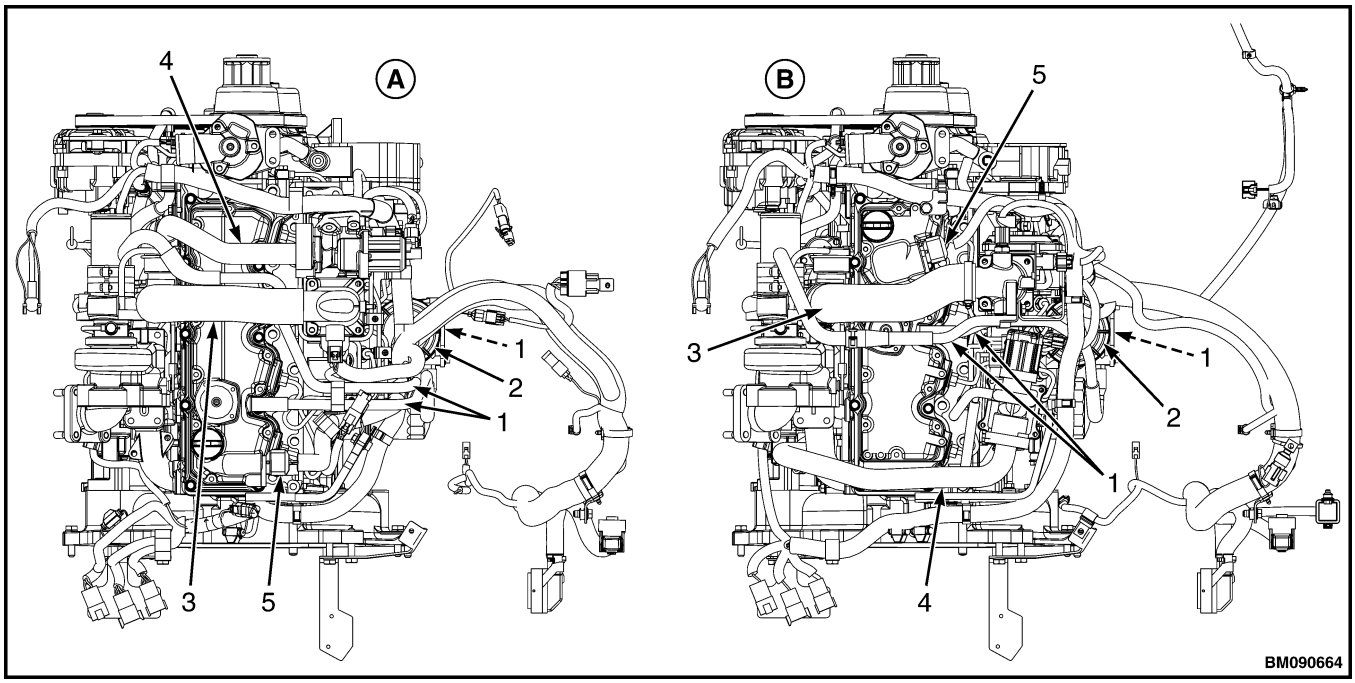
Figure 5. EGR Systems

NOTE: Mark connectors/wires during removal to aid in installation.

10. Disconnect wiring from fuel injector harness on upper cylinder head cover. See Figure 6.

11. Remove thirteen capscrews, upper valve cover and gasket from lower valve cover. Discard gasket. See Figure 7.

12. Remove eight terminal nuts. Disconnect fuel injector harness from fuel injectors. See Figure 7.



A. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024)

1. BREATHER TUBE
2. CRANKCASE BREATHER FILTER
3. TURBO CHARGER AIR OUTLET HOSE

B. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

4. EGR VALVE
5. WIRING CONNECTOR

Figure 6. Breather Tube and Hoses

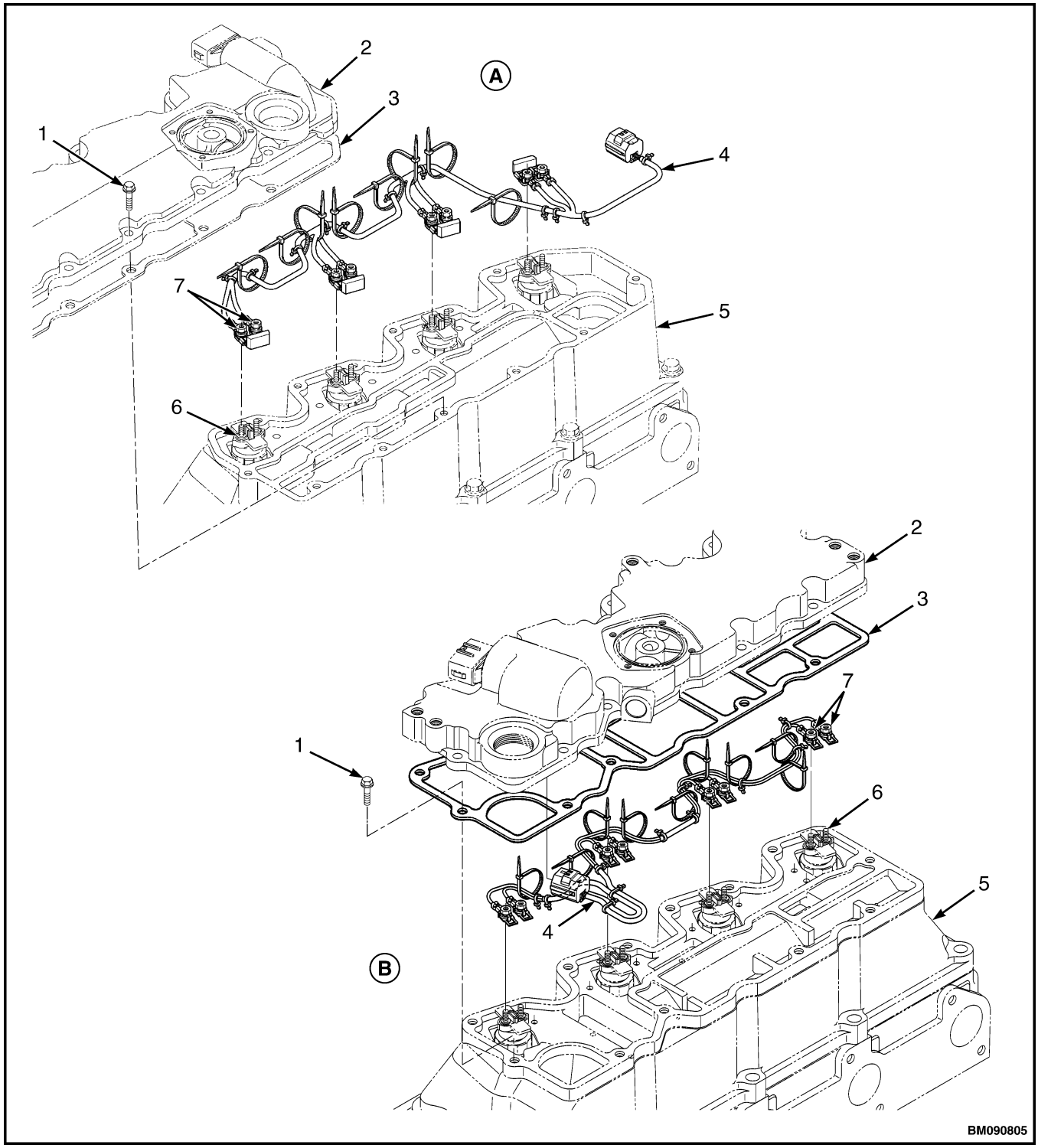


Figure 7. Upper Valve Cover

Legend for Figure 7

A. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024)
B. KUBOTA DIESEL ENGINE FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

1. CAPSCREW
2. UPPER VALVE COVER
3. GASKET
4. FUEL INJECTOR HARNESS
5. LOWER VALVE COVER
6. FUEL INJECTOR
7. TERMINAL NUT

13. Remove radiator cap.

14. Loosen hose clamp and remove lower radiator hose, draining coolant from coolant system.

15. Remove coolant drain plug and drain coolant from engine block. See Cooling System Repair in this service manual for procedures.

NOTE: Note position and location of fuel line clamps during removal to aid in installation.

16. Remove three pan head screws and six clamps from fuel injector lines. See Figure 8.

CAUTION

DO NOT loosen the fuel injection lines when the fuel is under high pressure (within five minutes of stopping the engine).

17. Loosen four fuel lines at fuel rail. Remove four fuel lines and O-rings from fuel injectors at lower valve cover. See Figure 8.

18. Remove ten lower valve cover bolts, lower valve cover and gasket from cylinder head. Discard gasket. See Figure 8.

19. Remove four banjo bolts and eight washers holding fuel overflow pipe to four injectors. Discard washers. See Figure 8.

20. Remove four flange nuts holding injector clamps to fuel injectors. See Figure 8.

CAUTION

Carefully remove injector clamps so as to not lose ball bearing from rocker arm bracket.

21. Remove four injector clamps holding fuel injectors to cylinder head. See Figure 8.

22. Remove four fuel injectors, four O-rings, and four base gaskets from cylinder head. Discard gaskets. See Figure 8.

Clean and Inspect

WARNING

Cleaning solvents can be flammable and toxic and can cause skin irritation. When using cleaning solvents, always follow the recommendations of the manufacturer.

WARNING

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

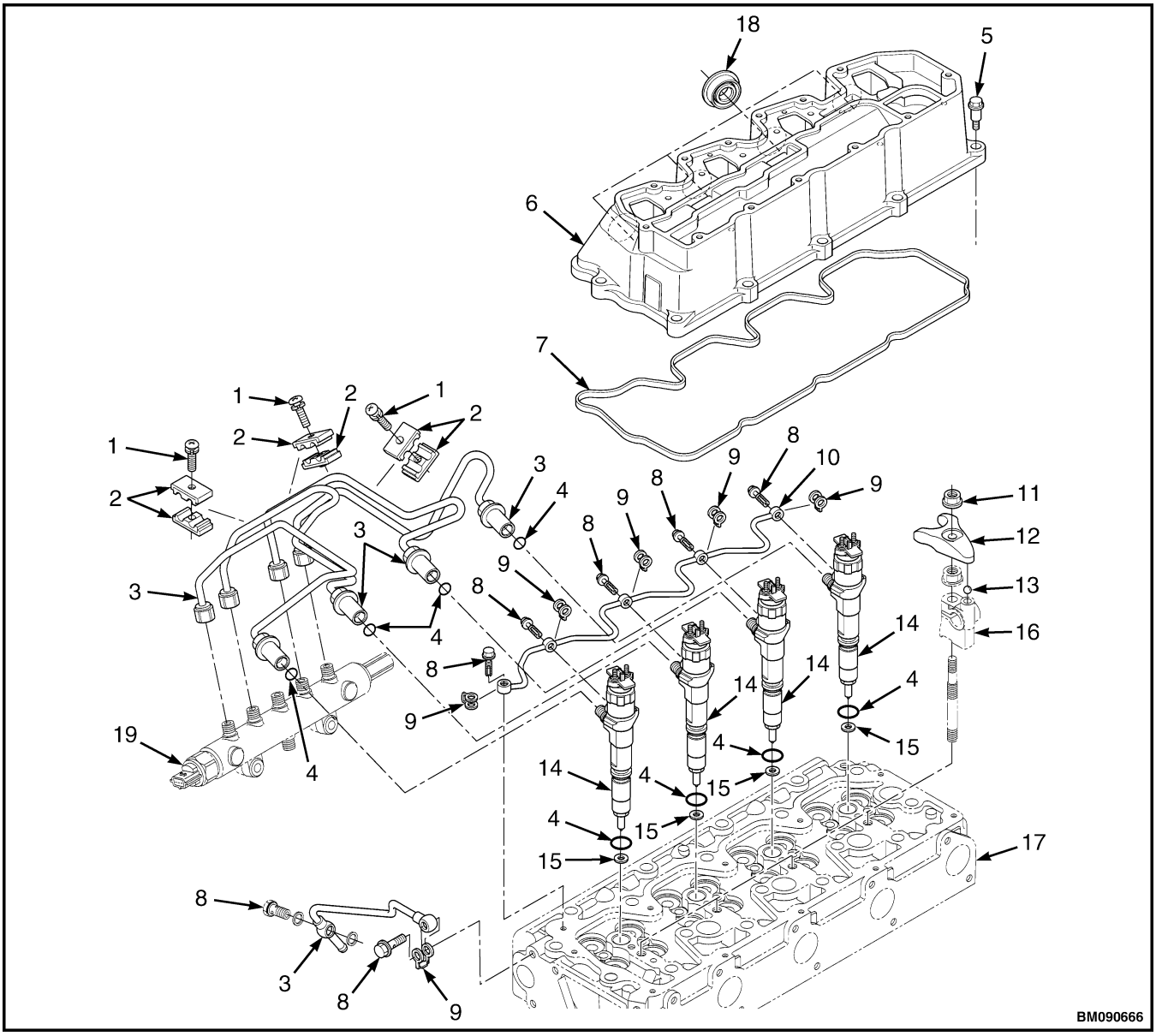
CAUTION

Use caution not to scratch the gasket mating surfaces when cleaning the valve cover and cylinder head.

Carefully remove all gasket residue from valve cover and cylinder head.

Clean valve cover in cleaning solvent. Dry valve cover with compressed air. Inspect for wear, cracks, and any other damage. If necessary, replace valve cover.

Inspect all O-rings and grommets for wear, cracks, and any other damage. Replace where necessary.



1. CAPSCREW
2. FUEL LINE CLAMP
3. FUEL LINE
4. O-RING
5. BOLT
6. LOWER VALVE COVER
7. GASKET
8. BANJO BOLT
9. WASHER
10. OVERFLOW PIPE
11. FLANGE NUT
12. INJECTOR CLAMP
13. BALL BEARING
14. FUEL INJECTOR
15. BASE GASKET
16. ROCKER ARM BRACKET
17. CYLINDER HEAD
18. TUBE SEAL
19. FUEL RAIL

Figure 8. Fuel Injectors and Lower Valve Cover

Install

1. Install four O-rings and four new base gaskets onto four fuel injectors. Install four fuel injectors into cylinder head. See Figure 8.
2. Install four injector clamps to rocker arm brackets. Ensure ball bearing is present in rocker arm bracket. See Figure 8.
3. Install four flange nuts to injector clamps. Tighten to 24 to 27 N•m (18 to 20 lbf ft).
4. Install eight new washers and four banjo bolts to fuel over flow pipe and injectors. Tighten to 10 to 11 N•m (89 to 97 lbf in).
5. Lightly grease new lower valve cover gasket.
6. Place new valve cover gasket into groove of lower valve cover.
7. Install lower valve cover and ten bolts onto cylinder head. Torque to 7 to 11 N•m (62 to 97 lbf in).
8. Install four O-rings and fuel lines to fuel injectors at lower valve cover. See Figure 8.
9. Install four fuel lines to common fuel rail.
10. Install six clamps and three pan head screws on fuel injector lines as noted during removal. See Figure 8.
11. Install fuel injector harness onto fuel injectors. Install eight terminal nuts. Torque to 1.6 to 2.2 N•m (14 to 20 lbf in). See Figure 7.
12. Lightly grease new upper valve cover gasket.
13. Place new valve cover gasket into groove of upper valve cover.
14. Install upper valve cover and thirteen capscrews onto lower valve cover. Torque to 10 to 11 N•m (89 to 97 lbf in). See Figure 7.
15. Connect wiring to fuel injector harness on upper cylinder head cover.
16. Install new gaskets on EGR gas pipe. See Figure 5.
17. Install EGR gas pipe onto back of EGR valve and EGR cooler. See Figure 5.
18. Install capscrews in EGR gas pipe and EGR cooler. See Figure 5.
    a. For lift truck models H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) and S6.0-7.0FT (S135-155FT) (F024) tighten capscrews to 24 to 27 N•m (18 to 20 lbf ft).
    b. For lift truck models H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) and S6.0-7.0FT (S135-155FT) (G024) tighten capscrews to 30 to 34 N•m (22 to 25 lbf ft).
19. Install capscrews in EGR gas pipe and EGR valve assembly. See Figure 5.
    a. For lift truck models H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) and S6.0-7.0FT (S135-155FT) (F024) tighten capscrews to 24 to 27 N•m (18 to 20 lbf ft).
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20. Install clamp, nut, and capscrew securing EGR gas pipe to engine.
21. Install coolant drain plug in engine block. See Cooling System Repair of this service manual for procedures.
22. Install lower radiator hose and tighten hose clamps.
23. Fill cooling system. See Cooling System Repair of this service manual for procedures.
24. Install turbo air outlet hose to turbo charger and air inlet elbow. See Figure 6.
25. Connect breather tubes to turbo air inlet pipe and upper cylinder head cover. See Figure 6.
26. Connect breather tube to bottom of crankcase breather filter and lower block.
27. Connect negative battery cable at battery.

ROCKER ARM ASSEMBLY

Remove

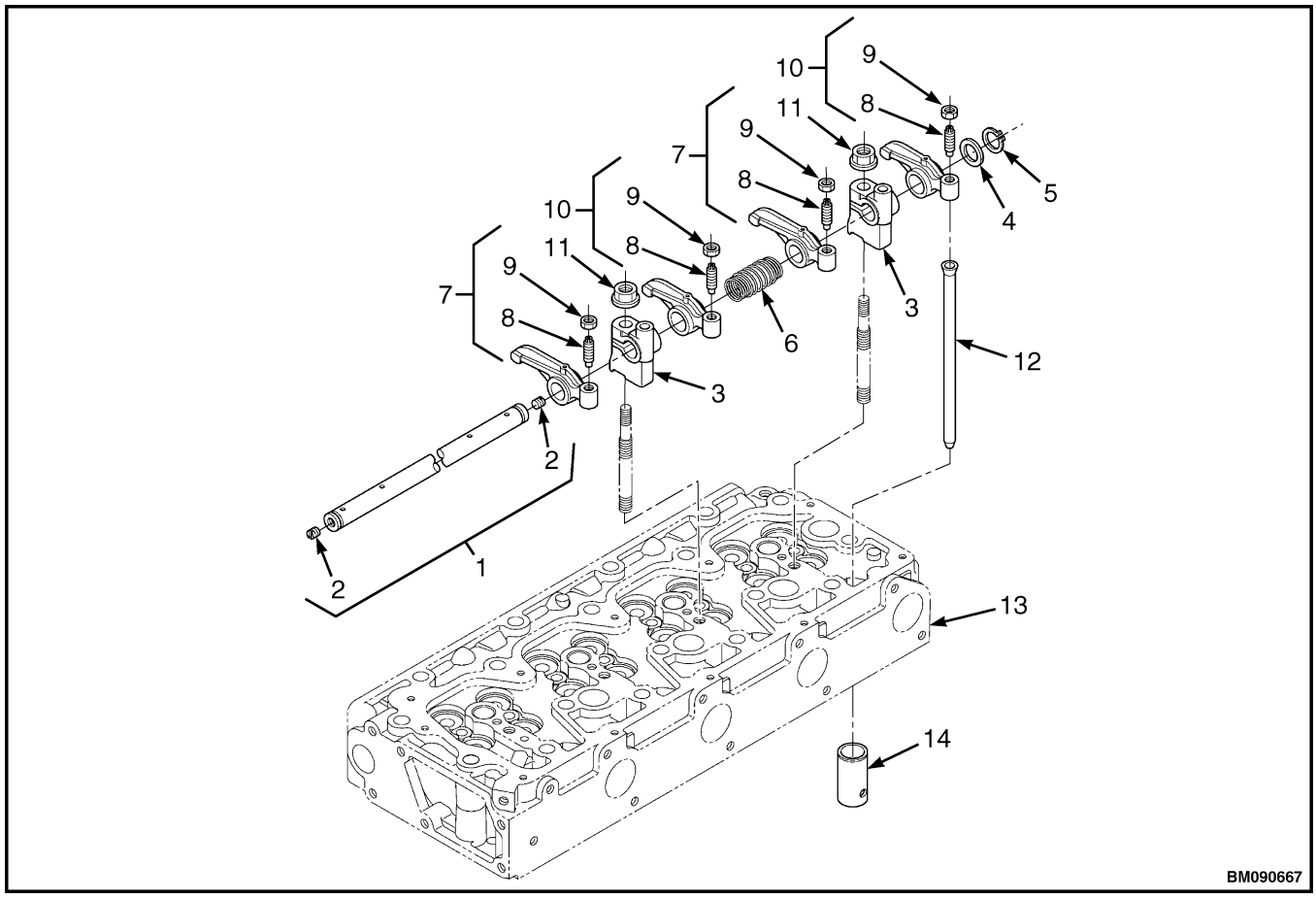
1. Remove valve cover and fuel injectors. See Valve Covers and Fuel InjectorsRemove.
2. Remove four flange nuts holding rocker arm brackets to cylinder head. See Figure 9.
3. Lift rocker arm shaft assembly from cylinder head.

NOTE: Mark push rods so they can be reinstalled in original location during reassembly.

4. Remove push rods from cylinder head.

Disassemble

1. Remove rocker arm shaft c-clips and washers from each end of rocker arm shafts. Discard washers. See Figure 9.
2. Remove c-clips and washers from ends of rocker arm shaft.



1. ROCKER ARM SHAFT
2. SLOTTED SCREW
3. ROCKER ARM BRACKET
4. WASHER
5. C-CLIP
6. ROCKER ARM SPRING
7. INTAKE ROCKER ARM ASSEMBLY
8. ADJUSTING SCREW
9. NUT
10. EXHAUST ROCKER ARM ASSEMBLY
11. FLANGE NUT
12. PUSH ROD
13. CYLINDER HEAD
14. LIFTER

Figure 9. Rocker Arm Assembly

NOTE: Mark rocker arms so they can be reinstalled in original location during reassembly.

NOTE: The rocker arm shaft fits tightly in rocker arm support brackets. Clamp support bracket in a padded vise and twist and pull rocker arm shaft to remove shaft.

3. Slide rocker arm shaft out of rocker arm brackets, springs, and rocker arms.

4. If necessary, remove valve adjusting screw and lock nut from rocker arms.

Clean and Inspect

WARNING

Cleaning solvents can be flammable and toxic and can cause skin irritation. When using cleaning solvents, always follow the recommendations of the manufacturer.

WARNING

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

Clean all parts in cleaning solvent. Dry parts with compressed air. Inspect for wear, cracks, and any other damage. Replace all parts as needed.

Push Rods

1. Place push rods on a flat inspection block.

2. Roll push rods until a gap can be observed between a portion of push rod and surface of inspection block.

3. Use a feeler gauge to measure gap. Refer to Engine Specifications for service limit. See Figure 10.

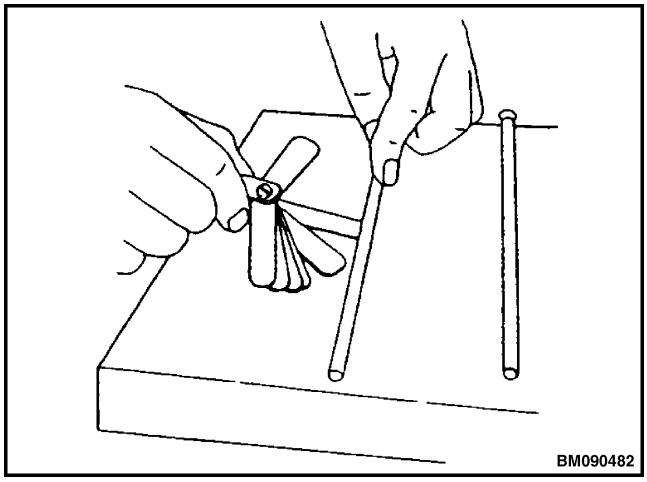


Figure 10. Push Rod Inspection

Rocker Arm Assembly

Rocker Arm and Support Bracket Inside Diameter: Use a test indicator and micrometer to determine if inside diameter of all rocker arm support brackets and rocker arms are within limits. Refer to Engine Specifications for service limit. See Figure 11.

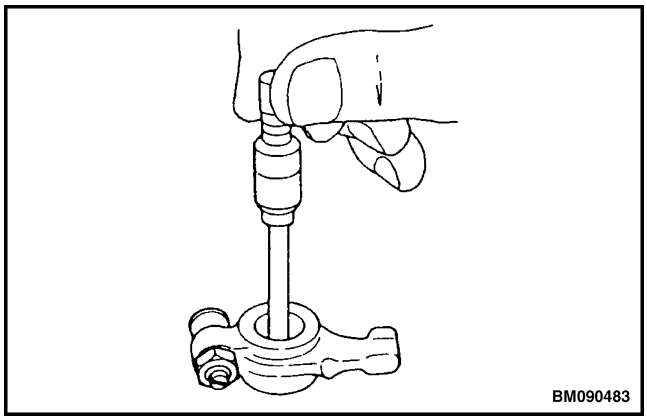


Figure 11. Rocker Arm Inside Diameter

Shaft Outside Diameter: Use a micrometer to measure rocker arm shaft outside diameter. Refer to Engine Specifications for service limit. See Figure 12.

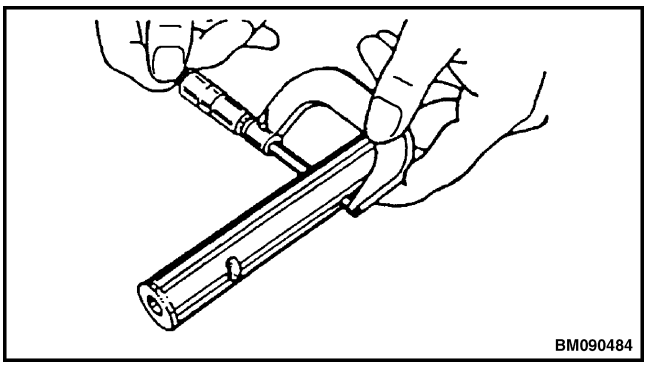


Figure 12. Rocker Arm Shaft Outside Diameter

Assemble

NOTE: The rocker arm shaft fits tightly in rocker arm support brackets. Clamp rocker arm shaft in a padded vise and twist and push support brackets onto rocker arm shaft.

1. Lubricate rocker arm shaft. Slide rocker arm support brackets, springs, and rocker arms onto shaft, as noted during removal.
2. Position rocker arm assembly on a flat surface. Install washers and c-clips onto ends of rocker arm shaft. See Figure 9.
3. If removed, install valve adjusting screws and lock nuts.

Install

NOTE: When installing push rod, mount it securely in groove located in bottom of lifter.

1. Install push rods.
2. Place rocker arm assembly in position on cylinder head.
3. Install and hand tighten rocker arm shaft retaining flange nuts.
4. Align push rods with their respective rocker arms, as noted during removal.
5. Tighten rocker arm shaft retaining flange nuts. Torque to 49 to 55 N•m (37 to 41 lbf in).
6. Adjust valve lash. See Valve Clearance Adjustments.
7. Install valve cover. See Valve Covers and Fuel InjectorsInstall.

VALVE CLEARANCE ADJUSTMENTS

NOTE: Make measurements and adjustments while engine is cold.

1. Remove valve cover. See Valve Covers and Fuel InjectorsRemove.

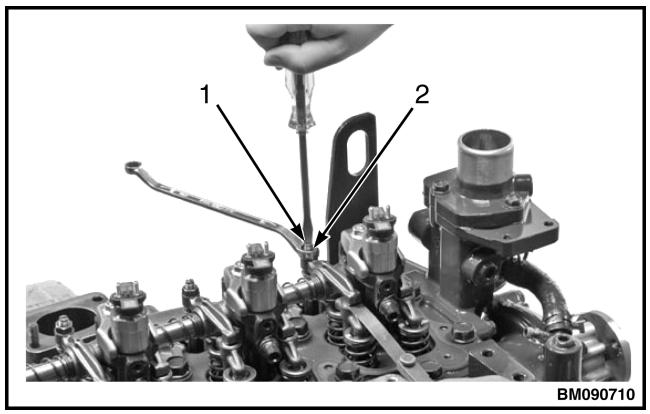
NOTE: The number one piston position is on radiator end of engine and ignition order is 1-3-4-2 at 180 degree intervals.

2. Rotate crankshaft clockwise, as seen from radiator side, to bring number one piston to top dead center (TDC). See Table 1 for reference to help determine which valves will be available for adjustment with number one piston at TDC.

Table 1. Available Valves for Adjustment

Adjustable Cylinder Location Of Piston		Intake	Exhaust
When No. 1 piston is at compression top dead center	1	⋆	⋆
	2	⋆	
	3		⋆
	4		
When No. 1 piston is at overlap position	1		
	2		⋆
	3	⋆	
	4	⋆	⋆

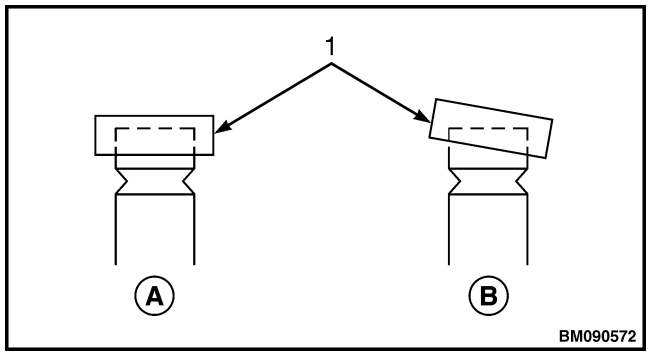
3. Insert a feeler gauge between rocker arm and valve cap. See Figure 13. Record measured valve clearance. The valve clearance should be between 0.23 to 0.27 mm (0.009 to 0.011 in.).



1. VALVE ADJUSTING SCREW
2. VALVE LOCK NUT

Figure 13. Valve Clearance Measurement

4. If adjustment is needed, loosen valve adjusting screw lock nut and valve adjusting screw on rocker arm (see Figure 13) and check valve for any inclination of valve cap, entrance of dirt, or wear. See Figure 14.



A. NORMAL **B.** ABNORMAL

1. VALVE CAP

Figure 14. Valve Cap Check

5. When valve clearance has been correctly adjusted, tighten the valve lock nut of the adjusting screw. See Figure 13.

NOTE: There is a tendency for clearance to decrease slightly when lock nut is tightened. It is suggested that you make clearance adjustment slightly on loose side before tightening lock nut.

6. Insert a feeler gauge between rocker arm and valve cap and adjust clearance so there is a slight drag on feeler gauge when sliding it between rocker arm and valve cap. Tighten valve adjusting screw lock nut and recheck clearance. The valve clearance should be between 0.23 to 0.27 mm (0.009 to 0.011 in.).

7. Apply clean engine oil to contact surface between adjusting screw and push rod.

8. Turn crankshaft 180 degrees and make measurement and adjustment for number three cylinder. Then turn crankshaft 180 degrees and make measurement and adjustment for number four cylinder. Then turn crankshaft 180 degrees and make measurement and adjustment for number 2 cylinder.

9. Install valve cover. See Valve Covers and Fuel Injectors, Install.

CYLINDER HEAD ASSEMBLY

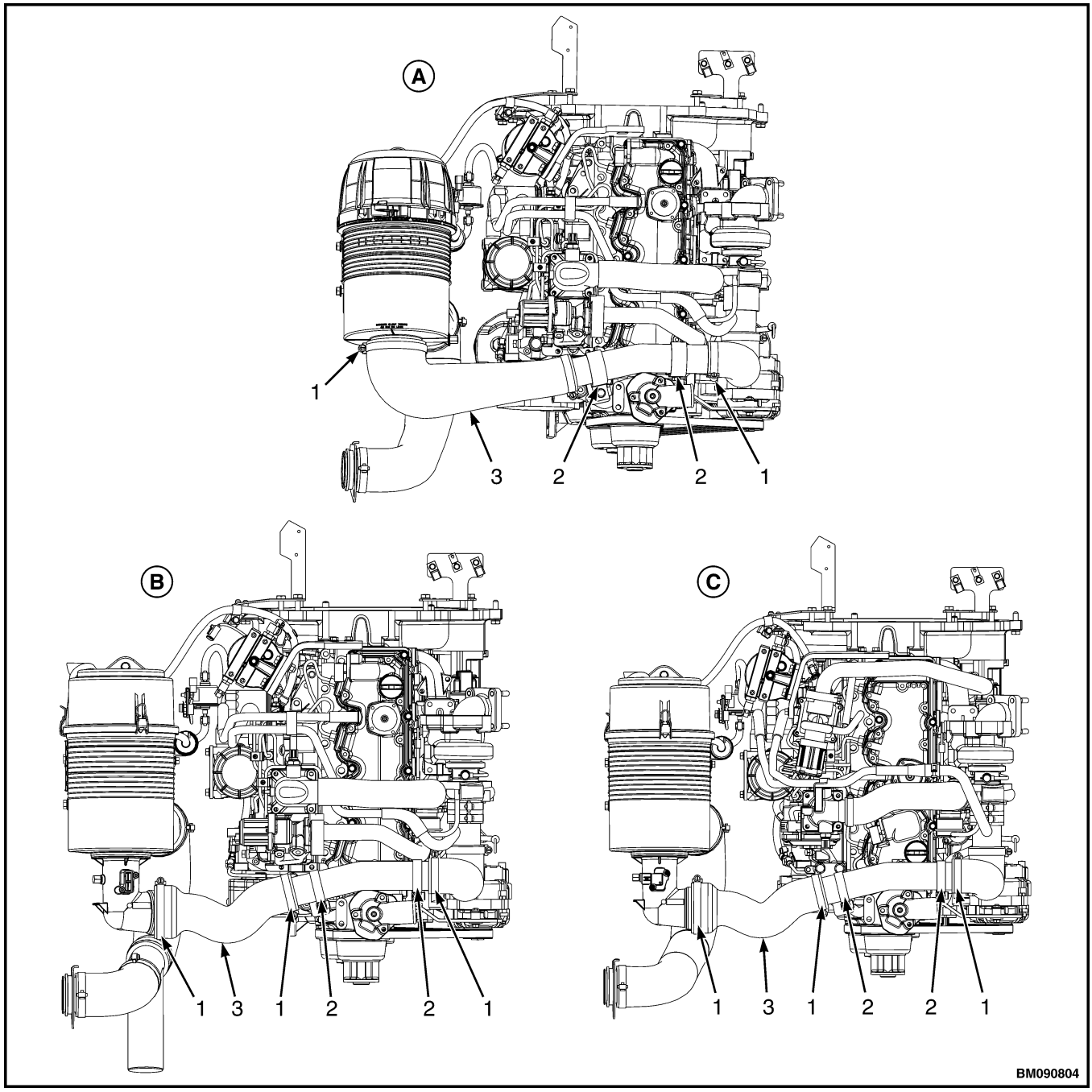
Remove

1. Disconnect negative battery cable at battery.

NOTE: Place a suitable container with a capacity of at least 12.0 liter (13 qt) under radiator and lower radiator hose.

2. Remove lower radiator hose and radiator cap. Allow cooling system to drain.

3. Remove two hose clamps, two retaining clamps and air intake hoses from air cleaner and turbo charger. See Figure 15.



A. LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024) MANUFACTURED BEFORE AUGUST, 2012

B. LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024) MANUFACTURED AFTER AUGUST, 2012

C. LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

1. HOSE CLAMP
2. RETAINING CLAMP
3. AIR INTAKE HOSE

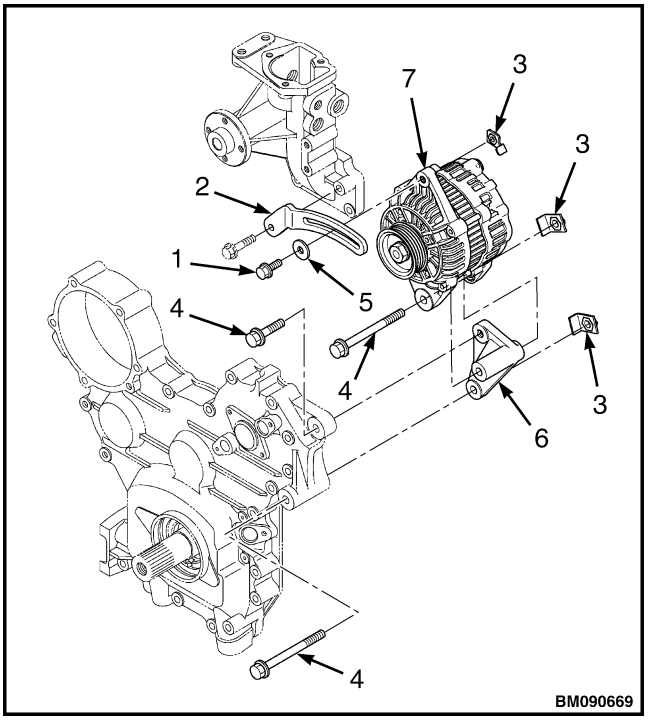
Figure 15. Air Intake Hoses

NOTE: Tag wiring connectors and wiring harness before removal to aid during installation.

4. Tag and disconnect connectors for engine wiring harness. Move harness aside for better access.

5. Loosen adjustment bolt for alternator and release tension on serpentine belt. Remove serpentine belt. See Figure 16.

6. Remove three mounting bolts, three retaining nuts, mounting bracket and alternator from lift truck. See Figure 16.



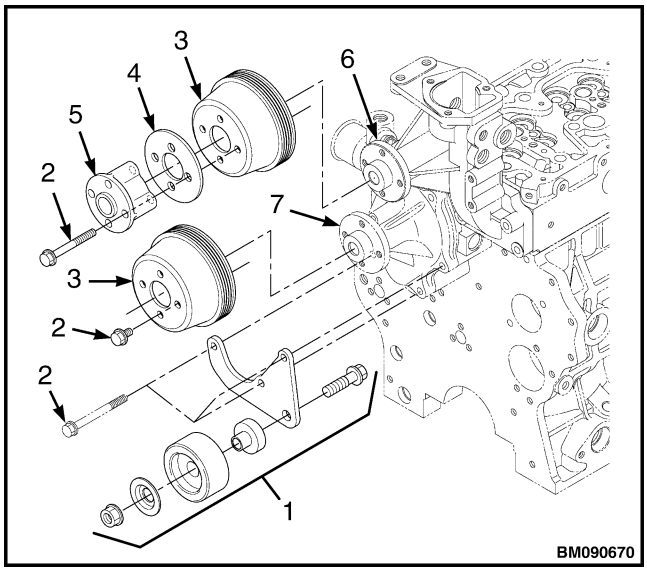
NOTE: ALTERNATOR MOUNTING FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) AND S6.0-7.0FT (S135-155FT) (F024). H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024) ARE SIMILAR.

1. ADJUSTMENT BOLT
2. ADJUSTER BRACKET
3. RETAINING NUT
4. MOUNTING BOLT
5. WASHER
6. MOUNTING BRACKET
7. ALTERNATOR

Figure 16. Alternator Mounting and Adjustment

7. Remove three bolts and idler assembly from water pump assembly. See Figure 17.

8. Remove eight bolts, collar, spacer, and two fan pulleys from water pump and water flange. See Figure 17.



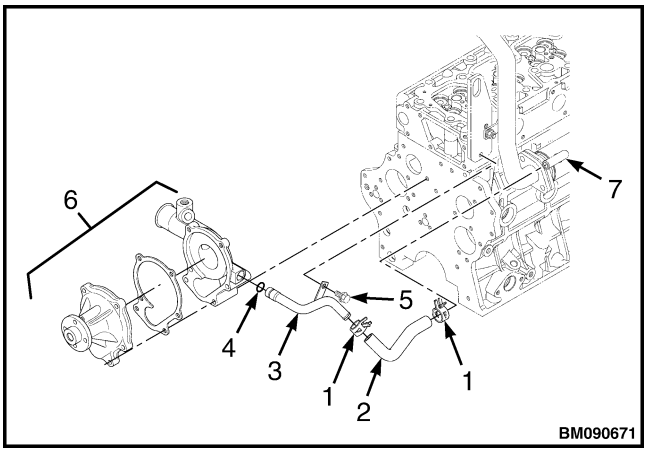
1. IDLER ASSEMBLY
2. BOLT
3. PULLEY
4. SPACER
5. COLLAR
6. WATER FLANGE
7. WATER PUMP

Figure 17. Engine Pulleys

NOTE: Perform Step 9 and Step 10 for lift truck models H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) and S6.0-7.0FT (S135-155FT) (F024).

9. Loosen two hose clamps and remove hose from water pipe to EGR cooler. See Figure 18.

10. Remove water pipe bolt from cylinder head. Remove water pipe and O-ring from water pump. Discard O-ring. See Figure 18.



1. CLAMP
2. HOSE
3. WATER PIPE
4. O-RING
5. BOLT
6. WATER PUMP ASSEMBLY
7. EGR COOLER

Figure 18. Water Pump Components for Lift Truck Models H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005) and S6.0-7.0FT (S135-155FT) (F024)

NOTE: Perform Step 11 through Step 14 for lift truck models H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) and S6.0-7.0FT (S135-155FT) (G024).

11. Remove two bolts holding water pipe to engine. See Figure 19.

12. Loosen hose clamps and remove EGR hose and tube from water pipe. See Figure 19.

13. Remove water pipe.

14. Loosen hose clamps and remove EGR hose from water pipe. See Figure 19.

15. Loosen two clamps and remove coolant by pass hose from water pump and water flange assembly. See Figure 20.

16. Remove water pump. See Cooling System Repair section in this manual for procedure.

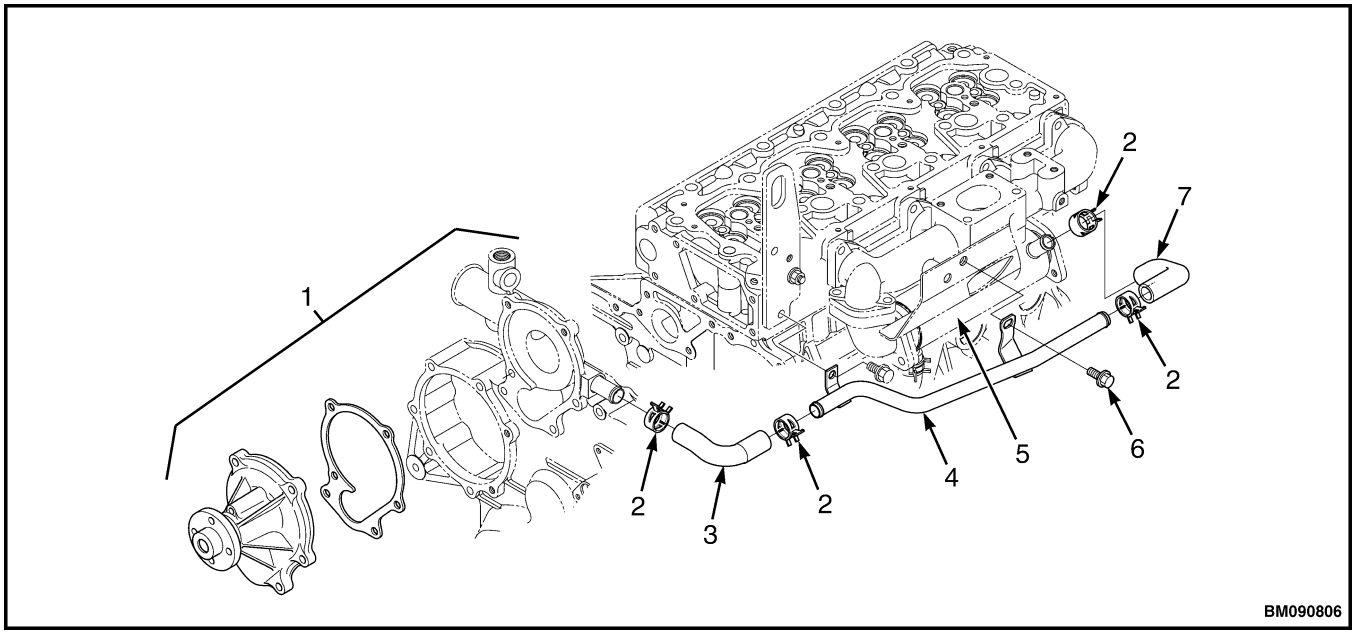
17. Remove four bolts, water flange assembly, and gasket from cylinder. Discard gasket. See Figure 20.

18. Loosen hose clamps. Tag and disconnect fuel hoses from fuel filter.

19. Plug hoses to prevent debris from entering fuel system.

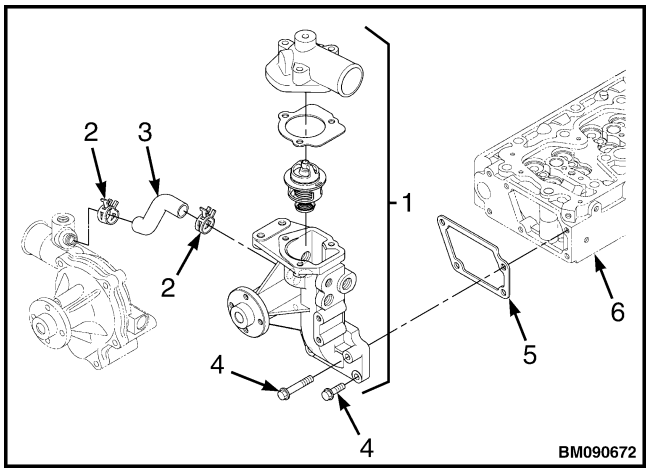
20. Remove two capscrews and two nuts holding fuel filter housing assembly to lifting eye bracket. Remove fuel filter assembly. See Figure 21.

21. Remove three bolts and lifting eye bracket from cylinder head. See Figure 21.



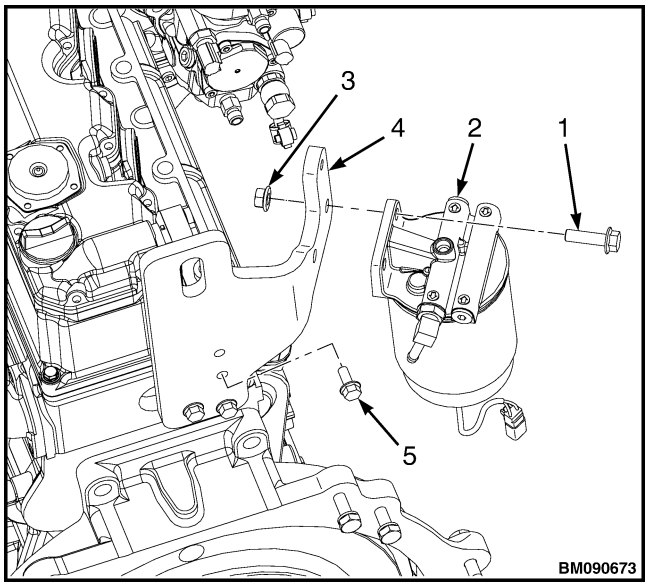
1. WATER PUMP ASSEMBLY
2. CLAMP
3. EGR HOSE
4. WATER PIPE
5. EGR COOLER
6. BOLT
7. TUBE

Figure 19. Water Pump Components for Lift Truck Models H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-20FT) (S005, U005) and S6.0-7.0FT (S135-155FT) (G024)



1. WATER FLANGE ASSEMBLY
2. CLAMP
3. BYPASS HOSE
4. BOLT
5. GASKET
6. CYLINDER HEAD

Figure 20. Water Flange



1. CAPSCREW
2. FUEL FILTER ASSEMBLY
3. NUT
4. LIFTING EYE BRACKET
5. BOLT

Figure 21. Fuel Filter Assembly

22. Remove valve cover, fuel injectors and related parts. See Valve Covers and Fuel Injectors, Remove section of this manual.

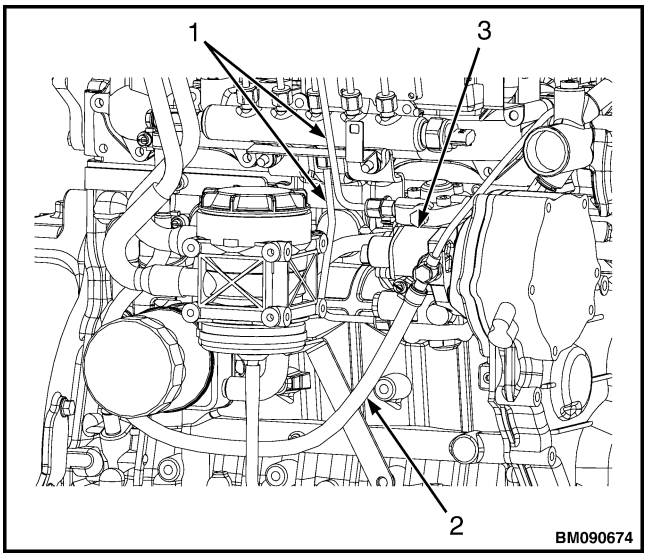
23. Remove two fuel lines from common fuel rail and fuel pump. See Figure 22.

24. Loosen hose clamp and remove fuel return line from fuel pump and end of common fuel rail. See Figure 22.

25. Remove two nuts and fuel rail from fuel rail mounting bracket on side of engine block. See Figure 23.

26. Remove nine bolts, intake manifold assembly and gasket from cylinder head. Discard gasket. See Figure 24.

27. Remove capscrew from dipstick tube and exhaust manifold heat shield. See Figure 25.



1. FUEL LINES
2. FUEL RETURN LINE
3. FUEL PUMP

Figure 22. Fuel Lines

28. Remove dipstick, dipstick tube, O-ring, and dipstick tube guide from engine block. Discard O-ring. See Figure 25.

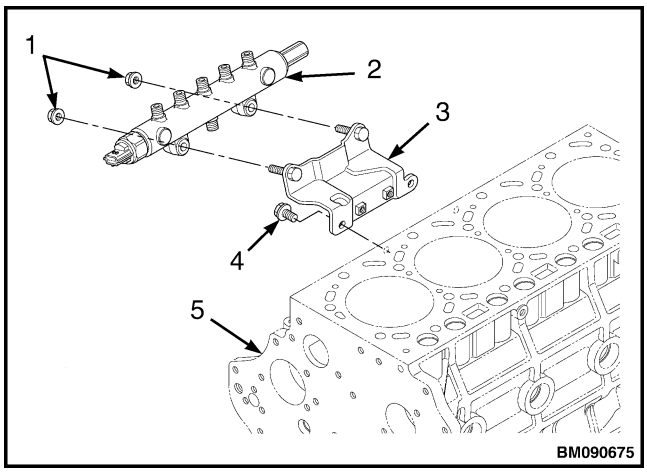
29. Remove two banjo bolts, two washer sets and turbocharger oil supply line. Discard washer sets. See Figure 26.

30. Remove two capscrews, two clamps, oil drain tube, hose and gasket from turbocharger and block. Discard gasket. See Figure 26.

31. Remove two clamps and water pipe from EGR cooler. See Figure 27.

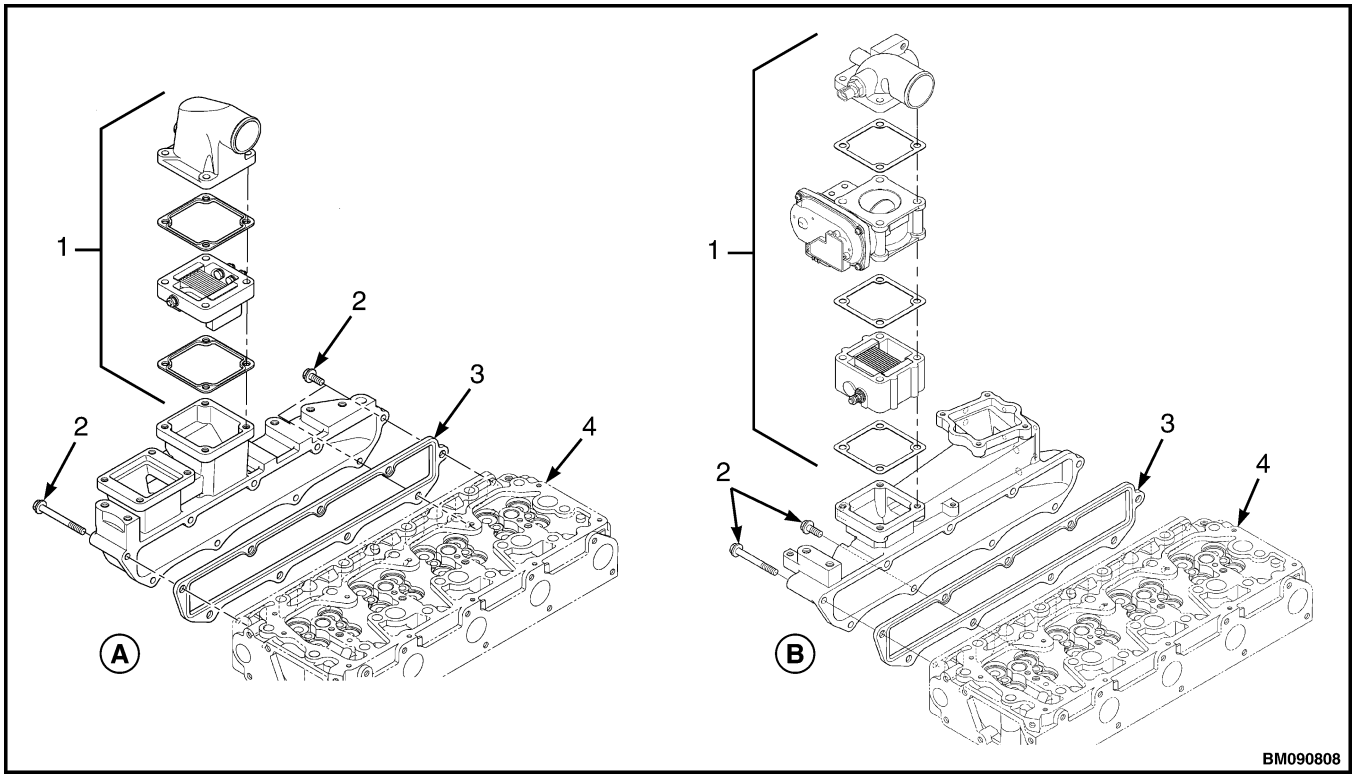
32. Remove two flange bolts, gasket and EGR cooler assembly from exhaust manifold. Discard gasket. See Figure 27.

33. Remove two flange bolts, gasket and EGR cooler flange from EGR cooler. Discard gasket. See Figure 27.



1. NUT
2. FUEL RAIL
3. MOUNTING BRACKET
4. CAPSCREW
5. ENGINE BLOCK

Figure 23. Fuel Rail



A. KUBOTA DIESEL INTAKE MANIFOLD FOR LIFT TRUCK MODELS S6.0-7.0FT (S135-155FT) (F024) AND H4.0FT5/FT6; H4.5FTS5, H4.5FT6, H5.0-5.5FT (H80-120FT) (R005)

1. INTAKE MANIFOLD ASSEMBLY
2. BOLT

B. KUBOTA DIESEL INTAKE MANIFOLD FOR LIFT TRUCK MODELS H4.0FT5/FT6; H4.5FTS5, H4.5FT6; H5.0-5.5FT (H80-120FT) (S005, U005) AND S6.0-7.0FT (S135-155FT) (G024)

3. GASKET
4. CYLINDER HEAD

Figure 24. Intake Manifold