

# SPECIFICATIONS

## General Vehicle Data

01

Vehicle Type	Engine						Gearbox Type	Clutch Type
	Type	Engine Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Compression Ratio		
F40U	E7J	724	75.8	77	1390	9.5	JB1	180 CP 3100
F40N	F8Q	722	80	93	1870	21.5	JB3	200 CPV 3500
F40A	E6J	734	75.8	77	1390	9.5	JB1	180 CP 3100
F404	F8M	736	78	83.5	1596	22.5	JB0 JB1	200 CPV 3100
	F8M	760						
F401	C1E	762	70	72	1108	8.8	JB0 JB1	180 CP 2750
F40F	C1G	726	71.5	77	1237	9.2	JB0 JB1	180 CP 2750
F407	C3J	762	75.8	77	1390	9	JB1	180 CP 3100
F40Y	E6J	738	75.8	77	1390	9.5	JB1	180 CP 3100
F40V	E7J	720	75.8	77	1390	9.5	JB1	180 CP 3100
F40P	F8Q	724	80	93	1870	21.5	JB3	200 CP 3500
F40T	C1E	764	70	72	1108	8.8	JB0 JB1	180 CP 2750

# LUBRICANTS

## Capacities

Diesel  
Engines

04

Unit	Capacity in litres	Grade	Special features				
Engines F8M F8Q	After draining  4.8 5  (plus an extra 0.5 litres for oil filter)	E.E.C. Countries					
		<div><div><div><div><div>- 20°C</div><div>- 15°C</div><div>- 10°C</div><div>0°C</div><div>+ 15°C</div></div><div><div><div>CCMC-PD2 20W40</div><div>CCMC-PD2 15W40</div><div>CCMC-PD2 10W30</div></div></div></div></div></div>					
Gearboxes   JB0 } JB1 } JB3 }	3.25 3.40	Other Countries					
		<div><div><div><div><div>- 20°C</div><div>- 15°C</div><div>- 10°C</div><div>0°C</div><div>+ 15°C</div></div><div><div><div>API CD 20W40</div><div>API CD 15W40</div><div>API CD 10W30</div></div></div></div></div></div>					
			First Change	Oil Change Frequency	Check Oil Level	Quality* Viscosity	
		All Countries	No change	No change	Every 15 000 km (10000 miles) after first service	TRANSELF TRX 80 W	
Braking system	0.7	SAE J 1703 and DOT 3 or DOT 4	Any brake fluid used must have been officially approved by our design office.				
Engine cooling systems F8Q F8M	7.2 6.8	Glaccol AL (type C) anti-freeze only	Protection down to - 23°C for hot, temperate and cold climates. Protection down to -40°C for intensely cold climates.				
Fuel tank	43	Diesel					

\* If viscosity of gearbox oil is excessive in intensely cold countries, use EP75B oil.

Unit	Capacity in litres	Quality	Special features					
Engines C1E E7J E6J C1G C3J	After draining  3 3,5 3,5 3 3 (plus an extra 0.5 litres for oil filter)	E.E.C. Countries						
		<div><div><div><div>- 20°C</div><div>- 15°C</div><div>- 10°C</div><div>0°C</div><div>+ 25°C</div></div><div><div>CCMC-G4 20W40 - 20W50</div><div>CCMC-G4 15W40 - 15W50</div><div>CCMC-G5 10W30 - 10W40 - 10W50</div><div>CCMC-G5 5W30 - 5W40</div></div></div></div>						
Gearboxes  JB0  JB1	3,25  3,40	Other Countries						
		<div><div><div><div>- 20°C</div><div>- 15°C</div><div>- 10°C</div><div>0°C</div><div>+ 10°C</div><div>+ 15°C</div></div><div><div>API SF or SG 20W40 - 20W50</div><div>API SF or SG 15W40 - 15W50</div><div>API SF or SG 10W30</div><div>API SF or SG 5W30</div></div></div></div>						
			First oil change	Oil change frequency	Check oil level	Quality* Viscosity		
		All countries	No change	No change	Every 12000 miles (20000 km) after first service	TRANSELF TRX 80 W		
Braking system	0,7	SAE J 1703 and DOT 3 or DOT 4		Any brake fluid must have been officially approved by our design office.				
Engine cooling systems  C1E E7J E6J C1G C3J	 4,8 5 5 4,8 4,8	Glaccol AL (type C) anti-freeze only		Protection down to - 23°C for hot, temperate and cold climates. Protection down to - 40°C for intensely cold climates.				
Fuel tank	43	-						

\* If viscosity of gearbox oil is excessive in intensely cold countries, use EP75B oil

ESSENTIAL SPECIAL TOOLS	
Mot. 445	Oil filter wrench
	Engine oil drain wrench

### PETROL ENGINE

**OIL DRAIN:** via plug (1)

First oil change 500-2000 miles (1000 - 3000 km)

Oil change frequency  
Every 6000 miles (10000 km)

Change oil filter at 6000 miles (10000 km)  
then every 12000 miles (20 000 km)

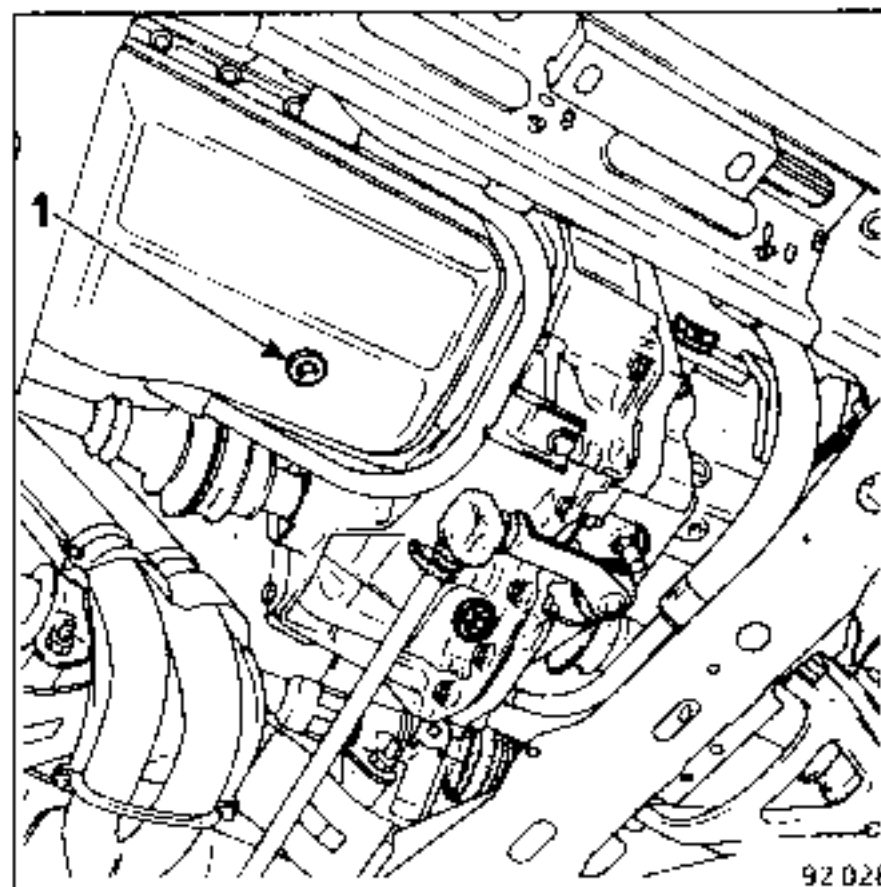
### DIESEL ENGINE

**OIL DRAIN :** via plug (1)

First oil change 500-2000 miles (1000-3000 km)

Oil change frequency  
Every 5000 miles (7500 km)

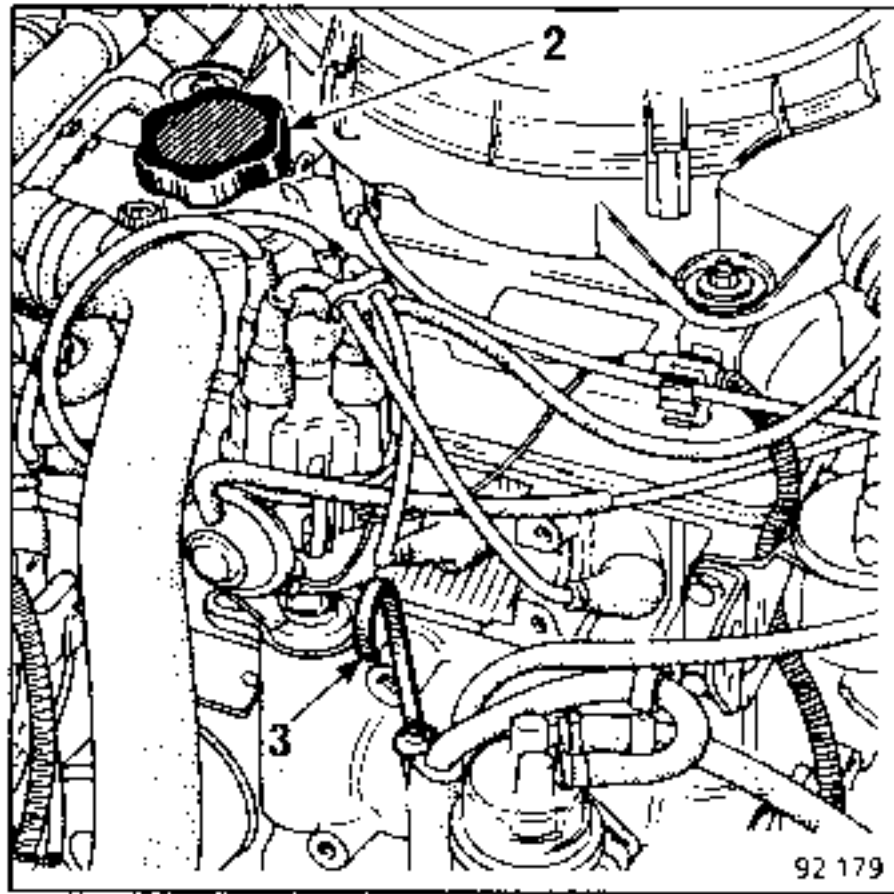
Change oil filter at each oil change interval.



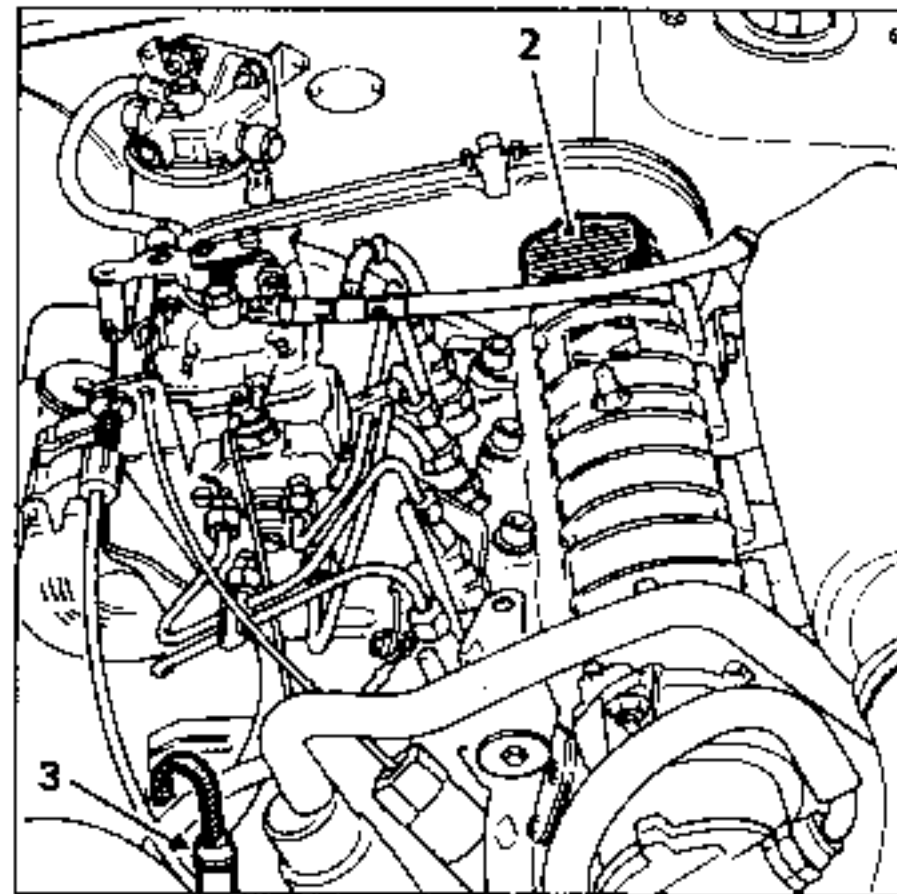
92 028

FILLING : Cap (2)

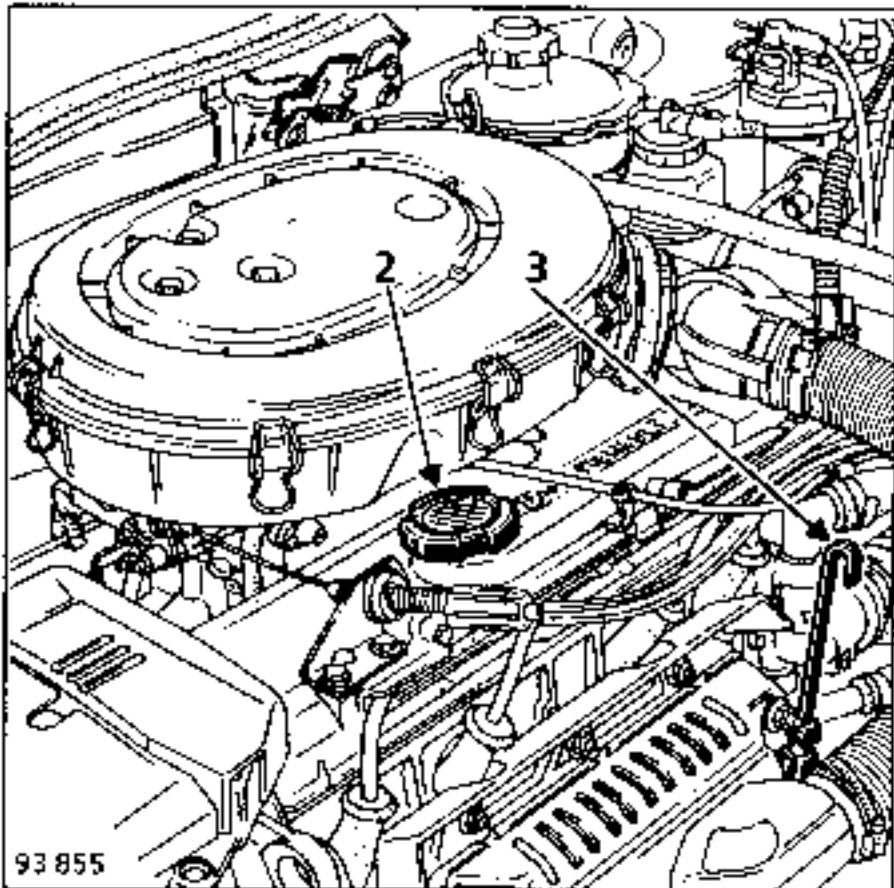
C ENGINES



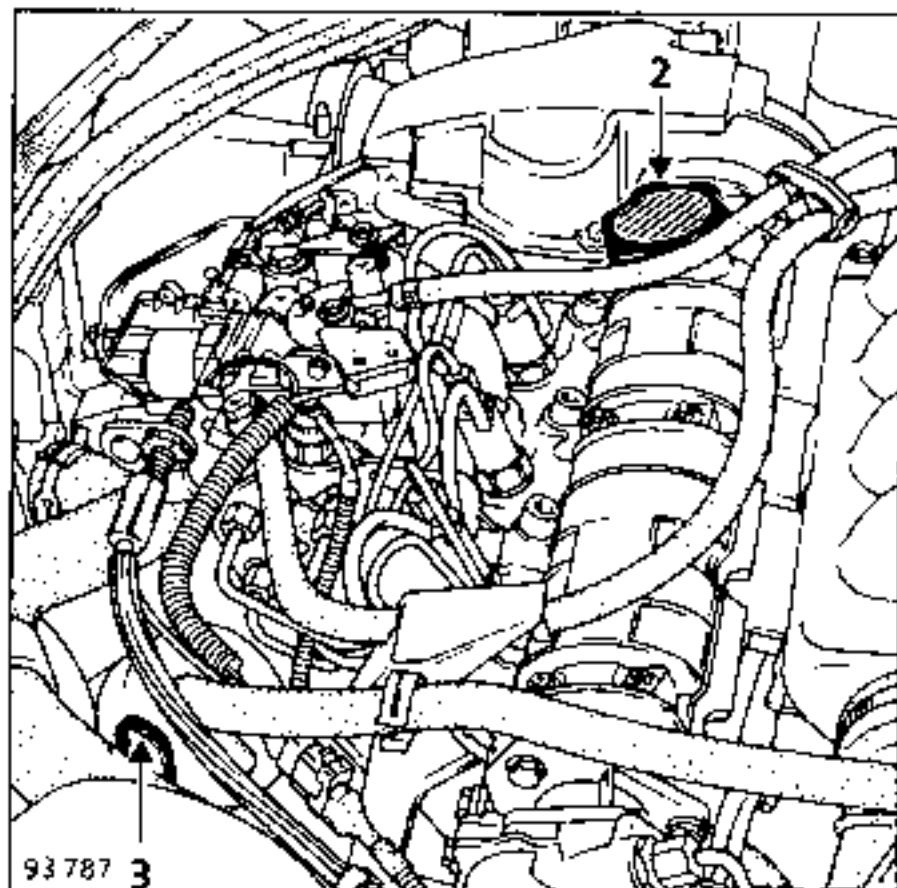
F8M ENGINES



E ENGINE



F8Q ENGINE



### DIPSTICK (3)

A Min. level

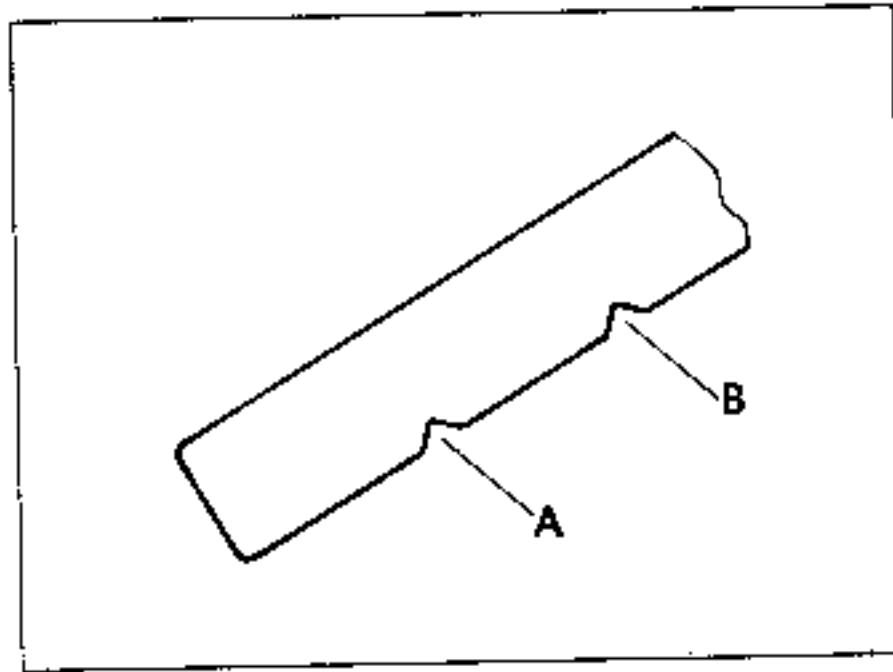
B Max. level

The difference between the max. and min. levels corresponds to approximately :

C Engines 1 litre

E Engines 1.5 litre (Screw plug 2)

F Engines 2 litres

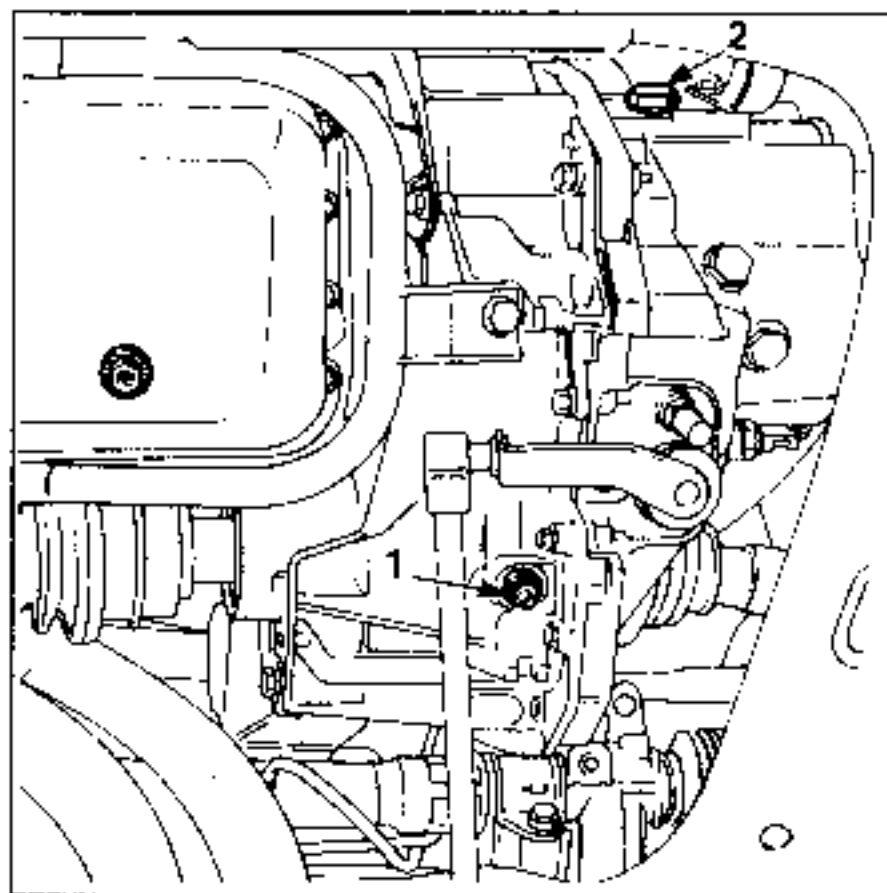


### ESSENTIAL SPECIAL TOOLS

Gearbox drain plug spanner

**DRAINING :** Plug (1)

**FILLING AND LEVEL :** Plug (2)



## ESSENTIAL SPECIAL TOOLS

B. Vi.	31 -01	Punches for spring pins
T. Av.	476	Ball joint extractor
Mot. 1	202	Clip pliers for MB type hose clips
SEF	689	Load spreader

## TIGHTENING TORQUES (daN.m)



Brake caliper securing bolt	10
Shock absorber bottom securing bolt	11
Steering ball joint	3.5
Lower ball joint nut	6.5
Drive shaft bellows securing screw	2.5
Wheel bolts	9
Hanging suspension rear arm bolt	6
Fastener of rubber pad mounting on front left-hand side member	2
Nut securing rubber pad to front left- hand rubber pad mounting	7.5
Front right-hand hanging suspension movement limiter securing bolt	5.5
Nut securing rubber pad to front right- hand hanging suspension top (assembly with captive washer Ø 24 mm)	*2.7

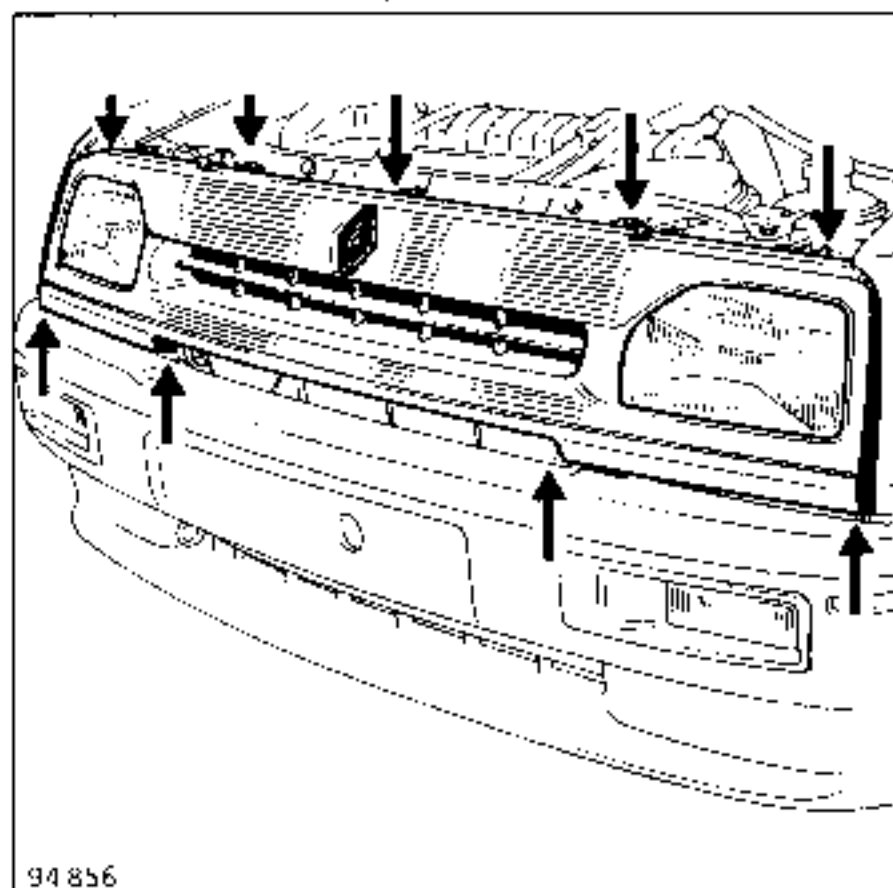
\* If other assembly 4.5

Mount vehicle on 2-post lift.

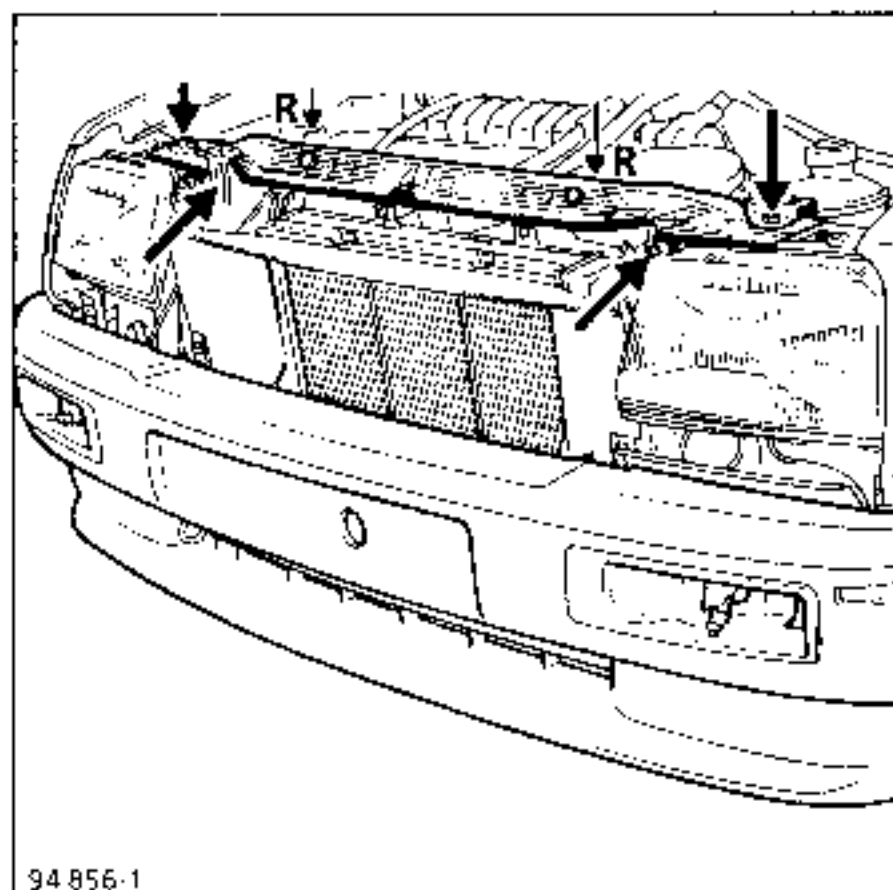
Disconnect battery.

Remove :

- the bonnet,
- the radiator grille,

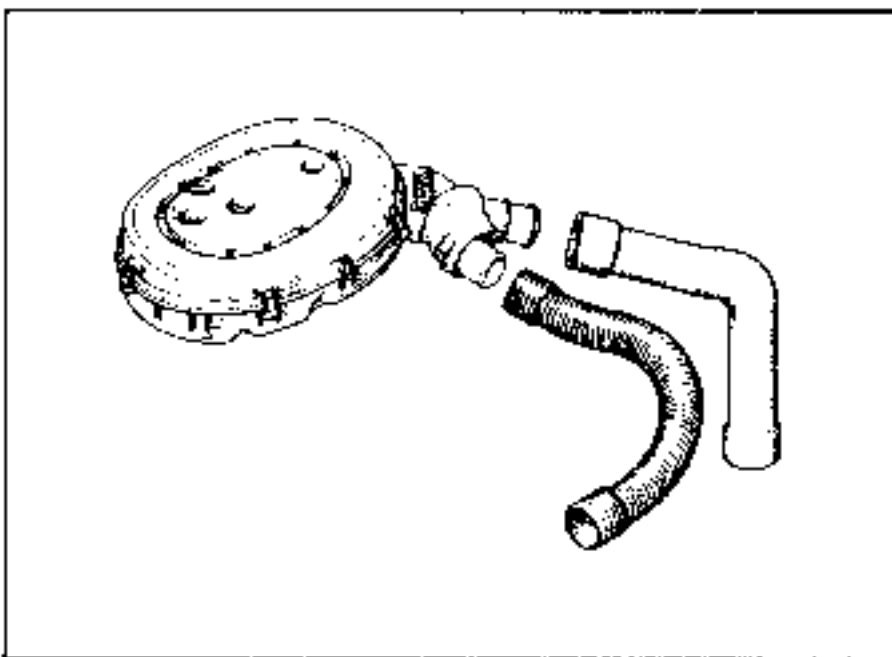


- the upper cross member and the radiator  
securing clamps (R).





- the air filter.

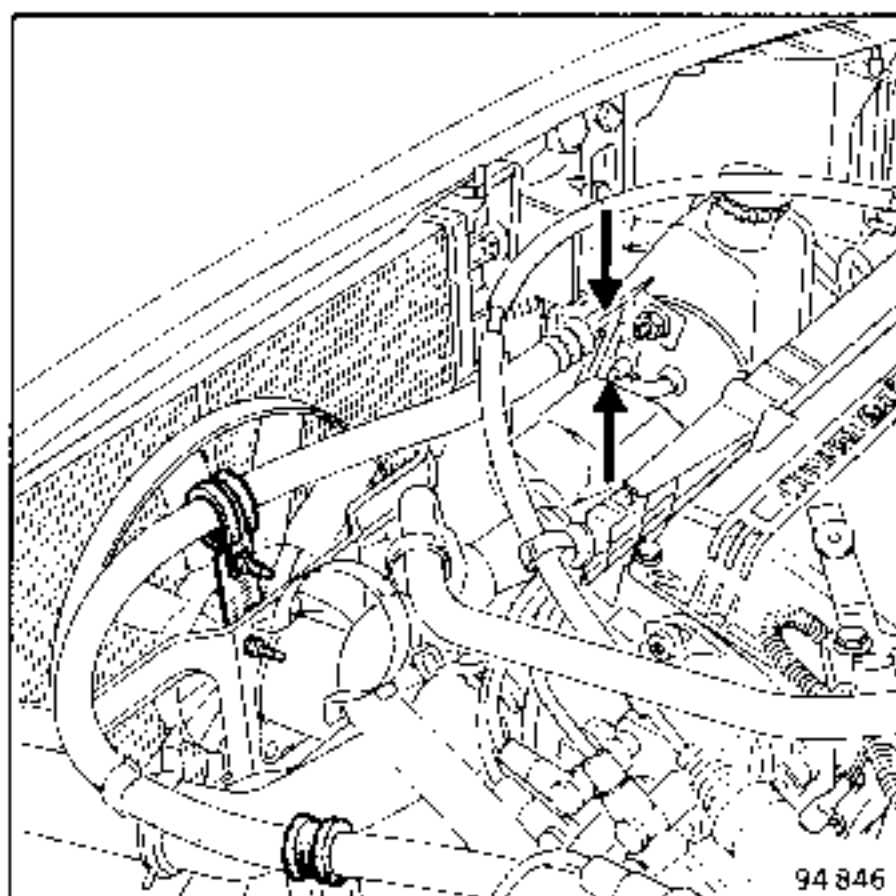


#### Drain:

- the gearbox,
- the cooling system by disconnecting :
  - the upper and lower radiator hoses, (Mot. 1202),
  - the heater hoses on the scuttle,
  - the power steering system

#### Disconnect:

- the fuel pipes and carburettor float chamber ventilation pipes,
- the brake vacuum pipes and AEI or MPA,
- the pins, engine harness in the casing on the left-hand wheel arch and the earth braiding on the upper front right-hand side of the scuttle,
- the starter and alternator wiring,
- the accelerator, starter and computer cables,
- the hoses for the power steering system.



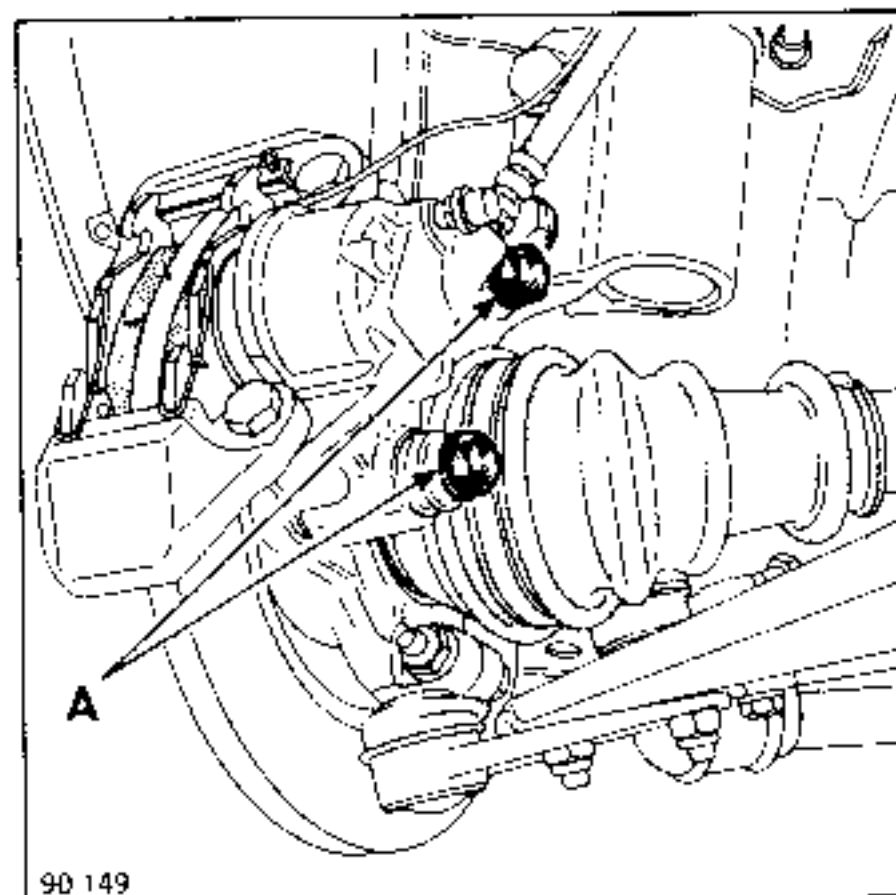
#### Remove:

- the radiator with the cooling fan motor
- the two front wheels.

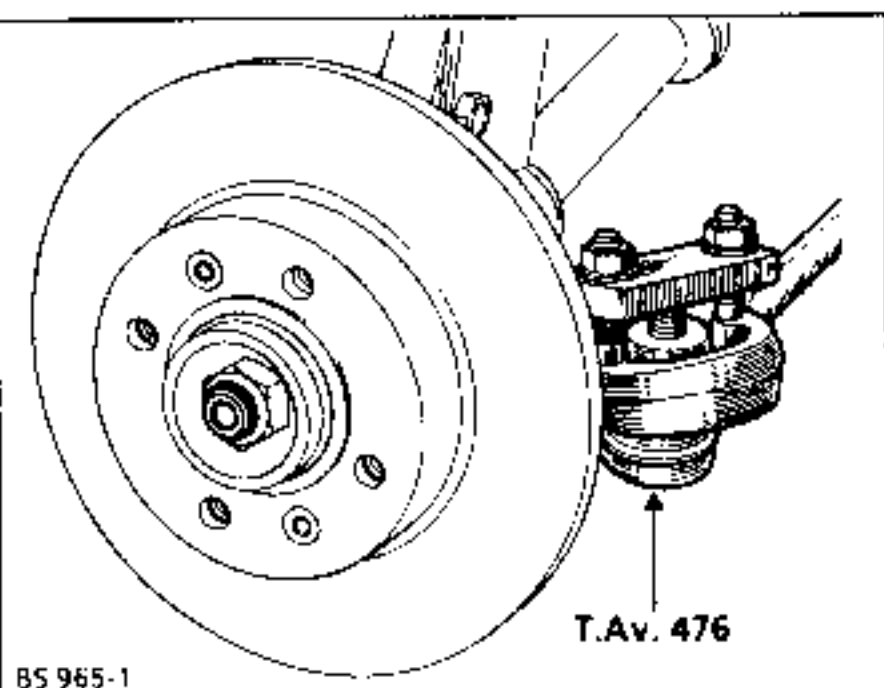
#### Left-hand side:

#### Remove:

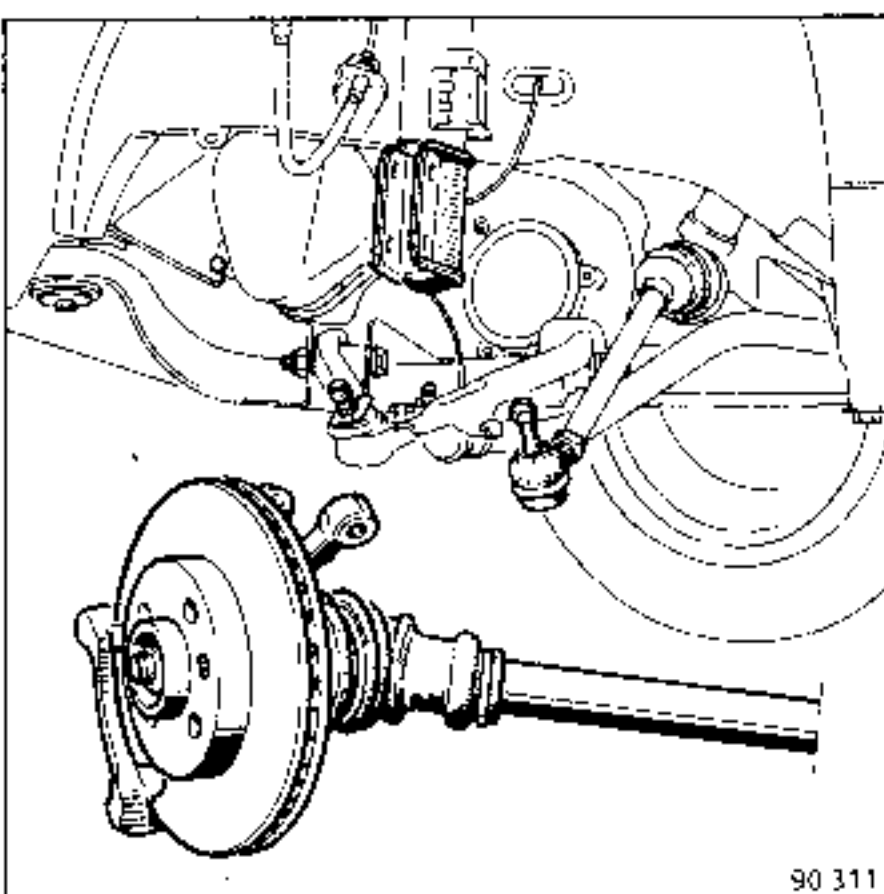
- The front brake caliper by removing bolt (A), and attach it to the body,



- The steering ball joint using extractor T. Av. 476,



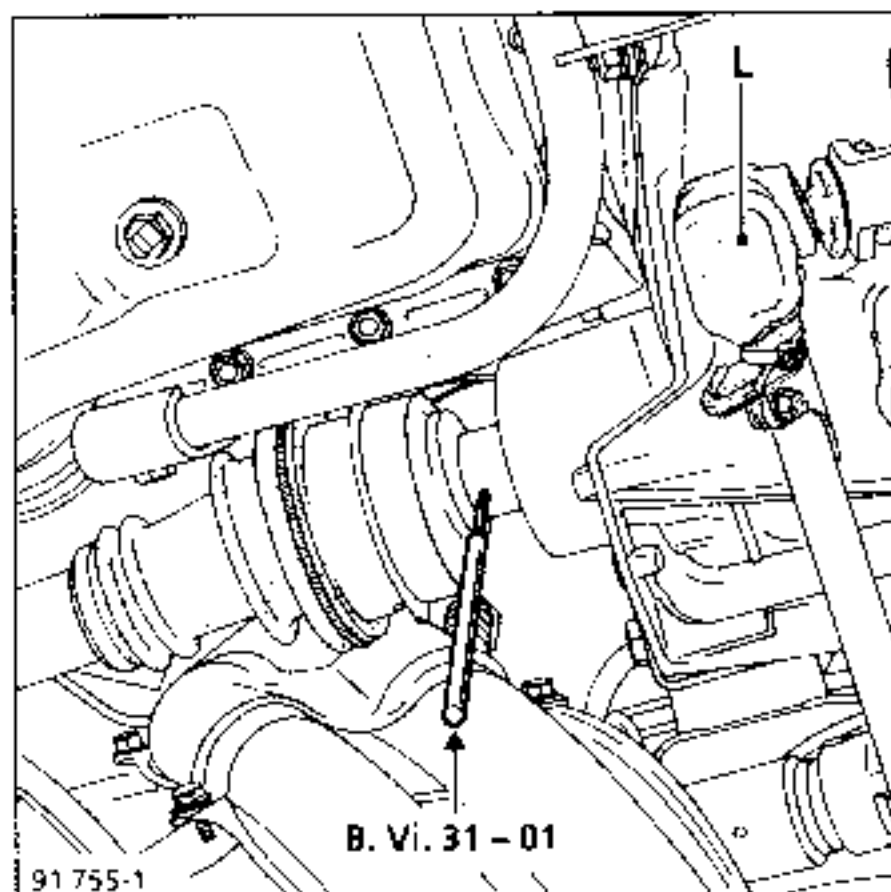
- The three screws from the bellows,
- The shock absorber bottom bolts and lower ball joint bolts,
- The stub axle carrier drive shaft assembly. Remember to protect the spider assembly.



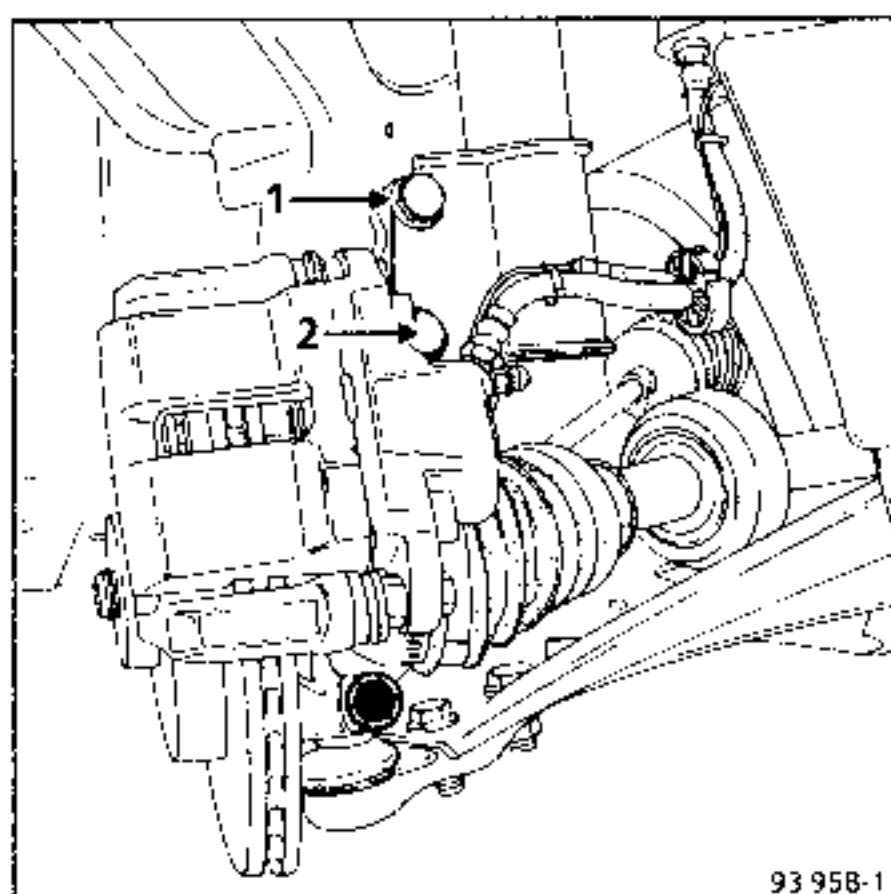
## Right-hand side

Remove :

- The drive shaft spring pin using punch B. Vi. 31-01.

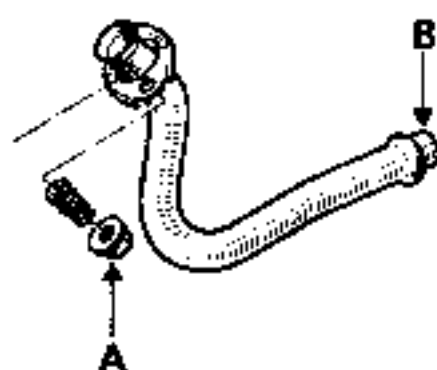


- The gear control at the gearbox end at (L), turn it round and attach it to the exhaust pipe.
- The upper bolt (1) and slacken off bolt (2),

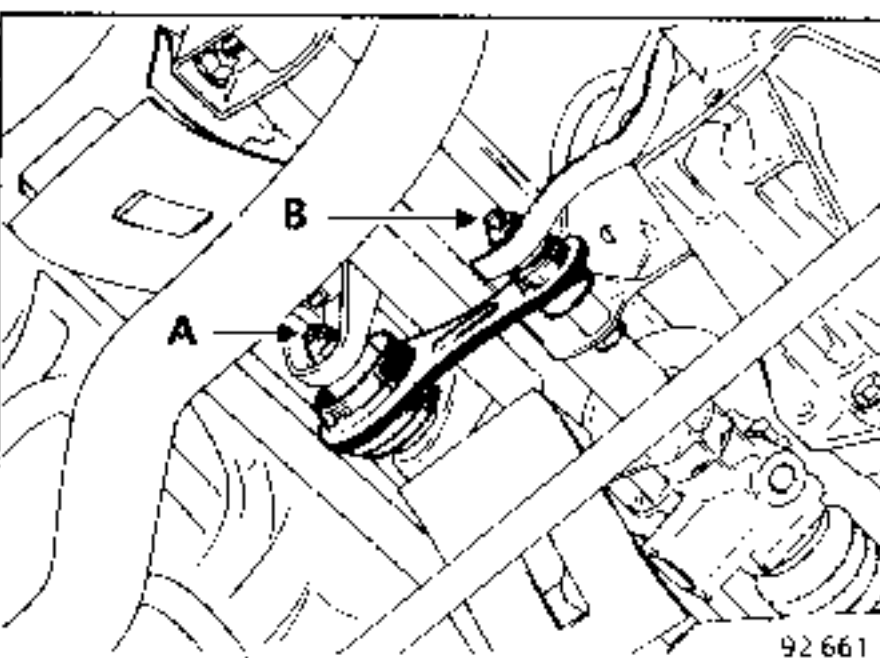


Tilt the stub axle carrier and uncouple the drive shaft.

Remove the exhaust pipe at (A) and (B).

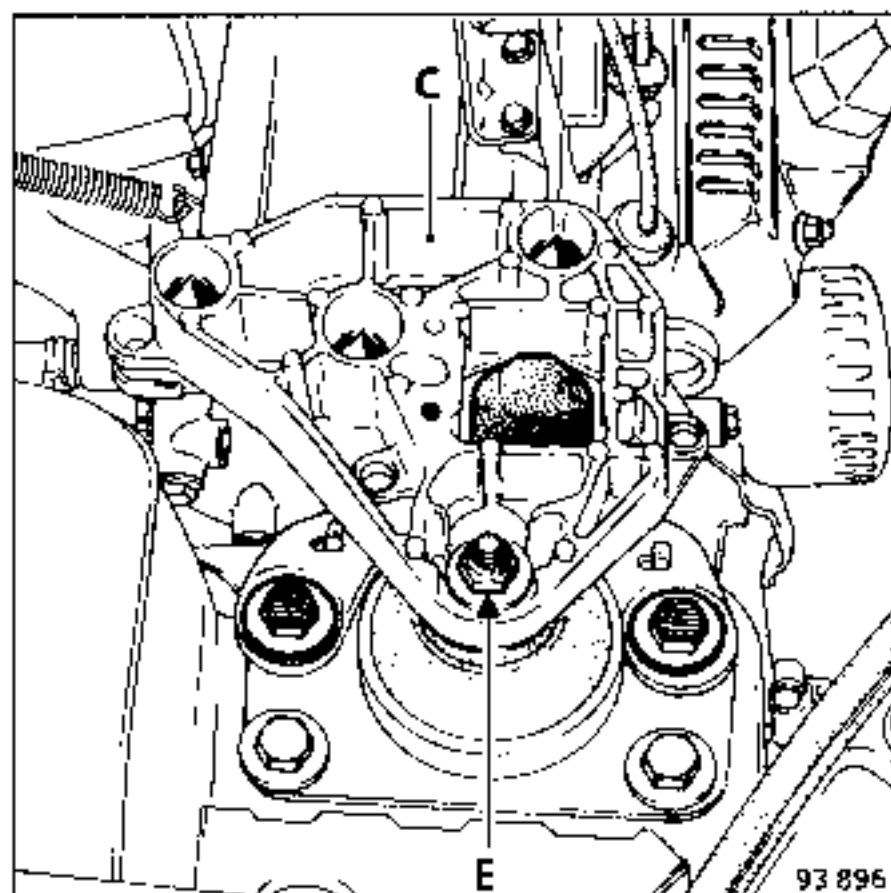


Unscrew but do not remove (A) and remove bolt (B) from the hanging suspension arm; release the arm.



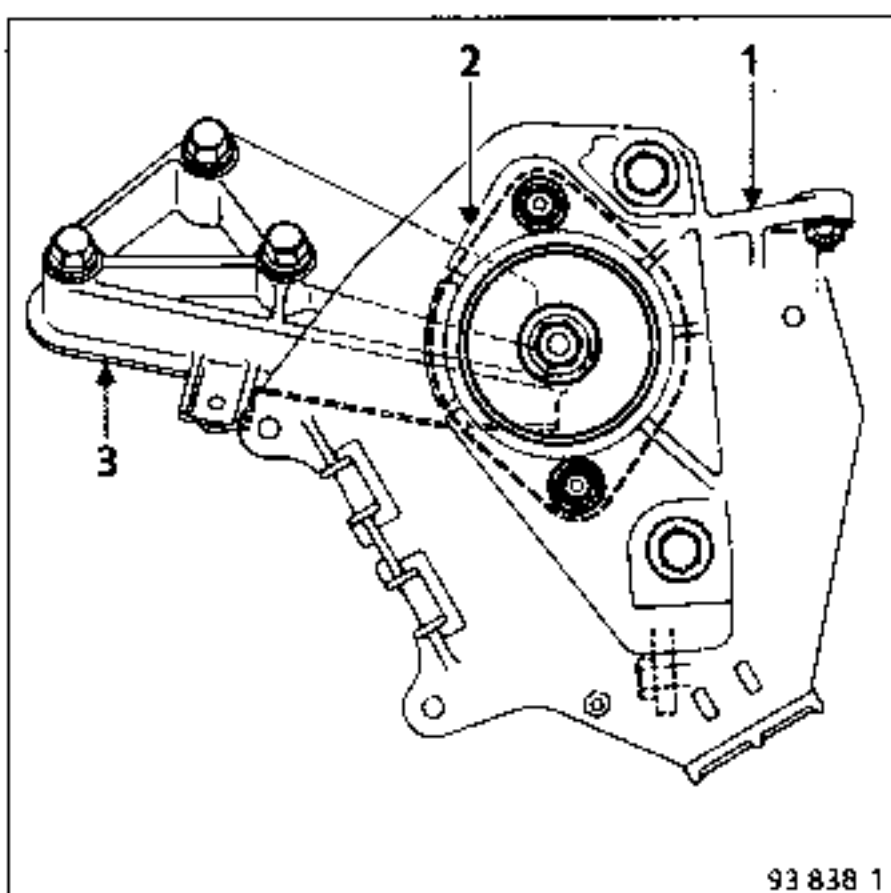
Remove :

- the front right-hand hanging suspension top cover, and the cover on the front left-hand rubber pad mounting.
- the nut (E) securing the rubber pad to the top (C).



Position the load spreader (SEF 689) and tension the chains so that they support the assembly.

Mark the position of the left-hand rubber pad (2) in relation to its mounting (1) (both lengthwise and across).



Take out the engine - gearbox assembly by tilting it slightly to the right-hand side with the help of SEF 689

**REFITTING (Special Points)**

Reposition the engine - gearbox in the engine compartment.

**Left-hand side**

Reposition the pad mounting (1).

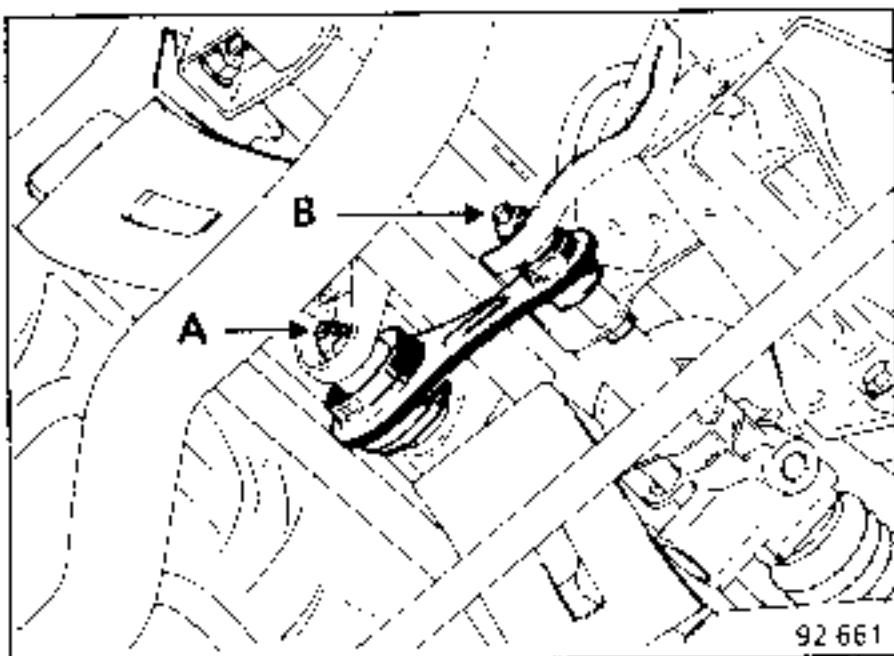
Pre-torque tighten the shock absorber turret nut and the pad mounting lower bolt to **0.3 daN.m**.

Torque tighten the two upper bolts for the pad mounting to **2 daN.m** and then tighten the lower nut and bolt to the same torque.

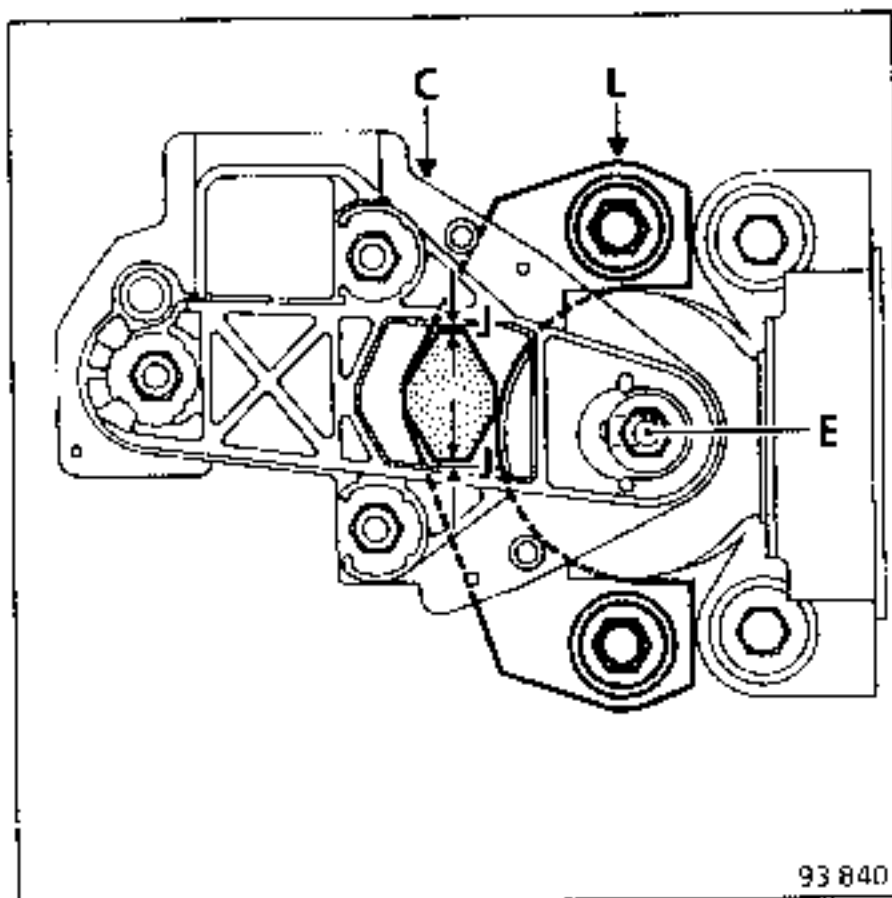
**Right-hand side**

Refit the top (C).

Fit bolt (B) on the torque take-up arm and then torque tighten the two bolts.



Centre the clearance limiter (L) in the gap in the top, ensuring that clearance (J) is the same on both sides.



Replace the top on the rubber pad (nut E) and torque tighten it.



Fit the brake caliper bolts after first coating them with **Loctite FRENLOC** and torque tighten them.

Press down on the brake pedal several times in order to bring the pistons into contact with the brake pads.

Apply **CAF 4/60 THIXO** to the drive shaft spring pin holes.

Adjust the accelerator cable.

Fit the speedometer cable

Fill the gearbox to the specified level.

Fill and bleed the cooling system.

Fill the power steering system to the specified level and bleed it.

## ESSENTIAL SPECIAL TOOLS

B. Vi.	31 -01	Punches for spring pins
T. Av.	476	Ball joint extractor
Mot.	1 202	Clip pliers for MB type hose clips
SEF	689	Load spreader

## TIGHTENING TORQUES (in daN.m)



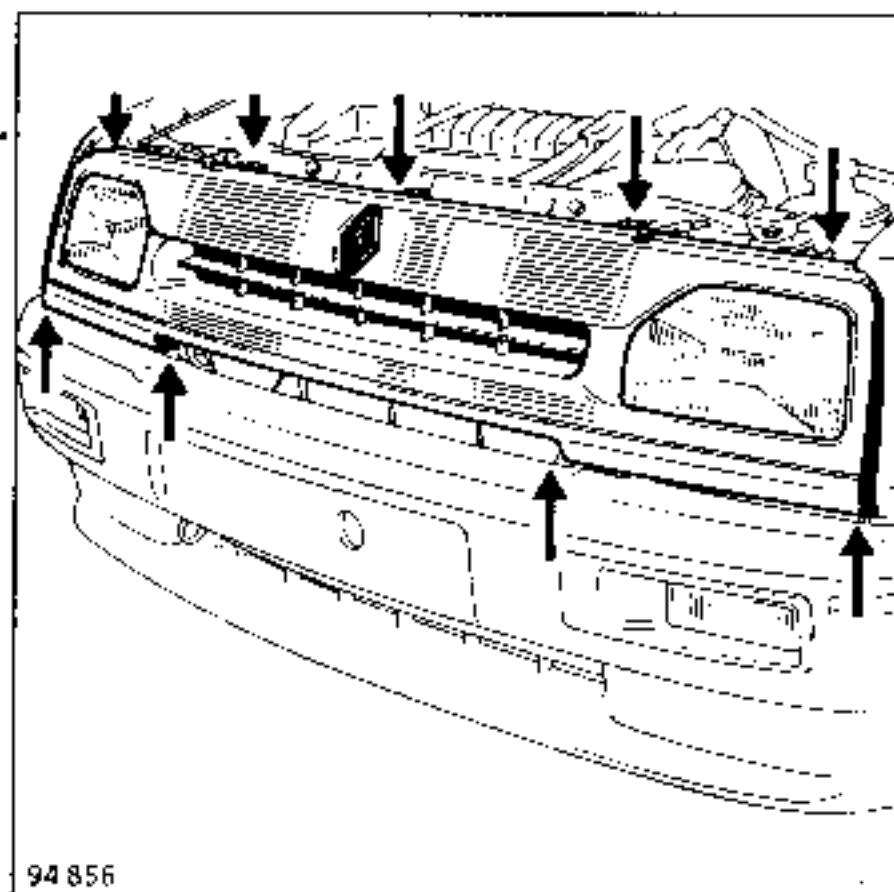
Brake caliper securing bolt	10
Shock absorber bottom securing bolt	11
Steering ball joint	3.5
Lower ball joint nut	6.5
Drive shaft bellows securing screw	2.5
Wheel bolt	9
Hanging suspension rear arm bolt	6
Fastener of rubber pad mounting on front left-hand side member	2
Nut securing rubber pad to front left-hand rubber pad mounting	7.5
Front right-hand hanging suspension movement limiter securing bolt	5.5
Nut securing rubber pad to front right-hand hanging suspension top (assembly with captive washer Ø 24 mm)	*2.7
* If other assembly	4.5

Mount the vehicle on a 2-post lift.

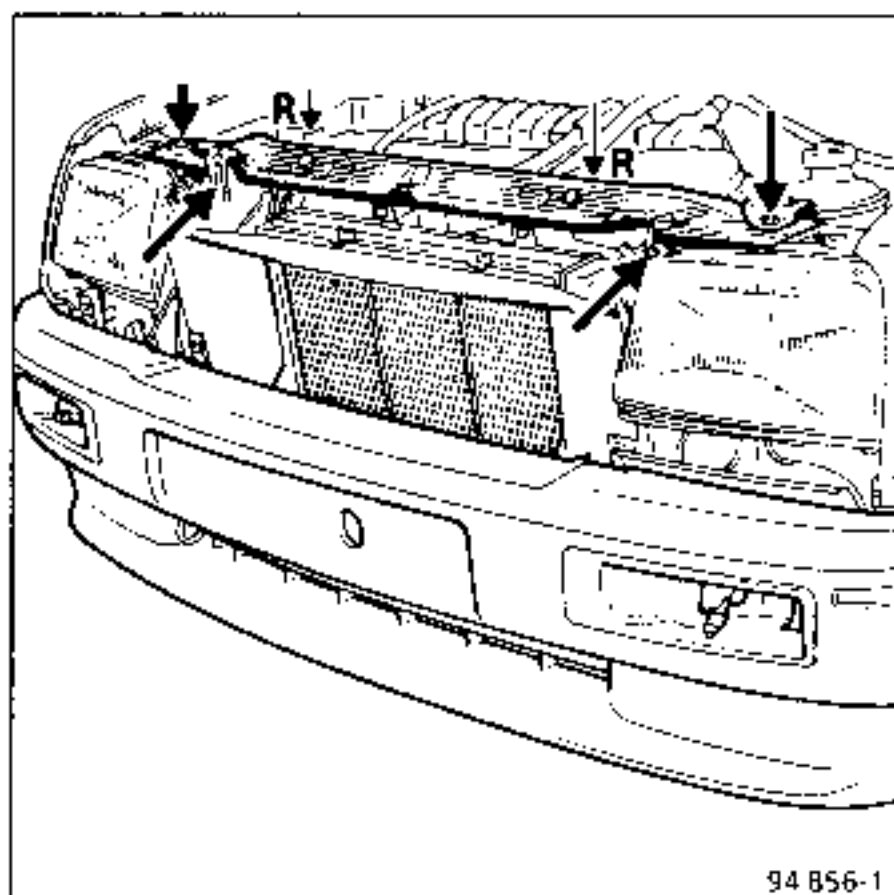
Disconnect the battery.

Remove:

- the bonnet,
- the radiator grille,



- the upper cross member and the radiator securing clamps (R).

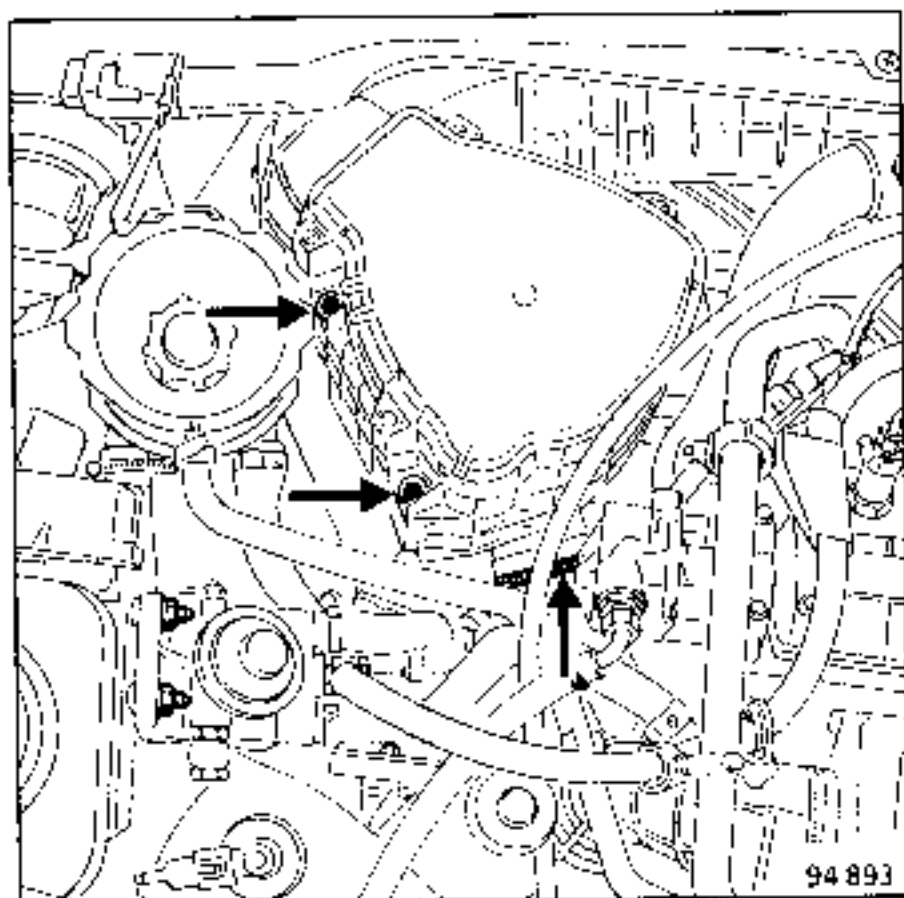


Drain :

- the gearbox oil,
- the cooling system (disconnect radiator hoses) (Mot. 1202).

Remove :

- the air filter and its mounting,



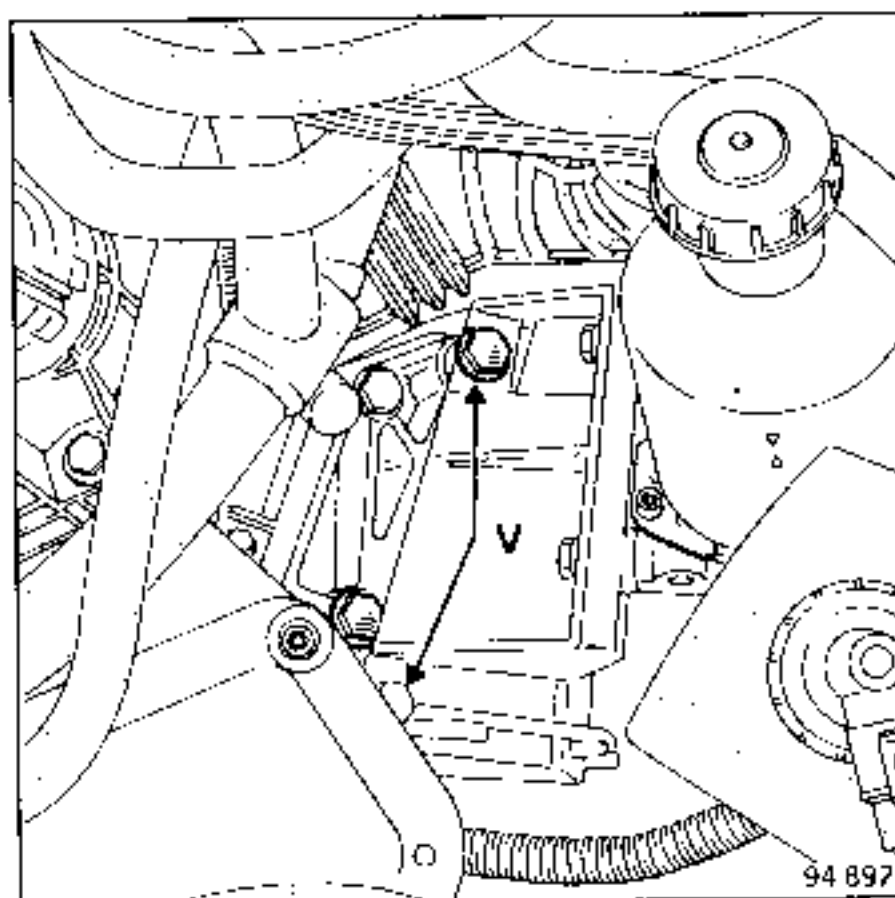
the radiator and the cooling fan motor

Disconnect:

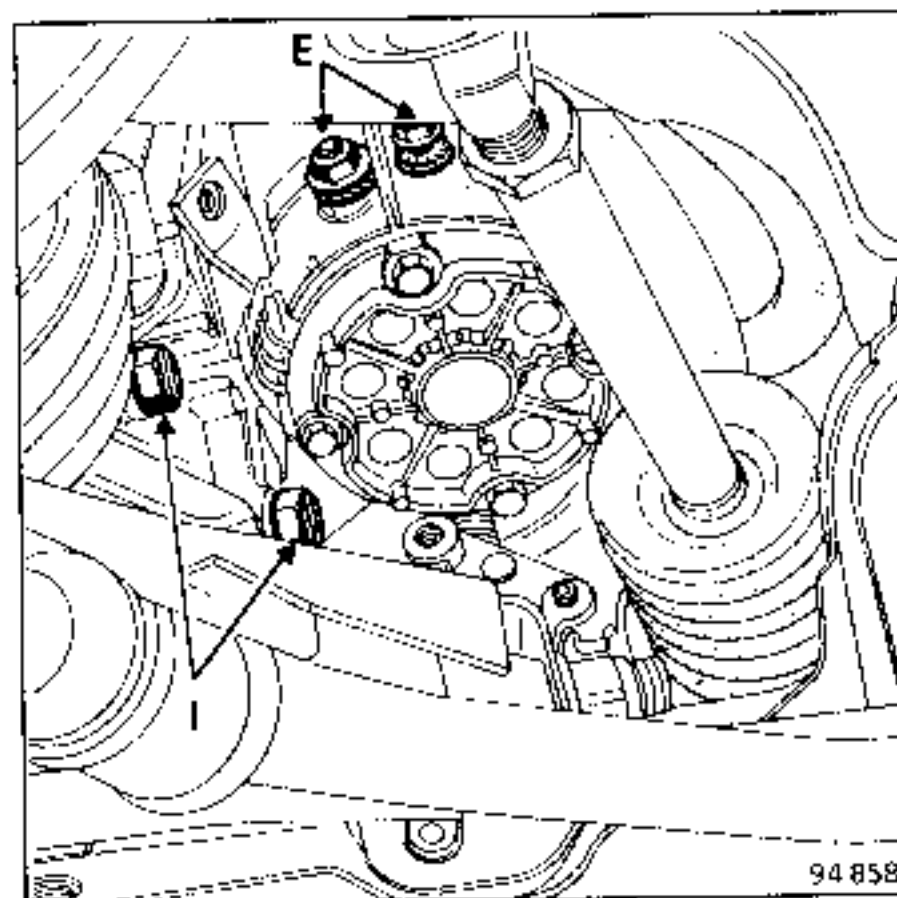
- the electrical connectors,
- the accelerator and clutch cables,
- the earth braiding on the scuttle under the battery and the reverse switch,
- the preheater unit harness,
- the diesel fuel feed and return pipes,
- the brake servo vacuum hose,
- the heater hoses from the scuttle,
- the tachometer cable.

Remove :

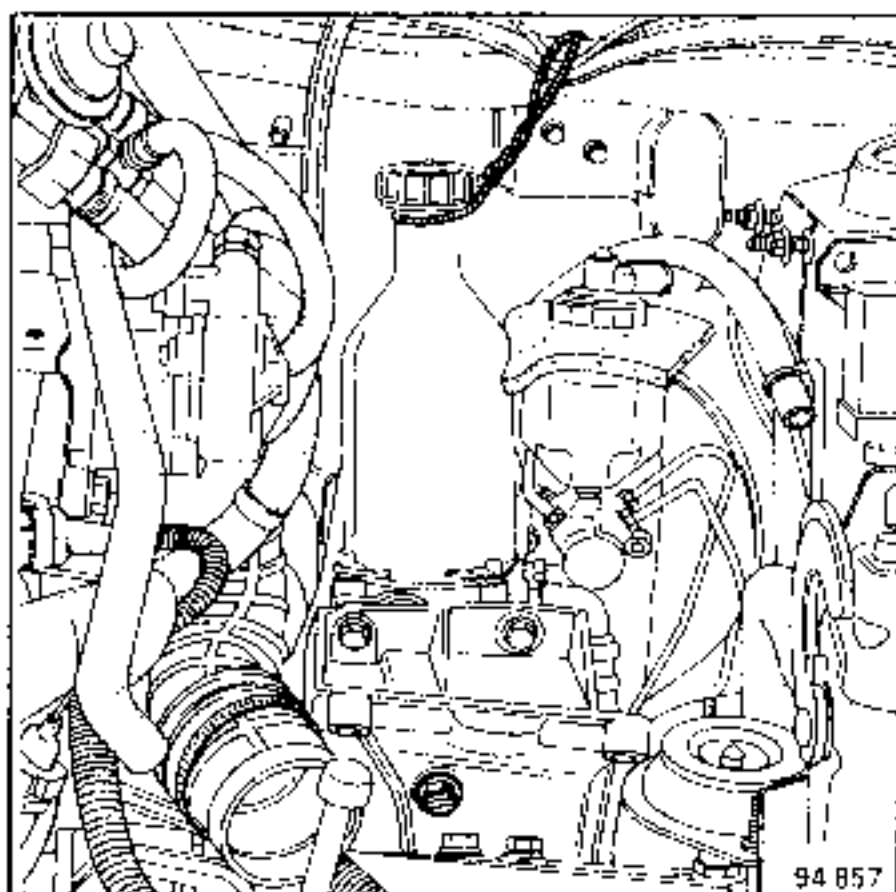
- The diesel filter and its mounting together with the reservoir for the cooling system. Secure vertically to the engine,
- The two upper bolts (V) of the power steering pump mounting on the housing mounting,



- The two lower bolts (I) of the power steering pump mounting together with the two nuts (E) for the electric pump wiring,



- Lift the electric pump assembly and remove the three bolts securing the pump to the mounting. Take out the mounting and secure the electric pump to the scuttle

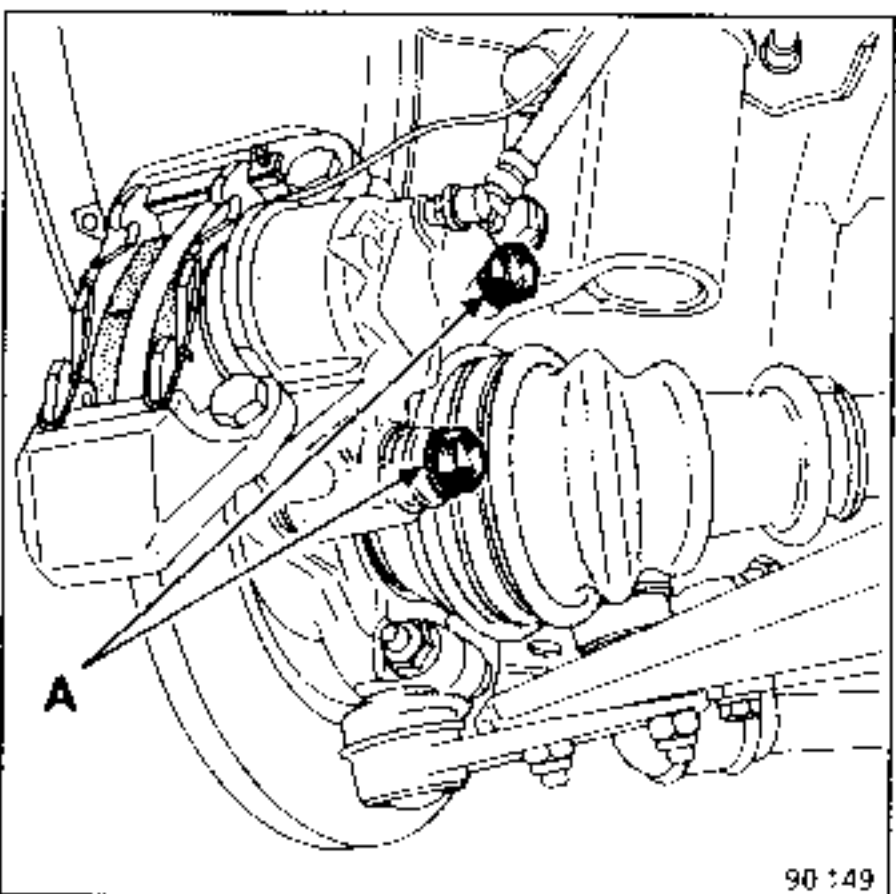


- The front wheels.

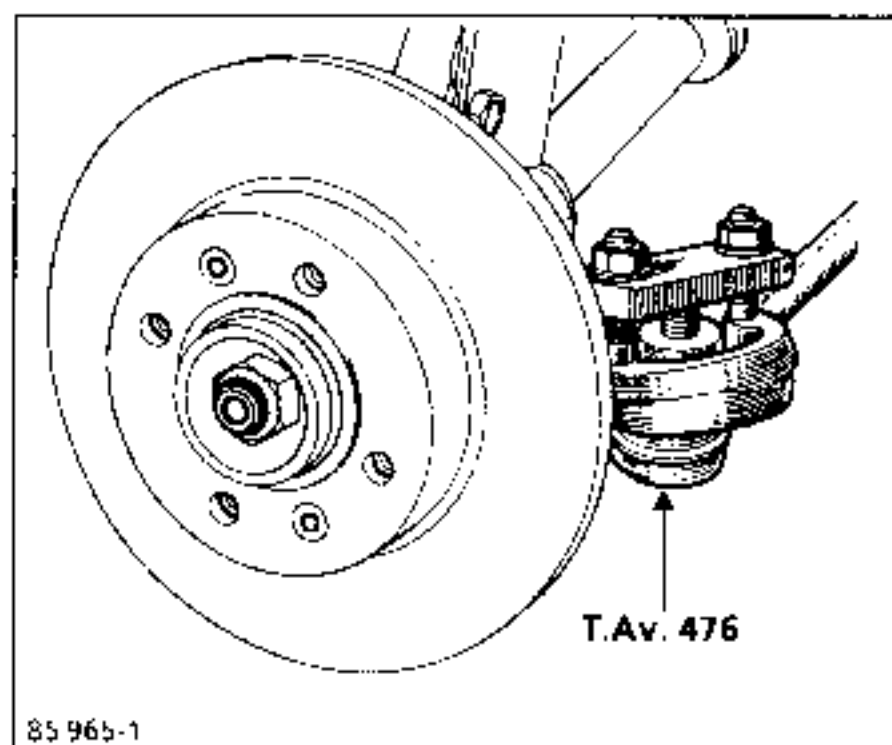
#### Left-hand side

#### Remove:

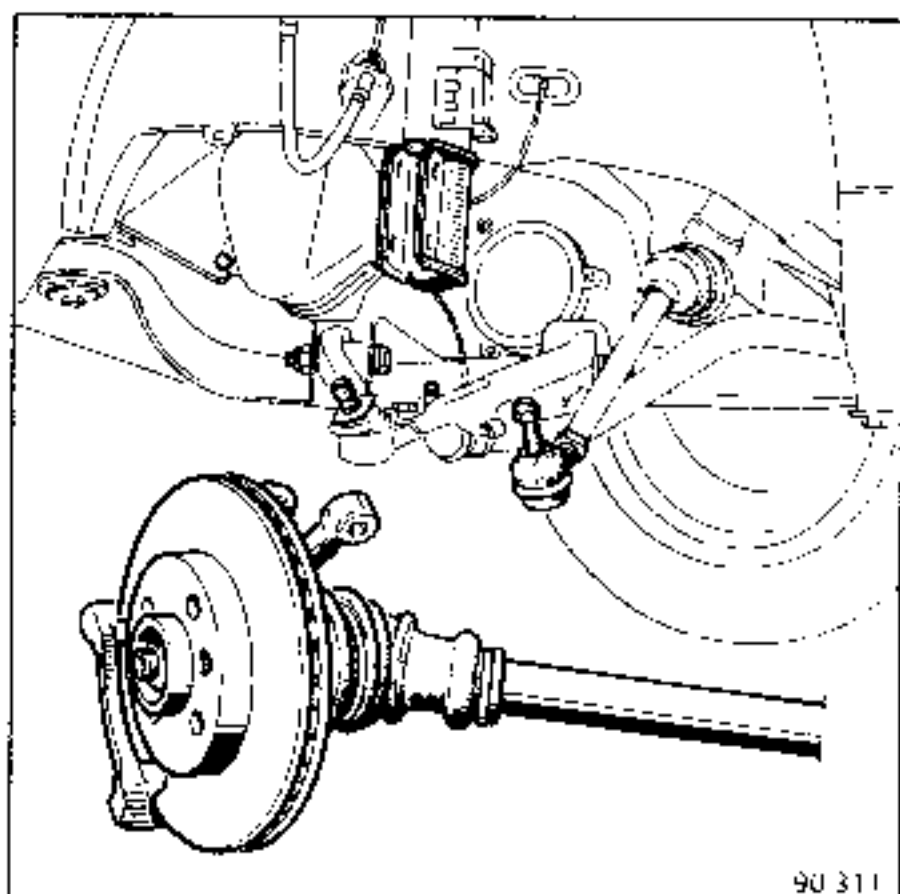
- The front left-hand brake caliper and bolts (A). Attach it to the body.



- The steering ball joint using extractor T.Av. 476,



- The three screws for the bellows,
- The bolts from the bottom of the shock absorbers and lower ball joint,
- The stub axle carrier - drive shaft assembly. Protect the spider assembly.

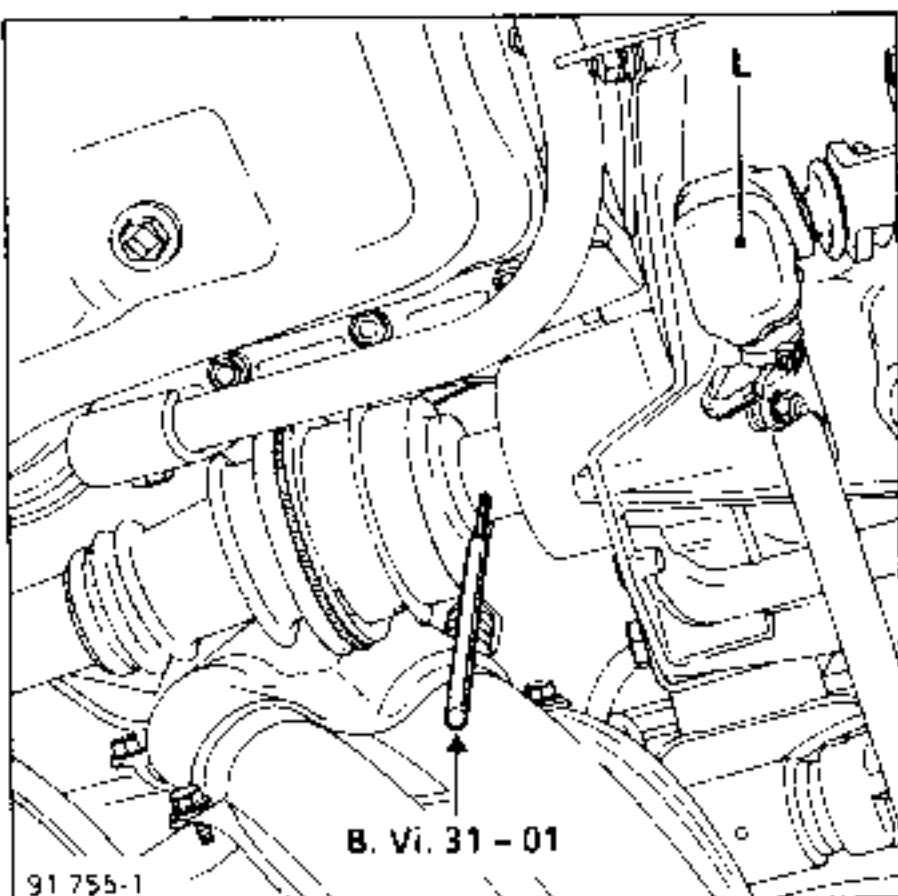




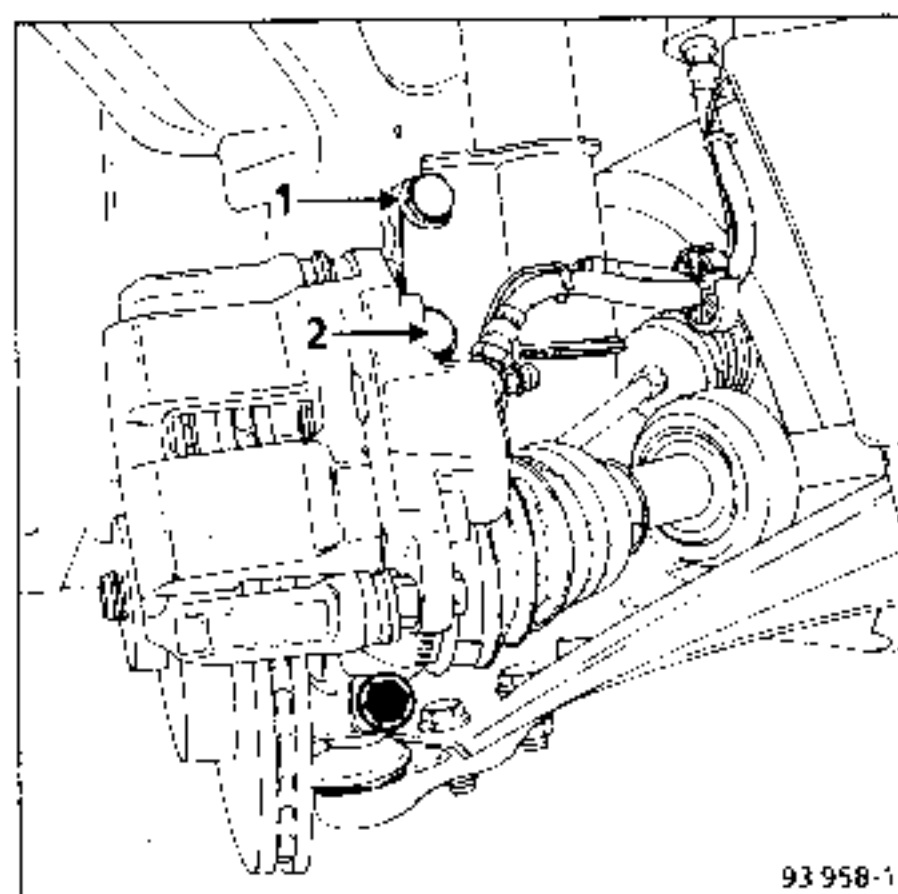
Right-hand side :

Remove :

- The drive shaft spring pins using punch B. Vi. 31-01.



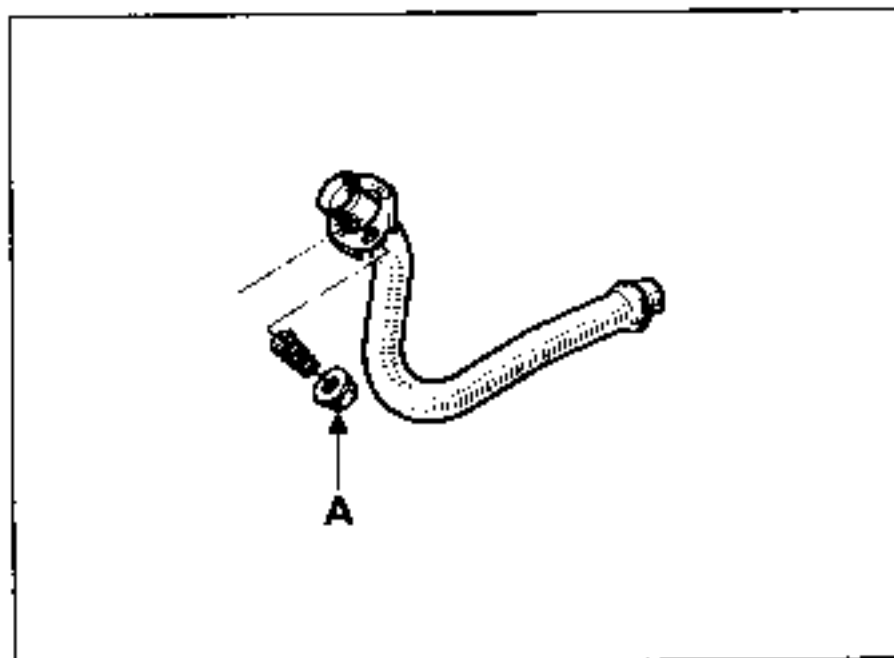
- The gear control at the gearbox end at (L), turn it round and attach it to the exhaust pipe.
- Upper bolt (1) and slacken off bolt (2).



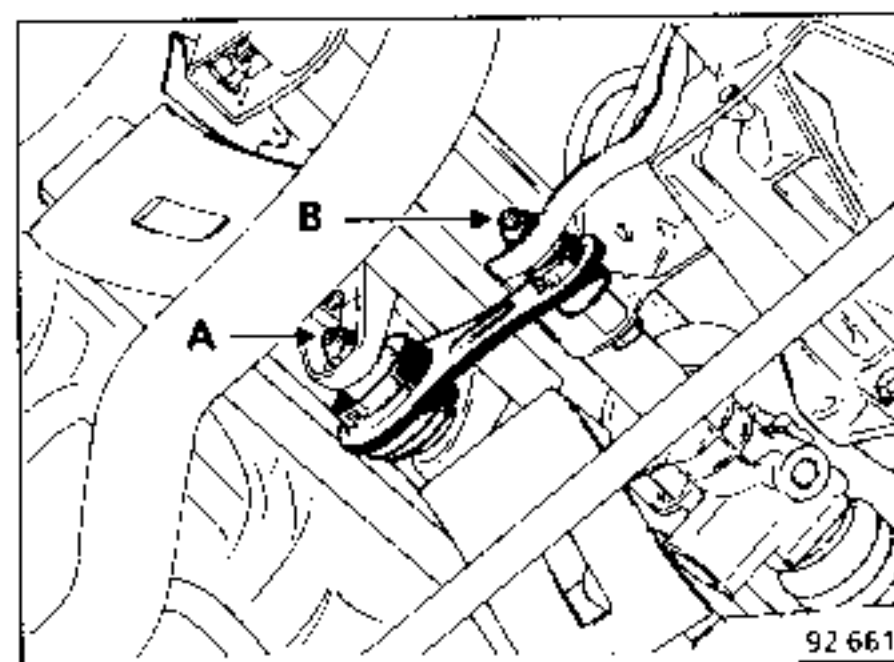
Tilt the stub axle carrier and uncouple the drive shaft.

Remove the starter wiring.

Remove the exhaust pipe at (A).

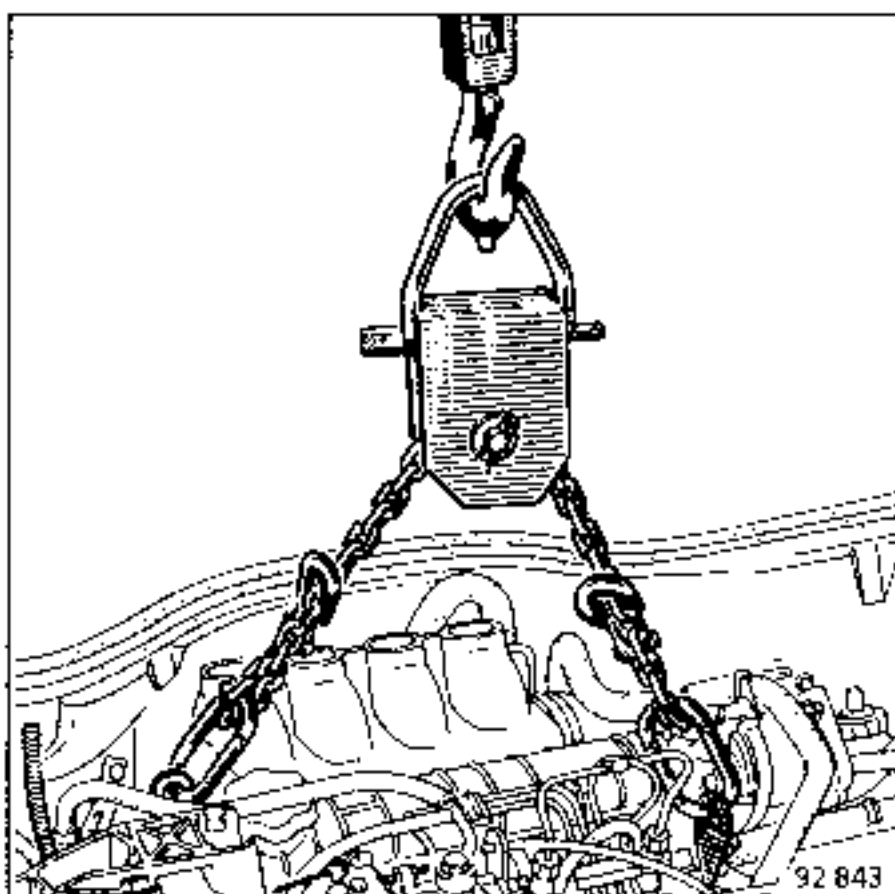


Unscrew but do not remove bolt (A) and remove bolt (B) from the hanging suspension arm. Release the arm.

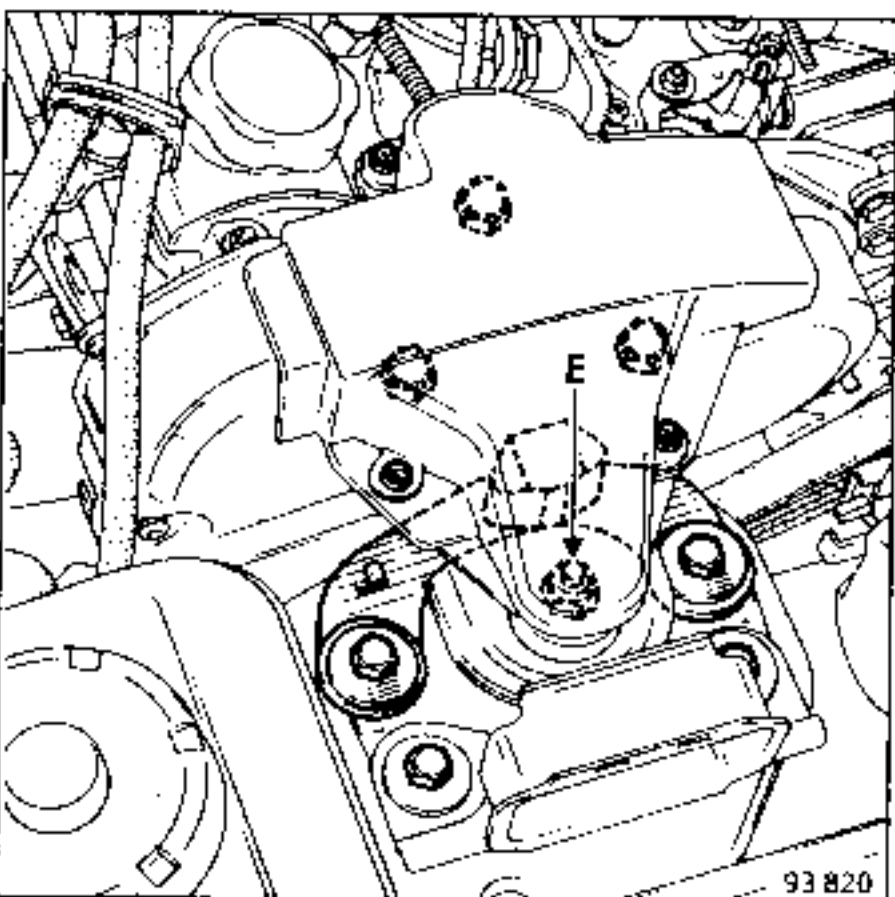




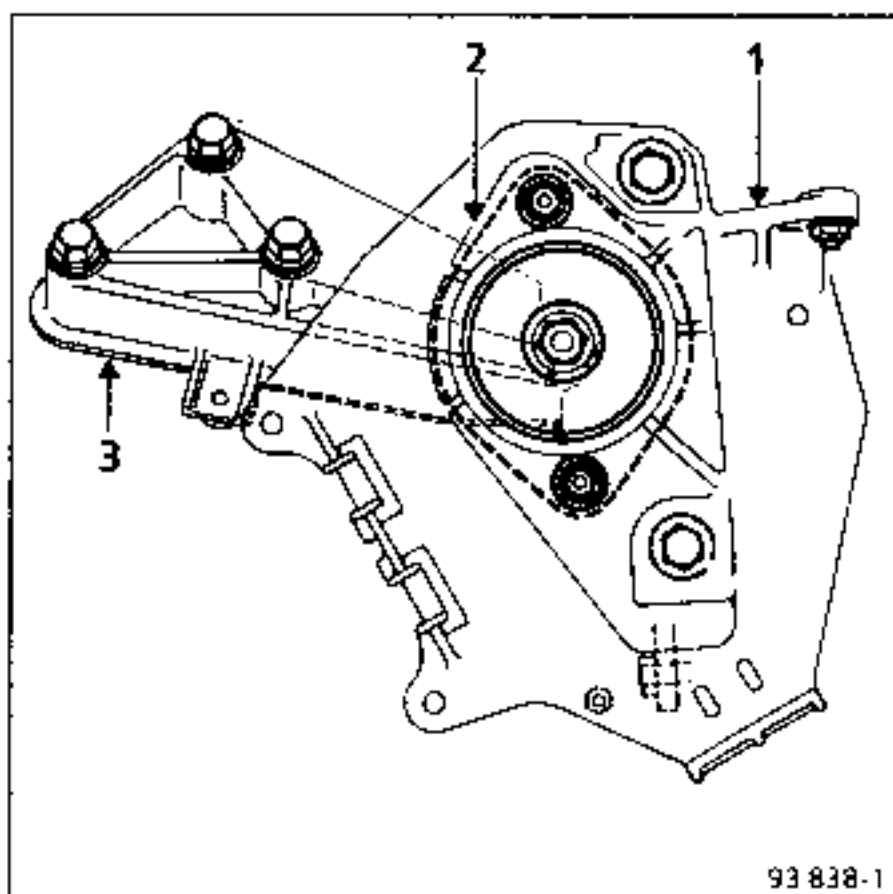
Fit load spreader SEF 689 on the engine lifting rings. Tension the chains so that they support the assembly.



Remove the front right hanging suspension top cover and nut (E).



Mark the position of the left-hand rubber pad (2) in relation to its mounting (1) (both lengthwise and across).



Remove pad support (1), and then the spring pin mounting (3) with its pad.

Take out engine - gearbox assembly by tilting it slightly to the right with the help of SEF 689

### REFITTING (Special Points)

Reposition the engine - gearbox in the engine compartment.

#### Left-hand side

Reposition the pad mounting (1).

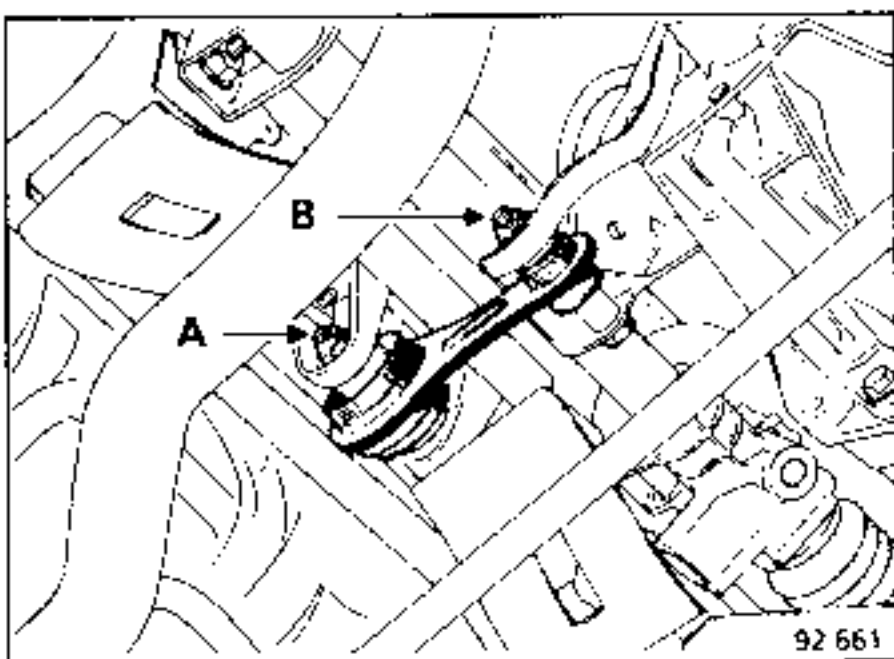
Pre-torque the shock absorber turret nut and the lower pad mounting bolt to a torque of 0.3 daN.m.

Torque tighten the two upper pad mounting bolts to 2 daN.m, and then tighten the lower nut and bolt to the same torque.

#### Right-hand side

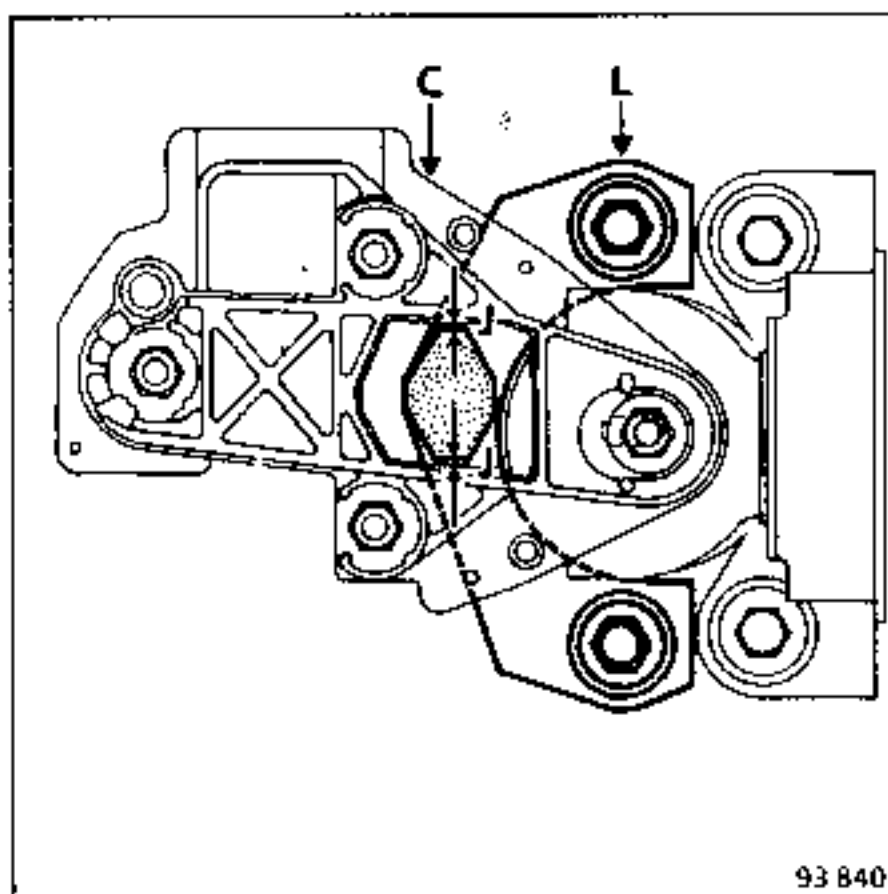
Refit the top (C).

Fit bolt (B) on the torque take-up arm, and then torque tighten the two bolts.



Centre clearance limiter (L) in the gap in the top (C) so that the same clearance (J) is obtained on both sides

Torque tighten all the nuts and bolts.



Fit the brake caliper bolts after first coating them with Loctite **FRENBLOC** and torque tighten them.

Press down on the brake pedal several times in order to bring the pistons into contact with the brake pads.

Apply **CAF 4/60 THIXO** to the drive shaft roll pin holes.

Adjust the accelerator cable.

Fit the speedometer cable.

Fill gearbox to specified level.

Fill and bleed cooling system.

Bleed diesel filter.

## ESSENTIAL SPECIAL TOOLS

Mot. 1 040 -01	Dummy cradle for removing and refitting power unit assembly
Mot. 1 159 1 159 -01	Engine support tool
Mot. 1 202	Clip pliers for MB type hose clips

## TIGHTENING TORQUES (in daN.m)



## Cradle securing bolts :

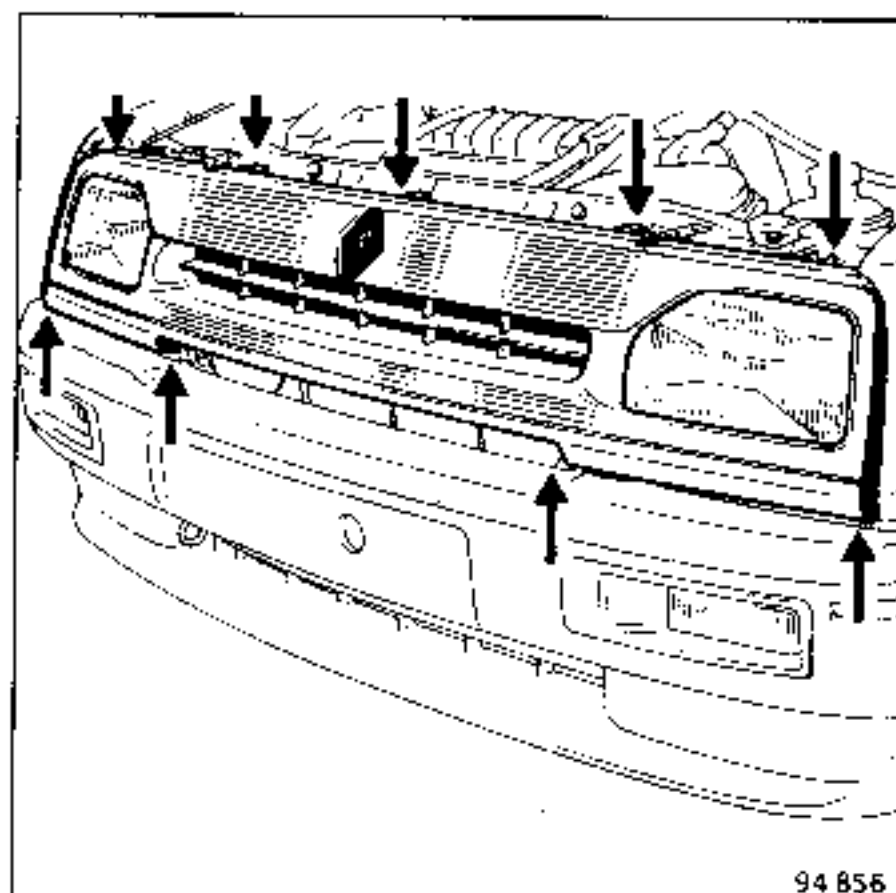
- Front	6
- Rear	11
Shock absorber upper cup securing bolt	2.5
Brake caliper securing bolt	10
Steering column universal joint securing bolt	3
Wheel bolt	9
Nut securing rubber pad to front left-hand side member mounting	7.5
Bolt securing top of front right-hand hanging suspension to engine	4.5
Nut securing top of hanging suspension to rubber pad (Assembly with captive washer Ø 24)	* 2.7
* If other assembly	4.5

Mount vehicle on two-post lift.

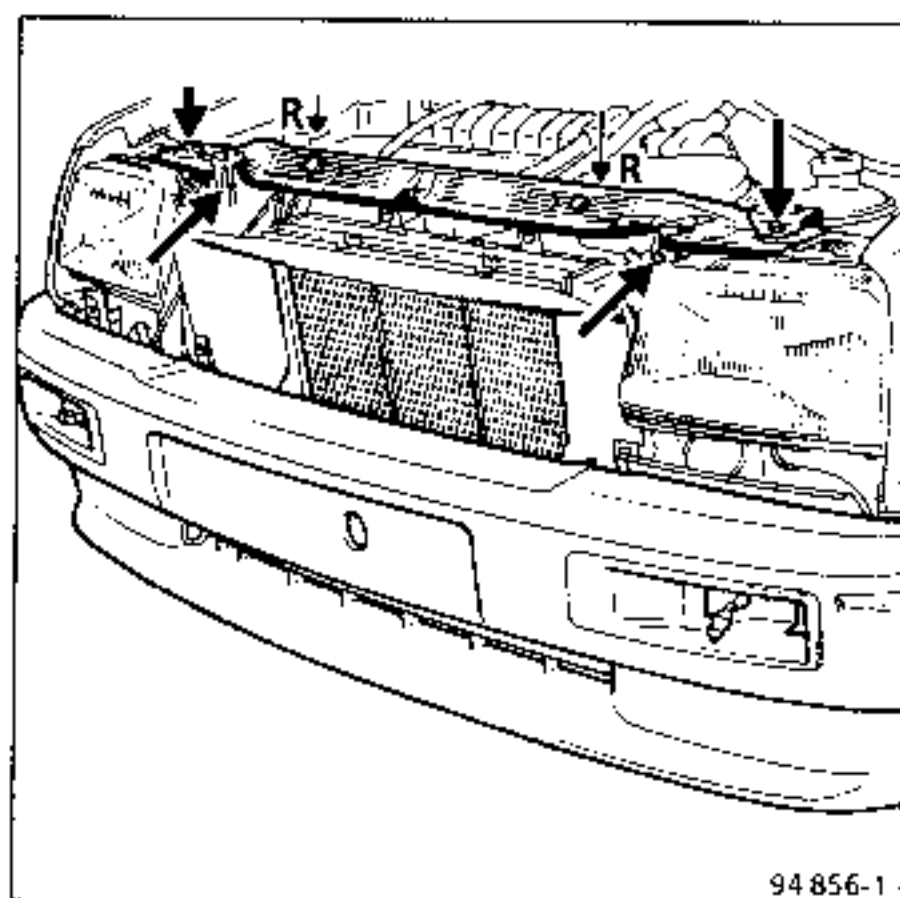
Disconnect the battery.

## Remove:

- the front wheels,
- the radiator grille,
- the upper cross member and the radiator securing clamps (R).



94 856

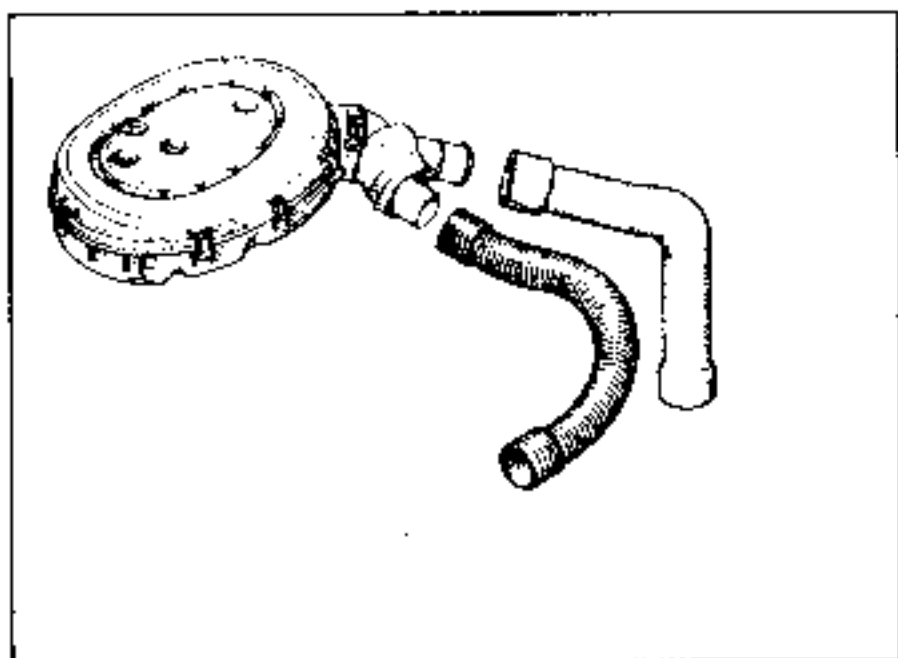


94 856-1

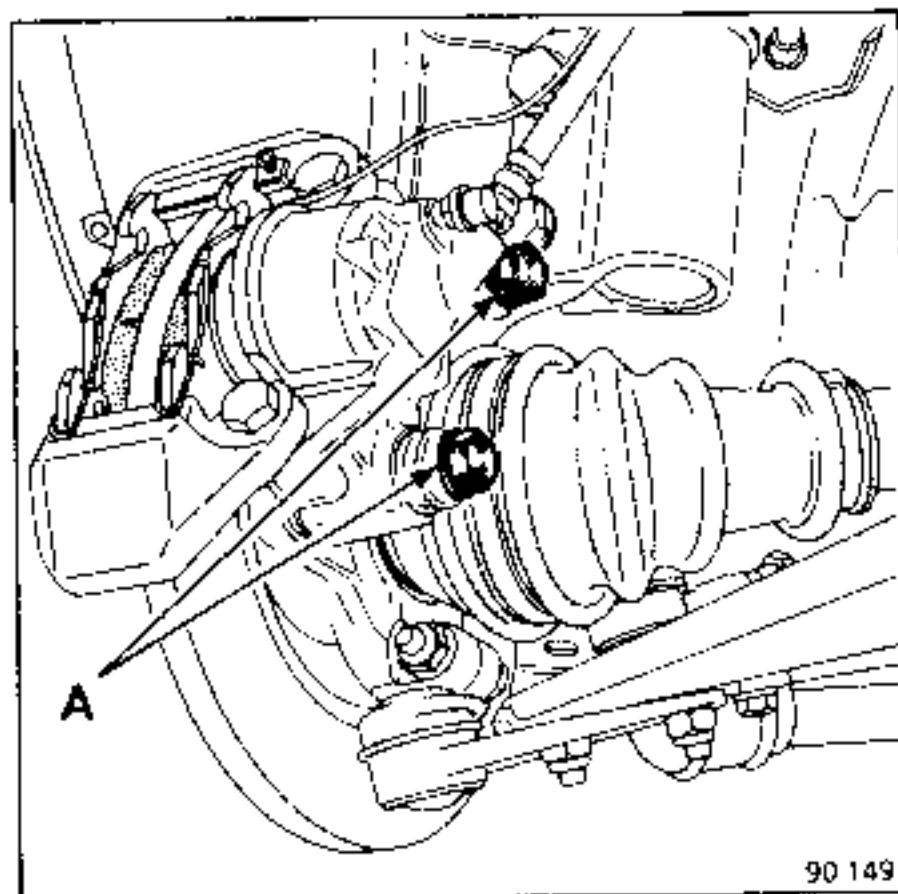
Drain the cooling circuit (Mot. 1202).

## Remove :

- the air filter and ducts,



- the radiator with the coolant fan motor.
- tie rods connecting the body shell to the cradle and the bolts (A) securing the brake calipers, which are to be secured to the body shell.

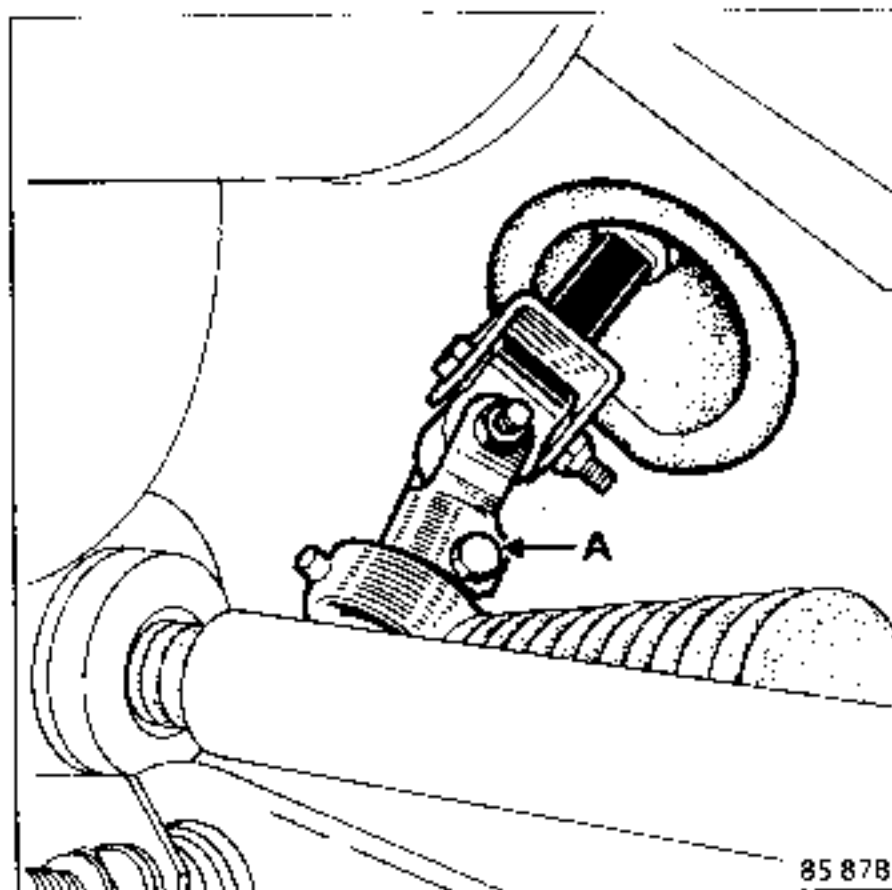


## Disconnect:

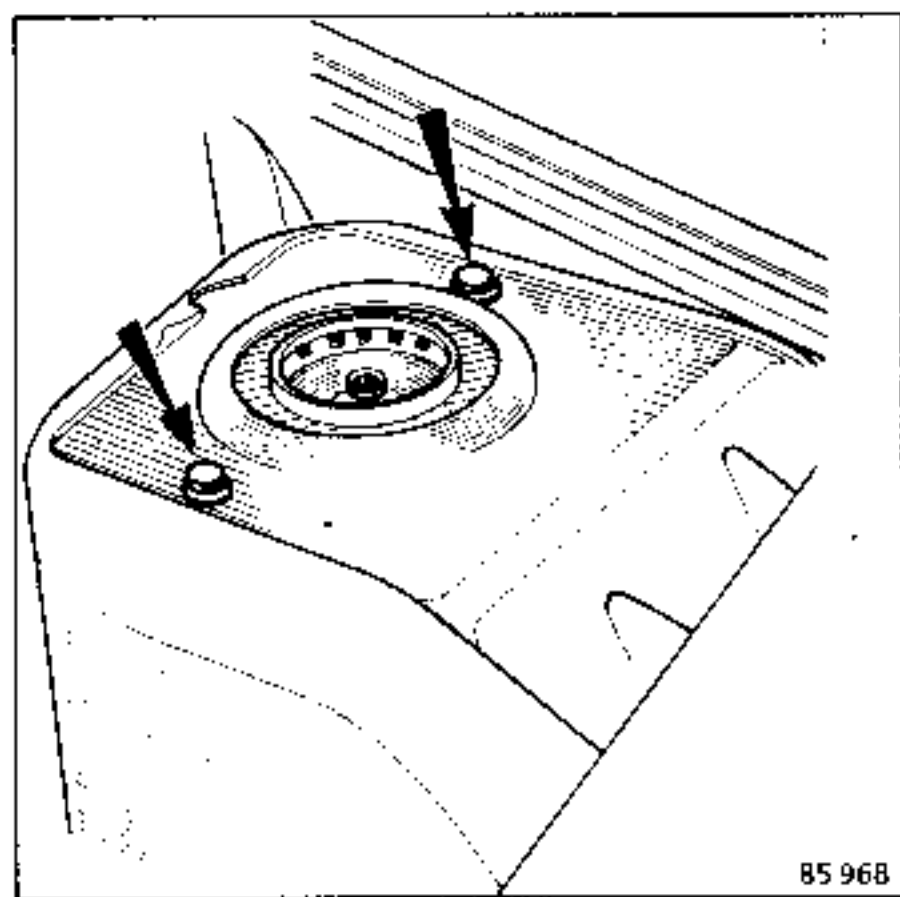
- the electrical connectors in the front left-hand wing and the harness for the AEI or MPA unit.
- the earth braiding to the bodywork at the scuttle,
- the starter and alternator wiring,
- the accelerator, choke, clutch and tachometer cables,
- the following pipes:
  - fuel pipes and carburettor float chamber venting pipes,
  - vacuum pipes for brakes and AEI or MPA unit,
  - heating ducts on the scuttle.

## Remove:

- the bolt (A) for the steering column universal joint,
- the gear lever control at the gearbox end (turn it round and attach it to the exhaust pipe),
- the exhaust tailpipe clamp (silencer end),

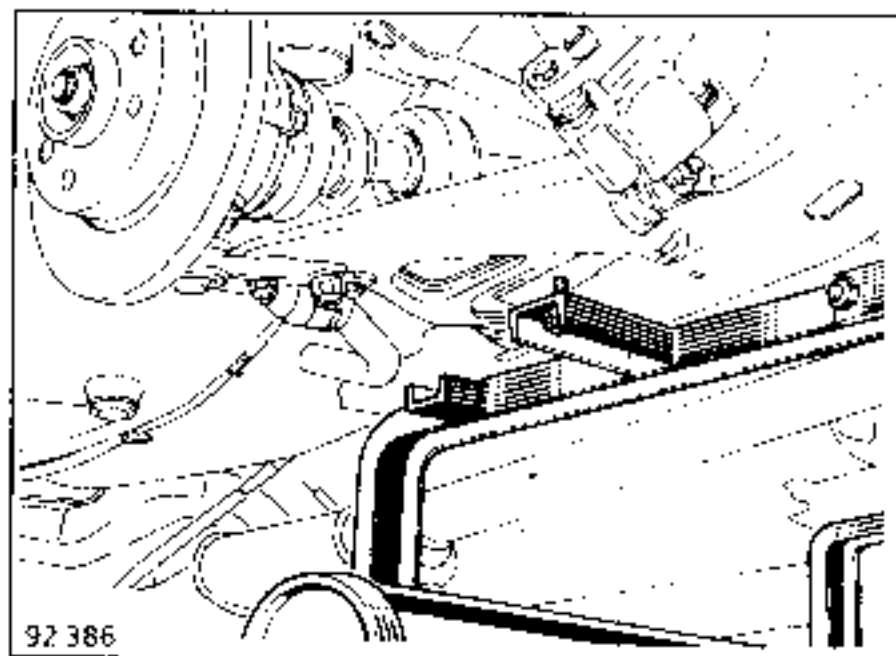


- the bolts for the upper shock absorber cups.



- the gear lever control at the gearbox end (turn it round and attach it to the exhaust pipe),
- the clamp of the exhaust downpipe

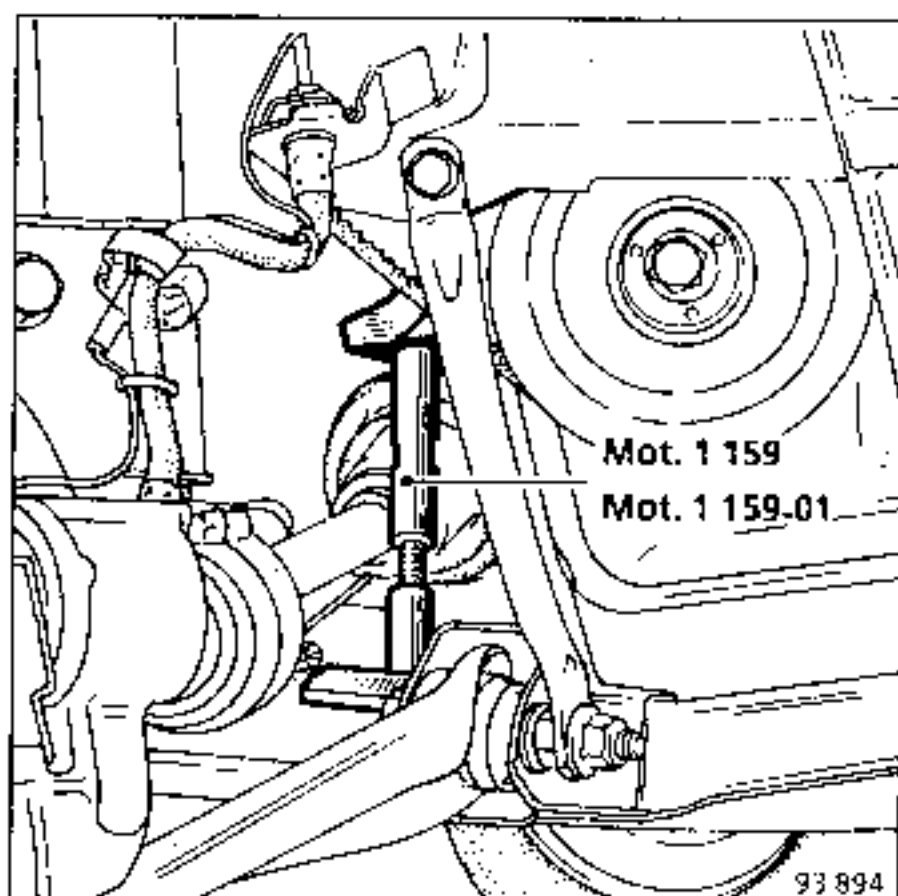
Secure tool **1040-01** with rollers at upper position on cradle.



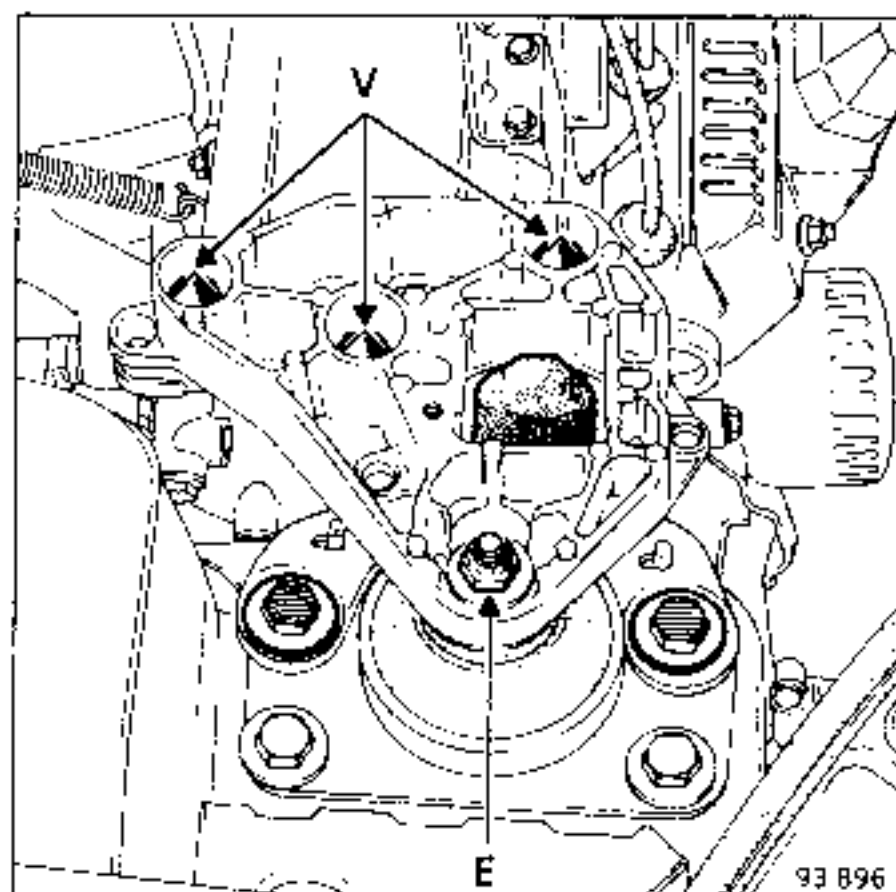
Release cradle securing bolts.

Lower vehicle until it makes contact with the ground.

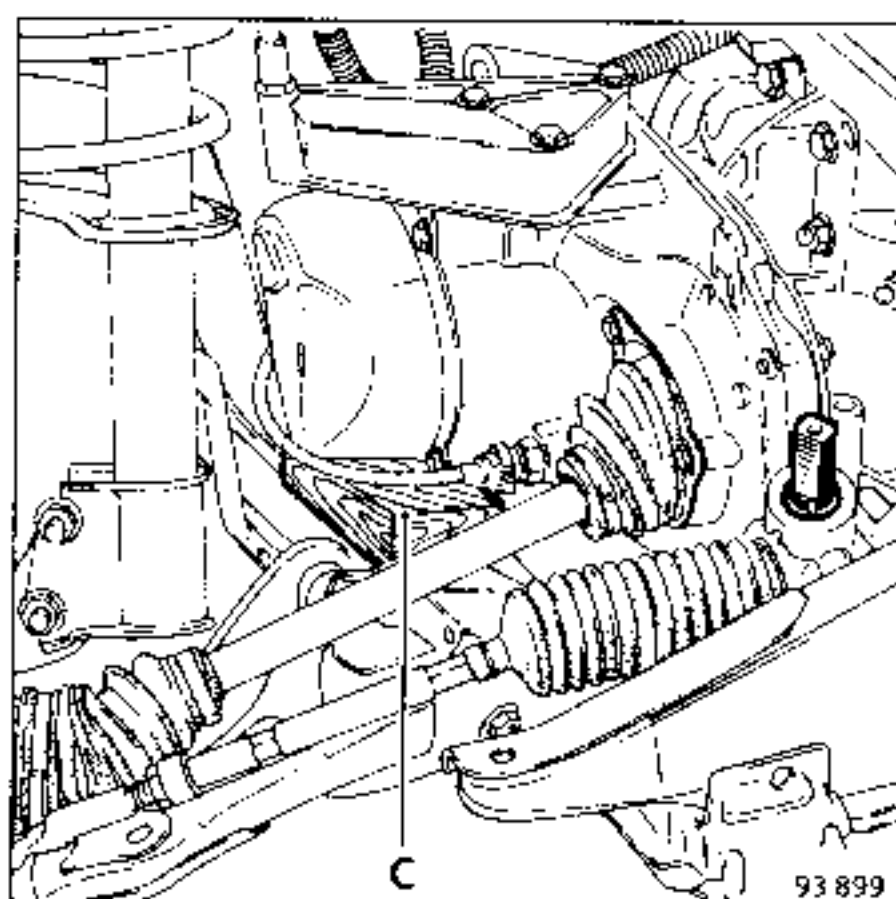
Place **Mot. 1159-01** between the cradle and the engine block. Relieve strain on engine slightly.



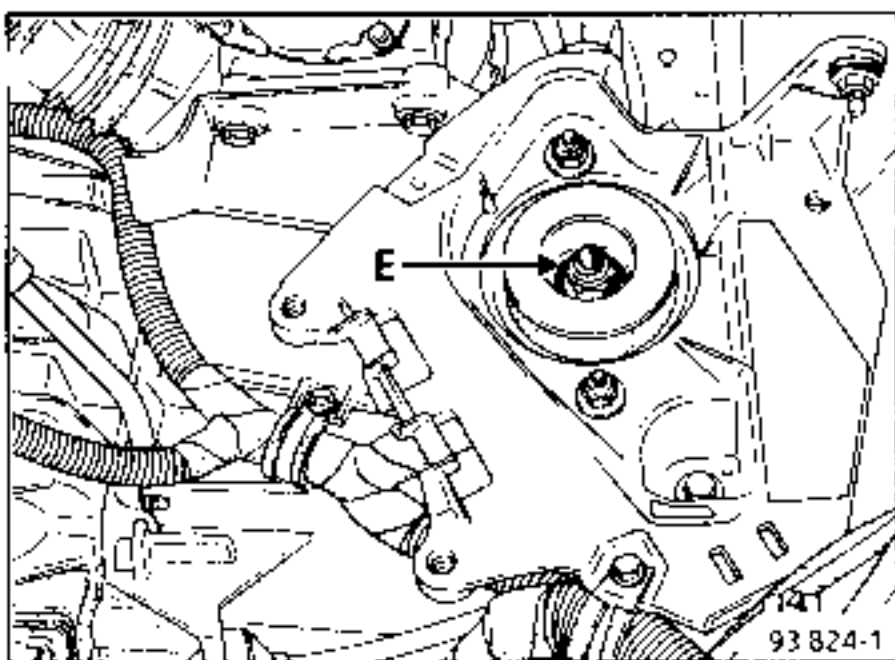
Remove top cover and hanging suspension top (bolt **V**, nut **E**)



Fit a 3 cm block of wood at **(C)** between the gearbox and the left side of the cradle.



Remove nut (E) then, using a bronze drift, knock the stud to release the hanging suspension mounting on the left-hand side.



Remove the 4 cradle mounting bolts, raise the body shell and release the engine - gearbox assembly, having first attached the spring - shock absorber assemblies and the radiator to the engine using string.

### REFITTING (Special Points)

Position the engine - gearbox assembly under the body shell and lower the latter.

Torque tighten the cradle front mounting bolts to **6 daN.m** and the rear mounting bolts to **11 daN.m**.

When the right-hand and left-hand hanging suspension mountings have been refitted, remember to remove the wooden block from under the gearbox as well as tools **Mot. 1159** and **1159-01**.

Torque tighten the nuts and bolts.



Fit the brake caliper bolts after first coating them with **Loctite FRENBLOC** and torque tighten them.

Press down the brake pedal several times in order to bring the pistons into contact with the brake pads.

Adjust the accelerator cable.

Fit the speedometer cable.

Top up and bleed the cooling system.

### ESSENTIAL SPECIAL TOOLS

Mot. 1 040 -01	Dummy cradle for removing and refitting the power unit assembly
Mot. 1 159 1 159 -01	Engine support tool
Mot. 1 202	
	Clip pliers for MB type hose clips

### TIGHTENING TORQUES (in daN.m)



#### Cradle securing bolts :

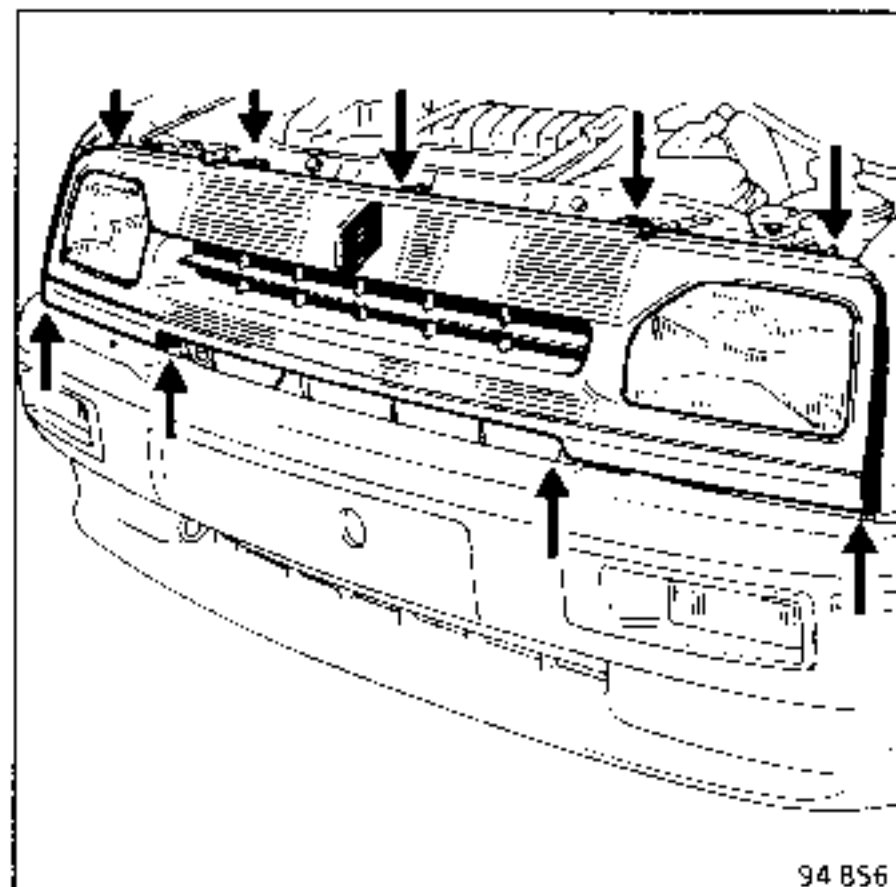
- Front	6
- Rear	11
Shock absorber upper cup securing bolt	2.5
Brake caliper securing bolt	10
Steering column universal joint securing bolt	3
Wheel bolt	9
Nut securing rubber pad to front left-hand side member mounting	7.5
Bolt securing front right-hand hanging suspension top to engine	4.5
Nut securing hanging suspension top to rubber pad (Assembly with captive washer Ø 24)	* 2.7
* If other assembly	4.5

Mount the vehicle on a 2-post lift.

Disconnect the battery.

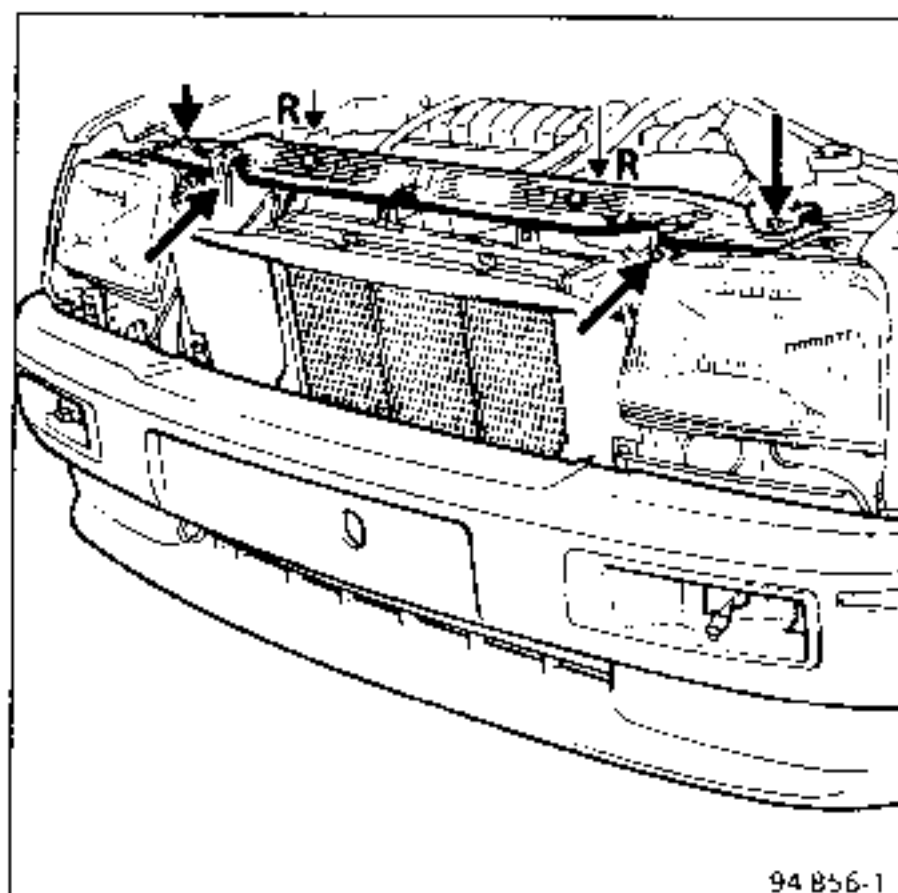
Remove :

- the front wheels,
- the radiator grille,



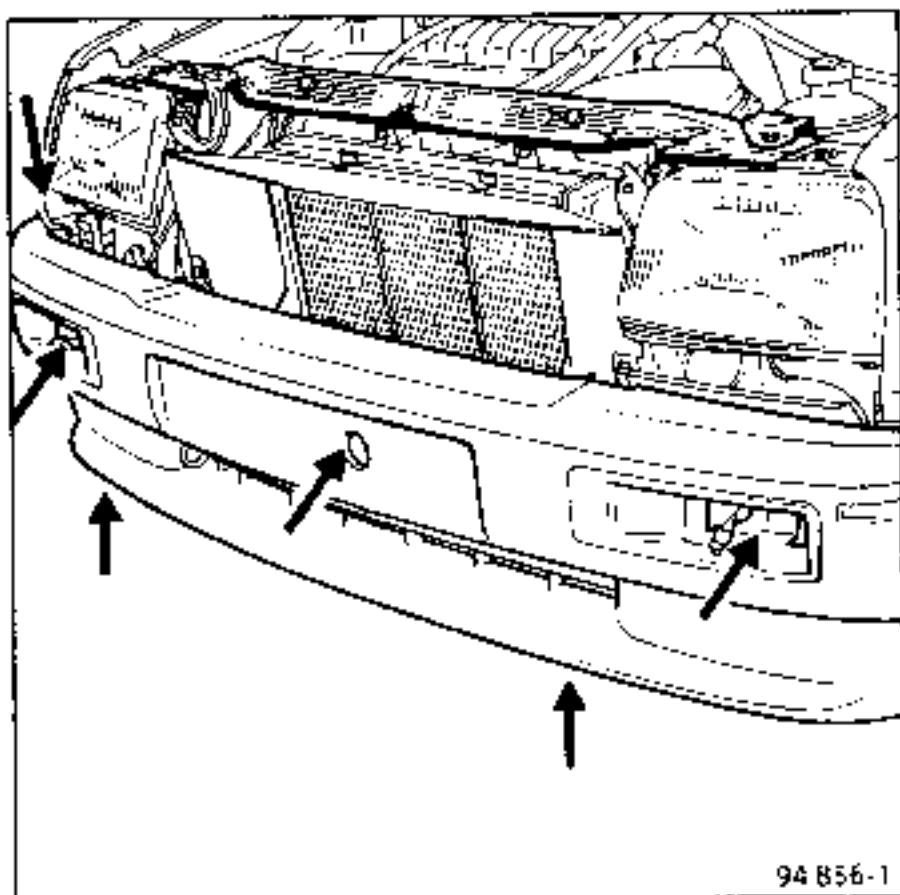
94 B56

- the upper cross member and radiator securing clamps (R).

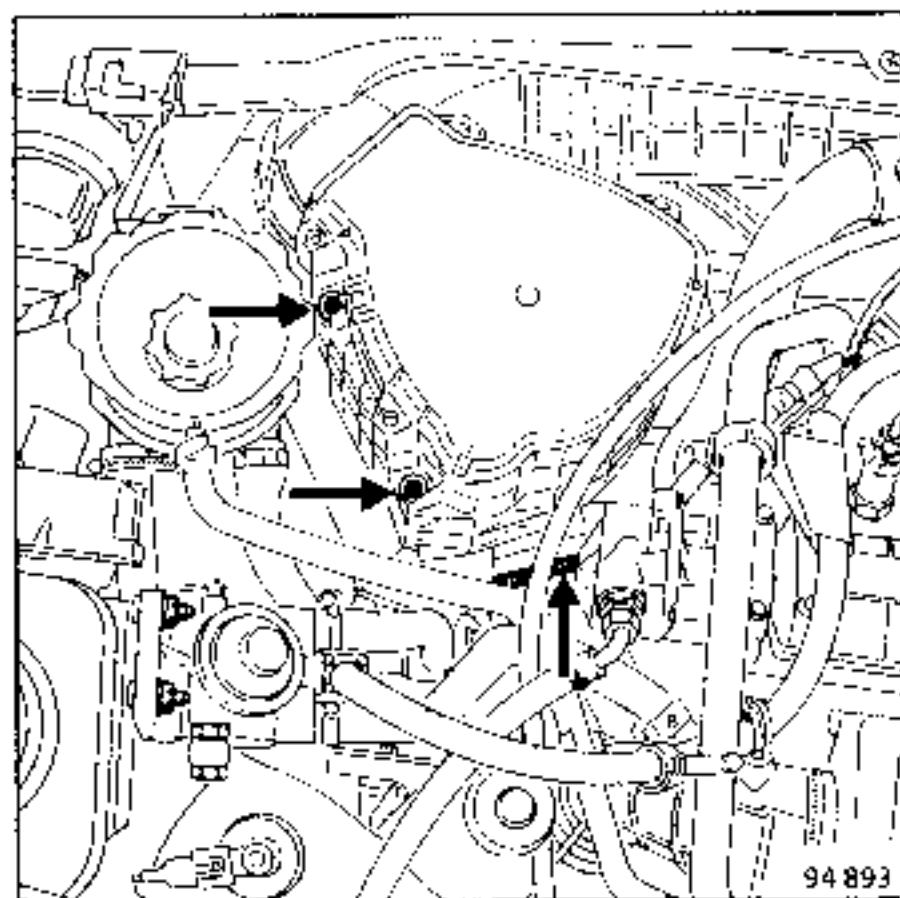


94 B56-1

- The bonnet and shield.
- Drain the cooling system (disconnect hoses on radiator) (Mat. 1202).



- Remove :
- air filter and support,



- the radiator and the cooling fan motor.

Disconnect:

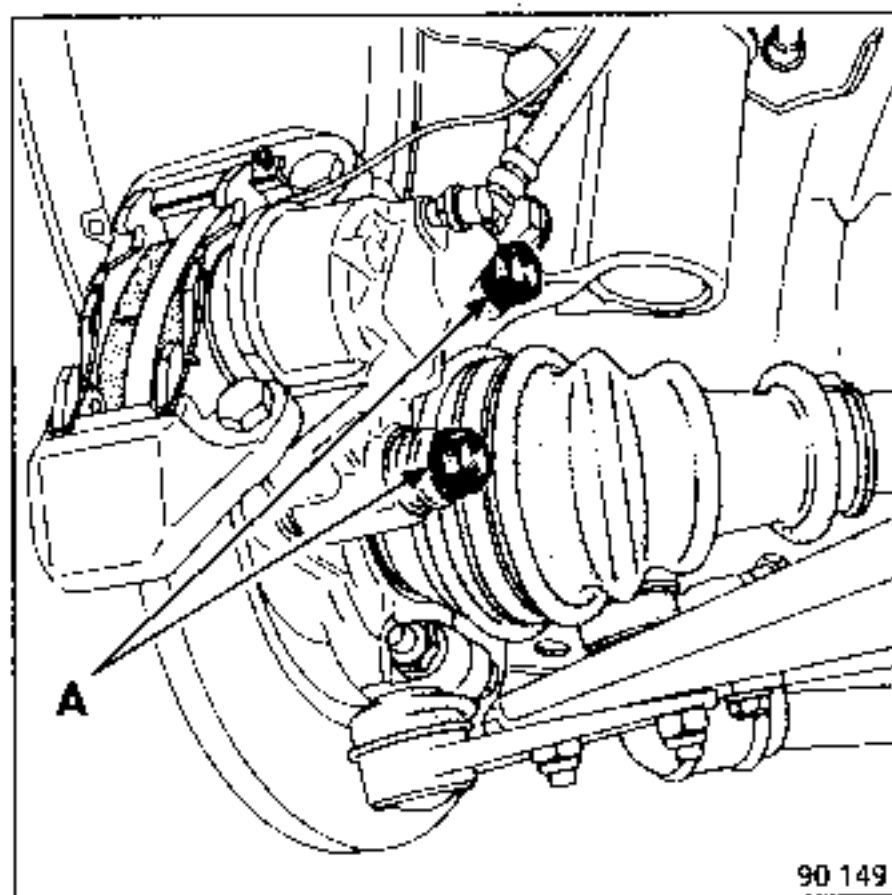
- the electrical connectors,
- accelerator and clutch cables,
- the earthing braid on the scuttle under the battery and the reverse gear switch,
- the wiring on the preheating unit,
- the diesel supply and return pipes,
- the brake servo vacuum pipe,
- the radiator heating pipes on the scuttle,
- the tachometer cable,
- the starter cable.

Remove :

- the diesel filter with its support and the cooling system reservoir. Secure to engine vertically.

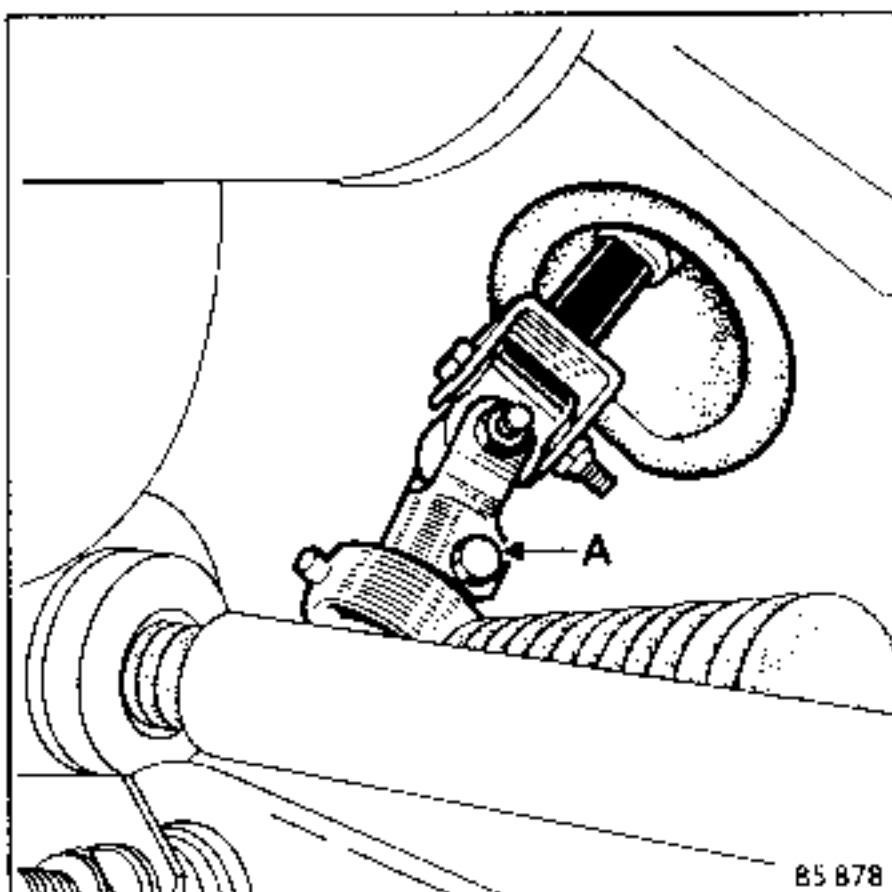
Remove :

- The tie rods between the body shell and the cradle together with the brake calipers. Secure them to body shell (A),

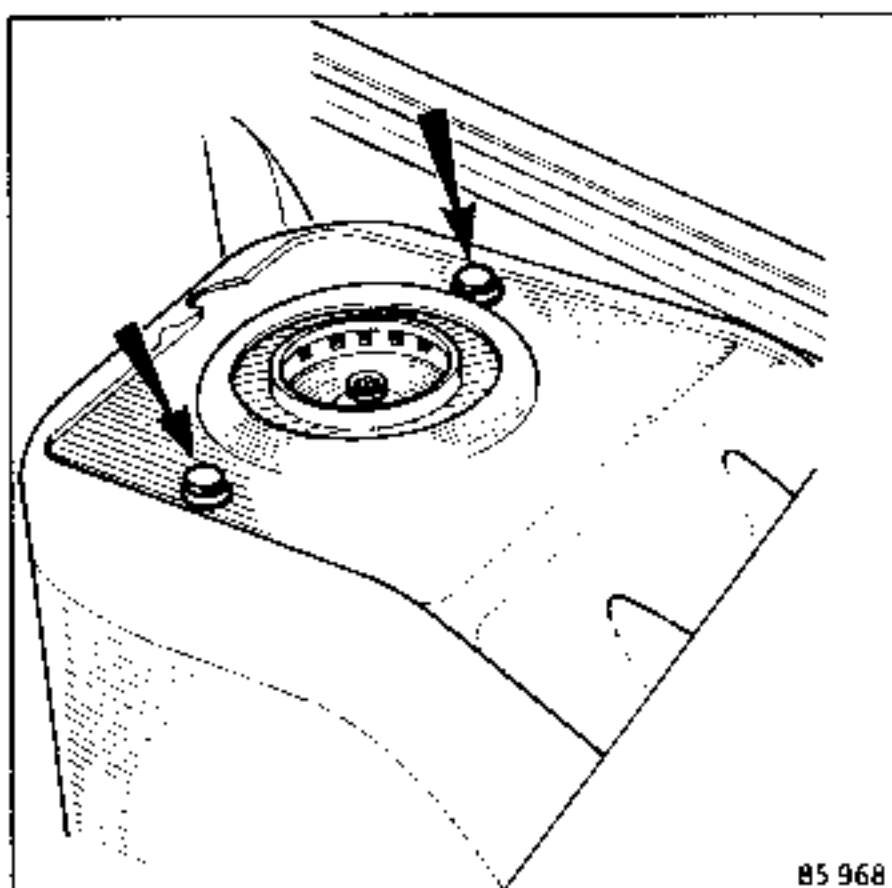




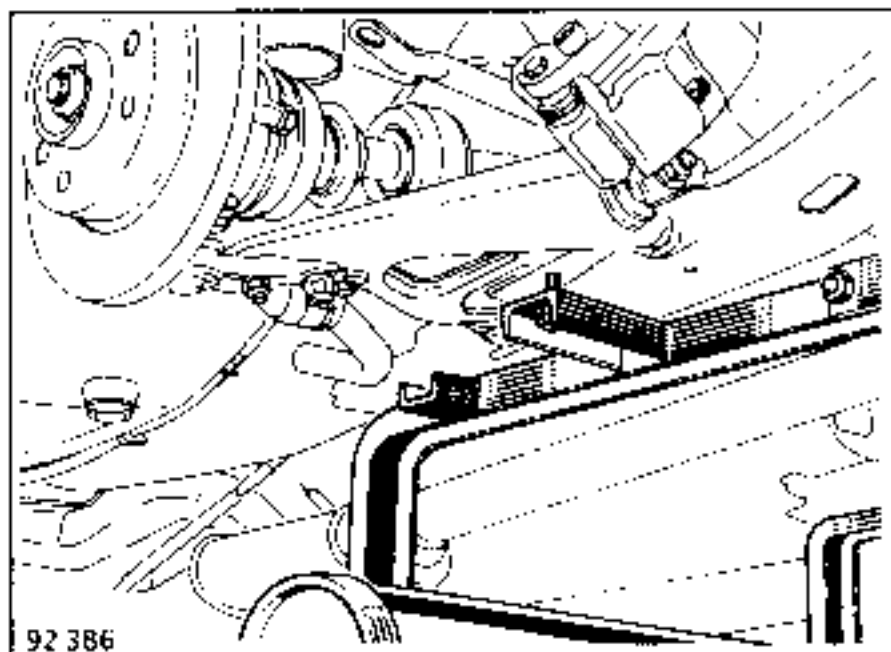
- The steering column universal joint bolt (A)
- The gear lever control at gearbox end (Turn it and attach to exhaust pipe.)
- Exhaust pipe flange (at silencer end)



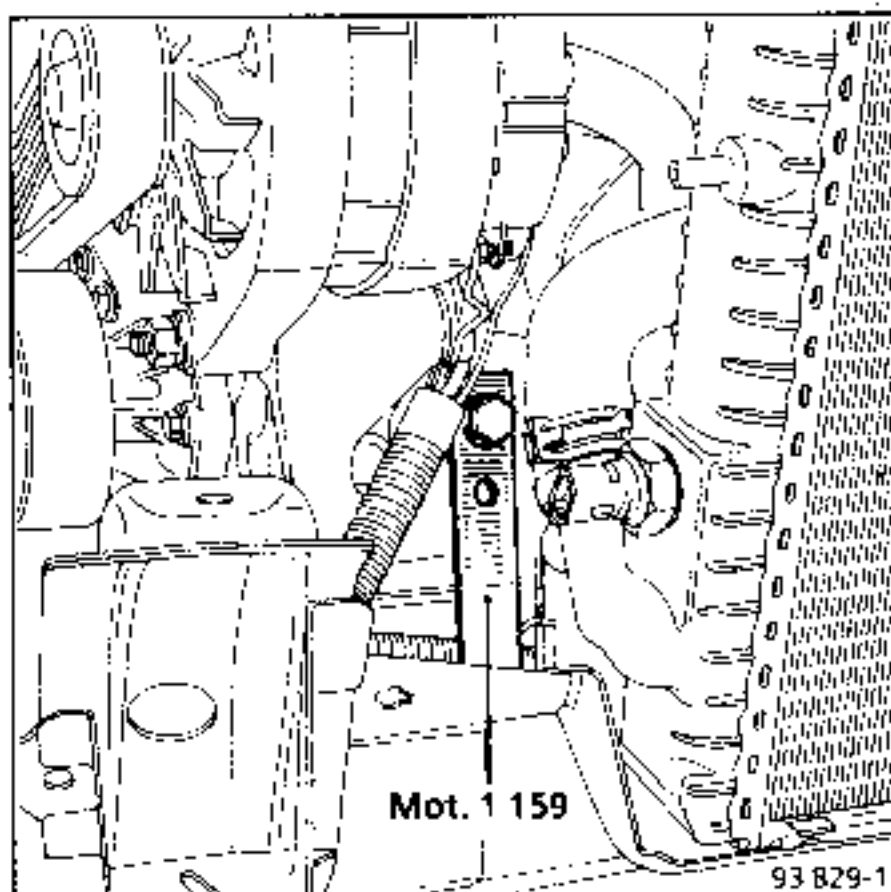
- Release the diesel supply pipe which is secured along the steering rack on the cradle.
- The shock absorber upper cup securing bolts.

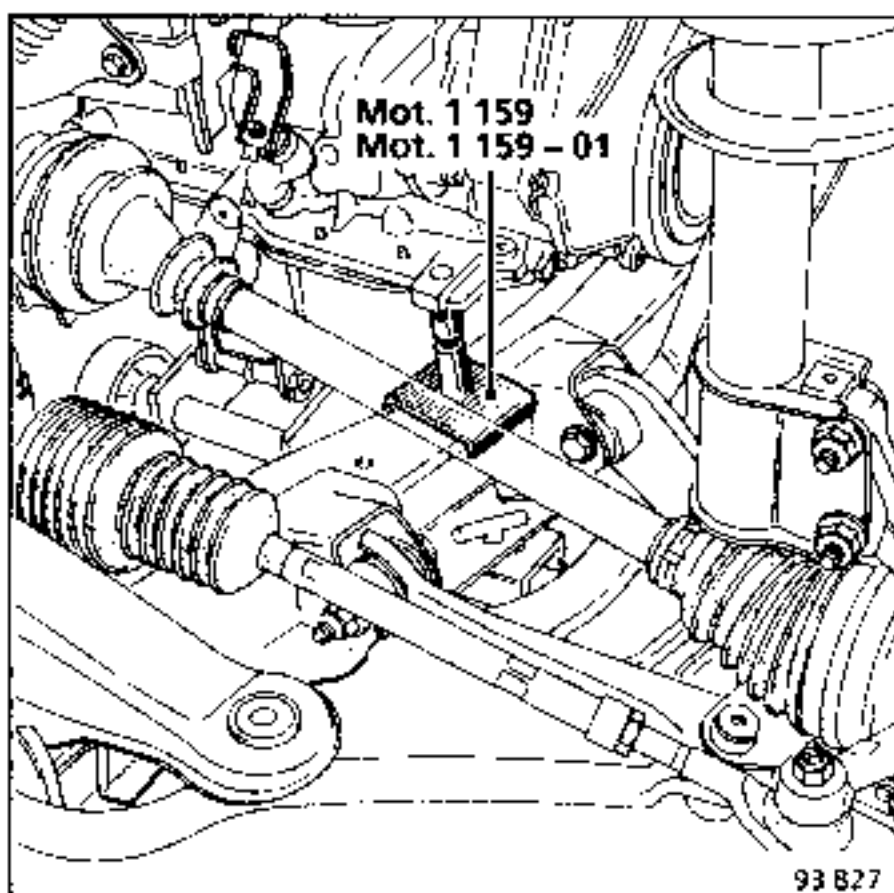


Secure tool **Mot. 1040-01** with rollers in upper position under cradle

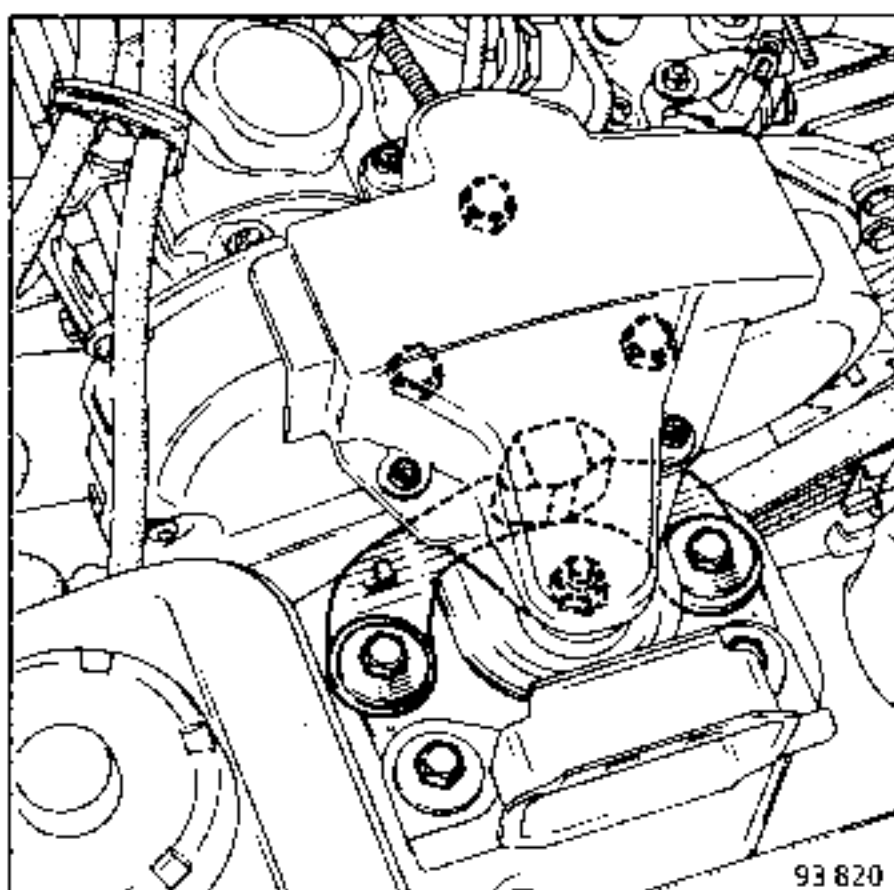


Fit **Mot. 1159** and **1159-01**.

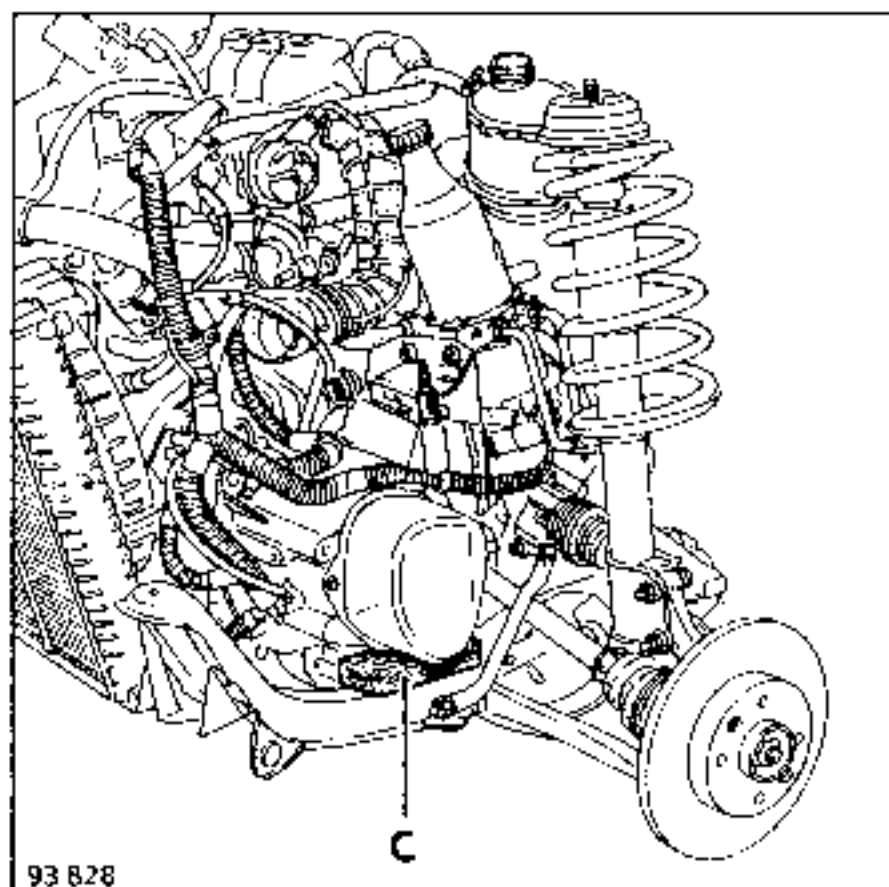




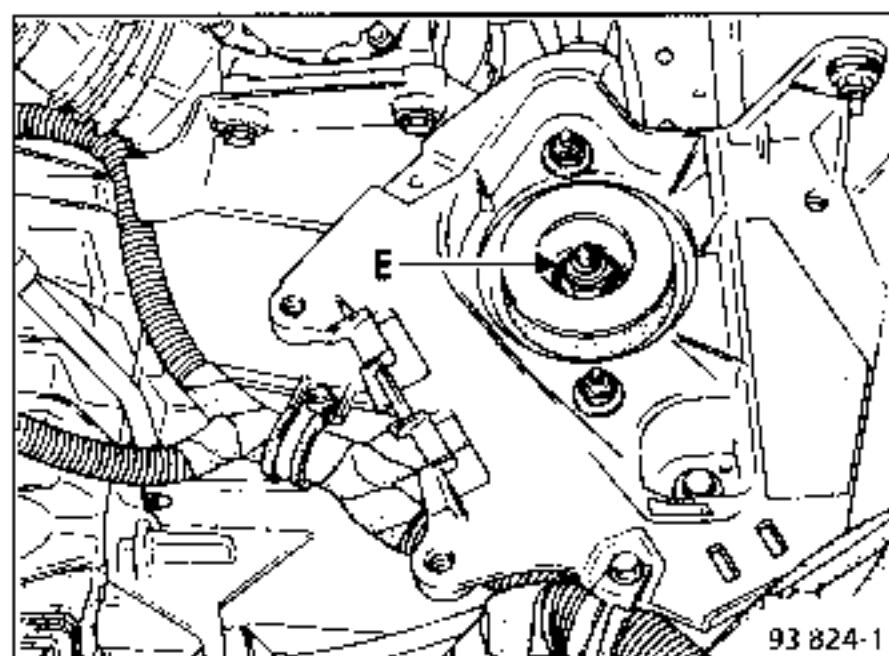
Remove hanging suspension top on right-hand side.



Fit a wooden block (C) between the gearbox and the cradle at the left-hand side.



Remove nut (E) then, using a bronze drift, knock the stud to release the hanging suspension mounting on the left-hand side.



Remove the 4 cradle mounting bolts, raise the body shell and release the engine - gearbox assembly, having first attached the spring - shock absorber assemblies to the engine using string.

## REFITTING (Special Points)

Position the engine - gearbox assembly under the body shell and lower the latter.

Torque tighten the cradle front mounting bolts to **6 daN.m** and the rear mounting bolts to **11 daN.m**.

When the right-hand and left-hand hanging suspension mountings have been refitted, remember to remove the wooden block from under the gearbox as well as tools **Mot. 1159** and **1159-01**.

Torque tighten nuts and bolts.

 Fit the brake caliper bolts after first coating them with Loctite **FRENBLOC** and torque tighten them.

Press down on the brake pedal several times in order to bring the pistons into contact with the brake pads.

Adjust the accelerator cable.

Fit the speedometer cable.

Fill the cooling system to the specified level and bleed it.

Bleed the diesel filter

## ESSENTIAL SPECIAL TOOLS

50 mm Torx end piece

Workshop crane lifting hook and chain

## TIGHTENING TORQUES (In daN.m)



Sump bolts

0.7 to 0.9

Mount vehicle on a two-post lift

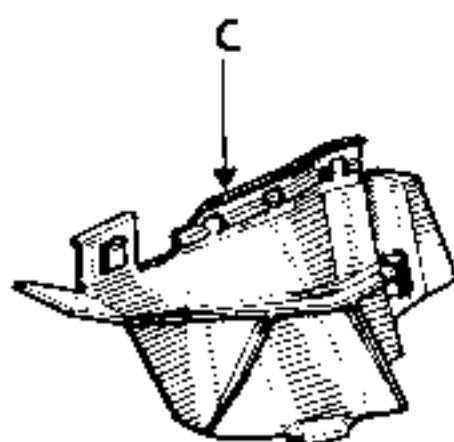
## REMOVAL

Disconnect the battery.

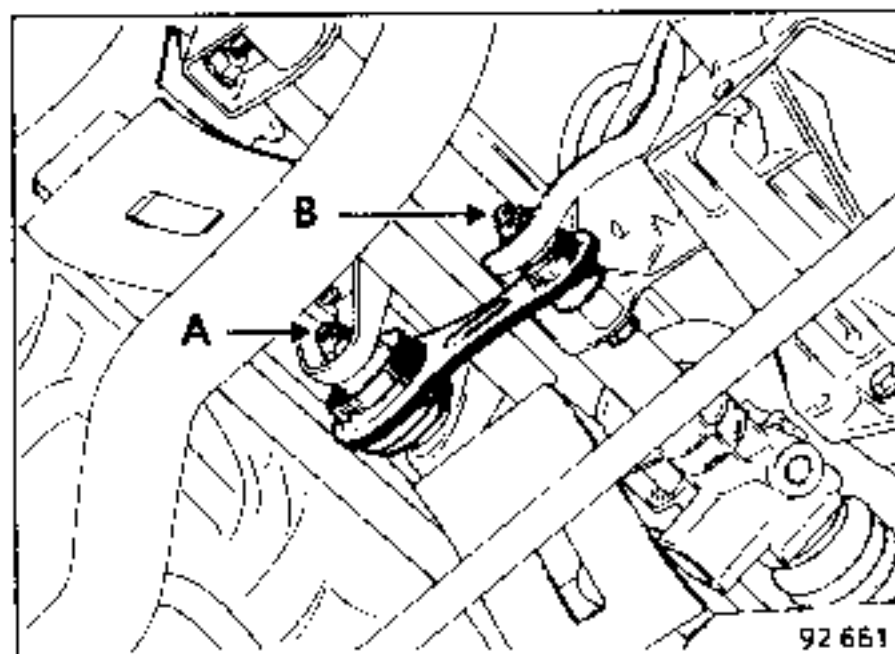
Drain oil from engine

Remove:

- the bonnet,
- the air filter and its mounting,
- the front right-hand wheel,
- the front right-hand wheel arch deflector (C)

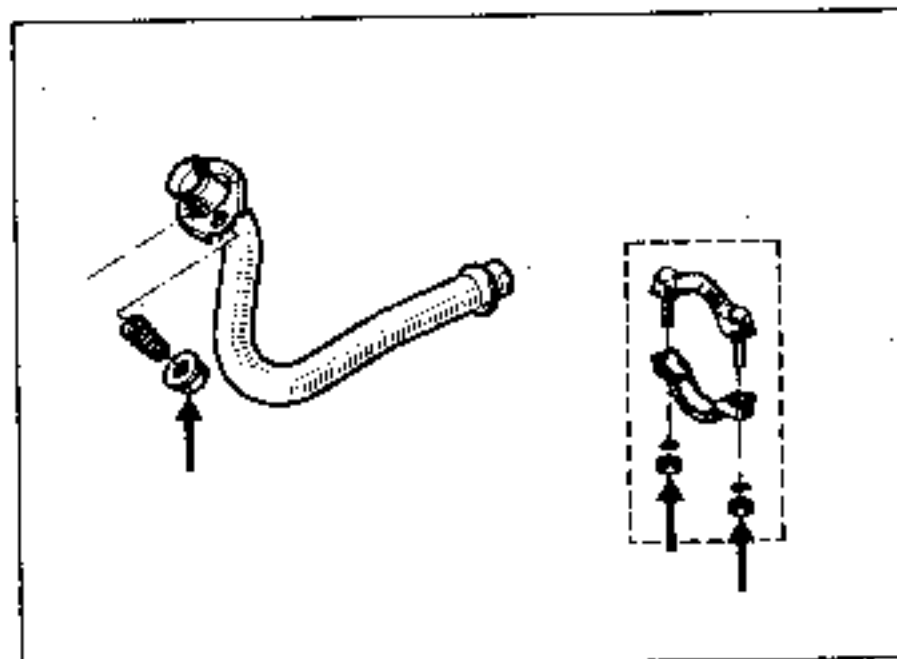


Unscrew but do not remove bolt (A) and remove bolt (B) from the hanging suspension arm. Release the arm.

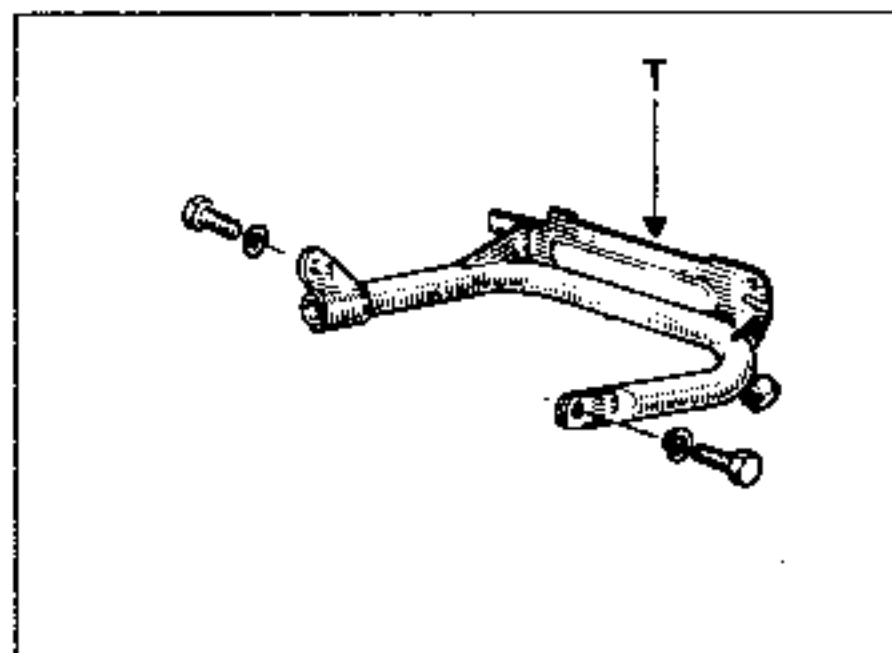


Remove:

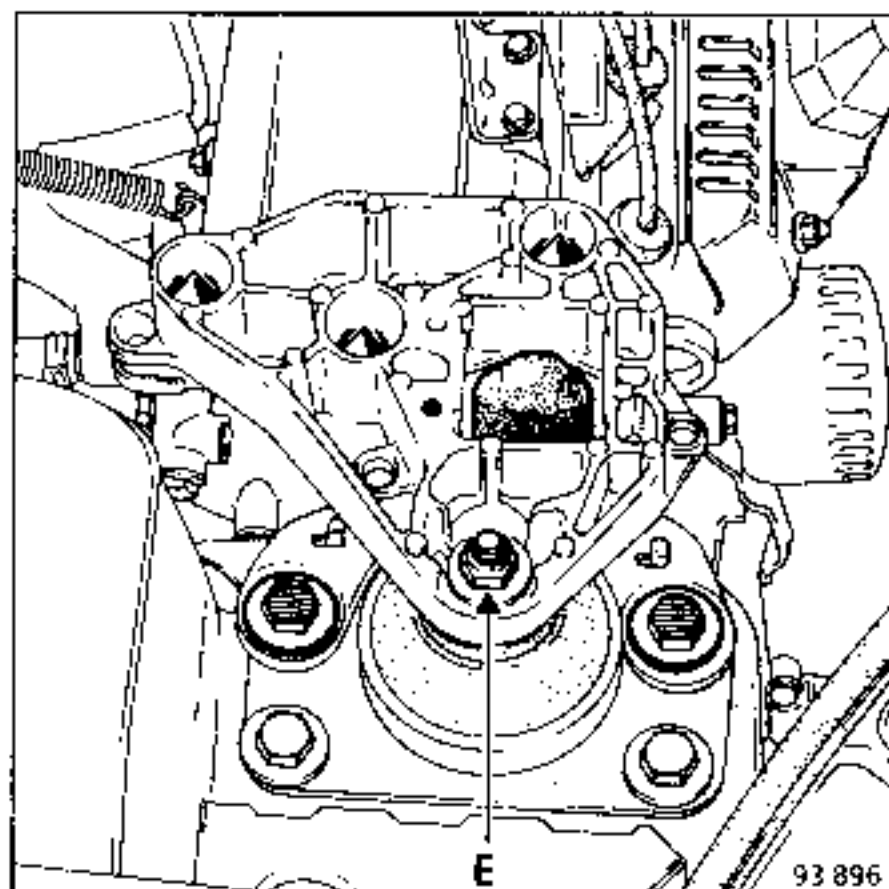
- the exhaust pipe,



- the engine - gearbox tie rod (T).



- the sump mounting bolts (leave one or two to hold it in place),
- the nut (E) securing the hanging suspension on the right-hand side.



Take the weight off the engine with the crane and chain and release the sump.

#### **REFITTING (Special Points)**

Proceed in reverse order to removal.

Top up engine with the specified oil.

## ESSENTIAL SPECIAL TOOLS

50 mm Torx type end piece

## TIGHTENING TORQUES (in daN.m)



Sump bolts

1.2 to 1.5

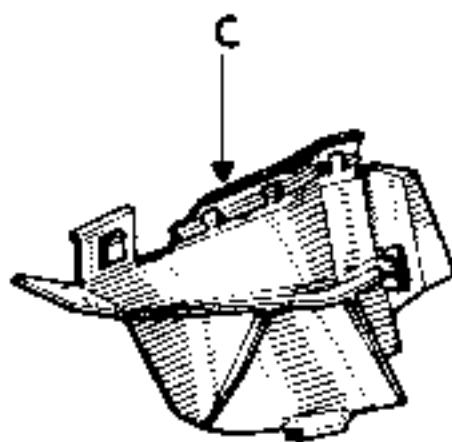
## REMOVAL

Disconnect the battery.

Drain oil from engine.

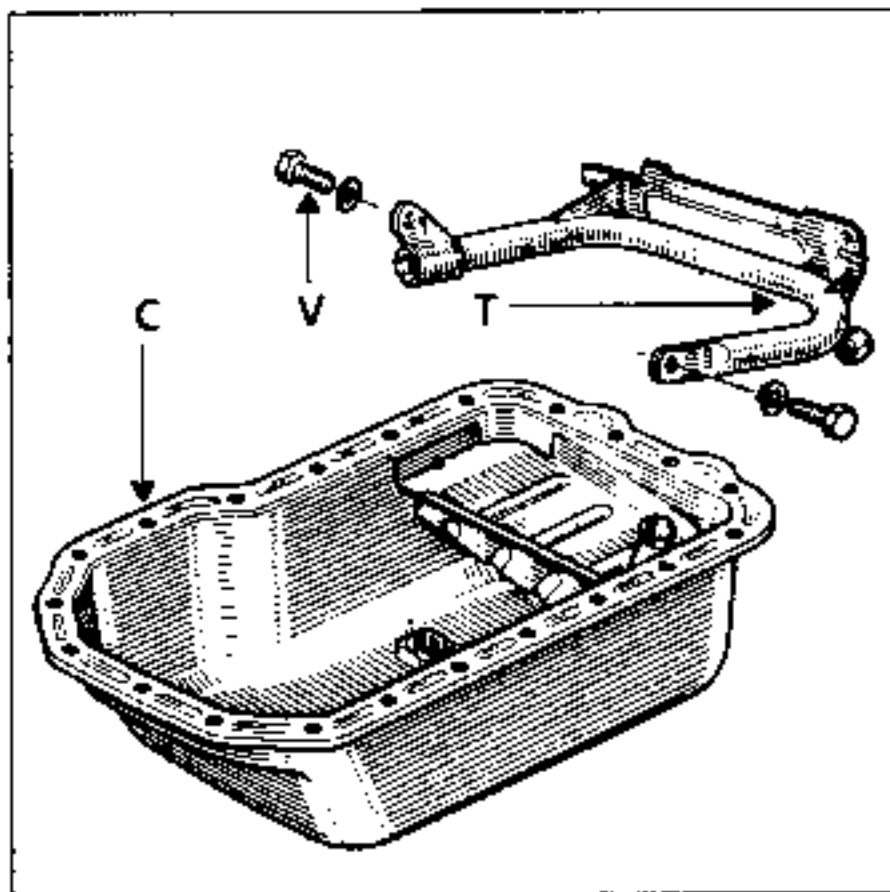
Remove:

- the front right-hand wheel,
- the front right-hand cover (C),



- the engine-gearbox tie rod (T).

**NOTE :** Bolt (V) is removed using a 50 Torx type end piece (example : Ex 250 from Facom) and an 8 mm single end wrench.



- the sump bolts (the engine must be raised in order to release the sump).

Release the sump.

## REFITTING

Clean the gasket joint face

Apply a bead (C) of **CAF 4/60 THIXO** paste over the entire sump bearing face.

Position the sump.

Secure the sump to the engine

Refit:

- the engine-gearbox tie rod,
- the front right-hand cover,
- the front right-hand wheel.

Top up the engine with the recommended oil.

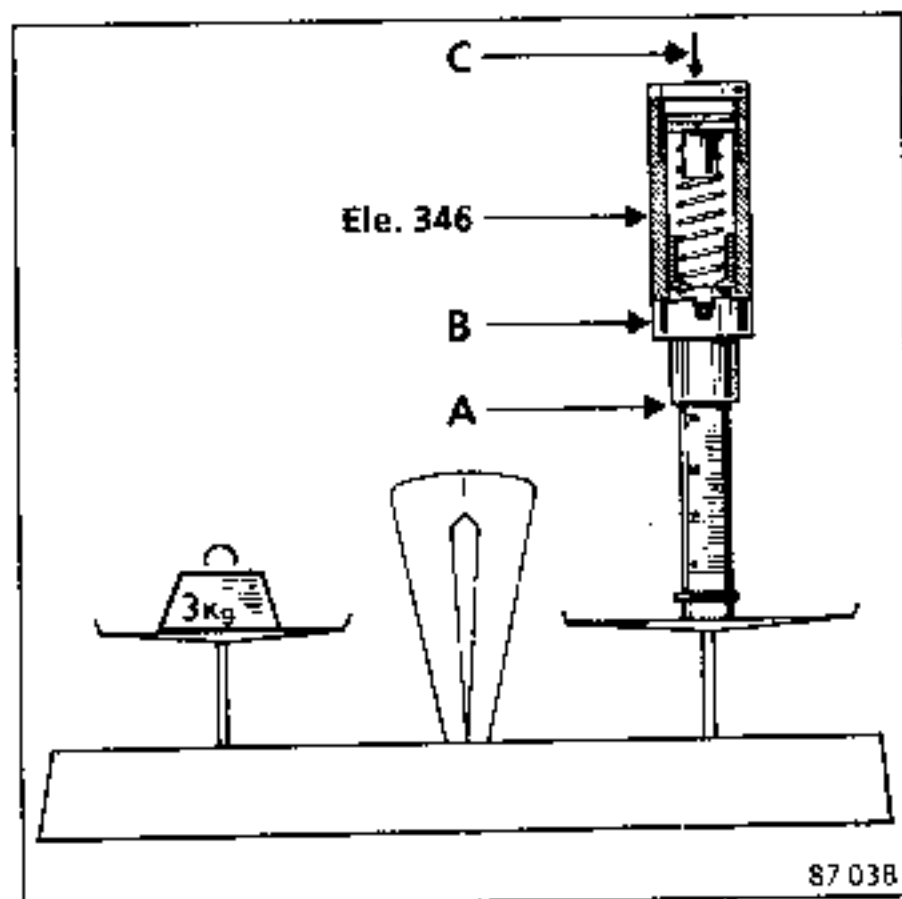
ESSENTIAL SPECIAL TOOLS		
Elé.	346-04	Belt tension tester
B. Vi.	906	Torque meter

### CALIBRATING TOOL Elé. 346

There are two methods:

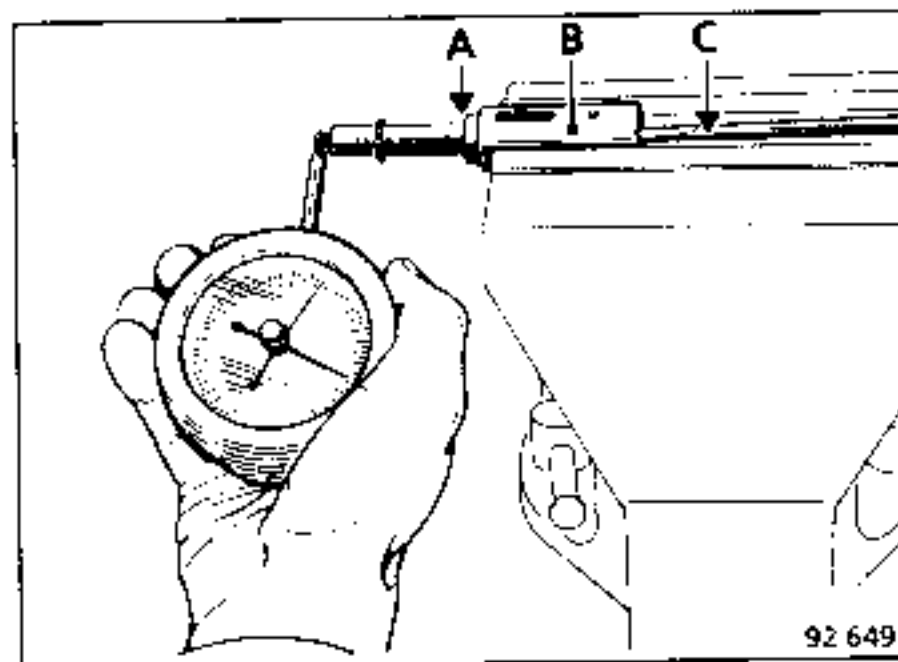
The calibration of tool **Elé. 346** must be checked before it is used the first time (new tool) and regularly thereafter.

#### 1st method :



Apply a load of **3 daN** to the tool (3 kg weight). Plunger (A) should be flush with body (B). If it is not, turn screw (C) to increase or decrease spring tension.

#### 2nd method :



Secure tool **Elé. 346** in a vice after removing the blanking plug. Apply the cylindrical part of tool **B. Vi. 906** at the end of the sliding part. Plunger (A) should be flush with body (B) when the needle indicates **3 daN**. If it does not, turn screw (C) to increase or decrease the spring tension.

## REPLACEMENT

## ESSENTIAL SPECIAL TOOLS

Mot. 1135-01	Timing gear belt tensioner tool
Elé. 346 -04	Tool for checking belt tension
Mot. 1159 -01 1159	Engine support tool

## TIGHTENING TORQUES (in daN.m)



Front left-hand hanging suspension top nut (fitted with captive washer Ø 24)	* 2,7
Wheel bolt	9
Tensioner roller nut	5
Hanging suspension top bolt	4,5
Hanging suspension limiter bolt	5,5
Crankshaft pulley	8 to 9
* If other assembly	4,5

Mount vehicle on a two-post lift

Disconnect the battery.

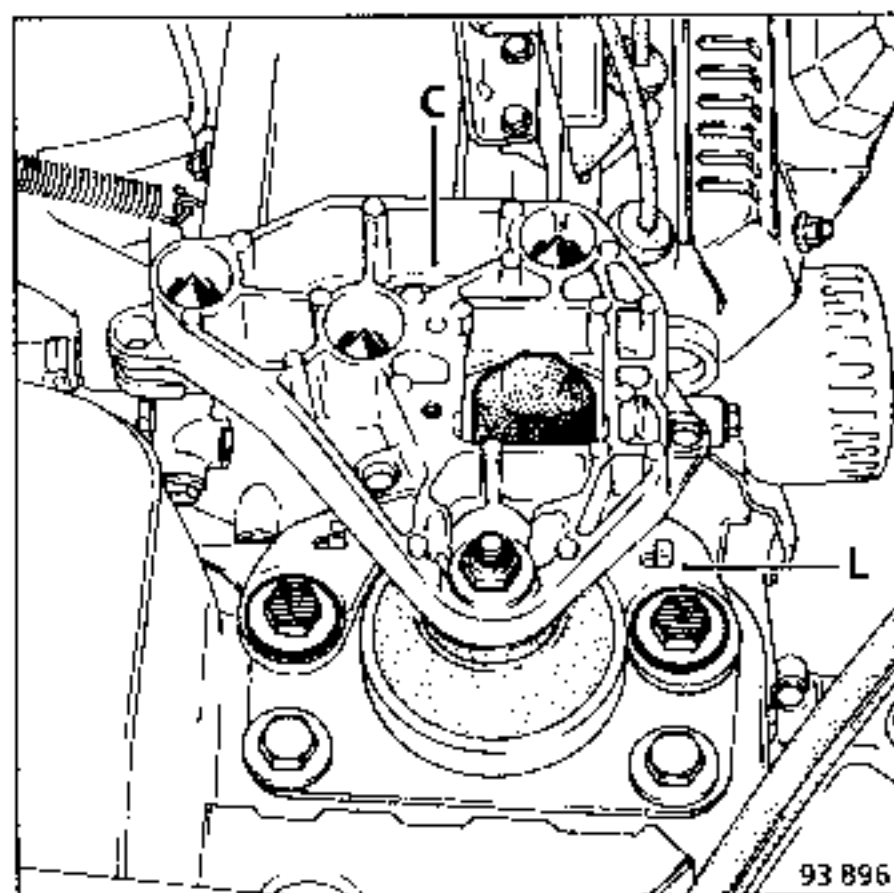
Remove:

- the bonnet,
- the front right-hand wheel and the deflector from the front right-hand wheel arch.

Fit in place tools Mot. 1159 and Mot. 1159-01.

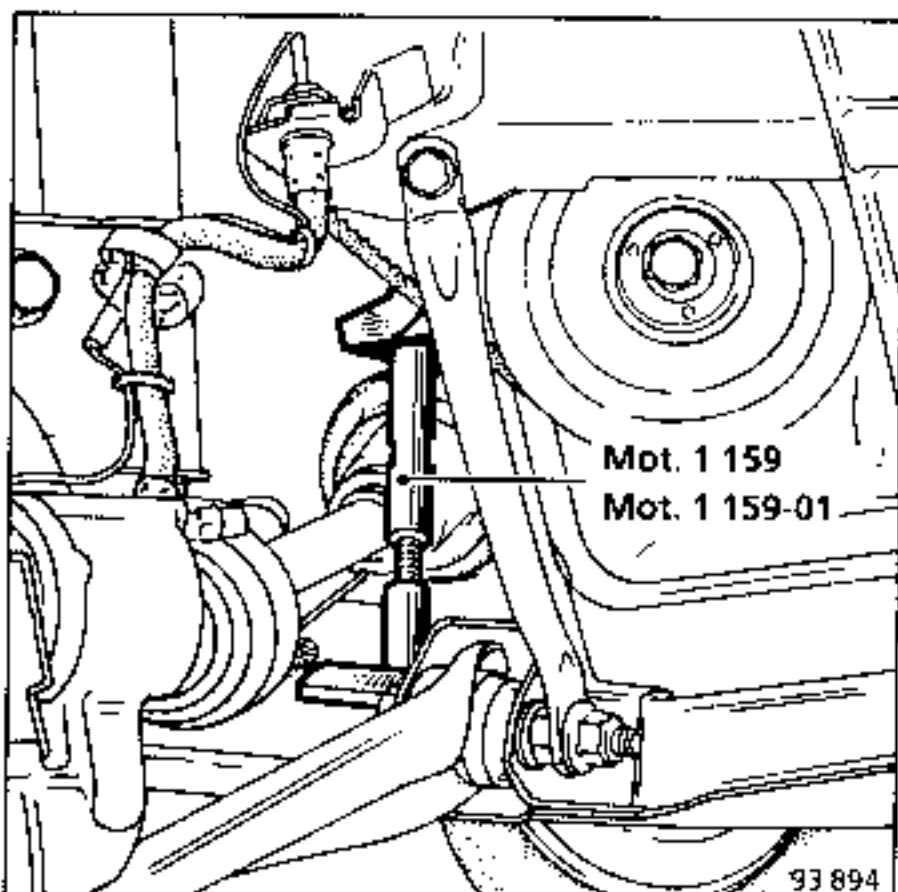
Remove:

- The top cover and cover (C) from the hanging type suspension unit,



93 896

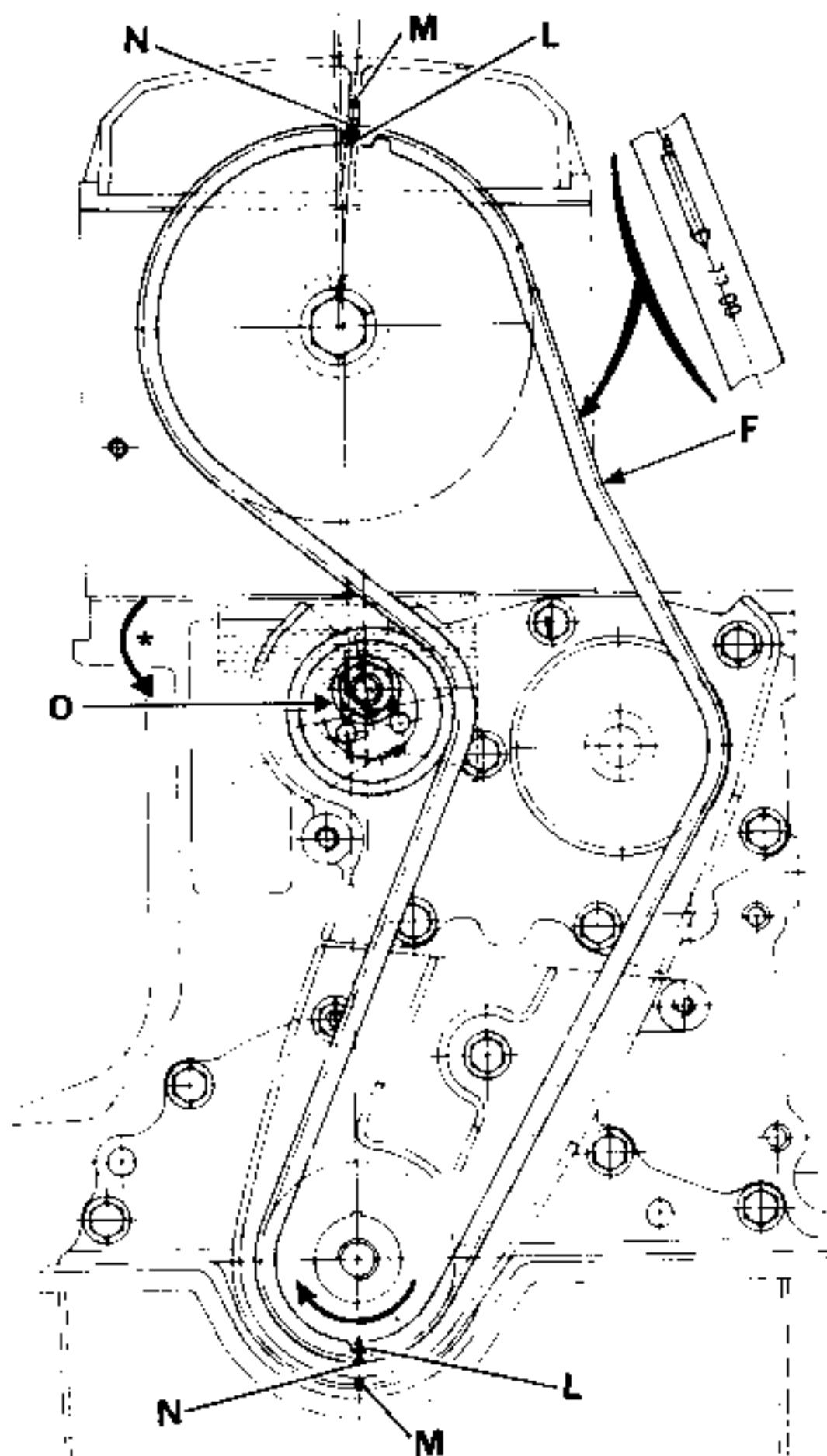
- the clearance limiter (L),
- the alternator belt,
- the alternator pulley (to do this, lock the starter ring gear with a large screwdriver),
- the timing gear covers.



93 894



Align marks (L) on the pinions with the fixed marks (M).  
Undo nut (O) and slacken off the tensioner roller.  
Remove the belt.



\* direction for turning tensioner.

#### REFITTING (Special Points)

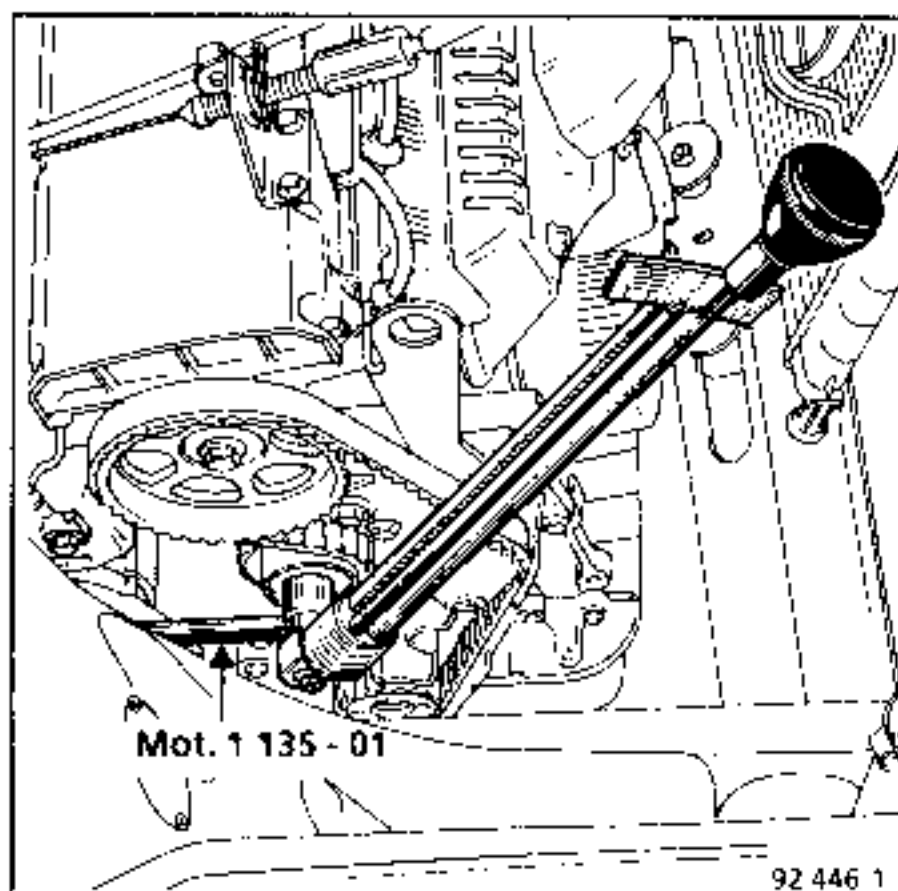
On the back of the belt there is a painted arrow indicating the direction of rotation and two lines for the timing.

Align the marks (line N) on the belt with those on the pinions (L) and the casings (M).

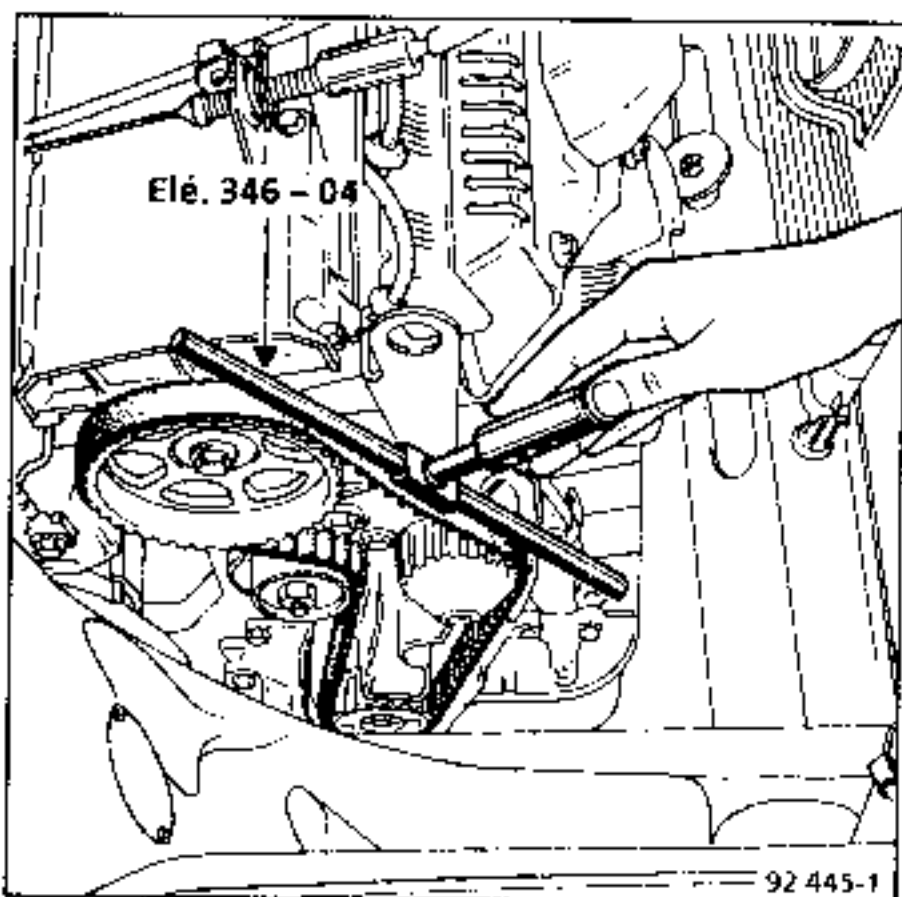
Ensure that the belt is fitted in the correct direction and start to position it on the crankshaft pinion

By acting on the tensioner roller, using tool **Mot. 1135-01**, produce a deflection of  $6 \pm 0.5$  mm (cold) at 3 daN at F.

Tighten the tensioner roller nut (O) to 5 daN.m.



Check the slack using tool **Elé. 346-04**.

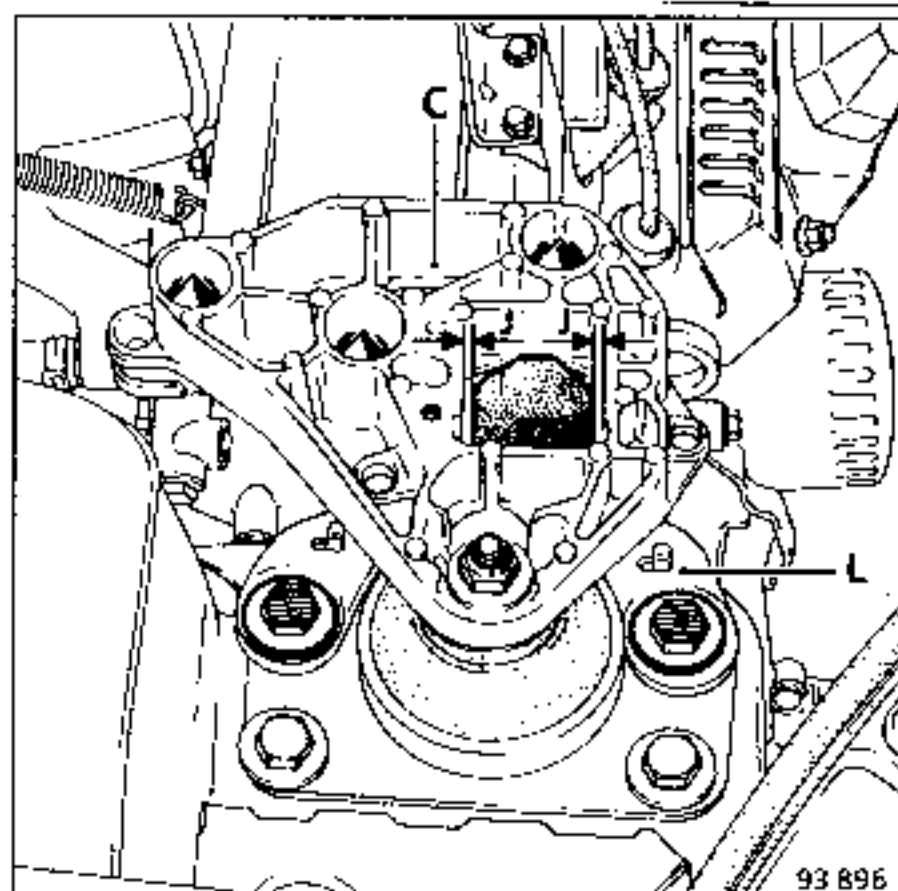


Turn the engine through two revolutions and check the slack and timing.

*It is essential to torque tighten the tensioner roller nut to 5 daN.m in order to avoid any slackening which would risk damaging the engine.*

Retighten rocker arm assembly bolts.

When reassembling the hanging suspension unit, adjust the clearance limiter (L) so that there is the same clearance (J) on both sides.



Remember to remove tools **Mot. 1159** and **1159-01**.

## REPLACEMENT

## ESSENTIAL SPECIAL TOOLS

Elé. 346 -04	Tool for checking belt tension
Mot. 1159	{ Engine support tool
1159-01	
Mot. 1054	TDC setting rod

## TIGHTENING TORQUES (in daN.m)



Crankshaft pulley	9 to 10
Tensioner roller nut	5
Hanging suspension top bolt	4,5
Wheel bolt	9
Hanging suspension top nut (fitted with captivated washer Ø 24)	* 2,7
Hanging suspension limiter bolt	5,5
* If other assembly	4,5

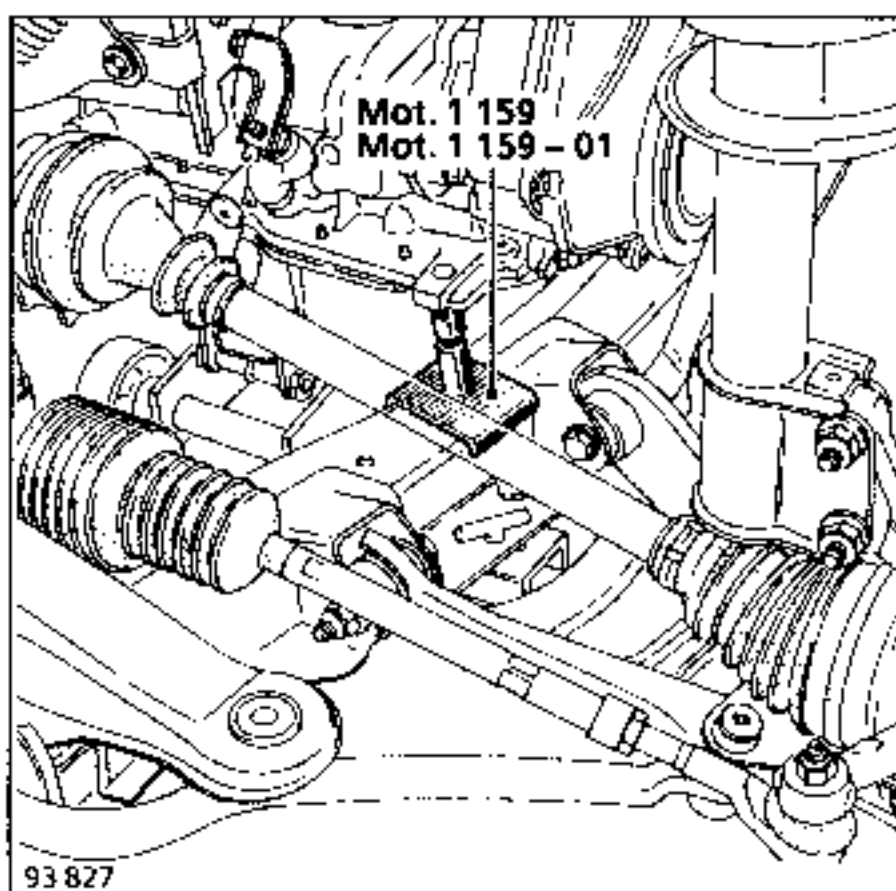
Place vehicle on a two-post lift.

Disconnect battery.

Remove:

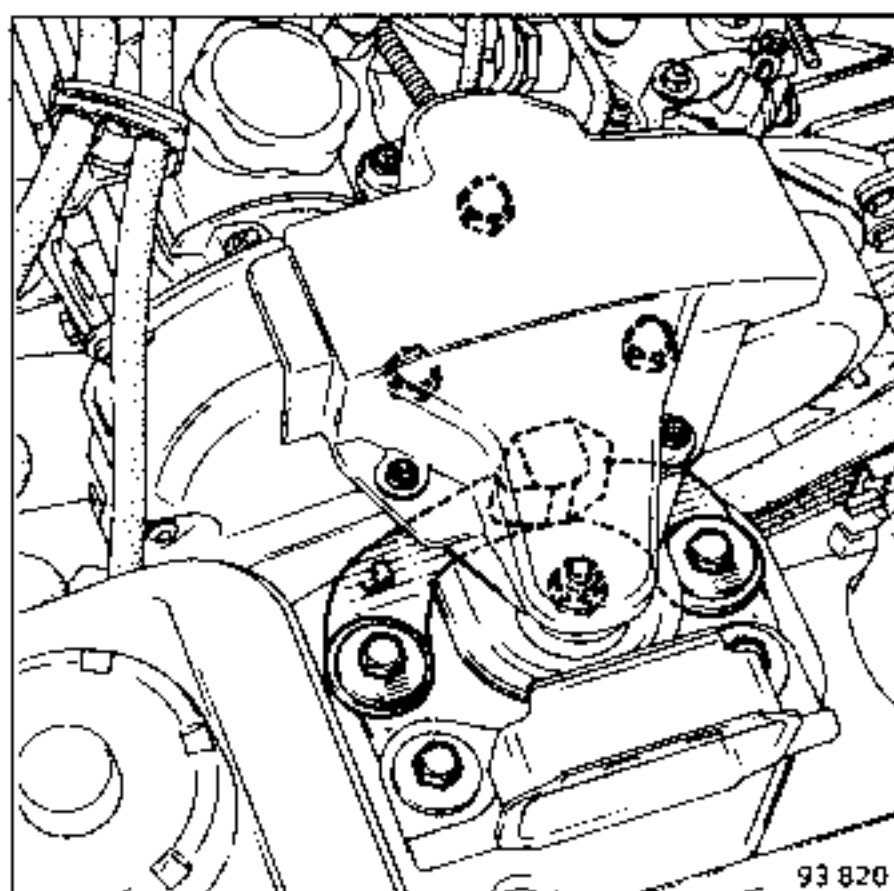
- the bonnet,
- the front right-hand wheel and the deflector from the front right-hand wheel arch.

Fit in place tools **Mot. 1159** and **1159-01**.

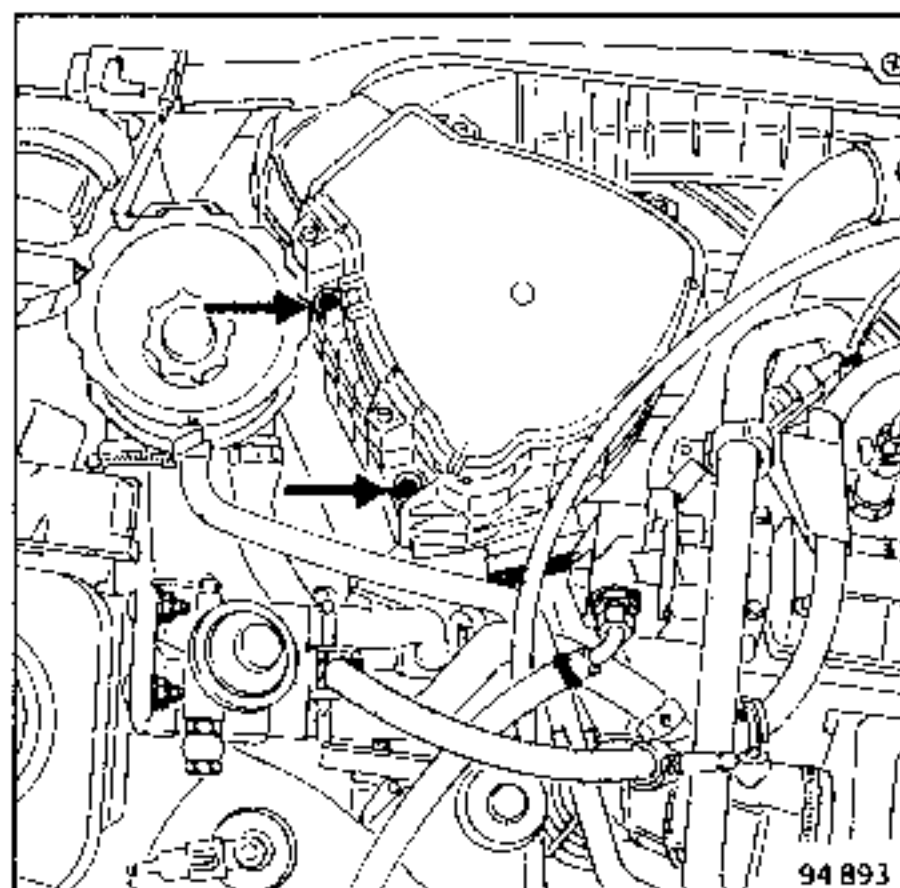


Remove:

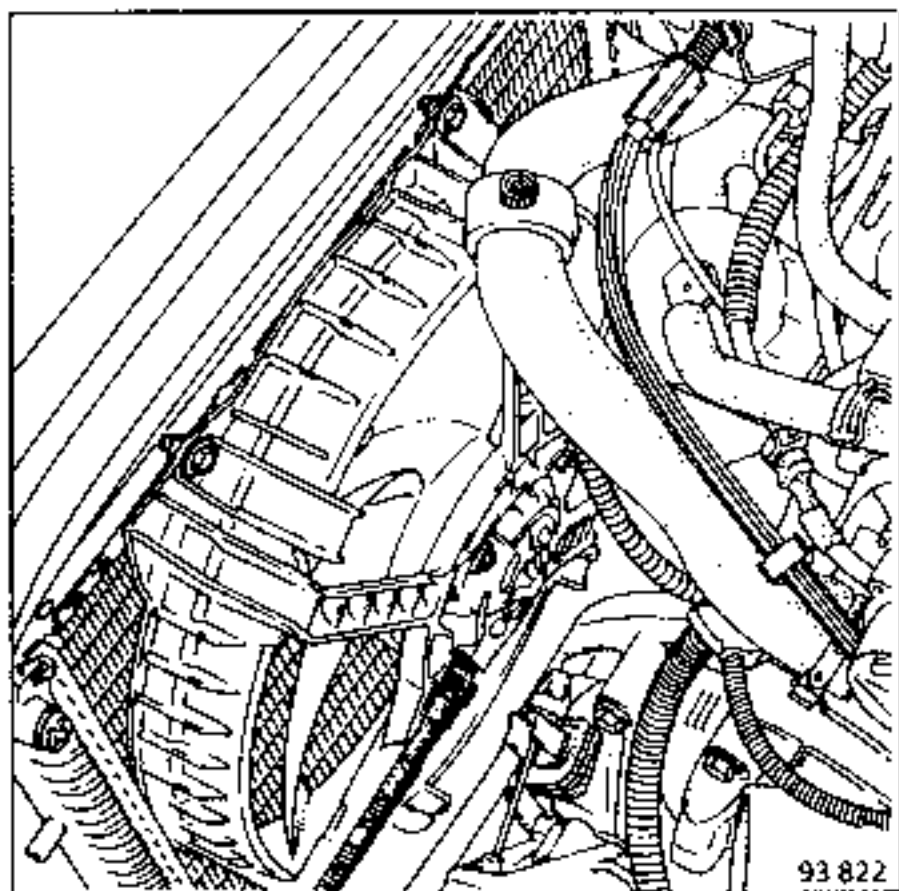
- the top and cover from the hanging type suspension unit,



- the air filter and its mounting.



- The engine cooling fan.

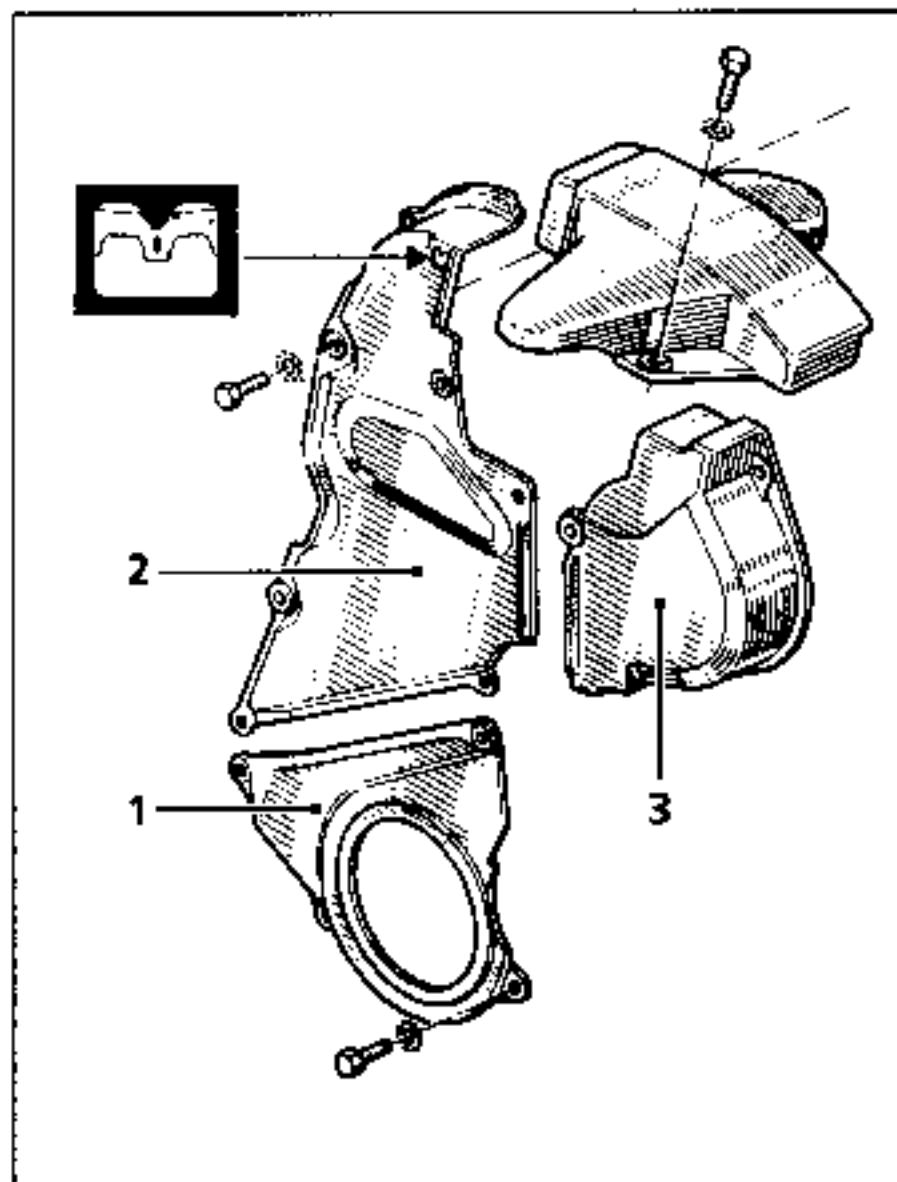


Remove the lower timing gear cover (1).

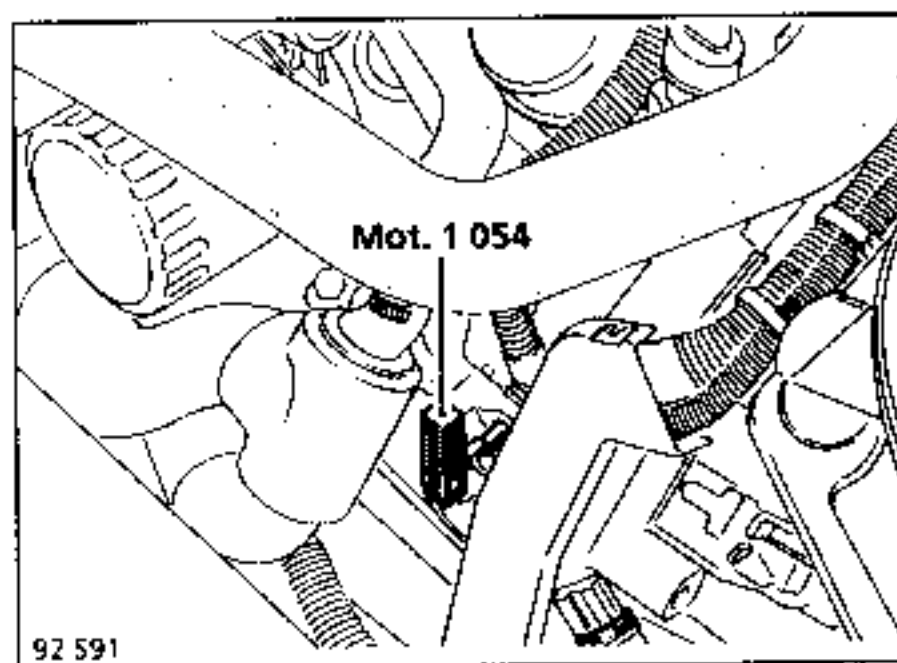
Take off the alternator belt.

Remove the crankshaft pulley: to do this, lock the starter ring gear with a large screwdriver.

Turn the crankshaft to align the timing mark in the timing window.



Fit in place the TDC setting rod **Mot. 1054**.



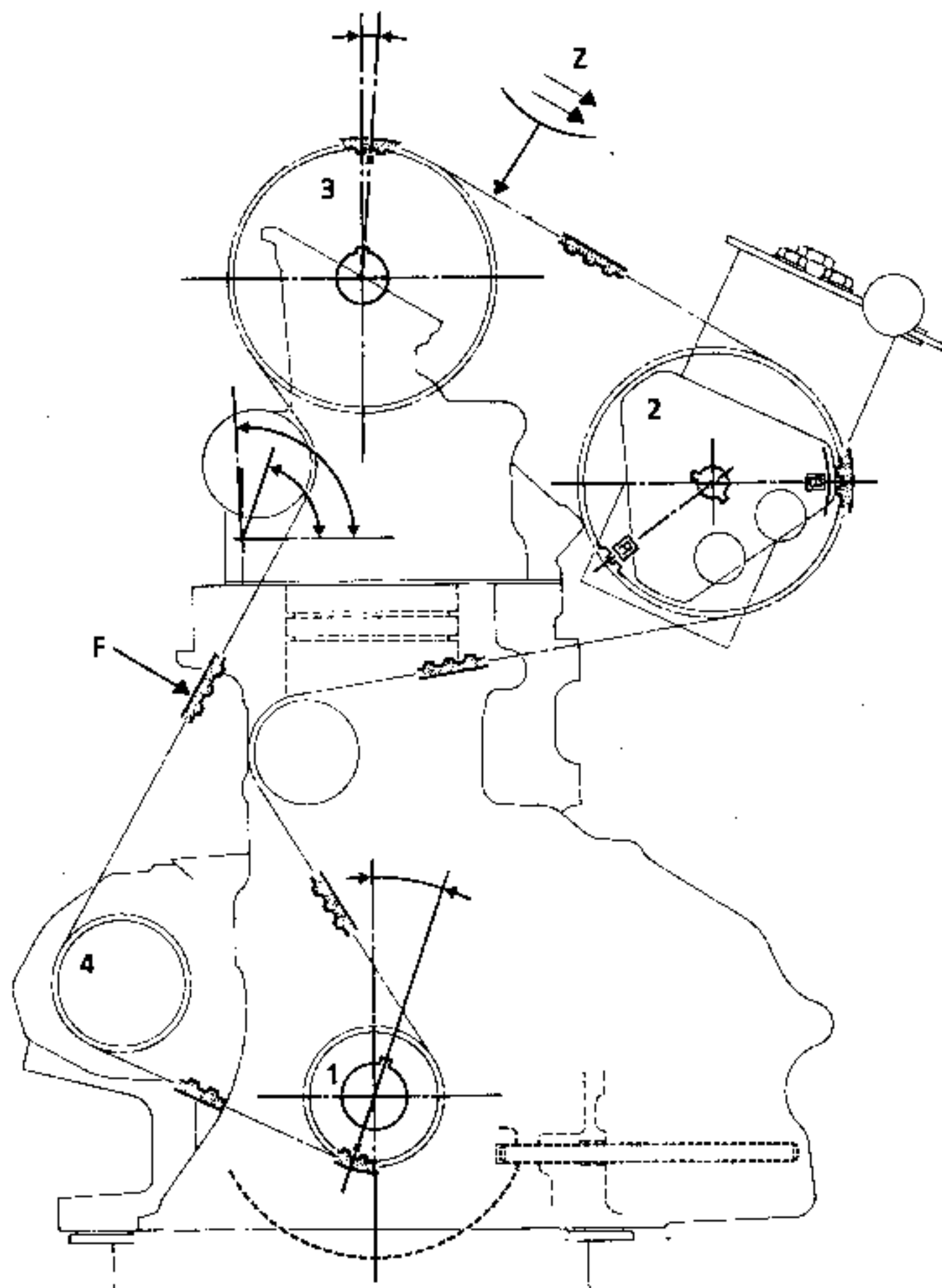
Try to turn the crankshaft clockwise and anti-clockwise to make sure that it cannot move.

Remove the timing covers (2) and (3) by raising or lowering the engine using tool **Mot. 1159** in order to take out the bolts which are difficult to reach.

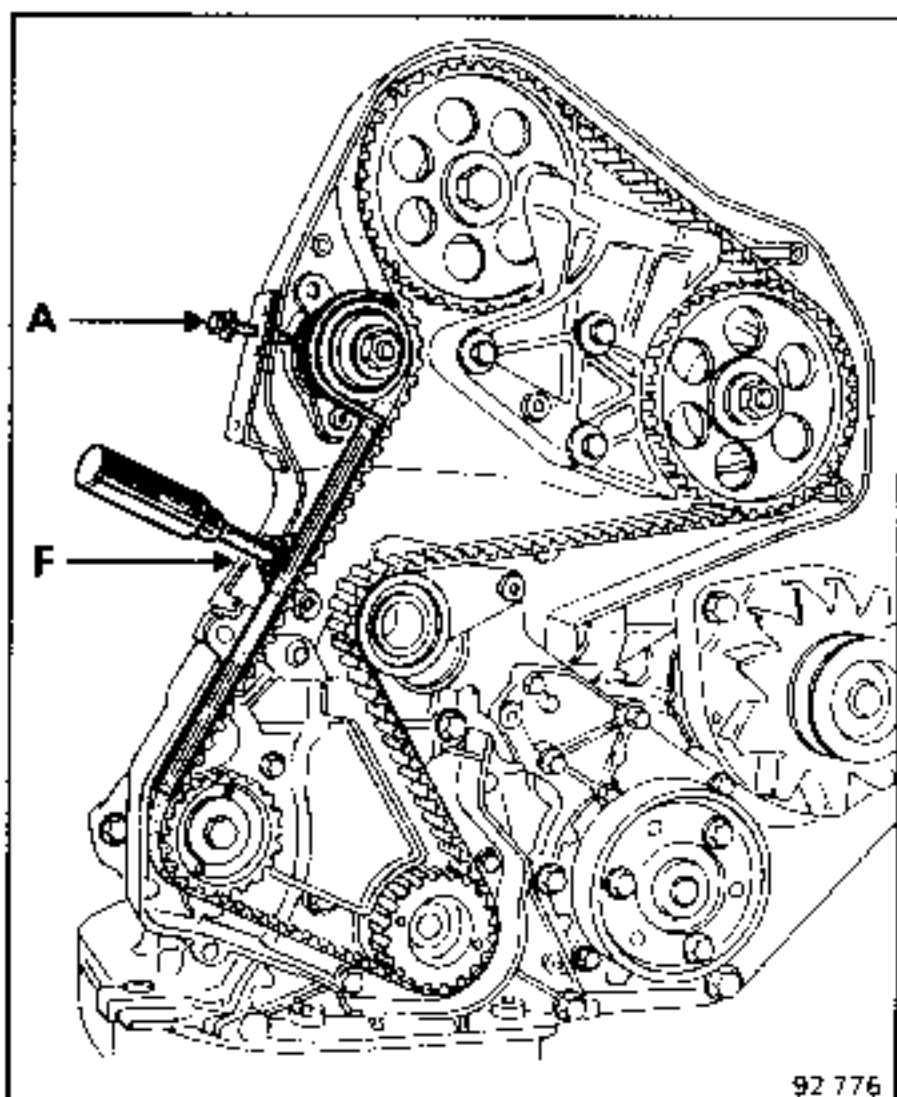
Slacken the tensioner roller and remove the belt.

#### REFITTING (Special Points)

Align the marks on the belt with those on the sprockets, ensuring that the belt is fitted in the correct direction and order (deflection **Z** and order 1, 2, 3, 4).



By screwing a  $\varnothing 6$  bolt (A) into the metal casing, push on the tensioner roller and produce a deflection of 7 to 8 mm (cold) at 3 daN at (F).



Check this slack using tool Elé. 346-04.

Remove the TDC gauge rod.

Turn the engine through two complete rotations in the normal running direction (clockwise).

Fit the TDC gauge rod.

Check the timing after replacing the covers.

Check the tension of the belt when cold, using Elé. 346-04. If it is correct, torque tighten the tensioner roller nut to 5 daN.m.

If it is not correct, repeat the operation.

Remove TDC gauge rod and bolt (A).

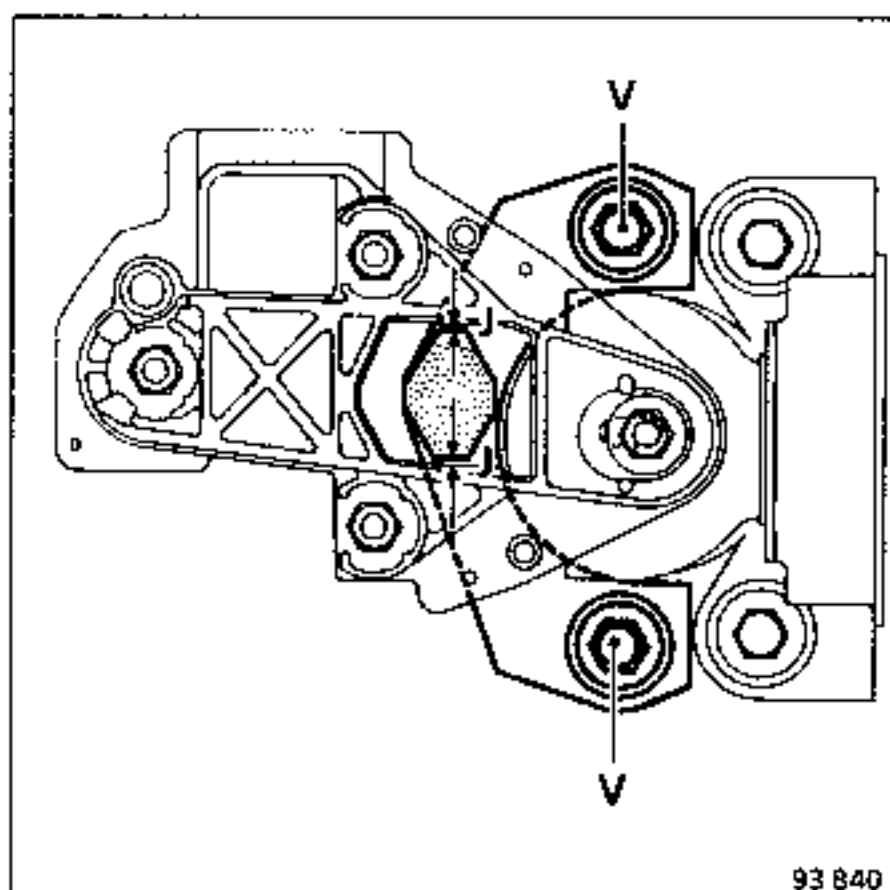
*It is essential to torque tighten the tensioner roller nut to 5 daN.m in order to avoid any slackening which would risk damaging the engine.*

*When the timing belt has been replaced, the injection pump timing must be checked.*

Reassemble:

- the alternator pulley on the crankshaft and torque tighten it to 9 to 10 daN.m;
- the alternator drive belt and adjust its tension;
- the timing gear covers,
- the gauge rod hole plug,
- the mounting nuts and bolts and torque tighten them.

Ensure that the front right-hand limiter is centred in its location (J).



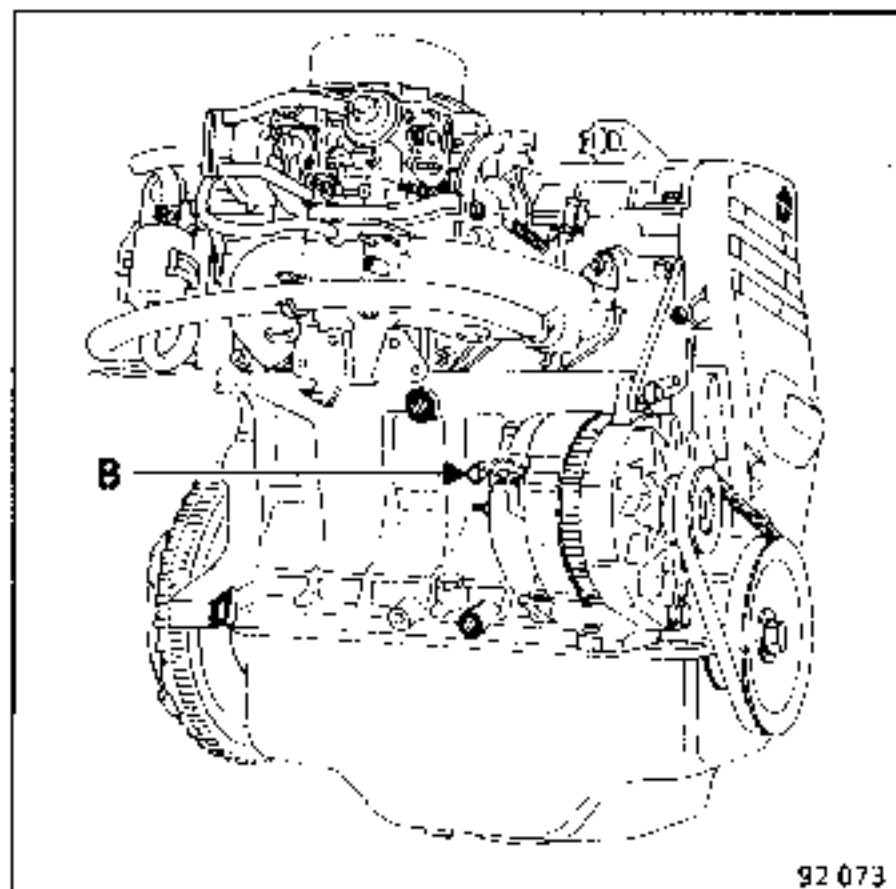
If it is not, adjust by turning bolt (V).

## REPLACEMENT

ESSENTIAL SPECIAL TOOLS		
Elé. 346 -04		Tool for checking belt tension
Mot. 1 159		Engine support tool (for retaining engine on cradle)
1 159-01	{	Cylinder head bolt tightening gauge (angular measuring type)
Mot. 591 -04		
Mot. 588		Cylinder block liner clamps

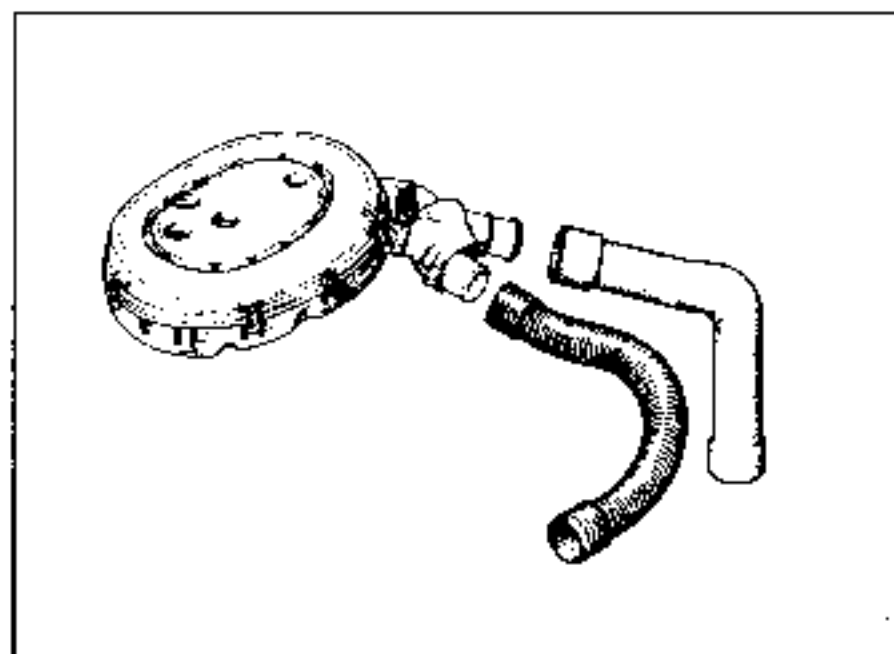
Drain the cooling system:

- from the lower hose of the radiator,
- through plug (B) in the cylinder block.

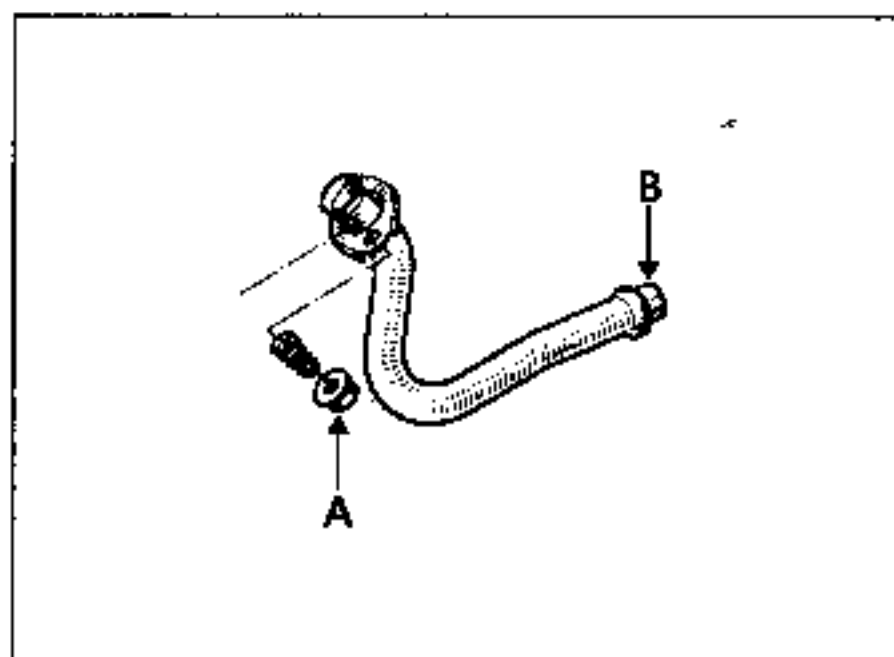


Remove:

- the timing belt (see section entitled "Timing Belt"),
- the air filter,

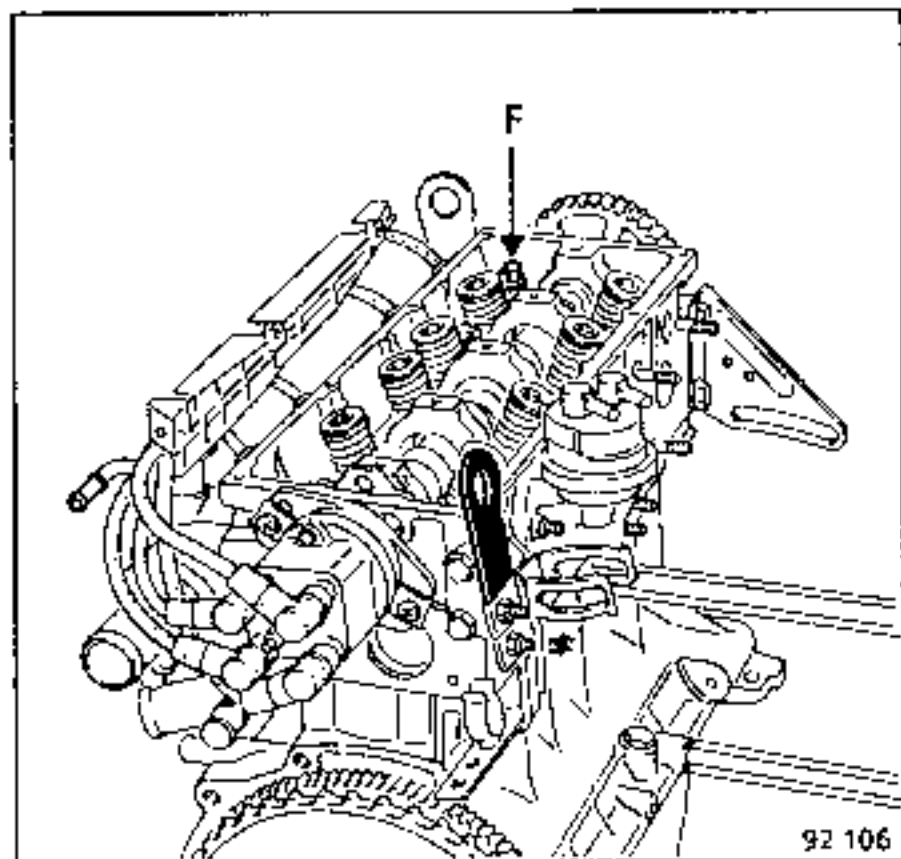


- the accelerator and choke cables,
- the fuel and vacuum pipes on the manifold,
- the exhaust pipe (at A and B).



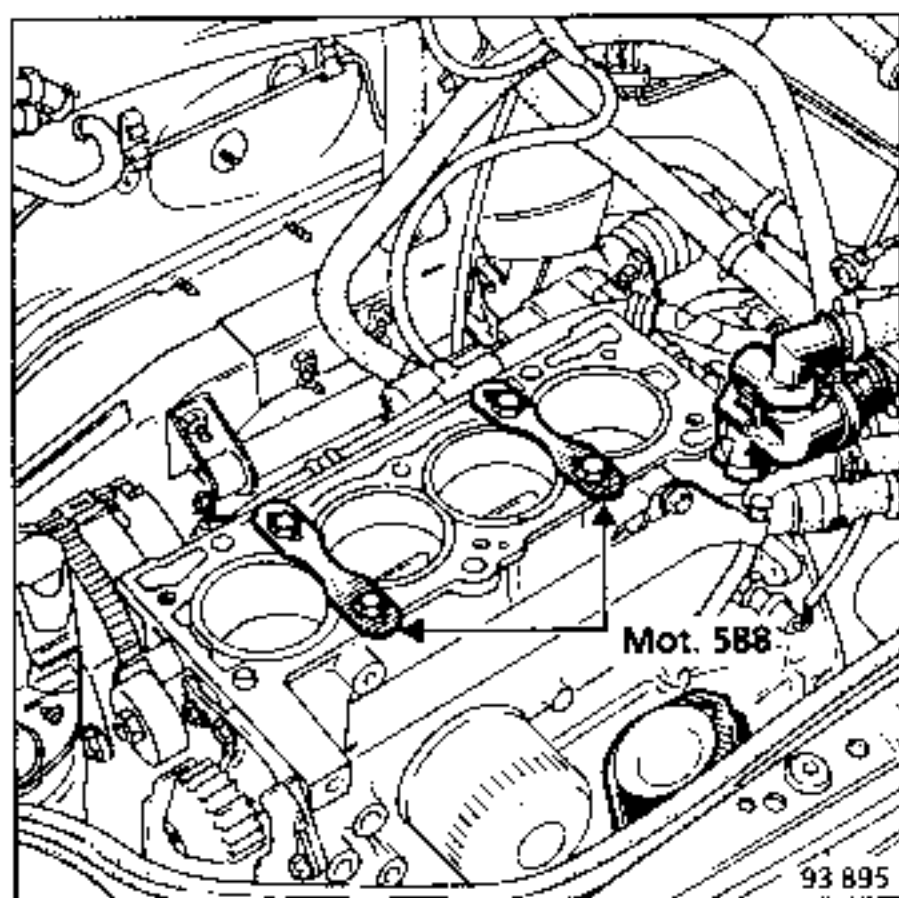
- the rocker cover,
- the thermostat mounting on the cylinder head,
- the temperature sensor connectors.

- the cylinder head bolts apart from bolt (F), which is only to be slackened off (use a 12 mm Torx type socket), turn the cylinder head about this bolt,



- the cylinder head and gasket.

Fit cylinder block liner clamps **Mot. 588**.

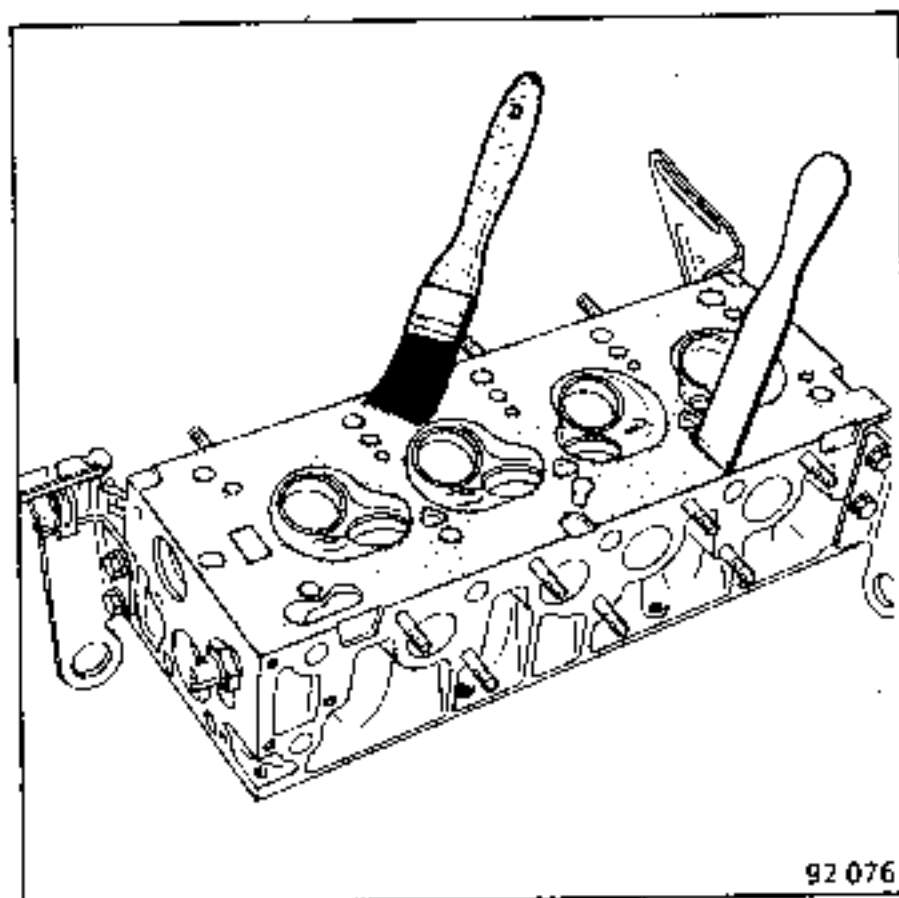


### CLEANING

It is very important not to scratch joint faces of aluminium parts.

Use **Décap-joint** to dissolve any parts of the gasket still attached to the joint face.

Apply the product to the part to be cleaned; wait for about 10 minutes, then remove it using a wooden spatula.



It is advisable to wear gloves during this operation.

Your attention is drawn to the care which must be taken on this operation in order to prevent foreign bodies falling into the oilways for the rocker assembly (oilways situated both in the cylinder block and the cylinder head).

If this advice is not followed, there is a risk of blocking the rocker arm jets, and this will quickly cause damage to the cams and rockers.

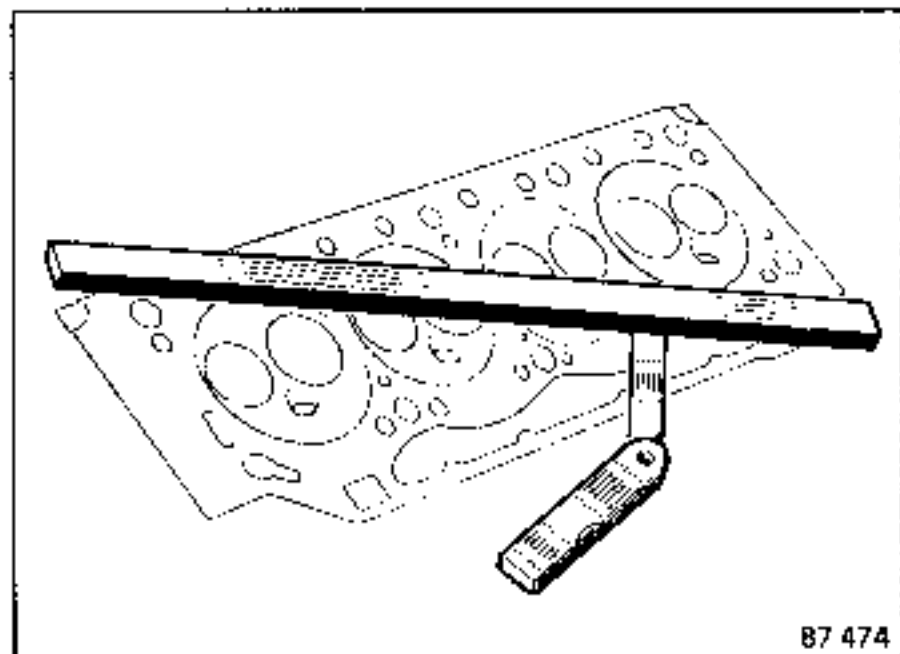


**CHECKING THE GASKET FACE FOR BOW**

Using a straight edge and a set of feeler gauges, check the gasket face for bow.

- Maximum bow 0.05 mm

The cylinder head cannot be reground.

**REFITTING (Special Points)**

Turn engine to position piston half way down the bores.

Remove liner clamps **Mot. 588**.

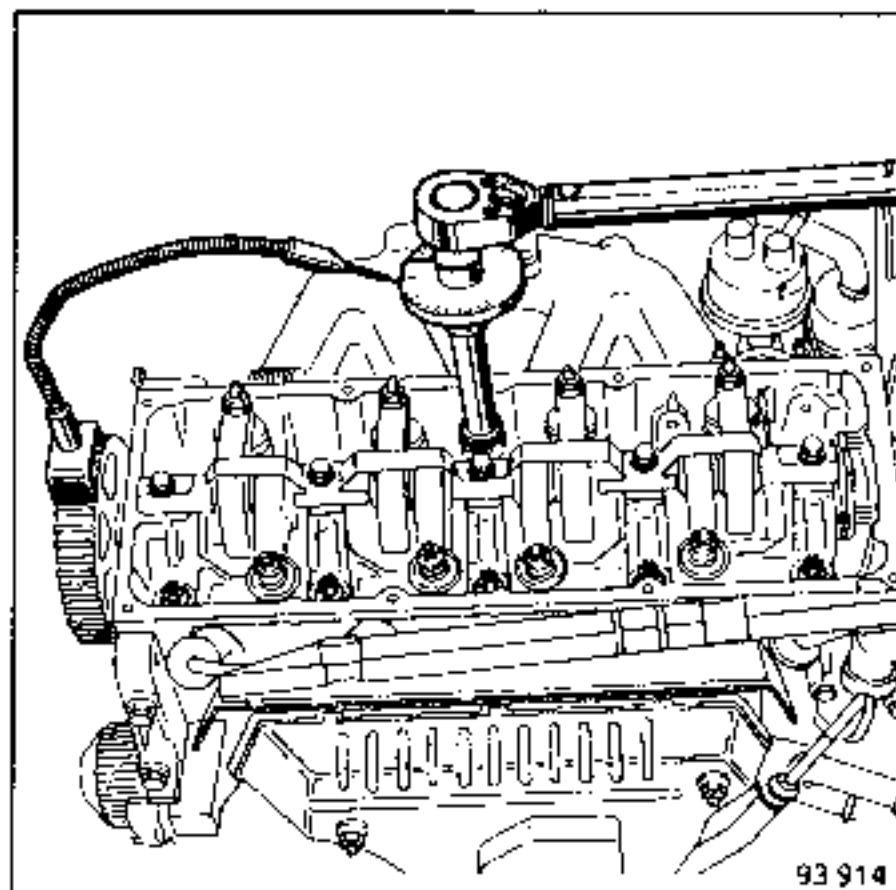
Wipe the joint faces of the cylinder block and cylinder head.

Check that the locating dowel is fitted.

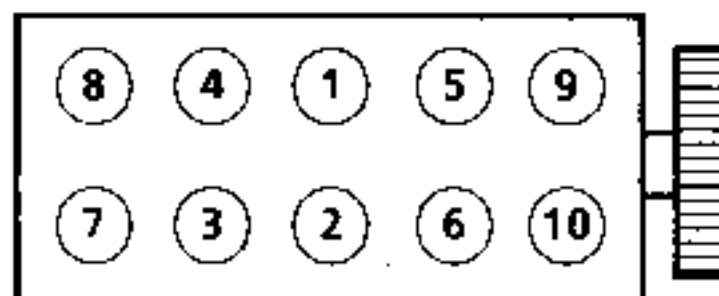
Position the cylinder head gasket.

Refit the cylinder head, lubricate the threads and pads under the bolt heads using engine oil.

The angular torque tightening of the cylinder head (using a 12 mm Torx type socket) is performed when the gasket has been pre-settled; there is no subsequent retightening (see following method). Tool: **Mot. 591-04**.

**Method of tightening cylinder head****a) Pre-settling the gasket**

- Torque tighten all bolts to 2 daN.m, then to an angle of  $97^\circ \pm 2^\circ$  in the order shown below.



Wait for 3 minutes to allow the gasket to settle.

**b) Tightening cylinder head :**

- Slacken off bolts 1 and 2 until they are completely free.
- Tighten bolts 1 and 2 to 2 daN.m, then to an angle of  $97^\circ \pm 2^\circ$ .
- Slacken off bolts 3, 4, 5, 6 until they are completely free.
- Torque tighten bolts 3, 4, 5, 6 to 2 daN.m, then to an angle of  $97^\circ \pm 2^\circ$ .
- Slacken off bolts 7, 8, 9, 10 until they are completely free.
- Torque tighten bolts 7, 8, 9, 10 to 2 daN.m, and then to an angle of  $97^\circ \pm 2^\circ$ .

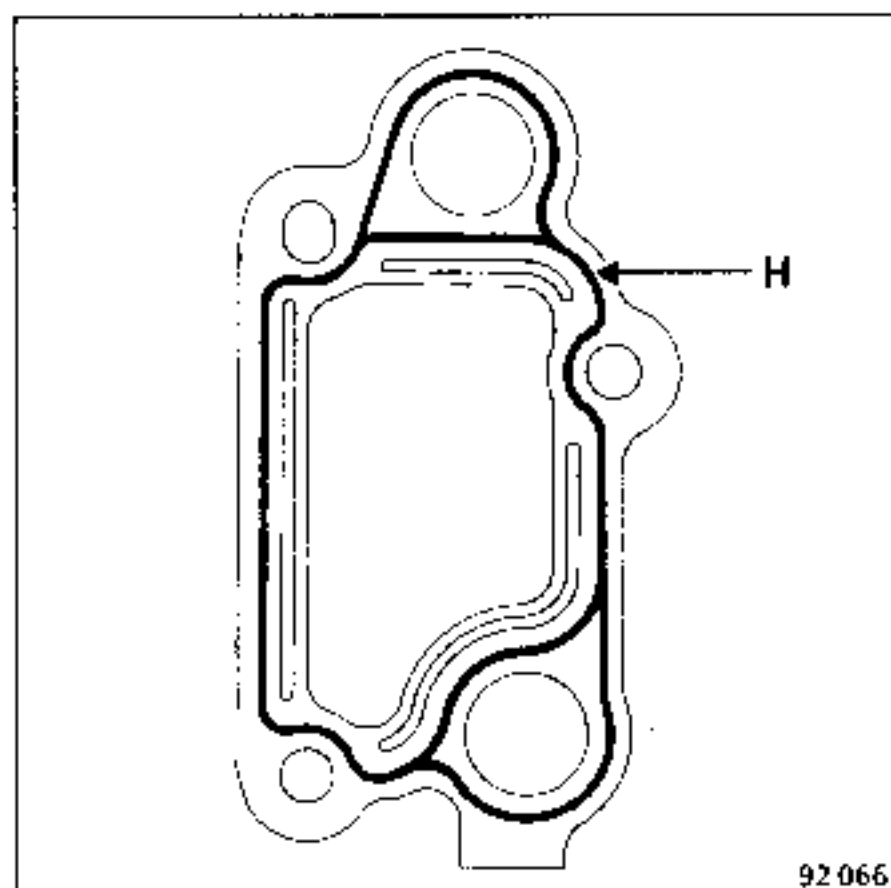
**REFITTING (Special Points)**

Proceed in reverse order to removal.

Adjust the timing gear (see section entitled "Timing Belt").

Refit the thermostat mounting, sealing it with **Loctite 518**.

The bead (H) should be **0.6 to 1 mm** thick and applied as shown below.



Adjust the accelerator and choke cables.

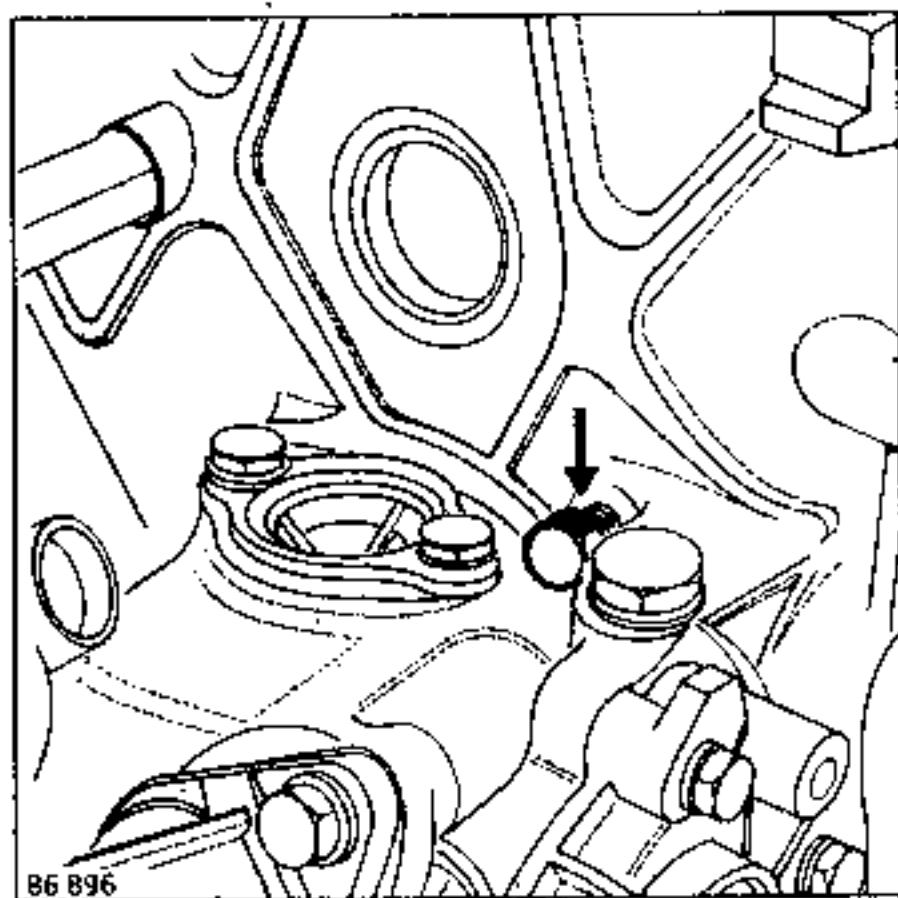
fill and bleed the cooling system

## REPLACEMENT

ESSENTIAL SPECIAL TOOLS		
Elé. 346 -04		Tool for checking belt tension
Mot. 1 159 1 159 -01	{	Engine support tool
Mot. 1 054		TDC setting rod
Mot. 591 -04		Cylinder head bolt tightening gauge (angular measuring type)
Mot. 252 -01		Thrust plate for checking liner protrusion
Mot. 251 -01		Dial gauge support
FACOM STL8		Hex bit for cylinder head bolts
FACOM SX55 S236	{	Bush and bush support for cylinder head torx bolts

Drain the cooling system:

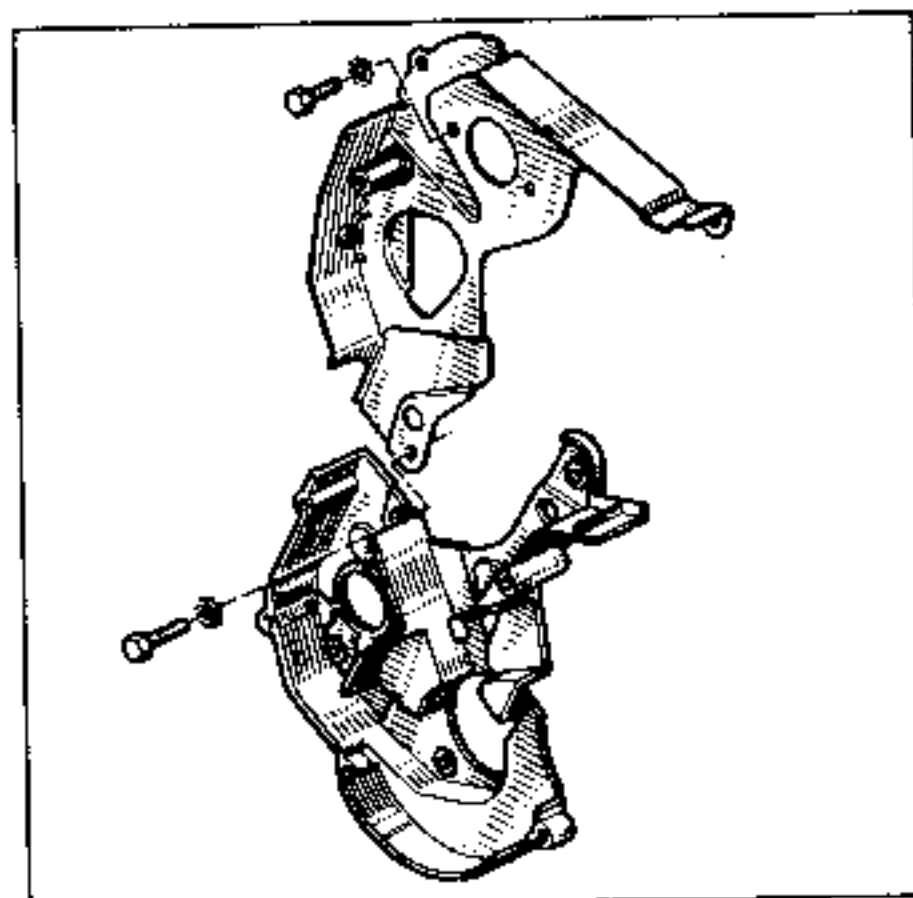
- from the lower hose of the radiator,
- through the plug in the cylinder block.



Remove:

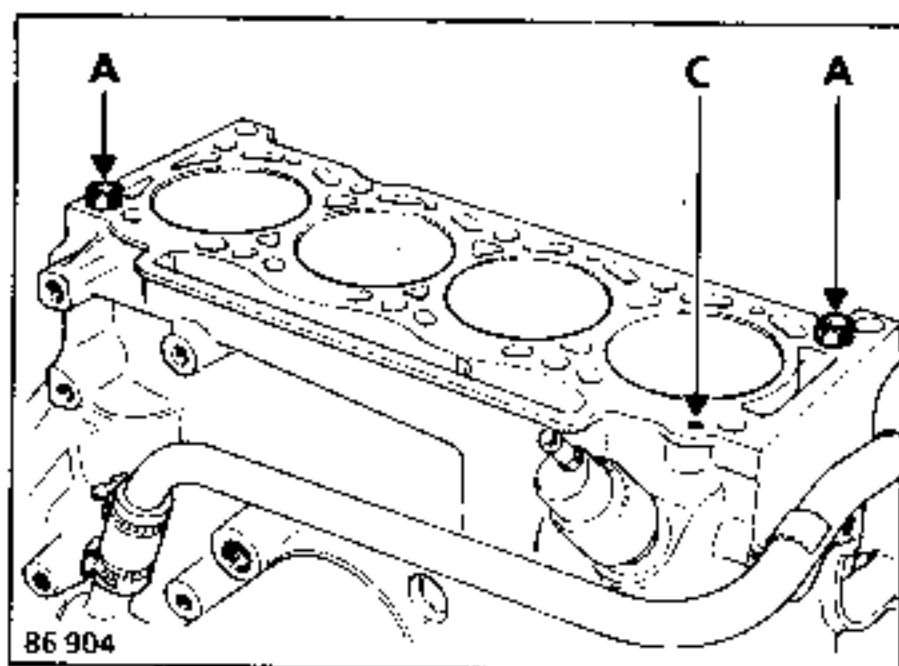
- the timing belt (see section entitled "Timing Belt"),
- the accelerator cable,
- the injection pump leads and connectors,
- the manifold exhaust flange,

- the cylinder head heater hose,
- the brake vacuum hose,
- the oil vapour rebreathing hoses,
- the the air filter hose,
- the oil separator from the manifold,
- the alternator tensioner,
- the bolts securing the timing inner casing to the engine block.



- the cylinder head bolts using tool FACOM STL8 or SX55 and S236.

Unstick the cylinder head but do not turn it since this is centred by the two dowels (A).



Use a syringe to remove any oil which may still be located in the cylinder head bolt holes.

This is necessary in order to ensure that the bolts are correctly tightened.

Protect the oilway (C) in order to prevent any foreign bodies entering the oilways in the cylinder head.

If this advice is not followed, there is a risk of blocking the oilways and this will quickly cause damage to the camshaft and cams.

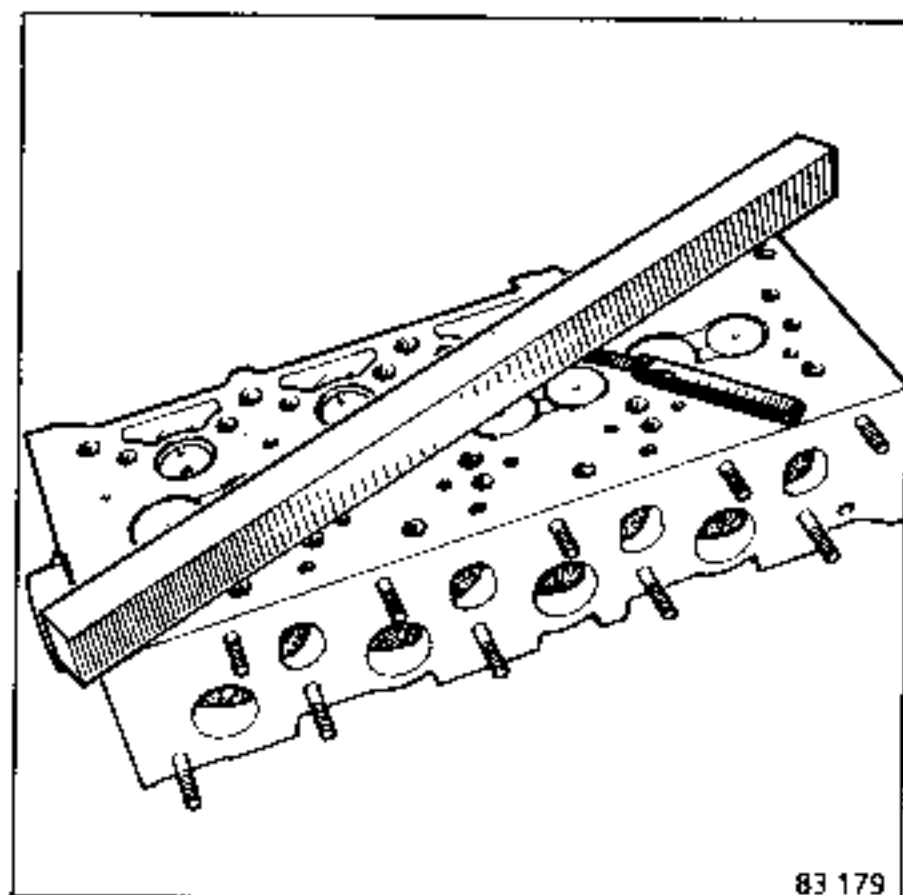
## REFITTING

### Checking the gasket face for bow

Using a straight edge and a set of feeler gauges, check whether the gasket face has any bow.

Maximum bow 0.05 mm.

The cylinder head cannot be reground.



## DETERMINING THE THICKNESS OF THE CYLINDER HEAD GASKET

### Checking the piston protrusion

Clean piston crowns to remove any carbon deposits.

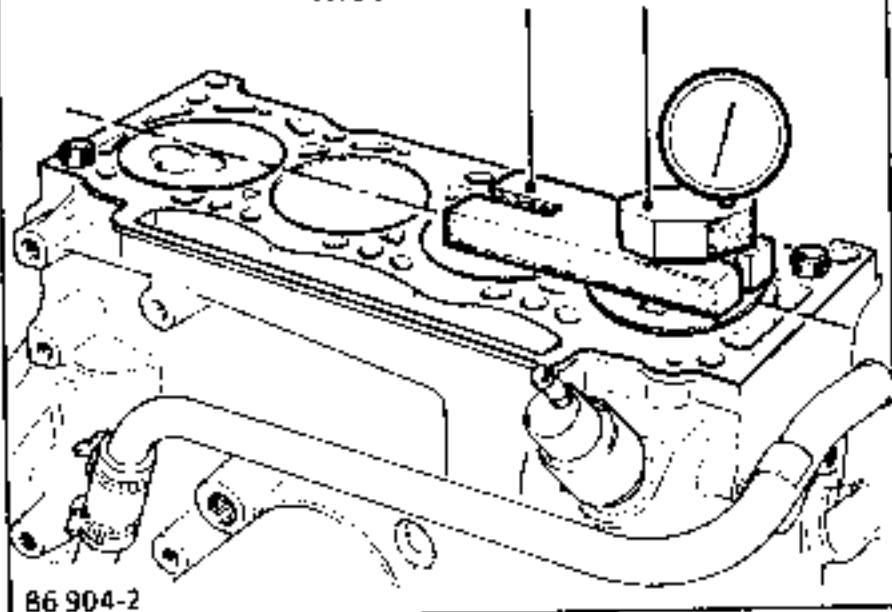
Turn the crankshaft in the normal running direction through one turn to bring piston number 1 close to TDC.

Fit tool Mot. 252-01 to the piston.

Fit tool Mot. 251-01 equipped with a clock gauge to support plate Mot. 252-01. With the clock gauge probe in contact with the cylinder block, determine the TDC of the piston.

**NOTE :** Any measurements must be taken along the longitudinal centre line of the engine to eliminate errors owing to tilting of the piston.

Mot. 252 - 01      Mot. 251 - 01



86 904-2

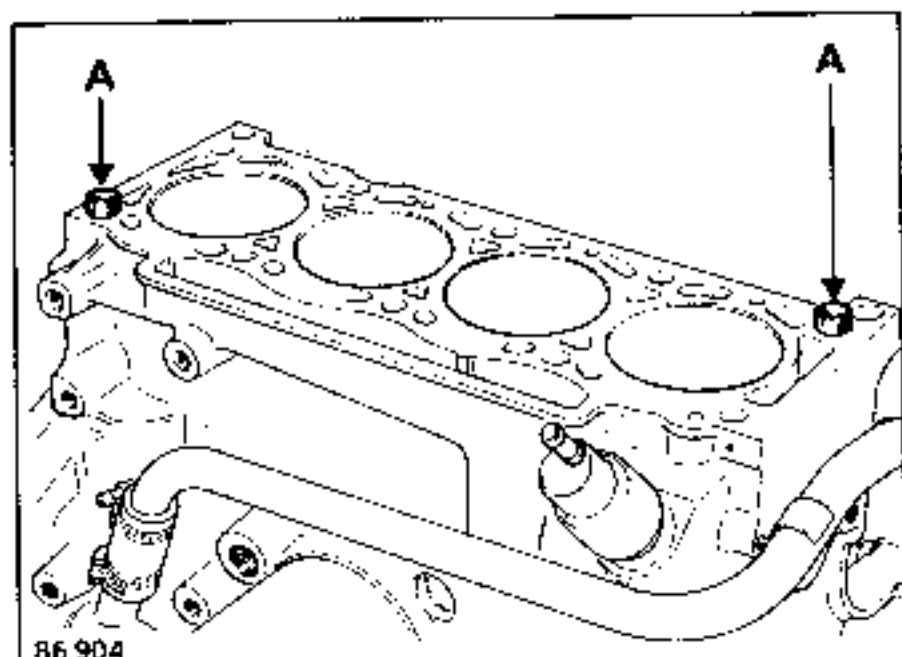
Measure piston protrusion.

**ONLY TAKE ACCOUNT OF THE PISTON HAVING THE LARGEST PROTRUSION.**

Where a piston has a maximum protrusion of:

- less than 0.868, use a gasket marked with a tab having 2 holes,
- between 0.868 and 1.000, use a gasket marked with a tab having 1 hole,
- greater than 1.000, use a gasket marked with a tab having 3 holes.

Fit the previously selected cylinder head gasket and centre it by the two dowels (A).



86 904

Place the pistons at mid-stroke to prevent any contact with the valves when the cylinder head is tightened.

Centre the cylinder head on the dowels.

**TORQUE TIGHTENING** (socket head cylinder head bolts)

This operation is performed with the engine cold when refitting the cylinder head, and is not to be performed subsequently.

Remember :

To ensure that the bolts are correctly tightened, use a syringe to remove any oil which may still be located in the cylinder head bolt holes.

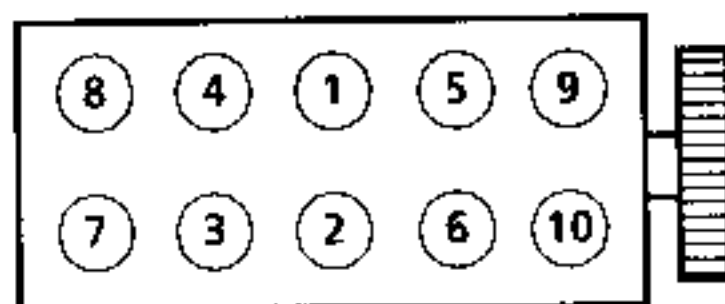
Use engine oil to lubricate the threads and under the heads of the bolts.

Tighten the bolts in the order shown :

- 1st tightening operation      **3 daN.m**
- 2nd tightening operation      **7 daN.m**

Wait for at least three minutes.

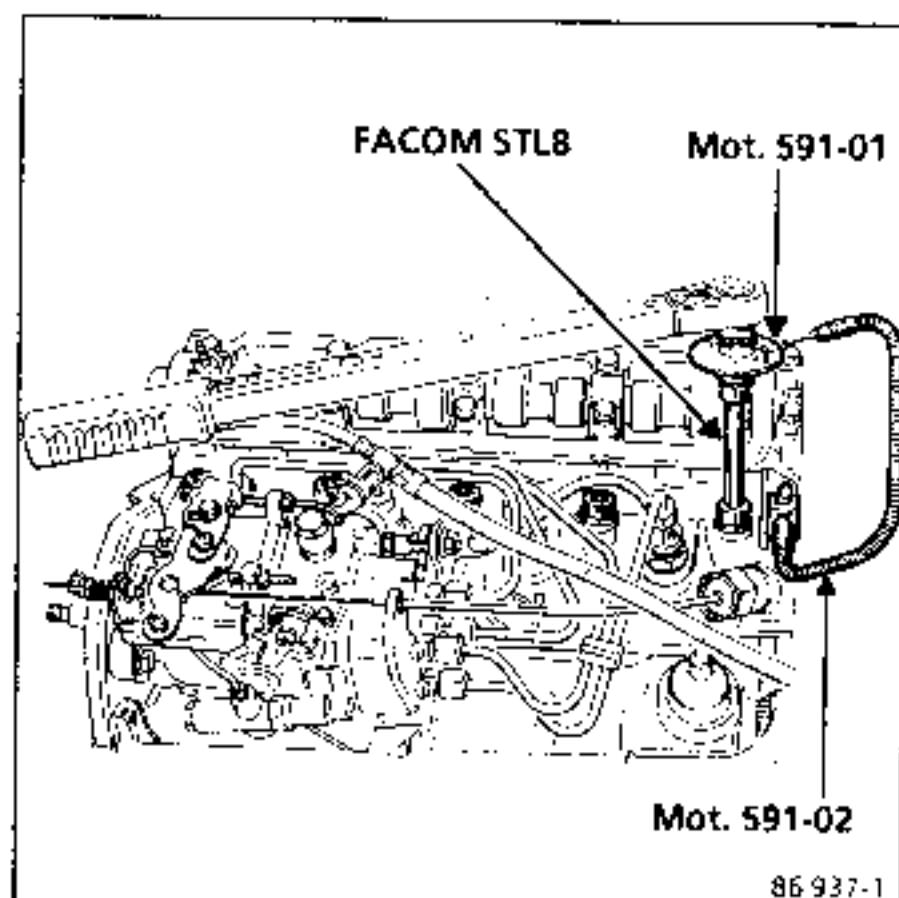
Tightening order :



90 775

Slacken off all the bolts until they are totally free and then perform:

- 1st retightening operation      **2 daN.m**
- 2nd retightening (angular) operation **123° ± 2°**

**TORQUE TIGHTENING (TORX cylinder head bolts)****Checking length of bolts:**

Successive reuse of cylinder head bolts may cause them to stretch by 1%. Bolts may be reused if their length, measured to below the bolt head without a washer, does not exceed :

$$L = 120.5 \text{ mm.}$$

It is essential to change all 10 bolts as soon as one of them exceeds the specified length.

This operation is performed with the engine cold when refitting the cylinder head, and is not to be performed subsequently.

**Remember :**

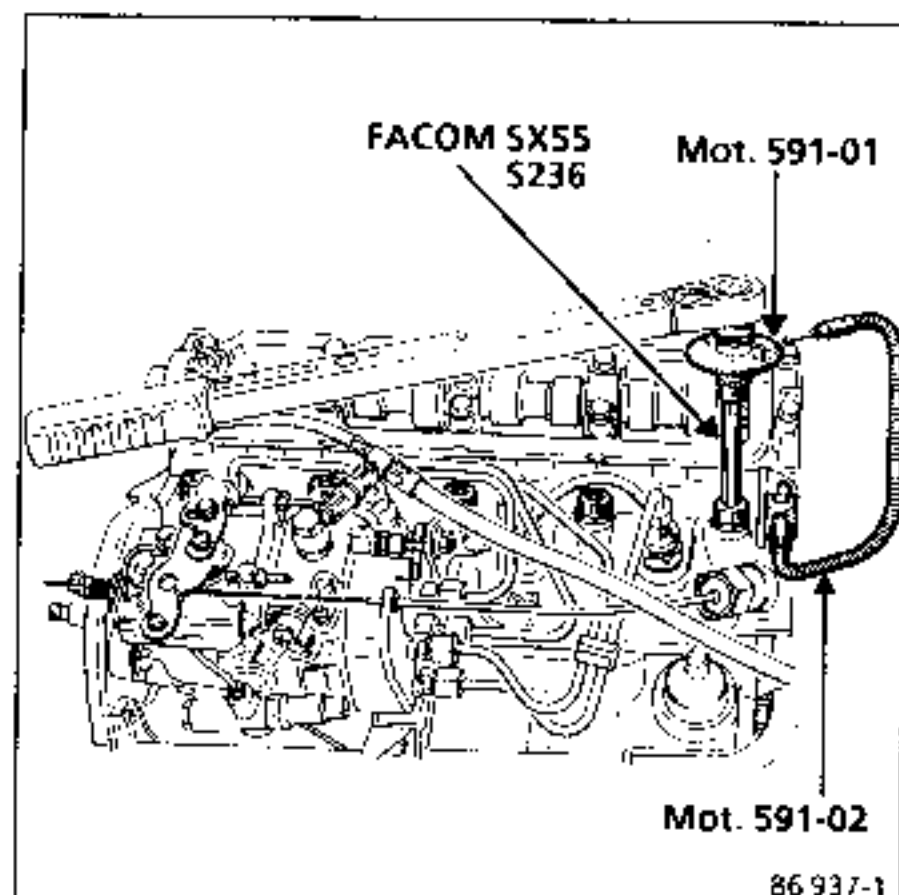
To ensure that the bolts are correctly tightened, use a syringe to remove any oil which may still be located in the cylinder head bolt holes

Use engine oil to lubricate the threads and under the heads of the bolts.

Tighten the bolts in the order shown:

- 1st tightening operation 3 daN.m
- 2nd tightening (angular) operation  $50^\circ \pm 7^\circ$

Wait for at least three minutes.



Slacken off all the bolts until they are totally free and , then perform :

- 1st retightening operation 2.5 daN.m
- 2nd retightening  
(angular) operation  $213^\circ \pm 7^\circ$

**REFITTING (Special Points)**

Proceed with refitting in reverse order to removal.

Adjust the timing gear (see section entitled "Timing Belt")

Adjust the accelerator cable.

Top up and bleed the cooling system.

# FUEL/AIR MIXTURE

## General

12

### SPECIFICATIONS

Vehicle	Engine						Gearbox type	Carburettor	Ref.
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Ratio			
	F 40 A F 40 Y	E6J	734 738	75,8	77	1390			
Idling speed									
Speed (rpm)		Mixture (CO)		Conditions :					
800 ± 50		1,5 ± 0,5		After E.F. has cut in					

\* Ref. 4 C for vehicles with power steering .

\*\* Ref. 4 D for vehicles with power steering and air conditioning.

Vehicle	Engine						Gearbox type	Carburettor	Ref.
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Ratio			
F 40 F	C1G	726	71,5	77	1237	9,2	Manual	SOLEX 32 BIS	997
Idling speed									
Speed (rpm)		Mixture (CO)		Conditions :					
700 ± 50		1,5 ± 0,5		After E.F. has cut in					

Vehicle	Engine						Gearbox type	Carburettor	Ref.
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Ratio			
F 401 F 40T	C1E	762 764	70	72	1108	8,8	Manual	SOLEX 32 BIS	104
Idling speed									
Speed (rpm)		Mixture (CO)		Conditions :					
700 ± 50		1,5 ± 0,5		After E.F. has cut in					

# FUEL/AIR MIXTURE

## General

12

### SPECIFICATIONS

Vehicle	Engine						Gearbox type	Injection type	Ignition type
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Ratio			
F407	C3J	762	75,8	77	1 390	9	Manual	Monopoint + mixture regulation	Ignition power module (M.P.A.)

Engine	Idling speed		Fuel	
	Speed (rpm)	Mixture (CO)	Grade	Octane rating
C3J 762	850 ± 50 (non-adjustable)	0,5% max. (non-adjustable)	Unleaded	I.O.91

Fuel system type	Regulated monopoint injection
Fuel pump: on rear cross member	Voltage: 12 volts Pressure: 3 bars Output: 130 l/h
Fuel filter: on rear cross member	To be replaced every : 12 000 miles (20 000 km)
Pressure regulator (integral part of throttle unit)	Pressure : 1 ± 0,05 bar
Solenoid injector	Voltage: 12 volts Resistance: 1,4 Ω must be less than 10Ω
Catalyser (mounted under floor)	◇ C21
Oxygen sensor or lambda probe	Make: Autolite or Bosch At 800°C : - Rich mixture : 625 to 1 100 mV - Lean mixture : 0 to 150 mV
E.G.R.	GM valve
Anti evaporation system	FITTED: Depending on country Canister : Purolator CAN 01

Computer (in passenger compartment)	Computer reference	Fault finding code	REMARKS
	N° Rénix : S1 00 813 101 Official approval no. 77 00 731 801 N° R.N.U.R. 77 00 735 140	- Using tester XR25 - Cassette n° 6 or following <div>150 3</div>	- Mixture regulation by lambda probe - Speed regulation by electric motor - Transitory defects not held on memory - Injection warning light does not operate



# FUEL/AIR MIXTURE

## General

E7J  
ENGINE

12

### SPECIFICATIONS

Vehicle	Engine						Gearbox type	Injection type	Ignition type
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Ratio			
F 40 V F 40 U	E7J	720 724	75,8	77	1390	9,25/1	BM	Bendix mono-point  BOSCH throttle unit	Ignition power module (MPA) with pinking sensor

Engine	Idling speed		Fuel	
	Speed (rpm)	Mixture (CO)	Grade	Octane rating
720 E7J 724	825 ± 50*	0,5 max.  (non-adjustable)	super  unleaded	I.O. 95  minimum

\* For a coolant temperature between 85° and 95° C.

Fuel system type	Regulated monopoint injection
Fuel pump fitted in tank, submerged: BOSCH EKP10.2	Voltage : 12 volts Pressure : 1,06 bar Output : 50 L/H minimum
Fuel filter before tank under vehicle.	Replace every 30 000 miles (50 000 km)
Monopoint throttle unit	BOSCH Ø 36
Pressure regulator integral part of throttle unit	Pressure: 1,06 ± 0,05 bar (non-adjustable)
Solenoid injector	Voltage : 12 volts Resistance : 1,2 Ω approx.
Idling speed adjustment micro-motor with switch at light throttle	Non-adjustable
Throttle position potentiometer including full load switch	Check with XR 25 # 17 No throttle : 10 min. Full throttle : 255 max. Engine stopped, ignition on: value equal or greater than 135.

## SPECIFICATIONS

Computer	N° Renix	Official Approval No.	N° R.N.U.R.	Fault finding code
Bendix : Fitted in engine compartment	S 101 708 101	77 00 749 946	77 00 860 650	168.3

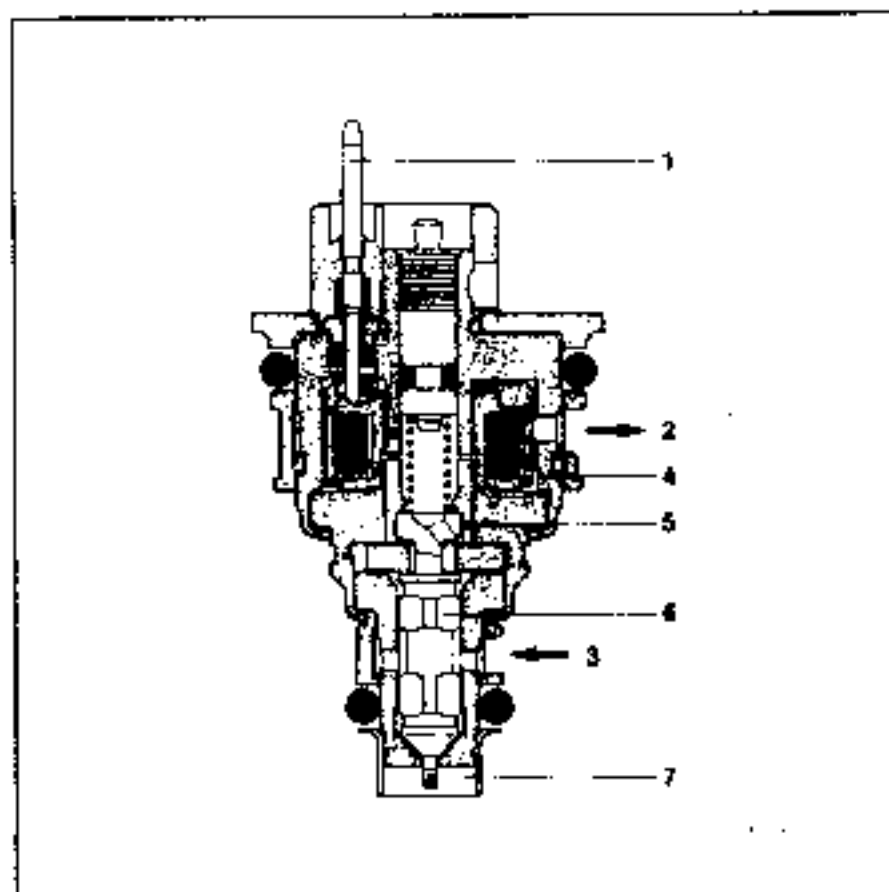
Temperatures in °C	0 ± 1	20 ± 1	40 ± 1	80 ± 1	90 ± 1
Air temperature sensor : CTN BOSCH type: resistance in $\Omega$	5290 to 6490	2400 to 2600	1270 to 1070	--	--
Coolant temperature sensor: CTN BENDIX type: resistance in $\Omega$	--	--	3060 to 4045	300 to 367	212 to 273

Oxygen sensor : BOSCH LS H 24 preheated	at 850 °C - Rich mixture : 625 at 1100 mV - Lean mixture : 0 at 80 mV
Catalyser (mounted under floor)	◇ C 10
Air filter with paper cartridge	To be replaced every 12 000 miles (20 000 km)
E.G.R.	
Anti-evaporation system : Canister	CAN 01
Ignition	Curves : Integrated in injection computer MPA : Ignition power module (MPA) with pinking sensor
Spark plugs	EYQUEM NGK FC 52 LS BCP 5 FS Spark gap : 0,9 ± 0,05 mm

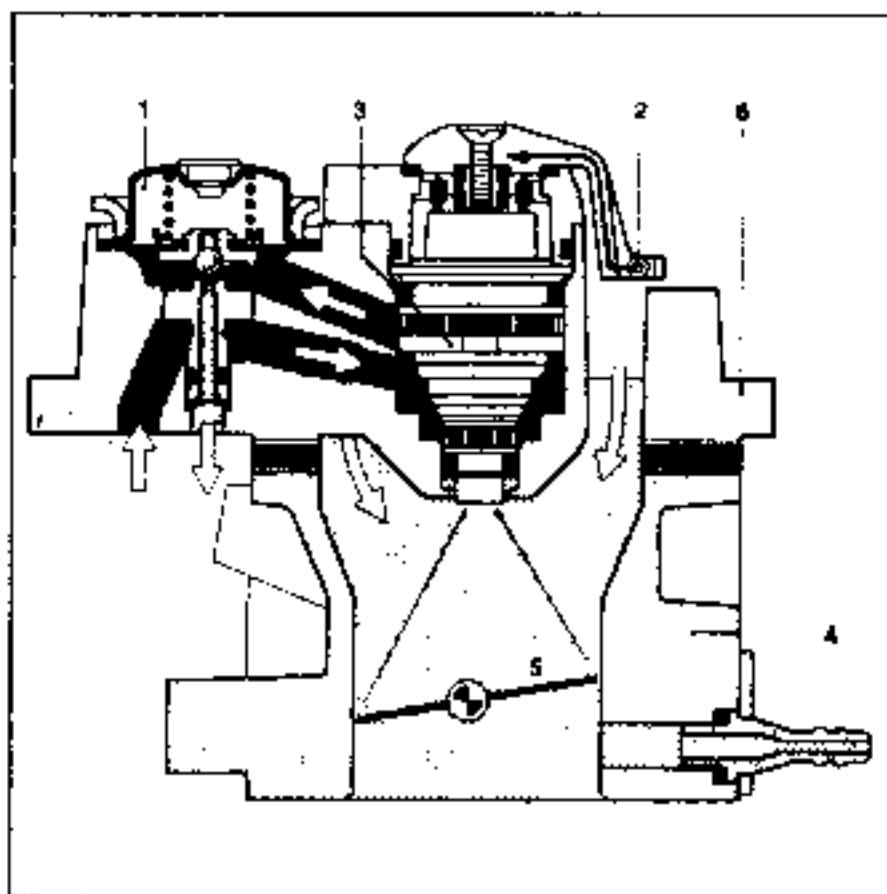
**BOSCH MONOPOINT INJECTION****Injector**

The injector on this centralised injection system is arranged in the inlet air flow above the butterfly, in order to ensure that a uniform mixture is produced which is distributed correctly to the different cylinders. The device uses a needle type injector which meters the fuel delivery by means of an annular slot. The injection stud, located at the end of the needle, provides a conical jet and ensures that the fuel is sprayed correctly. In order to ensure that the minimal amounts of fuel are metered accurately, the injector needle and rotor are very small which enables opening and closing times of far less than 1 millisecond to be obtained.

The injector is constantly supplied with fresh fuel which prevents bubbles of vapour forming in the metering zone in spite of the low feed pressure. This sweeping technique contributes to very good behaviour for starting and hot running.

**Electromagnetic injector**

- 1 - Electrical connection.
- 2 - Fuel return.
- 3 - Fuel inlet.
- 4 - Coil
- 5 - Rotor.
- 6 - Needle.
- 7 - Injection stud.

**BOSCH MONOPOINT THROTTLE CASING**

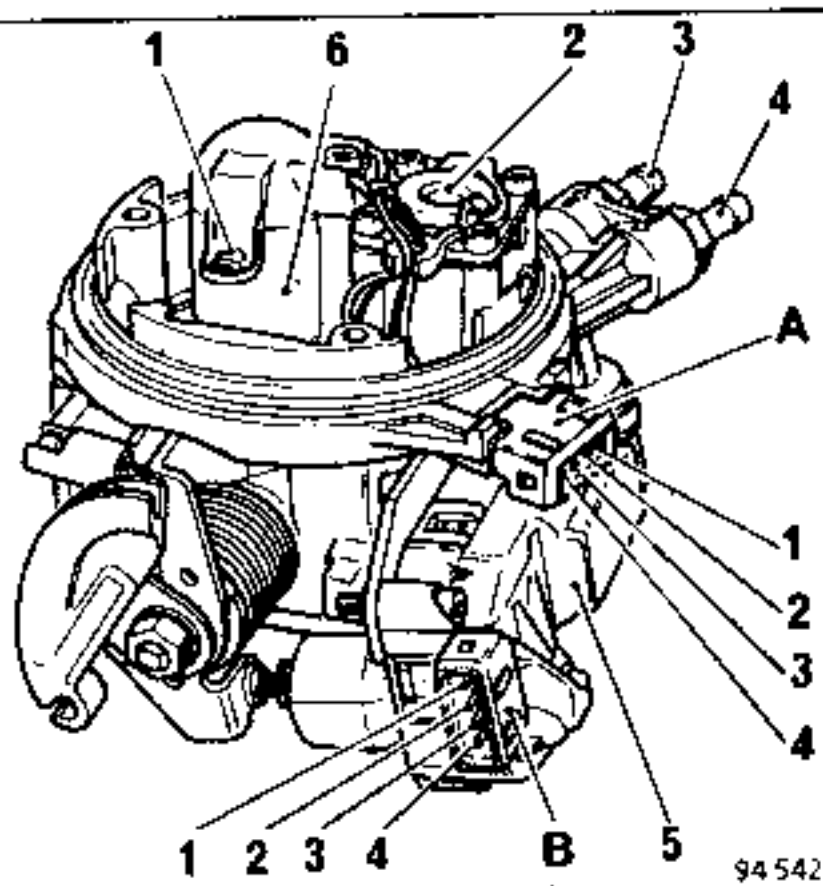
- 1 - Pressure regulator.
- 2 - Air temperature sensor.
- 3 - Electromagnetic injector
- 4 - Throttle casing.
- 5 - Butterfly.
- 6 - Hydraulic section (throttle casing top).

**Electric fuel pump**

The electric fuel pump is incorporated in the fuel tank. It delivers the fuel through a fine filter in the direction of the monopoint injection unit.

**Monopoint injection unit**

The monopoint injection unit is mounted directly on the inlet manifold and supplies the engine with atomised fuel. It consists of the throttle casing and the hydraulic section. The latter consists of an electromagnetic injector and the pressure regulator which maintains the difference between the fuel pressure and the pressure at the metering point of the injector at a constant level. The injection delivery therefore depends solely on the length of time for which the injector is open.



- 1 - Air temperature sensor.
- 2 - Fuel pressure regulator.
- 3 - Fuel return to tank.
- 4 - Fuel feed.
- 5 - Throttle opening motor.
- 6 - Monopoint injector.

### Connector (A)

Function of the injector and air temperature sensor.

- 1 and 4 - Air temperature sensor.
- 2 - + Monopoint injector
- 3 - - Monopoint injector.

### Connector (B)

Function of idling speed regulation and light throttle switch function

- 1 + or - Engine feed.
- 2 - or + Engine feed.
- 3 and 4 - Light throttle switch

### Connector (C)

Function of throttle potentiometer and full throttle switch.

- 1 - Earth, throttle potentiometer
- 2 - Output, throttle track position.
- 3 - Not used
- 4 - Potentiometer supply.
- 5 - Full load information.

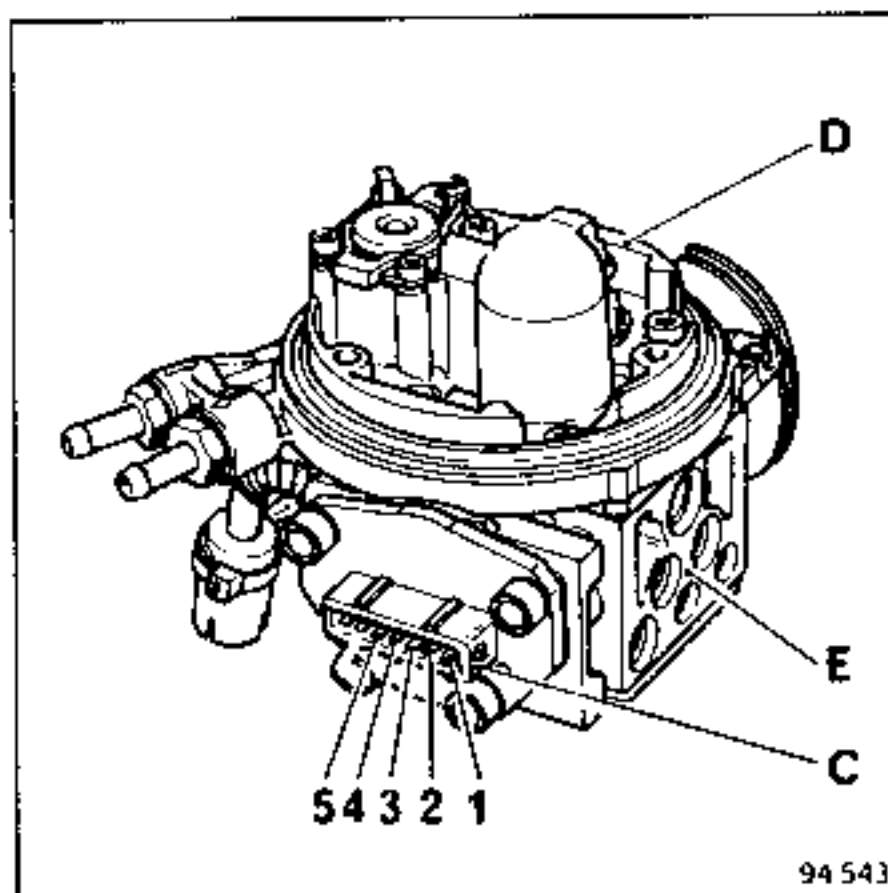
The throttle casing consists of two parts :

- D - The upper part known as the injector body.
- E - The lower part known as the butterfly body.

### NOTE :

With the casing removed, the two parts are held in place by plastic connectors with pressure stud joining pieces.

Press the pressure stud type joining pieces together to separate the two sections.



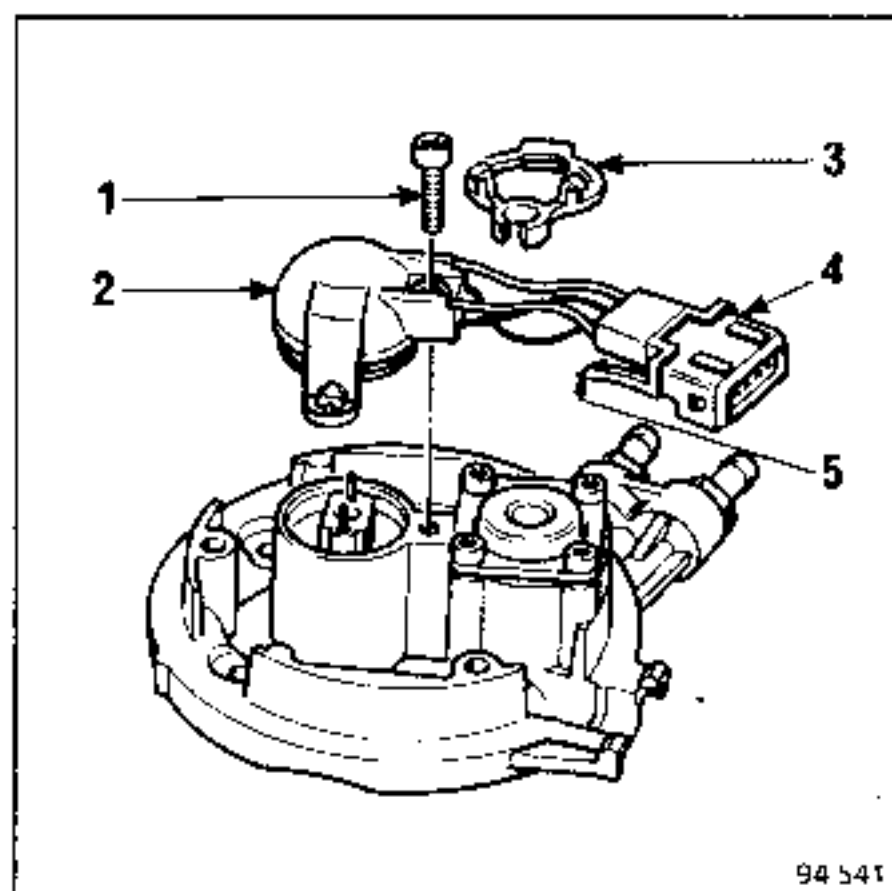
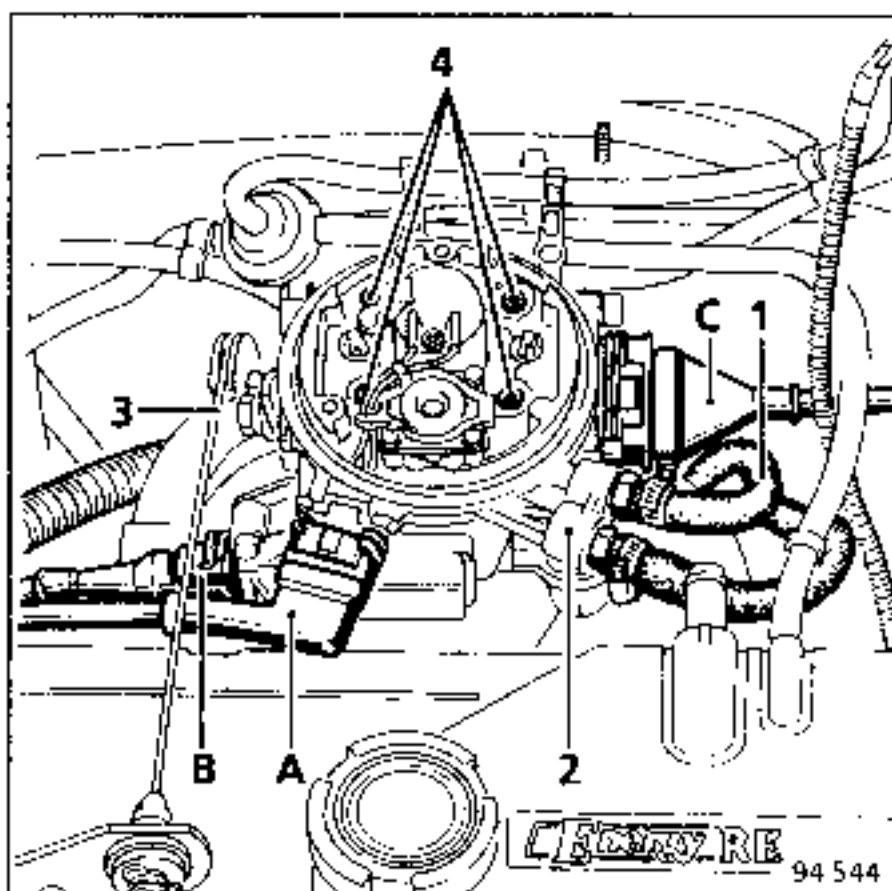
## REMOVAL - REFITTING

### Remove :

- The air filter.
- Disconnect connectors (A) (B) and (C).
- Disconnect the fuel feed (1) and return (2) lines.
- Disconnect the accelerator control cable (3).
- Remove the mounting screws (4) and take out the throttle casing.

### Removing the air temperature sensor :

- Remove the air filter.
- Disconnect the connector.
- Remove screw (1) and raise the cover (2).
- Release the leads from the mounting (3).
- Take out the connector (4) after first releasing the hooks (5).



### On reassembly :

Check that the connectors are correctly clipped in place

### On reassembly :

Change the seals between the manifold and casing.

Reconnect the fuel return and feed lines and check that the connectors are correctly clipped in place

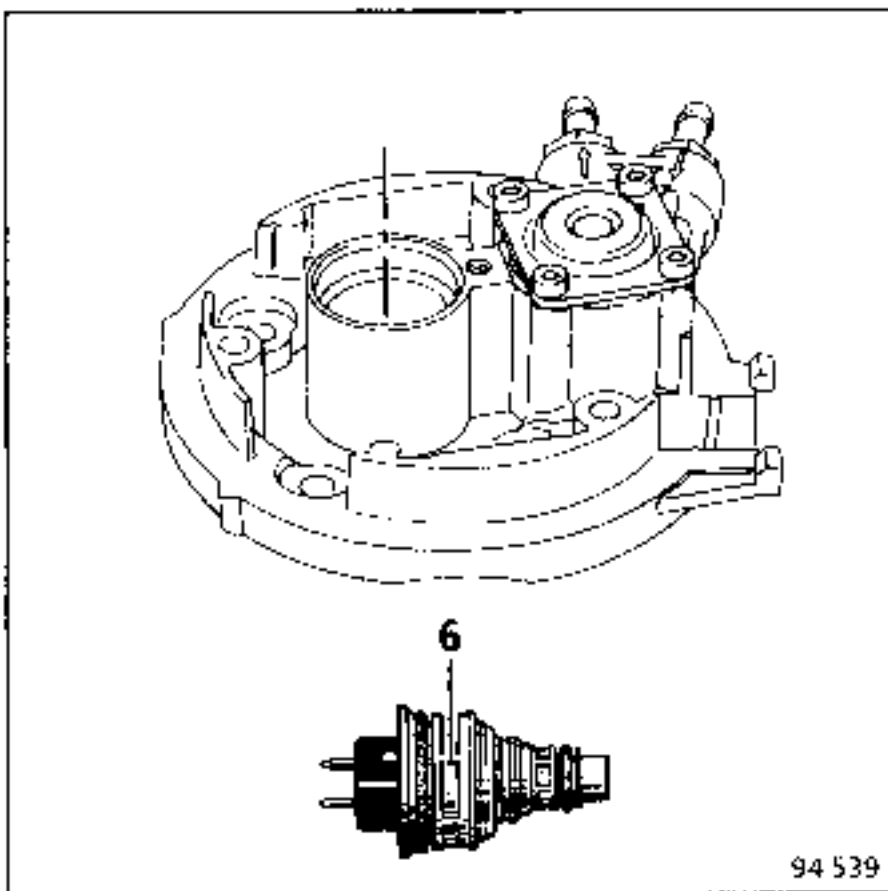
Reconnect the accelerator control and reassemble the air filter.

## REMOVING - REFITTING INJECTORS

Remove the air filter.

Remove the air temperature sensor cover (see page 12-8).

Take out injector (6) from its housing.



### On reassembly:

Replace the "O" ring seals and lubricate them.

Refit the injector equipped with the cover such that it can be correctly directed and secure the assembly in place

### NOTE :

The fuel pressure regulator cannot be adjusted: if there is a defect, the upper part of the throttle casing must be replaced.

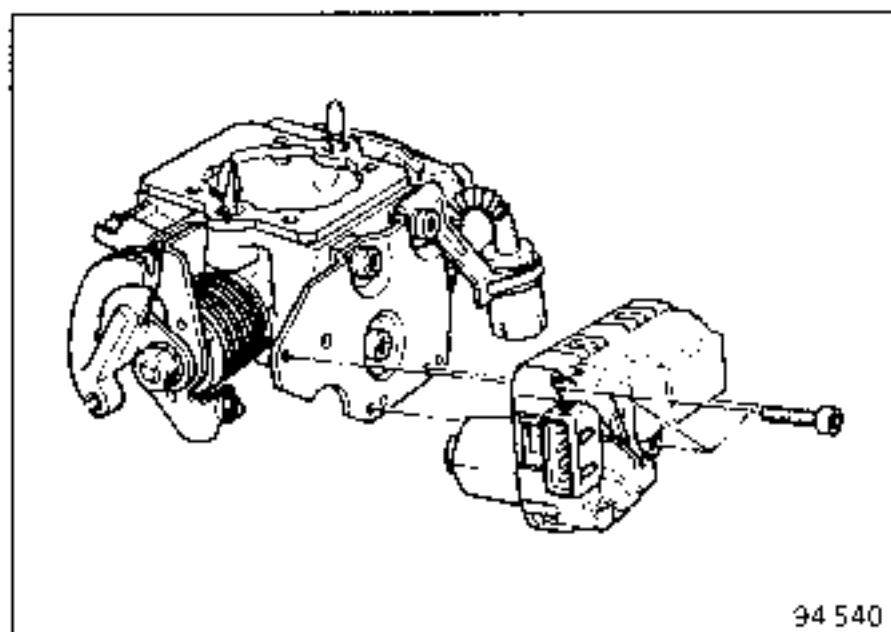
## REMOVING - REFITTING THE IDLING SPEED REGULATING MOTOR

Remove the air filter.

The motor may be removed without removing the throttle casing. However, access to the screws is facilitated by removing the throttle casing mounting bolts and releasing it without disconnecting the fuel pipes.

Disconnect the connector from the motor.

Remove the mounting bolts and take out the motor.



### On reassembly:

No readjustment is to be performed. However, with the ignition on, if the light throttle switch on the XR25 test box is not illuminated, place a shim between the throttle stop and micro-motor so as to obtain the no load switch setting. Switch the ignition on then off and the micro-motor should be positioned in the cold start setting. Repeat the operation without the shim, then check the position of the throttle butterfly with the ignition on and the engine stopped.

Test box XR 25 # 17 : 135

### REMOVING - REFITTING THE THROTTLE BUTTERFLY POTENTIOMETER

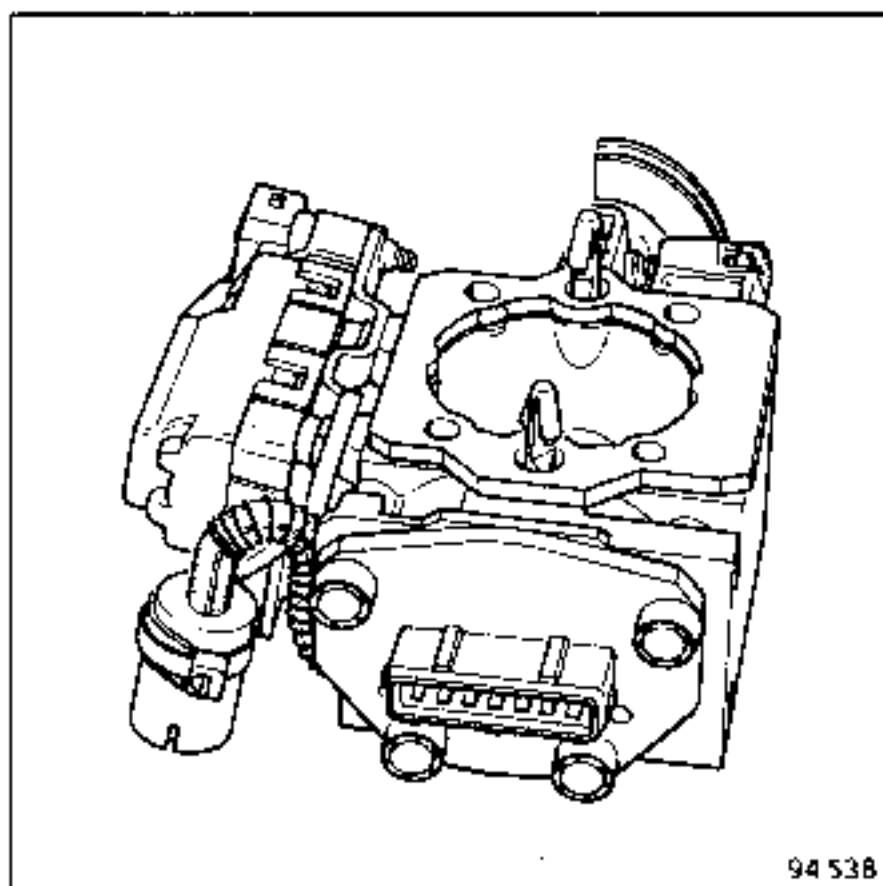
The throttle butterfly potentiometer is set in the factory and cannot be repaired.

If a defect occurs, replace the throttle casing body.

#### Removal

- Remove the air filter and complete monopoint throttle casing assembly (see page 12-8).

Remove the upper part of the throttle casing and the idling speed regulating motor.



#### On reassembly:

- Change the seals.
- Refit the throttle casing and ancillary units. Check that the connectors are correctly clipped in place.
- On the XR 25 test box check that the following bar graphs are present:
  - Light throttle.
  - Full throttle.

and check the cold start setting:

# 17 : 135



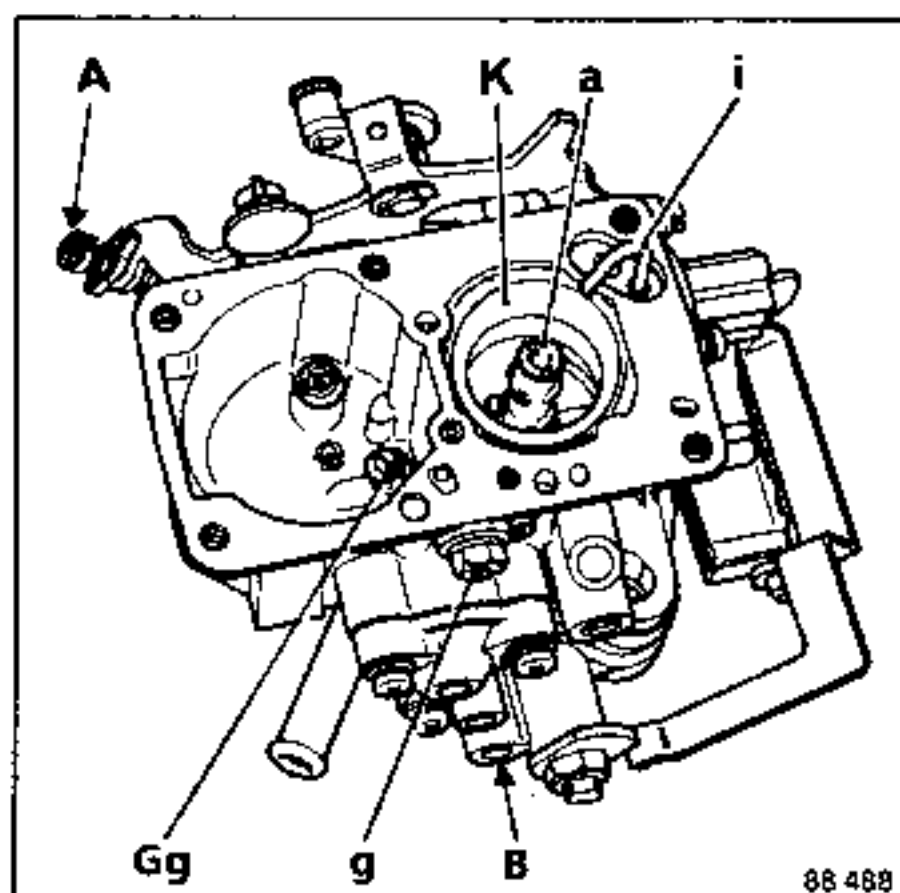
# FUEL/AIR MIXTURE

## Solex 32 Bis Carburettor

C  
ENGINE

12

### SETTINGS



88 488

DESCRIPTION	104	997
Choke tube (K)	23	24
Main jet (Gg)	115	120
Idle jet (g)	42	38
Air compensating jet (a)	150	140
Econostat	40	--
Pump injector (i)	45	40
Pneumatic enrichener (Ce)	40	40
Needle valve	1,3	1,3
Fuel level, (non-adjustable - Ensure needle valve seal is correct thickness = 1 mm)	--	--
Throttle angle in mm in degrees	--	--
Positive throttle opening (mm) Very cold climate version.	0,70 (20° 15)	0,70 (20° 15)
Accelerator pump travel (mm)	cam	cam
Degassing valve travel (mm) *Close (degrees)	Ø 0,3 13°	Ø 0,3 13°
Throttle opening (air conditioning)	--	--
Choke plate (C O A S)	2,6	2,8
Idle speed in rpm	700 ± 50	700 ± 50
% CO	1,5 ± 0,5	1,5 ± 0,5

\* The valve is closed for a throttle angle above ...

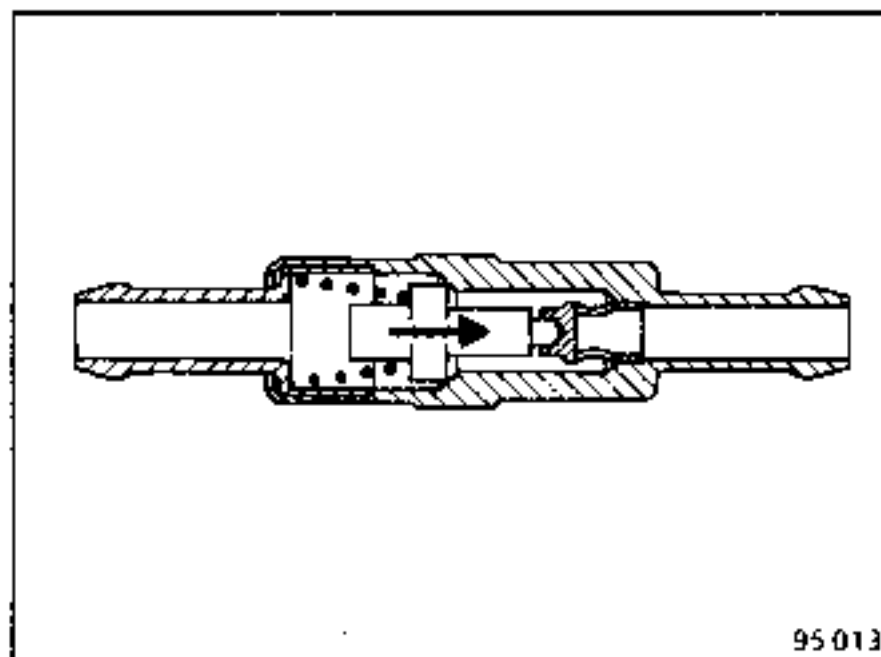
On engines **C1G 726** and **C1E 762**, Solex carburettors are equipped with a thermostatic valve on the float chamber breather circuit.

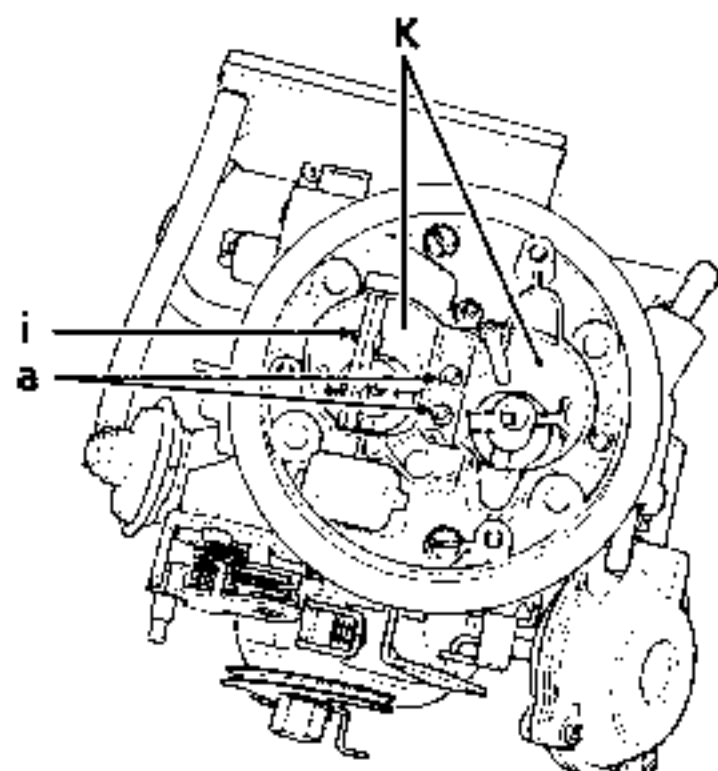
**Important - Correct direction for fitting:**

Yellow ring towards the decanter on the body.

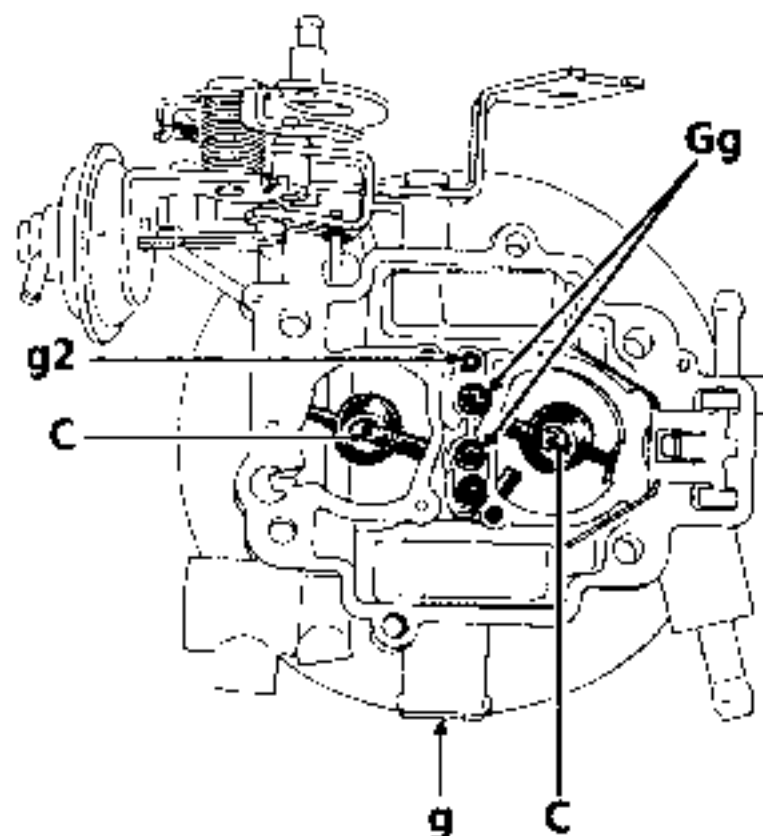
See arrow on body of valve.

The float chamber ventilation thermostatic valve opens if the temperature rises above **40° C**.





91 901



91 900

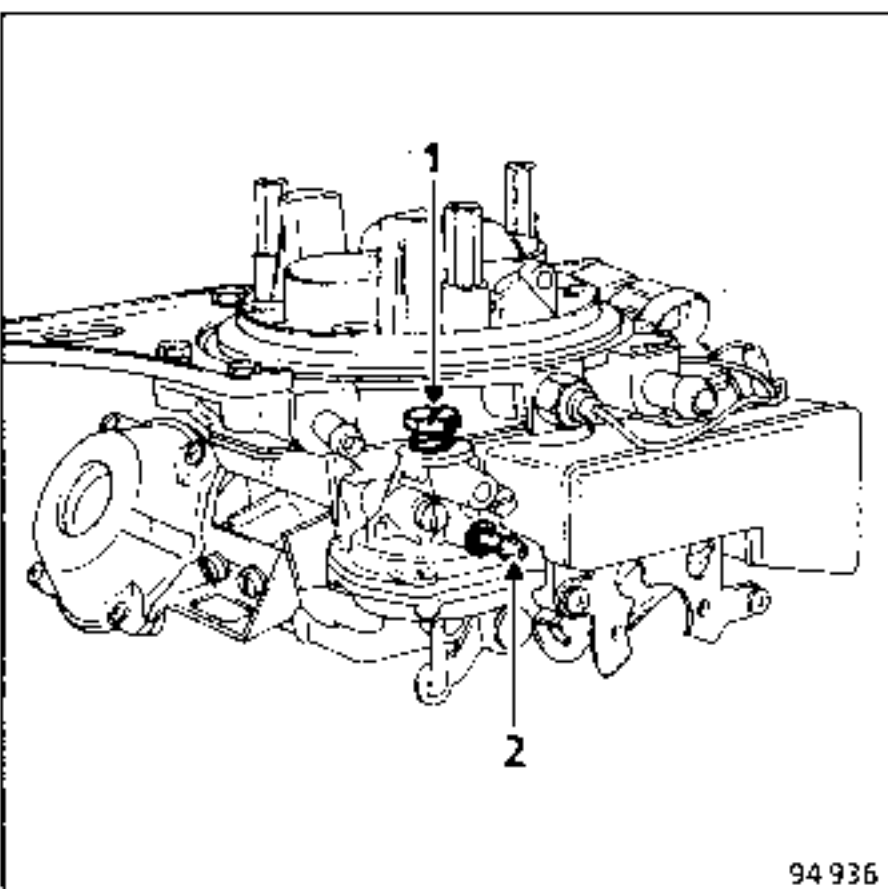
ITEM	4 · 4C · 4D ind 302	
	1st barrel	2nd barrel
Choke tube (K)	23	24
Main jet (Gg)	122	122
Air compensating jet (a)	175	200
Idling jet (g)	52	40
Mixture centraliser (C)	3,5 R	3,5 R
Emulsifier	F3	F24
Pneumatic enrichener	55	--
Ecdostat	--	110 - 110
Needle valve	150	
Floater level (mm)	31	
Floater travel (mm)	~	
Accelerator pump injector (i)	50	--
Accelerator pump travel	cam	
Positive throttle opening (mm or °)	0,70 or 17°30	
Pneumatic part-open setting (mm) vacuum (in mbar)	(1) 0 to 160 (2) 3,2 to 500	
(1) Start of C O A S (2) Max C O A S		
Mechanical part-open setting (mm)	4,5	--
Degassing valve (mm)	~	
Idling speed accelerated (AC or PAS)	900* ± 50	
Idling speed in rpm	800 ± 50	
% CO	1,5 ± 0,5	

\* Fast idling with AC + PAS : 950 ± 50 rpm

## SPECIAL FEATURES OF CARBURETTORS

## Single stage opener :

Vehicles with power steering.



- 1 - Idling speed adjustment screw when opener is operating.
- 2 - Restrictor for applying vacuum to opener

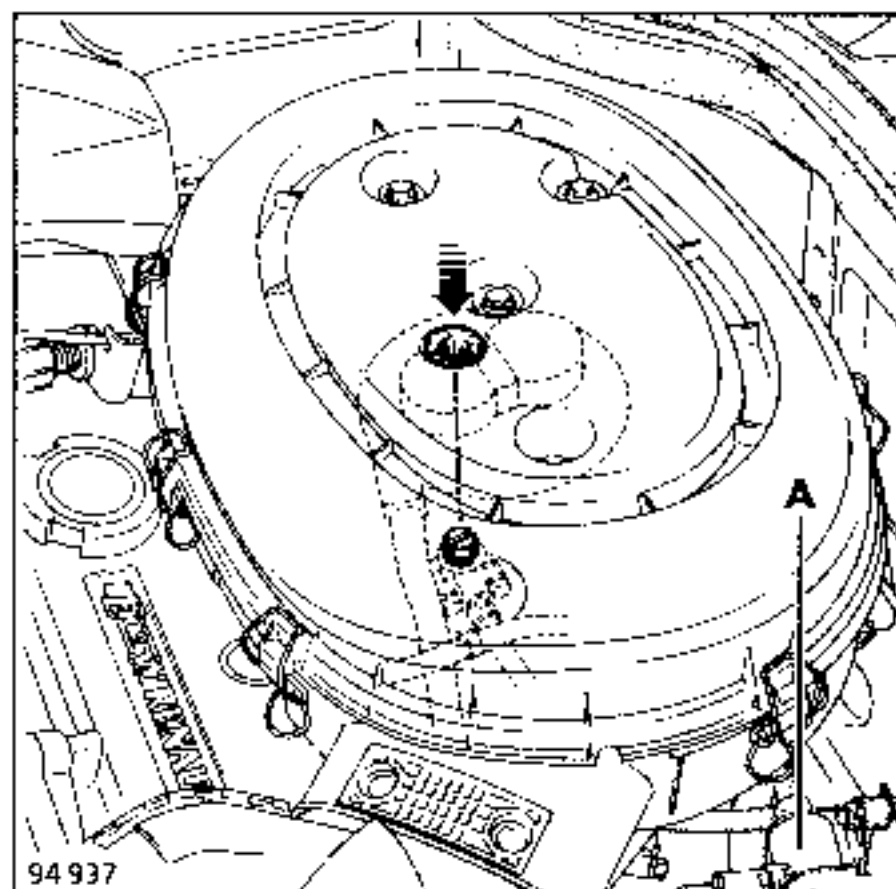
## Principle of Operation:

The power steering system is equipped with a pressostat which, when it is activated, controls a solenoid valve (A)

This solenoid valve allows vacuum to act on the throttle opener.

In this case, it should be possible to determine an increase in idling speed

## Adjustment procedure:



Engine warm, running at idling speed.

The steering pressostat is secured to a steering system hose.

Disconnect the pressostat connector and shunt the two pins on the connector.

When the shunt is in place, the idling speed should increase.

Then, using a screwdriver, adjust the idling speed to  $900 \pm 25$  rpm (see arrow on drawing).

If no variation in idling speed can be detected, check:

- that the solenoid valve (A) "clicks" when the shunt is applied to the pressostat connector,  
If this does not happen, have another look at the electrical wiring.
- that the vacuum acts on the solenoid (A) and then on the throttle opener,  
if this does not happen, have another look at the pneumatic line connections,
- If the two checks described above are correct, change the opener.

#### IMPORTANT :

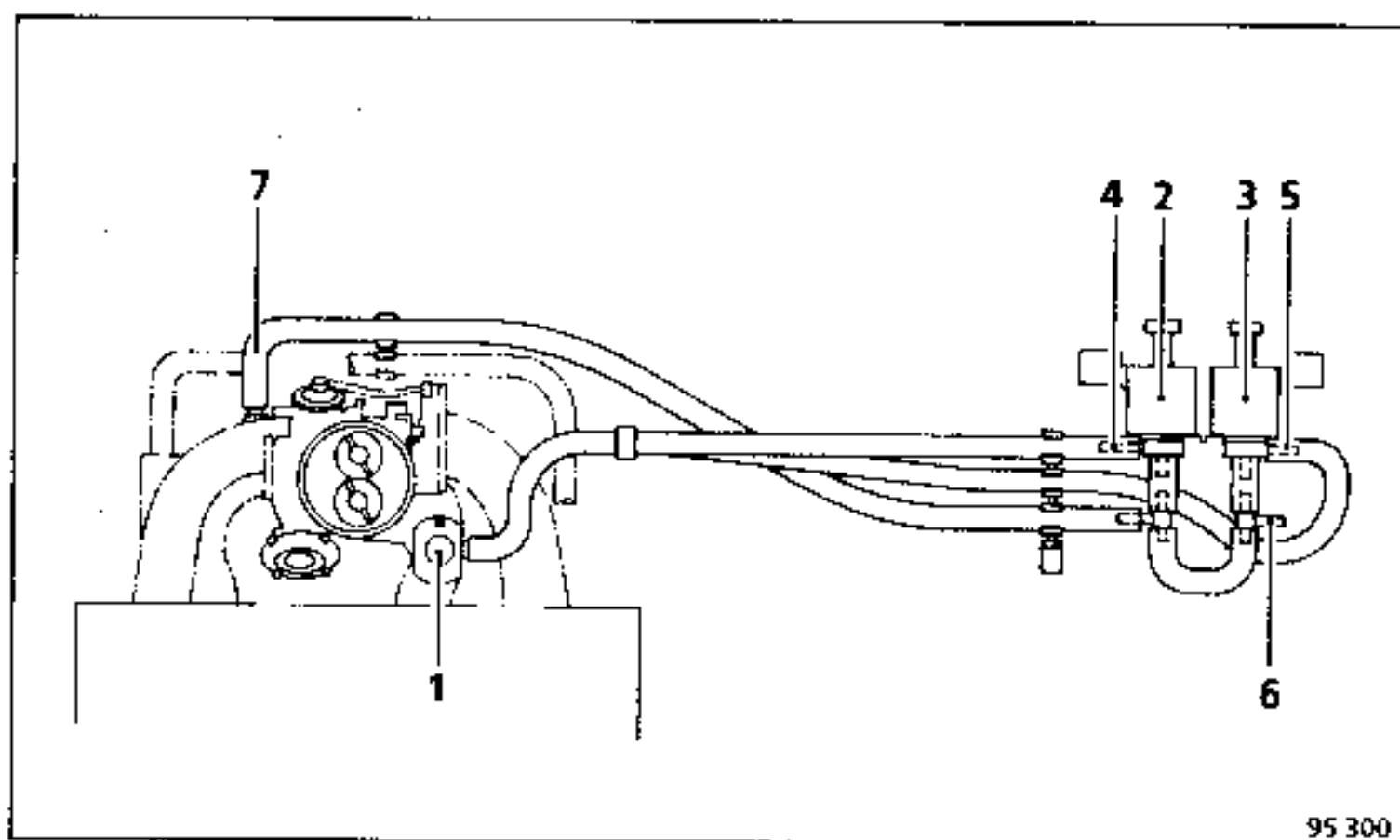
When the idling speed has been adjusted (with the shunt), remove the shunt and reconnect the connector on the pressostat.

Then turn the steering to full lock and check the increase in idling speed

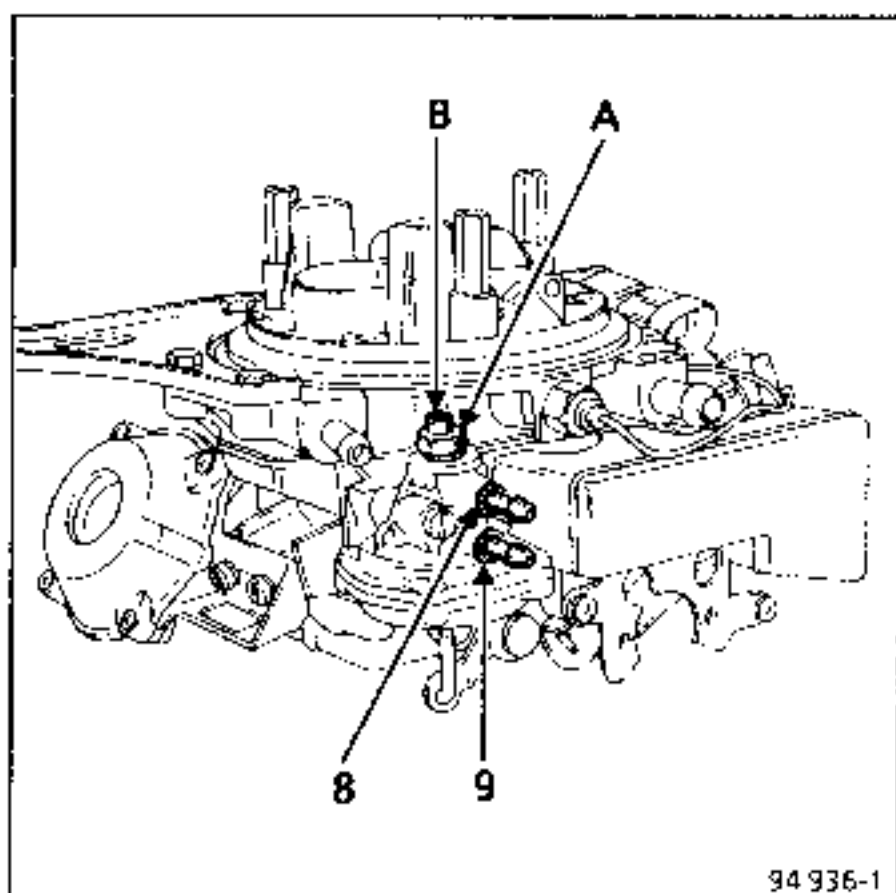
(If this does not happen, change the pressostat.)

**Two stage opener for vehicles with power steering and air conditioner.**

#### Pneumatic Diagram

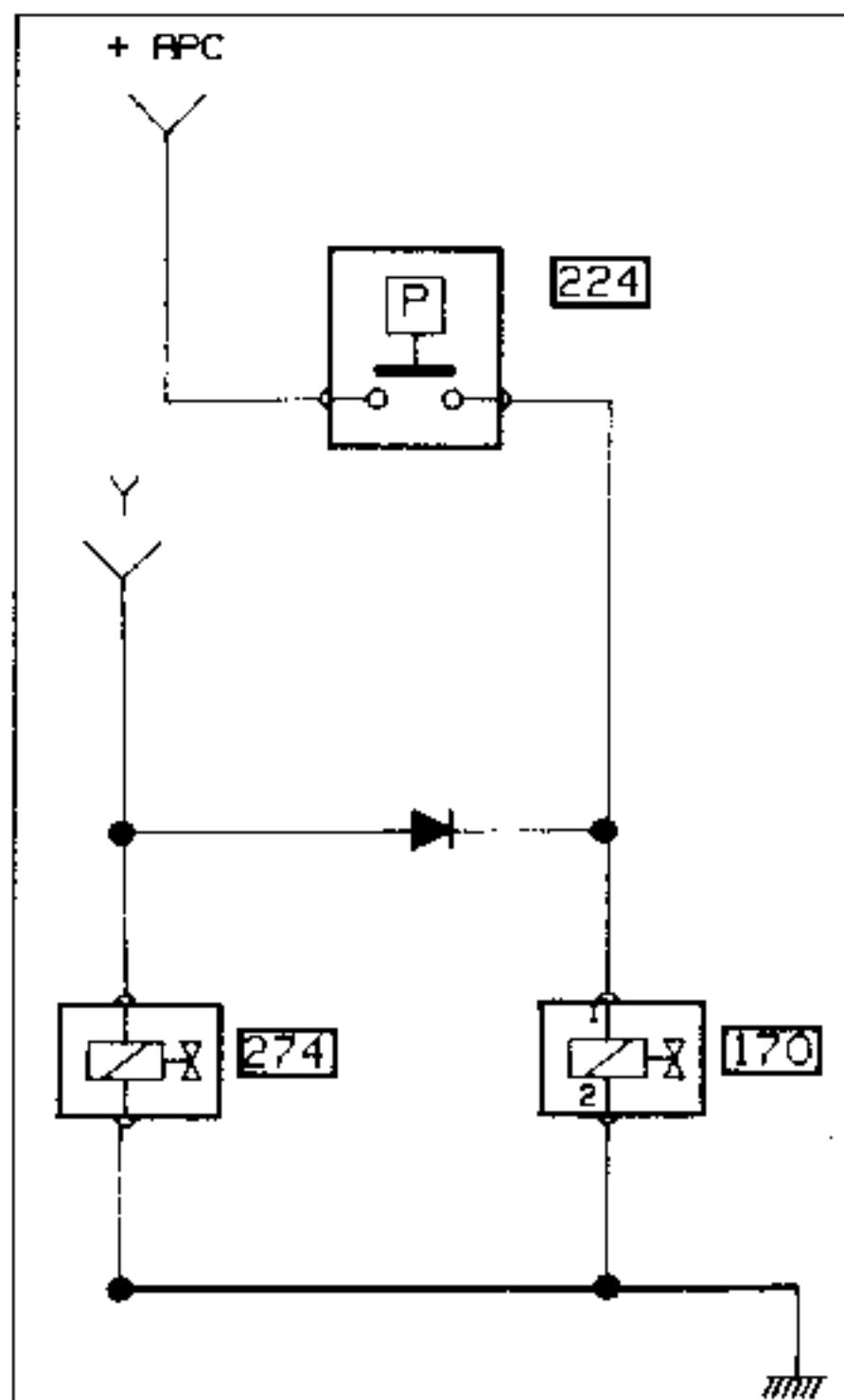


## Two stage opener (continued)



- 1 - Two stage opener on carburettor.
- 2 - Solenoid valve A.
- 3 - Solenoid valve PAS.
- 4 - Grey marker ring.
- 5 - Blue marker ring.
- 6 - Restrictor sealed by plug
- 7 - Vacuum outlet on manifold.
- 8 - Restrictor to solenoid valve AC.  
(Grey marker ring).
- 9 - Restrictor to solenoid valve PAS  
(Blue marker ring).

- A - Idling speed adjusting screw with PAS.
- B - Idling speed adjusting screw with AC.



170 : Power steering solenoid valve.

224 : Power steering pressostat

274 : Air conditioner solenoid valve.

Y : Information + 12 Volts for activating AC  
compressor clutch

**Two stage opener (continued)****Principle of Operation :**

When the power steering is activated, the pressostat 224 supplies the solenoid valve 170.

The vacuum can be applied to the lower restrictor on the opener and the idling speed should then be:

**$950 \pm 25$  rpm**

When the air conditioning is operating, the pressostat trifunction switch can supply the compressor (information Y).

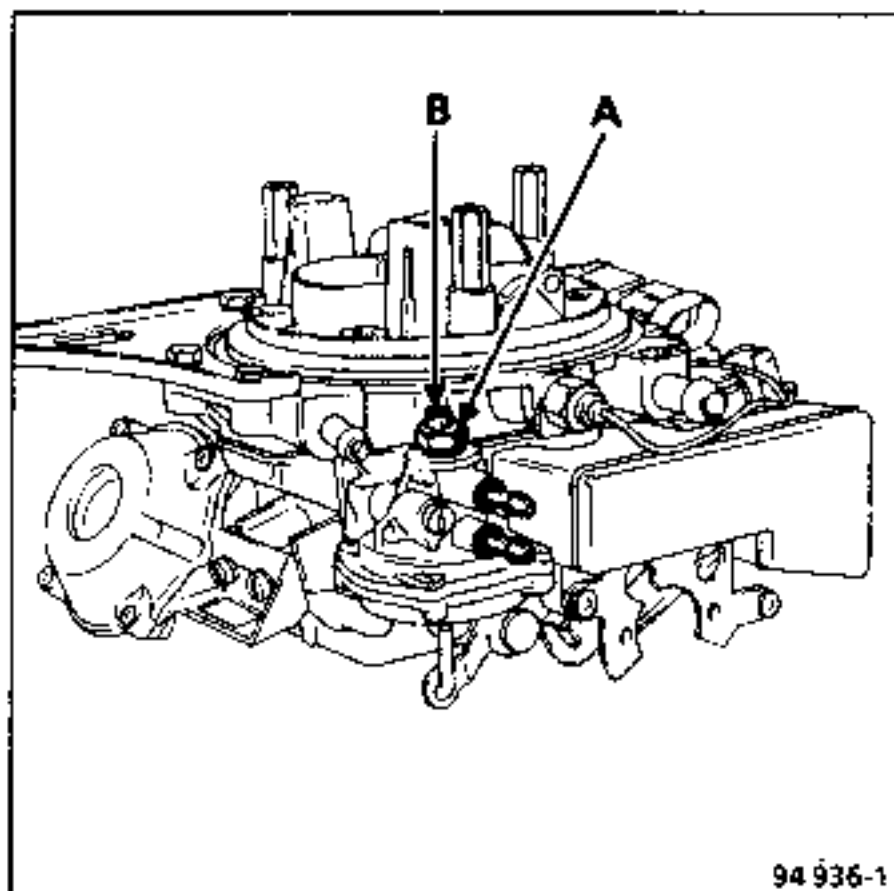
The two solenoid valves 170 and 274 are thus supplied with power

The vacuum acts on the two opener restrictors and the idling speed should then be:

**$900 \pm 25$  rpm**

**Comment :**

The diode prevents power being supplied to the AC solenoid valve if the PAS is supplied but makes the opposite possible

**Procedure for Fast Idling Adjustment:**

94 936-1

Idling	Conditions - Values	Comments
Normal	$800 \pm 50$ rpm CO = 1.5%	Engine warm (electric fan stopped) - No load.
Fast When PAS is activated	$950 \pm 50$ rpm Screw A moved	- Shunt pressostat. - No load whatsoever.
fast When CA is activated	$900 \pm 50$ rpm Screw B moved	- Air conditioning operating, compressor working. - No other load.

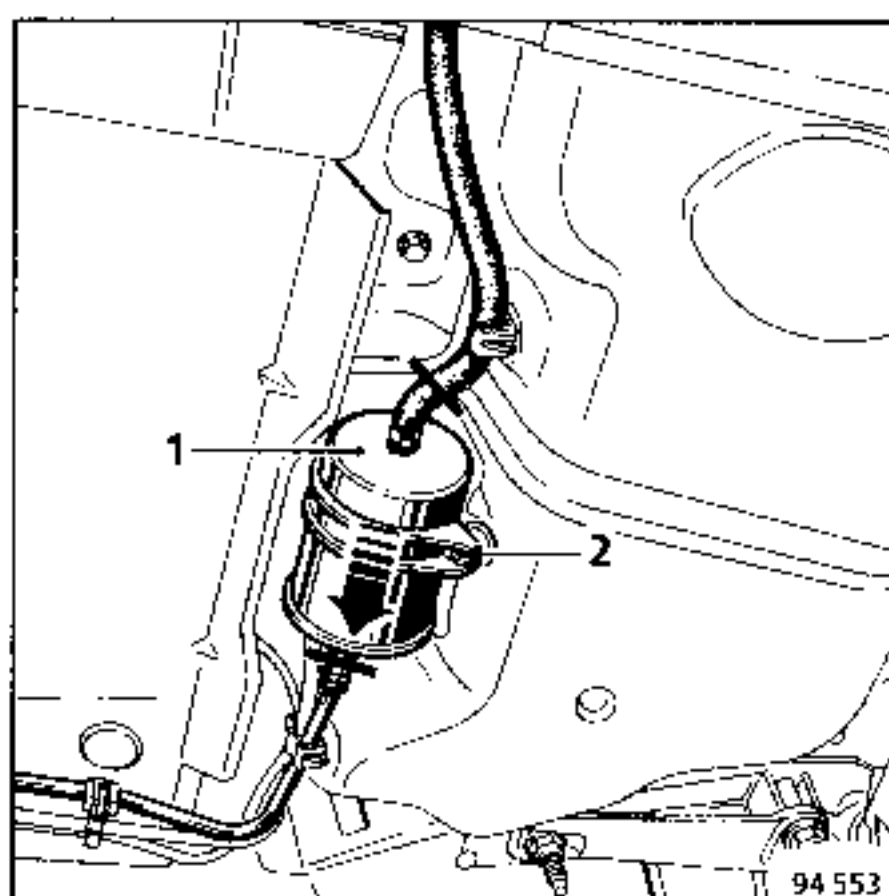
**CHANGING**

Change every 36 000 miles (50 000 km).

**ESSENTIAL SPECIAL TOOLS**

<b>Mot. 453-01</b>	Hose clamp
--------------------	------------

- The filter is fitted under the vehicle, in front of the tank. It is secured on the front part of the tank by a strap.



- Fit clamps **Mot. 453-01** on hoses.  
Remove clamps and disconnect filter inlet and outlet hoses.
- Remove screw (2) and take out fuel filter (1).  
When refitting, make sure that the direction of fuel flow is correct (see arrow on filter).
- Reconnect hoses.
- Remove clamps **Mot. 453-01**.



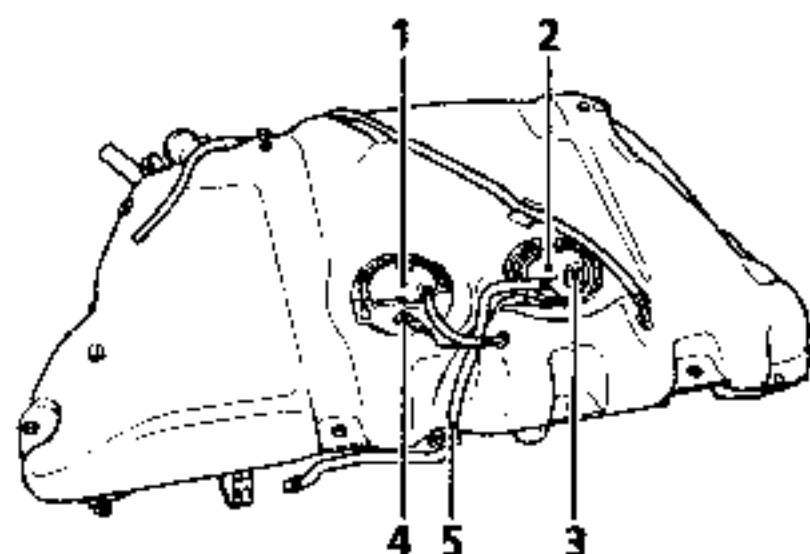
## REPLACING

## NOTE :

The fuel pump is of the type which is immersed in the fuel tank.

It is therefore necessary at present to remove the tank to reach the pump.

For removal of the fuel tank, see (M R. 257).



94 554

- 1 - Fuel tank sender unit.
- 2 - Immersed fuel pump.
- 3 - Feed connector on fuel pump.
- 4 - Connection harness to fuel gauge.
- 5 - Fuel feed hose

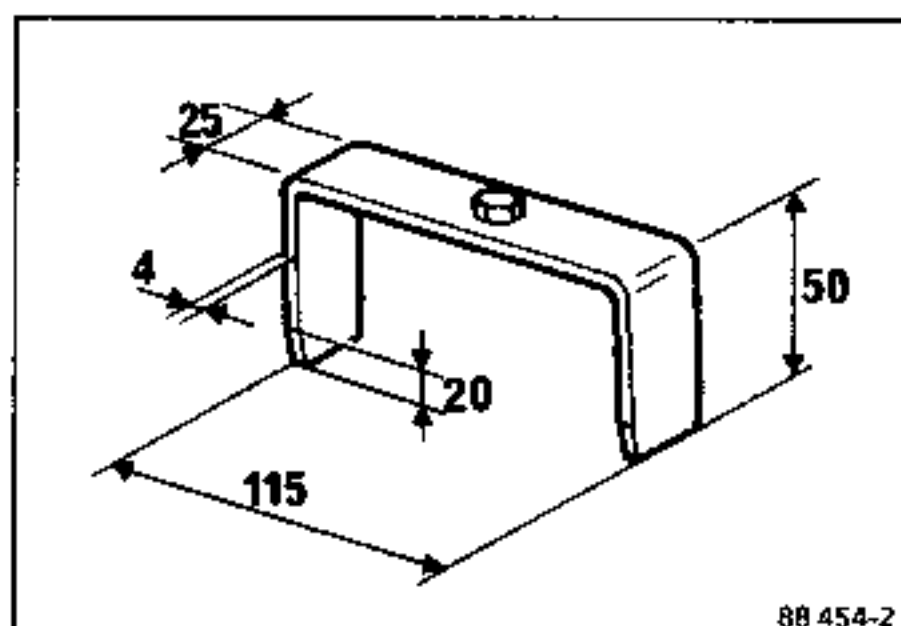
When the fuel tank has been removed, disconnect electrical connection (3) and feed hose (4)

It is prohibited to use a screwdriver or hammer, as there is a risk of damaging the notches on the plastic nut and damaging the sender unit.

Make up a tool locally in order to ensure that the compulsory tightening torque of 3 daN.m is adhered to.

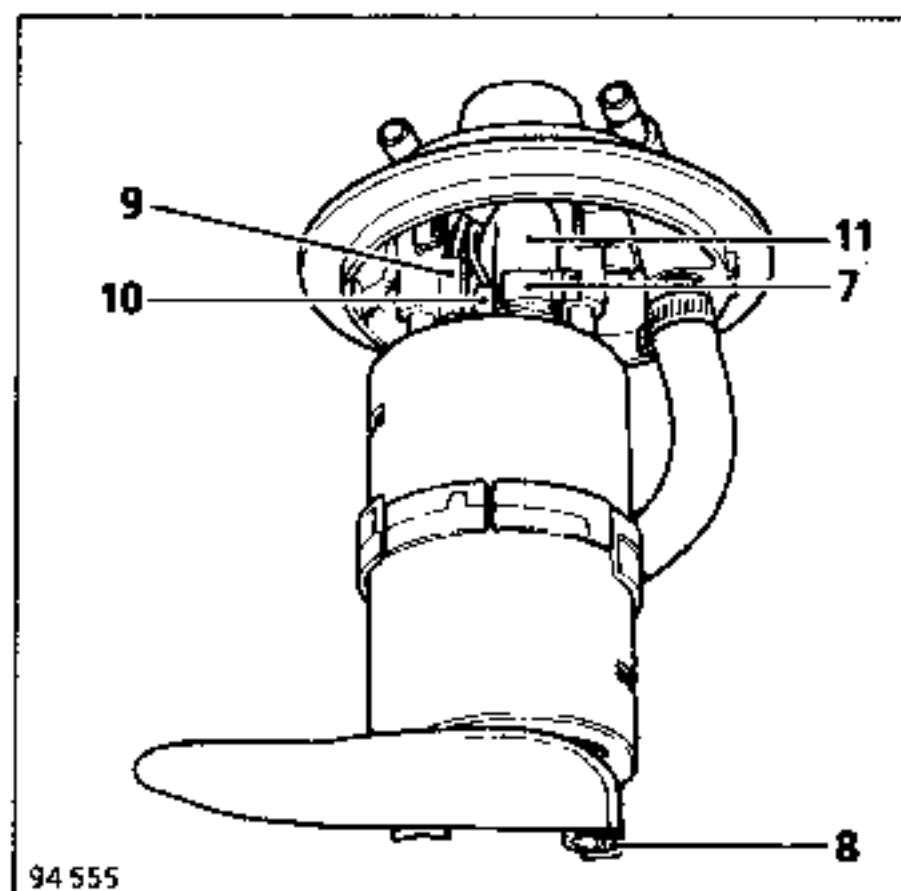
Drill a hole in the centre of a piece of flat iron bar 25x4x210 mm, and weld on a hexagon head bolt with a width across flats of 13 mm. Bend into a "U" shape. Adjust so that it fits into the notches on the plastic nut.

## Locally made up tool



88 454-2

Using this tool, unscrew nut (6) and take out the fuel pump.



94 555

Slacken off clip (7), remove clip (8) and separate the pump from the cover after disconnecting leads (9 and 10), and the fuel pipes (11).

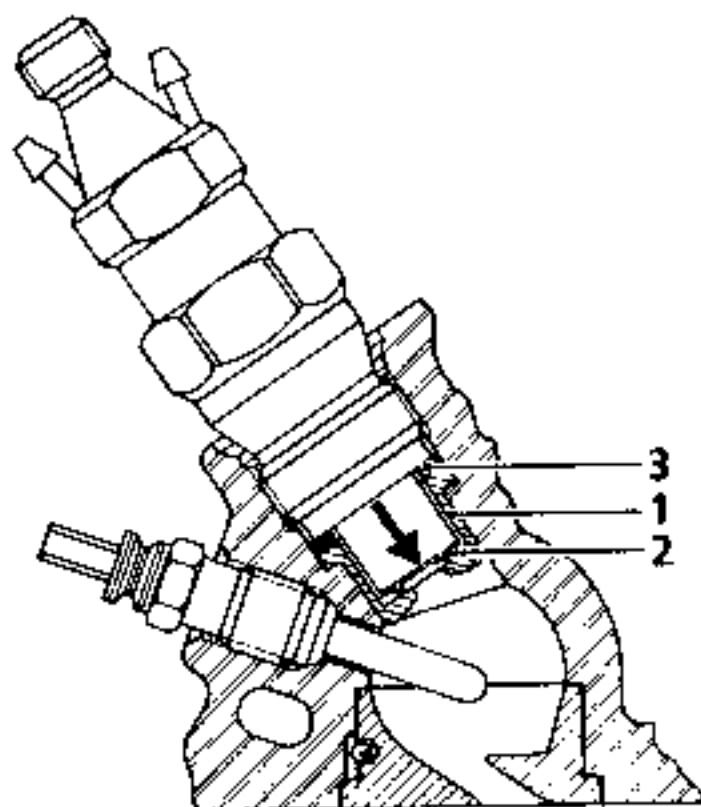
## On assembly:

Ensure that the polarity of the leads is correct, fit in place hose (7), leads (9) and (10), and clip (8) correctly.

Fit a new seal and torque tighten the nut to 3 daN.m.

## INJECTOR (Special Points)

The cylinder head is designed to receive a flame-proof end piece (1) and a flame proof washer (2).



92 447-1

Whenever an injector is fitted, fit a new seal (3) and a new flame-proof washer (2) (position as shown by arrow)

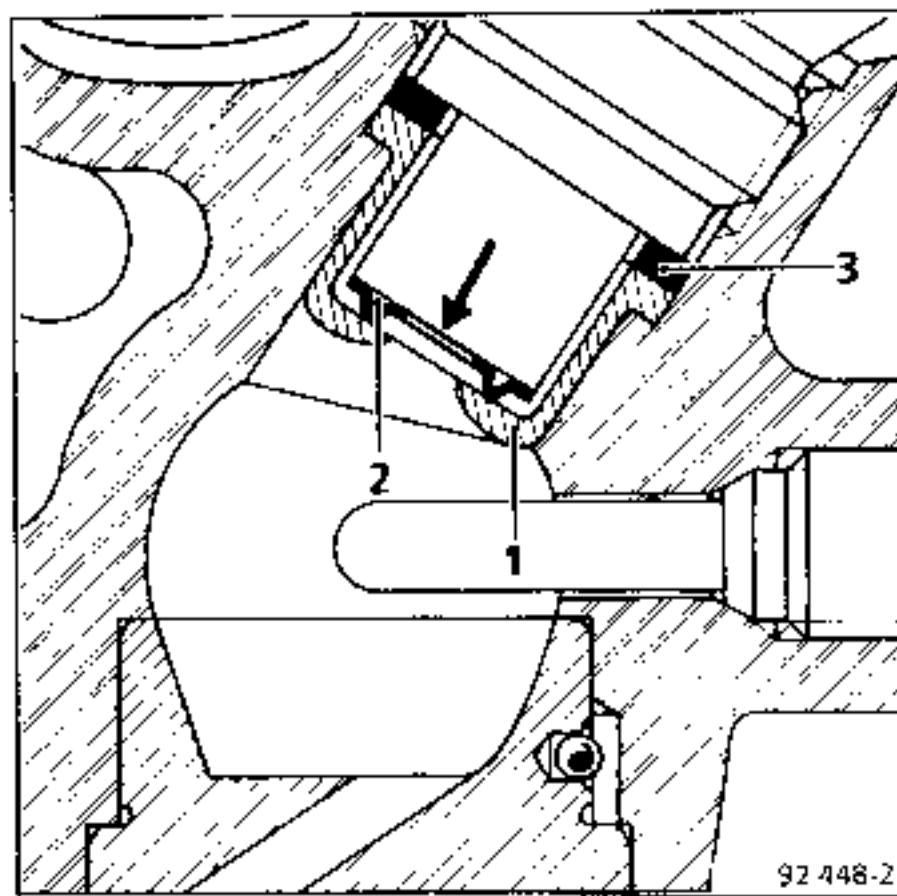
Torque tighten the injector using tool Mot. 997 to 7 daN.m.

### NOTE :

The old flame-proof washers marked (2) item: 77 00 663 363 are no longer available and have been replaced by washers marked (1) item : 77 00 854 406.

The new washers marked (1) are always fitted in the same positions as the old washers, as indicated by the arrow (injectors secured by clamp or screwed in cylinder head).

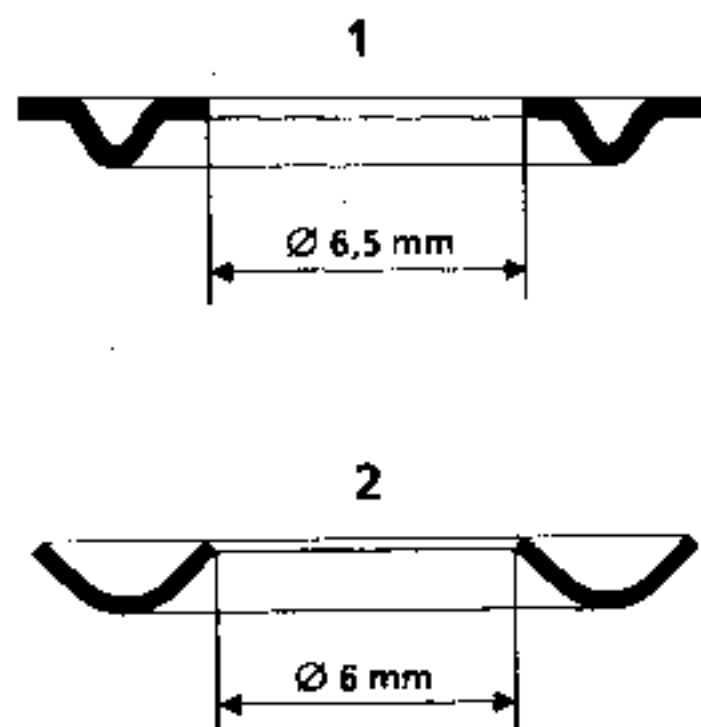
## Assembly of screwed injector



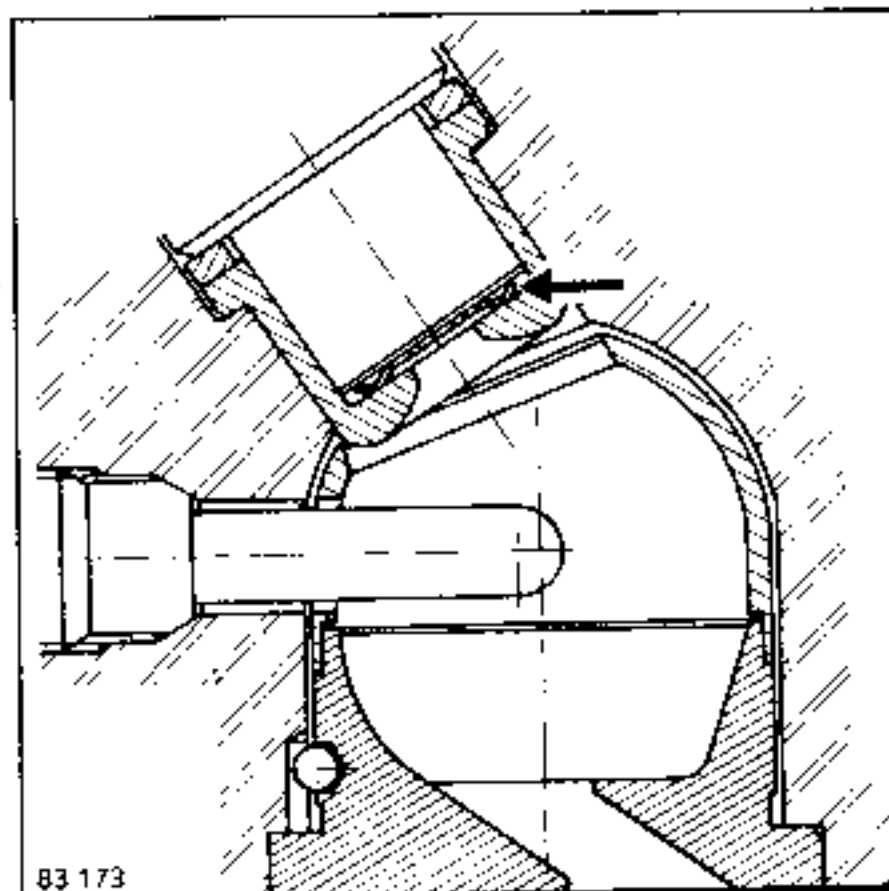
92 448-2

### NOTE :

Old washers marked (2) still in stock may only be used, in the same position, on injectors secured by strap.



94 952



83 173

# PUMPS

## Diesel System

13

### SPECIFICATIONS

Vehicle type	Engine	Injection unit
F 404	F8M 736 F8M 760	Bosch

Description	Make and Type	Special details
Injection pump	BOSCH VE 4/9 F 2400 R95	Single piston rotary pump with mechanical centrifugal governor, automatic hydraulic advance, electrically controlled hydraulic cold start, and solenoid shut-off.
Pump timing (engine at TDC, pump lift)	0,65 ± 0,02 mm	
Injector,	BOSCH KCA 30 S 44	
Pintle and seat assembly	BOSCH DN OSD 189/	Setting 130 $\pm \frac{8}{5}$ bars
Fuel filter	PURFLUX	With incorporated priming pump and diesel fuel heater.
Injector pipes	-	Outside dia. 6 mm Inside dia. 2,5 mm Length 275 mm
Thermostat (fast idle)	CALORSTAT	Travel 7 to 8,5 mm between 30° and 67° C.
Cold start advance system feed thermal switch	EATON 45°C (1) EATON 60°C (2)	Activating temperature: Closed circuit = 50 ± 3°C (1) 65 ± 3°C (2) Activating temperature: Open circuit = 40 ± 3°C (1) 55 ± 3°C (2)
Cold start advance system	Built into pump	Operating time 0,30 minute at + 20°C to 2,45 minutes at -20°C
Thermal element on injection pump		Resistance = 23 ohms.

### SETTINGS

Idling	850 ± 25 rpm
Fast idle	1 150 ± 50 rpm
Max. speed	5 300 ± 100 rpm
Smoke density	
Approved figure	1,20m-1 : 39%
Maximum legal	2 m-1 : 55%

### TIMING TEST (on diagnostic bay)

Injection pump	Idling speed rpm	Injection commences Before TDC
BOSCH VE.. R95	850 ± 25	11,5° ± 1°

Readings taken with a strobe light across the flywheel/clutch housing timing marks.

# PUMPS

## Diesel System

13

### SPECIFICATIONS

Vehicle type	Engine	Injection equipment
F 404	F8M 736	ROTO DIESEL
	F8M 760	

Description	Make and Type	Special details
Injection pump	ROTO DIESEL DPC R 844 B 376 C	Single distribution rotary pump with two pistons, mechanical centrifugal governor, automatic hydraulic advance, automatic fast idling when cold and solenoid shut-off.
Pump timing TDC, locked by pin		Dimension "X" on pump
Injectors	ROTO DIESEL LCR 67320	
Pintle and seat assembly	ROTO DIESEL RDN OSDC 6843 C	Setting 118 $\pm \begin{smallmatrix} 7 \\ 5 \end{smallmatrix}$ bars/max difference 8 bars
Fuel filter	PURFLUX	With incorporated priming pump and diesel fuel heater.
Injector pipes	-	Outside diameter 6 mm Inside diameter 2,5 mm Length 290 mm
Fast idle thermostatic unit	CALORSTAT	Travel 7 to 8,5 mm between 30 and 67°C

SETTINGS	
Idling	850 ± 25 rpm
Max. speed	5 300 ± 100 rpm
Smoke density	
Approved figure	1,11m-1 : 36%
Maximum legal	2 m-1 : 55%

TIMING TEST (on diagnostic bay)		
Injection pump	Idling speed rpm	Injection commences Before TDC
ROTO DIESEL DPC R 8443..	850 ± 25	9° ± 1°

Readings taken with a strobe light across the flywheel/clutch housing timing marks.

For parts not covered in this Workshop Repair Manual please refer to the most recent edition of Workshop Repair Manual INJ(D).

# PUMPS

## Diesel System

13

### SPECIFICATIONS

Vehicle type	Engine	Injection unit
F 40 N	F8Q 722	Roto Diesel

Description	Make and type	Special details
Injection pump	ROTO DIESEL DPC R 8443 B 690 B	Single distributor rotary pump with two pistons, centrifugal mechanical governor, automatic hydraulic advance, automatic fast idling when cold, solenoid shut-off, and electromagnetic timing override.
Pump timing, TDC locked by a pin		Dimension (X) on pump (value shown on plate attached to accelerator lever).
Injectors	ROTO DIESEL LCR 67 334	
Pintle and seat assembly	ROTO DIESEL RDN 4 SDC 6868 C	Setting <b>118</b> $\pm 7$ bars/max. difference 8 bars $-5$
Fuel filter	PURFLUX	With incorporated priming pump. Filter equipped with diesel fuel heater which heats the fuel via the engine cooling system.
Injector pipes		Outside dia. <b>6 mm</b> Inside dia. <b>2,5 mm</b> Length <b>300 mm</b>
Fast idling thermostatic unit	CALORSTAT	Travel 7 to 8,5 mm between 30° and 67°C.
Preheater unit	CARTIER	For preheating and after-heating (max. 3 minutes.)
Heater plugs	BERU	Power approx. 15A after 8" heating
Heater plug after-heating thermal switch		Circuit shuts off = $65^{\circ} \pm 2^{\circ}\text{C}$ Circuit closes = $55^{\circ} \pm 2^{\circ}\text{C}$

### SETTINGS

Idling	825 $\pm$ 25 rpm
Max. speed	5 200 $\pm$ 100 rpm
Smoke density :	
Approved figure	1,17m-1 : 38 %
Maximum legal	2m-1 : 55 %

### TIMING TEST (on diagnostic bay)

Injection pump	Idling speed rpm	Injection commences Before TDC
ROTO DIESEL DPC : R8443B 690 B	825 $\pm$ 25	-

# PUMPS

## Diesel System

13

### SPECIFICATIONS

Vehicle	Engine					
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cc)	Compression ratio
F 40 P	F 8 Q	724	80	93	1870	21,5

Description	Make and Type	Special details
Injection pump	BOSCH VE 4/8 F 2300 R 317-5	Single piston rotary pump with mechanical centrifugal governor, automatic hydraulic advance, electrically controlled hydraulic cold start, and solenoid shut-off.
Pump timing (engine at TDC, pump lift)	0,70 ± 0,02 mm	
Injectors	BOSCH KCA 17S 42	
Pintle and seat assemblies	BOSCH DN OSD 302	Setting 130 + 10 - 5 bars
Fuel filter	ROTO DIESEL	With incorporated priming pump. The filter is equipped with a diesel fuel heater which heats the fuel via the engine cooling system
Injector pipes		Outside dia.: 6 mm Inside dia.: 2,5 mm Length: 400 mm
Thermostat (fast idle)	VERNET (CALORSTAT)	Travel 7 to 9,5 mm between 15° and 45°C
Preheater unit	CARTIER	With preheating and after-heating (max. 3 minutes)
Heater plugs	BOSCH OR BERU	Power approx. 15 A after 8" heating.
Heater plug post-heating thermal switch		Circuit opens: 65° ± 2° C Circuit closes: 55° ± 2° C

### SETTINGS

Idling	825 ± 25 rpm
Fast idling	1000 ± 25 rpm
Max. speed	5200 ± 100 rpm
Smoke density	
Approved figure	1,38m-1 : 44%
Maximum legal	2m-1 : 55%

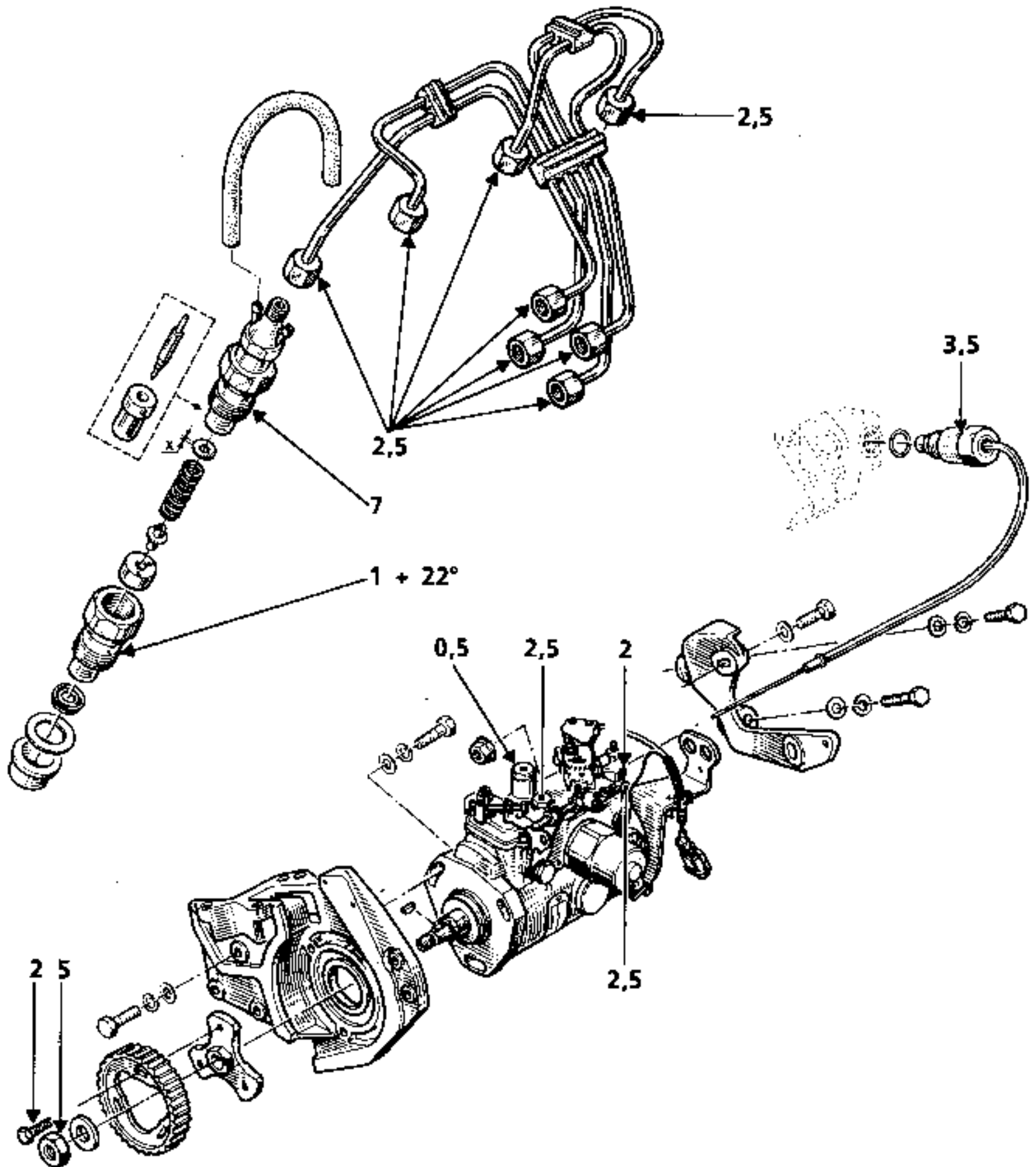
### TIMING TEST (on diagnostic bay).

Injection pump	Idling speed rpm	Injection commences Before TDC
BOSCH VE ... R317-5	825 ± 50	12,5° ± 1° *

\* Readings taken with a strobe light across the flywheel/clutch housing timing marks.  
(Figure given for checking purposes.)

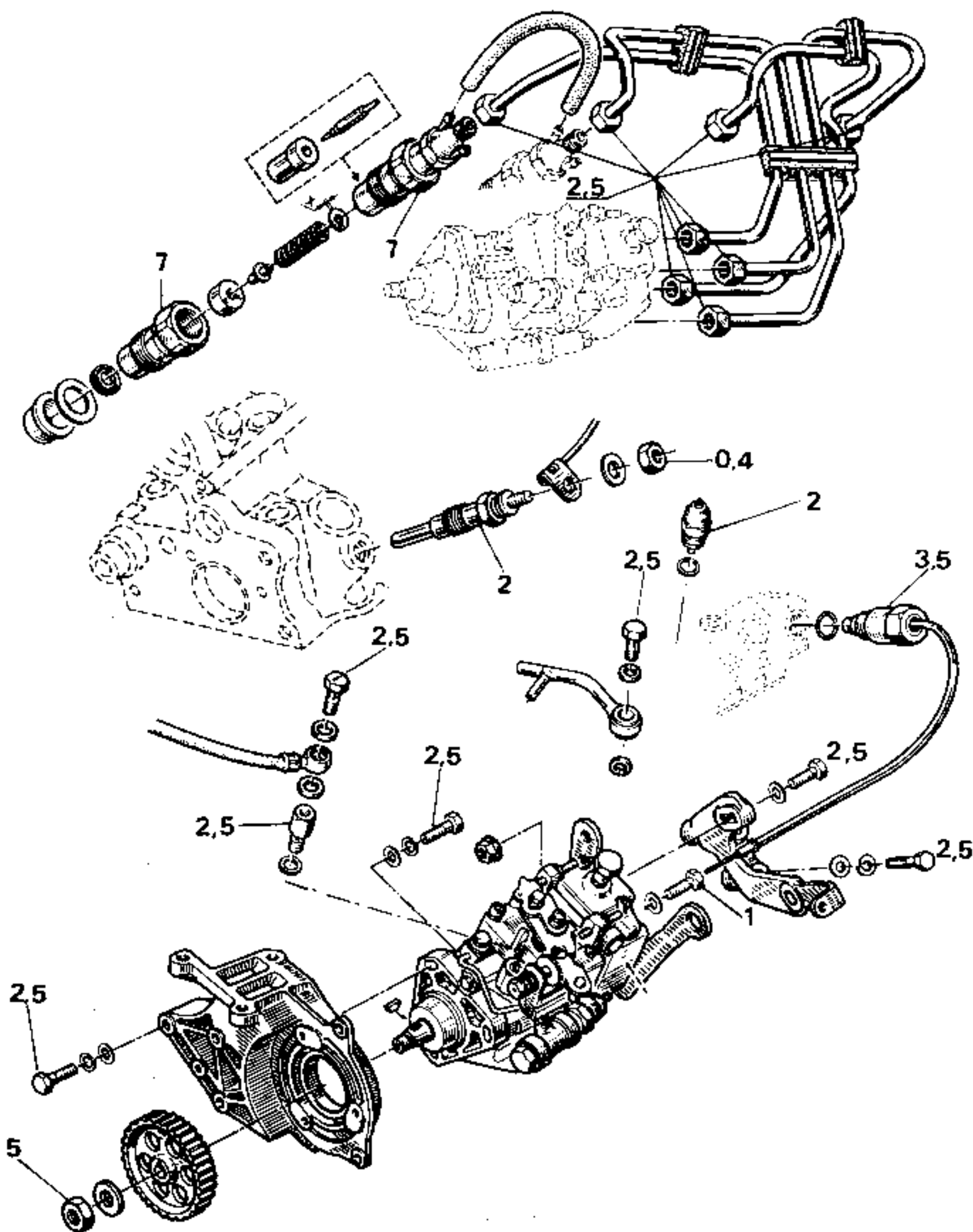
### ROTO DIESEL INJECTION PUMP

EXPLODED VIEWS AND TIGHTENING TORQUES (in daN.m)



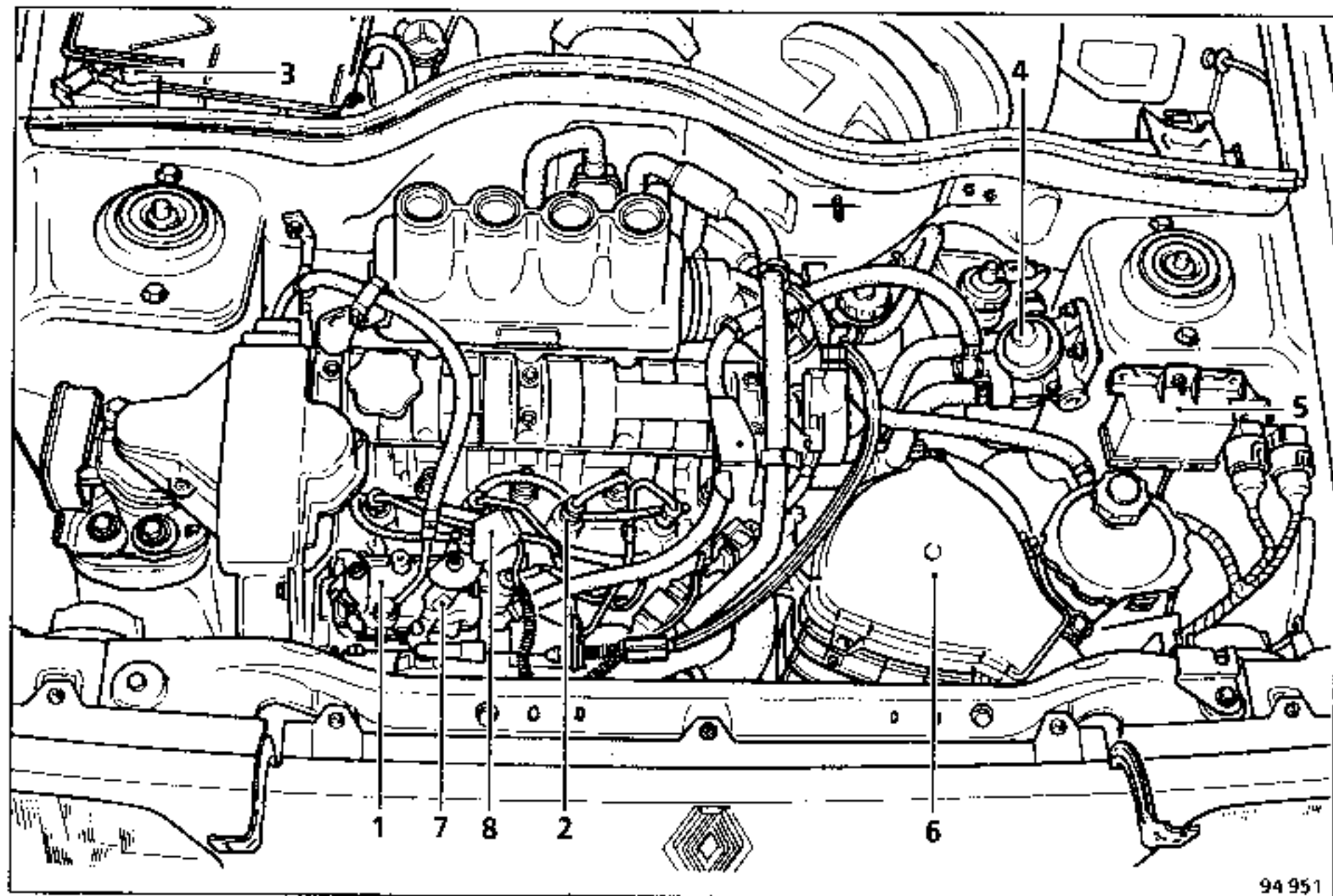
### BOSCH INJECTION PUMP

**EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)**

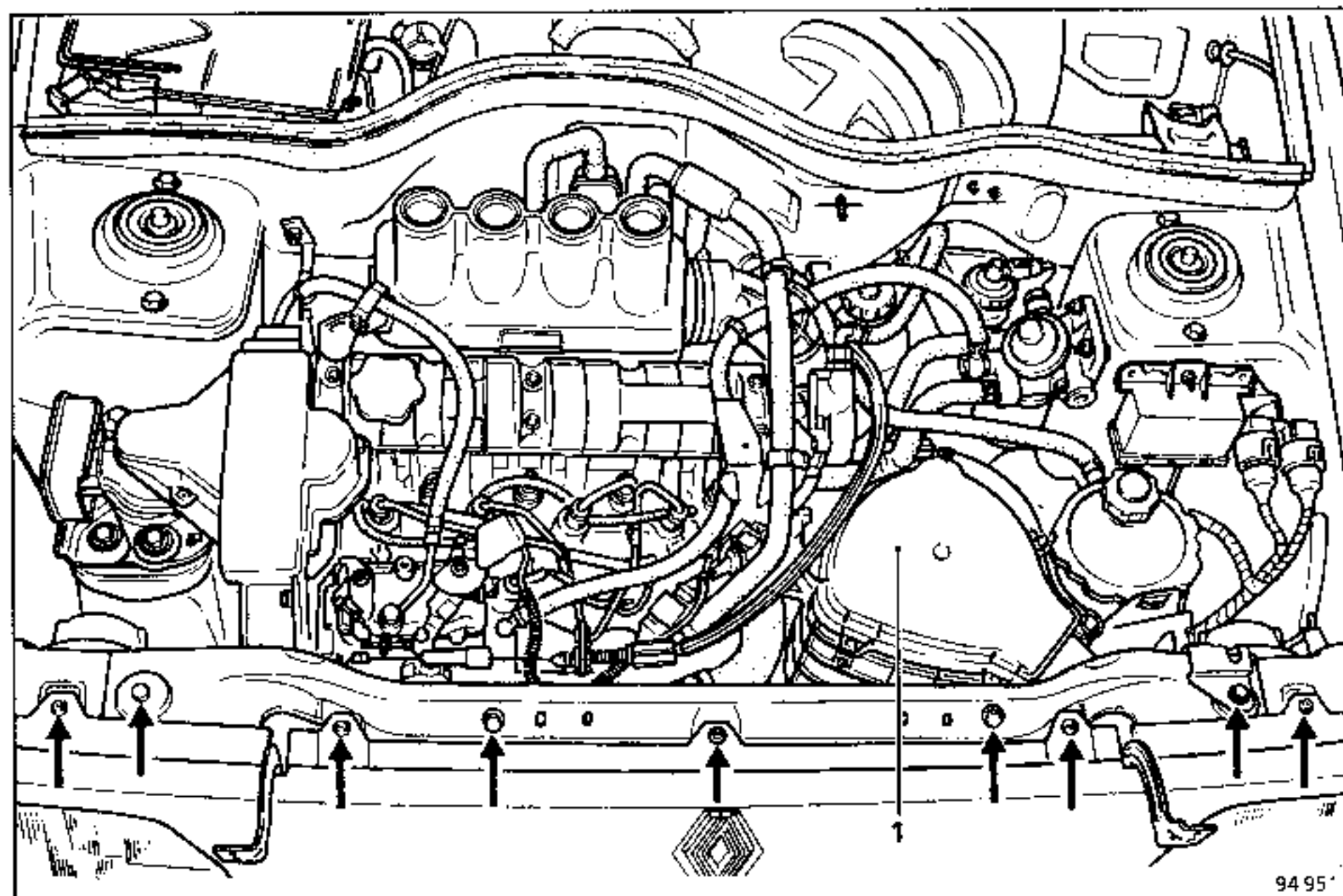




### POSITION OF COMPONENTS



- |                    |   |
|--------------------|---|
| 1 - Injection pump | 5 - Spark plug pre- and post-heating unit |
| 2 - Injectors      | 6 - Air filter                            |
| 3 - Battery        | 7 - Timing data label                     |
| 4 - Fuel filter    | 8 - Load micro-switch                     |



### REMOVING AND REFITTING INJECTION PUMP

The correct way to gain access to the injection pump is to :

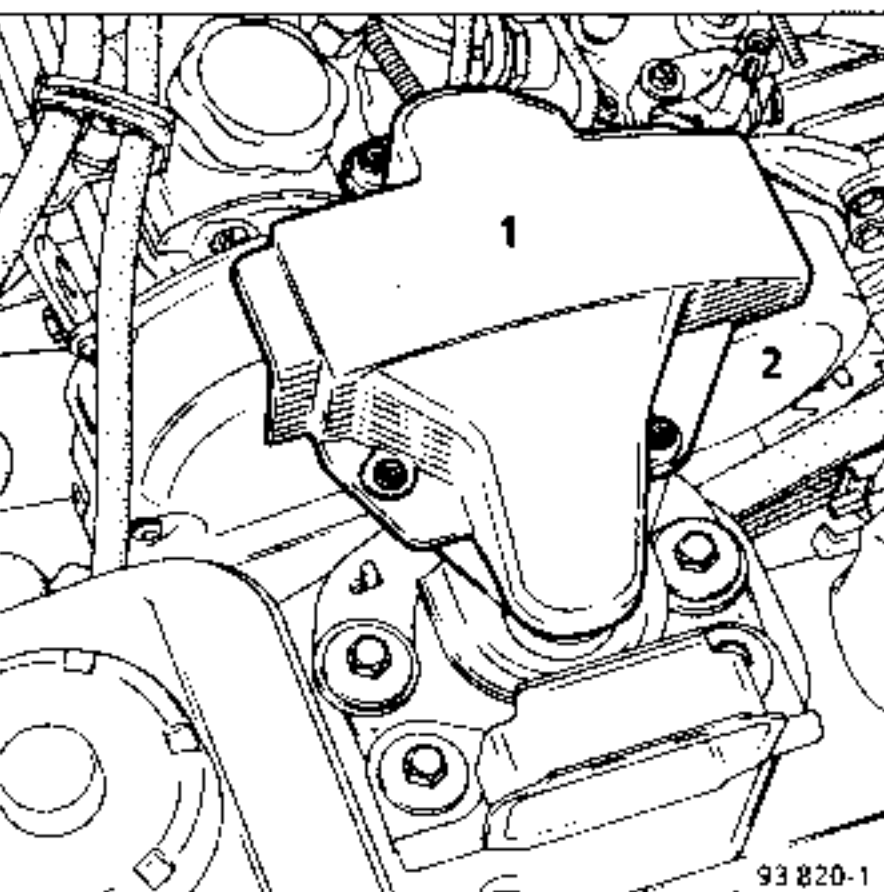
- Remove the bonnet.
- Remove the 5 upper radiator grille screws and pull the grille forward to release the upper cross member from the radiator.
- Remove the 6 securing screws from the upper cross member and remove it.
- Remove the air filter (1) and the fan to gain access to the TDC pin.

When refitting :

Refit the fan and the air filter before refitting the upper cross member of the radiator.

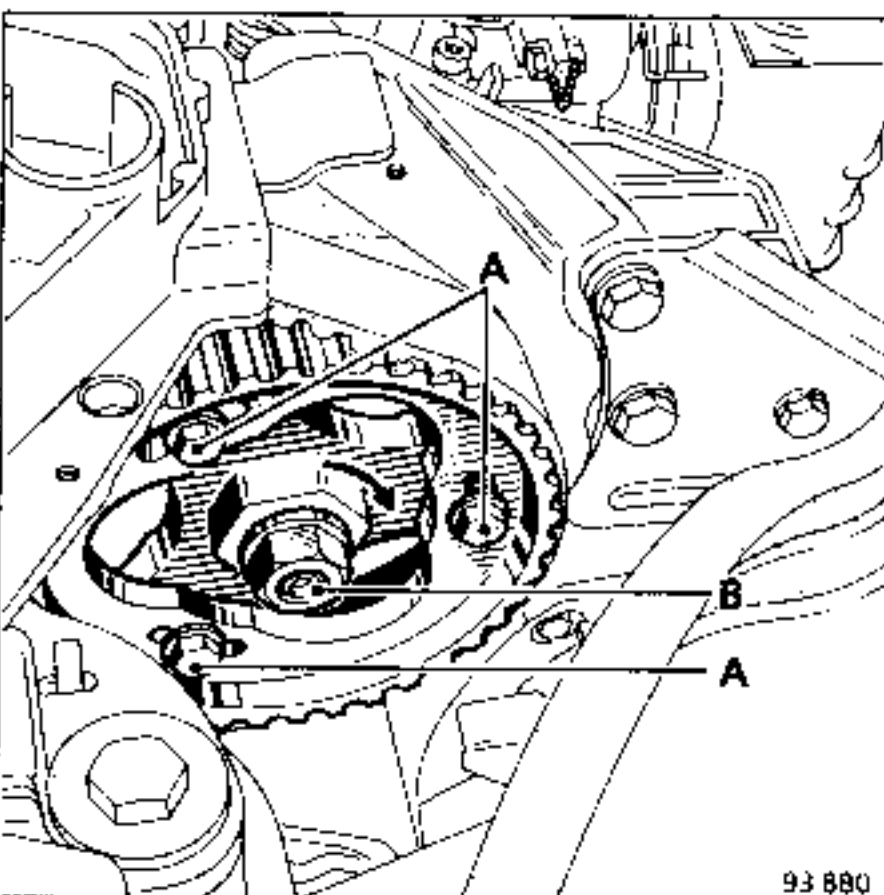
### REMOVING - REFITTING

With the exception of the few special points described below, the method of removing, refitting and timing the pump is described in the M.R. diesel injection (INJ. D) workshop repair manual.



Remove :

- the bolts securing casing (1) and remove it,
- the bolts securing casing (2) and remove it.

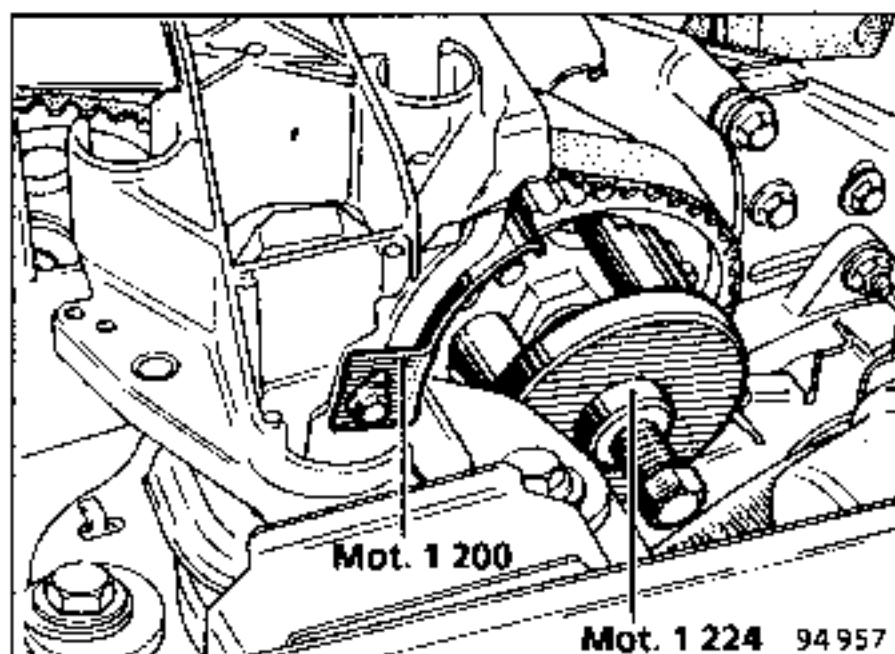


With the engine set so that no. 1 cylinder is on TDC with compression stroke, move engine back one tooth then engage tool Mot. 1 200 between the pump mounting and the sprocket, and secure it using a mounting bolt from the casing (2).

Slacken off pump sprocket mounting bolt (B) but do not remove it.

Slacken off mounting bolts (A), turn the hub in the direction of the arrow at the base of the elongated hole and then retighten the bolts (A).

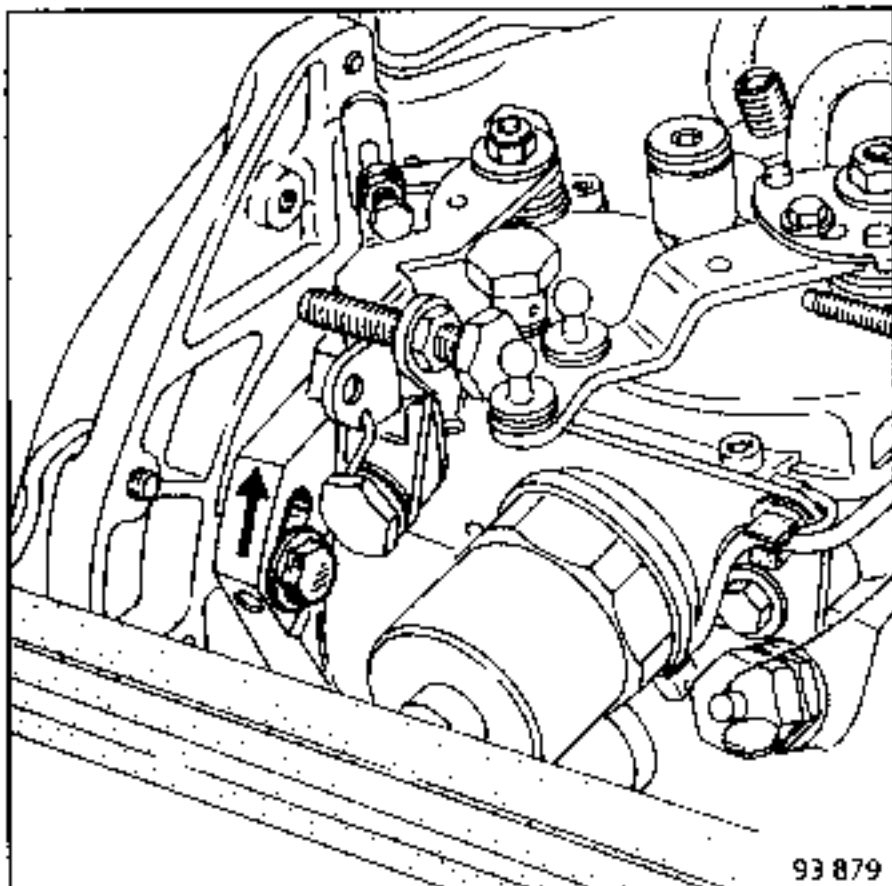
Fit extractor Mot. 1224 on the pump sprocket and separate the sprocket by turning the central bolt.



### PUMP TIMING

The pump must be timed by means of the sprocket, which is in two parts and adjustable.

When the pump is assembled, position it at the base of the elongated hole (direction of the arrow) and tighten it fully.



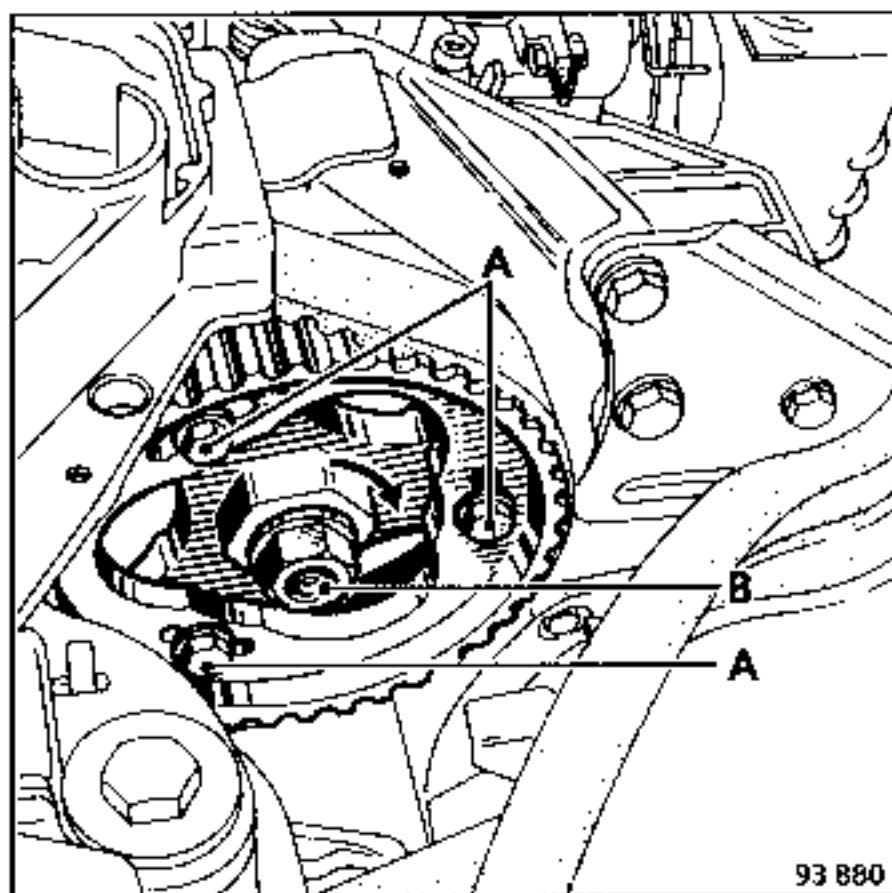
Fit in position tool Mot. 1 079 on the pump (see M.R. INJ. D).

Moving in the normal direction of rotation, rotate the crankshaft so that no. 1 cylinder is on the TDC compression stroke and lock it using tool Mot. 1 054.

Slacken off the 3 bolts (A) on the sprocket and turn the hub so that the lift value indicated on the pump is obtained and tighten bolts (A).

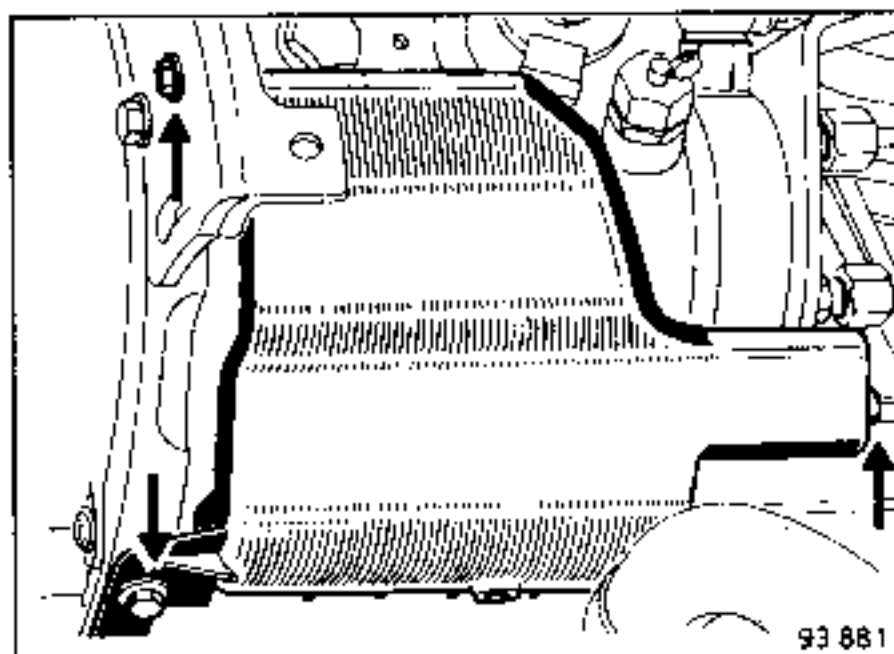
Turn the engine through two complete revolutions in the normal running direction and check again the value indicated by the clock gauge.

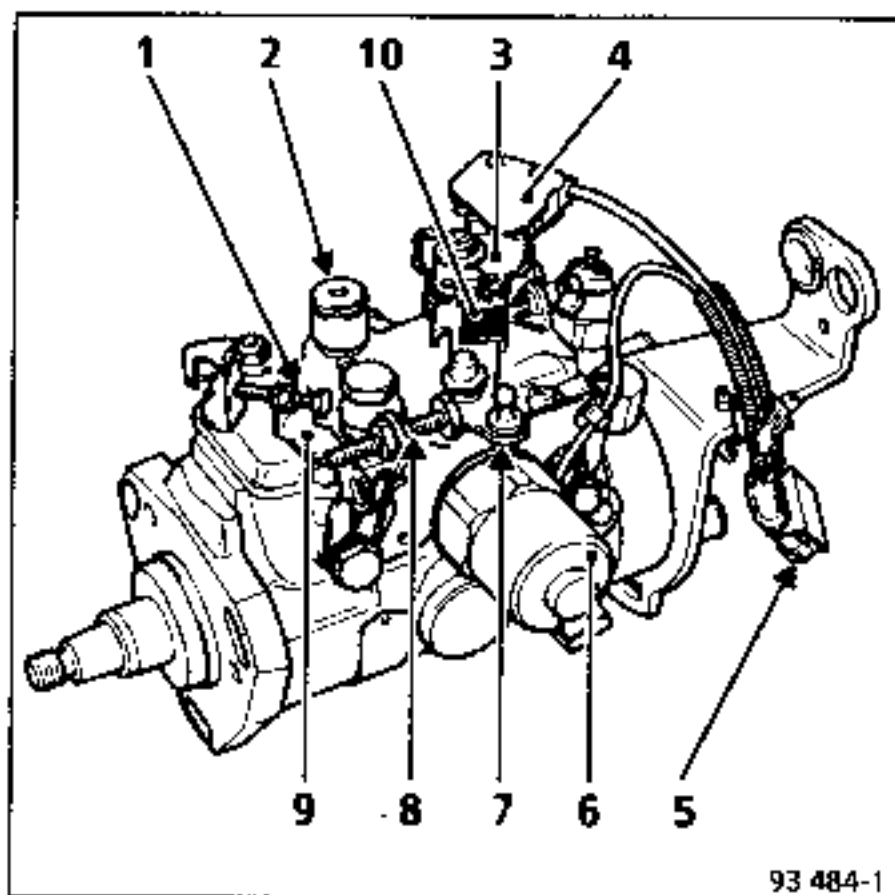
If necessary, correct this value and tighten bolts (A) to the specified torque (2 daN.m)



Protective casing under the injection pump.

(This casing is secured by three bolts.)





- 1 Idling speed adjusting screw
- 2 Access cap for checking the timing
- 3 Micro-switch adjusting cam
- 4 Load micro-switch
- 5 Electrical connector
- 6 Electromagnetic timing override
- 7 Gear lever
- 8 Anti-stall
- 9 Cold fast idling lever
- 10 Timing value indicating plate

### TIMING OVERRIDE

The electromagnetic timing override is supplied with power via the preheater unit. It is supplied with power while the starter is activated and 5 to 10 seconds after it has stopped.

The electromagnetic force of the timing override is insufficient to move the advance piston and compress its spring when the engine is stopped

The excess advance function can therefore only operate when the engine is rotating and the overload function has cancelled.

**NOTE :** It is possible to check that the timing override is operating correctly owing to the change in engine noise a few seconds after it has started.

### ADJUSTING FAST IDLING WHEN ENGINE COLD

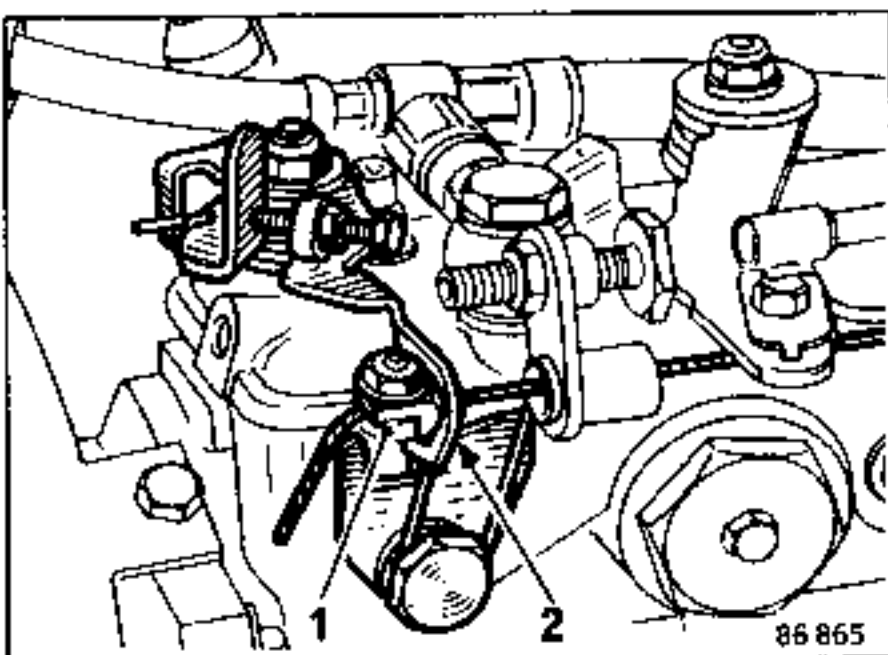
Fit in place :

- the cable,
- the sheathing stop,
- the cable clip.

Engine cold (coolant temperature less than 15°C).  
Push idling stop (2) to the end of its travel.

Tension cable.

Fit the cable clip in contact with the stop and tighten it.



With the engine hot and when the cooling fan has cut in, check, with the cable taut, the clearance between the cable clip (1) and the fast idling lever (2) at the minimum idling speed stop. The clearance should be 2 to 3 mm; if it is not, adjust cable clip (1) to obtain this value.

### ADJUSTING THE ANTI-STALLING DEVICE AND IDLING SPEED

(engine hot, after cooling fan has cut in)

**NOTE :** With the engine hot, lever (3) should have returned to its minimum stop (arrow).

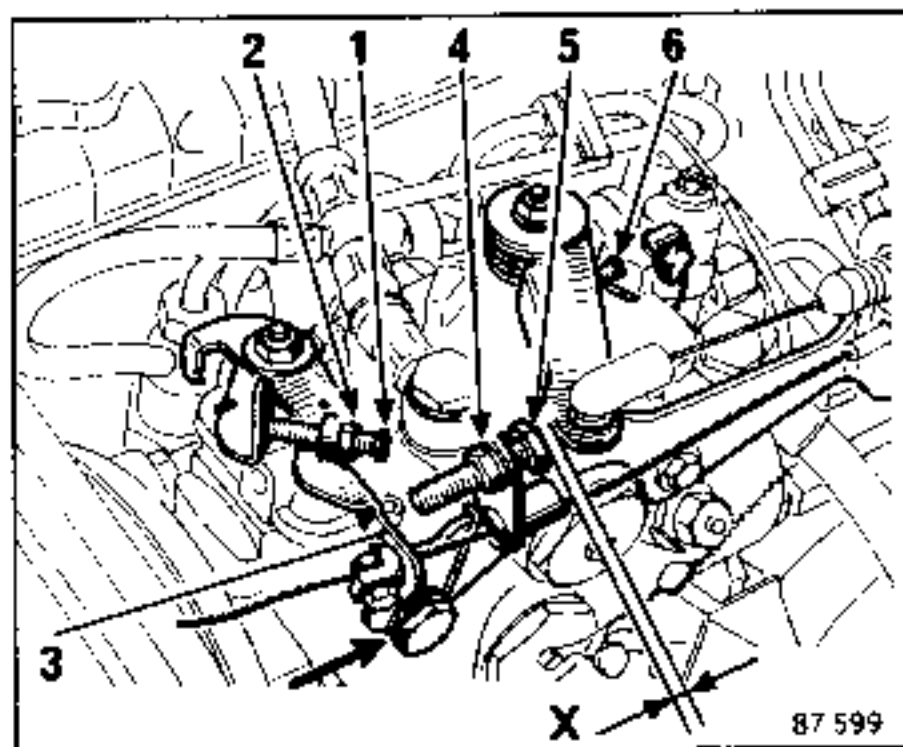
Fit a 5 mm feeler gauge (dimension X) between the stop (5) and the accelerator lever.

Slacken off lock nut (4) and move stop (5) to obtain a speed of  $1600 \pm 100$  rpm. Then remove the 5mm feeler gauge and tighten lock nut (4)

Adjust the idling speed to  $825 \pm 25$  rpm by moving the screw (1) and tightening the lock nut (2)

Accelerate hard and return to idling speed several times in succession:

- 1 the engine returns to a speed lower than the idling speed and tends to stall: in this case, slacken anti-stall stop (5) by a 1/4 of a turn,
- 2 the engine speed drops slowly: in this case, tighten anti-stall stop a 1/4 of a turn.



### CHECKING THE MAXIMUM ENGINE SPEED

With the engine hot, accelerate fully with the lever in its furthest position.

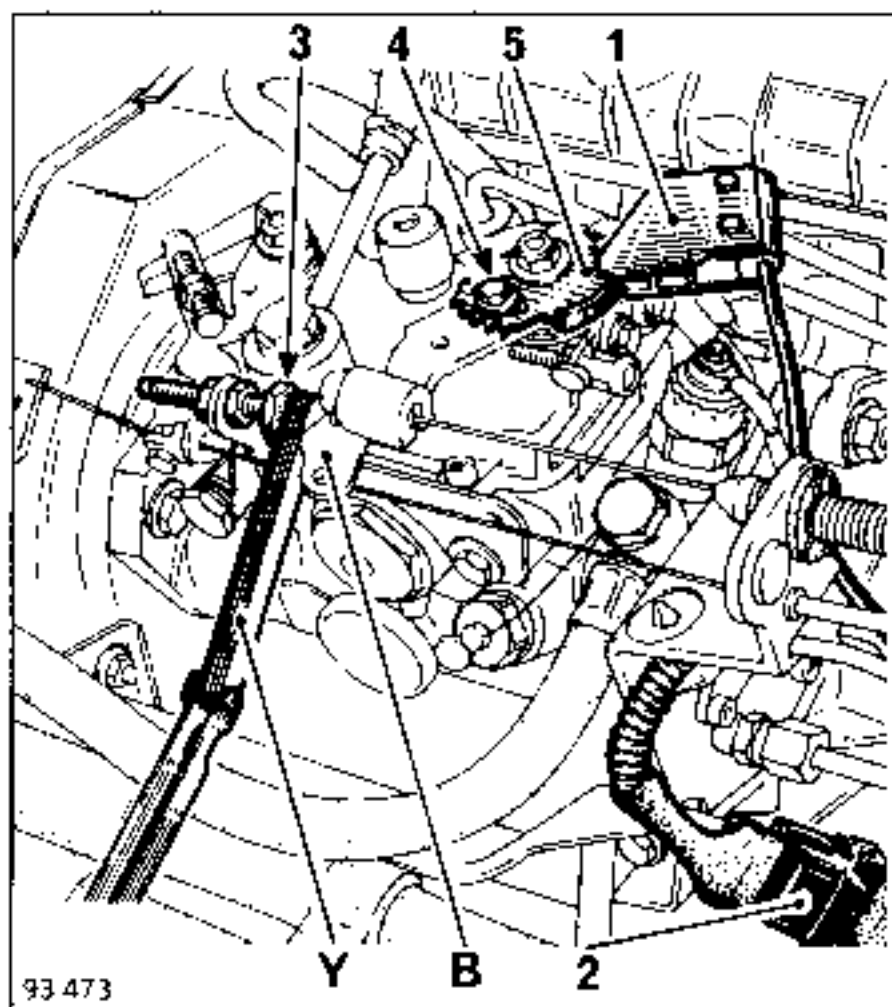
The engine speed should be between 5100 and 5300 rpm.

The maximum speed stop screw (6) is sealed in production and cannot be altered except by an injection centre specialist who should then reseal the screw.

### LOAD MICRO-SWITCH (1)

The micro-switch is to be adjusted or checked:

- when the micro-switch is replaced,
- when burnt-out heater plugs are replaced,
- following any operation on the injection pump at a Renault injection centre.



Use a multimeter connected to tracks **B** and **C** of the connector **(2)**.

Fit a feeler gauge **(Y)** between the load control lever **(B)** and the anti-stall stop **(3)** :

Feeler gauge (Y) in mm	Micro- switch	Ohm- meter
8	closed	0 $\Omega$
12	open	infinity

The micro-switch is adjusted by slackening off screw **(4)** and moving cam **(5)** in relation to the load control lever.



### IDLING, FAST IDLING AND ANTI-STALL ADJUSTMENT

**NOTE :** All the adjustment operations described below are performed with the engine coolant temperature above 80°C

I - a) Check that the idling speed is  $800 \pm 50$  rpm.

**NOTE :** If the idling speed is not correct, the complete adjustment procedure is necessary (see II).

b) If the idling speed is correct, place a 1 mm feeler gauge between the screw stop (3) and the lever (B); the idling speed should increase by 10 to 20 rpm.

- If the increase in idling speed is more than 20 rpm, the complete adjustment procedure is necessary (see II).
- If the increase in idling speed is less than 10 rpm, the adjustment procedure II d) only is necessary.

#### II - Complete idling speed adjustment procedure

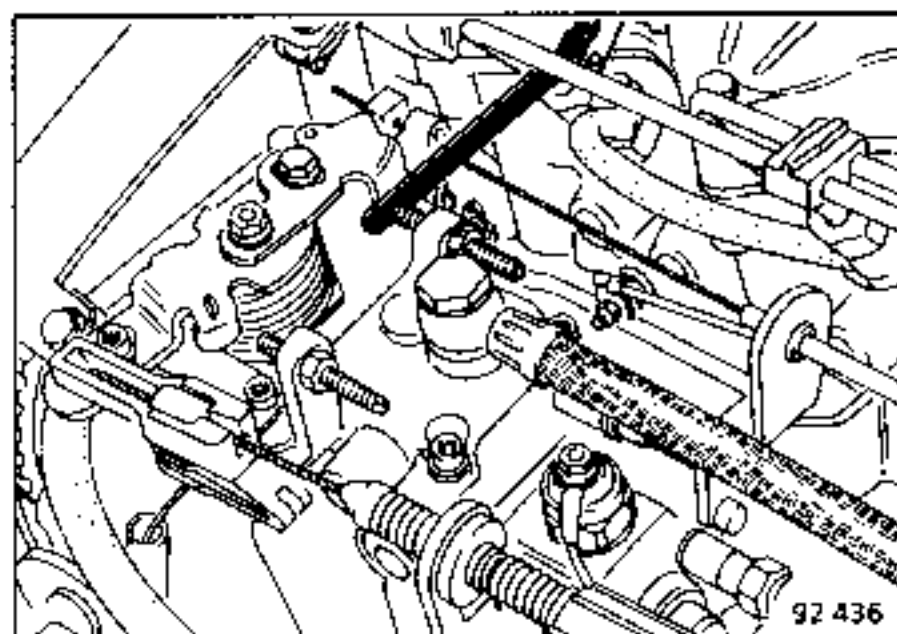
a) Unscrew lock nut and slacken off screw (3) until the drop in idling speed is stabilised. Then slacken off screw (3) by a further two turns.

Check that cable clip (C) does not obstruct the movement of lever (A).

b) Unscrew lock nut and turn screw (2) to obtain an idling speed of  $825 \pm 25$  rpm; then retighten the lock nut.

c) Place a 1 mm feeler gauge between the screw stop (3) and the lever (B); the idling speed should not increase. If not, repeat adjustments II a and II b.

d) With a 1 mm feeler gauge in position, tighten the screw stop (3) to increase the idling speed by 10 to 20 rpm. Remove the 1 mm feeler gauge; the idling speed should return to what it was originally.



Accelerate the engine hard several times and let it return to idling speed.

Check the original values for idling speed with and without a 1 mm feeler gauge; if the values have varied, repeat adjustments (b, c and d)

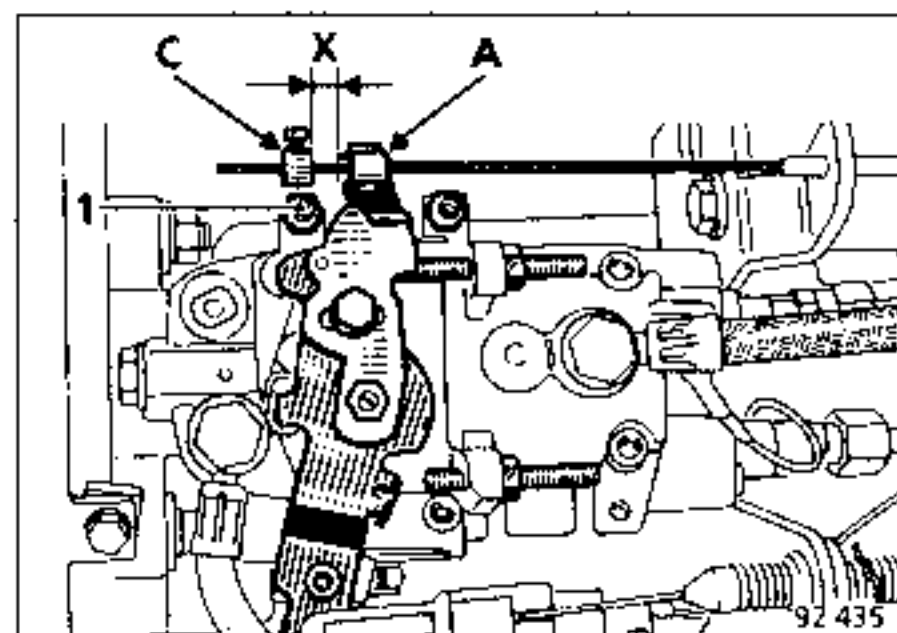
#### III - Fast idling speed adjustment

Place lever (A) against stop (1).

Unscrew the lock nut and turn screw (1) to obtain an idling speed of  $1\,000 \pm 25$  rpm; then tighten the lock nut.

Recheck the fast idling speed; if it is outside tolerance, repeat the operation III.

#### IV - Adjusting the fast idling speed thermal element clip



This operation must be performed with the engine warm and after adjustment of the idling speed and fast idling speed.

Keep the cable taut and position the cable clip 6 mm (dimension x) from the lever (A) at idling position, then tighten the cable clip screw (C).



# PUMPS

## Oil Level of Power Steering

**13**

Oil grade to be used in the system :

**ELF RENAULTMATIC D2**

or

**MOBIL ATF 220**

Capacity : 1.1 litre (Mechanical pump)  
0.7 litre (Electric pump)

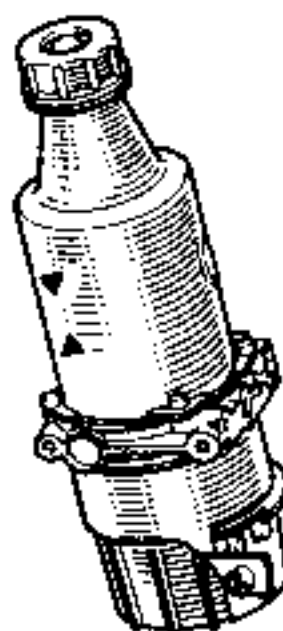
Filling the system:

Fully fill the reservoir.

Start the engine and gently move the steering  
from one full lock stop to the other.

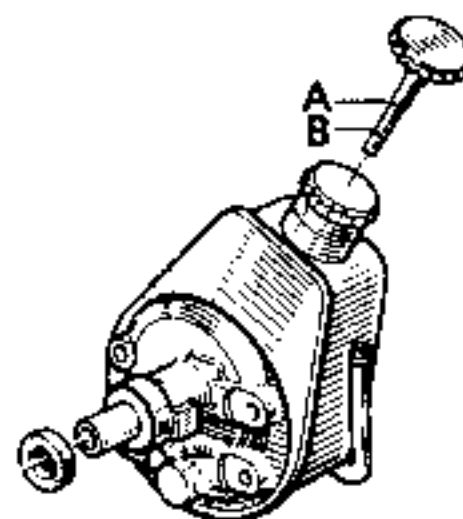
Top up the system.

### ELECTRIC PUMP



The oil should come up to the max. mark.

### MECHANICAL PUMP



The oil should come up to between marks (A) and (B).

### CAUTION:

Use a funnel fitted with a 15/100 filter to prevent  
foreign bodies getting into the system.

# PUMPS

## Power Steering Pressure Check

**13**

### MECHANICALLY DRIVEN POWER STEERING PUMP

ESSENTIAL SPECIAL TOOLS		
Dir. 1 204	Pressure test adaptor	
Fre. 1 085		
or	Oil pressure gauge	
Fre. 244 -04		

Remove the plug or the oil pressure pressostat at the pump outlet on the rigid high pressure pipe.

Connect the pressure test adaptor Dir. 1 204 and the oil pressure gauge (Fre. 1 085 or 244-04).

Start up the engine.

- Bleed the pressure gauge.

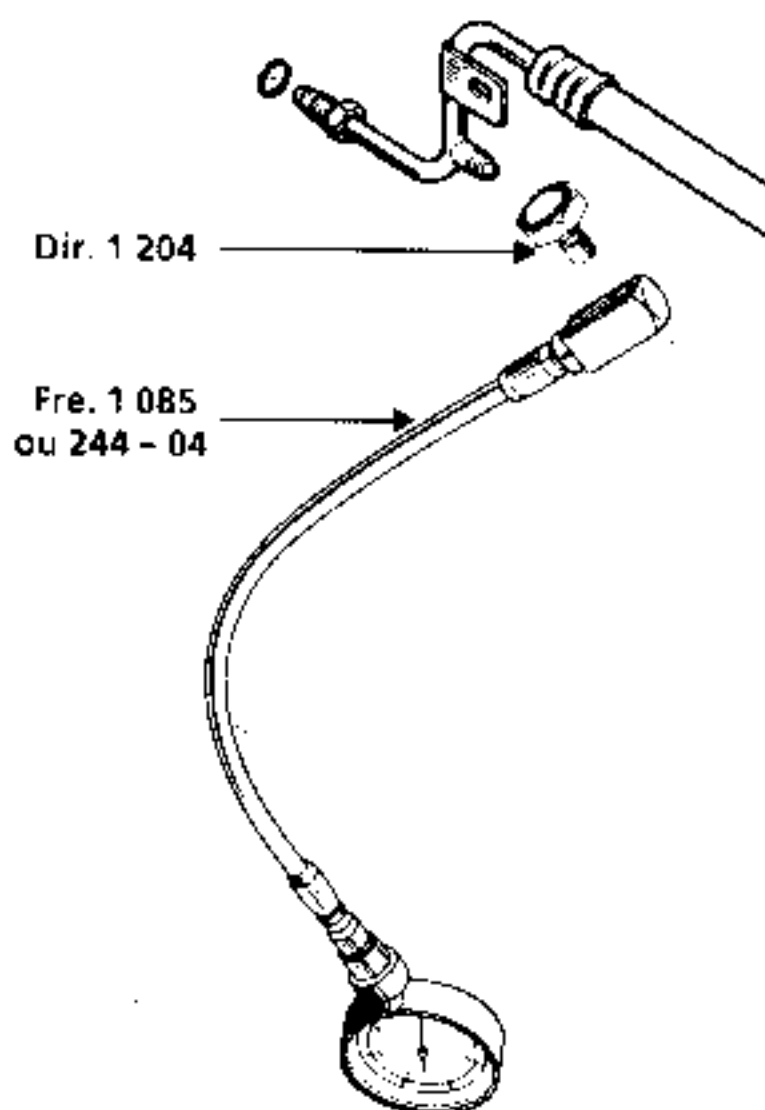
- The wheels must be in the straight ahead position:

Whatever the engine speed, the pressure must not exceed 5 to 7 bars.

- With the wheels turned through full lock to one side:

The maximum pressure should be 79 to 86 bars.

This operation is not to be prolonged as this could cause the oil to overheat.



# PUMPS

## Power Steering Pressure Check

**13**

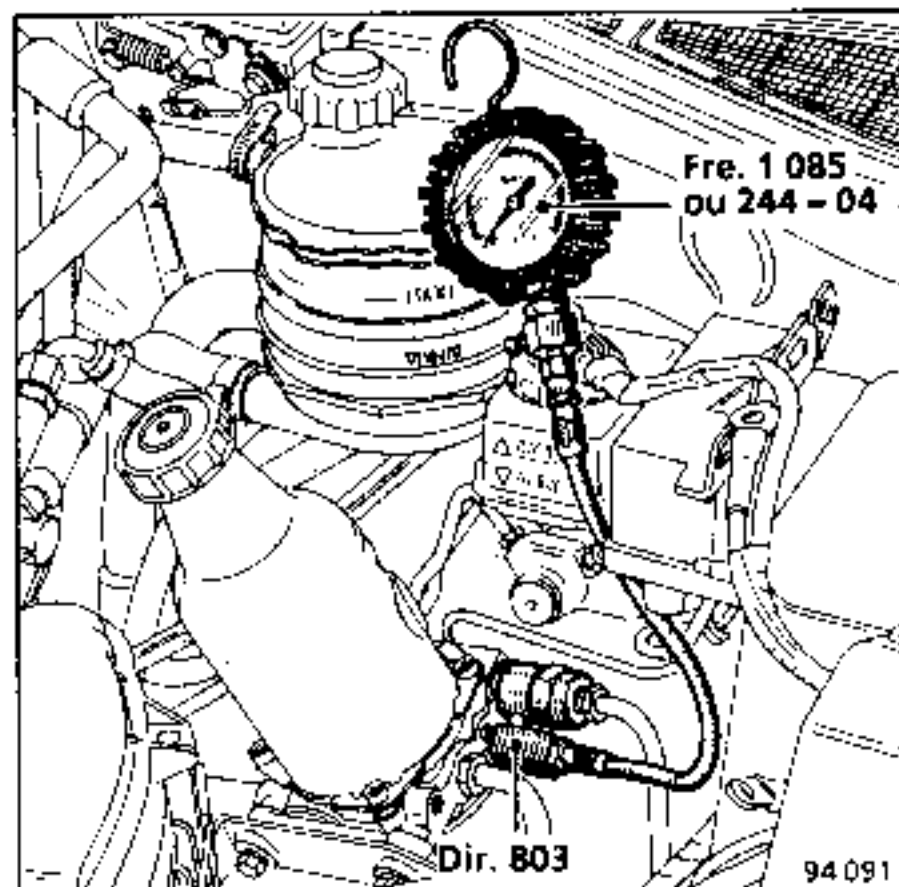
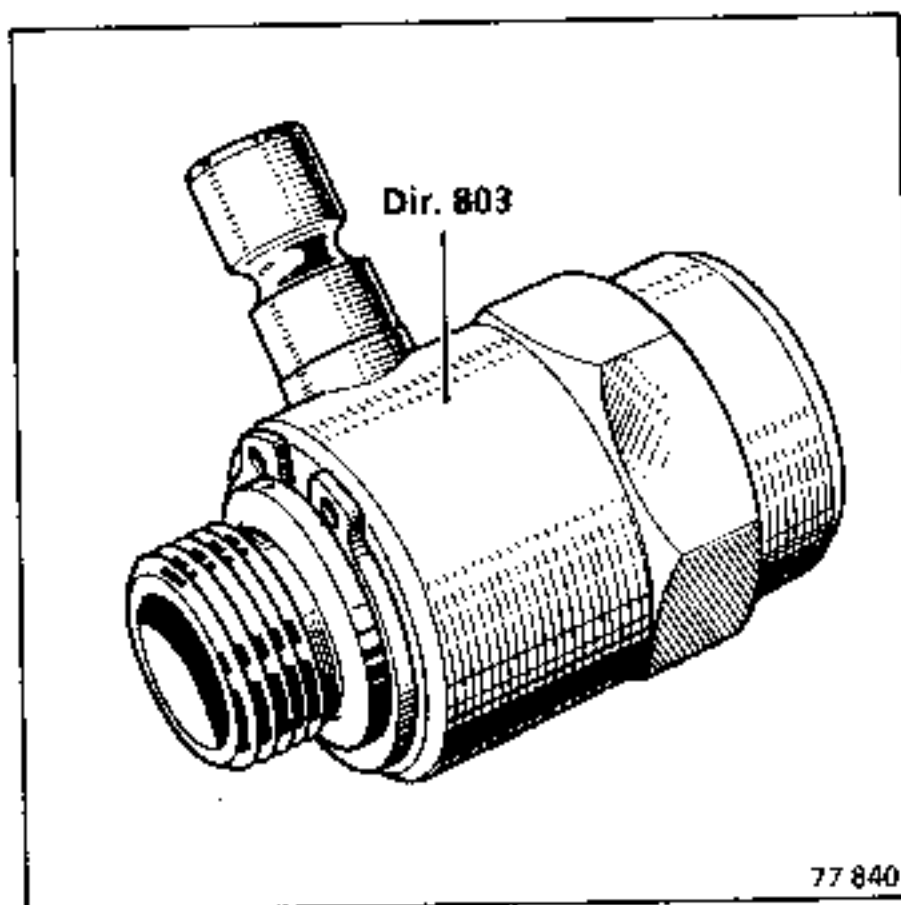
### ELECTRICALLY DRIVEN POWER STEERING PUMP

ESSENTIAL SPECIAL TOOLS		
Dir.	803	PAS pump pressure gauge adaptor
Fre.	1 085	Oil pressure gauge
	or	
Fre.	244 -04	

Slightly lower the support assembly and pump (See section on removing and installing.)

Disconnect the high pressure hose. (Provide a container to catch the oil).

Place union Dir. 803 (with a metric thread) between the hose and the pump.



Connect pressure gauge Fre. 1085 or Fre. 244-04.

Top up the pump oil level and turn the electric pump assembly

Bleed pressure gauge pipes

#### CAUTION :

Use a funnel fitted with a 15/100 filter to prevent foreign bodies getting into the system.

## Power Steering Pressure Check

---

- The wheels must be in the straight ahead position.

The pressure must not exceed **0 to 3 bars**.

- With wheels turned through full lock to one side:

The max. pressure should be **71 bars**  $\begin{matrix} +0 \\ -5 \end{matrix}$

This operation must not last more than two minutes as this may cause the oil to overheat.

Remove union **Dir. 803** and pressure gauge **Fre. 1085** or **Fre. 244-04** after cutting off the supply to the pump with clamp **Mot. 453-01**.

Reconnect the high pressure hose

Replace fasteners securing pump.

Top up the level of the oil in the reservoir. (See section on oil level)

Check that connections are not leaking.

## Electrically Driven Power Steering Pumps

## ESSENTIAL SPECIAL TOOLS

Mot. 453-01

Hose clamps

## ELECTRICALLY DRIVEN POWER STEERING PUMP

## TIGHTENING TORQUES (in daN.m)

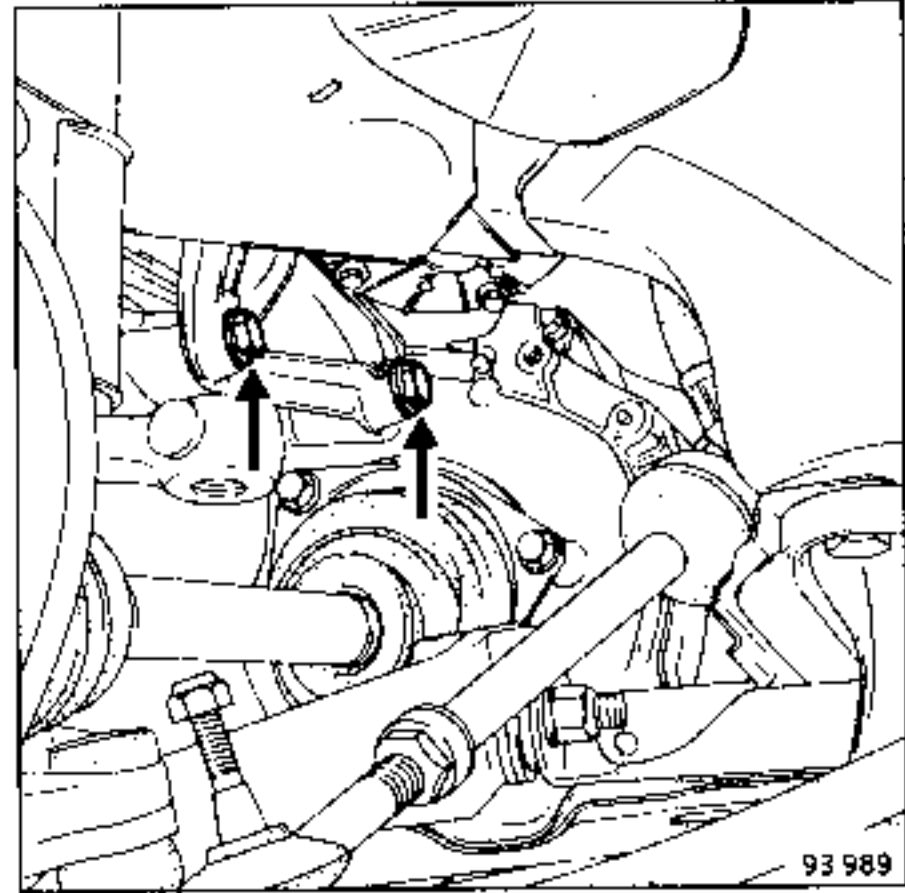
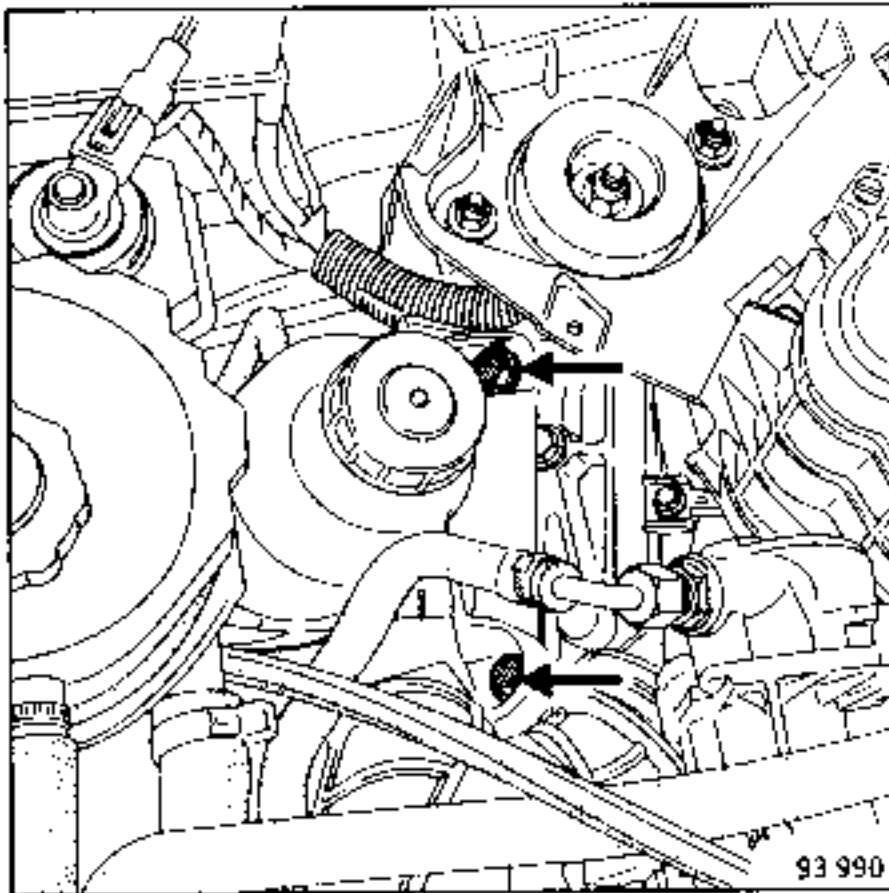


Pipe union :	Ø 16	2,5
	Ø 18	3
Electric pump assy. securing screw		4
Securing screw, reservoir on electric pump assy.		0,9

## REMOVING

Remove the battery. Fit clamp Mot. 453-01 on the low pressure hose of the pump.

Unscrew the four elements securing the pump.



Disconnect high and low pressure hoses. (Provide a container to catch the oil.)

Disconnect power supply wire.

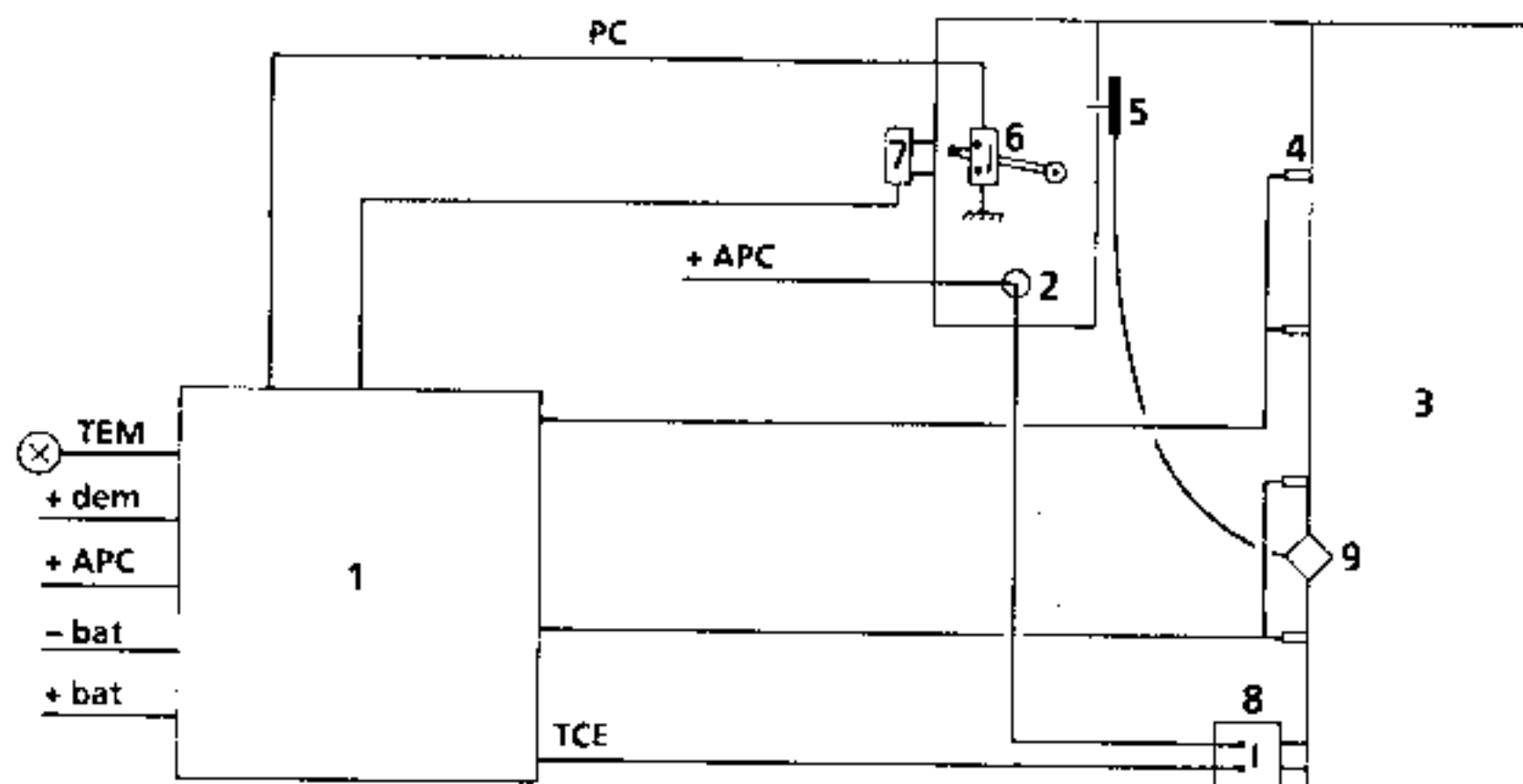
Take out pump mounting assembly

Reconnect hoses and electric pump assembly power supply wires.

Remove clamps Mot. 453-01.

Top up and bleed system.

## COLD STARTING SYSTEM CIRCUIT DIAGRAM



92 205-1

- 1 Pre-heating electronic unit
- 2 Injection pump
- 3 Engine
- 4 Pre-heater plugs
- 5 Idling and fast idling lever
- 6 Solenoid valve (circuit closed at idling)
- 7 Cold starting advance solenoid (KSB)
- 8 Temperature switch (circuit closed at temperatures of less than approx. 60 °C)
- 9 Thermostatic element (to provide a fast idling speed when the engine is cold).

## Principle of operation of the electronic pre-heating unit

- A. Ignition switched on (T.1 : pre-heater plug heating period)

**NOTE :** The time for which the warning light remains on varies depending on the temperature of the unit:

- approx. 20 seconds at - 30 °C,
- instantaneous shut-off at 80 °C.

- B. Pre-heater plug shut-off (if the starter is not operated, the supply to the plugs is shut off after 4.5 seconds T.2)

- C. Engine starting (after the starter operates, the plugs remain supplied with 100% current for 10 seconds T.3)

- D. Plug post-heating T4. This phase can last for a maximum of 3 minutes and during this period the plugs are supplied with 50% current (alternately 2 at a time).

**NOTE :** The T3 function is shut off:

- as soon as the coolant temperature exceeds approximately 60 °C (temperature switch (8)),
- 3 seconds after the load switch (6) opens. The supply to the plugs is re-established as soon as the circuit PC opens.

- E. Cold starting advance system. Solenoid KSB is supplied with current whilst the starter is operating and between 5 and 10 seconds after it stops.

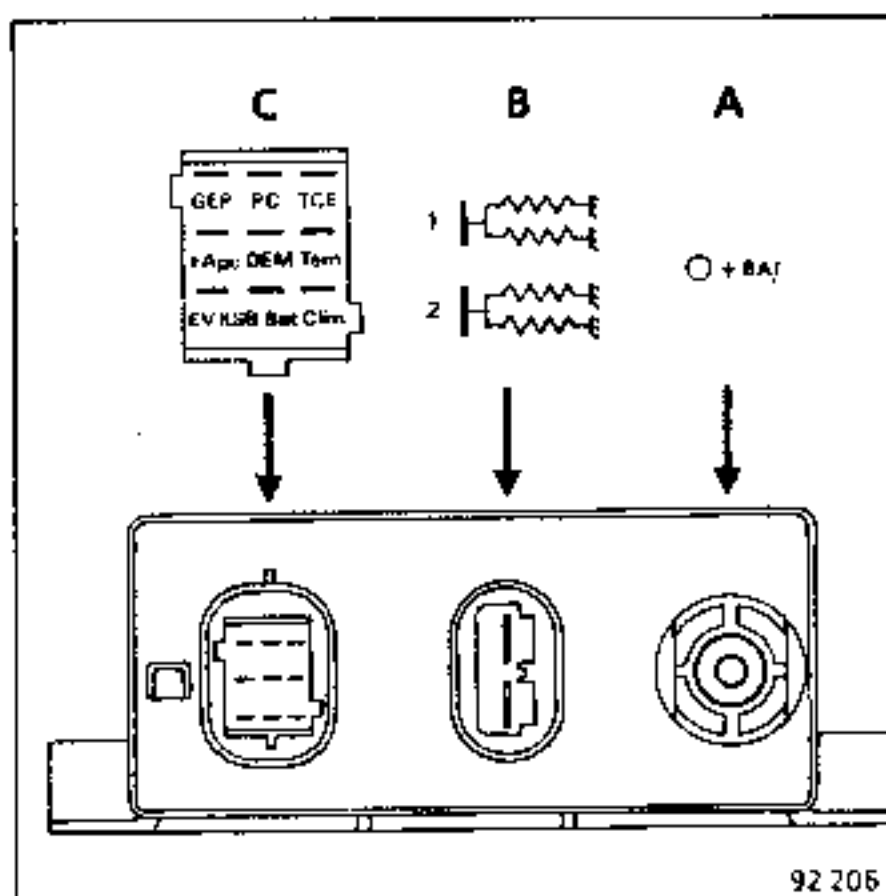
The current supply to solenoid valve KSB causes the transfer pressure to rise and thus increases the automatic advance at the injection pump.

## Fast idling when the engine is cold

A thermostatic element (9) holds the idling speed lever (5) in its fast idling position

As the temperature rises, the lever comes gradually back to the normal idling position.

## ELECTRONIC PRE-HEATER UNIT



## Channel functions

- A + BAT = + battery
- B 1 : Supply to pre-heater plugs 1 and 2  
2 : Supply to pre-heater plugs 3 and 4
- C GEP : not used (power steering electric pump)  
P.C. : load switch on injection pump control lever (circuit closed at idling speed).  
TCE : coolant temperature switch (circuit open at temperatures above approximately 60 °C)  
+ APC : + after ignition switch  
DEM : + starter signal  
TEM : pre-heating warning light  
EV KSB : solenoid valve providing advance during cold starting  
- BAT : battery earth  
Clim : signal indicating that air conditioning is operating

**FAULT FINDING****GENERAL**

The pre- and post-heating unit has protective systems that partially or totally shut it down when:

- there is a short circuit on the plugs or power circuit,
- there is a short circuit on the instrument panel warning light output,
- when the supply voltage is higher than  $16 \pm 1$  volts.

**NOTE :** The unit returns to normal operation as soon as any of the above defects disappear.

The causes of defects in the pre-heater unit are determined on the basis of the findings listed below:

1. If the pre-heater warning light is not operating and the engine will not start from cold.
2. If the pre-heater warning light is operating and the engine will not start from cold.
3. If the pre-heater warning light is not operating but the engine starts normally from cold after approximately 10 seconds pre-heating
4. If the pre-heating system is operating normally but the post-heating system is not operating
5. If both pre- and post-heating systems are working normally but the cold starting advance system KSB is not operating



**FAULT FINDING**

**1. If the pre-heating warning light does not operate and the engine will not start from cold:**

TEST	REMEDY
<p>Disconnect connector (B) that feeds the pre-heater plugs and carry out a pre-heating test :</p> <ul style="list-style-type: none"> <li>- If the warning light switches on normally,</li> <li>- If the warning light does not switch on and current is available at the connector outputs (B),</li> <li>- If the warning light does not switch on and there is no current available at the connector outputs (B),</li> </ul>	<p>Check the plug wiring. If correct, check and replace any defective plugs.</p> <p>Check the plug circuit and the instrument panel warning light circuit. Rectify if necessary.</p> <p>Check:</p> <ul style="list-style-type: none"> <li>- the connector battery + (A)</li> <li>- the connector + after ignition switch (C)</li> <li>- the connector earth - battery (C)</li> </ul> <p>If the supply is correct, replace the pre-heater unit.</p>

**2. If the pre-heating warning light switches on but the engine will not start from cold:**

TEST	REMEDY
<p>Disconnect connector (B) and carry out a pre-heating test :</p> <ul style="list-style-type: none"> <li>- If the warning light switches on and current is available at the connector outlets (B),</li> <li>- If the warning light switches on and current is not available at the connector outlets (B),</li> </ul>	<p>Check the pre-heater plug circuit and if correct check and replace the defective plug or plugs.</p> <p>Replace the pre-heater unit.</p>

**3. If the pre-heater warning light does not operate but the engine starts, normally, after approximately 10 seconds of pre-heating:**

TEST	REMEDY
<p>Earth the warning light outlet on the connector (C) using a two amp fuse and switch on the ignition:</p> <ul style="list-style-type: none"> <li>- If the fuse blows,</li> <li>- If the warning light does not switch on,</li> <li>- If the warning light switches on,</li> </ul>	<p>The instrument panel warning light wiring is short circuiting. Rectify the wiring.</p> <p>Its bulb is blown or its wiring is defective. Replace the bulb or rectify the wiring.</p> <p>Replace the pre-heater unit.</p>

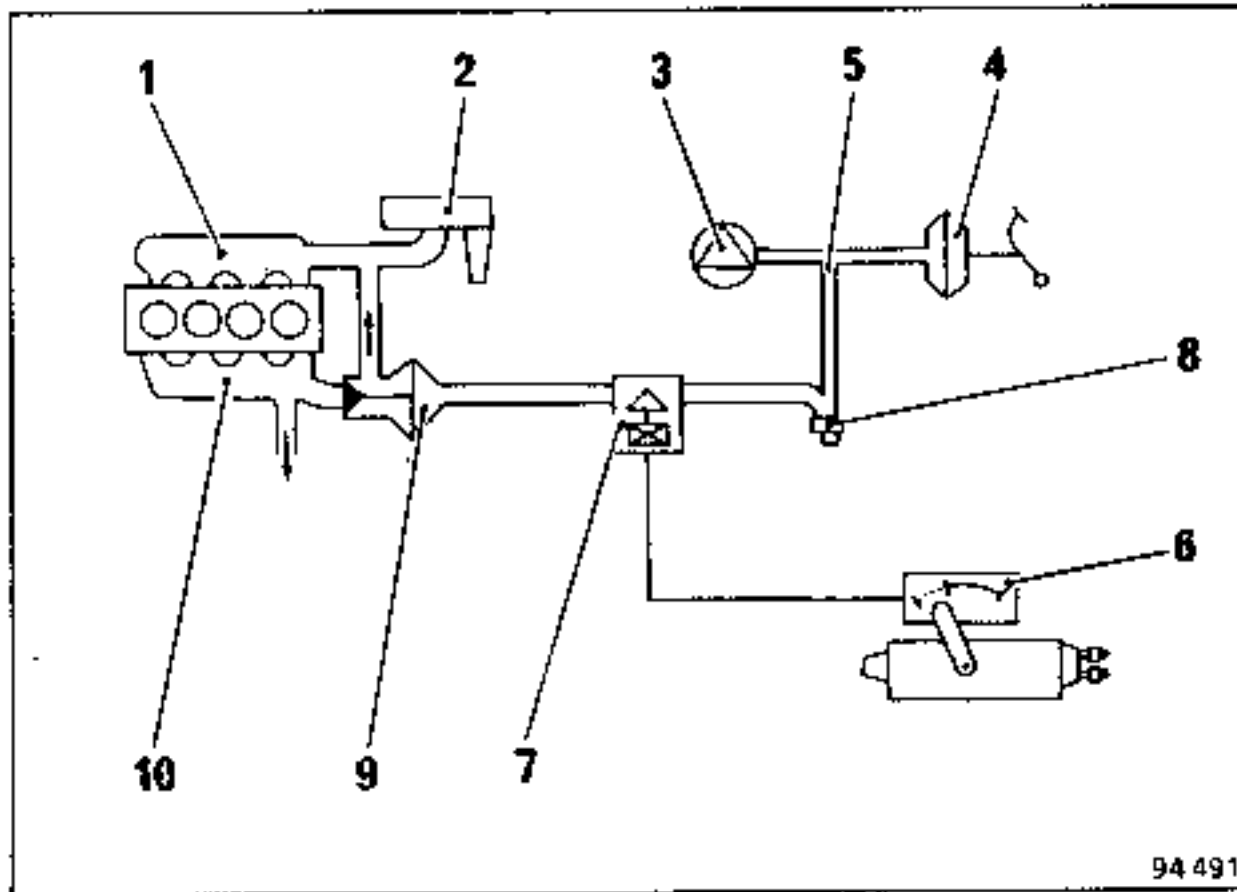
## FAULT FINDING

4. If the pre-heating system works normally but the post-heating system does not:

TEST	REMEDY
<p>Disconnect connector (C) and, using a voltmeter/ohmmeter check:</p> <ul style="list-style-type: none"> <li>resistance across the outputs (PC and - bat) : <ul style="list-style-type: none"> <li>with the accelerator in the idling position: resistance = 0 ohms,</li> <li>with the accelerator fully depressed: resistance = infinity.</li> </ul> </li> <li>the voltage, with the ignition on, across the outputs (TCE and - bat) : <ul style="list-style-type: none"> <li>engine cold, coolant temperature less than <math>55^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> = 12 volts,</li> <li>engine warm, coolant temperature above <math>65^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> = 0 volts.</li> </ul> </li> </ul> <p>If the results of the tests are correct but post-heating does not take place after starting from cold,</p>	<p>If the circuit is broken, check the wiring, the micro-switch and its connectors. If defective, rectify.</p> <p>If the circuit is closed, check that the micro-switch is of the correct type and correctly adjusted.</p> <p>If no voltage: check electrical wiring, temperature switch and its connector.</p> <p>If a voltage is registered, check the wiring and that the temperature switch is of the correct type.</p> <p>Replace the pre-heater unit.</p>

5. If the system operates correctly in pre- and post-heating but the cold starting advance system KSB does not operate:

TEST	REMEDY
<p>Disconnect connector (C) and measure the resistance across (EV KSB and - bat).</p> <p>The resistance should be around 8 ohms.</p> <p>With the engine running at idling and connector (C) disconnected, connect (+ APC and EV KSB). A slight change in the engine noise should be heard (a sharper note)</p>	<p>If it is not correct, check the wiring and the solenoid valve. Rectify.</p> <p>If there is no change in the noise, check that there is voltage (12 V) at the KSB solenoid valve and that the valve is of the correct type.</p> <p>If the noise changes, the pre-heater unit is responsible</p> <p><b>WARNING:</b> The KSB solenoid valve only operates for a very short time (5 to 10 seconds after engine has started)</p>

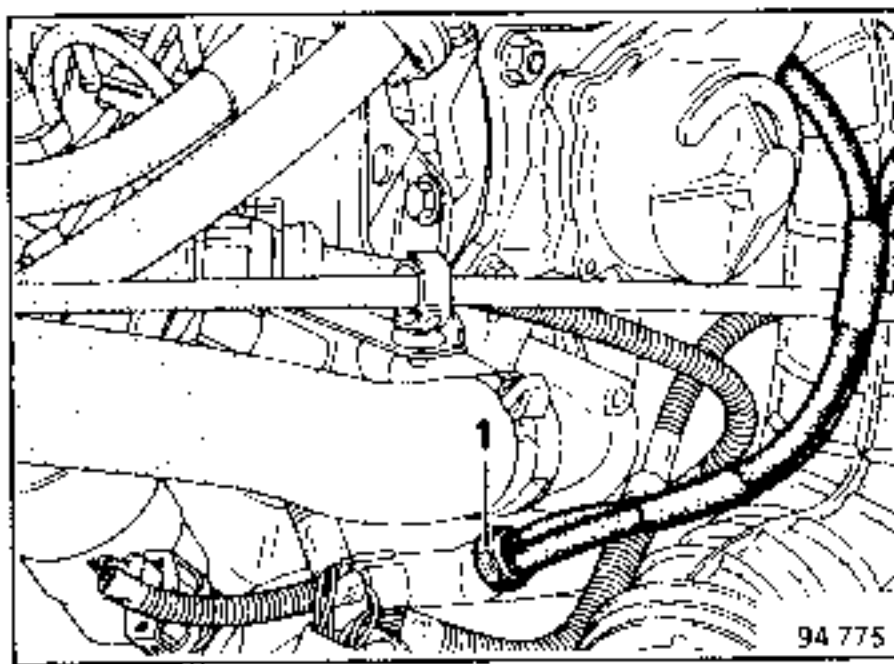


- 1 - Intake manifold.
- 2 - Air filter.
- 3 - Vacuum pump.
- 4 - Brake servo.
- 5 - T joint with bore dia. 0.5 mm to thermal valve (8).
- 6 - Full load micro-switch on injection pump.
- 7 - Solenoid valve.
- 8 - Thermal valve.
- 9 - EGR valve.
- 10 - Exhaust manifold.

This device allows exhaust gasses to be recycled to the intake manifold under determined load and temperature conditions

**Condition :**

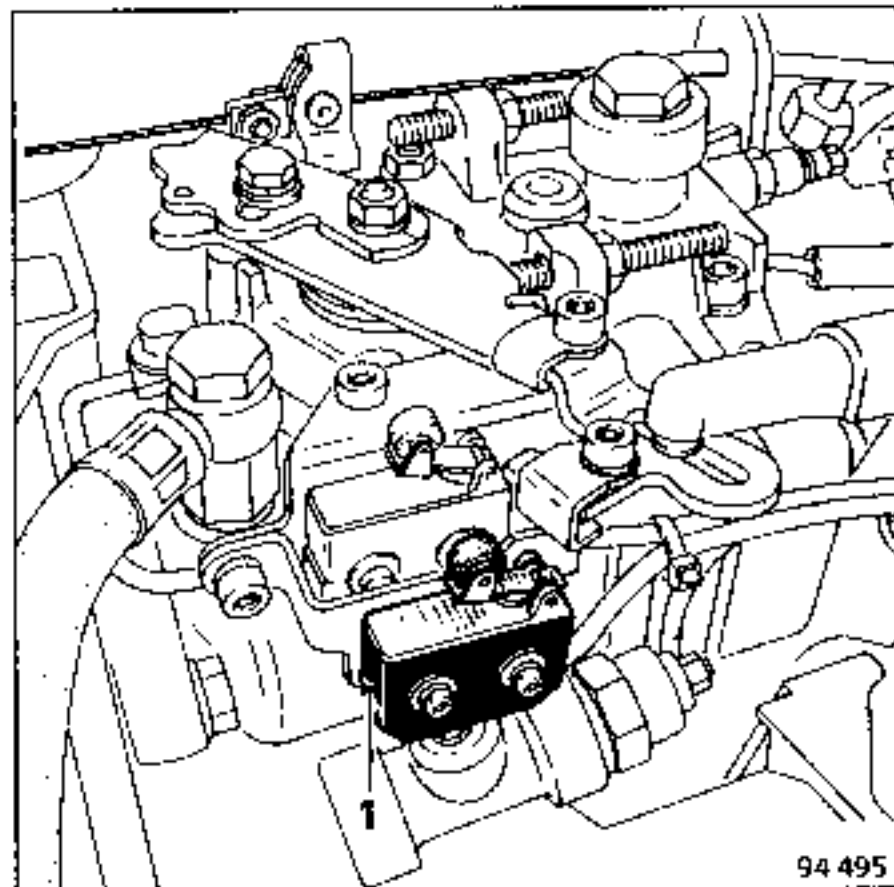
- **Temperature** is determined by a thermo-pneumatic valve (1) situated on the coolant pipe.



Vacuum passes to the solenoid only when the water temperature is above 20° C.

**Condition :**

- **Load** is determined by a full load micro-switch (1) mounted on the side of the injection pump.

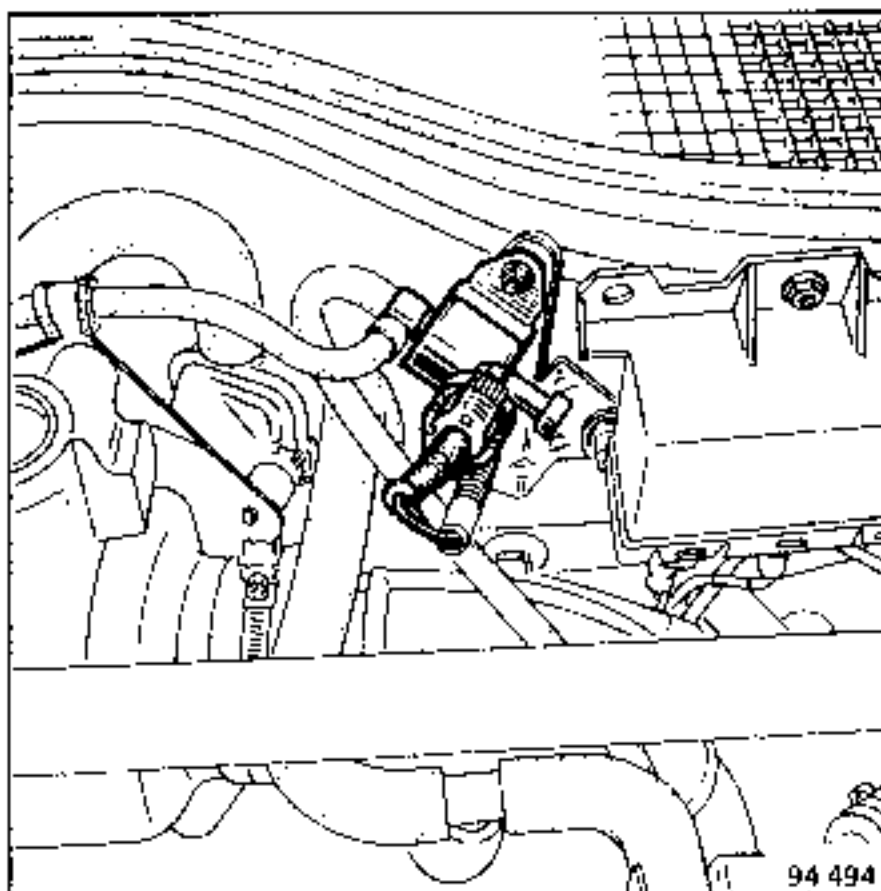


The electric circuit is closed for idle speed and open for a certain partial load\* and full load.

The EGR valve is only effective at idle speed and for low loads.

\* See page 14-5 "Adjustment of full load micro-switch".

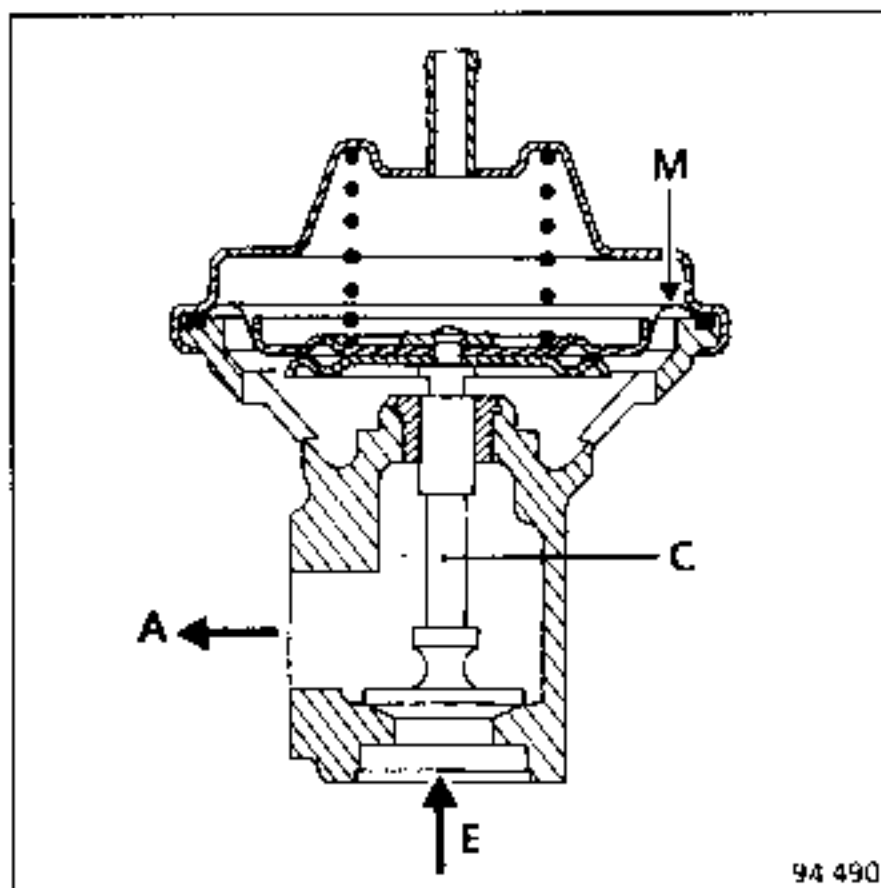
The solenoid valve for recycling control is fixed on the vehicle scuttle, near the pre- and post-heater unit



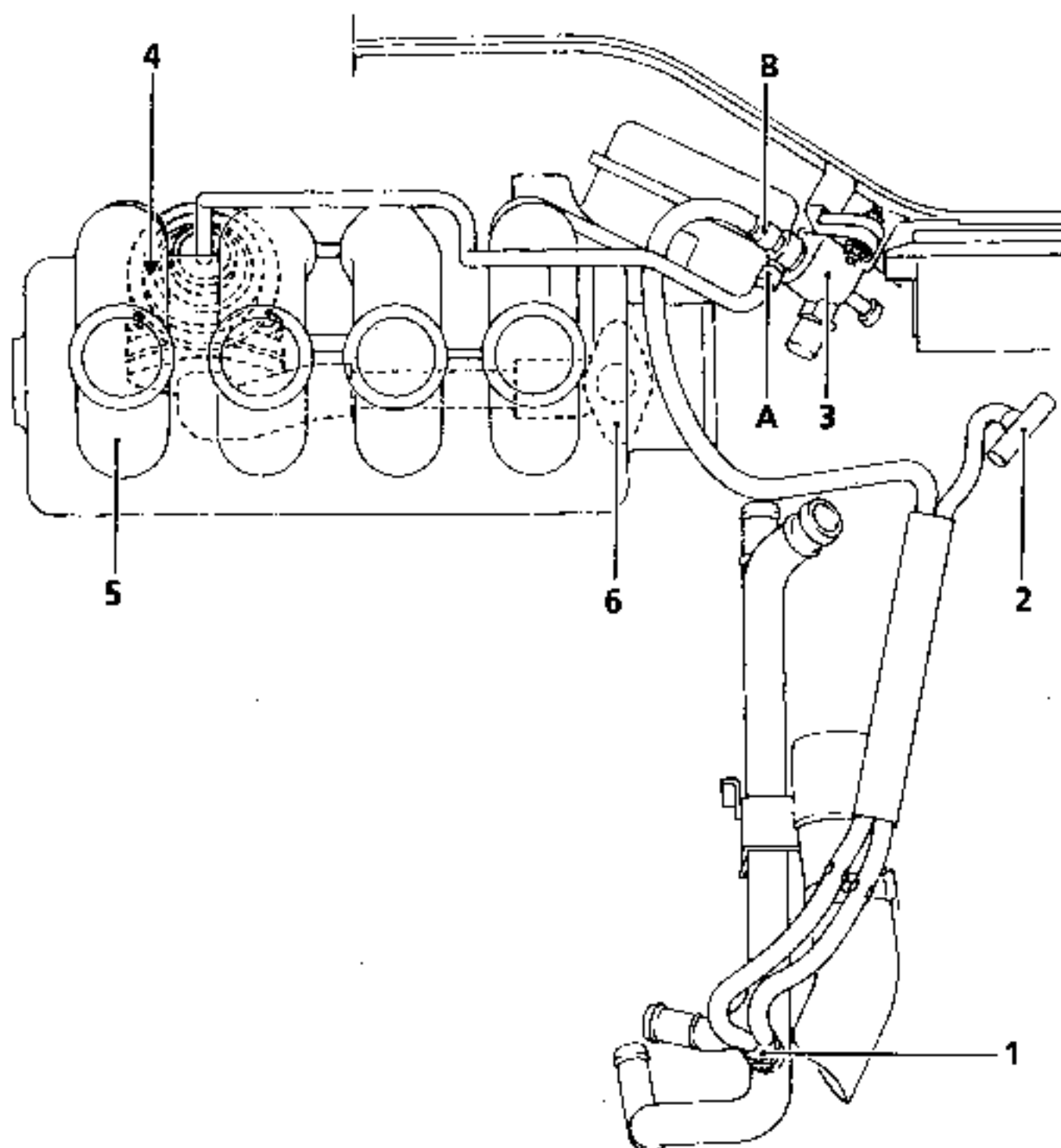
**Exhaust gas recycling valve.**

The effect of the vacuum on diaphragm (M) lifts the check valve (C).

Some of the exhaust gasses (E) then pass to the intake (A).



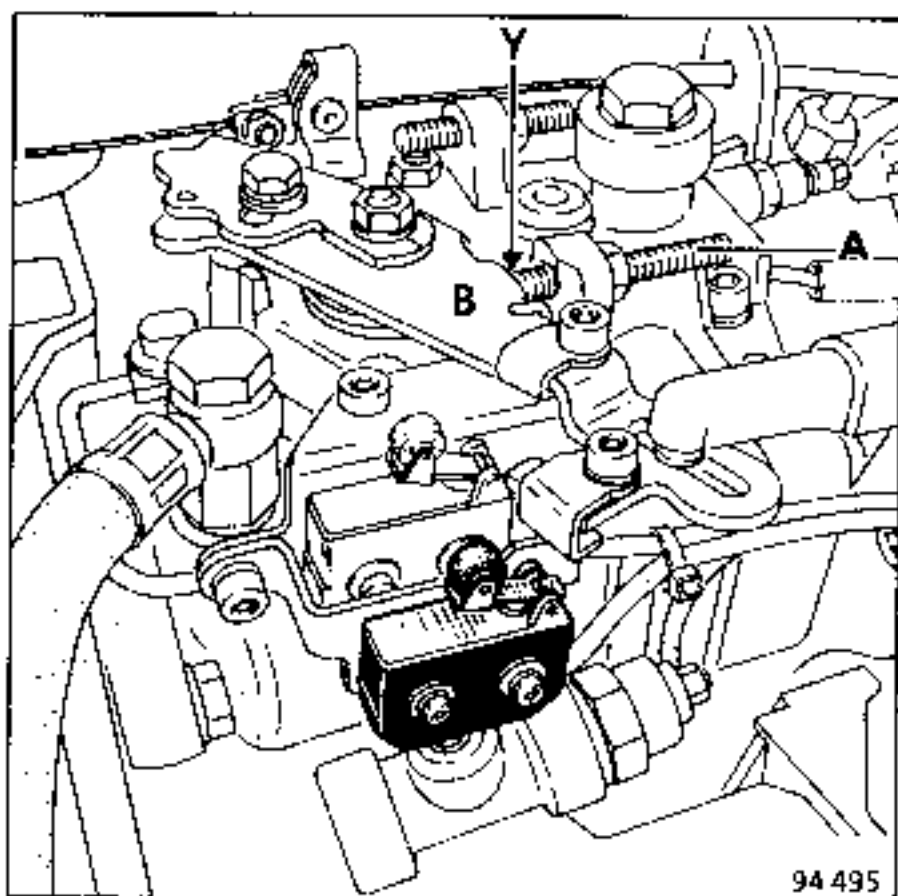
### PNEUMATIC CONNECTION DIAGRAM



94 492

- 1** - Thermo-pneumatic valve on coolant pipe.
- 2** - T joint on vacuum pump - brake servo connection.
- 3** - EGR valve control solenoid
- 4** - EGR valve
- 5** - Intake manifold.
- 6** - Exhaust gas recycling pipe (passes under intake manifold).
- A** - Red marking ring (to EGR valve).
- B** - Blue marking ring (to thermo-pneumatic valve).

## FULL LOAD MICRO-SWITCH ADJUSTMENT



The position of the micro-switch is to be adjusted or checked:

- after work has been carried out on the injection pump at a Renault injection centre,
- after work has been carried out on the full load micro-switch for the pre- and post-heating equipment,
- after replacing the micro-switch.

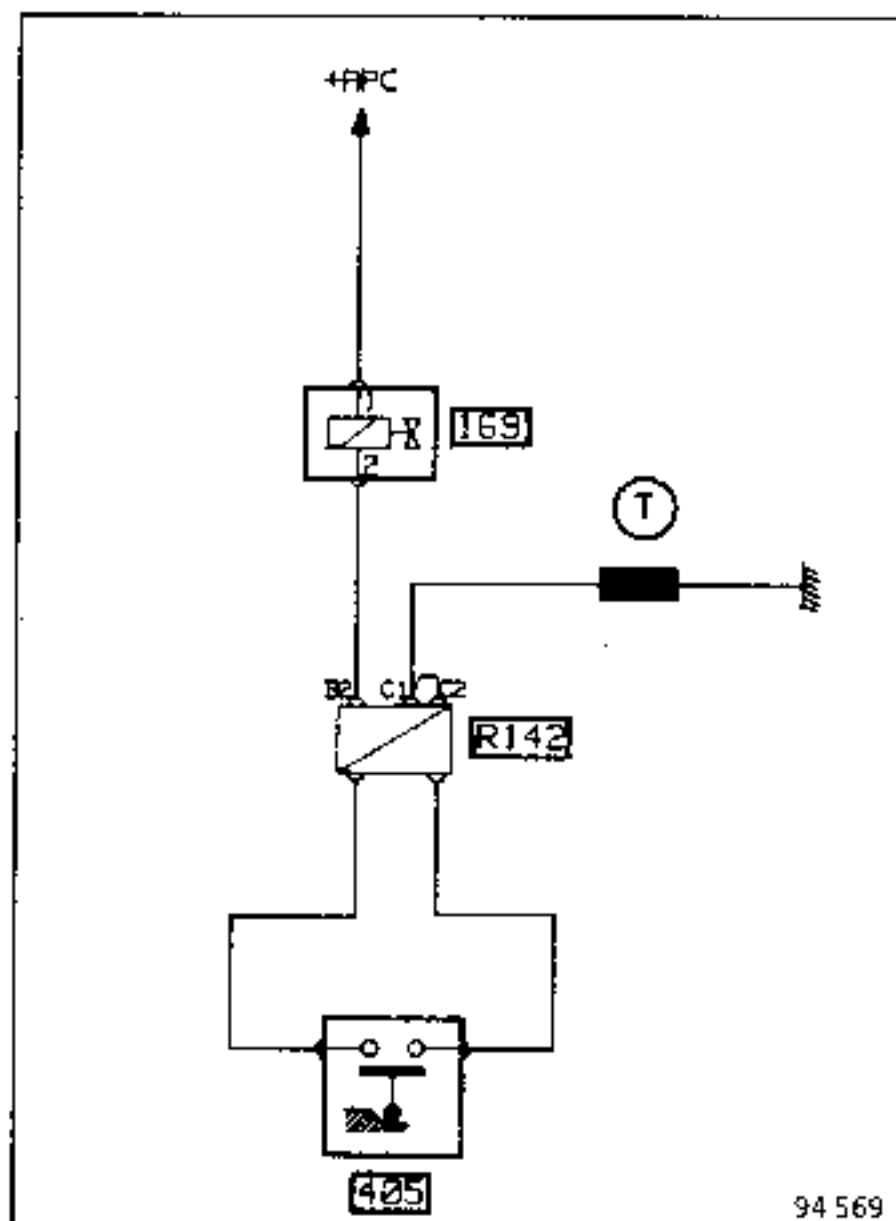
Place a shim (Y) between the accelerator lever (B) and the anti-stall stop (A).

Use an ohmmeter.

Shim(Y) in mm	Micro-switch	Ohmmeter Reading
13	closed	0 $\Omega$
14	open	infinite

This adjustment is carried out by moving the micro-switch on its support plate after loosening the two fixing bolts.

## SOLENOID ELECTRICAL CONNECTION DIAGRAM



169 : EGR valve control solenoid.

405 : Injection pump full load micro-switch

R 142 : Injection pump 6 track connection.

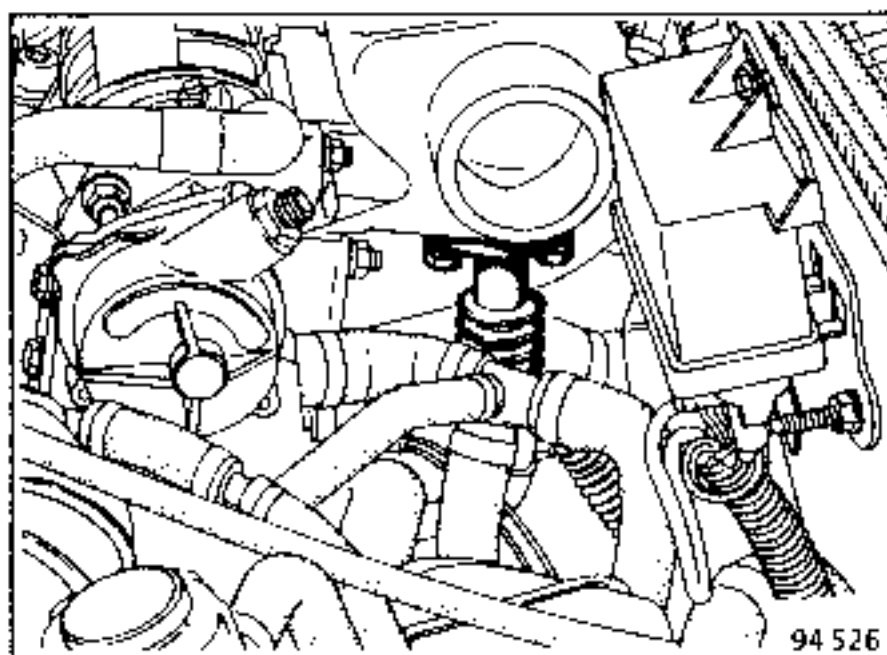
+ APC : Protected by fuse.

**REMOVAL AND REFITTING OF EGR VALVE**

To make the removal of the EGR valve easier, the EGR valve assembly and the intake recycling pipe should be removed.

**Removal:**

- Disconnect the battery.
- Remove the plastic air intake pipe on the intake manifold.
- Remove the oil vapour re-intake pipes between the T joint and the decanter chamber.



- Remove the two fixing bolts for the gas recycling pipe positioned under the intake manifold.
- Disconnect the EGR valve control pneumatic pipe.
- Remove the two fixing bolts for the EGR valve on the exhaust manifold.

The EGR valve assembly is thus removed together with the recycling pipe (which can be separated on the bench)

**Refitting:**

- Replace the connections.
- Check the condition of the EGR valve and the pneumatic system for recycling.



**CHECKING THE OPERATION OF THE ANTI-POLLUTION EQUIPMENT**

**Fault finding**

**Condition :**

Engine hot (after cooling fan has cut in at least once), running at idling speed.

The emissions control equipment is operating, the EGR valve is open.

**Check:**

Disconnect the EGR valve control pipes.

You should:

- hear the valve click (the check valve returns to its seat sharply),
- observe a destabilising effect on the idling speed for two or three seconds and a change in engine noise.

**Fault finding:**

If nothing happens during this check:

- check that there is a vacuum in the pneumatic pipe at the EGR valve,
- the depression value is approximately 500 mbar (read this on vacuum gauge 0 - 1000 mbar),
- the solenoid valve air intake filter.

If the vacuum read is 0, check:

- the pneumatic connections and solenoid electrical supply,
- the presence of vacuum at the thermo-pneumatic valve,
- correct operation and adjustment of the full load micro-switch on the injection pump,
- correct calibration at the T joint.

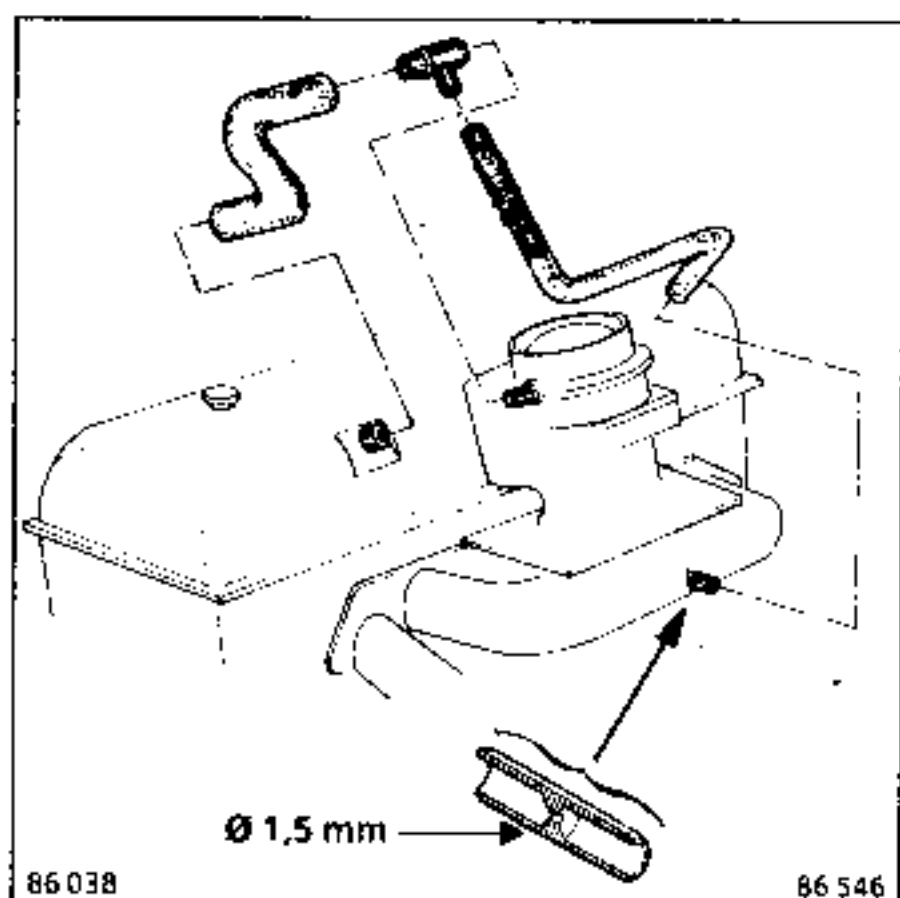
If the vacuum is present and is equal to approx. 500 mbar, the EGR valve is at fault. This requires the valve to be removed for further inspection (valve seized, diaphragm pierced).

# EMISSION CONTROL

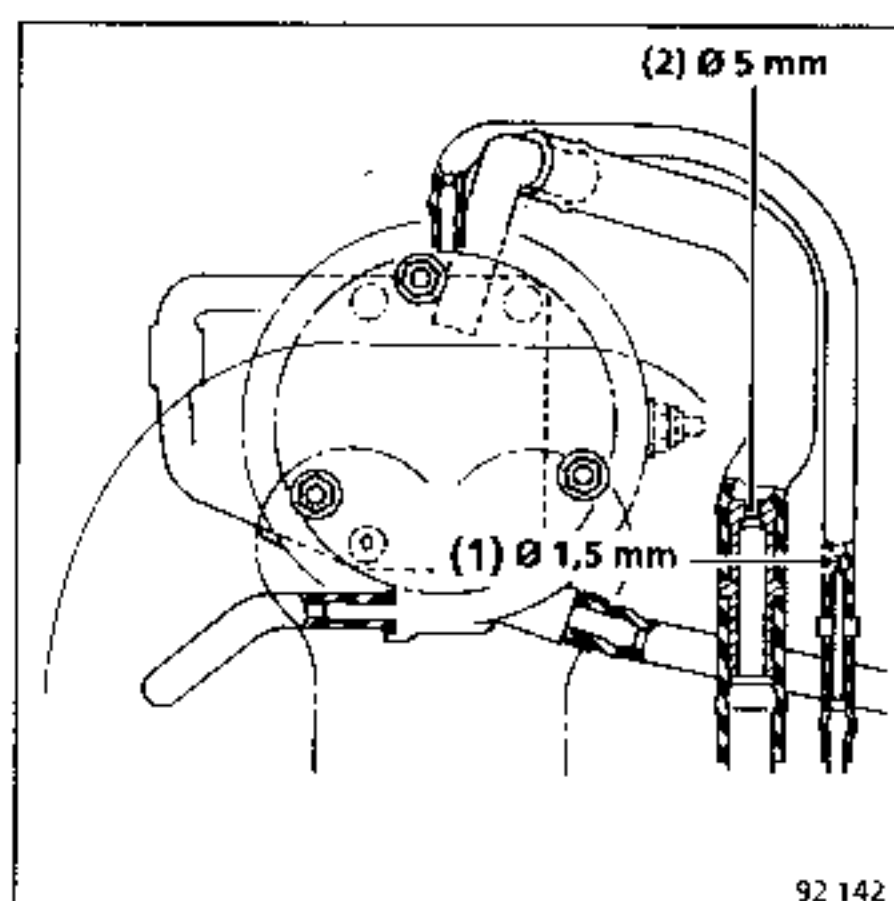
## Oil Vapour Re-intake System

14

C1E - C1G Engine

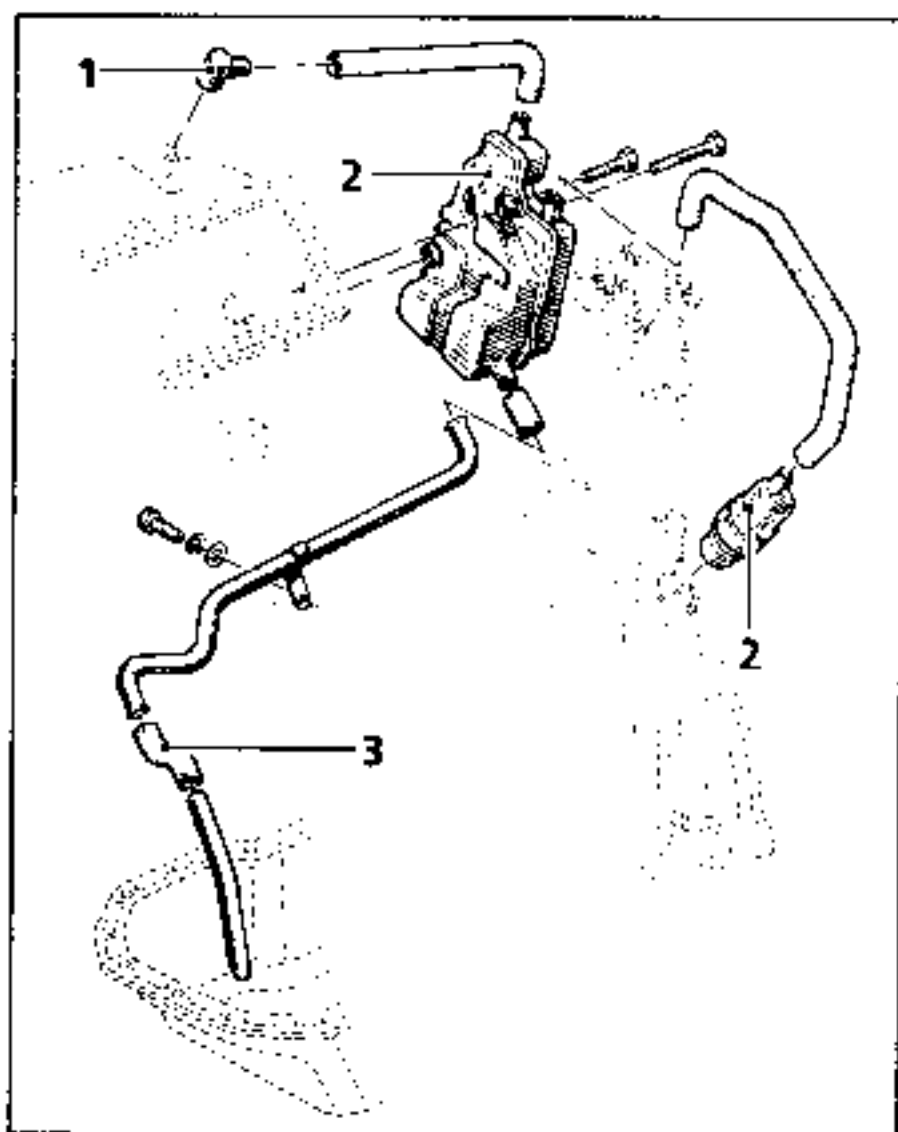


E6J Engine



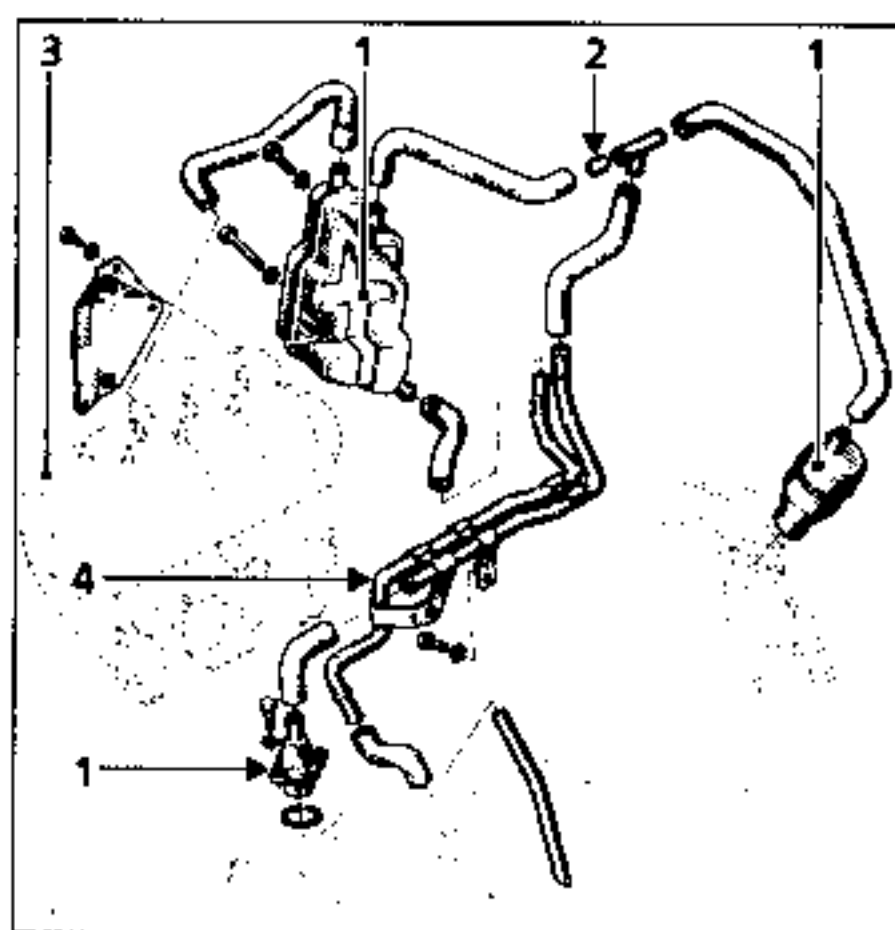
Green identification mark Ø 1.5 mm  
White identification mark Ø 5 mm

F8M Engine



- 1 - Elbow fitting on air filter.
- 2 - Decanter.
- 3 - Oil return pipe to sump.

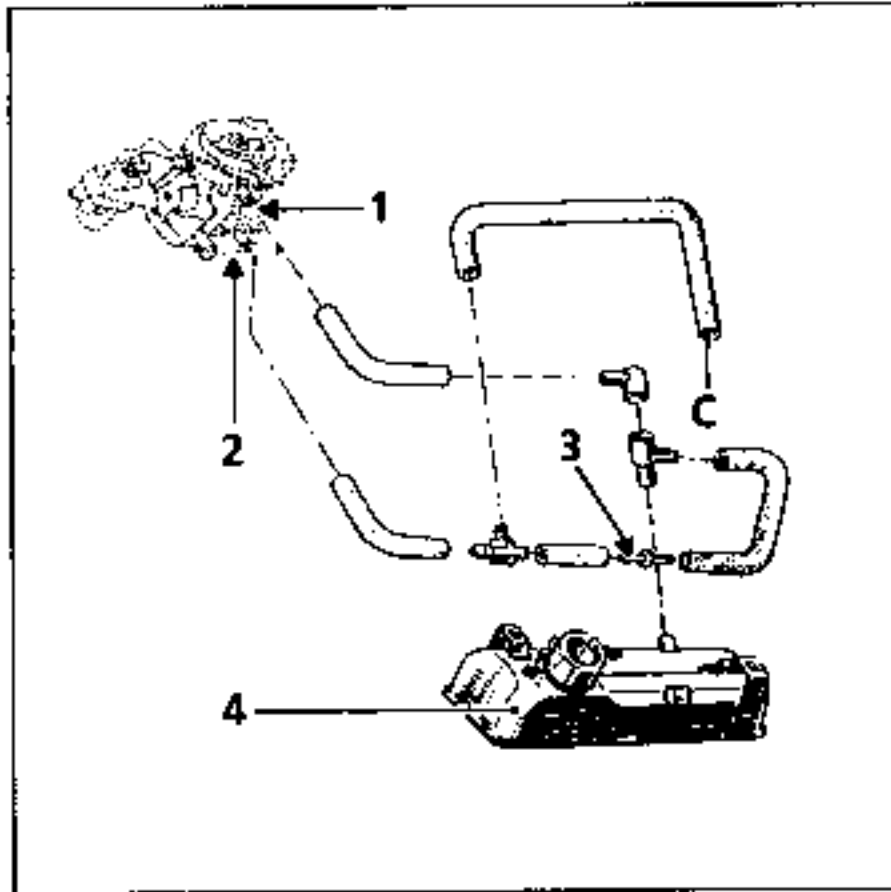
F8Q Engine



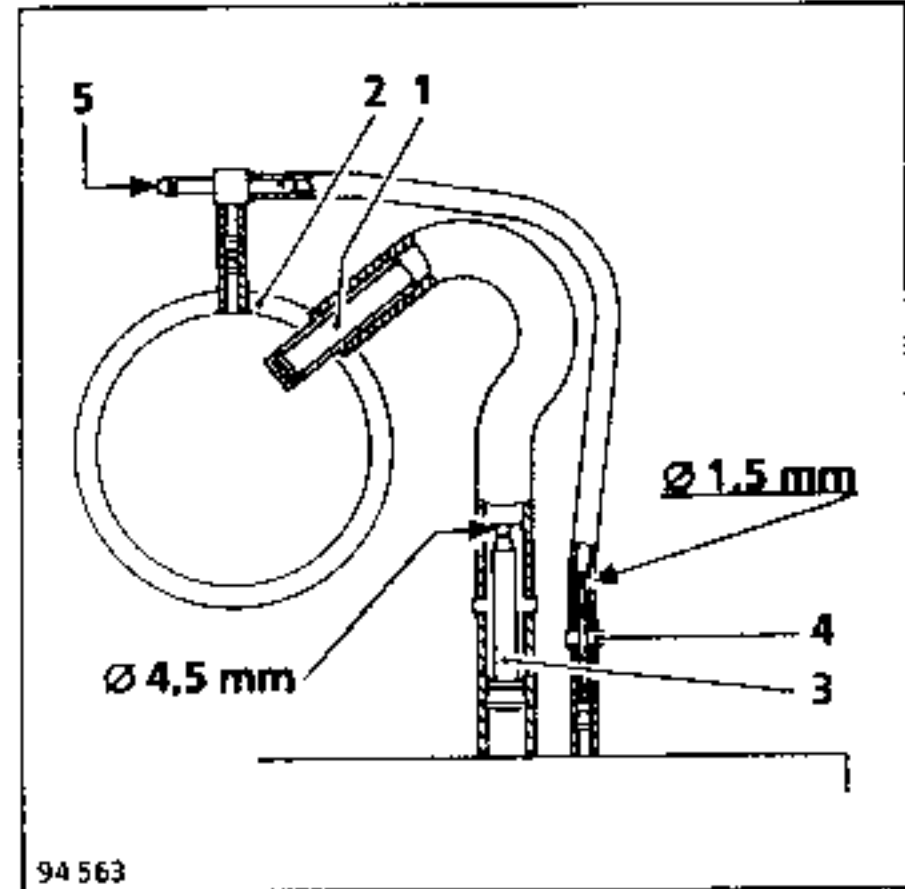
- 1 - Decanter.
- 2 - Calibrated orifice Ø 8mm
- 3 - Intake manifold.
- 4 - Return pipe to crankcase.

# EMISSION CONTROL

## Oil Vapour Reintake System

**14****C3J Engine**

- 1 - Connecting fitting on upper part of throttle housing
- 2 - Connecting fitting on lower part of throttle housing.
- 3 - Calibrated orifice  $\varnothing$  1.7 mm.
- 4 - Rocker cover.
- C - To canister.

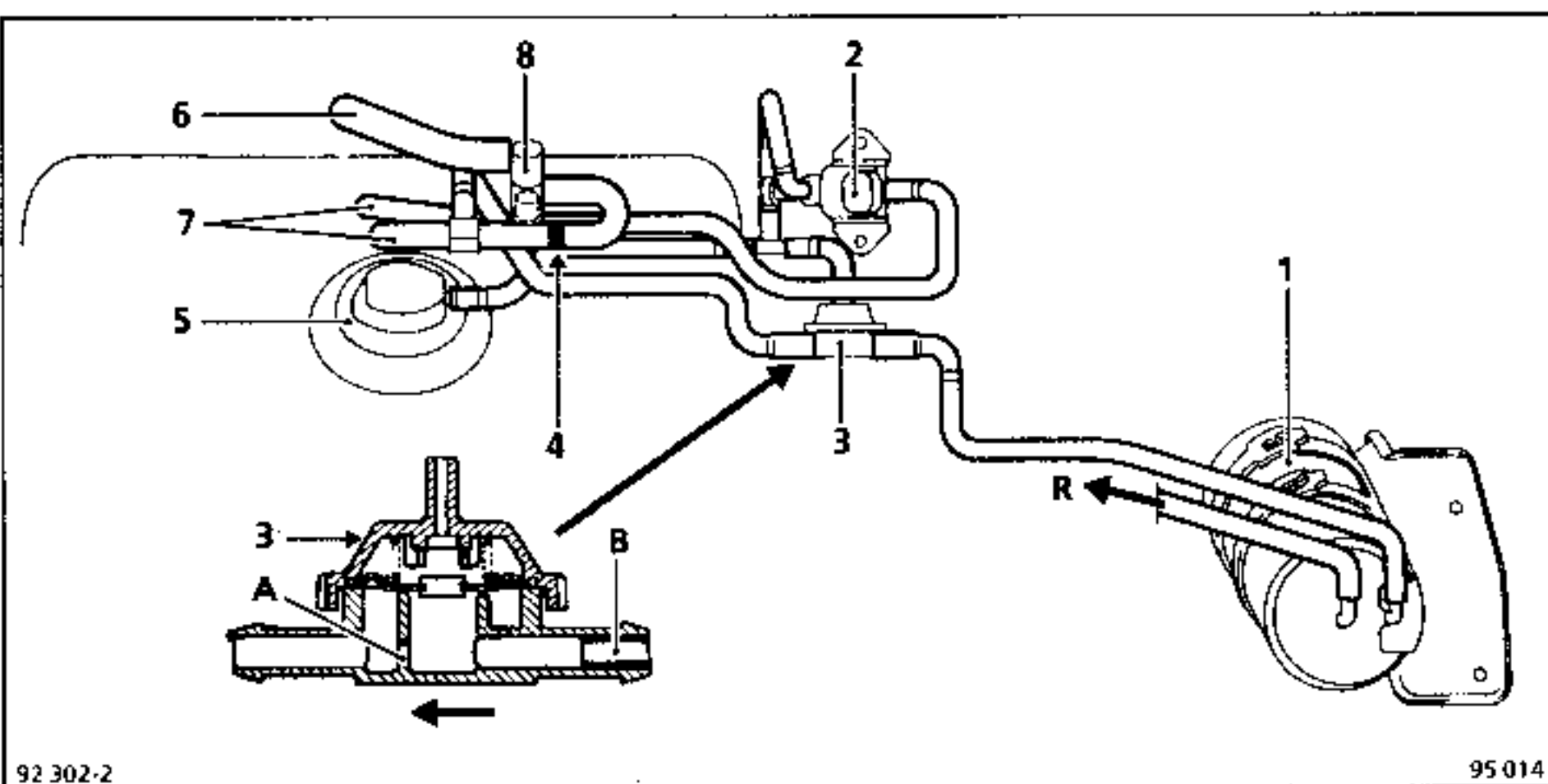
**E7J Engine**

- 1 - Connecting fitting on air filter.
- 2 - Connecting fitting on manifold.
- 3 - Calibrated orifice  $\varnothing$  4.5 mm.
- 4 - Calibrated orifice  $\varnothing$  1.5 mm.
- 5 - Connecting fitting for vapour bled from canister.

### CHECK

To ensure that the emission control system operates correctly, the oil vapour reintegration system should be kept clean and in good condition. Make sure that the calibrated orifices are present and meet specifications..

## CIRCUIT DIAGRAM



- 1 - Fuel vapour absorption canister.
- 2 - Canister bleed solenoid valve (controlled by earth on pin 5 of injection computer)
- 3 - Canister bleed valve
  - A : Restrictor inside  $\varnothing 0.8\text{mm}$  (partial bleeding of canister).
  - B : Restrictor  $\varnothing 2\text{ mm}$ .The arrow on the body of the valve indicates the direction in which the fuel vapour flows when the canister is bled. It is the direction in which the valve should be fitted.
- 4 - Restrictor  $\varnothing 1.5\text{ mm}$ .
- 5 - EGR valve (Exhaust gas recirculation at inlet).
- 6 - Connecting fitting on upper part of throttle housing.
- 7 - Connecting fitting on lower part of throttle housing.
- 8 - Connecting fitting on rocker cover to recover oil vapour.

## NOTE:

The canister bleeds and the EGR valve opens simultaneously as they are controlled by the solenoid valve.

**Special features of the EGR valve**

The purpose of exhaust inlet gas recirculation under the conditions stated for temperature, engine speed and pressure is to allow a reduction in combustion temperatures which reduces the formation of nitrogen oxides ( $\text{NO}_x$ ).

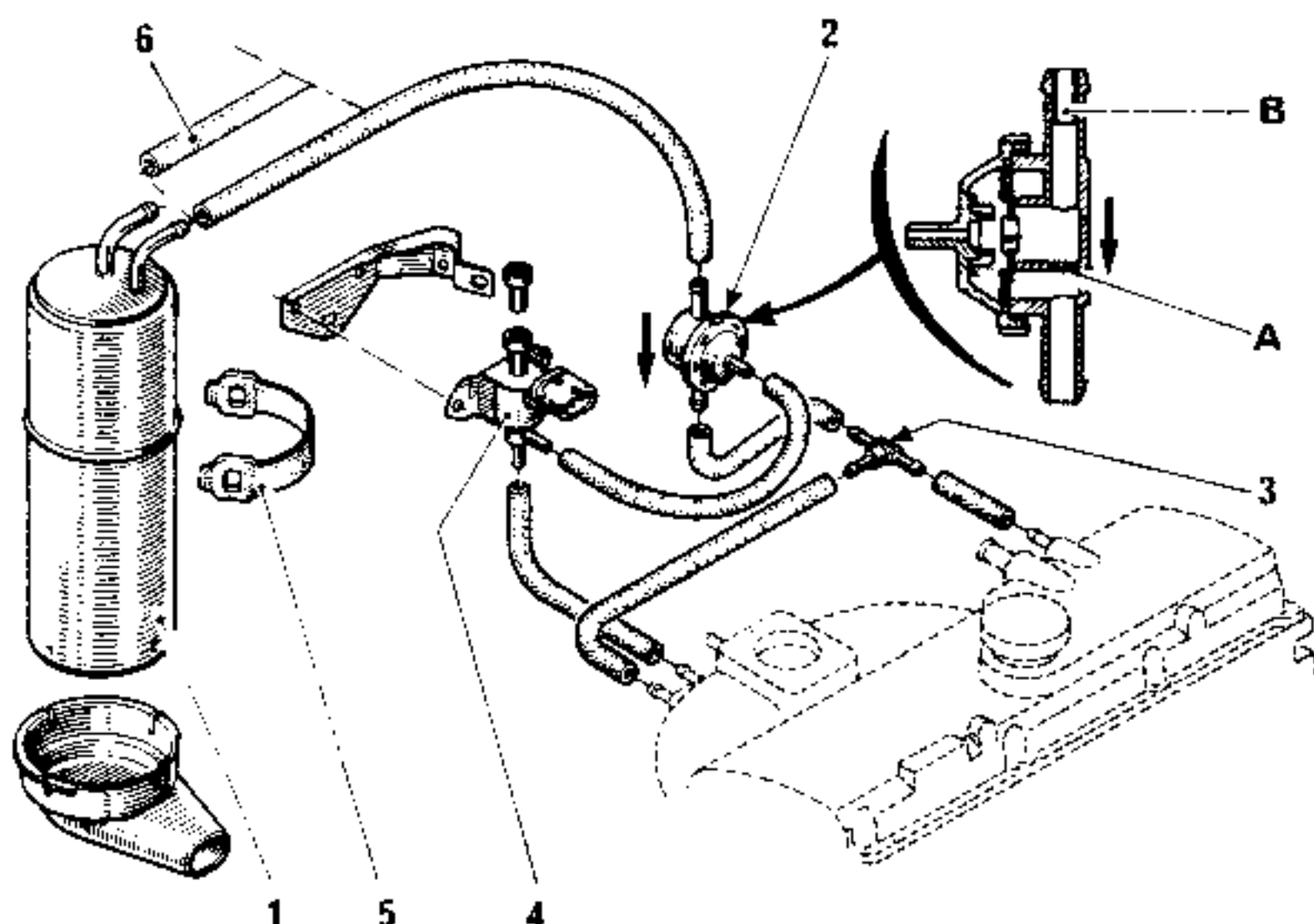
**NOTE:**

The EGR valve can only open under two conditions:

- If the exhaust gas back pressure is adequate (produced if the engine speed is above idling speed).
- If vacuum depression is applied to the upper part of the valve.

See explanations on conformity checking in Section 17 for functional check of solenoid, canister bleeding system and EGR system.

CIRCUIT DIAGRAM



1 - Fuel vapour absorption canister

2 - Canister bleeding valve

A - Calibrated orifice  $\varnothing$  0.8 mm (vapour flow, no power applied to solenoid)

B - Calibrated orifice  $\varnothing$  2 mm (vapour flow, power applied to solenoid)

**NOTE :**

The arrow indicates the direction of flow (Canister towards intake manifold of engine)

3 - Union

4 - Control solenoid

5 - Securing strap for canister.

6 - Connecting pipe between fuel tank and canister

**NOTE :**

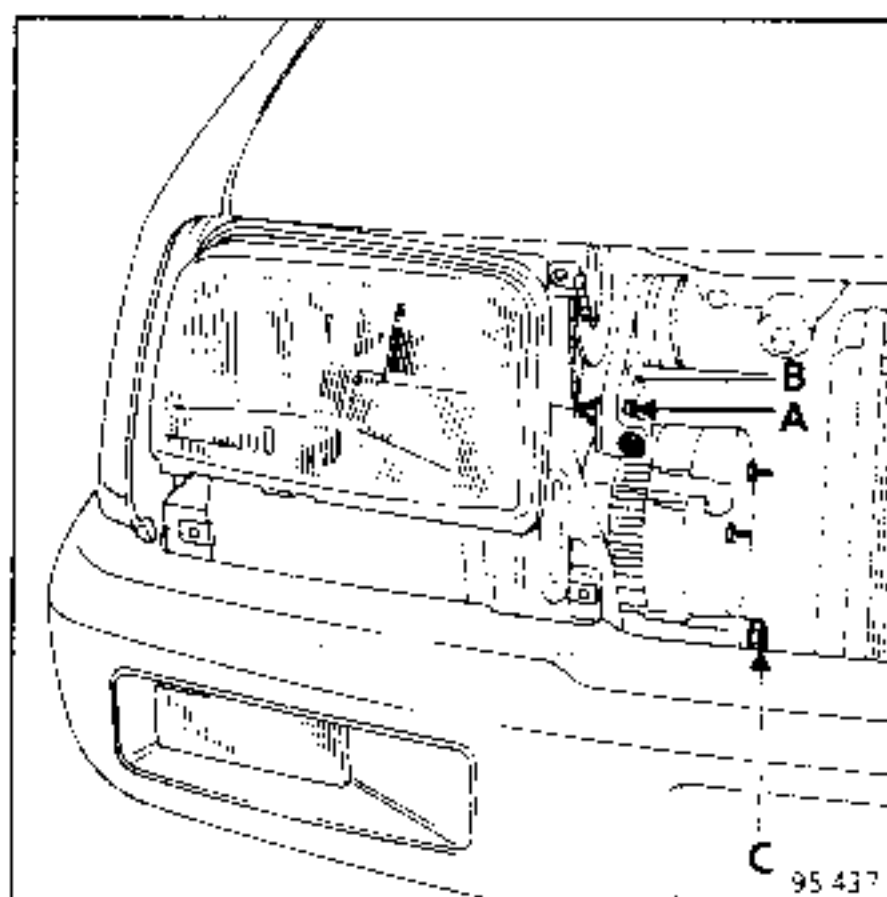
For functional check of canister and circuit, see conformity control in Section 17

**REMOVING**

Disconnect the battery

Remove

- the radiator grille (9 screws),
- the plastic surround on the radiator by releasing the three clips,
- the radiator by releasing the two upper securing clamps, disconnecting the sensor and the two pipes,
- the belt tensioning bolt (A) and its support (B)



Disconnect the alternator and the regulator electrical cables.

Loosen the lower mounting of the alternator, release the belt and remove the bolt (C)

Take out the alternator.

**REFITTING**

After the alternator has been refitted, retension the belt and top up and bleed the engine cooling system

# IGNITION SYSTEM

## Specifications

17

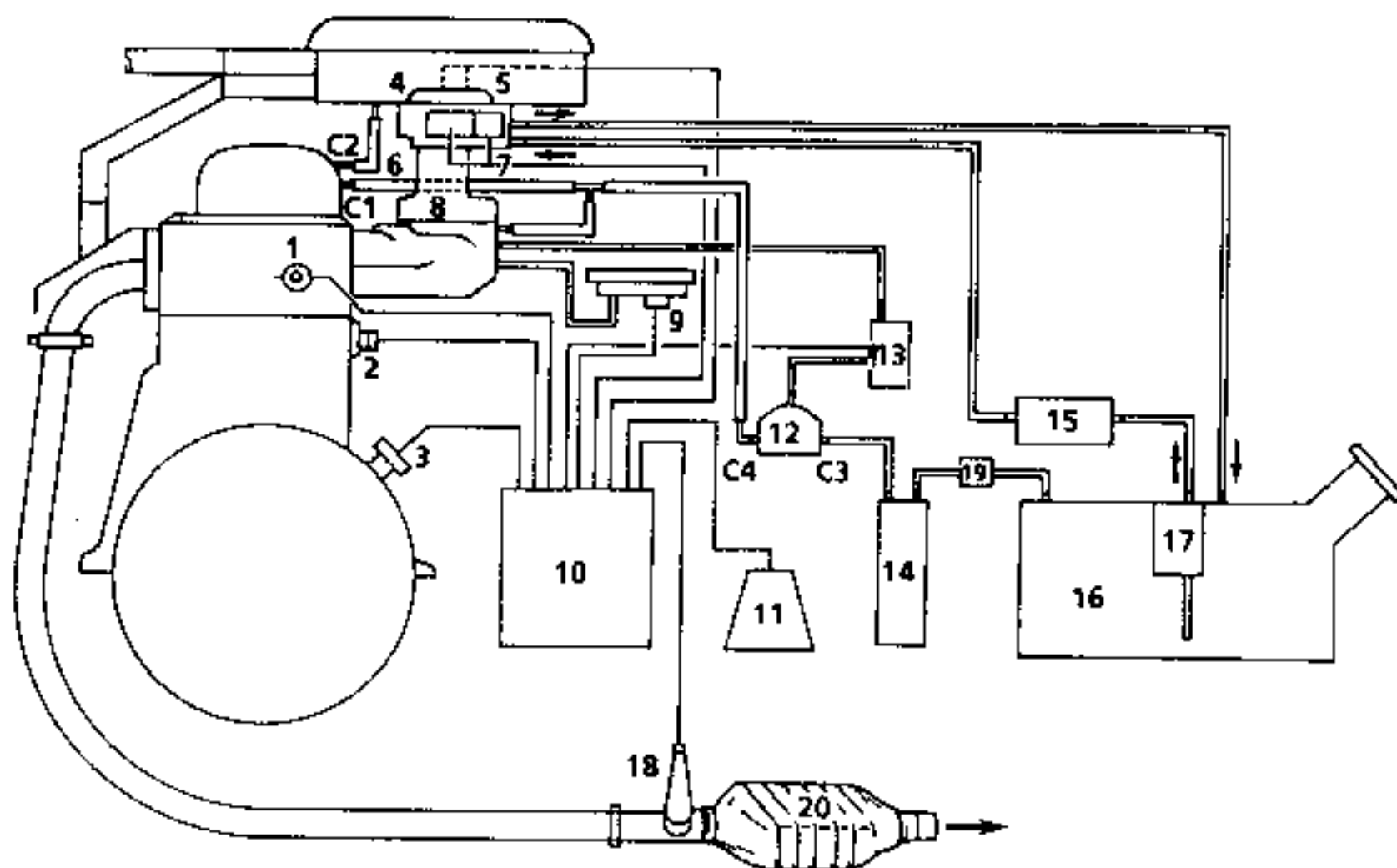
Vehicle Type	AEI Identification	Distributor Identification
F40A	RE 252	--
F401 F40T	--	R 350 D 90 (10°)
F40F	RE 306	--
F40Y	RE 290	--
F40 U F40V	Injection	--
F407	Injection	--

## Spark Plugs

Vehicle Type	Champion	Eyquem	AC	BOSCH	NGK	Gap in mm (± 0.5)
F40A	--	FC 52 LS	--	--	BCP 5 ES	0.9
F401 F40F F40T	N 12 YC	C 32 LS	C 42 CXLS	--	--	0.8
F40U F40V	--	FC 52 LS	--	--	BCP 5 ES	0.9
F407	RN 12 YC	--	--	--	--	0.8
F40Y	--	FC 52 LS	--	--	BCP 5 ES	0.9



### Special Features of E7J Engines

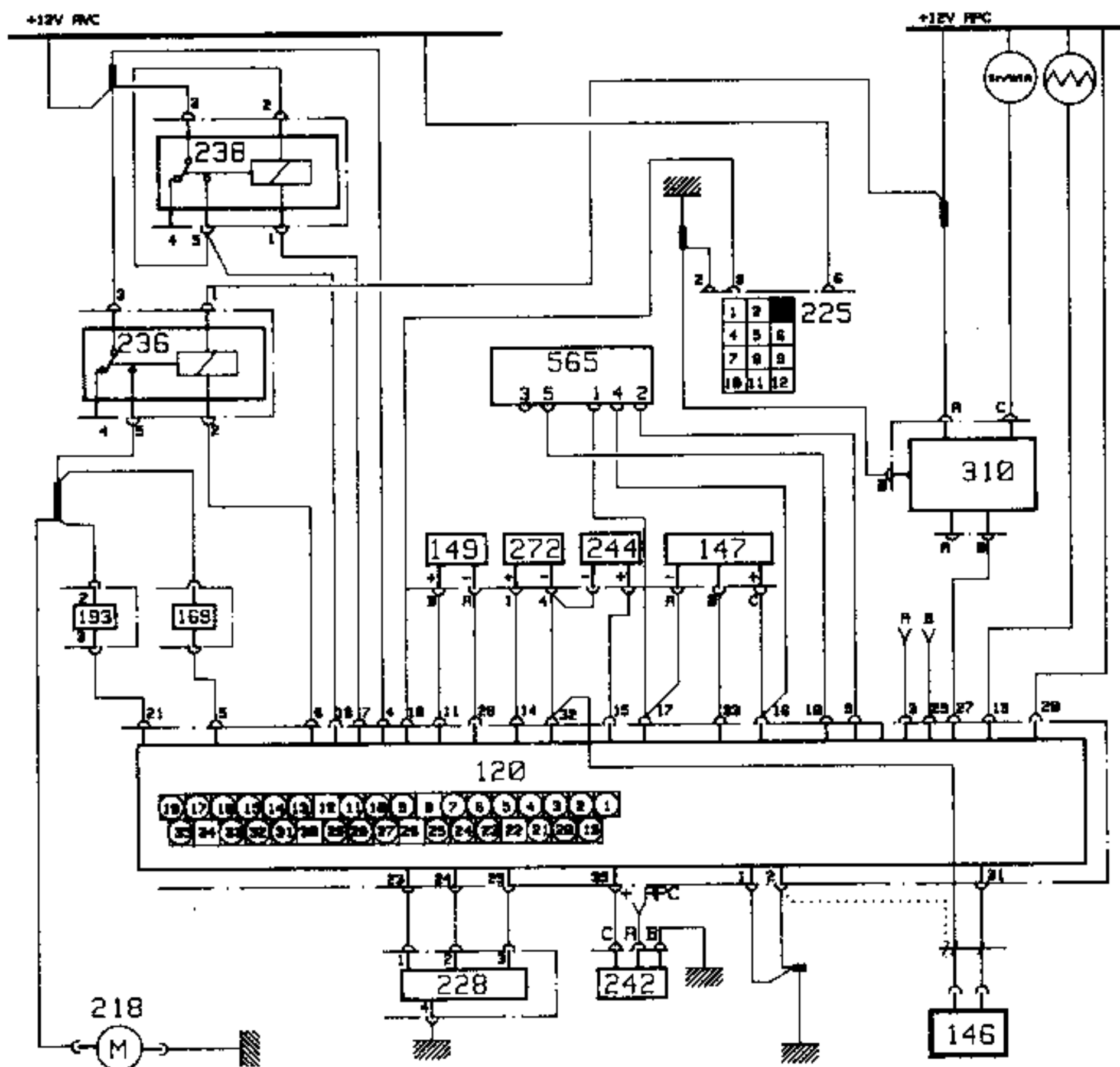


94 545

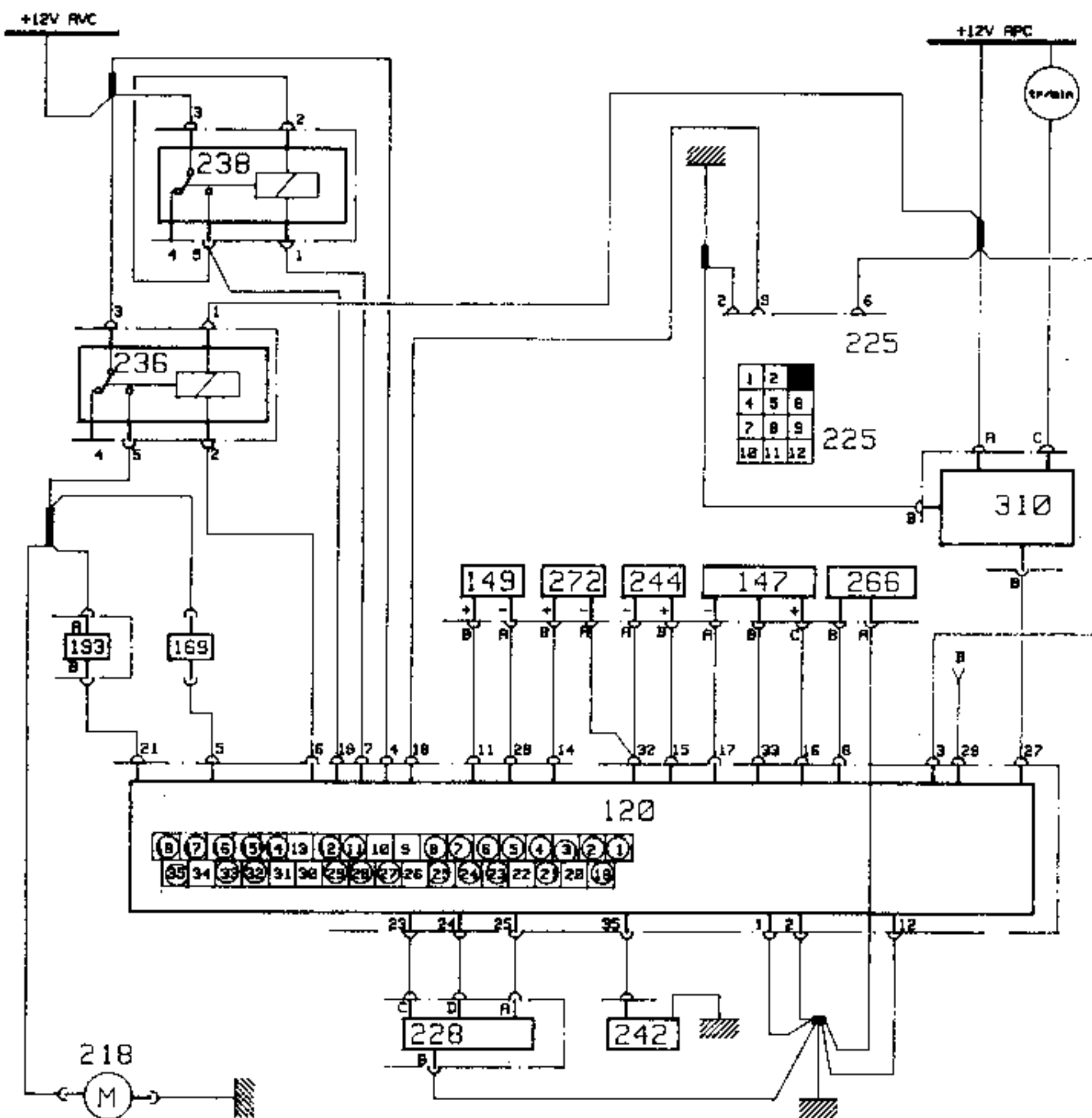
- 1 - COOLANT SENSOR
- 2 - PINKING SENSOR
- 3 - TDC SENSOR
- 4 - INJECTOR
- 5 - AIR SENSOR
- 6 - THROTTLE POTENTIOMETER
- 7 - IDLING SPEED REGULATING MOTOR
- 8 - INJECTION CASING
- 9 - PRESSURE SENSOR
- 10 - COMPUTER
- 11 - IGNITION UNIT
- 12 - VACUUM BLEED VALVE

- 13 - SOLENOID VALVE
- 14 - FUEL VAPOUR ABSORBER (CANISTER)
- 15 - FUEL FILTER
- 16 - FUEL TANK
- 17 - IMMERSED FUEL PUMP
- 18 - LAMBDA (oxygen) SENSOR
- 19 - NON-RETURN VALVE
- 20 - CATALYTIC CONVERTER
- C<sub>1</sub> - RESTRICTOR Ø 4.5 mm
- C<sub>2</sub> - RESTRICTOR Ø 1.5 mm
- C<sub>3</sub> - RESTRICTOR Ø 0.8 (inside) mm
- C<sub>4</sub> - RESTRICTOR Ø 2 mm

## CIRCUIT DIAGRAM



### CIRCUIT DIAGRAM



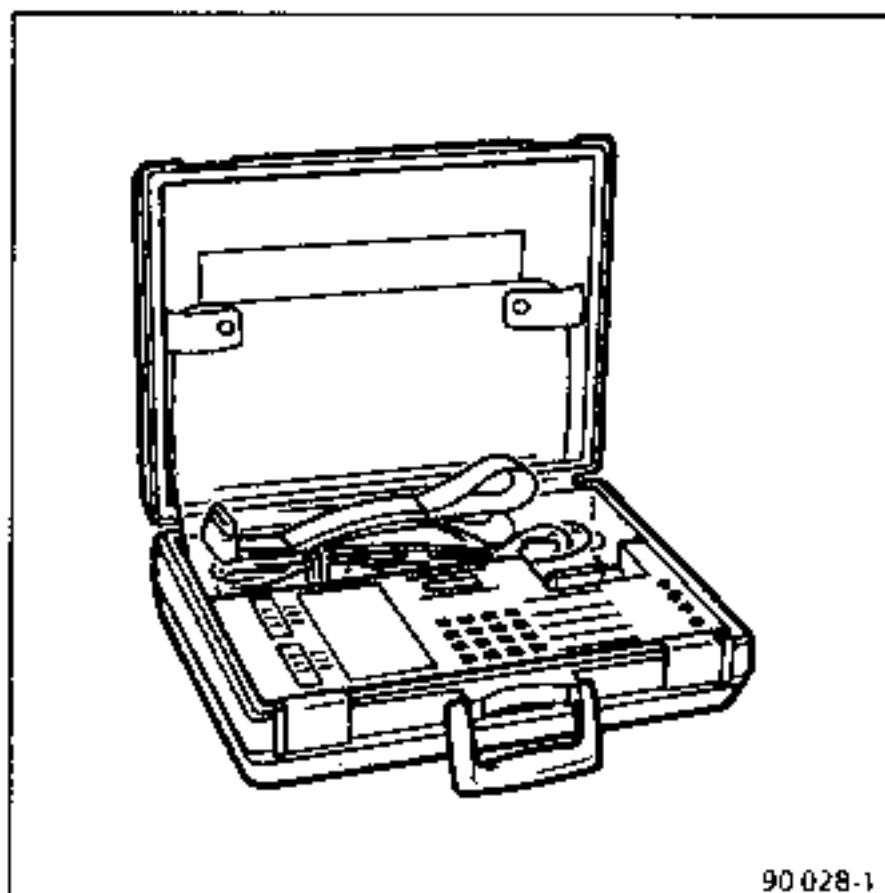
94 938

KEY TO CIRCUIT DIAGRAM

- 120** : Injection computer.
- 146** : Pinking sensor (E7J engine only)
- 147** : Pressure sensor.
- 149** : TDC sensor
- 169** : Canister bleeding solenoid valve (and EGR control for C3J engine).
- 193** : Injector on throttle unit
- 218** : Fuel pump (immersed type)
- 225** : Diagnostic socket.
- 228** : Idling speed regulating motor (with integrated no load switch).
- 236** : Fuel pump relay.
- 238** : Protective relay (injection interlock).
- 242** : Oxygen sensor.
- 244** : Temperature sensor : coolant (E7J engine)  
: at inlet manifold (C3J engine).
- 272** : Temperature sensor : air (E7J engine).  
: mixture (C3J engine).
- 310** : Ignition power module.
- 565** : Load potentiometer on throttle housing (E7J engine).

### TOOLS

The XR 25 microprocessor system test box, when connected to the diagnostic socket, enables checking and repair to be carried out rapidly by informing the operator of the state of the computer and the majority of its peripherals.



The XR 25 test case should be fitted with a N° 9 cassette or the successor unit.

The fault finding data is transmitted continuously with storage of intermittent faults (E7J) and without storage of intermittent faults (C3J).

The injection indicator light on the instrument panel is not operational.

The fault finding method and instructions on how to use the XR 25 test box are described in **MR Injection R (E)** section 17.

#### COMPUTER IDENTIFICATION CODE:

On the XR 25 centre display

Engine C3J


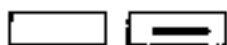
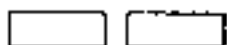



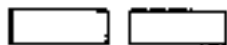
1	5	0	.3
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Engine E7J




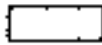
1	6	8	.3
---	---	---	----

TESTS PERFORMED (according to number read off XR25)	Key #	E7J	C3J	Units of measurement
Pressure sensor	01	X	X	Millibars
Coolant temperature	02	X	X	Degrees
Air temperature	03	X	X	Degrees
Supply voltage	04	X	X	Volts
CO potentiometer	05			Ohms
O <sub>2</sub> sensor	05	X	X	Millivolts
Engine speed	06	X	X	rpm
Turbo pressure RCO	11			Milliseconds
Idling speed regulating valve RCO	12			Milliseconds
Pinking sensor data	13	X		No units
Engine speed difference	14	X	X	rpm
Pinking correction	15	X		No units
Atmospheric pressure correction	16	X	X	Millibars
Part load/full load potentiometer value	17	X		No units
Vehicle speed	18	X		Km/h
Turbo pressure correction	20			Milliseconds
Mixture regulation	35	X	X	no units

## CHECKING THAT SYSTEM IS TO SPECIFICATION

Functions	Conditions	Test box selection	Bar graph line no.	Bar graph display	Display and comments
COMPUTER CONFORMITY	Eng stopped - Ignition on	D03	L1 #8 L10 L13		<div> <div>xxx3</div> <div>Check computer to specification</div> </div> <div> <div>Correct code</div> <div>No TOC</div> <div>No load switch</div> <div>Computer ready to receive data from oxygen sensor</div> </div>
THROTTLE POTENTIOMETER	Eng stopped - Ignition on  No load  - Throttle pedal slightly depressed  - Full load	# 17	L10  L10  L10	    	<div>The value should be greater than or equal to 135</div> <div>Otherwise check that the computer is to specification</div> <div>Left-hand bar graph illuminates when throttle angle is greater than 70°</div>
ABSOLUTE PRESSURE SENSOR	- Engine stopped - Ignition on	# 01	L7		<div>Value read off should be equal to atmospheric pressure (between 950 and 1025 mb at sea level).</div> <div>Otherwise check:</div> <div> <div>Pressure sensor</div> <div>- Harness and connections</div> </div>
COOLANT TEMPERATURE SENSOR	- Engine cold - Ignition on	# 02	L5		<div>Value read off should be equal to ambient temperature:</div> <div> <div>- If bar graph is illuminated, check sensor, connector and harness.</div> <div>- If value read off is not ambient temperature, check sensor.</div> </div>
AIR TEMPERATURE SENSOR	- Engine cold - Ignition on	# 03	L4		<div>Value read off should be equal to ambient temperature:</div> <div> <div>- If bar graph is illuminated, check sensor, connector and harness.</div> <div>If value read off is not ambient temperature, check sensor</div> </div>

## CHECKING THAT SYSTEM IS TO SPECIFICATION (continued)

Functions	Conditions	Test box selection	Bar graph line no.	Bar graph display	Display and comments
BATTERY VOLTAGE	Engine hot and idling	# 04			Value read off should be between 13 and 14.5 volts. Otherwise check battery and alternator.
MIXTURE REGULATOR	Engine hot and idling after cooling fan has cut in at least once and for at least 25 seconds since engine last started. At n (PARK NEUTRAL) position	# 35	113	    	<p>The value should vary and be between 0 and 255. Otherwise check.</p> <ul style="list-style-type: none"> <li>Oxygen sensor harness and connection</li> <li>Oxygen sensor.</li> </ul> <p><b>Note :</b> Oxygen sensor should be supplied with 12V</p> <p>Computer not processing oxygen sensor data: check computer is to specification</p> <p>Sensor circuit or oxygen sensor faulty</p>
ENGINE IDLING SPEED REGULATION	Engine hot and idling after cooling fan has cut in at least once	# 6  # 17			<p>Check engine speed: value should be:</p> <p><math>N = 825 \pm 50</math> rpm, E7J..BM</p> <p>If N is different, check .</p> <ul style="list-style-type: none"> <li>if there are any air leaks</li> <li>idling speed regulating motor</li> <li>connection</li> </ul> <p>The value for the throttle should be between:</p> <p>22 and 179 for E7J engine</p>
NOISE MEASURING PINKING SENSOR	Engine hot, underload 3500 rpm	# 13	L12		<p>Value read off should not be 0 but should be variable. Otherwise check .</p> <ul style="list-style-type: none"> <li>sensor harness.</li> <li>pinking sensor</li> </ul>
VEHICLE SPEED	Vehicle moving	# 18	L15		Value read off should be approximately that indicated by speedometer
CANISTER BLEEDING	Engine hot Handbrake applied, clutch pedal slightly depressed Maintain manifold pressure between 400 and 700 mb At idling	# 01  # 01			<p>Connect a 0-1000 mb pressure gauge between bleeding solenoid valve and Bailly Comte valve. Value should be between 250 and 600 mb (at sea level)</p> <p>Vacuum value should be 0</p>




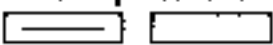

## CHECKING THAT SYSTEM IS TO SPECIFICATION (continued)

Function to test	Conditions	Test box selection	Bar graph line no.	Bar graph display	Digital display Comments
Injection fault finding position	Engine stopped Ignition on Temperature of intake manifold sensor greater than 60°C	D03	L1 L8 L10 L13	 L1 : correct code L8 : TDC code L10 : no load switch L13 : oxygen sensor	<div>xxx3</div> xxx = 150  3 = Injection fault finding
Check on no load/full load switch	Engine stopped Ignition on: - no load - part load - full load		L10 L10 L10		
Check on absolute pressure sensor	Engine stopped Ignition on	# 01			<div>xxxx</div> Local barometric pressure
Check on air temperature sensor	Engine cold - stopped - ignition on	# 03			<div>xxx</div> Ambient temperature $\pm 2^{\circ}\text{C}$
If air and coolant temperature are the same	Engine stopped Ignition on		L5		
Idling speed test	Engine running at idling, after a few seconds	# 06	L10		Note speed <div>xxx</div> 800 to 900 rpm

The check to ensure that the system specifications are correct is carried out with test box XR 25 equipped with the latest version of the cassette, with the corresponding magnetic card placed in front of the bar graph.

Connect the tester to the vehicle diagnostic socket with the engine switched off.

## CHECKING THAT THE SYSTEM SPECIFICATIONS ARE CORRECT (continued)

Function to test	Conditions	Test box selection	Bar graph line no.	Bar graph display	Digital display Remarks
Intake manifold temperature sensor	Engine hot and idling	# 02	L5		<div>xxx</div> $85 < xxx < 95^{\circ}C$
Check on oxygen sensor	Engine idling		L13	Test possible   Must be switched off on RH side	
Functional check of EGR and canister bleed system (in certain countries)	Conditions	Equipment		REMARKS	
	Engine hot, hand-brake applied, engage clutch in 1st, accelerating slightly	Vacuum gauge 0 ; -1 000 mbar connected to solenoid outlet on EGR valve side		At idling → No vacuum Under load → Vacuum same as manifold vacuum	

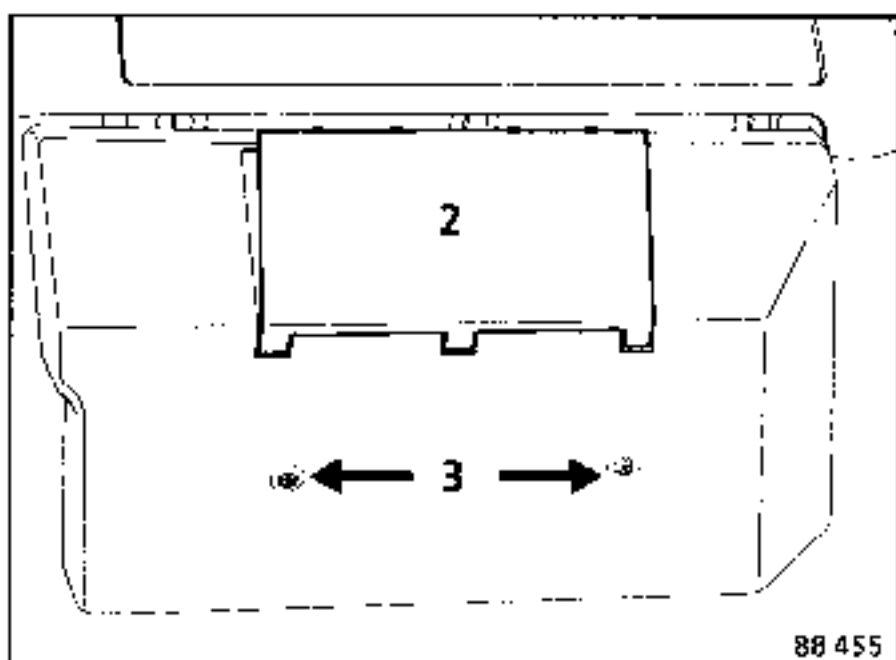
**REMOVING THE COMPUTER**

The computer is in the passenger compartment, on the right-hand side of the vehicle, under the glove box.

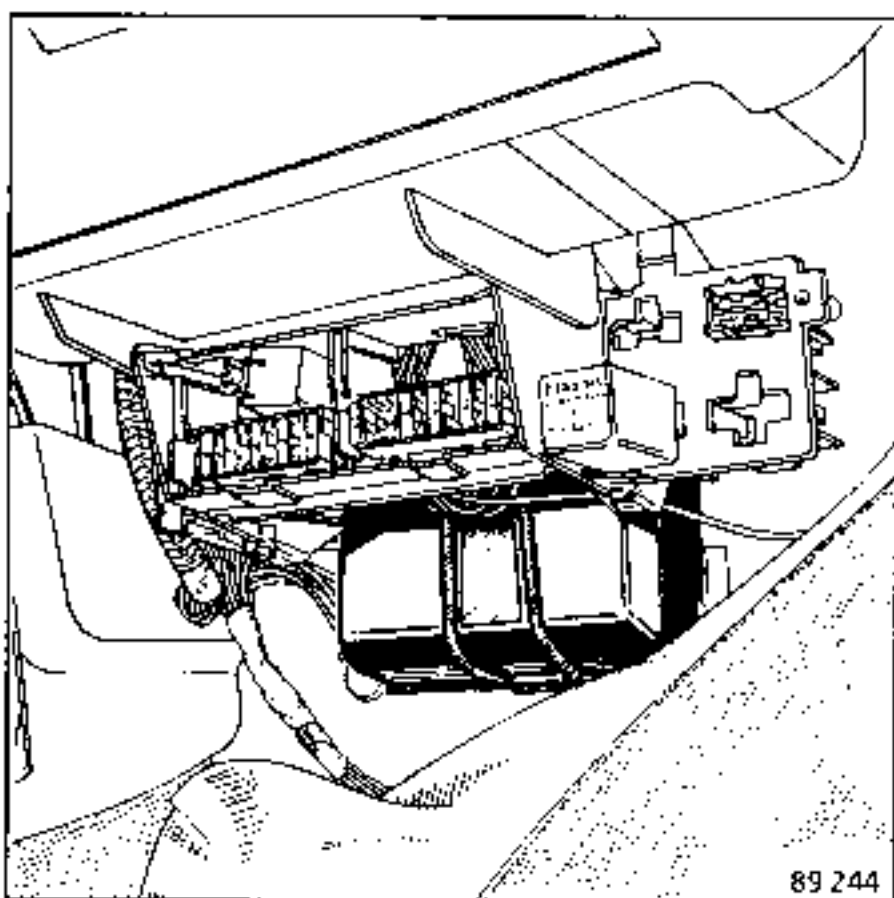
Disconnect the battery

Remove:

- the fuse box (2), (two torx screws (3)).



Pull back the trim



Release the strap that secures the computer and remove it from its mounting plate

**REFITTING**

Carry out the removing operations in reverse order.

Ensure that the computer is correctly positioned on its securing plate.

Ensure that the connection between the computer and the connector leading to the vehicle wiring is fully made.

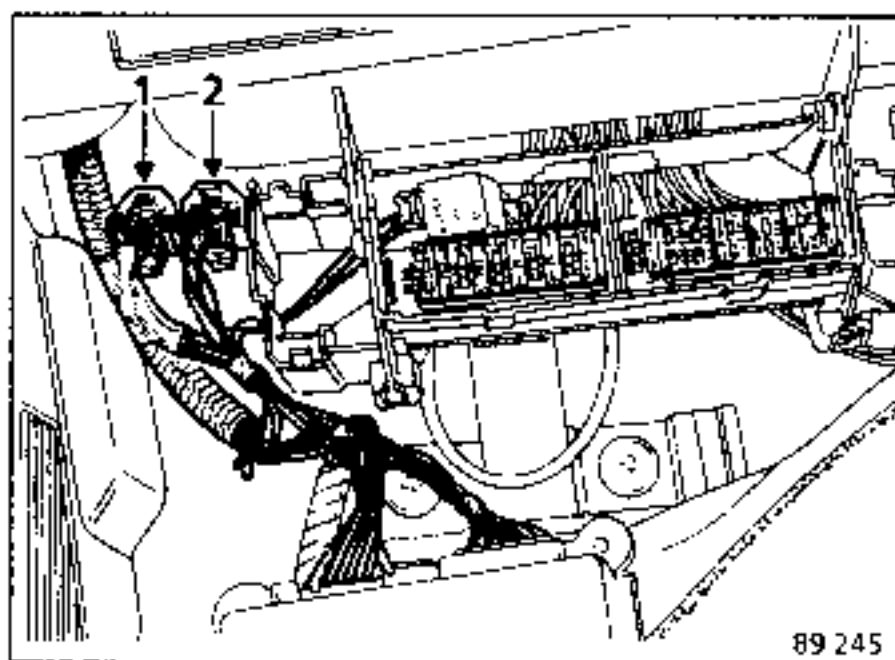
**REMOVING THE SUPPLY AND FUEL PUMP RELAYS**

These relays are in the passenger compartment under the glove box on the computer mounting plate.

Disconnect the battery.

(See section "Removing the Computer" )

Undo the screw that secures each relay to the plate.

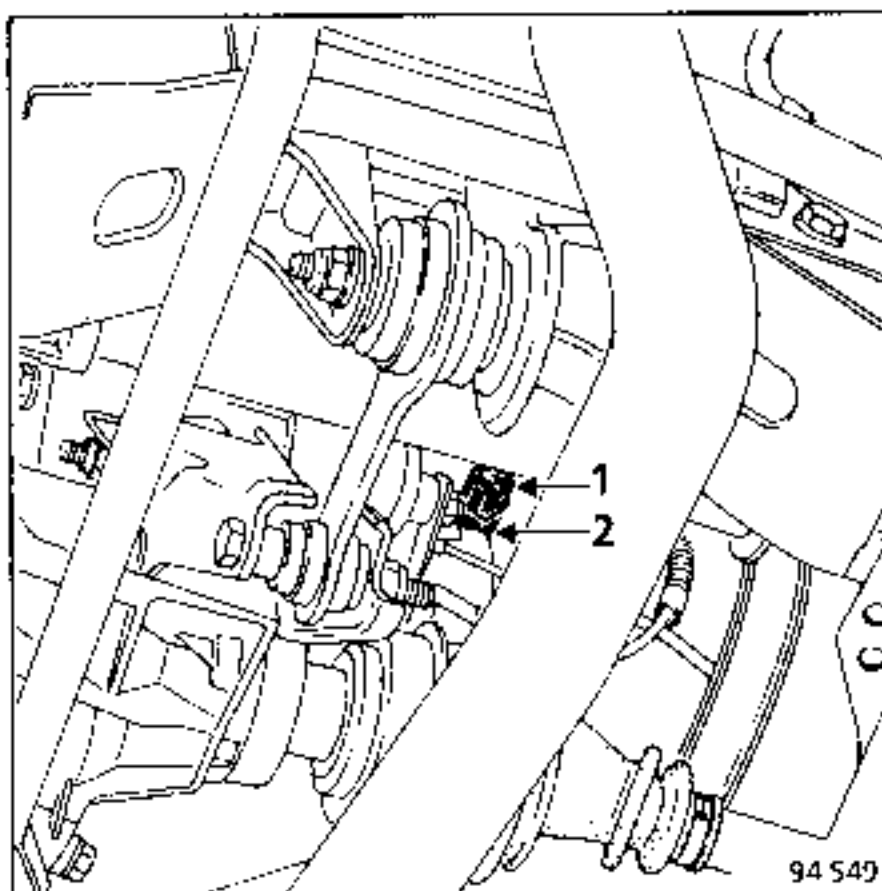


1. Supply or locking relay
2. Fuel pump relay (large wire)

### REPLACING

The sensor is located on the engine block between N° 2 and N° 3 cylinders, under the intake manifold.

Disconnect connector (1) and unscrew pinking sensor (2).



On reassembly :

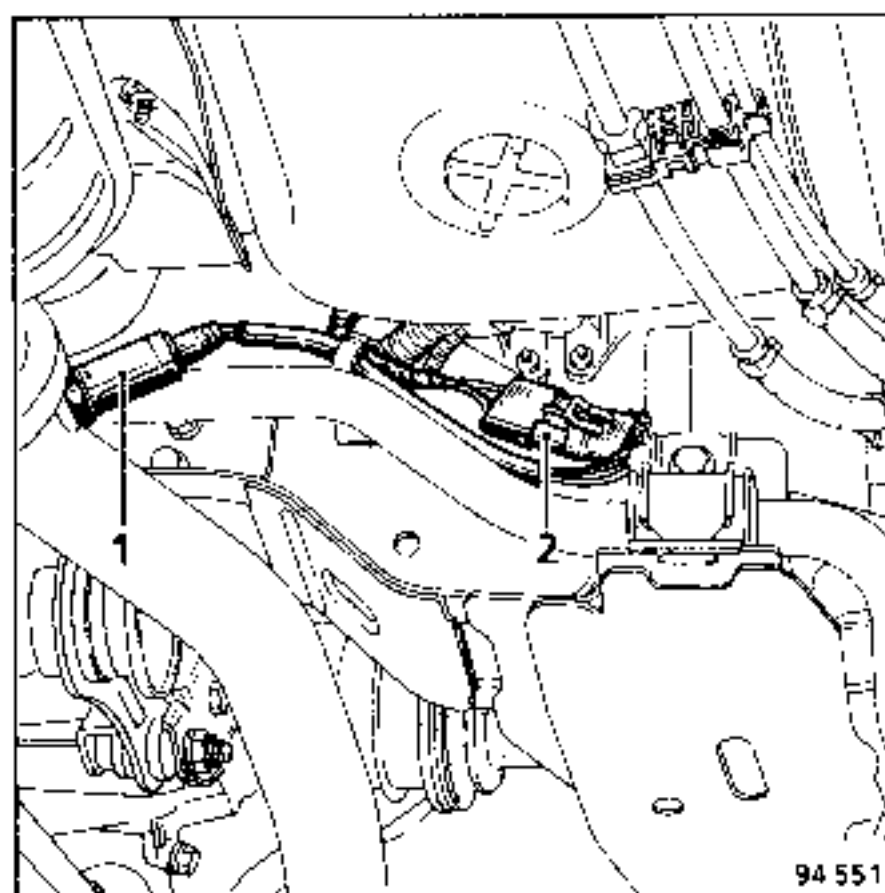
Ensure that the connector is correctly refitted and locked in place.

### REPLACING

#### Removal :

Disconnect connector (2) from the wiring harness.

Unscrew the oxygen sensor (1) from its mounting at the catalytic converter inlet and clean the threads.



- 1 - Oxygen sensor.
- 2 - Connector.

#### Refitting:

Only use anti-seizing grease (high temperature) on the oxygen sensor threads

Screw in the oxygen sensor by hand.

Tighten to 2,7 to 3,4 daN.m.

Reconnect the wiring harness connector.

#### NOTE:

The oxygen sensor leads cannot be joined or soldered. If these leads break, the sensor must be replaced.

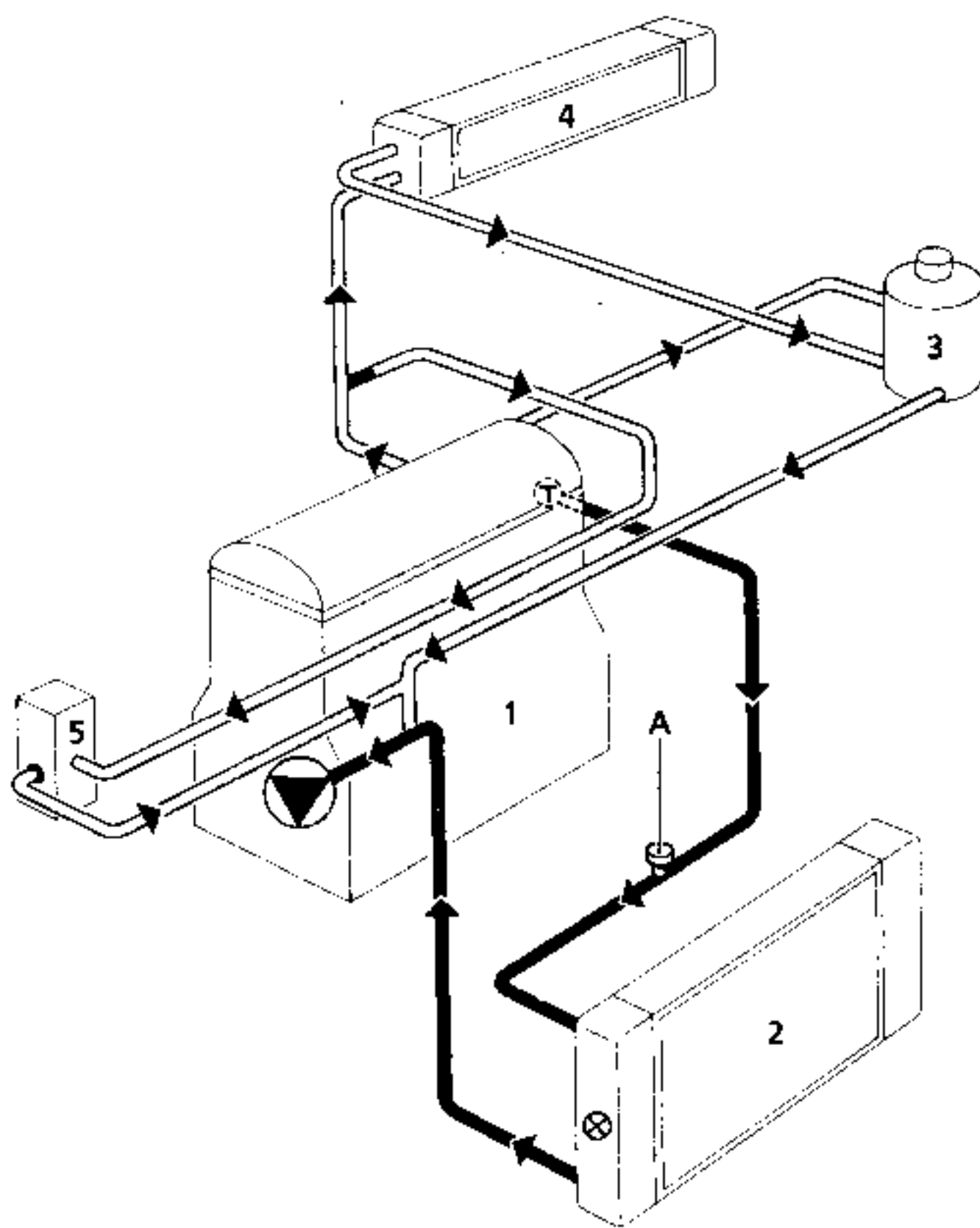
### ANTIFREEZE CAPACITIES AND GRADE

Engine	Capacity (in litres)	Grade	Special Points
C1E E6J F8M F8Q E7J C1G C3J	4,8 5 6,8 7,2 5 4,8 4,8	GLACEOL AL (type C) only use coolant	Protection down to - 23° C for hot, cold and temperate climates Protection down to - 40° C for extremely cold climates

### SINGLE ACTION THERMOSTAT





Engine type	Starts to open (at °C)	Fully open (at °C)	Travel (in mm)
C3J - C1E - C1G	83	95	7,5
E7J - E6J	86	98	7,5
F8M F8Q	82	94	7,5

## F8M ENGINE



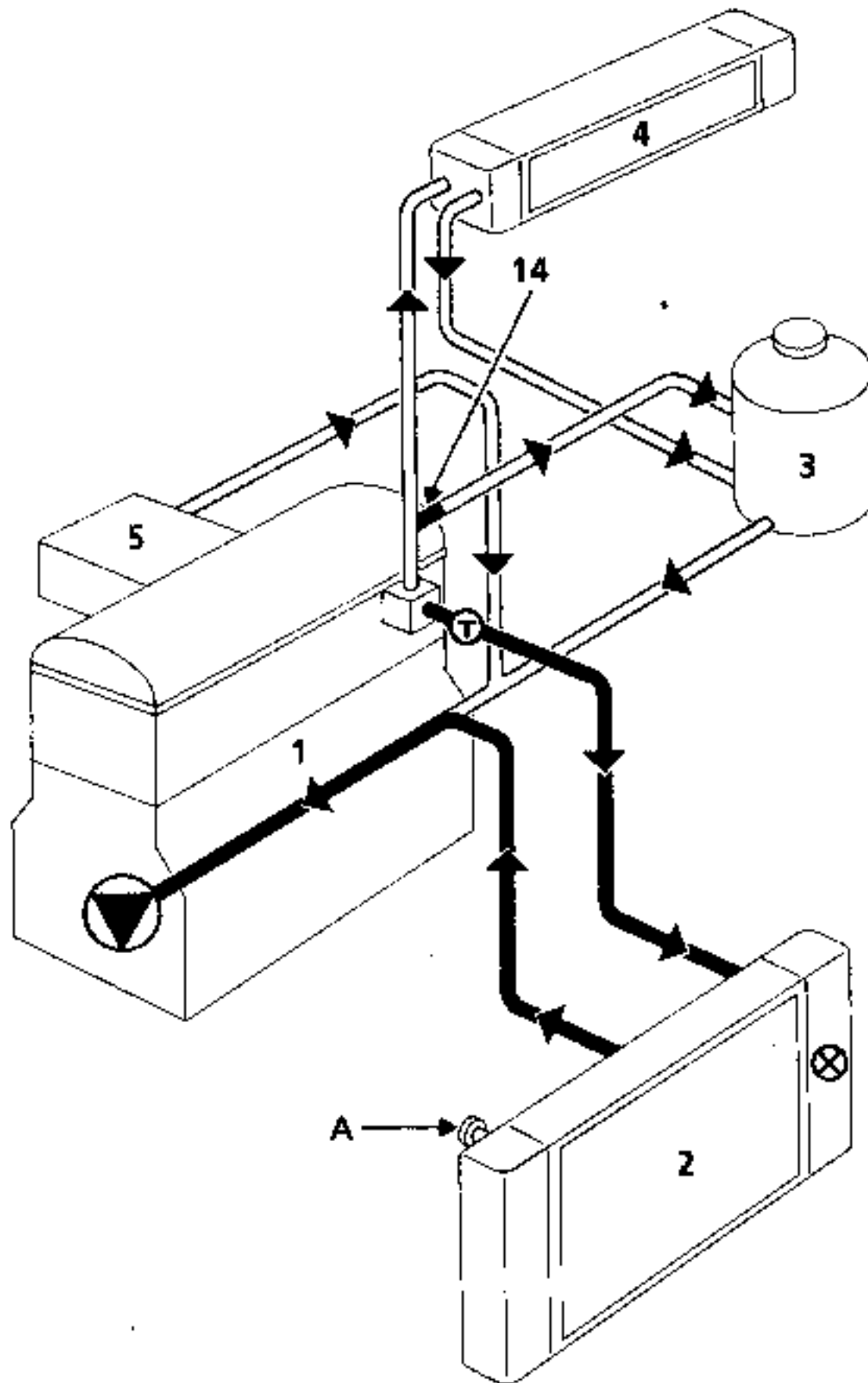
94 896

- 1. Engine
- 2. Radiator
- 3. "Hot type" expansion chamber with permanent defuming
- 4. Heater matrix
- 5. Diesel fuel reheater

-  : Coolant pump
-  : Thermostat
-  : Bleed screw (A)
-  : Thermal switch





The expansion bottle valve is brown and calibrated at 1.2 bar

## E TYPE ENGINE



92 397

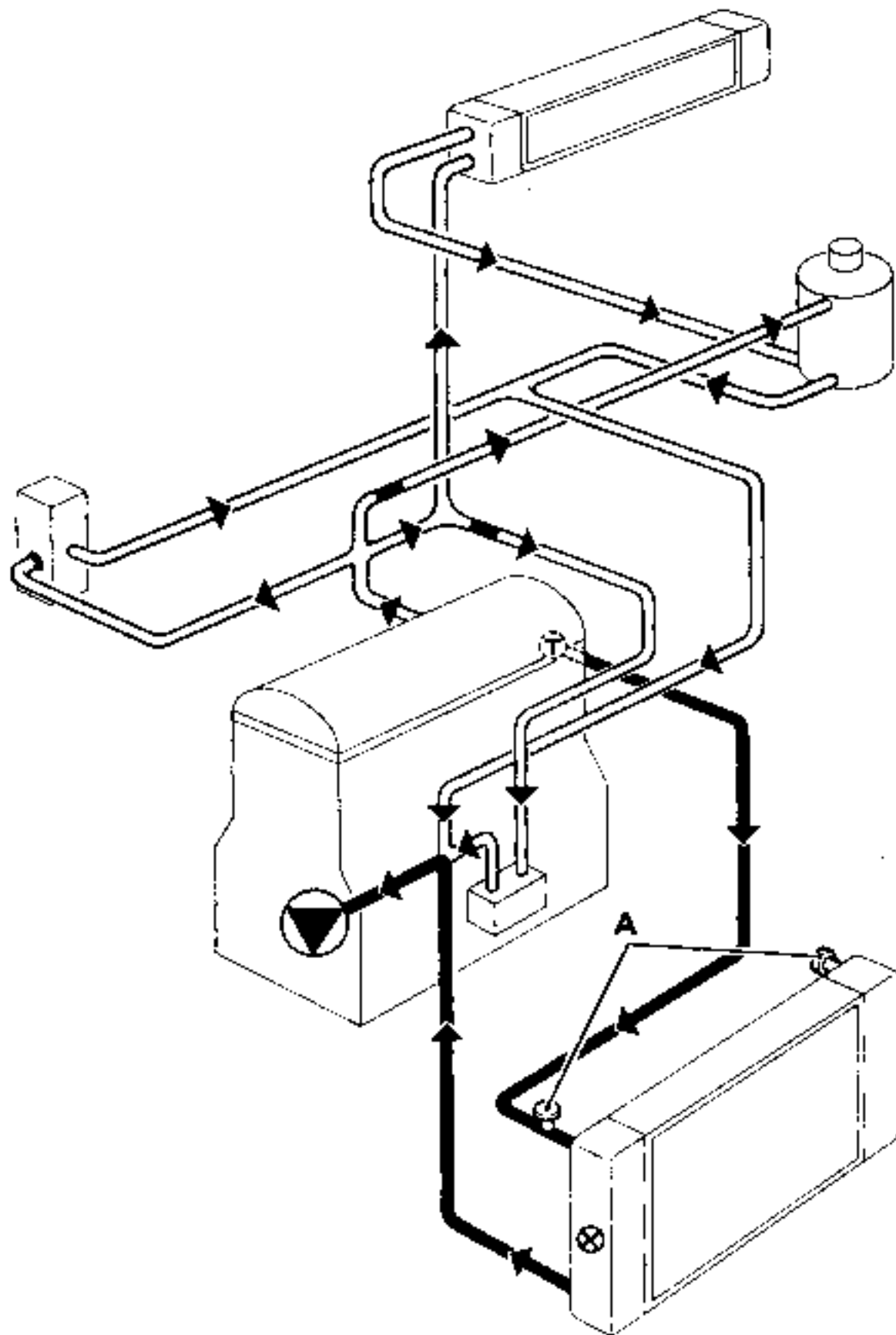
- 1. Engine
- 2. Radiator
- 3. "Hot type" expansion chamber with permanent defuming
- 4. Heater matrix
- 5. Manifold
- 14. 3 mm dia. restrictor

-  : Coolant pump
-  : Thermostat
-  : Bleed valve (A)
-  : Thermal switch

The expansion bottle valve is brown and calibrated at 1.2 bar.



## F8Q ENGINE



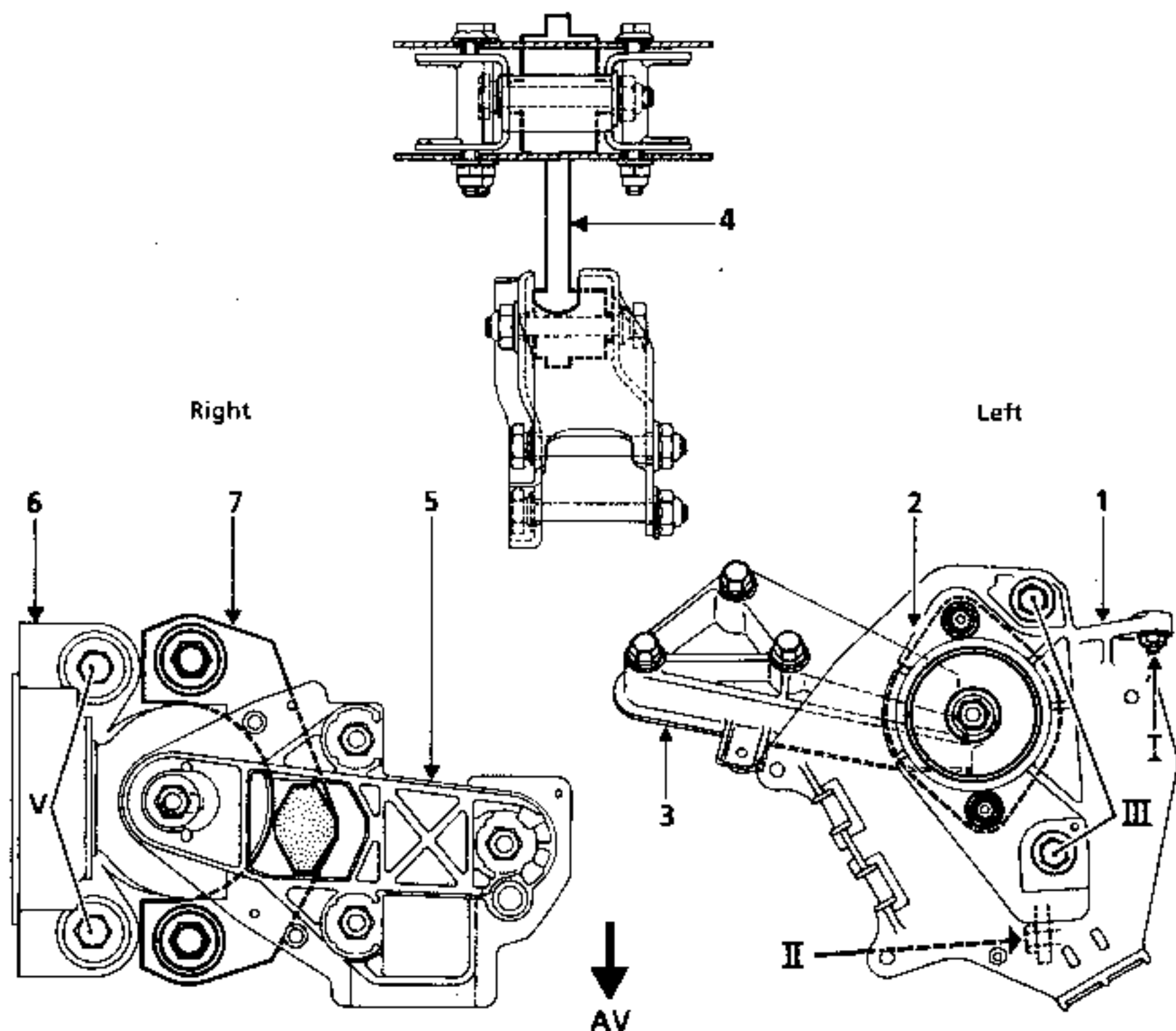
94 897

1. Engine
2. Radiator
3. "Hot type" expansion chamber with permanent defuming
4. Heater matrix
5. Diesel fuel reheater
6. Oil to water heat exchanger
14. 3 mm dia. restrictor
15. 10 mm dia. restrictor

- |  |                   |
|--|-------------------|
|  | : Coolant pump    |
|  | : Thermostat      |
|  | : Bleed screw (A) |
|  | : Thermal switch  |

The expansion bottle valve is brown and calibrated at 1.2 bar.

## DESCRIPTION



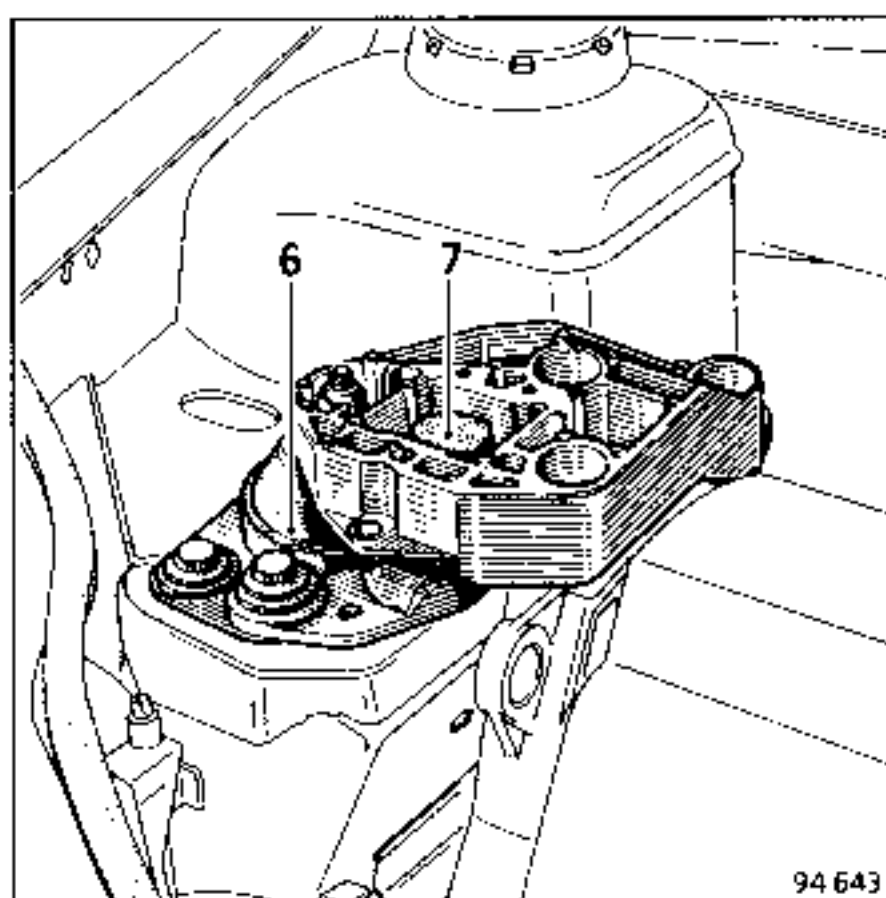
93 838-1 - 93 839 - 93 840

- 1 - Battery mounting secured to front left-hand side member.
- 2 - Left-hand rubber pad secured to pad mounting and gearbox mounting.
- 3 - Gearbox mounting.
- 4 - Torque take-up arm.
- 5 - Hanging suspension top
- 6 - Right-hand rubber pad (see detailed description).
- 7 - Movement limiter (longitudinal direction).

## COMPOSITION

The engine is suspended on two hydro-elastic pads (2 and 6). Torque is taken up in a longitudinal direction.

- at the bottom of the engine - gearbox assembly by the torque take-up arm (4),
- at the top of the engine - gearbox assembly by the movement limiter (7).



- 6 - Right-hand rubber pad  
7 - Movement limiter (longitudinal direction)

The position of the engine - gearbox assembly in the engine compartment is defined by the precise position of the rubber pads.

This means that certain precautions have to be taken when performing work which requires:

- the engine - gearbox assembly to be dismantled,
- the mountings or rubber pads to be dismantled or replaced.

**Dismantling the engine and gearbox (without replacing the mountings or elastic pads).**

As the suspension is positioned using a jig in the factory, it is essential to mark the position of the mounting (6) (with a dot of paint or a punch mark) in relation to the shock absorber turret and the position of the left-hand pad (2) in relation to the pad mounting (1).

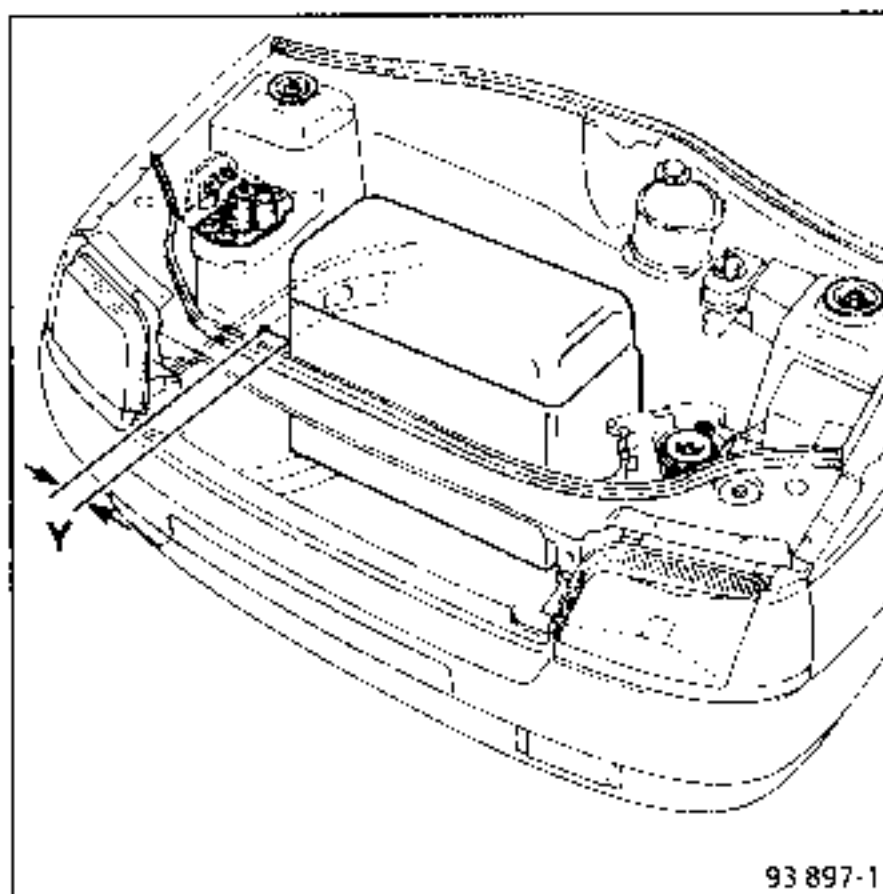
Markings are to be made longitudinally and transversely

**Method of repositioning the engine - gearbox assembly after altering the position of the mountings or rubber pads.**

- a) Reposition the engine - gearbox assembly in the engine compartment, and take up the weight with SEF 689 load spreader
- b) Reposition the pad mounting (1), pretighten the shock absorber turret nut (I) and lower pad mounting bolt (II) to 0.3 daN.m, tighten the two upper screws (III) to 2 daN.m, and then tighten the nut (I) and the bolt (II) to the same torque.
- c) Re-secure but do not tighten the mountings and pads (2, 3, 6).
- d) Ensure that there is a minimum clearance Y (depending on the engine) between the pulley and the side member lower cut-off edge near to the tie rod connecting the cradle and the body shell (T). This dimension does not take into account the thickness of the rule needed to take the measurement. (See diagram on page 19-7.)

Engines	Min. dimension Y (in mm)
E	48
E (DA)	32
F8Q	33 (27)*

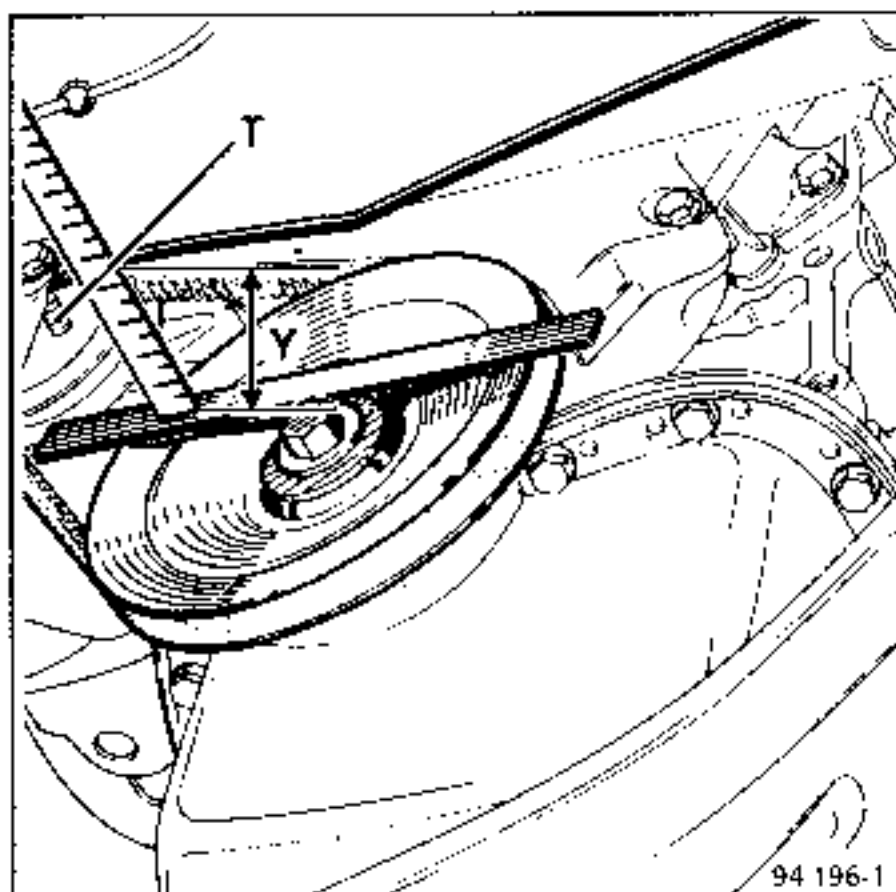
\* Dimension measured on the plastic timing gear case



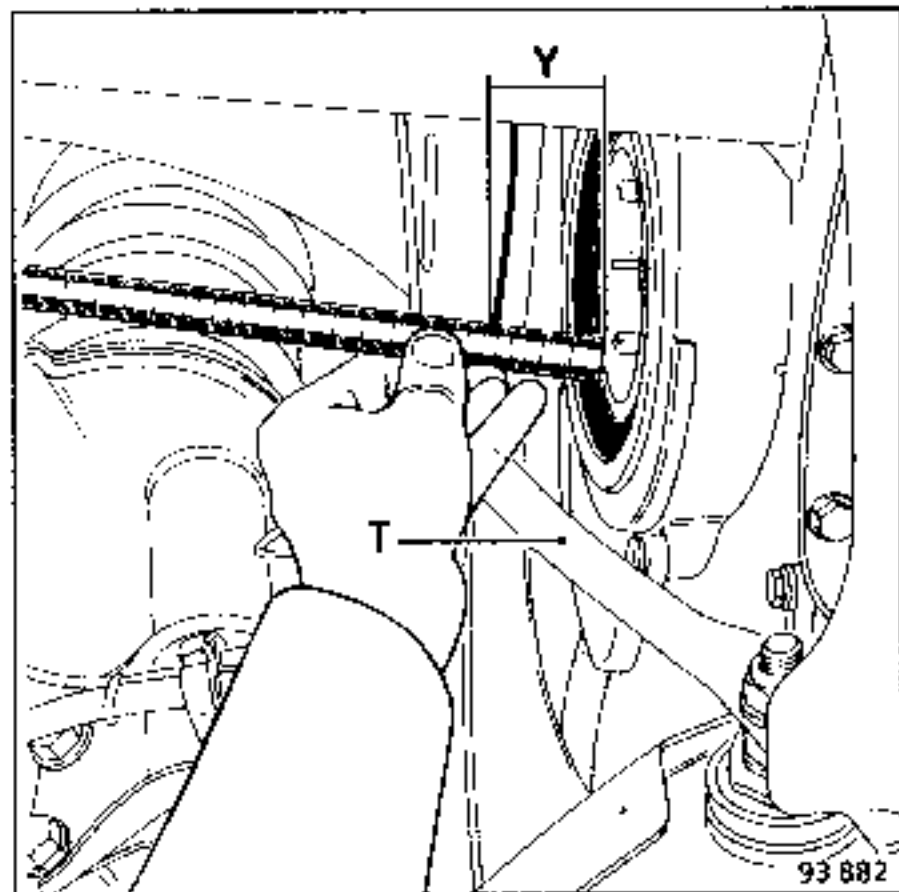
93 897-1

E Engine

F8Q Engine



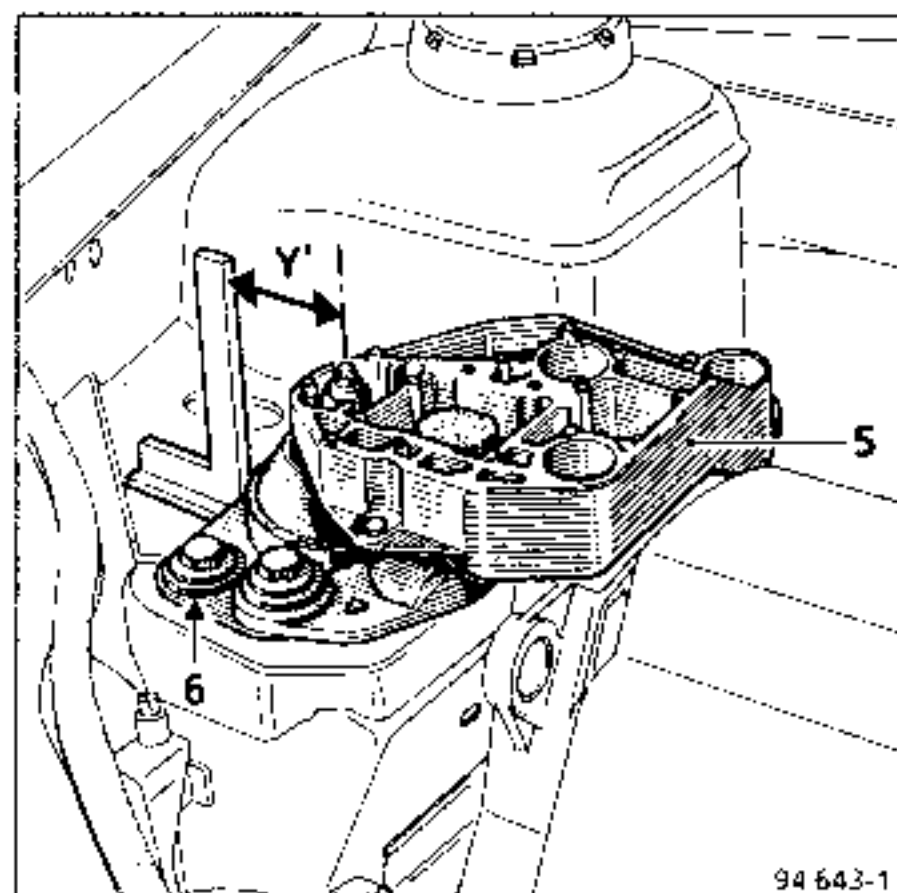
94 196-1



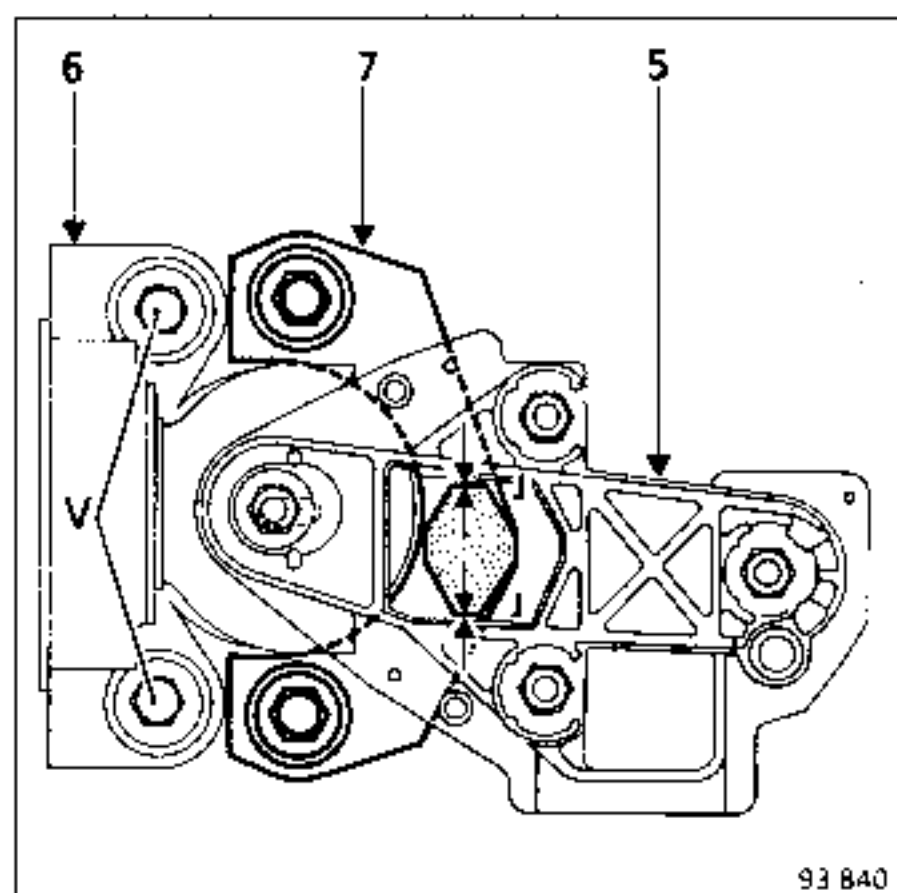
93 882

- Whilst keeping a minimum clearance of  $Y$ , centre the left-hand rubber pad longitudinally in relation to the centre of the pad mounting apertures (1).
- Torque tighten all the nuts and bolts on the mounting (3) and pad (2).
- Measure dimension  $Y'$  between the outer edge of the pad (6) and the centre of its pin. (The top (5) is not in position.)
- Fit the top (5) and torque tighten the 3 securing bolts on the cylinder head.
- With the pad (6) mounting bolts free, let the engine - gearbox assembly rest on its mountings
- Remeasure dimension  $Y'$ , set the same value recorded when the top (5) was not in position (pad at rest) by moving the pad (6).

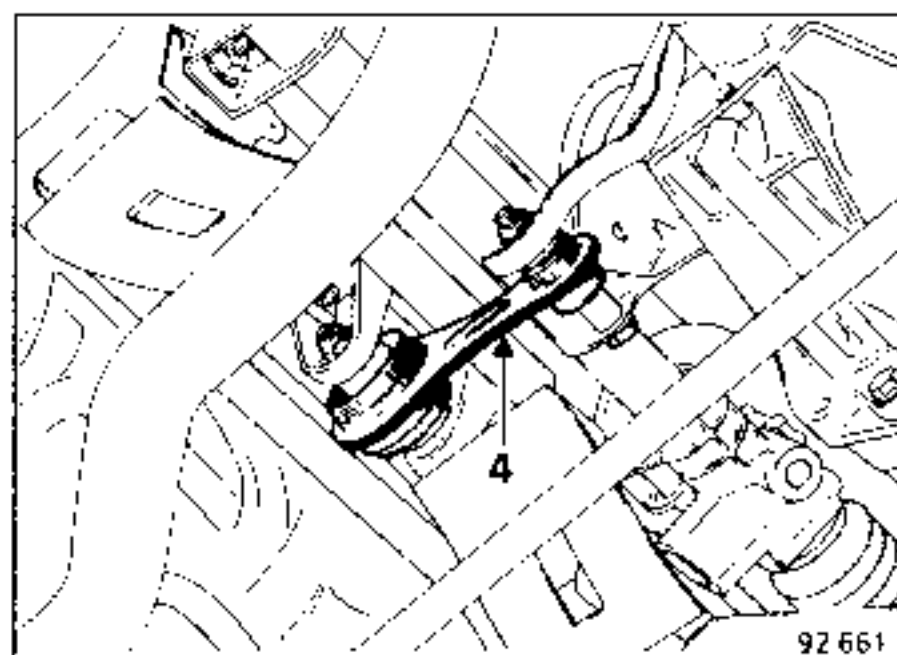
- k) Torque tighten the 2 bolts (V) securing the pad (6).
- l) Centre the clearance limiter (7) so that the same clearance (J) is obtained at each side in the gap in the cover (5) and torque tighten it.



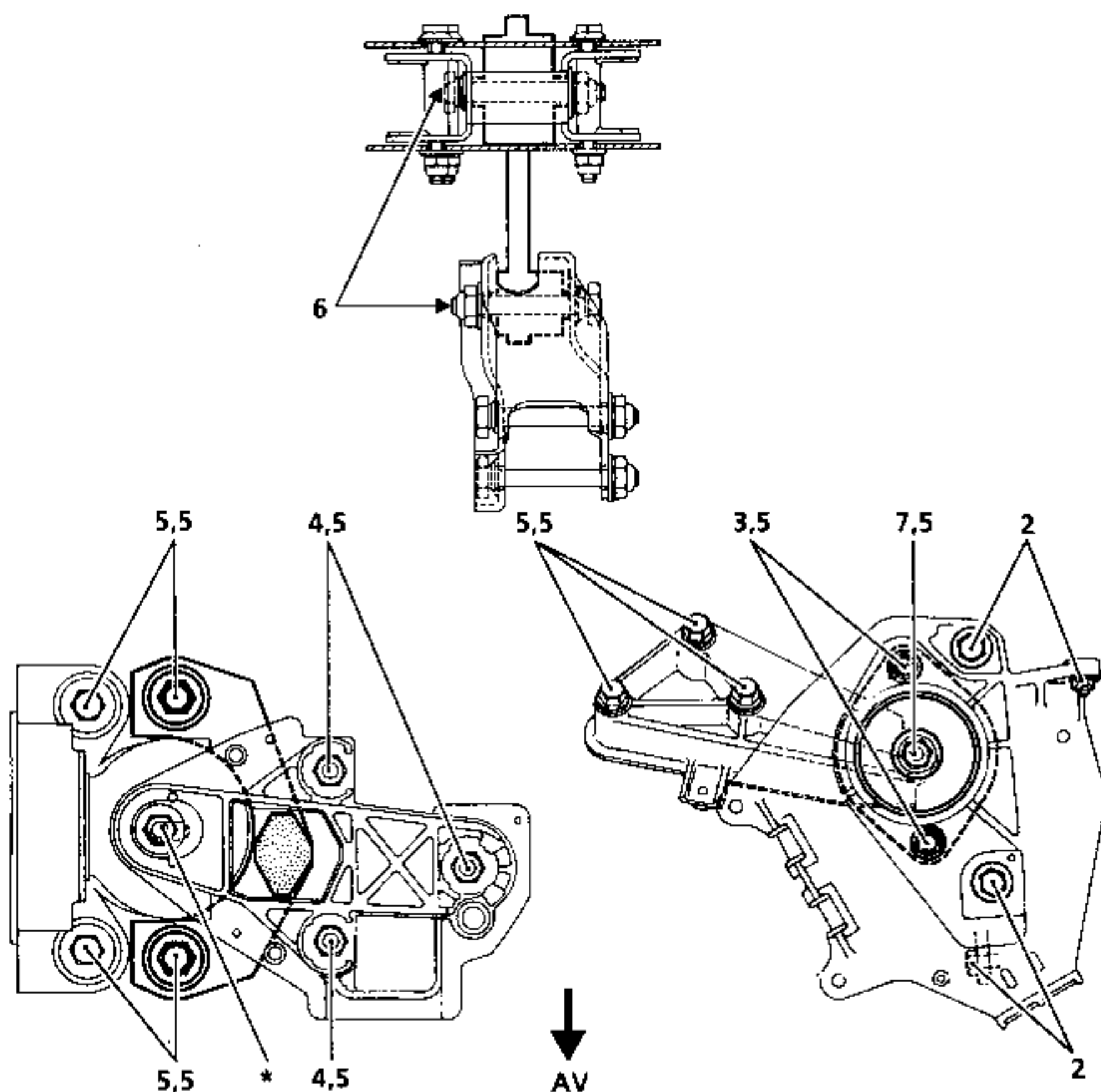
- m) Fit and torque tighten the bolts (4) on the arm.



- n) Check dimension Y' and readjust if necessary.



TIGHTENING TORQUES (In daN.m.) :  $\pm 15\%$



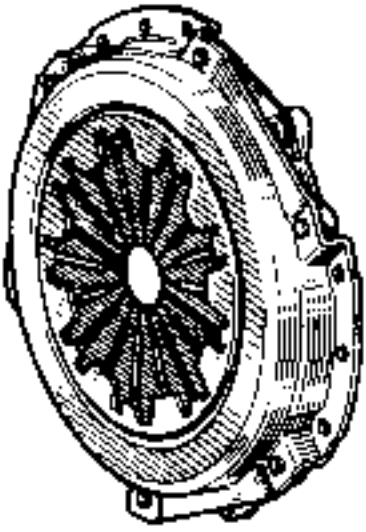
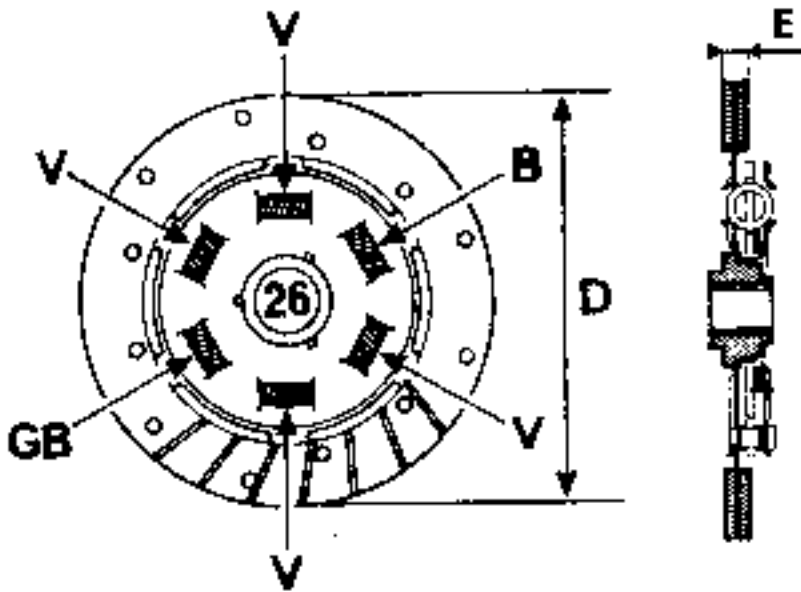
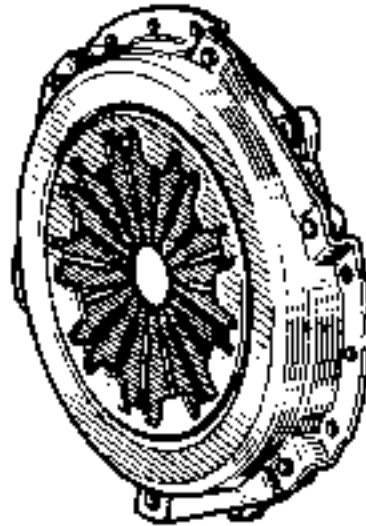
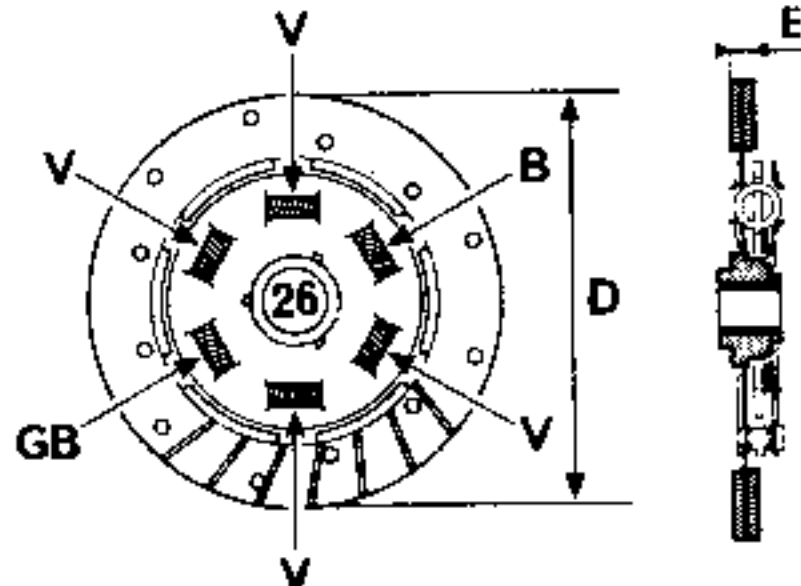
93 838-1 - 93 839 - 93 840

- \* Assembly with separate washer 24 mm dia.  $\Rightarrow$  4.5
- Assembly with captive washer 24 mm dia.  $\Rightarrow$  2.7
- Assembly with captive washer 27 mm dia.  $\Rightarrow$  4.5

AV = FRONT


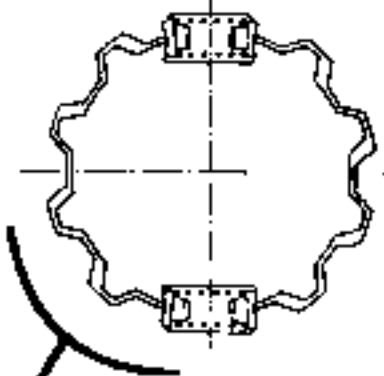
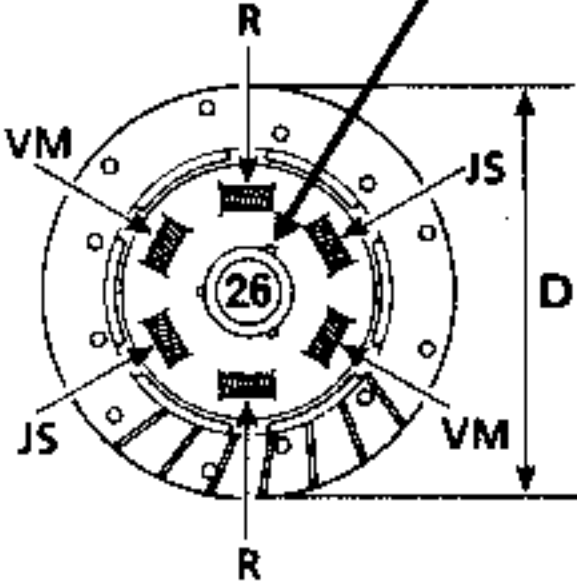


# CLUTCH Identification

20

Vehicle Type	Engine Type	Mechanism	Disc
F 40 I F 40 F F 40 T	C1E C1G C1E	 <p>85 873</p> <p>180 CP 2750</p>	 <p>90 693</p> <p>76 906</p> <p>26 splines    B = White E = 7.7 mm    GB = Bluish grey D = 181.5 mm    V = Green</p>
F 40 A F 40 Y F 40 U F 40 V F 407	E6J E6J E7J E7J C3J	 <p>85 873</p> <p>180 CP 3100</p>	 <p>90 693</p> <p>76 906</p> <p>26 splines    B = White E = 7.7 mm    GB = Bluish grey D = 181.5 mm    V = Green</p>

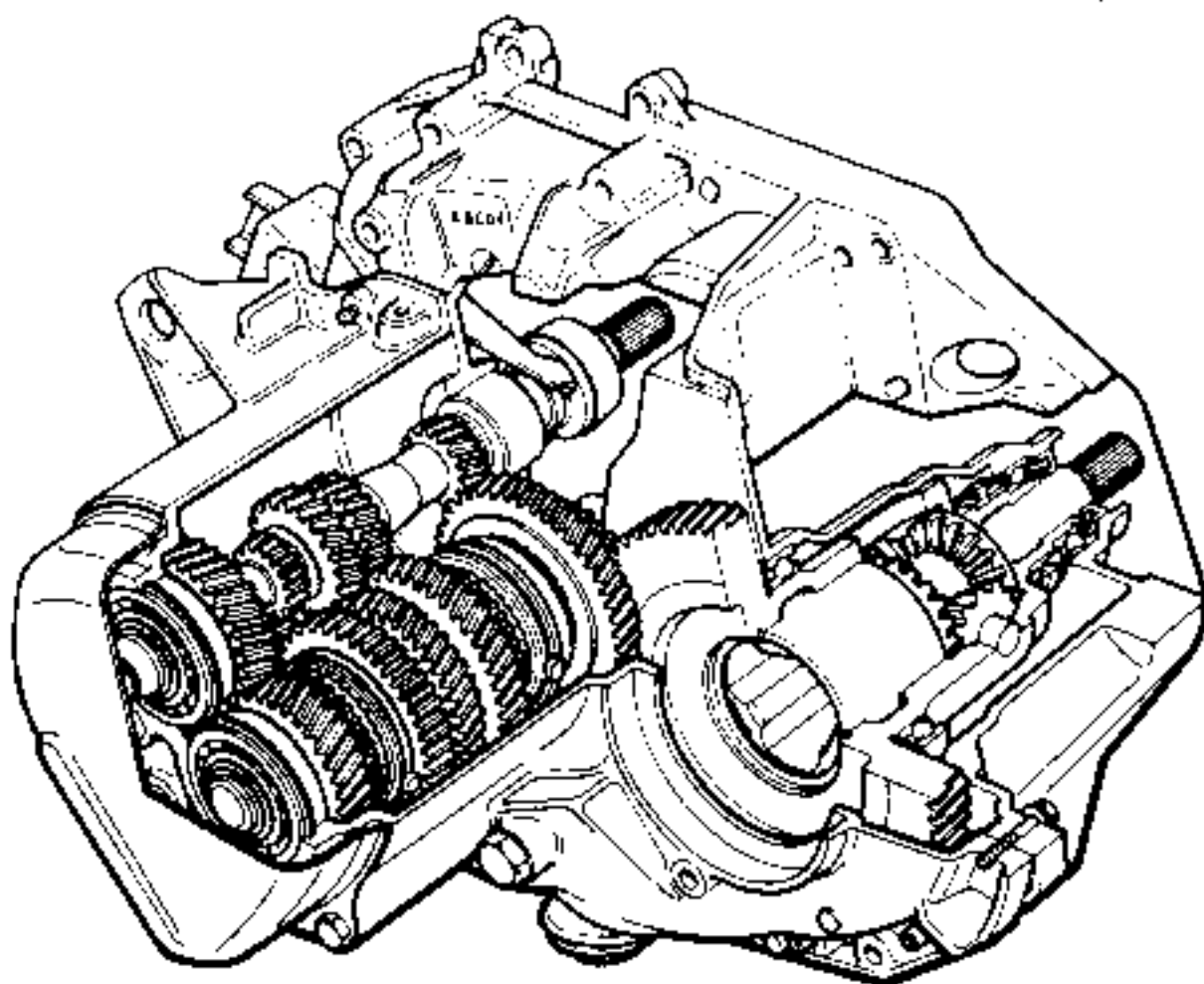
# CLUTCH Identification

20

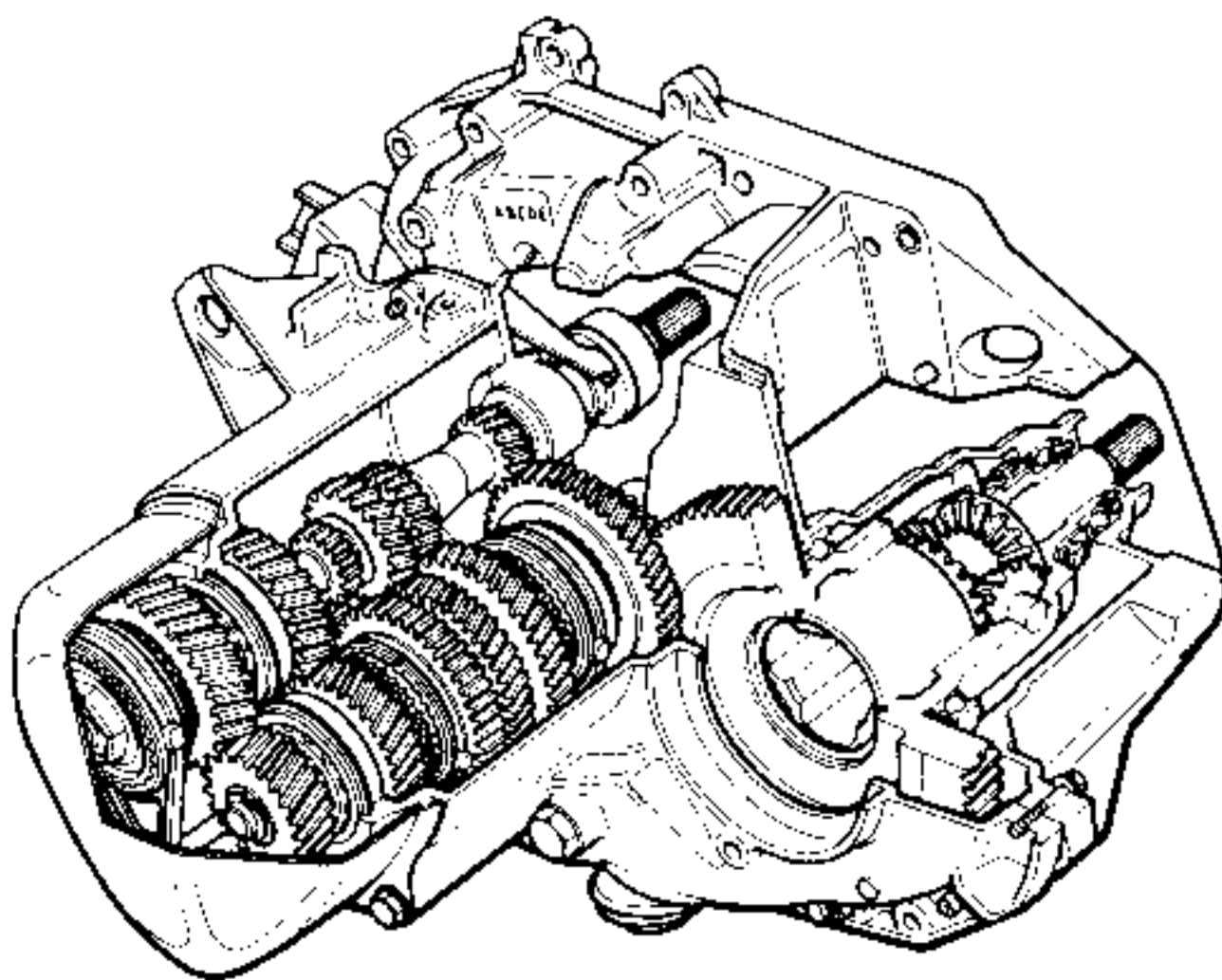
Vehicle Type	Engine Type	Mechanism	Disc
F 404	F8M	 <p>76 907</p> <p>200 CPV 3100</p>	<p>90 748</p>   
F 40 N F 40 P	F8Q	 <p>76 907</p> <p>200 CPV 3500</p>	<p>90 693</p> <p>76 906</p> <p>Special points : 2 additional springs on hub</p> <p>26 splines E = 7.7 mm D = 200 mm</p> <p>R = Red JS = Sand yellow VM = Moss green</p>



**JB0**

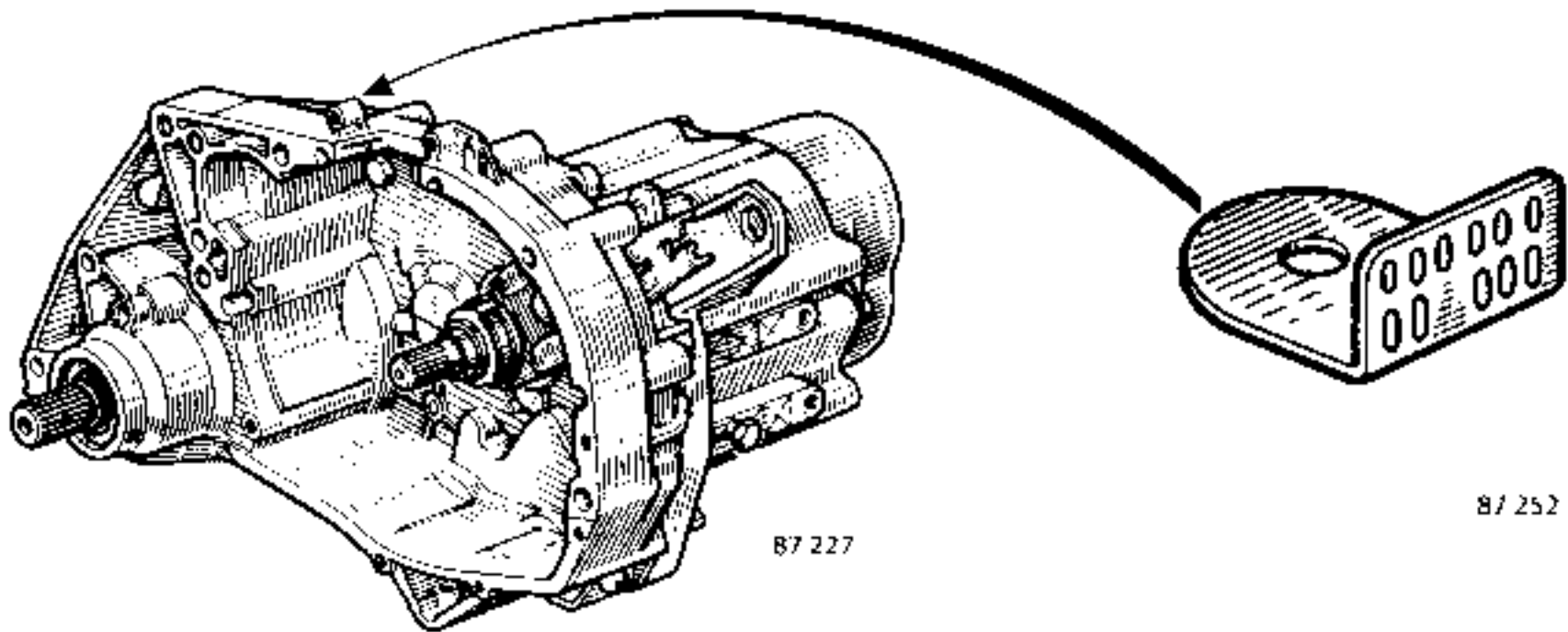


**JB1**  
**JB3**



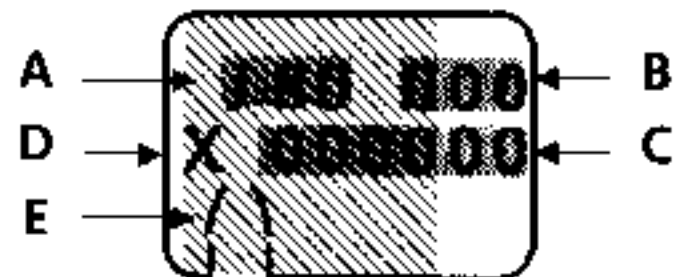
F 40 phase II vehicles are fitted with JB type gearboxes.

Workshop Repair Manual "B.V. JB" deals with the complete overhaul of this unit



An identification plate, located on the clutch housing, shows:

- At A : the type of gearbox
- At B : the gearbox suffix
- At C : the fabrication number
- At D : the factory of manufacture
- At E : a notch when the gearbox is assembled with C or E type engines



90 775

# MANUAL GEARBOX

## Gear Ratios

21

JB0								
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	Reverse
028	F 401 - F40 T	$\frac{15}{58}$	$\frac{21}{20}$	$\frac{11}{41}$	$\frac{21}{43}$	$\frac{28}{37}$	$\frac{31}{28}$	$\frac{11}{39}$ 26
033	F404		$\frac{21}{19}$					
035	F40 F	$\frac{15}{61}$	$\frac{21}{20}$					
036			$\frac{21}{19}$					
038	F404		$\frac{21}{19}$					

JB1									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
032	F404	$\frac{15}{61}$	$\frac{21}{19}$	$\frac{11}{41}$	$\frac{21}{43}$	$\frac{28}{37}$	$\frac{30}{29}$	$\frac{39}{31}$	$\frac{11}{39}$ 26
036	F401 - F40 T	$\frac{15}{61}$	$\frac{21}{20}$						
047	F40 F	$\frac{14}{63}$	$\frac{21}{19}$						
048	F40 A . U . V . Y		$\frac{21}{20}$						
049	F40 A								
050	F40 F								
051	F407	$\frac{14}{59}$	$\frac{21}{19}$						

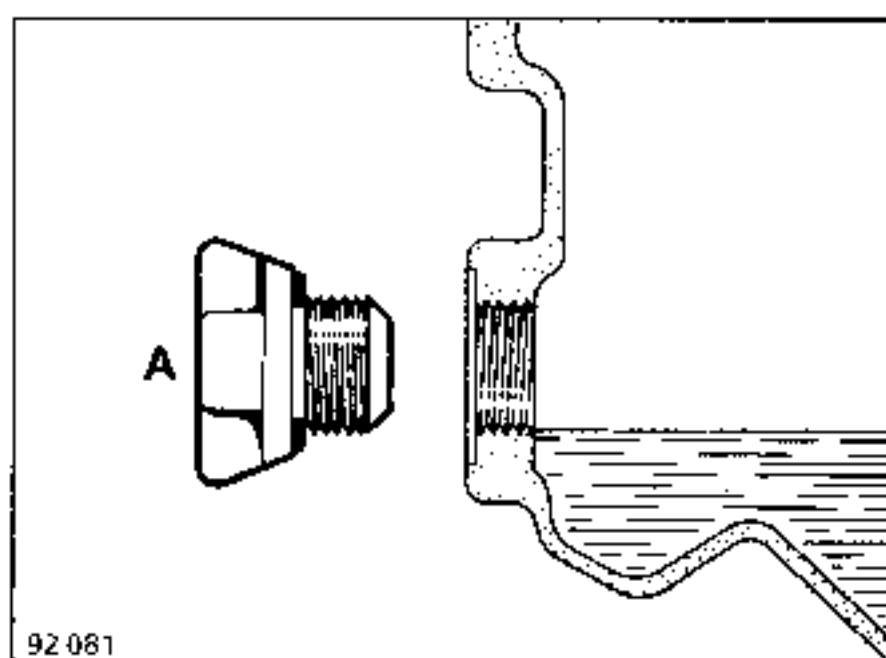
JB3									
Suffix	Vehicle	Final drive	Speedo drive	1st	2nd	3rd	4th	5th	Reverse
050	F40 N F40 P	$\frac{15}{58}$	$\frac{21}{19}$	$\frac{11}{41}$	$\frac{21}{43}$	$\frac{28}{37}$	$\frac{30}{29}$	$\frac{39}{31}$	$\frac{11}{39}$ 26

## CAPACITY (in litres)

4-speed gearbox		5-speed gearbox	
JB0	3,25	JB1 JB3	3,40

Vehicle	1st oil change	Oil change frequency	Check level	Viscosity grade
Petrol	None	None	1st inspection, then every 12 000 miles (20 000 km)	TRANSELF TRX 80 W*
Diesel			1st inspection, then every 9 000 miles (15 000 km)	

## CHECKING THE OIL LEVEL



Fill until the oil is level with the aperture.

\* If any difficulties are experienced in obtaining this oil locally, it may be ordered from the Parts Department under the following part number: 77 01 422 306 (5 litre drum).

## SPECIAL PRECAUTIONS

**"TRANSELF TRX 80 W"** oil is an advanced technology product and certain precautions must be taken to prevent it coming into contact with water, as even a very small amount of water can cause the oil to deteriorate and lead to problems with the gearbox.

If the oil in the gearbox needs topping up, do not mix any other oil with TRX oil.

## STORAGE AND USE

Whenever a drum has been opened for use, special care must be taken with regard to its airtightness in order to prevent foreign bodies or water from getting into the oil.

In particular :

- 1) It is absolutely essential that the drums are stored in a place where they are sheltered from bad weather and other moisture (rain, snow, splashed water), and in a horizontal position.
- 2) If a sample of oil is taken with a syringe, the drum must be closed after use.
- 3) Do not place the drums near to where vehicles are washed.
- 4) Do not decant oil into larger containers

## PRESSURE WASHING

- 1) On the vehicle :

Seal the air breather hole on the gearbox.

- 2) With gearbox removed :

It is absolutely essential to seal all the openings correctly to prevent water getting into the gearbox.

The following gearbox types:

**JB0**     4 forward gears  
          1 reverse gear

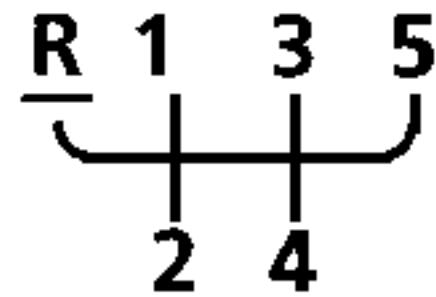
**JB1** { 5 forward gears  
**JB3** { 1 reverse gear

are equipped with **BORG-WARNER** synchronizers.

### Special features of JB3 gearboxes

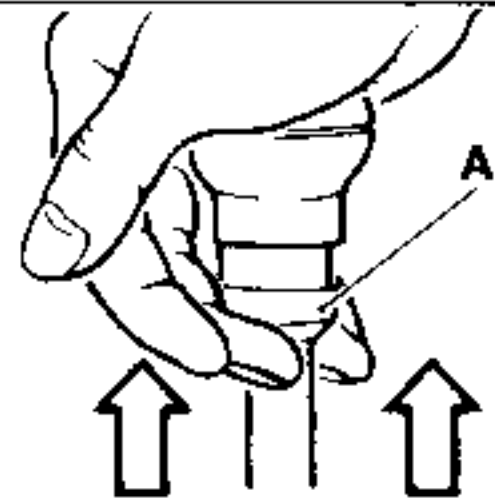
The differential is mounted on tapered roller bearings instead of ball bearings.

### GEAR CHANGE PATTERN



B.V.JB

To select reverse, raise release (A) and move the lever.



Type	Packaging	Part No.	Used for:
<b>MOLYKOTE BR2</b>	1 kg tin	77 01 421 145	Right-hand sun wheel splines Fork pivot Thrust pad guide Fork pads <div> <span>}</span> Clutch                 </div>
<b>Loctite 518</b>	24 ml syringe	77 01 421 162	Casing assembly faces
<b>CAF 4/60 THIXO</b>	100 g tube	77 01 404 452	Threaded plugs and switches Ball plugs Drive shaft roll pin ends
<b>Loctite FRENBLOC</b> (locking and sealing resin)	24 cc bottle	77 01 394 071	Primary and secondary shaft nuts 5th speed fixed gear and hub Dog clutch drive

### Parts to be replaced systematically

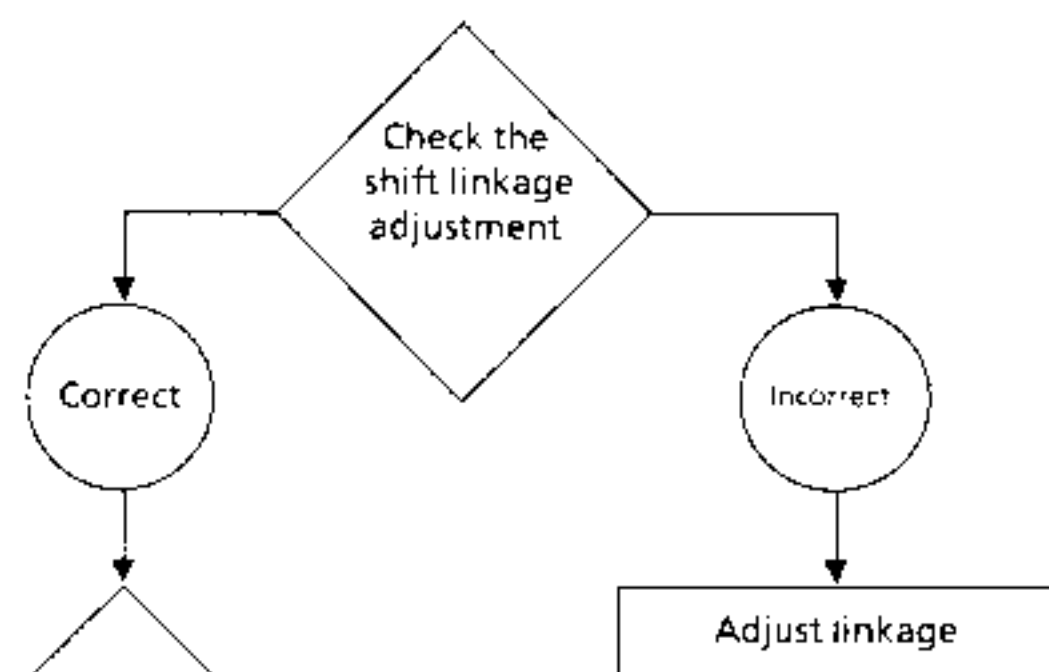
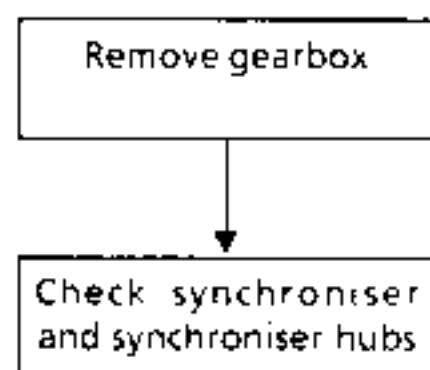
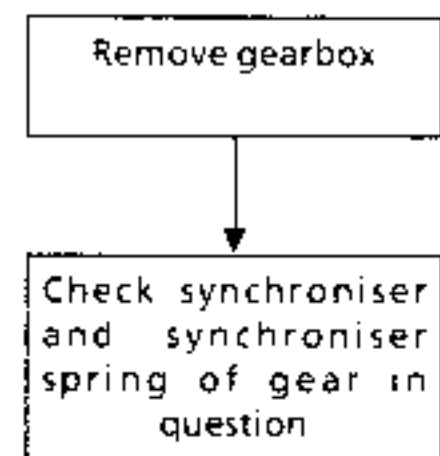
When they have been removed:

- lip type seals,
- roll pins,
- O ring seals,
- thrust pad guide tube,
- primary and secondary shaft nuts,
- speedometer pinion.

Grating on any single gear selection

Grating when each gear is engaged (after first checking clutch)

Impossible to engage gears (after first checking the clutch)



### KEY

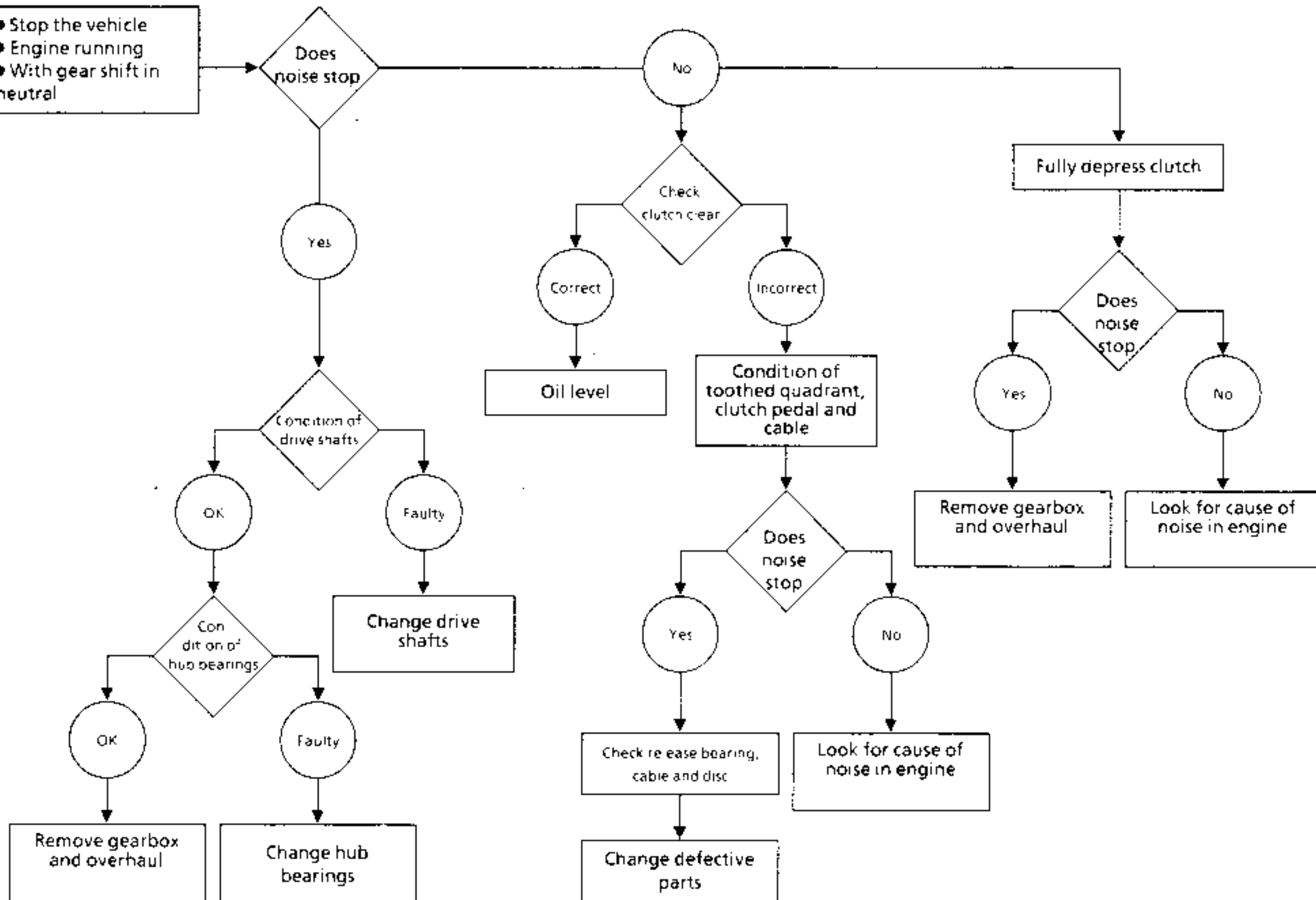
Operations to be carried out

Inspection



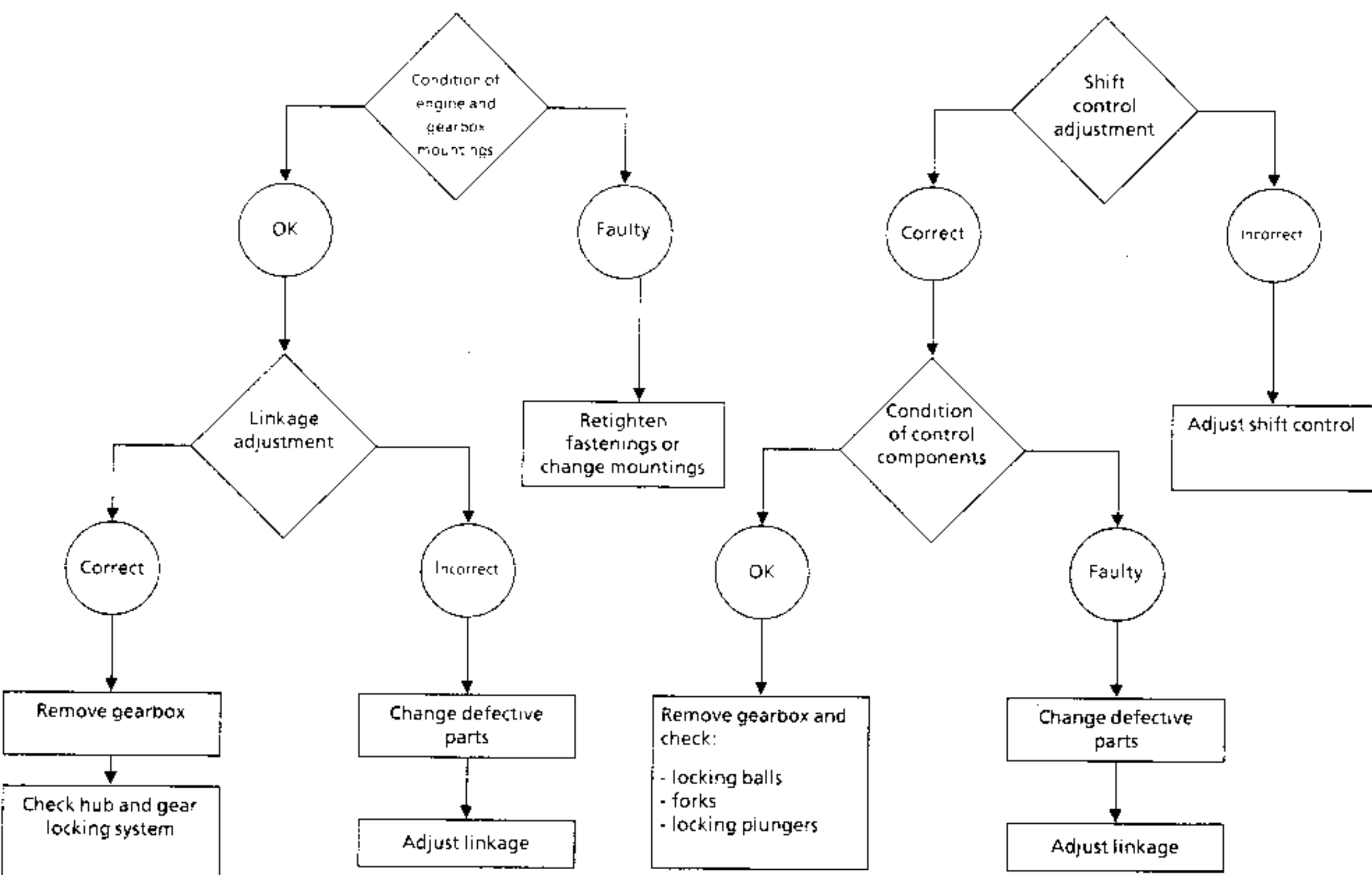
## Abnormal noises when vehicle is being driven

- Stop the vehicle
- Engine running
- With gear shift in neutral



## Slipping out of gear

## Locking in gear



On C and E type engines the gearbox may be removed alone.

ESSENTIAL SPECIAL TOOLS	
B.Vi. 31-01	Set of drifts
T.Av. 476	Ball joint extractor
SEF 689	Load spreader

### TIGHTENING TORQUES (In daN.m)



Hanging suspension rear arm bolts (E Engine)	6,5
Bolts securing battery mounting to side member (E engine)	2
Drive shaft bellows securing screws	2,5
Bolts securing mounting to gearbox	3,5
Brake caliper mounting bolts	10
Shock absorber base mounting bolts	11
Steering ball joint nut	3,5
Nut securing key to stub-axle carrier	5,5
Mounting securing bolts	4 to 5
Wheel bolts	9

### REMOVAL

Place the vehicle on a lift or stand.

Disconnect the battery.

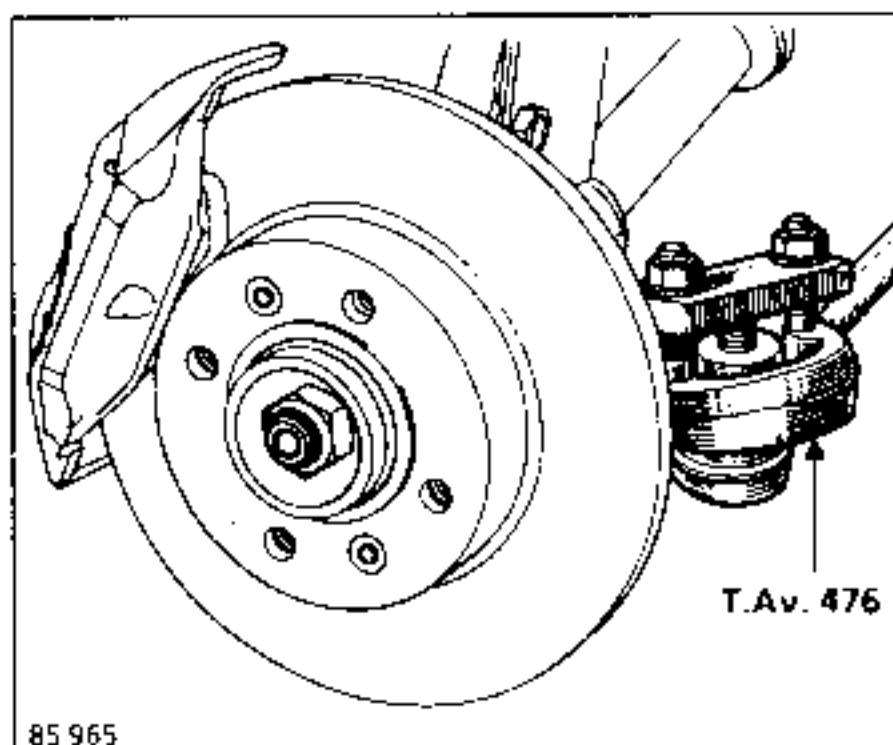
Remove the bonnet.

Remove the front wheels.

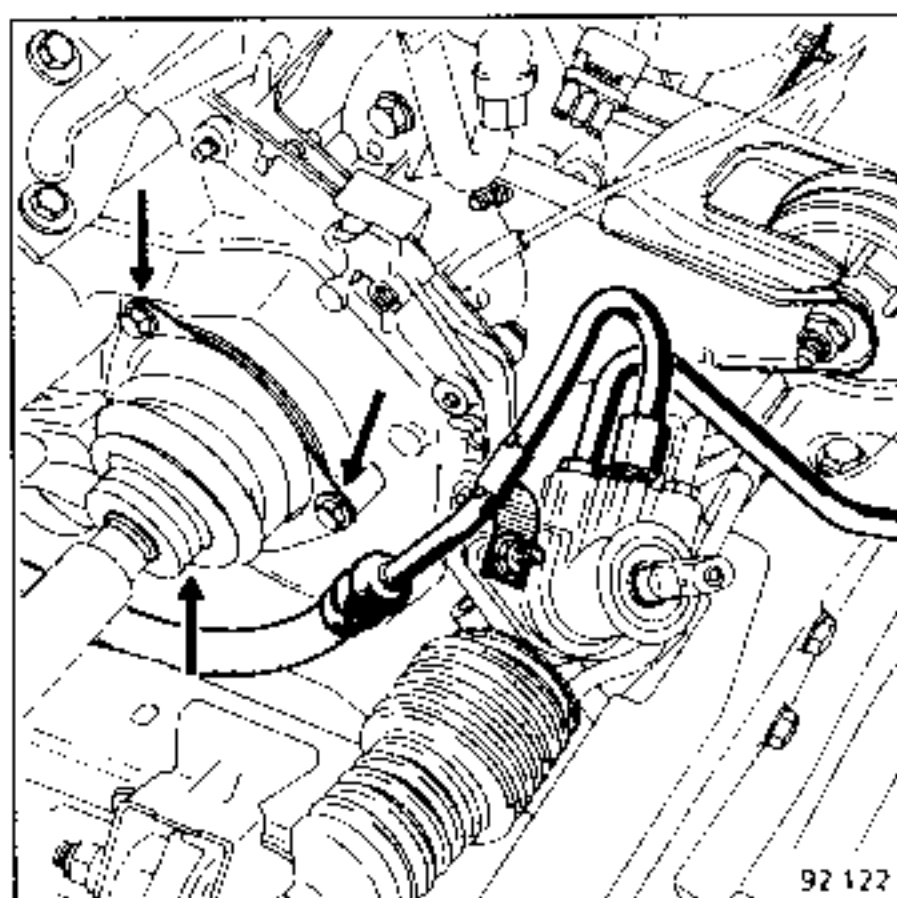
Drain the oil from the gearbox.

On left-hand side of vehicle, remove:

- the steering arm ball joint using tool T.Av. 476,



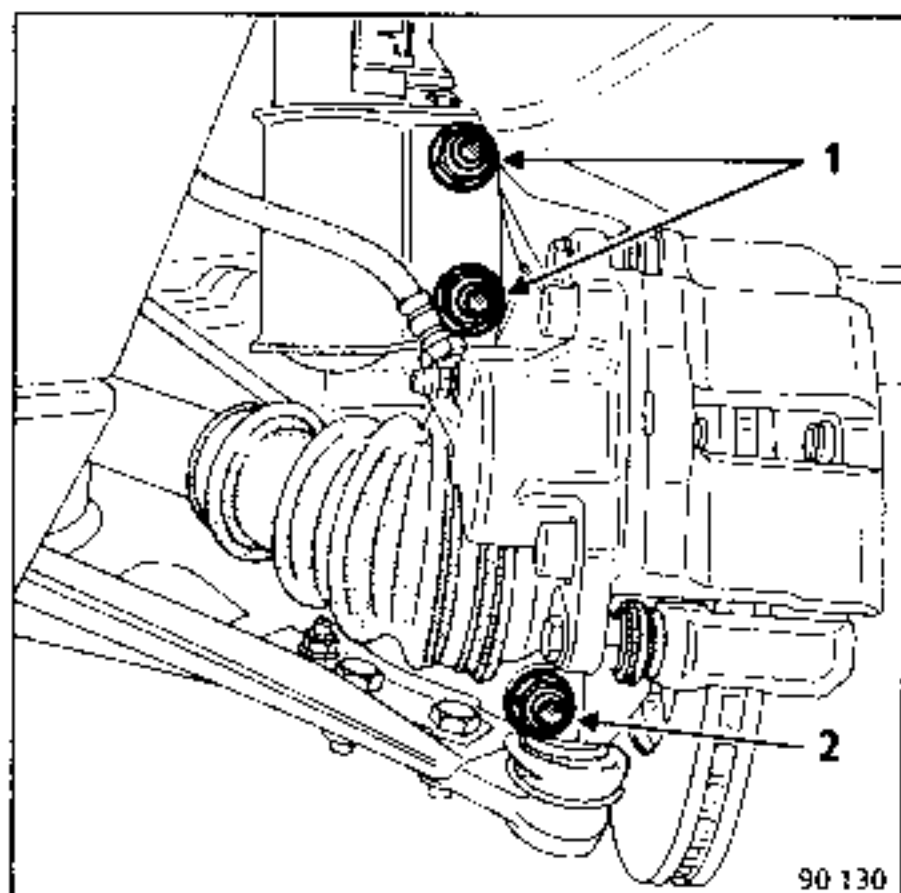
- the three bolts securing the drive shaft bellows,



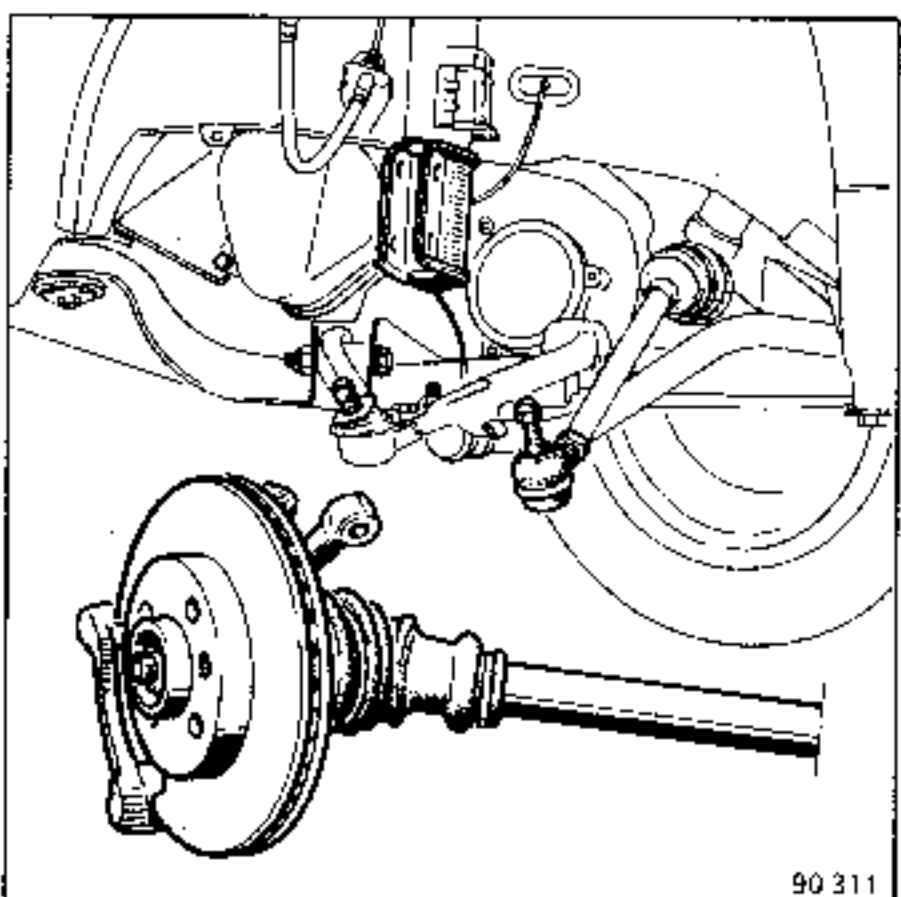
- the two bolts securing the caliper. (Secure the caliper to the suspension spring to prevent pulling on the hose.)

### Remove :

- the two bolts (1) securing the bottom of the shock absorber,
- the nut and the key (2),

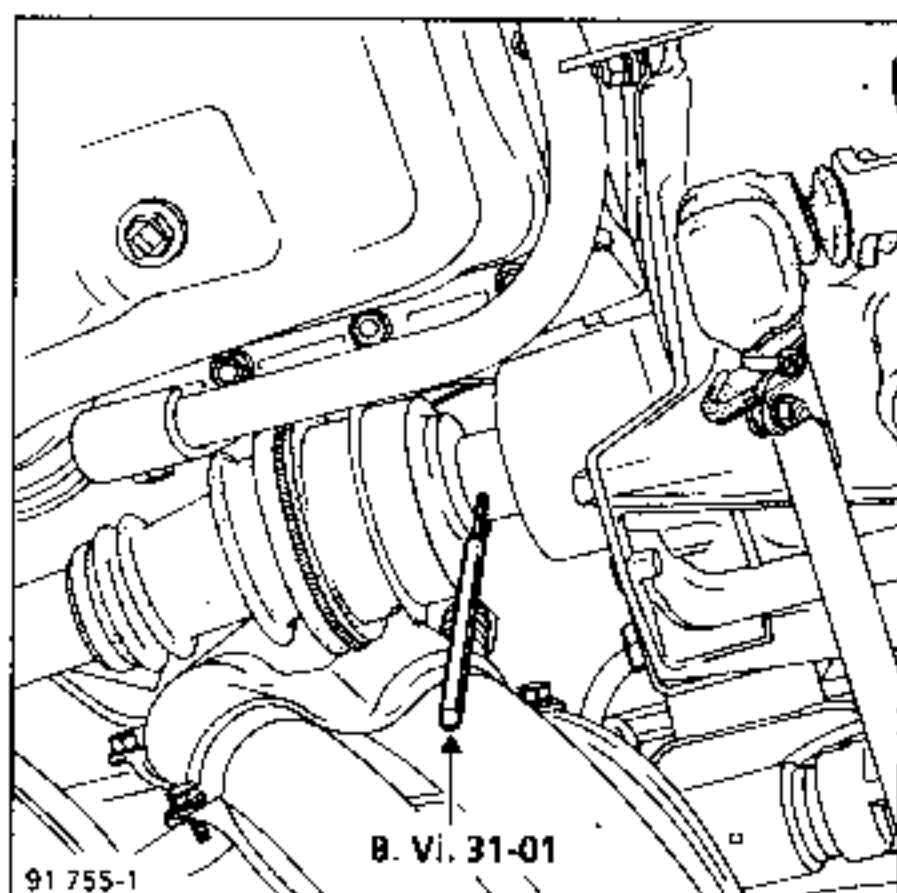


- the stub axle carrier - drive shaft assembly at the lower ball joint

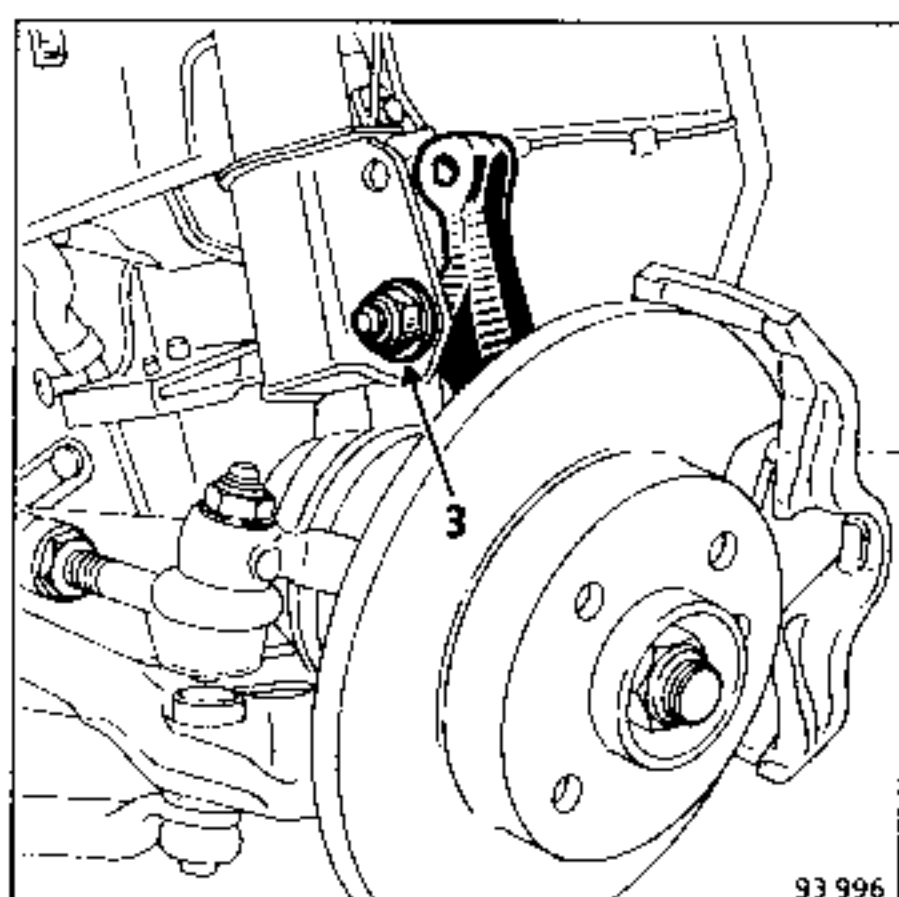


Check that the drive shaft rollers do not come out by hand. If they do, on refitting check that the needles have not fallen into the gearbox.

On the right-hand side of the vehicle, remove the drive shaft roll pins using tool B. Vi. 31-01.

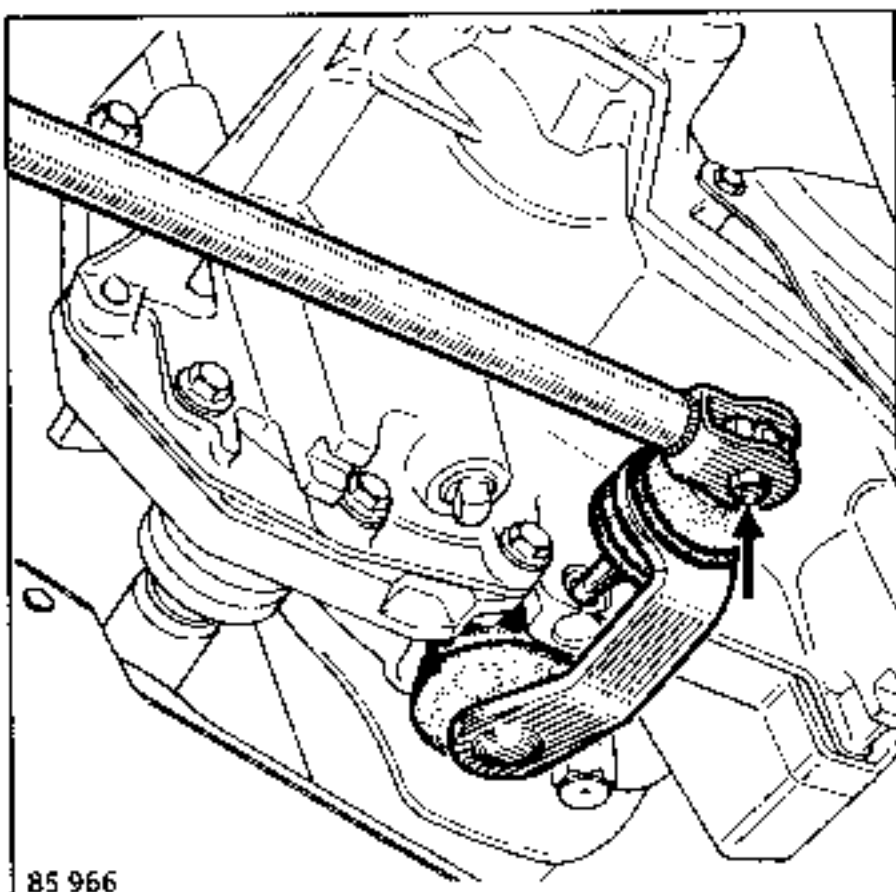


Slacken the lower bolt (3) on the shock absorber base and remove the upper bolt.



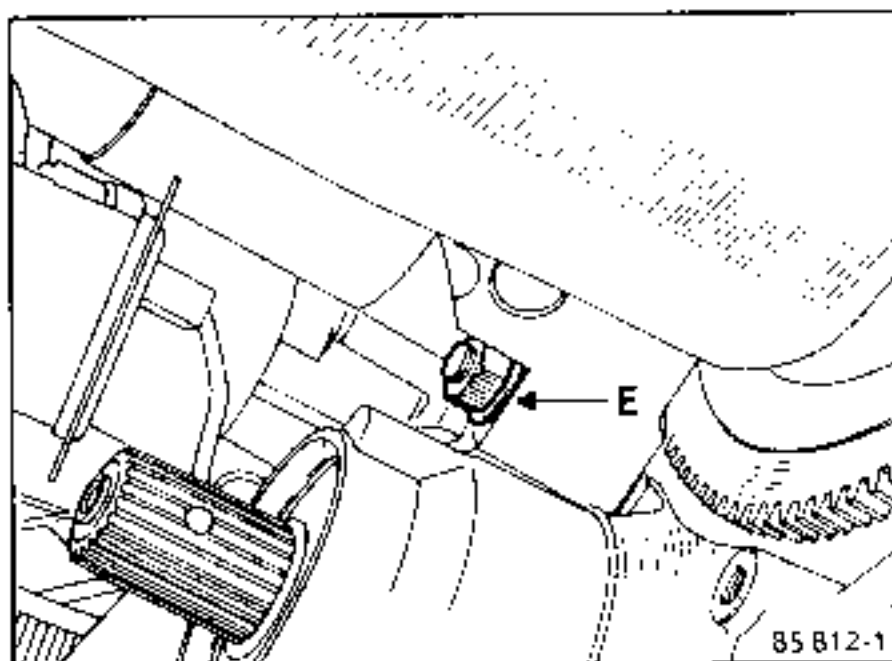
Tilt the stub axle carrier and uncouple the drive shaft.

Uncouple the gear control

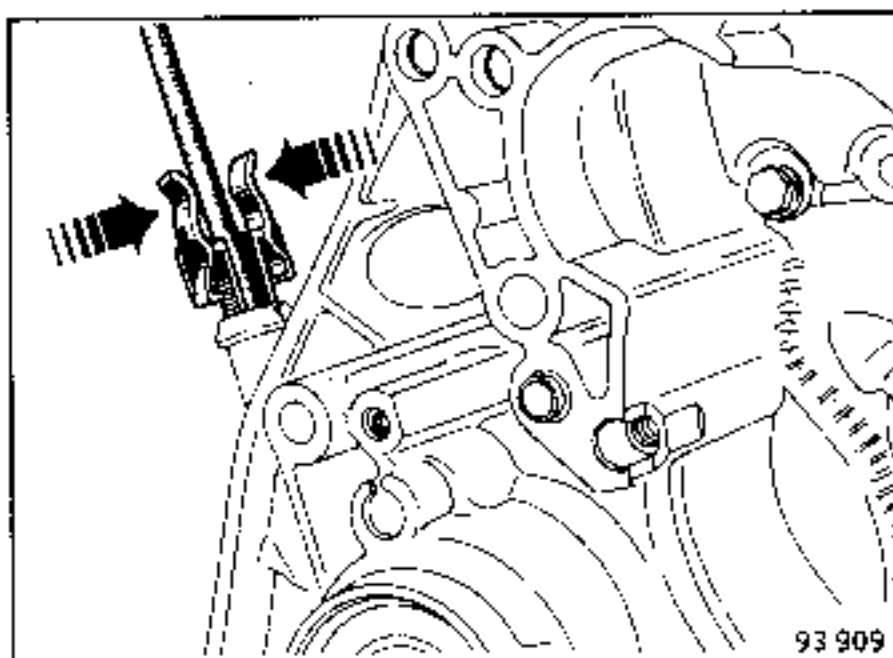


Remove:

- the clutch protective panel,
- the engine - gearbox mounting nut (E).

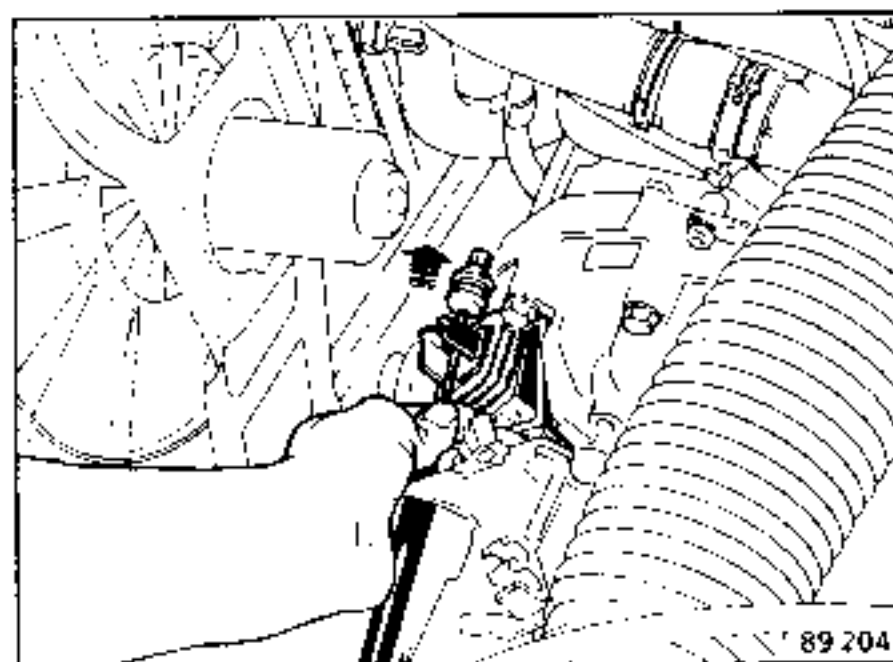


Pinch the tabs together (as shown by arrows) and remove the speedometer cable.



Disconnect:

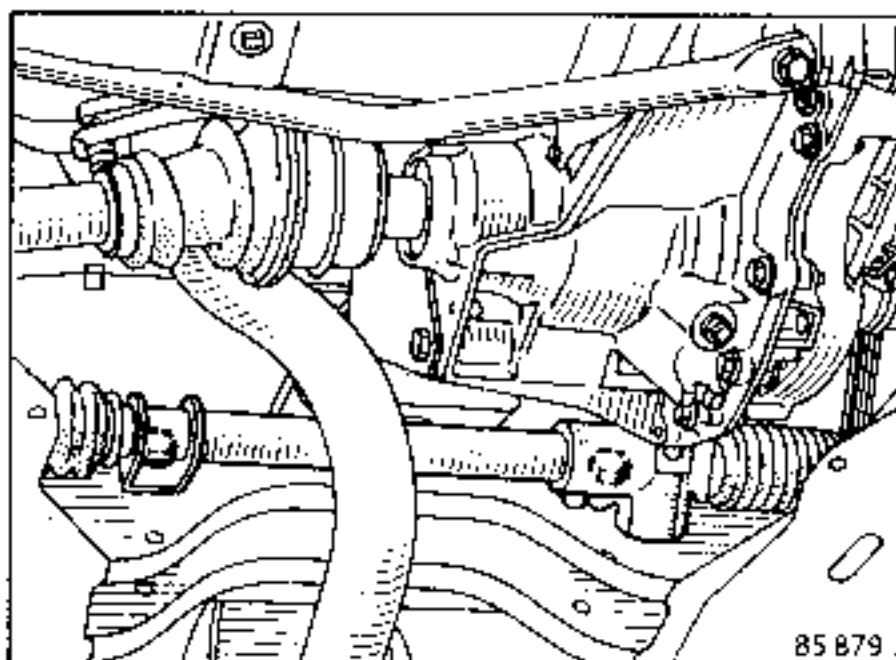
- the clutch cable,



- the earth braiding,
- the connector from the reversing lights switch.

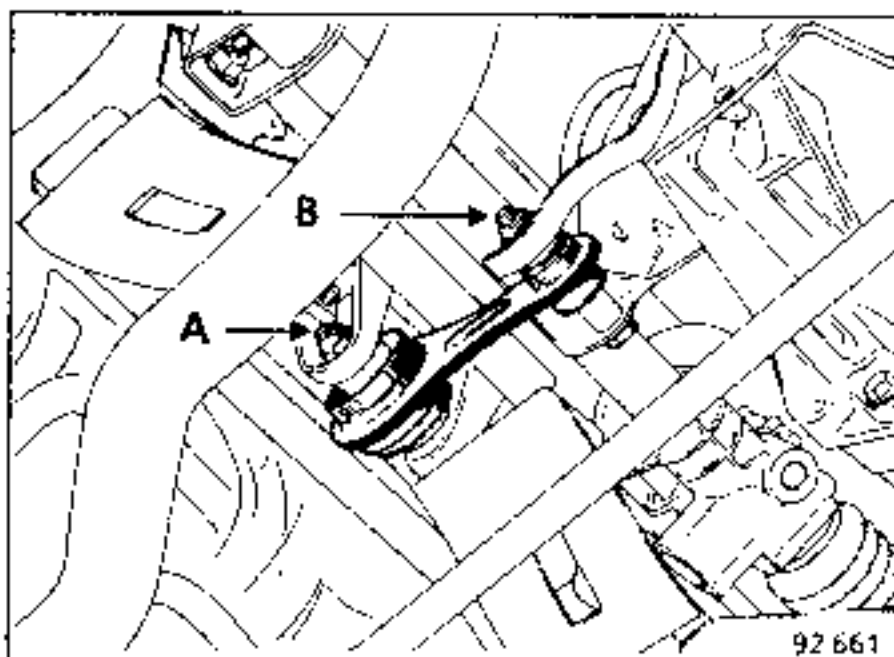
### C Type Engine

Remove the engine - gearbox tie rod.



### E Type Engine (Special Points)

Slacken but do not remove bolt (A). Then remove bolt (B) securing the hanging type suspension arm.



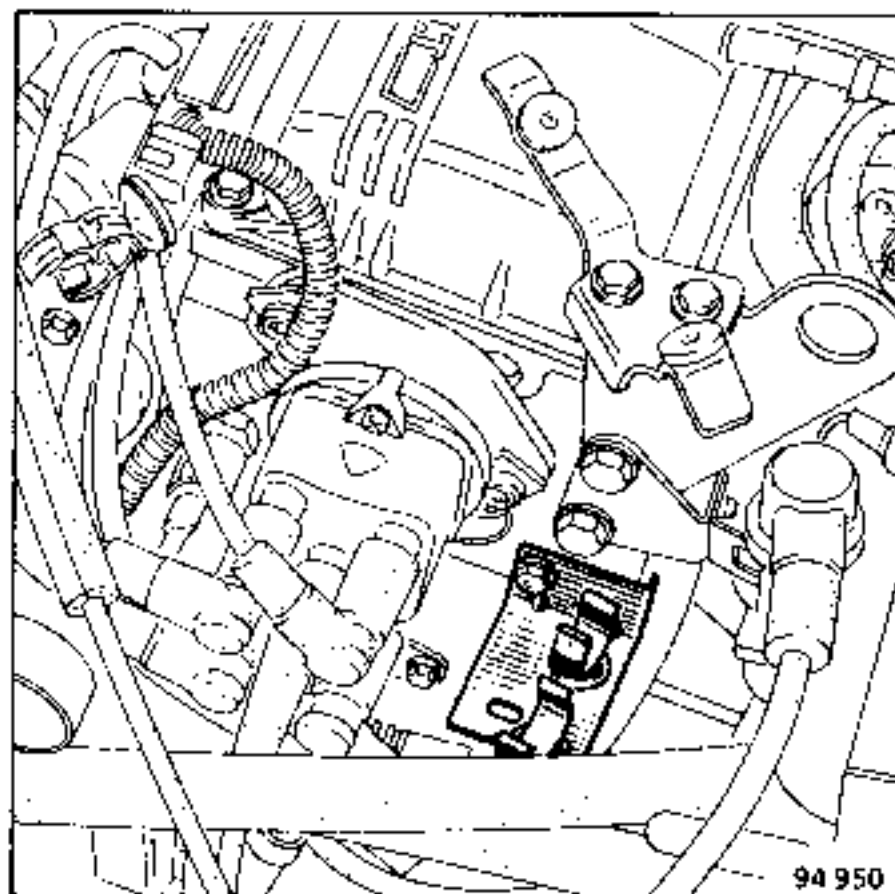
Remove:

- the air filter,
- the accelerator cable,
- the choke cable,
- the HT distributor cap,
- the A.E.I. or M.P.A. unit.

Drain the coolant system.

Remove:

- the upper hose,
- the thermostat,
- the other hoses,
- the expansion chamber,
- the hose mounting.

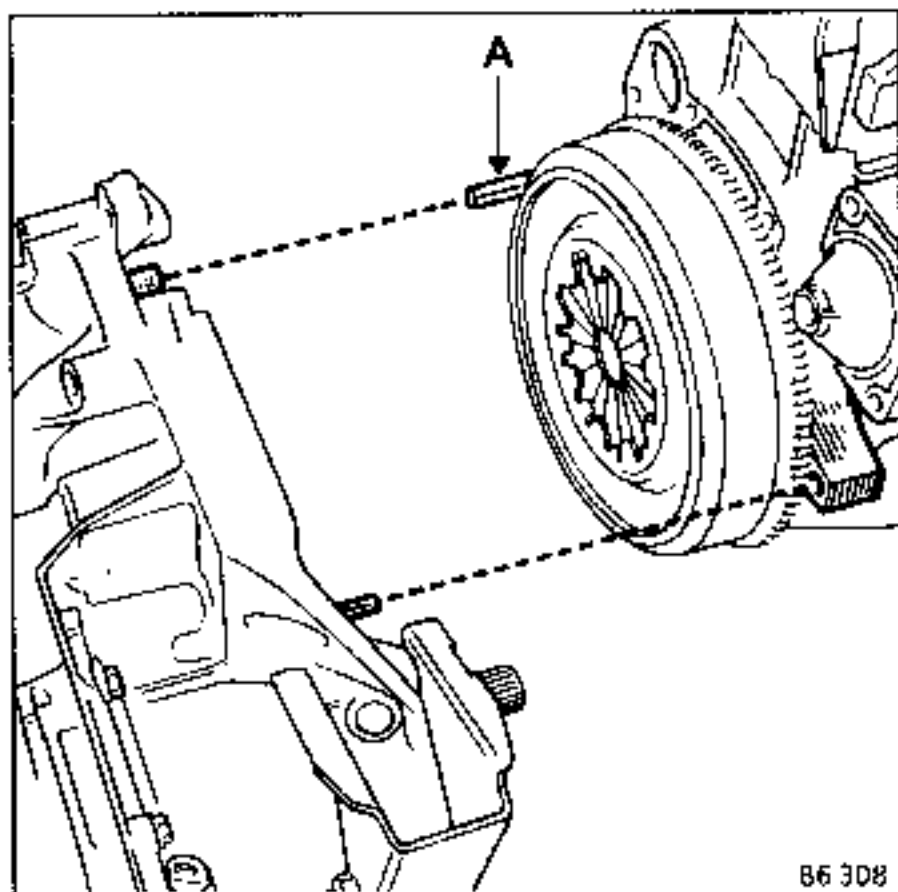


Release the electric cable

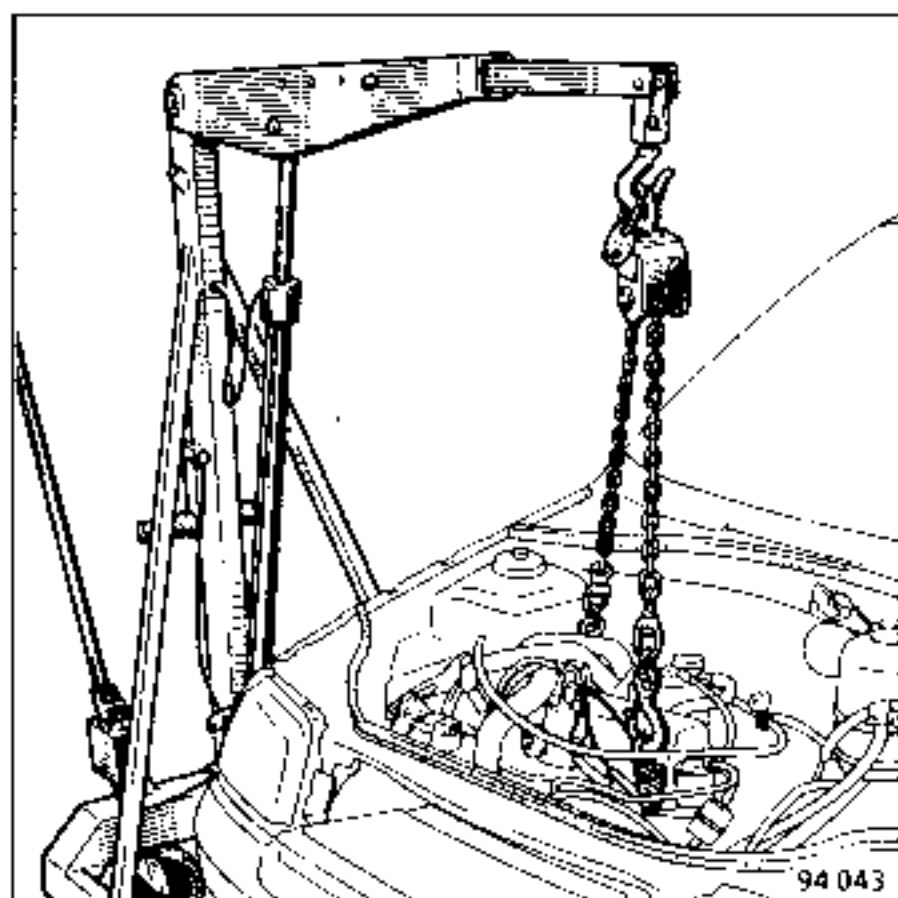
Remove the plastic cover on the rubber gearbox support.

### All Types

Remove the stud (A).



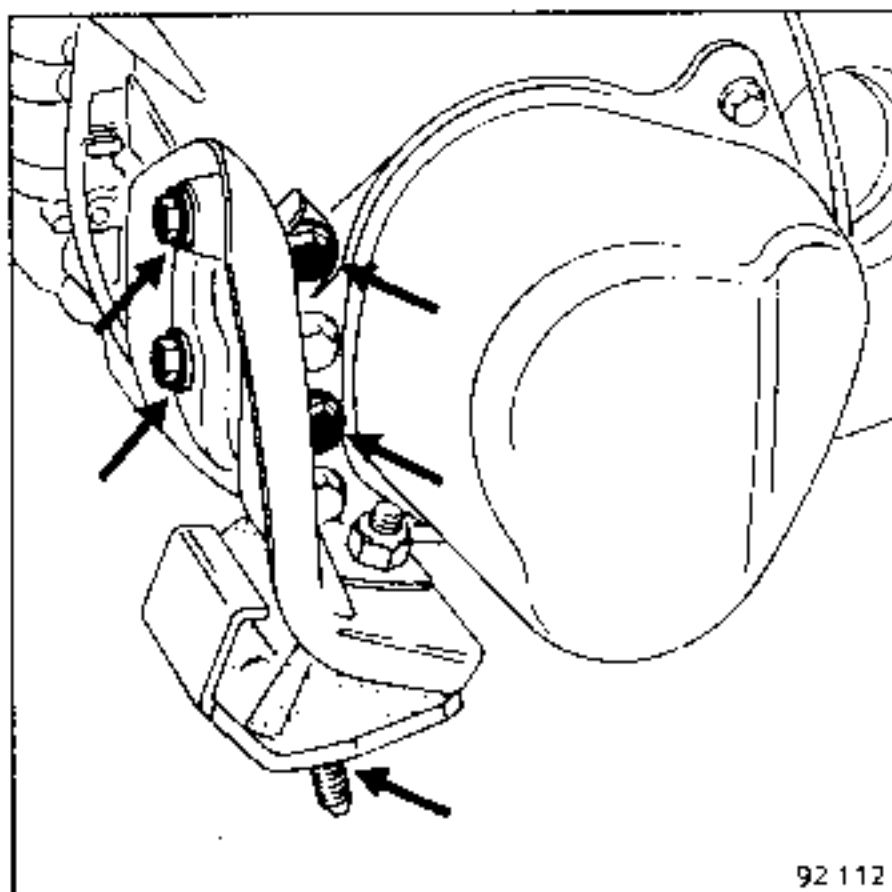
Using the workshop crane and load spreader (SEF 689), take the weight off the engine.



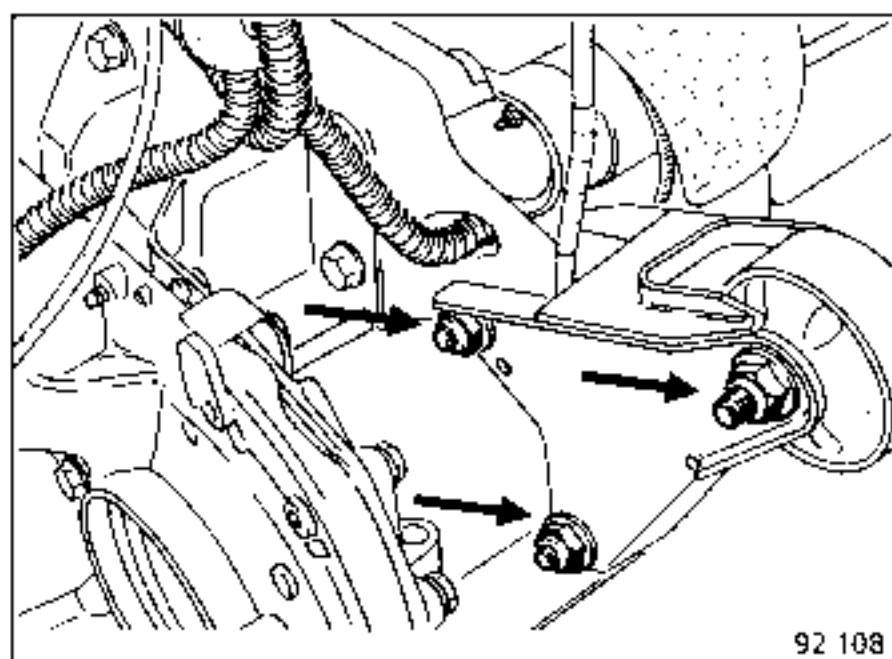
### C Type Engine

Remove:

- the front mounting.



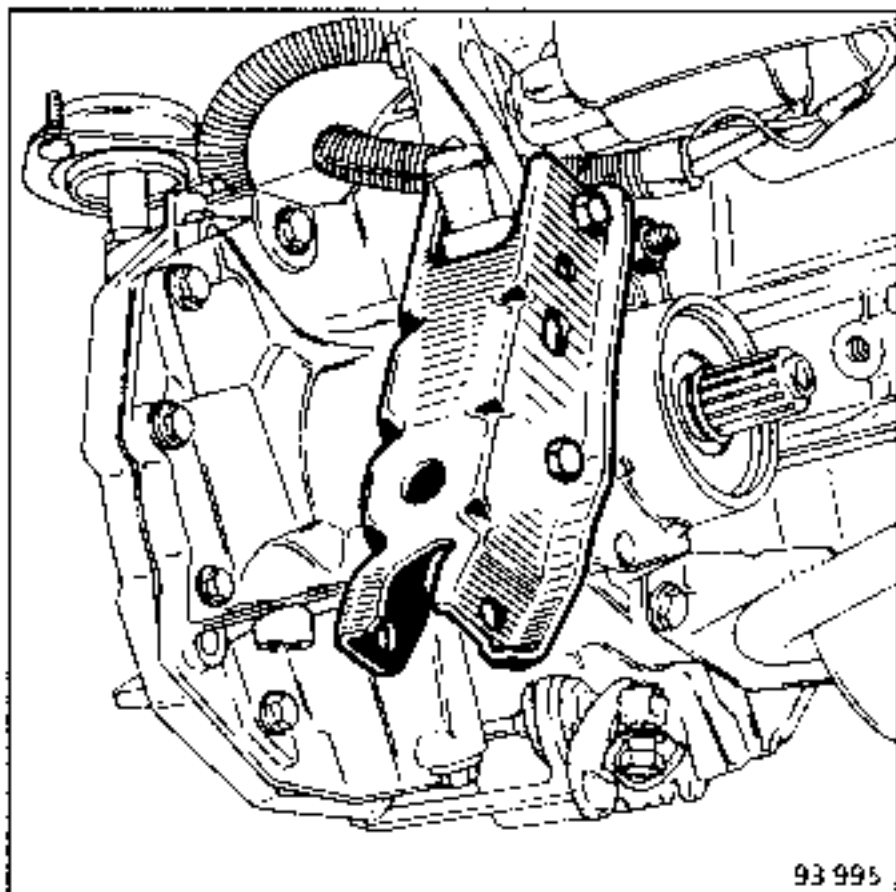
- the rear central mounting



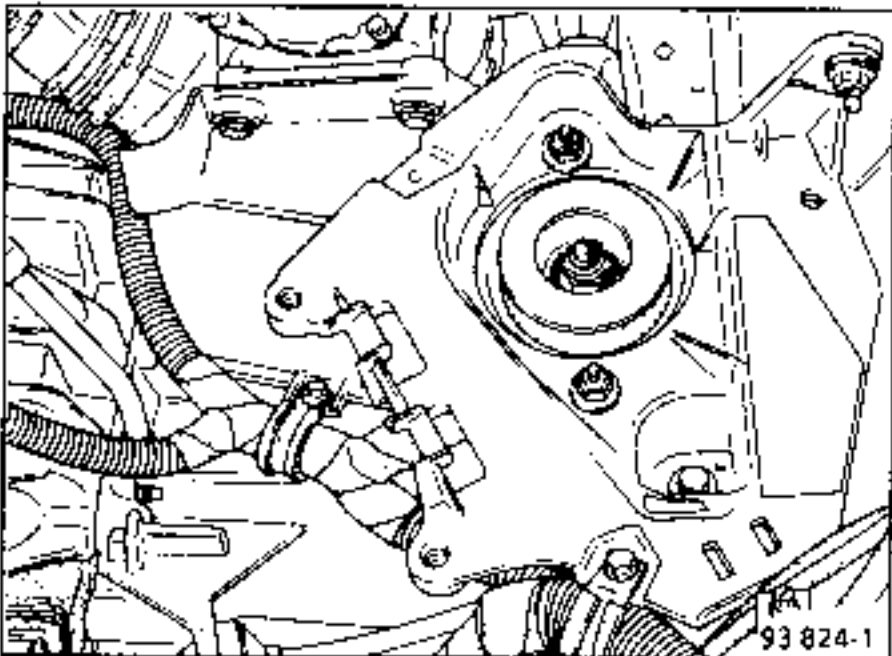
### E Type Engine

Remove:

- the rear mounting,



- the gearbox mounting pad.



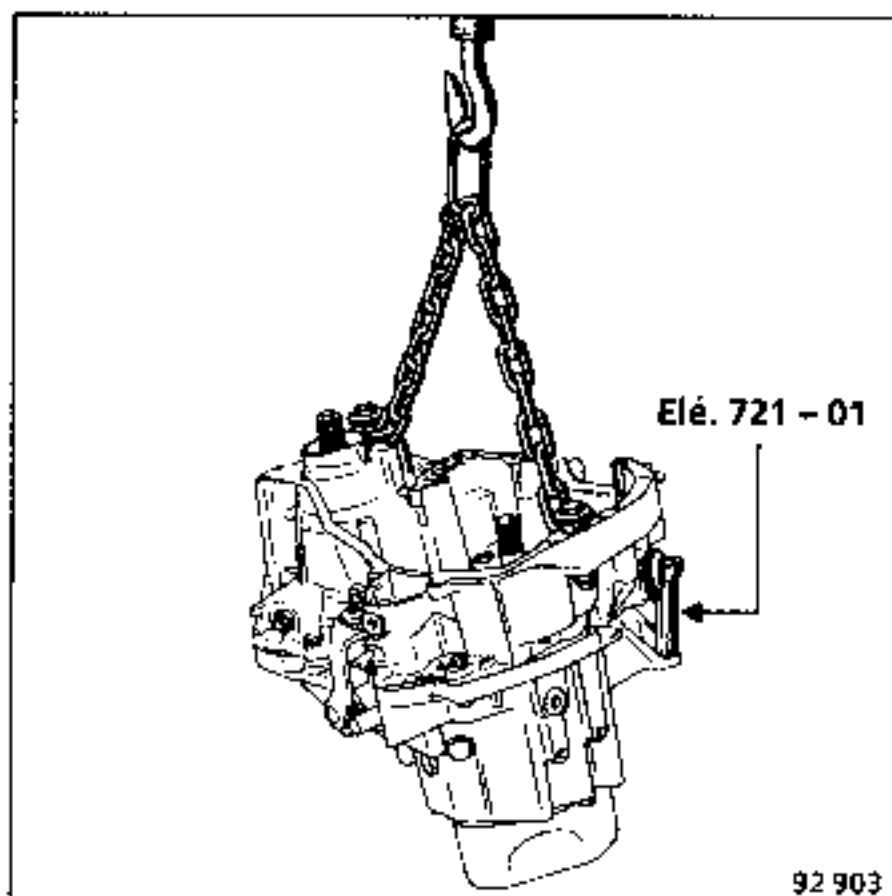
### All C and E Type Engines

Remove the bolts from around the gearbox and the starter.

Uncouple the gearbox from the engine, sliding the 5th speed casing between the vehicle side member and engine cradle.

Attach the gearbox to a workshop crane, securing the anchorage points in place of the two gearbox bolts

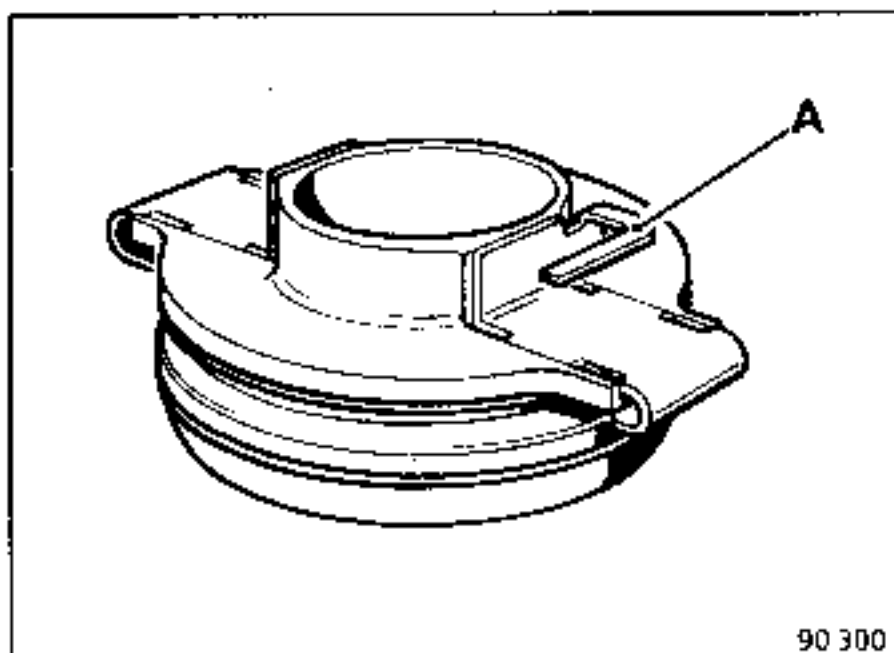
Gently pivot the gearbox forwards to release the final drive section, then remove the gearbox from the vehicle.





## REMOVAL

Lock the thrust pad - fork assembly by placing a tube (e.g. tool Elé. 721-01) between the fork and the sheathing stop on the mechanism casing to prevent the catch possibly becoming detached from the thrust pad.

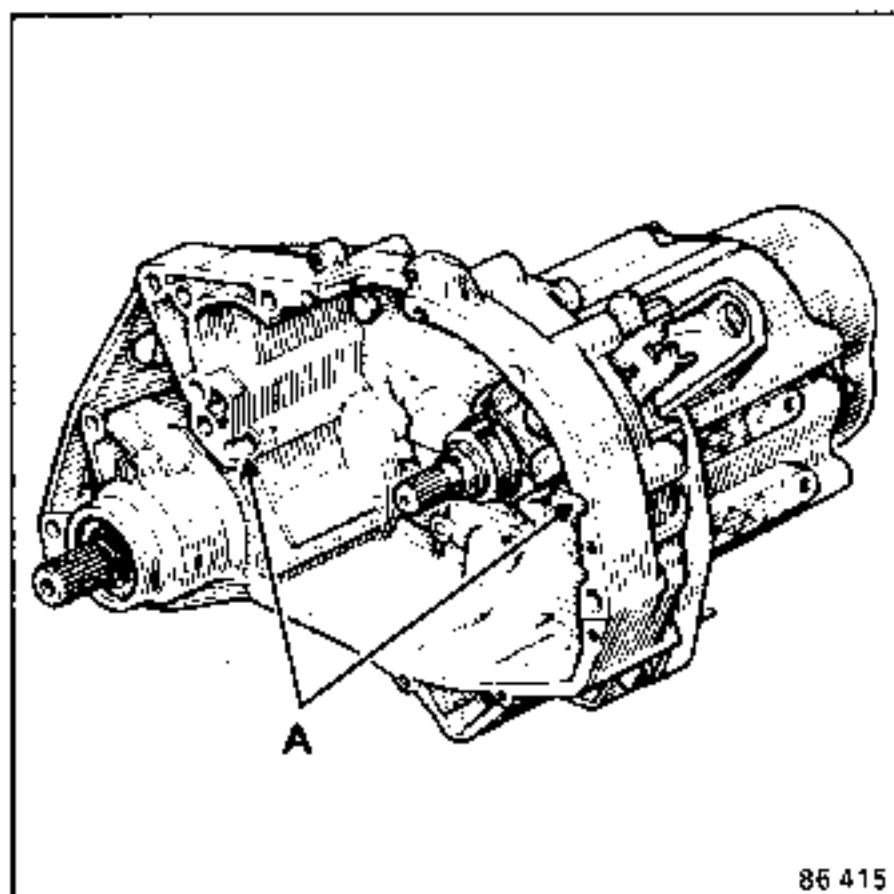


90 300

## Special Points

Ensure that the engine - gearbox centring dowels are fitted and correctly positioned:

At A : Gearbox assembled with C or E engine: long dowels.



86 415

PRECAUTIONS WHICH MUST BE FOLLOWED  
WHEN REPLACING THE CLUTCH

To improve the frictional properties of the clutch discs, from now on the disc hubs will be nickel-plated.

Clean the clutch shaft splines and refit the assembly without using any lubricant

## Special Points for "Diesel" Clutch Discs :

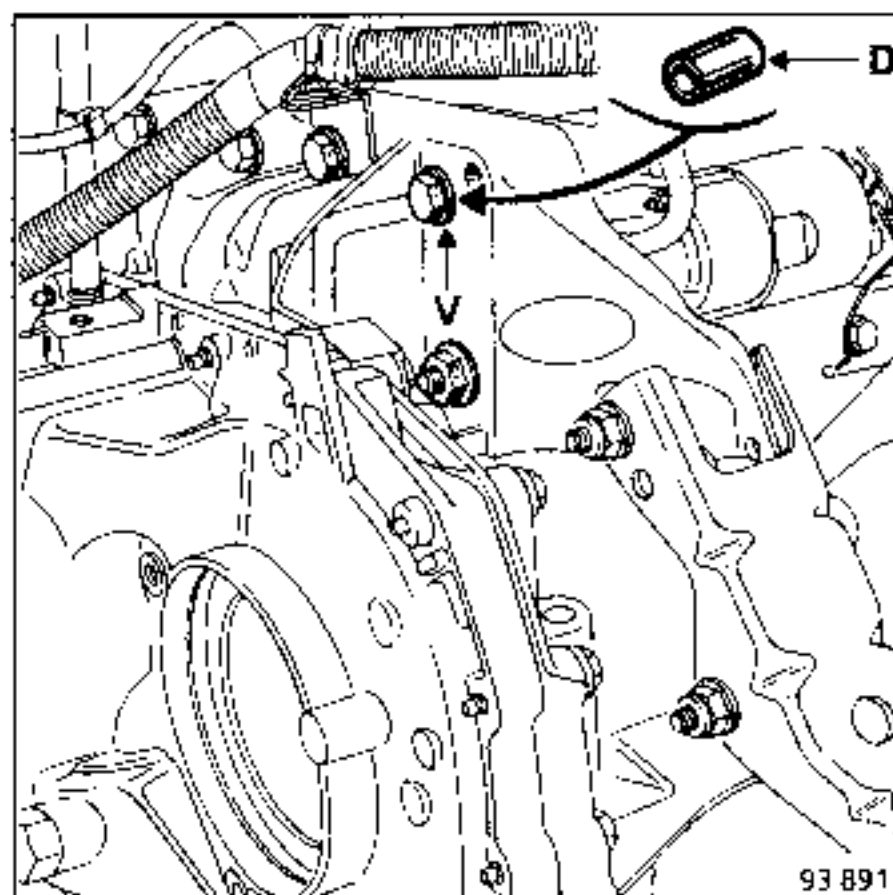
"Diesel" clutch discs are fitted with a shock-absorbing pre-hub which works most effectively when the internal components are not lubricated.

Assemble the gearbox and engine.

Ensure that the centring bushes are correctly positioned in their housing.

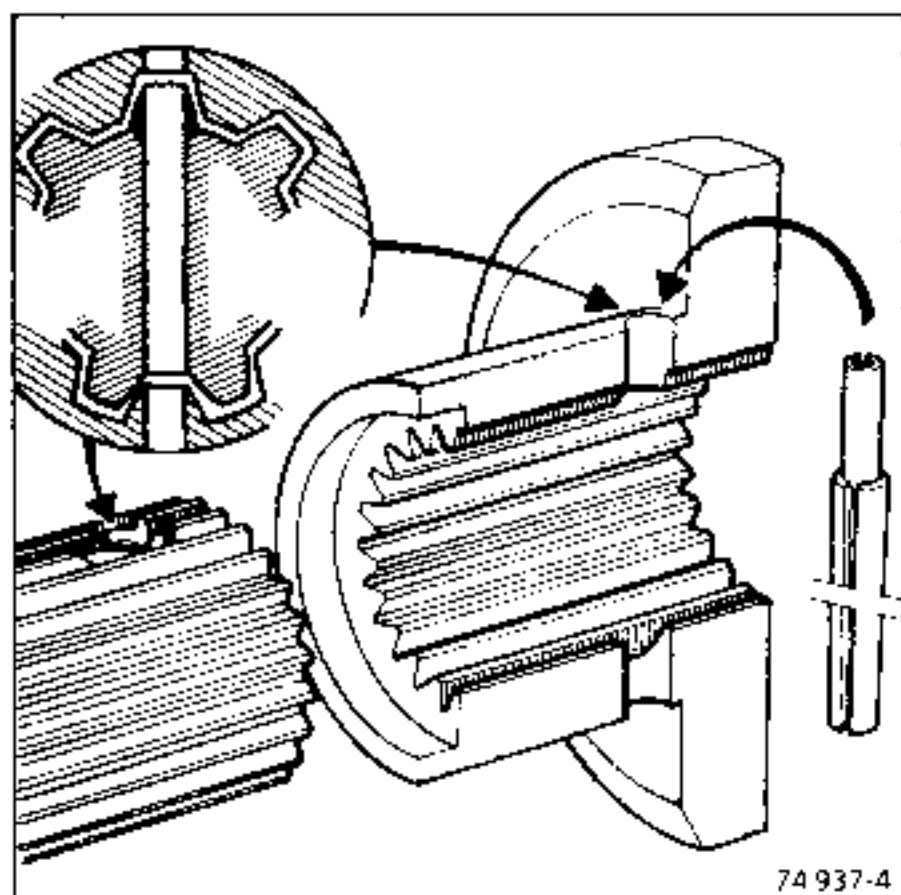
**ATTENTION :** Fit bolt (V) and starter centring bush (D) correctly:

## C and E Type Engine



93 891

Position the drive shaft in relation to the sun wheel, pivot the stub axle carrier engaging the drive shaft in the sun wheel, using the angled drift **B. Vi. 31-01** to align the holes.



An inlet chamfer on the sun wheel facilitates assembly of the new roll pins

Seal the ends with **CAF 4/60 THIXO**.

Fit the caliper mounting bolts greased with **Loctite FRENLOC** and torque tighten them.

Depress the brake pedal several times to bring the pistons into contact with the brake pads



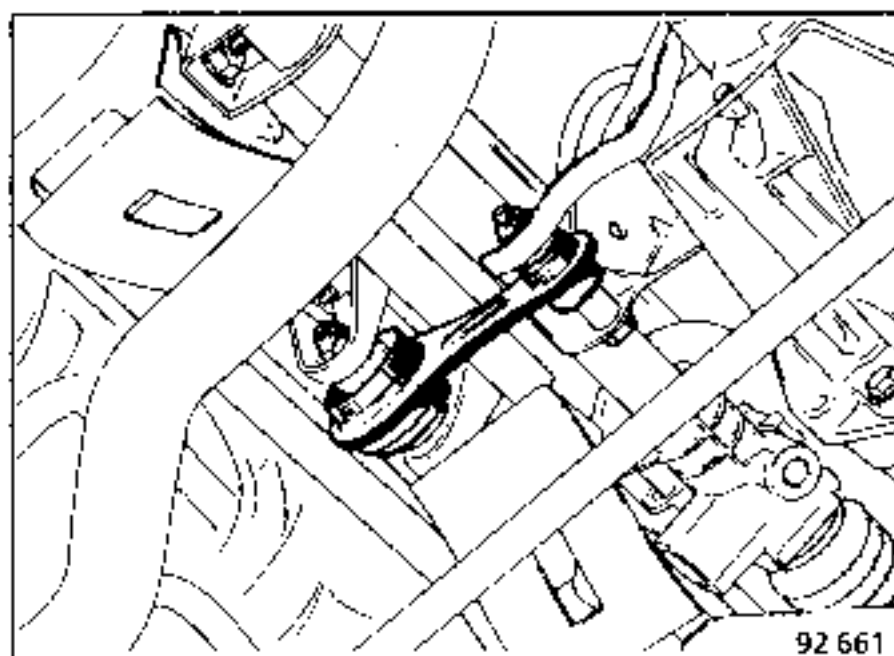
Torque tighten the nuts and bolts as specified.

Fill the gearbox with oil as specified.

### E Type Engine

Check the adjustment of the (upper) hanging mountings (see section 19).

Secure the rear hanging suspension arm



Fill the coolant system.

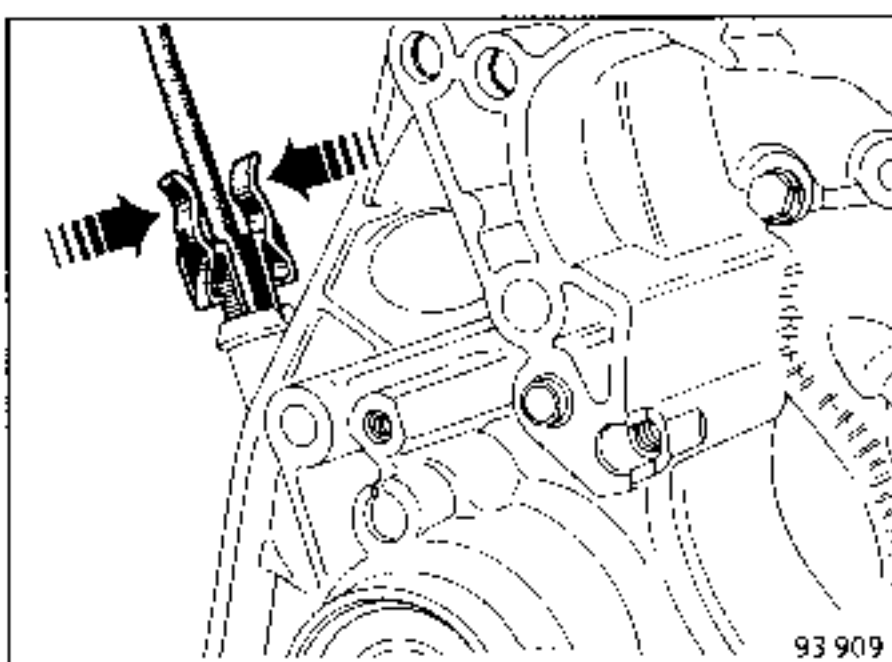
On "F" type diesel engines, the gearbox cannot be removed alone. The engine - gearbox assembly must be removed first (consult section 10) and separated afterwards.

**TIGHTENING TORQUES (in daN.m)**

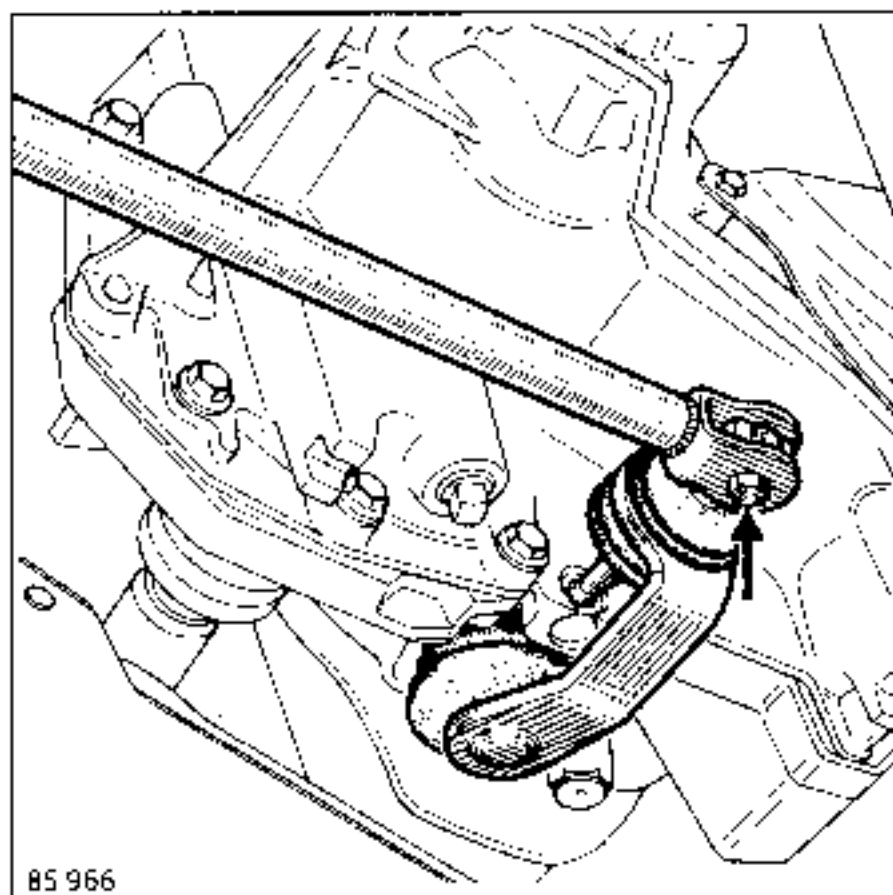
Bolts securing hanging type mounting to gearbox	3,5
Nuts and bolts securing clutch casing to engine	5
Clutch protection mounting bolts	2,5
Left-hand drive shaft bellows mounting bolts	2,5

**REMOVAL (Special Points)**

To remove the speedometer cable mounting, pinch the tabs together (as shown by arrows) and remove the cable.



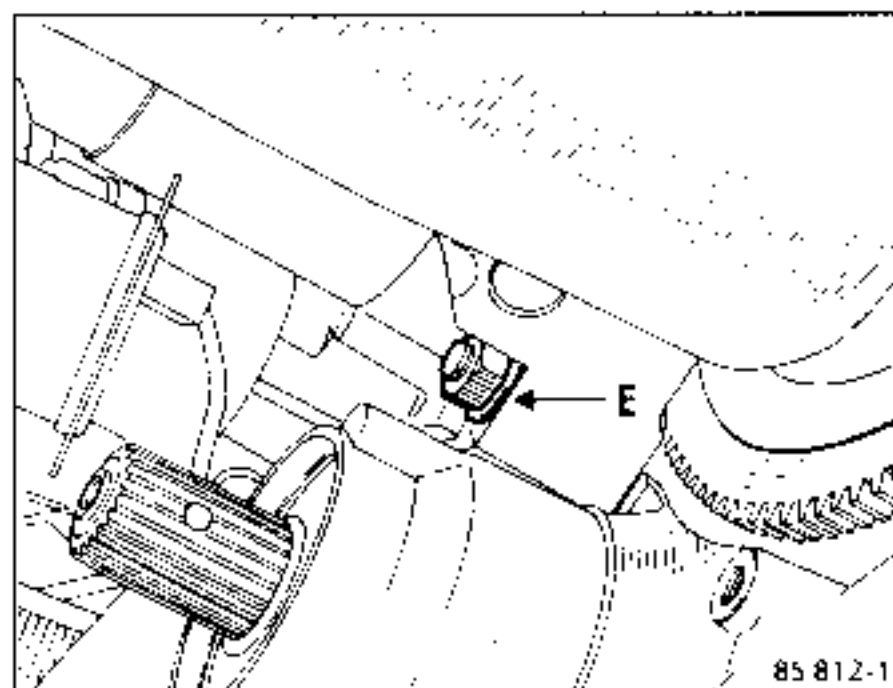
Uncouple the gear control from the gearbox output lever after first releasing the protective gaiter.



Disconnect the starter leads.

From the lower section remove:

- Engine - gearbox securing nut (E),

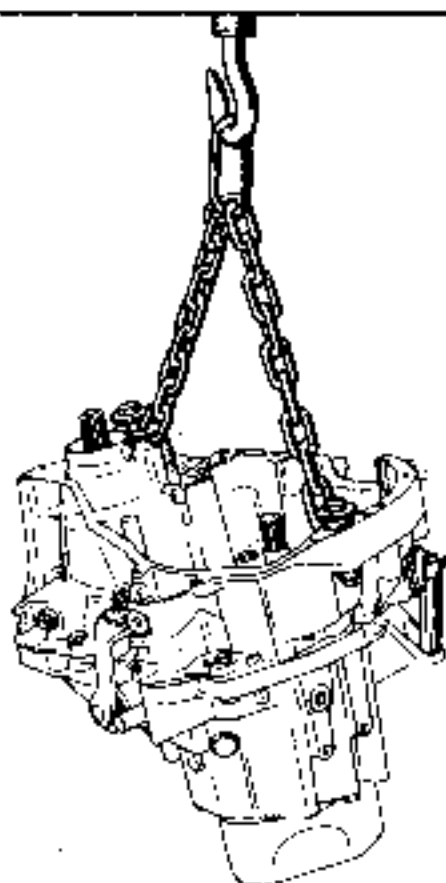


the tie rod - clutch protection assembly.

Place the engine on a support.

Remove the bolts from around the gearbox and the starter

Attach the gearbox to a workshop crane and uncouple it from the engine.

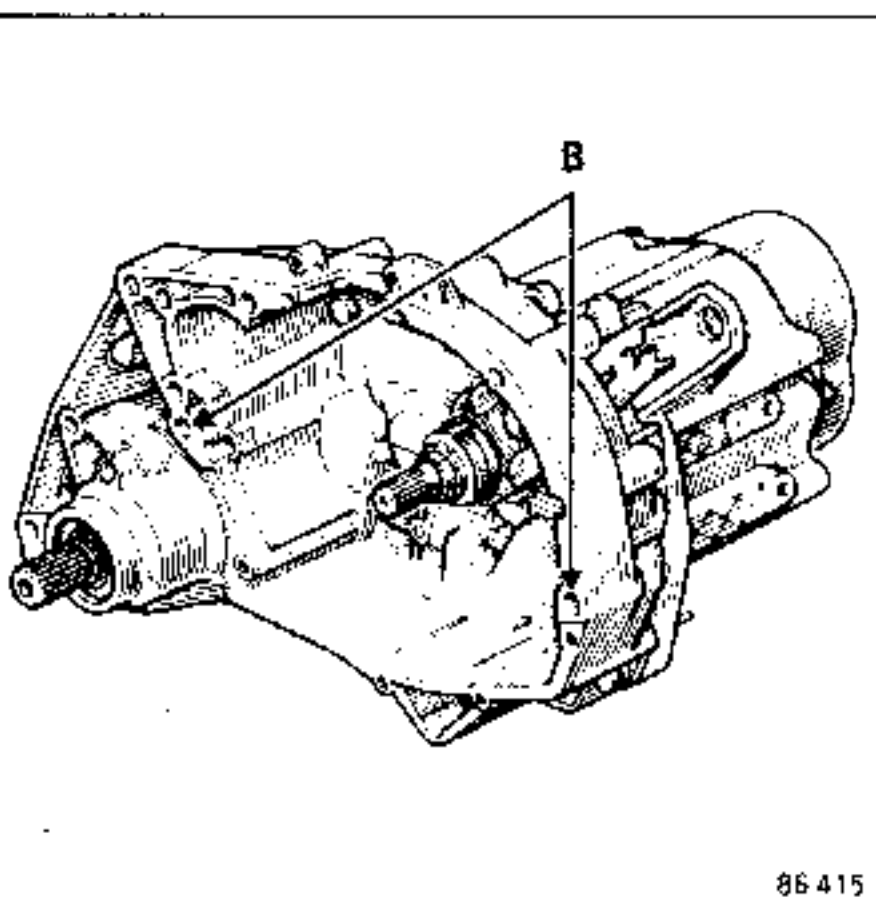


92 903

### REFITTING (Special Points)

Ensure that the engine - gearbox centring bushes are fitted and correctly positioned

At B : Gearbox assembled with F type engine, short dowels

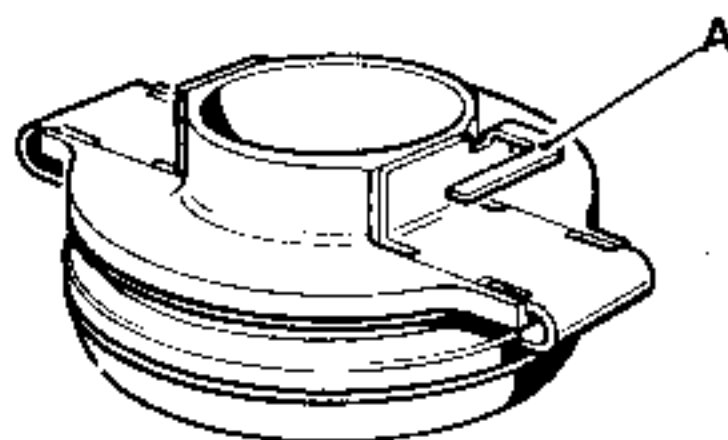


86 415

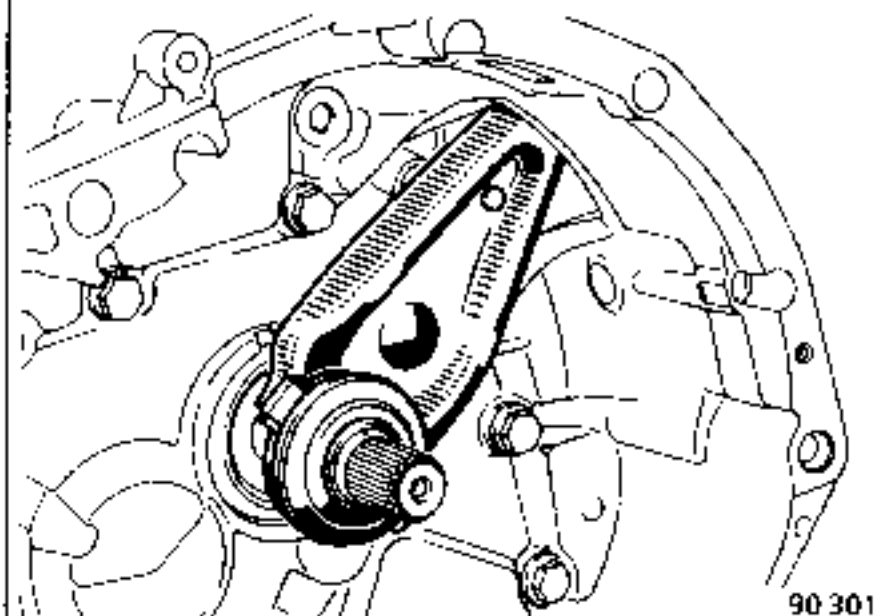
Coat the walls of the guide tube and fork pads with **MOLYKOTE BR2** grease.

Fit the fork and refit the rubber protector.

Place the thrust pad on the guide tube, fitting catch (A) in the fork



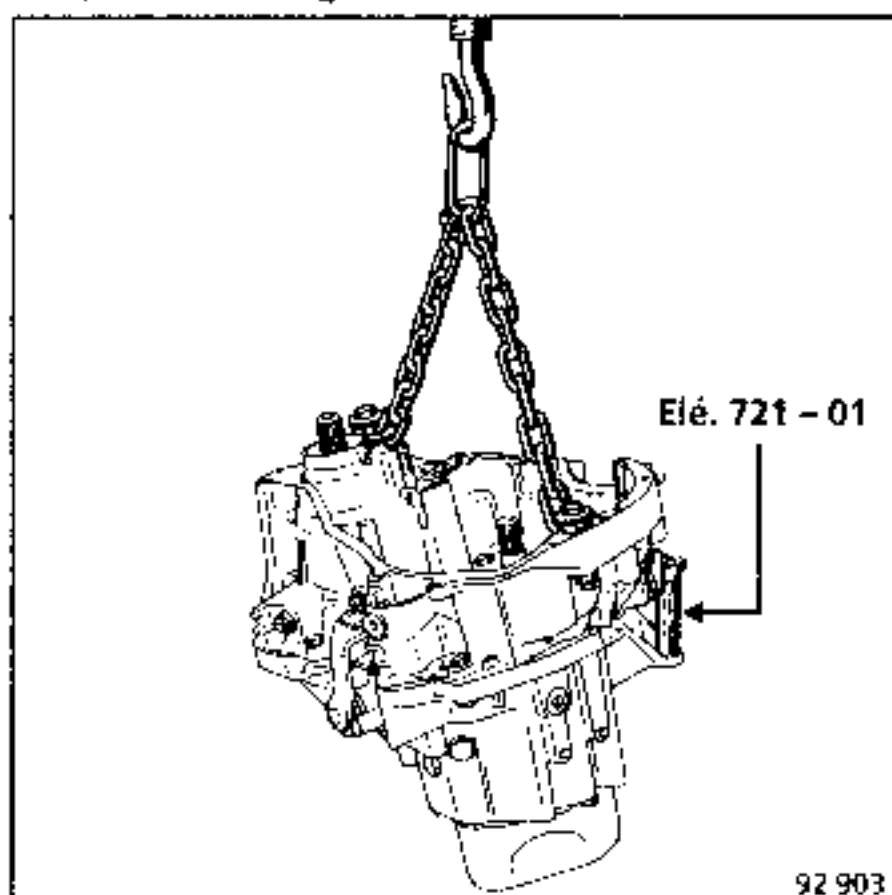
90 300



90 301

Ensure that it slides correctly.

Do not raise the fork as there is a risk that it would become detached from the catch (A) on the thrust pad. To do this, lock the thrust pad - fork assembly by placing a piece of tubing (e.g. tool Elé. 721-01) between the fork and the sheathing stop on the casing.



Elé. 721 - 01

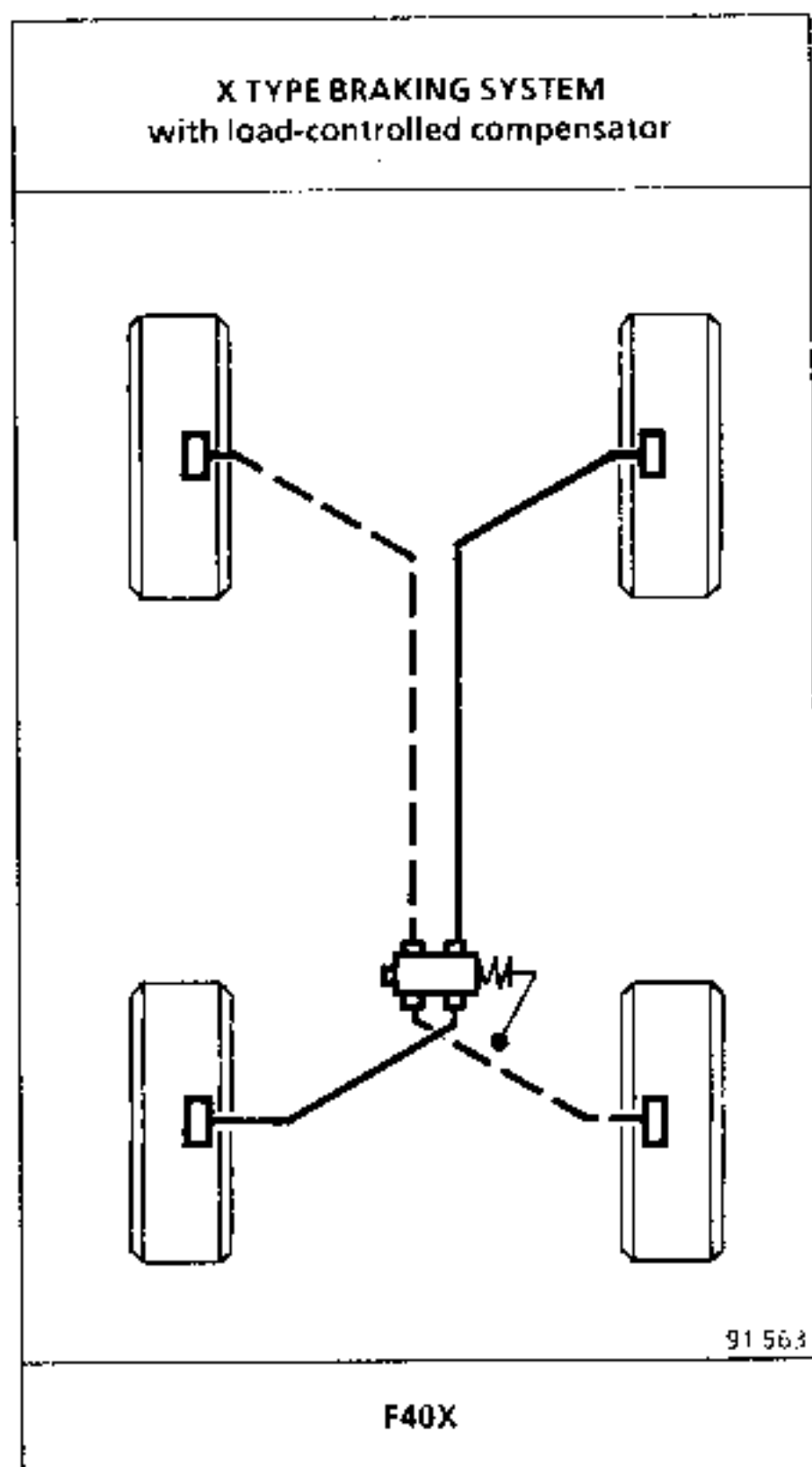
92 903

Assemble the engine and gearbox.

Ensure that the centring dowels are correctly fitted in their housing.

## General Operating Principle of Braking Circuits

**NOTE :** The following diagram is a general operating diagram; under no circumstances are they to be taken a reference for the circuit take-offs and matching. When replacing one of the constituent components of the braking system on a vehicle, the hoses and pipes must always be marked before dismantling so that they can be reconnected in their initial positions. This is essential.



	F401	F404 F407 F40A F40F F40N F40P F40U F40V F40T F40Y	F404* F407* F40A* F40F* F40N* F40P* F40U* F40V* F40T* F40Y*
<b>FRONT BRAKES (dimensions in mm)</b>			
Wheel cylinder diameter	48	48	48
Disc diameter	238	238	238
Disc thickness	12	12	12
Minimum disc thickness	10,5	10,5	10,5
Pad thickness (including backing)	18	18	18
Minimum pad thickness (including backing)	6	6	6
Maximum disc run-out	0,07	0,07	0,07
<b>REAR BRAKES (dimensions in mm)</b>			
Wheel cylinder diameter	22	20,6	22,2
Drum diameter (1)	180,25	203,45	228,5
Maximum drum diameter after relacing	181,25	204,45	229,5
Disc diameter	—	—	—
Disc thickness	—	—	—
Minimum disc thickness*	—	—	—
Lining width	40	38	40
Lining thickness ↗ Trailing	6,5	5,5	7
(including shoe) ↘ Leading	6,5	7	7
Minimum thickness of ↗ Trailing	2,5	2,5	2,5
lining ↘ Leading	2,5	2,5	2,5
(including shoe)			
<b>MASTER CYLINDER (dimensions in mm)</b>			
Diameter	19,05	20,6	20,6
Diameter, servo brake	7"	8"	8"

The brake discs must not be refaced. The part must be changed if excessive scoring or wear is present.

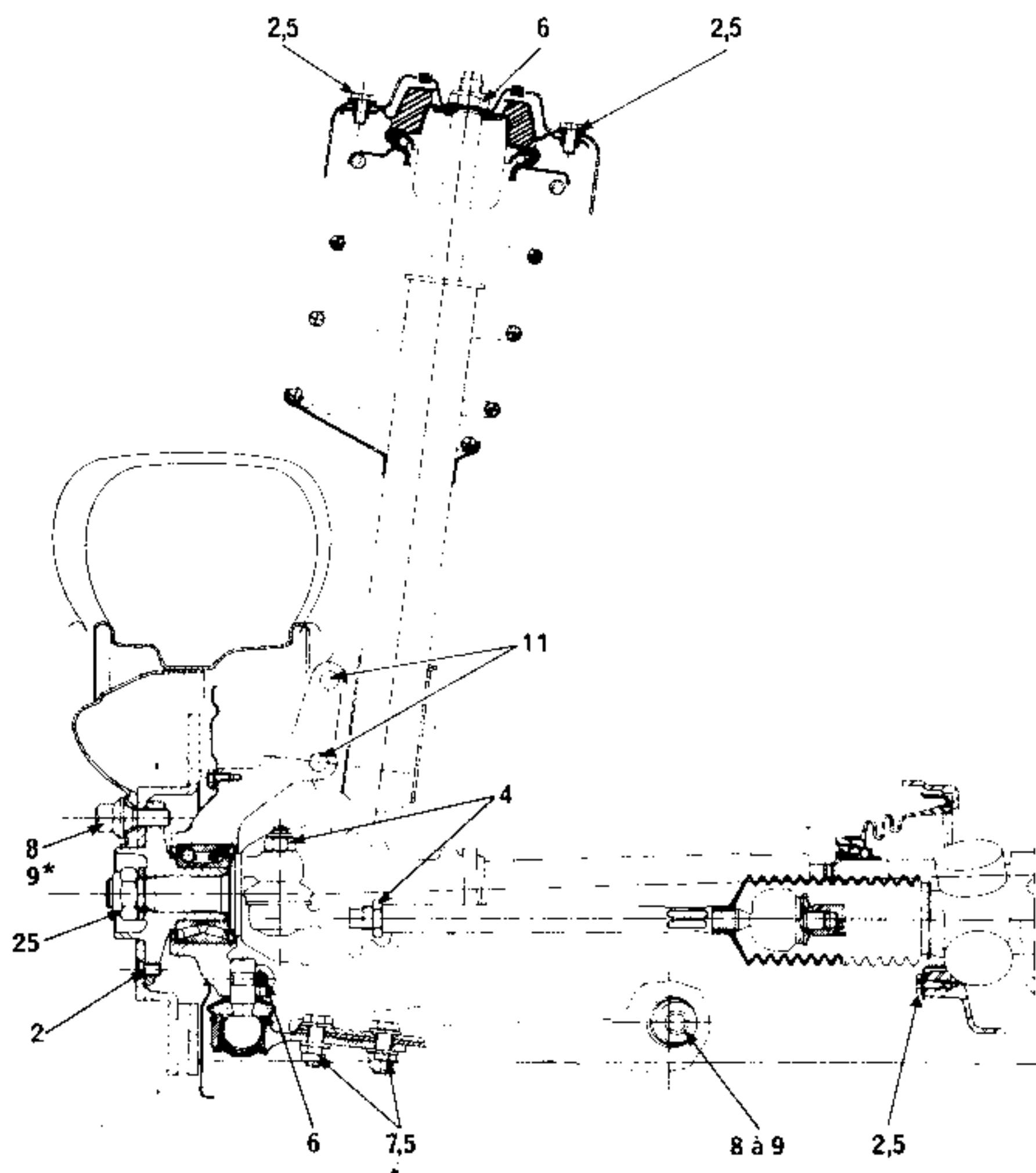
\* Increased load option

(1) Drum: The regrinding diameter is engraved on the drum.

# GENERAL

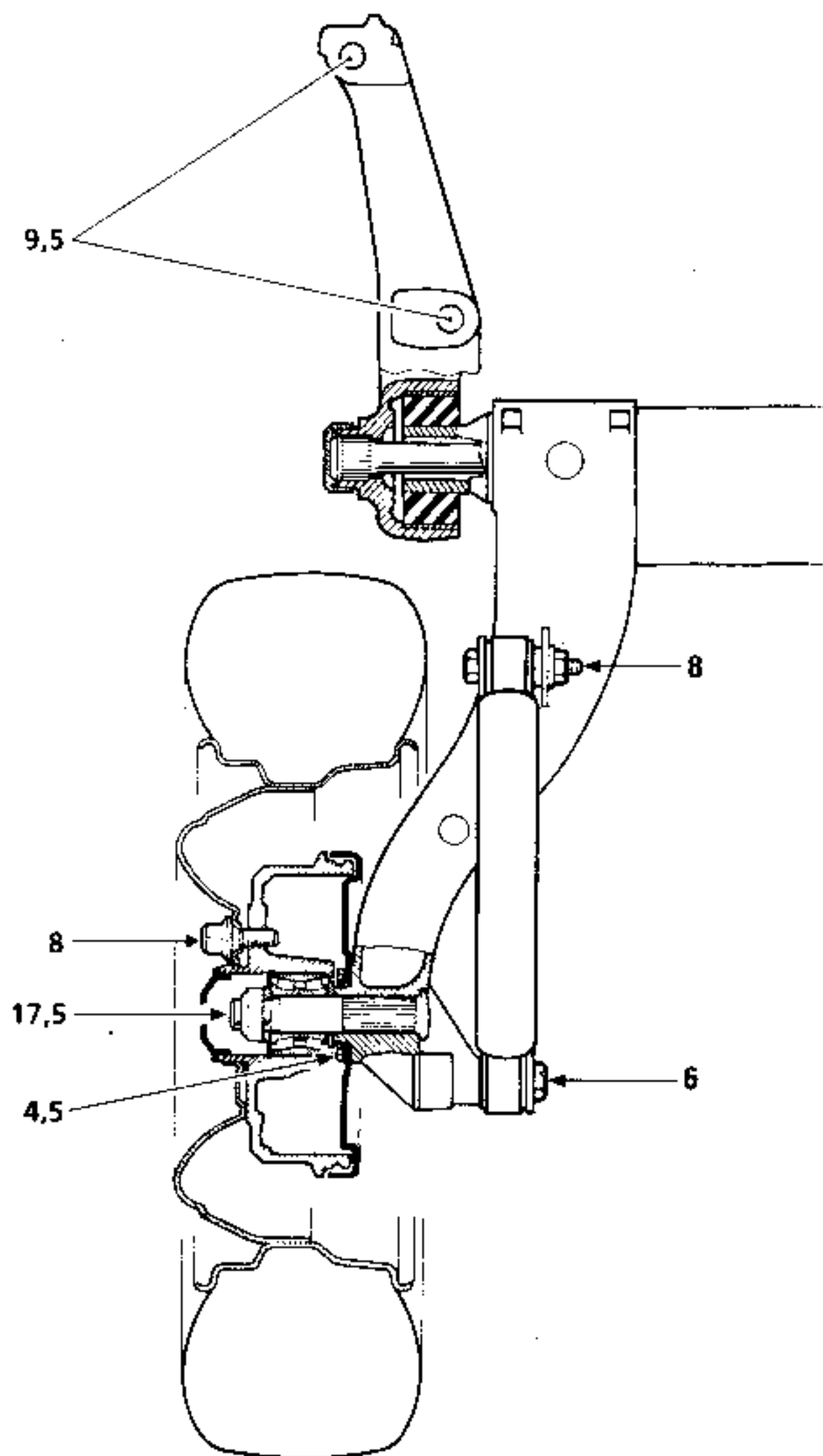
## Tightening Torques (in daN.m)

30



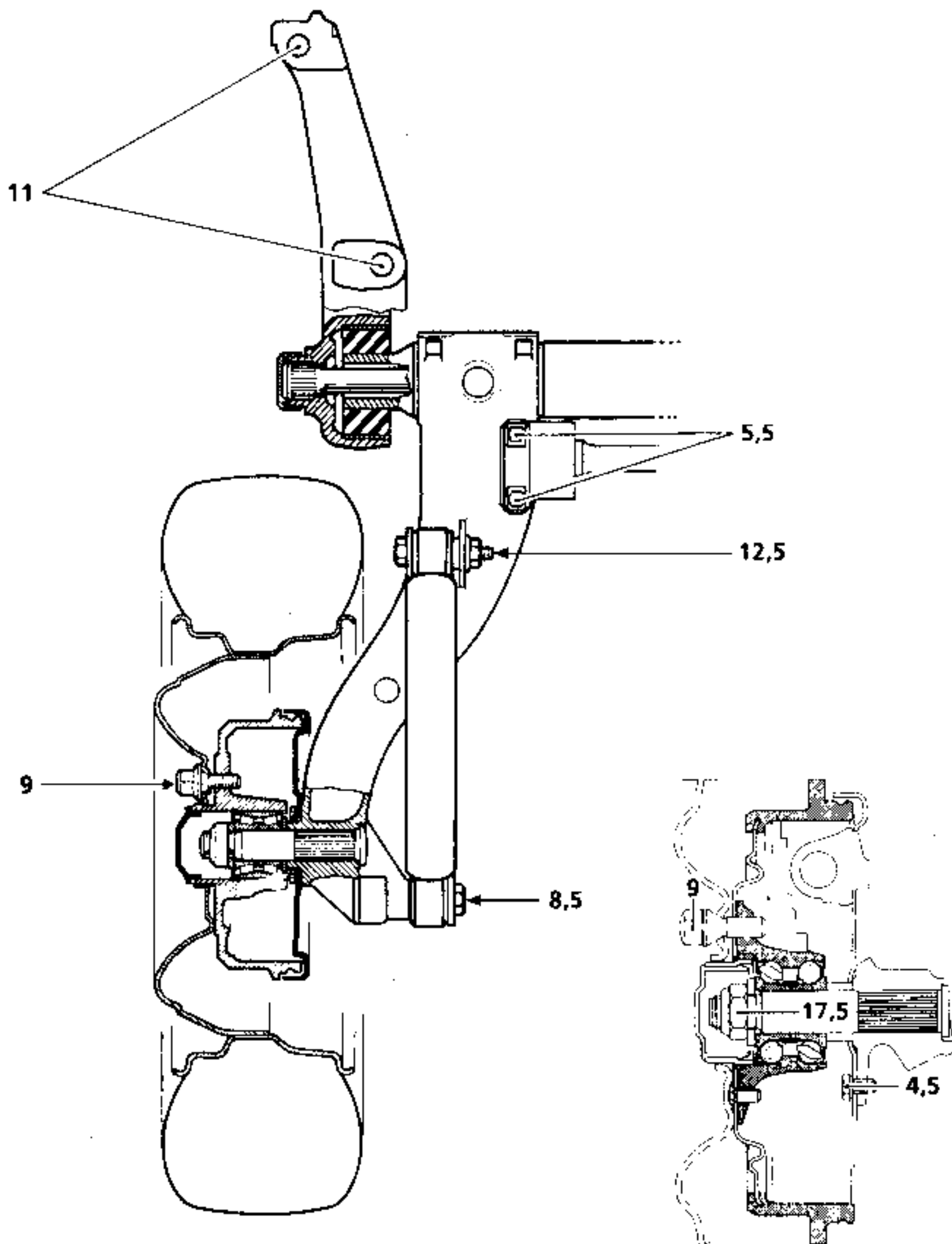
\* Increased load.

88 505





Increased load



88 507-1

87 396

# GENERAL

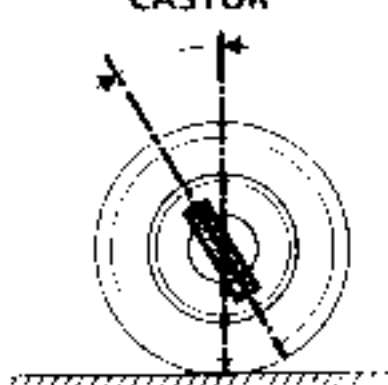
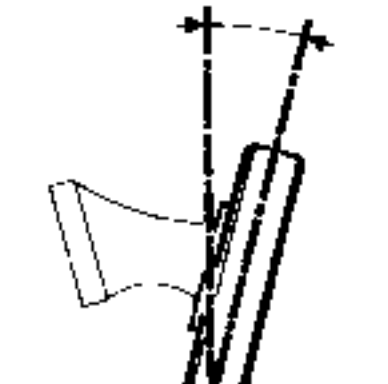
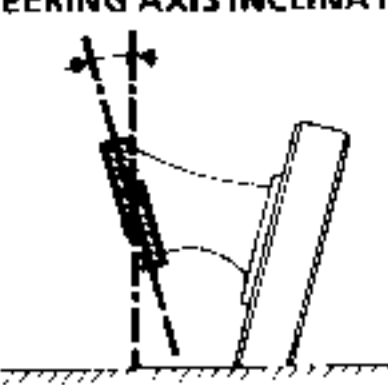

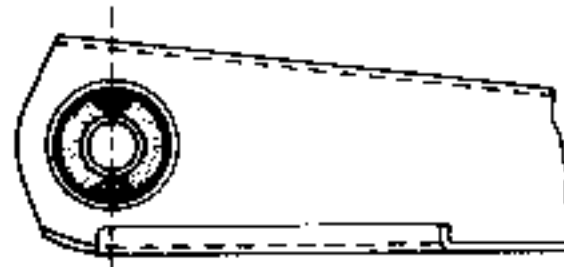
## Tightening Torques (in daN.m)

**30**



	DIMENSIONS	TIGHTENING TORQUE
Bleed screws	—	0,6 to 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 M12 x 100	1,3
Master cylinder outlets	M 10 x 100 or M12 x 100	1,3
Compensator inlets	M 10 x 100 or M12 x 100	1,3
Compensator outlet	M 10 x 100 or M12 x 100	1,3

## Front Axle Geometry Setting Values

ANGLE	VALUE	POSITION OF FRONT AXLE	ADJUSTMENT
<b>CASTOR</b> 	$2^{\circ}30'$ $2''$ $1^{\circ}30'$ $1''$ $0^{\circ}30'$ Max. difference RH-LH sides = $1^{\circ}$	$H5 - H2 = 40 \text{ mm}$ $H5 - H2 = 60 \text{ mm}$ $H5 - H2 = 80 \text{ mm}$ $H5 - H2 = 100 \text{ mm}$ $H5 - H2 = 110 \text{ mm}$	NON ADJUSTABLE
<b>CAMBER</b> 	$0^{\circ}50'$ $0^{\circ}30'$ $0^{\circ}15'$ $0^{\circ}$ $- 0^{\circ}20'$ Max. difference RH-LH sides = $1^{\circ}$	$H1 - H2 = 50 \text{ mm}$ $H1 - H2 = 60 \text{ mm}$ $H1 - H2 = 75 \text{ mm}$ $H1 - H2 = 90 \text{ mm}$ $H1 - H2 = 110 \text{ mm}$	NON ADJUSTABLE
<b>STEERING AXIS INCLINATION</b> 	$11^{\circ}50'$ $12^{\circ}10'$ $12^{\circ}40'$ $13^{\circ}10'$ $13^{\circ}40'$ Max. difference RH-LH sides = $1^{\circ}$	$H1 - H2 = 50 \text{ mm}$ $H1 - H2 = 60 \text{ mm}$ $H1 - H2 = 75 \text{ mm}$ $H1 - H2 = 90 \text{ mm}$ $H1 - H2 = 110 \text{ mm}$	NON ADJUSTABLE
<b>WHEEL ALIGNMENT</b> 	(toe-out)  Across both wheels $0^{\circ}10' \pm 10'$ $(1 \pm 1 \text{ mm})$	UNLADEN	Adjustable by turning the steering link sleeves 1 turn = $30'$ $(3 \text{ mm})$
<b>RUBBER BUSH TIGHTENING POSITION</b> 		UNLADEN	

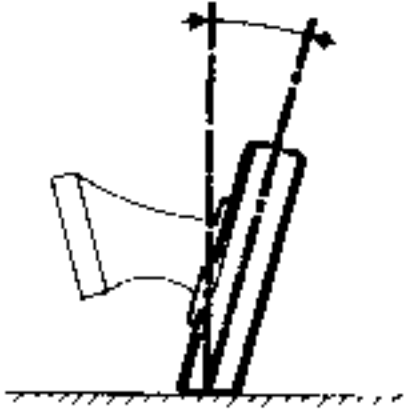
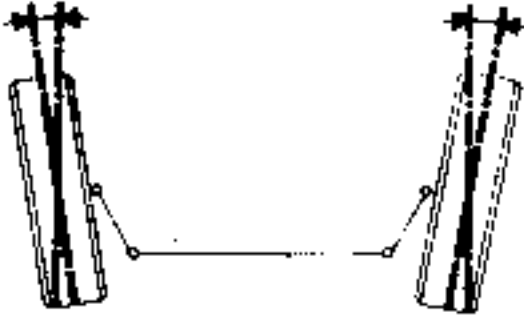
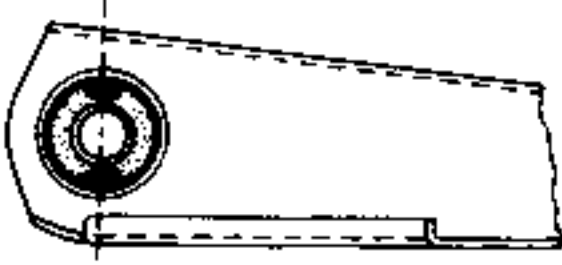
78 423

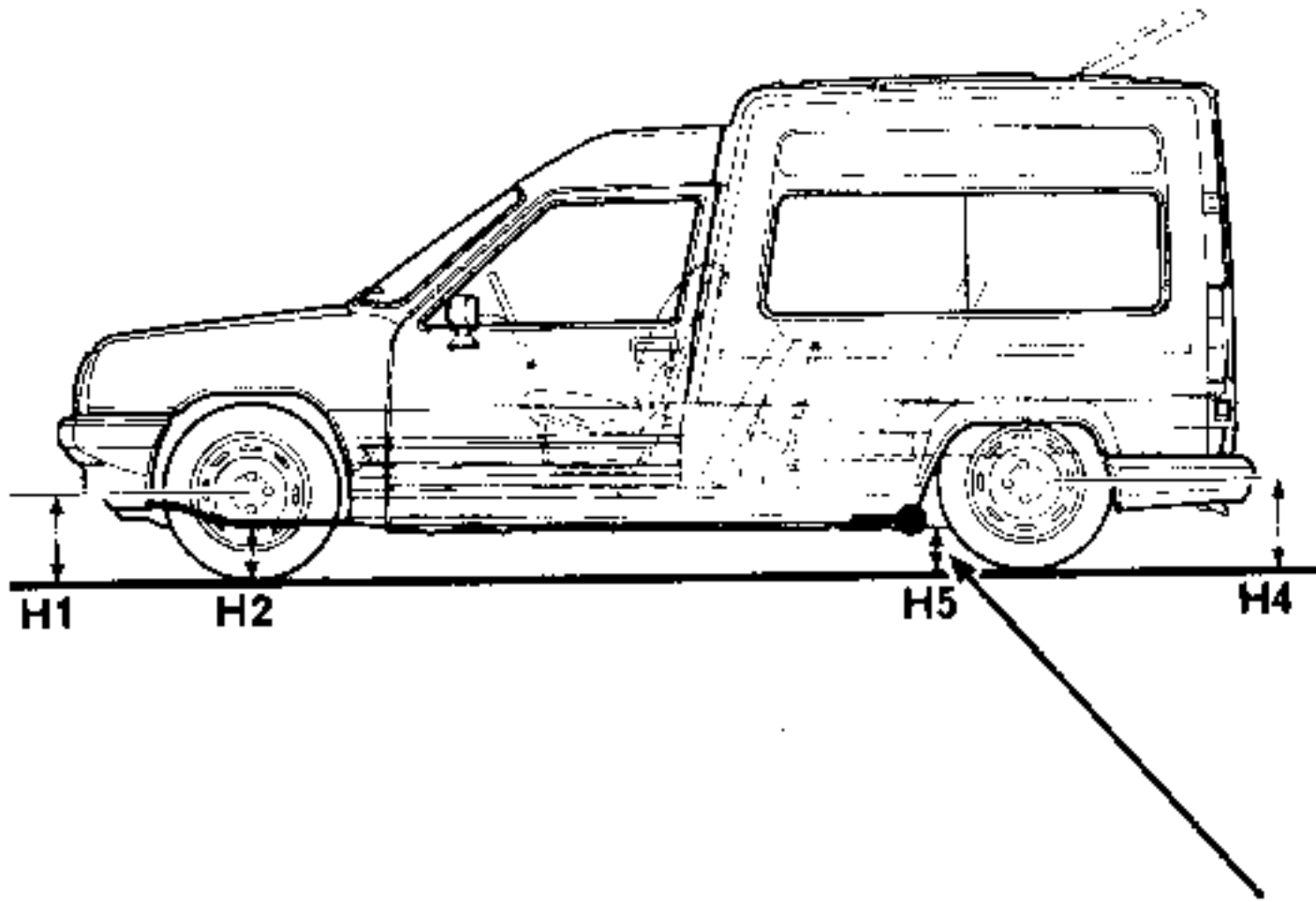
81 603

# GENERAL

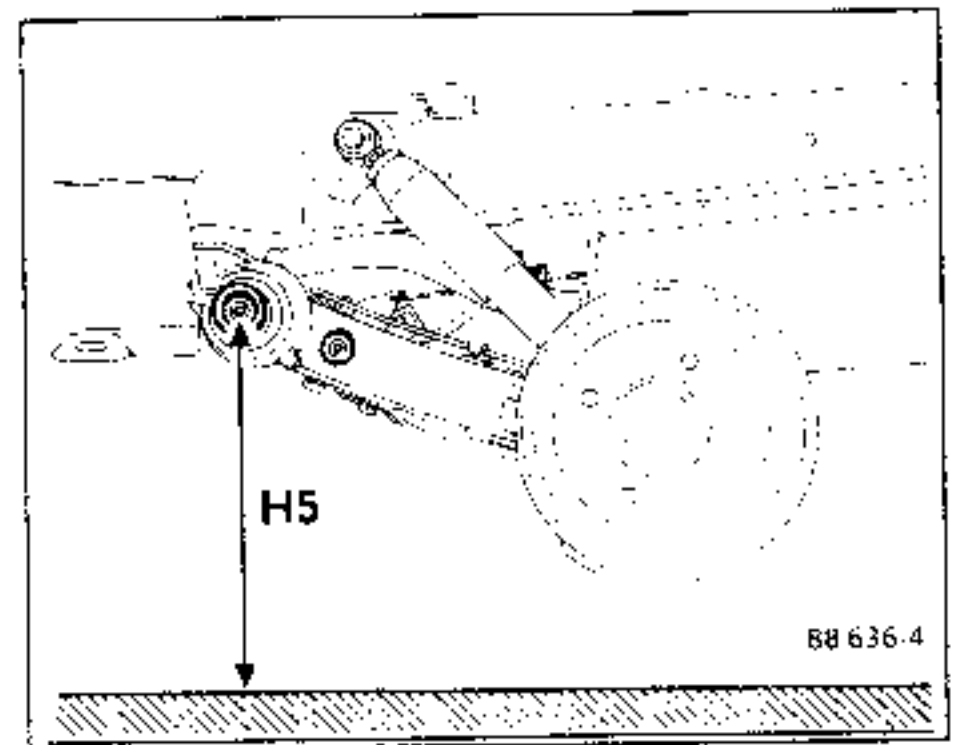
## Rear Axle Geometry Setting Values

30

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
<b>CAMBER</b> 		-0°50' ± 30' (negative)	UNLADEN		NON ADJUSTABLE	
<b>WHEEL ALIGNMENT</b> 		0° to -30' (toe in) or 0 to -3 mm	UNLADEN		NON ADJUSTABLE	
<b>RUBBER BUSH TIGHTENING POSITION</b> 			UNLADEN			



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



# GENERAL

## Underbody Heights

**30**

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 pressure.

**H1** and **H4** are the dimension between the centres of the wheels and the ground.

**H2** is the dimension from the front side member to the ground.

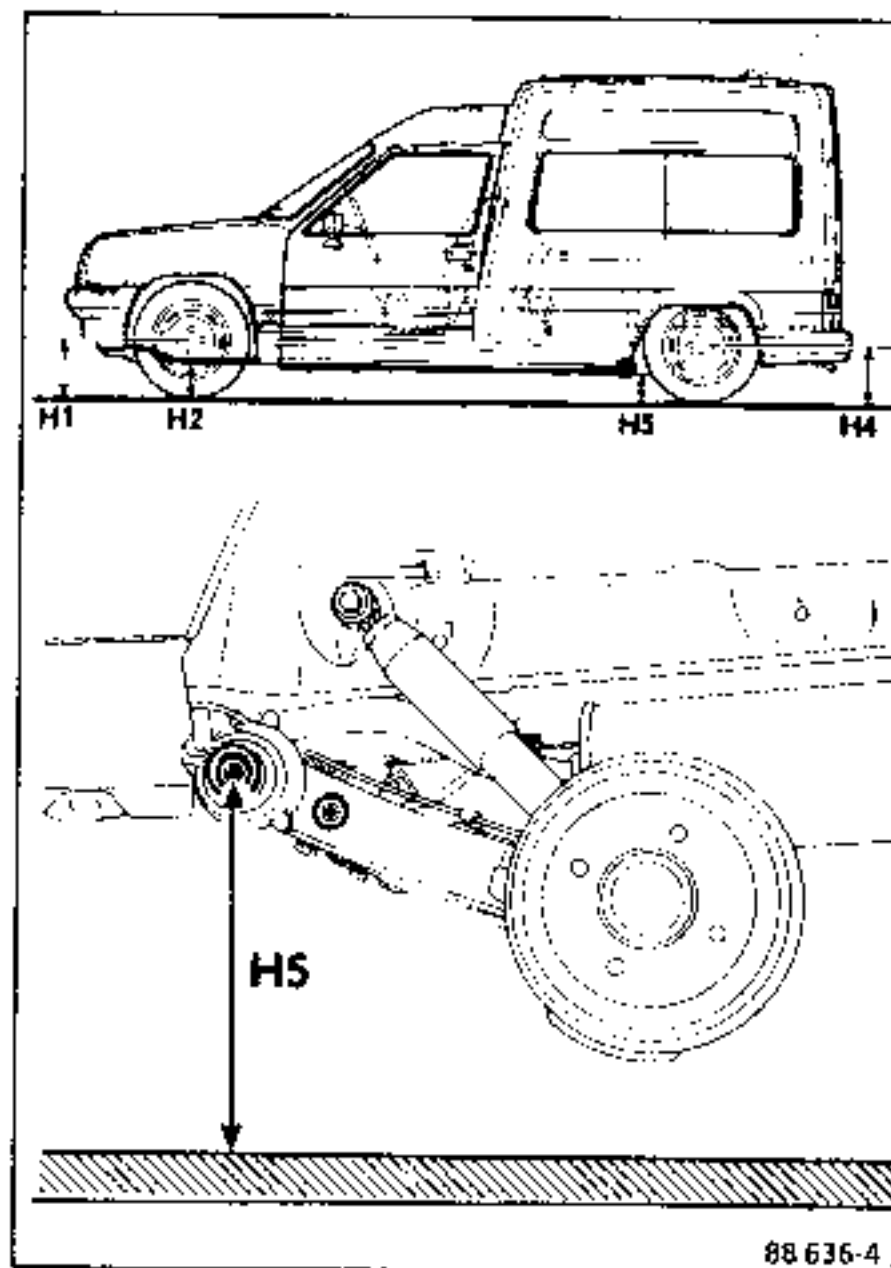
**H5** is the dimension between the suspension bar centre line and the ground.

Measure dimension :

**H1** and **H2** at the front,

**H4** and **H5** at the rear,

and determine the difference



**F40X Phase II**

At the front :

$$H1 - H2 = 61 \pm 7,5 \text{ mm}$$

At the rear :

$$H4 - H5 = - 52 \pm 7,5 \text{ mm}$$

**NOTE :** A minus sign in front of a figure indicates that the position of the floor is higher than that of the wheel centre line in relation to the ground.

TYPE	QUANTITY	UNIT
Elf-Multi	5 g Coating	Seal lips Threads on wheel bolts
Molykote BR2	24 cm <sup>3</sup> Coating	Steering box Drive shaft splines at gearbox end Torsion bar splines
CAF 4/60 THIXO	1 - 2 drops	Pin hole in drive shaft
Molykote 33 Medium	Coating	Anti-roll bar bearings
Loctite FRENBLOC	1 - 2 drops	Thread on axial ball joint Rear brake back plate mounting bolts
Loctite SCELBLOC	5 to 6 drops	Drive shaft stub axle
SAE W80 oil	Coating	Rear wheel stub axle

## Parts to be replaced when they have been dismantled

- Axial ball joint lock plate.
- Front hub bearing.
- Drive shaft bellows + bearing.
- Bearing clips.
- Stub axle lock nut.

# GENERAL

## Front Anti-Roll Bar Specifications

30

VEHICLE TYPE	F401 F404 F407 F40A F40F F40N F40P F40U F40V F40T F40Y	F404* F407* F40A* F40F* F40N* F40P* F40U* F40V* F40T* F40Y*
DIAMETER	22	21

## Rear Anti-Roll Bar Specifications

	4 BAR TYPE REAR AXLE	TUBULAR TYPE REAR AXLE
VEHICLE TYPE	F401 F404 F407 F40A F40F F40N F40P F40U F40V F40T F40Y	F404* F407* F40A* F40F* F40N* F40P* F40U* F40V* F40T* F40Y*
DIAMETER	23.4 mm	18 mm
NO. OF SPLINES AT WHEEL ENDS	31 splines	—
NO. OF SPLINES AT SHACKLE ENDS	30 splines	—

## Rear Suspension Bar Specifications

DIAMETER	23,2 mm	23,5 mm
NO. OF SPLINES AT BEARING ENDS	27 splines	27 splines
NO. OF SPLINES AT SHACKLE OR SUSPENSION ARM ENDS	26 splines	26 splines

\* Increased load option



# GENERAL

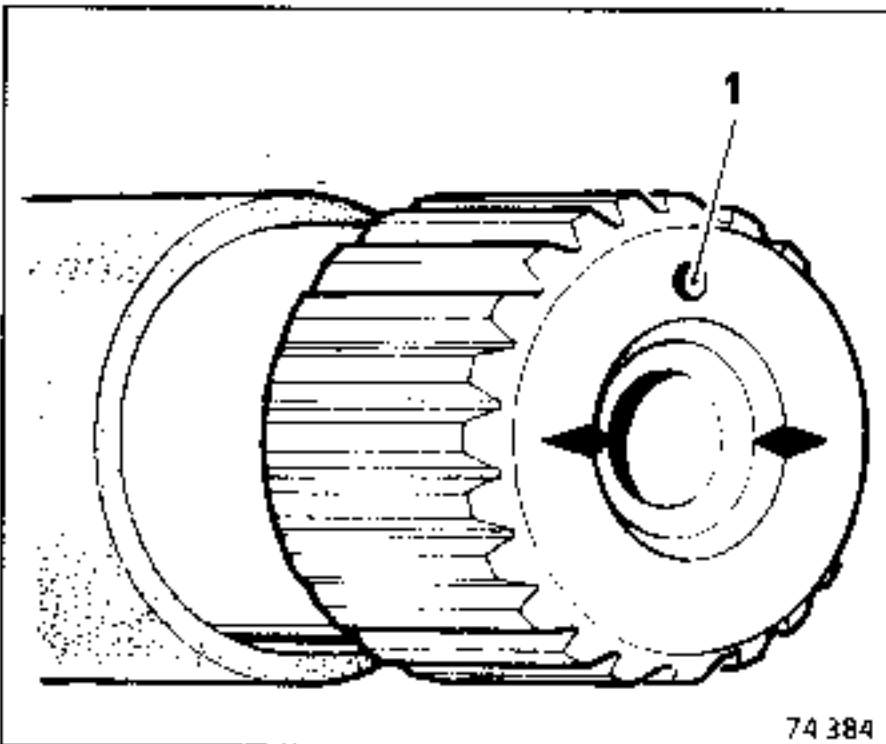
## Rear Torsion Bar Identification

**30**

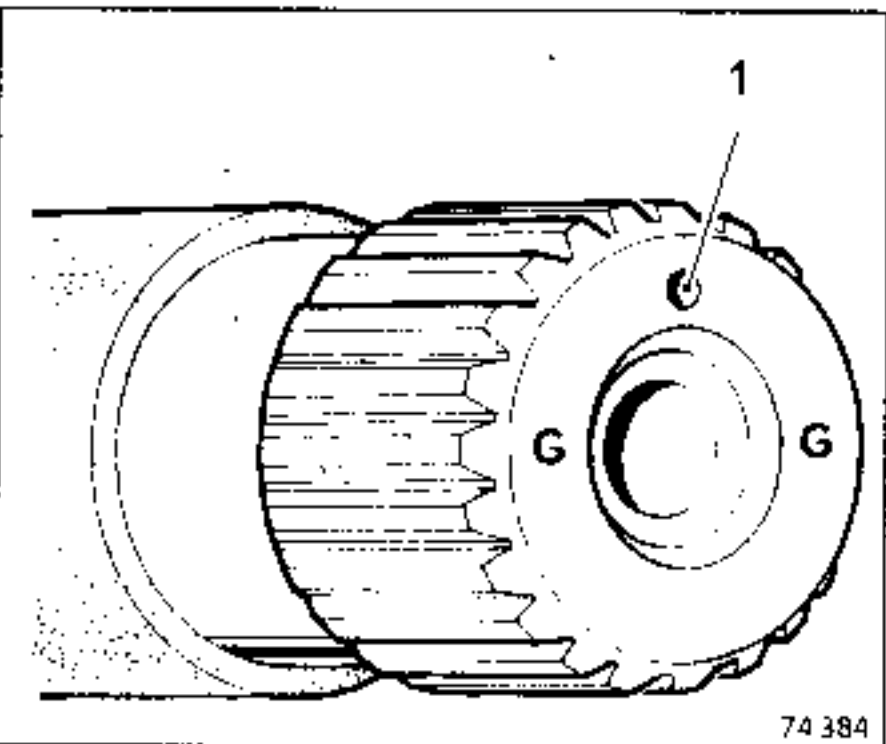
As the direction of torsion under load in these bars is reversed, the right-hand and left-hand bars are identified by :

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

LEFT-HAND BAR

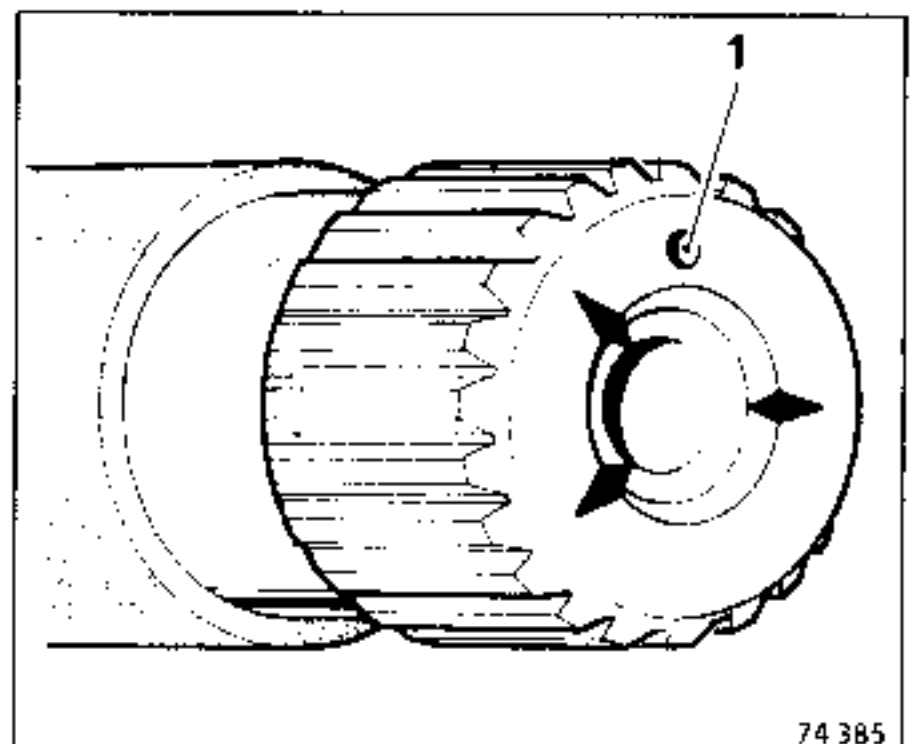


2 imprints

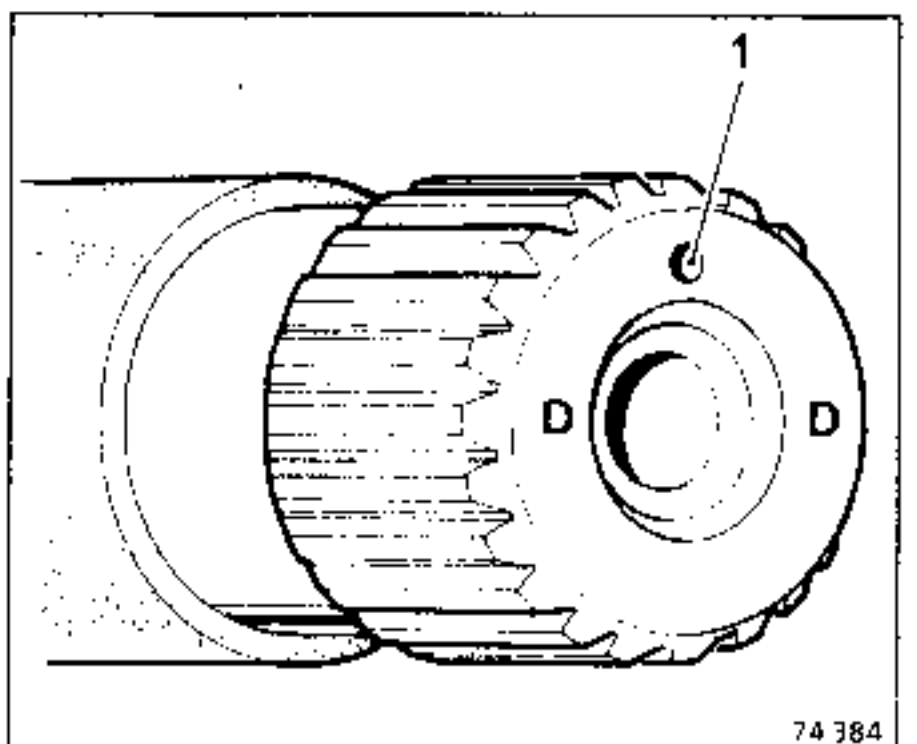


Letter G

RIGHT-HAND BAR



3 imprints



Letter D

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

### ESSENTIAL SPECIAL TOOLS

Fre. 573-01 Handbrake cable spring release pliers

Pliers for brake shoe spring

### TIGHTENING TORQUES (in daN.m)

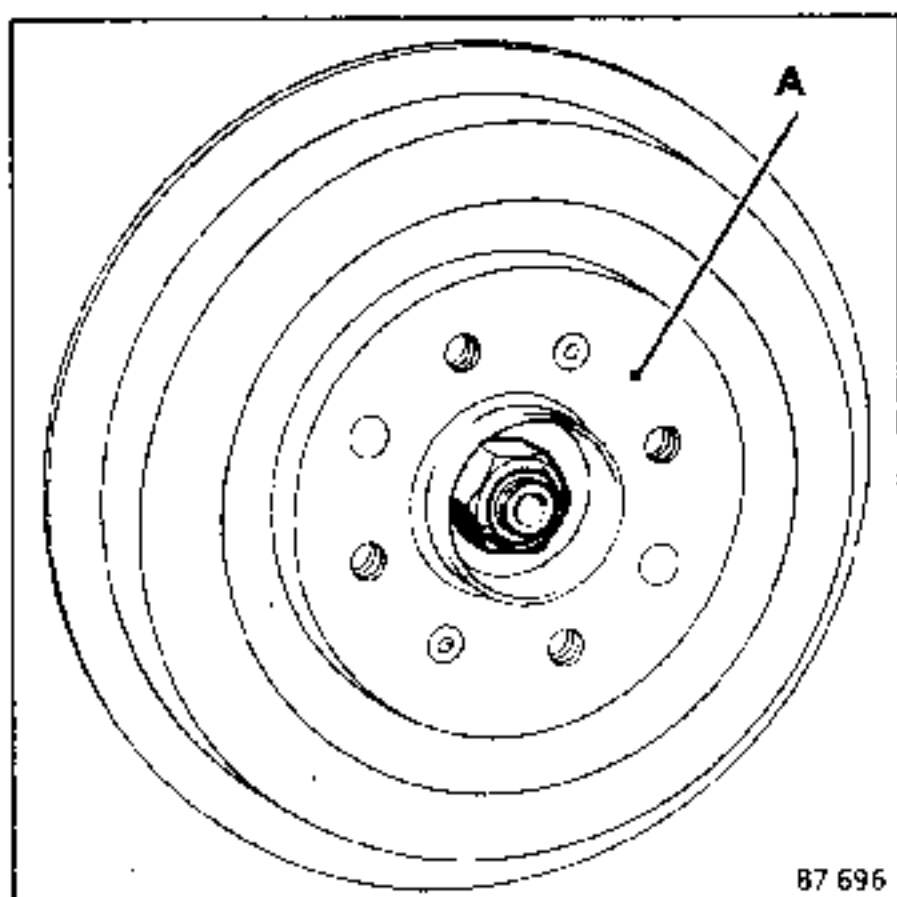


Wheel bolts	9
Stub axle nut	16.5 to 18.5

### REMOVAL

Remove :

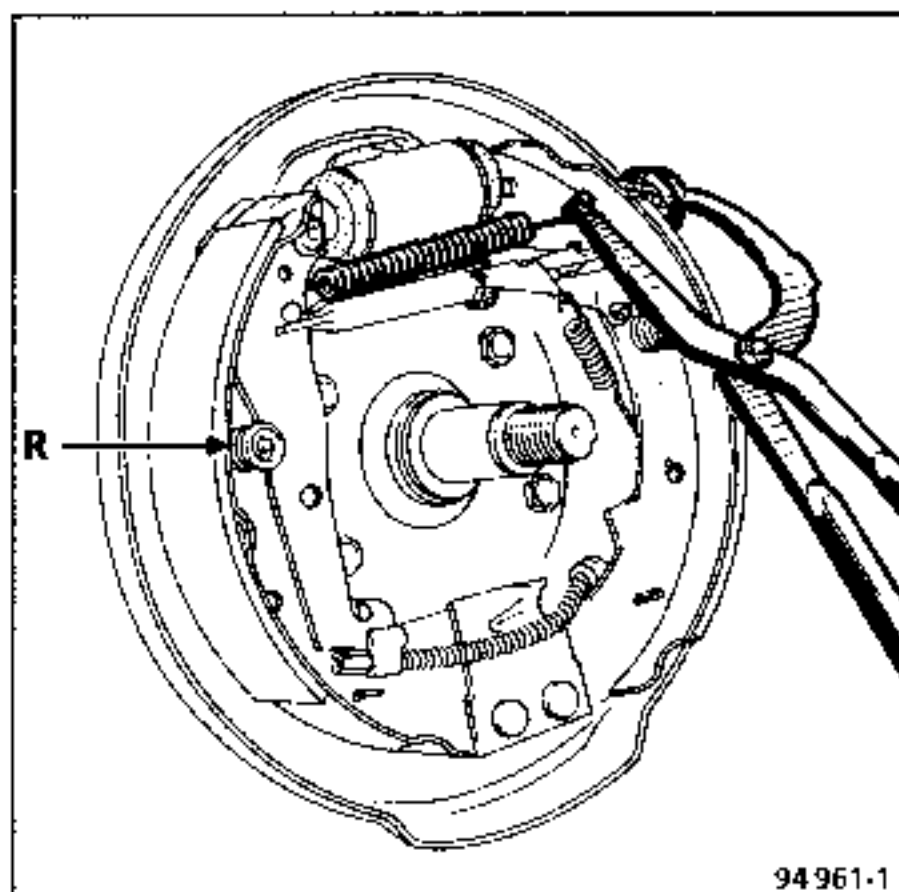
- hub cap,
- the drum - hub - nut assembly (A) (see section on "Rear brake drum").



Fit a clamp to the wheel cylinder pistons.

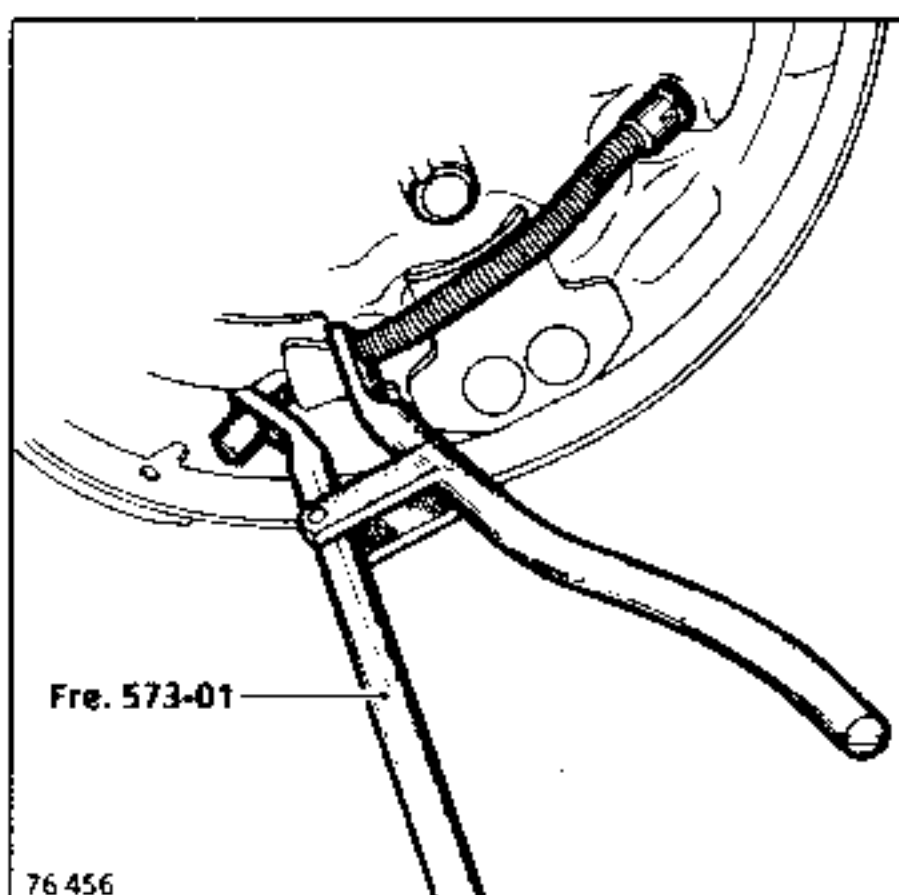
Using an end piece (of the valve adjusting spanner type), remove springs (R) holding the shoes at the side, keeping the connecting rod in contact with the brake anchor plate.

Slacken handbrake cable as much as possible.

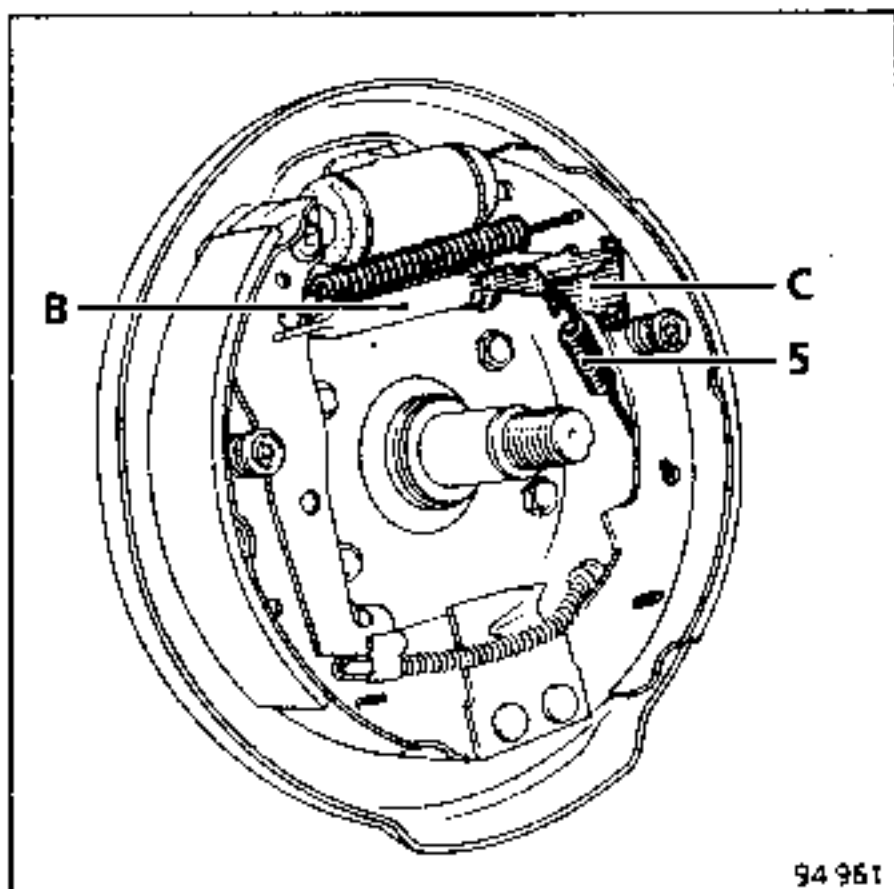


Remove :

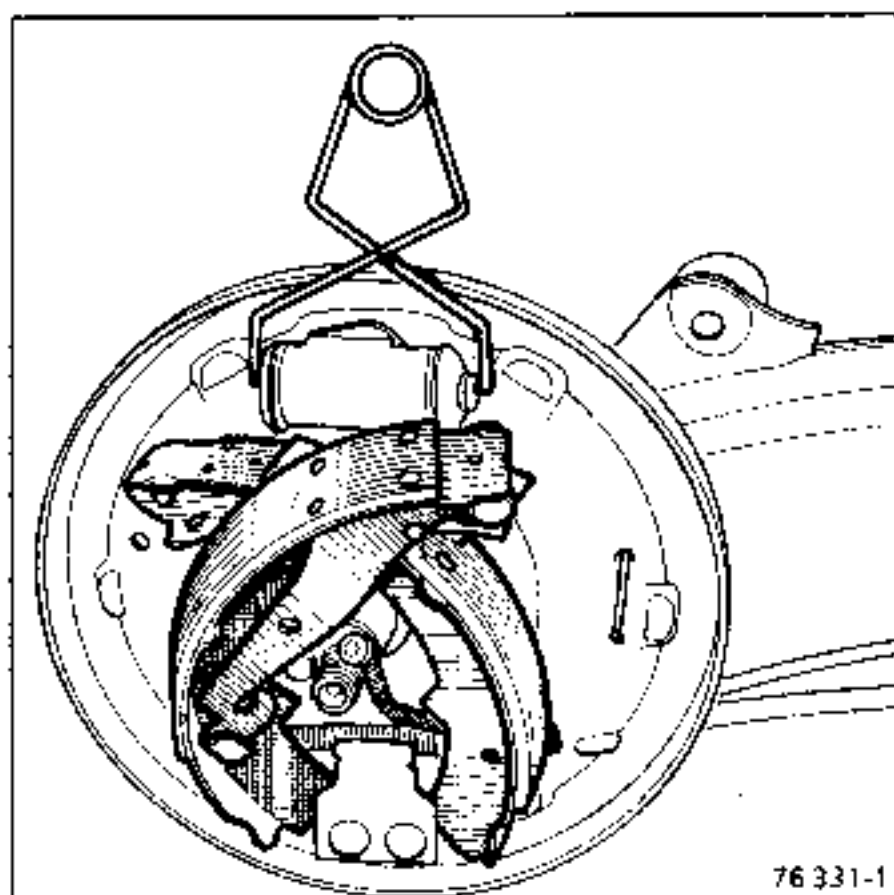
- the upper return spring,
- the handbrake cable, tool: Fre 573-01



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



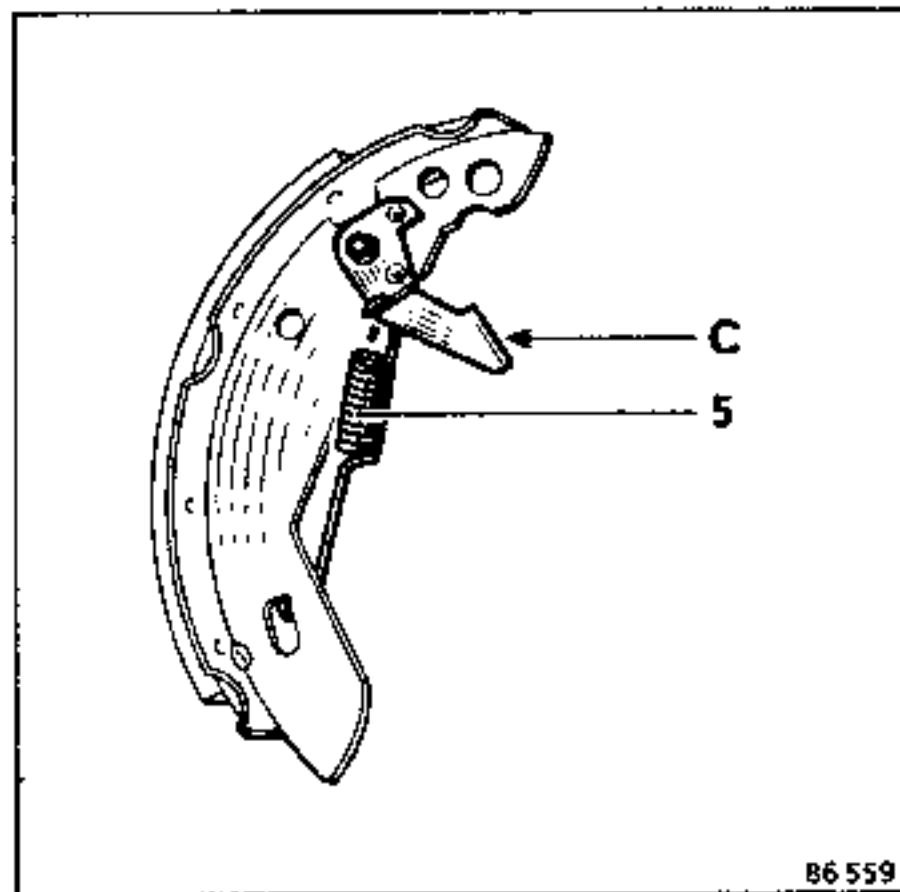
- the lining retainer mechanism (apply pressure and turn a quarter of a turn),
- the adjustable support link (B),



- the brake shoes, crossing them over on the stub axle to release the lower spring from behind the fixed point clamp.

From the leading brake 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.

Check the condition of the drums and hoses.

Hook the lower spring to the brake shoes.

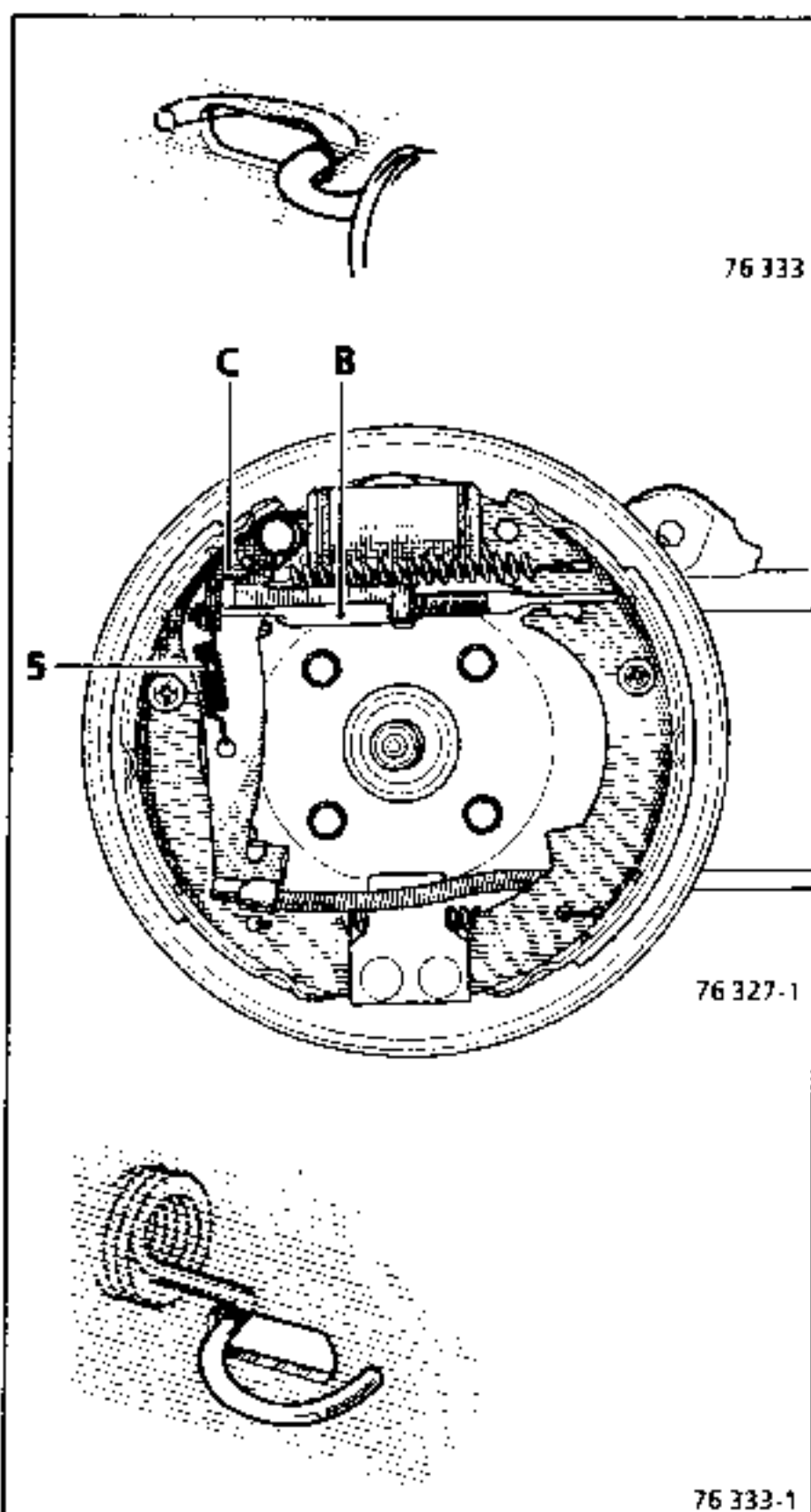
Cross over the brake shoes at the stub axle

Fit the return spring behind the fixed point clamp.

### REFITTING

Fit in position :

- the brake shoes,
- the adjustable support link (B),
- the brake lining retaining mechanism (apply pressure and turn through a quarter of a turn),
- the lever (C) tensioning spring (S),
- the adjusting lever (C).

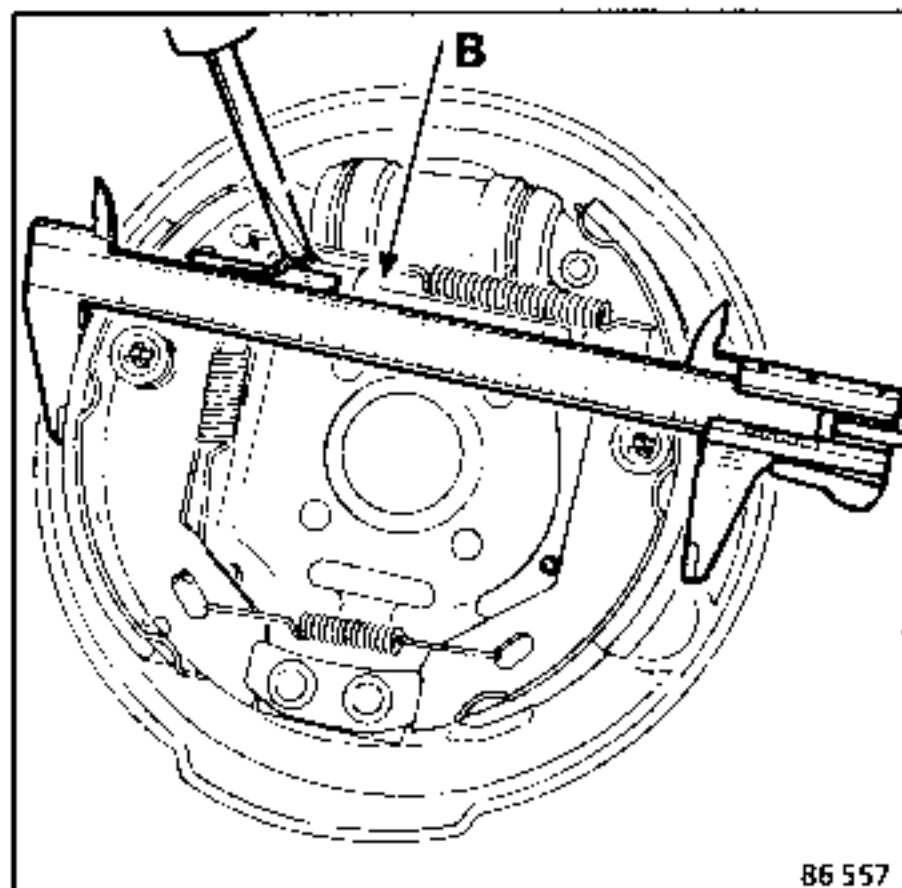


Position the handbrake cable, tool Fre. 573-01, and push the lever to the stop on the brake shoe.

Check that the ends of the upper and lower springs are correctly positioned on the brake shoes.

### ADJUSTMENT

Adjust the diameter across the shoes with a screwdriver at link (B) to obtain a diameter of 226.5 mm to 227.5 mm.



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

Replace the hub - drum assembly.


Torque tighten the stub axle nut.

Adjust the linings by pressing the brake pedal several times.

Adjust the handbrake.

Replace the cover on the anchor plate

The rear hubs of these vehicles have integrated bearings. As the bearing and the hub cannot be separated, if one of the two are faulty, it is necessary to replace the whole assembly

TIGHTENING TORQUES (in daN.m)		
Hub nut	16.5 to 18.5	
Wheel bolts	9	

REMOVAL

Remove :

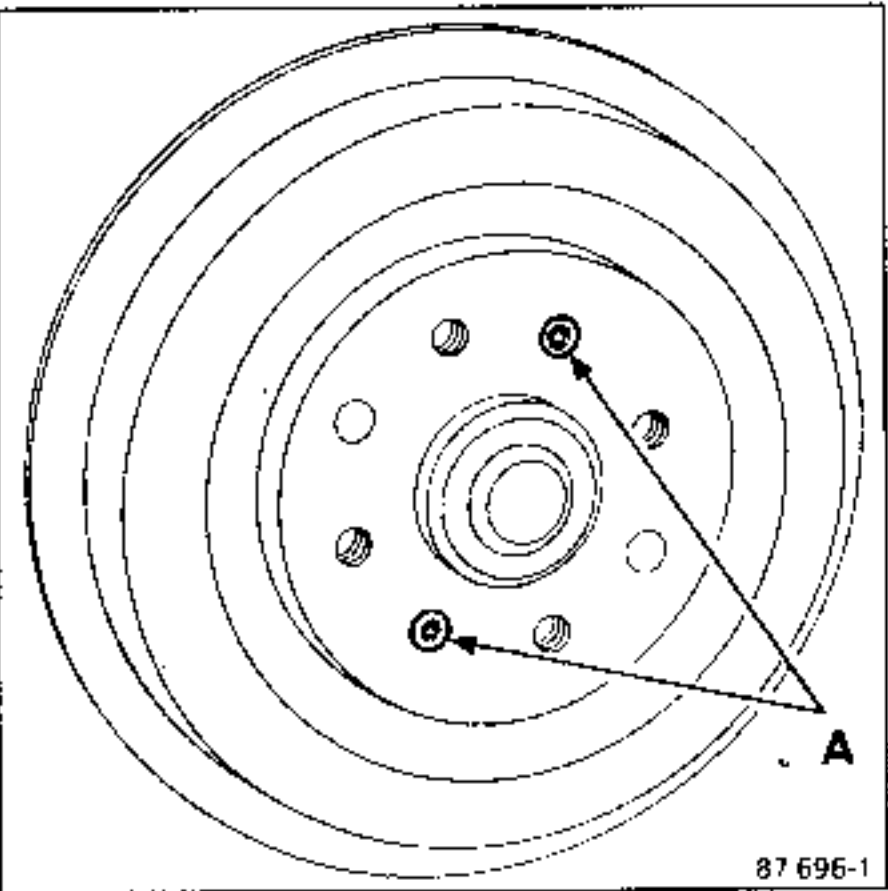
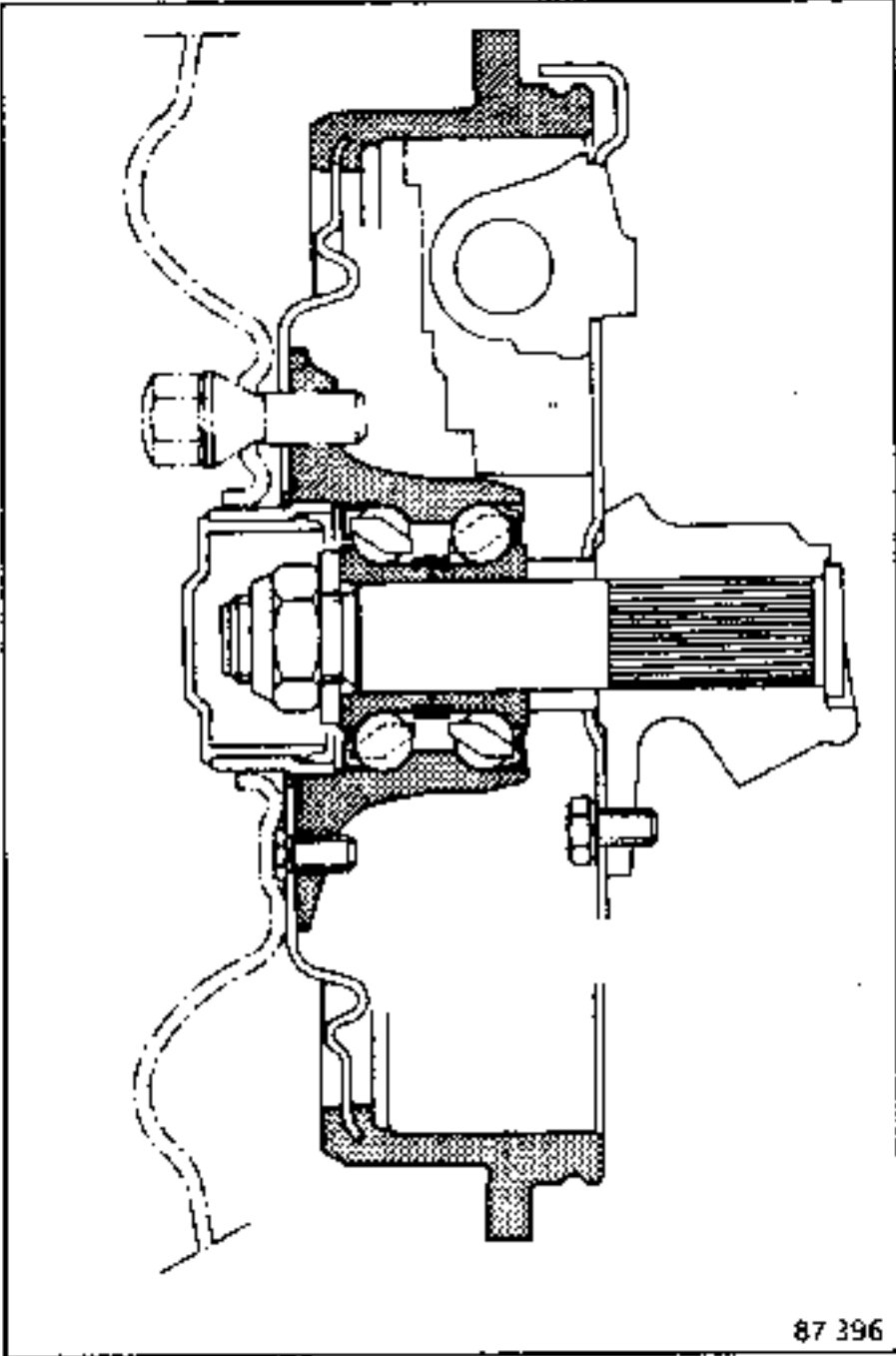
- the hub cap,
- the drum,
- the hub.

REFITTING

Lubricate the stub axle using oil SAE 80 W.

Fit:

- the hub and torque tighten it,
- the hub cap,
- the drum (bolt A, Torx T30).



This operation is performed when the complete rear axle has been removed and the two arms have been separated.

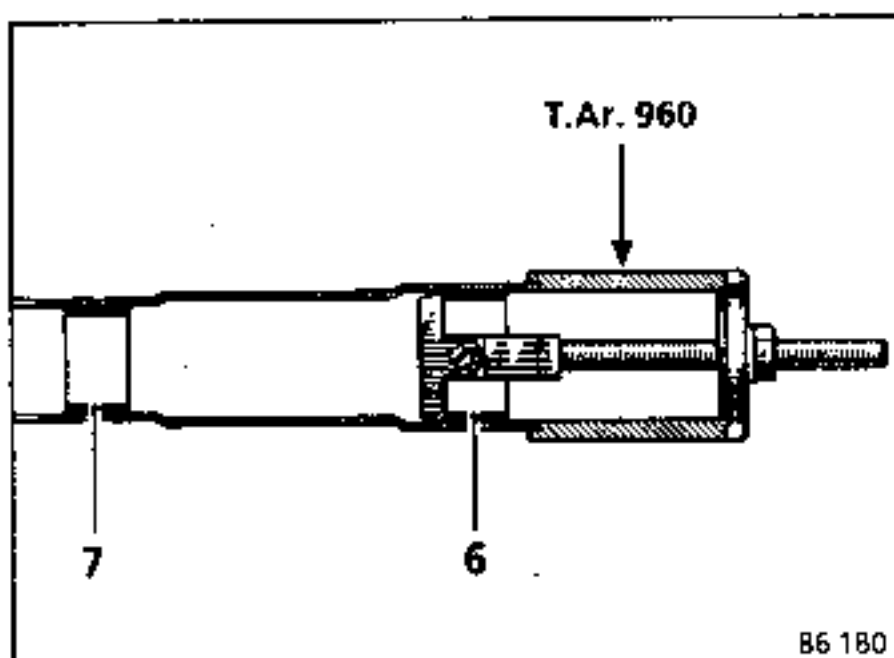
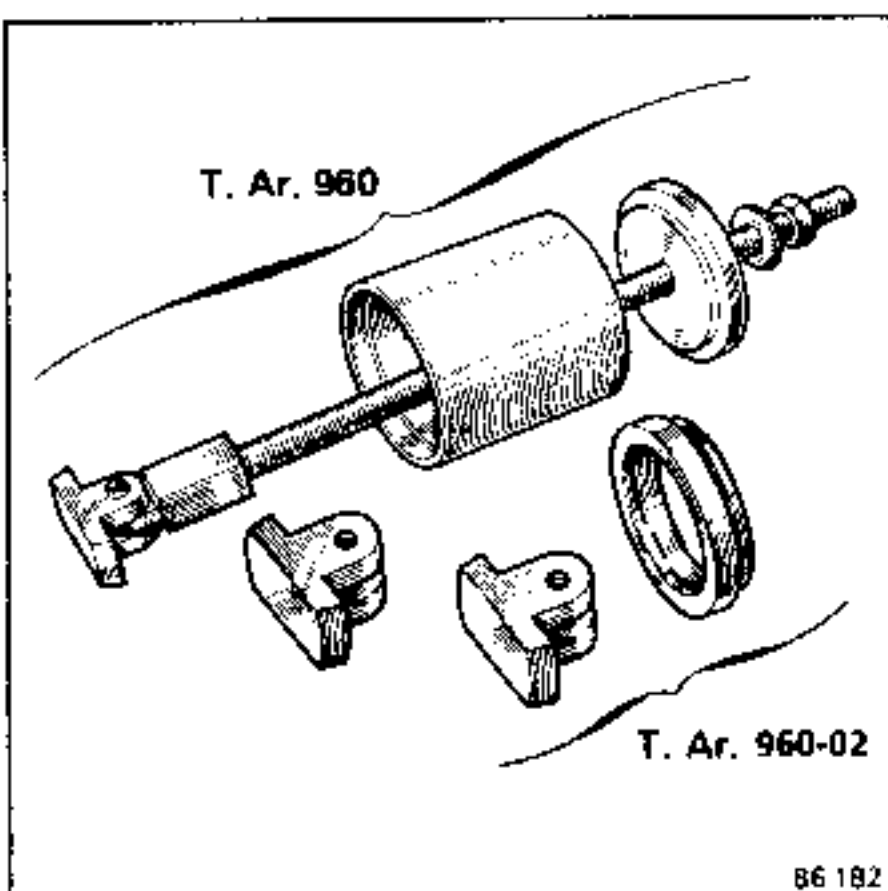
## ESSENTIAL SPECIAL TOOLS

T.Ar. 960-02	Axle bush extractor and spacer
T.Ar. 1 225	Tooling for replacing needle bearing bushes on the rear axle

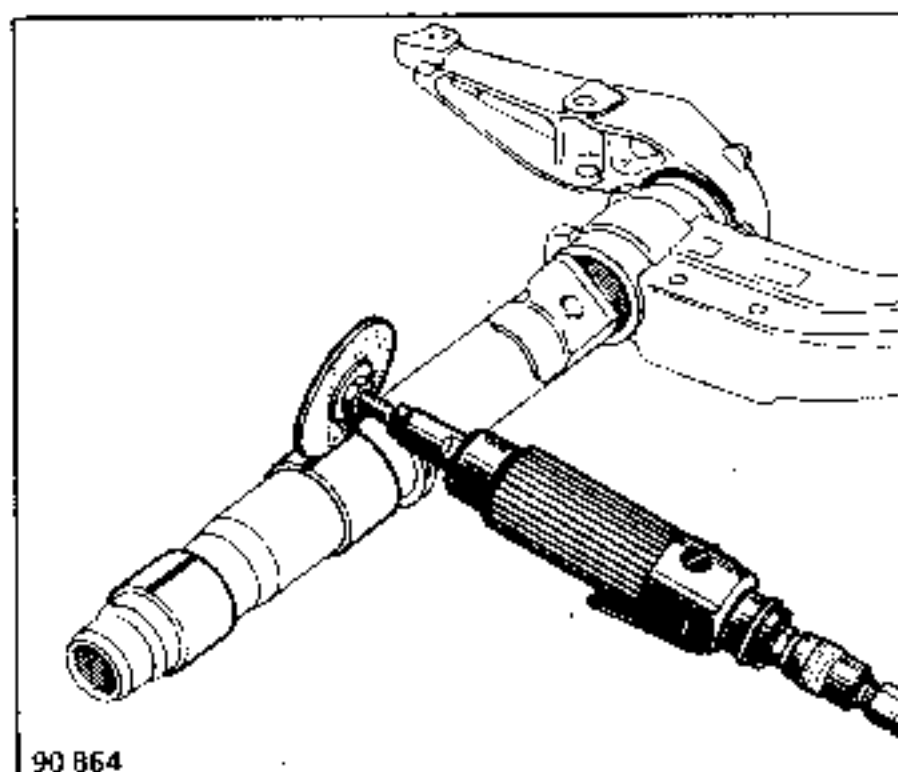
## DISMANTLING

From the female arm (left-hand side) extract:

- the outer bush (6) tool T. Ar. 960,
- the inner bush (7) using the small end piece from tooling T. Ar.,

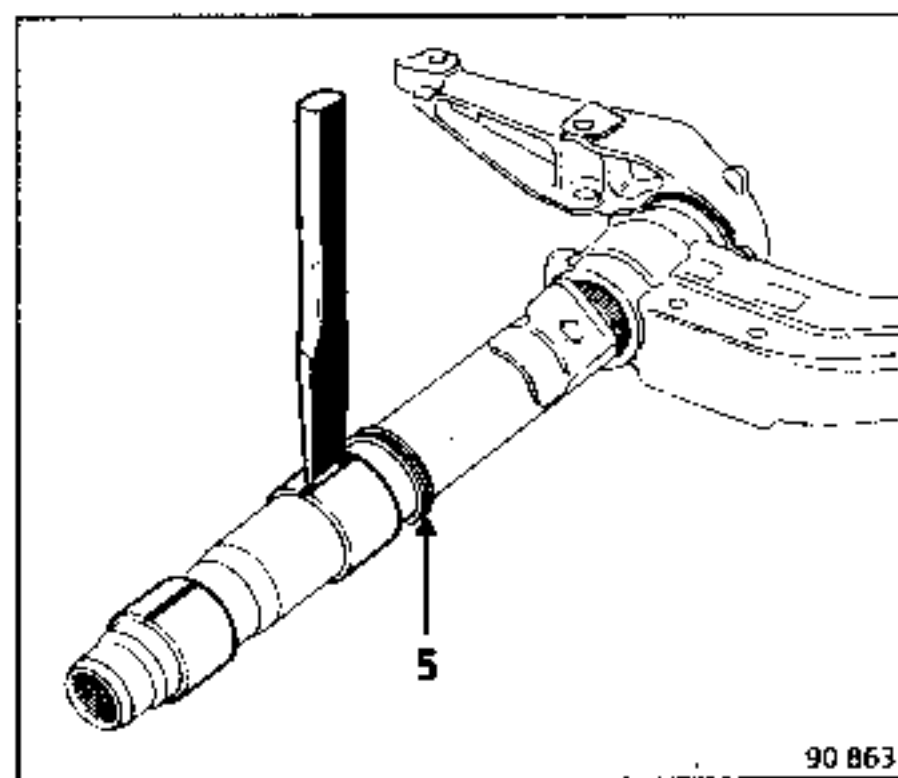


Grind the bearing races on the male arm (right-hand side) using a straight grinder, taking care not to mark the tube.



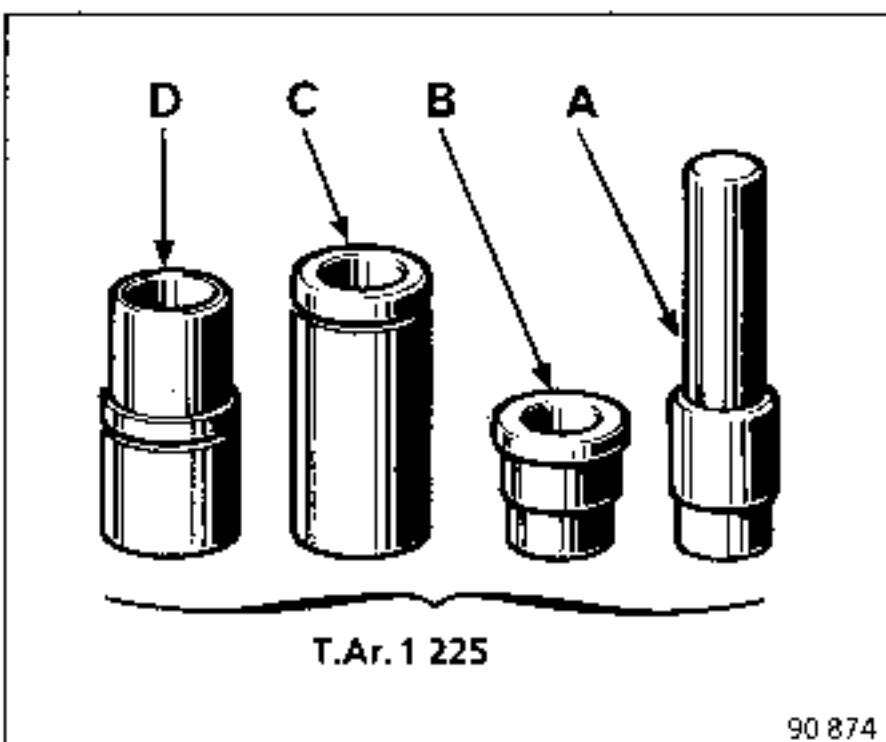
Split the bearing races with a chisel, then remove them.

Cut and remove coupling (5).



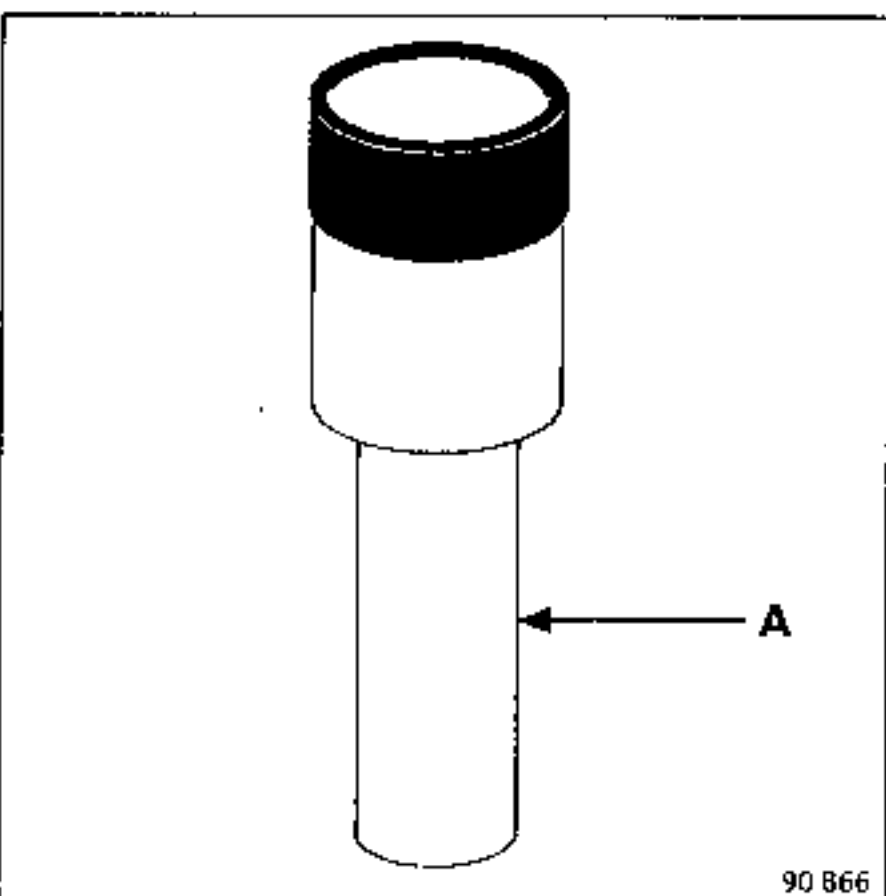
### REASSEMBLY

Tooling T. Ar. 1 225 has to be used in order to fit the needle bearing bushes and bearing races

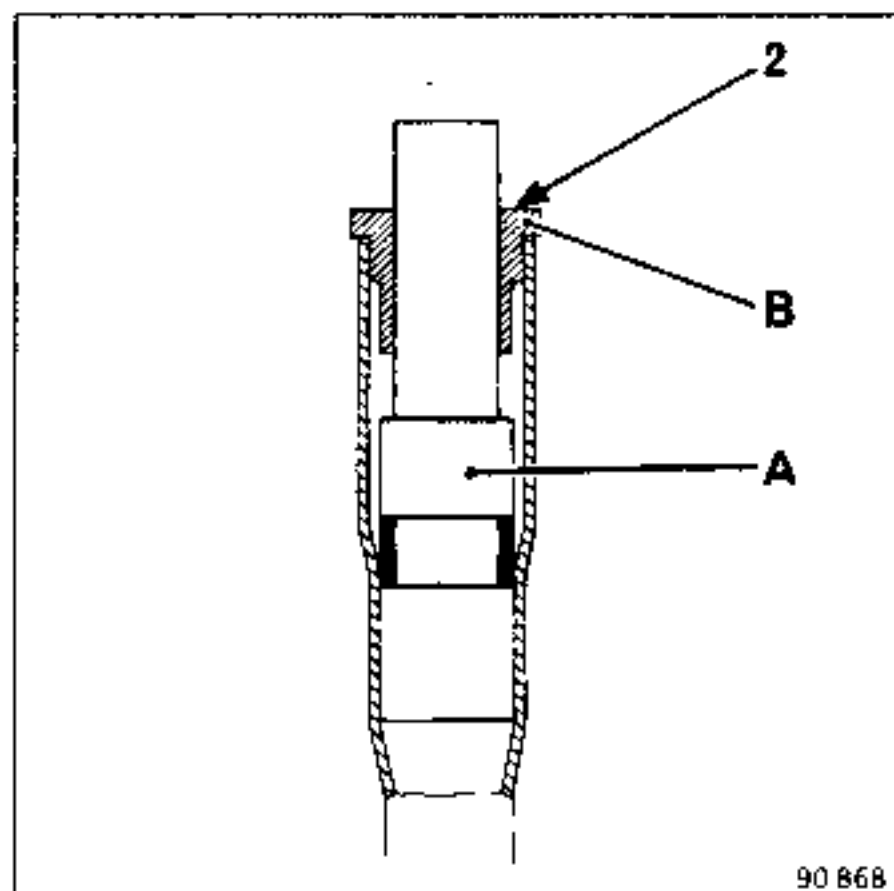


### Fit in place :

- the small needle bearing bush on the mandrel (A),
- the mandrel (A) in the tube with the mandrel (B) used as a guide.

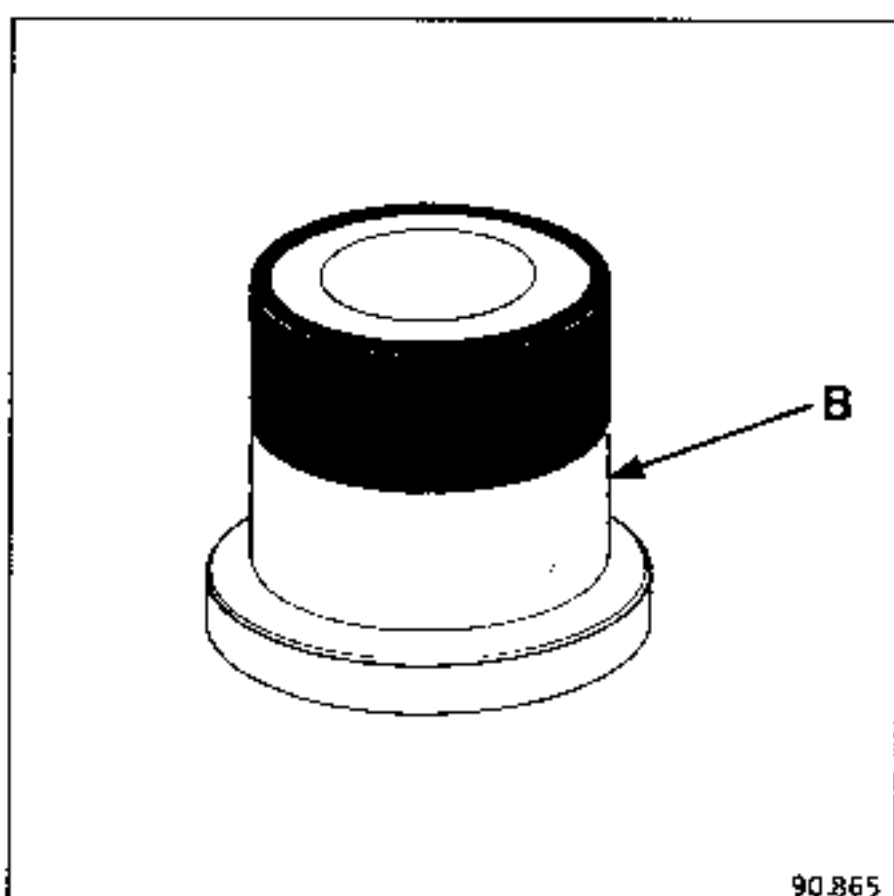


On the press, fit the parts until mandrel (A) is flush with face (2) of mandrel (B).

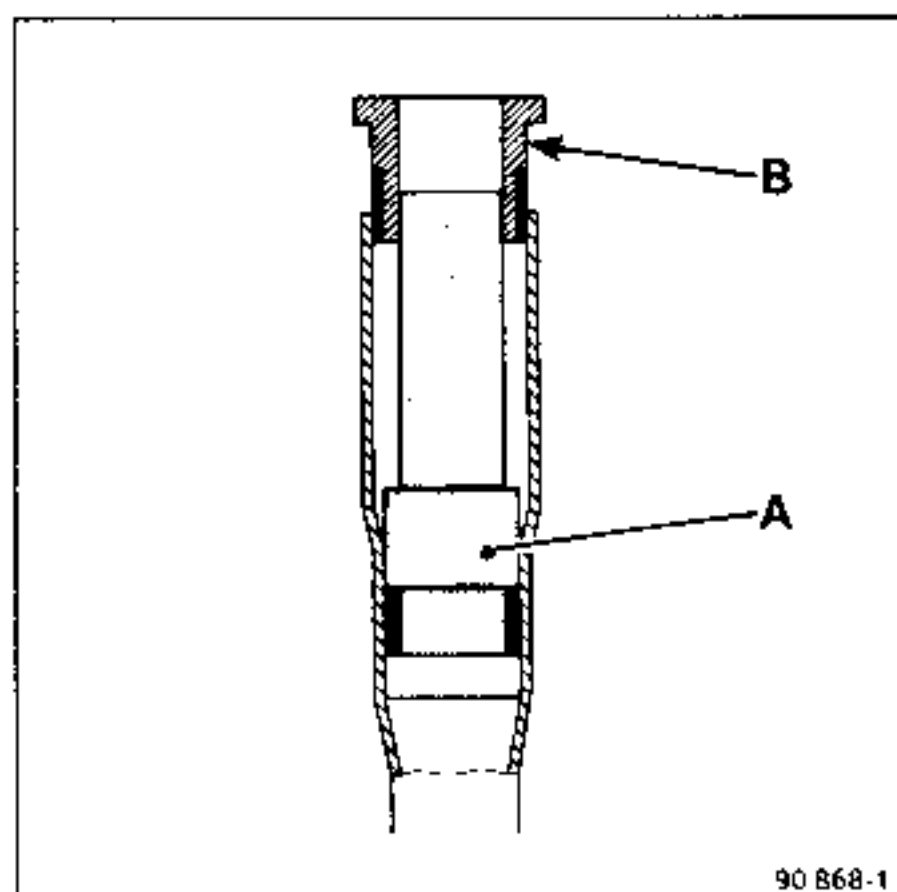


### Position:

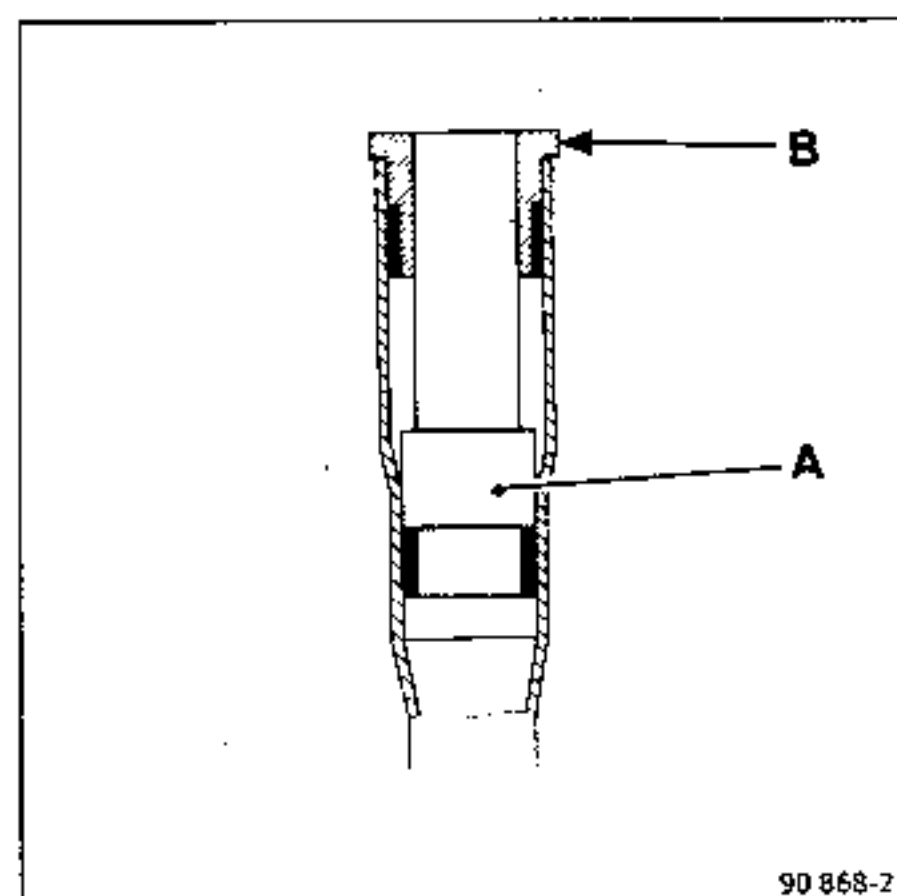
- the large needle bearing bush on the mandrel (B),



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



On the press fit the parts until mandrel (B) is bearing on the tube.

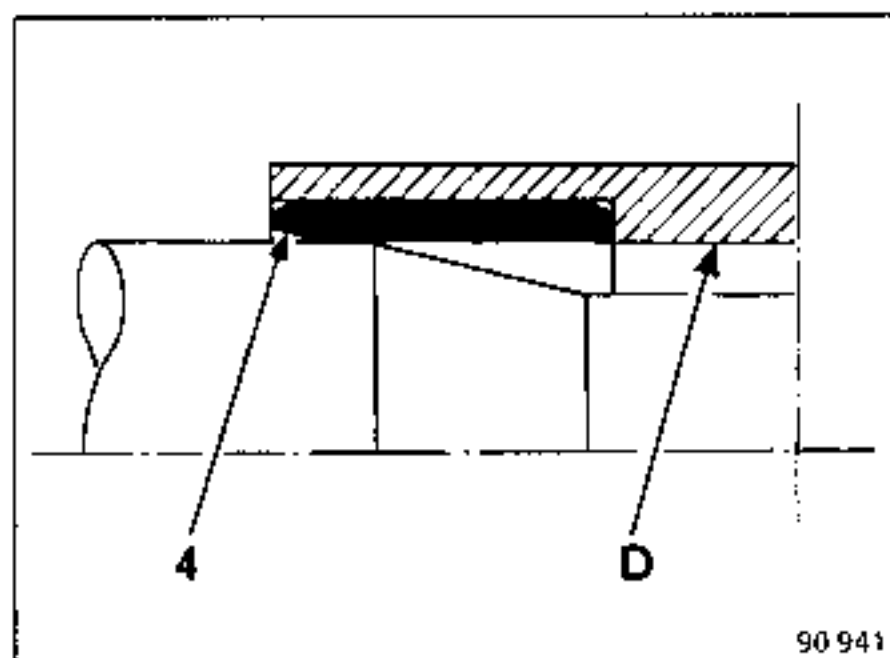


Remove mandrels (B) and (A).

Fit a new seal (5) on the male tube.

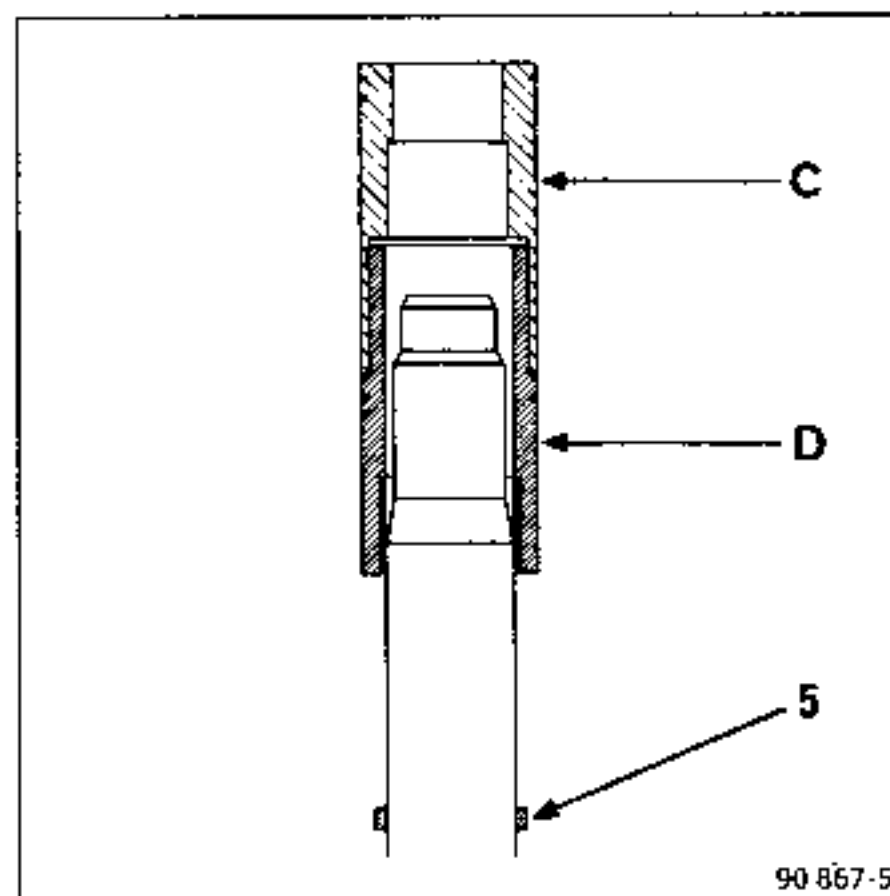
The bearing races have an inlet chamfer on one side.

The parts must be fitted in the correct direction: chamfer (4) directed as shown in the drawing so that sufficient support is retained for fitting the bush.



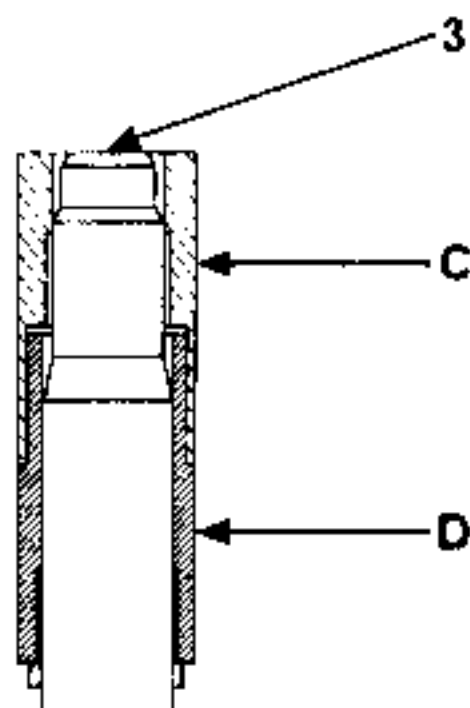
Fit in place :

- the large bearing race in the sleeve (D),
- sleeve (D) and (C) assembly on the tube.





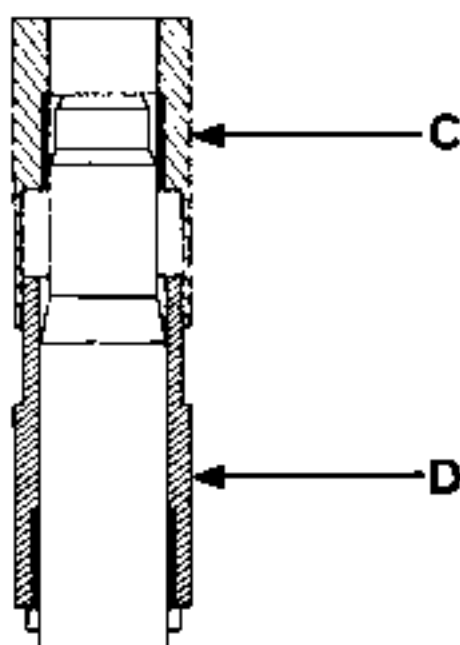
Fit assembly (D) and (C) until sleeve (C) is flush with the edge (3) of the tube.



90 867-2

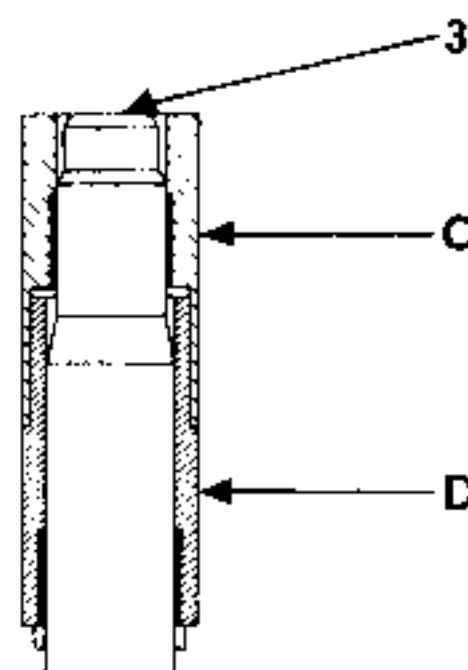
### Position:

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



90 867-3

On the press fit the parts until sleeve (C) is flush with the edge (3) of the tube.



90 867-4

Remove sleeves (C) and (D).

### IMPORTANT

When fitting the parts, if the weight was taken on the axle mounting bearings, it is essential to ensure that the suspension bars are correctly positioned in their anchorages (risk of movement).

Re-centre them if necessary.

Assemble the two half-shafts.

**NOTE :** The needle bearing bushes do not have to be lubricated as they are supplied ready greased.

Then re-couple and refit the rear axle to the vehicle.

# WHEELS AND TYRES

## Specifications

35

Type	Rim	Rim run-out (mm)	Wheel nut tightening torque (daN.m)	Tyres	Tyre Pressure (bar)	
					Front axle	Rear axle
F401	5 x 13	1,2	8	145 / 70 R13 145 / 80 R13	2,1	2,5
F404 F407 F40A F40F F40N F40P F40U F40V F40T F40Y	5 x 13	1,2	8	155 / 70 R13 155 / 80 R13	2,1	2,5
F404* F407* F40A* F40F* F40N* F40P* F40U* F40V* F40T* F40Y*	5 x 13	1,2	9	165 / 70 R13	2,4	4,2

\* Increased load option

### BRAKE COMPENSATOR

#### The Principle of the Test

These vehicles are equipped with a load controlled brake compensator. The pressure readings are taken on opposite sides of the vehicle to compare a given pressure on the rear wheels with that on 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.

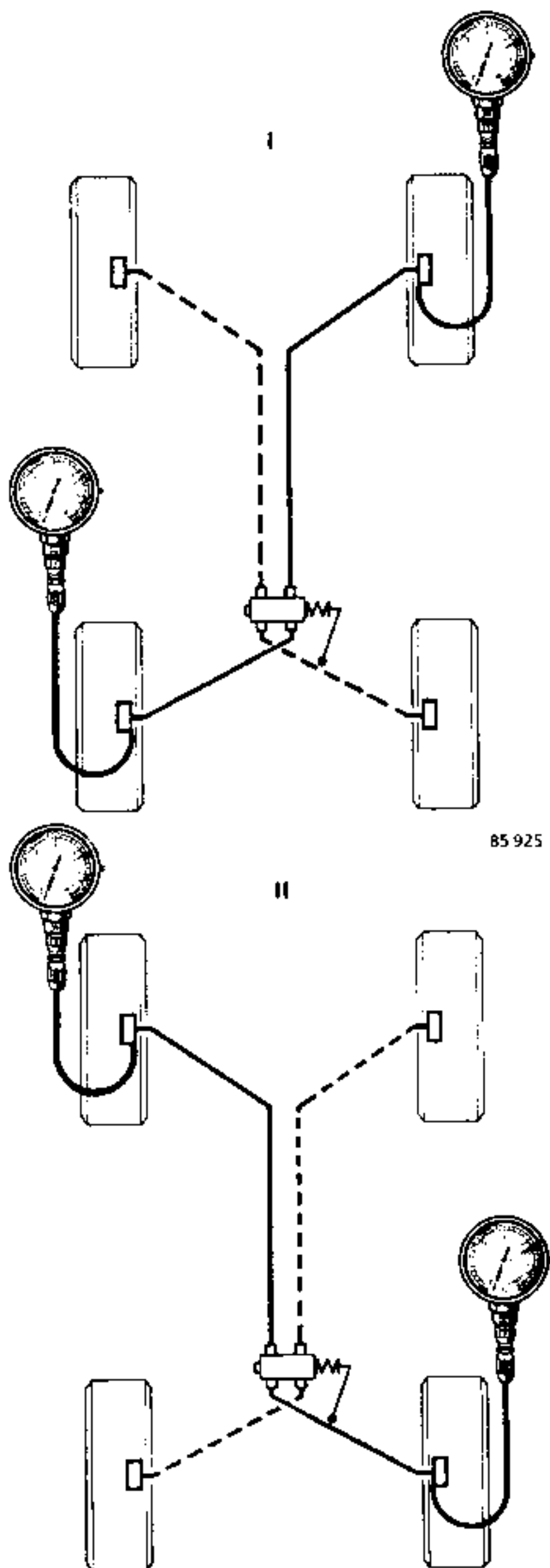
It is essential to check both the circuits.

- 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



BRAKE COMPENSATOR

Adjustment Figures

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
F40X Phase II	 Full 90 966	100 → 37 <sup>+0</sup> <sub>-8</sub>	

# CONTROLS

## Brake Compensator

**37**

The brake compensator is to be tested and adjusted with the vehicle on the ground and one person sitting in it.

ESSENTIAL SPECIAL TOOLS	
Fre. 1 085 or Fre. 244-04 with connection 284-06	Complete brake pressure gauge kit

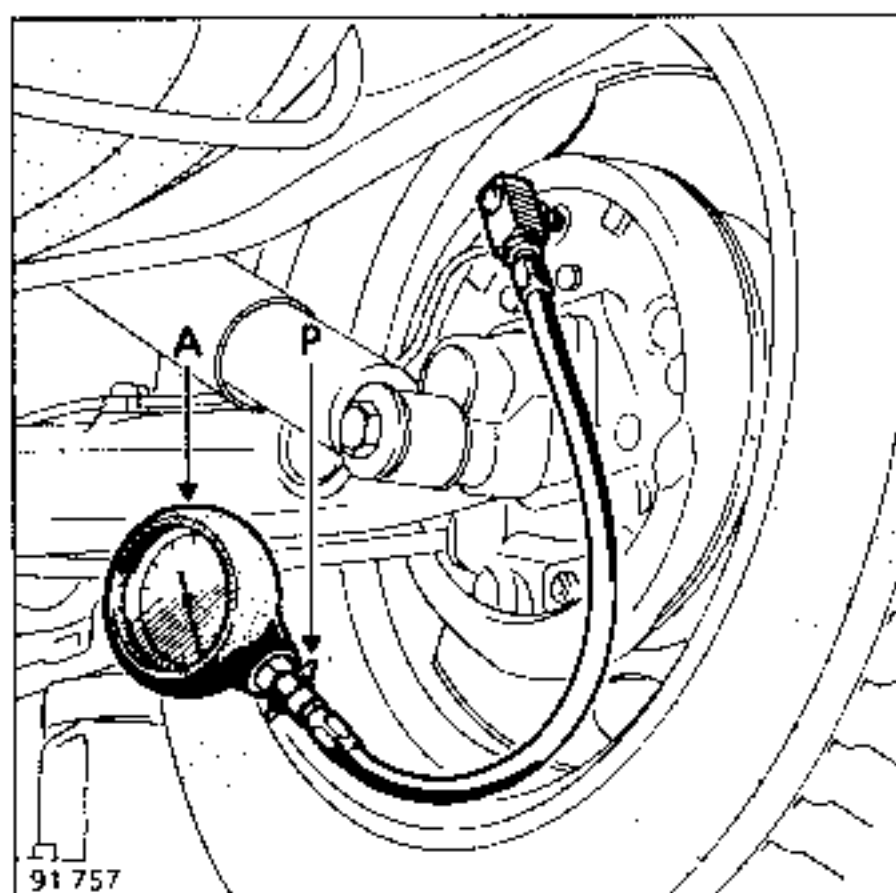
As the compensator has two separate bodies, it is essential to test one after the other.

### TEST

Connect two pressure gauges Fre. 1 085 :

- one to the front left-hand wheel,
- one to the back right hand wheel.

Bleed the brake circuit (the pressure gauge is bled by screw (P)).

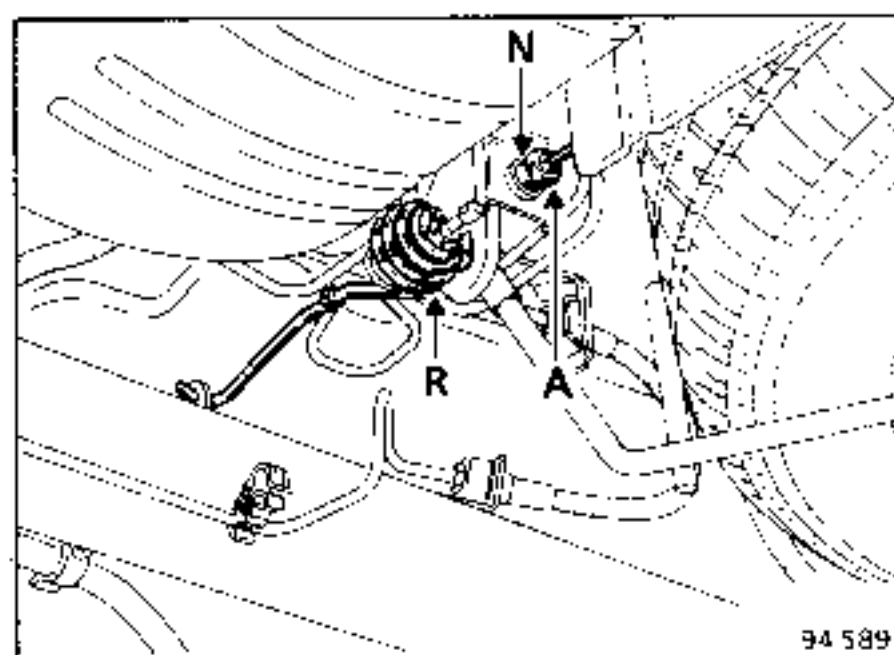


Press gradually down on the brake pedal until the test pressure is obtained on the front wheels (see the pressure chart). Read off the corresponding pressure on the rear wheels and correct it if necessary.

Carry out the same operations on the other circuit.

If, after adjustment, there is any considerable difference, replace the brake compensator. No repair work whatsoever is permitted.

### ADJUSTING



Slacken off nut (A) and change position of nut (N) to compress or release the spring (R) until the correct value is obtained.

### REPLACEMENT

The Parts Department supplies exchange compensators which are already adjusted and fitted with a brace.

The conditions for testing the brake compensator should be as specified.

Fit in place the new compensator.

Slacken off nut (A).

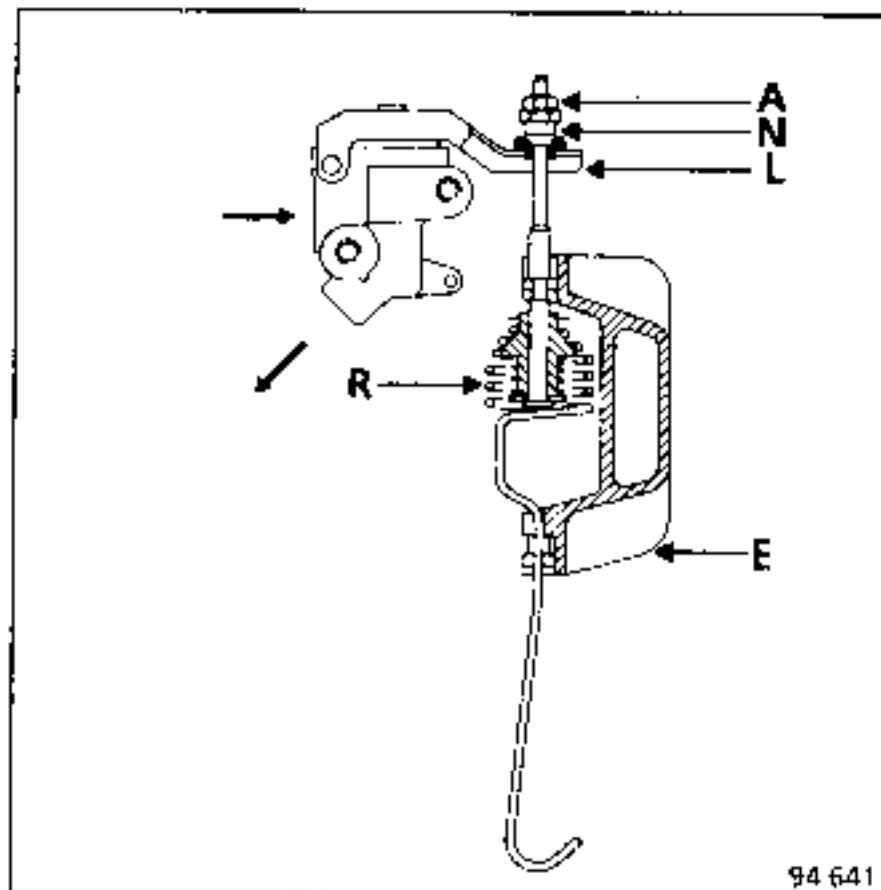
Attach the hook of the spring (R) to the suspension.

Apply pressure to the lever (L) and screw up the adjusting nut (N) until it makes contact with the lever.

Tighten the lock nut (A).

Remove the brace (E).

Bleed and test the circuit (see section of testing and adjustment).



### Special Feature of the Compensator Control:

When the vehicle is in the "wheel free" position, this type of control allows pressure to be applied to the lever so that the compensator is in "valves open" position during the bleeding operation.

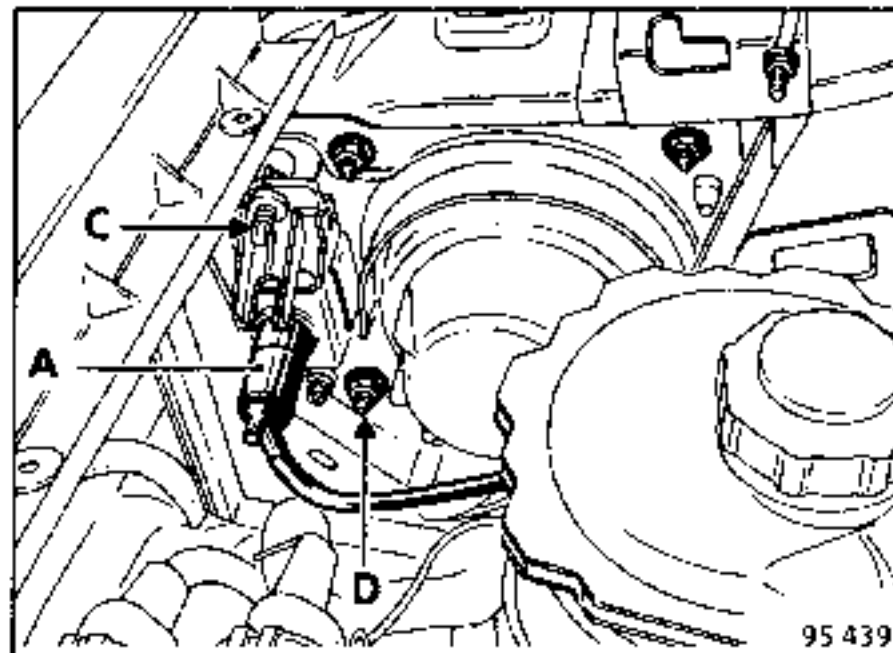
### REMOVING - REFITTING

#### Disconnect:

- the battery,
- the two connectors on the beam unit.

#### Remove:

- The radiator grille by removing the 5 upper screws and the 4 lower screws,
- the unit for setting the beam angle (A) by turning it through a quarter of a turn (if the vehicle has one),
- the beam units by removing the 4 mounting nuts.



Take out the beam unit (forwards).

#### Special operations during refitting :

After refitting the beam units, they must be adjusted.

### ADJUSTMENT

Ensure that the vehicle is unladen and that the beam setting is at 0 (if the vehicle is fitted with this unit).

Then adjust height by means of screw (C) and direction by screw (D).

# WIPERS

## Rear Screen Wiper

**85**

### REMOVAL

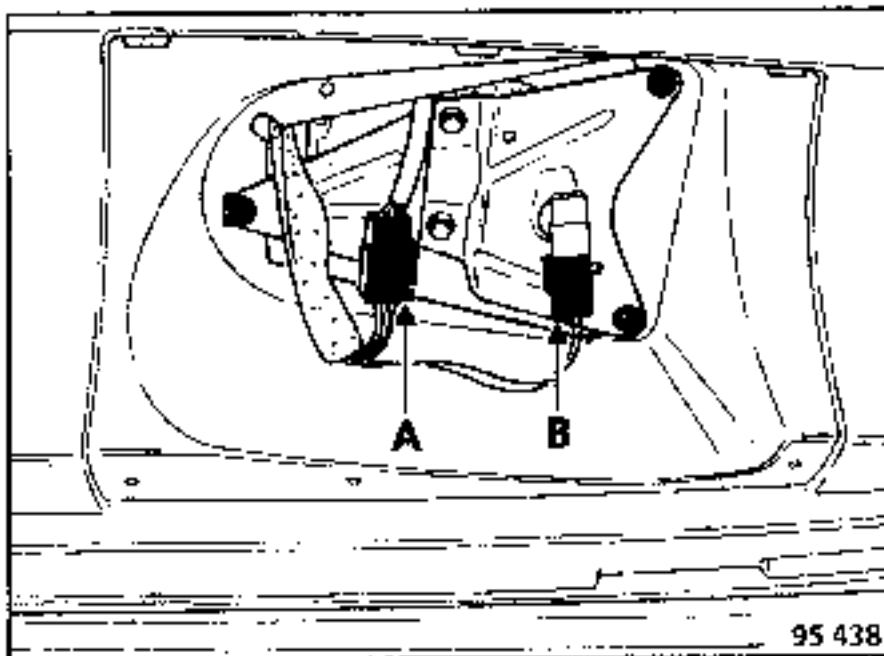
Disconnect the battery.

Remove:

- the wiper arm mounting nut,
- the blade carrier.

In the interior:

- Take off the motor cover by removing the 3 screws with their mounts,
- Disconnect the motor connector (A) and the boot light switch (B),
- Remove the three screws securing the motor and take it out.



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### REFITTING

Check that the motor is in the fixed park position before refitting the wiper arms

Connection:

Pin	Description
1	+ wiper
2	+ fixed park
3	earth