

## Adjust valve clearance

Revision: Number of gauge holders reduced and special tool (socket) for engine 100 added.  
Text revised.

Engines 100 116 117  
Not required for engines 100.985, 117.985/986

### Adjustment values in mm

	Engine	with cold engine approx. 20°C (68°F)	with warm engine 60° C ± 15° C (140° F ± 27° F)
Intake	100	0.10 <sup>1)</sup>	—
	116, 117	0.10 <sup>1)</sup>	0.15 <sup>1)</sup>
Exhaust	100	0.25	—
	116, 117	0.20	0.25






<sup>1)</sup> 0.05 mm higher with continuous outside temperatures below -20°C (-4°F)

### Tightening torques

		Nm	(kpm)
Hex.-hd. bolts for fixing cylinder head covers	Engine 100	5	(0.5)
	Engines 116, 117	3	(0.3)
Valve adjustment screws		20-40	(2-4)

### Special tools

#### Engine

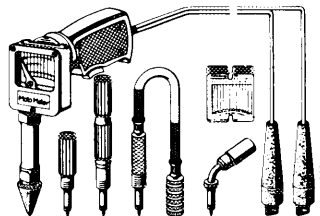
100	Valve adjustment wrench		110 589 00 01 00
116, 117	Valve adjustment wrench		116 589 02 01 00
All	Slip gauge holders various colors		617 589 00 40 00 to 05
All	Slip gauge blades	0.10 mm thick	617 589 00 23 00
		0.15 mm thick	617 589 01 23 00
		0.20 mm thick	117 589 00 23 00
		0.25 mm thick	117 589 01 23 00
116, 117	Socket 27 mm, 1/2" square		001 589 65 09 00
100	Socket 50 mm, 3/4" square		000 589 12 09 00



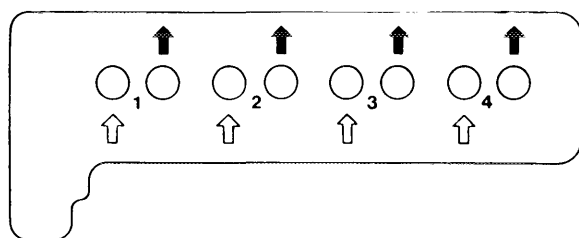
### Special tools (continued)

All

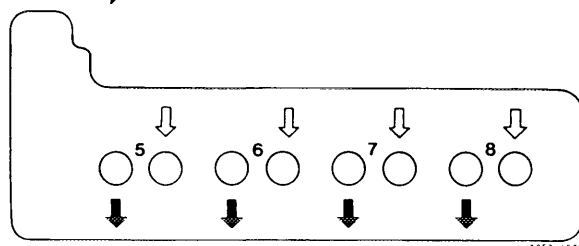
Contact handle for cranking engine  
(attachment of  
compression pressure recorder)  
001 589 46 21 00



001 589 46 21 08

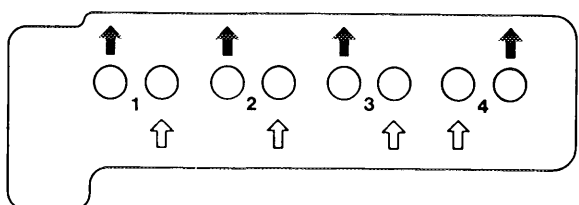


⚡ 1 5 4 8 6 3 7 2

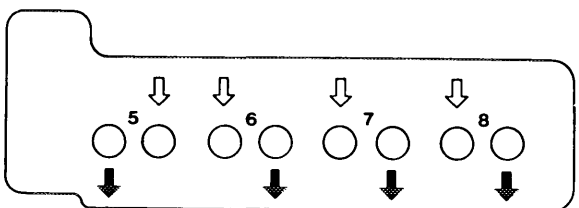


Z053-4200

Engine 100



⚡ 1 5 4 8 6 3 7 2



Z053-4199

Engines 116, 117

### Note

**Check or adjust valve clearance with engine cold or warm. On engines 100 with cold engine only.**

Note arrangement of intake and exhaust valves. In the case of engines 116 and 117 the valves on cylinders 4 and 5 are arranged asymmetrically.

## Adjust valve clearance

Revision: Number of gauge holders reduced and text revised.

Engine 110

### Adjusting values in mm

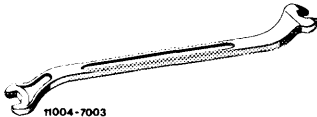
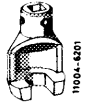

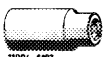
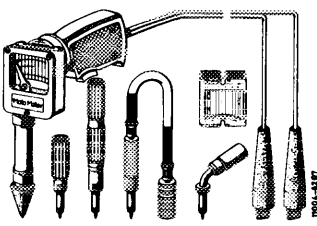
	with engine cold approx. 20°C (68°F)	with engine warm 60°C ± 15°C (140°F ± 27°F)
Intake	0.10 <sup>1)</sup>	0.15 <sup>1)</sup>
Exhaust	0.25	0.30

<sup>1)</sup> 0.05 mm more for extended ambient temperatures below -20°C (-4°F).

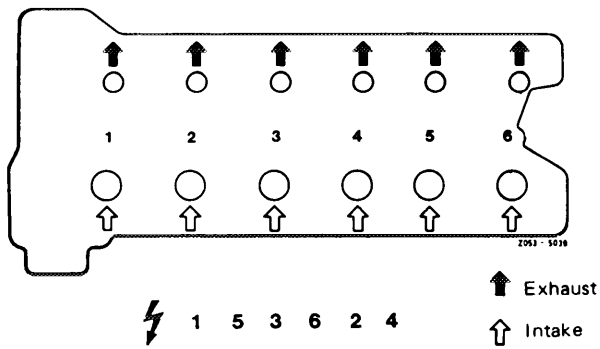
### Tightening torques

	Nm	(kpm)
Cap nuts and bolts for attaching cylinder head cover	5	(0.5)
Valve adjusting screws	20-40	(2-4)

### Special tools

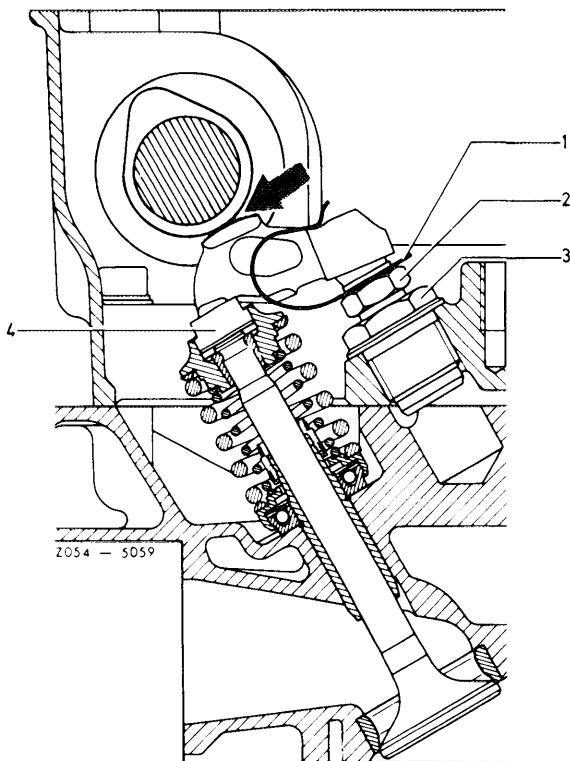
Valve adjusting wrench		110 589 01 01 00
Valve adjusting wrench for checking torque of valve adjusting screws		110 589 00 01 00
Slip gauge holders various colors		617 589 00 40 00 to 05
Slip gauge blades	0.10 mm thick	617 589 00 23 00
	0.15 mm thick	617 589 01 23 00
	0.20 mm thick	117 589 00 23 00
	0.25 mm thick	117 589 01 23 00
	0.30 mm thick	617 589 02 23 00
Socket SW 27, 1/2" square		001 589 65 09 00
Contact handle for cranking engine (attachment of compression pressure recorder 001 589 46 21 00)		001 589 46 21 08



**Note**

Check or adjust valve clearance with engine cold or warm.

Note arrangement of intake and exhaust valves.

**Adjustment**

- Remove rubber gaskets
- Measure valve clearance between sliding surface of rocker arm and cam base circle of camshaft (arrow).

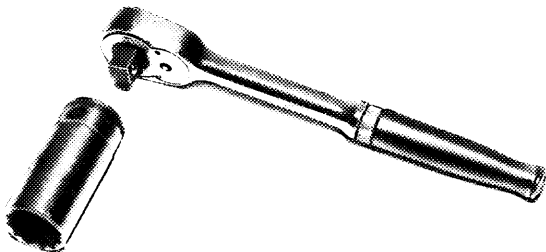
**Attention!** Replace thrust piece (4), if adjustments can no longer be made as required. They are available in various thicknesses (see spare parts list).

The engine can be cranked as follows:

- With combination tool on hex. bolt for attaching balancing disc to crankshaft.

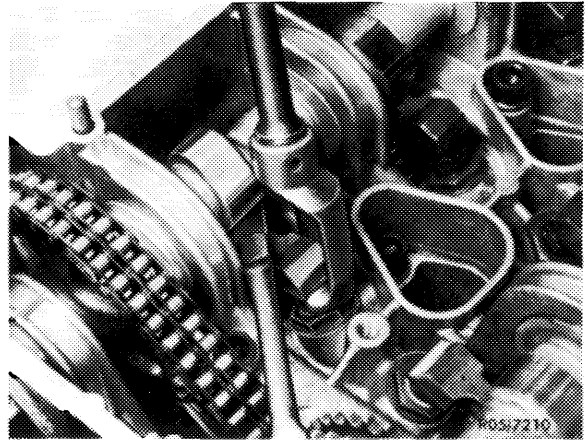
**Attention!** The engine **must not** be turned using the hex.-hd. bolts on the **camshaft gears**.

Do **not** turn the crankshaft **backwards**.



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- Check tensioning springs (1) for perfect seat upon completion of adjusting jobs.



Valve adjusting wrench 110 589 00 01 00

## Adjust valve clearance

Revision: Number of gauge holders reduced and text revised.

Engines 115 130

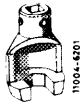
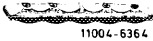
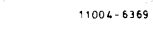
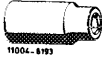
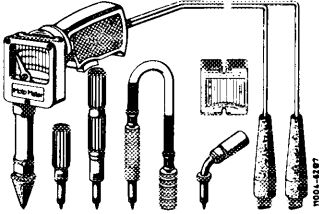
### Adjusting values in mm

	with engine cold approx. 20°C (68°F)	with engine warm 60°C ± 15°C (140°F ± 27°F)
Intake	0.10 <sup>1)</sup>	0.15 <sup>1)</sup>
Exhaust	0.20	0.25

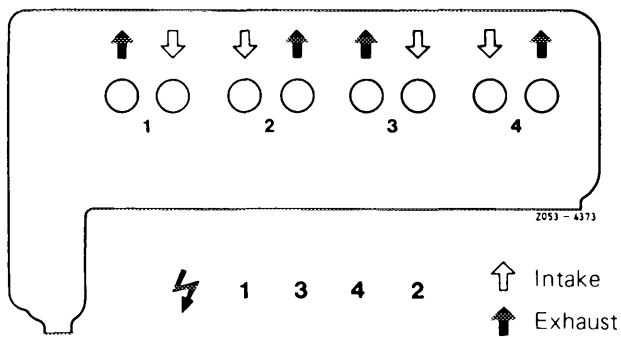
<sup>1)</sup> 0.05 mm more for extended ambient temperature below -20°C (-4°F).

Tightening torques	Engine	Nm	(kpm)
Hex. bolts or nuts for attaching cylinder head cover	115, 130	5	(0.5)
	115 with 4-bolt attachment and stop	15	(1.5)
Valve adjustment screws		20-40	(2-4)

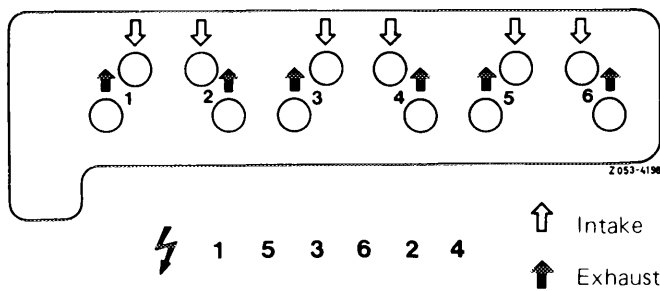
### Special tools

Valve adjusting wrench		110 589 00 01 00	
Slip gauge holders various colors		617 589 00 40 00 to 05	
Slip gauge blades		0.10 mm thick	617 589 00 23 00
		0.15 mm thick	617 589 01 23 00
		0.20 mm thick	117 589 00 23 00
		0.25 mm thick	117 589 01 23 00
Socket 27 mm, 1/2" square		001 589 65 09 00	
Contact handle for cranking engine (attachment of compression pressure recorder 001 589 46 21 00)		001 589 46 21 08	

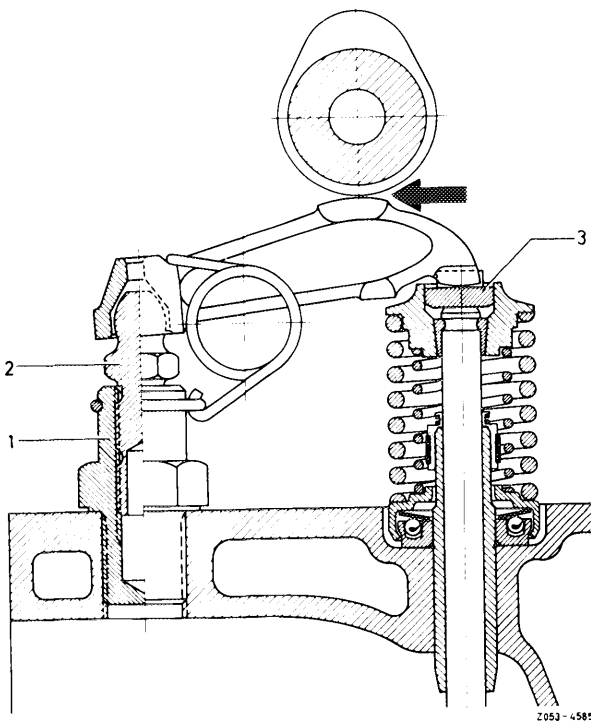




Engine 115



Engine 130



### Note

Check or adjust valve clearance with engine cold or warm.

Note arrangement of intake and exhaust valves.

If there is insufficient adjustment available replace pressure piece (3). They are available in various thicknesses (see Spare Parts Fiche).

If the torque of the adjusting screw is below 20 Nm (2 kpm) replace adjusting screw (2), or adjusting screw (2) with threaded bush (1).

### Adjustment

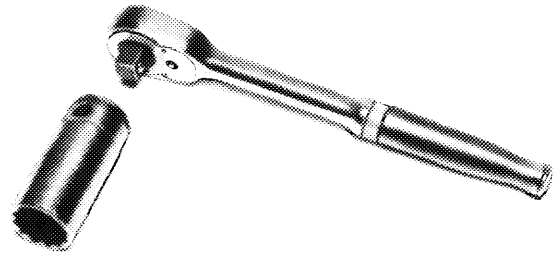
- Measure valve clearance between the sliding area of the rocker arm and the cam base circle of the camshaft (arrow).

For this purpose, the engine can be cranked as follows:

- a) **By means of tool combination on hex. bolt for attaching balancing disc to crankshaft.**

**Attention!** The engine **must not** be turned using the hex.-hd. bolt on the **camshaft gear**.

Do **not** turn crankshaft **backwards**.



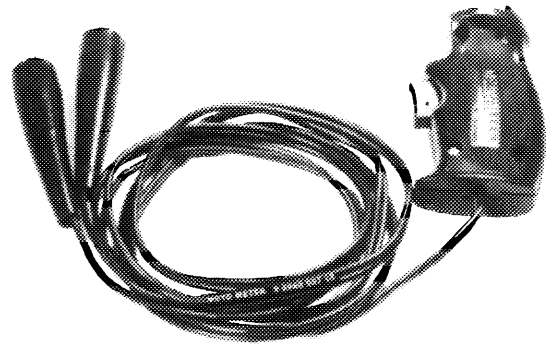
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- b) **With starter and contact handle**

**Models 114, 115**

Connect contact handle to battery + and to starter terminal 50.

Disconnect terminal 1 on ignition coil.



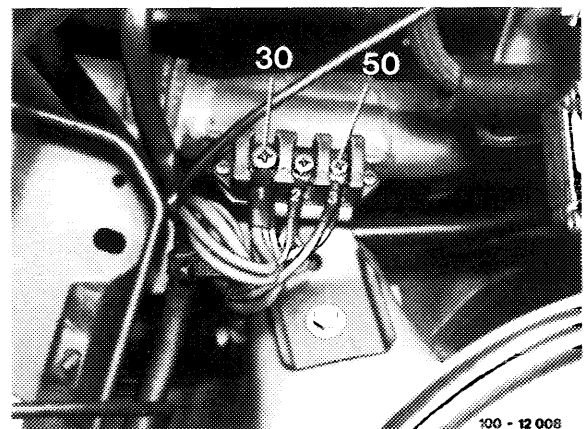
105-9061

**Model 123.023**

Connect contact handle to terminal 30 and terminal 50 on cable connector.

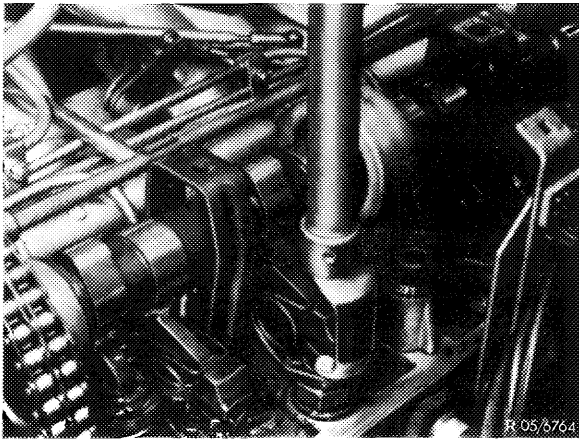
Instead of terminal 30, connection can also be made to battery +.

Disconnect terminal 1 on ignition coil.



100 - 12 008





Valve adjusting wrench 110 589 00 01 00

**Valve clearance is correctly adjusted, when the slip gauge indicates a tight fit.**

- If required, adjust valve clearance by turning adjusting screw (2) with valve adjusting and torque wrench.
- Before fitting cylinder head cover, check seals and renew if found necessary.

Engines 115, 130

## Adjust valve clearance

Revision: Engine 617.950 (turbo diesel) included.  
Number of gauge holders reduced.

Engines 615 616 617

### Adjusting values in mm


Engines		Cold engine approx. 20°C (68°F)	Warm engine 60°C ± 15°C (140°F ± 27°F)
615, 616, 617	Intake	0.10 <sup>1)</sup>	0.15 <sup>1)</sup>
615, 616, 617.912	Exhaust	0.30	0.35
617.950	Exhaust	0.35	0.40

<sup>1)</sup> 0.05 mm larger during constant ambient temperatures below -20°C (-4°F).


Tightening torques	Engines	Nm	(kpm)
Hex. head bolts for cylinder head cover	615	5	(0.5)
Nuts for cylinder head cover	615, 616, 617	15	(1.5)

### Special tools

Valve adjusting wrench 14 mm (2 each)  11004-6356 615 589 00 01 00

Holding wrench for valve spring retainer  11004-7118 615 589 00 03 00

Slip gauge holders various colors  11004-6364 617 589 00 40 00 to 05

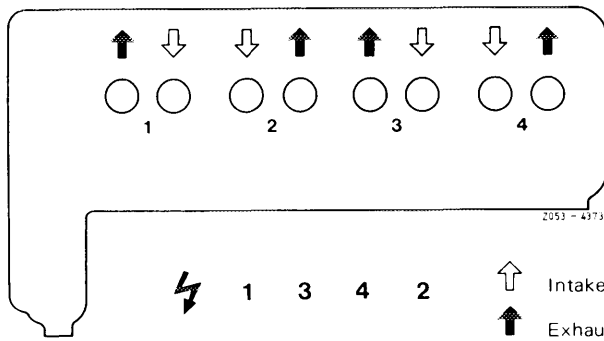
Slip gauge blades  11004-6369

0.10 mm thick	617 589 00 23 00
0.15 mm thick	617 589 01 23 00
0.20 mm thick	117 589 00 23 00
0.30 mm thick	617 589 02 23 00
0.35 mm thick	617 589 03 23 00
0.40 mm thick	617 589 04 23 00

Socket 27 mm 1/2" square  11004-6193 001 589 65 09 00

Contact handle for cranking engine  
(detail from compression pressure recorder 001 589 46 21 00)  11004-938 001 589 46 21 08



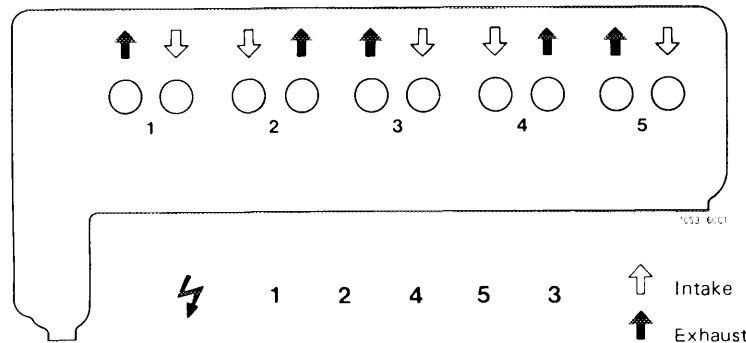


### Note

Check or adjust valve clearance with engine cold or warm.

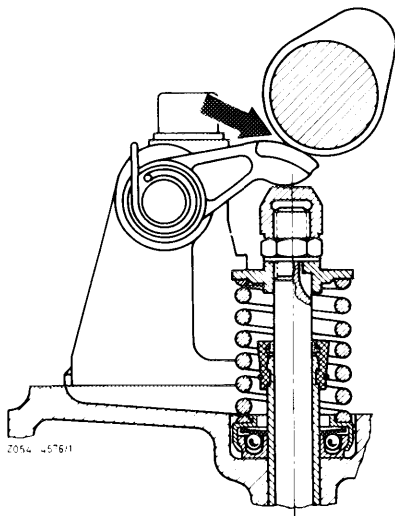
Note arrangement of intake and exhaust valve.

Engine 615, 616



↑ Intake  
↑ Exhaust

Engine 617



### Adjustment

- Measure valve clearance between slide area of rocker arm and cam base circle of camshaft (arrow). For this purpose, set camshaft in such a manner **that the tip of the cam is vertical** in relation to rocker arm.

Valve clearance is correctly adjusted, when the slip gauge indicates a tight fit.

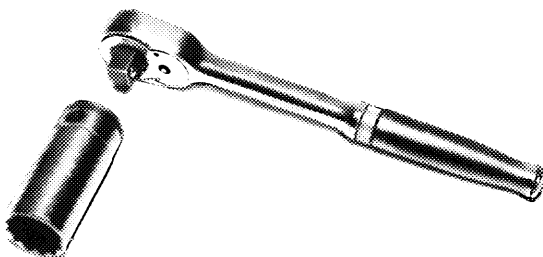
- Set start and stop cable to "Stop" or ignition key to "0".

For this purpose, the engine can be cranked as follows:

- By means of tool combination on hex. bolt for attaching balancing disc to crankshaft.

**Attention!** The engine **must not** be turned using the hex.-hd. bolt on the **camshaft gear**.

Do **not** turn the crankshaft **backwards**.



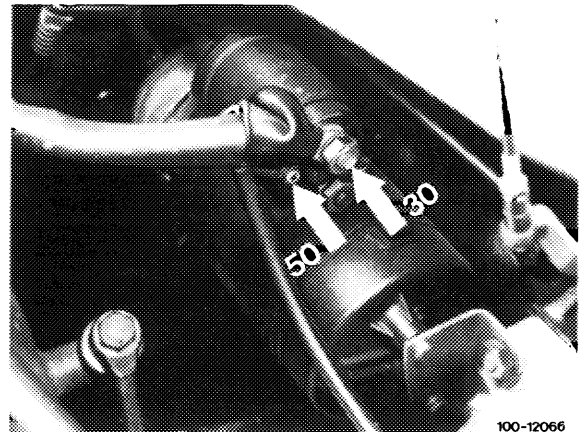
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b) **With starter and contact handle.**

**Models 115 and 123**

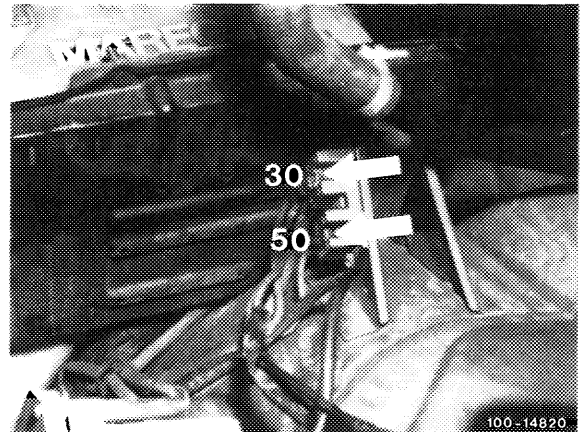
Connect contact handle to terminal 30 and terminal 50 on starter.

Instead of terminal 30, connection can also be made to battery +.



**Model 116.120**

Connect contact handle on cable connector below the battery to terminals 30 and 50.



- Fit holding wrench (17) onto hex. of valve retainer.
- Loosen cap nut (7), for this purpose counterhold hex.-hd. nut (8) on the valve with the valve adjusting wrench (14).
- Adjust valve clearance by turning the cap nut.
- After adjustment, lock cap nut by tightening the hex.-hd. nut.
- Recheck valve clearance.
- Before fitting cylinder head cover, check seals and renew if found necessary.

