

Test values

Engine	Injection nozzles Bosch designation	Opening pressure in bar gauge pressure ¹⁾ (atü)	
		new injection nozzles	used injection nozzles min

Standard version

National version (AUS) (E) (J) (S) up to 1978, (USA) up to 1977, (ZA)

615.912/941 616, 617	DNO SD 220	115-123 <i>1,648 psi</i> <i>1,784 psi</i>	100 = <i>1,450 psi</i>
	DNO SD 240 ³⁾		
615.913/940	DNO SD 1510		

National version (S) starting 1979, (USA) starting 1978

616 617	DNO SD 240 ²⁾	115-123	100
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¹⁾ The difference in opening pressure of injection nozzles within one engine should not amount to more than 5 bar gauge pressure (atü).

²⁾ Starting 1979 with rod-type filter.

³⁾ Engine 616, 617 starting from power increase.

72.5 psi

Tightening torques

	Nm	(kpm)
Injection nozzle top and bottom	70-80	(7-8)

Special tools

Torque wrench 1/2" square,
40-130 Nm (4-13 kpm)


000 589 22 21 00

Socket 27 mm, 1/2" square
for injection nozzle


001 589 65 09 00

Cleaning kit



000 589 00 68 00

Conventional tools

Tester EFEP 60 H

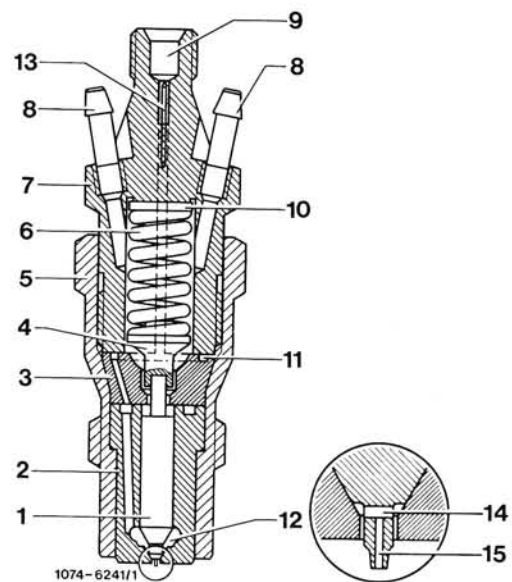
e.g. made by Bosch, D-7000 Stuttgart
Order no. 0 681 200 502

Note

The injection nozzle with Bosch designation DNO SD 240 is a perforated pintle nozzle. It differs from pintle nozzle by a crosswise bore and a longitudinal bore (14 and 15) in throttle pintle. In addition, a maintenance-free rod-type filter (13) is pressed into injection nozzle holder top (7).

The advantage of a perforated pintle nozzle is better injection at lower volume and less load, as well as a reduction of coking on ring gap.

- 1 Nozzle needle
- 2 Nozzle body
- 3 Nozzle holder element
- 4 Pressure pin
- 5 Injection nozzle holder bottom
- 6 Compression spring
- 7 Injection nozzle holder top
- 8 Leak oil connection
- 9 Fuel feed
- 10 Steel washer
- 11 Ring groove and feed bores
- 12 Pressure chamber in nozzle body
- 13 Rod-type filter
- 14 Crosswise bore
- 15 Lengthwise bore

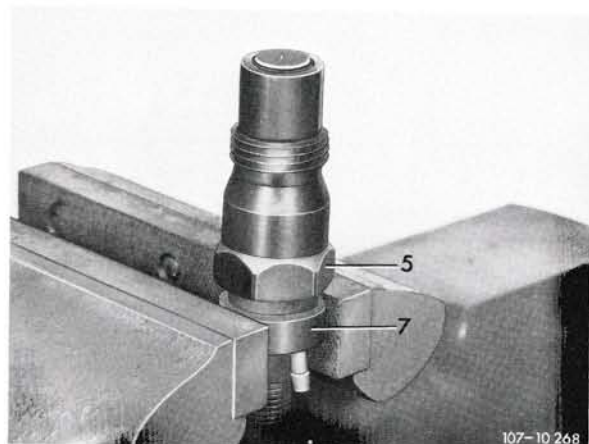


Disassembly

1 Clamp injection nozzle holder top (7) into vise in such a manner that the leak oil line connections are not damaged.

2 Loosen injection nozzle holder bottom (5) with socket wrench insert and screw off.

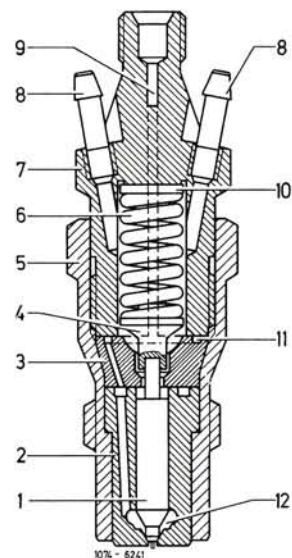
- 5 Injection nozzle holder bottom
- 7 Injection nozzle holder top



3 Remove steel washer (10), compression spring (6), pressure pin (4), nozzle holder element (3) and nozzle body (2) with nozzle needle (1).

Attention!

During disassembly make sure that the nozzle body, the nozzle needle and the individual components are not mixed up among each other.



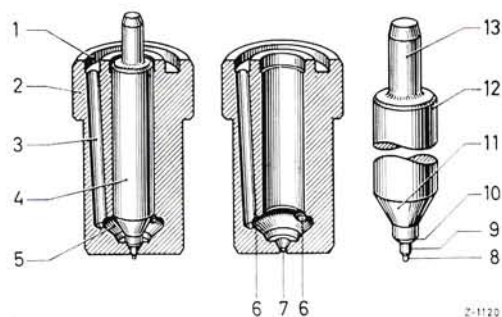
Cleaning

4 Brush off combustion deposits outside on face of nozzle body (2), mainly around nozzle mouth, by means of a brass brush.

Touch up nozzle holder element (3) and nozzle body (2) on face of both sides on a surface plate.

5 Clean pressure chamber (5) of nozzle body by means of ring groove scraper.

- | | |
|---|----------------------|
| 1 Ring groove | 7 Nozzle mouth |
| 2 Nozzle body | 8 Spray pintle |
| 3 Feed bore | 9 Throttle pin |
| 4 Nozzle needle | 10 Needle seat |
| 5 Pressure chamber | 11 Pressure shoulder |
| 6 Mouth of feed bores in pressure chamber | 12 Needle stem |
| | 13 Pressure pin |



6 Clean nozzle needle seat in nozzle body with cleaning needle. Perform this job with particular care, since the efficiency of the nozzle depends highly on a good nozzle needle seat. Do not exert excessive pressure with cleaning needle.

side, but **from inside out** (to guide spray hole cleaner and prevent canting).

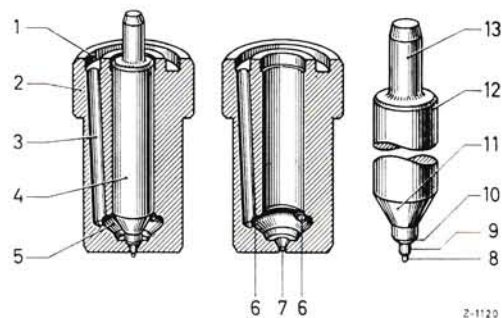
7. Clean spray hole in nozzle mouth with spray hole cleaner. As shown in illustration, not from outside, but from inside out (to guide spray hole cleaner and prevent canting).



8 Clean nozzle needle with a sharp-edged hardwood stick soaked in diesel fuel. If profile of nozzle needle is badly coked, needle maybe clamped for this purpose in a suitable chuck of a lathe or drilling machine at its pressure pin (13). The spray pintle (8), the throttle pin (9) and the needle seat (10) can be cleaned with a sharp-edged hardwood stick soaked in oil.



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Testing nozzle needle

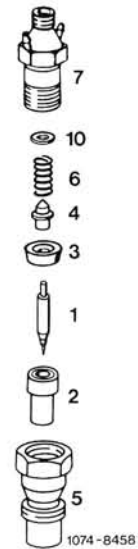
9 Visual test. Upon cleaning, test used nozzles visually. Test nozzle needle for dented or rough needle seat and for worn or damaged spray pintle. Replace damaged nozzles.

10 Slide test. For this purpose, immerse nozzle needle and nozzle body in filtered diesel fuel and insert nozzle needle into nozzle body. With nozzle needle held vertically the nozzle needle, which is pulled out by approx. one third, should slide back on its seat under its own weight. Replace injection nozzle, if required.

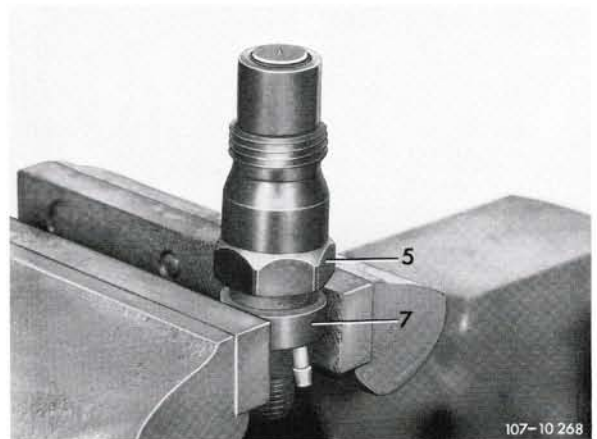
Assembly

11 Insert all parts in vice versa sequence into injection nozzle holder bottom (5) and screw on injection nozzle holder top (7), while inserting pressure pin (4) with bore into nozzle needle (1).

- | | |
|-------------------------|----------------------------------|
| 1 Nozzle needle | 5 Injection nozzle holder bottom |
| 2 Nozzle body | 6 Compression spring |
| 3 Nozzle holder element | 7 Injection nozzle holder top |
| 4 Pressure pin | 10 Steel washer |



12 Clamp injection nozzle holder top (7) into vise and tighten injection nozzle holder bottom (5) to 70–80 Nm (7–8 kpm).



Testing

13 Test injection nozzles for jet, buzzing noise, opening (ejection) pressure and for leaks (07.1–135).

Adjusting

14 Install or remove steel washers (10) between compression spring (6) and injection nozzle holder top (7) to maintain specified ejection (opening) pressure, if required for adjustment.

Putting in = increased ejection pressure

Taking out = decreased ejection pressure

Washers are available 1.0 to 1.8 mm thick in steps of 0.05 mm. An increase of preload by 0.05 mm increases ejection pressure by approx. 3.0 bar gauge pressure.

43.5 psi

