ORIGINAL SACHS SERVICE

Service Info

Assembly instructions

Clutches
Shock absorbers

BMW Series 3

316i / 318i / 320i / 325i

1991-92

The original Sachs components for each type are given in the current vehicle lists.

Clutch

The longitudinally installed engines can be combined with a ZF or Getrag gearbox. The diaphragm-spring clutch is operated hydraulically. To remove it, the gearbox must be removed first.

Removing the gearbox and clutch

- Position the vehicle on a lift.
- First connect up a back-up battery (e.g. to the cigar lighter) to ensure that the fault memory and codes will not be erased. Then disconnect the vehicle's battery.
- Disconnect the oxygen sensor, then remove the entire exhaust system after the manifold.
- Remove the reinforcing hoop for the transmission tunnel and the heat shield.
- Unscrew the bolts of the flexible rubber coupling at the end of the gearbox. Mark the position of the displaceable centre bearing, then unscrew the nuts holding it (Figure 3) and remove the flexible coupling.
- Remove the centre bearing of the cardan shaft and pull it carefully downwards.
- Detach the selector linkage from the gearbox and remove the slave cylinder of the hydraulic clutch actuating system (Figure 2) without disconnecting the line.
- Disconnect the plug of the reversing light from the contact.
- Suspend the engine from a supporting bridge (W1) or crane using the lug at the rear of the cylinder head.

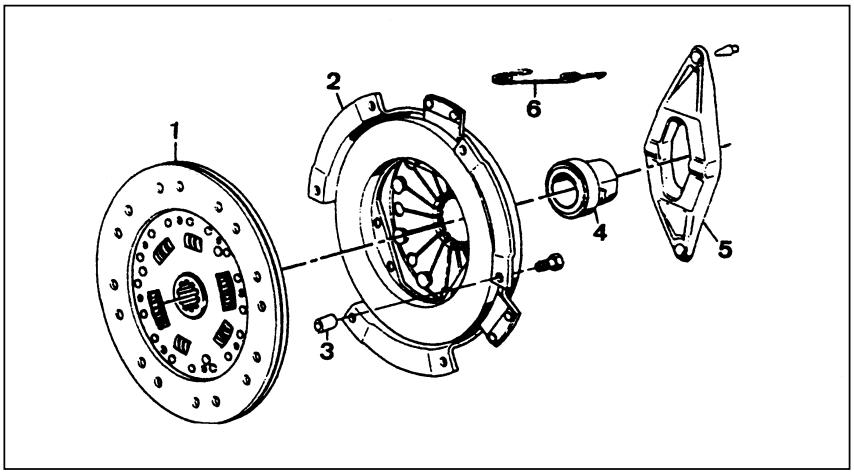

Figure 1 **Components of the diaphragm clutch**: 1 Clutch disc - 2 Clutch cover assembly - 3 Centering sleeve - 4 Release bearing - 5 Release fork - 6 Retaining spring

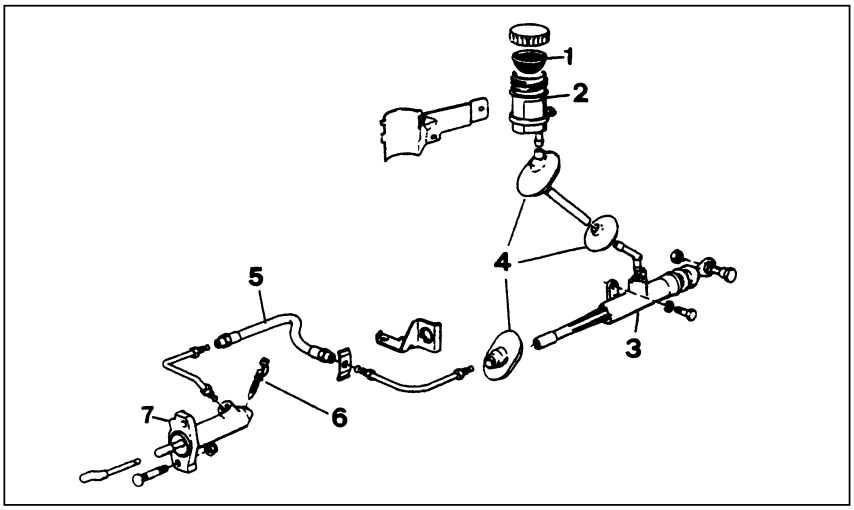

Figure 2 **Hydraulic clutch actuating system**: 1 Cap and filter of the fluid reservoir (2) - 3 Master cylinder - 4 Bulkhead covers - 5 Hose connection - 6 Bleed screw - 7 Slave cylinder.

Special tools: **BMW Series 3**

For changing the clutch

W1- Universal engine bridge
Order No.: 18 4200 080 440

W2- Univeral clutch disc tester
Order No.: 18 4200 080 550

For changing shock absorbers

W3- Clamping device
Order No.: 18 4200 081 530

W4- Universal spring compressing device
Order No.: 11 4200 081 150

In the text, the special tools are referred to as (W1-4).

- Remove the gearbox crossmember together with the two silentblocs and carefully lower the gearbox.
- Detach the upper strut from the gearbox and support the latter with a gearbox or car jack.
- Undo the Torx and hexagon bolts and pull the gearbox out carefully towards the rear.
- Unscrew the screws holding the clutch cover assembly, working uniformly, and remove it together with the clutch disc.

Assembling and installing the clutch
- Check the clutch disc for lateral run-out and then, with the torsional vibration damper pointing towards the gearbox, centre the disc with the clutch mandrel (W2). Fit the clutch cover assembly and tighten the screws, working crosswise and uniformly.
- Clean the clutch shaft and check it for signs of wear. Then apply a coating of Sachs clutch grease to the shaft and to the sliding surfaces of the release bearing and the release fork.
  The gearbox is fitted in reverse order.
- Check that the two fitting sleeves are present on the engine block.
- The slave cylinder should be fitted with the bleed screw facing outwards.
- When re-installing the cardan shaft centre bearing, it should be preloaded slightly while being tightened. To do this, push it forwards by 4...6 mm.

Important: To avoid twisting the rubber element (risk of vibration) of the flexible coupling, turn only the nuts when tightening the bolts.

Bleeding the hydraulic clutch actuation system
If you have had to change the master or slave cylinder or air has got into the system, it must be bled as follows:
- Clean the bleed screw (Fig. 2), then attach a transparent plastic hose of suitable size to it, allowing the hose to hang down into a clean container.
- Fill the reservoir of the master cylinder with brake fluid and ensure that it remains more or less full while you bleed the system.
- Get an assistant to press down quickly on the clutch pedal; at the end of the pedal travel, tighten the bleed screw. Repeat this procedure several times until there are no bubbles in the liquid that comes out.
- Finally, fill the reservoir, following the correct procedure.

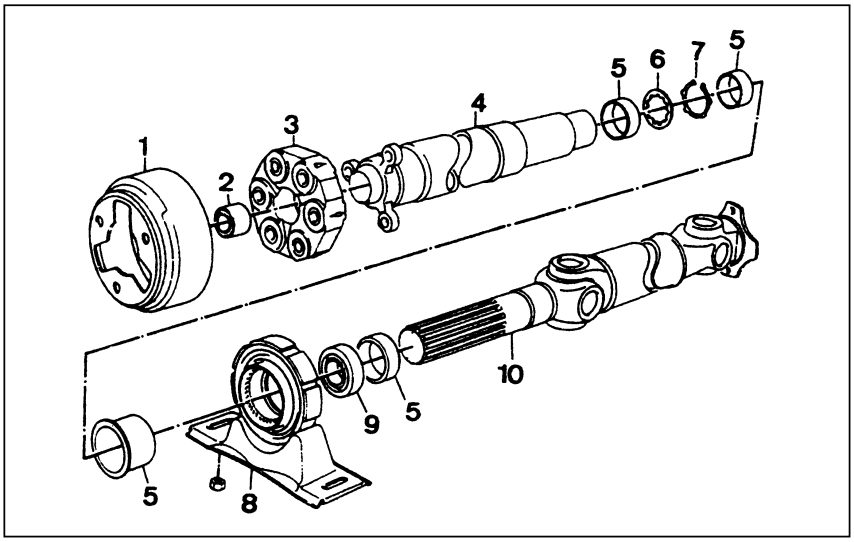

Figure 3 Cardan shaft (4) with flexible coupling (3), centre bearing (8) and prop shaft (10) with double universal joints.

Tightening torques (Nm)	
Engine/gearbox bolts M8/M10/M12	25/50/80
Flywheel bolts	113-130
Clutch fastening screws	23(32)
Fastening bolts for flexible coupling	81
Centre bearing fastening bolts	22
Master cylinder fastening bolts	23
Slave cylinder fastening bolts	26

Shock absorbers

Front suspension

The front suspension consists of ´L-shaped control arms and suspension struts, which are bolted to the steering knuckles at the bottom and supported in rubber mounts at the top. The anti-roll bar is connected to the control arms or steering knuckles by swivel linkages.

Removing the suspension struts
- Place the vehicle on a lift that leaves the wheels free.
- Disconnect the plug for the brake-lining wear warning system.
- Undo the fastening bolts of the brake caliper supports and hang the latter under the wings without disconnecting the brake hoses.
- Unscrew the track rod joints and push them off. Repeat this process for the ball joints of the steering knuckles.
- Unscrew the swivel linkage of the anti-roll bar and remove the speed sensor of the ABS from the steering knuckle.
- Undo the 3 fastening bolts connecting the strut to the steering knuckle. Undo the 3 nuts at the upper supporting mount on the body.
- Lower the strut out and compress the coil

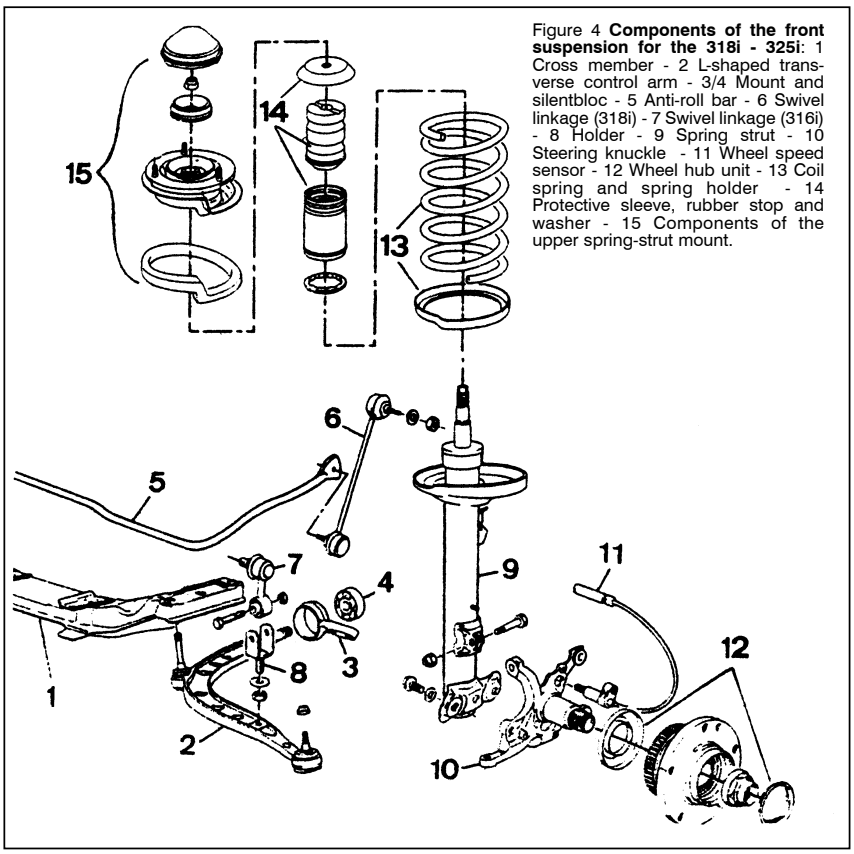

Figure 4 **Components of the front suspension for the 318i - 325i**: 1 Cross member - 2 L-shaped transverse control arm - 3/4 Mount and silentbloc - 5 Anti-roll bar - 6 Swivel linkage (318i) - 7 Swivel linkage (316i) - 8 Holder - 9 Spring strut - 10 Steering knuckle - 11 Wheel speed sensor - 12 Wheel hub unit - 13 Coil spring and spring holder - 14 Protective sleeve, rubber stop and washer - 15 Components of the upper spring-strut mount.

springs in a spring compressing device (W4).
- Undo the piston-rod nut and remove the spring and the other parts (Figure 4) from the strut.

Assembling and installing the strut
- Mount the compressed spring and other components on the strut in the reverse order, screw on the self-locking piston-rod nut and tighten it at 64 Nm.
- Refit the strut and apply a synthetic locking compound to the bolts attaching it to the steering knuckle. Use the correct tightening torques.
- Finally, check the wheel geometry. First weight the vehicle: put 68 kg weights on the front seats and in the middle of the back seat plus a 21 kg weight in the boot. Only the toe-in is adjustable.

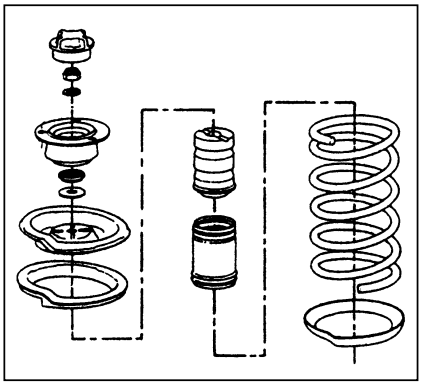

Figure 5 Additional components of the suspension strut for the 316i and 318i (somewhat simplified).

Tightening torques (Nm)	
Nuts of the upper supporting mount	22
Strut/steering knuckle fastening bolts	107
Piston rod nut	64
Steering knuckle/ball joint nut	62
Track rod joint nut	45
Wheel hub nuts	290
Wheel bolts	90
Brake caliper support fastening nuts	123

Wheel geometry	
Toe-in (mm/°)	1.8 ± 0.7 / 16' ± 6'
Castor (°)	3° 52' ± 30'
Camber (at 20° steering angle) (°)	-1° 30' ± 15'
Steering angle, inner/outer wheel	44° / 36°

Rear suspension

Each of the rear wheels is mounted on an A-arm system consisting of an upper and a lower transverse control arm and a trailing arm. The suspension is formed by coil springs and shock absorbers. The anti-roll bar is connected to the upper transverse control arms by swivel linkages.

Removing and installing the shock absorbers
- Open the boot and remove the side trim hiding the spherical covering around the shock absorbers, then undo and remove the two fastening nuts.
- Place the vehicle on a lift that leaves the wheels free and raise it.
- Undo the lower fastening bolt of the shock absorber and remove the shock absorber.

Installation is the reverse of removal. Only tighten the lower bolt and upper nuts once the vehicle is standing on its wheels.
- Finally, check the rear wheel geometry. Both the camber and toe-in are adjustable. Before any measurements are carried out place weights in the vehicle as described for the front suspension.

Tightening torques (Nm)	
Upper shock absorber fastening nuts	21
Lower shock absorber fastening bolts	100
Front trailing-arm mount fastening to vehicle	77

Wheel geometry*	
Toe-in (mm°)	1.8 ± 0.7 (16' ± 6')
Camber	-1° 30' ± 15'

*At a clearance of 523 ± 10 mm between the bottom edge of the rear wheel rim and the bottom edge of the side panel along a vertical line passing through the centre of the wheel.

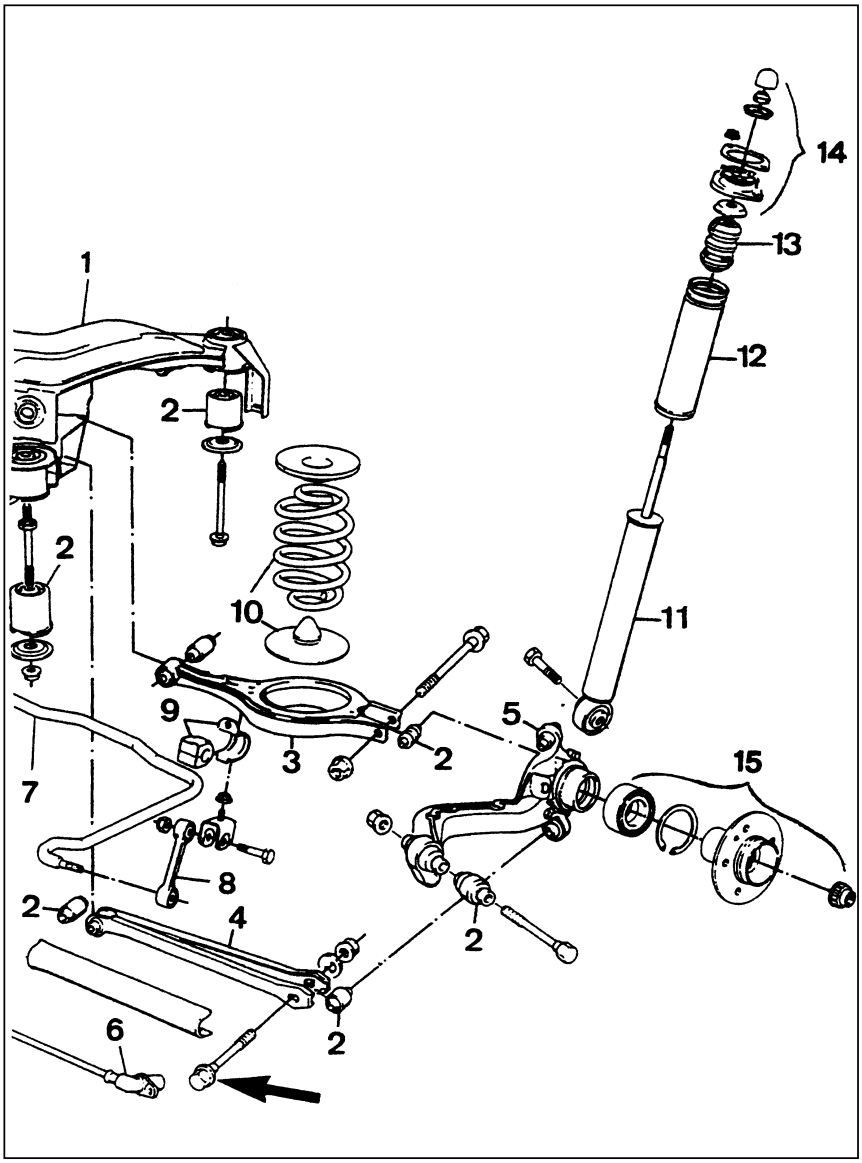

Figure 6 **Components of the rear suspension**: 1 Rear axle member - 2 Flexible supports (silentblocs) - 3 Upper transverse control arm - 4 Lower transverse control arm - 5 Swivel arm (trailing arm) - 6 Wheel speed sensor - 7 Anti-roll bar - 8 Swivel linkage - 9 Anti-roll bar mount - 10 Coil spring and plates - 11 Shock absorber - 12 Protective sleeve - 13 Rubber stop - 14 Upper shock absorber fastenings - 15 Wheel flange and bearing - Arrow = camber adjustment screw.

The camber of the wheels can be adjusted at the mounting bolt of the lower transverse control arm on the wheel carrier (Arrow, Figure 6). First of all undo the nut and turn the eccentric bolt until the desired camber is achieved. Tighten the nut at 127 Nm.

To adjust the **toe-in**, undo the three fastening bolts of the front trailing-arm mounting (Fi´gure 7). There is a special BMW tool for this job, which is applied to the upper bolt, but you can achieve the same effect by inserting a lever between the head of the bolt and the upper or lower tab (3) and pressing lightly to obtain the required setting. Finally, tighten the bolts at
77 Nm.

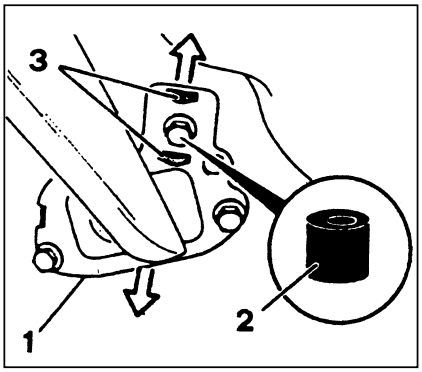

Figure 7 Adjusting the toe-in at the front trailing-arm mounting (1) of the rear suspension. - 2 Adjusting tool - 3 Adjustment tabs.