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## TECHNICAL NOTE 3426A

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### JE0 K - JE0 S

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Basic manual: Workshop Repair Manual 315

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# SPECIAL FEATURES OF THE ESPACE FITTED WITH THE G9T ENGINE

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77 11 297 642

JUNE 2000

EDITION ANGLAISE

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"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

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# VALUES AND SETTINGS

## Tightening the cylinder head

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07

### METHOD FOR TIGHTENING THE CYLINDER HEAD

**You must remove the engine and transmission assembly to remove the cylinder head**

Consult manual **Mot. G9** for the details of this operation.

# ENGINE AND PERIPHERALS Identification

10

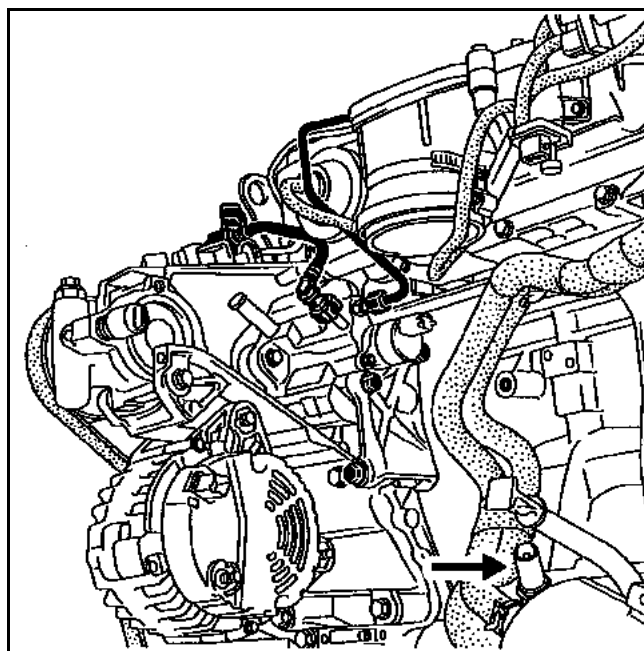
Vehicle type	Engine	Gearbox	Capacity (cm <sup>3</sup> )	Bore (mm)	Stroke (mm)	Compression ratio
JE0 K JE0 S	G9T	PK1	2188	87	92	18/1

Manual to consult: **Mot. G9**

<b>SPECIAL TOOLING REQUIRED</b>	
<b>Mot. 836-05</b>	<b>Boxed kit for measuring oil pressure</b>
<b>ESSENTIAL SPECIAL TOOLING</b>	
<b>22 mm long socket</b>	

### CHECKING

The oil pressure should be checked when the engine is warm (approximately 80°C).



### USE

Connect the pressure gauge in place of the oil pressure switch.

#### Oil pressure

1 000 rpm	<b>1.2 bar</b>
3 000 rpm	<b>3.5 bars</b>

SPECIAL TOOLING REQUIRED	
Mot. 1390	Universal mounting
Mot. 1410	Tool for unlocking the snap couplings in the refrigerant circuit
Dir. 1282 -01	Spanner for undoing the steering rack union
Dir. 1282 -02	Spanner for undoing the steering rack union

ESSENTIAL SPECIAL TOOLING
Two-post lift Safety pad or belts

TIGHTENING TORQUES (in daN.m)	
Shock absorber base mounting bolts Ø M16 x 200	20
Driveshaft gaiter mounting bolt	2.5
Wheel bolts	10
Engine tie-bar bolts	10
Suspended mounting bolt to gearbox	5.5 to 6.5
Rubber suspended mounting nut to the front left side member	5.5 to 8
Mounting bolt for front right suspended mounting cover to engine	6.2
Mounting bolt for the movement limiter of the upper front right hand suspended engine mounting	10.5
Mounting nut for the rubber pad on the front right suspended engine mounting cover	3 to 4.5

Parts to order: high pressure circuit plugs kit  
Part No.: 77 01 206 381.

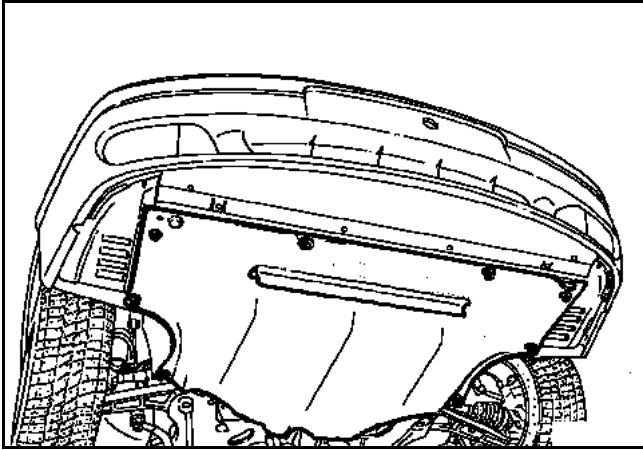
Place the vehicle on a two-post lift (fit the safety belts).

Disconnect and remove the battery.

Drain the refrigerant circuit (if fitted) using the filling station.

Remove:

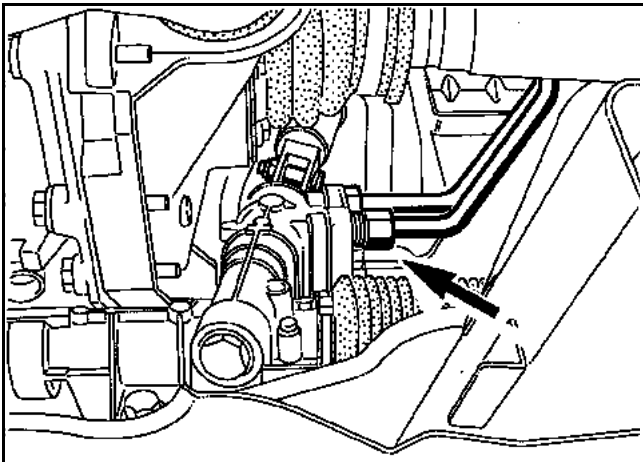
- the engine undertray,
- the front wheels,
- the front right and left undertrays at the end of the wheel arches,
- the wheel arch protectors,
- the front bumper,
- the side driveshafts (see **section 29 of Workshop Repair Manual 315 "Remove and refit side driveshafts"**).



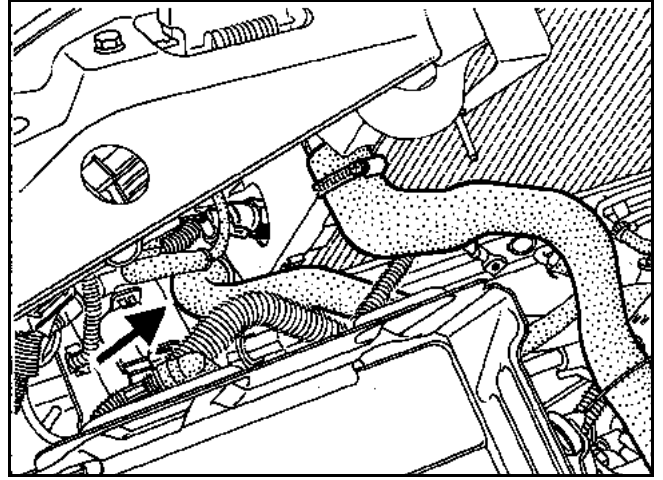
Open the degassing tank.

Drain the power assisted steering circuit:

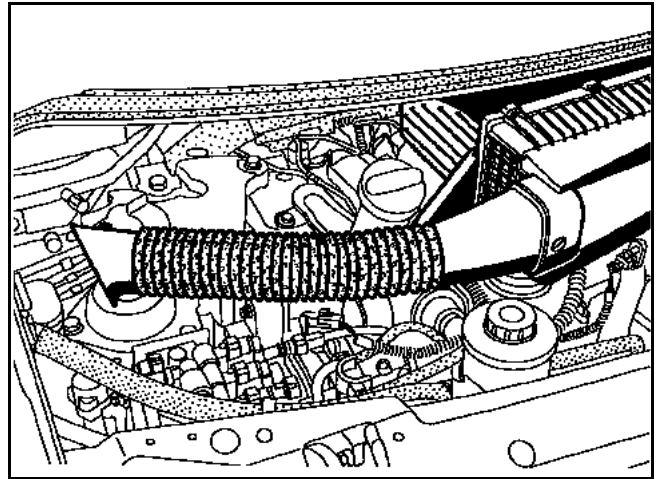
- by the low pressure hoses on the cooler,
- by disconnecting the power assisted steering high pressure pipe (lower pipe) from the steering rack (tool **Dir. 1282-01**). **Take care to prevent escape.**



Drain the cooling circuit through the lower radiator hose.



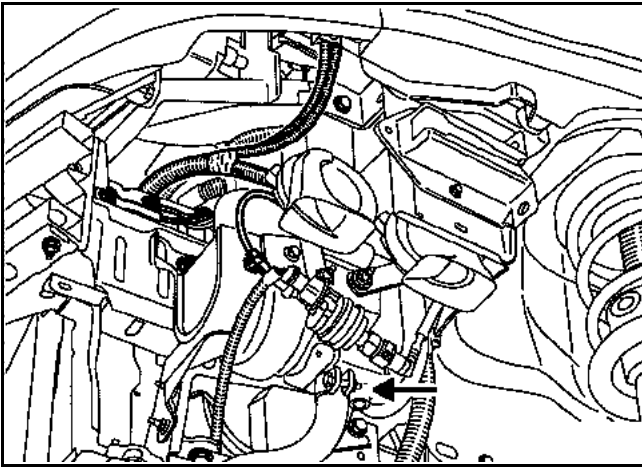
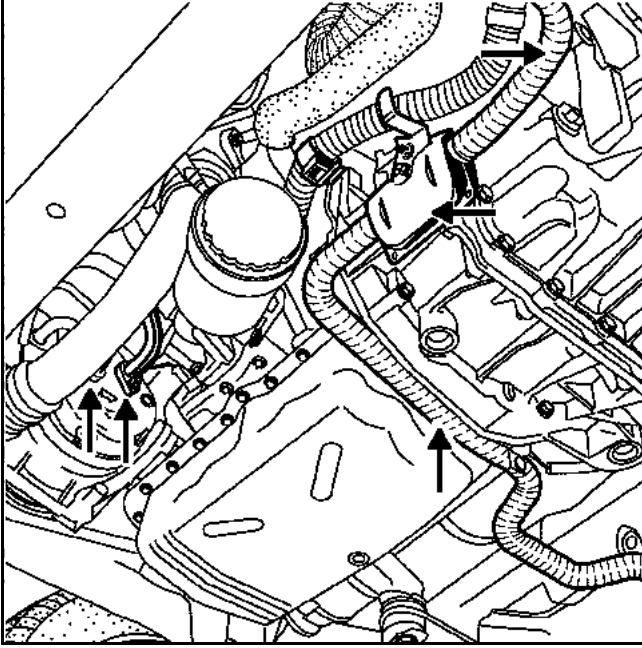
Remove the air filter unit.



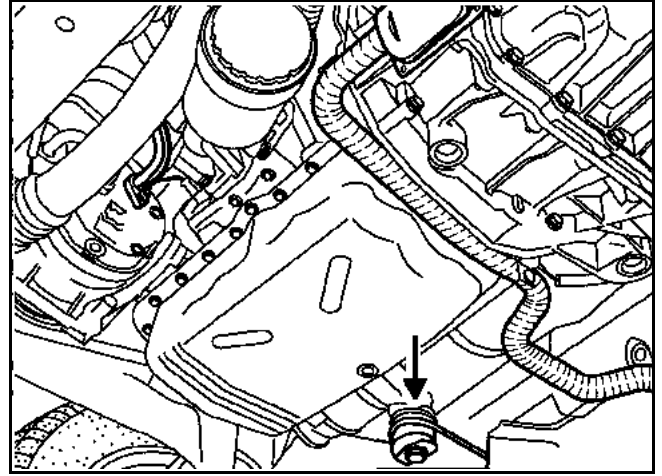


Disconnect the air conditioning compressor pipe connections.

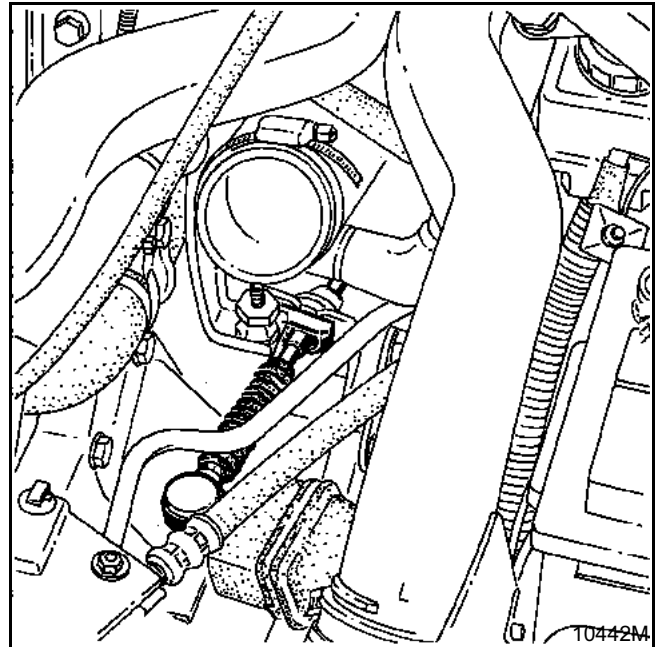
Remove the complete heater exhaust line (if fitted).

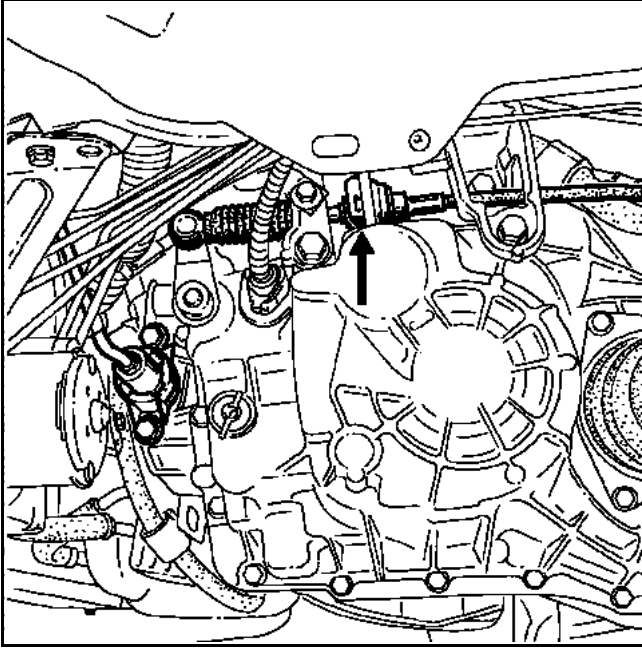


Remove:  
– the exhaust pre catalytic converter,  
– the engine tie-bar.



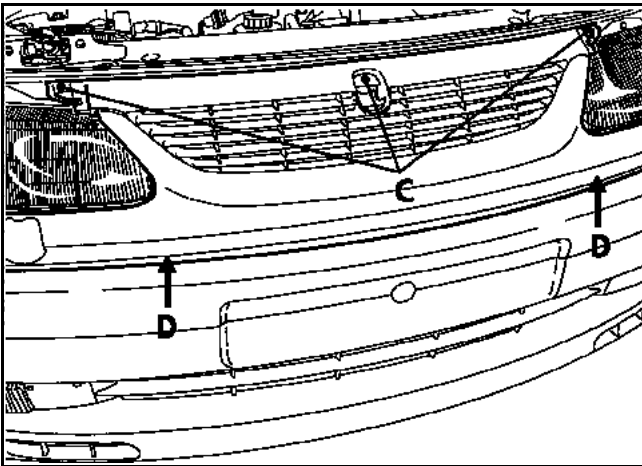
Disconnect the olives on the gearbox control cable.





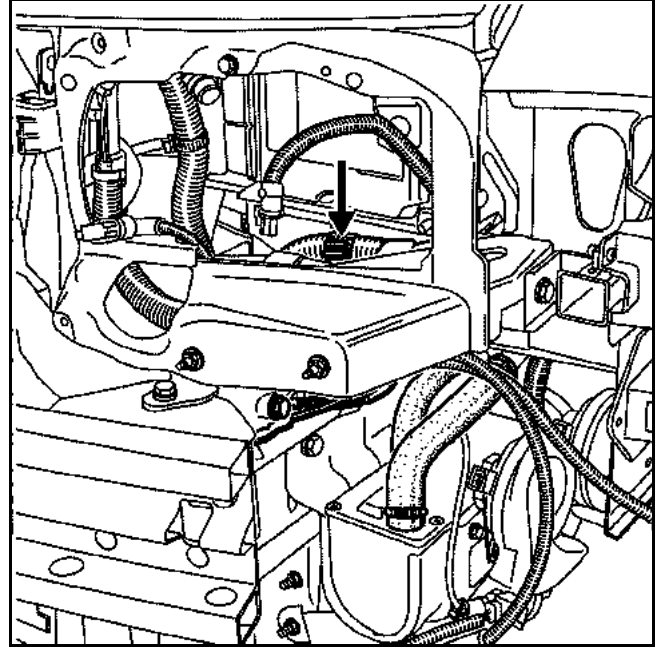
Remove:

- the radiator grille rack,
- the radiator grille (bolts (C) and (D)),



- the left hand headlight.

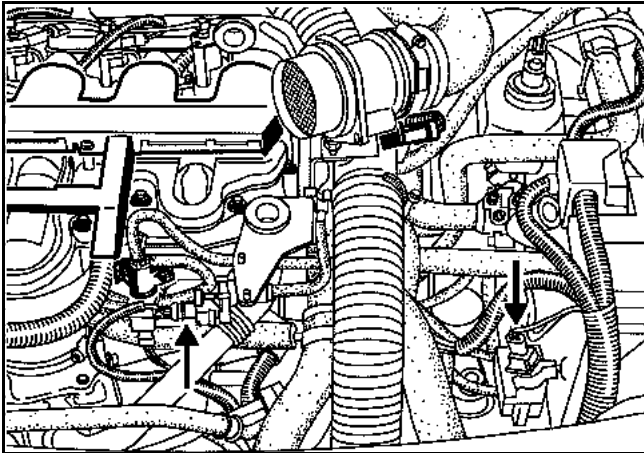
Separate the electrical wiring from its clip beneath the computer.



Disconnect the lead from the engine compartment connection unit; be sure to mark the location of the various connections correctly.

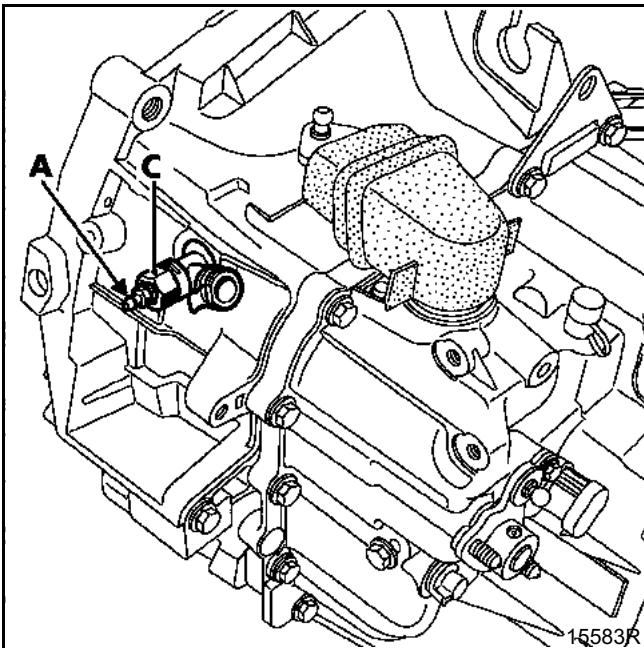
Separate:

- a connector from the battery tray,
- the control solenoid valve from the turbocharger regulation valve.



Fit hose pliers on the clutch master cylinder supply pipe (on the brake fluid tank side).

Open the clutch slave cylinder bleed screw (**WARNING: you must use a counter-spanner at (C) to compensate the effort of loosening/retightening the bleed screw (A); see Technical Note 3345A).**



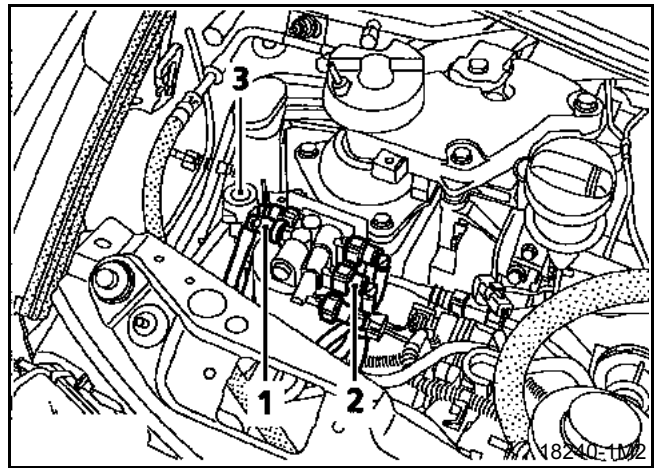
Disconnect:

**Left side:**

- the clutch slave cylinder high pressure union and release the pipe from its clips,
- the water hoses connecting the engine to the tank and the heater matrix element.

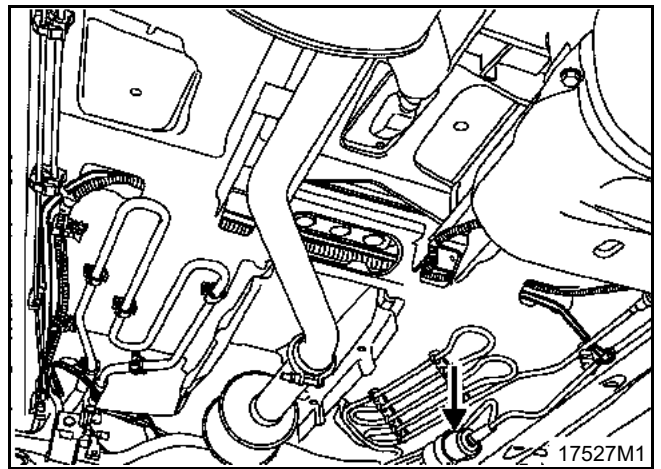
**Right side:**

- the diesel supply (1) and return (2) element from the injection pump to the filter. It is essential that you plug the openings with the appropriate plugs from kit **Part No.: 77 01 206 381,**
- the inertia switch connector (3),
- the air conditioning circuit low pressure pipe on the mounting bracket on the throttle body.

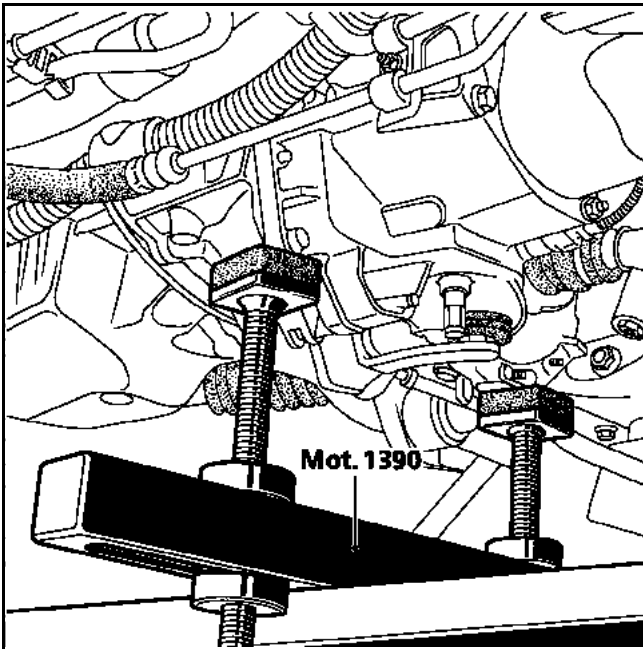
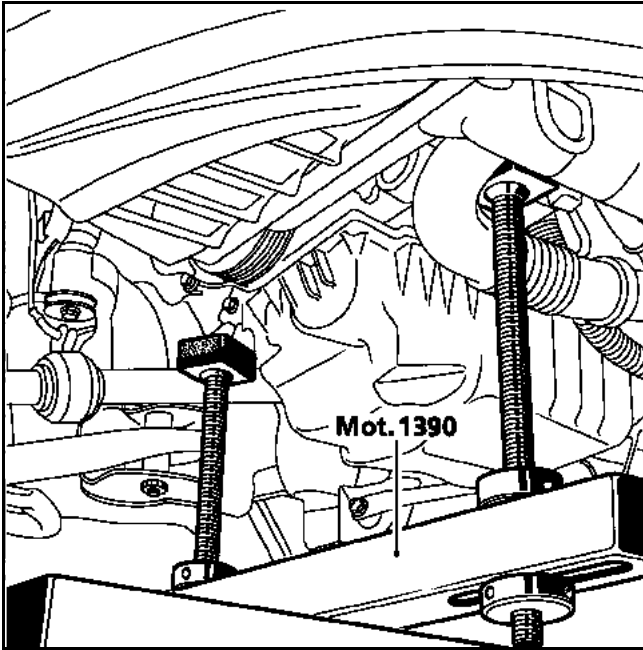


**Under the vehicle:**

- the booster pump connector; refit the electric wiring harness to the engine.

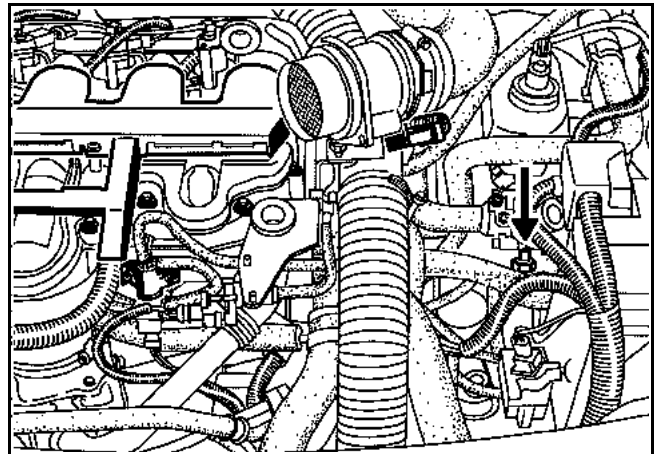
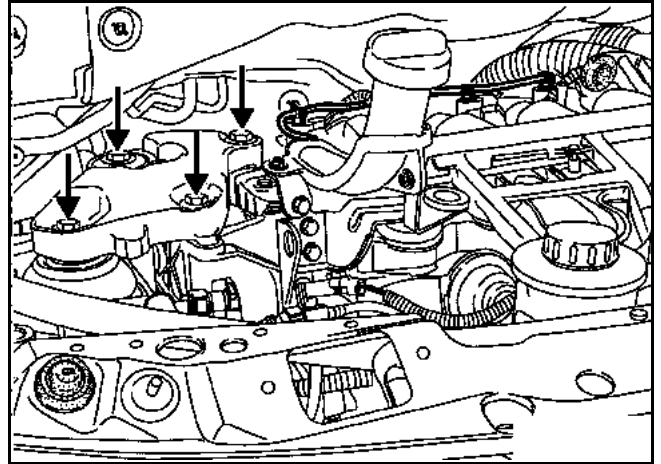


Prepare the universal mounting tool **Mot. 1390** and position it beneath the engine and transmission assembly (two people).



Remove:

- the right-hand suspended mounting cover,
- the travel limiter linkage located just behind this cover,
- the left-hand suspension axis mounting nut.



Gently raise the vehicle in relation to the engine (two-person operation).

**IMPORTANT:** when lifting, hold on to the gearbox control cables to prevent them from becoming trapped and being damaged.

### REFITTING - Special points

Pre-position the gearbox control cables.

Position the engine/gearbox assembly in its compartment. Check the rear of the gearbox in relation to the sub-frame.

Fitting suspended mountings: see section 19 "**Suspended mountings**".

Tighten all the bolts, nuts and studs to the recommended torques.

Refitting is the reverse of removal.



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

Reprogram all the components deprogrammed by disconnecting the battery.

Fill the refrigerant circuit using the filling station (see **section 62 "Air conditioning"**).

Refrigerant fluid **R134a**: **800 ± 20 g**.

Carry out:

- filling and bleeding of the cooling circuit (see **section 19**),
- filling and bleeding of the power assisted steering circuit,

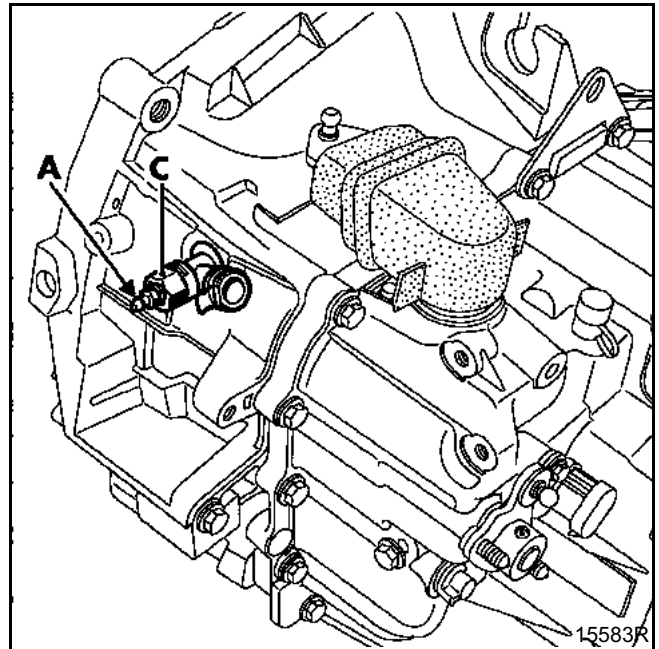
- bleed the hydraulic clutch circuit.

**IT IS ESSENTIAL THAT YOU FOLLOW THE BLEEDING METHOD GIVEN BELOW**

#### **VERY IMPORTANT:**

When bleeding use a **19 mm** ring spanner to immobilise the rotating union (C) while tightening and loosening the bleed screw (A) so as not to damage the slave cylinder and the union.

Damage to the union leads to replacement of the master cylinder, and thus removal/refitting of the gearbox.



### BLEEDING METHOD TO BE USED:

(for two people).

#### 1) Filling the circuit:

Check that the clutch pedal is in the top position; put it in this position and hold it by hand if necessary. Fill the hydraulic circuit by connecting a filling system and applying pressure to the tank, open the bleed screw (A) (always compensate for the force using a counter-spanner) and allow a little fluid to escape (approximately 0.5 l) through a transparent tube connected to the bleed screw. Close the bleed screw.

#### 2) Final bleeding of the circuit:

One operator **slowly** disengages fully and keeps the pedal depressed. Wait approximately ten seconds in this situation. With the pedal still depressed, a second operator opens the bleed screw briefly (A).

With the bleed screw closed again, the operator inside the vehicle releases the clutch pedal and slowly lifts it to top position by hand (*It is normal that the pedal does not return independently in this configuration*).

After a few seconds repeat the operations described above in 2) as often as required until no more bubbles escape when bleeding. Then repeat these operations five times to ensure that the system has been bled correctly.

These repeated bleedings allow the slave cylinder to eject all the air trapped in any section between the stop and the bleed screw and which has not been "cleaned" by the flow of liquid when refilling using the traditional pressurisation system.

An air bubble in the circuit, no matter how small, may lead to operating faults such as: incorrect pedal return, crashing of the gears,..., which may lead to incorrect fault finding and unnecessary replacement of a component in the clutch circuit.

# TOP AND FRONT OF ENGINE

## Accessories belt

TIGHTENING TORQUES (in daN.m)	
Wheel bolts	10

### REMOVAL

Put the vehicle on a two post lift.

Disconnect the battery.

Remove:

- the front right wheel,
- the front right wheel arch,
- the lower engine cover.

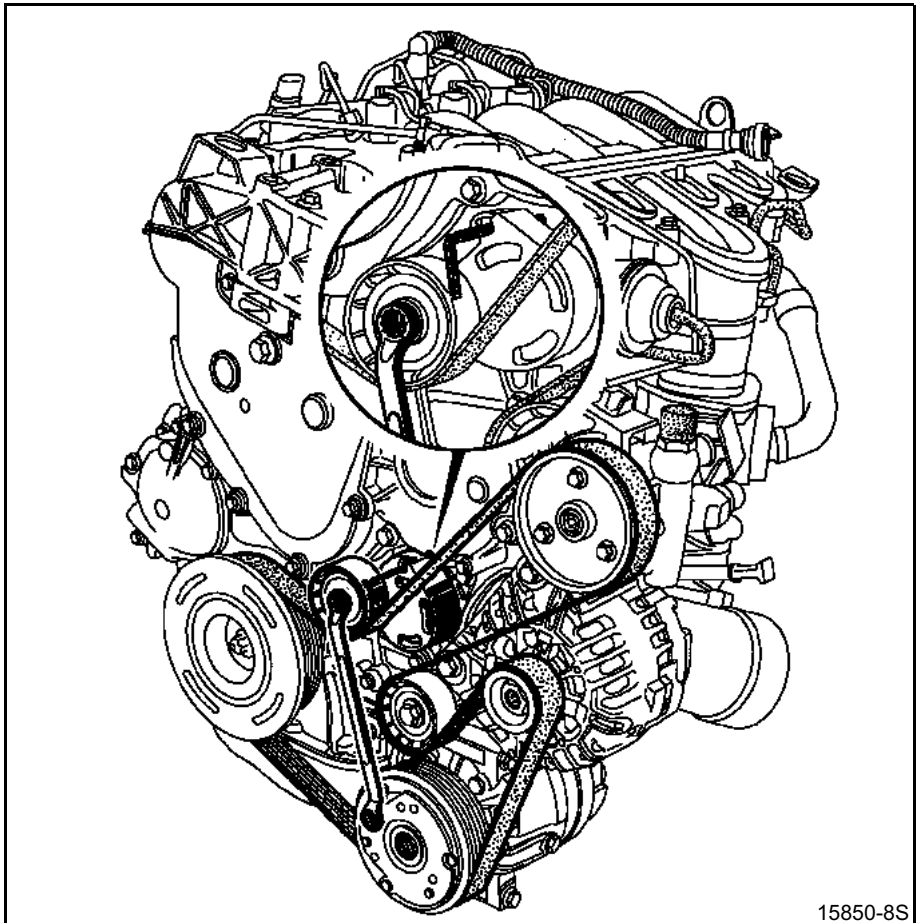
Using a ring spanner, turn the tensioner axle clockwise to release the belt and insert a tool (e.g.: Allen key) to lock the tensioner in this position.

### REFITTING

Replace the accessories belt.

**NOTE: never refit a belt once it has been removed, but replace it.**

Refitting is the reverse of removal.




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# TOP AND FRONT OF ENGINE

## Timing belt

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SPECIAL TOOLING REQUIRED	
Mot. 1390	Engine and transmission assembly mounting tool
Mot. 1536	TDC setting pin
Mot. 1534	Inlet camshaft timing/locking tool
Mot. 1537	Exhaust camshaft timing/locking tool

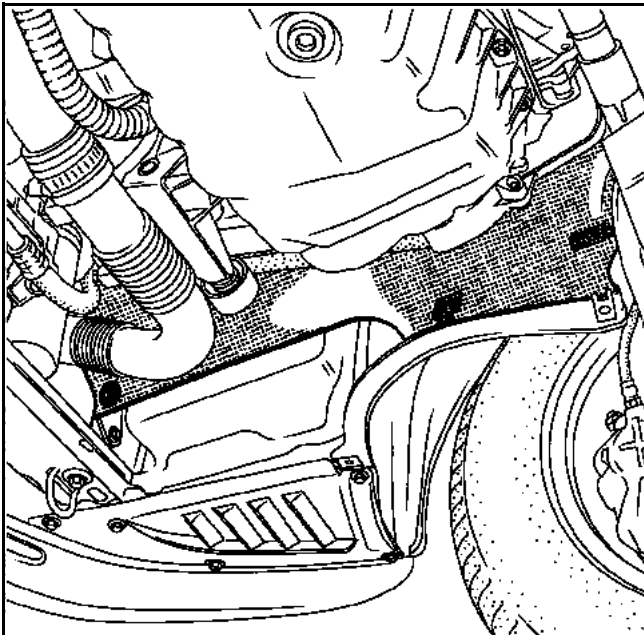
TIGHTENING TORQUES (in daN.m)	
Tensioner nut	2.6
Fixed roller nut	3.3
Timing cover bolt	1
Suspended mounting limiter bolt	10.5
Suspended mounting cover bolt	6.2
Wheel bolts	10

### REMOVAL

Disconnect the battery.

If necessary, place the vehicle on a two-post lift.

Remove the right-hand side member soundproofing.

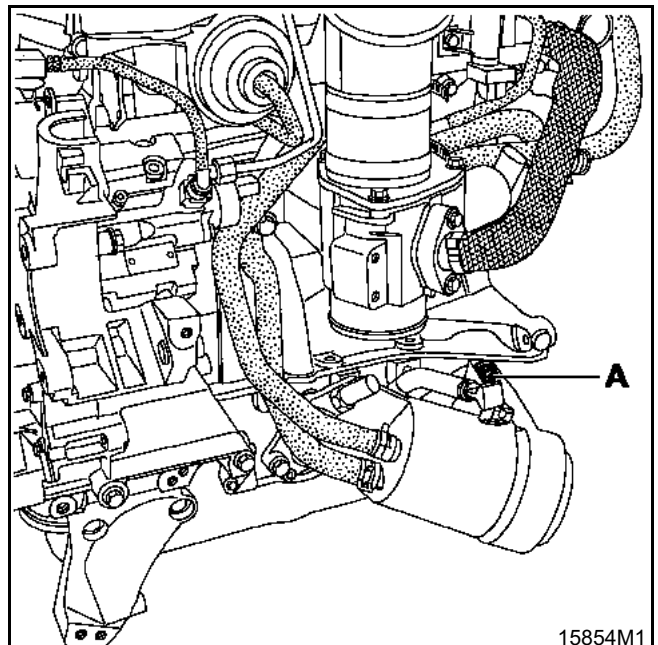
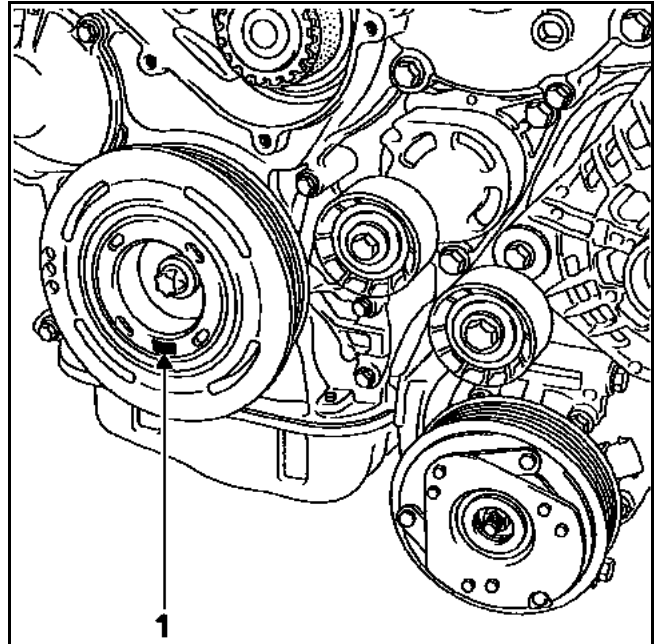


Remove the travel limiter linkage.

Turn the steering to full right-hand lock.

Remove the front right wheel arch cover.

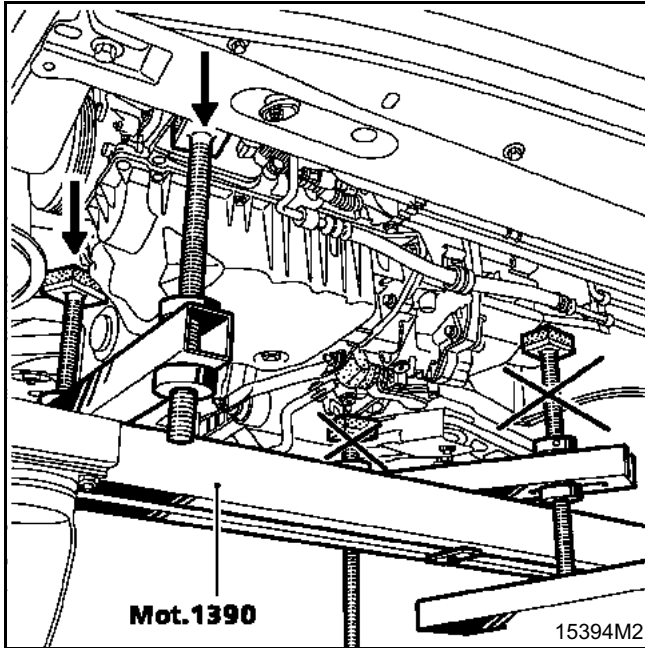
Adjust the engine cylinder n° 1 to top dead centre (marking (1) on the crankshaft pulley) and pin the crankshaft after removing the cap (A).



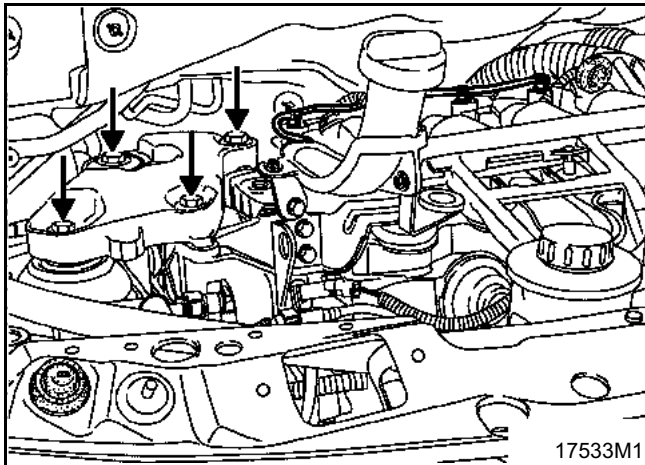
15854M1



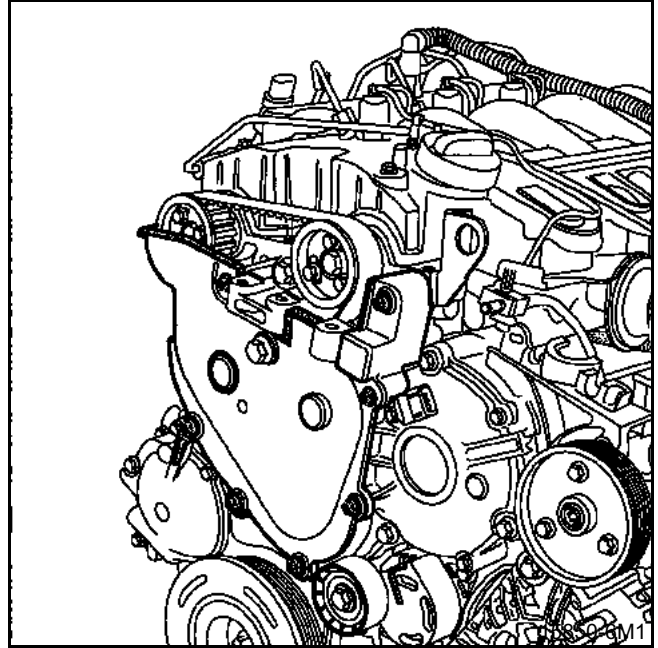
Insert the mounting tool **Mot. 1390** under the engine and transmission assembly, positioning the right-hand pads only underneath the engine. Lower the two unused left-hand pads.



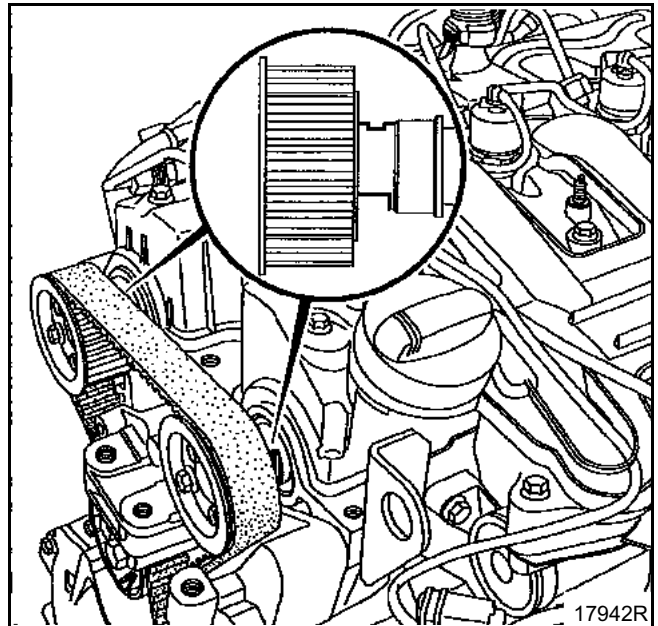
Remove the right-hand suspended engine mounting cover.



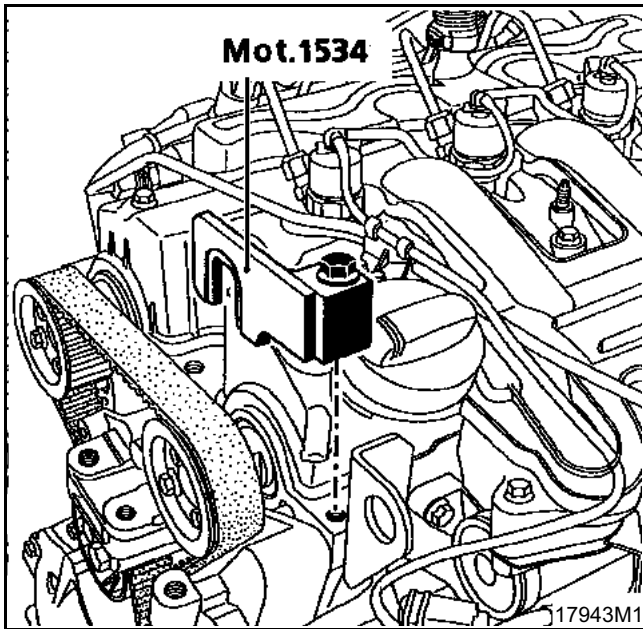
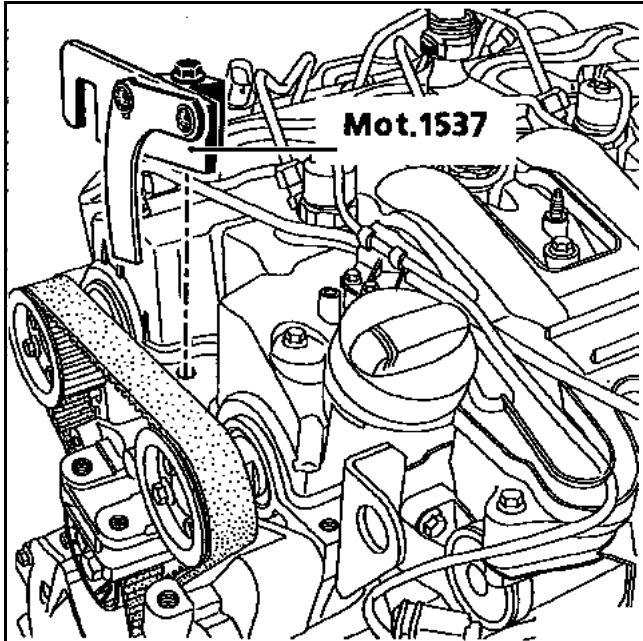
Remove the timing belt cover and the lower plastic cover.



Check the position of the camshaft grooves as shown below.



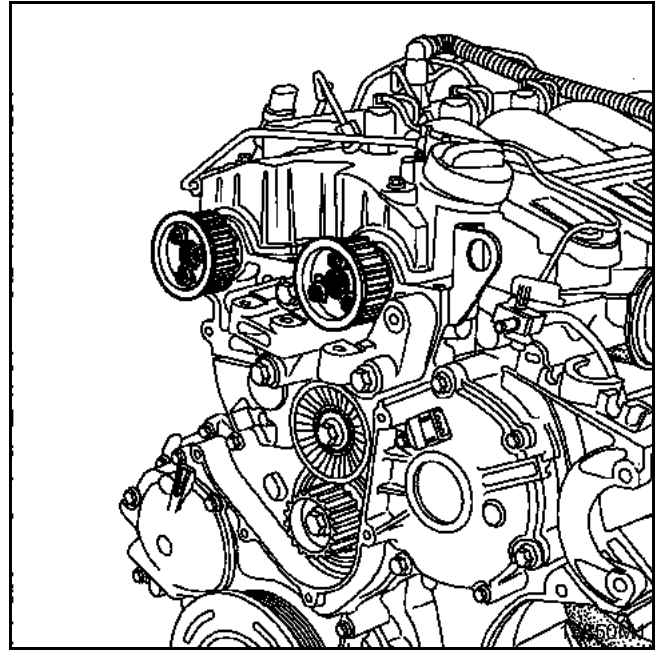
Fit the camshaft locking tools and tighten them carefully to the cylinder head.



Release the tension in the timing belt by undoing the timing tension wheel bolt.

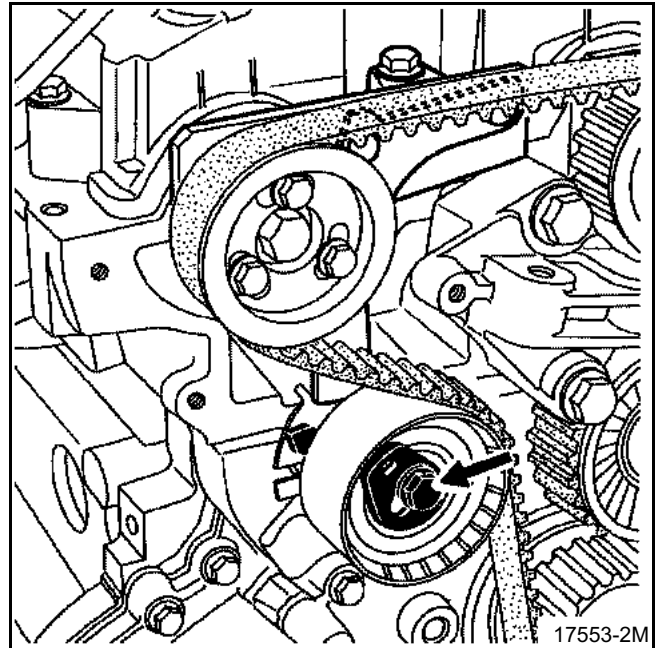
Remove:

- the exhaust camshaft sprocket by undoing the three mounting bolts on the sprocket on the hub),
- the timing belt.

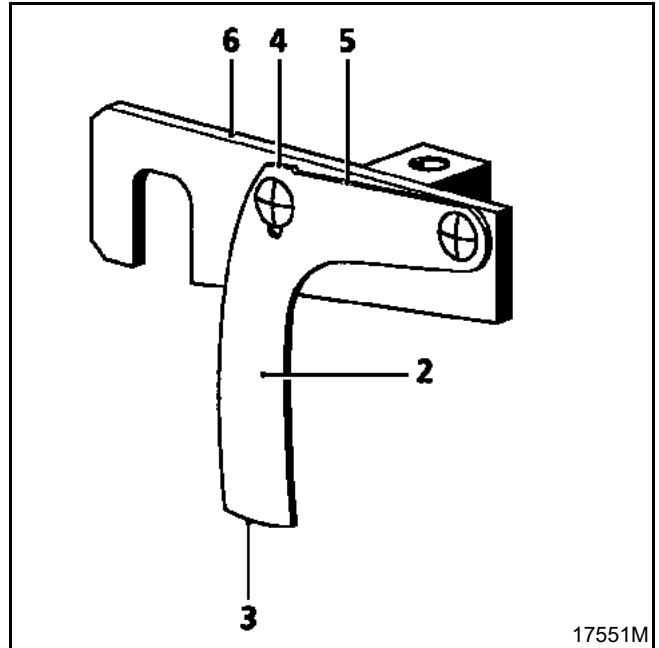
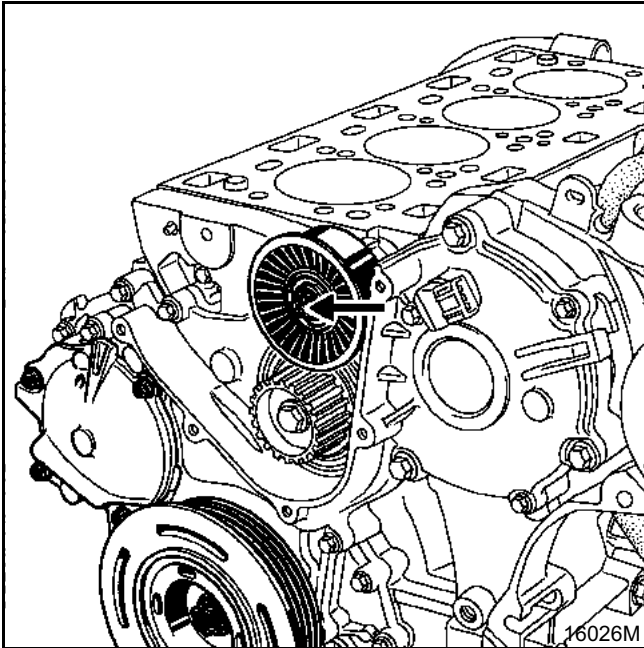


Remove tool **Mot. 1537**.

Remove the gear tensioner.



- the pulley; remove the nut and take the pulley out without removing the stud.



Adjust the position of the tension wheel (by pivoting the tension wheel eccentric anticlockwise) plus approximately  $5^\circ$  by aligning sections (5) and (6).

## REFITTING

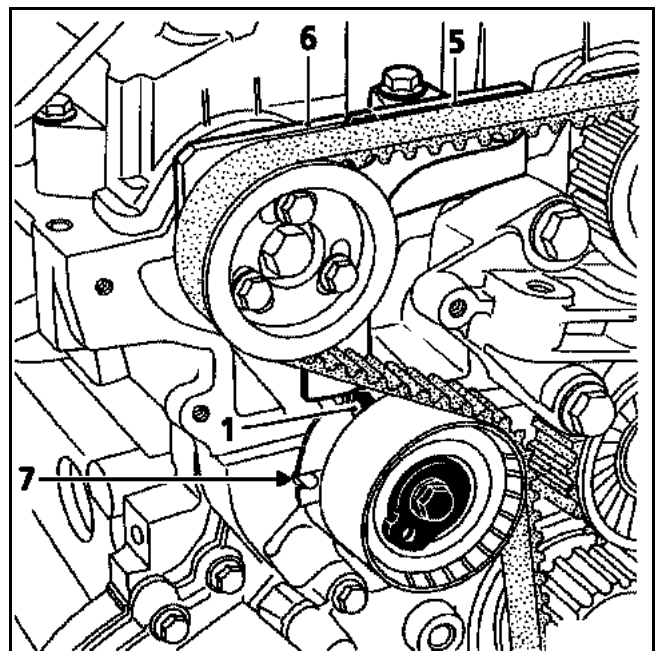
Fit:

- the pulley,
- the automatic tension wheel without tightening it and position the groove (7) of the tension wheel correctly in the pin,
- the three bolts at the centre of the inlet camshaft sprocket holes (this must be free),
- the exhaust camshaft timing tool **Mot. 1537**.

Check that the crankshaft is at top dead centre.

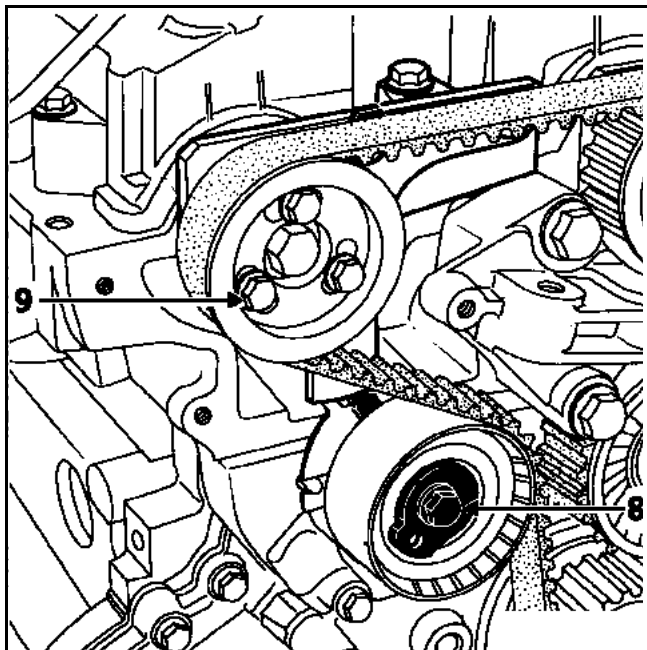
Fit the timing belt at the same time as the exhaust camshaft sprocket, and position the sprocket mounting bolts at the centre of the holes.

Operation of the exhaust camshaft timing/locking tool repeater: mobile mark (1) on the tension wheel pushes the repeater (2) to the lower section (3). The upper section has two edges (4) and (5) which, repeat the position of the tension wheel index by aligning with the edge (6) of the fixed section of the tool.



Tighten:

- the tension wheel bolt (8),
- the camshaft timing sprocket bolts (9) to a torque of **1 daN.m**.



Remove the camshaft timing tools **Mot. 1534** and **Mot. 1537** and the TDC pin **Mot. 1536**.

Rotate the crankshaft through two revolutions in a clockwise direction (timing side).

Pin the crankshaft to top dead centre (the top dead centre mark on the crankshaft accessories pulley must be in the vertical axis of the engine).

Fit the camshaft timing tools **Mot. 1534** and **Mot. 1537**.

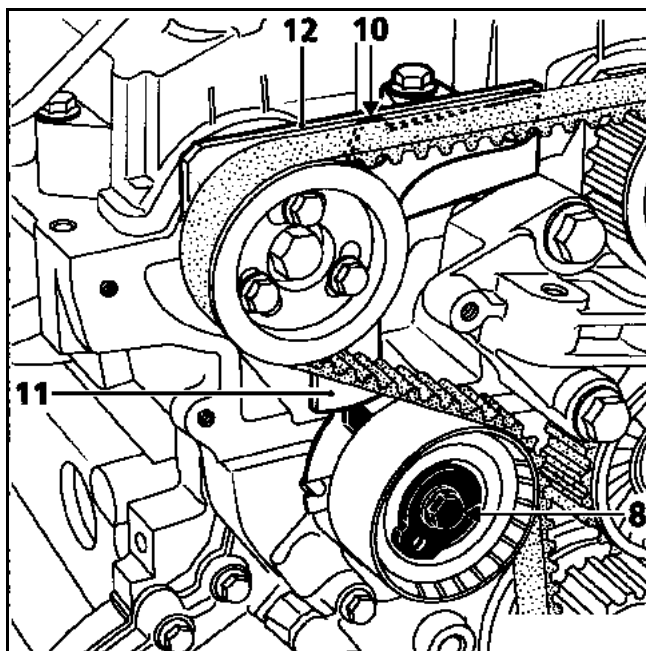
Check that the tab of **Mot. 1537** moves vertically without constraint.

Undo the camshaft timing sprocket bolts by a maximum of one turn.

### Checking the timing and the tension

Undo the tension wheel bolt (8) while holding the eccentric with a **6 mm** Allen key.

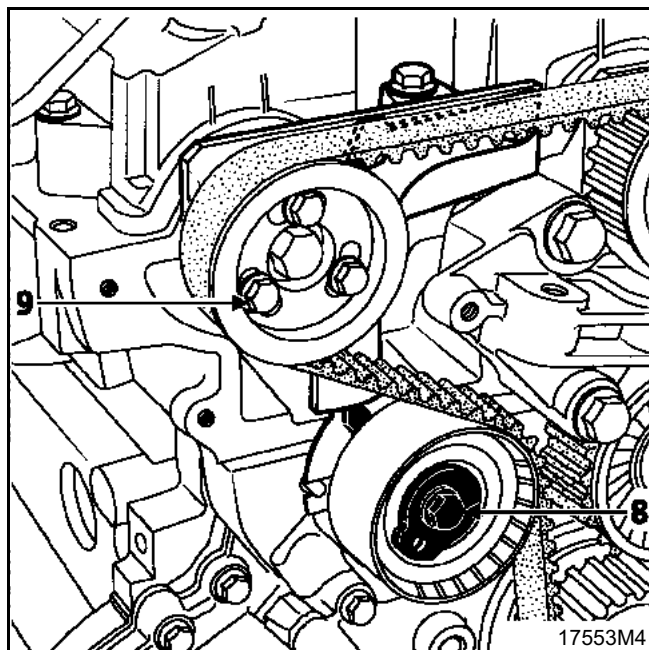
Pivot the tension wheel eccentric **clockwise**, until the **surface (10)** of the tab (11) is aligned with the upper surface (12) of tool 1537.



## Timing belt

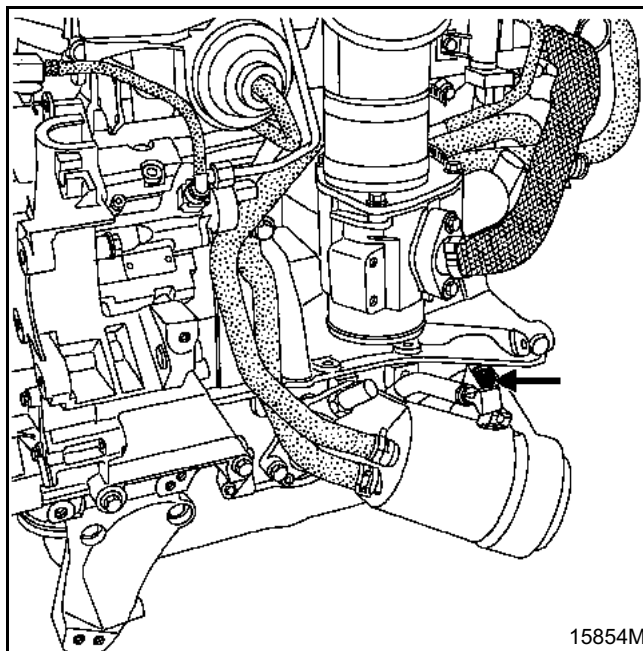
Tighten:

- bolt (8) of the tension wheel to a torque of **2.5 daN.m**,
- the camshaft timing sprocket bolts (9) to a torque of **1 daN.m**.



Remove the camshaft timing tools **Mot. 1534** and **Mot. 1537** and the TDC pin **Mot. 1536**.

Refit the cap in the TDC pin opening applying **RHODORSEAL 5661** to the thread and by tightening to a torque of **2.2 daN.m**.



Refitting is the reverse of removal.

To refit the right-hand suspended mounting, you must consult **section 19 "Suspended mountings"**.

# TOP AND FRONT OF ENGINE


## Cylinder head gasket

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**You must remove the engine and transmission assembly to remove the cylinder head**

Consult manual **Mot. G9** for the details of this operation.

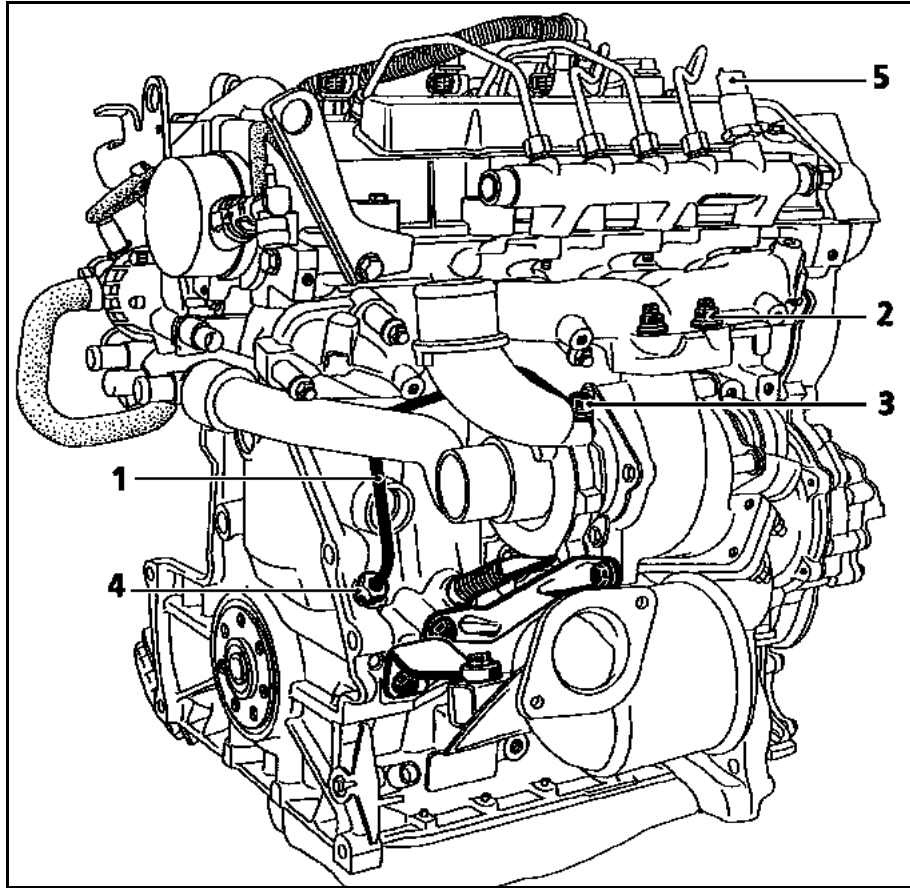
TIGHTENING TORQUES (in daN.m) 	
Turbocharger mounting nuts	2.6
Oil inlet union bolt	2
Oil return union bolt	0.9
Turbo mounting nut on the intermediate exhaust downpipe	2.6

**THE TURBOCHARGING PRESSURE ON THE TURBOCHARGER FITTED ON THE G9T 710 ENGINE IS NOT ADJUSTABLE.**

In operation, the pressure should stabilise at **210 ± 3.5 mbar**.

### REMOVAL

Removal or refitting of the turbocharger requires the removal of the engine and transmission assembly.



**IMPORTANT:** Never attempt to remove the turbocharger with the engine in place; you will not be able to follow the recommendations for refitting the oil supply pipe (1) and the constraints created by blind tightening the connection (3) will lead to the pipe (1) rupturing in service.

Fit:

- the pipe (1) to the turbocharger by tightening the union (3) by hand,
- the turbocharger, by holding the union (4) and tightening it manually. Tighten the turbocharger mountings on the manifold to a torque of **2.7 daN.m**.

Tighten the unions (4), then (3).

**IMPORTANT:** It is essential to change the special seal at the turbocharger oil inlet union (3).

Before running the engine, disconnect the pressure rail sensor connector (5).

Then run the starter motor until the oil pressure warning light goes out (persist for a few seconds).

Reconnect the sensor, preheat and start the engine.

Run the engine at idling speed and check that there are no leaks at the oil connections.

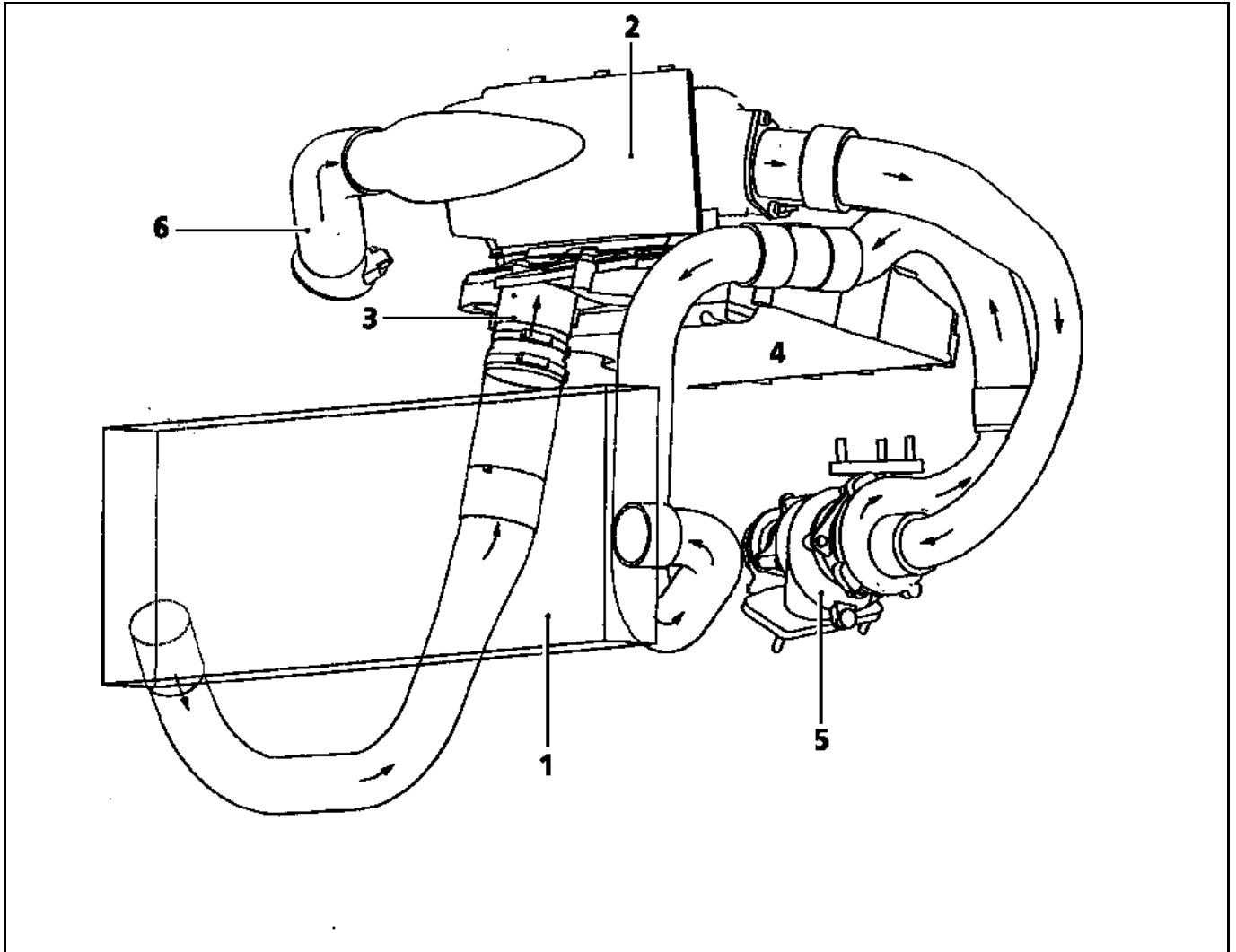
Using the fault finding tool, erase the fault as a result of the sensor being disconnected.

### Special precautions

- Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.
- If there has been a fault in the turbocharger, check that the air-air exchanger is not full of oil. If the air-air exchanger is full of oil, it must be removed, flushed with a cleaning agent and then left to drain properly.
- Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check also that it is perfectly tight. If not, replace it.



AIR INTAKE CIRCUIT DIAGRAM



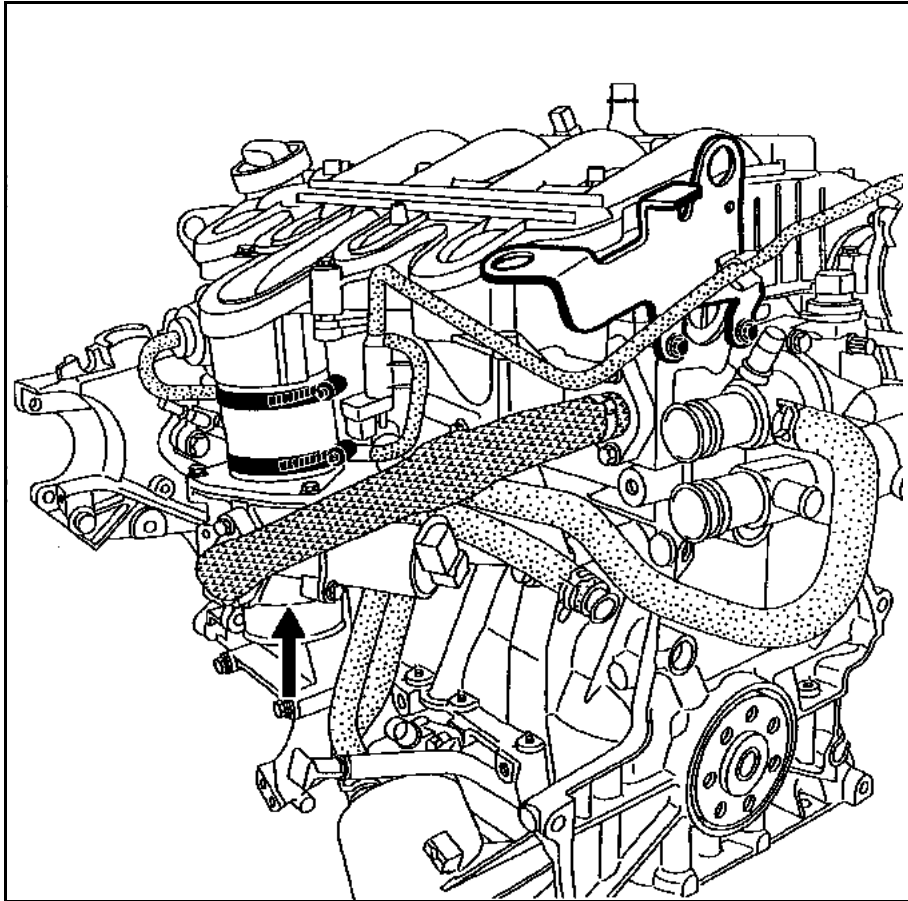
- 1 Air-air exchanger
- 2 Air filter
- 3 Damper unit
- 4 Inlet manifold
- 5 Turbocharger
- 6 Air inlet

TIGHTENING TORQUES (in daN.m)	
Clip nuts	5.5

### DAMPER UNIT

This unit, controlled by the injection computer, comprises a throttle placed in the air inlet flow which closes when the ignition is switched off to ensure that the engine stops cleanly.

It also includes the exhaust gas recirculation solenoid valve.



### REMOVAL

Put the vehicle on a two post lift.

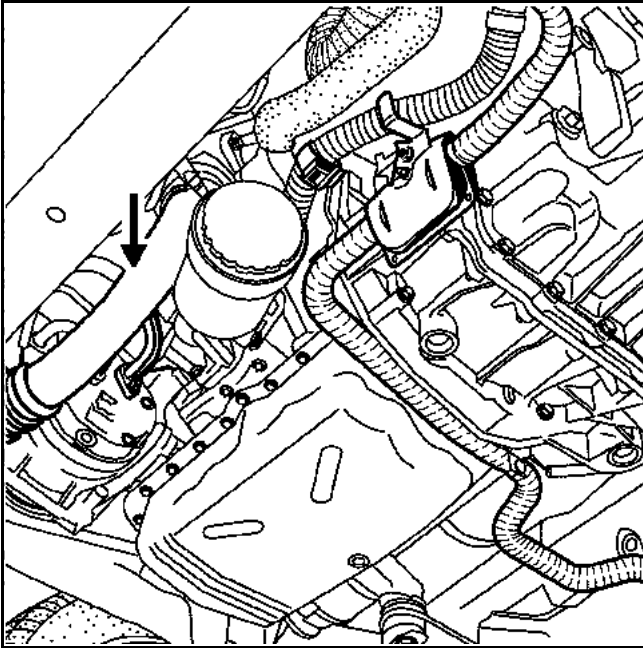
Disconnect the battery.

Remove:

- the lower engine cover,
- the air exchanger/damper unit pipe after disconnecting the electrics.

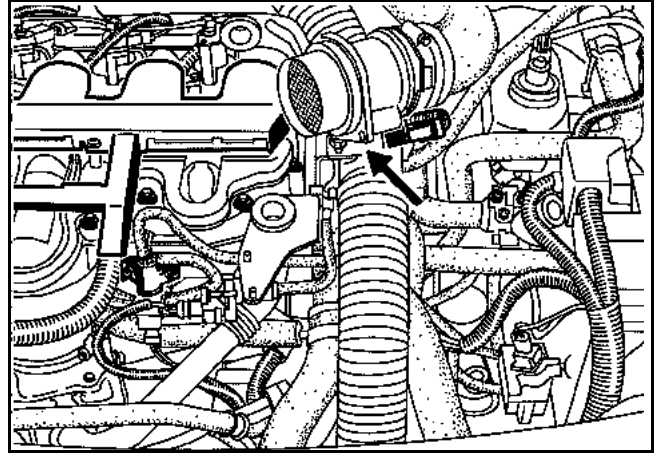
Place hose pliers on the oil tank/power assisted steering pump return pipe and disconnect the pump.

Separate the power steering reservoir without disconnecting the pump and move it on the side member.

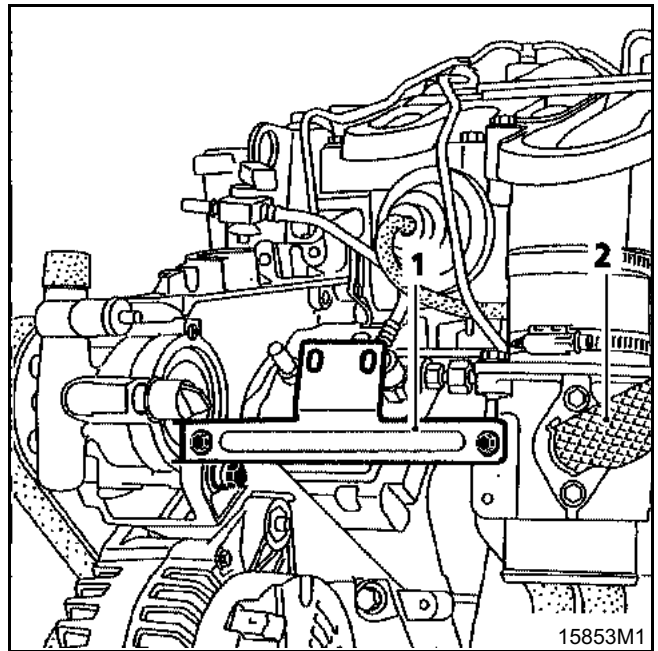


Remove:

- the turbocharger/exchanger air pipe mounting bolts from the cylinder head,



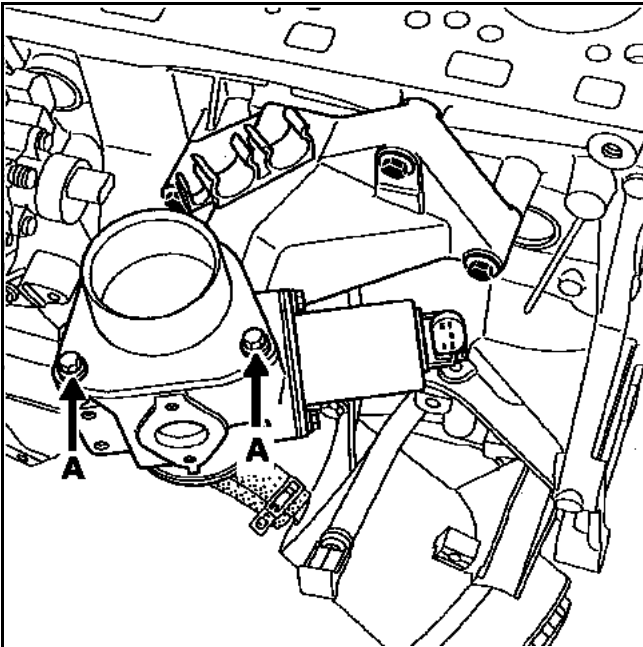
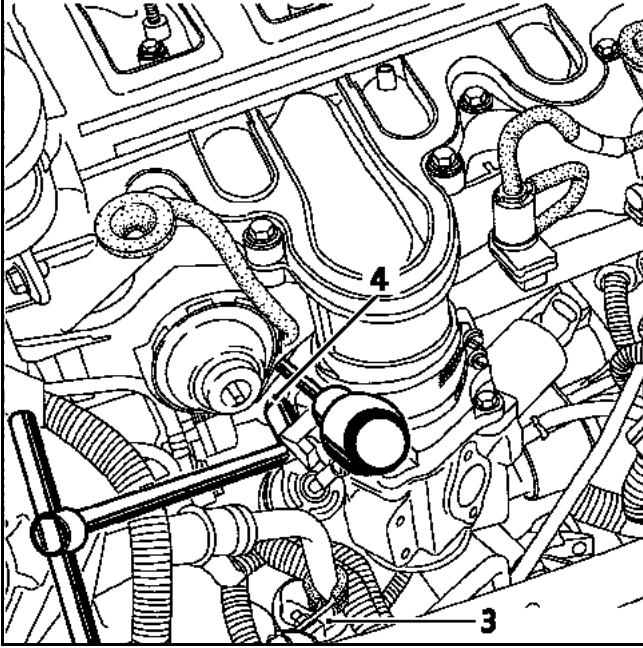
- the stiffening bracket (1) between the damper unit and the power assisted steering pump mounting,
- the exhaust gas recirculation pipe (2) and the seals. Plan for the replacement of the pipe and the seals when refitting.



Disconnect the exhaust gas recirculation control solenoid valve connector.

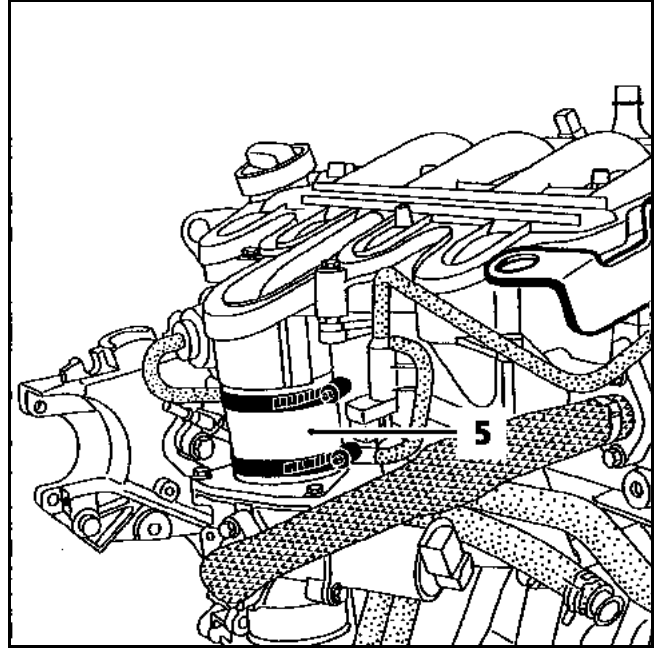
Remove:

- the mounting bolt from the low pressure air conditioning pipe bracket (3),
- the mounting bolts (4) from the throttle body on the engine housing. Use a **13 mm** dowel, a cardan joint and small extension. If necessary, remove the pipes to access the bolts.



**WARNING:** avoid loosening the four self-tapping bolts (A) which attach the top to the unit body.

Remove the connection pipe (5) between the throttle body and the inlet manifold,




If necessary, unclip the electrical wiring in front of the damper unit to ease the downwards release of this unit.

### REFITTING

Proceed in the reverse order from removal.

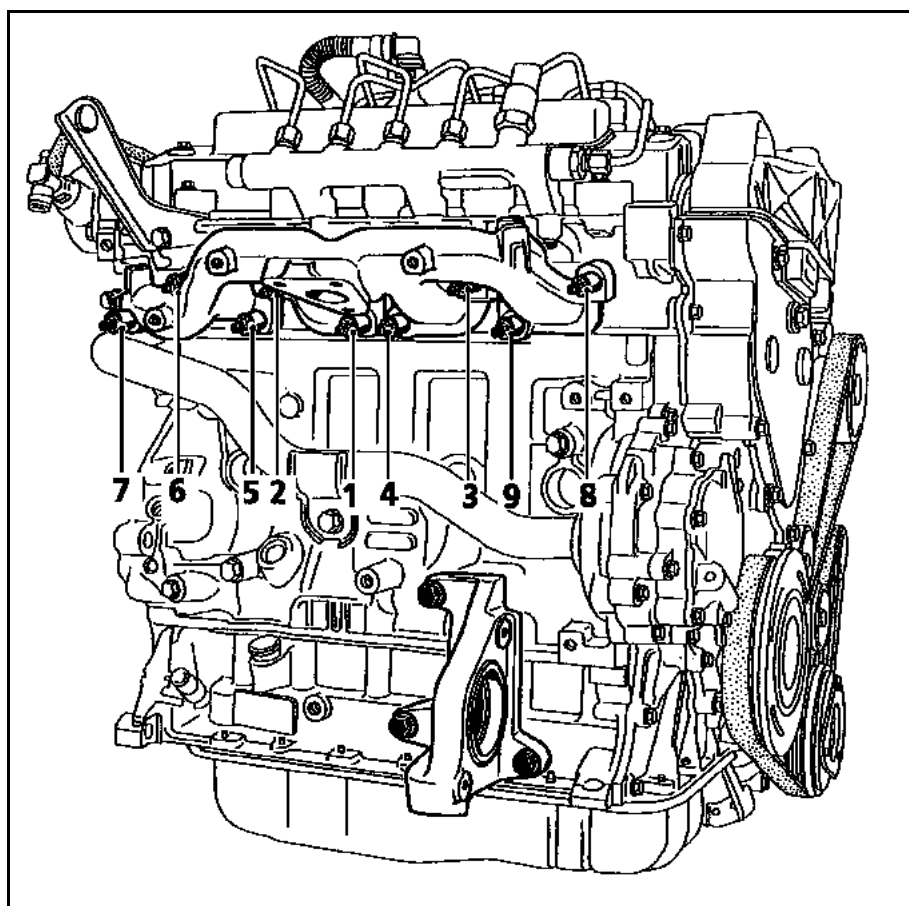
Tighten the mounting clips to **5.5 daN.m**.

Check that there are no stored faults using a fault finding tool. Erase them if necessary.

TIGHTENING TORQUES (in daN.m) 	
Manifold mounting nut	0.8±0.2
Manifold mounting nut	2.7±0.4
EGR valve mounting bolt	1.5
Turbocharger clamp mounting bolt	2.7

### REMOVAL

Removal of the exhaust manifold requires removal of the engine and transmission assembly (see section 10 "**Removing/refitting engine and transmission assembly**"), and the removal of the turbocharger (see section 12 "**Removing/refitting turbocharger**").



### REFITTING

Refit the manifold bolts in the order recommended above.

Refitting is the reverse of removal.

# FUEL MIXTURE

## Inlet manifold

12

### SPECIAL TOOLING REQUIRED

Mot. 1390	Engine and transmission assembly mounting tool
-----------	--

### TIGHTENING TORQUES (in daN.m)

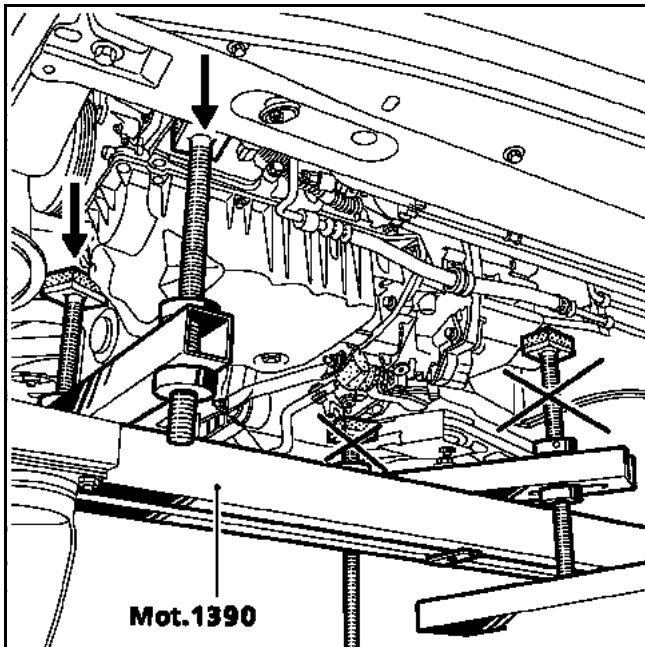


Heater plugs	1.1
Manifold mounting stud	1
"Common-Rail" high pressure unions	2.5

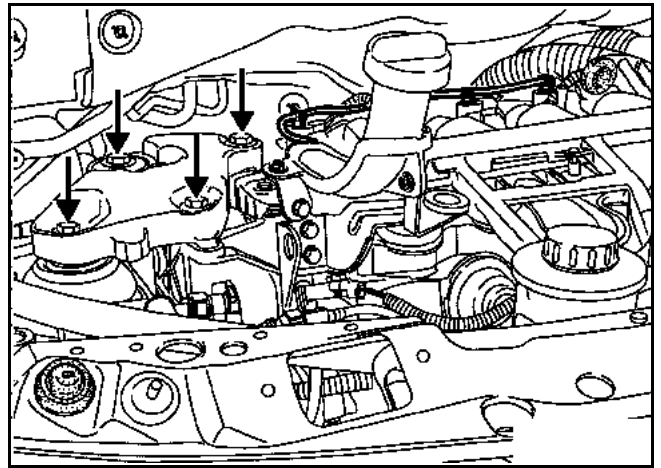
### REMOVAL

The removal of the inlet manifold/cylinder head cover requires the removal of the injectors and injection harnesses. (See section 13 "Removing/refitting the high pressure injection section").

Insert the mounting tool **Mot. 1390** under the engine and transmission assembly, positioning the right-hand pads only beneath the engine. Lower the two unused left-hand pads.

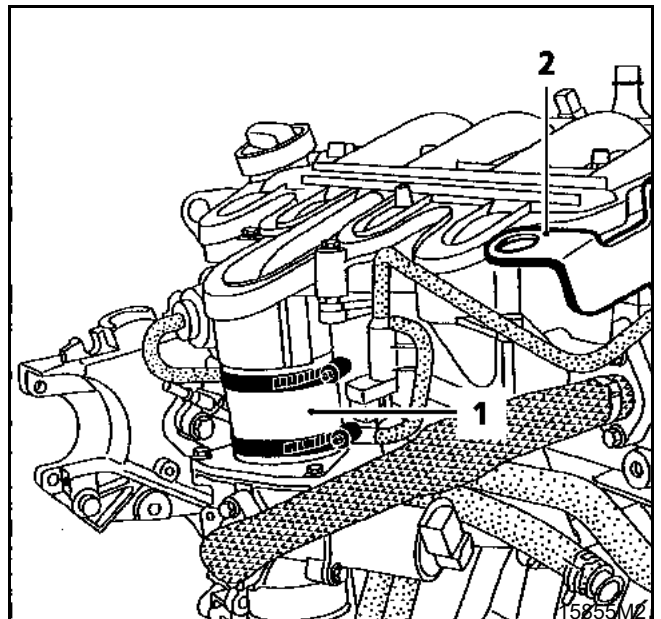


Remove the right-hand suspended engine mounting cover.

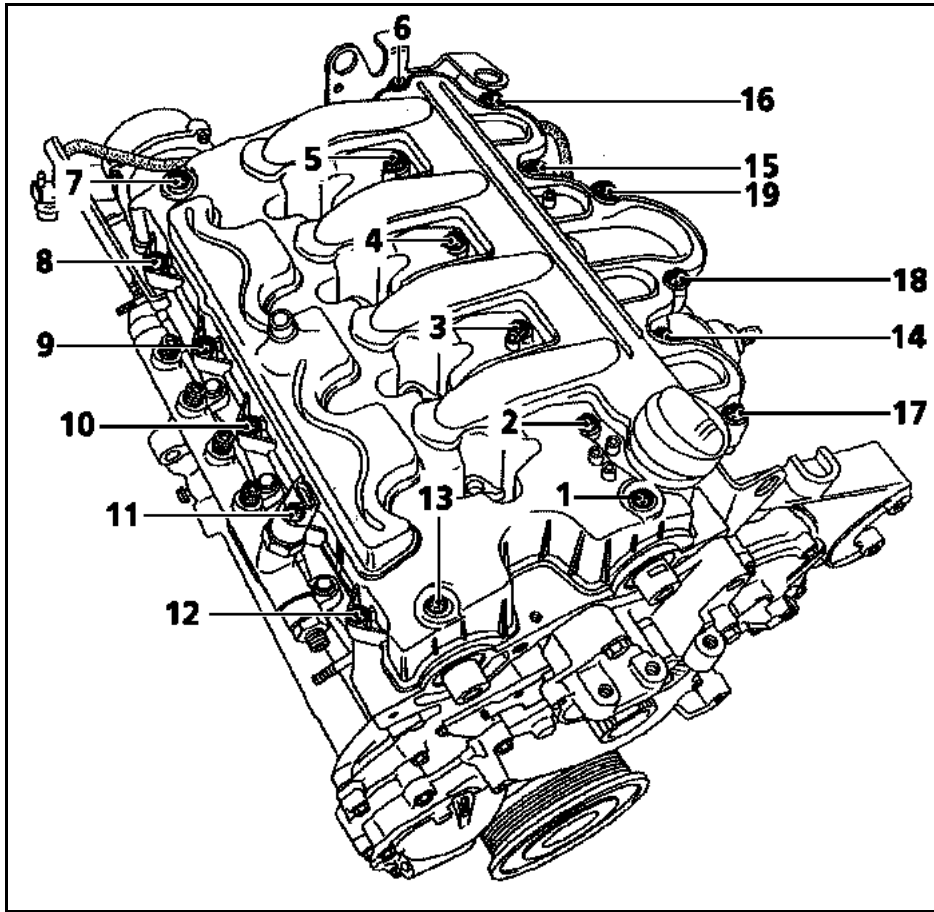


Undo the two clips on the connection hose (1) between the inlet manifold and the damper unit.

Remove the pad (2).



Remove the manifold mounting bolts and then remove the manifold.



## REFITTING

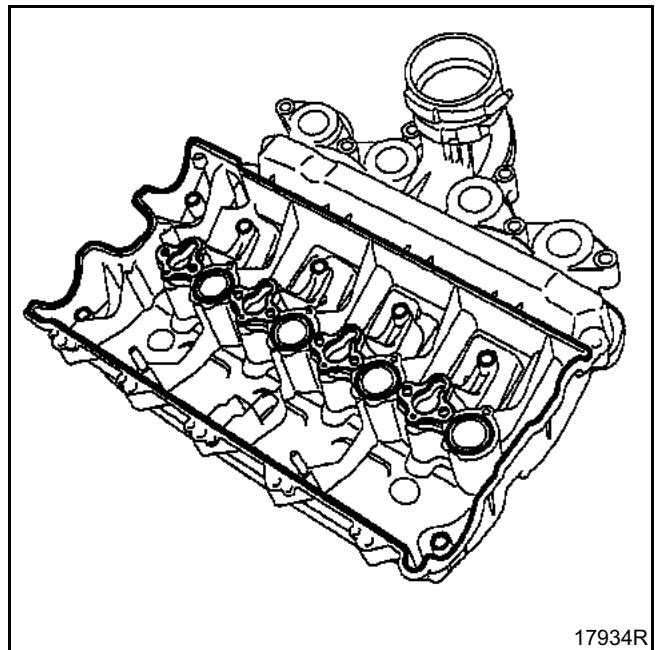
**IMPORTANT:** note the rubber seal on the inlet tubes; if necessary, seal this in its casing with some grease.

Bring all the cylinder head cover bolts into contact.

Tighten to **1.2 daN.m** observing the tightening order for the cylinder head cover bolts.

It is essential that you observe the order of tightening and the torques recommended for refitting the suspended mounting and the high pressure injection section (see sections 13 and 19).

To refit, proceed in the reverse order to removal.



17934R

# STARTING - CHARGING

## Alternator

16

### IDENTIFICATION

Type	Engine	Alternator	Current
JE0 K JE0 S	G9T	VALEO SG 12	125 A

### CHECKING

After 15 minutes warming up at a voltage of 13.5 volts.

Rpm	Amps
1500	26 A
4000	94 A
6000	105 A



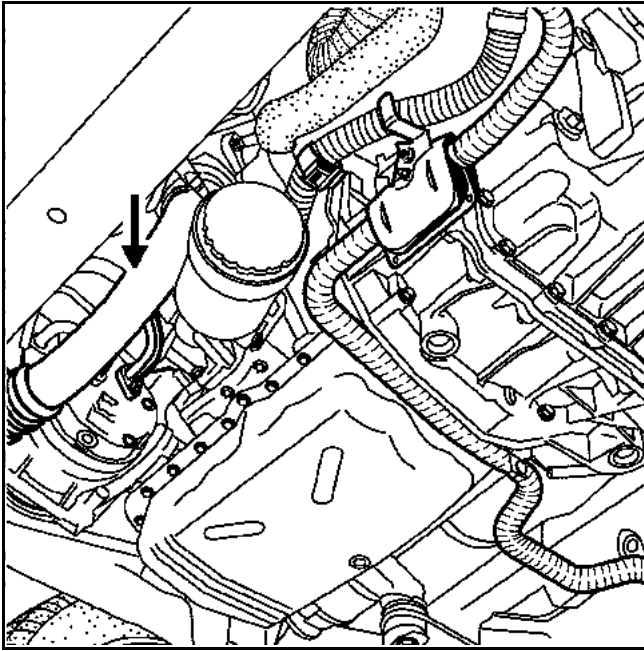
### REMOVAL

Put the vehicle on a 2 post lift.

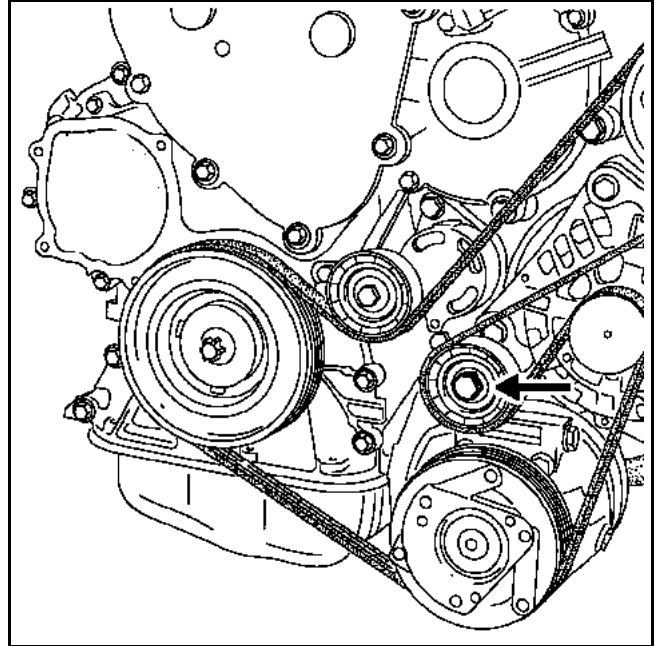
Disconnect the battery and the electrical connections on the alternator and the air conditioning compressor.

Remove:

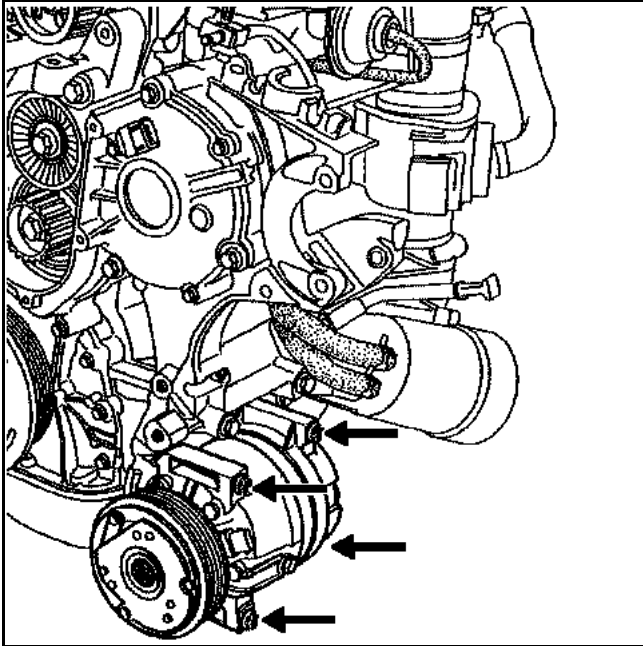
- the front right wheel,
- the right-hand wheel arch cover,
- the lower engine cover,
- the bumper,
- the windscreen washer tank,
- the air exchanger/throttle body unit pipe after disconnecting it,



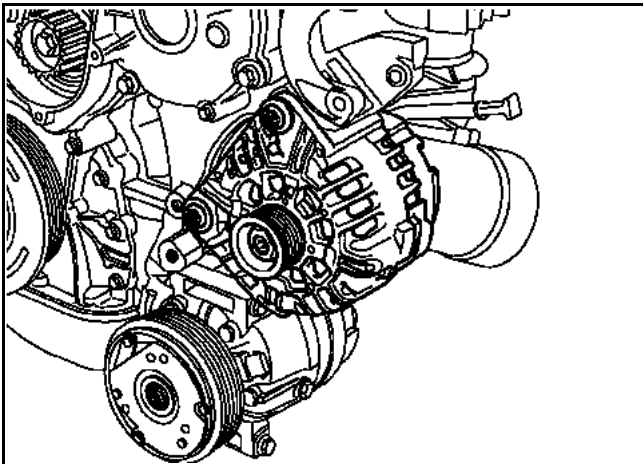
- the accessories belt (see method on page 11-1),
- the accessories belt pulley.



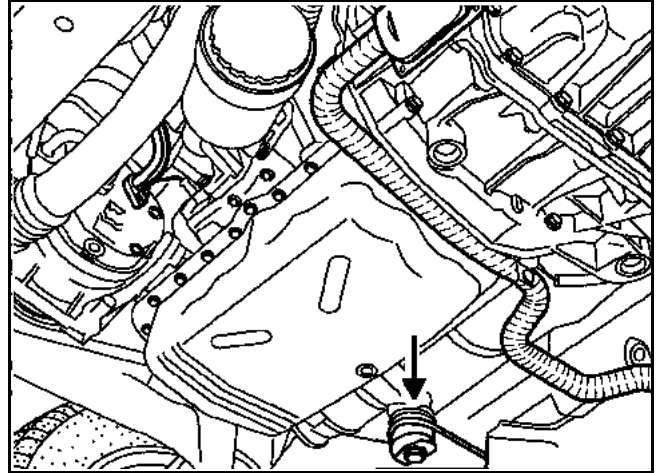
Undo the four air conditioning compressor mounting bolts and allow this to hang by its pipes.



Undo and remove the lower mounting bolt on the alternator; undo the upper bolt without removing it,



*On the right-hand side below*, remove the vertical engine tie-bar mounting bolt.



Undo without removing the pre-catalytic converter mountings on the exhaust pipe.

Remove the upper mounting bolt on the alternator by manually lifting the engine and transmission assembly forwards; the bolt passes just above the right hand side member.

### REFITTING

Refitting is the reverse of removal.

# STARTING - CHARGING

## Starter

16

### IDENTIFICATION

Type	Engine	Starter motor
JE0 K JE0 S	G9T	VALEO D7RP158

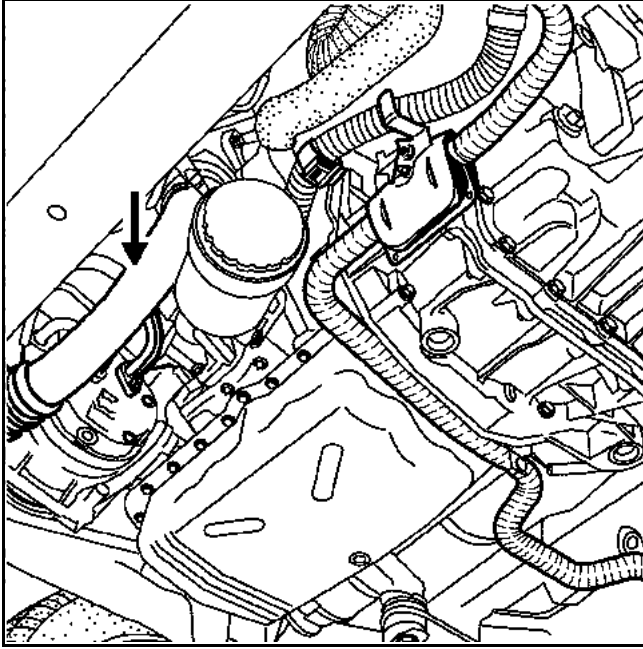
### REMOVAL

Put the vehicle on a 2 post lift.

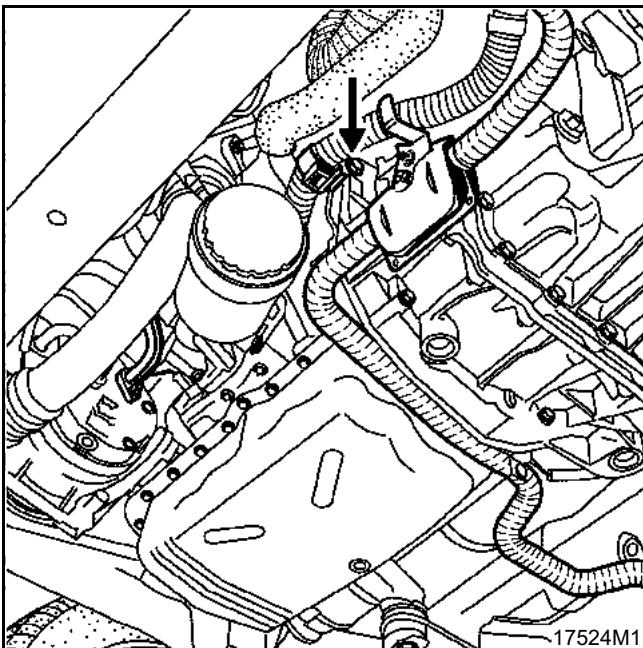
Disconnect the battery.

Remove:

- the lower engine cover,
- the air exchanger/throttle body unit pipe after disconnecting it,

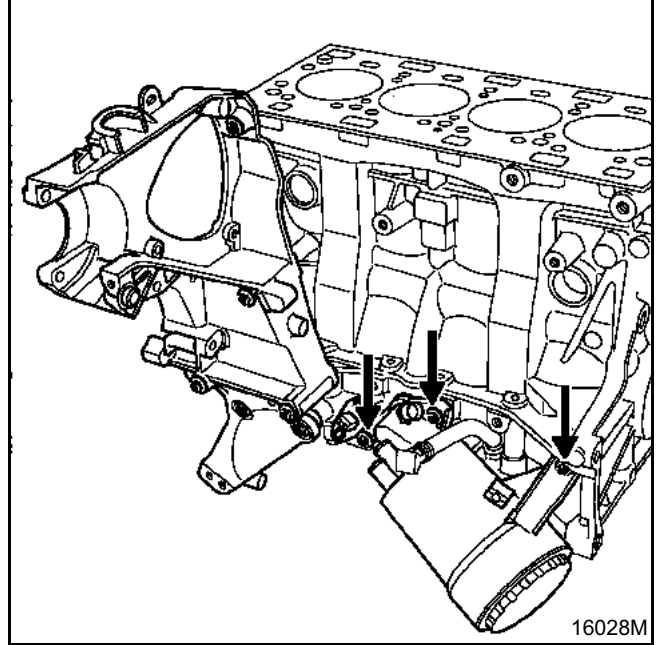


- the dipstick,
- the three starter mounting bolts,



- the oil filter unit bracket.

Release the filter bracket to the side, without disconnecting it.



Disconnect the starter electrical connections.

Remove:

- the dipstick well,
- the starter motor.

### REFITTING

To refit, proceed in the reverse order to removal.

There is continuous circulation in the heater matrices.

### FILLING

**It is essential to open the two bleed screws at the top of the radiator and the cylinder head coolant pipe housing outlet.**

Fill the circuit through the expansion bottle opening.

Close the bleed screws as soon as the liquid starts to flow in a continuous stream.

Start the engine (**2 500 rpm**).

Adjust the level by overflow for a period of about **4 minutes**.

Close the bottle.

### BLEEDING

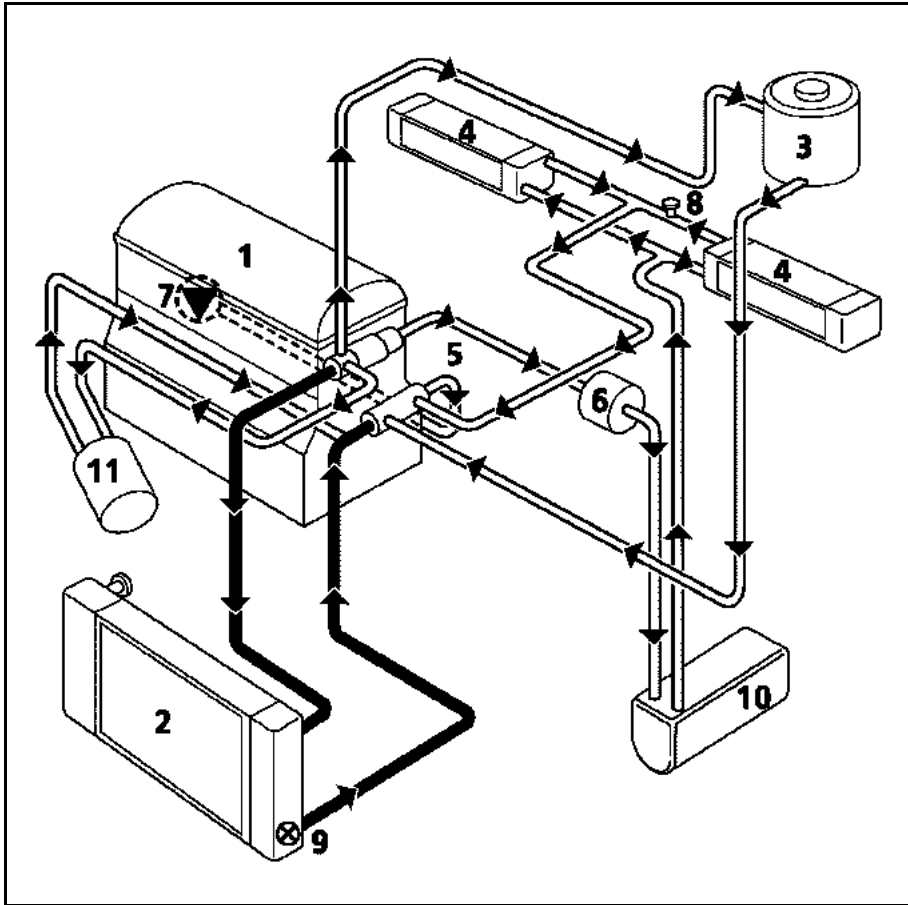
Allow the engine to run for about **20 minutes** at **2 500 rpm**, until the engine fans(s) operate (time necessary for automatic degassing).

Check the liquid level is at the "**Maximum**" marker.

**DO NOT OPEN THE BLEED SCREWS WHILST THE ENGINE IS RUNNING.**

**REFIT THE EXPANSION BOTTLE CAP WHILE THE ENGINE IS WARM.**

## SPECIFIC COOLANT CIRCUIT



- 1 Engine
- 2 Radiator
- 3 "Hot" tank with degassing after thermostat
- 4 Heater matrix
- 5 Thermostat mounting
- 6 Thermoplunger mounting
- 7 Coolant pump
- 8 Bleed screw
- 9 Temperature switch
- 10 Heater (if fitted)
- 11 Oil cooler + "eco" oil filter

The expansion bottle valve rating is **1.2 bar** (colour: brown).

### ESSENTIAL SPECIAL TOOLING

FACOM U 14 L sprocket extractor

#### REMOVAL

Put the vehicle on a 2 post lift.

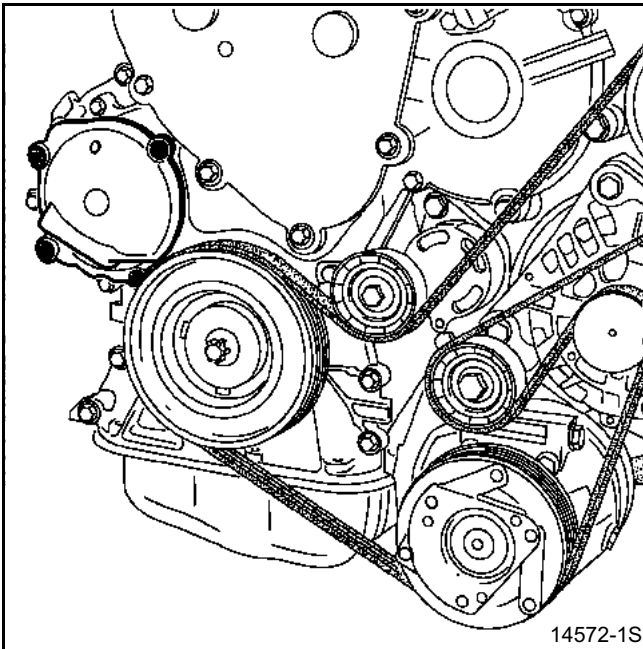
Disconnect the battery.

Bleed the engine cooling circuit and engine oil; do not refit the oil drain plug.

Remove:

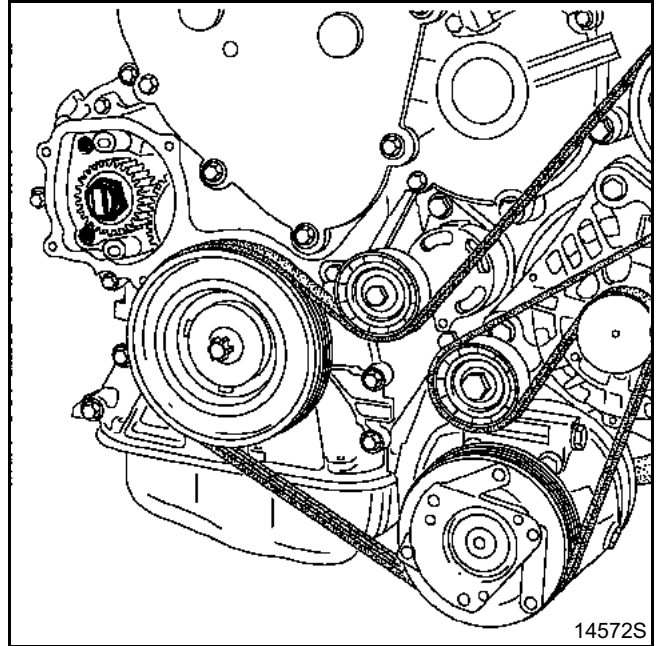
- the front right wheel,
- the right-hand wheel arch cover.

Remove the four mounting bolts of the coolant pump cover.

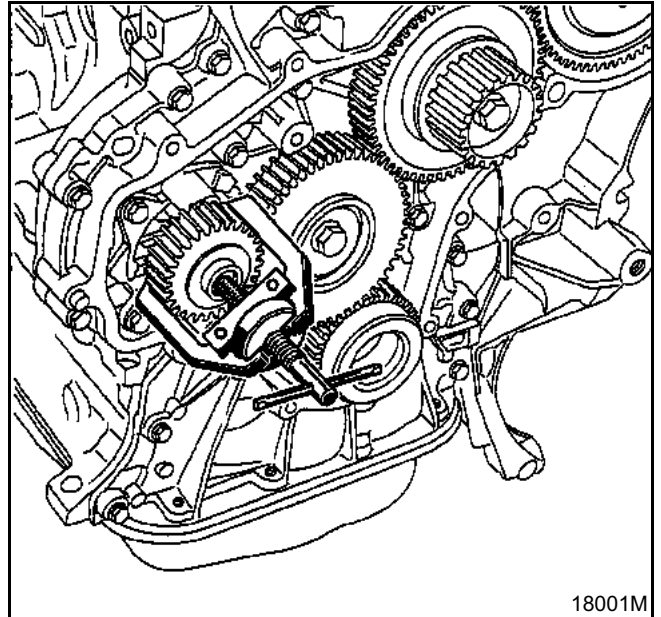


Lock the crankshaft using a screwdriver in the starter crown.

Remove the 30 hub lock nut from the coolant pump.



Remove the coolant pump sprocket using the **U 14 L FACOM** hub extractor



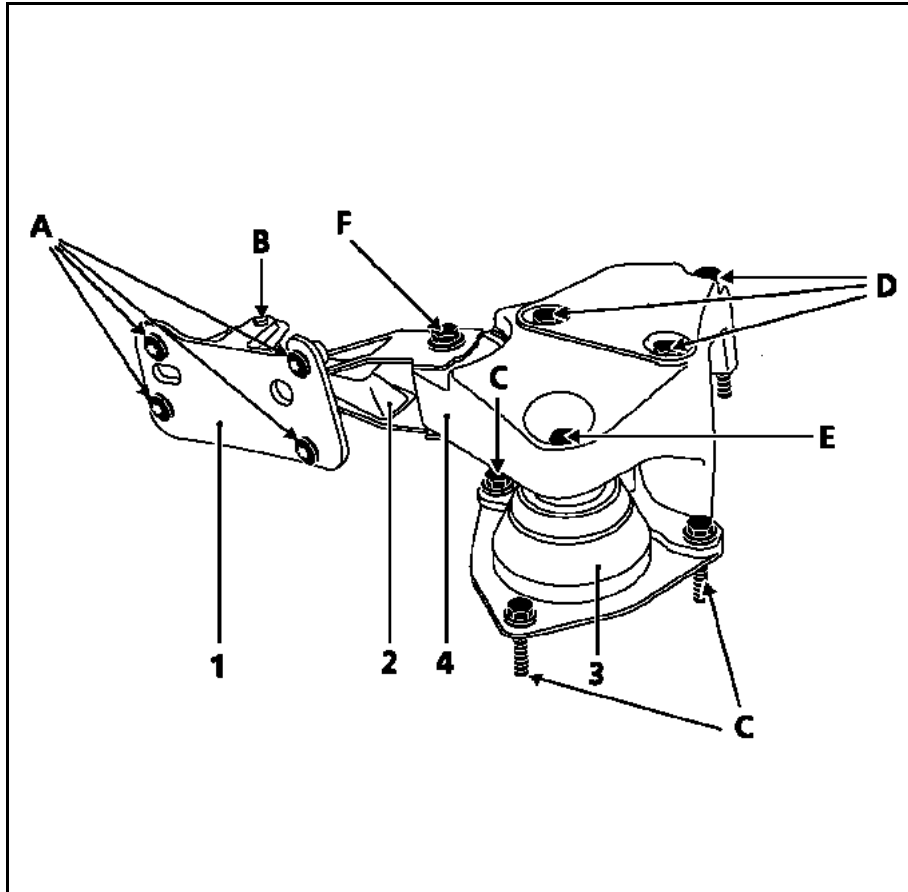
#### REFITTING

Replace the coolant pump.

**WARNING:** the rest of the coolant will drop into the engine housing.

Ensure that the mating surface on the pump is clean and that the coolant escapes from the engine housing (oil change).

Refitting is the reverse of removal.



The right-hand suspended mounting is fitted with a rear travel limiter linkage.

When removing the cover, linkage or cast iron mounting attached to the cage, respect the tightening procedure below which has been adapted for removed parts.

Fit in the following order:

- the cast iron linkage mounting (1) on the shock absorber cage and tighten the bolts (A) to **3 daN.m**,
- the linkage (2) on the mounting (1) without tightening it,
- the rubber pad (3) on the cage and tighten the bolts (C) by **5 to 6.5 daN.m**,
- the suspended engine mounting cover (4) on the rubber pad (3) and fix to the linkage (2). Tighten the linkage (2) mounting bolt (B) on the mounting (1) to **10.5 daN.m**.

Offer up the engine and tighten the cover mounting bolts (D) on the engine to **6.2 daN.m**.

Tighten the cover mounting bolt (E) on the rubber pad (3) to **6.2 daN.m** and the linkage connecting bolts (F) on the cover (4) to **10.5 daN.m**.

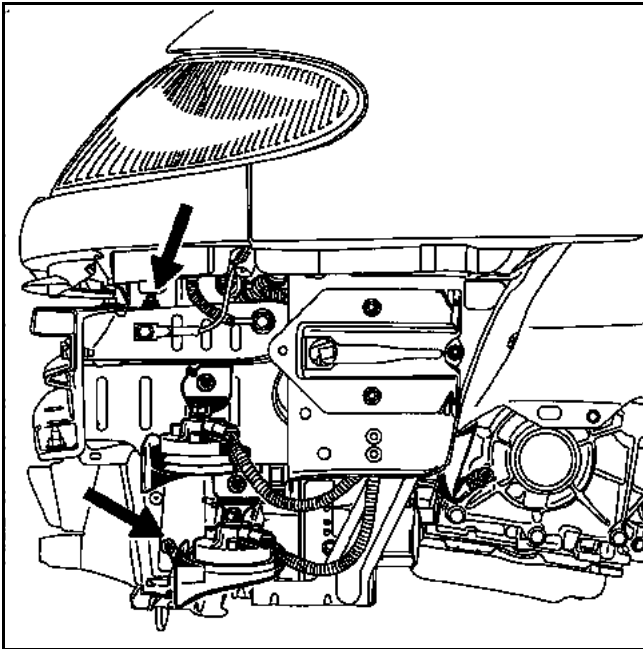


Bleed the cooling circuit, the air conditioning circuit (see special manual for air conditioning)

Open the relay unit at the top left of the ring and disconnect the electric wiring harness from the cooling system at the radiator.

Remove the front bumper, the radiator grille and the radiator grille rack.

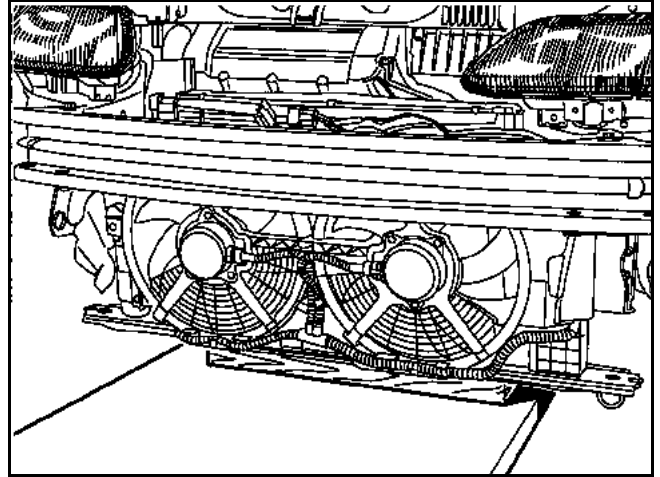
Remove the mounting bolts on the radiator convergents and fold them to remove it from the bottom.



Disconnect the air conditioning air hoses at the compressor for the compressor/condenser connection and at the quick-release union for the bottle/bulkhead connection.

When removing/refitting the cooling system, it is recommended that you do not disconnect the connections between the high pressure pipes and the condenser/bottle unit as the seals are special and delicate to replace.

Set the radiator cross member on a table with shims and release the mountings.



Remove the two mounting bolts from the cross member on the tips of the side members.

Lift the vehicle while holding the cooling system to prevent damage (operation for two people).

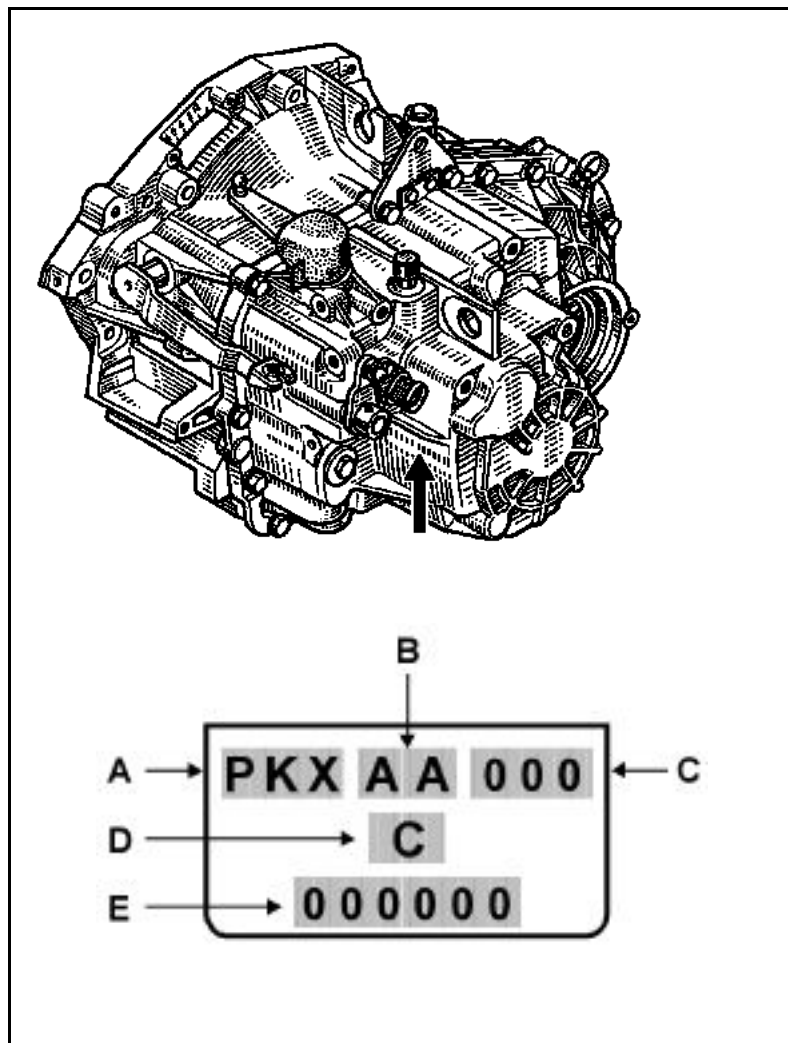
### REFITTING

Refitting is the reverse of removal.

Top up the coolant and the air conditioning circuit.

Replacement of the air conditioning condenser or the cooling exchanger requires the removal of the cooling system.

JE0 K - JE0 S vehicles with G9T turbo engines, are fitted with PK1 manual gearboxes.



A mark on the gearbox casing shows:

- At **A**: the gearbox type
- At **B**: the homologation number
- At **C**: the gearbox suffix
- At **D**: the factory of manufacture
- At **E**: the fabrication number

# MANUAL GEARBOX Ratios

PK1								
Index	Type	Final drive ratio	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	Reverse gear
026	JE0 K	$\frac{21}{74}$	$\frac{11}{43}$	$\frac{19}{40}$	$\frac{31}{43}$	$\frac{41}{40}$	$\frac{41}{31}$	$\frac{11}{29}$ 40
	JE0 S	$\frac{21}{74}$	$\frac{11}{43}$	$\frac{19}{40}$	$\frac{31}{43}$	$\frac{41}{40}$	$\frac{41}{31}$	

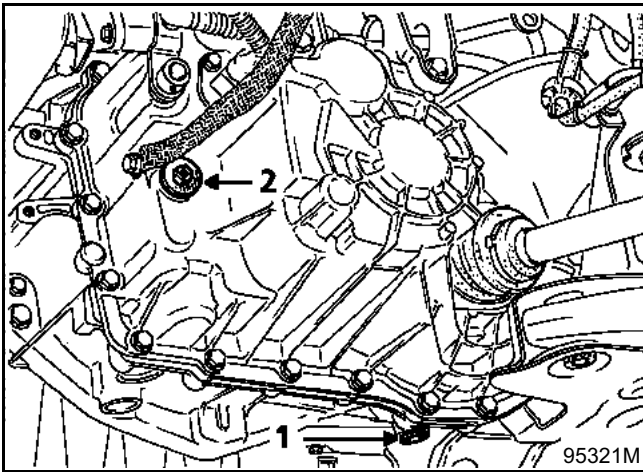
### OIL CAPACITY :

- Maximum: 2.8 l
- Minimum: 2.3 l

### OIL LEVEL

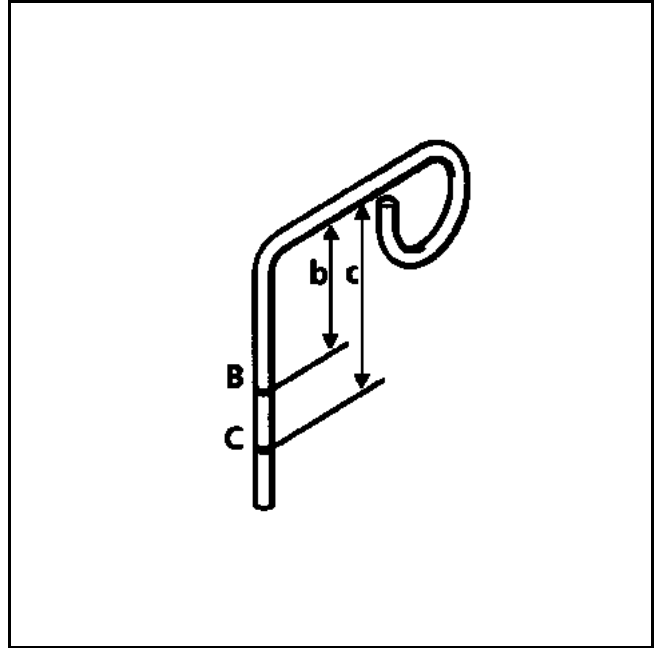
The oil level is adjusted using a locally manufactured dipstick, inserting into the oil filler hole (2) (see **Technical Note 2579A**).

To check the level it is necessary to remove the left hand front wheel and the left hand wheel arch cover. The oil can also be changed and refilled with the recommended quantity.



- 1 Drain plug
- 2 Fuel filler cap

**WARNING:** the fuel filler cap (2) should not be used to check the level by overfilling; using too much oil may damage the seals and overheat the oil.



Marks to graduate:

- B:  $22 \pm 0.5$  mm
- C:  $30 \pm 0.5$  mm

The method for removing/refitting the PK1 G9T gearbox is the same as for the G8T engine. See **Workshop Repair Manual 315 section 21 "Transmission: removing/refitting the PK1 gearbox"**.

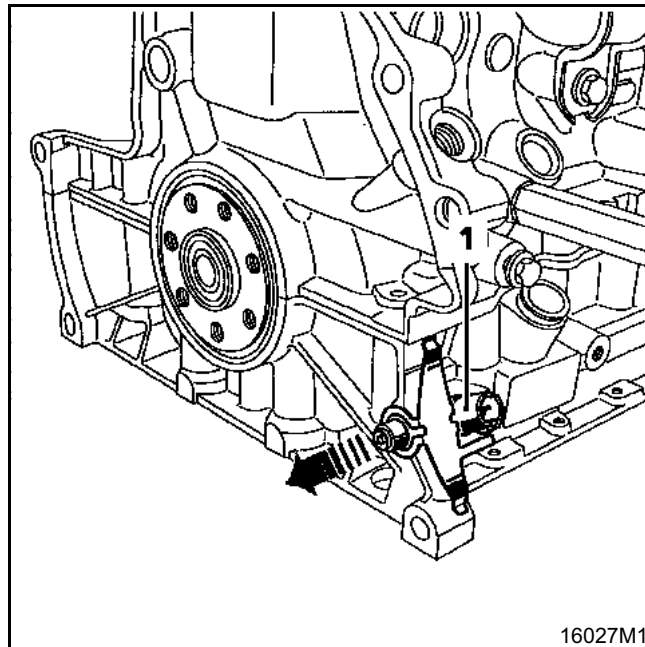
Please observe the recommendations for bleeding the hydraulic clutch system given in **Technical Note 3345A** when refitting.

### **IMPORTANT:**

The TDC sensor (1) may be moved during the gearbox removal/refitting operation.

If necessary, push this until it is in contact with the backing plate.

Too great a gap could cause a starting fault which is not visible on the fault finding tool.



### OPERATING PRINCIPLE

The vehicle with a **G9T** engine is fitted with an additional heating system as an option in some countries (Germany, Nordic countries...). This comprises an engine coolant heater, mainly for starting when cold.

The heater is switched on if the following three conditions are met:

- starting the engine,
- air intake temperature less than **5 °C**,
- coolant temperature less than **75 °C**.

The heater is usually switched off when the engine is stopped or the coolant temperature reaches **85 °C**.

The temperature is measured inside the heater.

The driver does not control operation.

The system is fitted with several safety features (see **page 61-3**).

The heater is connected as the outlet of the thermoplunger unit on the coolant circuit and operates independently of this. It is fitted outside the left-hand side member in the front bumper.

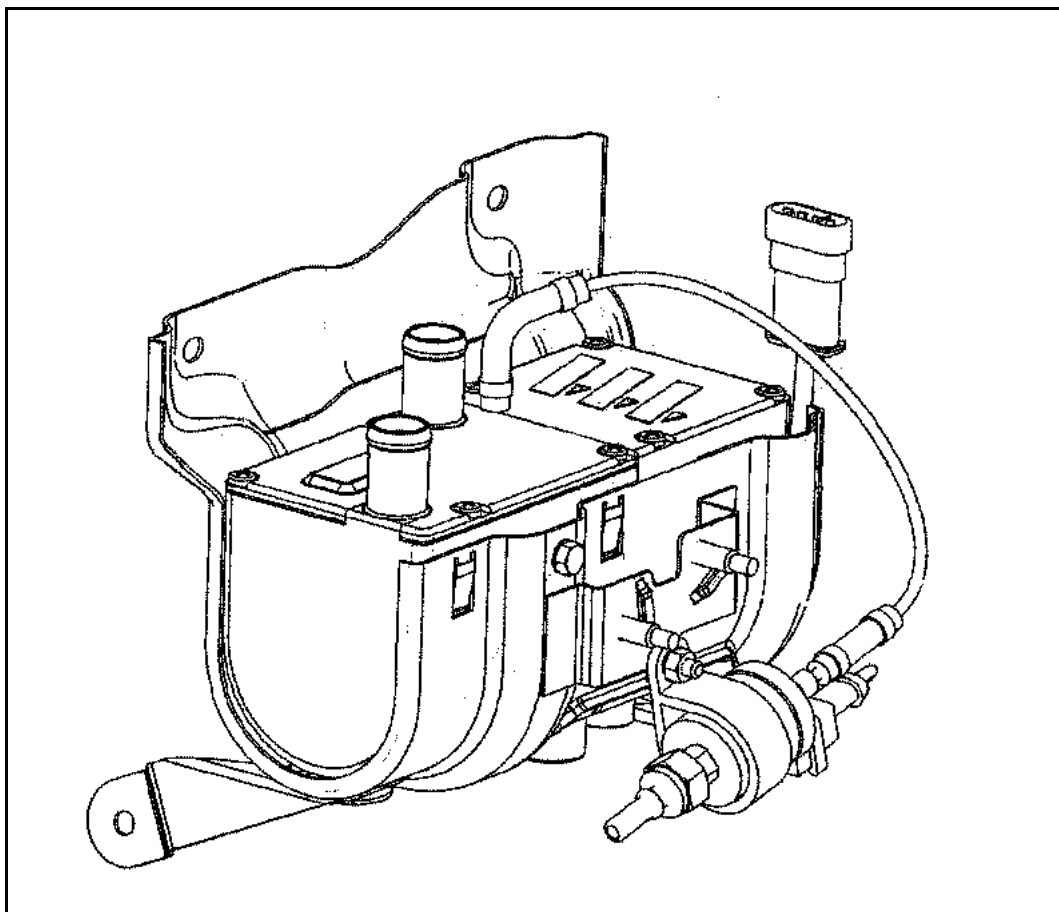
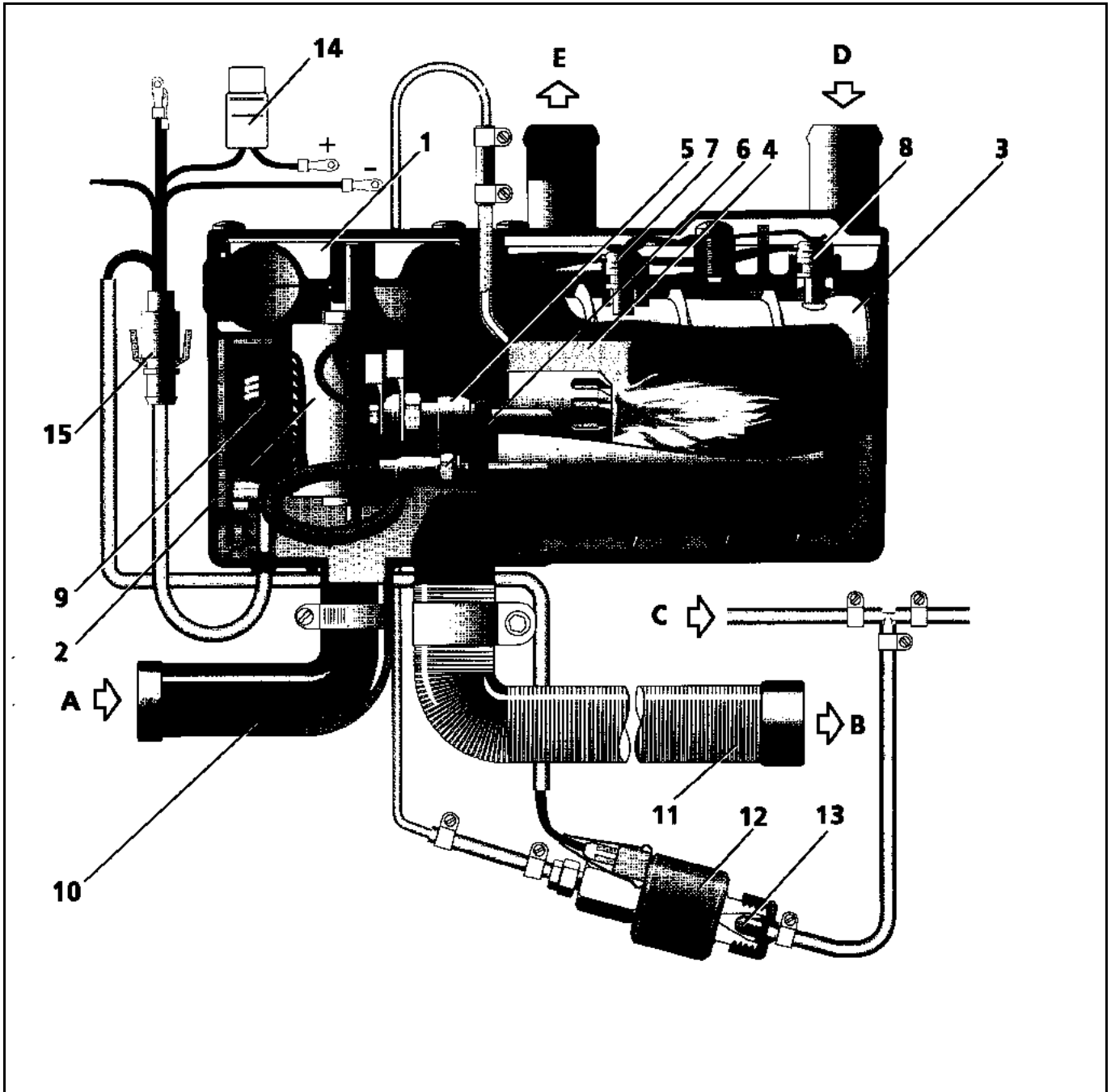


DIAGRAM OF THE D3WZ HEATER



- 1 Air blower turbine
- 2 Electric motor
- 3 Heat exchanger
- 4 Combustion chamber
- 5 Spark plug
- 6 Flame detector
- 7 Temperature sensor
- 8 Overheating switch
- 9 Control unit
- 10 Combustion air intake tube
- 11 Burnt gas exhaust pipe
- 12 Dosing pump

- 13 Fuel filter
  - 14 Main fuse
  - 15 Interface
- 
- A Combustion air inlet
  - B Exhaust gas outlet
  - C Vehicle fuel circuit
  - D Coolant inlet (thermoplunger outlet)
  - E Coolant outlet (towards the heater matrix)

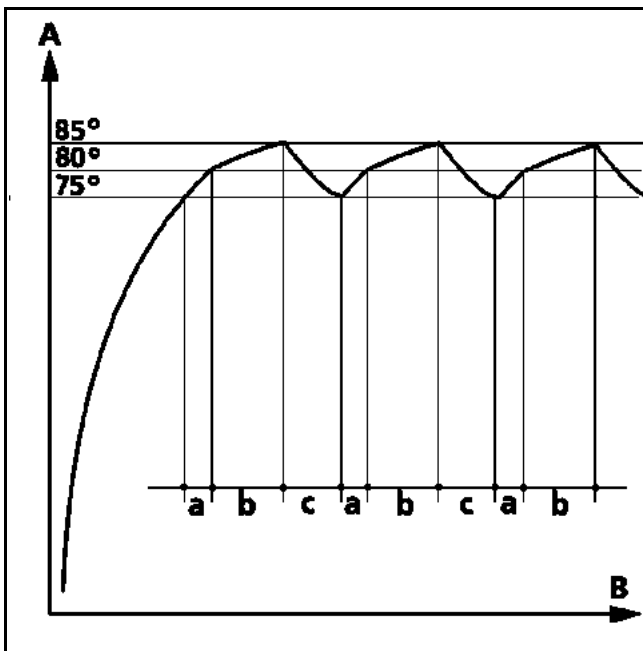
### TECHNICAL SPECIFICATIONS

The heater is fitted with an igniter appropriate for the vehicle fuel.

It operates in two power levels:

- 1°) Low speed:
  - Power: **1600 Watts**,
  - Fuel consumption: **0.2 l/hour**.
- 2°) High speed:
  - Power: **3300 Watts**.
  - Fuel consumption: **0.4 l/hour**.

When the engine is started, the heater is operated at high speed; circulation of the coolant inside the exchanger is ensured by the vehicle coolant circuit.



**A** Temperature (°C)

**B** Minutes

- Range a:  
High speed.
- Range b:  
Low speed.
- Range c:  
Heater stop.

Coolant temperature measured inside the heater.

### SAFETY SYSTEMS

The system is fitted with several safety features; it cuts out:

- if the difference in coolant temperature read by the two internal heater sensors reaches **15 °C**,
- if the coolant temperature reaches **120 °C** (different safety features than reading 85°),
- if the flame detector does not detect combustion, (notably the heater fuel pump),
- if the battery voltage is greater than **16 volts** or less than **10 volts**.

Other safety devices:

- when the heater does not light 90 seconds after the supply of fuel is started, the starting procedure is repeated. If, during the following 90 seconds the system still does not start, the emergency stop is engaged.
- if the flame extinguishes during operation the starting procedure is repeated. If the heater does not start up in the following 90 seconds, the emergency stop is engaged.
- in the event of overheating (lack of coolant, incorrectly drained cooling circuit...), the overheating switch reacts, the fuel supply is stopped and the emergency stop is engaged. The heater can be restarted after the source of overheating has been eliminated and the heater has cooled sufficiently.

### SWITCHING OFF

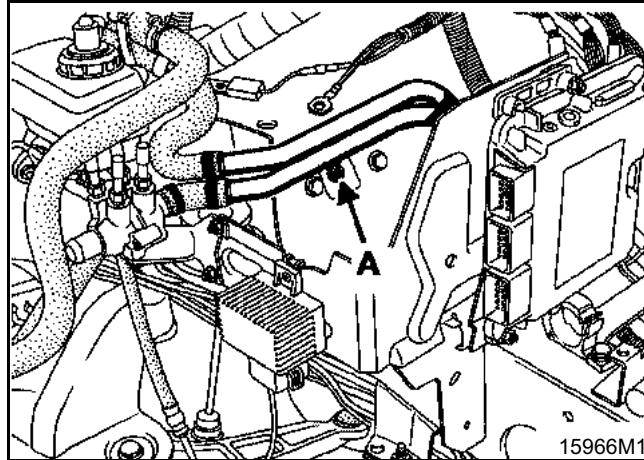
To temporarily disconnect the heater (operation with engine running in an enclosed space, noises when cold,...), disconnect the connector (15) (**page 61-2**). If possible, check that the heater engages after it is reconnected.

The main **F49** (70 A) fuse on the engine intercommunication unit supplies the additional heating system.

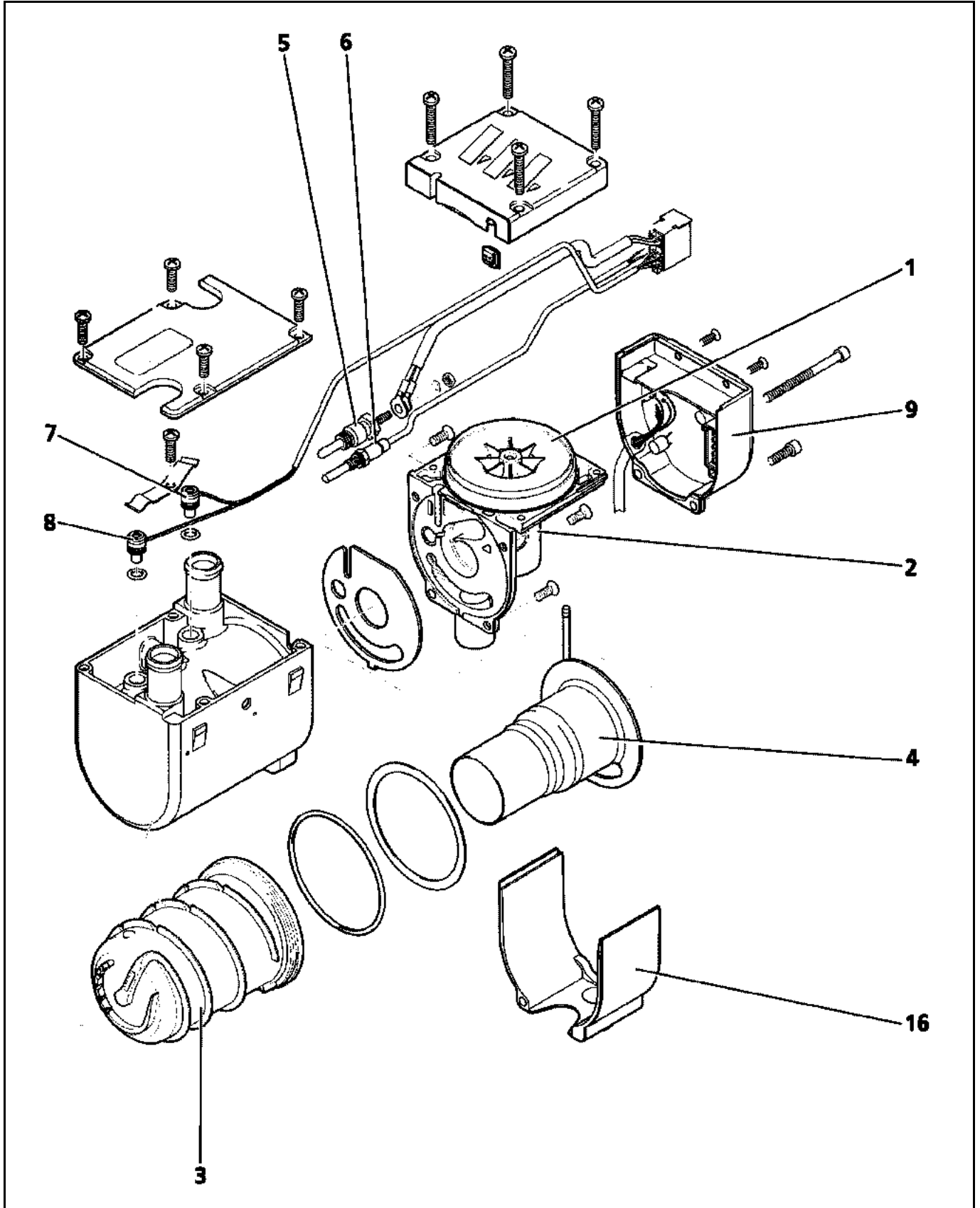


### RIGID HEATER COOLANT PIPES

These are fixed to the body by bolt (A).  
When refitting, tighten this bolt last after refitting and  
tightening all the clips.



EXPLODED VIEW OF THE HEATER



Marking as on page 61-2.

16 Cap

### MAINTENANCE

The principal maintenance operations on this assembly are:

- replacing the ignition spark plug (5),
- cleaning the filter at the pump inlet (13) (see **page 61-2**).

### REMOVING - REFITTING COMPONENTS

#### FUEL PUMP INLET FILTER (13)

Remove the front bumper.

Rotate the pump (12) (see **page 61-2**) if it turns and loosen the union covering the filter (13). Clean or replace the filter if there is a combustion problem.

#### IGNITION SPARK PLUG

Disconnect and remove the heater without draining the cooling circuit (use pliers **Mot. 453-01**).

Remove:

- the turbine cover (1),
- the control unit (9) and the cap (16),
- the spark plug (5) after disconnecting it.

#### FLAME DETECTOR

Disconnect and remove the heater without draining the cooling circuit (use pliers **Mot. 453-01**).

Remove:

- the turbine cover (1),
- the control unit (9) and the cap (16).

Disconnect the flame connector by pulling the flat terminals from the connector.

Remove the flame detector.  
(**WARNING:** fragile part)

#### COMBUSTION CHAMBER (4) AND EXCHANGER (3)

Remove:

- the flame detector and spark plug,
- the wiring harness fitted on the overheating detector (8) and the temperature sensor (7),
- the turbine support (1).

Remove the combustion chamber (4) and the exchanger (3) if necessary.

#### FAULT FINDING

In case of a fault, check:

- if there is fuel in the tank,
- if the fuses are intact
- if the pipes, connections and electrical unions are intact,
- if the combustion air ducts or exhaust gas ducts are blocked (unblock them if necessary).

In the even of combustion with the production of soot, check:

- if the combustion air ducts or exhaust gas ducts are blocked (unblock them if necessary),
- if there is a deposit in the exchanger (3) or the combustion chamber (4); clean these if necessary,
- if the dosing pump flow is correct;

To do this:

- remove the bumper,
- disconnect the electric pump inlet fuel pipe (12), from the side opposite the fuel filter (13),
- connect a pipe to the electric pump so that the flow can be collected in a glass at the same height as the heater,
- start the heater (if necessary, bridge the temperature sensor located in front of the battery screen). After approximately 40 seconds, the fuel arrives and begins to bleed the circuit. Switch off the ignition. Empty the glass and start again, collecting the stabilised flow for approximately 30 seconds. Switch off the heater and measure the quantity of fuel collected.  
Normal flow: between **6.8 cm<sup>3</sup>** and **7.8 cm<sup>3</sup>** for 90 seconds of operation.

The G9T engine vehicle is fitted with a variable geometry air conditioning compressor; that is, the compressor adapts the flow of refrigerant fluid according to a difference in pressure between the compressor inlet and outlet, and not according to the temperature read by the sensor (omission of the evaporator sensor).

The system cannot be adjusted

The pressure relief valve is still present but calibrated differently.

### REMOVAL

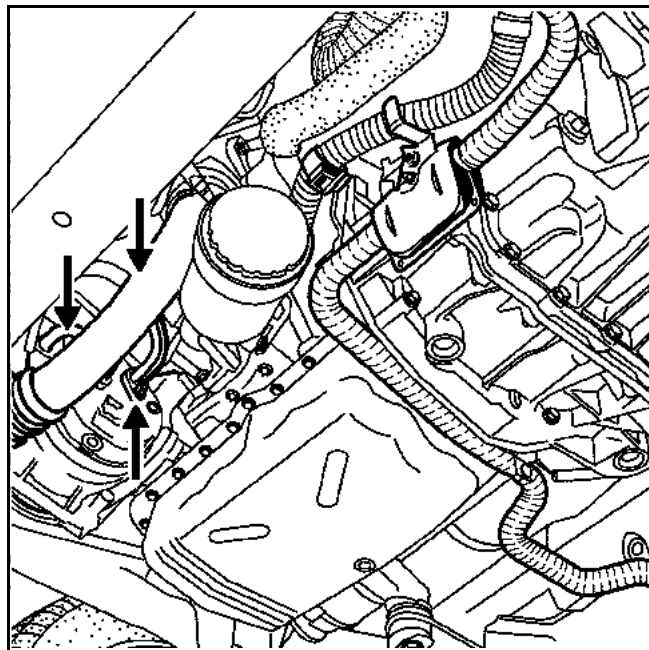
Put the vehicle on a 2 post lift.

Disconnect the battery.

Drain the refrigerant circuit (see special "AIR CONDITIONING" manual).

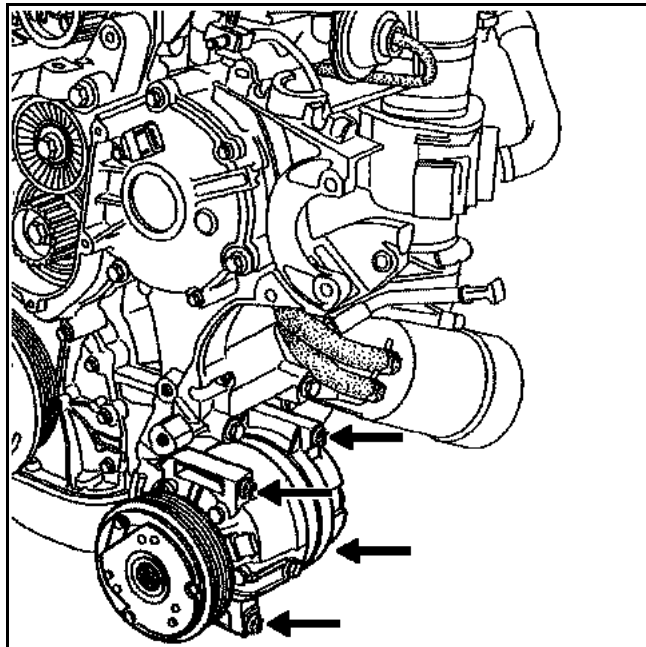
Remove:

- the front right wheel,
- the right-hand wheel arch cover,
- the lower engine cover,
- the air exchanger/throttle body unit pipe after disconnecting it.



- the accessories belt (see methods in **section 07 "Accessories belt"**),

Unscrew the two mounting clamps on the compressor refrigerant pipes and carefully plug the openings.



Unscrew the four mounting bolts from the air conditioning compressor and remove it.

### REFITTING

Refitting is the reverse of removal.

Refrigerant fluid **R134a**: **800 ± 20 g**