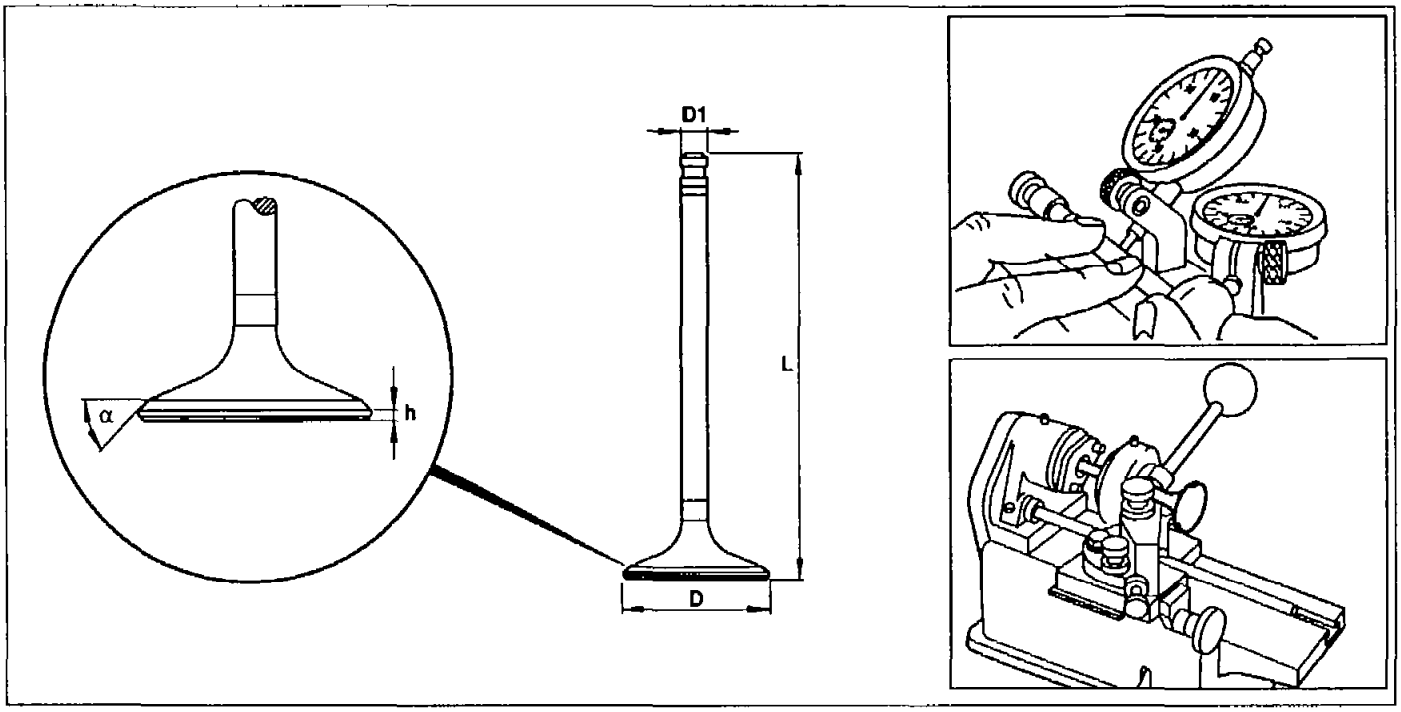
ENGINE 601, 602, 603 (except , 602.982)



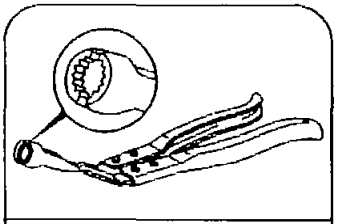
P01.30-0310-09

	Removing, installing		
1	Remove cylinder head		AR01.30-P-5800HX
2	Remove valve springs and valve stem seals		AR05.30-D-3510-02A **AR05.30-P-4201HW/4**
		603 589 01 40 00	
		111 589 25 61 00	
		601 589 01 59 00	
		606 589 00 37 00	
3	Remove valves		
	Inspecting		
4	Clean valves and carry out a visual inspection	Replace valves with scorched valve disc, with insufficient height (h) of valve disc or with used or scored valve stem.	BE05.30-P-1002-01D
5	Measure concentricity at valve stem and valve seat	Replace valve, if necessary.	BE05.30-P-1009-01D
Danger!	**Risk of explosion and poisoning** from sodium-filled valves melting or from improper handling. **Risk of injury** from burns and caustic injuries to areas of the skin from contact with sodium.	Do not open valves filled with sodium; if valves are damaged, wear protective gloves and eye protection if necessary.	AS05.30-Z-0001-01A **AR05.30-P-4201HW/7**
OS	Dispose of sodium-filled valves	exhaust valves with sodium filling	OS05.30-P-0001-01A **AR05.30-P-4201HW/8** BE05.30-P-1006-01D
	Machining		

6	Maching valve seat	 [i] Pay attention to operating instructions of machining equipment and setting angle.	WH58.30-Z-1022-05A BE05.30-P-1008-01D BE05.30-P-1003-01D BE05.30-P-1002-01D BE05.30-P-1001-01D BE05.30-P-1004-01D BE05.30-P-1005-01D BE05.30-P-1006-01D BE05.30-P-1007-01D
7	Once again measure runout at valve stem and valve seat	[i] If runout excessive or height (h) insufficient, replace valve.	BE05.30-P-1009-01D
8	Measure valve setback to cylinder head	see machining cylinder head contact surface, if necessary ↓ Machine valve seat rings	01-418 05-291
9	Insert valve and inspect for leaks		WH58.30-Z-1021-05A
10	Install in the reverse order		

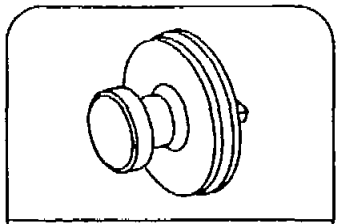
Test data of valves

Number	Designation			Engine 601, 602.91, 603.91	Engine 602.96, 603.96
BE05.30-P-1001-01D	Valve disc Ø (D)	Exhaust	mm	34.90–35.10	34.90–35.10
		Inlet	mm	37.90–38.10	37.90–38.10
		Fig. see		AR05.30-P-4201HW	AR05.30-P-4201HW
BE05.30-P-1002-01D	Valve disc height (h)	Exhaust when new	mm	1.75–2.05	1.75–2.05
		Exhaust limit value	mm	1.6	1.6
		Inlet when new	mm	1.75–2.05	1.75–2.05
		Inlet limit value	mm	1.6	1.6
		Fig. see		AR05.30-P-4201HW	AR05.30-P-4201HW
BE05.30-P-1003-01D	Valve seat angle (α)	Exhaust	°∡	45° + 15'	45° + 15'
		Inlet	°∡	45° + 15'	45° + 15'
		Fig. see		AR05.30-P-4201HW	AR05.30-P-4201HW
BE05.30-P-1004-01D	Valve stem Ø (D 1)	Exhaust	mm	8.945–8.960	8.945–8.960
		Inlet	mm	7.955–7.970	7.955–7.970
		Fig. see		AR05.30-P-4201HW	AR05.30-P-4201HW
BE05.30-P-1005-01D	Valve seat plating without ⇒ 1 wth ⇒ 2	Exhaust		2	2
		Inlet		2	2
BE05.30-P-1006-01D	Sodium filling without ⇒ 1 with ⇒ 2	Exhaust		1	2
		Inlet		1	2
BE05.30-P-1007-01D	Valve length (L)	Exhaust standard	mm	106.4	106.4
		Exhaust repair	mm	105.5	105.5
		Inlet standard	mm	106.4	106.4
		Inlet repair	mm	105.5	105.5
		Fig. see		AR05.30-P-4201HW	AR05.30-P-4201HW
BE05.30-P-1008-01D	Valve seat width	Exhaust	mm	2	2
		Inlet	mm	2	2
BE05.30-P-1009-01D	Concentricity of valve seat to valve stem	Exhaust	mm	≤0.03	≤0.03
		Inlet	mm	≤0.03	≤0.03
BE05.30-P-1010-01D	Marking at stem end	Exhaust		A 601 05	E 601 15 or E 601 17
		Inlet		E 601 02	A 601 19 or A 601 23



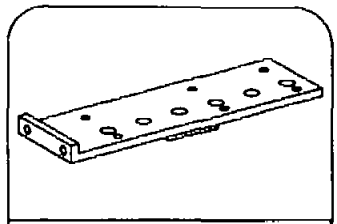
606 589 00 37 00

Pliers



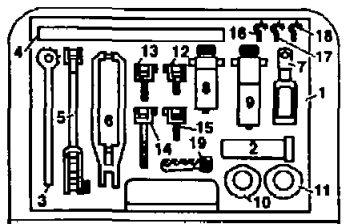
603 589 01 40 00

Retaining lock



601 589 01 59 00

Assembly board



111 589 25 61 00

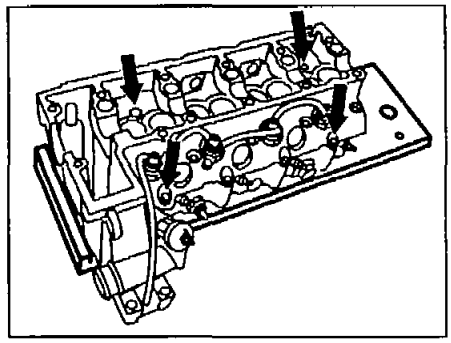
Valve assembly tools case

Commercially available tools (see Workshop Equipment Manual)

Number	Designation	Make (e.g.)	Order number
WH58.30-Z-1021-05A	Vacuum tester	Serdi GmbH Bregenzer Str. 69 D-88131 Lindau	SL1009
WH58.30-Z-1022-05A	Valve grinding machine	Modell VKM1A Firma Hunger D-81309 München 70	231 00 001 231 00 002

AR05.30-D-3510-02A	*Removing and installing valve springs and valve stem seals*	601 589 01 59 00 Assembly board 603 589 01 40 00 Holding wheel 606 589 00 37 00 Pliers 111 589 25 61 00 Case for valve installation tools	

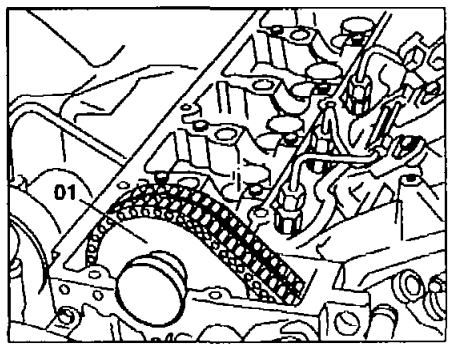
1.1 If cylinder head removed:
Bolt cylinder head to assembly board 601 589 01 59 00 with four cylinder head bolts (arrows).



P05.00-0024-01

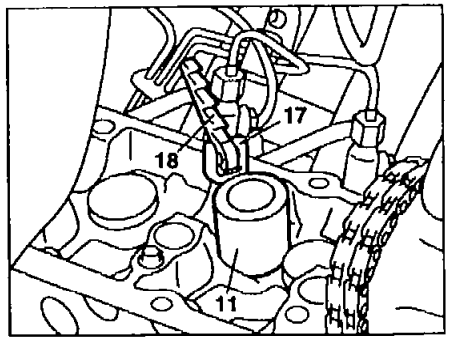
i Only if cylinder head removed.

1.2 If cylinder head installed: insert retaining wheel (01).



P05.20-0342-01

2 Insert matching guide bush (11) into bucket tappet bore, screw detent with pivot bearing with suitable retaining fork (17) into thread of camshaft bearing cap and align.



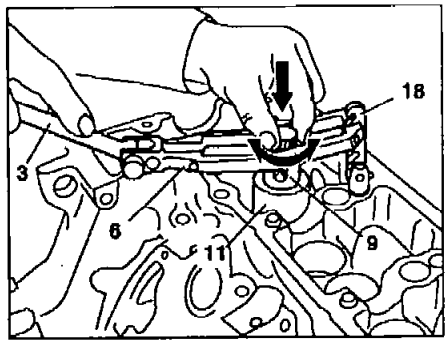
D05.30-0008-01

Ⓑ Do not use the threads of the cylinder head cover as the cylinder head cover is attached with self-tapping bolts.

3 Assemble thrust fork (6) with lever handle (3).

4 Insert assembly cartridge (9) into the guide bush (11). Attach thrust fork (6) to the mating bearing (18) and position at the mounting pins of the assembly cartridge (9).

5 Apply slight pressure to thrust fork (6) and to knurled screw and at the same time slowly rotate the knurled screw of the assembly cartridge (9) (arrow) until the inner locating drift with its tips is felt to engage between the valve collets.

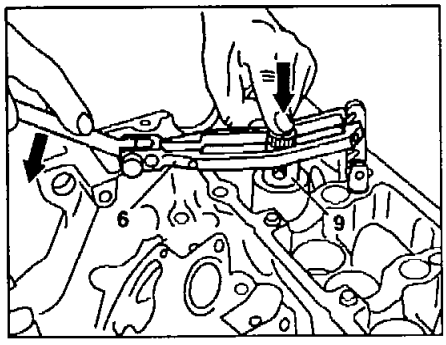


D05.30-0060-01

6 Apply slight pressure with your thumb to the knurled screw of the assembly cartridge (9) and press thrust fork (6) down as far as the stop (use extension if necessary). The valve collets are removed automatically.

7 Slacken thrust fork (6) and take off.

8 Take out assembly cartridge (9) with the removed valve collets.

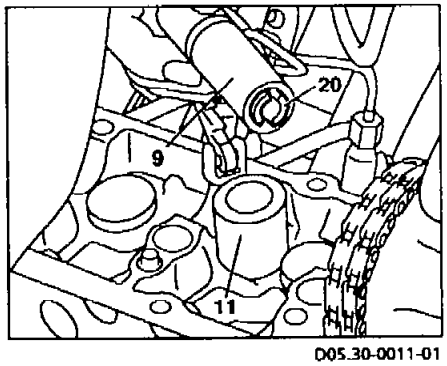


D05.30-0061-01

ⓘ The valve collets can remain in the assembly cartridge until installed but all the valve springs or valves should be removed, e.g. if cylinder head removed it is then possible to take the valve collets out of the assembly cartridge by pulling out the knurled screw.

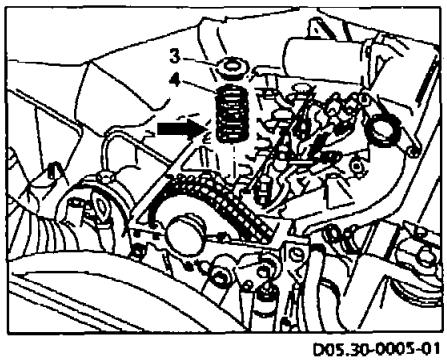
9 Check whether the valve collets are in the assembly cartridge (9) and repeat steps 4 to 7, if necessary.

10 Take out guide bush (11).



D05.30-0011-01

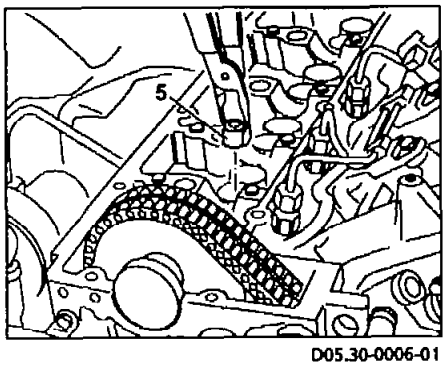
11 Remove top valve spring retainer (3) and valve spring (4).



D05.30-0005-01

12 Use [Y] pliers to pull valve stem seal (5) off the valve stem.

13 Take out bottom valve spring retainer, inspect for pitting, replace if necessary and re-insert. Inspect valve stem for pitting, remove if necessary.

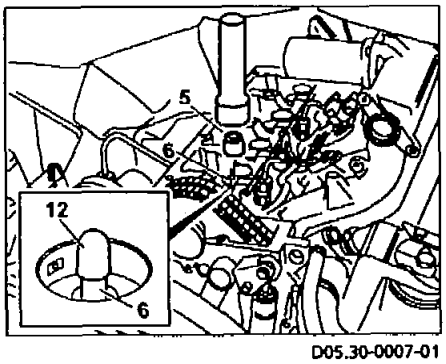


D05.30-0006-01

14 Fit protective cap (12) (contained in parts supplied) onto the valve stem (6) and oil well.

15 Insert new valve stem seal (5) into assembly drift and press onto valve stem (6) as far as the stop.

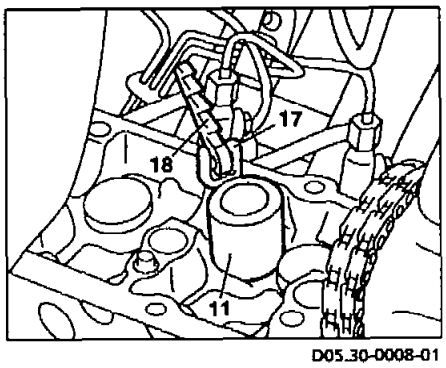
16 Take off protective cap (12).



D05.30-0007-01

17 Insert valve spring and top valve spring retainer.

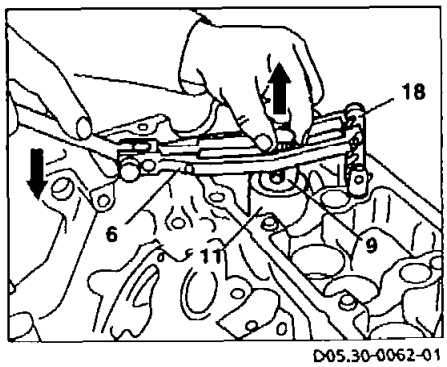
18 Insert guide bush (11) into the cylinder head.



D05.30-0008-01

19 Insert assembly cartridge (9) with valve collets inside into the guide bush (11), attach thrust fork (6) to mating bearing (18) and position with slight pressure onto the two mounting bolts of the assembly cartridge (9).

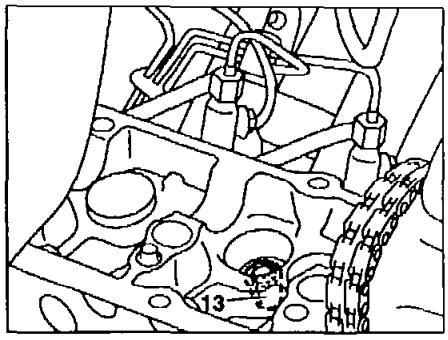
20 Press down thrust fork (6) (arrow). Pull the knurled screw of the assembly cartridge (9) up (arrow), this releases the pressure on the thrust fork (the valve collets are thus installed).



D05.30-0062-01

21 Check whether the valve collets (9) are correctly inserted; repeat steps 2 to 8 and 17 to 19, if necessary.

22 Detach all the special tools from the cylinder head.



D05.30-0013-01

AS05.30-Z-0001-01A	**Risk of explosion and of poisoning** from sodium-filled valves melting or being improperly handles. Risk of injury from burns and caustic injuries as a result of contact with sodium.	Do open valves filled with sodium. If necessary, wear protective gloves and eye protection.	⚠ **Danger!**
OS	Disposing of sodium-filled valves	Exhaust valves with sodium filling	OS05.30-P-0001-01A

Possible dangers

Risk of explosion
An explosion may result when sodium-filled valves are melted. Sodium has a very low self-ignition temperature (121 °C) and may ignite spontaneously if it comes into contact with moist air.
A fire may break out as a result of moisture in scrap containers if the valves are not disposed of properly.

Risk of poisoning
Inhaling poisonouy vapors results in severe irritations, respiratory problems, headaches, nausea and vomiting.

Risk of injury
Sodium which flows out may react violently and explode if it comes into contact with moist body tissue (perspiration or tears) and if heat produced as a result. This can cause irritations and burns to the skin, damage to the cornea of the eyes with the risk of blindness.

Protective measures / rules of conduct
- Keep sources of water, heat and ignition away from sodium.
- Wear suitable protective gloves and, as necessary, eye protection when handling damaged sodium-filled valves.
- Valves which are filled with sodium must not be machined.
- Do not open sodium-filled valves.
- Pay attention to any additional national safety precautions and regulations.

First-aid measures
Contact with skin and eyes
- Remove sodium and treat the injured point with an oily solution, e.g. Biseptol, and consult a doctor.

Swallowing
- Do not give the person concerned anything to drink. Contact a doctor.

Inhalation of vapors
- Remove the persons affected from the area of risk.
- If the person is vomiting, provide respiration with oxygen.
- If the respiratory system has failed, start artificial respiration and contact a doctor.

OS05.30-P-0001-01A	Disposing of sodium-filled valves	in the case of exhaust valves with sodium filling	OS

Collecting and storing
Sodium-filled valves have to be inspected for leaks and neutralized, if any leaks exist. Neutralization should be carried out in a vessel in the open containing a 2:1 mixture of methylated spirits and water. After this, the cleaned valves can be collected together with other scrap parts in a closed demountable waste container for scrap.

Disposal
Valves are disposed of through the scrap trade.
No disposal record, consignment or handling documents or other disposal documents are necessary.

Legal right to information
Please contact the competent local or national authorities to obtain information regarding available waste disposal facilities.

Disposal of larger quantities of leaktight valves through:
Mercedes-Benz AG
Werk Marienfelde
Daimlerstraße 145
Anlieferstelle KST 3153
Arbeitsvorbereitung TAI