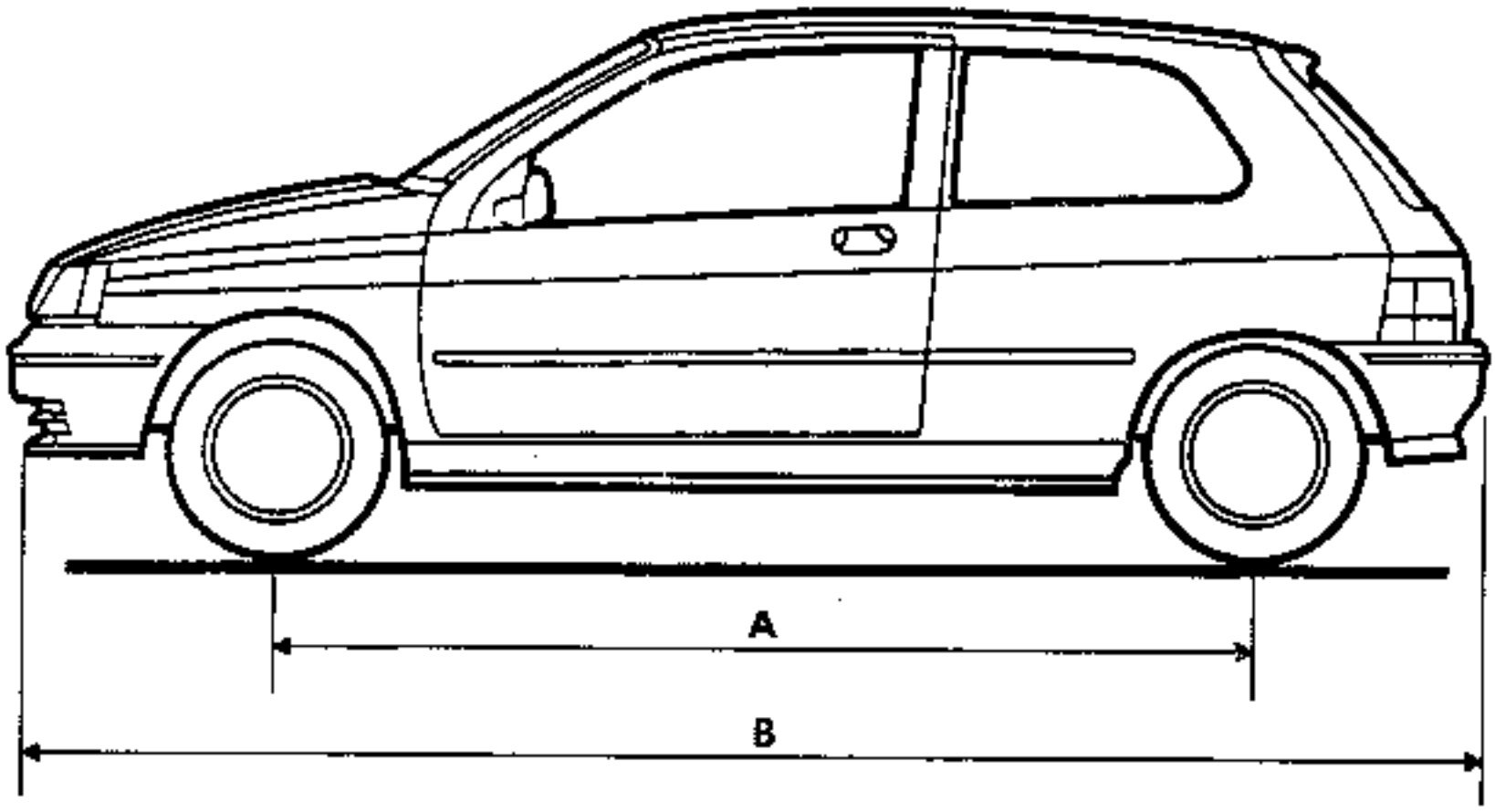
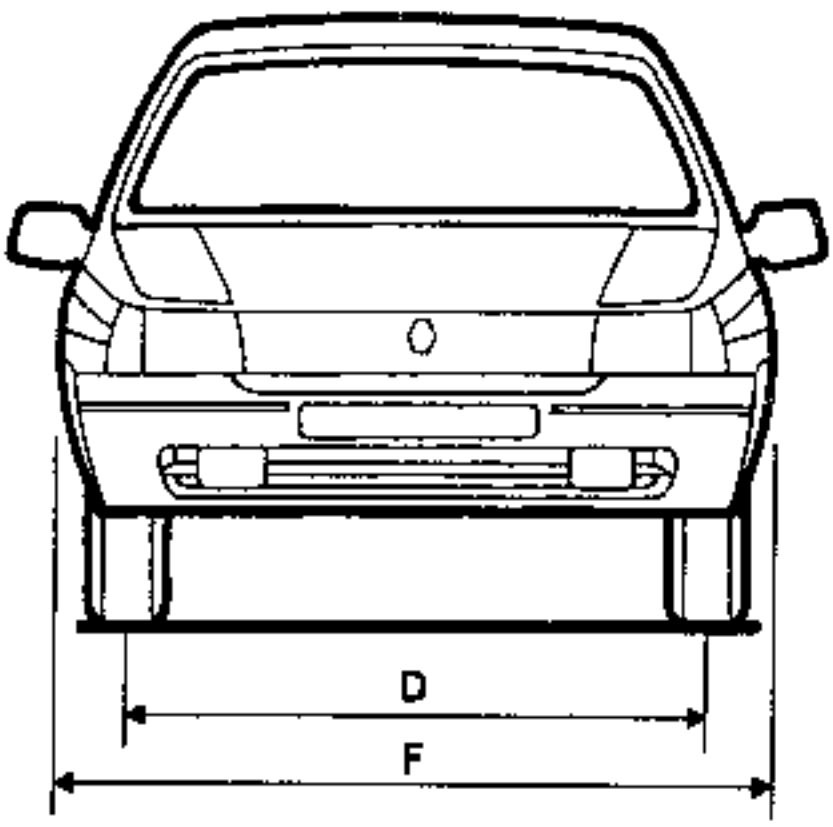
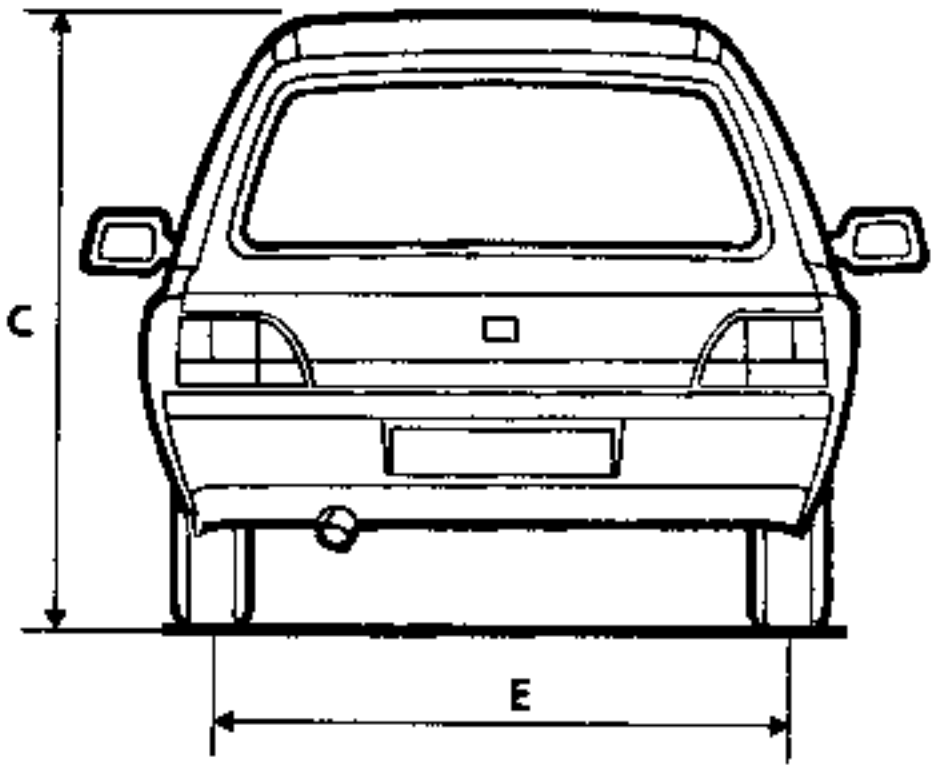






Key	Dimensions in metres
A	2.472
B	3 712
C	1.365 (unladen)
D	1 402
E	1.351
F	1.641

LIFTING
Trolley jack

SPECIAL TOOLING REQUIRED	
Cha. 280 -02	Trolley jack block
Cha. 408 -02	Trolley jack support

Never lift a vehicle with the weight supported under the front suspension arms or the rear axle assembly. Depending on the type of trolley jack used, use supports **Cha. 408-02** to fit the block **Cha. 280-02**.

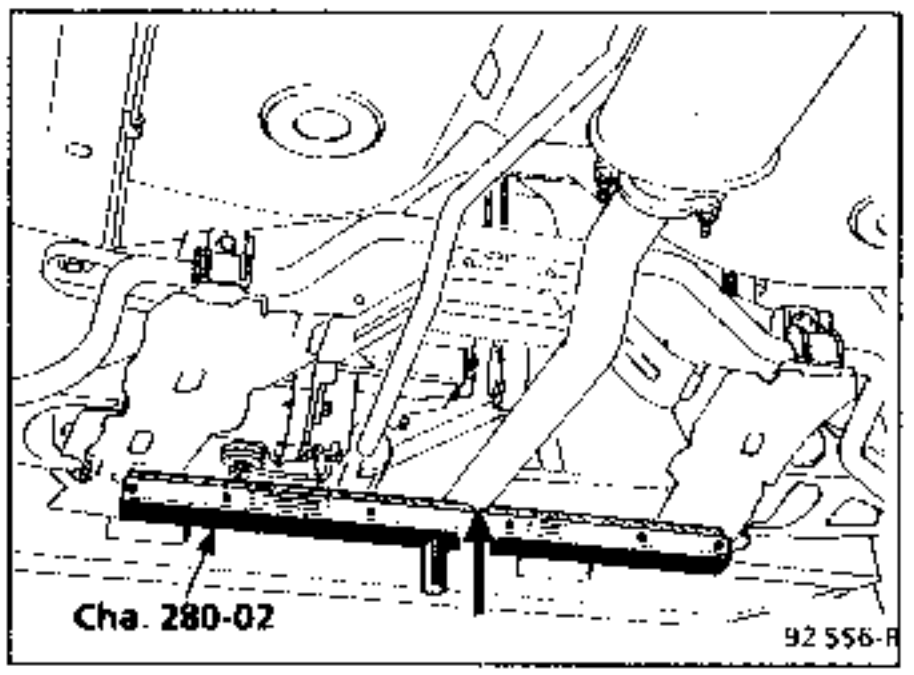
TROLLEY JACK USED FROM THE FRONT

Apply the handbrake or chock the rear wheels.

Use block **Cha. 280-02**.

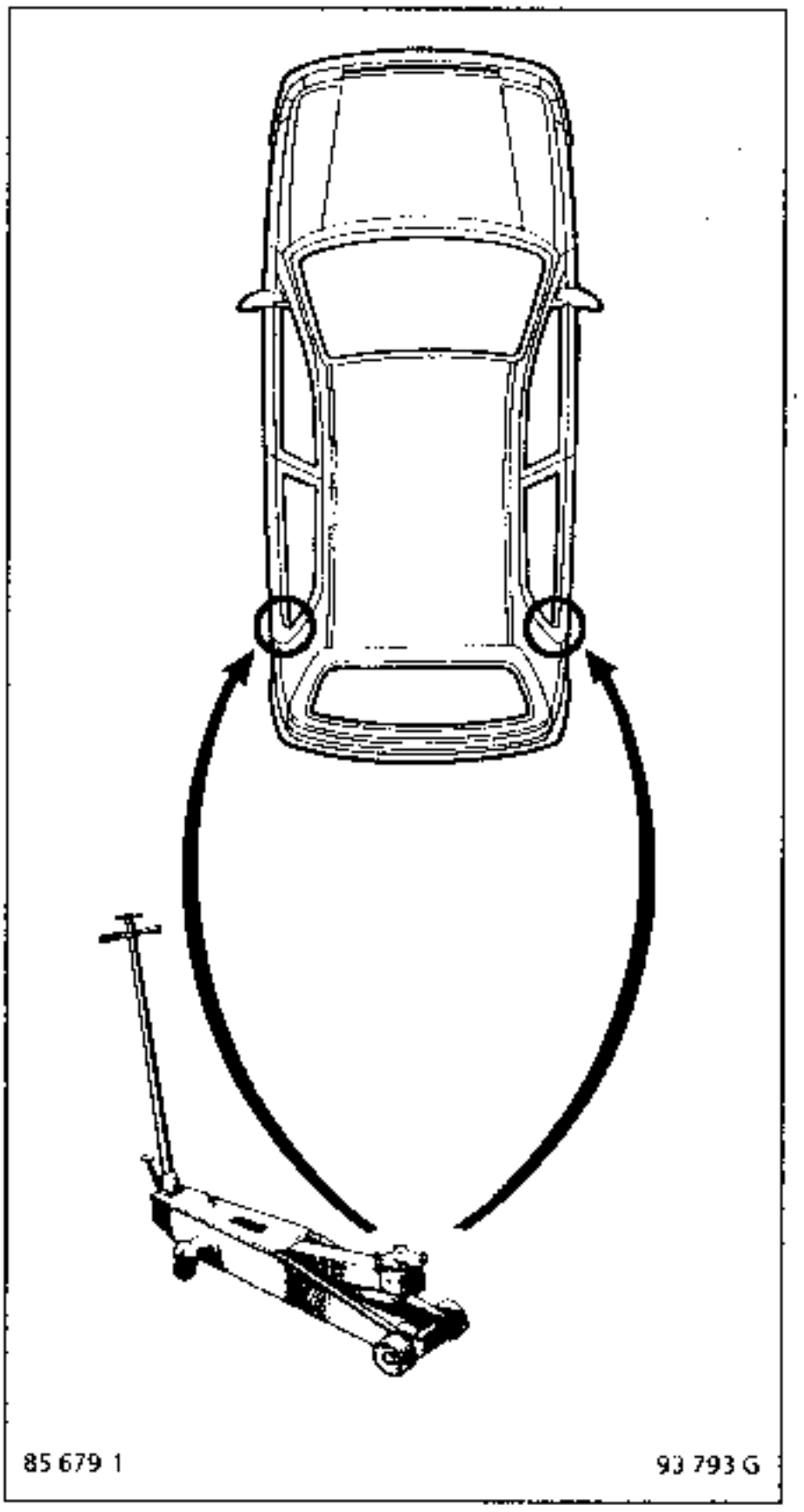
Take the vehicle's weight under the front engine mounting.

Ensure the block does not touch the gear box or the exhaust downpipe.



TROLLEY JACK USED FROM THE FRONT

Lift each wheel separately, taking the vehicle's weight under the jacking points.

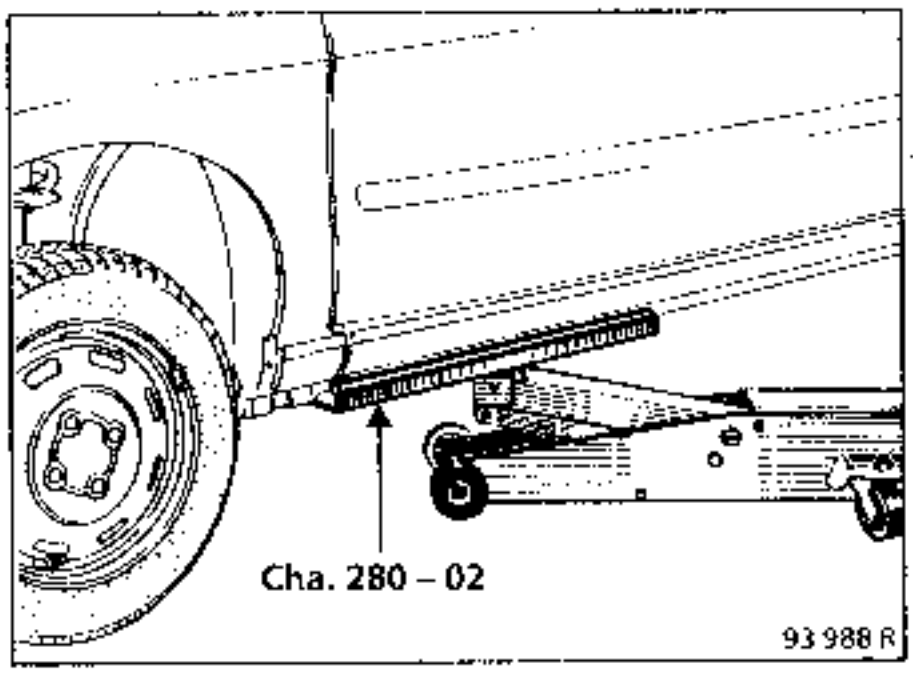


TROLLEY JACK USED FROM THE SIDE

Use block **Cha. 280-02**

Take the vehicle's weight under the sill by the front door.

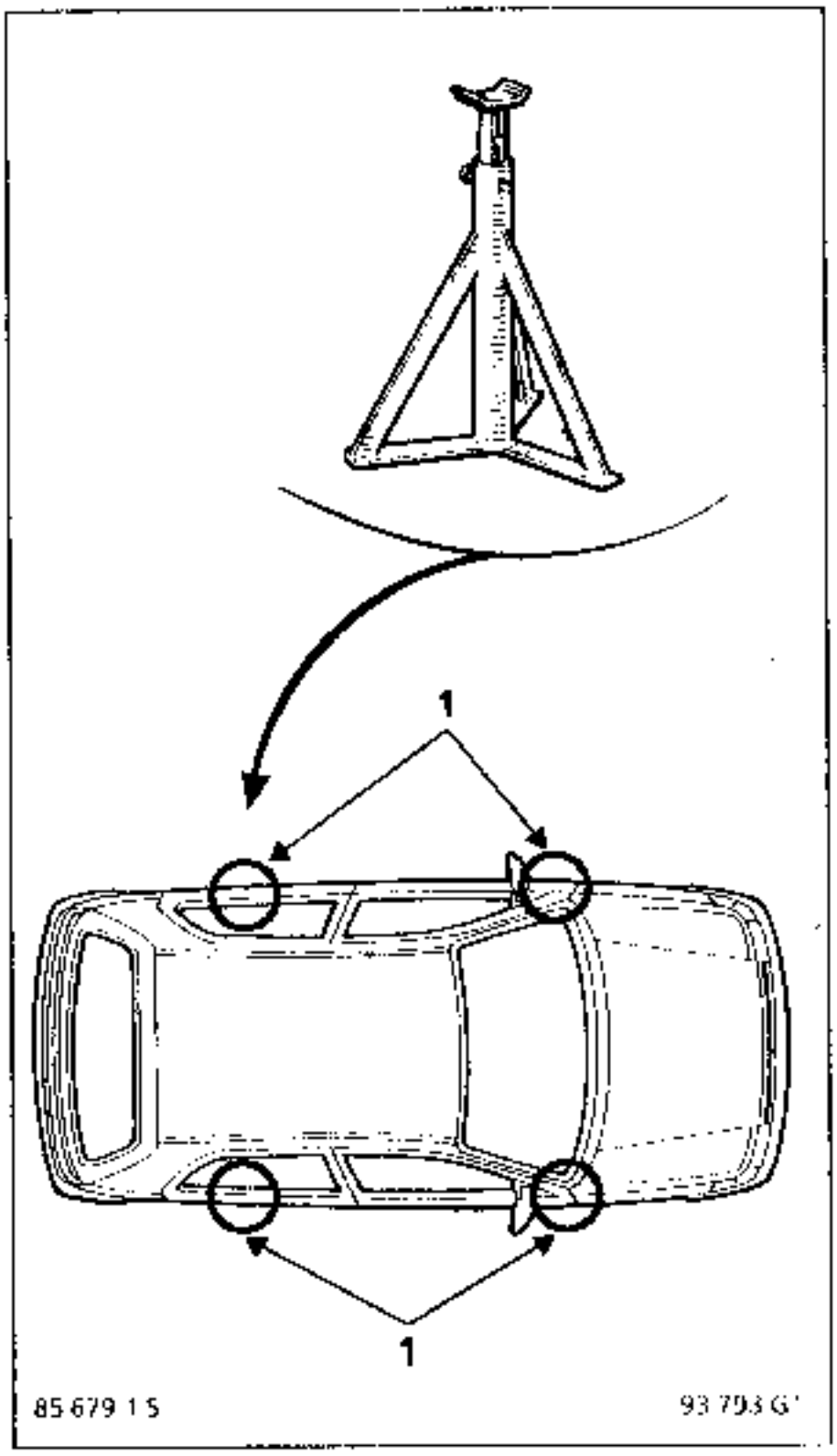
Position the sill strip correctly in the groove on the block.



AXLE STANDS

When supporting the vehicle on axle stands, position them under the reinforcements (1) provided for lifting the vehicle with its own jack.

Axle stands may be positioned at the rear by lifting the vehicle from the side.

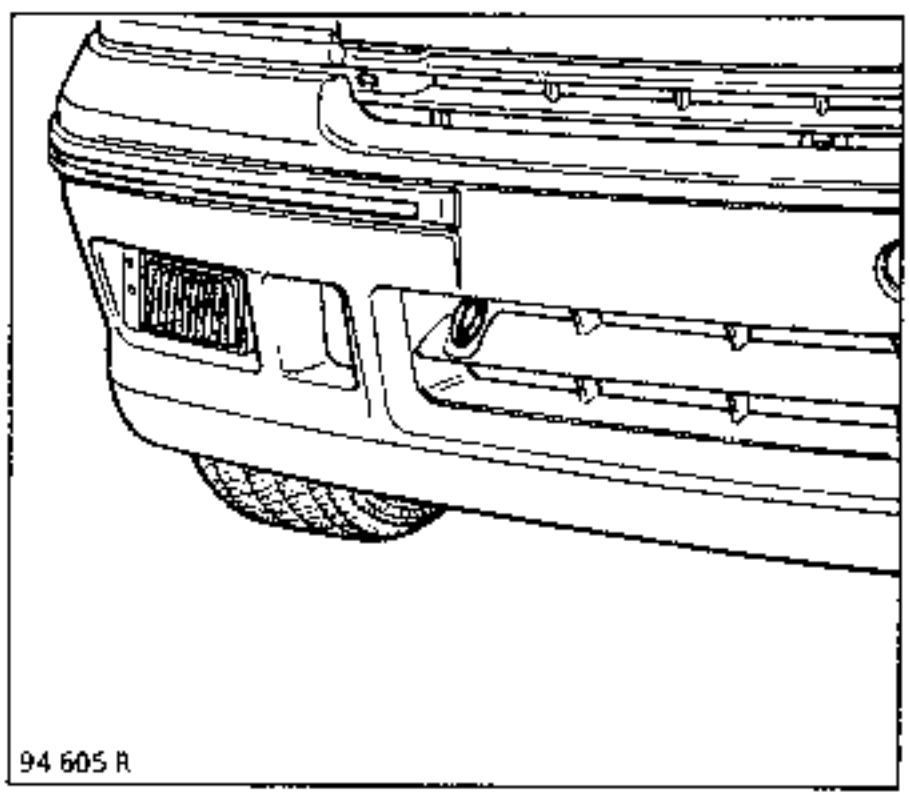


TOWING
All types

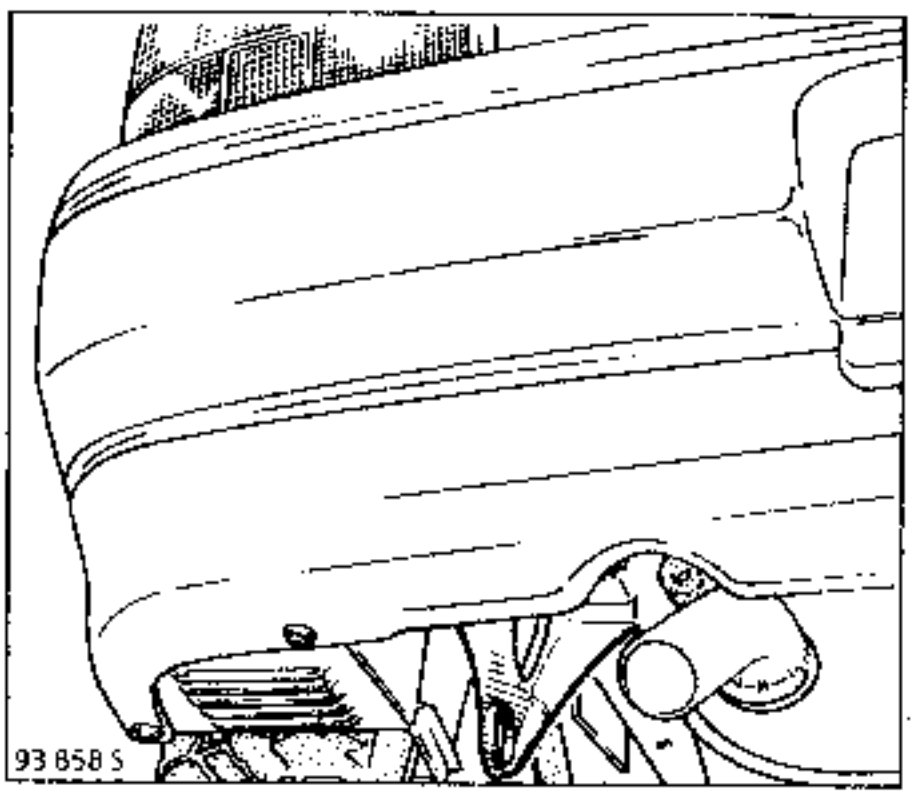
03

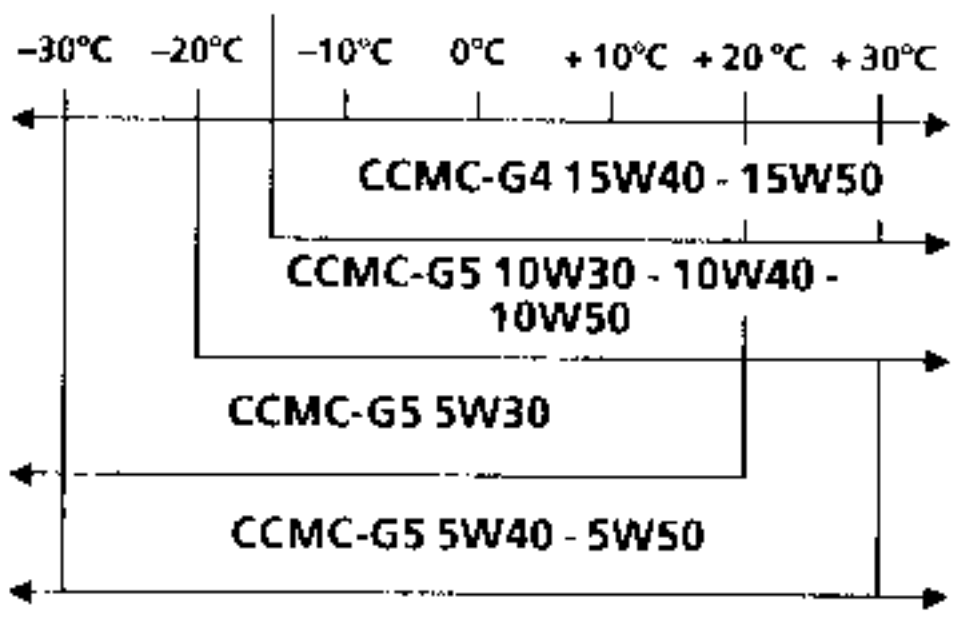
The towing hooks should only be used for towing the vehicle on the road. They should never be used for towing the vehicle out of a ditch, or any other similar recovery operation, or for lifting the vehicle, directly or indirectly.

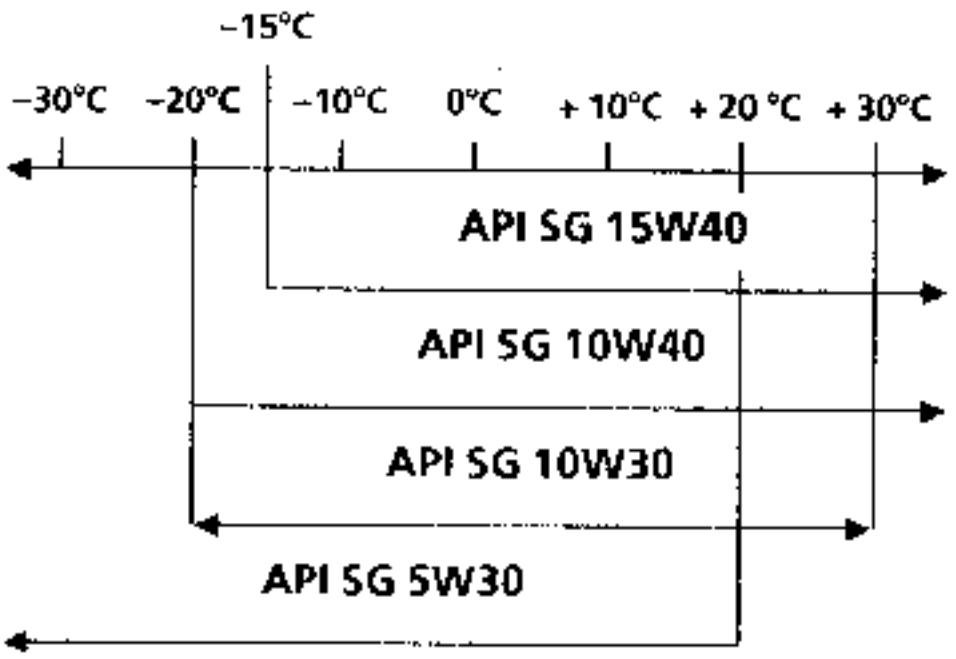
FRONT



REAR



<table>
<tr><th>Components</th><th>Capacity in litres</th><th>Grade</th><th>Notes</th></tr>
<tr><td>F7R engine</td><td>For draining
6
(plus 0.5 litre for oil filter)</td><td colspan="2">EEC countries
 

Other countries
 
</td></tr>
<tr><td>Gear box
JC5</td><td>3.1</td><td colspan="2"><table><tr><th></th><th>Check level</th><th>Grade* Viscosity</th></tr><tr><td>All countries</td><td>1st service then every 12000 miles (20 000 km)</td><td>TRANSELF TRX 75W 80W</td></tr></table></td></tr>
<tr><td>Brake circuit</td><td>0 7</td><td>SAE J 1703 and DOT 3</td><td>Brake fluids must be approved by the Design Department</td></tr>
<tr><td>Engine cooling circuit</td><td>7</td><td>AL antifreeze (type C) coolant only</td><td>Protection down to – 23°C for warm, temperate and cold climates
Protection down to – 40°C for extreme cold climates.</td></tr>
<tr><td>Fuel tank</td><td>50</td><td>Unleaded fuel octane rating 95 minimum</td><td></td></tr>
<tr><td>Separate reservoir for assisted steering</td><td>1.1</td><td colspan="2">Elf Renaultmatic D2
MOBIL ATF 220</td></tr>
</table>

* If gear changing difficulties are experienced in extreme cold climates, use EP75B oil.

DRAINING, REFILLING
Engine

SPECIAL TOOLING REQUIRED	
Mot. 445	Oil filter wrench

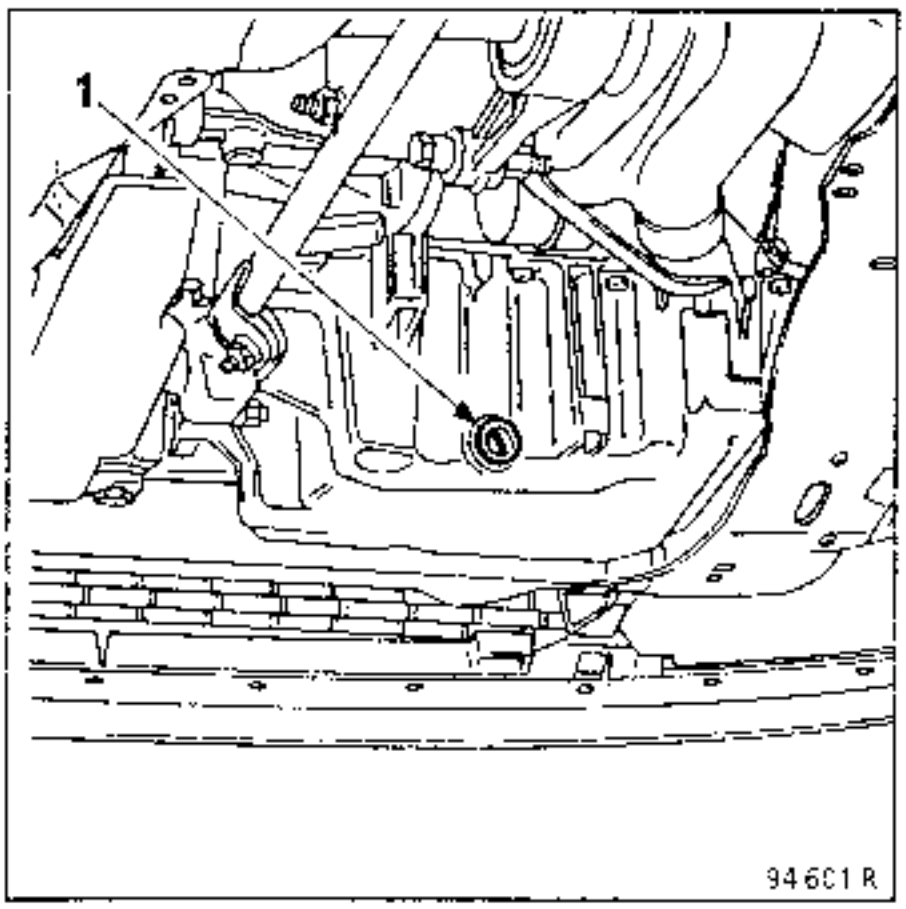
TOOLING REQUIRED
Engine drain spanner

DRAINING: plug (1)

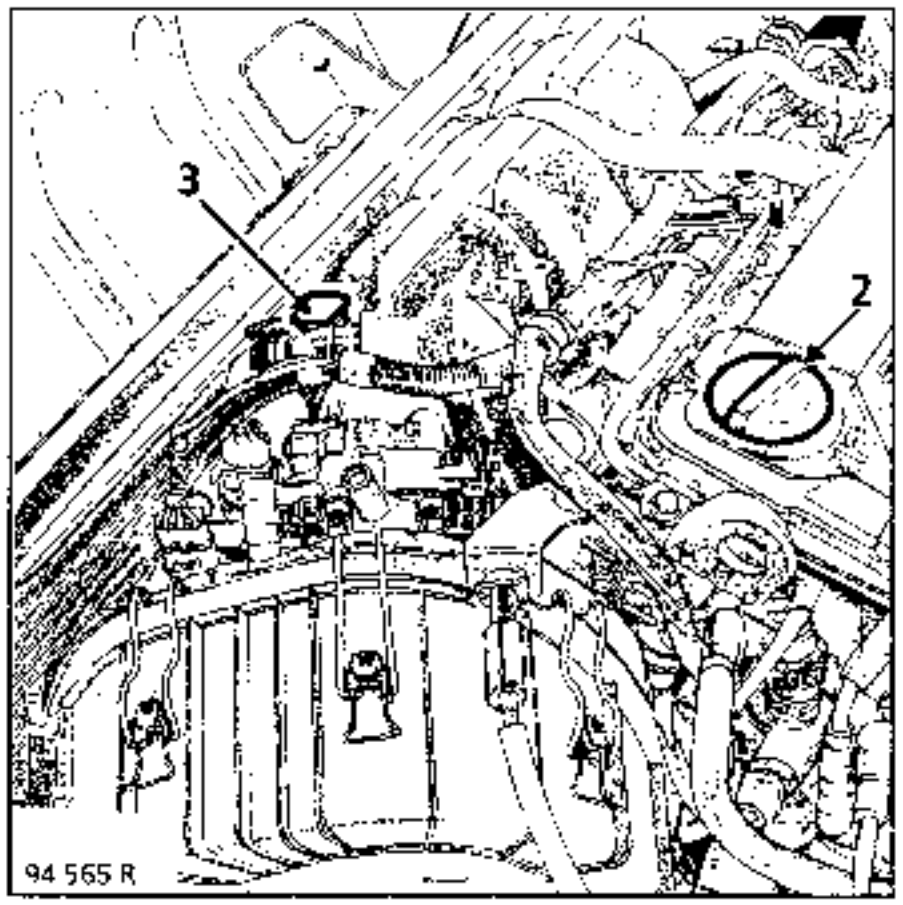
First oil change 6000 miles (10 000 km)

Oil change frequency 6000 miles (10 000 km)

Replace the oil filter every 6000 miles (10 000 km)



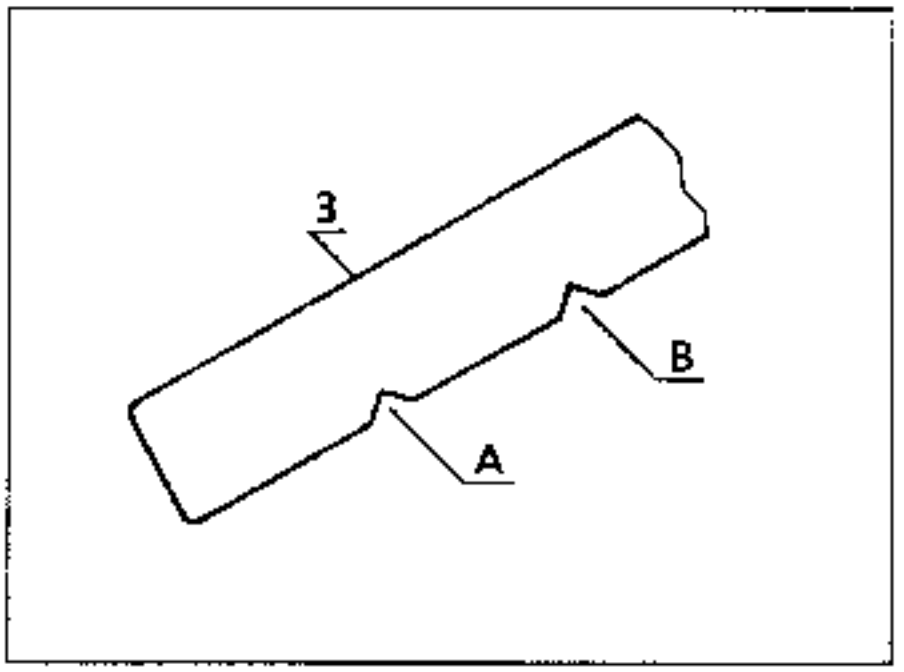
FILLING: plug (2)



DIPSTICK(3)

A : Minimum level
B : Maximum level

The difference between the two marks corresponds to **2.4** litres.

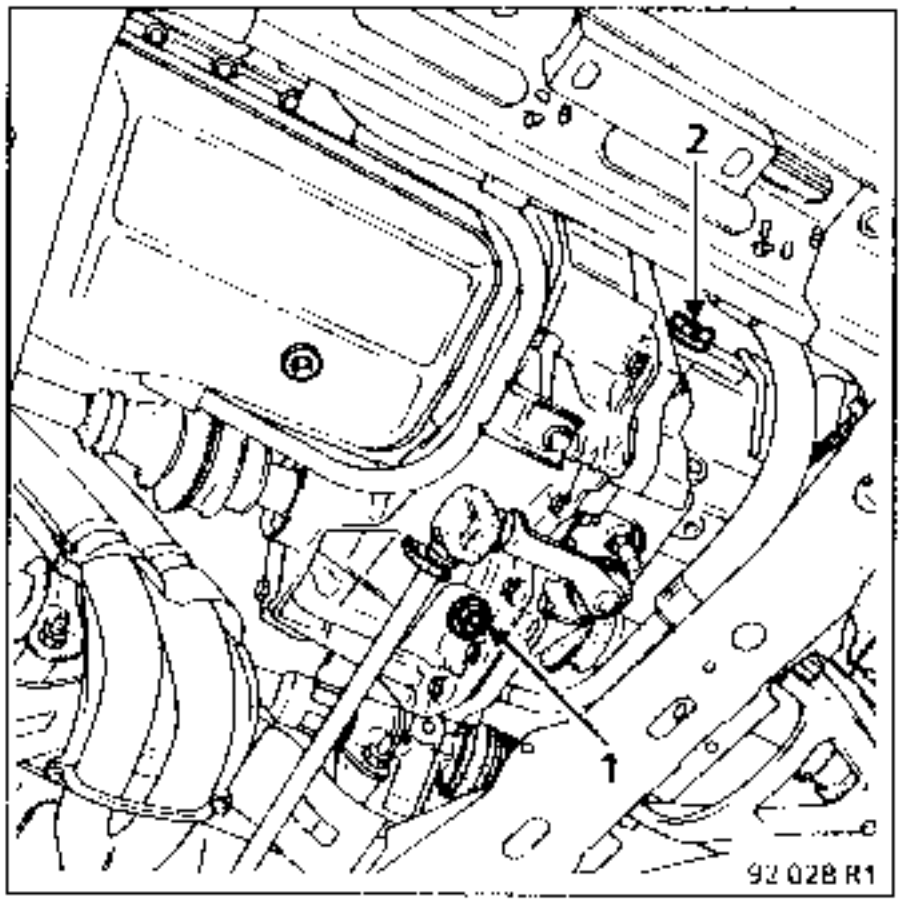


DRAINING, REFILLING
Gear box

TOOLING REQUIRED
Gear box drain spanner

DRAINING: plug(1)

FILLING AND LEVEL : plug (2).

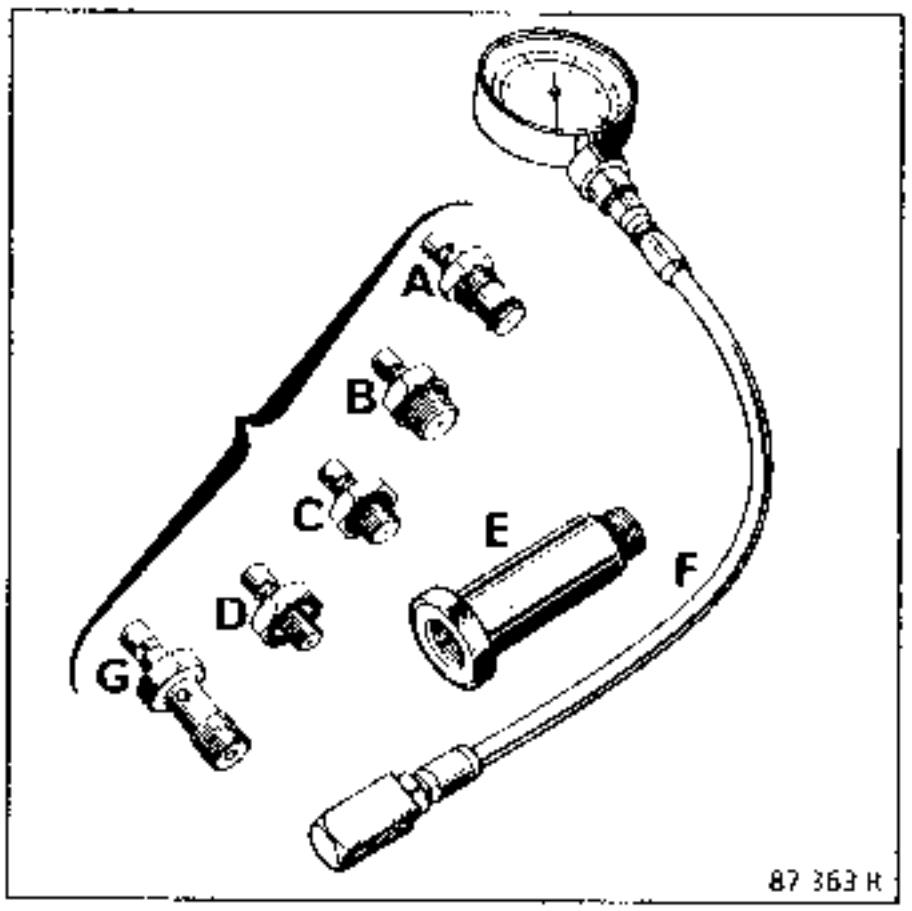


Checking the oil pressure

SPECIAL TOOLING REQUIRED	
Mot. 836-05	Oil pressure measuring kit

Checking

Contents of kit **Mot. 836-05.**



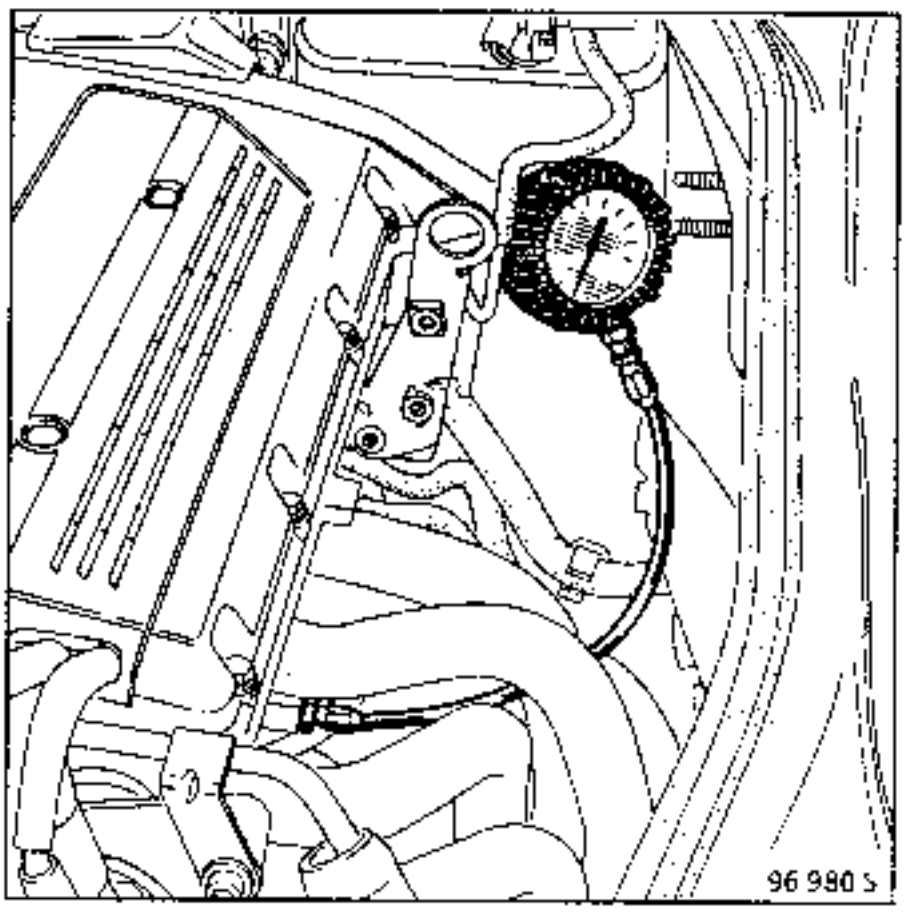
The test should be carried out when the engine is at normal operating temperature (approximately 80°C).

Remove the bulkhead heat shield, the heat shield under the exhaust, and the oil pressure switch.
Fit the pressure gauge into position.

F7R ENGINE

Use:

- unions C + F



Checking:

- at **1000 rpm** ..... **1.2 bar** min
- at **3000 rpm** ..... **3.5 bar** min

- Refer to chapter 17 for special notes on the oil pressure warning light.

SPECIAL TOOLING REQUIRED		
BV.i.	31-01	Roll pin punch
T. Av.	476	Ball joint extractor
Mot.	1 202	Hose clip pliers
Mot.	1289-03	Movement limiter centring fork .

TOOLING REQUIRED		
SEF	689	Load positioning tool

TIGHTENING TORQUES (in daN.m)	
Brake caliper mounting bolt	10
Shock absorber base mounting bolt	11
Track rod end	3.5
Lower ball joint nut	6
Driveshaft gaiter mounting bolt	2.5
Wheel bolts	9
Bolts for rear bars of suspended engine mountings	6.5
Battery mountings on front left hand side member	2
Mounting nut holding engine mounting on front left hand battery mounting	7.5
Front right hand suspended engine mounting cover bolt on engine	6.5
Front right hand suspended engine mounting limiter mounting bolt	5.5
Mounting nut holding engine mounting to front right hand suspended engine mounting cover	4.5

Remove:

- the battery,
- the bonnet.

Drain:

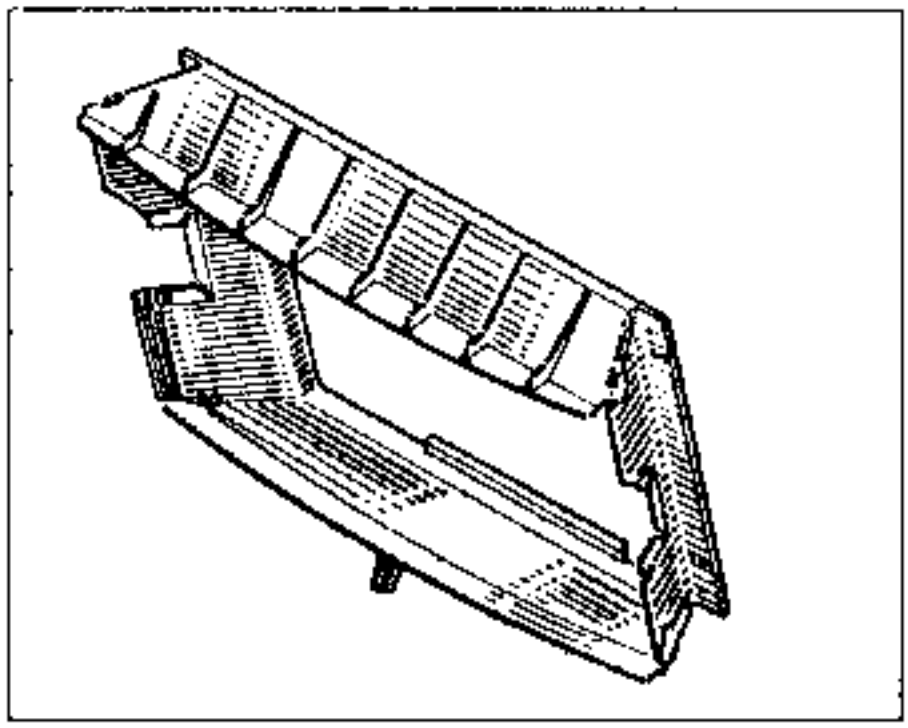
- the gear box,
- the cooling circuit.
- the power assisted steering circuit

Disconnect:

- the electrical connections,
- the accelerator and clutch cables.

Remove:

- the air filter assembly,
- the radiator mountings,
- the upper cross members,
- the engine cooling fan mountings,
- the air deflector mountings.



Remove the air deflector.

Remove the radiator and the engine cooling fan.

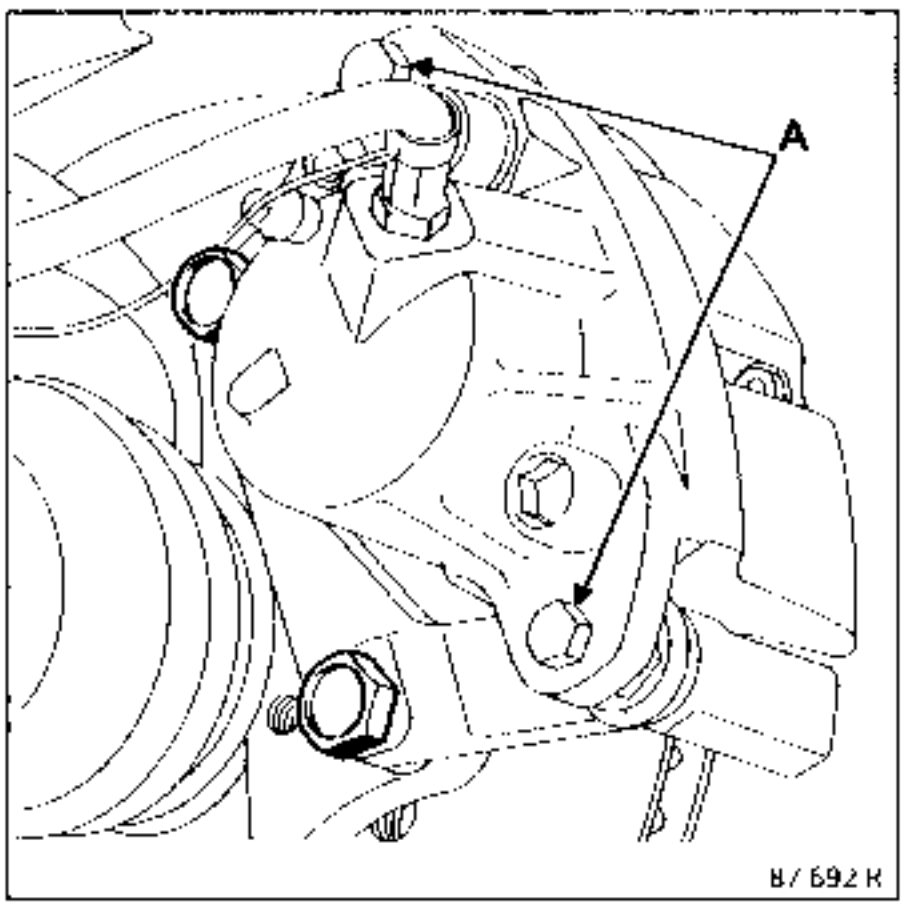
Remove:

- the electrical connections,
- the computer in the scuttle panel and place it on the engine,
- the gear lever control,
- the exhaust downpipe,
- the front wheels

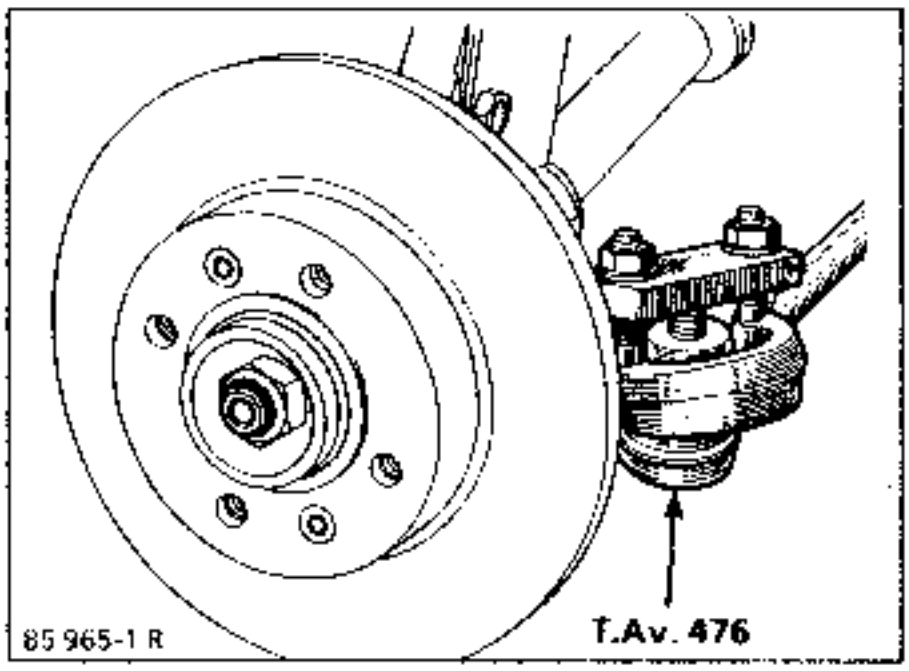
On the left hand side

Remove:

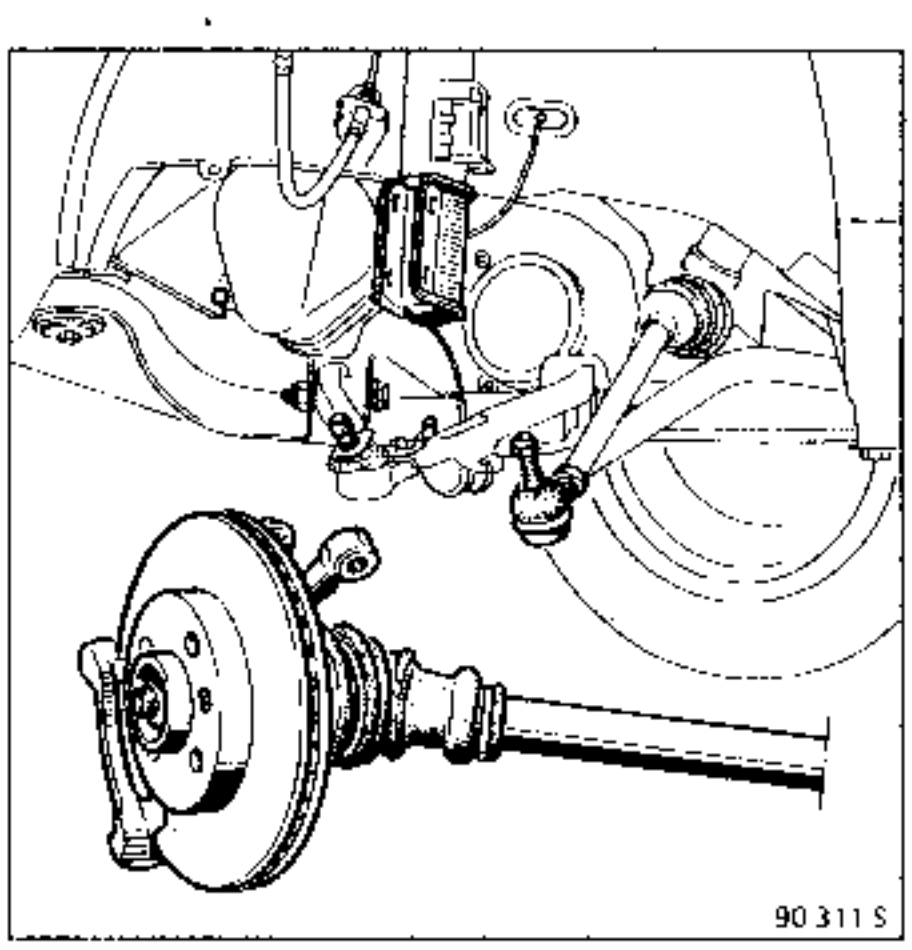
- the front left hand brake caliper bolts (A) and attach the caliper to the body,



- the track rod end using extractor **T. Av. 476,**



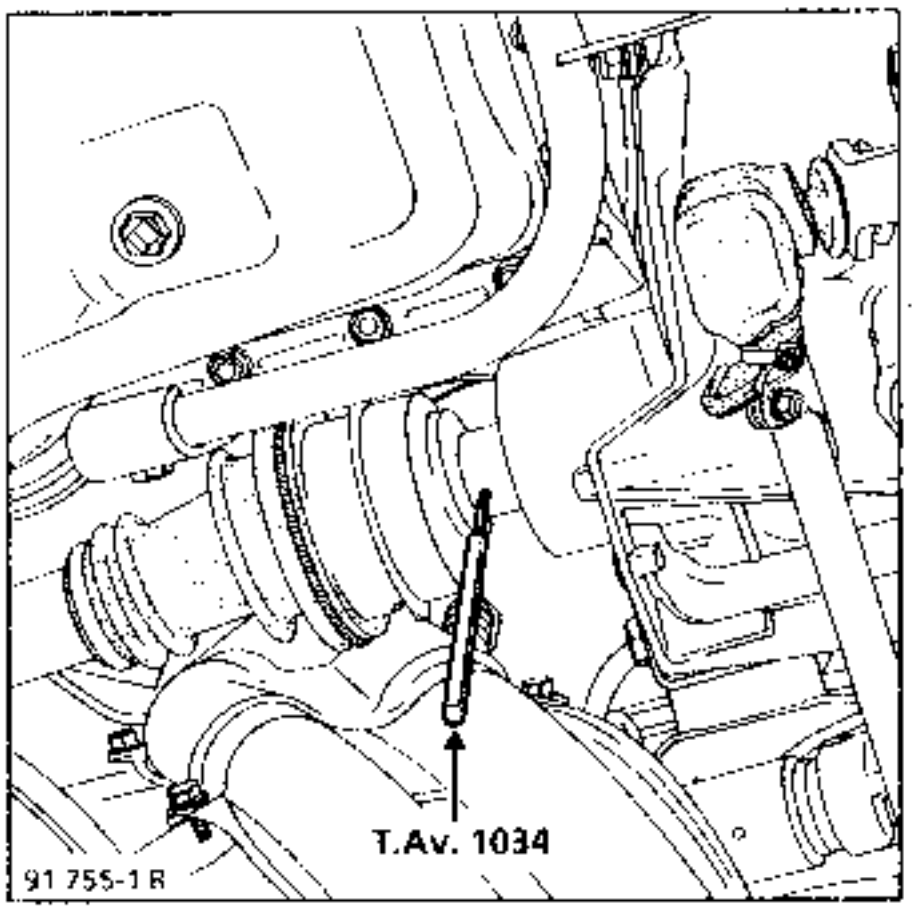
- the three gaiter bolts,
- the bolts from the base of the shock absorber and the lower ball joint,
- the driveshaft and stub axle carrier assembly, protecting the spider.



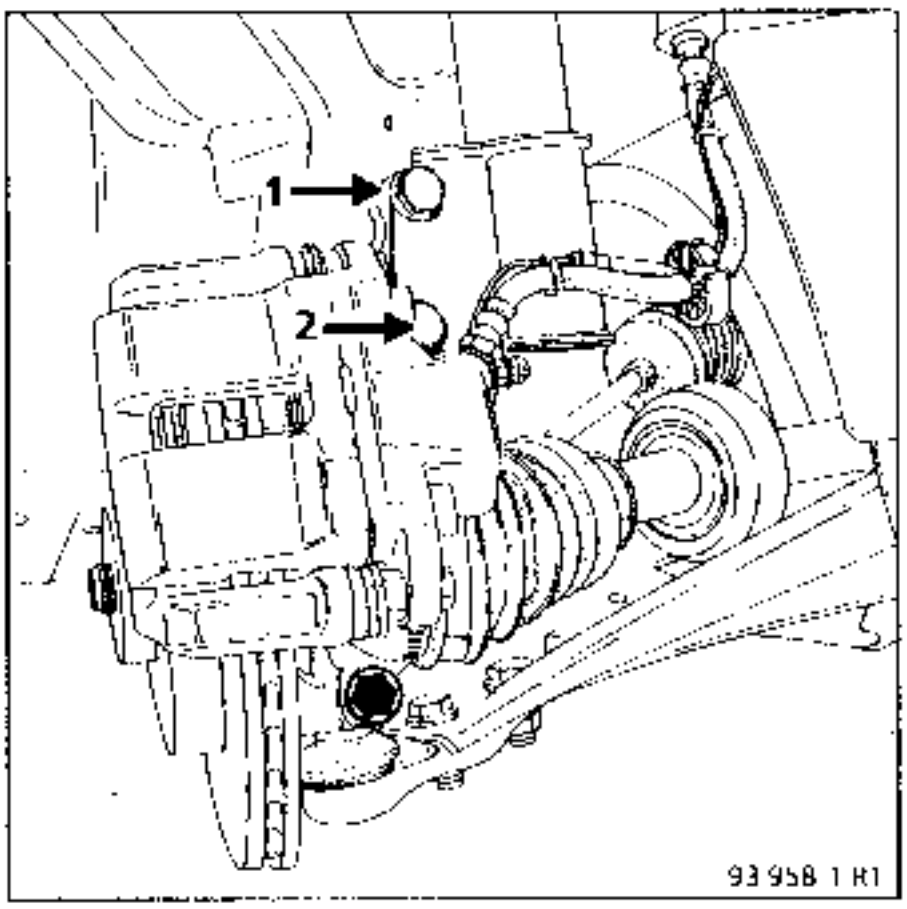
On the right hand side

Remove:

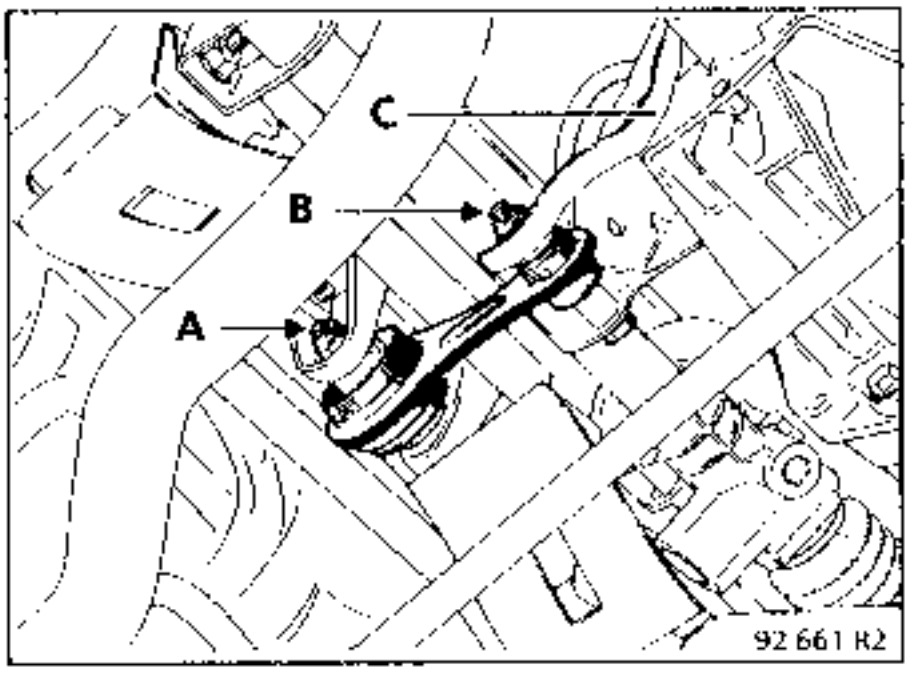
- the driveshaft roll pin using punch **B. Vi. 31-01.**



- the upper bolt (1) and loosen bolt (2).



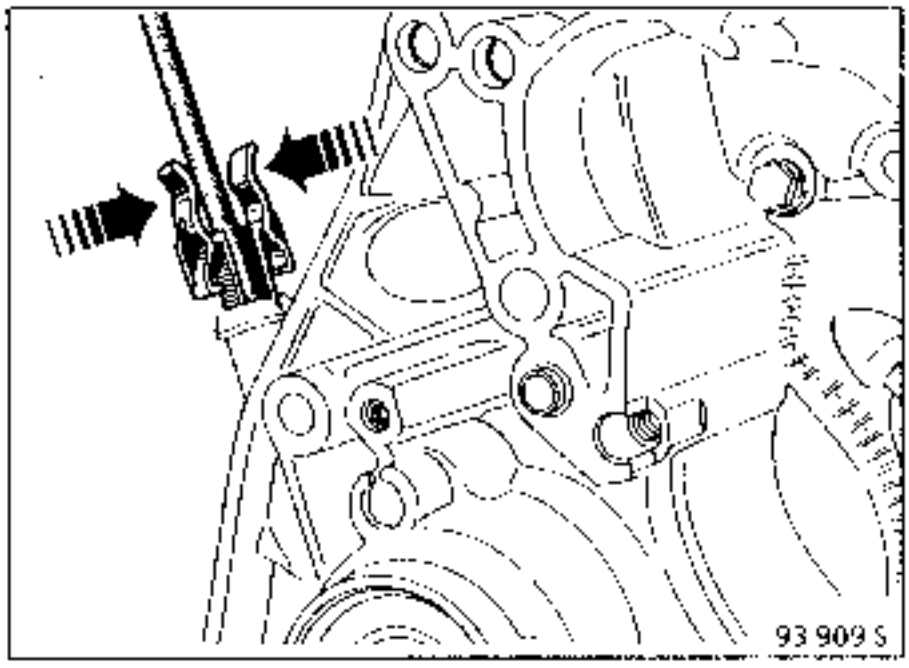
Tilt the stub axle carrier and release the driveshaft



Unscrew but do not remove bolt (A) and remove bolt (B) from the engine tie-bar, release the bar and the gear box mounting (C).

Remove:

- the speedometer cable. Pinch the tabs together and pull the cable out.

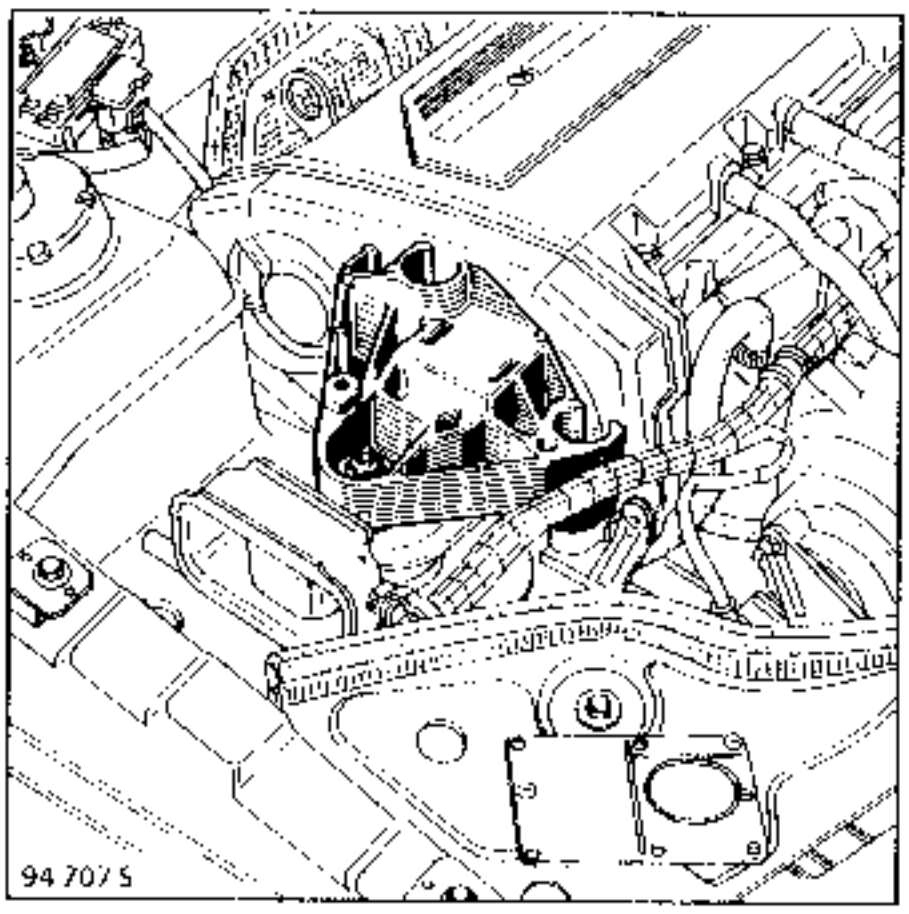


- the heating hoses on the bulkhead,
- the fuel pipes and fit a hose to connect the 2 rigid fuel pipes together.

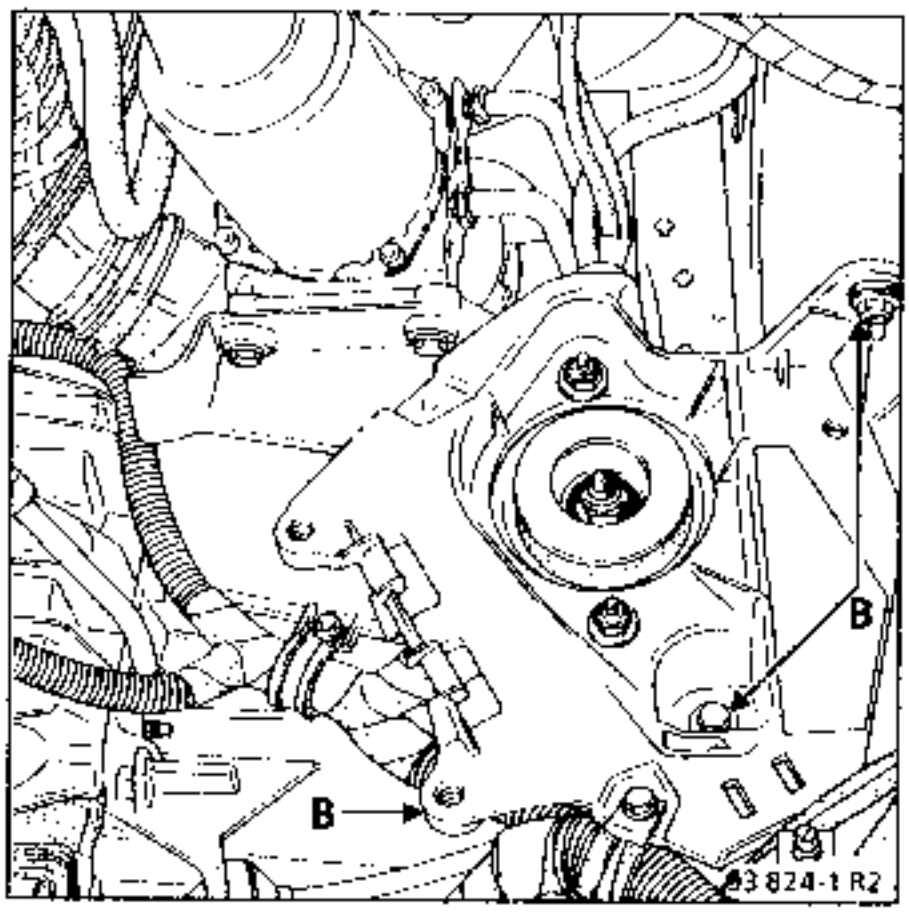
Fit the load positioning tool **SEF 689** to the engine lifting rings.

Tension the chains.

Remove the front right hand suspended engine mounting cover and cap

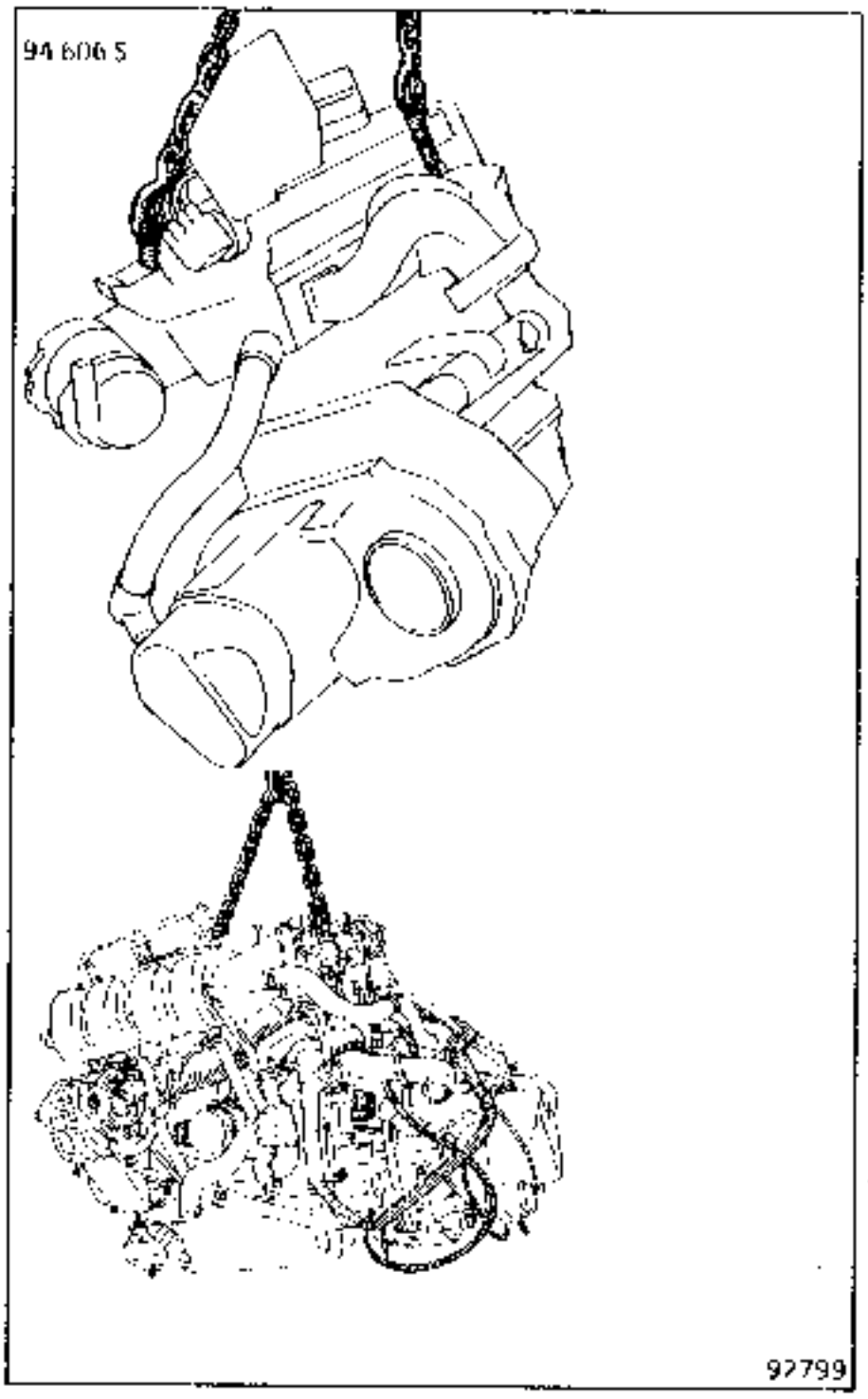


The rear gear box support at (B).



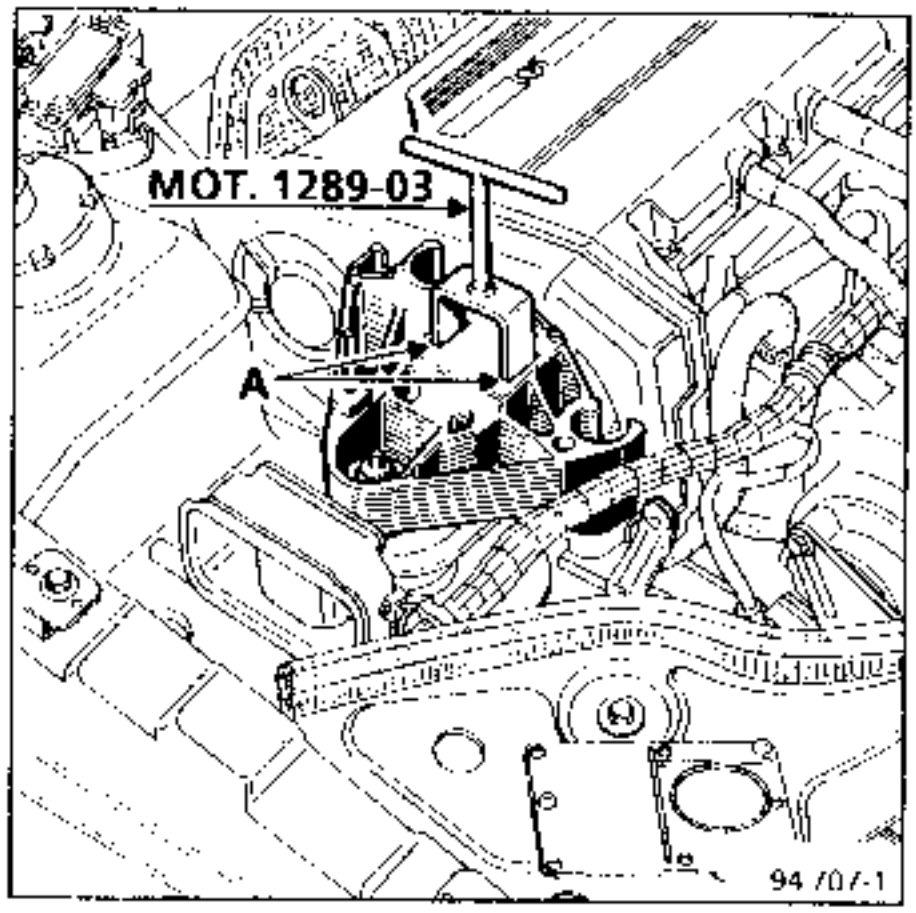
Tilt the engine and gear box assembly towards the front of the vehicle as far as possible.

Remove the assembly from the vehicle.



Refitting: (Special notes)

Fit the suspended engine mounting adjustment fork **Mot. 1289-03** into the openings in the cover at (A).



Refit the brake caliper bolts using Loctite **FRENBLOC** and tighten them to the recommended torque.

Press the brake pedal several times to bring the pistons back into contact with the brake pads.

Apply **CAF 4/60 THIXO** to the driveshaft roll pin holes

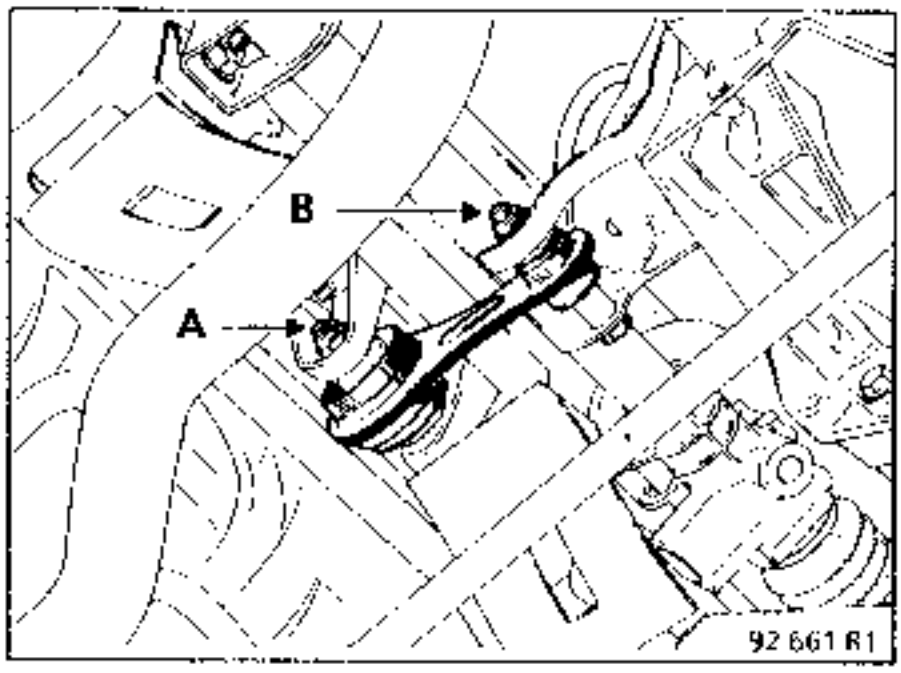
Adjust the accelerator cable

Refit the speedometer cable

Fill:

- the gear box with oil,
- the cooling circuit and bleed (see chapter 19).

Remember to tighten bolts (A) and (B) on the engine tie-bar.



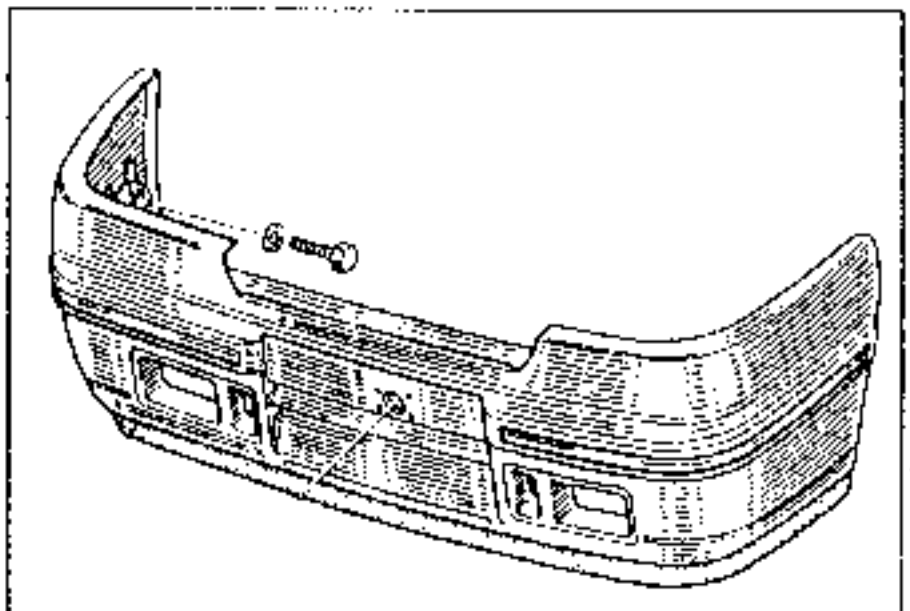
SPECIAL TOOLING REQUIRED	
Mot. 1040-01	Dummy engine mounting for removing and refitting the engine and transmission
Mot. 1 159	Engine support for right hand side member for operations where the engine is not removed
Mot. 1 159-01	Tool for supporting the engine on the engine mounting
Mot. 1 202	Hose clip pliers

TIGHTENING TORQUES (in daN.m)	
Engine mounting bolt:	
- Front	6
- Rear	11
Upper shock absorber cup mounting nut	6
Brake caliper mounting bolt	10
Steering shaft yoke mounting bolt	3
Wheel bolts	9
Mounting nut holding engine mounting to front left hand side member mounting	7.5
Mounting bolt holding front right hand suspended engine mounting cover to engine	6.5
Mounting nut holding suspended engine mounting cover to engine mounting	4.5

Put the vehicle on a 2 post lift.

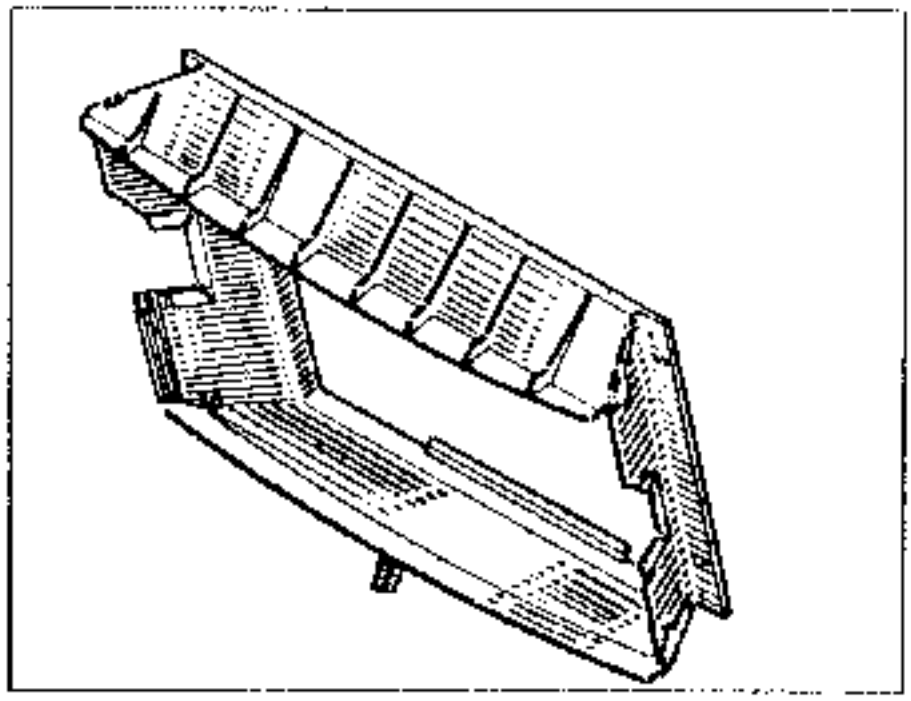
Remove:

- the battery,
- the front wheels,
- the bonnet and bumper.



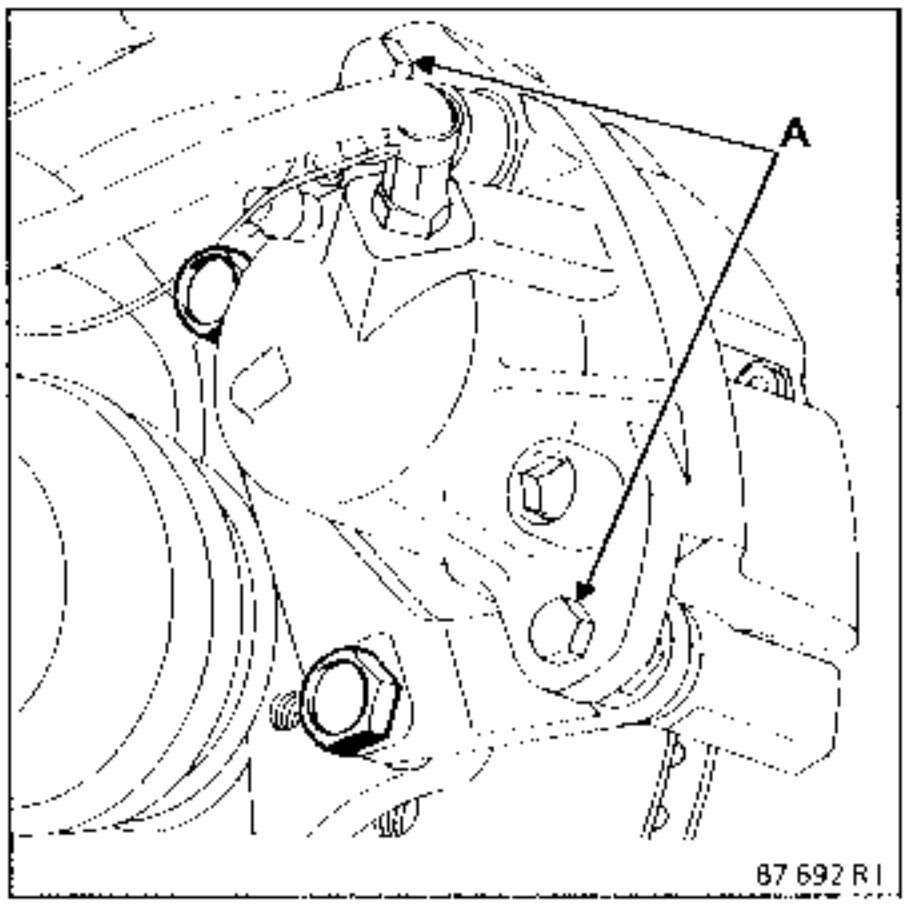
Drain the cooling circuit from the lower radiator hose.

- the radiator heat shield and the radiator mounting brackets



- The radiator mountings on the cross member

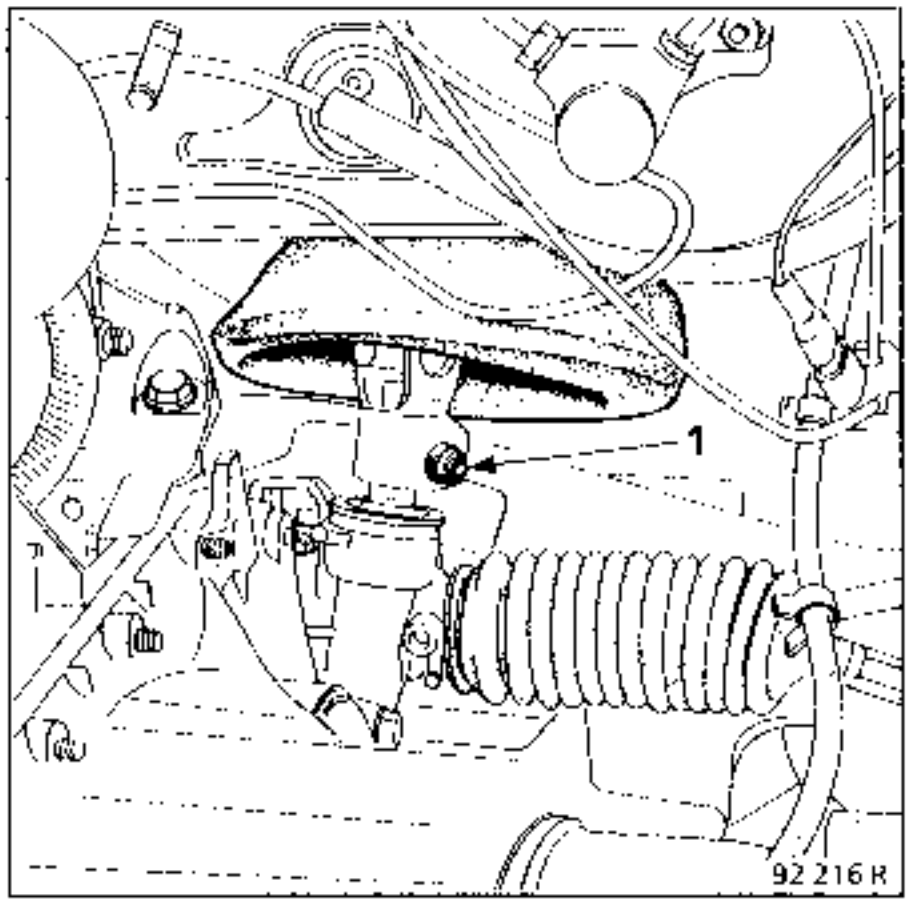
Remove the body - engine mounting tie-bars and the brake calipers which should be attached to the body (A).



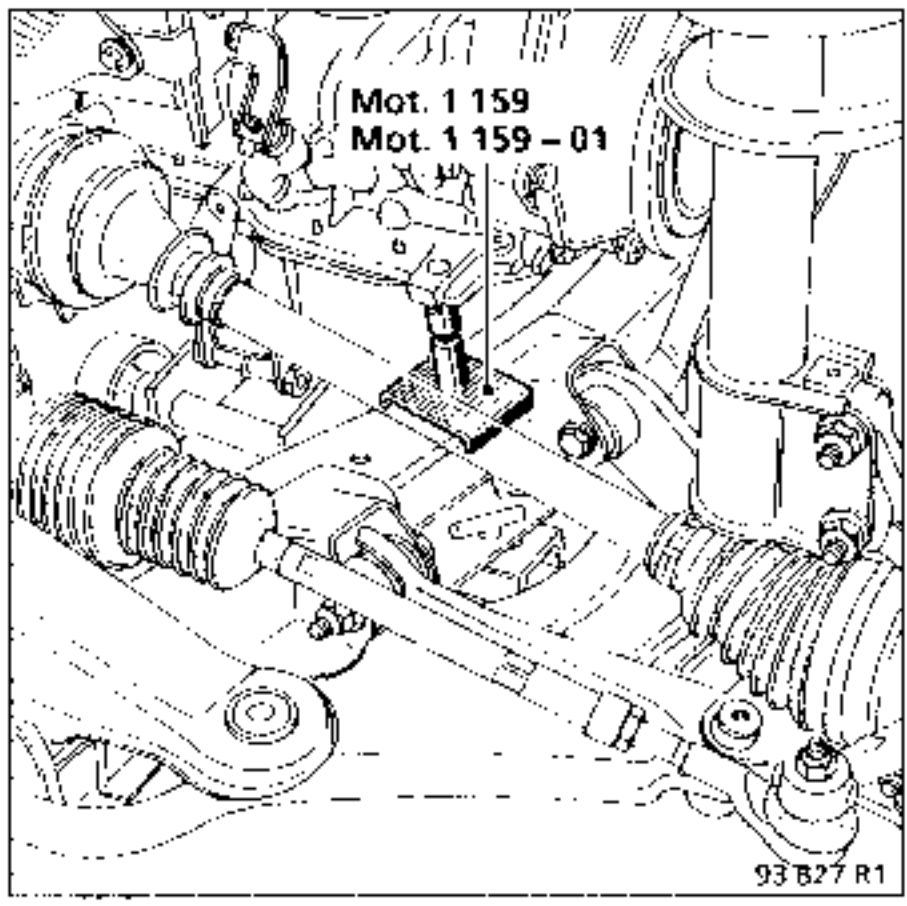
Disconnect:

- the electrical connections,
- the accelerator, clutch and speedometer cables,
- the earth straps and the reverse switch,
- the brake vacuum pipe,
- the heating hoses on the bulkhead ,
- the fuel pipes and fit a hose to connect the 2 rigid fuel pipes together.

- bolt (1) from the steering shaft yoke having pushed the protector back towards the bulkhead,
- the gear lever control on the gear box side, turn it round and attach it to the exhaust pipe,
- the exhaust outlet pipe collar (silencer side).

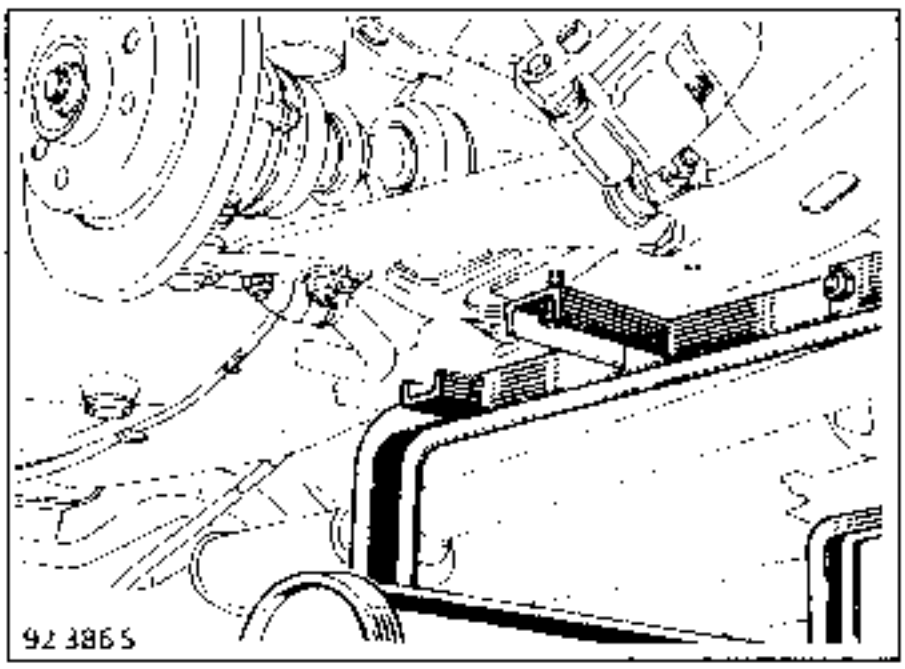


Fit tools **Mot. 1159** and **Mot. 1159-01** under the oil pump and take the weight of the engine



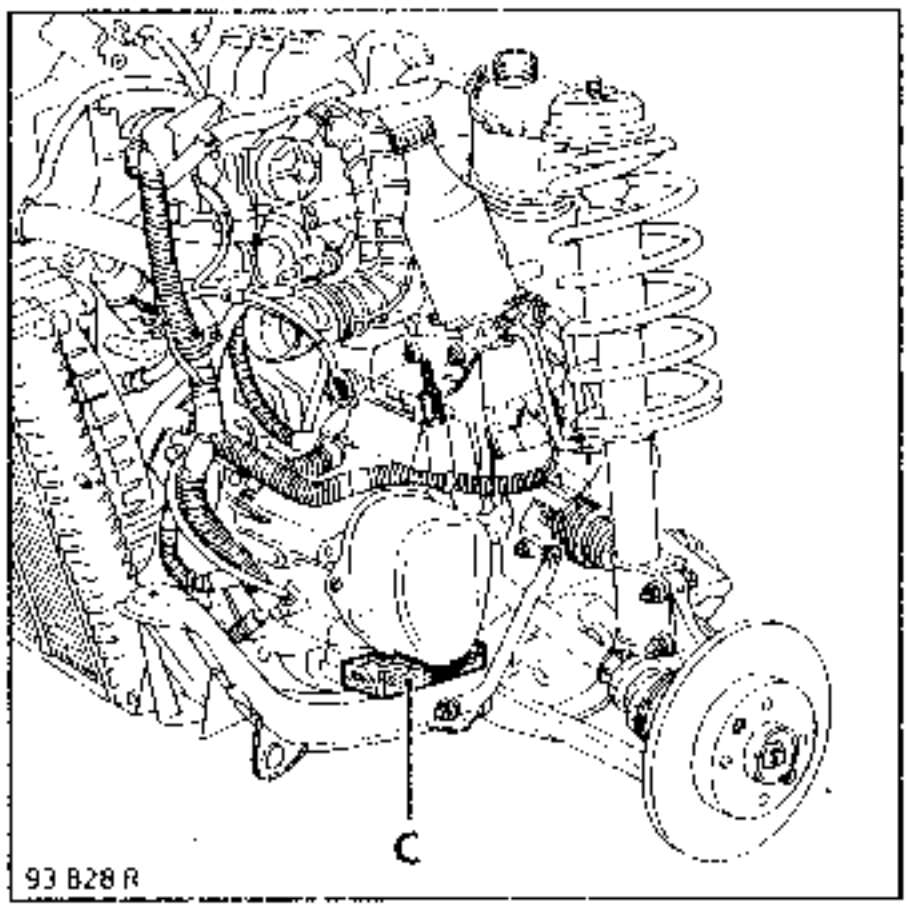
Loosen the engine mounting bolts.

Fit tool **Mot. 1040-01** with the wheels in the upper position under the engine mounting.

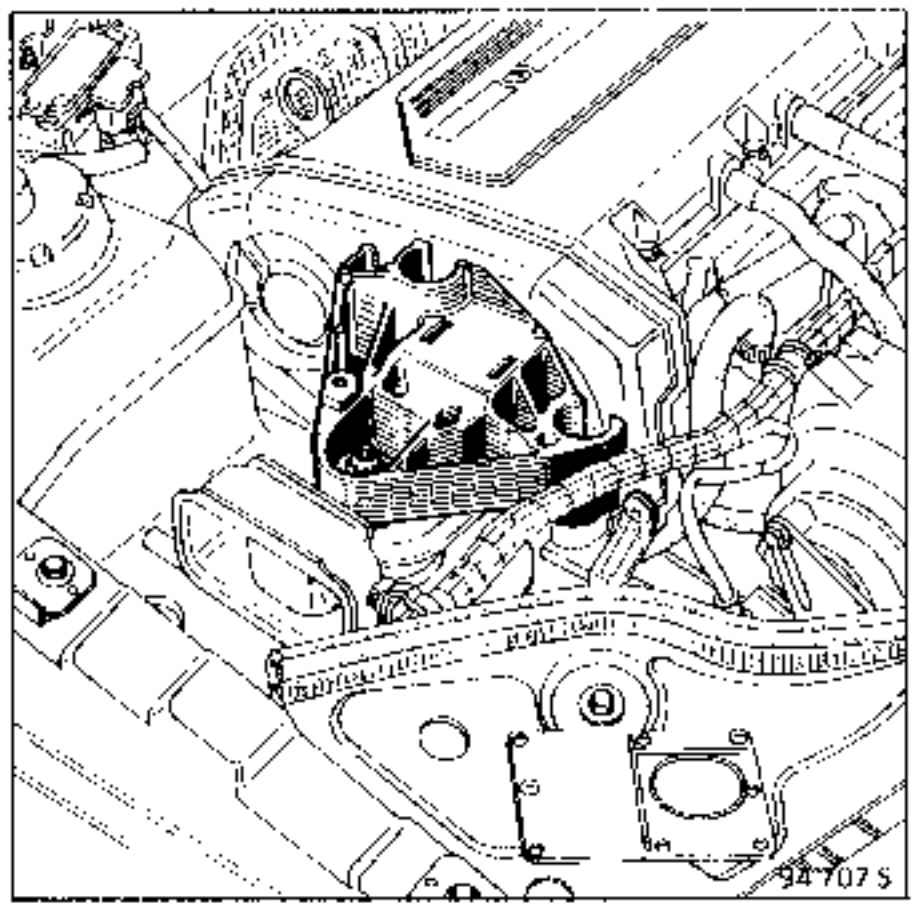


Lower the lift until the tool touches the ground.

Fit a block (C) between the gear box and the left hand side of the engine mounting.

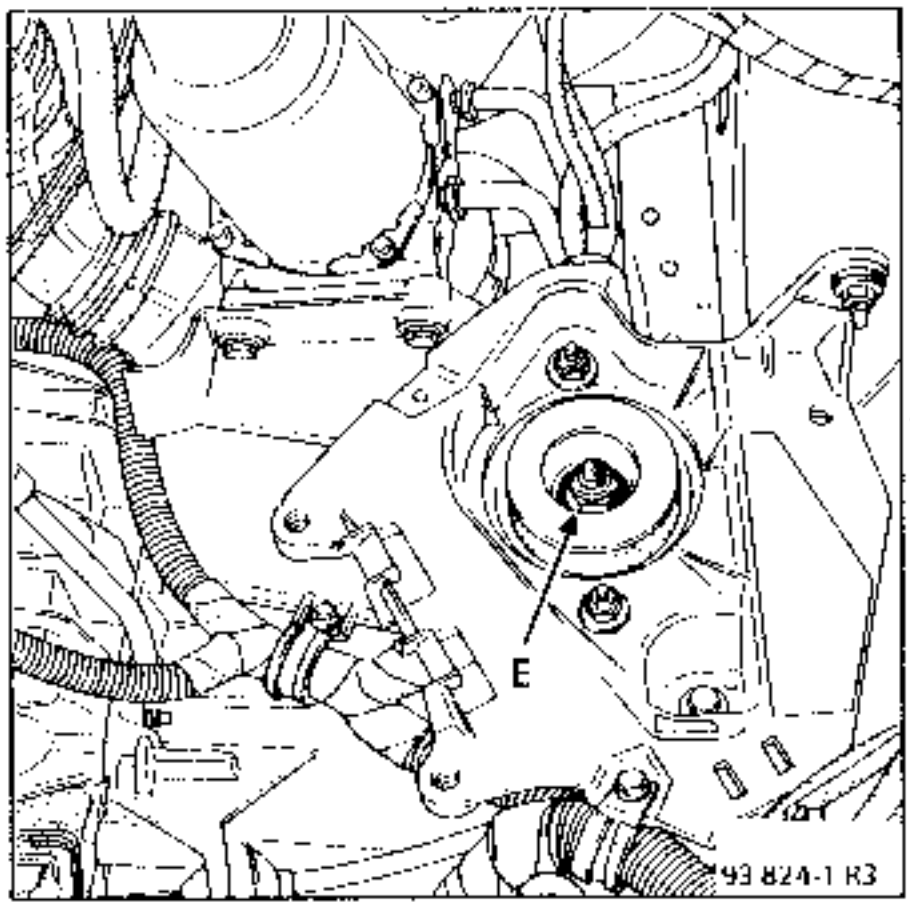


Remove the suspended engine mounting cover on the right hand side.

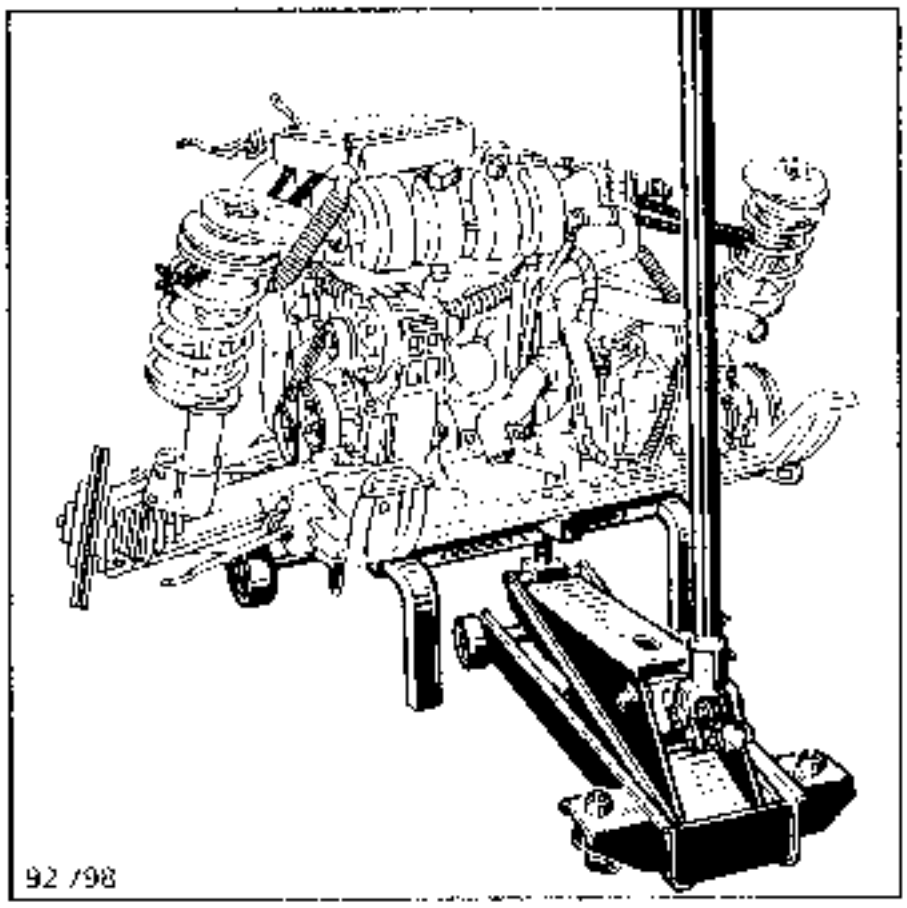


- the upper shock absorber mounting nuts.

Remove nut (E), then use a copper hammer to tap the left hand side suspended engine mounting stud to remove it



Remove the 4 engine mounting bolts, lift the body and release the engine and transmission assembly, having attached the shock absorber and spring assemblies and the radiator to the engine with a rope.



REFITTING (Special notes)

Position the engine and transmission assembly under the body and lower the body.

Tighten the front engine mounting bolts to **6 daN.m** and the rear bolts to **11 daN.m**.

When the left and right suspended engine mountings are refitted remember to remove the block from under the gear box and tools **Mot. 1159** and **Mot. 1159-01**.

Tighten the bolts and nuts to the recommended torque.

Refit the brake caliper bolts using **Loctite FRENBLOC** and tighten them to the recommended torque.

Press the brake pedal several times to bring the pistons back into contact with the brake pads.

Apply **CAF 4/60 THIXO** to the driveshaft roll pin holes

Adjust the accelerator cable.

Refit the speedometer cable.

Fill:

- the gear box with oil,
- the cooling circuit and bleed (see chapter 19).

Sump

SPECIAL TOOLING REQUIRED	
Mot. 1063	Torx 30 socket
T. Av. 1233.01	Bolt kit for removing the engine mounting

TIGHTENING TORQUES (in daN.m)	
Sump bolt	1.2 to 1.5
Gear box nut	2.5
Engine mounting bolt :	
– Front	6
– Rear	11
Steering shaft yoke mounting bolt	3

Put the vehicle on a 2 post lift.

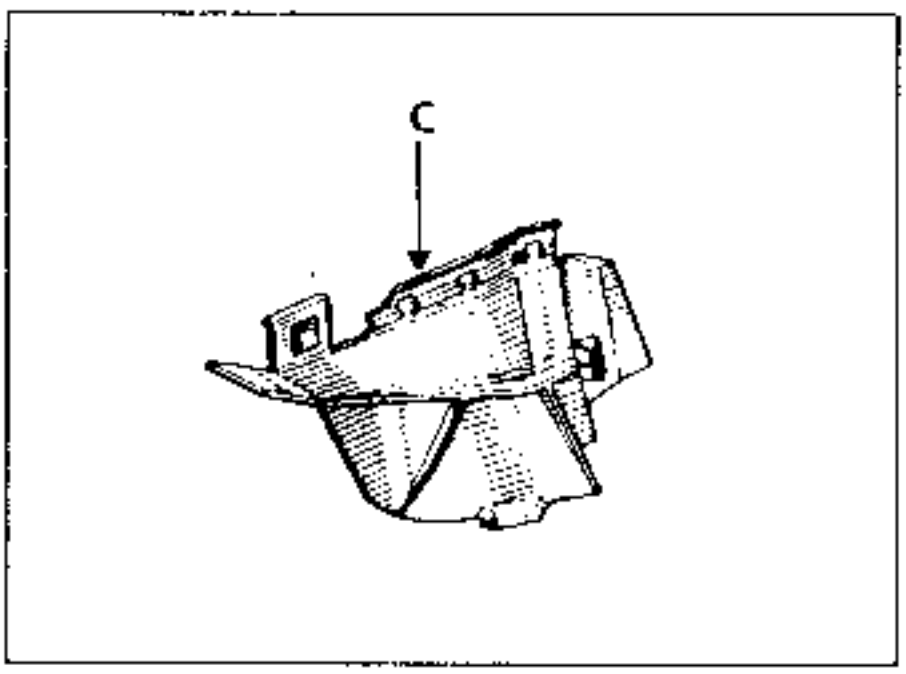
REMOVAL

Disconnect the battery.

Drain the engine.

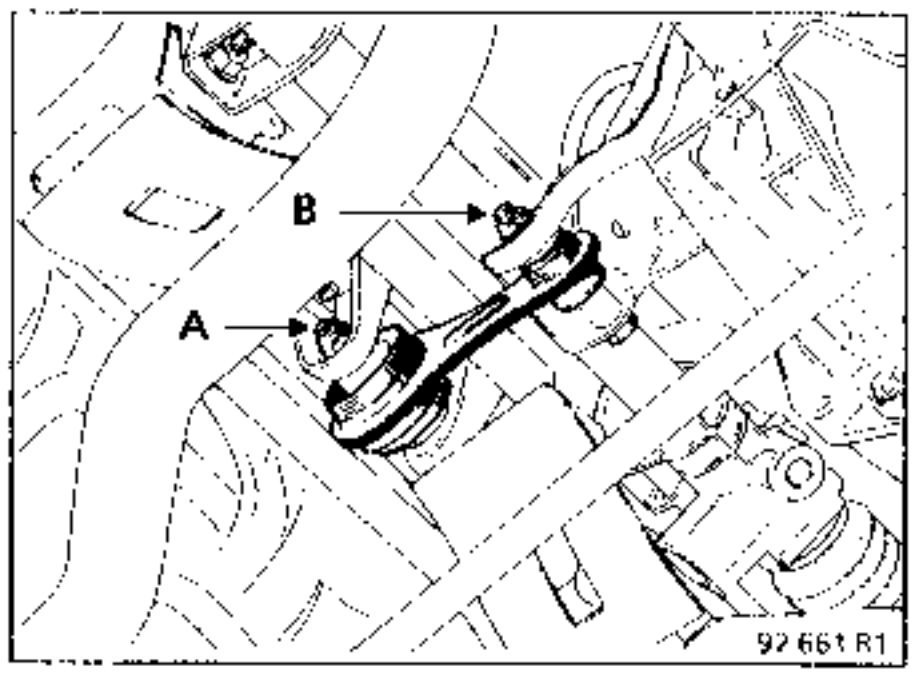
Remove:

- the front wheels.
- the wheel arch deflectors (C),
- the bumper.

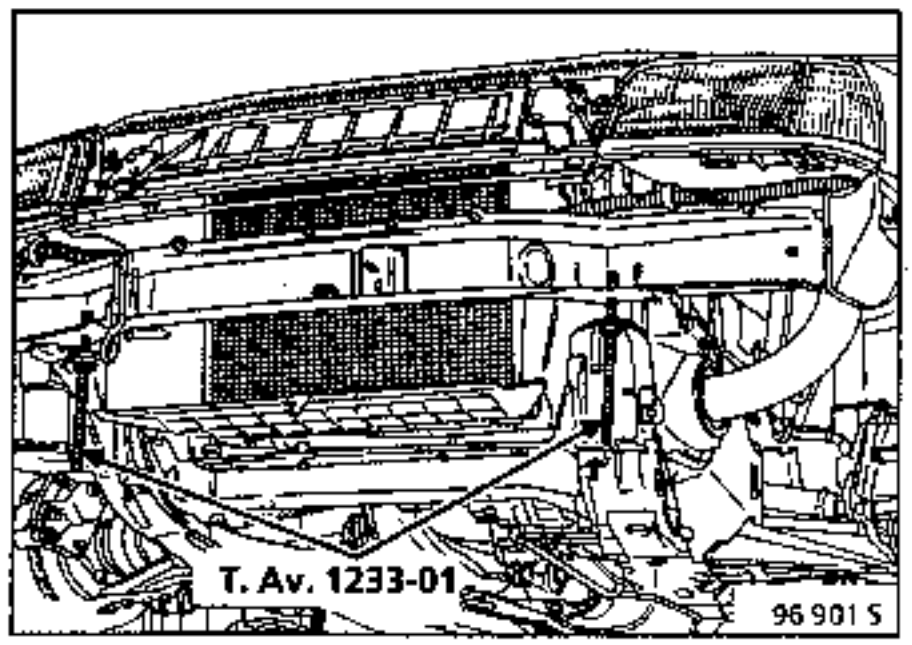


- the engine mounting - side member tie-bars

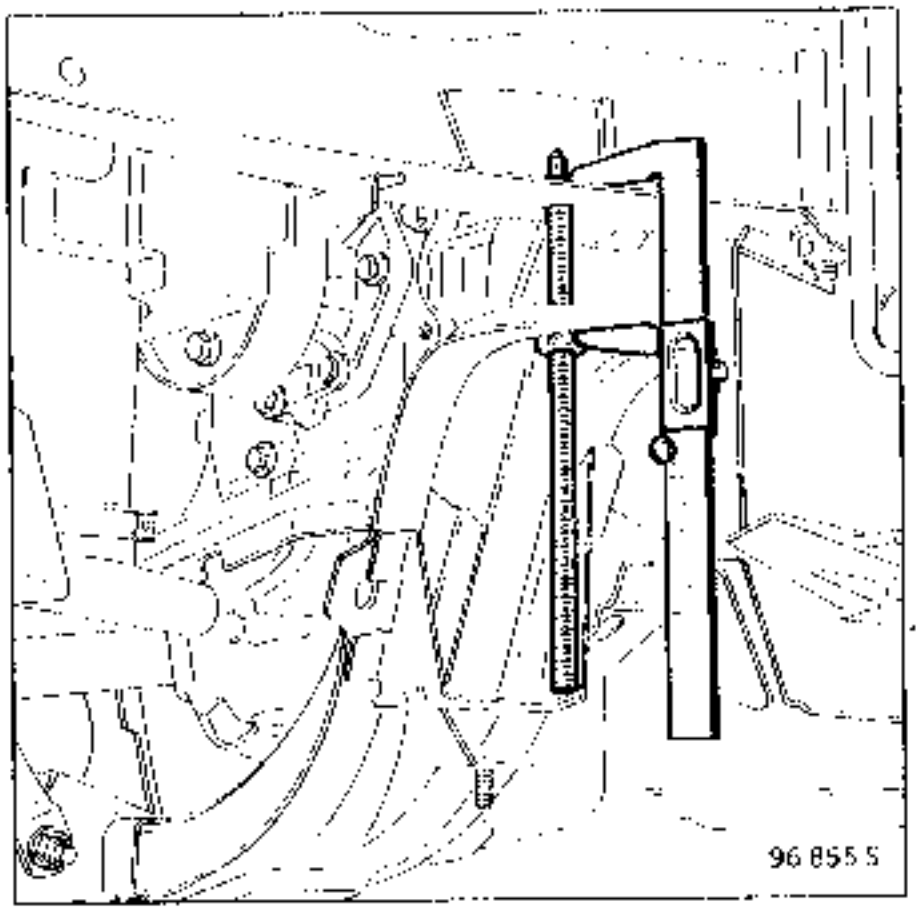
Undo but do not remove bolt (A) and remove bolt (B) from the engine tie-bar, and remove the bar.



- the steering shaft yoke bolt,
- remove the bolts holding the engine mounting to the body one by one and fit tools T. Av. 1233.01 in the place of the mounting bolts.



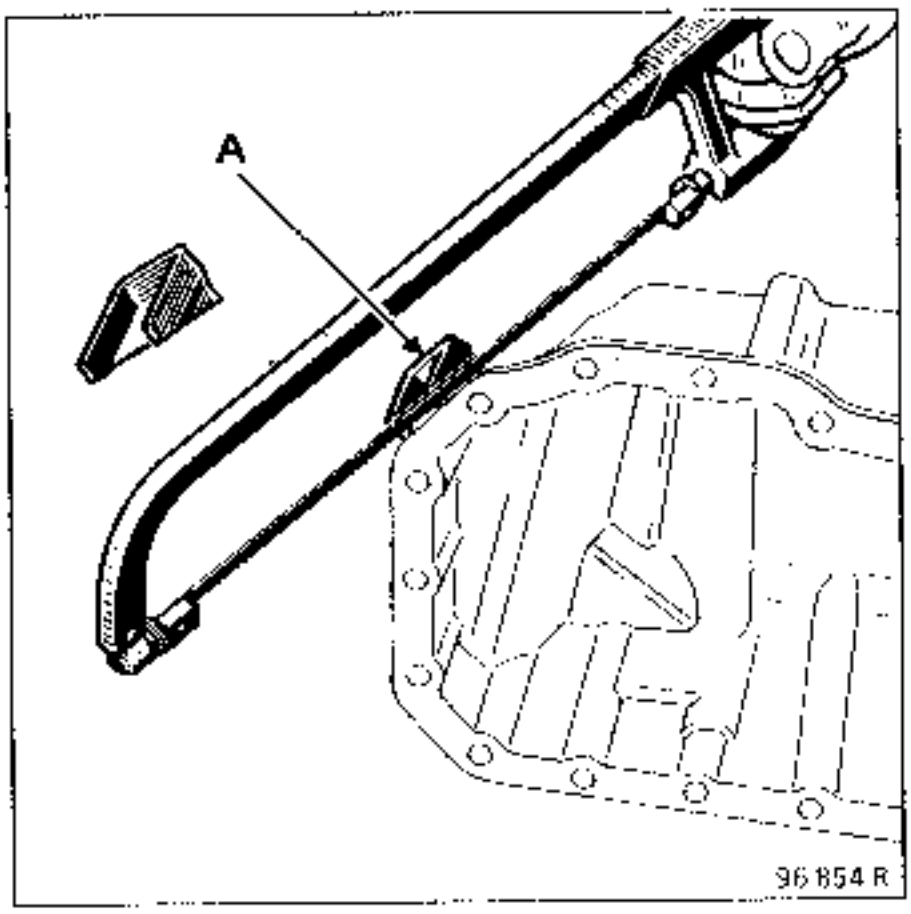
Lower the engine mounting until there is approximately 60 mm between the engine mounting and the body.



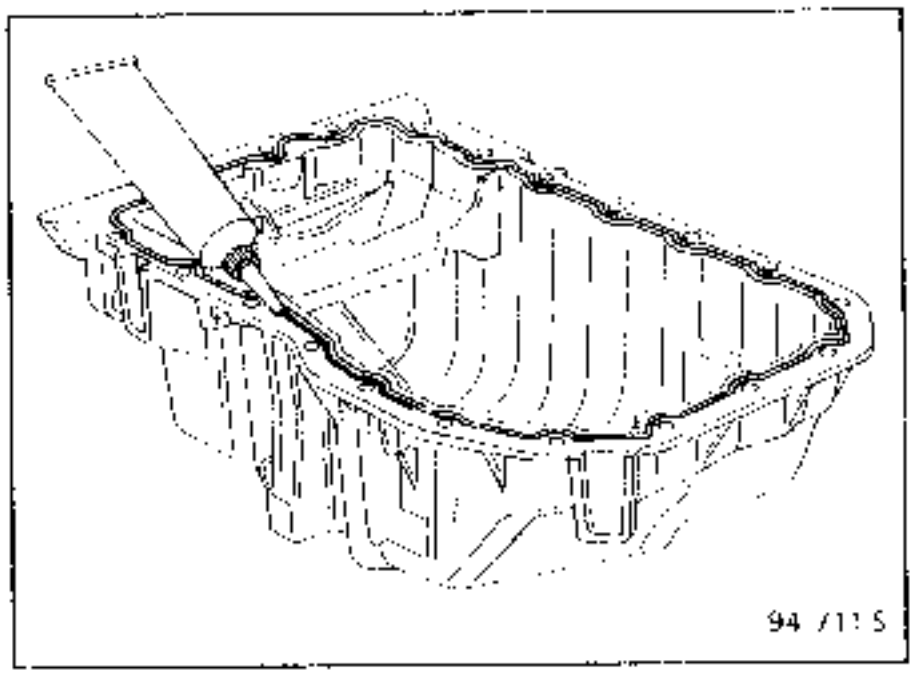
- Remove the four studs holding the sump to the gear box, remove the sump bolts and then remove the sump.

REFITTING (Special notes)

To facilitate refitting the sump, saw off corner (A).



Apply a 1 mm diameter bead of **CAF 4/60 THIXO** around the outside of the groove on the edge of the sump.



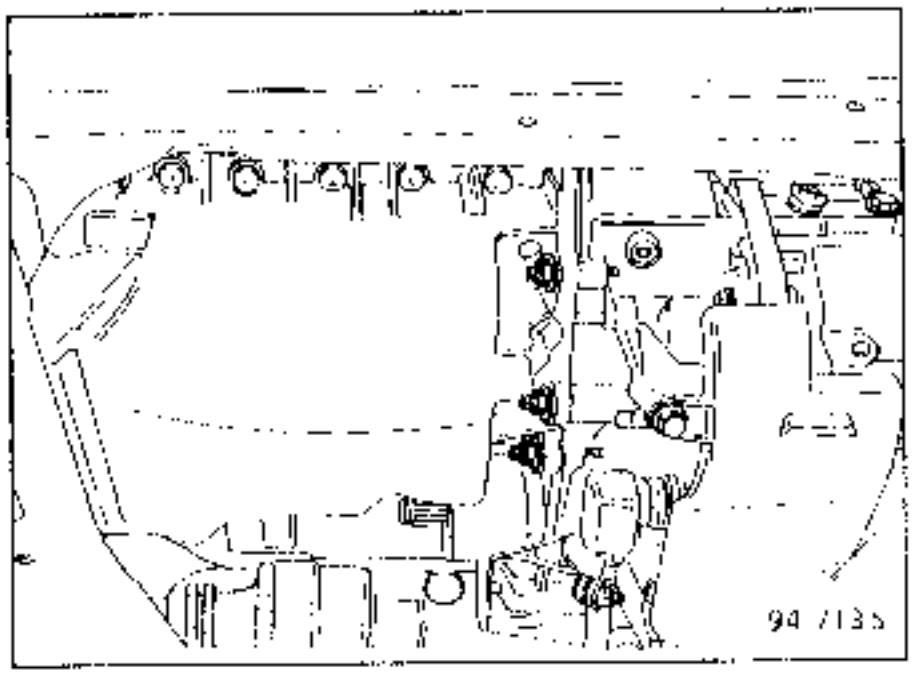
Refitting is then a reverse of removal.

Gently tighten 2 of the bolts holding the sump to the cylinder block.

Replace the studs holding the sump to the gear box.

Refit all the other sump bolts and tighten them to the recommended torque.

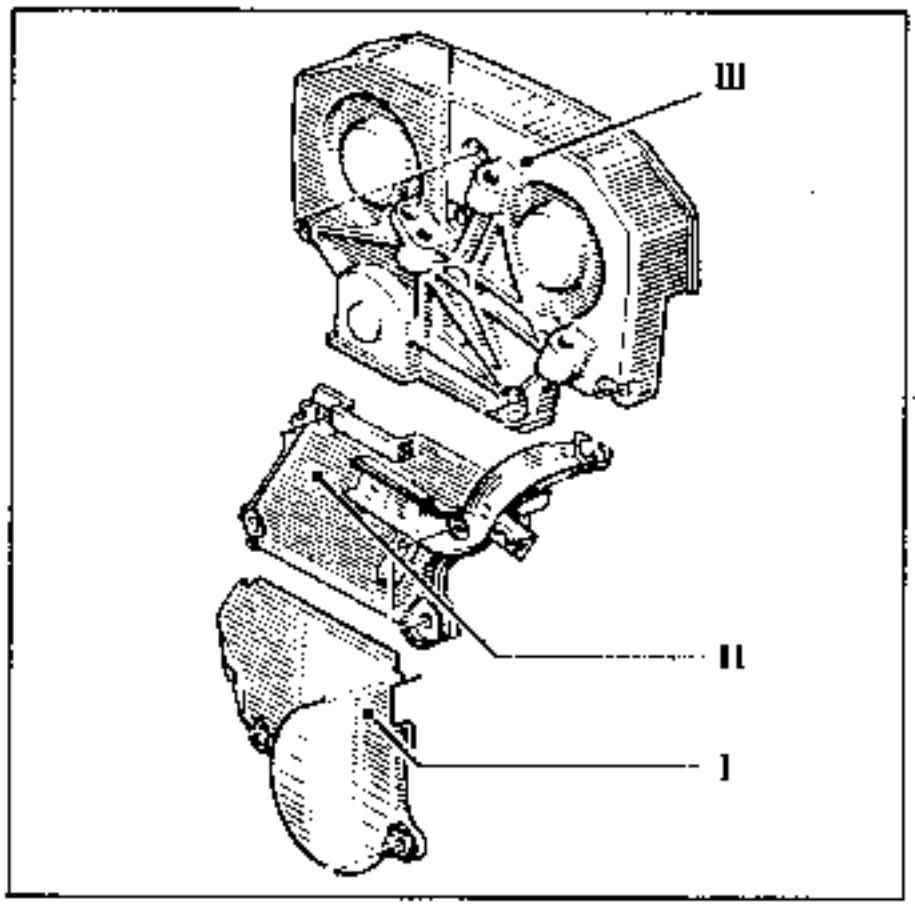
Fill the engine with oil



TOP AND FRONT OF ENGINE
Cylinder head gasket

SPECIAL TOOLING REQUIRED	
Mot. 451	Pins for refitting cylinder head gasket
Mot. 799	Camshaft sprocket immobiliser
Mot. 1 054	TDC pin.
Mot. 1 135-01	Timing belt tensioner
Mot. 1159	Tool for supporting engine on engine mounting
Mot. 1159-01	
Mot. 1 196	Gear immobiliser
Mot. 1 273	Tool for checking belt tension
Mot. 1 289-03	Movement limiter centring fork

TIGHTENING TORQUES (in daN.m)	
Nut for front left hand suspended engine mounting cover	4.5
Wheel bolt	9
Tensioner wheel nut	5
Suspended engine mounting cover bolt	6.5
Suspended engine mounting limiter bolt	5.5
Crankshaft pulley	9 to 10
Timing cover bolt	1.2

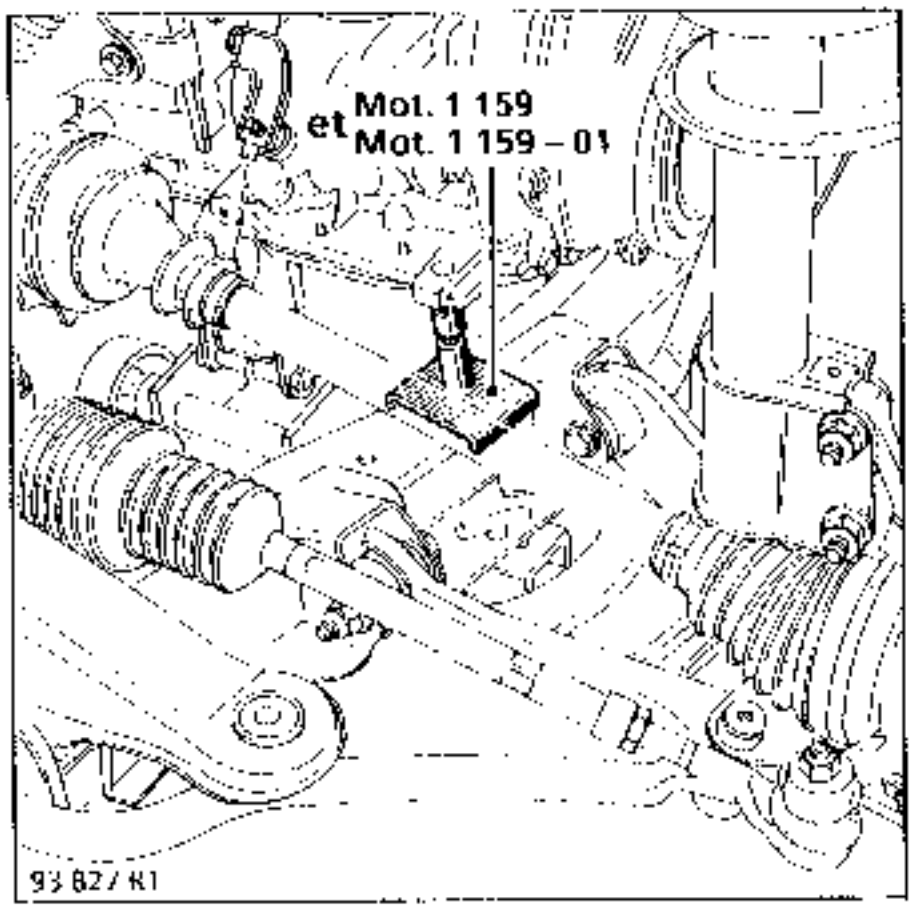


Remove:

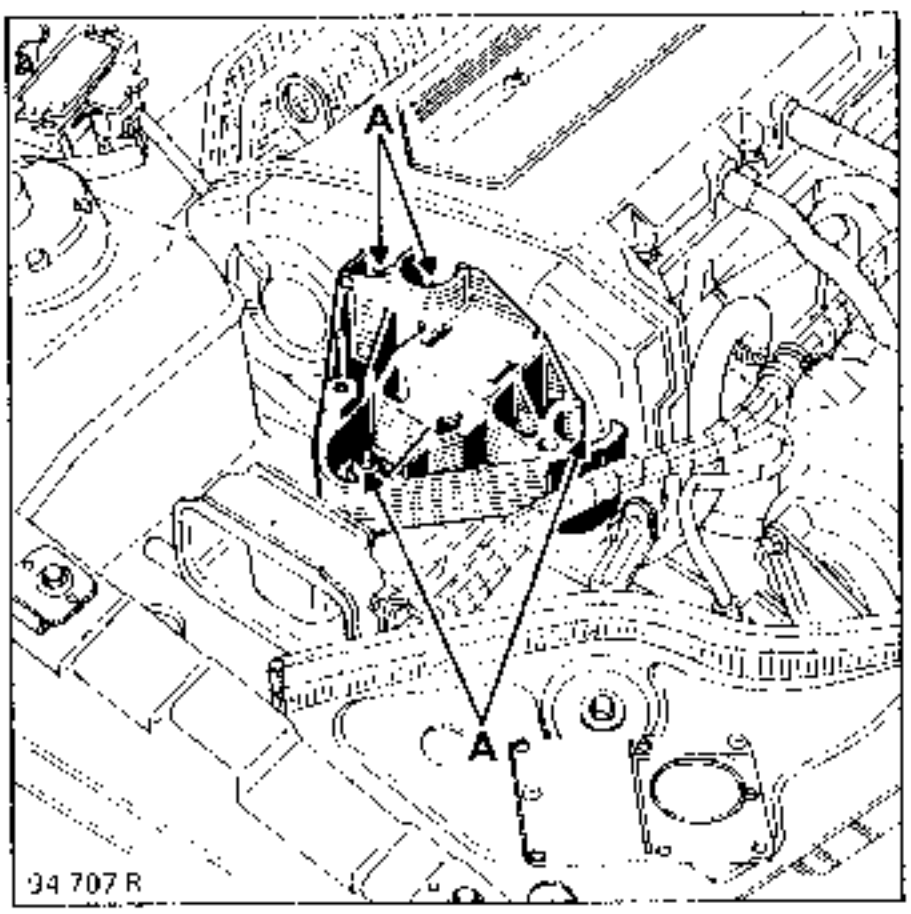
- the battery,
- the bonnet,
- the front right hand wheel,
- the front right hand wheel arch heat shield,
- the air filter,
- the air filter mounting,
- the right headlight lens unit,
- the lower timing belt cover, (I)
- the alternator belt,
- release the crankshaft pulley.

TOP AND FRONT OF ENGINE
Cylinder head gasket

Fit tools **Mot. 1159** and **Mot. 1159-01** between the engine mounting and the engine to support it.

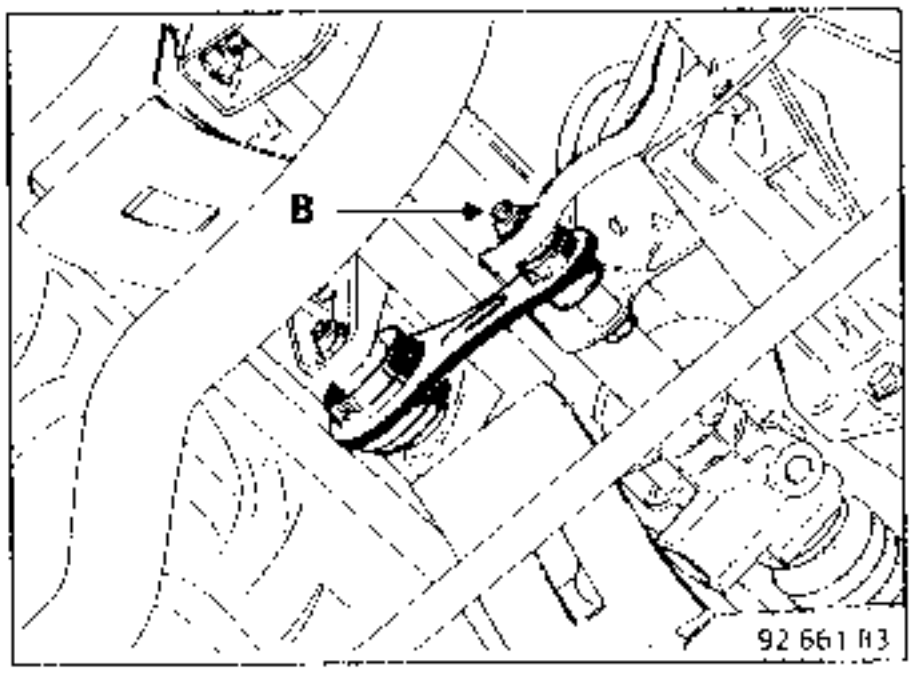


Remove the bolts and the nut **(A)** from the suspended engine mounting cover.



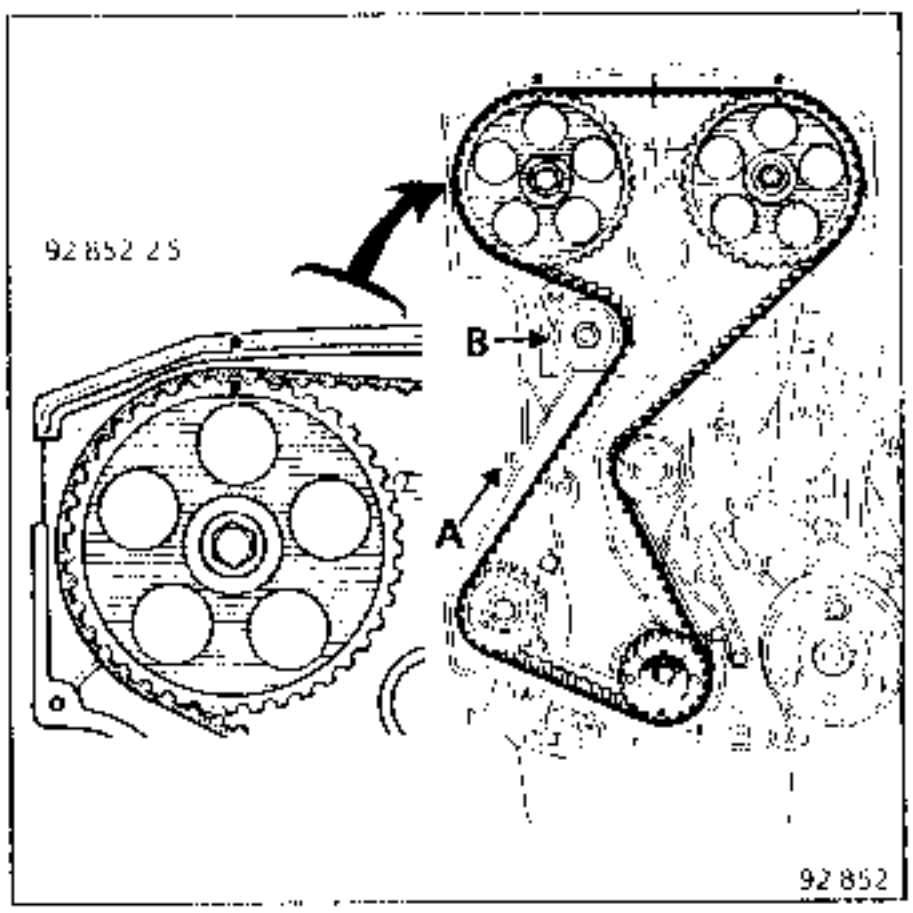
Remove:

- the fuel pipes and the absolute pressure sensor pipe,
- the canister pipe mounting,
- the intermediate cover **(II)**, then the upper cover **(III)** from the timing belt.
- the movement limiter bolt at **(B)**.



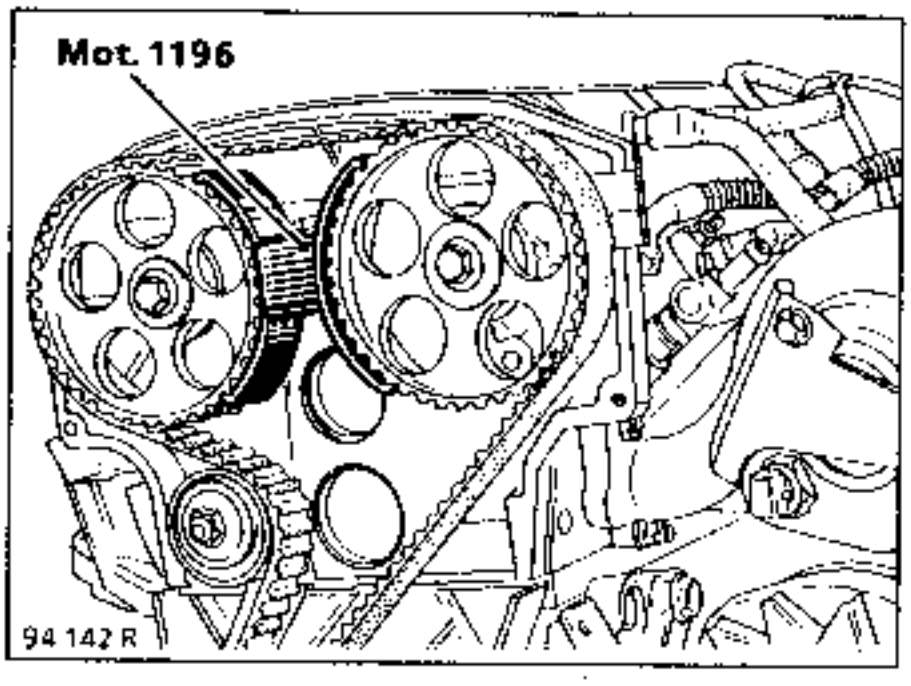
Remove the plug for the TDC pin.

Align the reference marks on the camshaft sprockets with the reference marks on the camshaft covers



Fit the TDC pin **Mot. 1054** into the crankshaft.

Fit the camshaft sprocket locking tool **Mot. 1196**.

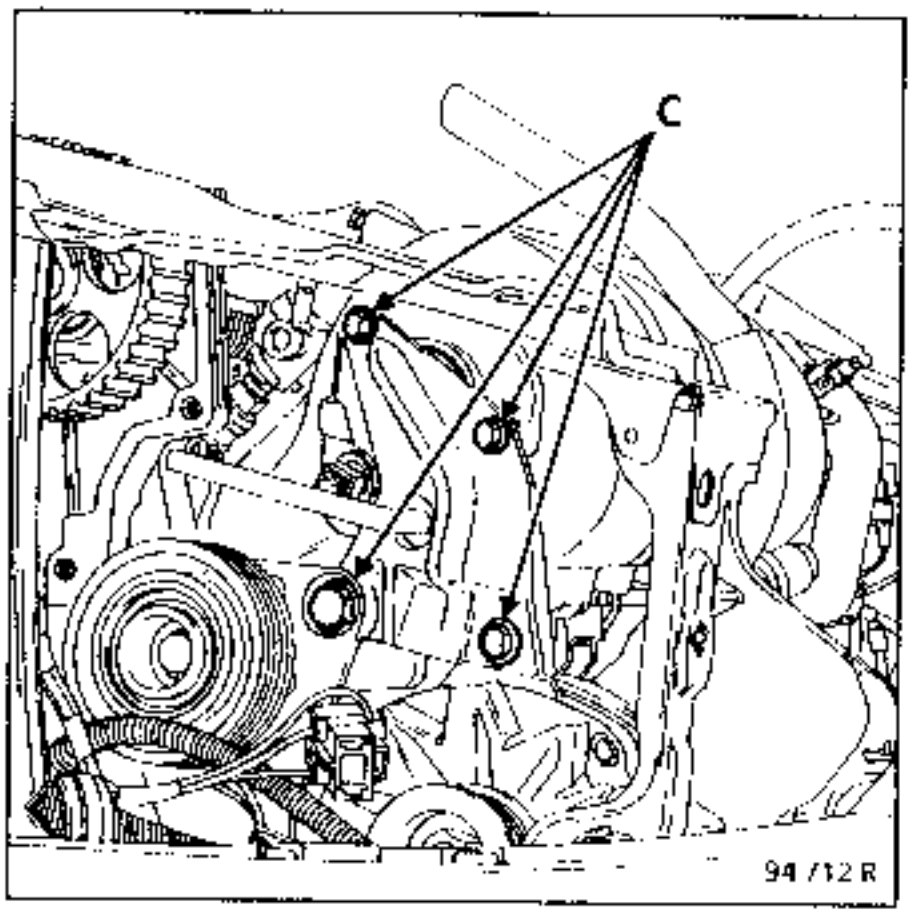


Loosen the tensioner wheel nut.

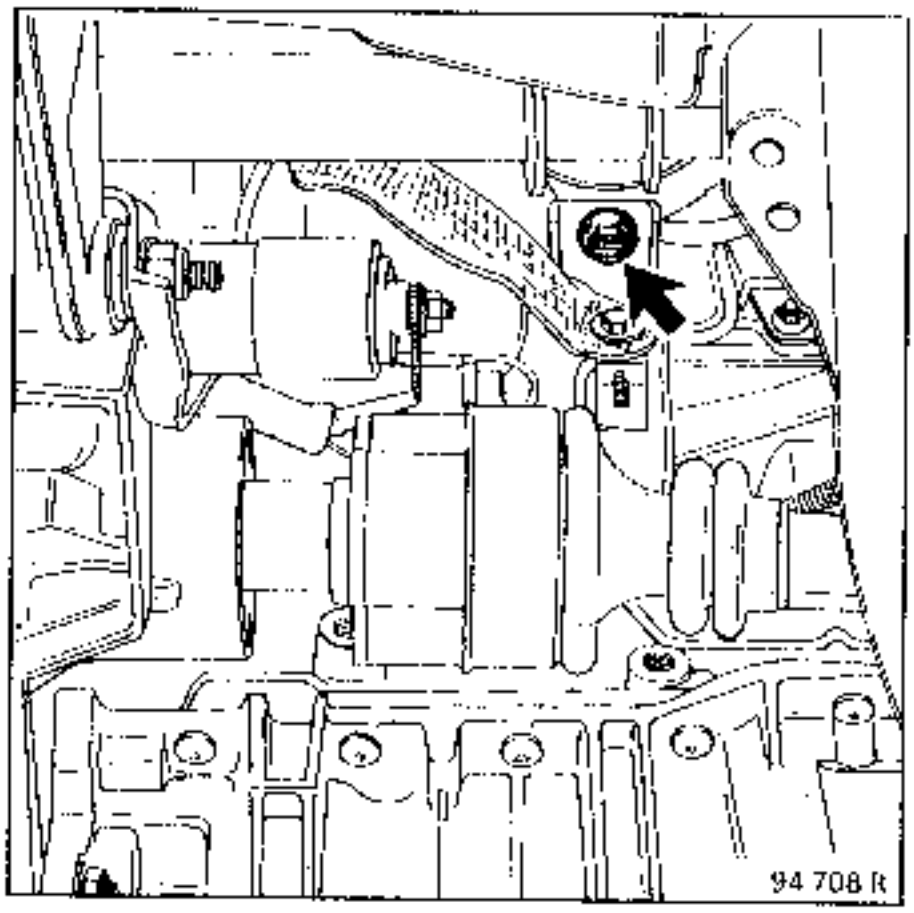
Remove the belt.

Remove:

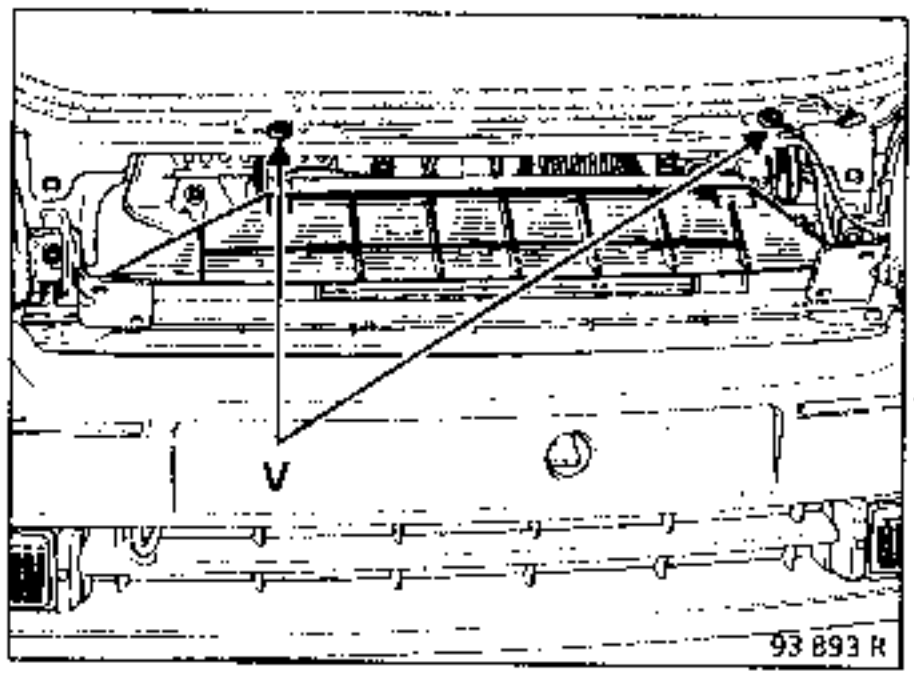
- the exhaust downpipe,
- the plug lead cover,
- the accelerator cable,
- the engine wiring and computer,
- the bracket holding the alternator on the inlet manifold at **(C)**.



- the rear starter mounting on the exhaust manifold,



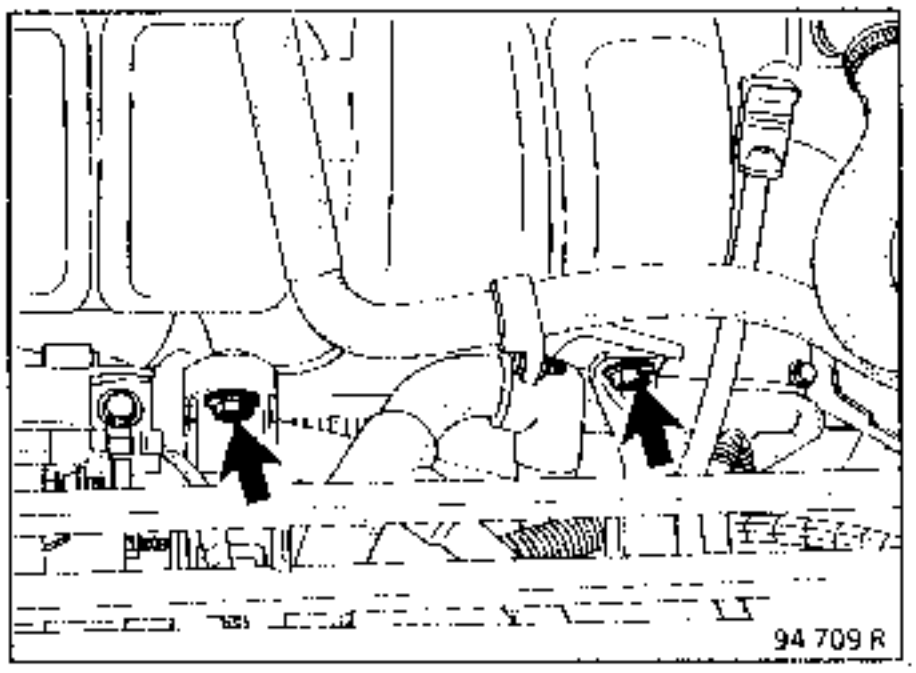
- the heat shield on the exhaust manifold,
- the upper radiator cross member and the radiator mounting bolts **(V)**, fold the heat shield back on itself,



Remove the engine cooling fan mountings on the radiator.

Remove the radiator then the engine cooling fan.

Remove the inlet manifold mountings.

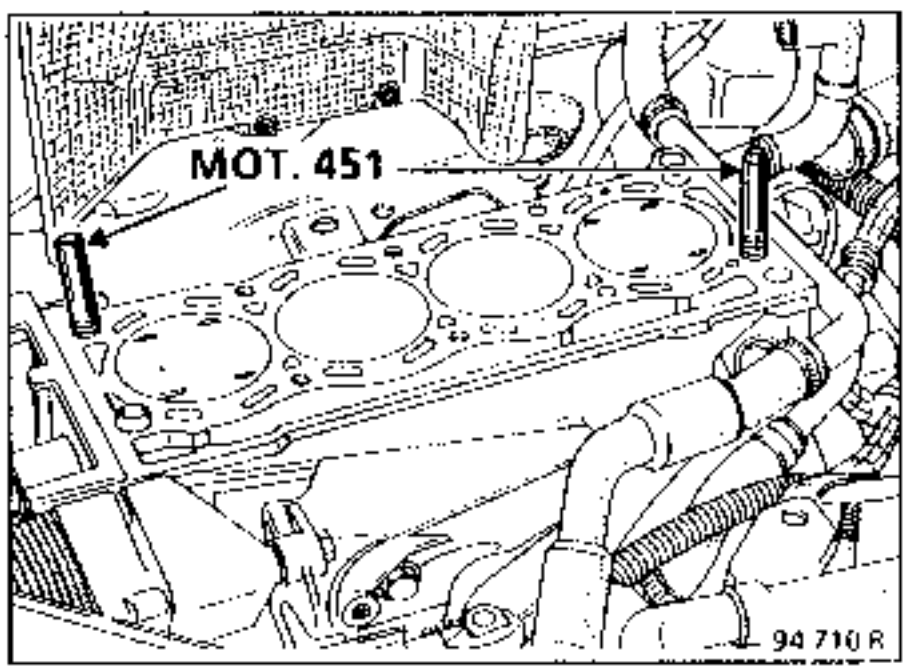


Remove the cylinder head bolts using a socket wrench with a 55 Torx socket

Remove the cylinder head.

REFITTING

Fit tools **Mot. 451** in the cylinder block.



Fit a new cylinder head gasket on the cylinder block.

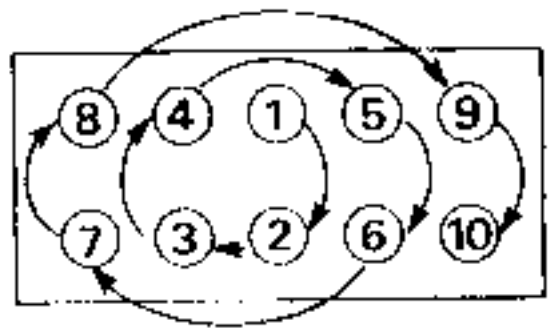
Remove tools **Mot. 451**.

TIGHTENING
This operation should be carried out when the engine is cold, after replacing the cylinder head, and should not be carried out later.

Reminder:
In order to ensure the bolts are tightened correctly, remove any oil in the cylinder head bolt holes using a syringe.

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

Tighten in the recommended order :



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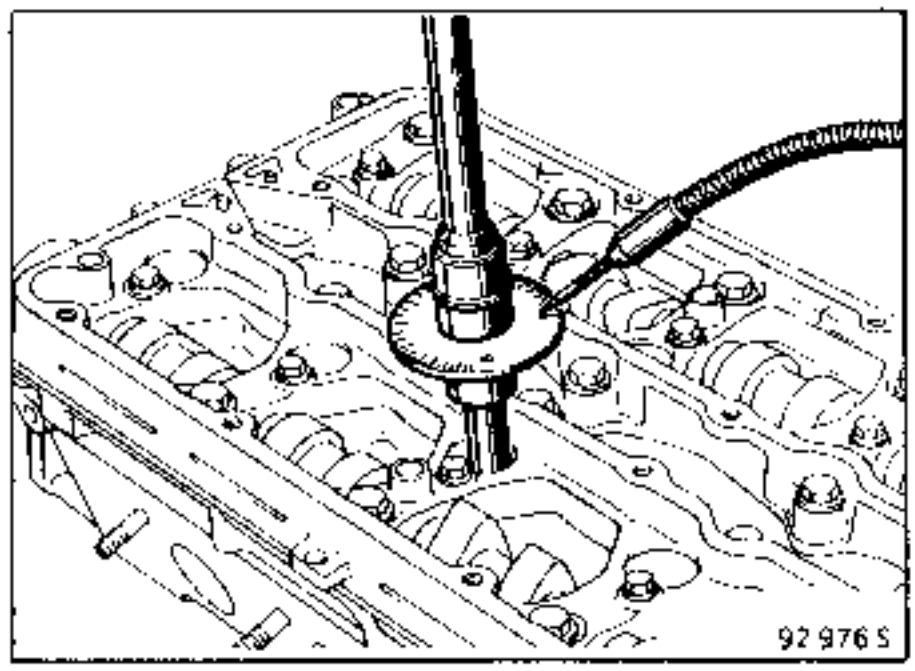
- 1st tightening : **3 daN.m**
- 2nd tightening: **5 daN.m**

Wait for a minimum of 3 minutes.

Loosen all the bolts to free them completely then:

- 1st retightening : **2.5 daN.m**
- 2nd retightening (angle) : **107° ± 2°**

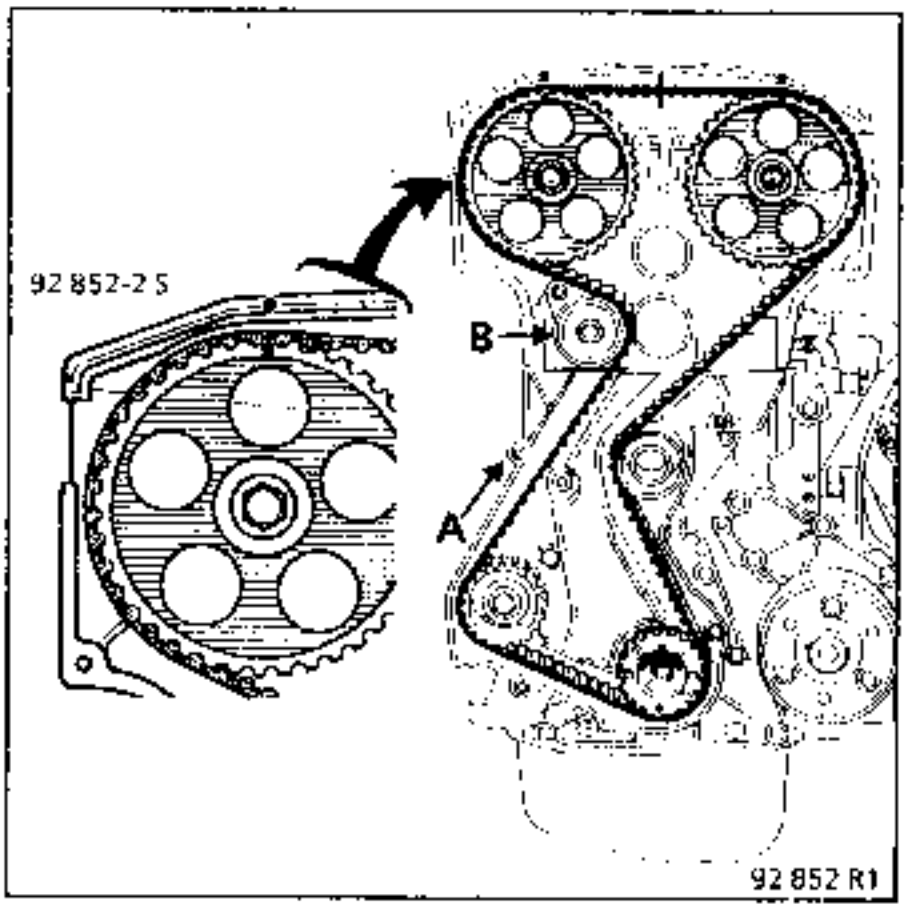


Timing:

Check pin **Mot. 1054** is in place.

Align the reference marks on the camshaft sprockets with the reference marks on the camshaft covers.

(If tool **Mot. 1196** has remained in place on the cylinder head, check that the camshaft sprocket marks are still aligned with the camshaft cover marks).



Fit the belt, observing:

- the direction of arrow **(A)**,
- the alignment of the marks on the belt with the camshaft sprocket marks.

Using a bolt **B** diameter **6 mm**, length **45 mm**, tension the belt using the tensioner wheel.

Remove pin **Mot. 1054**.
Remove the camshaft sprocket immobiliser tool **Mot. 1196.**

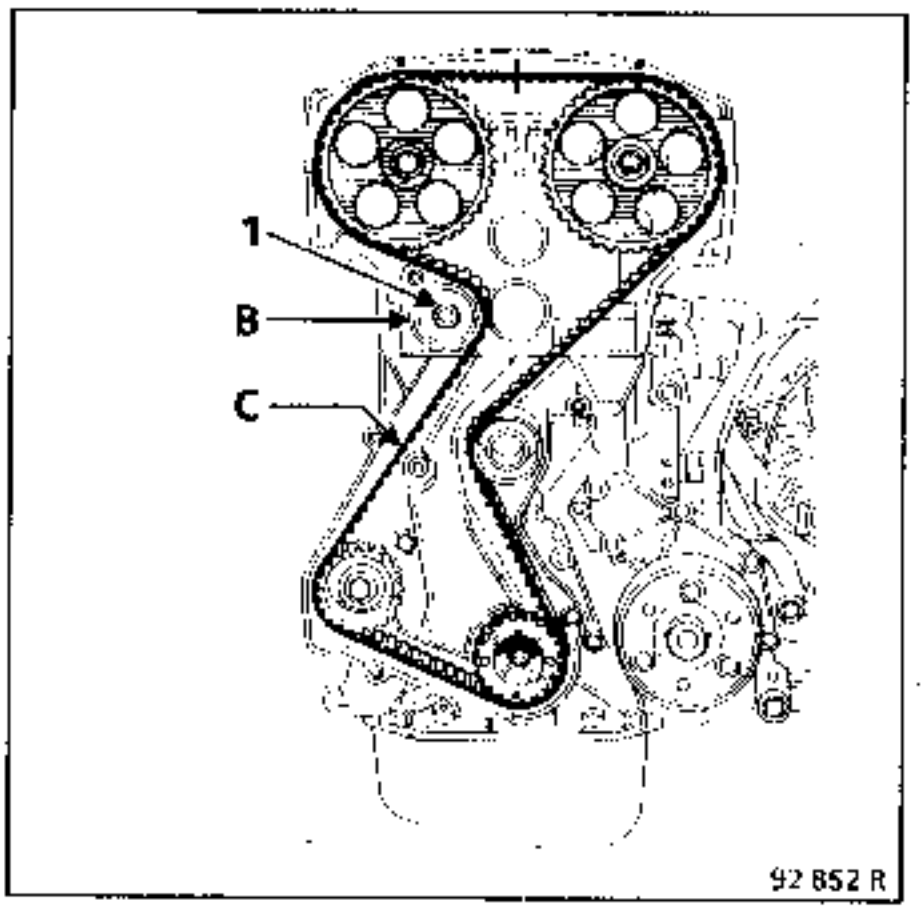
Press hard on section (C).

Fit the sensor of tool **Mot. 1273** to the slack part of section **(C)**.

Turn the wheel on the sensor until it clicks into place.

Adjust the tensions shown on tool **Mot. 1273** by moving bolt (B) until a value of:
32 ± 3 US (SEEM Units)
is reached.

Torque tighten nut **(1)** to **5 daN.m**



Checking:

Turn the engine over twice.

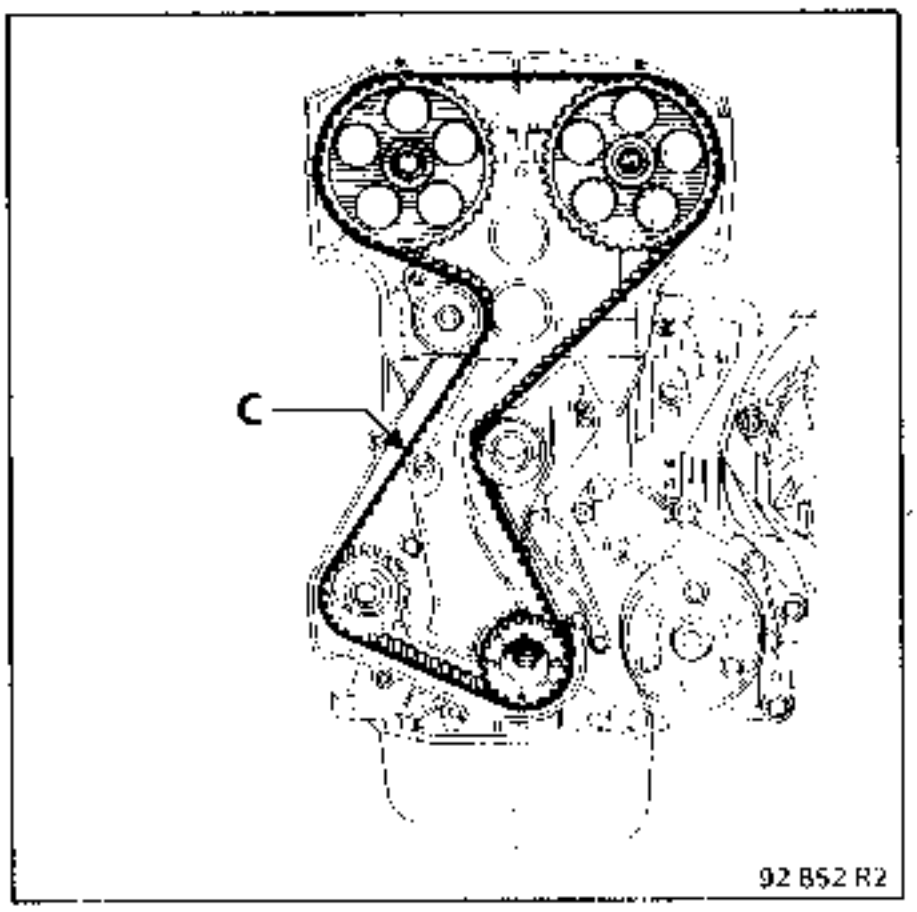
Refit pin **Mot. 1054** .

The reference marks on the camshaft sprockets should be aligned with the reference marks on the camshaft covers.

This operation is checking the timing belt calibration.

Remove pin **Mot. 1054**.

Press hard on section (C).



Fit the sensor of tool **Mot. 1273** to the slack part of section **(C).**

Turn the wheel of the sensor until it clicks into position.

Check the value shown on tool
Mot. 1273 is between:
19 and 32 US (SEEM Units)

Note: If the timing belt has been removed, it must be replaced with a new part.

Refit the timing covers.

Refit the accessories belt.

Tension values (for the accessories belt)

Engine cold (ambient temperature),

Fit the new belt.

Fit sensor **Mot. 1273** at (F) (→

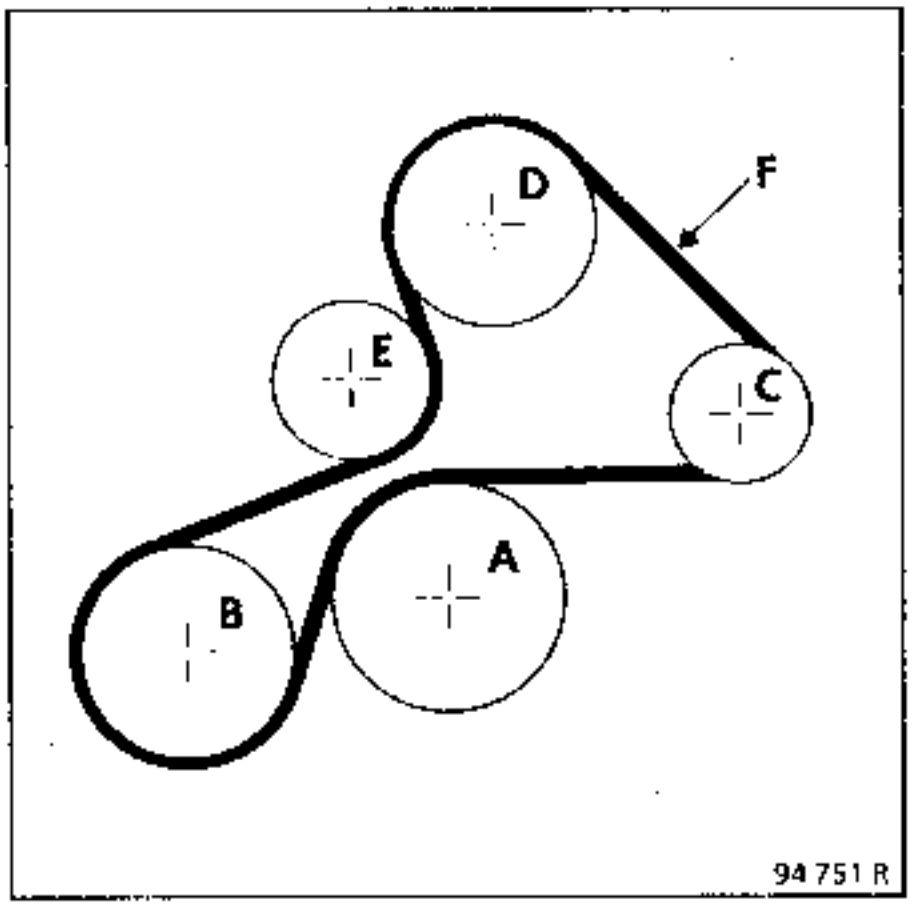
Turn the wheel of the sensor until it clicks into position.

Adjust the tension until the value shown by tool **Mot. 1273** is:
111 ± 6 US (SEEM Units)

Lock the tensioner.

Turn the crankshaft 3 times.

Check the tension value is between the fitting tension value and the minimum operating tension value 64 US and 111 US (SEEM Units).



Key to pullies:

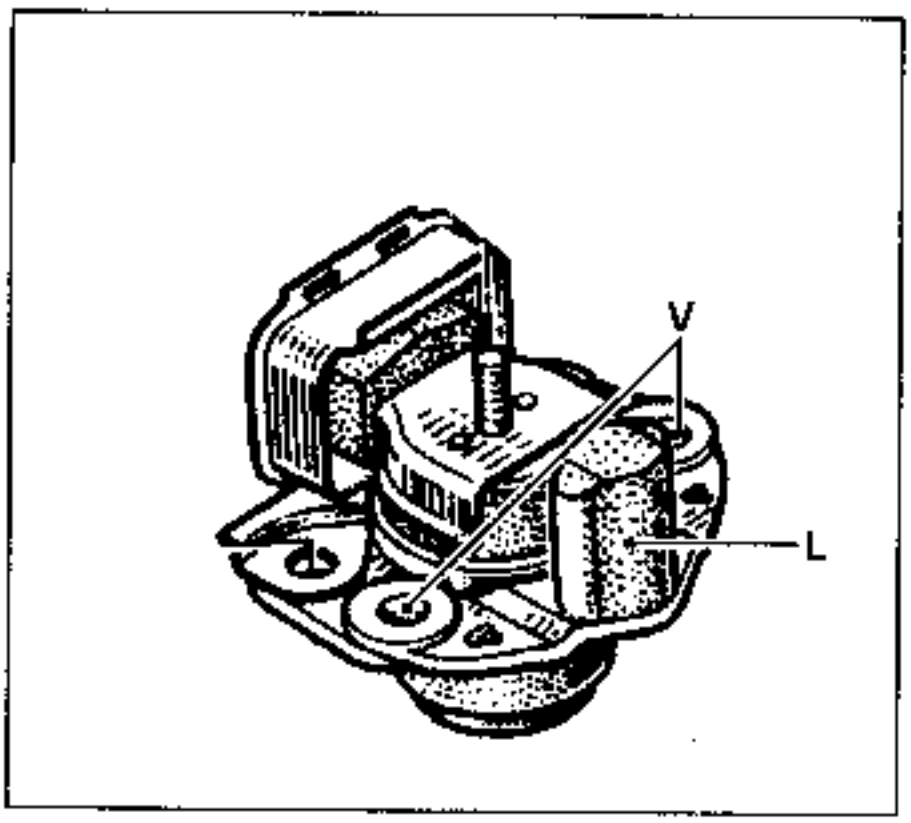
A : Water pump pulley
B : Crankshaft pulley
C : Alternator pulley
D : Power assisted steering pulley
E : Tensioner wheel

Refitting (Special notes)

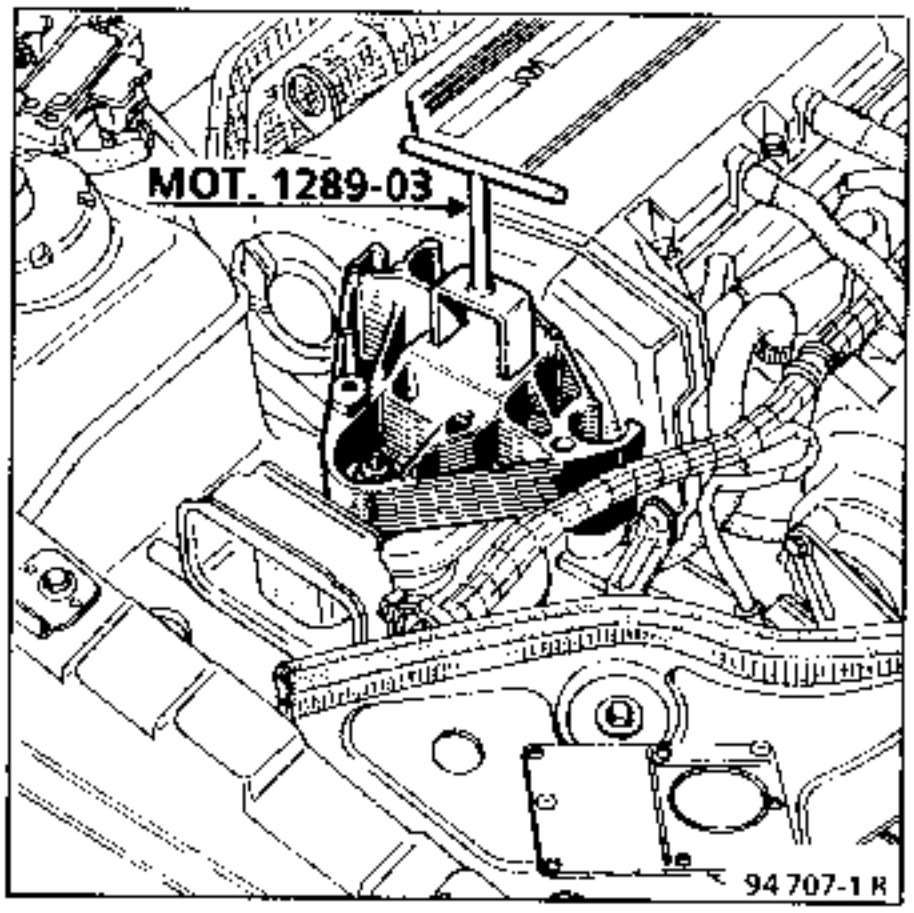
Refitting is the reverse of removal.

Do not forget to refit the TDC pin plug.

When refitting the suspended engine mounting cover, ensure the longitudinal movement limiter is correctly centred (L) in relation to the cover.



Fit the centring fork tool **Mot. 1289-03** into the holes in the cover. If the limiter is not correctly centred support the weight of the engine, loosen the bolts (V) on the limiter, insert the fork, refit the engine, and tighten bolts (V) to the recommended torque.



Fill:

- the engine with oil (if necessary).

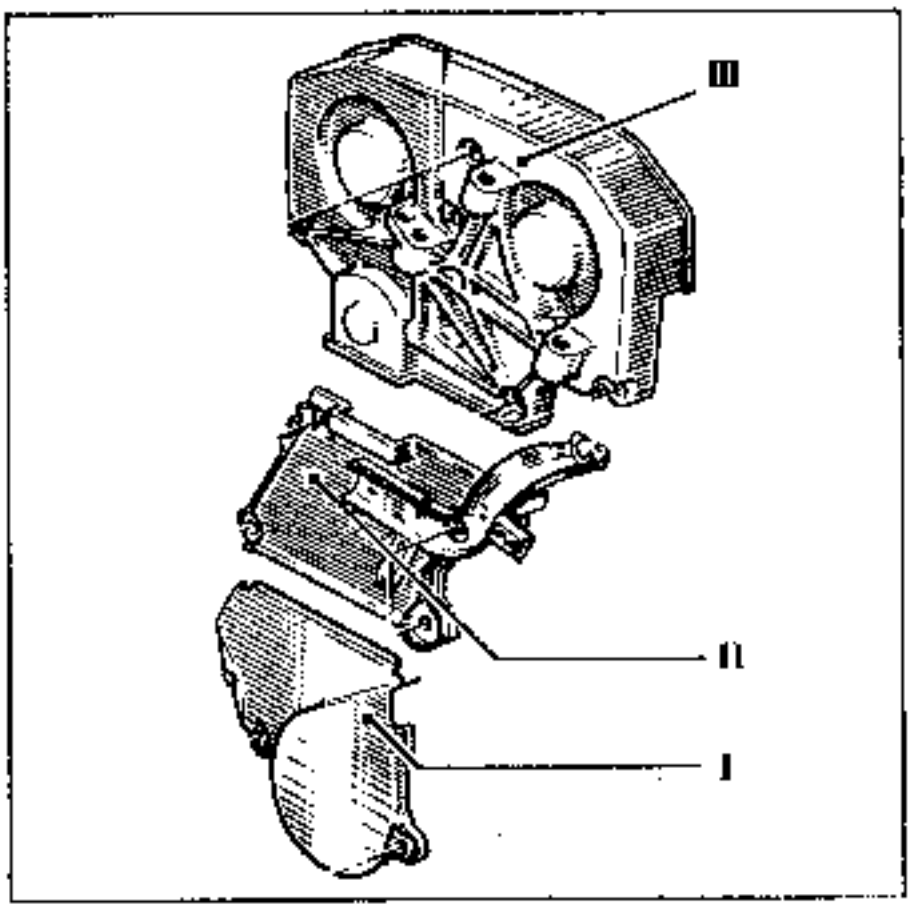
- the cooling circuit and bleed.

Adjust the accelerator cable.

TOP AND FRONT OF ENGINE
Timing belt

SPECIAL TOOLING REQUIRED	
Mot. 451	Pins for refitting cylinder head gasket
Mot. 799	Camshaft sprocket immobiliser
Mot. 1 054	TDC pin.
Mot. 1 135-01	Timing belt tensioner
Mot. 1159 } Mot. 1159-01 }	Tool for supporting engine on engine mounting
Mot. 1 196	Gear immobiliser
Mot. 1 273	Tool for checking belt tension
Mot. 1 289-03	Movement limiter centring fork

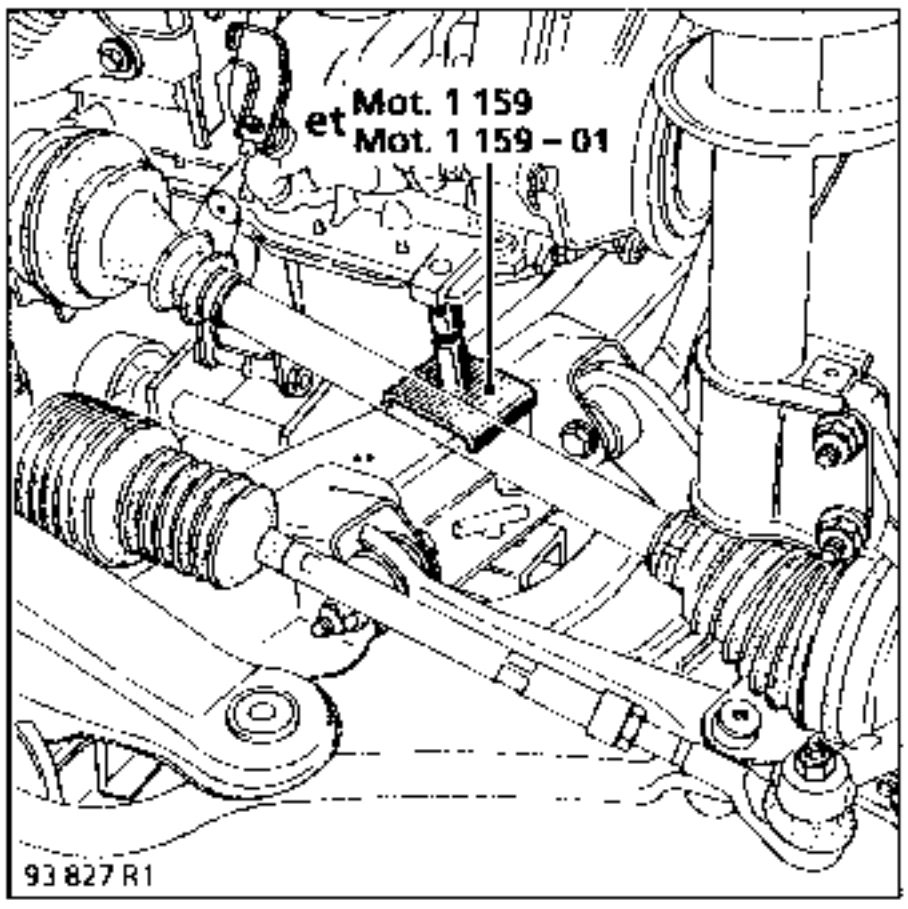
TIGHTENING TORQUES (in daN.m)	
Nut for front left hand suspended engine mounting cover	4.5
Wheel bolt	9
Tensioner wheel nut	5
Suspended engine mounting cover bolt	6.5
Suspended engine mounting limiter bolt	5.5
Crankshaft pulley	9 to 10
Timing cover bolt	1.2



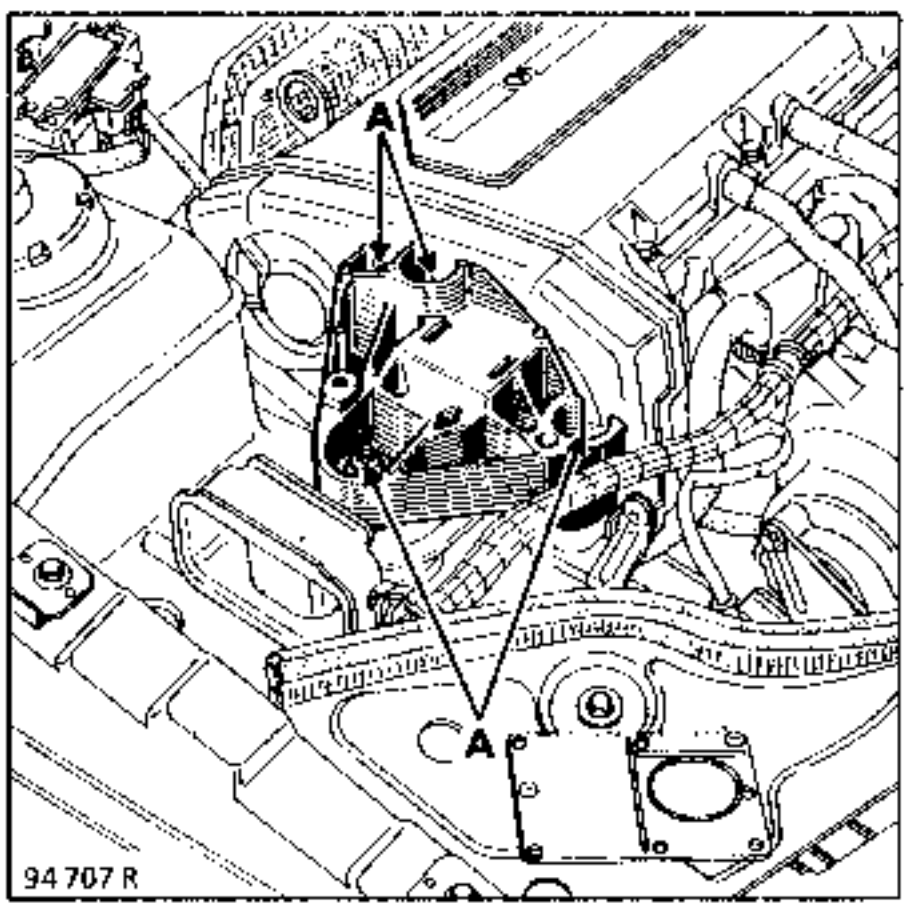
Remove:

- the battery,
- the bonnet,
- the front right hand wheel,
- the front right hand wheel arch heat shield,
- the air filter,
- the air filter mounting,
- the right headlight lens unit,
- the lower timing belt cover , (I)
- the alternator belt,
- release the crankshaft pulley.

Fit tools **Mot. 1159** and **Mot. 1159-01** between the cylinder block and the sub-frame.



Remove the bolts and the nut (A) from the suspended engine mounting cover.

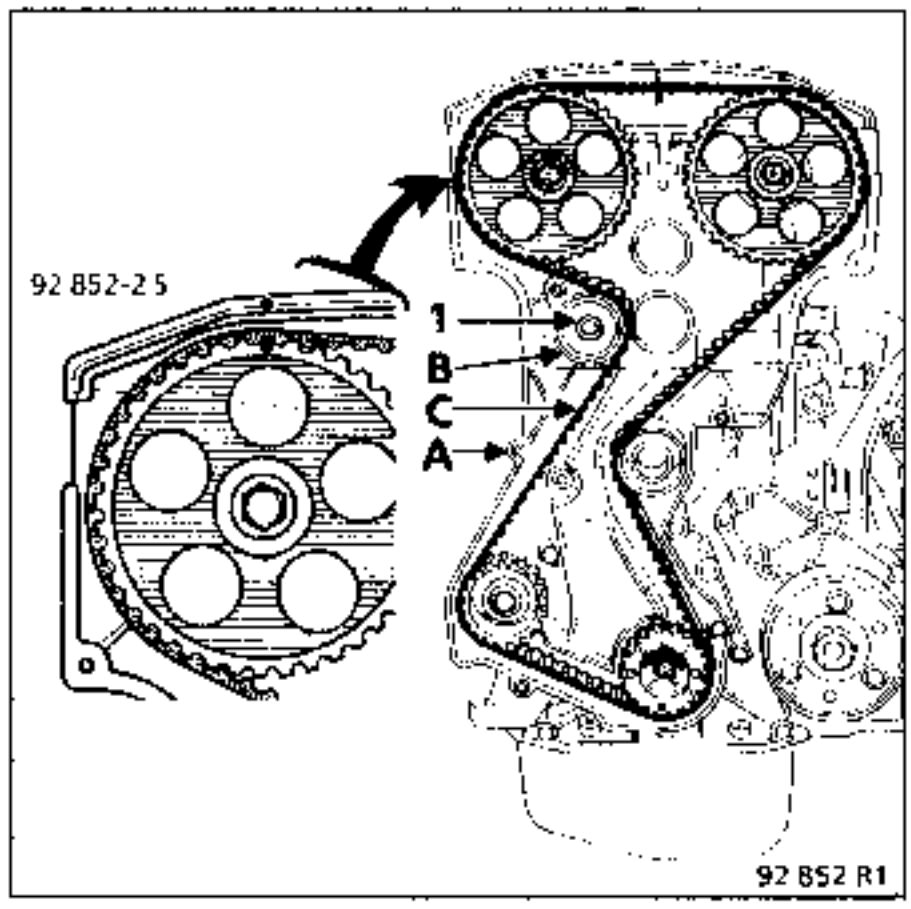


Remove:

- the fuel pipes and the absolute pressure sensor pipe,
- the canister pipe mounting,
- the intermediate cover (II), then the upper cover (III) from the timing belt.

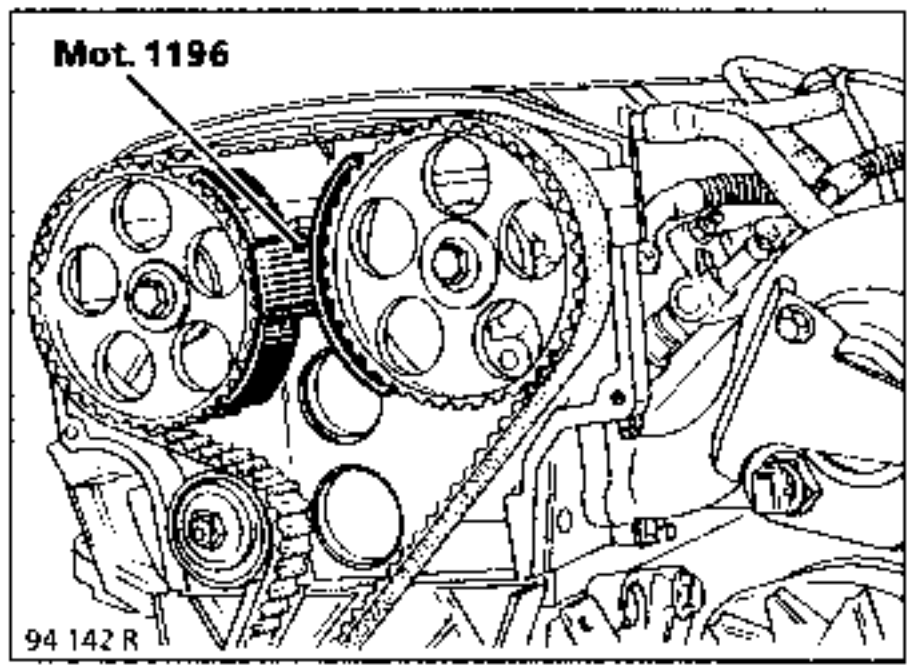
Remove the plug for the TDC pin.

Align the reference marks on the camshaft sprockets with the reference marks on the camshaft covers.



Fit the TDC pin **Mot. 1054** into the crankshaft.

Fit the camshaft sprocket locking tool **Mot. 1196**



Loosen the tensioner wheel nut.

Remove the belt.

TOP AND FRONT OF ENGINE
Timing belt

Timing belt tension after replacement:

Check pin **Mot. 1054** is in place.

Align the reference marks on the camshaft sprockets with the reference marks on the camshaft covers.

(If tool **Mot. 1196** has remained in place on the cylinder head, check that the camshaft sprocket marks are still aligned with the camshaft cover marks).

Fit the belt, observing:

- the direction of arrow **(A)**,
- the alignment of the marks on the belt with the camshaft sprocket marks.

Using a bolt **B** diameter **6 mm**. length **45 mm**, tension the belt using the tensioner wheel.

Remove pin **Mot. 1054**.

Press hard on section (C).

Fit the sensor of tool **Mot. 1273** to the slack part of section **(C)**.

Turn the wheel on the sensor until it clicks into place.

Adjust the tensions shown on tool **Mot. 1273** by moving bolt **(B)** until a value of:

32 ± 3 US (SEEM Units)

is reached.

Torque tighten nut (1) to **5 daN.m**

Checking:

Turn the engine over twice.

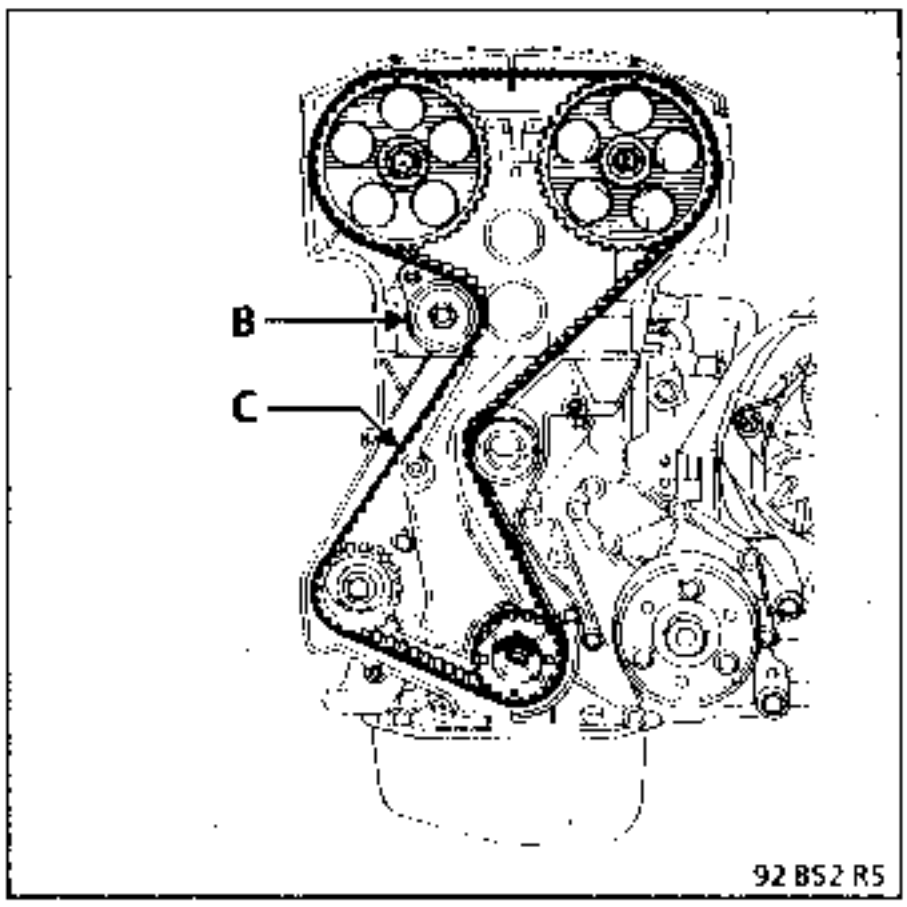
Refit pin **Mot. 1054** into place.

The reference marks on the camshaft sprockets should be aligned with the reference marks on the camshaft covers.

This operation is checking the timing belt calibration.

Remove pin **Mot. 1054**.

Press hard on section (C).



Fit the sensor tool **Mot. 1273** to the slack part of section **(C)**.

Turn the wheel of the sensor until it clicks into position.

Check the value shown on the tool **Mot. 1273** is between:

19 and 32 US (SEEM Units)

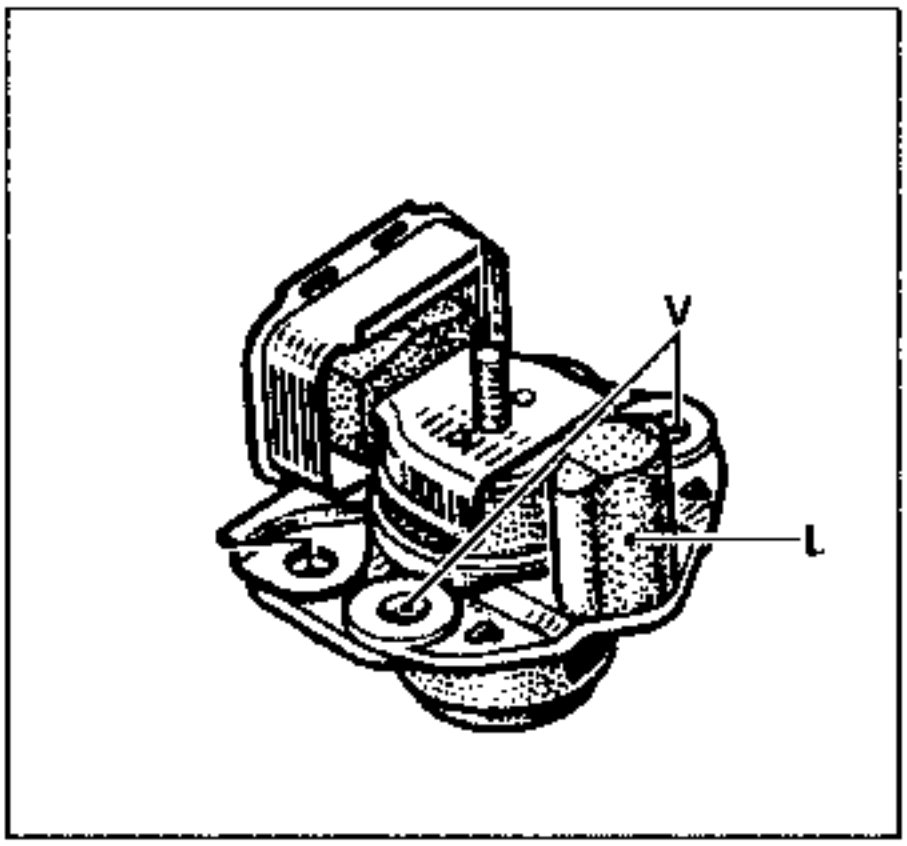
Note: If the timing belt has been removed, it must be replaced with a new part.

Refitting (Special notes)

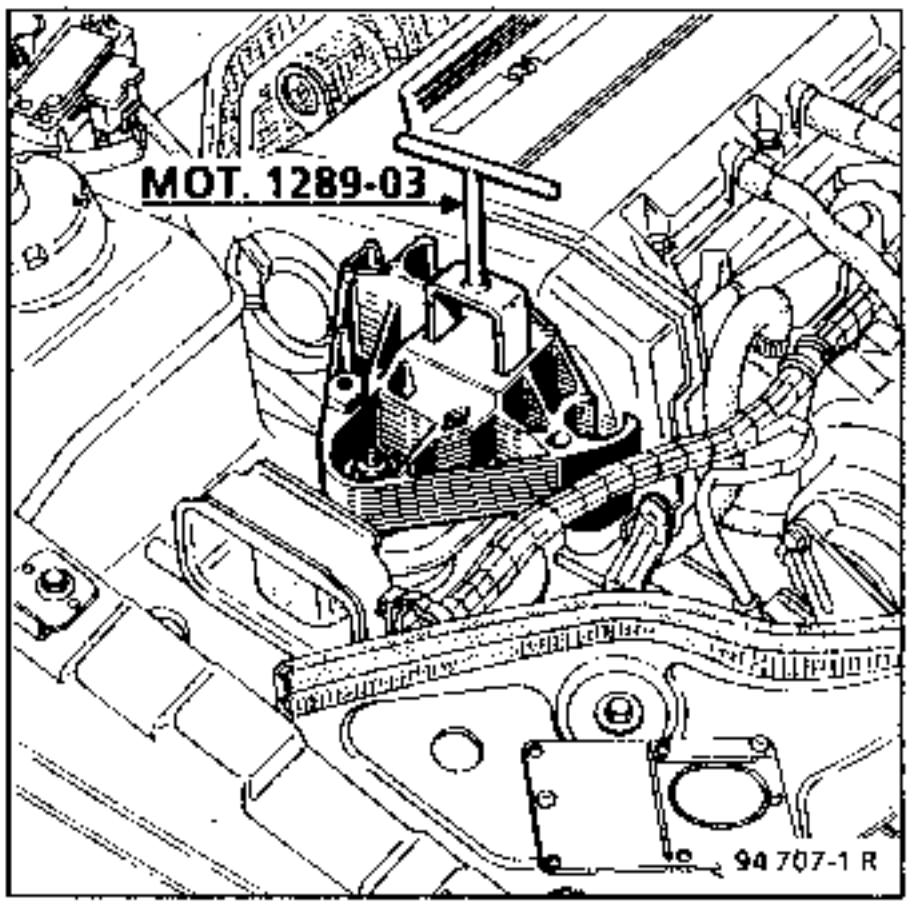
Refitting is the reverse of removal.

Do not forget to refit the TDC pin plug.

When refitting the suspended engine mounting cover, ensure the longitudinal movement limiter is correctly centred (L) in relation to the cover.



Fit the centring fork tool **Mot. 1289-03** into the holes in the cover. If the limiter is not correctly centred support the weight of the engine, loosen the bolts (V) on the limiter, insert the fork, refit the engine, and tighten bolts (V) to the recommended torque.

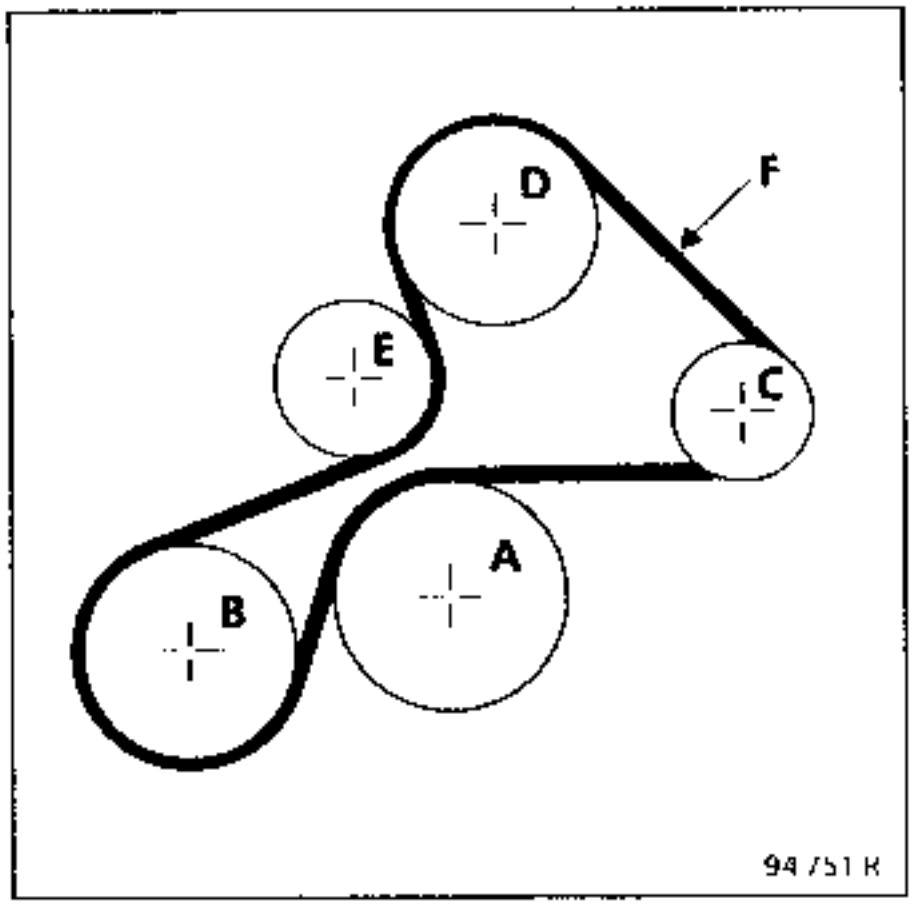


TOP AND FRONT OF ENGINE
Accessories belt

SPECIAL TOOLING REQUIRED	
Mot. 1 273	Tool for testing belt tension

Checking tension values:

- Engine cold (ambient temperature).
- Fit the new belt.
- Fit the sensor of tool **Mot. 1273** to section (F)
- Turn the sensor wheel until it clicks into position
- Tighten the belt until the tool **Mot. 1273** shows the recommended fitting value below.
- Lock the tensioner, check and adjust the value.
- Turn the crankshaft 3 times.
- Check the tension value is between the fitting value and the minimum operating value (same value for a test when the belt is not removed).
- Do not refit a belt once it has been removed. Use a new part.



Key to pullies:

A : Water pump pulley
B : Crankshaft pulley
C : Alternator pulley
D : Power assisted steering pulley
E : Tensioner wheel

Tension (US = SEEM Units)	Accessories belt
	Multi-tooth
Fitting	111 ± 6 US
Minimum operating tension	64 US

FUEL MIXTURE
General

12

Specifications and adjustment values

Vehicle	Engine						Gear box	Type of injection
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Ratio		
C57M	F7R	700	82.7	93	1998	10/1	Manual	Siemens multipoint, de-polluted

Test at idle speed *					Fuel (m i n i m u m octane rating)
Engine speed (rpm.)	Pollutant emission **				
	CO (%)	CO_2 (%)	HC (ppm)	Lambda (∎)	Unleaded (OR 95)
900 ±50	0.3 max	14.5 min	100 max	0.97< ∎ <1.03	

* For a coolant temperature above 80° C.

** For legislative values see specification for country.

Type of fuel supply	Regulated multipoint injection
Submerged pump in fuel tank Type : **Walbro**	Voltage : **12 volts** Pressure : **3 bar** Flow : **80 l/h minimum**
Fuel filter mounted under vehicle in front of fuel tank	Replace every 30 000 miles (50 000 km)
Throttle body	**PIERBURG** : double body 35 x 52
Pressure regulator	Pressure: - zero vacuum : **3.0 ± 0.2 bar** - vacuum 500 mbars : **2.5 ± 0.2 bar**
Solenoid injector Type : **BOSCH**	Voltage : **12 volts** Resistance : **2.4 ± 0.5 Ohms**
Idle speed regulation valve Type : **BOSCH** dual winding	Resistance of each winding : **20 ± 2 Ohms**
Throttle position potentiometer	Check using XR25 # 17 At idle speed : 8 to 13 Under full load : > 213
Cold start injector Type : **BOSCH**	Voltage : **12 volts** Resistance : **10.8 ± 0.5 Ohms**

FUEL MIXTURE
General

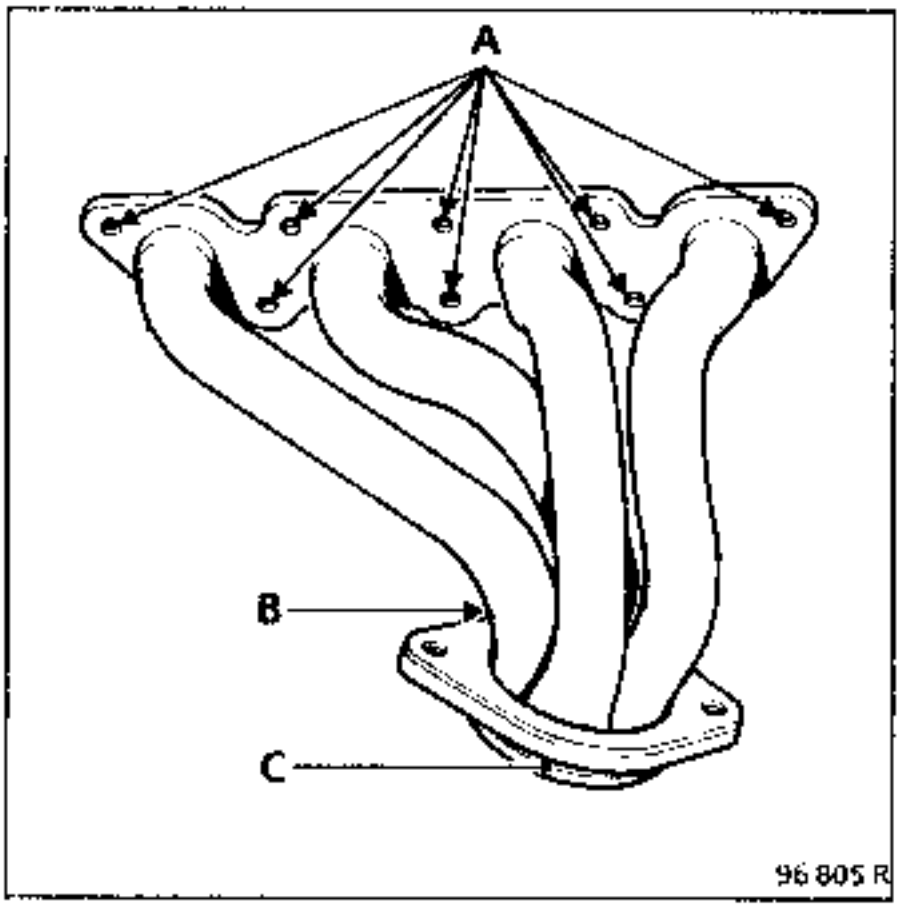
Specifications and adjustment values

Computer	Rénix N°	Homologation N°	R.N.U.R. N°	Diagnostic code
Siemens, in scuttle panel	S101 262 107	77 00 864 272	77 00 864 500	238

Temperature in °C (± 1°)	0	20	40	80	90
Air temperature sensor Type: CTN Siemens ; resistance in Ohms	7470 to 11970	3060 to 4045	1315 to 1600	.....	.....
Coolant temperature sensor Type: CTN Siemens ; resistance in Ohms	.....	3060 to 4045	1315 to 1600	300 to 370	210 to 270

BOSCH heated oxygen sensor	Voltage supplied at 850 °C : - rich mixture > 625 mV - lean mixture : 0 to 80 mV
Catalytic converter (under floor)	◇ C 30
Paper cartridge air filter	Replace every 12000 miles (20 000 km)
Anti-evaporation system : Canister	CAN 01
Ignition	- Advance integral in injection computer - Ignition power module - Pinking sensor
Plugs	Eyquem FC 58 LS3 Gap: 1.2 mm non-adjustable

REMOVAL - REFITTING



There is no special problem in removing the exhaust manifold.
The manifold is held by 8 nuts at (A) to the cylinder head and by a bolt at (B) to the exhaust downpipe mounting bracket.
To remove the manifold, remove the two upper mounting bolts for the fuel pipe heat shield.

When refitting, replace the manifold gasket and check the condition of the " METEX " friction ring (C) ; replace it if necessary.

IMPORTANT:

The seal between the exhaust manifold face and the catalytic converter must be perfect to ensure correct operation of the oxygen sensor (catalytic converter may otherwise be damaged).

FUEL MIXTURE
Inlet manifold

REMOVAL - REFITTING

Removal:

- Disconnect the battery,

- Remove:
  * the bonnet
  * the upper cross member
  * the complete air filter unit.

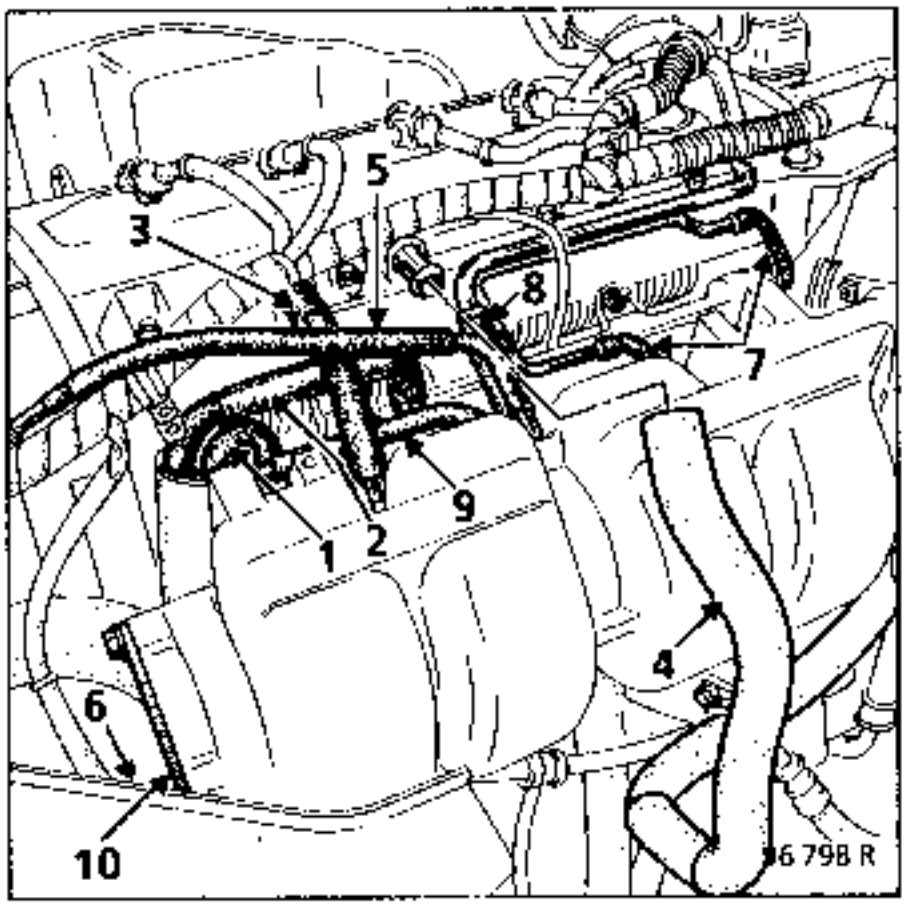
- Drain the cooling circuit.

- Disconnect the engine cooling fan connector and the fan temperature control switch.

- Unclip the various heat shields round the radiator,

- Remove the idle speed regulation valve,

- Remove the engine cooling radiator.



- Disconnect:
  * the fuel inlet pipe (1)
  * the fuel return pipe (2)
  * the oil vapour rebreathing pipes (3) and (4)
  * the fuel vapour recirculation pipe (5)
  * the absolute pressure sensor vacuum pipe (6)
  * the pipes to the fuel pressure regulator (7)
  * the injector connectors
  * the throttle position potentiometer
  * the air sensor
  * the pinking sensor
  * the accelerator cable
  * the pipe to the brake servo (8)

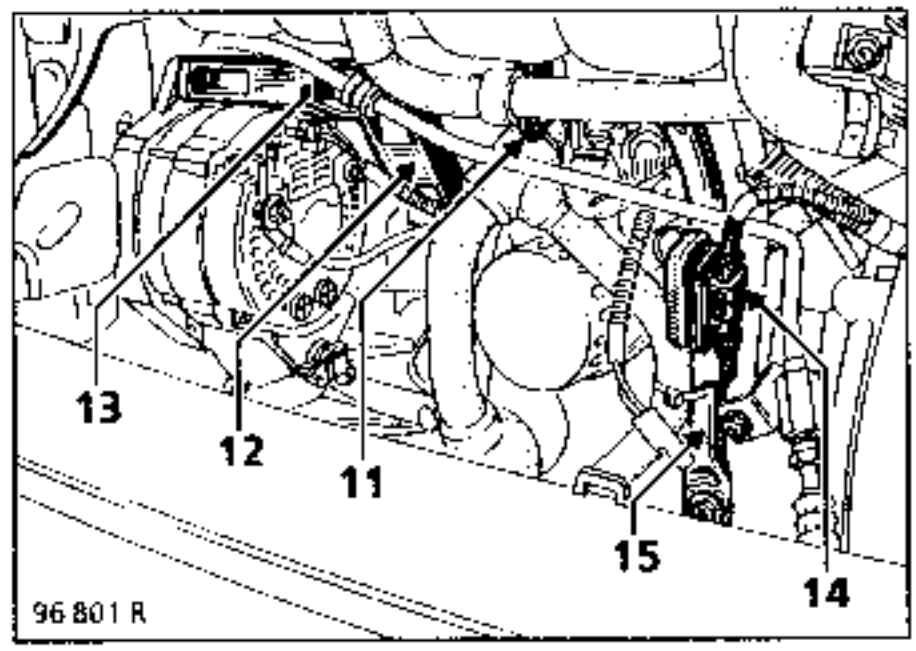
- Remove the collars securing the electrical wiring and release the wiring.

- Disconnect the cold start injector.

- Remove the cold start injector fuel inlet pipe (9)

- Release the injector mountings on the gallery

- Remove:
  * the two injector gallery mounting nuts and release the gallery
  * the four injectors
  * the mounting bracket (10) (2 bolts on the manifold and one bolt on the upper alternator mounting)

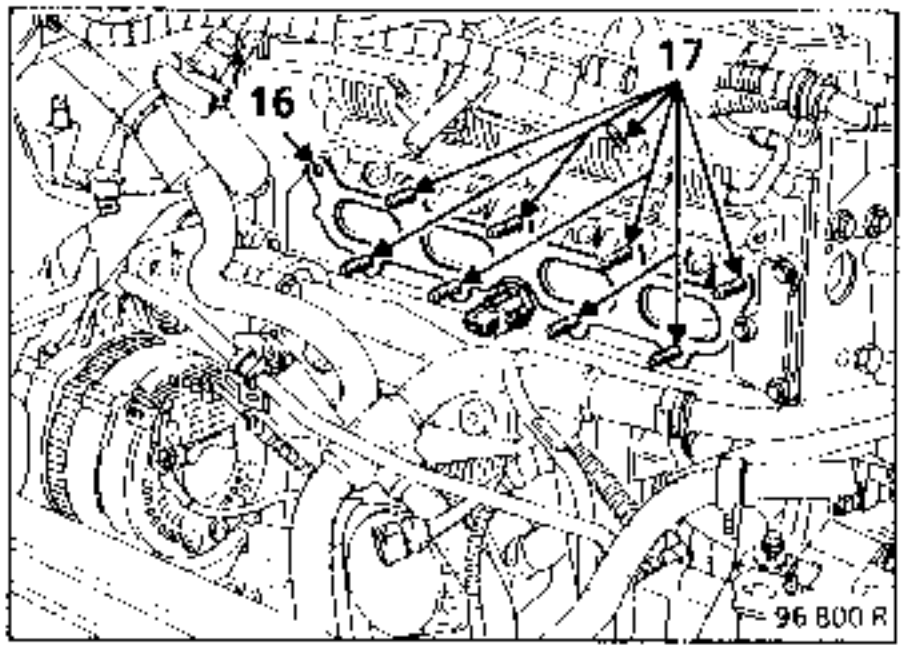


  * the oil vapour rebreathing pipe mounting bolt (11) and release the pipe
  * the manifold mounting bracket (12) on the engine block
  * the alternator mounting bracket (13) on the manifold

- Disconnect the oil level sensor connector (14)

- Remove the manifold mounting bracket (15) from the engine block

- Remove the dipstick guide tube mounting bolt from the engine block.



- Remove the manifold mounting nut (16) and stud
- Remove the eight other manifold mounting nuts (17)
- Remove the inlet manifold.

Refitting

- Replace:
  * the manifold gasket
  * the O rings for the four injectors
  * the four copper seals for the cold start injector pipes
- Refitting is then the reverse of removal.
- Ensure the collars are tight, the various pipes are correctly connected and connectors are correctly connected (especially the pinking sensor connector)
- Before refitting the engine cooling radiator, shunt tracks 3 and 5 (large section wires) on the fuel pump relay (236) by temporarily reconnecting the battery to check the fuel circuit is correctly sealed (injector gallery, cold start injector).

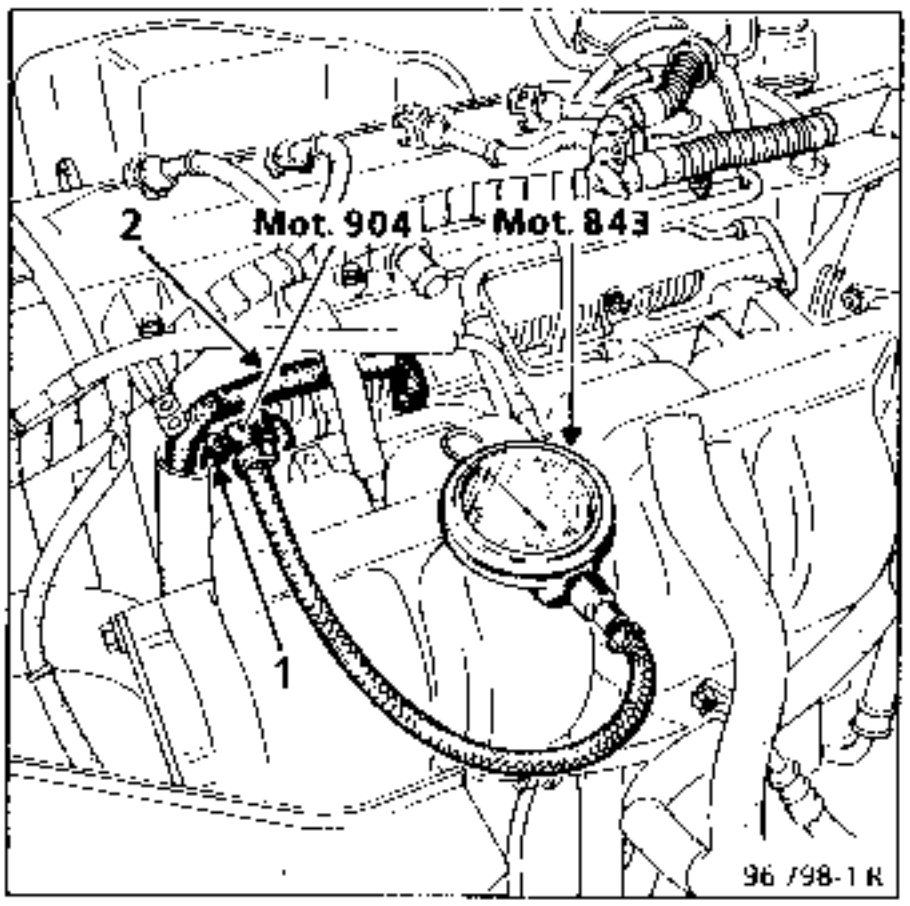
FUEL SUPPLY
Fuel pressure

SPECIAL TOOLING REQUIRED	
Mot. 843	0 - 6 bar pressure gauge
Mot. 904	T union for measuring pressure
1	2 000 ml measuring cylinder

CHECKING THE SUPPLY PRESSURE AND FLOW FOR THE FUEL PUMP

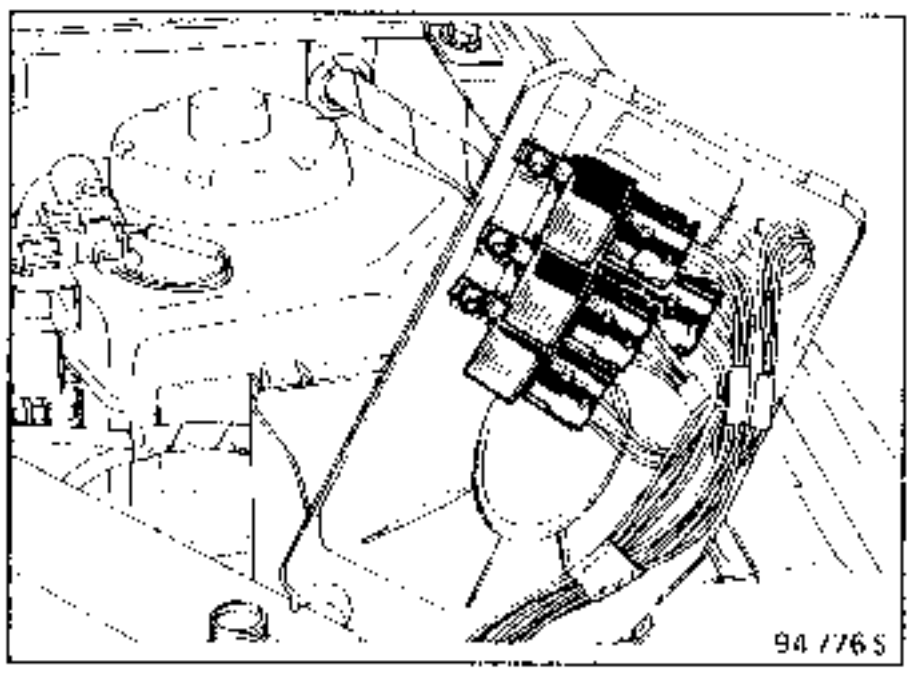
Checking the fuel pressure

- Disconnect the fuel supply pipe to the injector gallery and fit the T union **Mot. 904** and the **0 - 6 bar pressure gauge Mot. 843**.



1 : Fuel supply pipe
2 : Fuel return pipe

- Operate the pump by shunting the pump relay connectors **(236)**, tracks **3** and **5**. (5 mm² section wire).



- Check the pressure : it should be **3 ± 0.2 bars**.

- Apply a vacuum of approximately **500 mbars** to the pressure regulator: the fuel pressure should drop to this value

Checking the pump pressure

The operation of the fuel pump safety valve may be checked. To do this, run the fuel pump (with the pressure gauge still in place) and clamp the return pipe for a moment **(2)** ; the pressure should be between **4.5 and 7.5 bar**.

Checking the pump flow

- Disconnect the fuel return pipe **(2)** and replace it with a hose emptying into a 2000 ml measuring cylinder
  Run the pump for 30 seconds and measure the amount of fuel collected in the measuring cylinder.
  The flow should be greater than 80 l/h (more than 0.65 litre in 30 seconds)

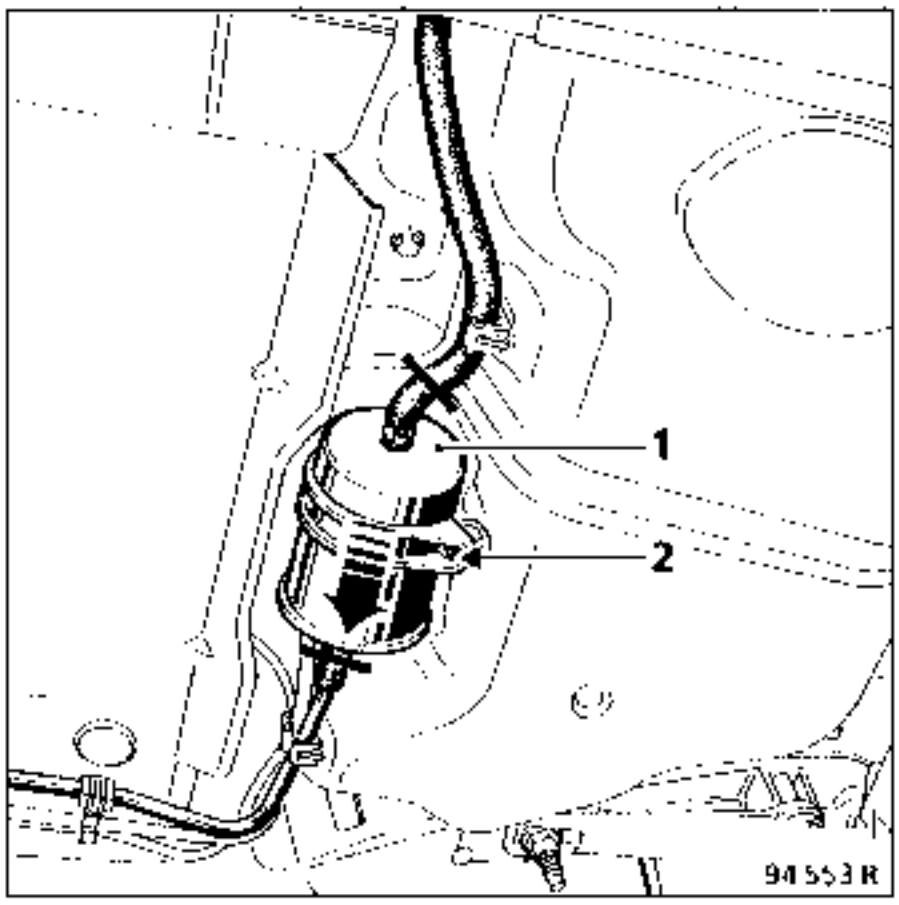
Attention :
If the flow is low, check the pump feed voltage (approximately 10 % drop in flow for a 1 Volt drop in voltage).

REPLACEMENT

Replace every 30 000 miles (50 000 km).

SPECIAL TOOLING REQUIRED	
Mot. 453-01	**Hose clamp pliers**

- The fuel filter is located under the vehicle in front of the fuel tank. It is mounted to the front part of the fuel tank by a bracket



Fit pliers **Mot. 453-01** to the pipes

Remove:
- the collars and disconnect the fuel inlet and outlet pipes from the filter
- bolt **(2)** and remove the fuel filter **(1)**.

When refitting, ensure the fuel is flowing the right way through the filter (arrow marked on the filter body).

- Reconnect the pipes.
- Remove pliers **Mot. 453-01**

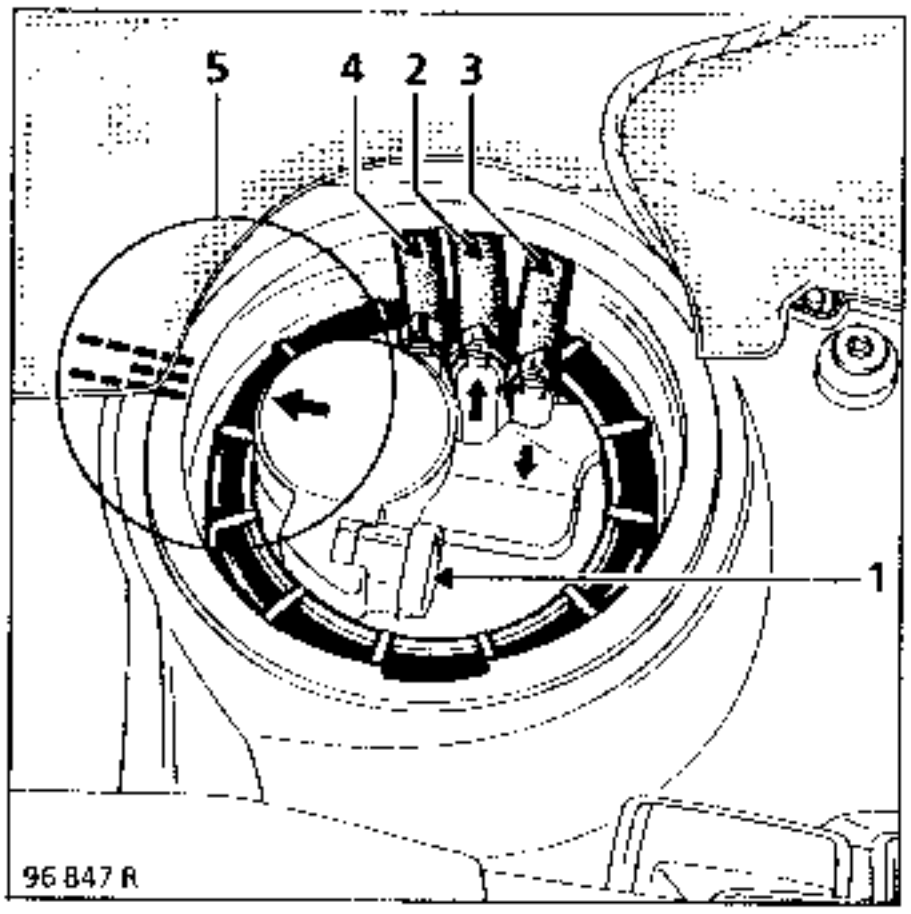
FUEL SUPPLY
Fuel pump

IMPORTANT
Never smoke or bring heat sources into the working area when working on the fuel tank or fuel supply circuit.

Protect yourself from fuel which may be sprayed out of pipes when they are disconnected (due to residual pressure).

REPLACEMENT

The pump - tank sender unit assembly may be removed directly through the flap under the rear bench seat. The pump cannot be separated from the sender unit - the assembly is sold as a complete unit.



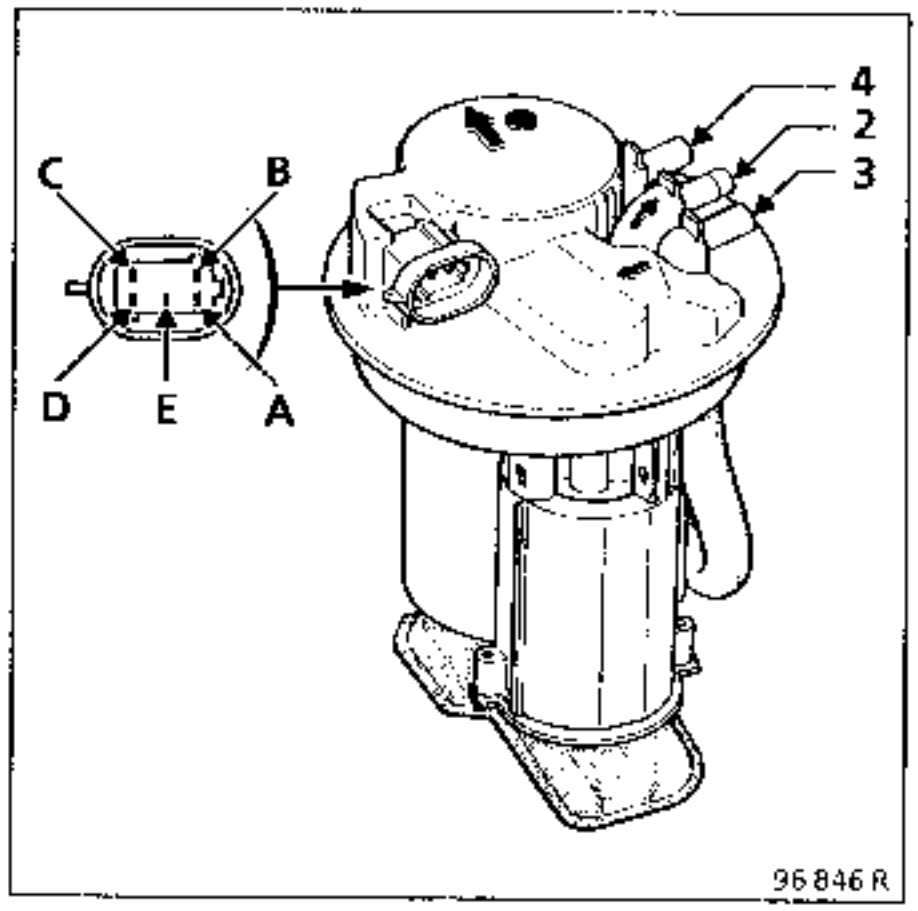
Disconnect the battery.

Remove:
- the seat
- the plug

Disconnect:
- the connector (1),
- the fuel supply pipe (2),
- the return pipe (3),
- the tank sender unit breather pipe (4) connected to the fuel tank.

Remove the mounting nut using tool **Mot. 1264**.

Remove the pump - sender unit assembly



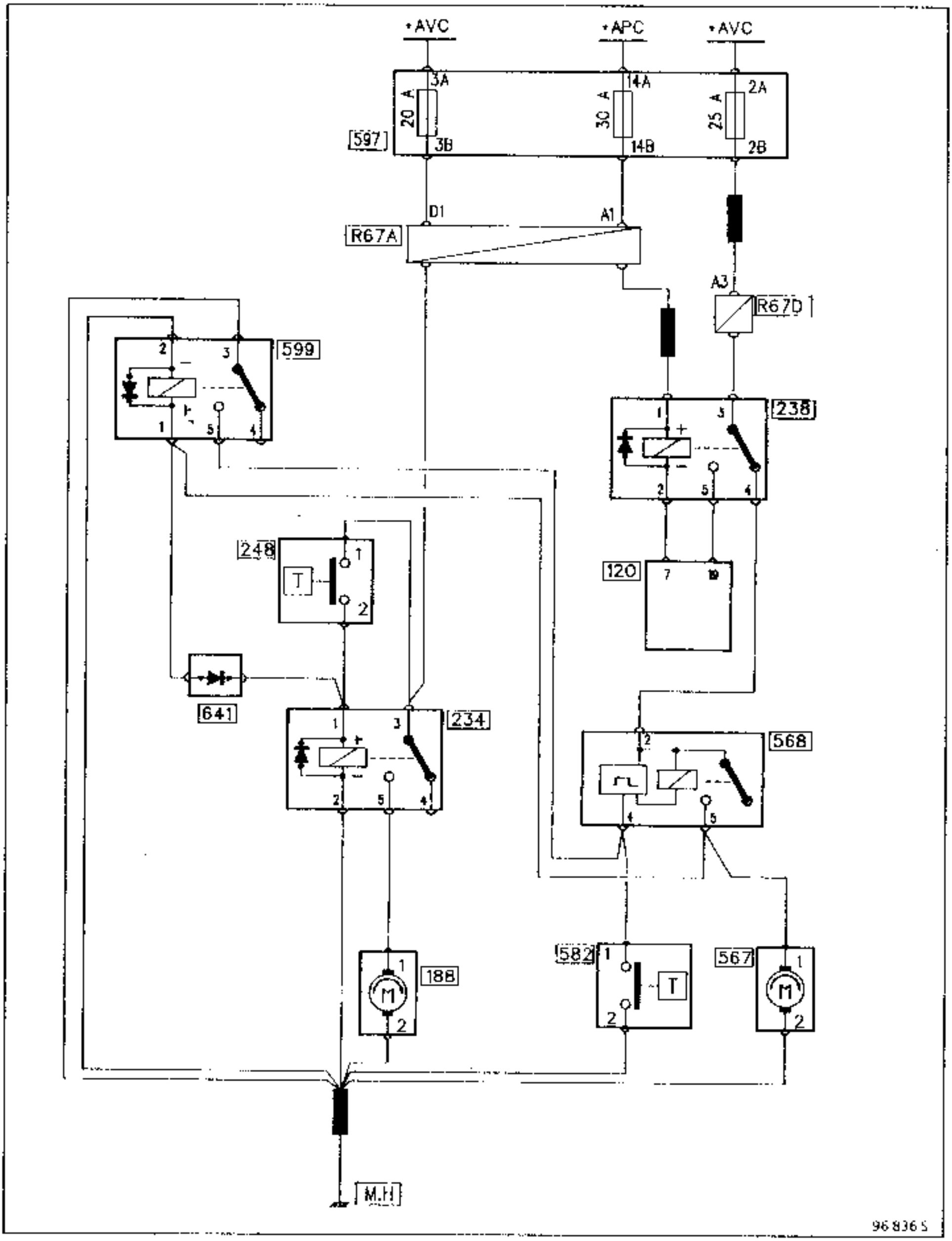
2 : Fuel supply
3 : Fuel return
4 : Breather

A : + fuel pump
B : – fuel pump
C : low fuel warning
D : – fuel tank sender unit
E : fuel gauge information

When refitting :
- check the seal is in good condition or replace it
- refit the seal on the fuel tank before refitting the assembly.
- position the pump - sender unit assembly (see reference mark 5)
- torque tighten to **5 daN.m**.

FUEL SUPPLY
Anti-percolation device

OPERATING DIAGRAM



KEY:

120	:	Injection computer
188	:	Engine cooling fan assembly
234	:	Relay for engine cooling fan assembly
238	:	Injection locking relay
567	:	Electric water pump
568	:	Timer relay
582	:	Temperature switch
597	:	Engine fuse box
599	:	Coolant pump retainer relay
641	:	Diode
R67 A / **R67 D**	:	Connection between front of engine and engine
MH	:	Engine earth

OPERATION:

The electric water pump **(567)** and the cooling fan **(188)** can only be fed:

- if the engine is not running (timer relay **(568)** fed on track (4) of relay **(238)**
- if the coolant temperature is at least **105° C** at the sensor **(582)**.

After the sensor **(582)** engages at **105° C**, the electric water pump and the engine cooling fan operate for approximately **8** minutes.

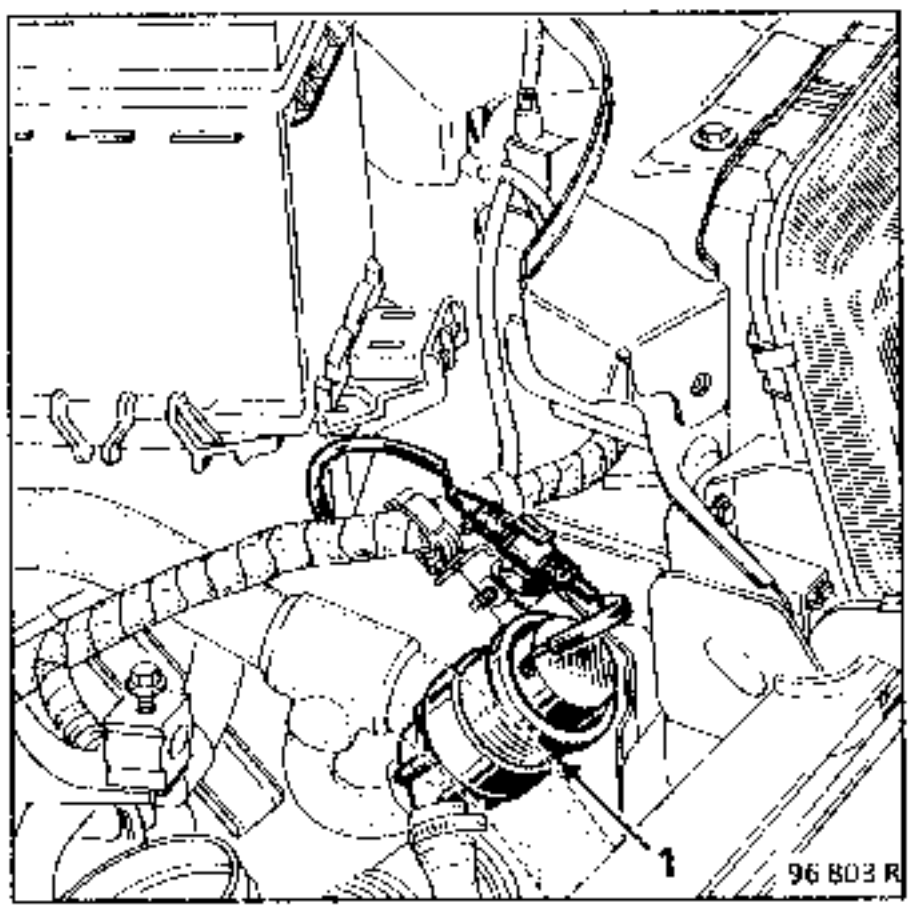
Whatever the status of the sensor **(582)**, the system is locked by relay **(599)**.

Diode **(641)** stops the electric water pump from operating when the main engine cooling fan operates when the engine is running.

FUEL SUPPLY
Anti-percolation device

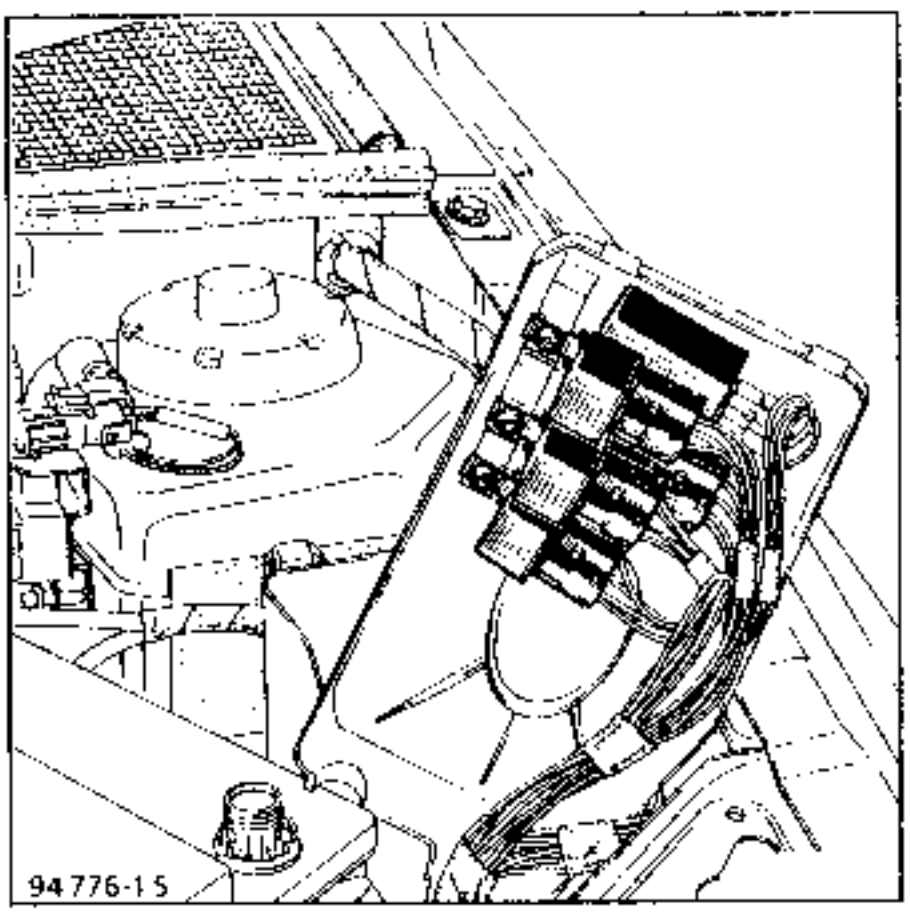
LOCATION OF COMPONENTS:

Electric water pump



The electric water pump (1) is located on the front left hand side under the air filter, close to the side member.

Relays



These are located in the relay unit on the front left hand wheel arch.

Identification:

Anti-percolation pump timer control relay

Easy to identify as it is larger .

Anti-percolation pump retainer relay

Identifiable by the wire section (small) or by the colour of the wires:

track 1 : white wires
track 2 : black wire
track 3 : black wire
track 5 : brown wire

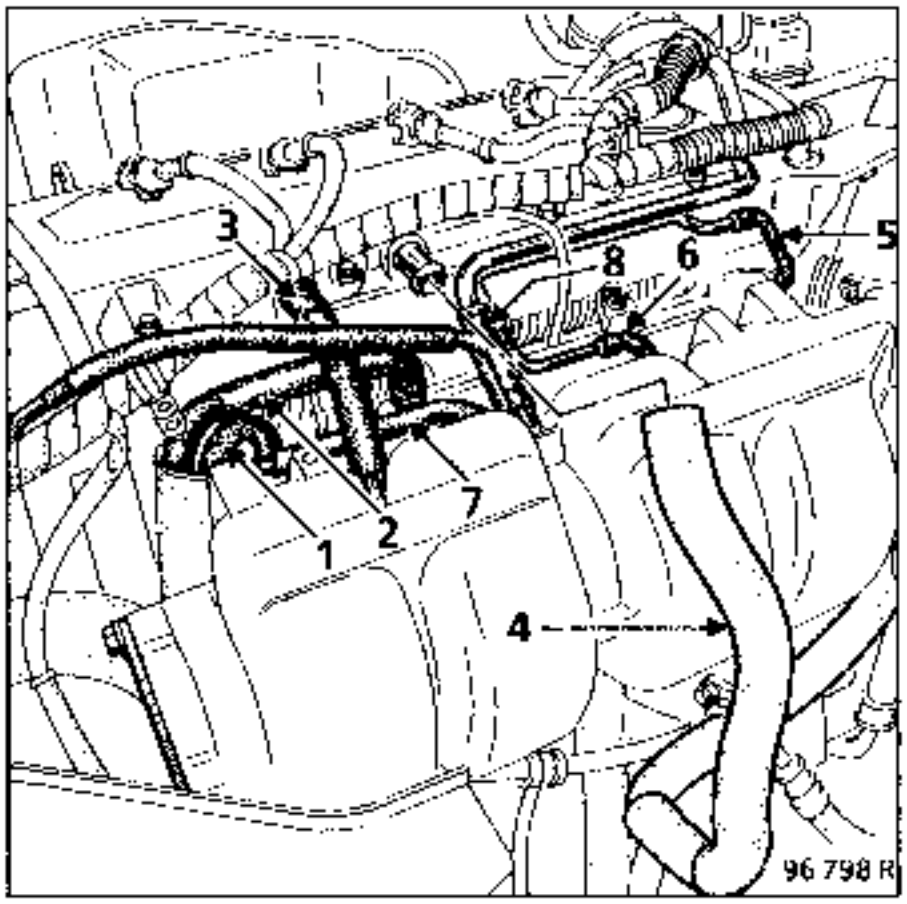
Engine cooling fan control relay

Identifiable as it has 2 wires on track 1 and track 3 or by the colour of the wires:

track 1 : yellow wires
track 2 : black wire
track 3 : red wires
track 5 : white wire

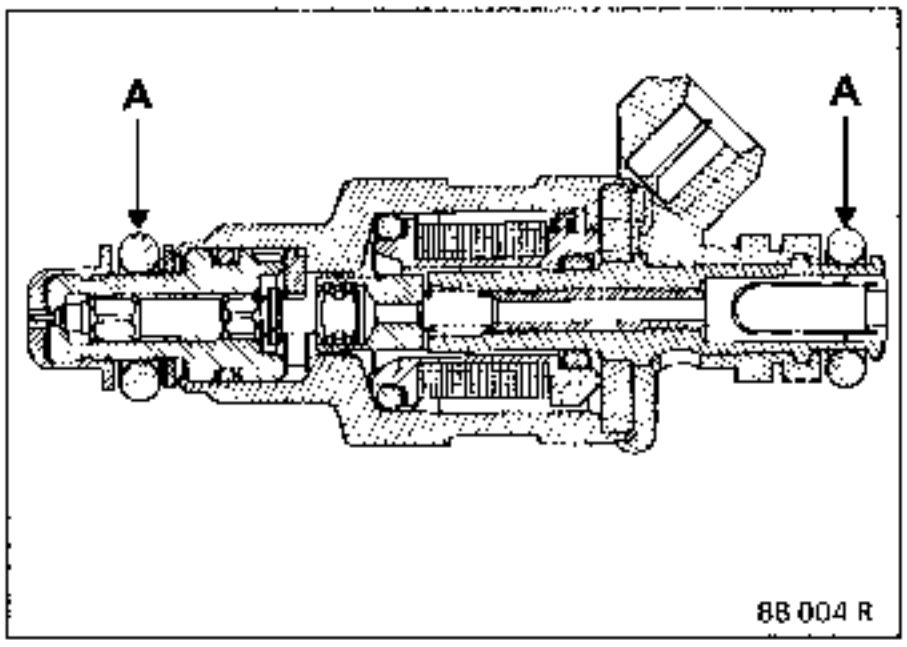
REMOVAL - REFITTING

Removal



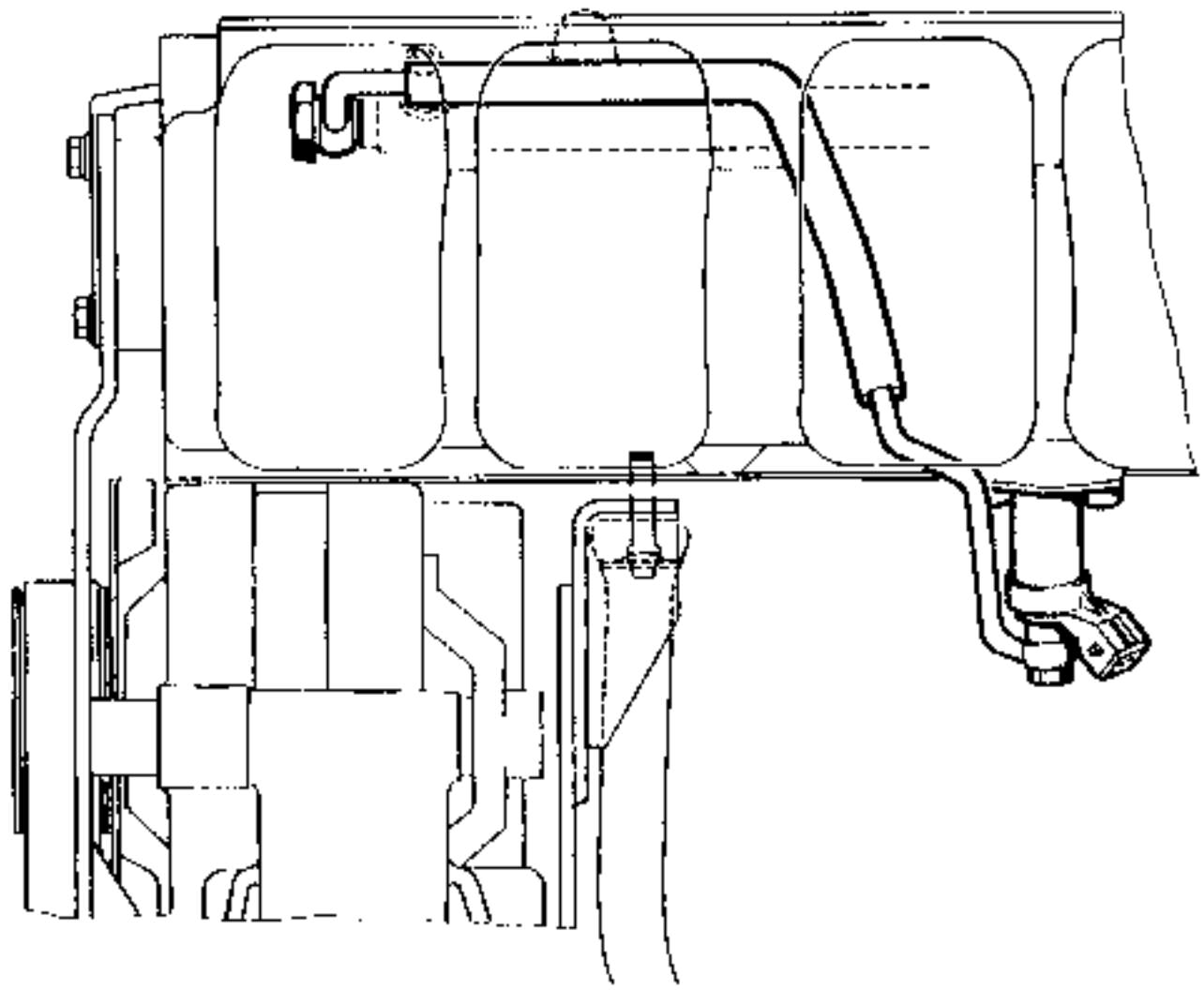
- Remove the manifold cover.
- Position pliers **Mot. 453-01**, on the fuel supply (1) and return (2) pipes and disconnect them.
- Disconnect the oil vapour rebreathing pipes (3) and (4).
- Disconnect the pipes to the fuel pressure regulator (5) and (6).
- Disconnect the pipe (8) to the brake servo.
- Disconnect the supply pipe (7) to the cold start injector.
- Disconnect the injectors.
- Remove the injector retaining clips.
- Remove the two gallery mounting nuts and remove the gallery.
- Remove the injectors.

Refitting



- Replace the O rings (A) for the four injectors and refit them with silicon-free grease
- Replace the two copper seals for the fuel supply pipe to the cold start injector.
- Before refitting the manifold cover, shunt tracks (3) and (5) (large section wires) on the fuel pump relay **(236)** to check the fuel circuit is sealed (injectors and cold start injector supply pipes).

INSTALLATION



93 207-1 S

CONTROL PROGRAMMING

Control of the injector is authorised as soon as the engine is running and if:

- the coolant temperature is below **20°C**
- the engine speed in the starting phase is less than a given threshold.

The control period corresponds to a certain number of engine revolutions depending on the coolant temperature.

REMOVAL - REFITTING

Disconnect the battery

Remove:

- the bonnet,
- the upper cross member.

Tilt the radiator forward as much as possible.

Release the oil vapour rebreathing pipe (held on to the manifold by a bolt).

Remove the mounting bolt for the strut on the manifold and undo the lower mounting bolt.

Disconnect the injector.

Remove the fuel inlet union

Remove the two injector mounting bolts

When refitting, before refitting the upper cross member, temporarily reconnect the battery and shunt tracks 3 and 5 of relay (236) (large section wires).

By running the pump the sealing of the fuel pipes to the injector may be checked.

Check the injector connector is correctly reconnected.

Check the engine cooling fan turns freely when all components have been refitted.

PUMPS
Mechanical power assisted steering pump

The method for removing and refitting the pump on the vehicle is identical to NT 1685.

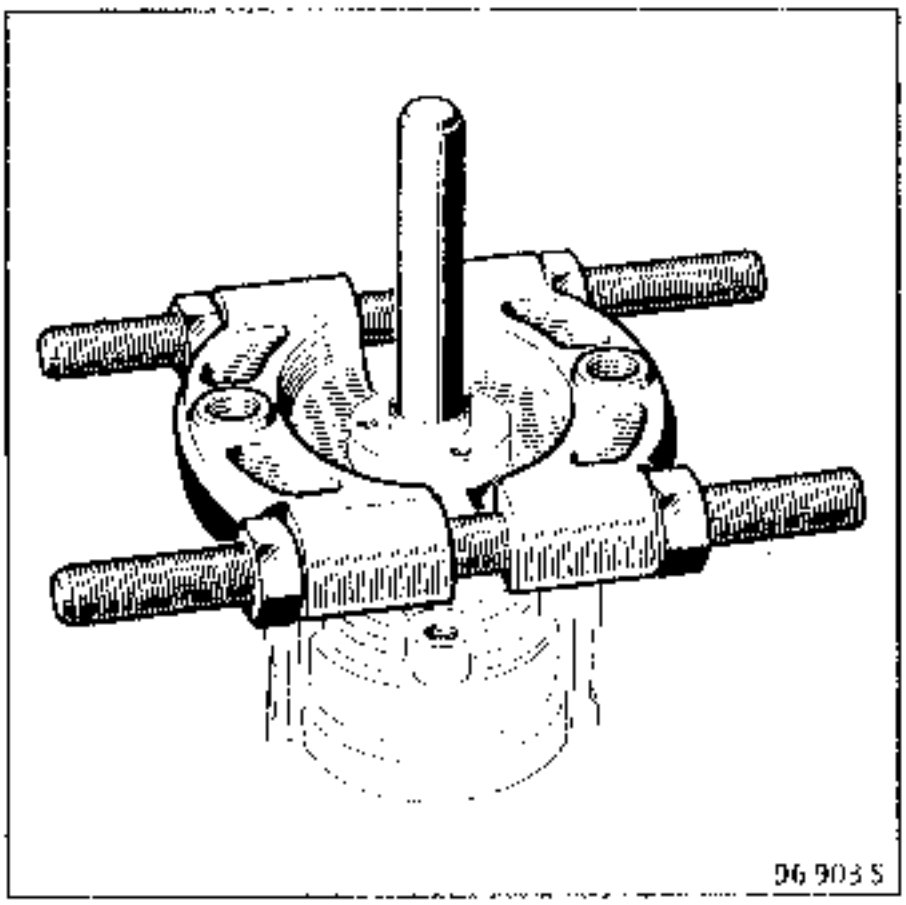
Replacing the power assisted steering pump hub.

SPECIAL TOOLING REQUIRED
Dir. 1083 Tool for refitting the power assisted steering pump hub

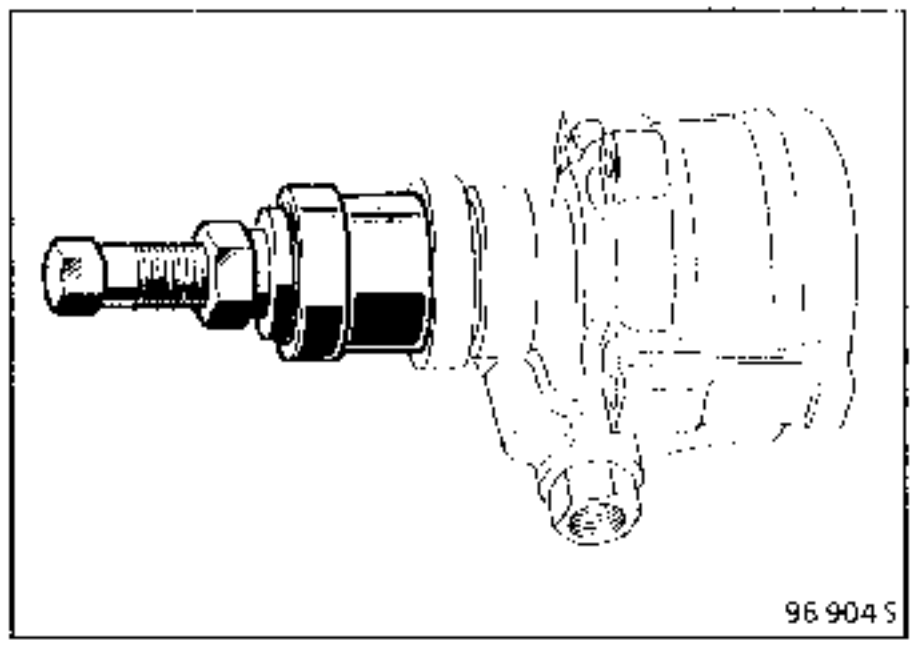
The Parts Department supplies the power assisted steering pump without a hub.The old hub must therefore be extracted and refitted to the new pump.

REMOVAL- REFITTING

Use a press and an extractor of type **FACOM U53T.**



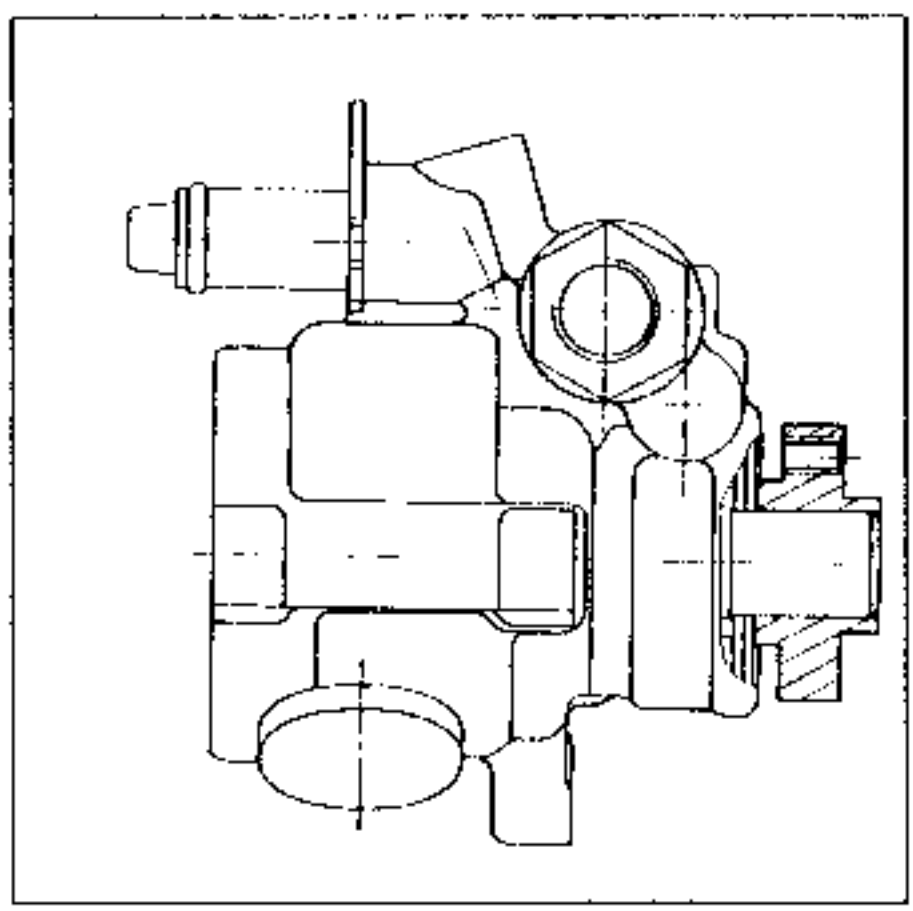
96 903 S



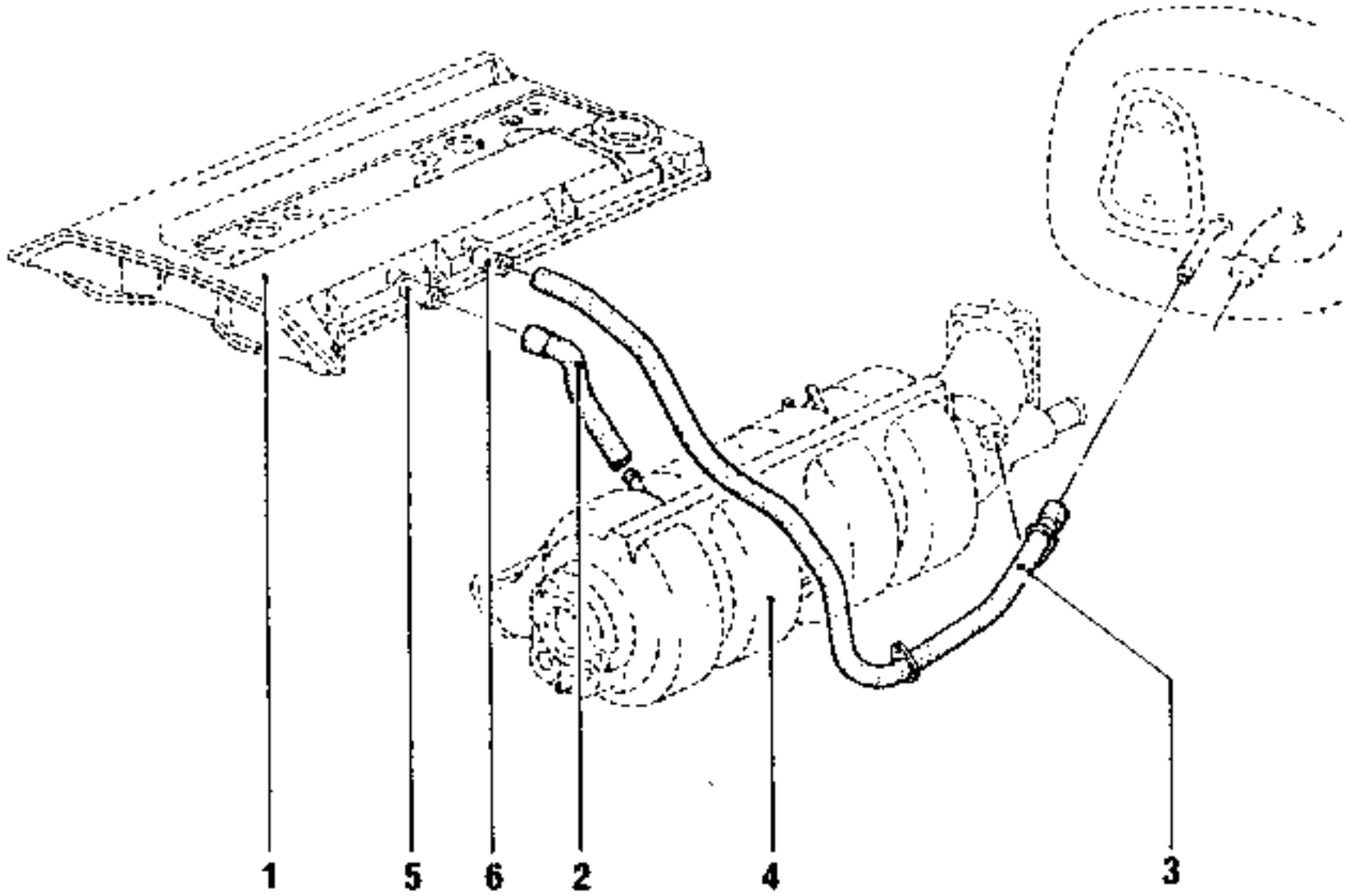
96 904 S

REFITTING

Press in the hub, using tool **Dir. 1083** or the **NAUDER** tool (see MATERIALS section) until dimension **X = 42.5 mm.**



ANTI-POLLUTION
Oil vapour rebreathing



1 - Manifold cover

2 - Vapour rebreathing downstream of throttle

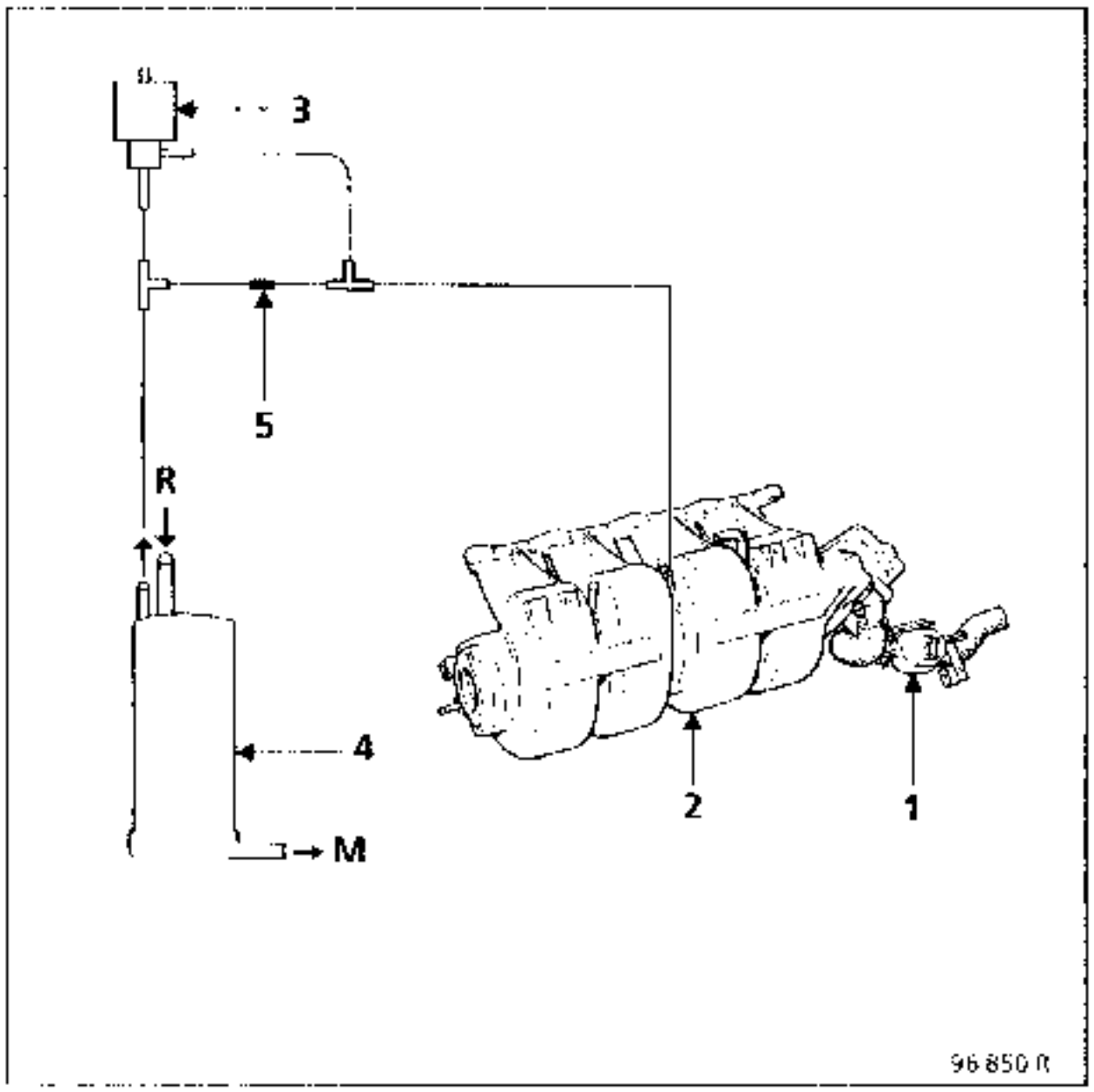
3 - Vapour rebreathing upstream of throttle

4 - Inlet manifold

5 - Nozzle diameter 1.7 mm

6 - Nozzle diameter 5.5 mm

OPERATING PRINCIPLE



1 - Idle speed regulation valve
2 - Inlet manifold
3 - Canister bleed solenoid control valve
4 - Fuel vapour absorber (canister)
5 - Nozzle diameter **0.5 mm**

M - Breather
R - Pipe from fuel tank for recirculation of fuel vapours.

OPERATION

Solenoid valve not energised :

The canister is partially bled through the pipe with the **0.5 mm** diameter nozzle (5) .

Solenoid valve energised:

Depending on particular operating conditions (pressure, speed, coolant and air temperature, engine running under load condition other than no load or full load), the canister is primarily bled via the solenoid valve

ANTI-POLLUTION
Fuel vapour recirculation

14

CHECKING THE SYSTEM

Disconnect the canister pipe (which connects to the manifold) and fit a vacuum pump to the pipe.

Connect the XR25, enter the injection code D03, and then #01 to see the manifold pressure displayed.

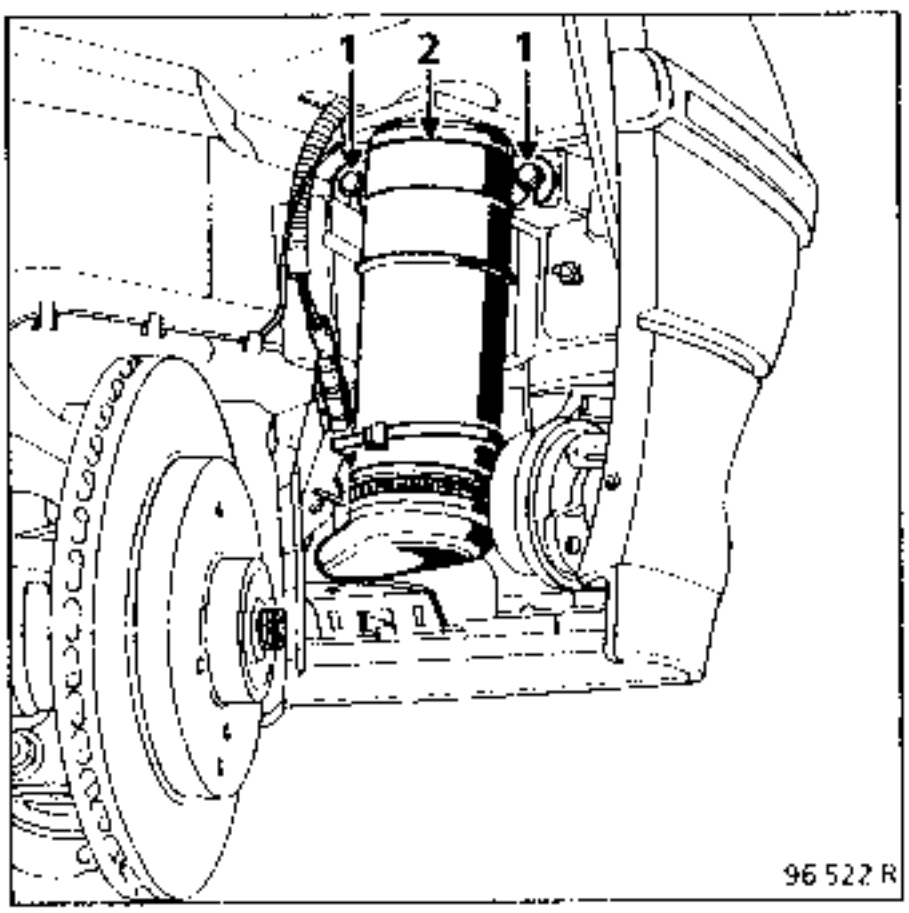
Warm engine:

At idle speed, check the vacuum is practically zero.

Accelerate sharply with your hand on the solenoid valve ; the valve should click (it is operated by the computer under certain conditions).

With the handbrake applied, engage a gear and let the clutch out slightly to obtain a manifold pressure of about 500 mb
The value read on the vacuum pump should be almost identical to the manifold pressure.

LOCATION AND REMOVAL - REFITTING OF THE CANISTER



The canister is located behind the plastic cover under the front right hand wing.

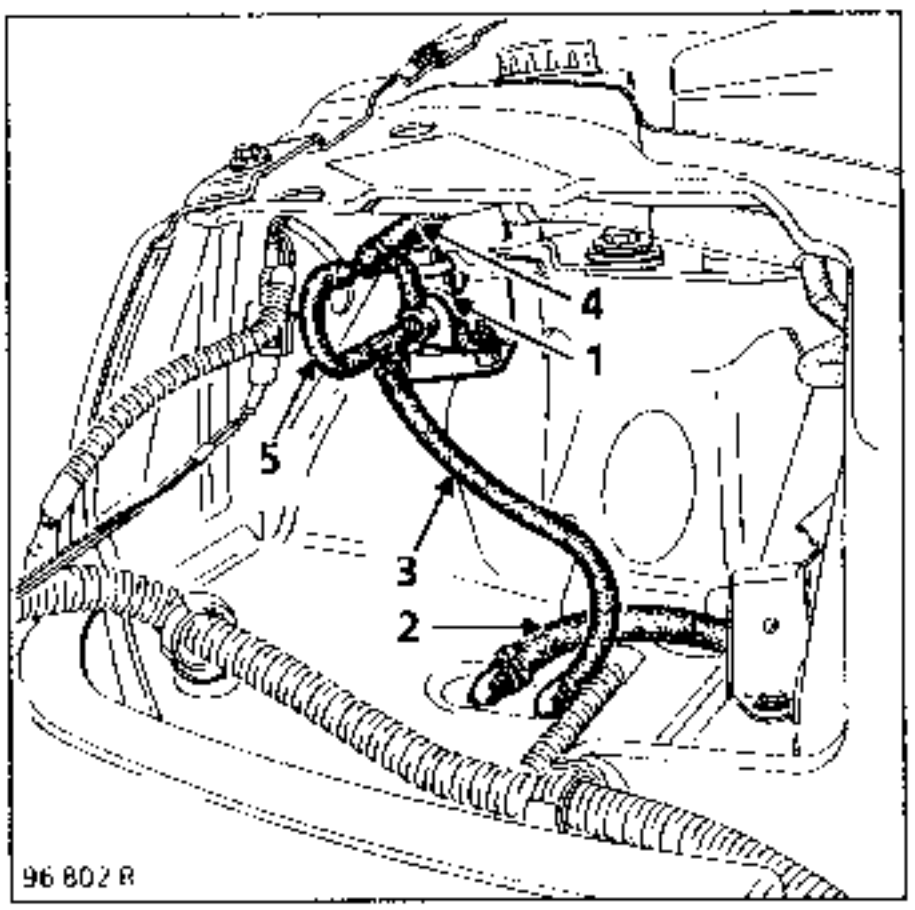
To remove the canister:

- remove the right hand headlight and indicator unit
- disconnect the pipe from the fuel tank and the pipe to the solenoid valve,
- remove the plastic cover under the wing (held in place by one bolt, one nut and two plastic clips),
- undo the two bolts (1) and remove the mounting (2),
- remove the canister.

When refitting :

Position the canister correctly to ensure the pipes are not twisted or stretched.

Ensure the pipes are correctly connected (see diagram below).



3 Canister bleed solenoid valve
4 Pipe from fuel tank
5 Pipe connecting solenoid valve to canister
6 Pipe to inlet manifold
7 Nozzle diameter 0.5 mm

CHECKS TO BE CARRIED OUT BEFORE THE ANTI-POLLUTION TEST

Ensure:

- the ignition system is operating correctly (correct type plugs, correctly set, HT leads correctly connected and in good condition)
- the injection system is operating correctly (correct supply, check conformity with XR25)
- conformity and sealing of exhaust line

Obtain information of the vehicle's history if possible (run out of fuel, lack of power, use of incorrect fuel type)

CHECKING THE ANTI-POLLUTION SYSTEM

Let the vehicle warm up until the engine cooling fan has operated twice.

Connect a correctly calibrated four gas analyser to the exhaust pipe.

Keep the engine speed at **2500 rpm** for 30 seconds and read off the pollutant values.:

CO $\leq$ **0.3 %**
CO_2 $\geq$ **14.5 %**
HC $\leq$ **100 ppm**
0.97 $\leq \lambda \leq$ **1.03**

NOTE : $\lambda = \dfrac{1}{\text{richness}}$

$\lambda > 1 \rightarrow$ lean mixture
$\lambda < 1 \rightarrow$ rich mixture

If these values are correct after the test, the anti-pollution system is operating correctly.

If these values are not correct, additional tests must be carried out.

Check:
- the condition of the engine (condition of the oil, timing, etc.),
- the correct operation of the oxygen sensor (see chapter 17),
- for the presence of lead (see following page).

If the test for lead is positive, wait until the vehicle has used two or three full tanks of unleaded fuel before replacing the oxygen sensor.

If, after all these tests have been carried out, the values are still incorrect, replace the catalytic converter.

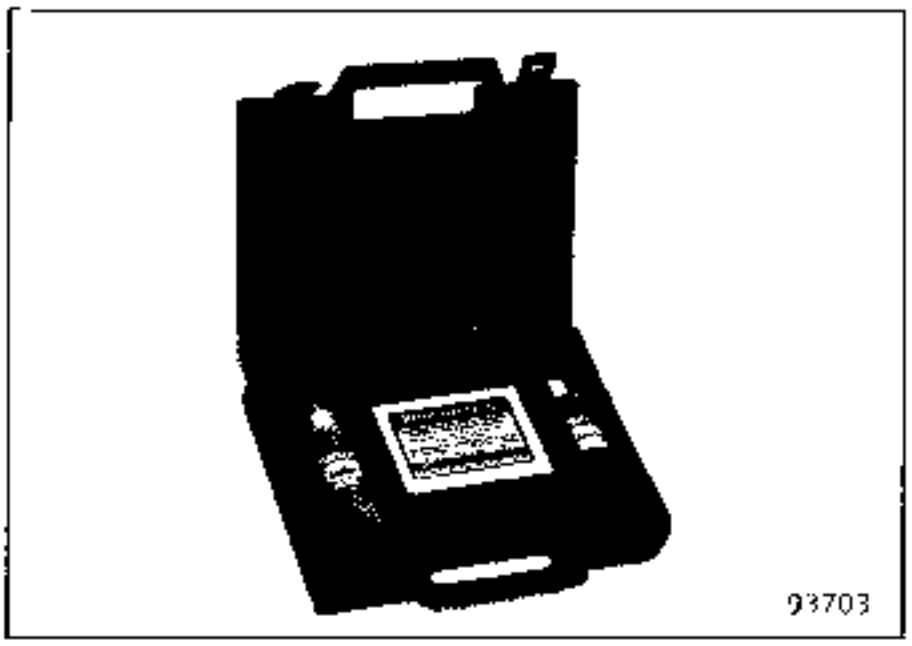
ANTI-POLLUTION
Test for the presence of lead

The Nauder lead testing kit is required for this test.

To obtain a kit :

Contact your After Sales Head Office for further information

Part numbers :
- Complete kit : **T900**
- 40 test papers : **T900/1**



METHOD

DETECTING LEAD AT THE EXHAUST

a - **Test conditions :**
- Engine stationary.
- Exhaust pipes hot but not burning.
- Do not test when the temperature is below 0°C.

b - If necessary use a soft cloth to clean the inside of the exhaust pipe so any soot deposits are removed.

c - Wearing the gloves, take a test paper and moisten it slightly with distilled water (the paper is not effective if it is too wet).

d - Press the damp paper onto the cleaned exhaust pipe immediately and hold it there firmly for about a minute.

e - Remove the test paper and allow to dry. The test paper will turn red or pink if lead is present.

ATTENTION : The test for lead should only be carried out on the exhaust pipe, not on the oxygen sensor.

VALEO D9E 138

REMOVAL

Vehicle on a 2 post lift, disconnect the battery.

Remove the 2 upper heat shield mountings (vertical)

From below the vehicle
Remove:
- the 3rd heat shield mounting and remove the heat shield

- the starter feed mounting nut

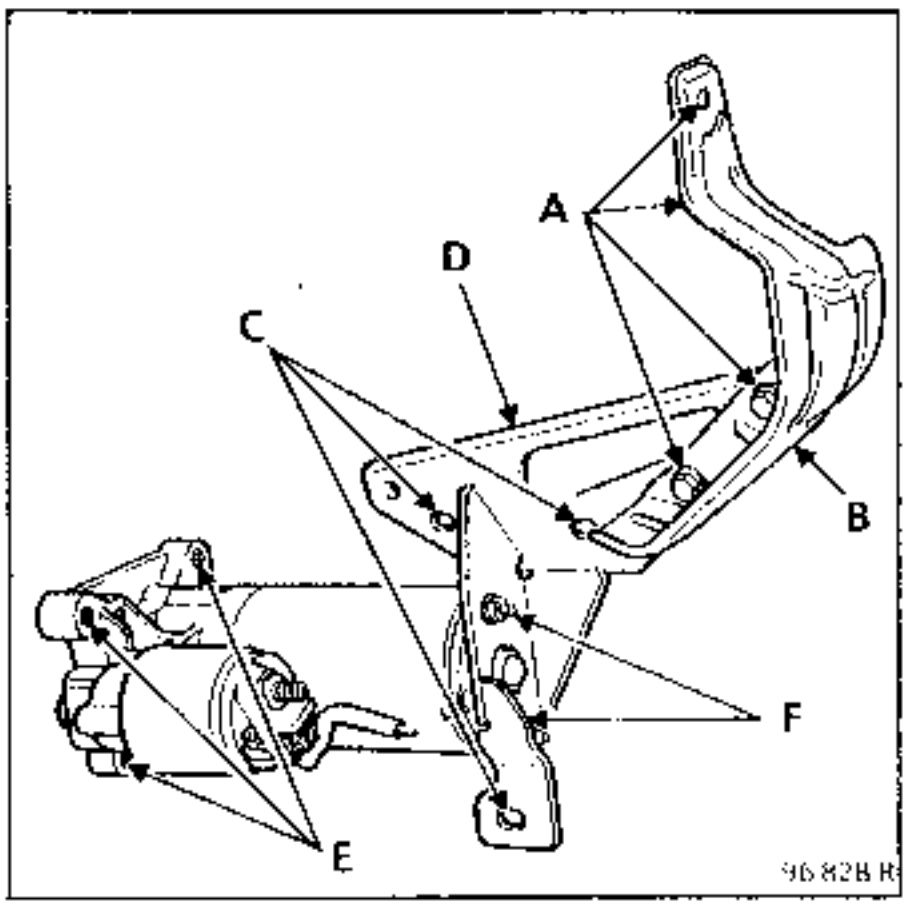
Disconnect the solenoid.

From above the vehicle
Remove the heat shield covering the starter after removing its 4 mountings (2 upper bolts with shouldered washers and 2 lower bolts).

Remove:
- the wiring retaining flange

- the 4 mountings (A) for the fuel pipe shield (B).

- the 2 upper mountings (C) for the support plate behind the starter (D).



From below the vehicle
Remove bolt (G) as well as the bolt which holds the reinforcement bracket to the manifold.

From above the vehicle
Remove the 3 starter bolts (E) from the clutch bellhousing.

Release the starter mounting (D) by removing the 2 mounting nuts (F)

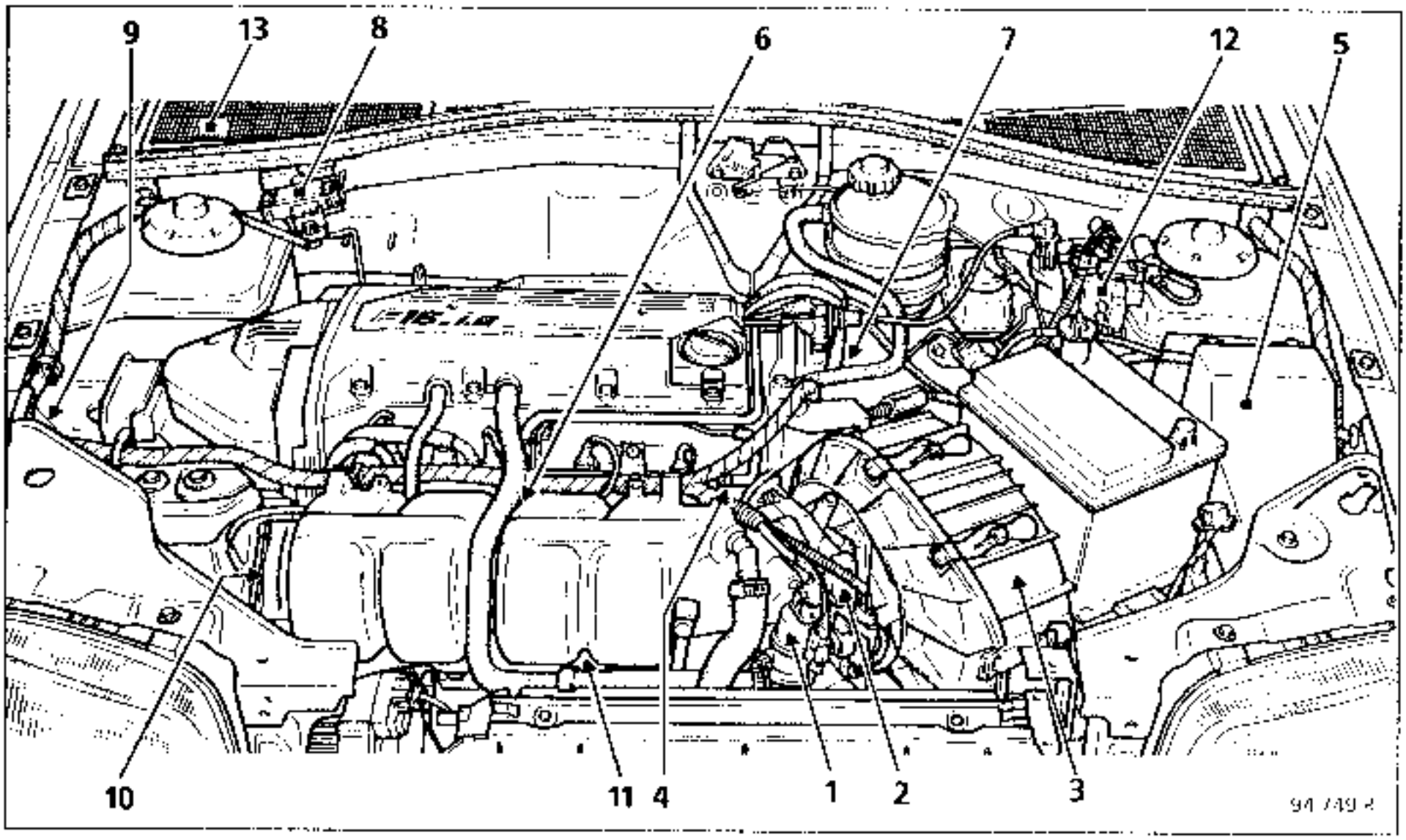
Remove the starter

REFITTING

Reposition the support plate (D) then the starter, using a centring pin.
Refitting is then the reverse of removal.

Reconnect the battery and test the starter.

INJECTION
Location of components



1 - Idle speed regulation valve

2 - Throttle position potentiometer

3 - Air filter

4 - Pressure regulator (at end of injector gallery)

5 - Relay unit

6 - Pinking sensor

7 - Coolant temperature sensor

8 - Absolute pressure sensor

9 - Canister bleed solenoid

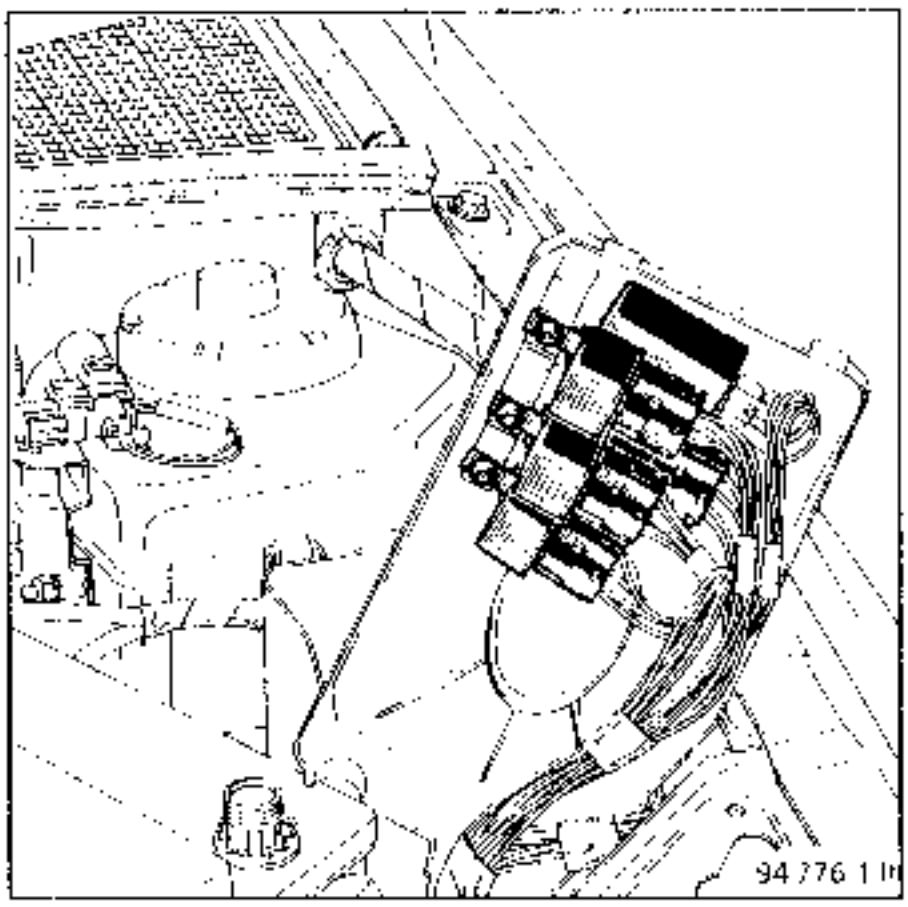
10 - Air temperature sensor

11 - Cold start injector

12 - Ignition power module

13 - Injection computer in scuttle panel

IDENTIFICATION OF THE RELAYS



IMPORTANT:

The location of relays in the relay unit may vary from vehicle to vehicle, according to production

Fuel pump control relay (236)

This is easy to identify because of the larger section wires (5 mm²) on track 3 (red wire) and on track 5 (brown wire).

Injection lock relay (238)

This may be identified by the colour of the wires and the presence of a wire on track 4:

Track 1 : yellow - grey wire
Track 2 : green - grey wire
Track 3 : red wire
Track 4 : red wire
Track 5 : white wire

Anti-percolation pump timer control relay

Easy to identify as it is larger

Anti-percolation pump locking relay

This may be identified by the wire size (small) or the wire colour:

Track 1 : white wires
Track 2 : black wire
Track 3 : black wire
Track 5 : brown wire

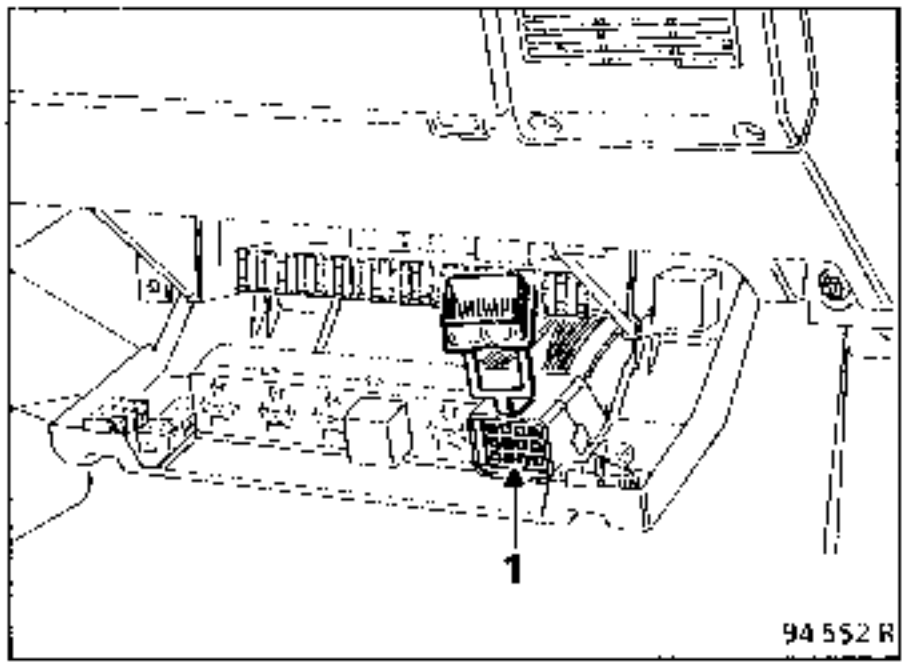
Engine cooling fan control relay

This may be identified by the presence of 2 wires on track 1 and on track 3 or by the wire colour:

Track 1 : yellow wires
Track 2 : black wire
Track 3 : red wires
Track 5 : white wire

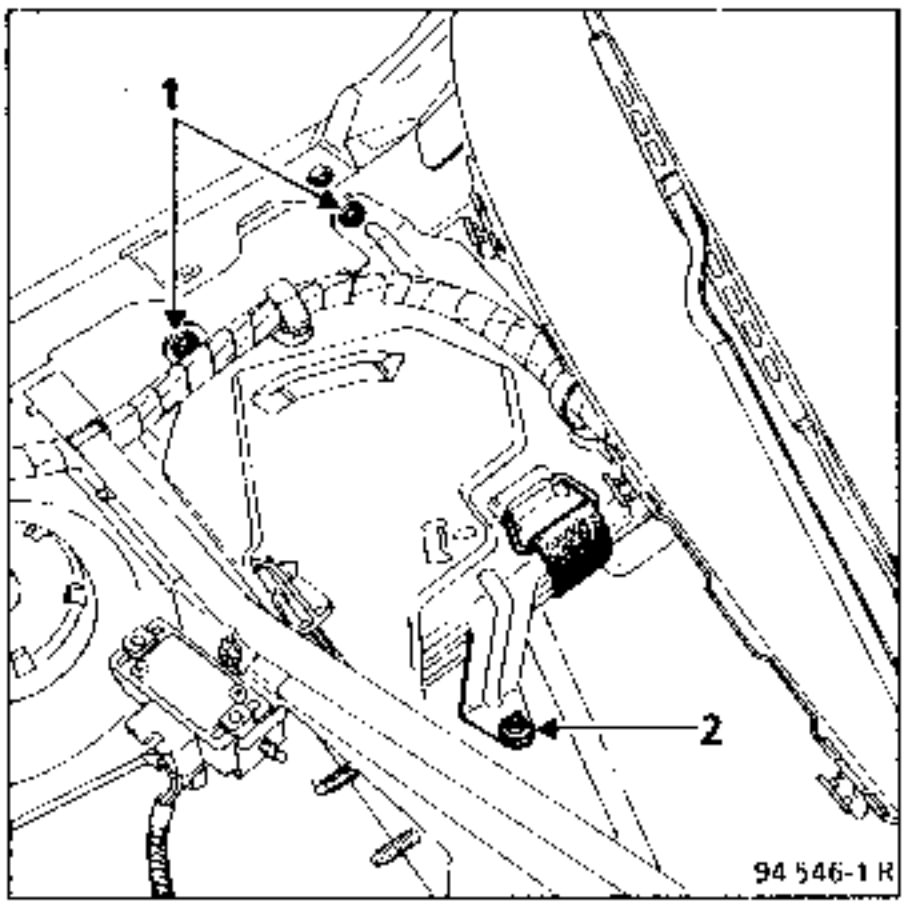
INJECTION
Location of components

DIAGNOSTIC SOCKET



The diagnostic socket (1) is integral with the accessories board in the passenger compartment

COMPUTER

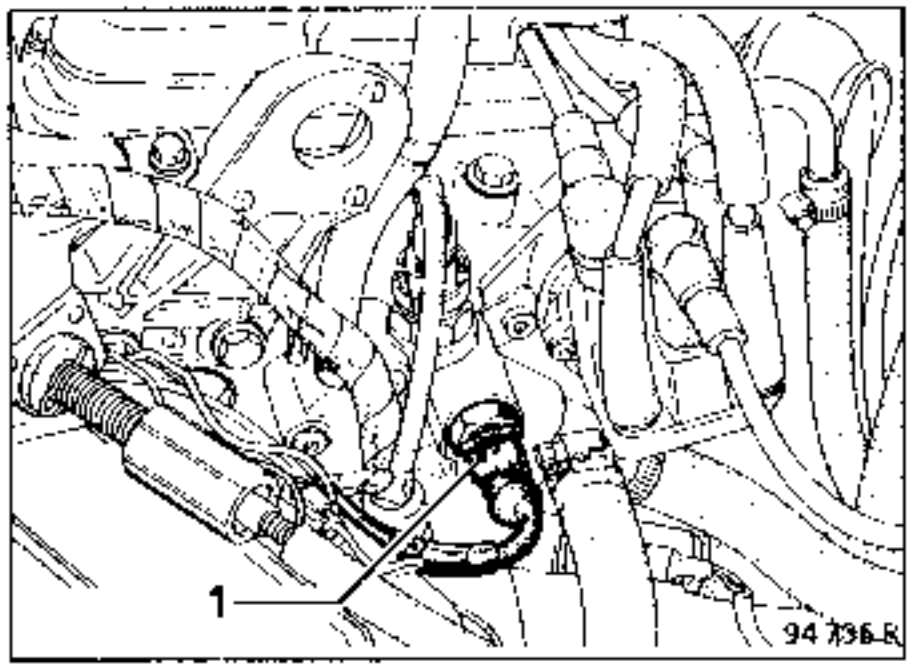


The computer is located in the scuttle panel under the jack.

To reach the computer, remove the scuttle panel grille, disconnect the battery, remove the jack, bolts (1) and the nut (2) then remove the computer with its mounting.

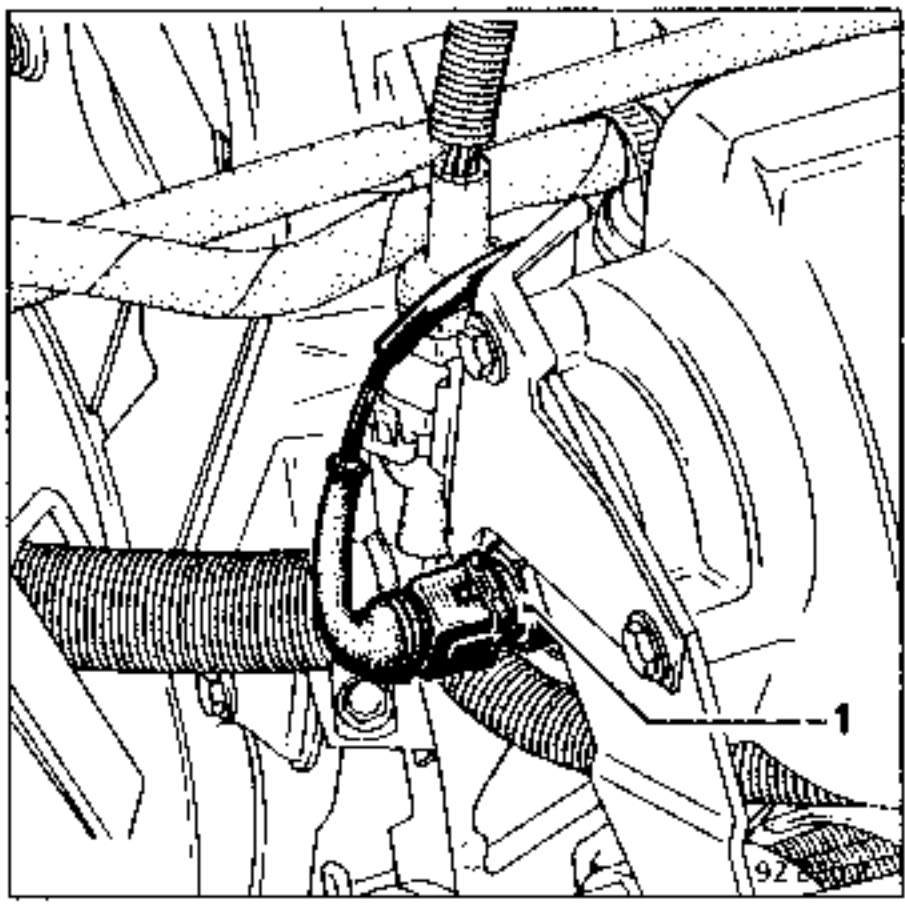
When refitting, check the connector is correctly reconnected and remember to replace the plastic protective cover for the computer ensuring the wiring is correctly routed.

COOLANT TEMPERATURE SENSOR



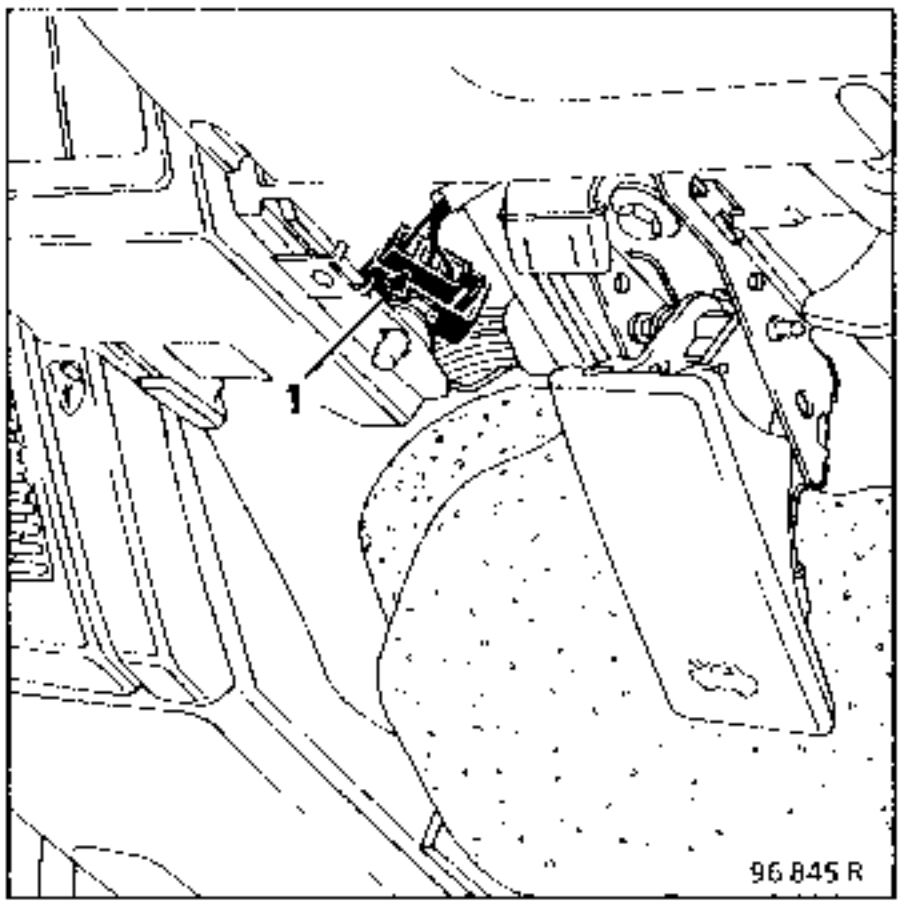
The coolant temperature sensor (1) is bolted to the left hand side of the cylinder head.

AIR TEMPERATURE SENSOR



The air temperature sensor (1) is bolted to the end of the inlet manifold.

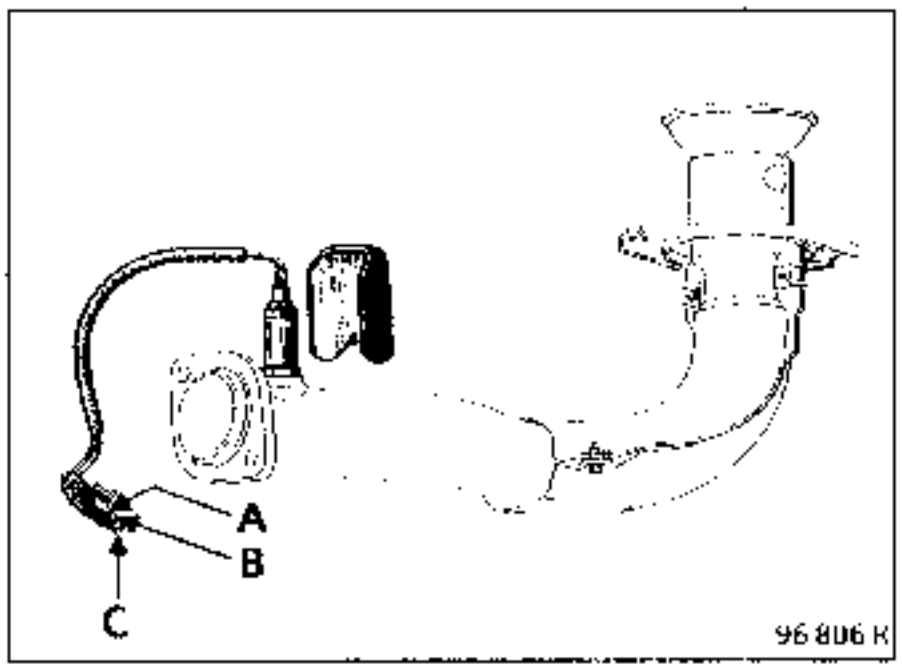
SPEED SENSOR



Vehicle speed information for the injection computer is sent by a sensor in the speedometer cable.

To reach the connector (1), remove the steering column cover.

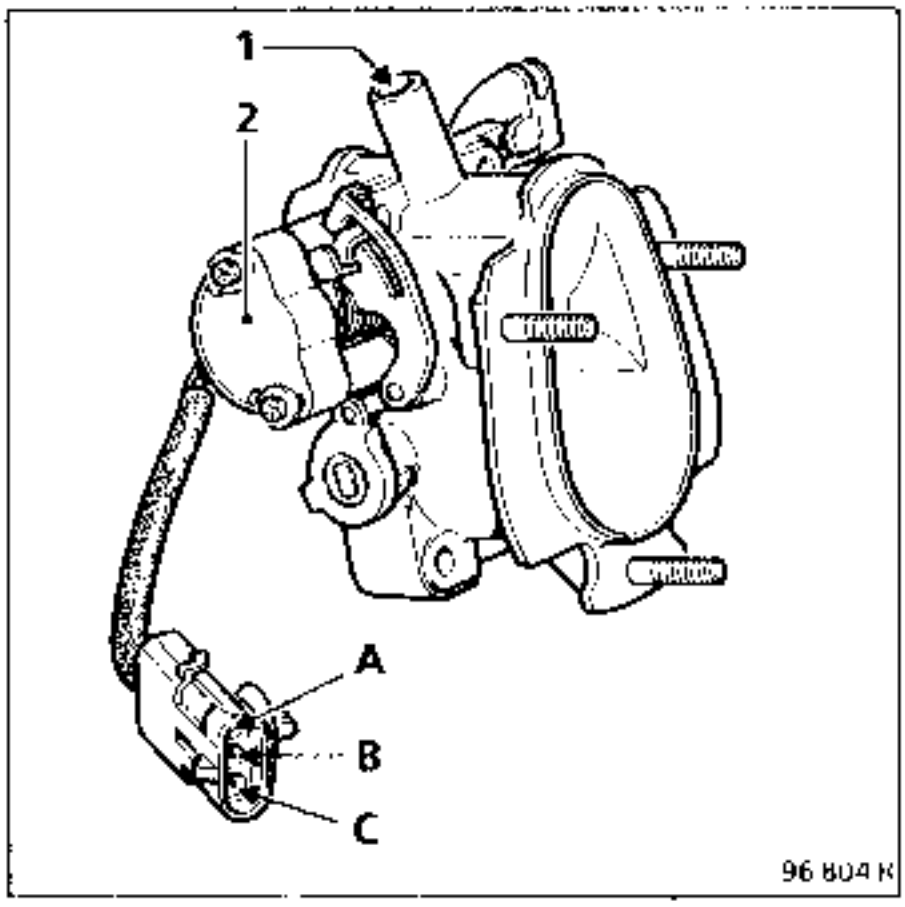
OXYGEN SENSOR



A : + after ignition } sensor heating
B : earth }
C : oxygen sensor voltage

The oxygen sensor is bolted onto the exhaust downpipe just before the catalytic converter flange
A waterproof protective cover is clipped over the sensor.

INJECTION
Throttle position potentiometer



1 By-pass (the screw should be fully screwed in)
2 Throttle position potentiometer
A Potentiometer information
B + 5 volts from the injection computer
C Earth

The throttle position potentiometer, is mounted on the first body of the throttle body.

Recognition of full load and no load positions is made using throttle angle information

If this component is faulty, it must be replaced. This operation is not particularly difficult; the new component must be adjusted after fitting.

Adjustment procedure

- Potentiometer slightly loose, connect the XR 25, enter code D 03 and then # 17

- Adjust the potentiometer so that the value read under # 17 is about in the middle of the range of values given (values given: 8 to 13 ; adjust to approximately 10).

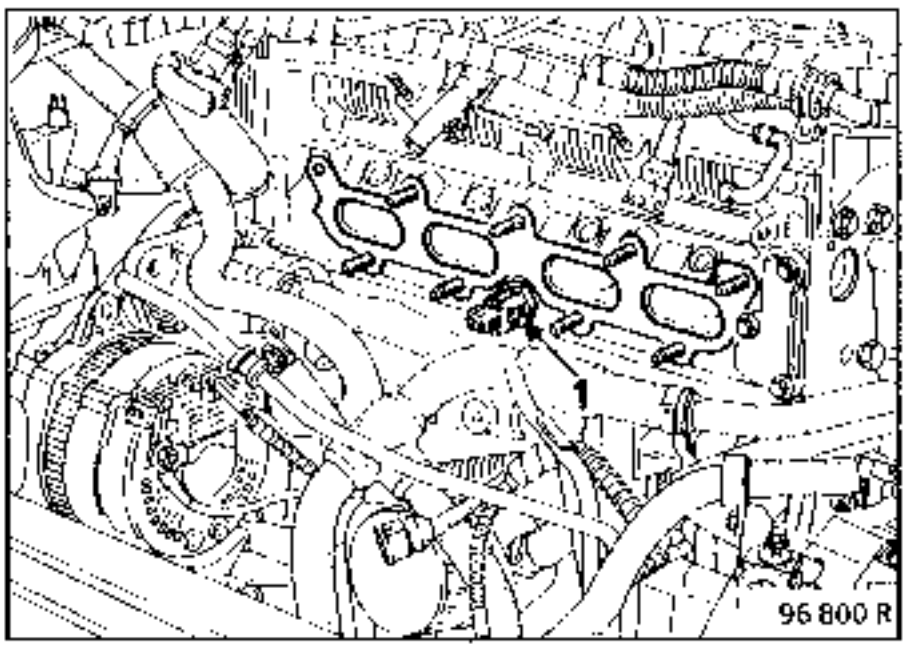
- Tighten the mounting bolts (ignore bargraph 10 right hand side).

- Turn the ignition off then back on again (or disconnect the battery if the potentiometer fault bargraph is illuminated) then press the accelerator pedal two or three times.

- Check the adjustment:
  * No load : 8 ≤ # 17 ≤ 13 and bargraph 10 right hand side is illuminated

  * Full load : # 17 ≥ 213 and bargraph 10 left hand side is illuminated

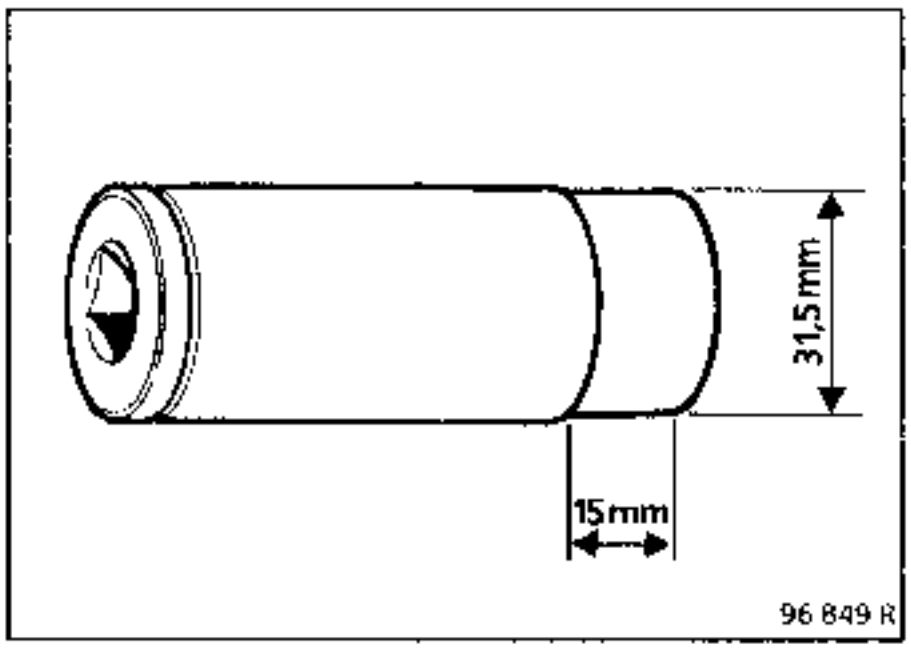
INJECTION
Pinking sensor



The pinking sensor (1) is mounted on the lower section of the cylinder head between the 2nd and 3rd cylinder under the manifold.

REMOVAL:

- Remove the bonnet.
- Remove the upper cross member and tilt the radiator as far forward as possible.
- Disconnect the cold start injector fuel supply pipe.
- Disconnect the connector for the sensor and unscrew the sensor using a modified long socket **Mot. 1155** (see diagram).

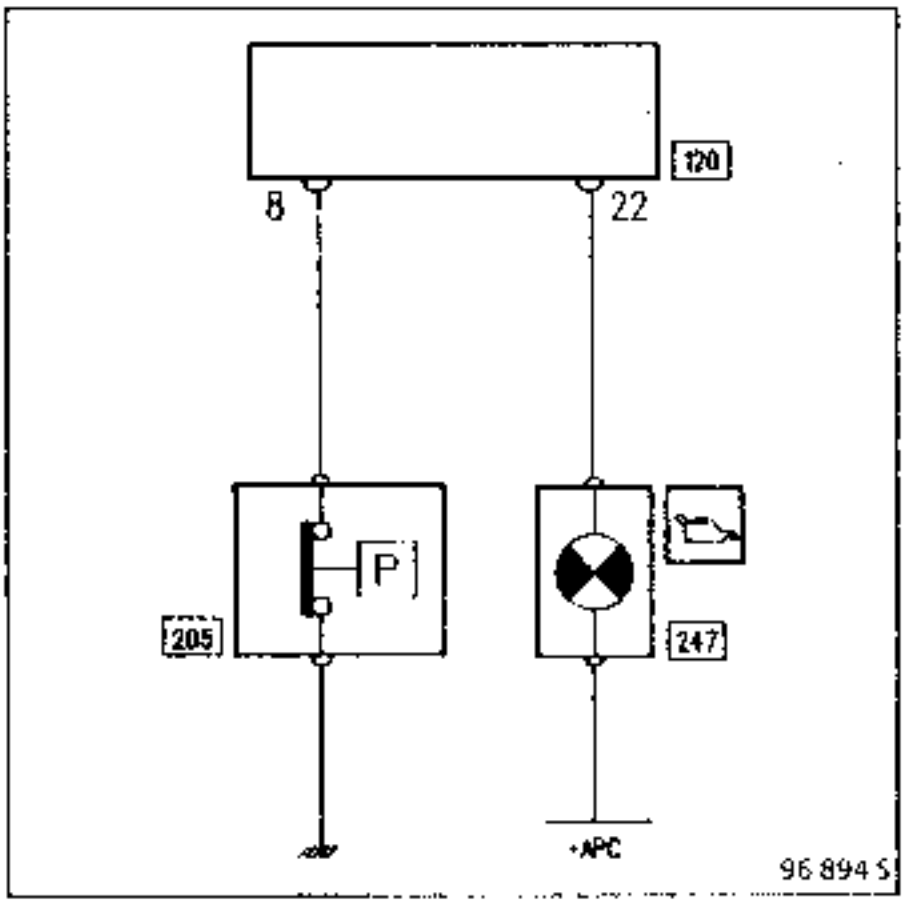


When refitting

- Tighten the sensor to the recommended torque **(0.8 daN.m)**,
- Ensure the connector is correctly reconnected.
- Replace the cold start injector fuel supply pipe seals.
- Before refitting the upper cross member , shunt tracks 3 and 5 (large wires) of fuel pump relay **(236)** to check the sealing of the cold start injector fuel supply pipe.

OIL PRESSURE WARNING LIGHT CONTROL

The computer fitted to the CLIO C57 M has a new set-up which includes an "oil pressure warning".
The oil pressure switch **(205)** is connected to track 8 on the computer **(120)** which controls the oil pressure warning light **(247)** via track 22.



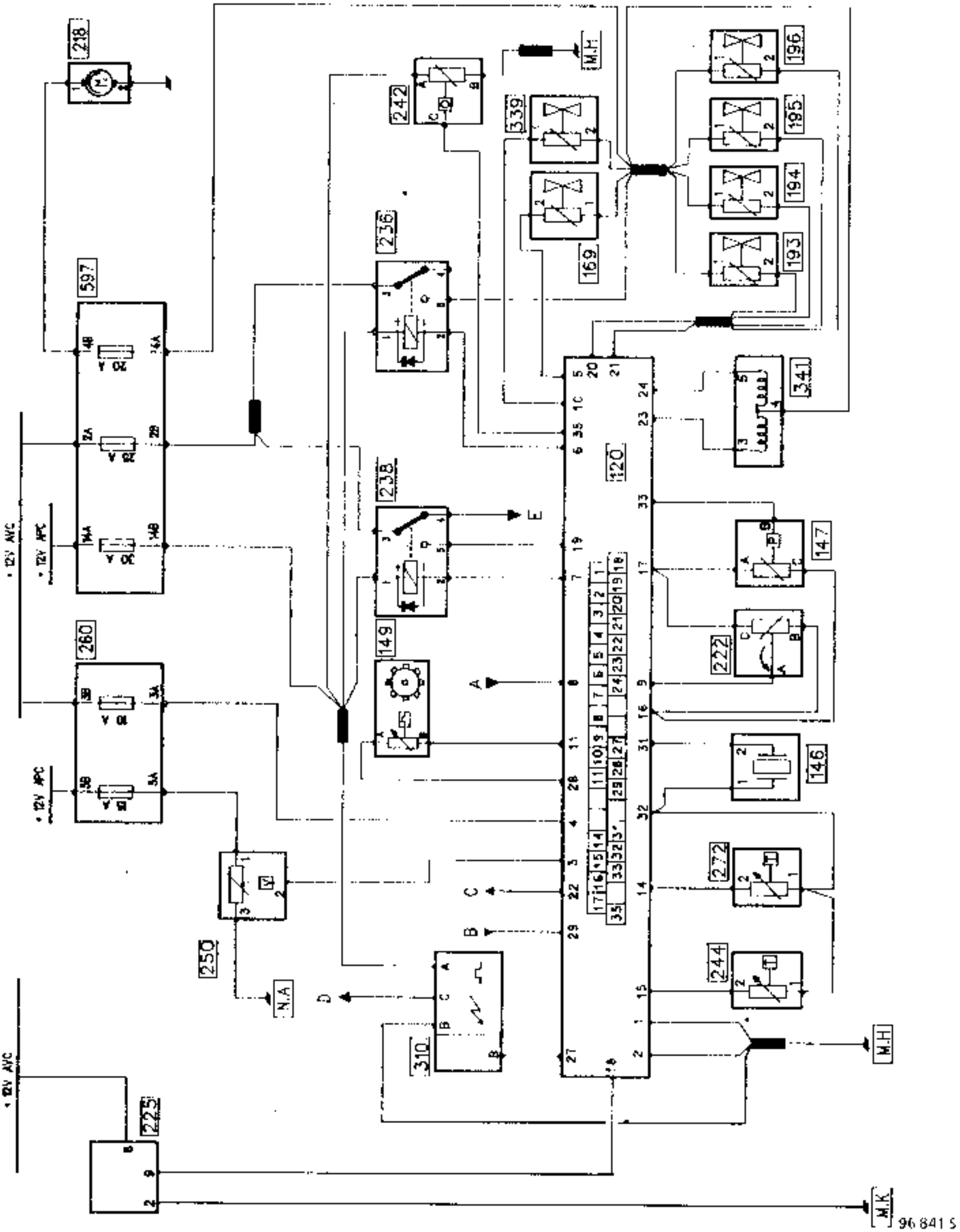
Operating principle:

For 10 seconds after the engine has been started the warning light does not illuminate. When the engine speed is below 1500 rpm, and the coolant temperature is less than 80°C, the oil pressure switch status is redirected to the "oil pressure warning" output (track 22 on computer).
If the coolant temperature is above 80°C and the engine speed is below 1500 rpm, the oil pressure warning light does not illuminate whatever status the oil pressure switch may have.

Under other engine operating conditions (engine speed above 1500 rpm after the starting phase), as soon as the oil pressure switch information is present, the computer operates the oil pressure warning light for 10 seconds.
This information is stored in the computer and may be displayed on the XR 25 after entering the injection code D 03 and then # 47 ("DEF" read on central display)
When the oil pressure warning light illuminates for the third time, it remains illuminated until the ignition is turned off.
When the ignition is turned back on, the oil pressure fault programming is reset but the "DEF" fault information under # 47 on the XR 25 remains stored in the computer until the battery is disconnected.

NOTE:
The oil pressure switch **(205)** is closed when the pressure is less than 0.5 bar.

INJECTION
Wiring diagram



KEY

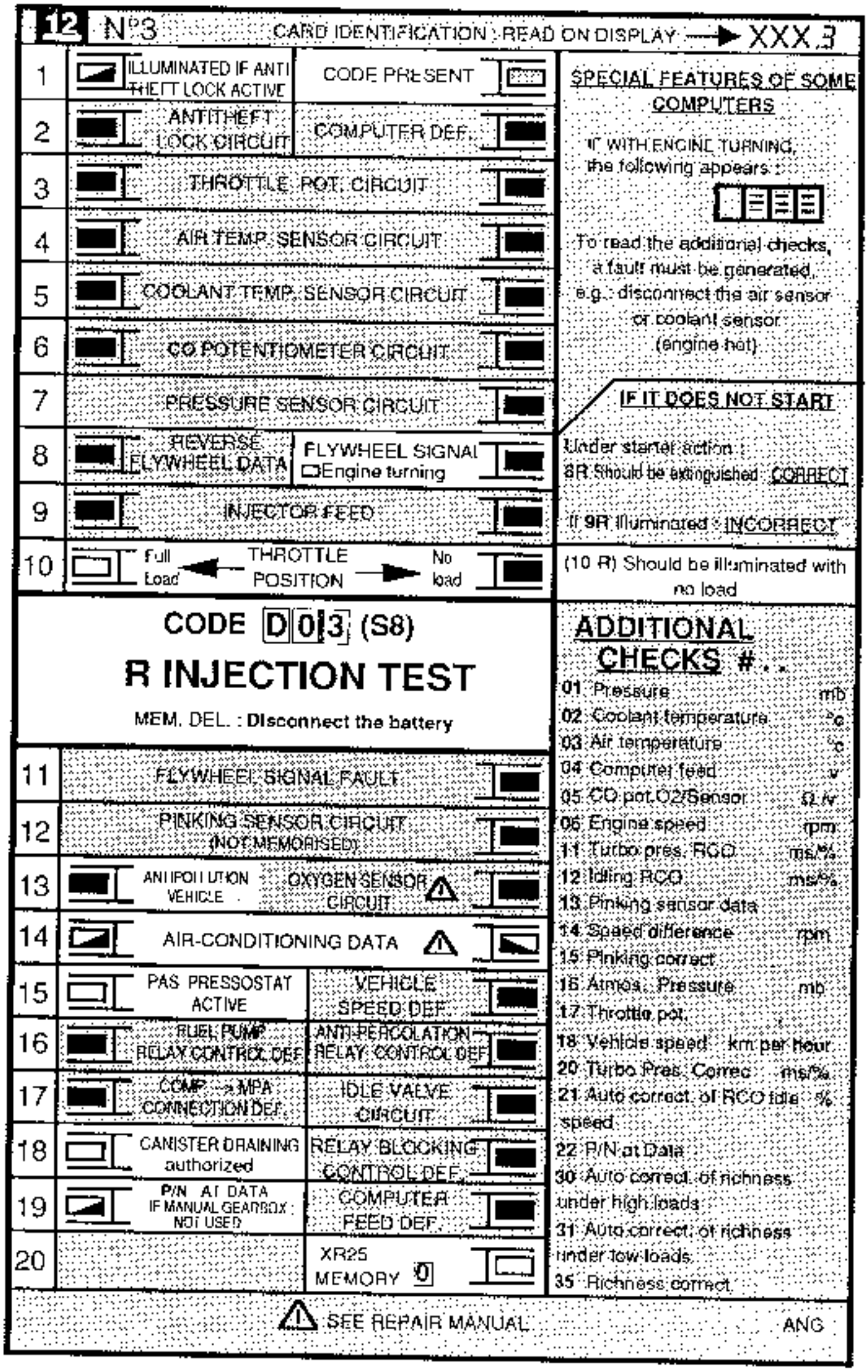
120 Injection computer
146 Pinking sensor
147 Absolute pressure sensor
149 TDC sensor
169 Canister bleed solenoid
193 to 196 Injectors
218 Fuel pump (submerged)
222 Throttle position potentiometer
225 Diagnostic socket
236 Fuel pump relay
238 Injection lock relay
242 Oxygen sensor (heated)
244 Coolant temperature sensor
250 Vehicle speed sensor
260 Passenger compartment fuse box
272 Air temperature sensor
310 Ignition power module
339 Cold start injector
341 Idle speed regulation valve (BOSCH)
597 Engine compartment fuse box

MH Engine earth
MK Front left hand pillar earth
NA Front right hand pillar earth

A Oil pressure switch information
B Starter information
C Oil pressure warning light control
D Rev counter signal
E Water pump timer relay feed

INJECTION
Fault finding using the XR25

For complete diagnostics of the injection system using the XR 25, use fiche N°3 and cassette N°12 (readings for # 21 may only be carried out using cassette N°13)

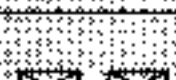


BARGRAPH FUNCTIONS

⊠	Bargraph does not operate for this type of injection
Fault bargraphs are shown on a coloured background	
■	If illuminated, the component tested is faulty, the associated text defines the fault.
Status bargraphs are shown on a white background	
▨	Should illuminate after the product code has been entered. If it remains extinguished: – the code is incorrect – the tool, diagnostic product or line is faulty **The following bargraphs show their initial status:** **– after the ignition has been turned on** **– after entering the code associated with the product** **– no action**
◪ or ◹	If illuminated, the function or status defined by the text is active
■	Should be illuminated (will extinguish if the function defined by the text is modified)
□	Should be extinguished (will illuminate if the function defined by the text is activated)

INJECTION
Fault finding using the XR25

PRESENTATION OF VARIOUS BARGRAPHS:

Line No	Bargraph display	
1		This bargraph should be illuminated when the ignition is turned on ; it shows that the computer - XR25 link is correct and the computer is sending diagnostic signals.
2		Incorrect or faulty computer.
3		Open circuit or short circuit to earth on the potentiometer or its wiring. Short circuit to + 5 V on the potentiometer or its wiring. **NOTE**: In both cases # 17 = 128 and no load and full load bargraphs do not illuminate
4		Short circuit on air sensor or its wiring Open circuit on air sensor or its wiring **NOTE**: In both cases # 03 = 20°C
5		Short circuit on coolant sensor or its wiring Open circuit on coolant sensor or its wiring **NOTE**: In both cases # 02 = # 03 ignition on and # 02 = 90°C engine running
6		
7		Fault on the absolute pressure sensor or its wiring. (open circuit or short circuit to earth) **NOTE**: In this case # 01 = 103 mb , the fault is not stored
8		Flywheel sensor signal : should extinguish when the starter activates, otherwise there is a fault on the TDC sensor or its wiring (open circuit) TDC sensor connections incorrectly connected
9		Bargraphs illuminated when starter activated (10 seconds minimum) indicates a fault in injector feed (1 injector in short circuit or 3 injectors in open circuit). The fault is not stored

INJECTION
Fault finding using the XR25

Line No	Bargraph display	
10	■ □	No load throttle position information Throttle information: should illuminate in full load position
11	■	Cyclical irregularity (engine flywheel target fault).
12	■	Fault on pinking sensor or its wiring. **NOTE**: the fault is not stored
13	■ ■	Oxygen sensor not operating ; in this case # 05 is fixed and # 35 = 128. The fault is stored until the ignition is turned off **NOTE:** As soon as a fault appears in the sensor or its wiring ; richness correction (# 35) changes to the upper limit (255) or lower limit (0) 10 times before the bargraph is permanently illuminated until the ignition is turned off Vehicle is fitted with an oxygen sensor.
14	⊠ ⊠	
15	⊠ ■	Fault in the vehicle speed sensor or its wiring. In this case, # 18 = 0 and the idle speed is too high (# 06 = 2000 rpm). After turning the ignition off, the fault is not stored and the idle speed returns to normal. To see this fault displayed, certain pressure and engine speed thresholds must be exceeded (road testing is recommended).
16	⊠ ⊠	
17	■ ⊠	Fault in the computer link to the MPA or in the MPA
18	⊠ ⊠	
19	⊠ ⊠	
20	□	After pressing key 0, information from the computer is stored

NOTES:

a) If line n° 17 is cut at the input into the computer, the bargraphs for lines 3 and 7 will not illuminate. You should however note that #17 = 252, #01 = 923 mb and bargraph 10 left hand side is illuminated, the vehicle starts then stalls immediately

b) If there is a short circuit to + 5 volts on the wire connecting track N°33 on the computer to track B on the absolute pressure sensor, bargraph 7 right hand side is extinguished but the value under #01 = 1020 mb.

c) If there is a break in the wire connecting track N°7 on the computer to track N°2 on the locking relay or if the relay is faulty, the vehicle will not start and there is no dialogue established between the computer and the XR 25.

FAULT FINDING FOR THE OIL PRESSURE SWITCH CIRCUIT

The oil pressure switch - computer link (track N°8) may be tested using #46 on the XR25 :

- **Open circuit:**
  This test should be carried out with the engine not running and the ignition on. The oil pressure warning light remains extinguished and "CO" is read on the central display after entering #46.

- **Short circuit to earth:**
  This test should be carried out with the engine running. The oil pressure warning light is permanently illuminated and when #46 is entered, "CC" is displayed. In order to distinguish a lack of oil pressure from a short circuit to earth of the oil pressure switch - computer link, the oil pressure must be checked using a pressure gauge (see chapter 10).

CHECKING CONFORMITY

Engine cold, ignition on

Functions to check	XR 25 selection Conditions	Line no.	Bargraph display	Central display - notes
COMPUTER CONFORMITY	D03			XXX.3 – XXX : diagnostic code (see chapter 12 - general) – .3 : diagnostics for injection
INTERPRETATION OF BARGRAPHS NORMALLY ILLUMINATED		L1 L8 L10 L13	□ ■ □ ■ □ ■ ■ □	Code present No TDC (should extinguish when starter activated) No load position recognised Computer ready to receive information from oxygen sensor
THROTTLE POSITION POTENTIOMETER	– No load #17	L10	□ ■	8 ≤ X ≤ 13
	– Accelerator pedal slightly depressed	L10	□ □	
	– Full load #17	L10	■ □	X ≤ 213 *
ABSOLUTE PRESSURE SENSOR	#01	L7	□	X = local atmospheric pressure
COOLANT TEMPERATURE SENSOR	#02	L5	□ □	X = ambient temperature ± 5°C
AIR TEMPERATURE SENSOR	#03	L4	□ □	X = ambient temperature ± 5°C
IDLE SPEED REGULATION VALVE	#12			Value read is fixed and between 80% and 85%
OIL PRESSURE WARNING LIGHT	#47			Correct Indicates there is no oil pressure fault (see special notes, chapter 17)

Engine warm at idle speed after engine cooling fan has operated at least once

Functions to check	XR 25 selection Conditions	Line no.	Bargraph display	Central display - notes
BATTERY VOLTAGE	#04			13 < X < 14 5 V
IDLE SPEED	#06 #12	L10	[ ] ■	X = 900 ± 50 rpm 29 % < X < 34 %
ANTI-PINKING NOISE MEASUREMENT	#13 (3500 rpm no load)	L12	[ ]	X = variable and not zero
RICHNESS REGULATION	At stable engine speed of 2500 rpm, then at idle speed #05 #35	L13	■ [ ]	X varies from 20 to 850 mV approximately X oscillates around 128 with a maximum of 255 and a minimum of 0
ADAPTIVE IDLE SPEED	#21			X varies around 0 (minimum stop - 1.9 % - maximum stop 6 2 %)

During a road test

Functions to check	XR 25 selection Conditions	Line no.	Bargraph display	Central display - notes
VEHICLE SPEED INFORMATION	#18	L15	▭ [ ]	X = speed on speedometer
PINKING SENSOR	#15	L12	[ ]	X = 0 (if there is a fault the bargraph illuminates and the system retards automatically by 4 ° of advance, which is not visible under #15)
ADAPTIVE RICHNESS	#30 #31			X varies around 128 (minimum stop 0 - maximum stop 255) X varies around 128 (minimum stop 0 - maximum stop 255)

ADAPTIVE IDLE SPEED CORRECTION (#21)

Note:
The XR 25 may only be used to read adaptive correction using #21 if cassette N°13 is used.

Principle:

Under normal warm engine operating conditions, the R.C.O. idle speed value read under #12 varies between an upper and lower limit to give the nominal idle speed (see checking for conformity).

If the engine operating conditions are different (running in, engine dirty...) the R.C.O idle speed value may be close to one or other of the limits

Adaptive correction of the R.C.O. idle speed allows adjustments to be made for small variations in the engine's air requirement, so that the R.C.O value read under #12 is kept at a nominal average value.

R.C.O. idle speed values and adaptive corrections :

R.C.O. idle speed (#12)	**29 % ≤ X ≤ 34 %**
Adaptive idle speed (#21)	Minimum stop : – 1.9 % Maximum stop : 6.2 %

Interpretation of the gate values :

If there is an excess of air (air leak, throttle stop incorrectly set ...) the idle speed increases and the R.C.O. idle speed read under #12 reduces to keep the idle speed at the nominal average value ; the value of the R.C.O. idle speed adaptive correction read under #21 also reduces to recentre the R.C.O. idle speed value read under #12

If there is a lack of air (pollution etc.), the operation reverses :

The R.C.O. idle speed read under #12 increases and the adaptive correction read under #21 also increases, in order to recentre the value under #12 to the nominal average value

ADAPTIVE RICHNESS CORRECTION (#30 and 31)

Principle :

In the loop phase (after a timed period has expired which is measured by a number of engine revolutions, and when the coolant temperature is above 18°C, richness regulation is effective depending on idle speed and pressure conditions), richness regulation (#35) corrects injection timing to give metering as close as possible to richness 1.

The correction value oscillates around 128 with a maximum of 255 and a minimum of 0.

If outside factors affect the injection system, the correction value could tend towards 0 or 255 in order to produce richness 1.

Adaptive correction allows the injection mapping to be offset to recentre the richness regulation (#35) around 128. There are two phases involved :

- adaptive correction under medium and heavy load in the loop phase (read under #30),
- adaptive correction at idle speed and under low load in the loop phase (read under #31).

The value read under these gates varies around 128 with a minimum of 0 and a maximum of 255.

Conditions necessary for correction to be effective:

- Coolant temperature above 60°C.
- Road testing is required in order to exceed certain pressure thresholds during a certain period.
- Engine speed less than 4000 rpm
- Manifold pressure between 350 and 800 mb.

Interpretation :

If there is a lack of fuel (injectors dirty, fuel pressure and flow too low...), the richness regulation read under #35 increases to give a richness value close to 1 and adaptive correction read under #30 and 31 increases until richness correction once more oscillates around 128

If there is an excess of fuel, the operation reverses :

Richness regulation read under #35 reduces and the adaptive correction read under #30 and 31 also reduces to recentre the richness correction (#35) around 128.

Notes:

The analysis which may be made using #31 is difficult since this correction is only effective at idle speed and under low load conditions, and is also extremely sensitive (influence of the canister bleed). Hasty conclusions should therefore not be drawn from this particular gate value, but #30 should be analysed in preference

Gates #30 and 31 should only be used and analysed following a customer complaint regarding an engine operating fault.

The information obtained from these two gates gives an impression of the engine operating richness, which is useful for targetting fault finding. These values should only be used in fault finding if they are at the maximum or minimum stops.

IMPORTANT : after the computer memory has been erased, information from adaptive correction is cancelled **The vehicle must be allowed to run for a few minutes before it is returned to the customer.** The idle speed adaptive correction has then had time to adjust , avoiding the customer experiencing any engine behaviour problems.

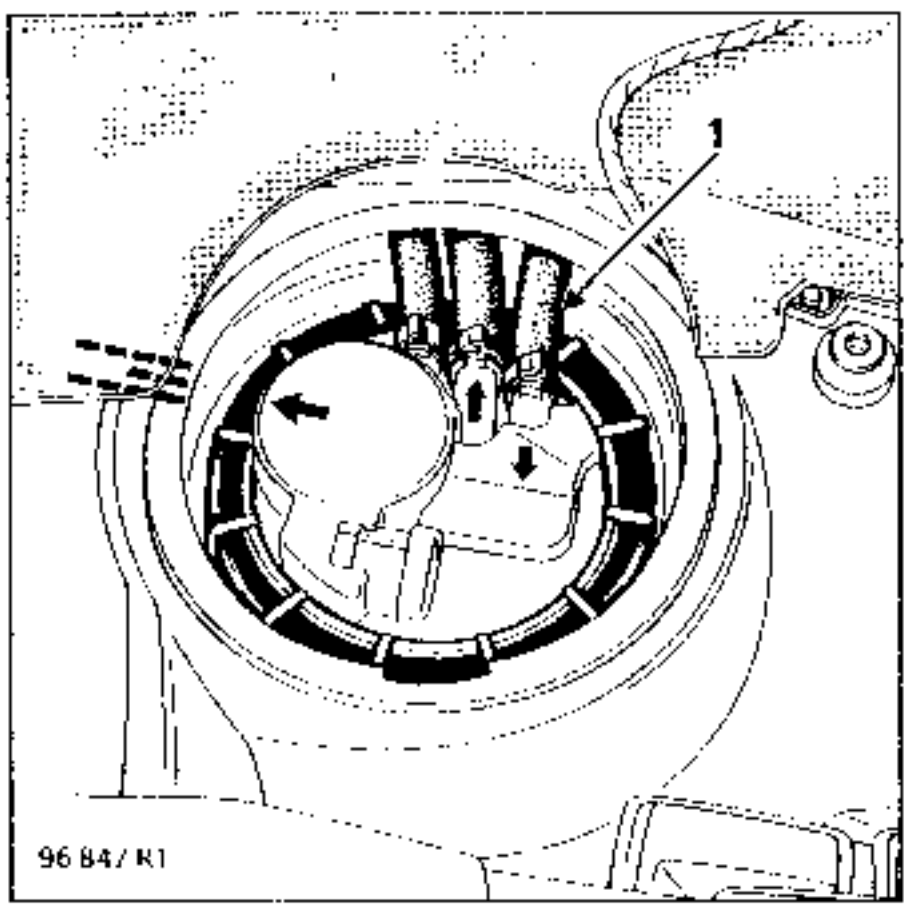
FUEL TANK
Main fuel tank

IMPORTANT

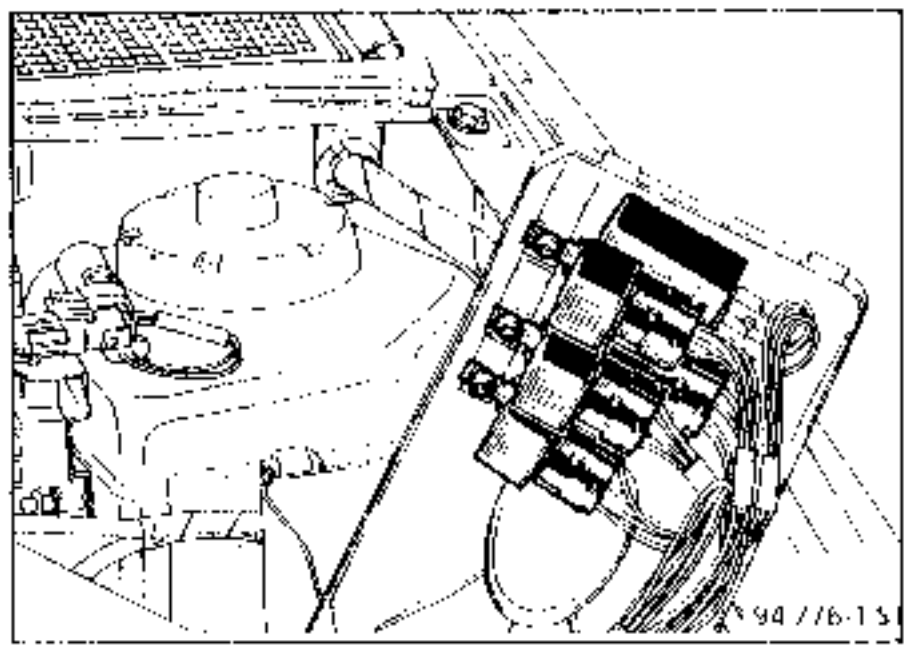
Never smoke or bring heat sources into the working area when working on the fuel tank or fuel supply circuit.

Protect yourself from fuel which may be sprayed out of pipes when they are disconnected (due to residual pressure).

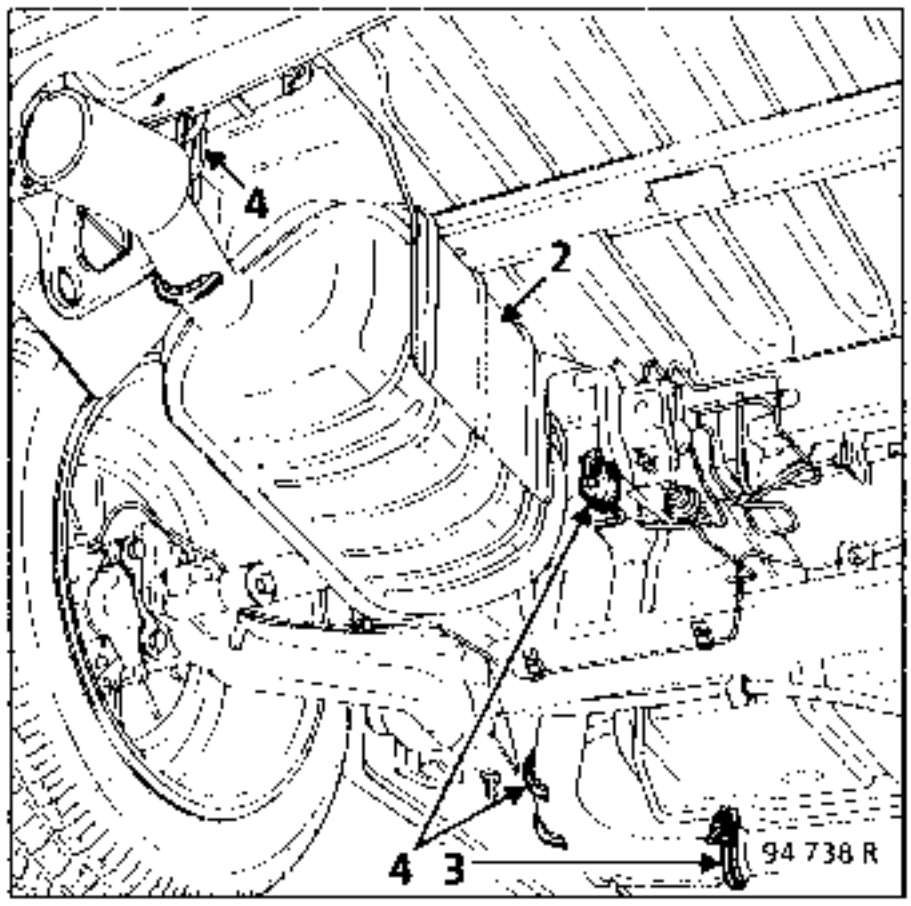
REMOVAL - REFITTING



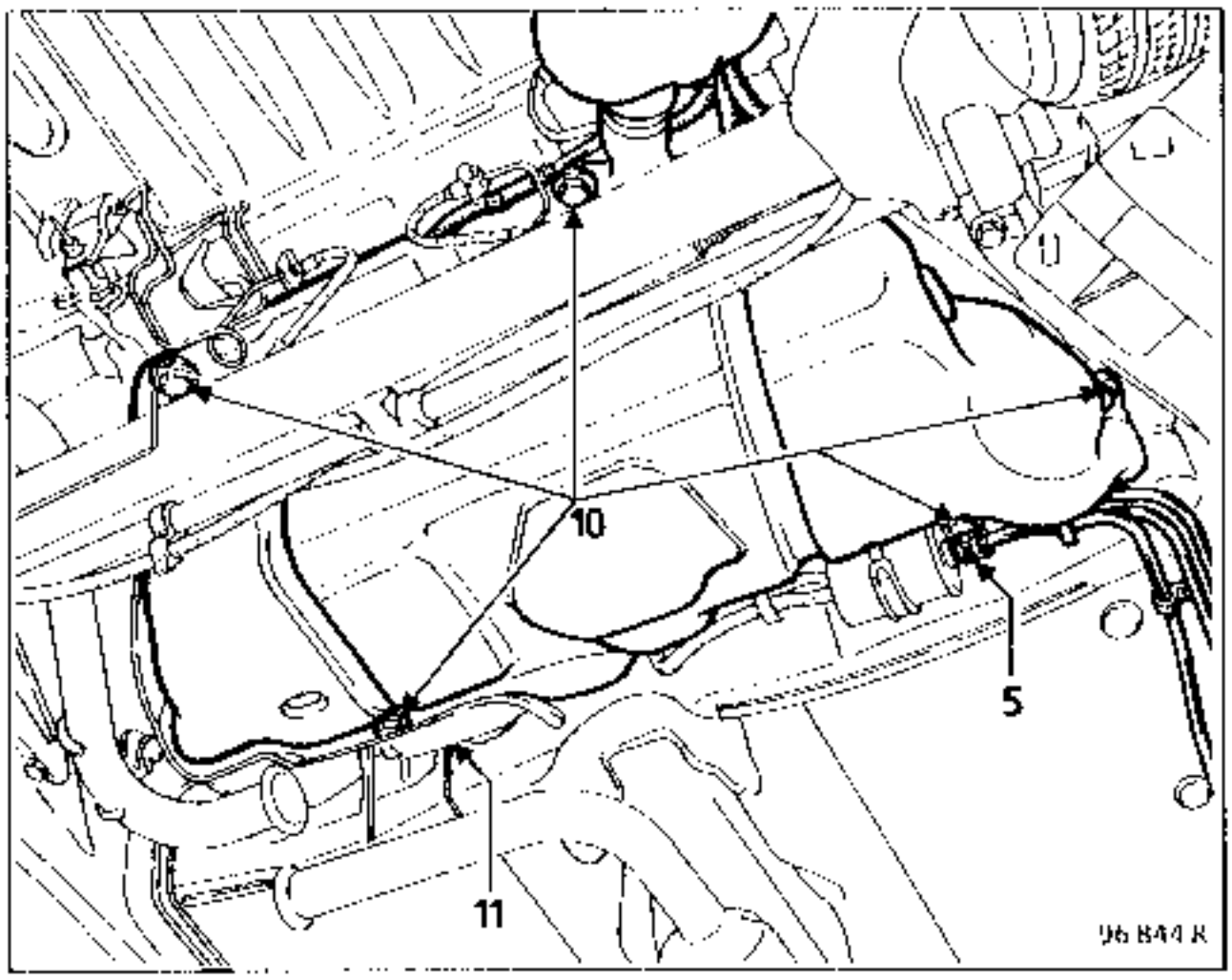
- Remove the rear bench seat squab and the plastic cover.
- Disconnect the fuel return pipe (3) and extend it to empty into a container (the fuel return pipe must be used to drain the fuel tank as this pipe has a valve to drain fuel from the reserve tank). .

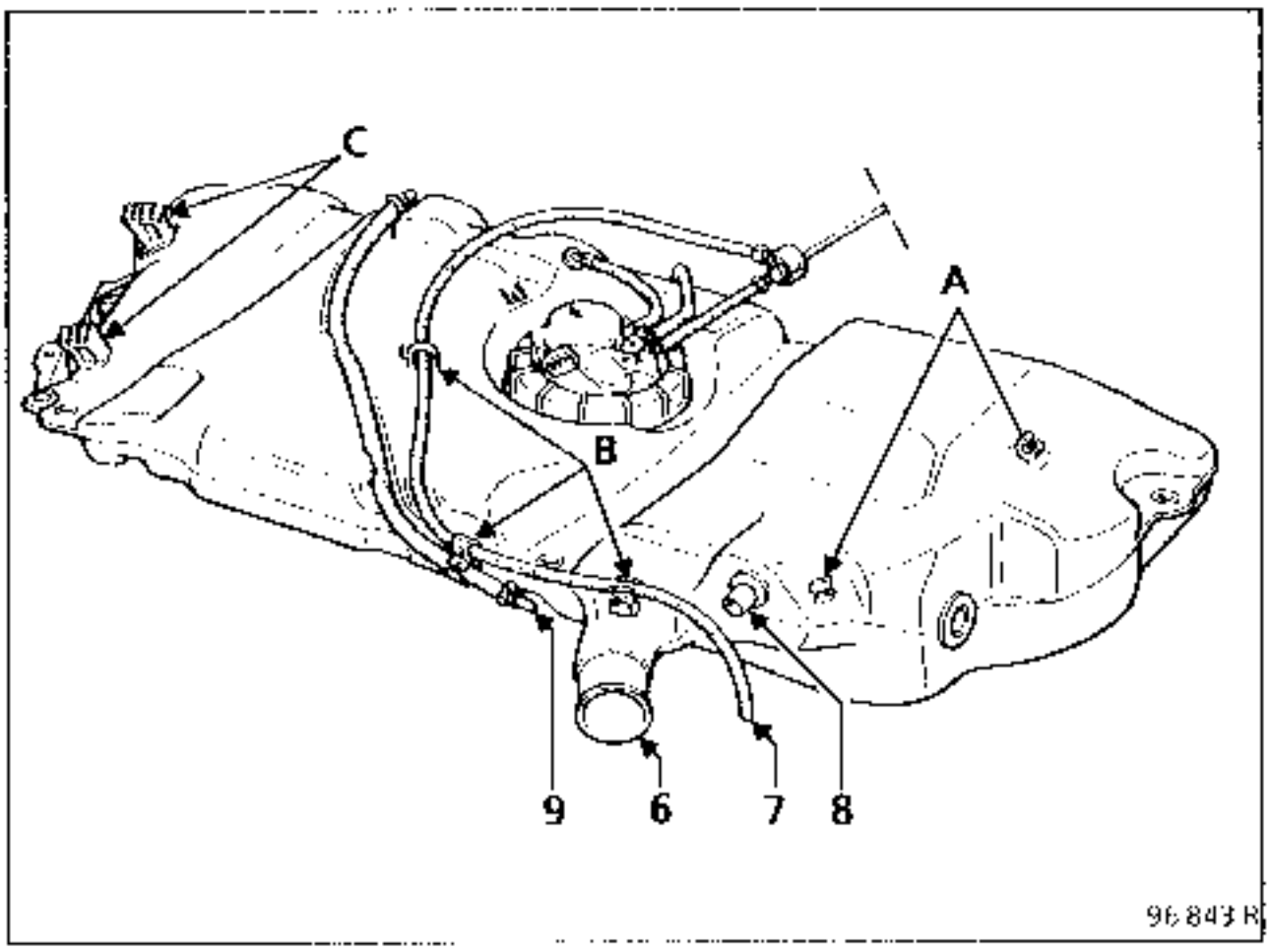


- Start the fuel pump operating: • on the pump relay connector (236) shunt tracks 3 and 5 (5 mm² section wires)
- Let the fuel drain out until only a few drops run out intermittently.
- Disconnect the connector for the pump - gauge assembly.
- Remove the emergency wheel and its carrier.



- Remove the emergency wheel heat shield (2) .
- Remove the collar (3) between the silencer and the expansion box.
- Remove the silencer rubber mountings (4) so the silencer may be moved when lowering the fuel tank.
- Disconnect the handbrake cables (having removed the heat shield).





- Disconnect:
  * the fuel supply pipes (5)
  * the pipe connecting the reserve tank to the main tank (6)
  * the reserve tank breather pipe (7)
  * the main tank degassing pipe (8)
  * the fuel vapour recirculation pipe (9)

- Position a jack under the fuel tank

- Remove the 5 mounting bolts (10)

- Slightly lower the fuel tank to remove :
  * the fuel vapour recirculation pipe at (A) (this pipe connects the fuel filler neck to the canister).
  * the reserve tank breather pipe (7) at (B).
  * the brake pipes at (C).

- Release the fuel tank by tilting it forwards

When refitting:

- Refitting is the reverse of removal.
- Ensure the various pipes mounted on the top of the fuel tank are correctly clipped into position
- Ensure that no pipes are pinched.
- Replace any clips if necessary
- Adjust the handbrake.
- Check all the heat shields are in position (especially shield (11) when replacing a fuel tank)
- Check for leaks after filling the fuel tank

FUEL TANK
Reserve fuel tank

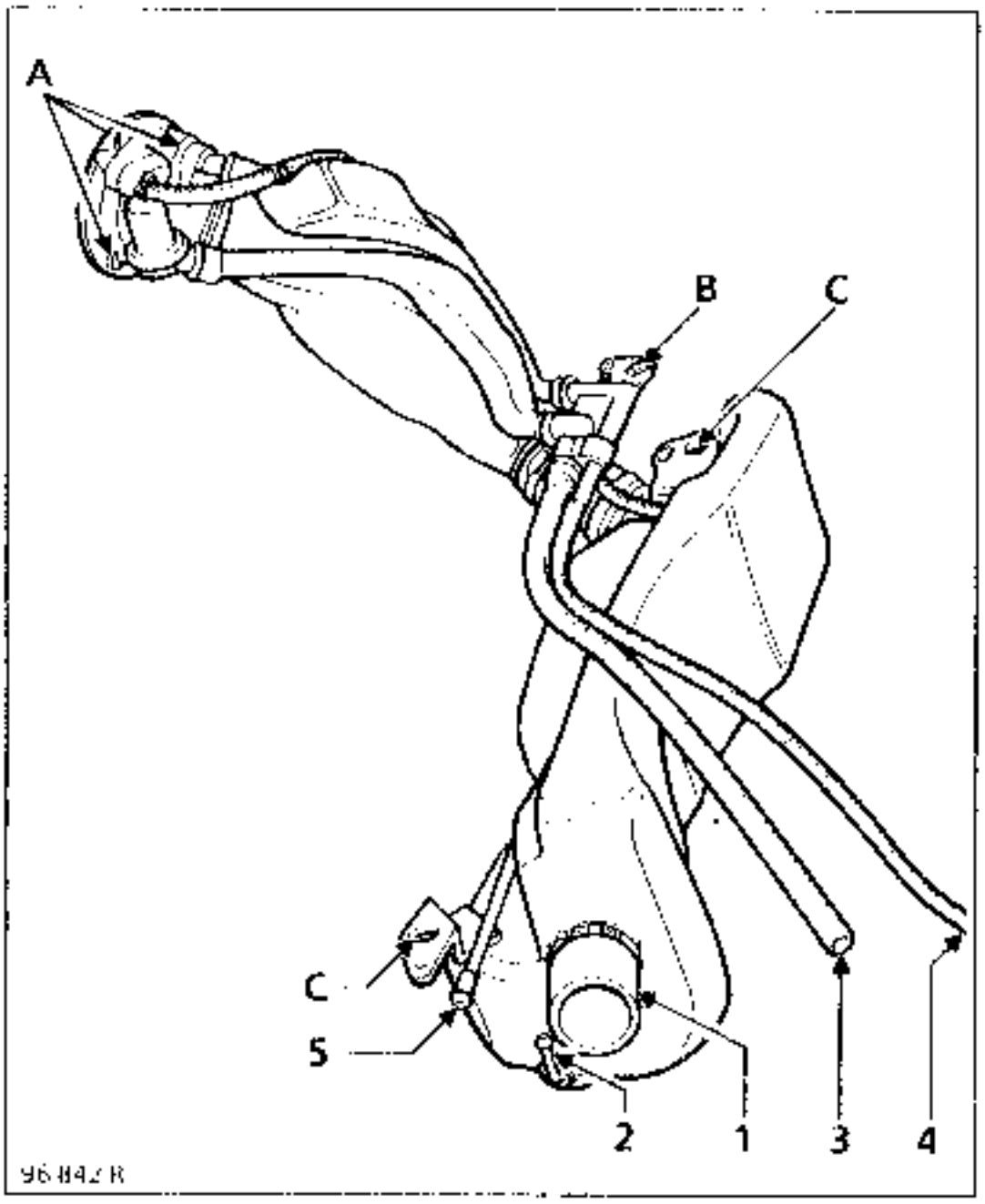
REMOVAL - REFITTING

– Put the vehicle on a 2 post lift.

Drain the fuel tank (see section on main fuel tank page 19-1).

– Remove the rear right hand wheel

– Remove the emergency wheel and its carrier.



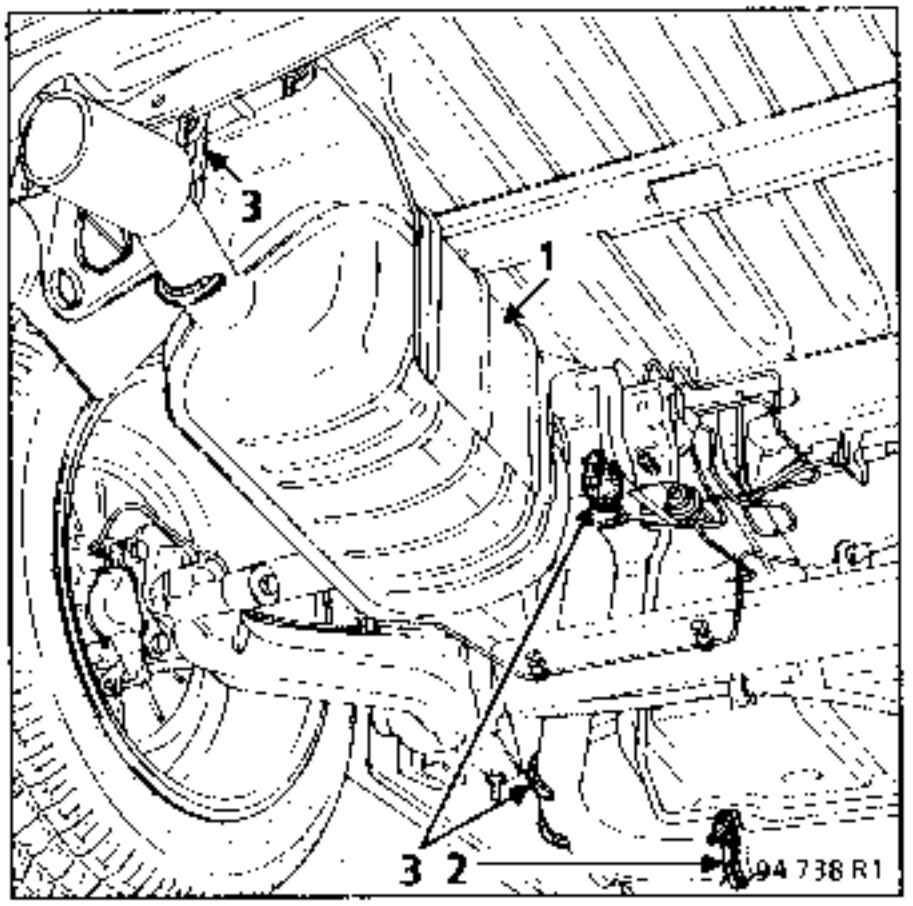
– Disconnect:
  * the pipe connecting the reserve tank to the main tank (1)
  * the reserve tank breather pipe (2)
  * the main tank degassing pipe (3)
  * the main tank fuel vapour recirculation pipe (4)
  * the fuel vapour recirculation pipe to the canister (5)
– Remove the filler cap and the three bolts (A) mounting the filler neck
– Remove the lower filler neck mounting bolt (plastic) (B)
– Remove the two reserve tank mounting bolts at (C).
– Remove the reserve tank.

When refitting:

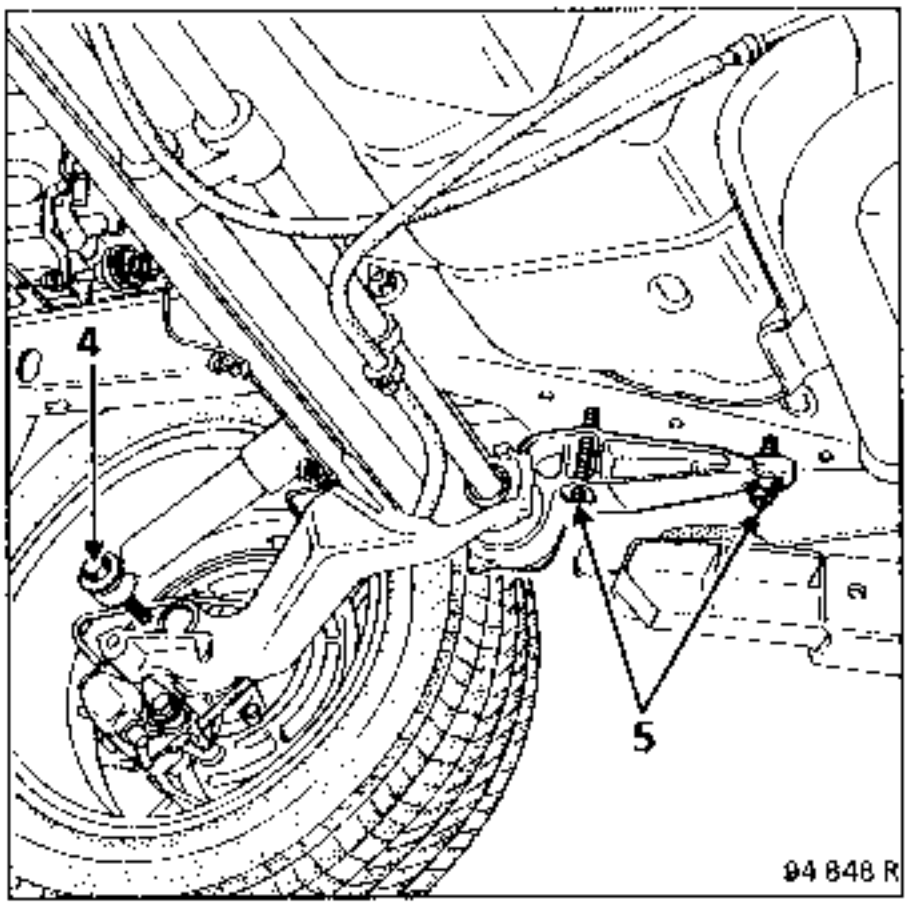
– Refitting is the reverse of removal.
– Take special precautions to ensure that no impurities enter the tanks or pipes
– Replace the clips if necessary.
– Check that pipes (3) and (4) are correctly routed into the side member (risk of splashing back when the fuel tank is filled).

REMOVAL - REFITTING

- Put the vehicle on a 2 post lift.
- Remove the emergency wheel and its carrier



- Remove the heat shield (1) protecting the emergency wheel.
- Remove the collar (2).
- Loosen the catalytic converter - expansion box joint.
- Remove the silencer rubber mountings (3) .



- Remove the lower mounting (4) for the left hand shock absorber.
- Undo the rear axle assembly mounting nuts (5) to lower the assembly by 3 cm.
- Remove the silencer.

When refitting:

- Refitting is the reverse of removal.
- Ensure the rear axle assembly mountings are tightened to the correct torque
  * shock absorber lower mounting bolt = 8.5 daN.m.
  * rear axle assembly mounting bolt on body = 10 daN.m.
- Check the rear axle assembly angles.

COOLING
Filling, bleeding

The heater matrix has no water control valve

Circulation through the heater matrix is continuous, which aids engine cooling.

FILLING

Check the tightness of the drain plug or plugs

Open the bleed screw or screws.

Fill the circuit at the expansion bottle.

Close the bleed screws as soon as liquid runs out as a continuous jet

Start the engine **(1 500 rpm.)**.

Adjust the expansion bottle water level after **4 minutes** approximately.

Tighten the expansion bottle cap.

BLEEDING

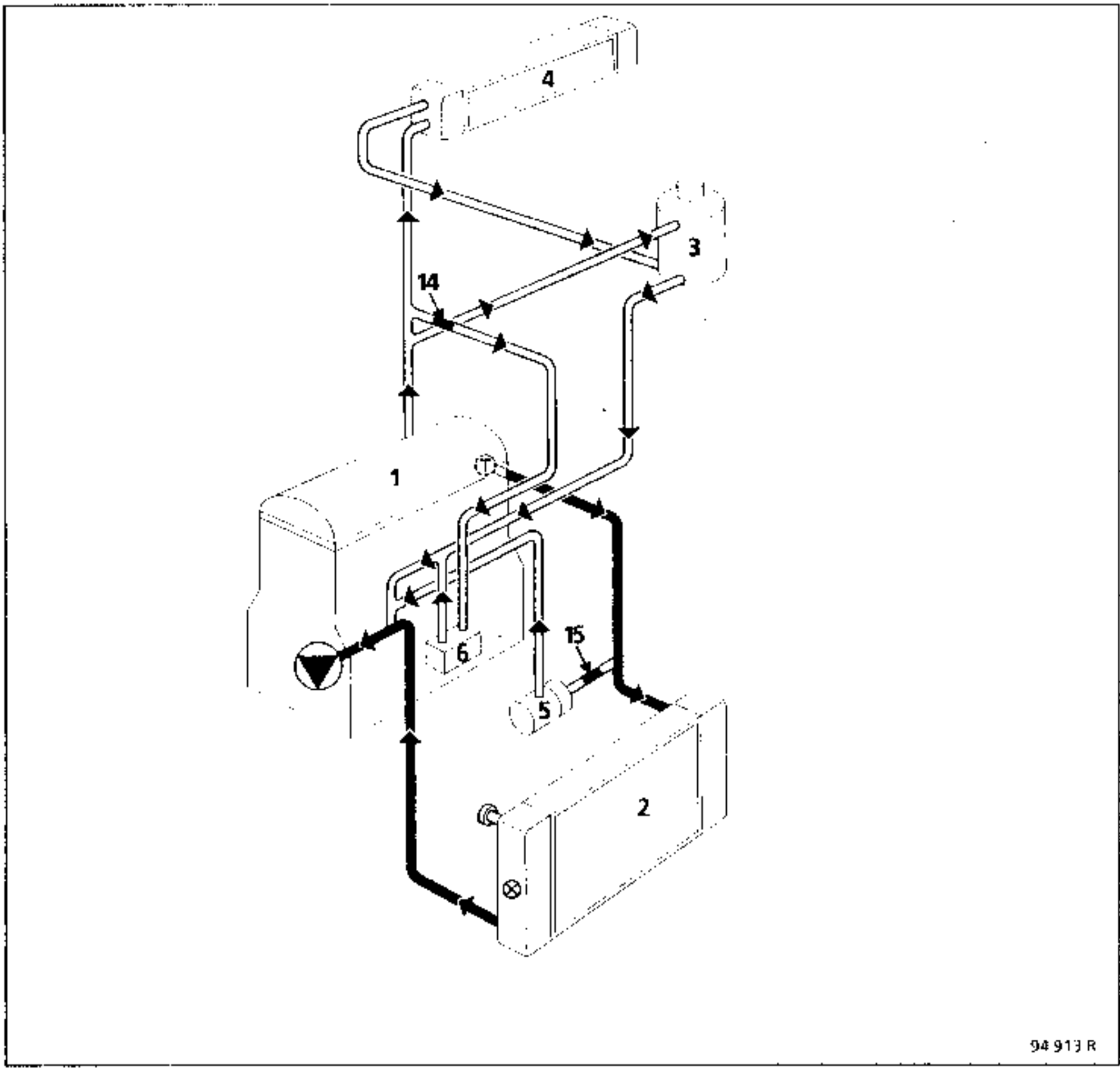
Let the engine run for **10 minutes** at **1 500 rpm.**, until the engine cooling fan or fans operate. (Time required for automatic degassing).

Check the level of the liquid is close to the **"Max"** mark

NEVER OPEN THE BLEED SCREW OR SCREWS WHEN THE ENGINE IS RUNNING.

RETIGHTEN THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM.

COOLING
Diagram



1. Engine
2. Radiator
3. « Hot» expansion bottle with permanent degassing
4. Heater matrix
5. Electric pump
6. Remote oil filter body support (water/oil exchanger)
14. 8 mm nozzle.
15. 8 mm nozzle

Water pump

T Thermostat

Bleed screw

Temperature switch
The expansion bottle valve is brown, rated at 1.2 bar.

NOISE FROM THE EXHAUST SYSTEM

The vehicle should be tested to determine the source of the noise (if necessary with the customer present). The fault should be reproduced when stationary if possible. To do this accelerate sharply in order to cover a large range of engine resonance.

After reproducing the fault :

- ensure the exhaust pipes do not touch the body,
- check the alignment, conformity and condition of the exhaust pipe assembly
- try to suppress the noise noted by stressing the exhaust pipe or heat shields suspected.

If the noise is coming from the catalytic converter it should be removed and the following tests completed:

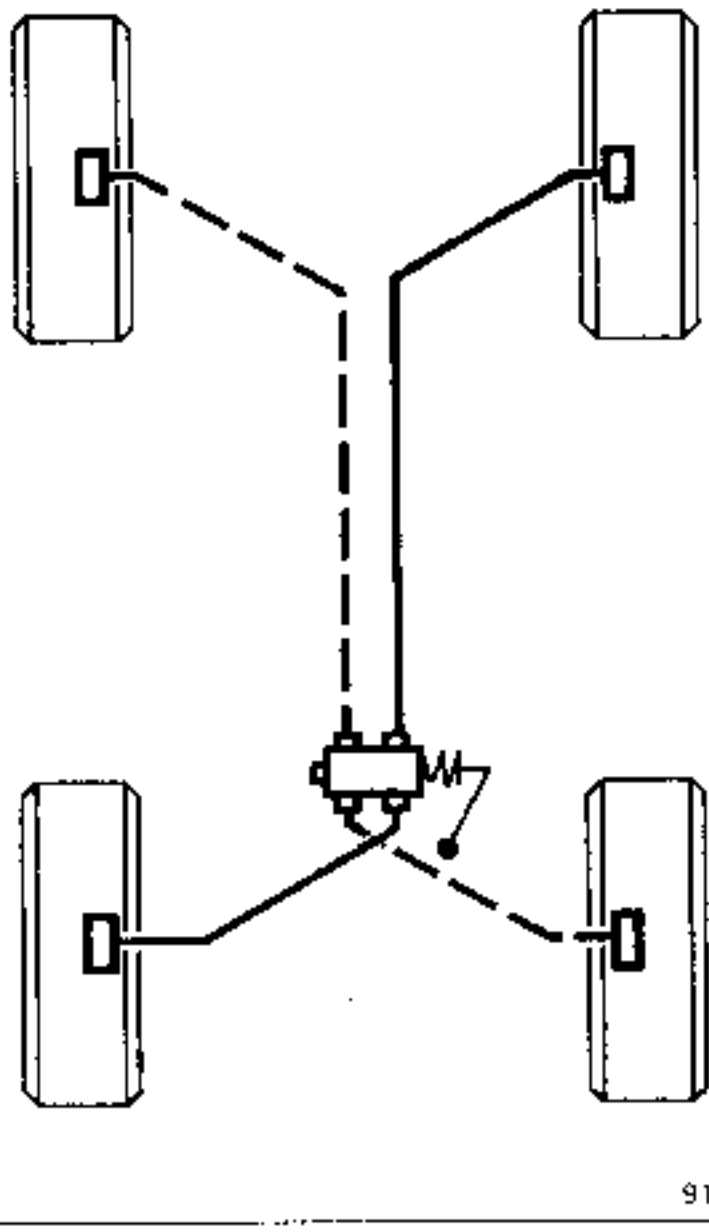
- visual inspection of the inside of the envelope (melted monolyth),
- listen to the converter after shaking it (split monolyth or foreign body present inside).

If the monolyth has melted, the cause must be determined (see chapter 14 : tests to be carried out before the anti-pollution test) and check that particles from the catalytic converter have not blocked the system further down the exhaust pipe.

Replace the catalytic converter only if one of the above faults is noted.

NOTE : the following diagram shows a general principle; it should never be used as a reference for specific circuit characteristics. When replacing one of the components of the braking circuit on a vehicle, always mark the pipes before their removal. They must be reconnected in their original positions.

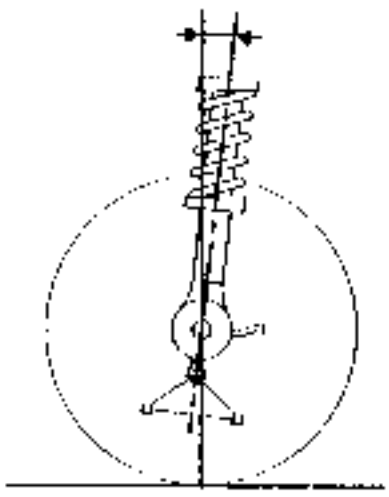
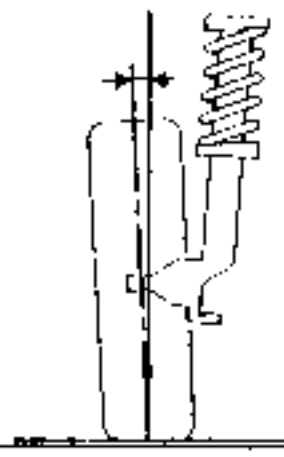
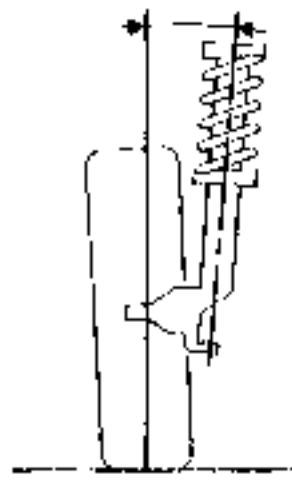
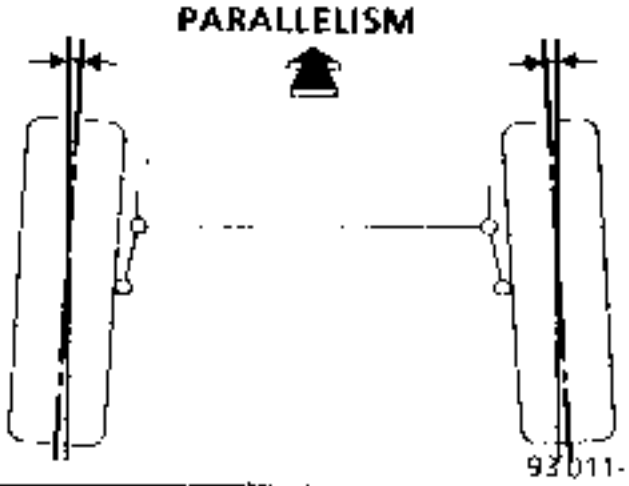
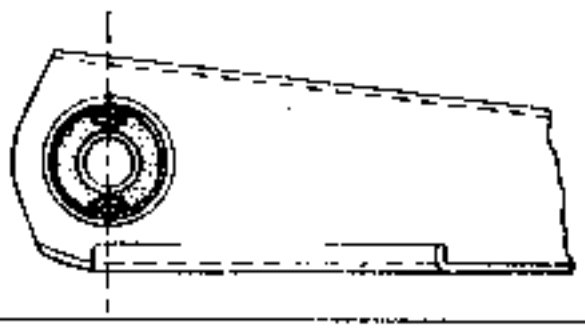
X" CIRCUIT BRAKING
with load sensitive compensator



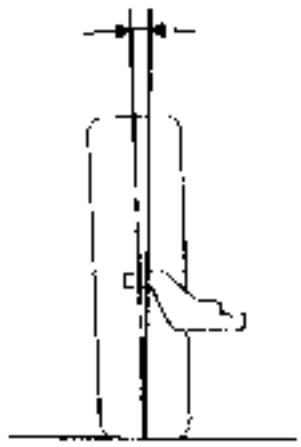
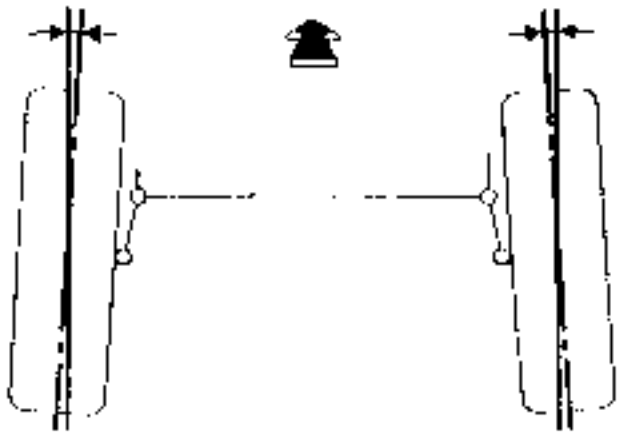
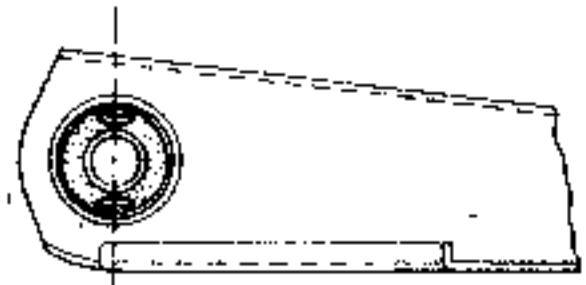
91 563 S

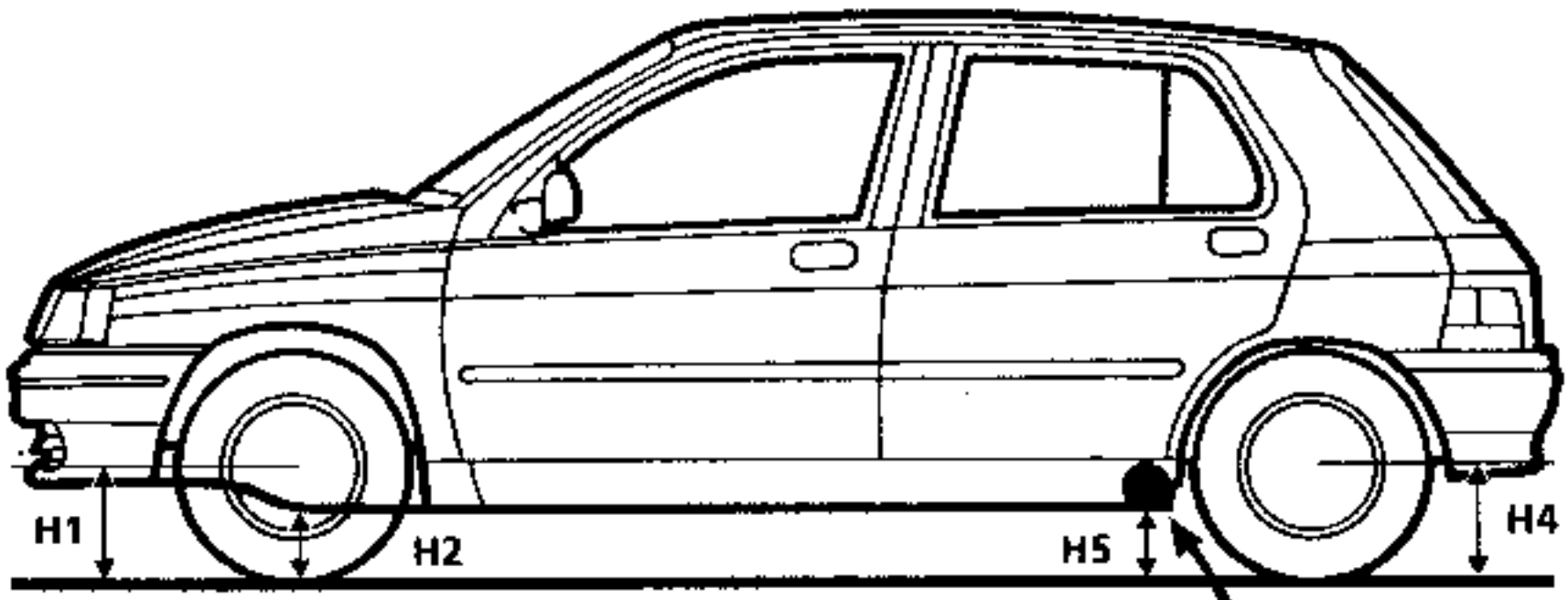
C57M

Values for checking front axle assembly angles

ANGLES	VALUES	POSITION OF FRONT AXLE	ADJUSTMENT
CASTOR  93012 1 S1	3°15' 2°45' 2°15' 1°45' } ± 30' Maximum left/right difference = 1°	H5 – H2 = 42 mm H5 – H2 = 61 mm H5 – H2 = 80 mm H5 – H2 = 99 mm	NON-ADJUSTABLE
CAMBER  93013 1 S1	0°29' – 0°41' – 0°40' – 0°15' } ± 30' Maximum left/right difference = 1°	H1 – H2 = 39 mm H1 – H2 = 122 mm H1 – H2 = 142 mm H1 – H2 = 180 mm	NON-ADJUSTABLE
KING PIN INCLINATION  93014-1 S1	10° 05' 12° 23' 12 °43' 13° } ± 30' Maximum left/right difference = 1°	H1 – H2 = 39 mm H1 – H2 = 122 mm H1 – H2 = 142 mm H1 – H2 = 180 mm	NON-ADJUSTABLE
PARALLELISM  93011-1 S1	(Toe-in) For both wheels – 0°20' ± 10' – 2 mm ± 1 mm	UNLADEN	Adjustable by turning track rod sleeves 1 turn = 30' (3 mm)
RUBBER BUSHES  03 S1	–	UNLADEN	–

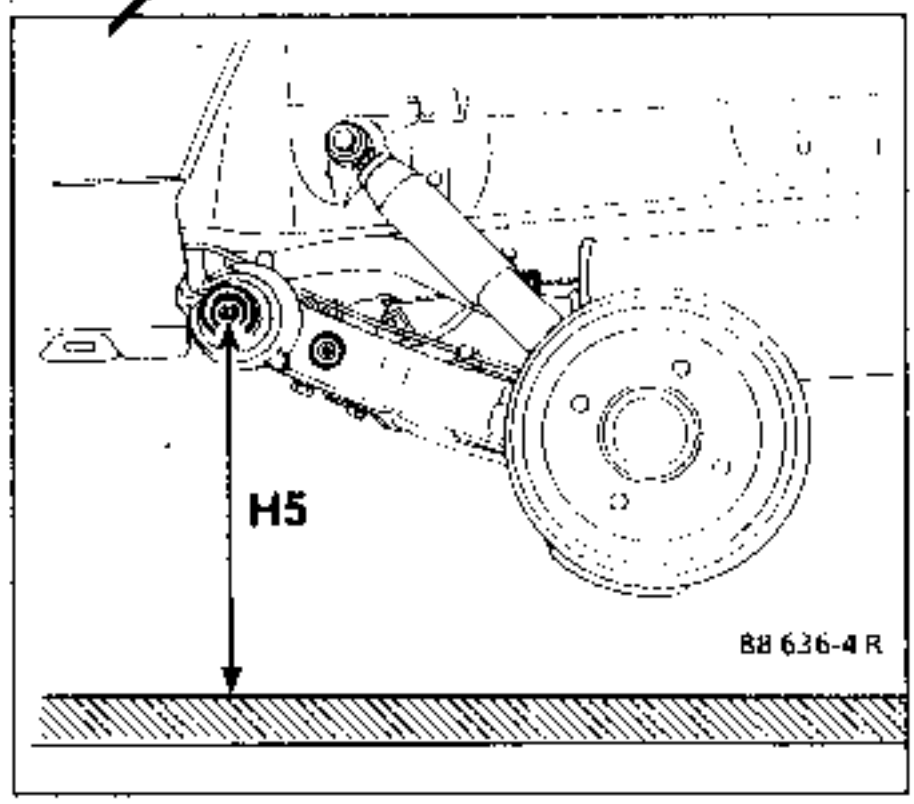
Values for checking rear axle assembly angles

ANGLES	VALUES	POSITION OF REAR AXLE	ADJUSTMENT
CAMBER  93 013-2 S1	– 0°50' ± 30' (Negative)	UNLADEN	NON-ADJUSTABLE
PARALLELISM  93 011-2 S1	Per wheel : – 10' to – 30' (toe-in) or – 1 mm to – 3 mm	UNLADEN	NON-ADJUSTABLE
RUBBER BUSHES  81 603 S1	..	UNLADEN	--



93 793 R

Dimension H5 is taken at the suspension arm axis.



88 636-4 R

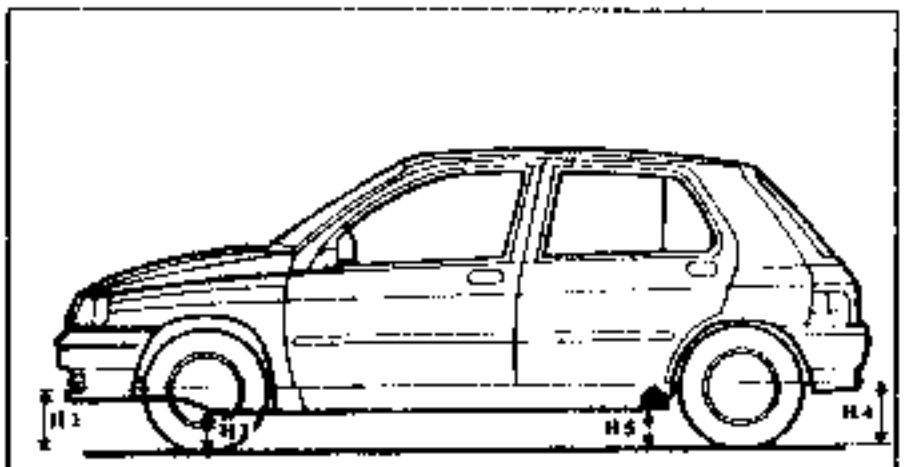
The vehicle should be unladen on a flat surface for the underbody heights to be measured (preferably on a vehicle lift) with:
- fuel tank full,
- correct tyre inflation pressures

. **H1** and **H4**: centre of wheels to ground
. **H2** : front side member to ground at wheel axis
. **H5** : suspension arm axis to ground

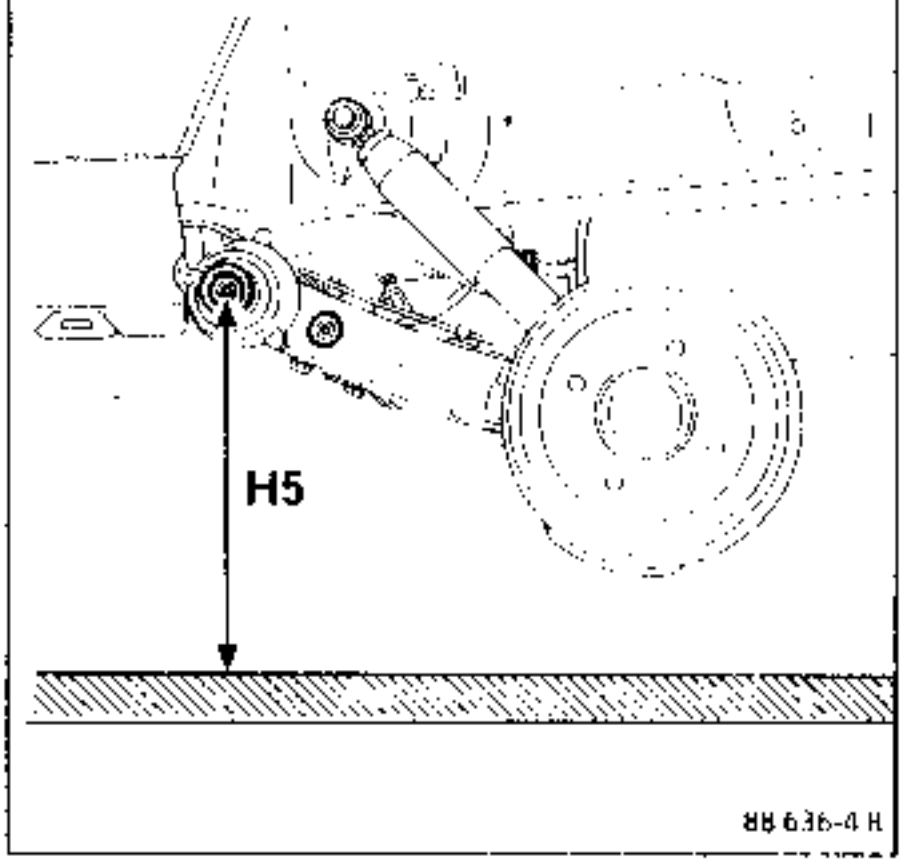
Measure the dimensions :

- **H1** and **H2** at the front,
- **H4** and **H5** at the rear,

and subtract.



93 793 R



88 636-4 R

C57M

H1 - H2 = 121,5 ± 7.5 mm
H4 - H5 = 45 ± 7.5 mm

PRELIMINARY CHECKS

Before checking the axle geometry angles, the following points must be checked and any repair or adjustment made :

- Symmetry of tyres on the same axle :
  - dimensions,
  - pressures,
  - degree of wear.

- Joints :
  - condition of rubber bearings,
  - ball joint play,
  - bearing play.

- Wheel run-out : this should not exceed 1.2 mm (compensated for by measuring equipment).

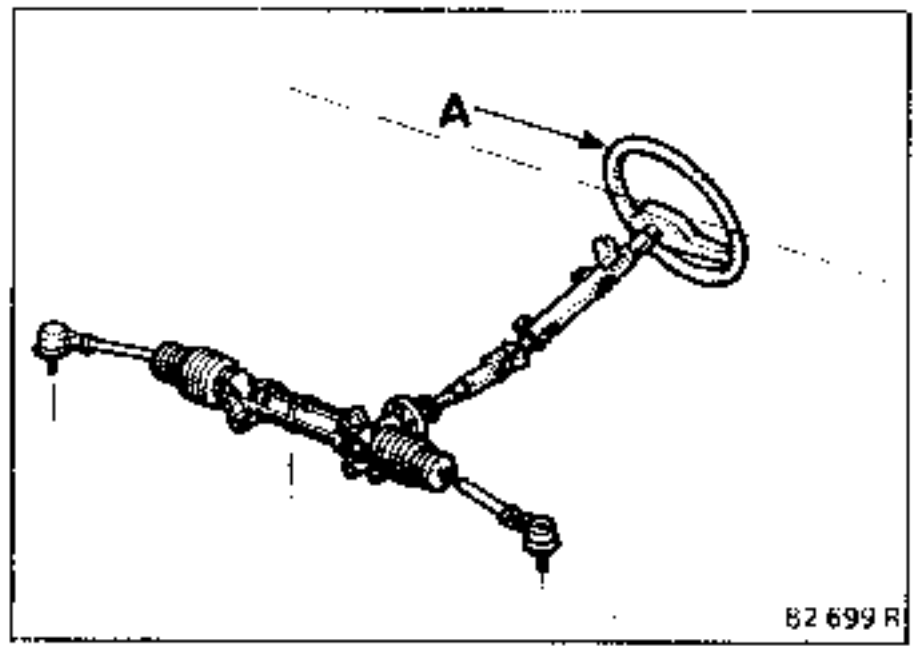
- Symmetry of underbody heights (condition of the suspension).

DETERMINING THE STEERING CENTRE POINT

When checking and adjusting the front axle geometry angles the steering must be at the centre point to avoid pulling.

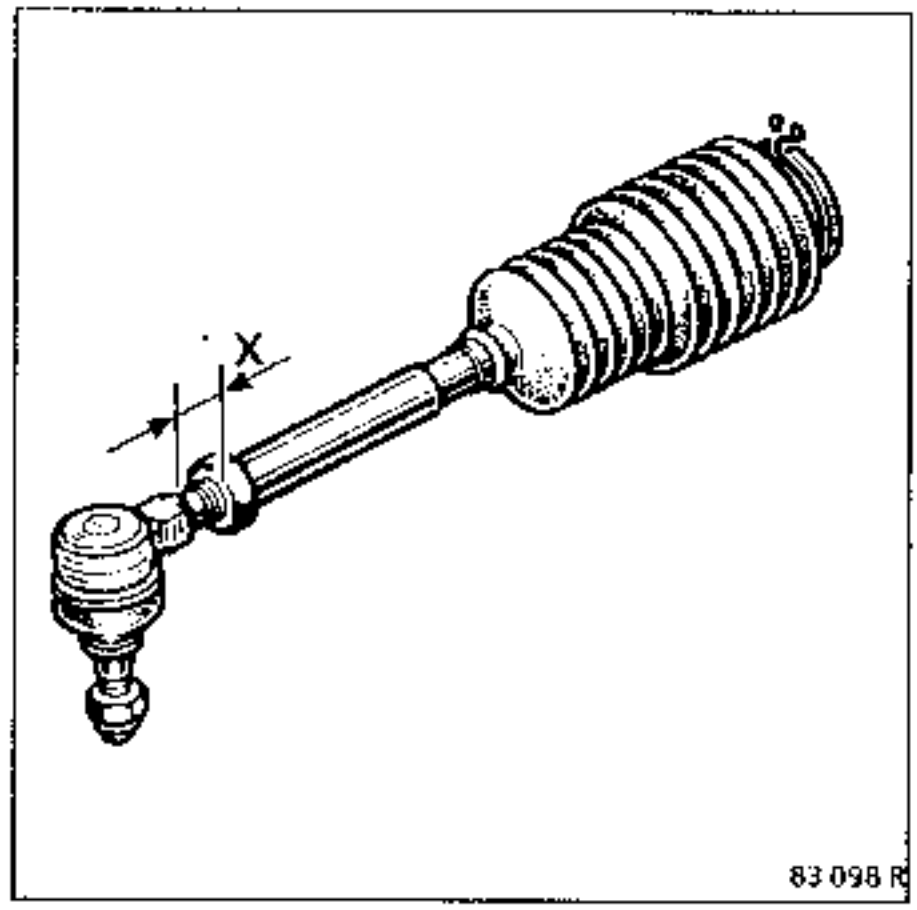
- Remove the keys from the ignition.

- With the steering lock applied there is still a certain amount of play in the steering wheel. The steering "centre point" is obtained by turning the steering wheel slowly to the left (left hand stop).



In this position, fit the measuring equipment and proceed with the test.

When adjusting the parallelism, ensure the dimensions X on the track rod ball joint units are the same.



WHEELS AND TYRES
Specifications

Vehicle type *	Wheels	Tyres
C57M	7J15	185/55 R15V

Inflation pressure : FRONT 2.2 bar
(pressure for motorway driving) REAR 2.2 bar

The tyres are Tubeless.

Tyre inflation pressures should be checked when cold. The increase in pressure when driving may be as much as **0.2** to **0.3 bar.**

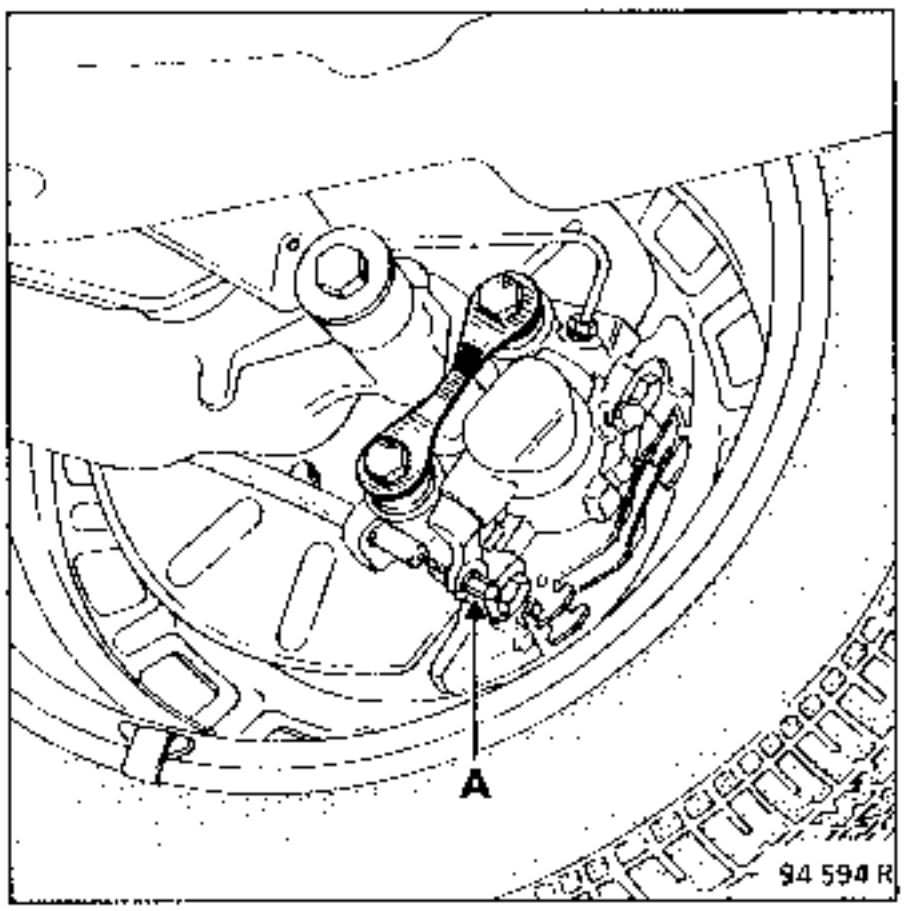
If tyre pressures must be checked when warm, take this increase in pressure into account and **never deflate the tyres**

* This vehicle is fitted with wheels to which snow chains may not be fitted.
If you wish to use chains, fit 5J14 wheels and 165/65-14M + S tyres.

Handbrake control

DISC BRAKES

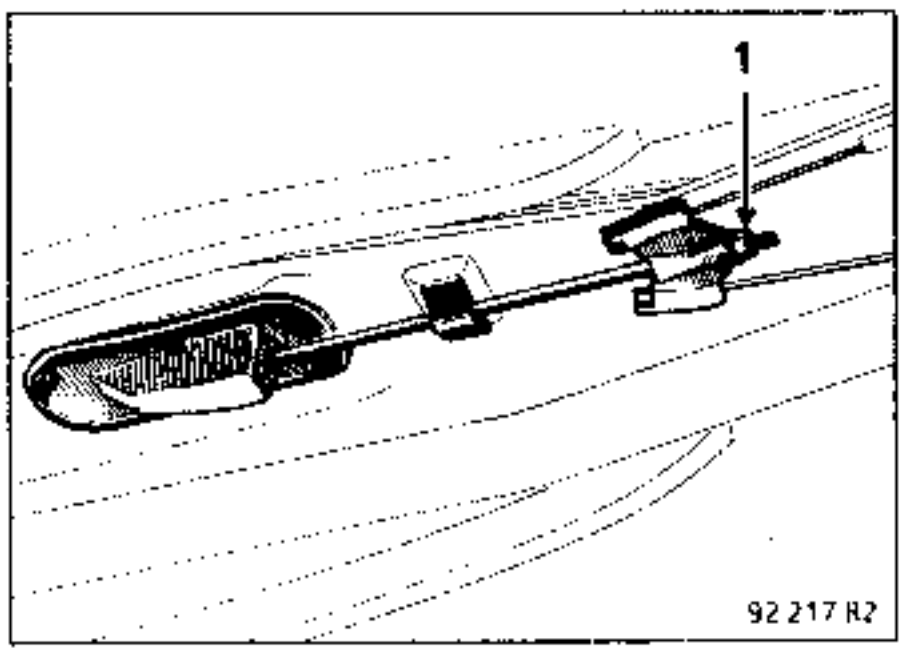
Ensure:
- the cables slide freely,
- the handbrake levers move correctly and return back towards the rear of the vehicle against the stop.



Slowly tighten the cables at the central adjustor, to bring stop (A) into contact with the actuating lever.

Adjust the setting so the levers start to move between the 1st and 2nd notch of the handbrake lever travel and remain activated from the 2nd notch.

Tighten the locking nut (1).



Braking compensator

CHECKING PRINCIPLE

These vehicles are fitted with load sensitive braking compensators. The pressure is read in an X pattern by comparing the pressure for the rear wheels with the pressure for the front wheels.

These dual compensators have two pistons which are totally separate and which act in an X pattern on one front wheel and one rear wheel.

Both circuits must be checked.

I : **front right / rear left**

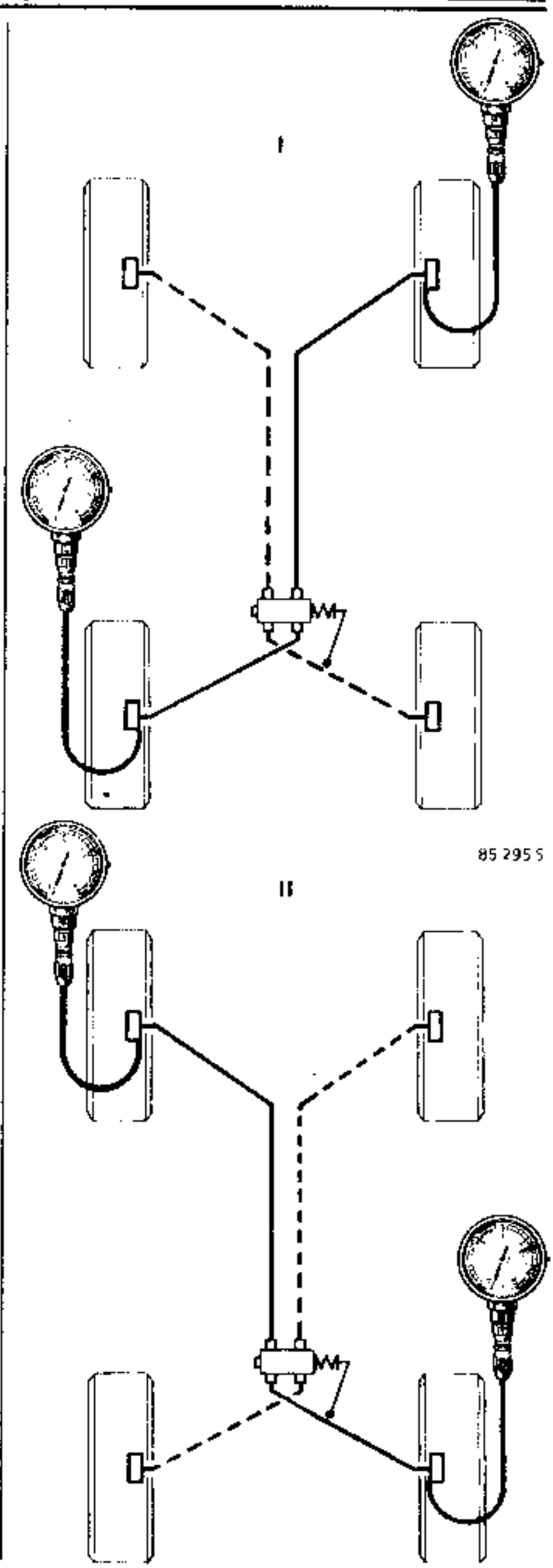
II : **front left / rear right**

Load sensitive compensator

On load sensitive compensators adjustment allows the rear pressure to be adjusted depending on the front pressure.

The adjustment is applied simultaneously to both pistons of the compensator.

If an incorrect pressure is noted for one of the two pistons, replace the compensator.



Braking compensator

Checks and adjustments should be carried out with the vehicle unladen, the fuel tank full and the driver on board.

Vehicle type	Fuel tank	Checking pressure (Bar)	
		Front	Rear
C57M	 Full	100	42 $^{+0}_{-8}$

Braking compensator

The braking compensator should be tested and adjusted with the vehicle on the ground and one person on board

SPECIAL TOOLING REQUIRED	
Fre. 1085 or Fre. 244-03 with union 284-06	Test pressure gauge for brake pressure limiter

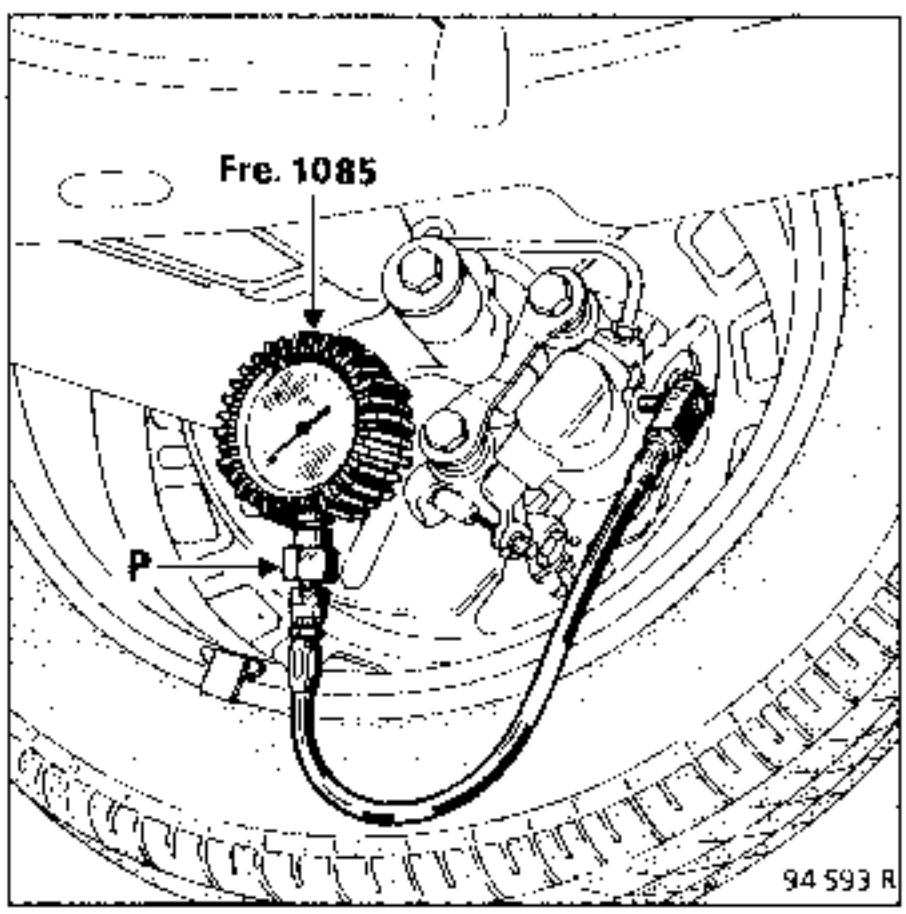
As the compensator has two separate pistons, they must be checked one after the other.

CHECKING

Connect two pressure gauges **Fre. 1085** :

- one at the front left hand side,
- one at the rear right hand side.

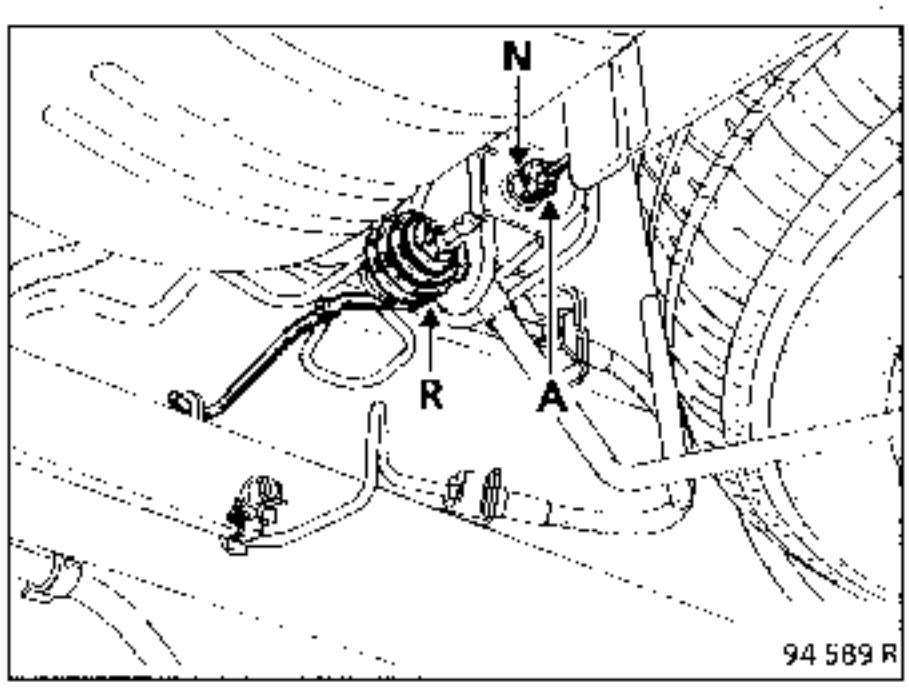
Bleed the braking circuit (the pressure gauge is bled via screw (P)



Press the brake pedal progressively until the checking pressure is obtained at the front wheels (see table of values). Read off the corresponding value for the rear wheels; correct it if necessary.

Carry out the same procedure for the other circuit.
If there is a significant difference (values outside of tolerance limits), replace the compensator since it cannot be repaired.

ADJUSTMENT



Loosen nut (A) and move the adjustor (N) to tighten or slacken spring (R) to obtain the correct value.

REPLACEMENT

The Parts Department supplies compensators pre-adjusted via a spacer.

Ensure the vehicle fulfils the test conditions.

Fit the new compensator.

Loosen nut (A)

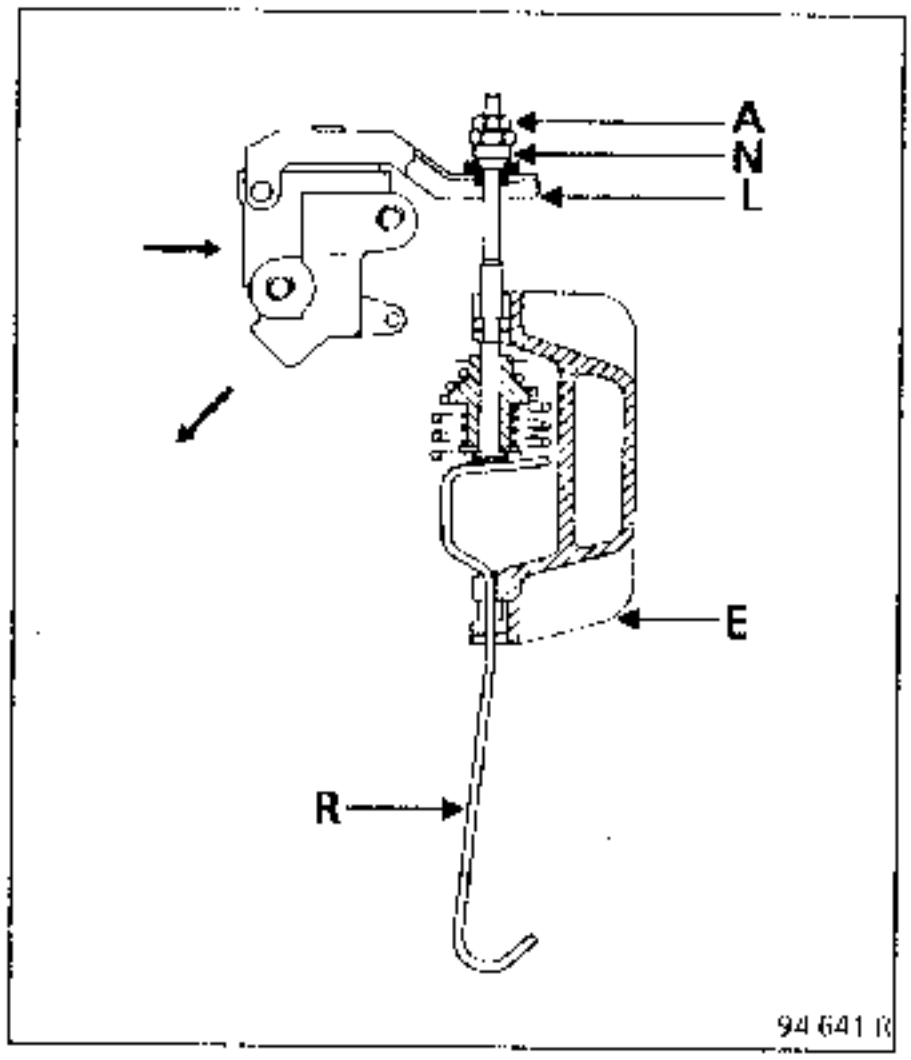
Attach the spring link (R) to the suspension.

Press lever (L) and screw the adjustor (N) until it touches the lever.

Tighten the lock nut (A).

Remove the spacer (E)

Bleed and check the circuit (see Checking and Adjustment)



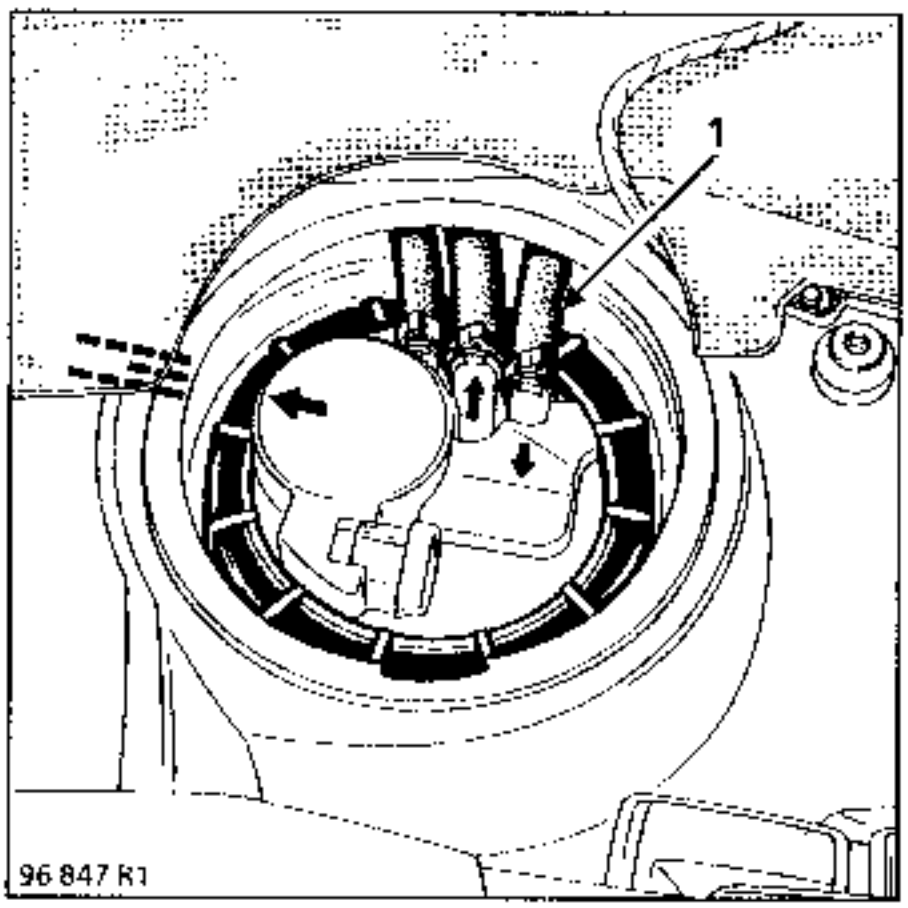
INSTRUMENT PANEL
Fuel gauge

IMPORTANT

The following precautions must be observed when working on the fuel gauge :
- do not smoke
- keep all naked flames or heat sources away from the working area.

REMOVING THE PUMP - GAUGE ASSEMBLY

The pump - gauge assembly may be removed through the opening under the rear bench seat.



Disconnect the battery.

Fold the rear bench seat down against the front seats.

Remove the plastic fuel gauge cover.

Disconnect the electrical connector(1).

Disconnect:
- the fuel supply pipe (2)
- the fuel return pipe (3)
- the gauge breather (4) ; it is connected to the fuel tank.

ATTENTION

When the pipes are removed, residual pressure may cause fuel to be emitted. Ensure the surrounding area is protected.

Remove the connector and pipes on the gauge side.

Remove the mounting nut for the pump - gauge assembly using tool **Mot. 1264**

Remove the pump - gauge assembly.

REFITTING THE PUMP - GAUGE ASSEMBLY

Special notes

Check the seal has not been damaged and replace it if necessary.

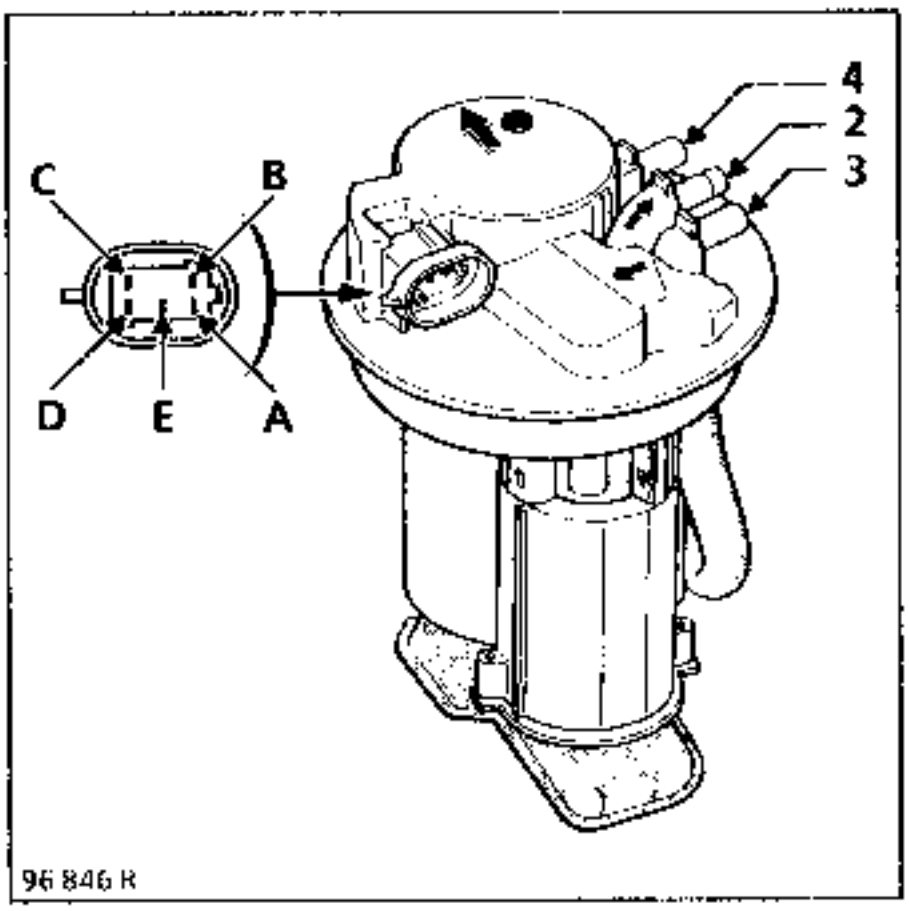
Replace the seal on the fuel tank before refitting the assembly.

Refit the pump - gauge assembly into the fuel tank aligning it so the arrow (5) is between the two marks on the fuel tank.

Torque tighten the mounting nut for the pump - gauge assembly to **5 daN.m** using tool **Mot. 1264** while holding the gauge,to avoid it turning in relation to the reference marks.

Reconnect the battery.

CONNECTIONS



Track	Allocation
A1	Earth
A2	Warning light
B1	Information
C1	+ pump
C2	– pump

CHECKING

Display	Value between terminals A1 and B1 (in Ω)	Height H (in mm)
4/4	7 max	3
3/4	51 ± 7	35
1/2	100 ± 10	62
1/4	159 ± 16	91
Mini gauge value	300 ± 20	122

Ensure the resistance value corresponds to the amount of fuel remaining in the tank.

To do this:
- with the pump - gauge assembly in place, measure the resistance between terminals A1 and B1 on connector (1).
- remove the pump - gauge assembly and seal
- measure the height (H) between the sealing surface and the surface of the fuel remaining in the tank.