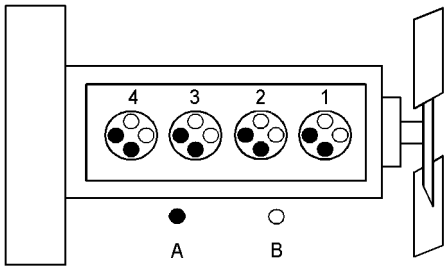
Specifications Section

i02657590

Engine Design



g01335181

Illustration 1

Cylinder and valve location

(A) Exhaust valve
(B) Inlet valve

Bore ..... 105 mm (4.133 inch)

Stroke ..... 127 mm (5.000 inch)

Displacement ..... 4.4 L (269 in^3)

Cylinder arrangement ..... In-line

Type of combustion ..... Direct injection

Compression ratio

Turbocharged engines and turbocharged aftercooled engines 16.2:1

Number of cylinders 4

Valves per cylinder 4

Valve lash

Inlet valve ..... 0.35 mm (0.0138 inch)
Exhaust valve ..... 0.35 mm (0.0138 inch)

Firing order 1, 3, 4, 2

When the crankshaft is viewed from the front of the engine, the crankshaft rotates in the following direction: ..... Clockwise

When the camshaft is viewed from the front of the engine, the camshaft rotates in the following direction: ..... Clockwise

The front of the engine is opposite the flywheel end. The left side and the right side of the engine are viewed from the flywheel end. The No. 1 cylinder is the front cylinder.

i02933788

Fuel Injection Lines

WARNING

Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow these inspection, maintenance and service instructions may cause personal injury or death.

Refer to Operation and Maintenance Manual, “General Hazard Information and High Pressure Fuel Lines” before adjustments and repairs are performed.

Note: Refer to Systems Operation, Testing and Adjusting, “Cleanliness of Fuel System Components” for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

Ensure that all adjustments and repairs are performed by authorized personnel that have had the correct training.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Manifold to Injector

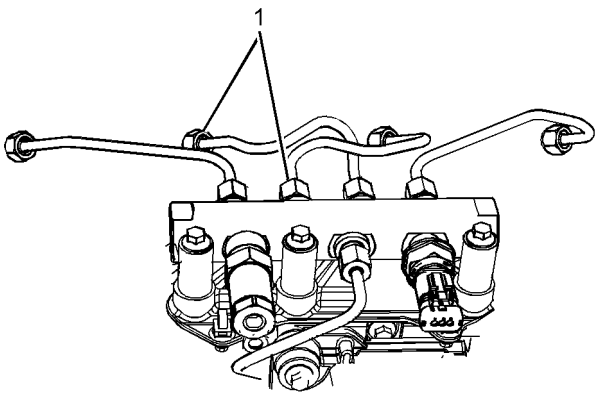


Illustration 2 g01260742
Typical example

(1) Tighten the union nuts for the high pressure fuel lines (1) to the following torque. ..... 30 N·m (22 lb ft)

Pump to Manifold

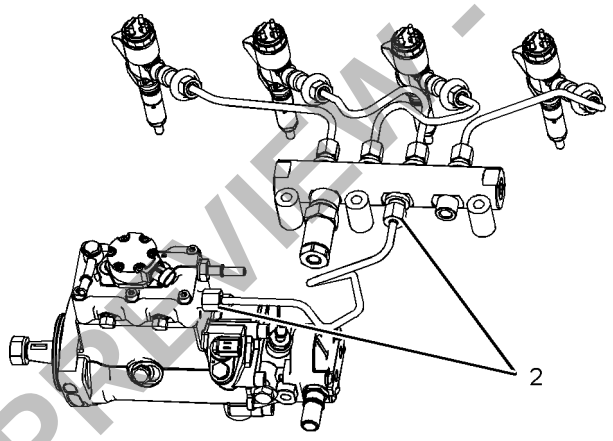


Illustration 3 g01454846
Typical example

(1) Tighten the union nuts for the high pressure fuel line (2) to the following torque. .. 30 N·m (22 lb ft)

i02519422

Fuel Injection Pump

Note: Before the pump is removed from the engine the fuel injection pump shaft must be locked. Position the engine to TC compression stroke of number one cylinder before tightening the locking screw. The locking screw will prevent the shaft from rotating. If the fuel injection pump was removed prior to correctly timing the engine and locking the shaft, the fuel injection pump will need to be timed by trained personnel. In order to time the fuel injection pump, refer to Disassembly and Assembly, “Fuel Injection Pump - Install”.

Note: Refer to Systems Operation, Testing and Adjusting, “Cleanliness of Fuel System Components” for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

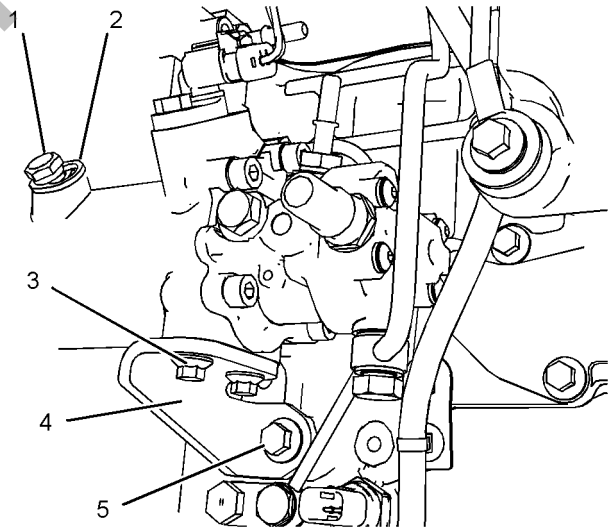


Illustration 4 g01260784
Typical example

(1) Locking screw

(2) Washer

(3) Setscrews

(4) Support bracket

(5) Setscrew

Locking the shaft

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Loosen locking screw (1) and move the washer (2) to the locked position. Tighten the locking screw to the following torque. .... 9 N·m (79 lb in)

Unlocking the shaft

Loosen locking screw (1) and move the washer (2) to the unlocked position. Tighten the locking screw to the following torque. ..... 9 N·m (79 lb in)

(3) Tighten the mounting setscrews to the following torque. ..... 22 N·m (16 lb ft)

(5) Tighten the mounting setscrew to the following torque. ..... 44 N·m (32 lb ft)

Note: The support bracket must be installed after the coolant pump is installed. In order to stop the distortion of the timing case, finger tighten the setscrew (5) and then tighten the setscrews (3).

Tighten the bolts that hold the fuel pump to the front housing to the following torque. ..... 25 N·m (18 lb ft)

i02933818

Fuel Injectors

Note: Refer to Systems Operation, Testing and Adjusting, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

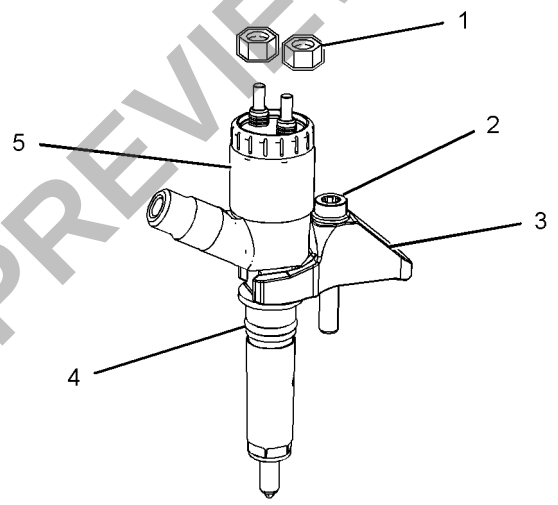


Illustration 5 g01454883

(1) Tighten the nuts to the following torque 2.4 N·m (21 lb in).

(2) Tighten the bolt in the clamp for the fuel injection nozzle to the following torque. .. 27 N·m (19 lb ft)

(3) Clamp

(4) O ring seal

(5) Trim code

Note: Refer to the Troubleshooting, "Injector Trim File" for more information.

i02933851

Fuel Transfer Pump

Note: Refer to Systems Operation, Testing and Adjusting, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

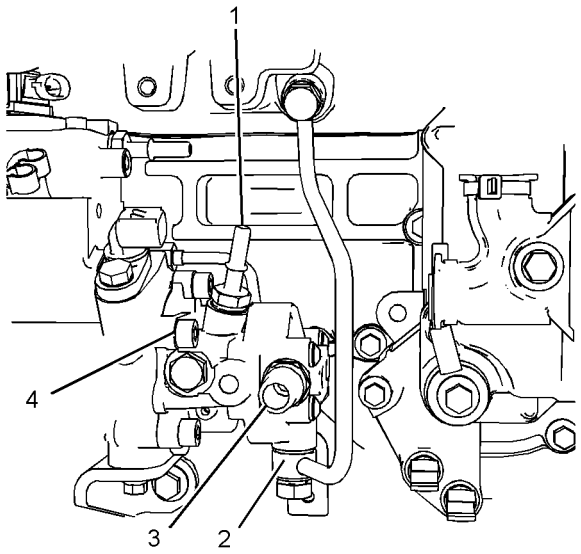


Illustration 6 g01454900

(1) Fuel outlet
(2) Fuel return from cylinder head
(3) Fuel supply
(4) Retaining setscrew

(4) Retaining setscrew ..... 30 N·m (22 lb ft)

The outlet pressure for the fuel ..... 400 to 500 kPa (58.0160 to 72.5200 psi)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

i02657602

Cylinder Head Valves

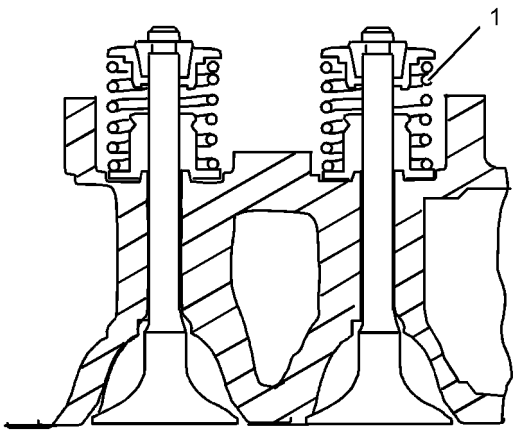


Illustration 17 g01335203

Typical example

The valve spring (1) may be used on the inlet valve or the exhaust valve. When the valve springs are replaced the valve springs must be replaced in pairs.

Table 1

The load for the valve spring	The length of the valve spring
161.5 to 178.5 N (36.3 to 40.1 lb)	31.5 mm (1.2402 inch)
337.9 ± 373.5 N (76 ± 84 lb)	21.5 mm (0.8465 inch)

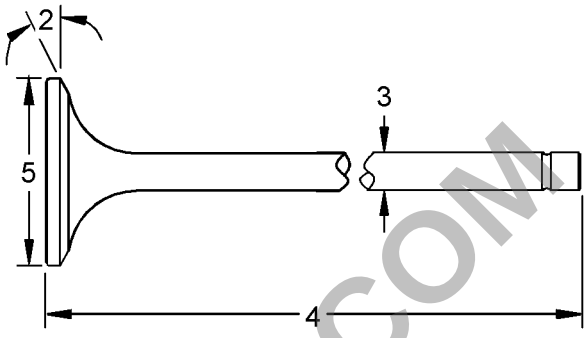


Illustration 18 g01335204

(2) Valve face angle

Inlet ..... 30 degrees
Exhaust ..... 45 degrees

(3) Valve stem diameter

Inlet .. 5.942 to 5.957 mm (0.2339 to 0.2345 inch)
Exhaust ..... 5.927 to 5.942 mm (0.2333 to 0.2339 inch)

Clearance

Maximum clearance of the inlet valve stem ..... 0.05 mm (0.0020 inch)
The service limit for the inlet valve stem ..... 0.08 mm (0.0031 inch)

Clearance

Maximum clearance of the exhaust valve stem ..... 0.065 mm (0.0026 inch)
The service limit for the inlet valve stem ..... 0.09 mm (0.0035 inch)

(4) Length of valve

Inlet valve ..... 107.925 to 108.375 mm (4.2490 to 4.2667 inch)
Exhaust valve ..... 107.703 to 108.153 mm (4.2403 to 4.2580 inch)

(5) Valve head

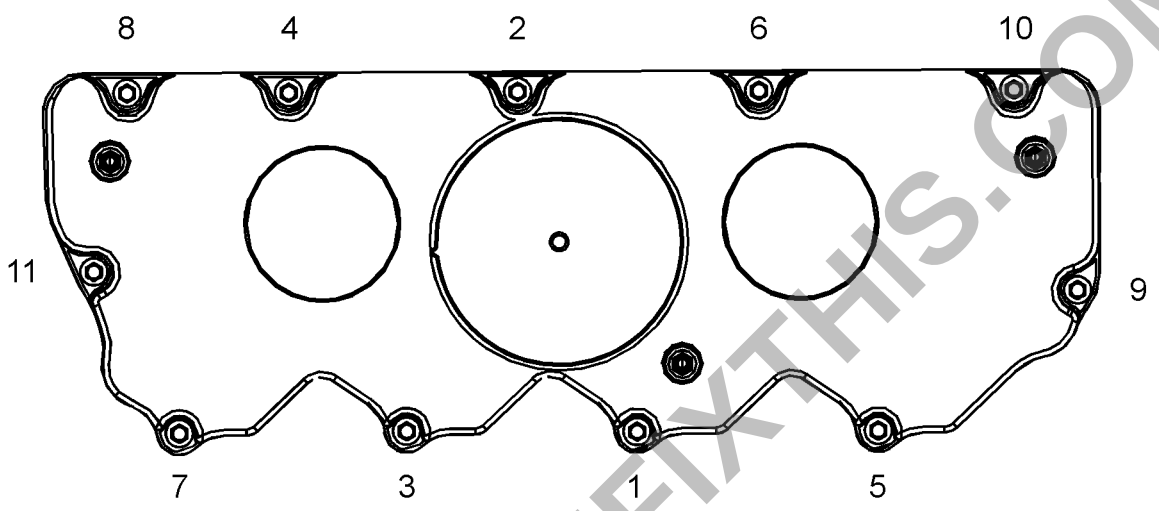
Diameter of inlet valve head ..... 35 mm (1.3780 inch)
Diameter of exhaust valve head ..... 33 mm (1.2992 inch)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

i02657600

Valve Mechanism Cover



g01335202

Illustration 16

Typical example

Tighten the bolts for the valve mechanism cover in the sequence that is shown in illustration 16 to the following torque. ..... 6 N·m (53 lb in)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

i02934390

Rocker Shaft

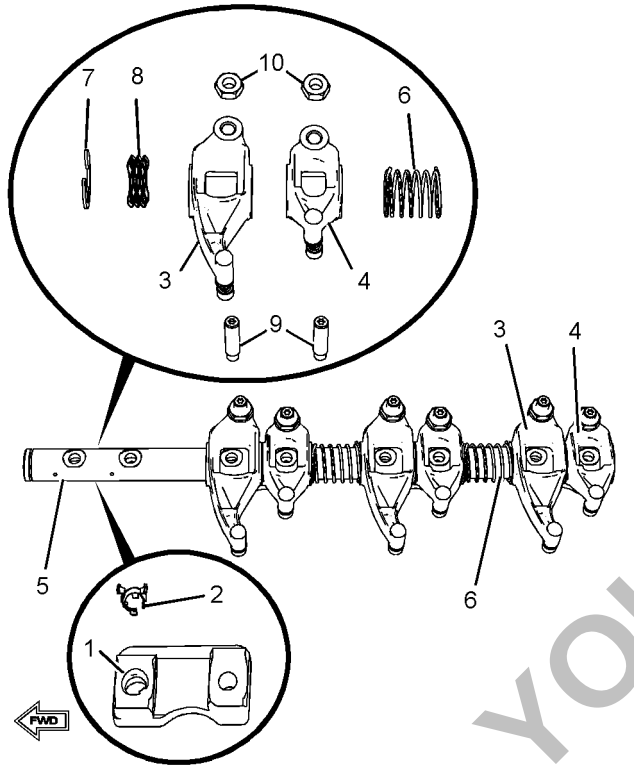


Illustration 14 g01455342

Typical example

(1) Pedestal

(2) Locator

(3) Inlet rocker arm

Diameter of the rocker arm bore .... 25.031 to 25.051 mm (0.9855 to 0.9863 inch)

(4) Exhaust rocker arm

Diameter of the rocker arm bore ..... 25.031 to 25.051 mm (0.9855 to 0.9863 inch)

Clearance

Maximum clearance of both the rocker arm bores ..... 0.089 mm (0.0035 inch)
The service limit for both rocker arm bores ..... 0.17 mm (0.0067 inch)

(5) Rocker shaft

Diameter of the rocker shaft ..... 24.962 to 24.987 mm (0.9828 to 0.9837 inch)

(6) Spring

(7) Snap ring

(8) Spring

(9) Adjuster

(10) Locknut

Torque for the locknut ..... 27 N·m (20 lb ft)

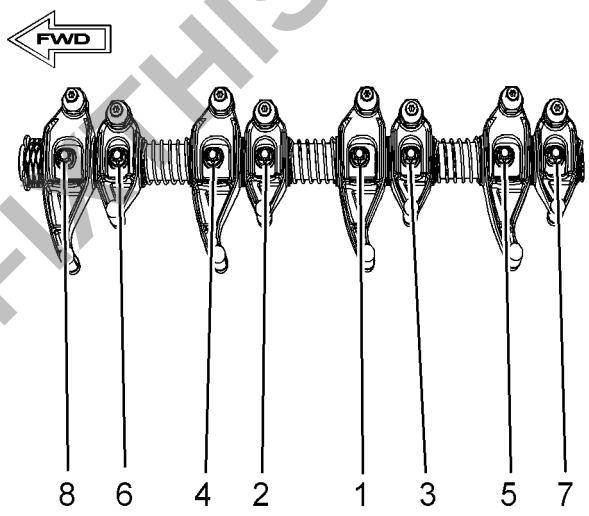


Illustration 15 g01455344

Tightening sequence

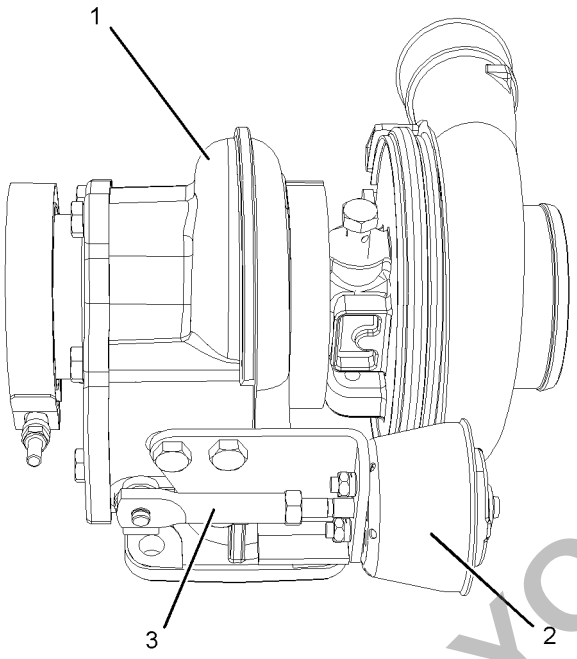
Tighten the fasteners in the sequence that is in illustration 15. Tighten the fasteners to the following torque. ..... 35 N·m (25 lb ft)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

i02527109

Turbocharger



g01265255

Illustration 22

Typical example

(1) Turbocharger

(2) Actuator

(3) Actuator rod

The maximum test pressure for the wastegate ..... 112 kPa (16.2445 psi)

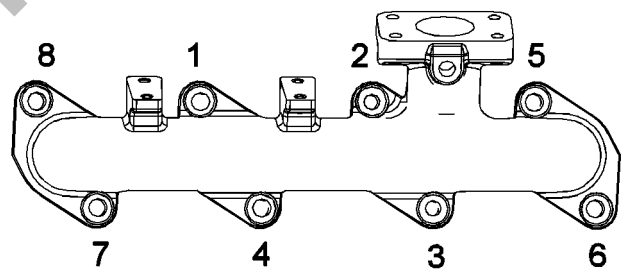
The movement for the rod actuator ..... 1 mm (0.0394 inch)

Table 3

The part number for the turbocharger	The pressure for the wastegate
2674A804	112 kPa (16.2445 psi)
2674A805	112 kPa (16.2445 psi)
2674A806	112 kPa (16.2445 psi)
2674A607	112 kPa (16.2445 psi)
2674A608	112 kPa (16.2445 psi)
2674A609	100 kPa (14.5040 psi)
2674A611	100 kPa (14.5040 psi)
2674A612	100 kPa (14.5040 psi)

i02873699

Exhaust Manifold



g01430662

Illustration 23

Typical example

Tighten the exhaust manifold bolts in the sequence that is shown in illustration 23 to the following torque. ..... 40 N·m (30 lb ft)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

i02934444

Cylinder Head

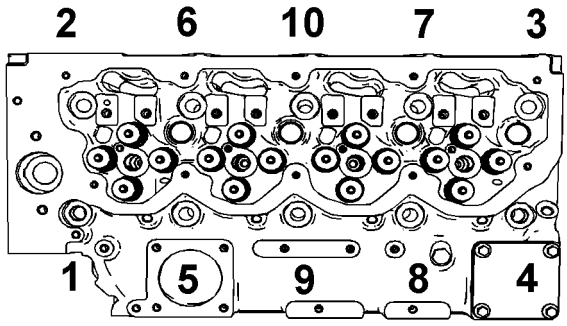


Illustration 19 g01250785
Typical example

Lubricate the threads and the underside of the head bolts with clean engine oil.

Tighten the bolts in the sequence that is shown in illustration 19 to the following torque. ..... 50 N·m (37 lb ft)
Tighten the bolts again to the following torque. ..... 100 N·m (74 lb ft)
Tighten the head bolts to the additional amount. ..... 225 degrees

Minimum thickness of cylinder head ..... 100.95 mm (3.9744 inch)

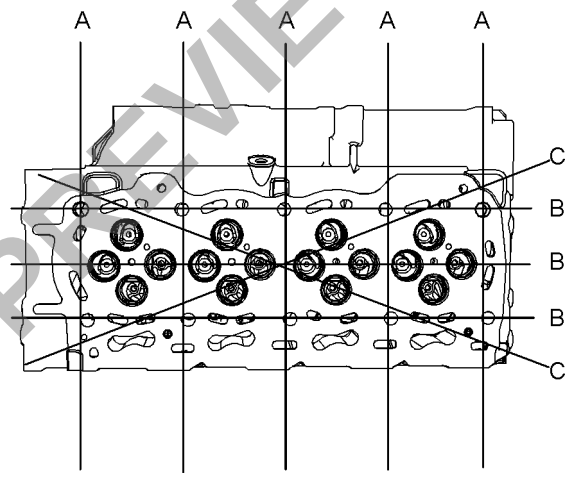


Illustration 20 g01455374

Note: The maximum distortion of the bottom face of the cylinder head is given in table 2.

Table 2

Dimension	Maximum Permissible Distortion
Width (A)	0.03 mm (0.0018 inch)
Length (B)	0.05 mm (0.0019 inch)
Diagonal Line (C)	0.05 mm (0.0019 inch)

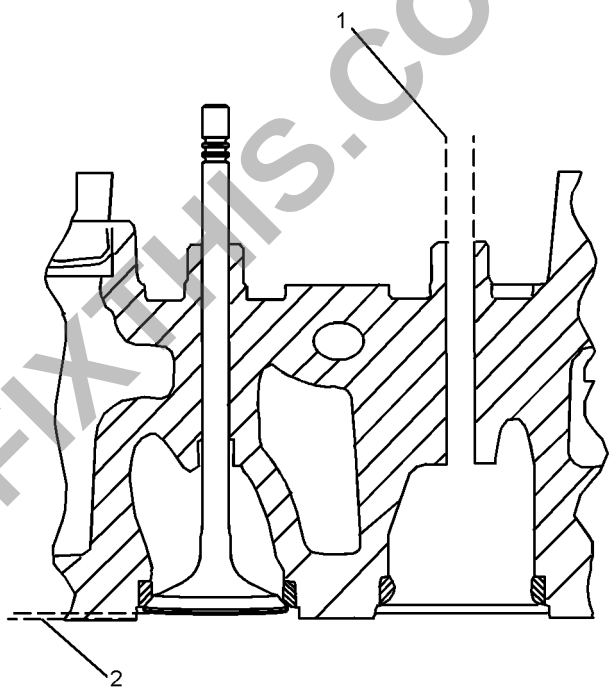


Illustration 21 g01335214
Typical example

(1) Valve guide bores

Inlet and exhaust ..... 5.979 to 5.992 mm (0.2354 to 0.2359 inch)

(2) Valve depths

Inlet .. 0.905 to 1.163 mm (0.0356 to 0.0458 inch)
The service limit for the depth of the inlet valve ..... 1.41 mm (0.0555 inch)
Exhaust ..... 0.876 to 1.131 mm (0.0345 to 0.0445 inch)
The service limit for the exhaust valve depth ..... 1.38 mm (0.0543 inch)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table of Contents

Specifications Section

Engine Design 4
Fuel Injection Lines 4
Fuel Injection Pump 5
Fuel Injectors 6
Fuel Transfer Pump 6
Fuel Filter Base 7
Fuel Filter 7
Fuel Priming Pump 9
Lifter Group 9
Rocker Shaft 10
Valve Mechanism Cover 11
Cylinder Head Valves 12
Cylinder Head 13
Turbocharger 14
Exhaust Manifold 14
Camshaft 15
Camshaft Bearings 15
Engine Oil Filter Base 16
Engine Oil Cooler 17
Engine Oil Pump 17
Engine Oil Pressure 19
Engine Oil Bypass Valve 19
Engine Oil Pan 20
Crankcase Breather 22
Water Temperature Regulator and Housing 23
Water Pump 23
Cylinder Block 24
Crankshaft 25
Crankshaft Seals 27
Connecting Rod Bearing Journal 28
Main Bearing Journal 28
Connecting Rod 29
Piston and Rings 30
Piston Cooling Jet 31
Front Housing and Covers 32
Gear Group (Front) 33
Flywheel 34
Flywheel Housing 35
Crankshaft Pulley 35
Belt Tension Chart 36
Engine Lifting Bracket 37
Alternator 37
Starter Motor 38
Coolant Temperature Sensor 39
Fuel Pressure Sensor 39
Engine Oil Pressure Sensor 40
Boost Pressure Sensor 40
Inlet Manifold Temperature Sensor 40
Crankshaft Position Sensor 41
Electronic Control Module 41
Glow Plugs 42

Index Section

Index 43

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Index

A

Alternator 37
The 12 Volt Denso Alternator 37
The 24 Volt Iskra Alternator 38

B

Belt Tension Chart 36
Boost Pressure Sensor 40

C

Camshaft 15
Camshaft Bearings 15
Connecting Rod 29
Connecting Rod Bearing Journal 28
Coolant Temperature Sensor 39
Crankcase Breather 22
Breather Canister 22
Open crankcase breather 22
Crankshaft 25
Crankshaft Position Sensor 41
Crankshaft Pulley 35
Crankshaft Pulley for the Poly V-Belt 36
Crankshaft Seals 27
Cylinder Block 24
Cylinder Head 13
Cylinder Head Valves 12

E

Electronic Control Module 41
Engine Design 4
Engine Lifting Bracket 37
Engine Oil Bypass Valve 19
Installed in the Balancer 20
Installed in the Oil Pump 19
Engine Oil Cooler 17
Engine Oil Filter Base 16
Engine Oil Pan 20
Front sealant 21
Rear sealant 21
Engine Oil Pressure 19
Engine Oil Pressure Sensor 40
Engine Oil Pump 17
Engines with Balancer Group 17
Engines without Balancer Group 18
Exhaust Manifold 14

F

Flywheel 34
Flywheel Housing 35
Front Housing and Covers 32
Fuel Filter 7
Primary Fuel Filter 7
Secondary Fuel Filter 8
Type One Primary Fuel Filter/Water Separator 7
Type One Secondary Fuel Filter 8
Type Two Primary Fuel Filter/Water Separator 8
Type Two Secondary Fuel Filter 8
Fuel Filter Base 7
Fuel Injection Lines 4
Manifold to Injector 5
Pump to Manifold 5
Fuel Injection Pump 5
Fuel Injectors 6
Fuel Pressure Sensor 39
Fuel Priming Pump 9
Electric fuel Priming Pump 9
Hand Fuel Priming Pump 9
Fuel Transfer Pump 6

G

Gear Group (Front) 33
Glow Plugs 42

I

Important Safety Information 2
Inlet Manifold Temperature Sensor 40

L

Lifter Group 9

M

Main Bearing Journal 28
The shell for the main bearings 28

P

Piston and Rings 30
Piston 31
Piston Cooling Jet 31
Piston Cooling Jet Alignment 31

R

Rocker Shaft 10

S

Specifications Section 4

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

Operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Perkins cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. If a tool, procedure, work method or operating technique that is not specifically recommended by Perkins is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Perkins dealers or Perkins distributors have the most current information available.

⚠ WARNING

When replacement parts are required for this product Perkins recommends using Perkins replacement parts.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

Operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Perkins cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. If a tool, procedure, work method or operating technique that is not specifically recommended by Perkins is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Perkins dealers or Perkins distributors have the most current information available.

⚠ WARNING

When replacement parts are required for this product Perkins recommends using Perkins replacement parts.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Glow Plug – The glow plug is an optional starting aid for cold conditions. One glow plug is installed in each combustion chamber in order to improve the ability of the engine to start. The ECM uses information from the engine sensors such as the engine temperature to determine when the glow plug relay must provide power to each glow plug. Each of the glow plugs then provides a very hot surface in the combustion chamber in order to vaporize the mixture of air and fuel. This improves ignition during the compression stroke of the cylinder.

Glow Plug Relay – The glow plug relay is controlled by the ECM in order to provide high current to the glow plugs that are used in the starting aid system.

Harness – The harness is the bundle of wiring (loom) that connects all components of the electronic system.

Hertz (Hz) – Hertz is the measure of frequency in cycles per second.

High Pressure Fuel Rail Pump – See “Fuel Rail Pump”.

High Pressure Fuel Rail Pump Solenoid Valve – See “Fuel Rail Pump Solenoid Valve”.

High Pressure Fuel Rail – See “Fuel Rail”.

Injector Codes – The injector codes or injector trim codes are numeric codes or alphanumeric codes that are etched or stamped on individual electronic unit injectors. These codes are used to fine tune the fuel delivery.

Injector Trim Files – Injector trim files are downloaded from a disk to the ECM. The injector trim files compensate for variances in manufacturing of the electronic unit injector. The serial number for the electronic unit injector must be obtained in order to retrieve the correct injector trim file.

Inlet Manifold Air Temperature Sensor – The intake manifold air temperature sensor detects the air temperature in the intake manifold. The ECM monitors the air temperature and other data in the intake manifold in order to adjust injection timing and other performance functions.

Inlet Manifold Pressure (Engines that are turbocharged) – The difference between the turbocharger outlet pressure and atmospheric pressure is commonly referred to as inlet manifold pressure. The sensor for the inlet manifold air pressure measures the amount of boost.

Integrated Electronic Controls – The engine is designed with the electronic controls as a necessary part of the system. The engine will not operate without the electronic controls.

Intake Manifold Pressure Sensor – The Intake Manifold Pressure Sensor measures the pressure in the intake manifold. The pressure in the intake manifold may be different to the pressure outside the engine (atmospheric pressure). The difference in pressure may be caused by an increase in air pressure by a turbocharger (if equipped).

J1939 CAN Data Link – Logged diagnostic codes are codes which are stored in the memory. These codes are meant to be an indicator of possible causes for intermittent problems. Refer to the term “Diagnostic Code” in this glossary for more information.

Logged Diagnostic Codes – Logged diagnostic codes are codes which are stored in the memory. These codes are meant to be an indicator of possible causes for intermittent problems. Refer to the term “Diagnostic Code” in this glossary for more information.

Open Circuit – An open circuit is a condition that is caused by an open switch, or by an electrical wire or a connection that is broken. When this condition exists, the signal or the supply voltage can no longer reach the intended destination.

OEM – OEM is an abbreviation for the Original Equipment Manufacturer. This is the manufacturer of the machine or the vehicle that uses the engine.

Parameter – A parameter is a value or a limit that is programmable. This helps determine specific characteristics or behaviors of the engine.

Parameter Identifier (PID) – A PID is a numerical code that contains two digits or three digits. A numerical code is assigned to each component. The numerical code identifies data via the data link to the ECM.

Password – A password is a group of numeric characters or a group of alphanumeric characters that is designed to restrict access to parameters. The electronic system requires correct passwords in order to change some parameters (Factory Passwords). Refer to Troubleshooting, “Factory Passwords” for more information.

Personality Module – This module is software that is inside the ECM. The module contains all the instructions (software) for the ECM and the module contains the performance maps for a specific engine. The personality module may be reprogrammed through flash programming.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Index

A

Air in Fuel - Test 45
Air Inlet and Exhaust System 11, 53
  Turbocharger 12
  Valve System Components 14
Air Inlet and Exhaust System - Inspect 53
Alternator - Test 79

B

Basic Engine 6, 70
  Camshaft 9
  Crankshaft 8
  Cylinder Block and Cylinder Head 7
  Cylinder head 7
  Gears and Timing Gear Case 9
  Introduction (Basic Engine) 6
  Pistons, Rings and Connecting Rods 8
  Rocker Shaft Assembly 10
Battery - Test 80

C

Charging System - Test 80
  Alternator Regulator 80
Cleanliness of Fuel System Components 18
  Cleanliness of the Engine 18
  Environment 19
  New Components 19
  Refueling 19
Compression - Test 57
Connecting Rod - Inspect 70
  Distortion of The Connecting Rod 72
  Length of The Connecting Rod 71
Cooling System 14, 65
  Coolant Flow 15
  Introduction (Cooling System) 14
Cooling System - Check 65
  Engine And Cooling System Heat Problems 65
Cooling System - Inspect 65
  Visual Inspection Of The Cooling System 65
Cooling System - Test 66
  Checking the Filler Cap 66
  Testing The Radiator And Cooling System For Leaks 67
Crankshaft Pulley - Check 77
Cylinder Block - Inspect 73
Cylinder Head - Inspect 73

E

Electric Starting System - Test 81
  Diagnosis Procedure 82
  General Information 81
Electrical System 17, 79
  Alternator 18
  Starting Motor 17
Electronic Control System 27
  Diagnostic Codes 33
  ECM 32
  Introduction (Electronic Control System) 27
  Passwords 33
  Pressure Sensors 35
  Speed/Timing Sensor 33
  Temperature Sensors 36
Engine Oil Cooler - Inspect 67
  Mounted Filter 67
Engine Oil Pressure - Test 62
  High Oil Pressure 62
  Low Oil Pressure 62
Engine Oil Pump - Inspect 62
Engine Operation 6
Engine Valve Lash - Inspect/Adjust 57
  Valve Lash Adjustment 58
  Valve Lash Check 58
Excessive Bearing Wear - Inspect 63
Excessive Engine Oil Consumption - Inspect 63
  Engine Oil Leaks into the Combustion Area of the Cylinders 63
  Engine Oil Leaks on the Outside of the Engine 63

F

Finding Top Center Position for No. 1 Piston 48
Flywheel - Inspect 74
  Alignment of the Flywheel Face 74
  Flywheel Runout 75
Flywheel Housing - Inspect 75
  Alignment of the Flywheel Housing 76
  Concentricity of the Flywheel Housing 75
Fuel Injection 20
  Fuel Injection Pump 25
  Fuel Injectors 27
  Fuel Manifold 27
  Fuel Priming Pump 24
  Fuel Pump Assembly 25
  Introduction (Fuel Injection) 20
  Primary Filter/water Separator 24
  Secondary Fuel Filter 25
Fuel Injection Timing - Check 48
Fuel Quality - Test 49
Fuel System 45
Fuel System - Inspect 45
Fuel System - Prime 50
  Electric Fuel Priming Pump 51
  Hand Fuel Priming Pump 50

G

Gear Group - Inspect 76
Gear Group (Front) - Time 51
General Information 4

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

4. Position a new exhaust manifold gasket (1) onto Tooling (A).

Note: Ensure that the exhaust manifold gasket is correctly oriented.

5. Align exhaust manifold (3) with Tooling (A). Install the exhaust manifold to the cylinder head.

Note: If the engine has a top mounted turbocharger, the tube assembly for the oil drain from the turbocharger must be connected to the cylinder block before the exhaust manifold is installed.

6. Install new bolts (4) finger tight.

7. Remove Tooling (A). Install the remaining bolts (4) finger tight.

8. Tighten bolts (4) to a torque of 33 N·m (24 lb ft) in the sequence that is shown in Illustration 68.

End By:

a. Install the turbocharger. Refer to Disassembly and Assembly, “Turbocharger - Install”.

i02585967

Exhaust Elbow - Remove and Install

Removal Procedure

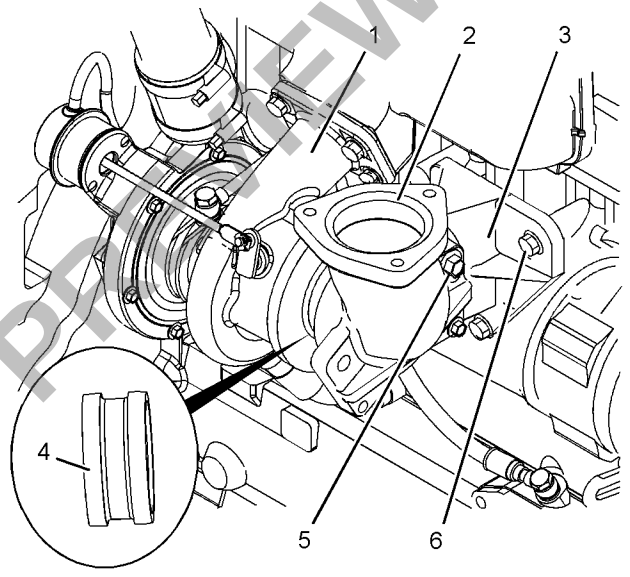


Illustration 69 g01261613

Typical example

1. Remove bolts (5) and remove exhaust elbow (2) from turbocharger (1). Note the orientation of the exhaust elbow.

2. Remove coupling (4) that connects exhaust elbow (2) to turbocharger (1).

3. If necessary, remove bolts (6) and remove support bracket (3) from the cylinder block.

Installation Procedure

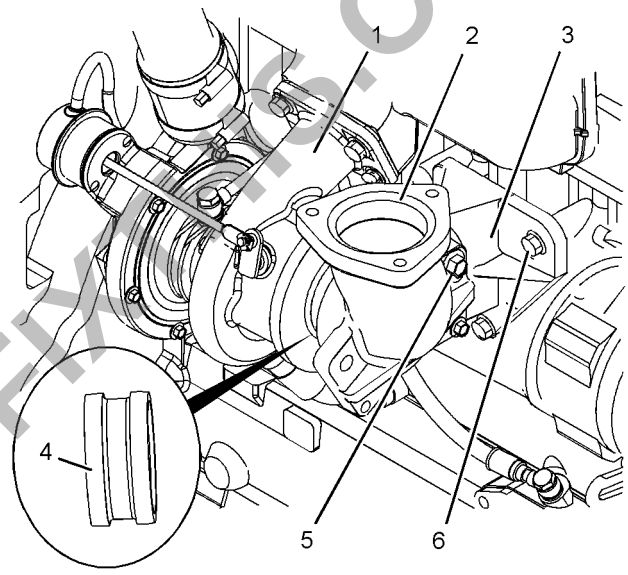


Illustration 70 g01261613

Typical example

1. Ensure that the exhaust elbow, the coupling and the outlet of the turbocharger are free from damage. Replace any components that are damaged.

2. Install coupling (4) to exhaust elbow (2).

3. Align coupling (4) to the outlet of turbocharger (1) and install the assembly of the exhaust elbow.

4. If necessary, install support bracket (3) to the cylinder block and install bolts (6). Tighten the bolts to a torque of 44 N·m (33 lb ft).

5. Install bolts (5) finger tight.

6. Ensure that coupling (4) is fully engaged into the outlet of the turbocharger (1). Ensure that the gap between the turbocharger and the exhaust elbow is evenly spaced.

7. Tighten bolts (5) to a torque of 44 N·m (33 lb ft).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

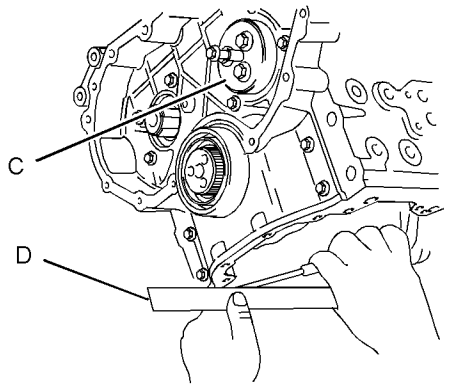


Illustration 153 g01269947

Typical example

8. Install the front housing over Tooling (B) and over Tooling (C) onto the cylinder block.

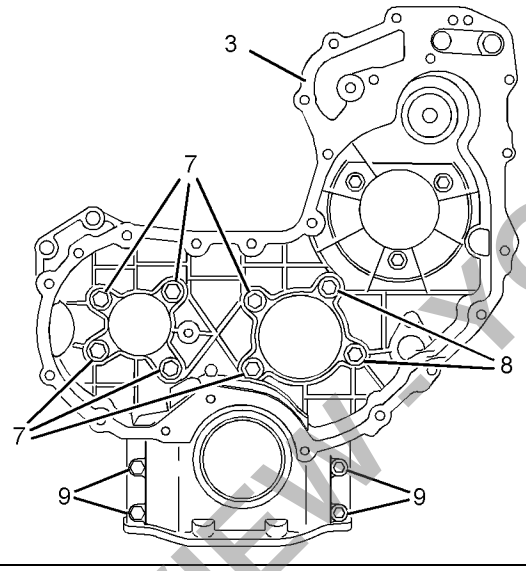


Illustration 154 g01269948

(7) M8 by 20 mm
(8) M8 by 35 mm
(9) M8 by 25 mm

9. Install bolts (9) to front housing (3) finger tight.

10. Remove Tooling (B).

11. Loosely install bolts (7) and (8). Refer to Illustration 154 for the correct position of the bolts.

12. Align the bottom face of front housing (3) to the lower machined face of the cylinder block. Use a Tooling (D) and a feeler gauge in order to check the alignment between the front housing and the cylinder block. Refer to Illustration 153. Refer to Specifications, “Front Housing and Covers” for further information.

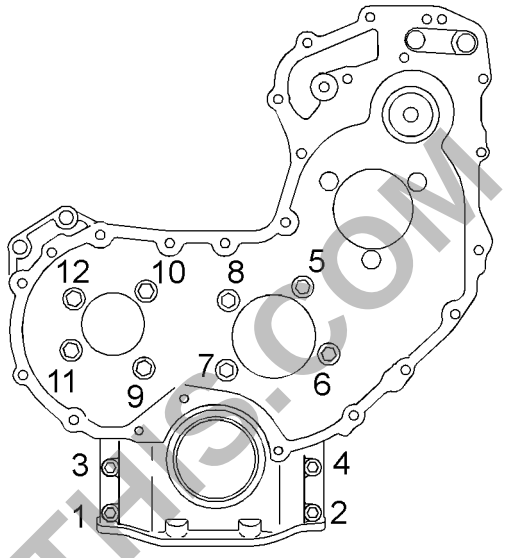


Illustration 155 g01269949

Tightening sequence for the front housing

13. Tighten bolts (6), (7) and (8) to a torque of 28 N·m (20 lb ft). Tighten the bolts in the sequence that is shown in Illustration 155.

Note: Ensure that the housing and the cylinder block are correctly aligned.

14. Remove Tooling (C) from the cylinder block.

15. If necessary, install a new crankshaft front seal. Refer to Disassembly and Assembly, “Crankshaft Front Seal - Remove and Install”.

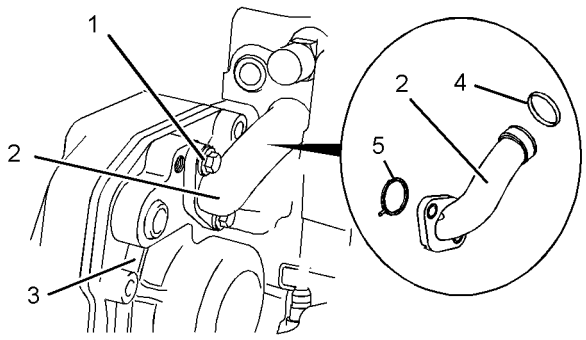


Illustration 156 g01265269

Typical example

16. Install new O-ring seals (4) and (5) to bypass tube (1). Use Tooling (E) in order to lubricate O-ring seal (5). Install bypass tube (2) to the cylinder head. Install bolts (1). Ensure that any brackets that are secured by the bolts are installed in the correct location. Tighten the bolts to a torque of 22 N·m (16 lb ft).

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

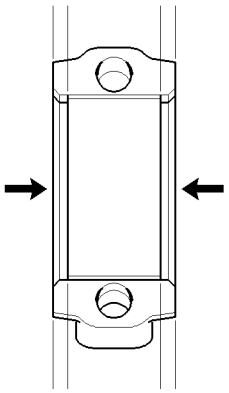


Illustration 255 g01001160

Aligning the connecting rod bearing in the center of the connecting rod

7. Install the upper half of connecting rod bearing (9) to connecting rod (6). Ensure that the connecting rod bearing is centralized in the connecting rod. Refer to Illustration 255.

Note: New connecting rod bearings are supplied with an alignment tool. If new connecting rod bearings are installed, use the tool to align the connecting rod bearing in the connecting rod.

8. Install the lower half of connecting rod bearing (10) to connecting rod cap (11). Ensure that the connecting rod bearing is centralized in the connecting rod cap. Refer to Illustration 255.

Note: New connecting rod bearings are supplied with an alignment tool. If new connecting rod bearings are installed, use the tool to align the connecting rod bearing in the connecting rod cap.

9. Repeat Steps 2 through 8 for the remaining piston and connecting rod assemblies.

Note: Fracture split connecting rods should not be left without the connecting rod caps installed. After the assembly procedure for the piston and connecting rod is completed, carry out the installation procedure as soon as possible. Refer to Disassembly and Assembly, “Piston and Connecting Rods - Install”.

End By:

a. Install the pistons and the connecting rods. Refer to Disassembly and Assembly, “Piston and Connecting Rods - Install”.

i02591052

Pistons and Connecting Rods - Install

Installation Procedure

Table 66

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A[1]	21825576	Crankshaft Turning Tool	1
A[2]	27610291	Barring Device Housing	1
	27610289	Gear	1
B	21825491	Piston Ring Compressor	1
C	21825607	Angle gauge	1

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE
Discard all used connecting rod bolts.

1. If the connecting rod caps were temporarily installed, remove the connecting rod caps. If necessary, thoroughly clean all of the components.

2. Apply clean engine oil to the cylinder bore, to the piston rings, to the outer surface of the piston and to the connecting rod bearings.

Note: Install the connecting rod bearings dry when clearance checks are performed. Refer to Disassembly and Assembly, “Bearing Clearance - Check”. Apply clean engine oil to the connecting rod bearings during final assembly.

3. Use Tooling (A) to rotate the crankshaft until the crankshaft pin is at the bottom center position. Lubricate the crankshaft pin with clean engine oil.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 17 of 304 pages

The full manual includes:

- All 304 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Perkins 1104D, 1104D EURO 3 - 120CV Repair Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual