Calibration devices

Control-lever stops

On every governor there are stops for the minimum and maximum control-lever deflection. If, for example, the driver fully depresses the accelerator, the control lever is brought into contact with an adjustable stop screw. Adjusting the screw alters

- the control-lever deflection, i.e. the injected fuel quantity, on a minimum/maximum-speed governor
- the maximum speed on a variable-speed governor.

The stop screw is factory-adjusted and sealed; tampering with it voids the manufacturer's warranty.

The other stop is normally used to adjust the idle speed. This stop may be sprung or rigid.

Rigid stop

With a rigid stop (Figure 1) the fuel-injection equipment must incorporate a separate device for stopping the engine.

Sprung stop

If a sprung stop is used (Figures 2 and 3) the stop setting is reached by pressing the lever past the stop position against the force of the spring.

If necessary, the minimum stop can be set to "shutoff", but in this case there must be a low-idle stop elsewhere on the engine.

Stops for intermediate fuel volumes or engine speeds

Stops for intermediate control lever settings can be fitted as an option.

Depending on governor type, either a "reduced-delivery stop" for setting a lower full-load delivery quantity, or an "intermediate-speed stop" for setting an engine speed below nominal speed can be used (Figure 4).

1 Rigid control-lever stops

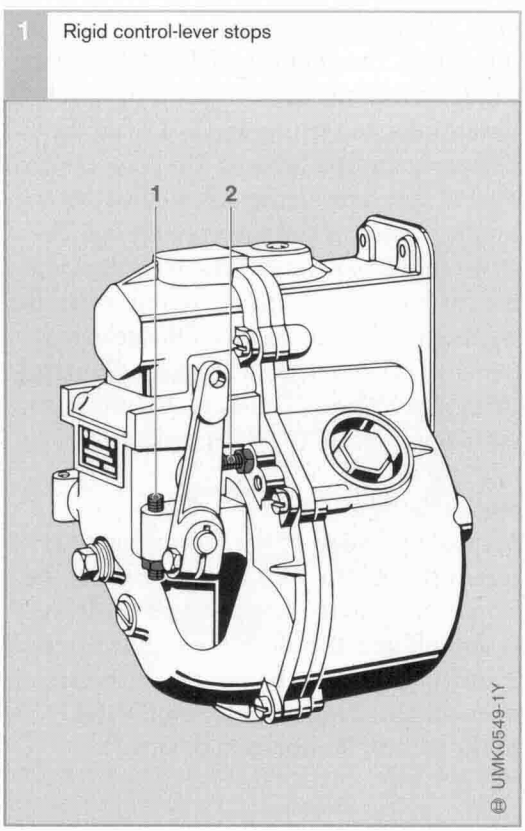


Fig. 1
1 Stop for idle speed (or shutoff)
2 Stop for full-load volume on minimum/maximum-speed governor or for nominal speed on variable-speed governor

2 Stops for reduced volume on minimum / maximum-speed governor or for intermediate speeds on variable-speed governor (external view)

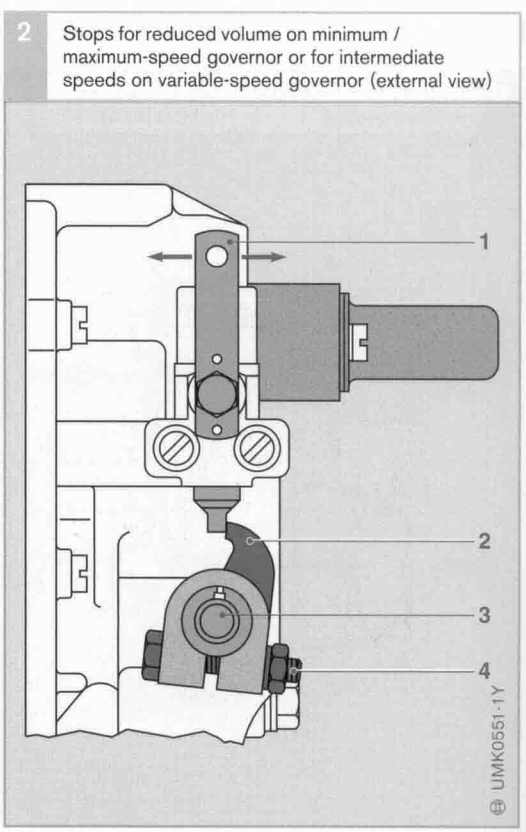
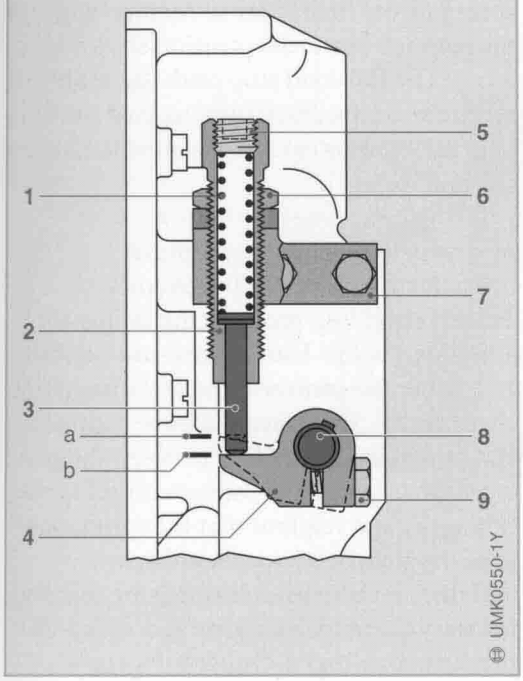


Fig. 2
1 Lever
2 Stop lever
3 Control-lever shaft
4 Clamping screw

3 Sprung control-lever stop (Type RQ and RQV governors)



Control-rod stops

Apart from the stops for idle speed/shutoff, full-load volume/maximum speed (present on every governor for limiting control-lever movement) a special stop is required to limit control rack travel at full load or when starting from cold.

There are also full-load stops for performing specific compensating functions. Control-rod stops may be fitted on the fuel-injection pump or on the governor. A selection of the possible variations is described below in more detail.

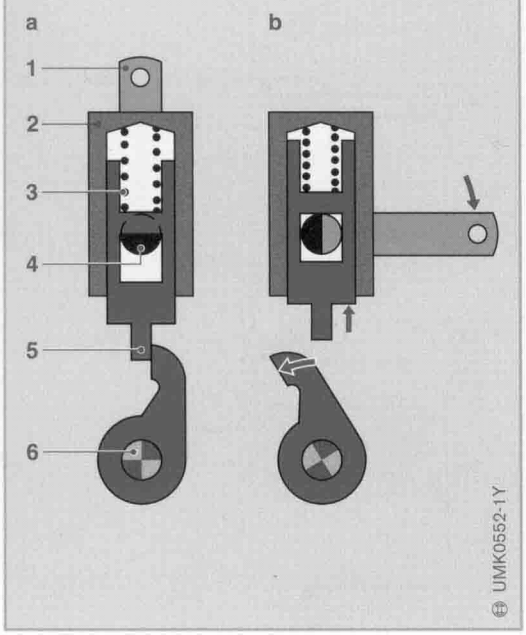
Rigid start-quantity stop

The rigid start-quantity stop is used primarily on Type RQ governors with low idle-speed settings (Figure 5). When the engine is running, the excess fuel for starting is backed off by the governor so that it does not have an adverse effect (emission of smoke).

Fig. 3
a Shutoff
b Idle speed

1 Spring
2 Threaded sleeve
3 Pin
4 Stop lever
5 Screw cap
6 Locking nut
7 Fixing bracket
8 Control-lever shaft
9 Clamping screw

4 Stops for reduced fuel volumes or intermediate engine speeds



5 Rigid control-rod stop for limiting start quantity on Type RQ governor

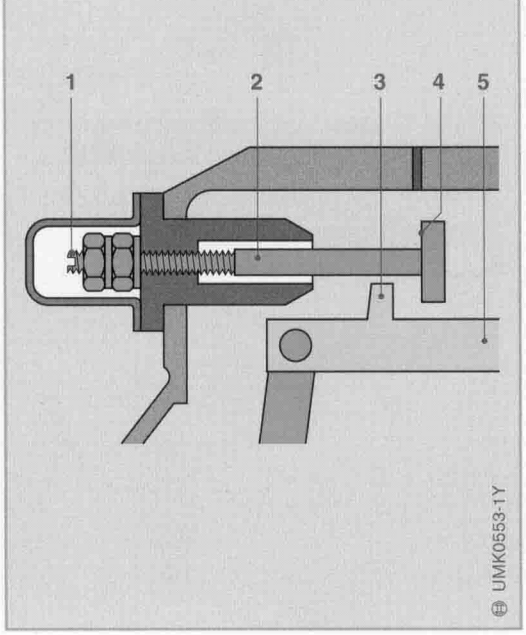


Fig. 4
a Locked
b Released

1 Lever
2 Housing
3 Spring
4 Switching shaft
5 Stud
6 Control-lever shaft

Fig. 5
1 Excess starting fuel adjusting screw
2 Stop pin
3 Stop lug
4 Start-quantity limitation
5 Link fork

Sprung start-quantity stop for Type RQ governor

When the engine is started (accelerator fully depressed), the stop pin is moved against the resistance of the spring to the set start-quantity position. The spring in the stop acts against the idle-speed spring and thus initiates early return of the control rack from the start-quantity position (Figure 6). That means that if the engine is accelerated rapidly from idle speed, partial application of the start quantity is prevented.

Automatic full-load stop

When the engine is not running, the governor springs in the flyweights act via the sliding bolt (Figure 8, Item 13) to overcome the rocker spring (12). The rocker (9) pushes the stop strap (8) with the full-load stop (7) downwards (position shown in gray). If the accelerator is fully depressed when the engine is started, the control rack (6) can be moved to the start-quantity position.

After the engine has started, the sliding bolt is drawn back from the rocker (arrow) by the action of the flyweights. For the same reason, the control rack moves back from the start-quantity position to a lower quantity setting. Consequently, the rocker spring pivots the rocker so that its long arm moves back upwards (position shown in blue). The full-load stop once again prevents the control rack moving past the full-load position by catching against the lug on the link fork (4).

Stop with external torque-control mechanism for Type RQV governor

This external stop provides the facility for adjusting the full-load control-rod position and the torque-control settings (starting point, characteristic and travel). Torque control is effected by the interaction between the governor drag spring and torque-control spring (Figure 7) and requires that the springs are precisely matched to one another.

If there is also a tension spring for enabling the start quantity, the rocker (i.e. speed-dependent enabling) is omitted (Figure 9).

6 Sprung control-rod stop for limiting start quantity on Type RQ governor

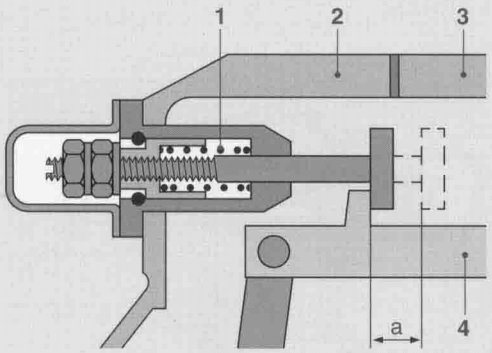


Fig. 6
1 Spring
2 Governor cover
3 Governor housing
4 Control-rod link fork

a Start-quantity stop travel

7 Control-rod stop with torque-control mechanism for Type RQV governor

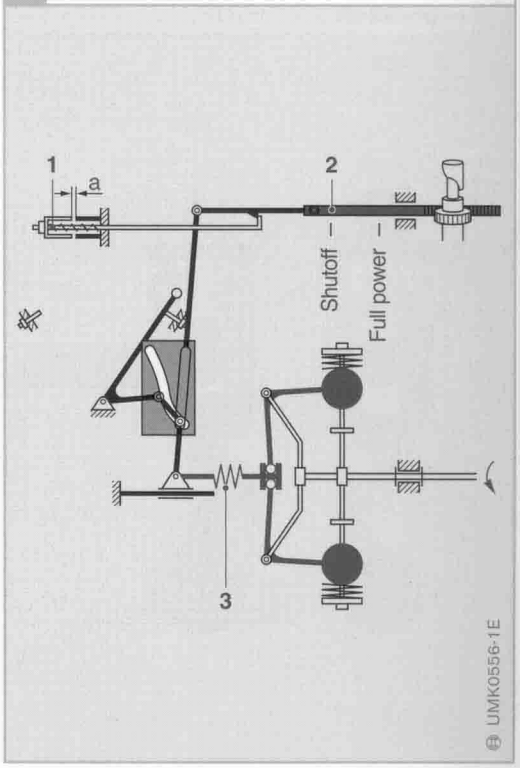


Fig. 7
Torque-control spring overcomes drag spring
1 Torque-control spring
2 Control rack
3 Drag spring
a Torque-control travel

8 Automatic full-load control-rod stop for Type RQV governor

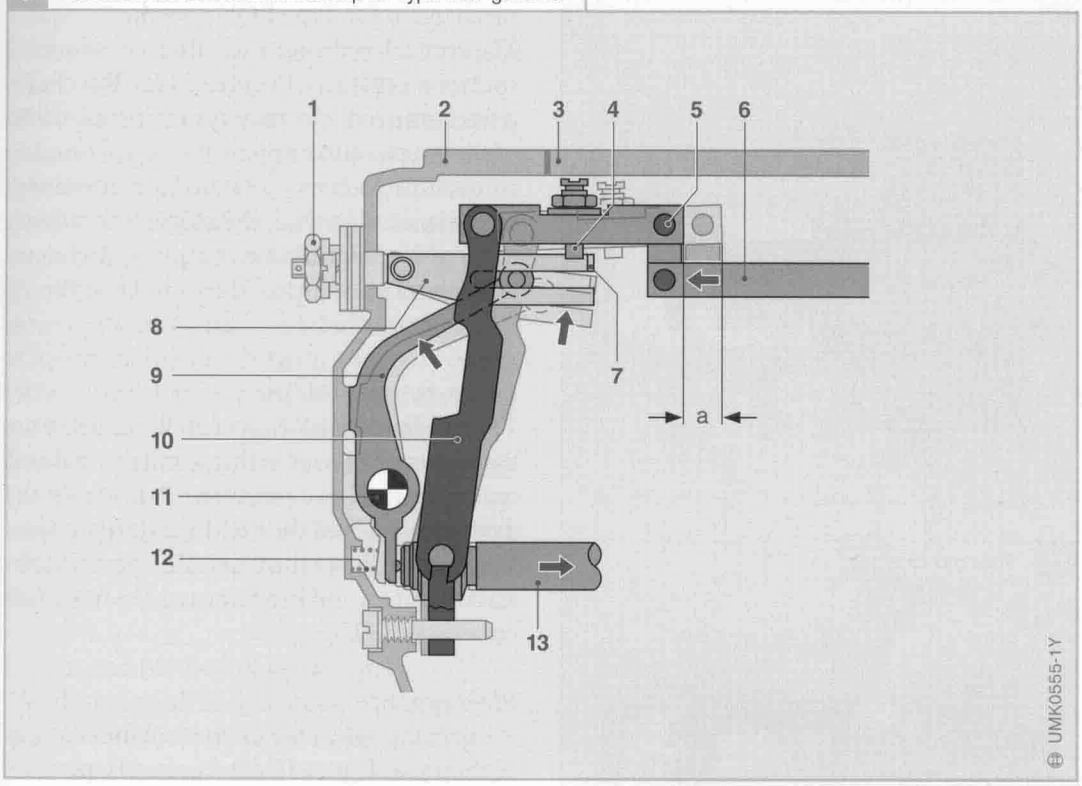


Fig. 8
Position shown in gray: start quantity enabled
Position shown in blue: full-load quantity setting

1 Full-load quantity adjuster
2 Governor cover
3 Governor housing
4 Stop lug
5 Link fork
6 Control rack
7 Full-load stop
8 Stop strap
9 Rocker
10 Variable-fulcrum lever
11 Control-lever shaft
12 Rocker spring
13 Sliding bolt

a Start-quantity stop travel

9 Control-rod stop for Type RQV governor with lever for excess starting fuel and torque-control mechanism

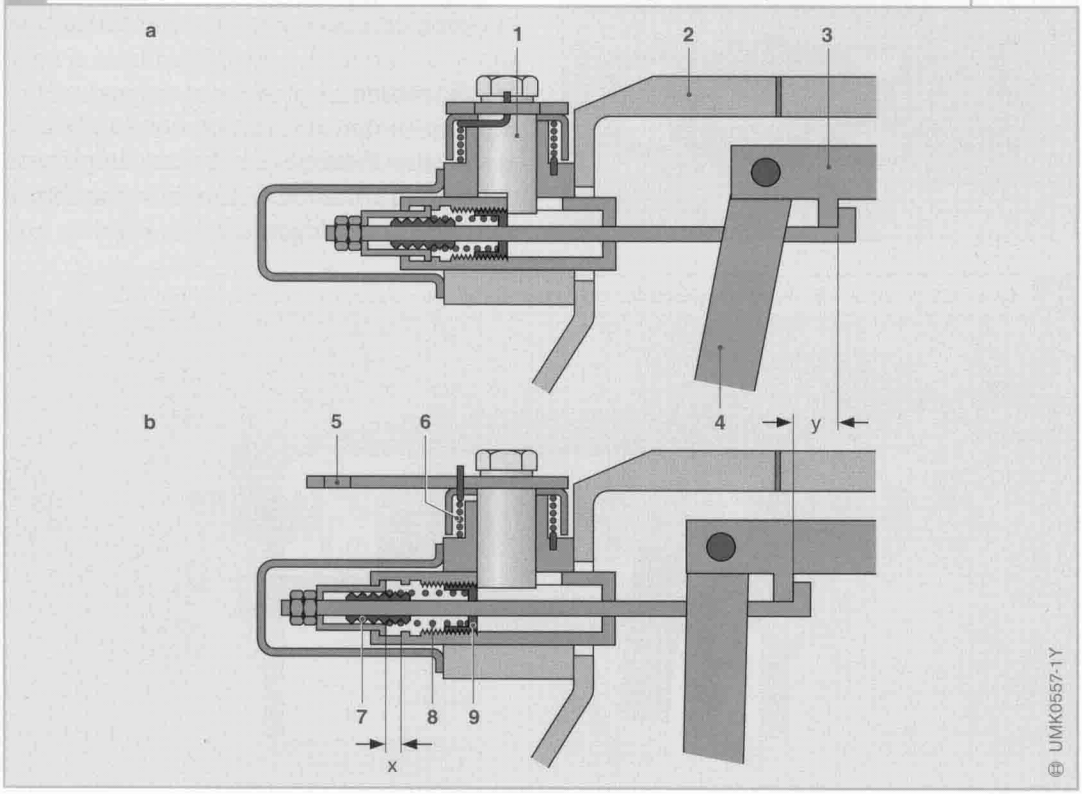


Fig. 9
a Start-quantity position
b Full-load setting with torque control

1 Locking pin
2 Governor cover
3 Link fork
4 Variable-fulcrum lever
5 Start-quantity lever
6 Lever compression spring
7 Threaded sleeve
8 Torque-control spring
9 Adjusting screw

x Torque-control travel
y Start-quantity stop travel

10 Rigid control-rod stop

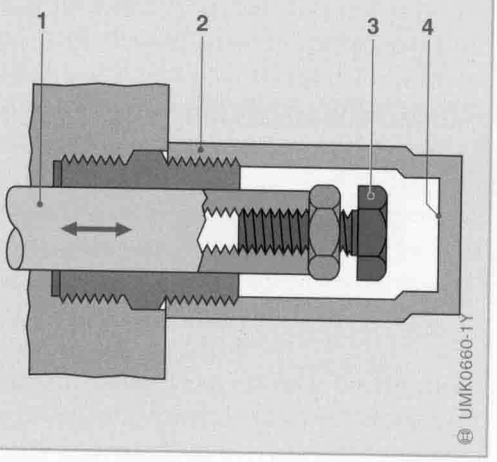


Fig. 10
1 Control rack
2 Screw cap
3 Adjusting screw
4 Stop surface

11 Sprung control-rod stop

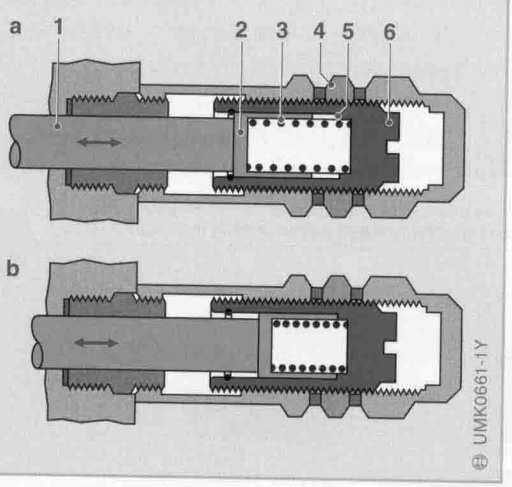


Fig. 11
a Full-load position
b Start position

1 Control rack
2 Stop sleeve
3 Spring
4 Locking nut
5 Stop
6 Adjusting sleeve

Stop with internal torque-control mechanism for Type RQV governor

The control-rod stop with internal torque-control mechanism (Figure 12) for Type RQV governors protrudes only approximately 25% of the length of the stop with external torque-control mechanism. Designed for situations where space is limited, this stop allows adjustment of the point at which torque control starts and the torque-control travel, but not the torque-control rate.

Pump-mounted stops

The full-load volume is generally adjusted on the governor. However, there are also rigid and sprung control-rod stops for mounting on the drive input side of the fuel-injection pump. They normally set the maximum permissible start quantity, and in a few cases the full-load volume as well.

Rigid version

A rigid stop set to the excess fuel for starting as shown in Figure 10 can be used in place of the governor-mounted stop shown in Figure 5. A rigid stop set to the full-load position will, by definition, not permit excess fuel for starting.

Sprung version

A pump-mounted sprung control-rod stop as shown in Figure 11 can be used in place of the governor-mounted stop shown in Figure 6; its function is identical.

12 Type RQV governor with internal torque-control mechanism

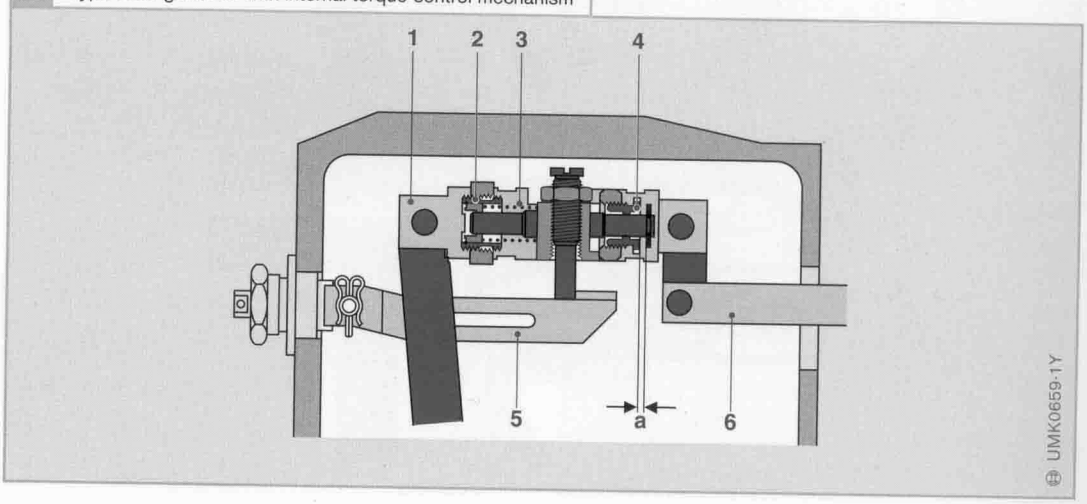


Fig. 12
1 Link with torque control mechanism
2 Adjusting screw for torque-control starting point
3 Torque-control spring
4 Adjusting screw for torque-control travel
5 Full-load stop
6 Control rack

a Torque-control travel