

# Shock Absorbers

Job No.

32-1

## A. General

The adjustment of the shock absorbers always closely corresponds to the type of spring installed. When installing the springs make sure that the shock absorbers match the springs.

The various types of shock absorbers can easily be distinguished by the make and the DB Part No. marked on the shock absorber housing. Furthermore the front shock absorbers are painted black and the rear shock absorbers are painted red.

## B. Checking of Shock Absorbers

Shock absorbers can only be checked satisfactorily on a test stand. Checking the shock absorber by hand is very inaccurate and makes it impossible to assess the condition and necessary adjustment of the shock absorber correctly.

The test values for shock absorbers are listed in Job No. 32-7, Sections G and H.

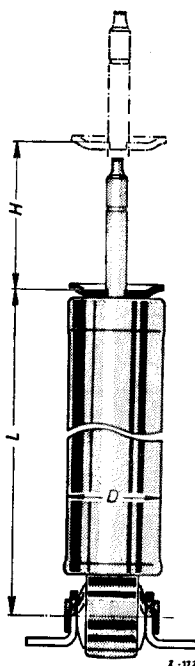


Fig. 32-1/1

H = Stroke  
L = Length compressed  
D = External diameter

## C. Bilstein Shock Absorbers

On Model 220 SE and Model 220 S as from chassis end No. 85 09110 and from chassis end No. 75 10452 to 75 11075 rear Bilstein shock absorbers were installed as standard parts. The front shock absorbers are F. & S., Tov 36×130, Part No. 180 323 00 00. However, a number of cars were also provided with Bilstein front shock absorbers.

### a) Suspension of Bilstein Shock Absorbers

The suspension of the Bilstein shock absorbers differs from that of the F. & S. and the Stabilus shock absorbers (Figs. 32-1/2 and 32-1/3).

Front suspension

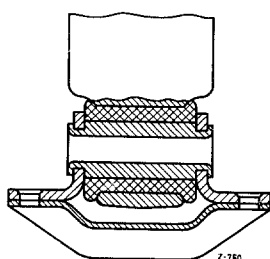
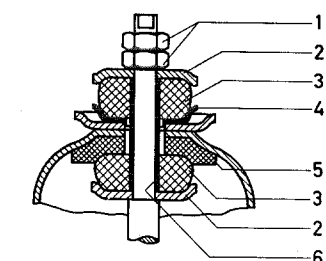
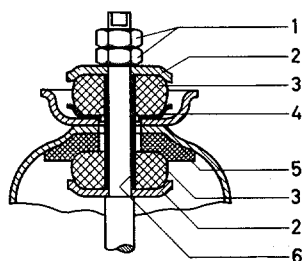


Fig. 32-1/2

- 1 Hexagon nut
- 2 Cup
- 3 Rubber ring
- 4 Cup
- 5 Rubber cup
- 6 Spacer sleeve

Rear suspension

1st version



2nd version

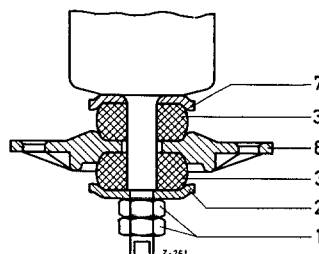
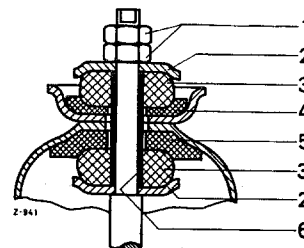


Fig. 32-1/3

- 1 Hexagon nut
- 2 Cup
- 3 Rubber ring
- 4 Cup
- 5 Rubber cup
- 6 Spacer sleeve
- 7 Cup
- 8 Adapter

**Note:** Models 220 SE and 220 S as from chassis end No. 85 10200 have the 2<sup>nd</sup> version rear shock absorber suspension. The 2<sup>nd</sup> version differs from the 1<sup>st</sup> version in that the sheet metal cup (4) has been replaced by a rubber cup Part No. 000 323 11 62 in order to prevent suspension noises.

### b) Installation Hints for Bilstein Shock Absorbers

Close attention should be paid to the following points when installing Bilstein shock absorbers:

1. Before installing the shock absorber check whether the top and bottom suspension points on the vehicle are satisfactory and free from burrs, welding projections, deformation, and foreign bodies.

2. Check the surface of the shock absorber piston rod for damage; damaged piston rods cut into the seal and thus make the shock absorber unserviceable. For the same reason the shock absorbers should be treated with the utmost care during installation.
3. The cup (4) of the 1<sup>st</sup> version rear shock absorber suspension must lie flat and must be centered in the cup on the chassis base panel to prevent rattling. The hexagon nuts (1) should be tightened firmly. The spacer sleeve (6) and the shoulder of the piston rod (bottom) prevent excessive initial stress of the rubber buffers (see Figs. 32-1/2 and 32-1/3).
4. After installation check whether the shock absorbers work properly.

#### c) Subsequent Installation of Bilstein Shock Absorbers

As a result of the initial stress of Bilstein shock absorbers the rear-wheel camber is changed by approx. plus  $0^{\circ} 30'$ ; before Bilstein shock absorbers are installed, the rear-wheel camber should therefore be changed by minus  $0^{\circ} 30'$  (see also Job No 32-0, Section C).

#### d) Checking of Bilstein Shock Absorbers

1. When complaints are received about noise or changes in the riding qualities of the car, check the shock absorbers and their suspension. Rattling noises can usually be traced to the shock absorber suspension. Make sure that the initial stress of the rubber buffers is correct and that all suspension parts are installed properly.
2. If rumbling noises can be heard with the car stationary, when getting into the car or at slow speed, the piston rods are running dry and should be given an extra coat of oil.
3. To check the shock absorbers themselves remove them from the vehicle and depress the piston rod by hand. If a hissing or clicking noise can be heard during the final lag of the power stroke before the piston rod comes to rest against the bottom stop, the shock absorber should be replaced.

When the shock absorber has been depressed by hand and the piston rod does not extrude when the pressure is released, the shock absorber does not work properly and is no longer serviceable.

4. If Bilstein shock absorbers lose oil, check the oil reserve. To do this depress the piston rod as far as the stop and measure the remaining length as far as the shoulder of the piston rod (Fig. 32-1/4). When this test is being made, the temperature of the shock absorber should be approx.  $+18$  to  $+20^{\circ}$  C.

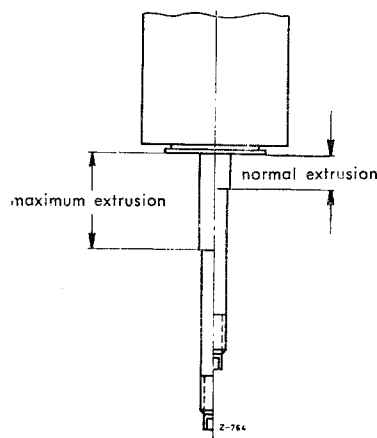


Fig. 32-1/4

The stop position of the piston rod and the position of the intermediate piston between gas pad and oil depends on the amount of oil in the shock absorber.

When oil has been lost the gas pressure forces the intermediate piston outward and increases the piston rod extrusion. If the maximum extrusion of the piston rod is exceeded, the shock absorber will become unserviceable.

The piston rod extrusion values are listed in the table below.

	Front shock absorber	Rear shock absorber
Type designation	Bilstein Type 062	Bilstein Type 063
Part No.	180 323 05 00	180 326 04 00
Normal extrusion of piston rod in mm	$12 \pm 1$	$15 \pm 1$
Maximum extrusion of piston rod in mm	33	37

**Note:** Shock absorbers with excessive piston rod extrusion are noisy (see Para 3) and should be replaced.

5. Light oil desposits on the shock absorber or on the lower suspension parts do not necessarily indicate that the shock absorber is unserviceable. Always check the oil reserve.
6. If these checking methods prove unsatisfactory the shock absorber should be checked on a tester.
7. Bilstein shock absorbers cannot be repaired with the tools and equipment available in garages and repair shops.

**Because of the over-pressure obtaining in Bilstein shock absorbers, they must never be opened.**