

SERVICE MANUAL

EXCAVATOR
100 C-1, 85 Z-1, 86 C-1, 90 Z-1

EN - 9813/2700 - ISSUE 2 - 2016-09-28


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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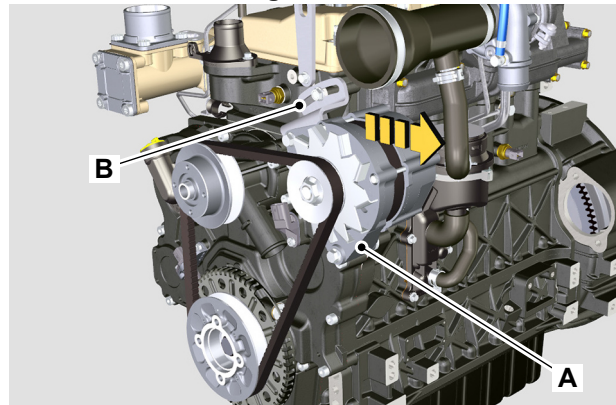
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Introduction

Original Belt Configuration

The alternator adjusting lever makes sure that the front end accessory drive belt (FEAD) is kept at the correct tension.

Figure 143.

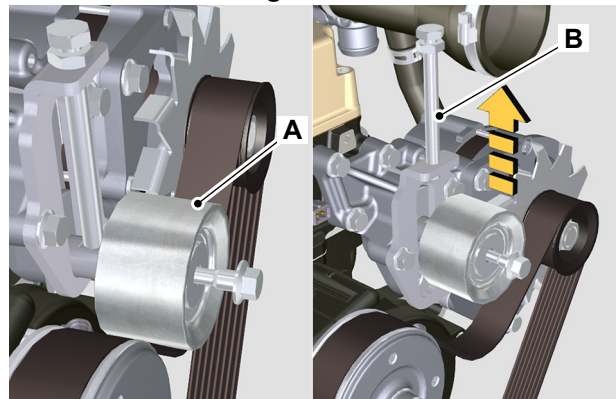


- A Alternator
- B Adjusting lever

Alternate Belt Configuration

A tensioning screw, which adjusts the tightening pulley travel, makes sure that the front end accessory drive belt (FEAD) is kept at the correct tension.

Figure 144.



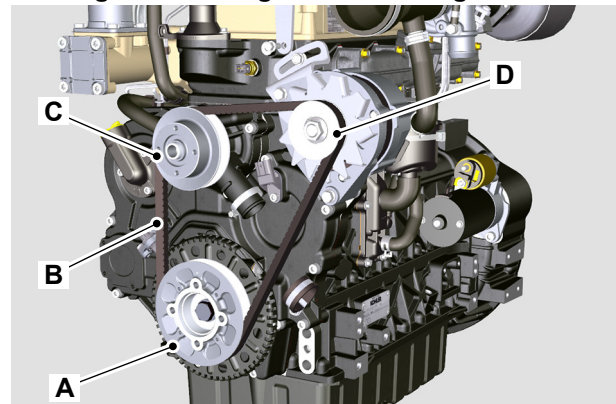
- A Tightening pulley
- B Tensioning screw

Health and Safety

▲ **Notice:** A drive belt that is loose can cause damage to itself and/or other engine parts.

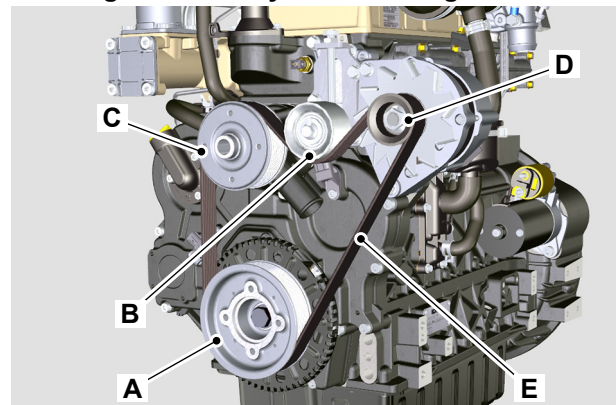
Component Identification

Figure 145. Original Belt Configuration



- A Crankshaft drive pulley
- B Drive belt
- C Coolant pump drive pulley
- D Alternator drive pulley

Figure 146. Poly-V Belt Configuration



- A Crankshaft drive pulley
- B Tensioner pulley
- C Coolant pump drive pulley
- D Alternator drive pulley
- E Poly-V belt

Check (Condition)

At the recommended service interval, visually inspect the drive belt for damage.

1. Make the machine safe. Refer to (PIL 01-03).
2. Stop the engine and let it cool down.
3. Replace the drive belt if it has cracks or if it is frayed or has pieces of material missing.

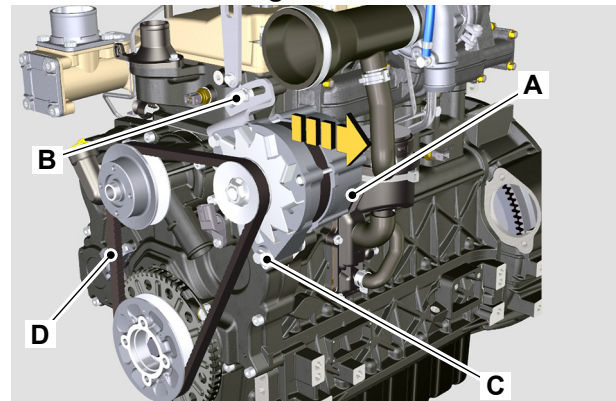
Adjust

Original Belt Configuration

The belt must always be replaced every time it is removed, even if it has not reached the scheduled hours for replacement.

1. Pull the alternator in the direction of the arrow.

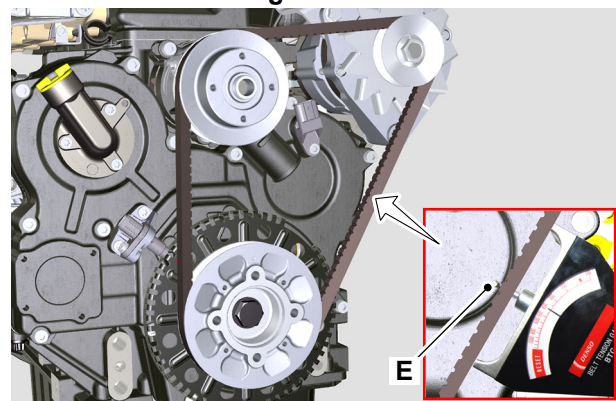
Figure 147.



- A Alternator
- B Top mounting bolt
- C Bottom mounting bolt
- D Drive belt

2. Tighten the top mounting bolt to the correct torque value.
Torque: 25N·m
3. Tighten the bottom mounting bolt to the correct torque value.
Torque: 40N·m
4. While tensioning the alternator, first install the top mounting screw and then the bottom mounting screw.
5. Measure the tension of the belt at the point shown.

Figure 148.



- E Tension measuring point

- The tension of the belt should be between the specified values.

Weight/Force: 350–450N

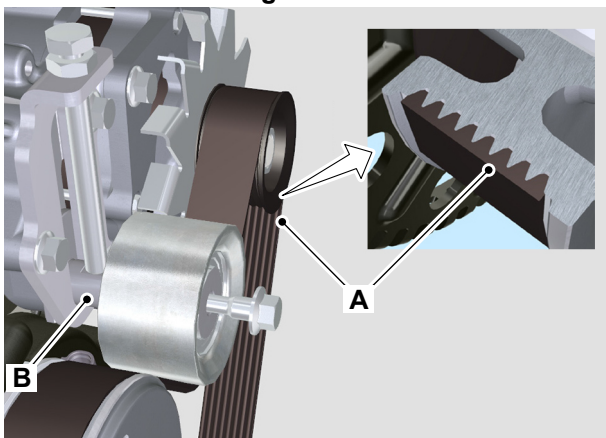
- If the tension values do not match the specified, tighten the screws, then repeat the steps 1 to 6.

Alternate Belt Configuration

The belt must always be replaced every time it is removed, even if it has not reached the scheduled hours for replacement.

- Make sure that the ribs of the belt are engaged correctly into the grooves of the pulleys.

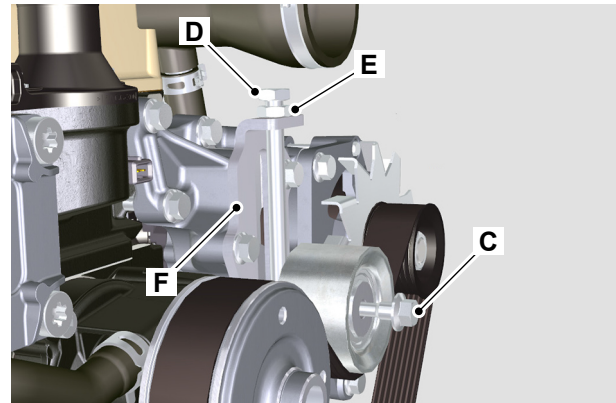
Figure 149.



A Drive belt
B Pulley pin

- Make sure that the pulley pin is at the bottom of the guide groove.
- Tighten the screw, that attaches the pulley, to the correct torque value.
Torque: 45N·m
- Hold the tensioning screw with an Allen key.
- Tighten the nut on the plate to secure the tightening screw.
Torque: 45N·m

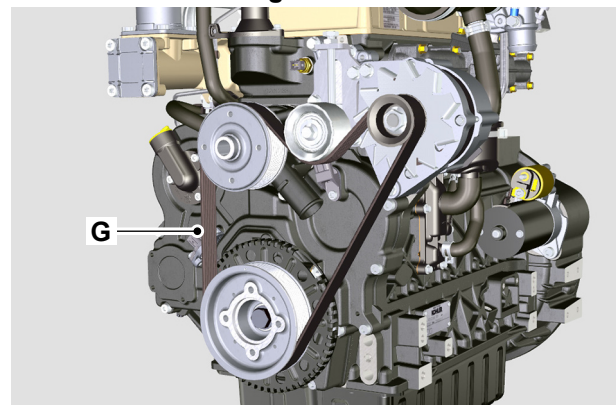
Figure 150.



C Screw
D Tensioning screw
E Nut
F Plate

- Measure the tension of the belt at the point shown.

Figure 151.



G Tension measuring point

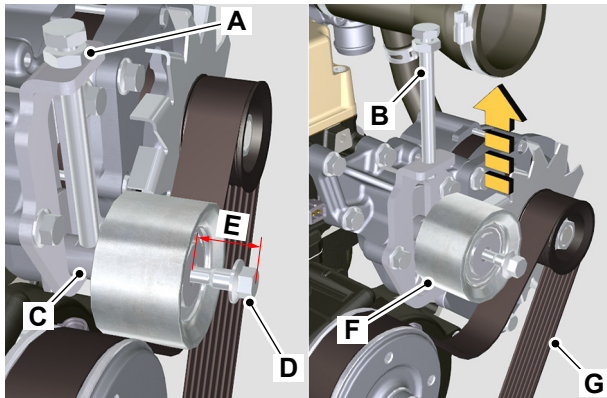
- The tension of the belt should be between the specified values.
Frequency: 149–196Hz
- Run the engine for the specified duration.
Duration: 15–20min
- Repeat the step 6 to 7.
- The Poly-v drive belt is not adjustable. If the tension value is not within the specified range replace the drive belt.

Remove and Install

Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Get access to the drive belt. Refer to (PIL 15-18).
3. Disconnect the battery. Refer to (PIL 33-03).
4. Loosen the nut and tighten the screw until it touches the pulley shaft. Refer to Figure 152.
5. Loosen the bolt that attaches the pulley to the pulley shaft, up to the specified distance. Refer to Figure 152.
 Distance: 32mm
6. Loosen the screw, the belt tensioner pulley will move up. Refer to Figure 152.
 - 6.1. If the pulley will not move, pull the belt tensioner pulley up.
7. Remove the drive belt. Refer to Figure 152.

Figure 152.

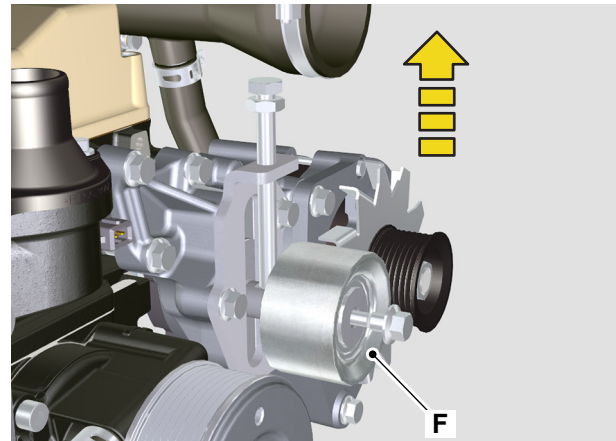


- A Nut
- B Screw
- C Pulley shaft
- D Bolt
- E 32mm
- F Tensioner pulley
- G Existing drive belt

Install

1. Pull the belt tensioner pulley up. Refer to Figure 153.

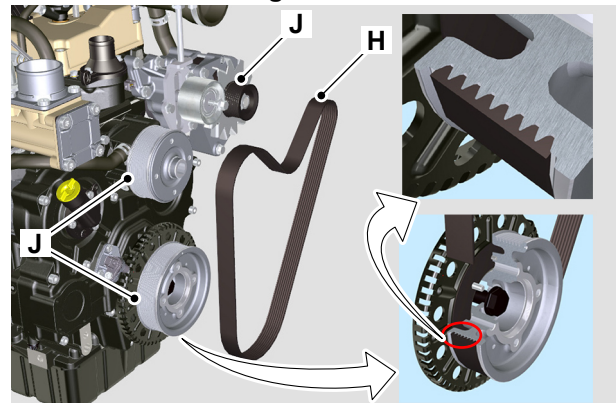
Figure 153.



F Tensioner pulley

2. Insert the new drive belt on the pulleys. Refer to Figure 154.

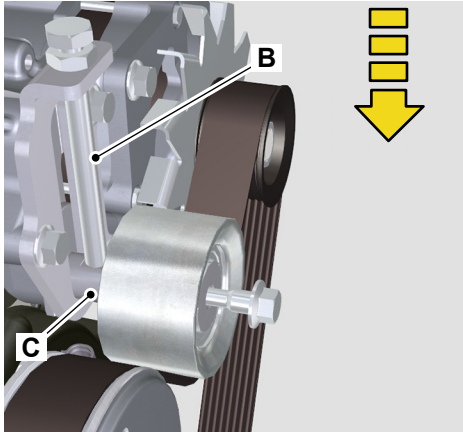
Figure 154.



H New drive belt
J Pulleys

3. Make sure that the ribs of the drive belt are engaged correctly into the grooves of the pulleys.
4. Tighten the screw until the pulley shaft reaches the bottom of the guide groove. Refer to Figure 155.

Figure 155.



B Screw
C Pulley shaft

5. Tension the drive belt.
6. Tighten the pulley bolt to the correct specified torque value.
Torque: 45N·m
7. Tighten the nut.
8. Connect the battery.
9. Close the engine cover.
10. Check the belt tension after the engine operation for the specified time.
Duration: 15min

21 - Tensioner

Remove and Install

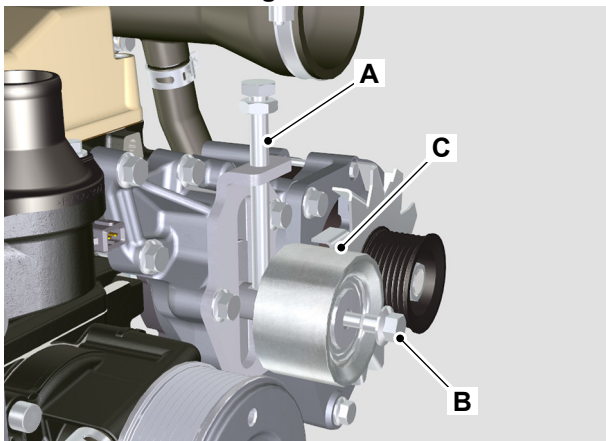
This procedure is applicable for machines installed with Poly-V drive belt.

Important: The drive belt must always be replaced every time it is removed, even if it has not reached the scheduled hours for replacement.

Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Remove the drive belt. Refer to (PIL 15-18).
3. Remove the tensioning screw.
4. Remove the screw that secures the tightening pulley.
5. Remove the tightening pulley.

Figure 156.

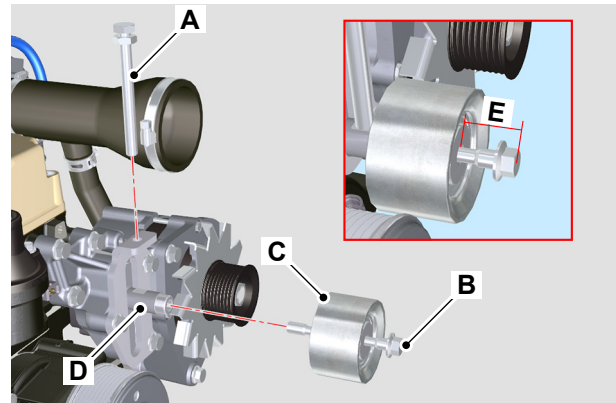


- A Tensioning screw
- B Screw
- C Tightening pulley

Install

1. Insert the screw in the tightening pulley.
2. Manually tighten the screw on to the pulley pin up to the stop; Loosen the screw again by one turn.
3. The screw must be out by the specified distance from the surface of the tightening pulley.
 Distance: 32mm
4. Install the drive belt. Refer to (PIL 15-18).
5. Install the tightening screw on to the plate, up to the stop on the pulley pin.
6. Tension the drive belt.

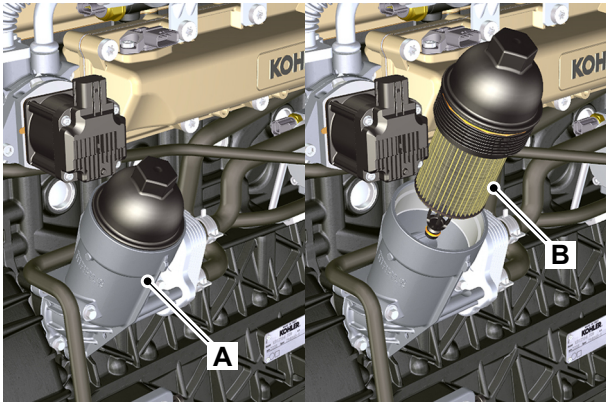
Figure 157.



- A Tensioning screw
- B Screw
- C Tightening pulley
- D Pulley pin
- E 32mm

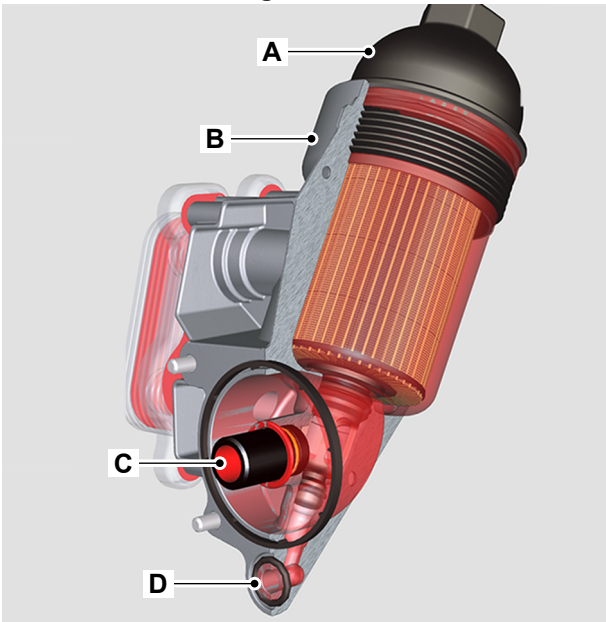
Component Identification

Figure 158.



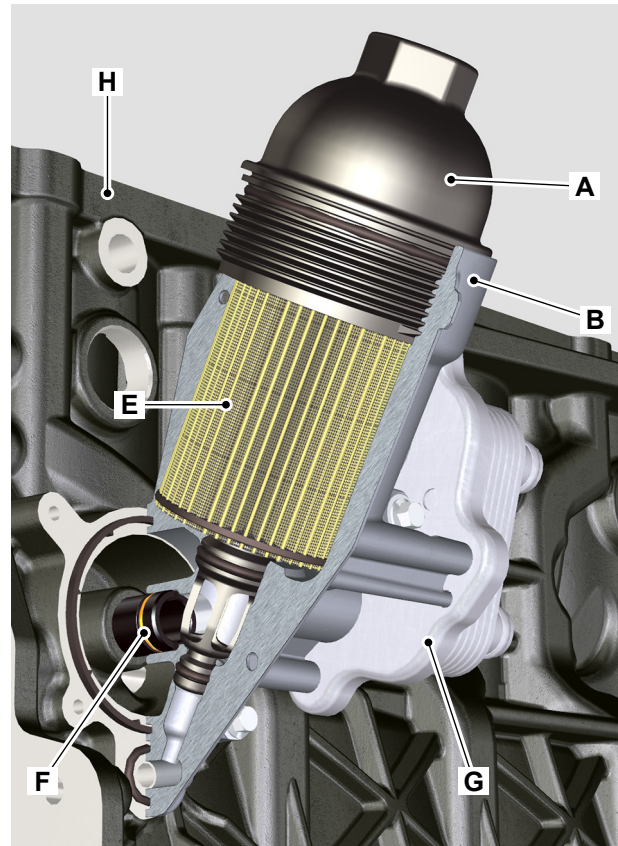
- A Oil Filter
- B Element

Figure 159.



- A Cartridge holder cover
- B Oil filter support
- C Oil returning into the circuit
- D Oil returning to the crankcase

Figure 160.



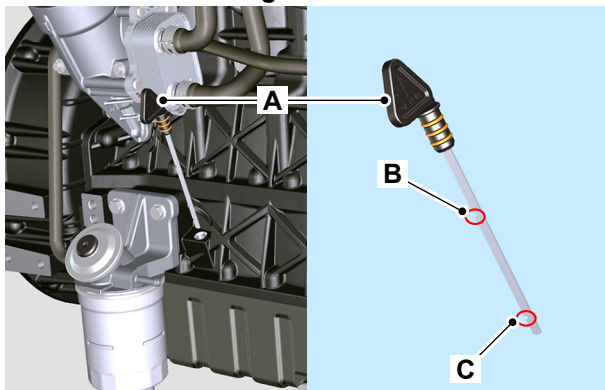
- A Cartridge holder cover
- B Oil filter support
- E Oil filter cartridge
- F Outgoing fitting from filter
- G Water/oil heat exchanger
- H Crankcase

Check (Level)

Engine oil and oil filter replacement must be completed in accordance with the service schedules. Failure to replace the oil and filter at the recommended interval could cause serious engine failure.

1. Make the machine safe. Refer to (PIL 01-03).
2. Park the machine on a hard level surface for accurate measurement of the oil level.
3. Get access to the engine.
4. Check that the oil level is between the two marks on the dipstick.

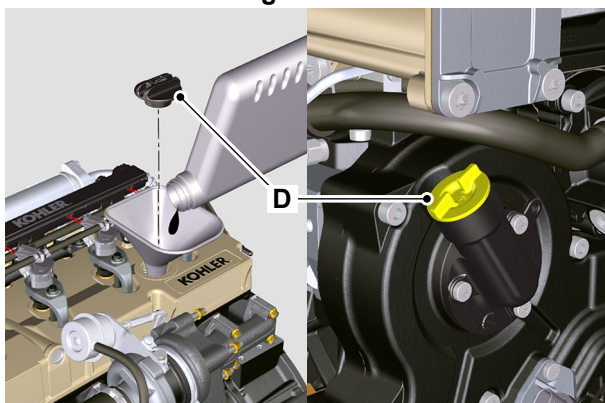
Figure 161.



- A** Dipstick
- B** Maximum level mark
- C** Minimum level mark

5. If necessary, add recommended oil through one of the filler points.

Figure 162.



- D** Oil filler caps

Remove and Install

Before Removal

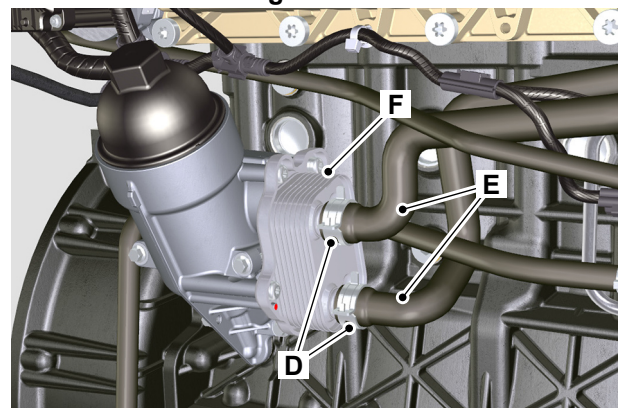
1. Drain the engine oil, refer to Engine-General, Drain and Fill (PIL 15-00).

[Refer to: Engine > General > General > Drain and Fill \(Page 15-17\).](#)

Remove and Install

1. Remove the clamps and remove the pipes from the oil cooler unit.

Figure 163.

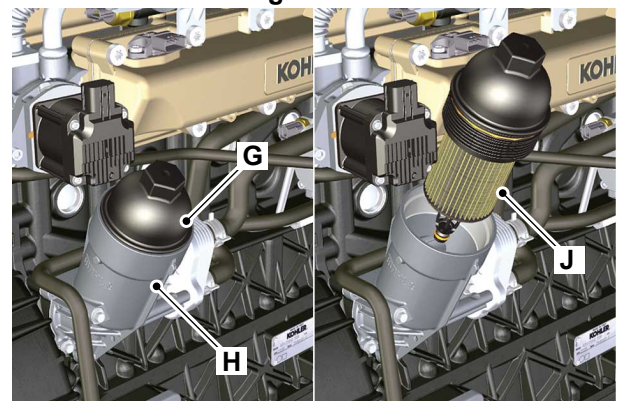


- D** Clamps
- E** Pipes
- F** Oil cooler

2. Use a suitable container to recover any residual oil.

3. Loosen the element holder cap.

Figure 164.

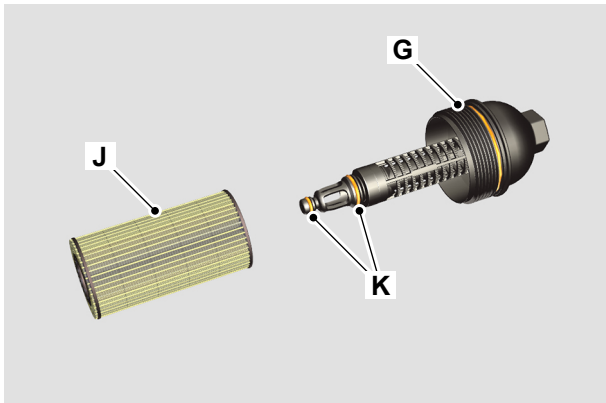


- G** Element holder cap
- H** Oil filter support
- J** Element

4. Remove the cap and the oil filter element from the oil filter support.

5. Remove the cartridge from the cap and discard.

Figure 165.



- G** Element holder cap
- J** Element
- K** Seal

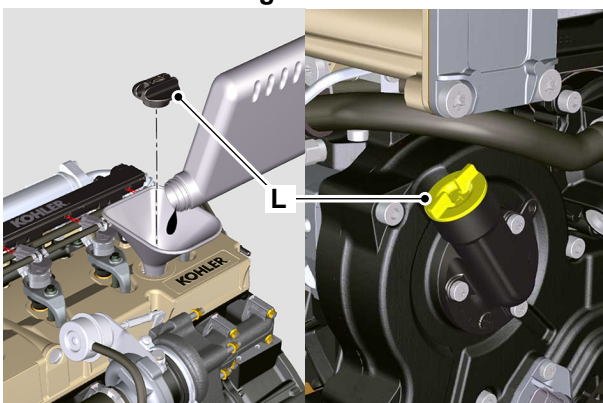
6. Remove and replace the seals.
7. Apply clean oil on the seals.
8. Put the element on the cap.
9. Install the cap on the oil filter support.
10. Tighten the cap to the correct torque value.
11. Install the pipes on the support.
12. Secure the pipes with the clamps.
13. Through one of the filler points, fill the engine with the recommended oil to the MAX mark on the dipstick.

17. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

Table 53. Torque Values

| Item | Nm |
|------|----|
| B | 35 |
| G | 25 |

Figure 166.



- L** Oil filler caps

14. Wipe off any spilt oil, install the filler cap and make sure it is secure.
15. Operate the engine, until the oil pressure low warning light has extinguished.
16. Check for oil leakage.

03 - Separator

Remove and Install

Oil

Oil is toxic. If you swallow any oil, do not induce vomiting, seek medical advice. Used engine oil contains harmful contaminants which can cause skin cancer. Do not handle used engine oil more than necessary. Always use barrier cream or wear gloves to prevent skin contact. Wash skin contaminated with oil thoroughly in warm soapy water. Do not use petrol, diesel fuel or paraffin to clean your skin.

Before removal

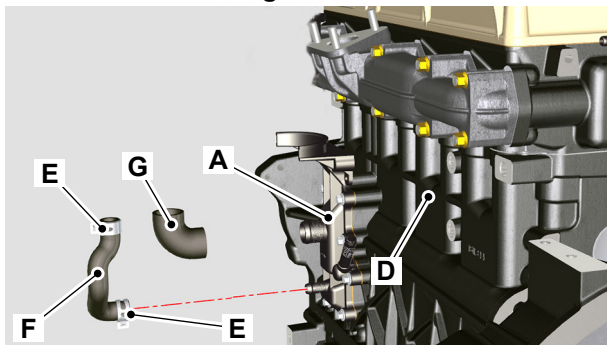
1. Make the machine safe with the lift arm lowered.
2. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
3. Get access to the engine.
4. Remove the crankcase ventilation filter

Refer to: [Engine > Crankcase Ventilation Filter \(Page 15-97\)](#).

Remove

1. Remove all the pipes from the separator.

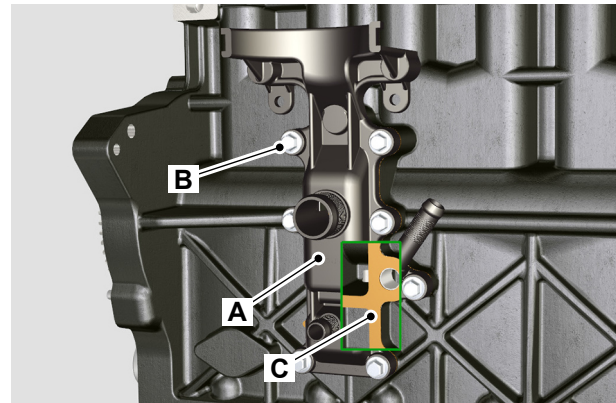
Figure 171.



- A Separator
- D Crankcase
- E Clamp
- F Pipe
- G Pipe1

2. Remove the screws.

Figure 172.



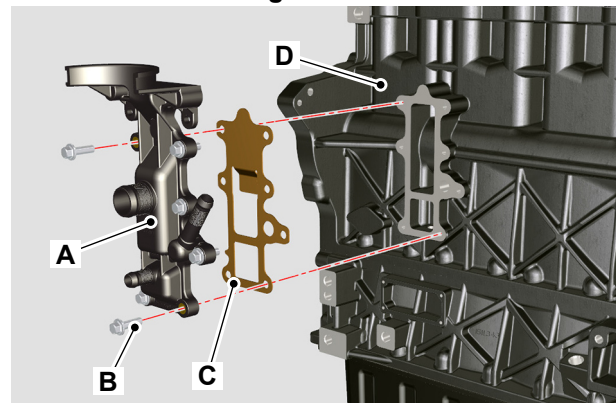
- A Separator
- B Screw
- C Gasket

3. Remove the separator with the gasket.

Install

1. Check that the contact surfaces are free from impurities.
2. Always examine the condition of the pipes, and replace them if there is any doubt regarding the integrity of their seal.
3. Always replace the gasket after each assembly.
4. Install the gasket on the separator.

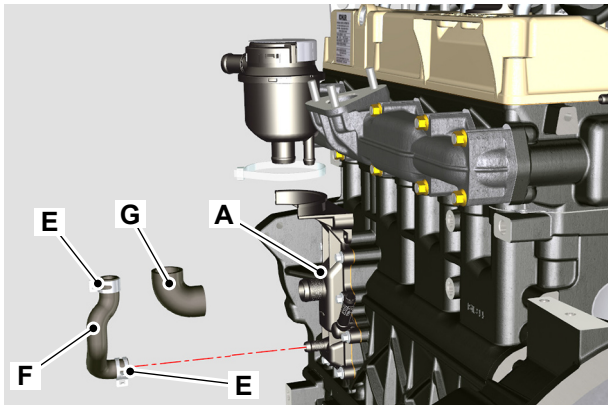
Figure 173.



- A Separator
- B Screw
- C Gasket
- D Crankcase

5. Attach the holder on the crankcase with the screws.
6. Tighten the screws to the correct torque value.

Figure 174.



- A Separator
- E Clamp
- F Pipe
- G Pipe1

7. Attach the pipes on the separator with the clamp.

After installation

1. Install the crankcase ventilation filter
[Refer to: Engine > Crankcase Ventilation Filter \(Page 15-97\).](#)
2. Start the engine and check for leaks.

Table 54. Torque Values

| Item | Nm |
|------|----|
| B | 10 |

00 - General

| | |
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Introduction

The valve train system opens and closes the valves with correct timing in relation to the piston movements.

Each push rod has one end in a valve tappet and the other end under a rocker arm, or as applicable. Hydraulic tappets are used which automatically adjust the clearance between the valve and push rods.

The valves extend through the cylinder head. The valves are made from a special metal to provide a long service life. Damaged or worn valves cannot be lapped or reground and must be replaced with new ones. Each valve stem has an oil seal.

The Valve seat inserts are pressed into the cylinder head. The seat inserts are also made from a special metal to provide for a long service life. Damaged or worn seat inserts can be removed and replaced with new ones.

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