



SERVICE MANUAL

FASTRAC (AGRICULTURAL TRACTOR)
8290, 8330

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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.

Contents

01 - Machine

03 - Attachments and Options

06 - Body and Framework

09 - Operator Station

12 - Heating, Ventilating and Air-Conditioning (HVAC)

15 - Engine

18 - Fuel and Exhaust System

21 - Cooling System

24 - Brakes

25 - Steering System

27 - Driveline

28 - Suspension

30 - Hydraulic System

33 - Electrical System

72 - Fasteners and Fixings

75 - Consumable Products

78 - After Sales

00 - General

Introduction	15-103
Technical Data	15-104
Component Identification	15-105
Operation	15-106
Check (Condition)	15-107
Remove and Install	15-107

Introduction

The piston is acted upon by the pressure of the expanding combustion gases in the combustion chamber space at the top of the cylinder. This force then acts downwards through the connecting rod and on to the crankshaft.

The pistons are cast from aluminium alloys for increased strength and improved fatigue life.

The connecting rod is attached to the piston by a swivelling piston pin. This pin is mounted within the piston, The pin itself is of hardened steel and is fixed in the piston, but free to move in the connecting rod. The pins are prevented from moving sideways and the ends of the pin digging into the cylinder wall by circlips.

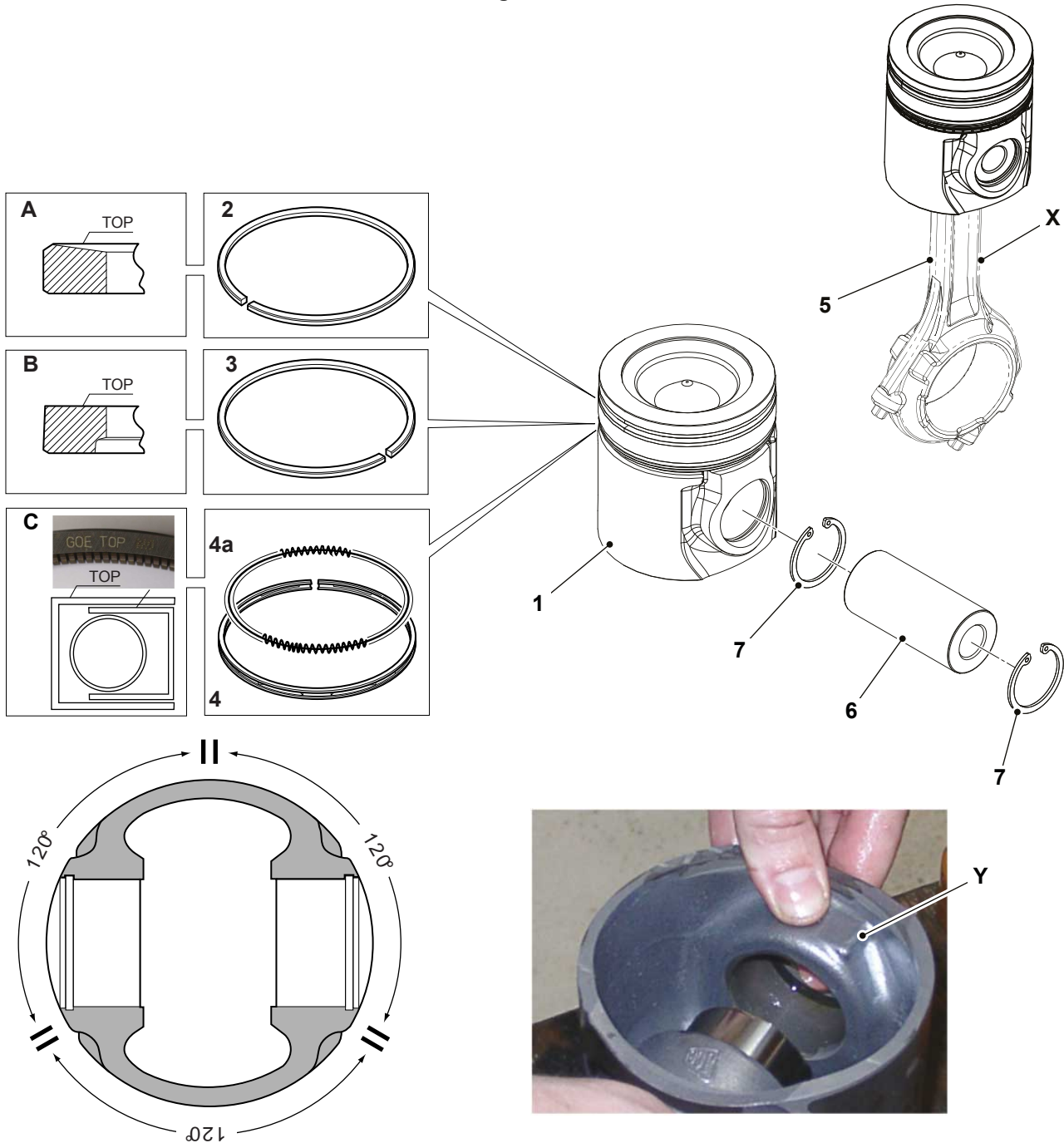
Technical Data

Table 43. Piston Data

Description	Data
Piston diameter at 15mm from lower edge	110.863–110.877mm
Pin bore in piston	40.003–40.009mm
Piston pin diameter	43.994–40mm
Width of the piston ring grooves	
1st groove	Wedge shaped ring
2nd groove	2.52–2.54mm
3rd groove	4.04–4.06mm
Side clearance of piston rings in their grooves	
1st ring	Wedge shaped ring
2nd ring	0.03–0.062mm
3rd ring	0.05–0.082mm
Reject limit	0.15mm
Piston ring height (in direction of cylinder)	
1st ring	Wedge shaped ring
2nd ring	2.478–2.49mm
3rd ring	3.975–3.99mm
Piston ring gap (with piston installed in cylinder)	
1st ring (Wedge shaped ring)	0.35–0.5mm
2nd ring	0.6–0.8mm
3rd ring	0.3–0.6mm
Reject limit for 1st and 3rd ring	1mm
Reject limit for 2nd ring	1.3mm
Maximum permissible weight difference between pistons in same engine	0.025kg
Piston must be heated up to 100°C (211.9°F) before you install the gudgeon pin.	

Component Identification

Figure 150.



- 1 Piston
- 3 Piston ring - compression No.2
- 4a Spiral wire - oil control ring
- 6 Piston pin
- X Connecting rod - longest side

- 2 Piston ring - compression No.1
- 4 Piston ring - oil control ring
- 5 Connecting rod
- 7 Retaining circlip (x2)
- Y Cast boss - piston

Operation

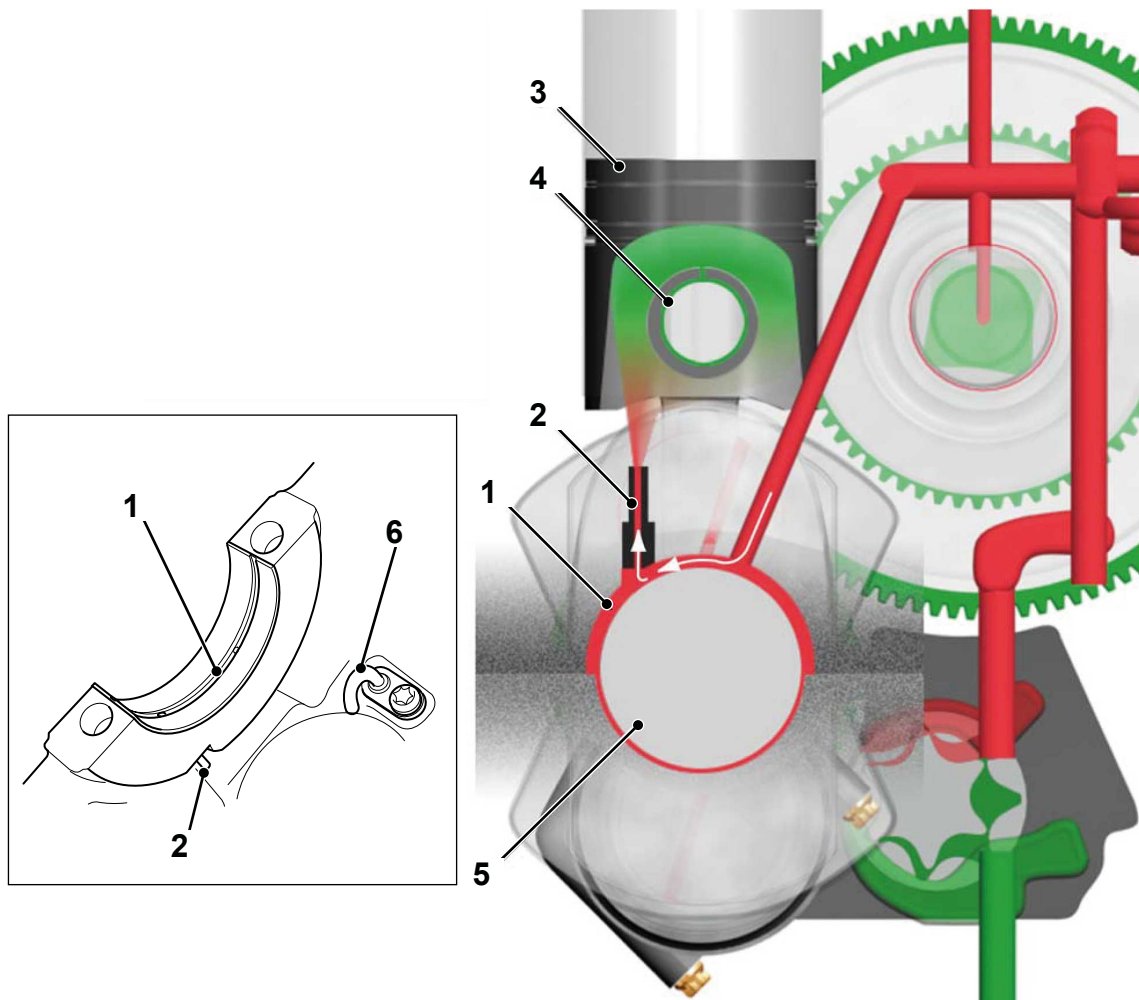
The groove around the diameter of the upper main bearing shells allows oil transfer to an oil jet located in the crankcase bearing saddle. Jets are installed at the main bearing positions.

The jets spray oil directly to the under side of the pistons effectively transferring heat away from the

top of the pistons. Oil spray also enters the small end bearing bushes via a feed hole on the top of each connecting rod.

Note: On turbocharged engines additional J-jets are installed. Oilways connect the J-shaped jets fixed to the crankcase at the underside of each cylinder bore.

Figure 151.



- 1 Groove
- 3 Pistons
- 5 Crankshaft

- 2 Oil jet
- 4 Bearing bushes
- 6 J shaped jets

Check (Condition)

1. Check the piston for signs of damage and excessive wear. Measure the piston skirt diameter, piston pin bore and the clearance in the piston ring grooves to confirm they are within service limits. Refer to Piston, Technical Data (PIL 15-36).
2. Check the piston pin for signs of damage and excessive wear. Measure the pin diameter to confirm it is within service limits. Refer to Piston, Technical Data (PIL 15-36).

The connecting rod small end bearing bush is not renewable. If the small end bearing bush is damaged or worn the connecting rod must be renewed as a complete assembly.

Remove and Install

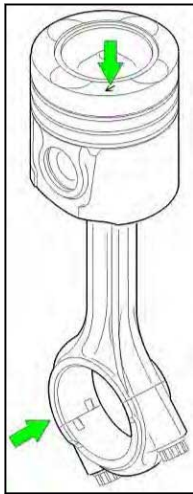
Remove

1. Remove the oil sump. Refer to (PIL 15-42).
2. Remove the oil inlet and pressure pipes.
3. Remove the cylinder head. Refer to (PIL 15-06).
4. Remove any soot in the cylinder bore.
5. If the turning edge is clearly marked, smooth it down carefully with a scraper.
6. Remove the big end bearing caps and bearing shells.
7. Place the shells in sequence.
8. Push up the piston and the connecting rod with the shaft of a hammer or similar wooden tool.
9. Remove the piston pin snap rings.
10. Push out the pin.
11. If the piston pin does not move under thumb pressure, the piston should be heated to the specified temperature.

Temperature: 100°C (211.9°F)

Install

1. Place the connecting rod inside the piston.
2. Push the piston pin into place.
3. The weight class letter should be on the side of the camshaft.
4. The arrow on the piston points towards the front end of the engine.
5. Instal the piston pin circlips.
6. Make sure that the circlips are pressed correctly into the grooves.
7. The circlip ends must point upwards.

Figure 152.


8. Make sure that the bearing locations are clean.
9. Place the bearing shells in the connecting rod and the bearing cap.
10. Make a note of the position of the bearing shells.
11. Lubricate the piston, piston rings and the cylinder bore.
12. Make sure that the piston ring gaps are spread around the piston.
13. Use a piston ring strap or AGCO special tool number 9201 85840 to install the piston.
14. Make sure that the direction of the arrow on the piston shows forward.
15. Lubricate the big end bearing journal and the bearing shells.
16. Push the piston down.
17. Install the bearing cap so that the notches for the guide lugs are in the same side.
18. Tighten the connecting rod screws to the correct torque value.
 - 18.1. First tighten to the specified torque value.
Torque: 40N·m
 - 18.2. Tighten to the specified torque value.
Torque: 80N·m
 - 18.3. Tighten by the specified degrees.
Angle: 90°
19. Check that the connecting rod has sufficient end float on the big-end bearing journal.

03 - Piston Ring

Introduction	15-109
Remove and Install	15-110

Introduction

Gas sealing inside the piston is achieved by the use of piston rings. The rings are loosely installed into grooves in the piston. The rings are split at a point in the rim, to allow them to press against the cylinder with a light spring pressure.

Two types of ring are used:

- Upper rings have solid faces and provide gas sealing
- Lower rings have narrow edges and have a U-shaped profile, to act as oil scrapers.

Remove and Install

Remove

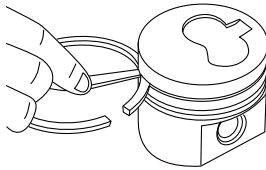
1. Remove the piston rings with the piston ring pliers (AGCO Part number 9052 46900).
2. Do not open the rings more than necessary.

Check Condition

1. Clean the piston ring grooves.
2. Measure the piston ring clearance with a feeler gauge.
 - 2.1. Make sure that the piston ring clearance does not exceed the specified value.

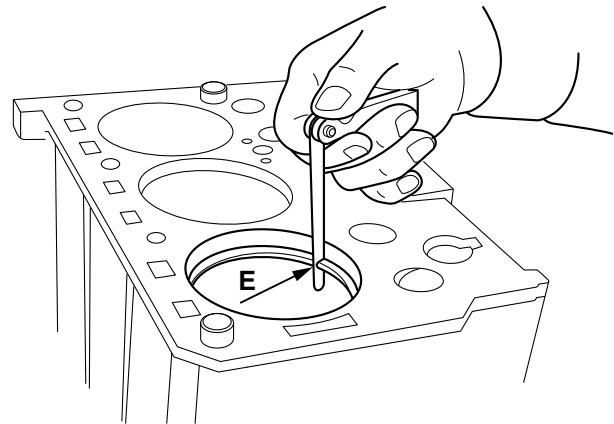
Dimension: 0.15mm

Figure 153.



- 2.2. Determine whether too large a clearance is due to worn rings or a worn groove.
- 2.3. Change any worn parts.
3. Measure the piston ring gap with a feeler gauge.
 - 3.1. Push one piston ring at a time into the cylinder bore.
 - 3.2. Make sure that the piston ring gap does not exceed the rejection value. Refer to Piston, Technical Data (PIL 15-36).

Figure 154.



E Piston ring end gap

Install

1. If the rings are to be used again, make sure that they are installed in the same groove.
2. Install the piston rings on to the piston with the piston ring pliers.
3. Make sure that the TOP or the manufacturer's designation on the piston ring faces upwards.

00 - General

Introduction	15-115
Technical Data	15-116
Component Identification	15-117
Operation	15-118
Check (Condition)	15-119

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.

Technical Data

Table 44. Rocker Arm Data

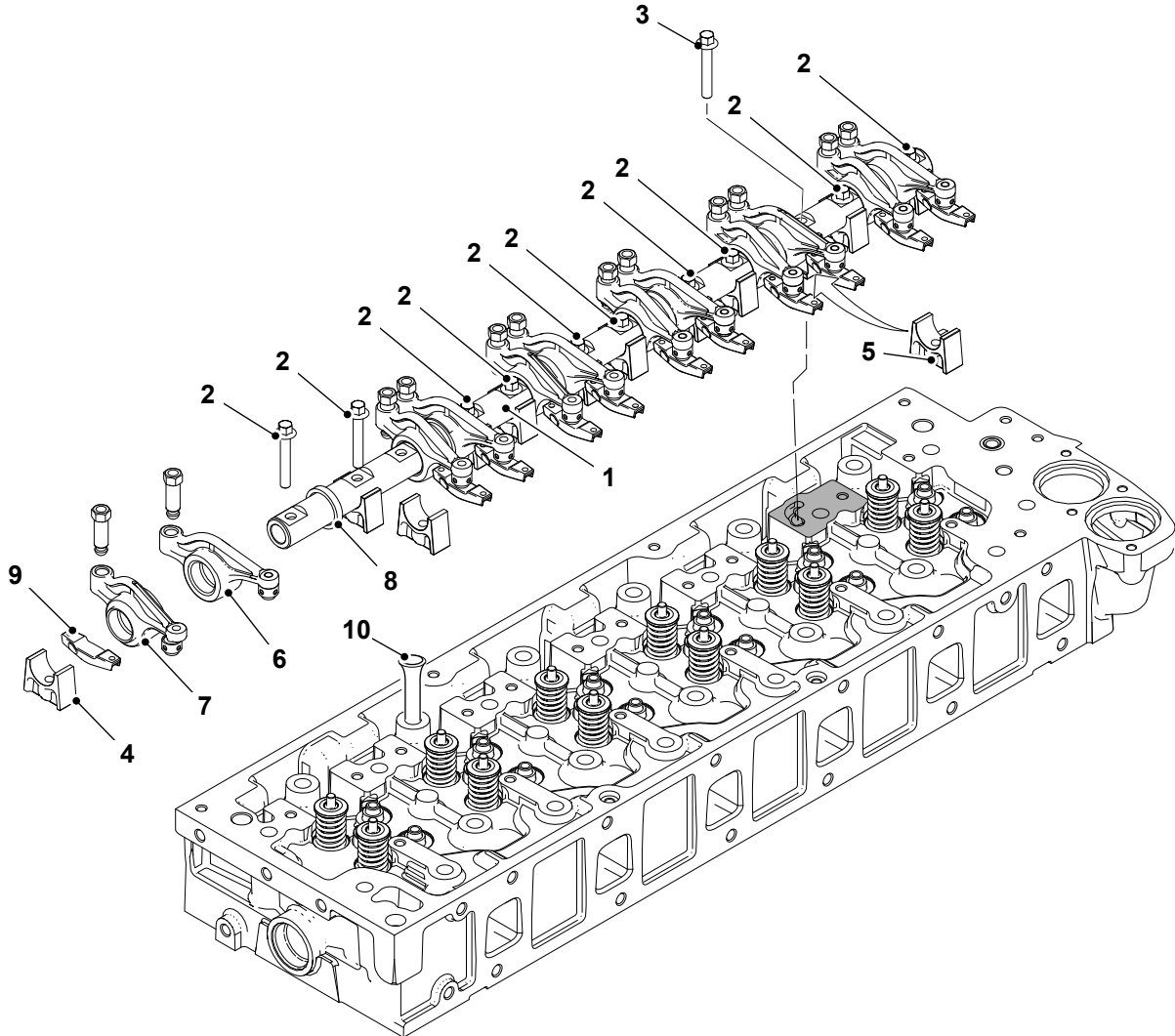
Description	Data
Rocker arm shaft diameter	24.97–24.99mm
Diameter of rocker arm bore	25–25.021mm
Free length of rocker arm spring	88mm
Spring pressure when spring is compressed to a length of 66mm	75–95N

Table 45. Tappet and Push Rod Data

Description	Data
Outside diameter of tappet	29.939–29.96mm
Diameter of tappet bore in crankcase	30–30.043mm
Maximum permissible push rod deflection (when free)	0.4mm
Overall length of push rod	286–287.3mm

Component Identification

Figure 155.



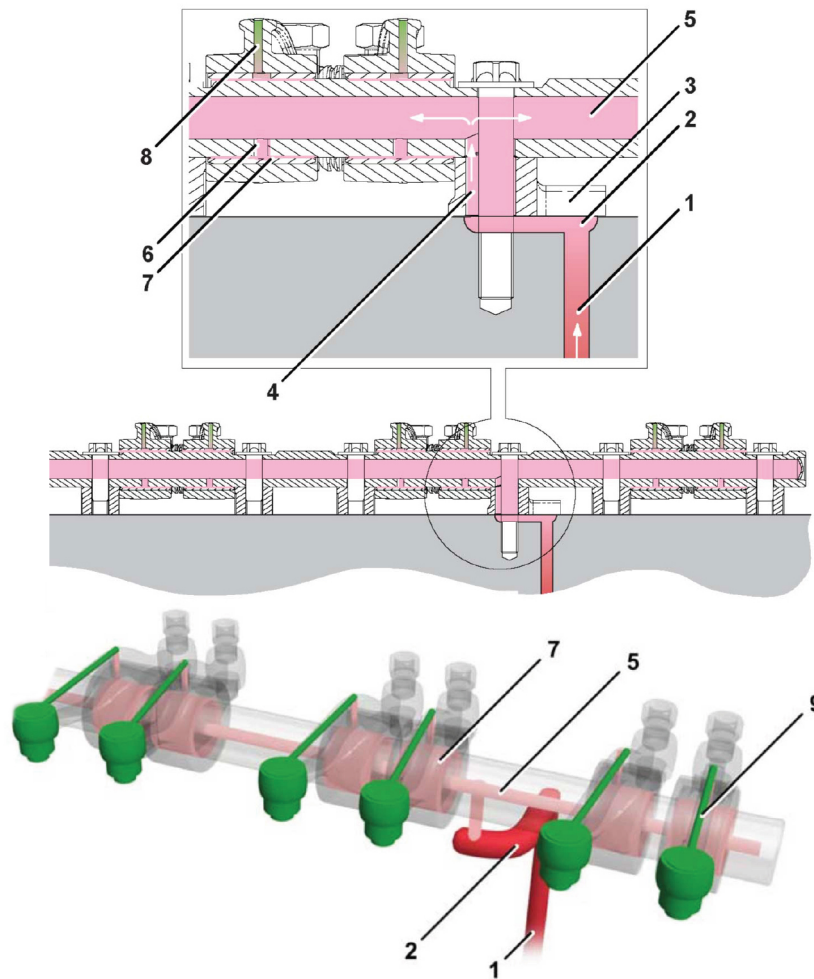
- | | | | |
|---|---|----|---------------------------------|
| 1 | Rocker assembly | 2 | Rocker shaft fixing bolts (x11) |
| 3 | Rocker shaft - oil feed pedestal fixing bolt (x1) | 4 | Pedestals (x11) |
| 5 | Oil feed pedestal (x1) | 6 | Rockers - exhaust (x6) |
| 7 | Rockers - inlet (x6) | 8 | Wave washers (x6) |
| 9 | Bridge pieces (x12) | 10 | Push rods (x12) |

Operation

When the camshaft lobe raises the outside of the rocker arm, the inside presses down on the valve stem to open the valve. When the outside of the

rocker arm is permitted to return due to the camshaft's rotation, the inside rises to allow the valve spring to close the valve.

Figure 156.



- 1 Oil feed from main gallery
- 3 Shaft pedestal
- 5 Centre rocker shaft drilling
- 7 Rocker pivot bushes
- 9 Groove

- 2 Small transfer gallery
- 4 Rocker shaft fixing bolt hole
- 6 Cross drillings
- 8 Cross drilling

Lubrication

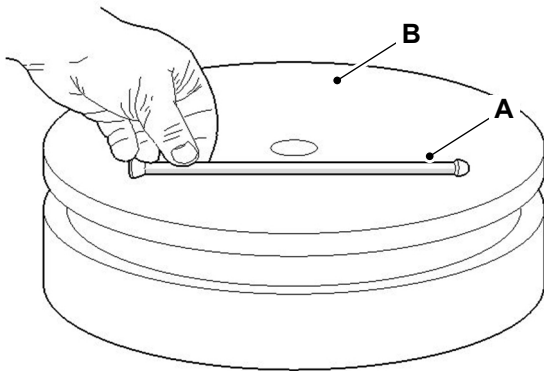
Oil is fed from the main gallery via a drilling which passes up through the crankcase and the cylinder head to a small transfer gallery under the rocker shaft pedestal. The oversized rocker shaft fixing bolt hole allows oil to pass into a drilling in the centre of the rocker shaft. Further cross drillings 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.

Check (Condition)

1. Check the condition of the valve tappets.
2. Check the contact surface of the valve tappets against the camshaft.
3. Discard any worn out or damaged tappets.
4. Roll the push rod on a surface table to check the straightness.

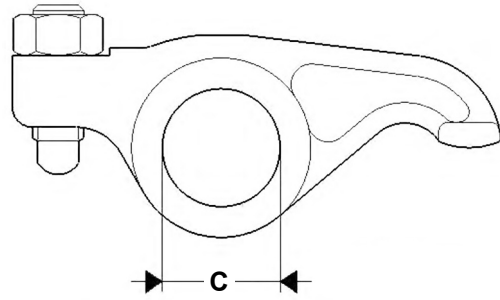
Figure 157.



- A** Push rod
- B** Surface table

5. Check the spherical surfaces at the ends of the push rods.
6. Make a note of the push rod length, they should be within the specified values. Refer to Rocker and Fittings, Technical Data (PIL 15-42).
7. Disassemble the rocker and fittings assembly. Refer to (PIL 15-42).
8. Clean the rocker and fittings assembly. Refer to (PIL 15-42).
9. Check the rocker shaft for wear.
10. Make sure that the oil ways are clean.
11. Make sure that the diameter of the rocker arm bore is within the specified limits.
 Dimension: 25–25.021mm
12. Replace any worn or damaged rocker arms.

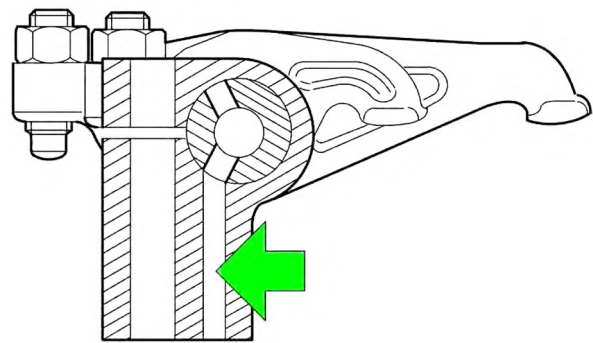
Figure 158.



C Rocker arm bore diameter (25–25.021mm)

13. If necessary, grind the rocker arm valve contact surface to the correct shape.
 - 13.1. Do not grind more than necessary. Make a note that the hardened layer is thin.
14. Install the plug to the other end of the rocker arm shaft.
15. Lubricate the rocker shaft.
16. Assemble the rocker and fittings assembly. Refer to (PIL 15-42).
17. Make a note of the correct position of the rocker shaft and the bearing brackets.
18. Install the plug at the other end.
19. Tighten the plug to the correct torque value.

Figure 159.



20. Install the connecting parts onto the valves in position.

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