



PART 7  
FRAME  
SUSPENSION  
WHEELS  
C 3-series

# SERVICE MANUAL

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# GROUP 70 GENERAL

## Data

### FRAME

Type .....	Fully welded with box-section side members
Length, 2-axle vehicle, wheelbase 2300 mm (90.5") .....	2530 mm (100")
, 2-axle vehicle, wheelbase 2530 mm (100") .....	3990 mm (157")
, 3-axle vehicle, wheelbase 2720 + 1050 mm (107 + 41") .....	5674 mm (223")

### Front springs

#### 2-axle vehicle, wheelbase 2300 mm (90.5")

Type .....	Leaf springs
Length between anchorage centres .....	1300 mm (51")
Width .....	76 mm (3")
Number of leaves .....	7
Thickness of leaves:	
Leaves 1-7 .....	7 mm (0.28")
Test values (complete spring)	
Load with deflection of 1 cm (0.4") .....	560 N (56 kp = 123 lb.)
Load for straight spring (spring must first be loaded to negative deflection of 150 mm = 6") .....	5900 N (590 kp = 1300 lb.)

#### 2-axle vehicle, wheelbase 2530 mm (100")

Type .....	Leaf springs
Length between anchorage centres .....	1300 mm (51")
Width .....	76 mm (3")
Number of leaves .....	8
Thickness of leaves:	
Leaves 1-8 .....	7 mm (0.28")
Test values (complete spring)	
Load with deflection of 1 cm (0.4") .....	640 N (64 kp = 140 lb.)
Load for straight spring (spring must first be loaded to negative deflection of 150 mm = 6") .....	7000 N (700 kp = 1400 lb.)

#### 3-axle vehicle

Type .....	Leaf springs
Length between anchorage centres .....	1300 mm (51")
Width .....	76 mm (3")
Number of leaves .....	8
Thickness of leaves:	
Leaves 1-8 .....	7 mm (0.28")
Test values (complete spring)	
Load with deflection of 1 cm (0.4") .....	640 N (64 kp = 140 lb.)
Load for straight spring (spring must first be loaded to negative deflection of 150 mm = 6") .....	7000 N (700 kp = 1400 lb.)

### Rear springs

#### 2-axle vehicle, wheelbase 2300 mm (90.5")

Type .....	Leaf springs
Length between anchorage centres .....	1300 mm (51")
Width .....	76 mm (3")
Number of leaves .....	8

## Thickness of leaves:

Leaves 1-8 ..... 7 mm (0.28")

## Test values (complete spring)

Load with deflection of 1 cm (0.4") ..... 640 N (64 kp = 140 lb.)

Load for straight spring must first be loaded to negative

deflection of 150 mm = 6" ..... 7000 N (700 kp = 1400 lb.)

## 2-axle vehicle, wheelbase 2530 mm (100")

Type ..... Leaf springs

Length between anchorage centres ..... 1300 mm (51")

Number of leaves ..... 9

## Thickness of leaves:

Leaves 1-9 ..... 7 mm (0.28")

## Test values (complete spring)

Load with deflection of 1 cm (0.4") ..... 720 N (72 kp = 160 lb.)

Load for straight spring (spring must first be loaded to negative

deflection of 150 mm = 6") ..... 8300 N (830 kp = 1825 lb.)

## 3-axle vehicle

Type ..... Leaf springs of parallel type

Length ..... 1320 mm (51")

Width ..... 76 mm (3")

Number of leaves ..... 4

## Thickness of leaves in centre:

Leaves 1-4 ..... 13 mm (0.5")

## Test values (complete spring)

Load with deflection of 1 cm (0.4") ..... 1040 N (104 kp = 230 lb.)

Load for straight spring ..... 19900 N (1990 kp = 4380 lb.)

## Helper spring

Type ..... Hollow-rubber

## Shock absorbers

Type ..... Telescopic

## Length between anchorage centres:

Compressed ..... 404 mm (16")

Extended ..... 671 mm (26")

## Wheels

## Rims

Type ..... Disc

Size ..... 7.5 L x 16"

Number of wheel nuts ..... 8

Max. radial throw ..... 2 mm (0.08")

Max. lateral throw ..... 2 mm (0.08")

Circle diameter of wheel studs ..... 222 mm (8.75")

## Tyres

Size ..... 280/85 x 16"

4-ply special

Wheel revs per km (mile) ..... approx. 375

Tyre pressure, front ..... 1.6 kp/cm<sup>2</sup> (23 lbf/in<sup>2</sup>)

, rear ..... 1.75 kp/cm<sup>2</sup> (25 lbf/in<sup>2</sup>)

**Hubs (front and rear)**

Pre-load, new wheel bearings .....	42–48 N (4.2–4.8 kp = 9–10 lbftf) + friction of sealing rings
, run-in wheel bearings .....	24–28 N (2.4–2.8 kp = 5–6 lbftf) + friction of sealing rings
Bearing clearance when about to adjust .....	0.08 mm (0.0032")

**Bogie**

Bogie distance. ....	1050 mm (41.3")
Axial clearance, cradle journalling .....	0.1 mm (0.004")

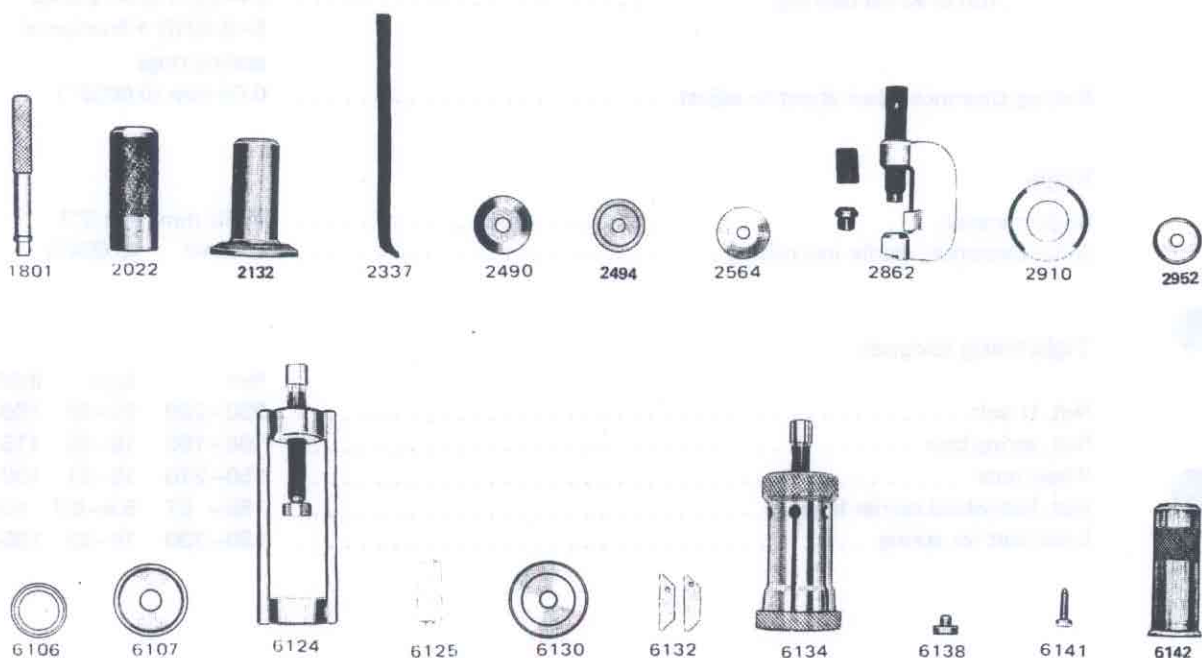
**Tightening torques**

	Nm	kpm	lbftf
Nut, U-bolt .....	230–280	23–28	166–202
Nut, spring bolt .....	160–190	16–19	115–137
Wheel nuts .....	150–210	15–21	108–152
Nut, hub-wheel carrier housing .....	55– 67	5.5–6.7	40– 48
Lock bolt for spring .....	180–230	18–23	130–166



## Tools

The following special tools are required for work on the frame, suspension, wheels



- 1801 Standard handle
- 2022 Sleeve for pressing on gear wheel
- 2132 Sleeve for pressing sealing ring into cradle
- 2337 Drift
- 2490 Drift for removing outer bearing outer ring in hub
- 2494 Drift for pressing needle bearing into cradle
- 2564 Drift for removing inner bearing outer ring in hub
- 2862 Press tool for removing and installing wheel studs
- 2910 Sleeve for installing outer sealing ring in hub
- 2952 Drift for pressing needle bearing out of cradle
- 6106 Sleeve for installing inner and outer bearing inner ring in hub

- 6107 Drift for installing inner bearing outer ring in hub
- 6124 Press tool for removing and installing spring bushings
- 6125 Drift. Used together with 6124 when removing spring bushing and for removing and installing rubber bushings on reaction rods
- 6130 Drift for installing inner seals in hub
- 6132 Press washers for removing outer bearing outer ring in hub
- 6134 Puller for removing outer bearing inner ring in hub
- 6138 Guide. Used together with 6124 and 6125
- 6141 Bolt for pressing out hub
- 6142 Sleeve for installing bearing races

## GROUP 71 FRAME

### Description

The frame is made up of two box-profile side members which are joined together by means of four crossmembers. The front and rear crossmembers are

of box-section while the two intermediate are gas-tight tubular members which function as vacuum tanks.

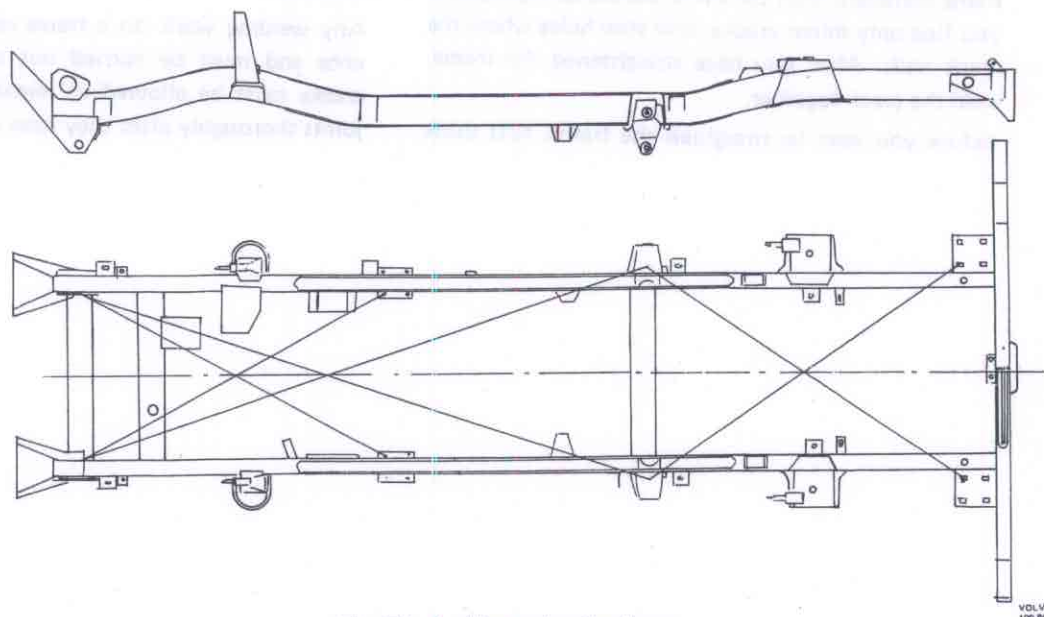


Fig. 71-1. Measuring the frame

### Service Procedures

#### Measuring the frame

If it is suspected that for some reason or other the frame is faulty, it should be check-measured. This can be done by transferring the position for certain fixed points to a flat, clean floor. Measuring is then done on the floor. The points shown in Fig. 71-1, for example, can be used.

Suspend a pointed plumb over one of the points. The vehicle must be securely parked with the parking brake or blocks behind the wheels. At the point on the floor over which the plumb hangs mark clearly with chalk. Then with a pencil or scribe make a cross on this mark, immediately below the plumb pointer. Repeat this procedure at the other points. Then remove the vehicle. Take a piece of string and stretch this between two of the points. Pull up the middle of the string slightly and let it strike against the floor. This will cause the tacked string to make a white line between the points. Do the same between the other

points so that you get diagonal lines as shown on Fig. 71-1. When measuring between the points marked where the plumb was suspended, the length of two diagonals crossing each other should agree with a permitted deviation of max. 3 mm (1/8"). If the deviation exceeds this, then the frame is crooked and must be straightened.

To find out whether the frame is twisted or bent, place it on trestles with the side members straight upper edges parallel with the floor and both sides at the same height. Measure the distance from the floor to the straight upper edge on the frame. This measurement is then to be used as a basic measurement when check-measuring. If this measuring is to be reliable, the floor must be absolutely flat. Be particularly thorough when marking and measuring. A faultless frame should be flat and the side members straight and in parallel.





## GROUP 72 SPRINGS

### Description

#### 2-axle vehicle

Both the front and rear springs are of the conventional leaf type. The front end of the springs is rigidly suspended in spring bolts. The rear ends hang from spring shackles. The vehicle is provided with hollow-rubber springs, both front and rear.

#### 3-axle vehicle

The design and suspension of the front springs is the same as for 2-axle vehicles. But the rear springs are of the parabel type. Rear springing is progressive with slip suspension at both ends, see Fig. 76-2. The vehicle has hollow-rubber springs front and rear.

### Service Procedures

#### SPRINGS

##### 2-axle vehicle and 3-axle vehicle (front)

##### Removing a spring

1. Jack up the vehicle.
2. Unbolt the wheel covering the spring.
3. Remove the front spring bolt.
4. Remove the four bolts for the rear spring anchorage so that the entire spring shackle is also removed at the same time.
5. Unscrew the nuts on the U-bolts and lift out the spring.

##### Installing a spring

1. Place the spring in position.
2. Bolt on the front spring bolt, but only a couple of threads. IMPORTANT! Make sure that the spring bolt in the rear spring takes the right thread in order not to damage the threads on the weld nut.
3. Fit the spring plate with the U-bolts. If you have any difficulty in centring the centre bolt on the rear spring, release the reaction rod. Tighten the nuts on the U-bolts.
4. Bolt tight the rear spring anchorage.
5. Make sure that all released spring bolts are not tightened up. Jack up the vehicle under the axle. Load the vehicle until there is an angle of  $90^\circ$  between the spring shackle and frame. Then tighten the spring shackle upper bolt. Load the vehicle further until the spring is flat and tighten up the remaining spring bolts.
6. Mount the wheel, tighten up the wheel studs and lower the vehicle.

##### Testing a spring

A spring can be tested in a hydraulic press. The press, however, must be provided with a sufficiently accu-

rate pressure gauge and it must have such a device that the spring cannot slide out sideways.

Invert the spring and place it in the press. Place supports at both ends. Apply pressure to the centre bolt, see Fig. 72-1. Check the spring test value against the data. If the pressure gauge indicates that the spring is faulty, straighten it or replace it.

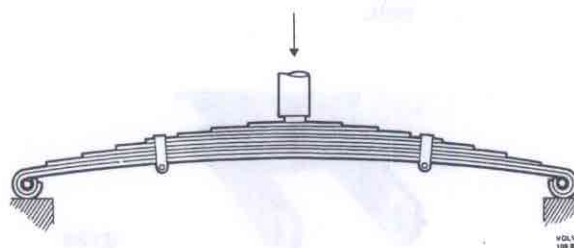


Fig. 72-1. Testing a spring

##### Fractured spring leaves

When one or several of the spring leaves are fractured, not only must they be replaced but the reason for the fracture should be looked into.

If the fracture is towards the middle of the spring, then the reason may be a faulty shock absorber. A fracture may also be due to a broken centre bolt or overloading.

##### Replacing spring bushings

##### Special tools:

- 6124 Press tool
- 6125 Drift
- 6138 Guide

##### Front springs

1. Jack up the vehicle.
2. Unbolt and remove the wheel covering the spring.

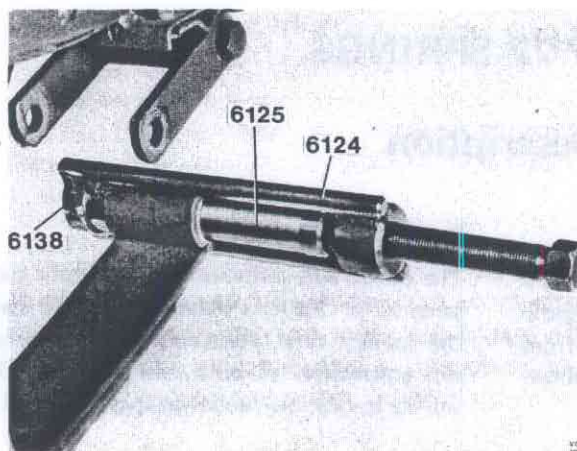


Fig. 72-2. Pressing out a spring bushing

3. Unscrew the spring bolt for the bushing to be replaced.
4. Fit press tool 6124, drift 6125 and guide 6138 according to Fig. 72-2 and press out the bushing.
5. Press in the new bushing using only press tool 6124, see Fig. 72-3, and screw in the spring bolt.

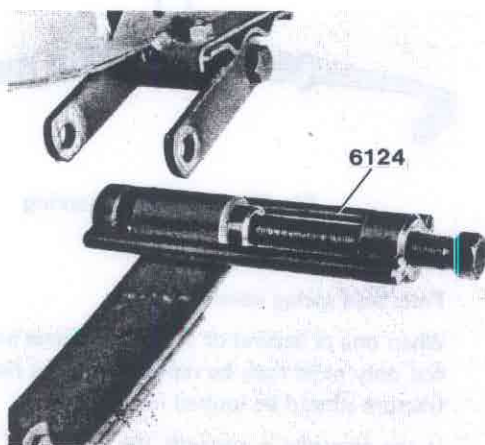


Fig. 72-3. Pressing in a spring bushing

6. Make sure that all spring bolts that were loosened are not tightened up. Jack up the vehicle under the axle. Load the vehicle to an angle of 90° between the spring shackle and frame. Then tighten up the spring shackle upper bolt. Load the vehicle further until the spring is straight and tighten up the remaining spring bolts.
7. Replace the upper bushing in the rear anchorage in the press with the drift 6125, see Fig. 72-4.
8. Mount and screw tight the wheel. Lower the vehicle.

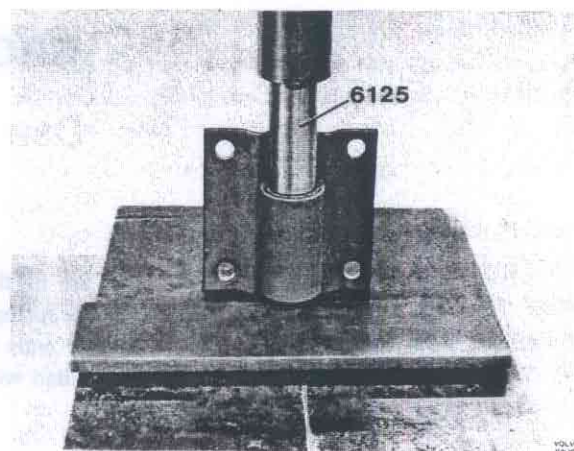


Fig. 72-4. Pressing bushing out of anchorage

### Rear springs

1. Screw down the rear spring according to the instructions given under the heading "Removing a spring".
2. Press out the bushings in the spring with press tool 6124 and drift 6125, see Fig. 72-2.
3. Press in the bushings with only press tool 6124, see Fig. 72-3.
4. Replace the upper bushing in the rear anchorage in the press with drift 6125, see Fig. 72-4.
5. Bolt tight the spring according to the instructions given under the heading "Installing a spring".

### 3-axle vehicle, rear springs

#### Removing a rear spring

1. Jack up the vehicle and unbolt and remove the wheels.
2. Release the U-bolts and the lock bolts (4, Fig. 76-2). Lift out the spring.

#### Installing a rear spring

1. Place the spring and fit the U-bolts. Do not tighten up the U-bolts.
2. Torque the lock bolts to 230–280 Nm (23–28 kpm = 166–202 lbfft), and tighten up the lock nuts.
3. Torque the U-bolts to 230–280 Nm (23–28 kpm = 166–202 lbfft).
4. Mount the wheels, screw tight the wheel studs and lower the vehicle.

#### Testing a spring-fractured spring leaf

See under the heading "2-axle vehicle and 3-axle vehicle (front)".