

# SERVICE MANUAL

LOADER  
457

EN - 9813/4150 - ISSUE 6 - 12/2017


This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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## Foreword

### The Operator's Manual

  
You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

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## 00 - General

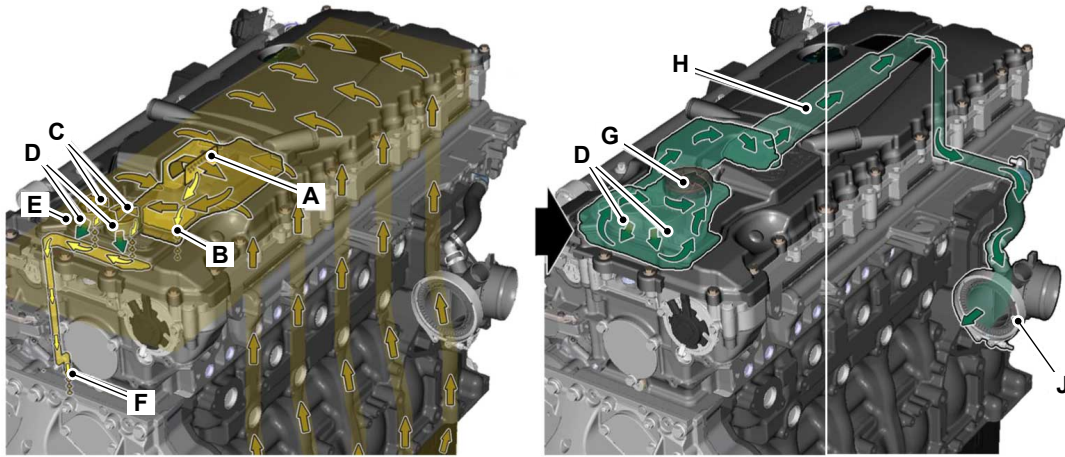
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## Introduction

Depending on the specification, the engine may be installed with open loop, filtered open loop or a closed loop CCV (Crankcase Ventilation) system.

## Component Identification

Figure 161.



A Nozzle plate

C Impactors

E Oil drain valve

G Pressure regulating valve

J Air intake pipe

B Oil drain duct

D Fleece elements

F Crankcase ventilation non-return valve

H Vent line

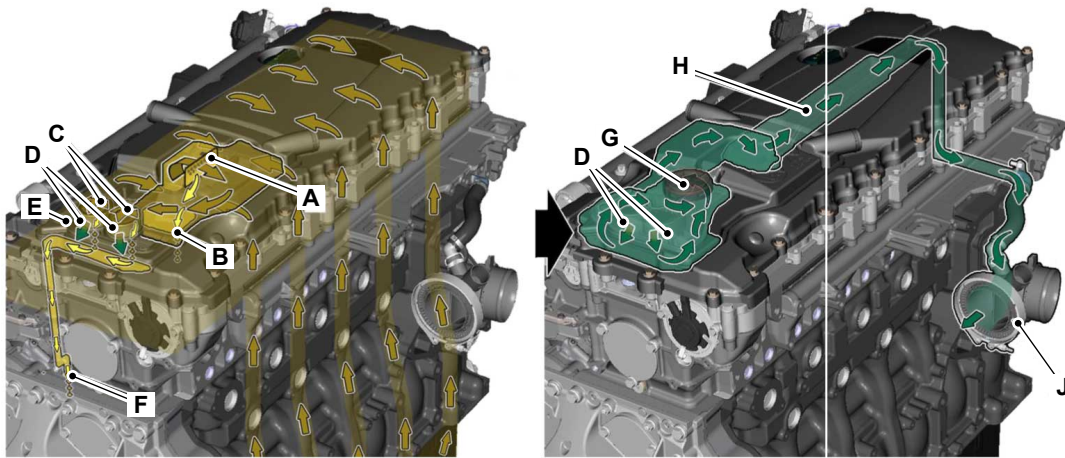
## Operation

The engine oil is separated from the blow-by gas in the oil mist separator in two phases:

1. The blow-by gas is accelerated through the holes in the nozzle plate. This accelerated blow-by gas hits a wall in the oil mist separator housing central section and the engine oil droplets contained in the blow-by gas are separated. The vertical fins on the wall improve the separation of the engine

oil from the blow-by gases and also help engine oil to drain downwards. Once enough separated engine oil gets collected to open the check valve which is installed in the oil drainage duct the separated engine oil flows via the oil drainage duct back into the rocker arm housing. The check valve also prevents the blow-by gases in the rocker arm housing from entering the oil mist separator via the oil drainage duct.

Figure 162.



- A Nozzle plate
- C Impactors
- E Oil drain valve
- G Pressure regulating valve
- J Air intake pipe

- B Oil drain duct
- D Fleece elements
- F Crankcase ventilation non-return valve
- H Vent line

2. The blow-by gas is accelerated through the holes in the nozzle plate. This accelerated blow-by gas hits a wall in the oil mist separator housing central section and the engine oil droplets contained in the blow-by gas are separated. The vertical fins on the wall improve the separation of the engine oil from the blow-by gases and also help engine oil to drain downwards. Once enough separated engine oil gets collected to open the check valve which is installed in the oil drainage duct the separated engine oil flows via the oil drainage duct back to the rocker arm housing. The check valve also prevents the blow-by gases in the rocker arm housing from entering the oil mist separator via the oil drainage duct.

## 00 - General

### Adjust

#### Special Tools

Description	Part No.	Qty.
Crankshaft Turning Tool (123.5mm PCD)- MTU	334/V7497	1

1. Make the machine safe with the lift arm lowered.  
 Refer to: PIL 01-03.

2. Make sure that the engine is safe to work on. If the engine has been running, make sure the engine has cooled sufficiently before you start the adjustment.

2.1. For accurate valve clearance measurement the engine must be cold. The engine must have been stopped for the minimum specified time period.

Duration: 30min

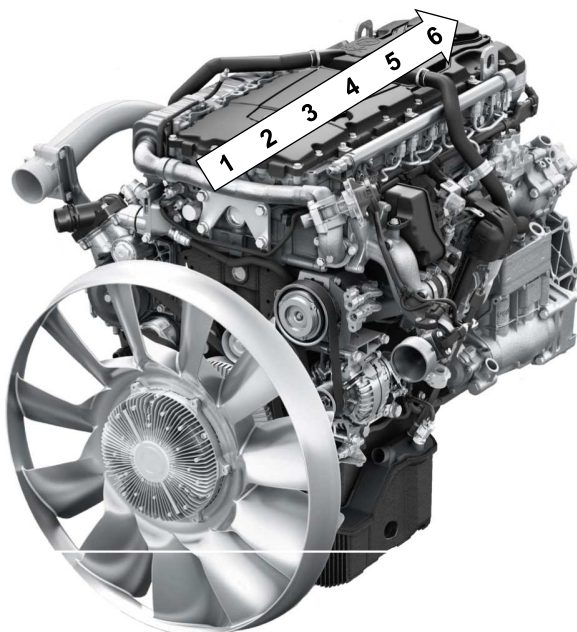
3. Open the engine cover.

Refer to: PIL 06-06-06.

4. Remove the rocker cover.

Refer to: PIL 15-42-06.

**Figure 163.**



5. Check the TDC (Top Dead Centre) position of piston in cylinder 1. Refer to Figure 163.

5.1. If the rocker arms are unloaded on cylinder 1, the piston is at firing TDC.

5.2. If the rocker arms are under load on cylinder 1, the piston is at overlap TDC.

5.3. If necessary rotate the crankshaft with the recommended tool.

**Special Tool: Crankshaft Turning Tool (123.5mm PCD)- MTU (Qty.: 1)**

6. Make sure that the piston in cylinder 1 is at overlap TDC.

7. Measure the following valve clearances valves with the feeler gauge: Refer to Figure 164.

7.1. Exhaust valves on cylinder 2

7.2. Intake valves on cylinder 3

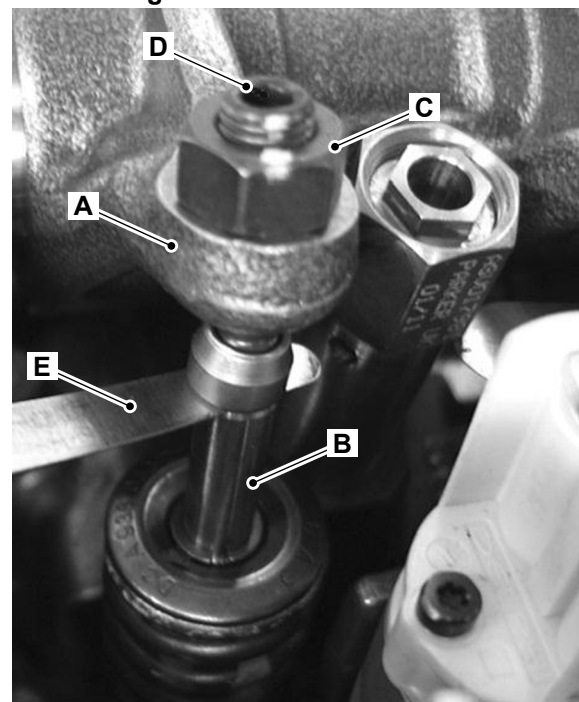
7.3. Exhaust valves on cylinder 4

7.4. Intake valves on cylinder 5

7.5. Intake valves, exhaust valves on cylinder 6

8. The engine brake valve clearance must be adjusted after checking or adjusting the exhaust valve clearances. 14

**Figure 164. Valve clearance**



**A** Rocker arm

**B** Valve

**C** Locknut

**D** Adjusting screw 1

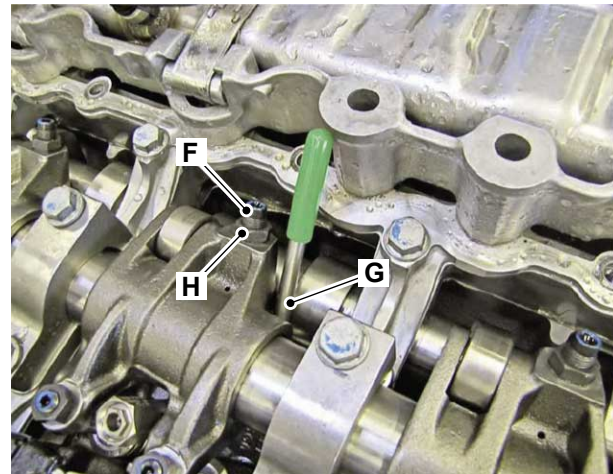
**E** Feeler gauge

9. Make sure that the piston in cylinder 6 is at overlap TDC.

10. Measure the valve clearances for the below mentioned valves with the feeler gauge: Refer to Figure 164.

- 10.1. Intake valves on cylinder 2.
  - 10.2. Exhaust valves on cylinder 3.
  - 10.3. Intake valves on cylinder 4.
  - 10.4. Exhaust valves on cylinder 5.
  - 10.5. Both intake and exhaust valves on cylinder 1.
11. The engine brake valve clearance must be adjusted after checking or adjusting the exhaust valve clearances. 14
12. Make sure that the valve clearances on a cold engine are within specified limits.
- 12.1. For intake valve  
Distance:  $0.3 \pm 0.05\text{mm}$
  - 12.2. For exhaust valve  
Distance:  $0.6 \pm 0.05\text{mm}$
13. If the valve clearance is not within permitted limits, adjust the clearance as follows: Refer to Figure 164.
- 13.1. Release the locknut 1 and turn out the adjusting screw 1 a few turns.
  - 13.2. Insert a feeler gauge between the valve and the rocker arm.
  - 13.3. Adjust the adjusting screw 1 again until the feeler gauge can just pass.
  - 13.4. Tighten the locknut 1 to the correct torque value.
  - 13.5. Measure the valve clearance again with the feeler gauge.
14. Adjust the engine brake valve clearance after checking or adjusting the associated exhaust valve clearances. The engine brake valve clearance cannot be checked, it must be adjusted.

**Figure 165. Engine brake valve clearance**



- F** Adjusting screw 2
- G** Feeler gauge 0.5mm
- H** Locknut 2

- 14.1. Release the locknut 2 and turn out the adjusting screw 2 a few turns.
- 14.2. Insert the specified thickness feeler gauge between the engine brake valve and the rocker arm.  
Length/Dimension/Distance: 0.5mm
- 14.3. Adjust the adjusting screw again until the feeler gauge can just pass.
- 14.4. Tighten the locknut 2 to the correct torque value.

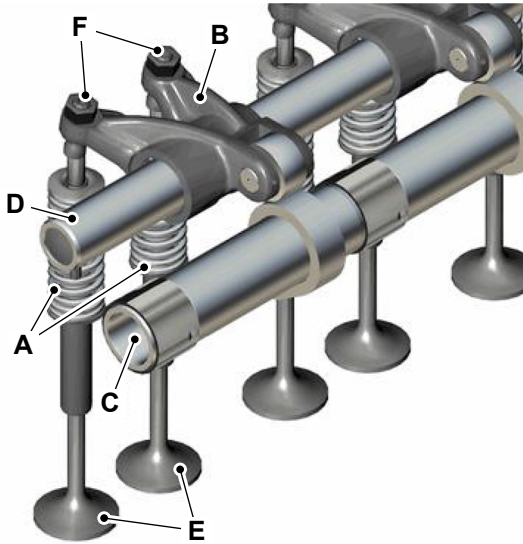
**Table 48. Torque Values**

Item	Description	Nm
C	Locknut 1	30
H	Locknut 2	27

**00 - General**

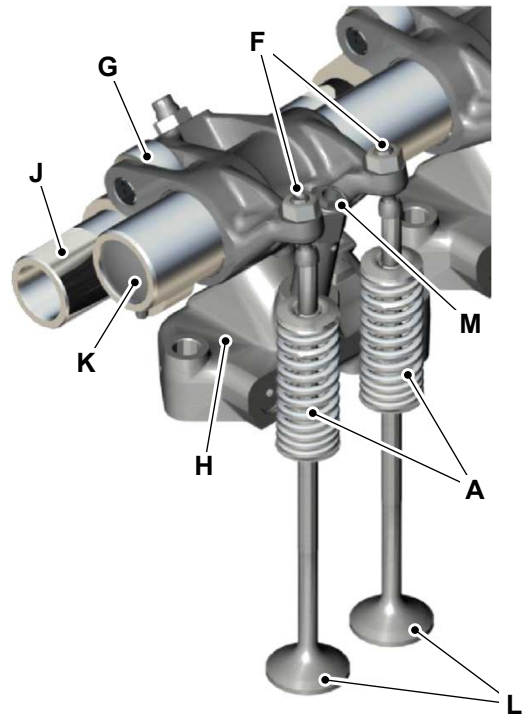
**Component Identification**

**Figure 166.**



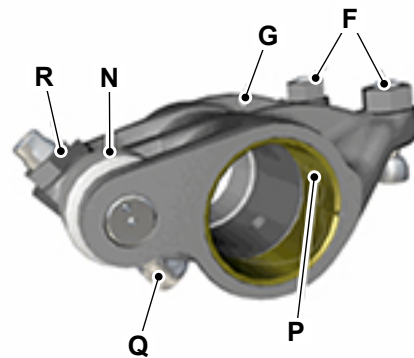
- A Valve spring
- B Intake rocker arm
- C Intake camshaft
- D Intake rocker arm spindle
- E Intake valve
- F Calibration elements for adjusting the valve clearance

**Figure 167.**



- A Valve spring
- F Calibration elements for adjusting the valve clearance
- G Exhaust rocker arm
- H hydraulic engine braking unit
- J Exhaust camshaft
- K Exhaust rocker arm spindle
- L Exhaust valve
- M Calibration element for pressure relief valve

**Figure 168.**



- F Calibration elements for adjusting the valve clearance
- G Exhaust rocker arm
- N Rocker arm roller
- P Oil access hole
- Q Locator foot
- R Calibration element for engine brake

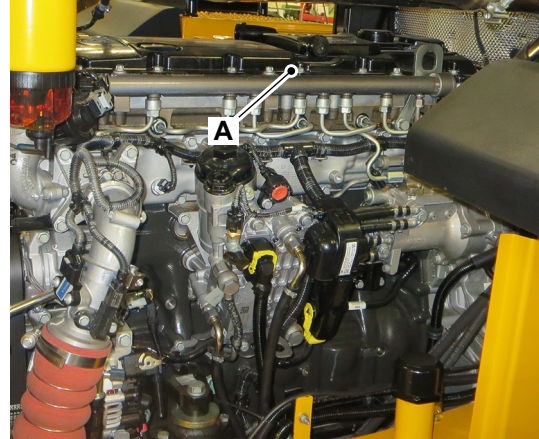
## 06 - Rocker Cover

### Remove and Install

#### Remove

1. Make the machine safe with the lift arm lowered. Refer to (PIL 01-03).
2. Make sure that the engine is safe to work on. If the engine has been running, make sure the engine has cooled sufficiently before you start the removal.
3. Remove the ignition key.
4. Clean the engine bay and the SCR (Selective Catalytic Reduction) unit to make sure no debris or dirt falls into the cylinder head after the rocker cover is removed.
5. Remove the screws (x 22) from the rocker cover.

**Figure 169.**



**A** Screws

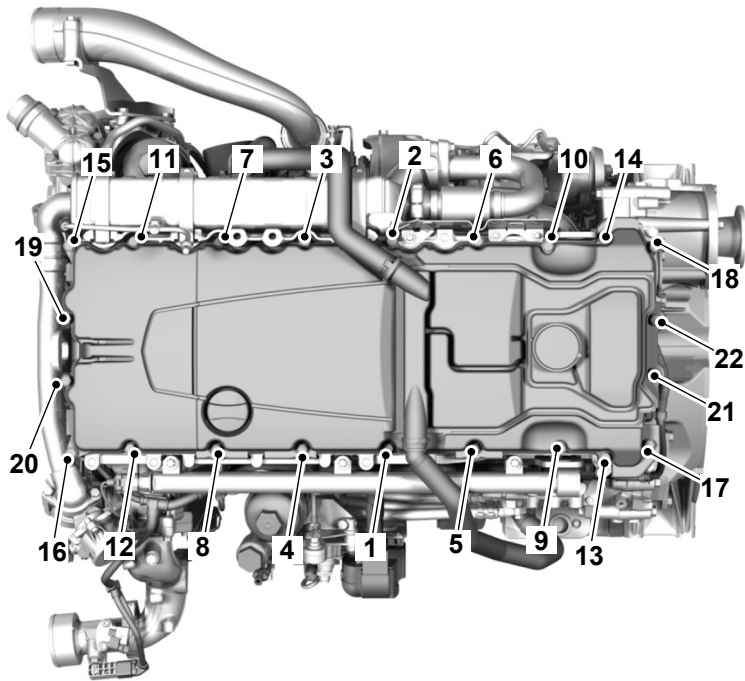
6. Remove the rocker cover.
7. Discard the gasket if installed.

#### Install

1. The installation procedure is the opposite of the removal procedure.
2. Tighten the screws to the correct torque value in the given sequence. Refer to Figure 170.



**Figure 170. Torque Tightening Sequence**



**Table 49. Torque Values**

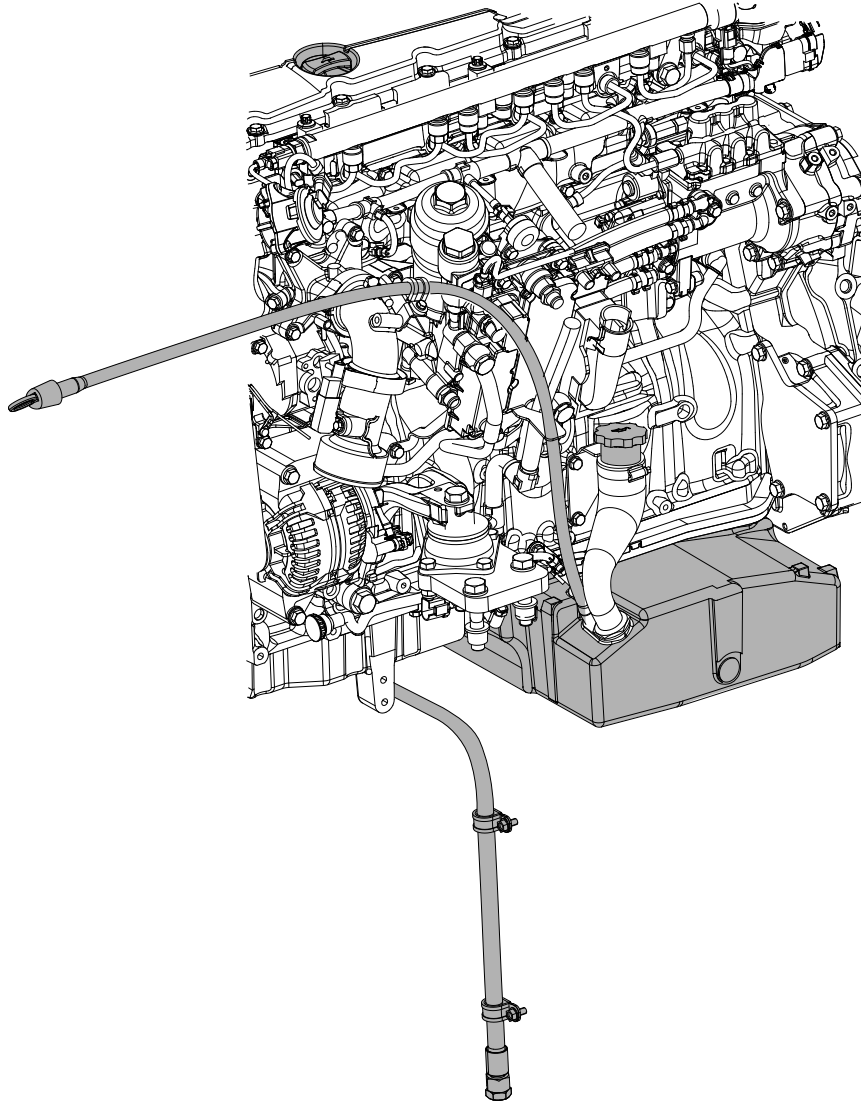
Item	Description	Nm
A	Screws (For plastic rocker cover)	25
A	Screws (For light alloy rocker cover)	20

**00 - General**

**Component Identification**

Component Identification ..... 15-63  
Drain and Fill ..... 15-64

**Figure 171.**



- A** Oil sump
- C** Oil filler (alternate)
- E** Remote oil drain pipe

- B** Oil filler pipe inlet
- D** Dipstick
- F** Drain plug

## Drain and Fill

**▲ CAUTION** Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

### Drain

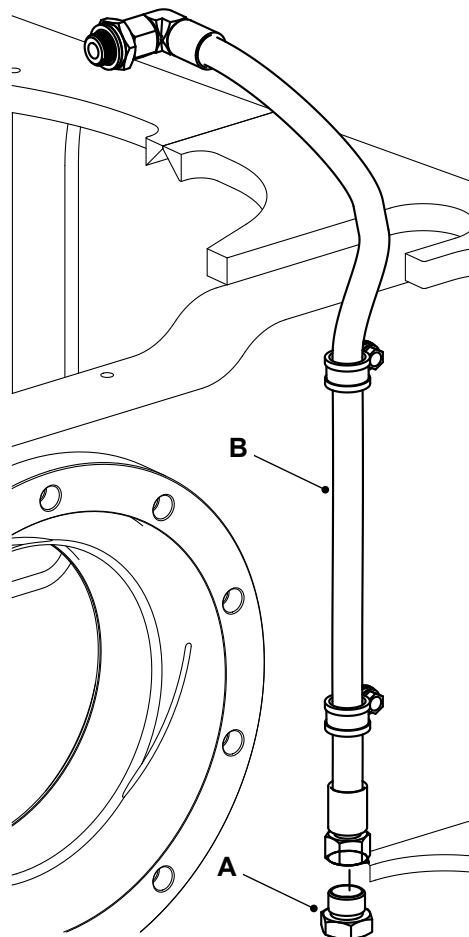
1. Make the machine safe with the lift arm lowered.  
[Refer to: PIL 01-03-27.](#)
2. Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.
3. Open the undershield to get access to the drain plug.

[Refer to: PIL 06-06-30.](#)

4. Place a container of suitable size beneath the drain plug.
5. Drain the oil.
6. Install the drain plug.
7. Tighten the drain plug to the correct torque value.
8. Close the undershield.

[Refer to: PIL 06-06-30.](#)

**Figure 172.**



**A** Drain plug

**B** Drain pipe

## Fill

1. Open one of the filler points to fill the oil.
2. Fill the engine with the recommended oil to the MAX mark on the dipstick.

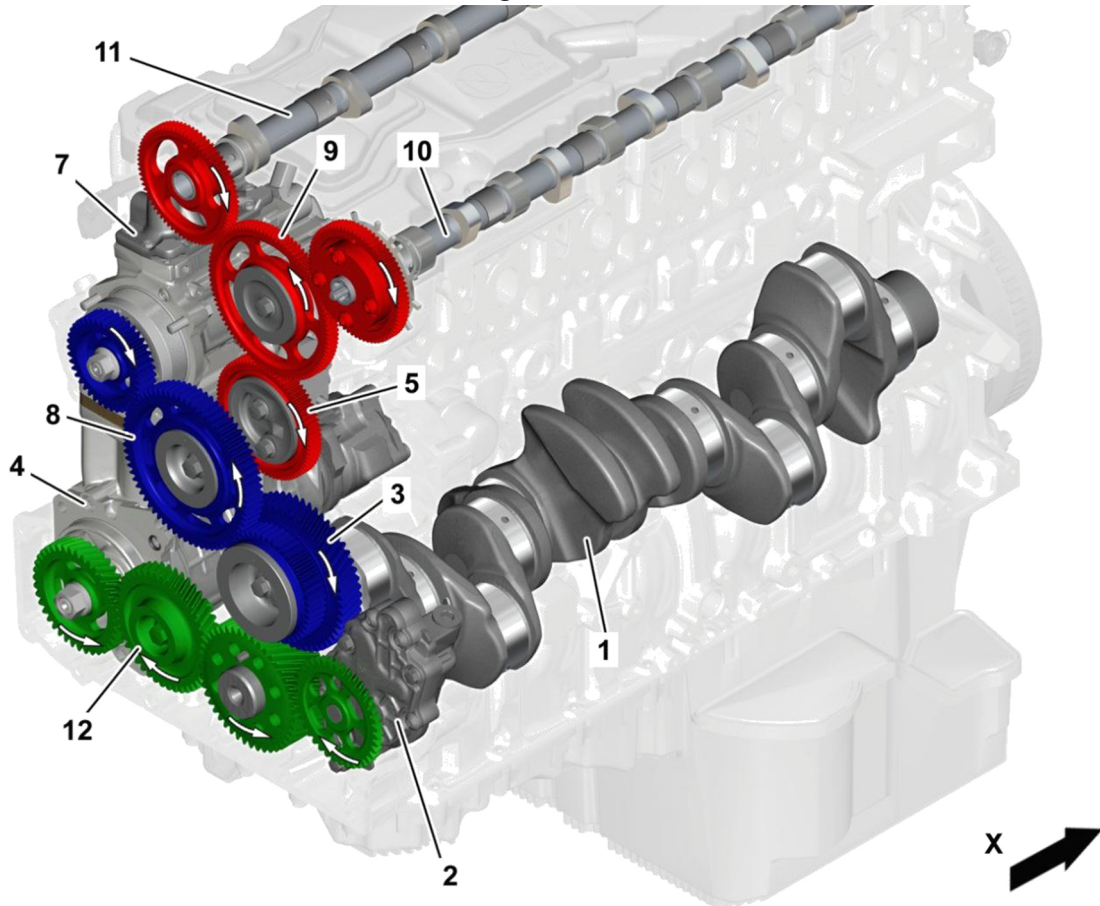
[Refer to: PIL 75-00-00.](#)

3. Wipe off any spilt oil.
4. Install the filler cap and make sure it is secured.

**00 - General**

**Component Identification**

**Figure 173.**

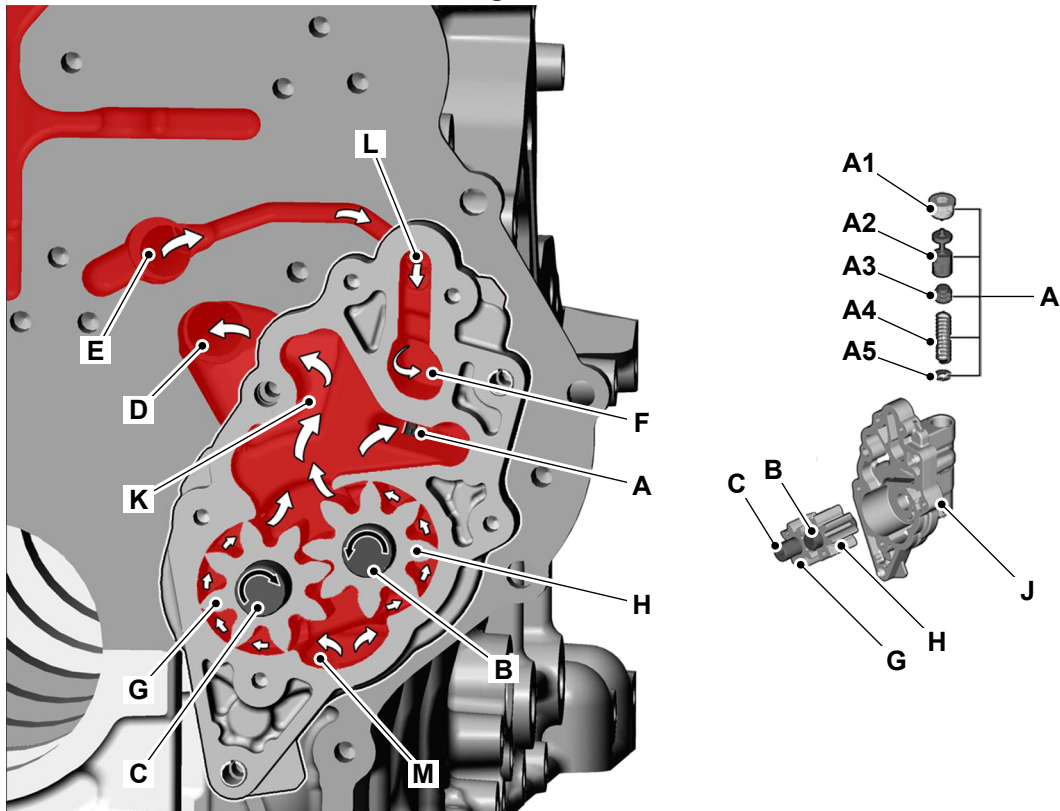


- |    |                   |    |                         |
|----|-------------------|----|-------------------------|
| 1  | Crankshaft        | 2  | Oil pump                |
| 3  | Double idler gear | 4  | Compressor              |
| 5  | Idler gear        | 7  | High pressure fuel pump |
| 8  | Double idler gear | 9  | Idler gear              |
| 10 | Exhaust camshaft  | 11 | Inlet camshaft          |
| 12 | Idler gear        |    |                         |

**00 - General**

**Component Identification**

**Figure 174.**



- A** Pressure regulation valve
- C** Drive shaft
- E** Main oil duct
- G** Drive gear
- J** Oil pump
- L** Connection to pressure regulator

- B** Idler shaft
- D** Oil duct (to oil coolant module)
- F** Hole
- H** Idler gear
- K** Outlet to oil coolant module
- M** Oil intake (suction side)

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