

07.1—110 Checking injection pump for begin of delivery (according to low pressure overflow method)

Test values

Engine	615.912/941	615.913/940	616, 617
Begin of delivery before TDC in compression stroke	24°	26°	24°

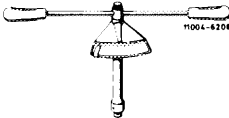



Attention!

On MW and M/RSF-injection pumps with mechanical governor, push regulating lever of injection pump to full load while measuring and remove vacuum hose from vacuum box.

Tightening torques

Designation	Engine	Injection pump abbreviation	Nm
Injection lines	615, 616, 617	M, MW, M/RSF	25
Pipe connection for pressure valves	615, 616, 617	M, M/RSF	35
	616, 617	MW	40–50

Special tools

Torque wrench 1/2" square, 15–65 Nm		000 589 27 21 00
Overflow pipe		636 589 02 23 00
Box wrench insert open, 17 mm, 1/2" square for injection lines		000 589 68 03 00
Socket Notched tooth 17 x 20, 1/2" square for pipe connection M/RSF-injection pump		617 589 00 09 00

¹⁾ Machine socket 617 589 00 09 00 (refer to 07.1–210).

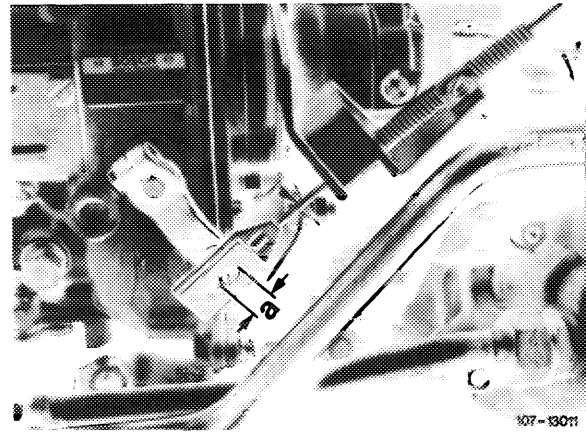
A. Engine 615, 616 M-injection pump with pneumatic governor

Checking

1 Clean injection pump on coupling nuts of injection lines and on pipe connections.

2 Move preglow starter switch on instrument panel to driving position. In this position, at least 2 mm clearance should be available between center axis of adjusting lever and oblong eye (distance "a"). Adjust cable control, if required (30–340).

3 Unscrew injection lines and clamping jaws from cylinder 1 and 2.



4 Unscrew pipe connection (1) of first injection pump element, remove compression spring (3) and pressure valve (4).

Attention!

For testing begin of delivery, the copper sealing ring (5) and the pressure valve carrier (6) must remain installed, since otherwise the fuel will continue to flow in spite of begin of delivery position.

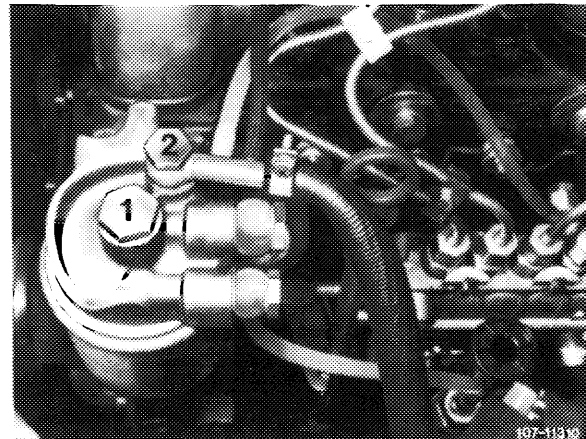


- 1 Pipe connection
- 2 Rubber sealing ring
- 3 Compression spring
- 4 Pressure valve
- 5 Copper sealing ring
- 6 Pressure valve carrier

5 Screw back pipe connection and screw on overflow pipe.

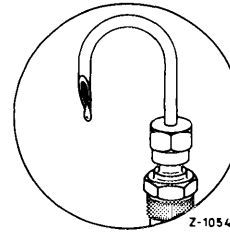
6 Rotate crankshaft in direction of rotation close to begin of delivery in compression stroke of first cylinder.

7 Open vent screw or hollow screw (2) on fuel filter and fill fuel filter with hand delivery pump so that fuel flows out of overflow pipe.



8 Rotate crankshaft in direction of rotation until fuel changes into drops at overflow pipe. Formation of drops: One drop per second.

9 In this position, read begin of delivery on graduated scale of balancing disc and adjust begin of delivery, if required (07.1–115).



10 Unscrew overflow pipe and pipe connection.

11 Remove pressure valve carrier (6). Check whether pressure valve (4) is freely running in pressure valve carrier (6).

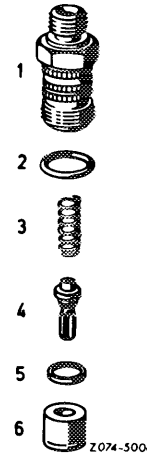
12 Insert pressure valve carrier (6) with annular groove in downward direction.

13 Insert pressure valve (4), **new** copper sealing ring (5) and compression spring (3).

14 Check rubber sealing ring (2) for wear and renew, if required.

15 Slightly lubricate pipe connection (1) on threads and screw in.

- 1 Pipe connection
- 2 Rubber sealing ring
- 3 Compression spring
- 4 Pressure valve
- 5 Copper sealing ring
- 6 Pressure valve carrier



For perfect seat of copper sealing ring tighten pipe connection as follows:

Tighten pipe connection to 30 Nm and release again. Tighten once again to 30 Nm and also release again.

Then tighten to 35 Nm.

16 Mount injection lines and clamping jaws and bleed injection system (07.1–140).

17 Run engine and check all connections for leaks.

B. Engine 615, 616, 617 MW and M/RSF-injection pump with mechanical governor

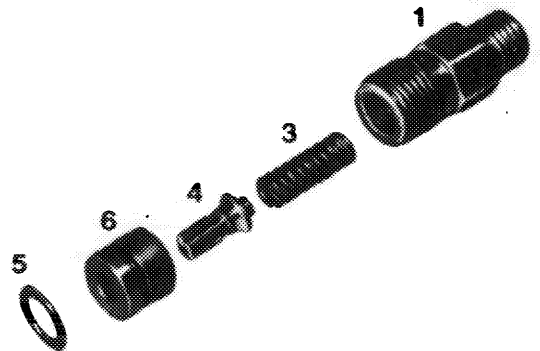
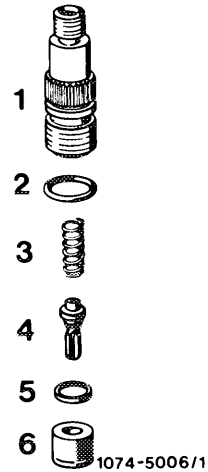
Testing

- 1 Clean injection pump on coupling nuts of injection lines and on pipe connections.
- 2 Pull off vacuum hose on vacuum box.
- 3 Unscrew injection line from cylinder 1.
- 4 Unscrew pipe connection (1) of first injection pump element, remove compression spring (3) and pressure valve (4).

Attention!

For testing begin of delivery, the copper sealing ring (5) and the pressure valve carrier (6) must remain installed, since otherwise the fuel will continue to flow in spite of begin of delivery position.

- Engine 615, 616, 617 with M/RSF-injection pump
- | | |
|-----------------------|--------------------------|
| 1 Pipe connection | 4 Pressure valve |
| 2 Rubber sealing ring | 5 Copper sealing ring |
| 3 Compression spring | 6 Pressure valve carrier |

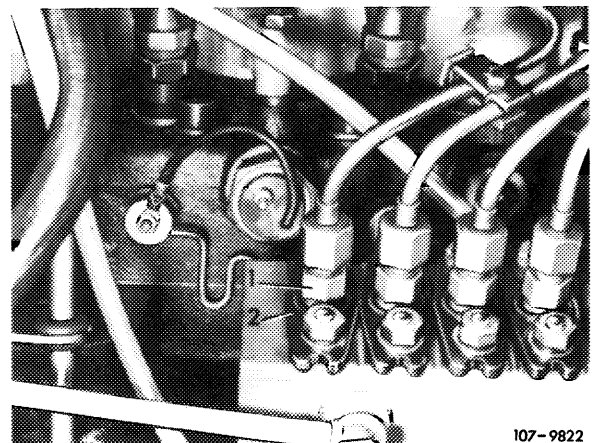


- Engine 616, 617 with MW-injection pump
- | | |
|----------------------|--------------------------|
| 1 Pipe connection | 5 Copper sealing ring |
| 3 Compression spring | 6 Pressure valve carrier |
| 4 Pressure valve | |

Attention!

On MW-injection pumps, do not unscrew element connection (2), since otherwise a basic adjustment of injection pump on injection pump test bench will be required.

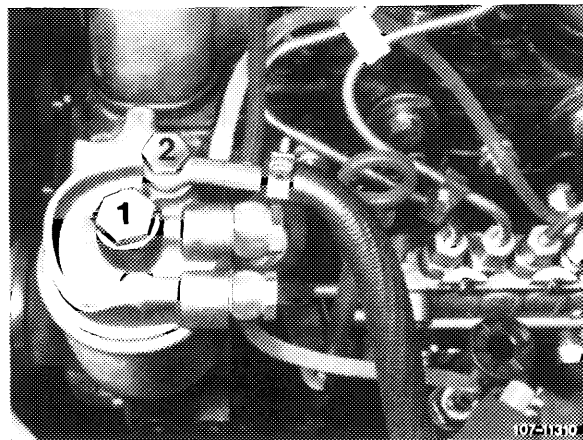
- | |
|----------------------|
| 1 Pipe connection |
| 2 Element connection |



5 Screw back pipe connection and screw on overflow pipe.

6 Rotate crankshaft in direction of rotation close to begin of delivery in compression stroke of first cylinder.

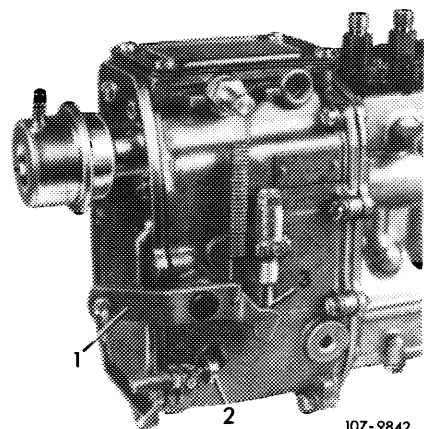
7 Open vent screw or hollow screw (2) on fuel filter and fill fuel filter with manual delivery pump so that fuel flows out of overflow pipe.



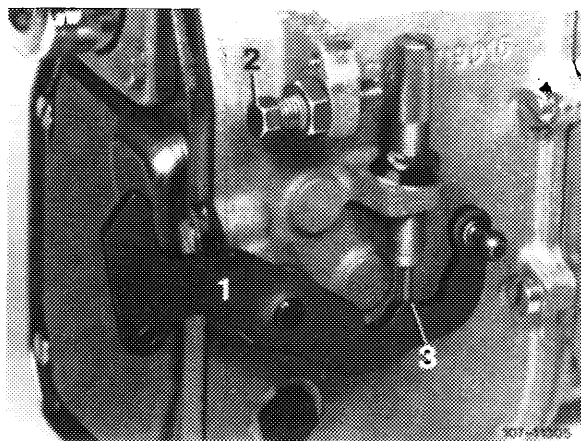
Attention!

Push regulating lever of injection pump to full load while measuring and pull vacuum hose from vacuum box.

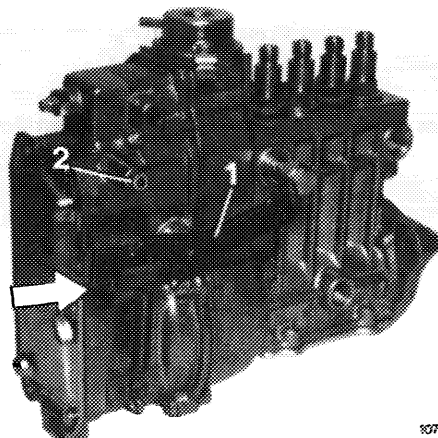
Engine 617.910 with MW-injection pump
1 Regulating lever
2 Full throttle stop
3 Idle speed stop



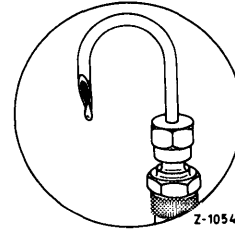
Engine 616, 617 with MW-injection pump
1 Regulating lever
2 Full throttle stop
3 Idle speed stop



Engine 615, 616, 617 with M/RSF-injection pump
1 Regulating lever
2 Full throttle stop

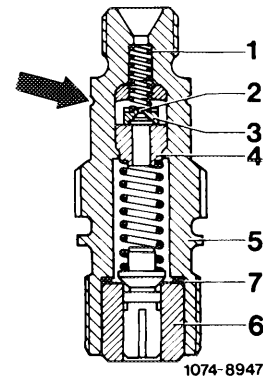
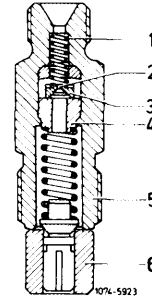


8 Rotate crankshaft in direction of rotation until fuel on overflow pipe turns to drops. Formation of drops: One drop per second.



Note: For pipe connections with relief choke (2), on M/RSF-injection pump identified by a ring groove on pipe connection (arrow), no full fuel jet will come out of overflow pipe. However, accuracy of measuring is not impaired.

Pipe connection MW-injection pump



Pipe connection M/RSF-injection pump

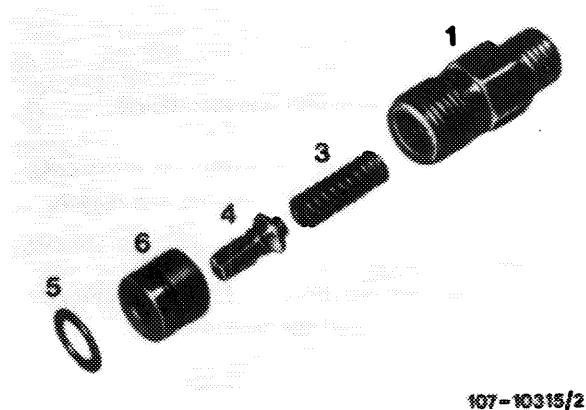
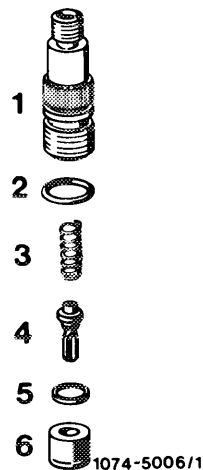
9 In this position, read begin of delivery at graduated scale on balancing disc and adjust begin of delivery, if required (07.1–115).

10 Unscrew overflow pipe and pipe connection.

11 Remove pressure valve carrier (6). Check whether pressure valve (4) runs freely in pressure valve carrier (6).

12 Insert pressure valve carrier (6) with annular groove in downward direction.

- Engine 615, 616, 617 with M/RSF-injection pump
- 1 Pipe connection
 - 2 Rubber sealing ring
 - 3 Compression spring
 - 4 Pressure valve
 - 5 Copper sealing ring
 - 6 Pressure valve carrier



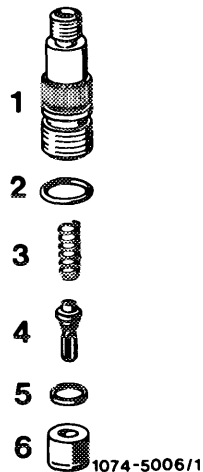
- Engine 616, 617 with MW-injection pump
- 1 Pipe connection
 - 3 Compression spring
 - 4 Pressure valve
 - 5 Copper sealing ring
 - 6 Pressure valve carrier

13 Mount pipe connection:

a) Engine 615, 616, 617 with M/RSF-injection pump

Insert pressure valve (4), new copper sealing ring (5) and compression spring (3).

Check rubber sealing ring (2) for wear and replace, if required.



14 Slightly lubricate pipe connection (1) on threads and screw in.

To obtain a perfect seat of copper sealing ring (5), tighten pipe connection as follows:

Tighten pipe connection to 30 Nm, release again.
Tighten once more to 30 Nm and also release again.

Then tighten to 35 Nm.

15 Mount injection lines and locking plate and bleed injection system (07.1–140).

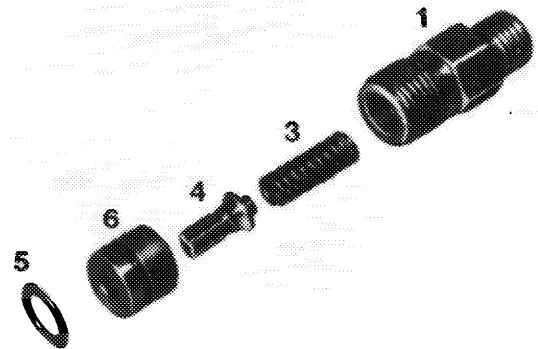
16 Run engine and check all connections for leaks.

b) Engine 616, 617 with MW-injection pump

17 Slightly lubricate pipe connection (1) on threads, screw in and tighten from 40 to 50 Nm in **one step**.

Attention!

The copper sealing ring (5) is installed under pressure valve carrier (6) and need not be replaced.



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18 Mount injection line and bleed injection system (07.1–140).

19 Run engine and check all connections for leaks. If a pipe connection is leaking, install new pipe connection with annular groove. When installing a new pipe connection, **replace** copper sealing ring **under pressure valve carrier** (07.1–150).