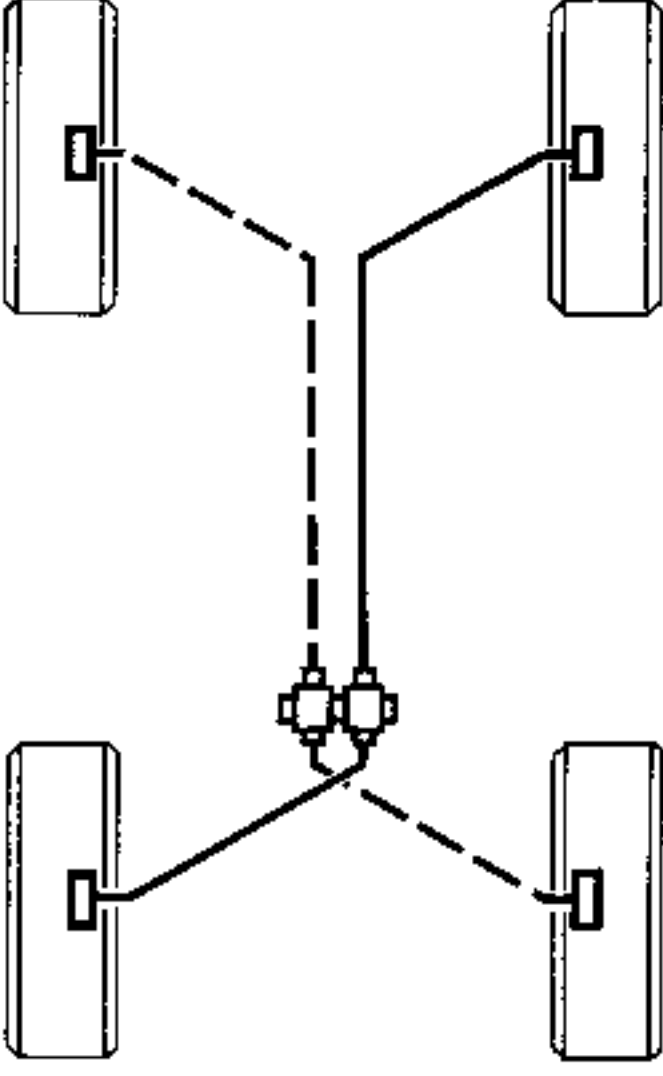
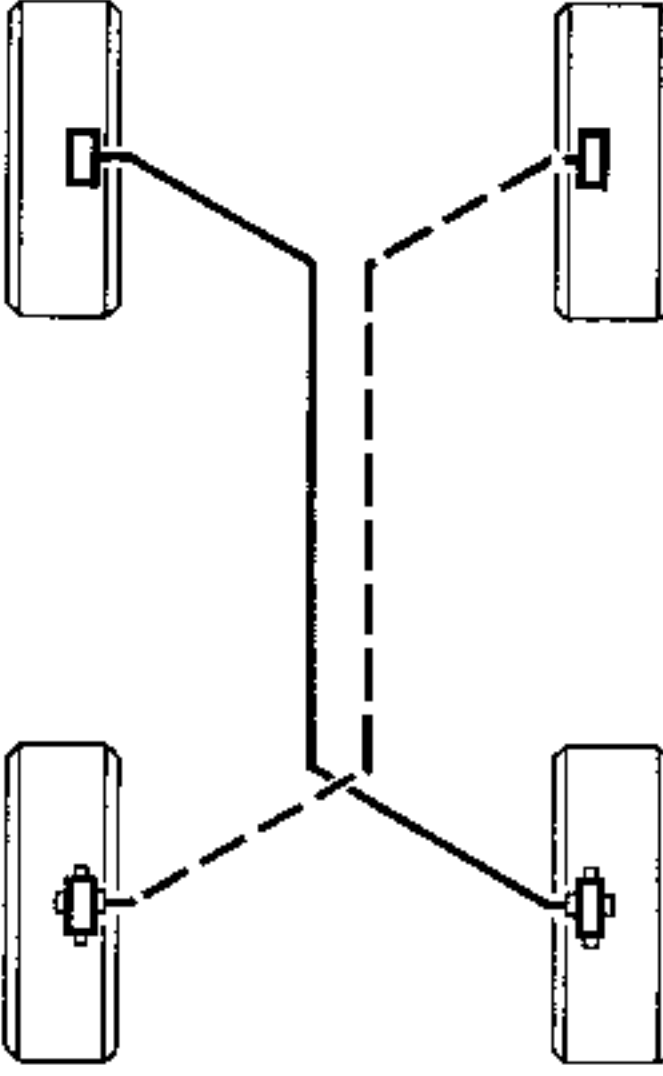
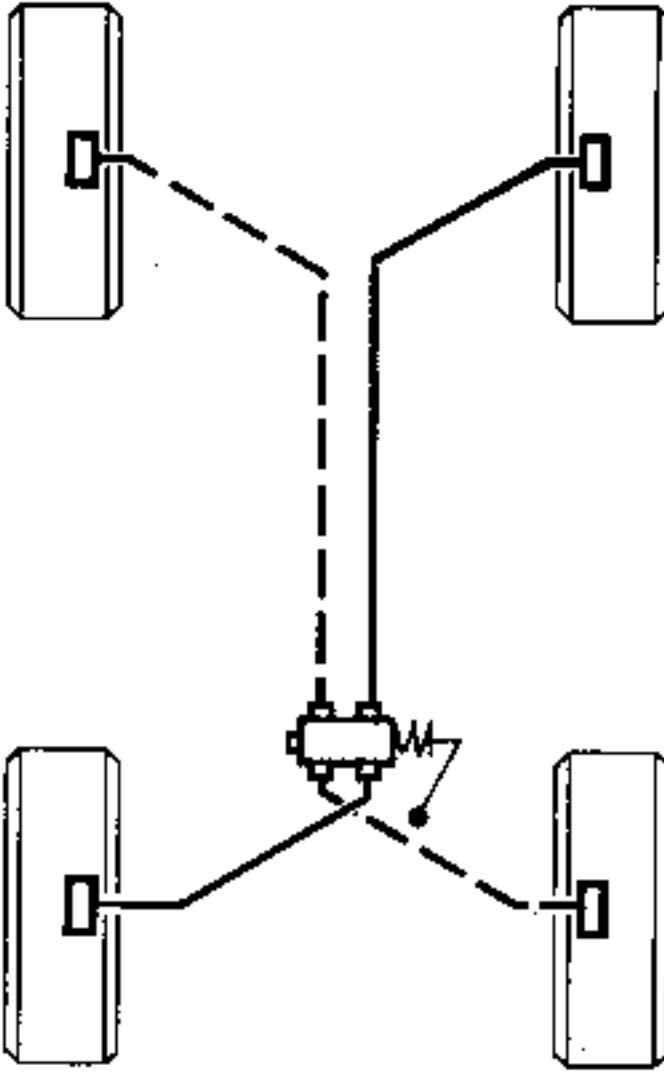


NOTE : these diagrams are general diagrams and under no circumstances are they to be used to determine take-off points and circuit applications. When replacing one of the component parts of a vehicle braking system, always mark the pipes before disconnecting them so that they can be reconnected in their original positions. ESSENTIAL.

"X" TYPE BRAKING SYSTEM with fixed compensator	"X" TYPE BRAKING SYSTEM with fixed compensators forming part of the wheel cylinders	"X" TYPE BRAKING SYSTEM with load controlled compensator																																																									
																																																											
<p>1st ARRANGEMENT</p> <p>B400 C400 S400 B401 C401 S401 B402 C402 B407 C407</p> <p style="text-align: right;">81 563-2</p>	<p>2nd ARRANGEMENT</p> <table> <tr> <td>B400</td><td>B404</td><td>B40G</td></tr> <tr> <td>C400</td><td>C404</td><td>C40G</td></tr> <tr> <td>S400</td><td>S404</td><td>B40H</td></tr> <tr> <td>B401</td><td>B407</td><td>C40H</td></tr> <tr> <td>C401</td><td>C407</td><td>B40J</td></tr> <tr> <td>S401</td><td>B408</td><td>C40J</td></tr> <tr> <td>B402</td><td>C408</td><td>B40K</td></tr> <tr> <td>C402</td><td>B40F</td><td>C40K</td></tr> <tr> <td>B403</td><td>C40F</td><td>B40M</td></tr> <tr> <td>C403</td><td>S40F</td><td>C40M</td></tr> </table> <p style="text-align: right;">91 563-3</p>	B400	B404	B40G	C400	C404	C40G	S400	S404	B40H	B401	B407	C40H	C401	C407	B40J	S401	B408	C40J	B402	C408	B40K	C402	B40F	C40K	B403	C40F	B40M	C403	S40F	C40M	<p>1st ARRANGEMENT</p> <table> <tr> <td>B403</td><td>C405</td><td>F400</td></tr> <tr> <td>C403</td><td>C409</td><td>F401</td></tr> <tr> <td>B404</td><td></td><td>F402</td></tr> <tr> <td>C404</td><td></td><td>F404</td></tr> <tr> <td>S404</td><td></td><td>F407</td></tr> <tr> <td>B408</td><td></td><td>F40F</td></tr> <tr> <td>C408</td><td></td><td>F40H</td></tr> <tr> <td>B40F</td><td></td><td>F40M</td></tr> <tr> <td>C40F</td><td></td><td></td></tr> </table> <p style="text-align: right;">91 563</p>	B403	C405	F400	C403	C409	F401	B404		F402	C404		F404	S404		F407	B408		F40F	C408		F40H	B40F		F40M	C40F		
B400	B404	B40G																																																									
C400	C404	C40G																																																									
S400	S404	B40H																																																									
B401	B407	C40H																																																									
C401	C407	B40J																																																									
S401	B408	C40J																																																									
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C402	B40F	C40K																																																									
B403	C40F	B40M																																																									
C403	S40F	C40M																																																									
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B40F		F40M																																																									
C40F																																																											

	B400 C400 S400	B401 C401 S401	B40H C40H	B402 C402 B403 C403 B404 C404 S404 B407 C407 B408 C408 B40F C40F S40F	B40J C40J B40M C40M
FRONT BRAKES (dimensions in mm)					
Diameter of wheel cylinders	45	45	45	48	48
Diameter of discs	238	238	238	238	238
Thickness of discs	8	8	8	12	12
Minimum thickness of discs*	7	7	7	10.5	10.5
Thickness of pads (back plate included)	15	15	15	18	18
Minimum thickness of pads (back plate included)	6	6	6	6	6
Maximum disc run-out	0.07	0.07	0.07	0.07	0.07
REAR BRAKES (dimensions in mm)					
Diameter of wheel cylinders	22 or 20.6 (1)	22 or 20.6 (1)	20.6 (1)	22 or 20.6 (1)	20.6 (1)
Diameter of drums	180.25	180.25	180.25	180.25	180.25
Maximum diameter of drums after re-grinding	181.25	181.25	181.25	181.25	181.25
Diameter of discs	-	-	-	-	-
Thickness of discs	-	-	-	-	-
Minimum thickness of discs*	-	-	-	-	-
Width of linings	40	40	40	40	40
Thickness of linings (shoe included)	6.5	6.5	6.5	6.5	6.5
Minimum thickness of linings (shoe included)	2.5	2.5	2.5	2.5	2.5
MASTER CYLINDER (dimensions in mm)					
Diameter	17.5	19	19	19	19

* The brake discs cannot be re-ground. If they are heavily worn or scored they must be replaced by new ones.

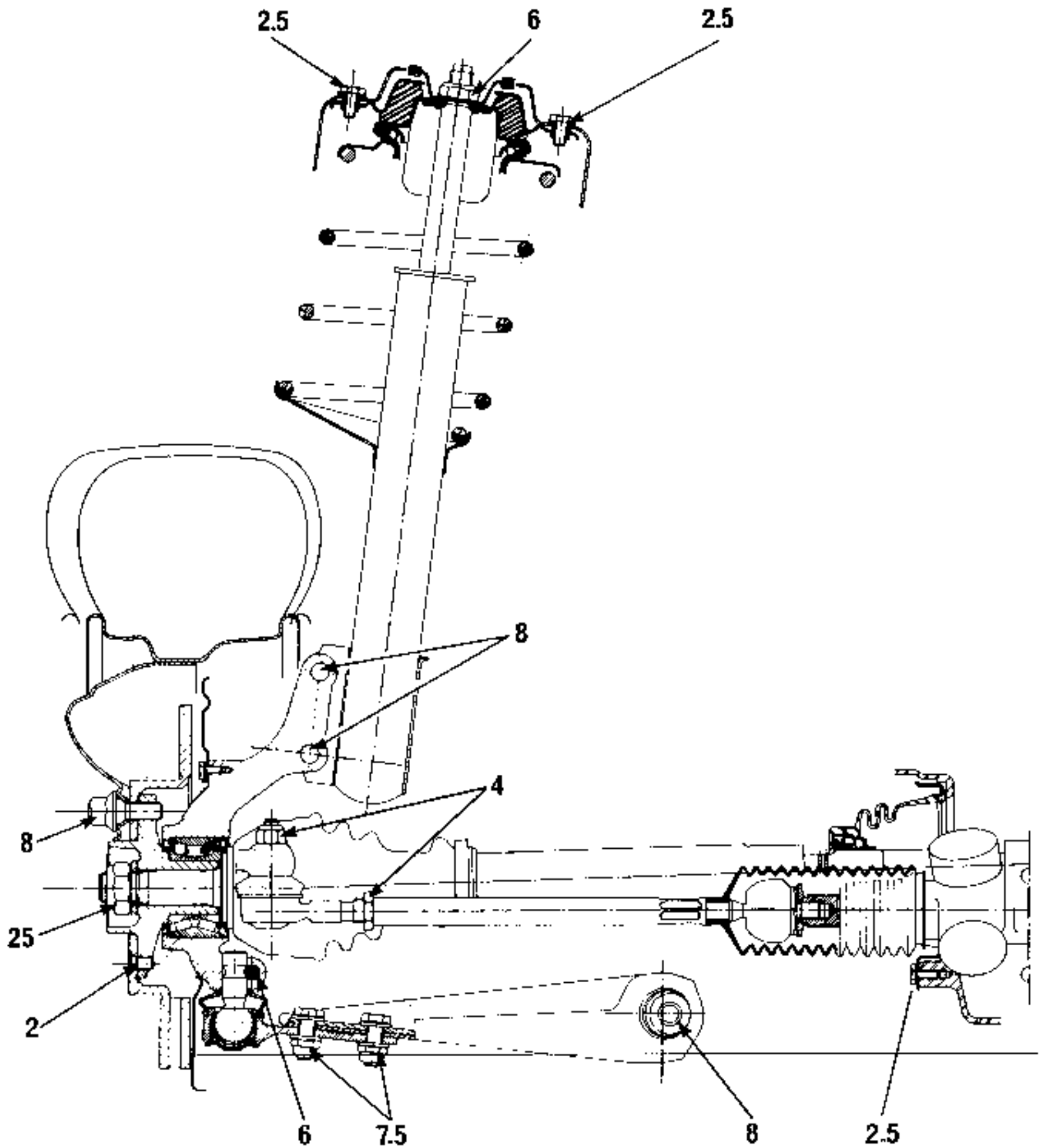
(1) Wheel cylinder with fixed integral compensator. If the wheel cylinder or compensator is defective, the entire unit must be replaced. Attempting to repair the unit is forbidden.

	B40G C40G B40K C40K	C405 C409	=> F401 MOD 89 F404 => MOD 86 F40H => MOD 89 F400	F401 MOD 89 => F40H MOD 89 =>	F402 F404 MOD 86 => F407 F40F F40M F401 (DAI)
FRONT BRAKES (dimensions in mm)					
Diameter of wheel cylinders	48	48	45	45	48
Diameter of discs	238	238	238	238	238
Thickness of discs	20	20	8	12	12
Minimum thickness of discs*	18	18	7	10,5	10,5
Thickness of pads (back plate included)	18	18	15	18	18
Minimum thickness of pads (back plate included)	6	6	6	6	6
Maximum disc run-out	0.07	0.07	0.07	0.07	0.07
REAR BRAKES (dimensions in mm)					
Diameter of wheel cylinders	20.6 (1)	30	22	22	22
Diameter of drums	180,25	-	180.25	180.25	203.45
Maximum diameter of drums after re-grinding	181.25	-	181.25	181.25	204.45
Diameter of discs	-	238	-	-	-
Thickness of discs	-	8	-	-	-
Minimum thickness of discs*	-	7	-	-	-
Width of linings	40	-	40	40	38
Thickness of lining (Disc) or pad (shoe or back plate included)	Trailing 6.5	-	6.5	6.5	5.5
	Leading 6,5	11	-	-	-
Minimum thickness of lining or pad (shoe or back plate included)	Trailing 2.5	-	2.5	2.5	2.5
	Leading 2.5	5	-	-	-
MASTER CYLINDER (dimensions in mm)					
Diameter	19	19	19 17.5 for F400	19	19

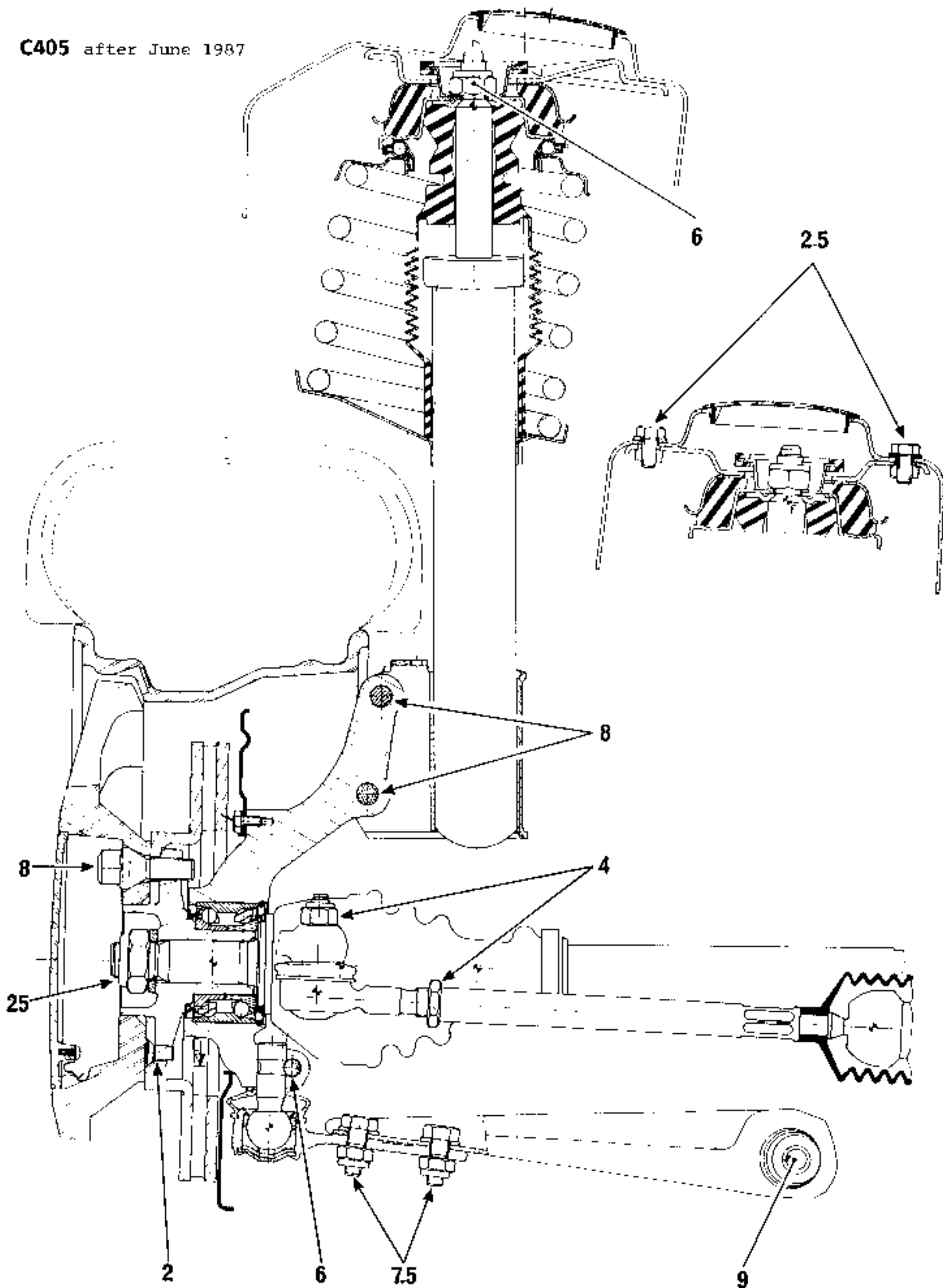
* The brake discs cannot be re-ground. If they are heavily worn or scored they must be replaced by new ones.

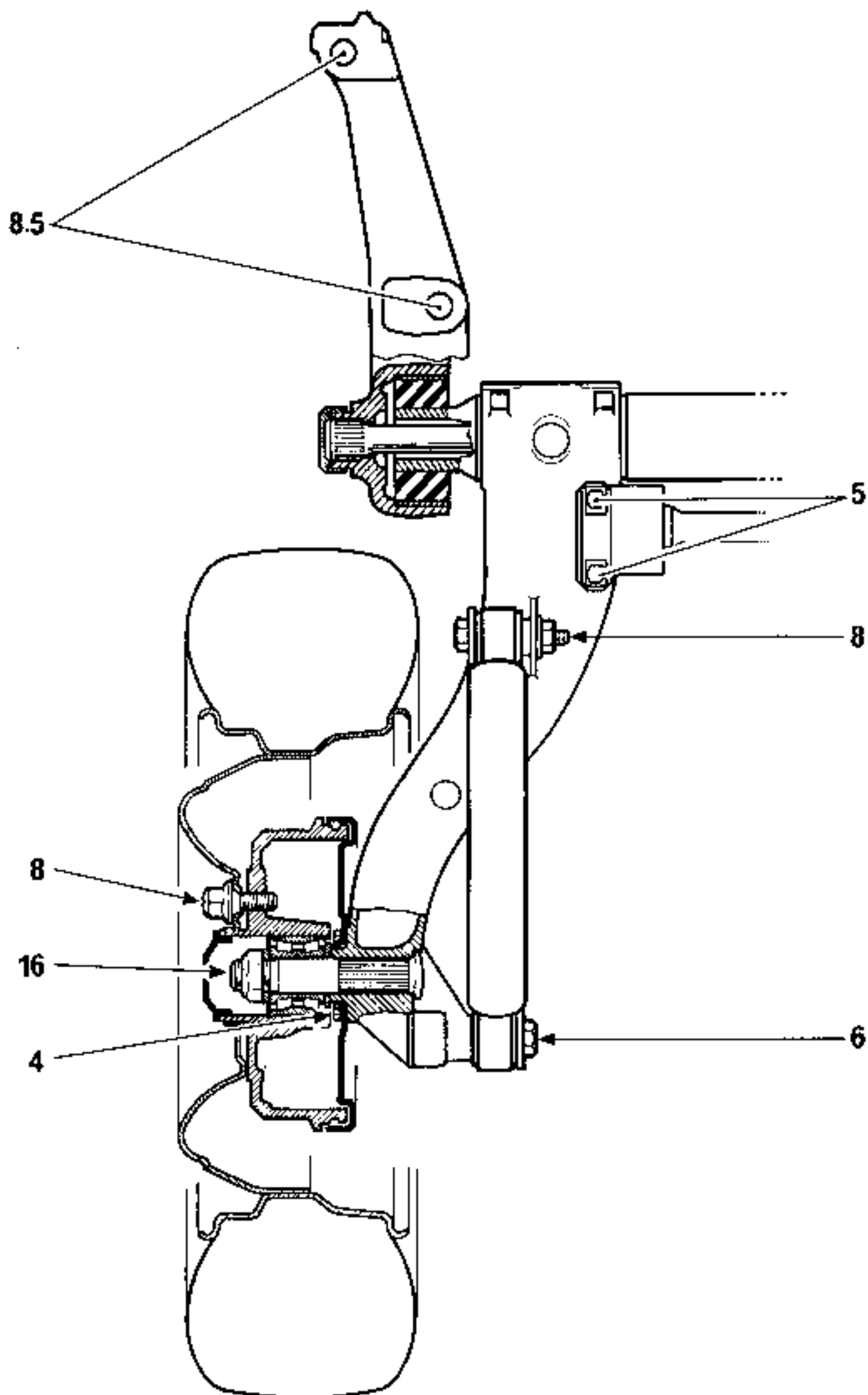
(1) Wheel cylinder with fixed integral compensator. If the wheel cylinder or compensator is defective, the entire unit must be replaced. Attempting to repair the unit is forbidden.

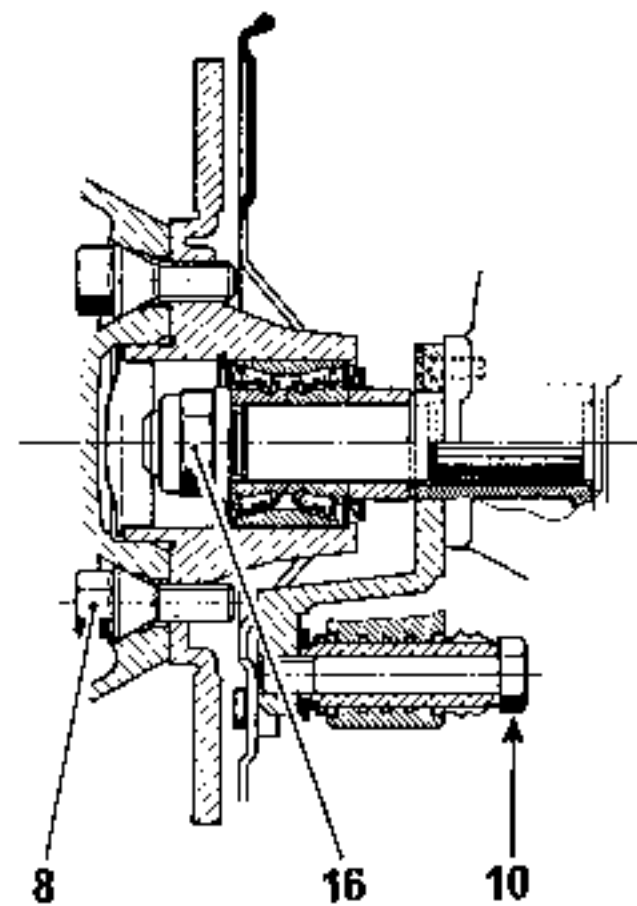
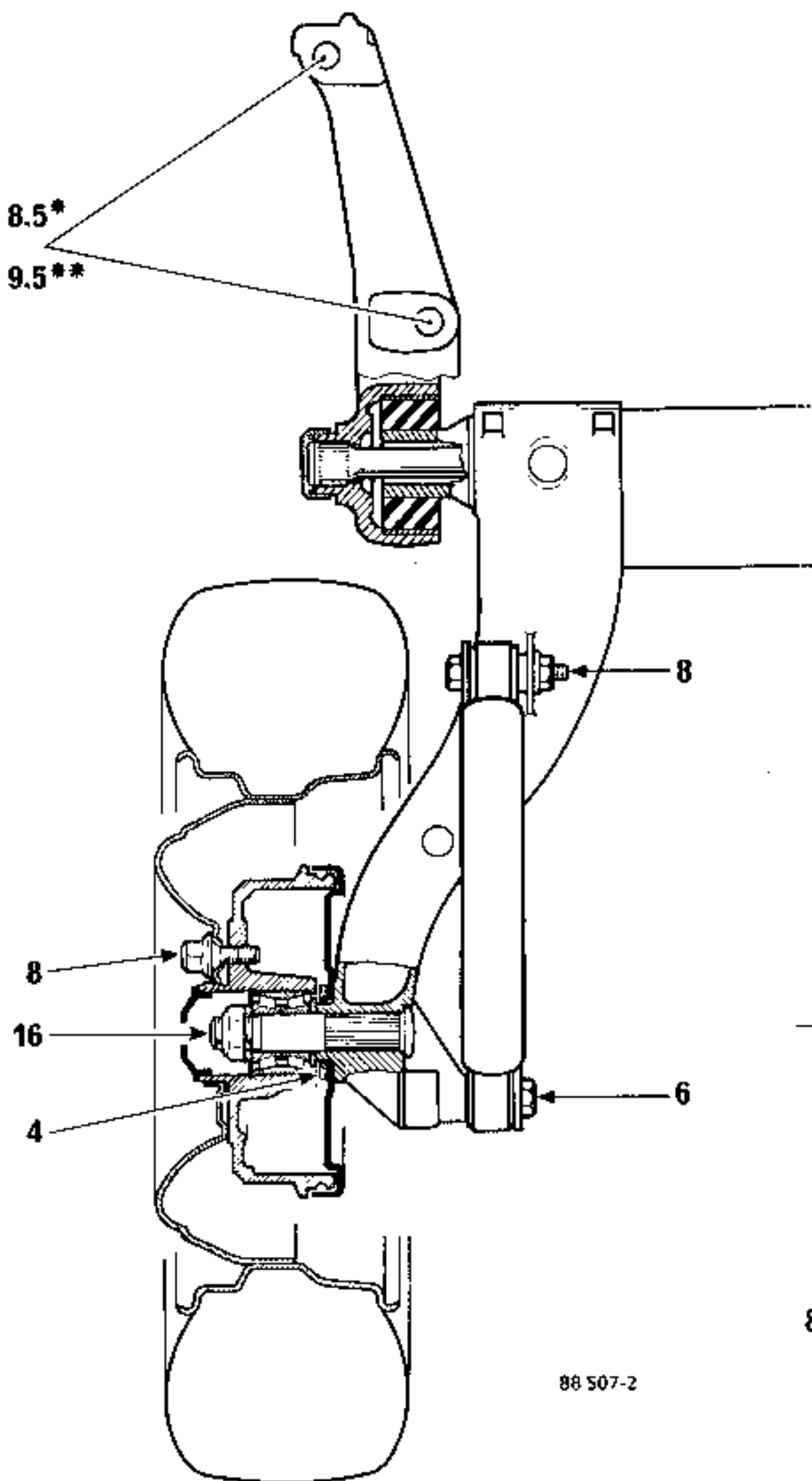
B40X - C40X - F40X - S40X All types
C405 before July 1987



C405 after June 1987







88 507-2

91 849

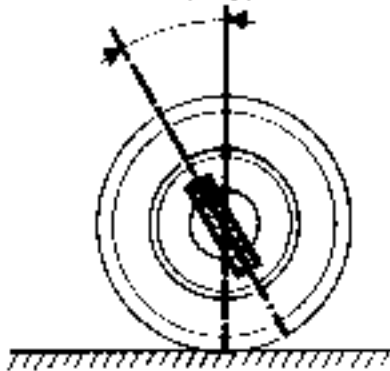
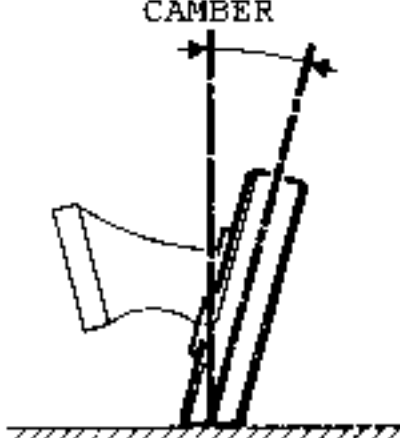
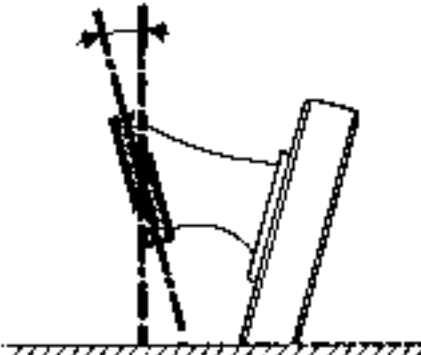
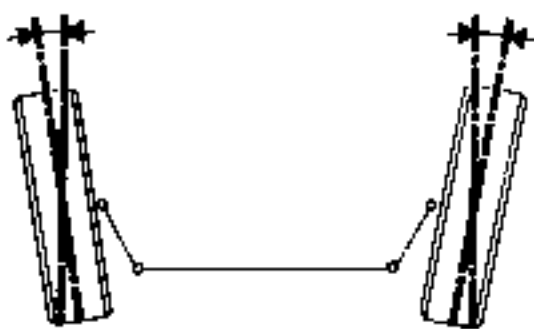
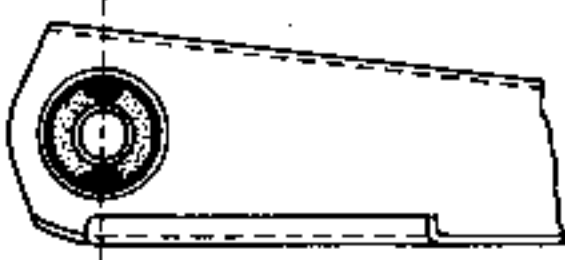
* B40X - C40X

** F40X

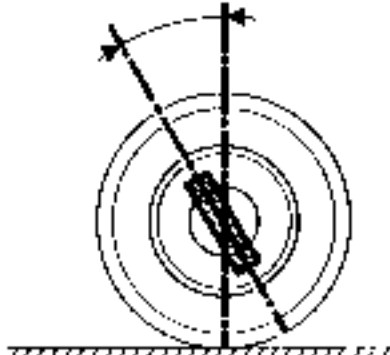
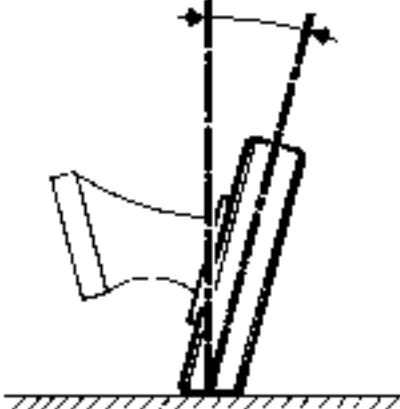
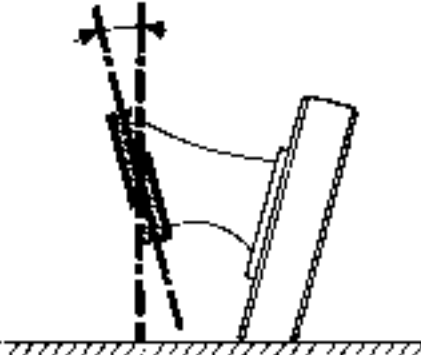
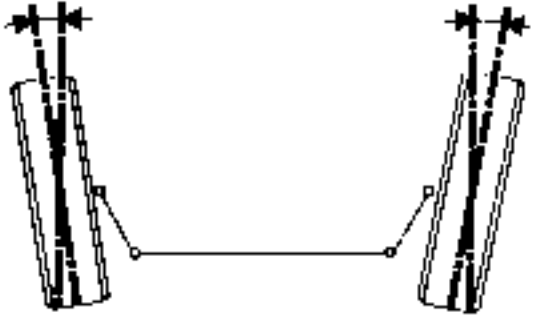
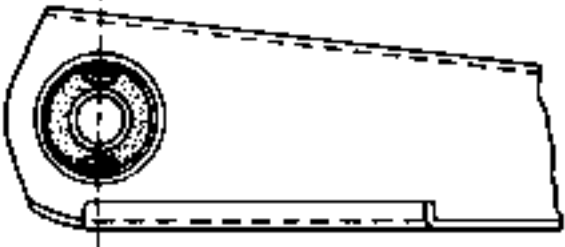


	DIMENSIONS	TIGHTENING TORQUES
Bleed screws	—	0,6 - 0,8
Hoses on front wheel cylinders	M 10 x 100	1,3
Hoses on rear suspension arms	M 10 x 100	1,3
Supply to rear wheel cylinders	M 10 x 100 or M 12 x 100	} 1,3
Master cylinder outlets	M 10 x 100 or M 12 x 100	} 1,3
Compensator inlets	M 10 x 100 or M 12 x 100	} 1,3
Compensator outlets	M 10 x 100 or M 12 x 100	} 1,3

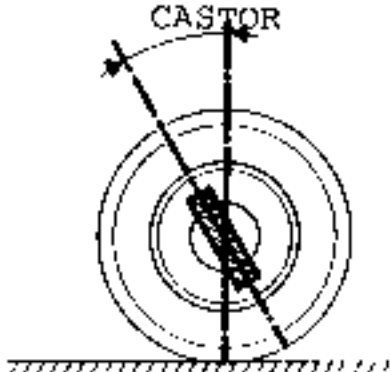
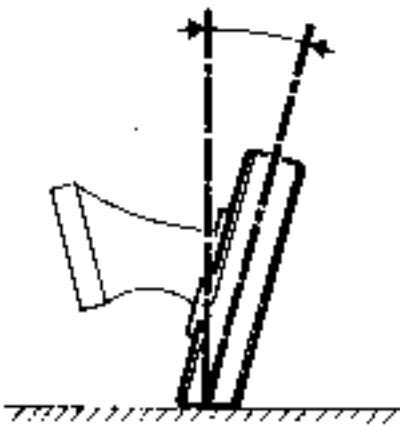
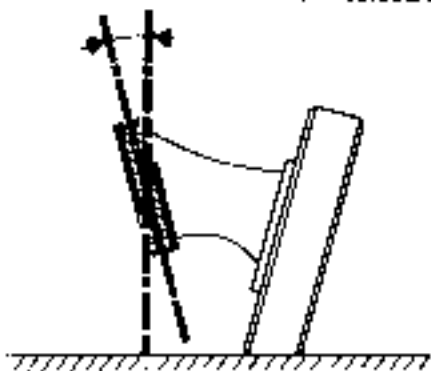
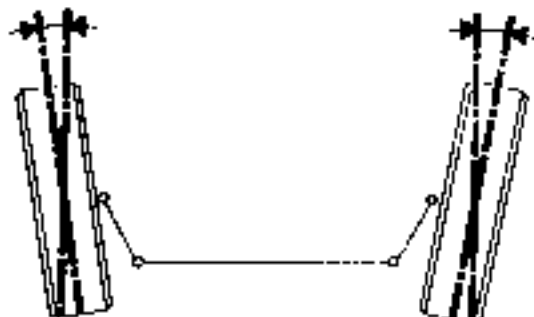
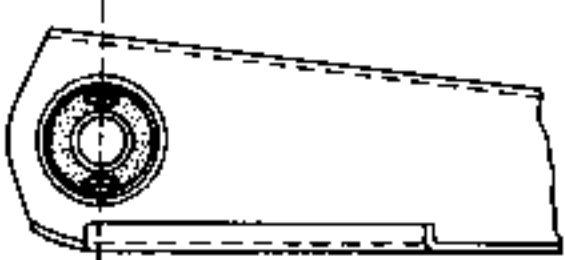
All types B40X - F40X - S40X - C40X except C405 - C409

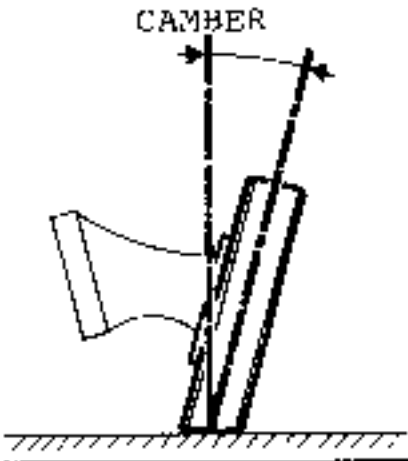
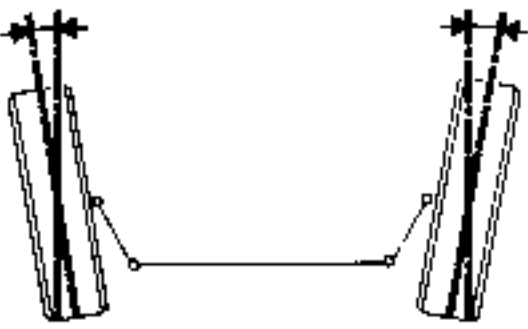
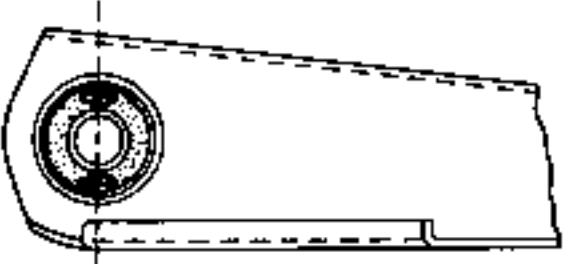
ANGLE	VALUE	POSITION OF FRONT AXLE	ADJUSTMENT
<p>CASTOR</p> 	<p>2°30'</p> <p>2°</p> <p>1°30'</p> <p>1°</p> <p>0°30'</p> <p>Max. difference RH-LH sides = 1°</p>	<p>H5 - H2 = 40 mm</p> <p>H5 - H2 = 60 mm</p> <p>H5 - H2 = 80 mm</p> <p>H5 - H2 = 100 mm</p> <p>H5 - H2 = 110 mm</p>	NON ADJUSTABLE
<p>CAMBER</p> 	<p>0°50'</p> <p>0°30'</p> <p>0°15'</p> <p>0°</p> <p>- 0°20'</p> <p>± 30'</p> <p>Max. difference RH-LH sides = 1°</p>	<p>H1 - H2 = 50 mm</p> <p>H1 - H2 = 60 mm</p> <p>H1 - H2 = 75 mm</p> <p>H1 - H2 = 90 mm</p> <p>H1 - H2 = 110 mm</p>	NON ADJUSTABLE
<p>STEERING AXIS INCLINATION</p> 	<p>11°50'</p> <p>12°10'</p> <p>12°40'</p> <p>13°10'</p> <p>13°40'</p> <p>± 30'</p> <p>Max. difference RH-LH sides = 1°</p>	<p>H1 - H2 = 50 mm</p> <p>H1 - H2 = 60 mm</p> <p>H1 - H2 = 75 mm</p> <p>H1 - H2 = 90 mm</p> <p>H1 - H2 = 110 mm</p>	NON ADJUSTABLE
<p>TOE-OUT</p>  <p style="text-align: right;">78423</p>	<p>Across both wheels</p> <p>0°10' ± 10'</p> <p>(1 ± 1 mm)</p>	UNLADEN	<p>Adjustable by turning the steering link sleeves</p> <p>1 turn = 30'</p> <p>(3 mm)</p>
<p>RUBBER BUSH TIGHTENING POSITION</p>  <p style="text-align: right;">81 603</p>		UNLADEN	

C405 before July 1987 - C409

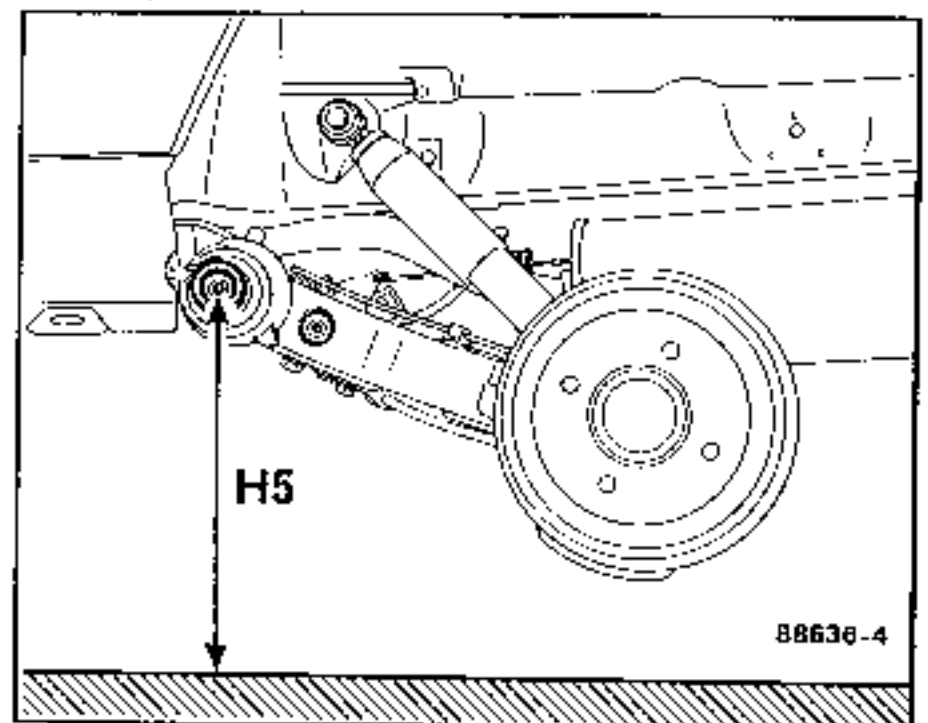
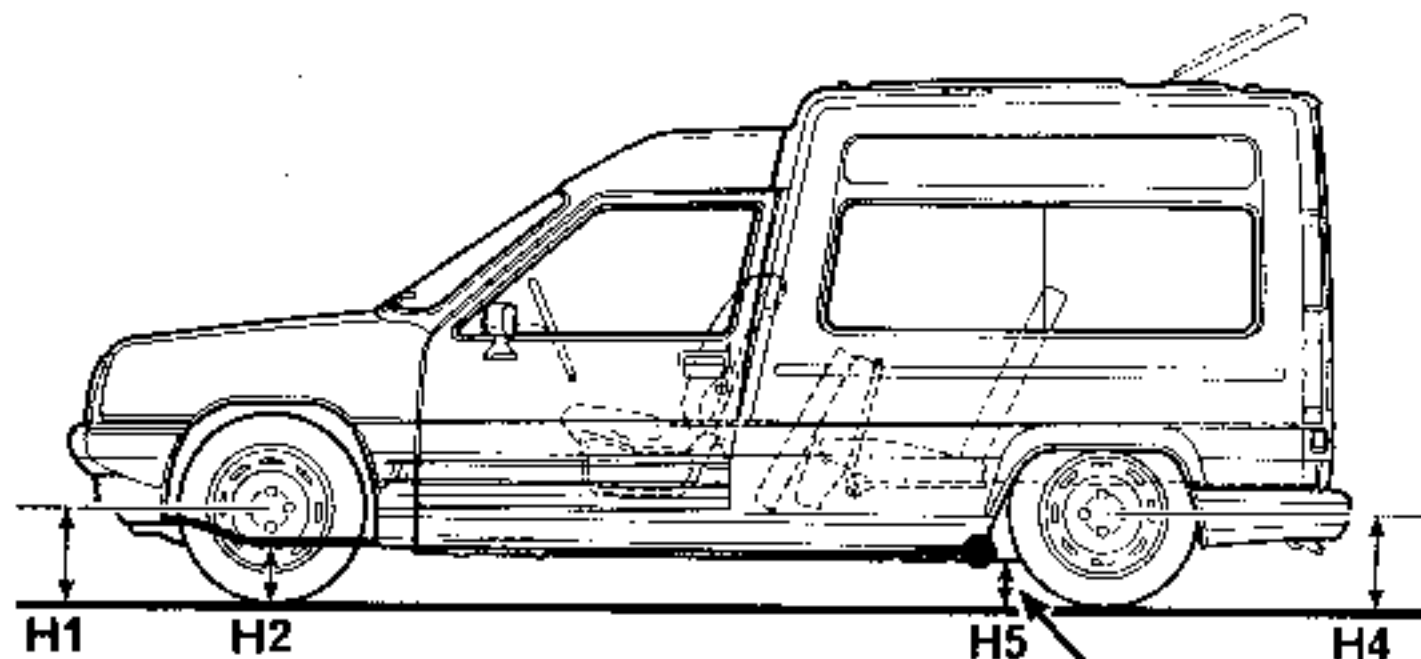
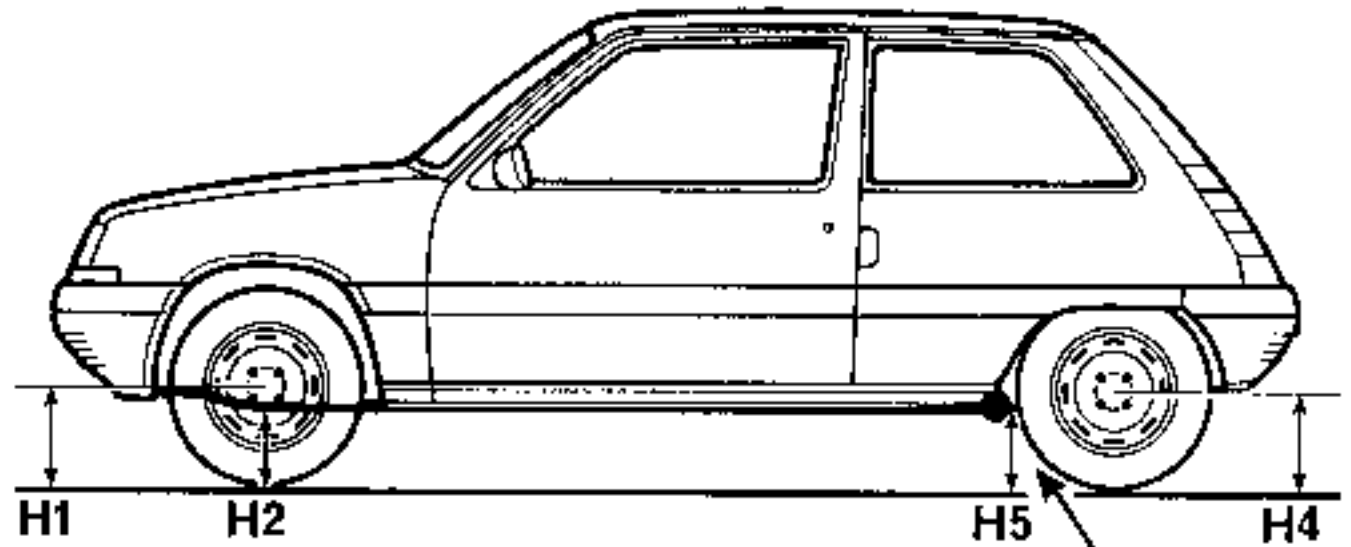
ANGLE	VALUE	POSITION OF FRONT AXLE	ADJUSTMENT
<p>CASTOR</p> 	$2^{\circ}10'$ $1^{\circ}40'$ $1^{\circ}10'$ $0^{\circ}40'$ $0^{\circ}10'$ Max. difference RH-LH sides = 1°	$H5 - H2 = 43 \text{ mm}$ $H5 - H2 = 62 \text{ mm}$ $H5 - H2 = 81 \text{ mm}$ $H5 - H2 = 100 \text{ mm}$ $H5 - H2 = 119 \text{ mm}$	NON ADJUSTABLE
<p>CAMBER</p> 	$- 1^{\circ} \pm 30'$ Max. difference RH-LH sides = 1°	UNLADEN	NON ADJUSTABLE
<p>STEERING AXIS INCLINATION</p> 	$13^{\circ}10' \pm 30'$ Max. difference RH-LH sides = 1°	UNLADEN	NON ADJUSTABLE
<p>TOE-OUT</p>  <p>78423</p>	Across both wheels $0^{\circ}10' \pm 10'$ $(1 \pm 1 \text{ mm})$	UNLADEN	Adjustable by turning the steering link sleeves $1 \text{ turn} = 30'$ (3 mm)
<p>RUBBER BUSH TIGHTENING POSITION</p>  <p>B1 603</p>		UNLADEN	

C405 after June 1987

ANGLE	VALUE	POSITION OF FRONT AXLE	ADJUSTMENT
<p>CASTOR</p> 	<p>3° 2°30' 2° 1°30' 1°</p> <p>Max. difference RH-LH sides = 1°</p>	<p>H5 - H2 = 41 mm H5 - H2 = 60 mm H5 - H2 = 79 mm H5 - H2 = 98 mm H5 - H2 = 117 mm</p>	NON ADJUSTABLE
<p>CAMBER</p> 	<p>- 1° ± 30'</p> <p>Max. difference RH-LH sides = 1°</p>	UNLADEN	NON ADJUSTABLE
<p>STEERING AXIS INCLINATION</p> 	<p>10°30' ± 30'</p> <p>Max. difference RH-LH sides = 1°</p>	UNLADEN	NON ADJUSTABLE
<p>TOE-OUT</p>  <p>78423</p>	<p>Across both wheels</p> <p>0°10' ± 10' (1 ± 1 mm)</p>	UNLADEN	NON ADJUSTABLE
<p>RUBBER BUSH TIGHTENING POSITION</p>  <p>81603</p>		UNLADEN	

ANGLE	VALUE		POSITION OF REAR AXLE		ADJUSTMENT	
	Tubular rear axle	4 bar rear axle	Tubular r. axle	4 bar r. axle	Tubular r. axle	4 bar r. axle
<p>CAMBER</p> 		$-0^{\circ}50' \pm 30'$ (negative)		UNLADEN	NON ADJUSTABLE	
<p>TOE-IN</p>  <p>78 423</p>	$0^{\circ}_{to} - 30'$ or $0_{to} - 3\text{ mm}$	$-20'_{to} - 50'$ or $-2_{to} - 5\text{ mm}$		UNLADEN	NON ADJUSTABLE	
<p>RUBBER BUSH TIGHTENING POSITION</p>  <p>81 603</p>				UNLADEN		

R. axle = Rear axle



Dimension H5 is measured to the centre of the suspension bar.

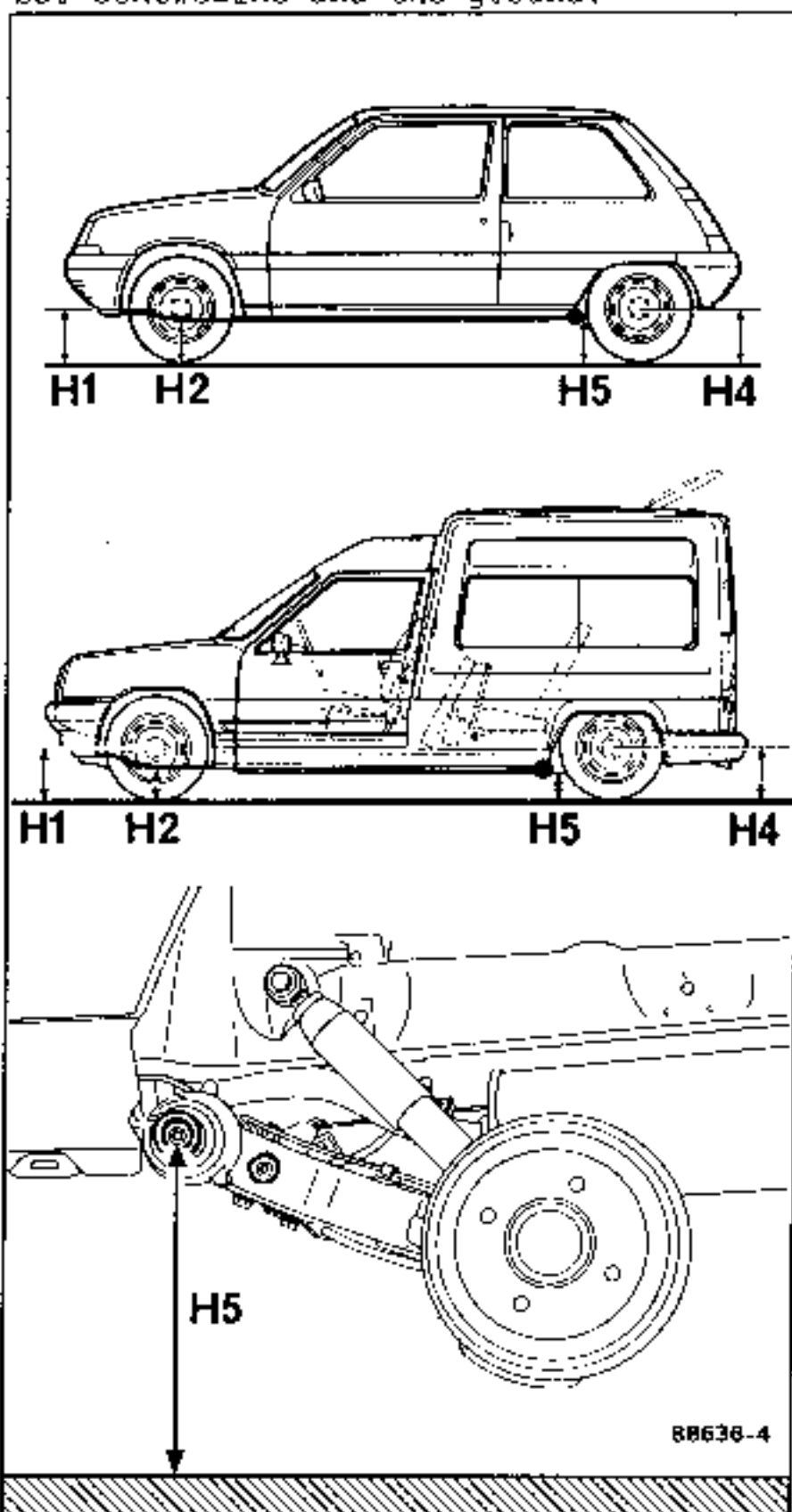
The underbody heights are measured with the vehicle unladen on a flat horizontal surface (preferably a lift) :

- with the fuel tank full,
- after checking the tyre pressures.

H1 and H2 is the dimension between the centres of the wheels and the ground.

H2 is the dimension from the front side member to the ground at the wheel centre-line.

H5 is the dimension between the suspension bar centreline and the ground.



Measure dimensions :

- H1 and H2 at the front,
 - H4 and H5 at the rear,
- and determine the difference.

GOOD ROAD VERSIONS

B400 - C400 - S400

$$H1 - H2 = 79 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B401 - C401 - S401 - B40H - C40H

$$H1 - H2 = 66 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B402 - C402 - B403 - C403 - B404 - C404 - S404 - B407 - C407 - B40F - C40F - S40F - B40G - C40G - B40J - C40J - B40K - C40K - B40M - C40M

$$H1 - H2 = 72 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B408 - C408

$$H1 - H2 = 84 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

C405 - C409 → MOD 88

$$H1 - H2 = 97 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = 20 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

C405 - C409 MOD 88 →

$$H1 - H2 = 101 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = 23 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

F400 - F401 - F402 - F404 - F407 - F40H - F40M

$$H1 - H2 = 61 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -40 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

ROUGH ROAD VERSIONS

B401 - C401 - B402 - C402

$$H1 - H2 = 51 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -27 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

Only the rear underbody height can be adjusted by turning the torsion bars.

After any modification to the underbody height adjust :

- the brake compensator (on certain versions),
- the headlight adjustment.

Consumables

TYPE	QUANTITY	UNIT
Elf-Multi	5 g	Seal lips
	Coating	Threads on wheel bolts
Hatmo	Coating	Lower suspension arm bearings
		Steering column splines and bushes
Molykote BR2	24 cm ³	Steering box
	Coating	Drive shaft splines at gearbox end
		Torsion bar splines
MOBIL CVJ 825 Black Star	140 g	Drive shaft joint at GB end (GI 62)
	160 g	Drive shaft joint at GH end (RC 490)
or	295 g	Drive shaft joint at wheel end (GE 68)
MOBIL EXF 57C	180 g	Drive shaft joint at wheel end (GE 76)
CAF 4/60 THIXO	1 -2 drops	Pin holes in drive shafts
Molykote 33 Médium	Coating	Anti-roll bar bearings
		Plastic bushes on the early type rear suspension arms
Loctite FRENBLOC	1 -2 drops	Thread on axial ball joint
Loctite SCELBLOC	5 -6 drops	Drive shaft stub axle
Self-vulcanising plugs in kit combi A	77 01 417 243	The repair of tubeless tyres
Huile SAE W80	Coating	Rear wheel stub axle

- Axial ball joint locking plates.
- Wheel balancing weight retainers.
- Hub bearings.
- Drive shaft bellows - bearing.
- Girling brake caliper guide screws.
- Rear bearing clips.
- Stub axle locking nuts.

Brake fluid

BRAKE FLUID CHANGE PERIODS

Current brake fluids suffer from a slight deterioration during the first months of operation because of a slight water take-up. From then on, the water content stabilises.

As this slight deterioration occurs at the beginning of the operating life, braking systems are designed according to the characteristics of used brake fluid so that THE BRAKE FLUID NO LONGER REQUIRES TO BE SYSTEMATICALLY PERIODICALLY REPLACED.

Furthermore, the design technology used for our braking systems, in particular our disc braking systems (hollow pistons that transmit very little heat, very small quantity of fluid in the cylinder, sliding calipers that make it unnecessary to maintain a reserve of fluid in the least well cooled part of the wheel) has permitted us to reduce, to a minimum, risks of vapour lock, even when the brakes are being very intensively used (in mountainous areas).

Consequently, as the characteristics of brake fluids change very little after the first few months of operation, it is, as we have said, no longer necessary to systematically change the brake fluid. However, all the brake fluid must be changed each time any extensive work is carried out on the braking system such as replacing a caliper or a wheel cylinder and, obviously, any time the system is fully overhauled.

Topping-up the level :

Wear on the brake pads and linings causes a progressive fall in the level of the fluid in its reservoir. It is not necessary to top-up this fall in that the correct level will be re-established when the pads or linings are replaced. Obviously, however, the level must not be allowed to fall below the minimum mark.

Officially approved brake fluids :

Mixing, in the same braking system, two incompatible brake fluids, could cause a high risk of leakage as a result, mainly, of the deterioration of the cup washers. To avoid such risks, it is imperative to use only brake fluids that have been checked and officially approved by our laboratories & which are in line with the requirements of SAE Standard J 1703 and DOT 3 or DOT 4.

VEHICLE TYPE	Equip. vers.				B40G C40G B40K C40K C405 C409
	B400 C400 S400 B401 C401 S401 B402 C402 B403 C403	161	B404 C404 S404 B407 C407 B408 C408 B40F C40F S40F	B40H C40H B40J C40J B40M C40M F400 F401 F402 F404 F407 F40H F40M	
DIAMETER	22				21

Rear anti-roll bar specifications

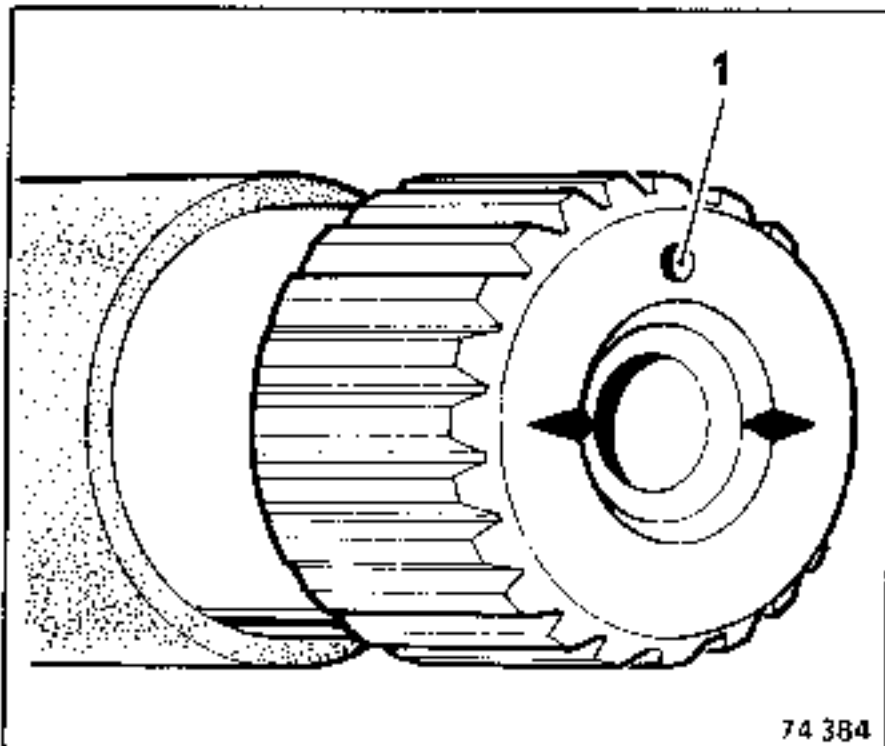
VEHICLE TYPE	TUBULAR TYPE REAR AXLE			4 BAR TYPE REAR AXLE	
	Except equip. vers. 161 B400 C400 S400	Equip. vers. 161 B400 C400 S400	Except rough road vers. B401 C401 B402 C402	rough road vers. B401 C401 B402 C402	F400 F401 F402 F404 F407 F40H F40M
DIAMETER	13.5 mm	15.5 mm	17 mm	23.4 mm	
NUMBER OF SPLINES AT WHEEL ENDS	-	-	-	31	
NUMBER OF SPLINES AT SHACKLE ENDS	-	-	-	30	

	TUBULAR TYPE REAR AXLE		4 BAR TYPE REAR AXLE	
	B400 C400 S400 B401 } except C401 } rough B402 } road C402 } vers. S401 B40H B403 C40H C403 B40J B404 C40J C404 B40M S404 C40M B407 C407 B40F C40F S40F	B408 C408 B406 C40G B40K C40K	B401 } C401 } rough B402 } road C402 } vers. C405 C409	F400 F401 F402 F404 F407 F40H F40M
VEHICLE TYPE				
DIAMETER	18 mm	18.5 mm	20.8 mm	23.2 mm
NUMBER OF SPLINES AT BEARING ENDS	27	27	27	27
NUMBER OF SPLINES AT SHACKLE OR SUSPENSION ARM ENDS	26	26	26	26

As the direction of the torsion in these bars is reversed, the right hand and left hand bars are identified by :

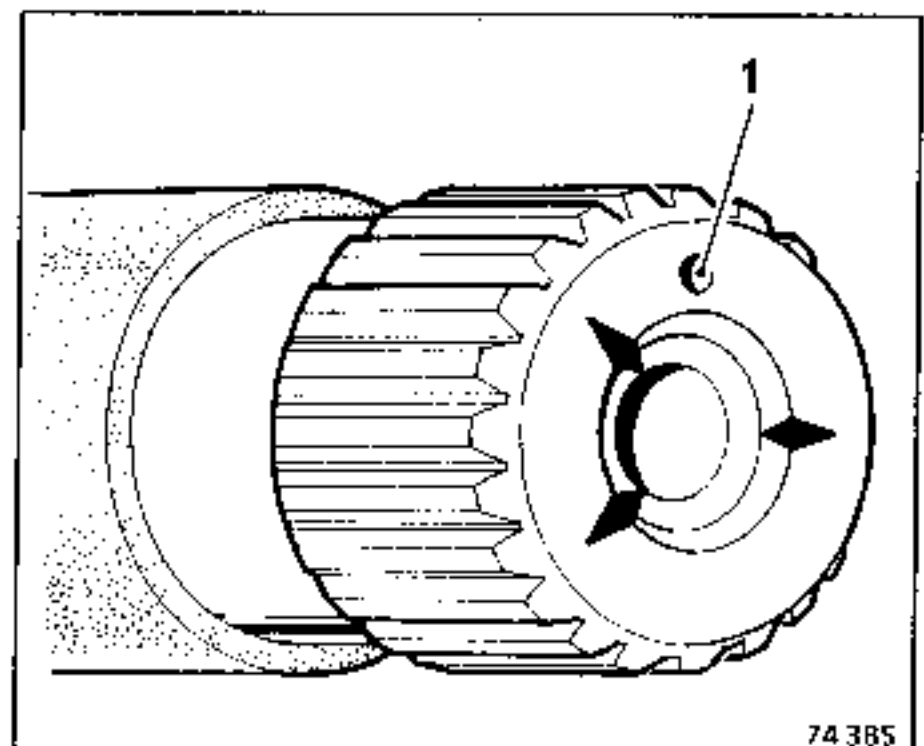
- imprints made in their ends
or
- letters stamped on their ends

LEFT HAND BAR

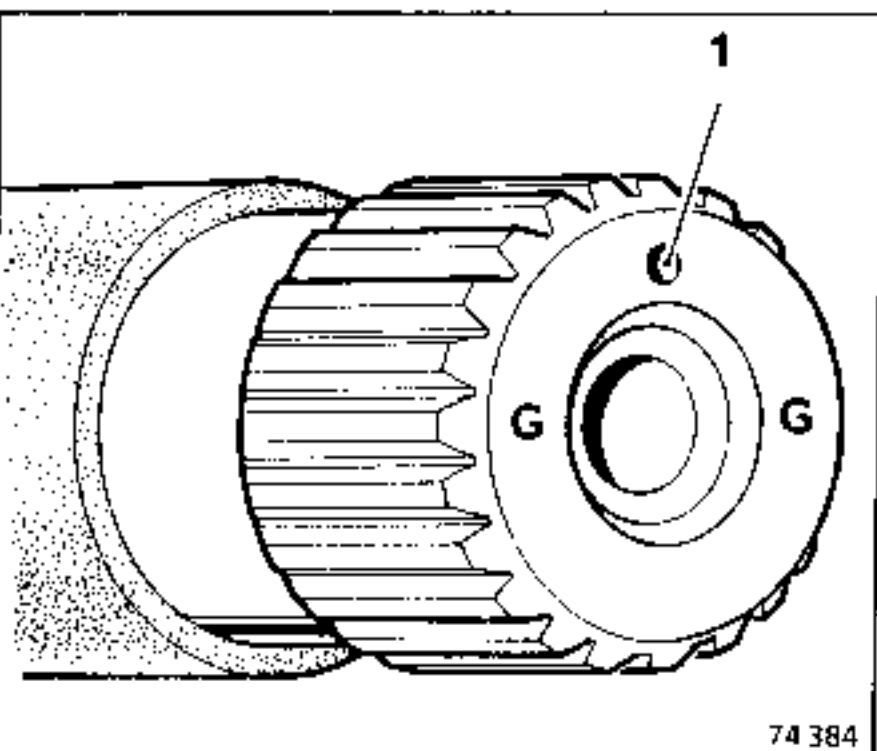


2 imprints

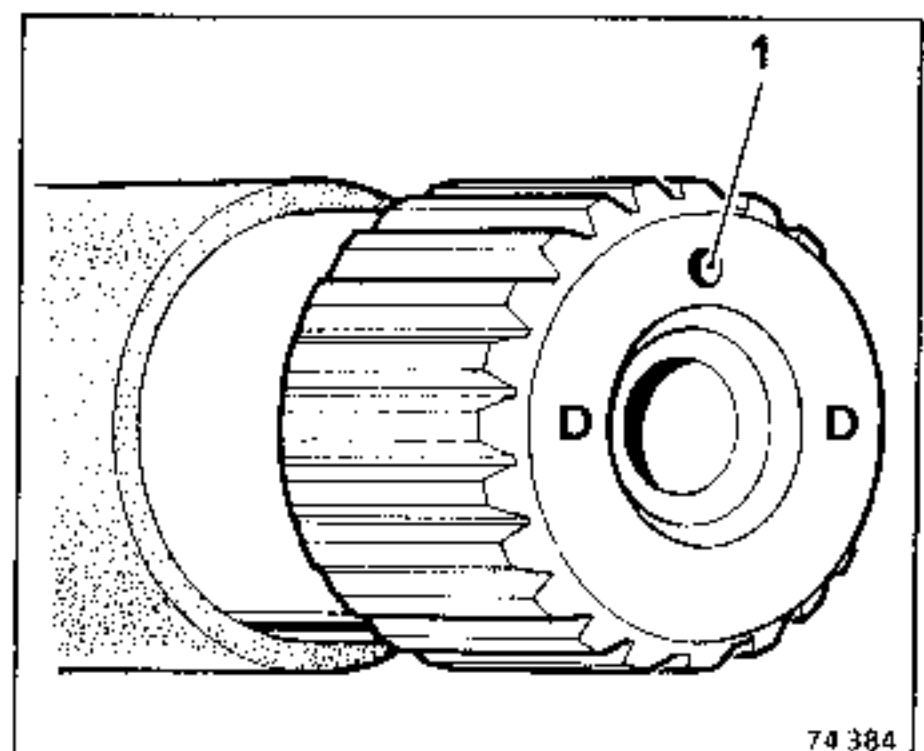
RIGHT HAND BAR



3 imprints



Letter G



Letter D

NOTE : certain bars carry a reference mark "1" (drill mark) that is used to position the bar in its bearings.

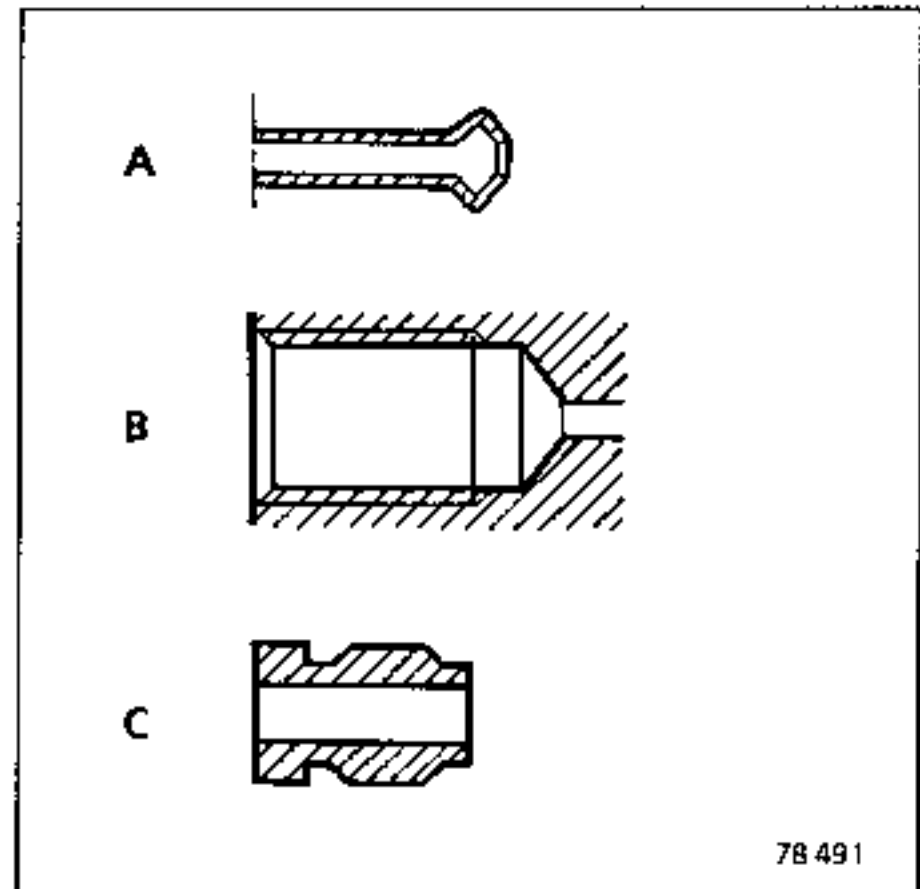


The unions on the pipes between the master cylinder, the front calipers, the pressure limiter and the rear wheel cylinders have METRIC THREADS.

Consequently, it is important only to use the Replacement Parts that appear in the Parts catalogue for this vehicle.

Parts identification :

- The SHAPE of the end of the PIPE whether steel or copper (A),
- The SHAPE of the TAPPING in the wheel cylinder (B),
- Pipe UNIONS coloured GREEN or BLACK : with external hexagons of 11 mm or 12 mm (C).



The effect of the angles

The effect of the various geometry angles on vehicle road holding and tyre wear.

CAMBER

It is the comparison between the left hand and right hand angles that is important. A difference of more than one degree between the two sides causes the vehicle to pull to one side and the necessary correction at the steering wheel causes abnormal tyre wear.

CASTOR

It is the comparison between the left hand and right hand angles that is important. A difference of more than one degree causes the vehicle to pull to one side and correcting this pull, at the steering wheel, causes excessive tyre wear.

This defect is characterised by the vehicle pulling towards the side on which the angle is smallest, at constant speed.

STEERING BOX HEIGHT

This adjustment effects the variation in

the toe-in or toe-out during movement of the suspension.

Variations in the toe-in/out that are different on the right and left hand sides cause (without any change in the position of the steering wheel) :

- pulling to one side during acceleration,
- pulling to the other side during overrun,
- changes in the steering position on bumpy roads.

TOE-IN/OUT

It is essential for the steering to be centralised before this adjustment is carried out in order to avoid an influence on the vehicle road holding.

It is to be noted :

- that too much toe-out causes symmetrical wear on the inside edges of both tyres,
- that excessive toe-in causes symmetrical wear on the outside edges of both tyres.

PRELIMINARY CHECKS

Before checking the axle geometry one must check the following points and remedy any defects :

- That the tyres on any given axle are the same from the point of view of :
 - . dimensions,
 - . pressures,
 - . states of wear.
- The hinge points :
 - . the condition of the rubber bushes,
 - . the play in the ball joints,
 - . the play in the bearings.
- The wheel run-out : this is not to exceed 1.2 mm (it will be compensated for by the geometry checking equipment).
- That the underbody heights are the same (condition of the suspension).

DETERMINING THE STEERING CENTRE POINT

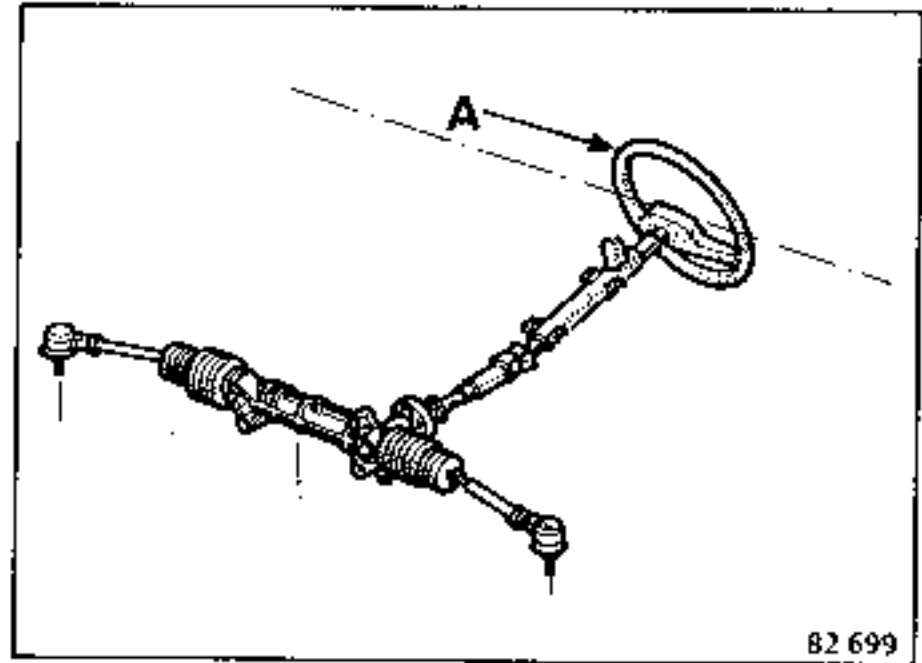
The steering must be centralised before checking and adjusting the front axle geometry to avoid the vehicle pulling to one side.

Turn the steering through full lock in one direction.

Make a mark (A) at the top of the steering wheel rim.

Turn the steering through full lock in the other direction whilst counting the number of turns and fractions of a turn.

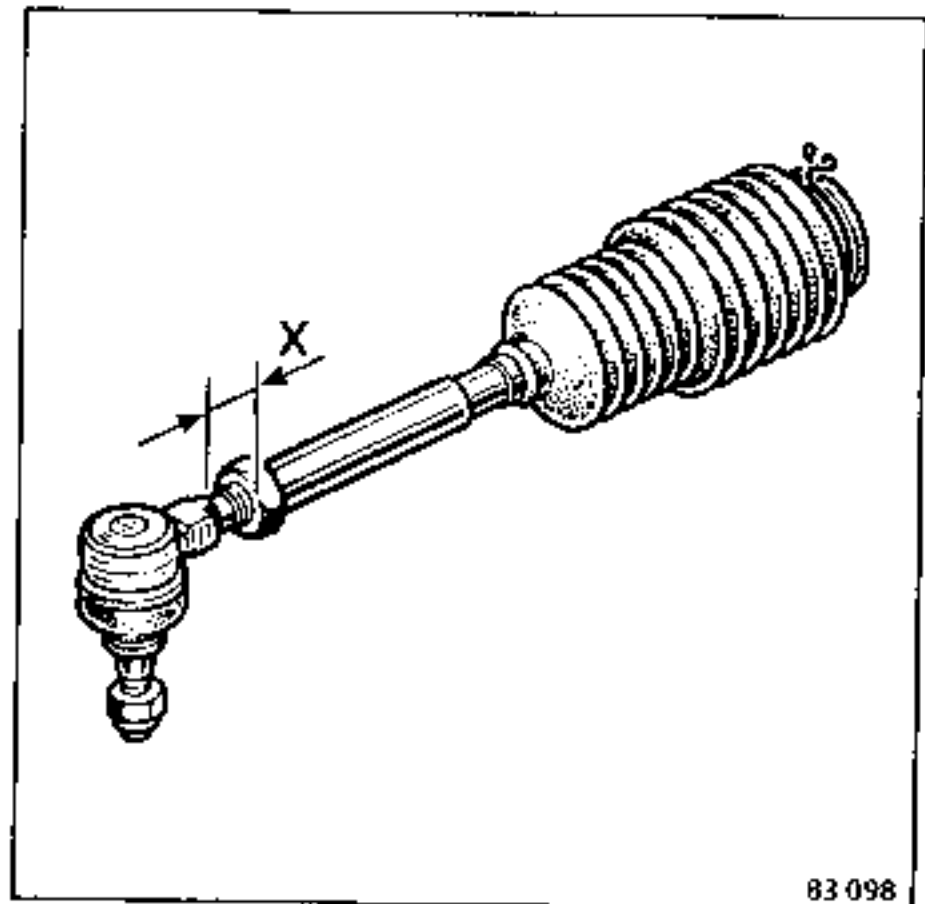
Return to half the number of turns and fractions of a turn noted. The steering will then be in the "centre point".



82 699

In this position, fit the geometry checking equipment and carry out the check.

When adjusting the toe-in/toc-out ensure that the lengths X on the steering link ball joint shanks are the same.



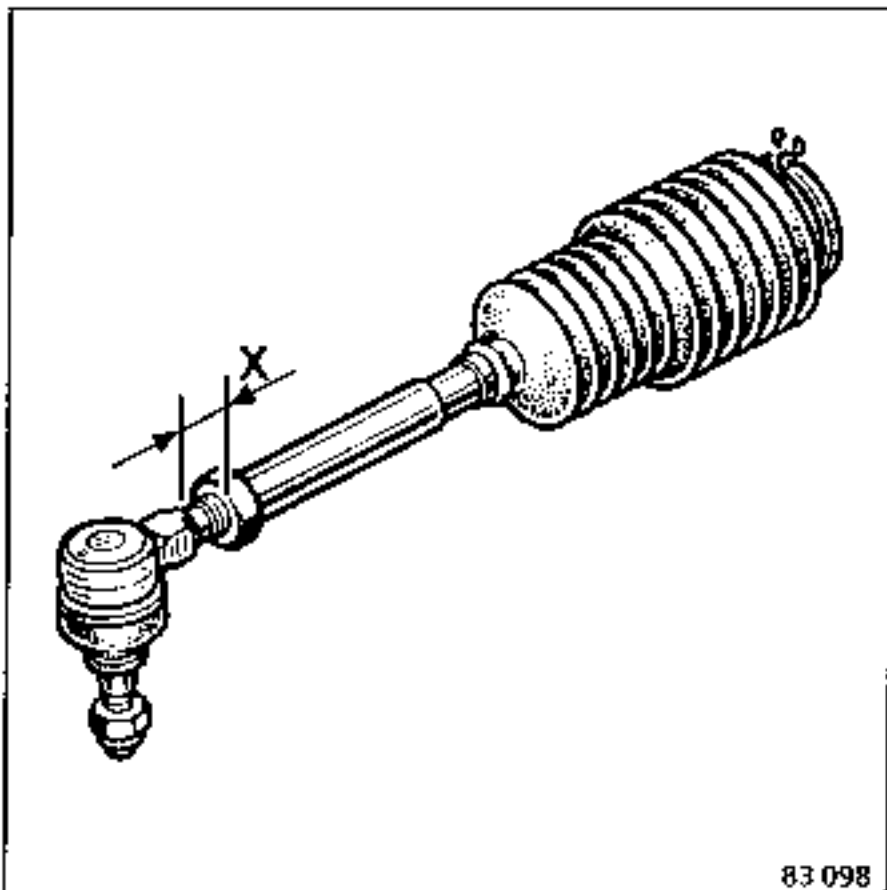
83 098

CHRONOLOGICAL ORDER IN WHICH THE OPERATIONS ARE TO BE CARRIED OUT

Because of the nature of the front axle geometry, altering one of the angles (castor, camber, king pin inclination, toe-in/out and variation) effects the other angles to a greater or lesser extent. (It is the castor angle that has most effect).

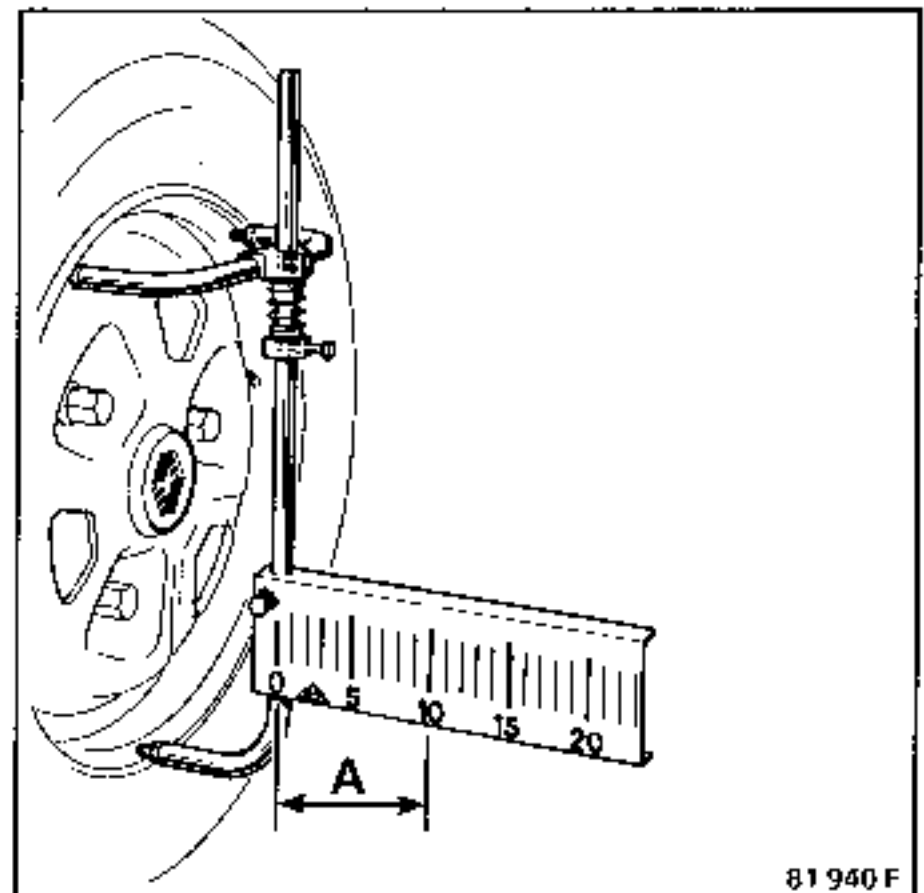
It is therefore essential to work in the following order :

- mount the equipment on the vehicle following the manufacturer's instructions,
- determine the steering centre point (see preceeding paragraph) and lock the steering wheel,
- lift the vehicle, taking the load under the body,
- eliminate the wheel run-out,
- lower the vehicle on to the swing plates,
- fit the brake pedal depresser,
- bounce the suspension to return the vehicle to the correct suspension height,
- check that the dimensions X on the steering ball joint shanks are the same,



83098

- take the readings A on the scales.



81940 F

1 IF dimensions X are the same :

- dimension A should be equally distributed.

2 IF dimensions X are not the same :

- note down dimensions A on the right hand and left hand sides, subtract them and distribute half the result on each side.

Example :

Reading on right hand side : 16

Reading on left hand side : 10

$$16 - 10 = 6$$

$$6 : 2 = 3$$

Adjust the steering links to even out the dimensions A on both sides :

$$A = 13$$

- in this position, zero the swing plates,
- check, in the following order :
 - . the castor,
 - . the steering axis inclination,
 - . the camber,
 - . the toe-in/out

ADJUSTING THE TOE-IN/OUT

One of several cases may arise :

	Toe-in/Toe-out	Distribution	Correction required
①	Correct	Incorrect	Turn the adjusting sleeves (or end fittings) by the same number of turns in opposite directions on the left and right hand sides to obtain the same dimension A on both sides.
②	Incorrect	Correct	Adjust the toe-in/out by the same amount on the right and left hand sides whilst ensuring that dimensions A remain exactly the same on both sides.
③	Incorrect	Incorrect	Carry out an initial evening-out of dimensions A on both sides then adjust the toe-in/out as described in case no. (2).

Front axle Fault Finding

DEFECT	POSSIBLE CAUSE
Incorrect castor	<ul style="list-style-type: none"> - Suspension arm bent - Side member bent
Camber + steering axis inclination correct but camber incorrect Steering axis inclination incorrect	<ul style="list-style-type: none"> - Suspension arm bent - Side member bent
Camber correct but Steering axis inclination incorrect	<ul style="list-style-type: none"> - Stub axle carrier bent
Steering axis inclination correct but Camber incorrect	<ul style="list-style-type: none"> - Stub axle carrier bent
Incorrect variation of toe-in/out	<ul style="list-style-type: none"> - Suspension arm bent - See castor - Side member bent
Toe-in/out incorrect by more than 6 mm	<ul style="list-style-type: none"> - RH or LH stub axle carrier bent

This fault finding sequence covers all the types of circuit and braking system component used on our current range of vehicles.

Notice is only to be taken of the information relating to the system and components used on the vehicle dealt with in this Workshop Manual.

To facilitate finding the cause of the trouble, the fault finding sequence is broken down into two distinct sections.

- I The effect felt at the pedal
- II The effect on the vehicle behaviour

I THE EFFECT FELT AT THE PEDAL

DEFECT	POSSIBLE CAUSE
<p>Stiff pedal :</p> <p>Excessive effort required to obtain a low rate of deceleration</p>	<ul style="list-style-type: none"> - Defect in servo system - Pads or linings : <ul style="list-style-type: none"> - greasy, - glazed or of the incorrect type, - overheating caused by prolonged braking with the pedal constantly depressed (coming down inclines) or linings of the wrong type. - Piston seized, - Pipe kinked or flattened, - Pads or linings worn : friction lining almost worn away. Commencement of metal to metal contact (loud noise).
<p>Spongy pedal</p> <p>Note : because the servo assistance on current vehicles is high, one often has the impression that the pedal is spongy. To determine whether the system is actually defective, two tests are to be carried out</p> <p>1. With the vehicle moving</p> <p>Carry out a subjective test as to whether the deceleration is what would be expected for a given pedal travel.</p> <p>2. Vehicle stationary with the engine stopped</p> <p>Carry out a further check on the pedal travel : depress the pedal 5 times to empty the brake servo before taking the results of the test as valid.</p>	<ul style="list-style-type: none"> - Air in the braking system : poorly bled. - Internal leakage in the braking system. - Insufficient fluid in the reservoir (external leakage from the braking system).

<p>Pedal travel excessive</p> <p>Test to be carried out with the vehicle stationary and the engine stopped.</p> <p>Note : the brake pedal must be depressed 5 times to empty the brake servo before the results of the test can be considered as valid.</p>	<ul style="list-style-type: none"> - Brake shoes incorrectly adjusted - Drum brakes - Manual adjustment : the shoes are too far away from the drum. <p>Disc and drum brakes</p> <ul style="list-style-type: none"> - Automatic adjustment : too much tension in the hand brake cable. <p>Note : the brake lining wear is automatically taken up when the pedal is depressed unless there is too much tension in the hand brake cable when the brake is released.</p> <ul style="list-style-type: none"> - Excessive and non-symmetrical wear on the linings and pads (wedge shaped or hollow). - Excessive master cylinder clearance. - Fluid boiling or which has overheated.
<p>Pedal right down to the floor</p> <p>Test to be carried out with the vehicle stationary and the engine stopped.</p> <p>Note : the brake pedal must be depressed 5 times to empty the brake servo before the results of the test can be considered as valid.</p>	<ul style="list-style-type: none"> - Hydraulic leakage (check the system for leaks). - Defect in the cup that seals between the two master cylinder circuits. - Fluid boiling.

II EFFECT ON VEHICLE BEHAVIOUR

DEFECT	POSSIBLE CAUSE
Brakes "self-applying"	<ul style="list-style-type: none"> - No load on brake linings - Linings slightly greasy - Springs require changing
Brake judder	<ul style="list-style-type: none"> - Drum oval - Too much run-out in the discs - Discs of uneven thickness - Abnormal deposits on the discs (corrosion between pad and disc).

Pulling to one side when brakes are applied (front)

- Check front suspension and steering.
 - Piston seized*.
 - Tyres (wear - inflation pressures).
 - Pipe kinked or crushed*.
- *WARNING : on vehicles with negative off-set on the front axle, pulling to one side is the result of a braking defect on the opposite side.

Vehicle pulling to one side on braking (rear)

- Brake compensator or pressure limiting valve defective (adjustment - operation).
 - Piston seized.
 - Shoes incorrectly adjusted.
manual adjustment : shoes too far from drums.
Automatic adjustment : hand brake cable too tight.
- NOTE : The wear is automatically taken up when the pedal is depressed unless there is too much tension in the hand brake cable when the brake is released.
- Return springs.

Brakes overheating

- Insufficient master cylinder clearance preventing the master cylinder returning to the released position.
- Piston seized or not returning correctly.
- Pipe kinked or crushed.
- Hand brake control seizing.
- Hand brake control incorrectly adjusted.

ESSENTIAL SPECIAL TOOLS

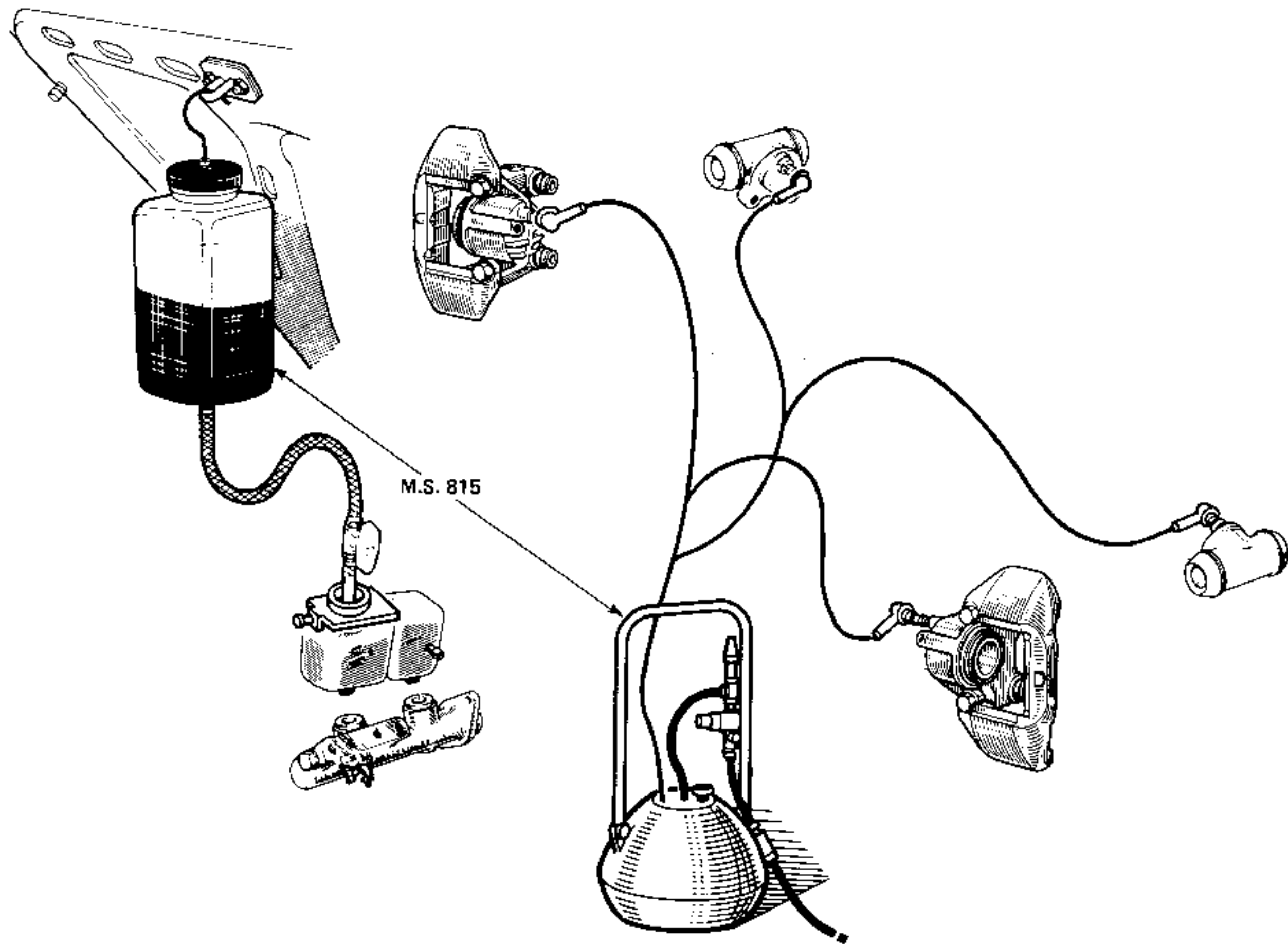
M.S. 815 Brake bleeding equipment

When bleeding the systems of vehicles equipped with servo brakes, no matter what the method used, it is important for the brake servo to be out of action during the brake bleeding operation.

- The brakes are bled using equipment M.S. 815, on a four column lift with the vehicle resting on its wheels.
- Connect the pipes of the M.S. 815 equipment to the bleed screws on the :
 - master cylinder
 - wheel cylinder
 - compensator or pressure limiting valve.
- Connect the equipment to a compressed air source (min. pressure 5 bars).
- Connect the filling system to the brake fluid reservoir.
- Open the fluid supply and wait for the reservoir to fill (both sections).
- Open the compressed air valve.

For vehicles equipped with "X" (crossed) type braking systems, proceed as follows :

- Open :
 - the bleed screw on the rear right hand wheel and leave the fluid running for approximately 20 seconds,
 - the bleed screw on the front left hand wheel and leave the fluid running for approximately 20 seconds.
- Take no notice of any air bubbles in the pipes on the bleed equipment.
- Carry out the same operations on the rear left hand wheel and the front right hand wheel.
- Check that the brake pedal is firm, when pressed (press it several times).
- Re-bleed the system if necessary.
- Top-up the level in the brake fluid reservoir after disconnecting the bleed equipment.



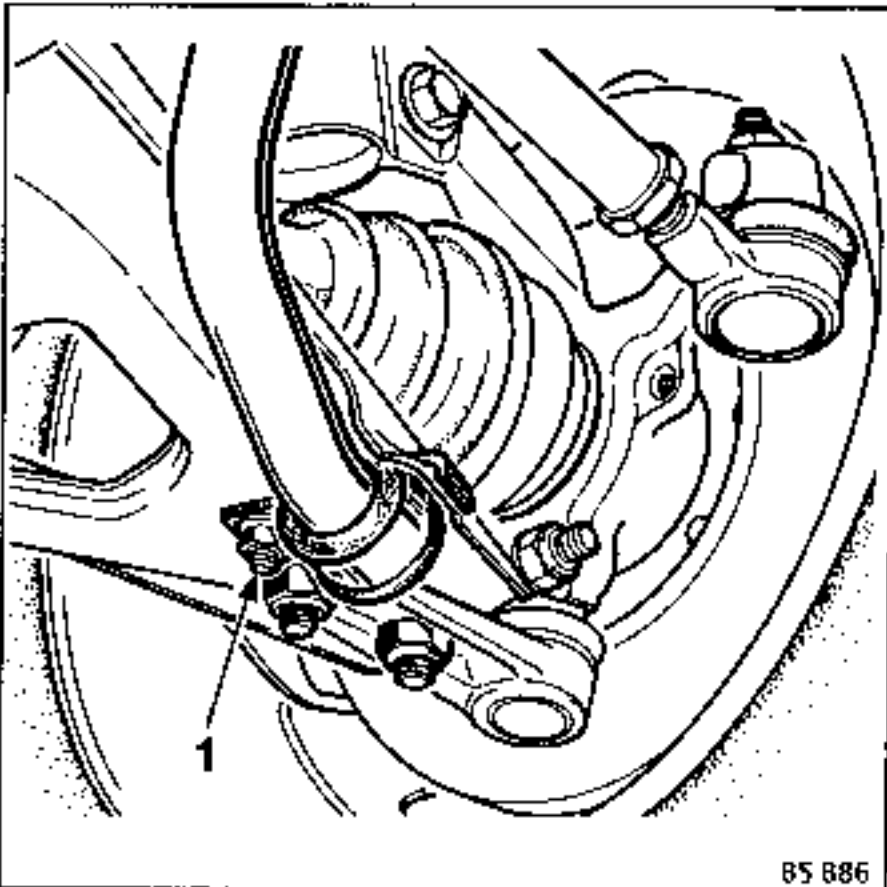


TIGHTENING TORQUES (in daN.m)

Nuts securing lower arm to sub-frame	8
Key nuts on stub axle carrier	6
Anti-roll bar bearing nuts	2
Lower ball joint nuts	7.5
Wheel bolts	8

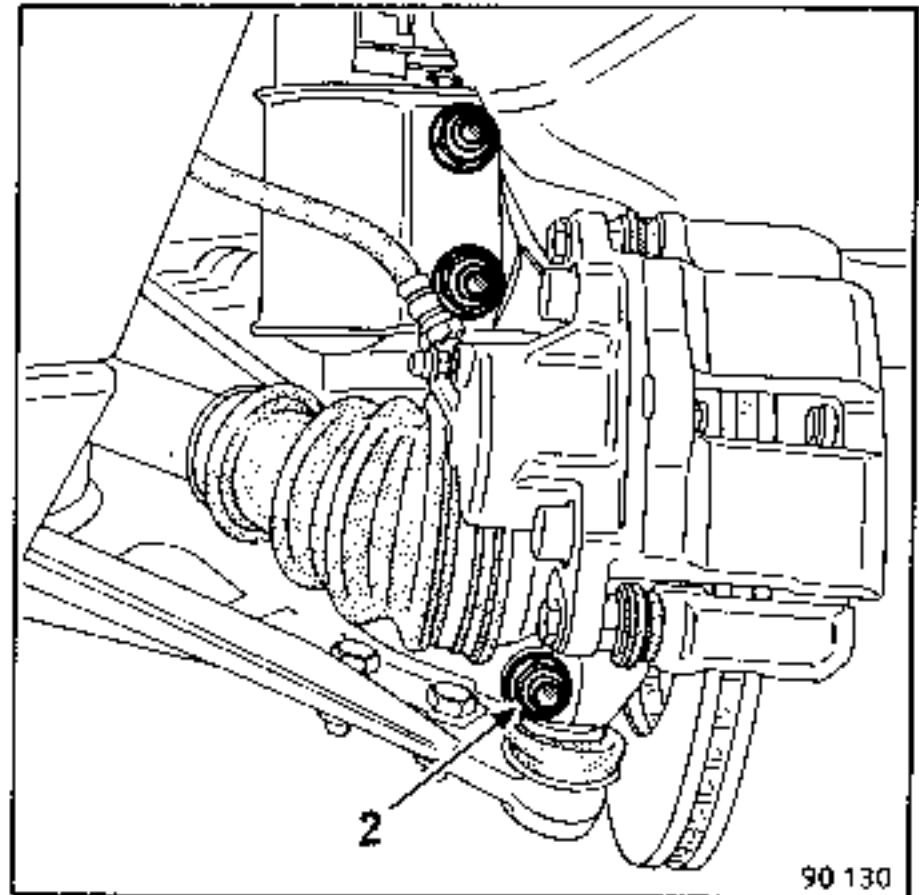
REMOVING

With the vehicle resting on its wheels, remove the anti-roll bar bearings (1) on the lower suspension arms.

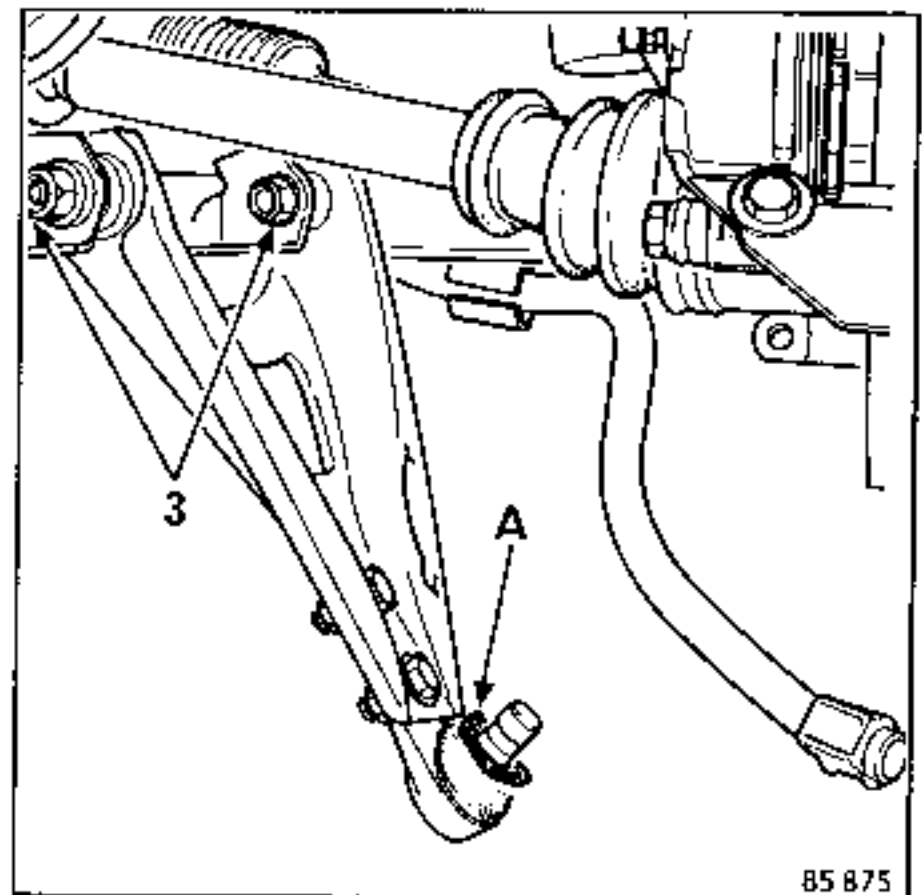


Remove the anti-roll bar downwards.
With the vehicle resting on stands, remove :

- the nut and the key (2),



- the two bolts (3) that secure the arm to the sub-frame,



- the arm.

REFITTING

Note : ensure that the plastic protective washer A is in position on the lower ball joint shank.

Fit :

- the suspension arm,
- the two bolts (3) without tightening them,
- the ball joint shank into the stub axle carrier and tighten the key nut (2) to torque.

With the vehicle resting on its wheels :

Refit the anti-roll bar without tightening its bearings.

Bounce the suspension and tighten the suspension arm and anti-roll bar bearing securing nuts to the specified torques (there is to be no load in the vehicle when the nuts are tightened).

Lower suspension arm rubber bushes



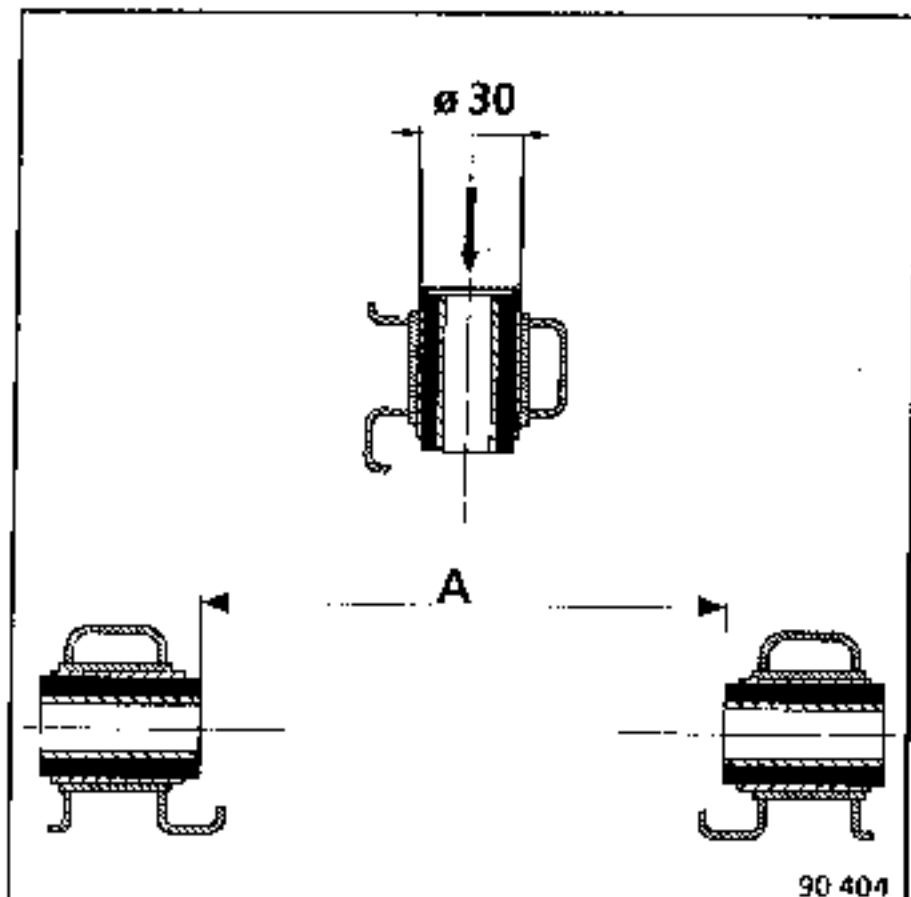
REPLACING

To maintain the correct relative positions of the bushes with reference to the suspension arm centreline, replace them one at a time.

Push out one of the worn bushes on the press using a tube with an outside diameter of 30 mm.

Fit the new bush to obtain :
dimension A = 147 ± 0.5 mm.

Push the second bush out, on the press and carry out the same operations as above to maintain :
dimension A at 147 ± 0.5 mm.



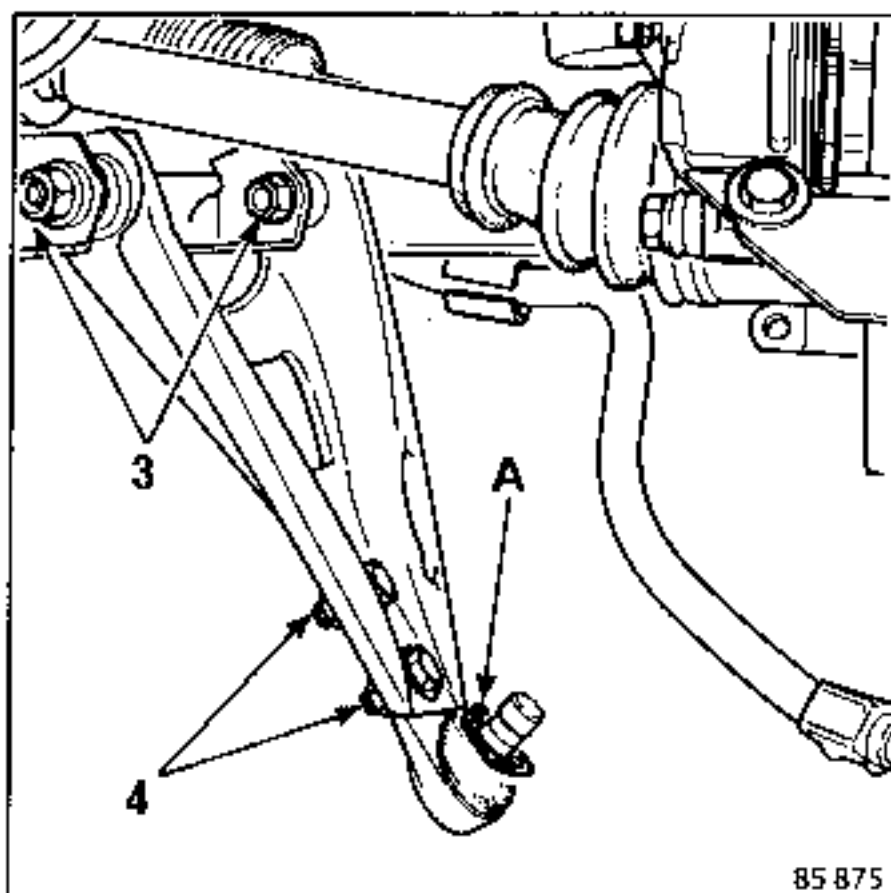


REMOVING

If its protective bellows is damaged, it is essential to replace the entire ball joint.

Carry out the same operations as for removing a lower suspension arm.

Loosen the two bolts (3) that secure the suspension arm to the sub-frame, without removing them.



Remove :

- the two ball joint securing bolts (4),
- the ball joint.

REFITTING

Note : ensure that the protective plastic washer A is in place on the lower ball joint shank.

Fit the ball joint and tighten its bolts to the specified torque.

Then continue with the same operations as for refitting the lower suspension arm.



ESSENTIAL SPECIAL TOOLS

Fre. 823

Piston pusher

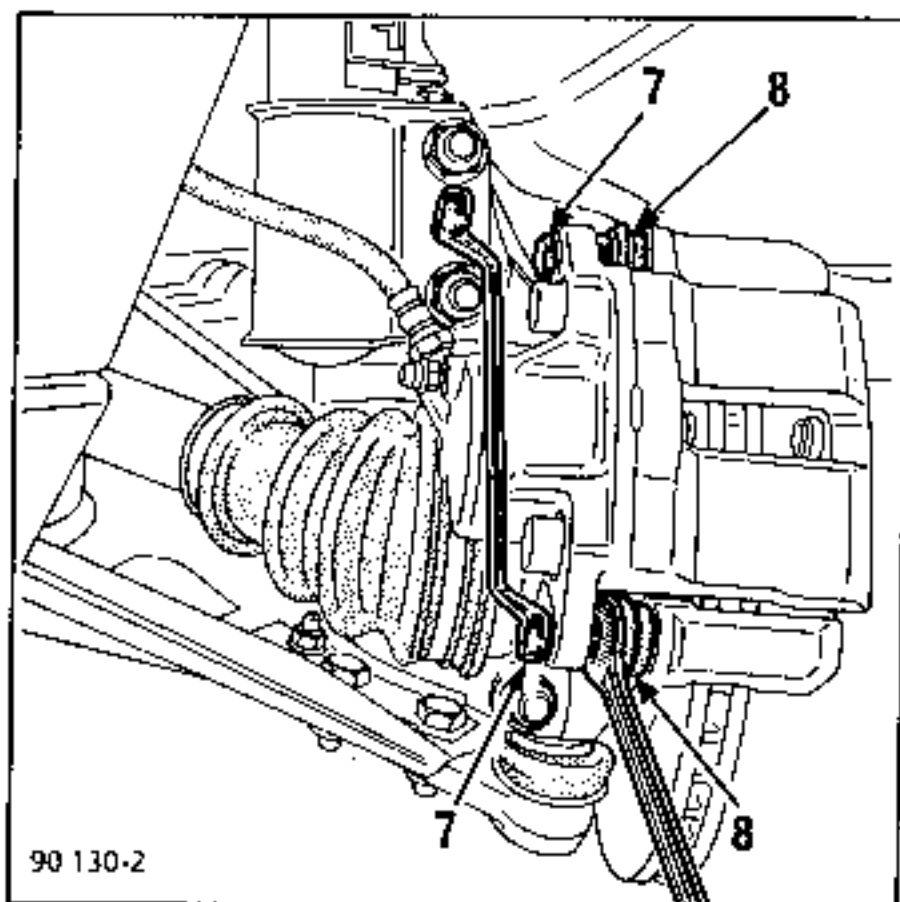
TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Brake caliper guide bolts	3.5

REMOVING

Disconnect the wire from the pad warning sensor.

Push back the piston by sliding the caliper outwards by hand.



Remove the guide bolts (7) using two spanners.

Do not clean these bolts.

Take out :

- the sliding caliper
- the pads

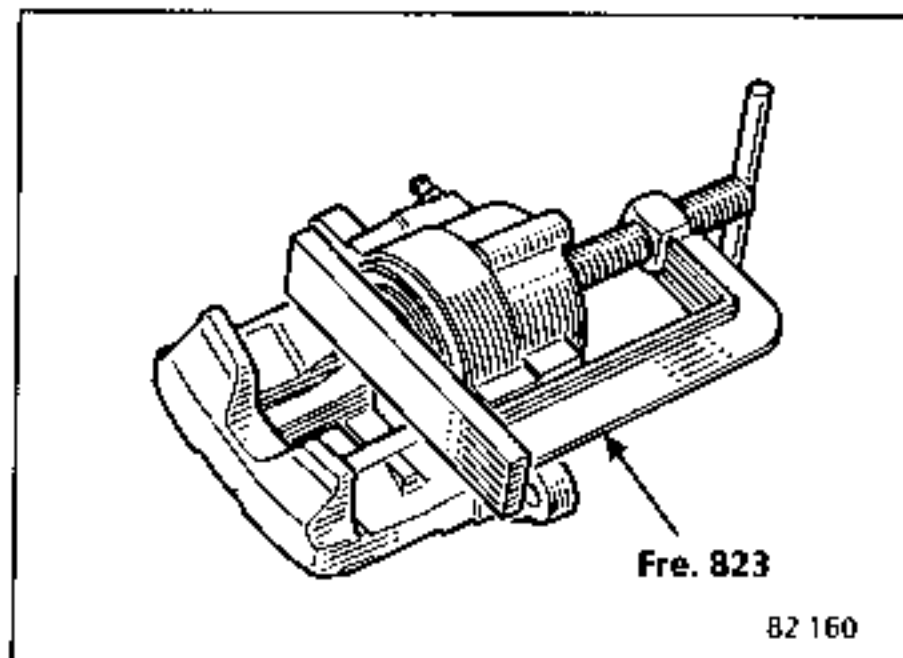
Checking

Check :

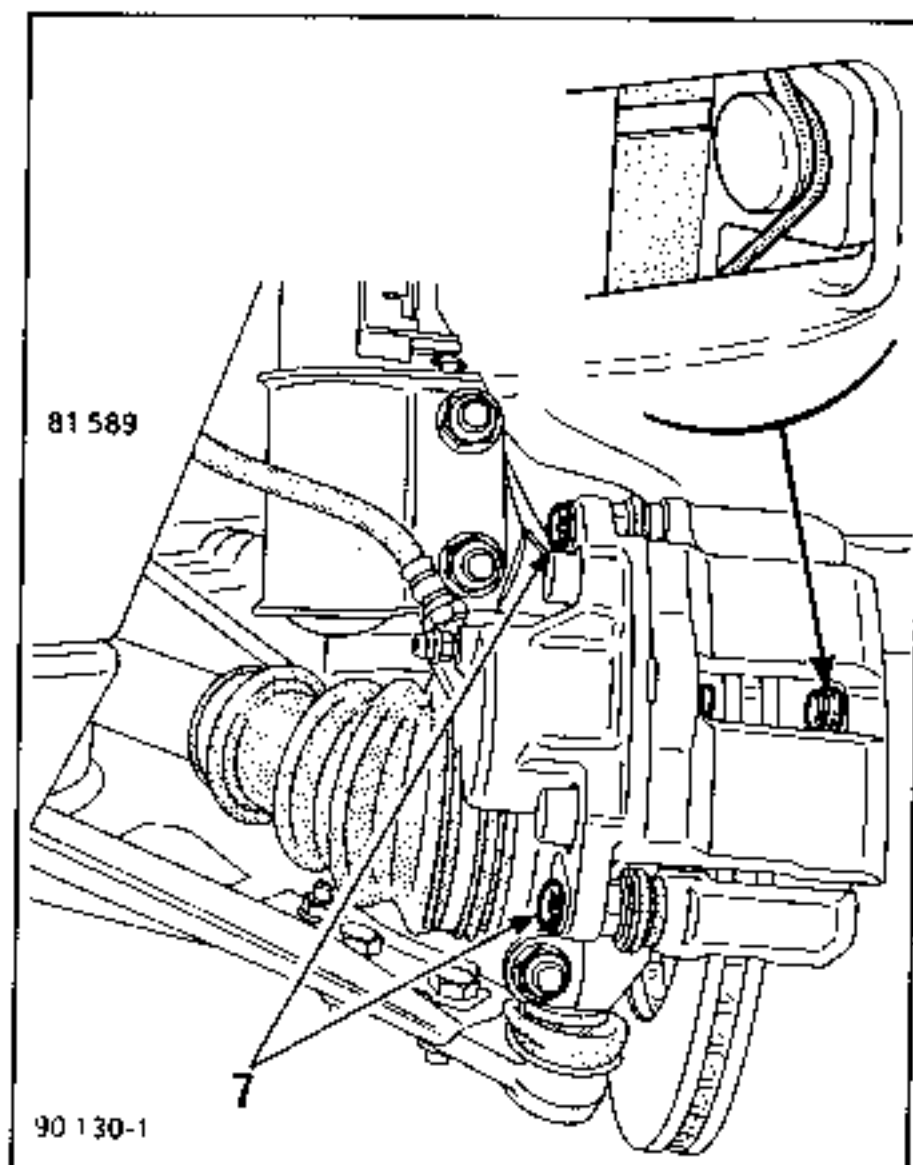
- that the piston dust cover and its retaining circlip are in good condition and correctly fitted,
- the condition of the dust cover (8) on the guides.

REFITTING

Push in the wheel cylinder piston using tool Fre.823.



Fit the new pads and their springs ensuring that they are fitted the correct way round.



The pad with the wear warning sensor wire on it is fitted on the inside.

Fit the caliper followed by the lower guide bolt (7) after coating it with Loctite FRENBLOC.

Press down the caliper and fit the upper guide bolt also coated with Loctite FRENBLOC.

Tighten the guide bolts to the specified torque starting with the bottom one.

Reconnect the wear sensor wire.

Press down the brake pedal a number of times to bring the piston into contact with the pads.



ESSENTIAL SPECIAL TOOLS

Fre. 823

Piston pusher

TIGHTENING TORQUES (in daN.m)

Wheel bolts

8

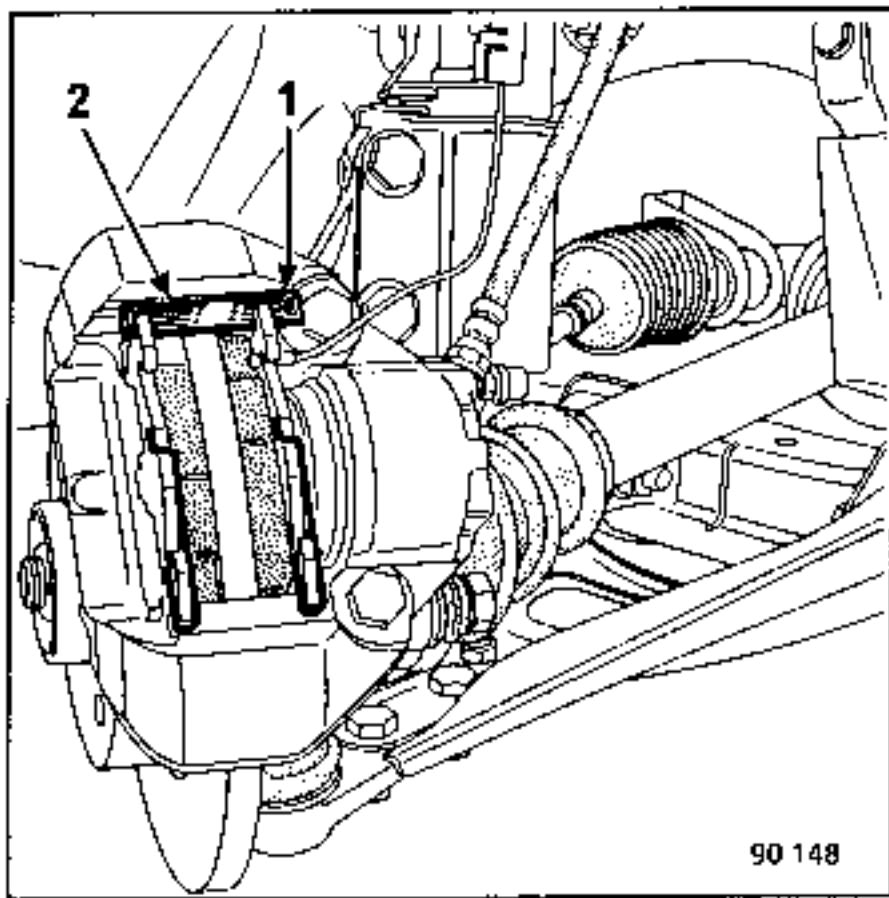
REMOVING

Disconnect the wear sensor wire.

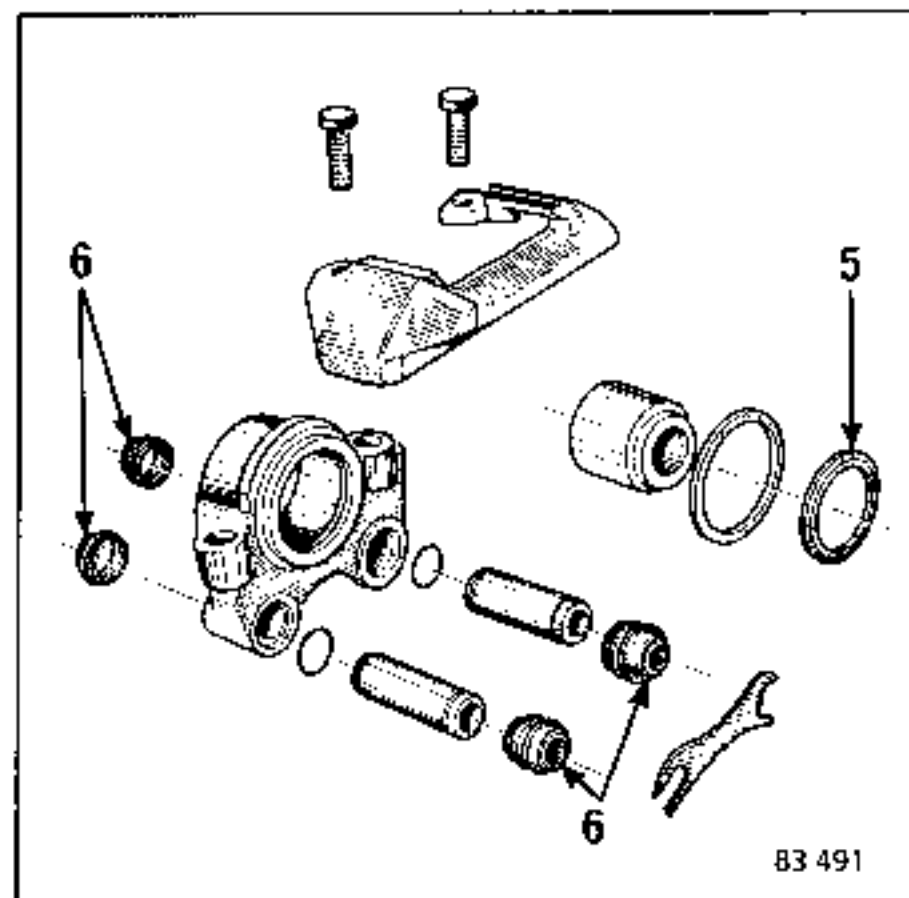
Push back the piston by sliding the caliper outwards, by hand.

Remove :

- the clip (1),
- the key (2),
- the pads.

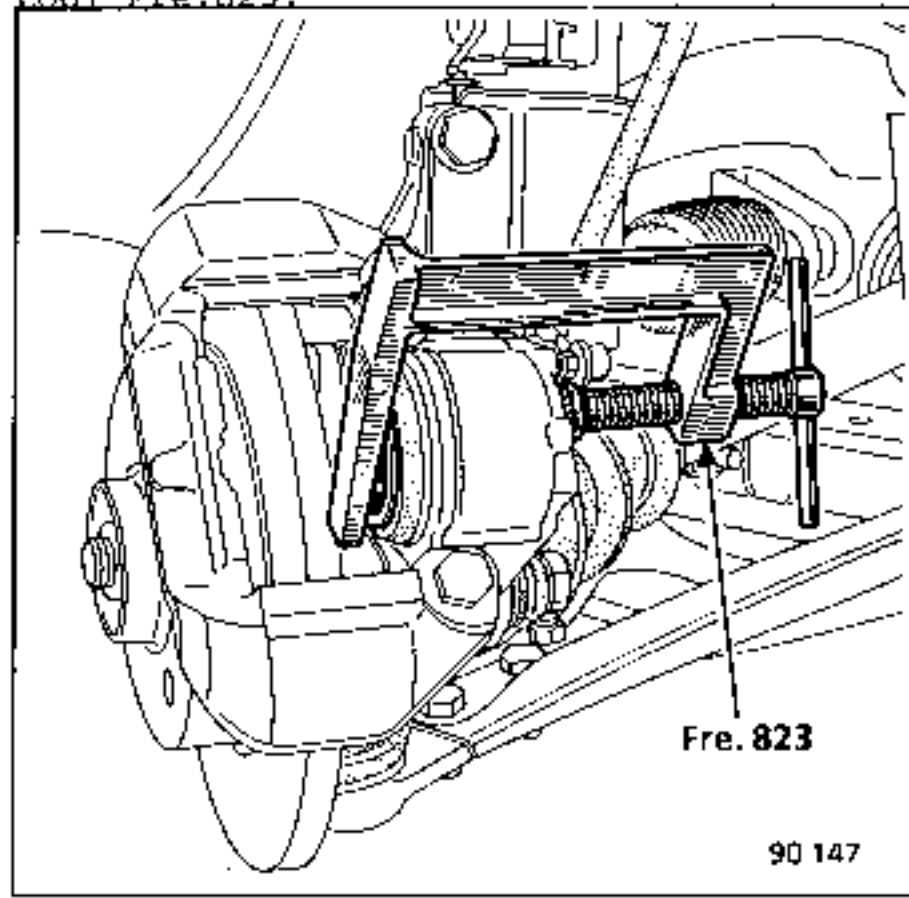


Check the condition of the dust cover (5) and the bellows (6) that protect the caliper slides and replace them if necessary. If they are replaced, grease the end of the piston and the two slides after first cleaning them with methylated spirits.

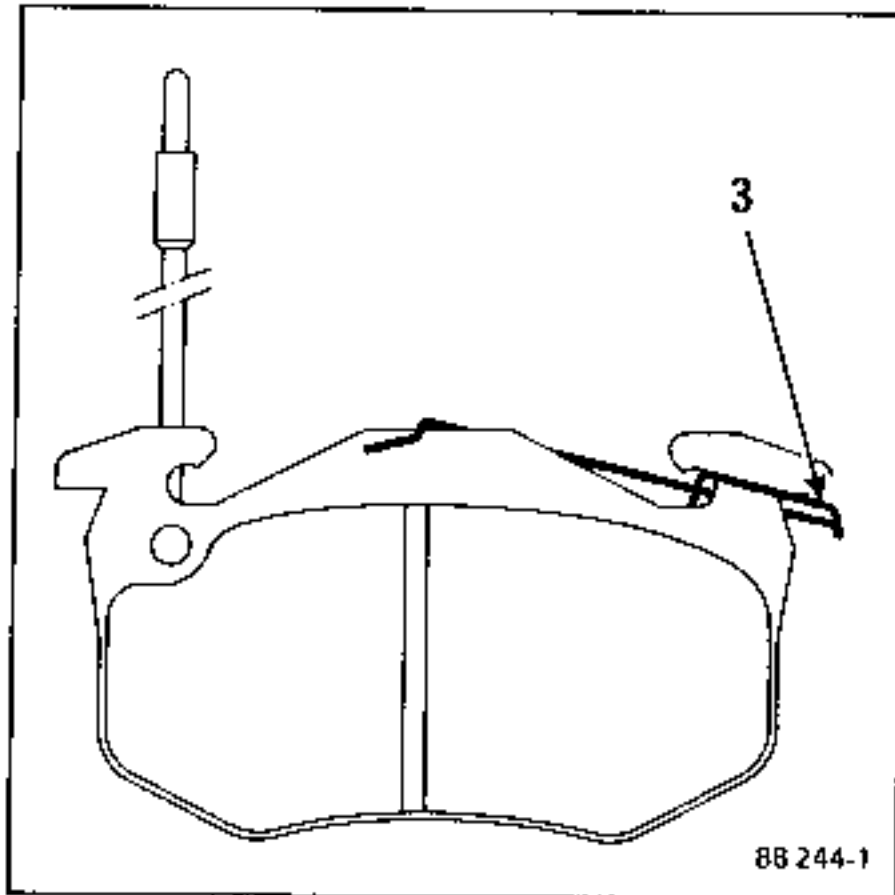


REFITTING

Push in the wheel cylinder piston using tool Fre.823.



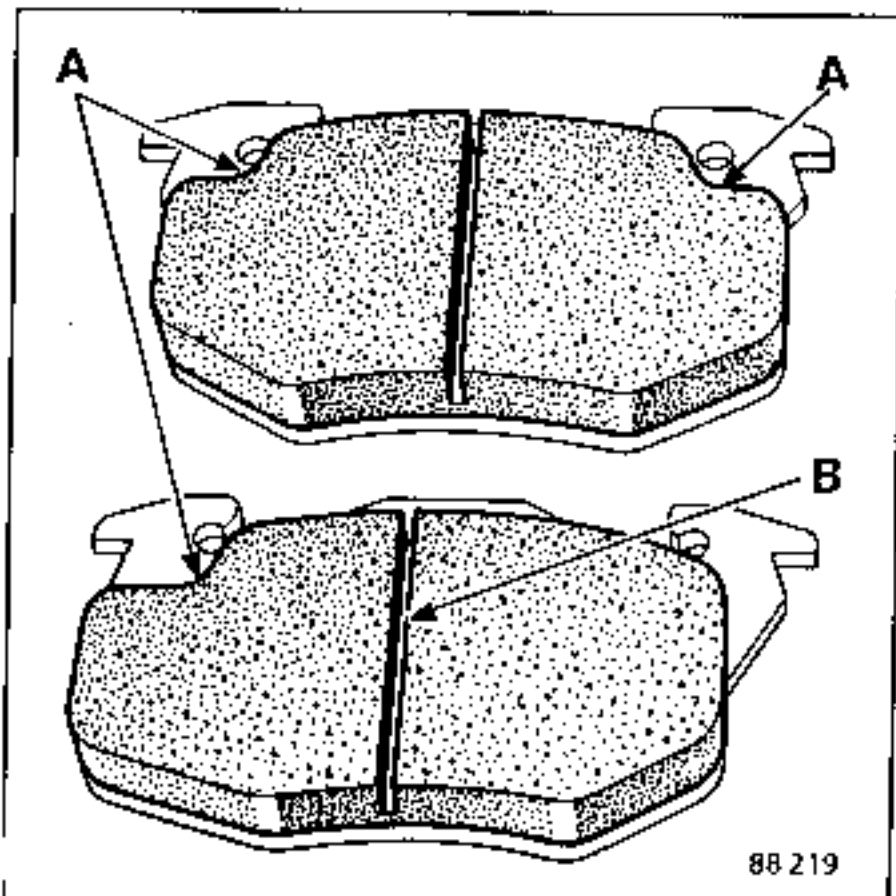
Fit the two anti-rattle clips (3) to the new pads.



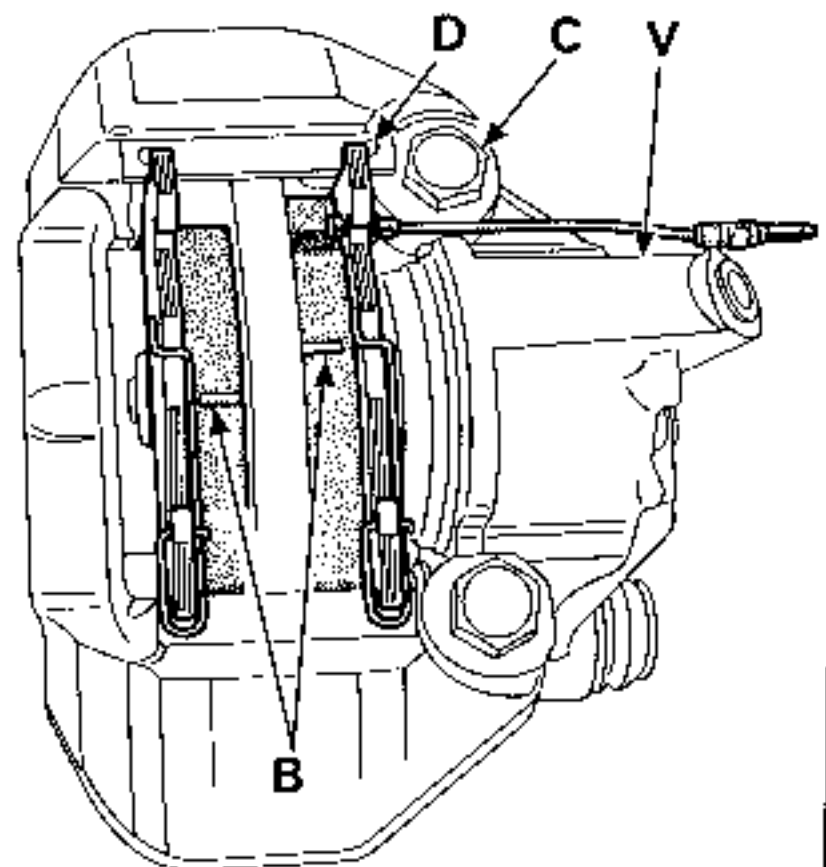
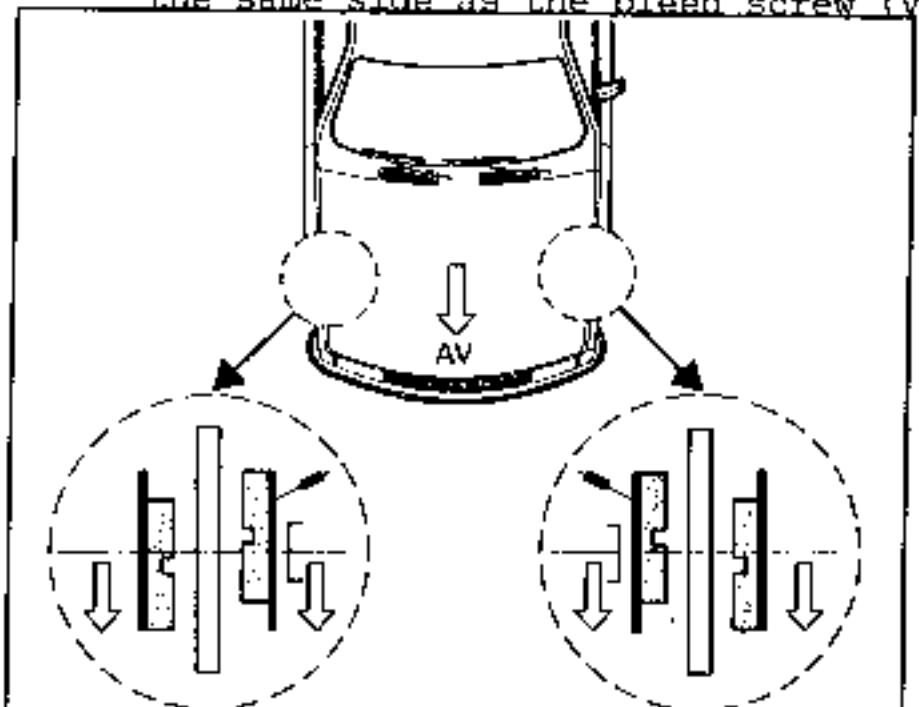
NOTE : these vehicles are either fitted with symmetrical pads or offset pads depending on the diameter of the caliper cylinder.

Ø 45 mm symmetrical pads
Ø 48 mm offset pads

Special feature of offset pads :



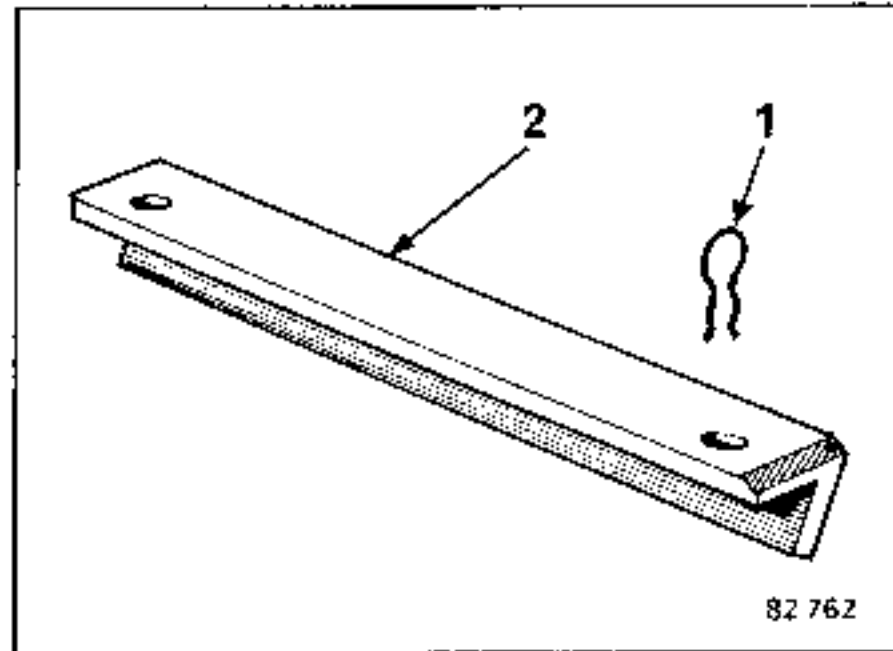
- the offset pad has only a single shoulder (A) on it instead of the two on the symmetrical pad.
- the groove (B) is offset when compared with that of the symmetrical pad.
- correct way round :
 - outer pad, both shoulders and groove (B) are offset towards the front of the vehicle,
 - inner pad, both shoulders and groove (B) are offset towards the rear of the vehicle,
 - the wear sensor wire is to be on the same side as the bleed screw (V).



Place the pads in the caliper and insert the key (2).

Fit the clip (1) (there is only one clip per caliper).

NOTE : the clip is fitted at (D) on the inside of the caliper, near the caliper bracket securing bolt (C).



Reconnect the wear sensor wire.

Depress the pedal a few times to bring the piston into contact with the pads.



TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Caliper securing bolts(BENDIX series IV)	10
Guide bolts (GIRLING)	3.5

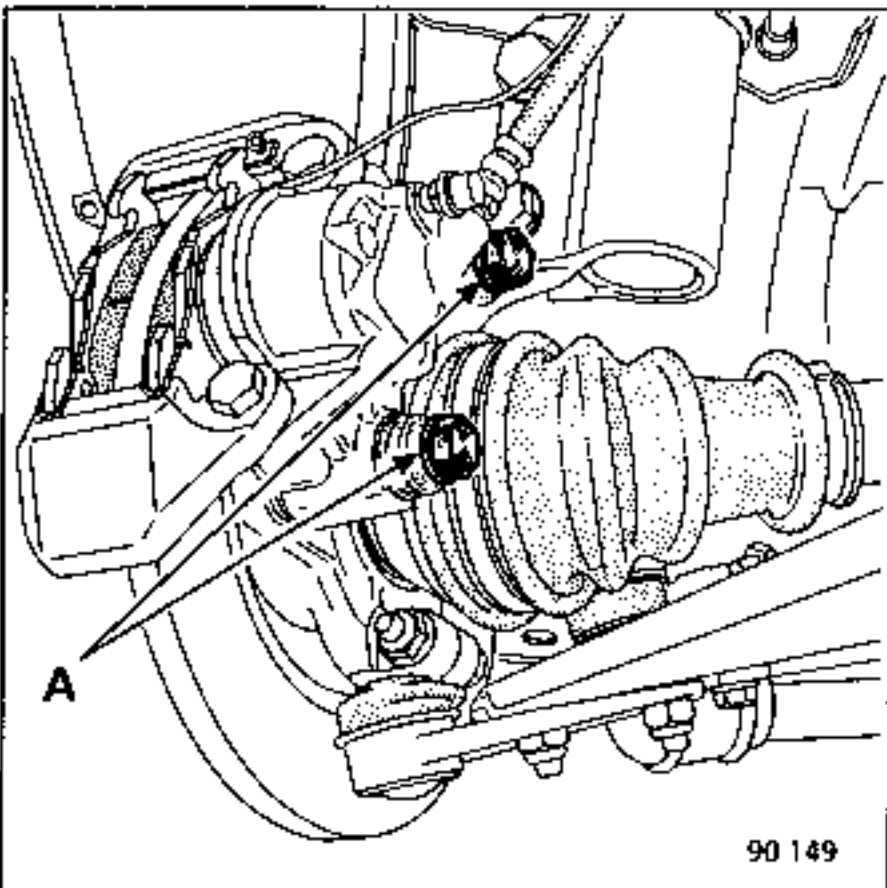
REMOVING

Loosen the hose at the wheel cylinder end.

Remove the brake pads (see corresponding section).

Special features of BENDIX Series IV

Remove the two bolts (A) that secure the unit to the stub axle carrier.



All types

Unscrew the wheel cylinder from the hose (catch the fluid in a container).

Check the condition of the hose and replace it if necessary (see replacing a hose).

REFITTING

Screw the new wheel cylinder to the hose.

Loosen the caliper bleed screw and wait till fluid flows from it (ensure that there is enough fluid in the reservoir).

Retighten the bleed screw.

BENDIX Series IV

Fit the caliper to the stub axle carrier and tighten the two bolts (A) to torque.

All types

Check the condition of the pads. If they are greasy, replace them.

The system will only require partial bleeding unless the brake fluid reservoir has emptied during the operation in which case a complete bleed will be necessary.

Press the brake pedal a number of times to bring the piston into contact with the pads.

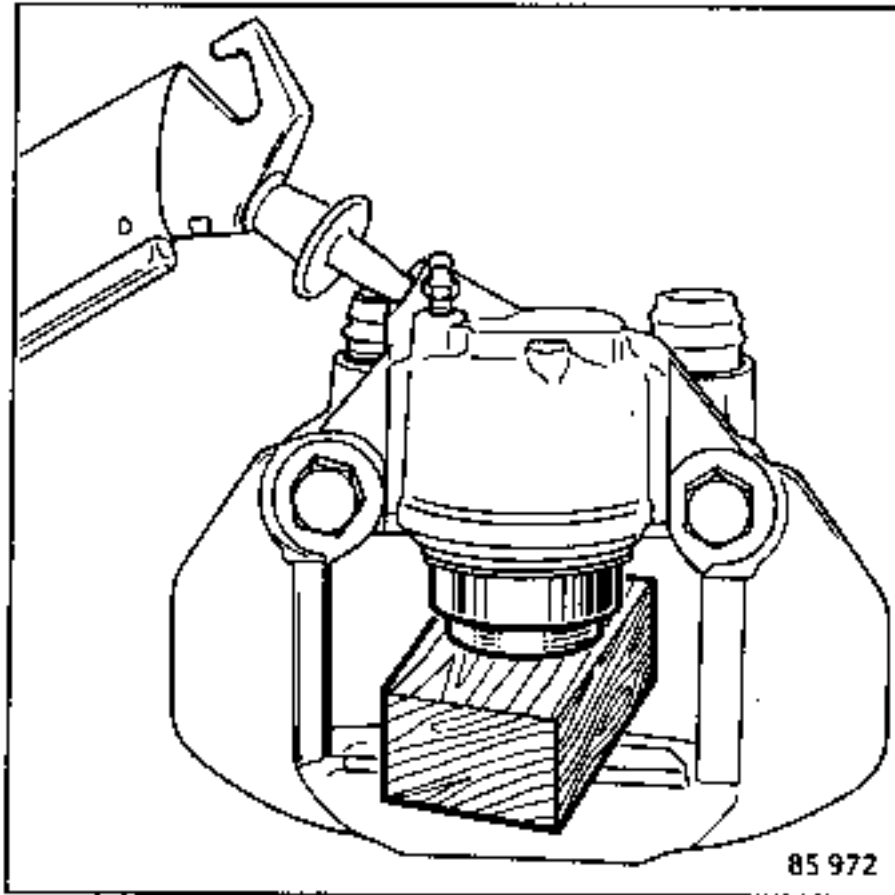
REPAIR

If the caliper bore is scored in any way the entire caliper must be replaced.

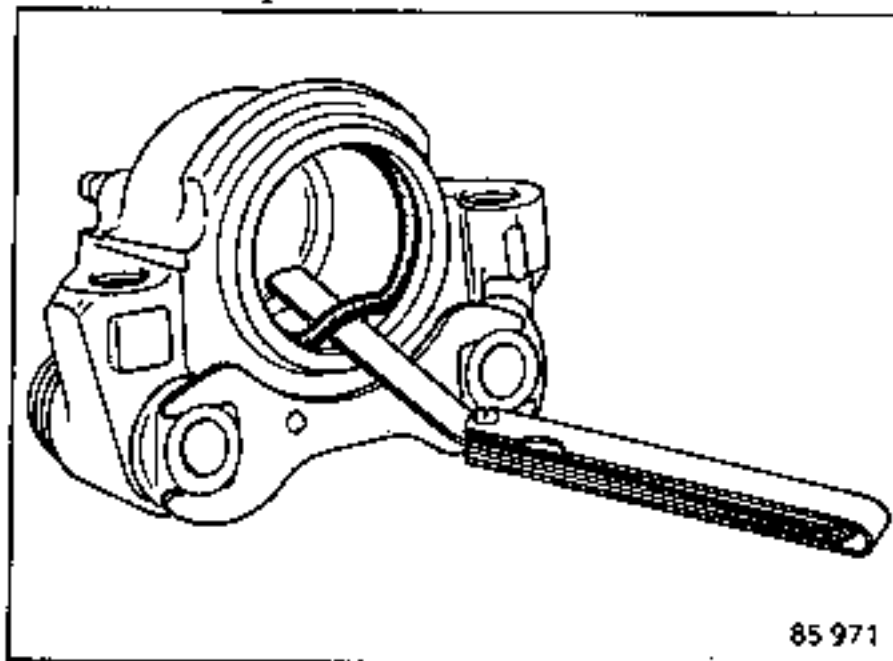
Remove the caliper.

Remove the dust cover (retaining snap ring on the GIRLING caliper).

Drive out the piston with compressed air after first placing a wooden chock between the caliper and the piston to avoid the piston being damaged. Any impact mark on the piston skirt would render it unusable.



Using a flexible strip with rounded edges (such as a feeler gauge) take out the rectangular section seal from the groove in the caliper.



Clean all the parts in methylated spirits.

Replace any defective parts by new genuine spares and refit the seal, the piston, the dust cover (and on the GIRLING the retaining snap ring).

The brake discs cannot be reground. If a disc is heavily worn or scored it must be replaced by a new one.

TIGHTENING TORQUES (in daN.m)

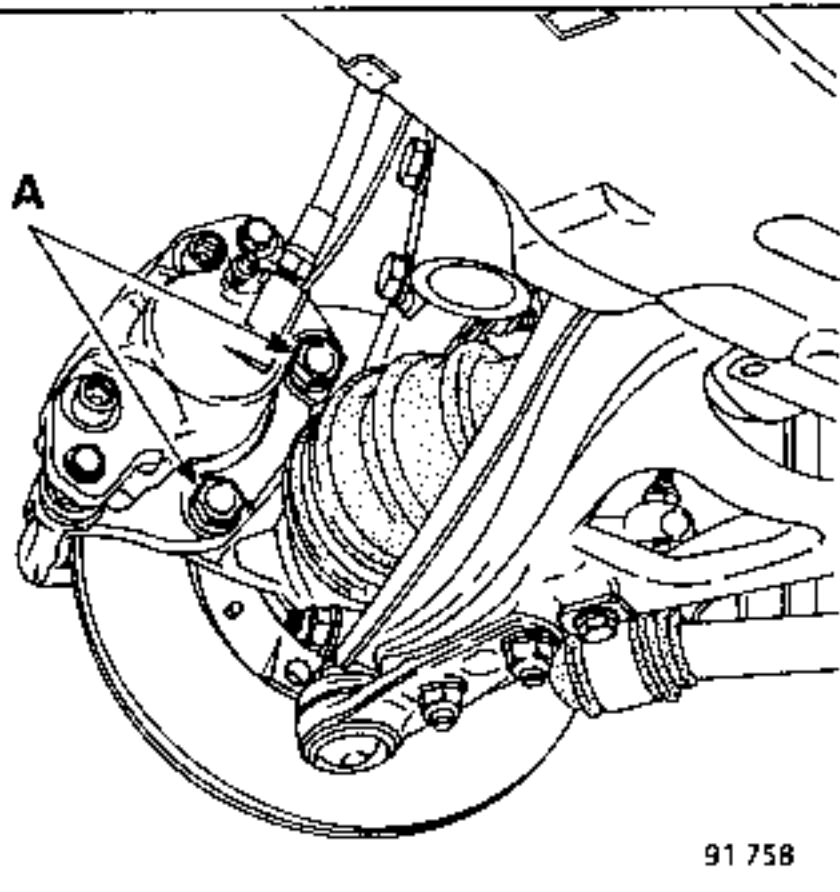
Wheel bolts	8
Caliper securing bolts	10
Caliper bracket securing bolts	
BENDIX Series IV	6.5

REMOVING

Remove :

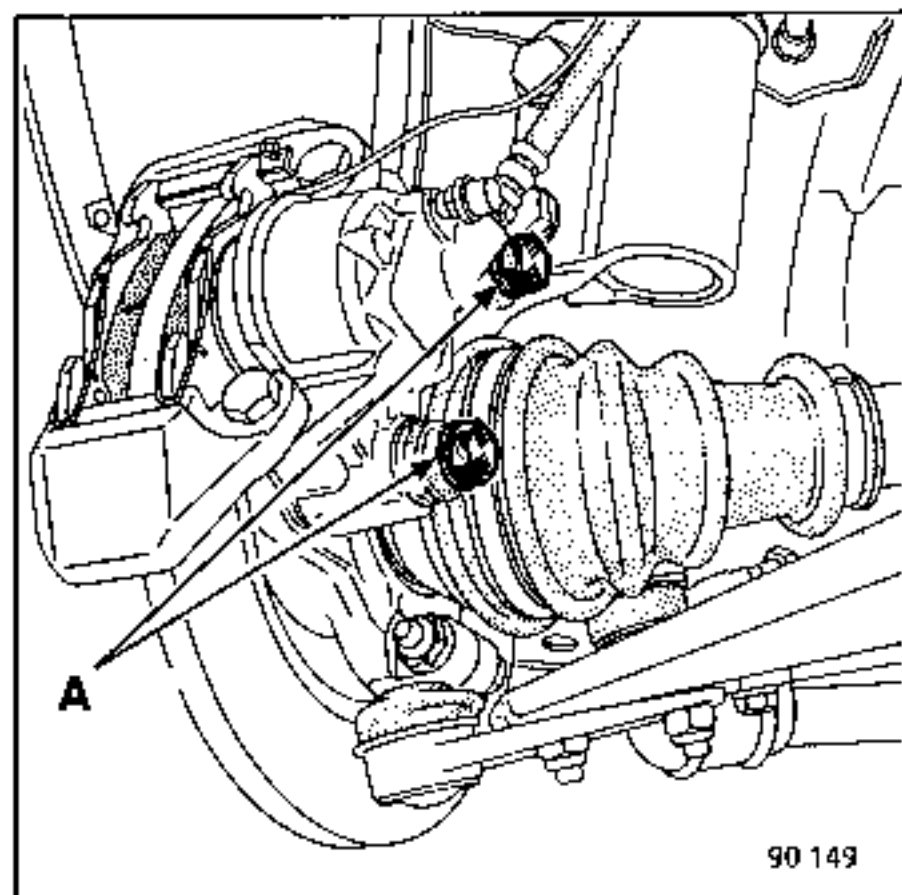
- the two brake unit securing bolts (A).

GIRLING



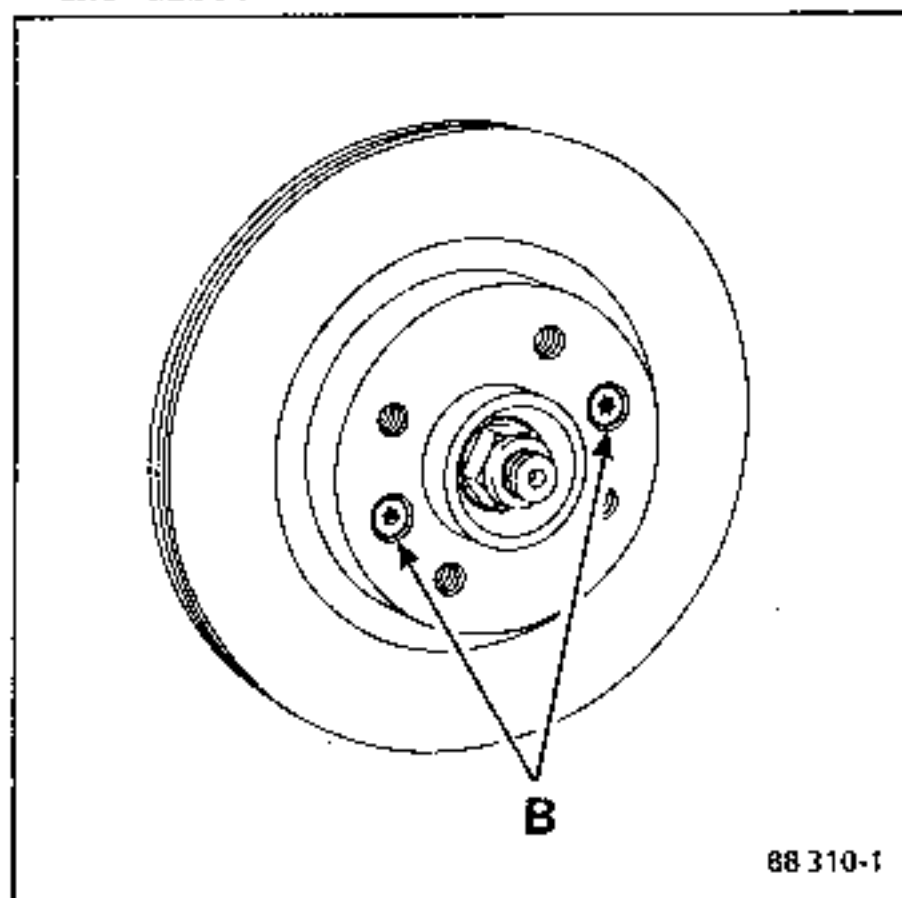
91 758

BENDIX Series IV



90 149

- the two disc retaining screws (B) using a key of the Torx T40 type (eg. Facom RX40 + adaptor or 89-40),
- the disc.



88 310-1

REFITTING

Fit the disc to the hub and secure it with the two screws (B).

Refit the brake caliper, coat the bolts with Loctite FRENLOC and tighten them to the specified torque.

Depress the brake pedal a number of times to bring the piston into contact with the pads.

REPLACING

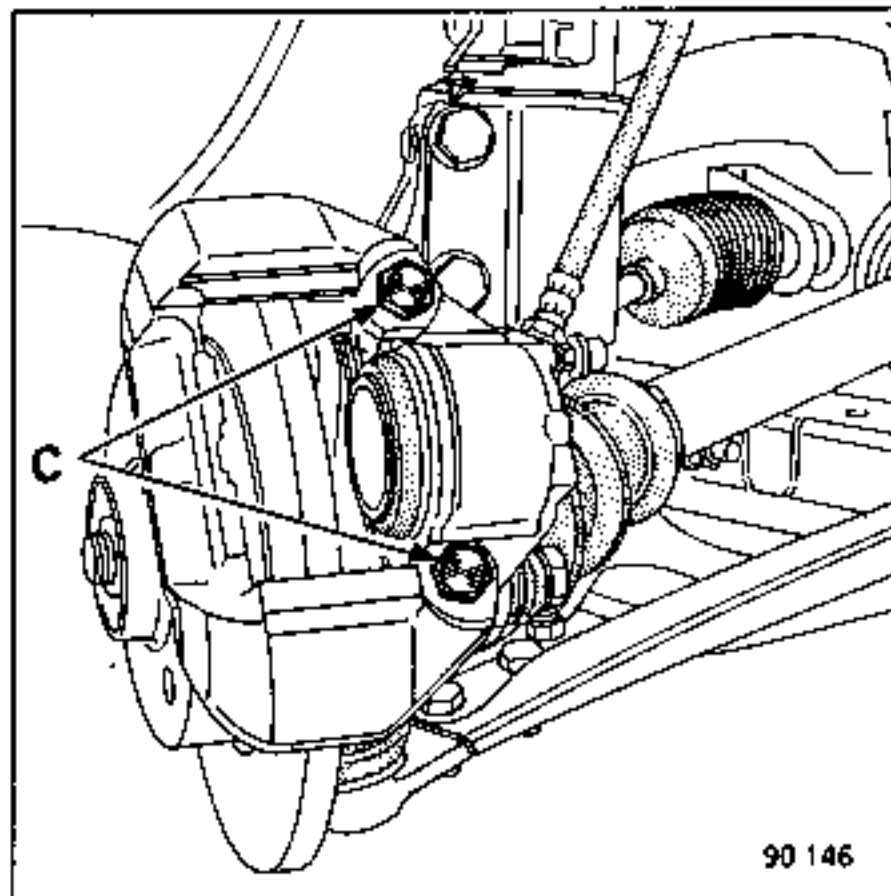
Whenever replacing a brake disc it is essential also to replace the pads.

As the first part of this operation, follow the method already described for replacing the pads and as the second part the method described for removing and refitting the calipers (see "Removing - Refitting" section).

Special features of the BENDIX Series IV

To replace the disc, remove :

- the pads,
- the two caliper bracket securing bolts (C).



90 146



ESSENTIAL SPECIAL TOOLS

M.S.	580	Inertia weight
Rou.	15-01	Shaft end protector
Rou.	604-01	Hub retainer
T.Av.	476	Ball joint extractor
T.Av.	1050	Hub extractor

TIGHTENING TORQUES (in daN.m)

Securing bolts at bottom of shock absorber	8
Nuts on lower ball joint keys	6
Steering ball joint nuts	4
Brake caliper securing bolts	10
Drive shaft nuts	25
Wheel bolts	8

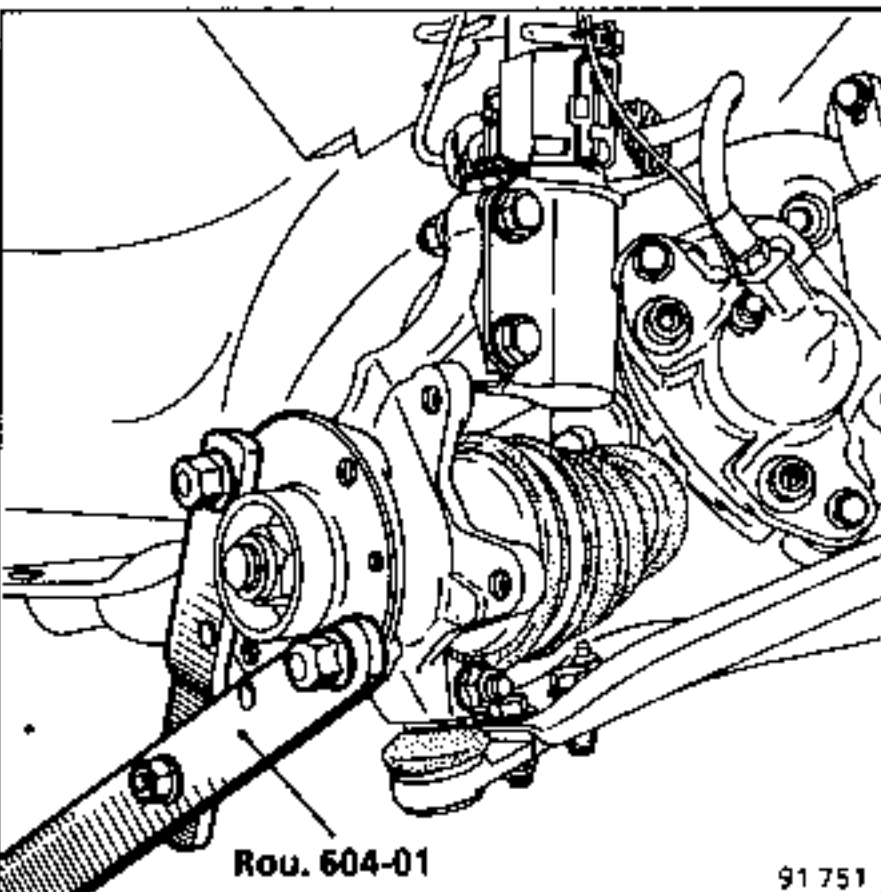
Checking the play

Check the end play in the hub with a dial indicator it should be : 0 to 0.05 mm.

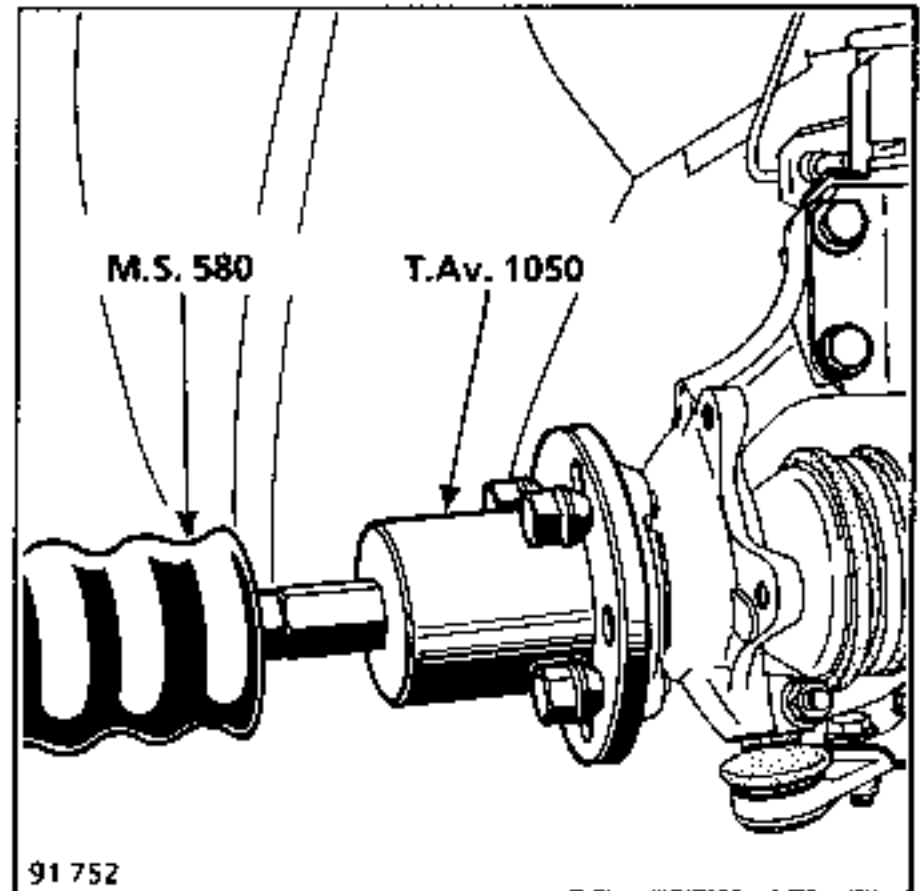
REMOVING

Remove :

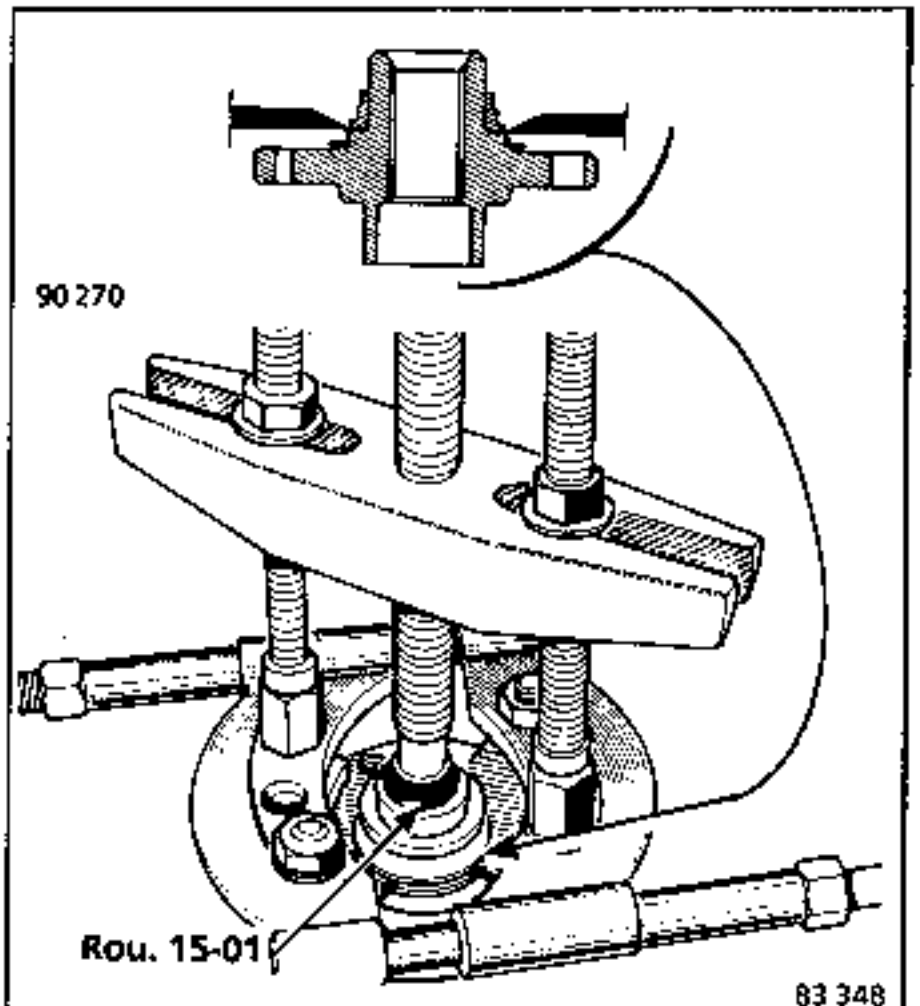
- the brake disc (see the corresponding section),
- the drive shaft nut using tool Rou. 605-01.



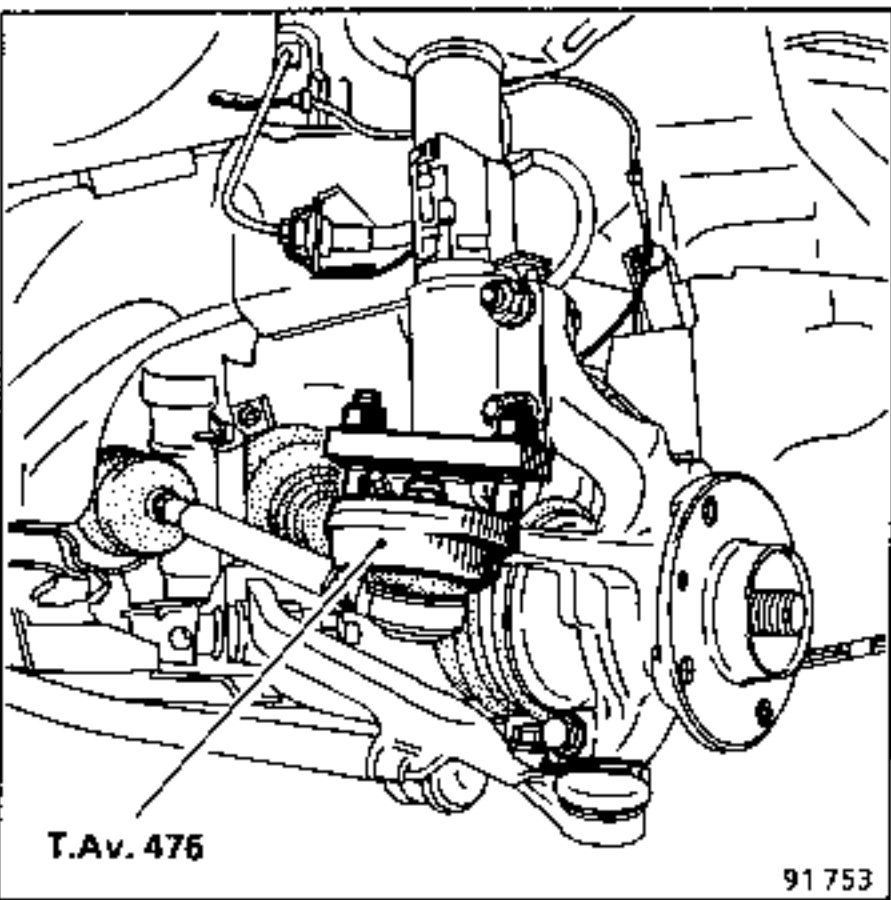
Extract the hub : tools T.Av.1050 + M.S.580.



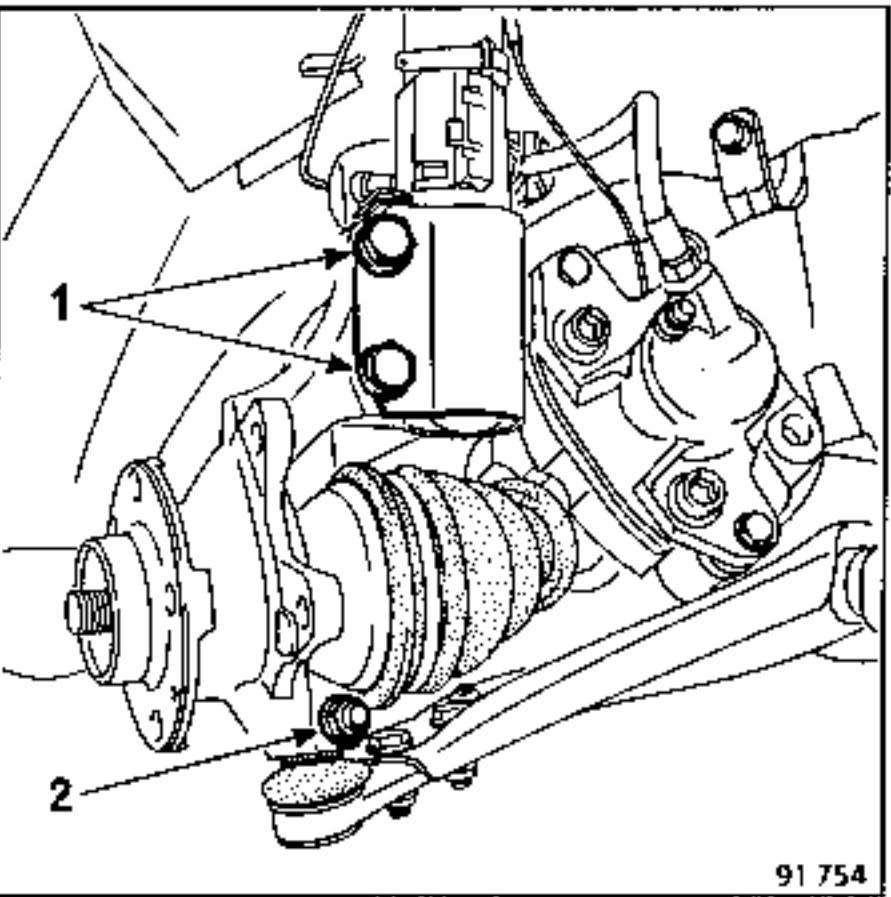
Remove the inner track ring from the hub using a jaw extractor type FACOM U53G + U53E and tool Rou.15-01.



Disconnect the steering link : tool
T.Av. 476.

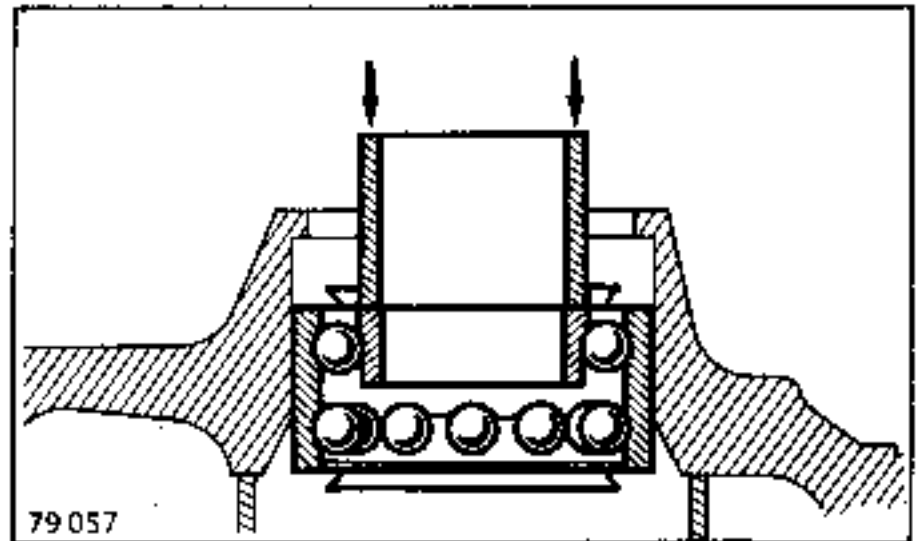


Remove :
- the securing bolts (1),
- the nut and the key (2),

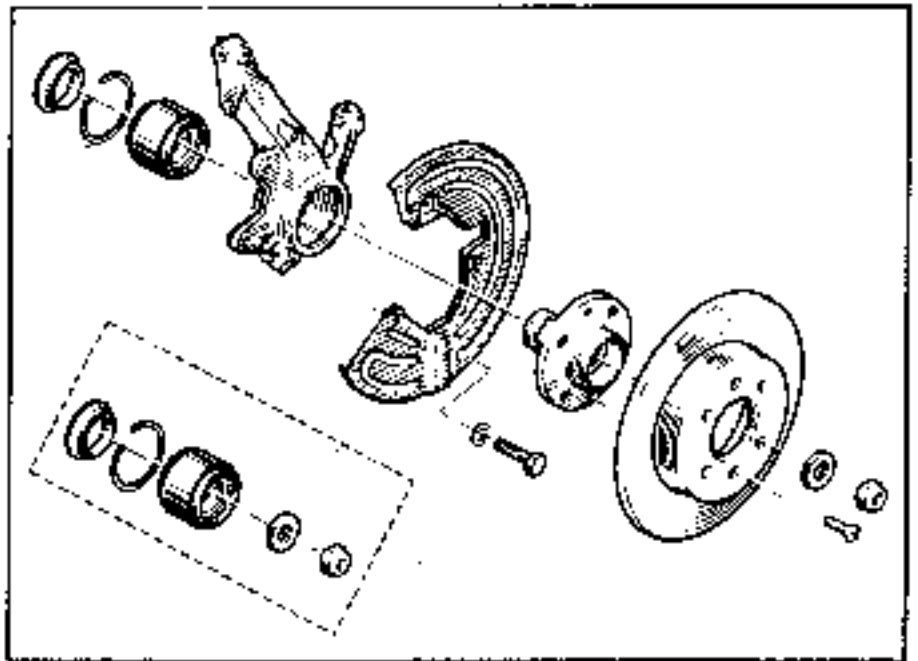


- the circlip.

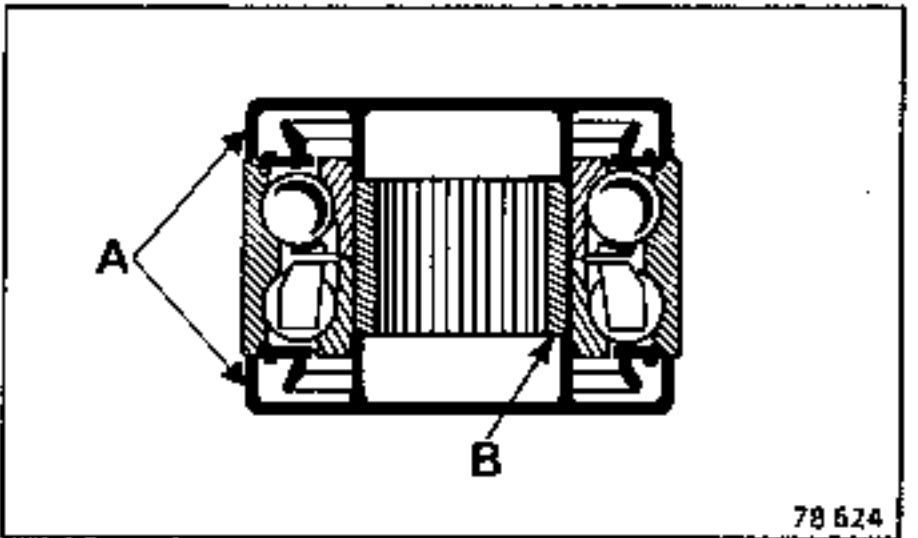
Extract the outer track ring, on the
press, using one of the two inner track
rings and leaving the ball cage and the
seals in place.



REFITTING

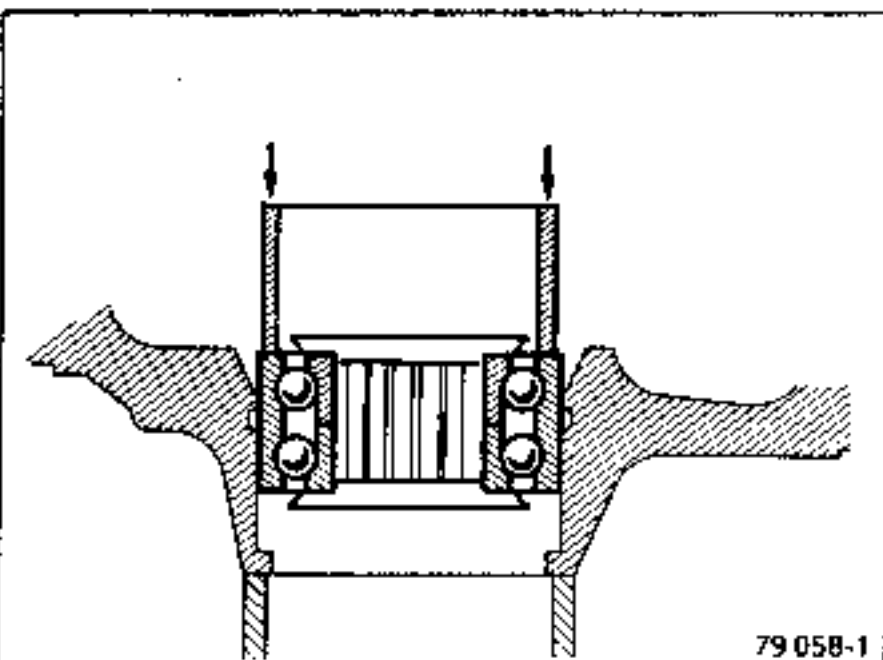


Remove the two plastic protectors (A)
from the new bearing.



Fit the bearing into the stub axle carr-
ier, on the press, together with its
plastic bush (B) using a tube with an
outside diameter of 63 mm and an inside
diameter of 59 mm taking the load on the
outer track ring.

Do not take the load on the inner track ring as this could damage the bearing, the insertion load being very high.

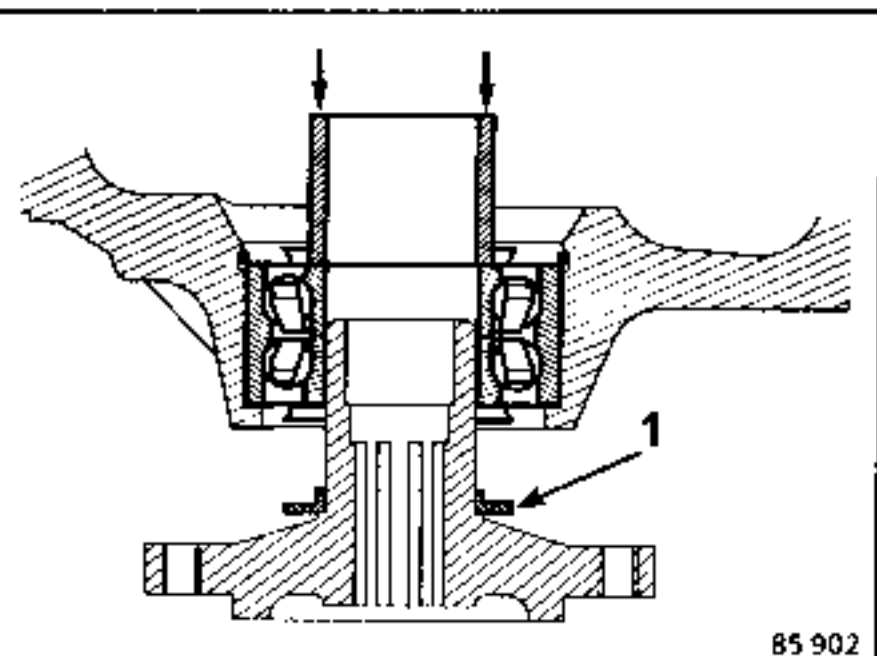


Remove the plastic bush (B).

Fit the new circlip.

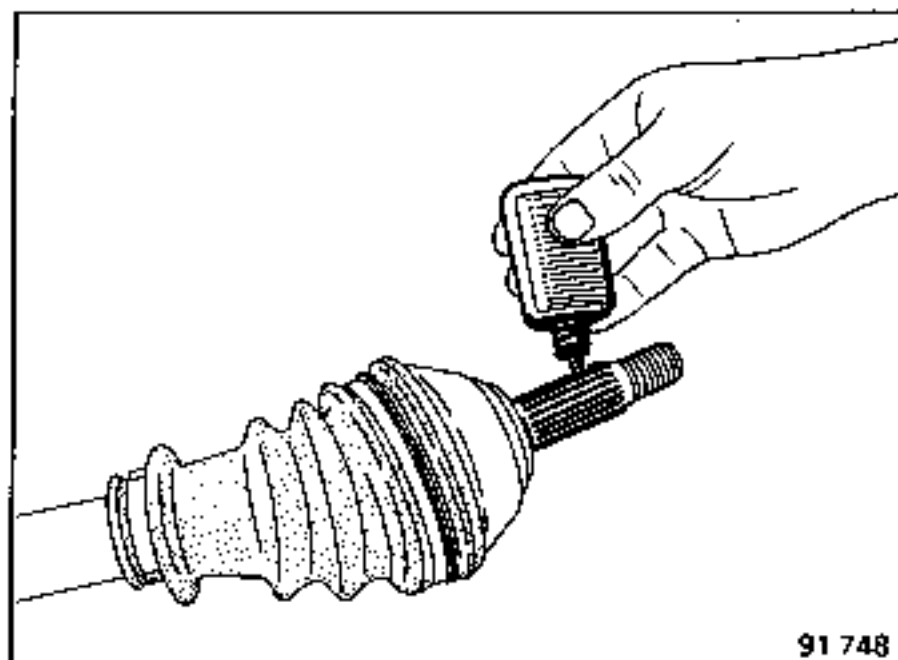
Coat each of the seal lips with ELF Multi grease.

Place the thrust washer (1) on the hub and fit the hub, on the press, using a tube with an outside diameter of 45 mm and an inside diameter of 39 mm, taking the load on the bearing inner track ring.



Refit the stub axle carrier to the vehicle.

Coat the drive shaft stub axle with Loctite SCELBLOC.



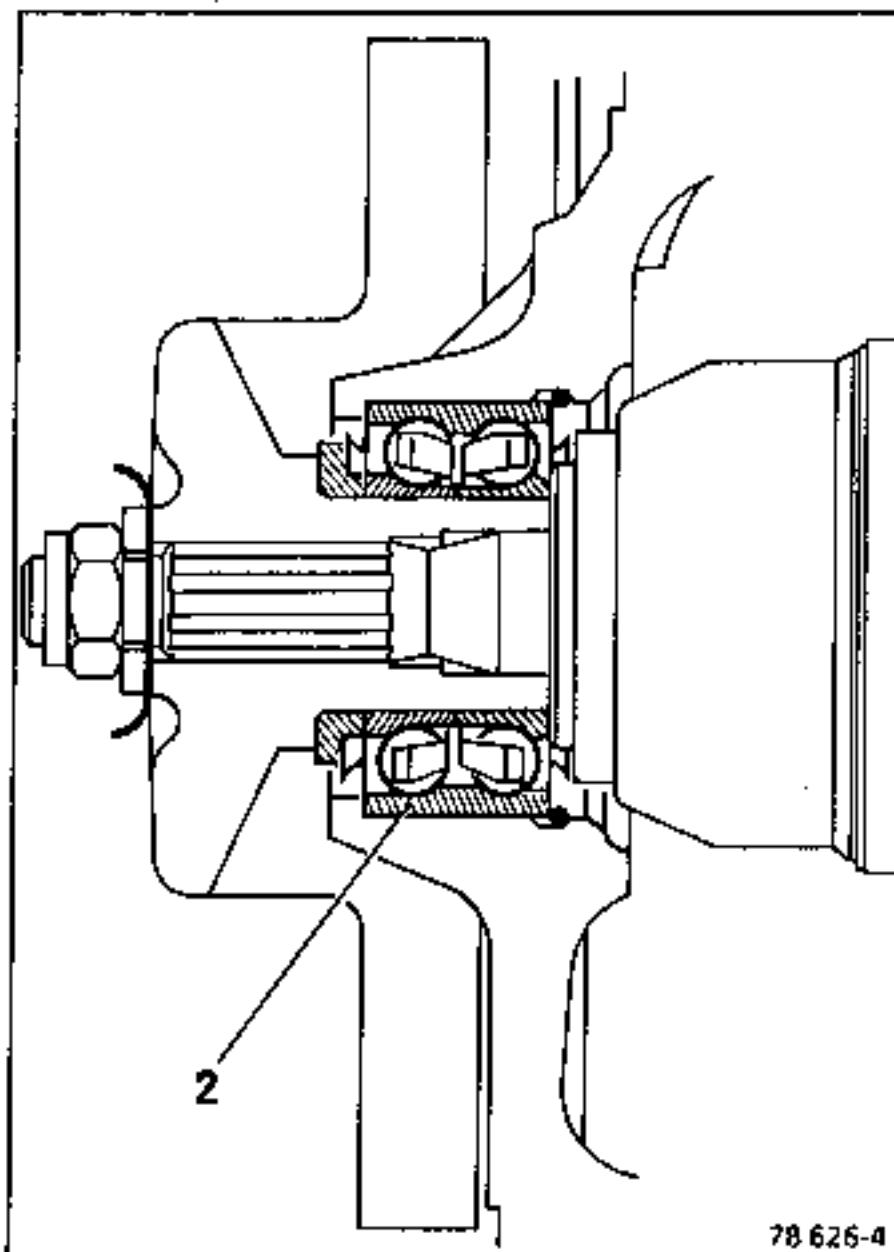
Proceed from here by carrying out the removing operations in reverse.



*

The method of removing and refitting the component is identical to that for replacing a bearing.

NOTE : as the load required to press the bearing outer track ring (2) into its bore is very high, one must, after removing this ring, replace the entire bearing because the bearing tracks are marked by the operation.



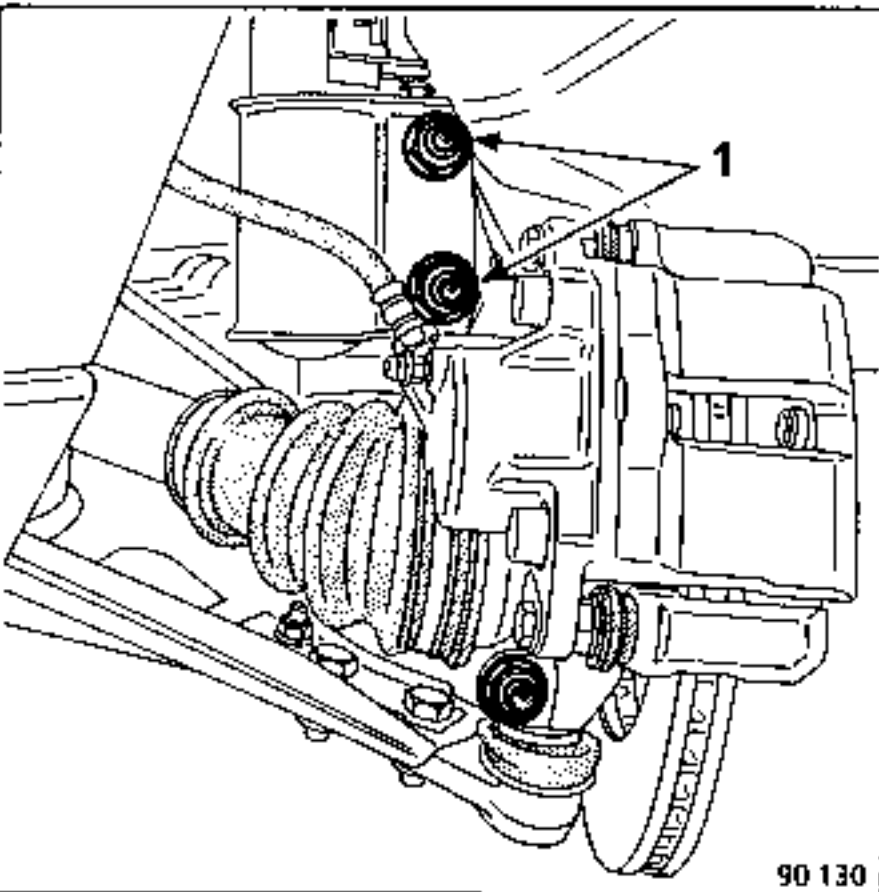
TIGHTENING TORQUES (in daN.m)

Nuts on shock absorber rod	5
Shock absorber lower securing bolts	8
Shock absorber cup securing bolts	2.5
Wheel bolts	8

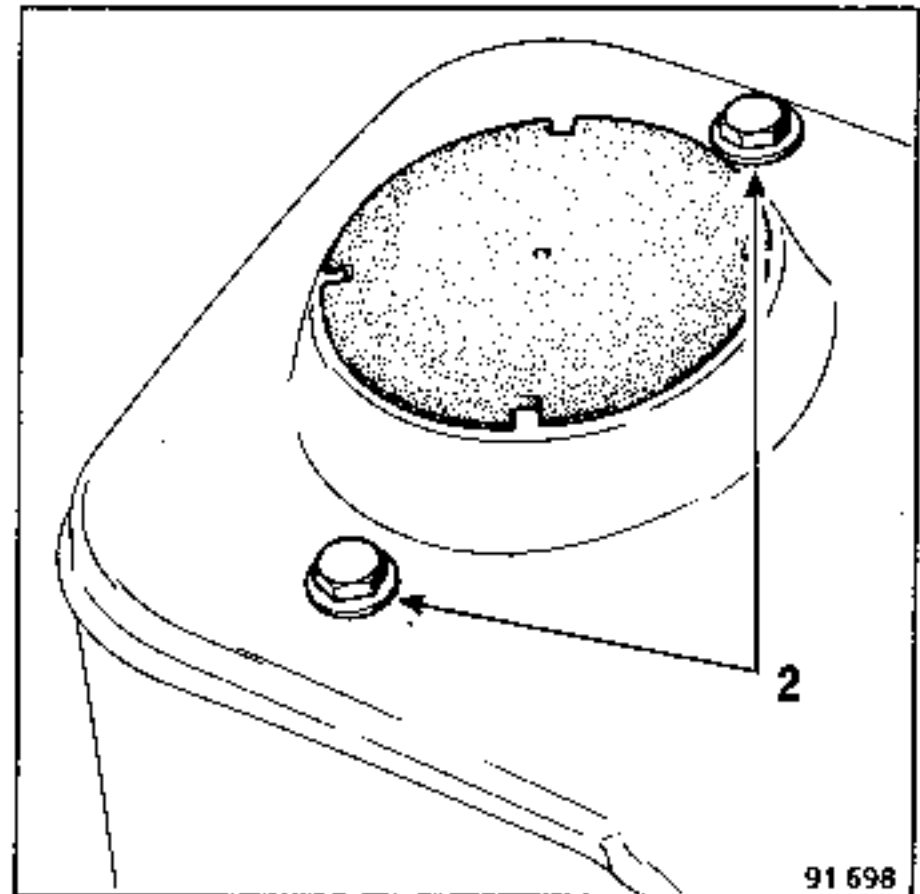
REMOVING

With the vehicle supported by stands on the side concerned, remove :

- the wheel,
- the two bolts from the lower end of the shock absorber (1),



- the two upper securing bolts (2),



- the shock absorber whilst pressing down the lower suspension arm to avoid contact between the shock absorber and the drive shaft bellows.

REFITTING

Carry out the removing operations in reverse, taking care not to damage the drive shaft bellows.

Tighten, to the specified torque :

- the shock absorber lower securing bolts (1),
- the upper securing bolts (2).

This tooling is not suitable for replacing the shock absorbers or the springs on type C405 vehicles made after June 1987. For these vehicles see the section entitled "Dismantling using tool Sus.1052".

Because of the high loads in the spring, it is essential to ensure that the tooling is in good condition.

ESSENTIAL SPECIAL TOOLS

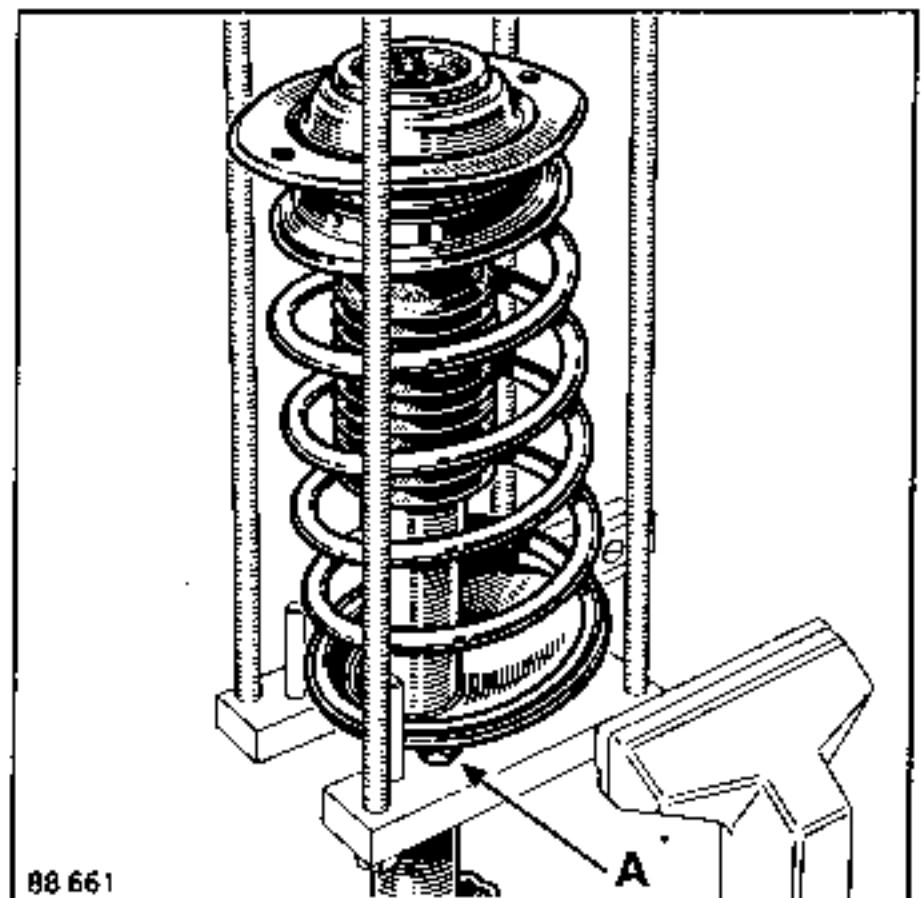
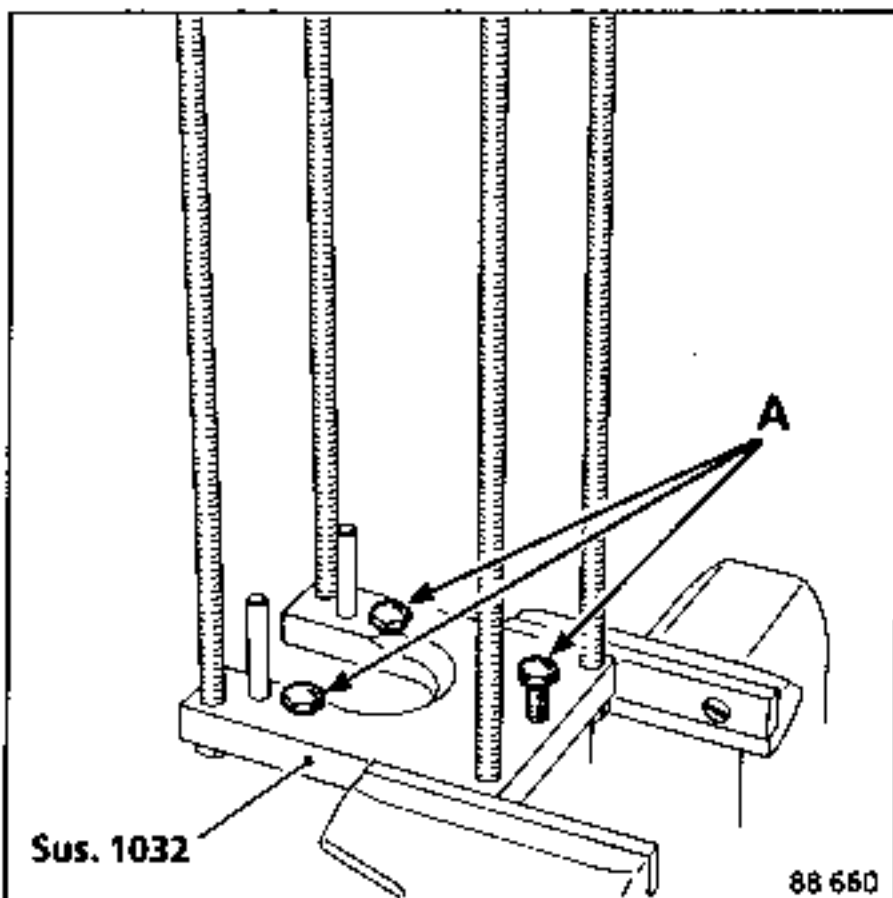
Sus.1032 Tooling for working on the front springs and shock absorbers

DISMANTLING THE SPRING - SHOCK ABSORBER

Grip the lower plate of tool Sus.1032 in a vice.

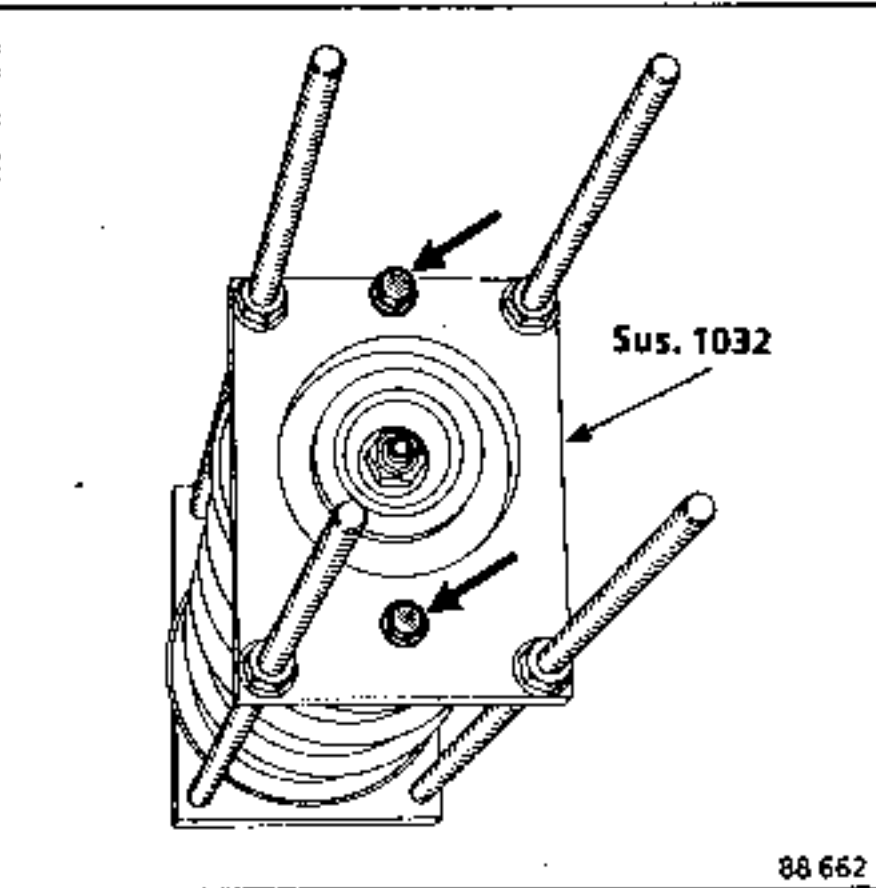
Fit :

- the spring - shock absorber assembly on the three locating bolts (A).



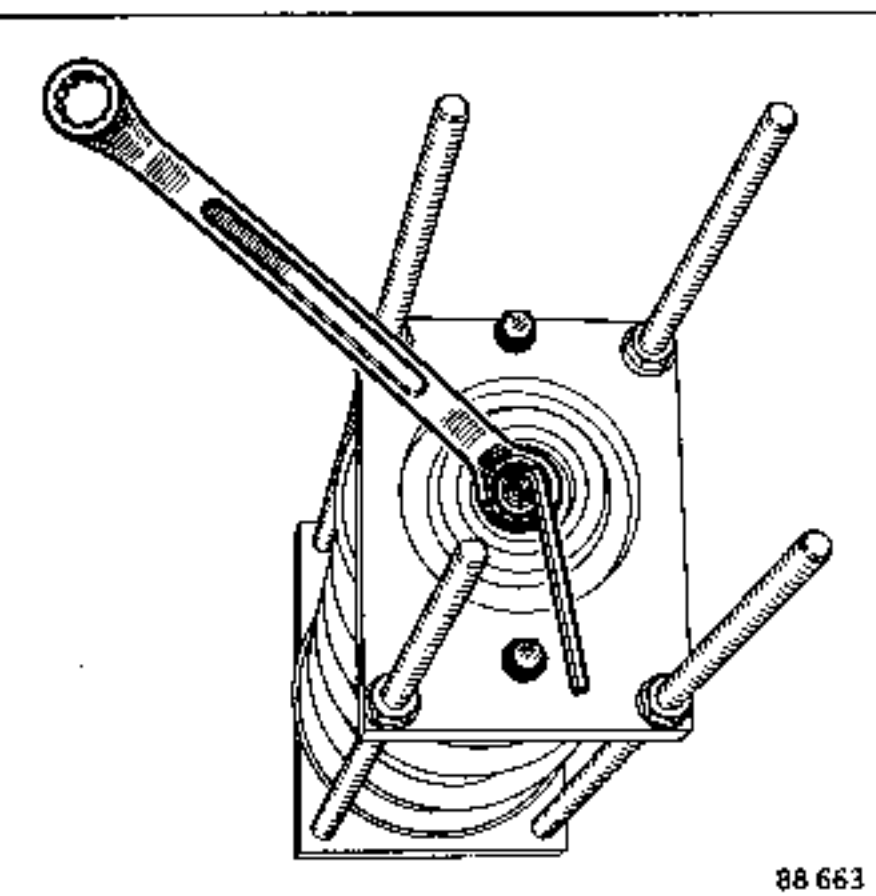
- the upper plate of tool Sus.1032.

Position the shock absorber by means of the three locating bolts (A) to be able to fit the two bolts that retain the upper cup.

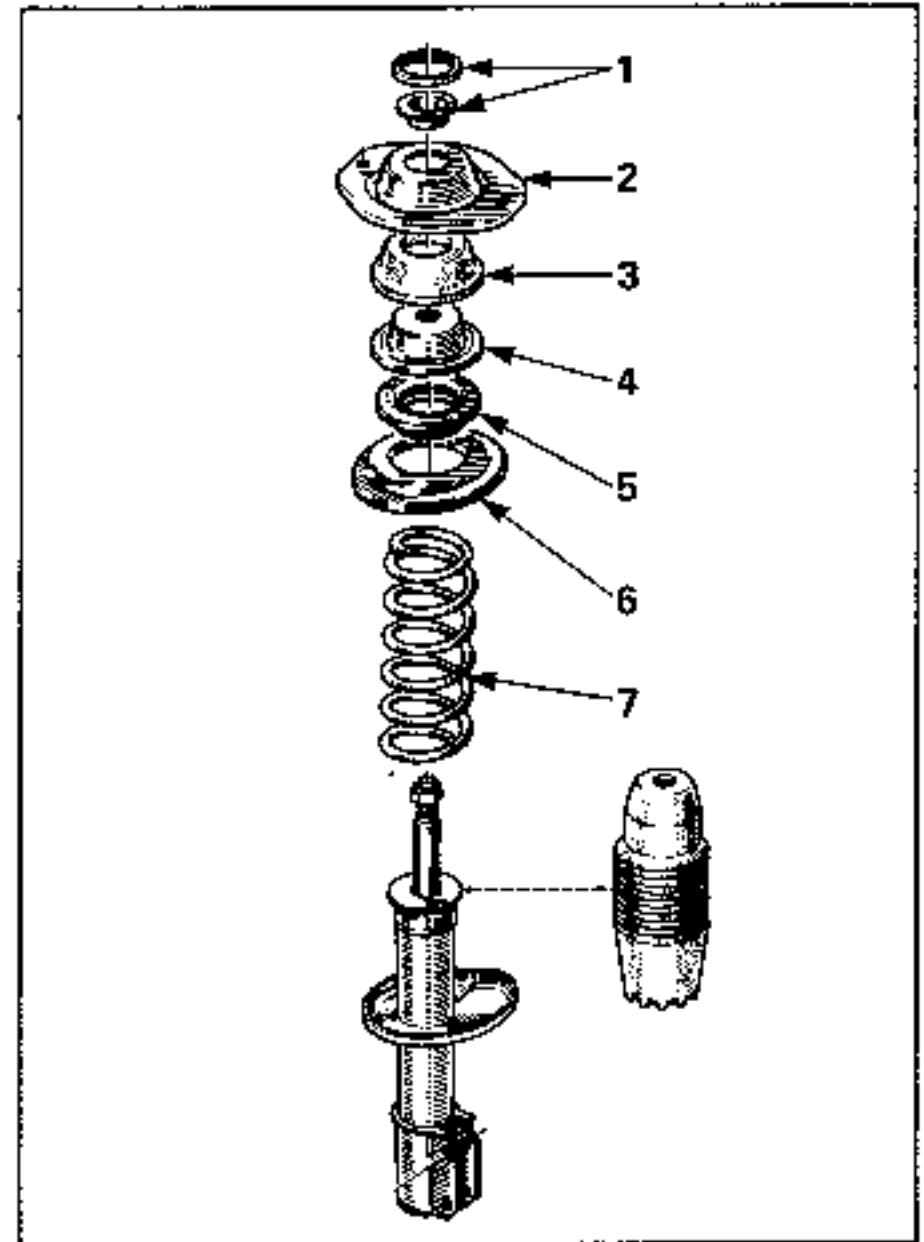


Compress the spring by approximately 10 mm.

Remove the nut from the shock absorber piston rod.



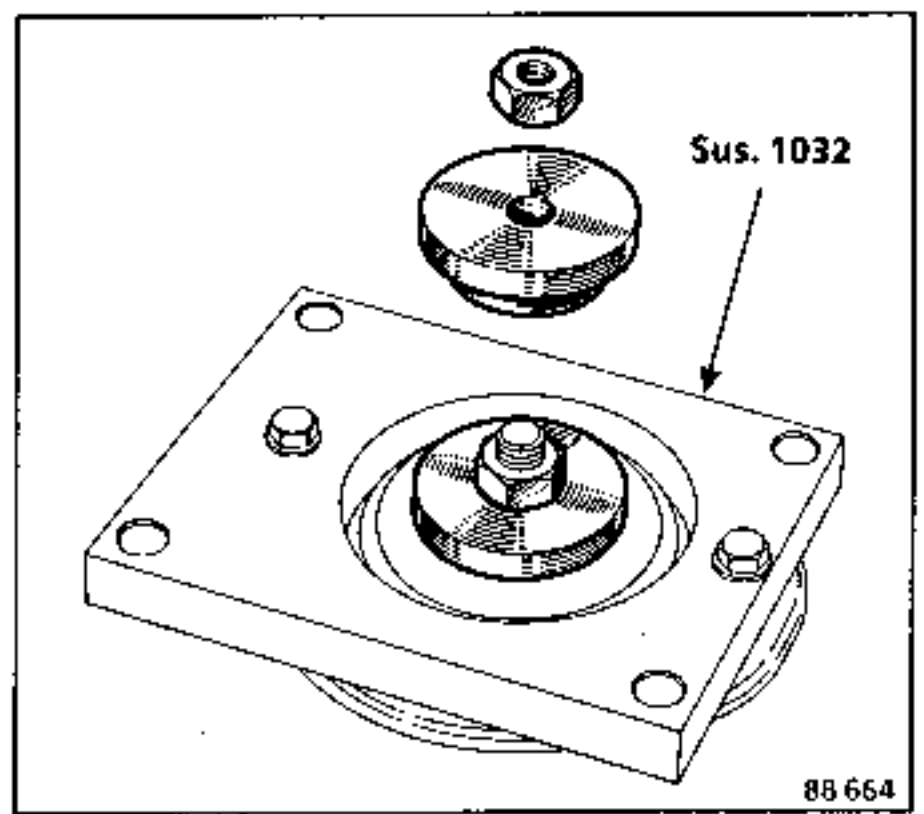
Gradually release the spring pressure.
Dismantle parts (1) to (7) in that order.



Parts (4), (5) and (6) are the front axle pivot point.

REASSEMBLING THE SPRING - SHOCK ABSORBER

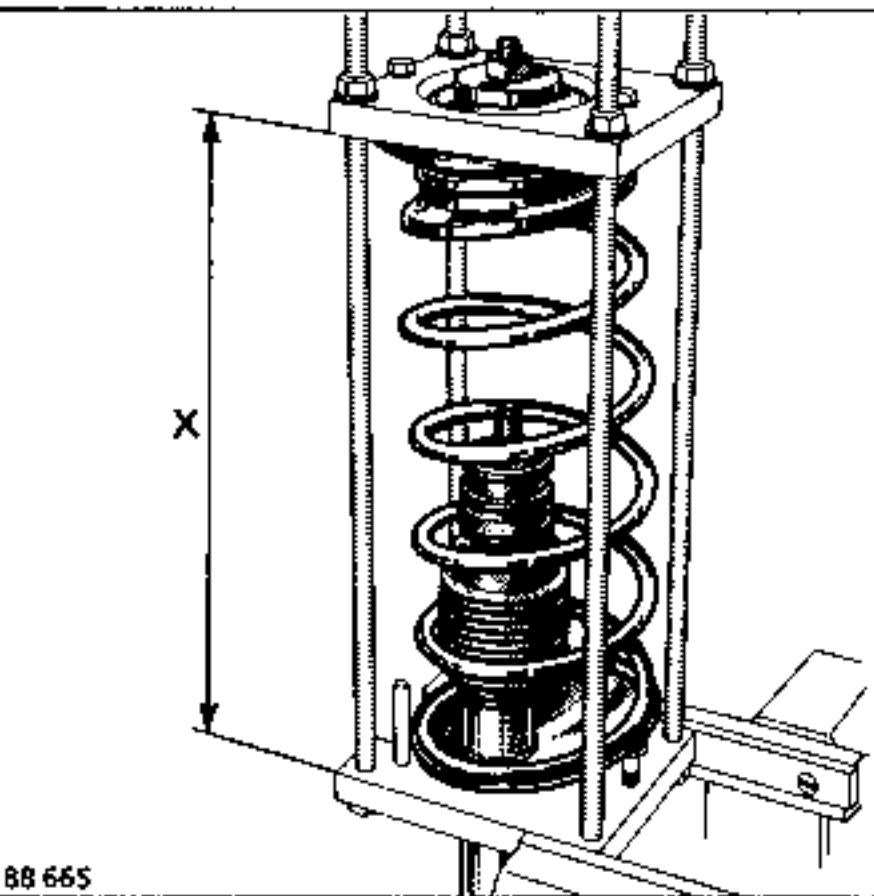
Fit a plug to the upper plate of tool Sus.1032 to hold (2), (3) and (4) in place.



Position :

- the shock absorber on the three locating bolts (A),
- the spring on the lower shock absorber cup, ensuring that it is correctly positioned against the stop,
- the cup (6), the bearing (5) and the upper plate - plug assembly on the spring.

Compress the assembly to obtain a height
 $X = 300 \text{ mm}$.

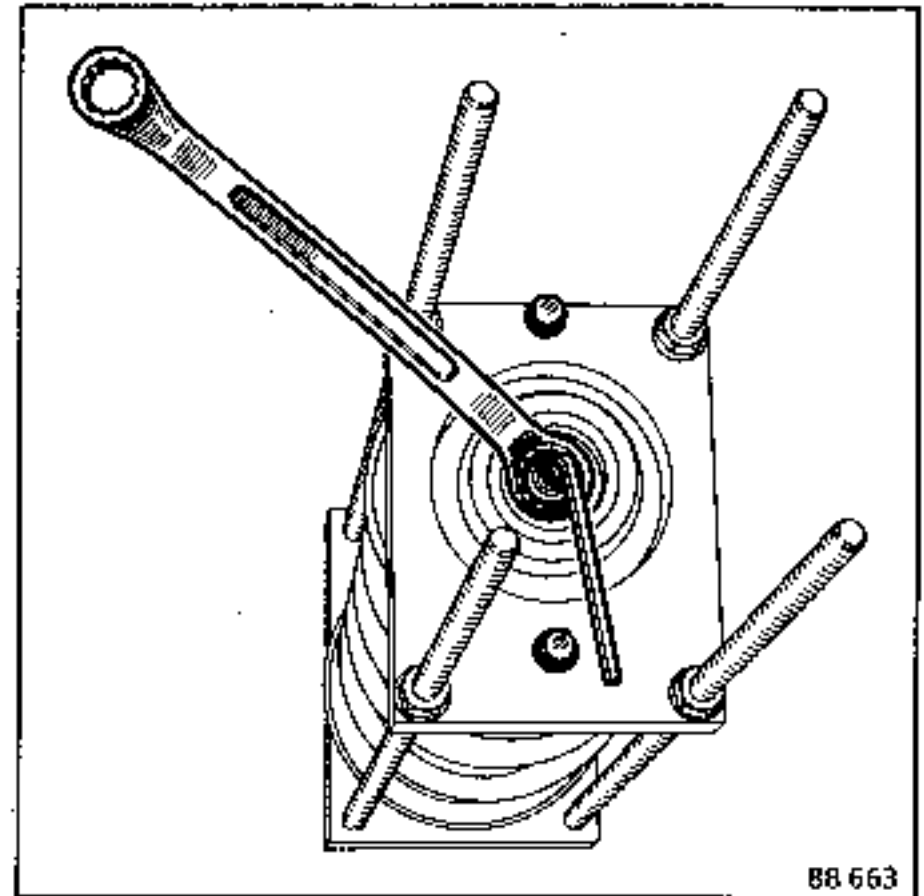


Remove the locating plug.

Pull on the shock absorber rod and, if necessary, turn the three locating bolts (A) to position the rod correctly in its location in the upper shock absorber cup.

Fit :

- the cup (1),
- the washer and nut.



Tighten the nut to the specified torque.

Gradually release the spring pressure.

Remove :

- the tool upper plate,
- the spring - shock absorber assembly from the compression tool.

REFITTING TO THE VEHICLE

Refit the spring - shock absorber assembly to the vehicle whilst pressing down the lower suspension arm to avoid the shock absorber making contact with the drive shaft bellows.

Refit :

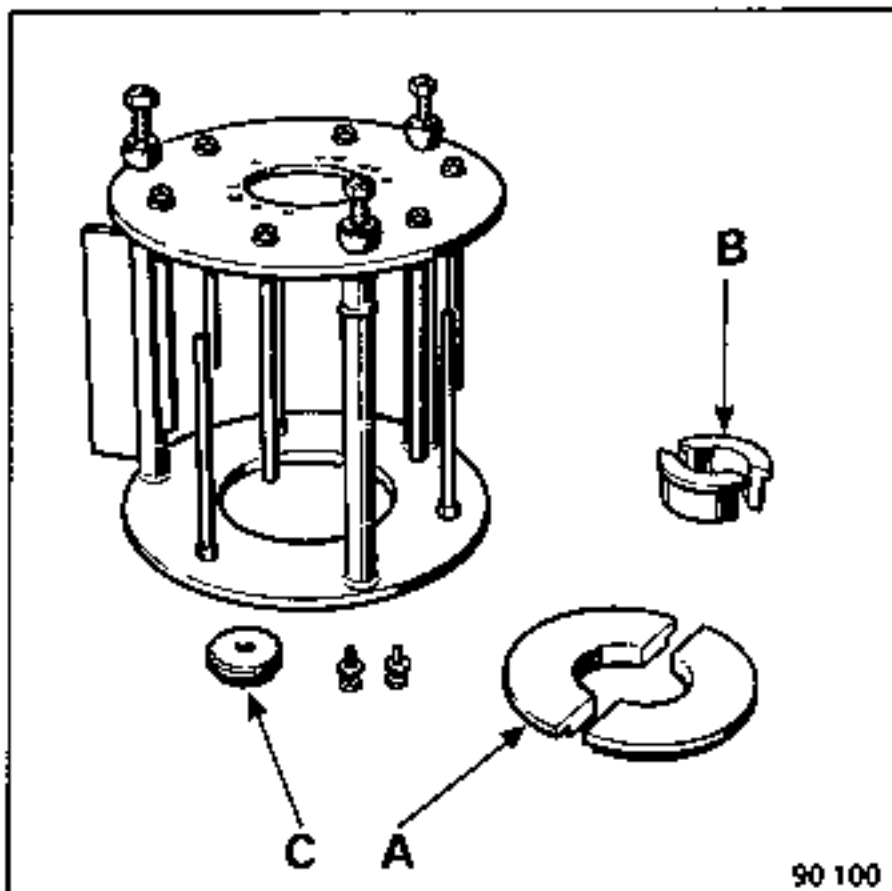
- the two shock absorber upper securing bolts and tighten them to torque,
- the shock absorber lower securing bolts and tighten them to torque.

Because of the heavy load in the spring, it is essential to ensure that the tooling is in perfect condition.

ESSENTIAL SPECIAL TOOLS

Sus.1052 Tooling for working on the front spring and shock absorber

Use components (A), (B) and (C) of tool Sus.1052.

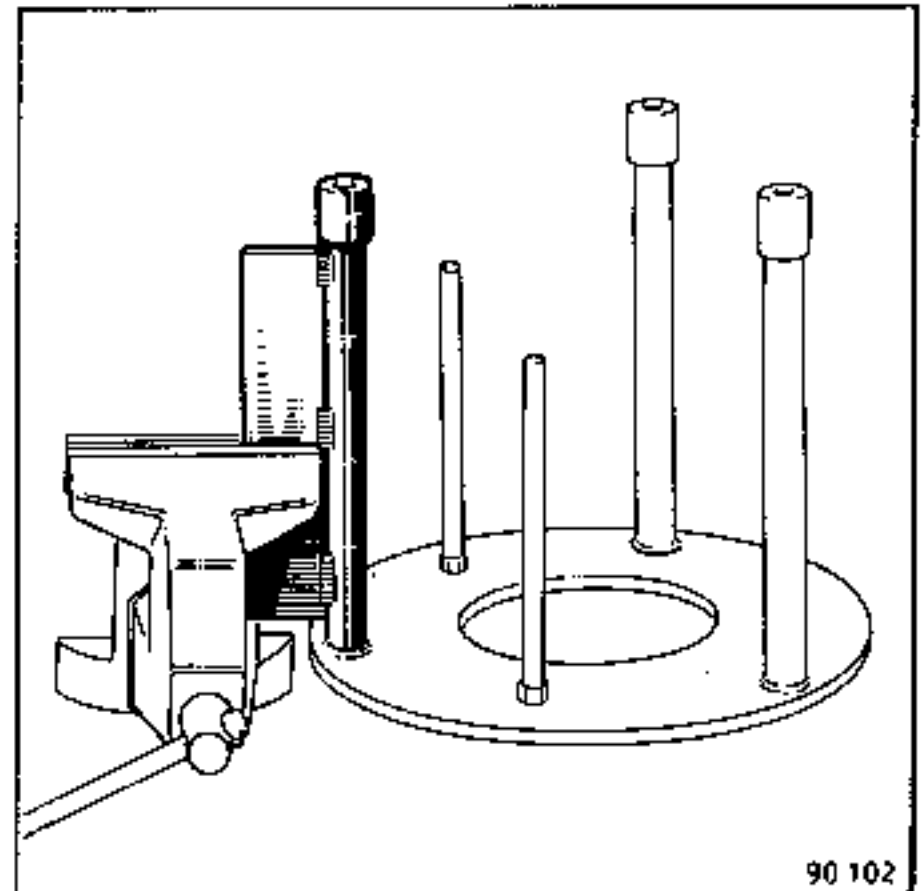


Upper and lower compression plate assembly assembly.

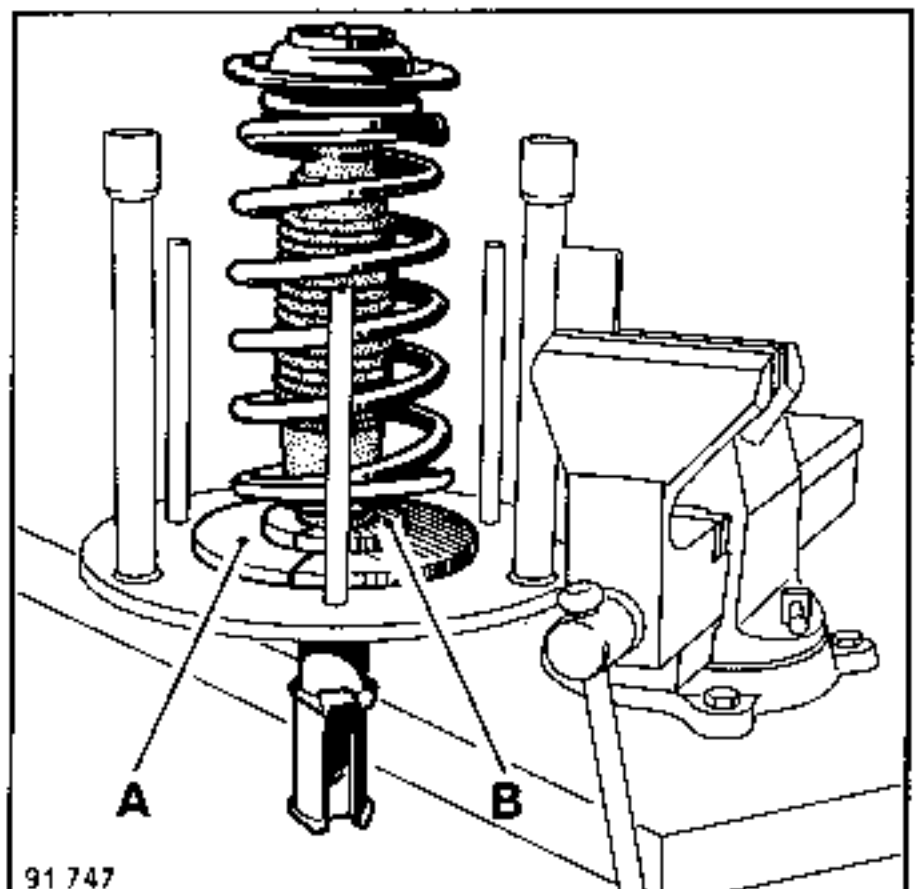
- A Thrust cup
- B Retaining shell marked R5
- C Locating plug

DISMANTLING THE SPRING - SHOCK ABSORBER ASSEMBLY

Grip the lower plate of tool Sus.1052 in a vice.

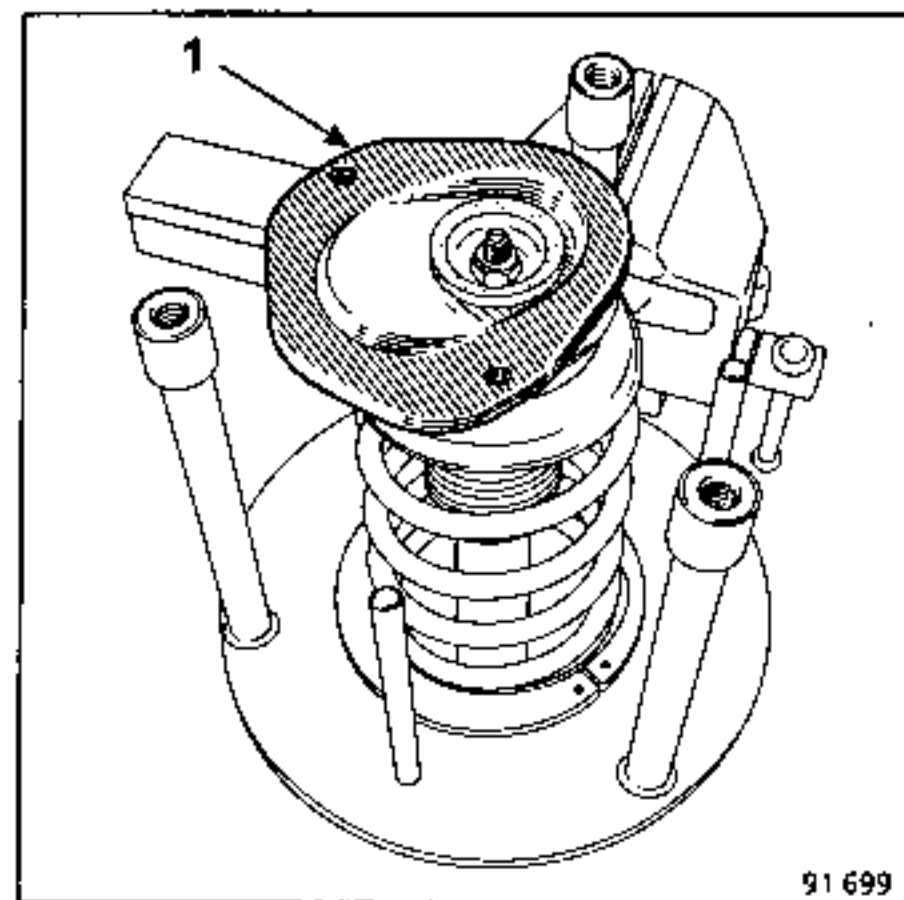


Place the spring - shock absorber assembly on the tool, positioning the two 1/2 cups (A) and the two 1/2 shells (B).

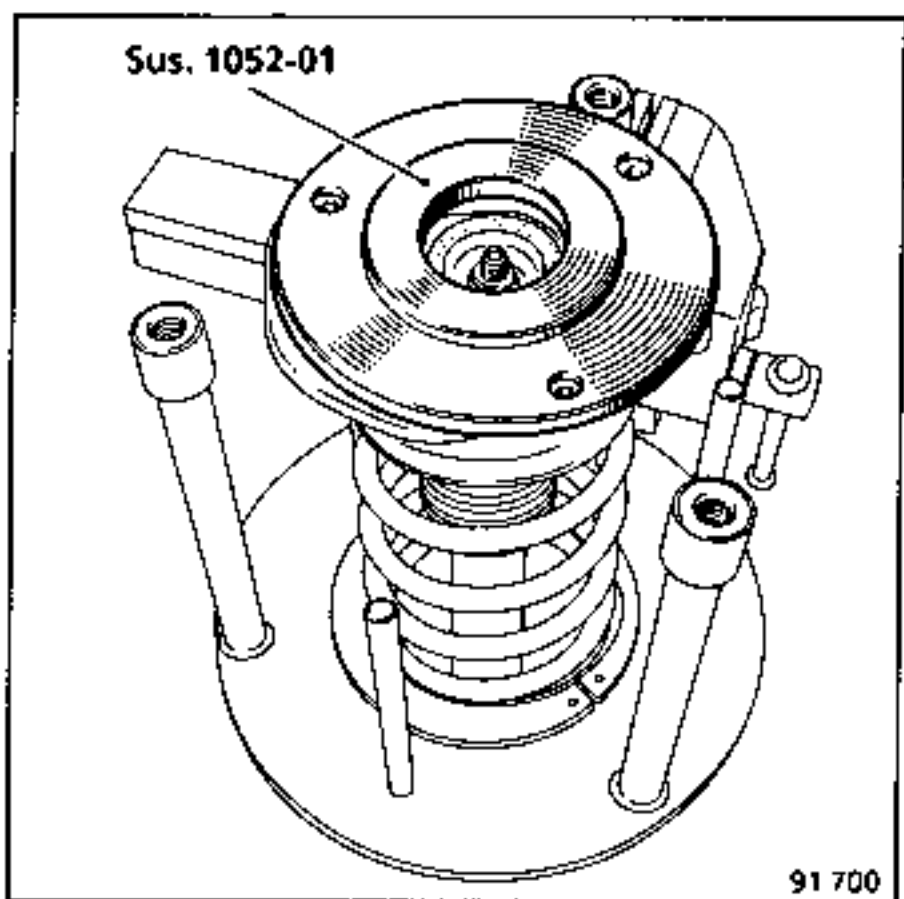


SPECIAL FEATURES OF TYPE C405 VEHICLES
SINCE JUNE 1987

The upper pad (1) on these shock absorber assemblies is inclined.



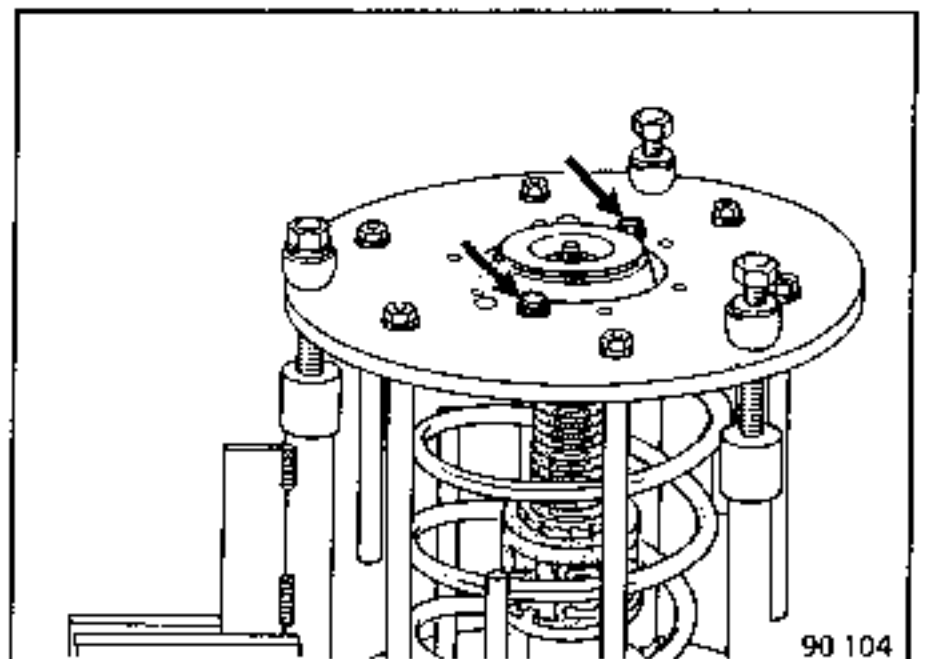
For this type of shock absorber one must use upper cup Sus.1052-01.



ALL TYPES

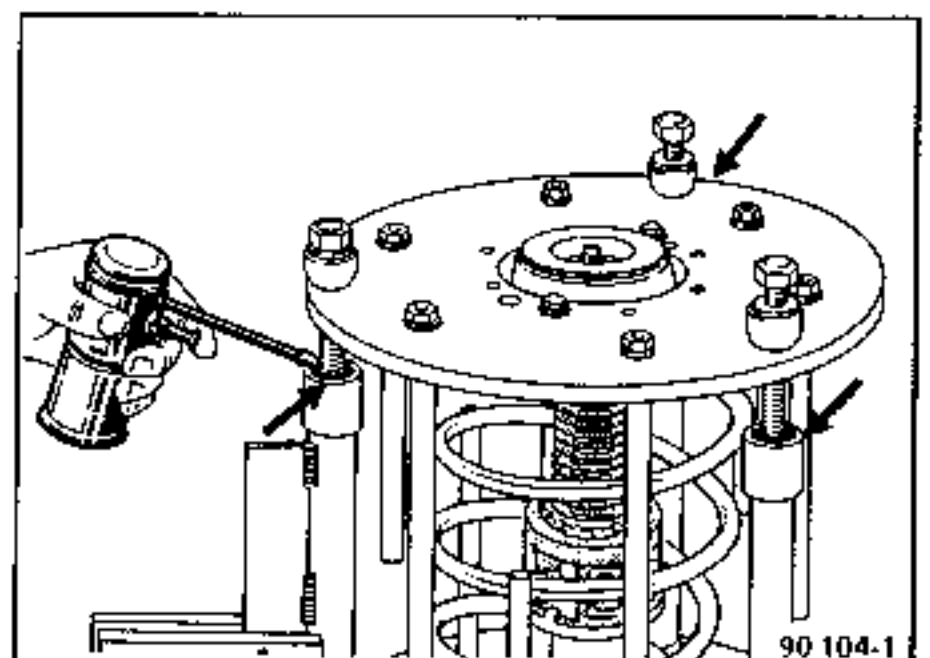
Fit :

- the upper plate,
- the two shock absorber upper cup retaining bolts in the marked holes (the vehicle references are engraved on the upper plate),



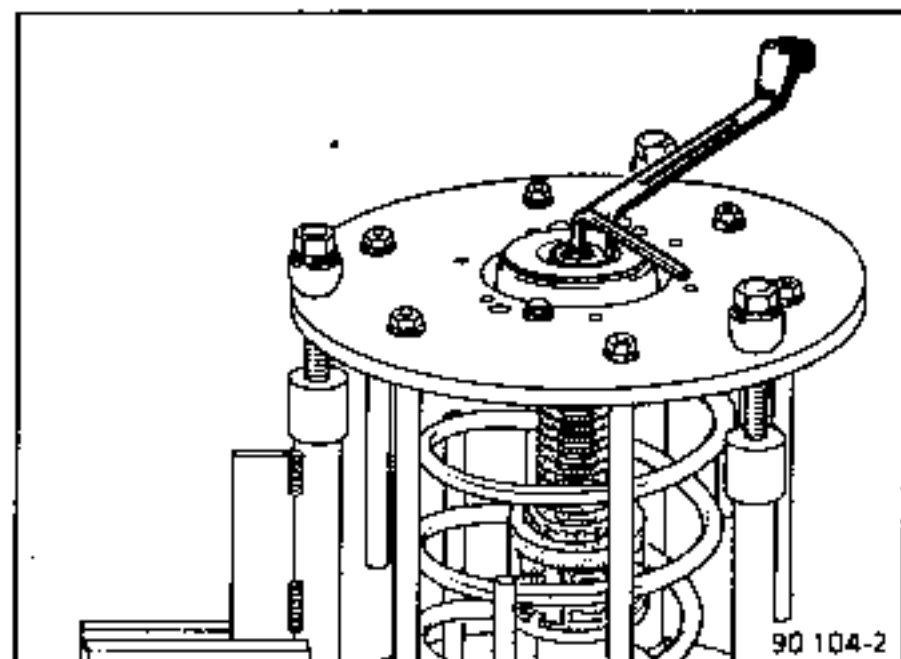
- the three compression bolts injecting copious quantities of oil into the oil reservoirs provided.

NOTE : as the screwed rods on the tool are subjected to very heavy loads, it is essential for them to be thoroughly oiled.

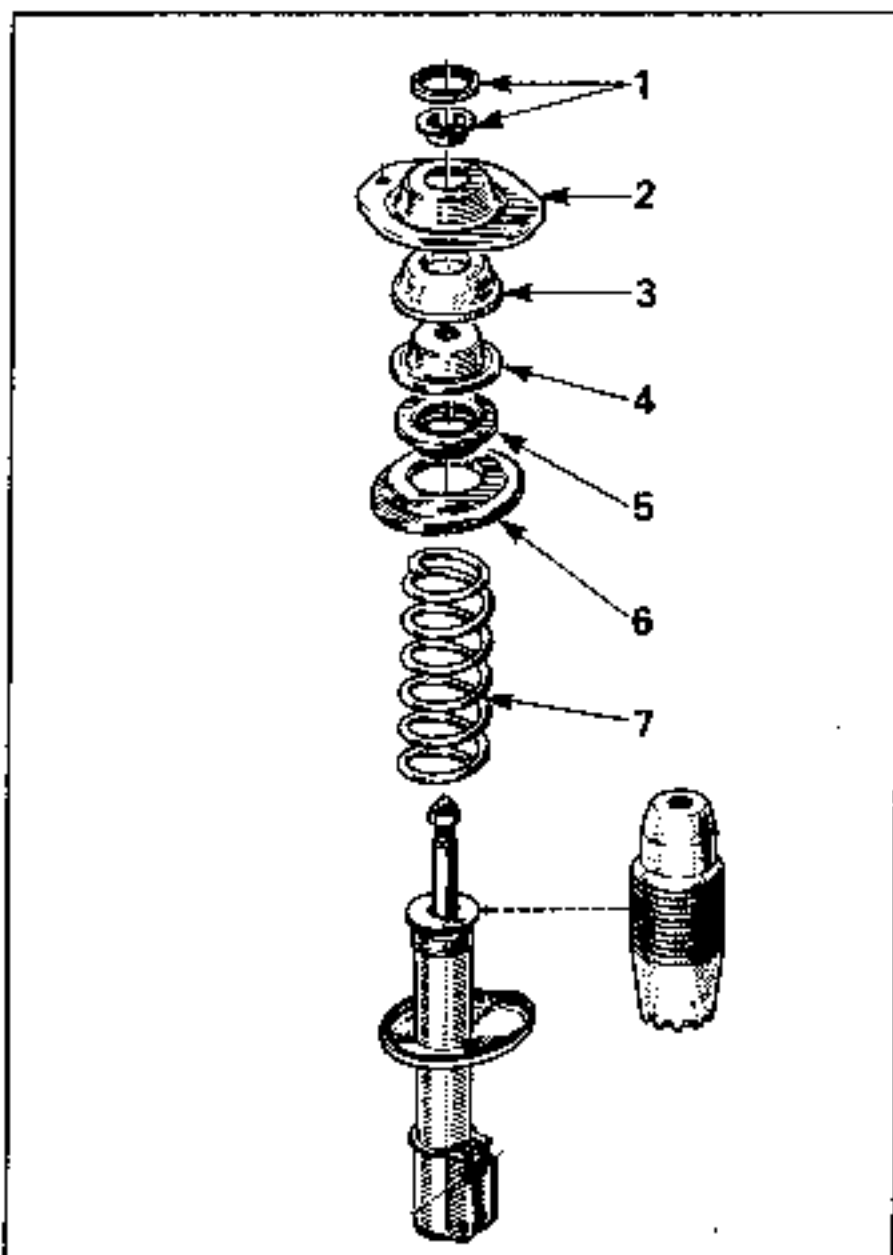


Compress the spring by approximately 10 mm.

Remove the nut from the shock absorber piston rod.



Gradually release the spring pressure.
Remove parts (1.) to (7) in that order.

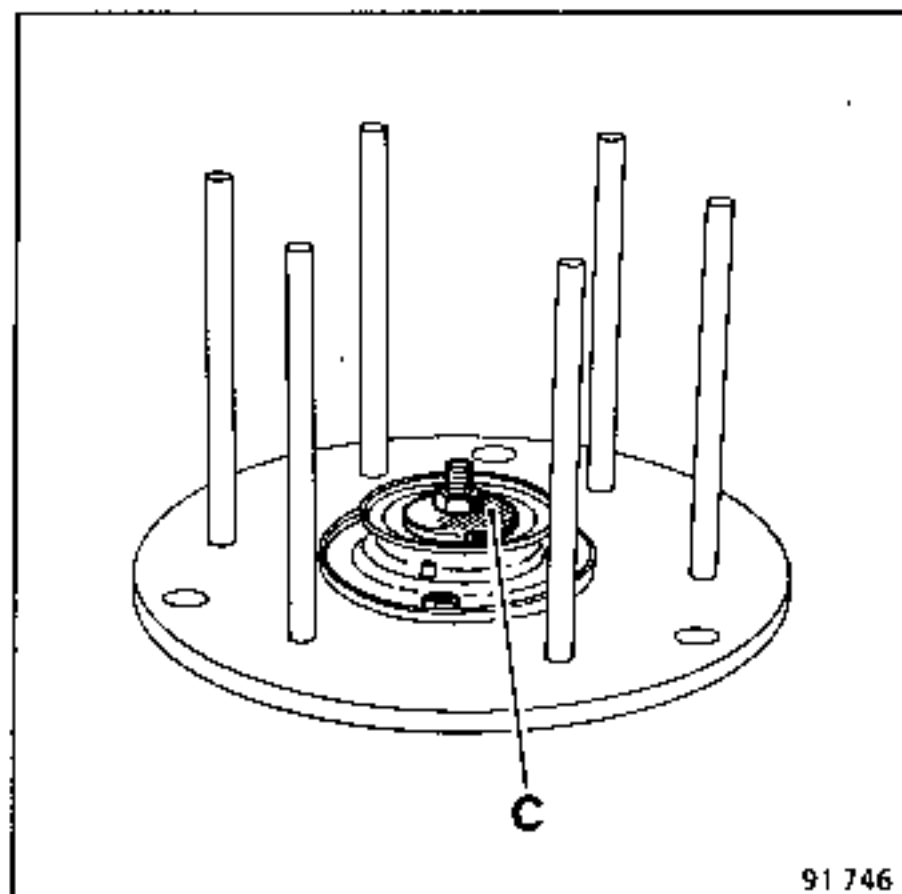


Parts (4), (5) and (6) form the front axle pivot point.

REASSEMBLING THE SPRING - SHOCK ABSORBER

Place a locating plug (C) on the upper plate of tool Sus.1052 to hold the assembly formed by (2), (3) and (4) in position.

Fit plate Sus.1052-01 for type C405 vehicles produced after June 1987.

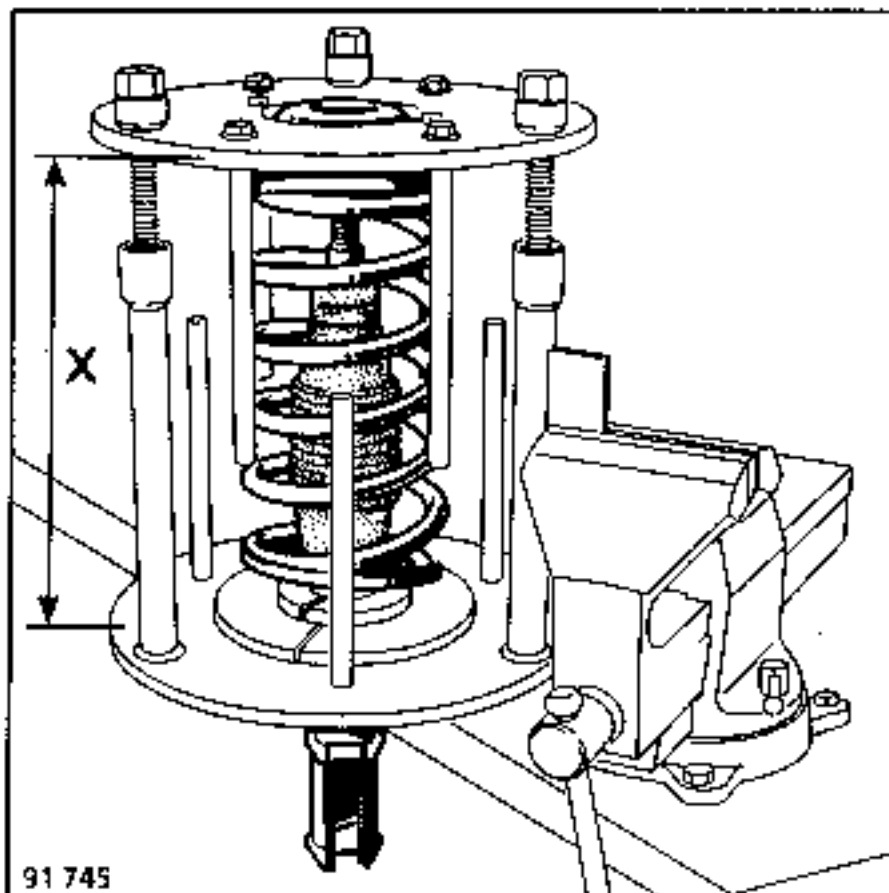


Position :

- the shock absorber,
- the spring on the shock absorber lower cup, ensuring that it is correctly positioned on the stop,
- the upper plate - plug assembly with the position marks in line.

Ensure that the spring is correctly positioned on the upper stop.

Compress the assembly to obtain a height
 $X = 400 \text{ mm}$

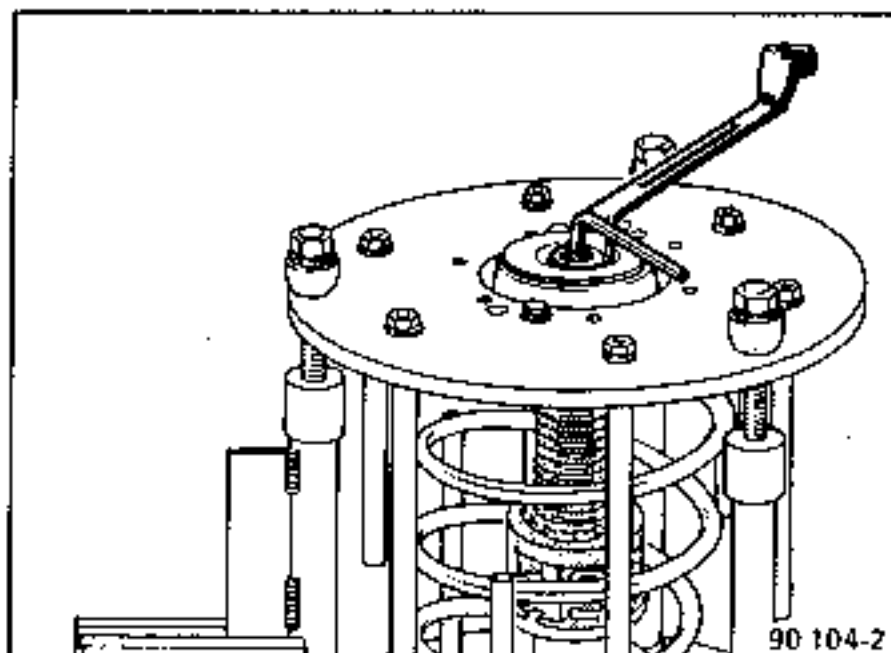


Remove the locating plug.

Compress the assembly and pass through
the shock absorber piston rod.

Fit :

- the cup (1),
- the nut.



Tighten the nut to the specified torque.

Gradually release the spring pressure.

Remove :

- the upper plate from the tool,
- the spring - shock absorber assembly
from the compression tool,
- plate Sus.1052-01 for the shock absorb-
ers of C405 vehicles made since June
1987.



TIGHTENING TORQUES (in daN.m)	
Bearing retaining nuts	3

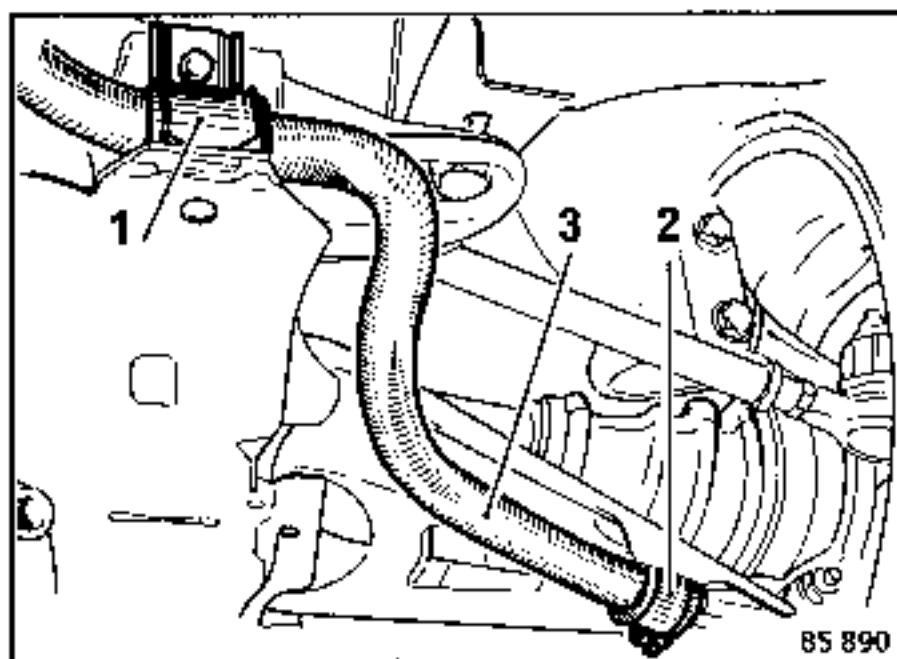
Before this operation can be carried out one must first remove :

- the exhaust down pipe,
- the gear shift control (manual gearboxes).

REMOVING

Remove from (1) to (3) on each side.

Check the condition of the anti-roll bar bearings and bushes and replace them if necessary.



- 1 Bearing on sub-frame
- 2 Bearing on suspension arm
- 3 Anti-roll bar

REFITTING

Coat the bearings with ELF MULTI MOS 2 grease.

Refit parts (3) to (1).

Position in which bearings are to be tightened : NO LOAD IN VEHICLE.

TIGHTENING TORQUES (in daN.m)

Bearing securing nuts :	
B40X-C40X-S40X	8.5
F40X	9.5
Wheel bolts	8
Shock absorber lower securing bolts	6

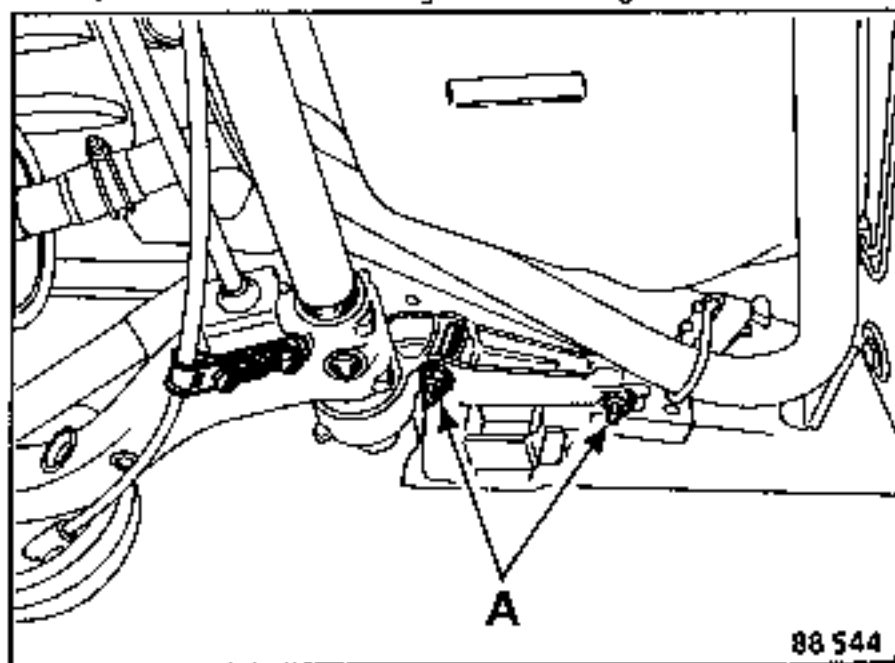
REMOVING

With the vehicle raised on a two column lift, remove :

- the two shock absorber lower securing bolts,
- the brake hoses,
- the brake compensator control (on certain versions),
- the hand brake secondary cables, disconnecting them at the central control point under the vehicle.

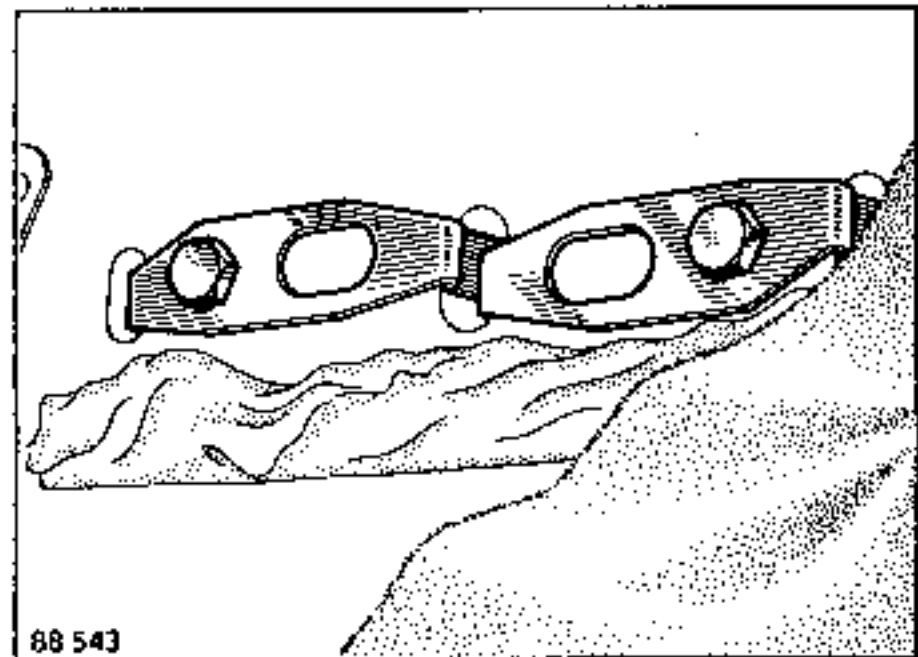
Support the rear axle and remove :

- the four bearing securing nuts (A),



- the rear axle assembly.

NOTE : damaged rear axle bearing securing bolts can be replaced by cutting the mastic under the rear seat to gain access to the bolt backing plates.



REFITTING

Carry out the removing operations in reverse.

Bleed the braking system.

Adjust the hand brake control.

Check, and if necessary adjust, the brake compensator (on certain versions).

(For these operations see section 37 "Controls").

Both brake drums must be of the same diameter and therefore regrounding one drum automatically involves regrounding the other. A maximum of one mm of metal, on diameter, can be removed.



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
M.S. 821	Dust remover
Rou. 943	Hub plug extractor

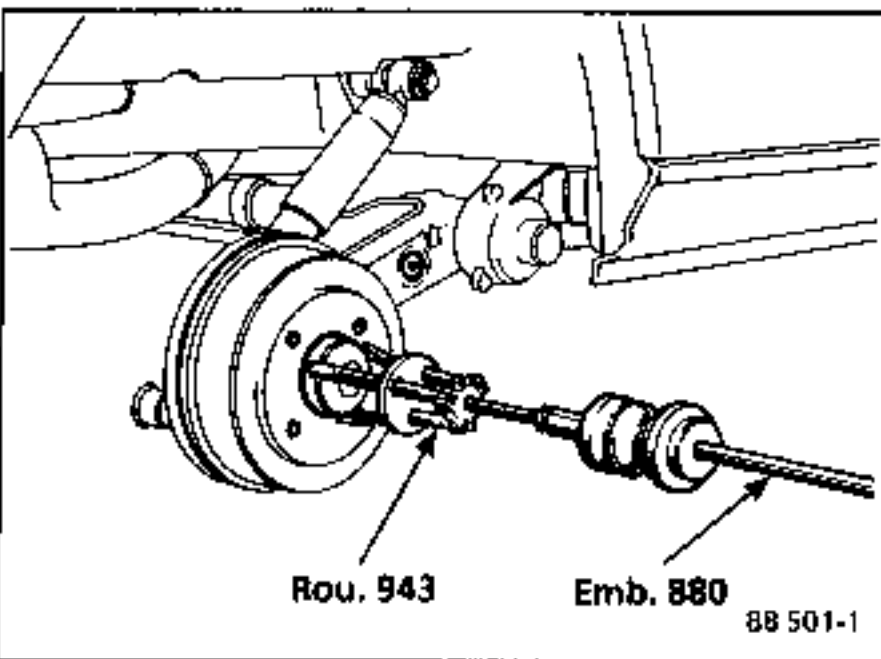
TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Brake anchor plate bolts	4.5
Hub nut	16

REMOVING

Remove :

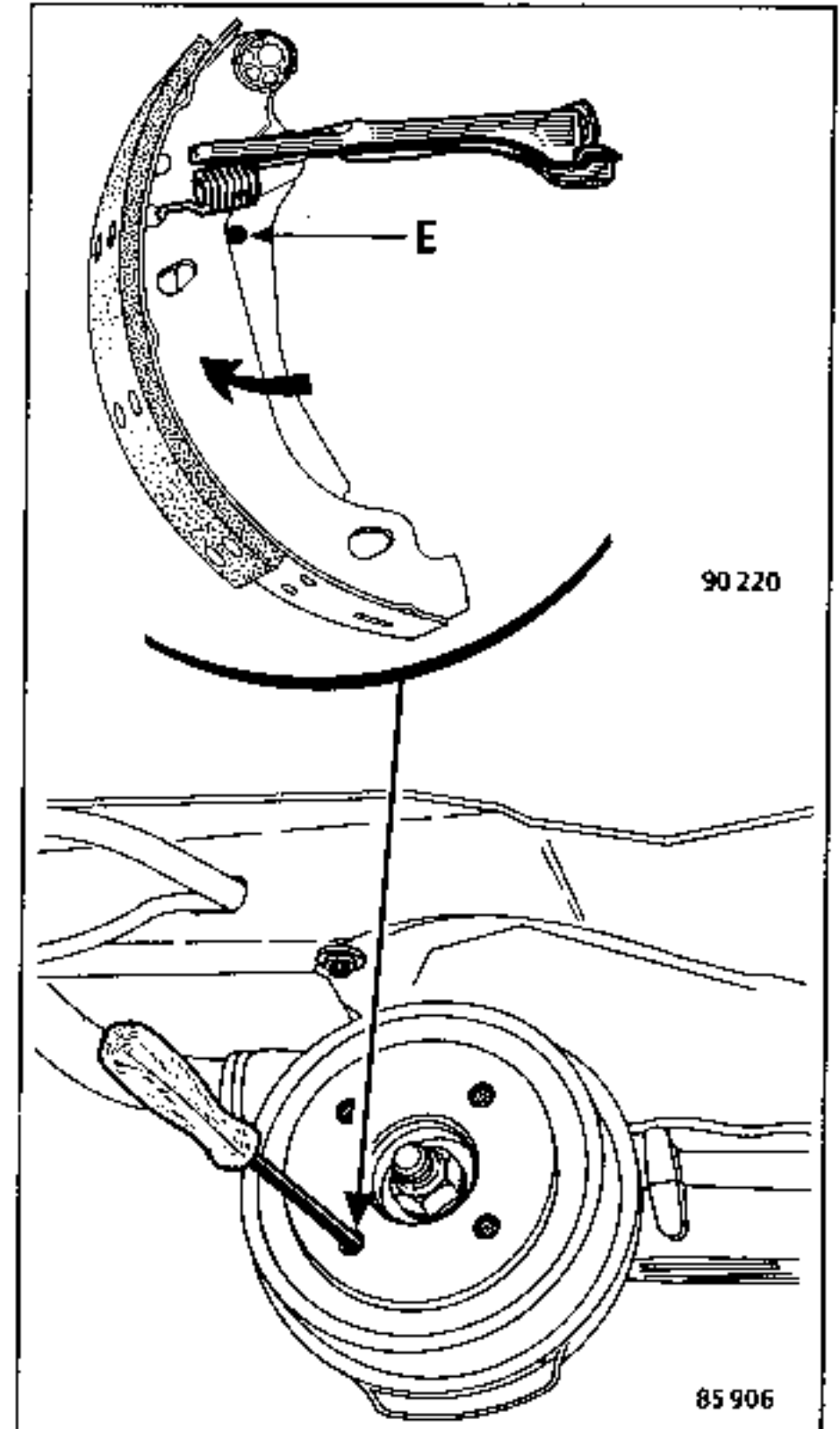
- the hub plug using tools Rou.943 + Emb.880,



Release the hand brake and slacken off the hand brake secondary cables to permit the lever to move back.

Pass a screwdriver through the wheel securing hole in the drum and push the hand brake lever to release the brake shoe stud (E).

Help the lever to release by pushing it towards the rear.



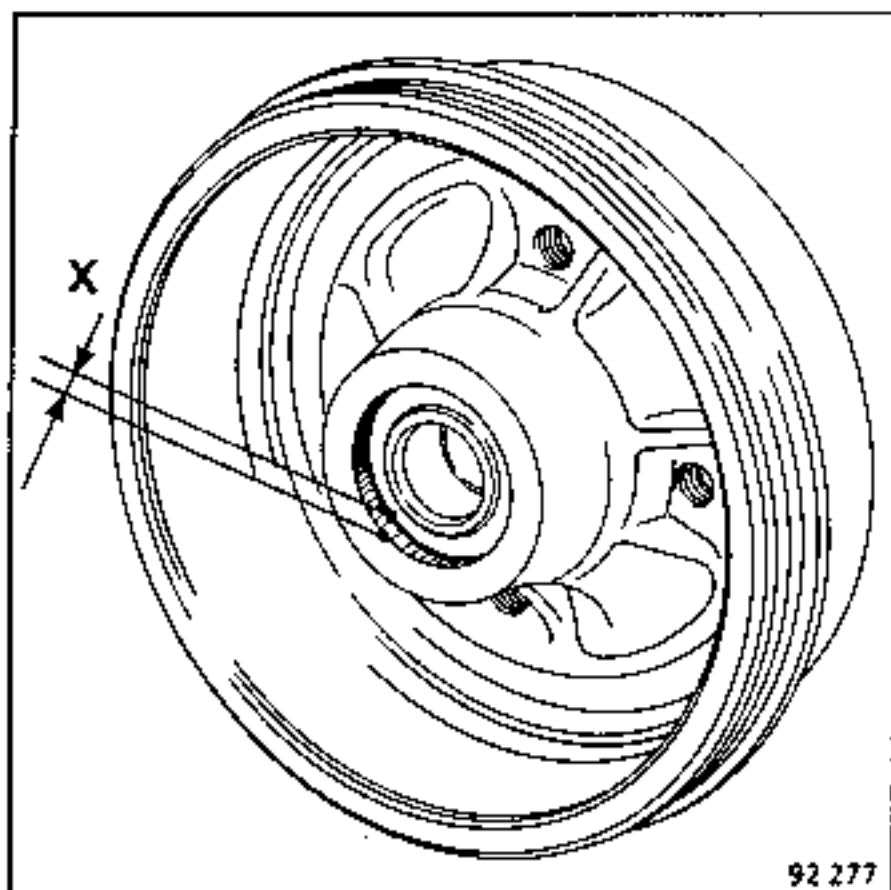
Remove :

- the stub axle nut and washer,
- the drum.

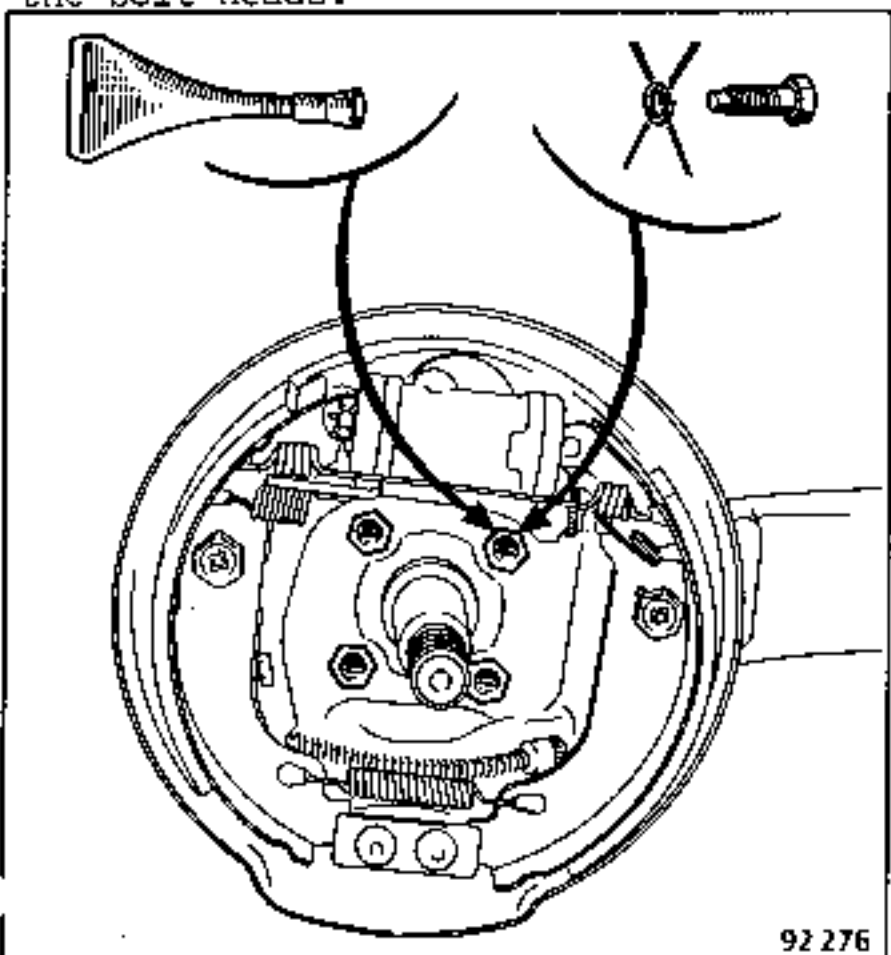
REFITTING

Special feature involved when replacing the drum.
The Parts Department is now supplying drums with a larger bearing locating area (dimension X) :

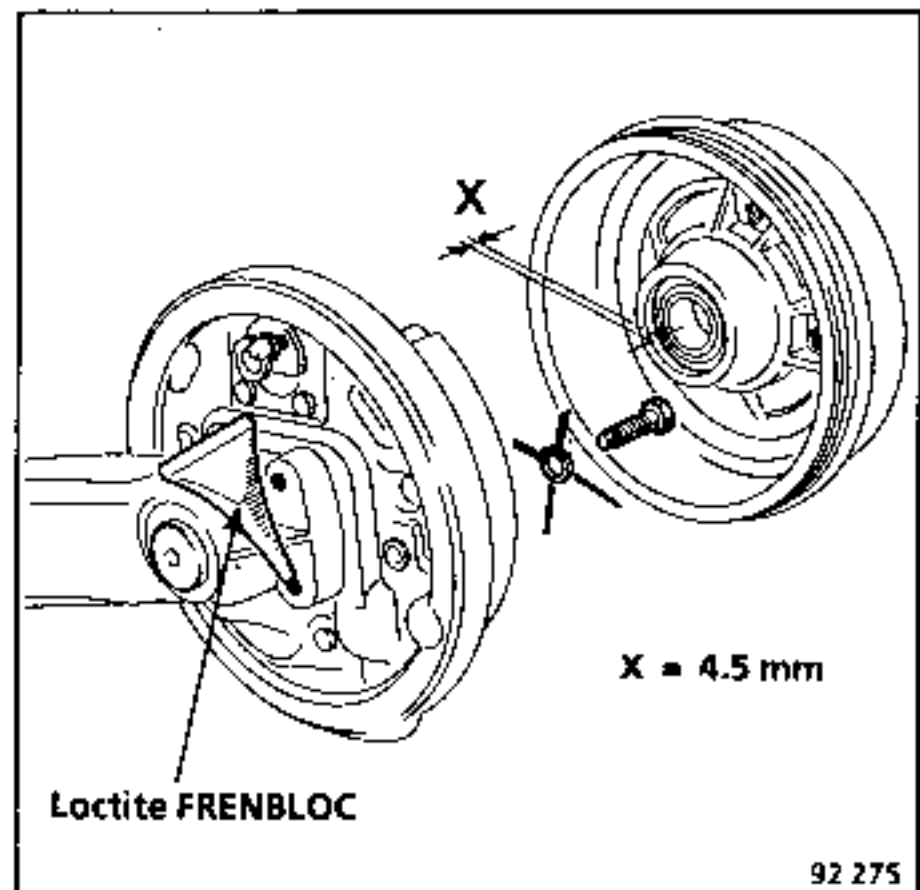
Early type : $X = 2.5 \text{ mm}$
Later type : $X = 4.5 \text{ mm}$



Carrying out this operation has involved eliminating the shakeproof washer and applying Loctite FRENBLLOC to the brake anchor plate securing bolts to avoid any possible contact between the drum and the bolt heads.



IMPORTANT : when applying the adhesive, it is essential, if the anchor plate is to be tightened correctly, to apply the adhesive to the tapping in the suspension arm and not to the bolt. In fact, if the adhesive is applied to the bolts, when they are tightened the excess adhesive will prevent the flange making the effective contact with the suspension arm.



Consequently, you will find the instructions listed below on a label applied to the drums supplied by the Parts Department.

Dust out the drum and the linings with tool M.S.821.

Fit :

- the drum,
- the washer and the nut, tightening it to torque,
- the plug.

Adjust :

- the positions of the brake shoes by repeatedly pressing the brake pedal,
- the hand brake (see section 37 "Controls").



The following vehicles,

B400	B401	B402	B403	B404	B407	B408	B40F	B40G	B40H	B40J	B40K	B40M
C400	C401	C402	C403	C404	C407	C408	C40F	C40G	C40H	C40J	C40K	C40M
S400	S401			S404			S40F					

are now equipped with fixed brake compensators that are integral with the wheel cylinders. If either a wheel cylinder or compensator is found to be defective, change the entire unit. Any attempt at repairing these items is forbidden.

ESSENTIAL SPECIAL TOOLS

M.S. 821	Brake dust remover
----------	--------------------

TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Wheel nut	16
Bleed screws	0.8
Pipe union screw	1.3

REMOVING

Remove :

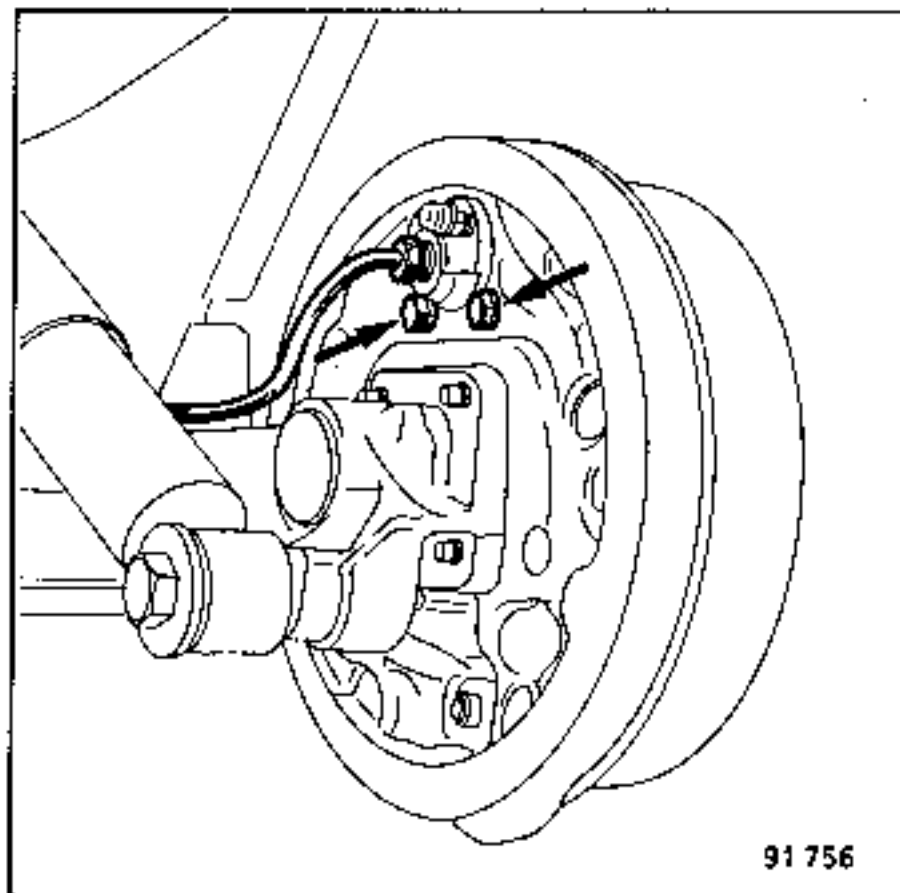
- the drum (see corresponding section),
- the upper return spring (see section entitled "Brake shoes").

Pull apart the shoes.

Unscrew :

- the rigid brake pipe union on the wheel cylinder, using a pipe spanner,
- the two bolts that secure the cylinder to the anchor plate and remove the cylinder.

Check the condition of the brake shoes. If, in particular, they shows signs of contamination with oil, replace them by new ones.



REFITTING

Remove the dust from the drums and the shoes using tool M.S.821.

Carry out the removing operations in reverse.

Bleed the braking system.

Adjust the positions of the pads by repeatedly depressing the brake pedal.

Vehicles with integral brake compensators:

Check the shut-off pressure (see section 37 "Controls").



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
M.S. 821	Brake dust removal equip.
Rou. 943	Hub plug extractor

TIGHTENING TORQUES (in daN.m)

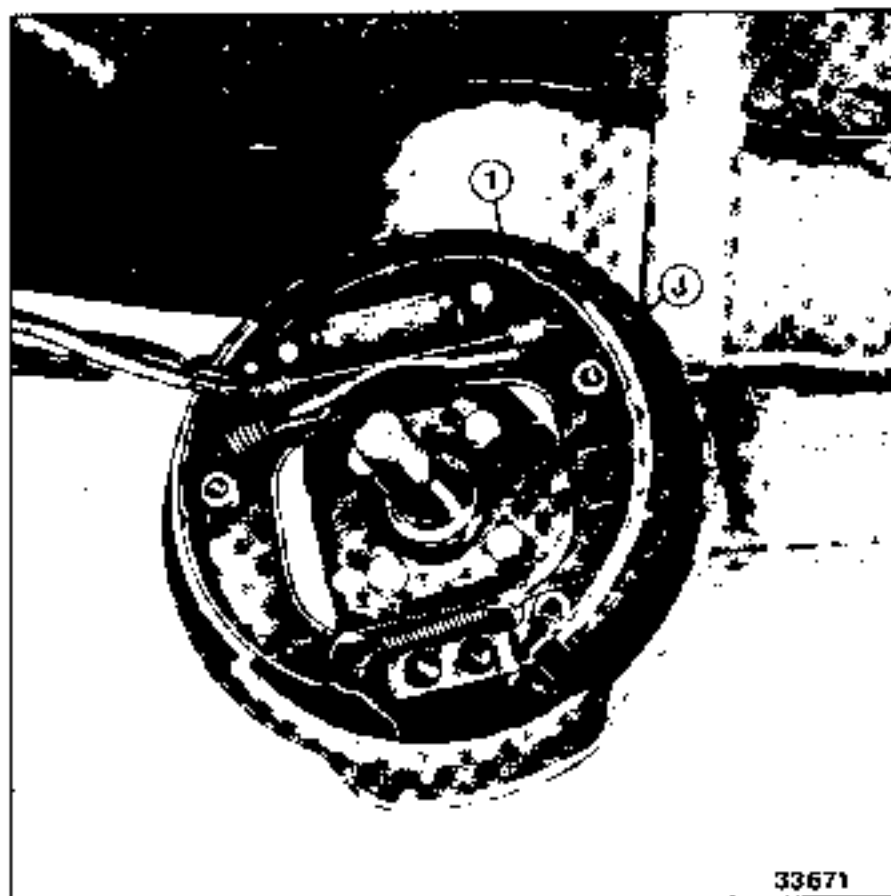
Wheel bolts	8
Hub nuts	16

All the shoes or linings on any given axle are to be replaced. Never fit linings of different grades or make.

REMOVING

Remove :

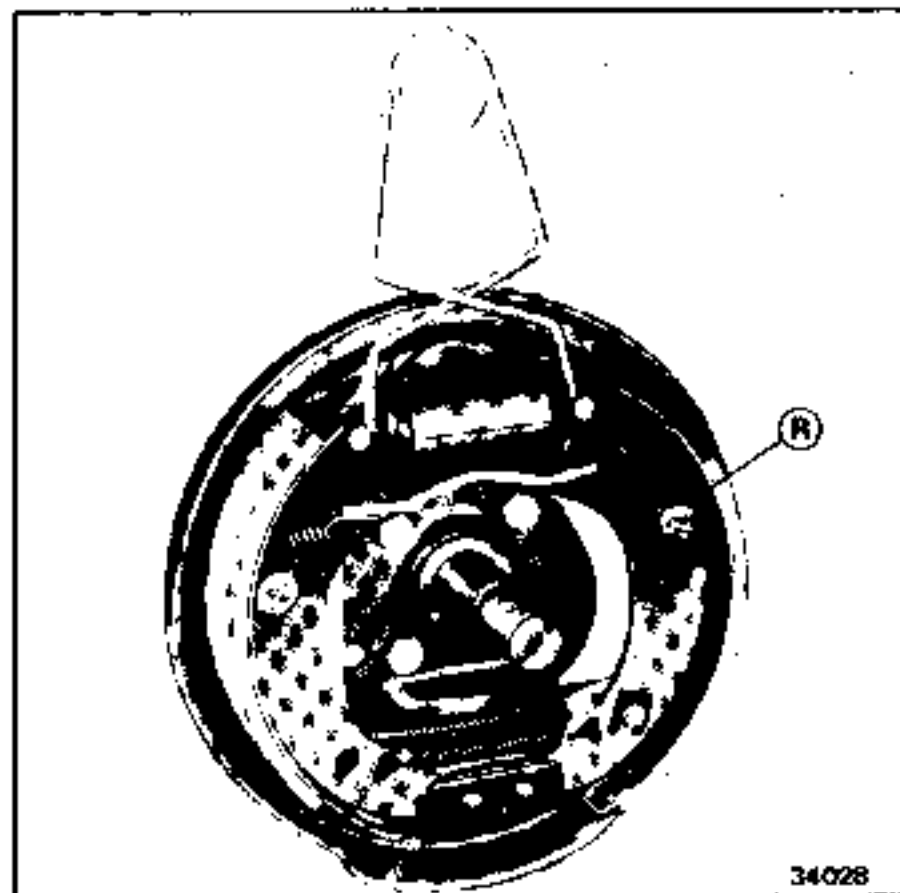
- the brake drum (see corresponding section),



- the upper spring (1) using brake shoe grips.

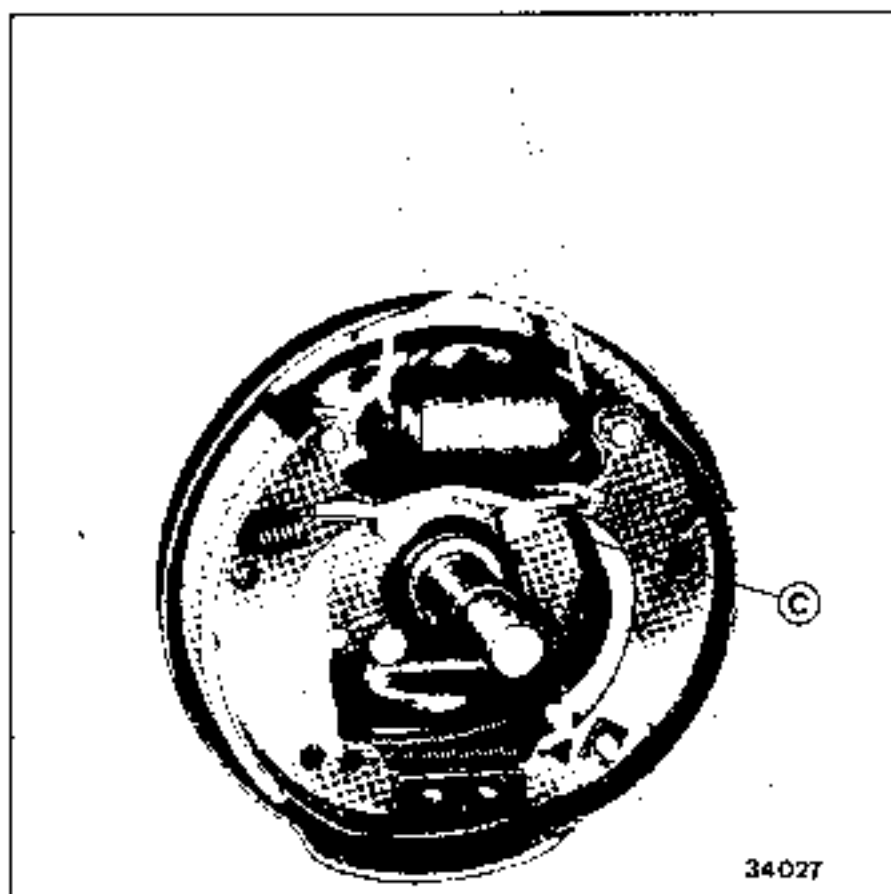
Fit a clip to the wheel cylinder pistons.

Using multi-purpose grips, remove the shoe retaining spring whilst keeping the connecting link (R) in contact with the brake anchor plate (J).

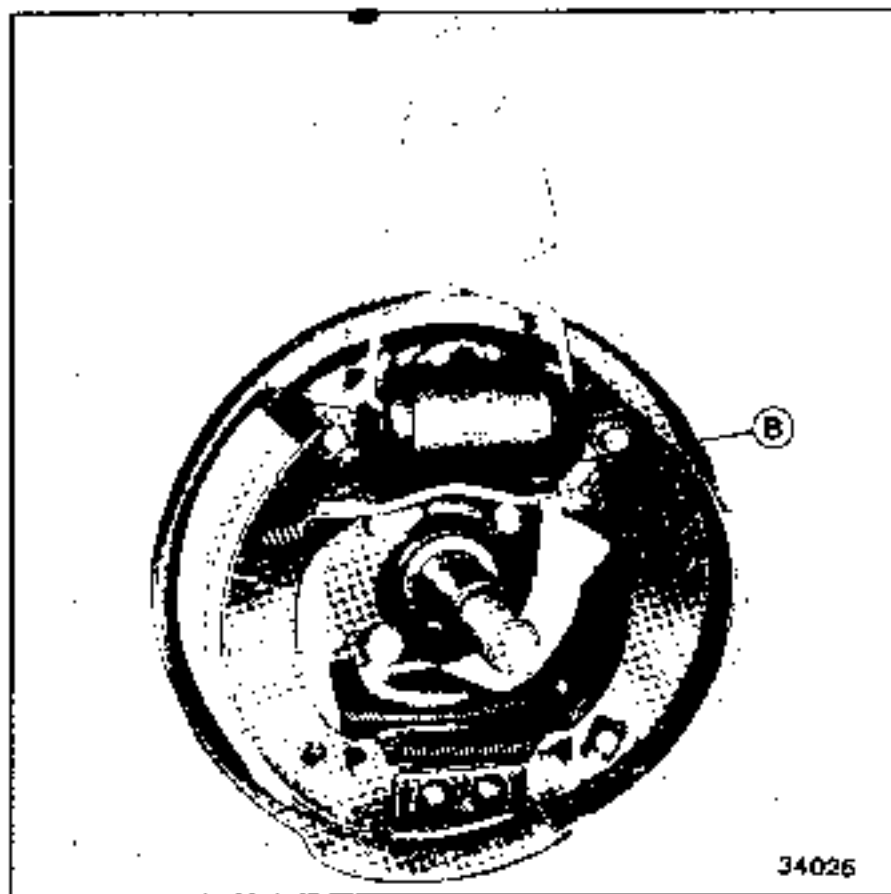


Move the toothed lever (C) as far as it will go towards the stub axle.

Pull the brake shoes away from the anchor plate.



Pull link (B) outwards and remove it from the leading shoe.

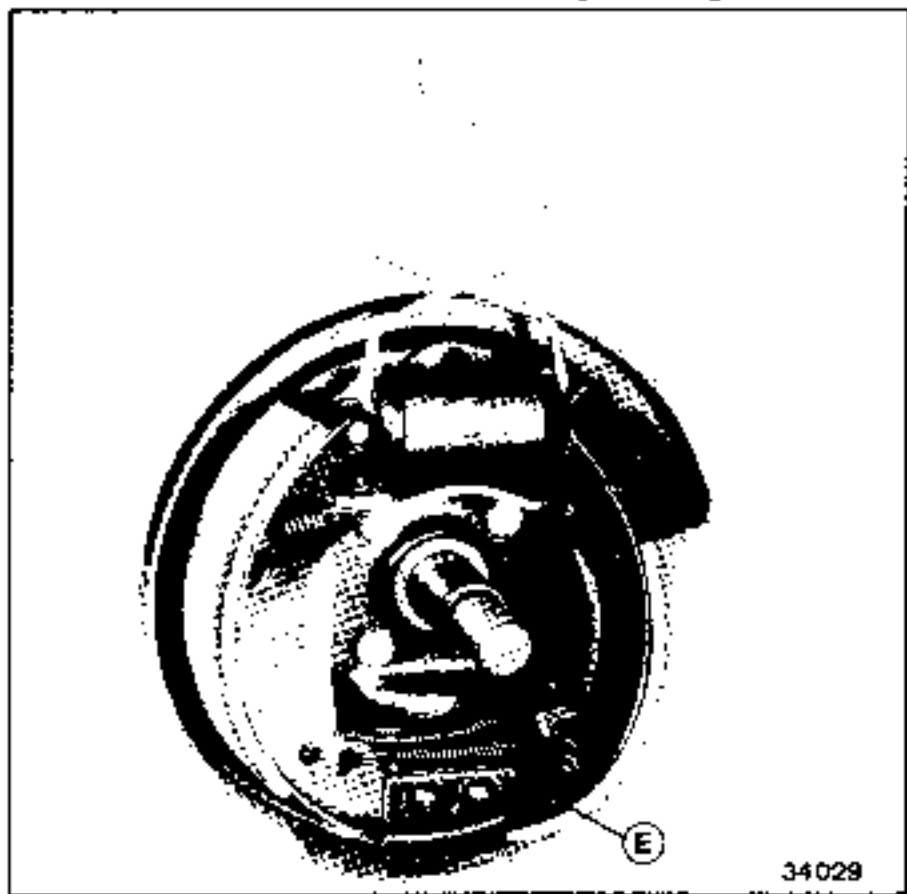


Unhook the hand brake cable.
Place the quadrant (D) in its initial position.



Swing the leading shoe through 90°.

Remove the shoes from the pivot points (E)



Dust out the drums and anchor plates using tool M.S.821.

Check the condition of the drums and hoses.

REFITTING

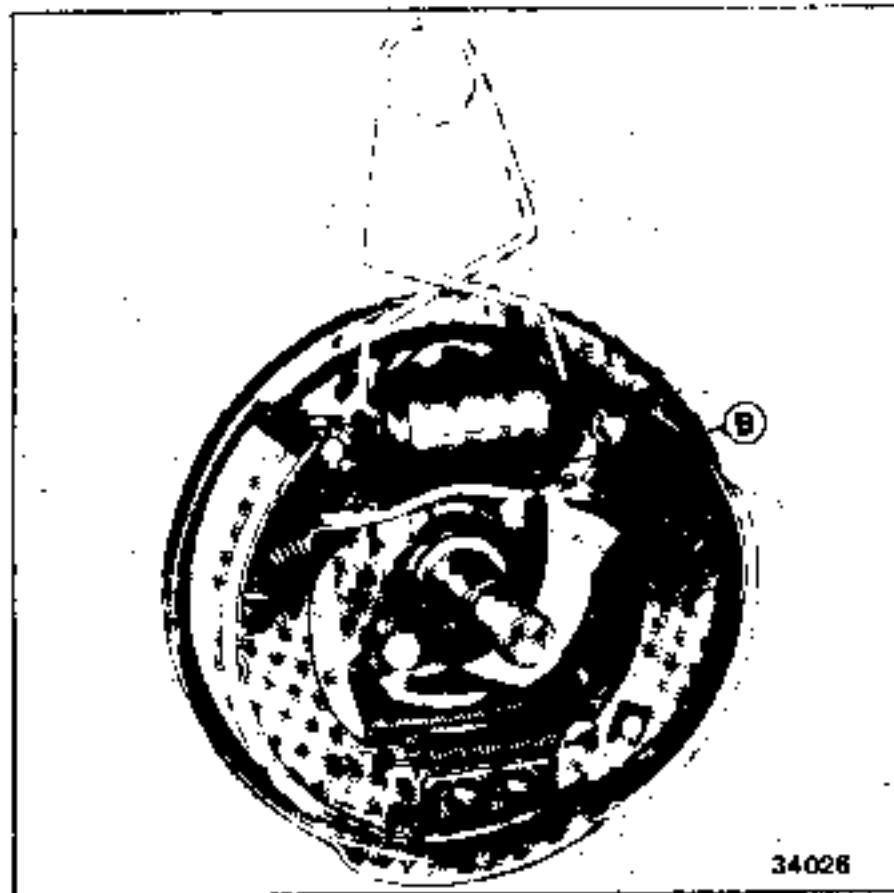
Hook :

- the hand brake cable in place,
- the lower spring into the shoes.

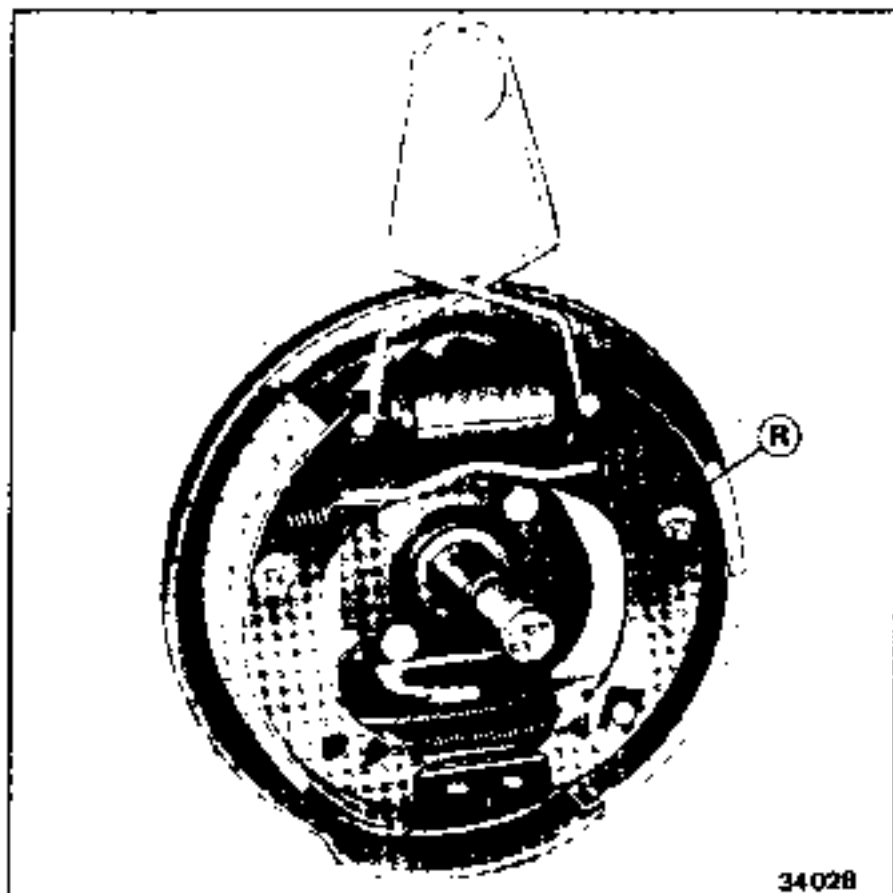
Place the shoes in position on the anchor plate, swinging the leading shoe through 90°.

Tilt the toothed lever as far as it will go towards the stub axle and then fit :

- the link (B),



- the two brake shoe retaining springs (R).

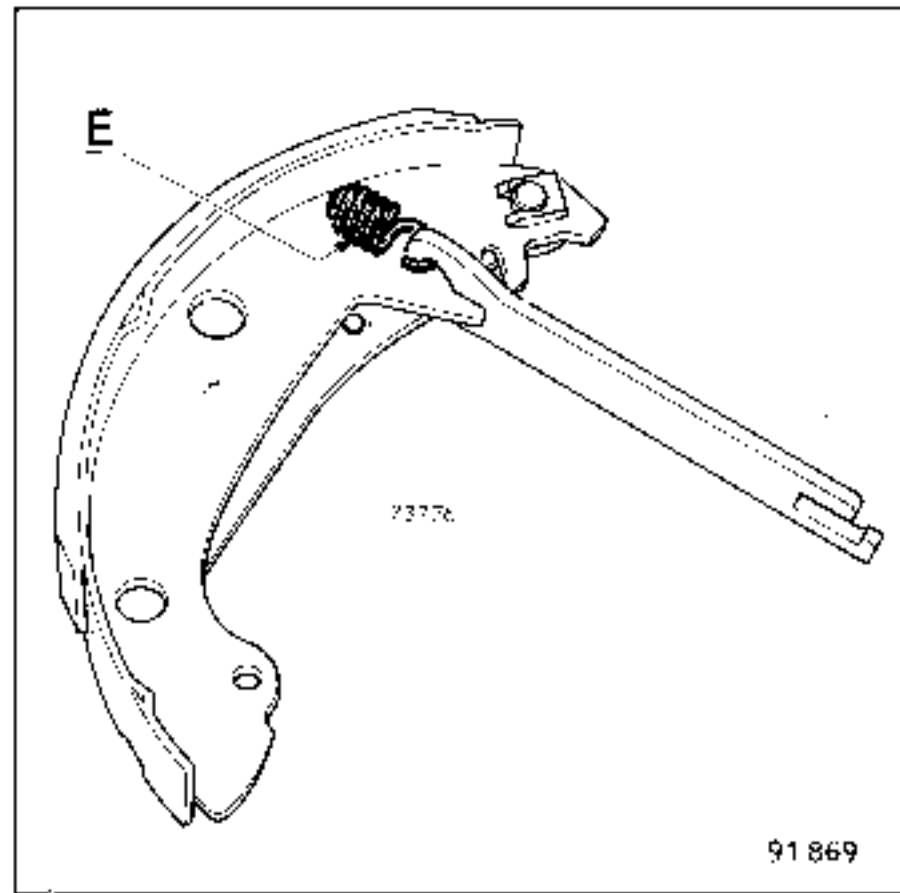


- the upper spring (1).

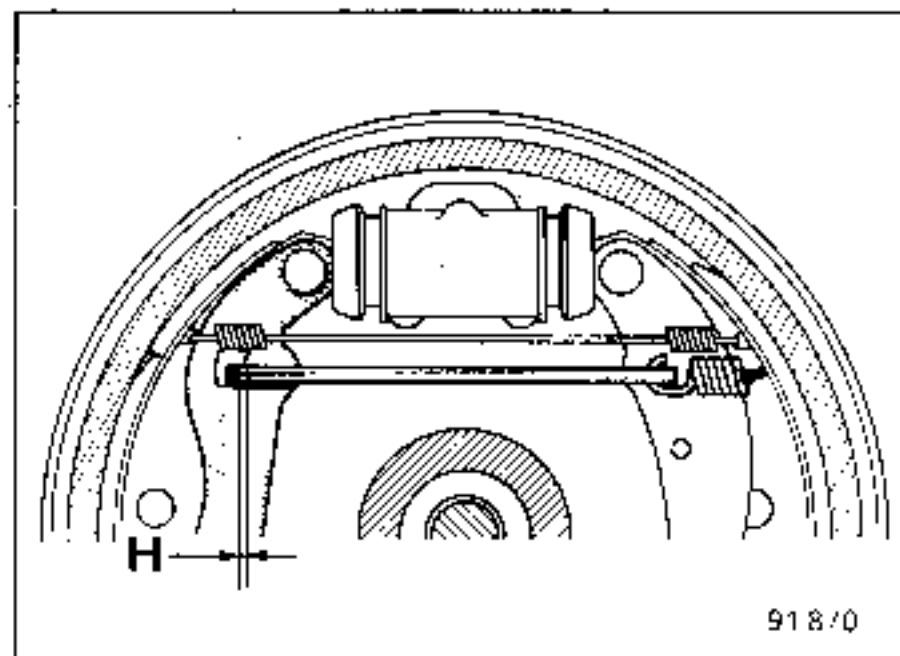
Remove the clips from the wheel cylinders.

ADJUSTING

The efficient operation of the automatic adjustment system depends on the tension in the spring (E) hooked between the link and the trailing shoe.



It is adjusted by measuring dimension H = approximately 1 mm, between the link and the leading shoe as shown above (with the hand brake lever in contact with the shoe).



If this dimension (H) is not correct, the link tension spring must be replaced as must the two shoe return springs.

Adjust :

- the positions of the shoes by repeatedly depressing the brake pedal.
- the hand brake (see section 37 "Controls").



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
M.S. 821	Brake dust remover
Rou. 943	Hub plug extractor

TIGHTENING TORQUES (in daN,m)

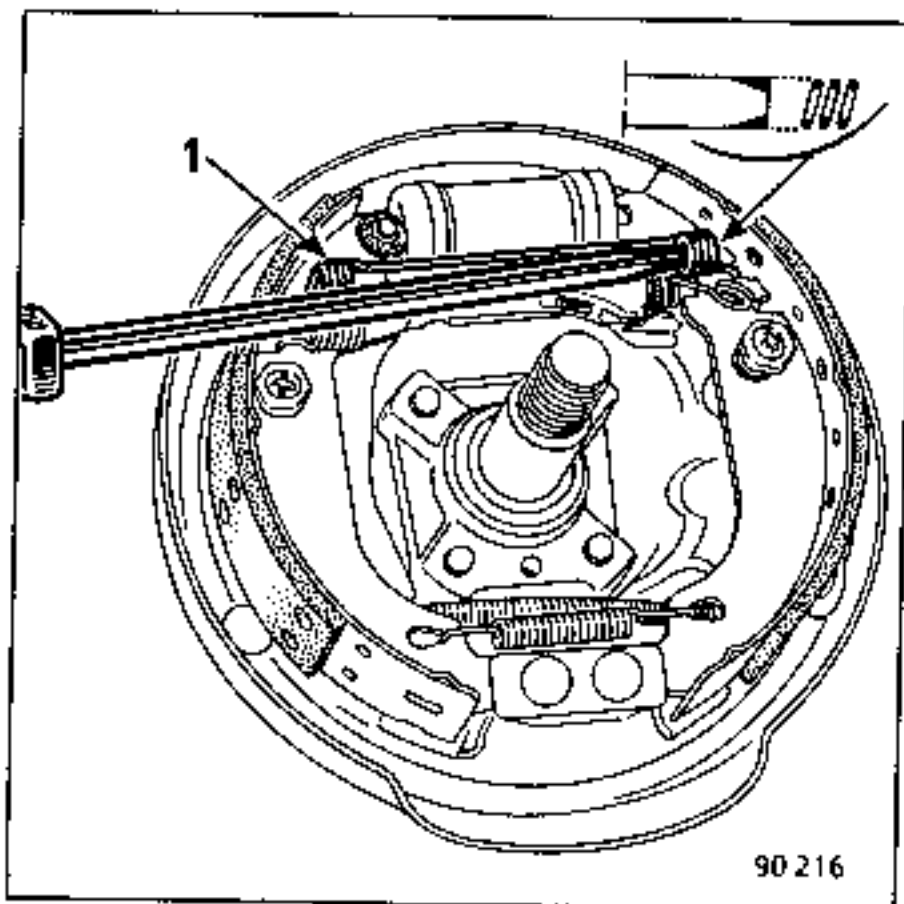
Wheel bolts	8
Hub nuts	16

All the linings on any given axle must be replaced. Never fit linings of different makes or grades.

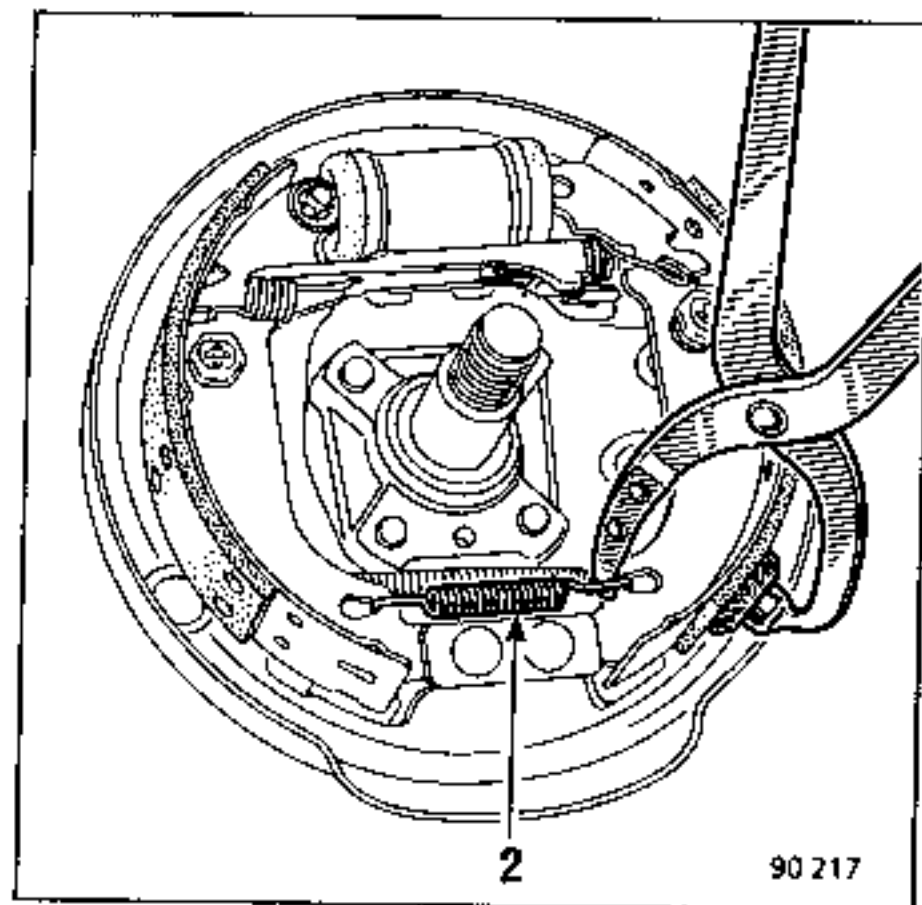
REMOVING

Remove :

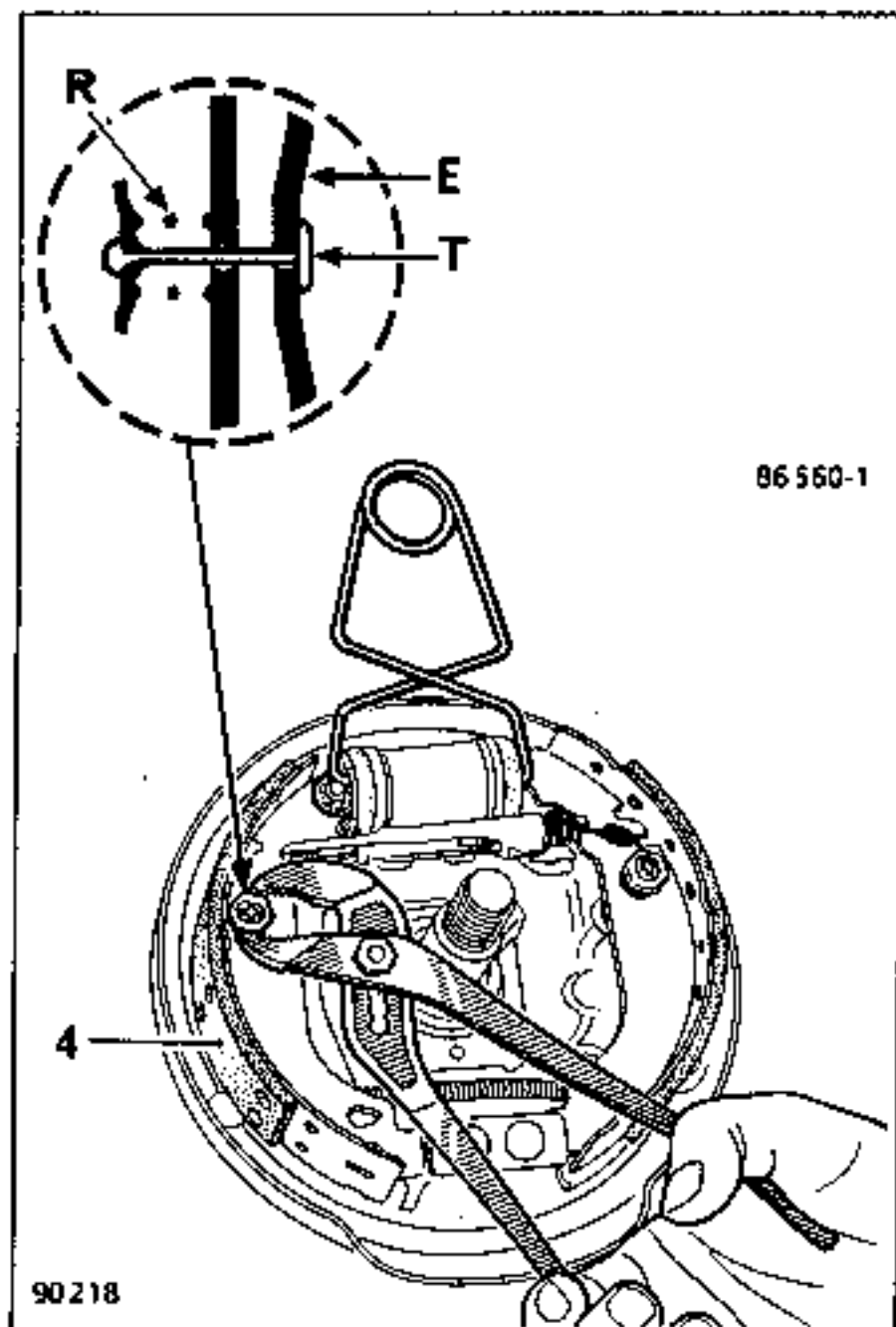
- the brake drum (see corresponding section),
- the upper spring (1) using a screwdriver modified as shown in this drawing,



- the lower spring (2) using brake shoe grips.

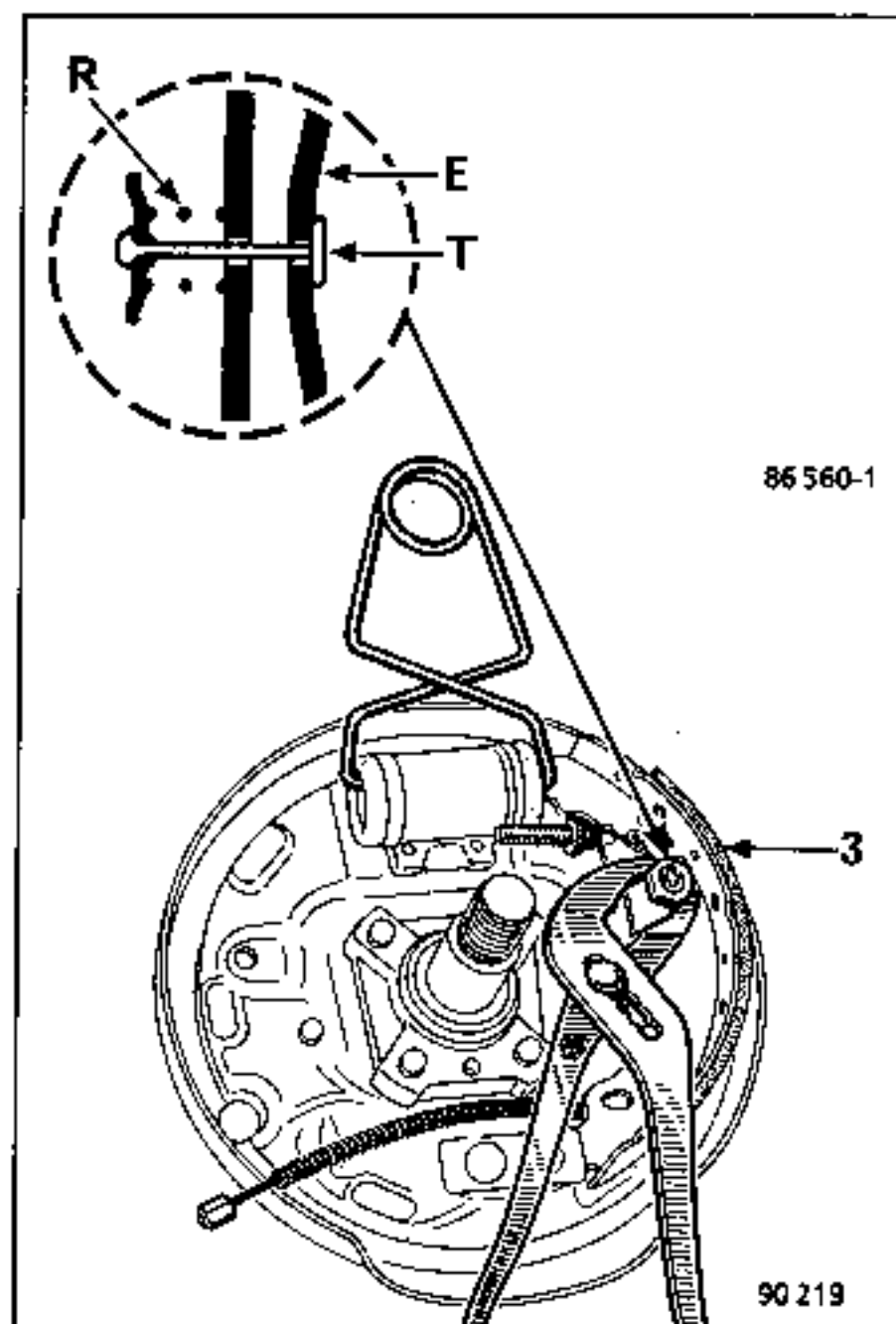


Fit a clip to the wheel cylinder pistons. Using multi-purpose grips, remove the trailing shoe lateral retaining spring (R) whilst holding the connecting link (T) in contact with the brake anchor plate (E).



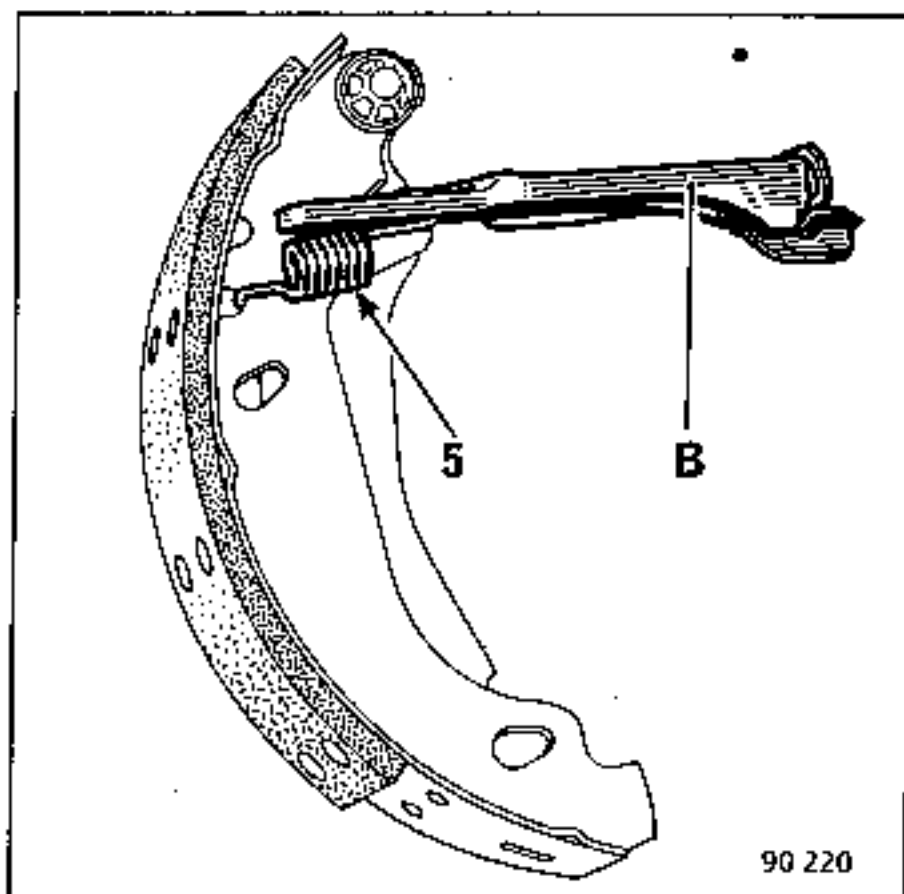
Slacken off, to their maximum extent, the hand brake cables and remove :

- the assembly formed by the trailing shoe (4) and the link, freeing the hand brake cable,
- the primary shoe lateral retaining spring (R),
- the primary shoe (3) and toothed quadrant assembly.

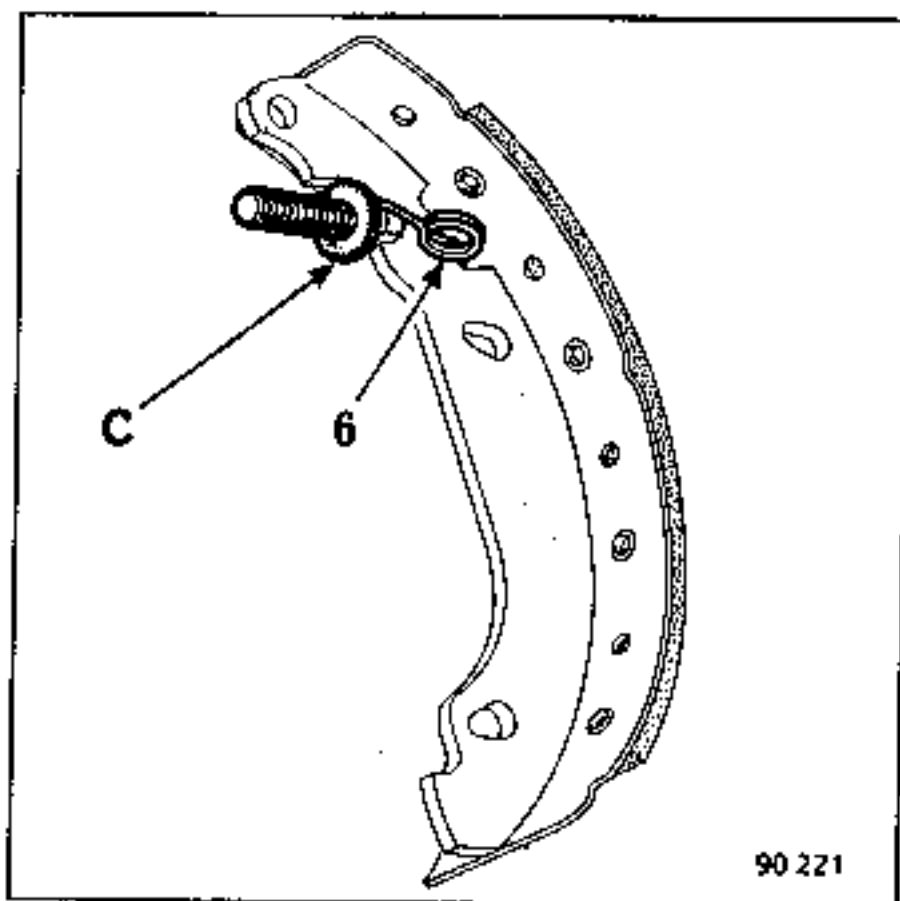


Remove, from the trailing shoe :

- the link (B) taking care not to damage the automatic wear take-up mechanism,
- the spring (5).



Remove the toothed quadrant (C) and the spring (6) from the leading shoe.



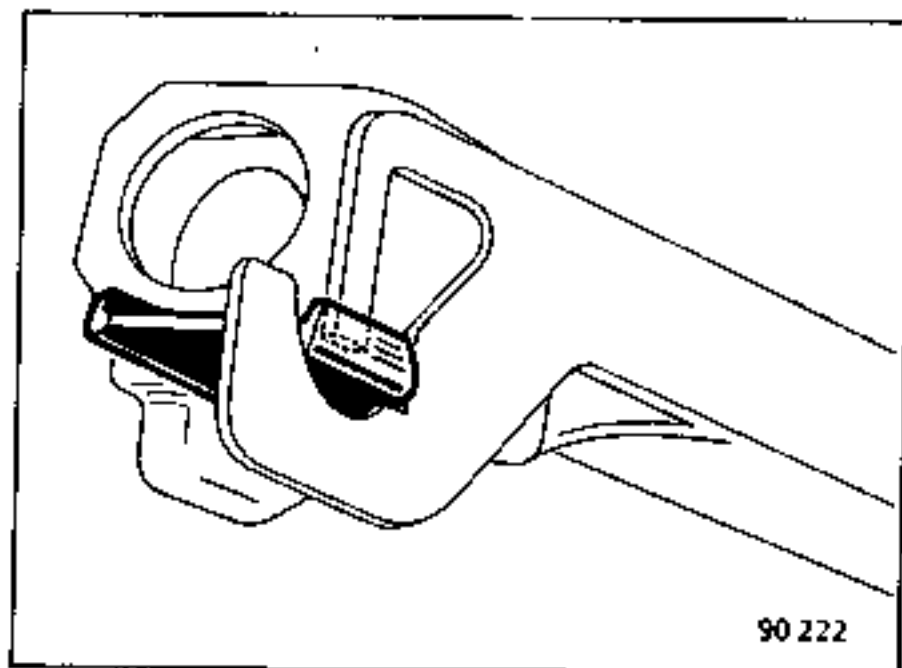
Dust out the drums and anchor plates using tool M.S.821.

REFITTING

NOTE : the component parts of the brake mechanisms are different on the right hand side and left hand side and it is essential not to intermix them.

Refit, to the trailing shoe :

- the link (B) fitted with spring (5), ensuring that the automatic wear take-up mechanism is correctly positioned,
- the hand brake cable.



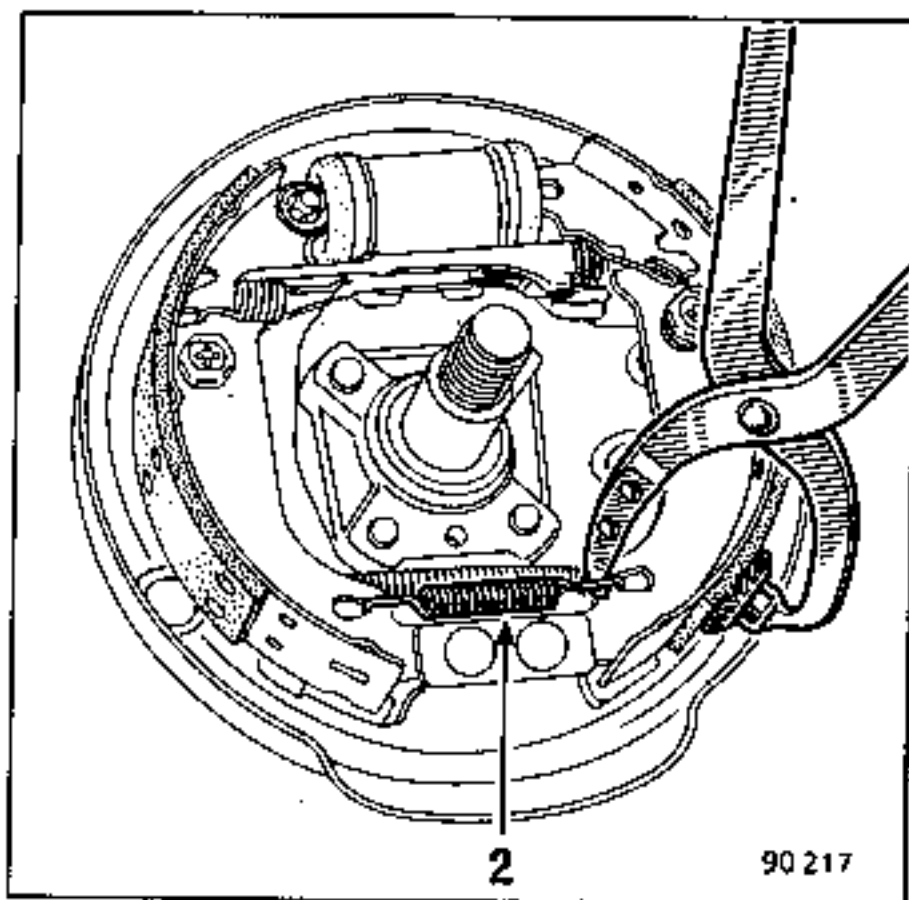
Re-secure the toothed quadrant (C) and spring (6) assembly, after returning them to zero.

Fit :

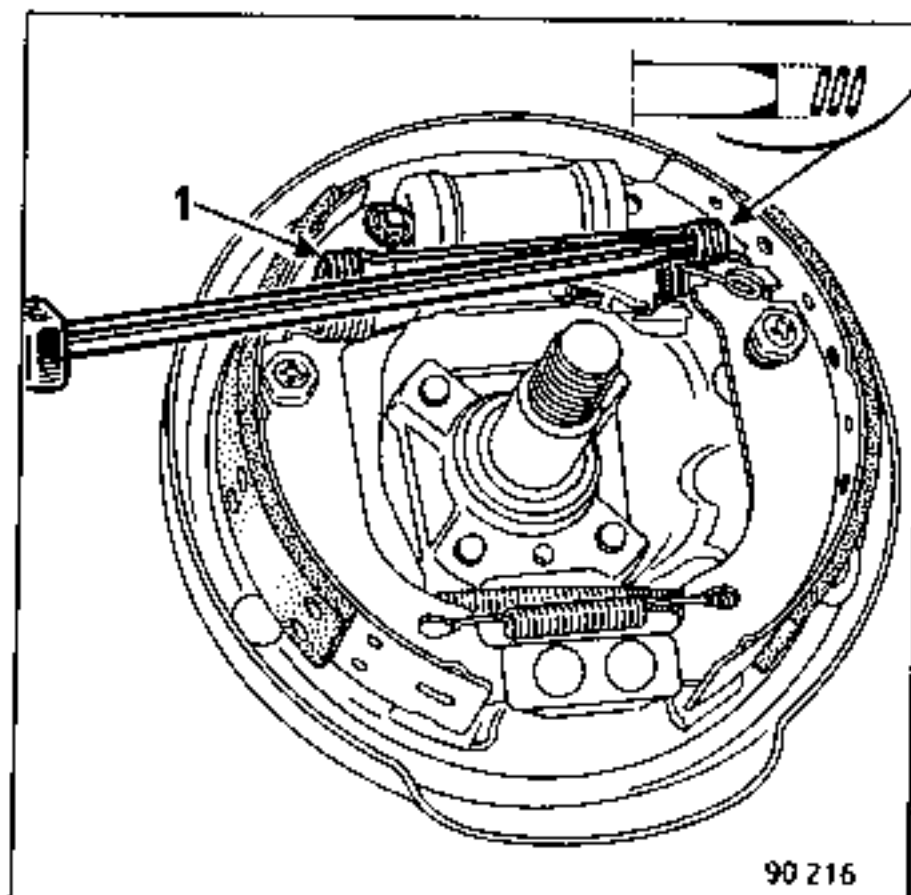
- the trailing shoe and secure it in place
- the leading shoe, ensuring that the toothed quadrant (C) fully enters the link (B) to secure it in place.

Remove the clips from the wheel cylinders then refit :

- the lower spring (2),

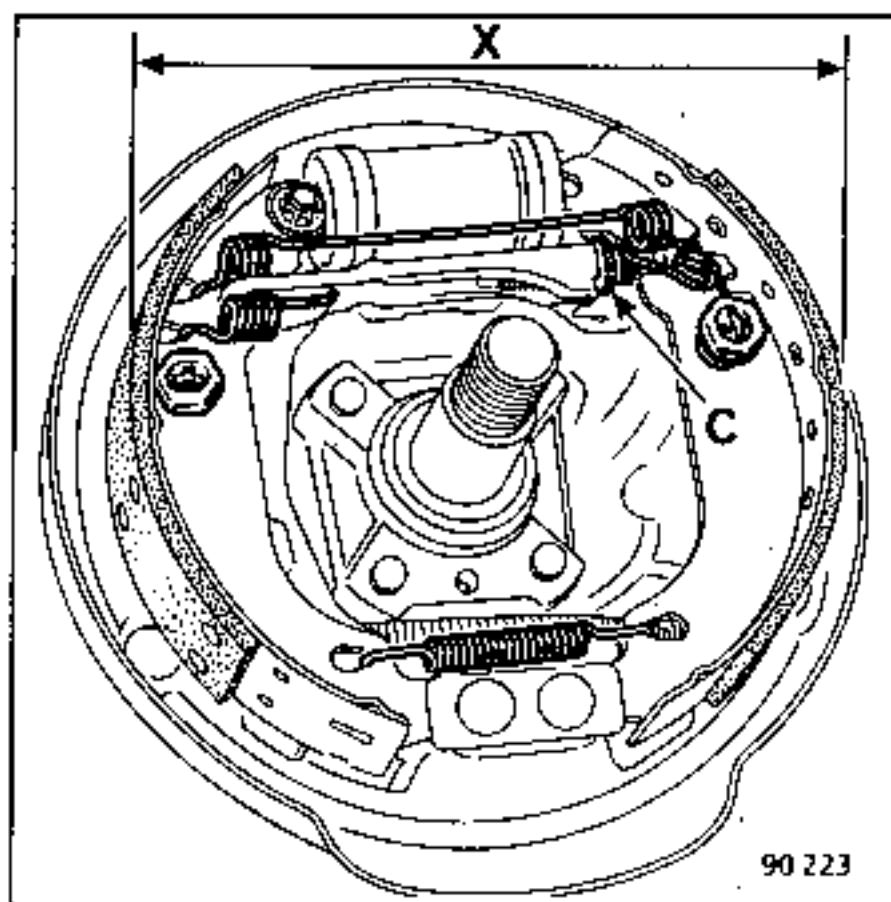


- the upper spring (1).



ADJUSTING

Adjust the shoe diameter adjustment, with a screwdriver, on the toothed quadrant (C) to obtain a diameter (X) between 178.7 mm and 179.2 mm.



Carry out the same adjustment on the other brake anchor plate.

Refit the drum.

Adjust :

- the shoes by repeatedly pressing the brake pedal,
- the hand brake (see section 37 "Controls").



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
M.S. 821	Brake dust removal equip.
Rou. 943	Hub plug extractor

TIGHTENING TORQUES (in daN.m)

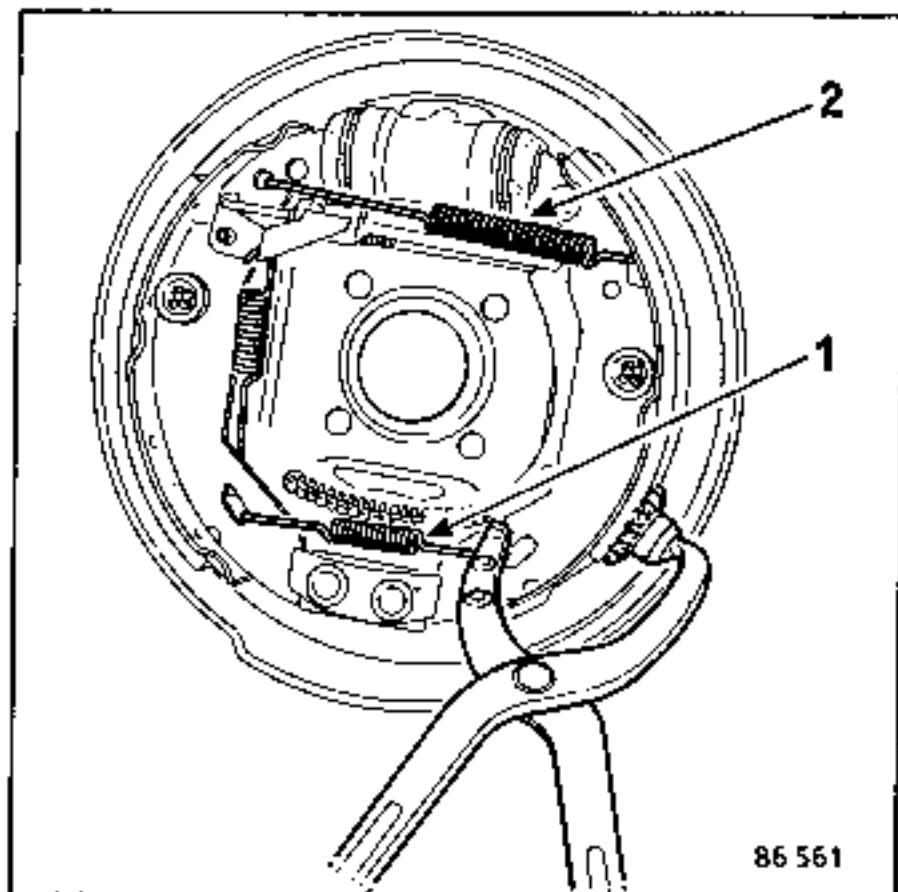
Wheel bolts	8
Hub nuts	16

All the shoes or linings any any given axle are to be replaced. Never fit linings of different grades or make.

REMOVING

Remove

- the brake drum (see corresponding section),
- the lower spring (1), followed by the upper spring (2), using brake shoe grips.



Fit a clip to the wheel cylinder pistons.

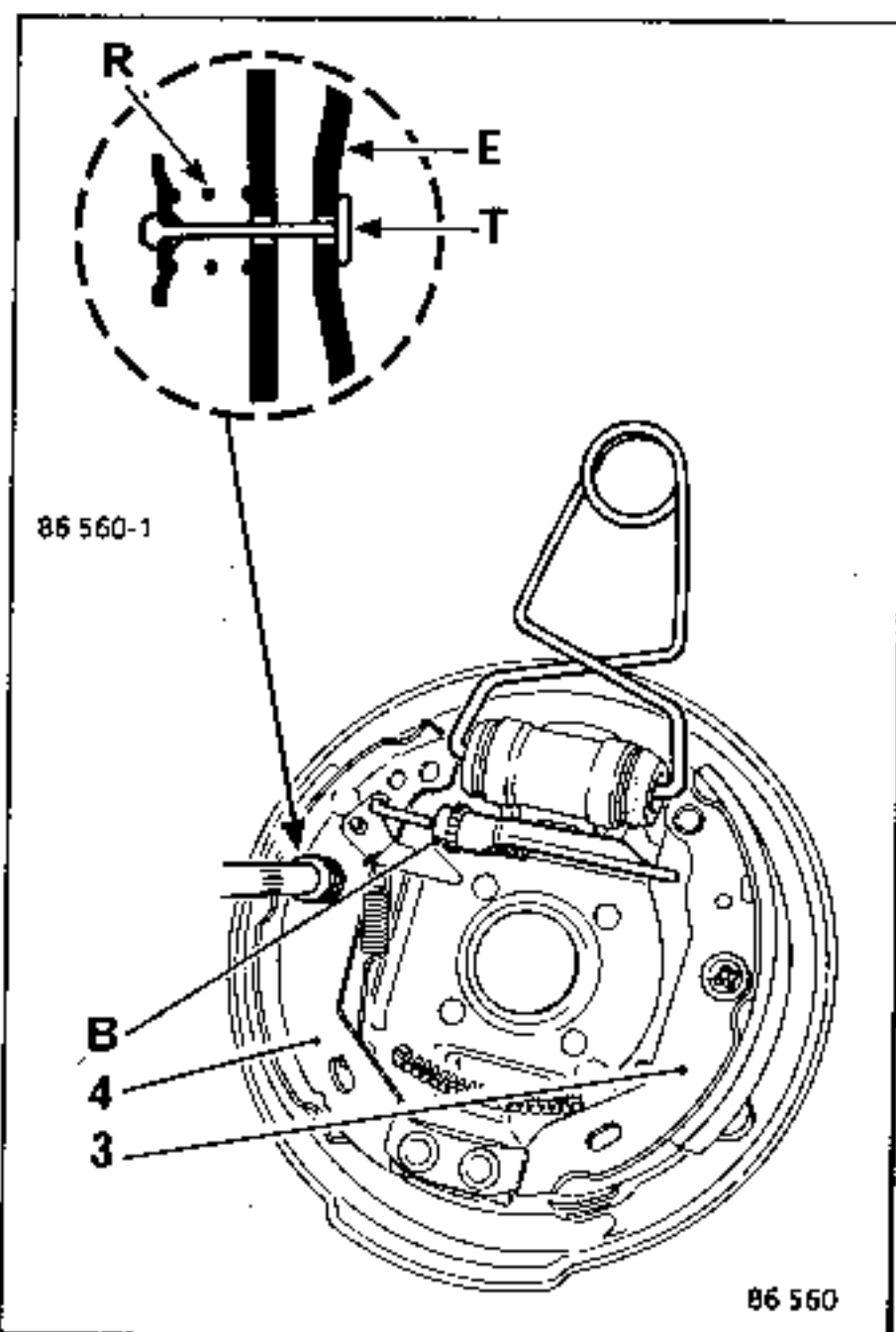
Using a socket of the valve clearance spanner type, remove the shoe lateral retaining springs (R), whilst keeping the connecting link (T) in contact with the brake anchor plate (E).

Fully slacken off the hand brake cables.

Remove :

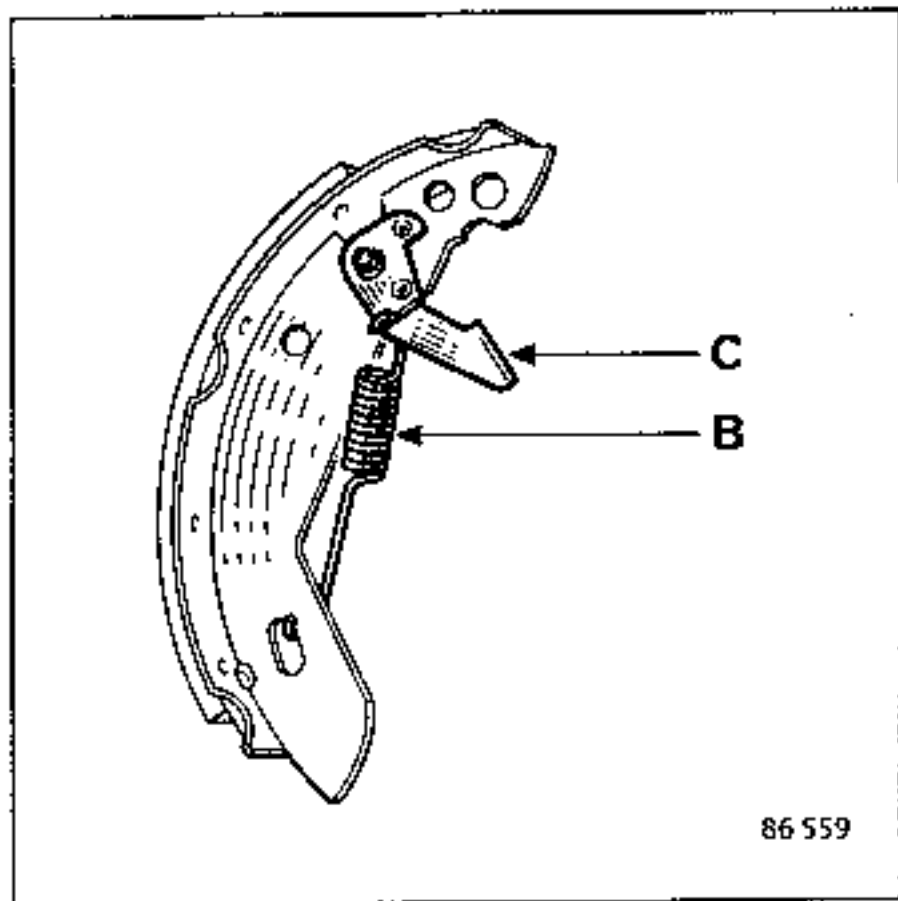
- the leading shoe (4),
- the link (B),
- the trailing shoe (3).

Disconnect the hand brake cable from the trailing shoe.



From the leading shoe, remove :

- the spring (5),
- the adjusting lever (C).



Dust out the drums and anchor plates using tool M.S.821.

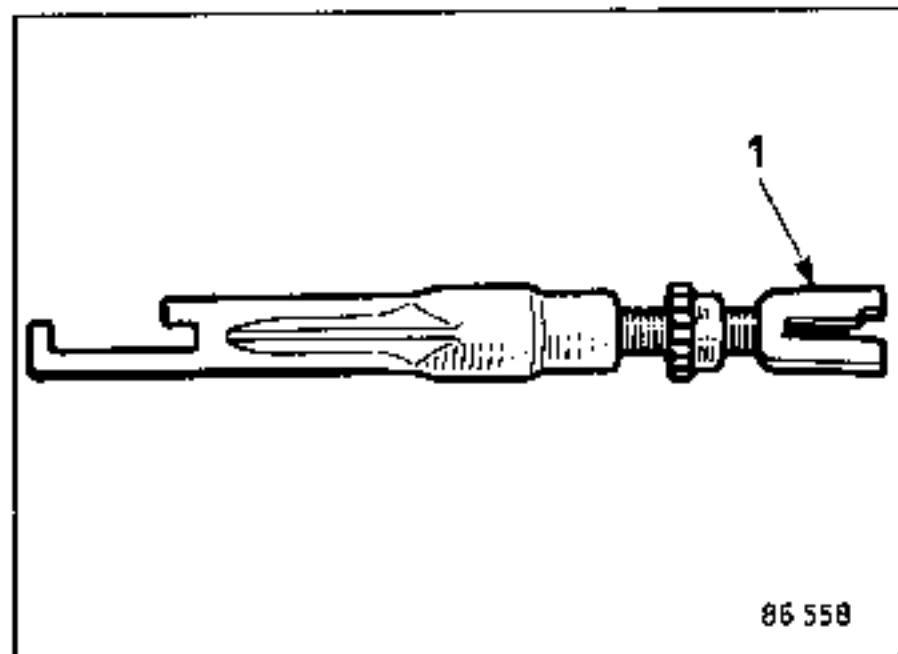
REFITTING

NOTE : the left hand brake mechanism and right hand brake mechanism component parts are different. It is essential not to intermix them.

Lightly grease the thread on the thrust link (B) and identify it.

The link for the left hand brake has a right hand thread.

The threaded plunger (1) is coloured SILVER.



The link for the right hand brake has a left hand thread.

The threaded plunger (1) is coloured GOLD.

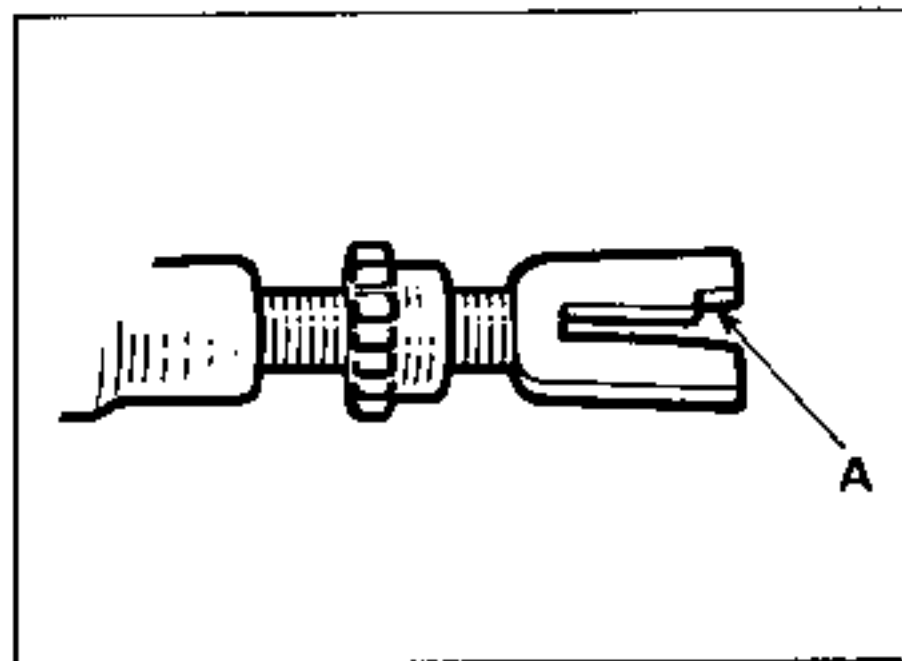
To the leading shoe, refit :

- the adjusting lever (C),
- the spring (5).

Re-secure the hand brake cable to the trailing shoe.

Fit :

- the trailing shoe and secure it in place,
- the thrust link, positioning the cut-out in the threaded plunger (A) on the same side as the adjusting lever.



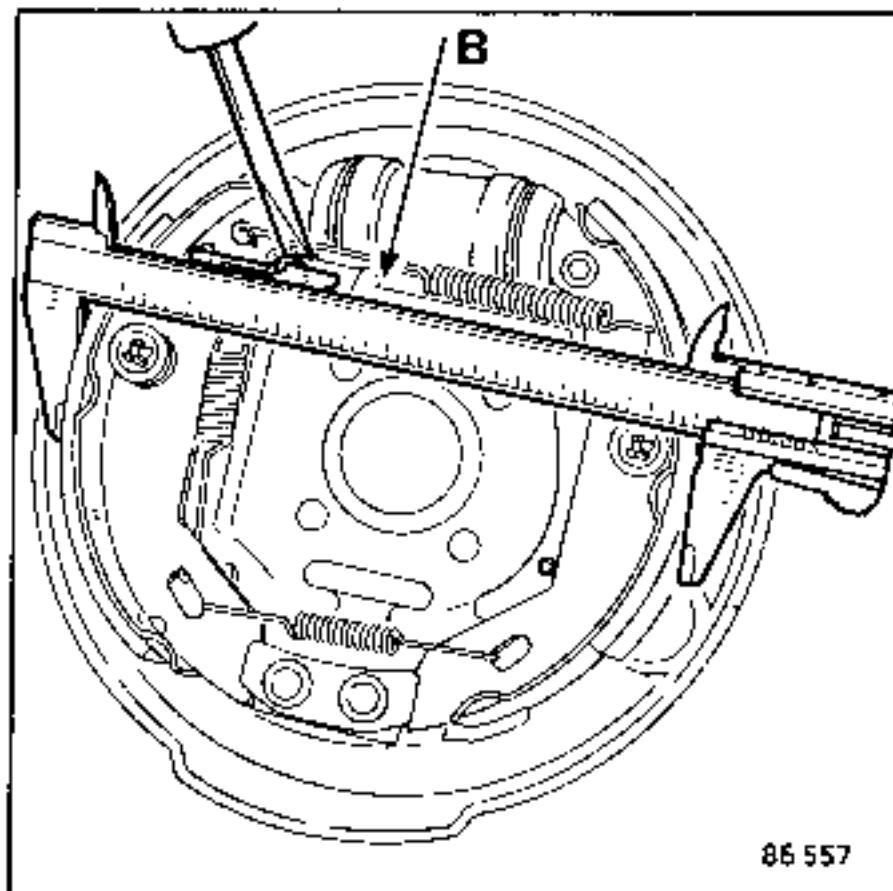
- the leading shoe and secure it in place.

Remove the clips from the wheel cylinder pistons then refit :

- the upper spring (2),
- the lower spring (1).

ADJUSTING

Adjust the diameter across the shoes with a screwdriver at link (B) to obtain a diameter of 178.7 mm to 197.2 mm.



Carry out the same adjustment on the other brake anchor plate assembly.

Refit the drum.

Adjust :

- the positions of the shoes by repeatedly pressing the brake pedal,
- the hand brake (see section 37 "Controls").



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
M.S. 821	Brake dust removal equip.
Rou. 943	Hub plug extractor

TIGHTENING TORQUES (in daN.m)

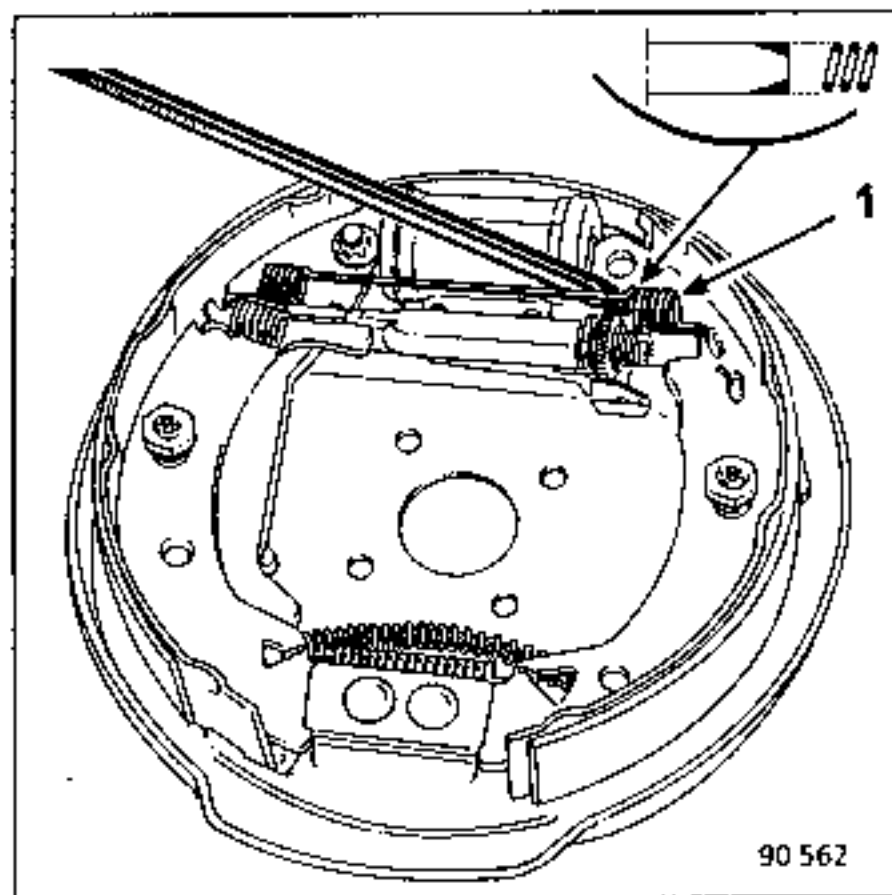
Wheel bolts	8
Wheel nuts	16

All the shoes or linings on any given axle are to be replaced. Never fit linings of different grades or make.

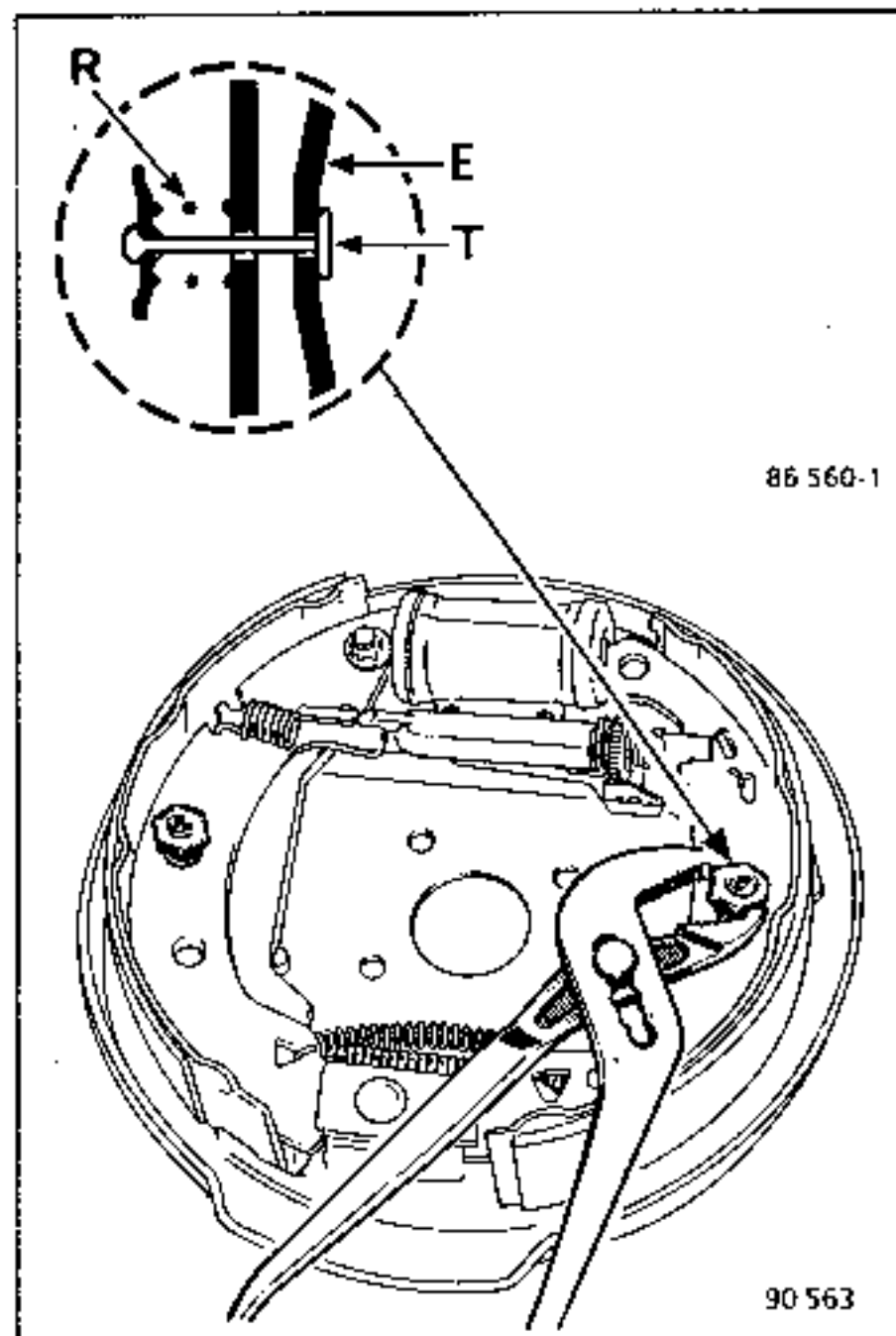
REMOVING

Remove :

- the brake drum (see corresponding section),
- the upper spring (1) using a screwdriver modified as shown in this drawing.

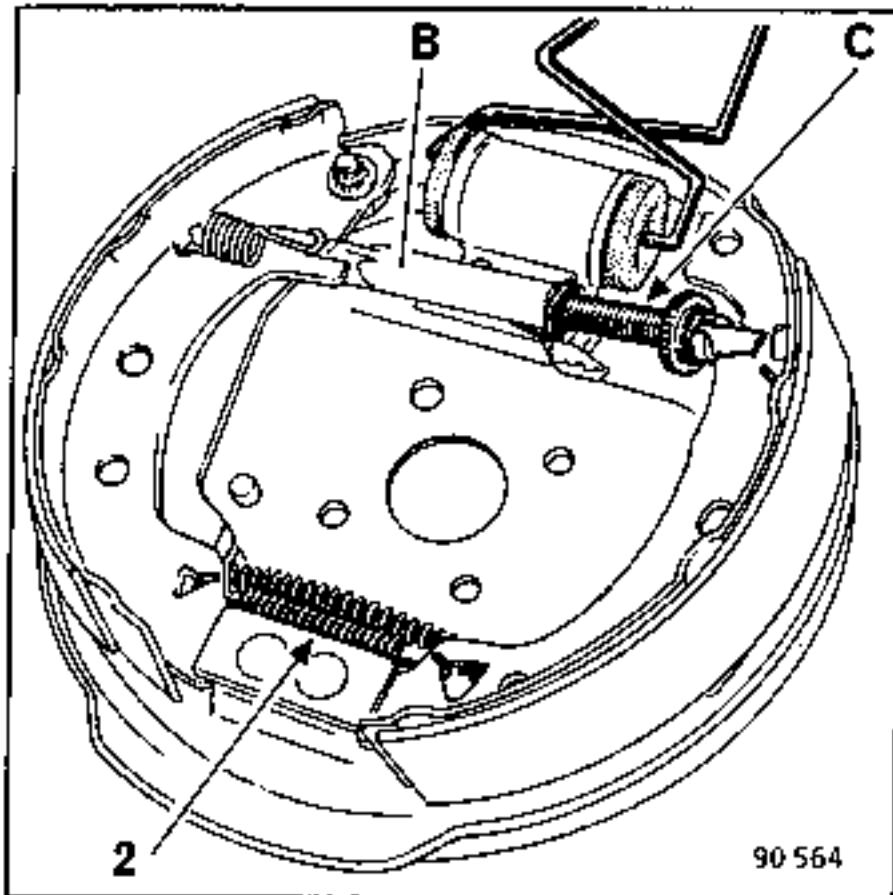


Using multi-purpose grips, remove the shoe retaining springs (R) whilst keeping the connecting link (T) in contact with the brake anchor plate (E).



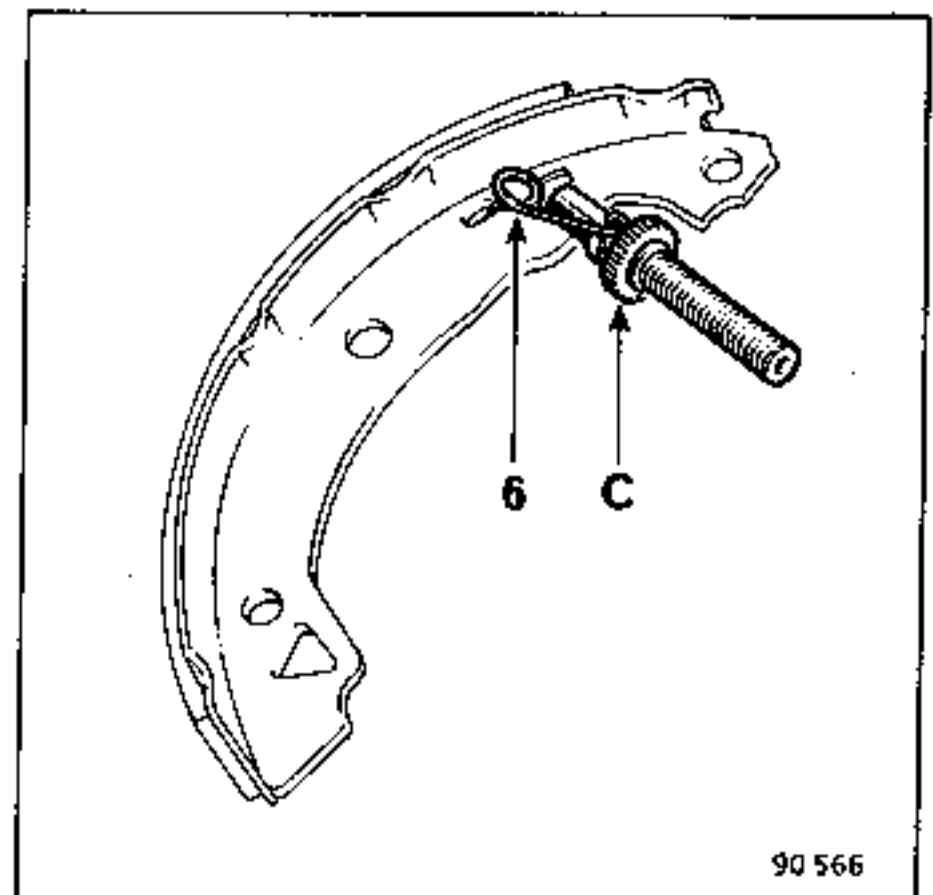
Fit a clip to the wheel cylinder pistons. Fully slacken off the hand brake cables. Pull the shoes apart to free the toothed quadrant (C) from the link (B).

Remove the shoes by freeing the lower spring (2) and the hand brake cable.



From the trailing shoe, remove :

- the link (B) taking care not to damage the automatic wear take-up mechanism,
- the spring (5).



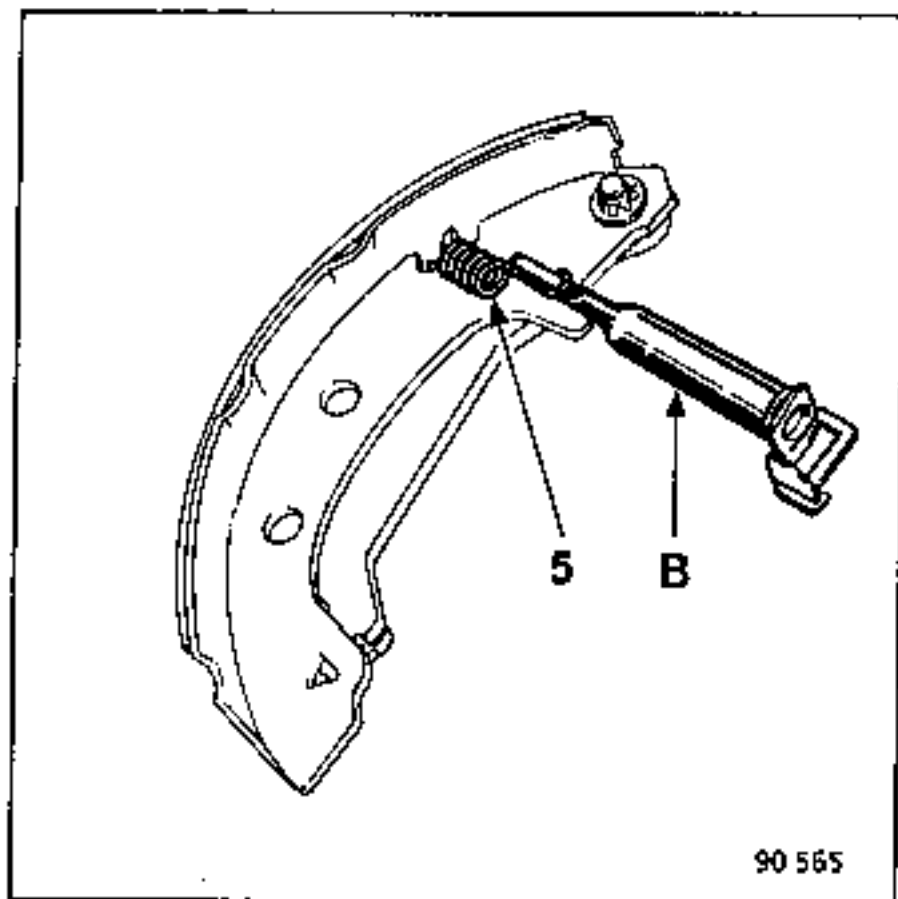
Dust out the drums and the anchor plates using tool M.S.821.

REFITTING

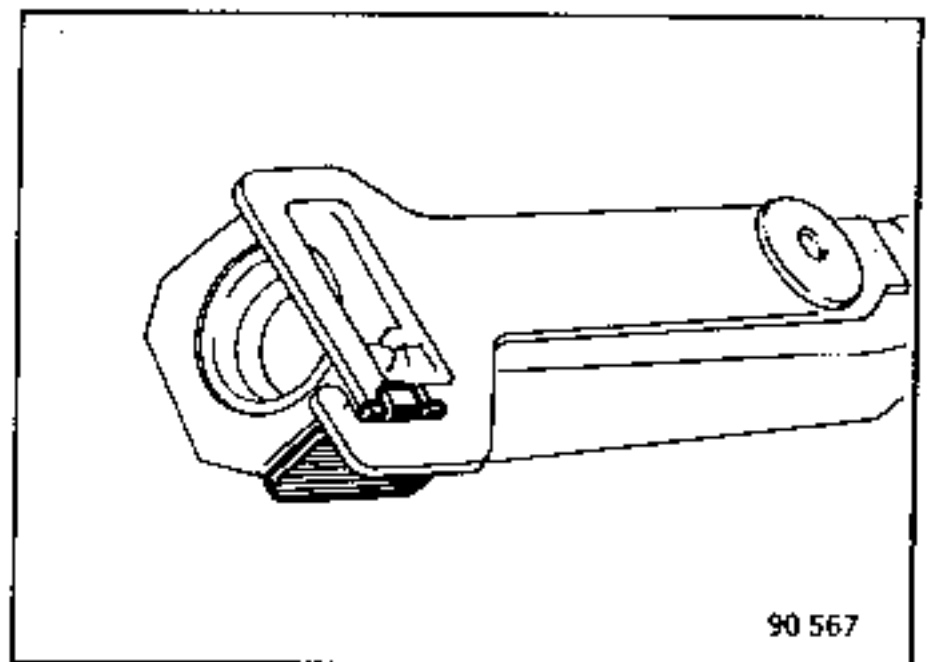
NOTE : the component parts of the left hand brake mechanism and right hand brake mechanism are different. It is essential not to intermix them.

Refit, to the trailing shoe :

- link (B) fitted with spring (5), ensuring that the automatic wear take-up mechanism is correctly positioned,



Remove the toothed quadrant (C) and the spring (6) from the leading shoe.



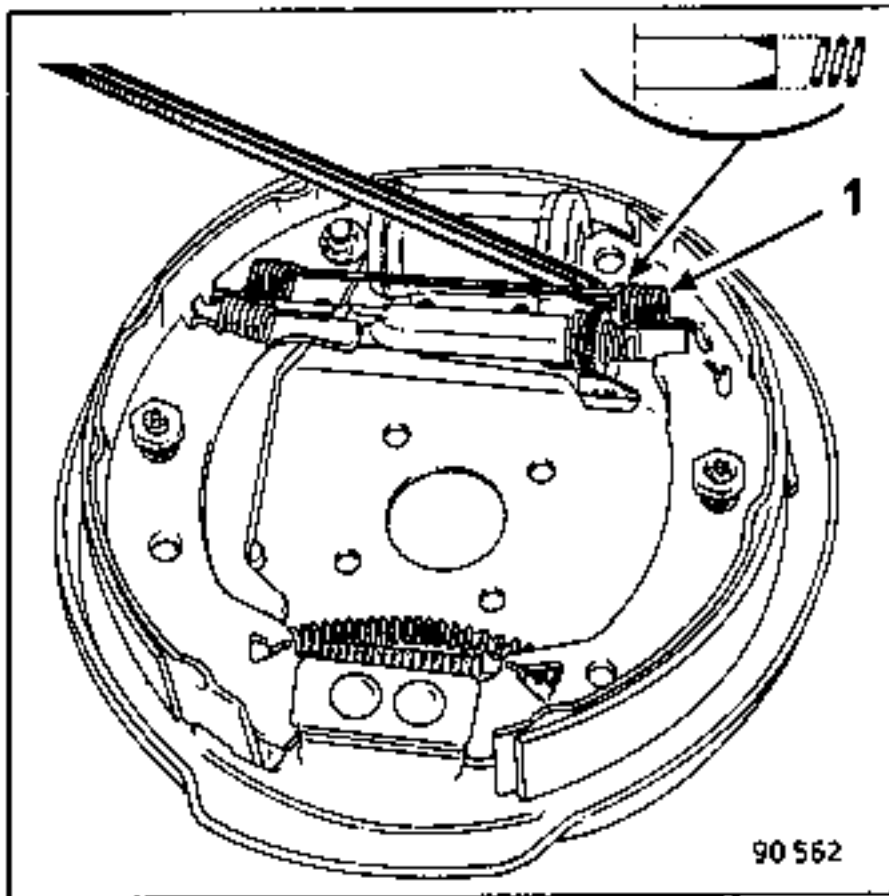
- the hand brake cable.

Re-secure the toothed quadrant (C) and spring (6) assembly to the leading shoe after zeroing them.

Fit both shoes equipped with spring (2) and the hand brake cable.

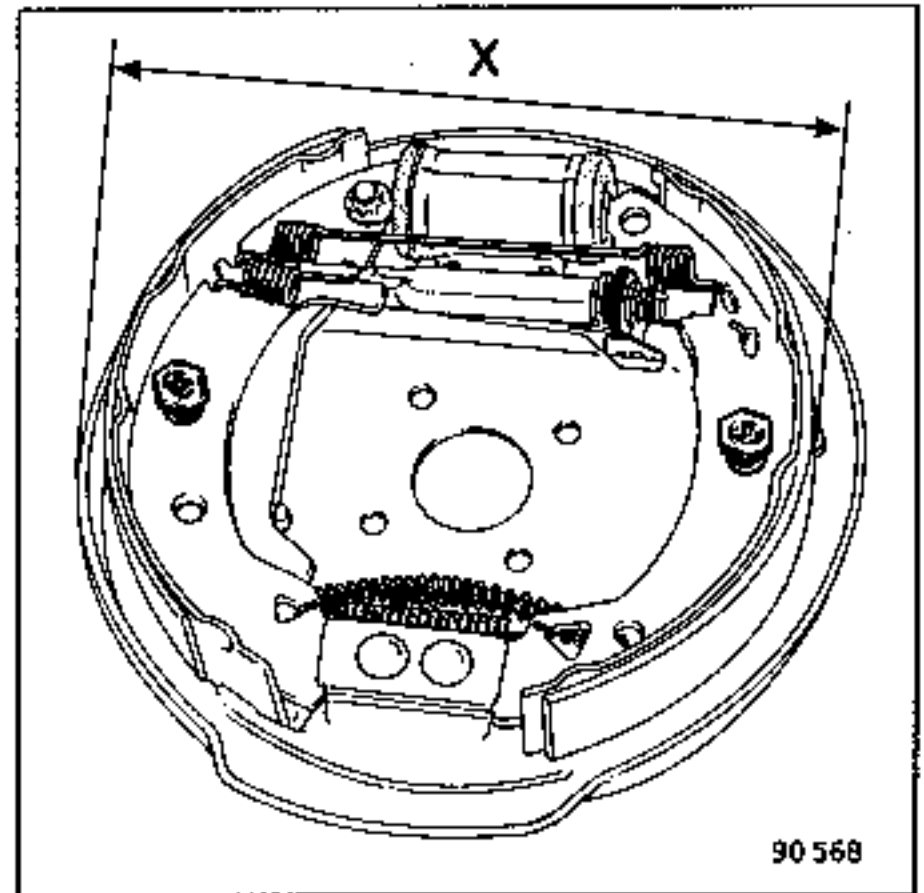
Pull the shoes apart to engage the toothed quadrant (C) into the link (B).

Secure the shoes to the anchor plates then refit the upper spring (1).



ADJUSTING

Using a screwdriver, adjust the diameter across the shoes at the toothed quadrant (C) to obtain a diameter X of between 202.5 mm and 202.7 mm.



Carry out the same adjustment on the other anchor plate assembly.

Refit the drum.

Adjust :

- the position of the shoes by repeatedly pressing the brake pedal,
- the hand brake (see section 37 "Controls").

TIGHTENING TORQUES (in daN.m)

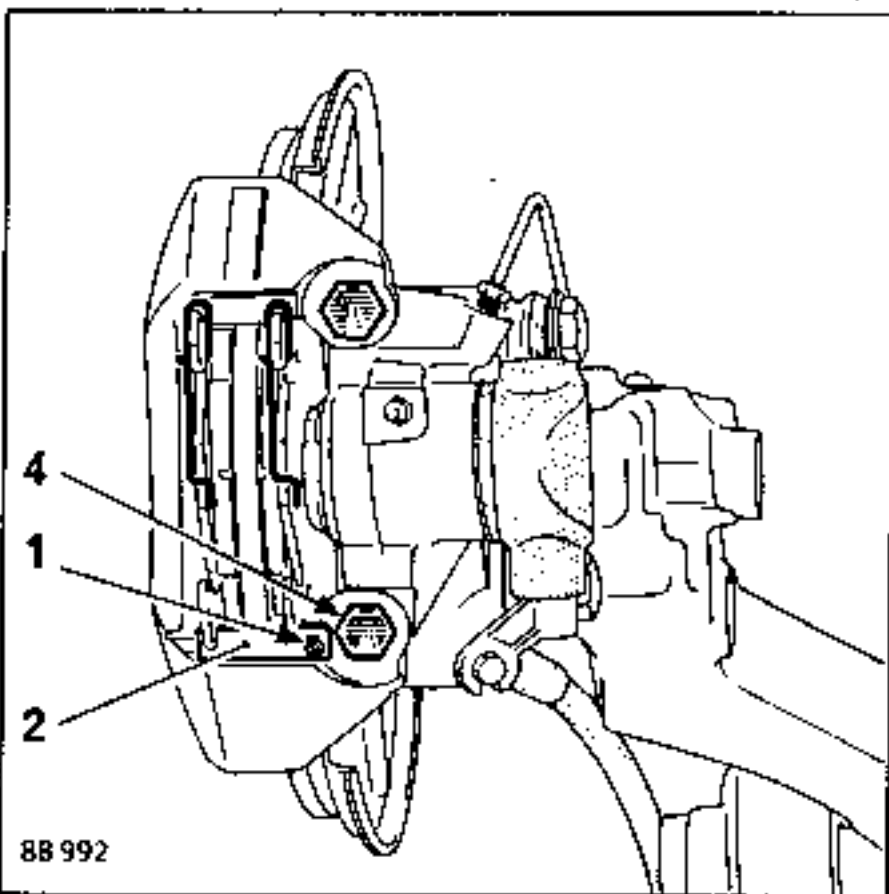
Wheel bolts

8

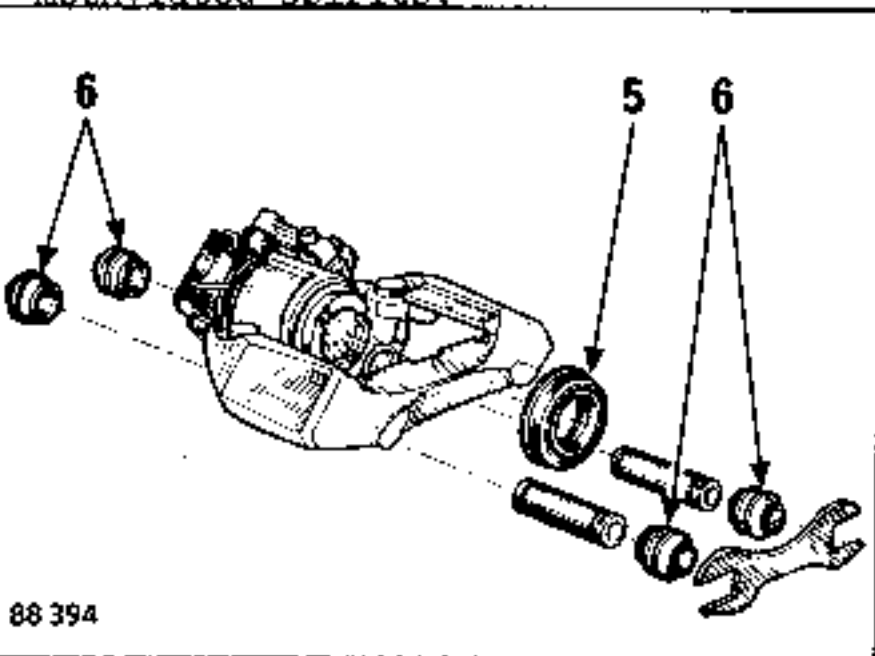
REMOVING

Remove :

- the clip (1),
- the key (2),
- the pads.

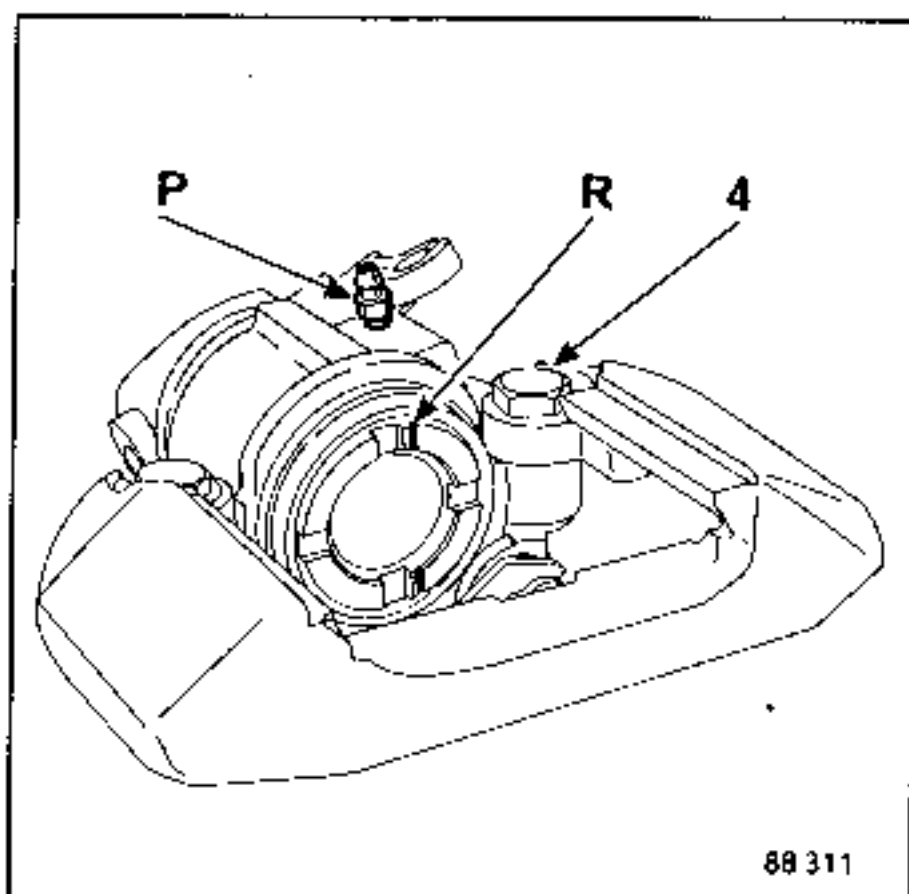


Check the condition of the dust cover (5) and the bellows (6) which protect the caliper slides and replace them if necessary. If they are replaced, grease the end of the piston and the two slides after first cleaning them with methylated spirits.



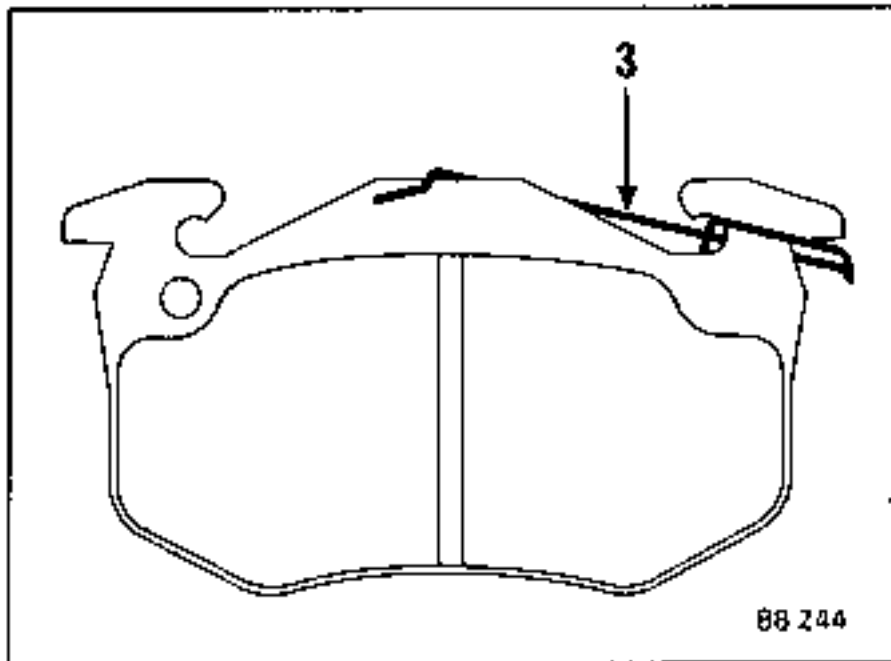
REFITTING

Push back the piston by screwing it in with a square section screwdriver until it turns but no longer moves inwards.



Position the piston so that the line (R) on its thrust face is on the same side as the bleed screw (P).

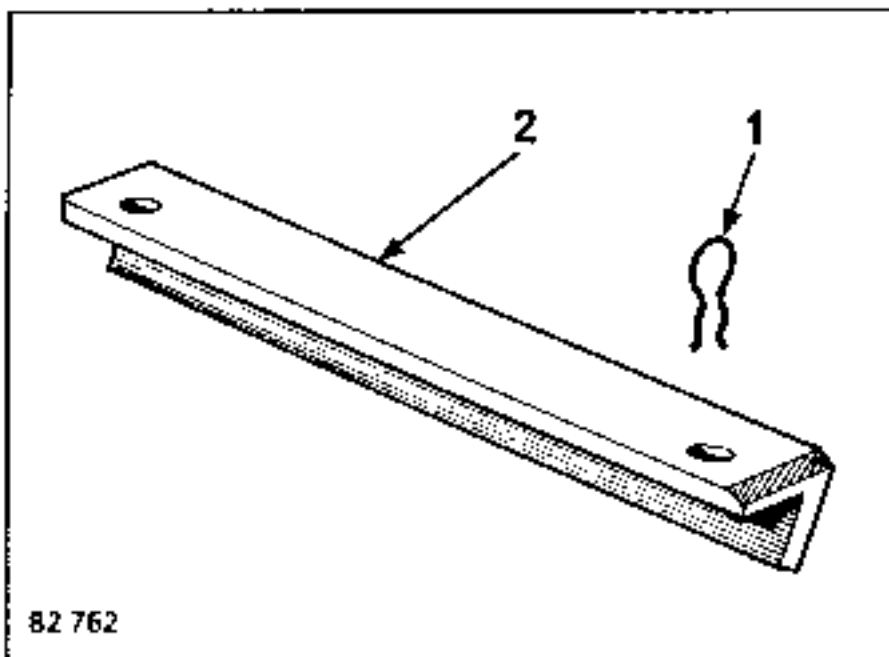
Fit the two anti-rattle clips (3) to the new pads.



Place the pads in the caliper, ensuring that they are the correct way round.

Insert the key (2) and refit the clip (1) (there is only one of these clips per caliper).

NOTE : clip (1) fits to the inside of the caliper near the bolt (4).



Depress the brake pedal a number of times to bring the piston into contact with the pads.



TIGHTENING TORQUES (in daN.m)

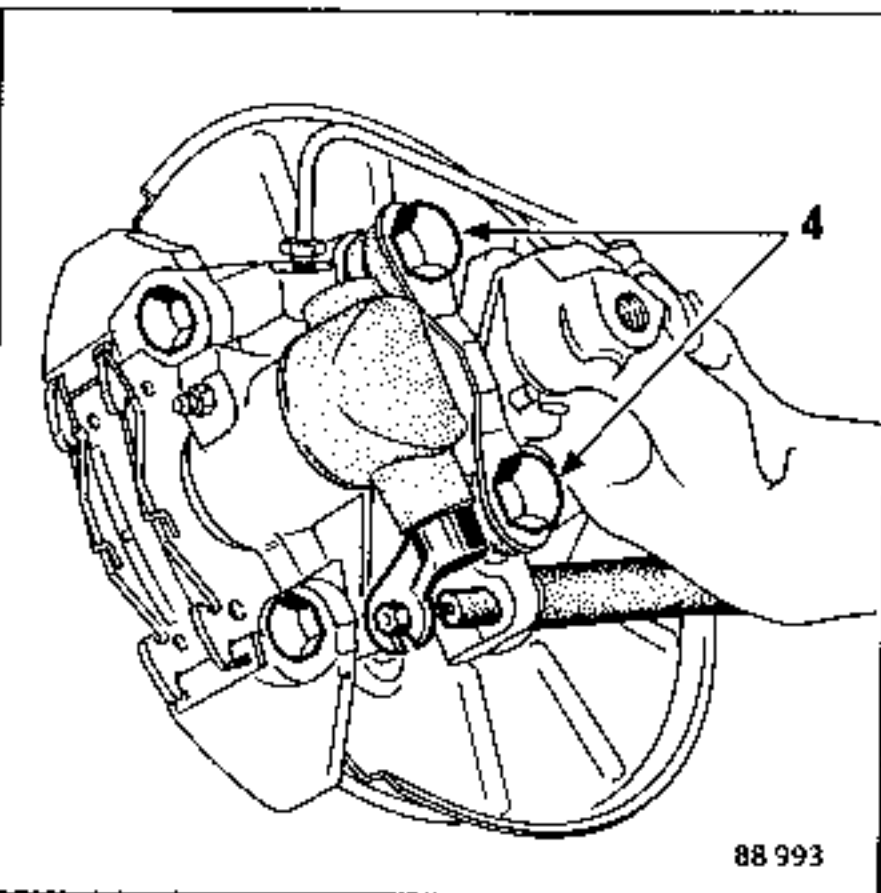
Wheel bolts	8
Brake caliper securing bolts	10

REMOVING

Remove the brake pads (see corresponding section).

Loosen the rigid brake pipe at the wheel cylinder end.

Disconnect the hand brake cable.



Remove the two bolts (A) that secure the caliper to the stub axle carrier.

Unscrew the pipe union (place a container to catch the brake fluid).

REFITTING

Screw in the union on the rigid pipe without tightening it.

Fit the caliper in place, coating the bolts with Loctite FRENBLLOC and tightening them to torque.

Tighten the union on the rigid pipe.

Loosen the bleed screw on the wheel cylinder and wait until brake fluid runs from it (check that there is sufficient fluid in the brake fluid reservoir).

Re-tighten the bleed screw.

Check the condition of the pads and re-fit them.

If the brake fluid reservoir is not completely empty, the braking system will only require a partial bleed. If it is empty the complete system will have to be bled.

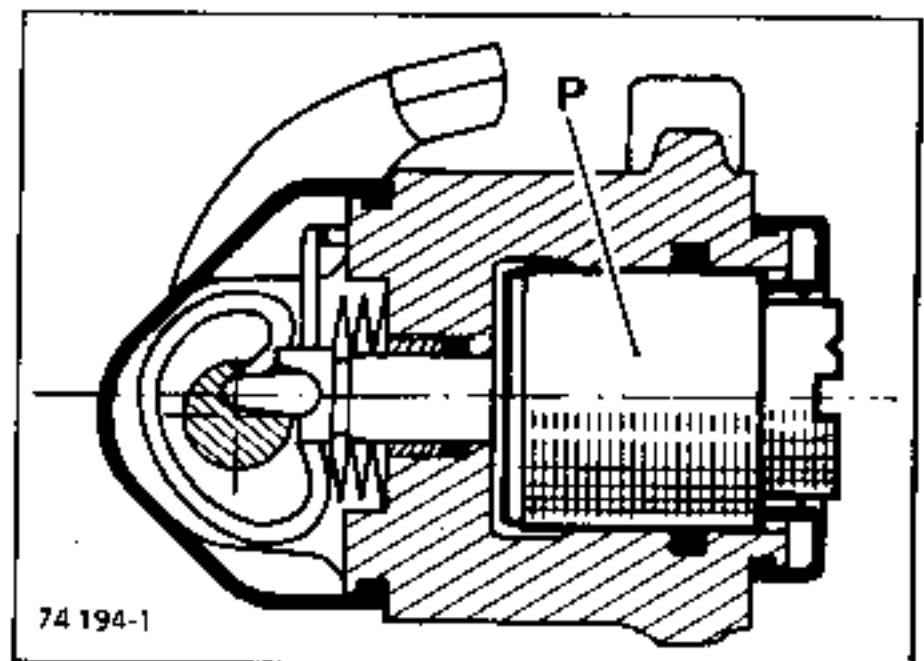
Press the brake pedal a few times to bring the piston into contact with the pads.

OVERHAULING

If there is any scoring in the caliper bore, the complete caliper will have to be replaced.

Remove the brake caliper.

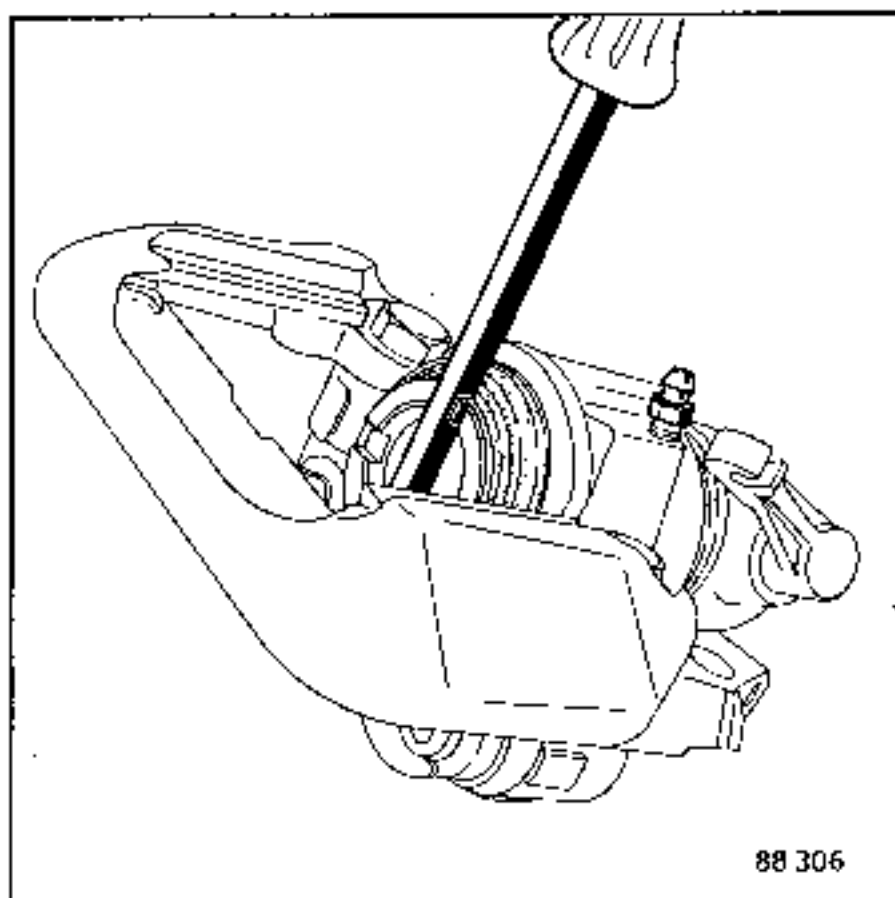
It is forbidden to dismantle the mechanism inside the piston (P).



Grip the caliper in a vice fitted with soft jaws.

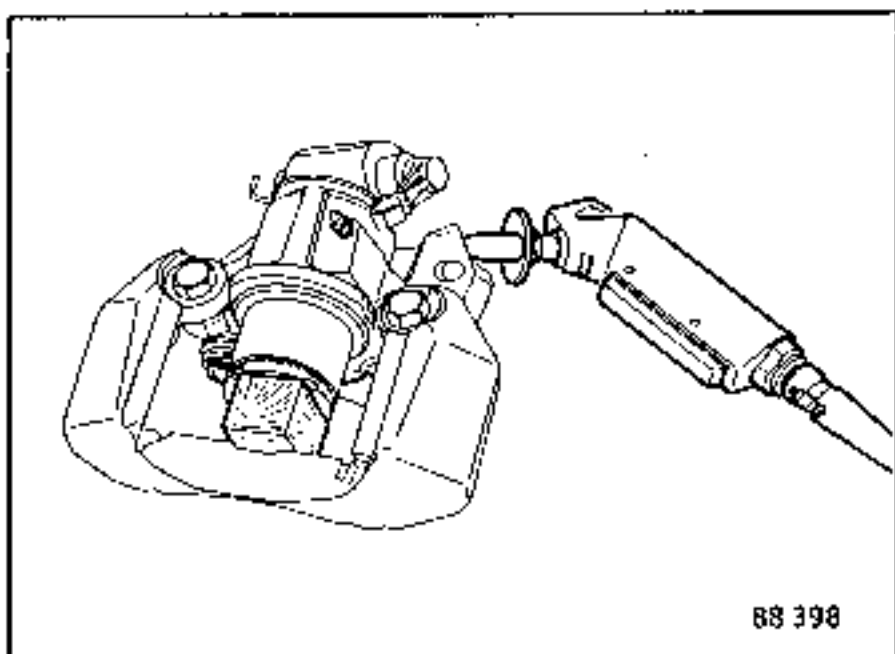
Remove the rubber dust cover.

Remove the piston, by unscrewing it with a square section screwdriver.



When the piston turns freely, blow compressed air into the cylinder, applying the pressure gradually so as not to violently eject the piston. Place a wooden chock between the caliper and the piston to avoid any damage to the piston.

Any impact marks or scoring render the piston unusable.



Remove the seal from its groove using a steel strip with rounded edges.

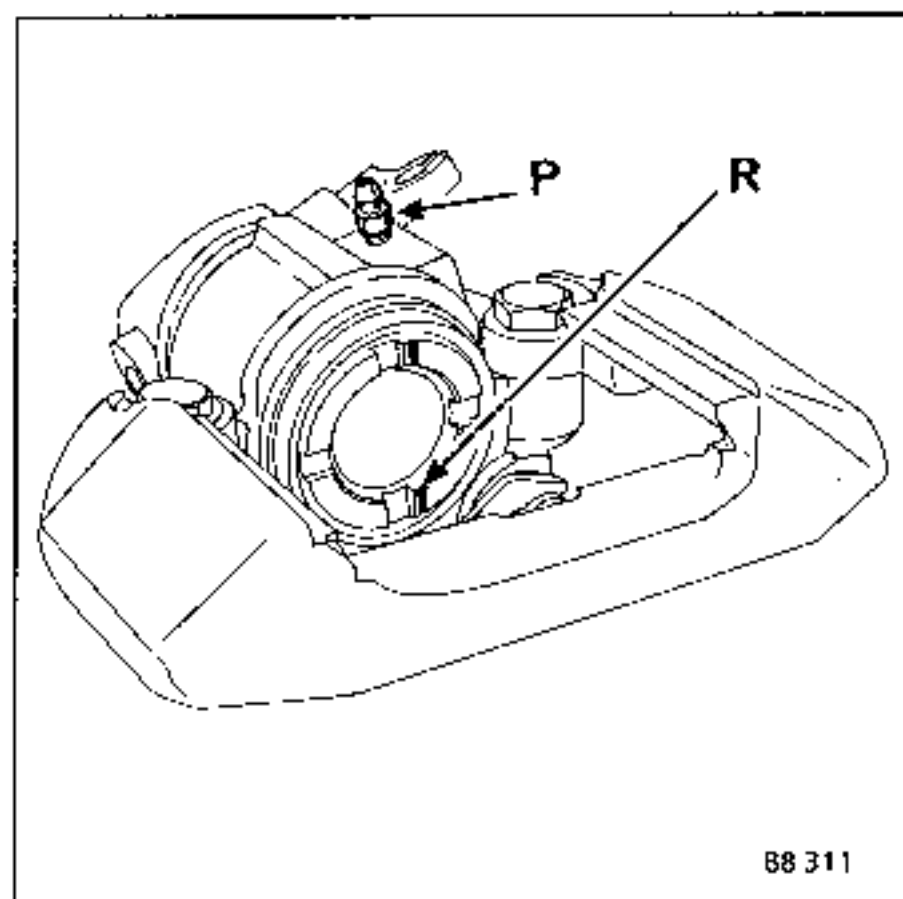
Carefully clean the parts in methylated spirits and reassemble them.

Lubricate the seal and the piston with brake fluid.

Gradually push in the piston, by hand, to avoid damaging its seal.

Complete the insertion of the piston by screwing it in with a screwdriver until the piston turns but no longer moves inwards.

Position the piston so that the line (R) on its thrust face is on the same side as the bleed screw (P), to ensure that the caliper can be fully bled and the pad can enter the central groove on the piston, correctly.



Coat the circumference of the piston with Spagaph grease.

Fit a new rubber dust cover.

ESSENTIAL SPECIAL TOOLS

B. Vi. 28-01	Claw type extractor
Fre. 1047	Bridge piece for removing the hand brake control from the rear caliper

DISMANTLING

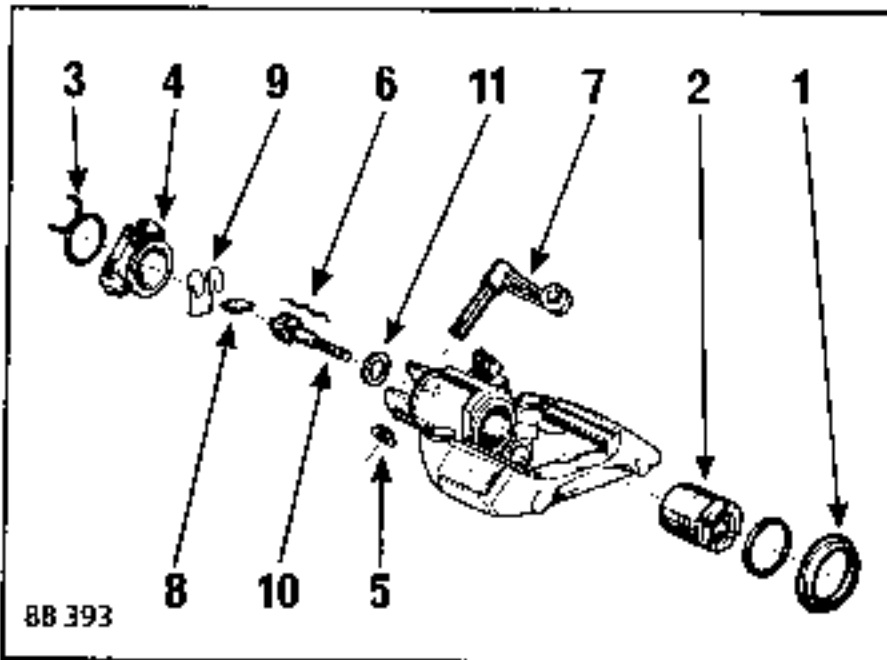
Grip the caliper and the caliper bracket in a vice fitted with soft jaws.

Remove :

- the sealing cap (1),
- the piston (2), by unscrewing it,
- the clip (3).

Turn the dust cover (4) over (it is fitted on to shaft (7)).

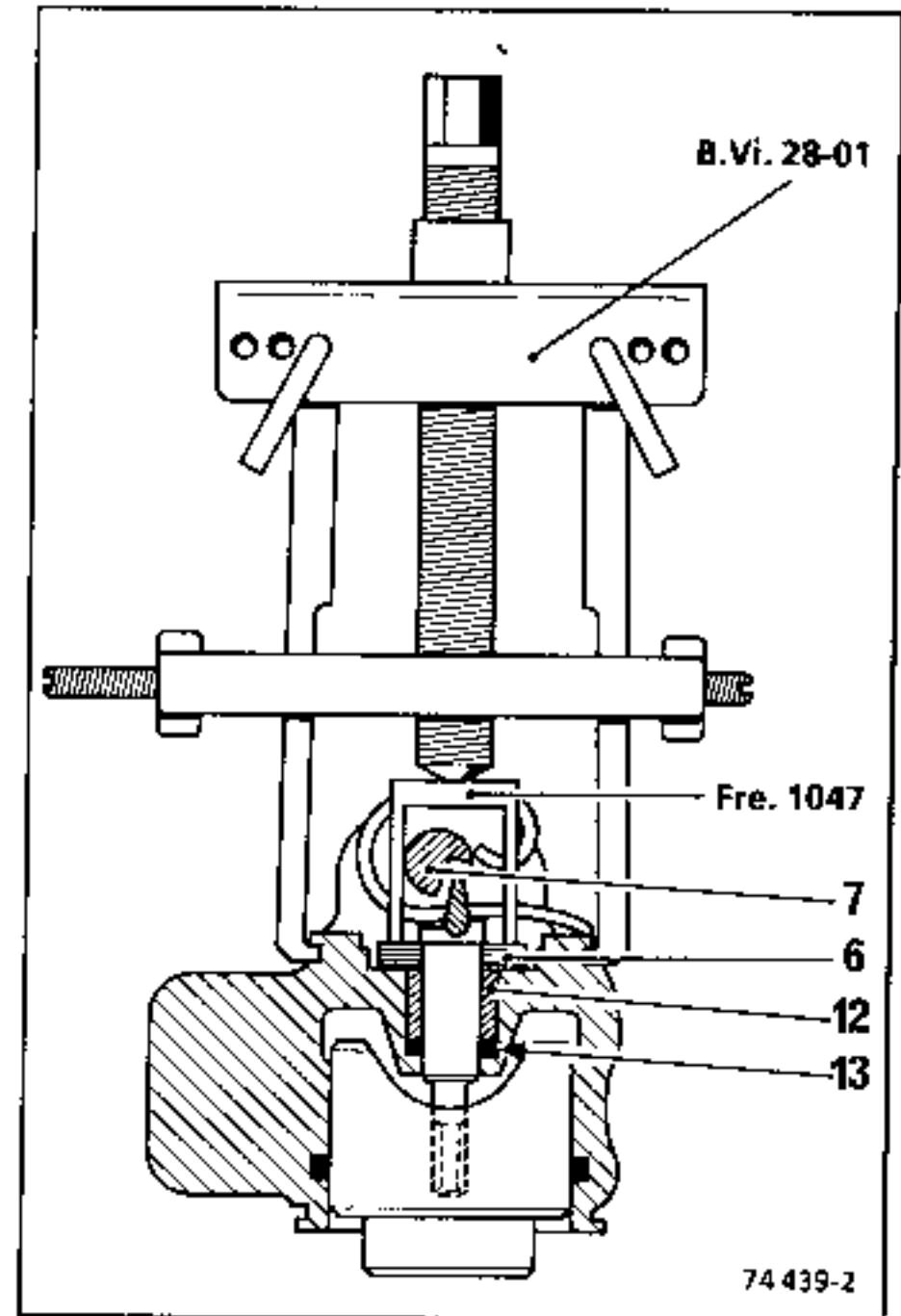
Remove the circlip (5).



Compress the spring washers (6) using tool Fre.1047 + B.Vi.28-01.

Remove :

- shaft (7) together with the dust cover (4) by pulling the lever,
- the plunger (8),
- the spring (9),



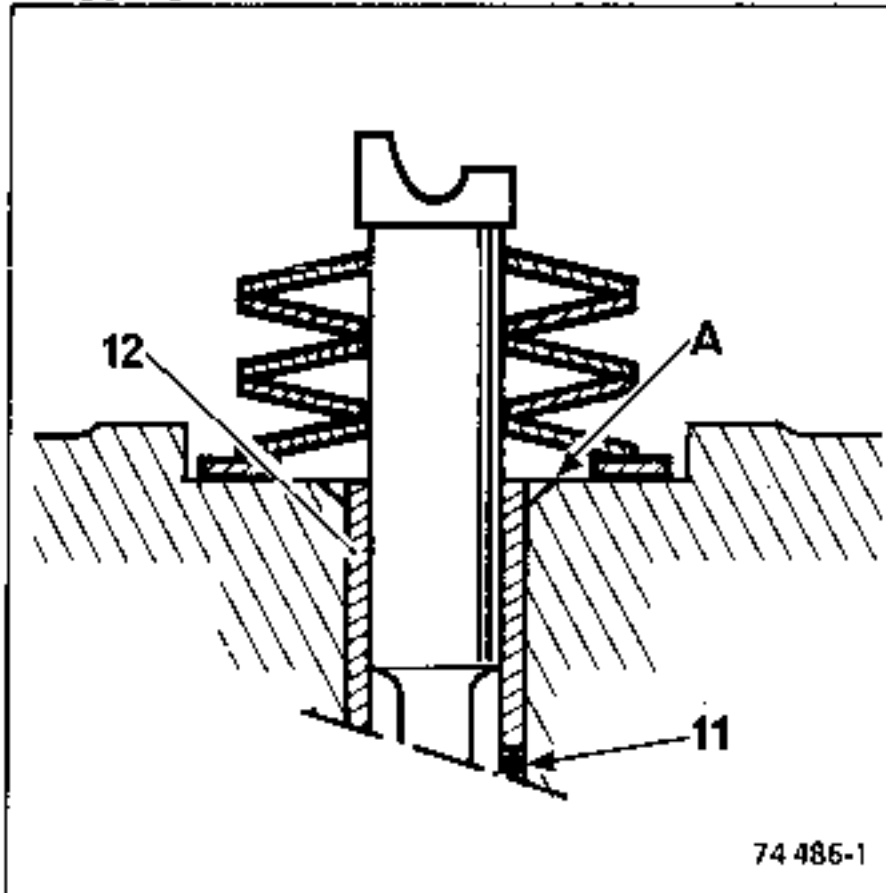
- the adjusting screw (10),
- the washer (11),
- the spring washers (6),
- the bush (12) using a pin punch,
- the O ring (13).

Clean all the parts in methylated spirits.

REASSEMBLY

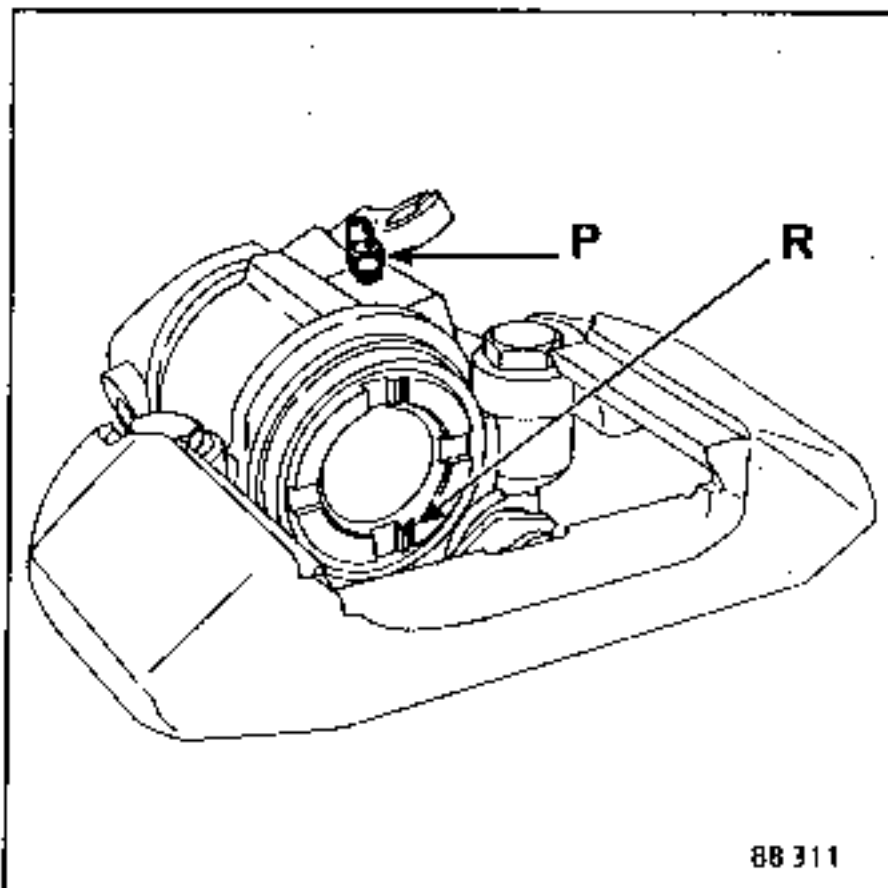
Fit :

- the O ring (13),
- the bush (12) until it is flush with the face (A), using a tube of the appropriate diameter.



Check the position of the spring washers that must be fitted as shown in this illustration to permit the hand brake lever to return to the "released" position.

From then carry out the dismantling operations in reverse. Position the piston so that line (R) on its thrust face is on the same side as the bleed screw (P).



ESSENTIAL SPECIAL TOOLS

Emb. 880	Inertia extractor
Rou. 943	Hub plug extractor

This vehicle is equipped with a hub-disc assembly that cannot be reground. If the disc is heavily worn or scored, the entire assembly must be replaced.

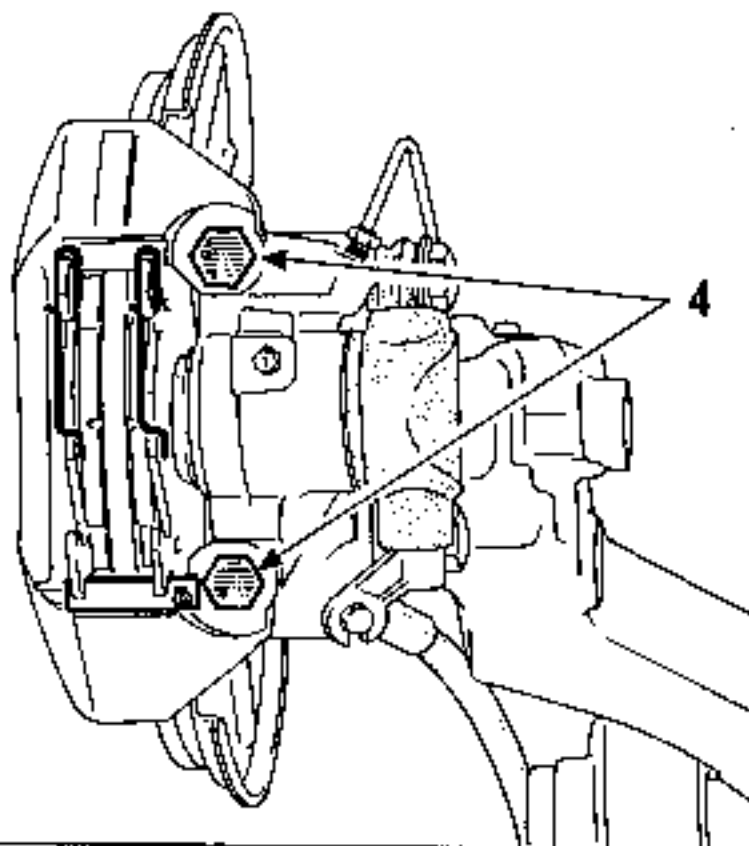
TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Hub nuts	16
Caliper bracket securing bolts	10

REMOVING

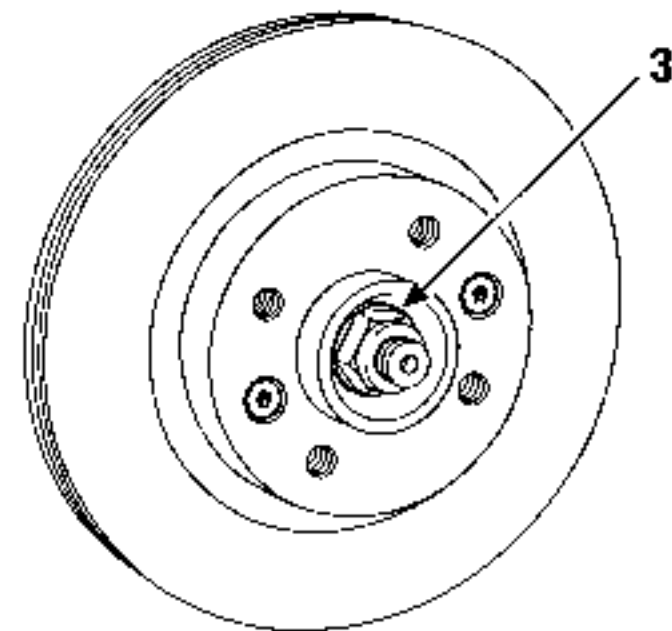
Remove :

- the brake pads (see corresponding section),
- the two caliper bracket securing bolts (A),



88 992

- the hub plug using tool Rou.943 + Emb.880,
- the hub nut (3),
- the hub-disc-bearing assembly.



88 310-2

NOTE : for the operations involved in replacing a hub-disc assembly, see the section entitled "Bearings".

REFITTING

Fit the hub-disc-bearing assembly on to the stub axle which has been previously coated with SAE W 80 oil.

Refit :

- the hub nut, tightening it to torque,
- the hub plug,
- the brake caliper bracket, coating its bolts with Loctite FRENBLOC and tightening them to torque,
- the brake pads (see the corresponding section).

Press the brake pedal a number of times to bring the piston into contact with the pads.

ESSENTIAL SPECIAL TOOLS

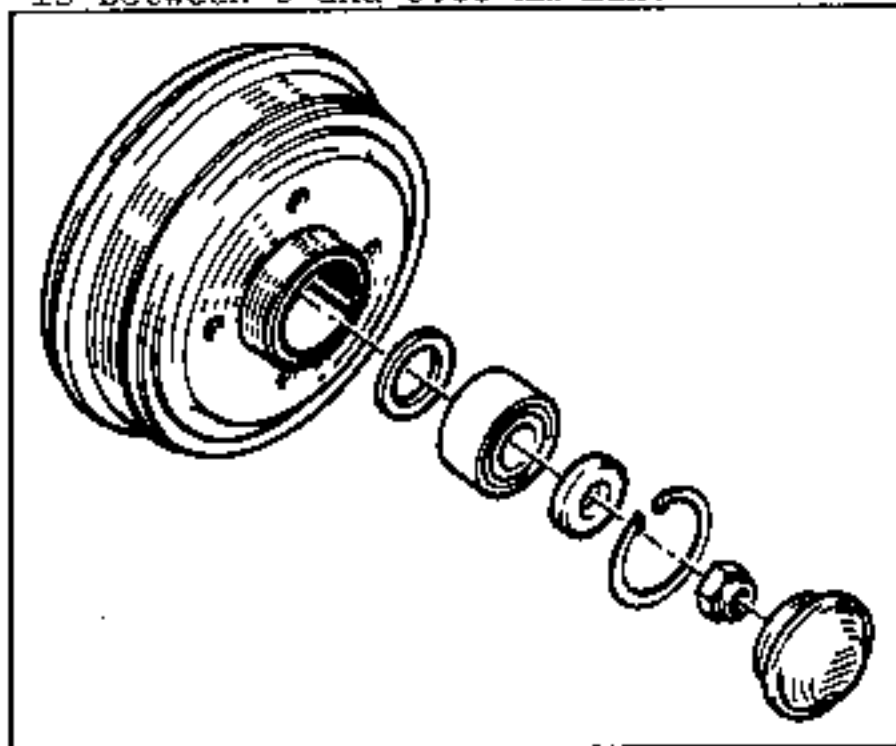
Emb. 880	Inertia extractor
Rou. 943	Hub plug extractor
T.Av. 1050	Hub extractor

TIGHTENING TORQUES (in daN.m)

Hub nut	16
Wheel bolts	8

CHECKING

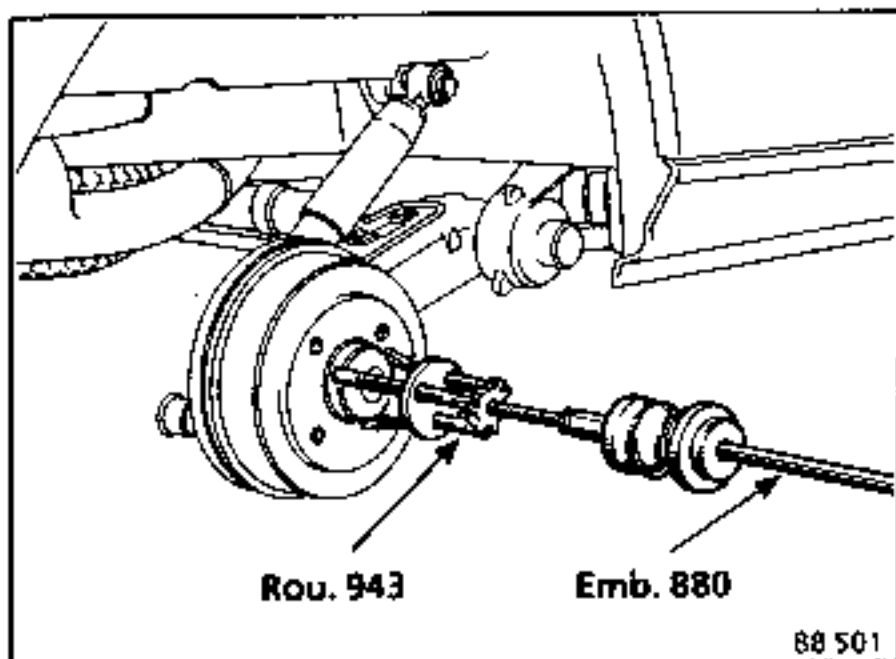
Check, by means of a dial indicator mounted on the hub, that the end play is between 0 and 0.03 mm max.



REMOVING

Remove :

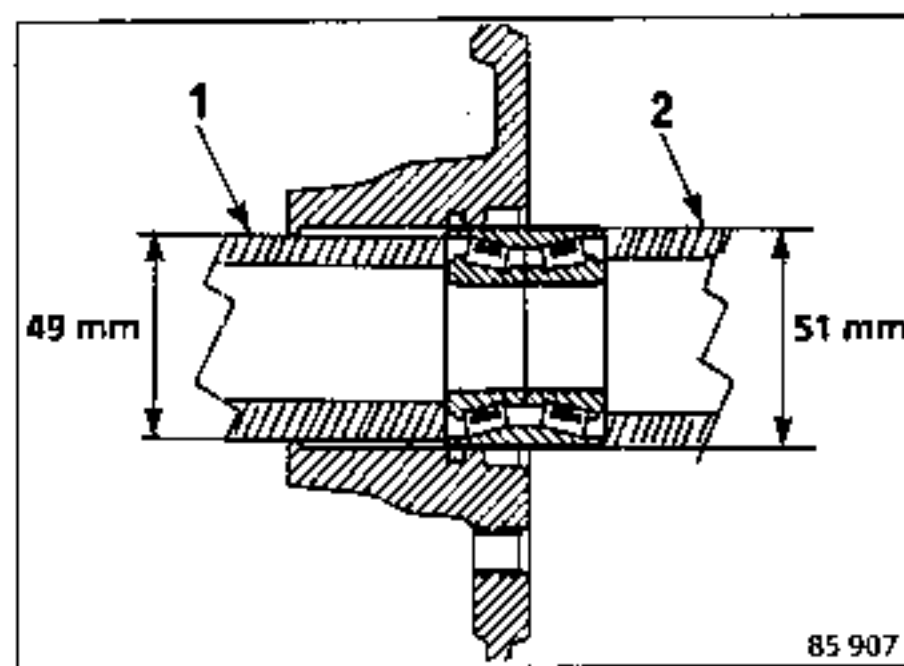
- the hub plug :
using tools Rou.943 + Emb.880,



- the drum (see corresponding section).

Remove, from the drum :

- the bearing retaining clip,
- the bearing, using a tube (1).



REFITTING

Using a tube (2) and a press, fit the bearing until it makes contact with the shoulder.

Fit :

- a new clip,
- the drum, to the stub axle which has previously been oiled with SAE W 80 oil,
- a new self-locking nut, tightening it to torque,
- the hub plug.

Adjust :

- the positions of the shoes by repeatedly depressing the brake pedal.
- the hand brake (see section 37 "Controls").

ESSENTIAL SPECIAL TOOLS

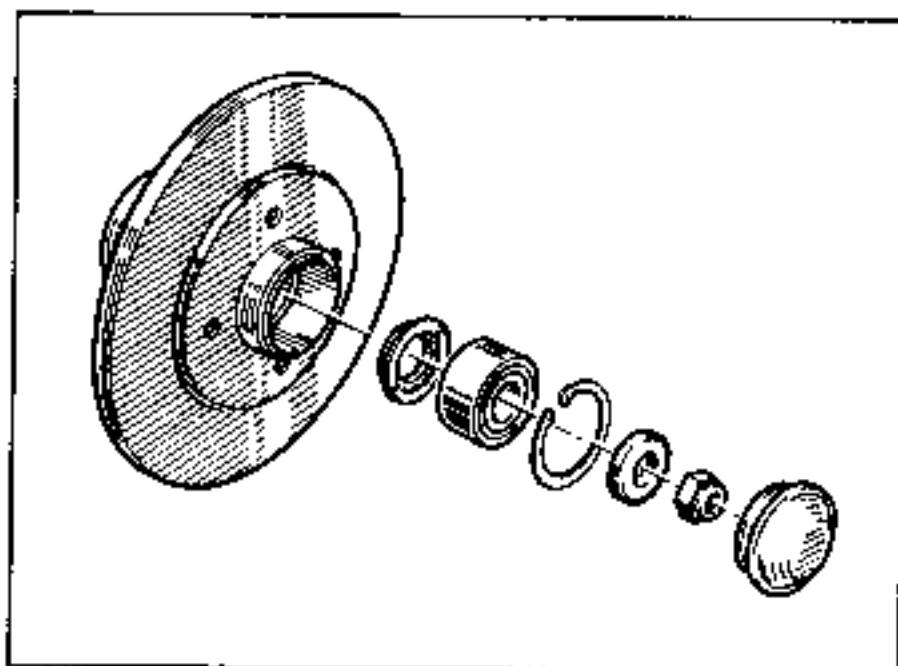
Emb. 880	Inertia extractor
Rou. 943	Hub plug extractor
T.Av. 1050	Hub extractor

TIGHTENING TORQUES (in daN.m)

Hub nuts	16
Brake caliper bracket bolts	10
Wheel bolts	8

CHECKING

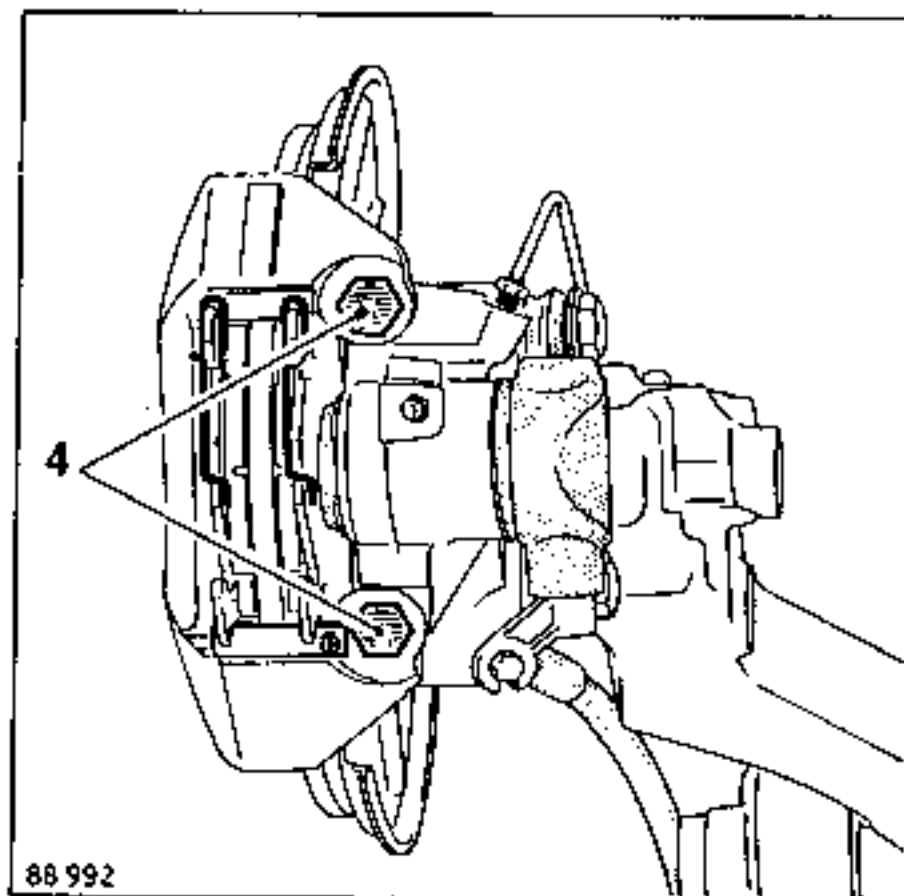
Check the axial play with a dial indicator mounted on the disc. It should be 0 to 0.03 mm max.



REMOVING

Remove :

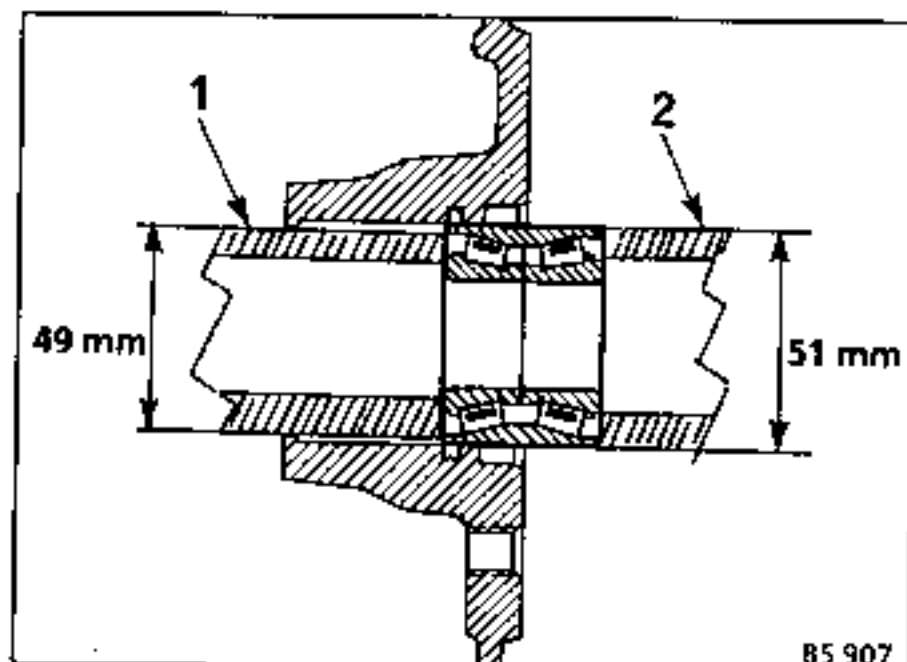
- the brake pads (see corresponding section),
- the caliper bracket (two bolts (4)),



- the hub plug :
tools Rou.943 + Emb.880,
- the stub axle nut and washer,
- the hub-disc-bearing assembly.

Remove, from the hub-disc :

- the bearing retaining clip,
- the bearing, using a tube (1).



85 907

REFITTING

Using a piece of tube (2) and a press, fit the bearing until it contacts the shoulder.

Fit :

- a new clip,
- the disc, to the stub axle, which has previously been oiled with SAE W 80 oil,
- a new self-locking nut, tightening it to torque,
- the hub plug,
- the caliper bracket, coating the two securing bolts with Loctite FRENBLOC and tightening them to torque,
- the brake pads (see corresponding section).

Press the brake pedal a number of times to bring the piston into contact with the pads.

TIGHTENING TORQUES (in daN.m)

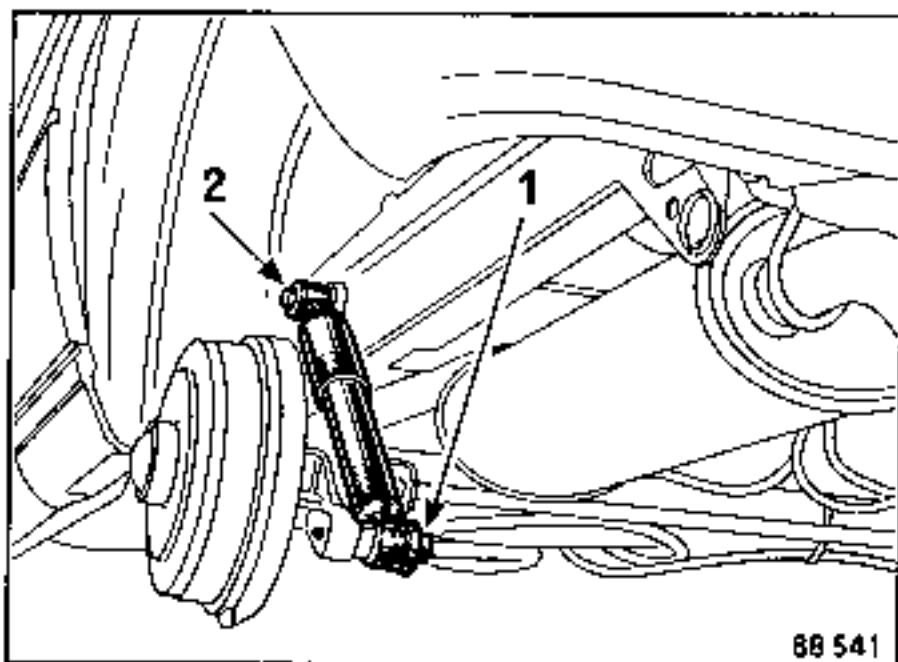
Upper securing bolt	8
Lower securing bolt	6

REMOVING

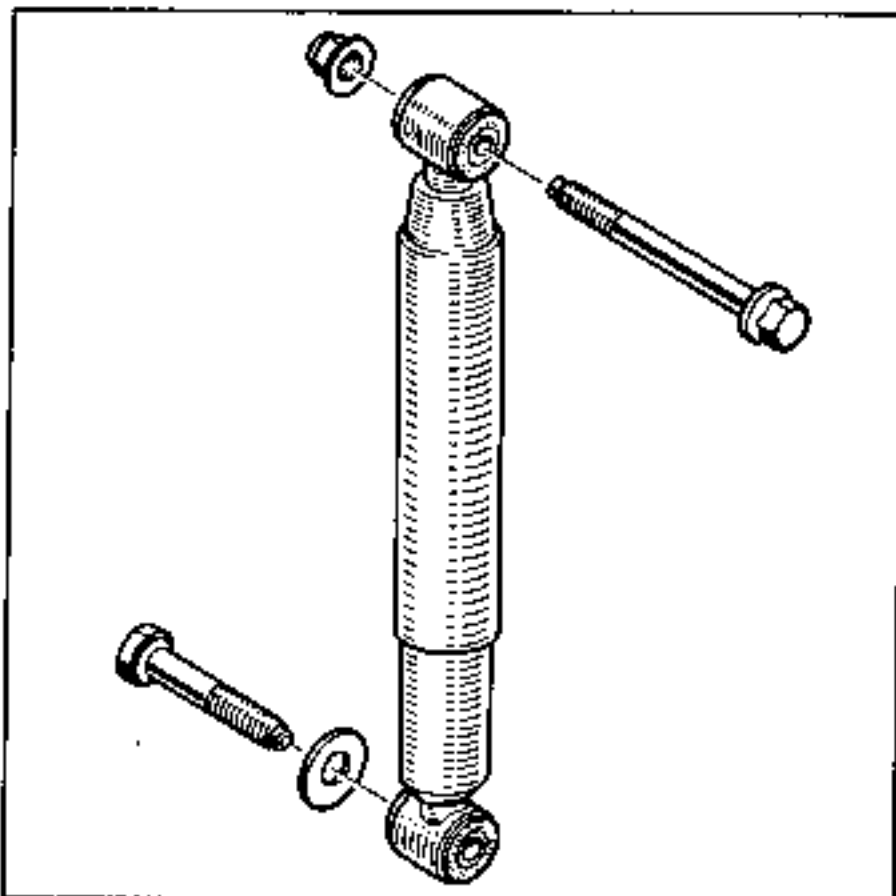
With the vehicle resting on its wheels, remove the lower securing bolt (1).

Lift the vehicle and remove :

- the wheel,
- the upper securing bolt (2),



- the shock absorber.



PRECAUTIONS TO BE TAKEN BEFORE FITTING A SHOCK ABSORBER

Shock absorbers are stored, in the spare parts stores, in a horizontal position.

Under these conditions, it is possible for the shock absorbers that are to operate vertically, to become unprimed.

Consequently, before fitting a shock absorber to the vehicle, pump it up and down, a number of times, in a vertical position.

REFITTING

Fit :

- the shock absorber,
- the upper securing bolt coated with MOLYKOTE BR2 grease, without tightening it,
- the wheel.

Lower the vehicle on to its wheels.

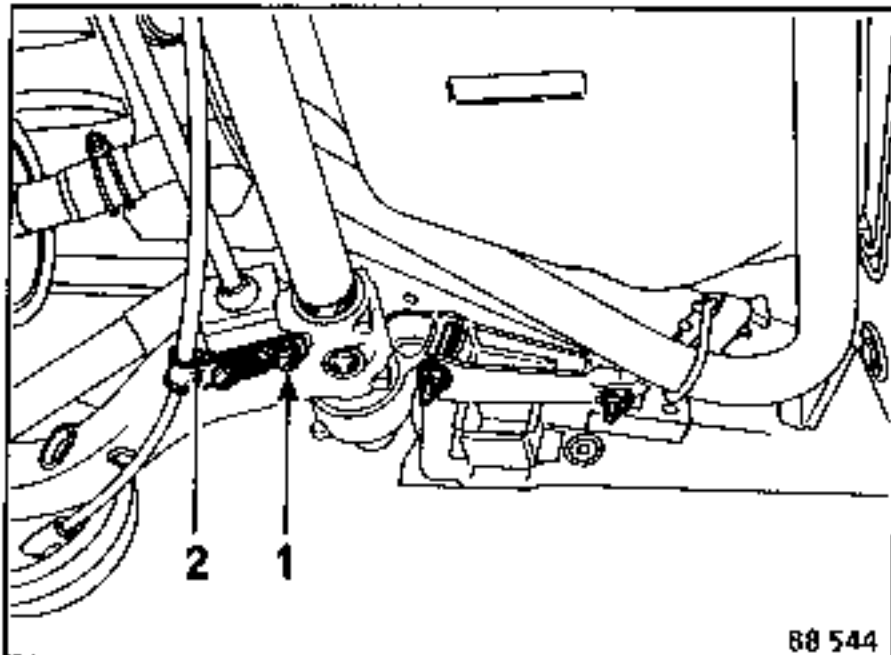
Fit the lower securing bolt after coating it with MOLYKOTE BR2 grease.

Tighten both bolts to the specified torque.

TIGHTENING TORQUES (in daN.m)

Bar securing bolts	5
--------------------	---

REMOVING



- 1 The securing bolts
- 2 The hand brake cable retaining clips.

Raise the vehicle on a lift with its wheels hanging free.

From either side, remove the bolts (1) and the nuts (2) and retrieve the trapped nuts.

Remove the bar.

REFITTING

Fit, on either side :

- the clips (2),
- the bolts (1) with their trapped nuts.

Tighten them to torque.

Half suspension arm assembly - tubular rear axle

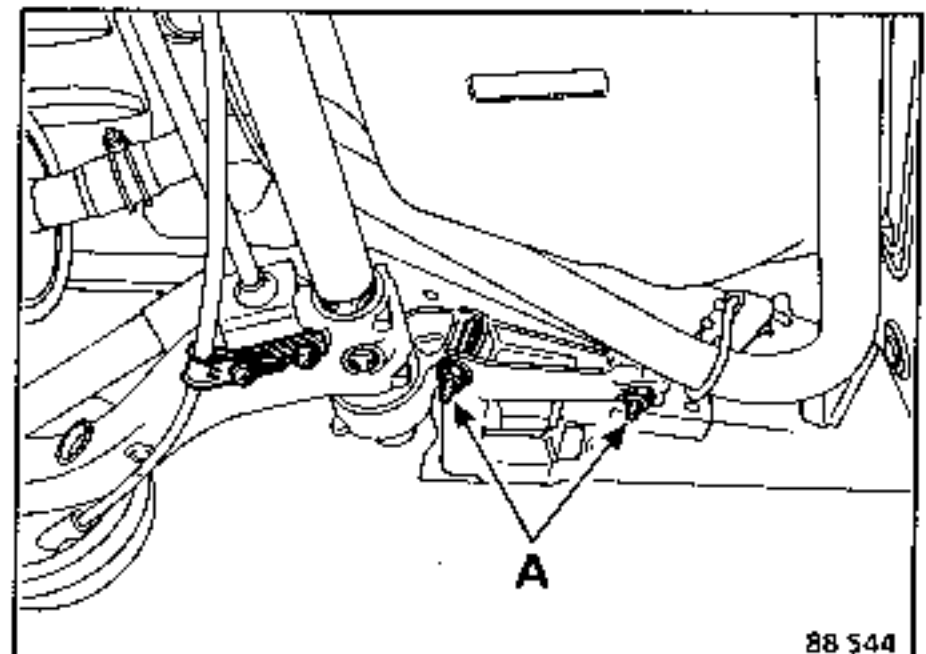
TIGHTENING TORQUES (in daN.m)

Bearing assembly securing nuts	
B40X-C40X-S40X	8.5
F40X	9.5
Anti-roll bar securing bolts	5
Wheel bolts	8
Shock absorber lower secur. bolt	6

REMOVING

With the vehicle on a two column lift, remove :

- the anti-roll bar,
- the shock absorber lower fastening,
- the hand brake secondary cable by disconnecting it from the central control under the vehicle,
- the brake hose,
- the compensator control on the right hand side (on certain versions),
- the two bearing assembly securing nuts (A).



Loosen the two nuts (A) on the other bearing assembly to be able to free the half suspension arm being removed from its locating points.

Remove the half suspension arm assembly by separating it from the other.

REFITTING

Three different cases may arise.

1. ARRANGEMENT WITH PLASTIC BUSHES

Check that the suspension arm shaft is suffering from no impact marks or excessive wear.

Lubricate the shafts and bushes with type 33 MEDIUM grease.

2. NEEDLE RACE TYPE ASSEMBLY

Check that the needle tracks and track rings are in good condition. If not replace them (see section "Axle bushes - tubular rear axle"). As the needle races are greased for life, it is not necessary to regrease them.

3. REPLACING A SUSPENSION ARM OF THE EARLY TYPE

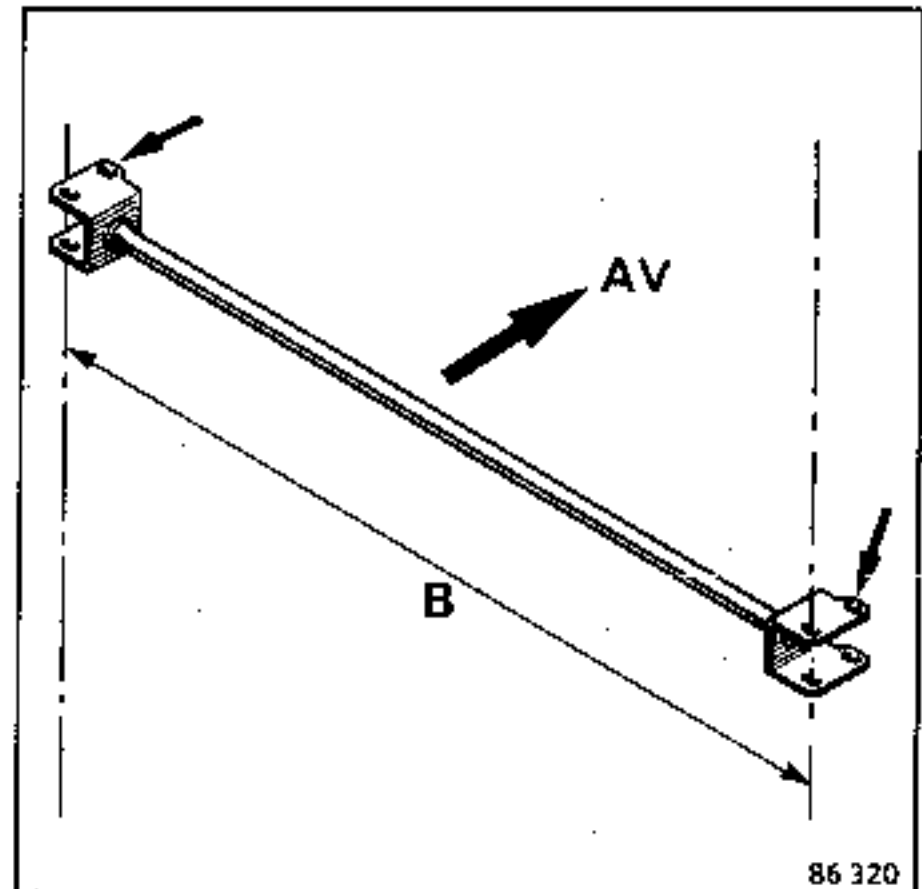
The fitting, in production, of needle race type bushes has involved a reduction in the \varnothing of the male tube (right hand) by 1 mm. The female tube (LH side) remains the same.

The Parts Department only supplies :

- male tubes (RH side) of the later type equipped with a needle track and a protector and this necessitates fitting a needle race into the female (left hand) suspension arm assembly (see "Axle bushes - tubular axle").
- female arms (LH side) fitted with needle race type bushes and a protector require the fitting of a bearing track (early or later type depending on the case) to the male arm (RH side) (see section entitled "Axle bushes - tubular rear axle").

Engage the two half assemblies, one into the other to obtain dimension (B).

NOTE : dimension (B) is the distance between the two same securing points for the anti-roll bar on the suspension arms. It is therefore possible to obtain this dimension by placing the anti-roll bar in its location and checking that its securing bolts enter correctly. Ensure that it is the correct way round.



From then on carry out the removing operations in reverse.

Bleed the braking system.

Adjust the hand brake control.

Check, and if necessary, adjust the brake compensator (on certain versions).

(For these operations, see section 37 "Controls").

This operation is carried out after removing the complete rear axle assembly and separating the two suspension arm sub-assemblies.

ESSENTIAL SPECIAL TOOLS	
T.Ar. 960	Bush extractor
T.Ar. 960-01	Additional spacer and end fitting
T.Ar. 960-02	Bush + spacer extractor assembly
T.Ar. 960-03	Tool for fitting standard type needle races
T.Ar. 960-04	Tool for fitting the special replacement needle races

The early type axles were fitted with plastic bushes. To eliminate the risk of noise, these vehicles are now fitted with needle races. These later type axles differ from the early type by a reduction in the ϕ of the male tube (RH side) of 1 mm. The female tube (LH side) remains the same.

The Parts Department supplies two sets of needle races, as replacement parts, to cover both arrangements :

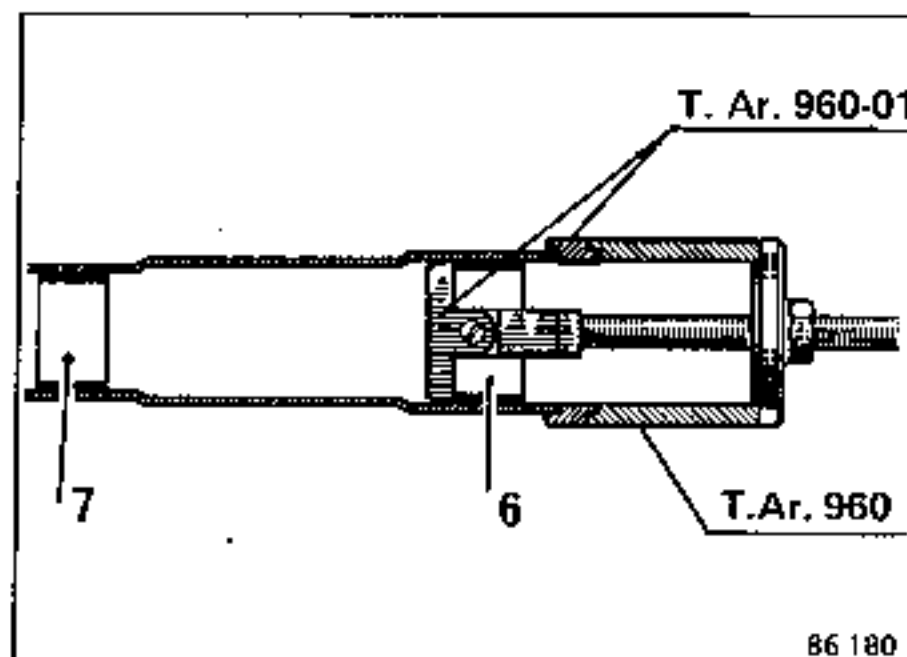
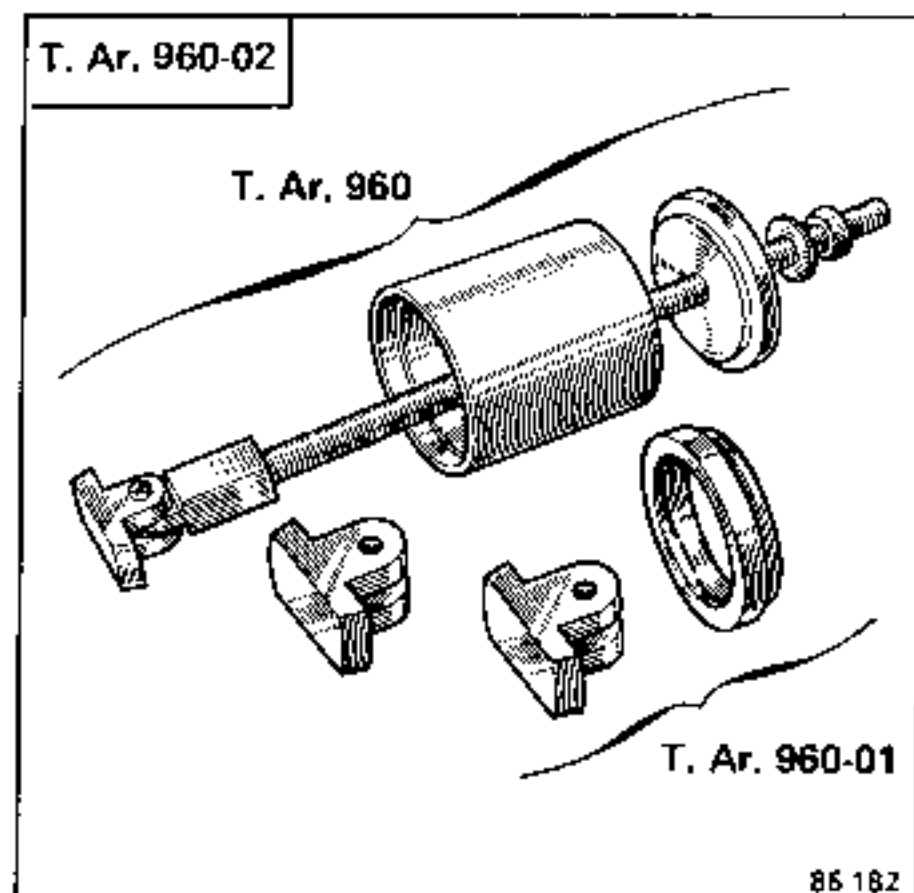
- The 1st set (special replacement) consists of :
 - two bearing tracks 1 mm thick for early type axles,
 - two needle races (common to both arrangements),
 - one seal (common to both arrangements).
- The 2nd set (standard production type) consists of :
 - two bearing tracks 1.5 mm thick for later type axles,
 - two needle races (common to both arrangements),
 - one seal (common to both arrangements).

DISMANTLING

Both early and later type axles

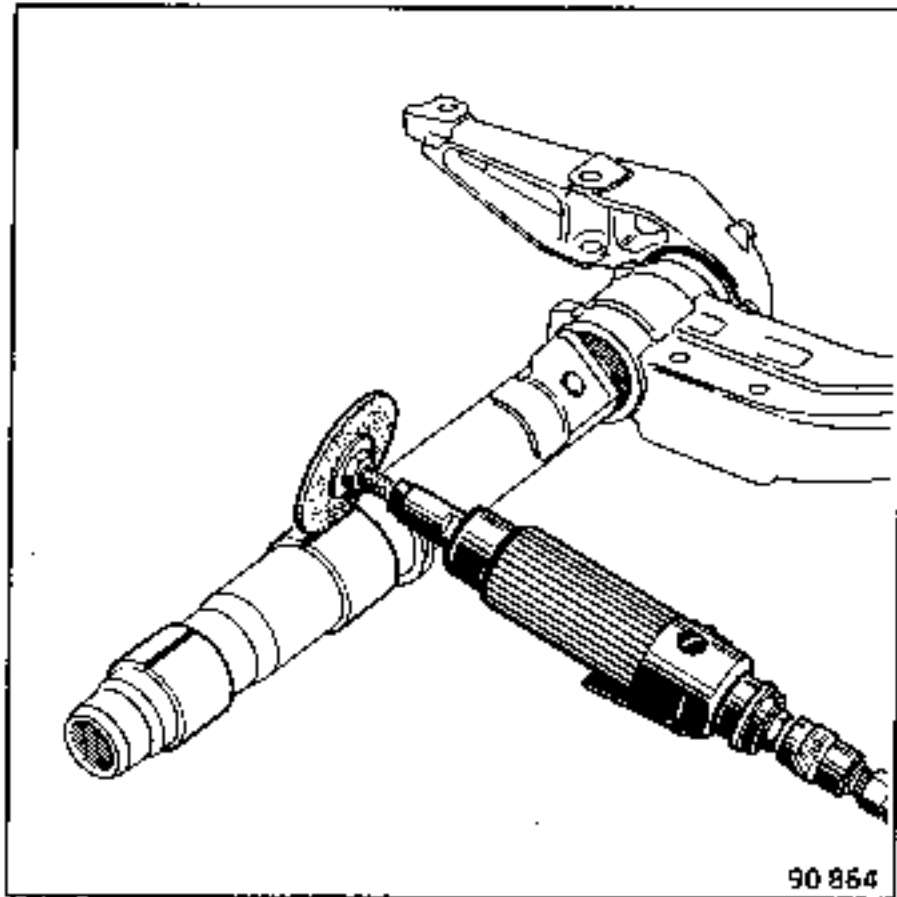
Remove, from the female arm (LH side) :

- the outer bush (6) tool T.Ar.960-02 or T.Ar.960 + T.Ar.960-01,
- the inner ring (7) using the small end fitting from tool T.Ar.960.



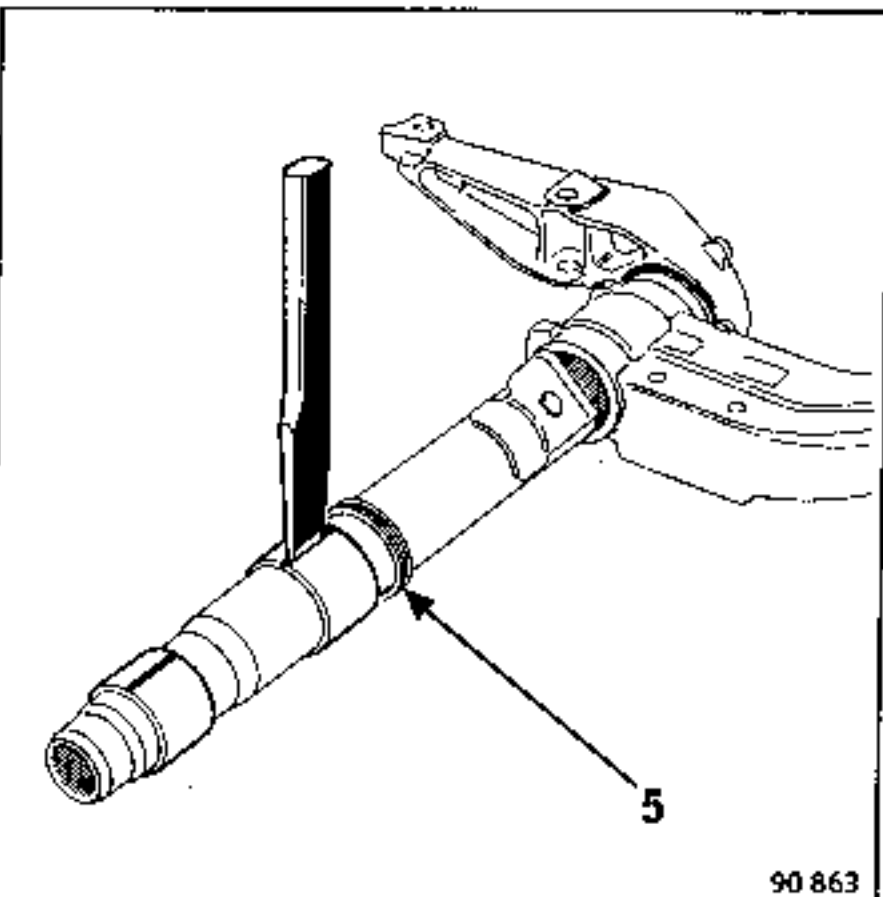
Later type axle

Grind grooves in the bearing tracks on the male arm (right hand) with a straight grinder, taking care not to mark the tube.



Split the bearing tracks with a cold chisel and remove them.

Cut and remove the seal (5).

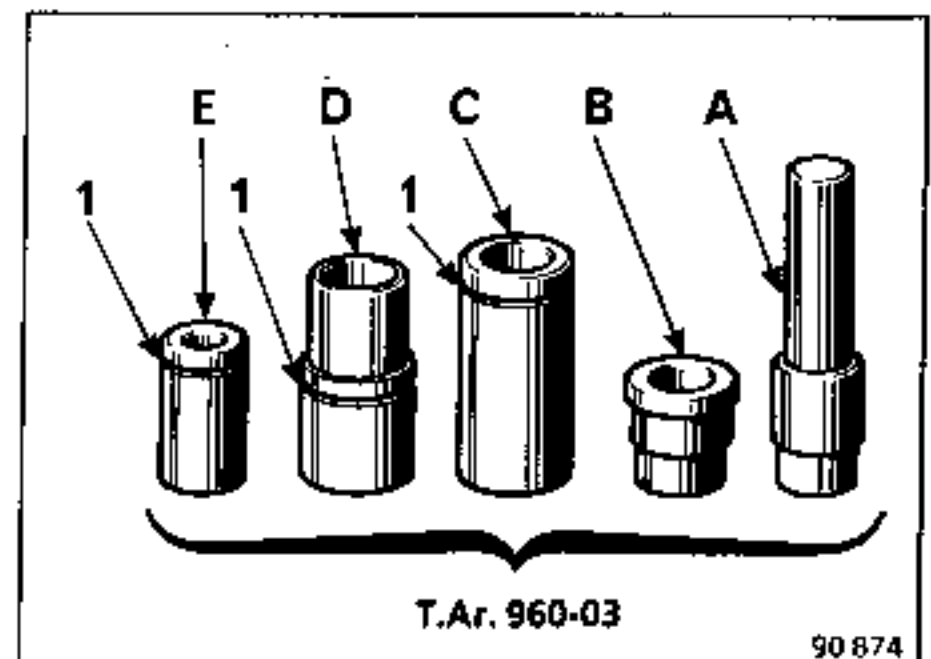


REASSEMBLY

Fitting the needle races and their tracks involves using special tools :

- tool T.Ar.960-03 for the later type (standard type),
- tool T.Ar.960-04 + components (A) and (B) from tool T.Ar.960-03 for the early type (special replacement).

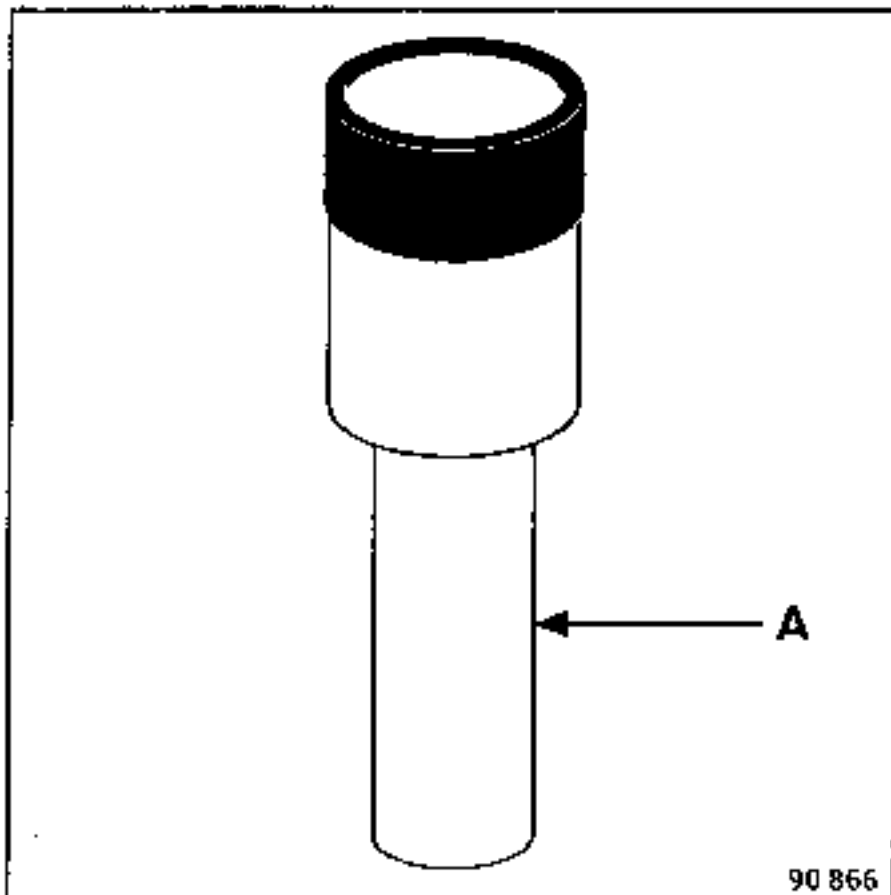
NOTE : Items (C), (D) and (E) of tool T.Ar.960-03 are identified by one groove (1) whereas tools T.Ar.960-04 have two grooves.



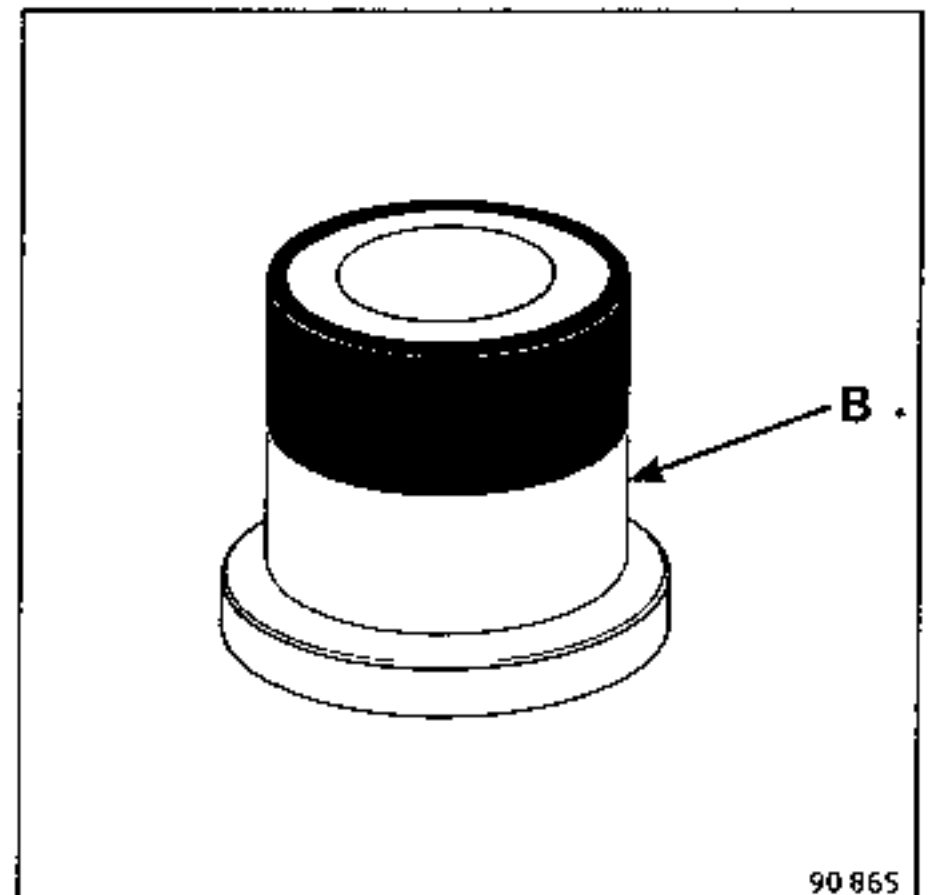
Fit :

- the small needle race to the mandrel (A),
- the mandrel (A) inot the tube using mandrel (B) as a guide.

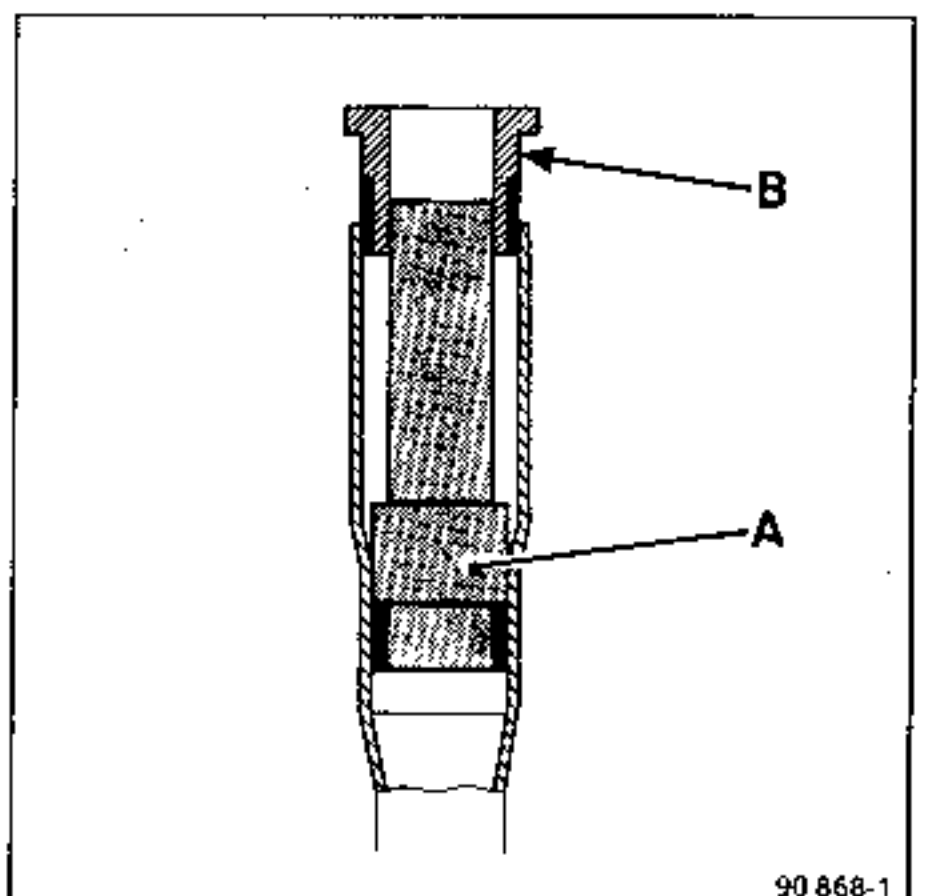
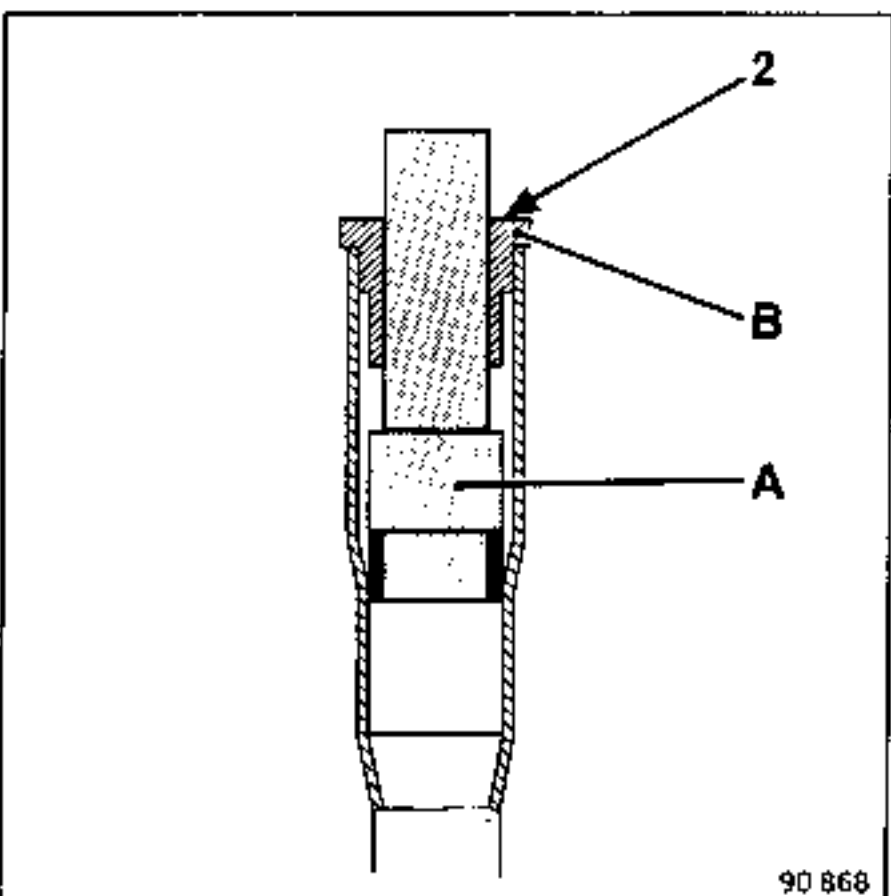
Push them in on the press until the mandrel (A) is flush with face (2) of mandrel (B).



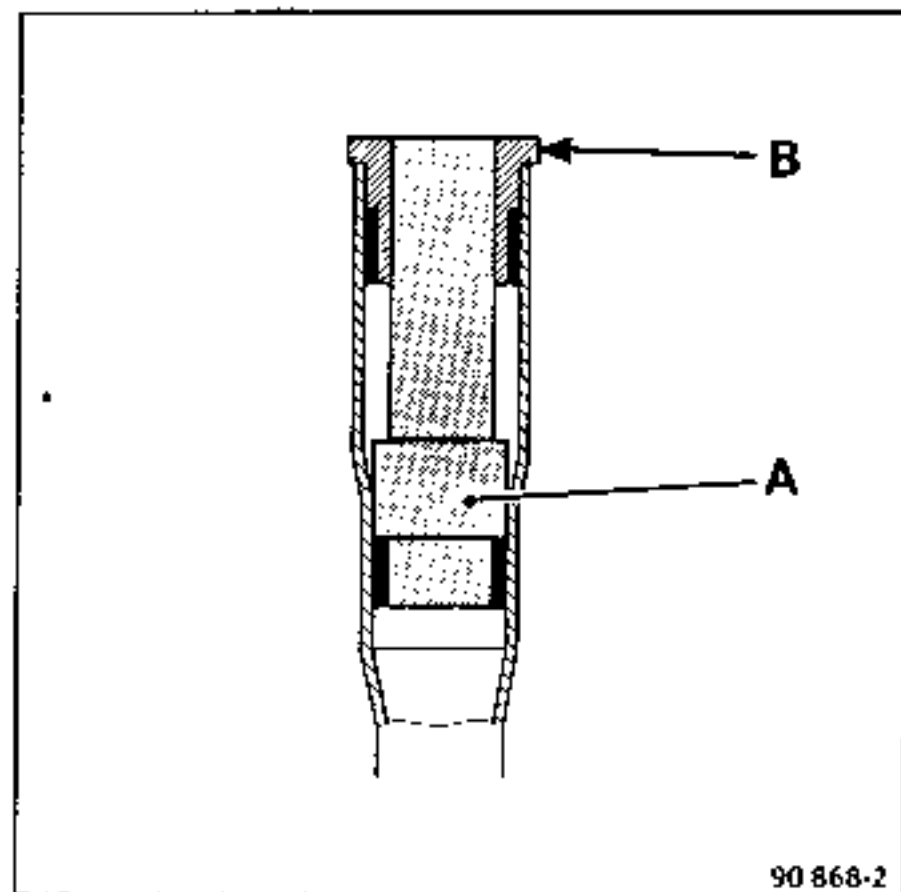
Position :
- the large needle race on mandrel (B),



- mandrel (B) in the tube, using mandrel (A) as a guide.



Push them in on the press until mandrel (B) makes contact with the tube.

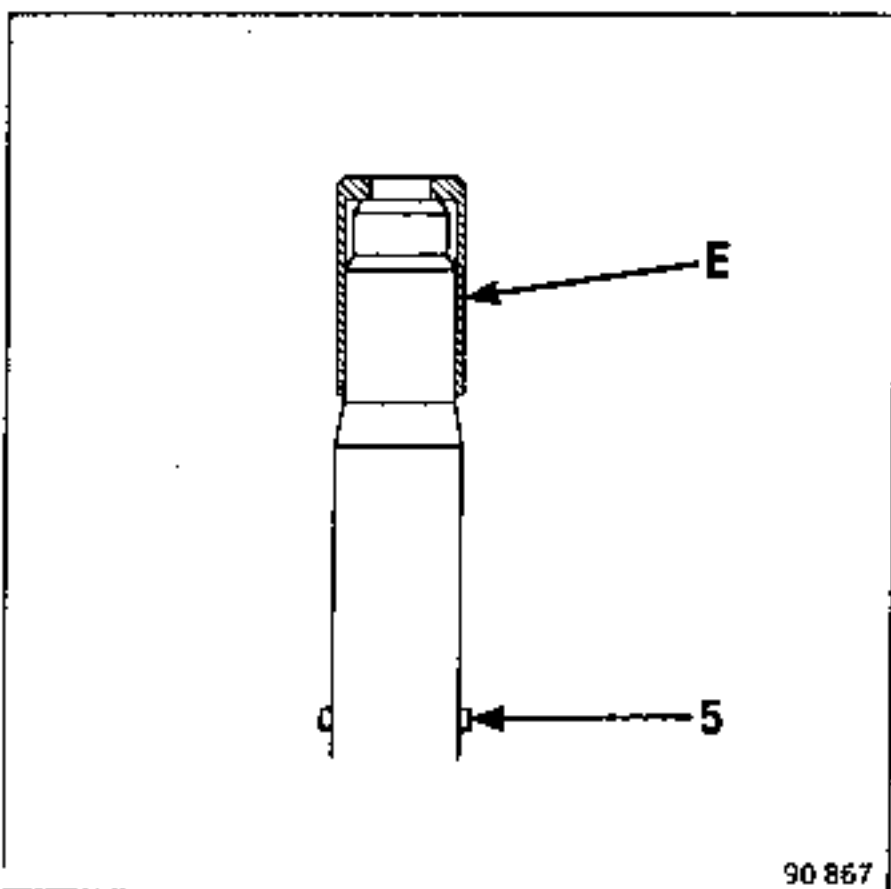


Remove mandrels (B) and (A).

Fit to the male tube :

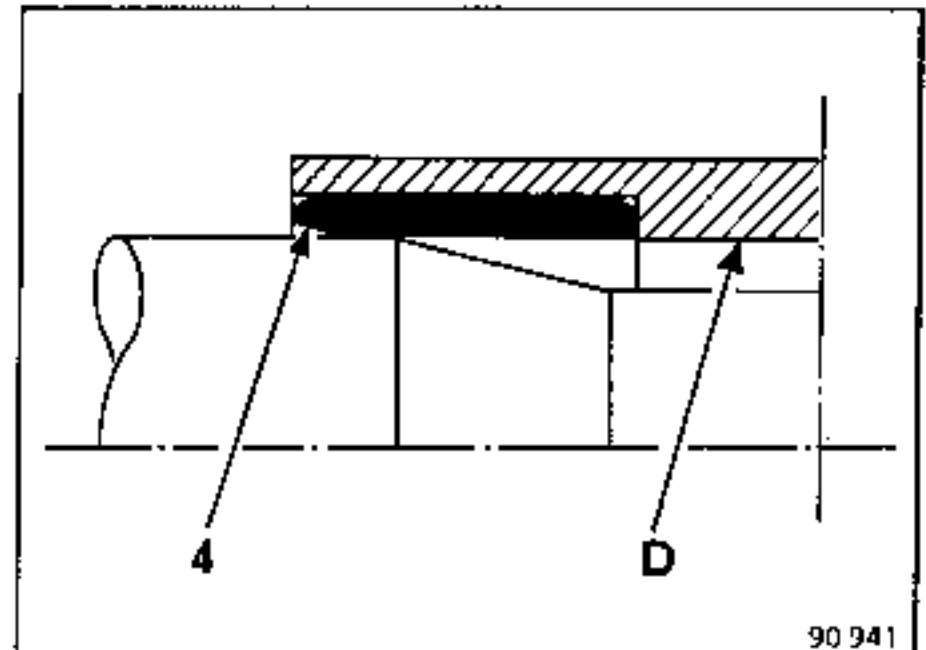
- a new seal (5),
- the guide bush (E).

NOTE : The "standard production type" arrangement is assembled by using tool T.Ar.960-03 which is identified by one groove whereas the "special replacement arrangement" requires the use of tool T.Ar.960-04 which is identified by 2 grooves.



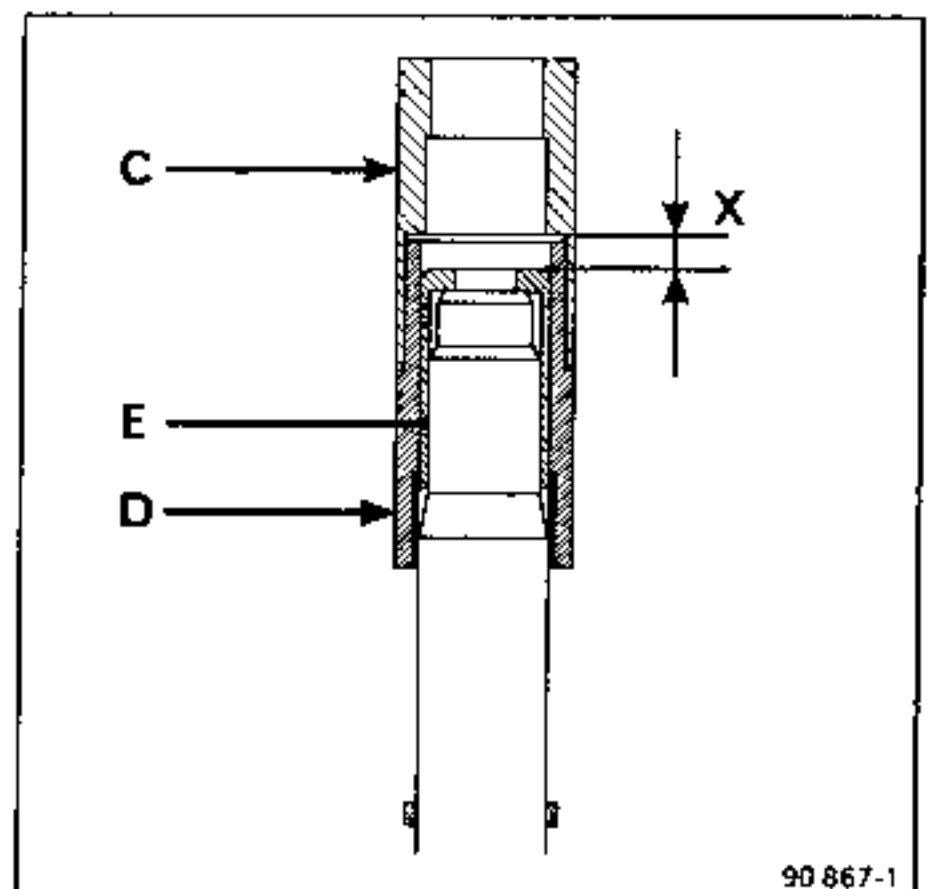
The bearing tracks have a lead chamfer at one end.

It is essential to fit these tracks the correct way round with chamfer (4) positioned as shown in this drawing so that there is enough bearing area left to support the insertion loads.



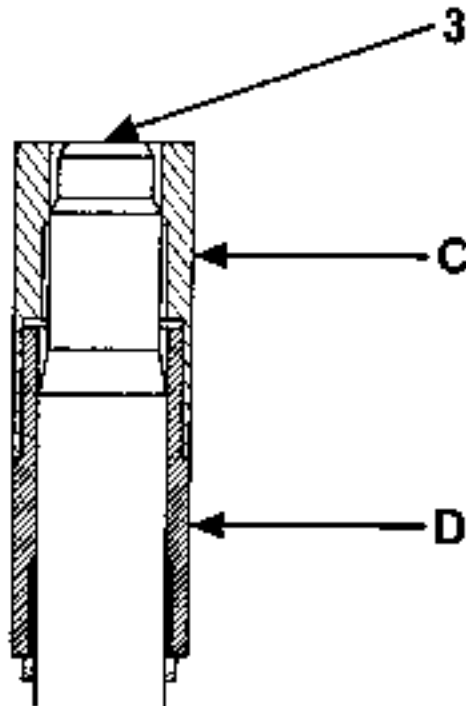
Fit :

- the large bearing track into the sleeve (D),
- the assembly formed by sleeve (D) and (C) on to the tube.



Push in the assembly by 10 mm (dimension X) (on the press).

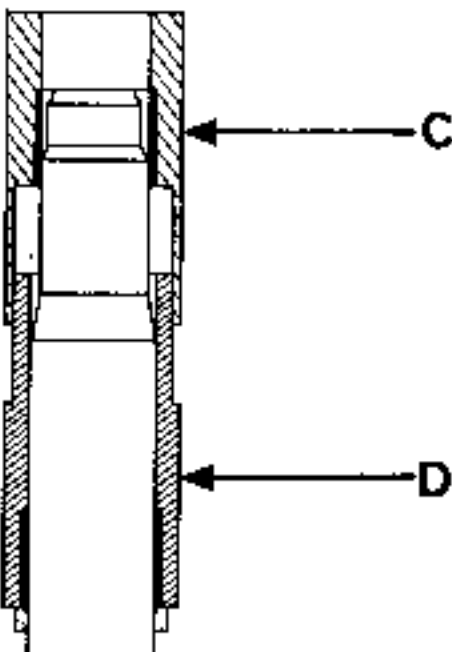
Remove the guide tube (E) and push in assembly (D) and (C) until sleeve (C) is flush with the edge (3) of the tube.



90 867-2

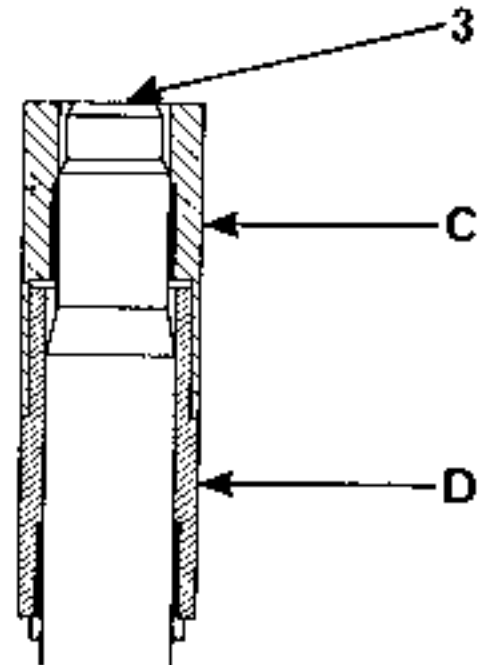
Position :

- the small bearing track ring in sleeve (C),
- sleeve (C) on the tube with sleeve (D) acting as a guide.



90 867-3

Push them on the press until the sleeve (C) is flush with the edge (3) of the tube.



90 867-4

Remove sleeves (C) and (D).

IMPORTANT

When fitting, if the load is taken on the axle bearings, it is essential to ensure that the suspension arms are correctly positioned in their anchor points (there is a risk of them coming out).

Re-locate them if necessary.

Assemble the two half axles.

NOTE : It is not necessary to grease the needle races. They are supplied greased for life.

Then reconnect the rear axle assemblies and refit them to the vehicle (see corresponding section).

ESSENTIAL SPECIAL TOOLS

Emb. 880 Inertia extractor

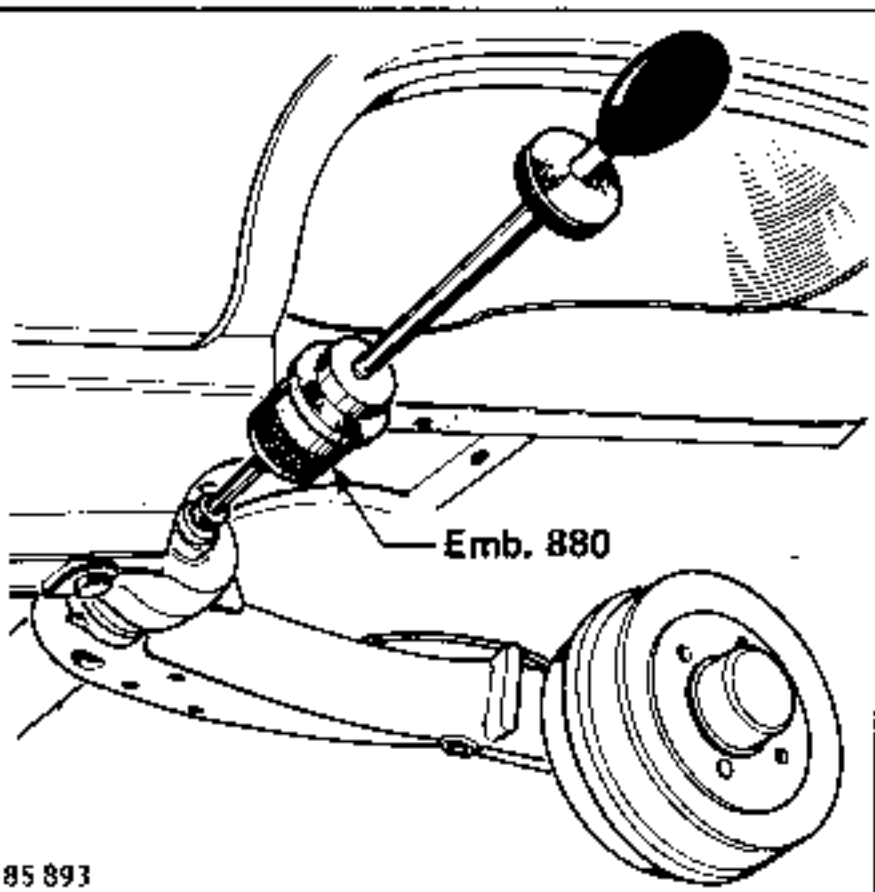
TIGHTENING TORQUES (in daN.m)

Shock absorber upper securing bolt	8
Shock absorber lower securing bolt	6

REMOVING

With the vehicle's wheels hanging free, remove the shock absorber on the side concerned.

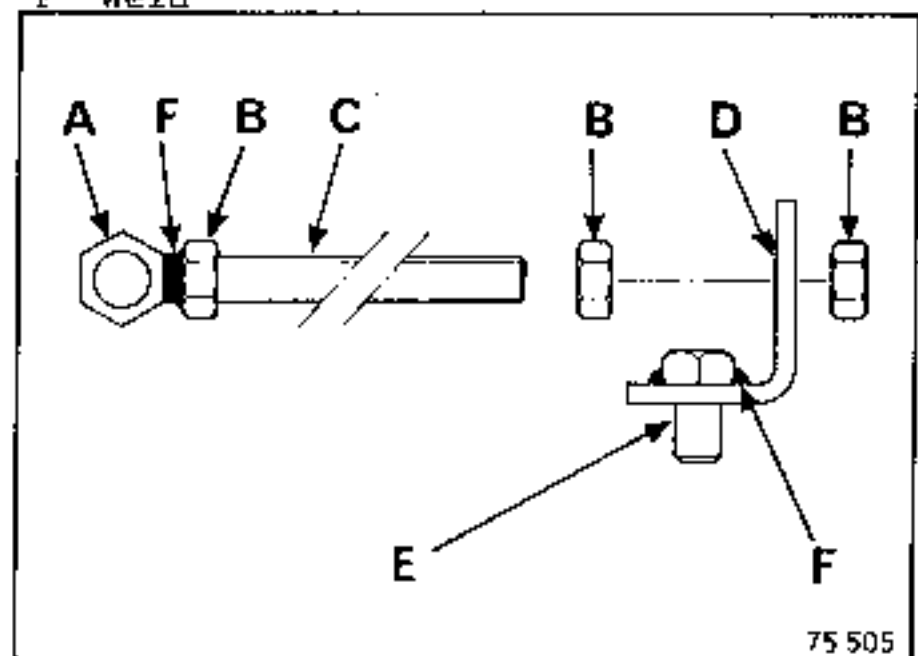
Extract the bar, from one side, using tool Emb. 880.



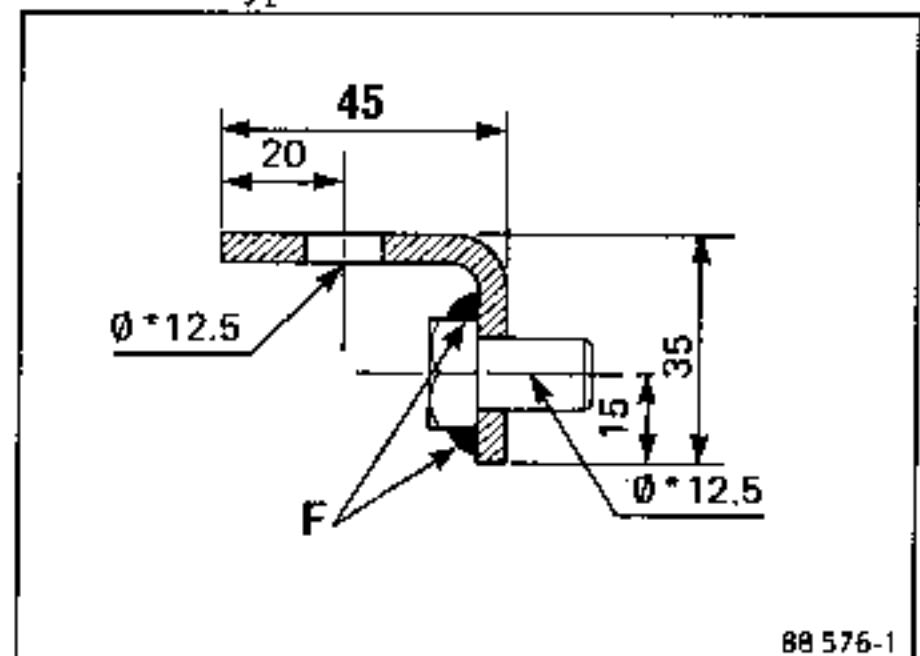
REFITTING

A tool will have to be made up locally to correctly position the bar when re-fitting.

- A Nut 14 mm \varnothing
- B Nut 12 mm \varnothing
- C Screwed rod 12 mm \varnothing - length 660 mm
- D Bracket made from flat section steel 30 x 5 mm
- E 12 x 60 mm bolt cut off to a length of 20 mm
- F Weld



The bracket (D) is specific to this vehicle type.

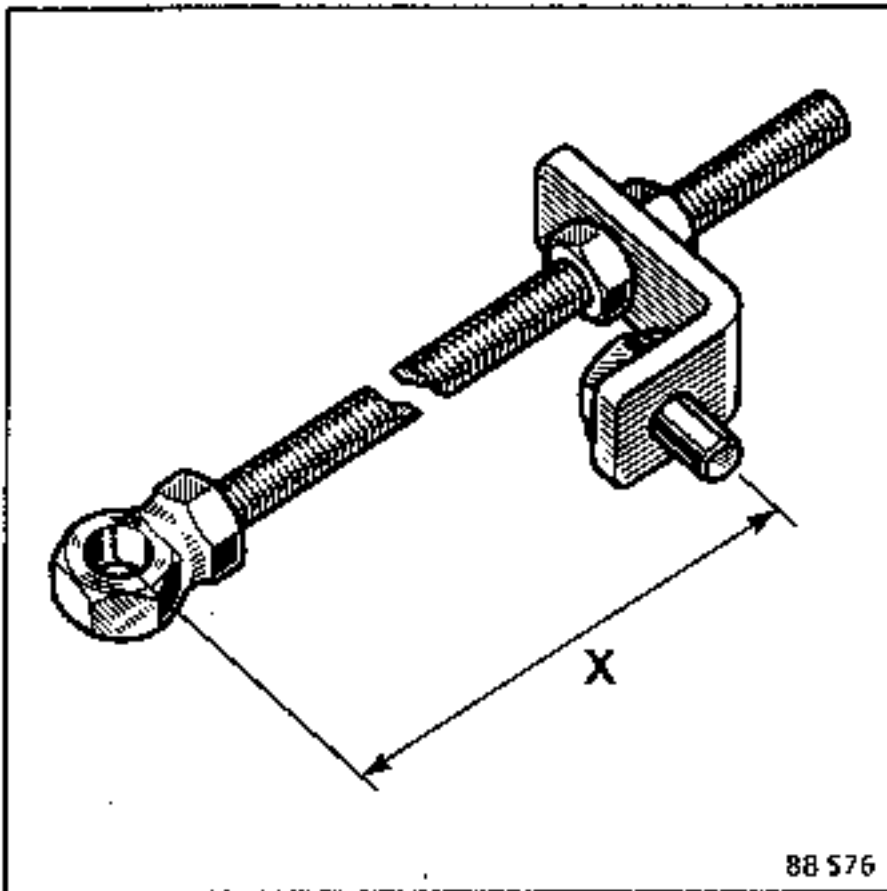


(*) hole diameter

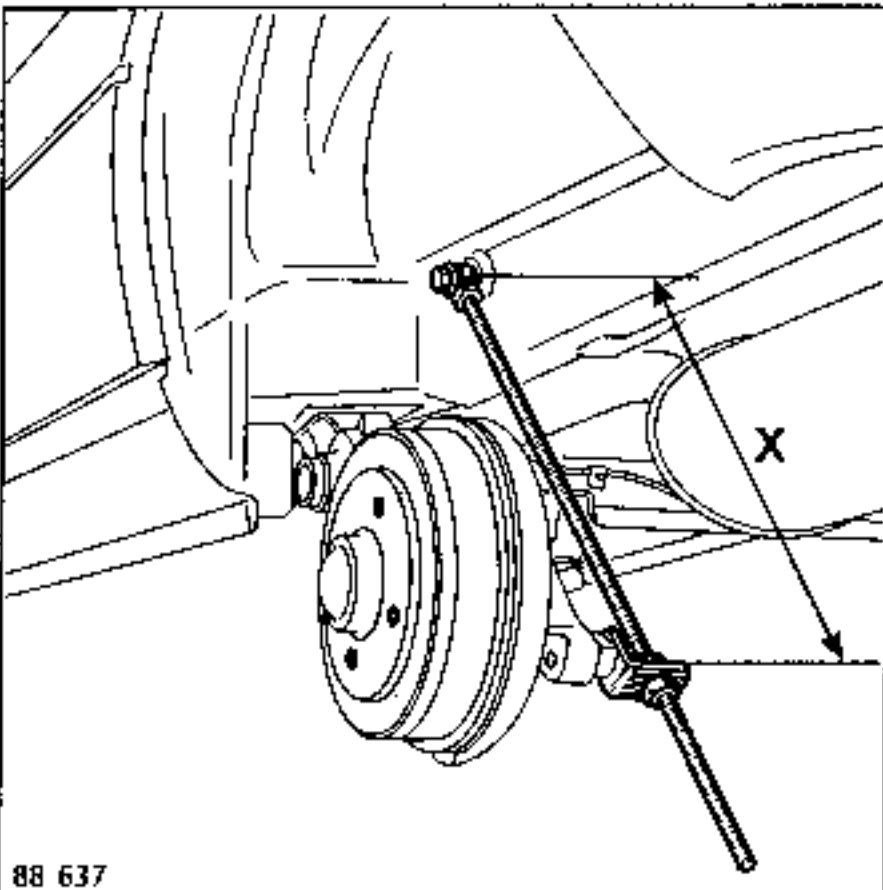
Pre-adjust the tool to obtain dimension "X".

All types :

X = 405 mm



Fit the tool in place of the shock absorber.



Coat the spines on the bar with MOLYKOTE BR2 grease, insert it into the bearing and into the suspension arm. Turning it to find the position where it will enter freely the splines in both the suspension arm and the bearing.

Remove the tool and refit the shock absorber.

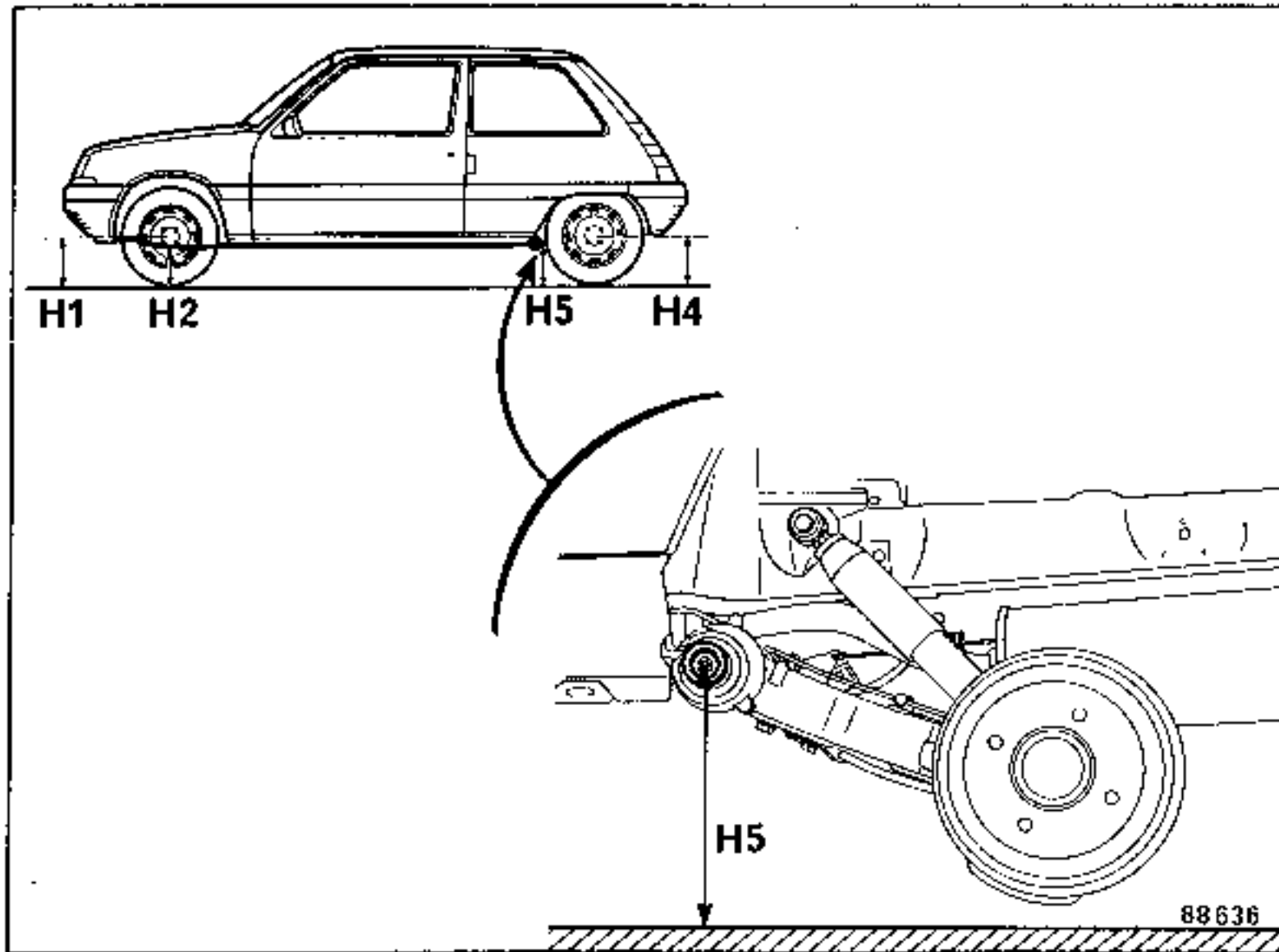
Lower the vehicle on to its wheels and measure the underbody heights (see section "Underbody height - Tubular rear axle").

Check, and if necessary adjust :

- the brake compensator (on certain versions),
- the headlights.

CHECKING

Park the vehicle, unladen, with its fuel tank full, on a flat horizontal surface.



B400 - C400 - S400

$$H1 - H2 = 79 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B401 - C401 - S401 - B40H - C40H

$$H1 - H2 = 66 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B402 - C402 - B403 - C403 - B404 - C404 - S404 - B407 - C407 - B40F - C40F - S40F - B40G - C40G - B40J - C40J - B40K - C40K - B40M - C40M

$$H1 - H2 = 72 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

B408 - C408

$$H1 - H2 = 84 \begin{matrix} + 10 \\ - 5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -10 \begin{matrix} - 10 \\ + 5 \end{matrix} \text{ mm}$$

ADJUSTING

Only the rear underbody height can be adjusted by turning the torsion bars.

Determine the existing dimension "X" by adjusting the bracket (D) on the locally manufactured tool until the bar can be slid by hand into its location.

Remove the bar.

As 3 mm is the minimum possible value for an offset spline arrangement, the height of the vehicle can only be adjusted in multiples of 3 mm.

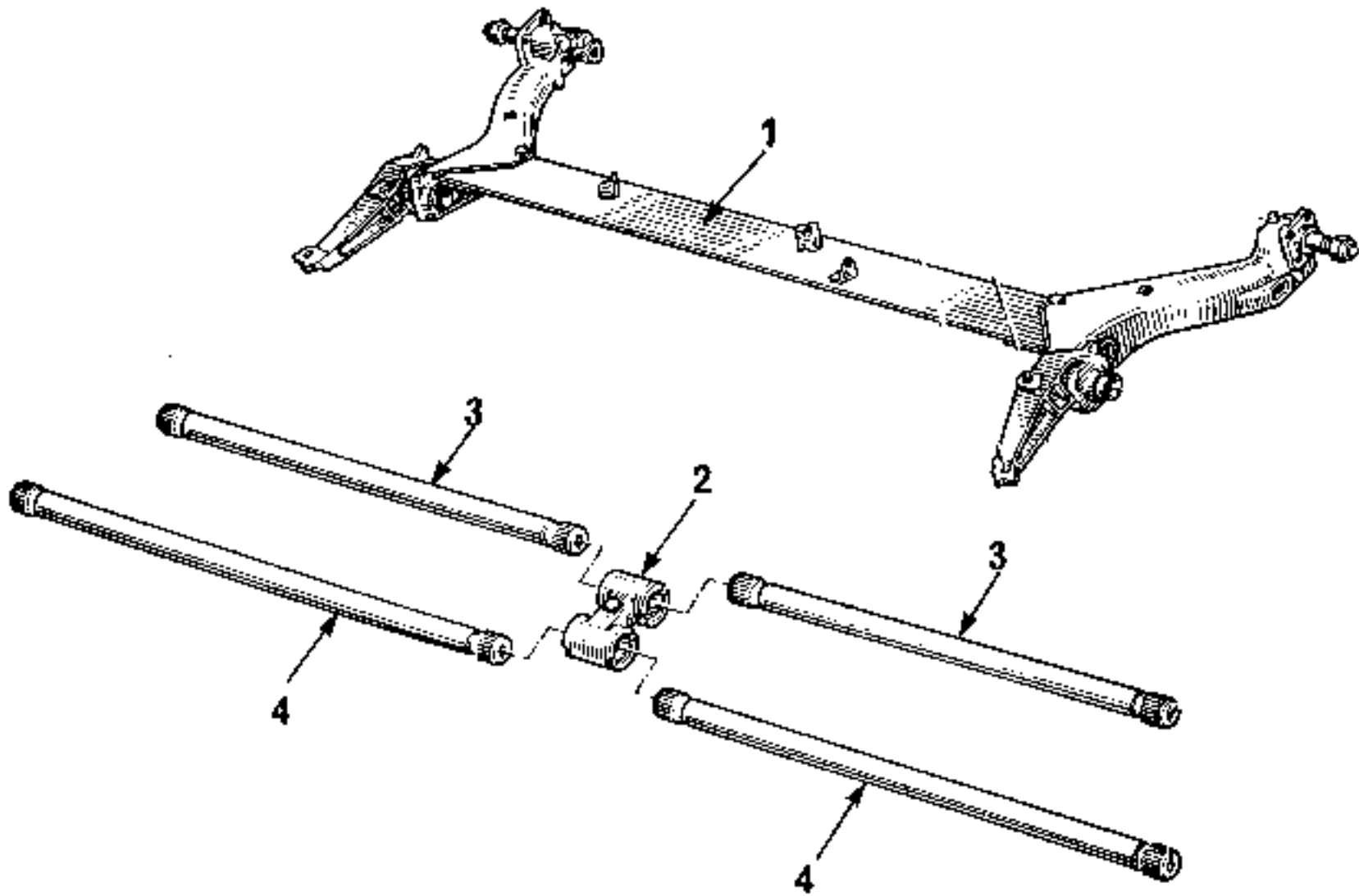
Lower the arm to offset the bar by the number of splines that will adjust the height by the amount required :

Example : 10 mm = 3 splines

Refit the bar so that it engages freely in the splines in both the suspension arm and its bearing.

Check, and if necessary adjust :

- the brake compensator (on certain versions),
- the headlights.



This rear axle assembly consists of :

- two arms interconnected by an angle section. This assembly (1) cannot be dismantled. If it is distorted, the entire assembly must be replaced.
- two bars known as anti-roll bars (3).
- two suspension bars (4).
- a double shackle (2) that interconnects the bars.

The assembly is secured to the body by two bearings on rubber bushes.

NOTE : it is forbidden to jack up the vehicle under the angle section (1).

The Parts Department supplies stripped down rear axle assemblies as replacements. The bars and the double shackle must therefore be removed from the original rear axle to make up the assembly.

ESSENTIAL SPECIAL TOOLS	
Emb. 880	Inertia extractor

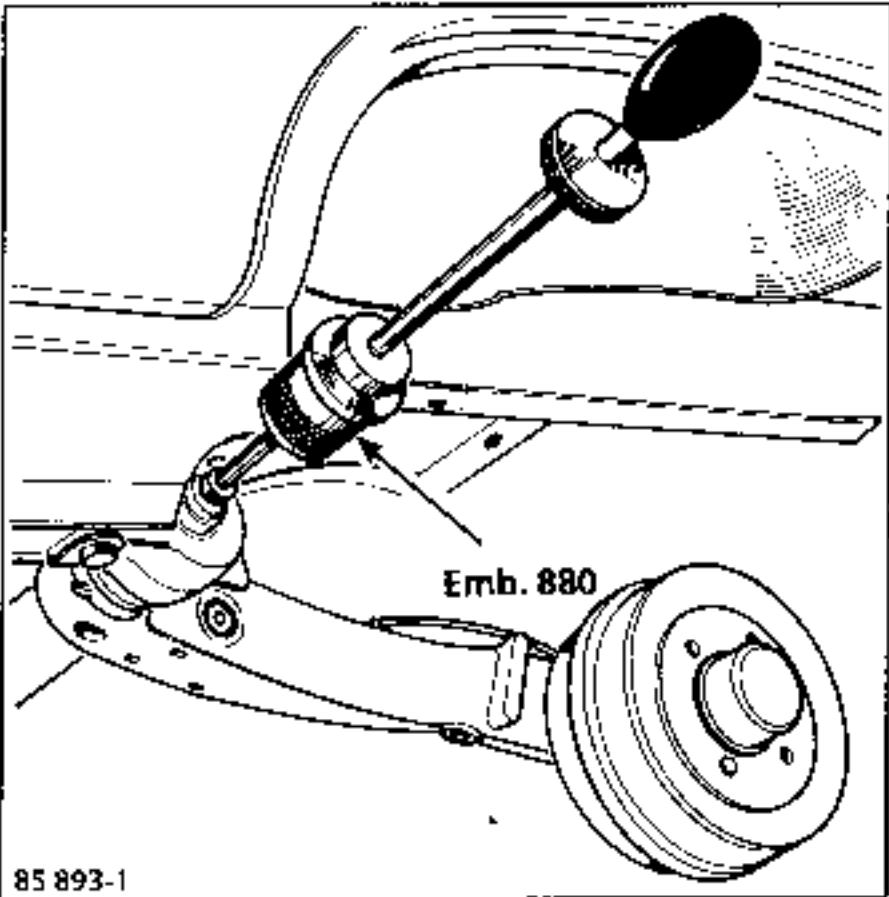
TIGHTENING TORQUES (in daN.m)
Shock absorber upper securing bolt 8
Shock absorber lower securing bolt 6

REMOVING

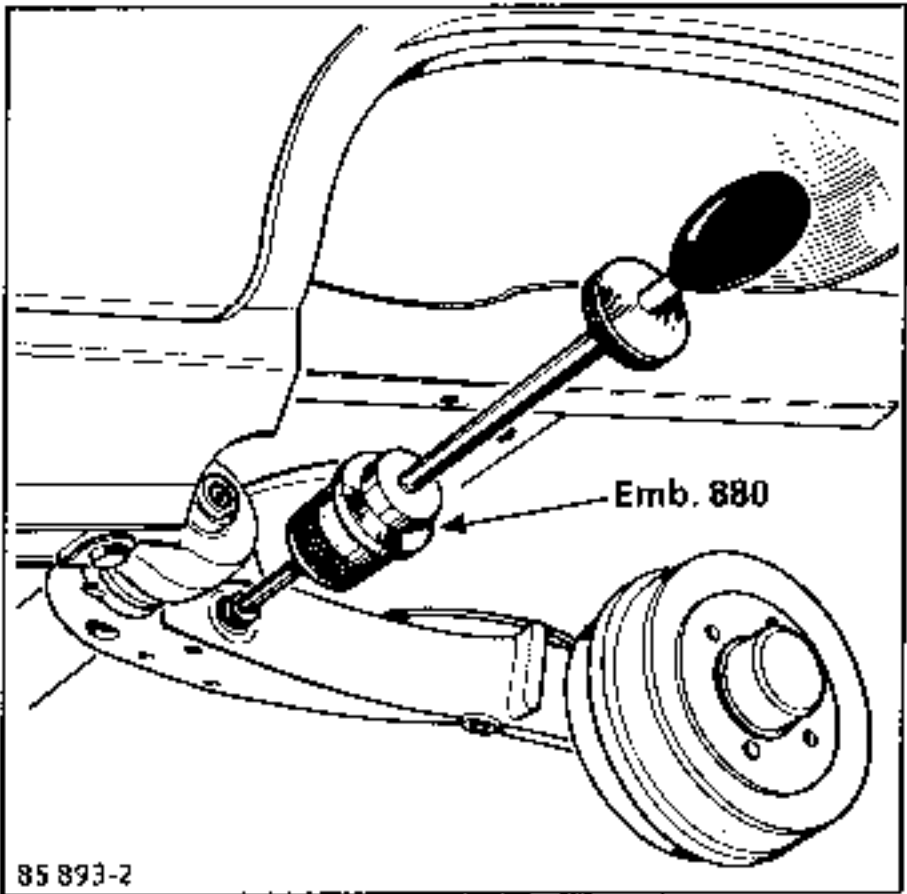
With the vehicle wheels hanging free, remove the two shock absorbers.

Using tool Emb. 880 :

- extract the two suspension bars,



- extract the anti-roll bars and retrieve the double shackle from the centre.

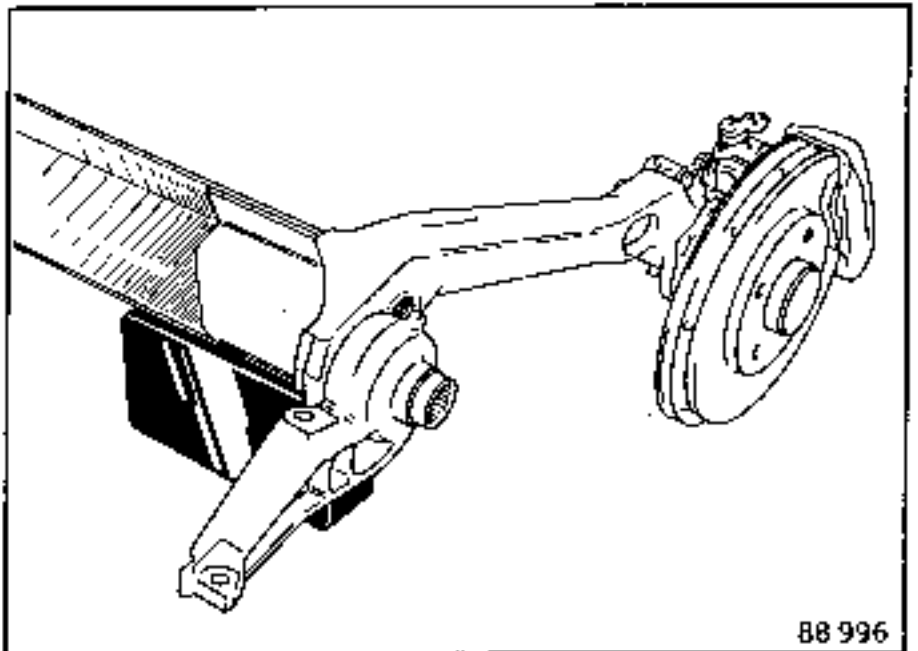


Clean and thoroughly grease the bar anchor points.

Then remove the rest of the rear axle assembly (see corresponding section).

REFITTING

Place the rear axle, upside down, on a flat surface and support it so that its bearings are free to move.

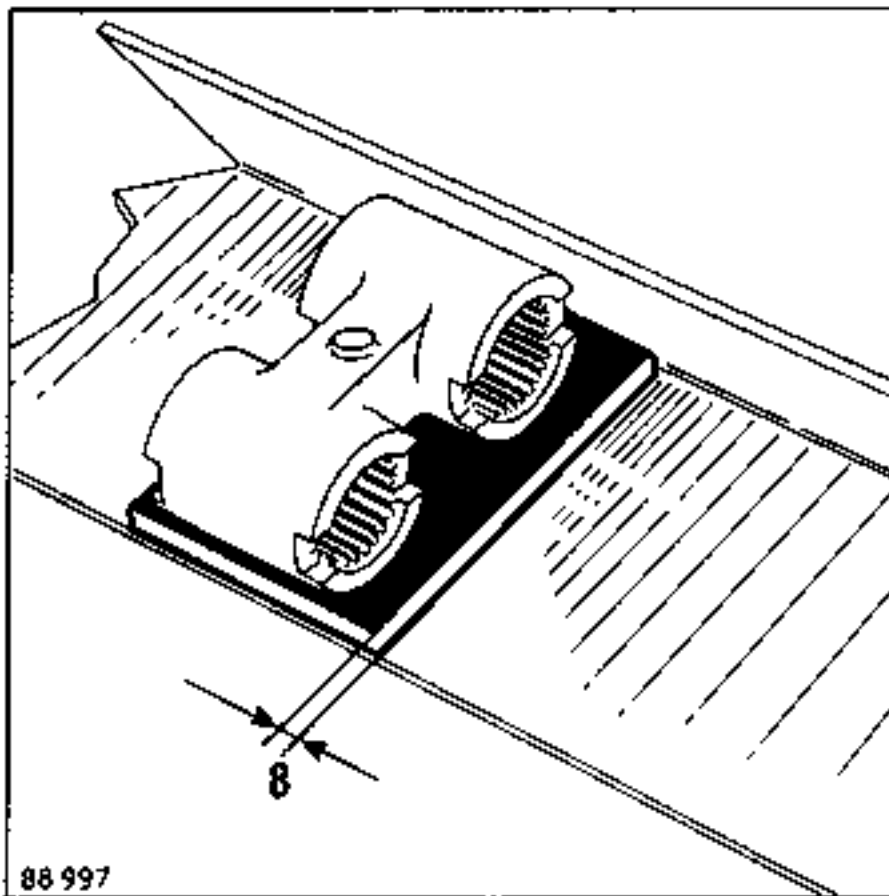


Special feature of early type C405 vehicles

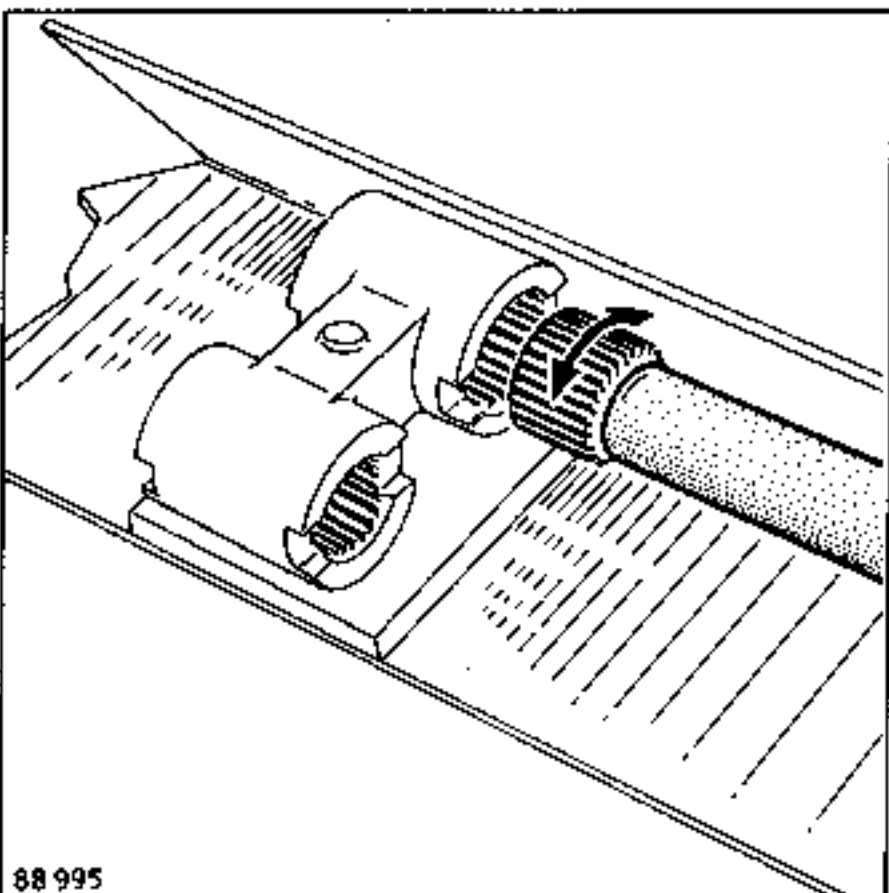
NOTE : these vehicles have no position marks on the bars.

Fit :

- the double shackle in the centre of the axle resting on a pad 8 mm thick, parallel with the longest part of the angle section,



- one anti-roll bar, turning it to find the point where it enters freely.



NOTE : it is essential that the splines should be clean and thoroughly greased if this point where the bar enters freely is to be found.

- the 2nd anti-roll bar also finding the point where it enters freely.

Mark the positions of the bars in the anchor points on the suspension arms.

Remove the 8 mm pad.

C405 later type

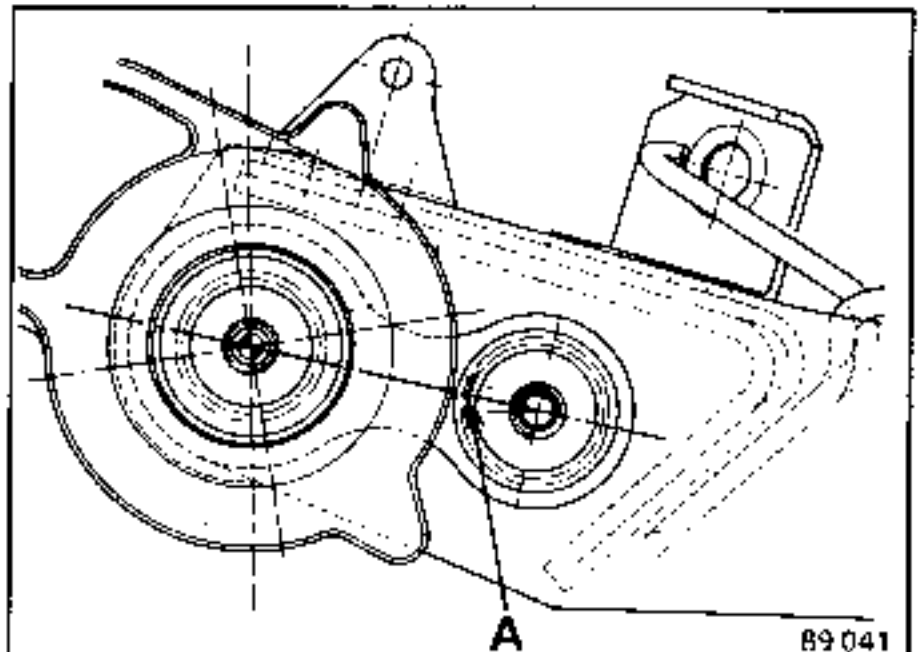
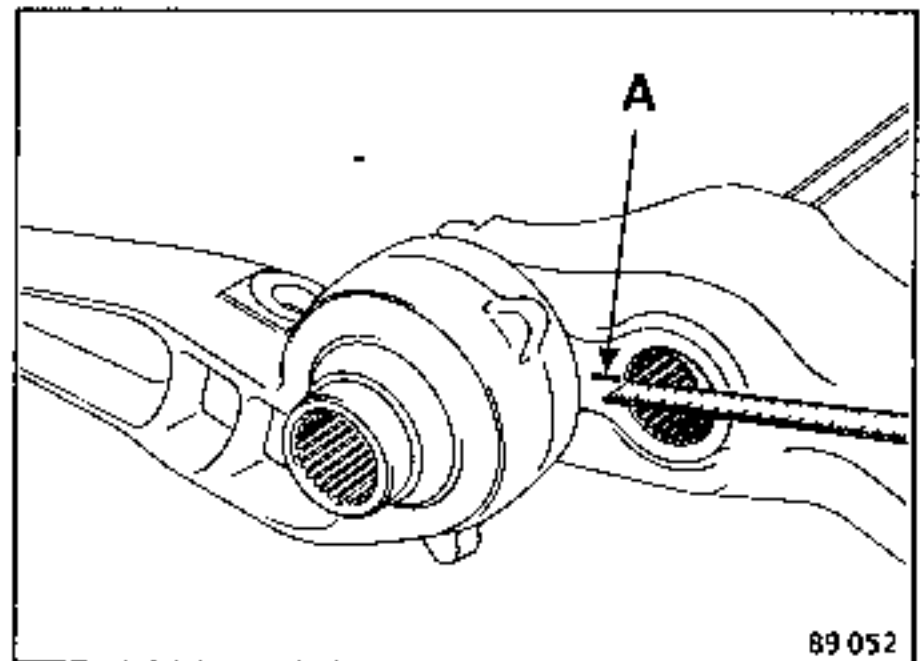
C409-C40X/B40X poor road version
F40X

NOTE : these vehicles do have position marks on the bars.

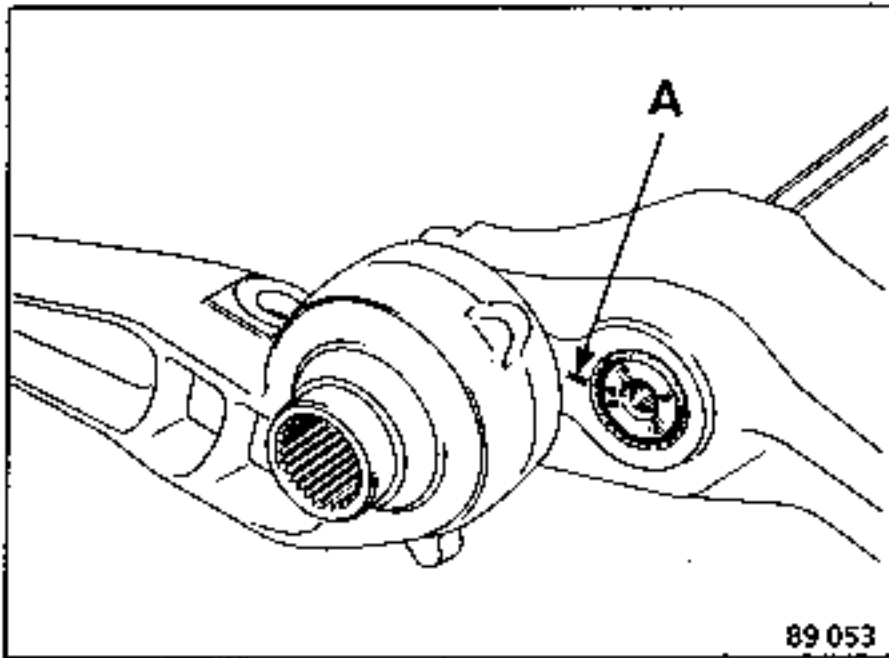
The marks are only on the bars and therefore corresponding marks must be made on the suspension arm outer anchor points.

To do this :

- lay a rule across the centres of the two anchor points and make a mark (A) (at the bottom of a spline),



- fit (after greasing the anchor point) :
- . one anti-roll bar, with the crest of its marked spline in line with the mark on the arm,

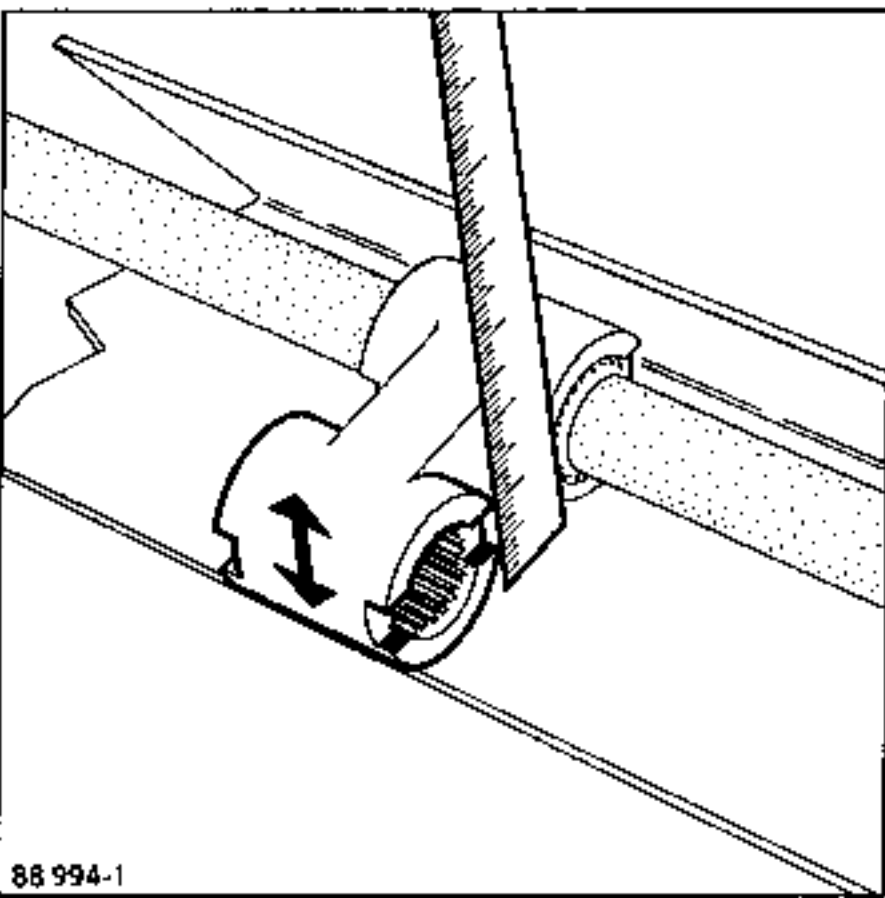


- . the double shackle parallel with the longest length of the angle section,
- . the 2nd anti-roll bar with the marked spline (1) in line with the mark on the arm.

All types - compensating for the play in the double shackle.

The movements of the vehicle suspension are accompanied by relative movements of the double shackle and the angle section. To avoid these two components striking one another as they move, it is essential to carry out the following operations to position, correctly, the shackle.

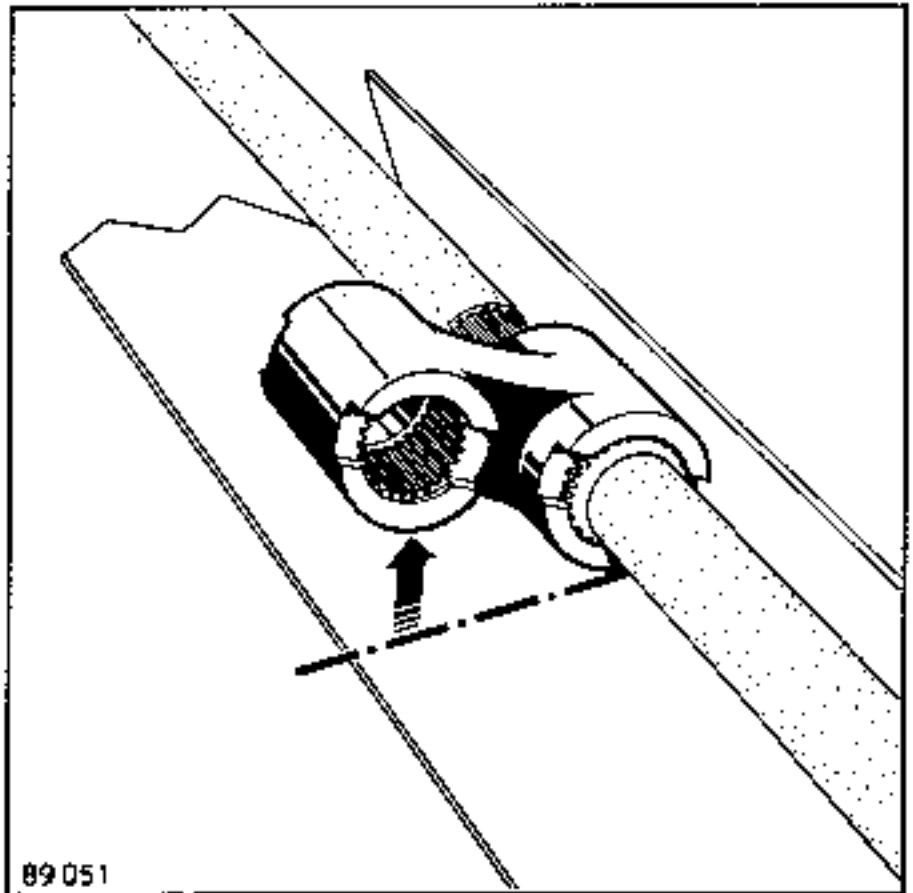
Measure the clearance caused by the play in the shackle.



Find, on chart I (page 33-44) the correction to be applied in number of splines.

Remove one of the bars.

Move out the shackle and turn it by the number of splines obtained from the chart to move it away from the longest arm of the angle section.

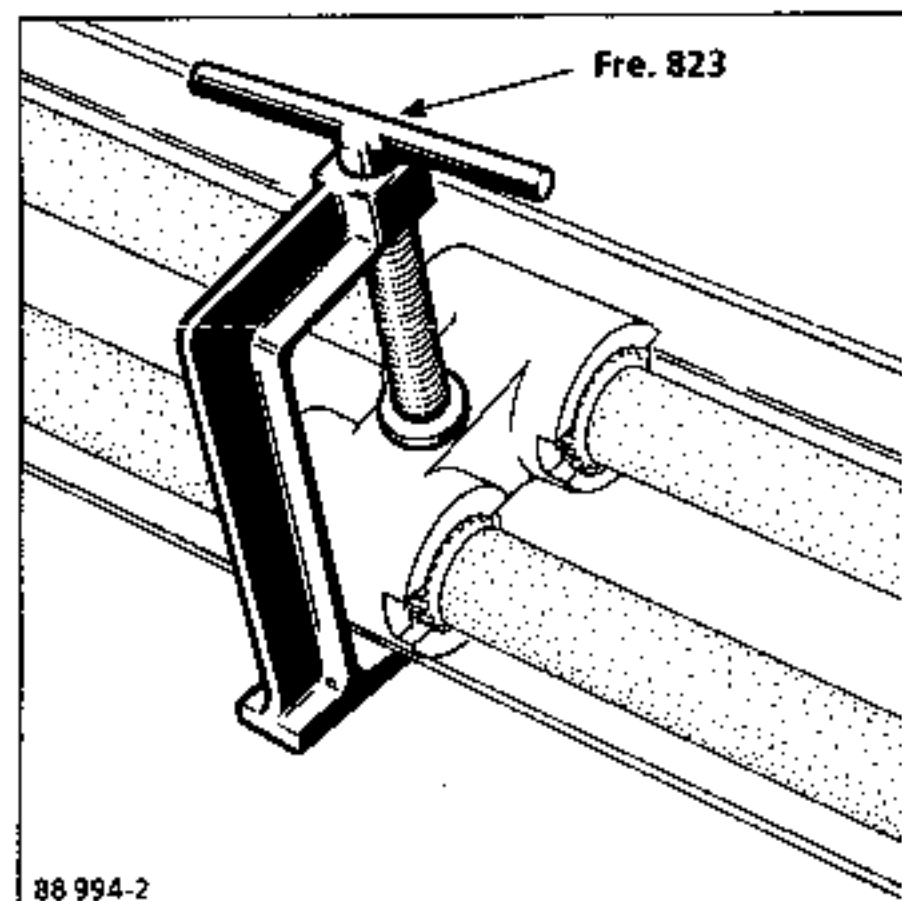


Refit the double shackle, in its new position, on the bar remaining in place.

Release the bar-shackle assembly and move them towards the "L" section by the same number of splines.

Refit the 2nd bar, offset by the same number of splines (in the opposite direction to the 1st as seen from the outer anchor point end).

Fit the two suspension bars, in the position where they will enter freely and clamp the double shackle with a tool of the Fre.823 type.

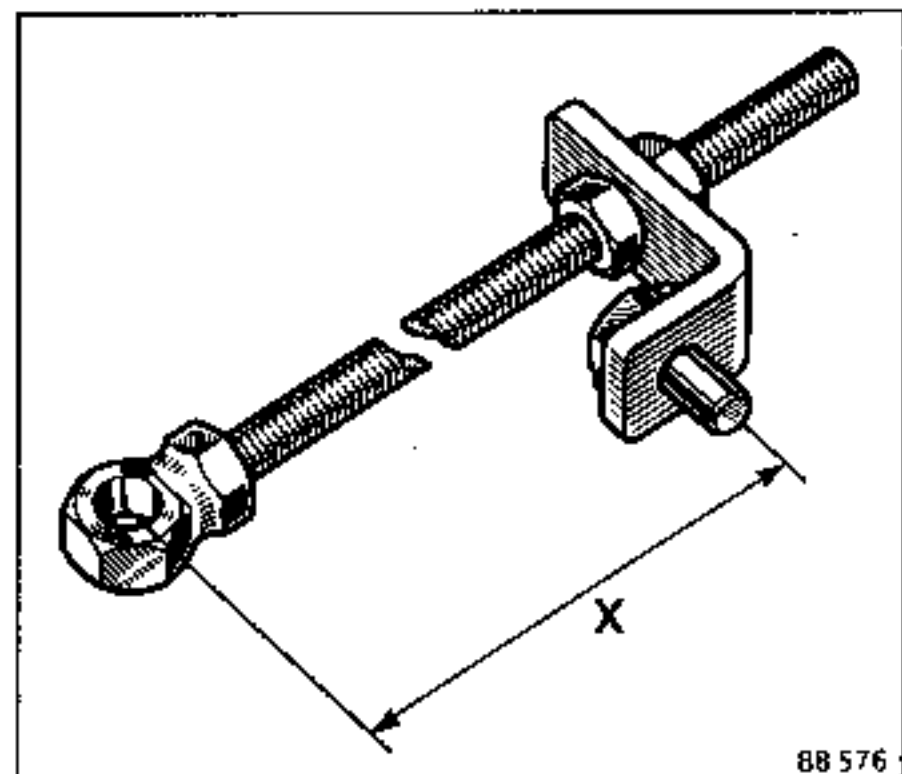


Fit the rear axle assembly to the vehicle.

To place the suspension arms in a position that permits the suspension arms to be fitted correctly, two tools will have to be made locally as shown by the drawing on page 33-36.

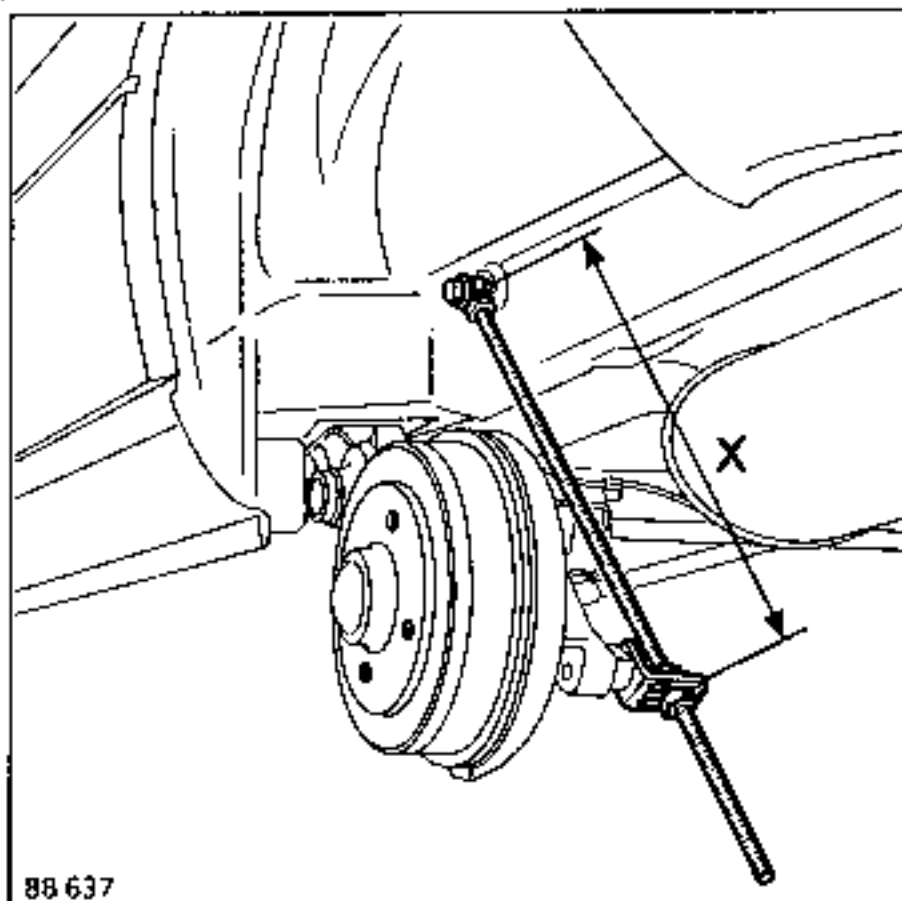
Pre-adjust the two tools to obtain a dimension "X" of :

C 405 - C 409	X = 385 mm
B 40X/C 40X (poor road)	X = 425 mm
F 40X	X = 415 mm



Remove the clamp Fre.823 and free the suspension bars from their anchor points in the double shackle and the bearings.

Fit the two tools in place of the shock absorbers.



Coat the splines with grease MOLYKOTE BR2 and engage one of the suspension arms, turning it to find the point where it will enter freely.

NOTE : it is essential for the splines to be absolutely clean and thoroughly greased to determine the point at which the bars will enter freely.

Insert the other bar in the same way.

Ensure that the position marks (1) on the suspension arms are in the same positions on either side. A difference of 2 splines is acceptable. If the difference is too great, it will have to be corrected by adjusting the positions at which the bars will enter freely.

Lower the vehicle on to its wheels and measure the underbody heights (see section "Underbody height - Four bar rear axle").

Check and, if necessary, adjust :

- the brake compensator,
- the headlights.

CHART I

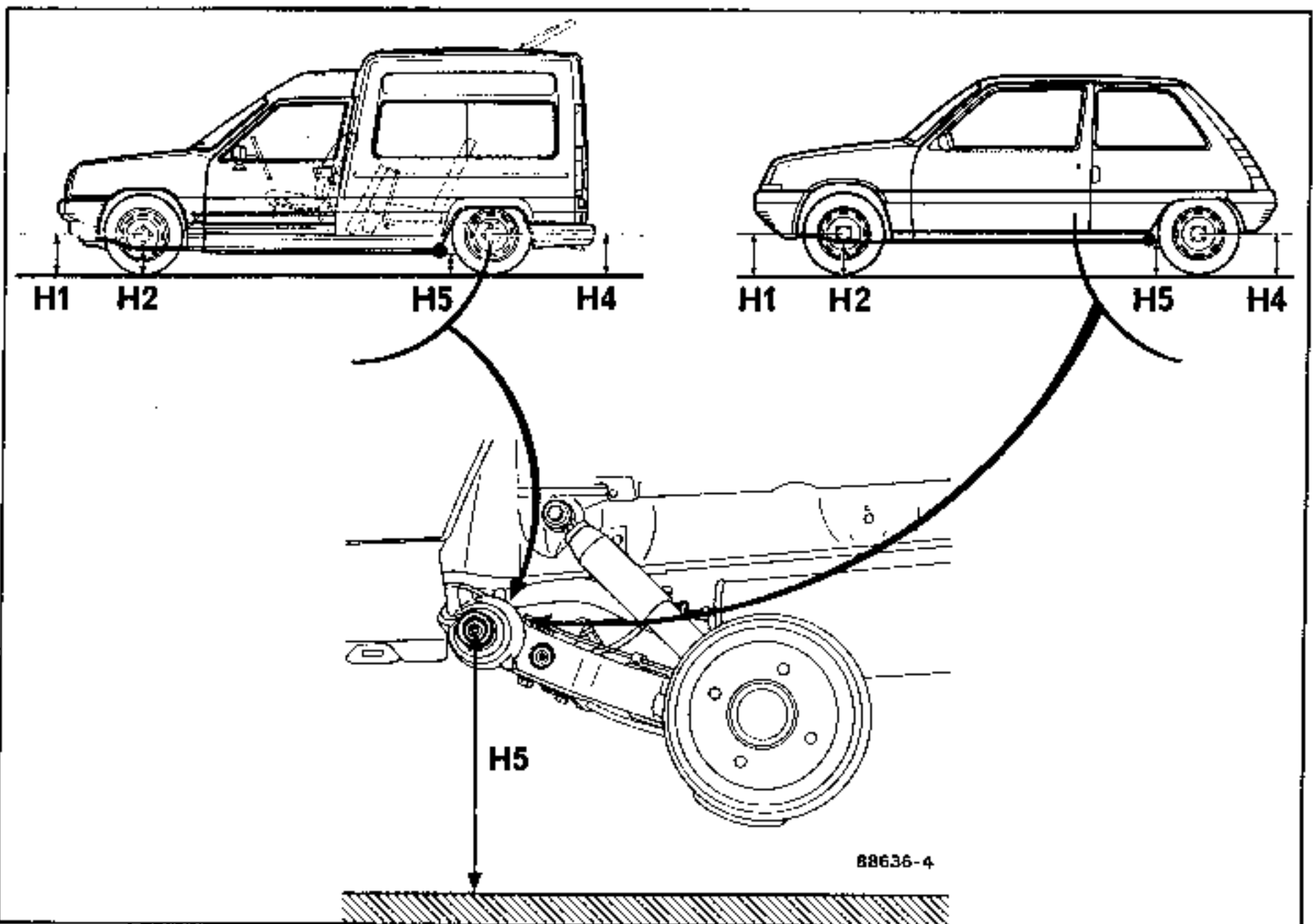
Play measured (mm)	Number of splines to compensate
2 to 4	1
5 to 6	2
7 to 8	3
9 to 10	4
11 to 12	5
13 to 14	6
15 to 16	7
17 to 18	8
19 to 20	9

CHART II

Height adjustment required (mm)	Number of splines to compensate
5	2
10	4
15	6
20	8
25	10
30	12
35	14
40	16
45	18
50	20

CHECKING

Park the vehicle, unladen, with its fuel tank full, on a flat horizontal surface.



GOOD ROAD VERSIONS

C405 - C409 → MOD 88

$$H1 - H2 = 97 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

$$H4 - H5 = 20 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

C405 - C409 MOD 88 →

$$H1 - H2 = 101 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

$$H4 - H5 = 23 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

F400 - F401 - F402 - F404 - F407 - F40H - F40M

$$H1 - H2 = 61 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -40 \begin{matrix} -10 \\ +5 \end{matrix} \text{ mm}$$

POOR ROAD VERSIONS

B401 - C401 - B402 - C402

$$H1 - H2 = 51 \begin{matrix} +10 \\ -5 \end{matrix} \text{ mm}$$

$$H4 - H5 = -27 \begin{matrix} -10 \\ +5 \end{matrix} \text{ mm}$$

Three cases may occur where adjustment is required :

1. the height is correct on one side but the difference between right and left is too great.
2. the heights are incorrect and the RH/LH difference is too great.
3. the heights are incorrect but the RH/LH difference is within limits.

ADJUSTING

1. CASES WHERE A REAR AXLE ASSEMBLY HAS BEEN REPLACED

A The underbody height is correct on one side but the difference between the RH and LH sides is too great

A difference between the RH and LH sides is still taken up by adjusting the anti-roll bar on the lowest side.

NOTE : It is essential to adjust from the lowest side in order to bring it up towards the highest side.

Mark the positions in the bearings and the double shackle of :

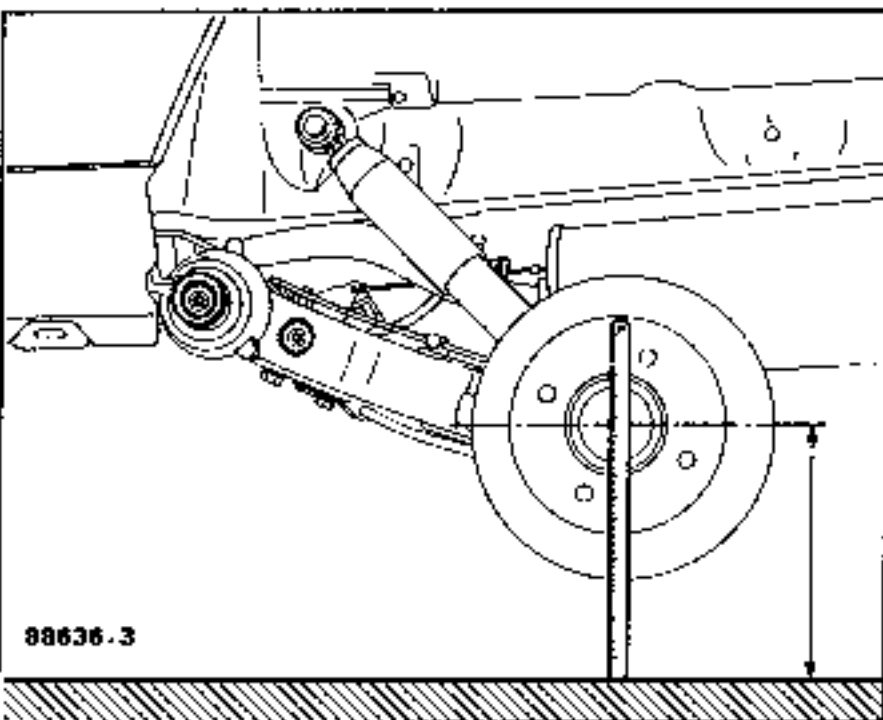
- the two suspension bars,
- the anti-roll bar on the lowest side.

Fit the special tools in place set to the dimension "X" that corresponds to the vehicle type.

Remove :

- the suspension bars,
- the anti-roll bar which has been marked.

Measure the dimension from the centre of



the wheel to the ground (on the side which has no anti-roll bar).

Reduce this dimension by the difference between the right and left hand sides already measured by increasing dimension "X" on the tool.

NOTE : do not change the setting of the tool on the other side.

In this new position, refit :

- the anti-roll bar, at the point where it enters freely, and check the offset of the splines in the suspension arm and in the double shackle (see chart II on page 33-44),
- the two suspension bars without any offset of the position marks.

Fit :

- the shock absorbers,
- the wheel.

Lower the vehicle on to its wheels and check, and adjust, if necessary :

- the brake compensators,
- the headlights.

B If the heights are incorrect and the difference between the RH and LH sides is too great.

The difference between the RH and LH sides is still adjusted at the anti-roll bar on the lowest side.

NOTE : it is essential to adjust on the lowest side to bring it back up towards the highest side.

Mark the positions in the bearings and double shackle of :

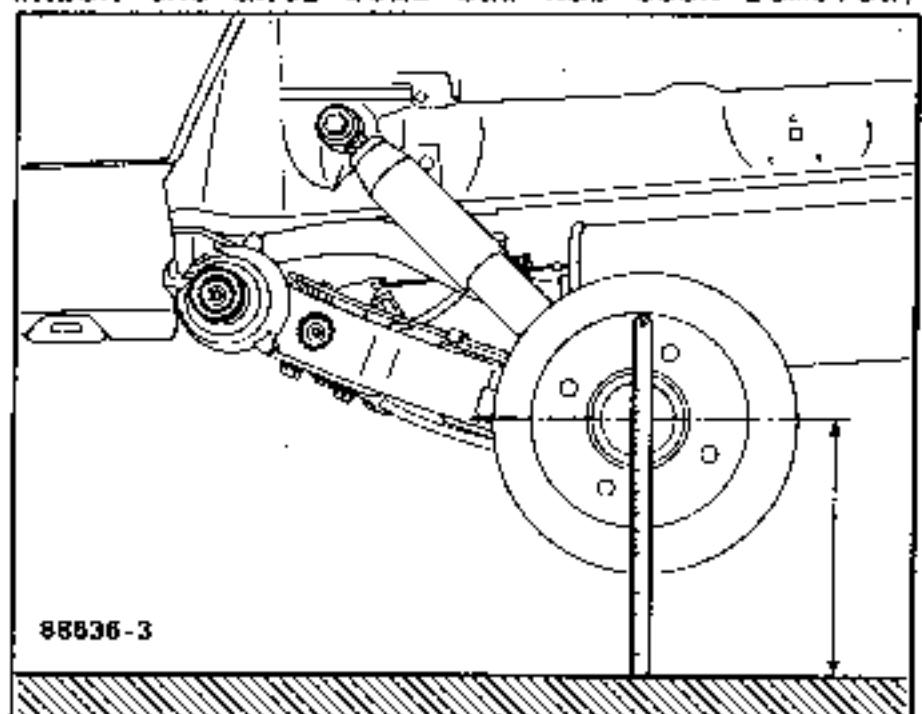
- the two suspension bars,
- the anti-roll bar on the lowest side.

Set the tools to the dimension "X" that corresponds to the vehicle type.

Remove :

- the suspension bars,
- the anti-roll bar which has been marked.

Measure the dimension from the centre of the wheel to the ground (on the side from which the anti-roll bar has been removed).



Reduce this dimension by the difference between the right and left hand sides already measured by increasing dimension "X" on the tool.

NOTE : do not alter the adjustment of the tool on the other side.

In this new position, refit the anti-roll bar at the point where it enters freely and check the offset on the splines in the suspension arm and the double shackle (see chart II on page 33-44).

Then, by adjusting both tools, increase or reduce the distance between the centres of the wheels and the ground, simultaneously on both sides, by the difference between the correct height and that measured on the highest side when the vehicle was initially checked.

In this position, refit the suspension bars at the point where they enter freely and check the amount by which the splines are offset (see chart II on page 33-44).

Refit :

- the shock absorbers,
- the wheels.

With the vehicle resting on its wheels, check, and if necessary adjust :

- the brake compensator,
- the headlights.

C If the heights are incorrect but the difference between the RH and LH sides is within the tolerances

The underbody height is adjusted at the suspension bars.

Mark the positions of the two suspension bars in their bearings and in the double shackle.

Fit the special tools set at the dimension "X" for the vehicle in question.

Remove the suspension bars.

Measure the distance between the centres of the wheels and the ground (on both sides).

By adjusting both tools, reduce or increase this dimension, simultaneously, on both sides by the difference between the correct height and that measured when the vehicle was initially checked.

Refit the suspension bars at the points where they slide in freely and check the amount by which the splines are offset (see chart II on page 33-44).

Fit :

- the shock absorbers,
- the wheels.

Lower the vehicle on to its wheels, check and if necessary, adjust :

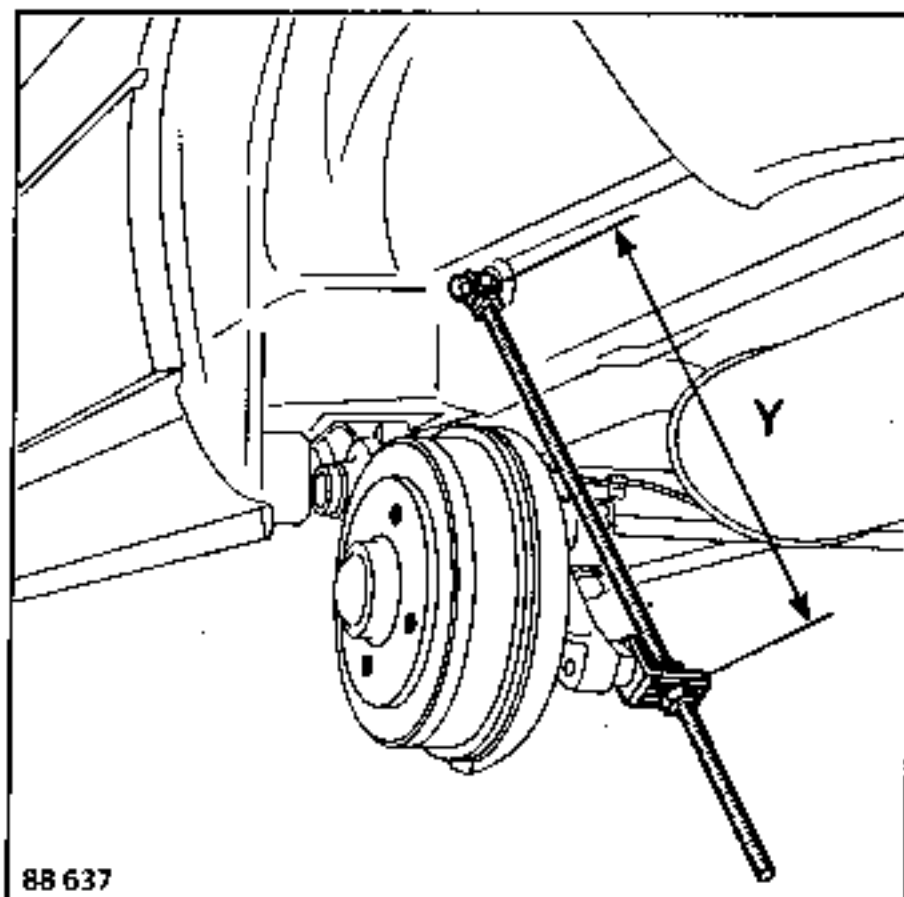
- the brake compensator,
- the headlights.

2. READJUSTING THE SUSPENSION ON A VEHICLE

When readjusting the suspension of a vehicle that has already covered a certain mileage, it is important to determine the position at which the bars enter freely.

Remove the wheels and the shock absorbers.

Fit the special tools in place of the shock absorbers setting them at the dimension "Y" that corresponds to the positions of the suspension arms when they are hanging free.

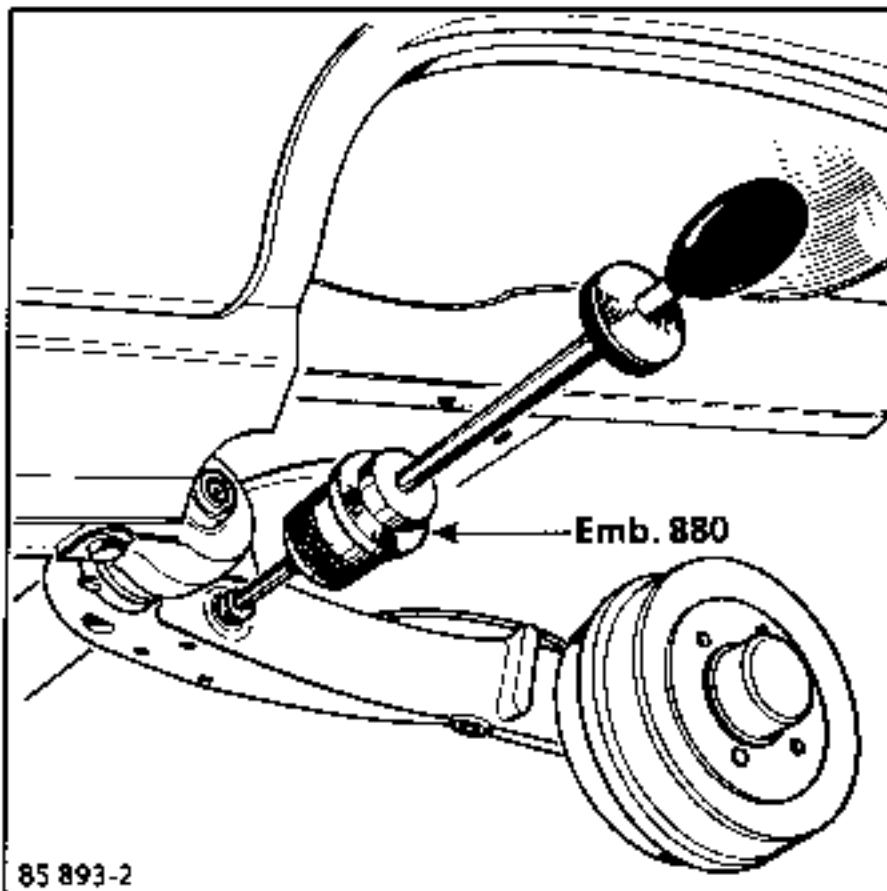


A If the difference between the RH and LH sides is too great

Mark the positions in their bearings and in the double shackle of :

- both suspension bars,
- the anti-roll bar on the lowest side.

Remove the three bars using tool Emb.880.



Thoroughly clean and grease the anchor points and the bars.

Find, by altering dimension "Y" on the side on which the anti-roll bar has been removed, the position at which the bar enters freely that corresponds to the position marks. From this position, adjust both tools simultaneously to determine the position at which the suspension arms enter freely in line with the position marks.

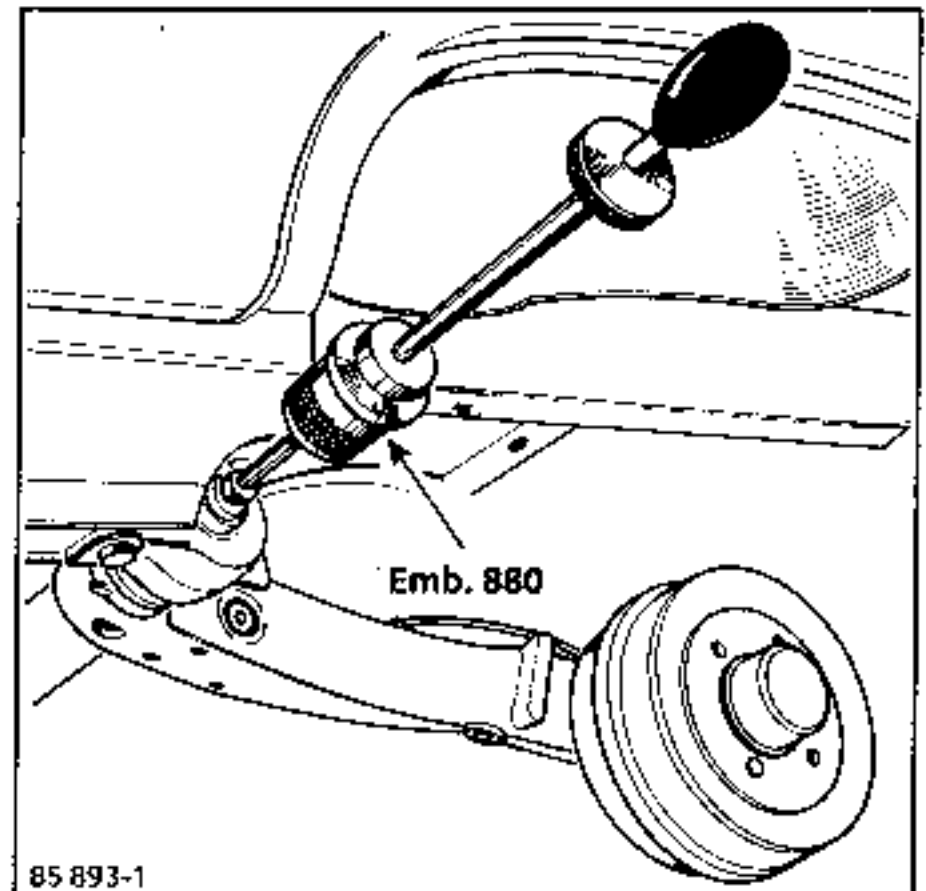
Lock the tools at the dimensions "Y" thus obtained.

Carry out the adjustment in this new position (see the section on "Adjusting the axle after a rear axle assembly has been replaced").

B Underbody heights that are incorrect but are the same on the RH and LH sides

Mark the positions of the two suspension bars in their bearings and in the double shackle.

Remove the two bars using tool Emb.880.



Thoroughly clean and grease the anchor points and the bars.

Adjust both tools simultaneously to determine the point at which the bars enter freely in line with the position marks.

Lock the tools at the dimension "Y" thus obtained.

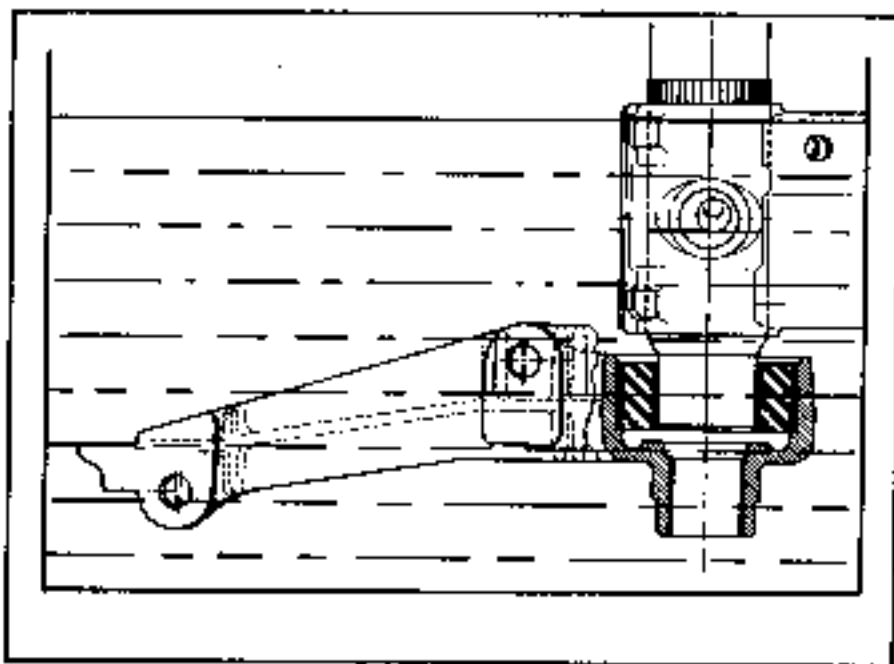
Carry out the adjustment in this new position (see the section on "Adjusting after the rear axle has been replaced"*)).

(*) WARNING : when readjusting the suspension, it is dimension "Y" which is used as the starting point for the adjustment and not the dimension "X" stated in this manual.

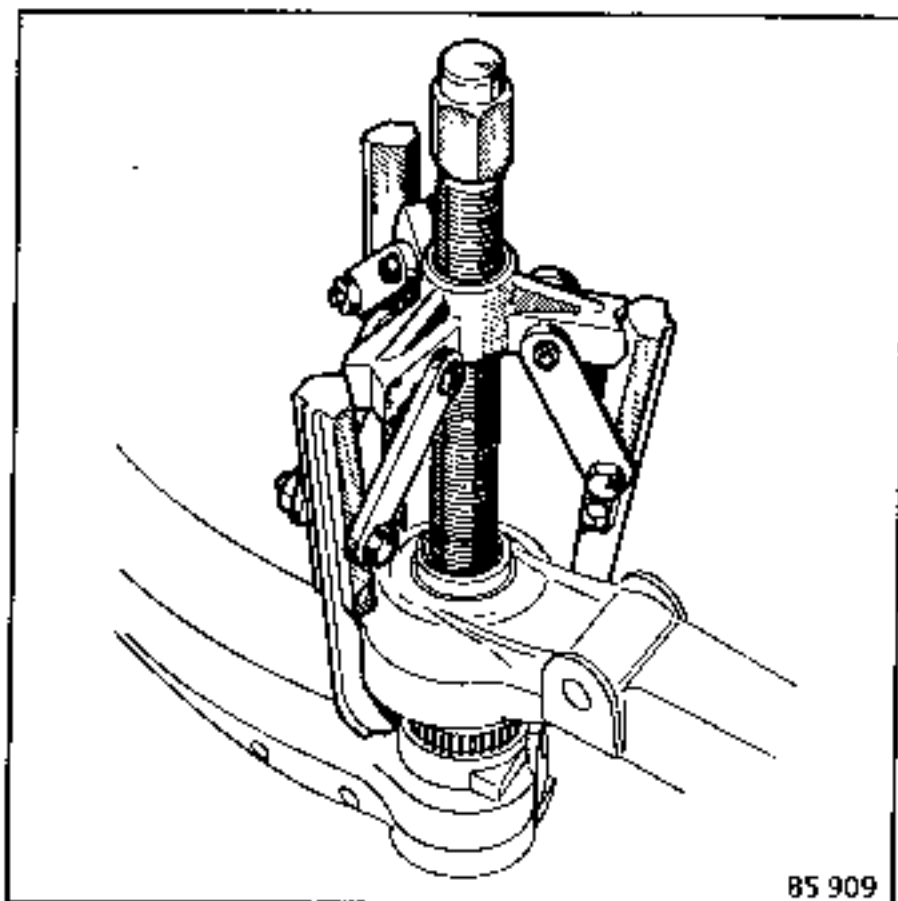
This operation is carried out after removing the rear suspension arms from the vehicle.

DISMANTLING

Fully immerse the bearing in brake fluid to soften the rubber bush.

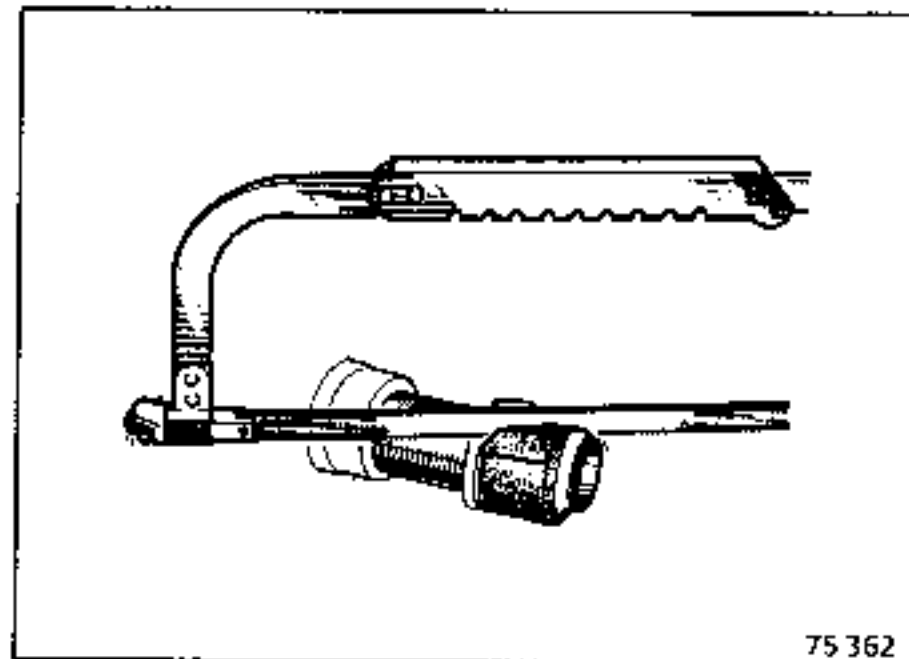


Using a two or three arm extractor, remove the outer part of the bearing by tearing away the rubber.



85 909

Saw off the inner bush taking care not to score the tube or the suspension arm.



75 362

REFITTING

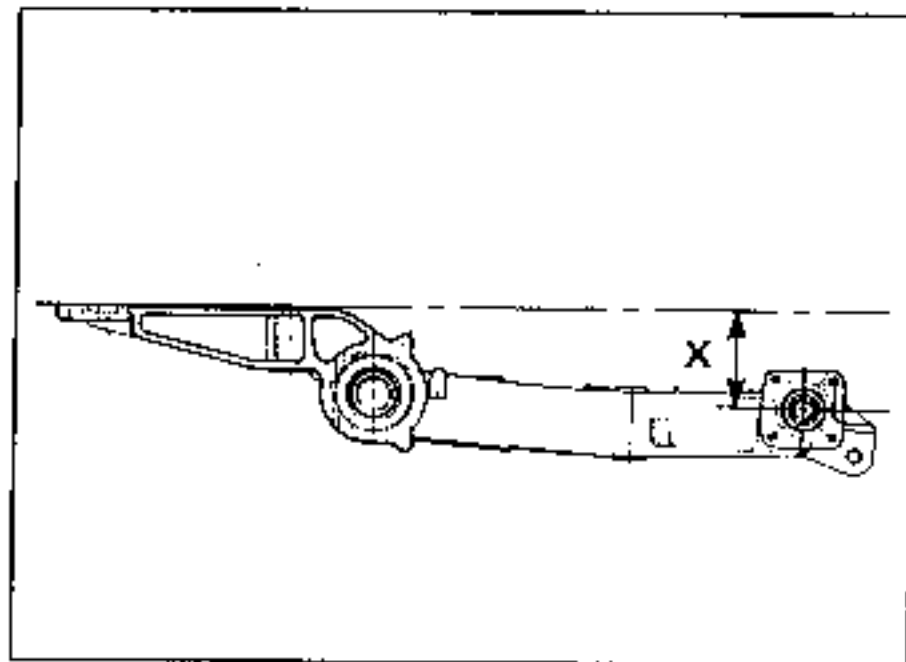
The new bearing is fitted to the suspension arm, on the press ensuring that its position and spacing, with reference to the arm, are correct.

Position

Ensure that dimension "X" between the locating face of the bearing and the stub axle centreline is correct.

B40X - C40X - S40X

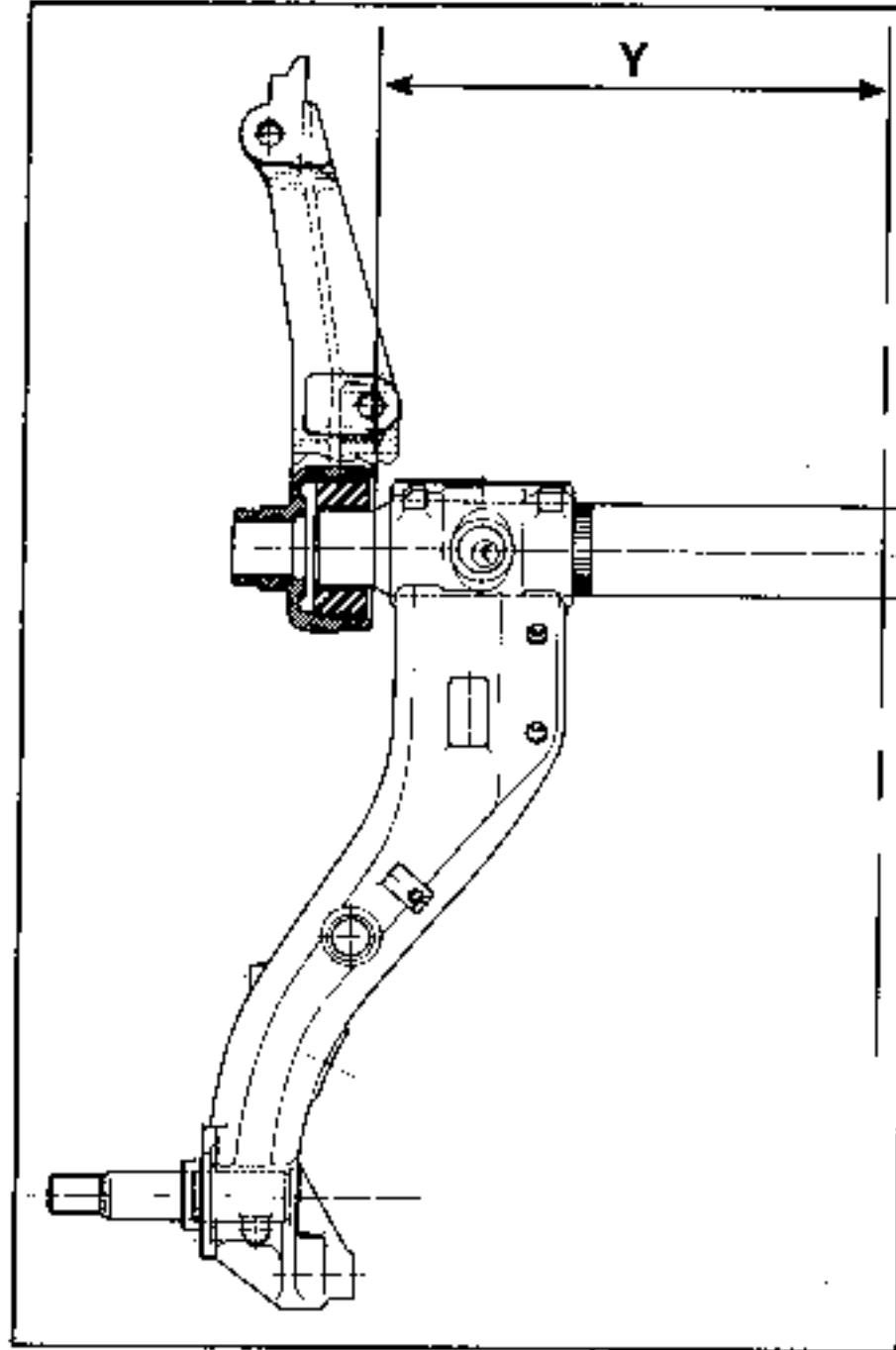
X = 83 mm



Spacing

With it in this position, push in the bearing until the bearing between centres dimension :

$$Y = 1054 \pm 1 \text{ mm}$$

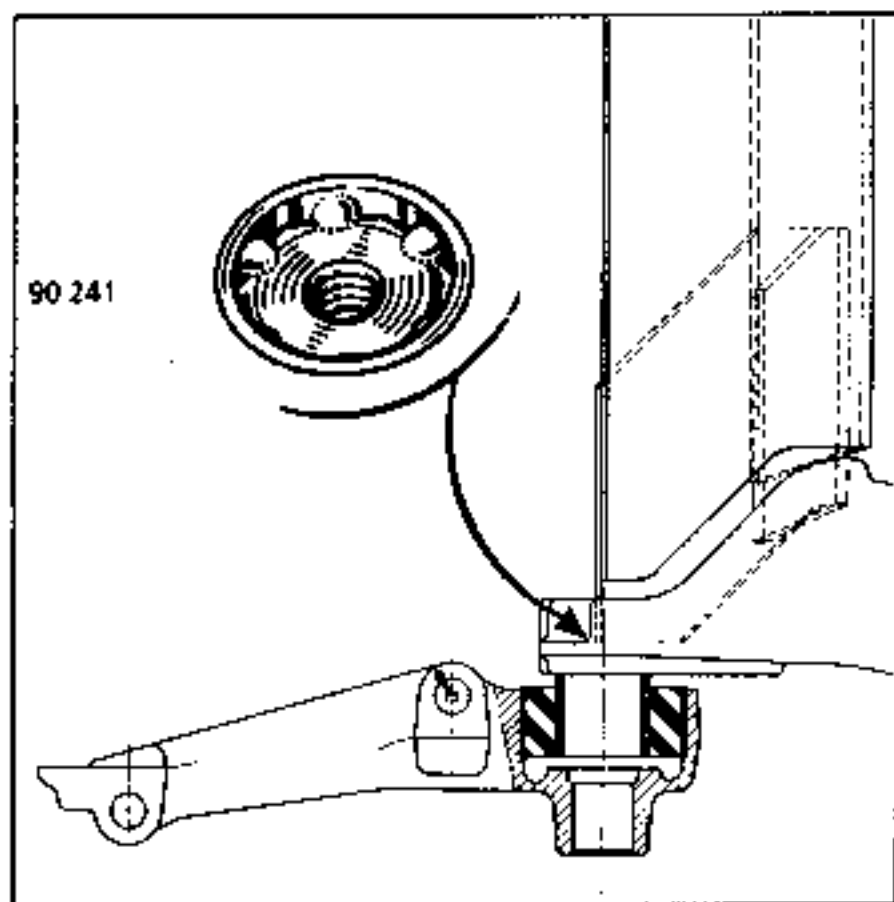


Refit the suspension arm to the vehicle.

This operation is carried out after the rear axle and the suspension arms have been removed from the vehicle.

DISMANTLING

Weld a spacer (for example a nut) into the bore of the bearing inner bush.



Push out the bush-bearing assembly on the press.

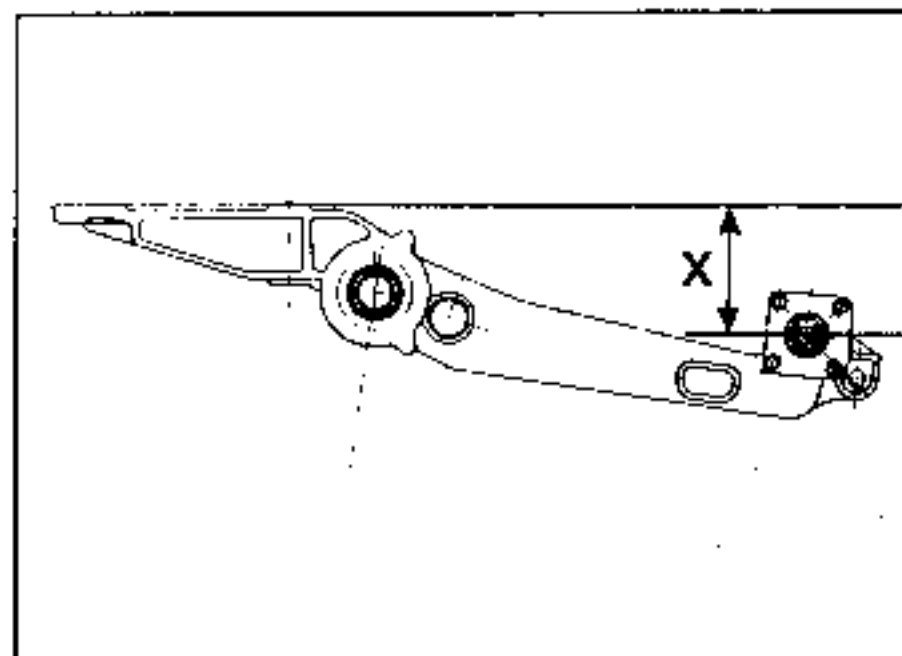
REFITTING

The bearing is fitted to the suspension arm on the press, ensuring that its position and spacing with reference to the suspension arm are correct.

Position

Ensure that dimension "X" between the locating face of the bearing and the stub axle centreline is correct.

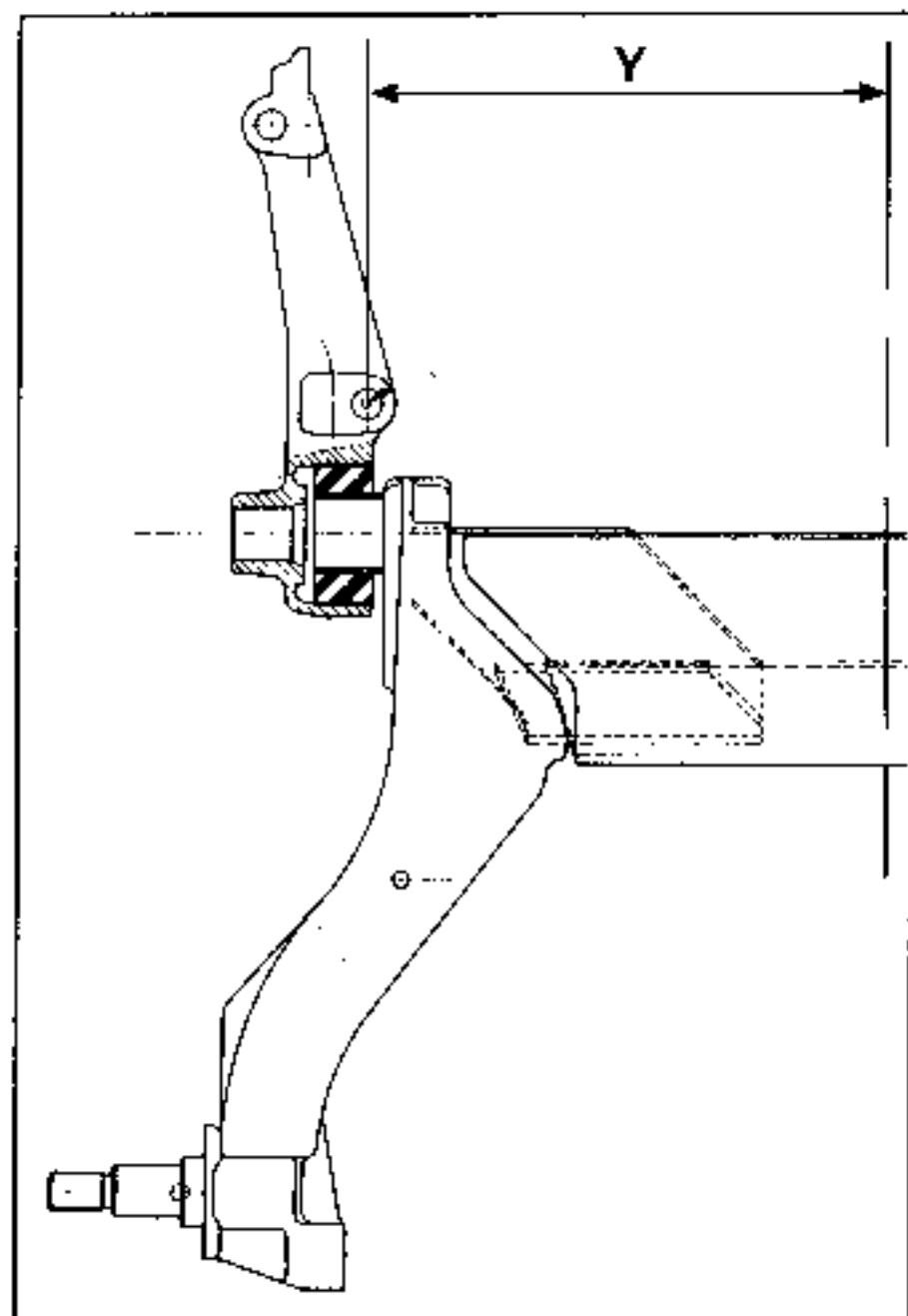
C405-C409	X = 74 mm
F40X	X = 123 mm
B40X/C40X (poor road)	X = 100 mm



Spacing

With the bearing in this position, push it in until the bearing between centres dimension :

$$Y = 1054 \pm 1 \text{ mm}$$



Fit the rear axle assembly to the vehicle and refit the suspension bars (see corresponding section).

WHEELS

The wheel identification mark can take one of two forms :

- engraved marking in the case of pressed steel wheels,
- cast-in marks in the case of light alloy wheels.

The identification mark shows the main dimensional specifications of the wheel.

It may be stated in full :

Example : 5 1/2 J 14 4 CH 36

or simplified

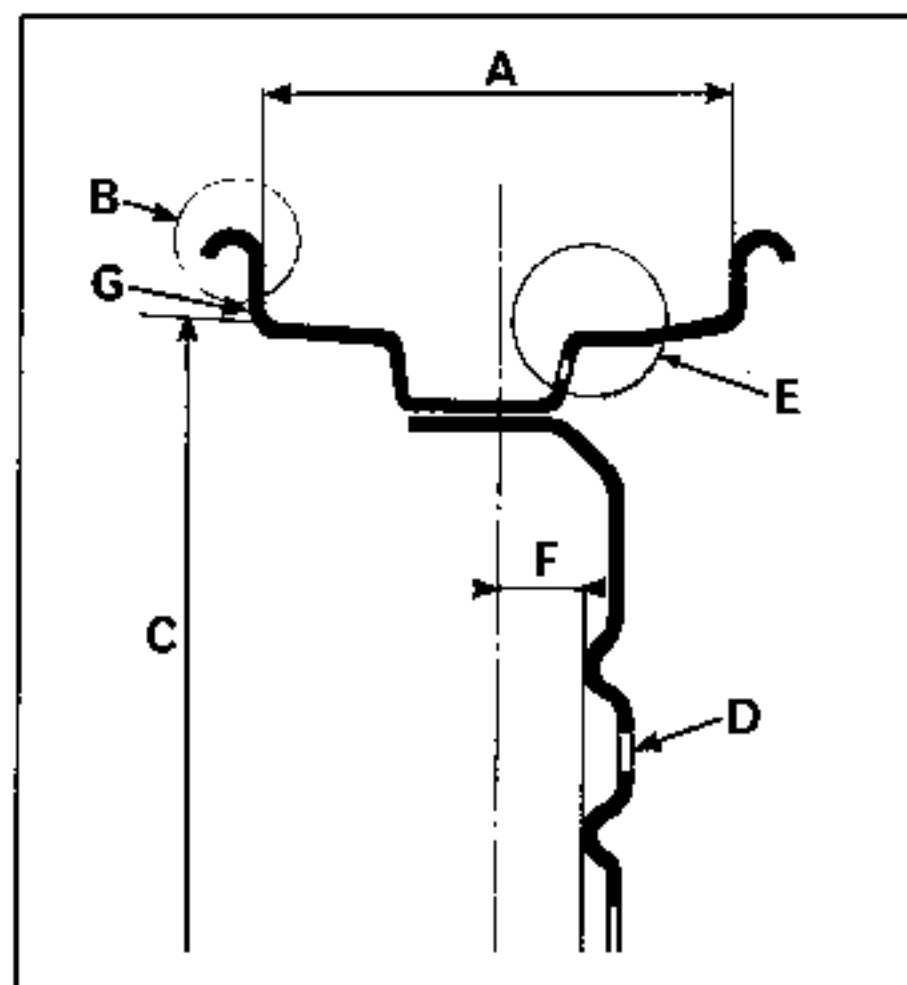
Example : 5 1/2 J 14

	A	B	C	D	E	F
WHEEL TYPE	WIDTH (in inches)	RIM EDGE PROFILE	NOMINAL ϕ (in inches) At the tyre bead	NUMBER OF HOLES	Tyre locating profile	Offset in mm
5 1/2 J 14 4 CH 36	5 1/2	J	14	4	CH	36

The wheel bolts are on a pitch circle diameter of 100 mm.

Maximum run-out : 1.2 mm measured at the wheel rim (point G).

Maximum eccentricity: 0.8 mm measured on the tyre bead locating surface.

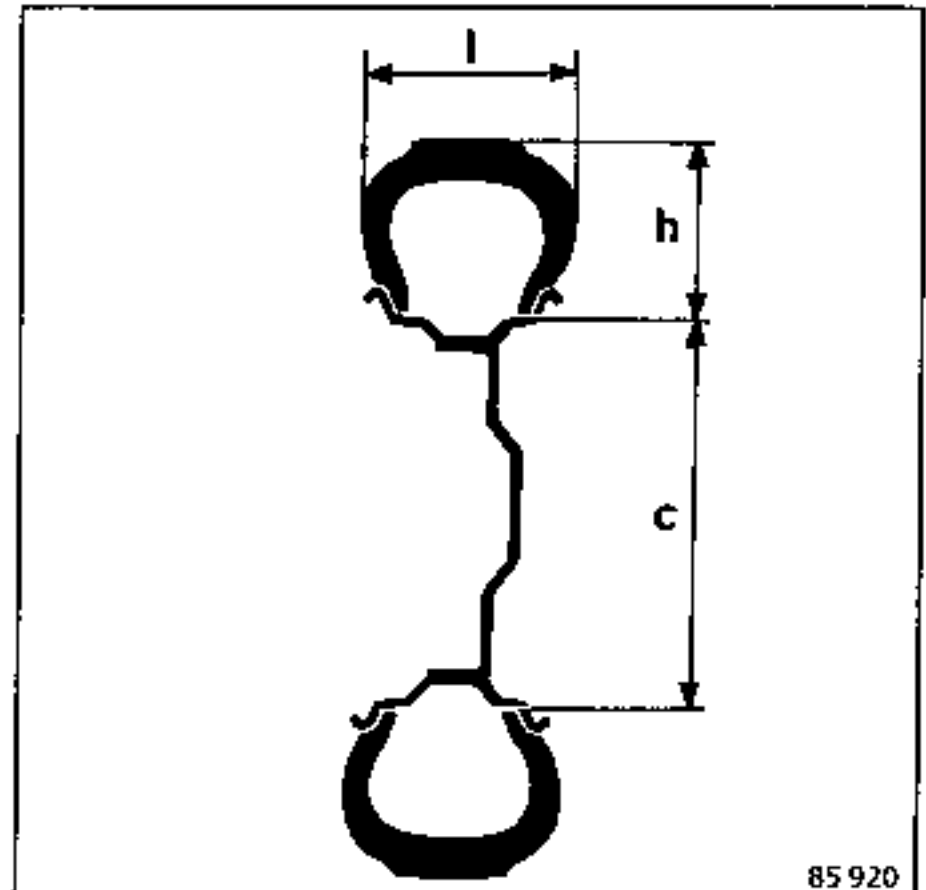


TYRES

The identification marking for any given tyre type can take two forms.

Example : 175/70 S R 13
or 175/70 R 13 80 S

175	/	70	S	R	13	
(1)		(2)	(3)	(4)	(5)	
175	/	70	R	13	80	S
(1)		(2)	(4)	(5)	(6)	(3)



1	175	Tyre width :	Expressed in millimetres (or in inches) and measured at the widest part of the tyre	
			l = 175 mm	
2	70	Series or h/w ratio	h/w = 0.8 (normal)	no inscription
			h/w = 0.7 (low profile)	70
			h/w = 0.6 (extra " ")	60
3	S	Maximum speeds :	up to 180 km/h	S
			up to 190 km/h	T
			up to 200 km/h	U
			up to 210 km/h	H
			up to 230 km/h	V
			More than 230 km/h	Z
4	R	Type of body :	Cross ply	no inscription
			Radial	R
			Bias belted	B
5	13	Diameter of wheel	Expressed in inches and in millimetres. c = 13 inches	
6	80	Index showing the load capacity of each tyre.		

VEHICLE TYPES			WHEELS	TYRES
B400	C400	S400	4 1/2 X 13	145/70 R 13 S
B401	C401	S401	4 1/2 X 13	145/70 R 13 S 155/70 R 13 S
B402	C402			
B403	C403			
B404	C404	S404		
B407	C407			
B40F	C40F	S40F		
B40H	C40H			
B40J	C40J			
B40M	C40M			
B403	C403		5 X 13	165/65 R 13 T
B404	C404			
B408	C408			
B40G	C40G			
B40J	C40J			
B40K	C40K			
C405			5 1/2 X 13	175/60 R 13 H 195/55 R 13 H
C409				
F400			5 X 13	145 R 13 S
F401				
F40H				
F401			5 X 13	155 R 13 S
F402				
F404				
F407				
F40F				
F40M				

The tyres used are of the Tubeless type.

The inflation pressures must be checked when the tyres are cold. The temperature rise whilst the vehicle is being driven causes a pressure increase of 0.2 to 0.3 bars.

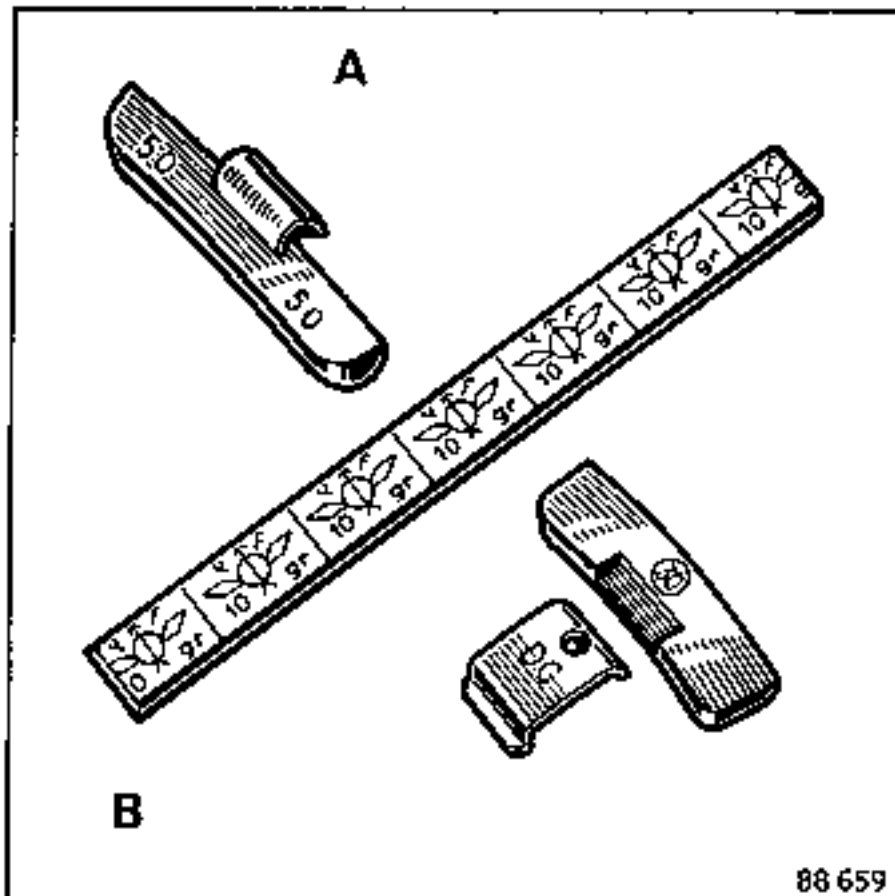
If the tyre pressures are ever checked when the tyres are warm, allow for this pressure increase and never deflate the tyres.

BALANCING WEIGHTS

Use only those balance weights supplied by the Parts Department :

- they are secured by hooks to pressed steel wheels (hooks that form part of the weight),
- they are secured by hooks (flat hooks) or are self-adhesive for light alloy wheels.

- A** Pressed steel wheels
B Light alloy wheels



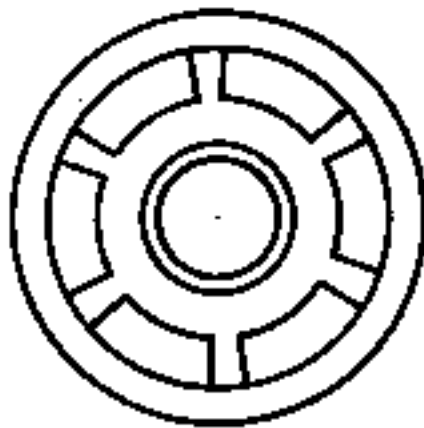


ESSENTIAL SPECIAL TOOLS		
Dir.	812-01	Spanners for tightening the axial ball joints
	or	
Dir.	832-01	
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)

Ball joint nuts	4
Axial ball joint	5

Axial ball joint with flat locking washer



(1)

86 111



(3)



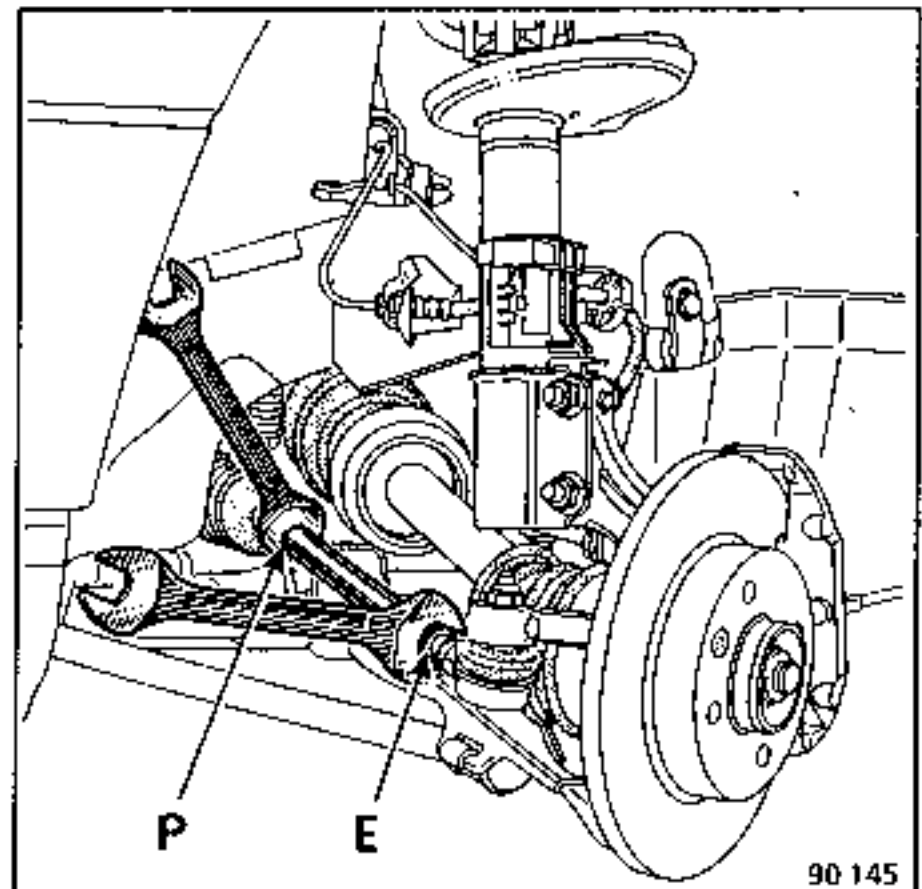
(2)

86 112

REMOVING THE BALL JOINT : assembly (2) must be replaced by a new one whenever removed. If the slots on the ball joint are not damaged, this can be refitted.

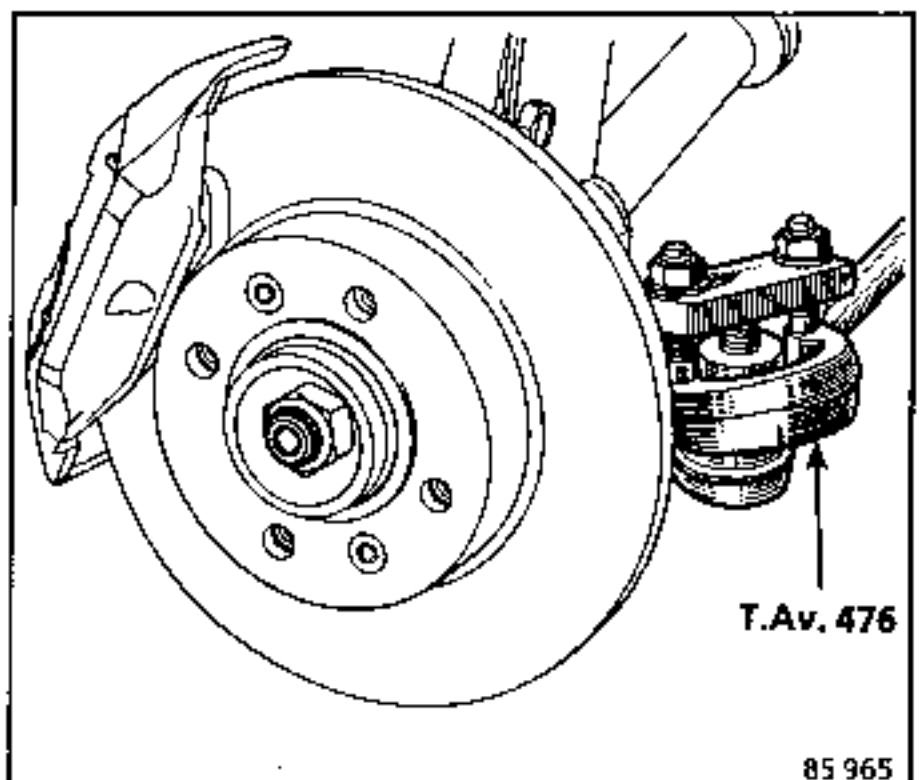
REMOVING

Loosen the lock nut (E) whilst holding the axial ball joint in an open ended spanner at (P).



90 145

Disconnect the steering ball joint using T.Av.476.



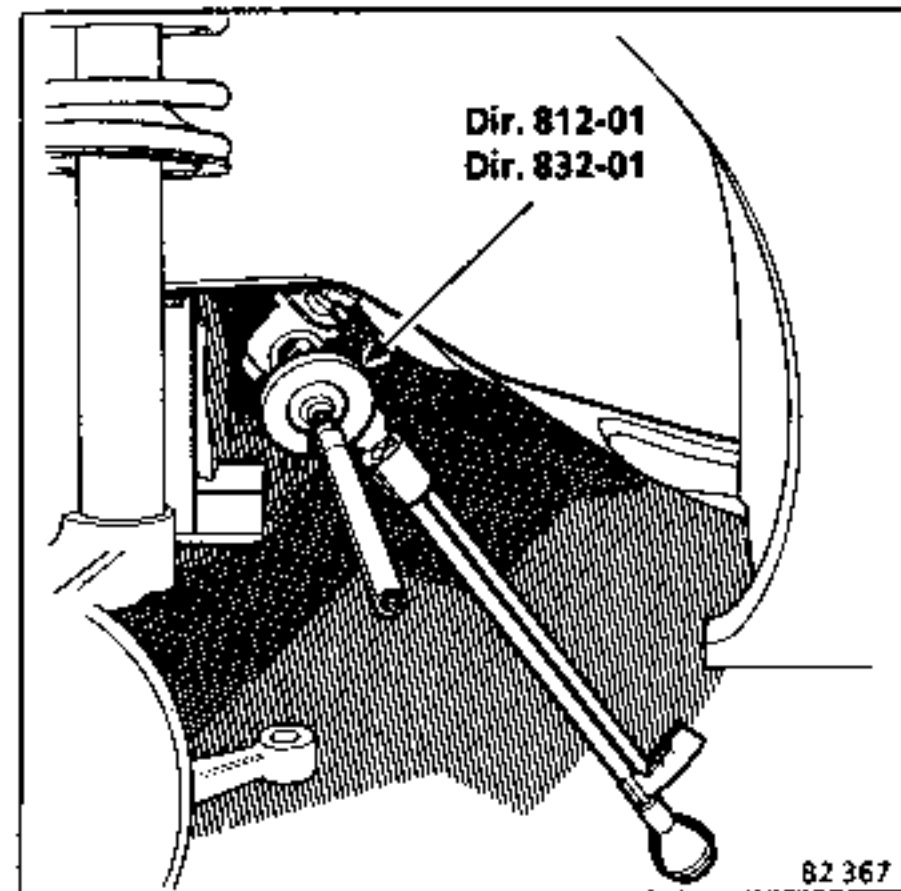
T.Av. 476

85 965

Remove :

- the ball joint casing, counting the number of threads engaged to facilitate adjusting the toe-out on refitting.
- the rack bellows.

Loosen the axial ball joint using spanner Dir.812-01 or Dir.832-01 whilst holding the stop washer (2) with a claw spanner to prevent the rack turning.



NOTE : before tightening the ball joint with spanner Dir.812-01 or Dir.832-01, check that the tabs on the locking washer (2) are in line with the flats (B) on the rack.

Refit the bellows and the clip.

Screw the ball joint into the sleeve by the number of turns noted during dismantling.

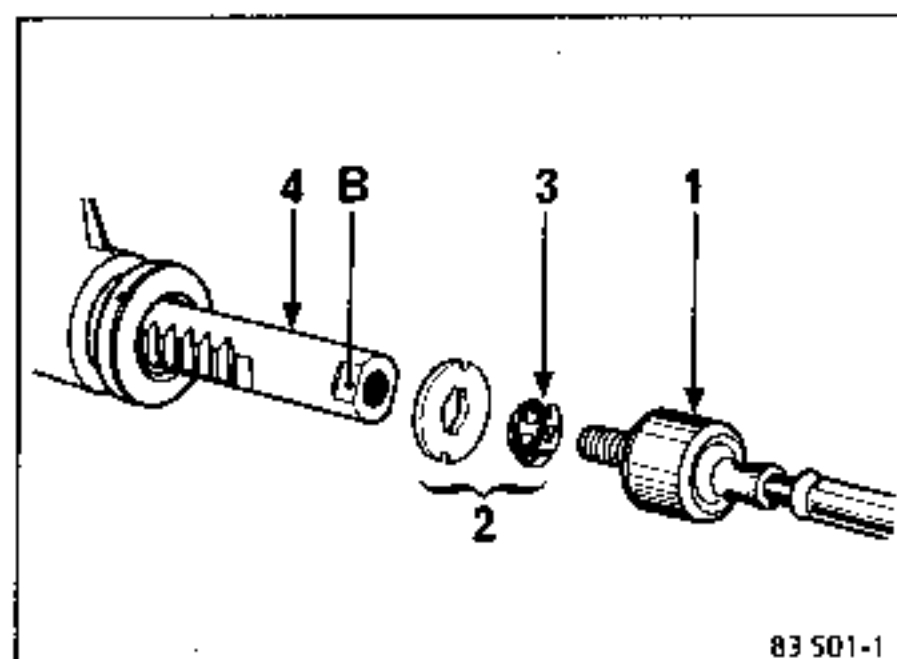
Reconnect the steering link to the stub axle carrier.

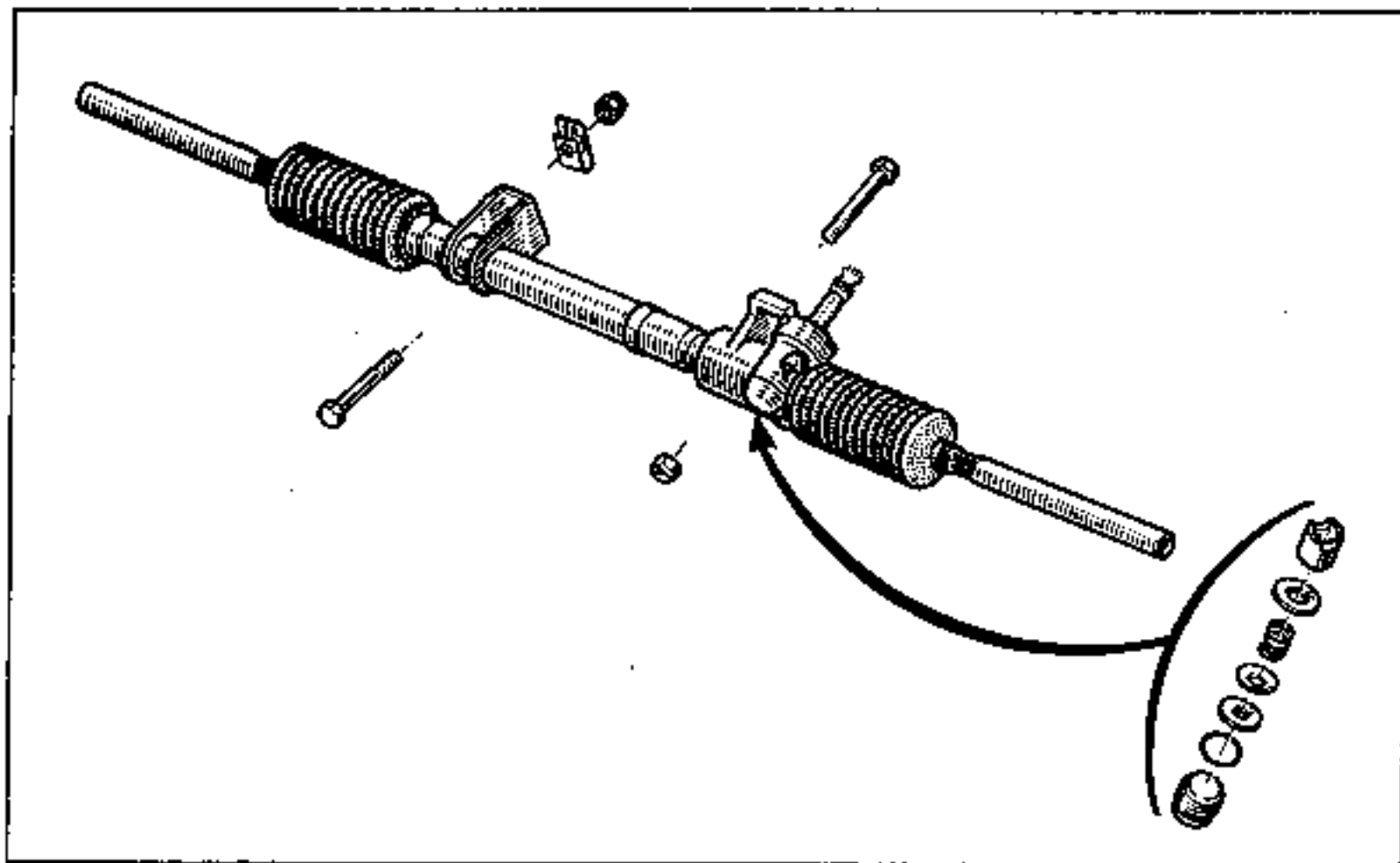
Check and, if necessary, adjust the toe-out then tighten the lock nut on the sleeve.

REFITTING

Fit the following to the rack (4) :

- the stop-locking washer assembly (2),
- the axial ball joint (1) after first coating its threads with LOCTITE "FRENBLOC".





ESSENTIAL SPECIAL TOOLS

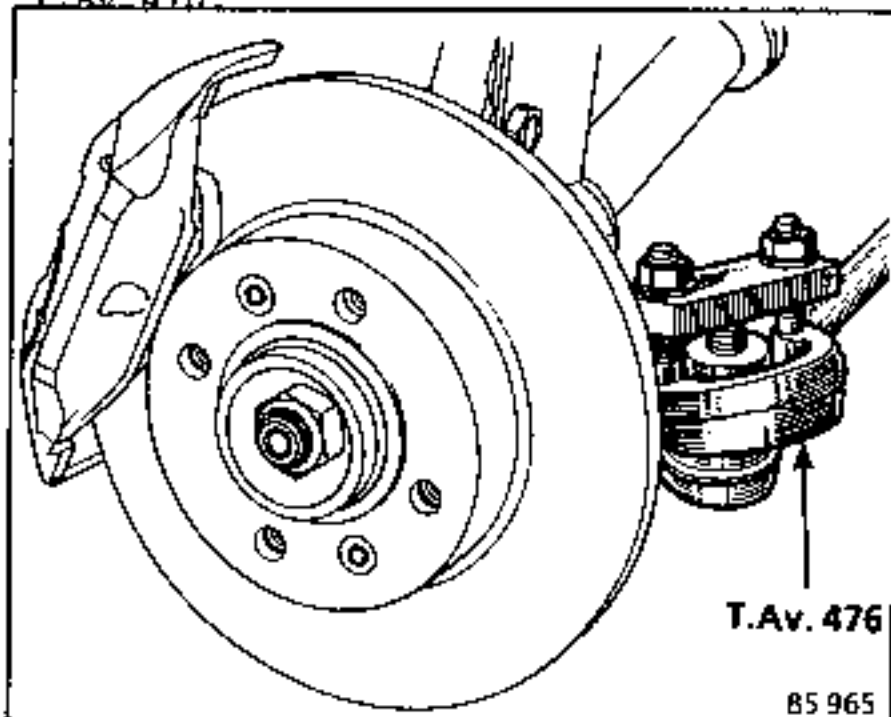
T.Av. 476 Ball joint extractor

TIGHTENING TORQUES (in daN.m)

Steering ball joint nuts	4
Axial ball joints	5
Steering box securing bolts	5

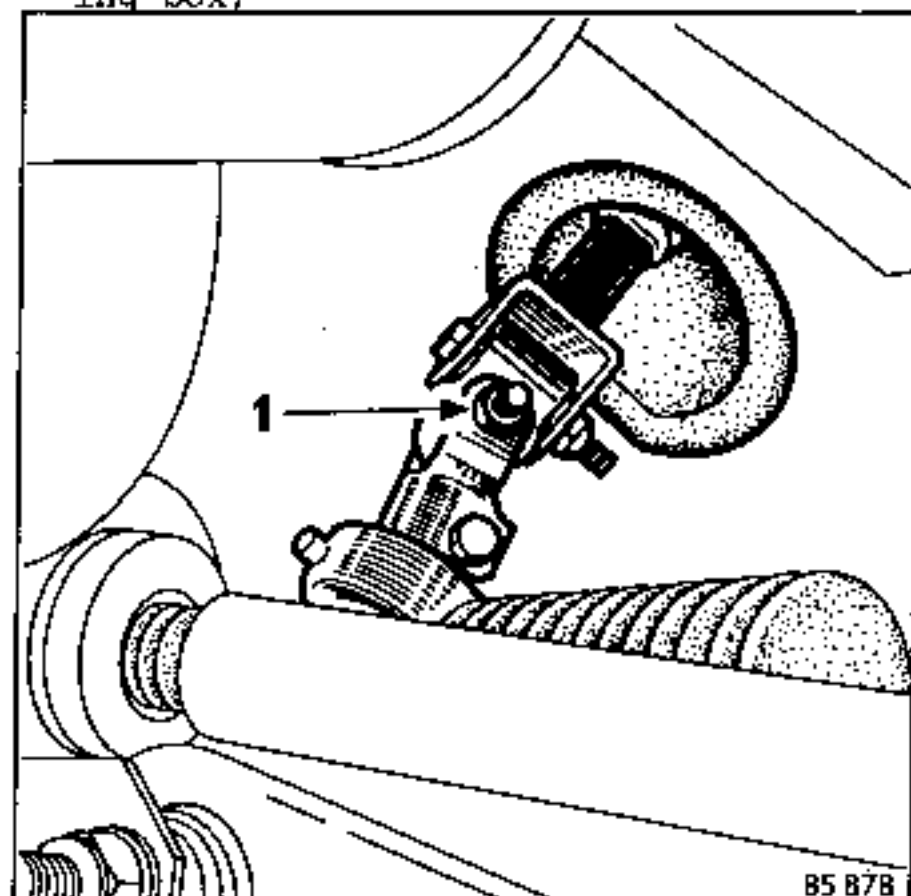
REMOVING

Disconnect the ball joints using tool
T. Av. 476.

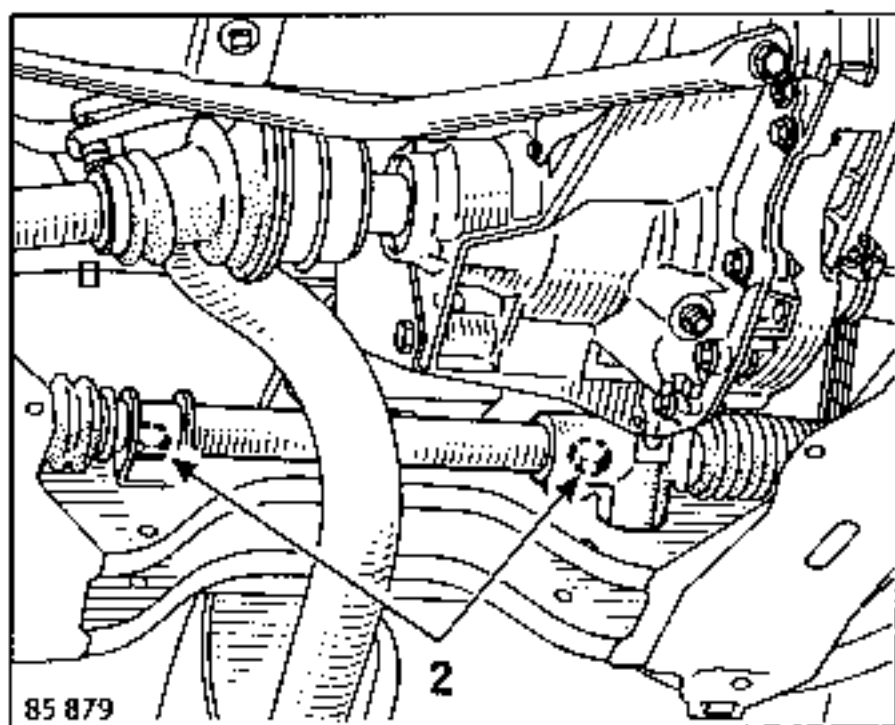


Remove :

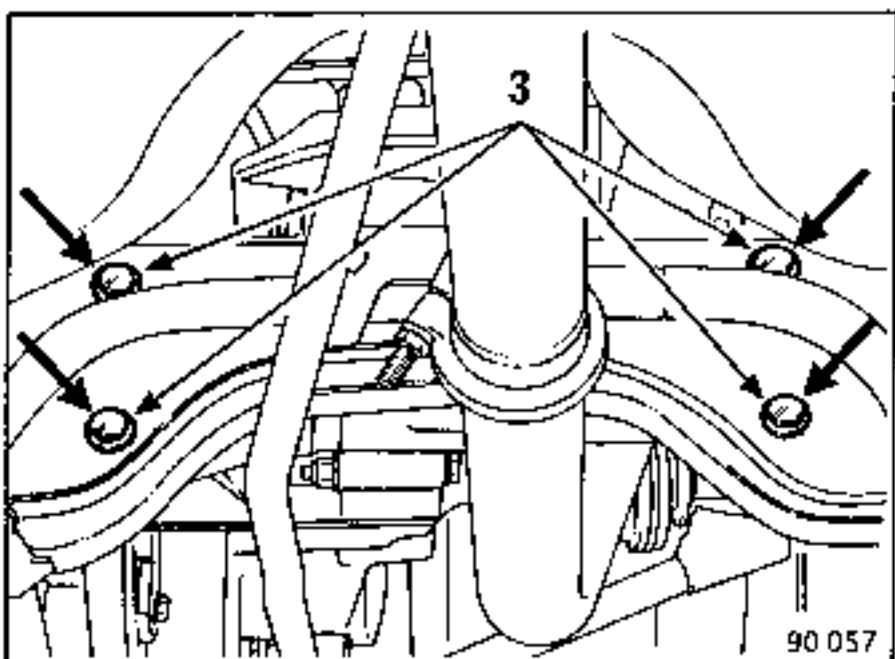
- the plastic protector,
- the bolt that secures the universal joint (1), marking its position with reference to the steering box,



- the two bolts (2).



Special features of early type C405-C409 vehicles : the four bolts (3).



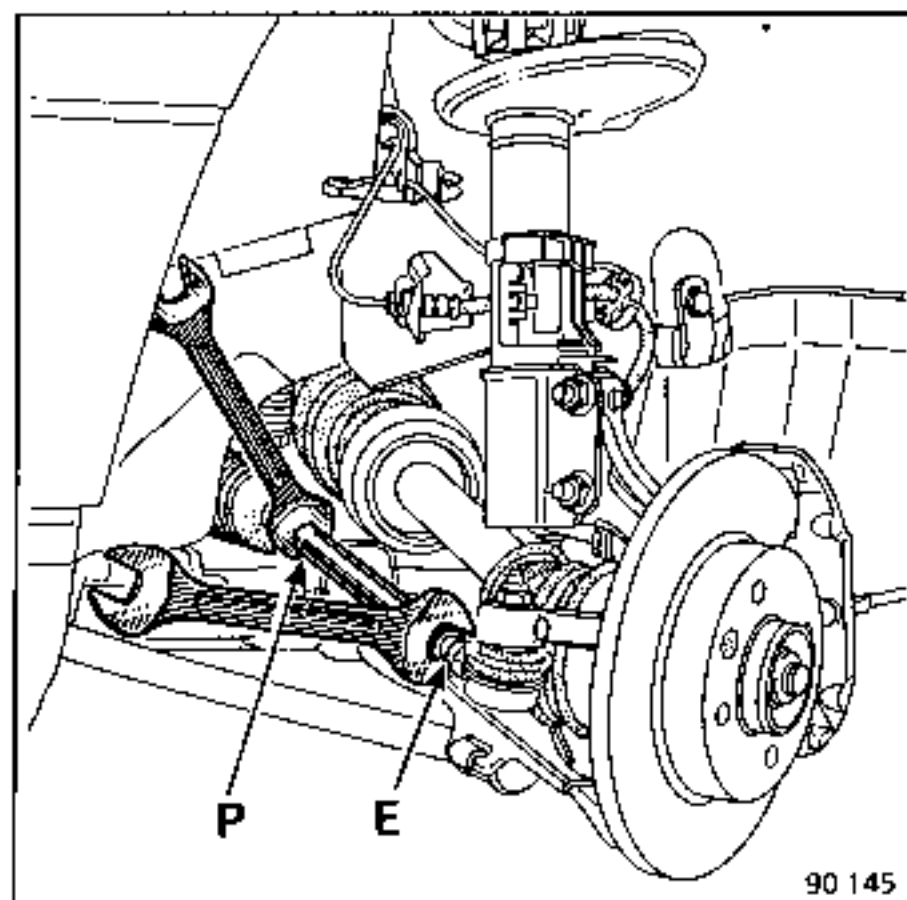
ALL TYPES :
the steering box.

Never unscrew the axial ball joints from the steering box unless they are to be replaced.

If the steering box is to be replaced, the ball joint casings at the stub axle end are to be removed.

To do this :

- loosen the lock nut (E) whilst holding the axial ball joint with an open ended spanner at (P),
- unscrew the ball joint casing, noting the number of threads engaged.



REFITTING

Carry out the removing operations in reverse.

If a new steering box is to be fitted, place the ball joint casings in the positions noted on dismantling.

Refit the steering box assembly and then the steering links to the vehicle with the universal joint in the position noted on dismantling. If not, re-centralise the steering wheel.

Fit the plastic protector.

NOTE : if it is impossible to fit the steering column universal joint, disconnect the retractable steering column shaft.

Check the front wheel toe-out.

ESSENTIAL SPECIAL TOOLS

Dir.	812-01	Spanners for tightening the axial ball joints
Dir.	832-01	
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)

Wheel bolts	8
Steering ball joint nuts	4
Axial ball joints	5

REMOVING

Support the front end of the vehicle on stands and remove the wheel on the opposite side to the steering column.

Remove :

- the rack bellows,
- the axial ball joint (see the corresponding section).

Move the steering through full lock so the rack is no longer projecting from the steering box and is away from the anti-rattle bearing.



34 035

With a flat screwdriver, the sharp end of which has been rounded off, remove the anti-rattle bearing.



34 032

REFITTING

Carefully clean the rack and the anti-rattle bearing location. Coat them both with MOLYKOTE BR2 grease.

Refit the anti-rattle bearing in the same way as it was removed, taking care to ensure that its three studs enter the slots (A).



34 035

Move the rack back into the bearing. Refit, to the rack :

- the stop washer with a new locking washer,
- the axial ball joint,
- the ball joint casing at the stub axial carrier end.

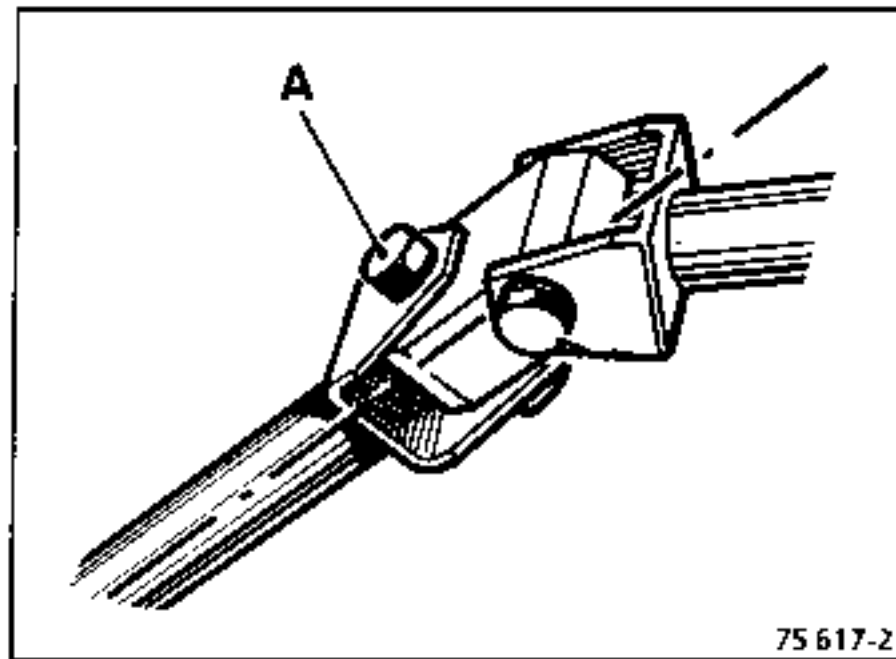
Check and, if necessary adjust, the toe-out.

TIGHTENING

Each of the bolts (A) and (B) is to be tightened when the centreline of its clevice is in line with the centreline of the block.

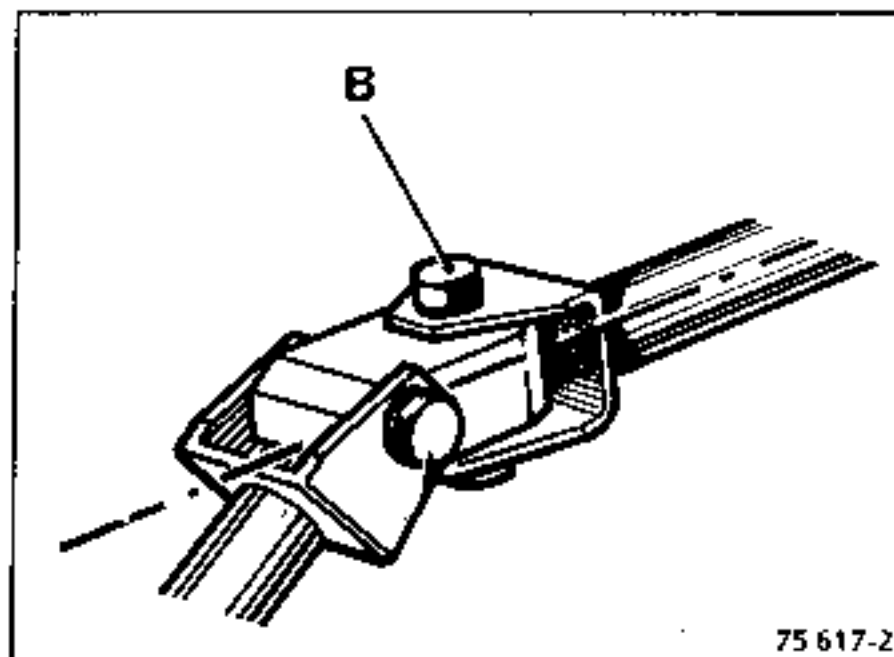
Place the block in position 1 and tighten bolt (A).

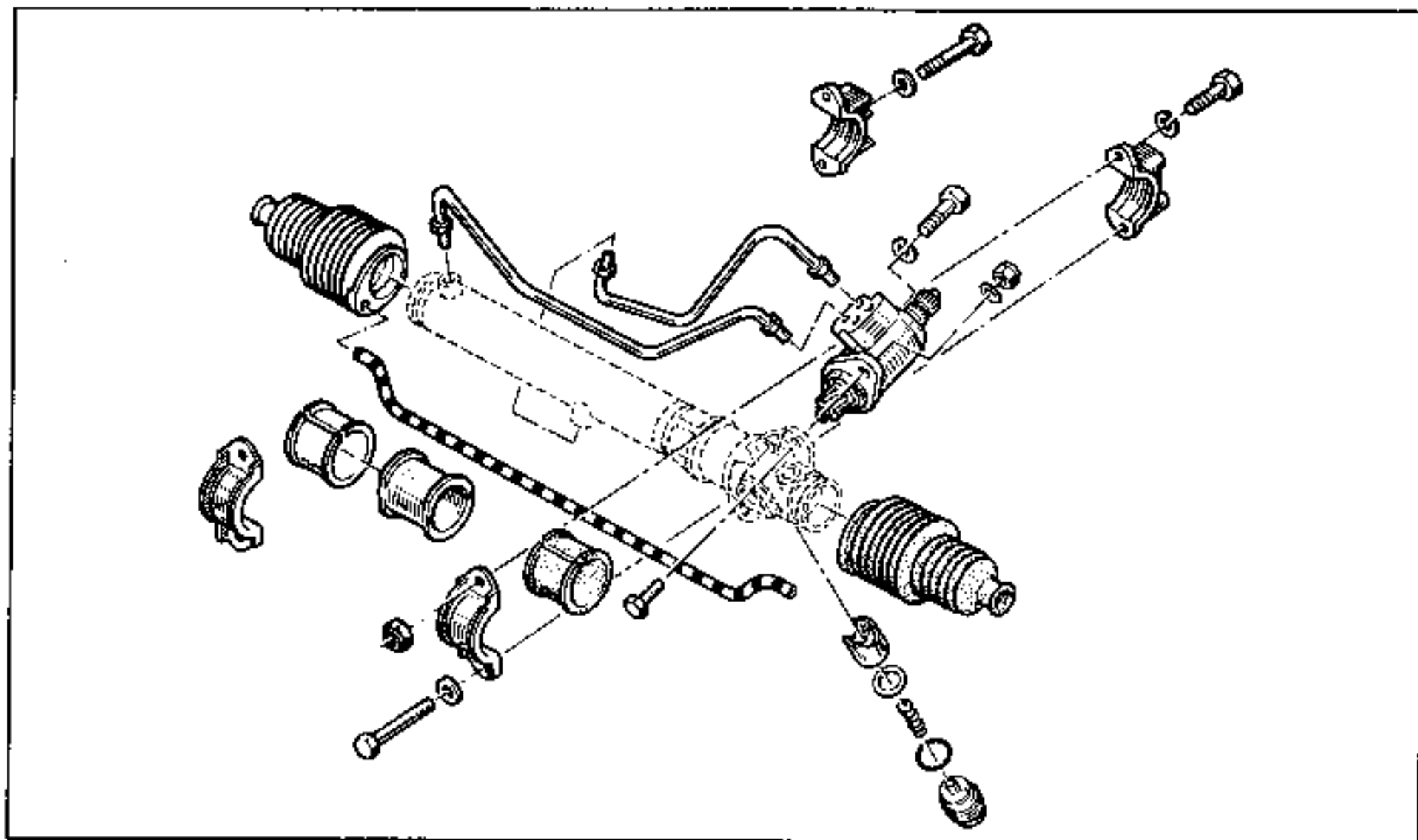
POSITION 1



Turn the steering wheel through a quarter of a turn to the right or to the left to obtain position 2 and tighten bolt (B).

POSITION 2





ESSENTIAL SPECIAL TOOLS

Mot.	453-01	Hose clamps
T.Av.	476	Ball joint extractor

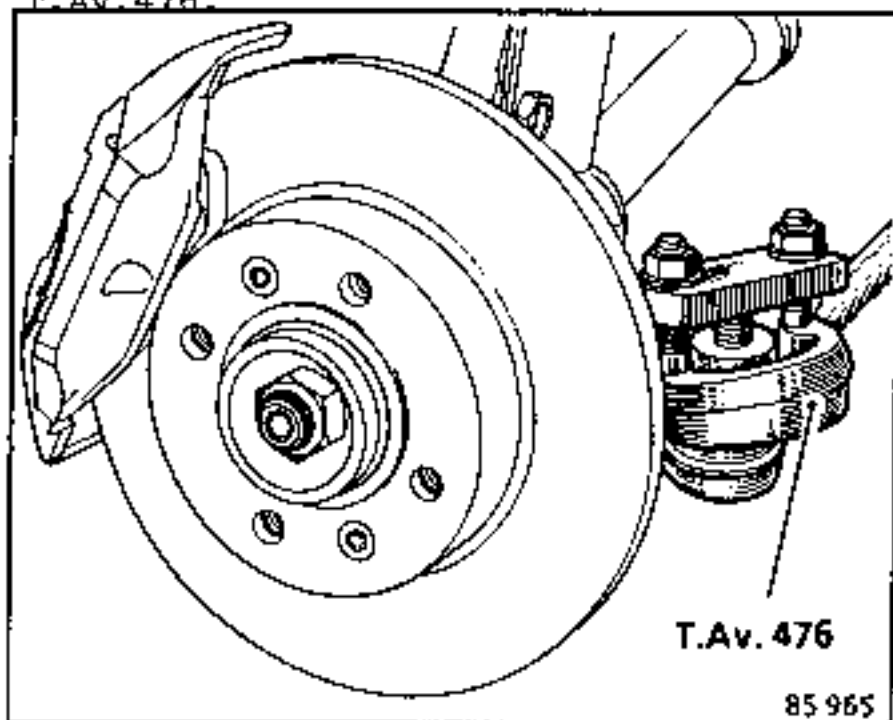
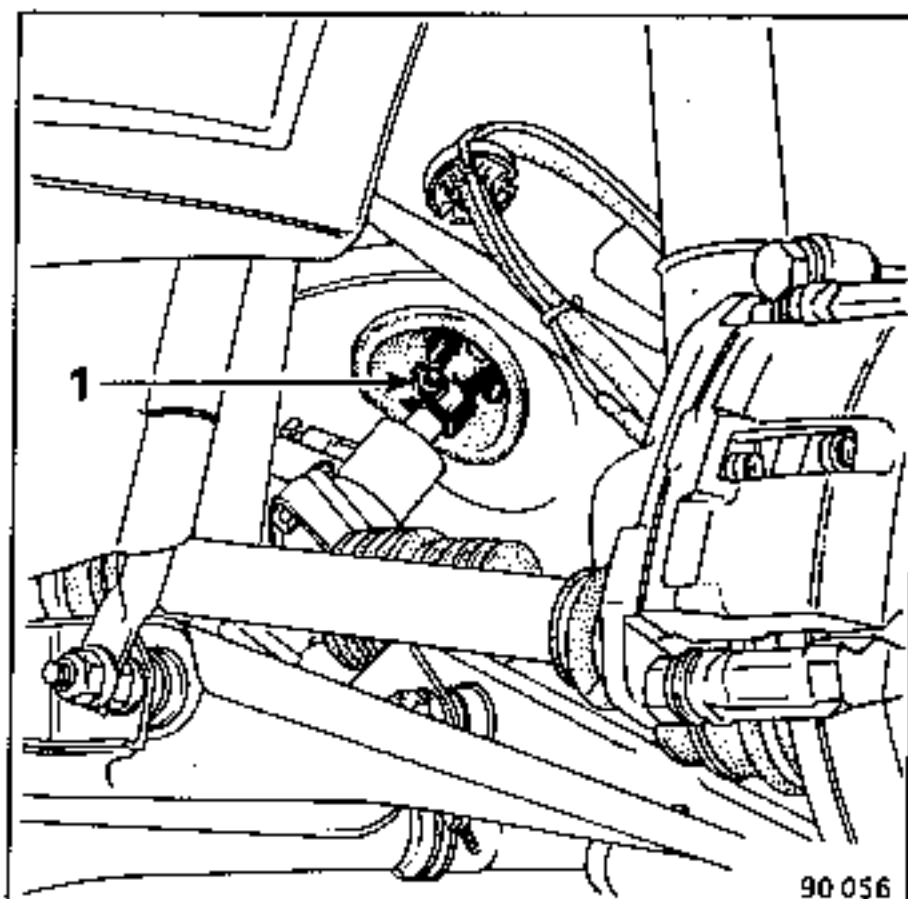
TIGHTENING TORQUES (in daN.m)

Steering ball joint nuts	4
Axial ball joints	5
Steering box securing bolts	5

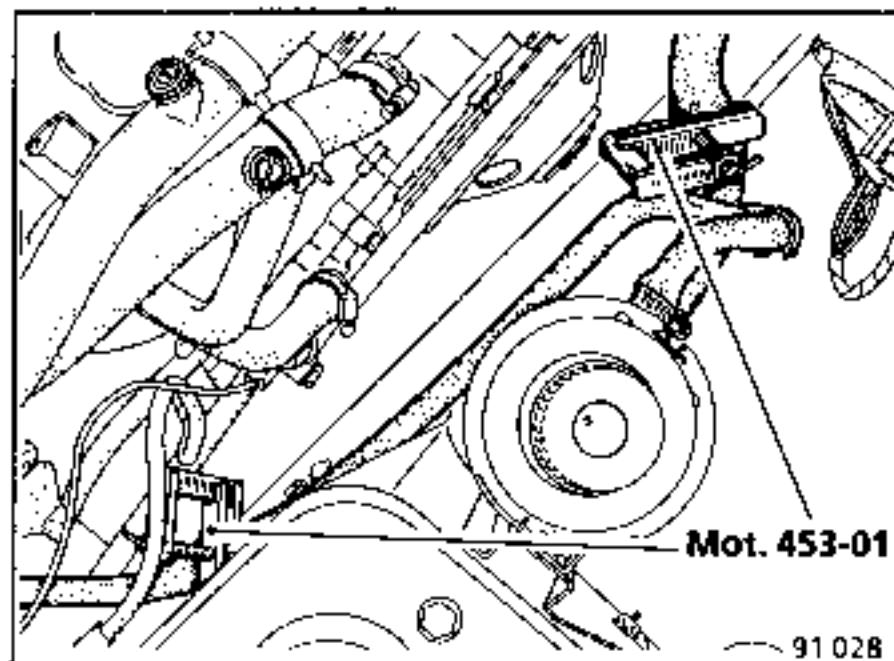
REMOVING

Disconnect the ball joints using tool T.Av. 476.

Remove the universal joint securing bolt (1) noting its position with reference to the steering box.

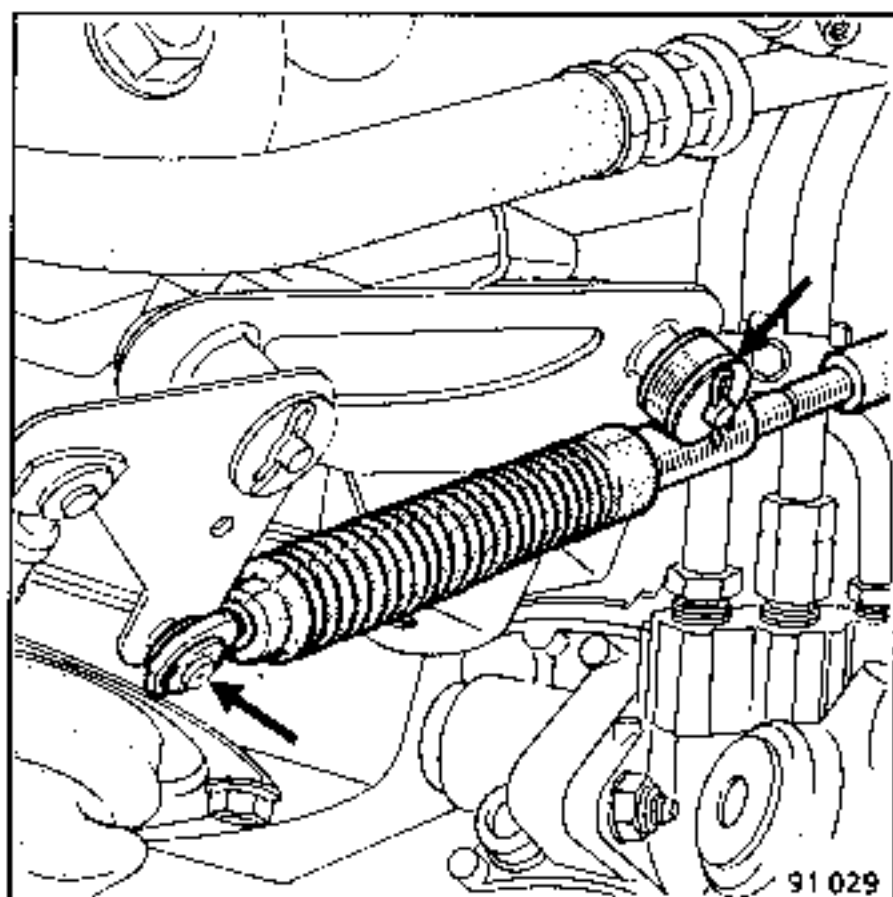


Place a clamp Mot.453-01 on each of the hoses leaving the oil reservoir.



Remove :

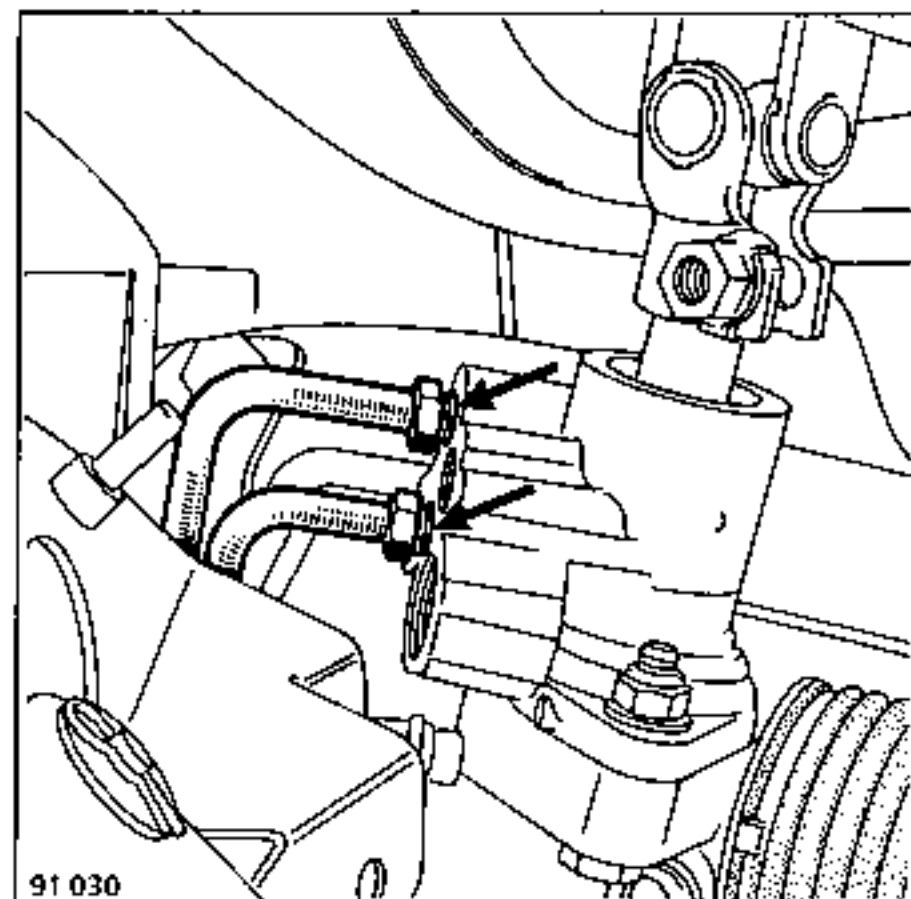
- the gear shift control, leaving it to hang under the vehicle,



- the pipe clip,
- the oil pipe leaving the reservoir and the high pressure pipe between the pump and the rotary valve.

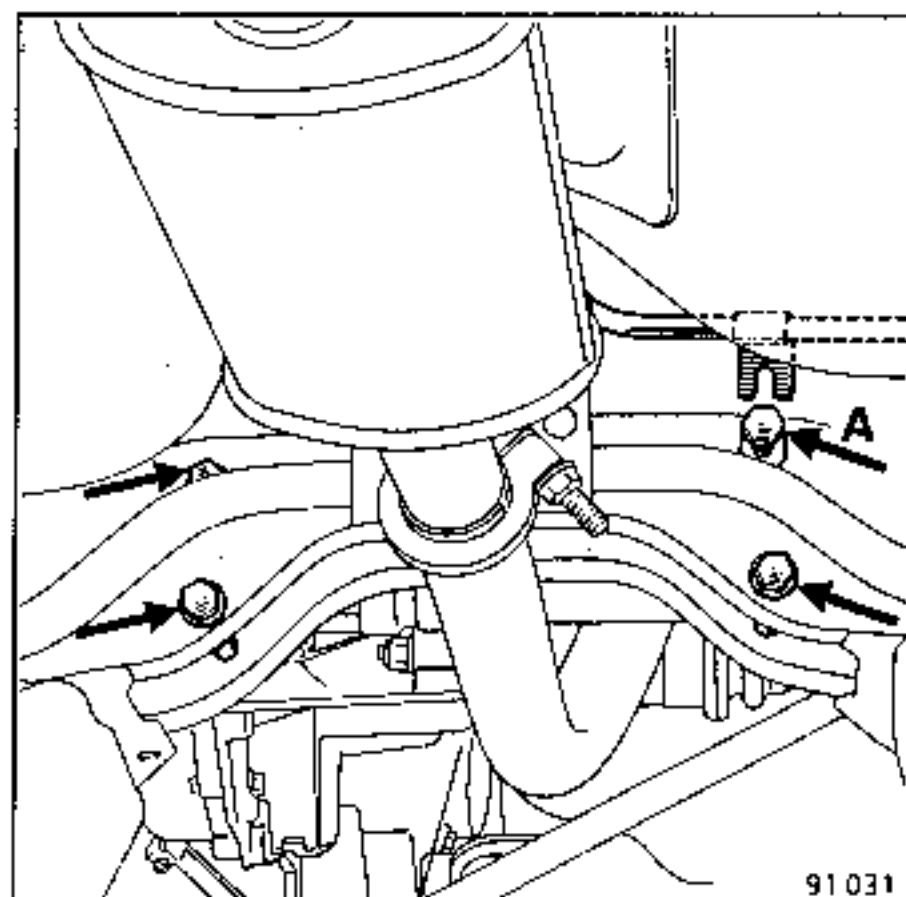
Loosen the steering box securing bolt (A) and free the low pressure pipe.

Fully unscrew the pipe leading to the ram (place a container to catch the oil).

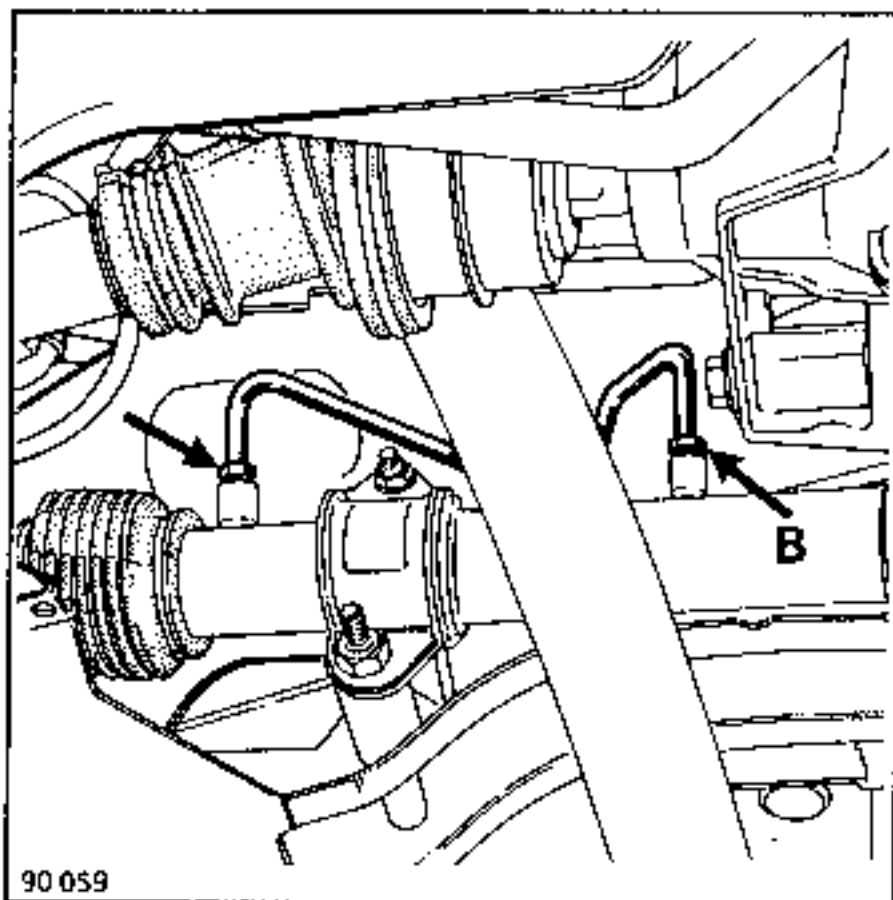


From under the vehicle, remove :

- the protective casing under the engine,
- the four bolts that secure the steering box to the sub-frame.

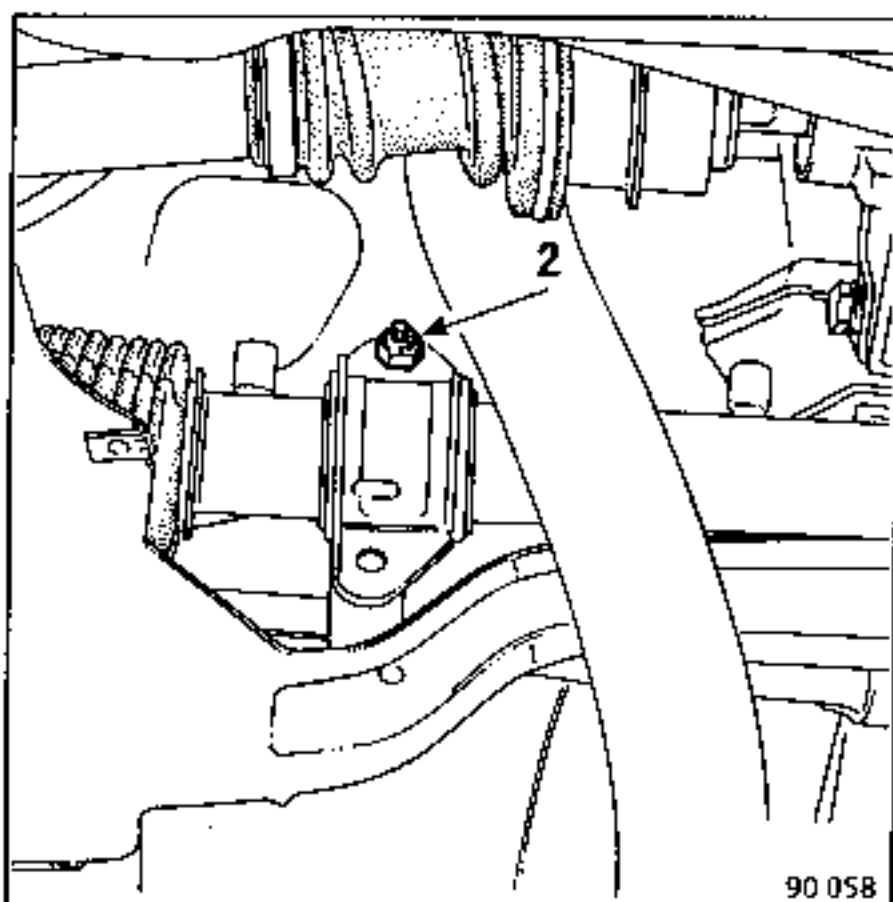


Lower the box. Unscrew and remove the pipes leading to the ram (place a container to catch the oil).

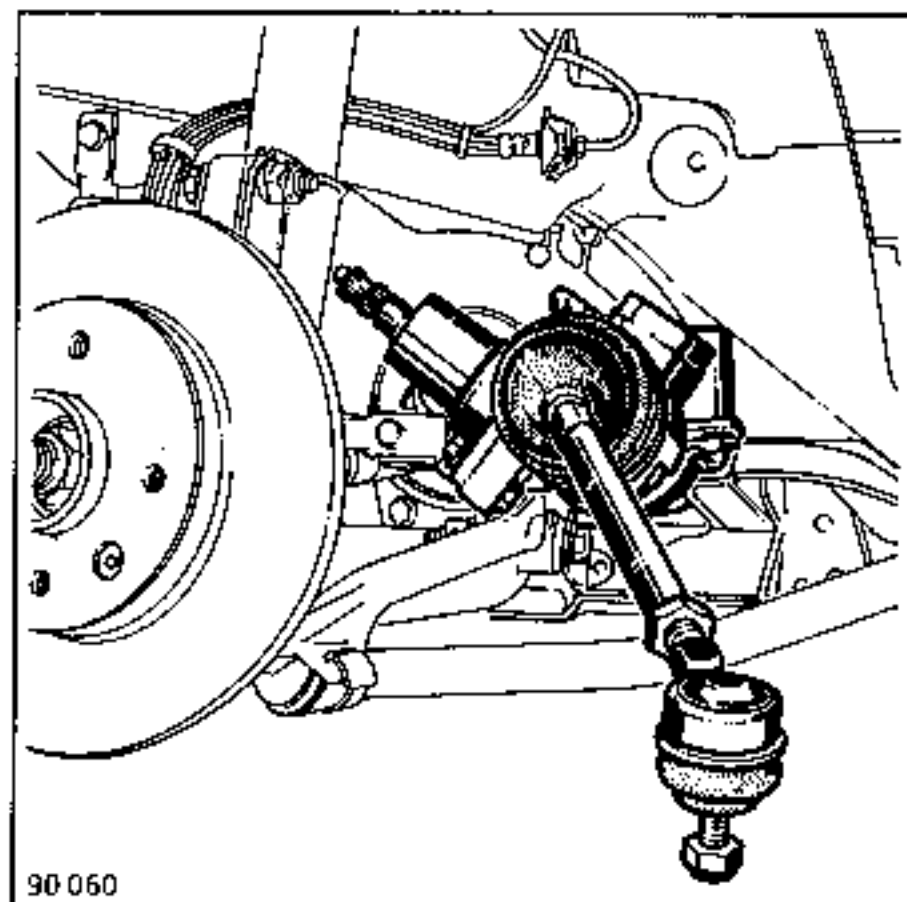


NOTE : fit plugs to the steering box tappings to prevent dirt entering.

Unscrew bolt (2) on the right hand steering box support so that it turns freely.



Remove the steering box through the left hand inner wing panel whilst positioning its right hand support so that it remains parallel with the sub-frame cross member.

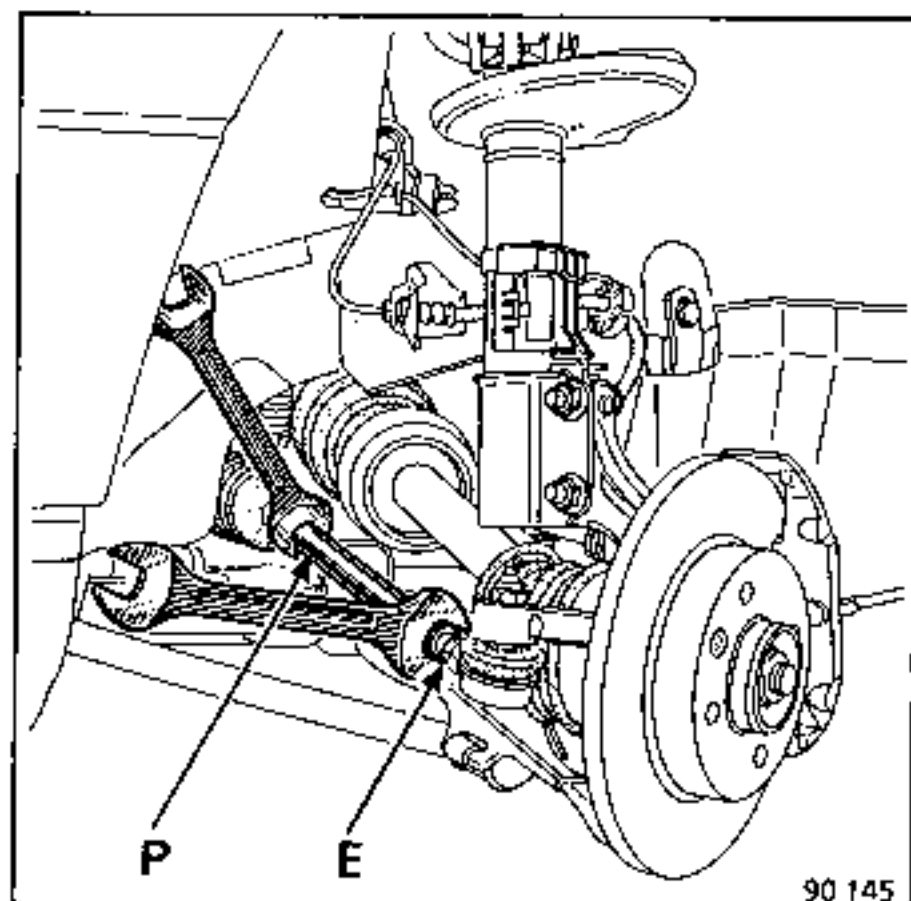


Never unscrew the axial ball joints from the rack unless they are to be replaced.

If the steering box is to be replaced by a new one, the ball joint casings at the stub axle carrier end will have to be removed for fitting to the new unit.

To do this :

- loosen the lock nut (E) whilst holding the axial ball joint with an open ended spanner at (P);
- unscrew the ball joint casings whilst counting the number of threads engaged.



REFITTING

If a new steering box is being fitted :

- place the ball joint casings in the positions noted during dismantling,
- loosen the right hand support on the steering box so that it can turn freely,
- remove the pipes from the ram and plug their tappings to prevent any dirt entering.

Place the steering box in position, without securing it and fit pipe (B).

Screw the ram supply pipe into the valve and the ram body without tightening it.

Position the steering column ball joint by following the marks made during dismantling and reconnect it.

Secure the steering box except at point (A).

Tighten the ram pipes and the bolt on the right hand mounting.

Tighten the steering column universal joint.

Reconnect the pipes to the rotary valve, repositioning the low pressure pipe.

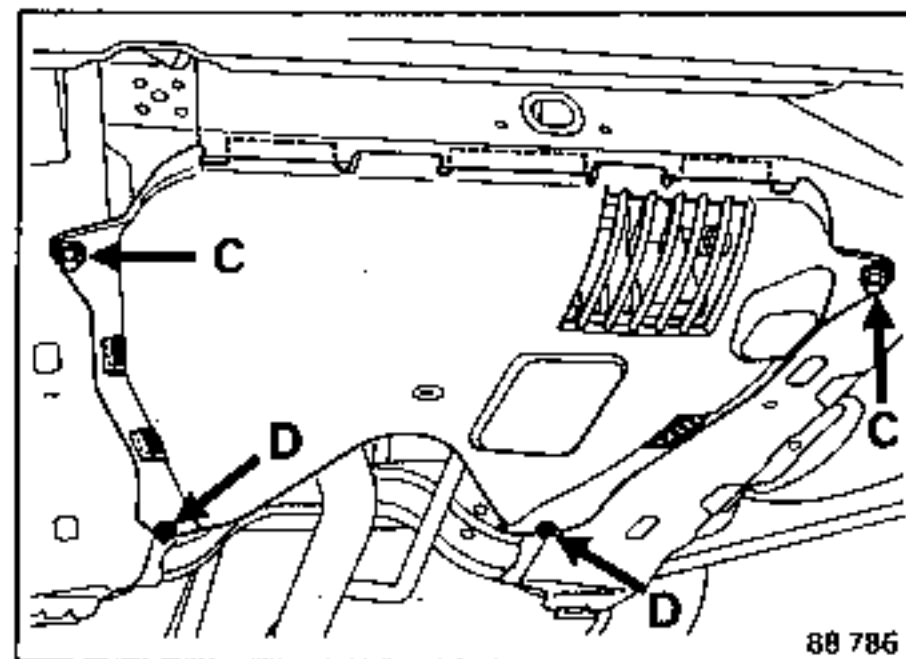
Tighten point (A) on the steering box.

Fit the pipe retaining clip and remove clamps Mot.453-01.

Reconnect :

- the gear shift control,
- the ball joints to the stub axle carrier,

Fit the protective casing under the engine.



The 2 bolts C

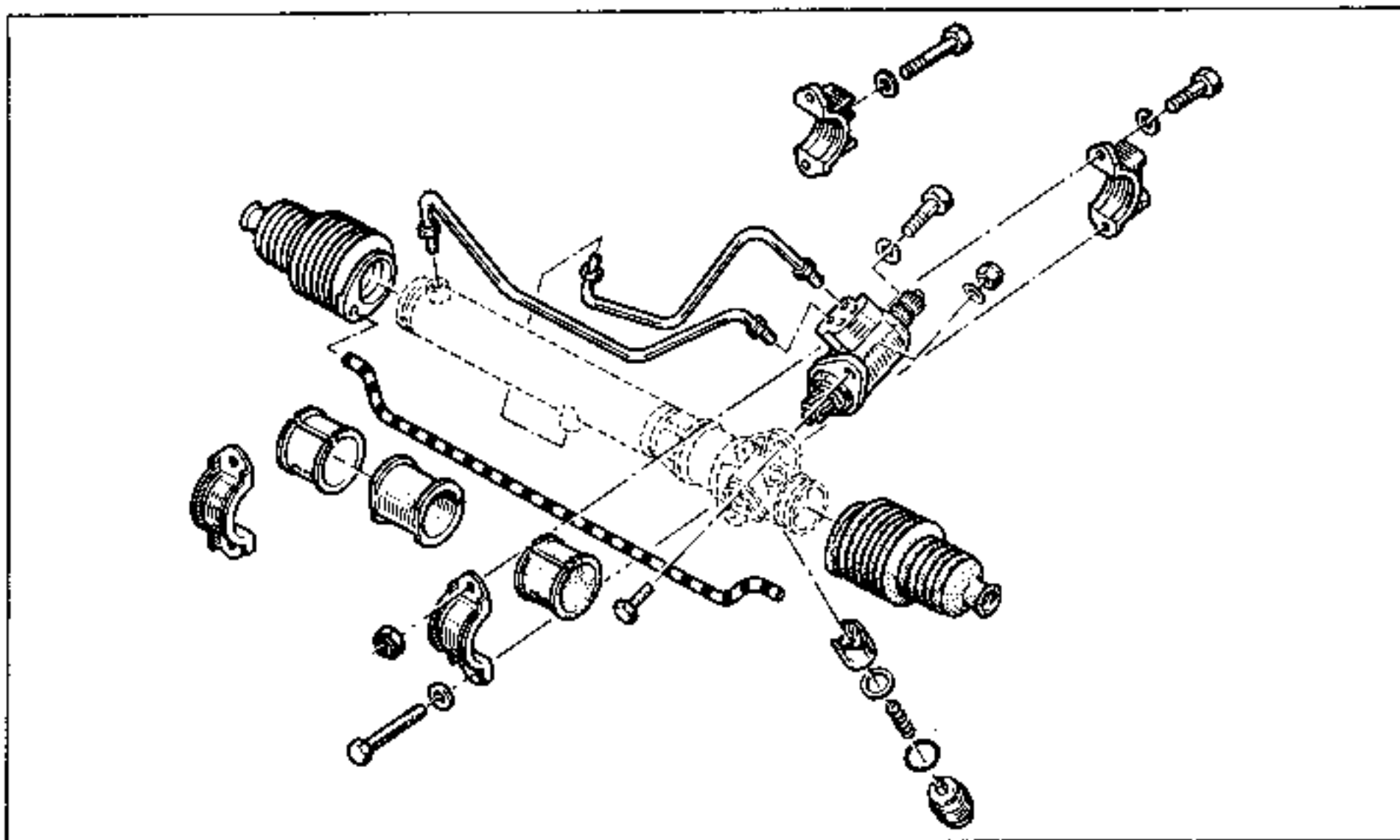
The 2 "1/4 turn" clips D

Fill the oil reservoir level with the grille.

Turn the steering from left to right (with the engine stopped) to distribute the oil throughout the system.

Repeat this operation with the engine running then top-up the level (see section 13 "Filling the system").

Check and, if necessary, adjust the toe-out.



ESSENTIAL SPECIAL TOOLS

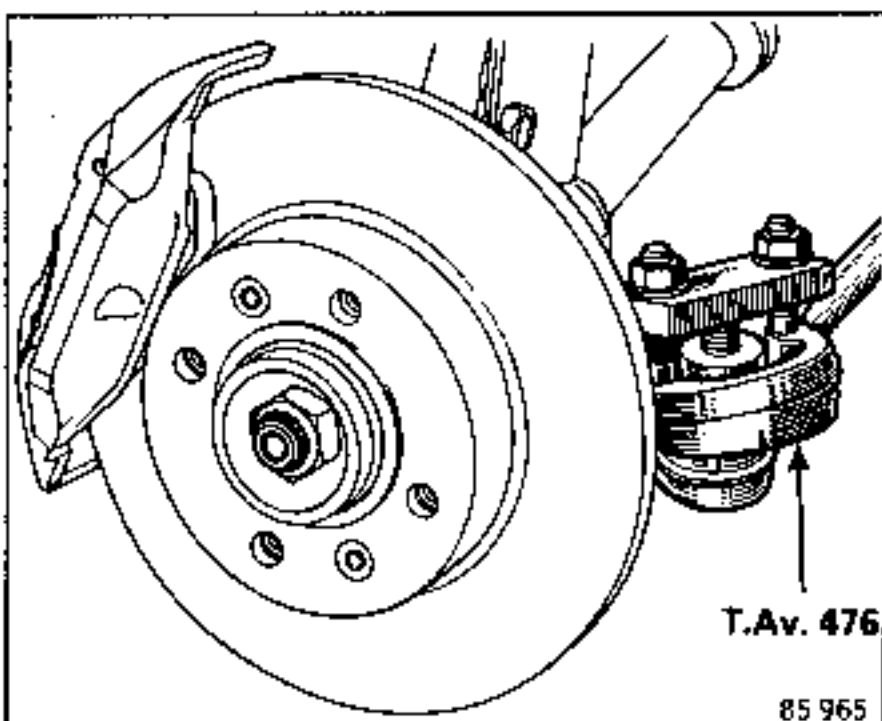
Mot.	453-01	Hose clamps
T.Av.	476	Ball joint extractor

TIGHTENING TORQUES (in daN.m)

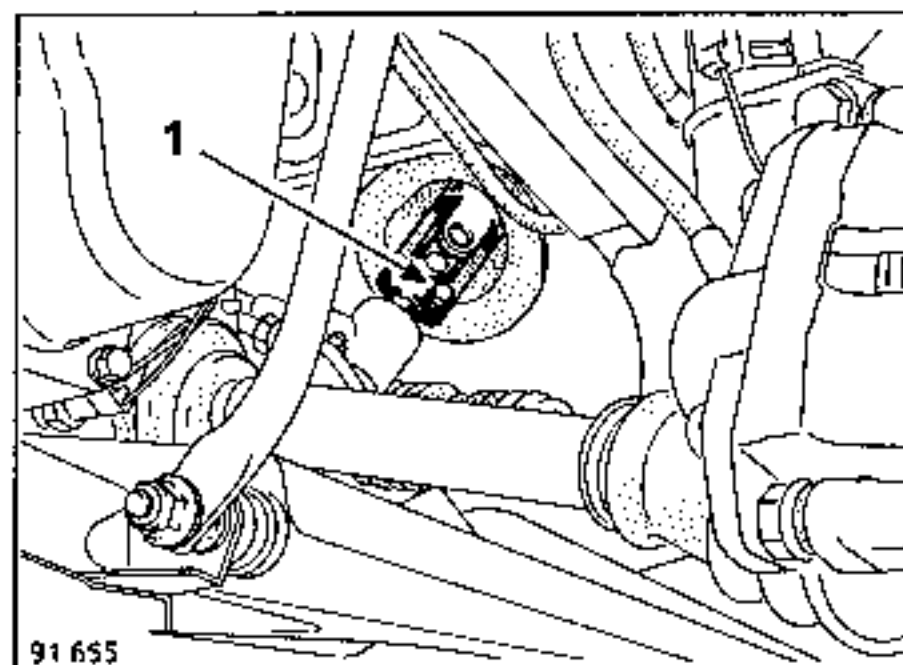
Steering ball joint nuts	4
Axial ball joints	5
Steering box securing bolts	5

REMOVING

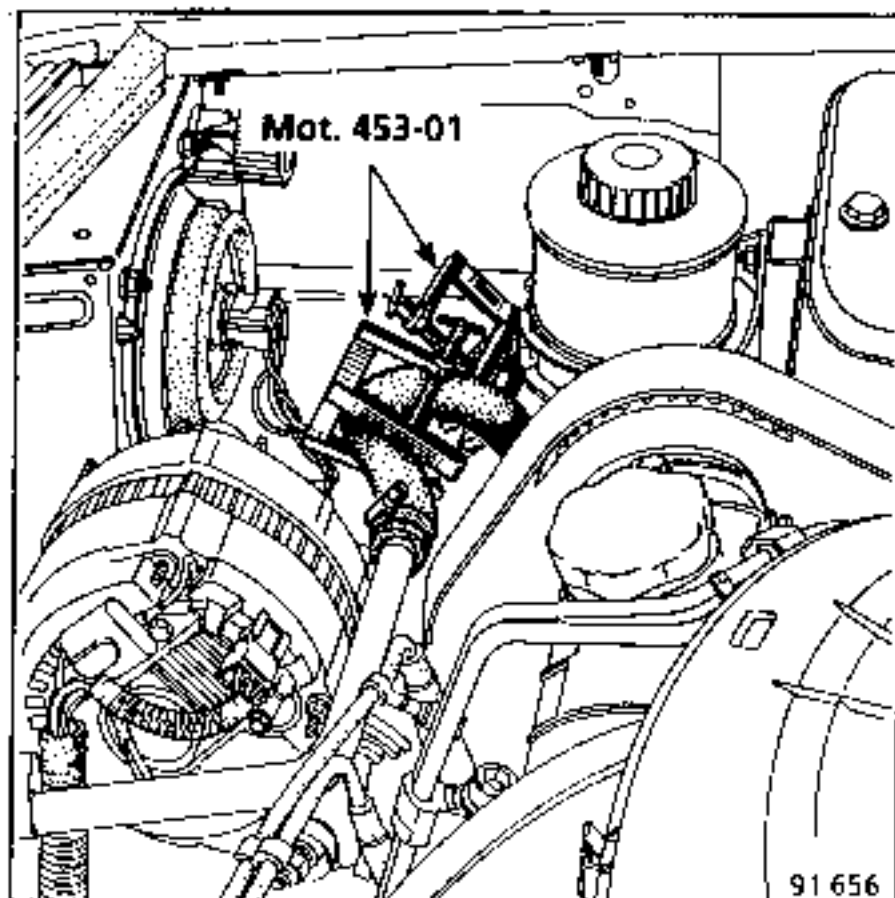
Disconnect the ball joints using tool T.Av.476.



Remove the ball joint securing bolt (1) noting its position with reference to the steering box.



Place a clamp Mot.453-01 on each of the pipes leading from the oil reservoir.

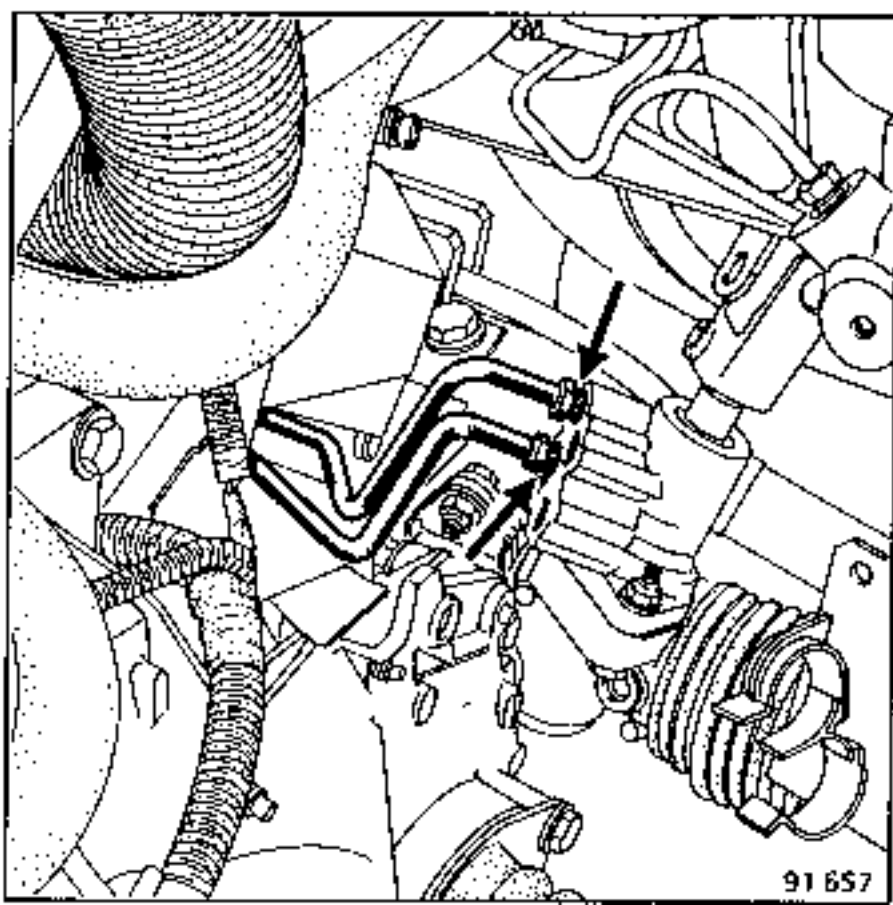


Remove :

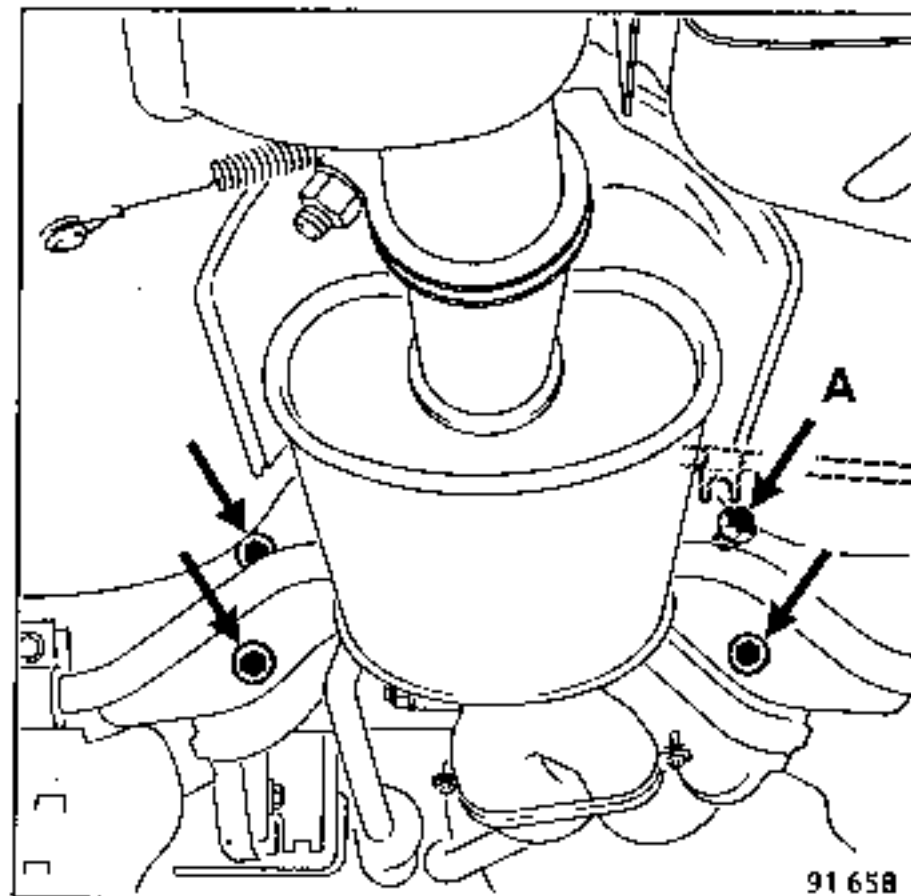
- the pipe retaining clip,
- the pipes from the oil reservoir and the high pressure pipe from the pump to the rotary valve.

Loosen the steering box securing bolt (A) and remove the low pressure pipe.

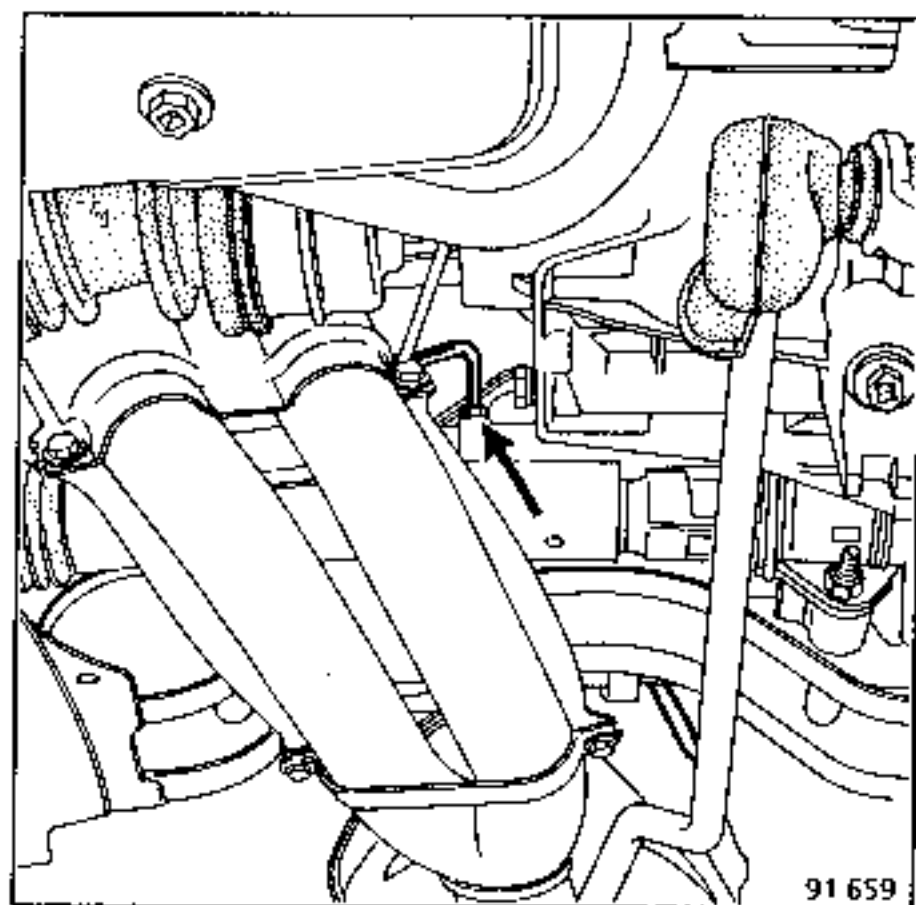
Fully unscrew the pipes leading to the ram (provide a container to catch the oil).



From under the vehicle, remove the four bolts that secure the steering box to the sub-frame.

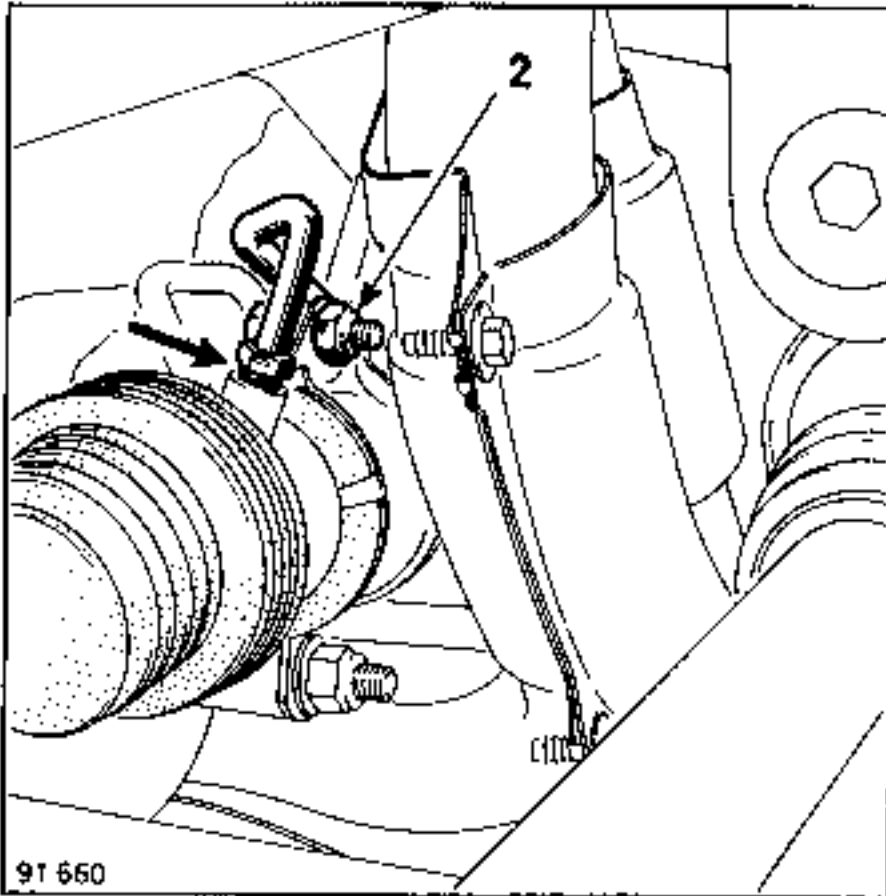


Lower the box and unscrew and remove the pipes leading to the ram (provide a container to catch the oil).

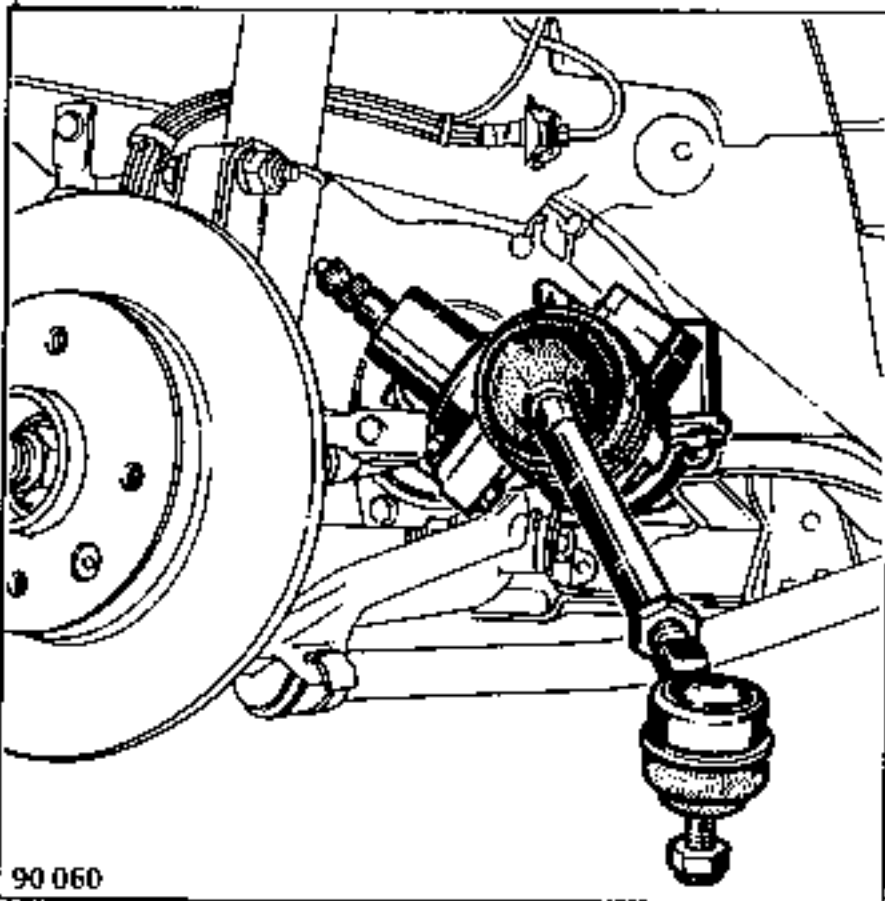


NOTE : fit plugs into the steering box tappings to prevent dirt entering.

Loosen the bolt (2) on the right hand steering box support so that it can turn freely.



Remove the steering box through the left hand inner wing panel, positioning the right hand support so that it remains parallel with the sub-frame cross member.

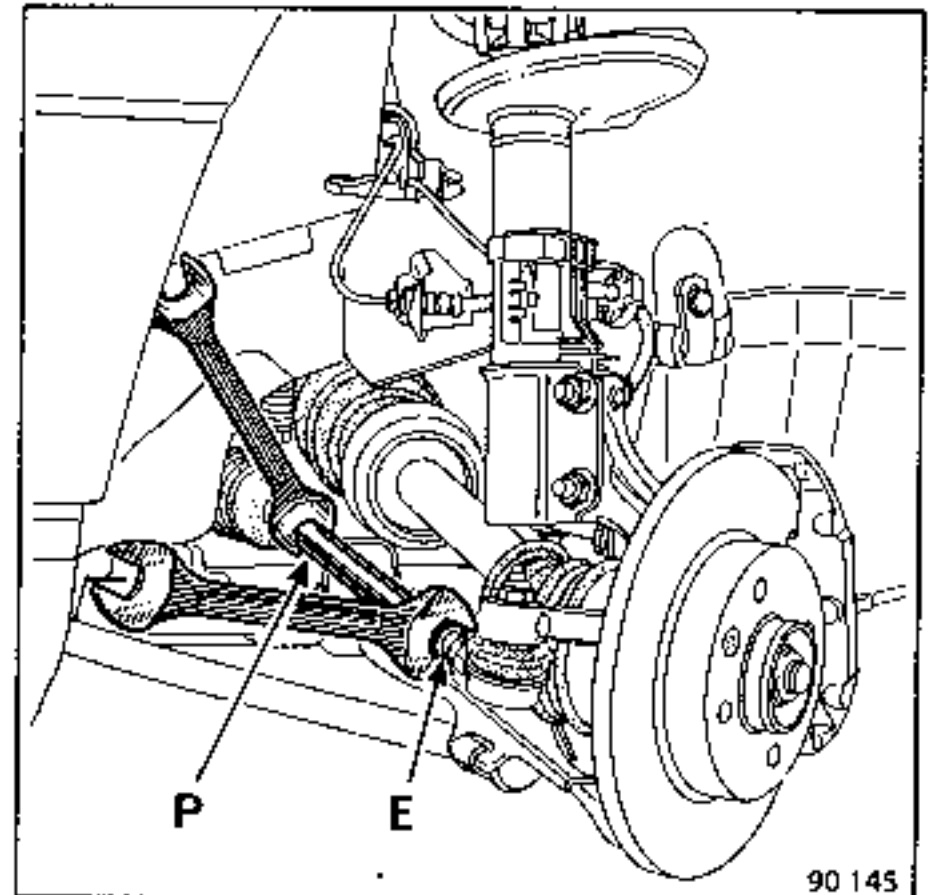


Never unscrew the axial ball joints from the steering rack unless they are to be replaced.

If the steering box is to be replaced, the ball joint casings at the stub axle carrier end will have to be removed.

To do this :

- loosen the lock nut (E) whilst holding the axle ball joint with an open ended spanner at (P),
- unscrew the ball joint casing whilst noting the number of threads engaged.



REFITTING

When fitting a new steering box :

- fit the ball joint casings in the positions noted during dismantling,
- loosen the right hand support on the steering box so that it can turn freely,
- remove the pipes from the ram, plugging their tappings to prevent any dirt entering.

Place the steering box in position without securing it.

Position and screw in the pipes leading to the ram on the valve and the steering box body without tightening them.

Position the steering column universal joint by following the marks made during removal and reconnect it.

Secure the steering box except at point (A).

Tighten the pipes leading to the ram and the bolt on the right hand support.

Tighten the steering column universal joint.

Reconnect the pipes leading to the rotary valve whilst correctly positioning the low pressure pipe.

Tighten the steering box securing bolt (A).

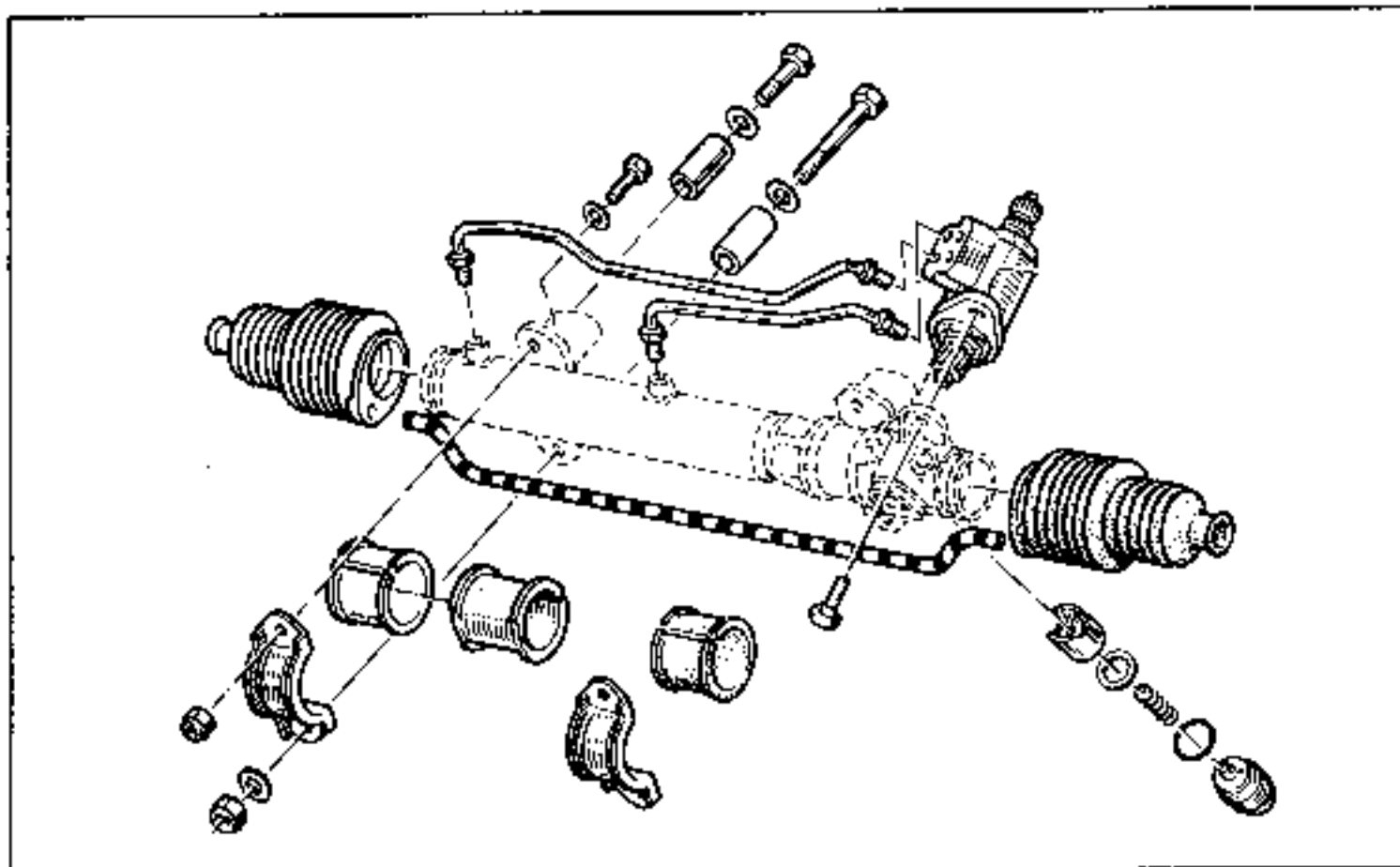
Fit the pipe retaining clip and remove clamps Mot.453-01.

Fill the system with oil up to the indicator pad on the reservoir filter.

Turn the steering to left and to right (with the engine stopped) to distribute the oil through the circuit.

Repeat this operation with the engine running then top-up the level (see section 13 "Filling the circuit").

Check and, if necessary, adjust the toe-out.



ESSENTIAL SPECIAL TOOLS

Mot. 453-01	Hose clamps
T.Av. 476	Ball joint extractor

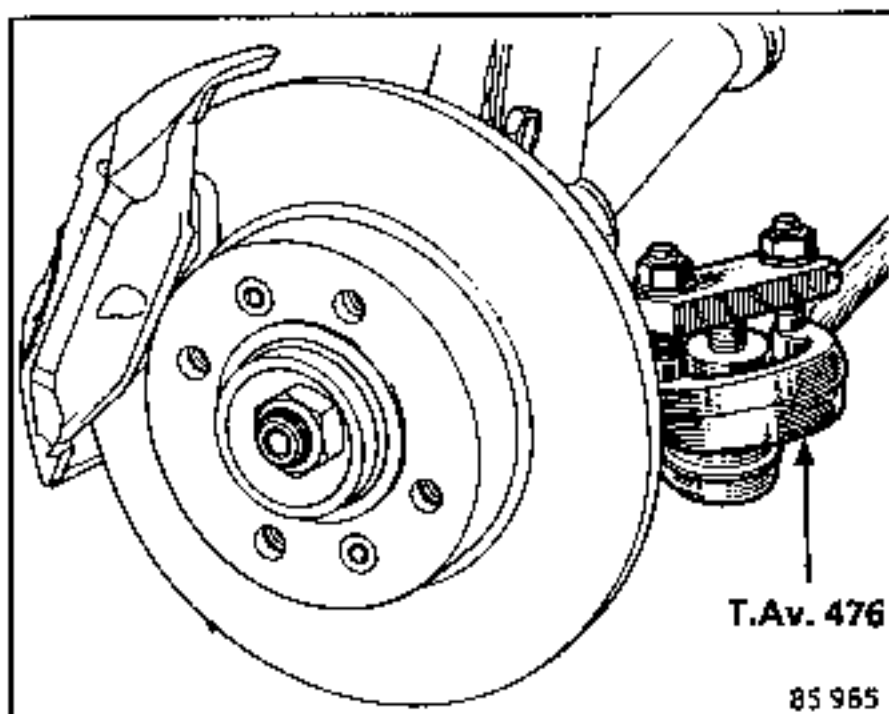
TIGHTENING TORQUES (in daN.m)

Steering ball joint nut	4
Axial ball joint	5

REMOVING

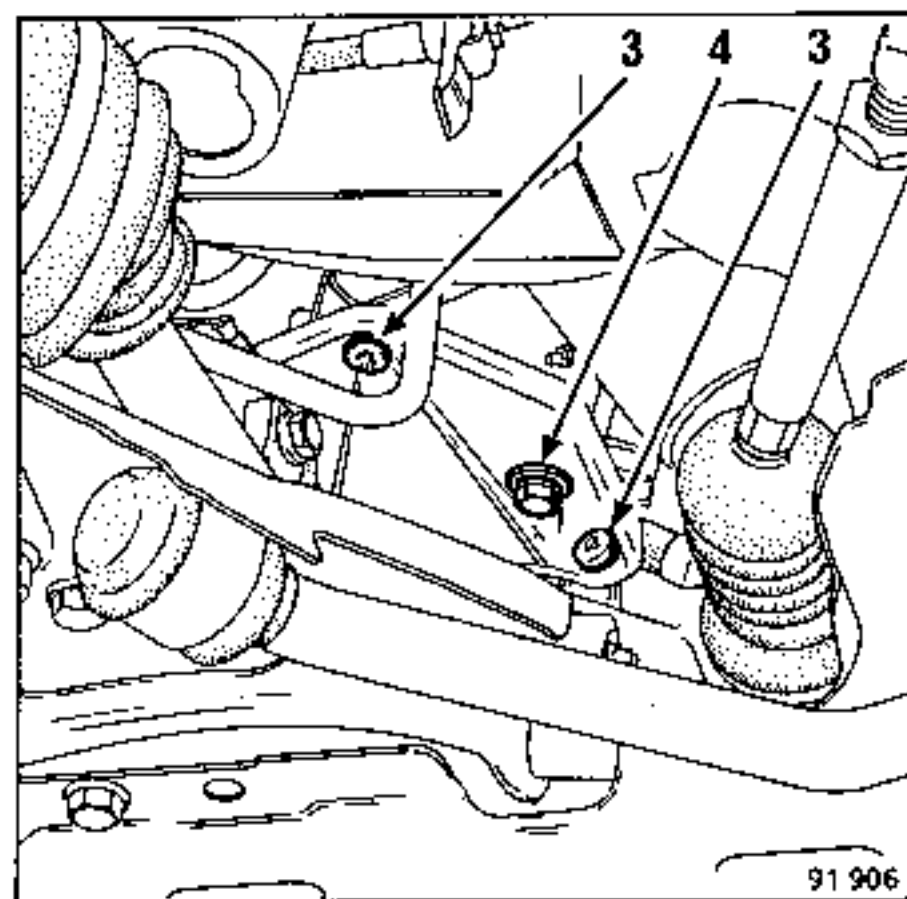
Disconnect :

- the battery,
- the steering ball joints : tool T.Av. 476.

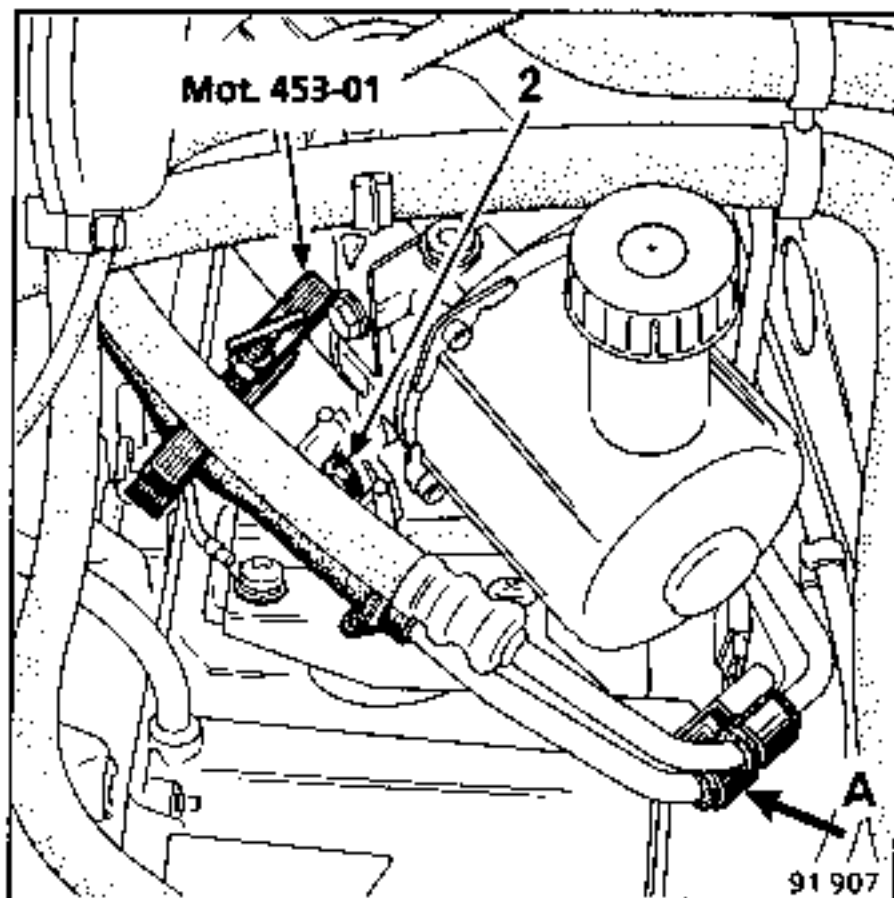


Remove :

- the lower bolts (3) and (4) that secure the pump to its support.



- the pump upper securing bolt (2),
- the hose retaining clip (A).

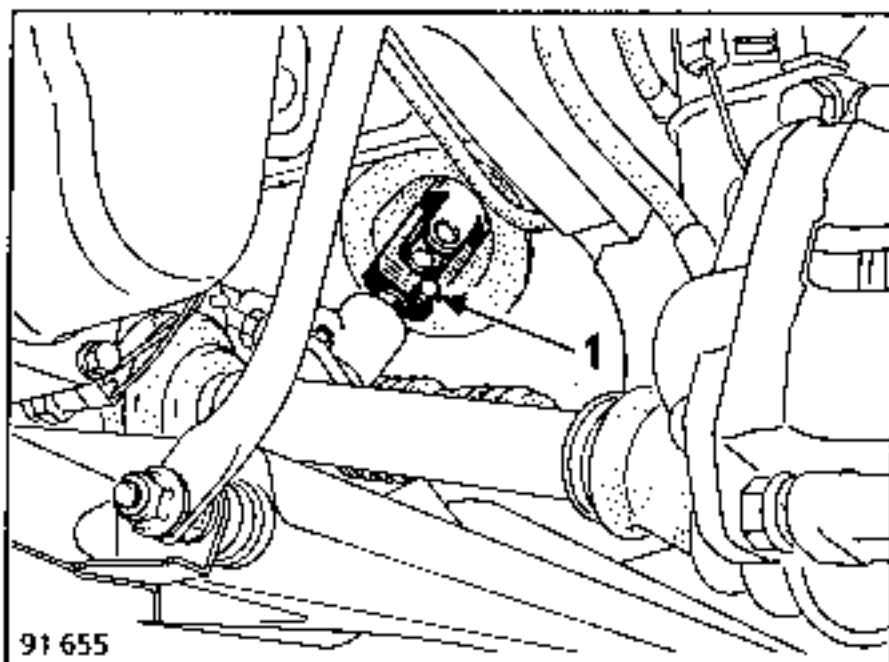


Place one clamp Mot.453-01 on the hose that supplies the rotary valve.

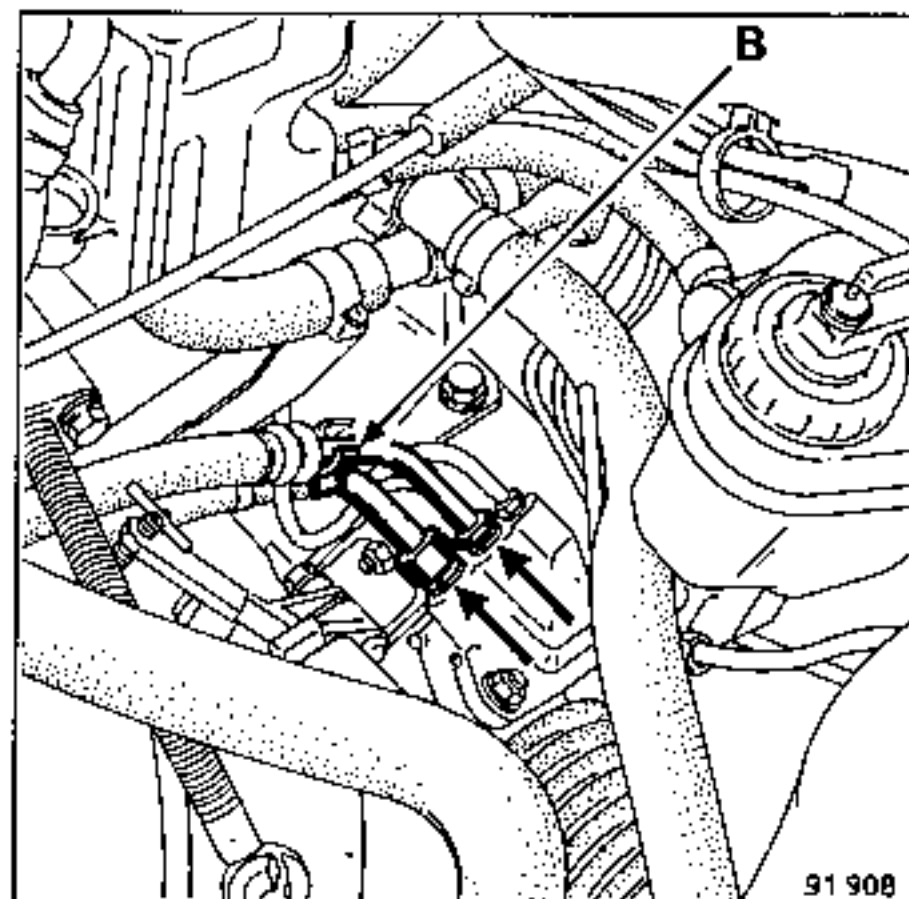
Push the electric pump towards the front of the vehicle.

Remove :

- the universal joint securing bolt (1), marking its position on the steering box,

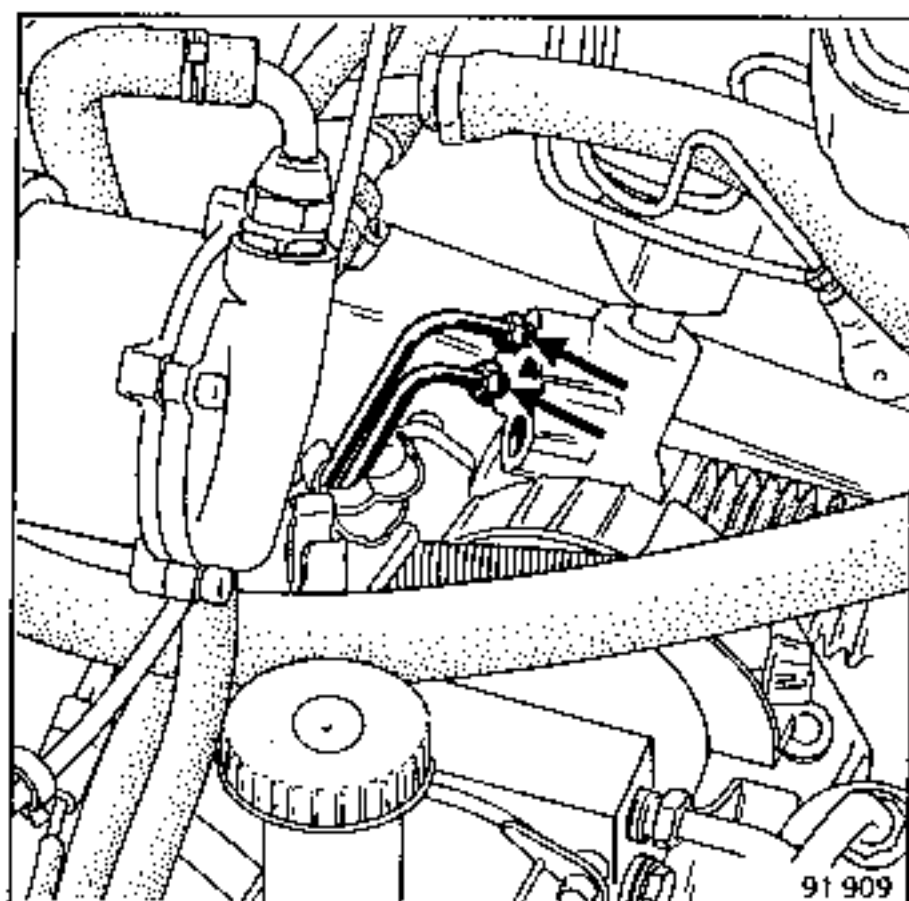


- the pipe retaining clip (B),



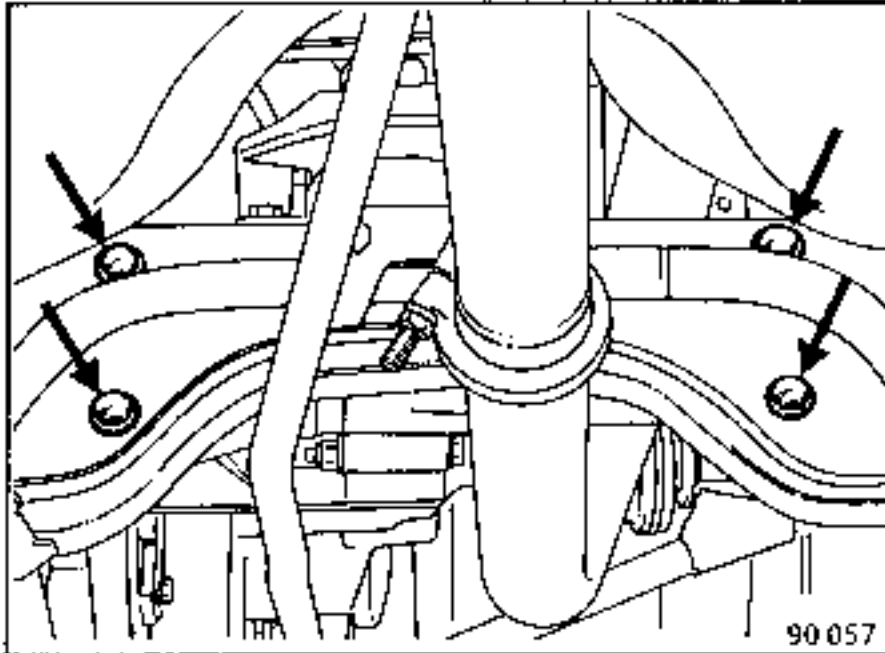
- the high and low pressure pipes from the rotary valve.

Fully unscrew the pipes leading to the ram (provide a container to catch the oil).

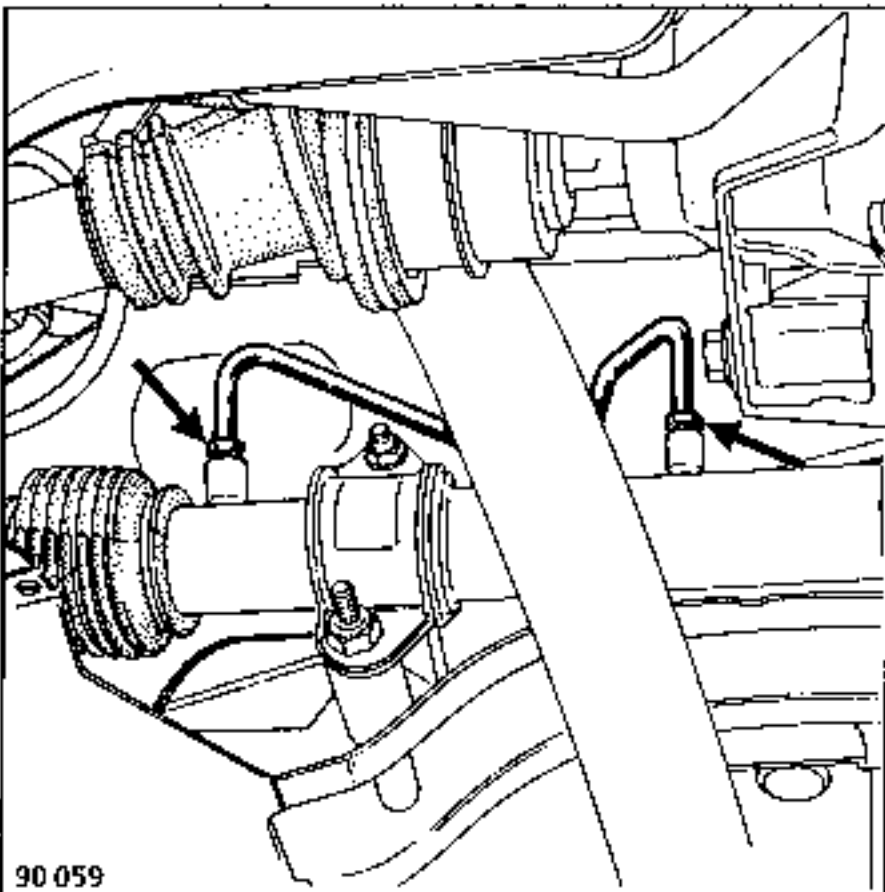


From under the vehicle :

- remove the protective casing under the engine,
- the four bolts that secure the steering box to the sub-frame.

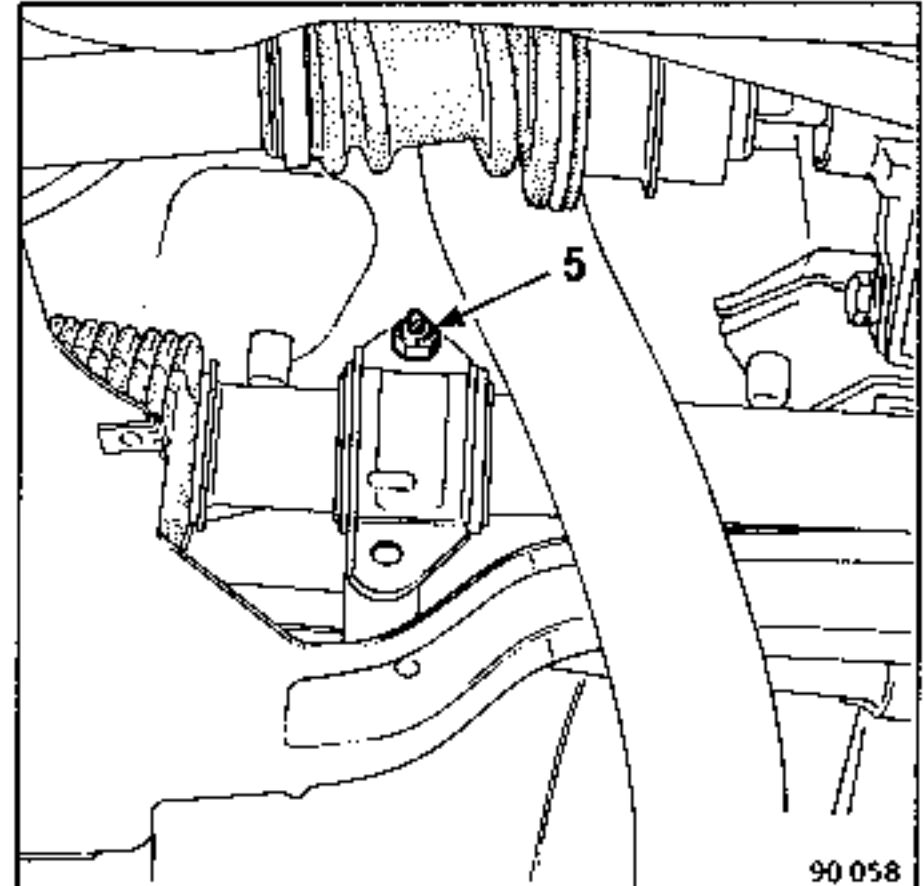


Lower the steering box and unscrew and remove the ram pipes (provide a container to catch the oil).

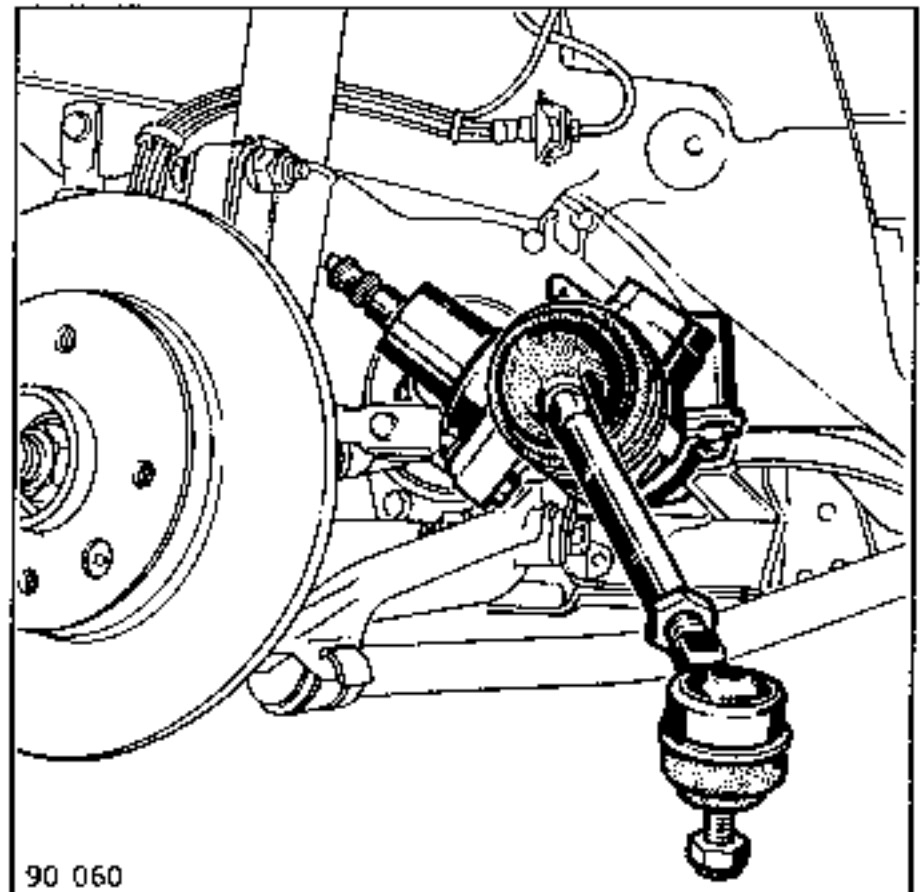


NOTE : place plugs in the steering box tappings to prevent dirt entering.

Unscrew bolt (5) and remove the right hand support from the steering box.



Take out the steering box through the left hand inner wing.

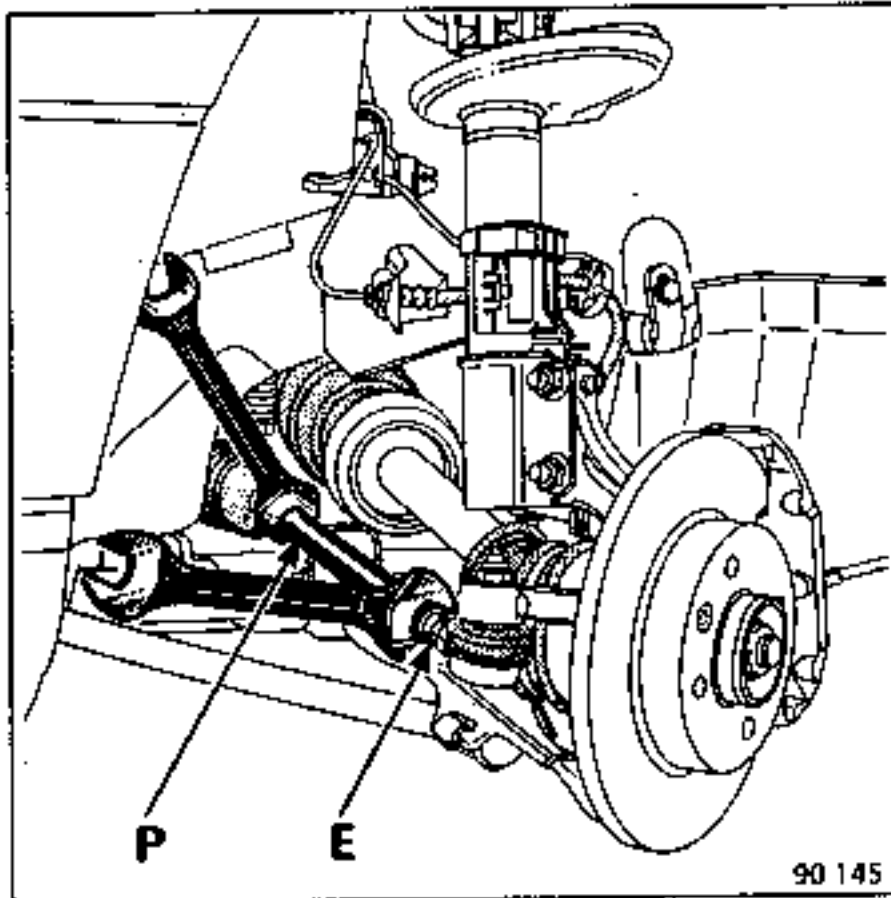


Never unscrew the axial ball joints from the rack unless they are to be replaced.

If the steering box is to be replaced, the ball joint casings at the stub axle end will have to be unscrewed and fitted to the new one.

To do this :

- loosen the lock nut (E) whilst holding the axial ball joint with an open ended spanner at (P),
- unscrew the ball joint casings whilst counting the number of threads engaged.



REFITTING

If a new steering box is fitted :

- fit the ball joint casings in the position noted during dismantling,
- remove the right hand support from the steering box,
- remove the pipes leading to the ram and plug the tappings to prevent dirt entering.

Fit :

- the steering box,
- the steering box right hand support, tightening it moderately,
- the pipes leading to the ram, to the valve and to the steering box body without tightening them.

Position the steering column universal joint at the position marks during removing and reconnect it.

Secure the steering box in place.

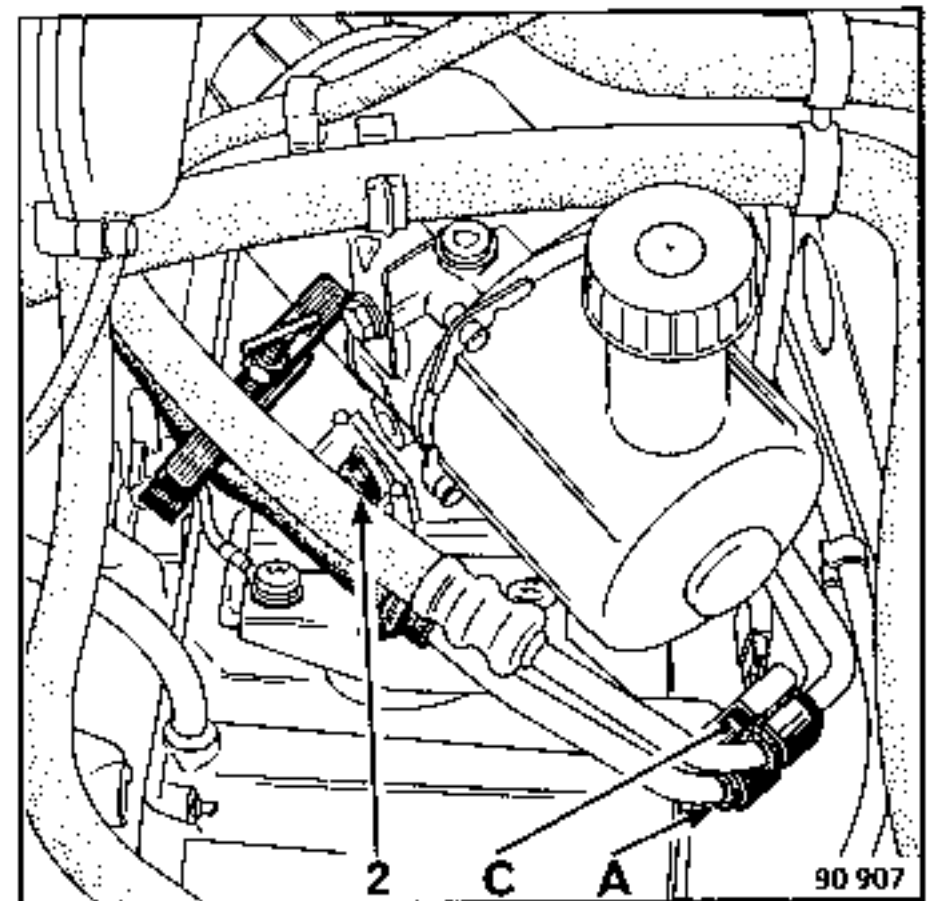
Tighten :

- the pipes leading to the ram and the bolt on the right hand support,
- the steering universal joint.

Reconnect the pipes leading to the rotary valve.

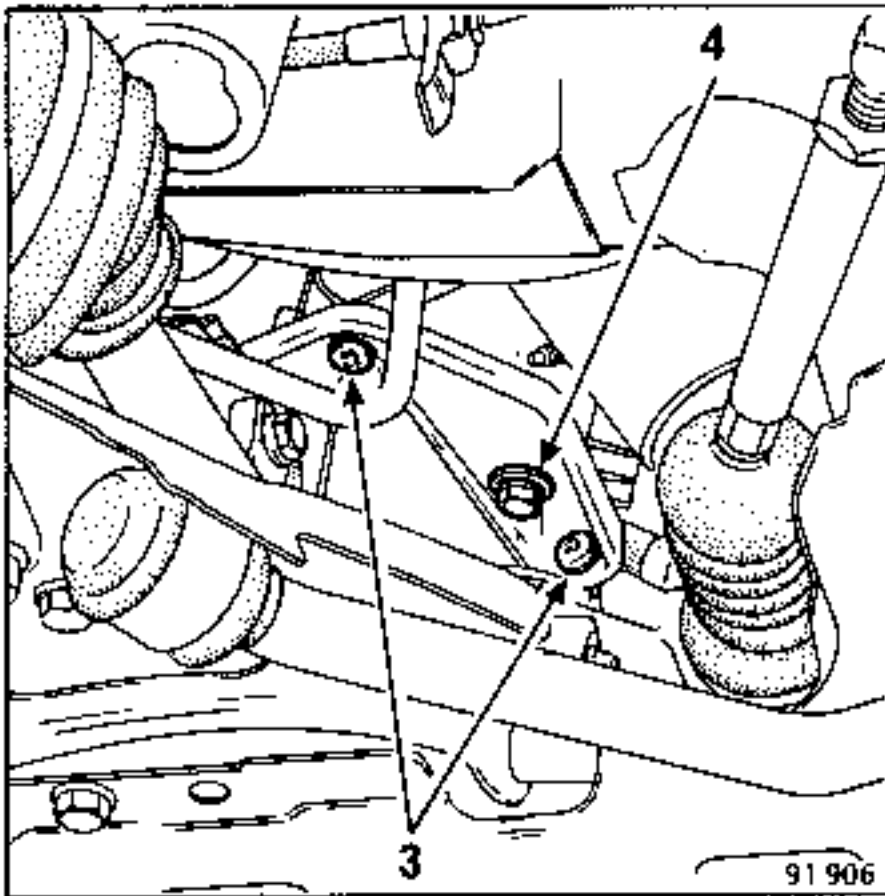
Fit the pipe retaining clip (B) and remove clamp Mot.453-01.

Place the pump in position on its support and resecure, without tightening them - bolt (2) and clip (A),



NOTE : ensure that the plastic pad is in position at (C).

- the pump lower securing bolts (3) and (4).

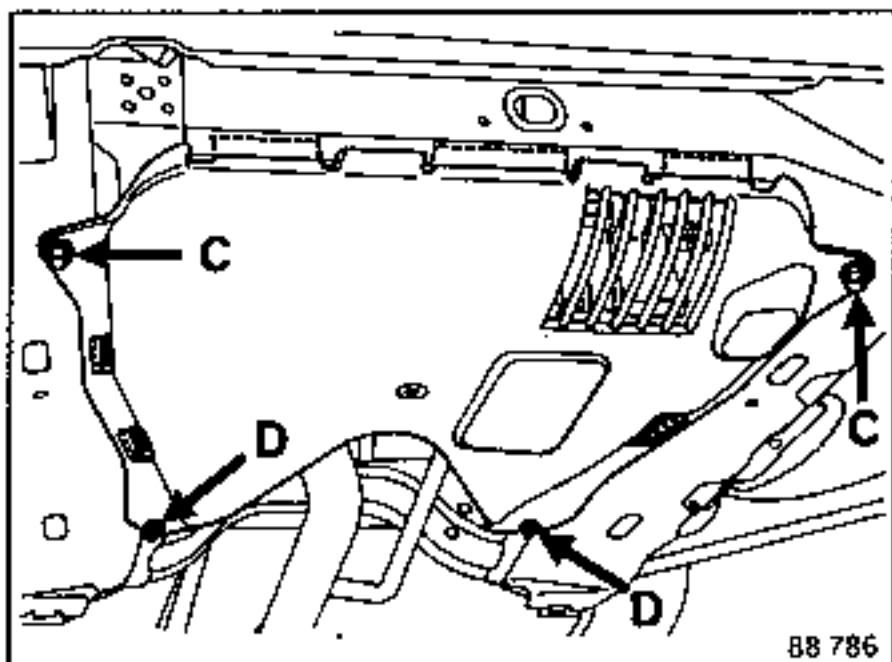


NOTE : bolts (3) and (4) are different lengths. It is essential to fit the short socket head bolt (4) in the position shown in this illustration to avoid the pump motor seizing.

Tighten the bolts securing the pump and the clip (A).

Reconnect the ball joints to the stub axle carrier.

Fit the protective casing under the engine.



Fill the power steering circuit with oil up to the max. mark on the reservoir.

Turn the steering to left and to right (with the pump stopped) to distribute the oil through the circuit.

Repeat this operation with the pump running then top-up the oil level (see section 13 "Filling the circuit").

Check, and if necessary adjust, the toe-out.

ADJUSTING

If rattling can be heard from the steering rack plunger, before replacing the steering box, ensure that the plunger is correctly adjusted.

This operation can be carried out on a vehicle without removing the steering box.

1. Checking on the source of the rattle

Grip the steering rack on the same side as the plunger and check it for axial play (backwards and forwards). If there is play at this point and a rattling noise can be heard the source is the rack plunger.

2. Adjusting a vehicle made before January 1986

Unlock the adjusting nut (1) by lifting the points where the flange on the nut has been peened down.

Tighten the adjusting nut by 1/8 turn (1 notch) with a 10 mm allen key.

The steering should still be free to move, without stiffness, from one lock stop to the other.

Max. permissible take-up : 2 notches.

Re-lock the nut by peaning its flange into two diametrically opposed slots in the housing.

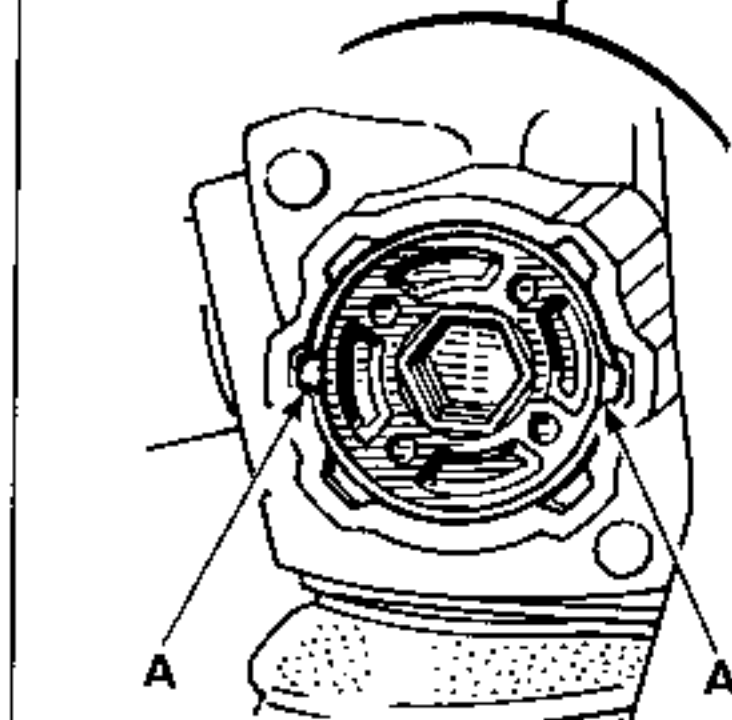
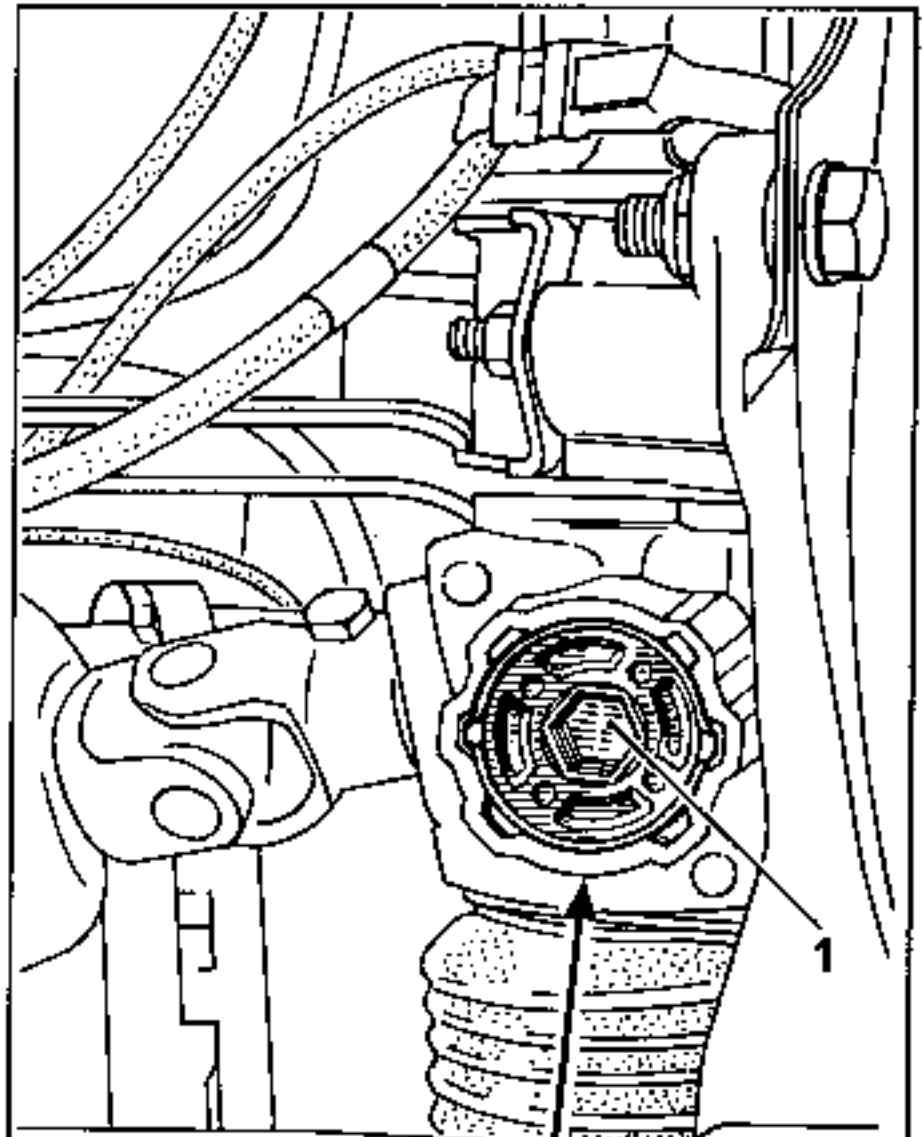
3. Adjusting a vehicle made after January 1986

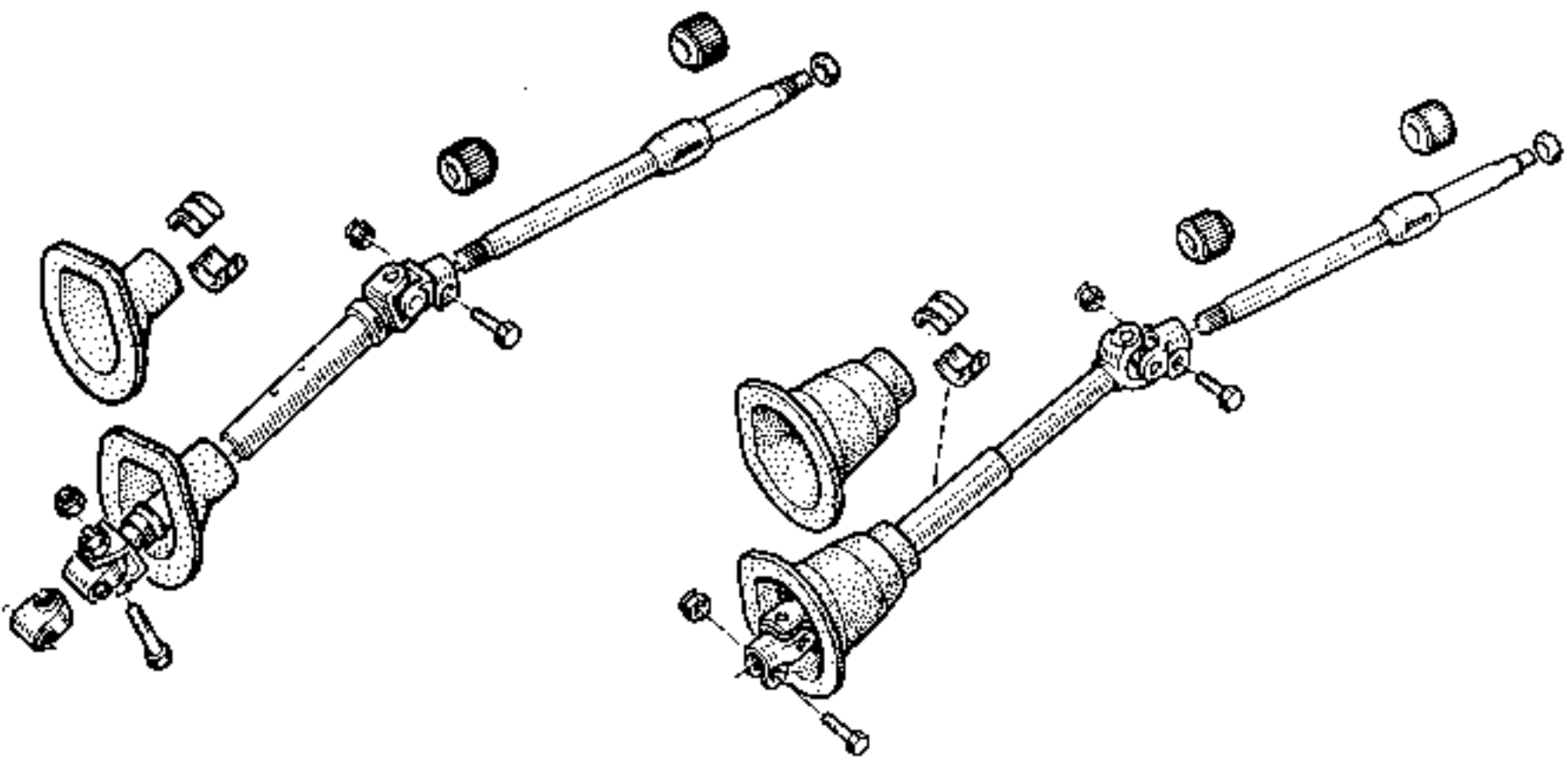
Unlock the adjusting nut (1) by lifting the peened points (A) on the nut flange.

Tighten the adjusting nut through two notches using a 10 mm allen key and check that the play has been eliminated.

Max. permissible take-up : 3 notches.

Re-lock the nut by peaning its flange into two diametrically opposed slots in the housing.





TIGHTENING TORQUES (in daN.m)

Steering wheel nut	4
Column universal joint bolts (torque stated as an indication)	2.5

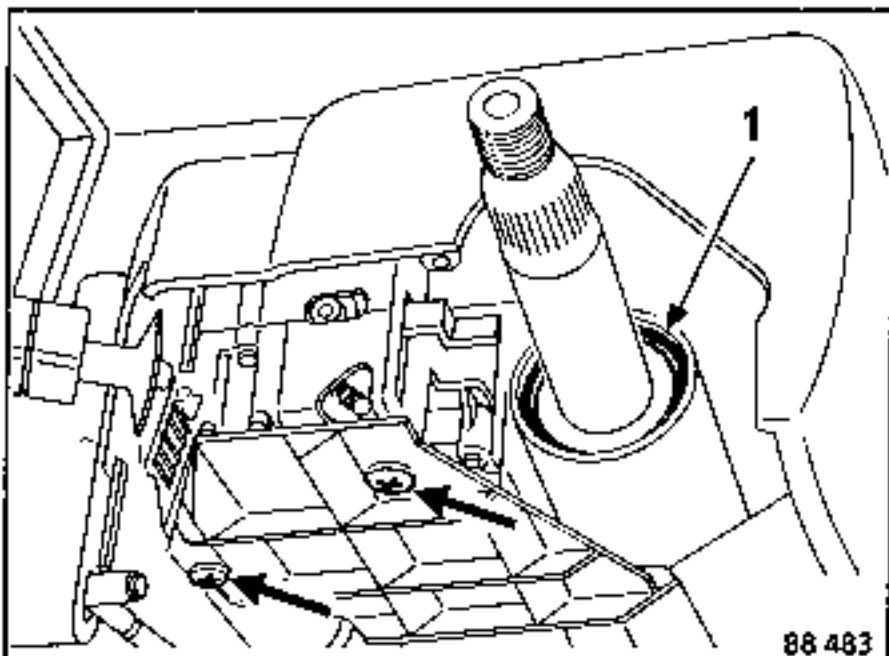
- the cotter bolt (2).

Temporarily refit the steering wheel and its nut, without tightening it.

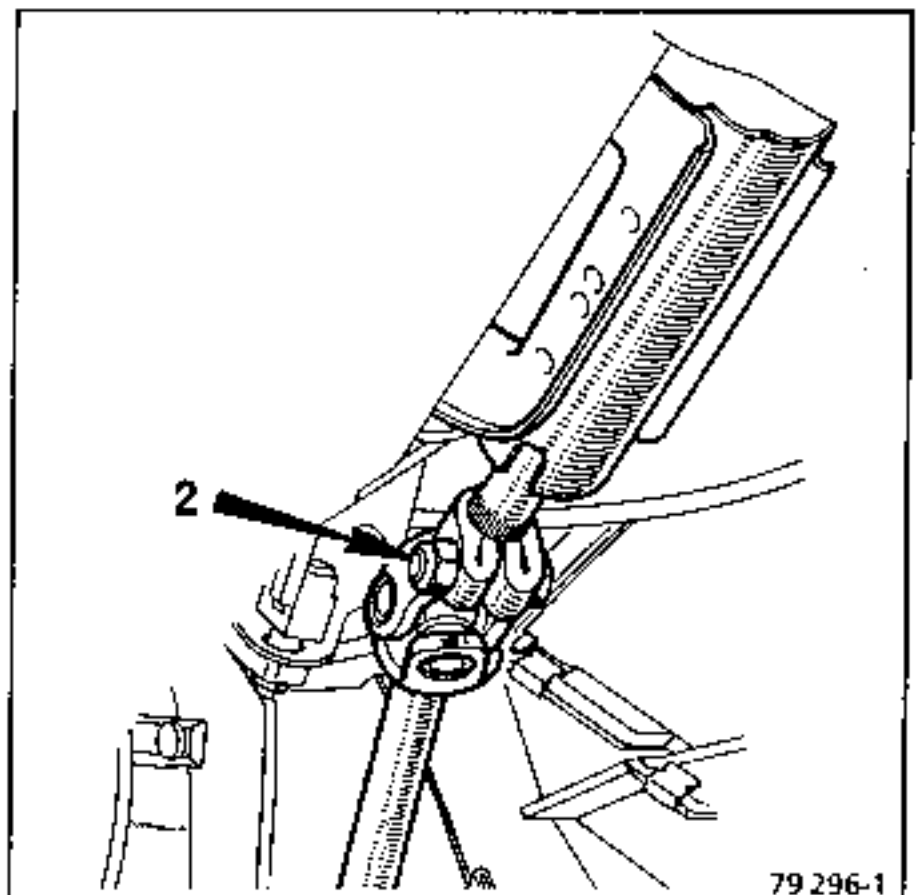
REMOVING

Remove :

- the half casing from the steering column and the steering wheel after marking its position,
- the screws securing the direction indicator light switch,
- the circlip (1) (on certain versions),

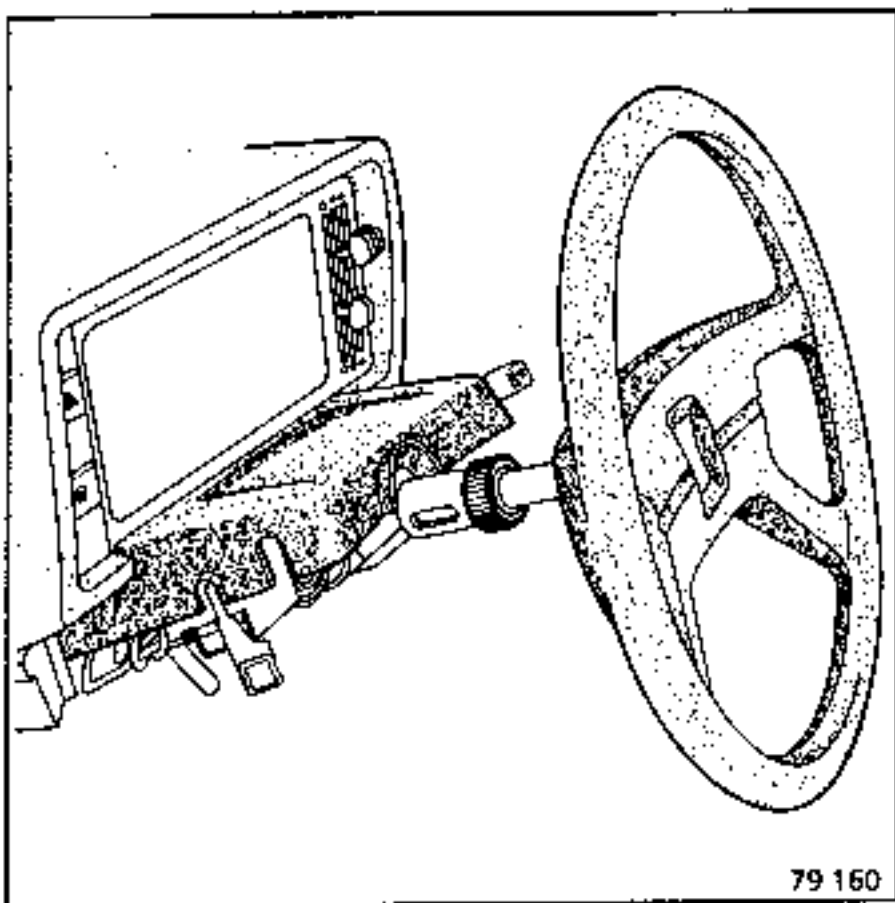


88 483



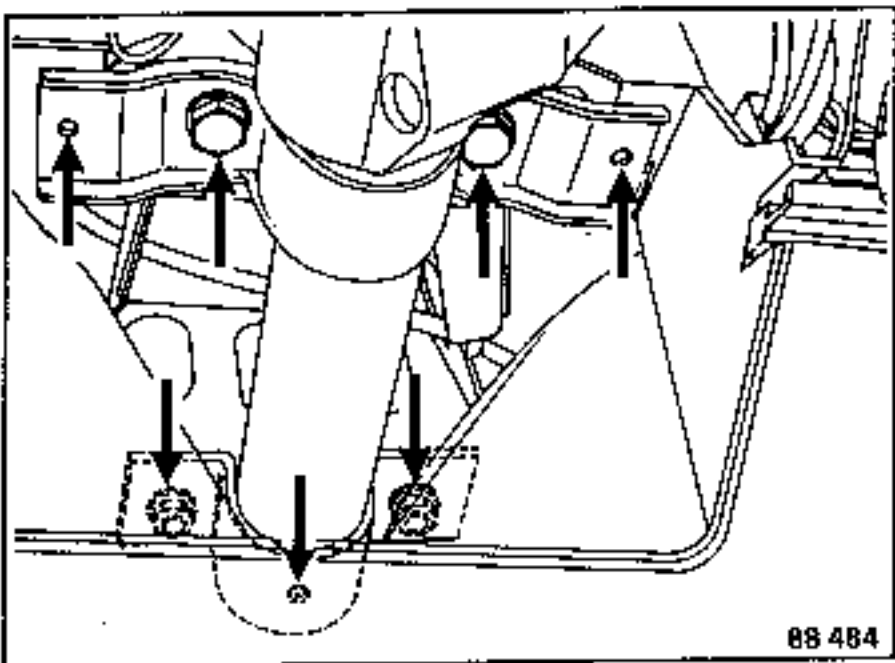
79 296-1

Pull the steering wheel to pull out the shaft and the upper bush (first ensure that the steering lock is not engaged).



Remove :

- the three screws that secure the fascia panel to the steering column,
- the four steering column securing bolts,



- the four screws that secure the central console and pull it back as far as it will go (see "Electrical" section).

Unclip the fascia panel lower fastenings (see section 83).

Disconnect the steering lock switch.

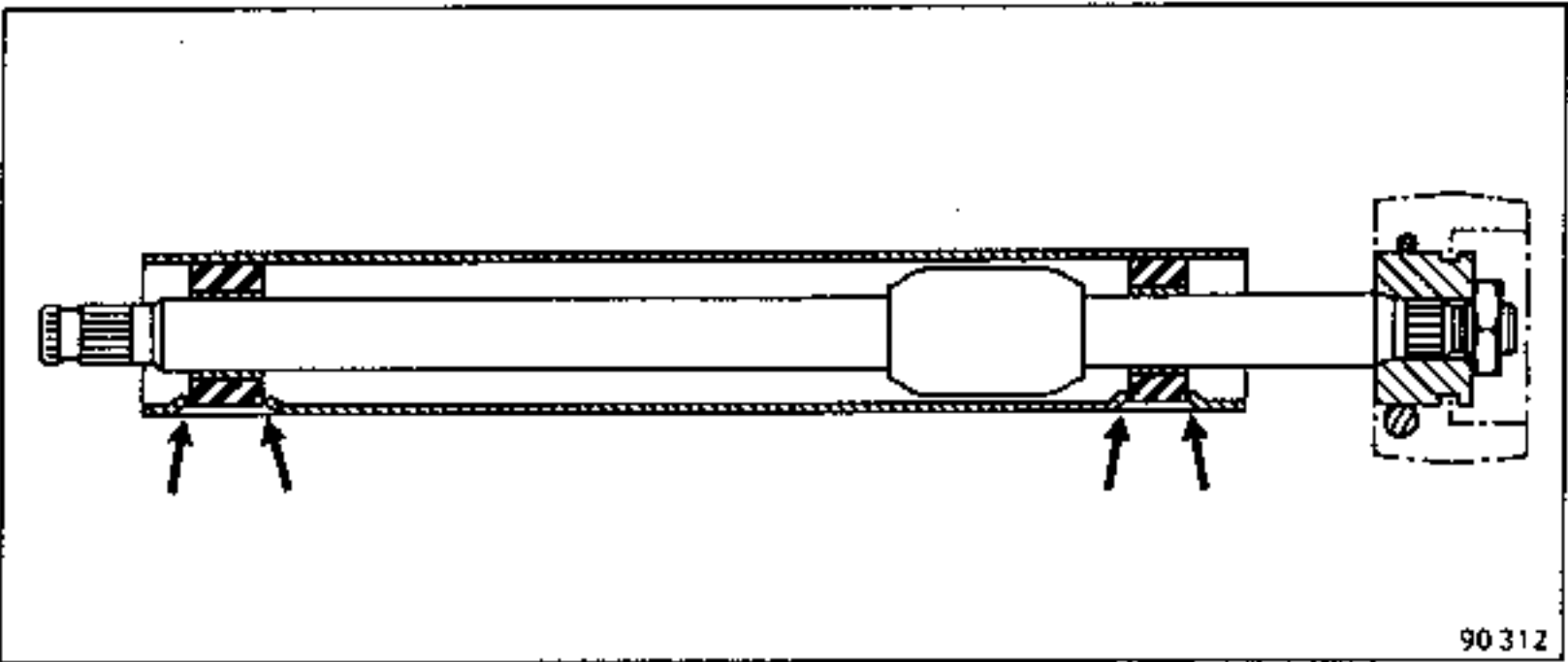
Lift the fascia panel and pull out the steering column at the same time.

Extract the lower bush using a tube with an outside diameter of 35 mm.

REFITTING

Fit :

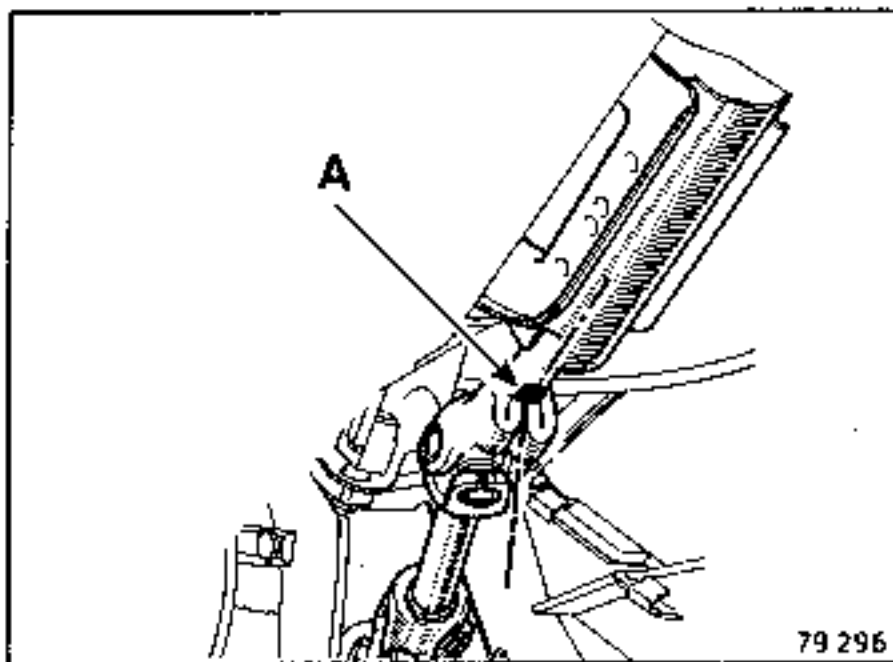
- a new lower bush using a tube with an outside diameter of 35 mm, after first coating the bush with grease,
- the steering column shaft,
- the new upper bush using a tube with an outside diameter of 35 mm, after first coating the bush with grease,
- the circlip (on certain versions),



- the steering column, whilst lifting the fascia panel.

Reconnect the steering lock switch.

Engage the steering column shaft into its universal joint, aligning the flat (A) with the centre of the slot and refit the cotter bolt.



Re-secure the steering column.

Clip the fascia panel in place and re-secure the central console.

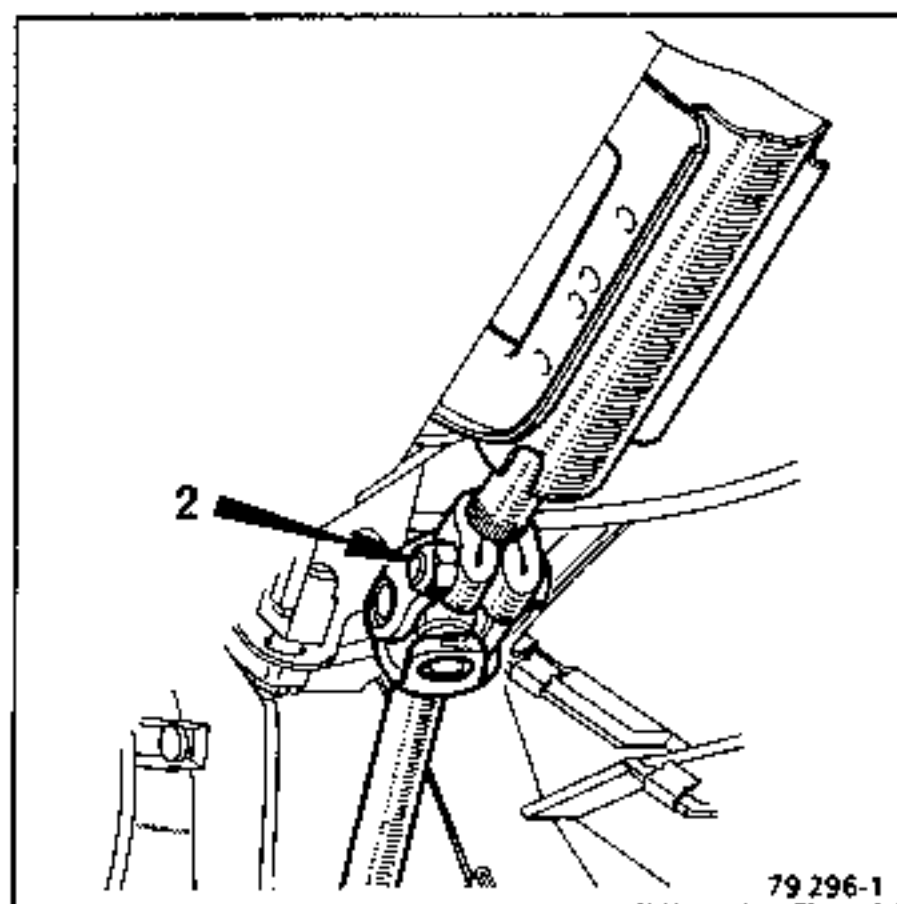
Fit :

- the direction indicator light switch,
- the steering column lower casing,
- the steering wheel in the position marked during dismantling.

REMOVING

Remove :

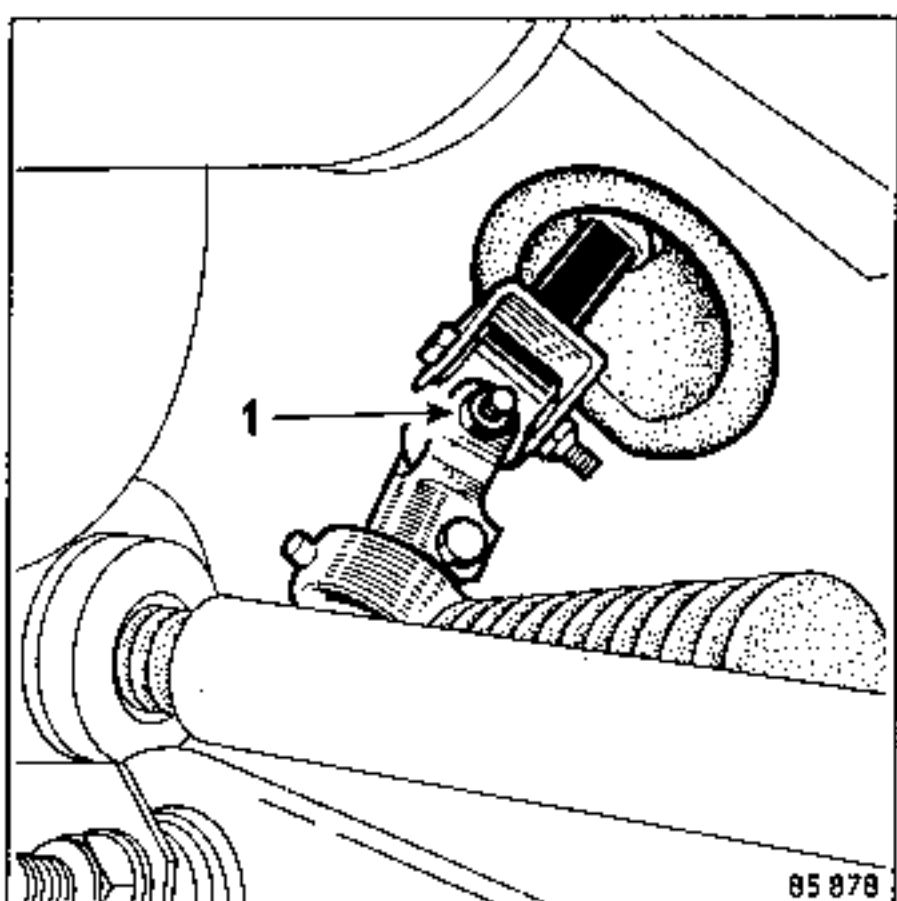
- the half casing that protects the light switch,
- the bolt (2) connecting the intermediate shaft to the steering column shaft,



- the universal joint securing bolt (1).

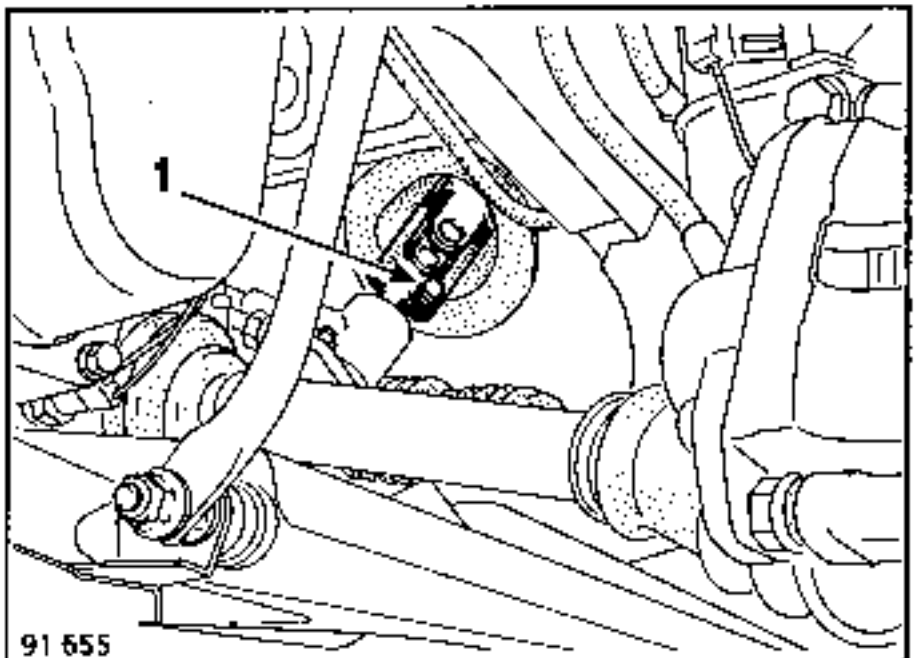
MANUAL STEERING

Remove the plastic protector.



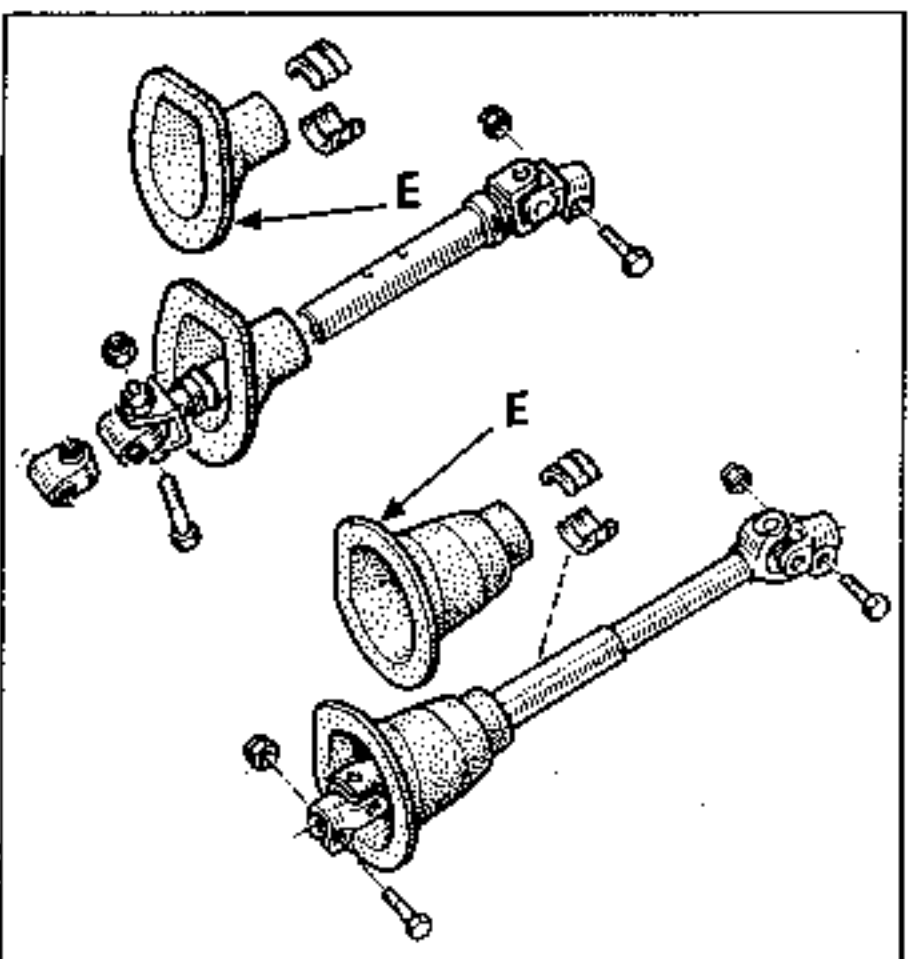
POWER STEERING

Remove the retractable shaft together with its rubber bellows.



REFITTING

Replace the bellows (E) on the scuttle if necessary.



Refit the retractable shaft.

MANUAL STEERING

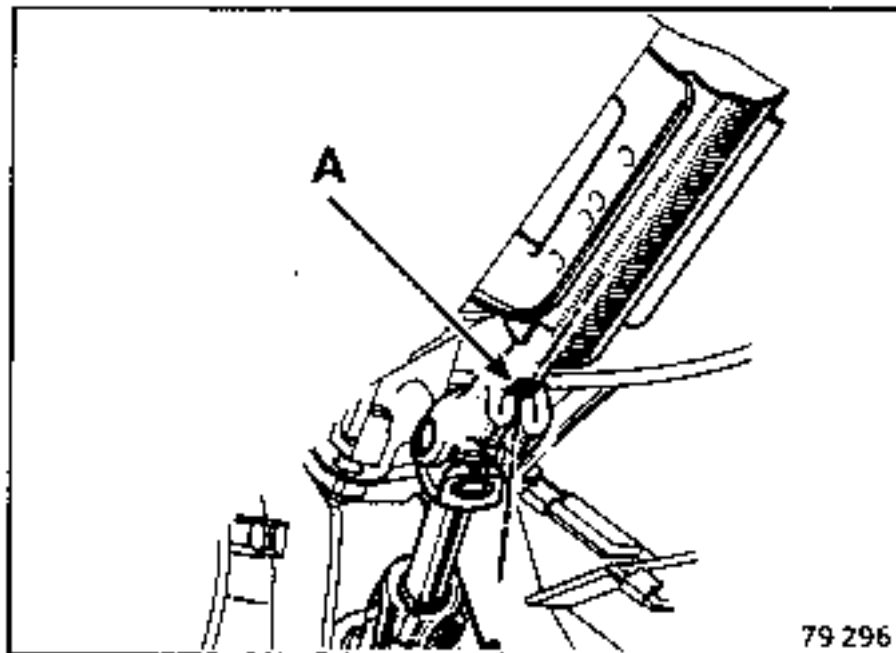
Connect up the lower universal joint without tightening the bolts.

POWER STEERING

Connect up the lower universal joint and tighten the bolt (1).

ALL TYPES

Fit the steering column shaft into its universal joint whilst aligning the flat (A) with the centre of the slot.



Refit :

- the cotter bolt,
- the upper 1/2 casing.

MANUAL STEERING

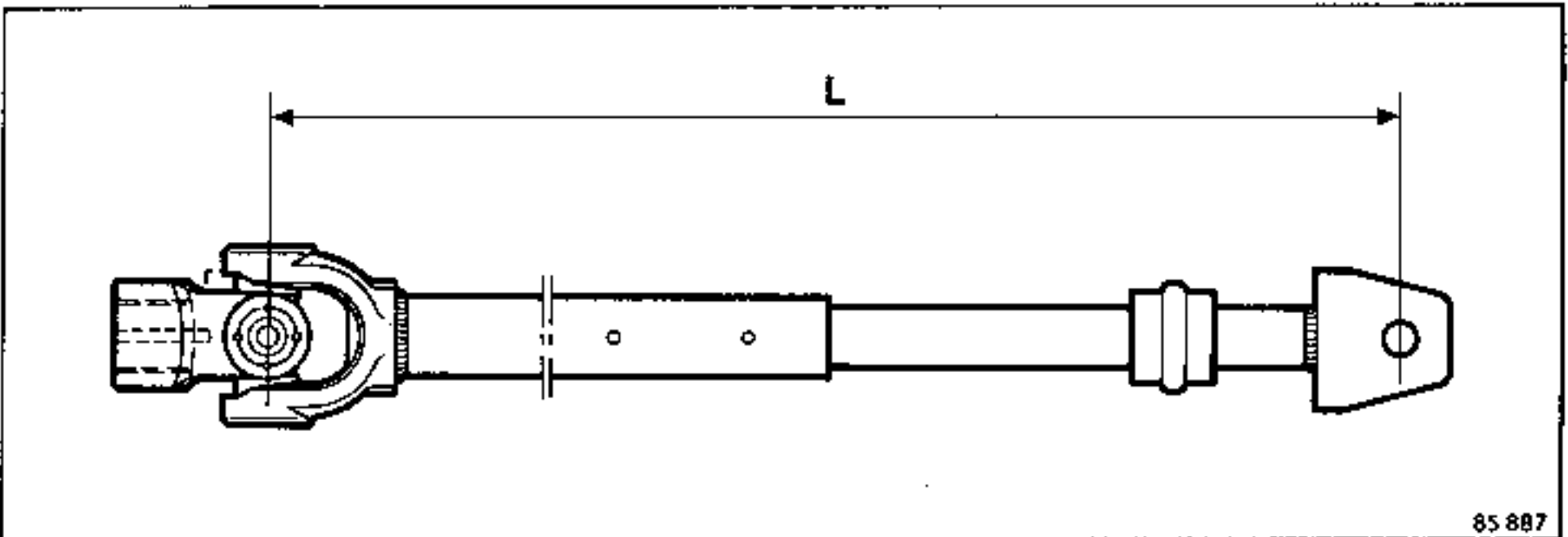
Tighten the bolts on the lower universal joint (see section "Manual steering universal joint").

Fit the plastic protector.

CHECKING

If it is impossible to engage the splines, fully, check that the steering column shaft is the correct length. If it is not, replace it by a new one.

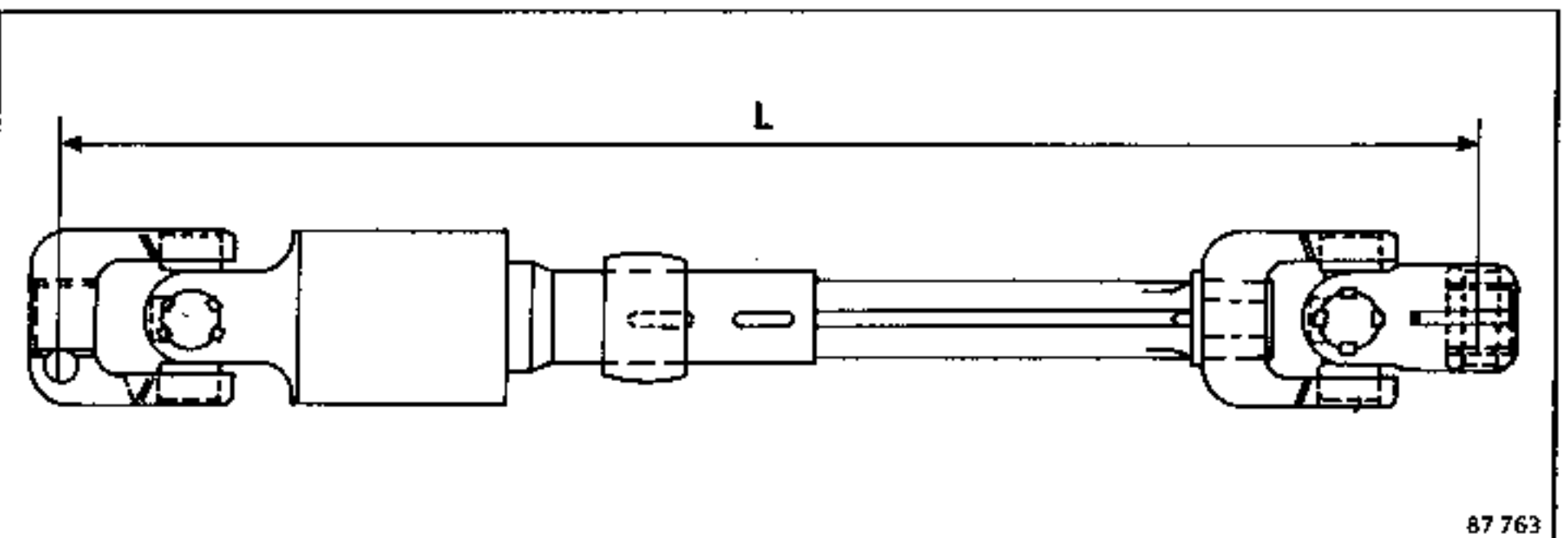
MANUAL STEERING



Left hand drive :
 $L = 378.5 \pm 1 \text{ mm}$

Right hand drive :
 $L = 401 \pm 1 \text{ mm}$

POWER STEERING



Left hand drive :
 $L = 381 \pm 1 \text{ mm}$

Right hand drive :
 $L = 401 \pm 1 \text{ mm}$

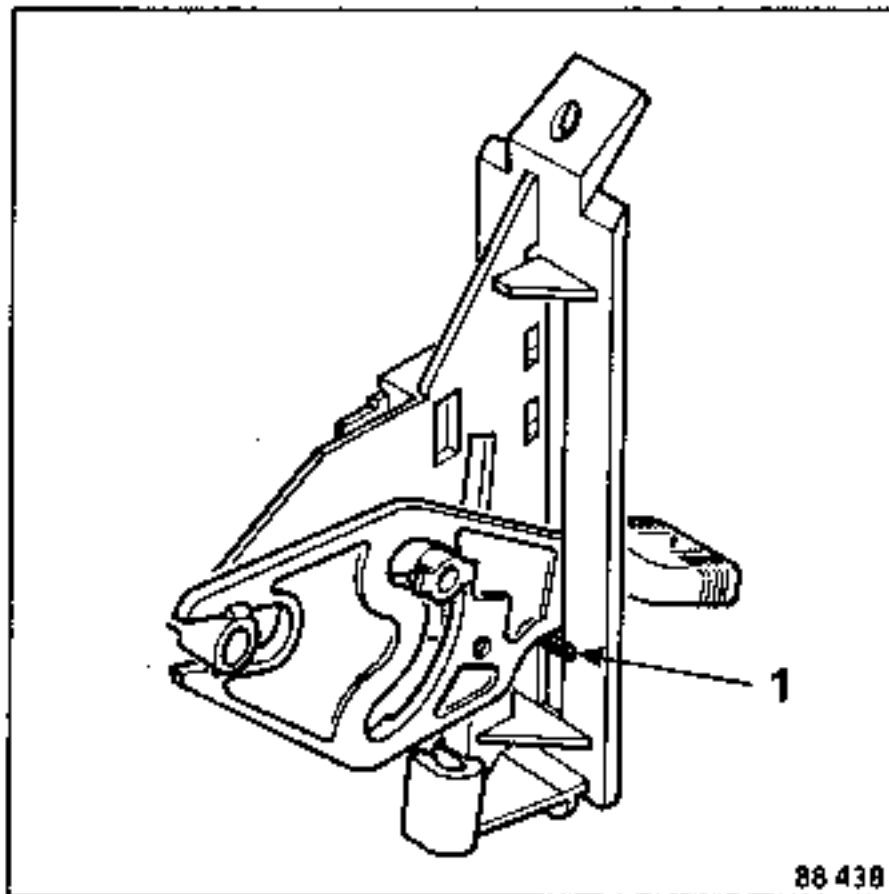
SPECIAL FEATURES

The new choke control has a travel limit-ign stop (1) that fixes the normal position of the choke knob, that is to say with the choke flap open.

After adjusting the control, break off this stop by pushing the knob downwards.

After adjusting it, check that the control correctly carries out its two functions :

- of completely opening the flap,
- of completely closing the flap.





TIGHTENING TORQUES (in daN.m)

M 10 x 100	1.3
M 12 x 100	1.3
Securing bolts on brake servo	1.3

REMOVING

Empty, and remove, by pulling it upwards, the brake fluid reservoir.

Remove the pipes and mark their position.

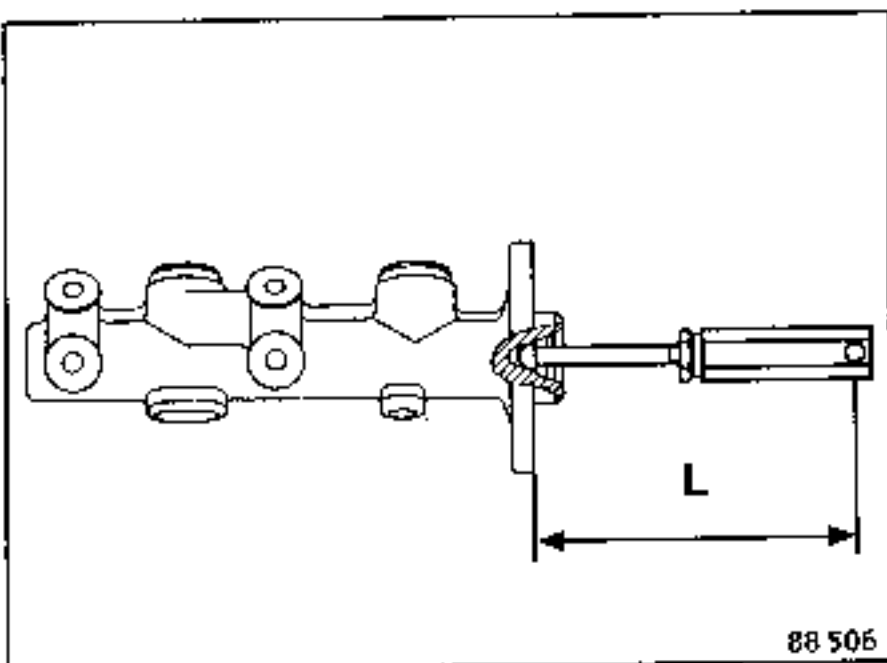
Remove the two nuts securing the master cylinder to the brake servo or to the body.

REFITTING

Check the length of the thrust rod.

Vehicles without brake servo :

$L = 110 \text{ mm}$

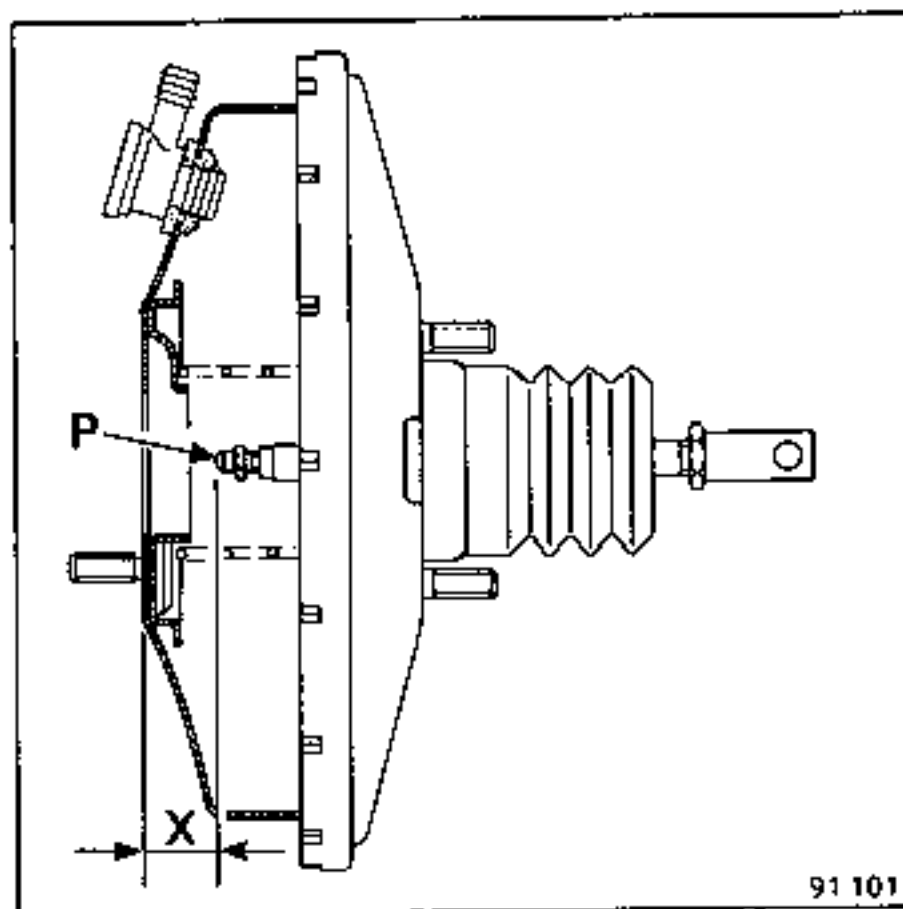


Vehicles with brake servo :

All types, LH and RH drive.

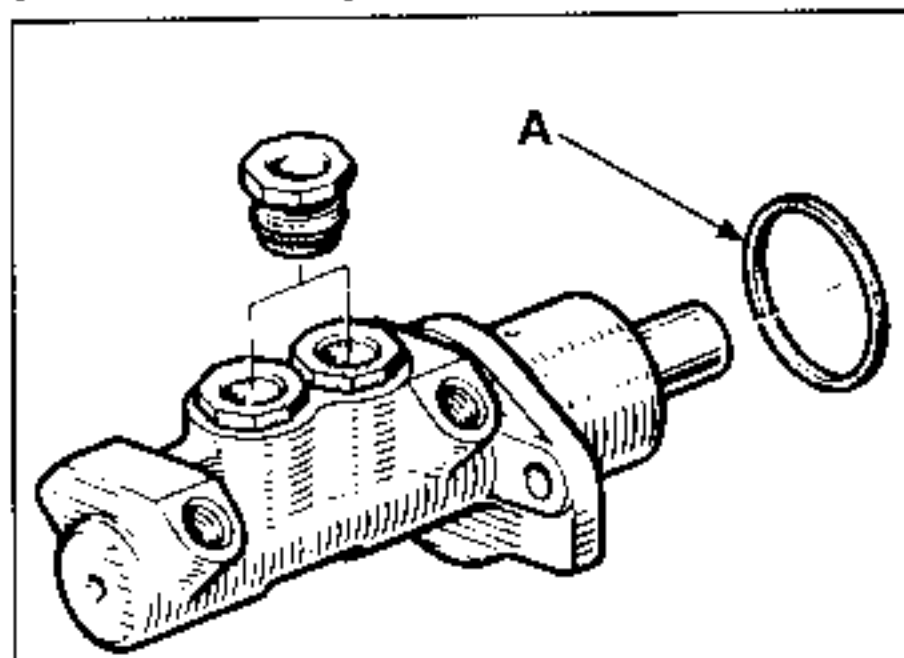
Dimension $X = 22.3 \text{ mm}$.

The system is adjusted, to suit the model, at adjuster (P).



NOTE : these vehicles are equipped with master cylinders that are an integral part of the brake servo. There is a seal between the brake servo and the master cylinder. Whenever carrying out any work on these units, a new seal (A) must be fitted.

Fit the master cylinder in line with the brake servo so that the thrust rod (P) enters correctly into its location in the



master cylinder.

Reconnect :

- the pipes in the positions marked during dismantling,
- the brake fluid reservoir, pushing it down to click it into place in the master cylinder.

Bleed the braking system.



TIGHTENING TORQUES (in daN.m)

Bolts securing master cylinder to brake servo	1.3
Nuts securing brake servo to scuttle	2

The brake servo cannot be repaired. The only operations that can be carried out on it are on :

- the air filter,
- the non-return valve.

REMOVING

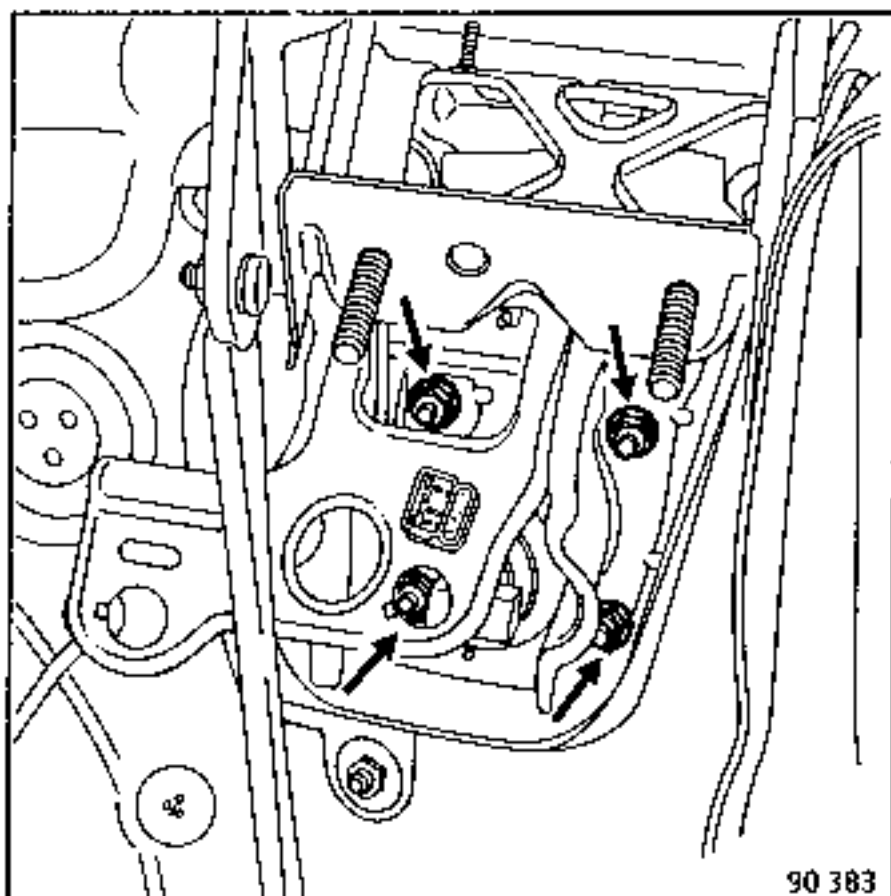
Disconnect the battery.

Remove the master cylinder.

Disconnect the vacuum hose from the brake servo.

Remove the clevice pin connecting the brake pedal to the thrust rod.

Unscrew the brake servo securing nuts and remove it.



REFITTING

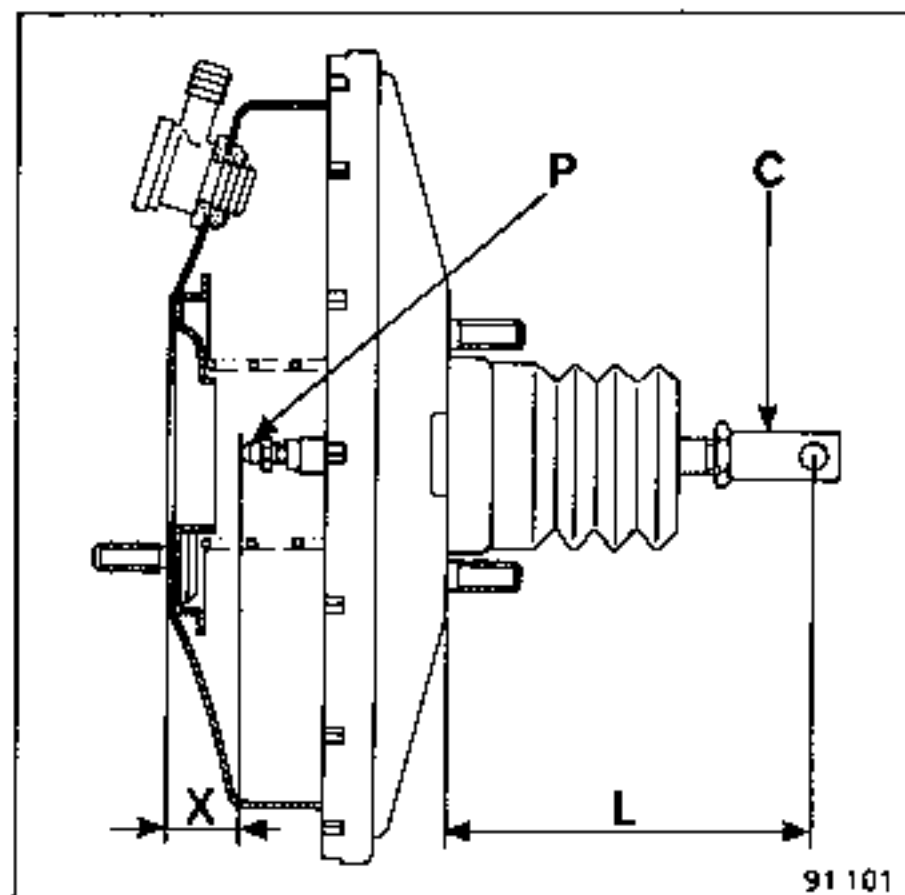
Before refitting, check :

On all left hand drive types :

- dimension L = 121 mm that can be adjusted to suit the model, at rod (C),
- dimension X = 22.3 mm that can be adjusted to suit the model, at rod (P).

On all right hand drive types :

- dimension L = 137.5 mm that can be adjusted to suit the model, at rod (C),
- dimension X = 22.3 mm that can be adjusted to suit the model, at rod (P).



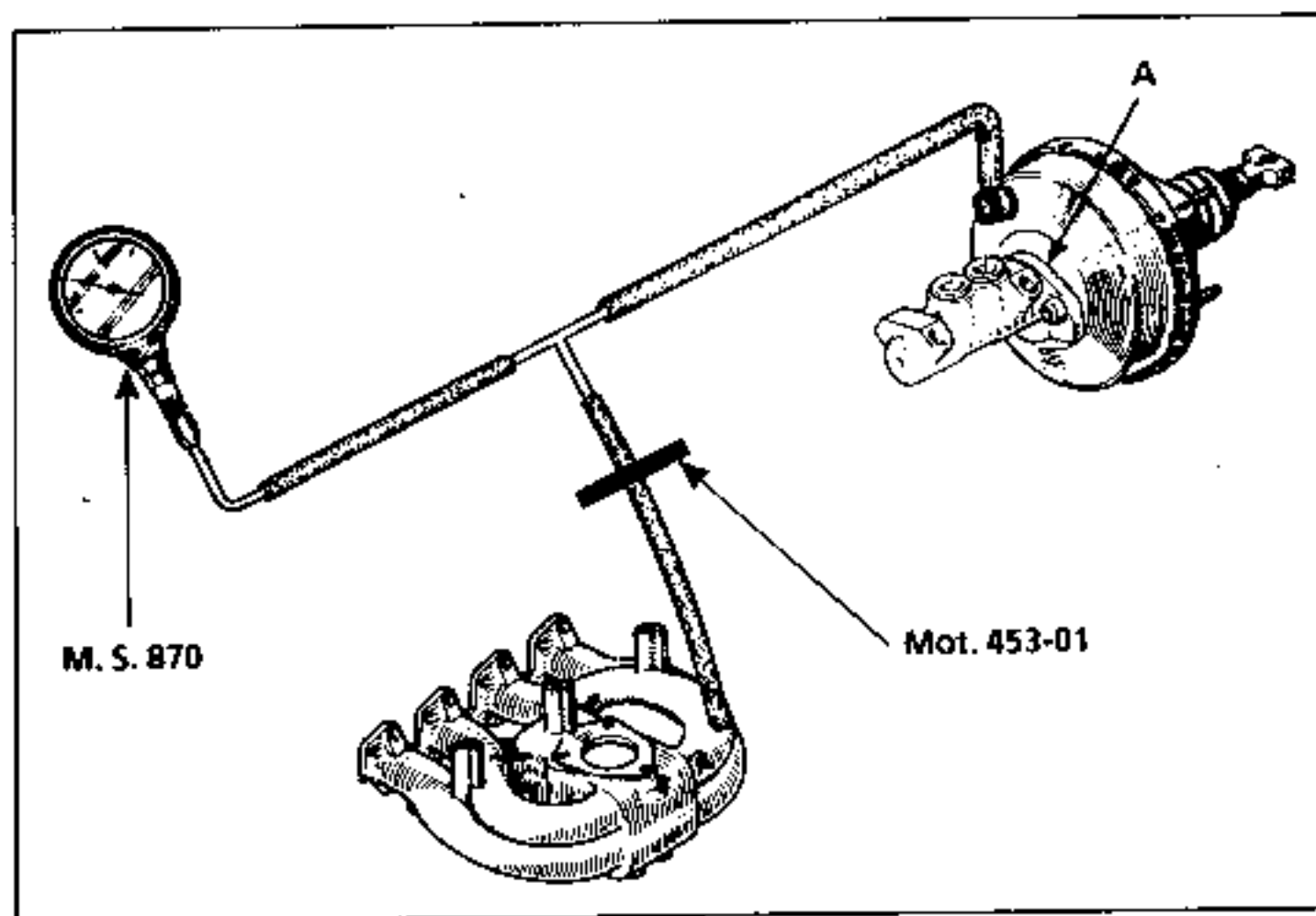
Fit the master cylinder (see instructions in the section concerned).

Bleed the braking system.

ESSENTIAL SPECIAL TOOLS		
Mot	453-01	Hose clamps
M.S.	870	Vacuum gauge

CHECKING THE SYSTEM FOR LEAKS

When checking the brake servo for leaks, ensure that the seal between it and the master cylinder is effective. If there is leakage at this point, replace seal (A).



The brake servo is to be checked for leaks on the vehicle with the hydraulic system in good working condition.

Connect the vacuum gauge M.S.870 between the brake servo and the vacuum source (the inlet manifold) with a "T" union and as short a length of pipe as possible.

Run the engine at idling speed for one minute.

Clamp flat the pipe (clamp Mot.453-01) between the "T" union and the vacuum source.

Stop the engine.

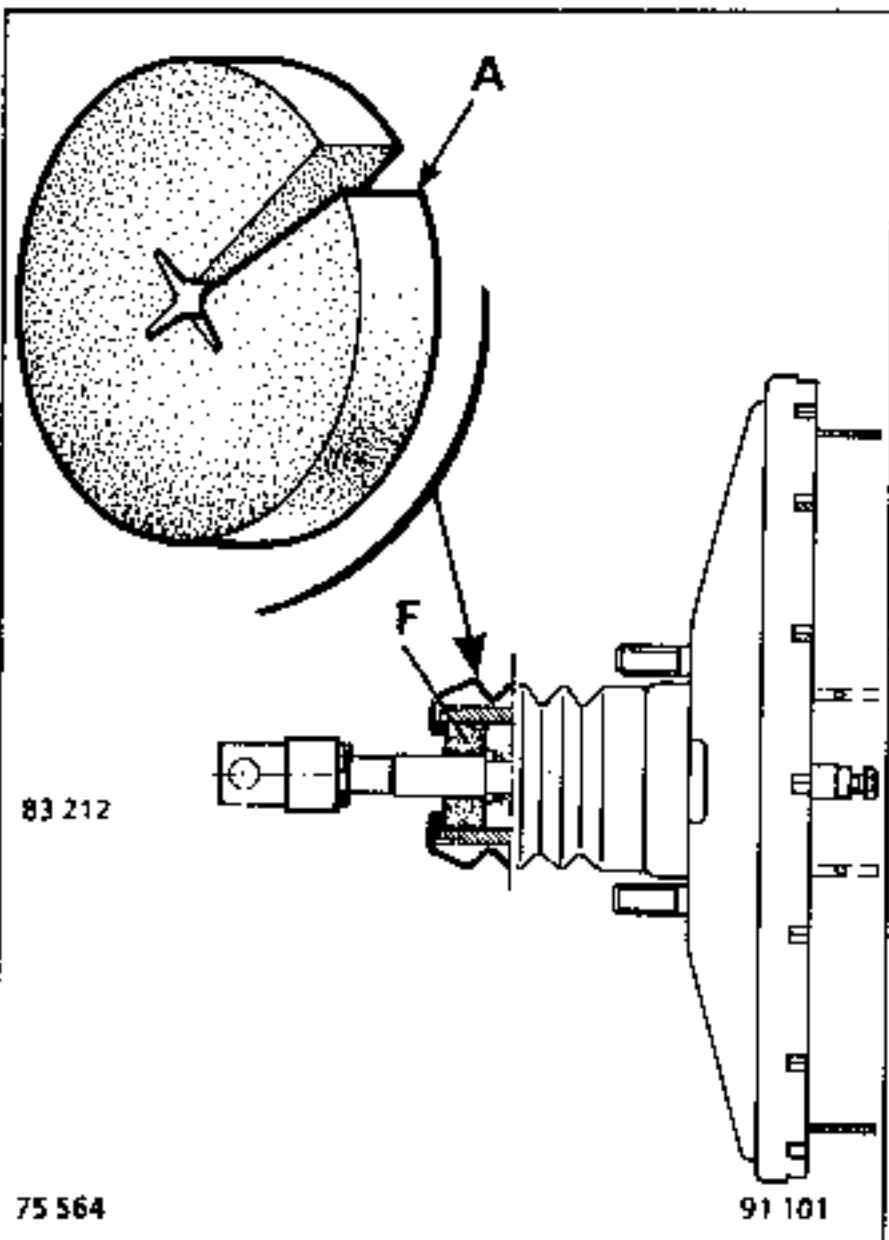
If the vacuum drops by more than 33 mbars (25 mm/Hg) in 15 seconds, there is a leak which may be at either

- the non-return valve (replace it by a new one),
- the thrust rod diaphragm (in this case replace the brake servo).

If the brake servo is not operating, the brakes will still work but the pedal pressure necessary to obtain the same deceleration as that with servo assistance, is much greater.



REPLACING THE AIR FILTER



It is not necessary to remove the brake servo to replace its air filter (F).

From under the pedal assembly, using a screwdriver or a metal hook, pull out the worn filter (F). Cut the new filter at A (see figure) and fit it round the rod then push it in to its location ensuring that it covers the entire aperture so that no unfiltered air can enter.

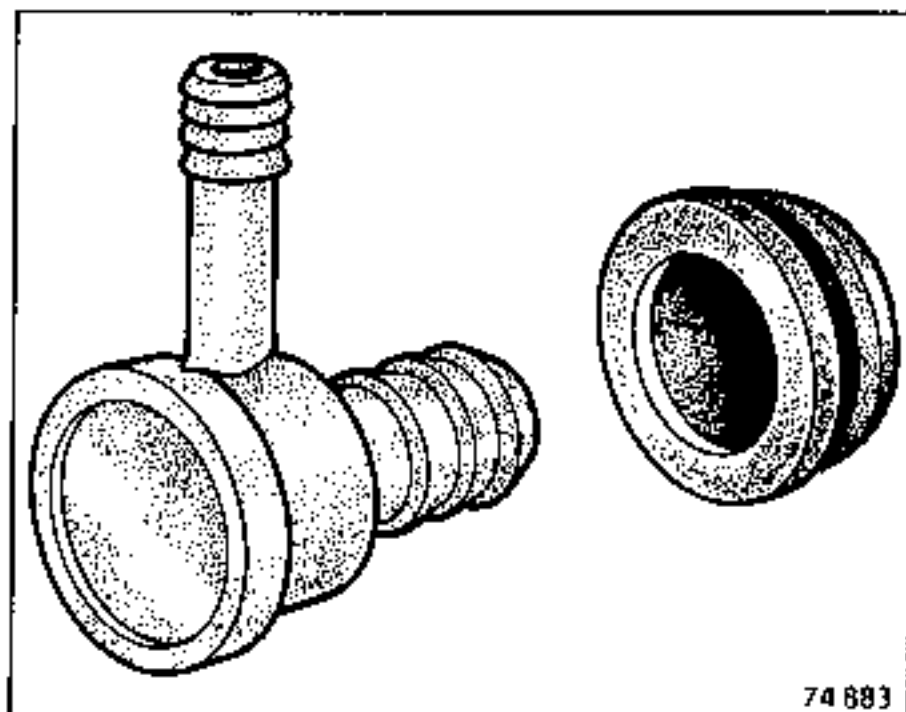
REPLACING THE NON-RETURN VALVE

This operation can be carried out on the vehicle.

REMOVING

Disconnect the vacuum input pipe from the brake servo.

Pull the non-return valve whilst twisting it to free it from the rubber seal.



REFITTING

Check the condition of the rubber seal and the non-return valve.

Replace any defective parts.

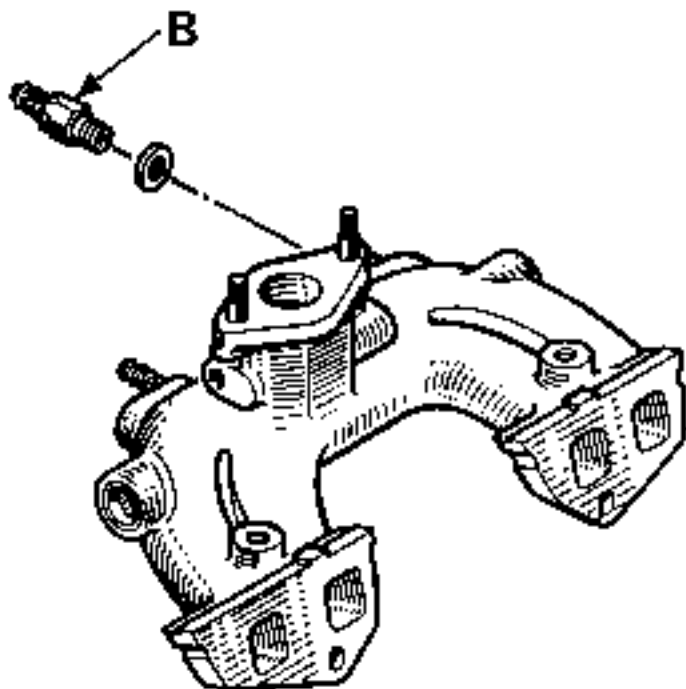
Refit the assembly.

SPECIAL FEATURES

C405 vehicles are equipped with a valve (B) in the brake servo vacuum circuit,

This valve avoids the brake servo being pressurised when the turbo charger is running.

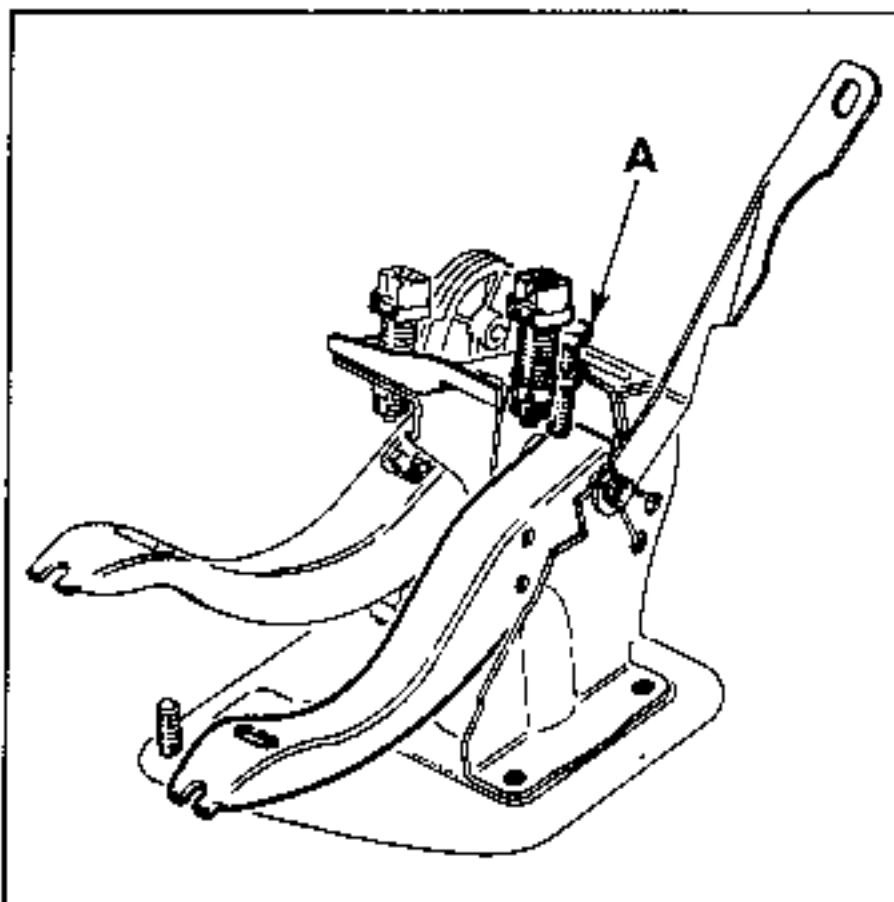
When checking the brake servo for leaks, ensure that this valve operates freely.



Pedal assembly

SPECIAL FEATURES

When removing the brake control assembly, it is essential to fit bolts with a maximum length, under the head, of 20 mm (A).



REMOVING

Unhook the cable from the fork.

Press the pedal to pull out the cable.

Hold the cable against the cam (C), by hand.

Release the pedal. The cable end fitting will come out of its location.

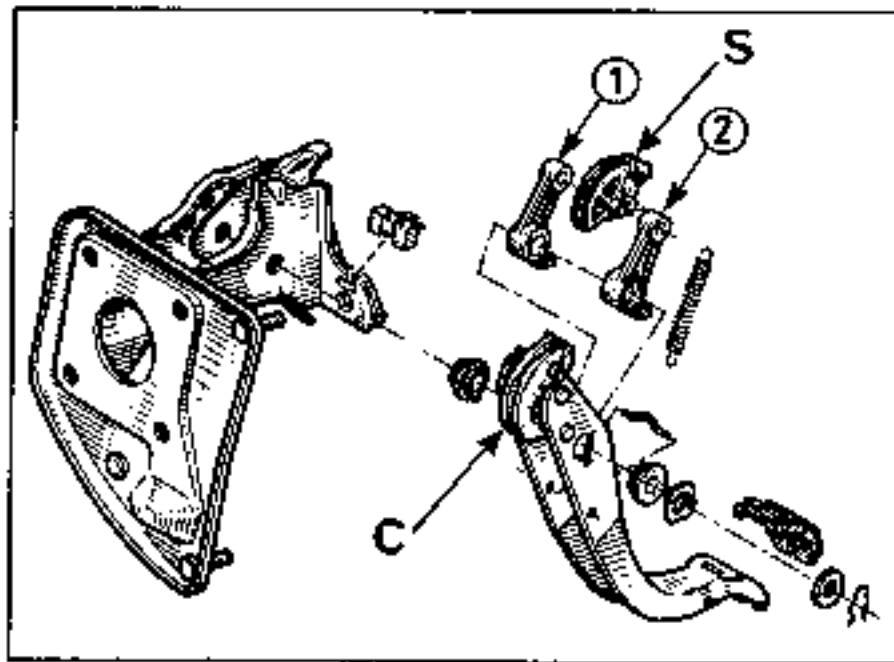
Free the cable from the pedal assembly.

Remove the cable cover end stop on the floor by pushing it with a screwdriver then pull out the complete cable assembly through the engine compartment.

REFITTING

Pass the cable through from the engine compartment into the passenger compartment.

Inside the vehicle, check that the rockers (1) and (2) return freely to their "at rest" position.



Place the cable on the cam (C) and the cable end fitting in its location on the serrated quadrant (S).

Fit the cable to the clutch fork.

Check that the cable cover end stop is correctly aligned with its location in the scuttle.

Press down the clutch pedal to engage the cable cover end stop into the scuttle. The adjustment is automatic.

PRINCIPLE OF OPERATION

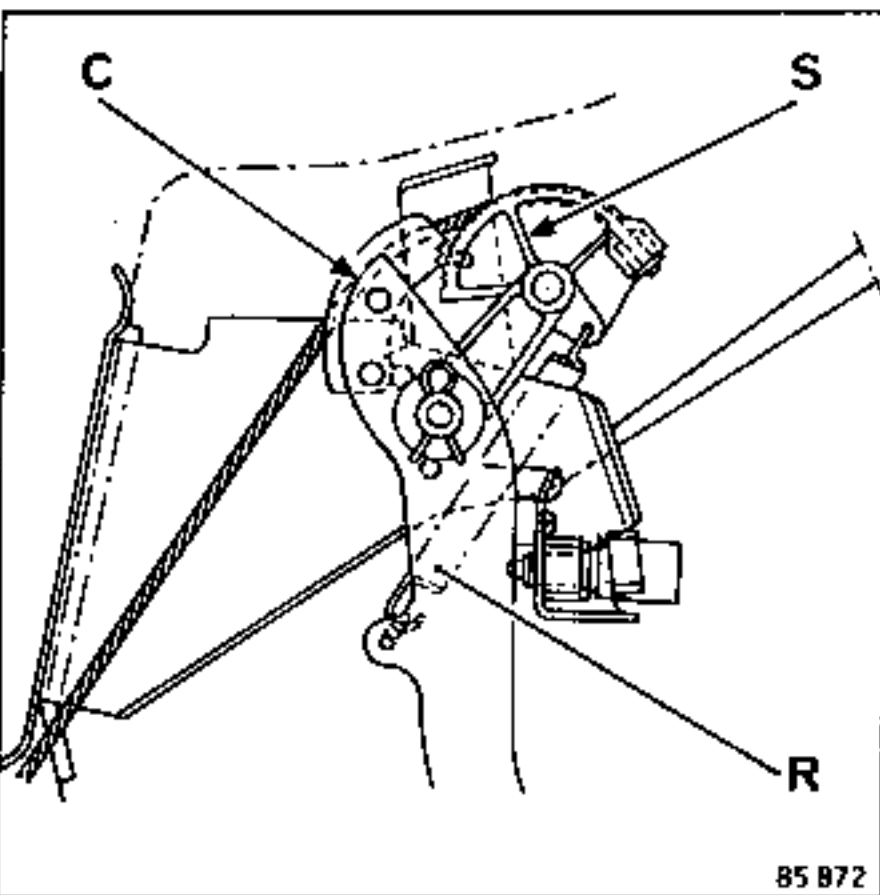
The spring (R) maintains a permanent tension on the wear take-up quadrant (S).

The cable is always under tension and this pulls the fork to keep the release bearing in permanent contact with the diaphragm.

The adjustment is automatic.

CLUTCH "DISENGAGEMENT" MOVEMENT

When the pedal is pressed down, the serrated cam (C) on the pedal engages with the serrations on the wear take-up quadrant (S) to prevent it pivoting and allow tension to be applied to the cable.

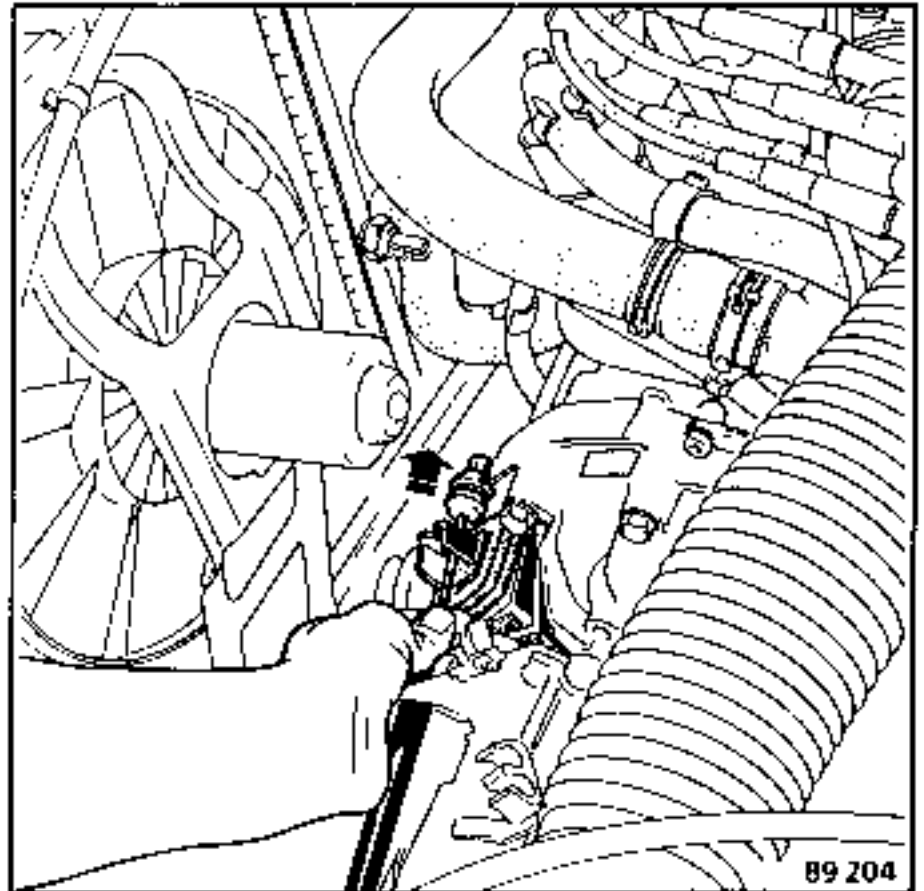


CHECKING

To ensure that the assembly is operating correctly :

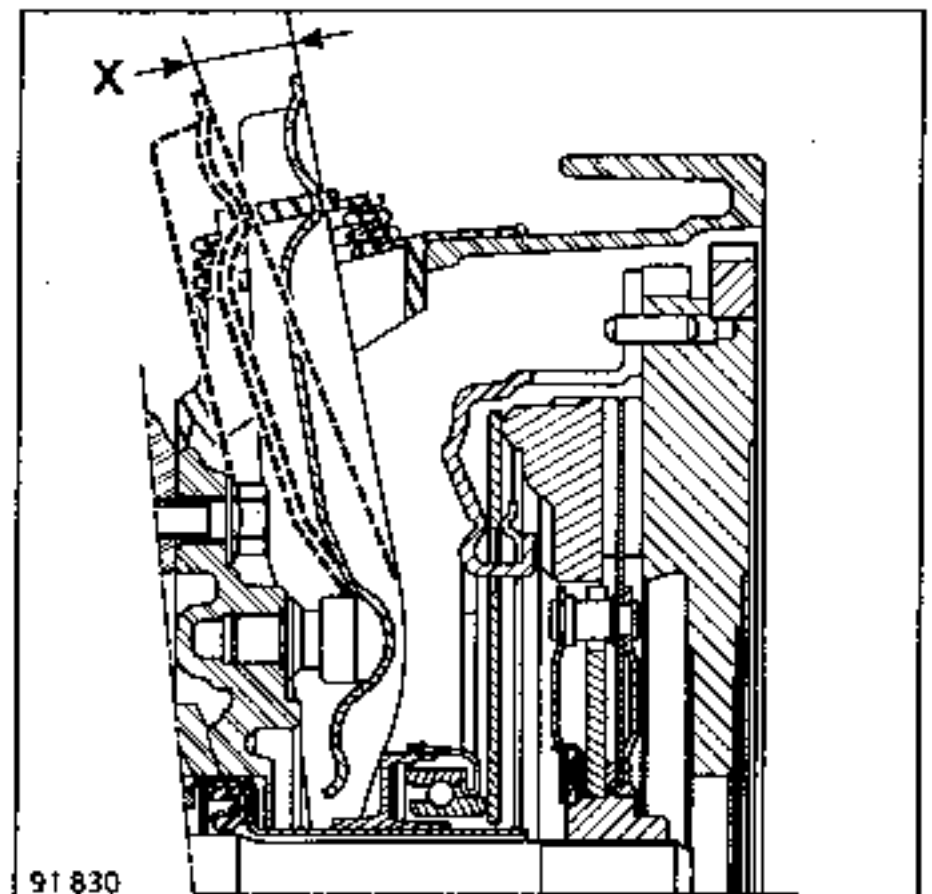
1. Check that the serrated cam (C) pivots freely round its shaft.
2. Pull the cable at the clutch fork end, on the gearbox.

There should be at least 2 cm of "slack" in the cable.

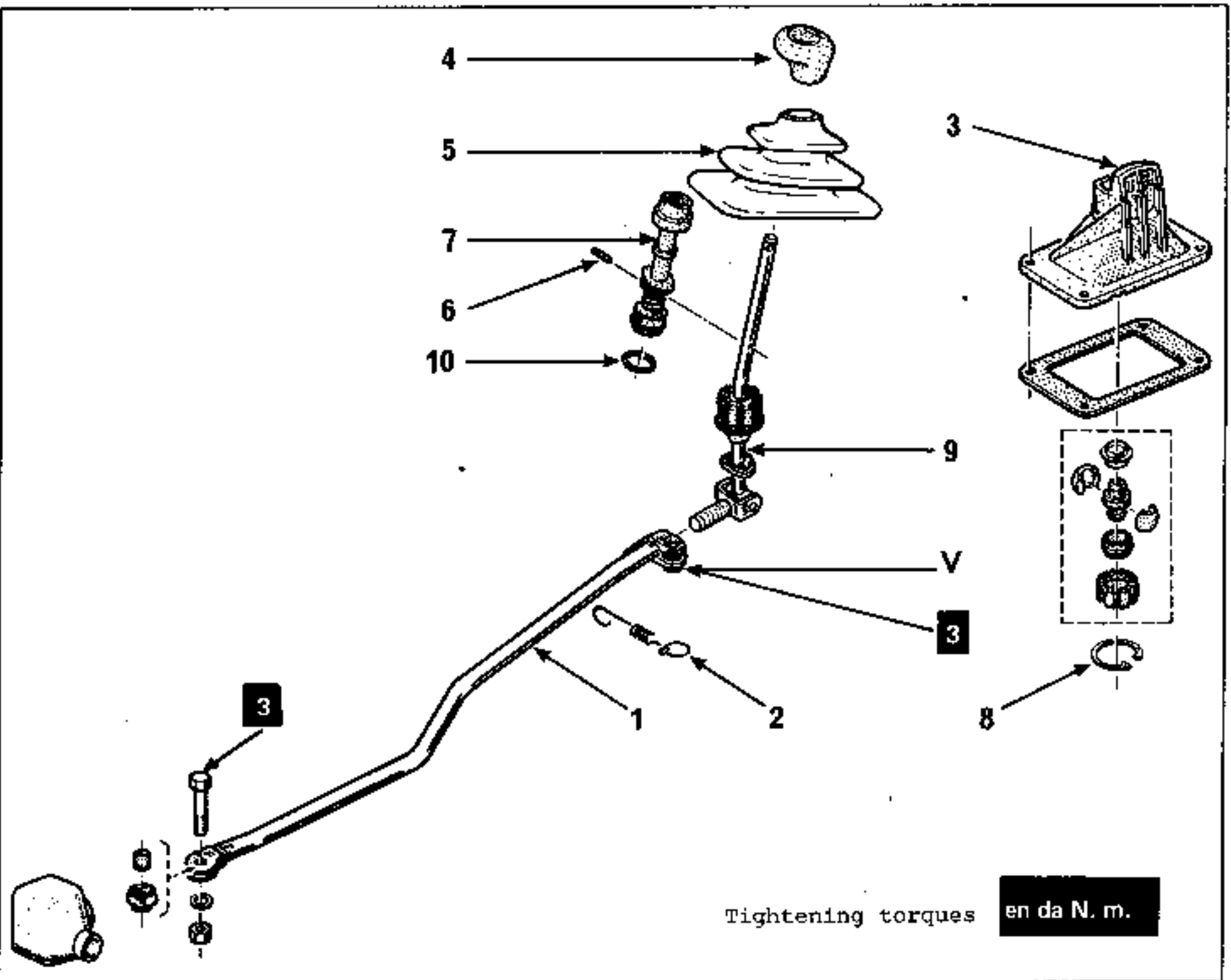


These checks permit one to ensure that the serrated cam (C) and the serrated quadrant (S) are free when in the clutch "engaged" position.

3. Check the fork travel. It should be :
X = 17 to 18 mm



These checks are to be carried out prior to any operation on the clutch itself.

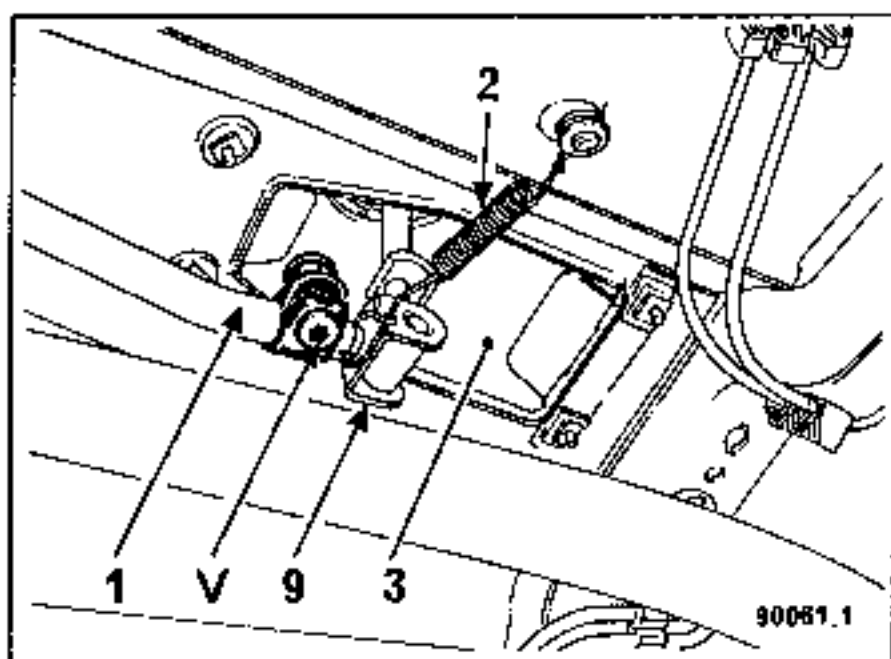


- 1 Link
- 2 Spring
- 3 Casing
- 4 Knob
- 5 Bellows

- 6 Spring pin
- 7 Reverse release
- 8 Circlip
- 9 Lever
- 10 O ring seal

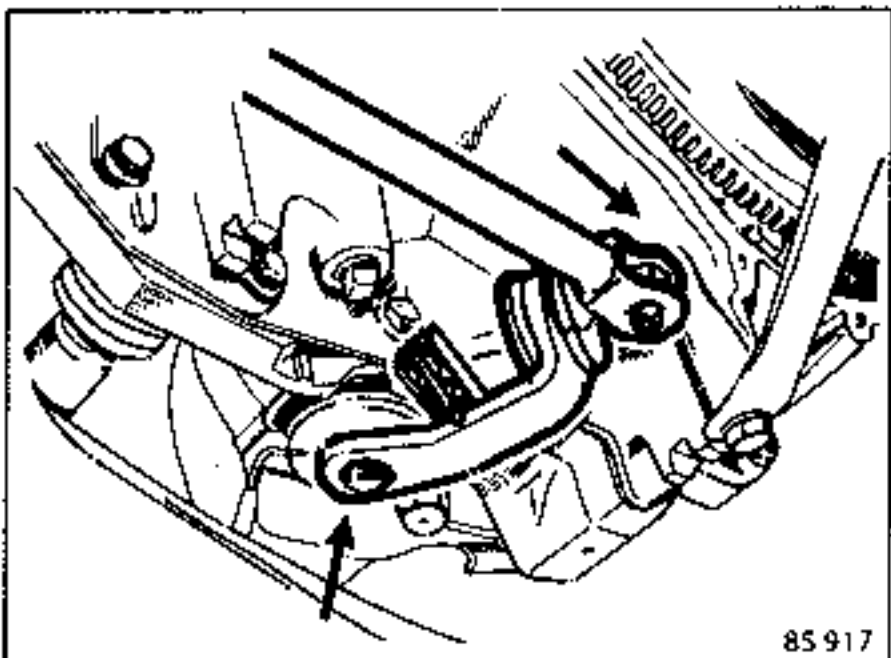
REMOVING

- Inside the vehicle : unclip the bellows (5) from the console.
- Under the vehicle : disconnect the link (1) from the clevice (9) and the spring (2) then remove the assembly formed by the casing (3) and the shift lever.
- Grip the shift lever clevice (9) in a vice fitted with soft jaws and remove the parts in the order (4) to (10).



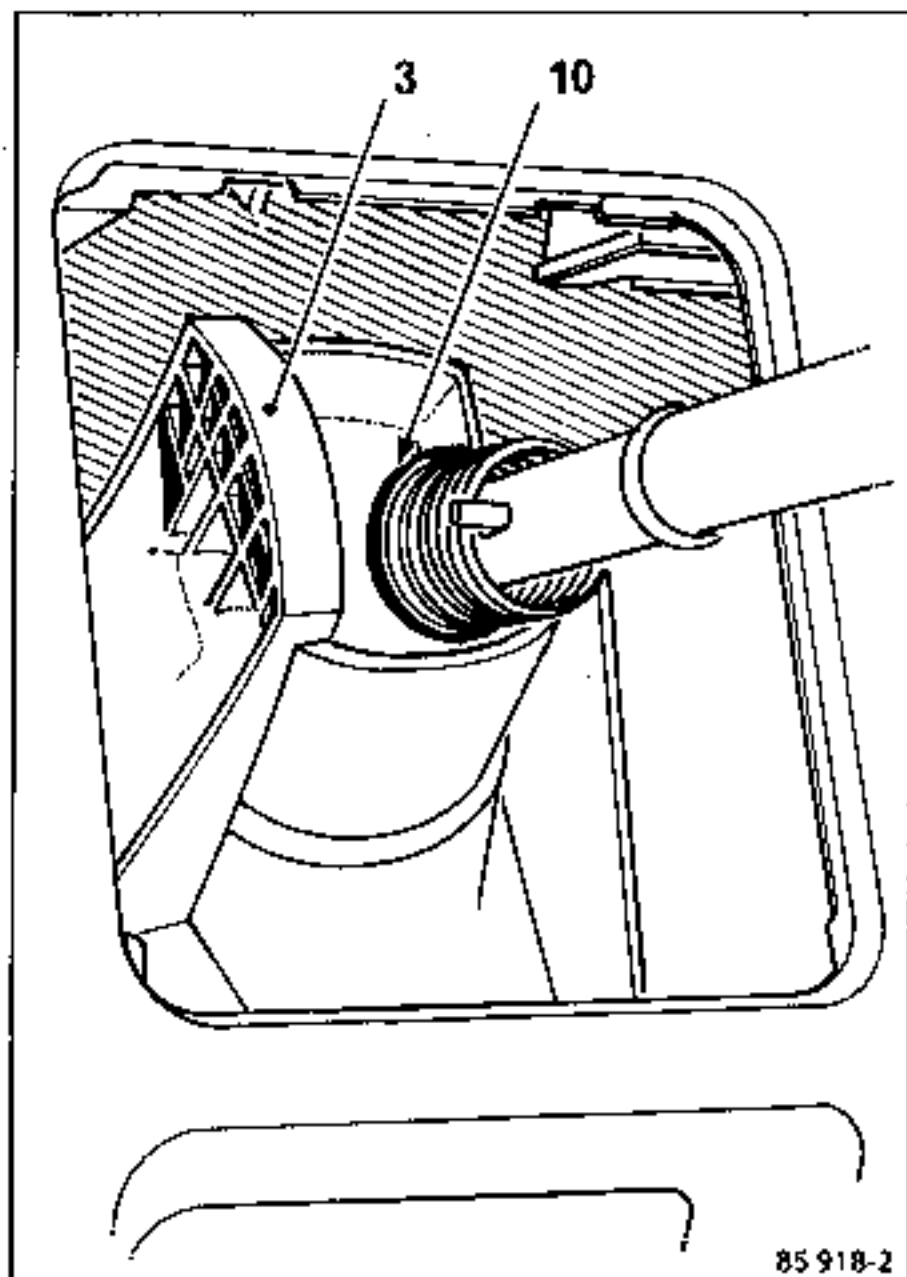
REFITTING (Special features)

Coat the pivot points on the gear shift lever with 33 Medium grease.



Select second at the gearbox and wedge the gearbox input lever against its stop.

Bring the O ring (10) against the ramp on the casing (3).



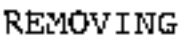
Fit the link (1) to the clevice on the lever (9).

Leave a clearance of 5 mm between the link and the body of the clevice.

In this position :

- tighten screw (V) to torque,
- check that the clamp is tight on the link (1),
- refit the spring (2) and the bellows (5).
- bond the knob (4) in place.

Check that the gears shift correctly.



Remove, from under the vehicle :

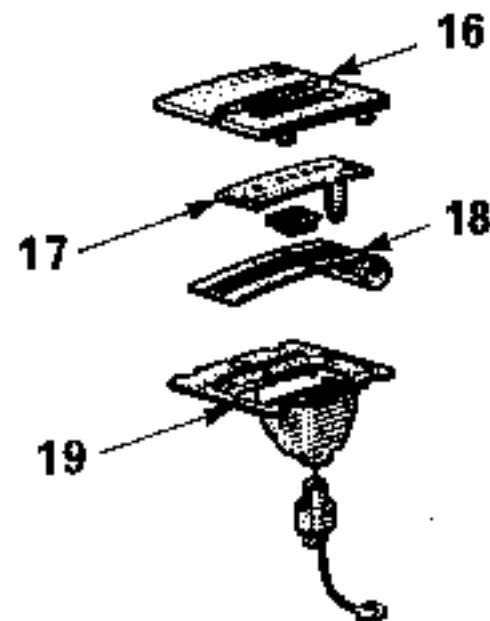
- the pin (1) that secures the control cable (4),
- the two nuts (2) from the retaining plate (5).

Remove, inside the vehicle :

- the repeater support (16 and 17),
- the cover and its bush (18),
- the base (19),
- the centre console (4 screws),
- the control securing bolts (3) and take out the control assembly.

DISMANTLING (Special features)

To gain access to pin (6), one must unstick the upper cover (7).



REASSEMBLY (Special features)

Grease the control.

Place :

- the selection gate in position with notch (A) on the same side as the moving section (11),
- the support flanges (12) with the folded down edge (B) on the opposite side to the moving section (11).

Refit the support plate (13) and the bellows (14).

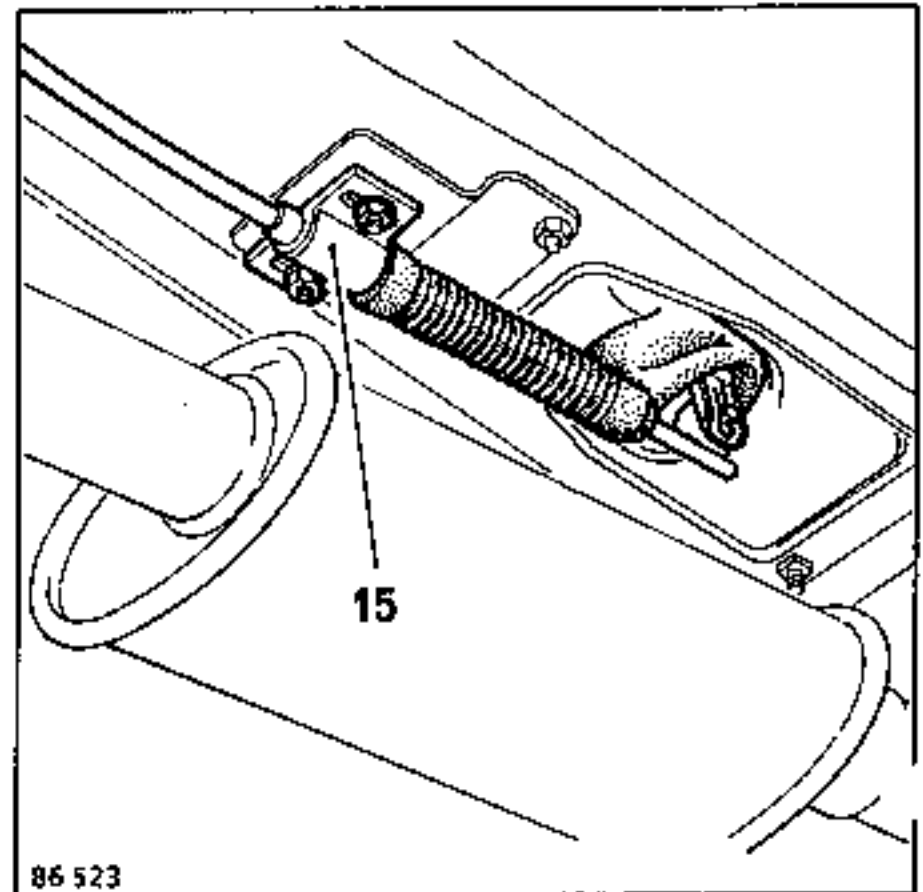
ADJUSTING

Place the selector lever in "N" (Neutral), inside the passenger compartment.

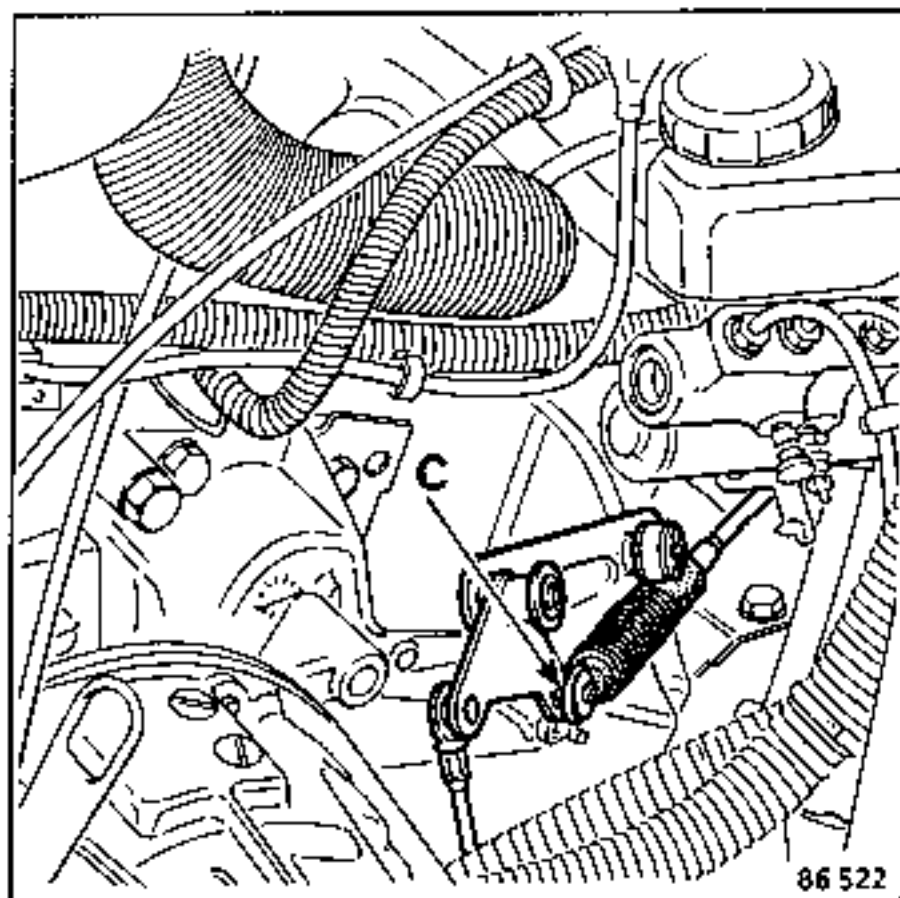
Place the control component on the transmission in position "N" with ball joint (C) disengaged.

Tighten the clevice (15) in the position in which the ball joint (C) is exactly in line with the end of the control cable.

Assemble the ball joints.



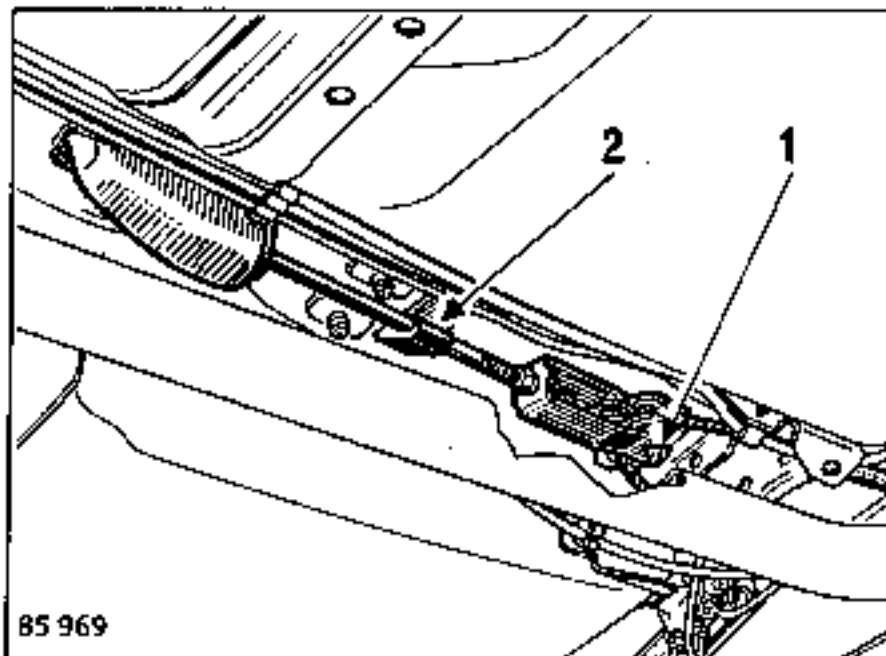
Ensure that the transmission speeds select correctly and that the starter operates in the "Park" and "Neutral" positions.



REPLACING

Release the hand brake and remove the pin that retains the swivel lever (1).

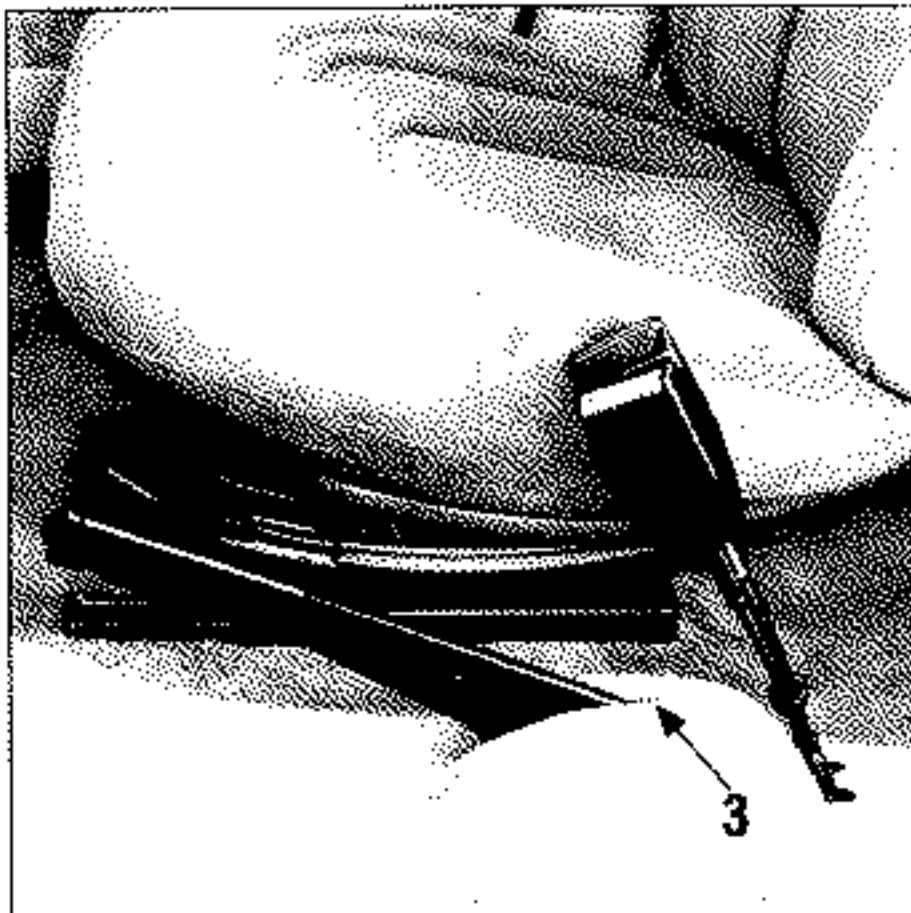
Free the control link from the clip (2).



Remove :

- the cover from the seat belt stalks,
- the two seat belt stalk securing bolts.

Make a small slit in the carpet (3).



Disconnect the wire from the hand brake switch.

Unscrew the two screws that secure the lever support to the floor.

Remove the hand brake lever.

When refitting, adjust the lever travel.



ADJUSTING

If the hand brake is incorrectly adjusted, with the cable too tight :

- the brake shoe automatic wear take-up system cannot operate correctly,
- the brake pedal travel will be too long.

Under no circumstances are the cables to be re-tensioned to remedy this defect as the problem would soon re-occur.

The hand brake is not a wear take-up system. It is only to be adjusted after the following have been replaced :

- the brake linings,
- the cables,
- the lever.

It is forbidden to adjust the hand brake except after these operations.

ADJUSTING THE DRUM BRAKE SYSTEM

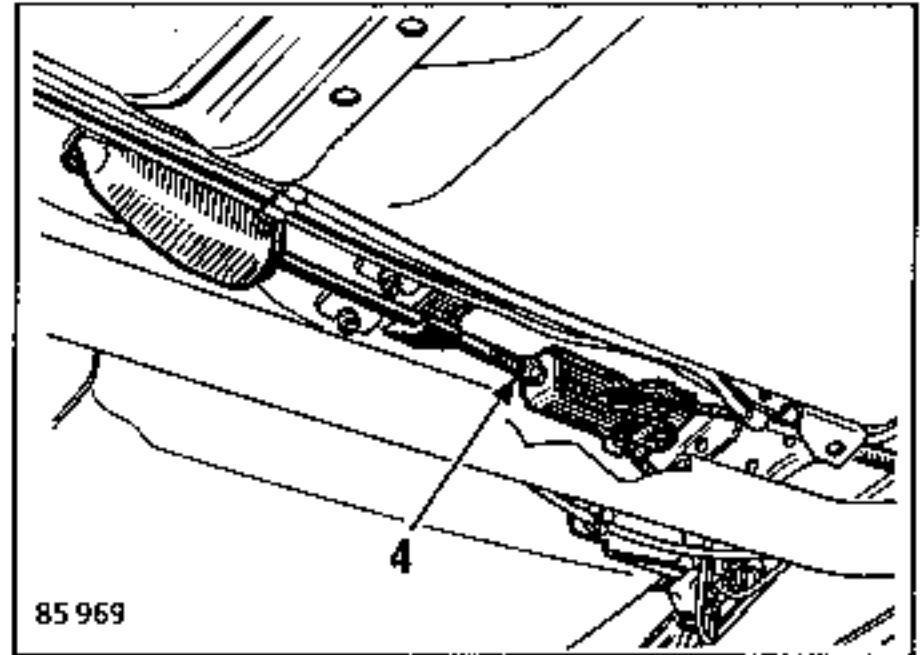
Raise the vehicle on a lift that locates under the body.

Depending on the version, remove :

- the plastic cover that protects the pipes,
- the heat shield.

NOTE : on vehicles fitted with a catalyser, the exhaust pipe will have to be disconnected from the catalyser flange to be able to remove the heat shield.

Loosen the lock nut (4) and fully unscrew the central swivel lever assembly.

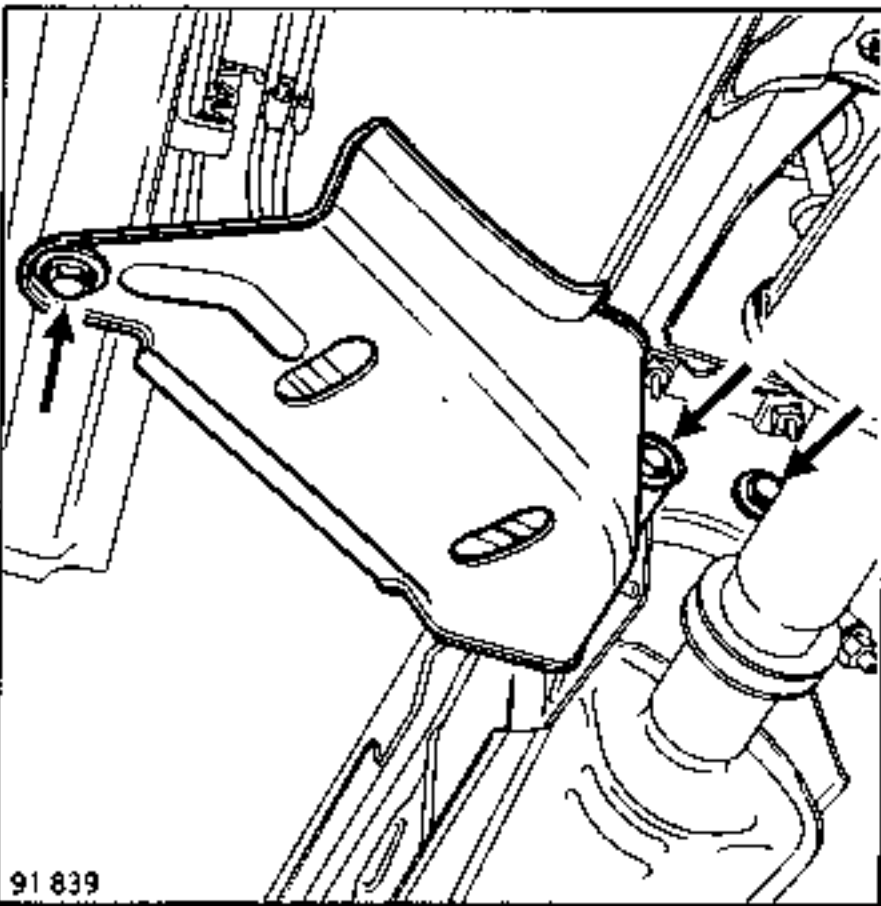


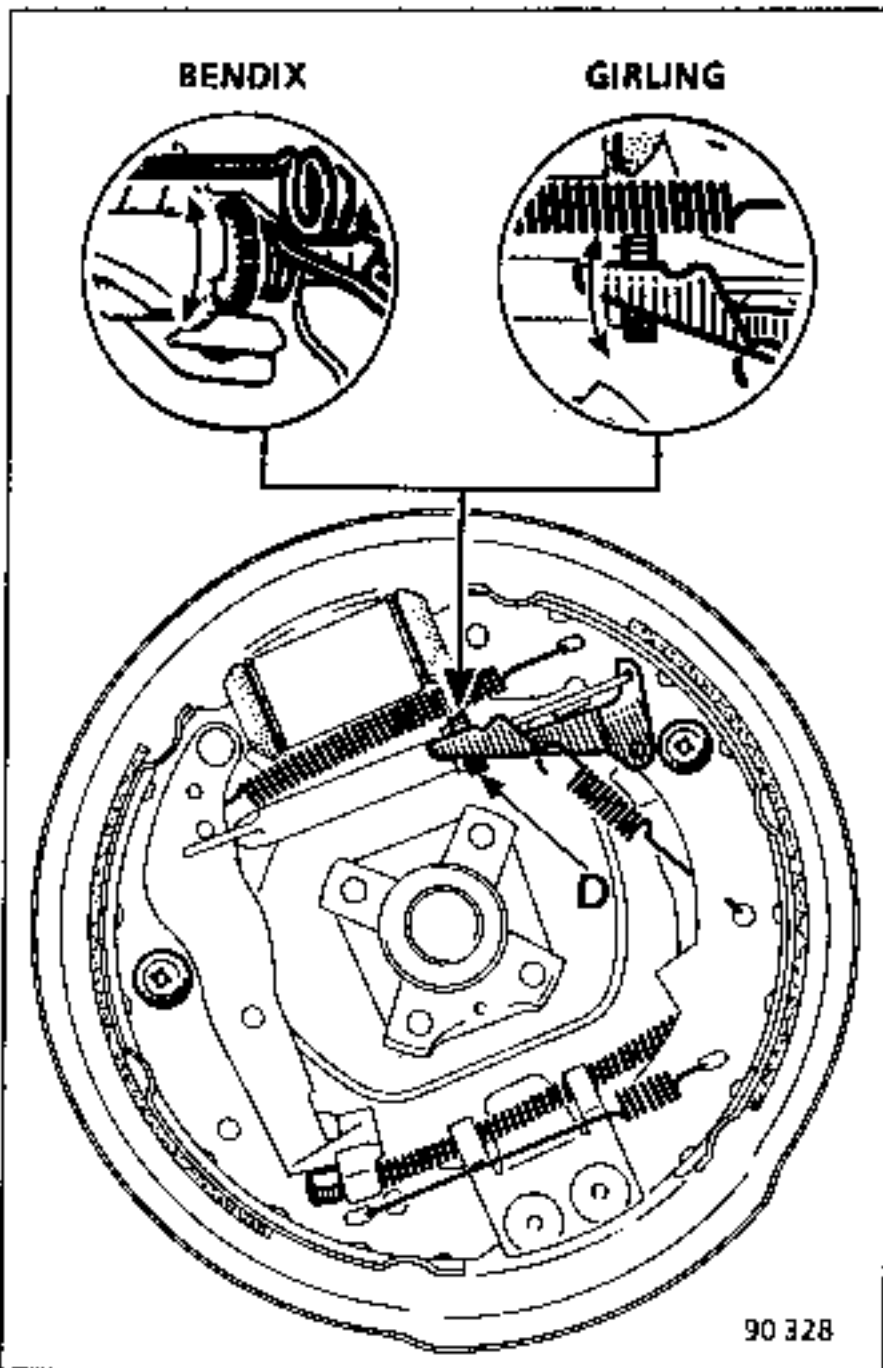
Remove both rear wheels.

I DRUM BRAKES

Remove both drums.

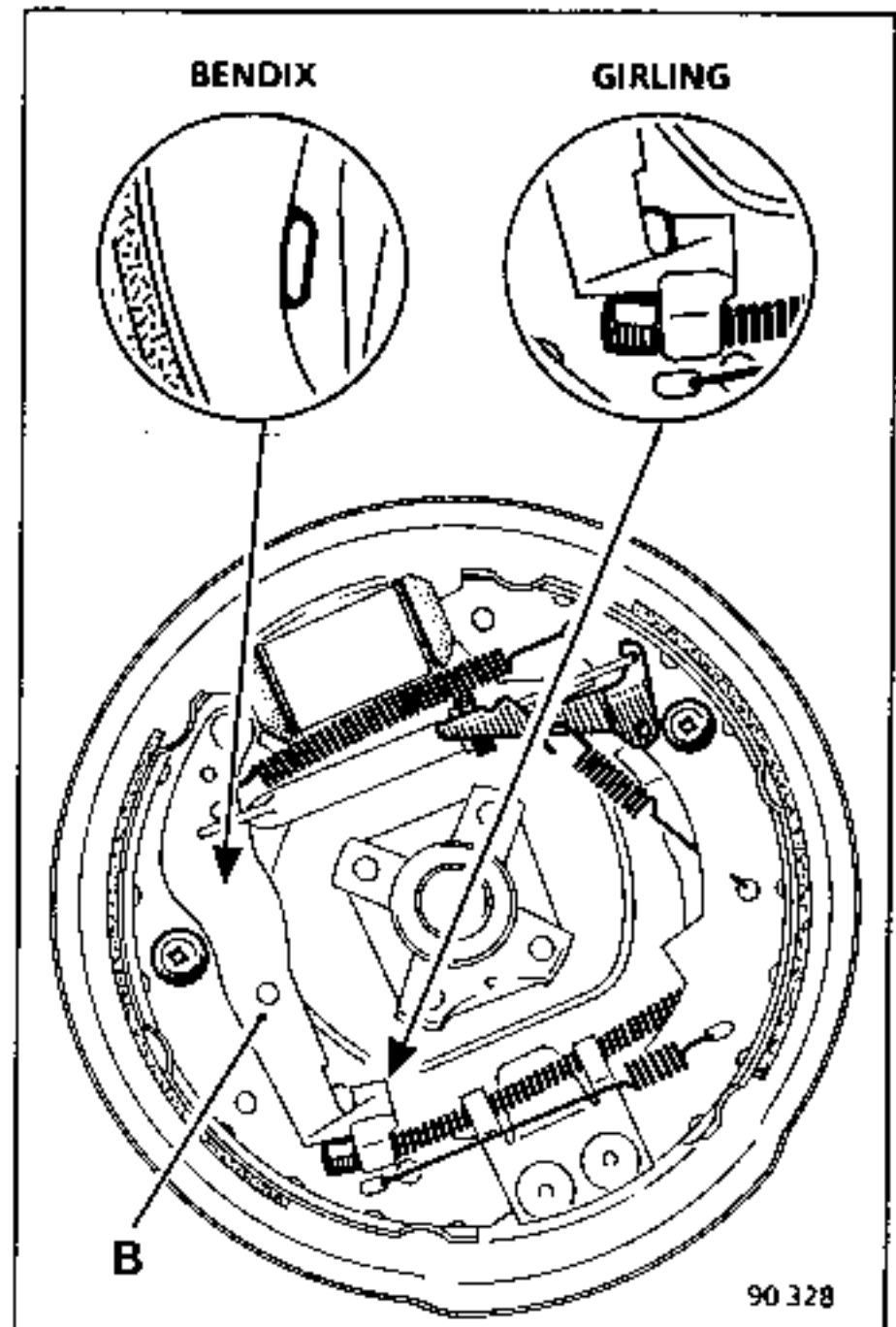
Check that the automatic wear take-up system is operating correctly by turning the toothed quadrant (D) (ensure that it can turn in both directions), then release its tension by 5 to 6 teeth.





Ensure :

- that the cables slide freely,
- that the hand brake levers (B) on the shoes locate correctly.



Gradually tighten the cables at the central adjuster until the levers (B) start to lift at between 1 and 2 notches on the hand brake lever travel and remain lifted at the 2nd notch.

Tighten the lock nut (4).

Fit the drums.

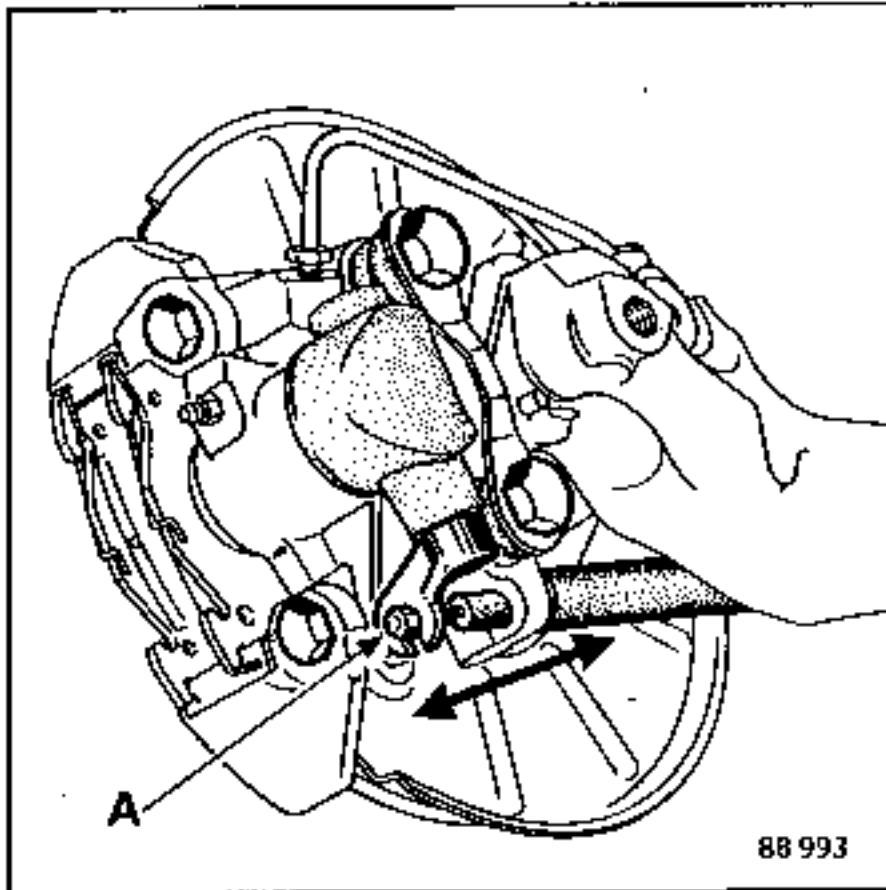
With the vehicle resting on its wheels :

Adjust the shoes by depressing the brake pedal firmly and gradually a number of times whilst listening for the automatic wear take-up system to operate.

II DISC BRAKES

Check :

- that the cables slide freely,
- the full movement of the hand brake levers and then bring them against their stops in a rearward direction.



Gradually tension the cables at the central adjuster to bring the end fitting (A) into contact with the lever, without actually moving it.

Complete the adjustment so that the levers lift between the 1st and 2nd notch on the hand brake lever travel and remain lifted at the 2nd notch.

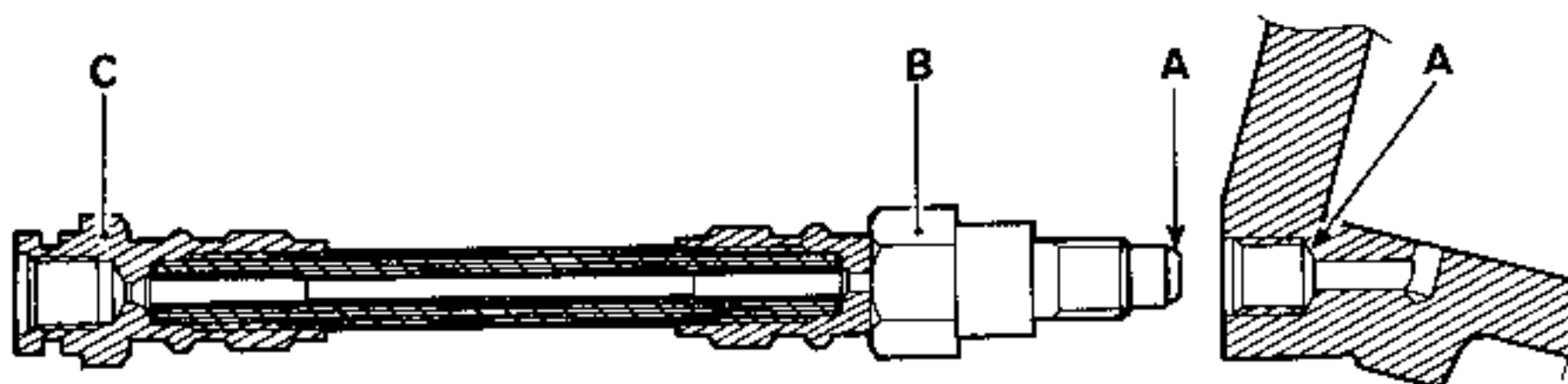
Tighten the lock nut (4).

These vehicles are fitted with hoses that have no copper seals. They seal by contact between the taper on the hose shoulder (A) and that at the bottom of the tapping.

TIGHTENING TORQUES (in daN.m)

B = 1.3

C = 1.3



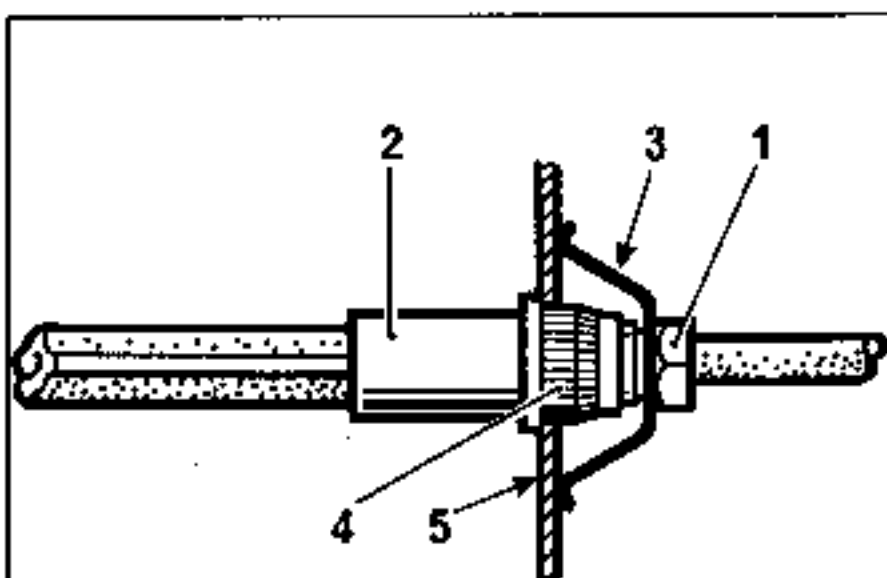
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PRECAUTIONS TO BE TAKEN WHEN REMOVING - REFITTING A WHEEL CYLINDER OR A BRAKE HOSE

For safety reasons and to avoid the brake hose being twisted and making contact with one of the suspension components, the following operations must be carried out in the order listed :

REMOVING

Unscrew the union (1) that secures the rigid pipe to the hose (2) to the point where the spring (3) is released. This will free the hose from its splines (4).



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Unscrew the hose from the caliper and, if necessary, remove the caliper.

REFITTING

Place the caliper in position on the brake assembly and screw the hose into it. Tighten it to a torque of 1.3 daN.m.

With the wheels hanging free in the straight ahead position, place the female end of the hose on the retaining lug (5) (the hose must not be twisted) and fit :

- the spring (3),
- the rigid pipe to the hose, ensuring that the hose does not turn as the union is screwed on.

Bleed the braking system.

THE PRINCIPLE OF THE TEST

These vehicles are equipped, depending on their version, with a brake compensator which is either load controlled or not. The pressure readings are taken on opposite sides of the vehicle to compare a given pressure on one of the rear wheels with that on one of the front wheels.

These double compensators have two totally independent bodies that act on an "X" circuit on one of the front wheels and one of the rear wheels.

It is essential to check both the circuits.

- I : that for the front right hand and rear left hand wheels,
- II : that for the front left hand and rear right hand wheels

The load controlled compensator

On load controlled compensators, the adjustment permits one to adjust the pressure at the rear as a function of the pressure on the front.

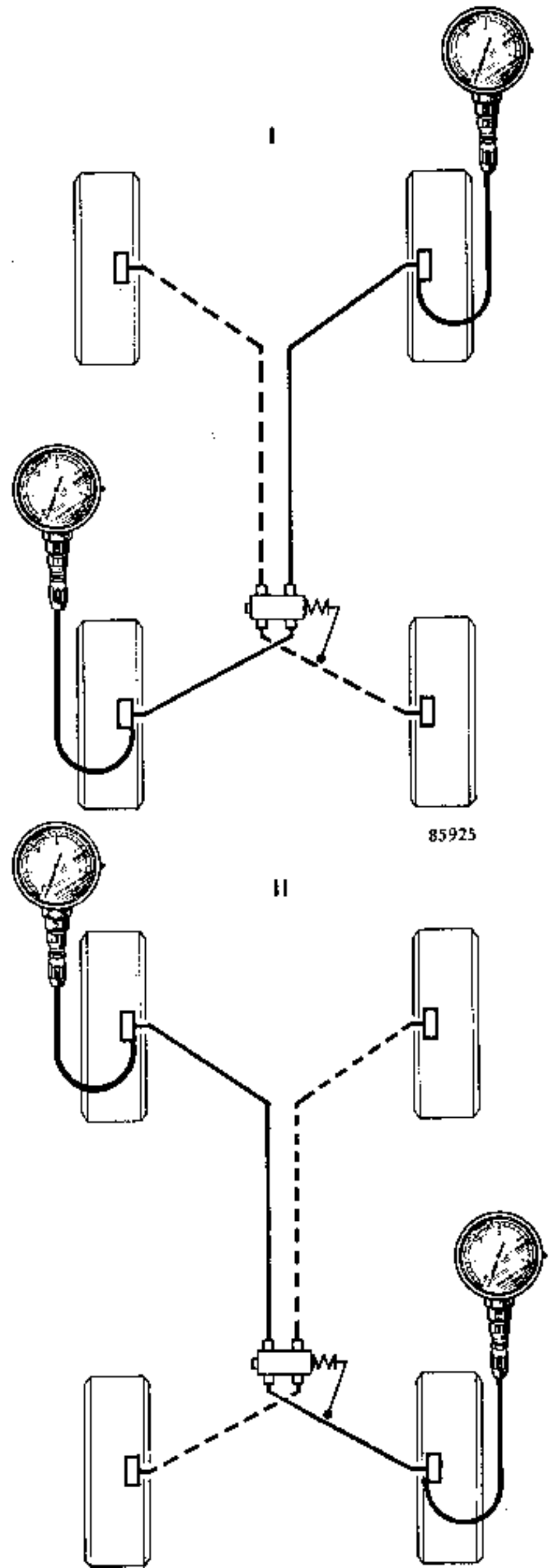
The adjustment acts simultaneously on both bodies and if the pressure is incorrect on only one of the two bodies, replace the compensator.

The fixed compensator (non-load controlled)

Only one test is to be carried out on this type of compensator and if the pressure is incorrect on one only or on both bodies, replace the complete unit.

The fixed compensator that is integral with the wheel cylinder

Only one test is carried out on this type of compensator. If the pressure is incorrect, replace the entire compensator-wheel cylinder assembly.



The brake compensator is to be adjusted with the vehicle on the ground and one person sitting in it.

ESSENTIAL SPECIAL TOOLS

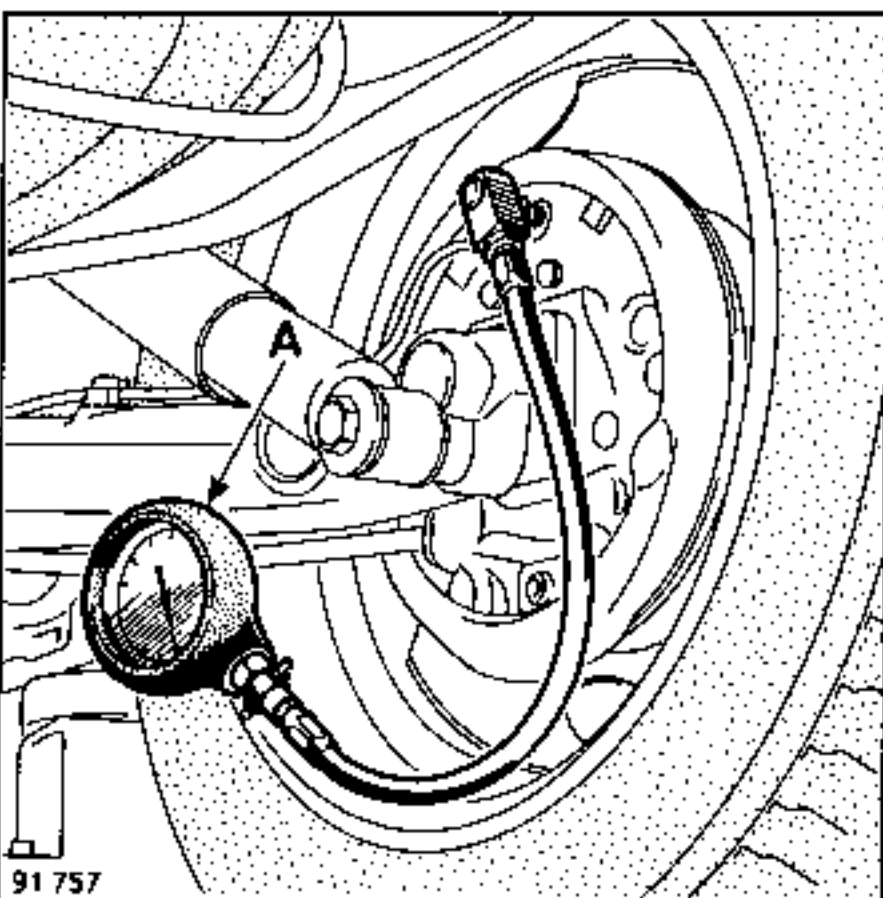
Fre. 244-04 Pressure gauge for testing
or
brake compensators
Fre. 1085

TESTING

Connect two pressure gauges (A) Fre.244-04 or Fre.1085 :

- one to the front right hand wheel,
- the other to rear left hand wheel.

Bleed the pressure gauges : screw (P).



Press gradually down on the brake pedal until the test pressure is obtained on the front wheels (see the pressure chart). Read the corresponding pressure on the rear wheels and correct it if necessary.

Carry out the same operations on the other circuit, that is to say :

- the front left hand one,
- the rear right hand one.

If, after adjustment, there is any considerable difference, replace the brake compensator.

ADJUSTING

EARLY TYPE

B400	B401	B402	B407
C400	C401	C402	C407
S400	S401		

This compensator is not load controlled and is not adjustable.

LATER TYPE

B400	B401	B402	B403	B404	B407
C400	C401	C402	C403	C404	C407
S400	S401			S404	
B40B	B40F	B40G	B40H	B40J	
C40B	C40F	C40G	C40H	C40J	
	S40F				
B40K	B40M				
C40K	C40M				

This compensator is an integral part of the wheel cylinder and is not adjustable.

LOAD CONTROLLED COMPENSATOR

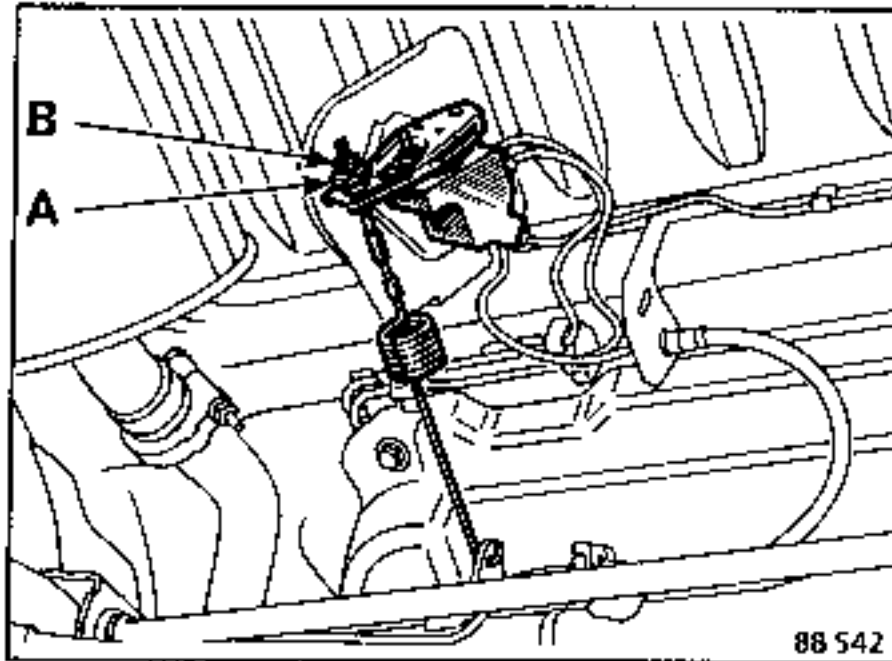
EARLY TYPE

B403	B404	B408	B40F	C405	C409
C403	C404	C408	C40F		
	S404				
F400	F401	F402	F404	F407	F40F
F40H	F40M				

ADJUSTING

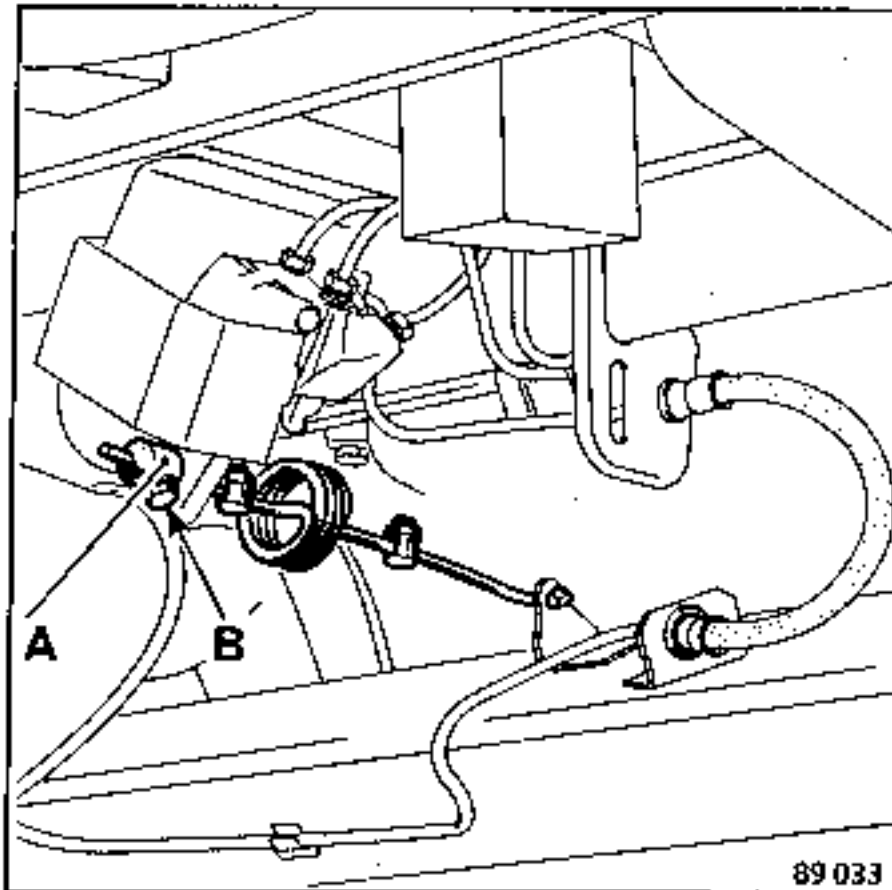
EARLY TYPE

The adjustment is carried out by changing the position of the nut (A). To do this, loosen lock nut (B) and turn nut (A) to adjust the compensator.



LATER TYPE

The adjustment is carried out by altering the position of the sliding sleeve (A). To do this, loosen screw (B) and move the sleeve (A) to adjust the compensator.

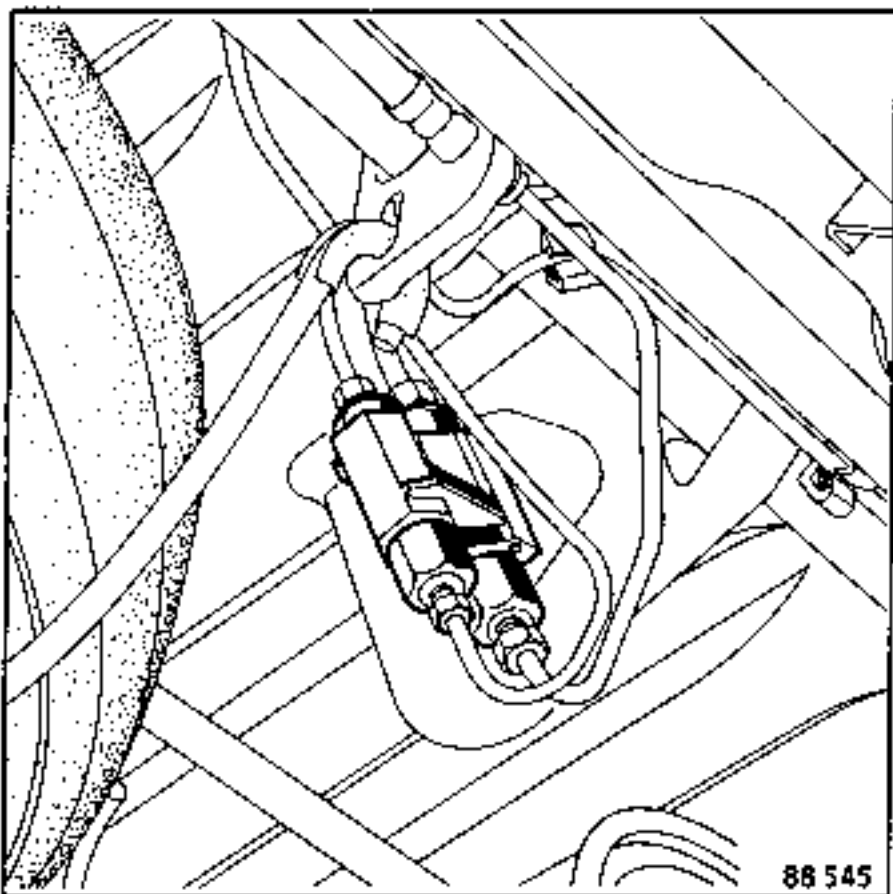


REMOVING

Disconnect :

- the pipes, marking their positions,
- the two bolts or nuts that secure the compensator to its support.

EARLY TYPE - Fixed compensator

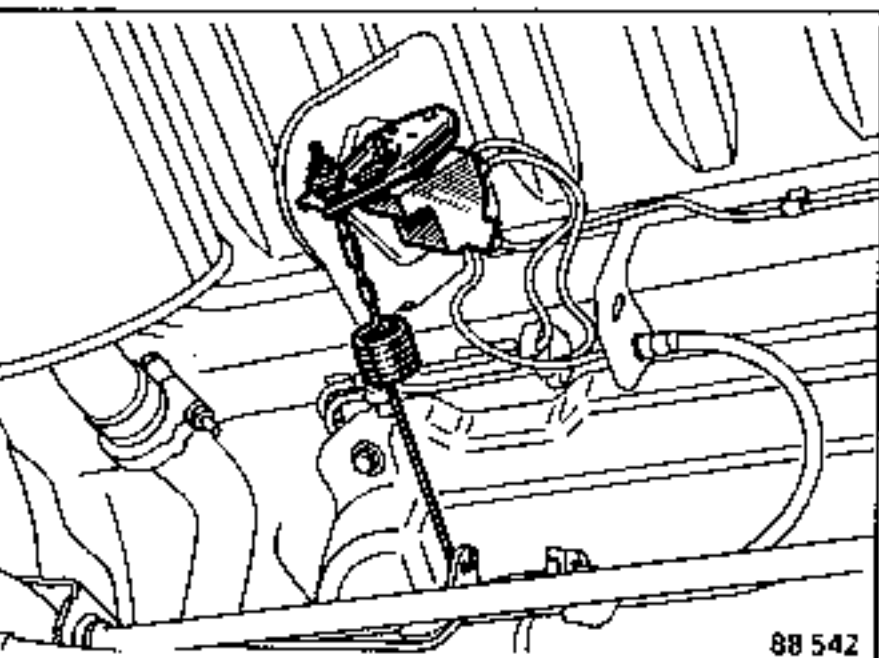


Remove the compensator.

LATER TYPE - Fixed compensator which forms part of the wheel cylinder (see section entitled "Rear wheel cylinder - Removing - Refitting").

LOAD CONTROLLED COMPENSATOR

Tilt the compensator, unhook the control spring from the axle and remove the compensator.

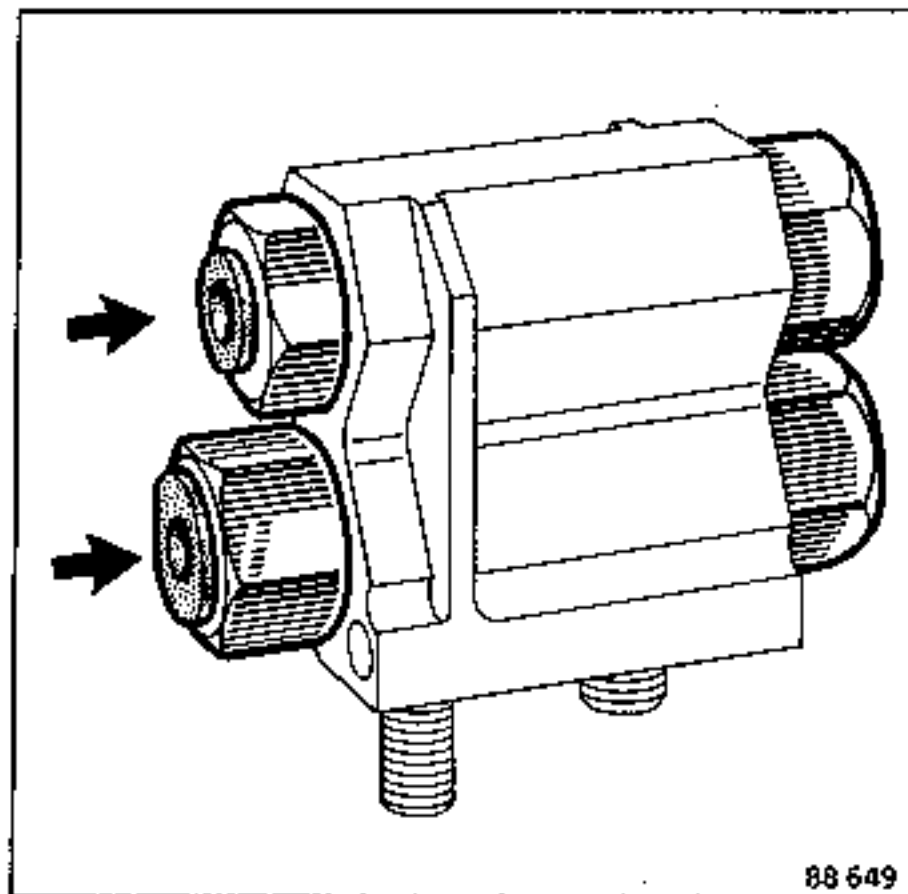


REFITTING (Special features)

Reconnect the pipes in the positions marked when the compensator was removed.

EARLY TYPE - Fixed compensator

The input side is that where the union sleeves are smallest (and are of unequal height).



All types

Bleed the braking system.

Check and, if necessary, adjust the pressure (see section entitled "Testing - Adjustment").



ADJUSTMENT FIGURES

Vehicle types :
B400 B401 B402 B407 B40G B40H B40J B40K B40M
C400 C401 C402 C407 C40G C40H C40J C40K C40M
S400 S401

are fitted, depending on their version, with :
 - a fixed brake compensator,
 - fixed brake compensators that are integral with the wheel cylinders.

The following vehicles:
B403 B404 B408 B40F
C403 C404 C408 C40F
S404 S40F


of the later type are equipped with fixed compensators that are integral with the wheel cylinders. They cannot be adjusted.

Vehicle type		Test pressure (Bars)	
		Front	Rear
B400	B408	60 →	26 ⁺⁰ -4
C400	C408		
S400	B40F		
B401	C40F		
C401	S40F		
S401	B40G		
B402	C40G		
C402	B40H		
B403	C40H		
C403	B40J		
B404	C40J		
C404	B40K		
S404	C40K		
B407	B40M		
C407	C40M		

The follow- **B403 B404 B408 B40F**
ing vehicles: **C403 C404 C408 C40F**
S404

of the early type and vehicle types : C405-C409-F400-F401-F402-F404-F407-F40F-F40H-F40M
are equipped with load controlled brake compensators.

The compensator is to be tested and adjusted with the vehicle unladen, the fuel tank
full and a person sitting in the driving seat.

Vehicle Type	Fuel tank contents	Test pressure (Bars)	
		Front	Rear
B403 C403 B404 C404 S404 B408 C408 B40F C40F	 Full	100 →	37 ⁺⁰ -4
C405 C409		-	17 ⁺⁰ -8
F400 F401 F402 F404 F407 F40F F40H F40M		100 →	30 ⁺⁰ -4

90 966