

Section 7

Suspension and wheels

Service Procedures

Specifications1

Group 70: General

Tools2

Group 73: Springs

Replacing front spring, see Section 6

Replacing rear spring3

Group 76: Shock absorbers and stabilizers

Replacing front shock absorber, see Section 6

Replacing rear shock absorber4

Replacing trailing arms and/or bushings5

Spare Parts drawing7

Replacing reaction rods and/or bushings8

Replacing track rod and/or bushings .8

Replacing front stabilizer link9

Replacing rear stabilizer9

Group 77: Wheels

Wheel change10

Wheel stud replacement10

Replacing and adjusting front wheel bearing10

Front spring

Front spring	metric	US spec.
Type	coil spring	
Wire thickness	13.85 mm	0.545"
Outer diameter	165.9 mm	6.53"
Springing coils	6.5	
Test specifications:		
Loading for 10 mm (0.394") compression	157 N	35 lbs
Measured within a spring lenght of	210–260 mm	8.27–10.24"
Length, fully compressed	134.3 mm	5.287"
Load	3230–3470 N	712–765 lbs
at spring length	235 mm	9.25"

Rear spring

Type	coil spring	
Wire thickness, 242, 244	12.0 mm	0.472"
245, 244	13.8 mm	0.543"
Outer diameter, 242, 244	128 mm	5.04"
245	131.6 mm	5.18"
Springing coils, 242, 244	8	
245	8.35	
Test specifications:		
Loading for 10 mm (0.394") compression, 242 and 244	167 N	37 lbs
245	262 N	58 lbs
Measured within a spring length of	262–312 mm	10.3–12.3"
Length, fully compressed:		
242 and 244	112 mm	4.41"
245	134 mm	5.28"
Load, 242 and 244	2068–2205 N	456–486 lbs
245	2342–2479 N	516–547 lbs
at spring length, 242, 244	287 mm	11.3"
245	322 mm	12.68"

Wheels

Type and size Disc, 5.5 J x 14

Tires

Type	Tubeless
Size, 242 and 244	CR 78-14 and DR 78-14
245	DR 78-14

Shock absorbers

Type Double-acting, hydraulic, telescopic

Wheels

WHEEL RIMS

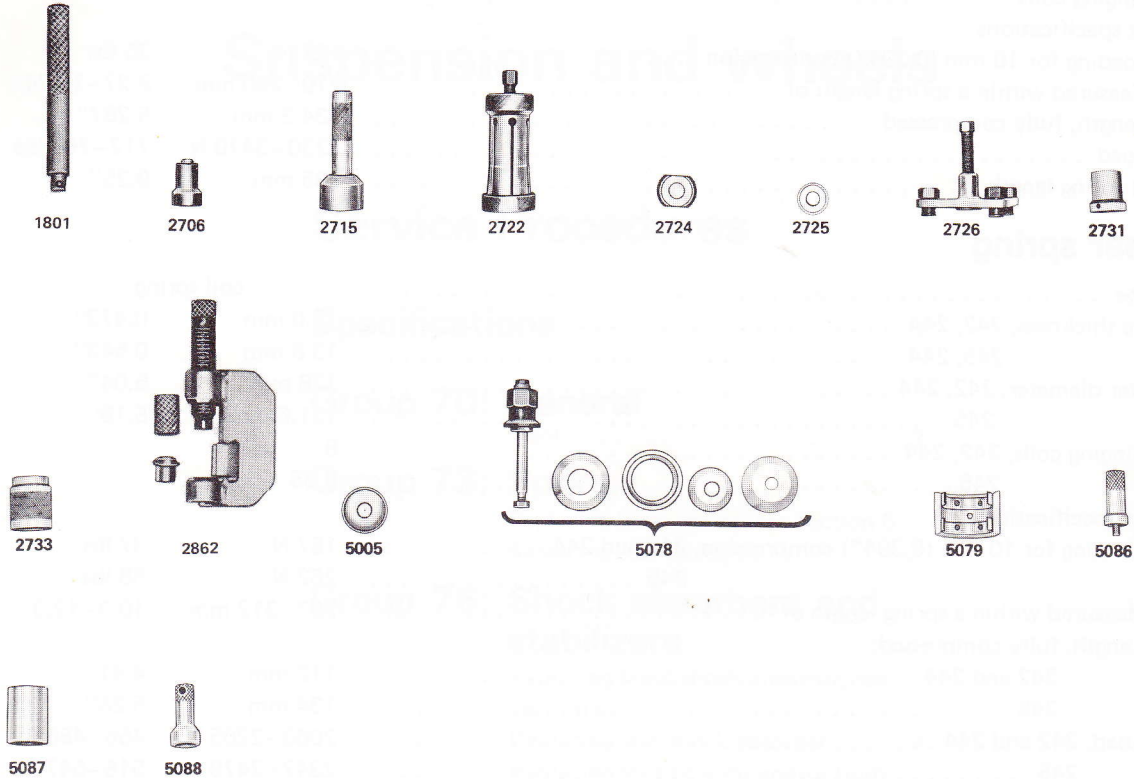
Type and size	Disc, 5.5 J x 14	
Radial throw	max. 1.6 mm	0.063"
Warp	max. 1.6 mm	0.063"
Imbalance, complete wheel	0.09 Nm	7.8 lb. in.
Tightening torque for wheel nuts	100–140 Nm	77–101 lb. ft.

Tires

Type	Tubeless
Size, 242 and 244	CR 78—14 and DR 78—14
245	DR 78—14

Group 70

Tools



- | | | | |
|------|--|------|--|
| 1801 | Standard handle, 18 x 200 mm | 2862 | Press tool, removing/installing wheel bolts |
| 2706 | Drift, removing/installing track rod bushing | 5005 | Drift, installing seal and outer race, inner front wheel bearing |
| 2715 | Tool, removing/installing grease cap | 5078 | Press tool, control arm bushing (comprises four parts, marked A, B, C and D) |
| 2722 | Puller, inner front wheel bearing inner race | 5079 | Spacer, control arm bushing |
| 2724 | Drift, removing outer front wheel bearing outer race, removing inner front wheel bearing outer race. | 5086 | Drift, removing/installing reaction rod bushing |
| 2725 | Drift, removing outer wheel bearing outer race | 5087 | Sleeve, removing/installing reaction rod bushing, removing/installing trailing arm front bushing |
| 2726 | Puller, front wheel hub | 5088 | Drift, removing/installing trailing arm front bushing |
| 2731 | Drift, removing/installing track rod bushing | | |
| 2733 | Adapter sleeve, removing/installing track rod bushing | | |

Group 73

Springs

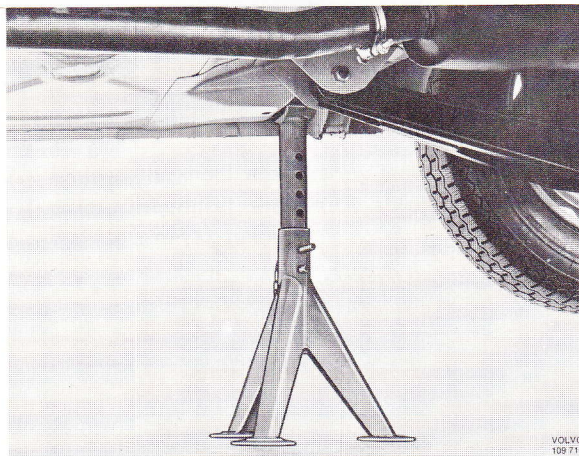
Replacing front spring

See Section 6 of this Manual.

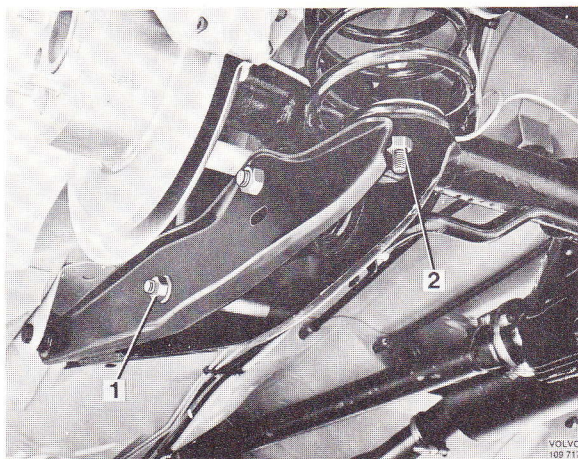
Replacing rear spring

Op. No. 73202

1. Put the rear end on stands. Position the stands in front of the rear jack supports and close to the rocker panels:

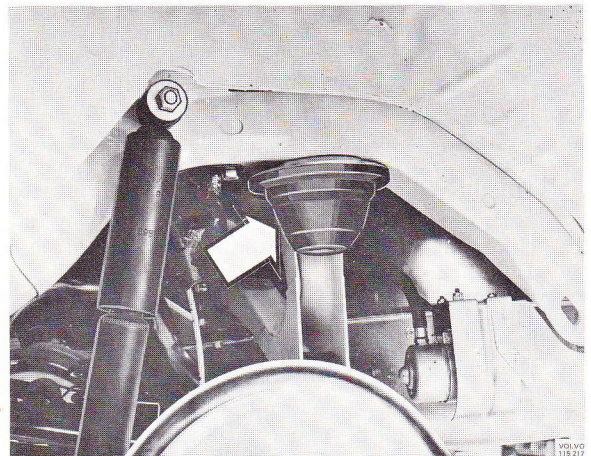


2. Remove the wheel at the side the spring is to be replaced.
3. Support spring by using jack while disconnecting lower shock absorber mounting, (1) below:

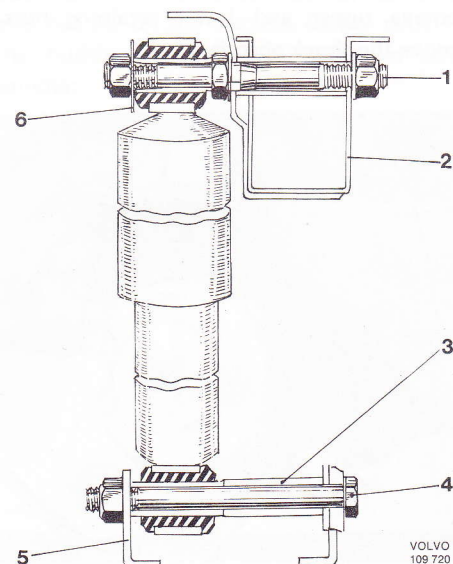


4. Remove the spring lower retaining nut, (2) above.

5. Lower the jack and remove the spring.
6. Check that the rubber spring support is correct.



7. Place the spring on the trailing arm and attach the lower end.
8. Jack up the rear axle and at the same time guide the spring into position.
9. Install shock absorber lower retaining bolt with the spacer sleeve (3) located on the inside:



Group 76

Shock Absorbers and Stabilizers

Replacing front shock absorber

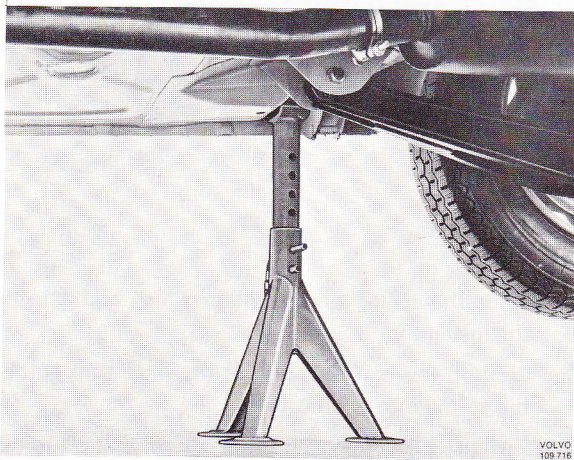
See Section 6 of this Manual

Replacing rear shock absorber

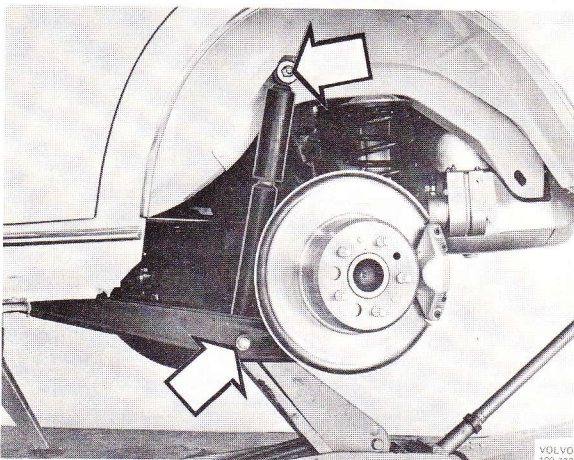
Op. No. 76104 = shock absorber and bushings, rear,
replace one side

Op. No. 76124 = shock absorbers and bushings, rear,
replace both sides

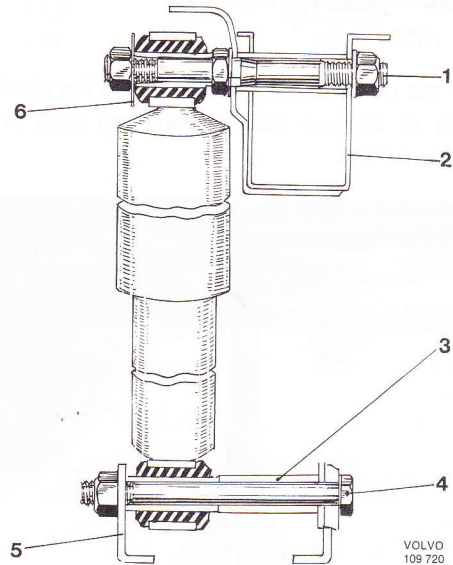
1. Put the vehicle on stands, with the stands located as shown:



2. Remove the wheel. Unload the shock absorber by jacking up the rear axle.
3. Remove upper and lower retaining nuts and remove the shock absorber:



4. Install the new shock absorber with the spacer sleeve for the lower attachment positioned on the inside:



Shock absorber

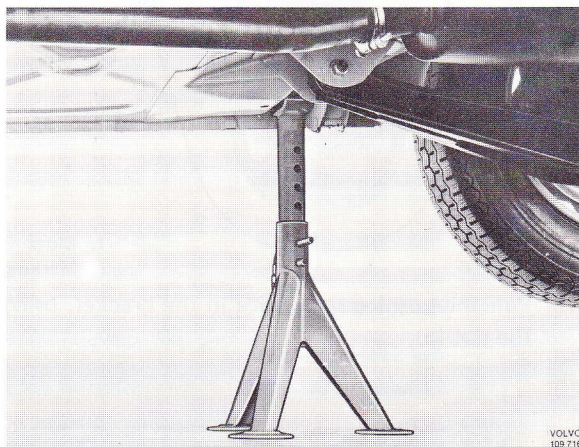
1. Upper retaining bolt
 2. Side member
 3. Spacer sleeve
 4. Lower retaining bolt
 5. Trailing arm
 6. Washer
5. Install the wheel and lower the vehicle.

Replacing trailing arms and/or bushings

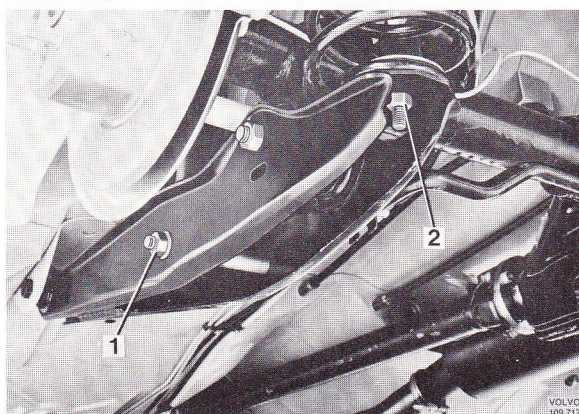
Op. No. 76332 = one side

Op. No. 76327 = second side

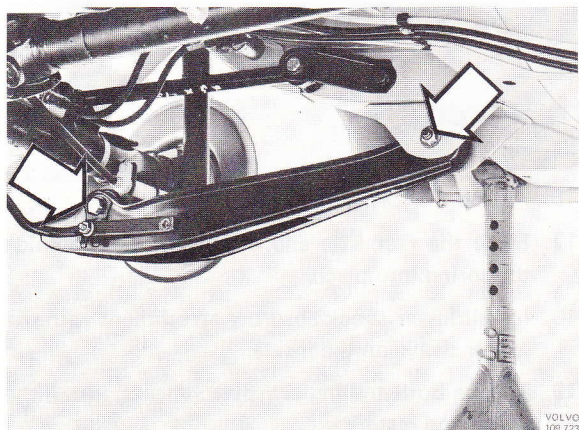
1. Put the rear end on stands with the stands located



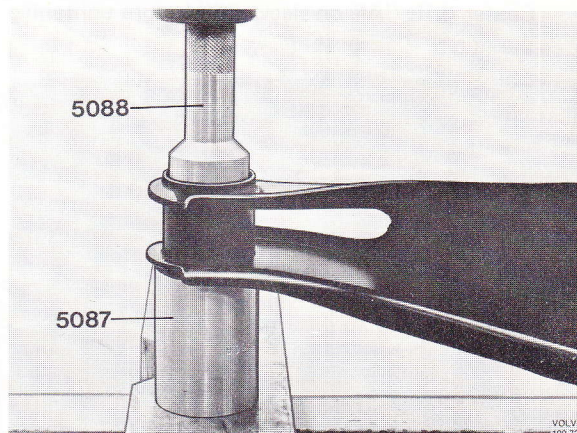
2. Unload the shock absorber by jacking up the rear axle. Disconnect the shock absorber from the trailing arm (1), below.



3. Remove the spring lower retaining nut (2), lower the jack and remove the spring
4. Remove front and rear retaining bolts for the trailing arm and remove the trailing arm:

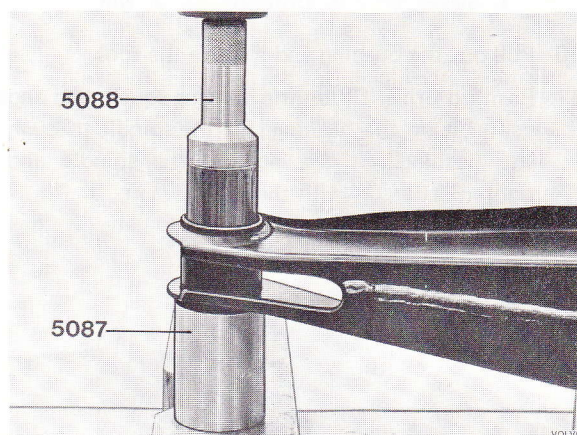


5. Press out the trailing arm front bushing with tools 999 5088 and 999 5087:

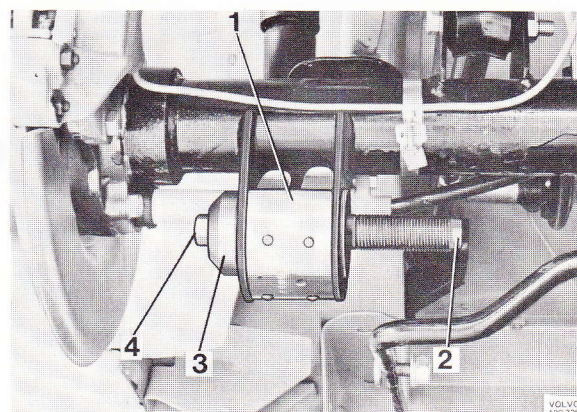


NOTE: Tool 999 5088 consists of four parts, A, B, C and D. Reference stamped on the tools.

6. Press in the new bushing using the same tools:



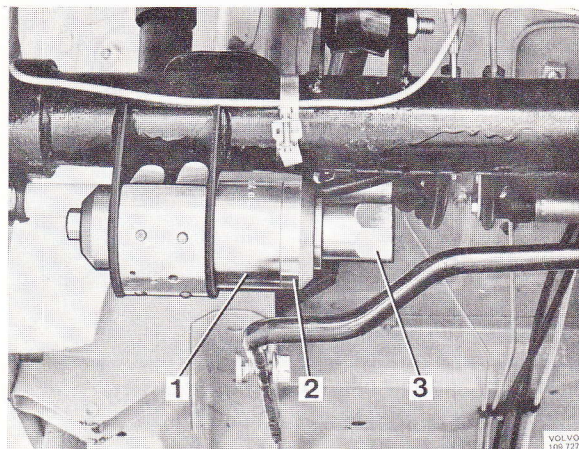
7. When replacing the rear bushing in the rear axle bracket, use press tool 999 5078 and spacer sleeve 999 5079.
8. Position the spacer sleeve (1, below around the bushing and fit the spindle (2) through the bushing from the inside. Position drift "C" (3) and nut (4) on the outside. Center drift "C" on the bushing before it is tightened with the spindle:



1. Spacer sleeve 999 5079
2. Spindle

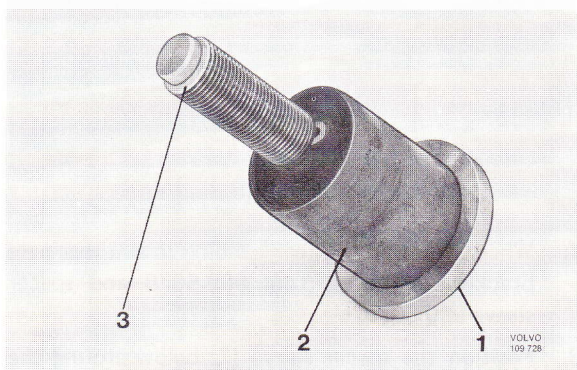
3. Drift "C"
4. Nut

9. Position sleeve "B" (1, below) on the bracket and drift "A" (2) and the nut (3) on the spindle. Center drift "A" on sleeve "B" before tightening the nut.



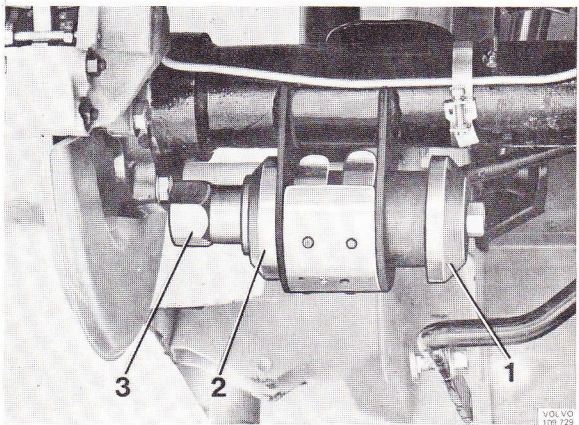
1. Sleeve "B" 2. Drift "A" 3. Nut

10. Pull out the bushing and remove the tool.
11. Position drift "D" on the bushing square end and center it on the bushing. Fit the spindle through the bushing, fit the nut on the spindle and tighten drift "D" with the spindle:



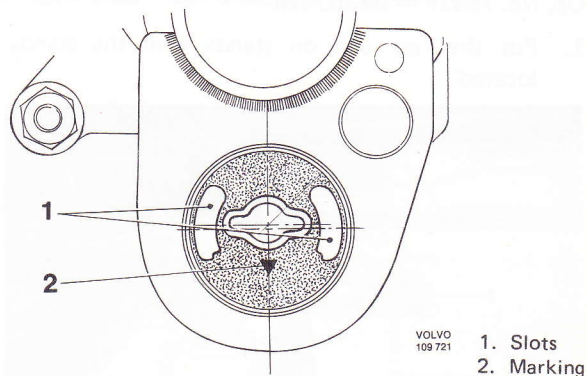
1. Drift "D" 2. Bushing 3. Spindle

12. Position the bushing in the bracket from the inside. At the same time position drift "A" (2, below) and nut (3):



1. Drift "D" 2. Drift "A" 3. Nut

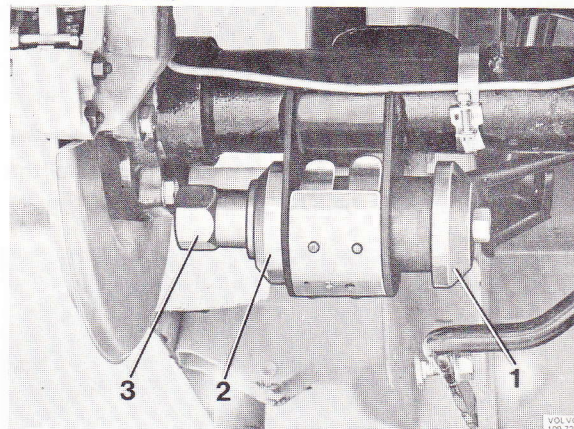
NOTE: The bushing center hole is displaced and the bushing is positioned in the bracket according to Fig. below. Both slots (1) should be horizontal and the arrow (2) should point downwards.



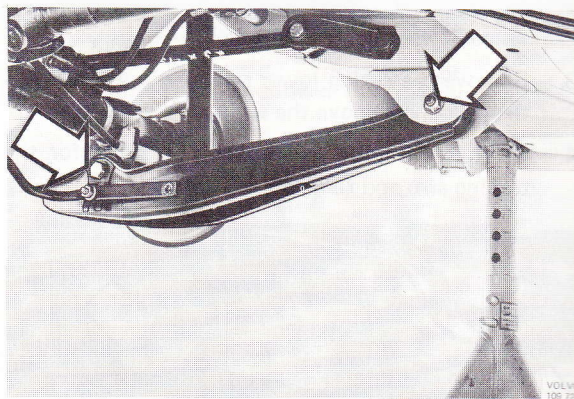
VOLVO
109 721

1. Slots
2. Marking

13. Pull the bushing into place in the bracket, using the nut (3),



14. Remove the press tool and the spacer sleeve.
15. Install the trailing arm, starting with front attachment and thereafter the rear attachment simultaneously with the stabilizer (Fig. 7-10). Torque the bolts finger tight.

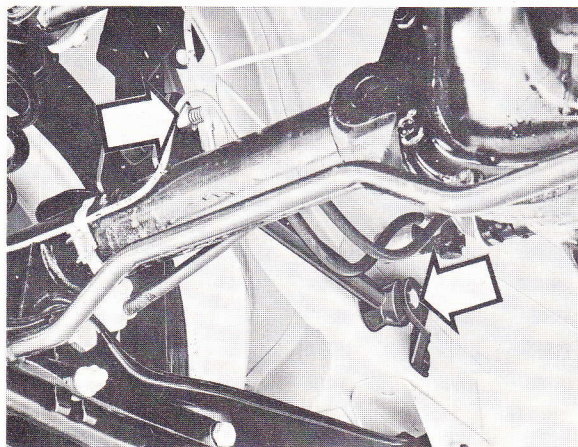


16. Attach the spring to the trailing arm.
17. Raise the rear axle and at the same time guide the spring into place.
18. Install lower shock absorber attachment with the spacer sleeve on the inside.
19. Torque both trailing arm attachments, install the wheel and restore.

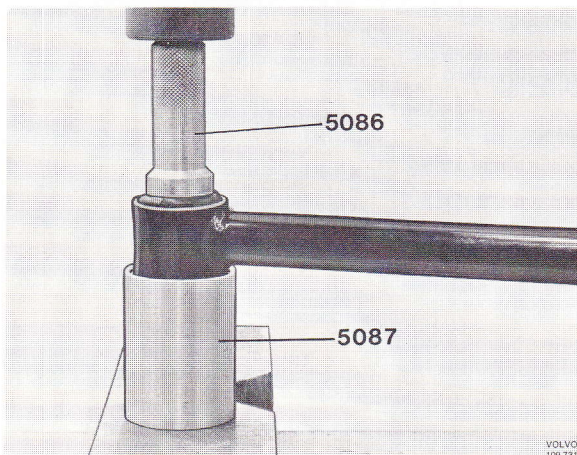
Replacing reaction rods and/or bushings

Op. No. 76328 = replace, one side

1. Put the rear end on stands.
2. Remove the reaction rod from the vehicle.



3. Remove the bushings, using tools 999 5086 and 999 5087:

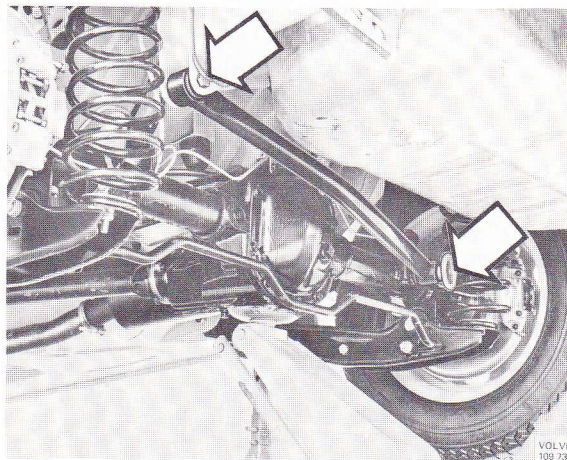


4. Press in the new bushings, using the same tools.
NOTE: Position the bushings in the reaction rod so that the flat sides are parallel to the rod.
5. Install the reaction rod and restore.

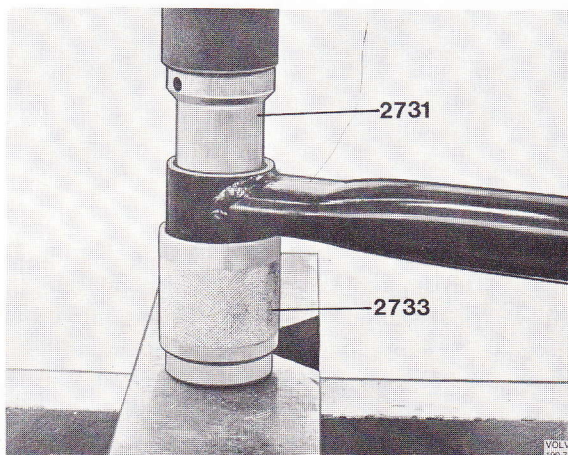
Replacing track rod and/or bushings

Op. No. 76322

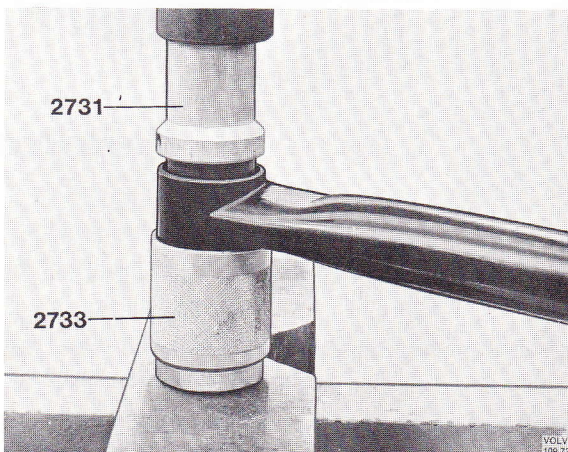
1. Put the rear end on stands with the stands located according to previous instructions.
2. Remove the track rod from body and rear axle:



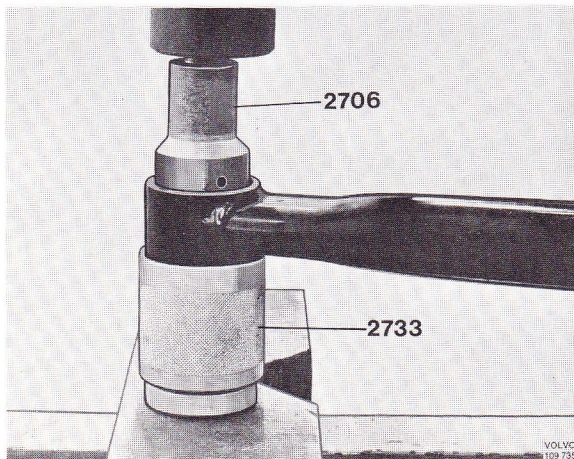
3. Remove the bushing in the end attached to the rear axle, using tools 999 2731 and 999 2733. Use the bigger end against the rod:



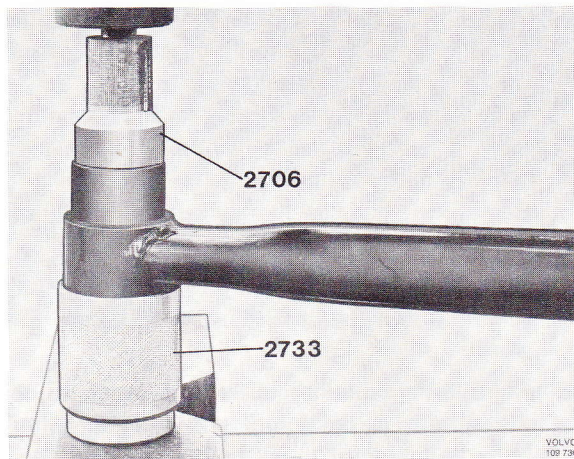
4. Press in the new bushing, using the same tools, but reversing 2733:



5. Press out the bushing in the track rod end attached to the body, using tool 999 2706 and counterhold 999 2733. The counterhold should be turned with the small end pointing down:



6. Press in the new bushing, using the same tools.
NOTE: The bushing slots should point according to Fig. below.



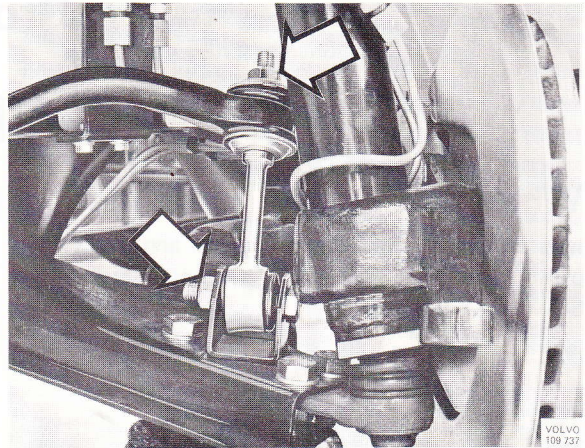
7. Attach the track rod to body bracket and rear axle. Restore.

Replacing front stabilizer link

Op. No. 76208 = replace, one side
Op. No. 76210 = replace, both sides

Put the front end on stands with the stands positioned under the control arms. Remove the wheel on the side where the link is to be replaced.

Remove the upper nut and lower nut and bolt. Remove the link. Position washer and bushing on the



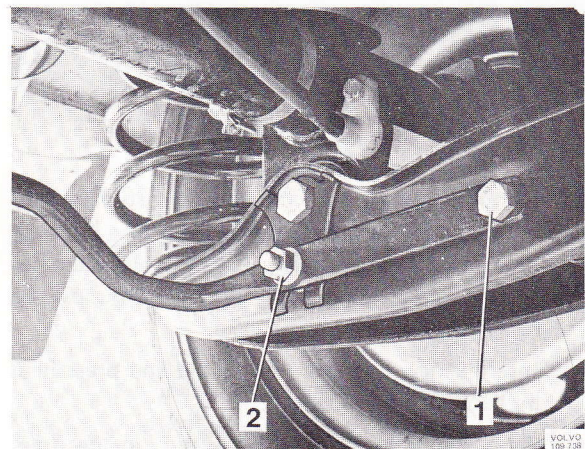
new link and install the link. Attach the lower bolt and nut and thereafter upper bushing, washer and nut.

Install the wheel.

Replacing rear stabilizer

Op. No. 76214

Put the vehicle on stands with the stands positioned in front of the rear jack supports. Unload the shock absorbers by jacking up the rear axle. Remove the shock absorber lower attachments (1, below) on both sides. Remove the nuts (2) on both sides. Remove the stabilizer.



When installing, position the stabilizer in the brackets. Install the nuts (2) finger tight. Then fit the lower shock absorber attachments (1) with the spacer sleeves for the shock absorbers on the inside. Adjust the stabilizer to the bracket and tighten nuts and shock absorber attachments.

Group 77

Wheels

Wheel change

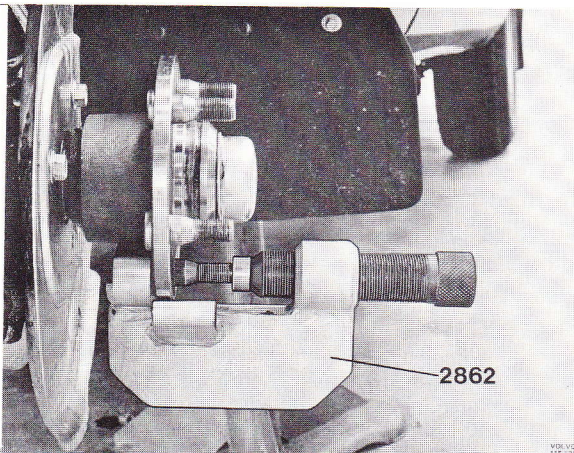
It is important that all grit and dirt and any surplus paint is cleaned off from the contact surfaces between wheel and hub.

Wheel stud replacement

Op. No. 77451

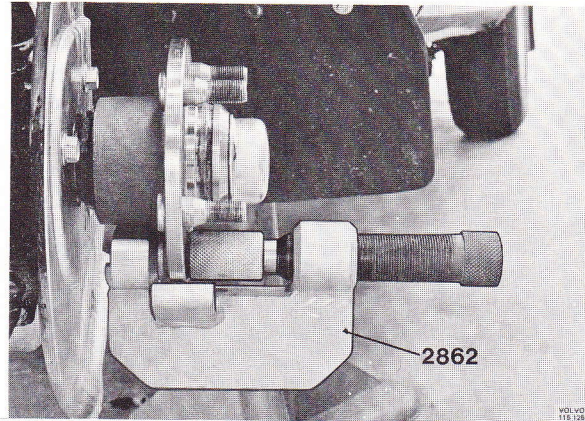
The wheel studs can be replaced without removing the front wheel hubs or drive shafts.

1. Remove the brake caliper and brake disc according to the instructions in Section 5.
2. Set up tool 2862, without the accessory components as shown:



Run the impact wrench until the stud is fully removed. If the old stud is loose in the hub, the hole must be checked. If the hole diameter exceeds 16.27 mm (.64"), the hub must be replaced.

3. Insert a new oversize wheel stud and press it in by hand as far as possible.
4. Place the accessory part, the pin, in the press tool.
5. Place the sleeve on the outer end of the wheel stud.
6. Place the tool in position (see Fig. 7-17) and use an impact wrench to screw in the stud completely.



NOTE: When replacing a wheel stud, always use a new, oversize stud. The oversize stud can be installed without previously machining the hole.

Replacing and adjusting front wheel bearing

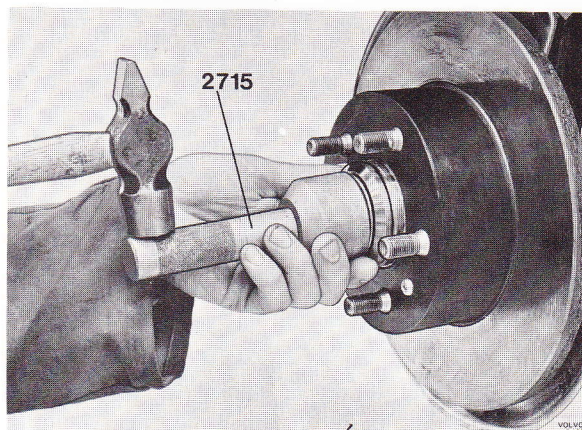
Op. No. 77404 = Replace wheel inner and outer bearing, seal and race, one side.

Op. No. 77406 = Front wheel hub seal, replace and grease, one side

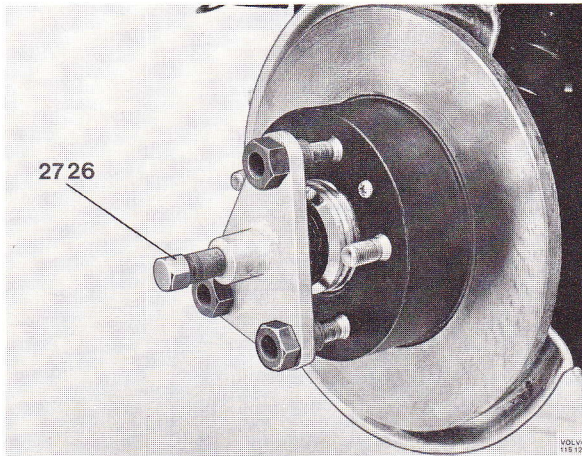
Op. No. 77408 = Replace wheel inner and outer bearing, seals and races. Both sides.

Op. No. 77423 = Front wheel hub bearing, adjust

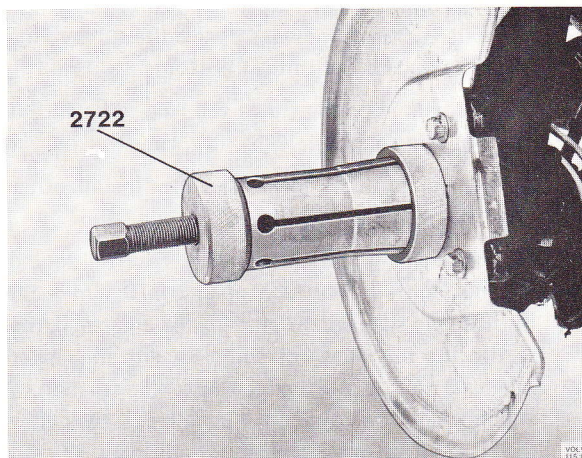
1. Remove the hub cap and slacken the wheel nuts slightly.
2. Jack up the front end and put stands under the lower control arms. Remove wheel nuts and wheel.
3. Remove the front wheel brake according to the instructions in Section 5 under "Front wheel brake unit removal".
4. Remove the grease cap with tool 2715. Remove cotter pin and castle nut.



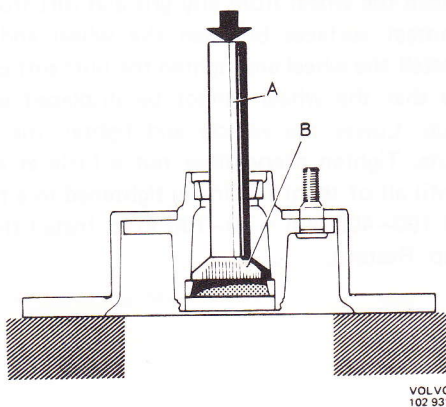
Pull off the hub with puller 2726 (see Fig. 7-19).



Pull off the inner bearing from the stub axle with puller 2722 (see Fig. 7-20) if the bearing remains in place.

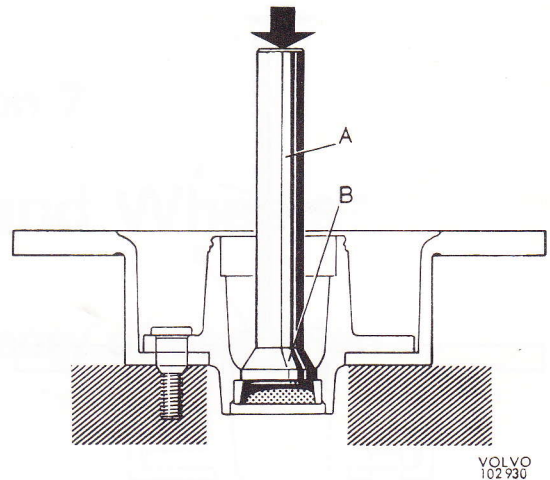


5. Remove the bearing races. Use drift 2724 (Fig. 7-21) for the inner bearing ring together with standard handle 1801.



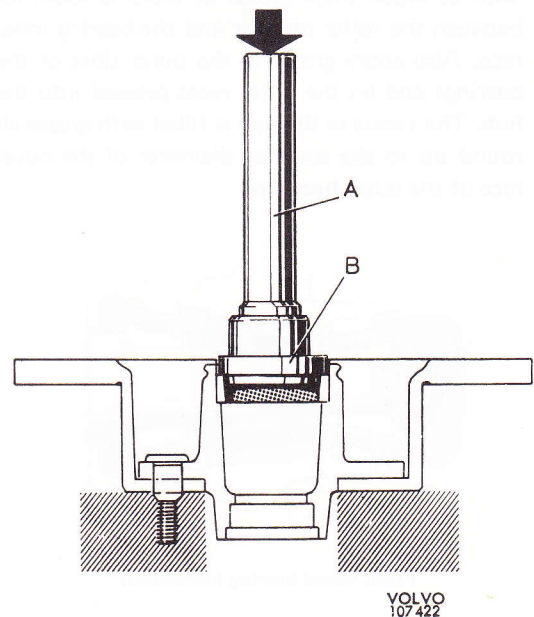
Inner bearing race removal
A = Tool 1801 B = Tool 2724

Use drift 2725 for the outer bearing race together with standard handle 1801.



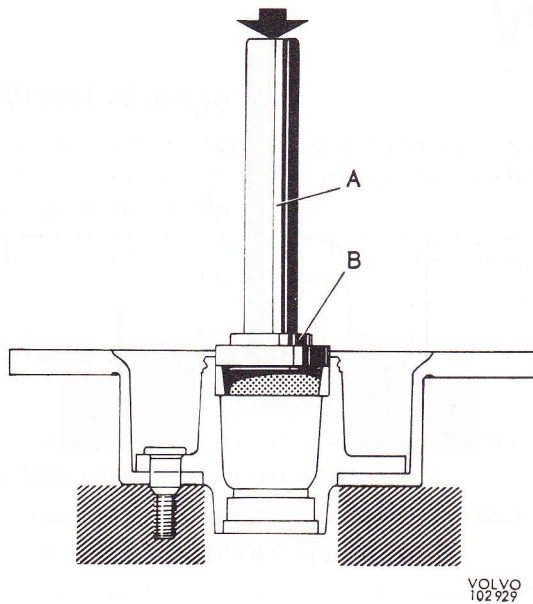
Outer bearing race removal
A = Tool 1801 B = Tool 2725

6. Clean hub, brake disc and grease cap.
7. Press in the new bearing races. Use drift 5005 in addition to standard handle 1801 for the inner ring, see Fig:



Inner bearing race installation
A = Tool 1801 B = Tool 5005

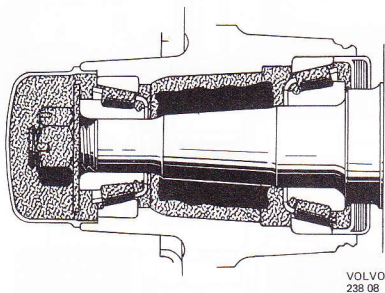
Use drift 2724 in addition to handle 1801 for the outer bearing race.



Outer bearing race installation

A = Tool 1801 B = Tool 2724

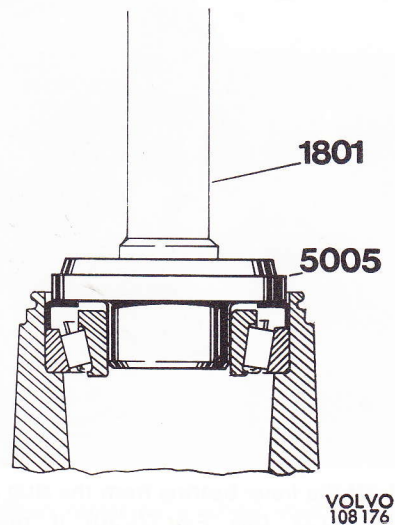
8. Grease the bearing with a grease press. If a grease press is not available, pack the bearings by hand with as much thick grease as there is room for between the roller retainer and the bearing inner race. Also apply grease to the outer sides of the bearings and on the outer races pressed into the hub. The recess in the hub is filled with grease all round up to the smallest diameter of the outer race of the outer bearings.



Front wheel bearing lubrication

Use a high-class bearing grease for the bearing. Place the inner bearing in position in the hub.

Press in the washer until it lies against the bearing outer ring. Use tools 1801 and 5005.



Installation of washer

Without the tools, however, press the rubber ring onto the hub carrier until it bottoms.

NOTE: It is important that the ring is fitted flat and not at an angle.

9. Install the hub on the stub axle. Install outer bearing, washer and castle nut.
10. Adjust front wheel bearings by first tightening the nut with a torque wrench to 70 Nm = 50 lb.ft. Then slacken the nut 1/3 of a turn. If the slot in the nut does not coincide with the cotter pin hole in the stub axle, slacken it further to enable the cotter pin to be installed. Check that the wheel rotates easily without any play.
11. Fill the grease cap half full and install with tool 2715.
12. Install the front wheel brake unit according to Section 5.
13. Clean the wheel from any grit and dirt from the contact surfaces between the wheel and hub. Install the wheel and tighten the nuts sufficiently so that the wheel cannot be displaced on the hub. Lower the vehicle and tighten the wheel nuts. Tighten every other nut a little at a time until all of them are finally tightened to a torque of 100–400 Nm = 70–100 lb.ft. Install the hub cap. Restore.

Section 7

Suspension and Wheels

Description and theory of operation

Section 7

Suspension and Wheels

Description and theory of operation

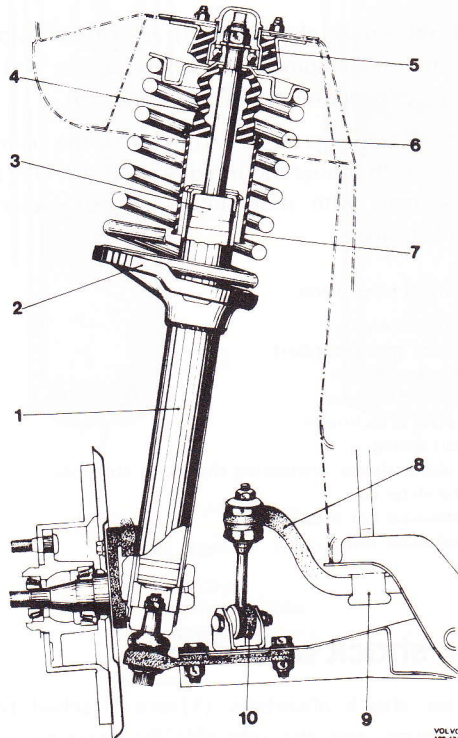
Index

Group 73: Springs	1
Group 76: Shock Absorbers and Stabilizers	2

Group 73

Springs

Front springs



The vehicle is provided with coil springs both front and rear. The front wheel suspension is of the McPherson type.

The lower end of the coil spring (6) rests on a bracket welded to the strut outer casing (1).

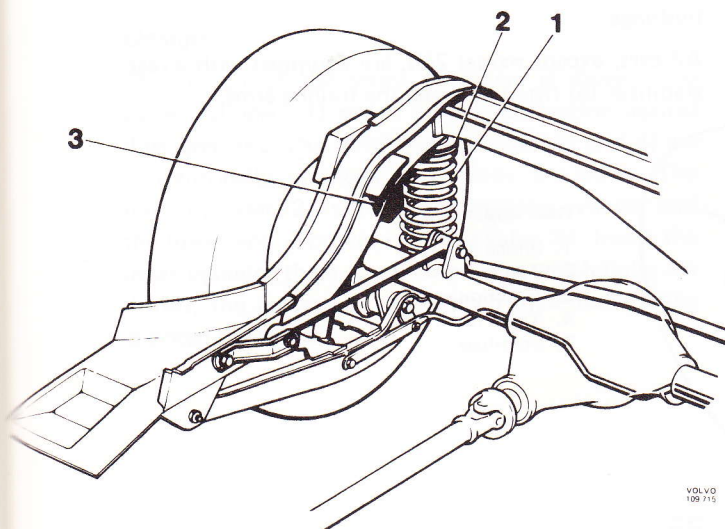
The upper end of the spring rests in a rubber-mounted support (5), bolted to the wheel housing.

The shock absorber sprindle acts as an upper guide for spring and strut assembly and is provided with a rubber bumper (4) to prevent damages in case of bottoming.

Front suspension

1. Strut assembly
2. Lower spring support
3. Shock absorber
4. Rubber bumper
5. Upper attachment
6. Coil spring
7. Rubber sleeve, protecting the sprindle
8. Stabilizer bar
9. Stabilizer attachment
10. Stabilizer link

Rear springs



The lower end of the rear spring (1) is bolted to the trailing arm behind the rear axle.

The upper end of the spring has a rubber spring support (2) attached to the rear side member.

On the underside of the side members there are rubber bumpers (3) to prevent damages in case of bottoming.

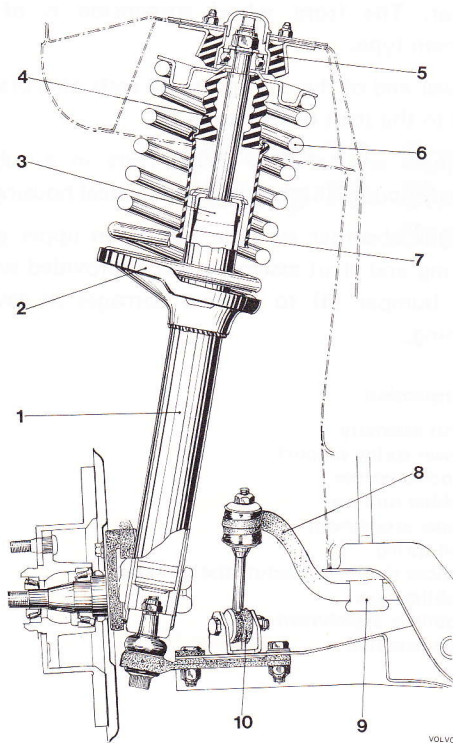
Rear suspension

1. Spring
2. Rubber-mounted spring support
3. Rubber bumper

Group 76

Shock Absorbers and Stabilizers

The shock absorbers are double-acting, hydraulic and of the telescopic type. They are maintenance-free and cannot be disassembled.



Front shock absorbers

The front shock absorbers (3) are fitted inside the struts and their spindles make the spring and strut assembly connection in the upper ends (5).

The front stabilizer (8) is attached to the front side members with rubber-mounted brackets (9) and to the control arms with short links and not replaceable rubber bushings.

Front wheel suspension

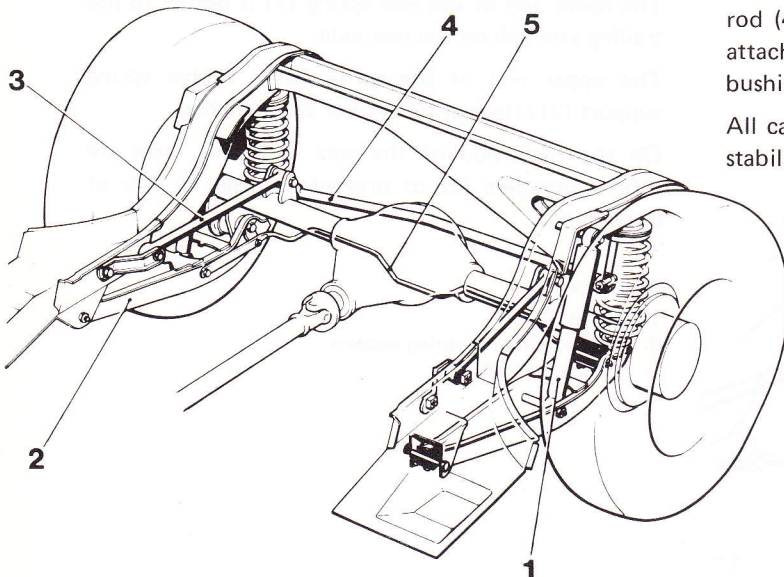
1. Strut assembly
2. Lower spring support
3. Shock absorber
4. Rubber bumper
5. Upper attachment
6. Coil spring
7. Rubber sleeve, protecting the shock absorber
8. Stabilizer bar
9. Stabilizer bar attachment
10. Stabilizer link

Rear shock absorbers

The rear shock absorbers (1) are attached to the trailing arms and the rear side members by rubber bushings which are not replaceable.

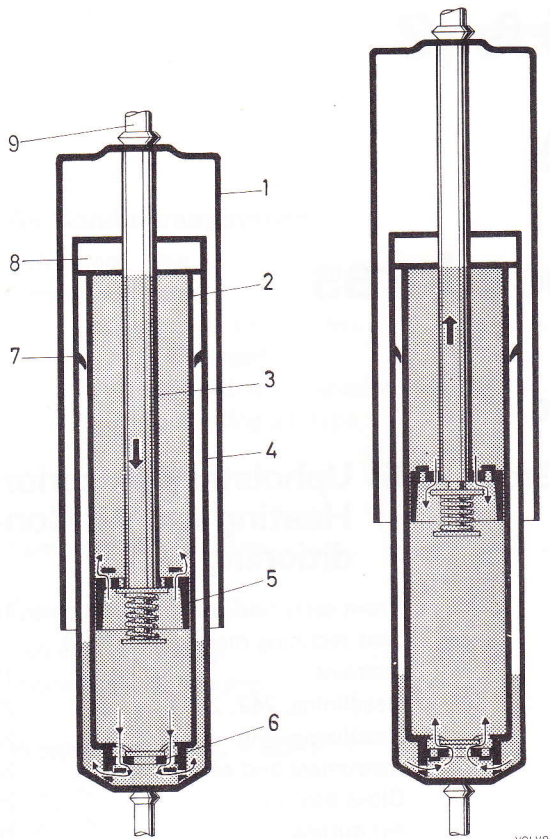
The rear axle is connected to the body by two trailing arms (2). Longitudinal forces are transferred by two reaction rods (3) and transversal forces by a track rod (4). Trailing arms, reaction rods and track rod are attached to body and rear axle by replaceable rubber bushings.

All cars, except model 245, are equipped with a rear stabilizer (5) fitted between the trailing arms.



Rear suspension

1. Shock absorber
2. Trailing arm
3. Reaction rod
4. Track rod
5. Stabilizer



Shock absorber, function

1. Dust cover
2. Working cylinder
3. Piston rod
4. Reservoir cylinder
5. Piston
6. Valve
7. Baffle ring
8. Cover
9. Upper attachment

Shock absorbers

Design

The design of the shock absorbers is shown. The outer cylinder (1) serves only as protection against dust and dirt. The other two cylinders (2 and 4) are concentrically arranged, one inside the other. The inner cylinder (2) is the actual working cylinder and the lower end is provided with a valve (6). Inside the inner cylinder there is a piston (5) in which holes are drilled, the passage of oil through these holes being checked by valves.

The piston is attached to a piston rod (3), whose upper end forms an attachment to the body. At the opposite end of the shock absorber a similar screw attachment is attached. The space between the cylinders (2 and 4) serves as a reservoir and is only partially filled with fluid. The inner cylinder (2) is completely filled with fluid on both sides of the piston (5). The cover (8) serves as a seal and guide for the piston rod (3). The baffle ring (7) acts as a baffle for the fluid.

Function

When the shock absorber is compressed or extended according to the vehicle movements, the piston (5) moves in the inner cylinder (2). Fluid then flows through the valve-controlled holes in the piston. The speed with which the piston moves is determined by the rate at which the fluid passes through the holes from one side of the piston to the other. Since the drilled holes are very narrow, the fluid can only pass through slowly, thus braking the movement of the piston. When the shock absorber suddenly is compressed or extended, a further braking effect is caused by turbulence in the fluid passing through the holes in the piston. This dampens any rolling tendency of the vehicle and ensures smoother riding.

When the shock absorber is compressed or extended, the volume on each side of the piston is not altered by the same amount since the piston rod occupies a certain space. When the shock absorber is compressed, some of the fluid passes out through the valve (6) into the reservoir, and when the shock absorber is extended, fluid is again sucked into the cylinder (2) on the underside of the piston.