

AVANTIME

1 Engine and peripherals

10 ENGINE AND PERIPHERALS

11 TOP AND FRONT OF ENGINE

12 FUEL MIXTURE

13 SUPPLY - PUMP

16 STARTING - CHARGING

17 IGNITION - INJECTION

19 COOLING - ENGINE MOUNTING -
EXHAUST

This document deals with special features of the **AVANTIME**. For all information on features shared with the **ESPACE**, consult Workshop Repair Manual 315 corresponding to Technical Note **2996A**.

DE0 T

77 11 304 522

SEPTEMBER 2001

EDITION ANGLAISE

"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."

All copyrights reserved by Renault.

Copying or translating, in part or in full, of this document or use of the service part reference numbering system is forbidden without the prior written authority of Renault.

© RENAULT 2001

Engine and peripherals

Contents

	Page		Page
10 ENGINE AND PERIPHERALS		16 STARTING - CHARGING	
Consumables	10-1	Alternator	16-1
Identification	10-2	Starter	16-3
Oil pressure	10-3		
Engine - gearbox	10-4		
		17 IGNITION - INJECTION	
11 TOP AND FRONT OF ENGINE		Ignition	
Accessories belt (removal-refitting)	11-1	Static ignition	17-1
Timing belt	11-2	Spark plug replacement	17-2
Cylinder head gasket	11-3	Injection	
		Oxygen sensor	17-3
12 FUEL MIXTURE		19 COOLING - ENGINE MOUNTING - EXHAUST	
General information	12-1	Cooling	
Technical specifications	12-2	Technical specifications	19-1
Inlet manifold	12-4	Filling - bleeding	19-2
Exhaust manifold	12-5	Checking	19-3
		Diagram	19-4
13 SUPPLY - PUMP		Coolant radiator	19-5
Feed		Repairing positioning pins	19-7
Air intake	13-1	Coolant pump	19-10
Air filter	13-2	Engine mounting	
Injector rail	13-3	Suspended engine mounting	19-11
Supply pressure	13-4	Exhaust	
Pump		General information	19-13
Manual power steering pump	13-5	Catalytic converters	19-14

Type	Quantity	Components
Rhodoreal 5661	Coat	Driveshaft roll pin holes.
Loctite FRENBLOC Locking and sealing resin	Coat	Brake caliper mounting bolts.
Loctite FRENETANCH Locking and sealing resin	Coat	Crankshaft pulley mounting bolts.
MOLYKOTE BR 2	Coat	For wheel centres.
Exhaust pipe paste	Coat	For sealing the exhaust.

Vehicle type	Engine	Manual gearbox	Cubic capacity (cm ³)	Bore (mm)	Stroke (mm)	Compression ratio
DE0 T	L7X	PK6	2946	87	82.6	10.9/1

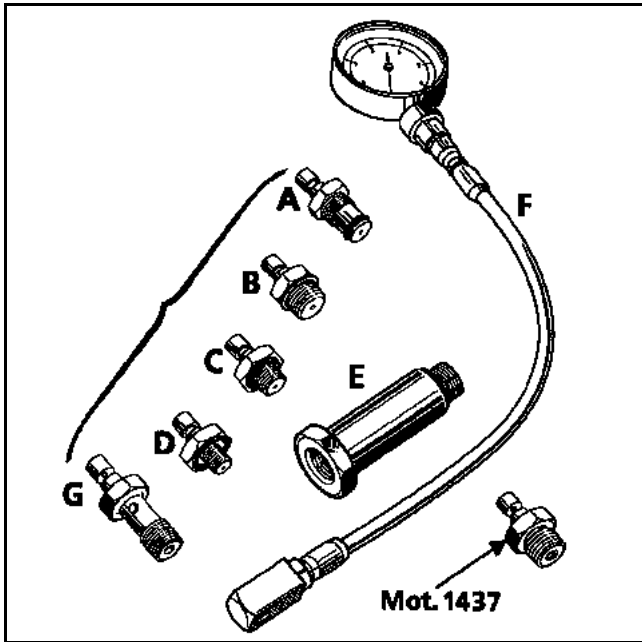
Documents for consultation: Workshop Repair Manual for **L7X engines** + Technical Note **2996A**

SPECIAL TOOLING REQUIRED	
Mot. 836-05	Boxed kit for measuring oil pressure
Mot. 1437	Pressure measuring connector

CHECKING

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

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



Use

Engine L: F + **Mot. 1437**

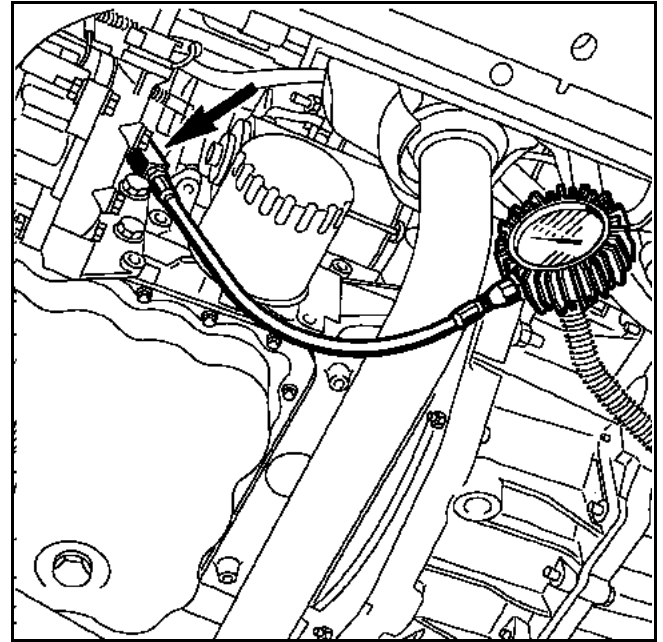
Oil pressure

Idle speed	2 bar
3000 rpm	5 bar

Place the vehicle on a lift, and disconnect the battery.

Remove the oil pressure switch.

In its place, fit the **Mot. 1437** adapter, and the oil pressure gauge.



The removal-refitting method for the **L7X PK6** engine - gearbox assembly on the **AVANTIME** is the same as for the **L7X LM0** engine - gearbox assembly on the **ESPACE**, except for:

- the suspended mountings (see the **Engine-gearbox assembly suspended mountings** section).
- the **PK6** gearbox and its control (see the **Gearbox control information in section 37**).

For these operations, please consult **Workshop Repair Manual 315** and **Technical Note 2996A** (L7X), for all the technical information.

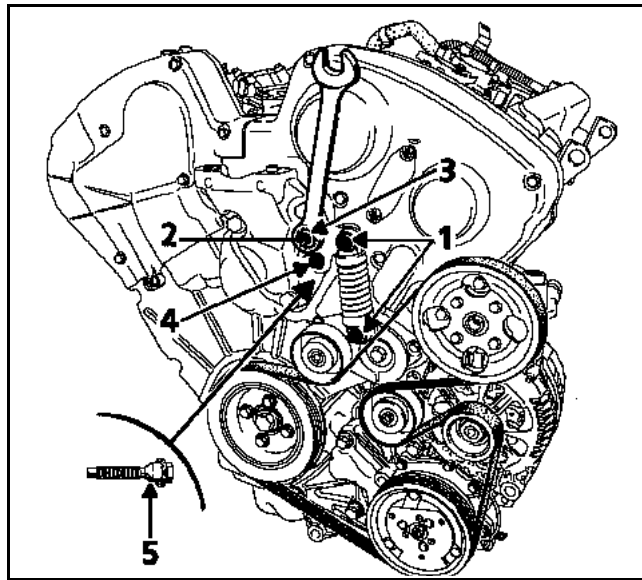
SPECIAL NOTES ON REMOVING THE ACCESSORIES BELT

Loosen bolts (1) and (2).

Keep the tensioner taut using the hexagonal spanner (3).

Unscrew the bolts (4) until they pass the conical section (5) of the oblong hole on the tensioner.

Remove the belt.



To refit, move the tensioner back into its operating position to the right, and torque tighten bolts (4) and (2) to **2.5 daNm**.


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

TOP AND FRONT OF ENGINE

Timing belt

11

SPECIAL TOOLING REQUIRED	
Mot. 1273	Tool for checking belt tension
Dir. 1282 -01	Steering rack PAS pipe removal/refitting tool
Mot. 1390	Engine support
Mot. 1410	Coolant hose removal/refitting tool
Mot. 1428	Camshaft hub locking tool
Mot. 1429	Tensioner setting tool
Mot. 1430	Crankshaft and camshaft sprocket timing pin
Mot. 1430-01	Crankshaft and camshaft sprocket timing check pin
Mot. 1436	Timing belt retaining clip
Tav. 476	Ball joint extractor
EQUIPMENT REQUIRED	
Ball joint setter	

TIGHTENING TORQUES (in daNm)	
Timing tensioner bolt	2.5
Camshaft sprocket bolt	1
Suspended mounting cover bolt	6.2
Crankshaft pulley bolt	2.5
Wheel bolts	10

REMOVAL

Removal or refitting the timing belt requires the removal of the engine - gearbox assembly.

See the method described in section **10 - Removal/Refitting engine - gearbox assembly**.

Remove the engine cover.

Remove the accessories belt (see the method described in section **07 - Accessories belt tension**).

REPLACEMENT

Replacing the cylinder head gaskets requires the removal of the engine - gearbox assembly.

See the method described in **section 10 - Removal/ Refitting engine - gearbox assembly** of **Technical Note 2996A**.

Remove the engine cover.

Remove the accessories belt (see the method described in **section 07 - Accessories belt tension**).

FUEL MIXTURE

General information

12

TECHNICAL SPECIFICATIONS AND SETTING VALUES

Vehicle	Gearbox	Engine							Depollution standard
		Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm ³)	Compression ratio	Catalytic converter	
DE0 T	LM0	L7X	722	87	82.6	2 946	10.9/1	◇ C 100	EU 2000

Engine		Tests at idle speed*					Fuel*** (minimum octane rating)
		Engine speed (rpm)	Pollutant emission **				
Type	Suffix		CO (%) (1)	CO2 (%)	HC (ppm)	Lambda (λ)	
L7X	722	650±50	0.5 max	14.5 min	100 max	0.97<λ<1.03	Unleaded (OR 95)

(1) at 2500 rpm, the CO content should be 0.3 maximum.

- * For a coolant temperature above 80 °C and after engine speed has stabilised to 2500 rpm for approximately 30 seconds. Test to be carried out after return to idle speed.
- ** Refer to your country specification for legal values.
- *** OR 91 unleaded compatible.

Temperature in °C (± 1°)	0	20	40	80	90
Air temperature sensor NTC type Resistance in ohms	5500 to 6500	2000 to 3000	1000 to 1500	-	-
Coolant temperature sensor NTC type (green 2-track connector) Resistance in Ohms	5500 to 6500	2000 to 3000	1000 to 1500	270 to 350	220 to 250

FUEL MIXTURE

Specifications

12

DESCRIPTION	BRAND/TYPE	SPECIAL NOTES															
Computer	BOSCH/ME7.4.6	32/48/48 tracks															
Injection		Multipoint with sequential regulation															
Ignition		Static with six dual output monobloc coils A pinking sensor Tightening torque 2 daNm Firing order: 1 - 6 - 3 - 5 - 2 - 4 The coil-plugs assembly can be diagnosed															
TDC sensor		Can be diagnosed															
Spark plugs	NGK PFR 6 E - 10	Gap: 1,0 mm (adjustable) Tightening torque: 3 daNm															
Fuel filter		Mounted under vehicle in front of fuel tank. Replaced during major service															
Fuel pump	WALBRO	Immersed in the tank Flow: minimum of 80 l/h under a regulated pressure of 3 bar and at a voltage of 12 volts															
Pressure regulator	BOSCH	Regulated pressure Vacuum of zero: 3 ± 0.2 bar Vacuum of 500 mbar: 2.5 ± 0.2 bar															
Pulse damper	BOSCH																
Solenoid injector	BOSCH	Voltage: 12 volts Resistance: $13 \pm 1 \Omega$															
Throttle housing	BOSCH	Can be diagnosed															
Throttle position potentiometer	BOSCH	Voltage: 5 volts <table><tr><th colspan="3">Resistance</th></tr><tr><th>Track</th><th>No load (Ω)</th><th>Full load (Ω)</th></tr><tr><td>1-2</td><td>1930</td><td>1930</td></tr><tr><td>1-3</td><td>1130</td><td>2680</td></tr><tr><td>2-3</td><td>2515</td><td>970</td></tr></table>	Resistance			Track	No load (Ω)	Full load (Ω)	1-2	1930	1930	1-3	1130	2680	2-3	2515	970
Resistance																	
Track	No load (Ω)	Full load (Ω)															
1-2	1930	1930															
1-3	1130	2680															
2-3	2515	970															

FUEL MIXTURE
Specifications

DESCRIPTION	BRAND/TYPE	SPECIAL NOTES
Fuel vapour rebreathing canister solenoid valve	-	Voltage: 12 volts (RCO control) Resistance: $30 \pm 5 \Omega$
Heated oxygen sensor	77 00 105 557 index B BOSCH LSW 24 WS	Voltage delivered at 850 °C Rich mixture > 625 mvolts Lean mixture: 0 to 80 mvolts Heating resistance, track 1-2: 2 to 15 Ω Tightening torque: 4 to 5 daNm
Fault finding procedure (described in special Technical Note)	SHEET no. 47 CODE D13 SELECTOR S8	Throttle position potentiometer: In idle speed regulation $0 \leq \#08 \leq 1000$ With full load $\#17 \geq 77$ Idle speed R.C.O. $20 \leq \#12 \leq 40$ Idle speed R.C.O. adaptive $- 12.5 \leq \#21 \leq +12.5$ Richness adaptive operation $0.75 \leq \#30 \leq 1.25$ Idle speed richness adaptive $- 1 \leq \#31 \leq 1$

TIGHTENING TORQUES (in daNm)



Manifold mounting bolt	2
Distribution mounting	2.5

REMOVING THE INLET MANIFOLD

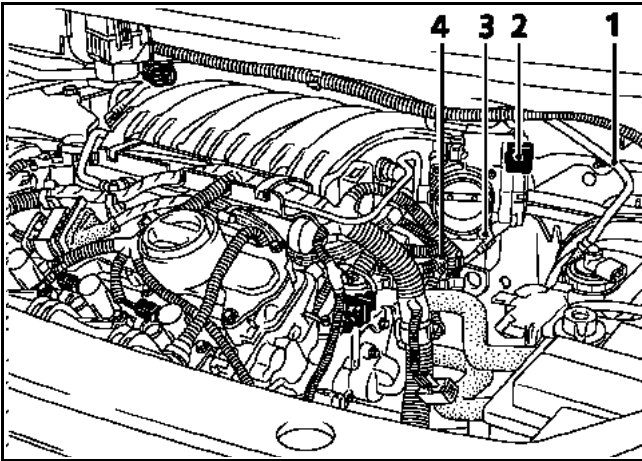
Disconnect the battery.

Remove:

- the engine cover,
- the air filter unit and its connecting hose to the throttle body.

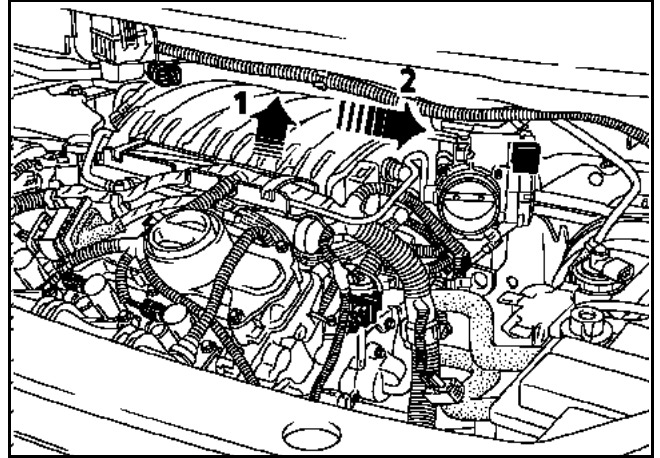
Disconnect:

- the vacuum tapping pipe (1) from the brake servo,
- the motorised throttle body connector (2),
- the fuel vapour rebreathing pipe (3),
- the oil vapour rebreathing pipe (4).

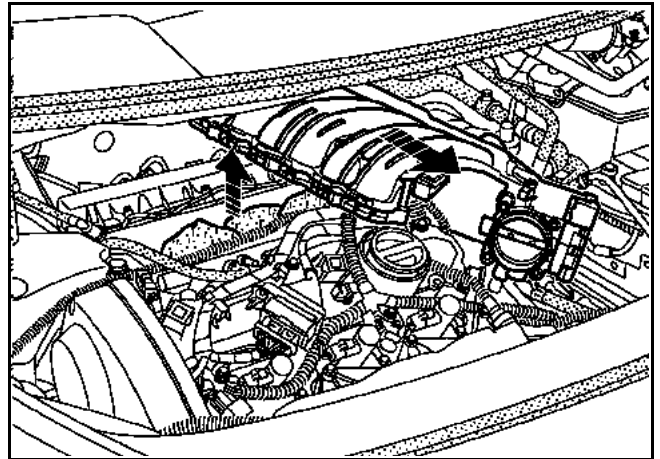


Remove the inlet manifold mounting bolts.

Gently lift the inlet manifold away from the tracts and push it to the left of the vehicle.



Still pushing to the left, twist the inlet manifold to disengage it between the brake fluid tank and the engine. While twisting, disconnect a temperature sensor behind the inlet manifold.



Retrieve the manifold seal from the distributor.

Refit in the reverse order to removal. Make sure that you position the seal correctly and reconnect the sensor behind the manifold sensor.

TIGHTENING TORQUES (in daNm)



Pre-catalytic converter mounting bolt on the manifold	2.1
Catalytic converter downpipe mounting bolt	2.1
Oxygen sensor mounting bolt	5

FRONT EXHAUST MANIFOLD

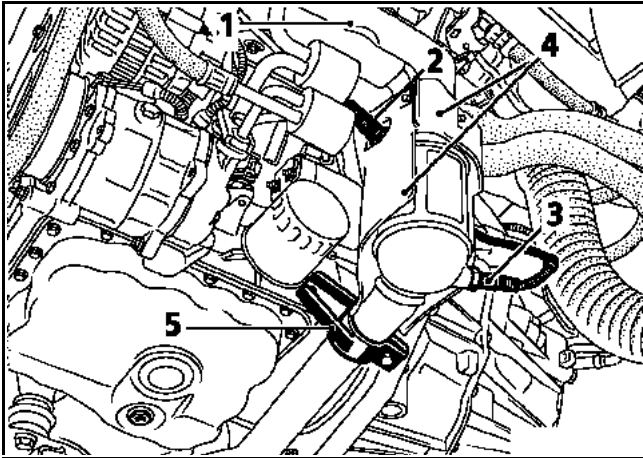
Put the vehicle on a two-post lift.

Disconnect:

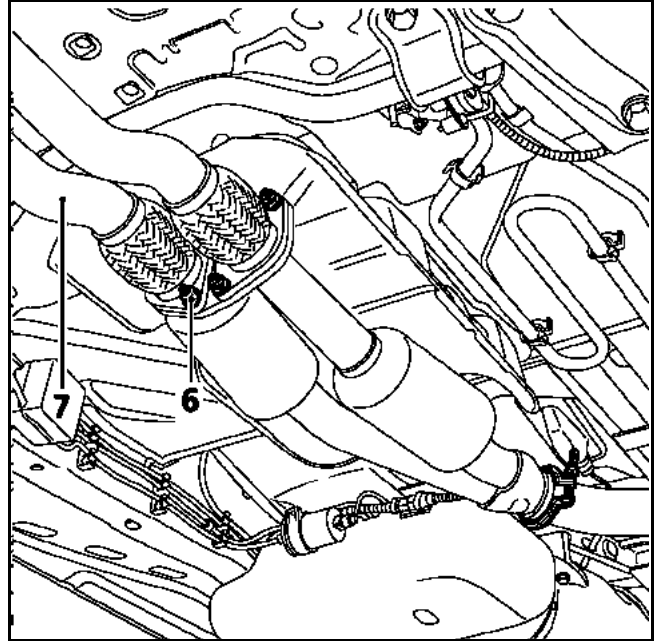
- the battery,
- the oxygen sensors (2) and (3).

Remove:

- the oxygen sensors (2) and (3).
- the front exhaust manifold upper heat shield (1),
- the engine housing bracket (5),
- the heat shields (4),
- the 3 pre-catalytic converter mounting bolt from the exhaust manifold.

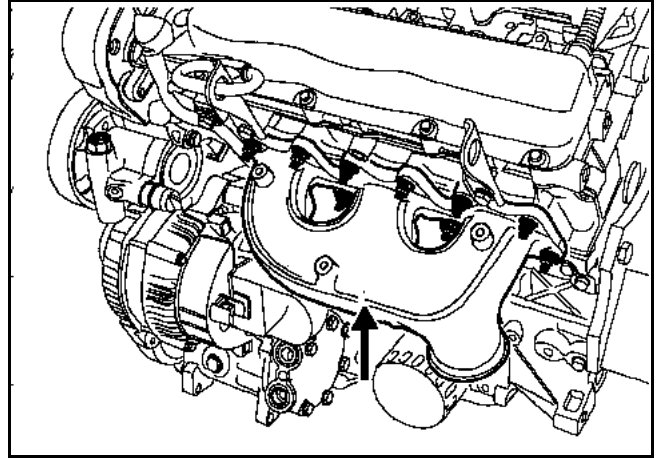


- the two mounting bolts (6) from the exhaust downpipe (7),



Remove:

- the exhaust downpipe,
- the exhaust manifold.



You must replace the seals after refitting.

TIGHTENING TORQUES (in daNm)



Pre-catalytic converter mounting bolt on the manifold	2.1
Catalytic converter downpipe mounting bolt	2.1
Oxygen sensor mounting bolt	5

REAR EXHAUST MANIFOLD

REMOVAL

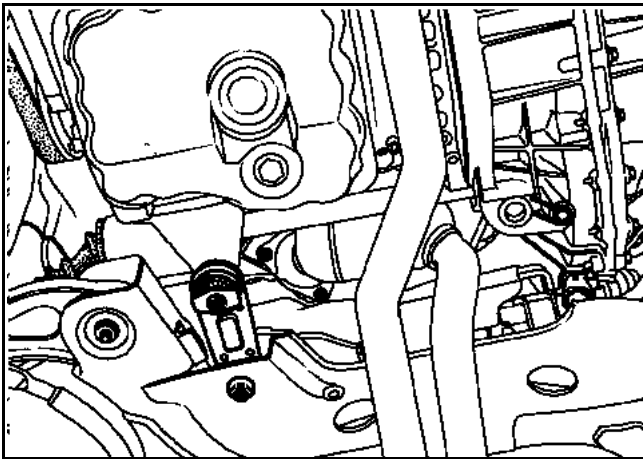
Put the vehicle on a two post lift.

Disconnect:

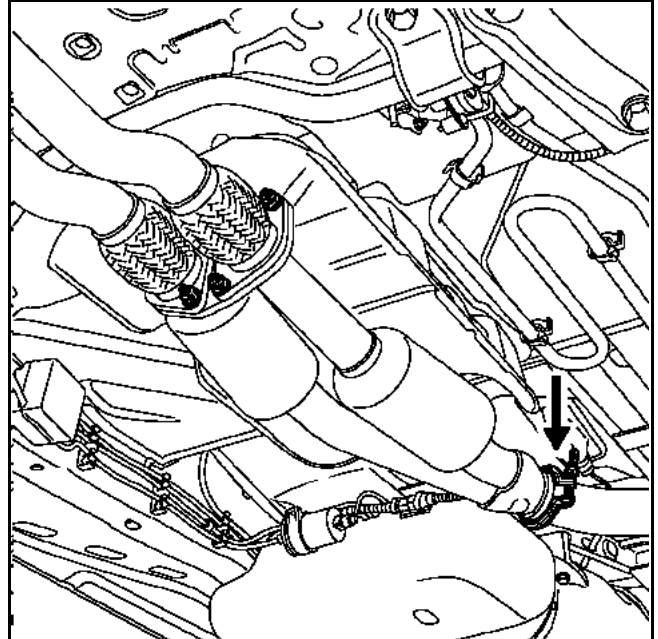
- the battery,
- the oxygen sensors (8) and (13).

Remove:

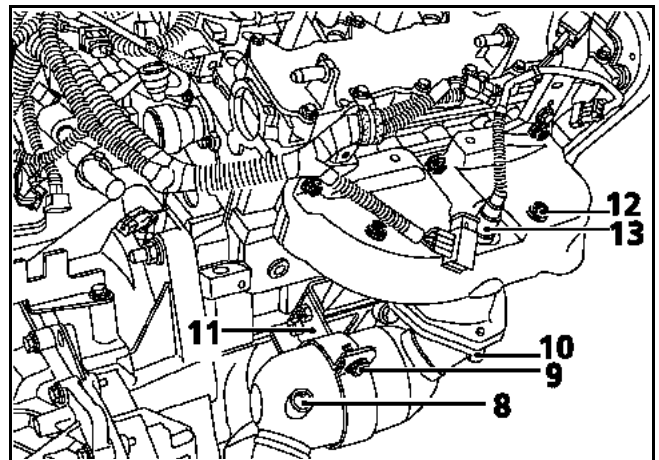
- the torque reaction arm,



- the central catalytic converter assembly rear mountings on the exhaust system,



- the oxygen sensor (8),
- the bolt (9),
- the pre-catalytic converter mounting bolts (10) on the manifold,
- the heat shields (4),
- the three pre-catalytic converter mounting bolts on the exhaust manifold.



Remove the sensor (13) with tool **Mot. 1610**, from underneath the vehicle (see page 17-3).

Remove:

- the exhaust manifold heat shield by removing the bolts (**12**),
- the exhaust manifold.

REFITTING

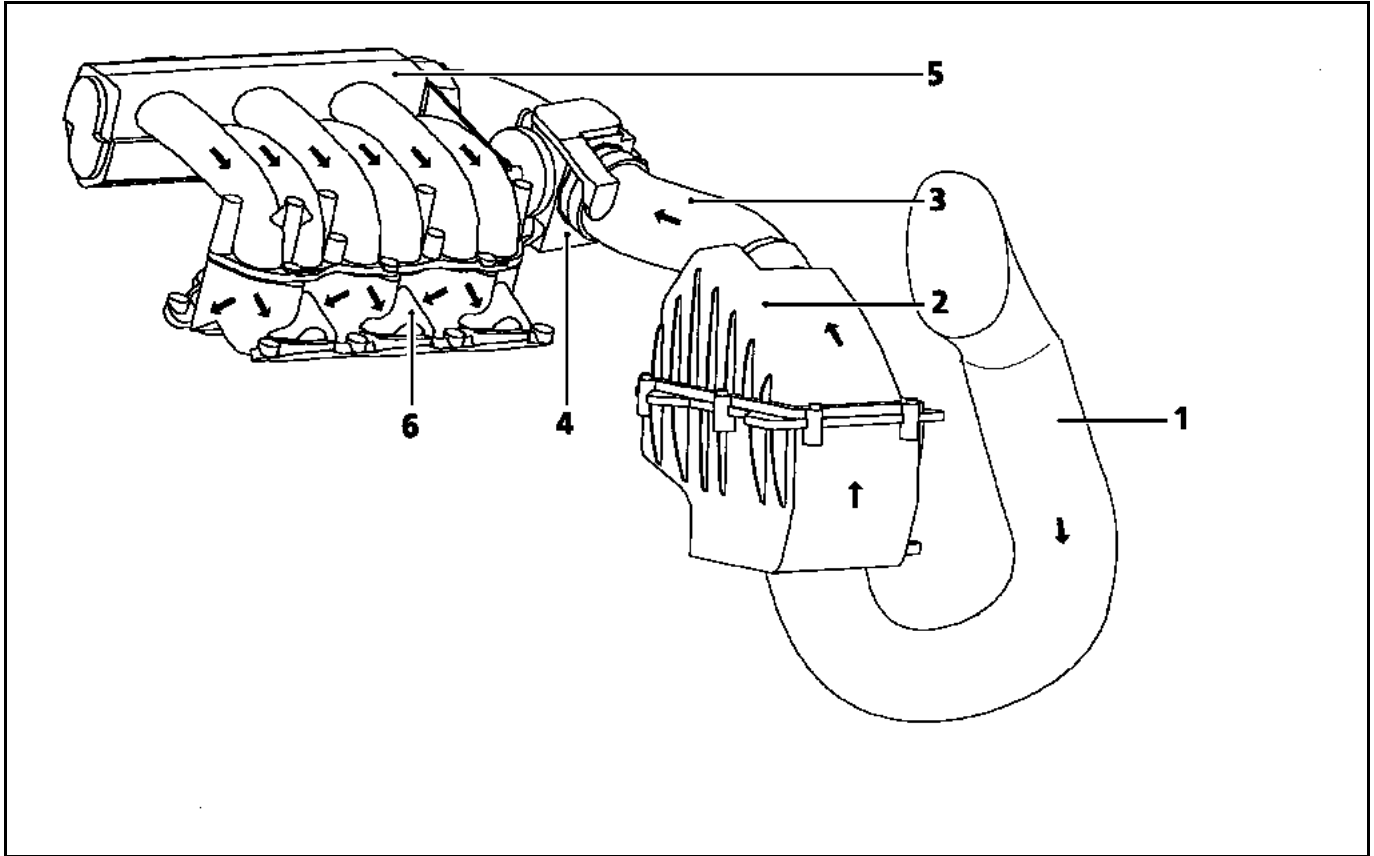
Proceed in the reverse order to removal.

WARNING

The bolt (**9**) must be tightened after bolts (**11**) and (**10**).

You must replace the seals.

AIR INTAKE CIRCUIT (diagram)

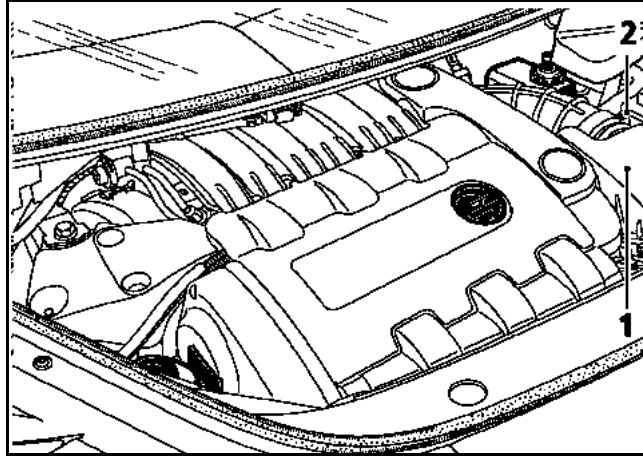


- 1 Air pipe
- 2 Air filter unit
- 3 Air pipe
- 4 Throttle housing
- 5 Inlet manifold
- 6 Air intake

REPLACING THE FILTER ELEMENT

Remove the mounting bolts from the upper section of the unit (2) and unscrew the clamp on the flexible hose to reach the filter element.

REPLACING THE FILTER ELEMENT



Remove the eight mounting bolts from the upper section (1) and unscrew the clamp (2) on the flexible hose to reach the filter element.

REMOVING THE FRONT BANK RAIL

Disconnect the battery.

Remove the engine cover.

Disconnect the petrol inlet pipe (1) leading to the rail. Watch out for leaks.

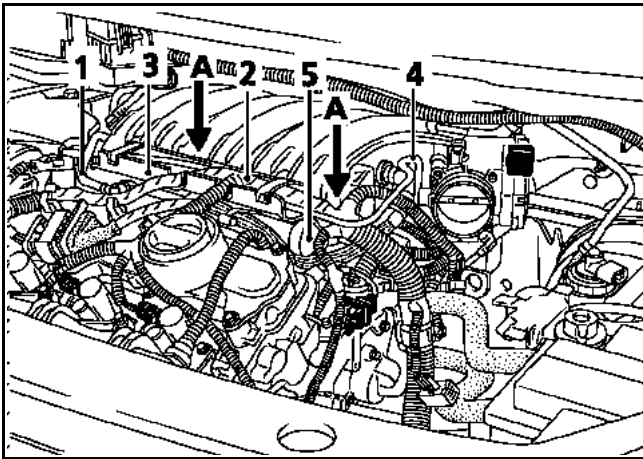
Remove the filler neck (3), the wiring (2) and the petrol vapour rebreather pipe (4) without disconnecting them.

Remove the filler neck (3).

Remove the injector rail (4) by removing the two mounting bolts located at (A).

Remove the rail and the injectors.

Check that the injectors seals are all present and in good condition before refitting.

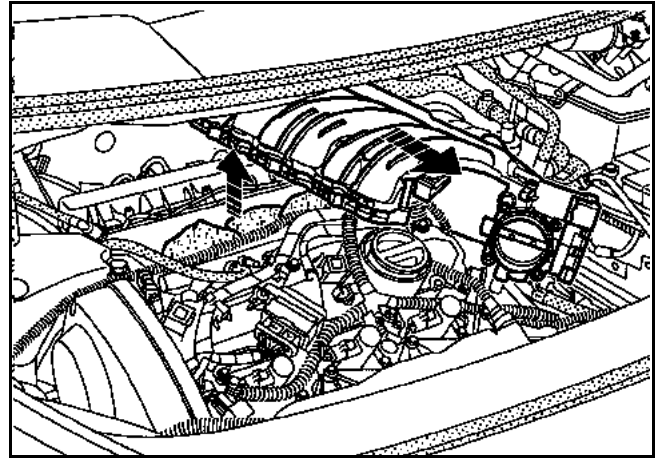


REMOVING THE REAR BANK RAIL

Disconnect the battery.

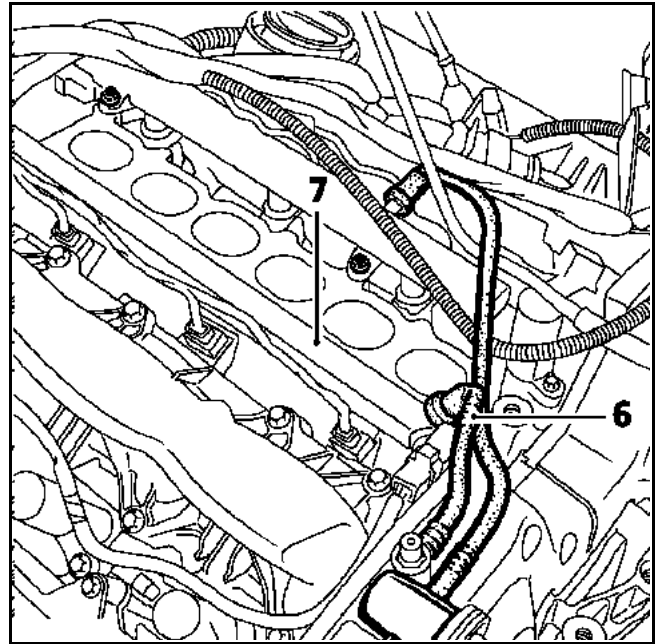
Remove:

- the engine cover,
- the inlet manifold; see **section 12 - Inlet manifold**,



Disconnect the fuel pipe (6).

Remove the rear rail mounting bolts (7) and then remove the rear rail.



Check that the injectors seals are all present and in good condition before refitting.

SPECIAL TOOLING REQUIRED

Mot. 1311-01 Fuel pressure test unit

Mot. 1311-03 Pressure reading union

CHECKING THE FUEL PRESSURE AND PUMP FLOW

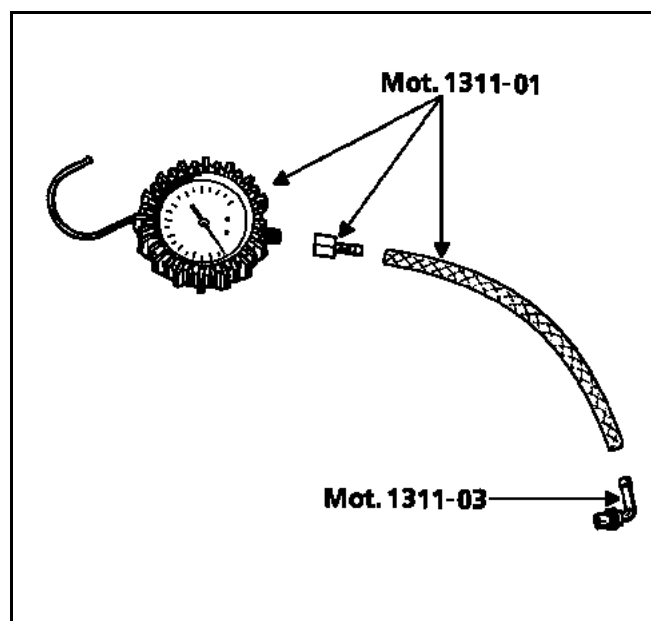
CHECKING THE PRESSURE

Remove the protective plastic cover from the cylinder head cover.

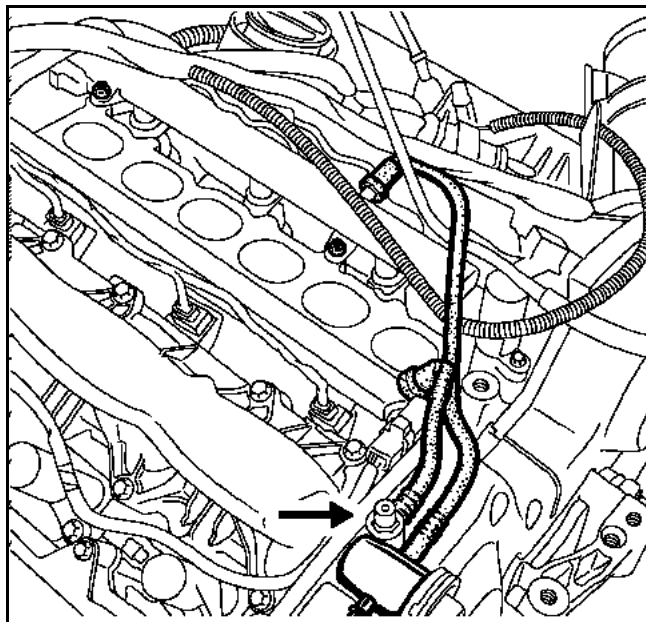
A quick-release union specially designed for pressure reading is fitted on the pulsation shock absorber.

Connect tool **Mot. 1311-03** to the quick-release union, and then join **Mot. 1311-03** to the test unit **Mot. 1311-01**.

Join **Mot. 1311-03** to the pressure gauge 0; + 10 bar using the unit (**Mot. 1311-01**).



Start the engine. Measure the pressure which should be between 3.5 ± 0.2 bar.



The fuel pressure is regulated according to the atmospheric pressure, not the manifold pressure.

It is therefore normal for the pressure to stay constant irrespective of the engine load.

PUMP

Manual power steering pump

13

The removal/refitting method for the power assisted steering pump is the same as the one described in **Technical Note 2996A**.

IDENTIFICATION

VEHICLE	ENGINE	ALTERNATOR	CURRENT
DE0 T	L7X	Valéo A 13 VI	120 A

CHECKING

After **15 minutes** warming up with a voltage of **13.5 volts**.

Engine rpm	12 amps
1500	26
4000	94
6000	105

REMOVAL

Put the car on a two-post lift.

Disconnect the battery.

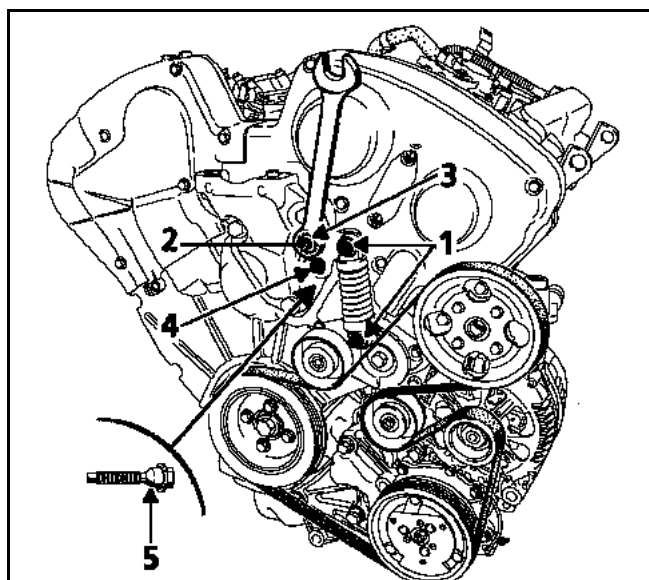
Remove the accessories belt.

Loosen bolts (1) and (2).

Keep the tensioner taut using the hexagonal spanner (3).

Unscrew the bolts (4) until they pass the conical section (5) of the oblong hole on the tensioner.

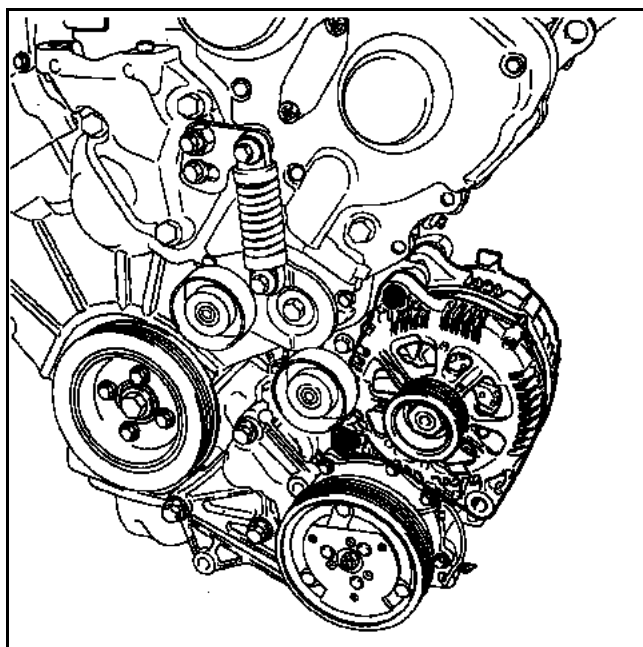
Remove the belt.



Disconnect the battery and all electrical connections on the alternator.

Remove:

- the compressor (see section **62 - Air conditioning compressor**),
- the power steering pump pulley,
- the alternator.



REFITTING

Proceed in the reverse order to removal. Fill up with refrigerant fluid (see section **62**).

To refit the accessories belt, move the tensioner back into its operating position to the right, and torque tighten bolts (4) and (2) to **2.5 daNm**.

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

VEHICLE	ENGINE	STARTER
DE0 T	L7X	VALEO D6 RAP 405

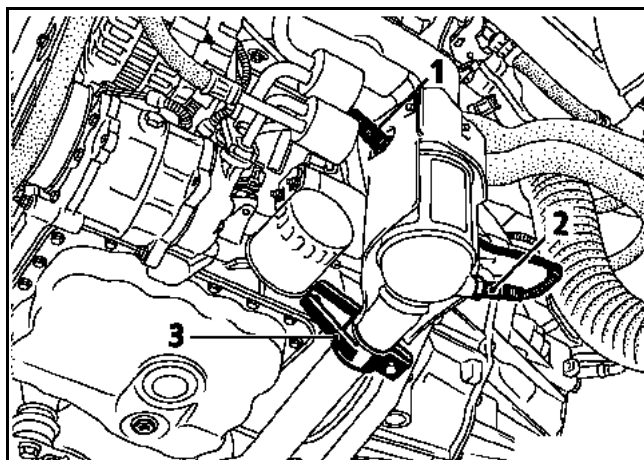
Put the vehicle on a two post lift.

Disconnect the battery.

Remove:

- the engine cover,
- the plastic engine undertray.

Disconnect electrically the two oxygen sensors (1) and (2) from the front cylinder row, and remove the sensor (1).



Remove:

- the bracket (3),
- the pre-catalytic converter flange mounting nuts from the exhaust manifold.

Let the pre-catalytic converter hang down.

The heat shield from the starter motor linked to the engine housing.

Disconnect the starter motor electrically.

Remove the starter motor mounting bolts and the starter motor.

Ignition is controlled by the injection/ignition computer.

The firing order is 1 - 6 - 3 - 5 - 2 - 4.

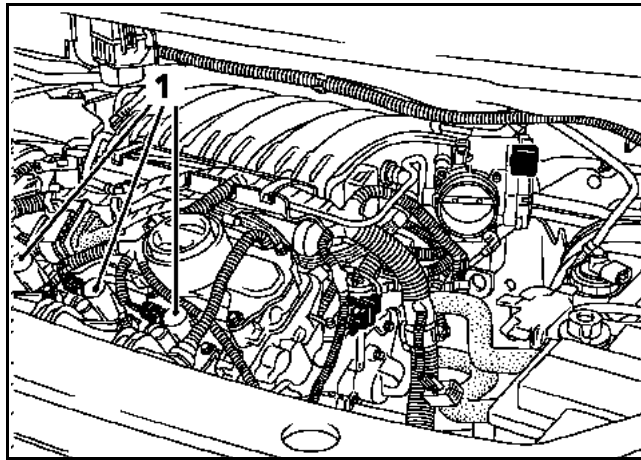
PRESENTATION

The system comprises:

- the injection computer (the ignition power stage is integrated into the computer),
- six coils on the spark plugs,
- six spark plugs,
- a pinking sensor.

PENCIL COILS (1)

There are six pencil coils, integrated in the spark plugs.



SPARK PLUGS

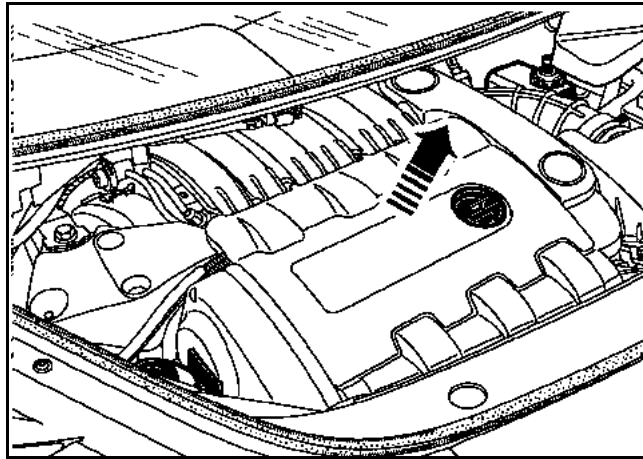
NGK PFR 6 E - 10

Gap: **1.0 mm** (adjustable)

Tightening torque: **3 daNm**.

FRONT CYLINDERS

These can be removed once the engine cover and coils have been removed (1).



REAR CYLINDERS

These can be removed once the inlet manifold has been removed. See the removal - refitting method described in **section 12 - Inlet manifold**.

There are four interchangeable oxygen sensors.

REAR MANIFOLD OXYGEN SENSOR

REMOVAL

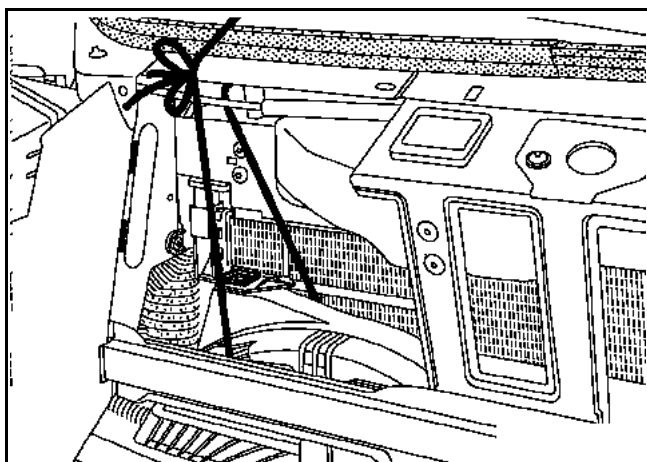
Remove the sensor using tool **Mot. 1610**.

Place the vehicle on a lift.

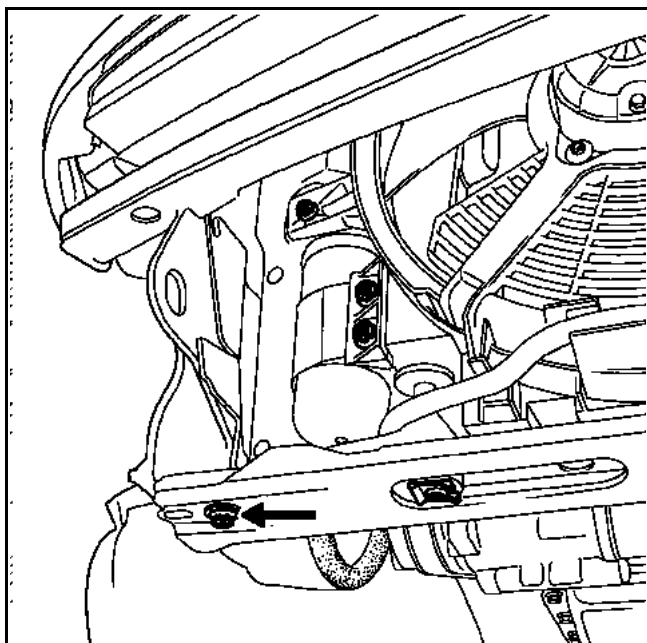
Disconnect the battery.

Remove the front bumper.

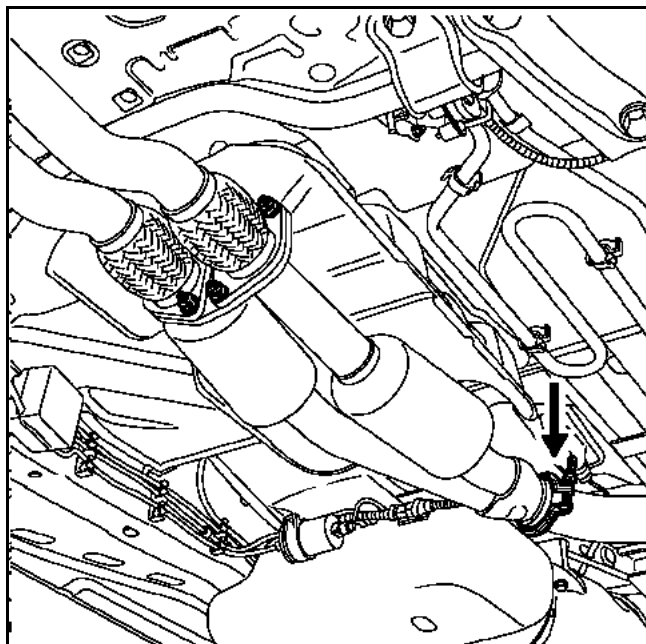
Support the cooling system while attaching the right collar with string to the upper cross member.



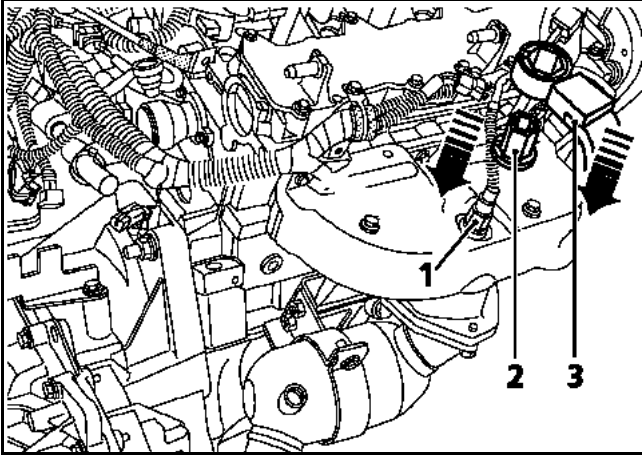
Remove the mounting bolt from the cross piece on the side member.



Detach the exhaust pipe underneath the Y-shape union of the catalytic converters.



Carefully tip the engine - gearbox assembly towards the front to reach the sensor and then disconnect the sensor electrically.



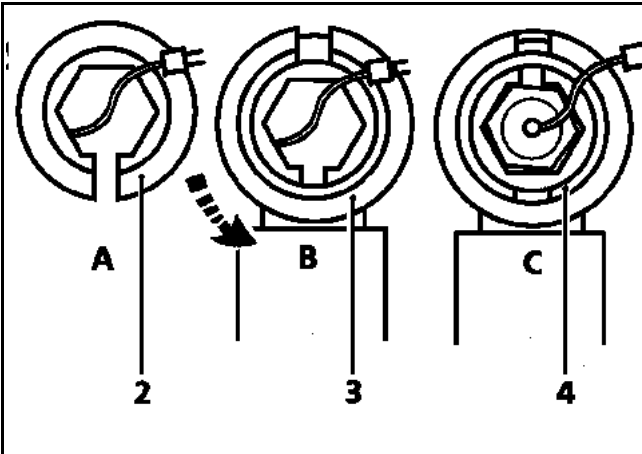
Place the socket (2) around the sensor wiring (1) with the slot pointing downwards (diagram A).

Do not bring the socket directly into contact with the sensor.

Next, bring the tool head (3) into the "to be unscrewed" position around the socket (diagram B).

Turn the socket (2) and the split ring (4) half a turn to position (C).

Fit the assembly to the sensor.



Considerable force is needed to unscrew this assembly, and it is therefore very important to fit the parts in the order described above so as not to damage the tool or the sensor.

REFITTING

When refitting, ensure that the new sensor does not get damaged by the heater matrix water reservoirs and take care not to twist the electric wiring (connect it after tightening the sensor).

Tightening torque: **5 daNm** (examples only).

ANTIFREEZE QUANTITY AND QUALITY

Engine	Volume (in litres)	Grade	Special notes
L7X	7	GLACEOL type D only use recommended coolant	Protects down to - 35 °C for all countries

THERMOSTAT

Engine type	Starts to open at (°C)	Fully open at (°C)	Travel (mm)
L7X	83	95	7.5

Coolant flow is continuous in the heater matrix, which contributes to the cooling of the engine.

FILLING

Check the tightness of the drain plug(s).

Open the bleed screw on the heater matrix water reservoirs.

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

Let the engine run for about **10 minutes** at **2500 rpm**, until the fans operate (time needed for automatic degassing).

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

DO NOT OPEN THE BLEED SCREW(S) WHILE THE ENGINE IS RUNNING.

RE-TIGHTEN THE EXPANSION BOTTLE CAP WHILE THE ENGINE IS WARM.

SPECIAL TOOLING REQUIRED	
M.S. 554-07	Kit for testing cooling circuit sealing
M.S. 554-01	Adapter for M.S. 554-07
M.S. 554-06	Adapter for M.S. 554-07

1 - Testing the sealing of the circuit

Replace the expansion bottle valve with adapter **M.S. 554-01**.

Connect this to tool **M.S. 554-07**.

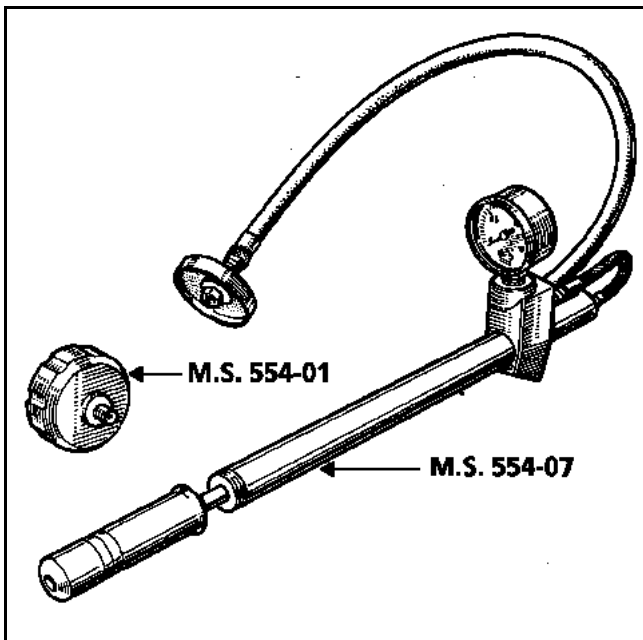
Let the engine warm up then turn it off.

Pump to put the circuit under pressure.

Stop pumping at **0.1 bar** less than the valve is rated.

The pressure should not drop; if it does, look for the leak.

Slowly unscrew the union of tool **M.S. 554-07** to decompress the cooling circuit, then remove tool **M.S. 554-01** and refit the expansion bottle valve with a new seal.



2 - Checking the rating of the valve.

If liquid passes through the expansion bottle valve, the valve must be replaced.

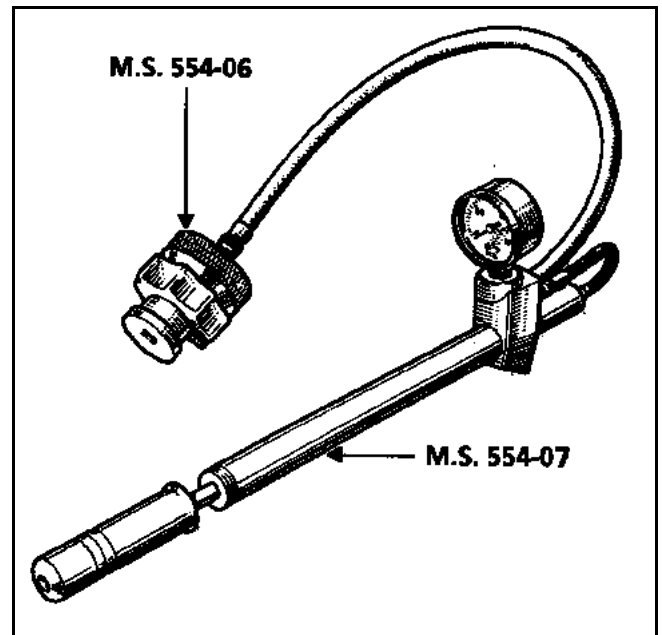
On pump **M.S. 554-07** fit tool **M.S. 554-06** and fit the assembly on the valve to be checked.

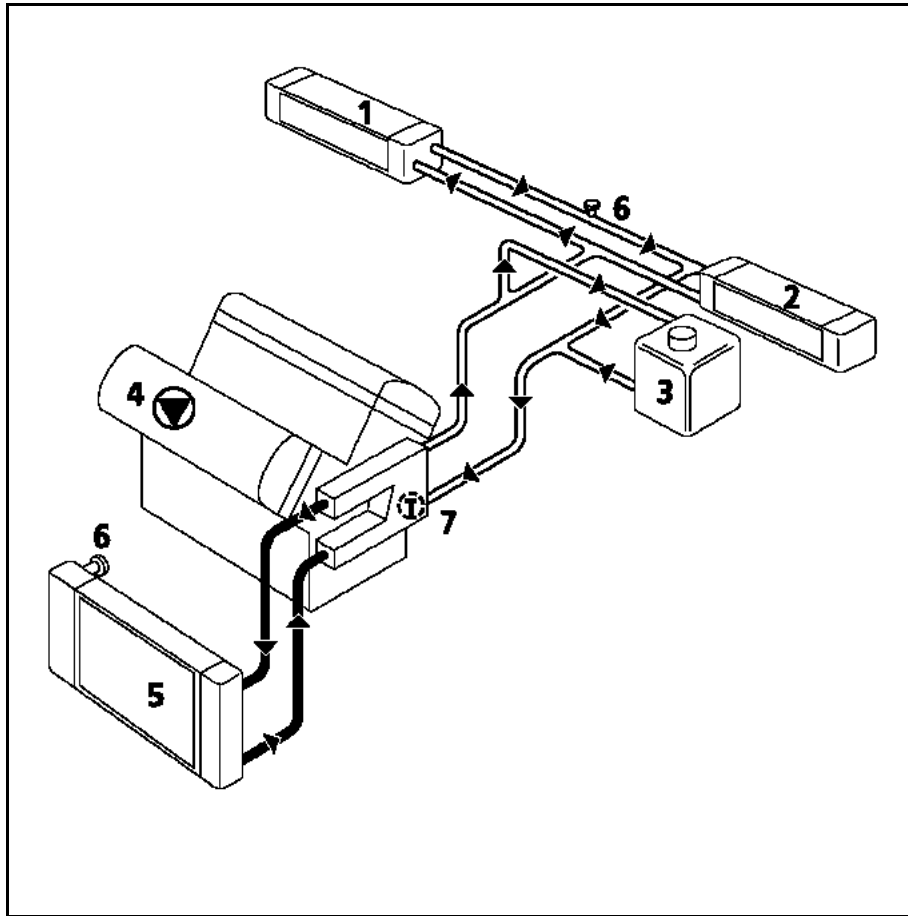
Increase the pressure, which should stabilise at the valve rating pressure with a test tolerance of ± 0.1 bar.

Valve rating value:

Brown plastic valve **1.2 bar**.

Blue plastic valve **1.6 bar**.





- 1 Right heater matrix
- 2 Left heater matrix
- 3 "Hot" bottle with permanent degassing
- 4 Coolant pump
- 5 Engine radiator
- 6 Bleed screws
- 7 Thermostat

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

You can remove the cooling radiator on its own, without opening the coolant circuit.

Put the vehicle on a two post lift.

Disconnect the battery.

Drain the coolant circuit through the lower hose.

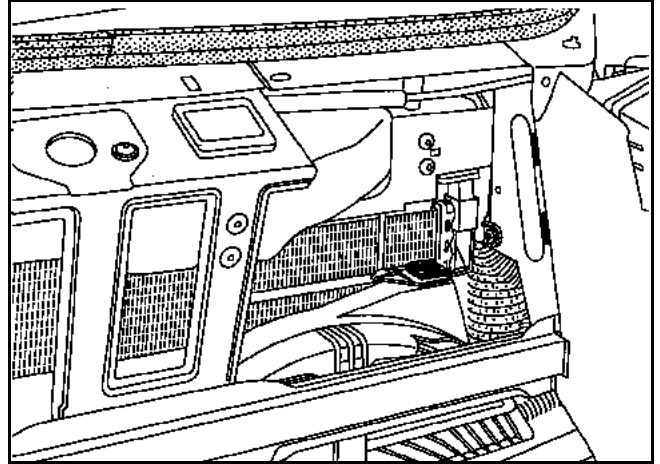
Remove:

- the front bumper,
- the plastic engine undertray.

Disconnect the fog lights if necessary.

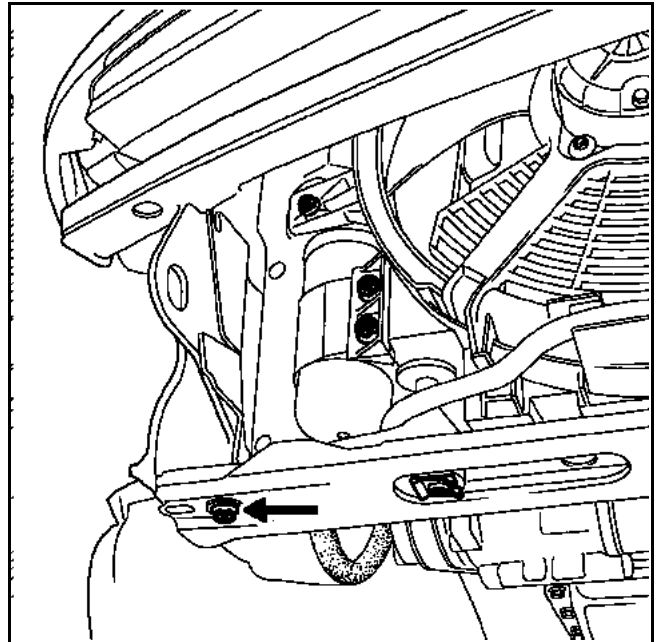
Attach the collar/condenser assembly to the cross member on the bonnet catch.

Detach the nozzle/radiator mountings.



Position a board under the front of the vehicle to support the lower cross member while gaining access to the mounting bolts on the side member tips.

Remove the cross member mounting bolts.



Lift the vehicle and remove the radiator from the nozzle at the same time (this is a two-man job).

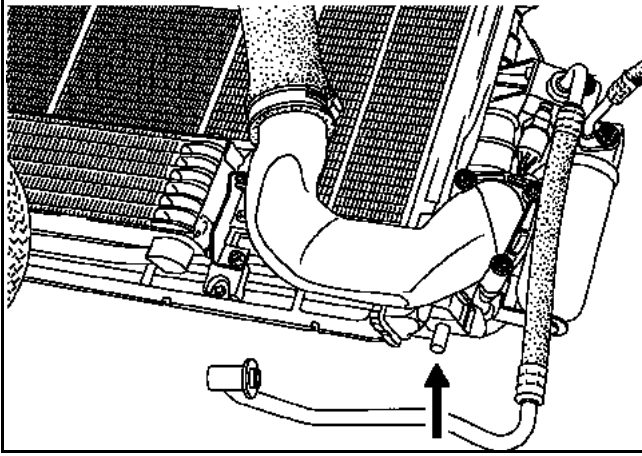
REFITTING

Still working in a pair, refit the cooling radiator; lubricate the upper rubber mountings on the headlight holder cross member if necessary.

Refitting in the reverse order to removal.

Bleed the engine and check the tightness of the cooling and air conditioning circuits.

This operation consists of reattaching one or two centring pins from the radiator in the cross member, which have been split due to a mild impact (radiator wiring and plenum chambers still intact).



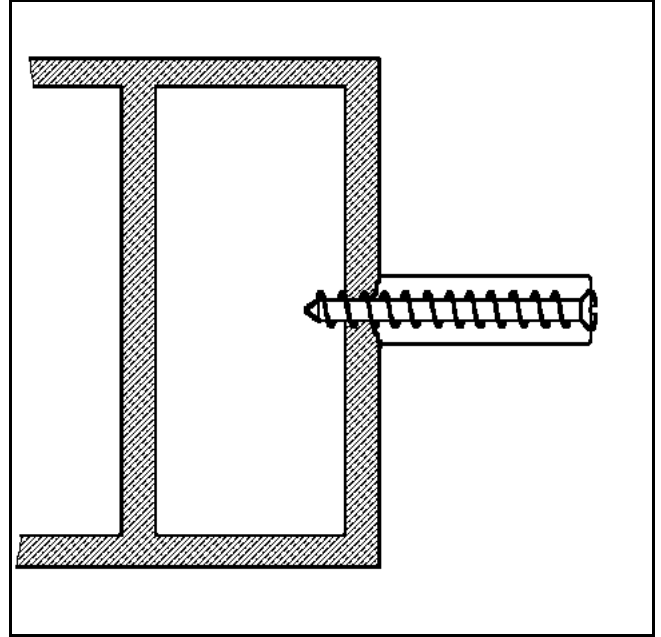
Check that the radiator is not pierced, warped or dented and possibly leaking before starting the operation.

The repair applies to the cooling radiator and the engine fan collars.

The following repair methods are classified in order of rising cost.

We therefore recommend selecting the method best suited to the severity of the damage.

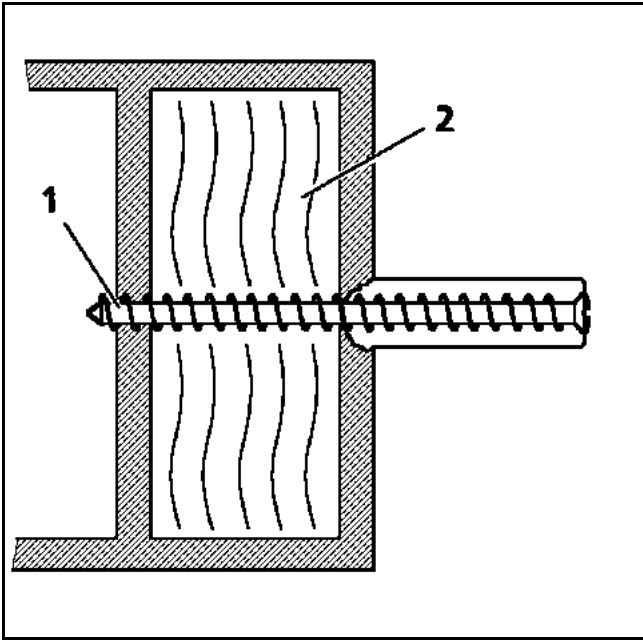
Repair methodno. 1



A "Parker" bolt goes through the pin in the shaft and screws into the foot of the radiator, at the base of the pin, which has been pierced to the diameter of the bolt centre prior to the operation. This operation can only be performed on a radiator whose pin has been cut without damaging the foot, and only if the remaining thickness is sufficient for the bolt to "hold" in the metal (approximately 1 bolt centre).

In the event that a foot is deformed or the surface has been taken out, apply one of the methods in the following pages **where possible**. They are classed in order of rising labour cost.

Repair methodno. 2

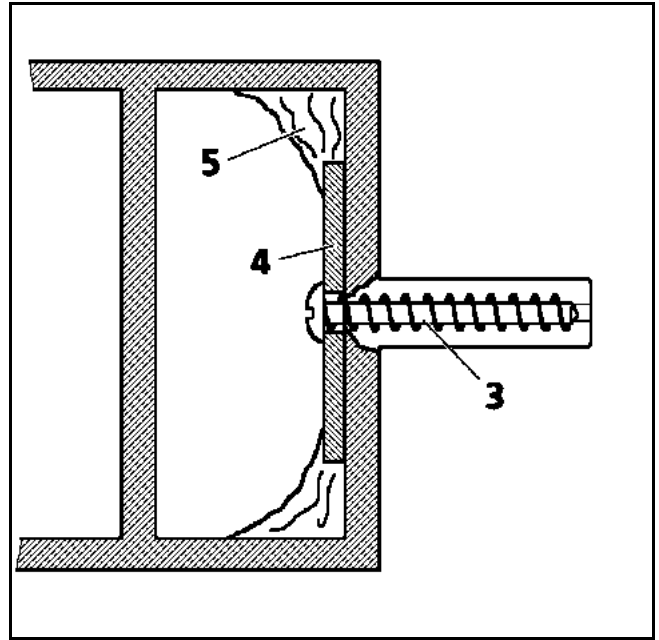


The "Parker" bolt should go through another intact surface on the foot of the radiator (1).

Warning: not a cooling circuit surface.

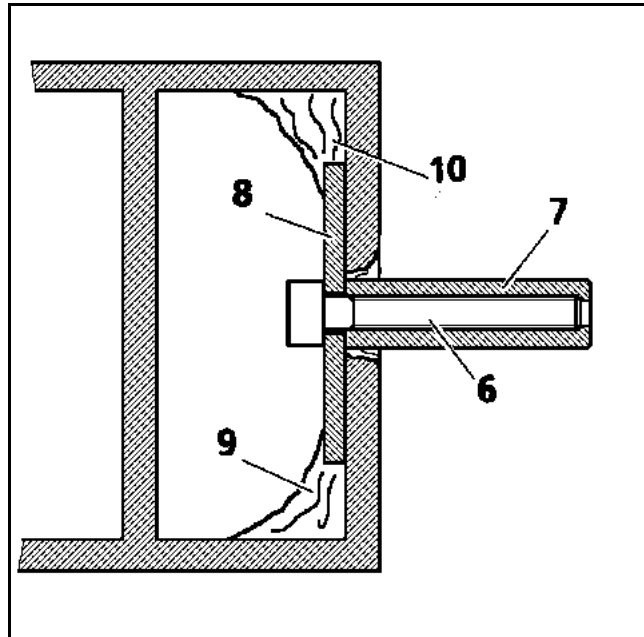
To strengthen the assembly, plug the intermediate cavity with PLIOGRIP 103 adhesive (**part no.: 77 11 171 429**) or an equivalent product (2).

Repair methodno. 3



A "Parker" bolt (3) is assembled with the largest available flat washer (4) before being inserted into the surface removed from the foot. The original pin is then screwed into the bolt thread. Use a hacksaw blade, or similar tool, to support the bolt head. Add adhesive (5) to strengthen the assembly.

Repair methodno. 4



A CHC bolt (6) reinforces a locally manufactured metal pin (7) (with a round rim of the same diameter as the original pin), holding a large flat washer (8). Adhesive (9) strengthens the assembly.

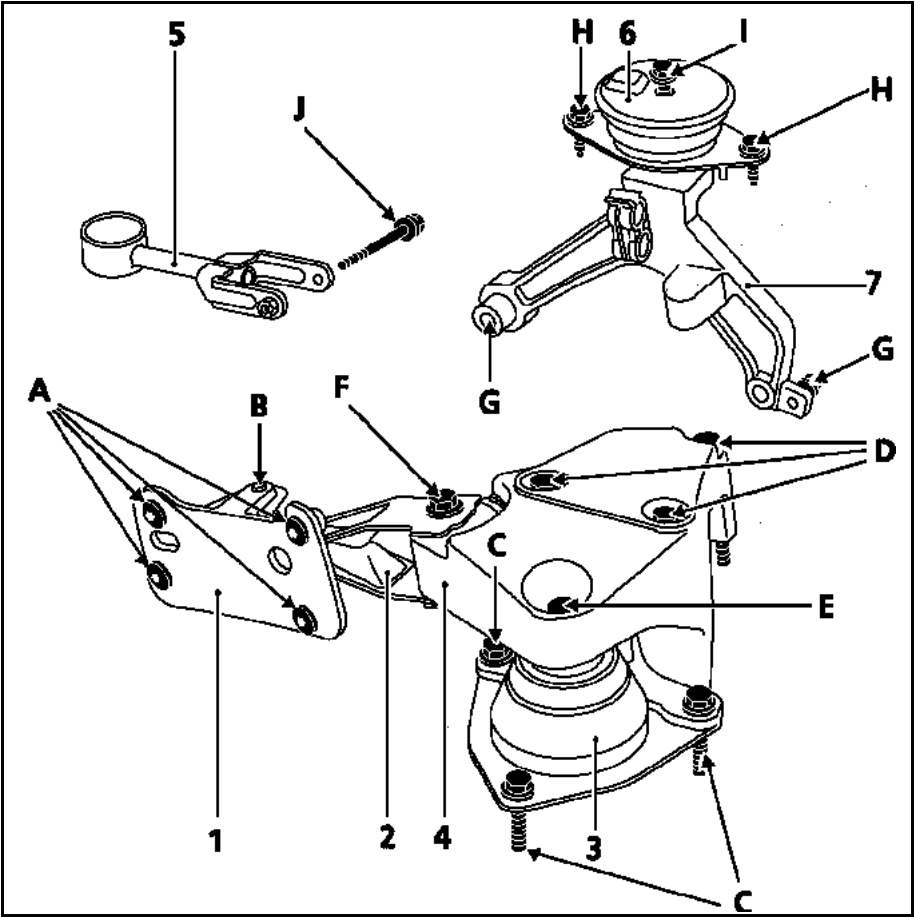
Reinforce the pin flush fitting with a cement bead (10).

The removal/refitting method for the coolant pump on the **AVANTIME** is the same as for the **ESPACE** with the **L7X** engine.

Please consult Technical Note **2996A** for information on this operation.

DESCRIPTION

Symbol	Tightening torques (daNm)
A	3
B	10.5
C	6
D	6.2
E	6.2
F	10.5
G	6.2
H	10.5
I	10.5
J	10.5



- 1 Anti-torque linkage fastening fork
- 2 Torque reaction arm
- 3 Rubber pad on the front right suspended engine mounting
- 4 Right suspended mounting cover
- 5 Rear torque reaction arm
- 6 Rubber pad on the front left suspended engine mounting
- 7 Suspended engine mounting support on the gearbox

COMPOSITION

The engine is suspended on two rubber pads (3 and 6). The longitudinal torque reaction is maintained by:

- by the torque reaction arm (5) for the lower section of the engine-gearbox assembly,
- by the travel limiter (2) for the upper section of the engine-gearbox assembly.

NOTE: do not exceed a travel limiter angle of 20 ° in relation to the vertical so as not to damage the rubber pads.

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 turret and tighten the bolts to **3 daNm**,
- the linkage (2) on the mounting (1) by tightening it by hand,
- the Paulstra rubber pad (3) on the turret and tighten it to between **5** and **6.5 daNm**,

- the suspended engine mounting cover (4) on the rubber pad (3) and fix it to the linkage (2). Tighten the linkage (2) mounting bolt to the mounting (1) to **10.5 daNm**.

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

Tighten the cover mounting bolt on the rubber pad (3) to **6.2 daNm** and the linkage connecting bolts (2) on the cover (4) to **10.5 daNm**.

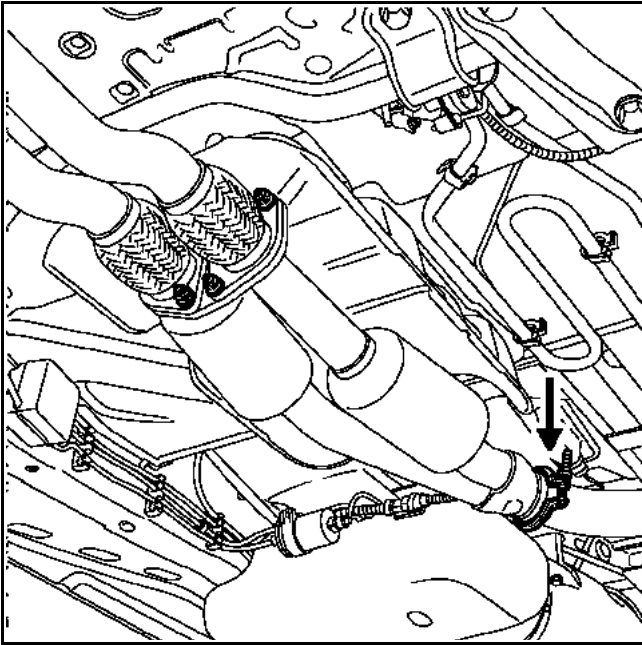
TIGHTENING TORQUES (in daNm)

Catalytic converter intake flange nuts	2.2
Catalytic converter clamp/expansion nuts	2.5

REMOVING THE SYSTEM

Put the vehicle on a two-post lift.

Separate the connection between the central catalytic converter unit and the expansion - silencer unit.



Remove:

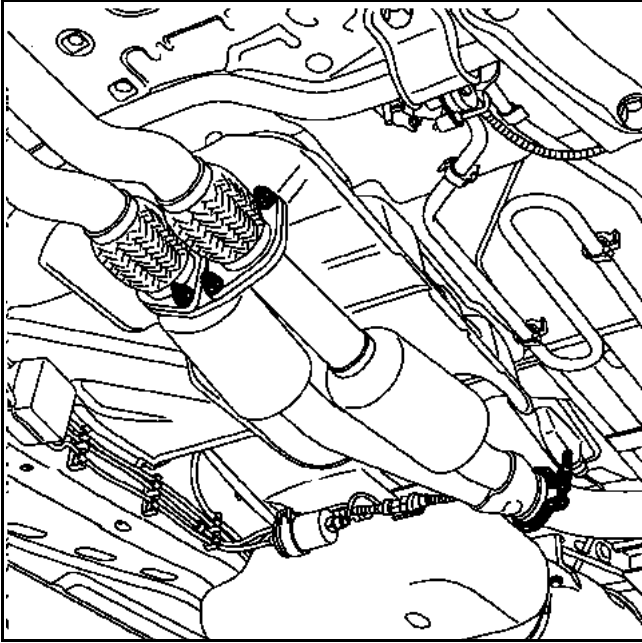
- the emergency spare wheel,
- the rubber suspensions from the expansion/silencer unit,
- the expansion chamber heat protector.

Remove the assembly from the rear (two-man job).

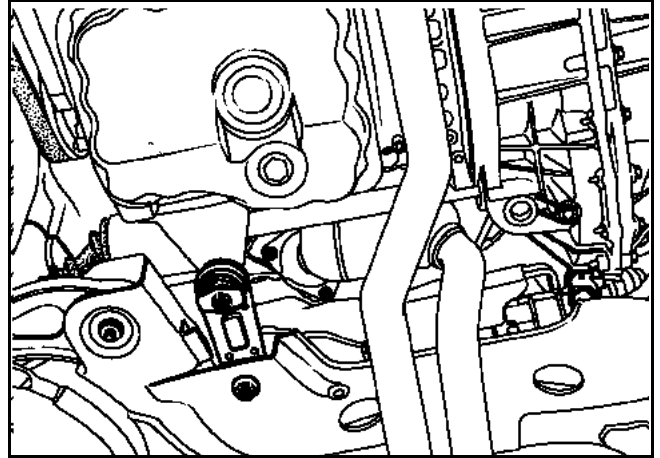
IMPORTANT:

- The seal between the exhaust manifold gasket face and the catalytic converter must be perfect.
- It is imperative that every gasket removed be **REPLACED** (especially at the catalytic converter flange).
- When removing/refitting, the catalytic converter must not be subjected to mechanical shocks, as these could damage it.

Y-shape union of the two catalytic converters



You must remove the torque reaction arm before removing this component, so as to let the exhaust system give way slightly.



IMPORTANT:

- The seal between the exhaust manifold gasket face and the catalytic converter must be perfect.
- It is imperative that every gasket removed be **REPLACED** (especially at the catalytic converter flange).
- When removing/refitting, the catalytic converter must not be subjected to mechanical shocks, as these could damage it.

REMOVAL - REFITTING

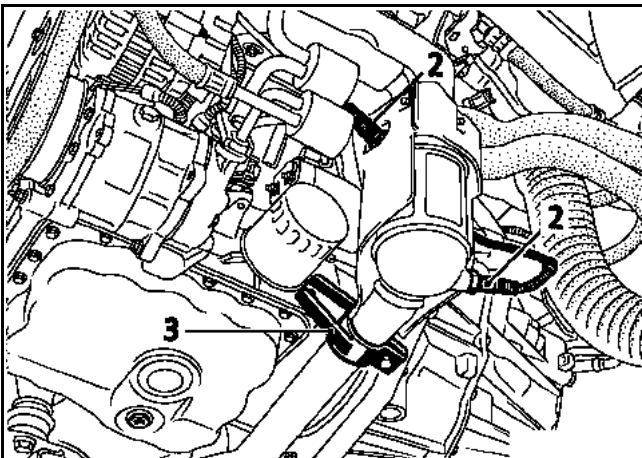
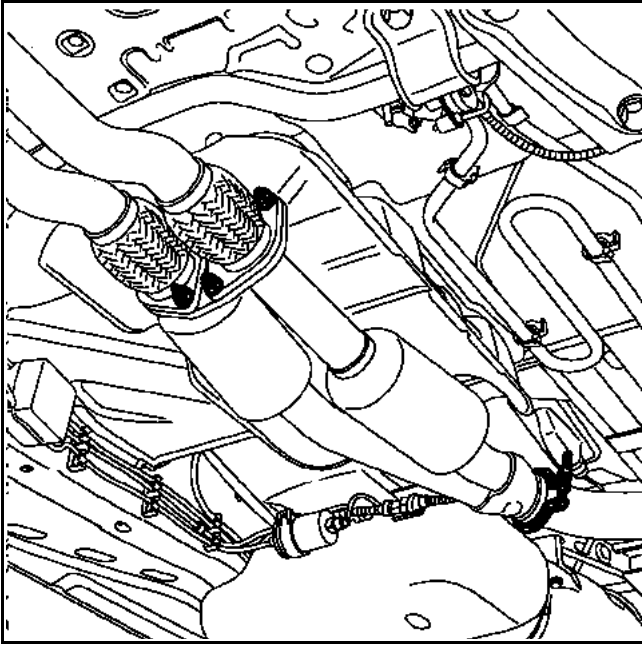
Put the vehicle on a two-post lift.

Disconnect the battery.

Catalytic converter on the front cylinder row.

Remove the **Y-shape** union.

Disconnect and remove the two oxygen sensors (2) and the hose supporting bracket (3) on the sump.



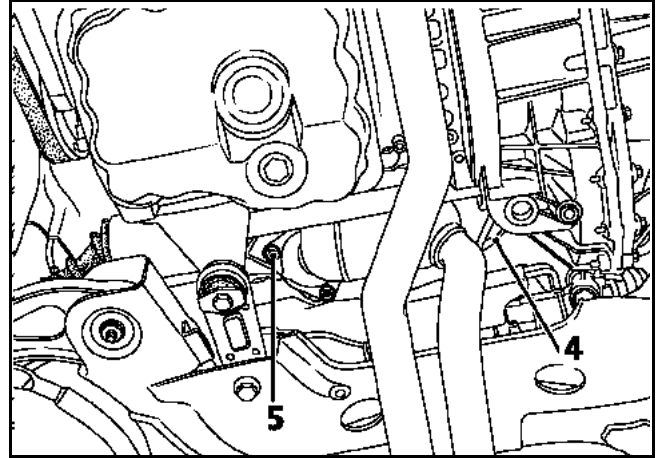
Remove:

- the catalytic converter heat shields,
- the catalytic converter flange bolts on the exhaust manifold,
- the hose and the front catalytic converter.

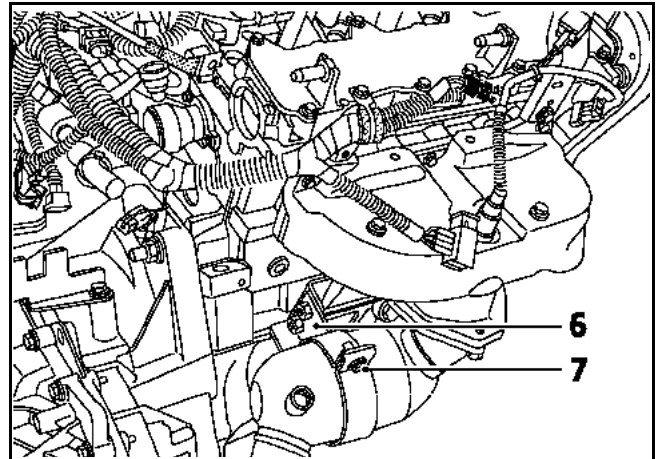
Catalytic converter on the rear cylinder row.

Remove the **Y-shape** union.

Disconnect and remove the sensor (4) and the three catalytic converter flange mounting nuts (5) on the exhaust manifold.



Remove the catalytic converter retaining bracket (6).



WARNING: when refitting, tighten the nut (7) last, after tightening the flange nuts (5) and the bracket (6).

A collar that has been used once must be replaced.

Before refitting the assembly, check that no impurities or metal particles have lodged in the exhaust pipe upstream of the expansion chamber or in the pre-catalytic converters.

Replace the catalytic converter outlet seal.

After everything has been refitted, check that no part of the exhaust pipe is in contact with the underbody.

NOISE FROM THE EXHAUST SYSTEM

Test the vehicle to locate the source of the noise (as required, on customer request). Then attempt to reproduce the fault. To do this, you must accelerate sharply to cover the wide range of engine noises.

Once you have reproduced the fault:

- ensure that the exhaust system is not in contact with the vehicle body,
- check the alignment, conformity and condition of the exhaust assembly,
- try to eliminate the noise by putting the faulty exhaust system or heat shield under constraint.

If the noise is located at the catalytic converter, you must remove it and carry out the following checks:

- visually inspect the inner walls (monolith melted),
- listen for noise after shaking the converter vigorously (monolith melted or foreign body present).

If the monolith has melted, you must find the reason why (see section **14: Checks to be performed before the anti-pollution test**) and check that particles from the catalytic converter have not blocked up the downstream exhaust system.

Only replace the catalytic converter if one of the above faults is present.