Adjusting No-Load Maximum Speed

Change: Note and Table on Page 00-12/2 added

In the highest speed range of an engine there are two speeds, the full-load max. speed and the no-load max. speed.

Higher maximum speeds as those stated (see Job No. 00–0 and 0–2) are **not permissible** for mechanical reasons and because of carrying along of oil and dirt from the air filter.

a) Full-Load Max. Speed:

The full-load max. speed, also called rated speed, is the speed which the engine should reach at max. power output. The throttle butterfly is fully opened against the full-load stop. At low speed there is at first only a small vacuum in the vacuum chamber. The vacuum necessary for governing and the required force to pull back the control rod in the direction STOP will only be obtained if the throttle butterfly is fully opened and during full-load max. speed. At the same time, the compensating spring will be completely relieved but is still lightly resting on the full-load stop (see Fig. 07–4/13). As soon as the engine has reached its full-load max. speed the pulling back of the control rod in the direction STOP begins and with it the limitation of the no-load max. speed (beginning of governing).

b) No-Load Max. Speed:

The no-load max. speed is the speed which the engine can reach in extreme cases but should never surpass for longer periods without endangering the engine or one of the units driven by the engine.

If for instance the throttle is opened fully while stationary or during a downhill drive, the speed surpasses the full-load max. speed. The vacuum increases so that the diaphragm is lifted away from the full-load stop and is pulled further in the direction STOP against the Stupser.

Even though the governor goes into action (the injected quantity becomes smaller) while the diaphragm is leaving the full-load stop, the engine speed still increases due to the small load. The speed continues to increase until the diaphragm is pulled so far back that the pump plunger passes the partial load and idling position and reaches the range of no delivery. The Stupser is compressed during this process. The diaphragm and control rod thus travel through the idling position into the no-delivery range of the injection pump as is exactly the case during the stopping of the engine (Figure 07–4/14 and Figure 07–4/15). Therefore, a further speed increase is impossible in this position of the governor (end of governing).

Note: The above description shows that the position of the Stupser is of essential importance for the no-load max. speed. A required adjustment of the Stupser to smoothen idling operation should therefore be conducted very carefully (see Job No. 07–8, Section III).

c) Adjusting No-Load Max. Speed:

Warm up engine, then accelerate by opening throttle butterfly, as far as possible and measure no-load max. speed with revolution counter. If the no-load max. speed is higher than specified for the respective type in the technical data (see page 0–1/11 and next page, as well as 0–2/1). The full-load stop screw must be screwed in so far that the specified speed will be obtained (see Figure 00–11/1).

If the no-load max. speed is not reached, then open the throttle butterfly and/or increase the speed by unscrewing the full-load stop screw (1) (Figure 00–11/1).

Since the vacuum of the individual engines are never exactly the same, it may happen that the full-load stop screw and/or the throttle butterfly position during full throttle have to be adjusted (see Job No. 07–23).

If the throttle butterfly is already opened as far as possible, the governing spring of the injection pump must be further pre-loaded by means of spacer rings (for OM 636 see Fig. 00–12/1, Pos. 20, for OM 621 see Fig. 00–12/2, Pos. 14). Then measure no-load max. speed and if it corresponds to the values listed in the technical data, attach lead seal to governor housing of injection pump (see Figure 07–5/1). The subsequent installation of a spacer ring must therefore be done by one of our agencies which are in possession of lead pliers of the Bosch company, or it must be done in cooperation with the nearest Bosch Service Agency. The installation of one spacer ring 1 mm thick results in an average increase in engine speed of approx. 120 to 150 rpm on the OM 636, depending on the properties of the individual governing spring.

Spacer ring 1.0 mm thick, Part No. 180 990 18 40
Spacer ring 0.5 mm thick, Part No. 180 990 17 40
Spacer ring 0.2 mm thick, Part No. 180 990 16 40

Note: Instead of measuring the no-load max. speed (changing-down end), the full-load max. speed (begin of changing down at full load) or the permissible max. speed of vehicles in 2nd and 3rd gear can be checked and corrected in accordance with tachometer indication. For permissible max. speeds refer to table at right. Higher speeds are not permissible for mechanical reasons and because of the possibility of carrying along oil and dirt from the air filter.

Permissible Max. Speeds as per Tachometer Indication			
Model		2nd Gear	3rd Gear
170 D, 170 Da, 170 Db, 170 DS, 170 SD, 180 D, 180 Db, 180 Dc		51	79
190 D 190 Db		56	89
190 Dc		58	91
L and O 319 D	with engine OM 636	28	48
	with engine OM 621	32	55

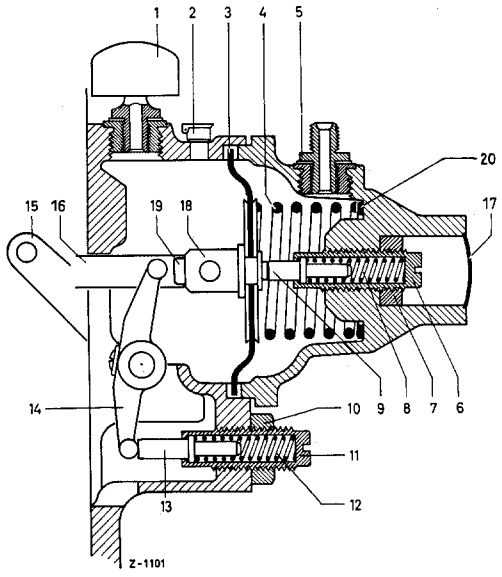

Fig. 00–12/1

Partial Load or Idling Position OM 636

1 Venting strainer for atmospheric chamber
2 Flap-type oiler for lubricating governor linkage
3 Diaphragm
4 Control spring
5 Vacuum connection to the vacuum chamber
6 Adjusting screw with additional spring (Stupser)
7 Fixing nut for adjusting screw
8 Additional spring
9 Stop pin (Stupser)
10 Fixing nut
11 Adjusting screw with full-load stop
12 Spring
13 Stop pin
14 Throttle lever
15 Re-adjusting lever
16 Control rod
17 Cap in diaphragm block housing cover
18 Diaphragm pin
19 Pressure pin of the adaptation spring
20 Spacer ring

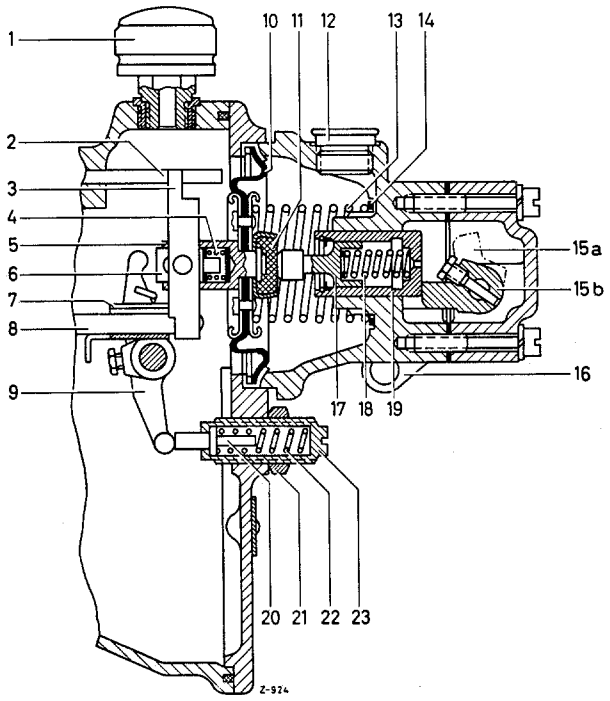

Fig. 00–12/2

Idling Position of OM 621

1 Air filter
2 Guide rod
3 Guide lever
4 Adaptation spring
5 Diaphragm pin
6 Pressure pin of adaptation spring
7 Starting quantity stop
8 Control rod
9 Double lever
10 Diaphragm
11 Rubber buffer
12 Vacuum connection on the vacuum chamber
13 Control spring
14 Spacer ring
15a Engaging cam, full-load position
15b Engaging cam, idling position
16 Lever for automatic additional control
17 Stop pin (Stupser)
18 Additional spring
19 Stupser housing and/or spring capsule, sliding
20 Stop pin for full-load stop
21 Fixing nut
22 Spring
23 Adjusting screw with full-load stop