SERVICE MANUAL

EXCAVATOR
67C-1

EN - 9813/3450 - ISSUE 2 - 04/2018

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

00 - General

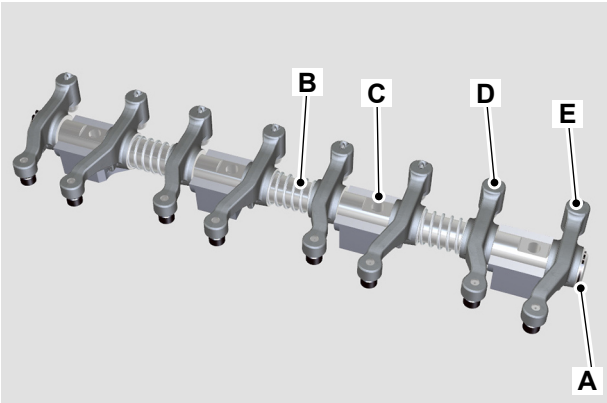
Introduction

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.

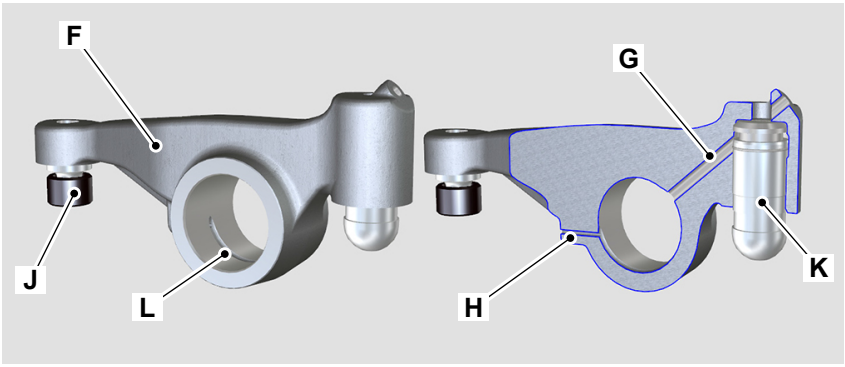
Component Identification

Figure 233.



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

Figure 234.



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

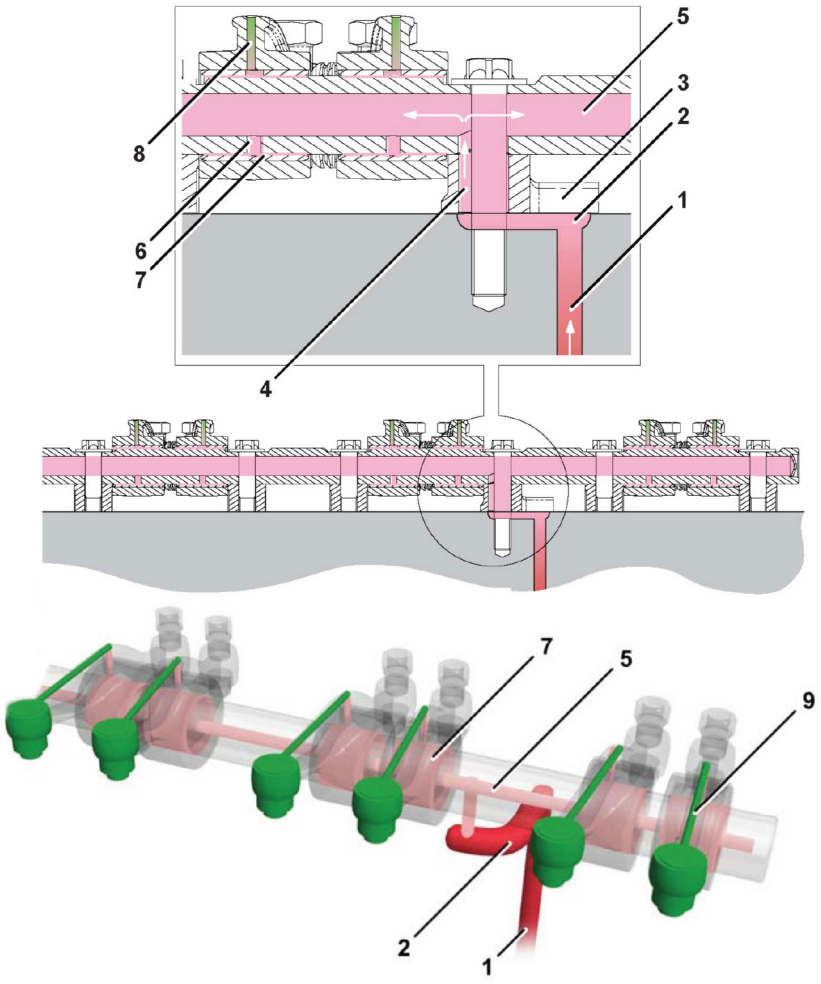
Operation

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 235.



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. 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.

   Refer to: PIL 15-42.

2. Make sure that all oil-ways and cross drillings in the rocker shaft, rocker arms and pedestals are clear and free from debris. Use an air line to blow through cross drillings.

Remove and Install

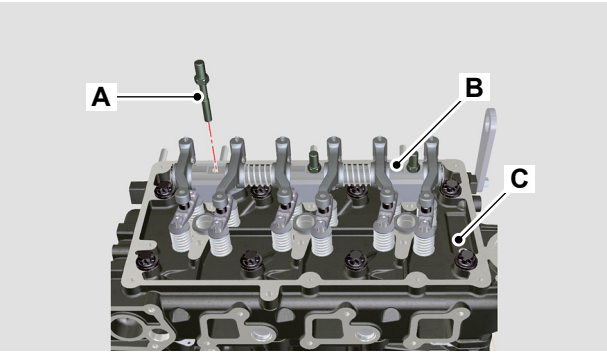
Before Removal

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.

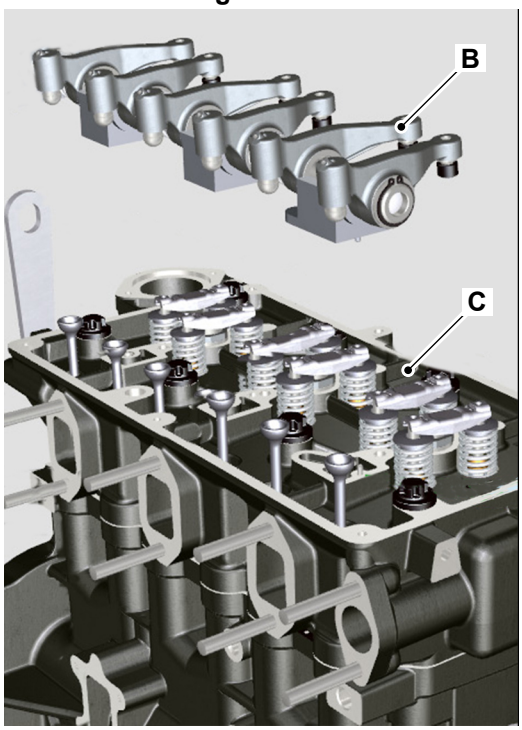
Figure 236.



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.

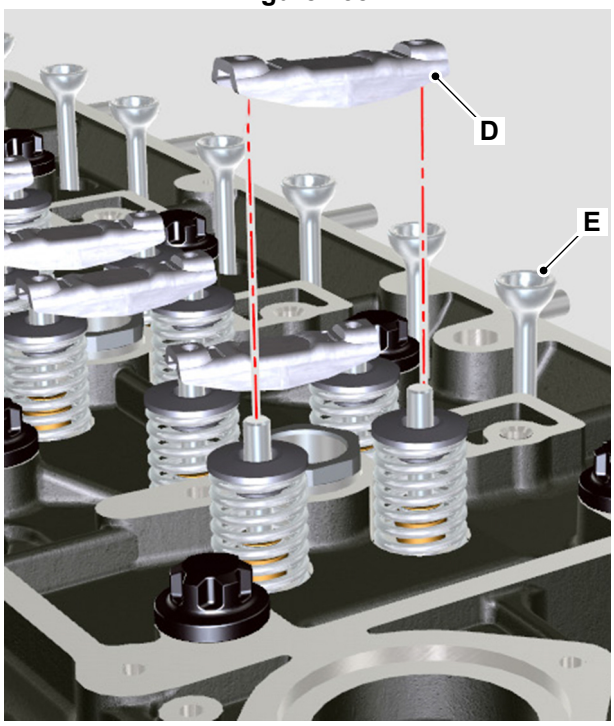
Figure 237.



B Rocker arm assembly
C Cylinder head

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

Figure 238.



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

5. Remove the push rods from the crankcase.

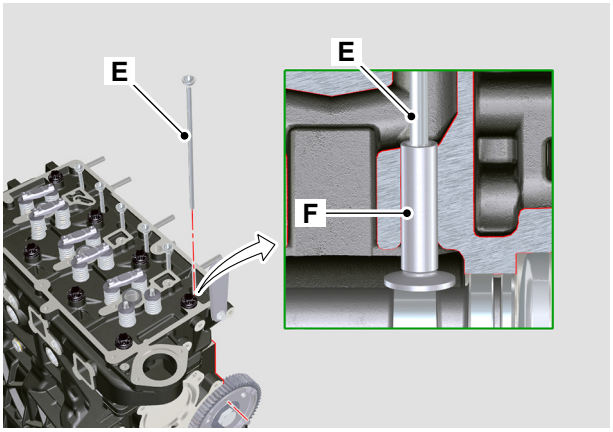
Before Installation

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.

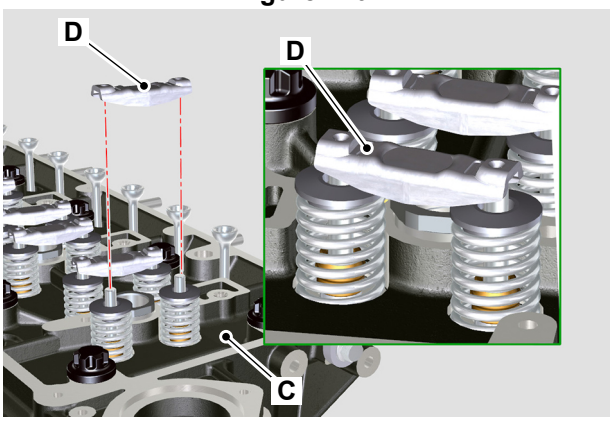
Figure 239.



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 240.

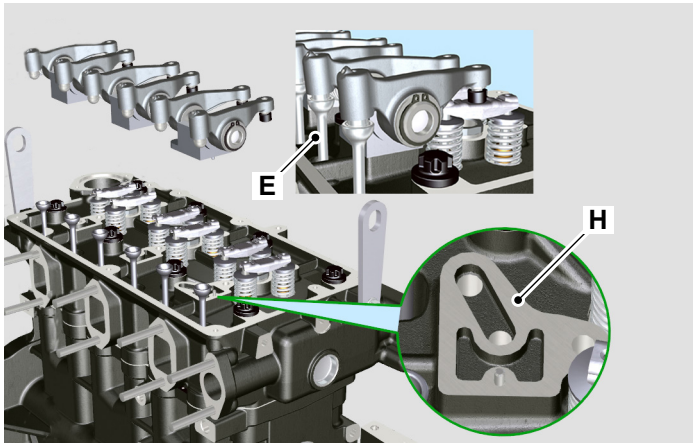


C Cylinder head
D Valve bridge

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

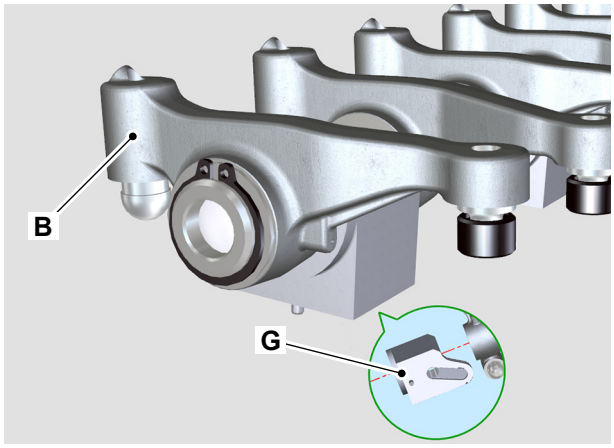
5. Make sure you install the rocker arm assembly on the cylinder head with respect to the plug and the holder.

Figure 241.



E Push rod
H Plug

Figure 242.

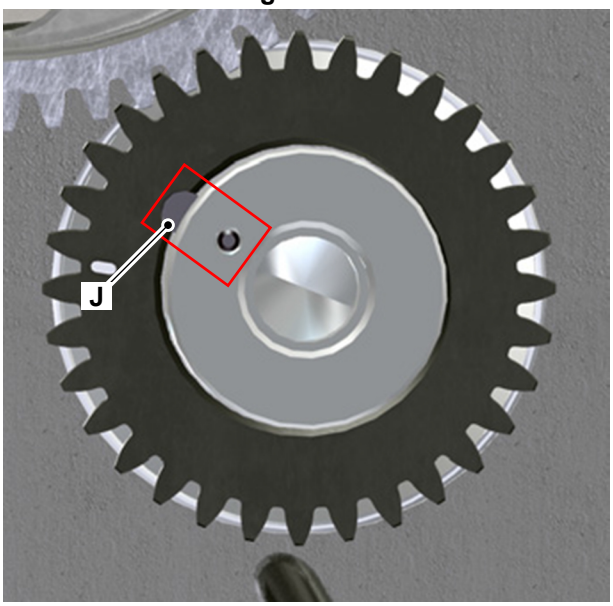


B Rocker arm assembly
G Holder

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.

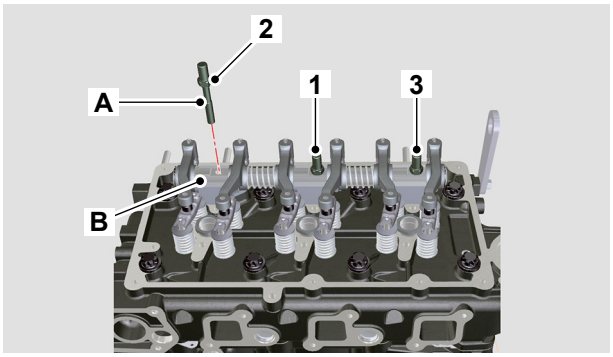
Figure 243.



J Gear key

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

Figure 244.



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 71. Torque Values

Item	Nm
A	25

Disassemble and Assemble

Special Tools

Description	Part No.	Qty.
Insertion Pliers for Hydraulic Tappets	892/12425	1

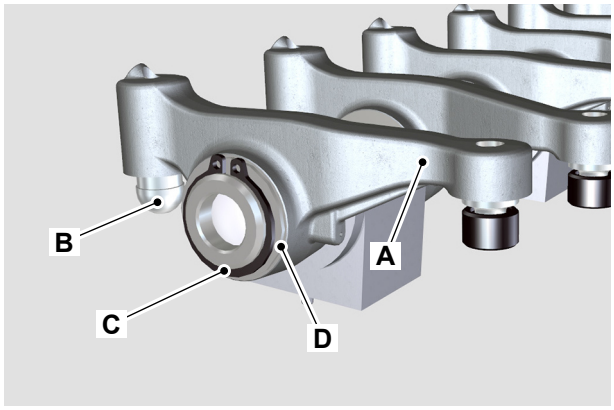
Before Disassembly

1. Remove the rocker cover.
   Refer to: PIL 15-42-06.
2. Remove the rocker assembly.
   Refer to: PIL 15-42-00.

Disassemble

1. Remove the retainer ring.

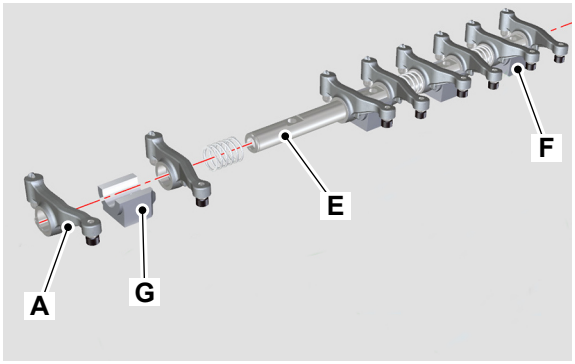
Figure 245.



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.

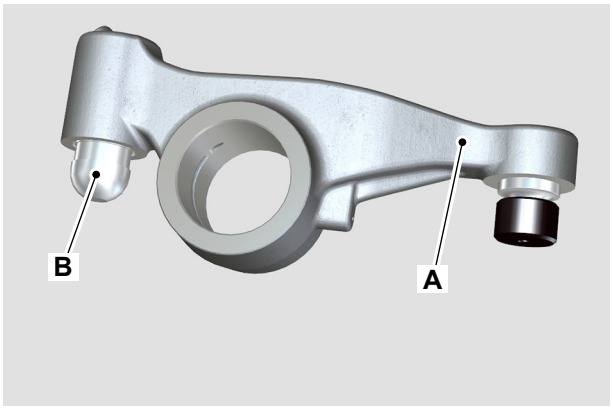
Figure 246.



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 247.



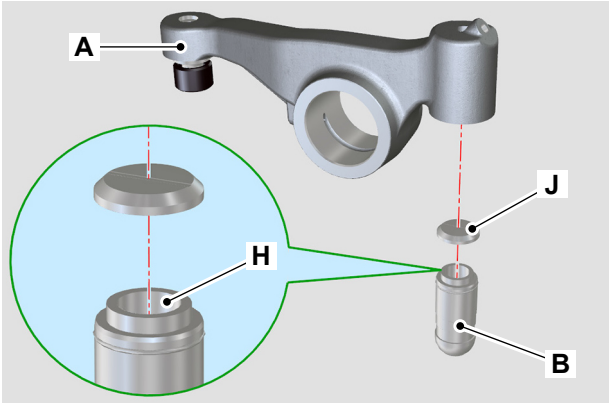
A Discharge rocker arm
B Hydraulic tappet

6. Check (Condition) of the rocker arm assembly for signs of damage and excessive wear.
   Refer to: PIL 15-42-00.

Assemble

1. The assembly procedure is the opposite of the disassembly procedure. Additionally do the following steps.
2. Install the tappets into the rocker arm.
   2.1. Insert the tappets into the hydraulic tappet insertion pliers.
   Special Tool: Insertion Pliers for Hydraulic Tappets (Qty.: 1)
   2.2. Fill the chamber of the tappet with oil.
   2.3. Put the pad on the tappet.

Figure 248.



A Discharge rocker arm
B Hydraulic tappet
H Chamber
J Pad

2.4. Position the rocker arm in the pliers.

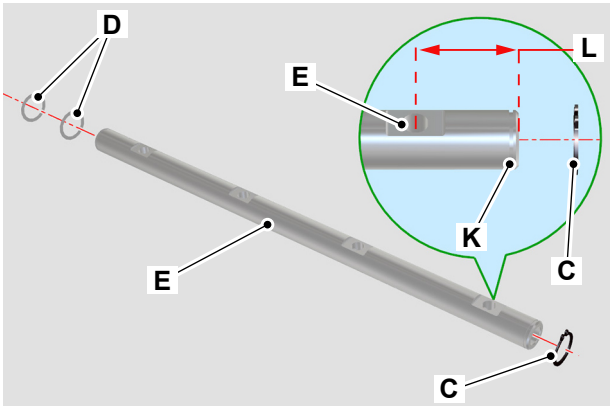
2.5. Use the pliers to push the tappet through the rocker arm until the tappet is properly inserted.

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 249.



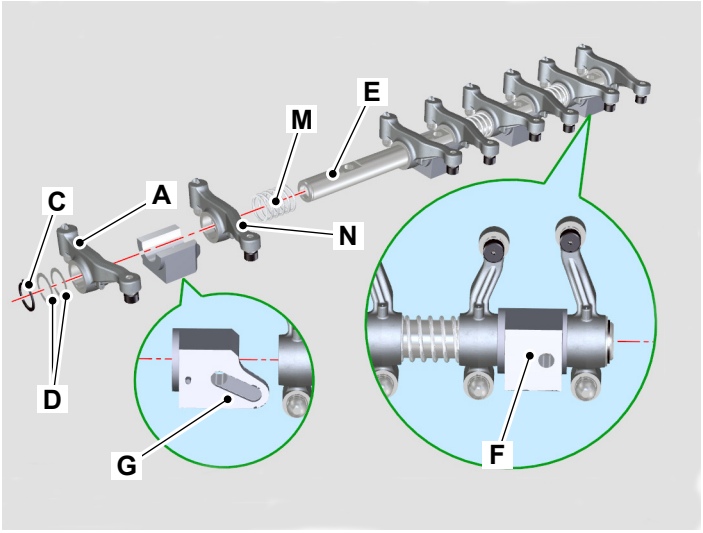
C Retainer
D Shoulder ring
E Rocker shaft
K Seat
L Rocker shaft lower height

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 250.



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 15-42-00.

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

01 - Rocker Arm

Remove and Install

Refer to Rocker Assembly-Remove and Install. Refer to: PIL 15-42-00.

03 - Rocker Shaft

Remove and Install

Refer to Rocker Assembly- Disassemble-Assemble.
Refer to (PIL 15-42-00).

06 - Rocker Cover

Introduction

The rocker arm cover is installed over the rocker and fittings. It carries the engine oil for the lubrication of the rocker components.

Remove and Install

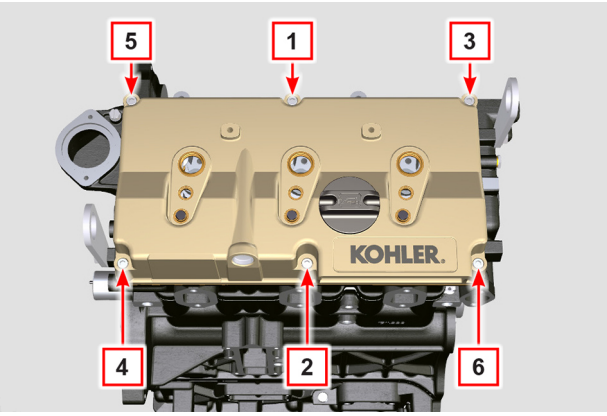
Before Removal

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. Clean the engine.
   Refer to: PIL 15-00-00.

Remove

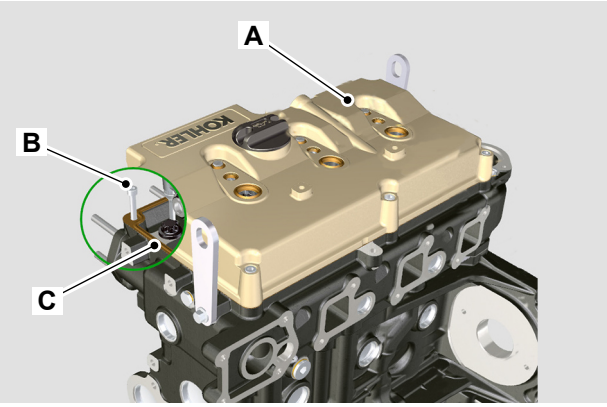
1. Get access to the engine.
2. Remove the high pressure fuel pipes.
   Refer to: PIL 18-96-03.
3. Remove the fuel bleed off fuel pipes.
   Refer to: PIL 18-96-06.
4. Disconnect the electrical connectors at the fuel injectors.
   Refer to: PIL 18-18-03.
5. Disconnect the electrical connector at the coolant temperature sensor.
   Refer to: PIL 15-84-33.
6. Move the electrical harness away from the rocker cover.
7. Progressively remove the rocker arm cover screws from 1 to 6 in reverse order, starting at bolt 6.

Figure 251.



8. Lift the rocker cover from the cylinder head.

Figure 252.



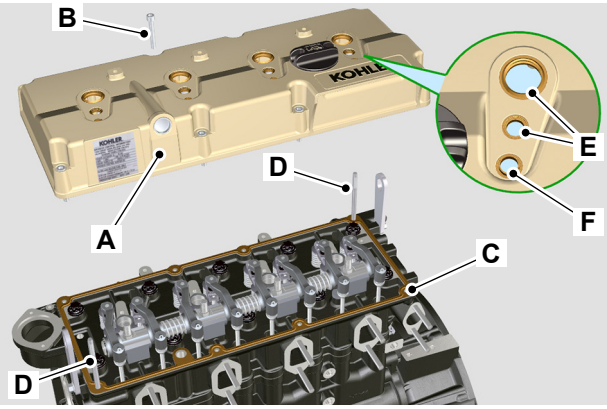
A Rocker arm cover
B Screws
C Gasket

9. Discard the gasket.
10. The rocker cover injector seals must be replaced.
    Refer to: PIL 18-18-03.

Install

1. Remove all oil and sludge contamination from inside the valve chamber.
2. Use a new rocker arm cover gasket.
3. Make sure you align the gasket on the cylinder head with the rocker cover fastening screws.
4. Locate the two guide pins before mounting the rocker arm cover.
5. Put sleeves/covers on the four injectors to prevent from damage.
6. Apply a Vaseline lubricant to the seals.

Figure 253.



A Rocker arm cover
B Screws
C Gasket
D Guide pins
E Seal (lubricate upper part)
F Seal (lubricate inner part)

7. Install the rocker arm cover and put the screws in sequence from 1 to 6.
8. Tighten the screws to the correct torque value.
9. Remove the sleeves/covers.

After Installation

1. The high pressure fuel pipes must be replaced with new parts.

   Refer to: PIL 18-96-03.

2. Start the engine and check for oil and fuel leaks.

Table 72. Torque Values

Item	Nm
B	10

Our support email:

ebooklibonline@outlook.com