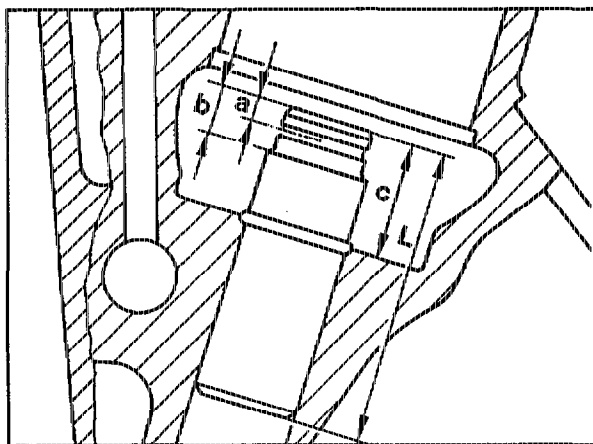


05-2850 Replacing valve guides

Preceding work:

Valve guides inspected (05-2845).

A. Non-ferrous metal valve guides, engine 104.980/981 (1st and 2nd version) and engine 104.990 (1st version)

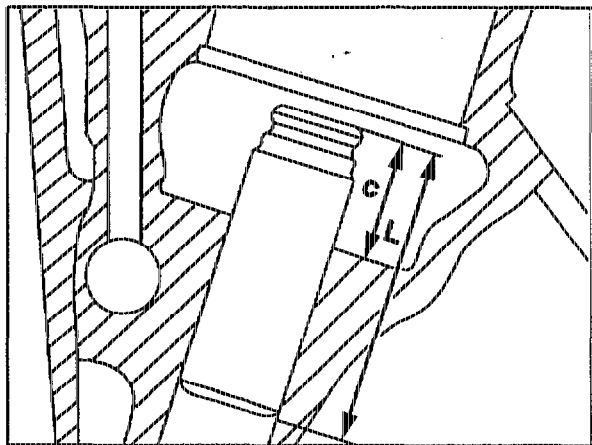


P05-5372-13

Valve guides and basic bores

	Standard size	Standard size I	Repair size I
Basic bore in cylinder head	13.50 – 13.51	13.53	13.70
Valve guide outer \varnothing and color coding	13.52 – 13.53	13.54 – 13.55 grey – brown	13.71 – 13.72 red
Overlap		0.012 – 0.031	
	Inlet		Exhaust
Valve guides 1st version inner \varnothing	8.000 – 8.015		9.000 – 9.015
Valve guides 2nd version inner \varnothing	7.000 – 7.015		8.000 – 8.015
Length (L)	35.5		37.9
Dim. (c)	10.8 – 11.2		8.2 – 8.6

**B. Sintered metal valve guides engine 104.980/981 (3rd version)
engine 104.990 (2nd version) engines 104.940/941/942/943/944/945/
992/994/995/996 as of start of production**



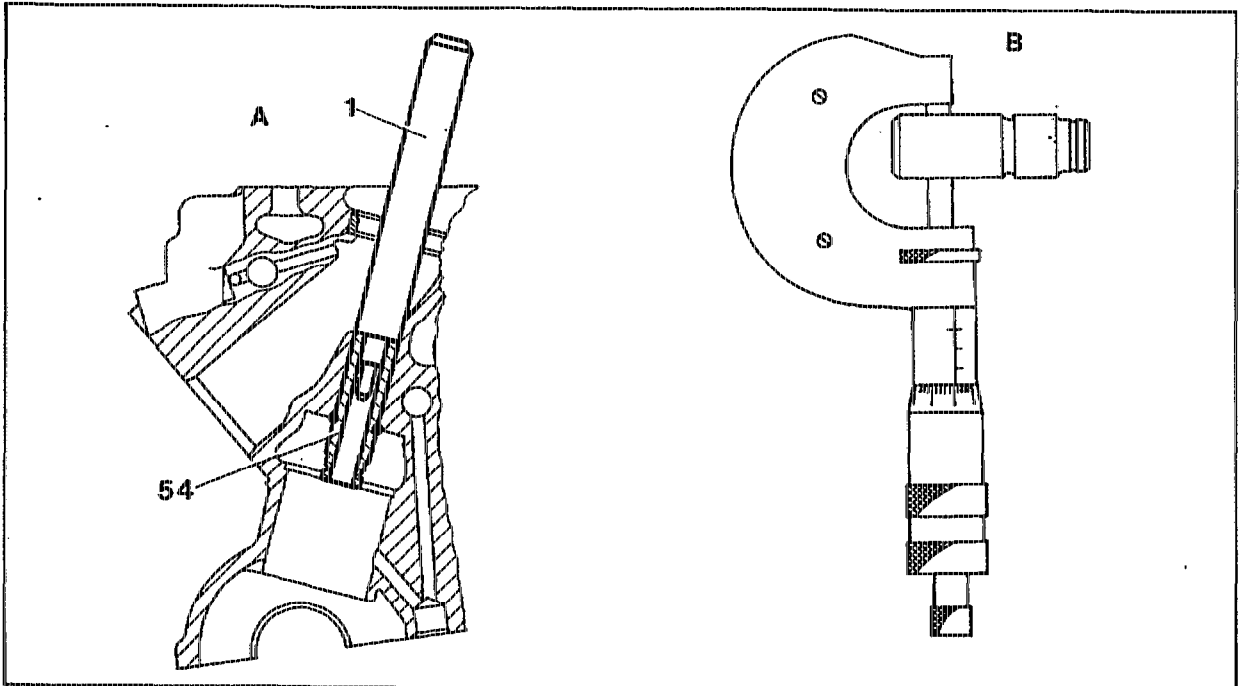
P05.30-0296-13

Valve guides and basic bores

	Standard size	Standard size I	Repair size I
Basic bore in cylinder head	12.50 – 12.51	12.53	12.70
Valve guide outer \varnothing and color coding	12.54 – 12.55	12.56 – 12.57 grey	12.74 – 12.75 red
Overlap		0.029 – 0.051	
		Inlet / Exhaust	
Valve guide inner \varnothing		7.000 – 7.015	
Length (L)		37.5	
Dim. (c)		10.2 – 10.4	

Replacing non-ferrous metal and sintered metal valve guides

Knocking out valve guide



P05-5373-55

- A Knocking out valve guide
- B Measuring valve guide outer \varnothing

Valve guide (54)

knock out with drift (1) from the combustion chamber side.

Drift 111 589 02 15 00 for valve guide inner \varnothing 7 mm.

Drift 103 589 03 15 for valve guide inner \varnothing 8 mm.

Drift 103 589 02 15 for valve guide inner \varnothing 9 mm.

Measuring valve guide

Outer \varnothing

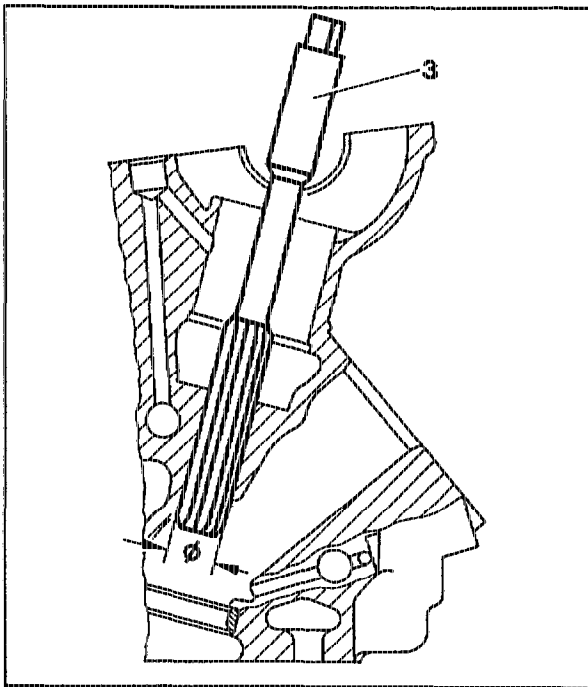
measure with micrometer.

Determine which valve guide was installed; match up next larger valve guide, see table.

Basic bore in cylinder head

ream standard size I or broach repair size I according to matched valve guide.

Standard size I
(reaming basic bore with reamer)



P05-5374-15

Basic bore

ream through with reamer (3).

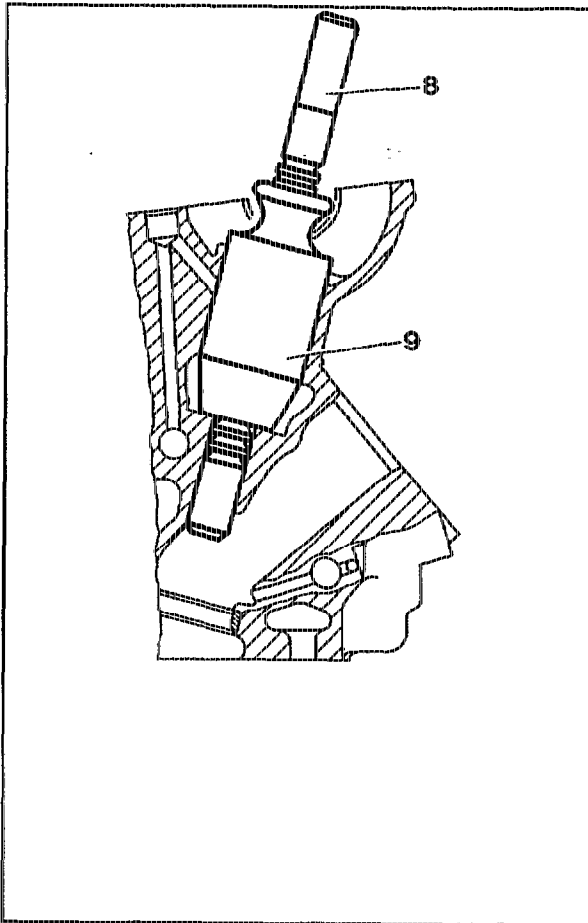
Use reamer 104 589 00 53 00 for basic bore \varnothing 13.53 mm

Use reamer 119 589 00 53 00 for basic bore \varnothing 12.53 mm

Note

Lubricat with petrol when reaming. Apply only slight pressure and do not tilt reamer (3). Clean blades of reamer before each reaming operation.

Repair size I
 (broaching basic bore with broaching tool)



P05-5375-15

Guide sleeve (9) and broaching tool (8)

insert into bucket tappet basic bore.
 Use guide sleeve 104 589 01 63 00 and
 broaching tool 104 589 01 53 00 for basic
 bore \varnothing 13.7 mm.

Use guide sleeve 119 589 05 63 00 and
 broaching tool 119 589 01 53 00 for basic
 bore \varnothing 12.7 mm.

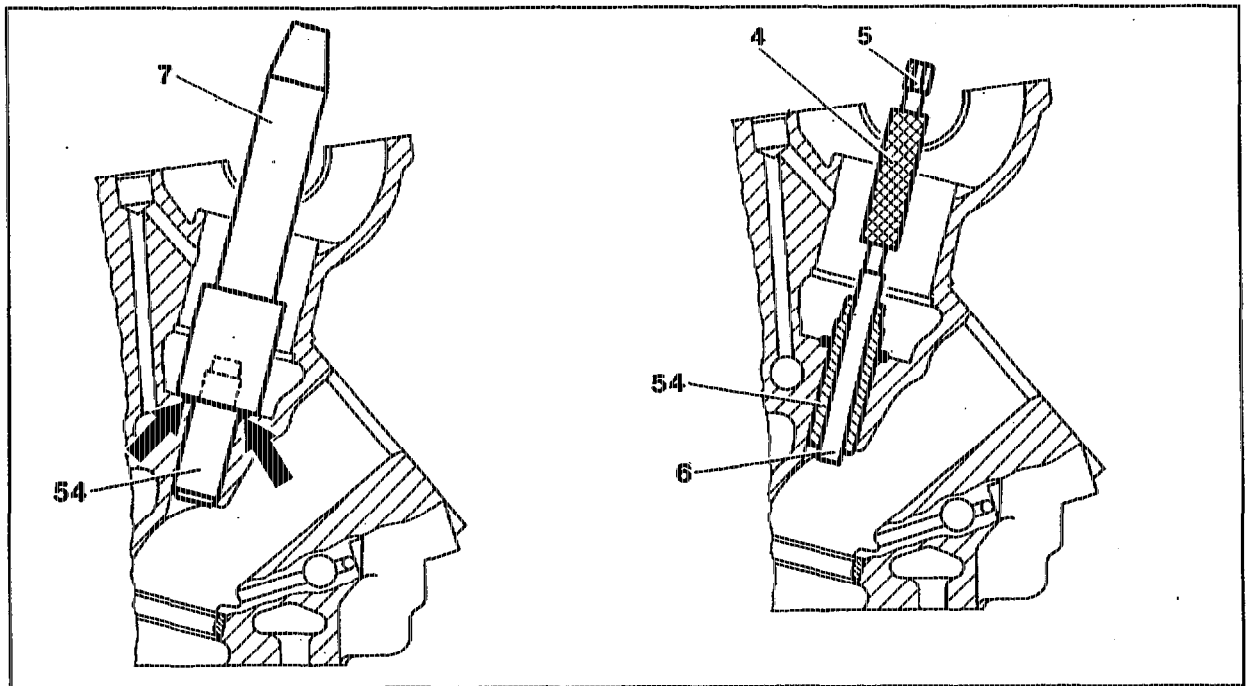
Broaching tool (8)

press through.

Note

Lubricate with petroleum when broaching. Clean
 broaching tool (8) with compressed air before
 and after each broaching operation.

Inserting valve guide



P05-5389-55

- Non-ferrous metal valve guides: supercool valve guides (54) in liquid nitrogen (for about 3 minutes). If no liquid nitrogen available, heat cylinder head in water bath to about 80 °C.
- Sintered metal valve guides: moisten valve guide (54) on outside with oil.
- Valve guide (54) knock in as far as the stop (arrows) with drift (7).
 Insertion drift 119 589 02 15 00 inlet
 Ø 7 mm for basic bore 13.5 and 13.7.
- Insertion drift 606 589 02 15 00 inlet/exhaust
 Ø 7 mm for basic bore 12.5 and 12.7.
- Insertion drift 104 589 00 15 00 inlet Ø 8 mm.

Insertion drift 104 589 02 15 00 exhaust
Ø 8 mm.

Insertion drift 104 589 01 15 00 exhaust
Ø 9 mm.

Note

The circlip is not fitted to the sintered metal valve guides. The insertion depth is determined by the insertion drift.

Valve guide (54)

inspect that it is tight once cylinder head is cooled down.

Inner Ø of valve guide (54)

inspect with gauging drift (4).

Gauge 102 589 00 23 00 inlet Ø 8 mm.

Gauge 117 589 03 23 00 exhaust Ø 9 mm.

Gauge 102 589 01 23 00 inlet Ø 7 mm.

Note

It must be possible to fully insert the GO side (6) of the gauge (4).

Non-ferrous metal valve guides: ream inner Ø with reamer, if necessary.

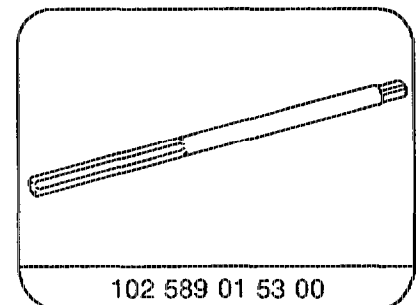
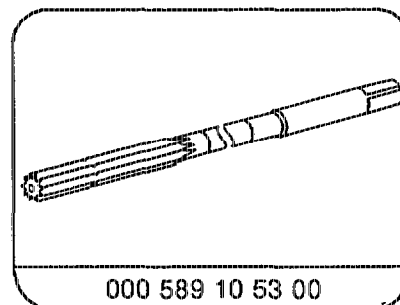
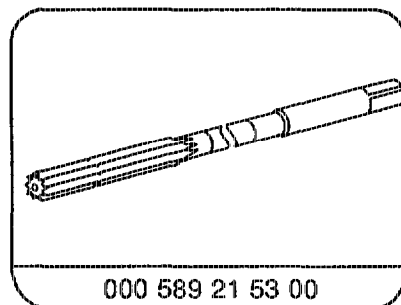
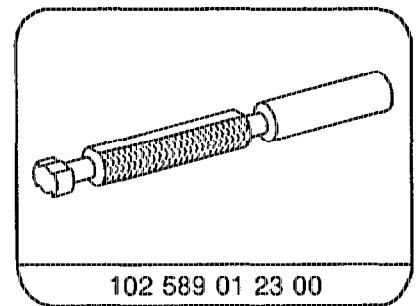
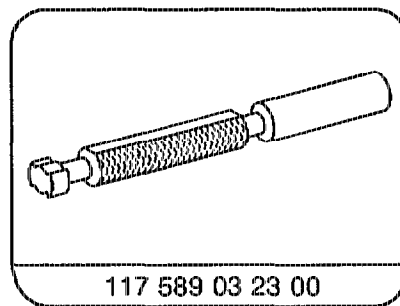
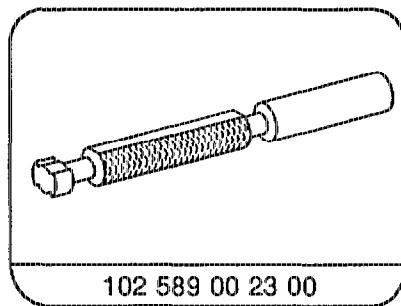
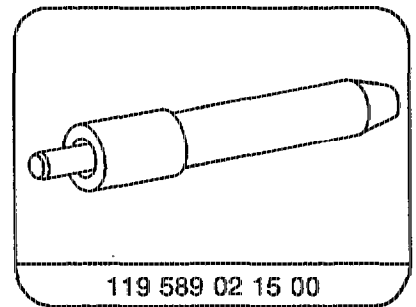
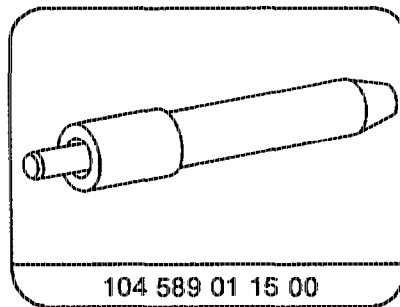
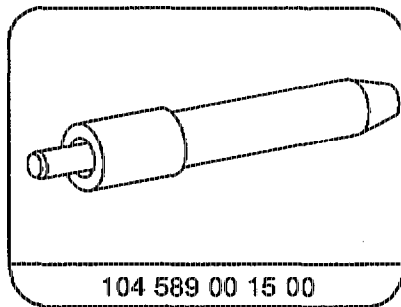
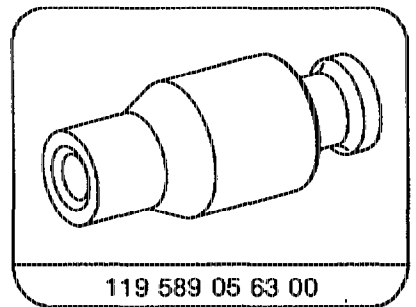
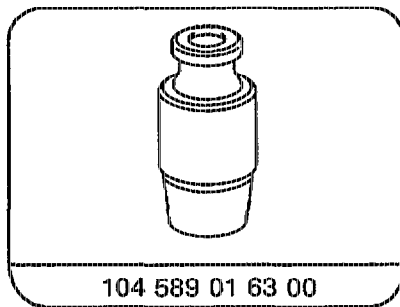
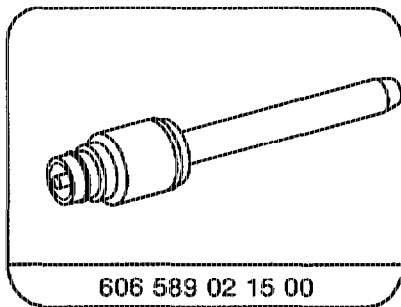
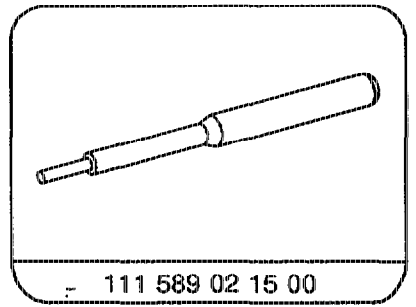
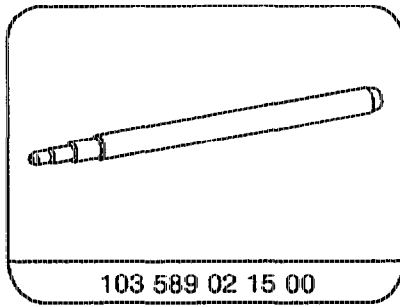
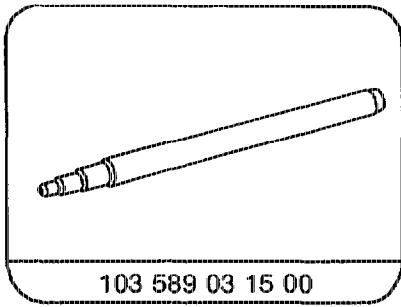
Reamer 000 589 21 53 00 inlet Ø 8 mm.

Reamer 000 589 10 53 00 exhaust Ø 9 mm.

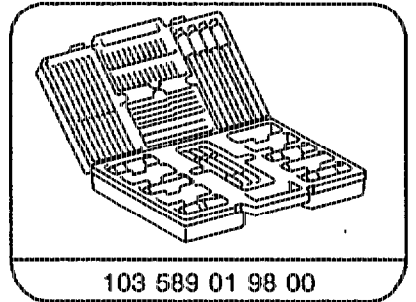
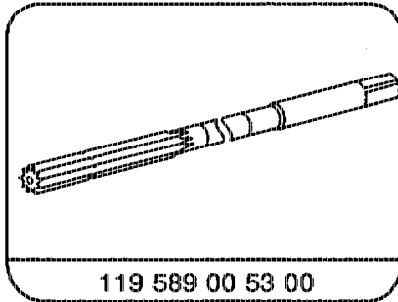
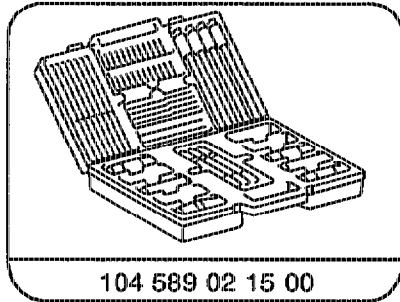
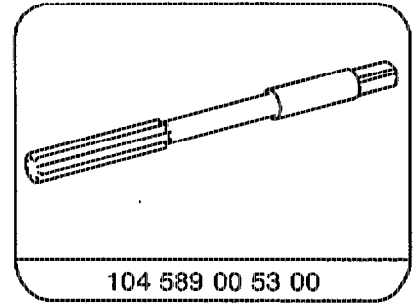
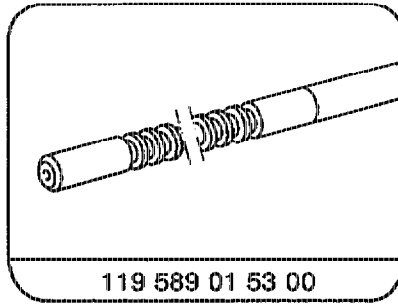
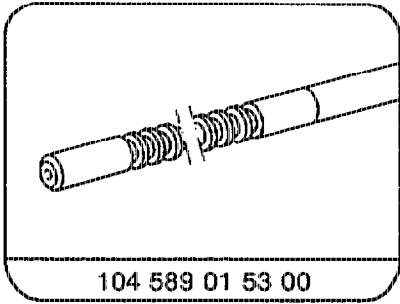
Reamer 102 589 01 53 00 inlet, exhaust
Ø 7 mm.

Sintered metal valve guides: if the gauge cannot be inserted, the valve guide should be replaced as the material of the sintered metal guides too hard for reaming.

Special tools



Special tools



Commercially available tools

Cylinder head clamping device

e.g. Hunger
D-8000 Munich 70
Order no. 221.60.000

Micrometer 0.25 mm