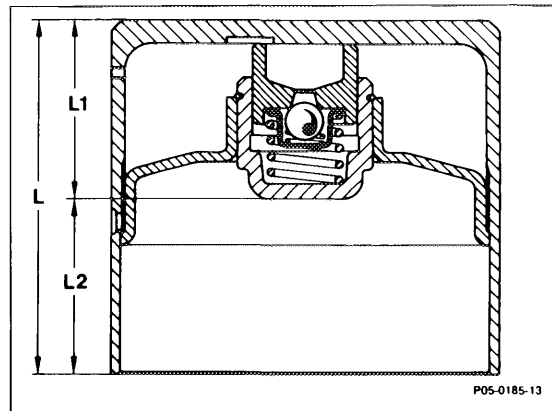
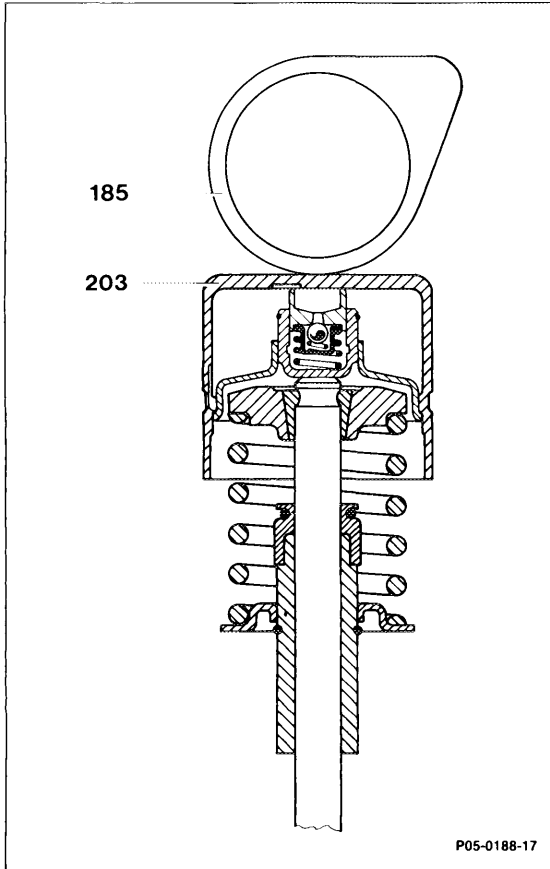


05-211 Checking and renewal of hydraulic valve clearance compensating elements



Engine
 Engine oil level

bring to operating temperature (80°C).
 check.

Turbo engine:

Charge air pipe
 Cylinder head cover
 Valve tappet (203)

remove, install.
 remove, install, 10 Nm.
 check with a mandrel, to do this first check on the cylinder which is exactly on ignition TDC (cam tips for inlet and exhaust valve point upwards).

Caution!

Unnecessary rotation of the engine causes the valve clearance compensating elements to sink.

A valve clearance compensating element must only be removed when an air gap >0.4 mm is established between cam and element. The engine must not be turned by the camshaft timing gear bolt.

If the valve tappet sinks quicker than the others, measure pre-stroke.

Pre-stroke measure, reference value: 0.25 - 2.0 mm
(Numbers 6 - 10).

With excessive pre-stroke:

Valve tappet (203) remove, install in the same position again, magnetic lifter 102 589 02 61 00.

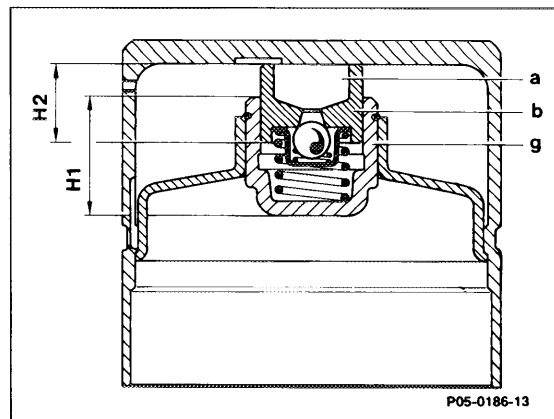
Dimension L1 determine. The dimension L1 is the difference between the dimensions L and L2. Reference value 18 - 19 mm (Number 12 - 14).

Parts of the valve tappet clean. The valve tappet must be replaced if oil loss cannot be eliminated.

Data	1st Design	2nd Design from 08/84	3rd Design from 01/90
Plunger "b" dimension H 2 (mm)	8.0	8.6	9.1
Guide sleeve "g" dimens. H 1 (mm)	12.5	13.2	13.2

Note

Hydraulic valve clearance compensating elements have been fitted with a larger oil reservoir chamber since the start of production on engines 602 and 603.

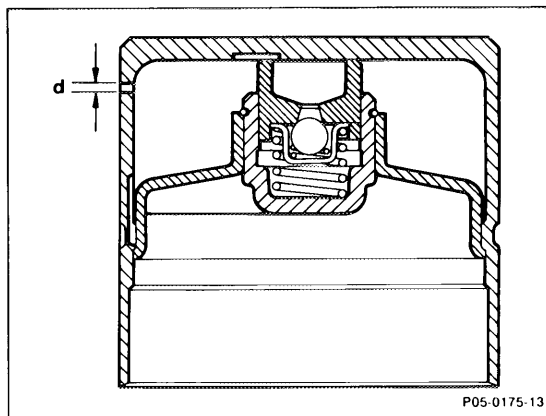


a Storage chamber

Break date: 08/84

Model	Engine	Engine end No.		Vehicle identification end No.	
		Manual transmission	Automatic transmission	A	F
201.122	601.921	001712	004503	104388	028653

From 09/87 valve tappets have been installed with a ventilation bore (d = 0.2 mm), in order to prevent tappet rattle during short distance operation.



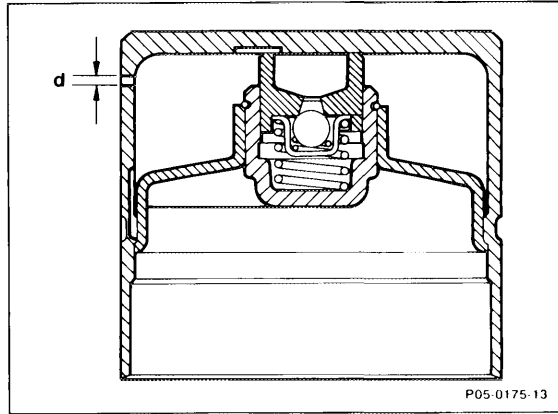
- a Reservoir chamber
- b Plunger
- c Working chamber

Production breakpoint: 09/87

Model	Engine	Engine end No.		Vehicle identification end No.	
		Manual transmission	Automatic transmission	A	F
124.133 124.193	603.960	–	013998	*	*
124.133	603.960	–	000433	*	*
201.126	602.911	050700	011065	*	*
201.128	602.961	–	001542	*	*

* not recorded

From 01/90 revised valve clearance compensating elements have been installed. These compensating elements have a reduced residual stroke, i.e. the stroke of the plunger (b) and the working chamber (c) have been reduced and the reservoir chamber (a) enlarged. Less oil is needed in the working chamber due to the reduced stroke. Therefore the working chamber fills up more quickly after initial engine starting.



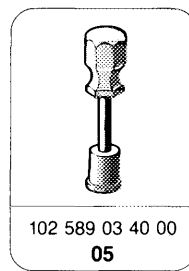
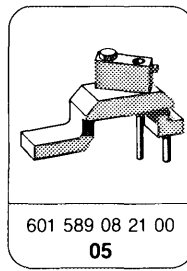
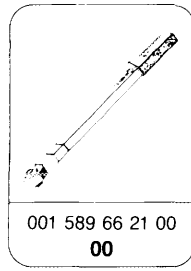
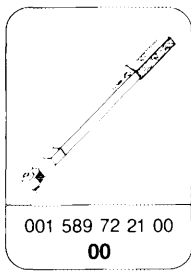
Production breakpoint: 01/90

Model	Engine	Engine end No.		Vehicle identification end No.	
		Manual transmission	Automatic transmission	A	F
124.128	602.962	001938	004158	*	*
124.133 124.193	603.960	-	025508	*	*
126.135	603.970	-	000057	*	*
201.126	602.911	Q87710	017102	*	*
201.128	602.961	001314	007602	*	*

* not recorded

Tightening torque	Nm
Hexagon bolts for cylinder head cover	10

Special tools



Conventional tool

Dial gauge

e. g. Mahr
D-7300 Esslingen
Part No. 810

Checking

- 1 Run engine to operating temperature (80°C).
- 2 Check engine oil level, making absolutely sure it is not overfilled.

Turbo engine:

- 3 Remove charge air pipe.
- 4 Remove cylinder head cover.

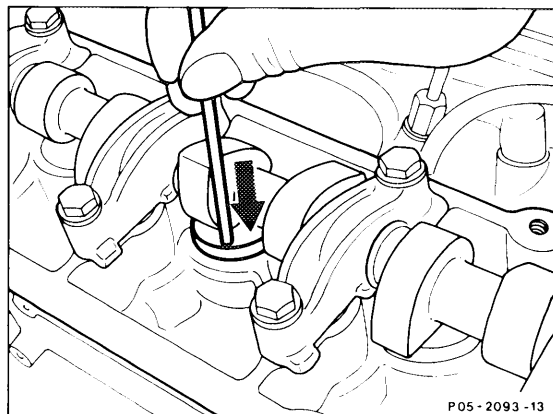
Caution!

Turning the engine unnecessarily causes valve play compensating elements to sink.
The engine must not be turned by the camshaft timing gear bolt.

- 5 First check the cylinder which is exactly on TDC. (Cam tips for inlet and outlet valves point upwards).

6 In order to check with a mandrel press lightly on the valve clearance compensating element and thus check the clearance. Continue turning the engine until the next cylinder in the firing order can be checked.

A valve clearance compensating element must only be replaced when a clearance of >0.4 mm is established between cam and element. If the valve tappet sinks quicker than the others, or has play at the cam base circle, the pre-stroke of the valve tappet must be measured.



Measuring pre-stroke

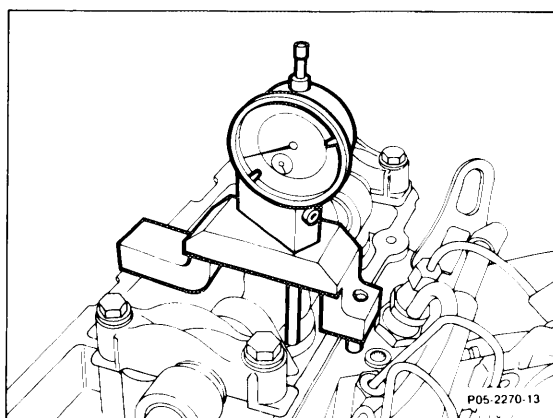
7 The basic setting of the dial gauge has to be undertaken before measurement. To do this insert the dial gauge in the measuring bridge 601 589 08 21 00 and push in until there is a preload of approx. 1 mm. The probe in the measuring bridge must be in the basic position (lower stop).

The basic setting must not be changed during measurement.

8 In order to measure and note dimension "X" (cylinder head mating surface to valve tappet), put measuring bridge on the cylinder head mating surface over the valve tappet.

Note

If required, measure dimension "X" on all valve tappets.



9 Remove camshaft (05-220).

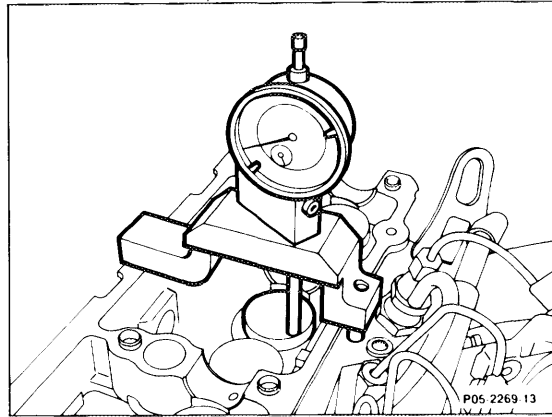
10 Measure dimension "Y" (cylinder head mating surface to valve tappet).

The difference between the dimension "X" and "Y" is the pre-stroke of the valve tappet.

Reference value: 0.25 – 2.0 mm.

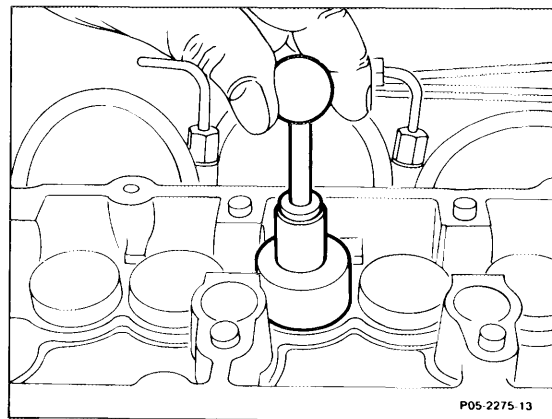
Example:

No. 1 Cylinder	A (exhaust)	E (Inlet)
Dimension "Y" mm	2.82	2.98
Dimension "X" mm	1.95	1.92
Pre-stroke mm	0.87	1.06



11 If the valve tappet sinks too quickly or if the dimension differs from the reference value, lift out valve tappet with the magnetic lifter 102 589 03 40 00.

Note location of valve tappet.

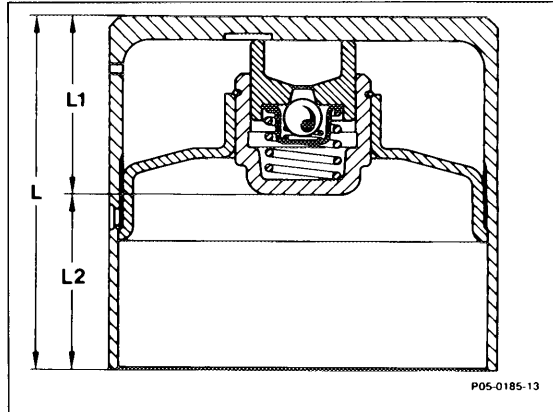


- 12 Measure dimension "L" on valve tappet.
- 13 Measure dimension "L2" on valve tappet.

The dimension L1 is the difference between L and L2.

Reference value: 18 – 19 mm.

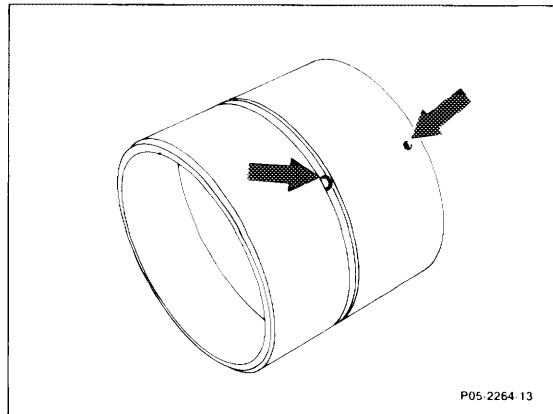
- 14 If the dimension "L1" is outside the reference value remove guide sleeve. To do this pull out guide sleeve out of the valve tappet with rotary movements using pliers. Do not damage guide sleeve.



- 15 Pull plunger out of the guide sleeve and remove compression spring.

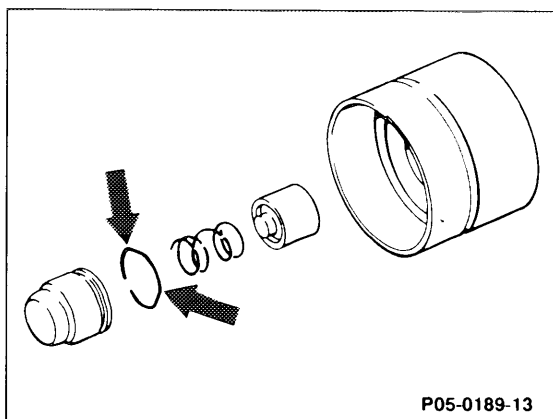
- 16 Blow through all individual parts with compressed air.

Blow air through valve tappet at the oil supply bore and ventilation bore (arrows).



- 17 Remove snap ring from the guide sleeves and pinch slightly at the edges (arrows) and reassemble on the guide sleeve.

- 18 Install guide sleeve, compression spring and plunger in sequence.



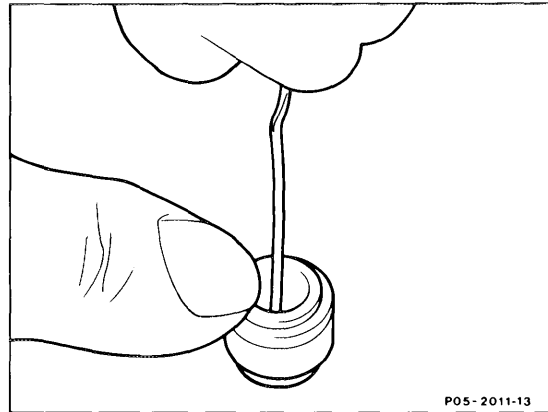
19 Fill plunger with engine oil. Press off ball valve with a suitable pin and then ventilate the working chamber by pumping the plunger, close ball valve and possibly replenish oil. Then no oil should escape from the ball valve when it is gently compressed.

Note

If oil escapes, renew valve tappet.

20 Fill valve tappet with engine oil and insert vented plunger with guide sleeve into the valve tappet.

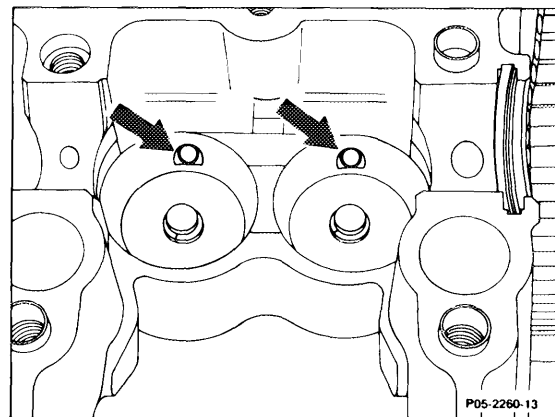
Fit guide sleeve into valve tappet until the snap ring engages, press in, if necessary.



21 Re-check dimension "L1".

22 Check oil supply to cylinder head. To do this unscrew sealing plug of the oil channel in cylinder head.

Blow compressed air into the oil channel, while checking exit bores (arrows) at the seat for the valve tappet for air.



23 Lubricate valve tappet and install in the same position, noting sequence.

24 Install camshafts (05-220).

25 Install cylinder head cover, 10 Nm.

Turbo engine:

26 Install charge air pipe.