SERVICE MANUAL

55Z-1, 57C-1

EN - 9813/6450 - ISSUE 1 - 03/2016

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

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.

Contents

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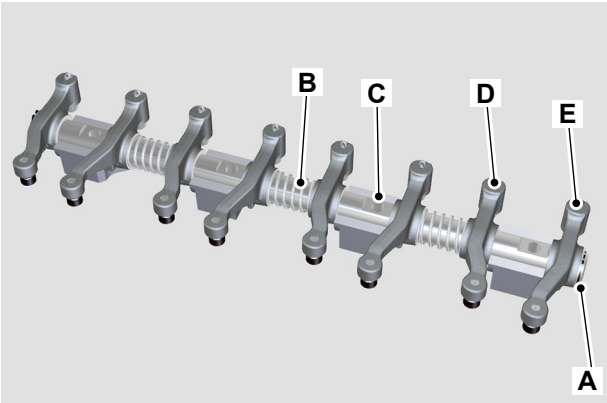
Introduction

The rocker assembly is an indirect valve actuating system consisting of rocker arms and a shaft.

The rocker arm is an oscillating lever that conveys radial movement from the cam lobe into linear movement at the poppet valve to open it. One end is raised and lowered by a rotating lobe of the camshaft via a tappet and push rod while the other end acts on the bridge piece which is connected to the valve stem.

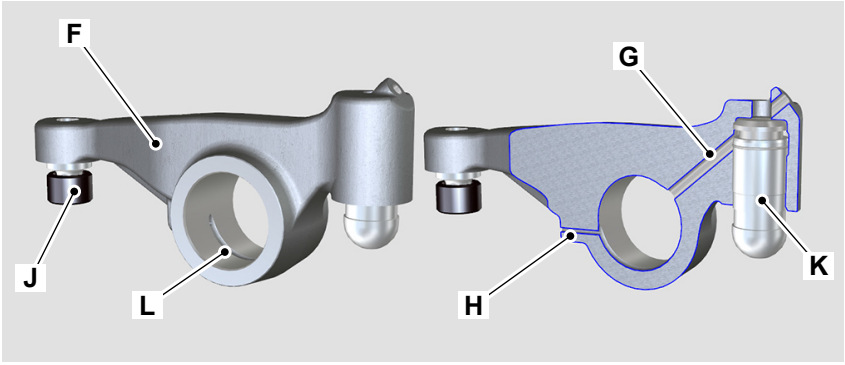
Component Identification

Figure 196.



A Rocker arm shaft
B Rocker arm distancing spring
C Rocker arm shaft support
D Exhaust rocker arm
E Intake rocker arm

Figure 197.



F Rocker arm body
G Hydraulic tappet oil refill line
H Valve tappet lubrication line
J Valve tappet
K Hydraulic tappet
L Oil flow line

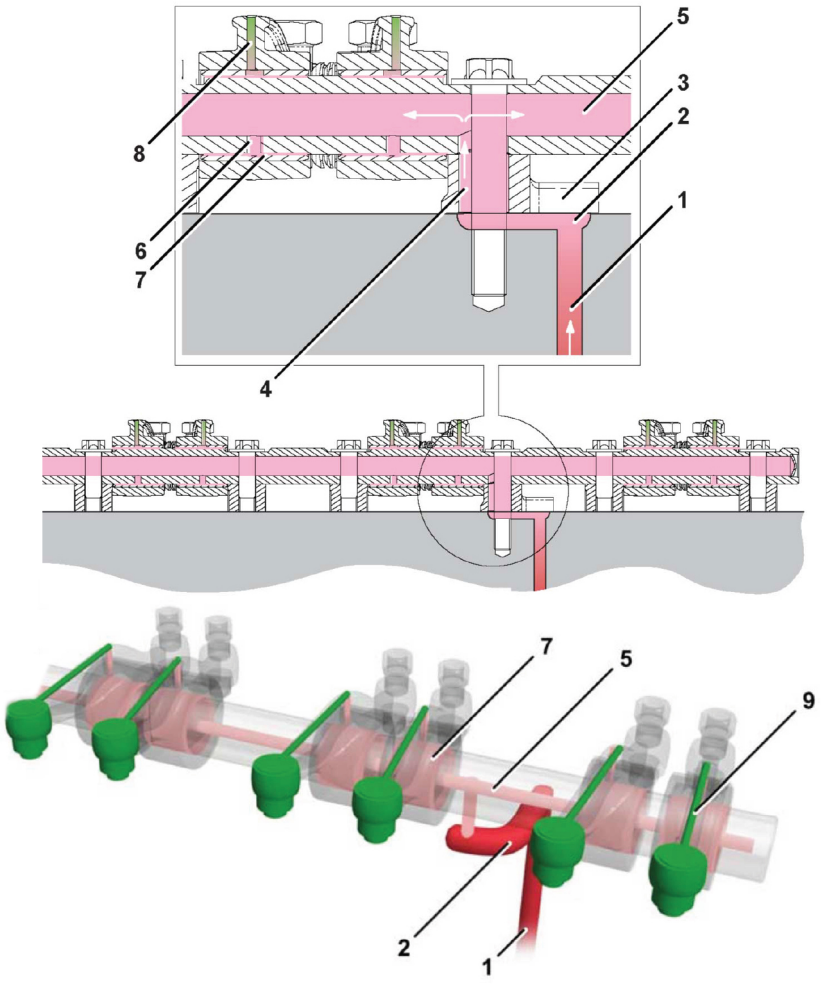
Operation

When the camshaft lobe raises the push-rod, the push-rod pushes the rocker arm up. Due to this the rocker arm presses down on the valve stem to open the valve. When the rocker arm returns due to the camshafts rotation, the valve spring closes the valve.

Lubrication

Oil is fed from the main gallery through a drilling which passes up through the crankcase and cylinder head to a small transfer gallery under the rocker shaft pedestal. The oversize rocker shaft fixing bolt hole allows oil to pass into a drilling in the centre of the rocker shaft. Further cross drillings transfer oil to each of the rocker pivot bushes. A cross drilling in each rocker transfers oil to the top of the rocker where it flows by gravity along a groove to the rocker tip.

Figure 198.



1 Main gallery
2 Small transfer gallery
3 Shaft pedestal
4 Rocker shaft fixing bolt hole
5 Centre rocker shaft drilling
6 Cross drillings
7 Rocker pivot bushes
8 Cross drilling
9 Groove

Check (Condition)

1. Check the rocker shaft and rocker bushings for signs of damage and excessive wear. Measure the rocker shaft diameter and rocker bearing bushes to confirm they are within service limits, refer to Technical Data (PIL 15-42). Note: The rocker bearing bushes are not renewable. If a rocker bearing bush is damaged or worn the rocker must be renewed as a complete assembly.
2. Make sure that all oil-ways and cross drillings in the rocker shaft and pedestals are clear and free from debris. Use an air line to blow through cross drillings.

Remove and Install

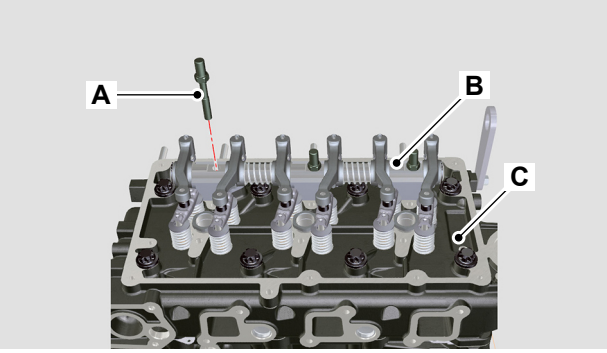
Before Removal

1. 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.
2. Get access to the engine.
3. Disconnect and remove the fuel pipes from the fuel injectors. Refer to (PIL 18-96).
4. Remove the rocker cover. Refer to (PIL 15-42-06).

Remove

1. Remove the rocker shaft fixing screws.

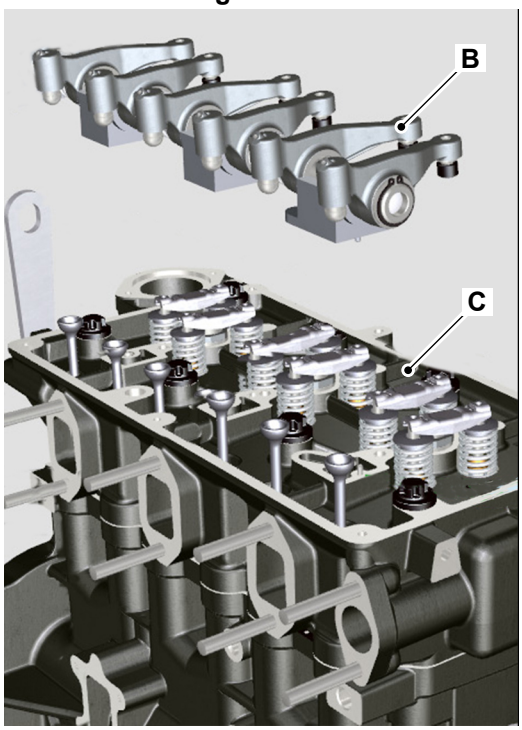
Figure 199.



A Rocker shaft fixing screw (x3)
B Rocker arm assembly
C Cylinder head

2. Make sure that you keep all the fixing screws in their original positions.
3. Lift the rocker arm assembly from the cylinder head completely.

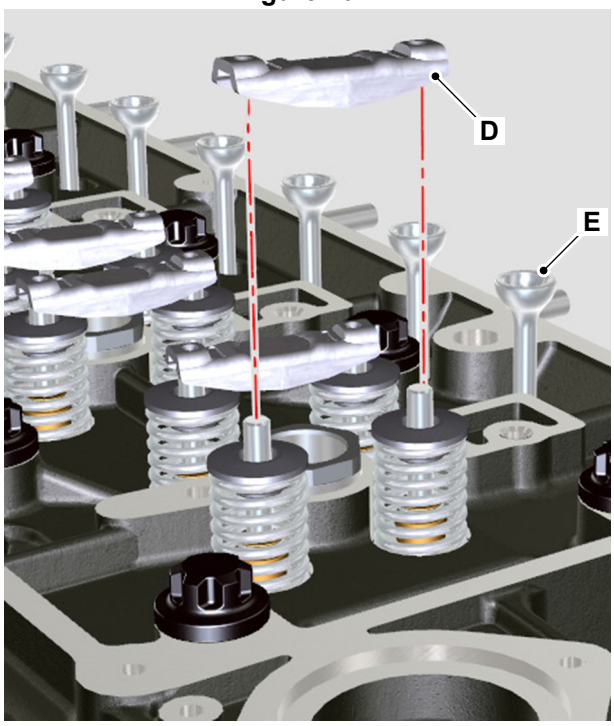
Figure 200.



B Rocker arm assembly
C Cylinder head

4. Lift off the valve bridge pieces from the pairs of inlet and exhaust valves.

Figure 201.



D Valve bridge (x6)
E Push rod (x6)

5. Remove the push rods from the crankcase.

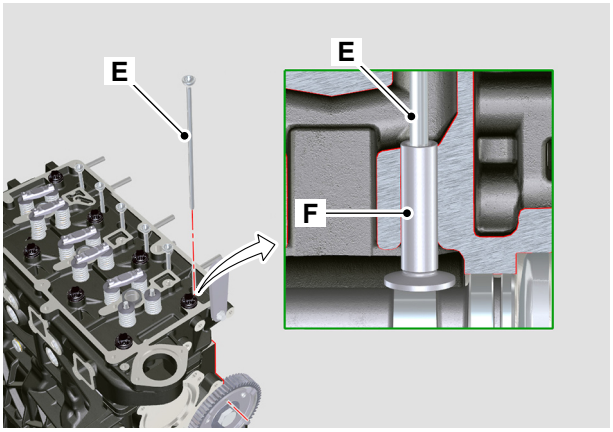
Before Installation

1. Make sure that all items are clean and free from damage and corrosion. If components within the rocker assembly are damaged or worn.
2. Make sure that all oilways and cross drillings in the cylinder head, rocker shaft and pedestals are clear and free from debris. Use an air line to blow through the cross drillings.
3. Use a suitable degreasing agent to clean the top of the cylinder head.

Install

1. Replacement is the reversal of the removal procedure.
2. Insert the push rods into the crankcase. Make sure that they engage with the camshaft tappets.

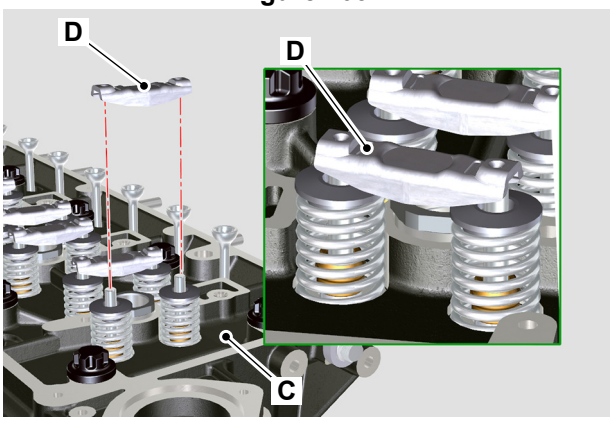
Figure 202.



E Push rod
F Camshaft tappet

3. Install the bridge pieces on to the pairs of inlet and exhaust valves in the cylinder head.

Figure 203.

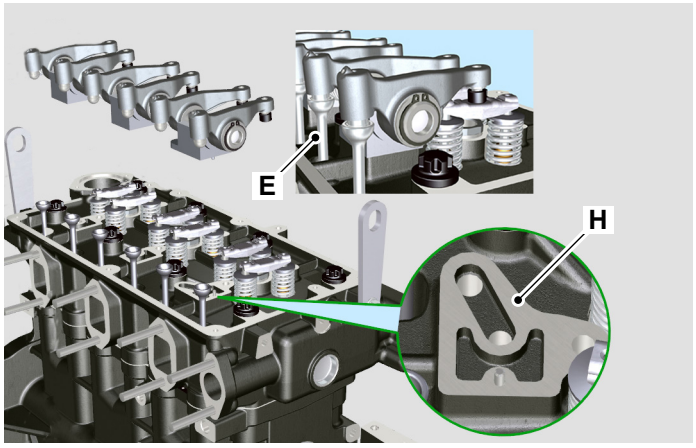


C Cylinder head
D Valve bridge

4. Align the rocker arm assembly on a level surface.

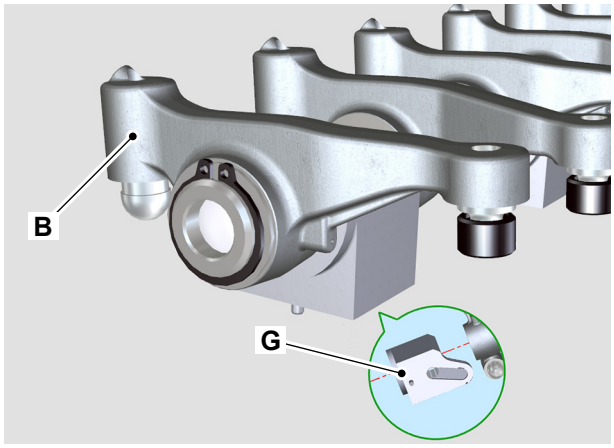
5. Make sure you install the rocker arm assembly on the cylinder head with respect to the plug and the holder.

Figure 204.



E Push rod
H Plug

Figure 205.

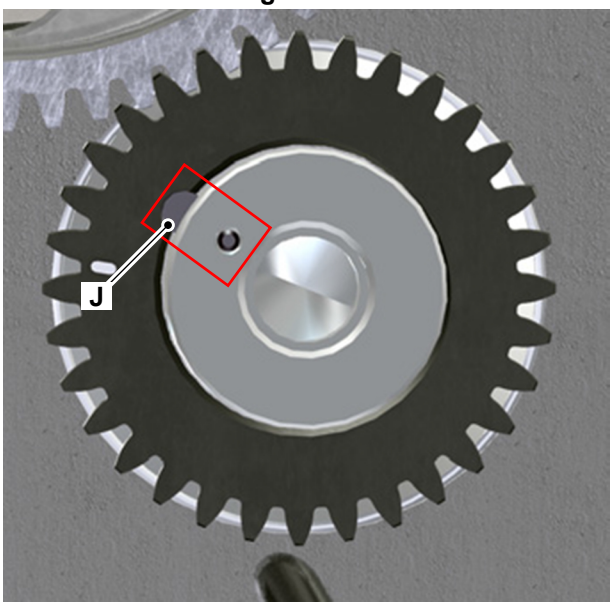


B Rocker arm assembly
G Holder

6. Make sure that the rocker arm assembly is seated properly on the push rod.

7. Make sure that you put the crankshaft gear key in the position as shown to avoid the rocker arm rod bending at the time of tightening the fixing screws.

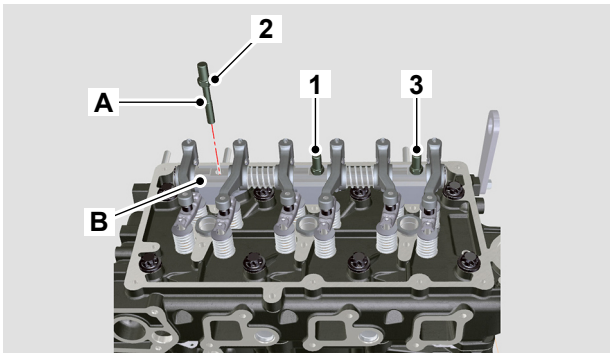
Figure 206.



J Gear key

8. Put the rocker arm fixing screws and tighten the screws in the sequence shown.

Figure 207.



A Rocker shaft fixing screw (1-3)
B Rocker arm assembly

9. Tighten the screws to the correct torque value.

After Installation

1. Measure and adjust the valve clearances. Refer to (PIL 15-30).

2. Install the rocker cover. Refer to (PIL 15-42-06).

3. Install and connect the fuel pipes to the fuel injectors. Refer to (PIL 18-96).

Table 64. Torque Values

Item	Nm
A	25

Disassemble and Assemble

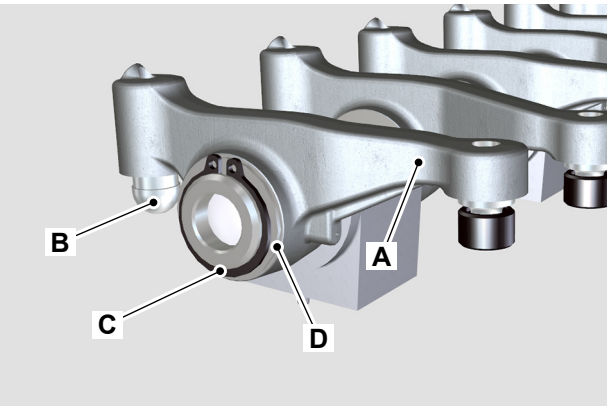
Before Disassembly

1. Remove the rocker cover. Refer to (PIL 15-42).
2. Remove the rocker assembly. Refer to (PIL 15-42).

Disassemble

1. Remove the retainer ring.

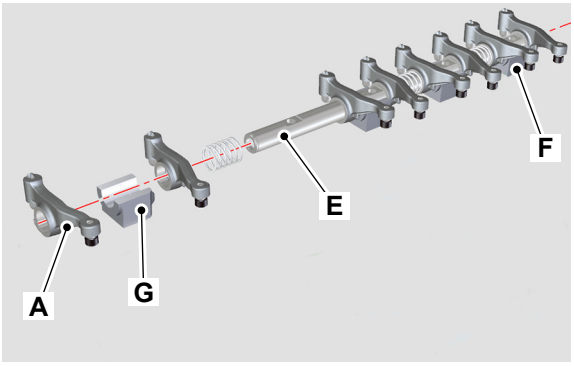
Figure 208.



A Discharge rocker arm
B Hydraulic tappet
C Retainer
D Shoulder ring

2. Remove the shoulder ring.
3. Remove the rockers and the holders from the rocker shaft.

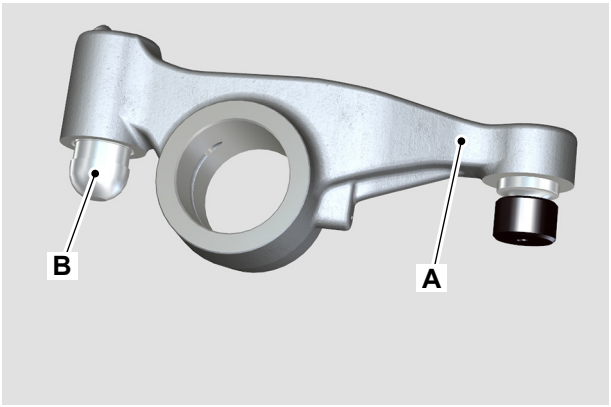
Figure 209.



A Discharge rocker arm
E Rocker shaft
F Holder
G Holder 1

4. Label the rockers and the holders to make sure that they are installed in the correct positions on assembly.
5. Remove the tappets from the rocker.

Figure 210.



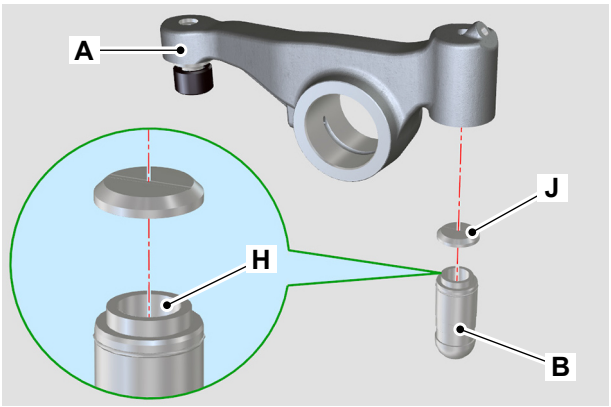
A Discharge rocker arm
B Hydraulic tappet

6. Check (Condition) of the rocker arm assembly for signs of damage and excessive wear. Refer to (PIL 15-42).

Assemble

1. Assembly is the reversal of the disassembly procedure.
2. Install the tappets into the rocker arm.
   2.1. Insert the tappets into to the hydraulic tappet insertion pliers.
   2.2. Fill the chamber of the tappet with oil.
   2.3. Put the pad on the tappet.

Figure 211.

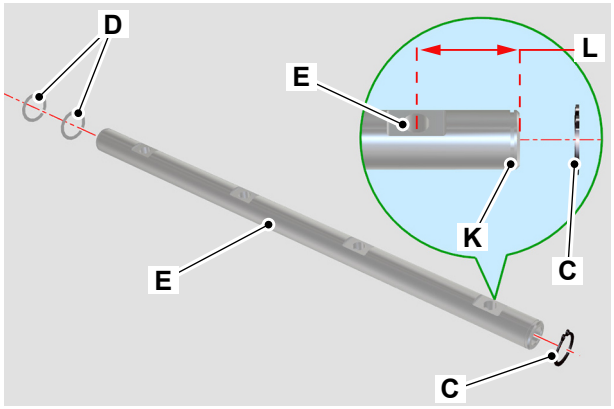


A Discharge rocker arm
B Hydraulic tappet
H Chamber
J Pad

   2.4. Position the rocker arm in the pliers.
   2.5. Push the tappet through the rocker arm, using the pliers, until the tappet is properly inserted.
3. Lubricate the rocker shaft with clean engine oil.

4. Install the rocker arms in the correct position, turn the rocker shaft with the lower height towards the timing gear system side.
5. Put the lock ring into the seat of the rocker shaft.

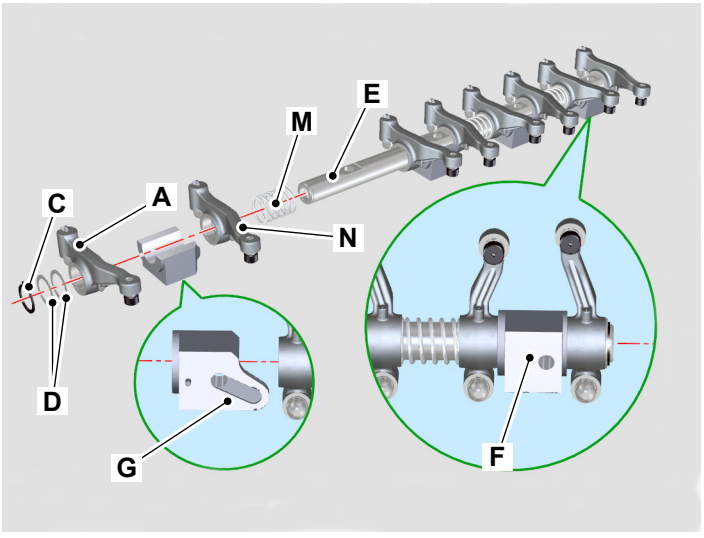
Figure 212.



C Retainer
D Shoulder ring
E Rocker shaft
K Seat
L Rocker shaft lower height

6. Position the fixing screw support surface facing upwards.
7. Put the two shoulder rings on the rocker shaft.
8. Sequentially put the suction rocker arm, the holder and the discharge rocker arm on the rocker shaft.

Figure 213.



A Discharge rocker arm
C Retainer
D Shoulder ring
E Rocker shaft
F Holder
G Holder 1
M Spring
N Suction rocker arm

9. The discharge rocker arm is shorter than the suction rocker arm.
10. install the spring on the rocker shaft.
11. Do the steps 8 and 10 for all the remaining rocker arms.
12. Install the holder 1 with the last pair of rocker arm towards the flywheel.
13. The spring makes sure that the holder and the holder 1 are kept in place.
14. Make sure that the rockers are installed in their original positions along the rocker shaft.
15. Put the shoulder rings and the lock ring to lock all the components on the rocker shaft.

After Assembly

1. Install the rocker assembly. Refer to (PIL 15-42).
2. Install the rocker cover. Refer to (PIL 15-42).

00 - General

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Component Identification 15-158
Remove and Install 15-159

Introduction

The lubrication system is supplied by the oil sump that forms the lower part of the engine. Oil is taken from the sump by the gear pump and it is passed through an oil filter. The oil is then delivered under pressure through a system of passages drilled through the engine.

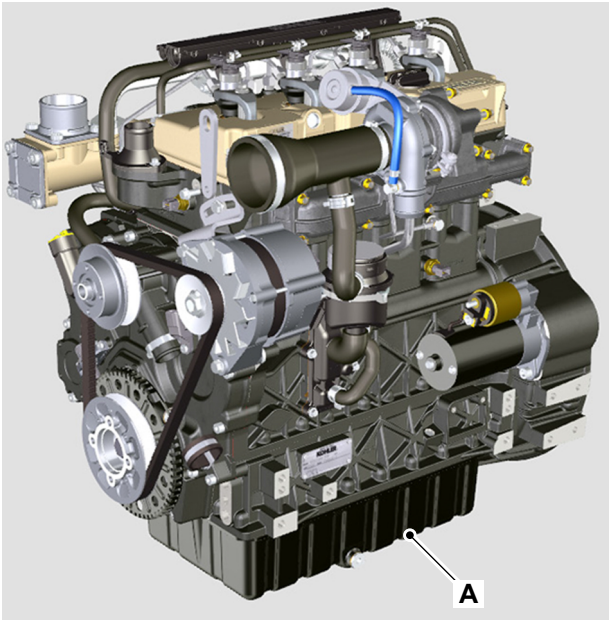
Technical Data

Table 65.

Oil sump type	Wet
Oil sump capacity	7.5L

Component Identification

Figure 214.



A Oil Sump

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.

CAUTION! *It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.*

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

Before Removal

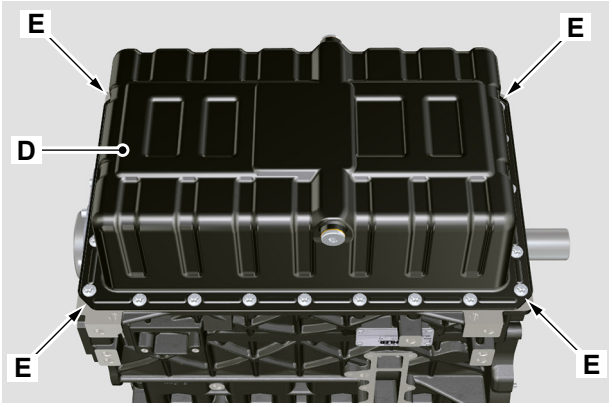
1. Get access to the engine.
2. Drain the engine oil, refer to (PIL 15-00)

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

Remove

1. Remove the screws that attach the oil sump to the bedplate.
2. Insert plates in the areas shown by the arrows.

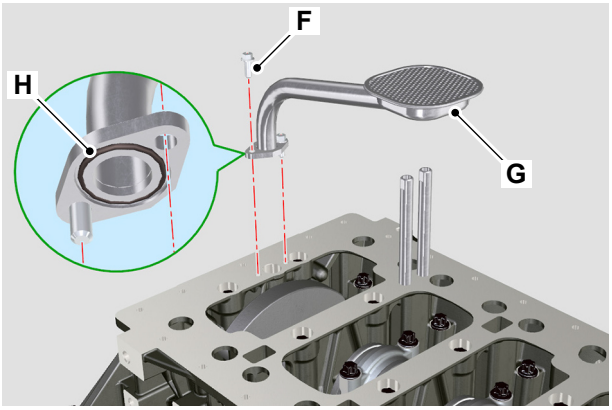
Figure 215.



D Oil sump
E Plate insertion areas

3. Lift the plates to remove the oil sump.
4. Remove the remaining sealant from the oil sump and bedplate contact surfaces.
5. Remove the screws that attach the oil intake pipe.
6. Remove the oil intake pipe and the gasket. Discard the gasket.

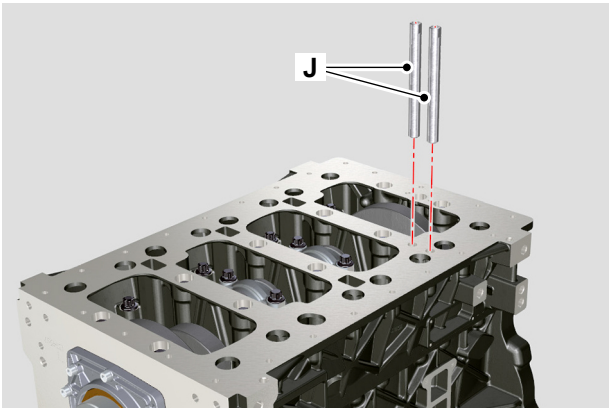
Figure 216.



F Screw
G Oil intake pipe
H Gasket

7. Remove the oil vapour pipes.

Figure 217.



J Oil vapour pipes

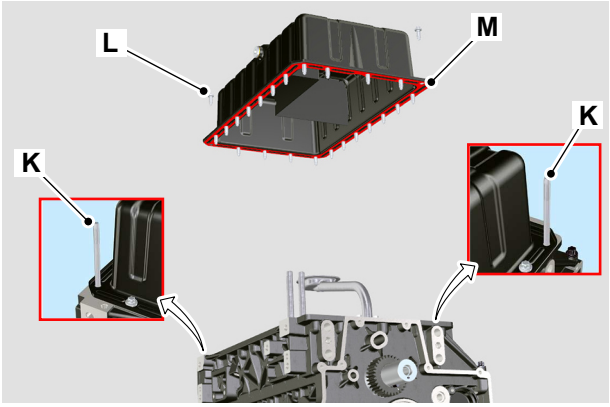
Install

1. Apply Loctite 648 on the threads of the oil vapour pipes.
2. Install the oil vapour pipes.
3. Put a new gasket in the seat of the oil intake pipe.
4. Attach the oil intake pipe onto the bedplate with the screws.
5. Tighten the screws to the correct torque value.
6. Make sure that the oil sump is clean and free from contamination.
7. Make sure that the contact faces on the oil sump and bedplate are clean.

8. Apply a bead of sealant (Loctite 5660) on the oil sump contact surface to the specified thickness.

   Dimension: 2.5mm

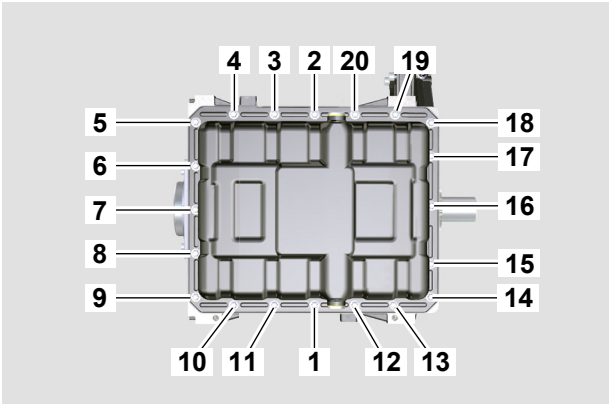
Figure 218.



K Mounting studs
L Screw
M Sealant application surface

9. Install the mounting studs to help you to position the oil sump.
10. Put the oil sump on the bedplate. Make sure that the screw holes are aligned.
11. Strictly follow the torque tightening sequence. Tighten the screws to the correct torque value.

Figure 219. Torque Sequence



12. After you tighten all of the screws, loosen screw no.1 and tighten again to the correct torque value.
13. Clean and install the drain plugs with a new O-ring. Tighten the plug to the correct torque value.
14. Through one of the filler points, fill the engine with the recommended oil to the MAX mark on the dipstick.
15. Wipe off any spilt oil, install the filler cap and make sure it is secure.
16. Operate the engine, until the oil pressure low warning light has extinguished.
17. Check for oil leakage.
18. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

Table 66. Torque Values

Item	Nm
B	35
F	10
L	25

03 - Drain Plug

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.

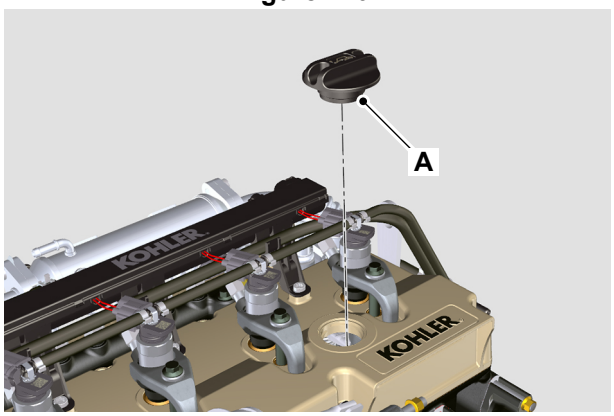
CAUTION! *It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.*

Remove

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

1. Gain access to the oil sump.
2. Place a container of suitable size below the drain plug.
3. Remove the oil filler cap.

Figure 220.

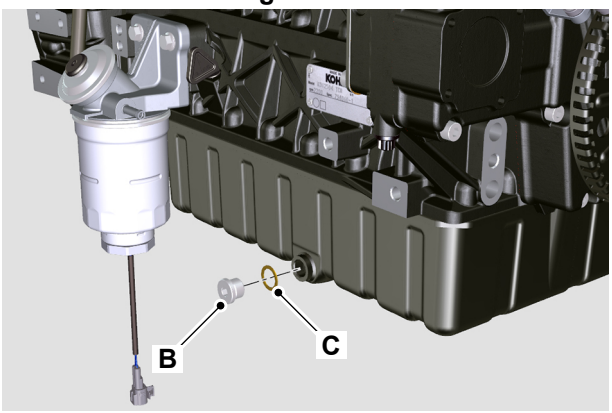


A Oil filler cap

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

4. Remove the oil sump drain plug and O-ring. Let the oil drain out.

Figure 221.



B Drain plug
C O-ring

Install

1. Clean and install the drain plug with a new O-ring.
2. Tighten the plug to the correct torque value.
3. Through one of the filler points, fill the engine with the recommended oil to the MAX mark on the dipstick.
4. Wipe off any spilt oil, install the filler cap and make sure it is secure.
5. Operate the engine, until the oil pressure low warning light has extinguished.
6. Check for oil leakage.
7. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

Table 67. Torque Values

Item	Nm
B	35

Our support email:

ebooklibonline@outlook.com