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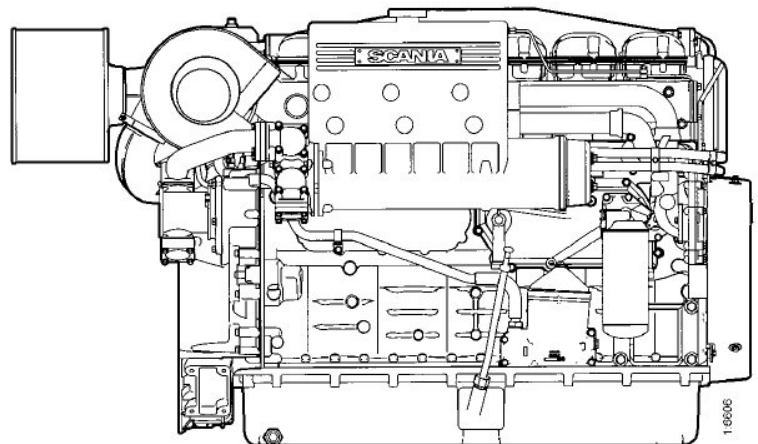
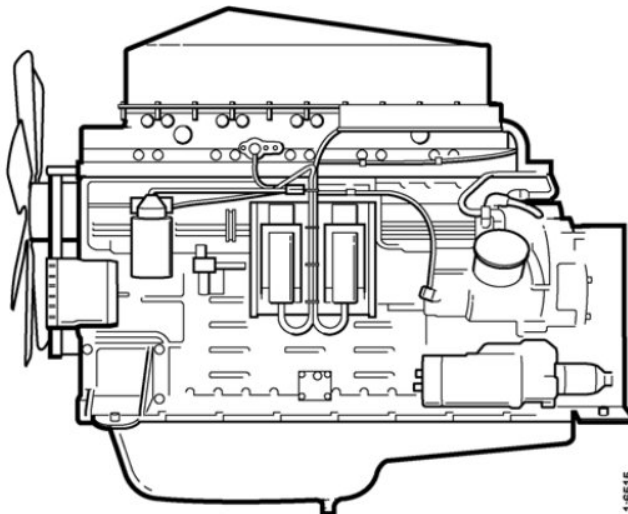


SCANIA
Industrial & Marine Engines

Issue 5 **en**

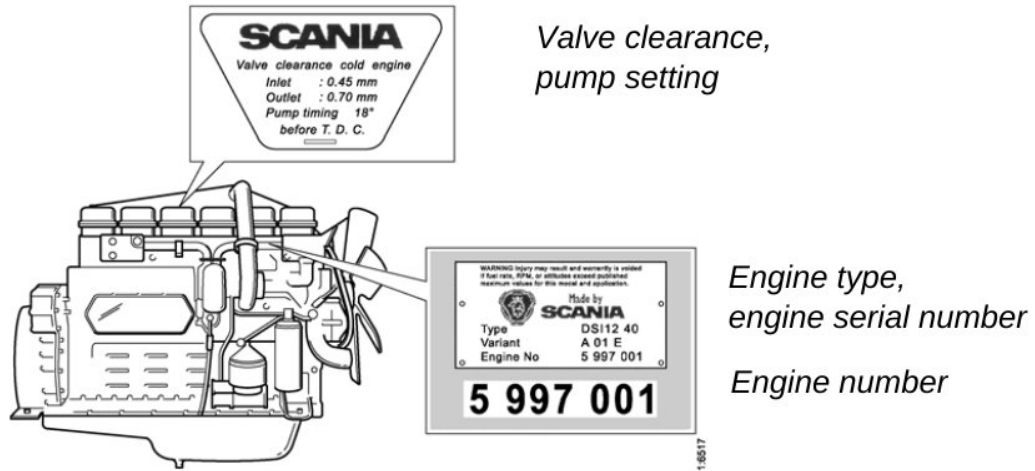
Work Description - 12 Engine

Industrial and Marine Engines



Part no.
1 588 557

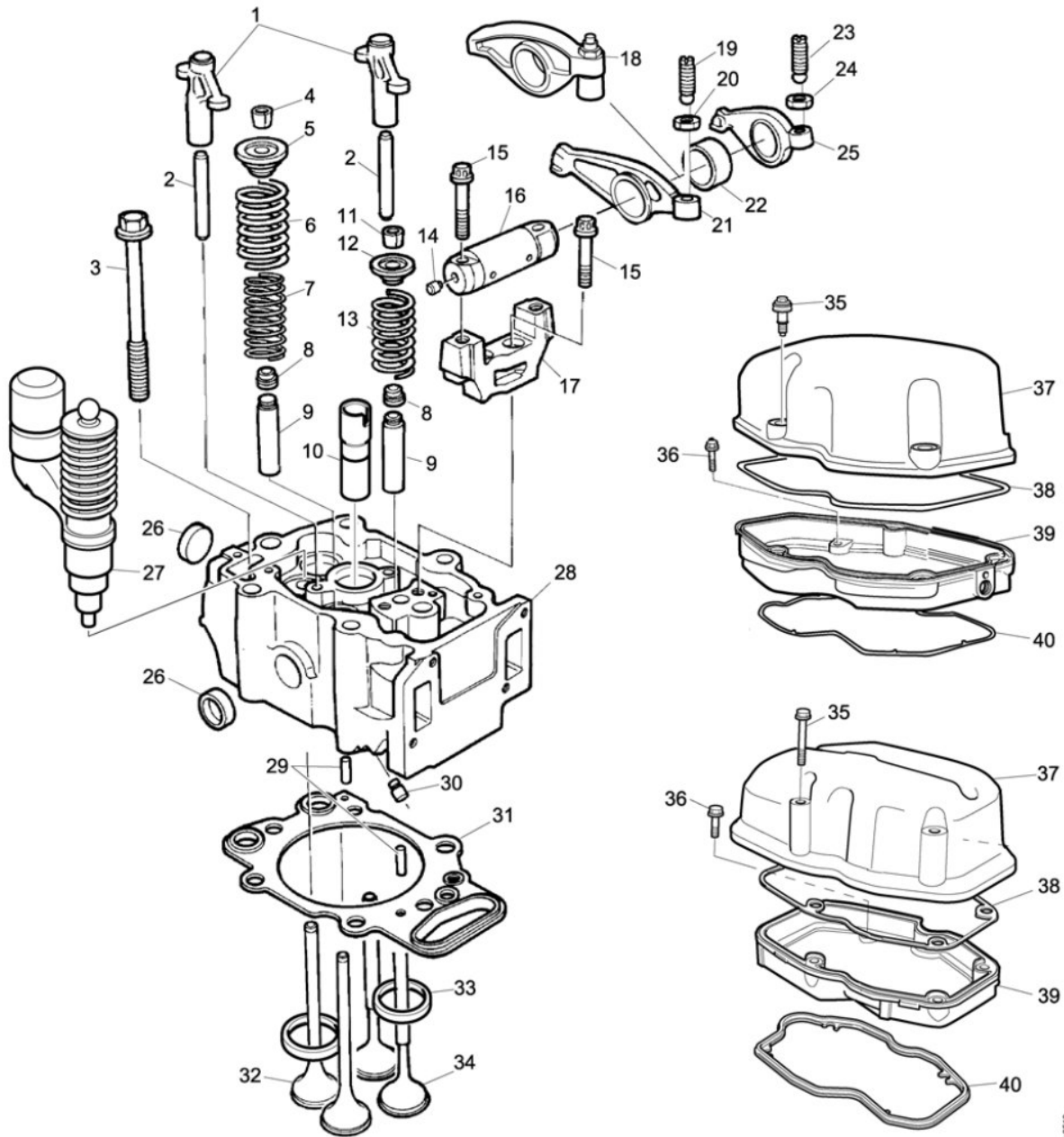
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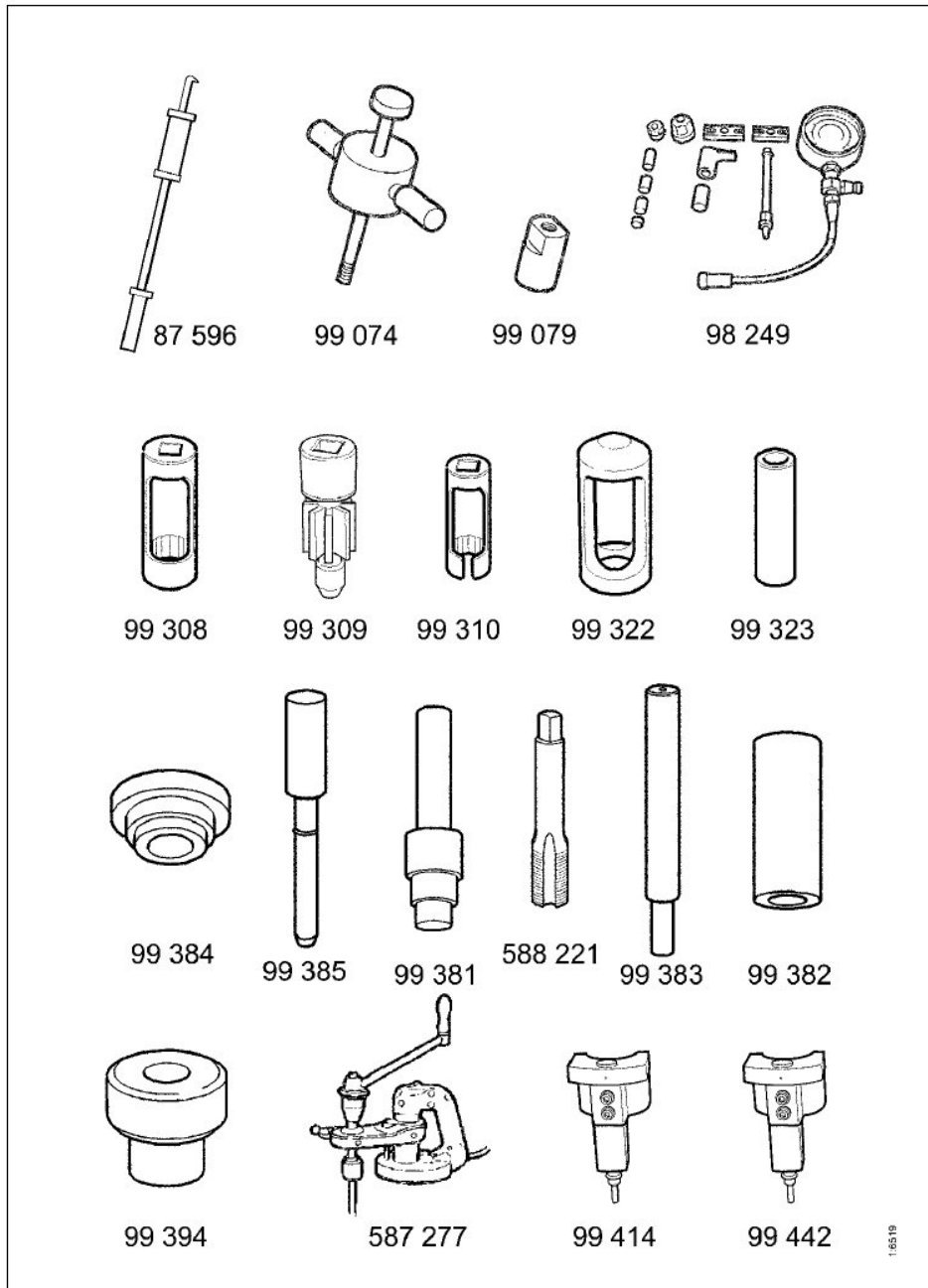
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Cylinder head



- | | | |
|-------------------------|-------------------------------------|---------------------------------|
| 1. Valve bridge | 16. Shaft | 29. Pin |
| 2. Pin | 17. Bearing bracket | 30. Rivet plug |
| 3. Bolt | 18. Rocker arm for unit injector | 31. Gasket |
| 4. Collet | 19. Adjusting screw | 32. Exhaust valve |
| 5. Valve spring collar | 20. Hexagon nut | 33. Valve seat insert |
| 6. Valve spring | 21. Rocker arm | 34. Intake valve |
| 7. Valve spring | 22. Spacing sleeve (injection pump) | 35. Flange bolt |
| 8. Valve stem seal | 23. Adjusting screw | 36. Flange bolt |
| 9. Valve guide | 24. Hexagon nut | 37. Rocker cover, upper section |
| 10. Socket | 25. Rocker arm | 38. Rocker cover gasket |
| 11. Collet | 26. Core plug | 39. Rocker cover, lower section |
| 12. Valve spring collar | 27. Unit injector | 40. Rocker cover gasket |
| 13. Valve spring | 28. Cylinder head | |
| 14. Rivet plug | | |
| 15. Tight-fit screw | | |

Special tools



87 596	Slide hammer	99 381	Drift
98 249	Compression tester	99 382	Drift
99 074	Impact drift	99 383	Drift
99 079	Extractor for injectors	99 384	Drift
99 308	Sleeve for injectors	99 385	Handle
99 309	Tool for turning flywheel	99 394	Guide
99 310	Socket	99 414	Setting tool
99 322	Press drift	99 442	Setting tool
99 323	Assembly drift	587 277	Valve seat cutter
		588 221	Pilot tap

Valve clearances (engines with injection pump)

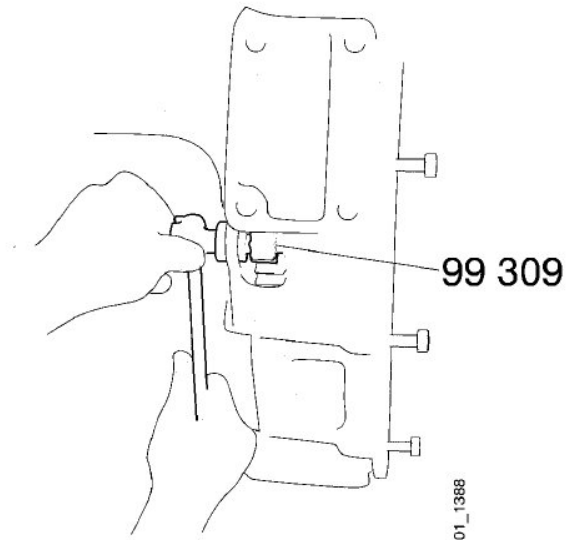
Checks and adjustments

Check the valve clearance. The clearance for intake valves should be 0.45 mm and the clearance for exhaust valves should be 0.70 mm when the engine is cold.

The following alternative methods of adjustment are possible:

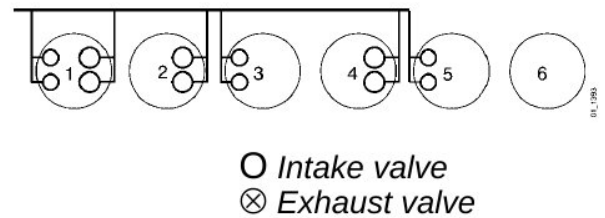
- A. Adjust all four valves for each cylinder when at TDC after compression. Start with cylinder No. 1 and turn the crankshaft 1/3 turn at a time using tool 99 309 in the following injection order:

1-5-3-6-2-4



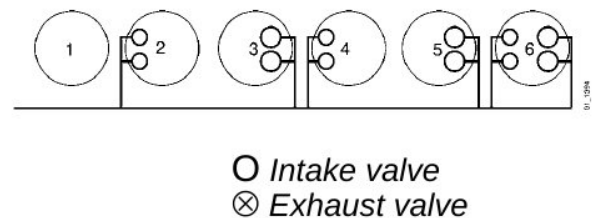
- B. Put cylinder 1 at exact TDC after the compression stroke. The following valves can now be adjusted:

- cyl. 1 intake and exhaust
- cyl. 2 intake
- cyl. 3 exhaust
- cyl. 4 intake
- cyl. 5 exhaust



Turn the crankshaft precisely one revolution so that TDC for No. 6 cylinder is set. The remaining valves can now be adjusted:

- cyl. 2 exhaust
- cyl. 3 intake
- cyl. 4 exhaust
- cyl. 5 intake
- cyl. 6 exhaust and intake

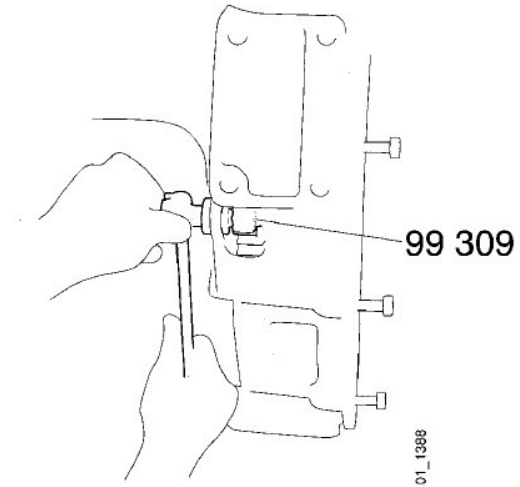


Adjusting the valve clearance and unit injectors (engines with PDE unit injector)

Note: Check and adjust the valve clearance and unit injectors at the same time and with the engine cold.

Checking and adjusting the valve clearance

1. Turn the flywheel with tool 99 309 so that the piston in cylinder No. 1 is at TDC after compression.
2. Check the valve clearance using a feeler gauge and, if necessary, use the adjusting screw on the rocker arm to set the correct clearance. The clearance for intake valves should be 0.45 mm and the clearance for exhaust valves should be 0.70 mm when the engine is cold. The intake valves are actuated by the short rocker arms and the exhaust valves by the long rocker arms. Make sure the valve bridge is resting correctly against the valves.
3. Adjust the unit injector for cylinder No. 5. See Adjusting unit injectors.
4. Rotate the flywheel 1/3 turn at a time using tool 99 309 and repeat steps 1-3 and adjust as per the order of adjustment below.



Order of adjustment for valve clearance:

1-5-3-6-2-4

Order of adjustment for PDE unit injector:

5-3-6-2-4-1

Adjusting unit injectors, PDE31 and PDE32

Important! *The PDE31 unit injector is adjusted using setting tool 99 414 or a digital sliding caliper.*

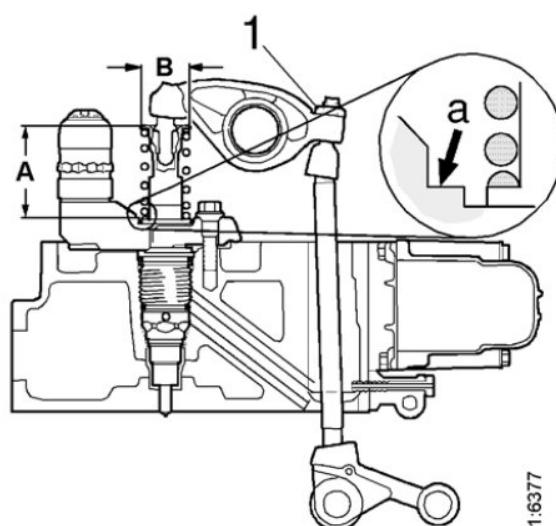
The PDE32 unit injector is adjusted using setting tool 99 442 or a digital sliding caliper.

This adjustment is important because an incorrectly positioned unit injector may result in poor performance and possible breakdown.

Screw on the rocker arm adjusting screw 1 while measuring the distance between plane a and the top of the valve spring collar using a digital sliding caliper.

The dimension should be 66.9 mm for PDE31 and 69.9 mm for PDE32.

See dimension B in the figure for identifying the injector.



Dimension A = PDE31: 66.9 +/- 0.1 mm

PDE32: 69.9 +/- 0.1 mm

Dimension B = PDE31: 36.5 mm

PDE32: 38.8 mm

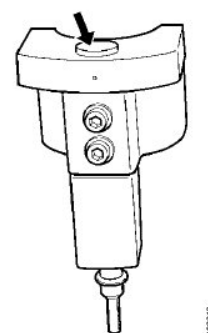
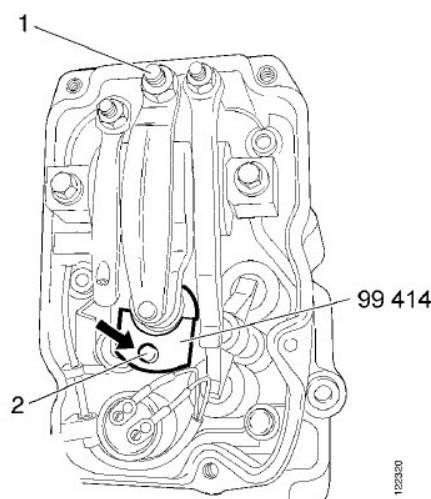
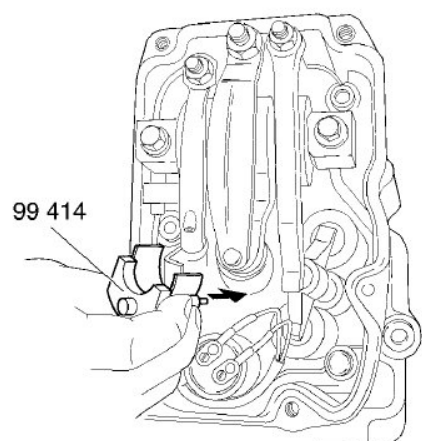


WARNING!

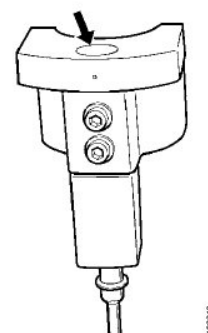
Take care when carrying out the adjustment if the dimension is well outside the adjustment dimension. The spring is pre-tensioned and can cause personal injury if it is released.

PDE31

1. Position setting tool 99 414 with the metal plate around the injector spring.
2. Finely adjust dimension A by simultaneously using a finger to sense that the small piston 2 is level with the flat upper surface of the tool. It is possible to sense differences of less than a tenth of a millimetre.
3. *If tool 99 414 is not available:* Measure the distance between plane a and the top of the valve spring collar using a digital sliding caliper. Adjust the rocker position by means of the adjusting screw until the dimension is 66.9 ± 0.1 mm.
4. Tighten the lock nut to 39 Nm.
5. See *Order of adjustment* on page 6 for checking/adjusting the injector rockers.



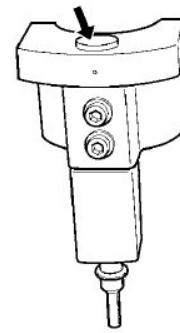
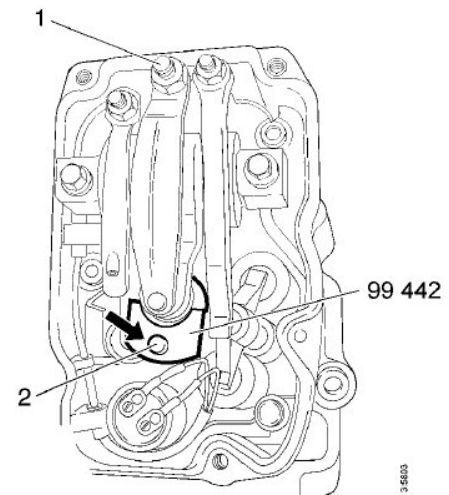
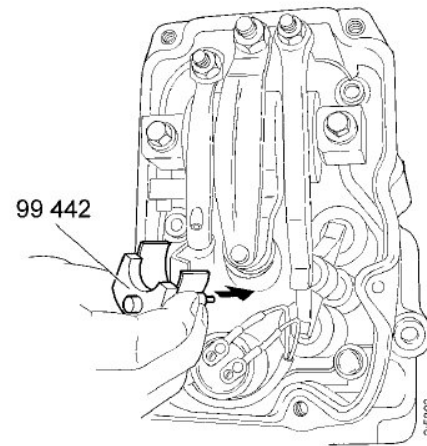
Piston above or below the flat surface. Adjustment necessary.



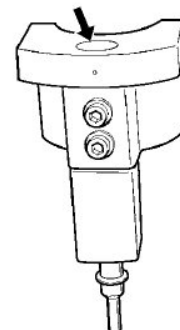
Piston level with the flat surface. Adjustment is correct.

PDE32

1. Position setting tool 99 442 with the metal plate around the injector spring.
2. Finely adjust dimension A by simultaneously using a finger to sense that the small piston 2 is level with the flat upper surface of the tool. It is possible to sense differences of less than a tenth of a millimetre.
3. If tool 99 442 is not available: Measure the distance between plane a and the top of the valve spring collar using a digital sliding caliper. Adjust the rocker position by means of the adjusting screw until the dimension is 69.9 ± 0.1 mm.
4. Tighten the lock nut to 39 Nm.
5. See *Order of adjustment* on page 6 for checking/adjusting the injector rockers.



Piston above or below the flat surface. Adjustment necessary.



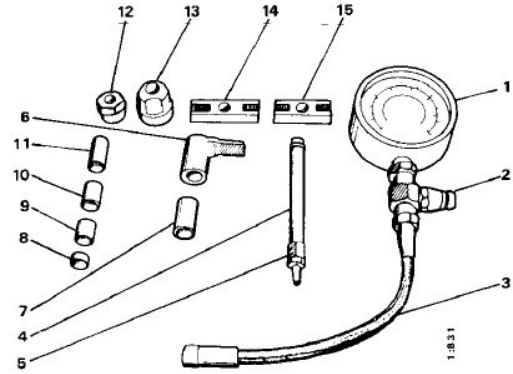
Piston level with the flat surface. Adjustment is correct.

Compression

Measuring

The compression tester is used to quickly and simply check wear and damage to primarily the cylinder head valves, but also to cylinder liners and piston rings.

The results are only intended for comparison between the cylinders. Lower compression in one or more of the cylinders is a sign of abnormal wear or damage.



Compression tester 98 249

The compression tester may be used on many engine types by using various accessories.

Important! The battery must have an adequate voltage level in order to carry out a reliable compression test.

1. Cut off the supply of fuel by disconnecting the power source.
2. Clean around the injectors. Detach the delivery pipes to all injectors using tool 99 310.

1. Manometer
2. Reset valve
3. Flexible metal hose
4. Gauge rod
5. End sleeve diameter 21 mm
6. Spacing sleeve with support lug
7. Spacing sleeve with shoulder
8. Spacing sleeve, length 6 mm
9. Spacing sleeve, length 19 mm
10. Spacing sleeve, length 25 mm
11. Spacing sleeve, length 38 mm
12. Cap nut
13. Threaded socket nut
14. Large yoke
15. Small yoke

Note: Fit protection caps on the delivery valve holders in the injection pump and on the injectors to protect them from dirt.

3. Remove the rocker covers.
4. Undo and remove the injectors and copper washers.
5. Turn the engine over several times using the starter motor to remove any loose soot in the cylinders.