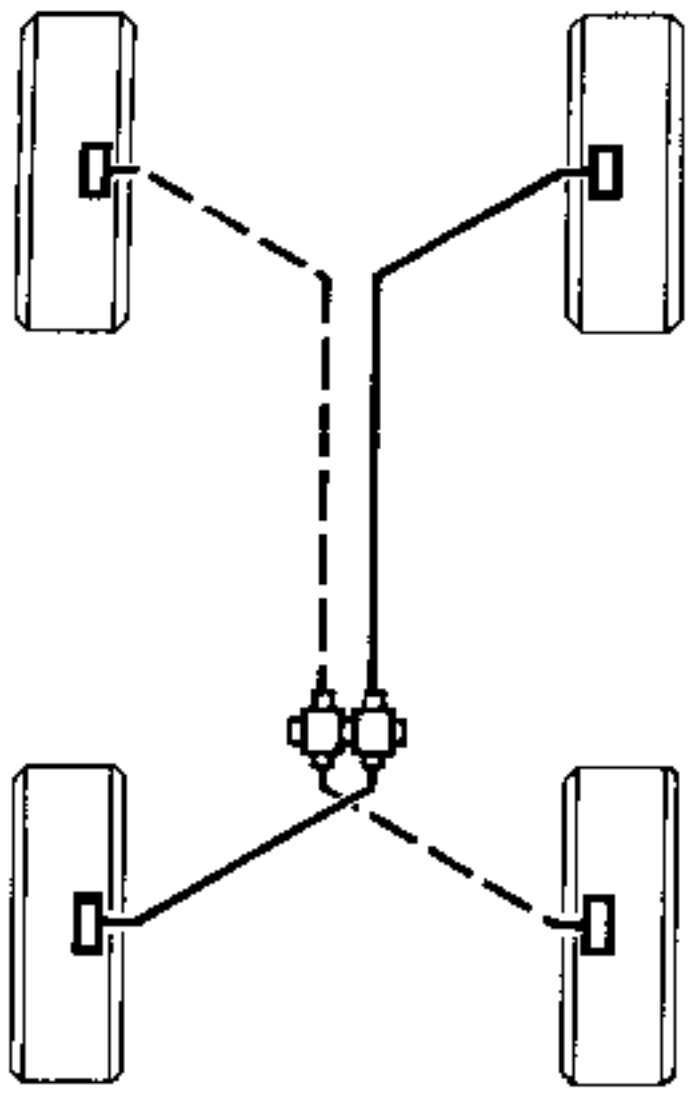
NOTE : The following diagrams show general operating principles. Under no circumstances are they to be taken as a reference for the take-offs and allocation of the circuits. When one of the constituent parts of the brake circuit on the vehicle is replaced, the pipes and lines must always be marked before dismantling in order that they can be reconnected in their initial positions.

"X" TYPE BRAKING ARRANGEMENT with fixed compensators

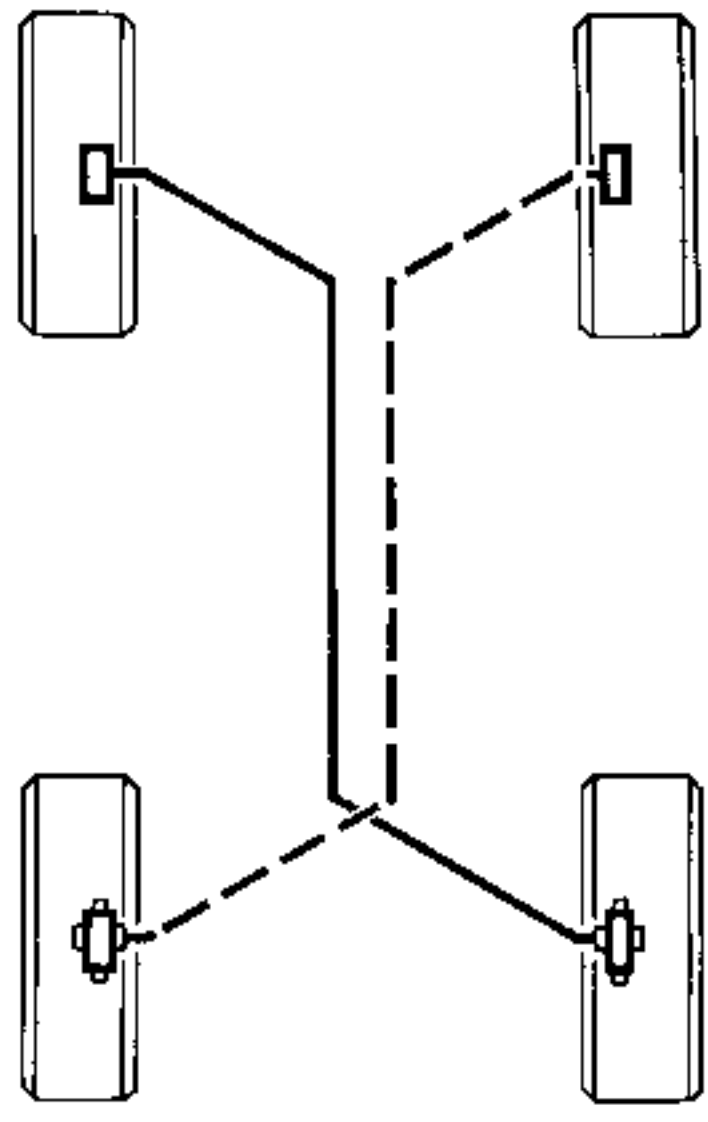


91563-2S

- L481
- L482
- L486
- L48E
- L48F
- L48J

} 1st TYPE

"X" TYPE BRAKING ARRANGEMENT with compensators integrated in the wheel cylinder



91563-3S

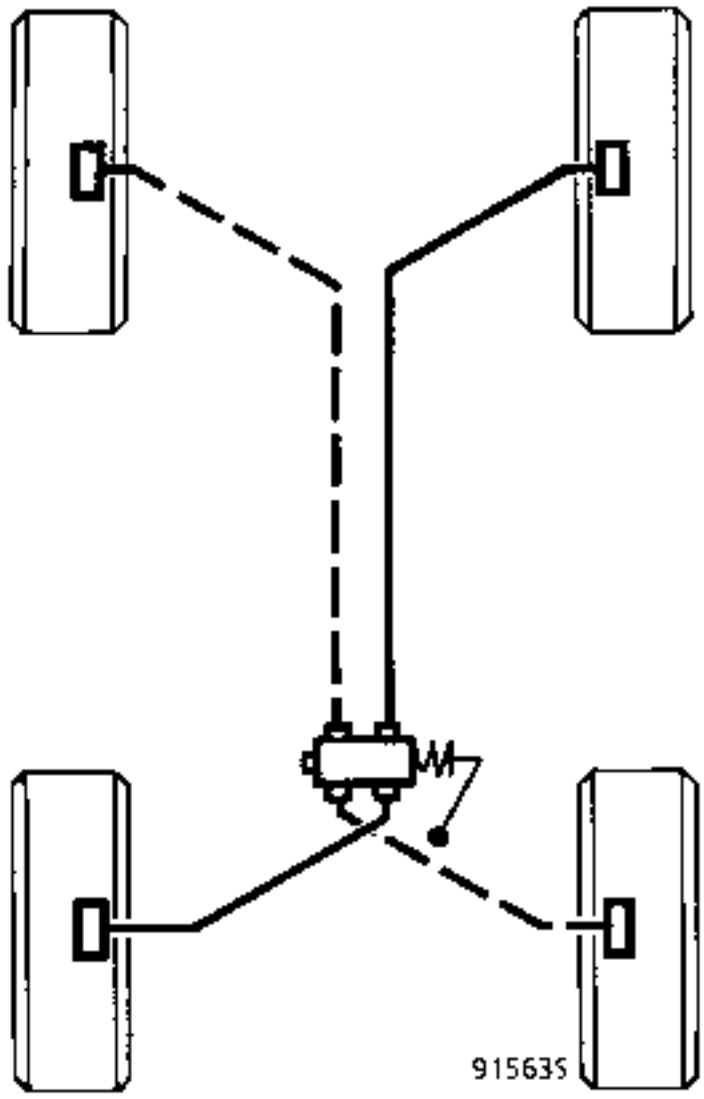
- L481
- L482
- L486
- L48E
- L48F
- L48J

} 2nd TYPE

- L48M
- L48N

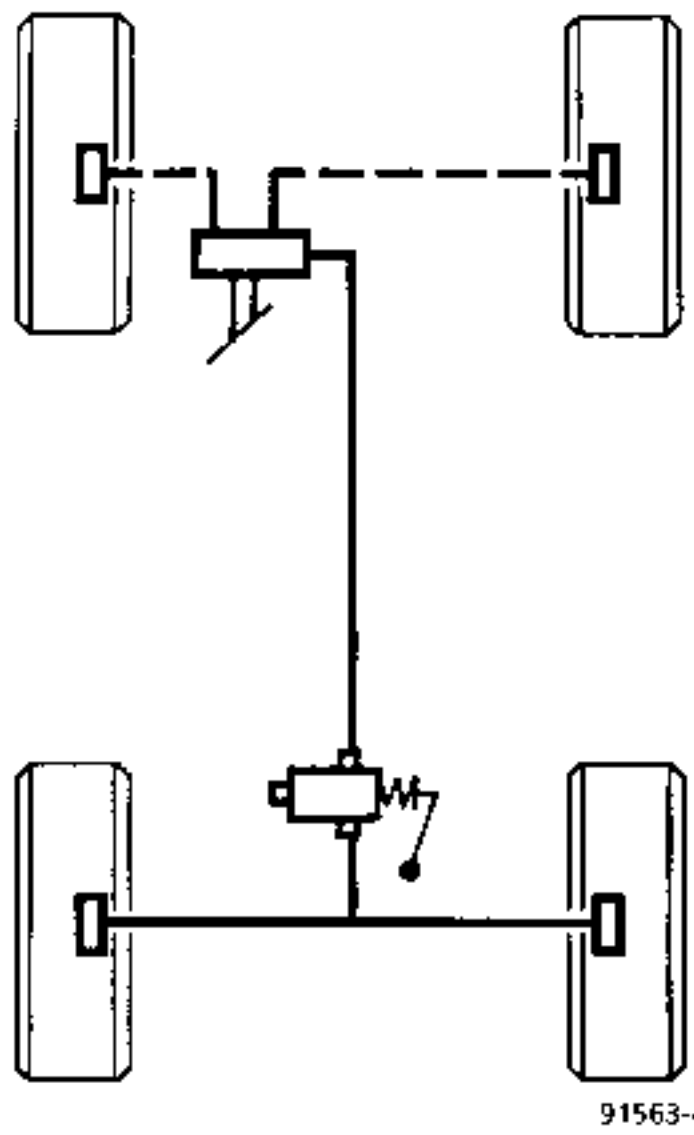
- B481
- B482
- B486
- L486
- B48V
- L48V
- B48E
- B48J
- B48F

"X" TYPE BRAKING ARRANGEMENT
with load controlled compensator



B480 B48A L48P
L480 L48A B48R
B483 B48C L48R
L483 L48C B48Y
B487 B48K L48Y
L487 L48K B48W
B488 B48O L48W
L488 L480
L489 B48P
L485
L48L
L485 4 x 4
L48L 4 x 4
K480 K487 K48I
K481 K488 K48J
S481 K489 K48K
K482 K48A K48O
S482 K48E K48P
K483 K48F K48V
K486 K48H S48V
S486 S48H K48W
K48R
K483 4 x 4
K486 4 x 4
K46K 4 x 4
K48V 4 x 4

"ABS" BRAKING ARRANGEMENT
with load controlled compensator



B483 L488
L483 B48P
B487 L48P
L487 B48K
B488 L48K
B48R
L48R
B48Y
L48Y
K483
K48K
K487
K488
K48R

"X" TYPE BRAKING ARRANGEMENT

with load controlled compensator

Except for the versions with **ABS**, these vehicles are equipped with a dual braking circuit arranged in an "**X**" formation, the master cylinder is of the "**Tandem**" type (having two separate internal systems) :

The master cylinder activates separately :

1 - the front righthand - rear lefthand brakes,

2 - the front lefthand - rear righthand brakes.

The braking on the rear wheel is restricted :

- either by a fixed compensator,
- or by two fixed compensators incorporated in the wheel cylinders.
- or by a dual load controlled compensator.

"X" TYPE BRAKING ARRANGEMENT

with load controlled compensator

Vehicles with **ABS** have a compact hydraulic unit comprising a "**Tandem**" master cylinder and a hydraulic amplifier.

The master cylinder activates statically and separately :

1 - the front righthand brake,

2 - the front lefthand brake.

The hydraulic amplifier activates the two rear brakes dynamically which are restricted by :

- a delay valve,
- a single load controlled compensator.

Vehicle Type	B48I L48I B481 L481 B48D L48D B48F L48F B48H L48H L48M	B484 L484 B482 L482 B48E L48E B48J L48J L48N	B48W L48W L483 B483 L489 B48K L48K B487 L487 B488 L488	B480 L480 B486 L486 B48V L48V B48A L48A	B488 L488 B48W L48W	B483 L483 B48K L488 B48W L48W L48K	L485 B48Q L48Q B48Y L48Y L48R B48R L48L	B48Y L48Y L48R B48R
FRONT BRAKES (dimensions in mm)								
Wheel cylinder diameter	48	48	54	54	54	54	54	54
Disc diameter	238	238	265	244	244	265	285	285
Disc thickness	12	20	19.7	19.7	19.7	19.7	21	21
Minimum disc thickness*	10.5	18	17.7	17.7	17.7	17.7	19	19
Pad thickness (including backing)	18	18	17.5	17.5	17.5	17.5	17.5	17.5
Minimum pad thickness (including backing)	6	6	6.5	6.5	6.5	6.5	6.5	6.5
Maximum disc run-out	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
REAR BRAKES (dimensions in mm)								
Wheel cylinder diameter	22 or 20.6(1)	22 or 20.6(1)	22	22 or 20.6(1)	22	36	36	36
Drum diameter	180.25	180.25	228.5	180.25	228.5	–	–	228.5
Maximum diameter of drums after re-facing	181.25	181.25	229.5	181.25	229.5	–	–	229.5
Disc diameter	–	–	–	–	–	255	255	–
Disc thickness	–	–	–	–	–	10.5	10.5	–
Minimum disc thickness*	–	–	–	–	–	9.5	9.5	–
Lining width	40	40	40	40	40	–	–	40
Lining thickness (including shoe)	6.5	6.5	6.5	6.5	6.5	14	14	6.5
Minimum lining thickness (including shoe)	2.5	2.5	2.5	2.5	2.5	6	6	2.5
MASTER CYLINDER (dimensions in mm)								
Diameter	19	19	20.6	20.6	20.6	(ABS)	(ABS)	20.6

* The brake discs must not be re-faced. The part must be changed if excessive scoring or wear is present.

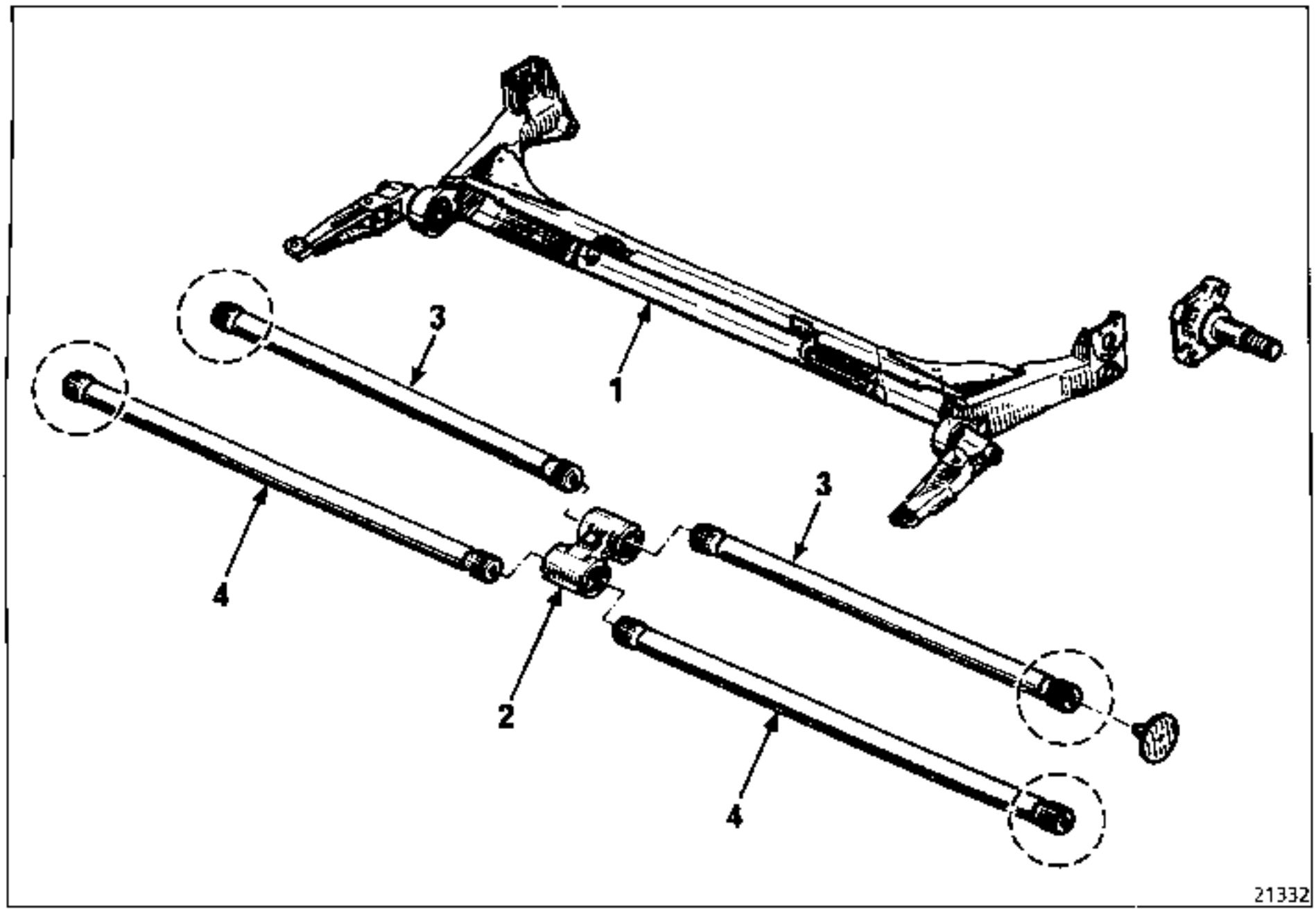
(1) Wheel cylinder with integral fixed compensator : if the wheel cylinder or compensator does not operate correctly, change the assembly, as all repairs are forbidden.

Vehicle type	K48I K484 K481 S481 K482 S482 K48E K48H S48H K48J K48M K48N	K483 K488 K48K K487	K486 K48V S486 S48V K489 K48A K48B K48C K48O	K483 K48K K488 K48W	K486 4 x 4 K48V 4 x 4 K483 4 x 4 K48K 4 x 4
FRONT BRAKES (dimensions in mm)					
Wheel cylinder diameter	48	54	54	54	54
Disc diameter	238	265	244	265	244
Disc thickness	20	19.7	19.7	19.7	19.7
Minimum disk thickness*	18	17.7	17.7	17.7	17.7
Pad thickness (including backing)	18	17.5	17.5	17.5	17.5
Minimum pad thickness (including backing)	6	6.5	6.5	6.5	6.5
Maximum disc run-out	0.07	0.07	0.0	0.07	0.07
REAR BRAKES (dimensions in mm)					
Wheel cylinder diameter	22	22	22	36	22
Drum diameter	228.5 229.5	228.5 229.5	228.5 229.5	– –	255 256
Maximum drum diameter after re-facing					
Disc diameter	–	–	–	255	–
Disc thickness	–	–	–	10.5	–
Minimum disc thickness*	–	–	–	9.5	–
Lining width	40	40	40	–	45
Lining thickness (including shoe)	6.5	6.5	6.5	14	6.5
Minimum lining thickness (including shoe)	2.5	2.5	2.5	6	2.5
MASTER CYLINDER (dimensions in mm)					
Diameter	19	20.6	20.6	(ABS)	20.6

* The brake discs must not be re-faced. The part must be changed if excessive scoring or wear is present.

(1) Wheel cylinder with integral fixed compensator : if the wheel cylinder or compensator does not operate correctly, change the assembly, as all repairs are forbidden.

EXPLODED VIEW



21332

The rear axle consists of :

- two arms connected by a V-shaped section (1) cannot be dismantled. If any components are deformed in any way, the entire assembly must be replaced;

- two anti-roll bars (3),

- two suspension bars (4),

- a link block (2) connecting the bars.

The assembly is connected to the body by means of two bearings fitted on silentbloc bushes.

NOTE : It is prohibited to use a jack under the V-shaped section (1) to raise the vehicle.

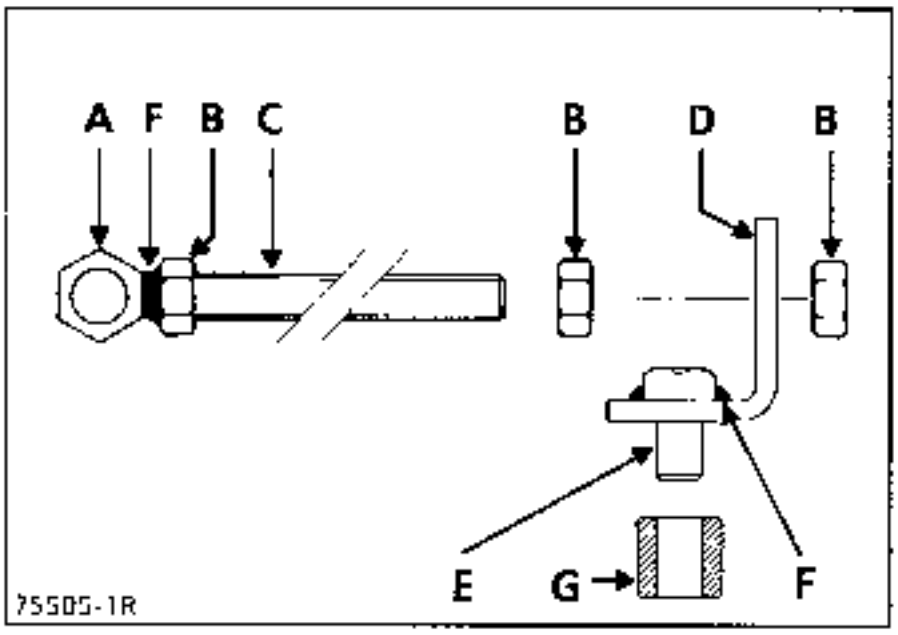
REPLACEMENT

The Parts Department supplies bare rear axles in service exchange; it is, therefore, necessary to retain the bars and link block from the old axle so as to prepare the assembly.

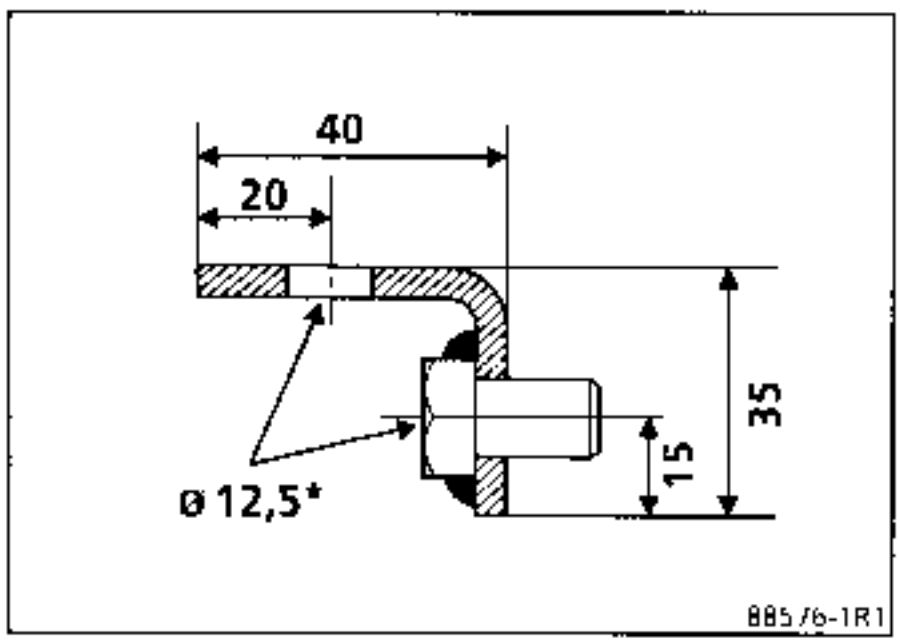
Fit in place on the vehicle the rear axle, without its torsion bars or the link block.

So as to be able to fit the arms in such a way that the torsion bars can be positioned correctly, two tools must be made up locally in accordance with the drawing below.

A **14 mm** diameter nut
B **12 mm** diameter nut
C **12 mm** diameter threaded rod, **660 mm** in length
D Flat iron bracket **30 x 5 mm**
E **12 x 60 mm** bolt cut to **20 mm**
F Solder
G Spacer from tool **T.Ar. 1056**



Bracket D



* Drilling diameter

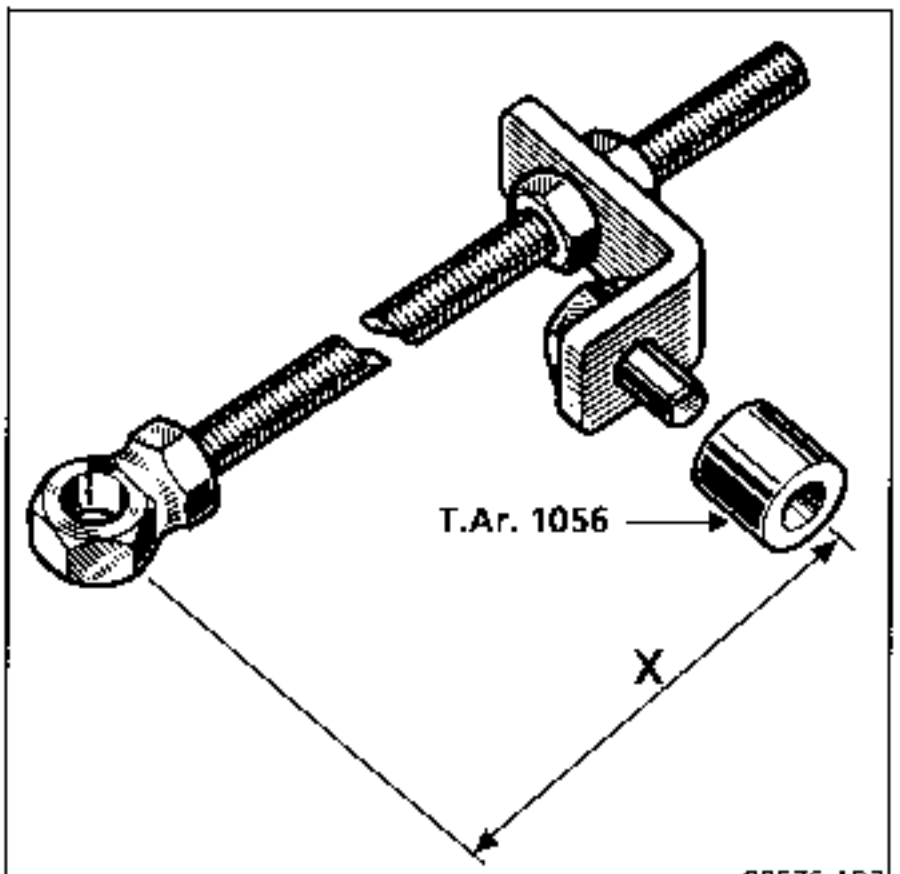
First set the two tools to obtain the correct dimension for X.

GOOD ROADS

B481 - B482 - B48E - B48F - B48J L481 - L482 - L48E - L48F - L48J L48M - L48 N - B48D - L48D B48I - L48 I - B484 - L484	**X = 496 mm**
B483 - B 486 - B488 - B48K - B48A - L48A L483 - L486 - L488 - L489 - L48K B48V - B48W - L48W - L48V - B487 L487 - B48C - L48C - B48P - L48P B480 - L480 - B48O - L48O	**X = 485 mm**
L485 - L48L	**X = 445 mm**
B48Q - L48Q - B48R B48Y - L48Y - L48R	**X = 480 mm**
K481 - K482 - K483 - K486 - K488 - K48R K48E - K48F - K48J - K48K - K48 M K48N - S481 - S482 - S486 K48H - S48H - K48V - S48V - K480 K48A - K48I - K48O - K487 - K489	**X = 475 mm**

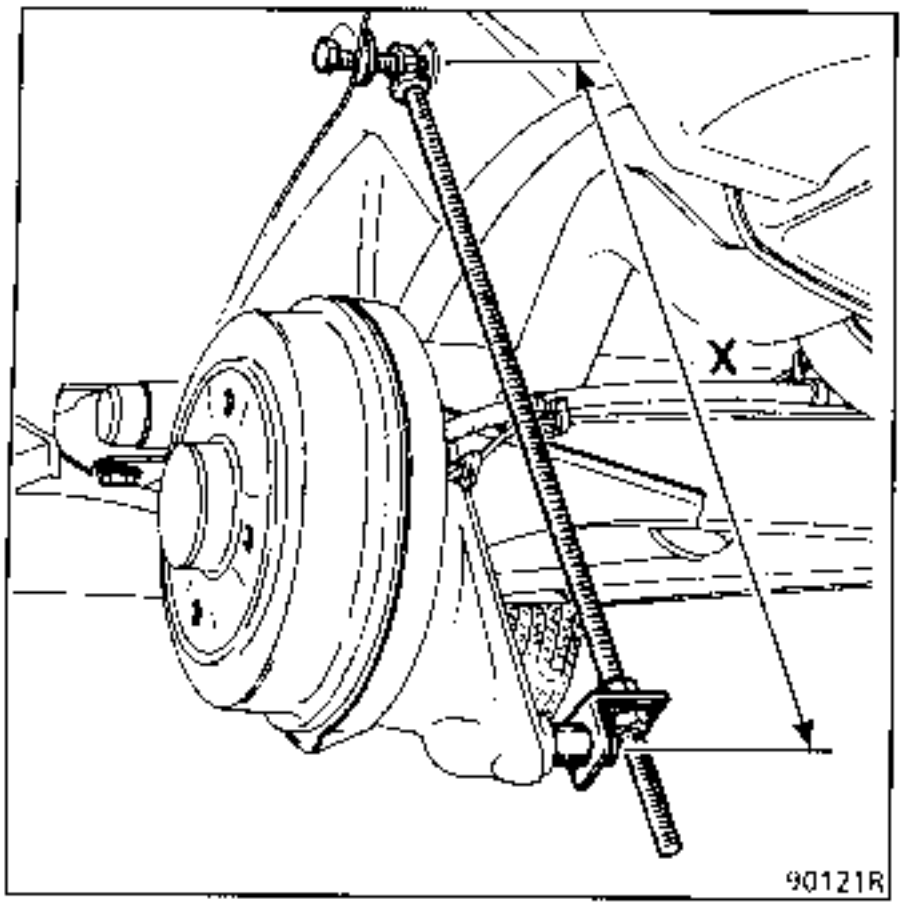
UNMADE ROADS

L481 - L48 J	**X = 508 mm**
K48 J	**X = 475 mm**

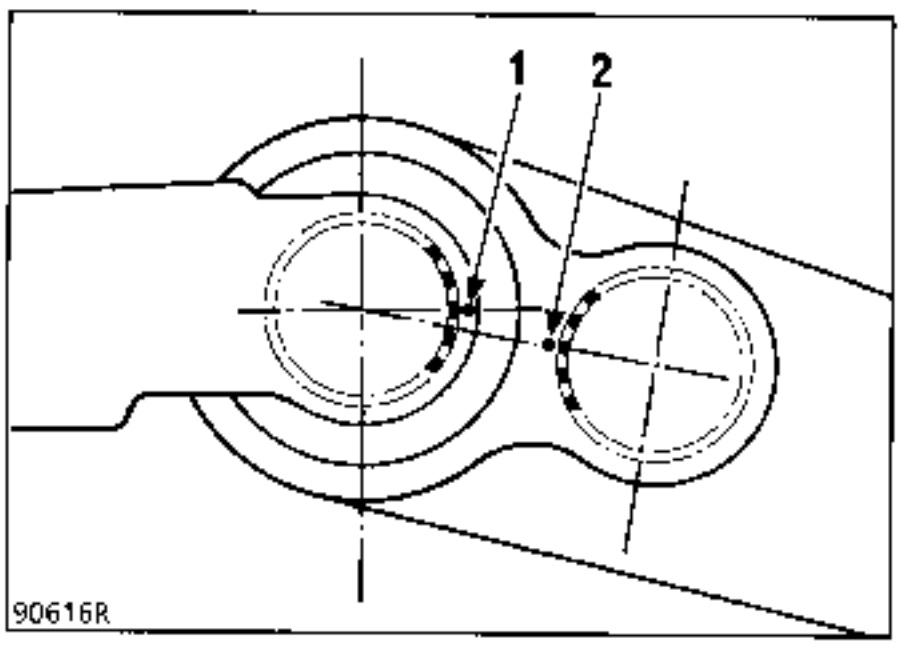


REPLACEMENT

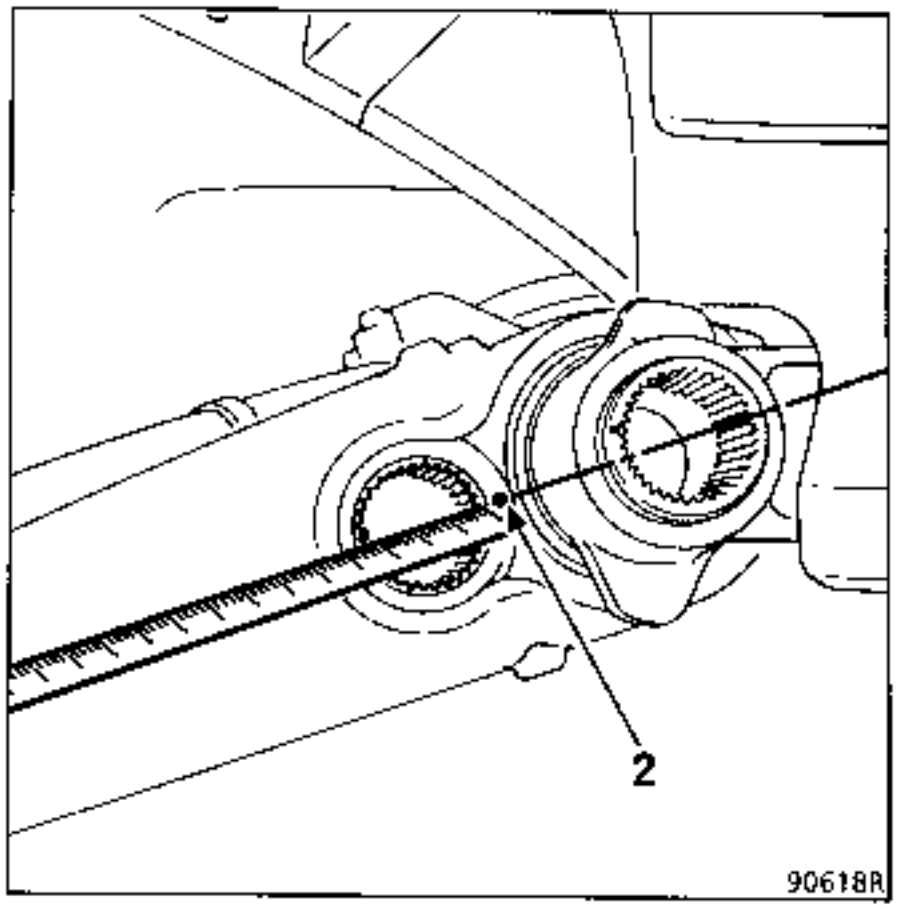
Fit the two tools in place of the shock absorbers.



The bearings have a mark (1) enabling the suspension bars to be initially positioned, but mark (2) must be made on the external anchorages of the anti-roll bars.



To do this: place a ruler on the centreline of the two anchorages and make a mark (2) (at the bottom of a tooth).

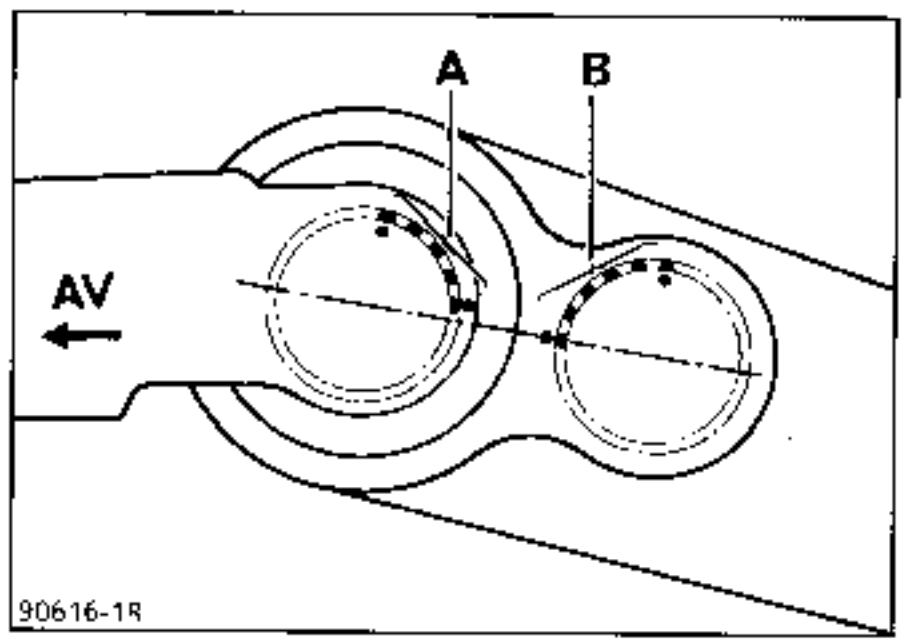


I - TRANSVERSE ENGINE (B and L48)

Fit in place (anchorages greased) :

- one anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 4 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from the outer anchorage end),
- one suspension bar, with the mark offset by four teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

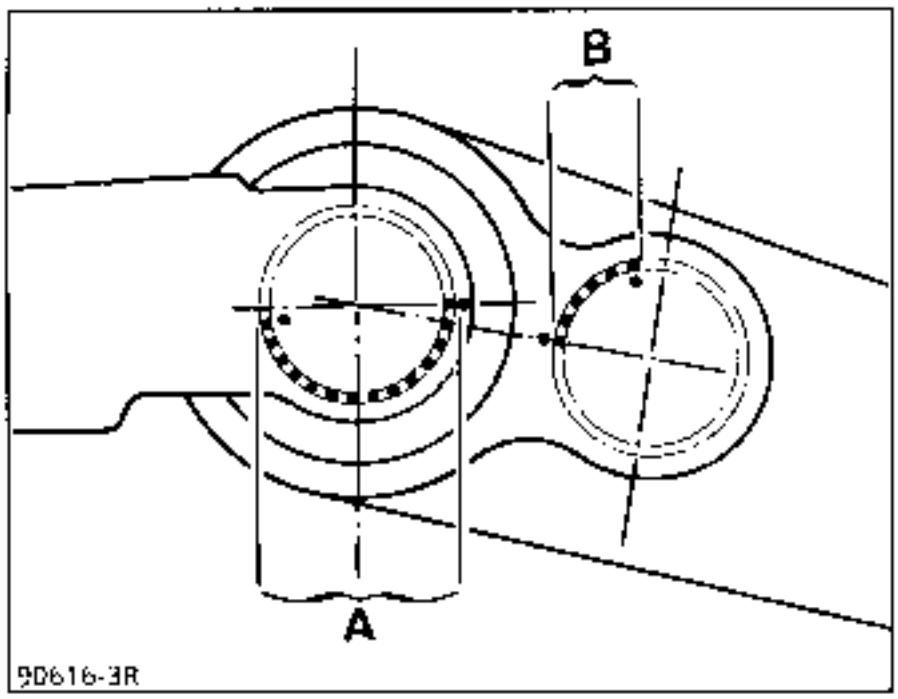
REPLACEMENT

- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

Transverse engine (K48)

Fit in place (anchorages greased):
- an anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 13 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from outer anchorage end),
- one suspension bar, with the mark offset by thirteen teeth, as shown in the drawing.

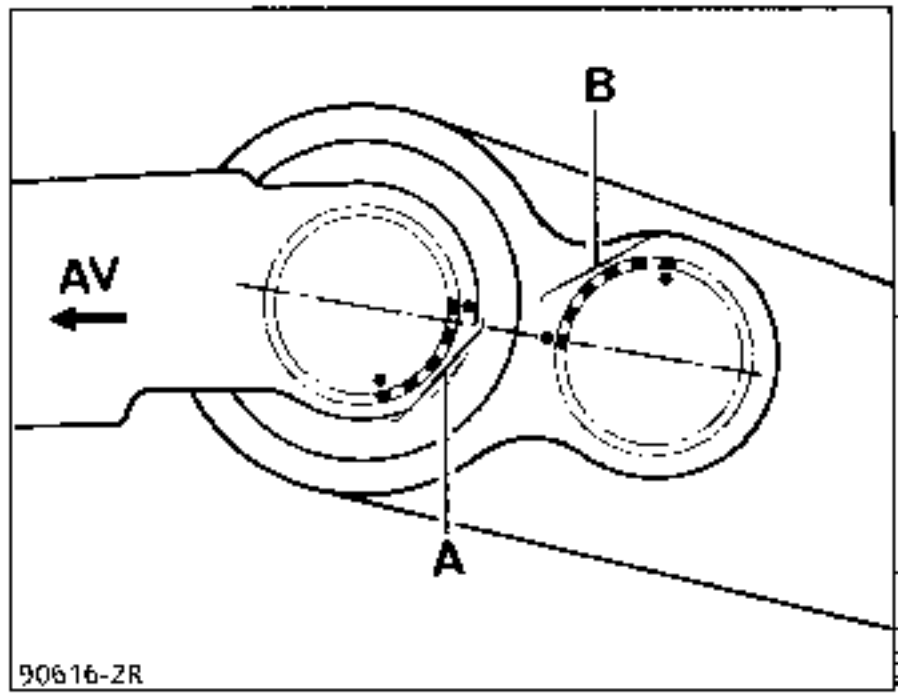
NOTE: Raise the link block to make it easier to fit the suspension bar.

- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

II - LONGITUDINAL ENGINE (B and L48)

Fit in place (anchorages greased) :
- one anti-roll bar with the mark offset by five teeth as shown in the drawing,

LEFT-HAND SIDE



A = 4 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
  the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from outer anchorage end),
- one suspension bar, with the mark offset by four teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

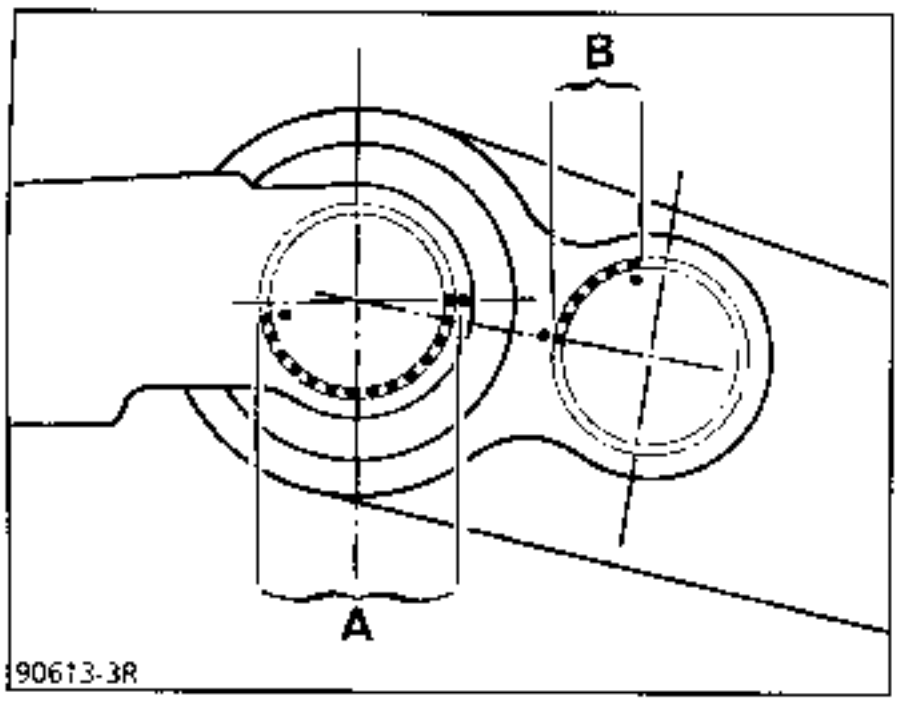
- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

REPLACEMENT

Longitudinal engine (K and S48)

Fit in place (anchorages greased):
- one anti-roll bar with the mark offset by five teeth, as shown in the drawing,

LEFT-HAND SIDE



A = 13 teeth B = 5 teeth

- the link block, centring it in the V-shaped section,
- the second anti-roll bar offset by the same number of teeth in the opposite direction to the first anti-roll bar (as viewed from the outer anchorage end),
- one suspension bar, with the mark offset by thirteen teeth, as shown in the drawing.

NOTE: Raise the link block to make it easier to fit the suspension bar.

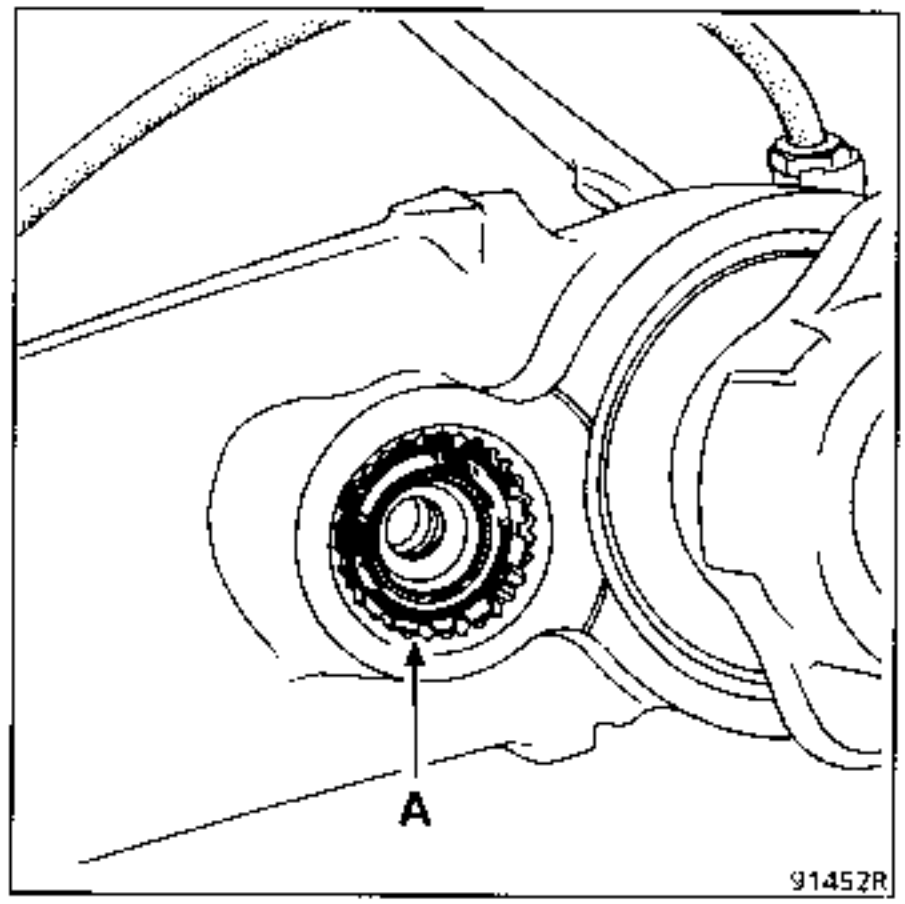
- Fit the second suspension bar offset by the same number of teeth in the opposite direction to the first suspension bar (as viewed from the outer anchorage end).

ALL TYPES

Remove the tools and refit the shock absorbers.

Place the vehicle on its wheels and measure the underbody heights (see chapter on "**Checking and adjusting the underbody height**").

If the vehicle height is correct, fit new clips (A) in the torsion bar anchorages.



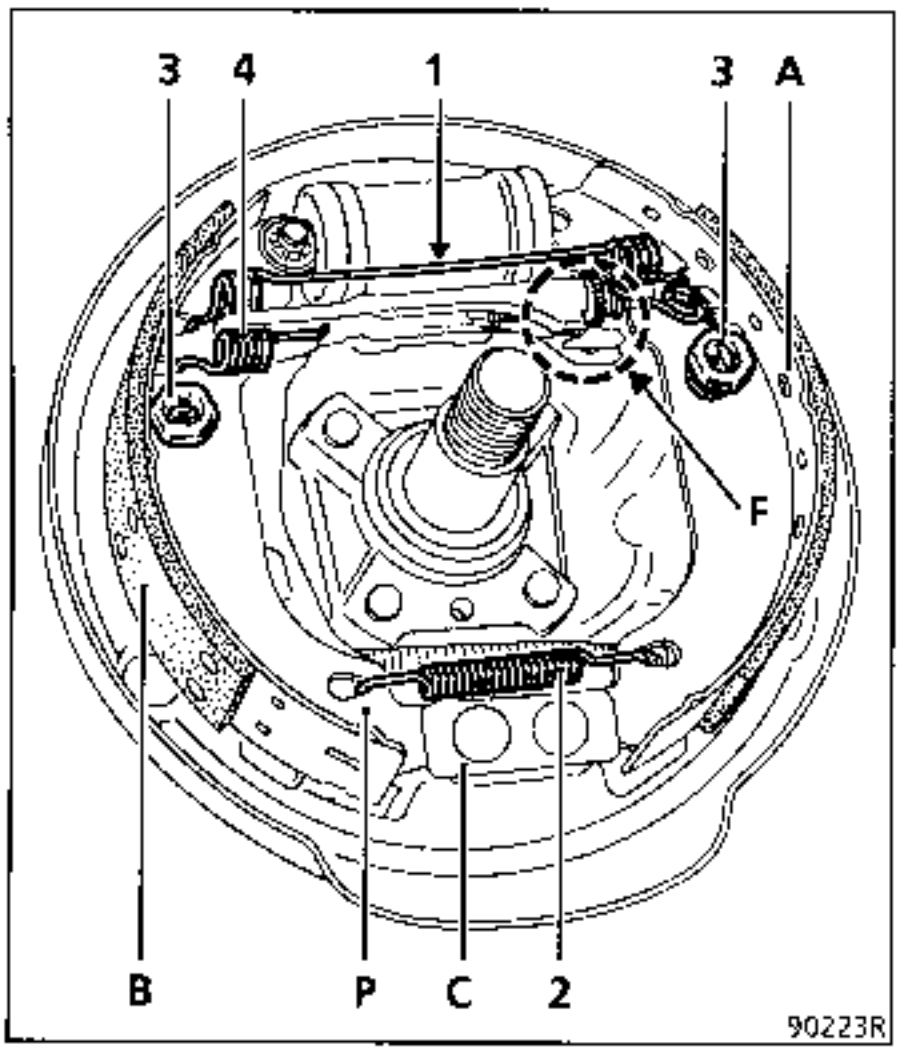
Check and adjust if necessary :

- the brake compensator (depending on version),
- the headlight beam setting.

ESSENTIAL SPECIAL TOOLING		
Emb.	880	Inertia extractor
Rou.	943	Hub centre cap extractor

TIGHTENING TORQUE (in daN.m)	
Wheel bolts	9
Hub securing nuts	16

Composition of **BENDIX 180 x 40 RAI** brake (incremental automatic take-up).

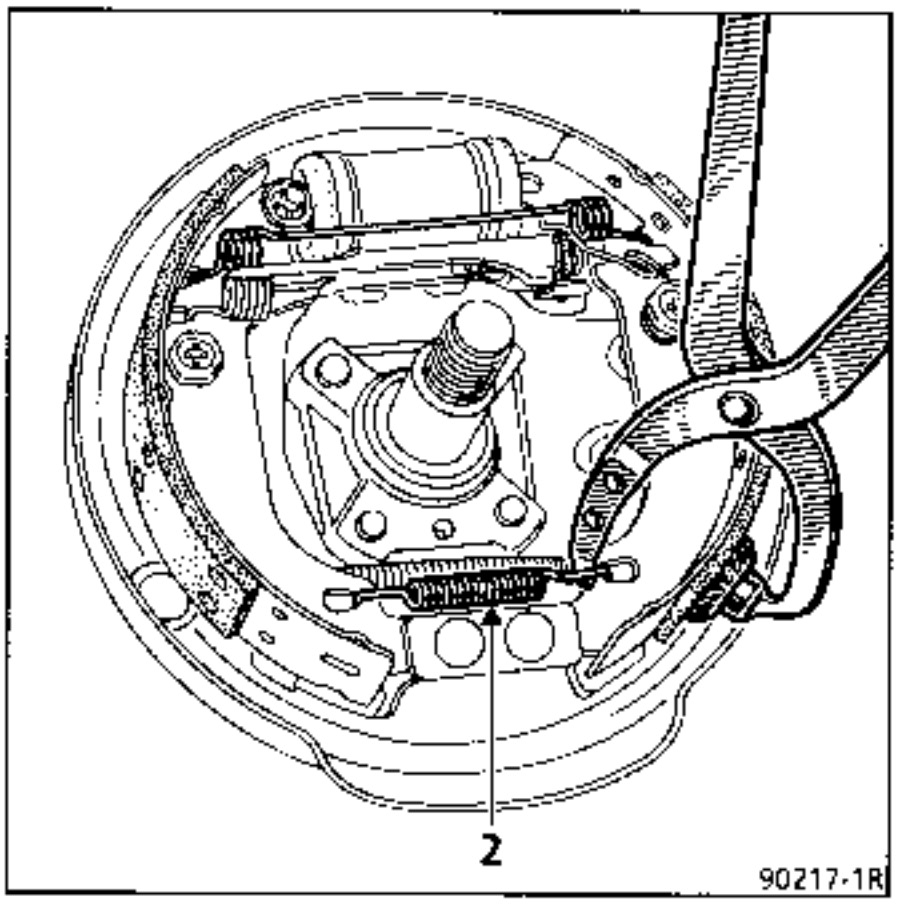


A Leading shoe
B Trailing shoe
C Fixed point
P Brake shoe foot
F RAI
1 Upper return spring
2 (Base) lower return spring
3 Side fastening
4 Handbrake lever return spring

REMOVING

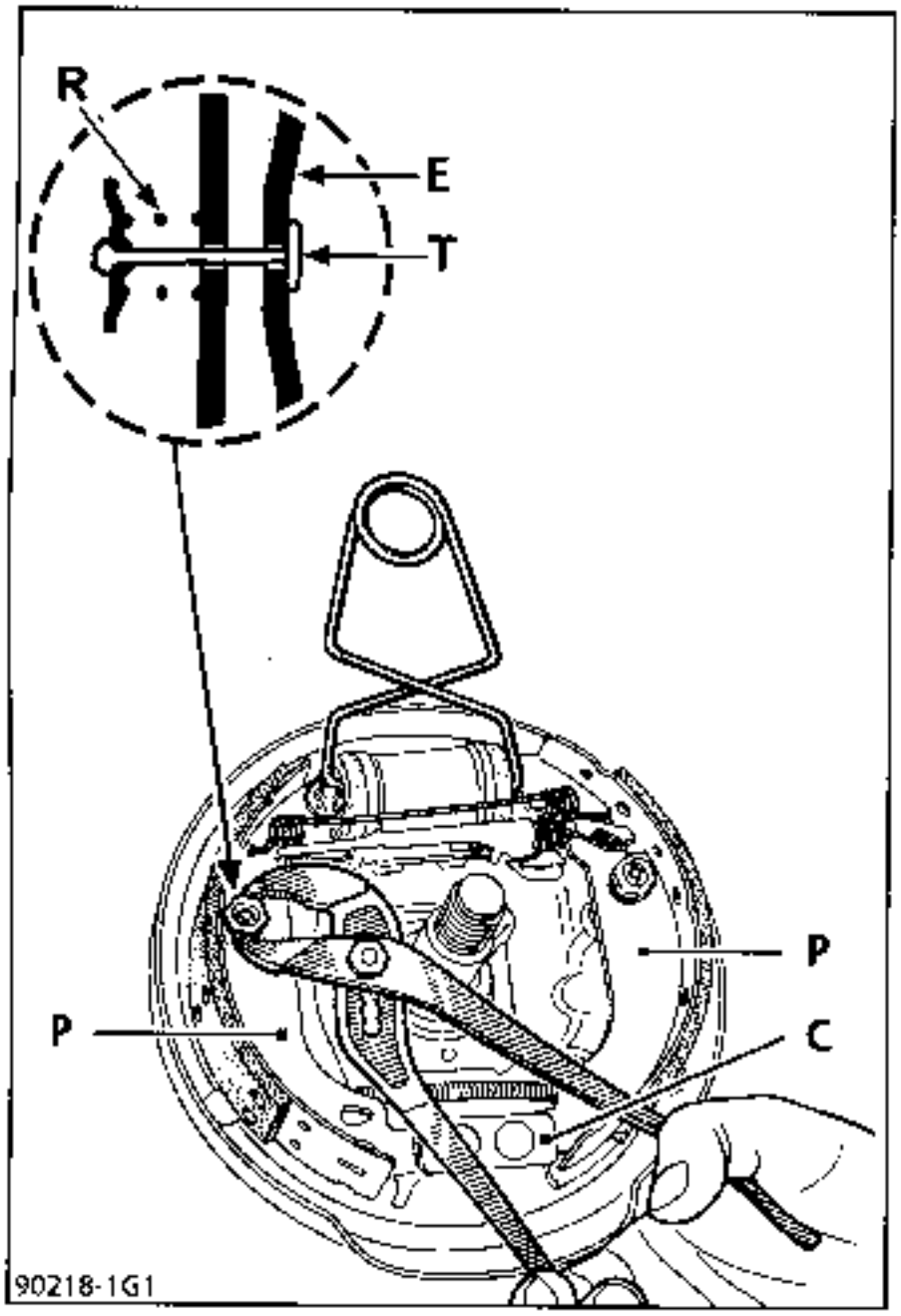
All the shoes on any given axle are to be replaced at the same time. Always fit shoes with linings of the same make and grade.

Remove lower spring (2) using brake shoe grips.



Fit a clamp to the wheel cylinder pistons.

Using multiple joint pliers and keeping connecting link (T) in contact with brake back plate (E), remove springs (R) laterally holding the trailing shoe.

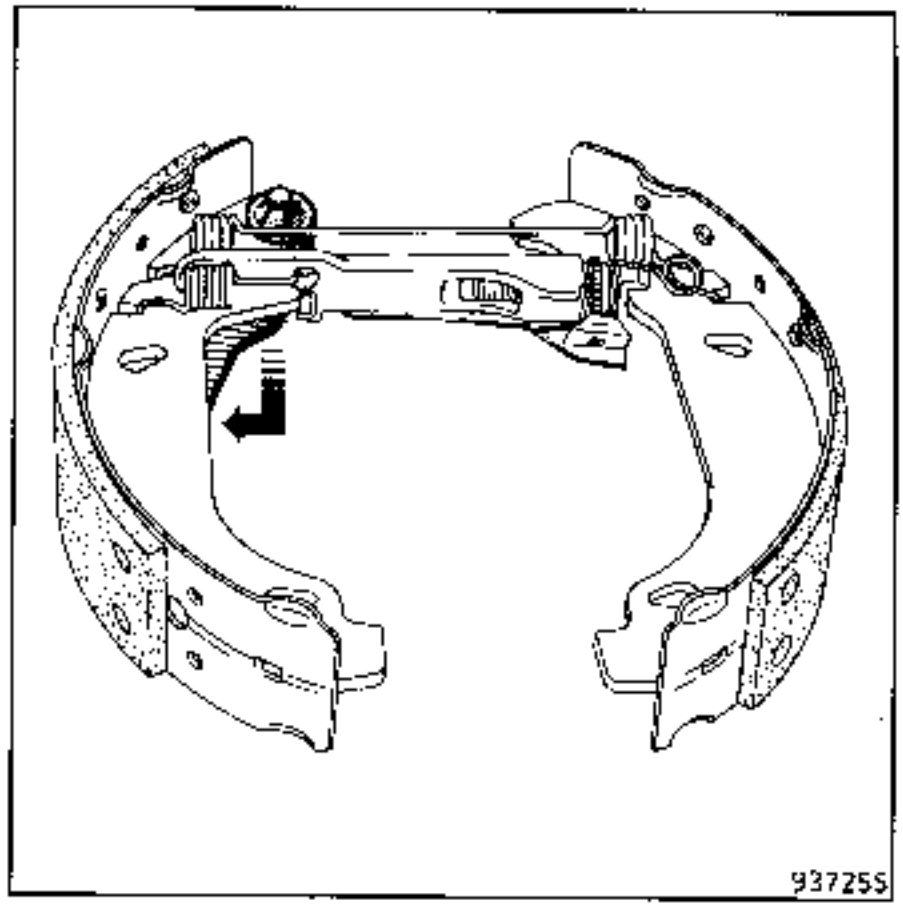


Pass each shoe base (P) above fixed point (C). alternately. Tighten the shoe bases with respect to one another to move the tips away at the wheel cylinder.

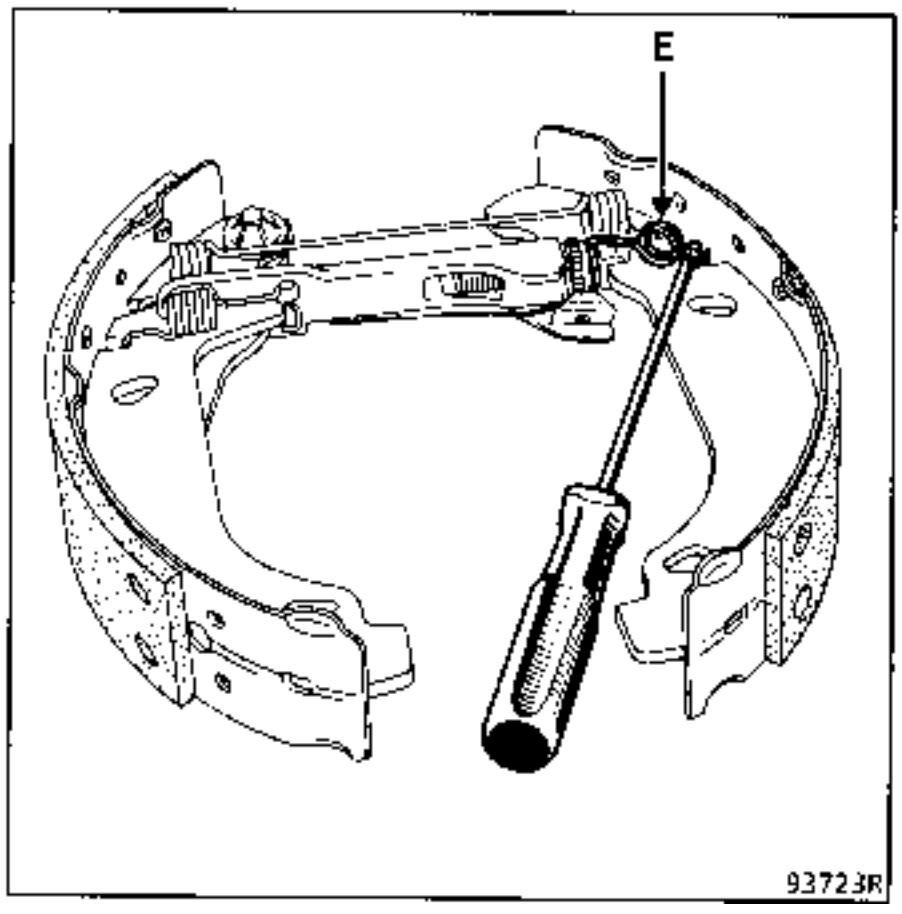
Move the assembly (RAI and shoes) away from the brake back plate then remove it, after first unfastening the handbrake cable.

On the work bench, dismantle the RAI and shoe assembly.

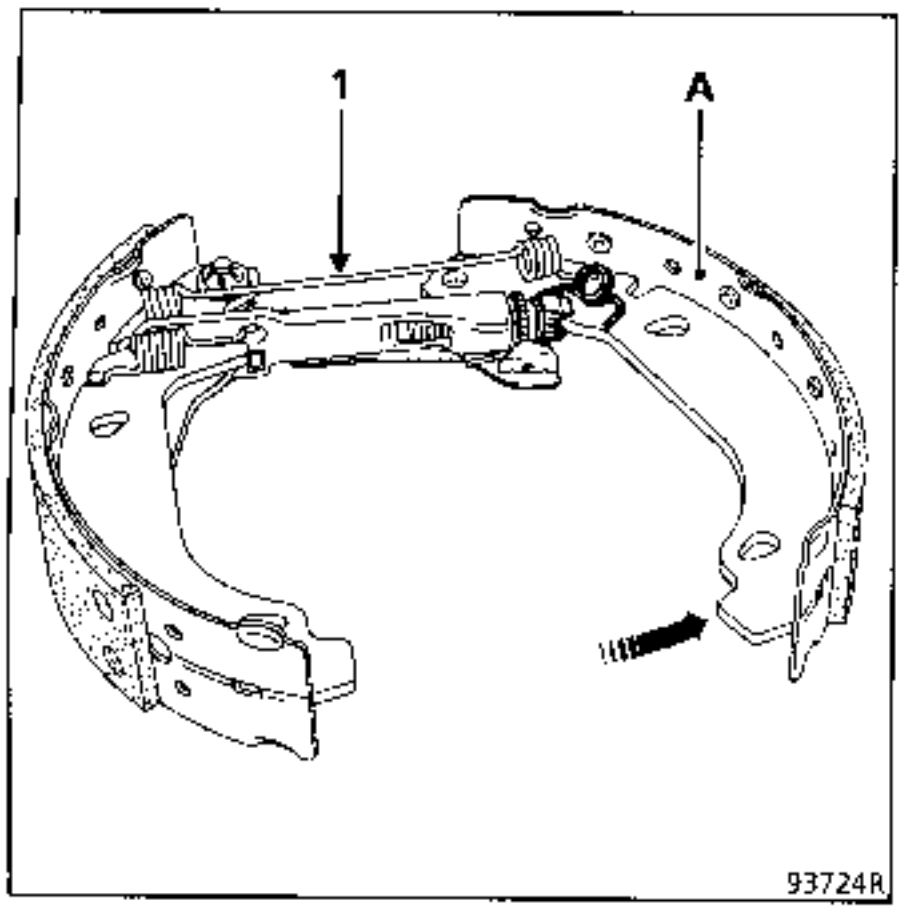
Disarm the handbrake lever.



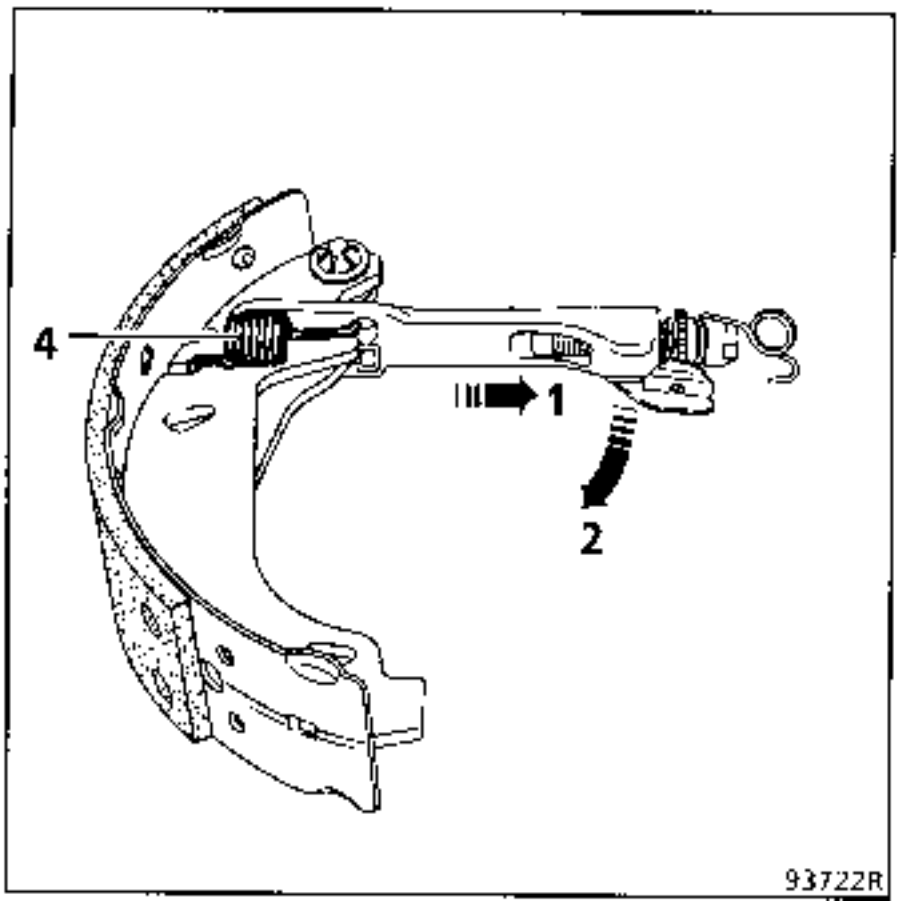
Using a small screwdriver, unfasten clip (E).



Pivot leading shoe (A), as shown by the arrow so as to release the head of the RAI screws. This will enable upper spring (1) to be removed easily.

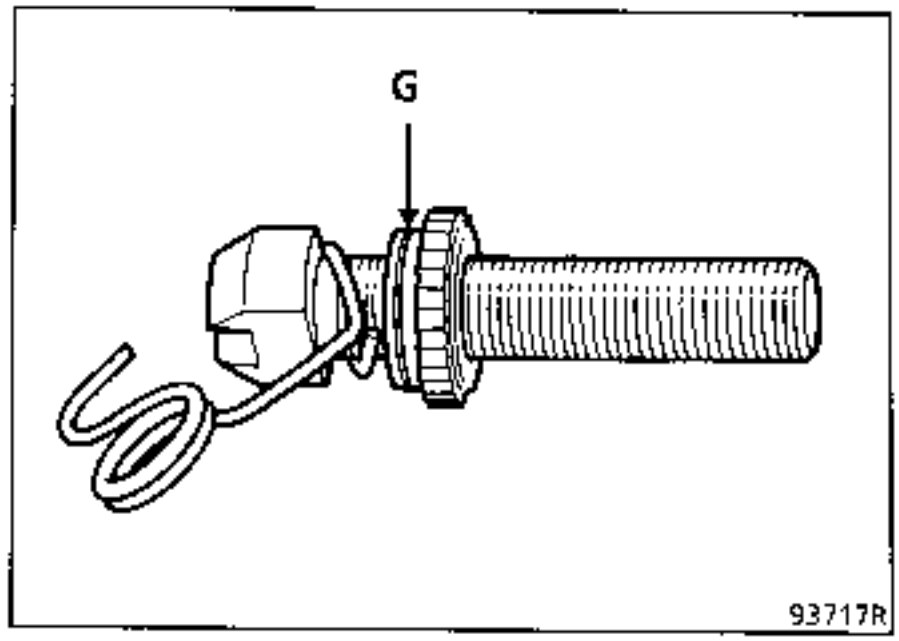


To remove the RAI assembly, pull in the direction of arrow (1) then turn in the direction of arrow (2). Remove spring (4) and the handbrake lever.



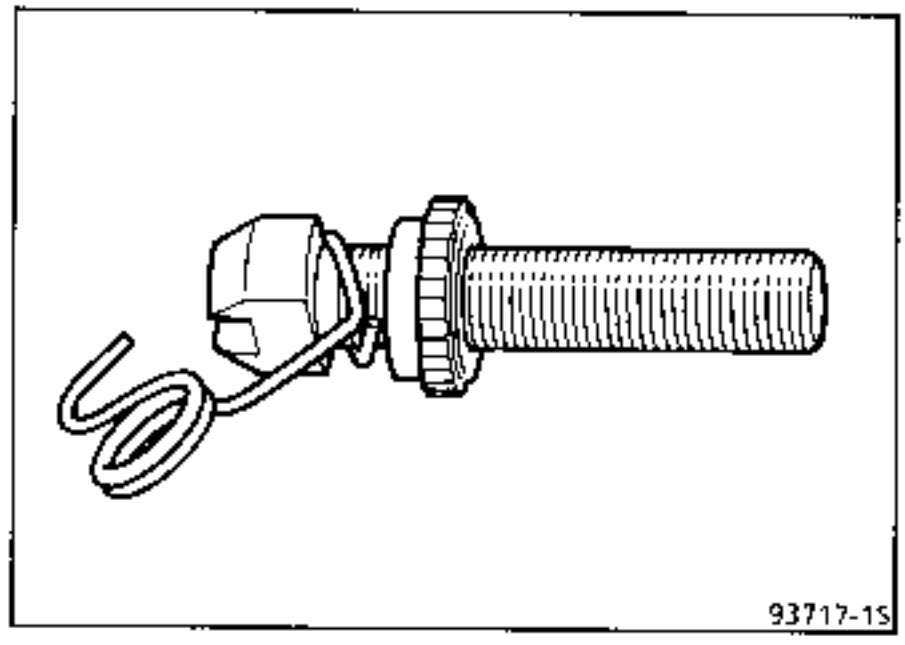
Marking and reassembly of the parts constituting the RAI system.

Left-hand bolt and notched nut



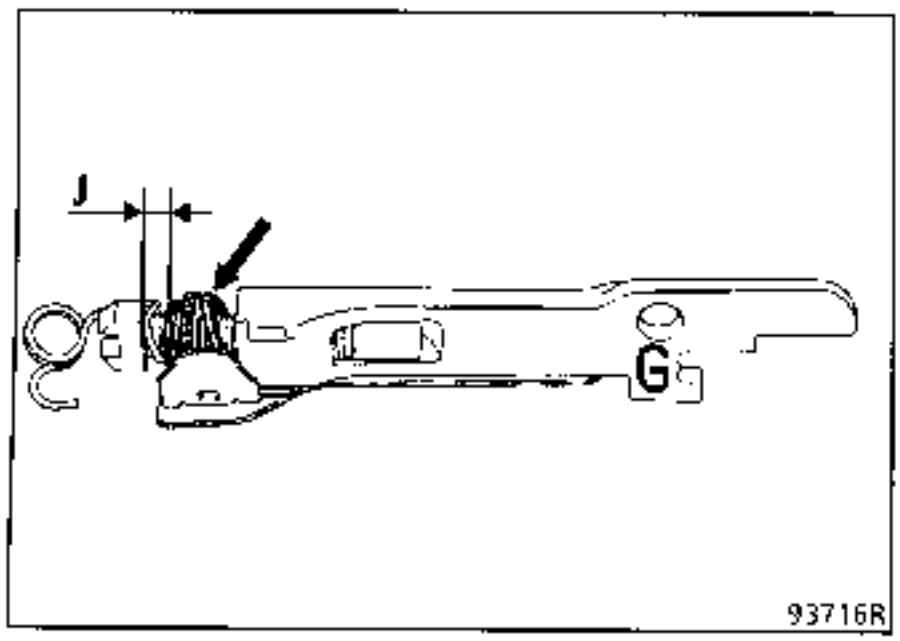
The bolt has a left-hand thread, the notched nut has a groove (G) and the clip is not painted.

Right-hand bolt and notched nut



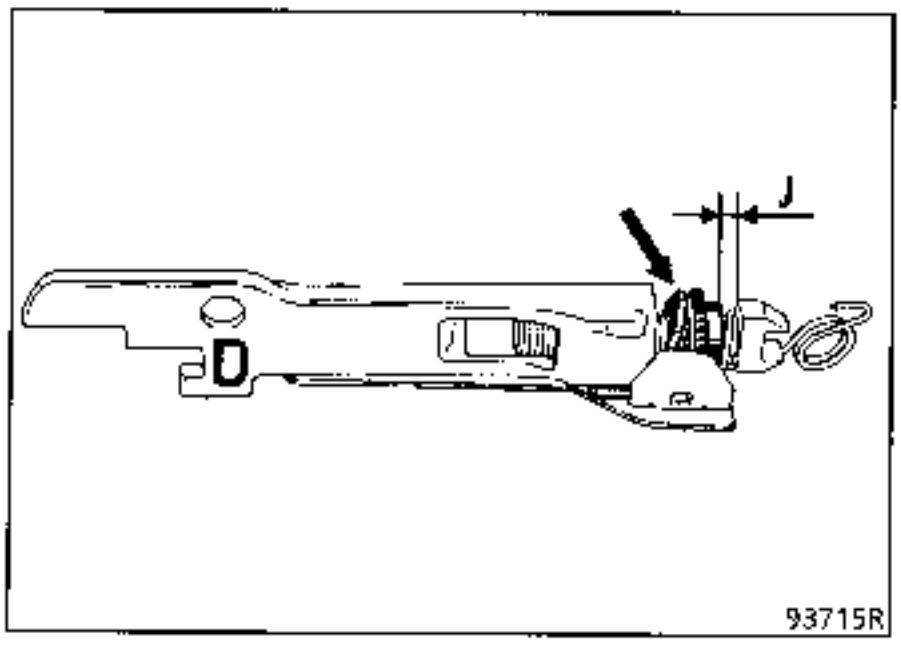
The bolt has a right-hand thread, the notched nut does not have a groove and there are dabs of paint on the clip.

Left-hand RAI assembly



Note the G (left-hand) stamped on the part and the position of the bracket.

Right-hand RAI assembly



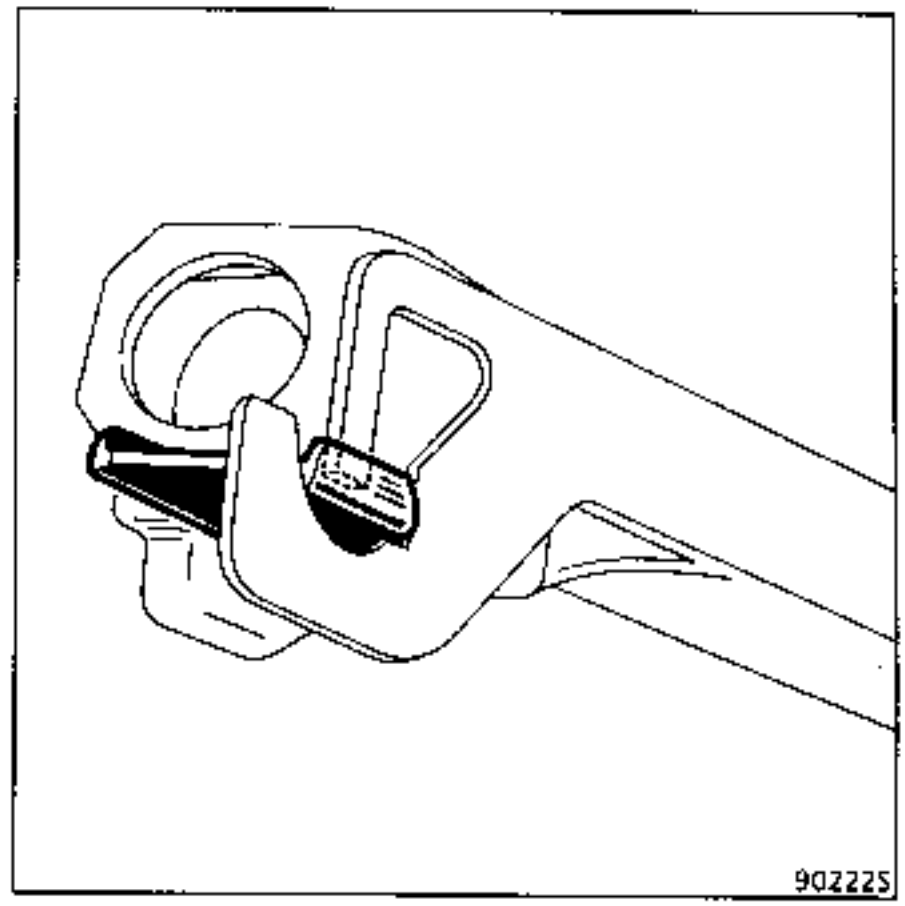
Note the D (right-hand) stamped on the part and the position of the bracket.

In both cases, the clip fastening must not be jammed between the bolt head and the notched nut; a slight clearance (J) must be left (J).

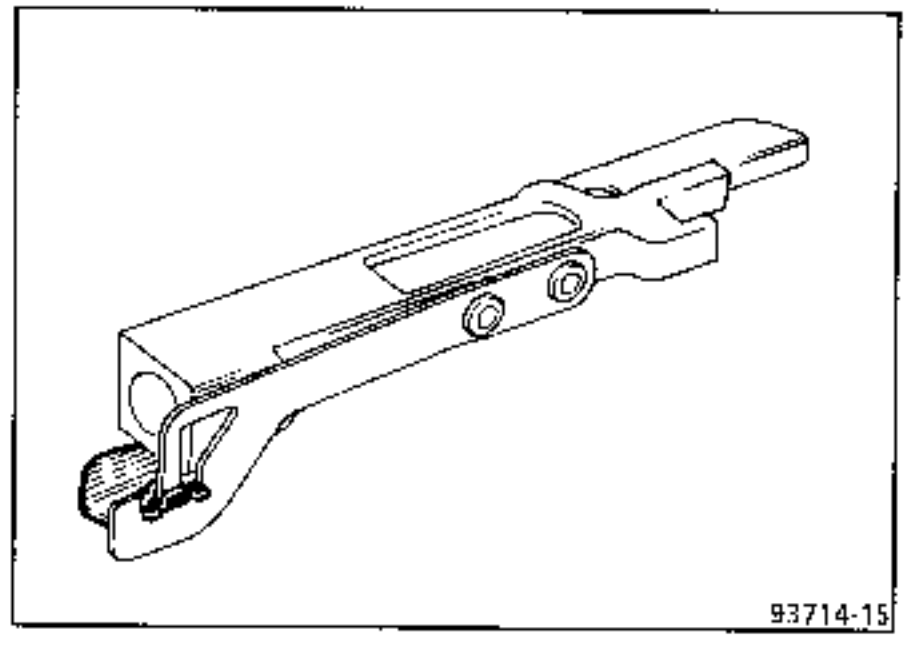
Reassembling the RAI assembly

Ensure that the catch is positioned correctly.

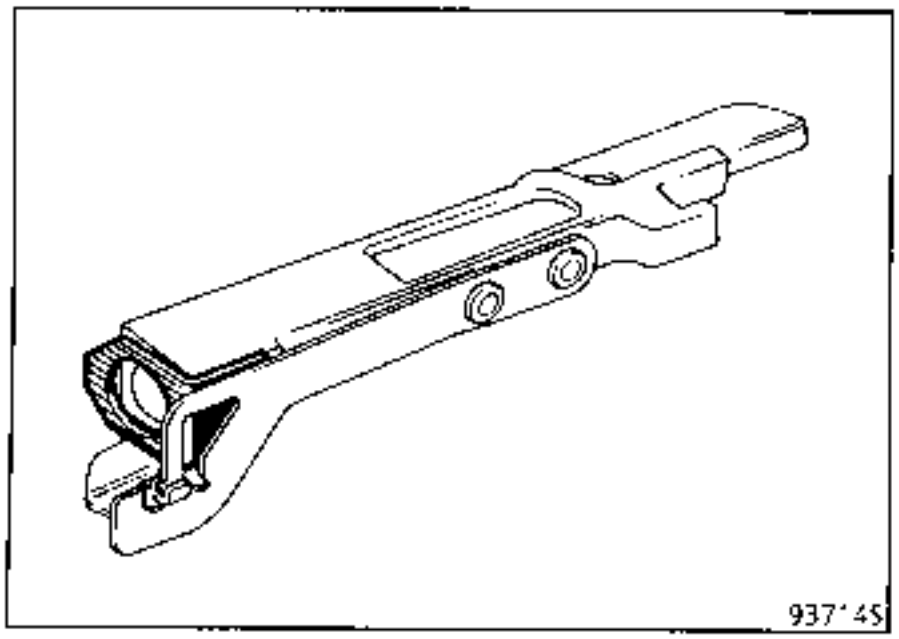
1ST TYPE



2ND TYPE



Refit the bracket, the solid section should be placed between the blade and the link arm.

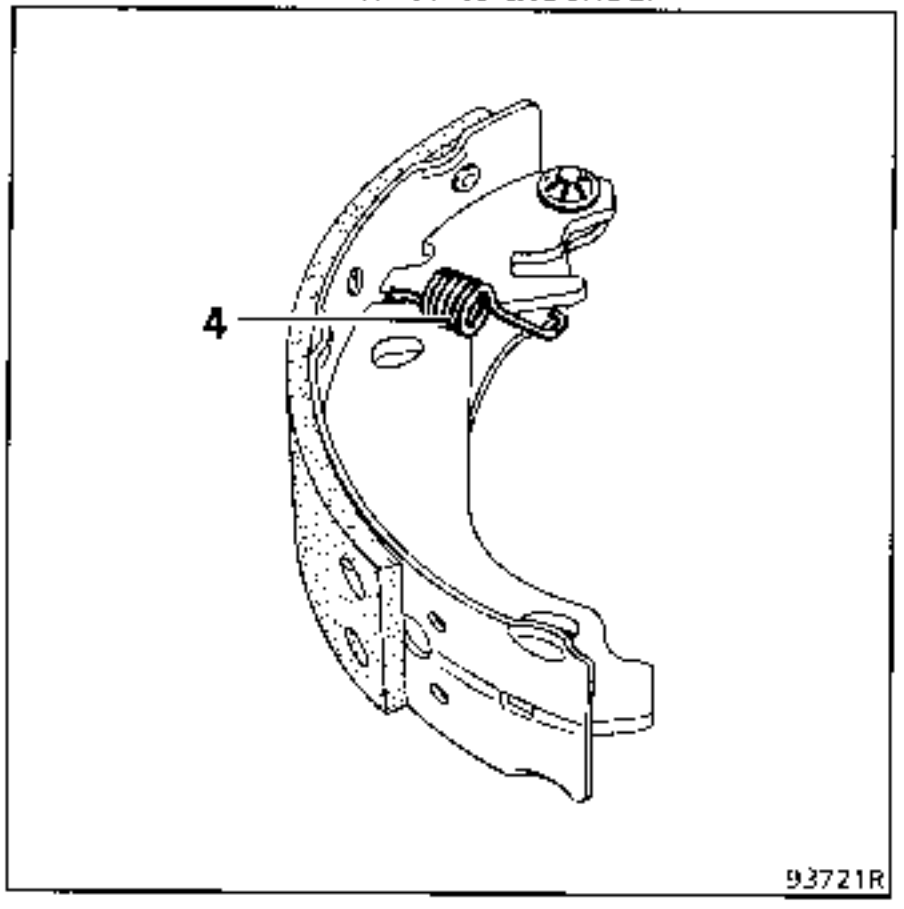


Then assemble the link arms with their respective bolts and nuts, with the right-hand bolt, clip and nut in the right-hand link arm, passing through the hole in the bracket and likewise for the left-hand RAI.

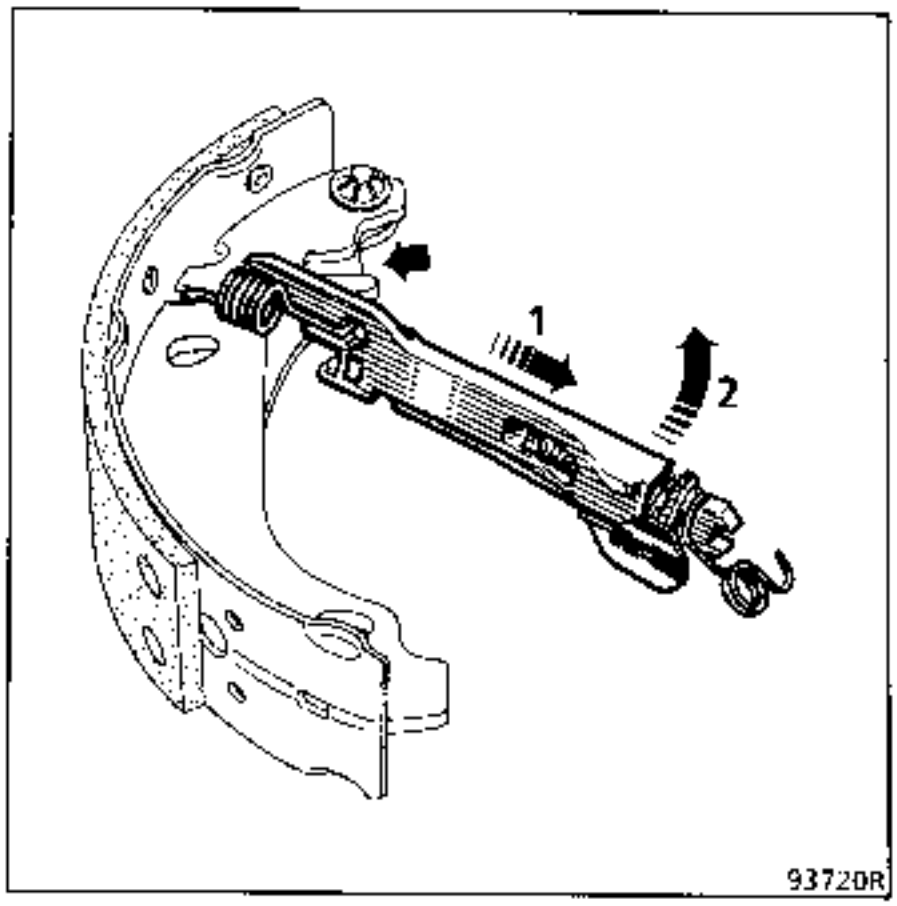
On the repair bench, refit the RAI and shoe assembly.

Refit the handbrake lever to the trailing shoe with a new clip, then disarm the lever.

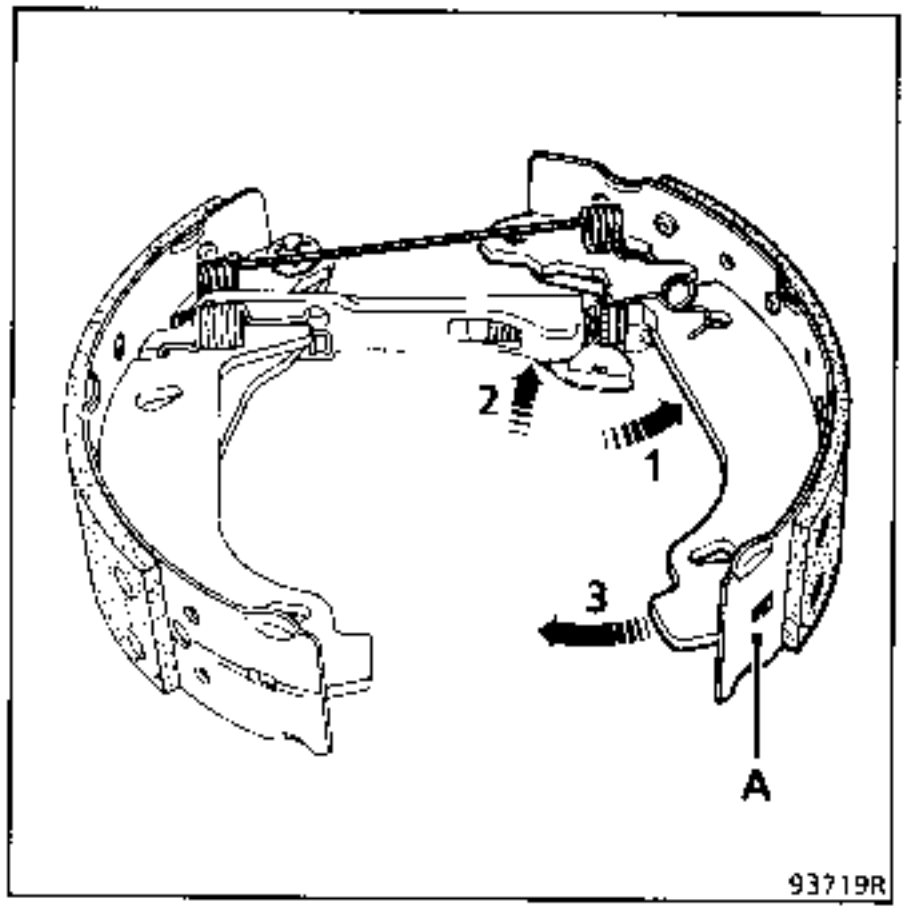
Position spring (4) in the notch in the shoe taking care that it is fitted in the correct direction with the shorter hook secured to the shoe.



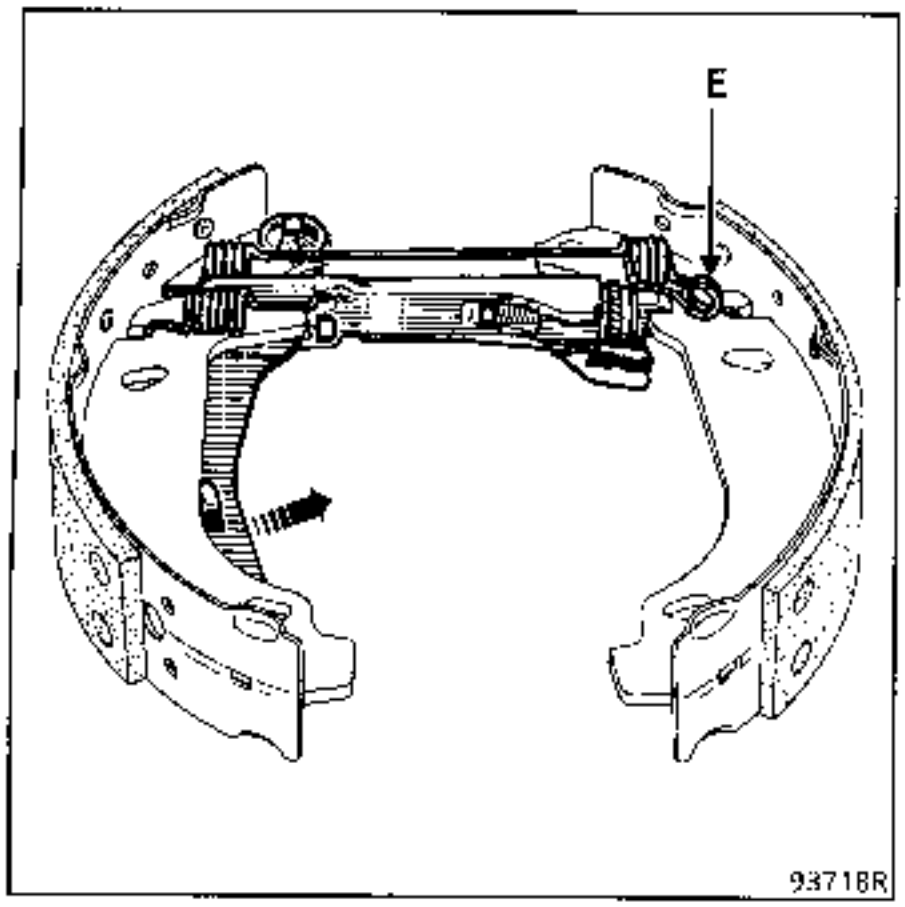
Attach the RAI assembly to spring (4) then pull in the direction shown by the arrows and the RAI moves automatically into its operating position.



Position the upper spring (1) in the notches in the two shoes, then pull in the direction shown by the arrows and the recess on the bolt should locate in that of the leading shoe (A).



Attach clip (E) and rearm the handbrake lever.



REFITTING

Offer the assembly up to the vehicle.

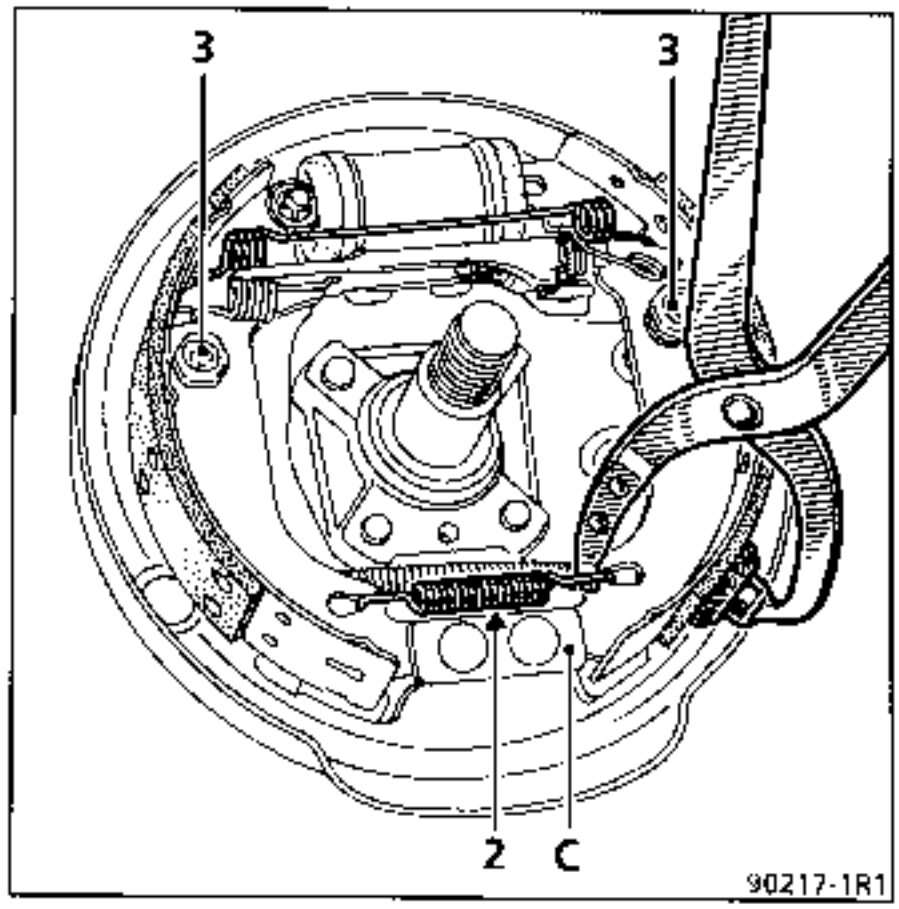
Attach the handbrake cable to the lever.

Tighten the bases of the brake shoes and position the tips on the wheel cylinder pistons. Take care not to damage the caps.

Position the shoes on fixed point (C).

Fit in place the side retaining devices (3).

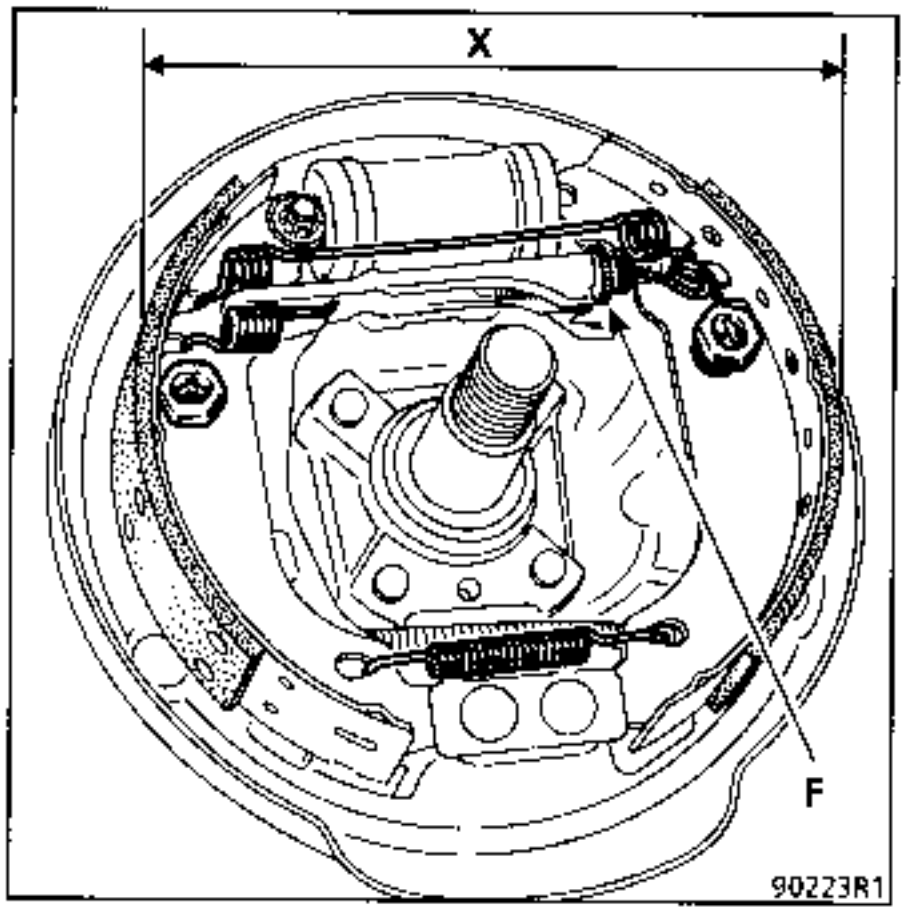
Remove the clamps from the wheel cylinder pistons then refit the lower spring (2).



ADJUSTING

Using a screwdriver, adjust the diametric setting of the shoes via notched sector (F) in order to obtain a diameter (X) between:

179.2 mm and 179.5 mm



Adjust the other brake anchor plate in the same way.

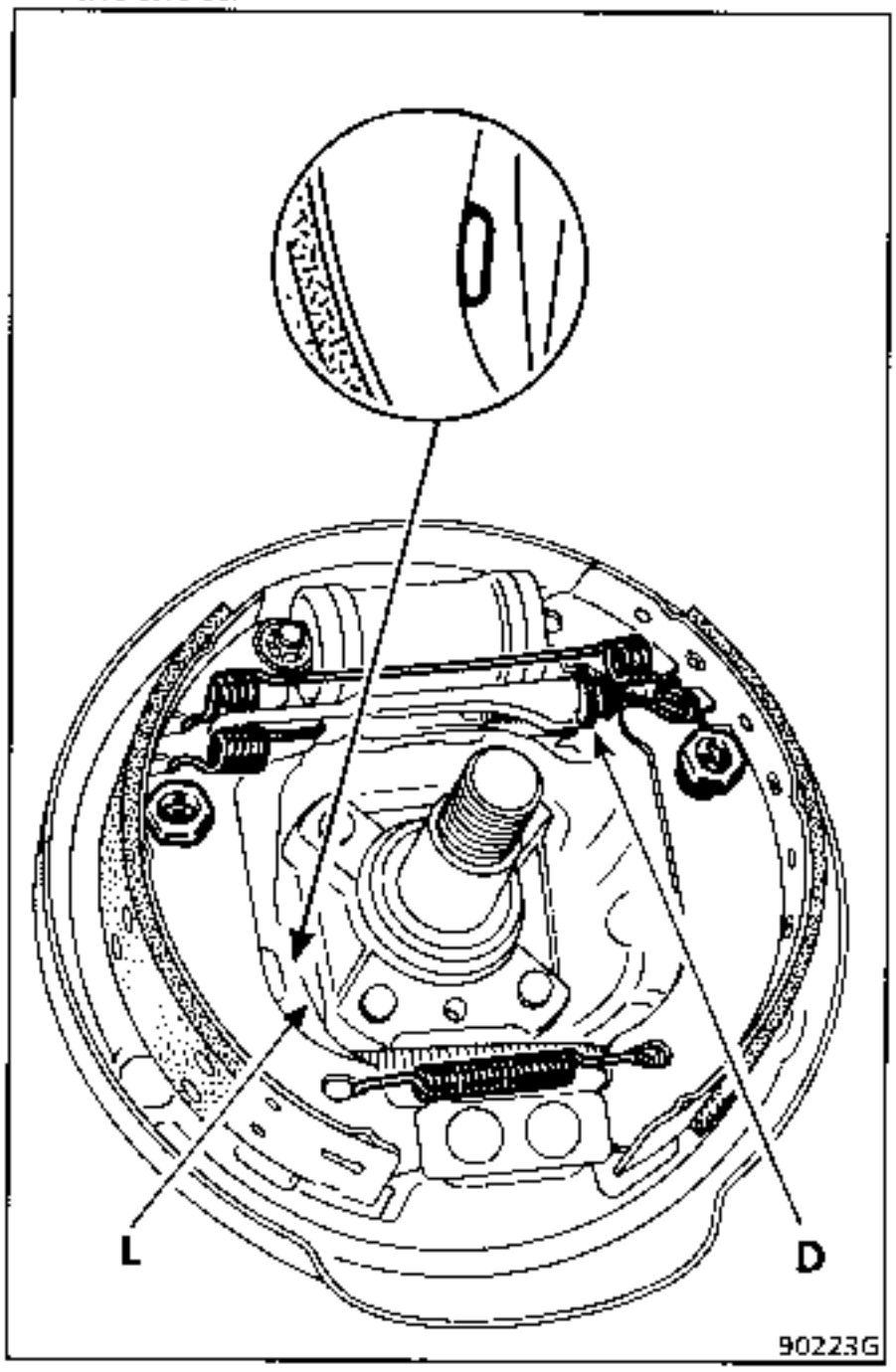
Refit the drums but do not tighten the nuts.

Adjust the linings by pressing down repeatedly on the brake pedal (approximately 20 times).

Ensure that the RAI operates correctly (a characteristic "click" will be heard from the drums).

Remove the drums.

Ensure :
- that the cables slide correctly,
- that the handbrake levers (L) bear correctly on the shoes.



Gradually tension the cables at the central adjusting point so that levers (L) **lift off between the first and second notches** of the control lever travel and remain lifted off at the second notch.

Tighten the lock nut at the central adjusting point.

Refit :
- the drums and torque tighten the nuts to 16 **daN.m,**
- the plugs.

ESSENTIAL SPECIAL TOOLING		
Fre.	573-01	Handbrake cable clamp

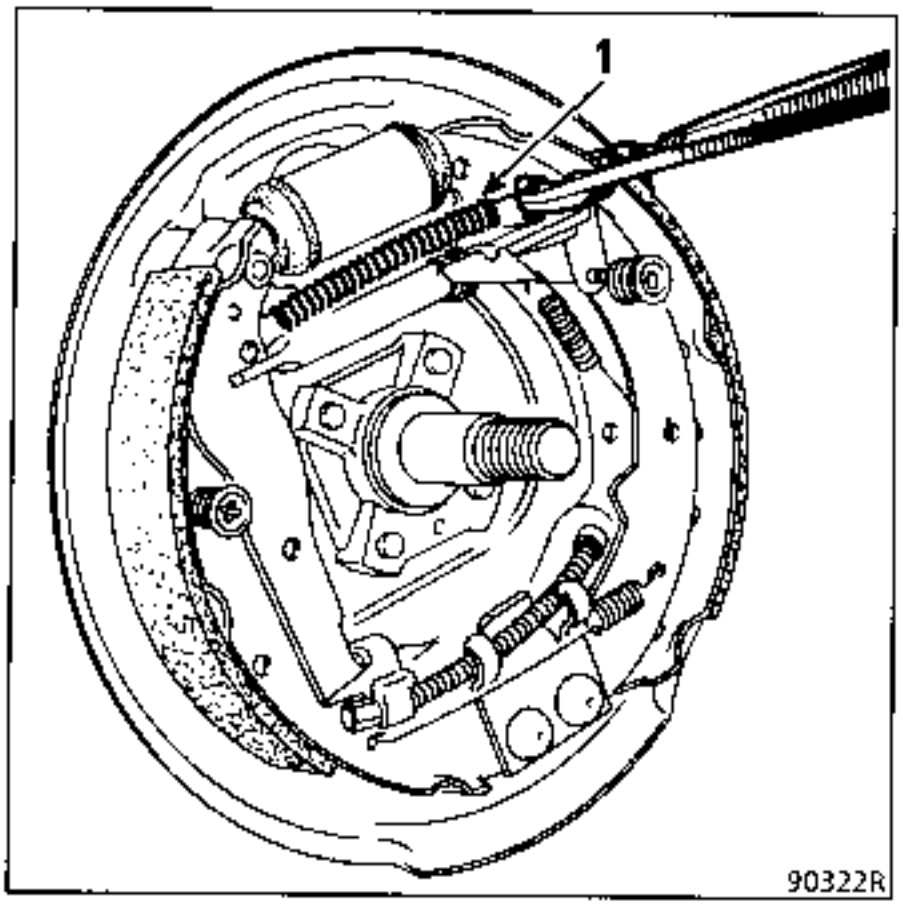
TIGHTENING TORQUE (in daN.m)	
Wheel bolts	9
Hub securing nuts	16

All the shoes on any given axle are to be replaced at the same time. Always fit shoes with linings of the same make and grade.

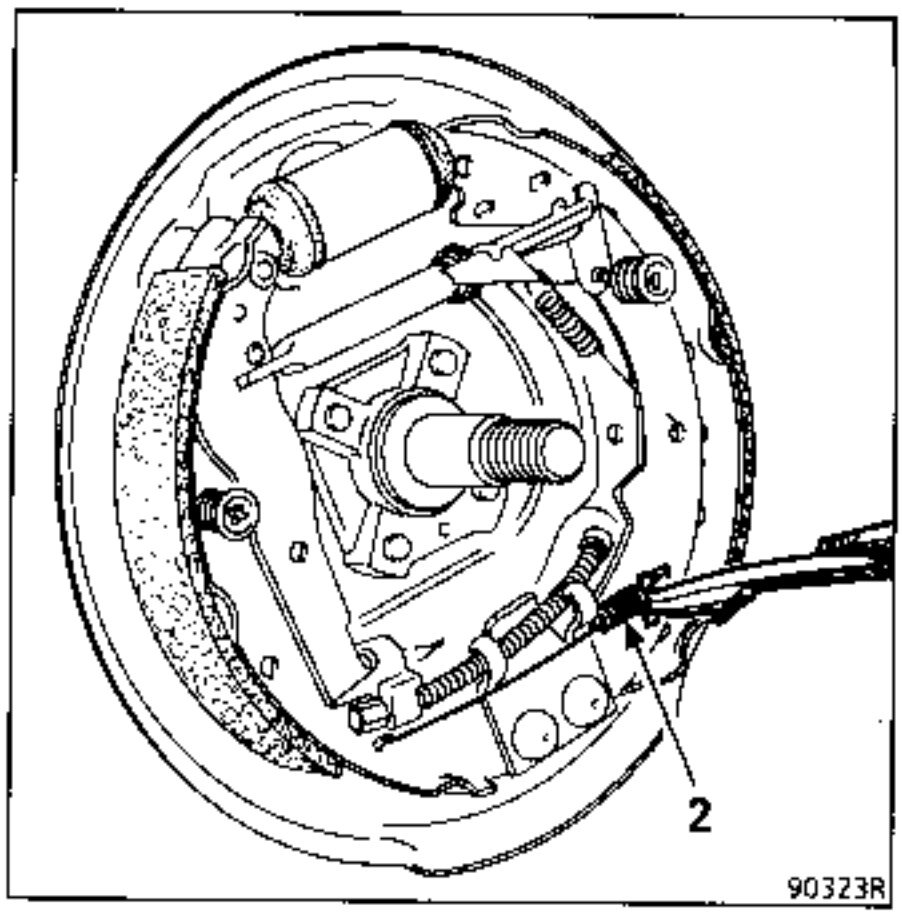
REMOVING

Remove the brake drum (see relevant section).

Remove :
- the upper spring (**1**) using brake shoe grips,

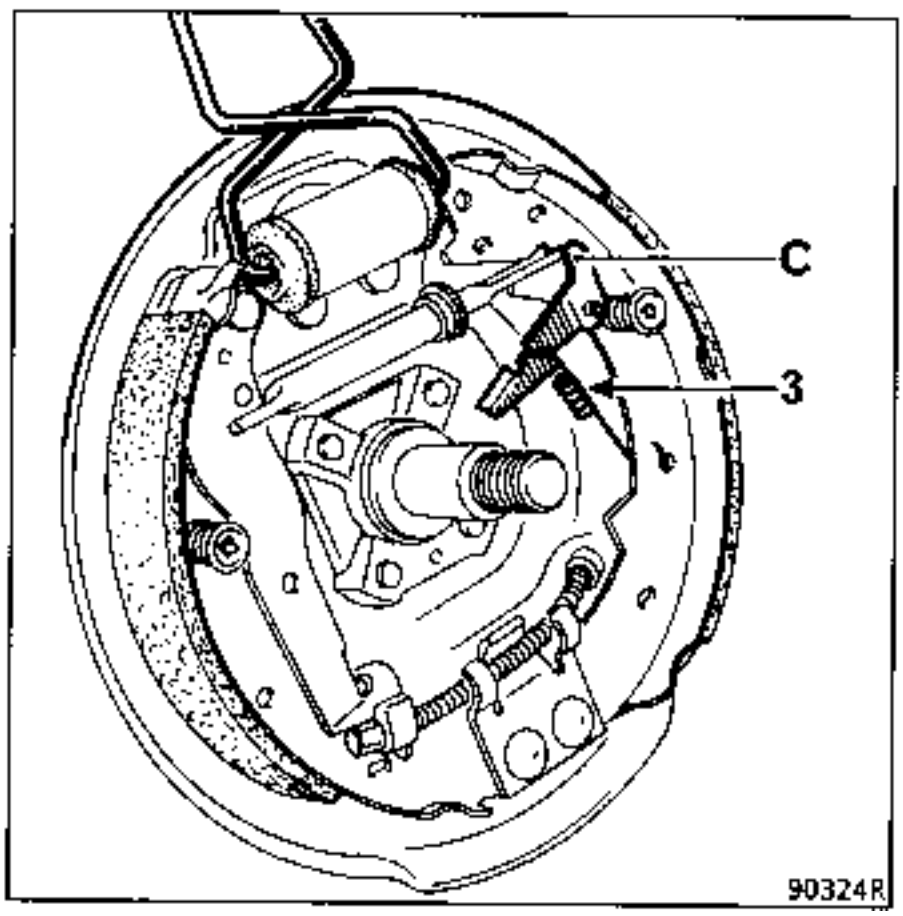


- the lower spring (**2**) using brake shoe grips.

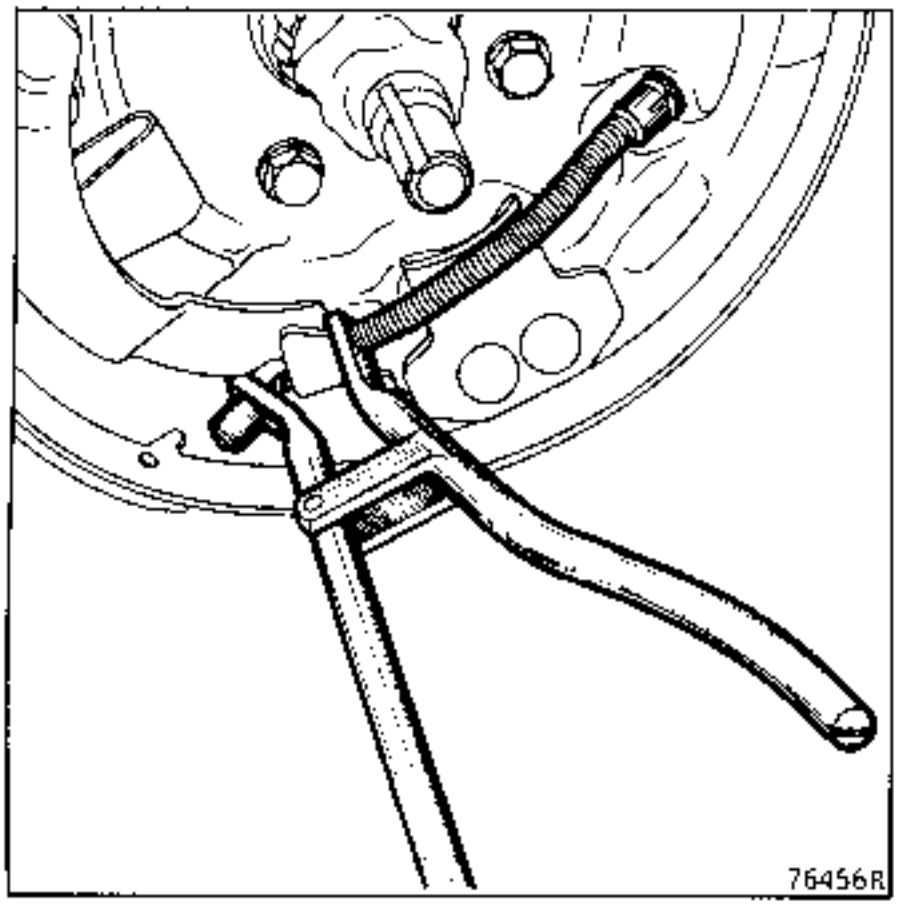


Fit clamp to the wheel cylinder piston.

Remove :
- spring (**3**) and adjusting lever (**C**),

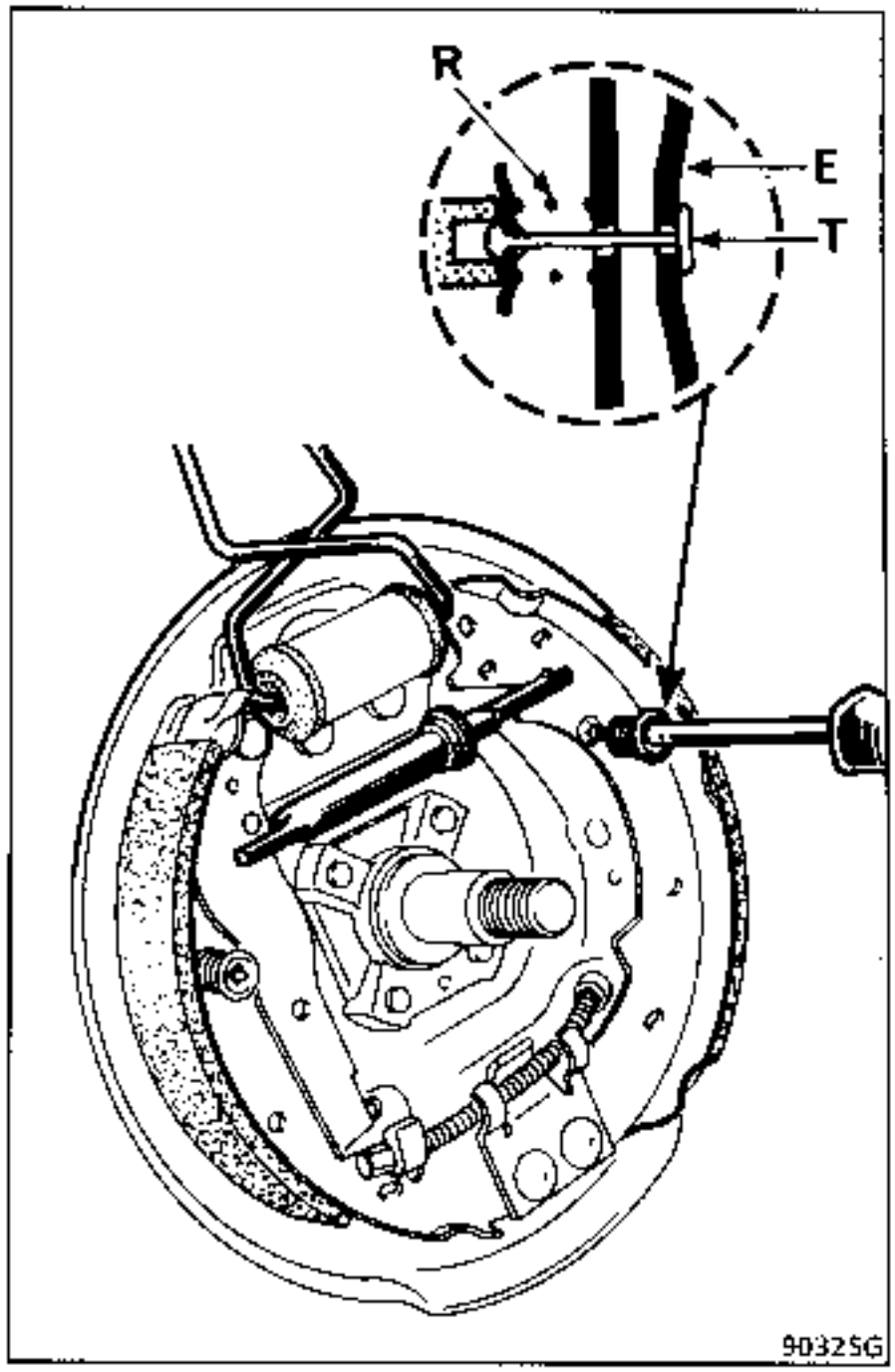


- handbrake cable using tool Fre. 573-01.

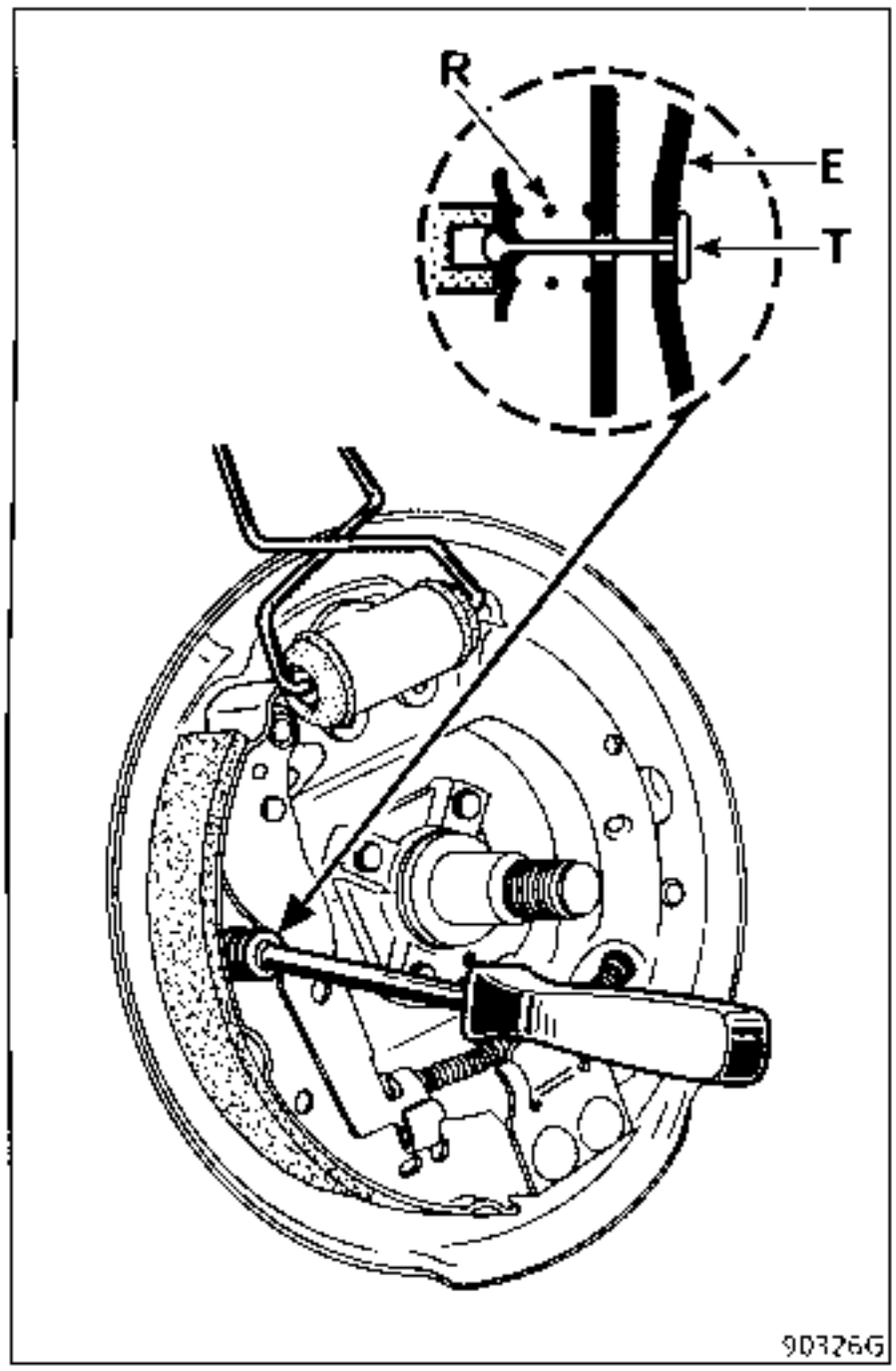


Using a tool such as the end of a valve adjusting spanner, remove lateral shoe spring (R), holding connecting rod (T) against brake back plate (E).

Remove :
- the leading shoe - thrust link assembly.



- spring (R) holding the trailing shoe,
- the trailing shoe.



Dust out the drums and back plates using dust removal equipment.

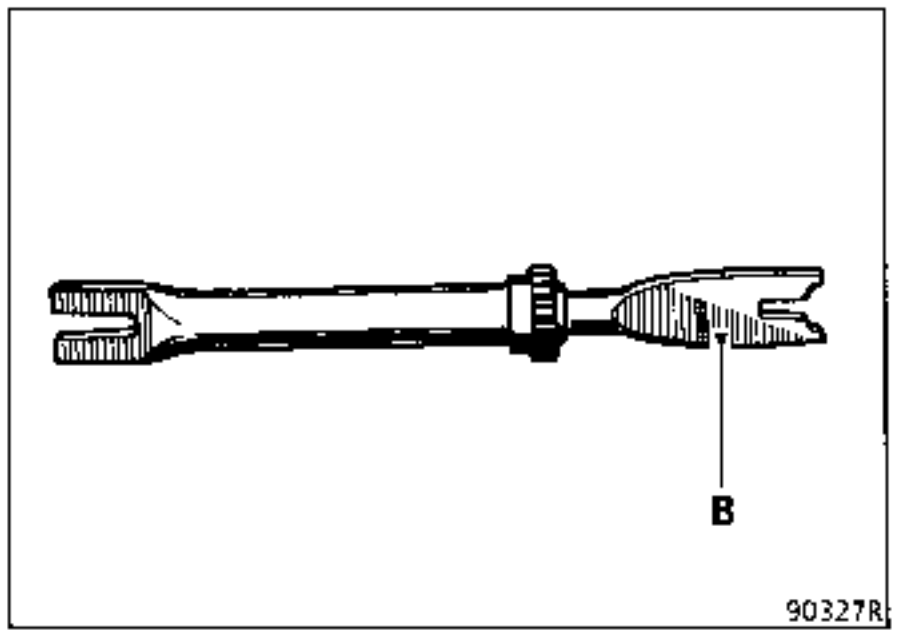
REFITTING

NOTE: The component parts of the brakes are different for the left-hand and right-hand sides so it is essential not to interchange them.

Lightly grease the thread on the thrust link and mark it.

On the left-hand brake : the screw thread is right-hand.

The screw end (B) is **METALLIC SILVER** in colour.

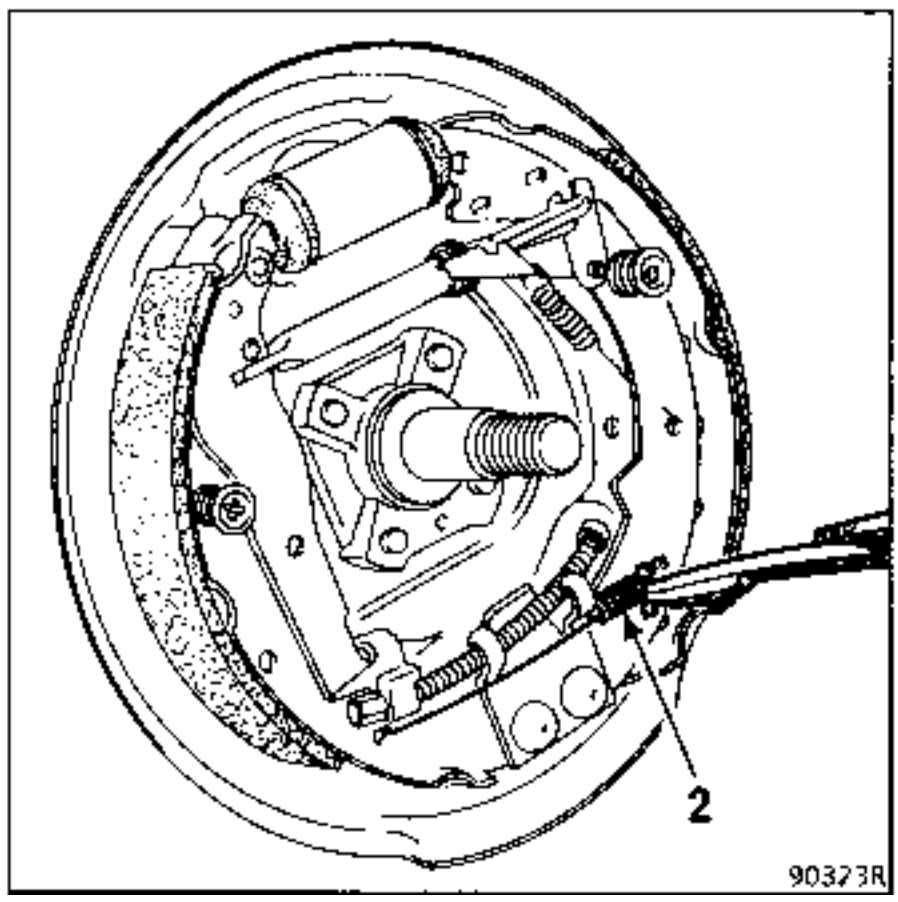


On the right-hand brake: the screw thread is left-hand.

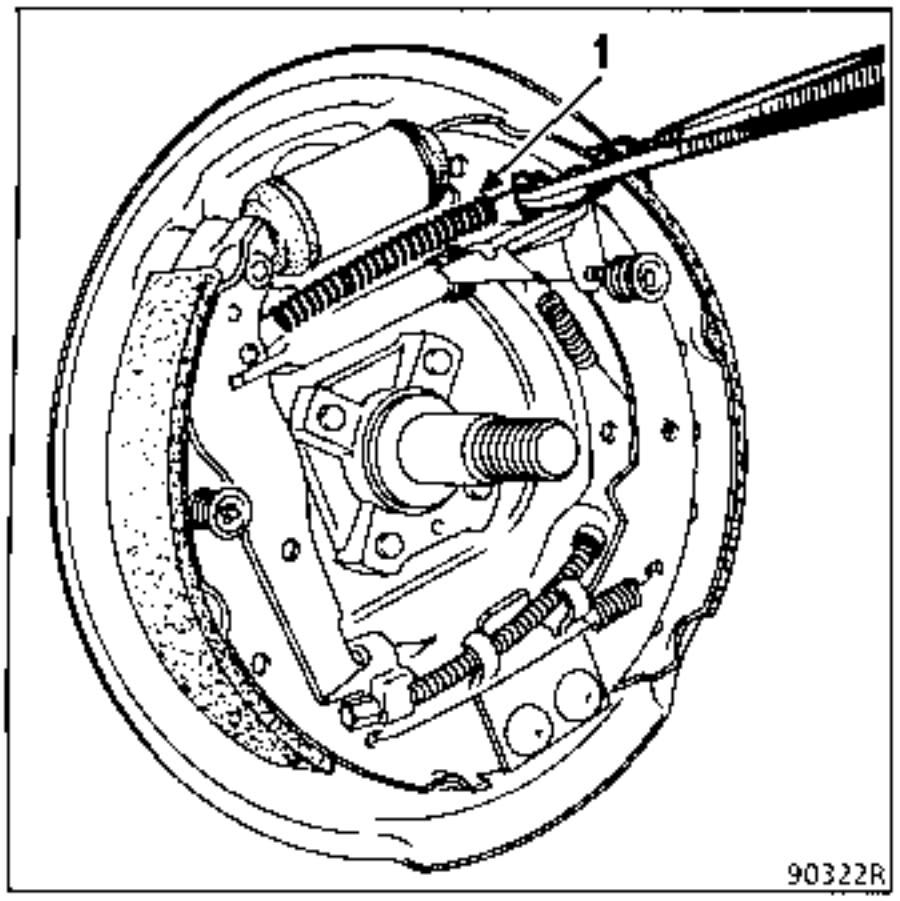
The screwed end (B) is **GOLD** in colour.

Fit in place:
- the trailing shoe and secure it,
- the thrust link,
- the leading shoe and secure it,
- spring (3) and adjusting lever (C).

Remove the clamps from the wheel cylinder pistons then refit:
- lower spring (2),



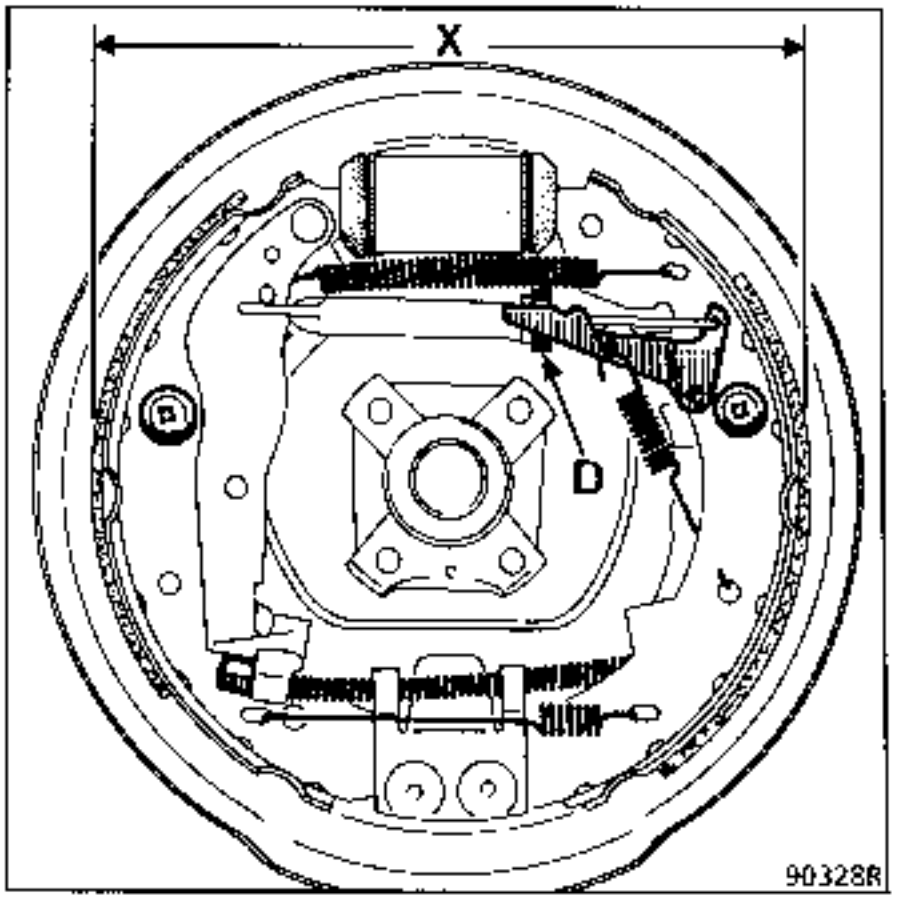
- upper spring (1).



ADJUSTING

Using a screwdriver, adjust the diametral positions of the shoes via toothed quadrant (D) so that diameter (X) is between:

227.9 mm and 228.5 mm.



Perform the same adjustment on the other anchor plate.

Refit the drum.

Adjust the positions of the brake linings by pressing down repeatedly on the brake pedal.

Adjust the handbrake (see relevant paragraph).

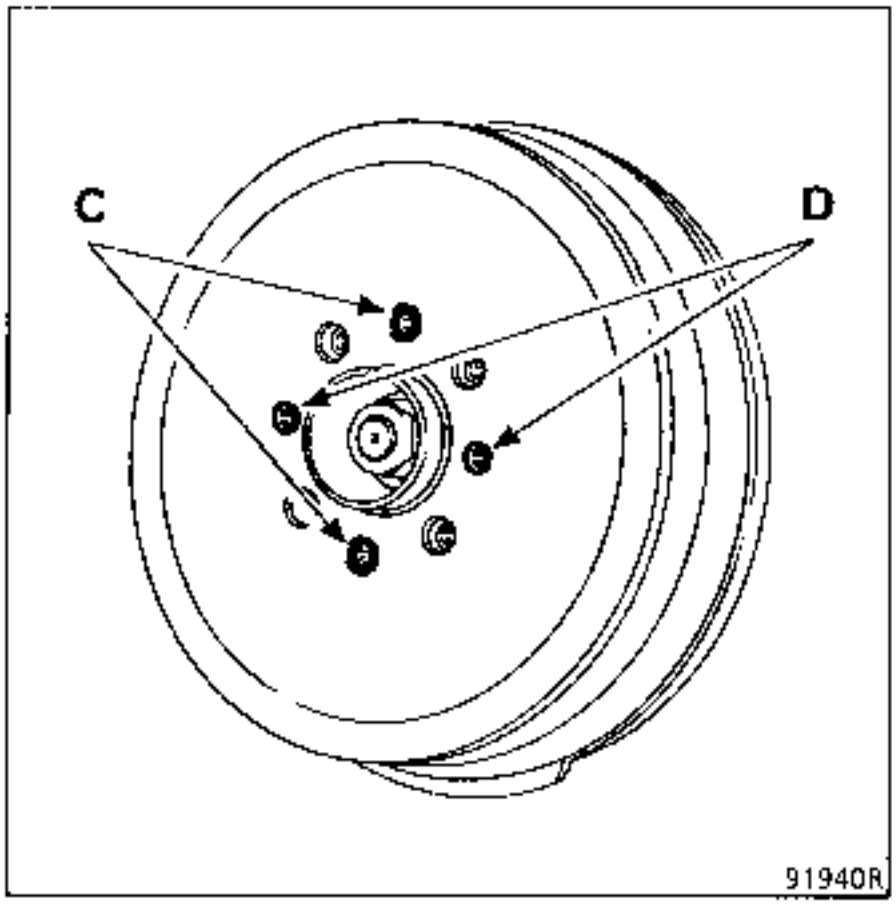
ESSENTIAL SPECIAL TOOLING		
Rou.	604-01	Hub locking tool
T.Av.	1050-02	Hub extractor
Fre.	573-01	Handbrake cable spring release pliers
Fre.	826	Tool for removing spring
M.S.	580	Impact tool

TIGHTENING TORQUES (in daN.m)	
Drive shaft nuts	21
Wheel bolts	9

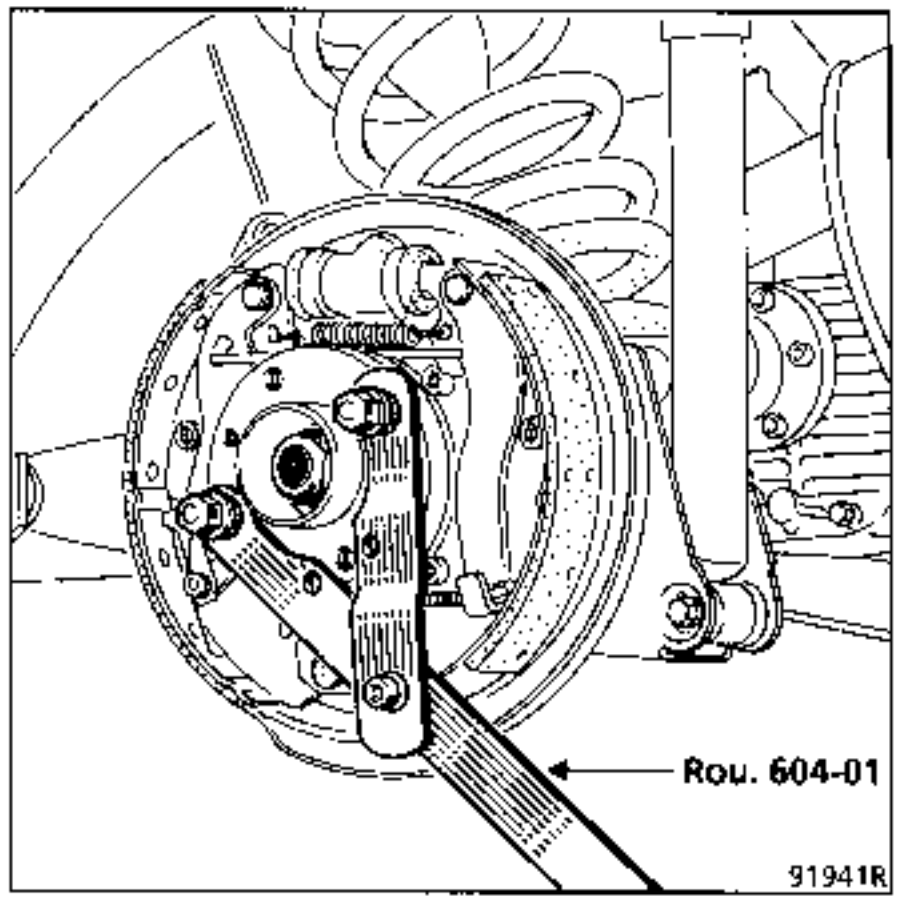
All the linings on any given axle must be replaced at the same time. Always fit linings of the same brand and quality.

REMOVING

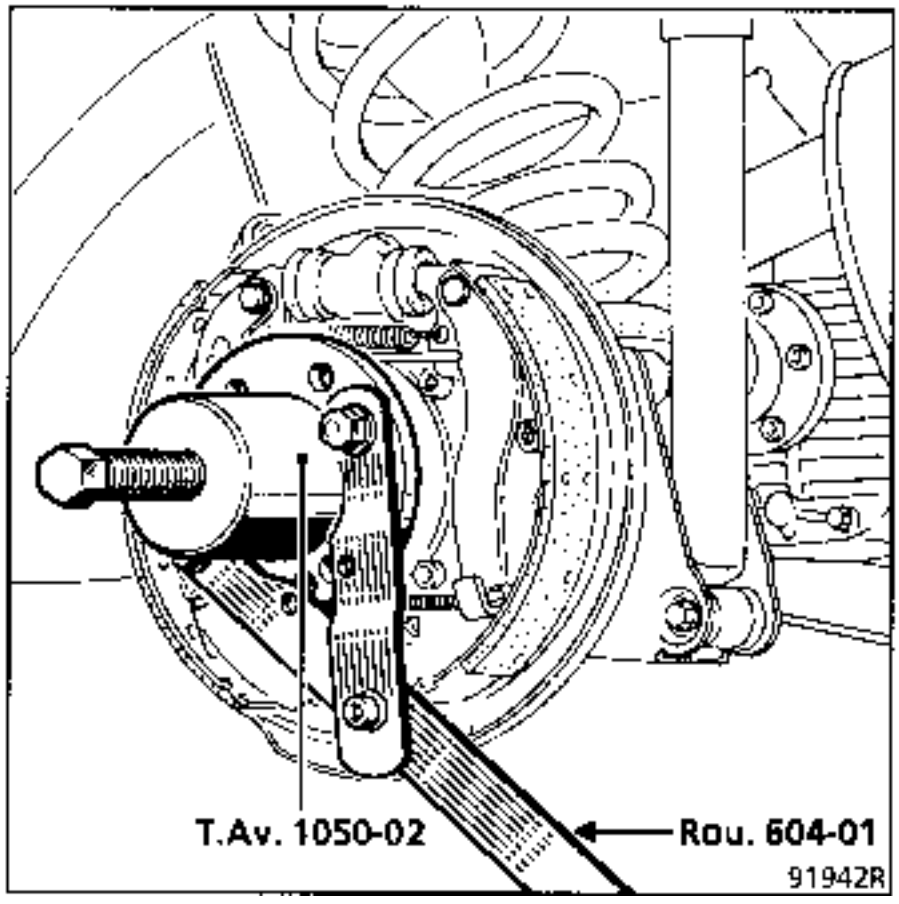
Remove :
- the brake drums, two bolts (C); if problems are encountered, extract them by inserting two bolts in holes (D),



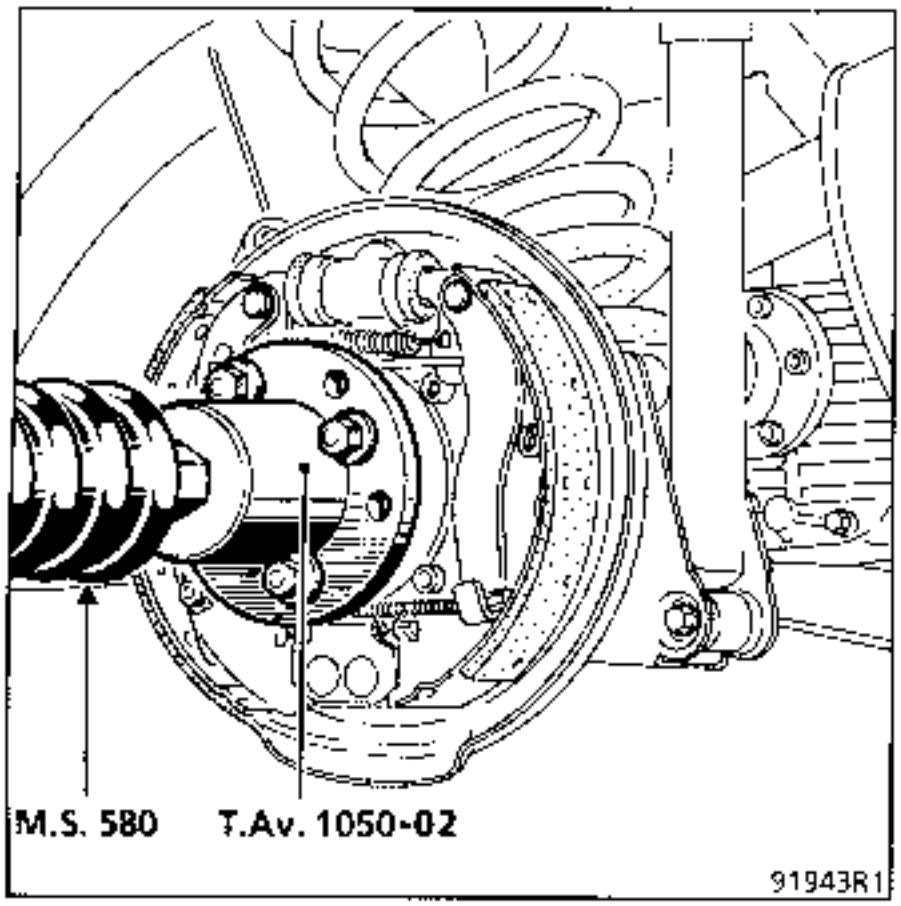
- the drive shaft nut, tool **Rou. 604-01**.



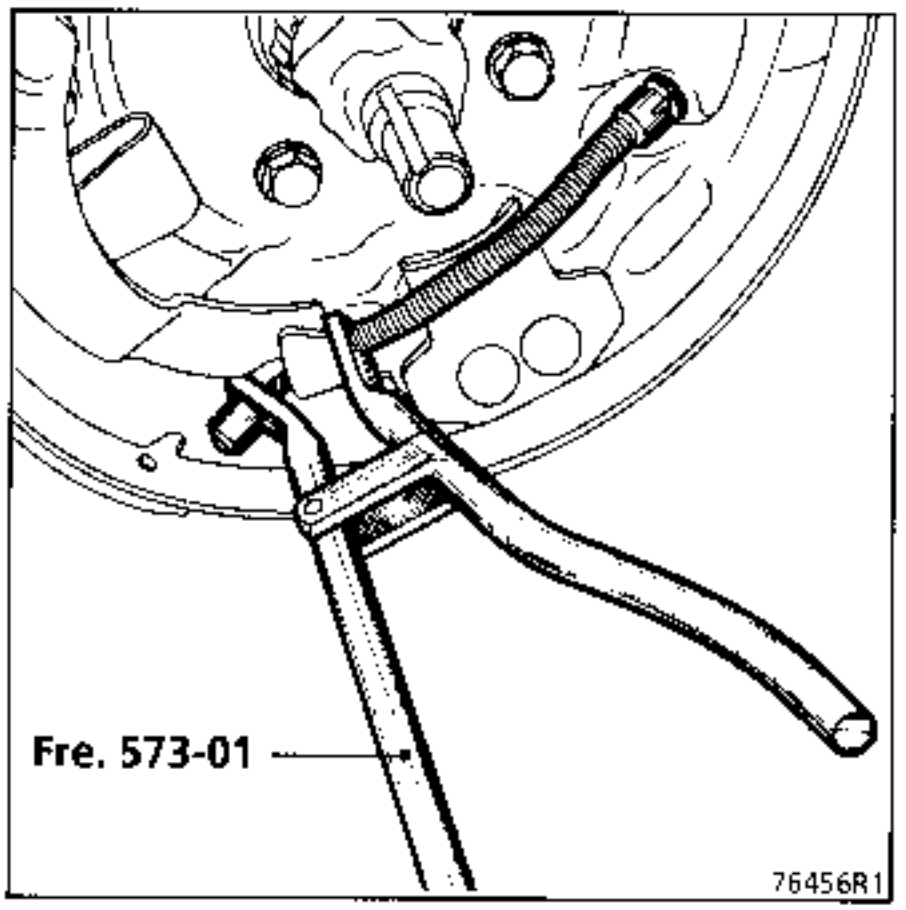
Push back the drive shaft to release tools **T.Av. 1050-02 + Rou. 604-01**.



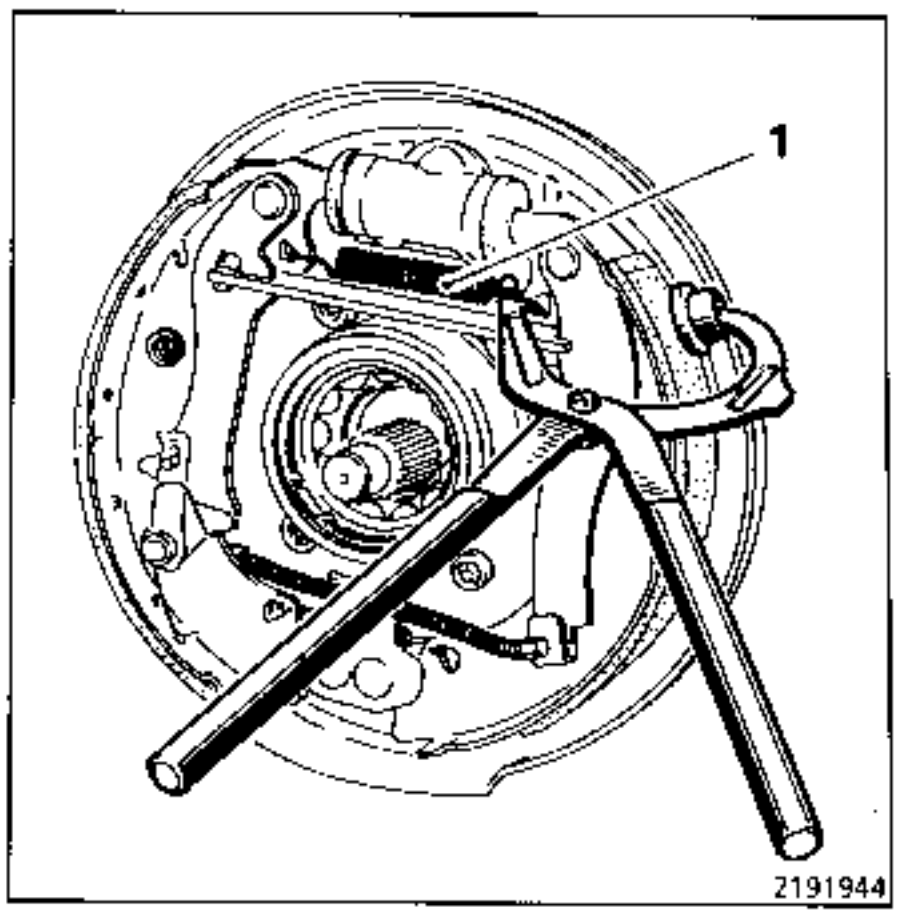
Extract hub, using tools **T.Av. 1050-02** + **M.S. 580**.



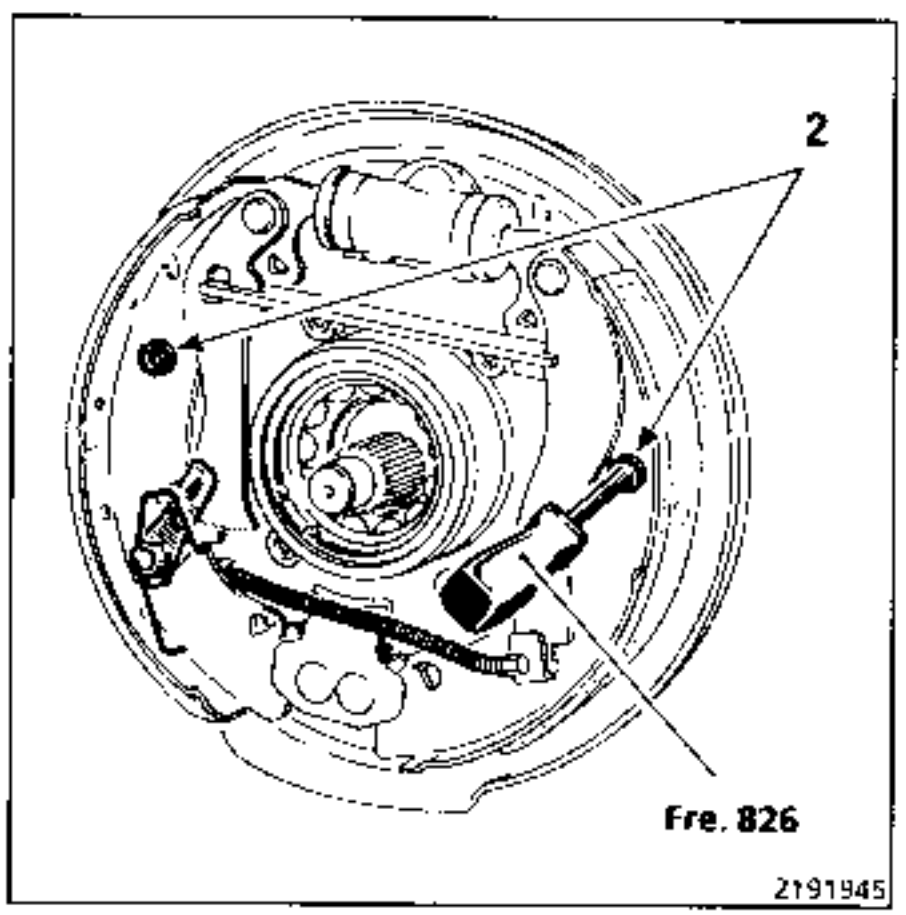
Remove:
- the handbrake cable, using tool Fre. **573-01**,



- the upper spring (1) using a brake shoe grip,

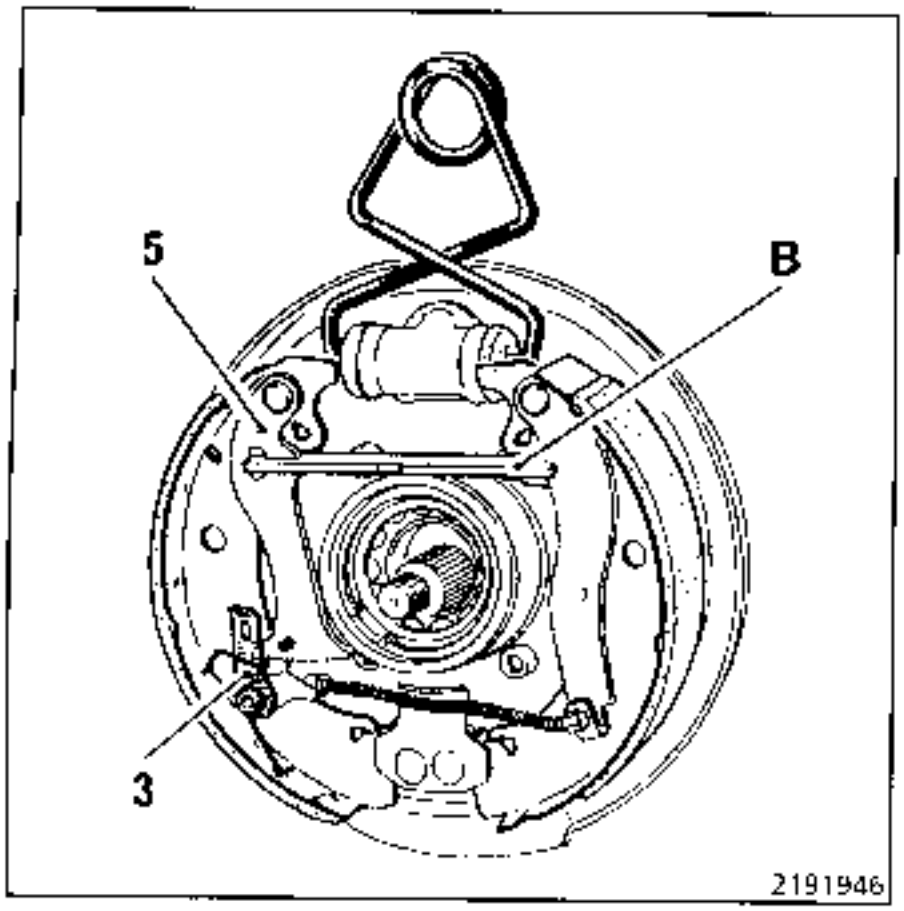


- the side retaining springs (2), using tool Fre. **826**.



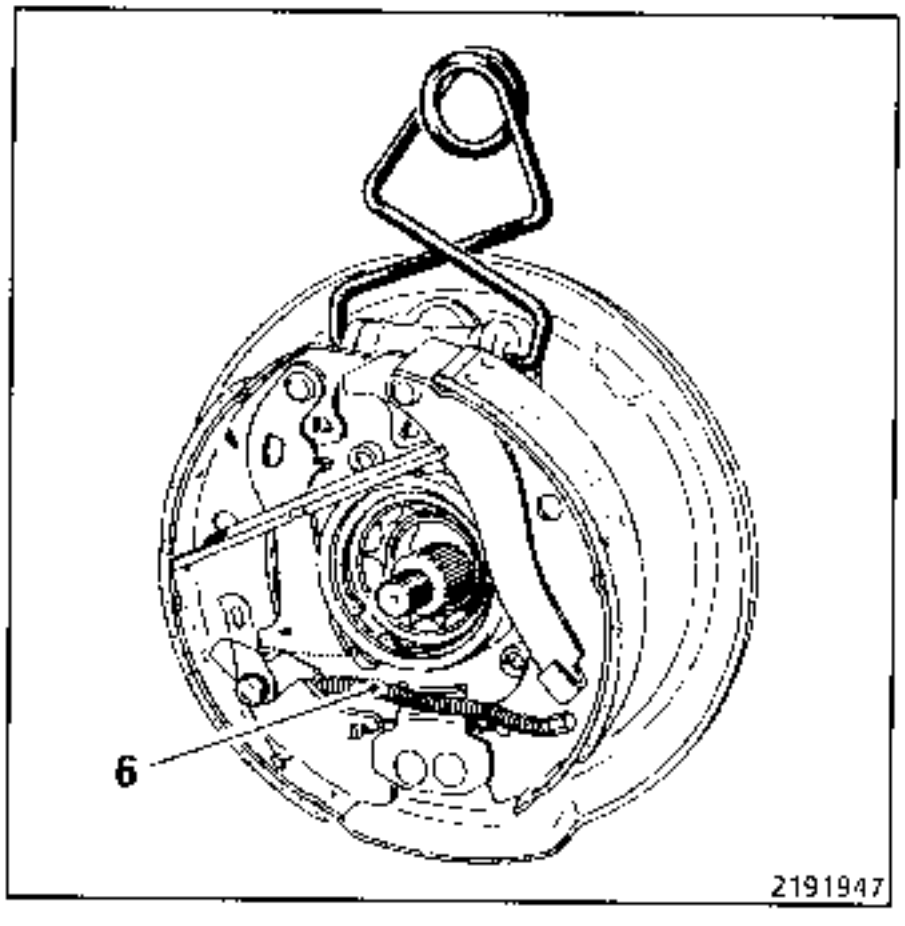
Fit a grip on the wheel cylinder pistons.

Release:
- the wear compensation system removing clip (3) from the pin and separating the shoes from the wheel cylinder,



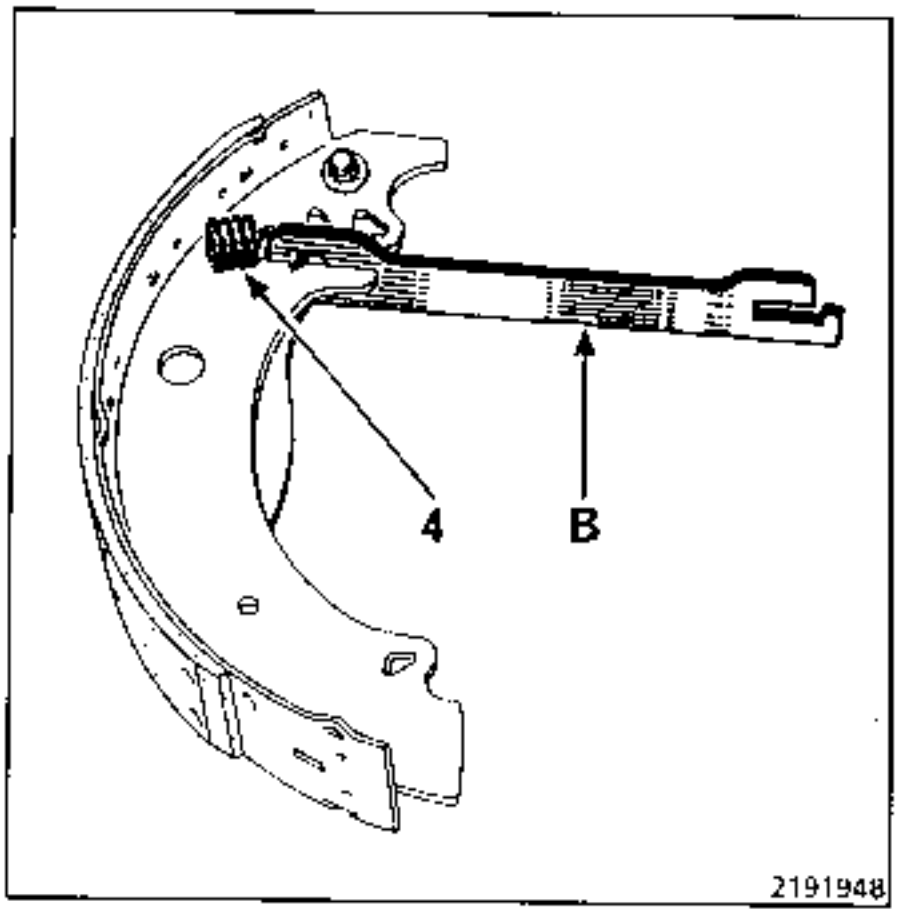
- the connecting bar (B) from the wear compensation lever (5).

Remove the two shoes including the lower spring (6).

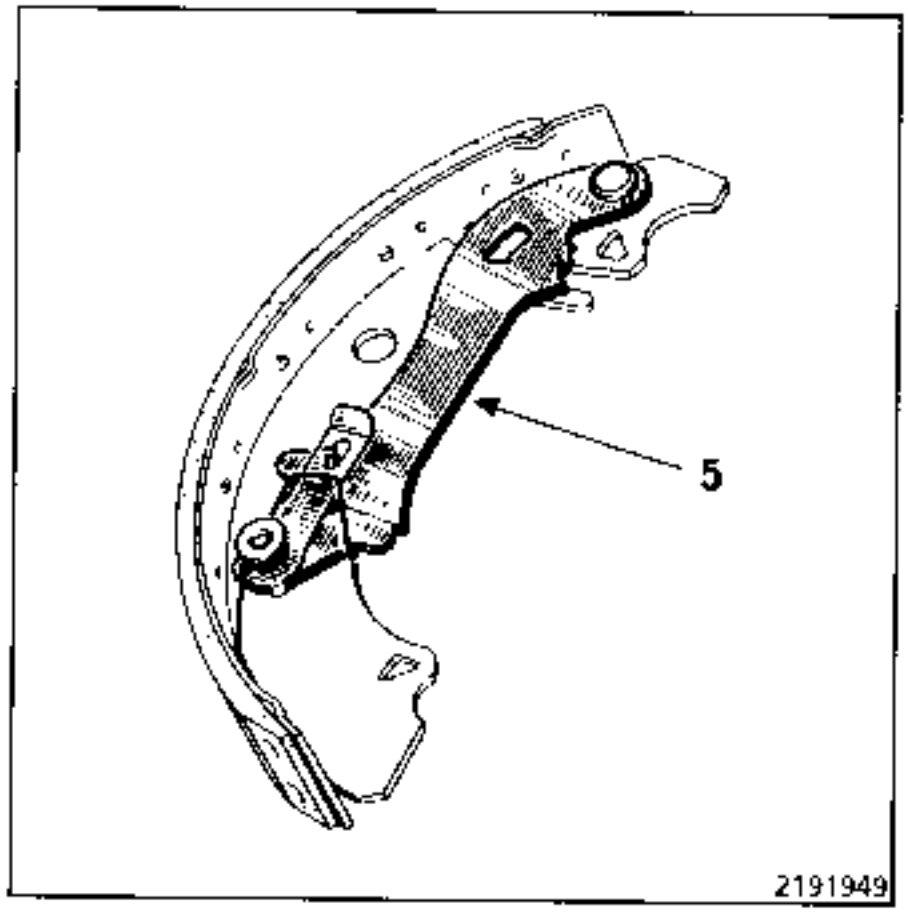


Remove:
- arm (B),
- spring (4).

from the trailing shoe.



Remove the wear compensation lever (5) from the leading shoe.



Clean the drum and flange, protecting the hub bearing.

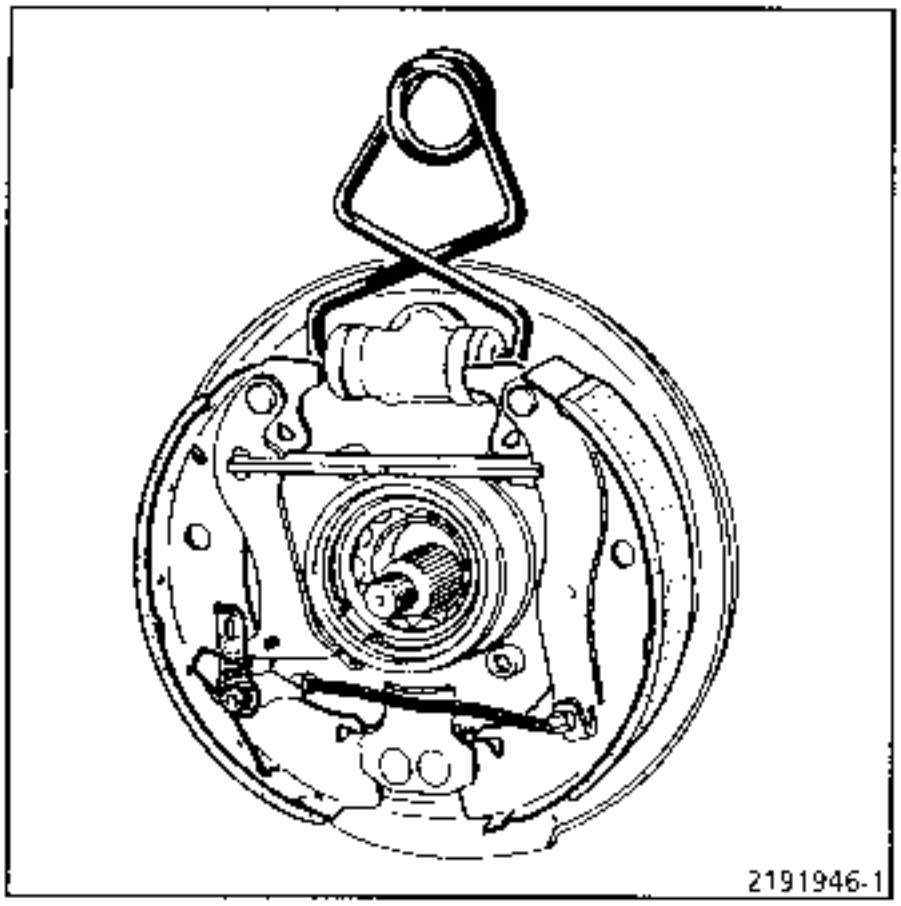
REFITTING

Install the arm (B) with the spring (4) fitted on the trailing shoe.

Reattach lever (5) to the leading shoe without engaging the toothed quadrant (C).

Connect the two shoes using the lower spring (6) and fit them on the back plate.

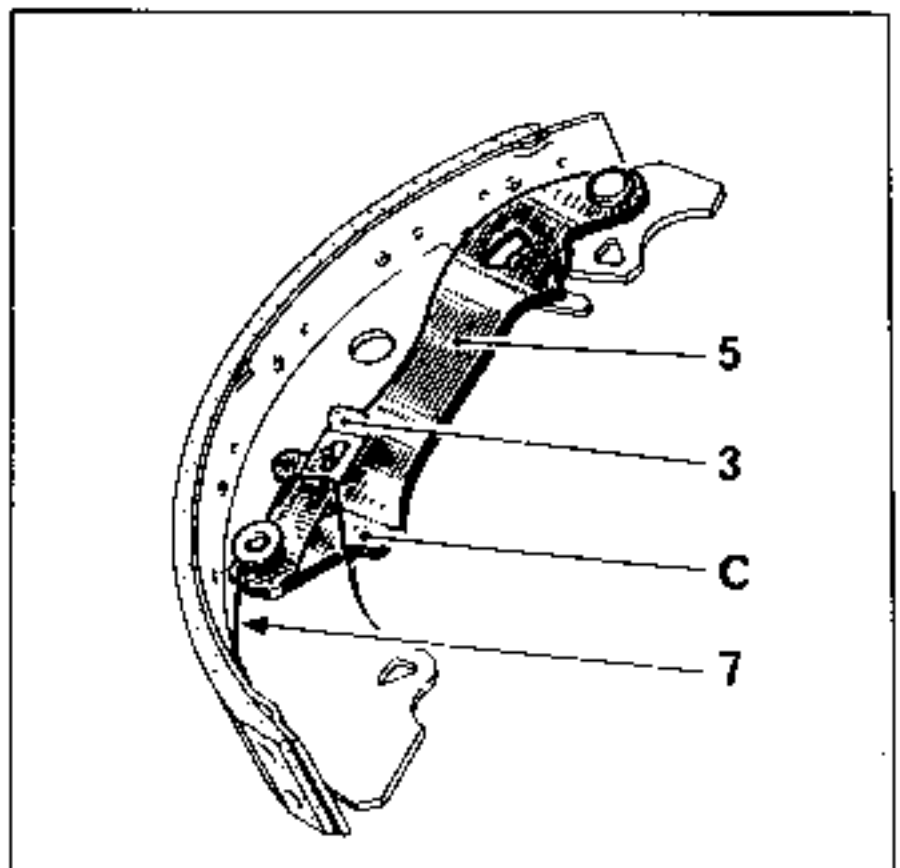
Engage the connecting bar (B) in the lever (5).



2191946-1

Remove the grips on the wheel cylinder pistons and then refit the side retaining springs (2) using tool Fre. 826.

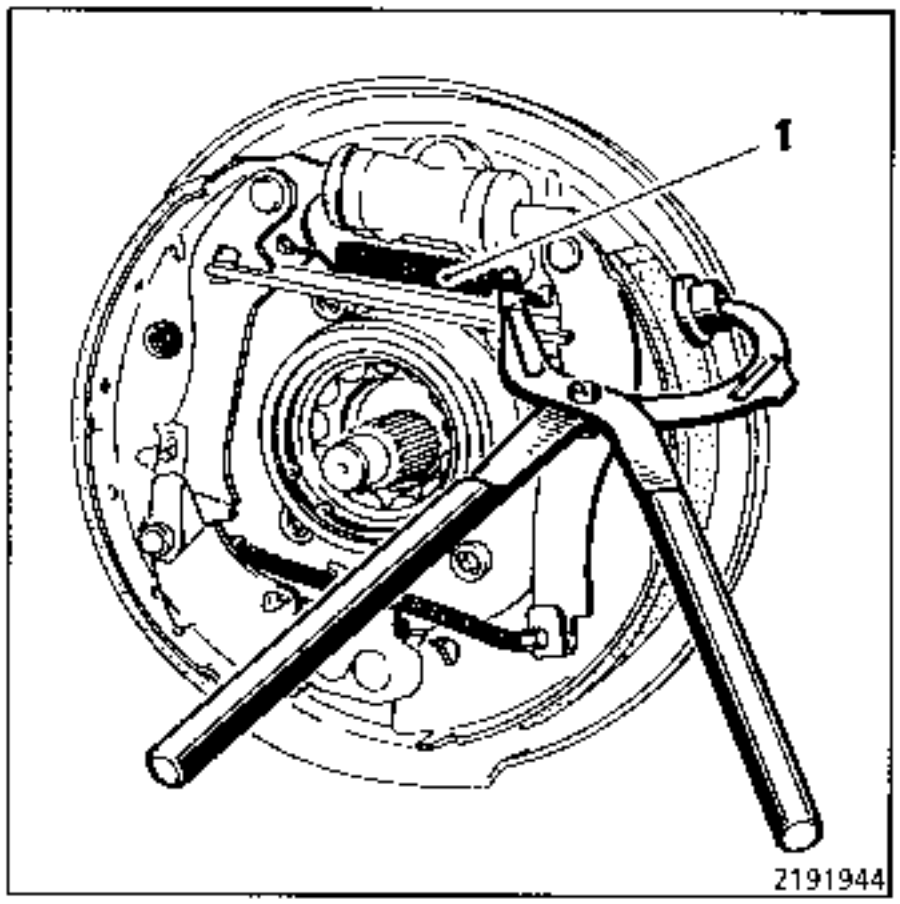
Refit toothed segment (C) in lever (5) and engage clip (3) around pin.



2191949-1

Check that the spring is correctly positioned (7).

Refit :
- the upper spring (1),

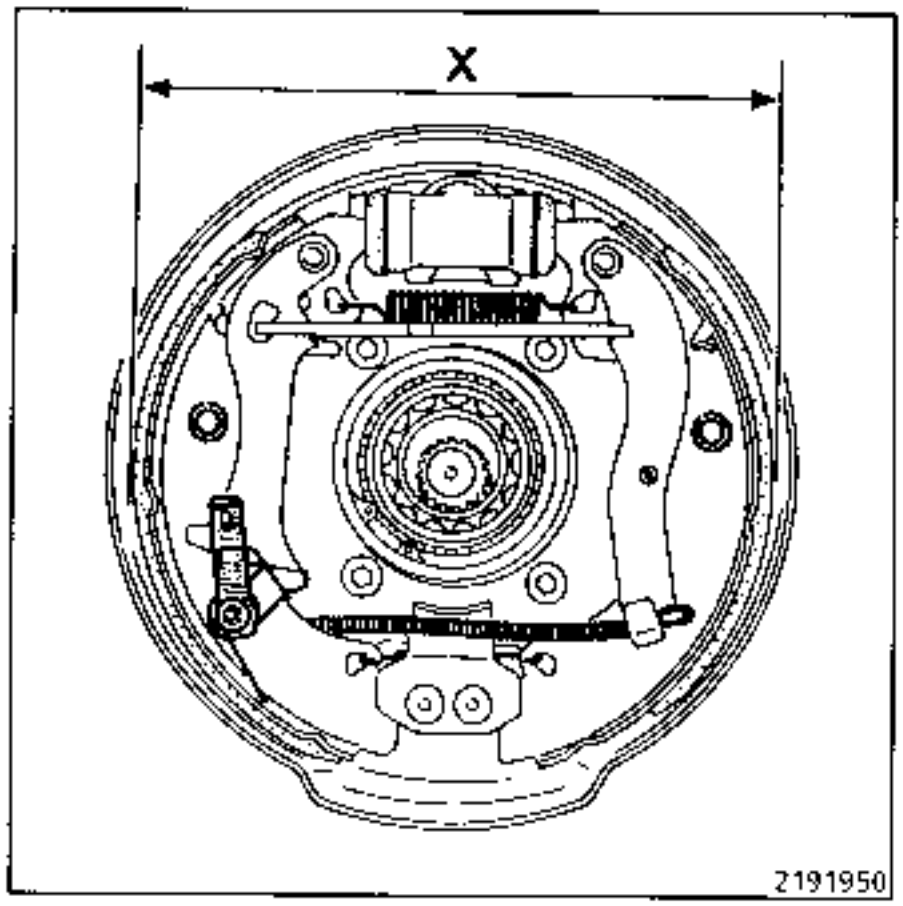


2191944

- the handbrake cable, using tool Fre. 573-01.

ADJUSTING

Using a screwdriver, adjust the diametral positions of the shoes via toothed quadrant (C) so that diameter (X) is between **254 mm** and **254.5 mm**.



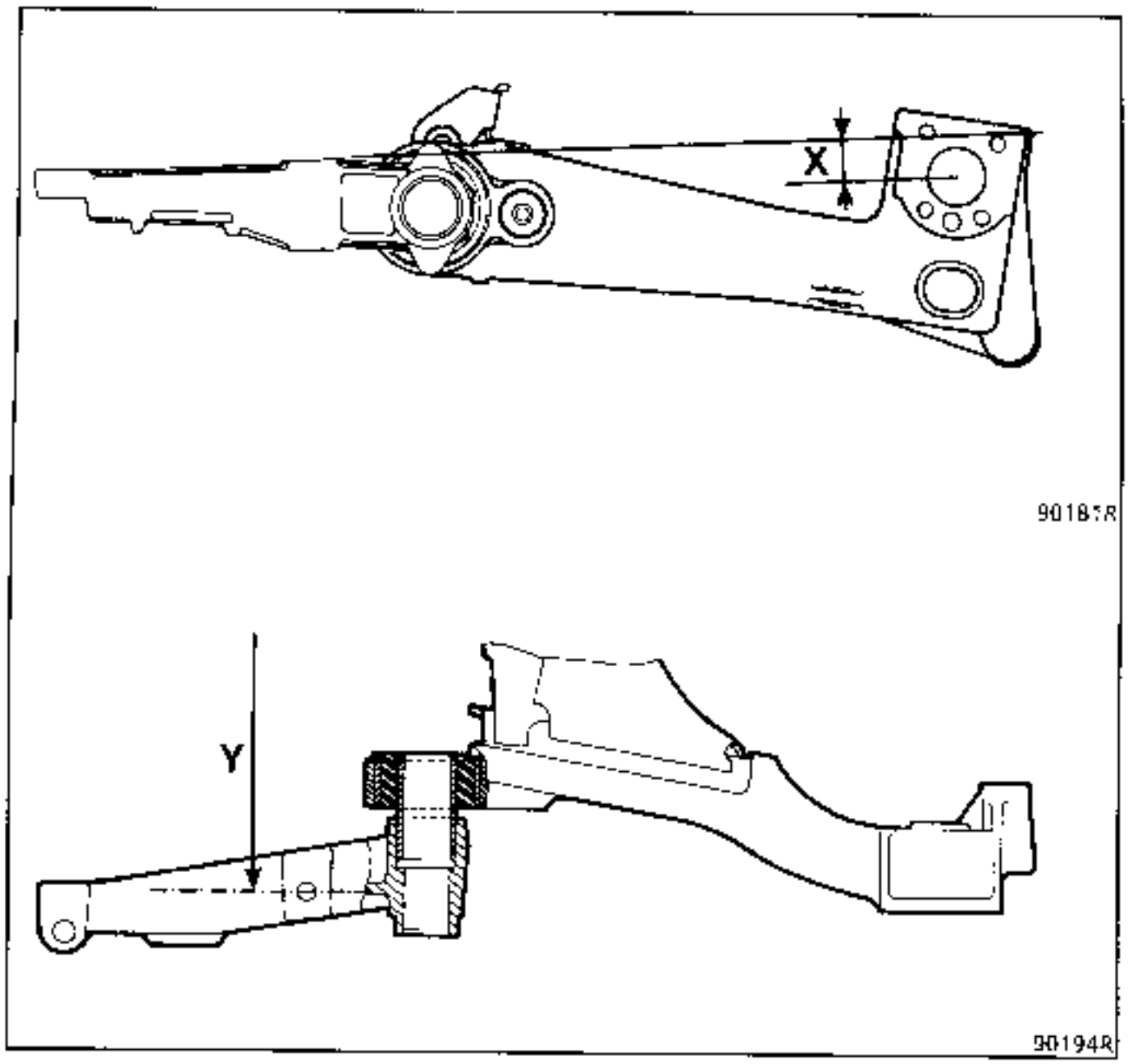
Perform the same adjustment on the other anchor plate.

Brush the drive shaft splines and coat them with **LOCTITE SCELBLOC**.

Refit:
- the hub and torque tighten using tool **Rou. 604-01**,
- the drum.

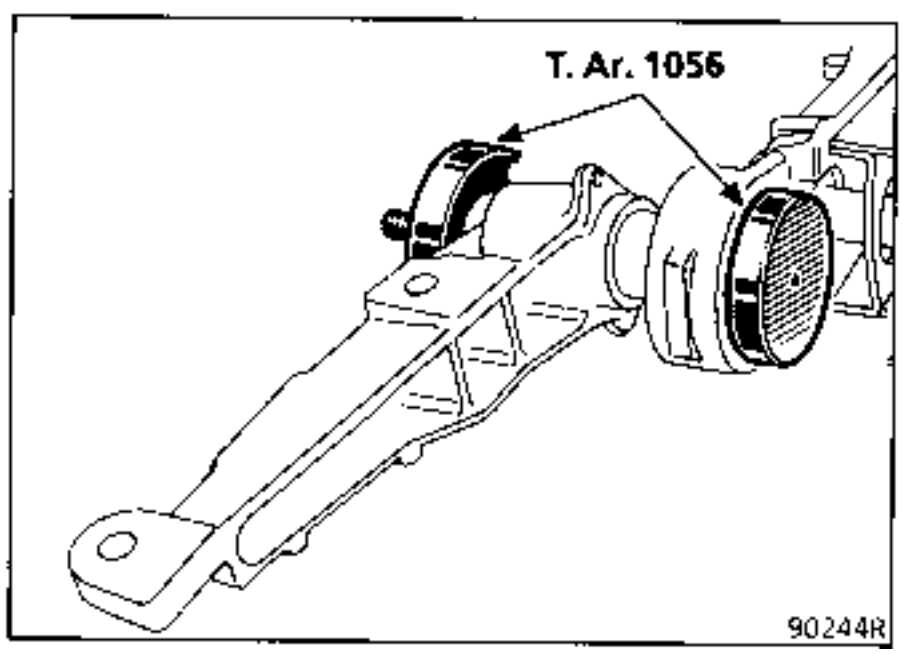
Adjust :
- **the linings by pressing down repeatedly on the brake pedal**,
- the handbrake (see relevant paragraph).

Fit in place the bearing on the bush ensuring dimension X = 24 ± 1 mm between the bearing face and stub axle shaft.



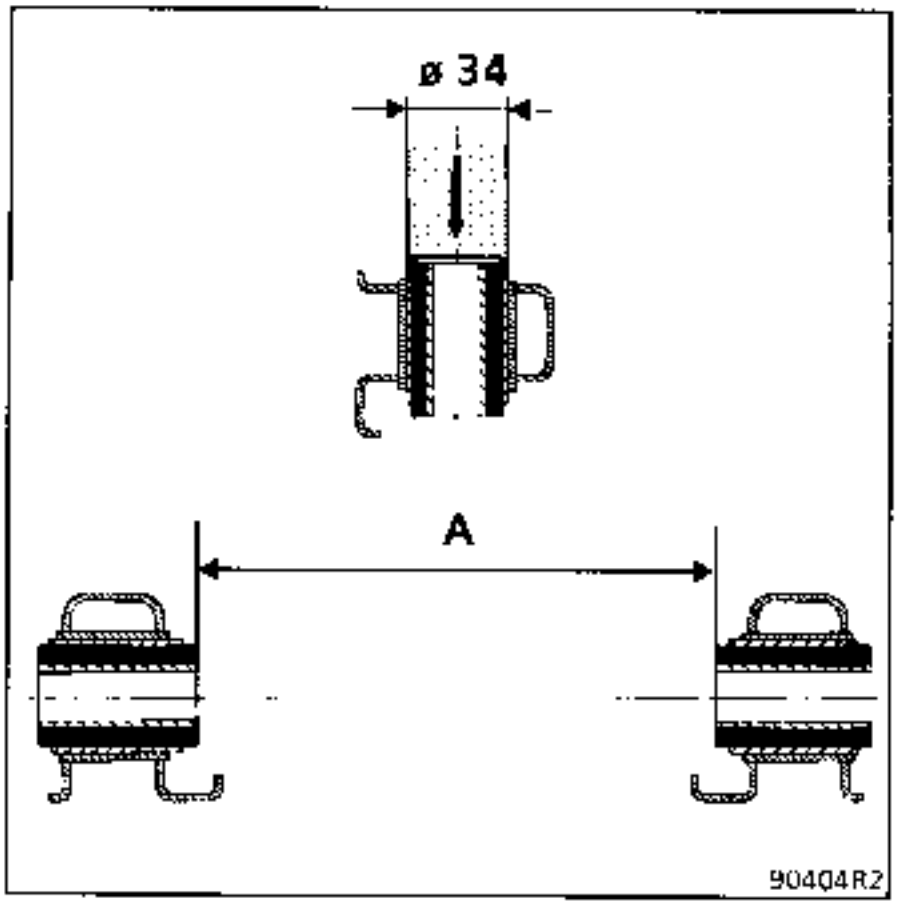
In this position, fit the bearing using components (A) and (C) from tool T.Ar. 1056 until dimension Y = 1285 ± 1 mm is obtained between the bearing centre lines

Fit the rear axle in place on the vehicle and refit the suspension bars (see relevant section).



On the press, knock out the second bush and proceed in the manner as above in order to retain dimension A = 262 ± 0.5 mm.

NOTE : The inner and outer bushes of the swing arms are not identical (please see the PR for the vehicle in question).



REFITTING

Refit the swing arm to the vehicle, positioning the cam bolt so that it is aligned with the markings made on removal.

Place a jack under the arm and fit in place:
- the spring (see relevant section),
- the drive shaft (see relevant section),
- the handbrake cable,
- the brake drum.

With the vehicle on its wheels, torque tighten the following:
- the mounting securing the arm to the cross member,
- the anti-roll bar link arm mounting,
- the shock absorber base.

Bleed the brake system; check and if necessary adjust the parallelism.

The tyres are of the **Tubeless** type.

Tyre inflation pressures must be checked when cold. During normal running, pressures may increase by **0.2** to **0.3 bars**.

If a check has to be made when the tyres are hot, take into account this increase in pressure and **NEVER** deflate the tyre.

For **4 x 4** vehicles, it is essential that the tyres are identical (circumference the same length).

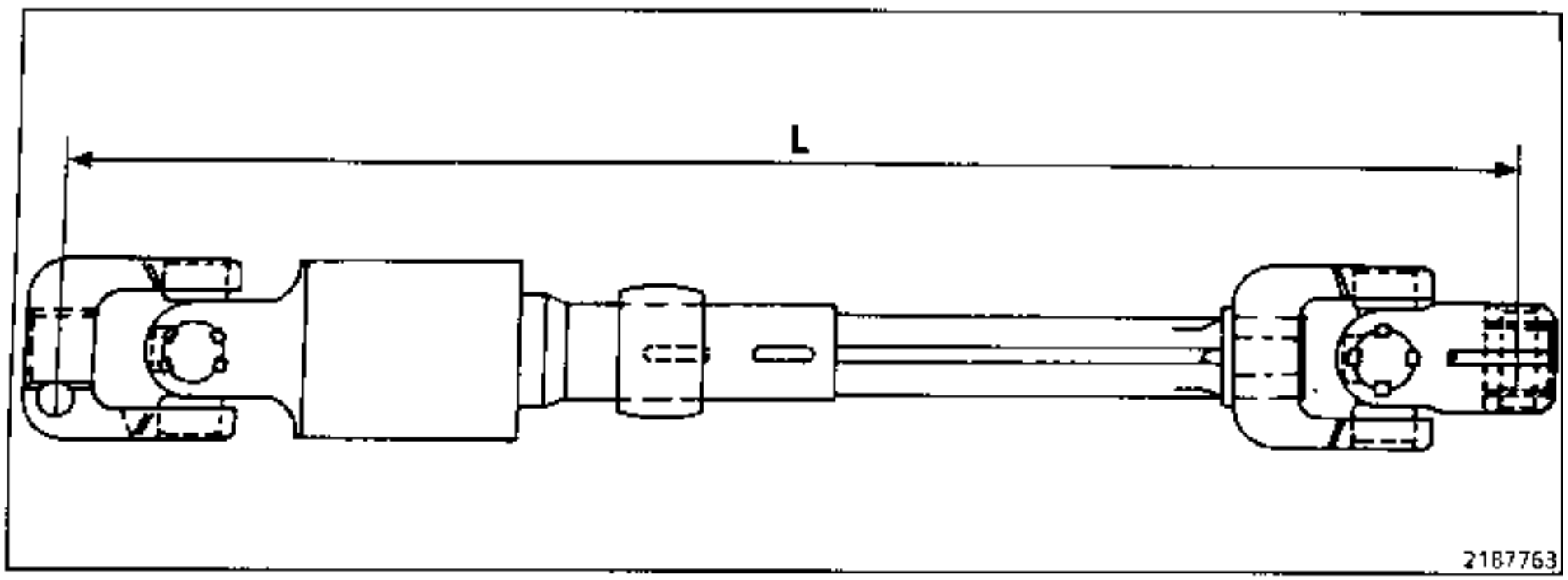
Type	Rim	Rim run-out (mm)	Wheel bolts tightening torque in (daN.m)	Tyres	Inflation pressure (bars)	
					FRONT	REAR
B481 B48D L481 L48D	5 x 13 5 1/2 x 13	1,2	9	155R13T 175/70R13T	2.0	2.2
L481 D.A.I.	5 x 13			165/80R13T		
B482 B484 L482 L484	5 1/2 x 13 5 1/2 x 14			175/70R13H 175/70R13T 175/65R14H 175/65R14T		
B483 B48C L489 L483 L48C	5 1/2 x 14			185/65R14H	2.3	2.3
B48K L48K						
L485 L48L	6 1/2 x 15		10	195/55R15V 195/55R15Z	2.5	2.3
B486 B48V L486 L48V	5 1/2 x 13 5 1/2 x 14		9	175/70R13T 175/65R14T	2.3	2.3
L48A B48O B488 B48A L48O L488 B48I B48P B487 L48I L48P L487 B48W L48W	5 1/2 x 13 5 1/2 x 14			185/70R13T 185/65R14T		
B48E L48N L48E	5 1/2 x 13 5 1/2 x 14			175/70R13H 175/65R14H	2.0	2.2
B48F L48F	5 1/2 x 13 5 1/2 x 14			155R13T 175/70R13T 175/65R14T		
B48J L48J	5 x 13 5 1/2 x 13 5 1/2 x 14			165/80R13T 175/70R13T 175/65R14T		
L48M	5 x 13 5 1/2 x 13 5 1/2 x 14			155R13T 175/70R13T 175/65R14T		
B48H B480 L48H L480					2.3	2.3
B48R 4 x 4 L48R 4 x 4 B48 Y 4 x 4 L48Y 4 x 4	6 1/2 x 15			175/70R13T	2.0	2.6

Type	Rim	Rim run-out (mm)	Wheel bolts tightening torque in (daN.m)	Tyres	Inflation pressure (bars)	
					FRONT	REAR
K481	5 1/2 x 13	1.2	9	175/70R14T	2.0	2.6
K482 K484	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T 175/65R14H		
K483 K489 K48K K48B K48C	5 1/2 x 14			185/65R14H	2.3	2.6
K486 K48V	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T		
K487 K488 K48W K48A K48I K48O K48P	5 12 x 14			185/65R14T		
K483 4 x 4 K486 4 x 4 K48K 4 x 4 K48V 4 x 4	5 1/2 x 14			185/65R14H		
K48E K48F	5 1/2 x 14			175/65R14T	2.0	2.6
K48J	5 x 13 5 1/2 x 14			165/80R13T 175/65R14T		
K48M	5 1/2 x 13			175/70R13H		
K48N K48H	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14H 175/65R14T	2.3	2.6
S481 S482	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T	2.0	2.6
S486 S48H S48V	5 1/2 x 13 5 1/2 x 14			175/70R13T 175/65R14T	2.3	2.6
B48Q L48Q B48Y L48Y B48R L48R	6 1/2 x 15		10	185/55R15V	2.3	2.3
K48R	6 1/2 x 15	1.2	10	185/55R15V	2.5	2.5

Add 0.1 bar for vehicles with automatic transmission.

CHECKING

When changing the steering, if the splines cannot be fully engaged, check the shaft length and change it if it is incorrect.



Transverse engine

Conventional steering, righthand drive and lefthand drive :

L = 456.5 ± 1 mm

Power-assisted steering, righthand drive and lefthand drive :

L = 426.5 ± 1 mm

In-line engine

Conventional and power-assisted steering, righthand drive and lefthand drive :

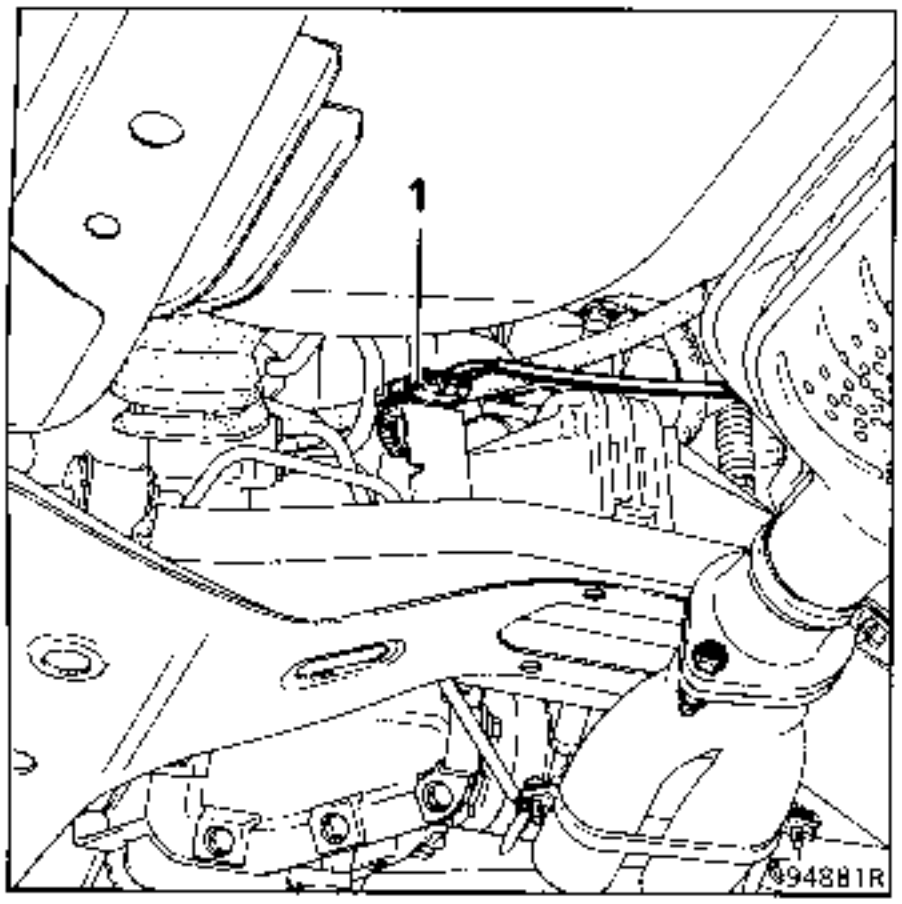
L = 307.5 ± 1 mm

Disconnect the light from the repeater.

Under the vehicle :

Disconnect the oxygen sensor connector (1).

Remove the two bolts securing the flange. Save the seal to be used again.



Remove the protective cover (6).

Disconnect the ends of the cable.

Remove:

- the four retaining nuts on the control unit and take it out to move it downwards,
- the cable retaining clips.

REFITTING - ADJUSTING

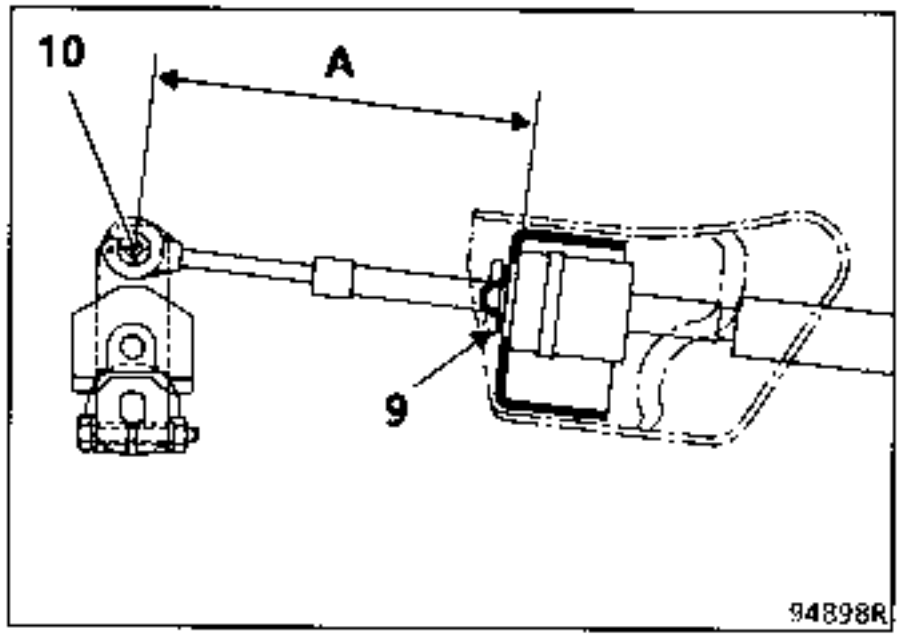
The automatic transmission must be in position (D).

Automatic transmission :

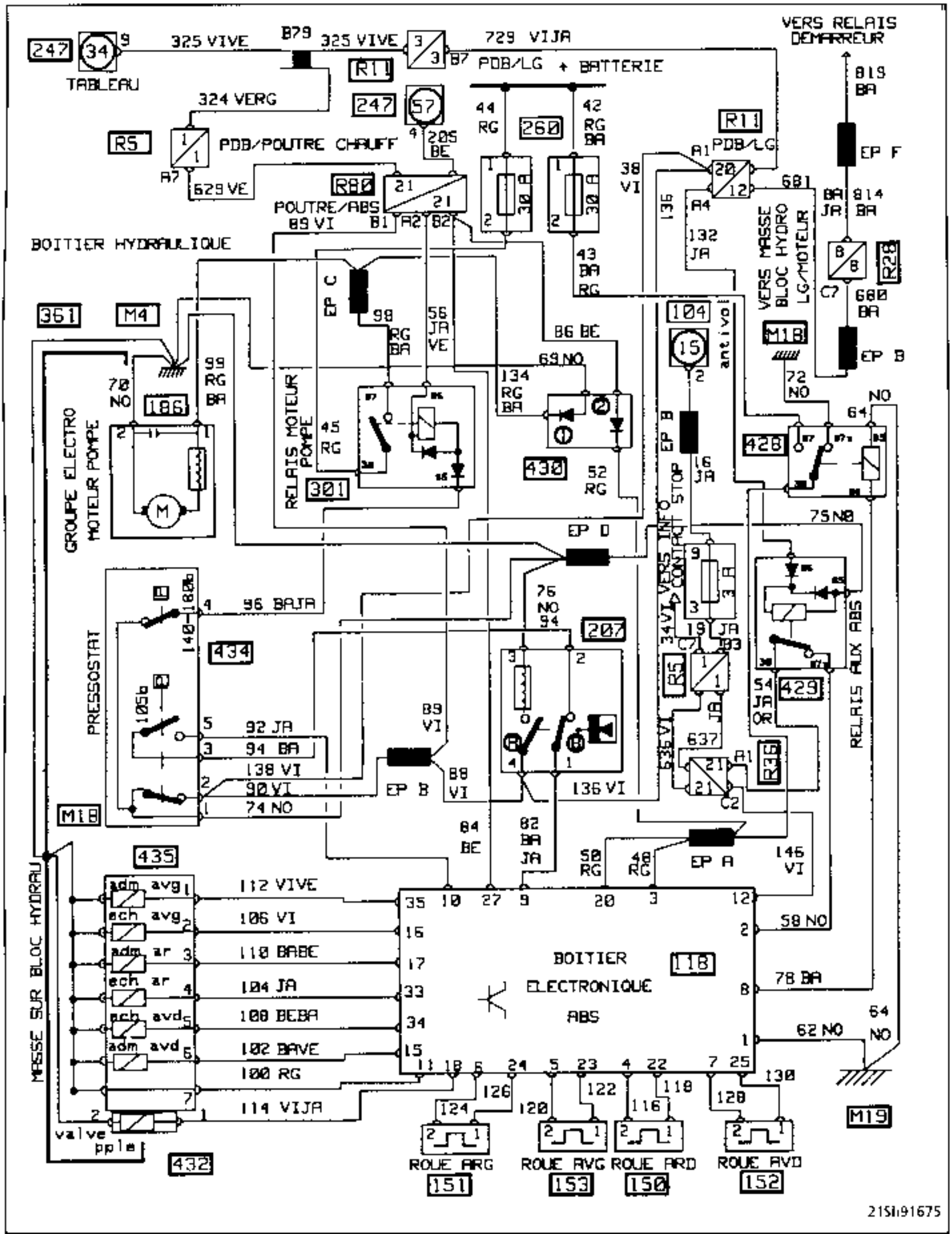
Before refitting the cable, check dimension (A) between surface where the cable makes contact with the sheath stop (9) and the locking ball joint (10).

A = 131 mm

If necessary, slacken off screw (12) to obtain this dimension.



OPERATING DIAGRAM



KEY TO WIRING DIAGRAM

34 : Brake fluid level warning light

57 : ABS voltage

104 : Anti-theft switch

118 : ABS computer

150 : Rear right hand wheel sensor

151 : Rear left-hand wheel sensor

152 : Front right-hand wheel sensor

153 : Front left-hand wheel sensor

186 : ABS electric pump assembly

207 : Nivocode sensor

247 : Instrument panel

260 : ABS fuse (30 amps)

301 : ABS pump motor relay

361 : ABS hydraulic assembly

428 : ABS main relay

429 : ABS auxiliary relay

430 : ABS diode casing

432 : Main valve

434 : ABS cut-off pressostat

435 : ABS solenoid valve unit

M4 : Bodywork earth

M18 : ABS earth

M19 : ABS electronic earth

R5 : Junction block: dashboard to heater bulkhead

R11 : Dashboard to left-hand side member

R28 : Junction block: engine to right-hand side member

R36 : Junction block: ABS to dashboard

R80 : Junction block: heater bulkhead to ABS

Special points:

Renault 21, L48 5RYL and B48 RY vehicles with permanent 4-wheel drive and Teves ABS are equipped with a fault finding system incorporated in the computer.

The incident codes are displayed by the ABS warning light on the instrument panel flashing.

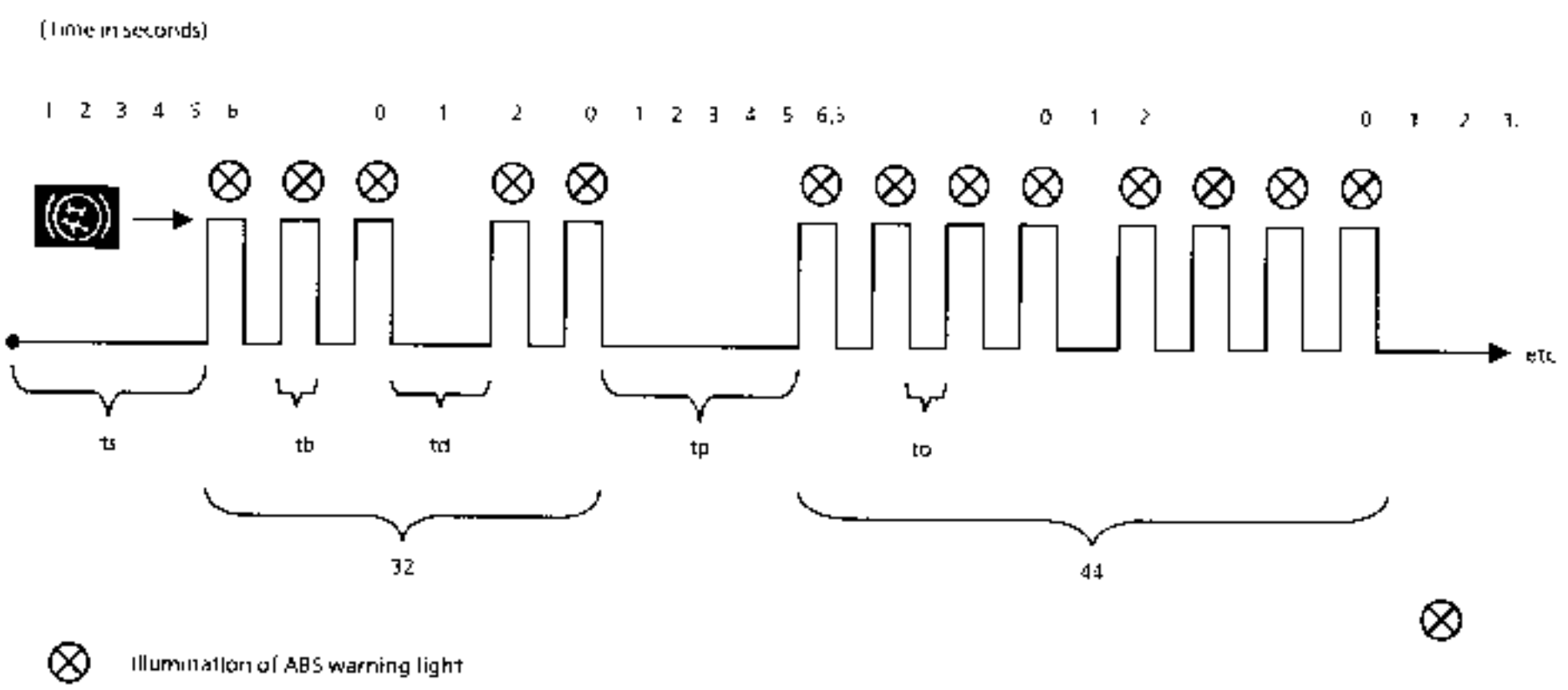
To start this light flashing, a shunt must be produced between tracks **2** and **11** of the diagnostic socket **225**, then switch on the ignition; if incidents have been stored, the flashing sequence will start **6 seconds** later.

DIAGNOSIS

GENERAL

The codes consist of two figures: tens and units (for example: **32** and **44**).

Identifying codes warning lights flashing.



Lights flash for:

ts 6.0 seconds : Start time after ignition switched on.
tb 0.5 seconds : Duration of pulses (warning light illuminates) .
td 2.0 seconds : Interval between tens and units.
tp 6.5 seconds : Pause between codes.
to 0.5 seconds : Interval between two flashes .

The monitoring system detects incidents and intermittent defects either during the normal operation of the ABS system or during a reading and fault finding procedure. This information is then stored and saved in a memory which **is not erased when the electrical supply is interrupted** (see following pages).

DIAGNOSIS

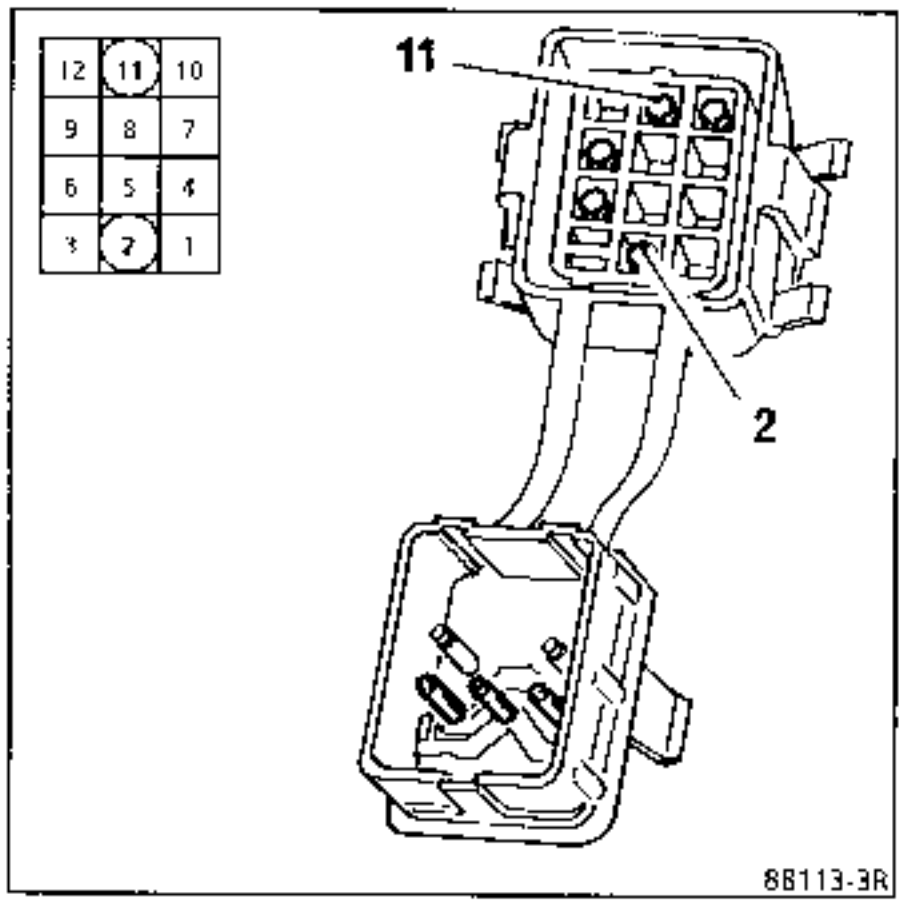
CODE READING PROCEDURE

1 - Have a pen and paper available.

2 - Vehicle stopped, ignition off.

3 - Make a shunt with the two "PACKARD" terminals and a lead approx. 8 cm. in length.

4 - On diagnostic socket 225, connect tracks 2 and 11 with this shunt shunt (this earths track 11).



5 - Switch on the ignition and watch warning light .

6 - After 6 seconds, the flashing sequence for the first code starts.

Watch warning light flash, count the pulses and write down the 2-figure number obtained. Each time there is a 6.5 second pause between the codes flashing to enable you to note down the number.

After each pause, warning light indicates the following code number and so on until all the codes stored have been read, which is signalled by the warning light staying extinguished.

7 - To conclude the reading procedure, disconnect the shunt from diagnostic socket 225 and switch off the ignition.

8 - Compare the codes noted with the reference list below and perform the additional checks and any repairs indicated.

DIAGNOSIS

ATTENTION

If the codes have not all been noted down correctly, the reading procedure may be repeated. Nevertheless, avoid travelling with the vehicle at more than 18 mph (30 km/h) between two reading procedures so as not to erase the data stored in the computer.

EXCEPTIONS TO THE NORMAL READING PROCEDURE

1 - If warning light  illuminates for 1.7 seconds and then goes out permanently after the reading procedure has started, no incident/defect has been recorded in the memory and the system is operating correctly.

2 - If a high priority solenoid valve incident occurs during the reading procedure, the monitor is made aware of this incident and stops after displaying the first code (if this was a code indicating a solenoid valve incident, this data will be overwritten by the new solenoid valve incident code). If a solenoid valve incident occurs later during the continuous code sequence, the monitor stops but only when it has finished displaying the current code. In both cases, the solenoid valve incident which has occurred must be remedied and it is recommended that the complete reading procedure be repeated from the beginning.

3 - If the car is driven during the fault-finding reading procedure, the monitor stops as soon as the vehicle speed exceeds 5 mph (8 km/h) or if three wheels have rotated at more than 5 mph (8 km/h). This may lead to incorrect interpretation of the codes interrupted during the reading procedure.

ERASING THE COMPUTER MEMORY

The ABS system monitor has an automatic memory cancelling function. Erasure is triggered in two stages as follows:

1 - The reading procedure must reach its conclusion in the normal manner, i.e. all the codes stored have been displayed. To prepare the computer for erasure, a normal reading procedure merely has to be triggered.

2 - Then remove the shunt from the diagnostic socket, switch on the ignition and drive the vehicle at a speed above 19 mph (30 km/h). This will erase all the information stored and the car will return to normal ABS operating mode.

DIAGNOSIS

LIST OF INCIDENT CODES : High priority incidents

CODE (1)	COMPONENT	INCIDENT	REPAIR (2)
11	Harness.	Electrical interference.	Check harness correctly fitted. Replace computer.
12	Computer.	Faulty.	
21	Main solenoid valve.	Harness solenoid valve or power transistor in computer incident.	Check solenoid valve indicated, its harness and connector terminals (cut, shorting). If correct, change computer.
22	Front left-hand inlet solenoid valve.		
23	Front left-hand outlet solenoid valve.		
24	Front right-hand outlet solenoid valve.		
25	Front right-hand outlet solenoid valve.		
26	Rear inlet solenoid valve.		
27	Rear outlet solenoid valve.		
31	Front left-hand sensor	Winding or sensor cable cut, connector open.	Check sensor indicated, its harness and connector (open circuit or shorting). If correct, change computer.
32	Front right-hand sensor		
33	Rear right-hand sensor		
34	Rear left-hand sensor		
35	Front left-hand sensor.	Sensor winding or cable circuit open or intermittent shorting. Air gap between sensor and target not to specification. Sensor incident detected by continuity test (open circuit or shorting) of wheel speed at speeds above 25 mph (40 km/h).	Check sensor indicated, its harness and connector. Check sensor/target air gap at several points on the sensor target. Check sensor earth lead, computer earthing, hub vibration and sensor mounting.
36	Front right-hand sensor.		
37	Rear right-hand sensor.		
38	Rear left-hand sensor.		

DIAGNOSIS

LIST OF INCIDENT CODES : High priority incidents (continued)

CODE (1)	ELEMENT	INCIDENT	REPARATION (2)
41 42 43 44	Front left-hand sensor. Front right-hand sensor. Rear right-hand sensor. Rear left-hand sensor.	No sensor signal, sensor/target air gap too large. This fault is detected by comparing the wheel speeds.	Check that sensor target is fitted and check air gap.
51 52 53 54	Front left-hand outlet solenoid valve. Front right-hand outlet solenoid valve. Rear outlet solenoid valve. (Identical to 53).	Drop in pressure and wheels reacting at speeds greater than 25 mph (40 km/h). Defect resulting from incorrect hydraulic operation of valve.	Check sensor leads corresponding to solenoid valve and computer earth.
55 56 57 58	Front left-hand sensor. Front right-hand sensor. Rear right-hand sensor. Rear left-hand sensor.	Sensor signal absent long time (long-term monitoring of duration of test).	Check position of sensor target fitted and air gap (sensor detached).
61	Nivocode sensor. Pressostat.	Earth shorting on leakage current between battery positive terminal and cut-off pressostat (434) or (207).	Check nivocode sensor, pressostat and their harness.
65	Longitudinal acceleration sensor.	Circuit open or shorting.	Check sensor, its harness, connector and mounting.

DIAGNOSIS

LIST OF INCIDENT CODES : Low priority incidents

CODE (1)	COMPONENT	INCIDENT	REPAIR (2)
71 72 73 74	Front left-hand sensor Front right-hand sensor Rear right-hand sensor Rear left-hand sensor	Drop in pressure and wheels reacting at speeds of less than 25 mph (40 km/h). Long-term detection of electrical interference.	Check earth lead of sensor indicated, computer earth and solenoid valve corresponding to sensor.
75 76 77 78	Front left-hand sensor Front right-hand sensor Rear right-hand sensor Rear left-hand sensor	Hub vibrating, excessive play or air gap too small. Sensor incident detected by checking speed continuity of wheel at speeds less than 25 mph (40 km/h).	Check earth lead of sensor indicated, computer earth hub vibrations, sensor mounting, its air gap and harness.

1 - If warning light  remains permanently illuminated without indicating an incident code, it is likely that the computer is faulty. Check first of all the electrical supply, if this is correct, replace the computer.

2 - If the recommended repairs are not successful, replace the computer.

COMMENT:

Codes 71 and 78 indicate low priority incidents which only cause temporary and/or partial malfunctions. It is possible that the driver is not even aware of these incidents but they are nevertheless stored in the computer memory.

DIAGNOSIS

WARNING LIGHT  indication

WITHOUT PRODUCING AN INCIDENT CODE

The on-board fault finding system can only check incidents or errors producing an electrical signal. Processing of the error code is triggered by the input of the fault finding triggering process and is displayed by warning light  .

In order to avoid incorrect fault finding results, all the components concerned must operate correctly.

Cases when the lighting-up of the warning light does not correspond to an error code are listed below :

1 - ALARM COMMUTATOR TEST CYCLE

When the ignition has been switched on warning light  illuminates for approximately **1.7 seconds**, then flashes for approximately **1 second** to check the connection to the level and pressure alarm commutators.

In this case, warning light  continues to flash, this connection to the commutators has been interrupted or is shorting with the vehicle earth.

2 - INCORRECT ASSEMBLY

If the computer is not fitted correctly to the main connector (or if the connection is faulty), the main relay stays on the normally closed contact while the ignition is switched on.

In this case, warning light  illuminates permanently via the normally closed contact of main relay **428**.

3 - COMPUTER INCIDENTS

3.1 Incident detected by internal time check

Some hardware errors cause the computer to be deactivated after an internally set time period has elapsed. Warning light  illuminates simultaneously.

As this action cuts off the main computer feed, it can neither record nor output the error codes.

3.2 Short circuit when fault finding trigger instruction input

If the fault finding trigger input is earthed (shunt tracks **2** to **11**) via the diagnostic socket, the computer switches to reading the error codes stored when the ignition is switched on and if one or more error code(s) has (have) been stored in the memory. If the vehicle accelerates and reaches a speed of 5 mph (8 km/h) whilst there is still a short circuit on the trigger input earth, the computer is deactivated and warning light  illuminates.

DIAGNOSIS

3.3 Warning light connection defects

3.3.1 Warning light illuminates if there is a short circuit on its earth lead, without however, impeding the operation of the anti-lock braking system. The computer cannot detect this short circuit.

3.3.2 Warning light feed circuit faulty

If there is a defect on the feed circuit inside the computer, the warning light will either be illuminated or permanently extinguished depending on the type of internal defect.

3.4 Warning light incorrectly activated (without incident detected)

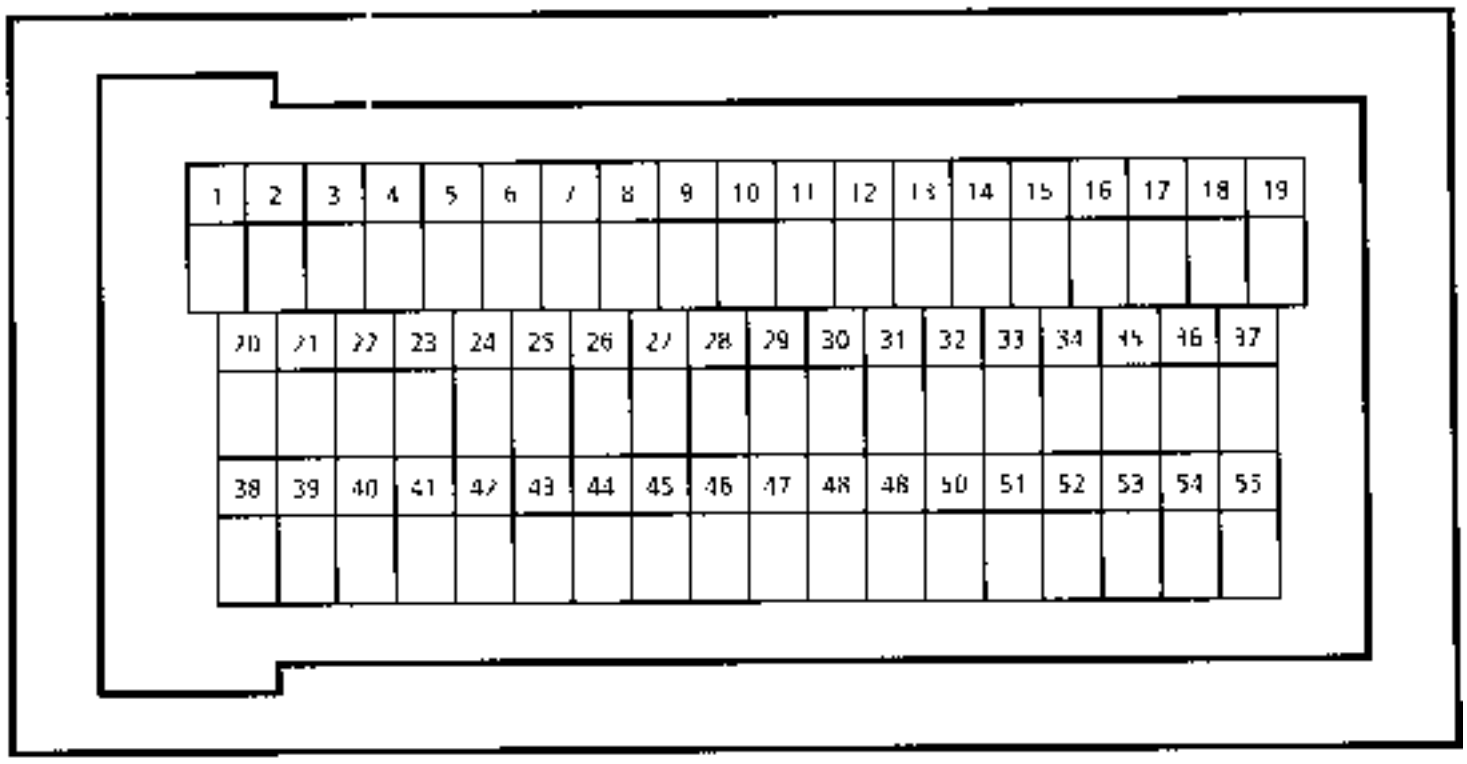
3.4.1 If there are intermittent transitory interruptions on the contacts or feed wires of warning light , it may flash erratically.

3.4.2 If warning light bulb is burnt out or damaged in any way, it is impossible for the data contained in the computer to be displayed.

ELECTRICAL TESTS TO BE PERFORMED ACCORDING TO DIAGNOSTIC CODE

Connector (118)

The tests are performed at the terminal end (the drawings shows the harness end).



1 - SWITCHES OPEN

Connector (118)

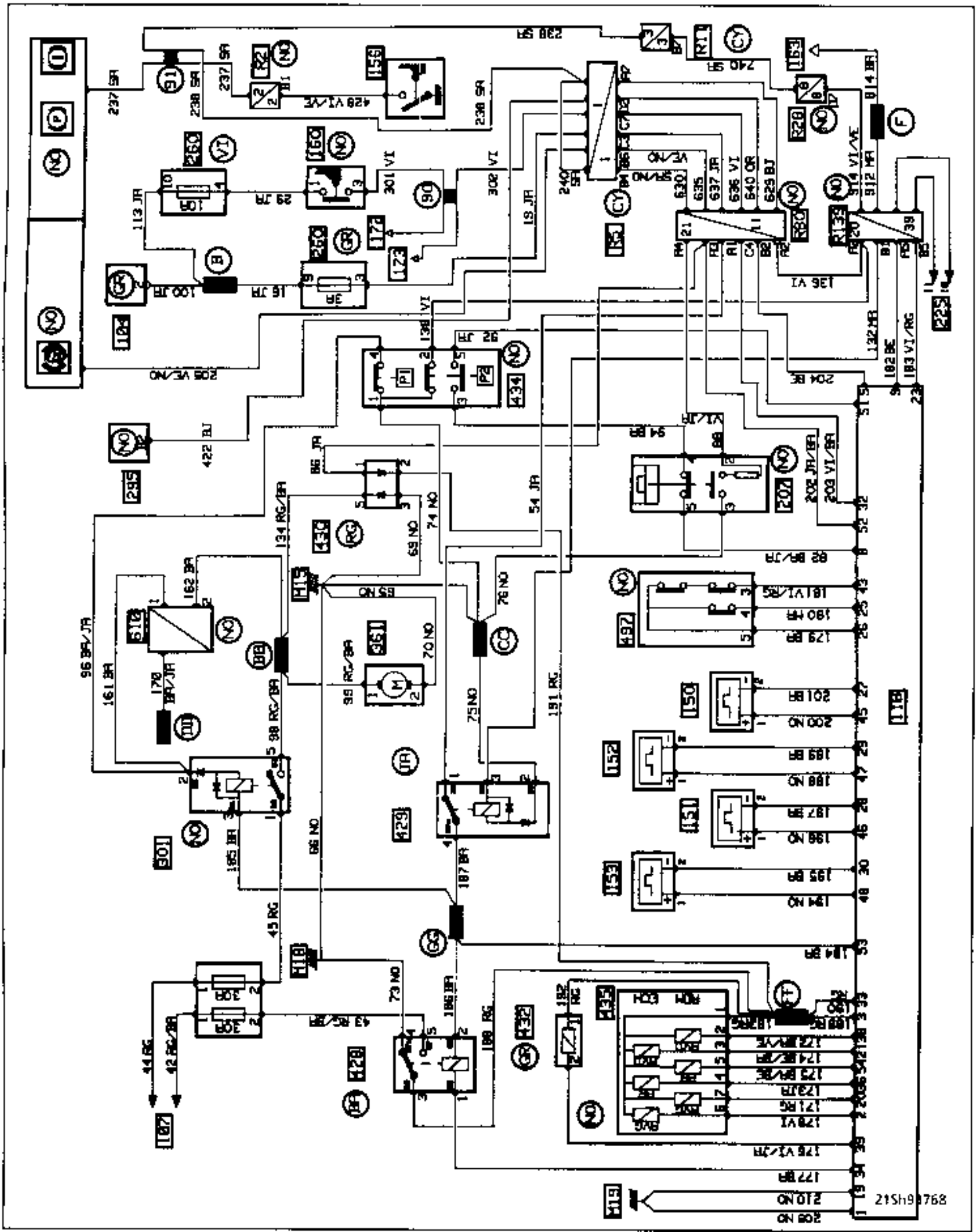
TESTS	TERMINALS (118)		VALUES	CODE NUMBER		
EARTH	1	⏚	0 to 1 Ω			
EARTH	19	⏚	0 to 1 Ω			
Rear RH sensor (150)	27	45	800 to 1400 Ω	33	37	57
Rear LH sensor (151)	28	46	800 to 1400 Ω	34	38	58
Front RH sensor (152)	29	47	800 to 1400 Ω	32	36	56
Front LH sensor (153)	30	48	800 to 1400 Ω	31	35	55
Relay coil (428)	34	53	50 to 100 Ω			
Harness	3	33	0 to 1 Ω			
Relay normally closed contact (428)	3	⏚	0 to 1 Ω			
Main solenoid valve (432)	3	39	2 to 6 Ω	21		
Front LH solenoid valve	3	2	3 to 5 Ω (outlet)	23		
Front LH solenoid valve	3	20	5 to 7 Ω (inlet)	22		
Rear solenoid valve	3	36	3 to 5 Ω (outlet)	26		
Rear solenoid valve	3	54	5 to 7 Ω (inlet)	27		
Front RH solenoid valve	3	21	3 to 5 Ω (outlet)	25		
Front RH solenoid valve	3	38	5 to 7 Ω (inlet)	24		
Accelerator sensor (497)	26 26	43 25	0 to 1 Ω Note : Vehicle 0 to 1 Ω must be horizontal	65		
Pressostat circuit (434)	8	51	0 to 1 Ω : With pressure present	61		
and minimum level (207)	8	51	⩾ 20 kv : When pressure absent			

DIAGNOSIS

2 - SWITCHES CLOSED

TESTS	TERMINALS (118)	VALUES
Diode circuit (430)	52 3	0.5 to 1V ABS warning light should be illuminated
Brake circuit (610) (switch)	32 32	0 v brake raised 12 v brake depressed
Dog clutch warning light circuit (295)	5 and ⏚	Position of dog clutch switch C 1 Raised → Read 12 volts 2 Depressed → If dog clutch warning light permanently illuminated: read 0 V 2 Depressed → If dog clutch warning light flashes: variable voltage to illuminate warning light C permanently. Place vehicle in first or reverse (press vehicle gently if necessary): read 0 V.

WIRING DIAGRAM



KEY TO WIRING DIAGRAM

104 : Ignition switch

107 : Battery

118 : ABS computer

150 : Rear right-hand wheel sensor

151 : Rear left-hand wheel sensor

152 : Front right-hand wheel sensor

153 : Front left-hand wheel sensor

156 : Handbrake switch

160 : Stop light switch

163 : Starter (data)

172 : Rear right-hand stop

173 : Rear left-hand stop

207 : Low brake fluid level

225 : Diagnostic socket

247 : Instrument panel

260 : Fuse box

295 : Dog clutch control warning light unit

301 : ABS electric pump assembly relay

361 : ABS hydraulic assembly

428 : ABS main relay

429 : ABS auxiliary relay

430 : Diode unit

432 : Main solenoid valve

434 : Cut-off pressostat

435 : Solenoid valve unit

497 : 4 x 4 ABS acceleration sensor

610 : ABS diagnostic switch

Junctions

R2 : Dashboard/rear left-hand

R5 : Dashboard/heater bulkhead

R11 : Dashboard/left-hand side member

R28 : Engine/left-hand side member

R80 : Heater bulkhead, ABS

R139 : Engine/ABS

Earth

M15 : Heater bulkhead earth

M18 : ABS earth

M19 : ABS electronic earth