

The drip-oil reaching the nozzle holder (7) has access to the annular groove of the drip-oil connector (9) via the passage (8) and flows back through the Drip-oil outlet (13) into the fuel tank. If, towards the end of the discharge stroke, the fuel pressure becomes weaker than the tension spring (6), the latter presses by way of the pressure bolt (4) the nozzle needle (1) back again on its seat; the injection is completed. With this the nozzle is closed until actuated again by the next discharge stroke. There must be no dribbling of fuel.

The opening pressure of the nozzle can be adjusted by changing the initial load of the tension spring with the help of the washers (15).

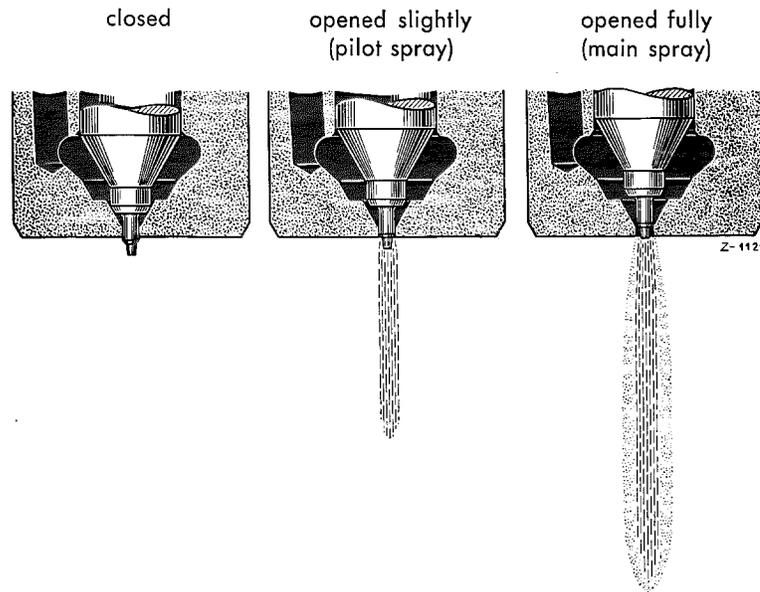


Figure 07-4/21

Throttle Nozzle DNO SD 211 with pilot injection

With the throttle nozzle installed in the Models OM 636 and OM 621 the injection process is influenced by the shape of the spray pin of the nozzle needle and the throttle bore in the nozzle head, meaning a pilot injection is obtained. The nozzle needle opens at first only a narrow annular gap, through which can only pass a little fuel very finely sprayed (throttle effect). During further opening (caused by increase of pressure) the cross section of the passage becomes larger, the main portion of the fuel is injected towards the end of the needle stroke. The combustion and the engine performance is therefore smoother, because there is a slower increase of pressure in the combustion chamber.

The two injection nozzles DNO SD 211 (OM 636) and DNO SD 151 (OM 621) are different regarding the shape of the throttle pin (9) and the travel of the nozzle needle (see Figure 07-5/32).

The injection nozzle DNO SD 211 must only be used for the OM 636 and the nozzle DNO SD 151 must only be used for the OM 621.

VIII. Fuel Feed Pump

a) General

The fuel feed pump is a single-acting plunger pump, which has the task of pumping fuel at a certain pressure (approx. 1.5 atm.) through the fuel main filter into the suction end of the injection pump. This is necessary to guarantee a satisfactory fuel supply of the pump elements,

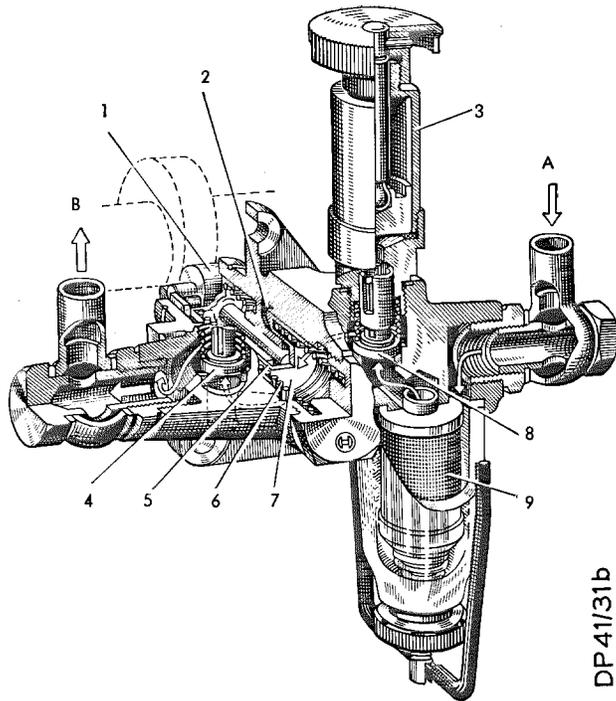


Figure 07-4/22

- A Fuel inlet (suction end)
- B Fuel outlet (discharge end)
- 1 Roller tappet
- 2 Pressure space
- 3 Hand pump
- 4 Pressure valve
- 5 Plunger
- 6 Plunger spring
- 7 Suction space
- 8 Suction valve
- 9 Pre-filter

DP41/31b

especially in the higher full load speed ranges. The system can be primed with the hand pump attached to the feed pump while the engine is not in operation. Furthermore, the hand pump serves to bleed the injection system.

b) Design and Operation

The feed pump is driven by the camshaft of the injection pump by means of an eccentric or a cam. The eccentric (11) or cam presses the plunger (5) outwards against the plunger spring (6) by way of the roller tappet (1) and the pressure bolt (12) (Figure 07-4/22). By this the fuel in the suction space (7) is discharged through the pressure valve (4) into the pressure space (2). This stroke is called intermediate stroke. At the same time the plunger spring (6) is compressed (see Figure 07-4/23). At the end of this stroke the spring-loaded pressure valve (4) closes. The pressure bolt (12) is neither attached to the roller tappet (1) nor the plunger (5). As soon as the eccentric has reached its max. stroke the plunger, the pressure bolt and the roller tappet are forced inwards again in the direction of the injection pump by the pressure of the pre-loaded plunger spring (6) (see Figure 07-4/24). The result is that the fuel is discharged from the pressure space through the filter into the injection pump. At the same time, however, fuel is drawn from the fuel tank through the pre-filter and the suction valve (8) into the suction space (7) by the returning plunger (5). This stroke is called discharge and suction stroke (see Figure 07-4/24). The discharge and suction stroke is thus executed by the pre-loaded plunger spring (6). The intermediate stroke serves only to discharge the fuel from the suction space (7) into the pressure space (2) and to tension the plunger spring (6).

If the pressure at the discharge end (that is between the feed pump and the injection pump) surpasses the specified rate, the plunger spring is no longer able to press the plunger inwards all the way. This can even go so far that the plunger will no longer move, if the fuel system is clogged in the discharge section (e.g. fuel clouding in the winter) or if the by-pass valve is pre-loaded too strongly.

The plunger spring will only press the plunger inwards as long as the opposing fuel pressure is lower than the spring force. By this design the system is pressure-proof. The stopping of the plunger can sometimes be heard as a tapping noise. And this is the reason: The continuously operating roller tappet knocks against the stationary or only slightly moving plunger. In such cases check the by-pass valve, which has the task of maintaining the specified delivery pressure.

The hand pump is screwed into the feed pump above the suction valve. While the engine is not in operation the hand pump can be used to pump the fuel from the tank into the filter and the injection pump. The discharge rate is approx. 6 cm³ per discharge stroke. In order to operate the hand pump unscrew the handle (knurled nut) so far that the plunger can be pulled upwards. The suction valve opens during this stroke and the fuel flows into the suction space. During the downward motion the suction valve closes, the pressure valve opens and the fuel flows through the filter into the injection pump. Tightly screw in the handle after using the hand pump, otherwise the fuel will leak here while the engine is in operation. By tightening the handle the plunger is pressed against a rubber sealing ring and seals the hand pump.

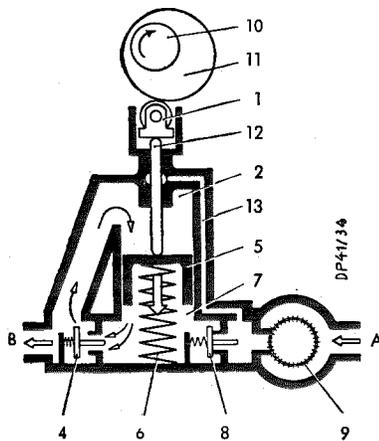


Figure 07-4/23

Intermediate Stroke

- 1 Roller tappet
- 2 Pressure space
- 4 Pressure valve
- 5 Plunger
- 7 Suction space
- 8 Suction valve

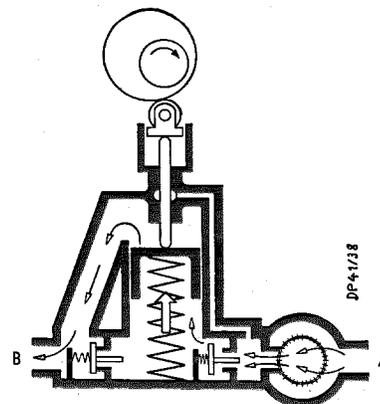


Figure 07-4/24

Discharge and Suction Stroke

- 9 Pre-filter
- 10 Camshaft
- 11 Driving eccentric
- 12 Pressure bolt
- 13 Drip-oil passage
- A Fuel inlet (suction end)
- B Fuel outlet (discharge end)