Mégane

Scénic

Technical Note 3350A

XA0 5

SPECIAL FEATURES OF F9Q 732 ENGINE

WITH HIGH PRESSURE DIRECT INJECTION

Please observe the cleanliness advice for any operations on this vehicle (section 13).

This Technical Note cancels and replaces Technical Note 3245A

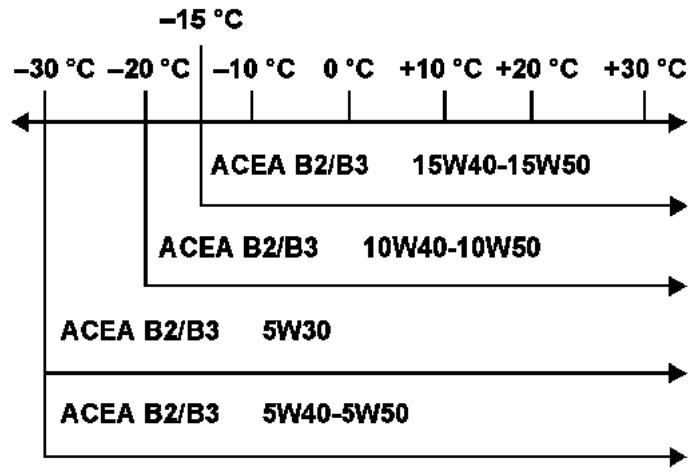
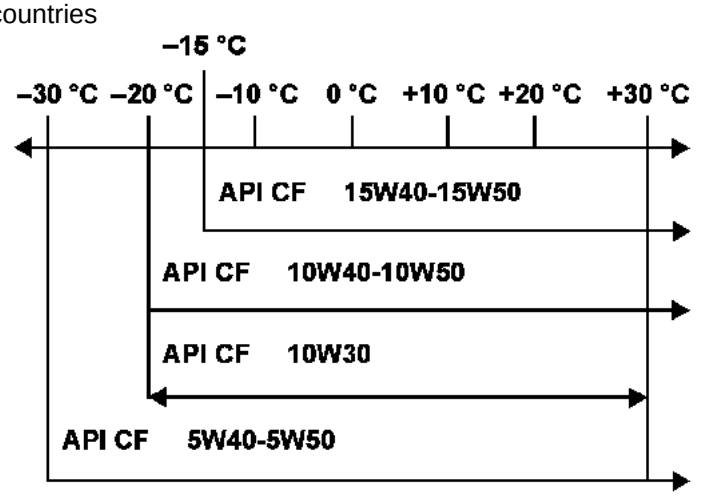
For all parts not dealt with in this Technical Note refer to Workshop Repair Manual MR 312.

Consult Technical Note 3341A for the diagnostic part.

77 11 292 962 **MARCH 2000** **EDITION ANGLAISE**

Contents

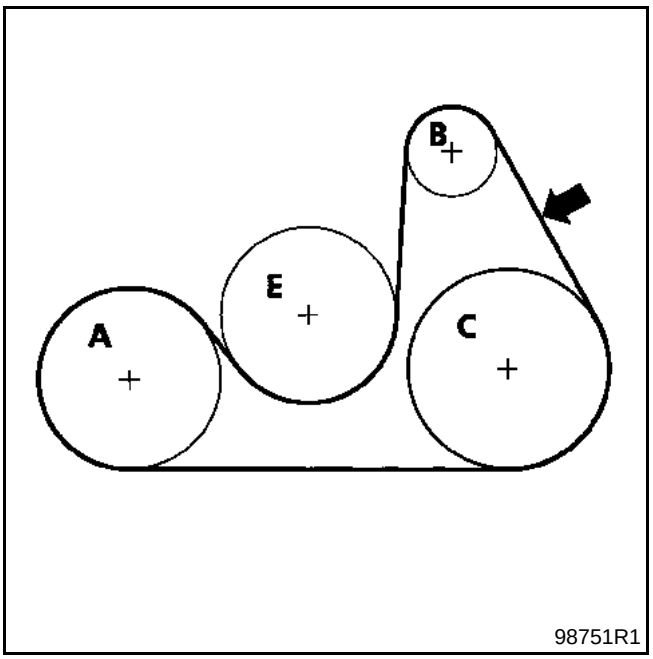
Contents

Components	Capacity in litres (approx.)*	Grade
Diesel engine (oil)	In case of oil change	European Union countries  Under no circumstances should ACEA B1 oils be used for diesel engines
F9Q	4,5 4,6 (1)	Other countries 

* Adjust using the dipstick
(1) After replacing the oil filter

Components	Capacity in litres	Grade	Special notes
Gearbox JC5	3.1	All countries: TRANSELF TRX 75 W 80 W (Standards API GL5 or MIL-L 2105 G or D)	
Coolant circuit F9Q	7.5	Glacéol RX (type D)	Protection to - 20 °C ± 2°C for warm, moderate and cold climates. Protection to - 37°C ± 2°C for very cold climates.

ALTERNATOR AND POWER ASSISTED STEERING



Fitting tension (in Hertz): 188 ± 5

See Technical Note **3247A** for the procedure for using the tension measuring tool **Mot. 1505**.

A Crankshaft
B Alternator
C Power assisted steering pump
E Water pump

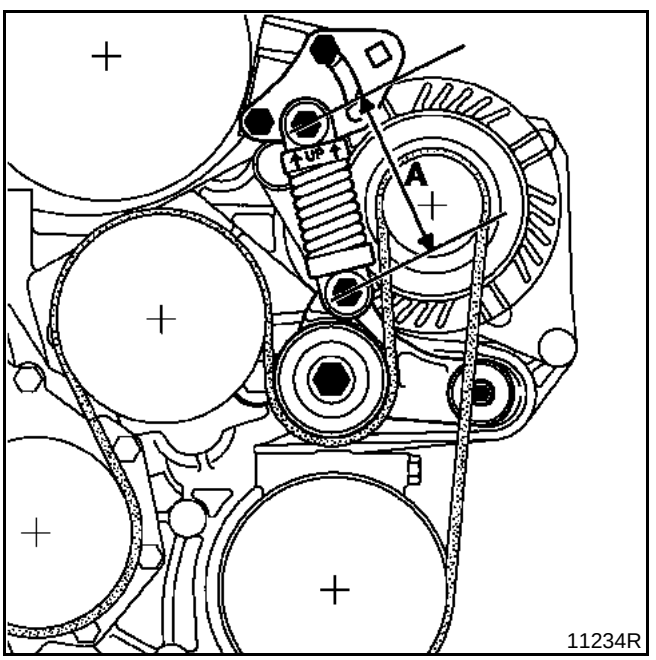
→ Tension checking point

Checking the accessories belt tension

SPECIAL TOOLING REQUIRED	
Mot. 1387	**Tool for checking the automatic tension wheel centreline**

Checking the automatic tension wheel centre line

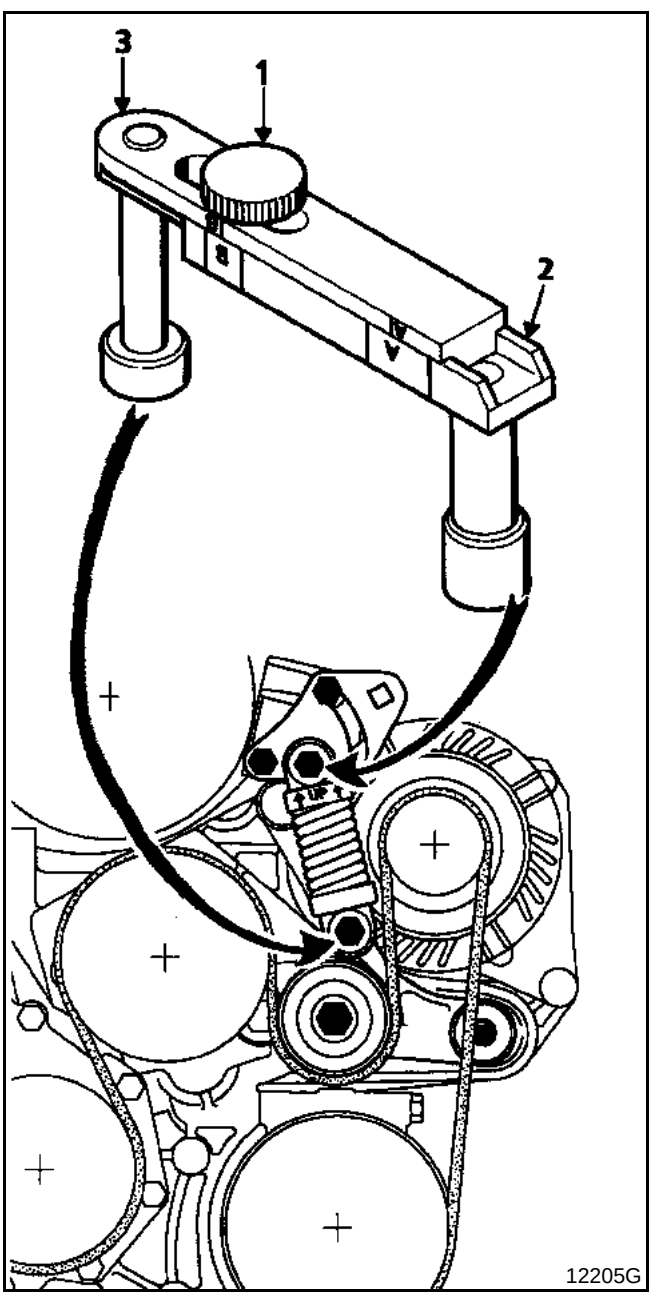
Before removing the accessories belt, check the centreline (A) on the automatic tension wheel using **Mot. 1387**.



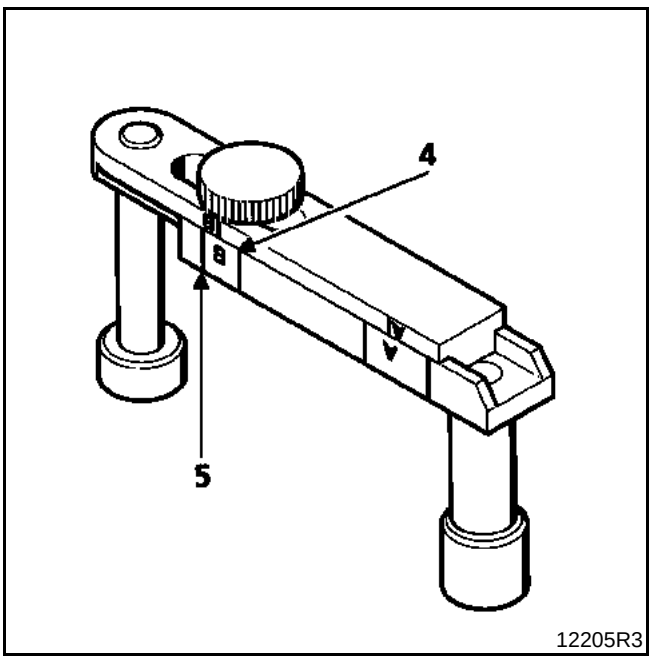
Methods for using Mot. 1387

Loosen knurled bolt (1) so that the arms (2) and (3) can slide against each other.

Position **Mot. 1387** on the two mountings for the tensioner component, then lock the arms (2) and (3) by turning the knurled bolt (1).



Using **Mot. 1387** check that you are well within tolerance **(zone B)**.



NOTE:

Min. tolerance = Mark (4)

Max. tolerance = Mark (5)

Checking the centreline allows you to check if the automatic tension system is working correctly.

If the centreline is outside permitted tolerance values, check the following points:

ENGINE / CENTRELINE	F9Q
Centreline less than minimum	– Check that the eccentric plate is positioned correctly (at the base of the opening). – Incorrect belt (too short). – Incorrect belt passage.
Centreline greater than maximum	– Check that the eccentric plate is positioned correctly (at the base of the opening). – Incorrect belt (too long). – Incorrect belt passage.

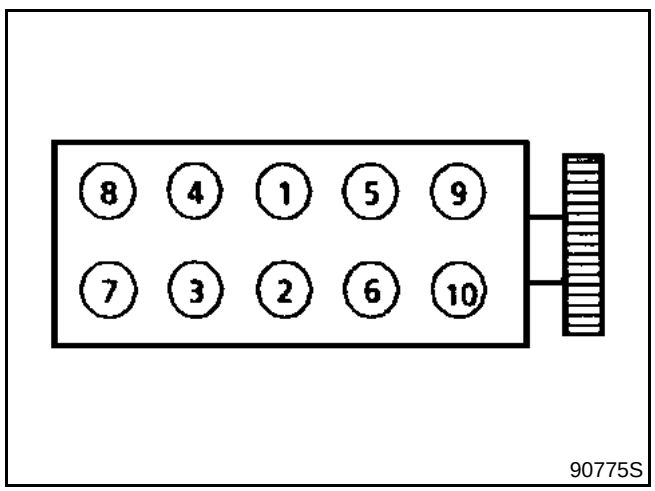
METHOD FOR TIGHTENING THE CYLINDER HEAD

REMINDER: in order to tighten the bolts correctly, use a syringe to remove any oil which may have entered the cylinder head mounting bolt holes.

All the cylinder head bolts must always be changed after removal. There is no cylinder head retightening operation.

Preseating the gasket

Tighten all the bolts to **3 daN.m**, then angle tighten to **100° ± 4°** in the order shown below.



Wait 3 minutes settling time.

Tightening the cylinder head:
- cylinder head tightening is carried out in stages, and the following procedure is applied successively to bolts **1-2 then 3-4, 5-6, 7-8 and 9-10,**
- slacken bolts **1-2** until they are completely free,
- tighten bolts **1-2 to 2.5 daN.m**, then angle tighten to **213 ± 7°**,
- repeat the slackening and tightening operations for bolts **3-4, 5-6, 7-8 and 9-10**.

There is no cylinder head retightening operation.

Type	Rim	Tyres	Tyre pressure when cold (in bar) (1)	
			Front	Rear
BA05	6 J 15	185/60 R 15	2.4	2.2
JA05	6 J 15	185/60 R 15	2.3	2.3

(1) With full load and on motorways.

Tightening torque for wheel nuts: **9 daN.m**

Rim run-out: **1.2 mm**

Type	at the front		at the rear			
	Disc thickness (in mm)		Disc thickness (in mm)		Drum diameter (in mm)	
	Max.	Min.	Max.	Min.	Min.	Max. (1)
BA05	20.6	17.6	-	-	203.2	204.45
JA05	24	21	11	9.5	-	-

(1) Drum: maximum wear diameter

Max. disc run-out: **0.07 mm**

Type	Lining thicknesses (in mm) (including backing)				Brake fluid
	Front		Rear		
	New X $^{+0,05}_{-0,55}$	Min.	New X $^{+0,3}_{0}$	Min.	
JA05	18	6	11	5	SAE J1703 DOT 4
BA05	18	6	4.9 (1) 3.4 (2)	2	SAE J1703 DOT 4

(1) Leading brake shoe.
(2) Trailing brake shoe.

BRAKING PRESSURE

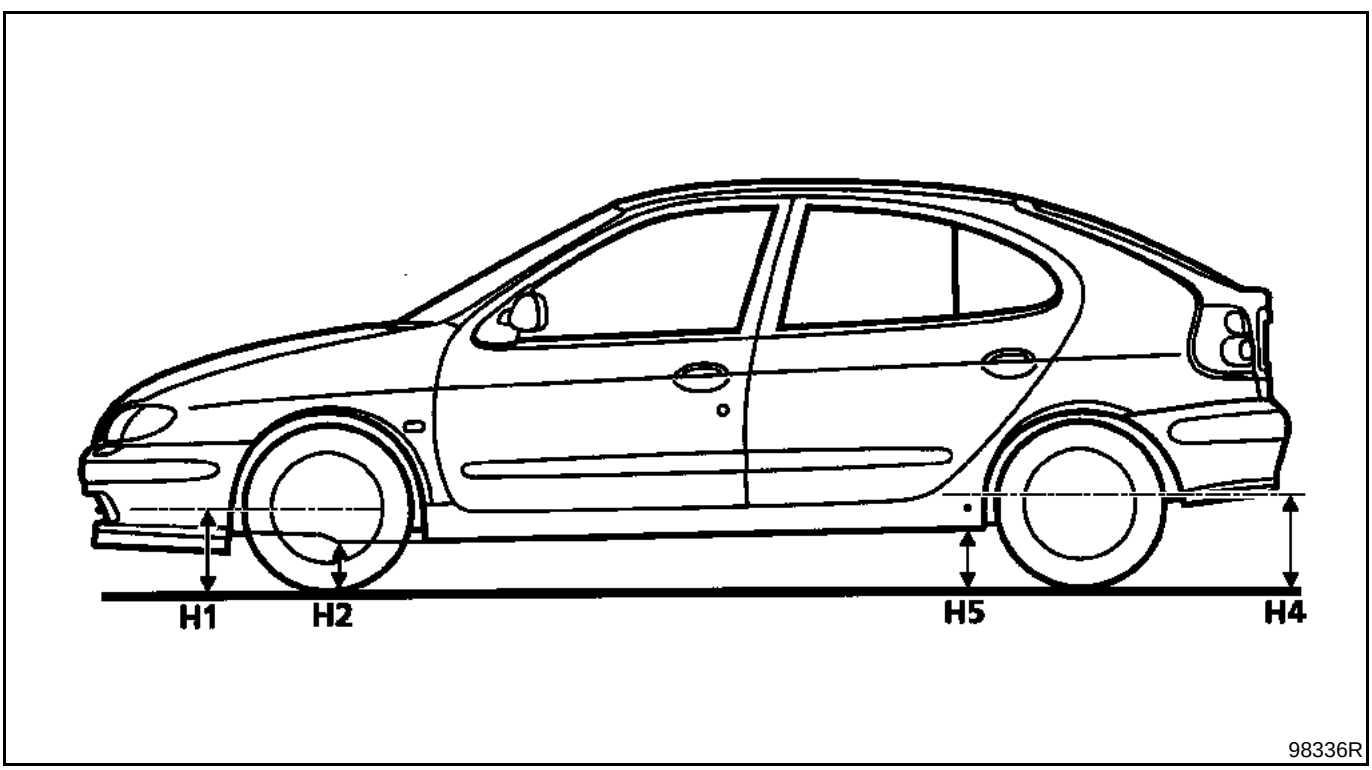
Conditions:
– Full fuel tank,
– Driver on board.

Type	Check pressure (1) (in bars)	
	Front	Rear
B0A5	140	52 $^{+18}_{0}$
JA05	140	32 $^{+18}_{0}$

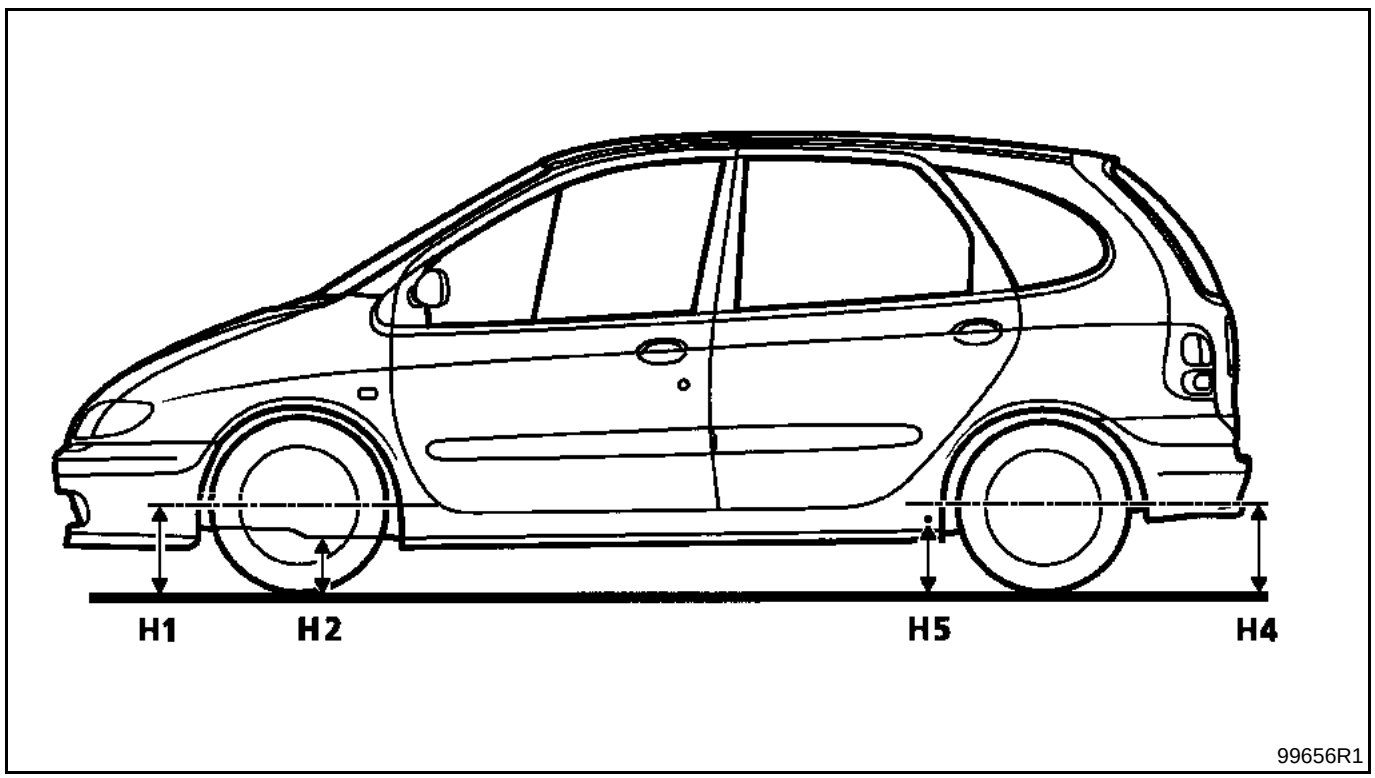
(1) The test is performed using two pressure gauges in an X arrangement.

Type	at the front H1 - H2 = ... mm ± 7.5 mm	at the rear H4 - H5 = ... mm ± 7.5 mm	Dimension X (mm) D and G ± 0.5 mm
BA05	104	22	496
JA05	102	27	512

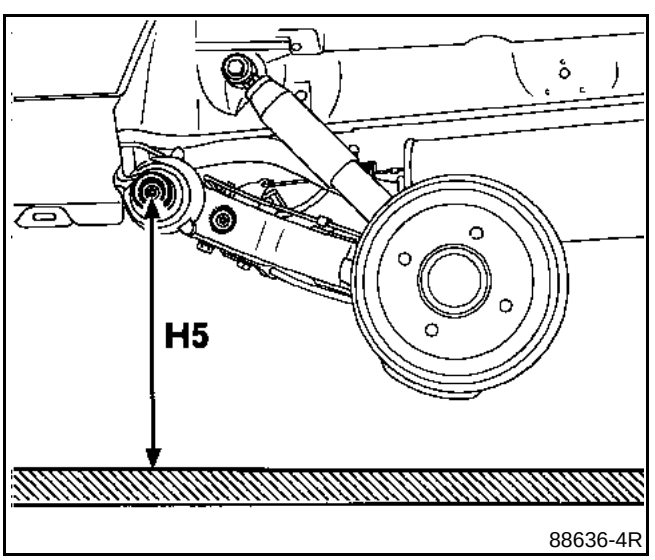
The difference between the right-hand side and the left-hand side of the same axle of a vehicle must not exceed **5 mm**, the driver's side always being higher.
Any alteration to the underbody height also requires adjustment of the brake compensator and of the headlights.



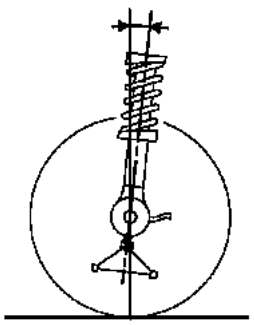
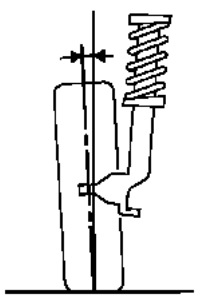
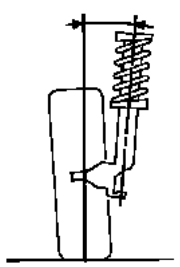
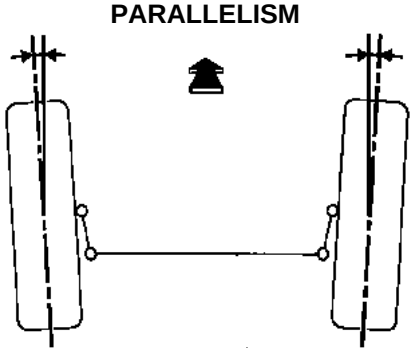
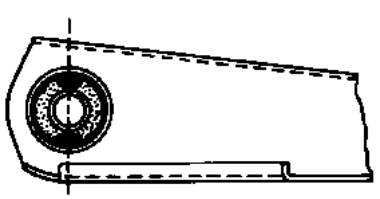
MEASUREMENT POINTS



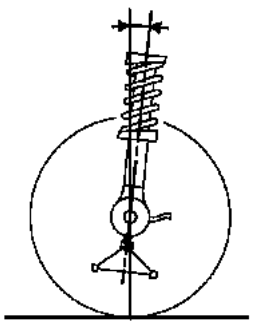
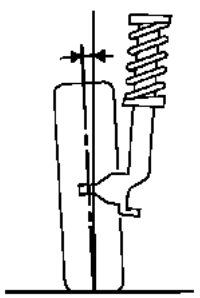
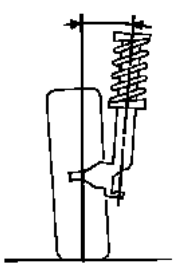
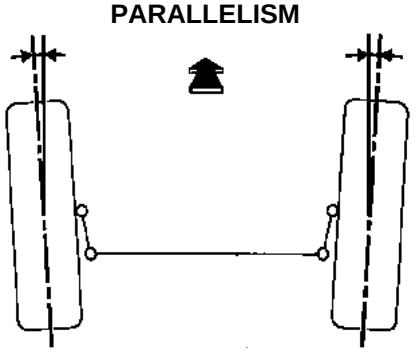
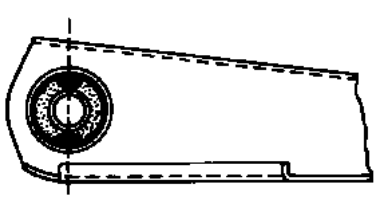
Dimension H5 is measured from the axis of the suspension bar.

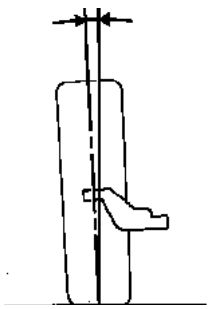
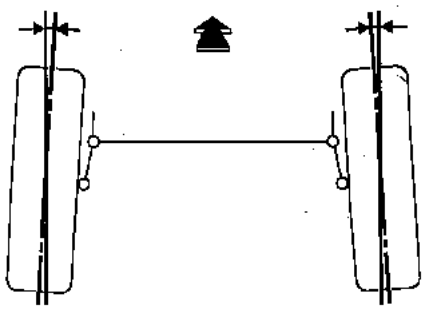
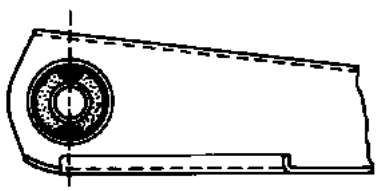


B0A5

ANGLES	VALUES	POSITION OF FRONT AXLE	ADJUSTMENT
CASTOR 	3°22' 3°52' } ± 30' 4°22' Max. right/left difference = 1°	H5 - H2 = 89 mm H5 - H2 = 69 mm H5 - H2 = 49 mm	NOT ADJUSTABLE
CAMBER 	- 0°23' - 0°29' } ± 30' - 0°38' Max. right/left difference = 1°	H1 - H2 = 104 mm H1 - H2 = 115 mm H1 - H2 = 125 mm	NOT ADJUSTABLE
PIVOT 	13°25' 13°40' } ± 30' 13°52' Max. right/left difference = 1°	H1 - H2 = 104 mm H1 - H2 = 115 mm H1 - H2 = 125 mm	NOT ADJUSTABLE
PARALLELISM 	(for 2 wheels) toe-out + 0°10' ± 10' + 1 mm ± 1 mm	UNLADEN	Adjustable by rotating track rod sleeves 1 turn= 30' (3 mm)
POSITION FOR TIGHTENING RUBBER BUSHES 	-	UNLADEN	-

J0A5

ANGLES	VALUES	POSITION OF FRONT AXLE	ADJUSTMENT
CASTOR 	5°00' ± 30' 3°54' ± 30' 3°19' ± 30' Max. right/left difference = 1°	H5 - H2 = 23 mm H5 - H2 = 65 mm H5 - H2 = 75 mm	NOT ADJUSTABLE
CAMBER 	- 0°15' ± 30' - 0°28' ± 30' - 0°37' ± 30' Max. right/left difference = 1°	H1 - H2 = 90 mm H1 - H2 = 112 mm H1 - H2 = 120 mm	NOT ADJUSTABLE
PIVOT 	13°14' ± 30' 13°32' ± 30' 13°55' ± 30' Max. right/left difference = 1°	H1 - H2 = 90 mm H1 - H2 = 112 mm H1 - H2 = 120 mm	NOT ADJUSTABLE
PARALLELISM 	(for 2 wheels) toe-out + 0°10' ± 10' + 1 mm ± 1 mm	UNLADEN	Adjustable by rotating track rod sleeves 1 turn= 30' (3 mm)
POSITION FOR TIGHTENING RUBBER BUSHES 	-	UNLADEN	-

ANGLES	VALUES	POSITION OF REAR AXLE	ADJUSTMENT
CAMBER 	- 0°50' ± 15' - 1°15' ± 15'	UNLADEN	NOT ADJUSTABLE
PARALLELISM 	(for 2 wheels) toe-in - 0°30' ± 20' - 3 mm ± 2 mm - 0°15' ± 20' - 1.5 mm ± 2 mm	UNLADEN	NOT ADJUSTABLE
POSITION FOR TIGHTENING RUBBER BUSHES 	-	UNLADEN	-

Vehicle type	Engine	Gearbox	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Compression ratio
XA05	F9Q 732	JC5	1870	80	93	19/1

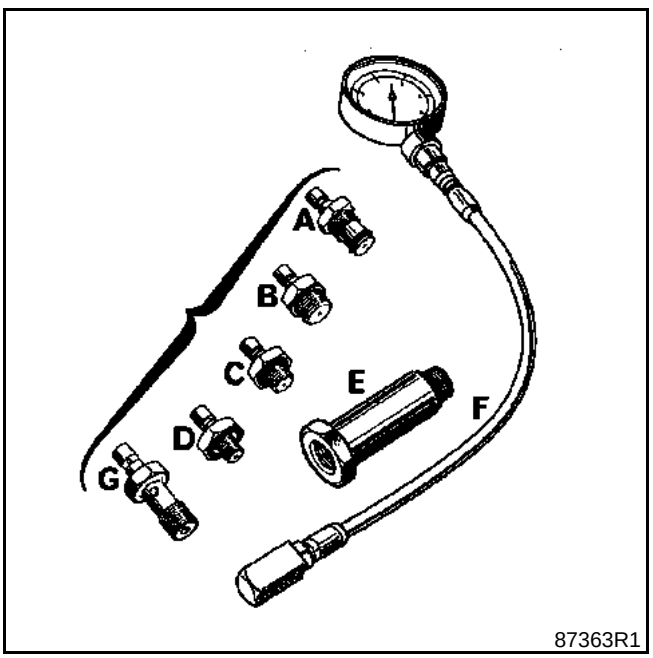
Repair Manual to be consulted: **Mot. F9Q**.

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

CHECKING

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

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



USE

C + F

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

Oil pressure

1000 rpm	**1.2 bar**
3000 rpm	**3.5 bars**

SPECIAL TOOLING REQUIRED		
Mot.	1040-01	Dummy sub-frame for removing and refitting engine and transmission assembly
Mot.	1159	Tool for maintaining engine on subframe
Mot.	1202-01	Hose clip pliers
Mot.	1202-02	
Mot.	1233-01	Threaded rods for lowering the sub-frame
Mot.	1294-01	Tool for removing windscreen wiper arms
Mot.	1448	Long nose pliers for hose clips
Mot.	1453	Engine support tool

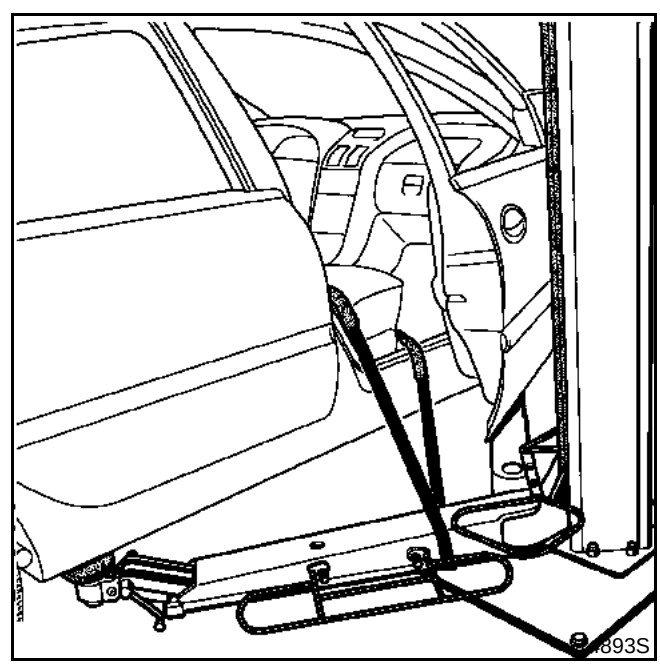
TIGHTENING TORQUES (n daN.m)	
Sub-frame front mounting bolts	6.2
Sub-frame rear mounting bolts	10.5
Mounting bolt for front right suspended mounting cover to engine	6.2
Movement limiter mounting bolt	6.2
Mounting nut for rubber engine mounting pad on front left-hand side member support	6.2
Shock absorber base bolts	18
Brake caliper mounting bolt	4
Steering shaft yoke mounting bolt	3
Sub-frame - side member tie rod bolts	3
Wheel bolts	9

REMOVAL

Put the vehicle on a two post lift.

During this operation, it is necessary to secure the vehicle to the lift using a strap to prevent the vehicle from losing balance.

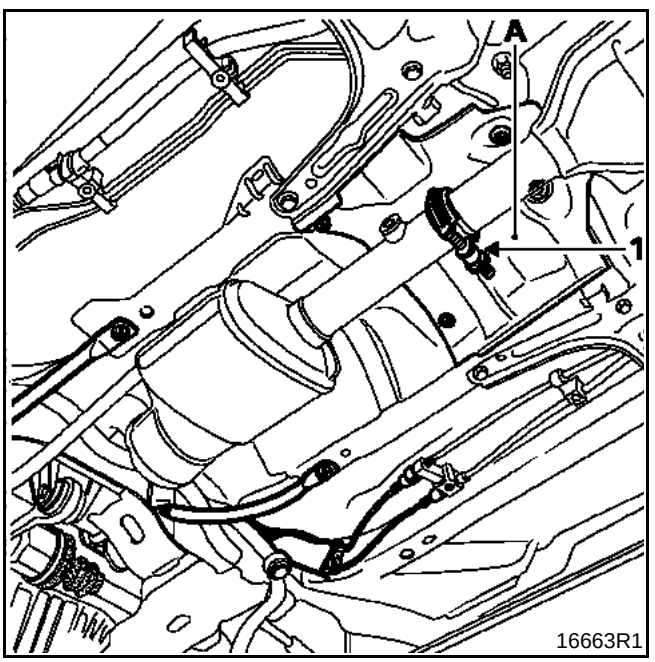
See Technical Note **2988A** for the procedure for fitting the strap.



Remove:
– the battery,
– the engine undertray.

Drain:
– the cooling circuit through the bottom hose of the radiator,
– the gearbox and the engine (if necessary),
– the refrigerant circuit (if fitted) using filling equipment.

Remove:
– the front wheels along with the mudguard,
– the sub-frame and body tie rods,
– the track rod ends,
– the brake calipers (as well as the **ABS** sensors, if fitted) and secure them to the suspension springs,
– the shock absorber base bolts,
– the heat shield (A) as well as the gearbox control,
– the clip (1) of the catalytic converter and secure this to the body.



– the front bumper,
– the horn,
– the two mountings for **power assisted steering** hoses on the right hand side of the sub-frame,
– the nut and the eccentric bolt of the steering shaft yoke, after pushing back the guard.

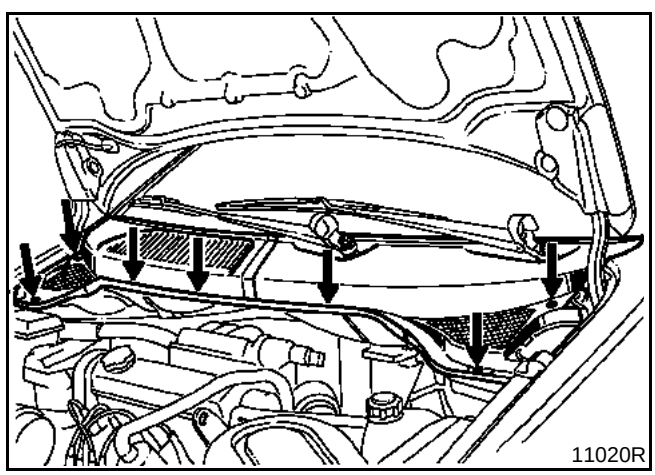
SPECIAL NOTES FOR VEHICLES FITTED WITH A DRIVER'S AIRBAG

WARNING

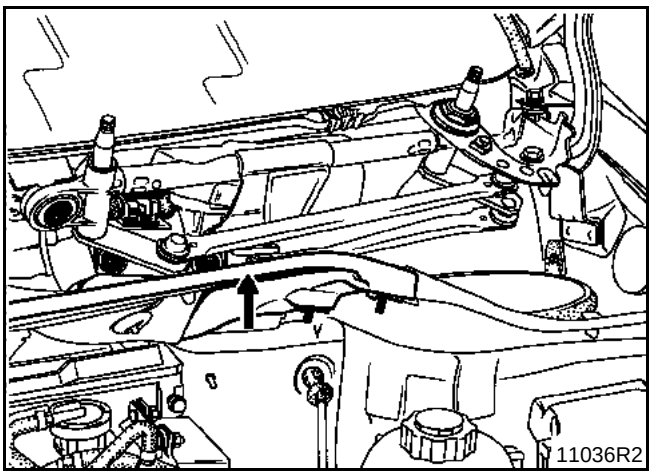
In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:
- **Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised with the wheels straight for the duration of the operation using a "steering wheel locking tool".**
- **If there is any doubt regarding the correct alignment of the rotary switch, the steering wheel must be removed so that the alignment procedure described in the "AIRBAG" section can be applied.**

REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

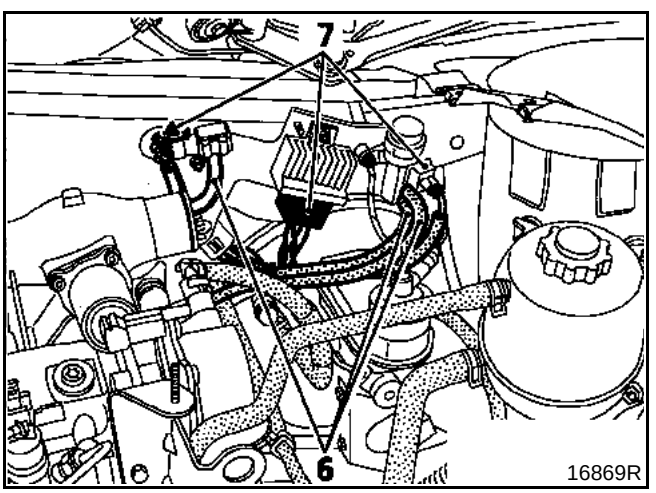
Remove **(for the Scénic)**:
– the windscreen wiper arms using tool **Elé. 1294-01**,
– the front grilles,



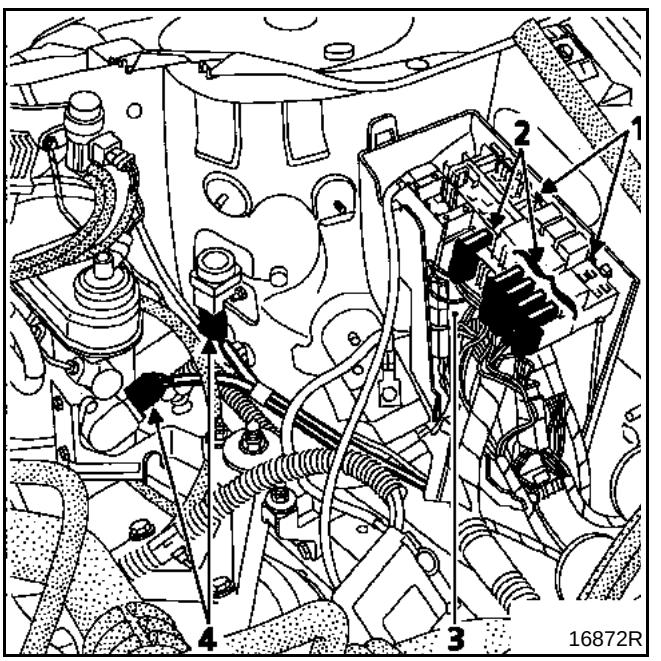
– the closure panel for the plenum chamber.



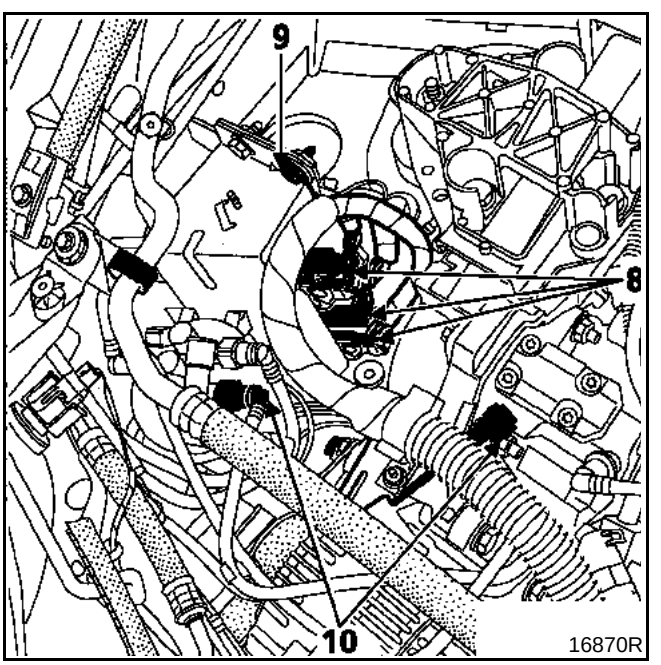
Remove **(all types)**:
– the shock absorber cap protectors,
– the clutch cable,
– the brake servo vacuum pipe,
– the air intake pipe,
– the turbocharging air ducts between the exchanger and the engine,
– the hoses on the heater radiator,
– the pipes (6) and the connectors (7),



– the battery mounting,
– the expansion bottle mountings and the expansion bottle,
– the precatalytic converter mountings and the precatalytic converter,
– the relay plate at (1) and the fuse holder (2) as well as the connectors (3) and (4),



– the injection computer connectors (8),
– the earth strap (9),
– the fuel pipes (10) and fit cleanliness plugs.

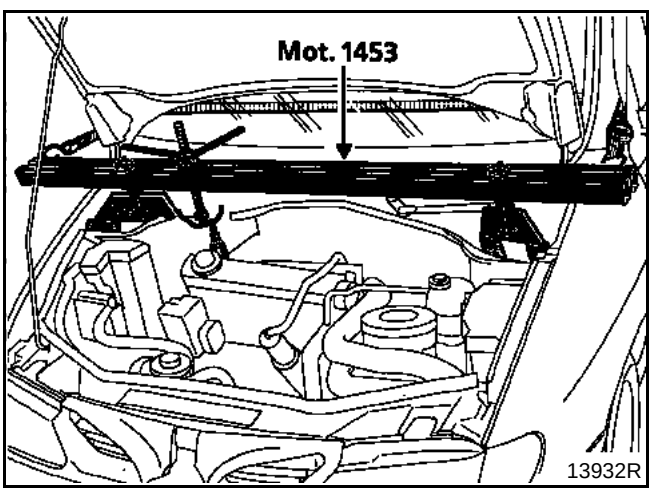


– the earth strap on the bulkhead,
– the mountings of the **air conditioning** hoses (if fitted) on the compressor and the condenser.

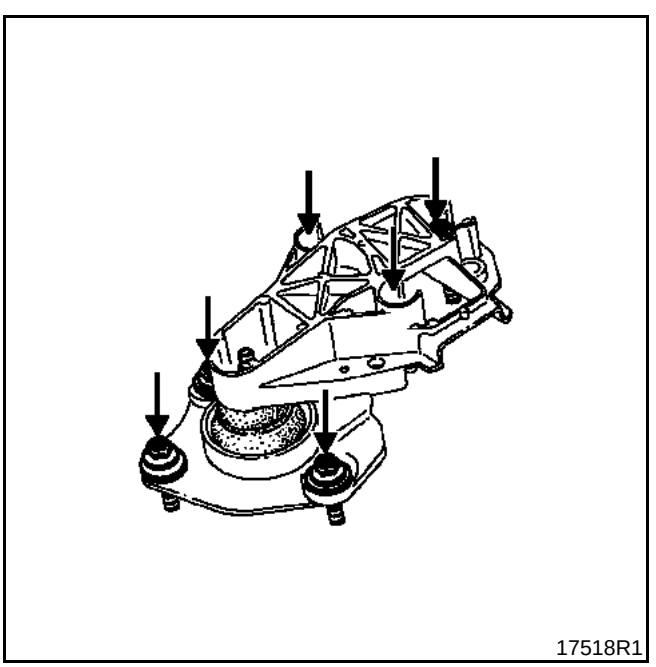
NOTE: it is essential to insert plugs in the pipes and on the compressor to prevent the moisture entering the circuit.

Remove the upper radiator mountings and attach the cooling system to the engine.

Fit the engine retaining tool **Mot. 1453** ensuring that the strap is correctly positioned.

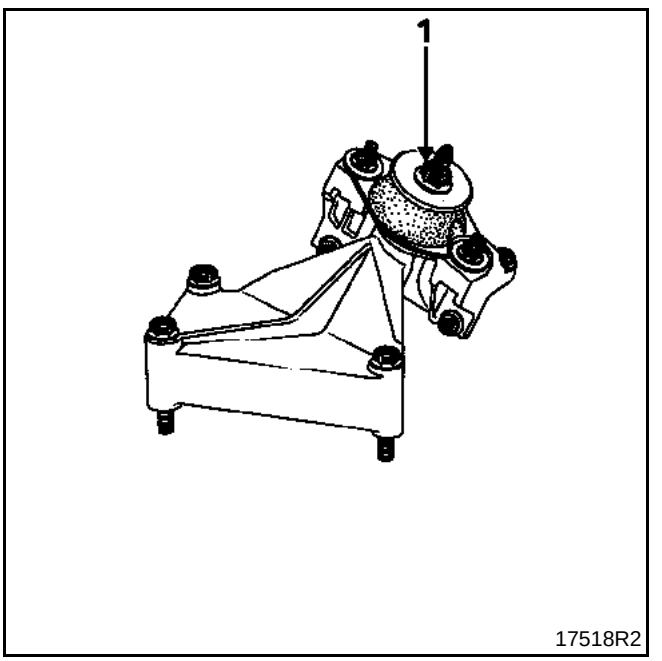


Remove the suspended engine mounting cover.

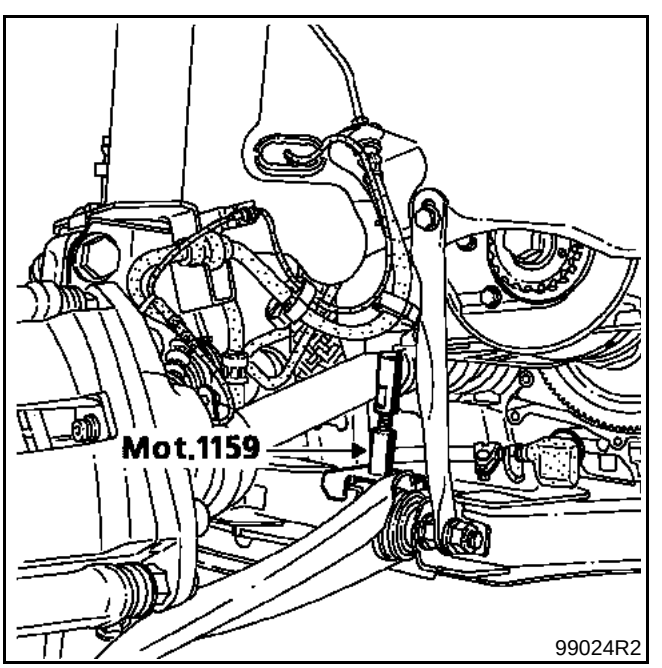


Insert a wooden block between the gearbox and the sub-frame.

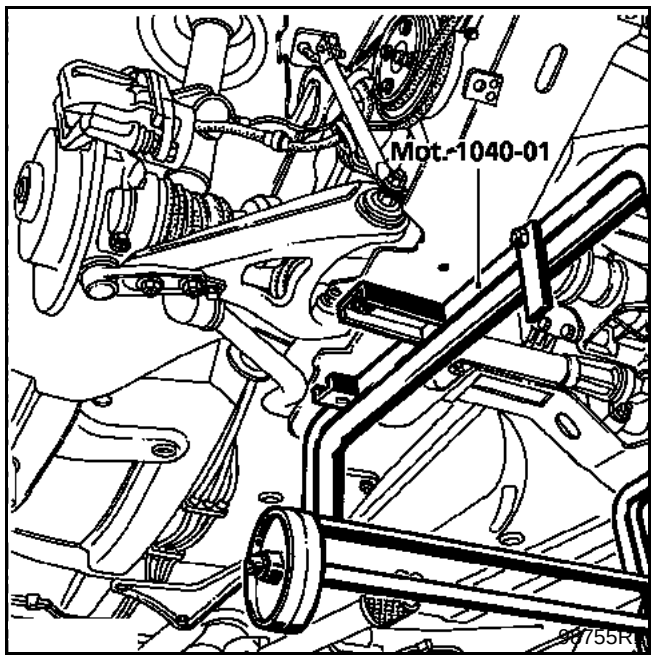
Remove the nut (1), then tap it with a copper hammer to release the suspended engine mounting stud.



Fit tool **Mot. 1159** as shown below.



Fit tool **Mot. 1040-01** under the engine sub-frame.



Lower the lift until the tool touches the ground.

Remove the sub-frame mounting bolts and take out the engine and transmission assembly by lifting the body.

When starting to lift the body, ensure that the catalytic converter is removed and extract the radiator from its upper mountings (then place it on the sub-frame).

NOTE: for any operation requiring the engine, gearbox and sub-frame assembly to be separated, take care to mark the position of tool **Mot. 1159** on the sub-frame.

REFITTING

The alignment of the sub-frame with the body will be made easier by positioning two threaded rods **Mot. 1233-01** in the two front mountings of the sub-frame on the body.

When lowering the body onto the engine - gearbox assembly, ensure that the catalytic converter is refitted.

Tighten the sub-frame mounting bolts to a torque of:
– **6.2 daN.m** at the front,
– **10.5 daN.m** at the rear.

See section **19 "Suspended engine mounting"** for the tightening torques for the engine and gearbox assembly mountings.

Refitting is the reverse of removal.

Refit the heat shields correctly.

Apply **Loctite FRENBLOC** to the caliper mounting bolts and tighten them to the recommended torque.

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

Fill:
– the engine and gearbox with oil (if necessary),
– the cooling circuit and bleed it (see section **19** "**Filling - bleeding**").

Fill the refrigerant circuit using the filling equipment (if fitted).

SPECIAL TOOLING REQUIRED	
Mot. 1233-01	Threaded rods for lowering the sub-frame

TIGHTENING TORQUES (n daN.m)	
Sub-frame front mounting bolts	6.2
Sub-frame rear mounting bolts	10.5
Sump bolts	1.5
Steering shaft yoke mounting bolt	3
Lower ball joint mounting bolt	6
Engine tie bar bolt	6.2
Sub-frame - side member tie rod bolts	3
Wheel bolts	9

REMOVAL

Put the vehicle on a two post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the engine.

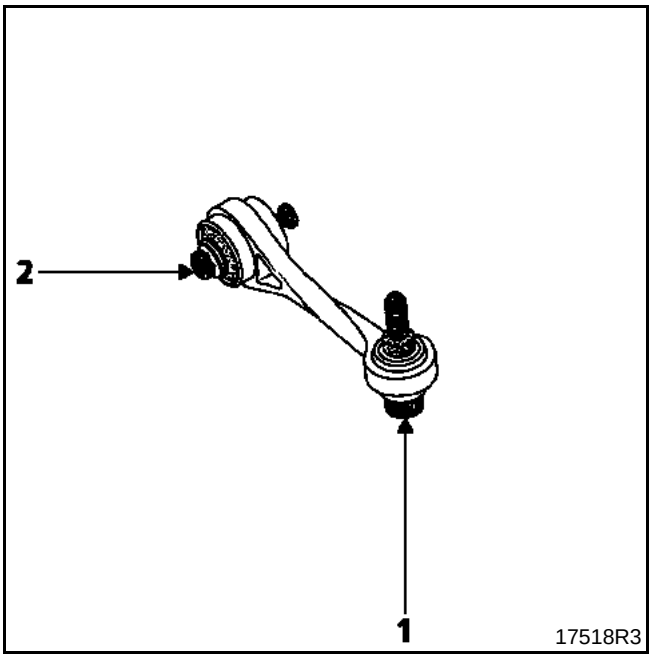
Remove:
– the front wheels as well as the right hand mudguard and the lower clip of the left hand mudguard,
– the nut and the eccentric bolt of the steering shaft yoke, after pushing back the guard.

WARNING

In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:
- **Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised with the wheels straight for the duration of the operation using a "steering wheel locking tool".**
- **If there is any doubt regarding the correct alignment of the rotary switch, the steering wheel must be removed so that the alignment procedure described in the "AIRBAG" section can be applied.**

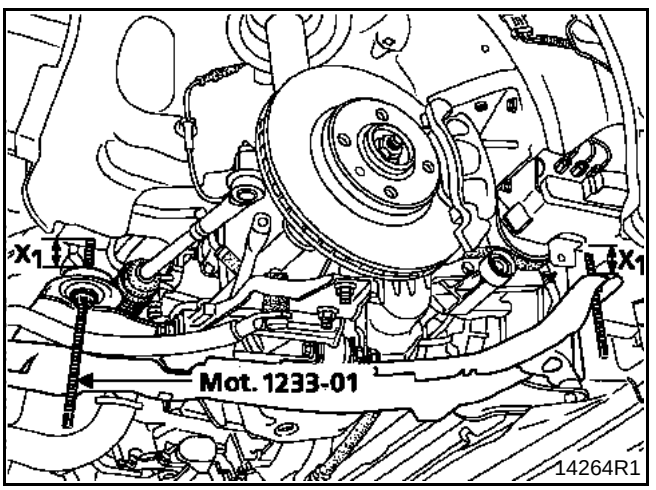
REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

Remove:
– the lower ball joint mountings as well as the track rod ends,
– the sub-frame and body tie rods,
– the gear control on the gearbox side,
– the horn,
– the bolt (1), and slacken engine tie-bar bolt (2), without removing it,
– the bottom mountings of the bumper,



– the sub-frame mounting bolts, inserting the threaded rods **Mot. 1233-01** as you go.

Lower the sub-frame gradually using threaded rod **Mot. 1233-01** until dimensions X_1 **= 9 cm** are reached.

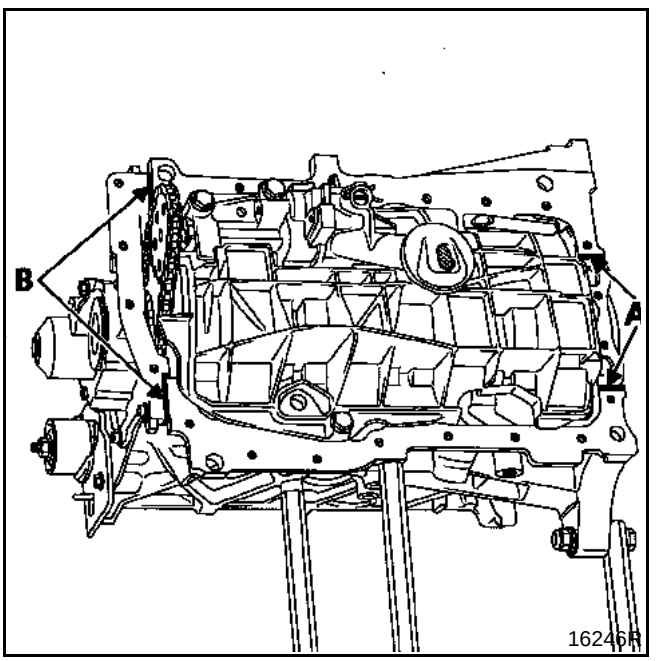


Release the electrical harness from the sub-frame (left hand side).

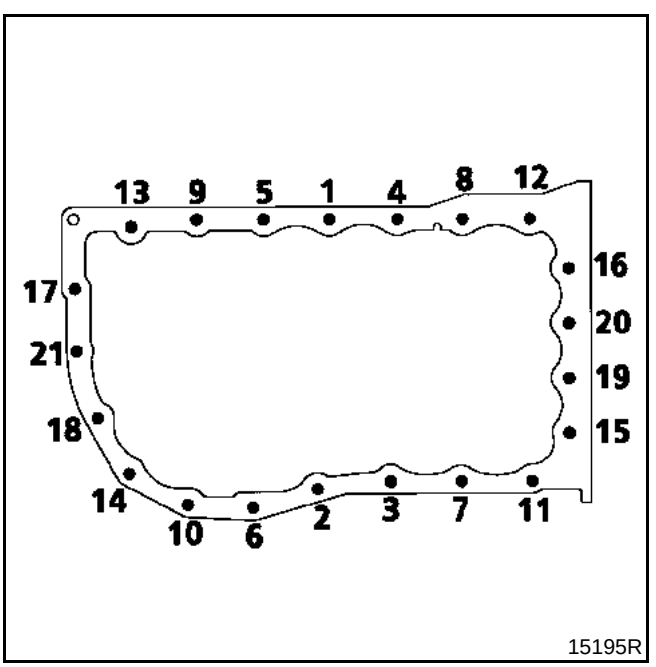
Remove the sump.

REFITTING

Put a drop of **RHODORSEAL 5661** at (A) (on either side of bearing N° 1), and at (B) (at the intersection of the crankshaft closure panel and the cylinder block).



Refit the sump with a new gasket, pre-tightening it to a torque of **0.8 daN.m,** then tighten it finally to a torque of **1.5 daN.m** in the order recommended below.



Fill the engine with oil.

SPECIAL TOOLING REQUIRED		
Mot.	1054	TDC setting pin
Mot.	1387	Tool for checking the automatic tensioner centreline
Mot.	1453	Engine support tool
Mot.	1505	Tool for measuring belt tension
Mot.	1543	Timing belt pretensioning torque tool
Mot.	1294-01	Tool for removing windscreen wiper arms
ESSENTIAL SPECIAL TOOLING		
14 torx socket		

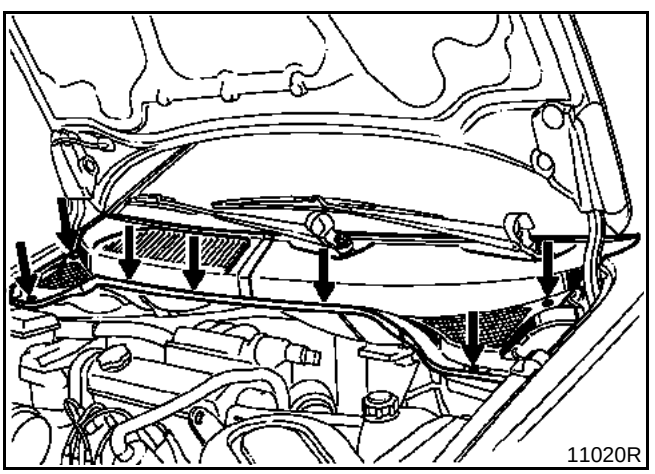
TIGHTENING TORQUES (in daN.m and/or °)	
Tension roller nut	5
Crankshaft pulley bolt	2 + 115° ± 15°
Suspended mounting limiter bolt	6.2
Suspended mounting cover bolt	6.2
Wheel bolts	9

REMOVAL

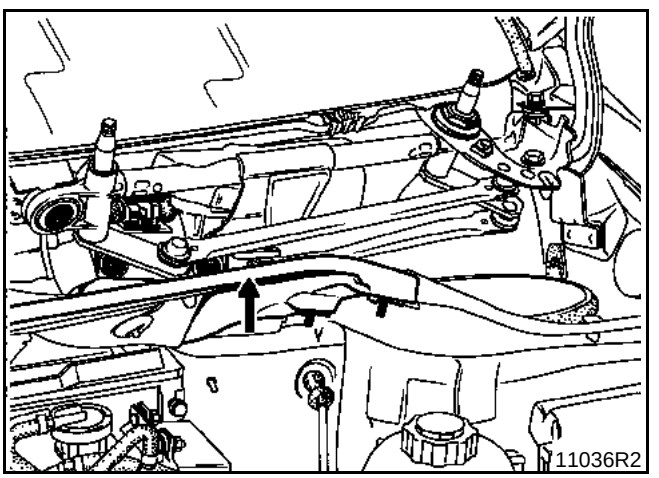
Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove **(for the SCENIC)**:
– the windscreen wiper arms,
– the front grilles,


11020R

– the closure panel of the plenum chamber.

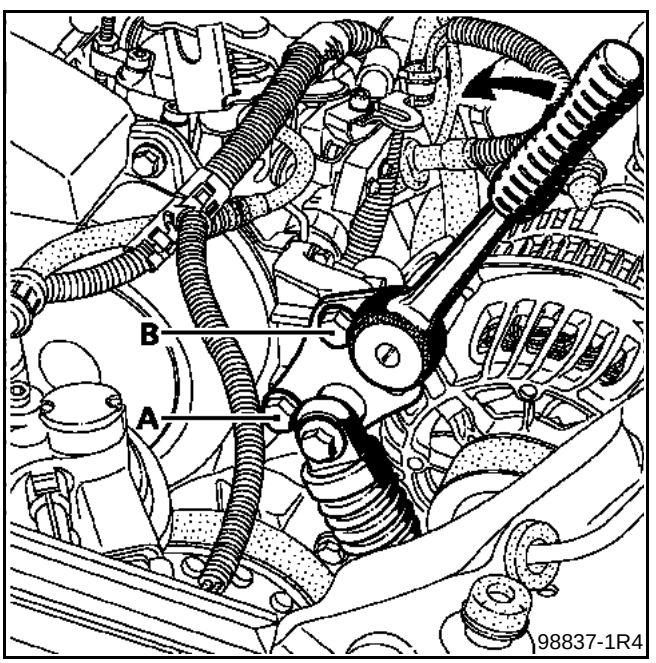

11036R2

Remove **(all types)**:
– the engine cover,
– the front right wheel as well as the mudguard,
– the accessories belt,
– the crankshaft accessories pulley.

Special features of vehicles fitted with air conditioning:

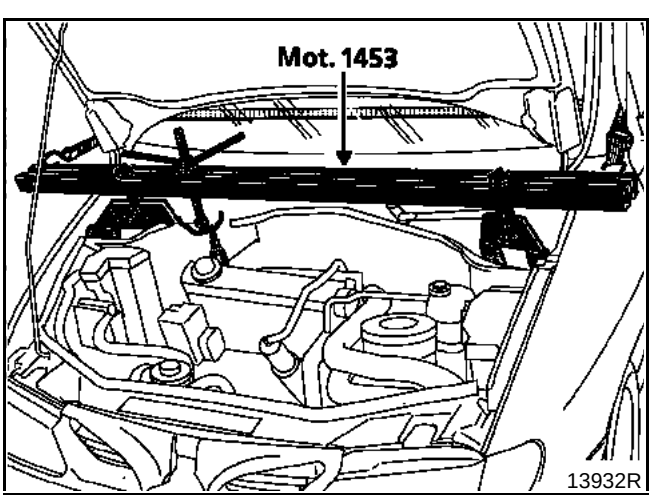
Before removing the accessories belt, check the centreline of the automatic tensioner (see section 07 "Checking the accessories belt tension").

Loosen bolt (A), then bolt (B) to past the shoulder while holding the automatic tensioner plate using a **9.35 mm** square, then relax the belt moving the ratchet in the direction of the arrow.

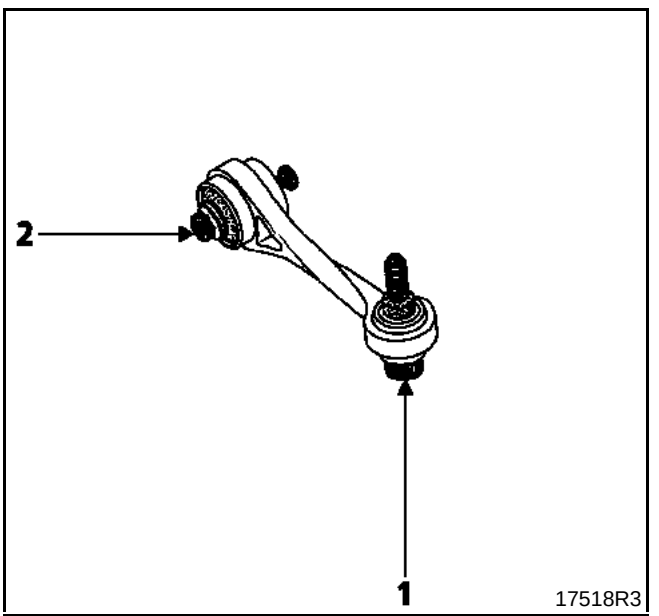


Remove the Top Dead Centre pin plug.

Position the engine support, tool **Mot. 1453** with the retaining straps.

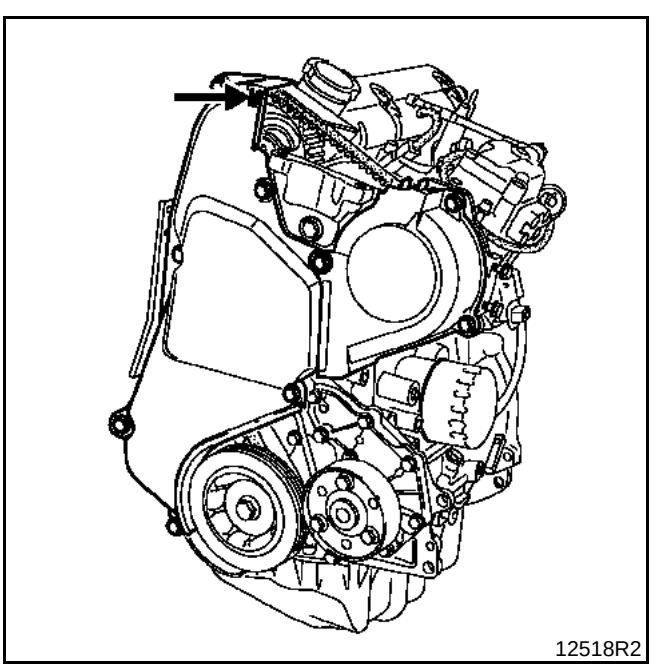


Remove:
– the suspended mounting cover and its movement limiter.
– the bolt (1), and slacken engine tie-bar bolt (2), without removing it.

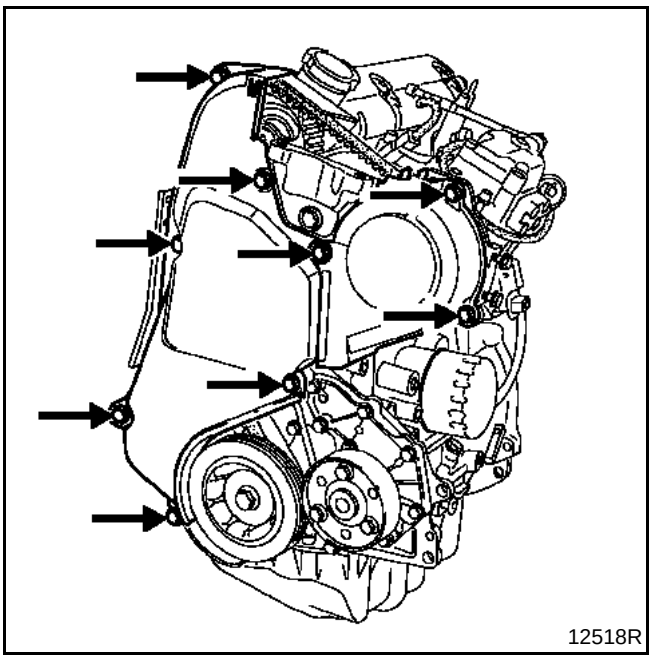


Adjusting the timing

Turn the crankshaft to align the camshaft and housing timing marks while at the same time inserting the TDC pin **Mot. 1054 (begin to press one half tooth on the pin before aligning the camshaft marks to prevent it falling into a crankshaft balancing hole)**.



Remove the timing gear cases.



Release the tension wheel, then remove the timing belt.

Check that the tension wheel and pulleys turn freely without play.

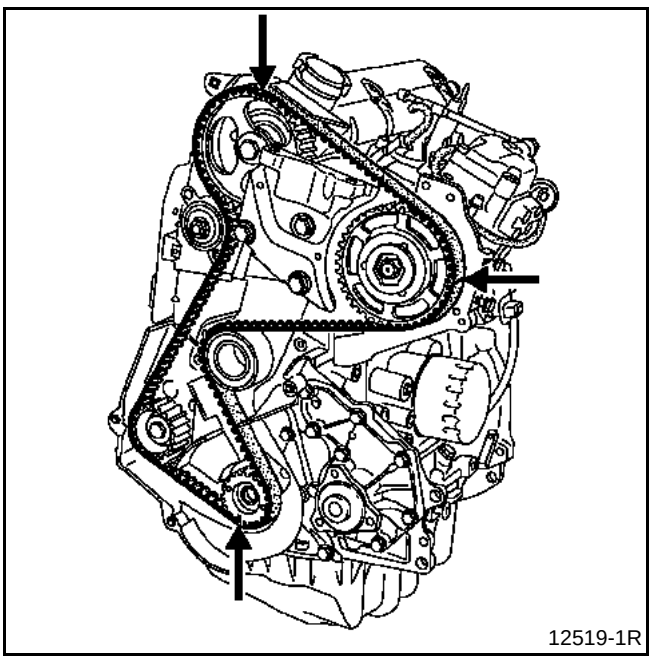
NOTE: Slackening the tension wheel bolt by more than one turn may cause it to come loose.

REFITTING

Engine cold (ambient temperature).

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

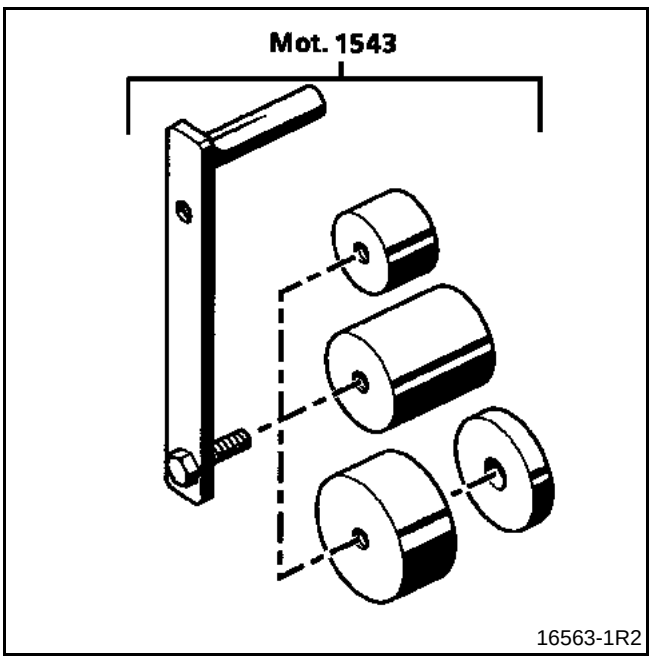
Fit the timing belt by aligning the belt markings with those of the camshaft, injection pump and crankshaft sprockets.


12519-1R

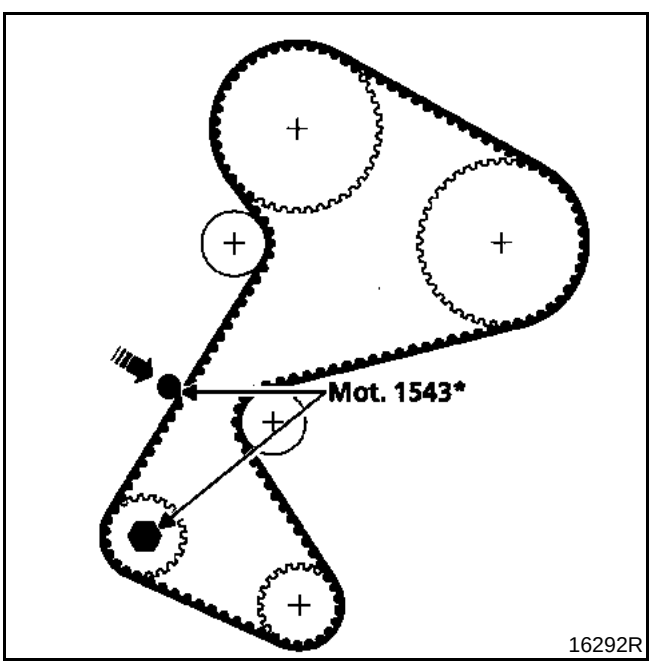
Bring the tension wheel into contact with the belt by tightening a bolt to the inner timing cover.

Remove pin **Mot. 1054**.

Apply a pretensioning torque using **Mot. 1543** (fitted with cover N° 3) by using a torque wrench adjusted **to a torque of 1.1 daN.m** on the edge of the belt to be measured.



16563-1R2



16292R

➡ Pretensioning torque application and belt tension check point

⬢ Pretensioning torque tool contact point

See Technical Note **3247A** for the procedure for using the tension measuring tool **Mot. 1505**.

Fit the reading head of **Mot. 1505** and carry out the measurement, then adjust the tension using the bolt in contact with the belt until **pretension value T1 = 68 ± 3 Hertz** is reached.

Tighten the tensioner.

Turn the crankshaft four times and reposition the timing at top dead centre using the pin.

Remove pin **Mot. 1054**.

Apply a pretensioning torque using **Mot. 1543** (fitted with cover N° 3) by using a torque wrench adjusted **to a torque of 1.1 daN.m** on the edge of the belt to be measured.

Fit the reading head of **Mot. 1505** and carry out the measurement, then adjust the tension using the bolt in contact with the belt until **pretension value T2 = 61 ± 5 Hertz** is reached.

Tighten the tension wheel nut to a torque of **5 daN.m**.

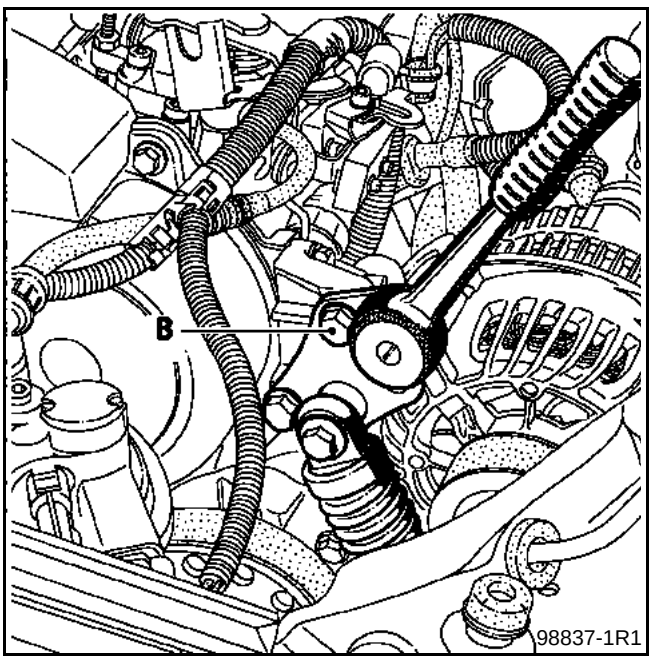
NOTE: it is vital that you tighten the tension wheel nut to torque to avoid any slackening which may cause damage to the engine.

Never refit a belt once removed, but replace it.

Replace the crankshaft pulley bolt and tighten it to a torque of **2 daN.m** plus an angle of **115° ± 15°**.

See section **07 "Accessories belt tension"** for the tension value for fitting the power assisted steering belt.

The belts on vehicles fitted with air conditioning are tensioned by bringing the automatic tensioner plate to a stop at bolt (B), **without forcing it**, using a **9.35 mm** square.



SPECIAL TOOLING REQUIRED		
Mot.	251 -01	Dial gauge support
Mot.	252 -01	Pressure plate to measure piston protrusion
Mot.	1054	TDC setting pin
Mot.	1159	Tool for holding engine on subframe
Mot.	1202 -01	Hose clip pliers
Mot.	1202-02	
Mot.	1387	Tool for checking the automatic tensioner centreline
Mot.	1448	Long nose pliers for hose clips
Mot.	1453	Engine support
Mot.	1505	Tool for measuring belt tension
Mot.	1453	Timing belt pretensioning torque tool
ESSENTIAL SPECIAL TOOLING		
Cylinder head testing equipment		
14 torx socket		
Angular tightening wrench		
55 torx socket		

TIGHTENING TORQUES (in daN.m and/or °)	
Tension roller nut	5
Crankshaft pulley bolt	2 + 115° ± 15°
Suspended mounting cover bolt	6.2
Suspended mounting limiter bolt	6.2
Torque reaction arm	6.2
Wheel bolts	9

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

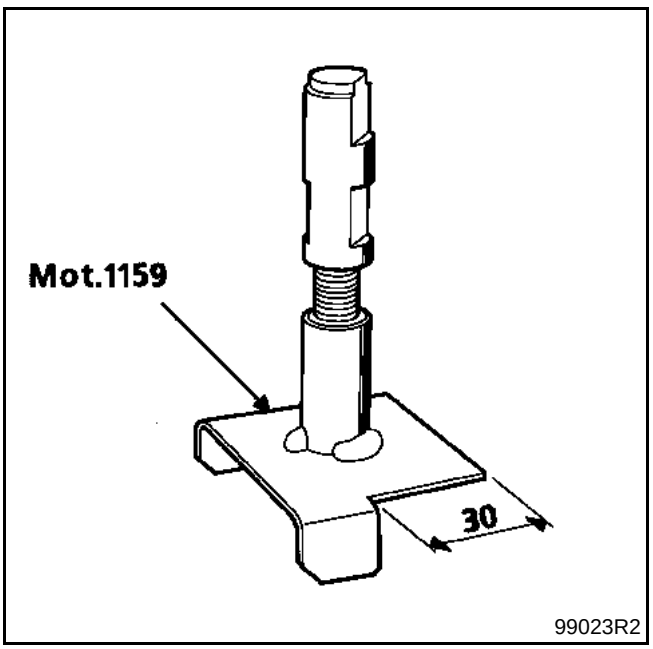
Remove the engine undertray.

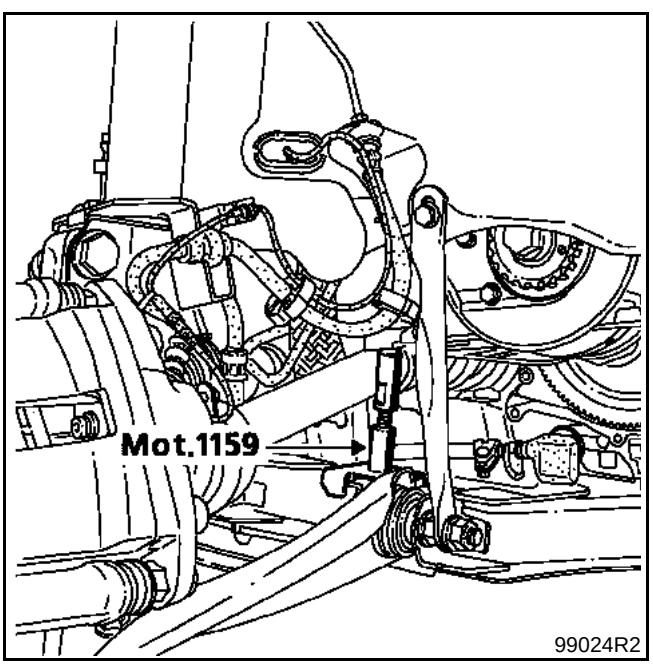
Drain the cooling circuit through the lower radiator hose.

Remove:
– the timing belt (see method described in section **11,** "**Timing belt**").
– the two PAS pipe mountings on the right hand sub-frame.

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

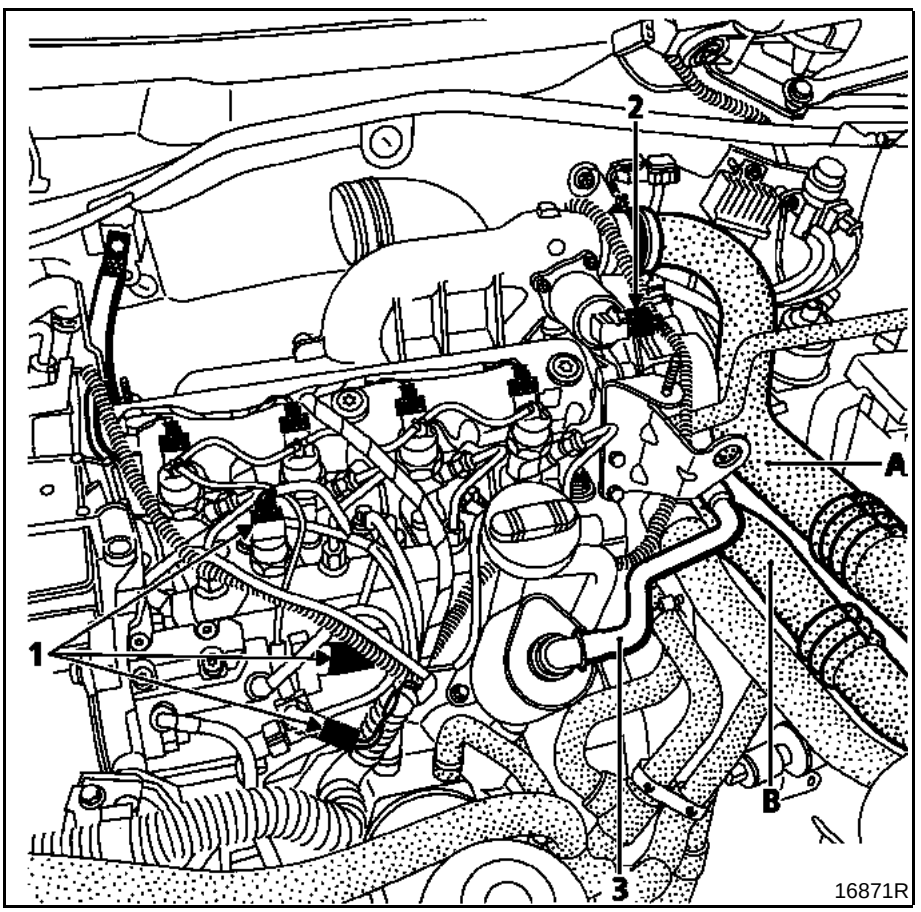
NOTE: cut the base of **Mot. 1159** by **30 mm**.



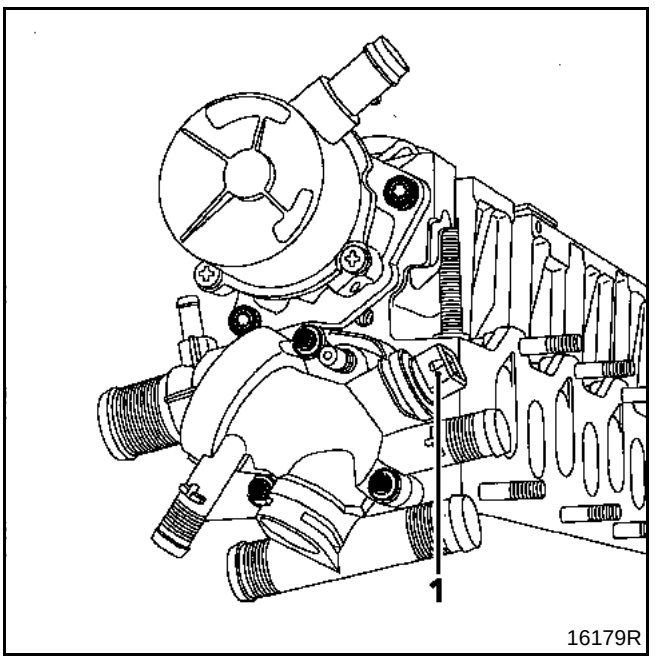


Remove the engine mountings **Mot. 1453**.

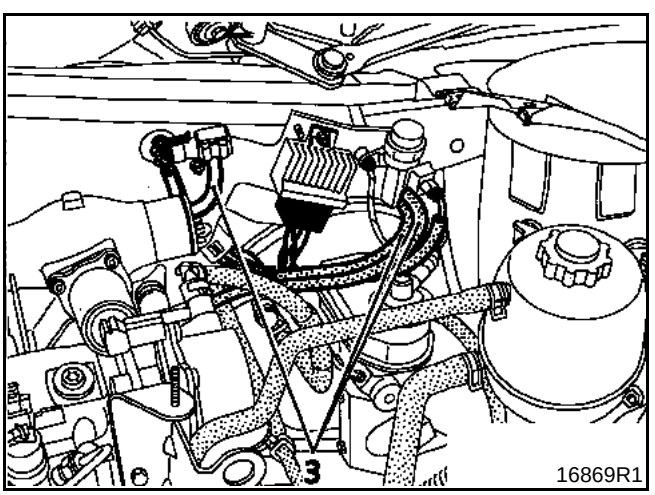
Remove:
– the air filter assembly and the air inlet pipe,
– the air ducts (A) and (B),
– the injector connectors and the heater plugs,
– the connectors (1) and (2),
– the oil rebreather pipe (3),



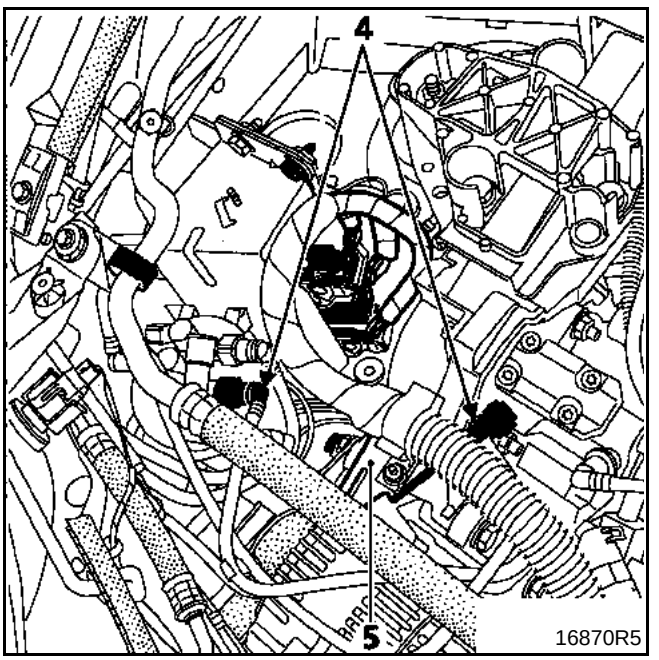
– the brake servo vacuum pipe,
– the pipes on the cylinder head water outlet unit and the sensor connections (1),



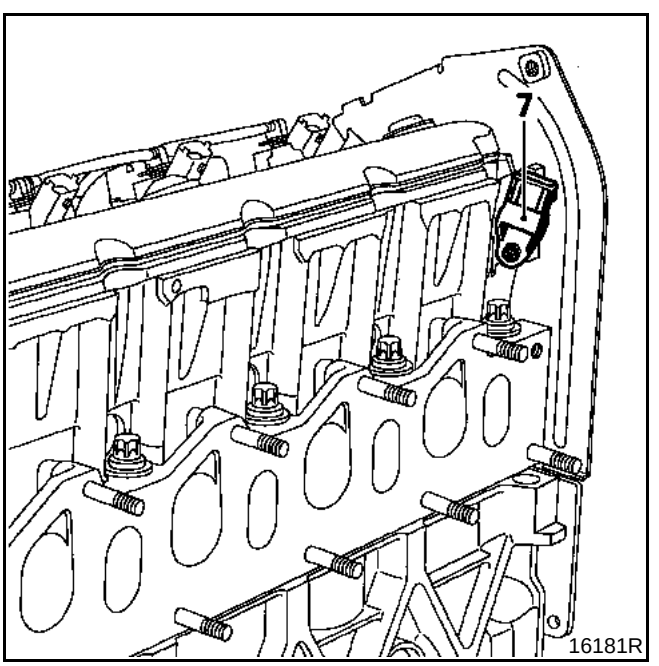
– the pipes (3),



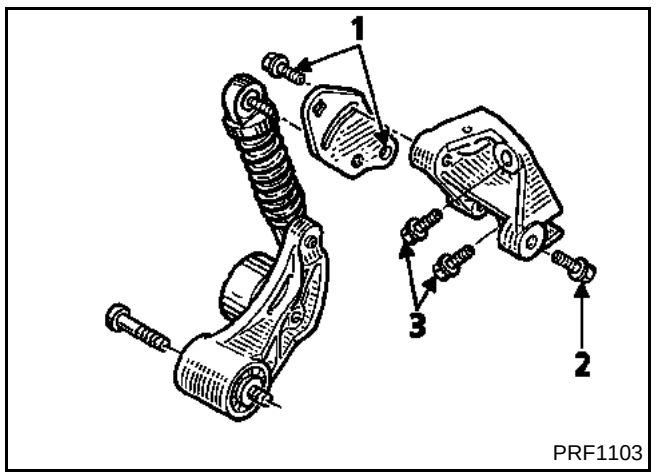
– the fuel pipes (4) (fit cleanliness plugs) and the wiring mounting (5),



– the cylinder marking sensor (7),

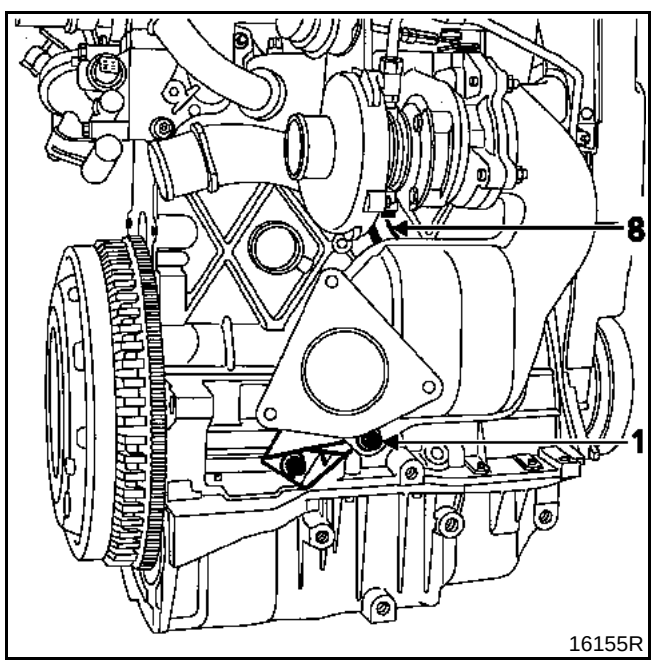


– the low pressure pump connector,
– the bolts (1) and (2),
– the alternator mounting bolts and remove the alternator, then remove the bolts (3).

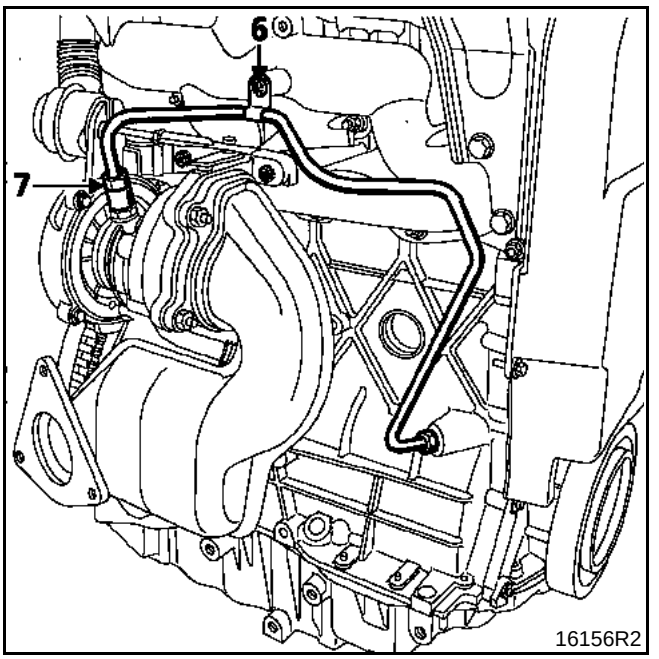


Loosen the exhaust pipe clamp mounting.

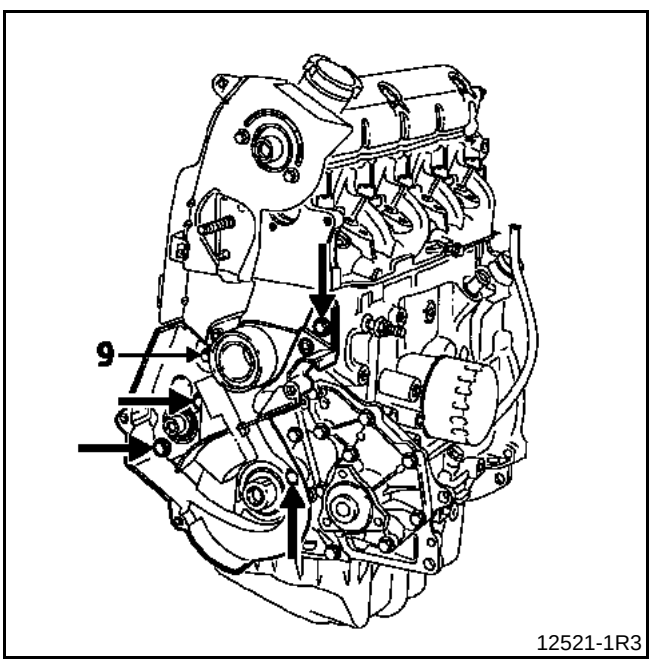
Remove:
– the catalytic converter mountings on the pre-catalytic converter,
– the pre-catalytic converter stay (1),



– the mounting (6),
– the oil supply pipe at (7) and remove towards the bulkhead,
– the pre-catalytic converter mountings to the turbo,
– the catalytic converter removing the engine towards the cooling system,
– the oil return pipe (8),



– the bolt (9) and loosen the other mounting bolts on the lower timing cover without removing them,



– cylinder head bolts.

Release the cylinder head by setting aside the lower part of the camshaft housing, without causing the cylinder head to turn, since this is centred by the two dowels.

CLEANING

It is very important not to scratch the gasket faces of any aluminium component.

Use the **Décapjoint** product to dissolve any part of the gasket which remains attached.

Wear gloves whilst carrying out the following operation.
– Apply the product to the parts to be cleaned; wait about ten minutes, then remove it using a wooden spatula.

We must draw your attention to the care which must be taken during this operation, to prevent any foreign bodies from being introduced into the oil ways (ducts located in the cylinder block and in the cylinder head).

CHECKING THE GASKET FACE

Check for gasket face bow using a straight edge and a set of shims.

Maximum deformation: **0.05 mm.**

No regrinding of the cylinder head is permitted.

Check the cylinder head for cracks.

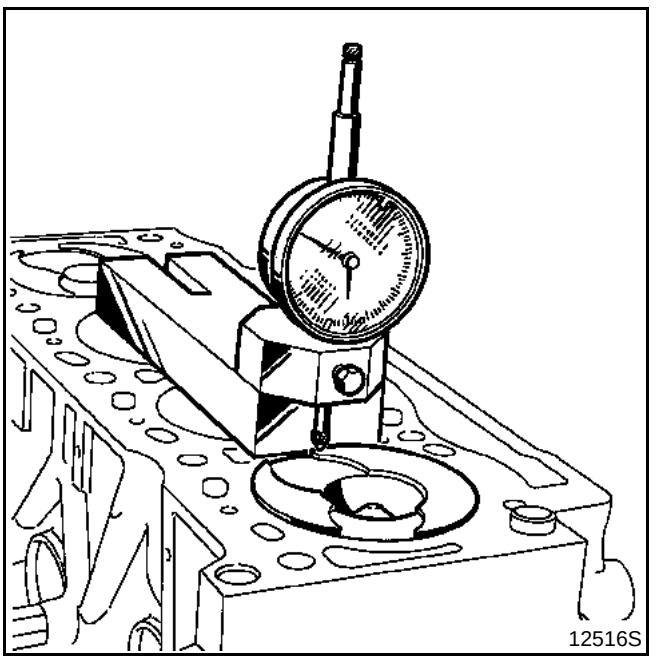
Checking piston protrusion

Clean the piston heads in order to eliminate any traces of deposits.

Turn the crankshaft in its operating direction, to bring piston n ° **1** close to **TDC.**

Fit tool **Mot. 252-01 on the piston**.

Fit the tool **Mot. 251-01** fitted with a gauge on the pressure plate **Mot. 252-01** (the dial gauge measuring pin being in contact with the cylinder block) and look for the **TDC** of the piston.



NOTE: All measurements are to be carried out in the longitudinal axis of the engine, in order to eliminate any errors due to tilting of the piston.

Max. piston protrusion: **0.72 ± 0.077 mm**

REFITTING (special notes)

Fit the cylinder head gasket. This is centred by two dowels.

Bring the pistons to mid-stroke position to prevent them from coming into contact with the valves as the cylinder head is tightened.

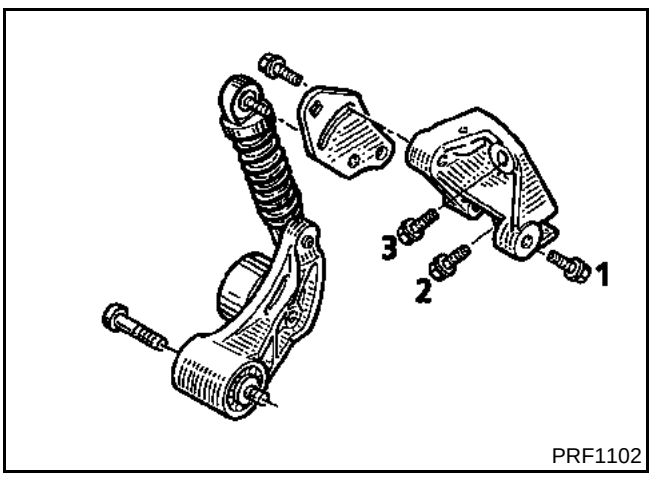
Centre the cylinder head on the dowels.

Lubricate the threads and under the heads of the mounting bolts.

Tighten the cylinder head using an angular tightening wrench (see section '**07** "**Tightening the cylinder head**").

Tightening procedure for the automatic tensioner mounting

Offer up the three touching bolts then apply a torque of **2.5 daN.m** respecting the order shown below.



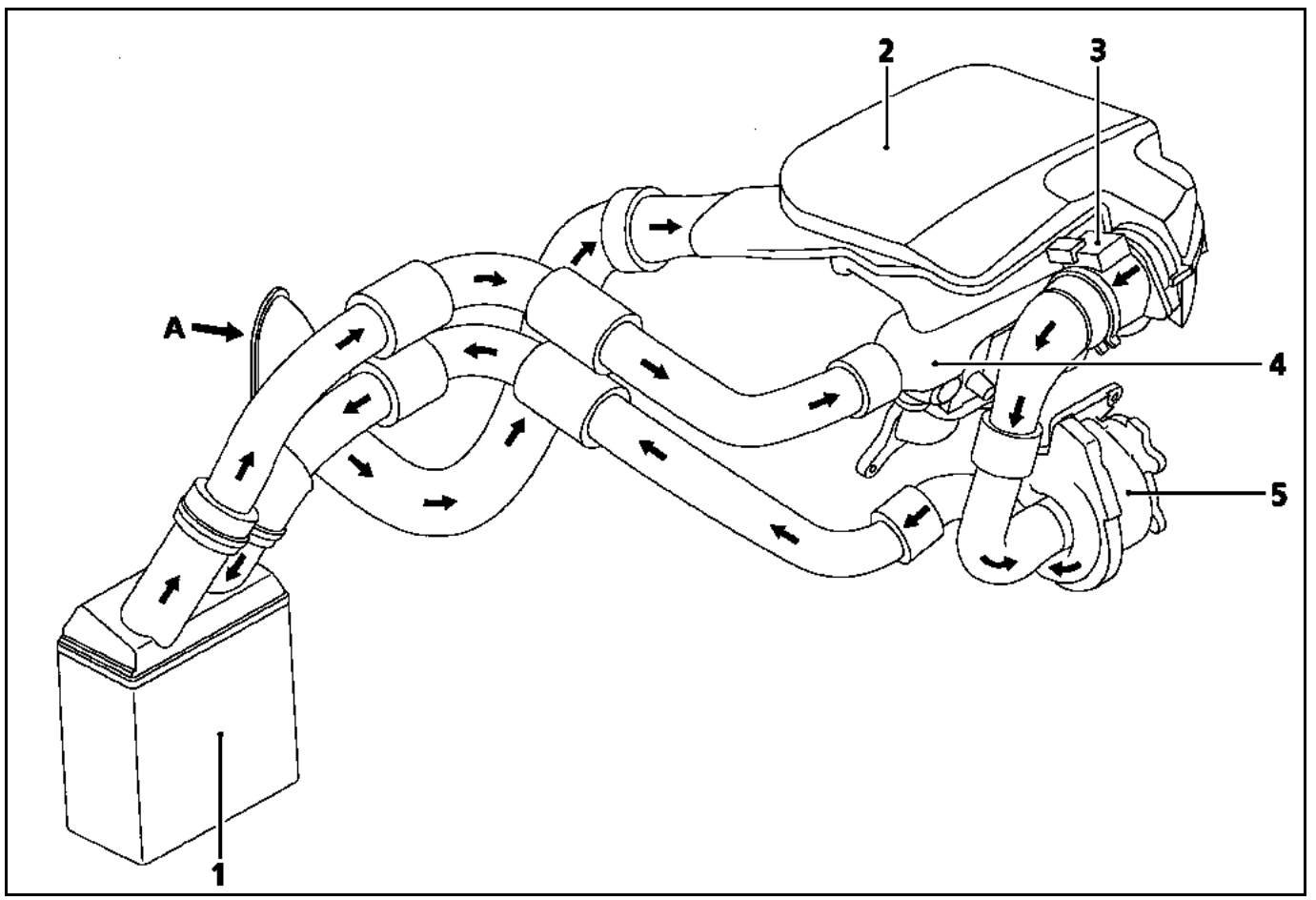
Refitting is the reverse of removal.

Refit the timing belt, (see procedure described in section **11** "**Timing belt**").

Fill and bleed the cooling circuit, (see section **19** "**Filling and Bleeding"**).

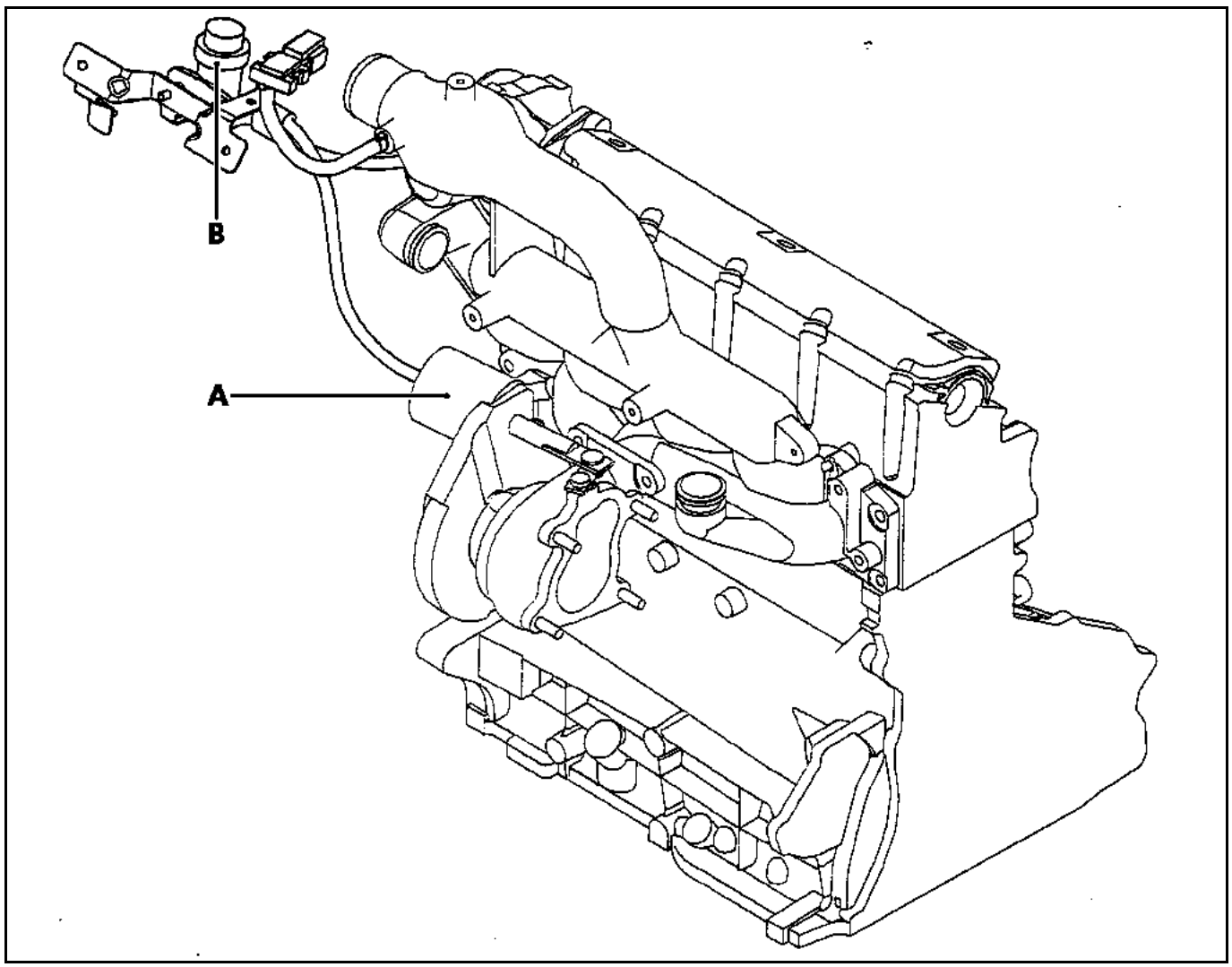
To reprime the diesel circuit, consult section **13**, "**Fuel filter**".

AIR INTAKE CIRCUIT DIAGRAM

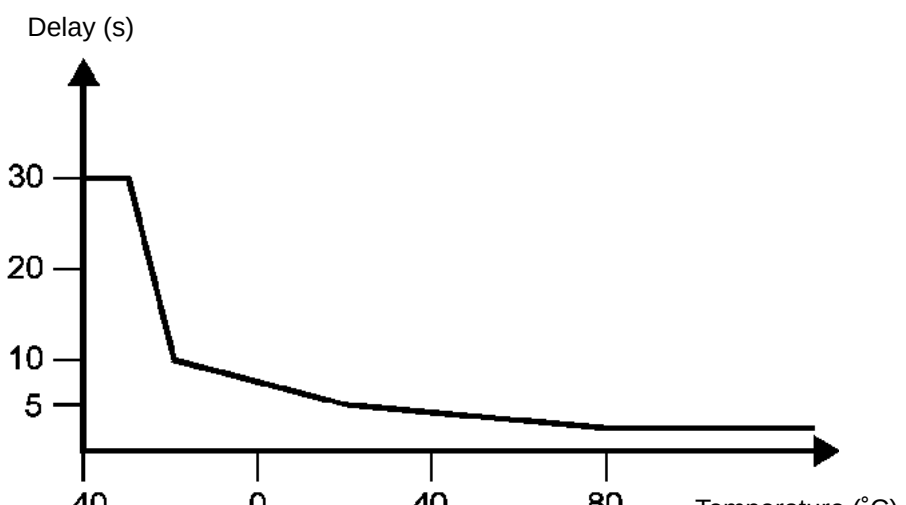


1 Air-air exchanger
2 Air filter
3 Flow meter
4 Inlet manifold
5 Turbocharger
A Air inlet

The LDA (A) of the pressure regulation valve is controlled by a solenoid valve (B) which is controlled by the injection computer. This solenoid valve varies the underpressure as a function of the engine operating ranges, which allows the turbocharging pressure to be regulated.



The pressure regulation valve is open in rest position. The engine operates as normally aspirated.
The solenoid valve, closed in rest position, is supplied after starting the engine, after a delay dependent on the coolant temperature.



TURBOCHARGING PRESSURE LIMITATION VALVE (WASTEGATE)

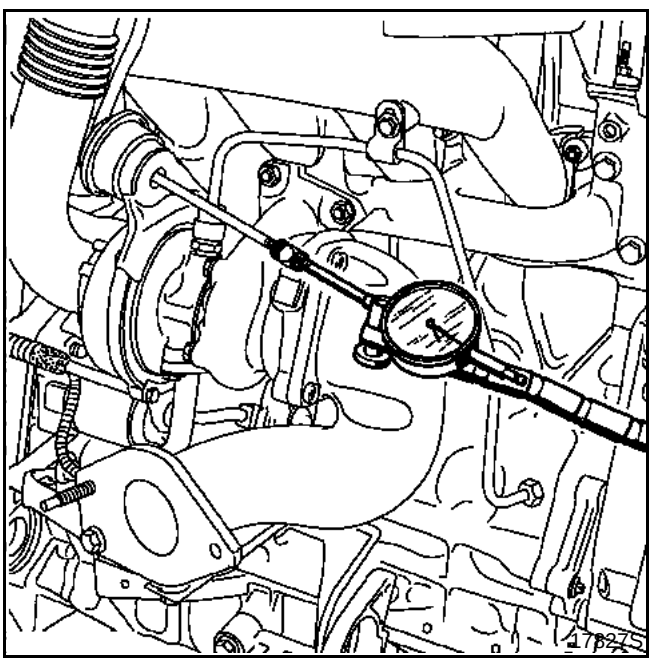
NB: the limitation valve operates in the opposite way to the usual fittings.

The absence of control pressure causes a turbocharging pressure limitation.

Check that there are no leaks between the vacuum pump and the limitation valve.

Checking calibration pressure

Fit on vehicle.



Use a dial gauge which should be positioned at the end of the **wastegate** rod (as far as possible in the **wastegate** axis).

An underpressure is progressively generated on the wastegate using a manual vacuum pump**.**

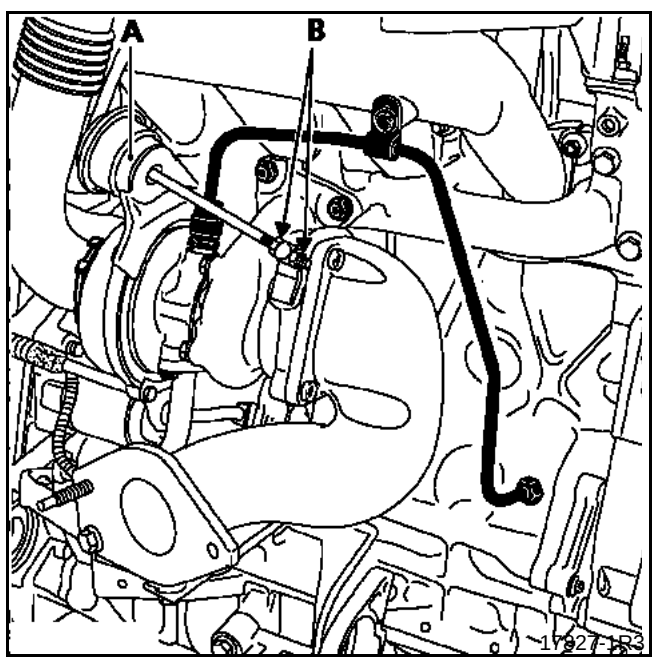
Calibration values

Underpressure values	Rod movement (mm)
120 mb	Between 1 and 4 mm
400 mb	Between 10 and 12 mm
> 450 mb	Rod at stop

Fitting on the vehicle

When checking the calibration pressure it may be necessary to adjust the **wastegate** rod length (A) (if the pressure is not within tolerance).

This adjustment is made with the turbocharger in place.

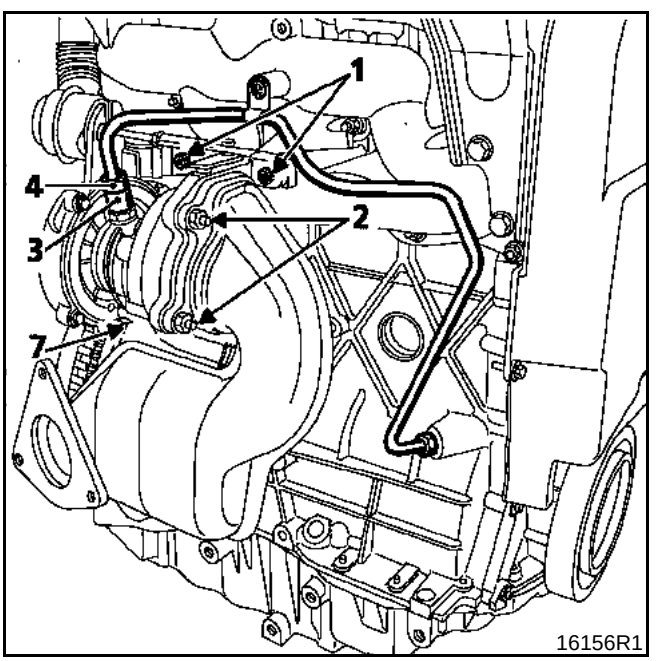


Loosen the lock nut then loosen or tighten the adjusting nut (B).

Validate the repair in a road test, checking the "RC0 turbocharging limiter valve" parameters and the "turbocharging pressure" on the diagnostic tools.

SPECIAL TOOLING REQUIRED		
Elé.	1294 -01	Tool for removing windscreen wiper arms

TIGHTENING TORQUES (in daN.m)	
Turbo mounting nuts (1)	2.4
Oil inlet connection (4)	2.4
Oil inlet connection (3)	2.6
Oil return connection bolt (7)	1.2
Primer catalytic converter mounting bolt to turbo (2)	2.4



16156R1

REMOVAL

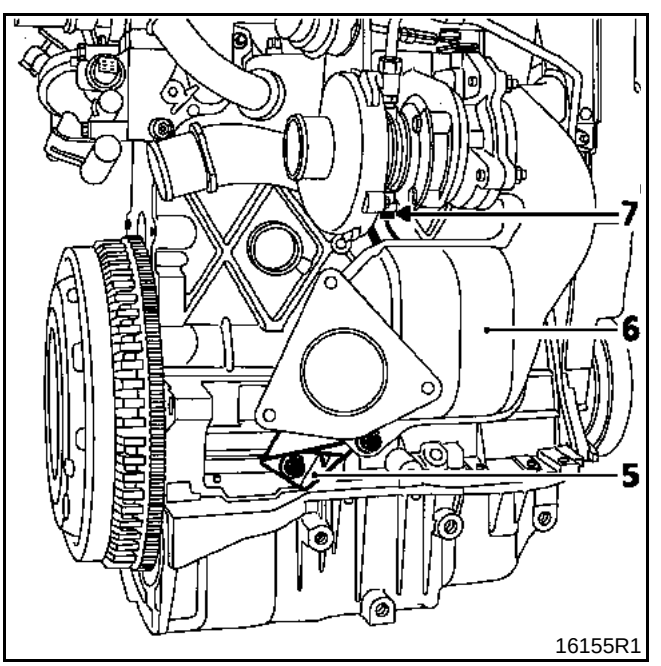
NOTE: to slacken the turbocharger mounting nuts more easily on the exhaust manifold, it is useful to spray a releasing agent on the nuts when still hot, just before removal.

Disconnect the battery.

Remove the engine cover.

From below

Remove:
- the engine undertray,
- the mounting stay (5),
- the two bolts fixing the turbo oil return pipe (7) to the engine,
- the lower turbo mounting nut on the exhaust manifold.

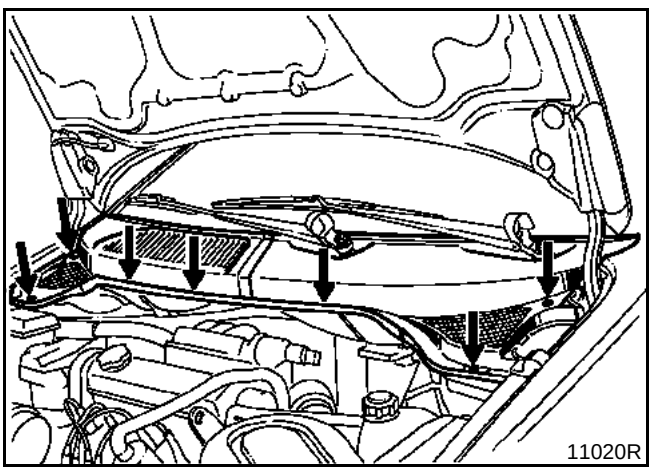


16155R1

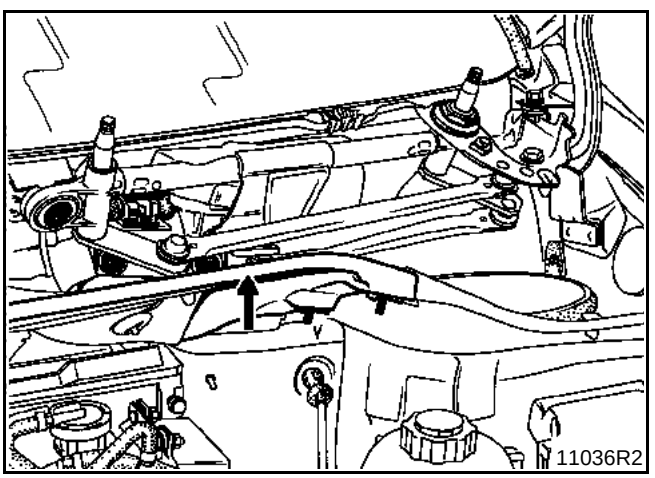
Disconnect the turbo pre-catalytic converter (6) (priming catalytic converter).

From above

Remove **(for the Scénic)**:
– the windscreen wiper arms using tool **Elé. 1294-01**,
– the scuttle panel,



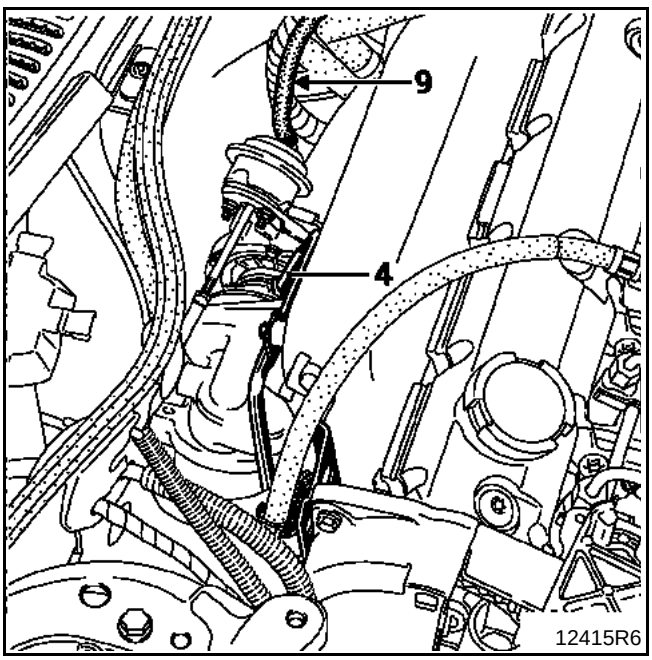
– the bulkhead panel,



Disconnect the flow meter and remove the air unit.

Remove:
– the turbo oil inlet connection (4),
– the two air intake and outlet ducts connected to the turbo,
– the two upper turbo mounting nuts on the manifold.

Disconnect the rubber hose (9) (connected to the **wastegate**).



REFITTING

For refitting operations, use the same procedure as for removal in reverse.

IMPORTANT: you must change the copper gasket at the turbo oil inlet connection.

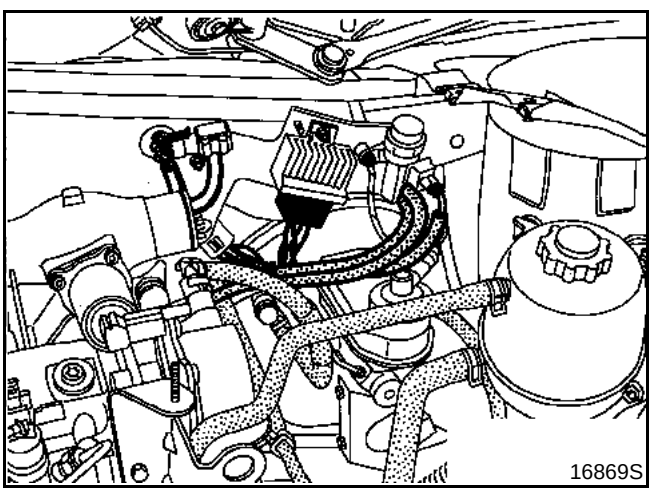
IMPORTANT:
Before starting the engine disconnect the pressure regulator manifold on the high pressure pump.

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

Reconnect the regulator, preheat and start the engine.

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

Erase the fault and check the turbocharging pressure solenoid valve sensor.



Special precautions

- Before refitting, make sure that the lubrication is correct for the turbocharger bearings. To do this activate the starter motor having first disconnected the high pressure manifold regulator (do not start the engine) (erase the computer memory). Sufficient oil should arrive via the oil pressure pipes (place a container below). If this is not the case, change the lubrication pipe.

- Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

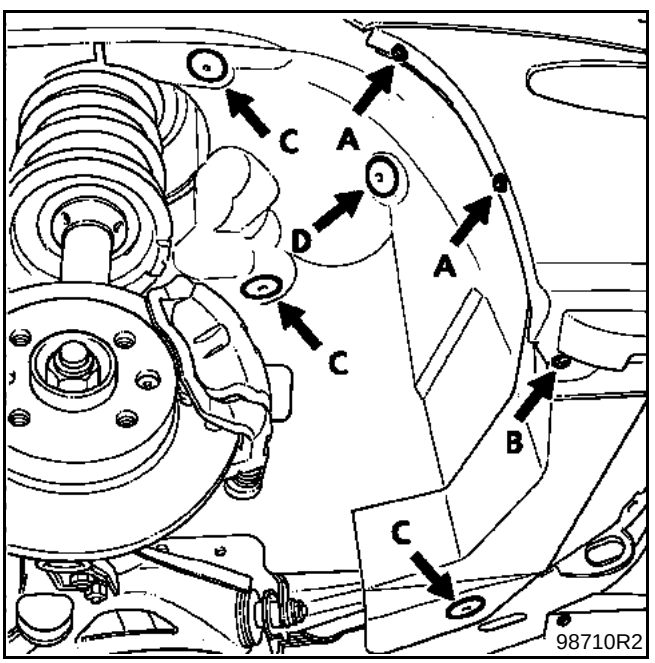
- If there has been a fault in the turbocharger, check that the air-air exchanger is not full of oil.
  If the air-air exchanger is full of oil, it must be removed, flushed with a cleaning agent and then left to drain properly.

- 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.

REMOVAL

It is necessary to remove the bumper to access the air-air exchanger.

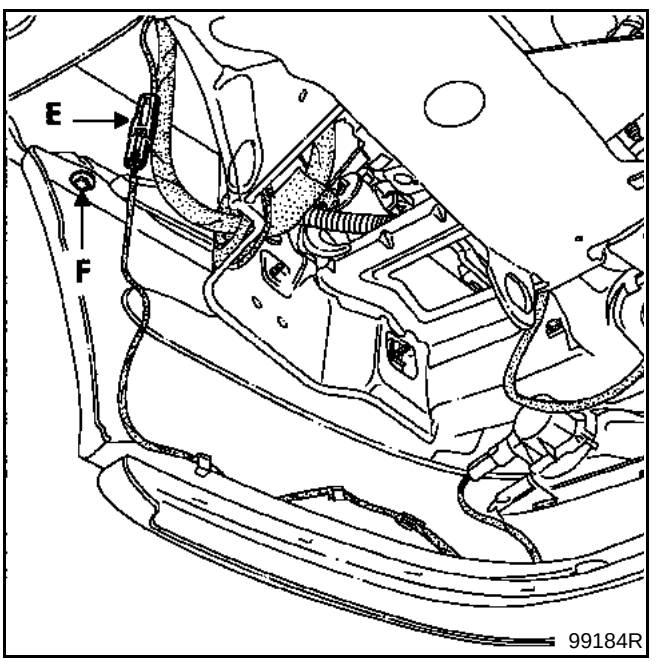
To do this, remove:
– the two upper side mounting bolts (A) (torx **20**) and the lower side mounting bolt (B) (torx **20**) from the front section of the front wing inner protector,
– the three mounting clips (C),
– the mounting clip (D) and separate the front section of the right and left wing protector.



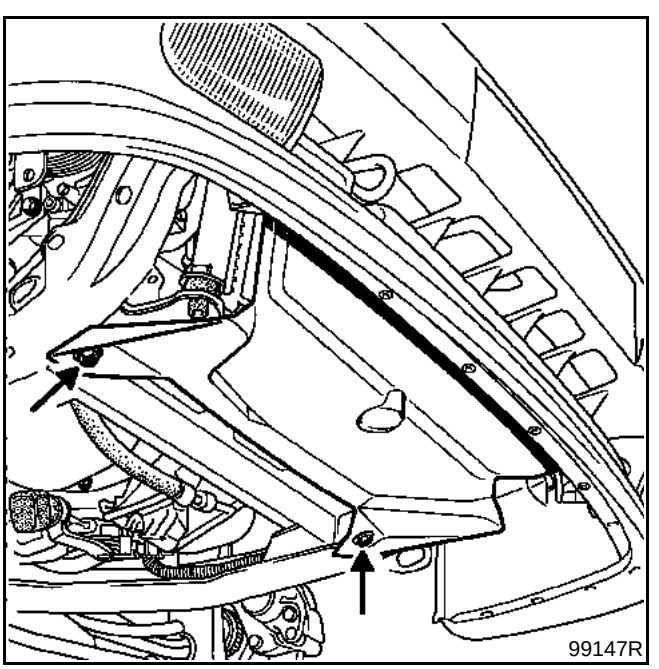
If the vehicle is fitted with fog lights.

Disconnect:
– the battery,
– the fog light wiring harness connector (E) located in the front section of the left-hand front wheel arch.

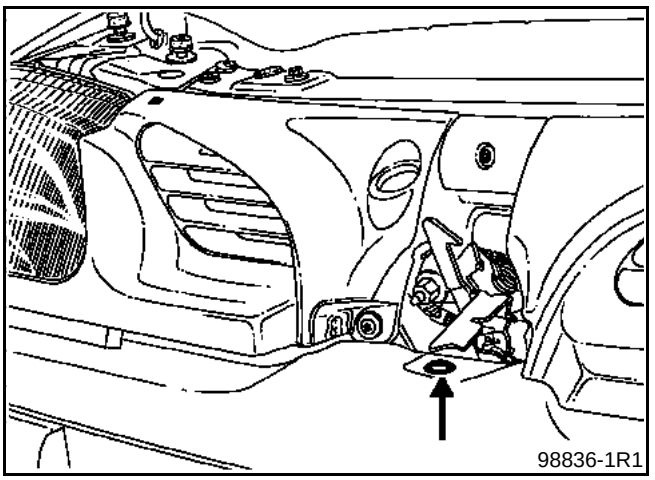
Remove:
– the upper side mounting bolt (F) on the bumper (on each side),



– the two front engine underbody mounting bolts,

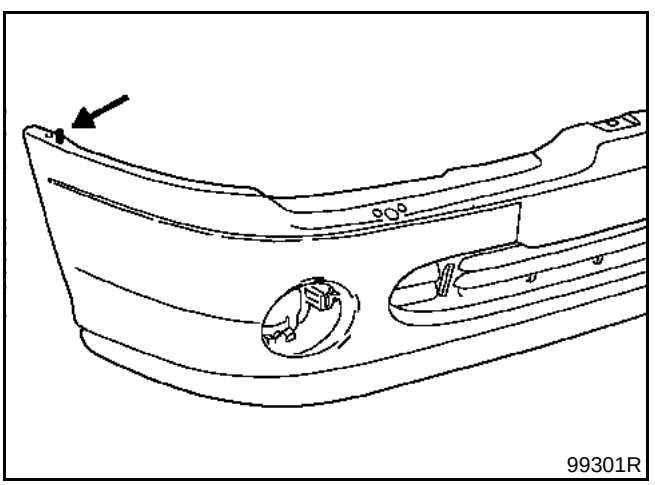


– the central mounting bolt (torx **40**).

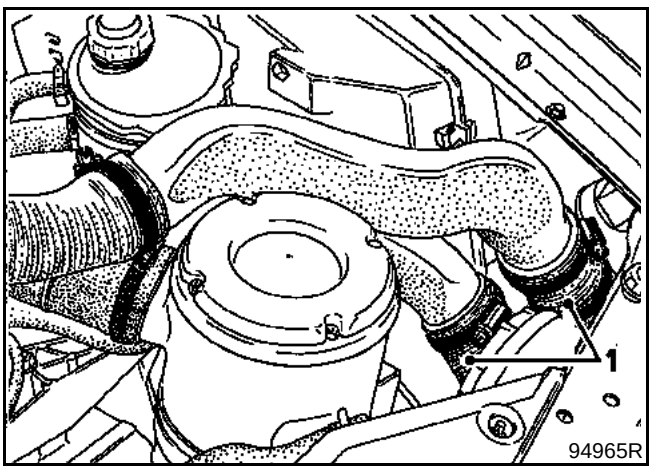


Remove the two side positioning centring fittings on the bumper in relation to the wing.

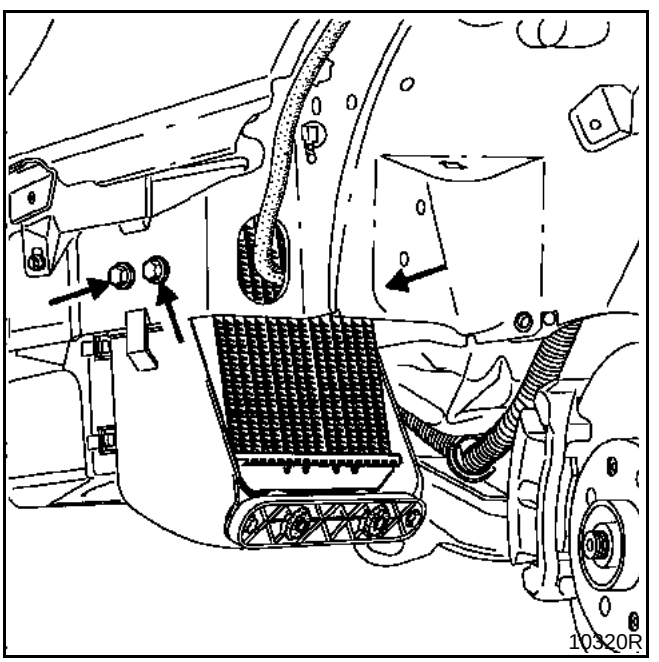
Remove:
– the bumper by pulling forwards,



– the flexible air inlet and outlet ducts on the exchanger (1),



– three mounting bolts,



– the air-air exchanger.

REFITTING

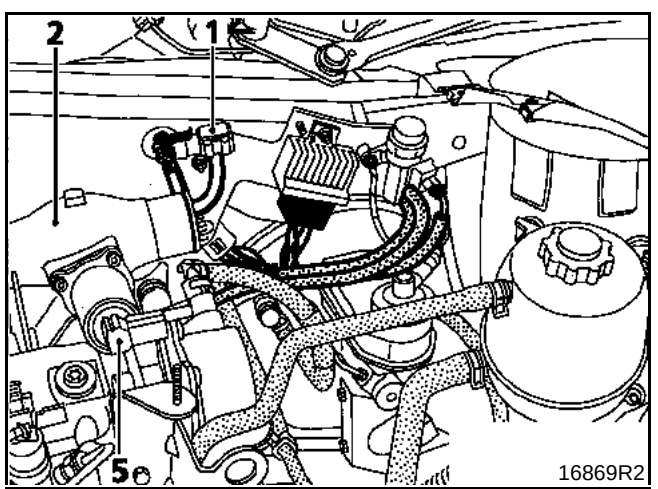
Refit the unit proceeding in the reverse order to removal.

TIGHTENING TORQUES (in daN.m)	
Manifold mounting stud	**0.8**
Manifold mounting stud	**2.8**
EGR valve mounting bolt	**2.1**

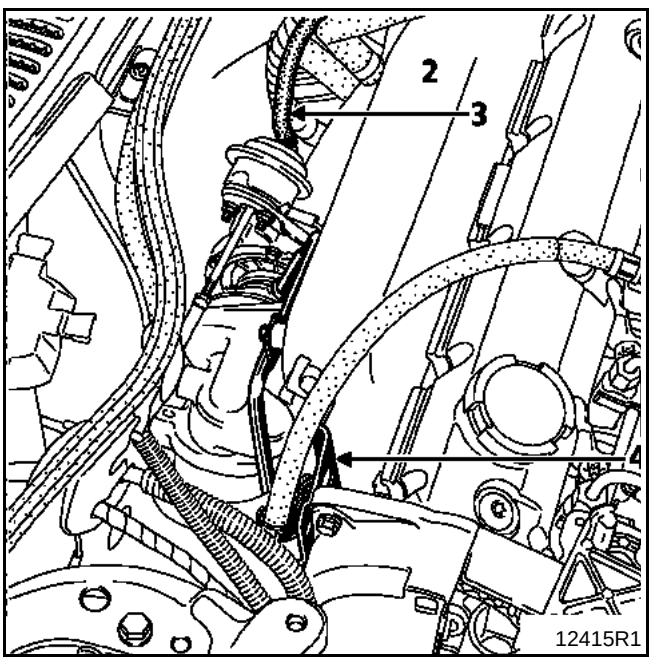
REMOVAL

NOTE: Removal of the manifolds requires that you remove the turbocharger (see section **12** "**Turbocharging**"). The two manifolds cannot be removed separately.

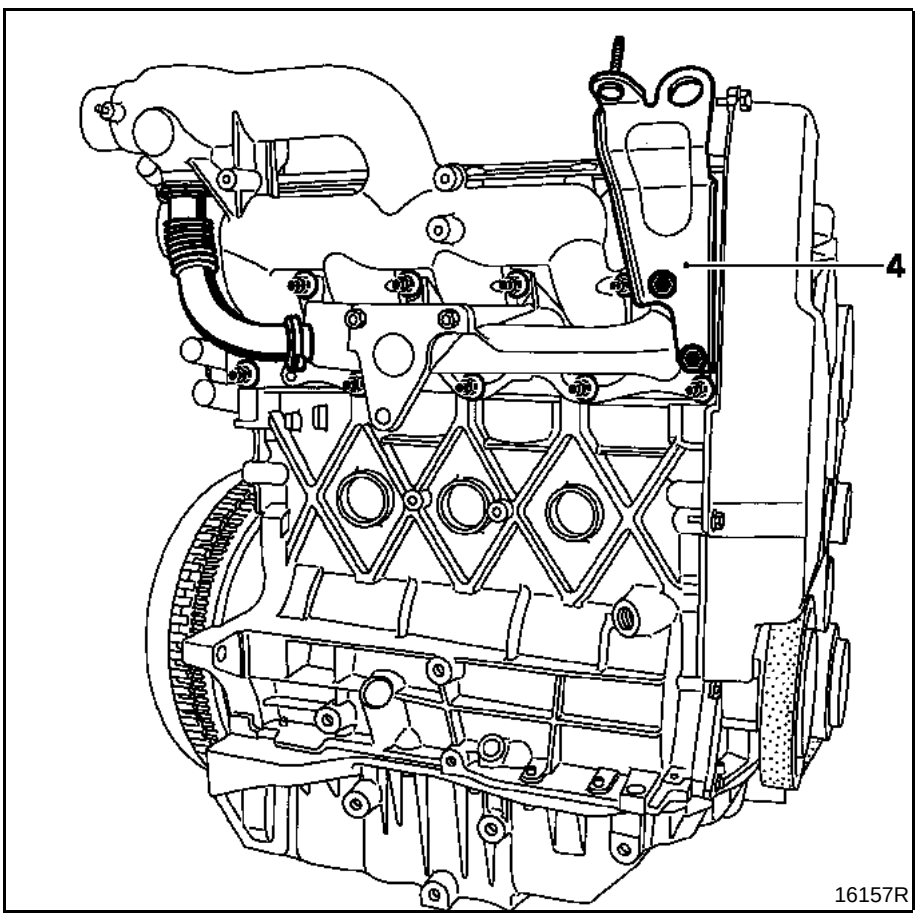
Disconnect:
– the battery,
– the air inlet pipe from the intake manifold (2),
– the pipe leading to the pressure sensor on the manifold (1),
– the **EGR** (5) solenoid valve.



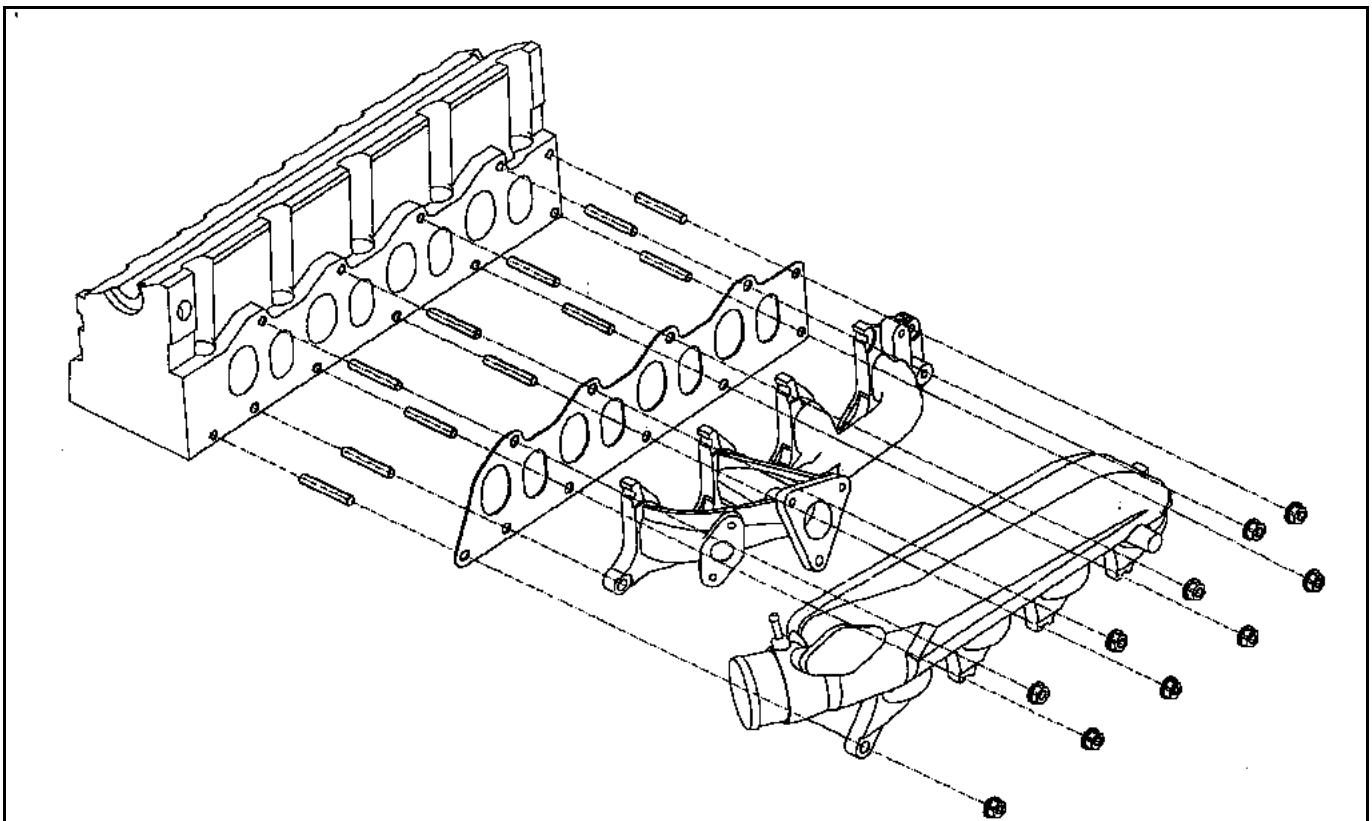
Remove **(for the Scénic)**:
– the windscreen wiper arms,
– the scuttle panel,
– the bulkhead panel,
– the air unit,
– the turbocharger.



Remove the **EGR** solenoid valve pipe and the lifting bracket (4).



Remove the nuts securing the manifolds.



Manifolds

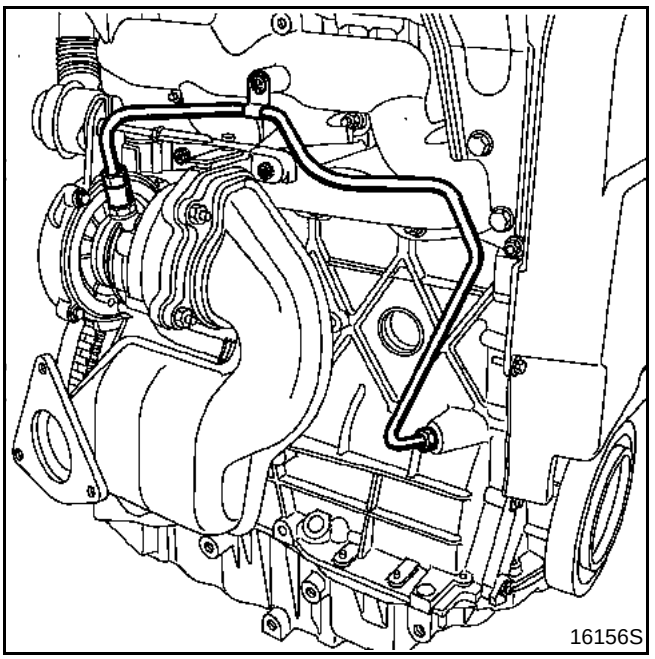
If replacement of the inlet manifold is planned, remove the **EGR valve** (consult section **14** "**Antipollution**" for the method).

REFITTING

Proceed in the reverse order to removal.

Change the manifold gasket and take care to replace it properly.

TIGHTENING TORQUES (in daN.m)	
Priming catalytic converter mounting nuts (pre-catalytic converter)	**2.4**
Lower mounting bolt	**2.4**
Priming catalytic converter stay bolt	**6**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REMOVAL

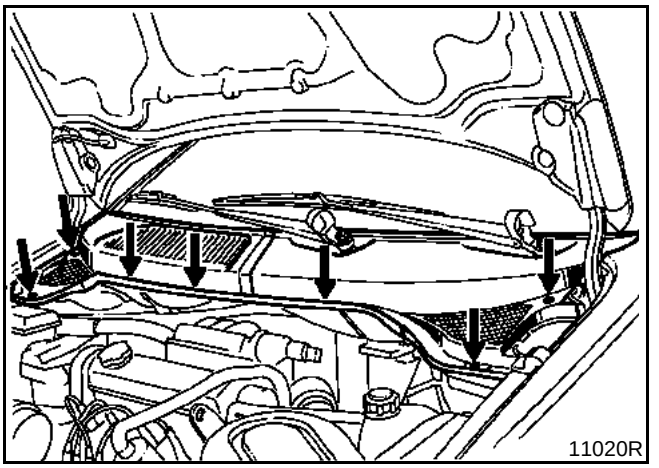
Put the vehicle on a two post lift.

Disconnect the battery.

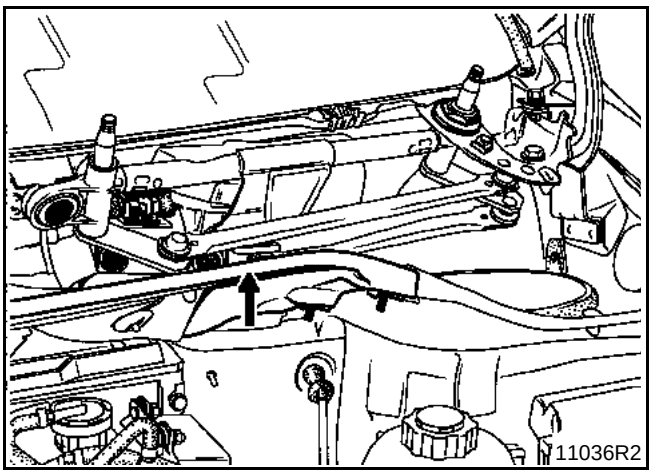
Remove the cover and the under body protection.

Disconnect the exhaust downpipe.

Remove **(for the Scénic)** :
– the windscreen wiper arms using tool **Elé. 1294-01**,
– the scuttle panel,


11020R

– the bulkhead panel,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Disconnect the flow meter and remove the air unit.

Remove:
– the priming catalytic converter mounting stay,
– the mounting nuts,
– the pre-catalytic converter.

REFITTING

Fit the priming catalytic converter (or pre-catalytic converter) to the turbocharger.

Fit:
– the pre-catalytic converter stay,
– the mounting nuts.

Tighten all the nuts and mounting bolts.

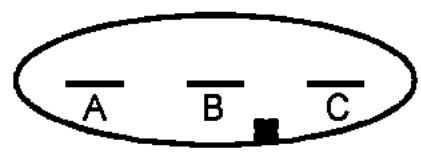
Refit the exhaust downpipe.

Replace the seals.

Vehicle	Gearbox	Engine							Depollution standard
		Type	Index	Bore (mm)	Stroke (mm)	Cubic capacity (cm^3)	Compression ratio	Catalytic converter	
XA05	JC5	F9Q	732	80	93	1 870	19/1	◊ C103	Euro 2000

ENGINE SPEED (rpm)			SMOKE DENSITY	
IDLING SPEED	Max. - no load	Max. - under load	Homologation value	Max. - Max
835 ± 50	4,700 ± 150	4,500 ± 100	1.5 m^{-1} (46 %)	3 m^{-1} (70 %)

DESCRIPTION	BRAND/TYPE	SPECIAL NOTES
High pressure pump	BOSCH CR/CP153/R65/10-15	Pressure from **250** to **1350 bars**
Supercharging pump (low pressure)	BOSCH	Pressure from **2.5 to 4 bars** Flow: **80 to 100 litres/hour minimum**
Diesel pressure sensor	BOSCH	Fitted to the injection rail Resistance: **tracks 1,2 and 1,3 = 4.3 MΩ** **tracks 2,3 = 1050 Ω**
Injectors	BOSCH	Solenoid injector Resistance: **< 2 Ω** Maximum pressure **1525 bars**
Pressure regulator	-	Integrated with the high pressure pump Resistance: ≈ **5 Ω at 20° C**
Injection computer	BOSCH	**128 track** computer
Pre-postheating unit	NAGARES BED/7	With pre-postheating function controlled by the injection computer
Heater plugs	BERU or CHAMPION	Resistance: **0.6 Ω** connector removed
Accelerator potentiometer	CTS	Double track potentiometer Track resistance ≈ **1.7 Ω**
Air intake temperature sensor	SIEMENS	integrated in the flow meter Resistance between **100 Ω and 40 Ω**

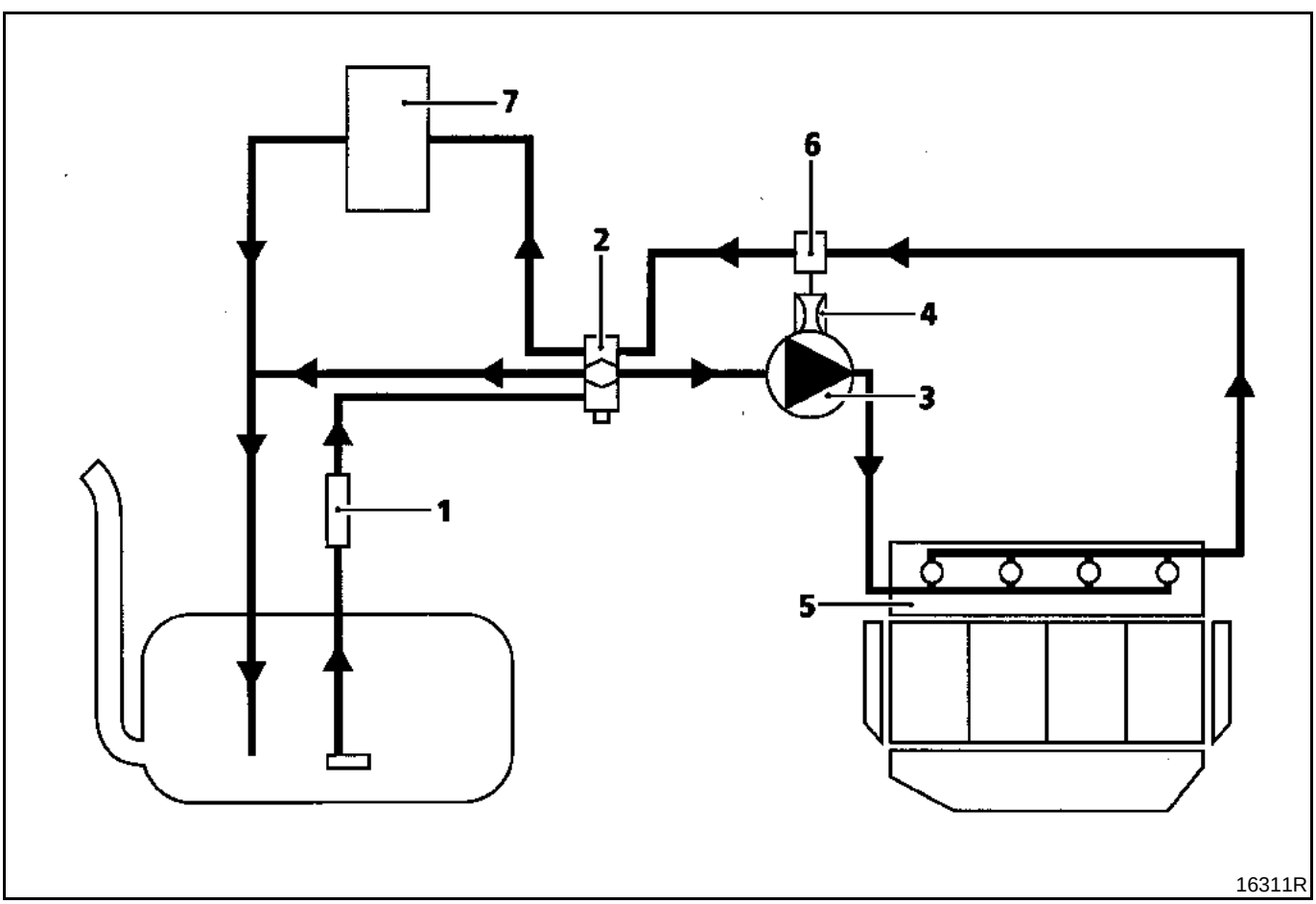
DESCRIPTION	MAKE/MODEL	SPECIAL NOTES
Diesel temperature sensor	MAGNETTI MARELI	Resistance: ≈ **2.050 Ω at 25 °C**
Engine speed sensor	MGI	Resistance: **800 ± 80 Ω**
Atmospheric pressure sensor	-	Integrated in the computer
Camshaft sensor	ELECTRIFIL	Hall effect sensor
Turbocharger pressure sensor	DELCO	Resistance : **4 KΩ** across tracks **A** and **C** Resistance : **5 KΩ** across tracks **A** and **C** Resistance : **9 KΩ** across tracks **A** and **B** 
Turbocharger operating solenoid	BITRON	Resistance **16.5±1 Ω** at **25 °C**
Air flow meter	SIEMENS	Flow meter with integrated air temperature sensor **track 1** : air temperature **track 2** : earth **track 3** : **5 V** reference **track 4** : + battery feed **track 5** : air flow signal **track 6** : earth
EGR solenoid valve	PIERBURG	Track resistance: **8±0.5 Ω** to **20 °C** (tracks 1 and 5) Sensor resistance: **4 KΩ** to **20 °C** (tracks 2 and 4)
Turbocharger	KKK	Calibration : **120 mbars** for rod travel between **1 and 4 mm** **400 mbars** for a stroke between **10 and 12 mm**
Thermal plungers	-	Resistance: **0.45 ± 0.05 Ω at 20 °C**

The common rail direct high pressure injection system aims to deliver a certain quantity of diesel to the engine at a specific time.

DESCRIPTION

The system consists of:
– a low pressure pump (1) (located between the induction unit and the fuel filter),
– a fuel filter (2),
– a high pressure pump (3),
– a high pressure regulator (4) attached to the pump,
– an injection rail (5) fitted with a diesel pressure sensor,
– a priming fuel cock (6) (open in normal mode) (depending on version),
– a fuel cooler (7),
– four solenoid injectors,
– various sensors,
– an injection computer.

Removal of the interior of the high pressure pump and the injectors is prohibited.



OPERATION

The **common rail** direct high pressure injection system is a sequential diesel injection system (based on the operation of multipoint injection for petrol engines).

This new injection system reduces operating noise, lowers the quantity of polluting gas and particles and produces significant engine torque at low engine speeds thanks to a pre-injection procedure.

The low pressure pump (also called the supercharging pump) supplies the **HP** pump, through the filter with pressure of between **2.5** and **4 bars**.

The **HP** pump generates the high pressure sent to the injection rail. The pressure regulator located on the pump modulates the value of the high pressure via the computer. The rail supplies each injector through a steel pipe.

The computer:
– determines the value of injection pressure necessary for the engine to operate well and then controls the pressure regulator. It checks that the pressure value is correct by analysing the value transmitted by the pressure sensor located on the rail,
– determines the injection time necessary to deliver the right quantity of diesel and the moment when injection should be started,
– controls each injector electrically and individually after determining these two values.

The injected flow to the engine is determined depending on:
– the duration of injector control,
– the injector opening and closing speed,
– the needle stroke (determined by the type of injector),
– the nominal injector hydraulic flow (determined by the type of injector),
– the high pressure rail pressure controlled by the computer.

FOR ANY INTERVENTION IN THE HIGH PRESSURE INJECTION SYSTEM YOU MUST RESPECT THE CLEANING AND SAFETY ADVICE SPECIFIED IN THIS DOCUMENT.

POST-REPAIR CHECK

A fuel cock is fitted to the fuel filter at the level of the diesel return pipe leading to the tank. It should be in open position for normal operation.

However, to carry out a circuit reignition after an intervention, a filter change or a fuel fault, you should:
– close the fuel cock,
– start the low pressure pump by switching on the ignition several times,
– start the engine,
– OPEN THE FUEL COCK (the valve is open when the two coloured lines are aligned).

NOTE: certain vehicles are not fitted with a fuel cock. In this case, ignore this operation.

After any operation, check that there are no diesel leaks. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.

IMPORTANT: the engine must not run with diesel containing more than **10 %** diester.

The system can inject the diesel into the engine up to a pressure of **1350 bars**. **Before any intervention, check that the injector rail is depressurised**.

It is absolutely vital that you observe the tightening torque:
– of the high pressure pipes,
– of the injector on the cylinder head,
– of the pressure regulator,
– of the pressure sensor.

When the high pressure pump, injectors, supply, return and high pressure output unions are repaired or removed, the bores should be fitted with new and appropriate core seals to avoid impurities.

When replacing a high pressure pipe, the following procedure should be observed:

– remove the high pressure pipe,
– fit the cleanliness plugs,
– loosen the high pressure rail and the pump/rail pipe,
– fit the high pressure pipe,
– tighten the injector side union to torque,
– tighten the connection on the high pressure pump side to torque,
– tighten the high pressure rail fastenings to torque.
– tighten the pump/rail pipe to torque (pump side first).

It is prohibited to remove the interior of the pump.

It is vital that you replace the fuel return pipe placed on the injectors during removal.

The diesel temperature sensor is not removable. It is part of the fuel return rail.

It is forbidden to loosen a high pressure pipe connection when the engine is running.

CLEANLINESS INSTRUCTIONS WHICH MUST BE FOLLOWED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is very sensitive to contamination. The risks caused by the introduction of pollution are:
– damage to or destruction of the high pressure injection system,
– seizing of a component or a component which is not sealed.

All after-sales operations must be performed under very good cleanliness conditions. This means that no impurities (particles a few microns in size) have penetrated into the system during removal or into the circuits via the fuel unions.

The cleanliness principle must be applied from the filter to the injectors.

WHAT ARE THE POLLUTING ELEMENTS?

The elements which pollute are:
– metal or plastic splinters,
– paint,
– fibres:
  ● of cardboard,
  ● of brushes,
  ● of paper,
  ● of clothing,
  ● of cloths.
– foreign bodies such as hair,
– ambient air,
– etc.

WARNING: it is impossible to clean the engine using a high pressure washer at the risk of damaging connections. Also the moisture may collect in the connectors and cause electrical connection problems.

INSTRUCTIONS TO BE FOLLOWED <u>BEFORE ANY WORK IS CARRIED OUT</u> ON THE INJECTION SYSTEM

● Ensure that you have plugs for the unions to be opened (bag of plugs sold by the **P**arts **D**epartment).
Plugs are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable).
Unused plugs must be thrown away.

● Ensure that you have the resealable plastic bags for storing removed parts. There is less risk of parts stored in this way being subjected to impurities. The bags can be used only once, and once used they must be thrown away.

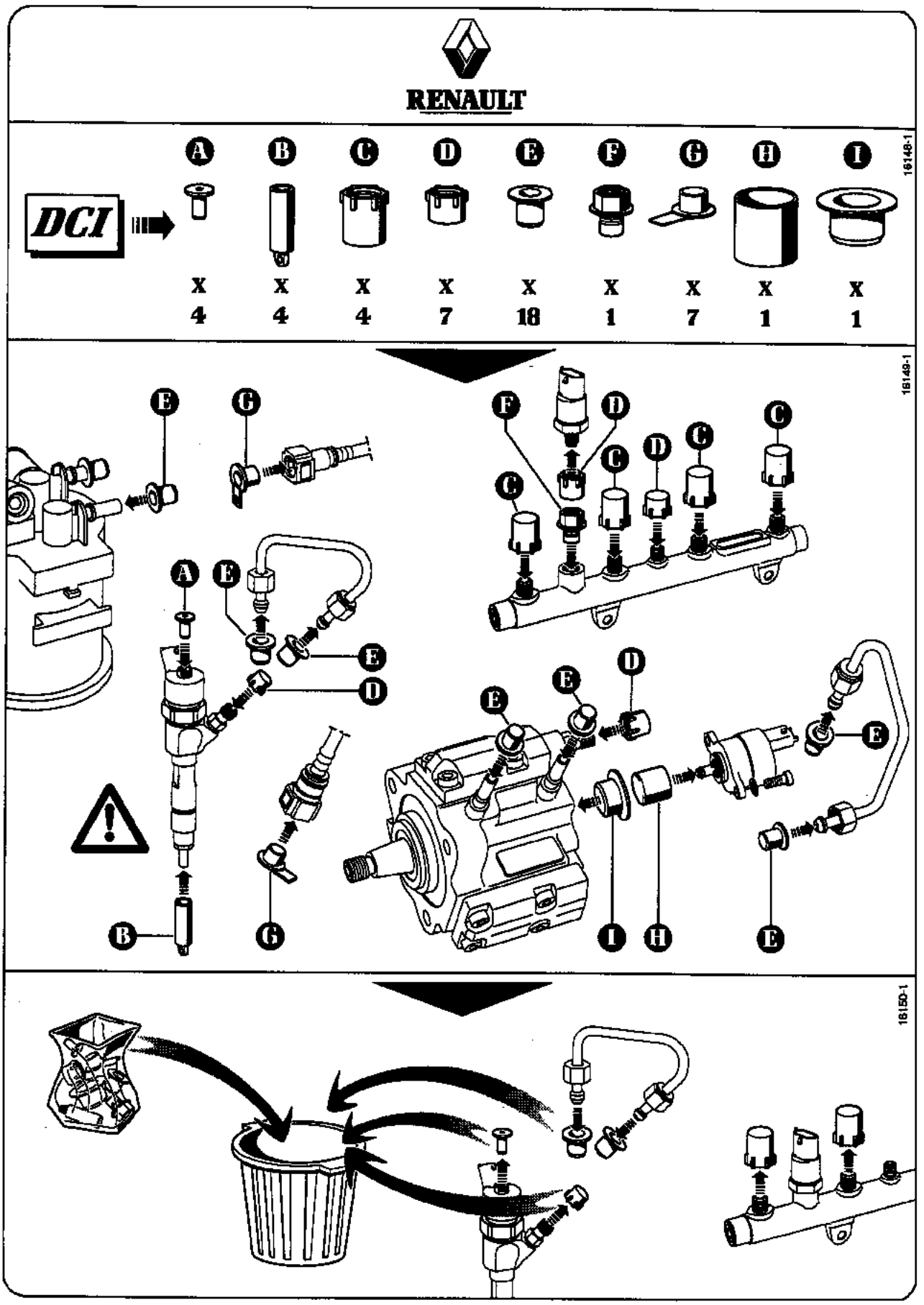
● Ensure that lint-free cleaning wipes are available (cloths with **SODICAM** part numbers). **The use of conventional cloth or paper is prohibited.** In fact, these create lint and may contaminate the system's fuel circuit. A lint-free cloth should only be used once.

INSTRUCTIONS TO BE FOLLOWED BEFORE OPENING THE FUEL CIRCUIT

- For each operation, use new thinner (used thinner contains impurities). Pour it into a clean receptacle.
- For each operation, use a clean brush which is in good condition (the brush must not shed its bristles).
- Clean using the unions to be opened and the parts to be removed using thinner and tweezers.
- Blow compressed air over the cleaned parts (tools, set up the same way as the parts, connections and injection system zone). Check that no bristles are left.
- Wash your hands before and during the operation if necessary.
- When using protective gloves, cover leather gloves with latex gloves (available from **SODICAM**).

INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION

- As soon as the circuit is open, all openings must be blanked to prevent pollution from penetrating the circuit. The plugs to be used are available from the **P**arts **D**epartment. They must not be reused.
- Reseal the bag hermetically, even if it has to be reopened only a short time later. Ambient air carries pollution.
- All components of the injection system must, after having been blanked, be stored in a hermetically sealed plastic bag.
- After opening the circuit, the use of a brush, thinner, bellows, sponge or normal cloth is **strictly forbidden**. In fact, these elements are liable to cause the entry of impurities into the system.
- When replacing a component with a new one, do not remove it from its packaging until it is to be fitted to the vehicle.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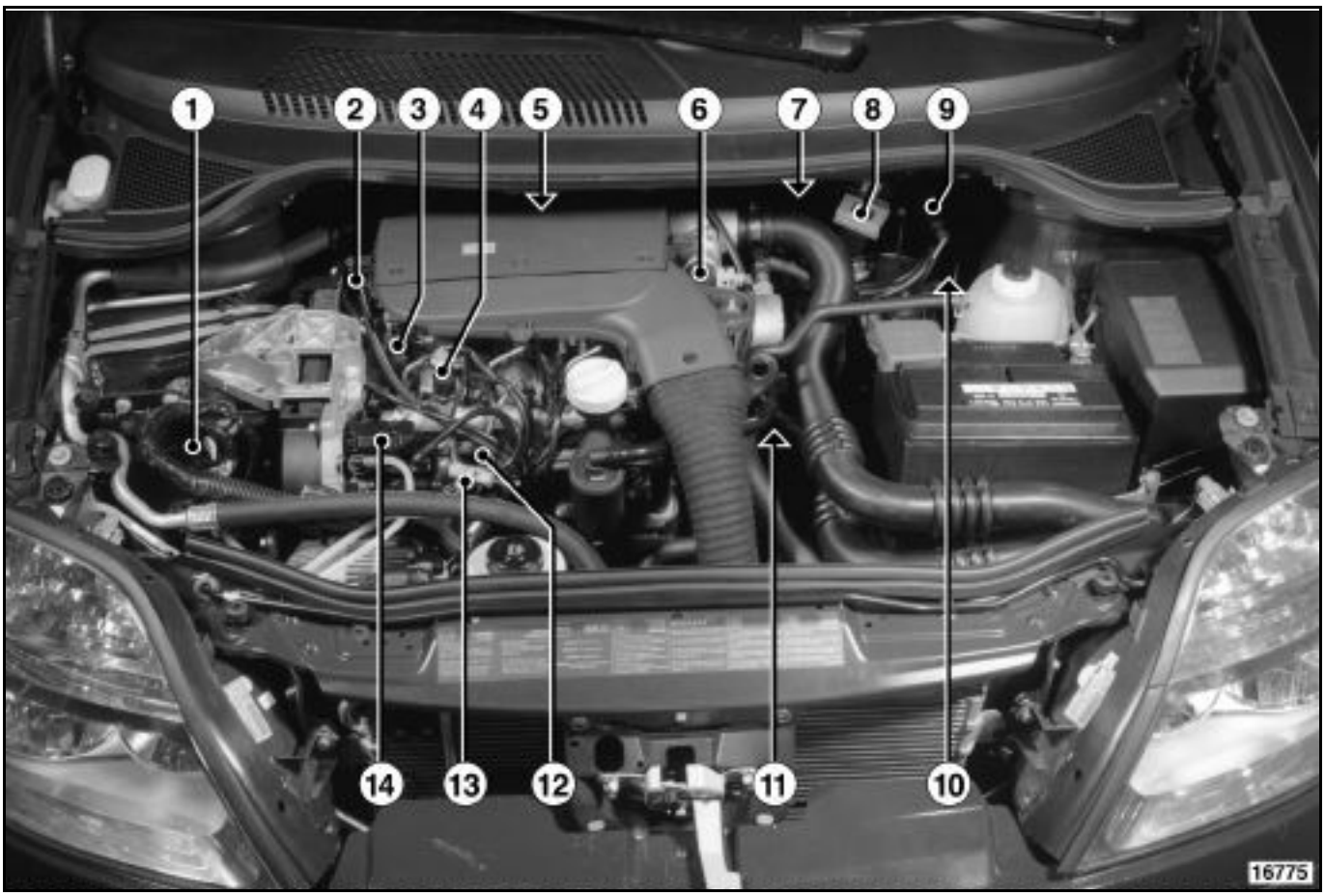
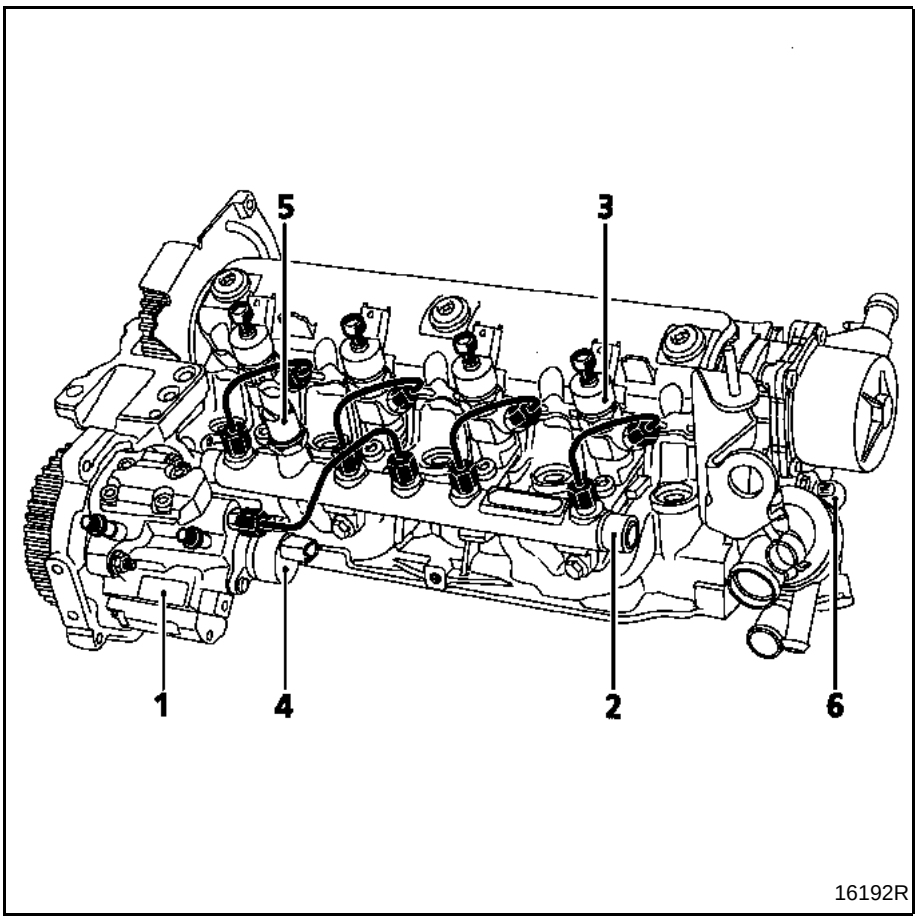
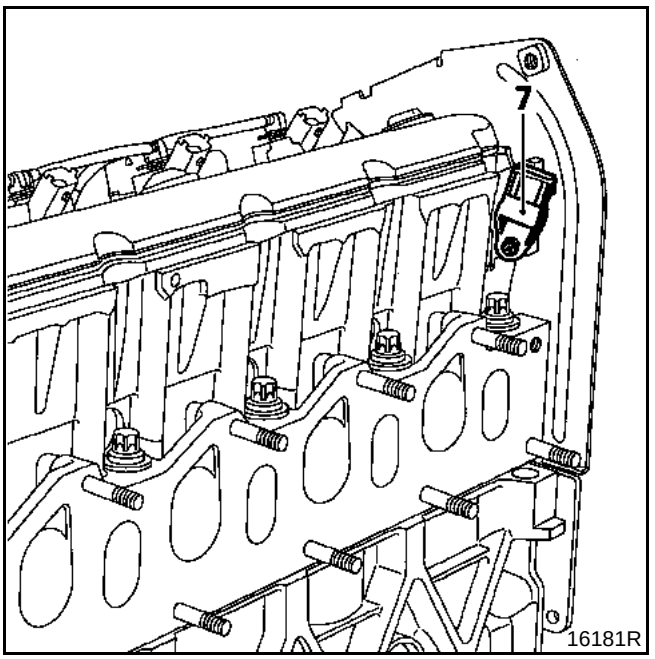


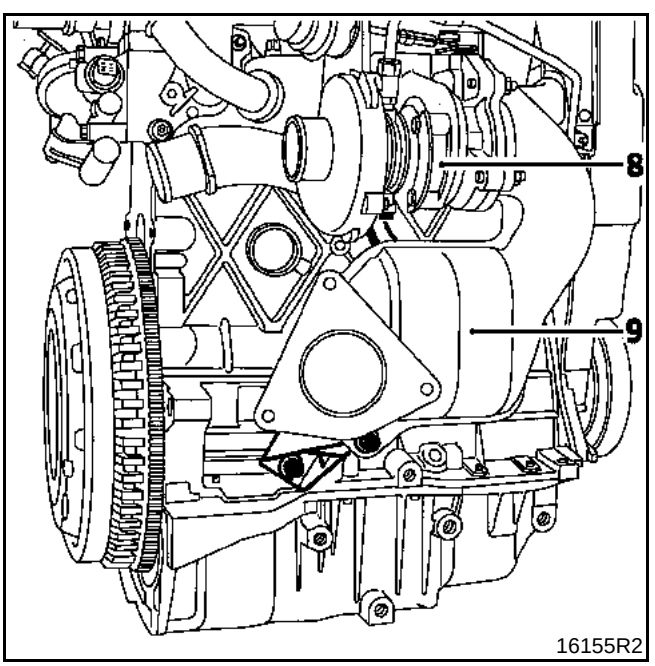
1 Injection computer
2 Cylinder marking sensor
3 Solenoid injector
4 Rail pressure sensor
5 Flow meter with air temperature sensor
6 EGR valve
7 Turbocharger pressure sensor
8 Preheating unit
9 Turbocharging pressure regulator (solenoid)
10 Accelerator pedal potentiometer
11 Engine speed sensor and coolant temperature sensor
12 Fuel pressure regulator
13 Fuel temperature sensor (depending on version)
14 High pressure pump



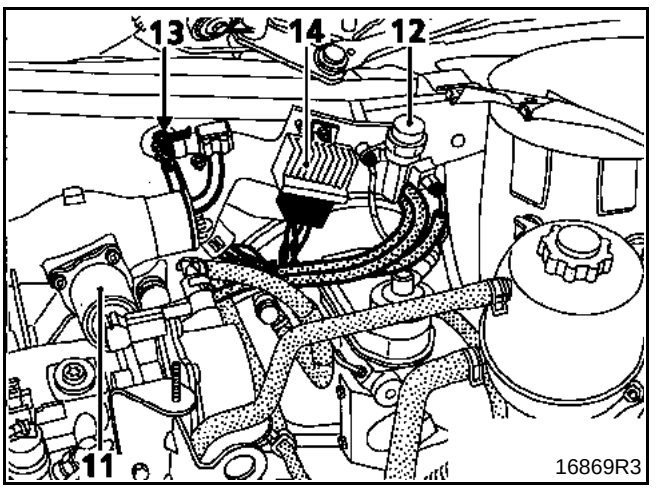
1 High pressure pump
2 Common injection rail
3 Injector
4 Pressure regulator
5 Pressure sensor
6 Water temperature sensor



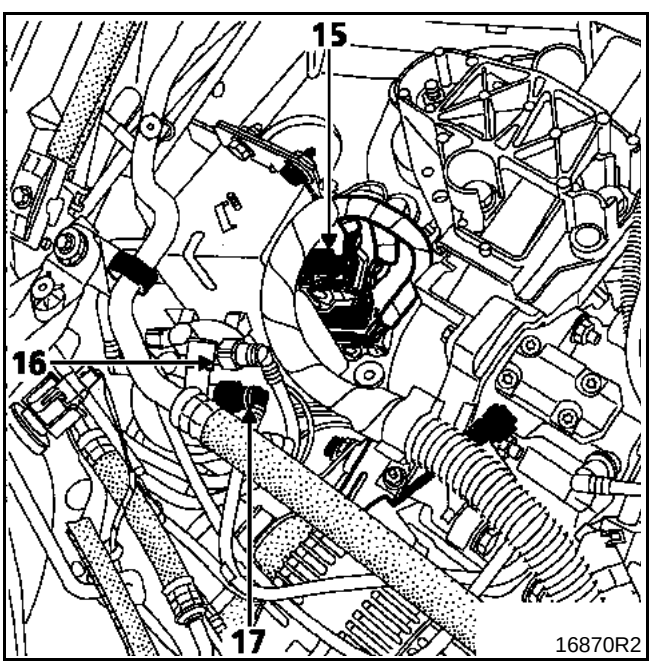
7 Cylinder marking sensor
8 Turbocharger
9 Priming catalytic converter



11 EGR solenoid valve
12 Turbo regulation solenoid
13 Turbocharger pressure sensor
14 Preheating unit



15 Injection computer
16 Fuel filter
17 Repriming fuel cock



Injection warning light

Vehicles using the high pressure diesel system are fitted with two injection warning lights used during the preheating phase and in case of an injection fault (or engine overheating).

WARNING LIGHT PRINCIPLE

- When ignition is switched on, the preheating light is lit during the preheating phase and then goes out (see section **13** "**Pre-postheating control**").

- When there is a fault on the injection system the "fault" warning light lights up. These faults are:
  - internal computer fault,
  - engine speed fault (the vehicle doesn't start),
  - main relay or low pressure fault (the vehicle doesn't start),
  - injector fault,
  - **TDC** sensor coherence fault and camshaft sensor,
  - rail pressure sensor fault,
  - rail pressure regulator fault,
  - accelerator potentiometer fault,
  - engine immobiliser fault,
  - computer supply voltage fault,
  - engine overheating.

NOTE: the **OBD** warning light (symbolised by an engine), visible when the ignition is switched on, is never visible when the engine is running.

This vehicle is fitted with an engine immobiliser controlled by a random rolling code key recognition system.

REPLACING AN INJECTION COMPUTER

The injection computers are supplied without a code but they must all be programmed with one.

When the computer is replaced, the vehicle code must be programmed in and then a check must be made to ensure that the immobiliser system is operational.

To do this, simply switch on the ignition for a few seconds without starting the engine then switch it off. When the ignition is off, the engine immobiliser function will be activated after approximately 10 seconds (red engine immobiliser warning light flashes).

IMPORTANT:

With this engine immobiliser, the computer keeps its immobiliser code for life.

In addition, this system does not have a security code.

Consequently, it is forbidden to perform tests with computers borrowed from the stores or from another vehicle which must then be returned.

It will no longer be possible to decode them.

INJECTION COMPUTER/AC COMPUTER CONNECTION

The compressor is of the variable cubic capacity type.

The injection calculator and the air conditioning calculator are linked by two leads:

– The power absorbed information tells the injection computer the output absorbed by the compressor. It is possible to see the output absorbed using the diagnostic tool. When air conditioning is engaged the reading should be between **250** and **5000 Watts**.

– The connection from the injection computer to the air conditioning computer. This lead carries information on whether starting the compressor is authorized or forbidden.

When the air conditioning function is selected, idling speed is modified to reach a maximum of **875 rpm**.

IMPORTANT: the absorbed output is never equal to 0, whatever the status of the compressor, engaged or not. The minimum value read is approximately **250 Watts**.

COMPRESSOR OPERATION PROGRAMMING

During certain stages of operation, the diesel injection computer stops the compressor from functioning.

Engine start programming

The compressor is prevented from operating for **5 seconds** after the engine has started.

Recovery of performance

When the position of the accelerator pedal is changed significantly and if the engine speed is less than **3000 rpm**, the compressor is prevented from operation for **5 seconds**.

Recovery of output when the vehicle starts moving

If the position of the potentiometer is more than **50 %** the engine speed is less than **2250 rpm** and the vehicle speed is below **20 km/h**, the compressor is cut for **5 seconds**.

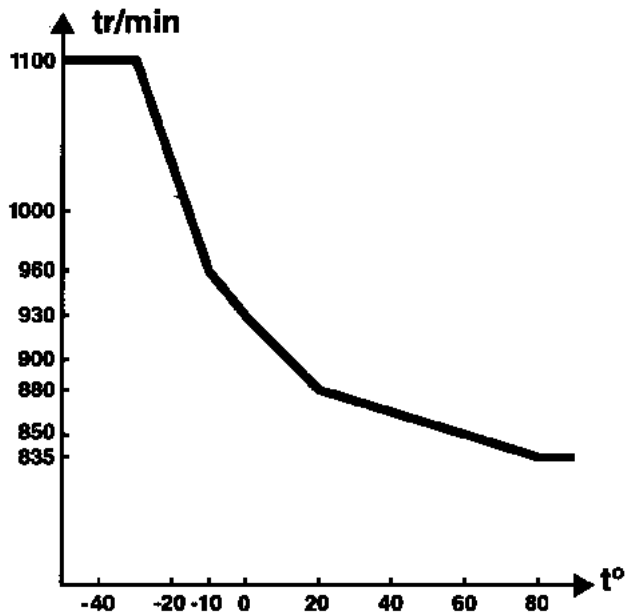
Anti-stall protection

If the no load position is not detected, and the engine speed is less than **675 rpm.** the compressor is disengaged. It is engaged again after **5 seconds** if the engine speed is increased.

Thermal protection programming

The compressor does not engage in cases where the coolant temperature is greater than **+ 112 °C.**

IDLING SPEED CORRECTION ACCORDING TO COOLANT TEMPERATURE



CORRECTION OF THE IDLING SPEED WHEN THE POTENTIOMETER IS FAULTY

If the accelerator pedal potentiometer is faulty, idling speed is held at **1200 rpm.**

If the information from the accelerator pedal position potentiometer and the brake switch information does not correspond, the speed is changed to **1250 rpm**.

CORRECTION OF THE IDLING SPEED ACCORDING TO THE GEAR RATIOS

The running idling speed is modified according to the gear engaged in the gearbox:
– in 1st, 2nd and 3rd gears the speed is **835 rpm.**,
– for other gears the speed is **925 rpm.**

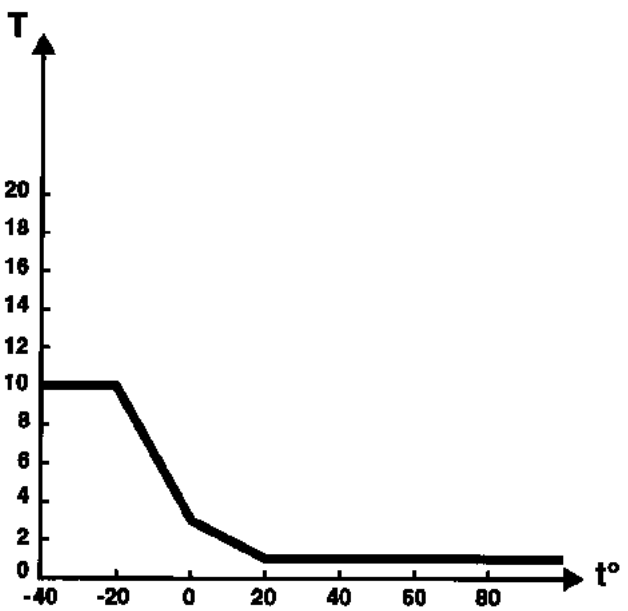
The pre-postheating function is controlled by the preheating unit.

OPERATING PRINCIPLE FOR PRE-POST HEATING

1) "Preheating" on ignition

a) Variable preheating

The warning light lighting time and the supply to heater plugs time depends on the coolant temperature and the battery voltage.



In all cases the injection warning light lighting time cannot exceed **15 seconds**.

b) Fixed preheating

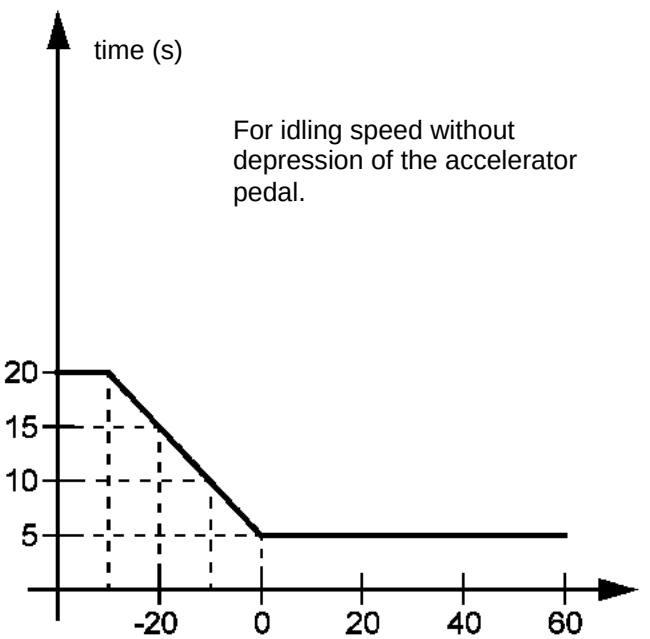
After the warning light goes out the plugs remain supplied for a fixed period of **10 seconds**.

2) Starting

The plugs remain supplied while the starter is being activated.

3) "Postheating" while the engine is running

During this phase the plugs are supplied continuously according to coolant temperature.



The resistance of a heater plug is **0.6** Ω.

TIGHTENING TORQUES (in daN.m)	
Heater plug	**1.5**

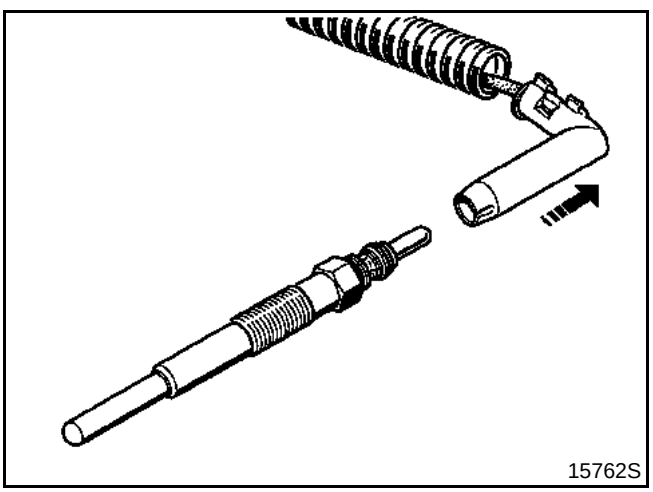
Plugs may be removed without having to open the high pressure circuit.

REMOVAL

Unclip the plug connector.

Clean the plug exterior to avoid any dirt entering the cylinder.

Undo and then remove the plugs.



To undo the plug on cylinder 4 use a **10 mm** long radio socket attached to a universal joint. Once the plug is loosened use a pipe socket to unscrew it completely.

REFITTING

Proceed in the reverse order to removal.

The three thermal plungers are located on a water unit fixed under the manifold at the engine - gearbox joint.

The objective of the system is to reheat the coolant.

The thermal plungers are supplied with **12 volts** by two relays. One relay controls two thermal plungers, and the other relay controls one thermal plunger. This enables control of one, two or three thermal plungers as required.

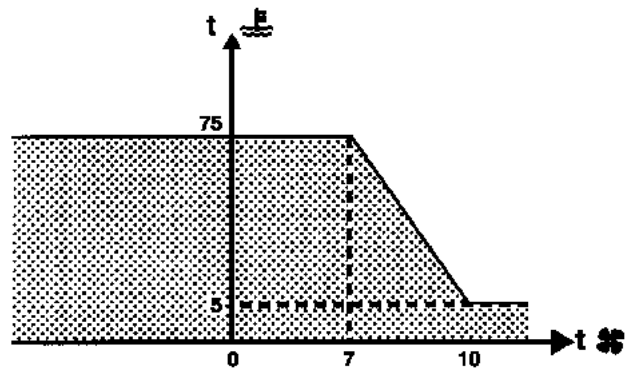
The resistance of the thermal plungers is:
0.45 ± 0.05 Ω at 20°C.

Control strategy

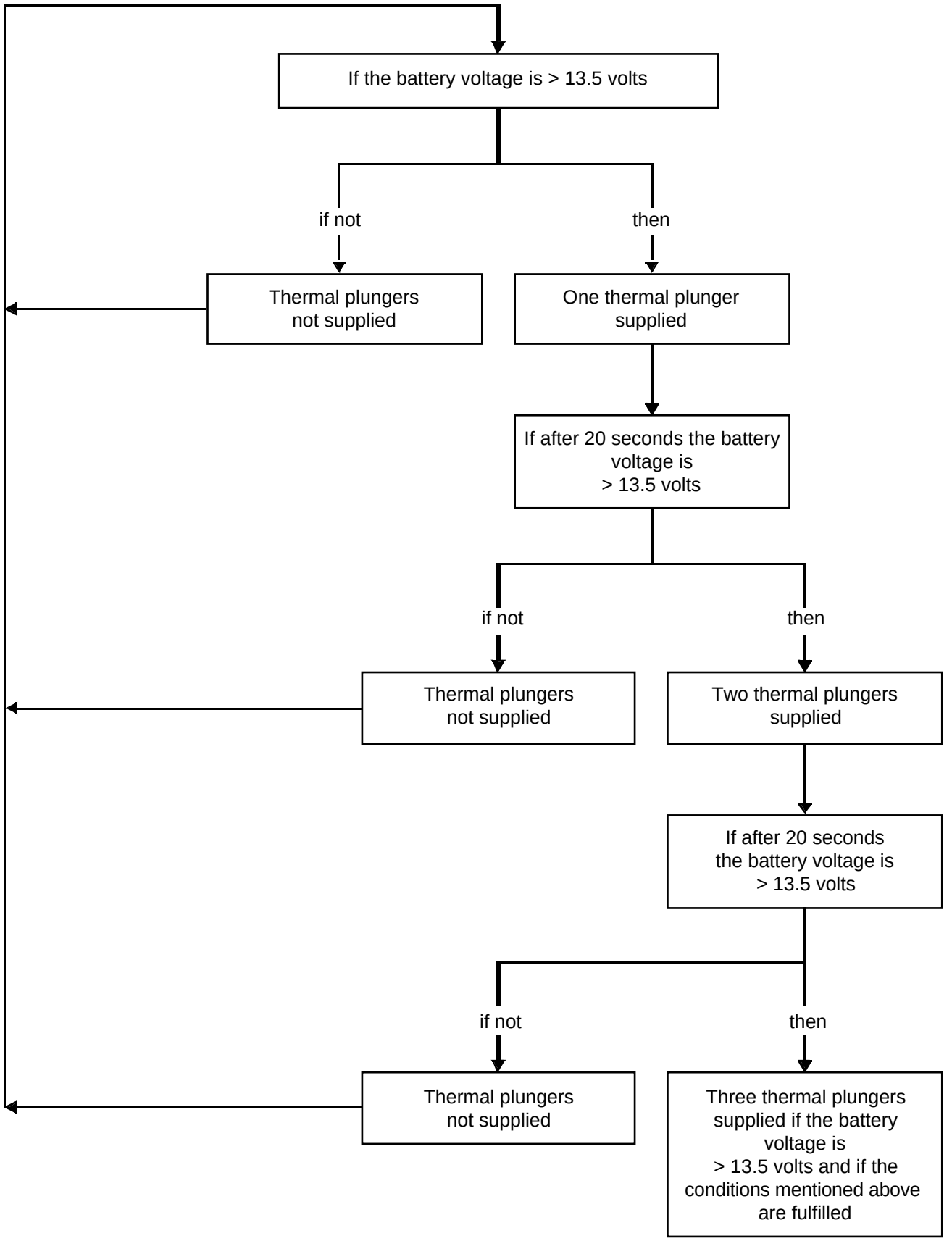
When the thermal plungers are operating the idling speed is brought to **900 rpm**.

Thermal plungers cannot operate in the case of:
– preheating,
– post heating,
– heated windscreen selected,
– engine speed below **700 rpm.**,

If the conditions mentioned above apply, the thermal plungers are controlled according to a characteristics map linked to the air and coolant temperature.



Unshaded zone: Thermal plunger not supplied
Shaded zone: Thermal plunger supplied

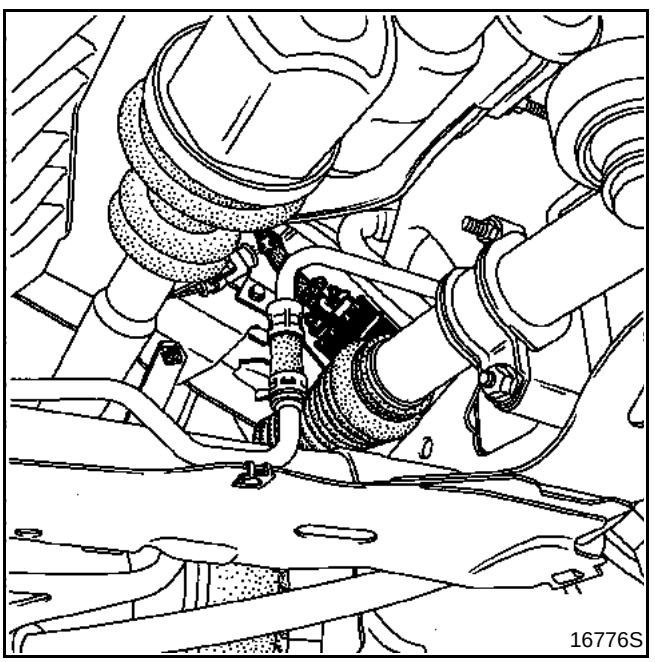

If the battery voltage is > 13.5 volts
if not
then
Thermal plungers not supplied
One thermal plunger supplied
If after 20 seconds the battery voltage is > 13.5 volts
if not
then
Thermal plungers not supplied
Two thermal plungers supplied
If after 20 seconds the battery voltage is > 13.5 volts
if not
then
Thermal plungers not supplied
Three thermal plungers supplied if the battery voltage is > 13.5 volts and if the conditions mentioned above are fulfilled

The supercharging pump is an electric pump located in the engine compartment.

REMOVAL

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY.

IMPORTANT: take note of the quantity of diesel and the residual pressure in the pipes.

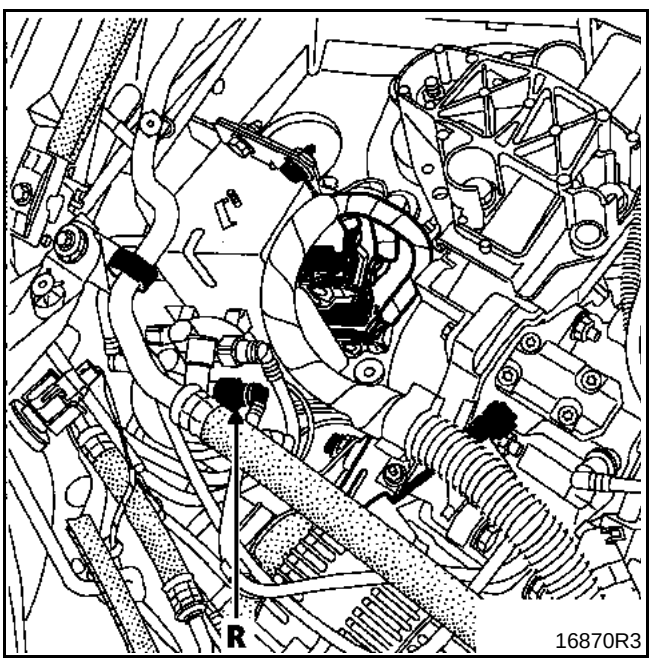

16776S

IMPORTANT:

A fuel cock (R) is fitted to the fuel filter at the level of the return pipe leading to the tank.

It should be in open position for normal operation.

To reprime the circuit after an intervention, a filter change or a fuel fault you should:
– close the fuel cock (R),
– start the low pressure pump by switching on the ignition several times,
– start the engine,
– OPEN THE FUEL COCK (the valve is open when the two coloured lines are aligned).



16870R3

NOTE: certain vehicles are not fitted with a fuel cock. In this case, ignore this operation.

Fuel filter

The fuel filter is located in the engine compartment. It is contained in an unremovable cartridge. This cartridge contains a regulating valve which limits the flow of diesel circulating to the engine.

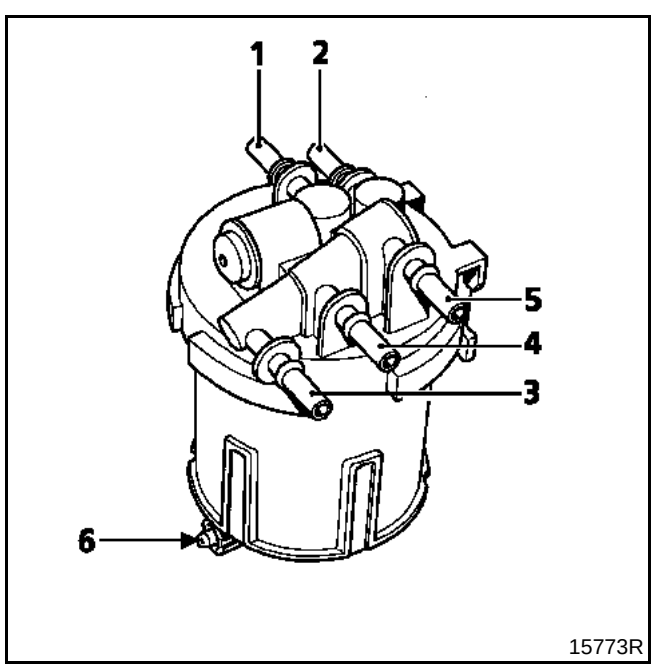
To replace the filter it is therefore necessary to replace the whole unit.

REMOVAL

YOU SHOULD FOLLOW THE CLEANNESS ADVICE CLOSELY.

IMPORTANT: take note of the quantity of diesel and the residual pressure in the pipes.

Disconnect the pipes on the filter which:
– feed the engine (1),
– come from the fuel tank (2) (low pressure pump),
– return to the tank (3) via the fuel cock (depending on version),
– return from the engine (4),
– which return to the tank via the temperature exchanger (5).



NOTE: certain vehicles are not fitted with a fuel cock. In this case, ignore the repriming procedure.

REFITTING

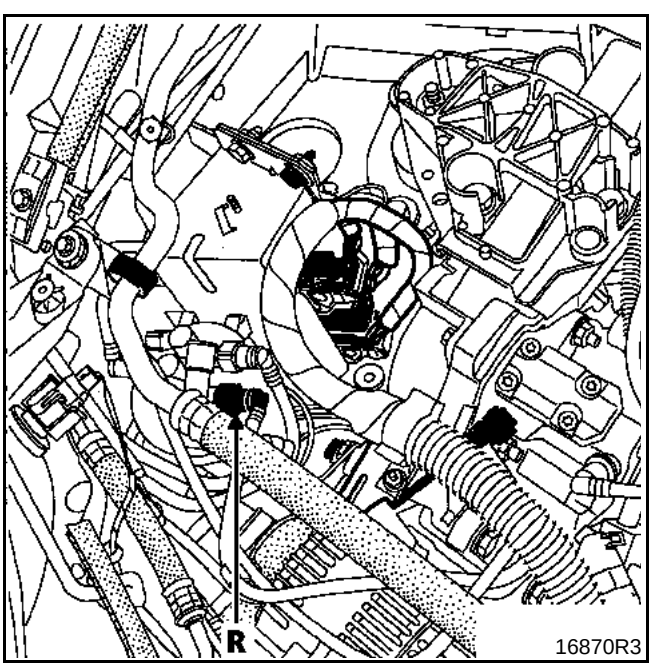
It is vital that you respect the position of the connections to the filter.

Be careful not to squeeze or damage the pipes.

IMPORTANT:
A fuel cock (R) is fitted to the fuel filter at the level of the diesel return pipe to the tank.

It should be in open position for normal operation.

To reprime the circuit after an intervention, a filter change or a fuel fault you should:
– close the fuel cock (R),
– start the low pressure pump by switching on the ignition several times,
– start the engine,
– OPEN THE FUEL COCK (the valve is open when the two coloured lines are aligned).



It is necessary to periodically bleed the water trapped in the diesel filter via the bleed plug (6).

IT IS PROHIBITED TO REMOVE THE INTERIOR OF THE PUMP.

SPECIAL TOOLING REQUIRED		
Mot.	1054	TDC setting pin
Mot.	1200-01	Pump-pulley retaining tool
Mot.	1383	Tool for removing high pressure pipes
Mot.	1525	Pulley extractor
Mot.	1525-01	Extractor adaptor for F9Q
ESSENTIAL SPECIAL TOOLING		
"Low torque" torque wrench		

TIGHTENING TORQUES (in daN.m)	
High pressure pipe	2.5±0.2
High pressure pump mounting	3.2± 0.3
High pressure pump pulley nut	5 ± 0.5
Suspended mounting cover bolt	6.2 ± 1
Torque reaction arm bolt	15

IMPORTANT: before any intervention, connect the after-sales diagnostic tool, query the injection computer and check that the injection rail is not under pressure.

Take note of the fuel temperature.

REMOVAL

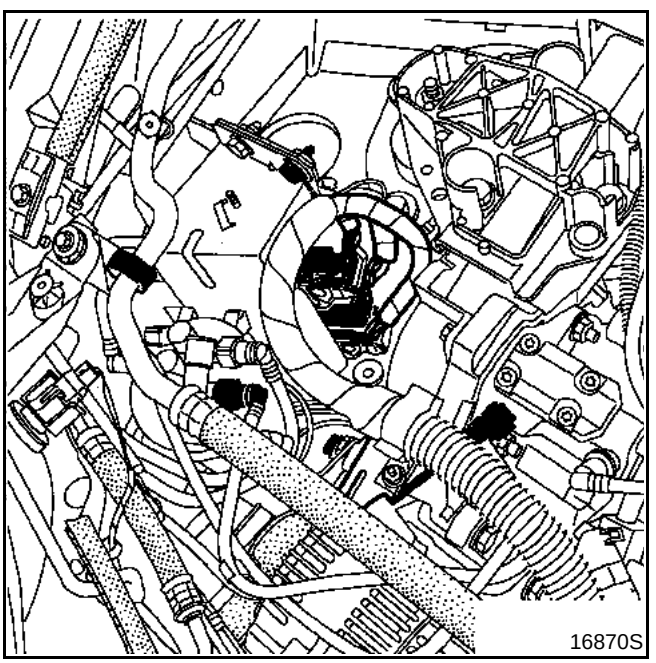
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

Set the engine to top dead centre using the pin **Mot. 1054**.

Release from the fuel filter from its support.

Remove:
– the injection computer mounting,
– the high pressure pulley cover,



– the pump outlet/injection rail inlet pipe using **Mot.1383**.

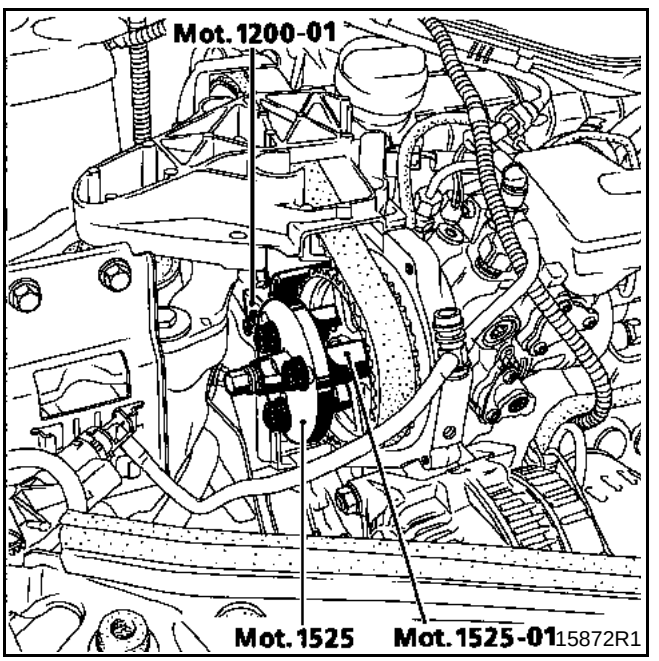
Insert the blanking plugs.

Disconnect the fuel return pipe from the pump and insert the plugs to maintain cleanness.

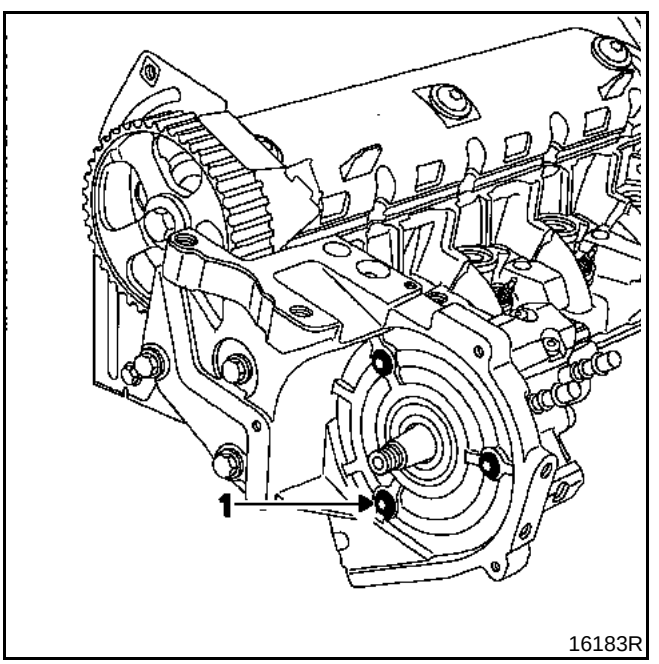
Fit tool **Mot. 1200-01** on the pulley.

Remove the nut from the high pressure pump pulley.

Fit the extractor **Mot. 1525** fitted with the adaptor **Mot. 1525-01** on the pulley pump then disassemble the unit.



Remove the mounting nuts by holding the bolts (1).



REFITTING

Refitting is the reverse of removal.

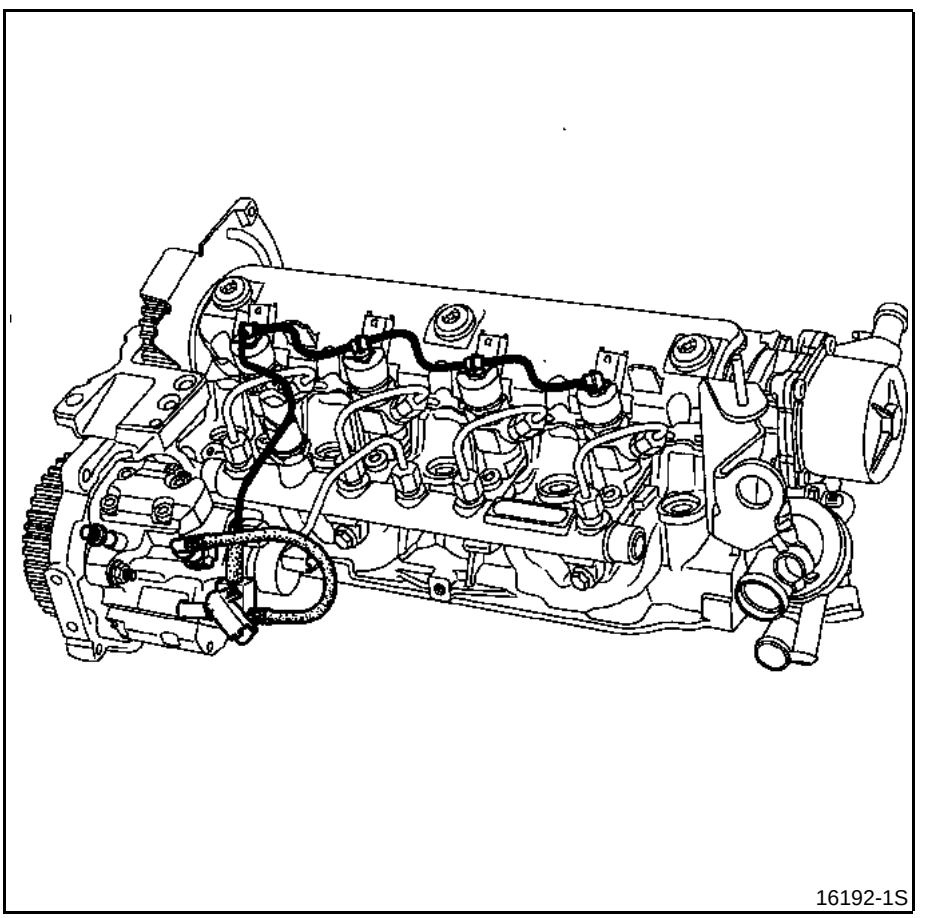
NOTE: be careful not to place the high pressure pipe under stress. Undo the high pressure rail.

Offer up the high pressure pipe nuts on the pump and rail side.

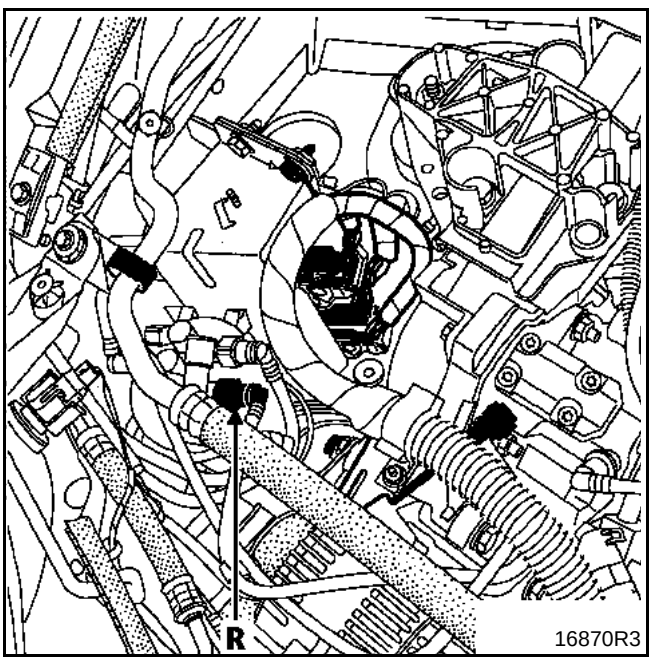
Tighten the high pressure rail.

Tighten the high pressure pipe connections to torque (high pressure pump side first).

You must replace the diesel return pipe after each removal.


16192-1S

Reprime the circuit:
– close the fuel cock (R),
– start the low pressure pump while switching on the ignition several times,
– start the engine,
– OPEN THE FUEL COCK (R) (the valve is open when the two coloured lines are aligned).



NOTE: certain vehicles are not fitted with a fuel cock. In this case, ignore the repriming procedure.

After any intervention, check that there are no leaks in the diesel circuit. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.

SPECIAL TOOLING REQUIRED		
Mot.	1294 -01	Tool for removing windscreen wiper arms
Mot.	1383	Tool for removing high pressure pipes
ESSENTIAL SPECIAL TOOLING		
"Low torque" torque wrench		

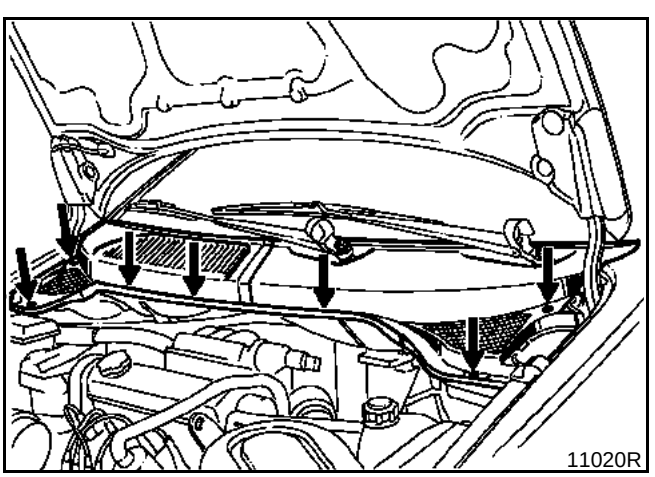
TIGHTENING TORQUES (in daN.m)	
High pressure pipe nut	2.5±0.2
Injection rail mounting bolt	2.2±0.2

IMPORTANT: before any intervention, connect the after-sales diagnostic tool, query the injection computer and check that the injection rail is not under pressure.

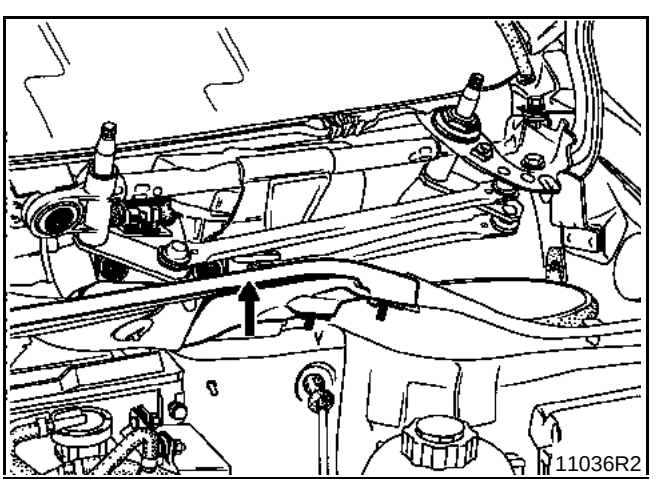
Take note of the fuel temperature.

REMOVAL

Remove **(for the Scénic)**:
– the windscreen wiper arms using tool **Elé. 1294-01**,
– the scuttle panel,


11020R

– the bulkhead panel.


11036R2

Disconnect the flow meter and remove the air unit.

REMOVAL

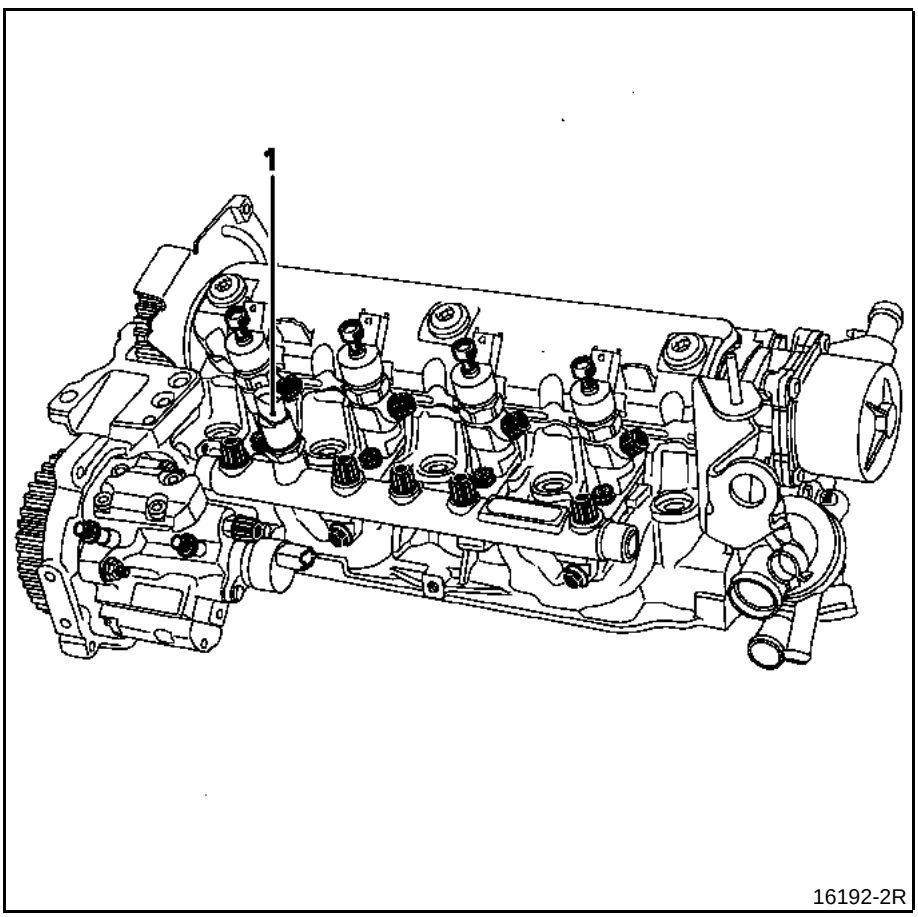
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect:
– the battery,
– the pressure sensor (1),
– the injectors,
– the cylinder marking sensor.

Undo and remove the diesel **HP** pipes.

Insert the plugs to maintain cleanness.

Gently remove the injection rail.

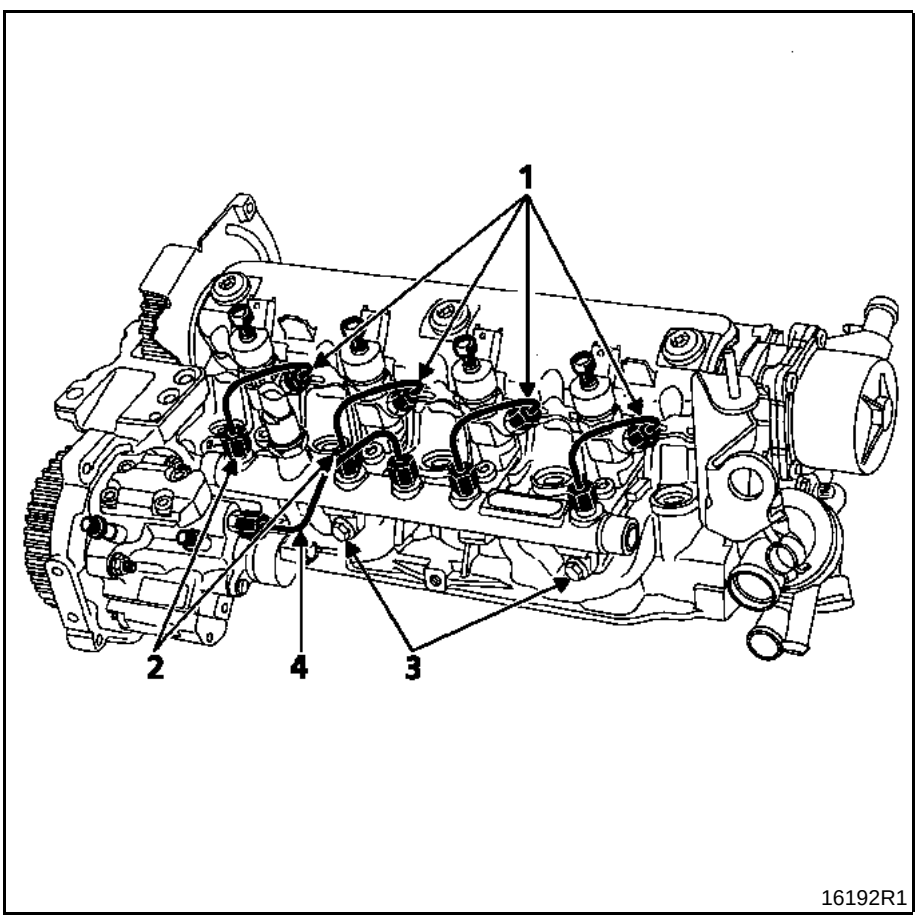


REFITTING

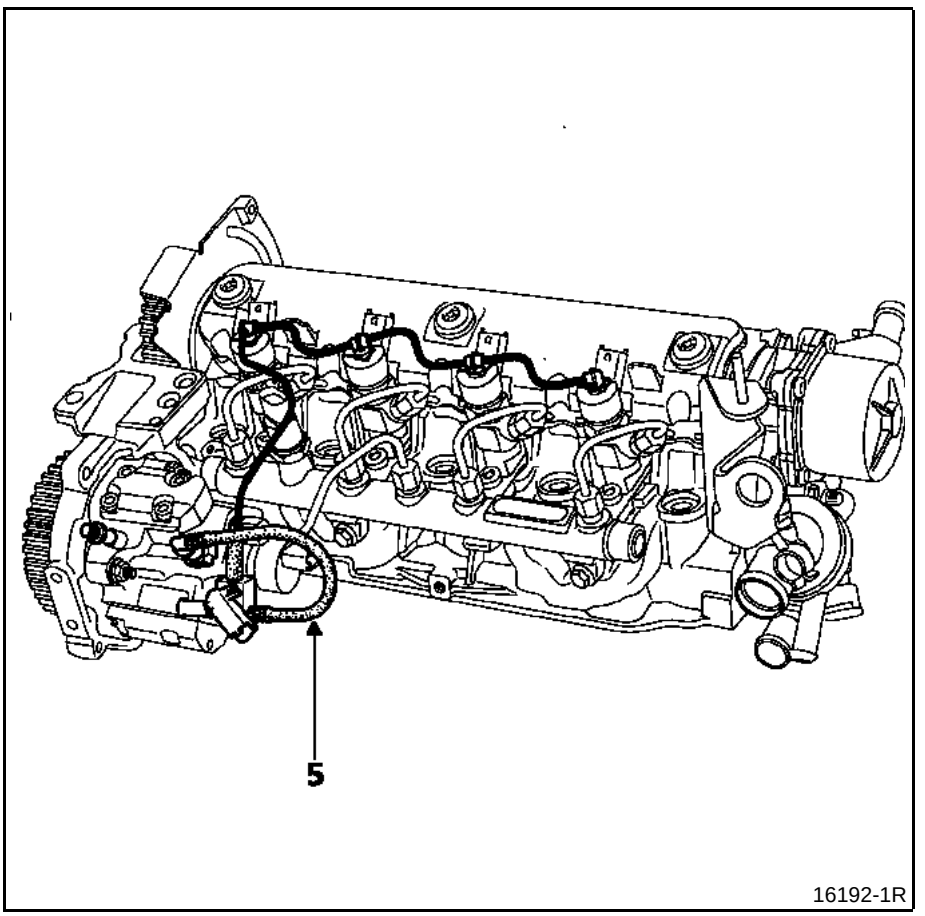
Position the injection rail and finger-tighten the mounting bolts (the rail should be floating).

Position all the **HP** pipes and finger-tighten them.

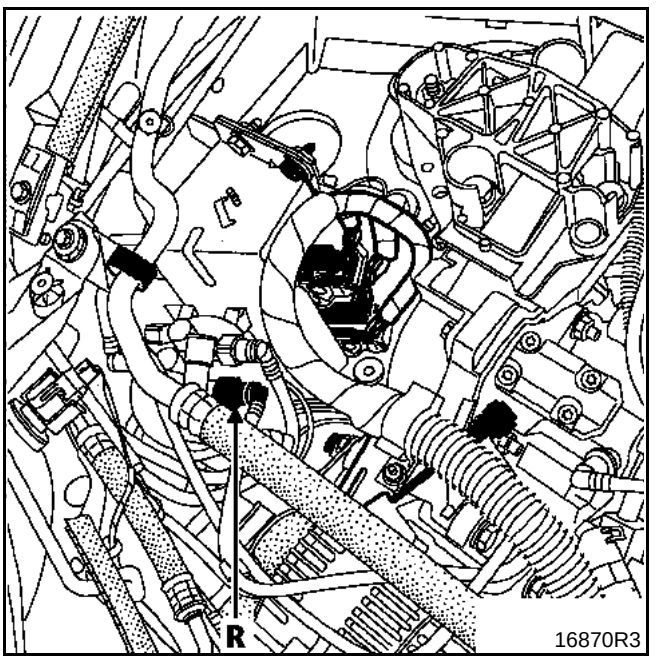
Tighten:
– all the **HP** injection pipe connections (on the injector side (1) then on the injection rail side (2).
– the rail bolts (3).
– the HP pump/rail pipe (4).



NOTE: it is imperative that you replace the fuel return pipe (5) placed on the injectors during removal.



Reprime the circuit using a fuel cock (R) placed on the diesel filter (depending on version).



NOTE: certain vehicles are not fitted with a fuel cock. In this case, ignore the repriming procedure.

After any intervention, check that there are no leaks in the diesel circuit. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.

IT IS FORBIDDEN TO REMOVE THE INTERIOR OF AN INJECTOR OR TO SEPARATE THE INJECTOR HOLDER FROM THE PIPE.

SPECIAL TOOLING REQUIRED		
Elé.	**1294 -01**	**Tool for removing windscreen wiper arms**
Mot.	**1383**	**Tool for removing high pressure pipes**

TIGHTENING TORQUES (in daN.m)	
Injector clamp mounting bolt	**2 ± 0.2**
High pressure pipe nut	**2.5 ± 0.2**

IMPORTANT: before any intervention, connect the after-sales diagnostic tool, query the injection computer and check that the injection rail is not under pressure. Take note of the fuel temperature.

REMOVAL

If necessary, remove:
– the bulkhead panel using tool **Elé. 1294-01**,
– the scuttle panel,
– the air unit.

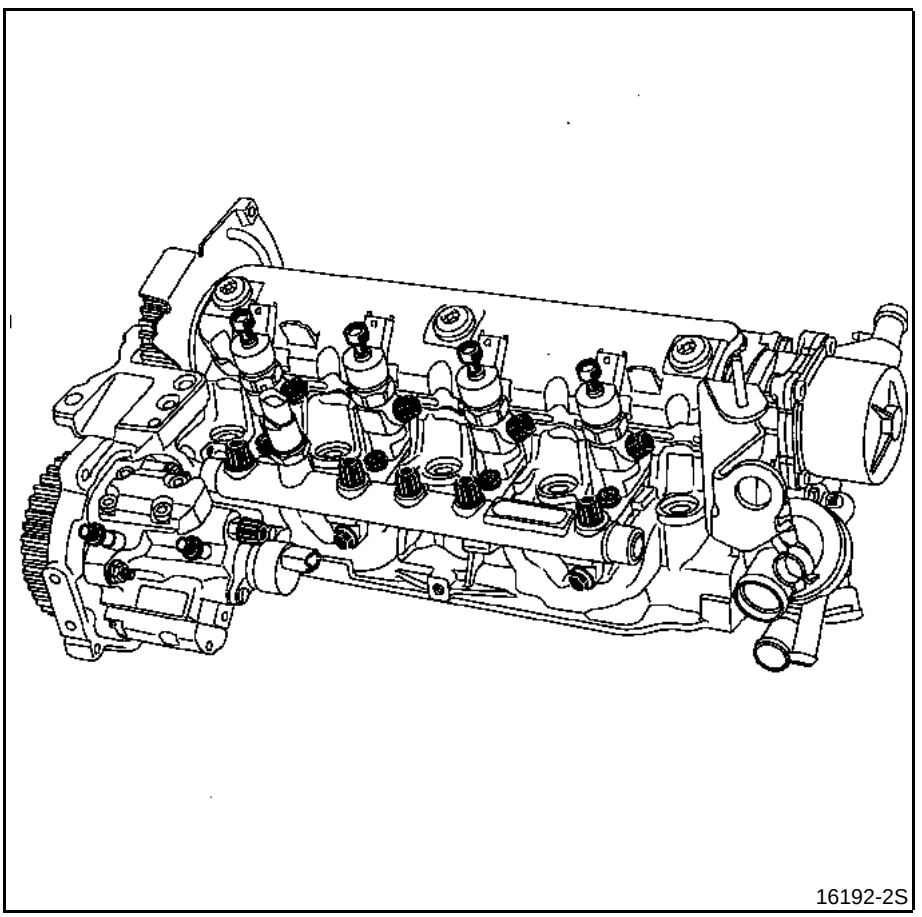
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

NOTE: the injectors may be replaced individually.

Remove the **HP** pipe using the tool **Mot. 1383**.

Insert the plugs to maintain cleanness.

Remove:
– the injector mounting clamp,
– the injector,
– the flame shield washer.


16192-2S

CLEANING

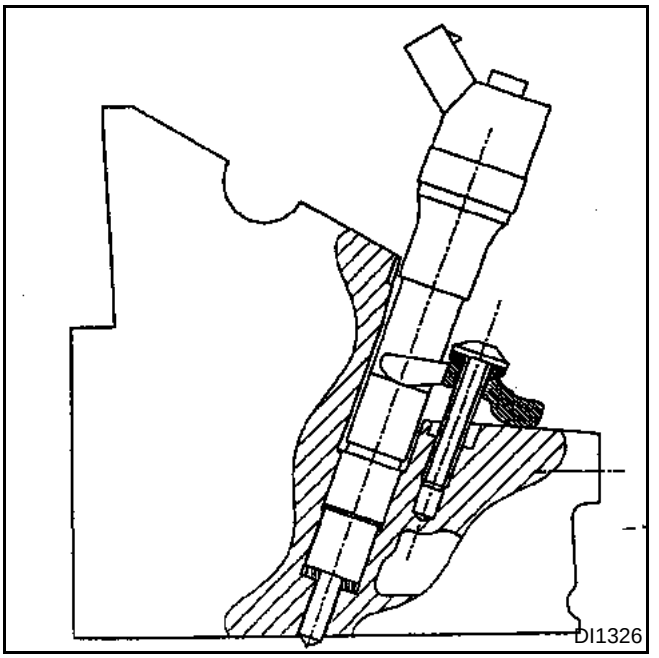
It is absolutely forbidden to use the following when cleaning the injector:
– a metallic brush,
– an emery cloth,
– an ultrasound cleaner.

To clean the nose of the injector, let it soak in degreaser, then wipe is with a lint-free cloth.

Clean the injector point.

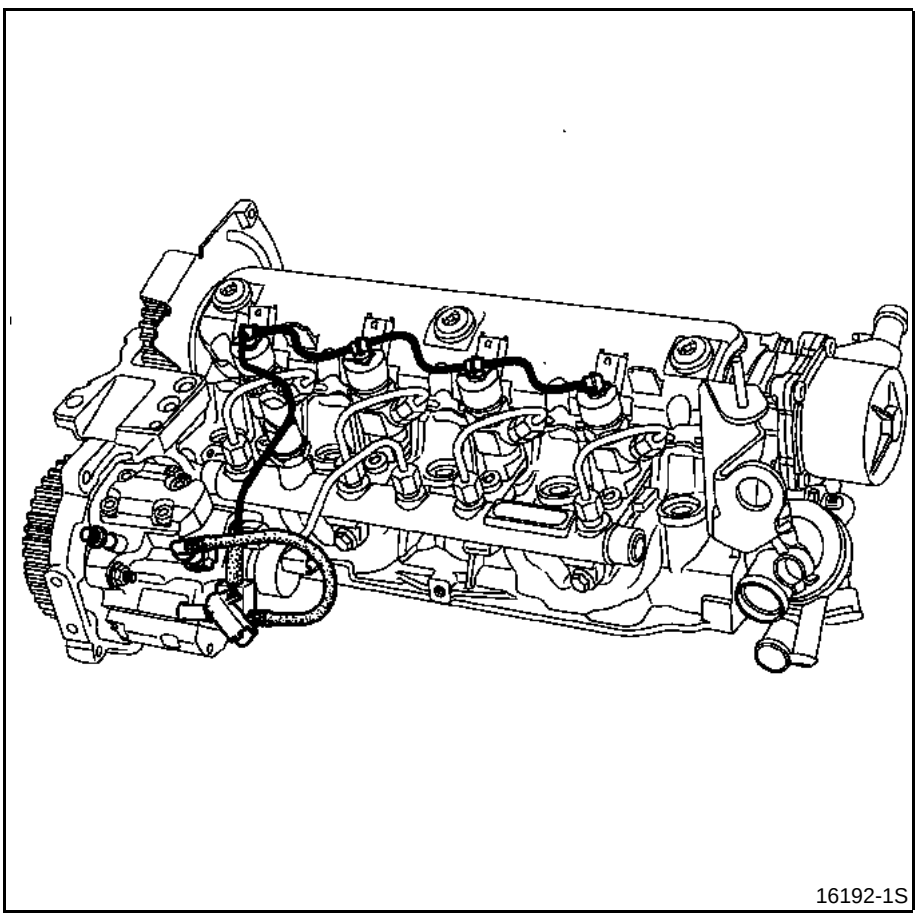
REFITTING

Change the washer beneath the injector.



NOTE: be careful when refitting that you do not stress the **HP** pipe. Remove the injection rail.

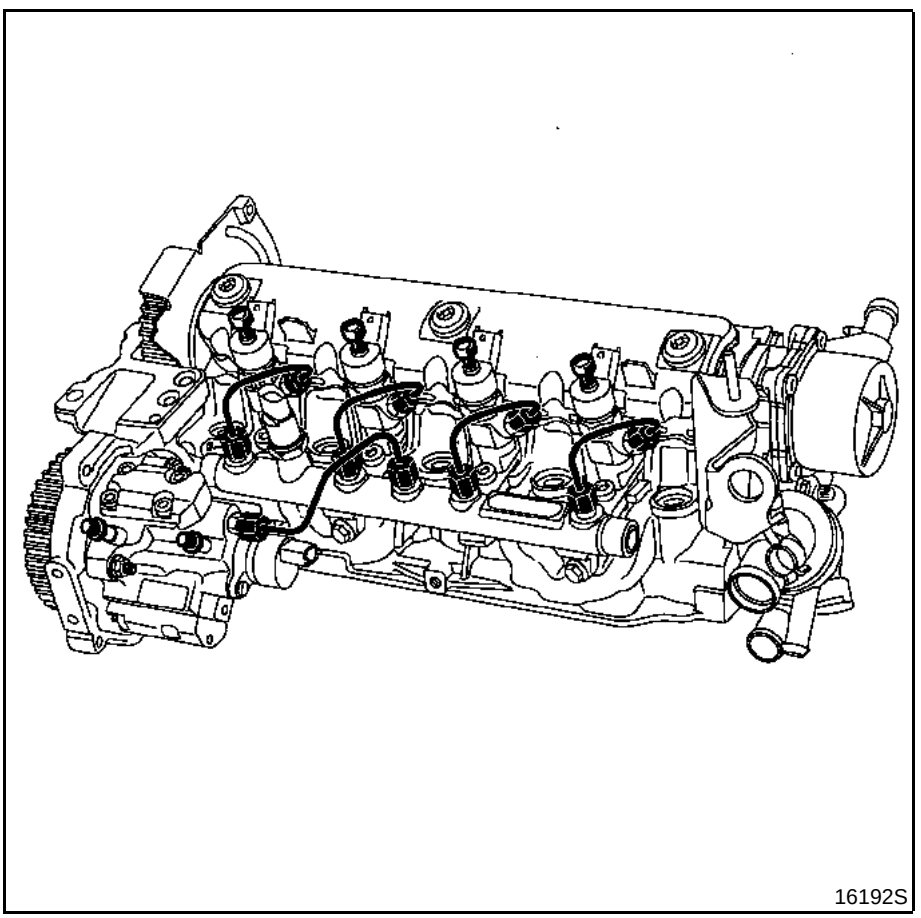
Fit:
– the injector,
– the diesel return pipe.



Fit the **high pressure** pipe.

Loosen the high pressure pump/rail pipe.

Tighten to torque:
– the injector,
– the injector side connections, then the injection rail connections,
– the rail.
– the pump/rail pipe (high pressure pump side under pressure).


16192S

NOTE: it is essential that you replace the fuel return pipe placed on the injectors during removal.

After any intervention, check that there are no leaks in the diesel circuit. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.

It is possible to check the pressure and flow in the low pressure fuel circuit.

The low pressure is delivered by the supercharging pump (electric pump located under the diesel filter designed to feed the high pressure pump).

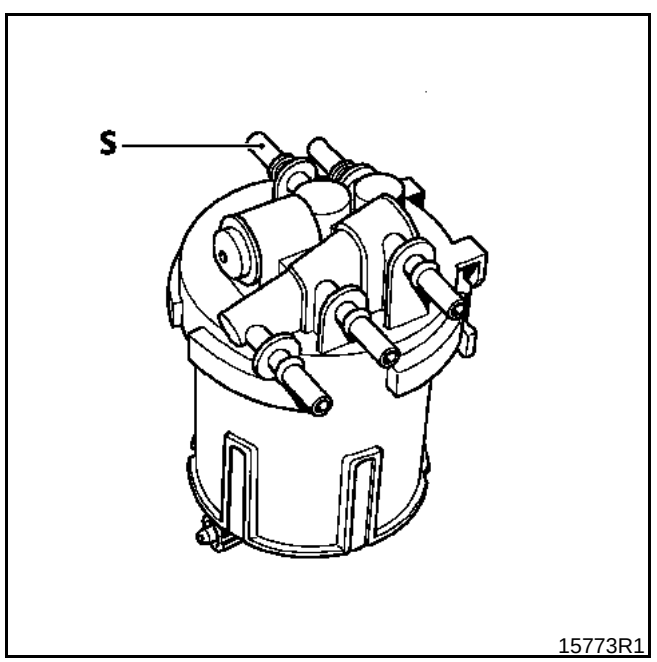
SPECIAL TOOLING REQUIRED	
Mot. 1311-01 or Mot. 1328	Pressure gauge
Mot. 1311-08	Pressure measuring connector
ESSENTIAL SPECIAL TOOLING	
Graduated 2000 ml test tube	

CHECK LOW PRESSURE (SUPERCHARGING PUMP)

Place a "**T**" connector **Mot. 1311-08**, to position the pressure gauge **Mot. 1311-01 or Mot. 1328** at the outlet (S) of the fuel filter or at the **HP** pump inlet.

Turn the fuel pump using the diagnostic tool or by directly feeding the pump (each time the ignition is switched on the low pressure pump is supplied for **30 seconds**).

Measure the pressure which should be between **2.5 and 4 bars**.



CHECK THE FLOW (SUPERCHARGING PUMP)

Make the pump flow into a **2000 ml** graduated test tube. Turn on the ignition to run the pump. The pump is supplied for **30 seconds** if the engine is not started.

The flow read should be **80 to 100 litres/hour minimum**.

IMPORTANT: it is forbidden to measure the pressure and the flow of the high pressure pump.

TIGHTENING TORQUES (In daN.m or/and°)	
Pressure sensor	3.5 ± 0.5

IMPORTANT: before any intervention, connect the after-sales diagnostic tool, query the injection computer and check that the injection rail is not under pressure. Take note of the fuel temperature.

PRESSURE SENSOR (1)

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY.

REMOVAL

Disconnect the battery.

Remove the sensor connector.

Unscrew the pressure sensor.

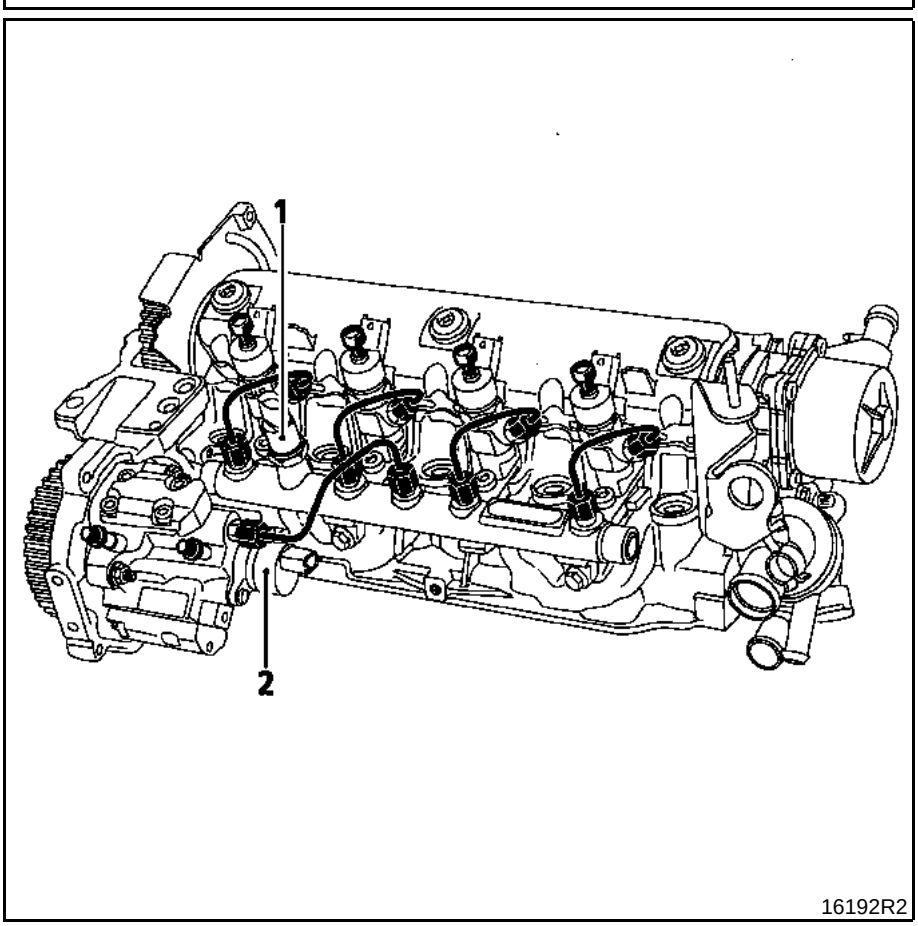
REFITTING

Replace the seal.

Screw in the sensor then tighten it to torque.

Connect the connector.

After any intervention, check that there are no leaks in the diesel circuit. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.



TIGHTENING TORQUES (In daN.m or/and °)	
Regulator bolt	0.9 ± 0.1

IMPORTANT: before any intervention, connect the after-sales diagnostic tool, query the injection computer and check that the injection rail is not under pressure. Take note of the fuel temperature.

PRESSURE REGULATOR (2)

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY.

REMOVAL

Disconnect the battery.

Remove the regulator connector.

Remove the retaining bracket for the diesel temperature sensor.

Unscrew the regulator mounting bolts.

Remove the regulator by turning in an anticlockwise direction (do not use any tools as a lever when removing the pump regulator).

REFITTING

Change the seals.

Dampen the seals with clean diesel.

Replace the regulator in the pump by turning it in an anticlockwise direction (do not use any tools as a lever when replacing the pump regulator).

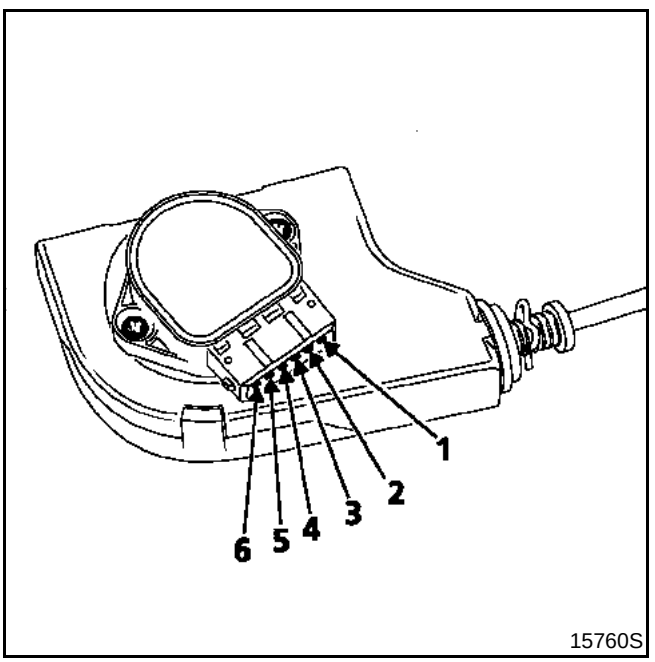
Fit the mounting bolts then tighten to torque.

Connect the connector.

After any intervention, check that there are no leaks in the diesel circuit. Start the engine at idling speed until the fan starts up, then accelerate several times under no load.

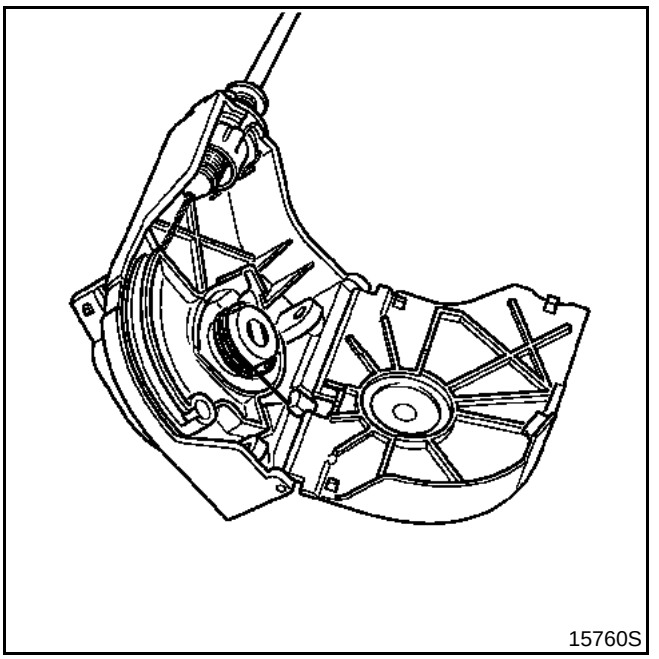
TRACK ASSIGNMENT

Track	Description
1	Signal track 2
2	Signal track 1
3	5 volt supply track 2
4	Track 1 earth
5	Track 2 earth
6	5 volt supply track 1

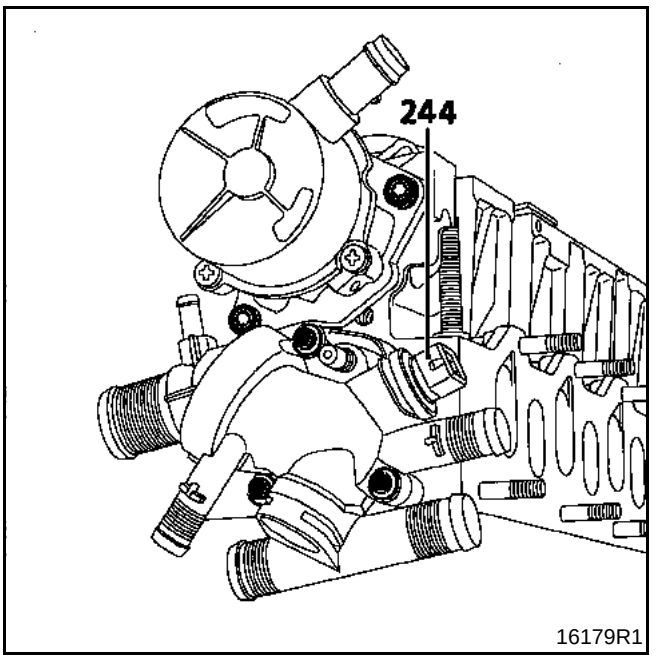


15760S

NOTE: a fault on one of the tracks for the accelerator pedal position potentiometer leads to idling speed or modified operation.


15760S

CCTM



244 Coolant temperature sensor (injection and coolant temperature indication on the instrument panel).
Three track sensor, two tracks for coolant temperature information and one track for indication on the instrument panel.

This system allows the engine cooling fan to be controlled by the injection computer. It consists of a single coolant temperature sensor serving injection, the engine cooling fan, the temperature indicator and the instrument panel temperature warning light.

OPERATION

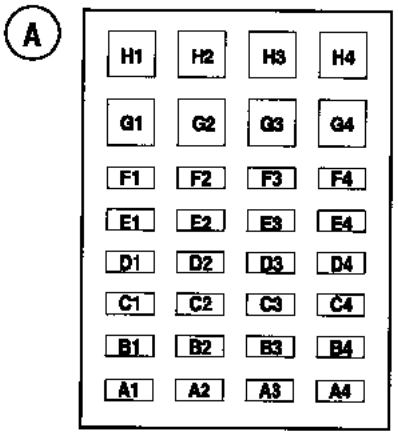
The injection computer controls, as a function of the coolant temperature:
– the injection system,
– the engine cooling fan relays:
  ● the **fan** is kept at a low speed if the coolant temperature exceeds **99 °C** and stops when the temperature drops below **96 °C**,
  ● the **fan** is kept at a high speed if the coolant temperature exceeds **102 °C** and stops when the temperature drops below **99 °C**,
  ● the **fan** can be controlled by the **air conditioning**.

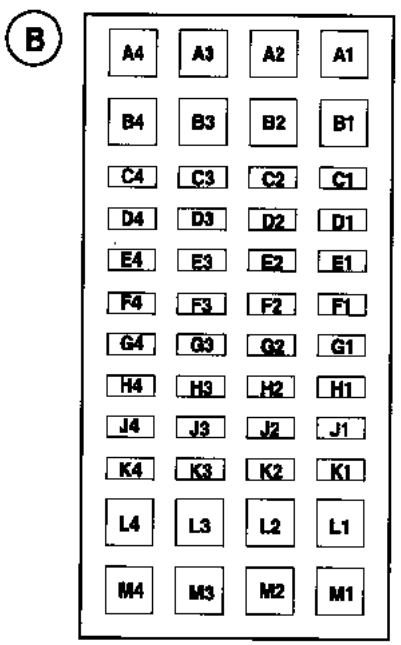
For vehicles without air conditioning, only the low speed engine cooling fan is operational.

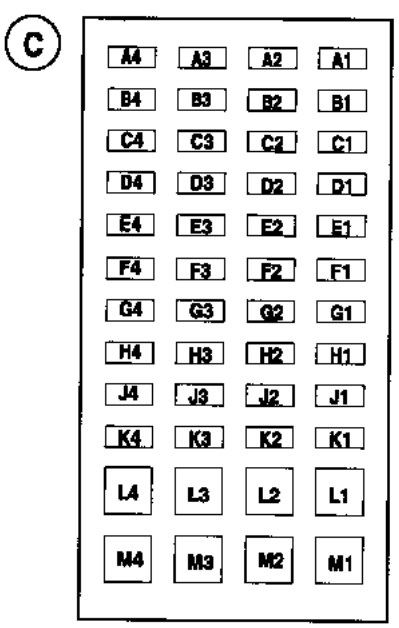
COOLANT TEMPERATURE WARNING LIGHT (shared with the injection fault warning light)

The warning light is controlled by the computer.

It is illuminated when the temperature exceeds **120 °C**.







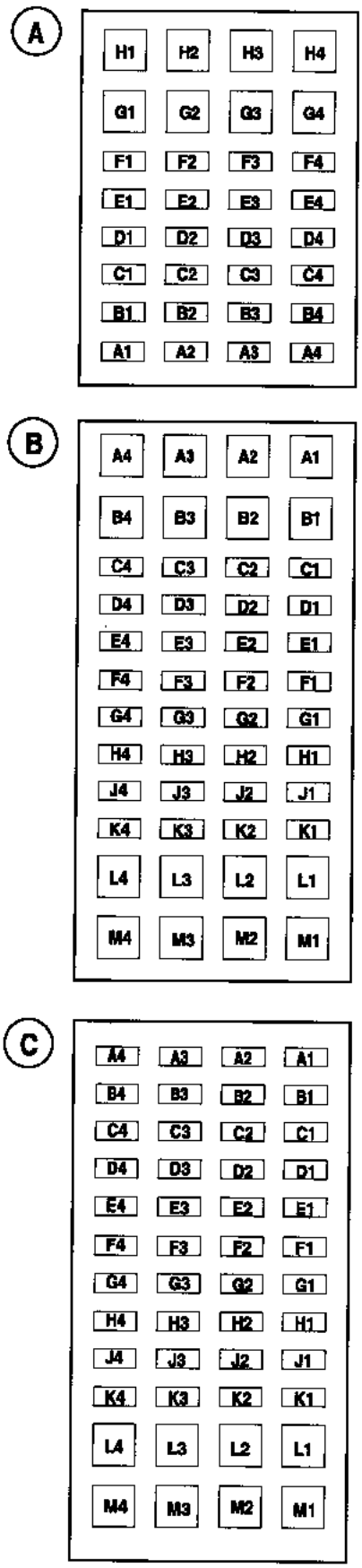
TRACK ASSIGNMENT

Connector A

H2	---	THROTTLE POTENTIOMETER SUPPLY (TRACK 2)
H3	→	OBD WARNING LIGHT
H4	→	COOLANT TEMPERATURE WARNING OUTPUT
G1	→	PREHEATING WARNING LIGHT OUTPUT
G2	←	IMMOBILISER INPUT
G3	→	FAULT WARNING LIGHT OUTPUT
G4	←	POWER CONSUMED
F1	←	THROTTLE POTENTIOMETER INPUT (TRACK 2)
F3	←	FUEL CUT-OFF SOLENOID INPUT
F4	→	AIR CONDITIONING INHIBITION OUTPUT
E1	---	THROTTLE POTENTIOMETER SUPPLY (TRACK 1)
E2	←	CLUTCH BREAKER INPUT
E3	→	CONSUMPTION INFORMATION OUTPUT
E4	←	VEHICLE SPEED INPUT
D3	→←	FAULT FINDING
D4	→	ENGINE SPEED INFORMATION
C1	←	THROTTLE POTENTIOMETER INPUT (TRACK 1)
C3	→←	FAULT FINDING
B1	→	HEATED REAR WINDSCREEN INPUT
B3	---	THROTTLE POTENTIOMETER EARTH (TRACK 1)
A3	---	THROTTLE POTENTIOMETER EARTH (TRACK 2)

Connector B

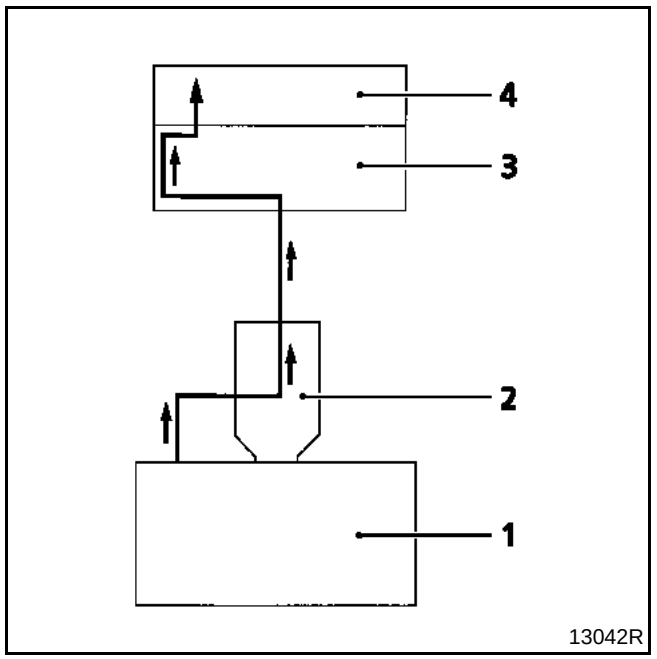
B3	←	PLUGS DIAGNOSTICS INPUT (1)
B2	---	EGR POTENTIOMETER POSITION EARTH
C3	→	PREHEATING RELAY CONTROL
C2	←	EGR POTENTIOMETER POSITION SIGNAL INPUT
C1	←	TURBOCHARGER PRESSURE INPUT SENSOR
D4	→	SUPPLY RELAY CONTROL OUTPUT
D3	←	AIR TEMPERATURE SENSOR INPUT
D1	←	DIESEL PRESSURE INPUT SENSOR
E3	---	+ AFTER IGNITION FEED
E1	---	COOLANT TEMPERATURE SENSOR EARTH
F2	---	EGR POTENTIOMETER POSITION SUPPLY
G3	←	ENGINE SPEED SIGNAL SENSOR
G2	---	AIR FLOW METER SUPPLY
G1	---	FUEL TEMPERATURE SENSOR EARTH
H4	←	AIR FLOW METER SIGNAL INPUT
H3	←	ENGINE SPEED SIGNAL SENSOR
H2	---	DIESEL PRESSURE SUPPLY SENSOR
J3	←	FUEL TEMPERATURE INPUT
J2	---	TURBOCHARGER PRESSURE SUPPLY SENSOR
K3	←	COOLANT TEMPERATURE SENSOR INPUT
L4	---	POWER EARTH
L3	---	POWER EARTH
L2	→	TURBO PRESSURE SOLENOID VALVE CONTROL OUTPUT
L1	→	PRESSURE REGULATOR SOLENOID VALVE CONTROL OUTPUT
M4	---	POWER EARTH
M3	---	+ AFTER RELAY
M2	---	+ AFTER RELAY
M1	→	EGR SOLENOID CONTROL OUTPUT



Connector C

A4	---	TURBOCHARGER PRESSURE SENSOR EARTH
A3	---	FLOW METER EARTH
A2	→	LOW SPEED FAN RELAY CONTROL OUTPUT
A1	→	ELECTRIC FUEL PUMP CONTROL OUTPUT
B4	→	HIGH SPEED FAN RELAY CONTROL OUTPUT
B3	---	DIESEL PRESSURE SENSOR EARTH
C1	---	CAMSHAFT POSITION SENSOR EARTH
E4	→	ADDITIONAL HEATING CONTROL OUTPUT
J4	→	ADDITIONAL HEATING CONTROL OUTPUT
K4	←	CAMSHAFT POSITION SIGNAL SENSOR
L4	→	INJECTOR 2 CONTROL
L3	---	INJECTOR 2 SUPPLY
L2	---	INJECTOR 3 SUPPLY
L1	→	INJECTOR 4 CONTROL
M4	---	INJECTOR 4 SUPPLY
M3	---	INJECTOR 1 SUPPLY
M2	→	INJECTOR 3 CONTROL
M1	→	INJECTOR 1 CONTROL

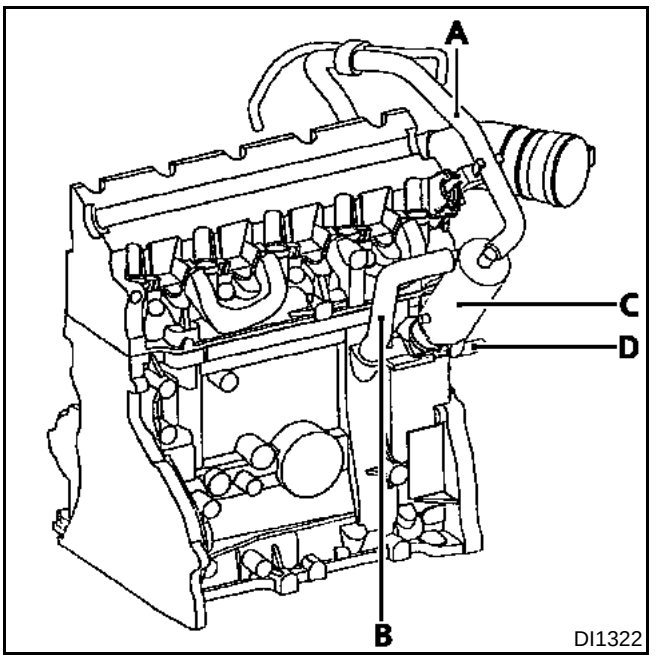
CIRCUIT DIAGRAM



1 Engine
2 Oil separator
3 Air filter unit
4 Inlet manifold

CHECKING

To ensure the correct operation of the anti-pollution system, the oil vapour rebreathing circuit must be kept clean and in good condition.



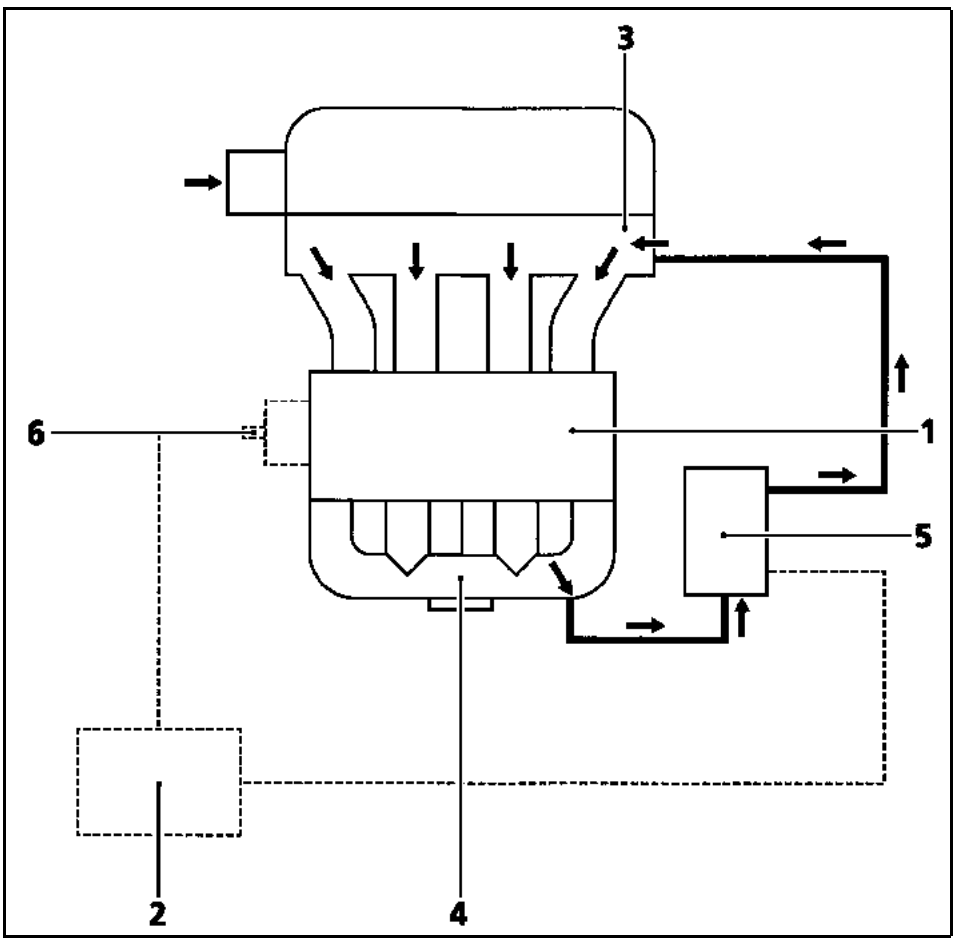
A Oil vapour rebreathing pipe for the bottom of engine

B Oil vapour rebreathing pipe for the top of engine

C Oil separator

D Oil vapour rebreathing pipe linked to the intake pipes

CIRCUIT DIAGRAM



1 Engine
2 Injection computer
3 Inlet manifold
4 Exhaust manifold
5 EGR solenoid valve
6 Water temperature sensor

REMOVING THE VALVE

The **EGR** valve is an interference fit in the intake manifold.

To facilitate its replacement it is preferable to remove the manifolds.

PURPOSE OF THE EGR SYSTEM

The recirculation of the exhaust gases is used to reduce the nitrogen oxide (**NOx**) content of the exhaust gases.

The passage of gas is authorised by the control of an electromagnetic valve by the injection computer.

OPERATING PRINCIPLE

The valve is controlled by an **RCO** signal issued by the injection computer. The **RCO** signal permits modulation of the opening of the valve, and consequently, the quantity of exhaust gas directed back towards the inlet manifold.

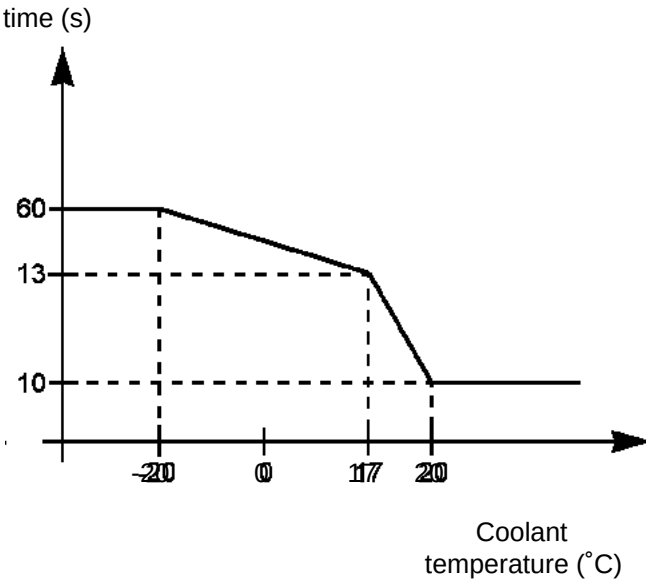
The computer continuously carries out a test to detect the position of the **EGR** valve flap.

OPERATING CONDITIONS

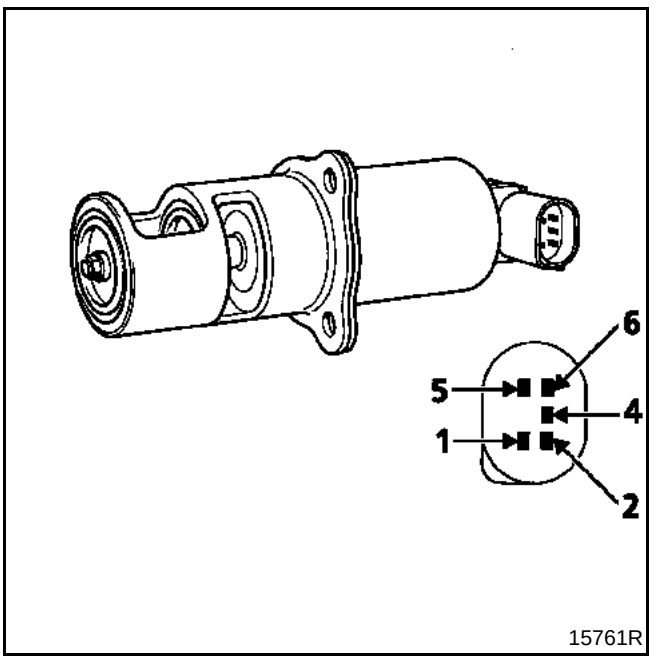
The parameters which determine the actuation of the **EGR** valve are as follows:
– the coolant temperature,
– the air temperature,
– the air pressure,
– the accelerator pedal position,
– the engine speed.

The EGR function is cut if:
– the battery voltage is less than **9 volts**,
– the engine speed is greater than **3000 rpm.**,
– a characteristics map (engine speed/load) exceeds a given threshold,
– the vehicle speed is less than **12 km/h**, the engine speed is less than **1000 rpm** and if the coolant temperature is greater than **60 °C** for **40 seconds**.

The **EGR** valve is not supplied after engine start according to a coolant temperature characteristics map.



The electric **EGR** valve is supplied for **40 seconds** on each return to idling speed if the air temperature is greater than **15 °C**.



1 Solenoid supply
2 Sensor supply
4 Sensor earth
5 Solenoid earth
6 Sensor output

IDENTIFICATION

Type	Engine	Alternator	Current
XA0 5	F9Q 732	SG 10 B010 SG 10 B011	120 A
		A13VI252	80 A
		A11VI88	75 A

CHECKING

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

Rpm.	75 Amps	80 Amps	120 Amps
1 000	40	54	-
1 500	-	-	26
2 000	68	75	-
3 000	71	80	-
4 000	72	82	94
6 000	-	-	105

SPECIAL TOOLING REQUIRED	
Mot. 1273	Tool for checking belt tension

REMOVAL

Put the vehicle on a 2 post lift.

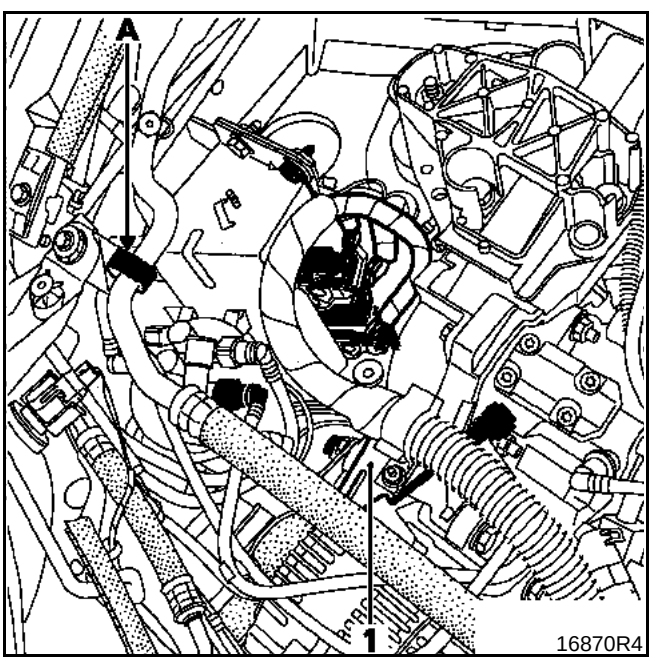
Disconnect the battery as well as all electrical connections on the alternator.

Separate the diesel filter from its mounting and remove.

Unclip the power steering reservoir.

Release the air conditioning pipe at (A).

Remove:
– the wiring mounting support (1) and remove the unit,

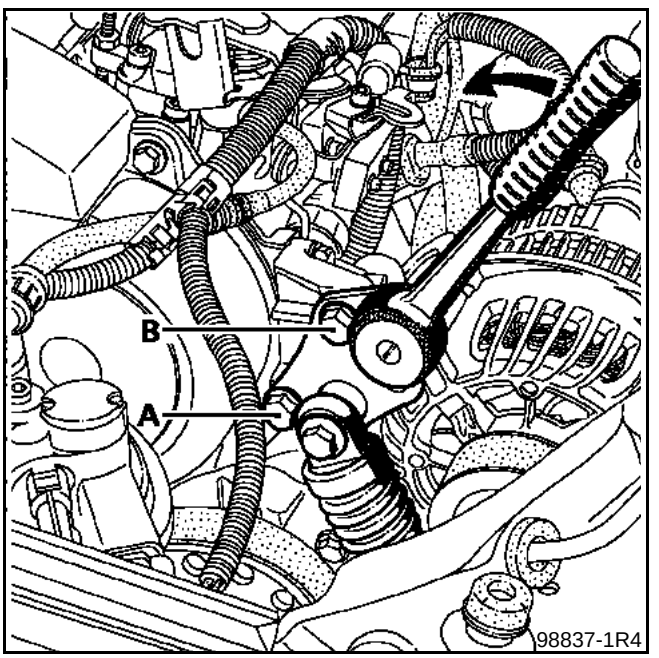


– the front right wheel as well as the mudguard,
– the accessories belt.

Special features of vehicles fitted with air conditioning:

Before removing the accessories belt, check the centreline of the automatic tensioner (see section 07 "Accessories belt tension").

Loosen bolt (A), then bolt (B) until the shoulder is exceeded while holding the automatic tensioner plate using a **9.35 mm** square, then relax the belt by moving the ratchet in the direction of the arrow.

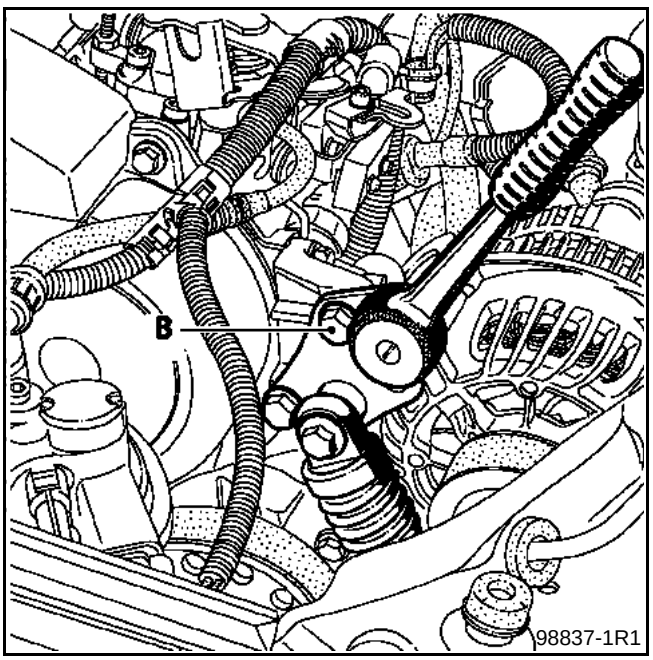


Remove:
– the bolts (A) and (B),
– the alternator mountings and remove the alternator.

REFITTING (special notes)

Refit in reverse order to removal.

The belts on vehicles fitted with air conditioning are tensioned by bringing the automatic tensioner plate to a stop at bolt (B), without forcing it, using a **9.35 mm** square.



See section **07** "**Accessories belt tension**" for the belt tension value for vehicles without air conditioning.

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

IDENTIFICATION

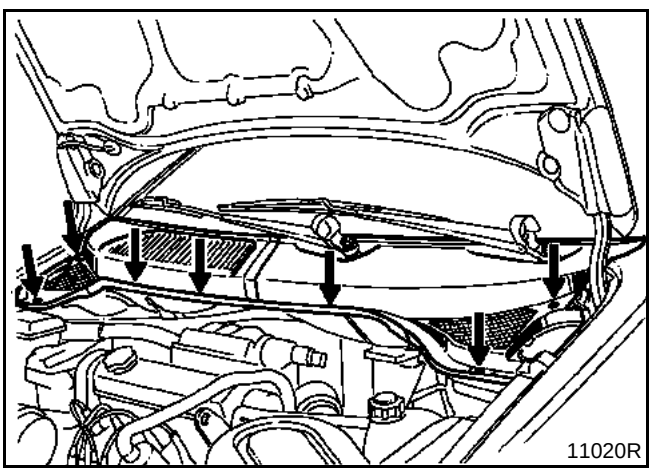
Type	Engine	Starter motor
XA0 5	F9Q 732	MITSUBISHI M1T85781

REMOVAL

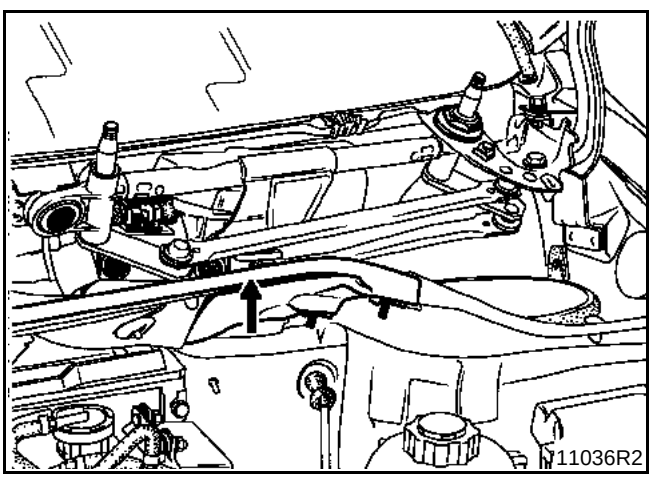
Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove **(for the Scénic)**:
– the front right hand grille as well as the mounting bolts of the left hand grille,


11020R

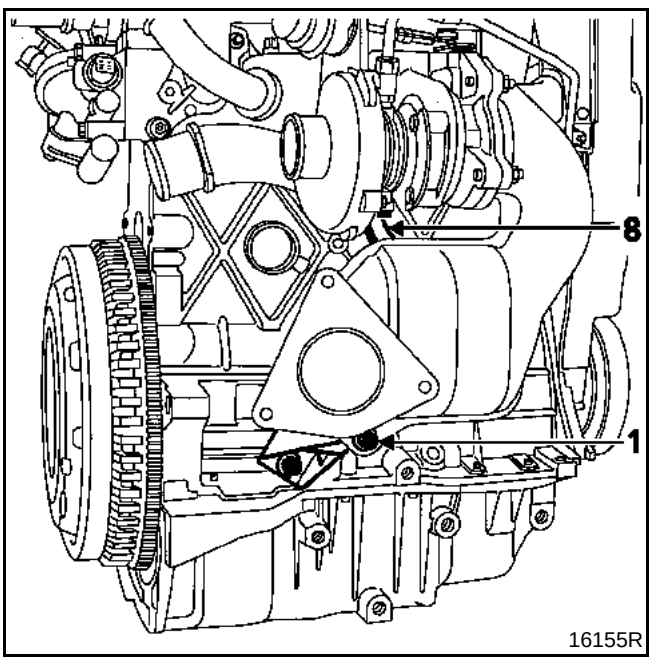
– the closure panel of the scuttle,


11036R2

Remove **(all types)**:
– the turbocharging air ducts between the exchanger and the engine,
– the pre-catalytic converter mountings to the turbo.

Loosen the exhaust pipe clamp mounting.

Remove:
– the pre-catalytic converter stay (1),
– the catalytic converter mountings on the precatalytic converter and remove this by moving the engine towards the cooling system,
– the oil return pipe (8),



16155R

– the starter electrical connections.
– the starter mountings,
– the starter motor.

REFITTING

To remove, proceed in the reverse order.

Check the presence of the starter motor centring dowel.

There is no heater matrix water control valve.

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

FILLING

It is essential to open the bleed screw on the cylinder head coolant pipe housing outlet.

Fill the circuit through the expansion bottle opening.

Close the bleed screw as soon as the fluid runs out in a continuous jet.

Start the engine (**2500 rpm**).

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

Tighten the expansion bottle cap.

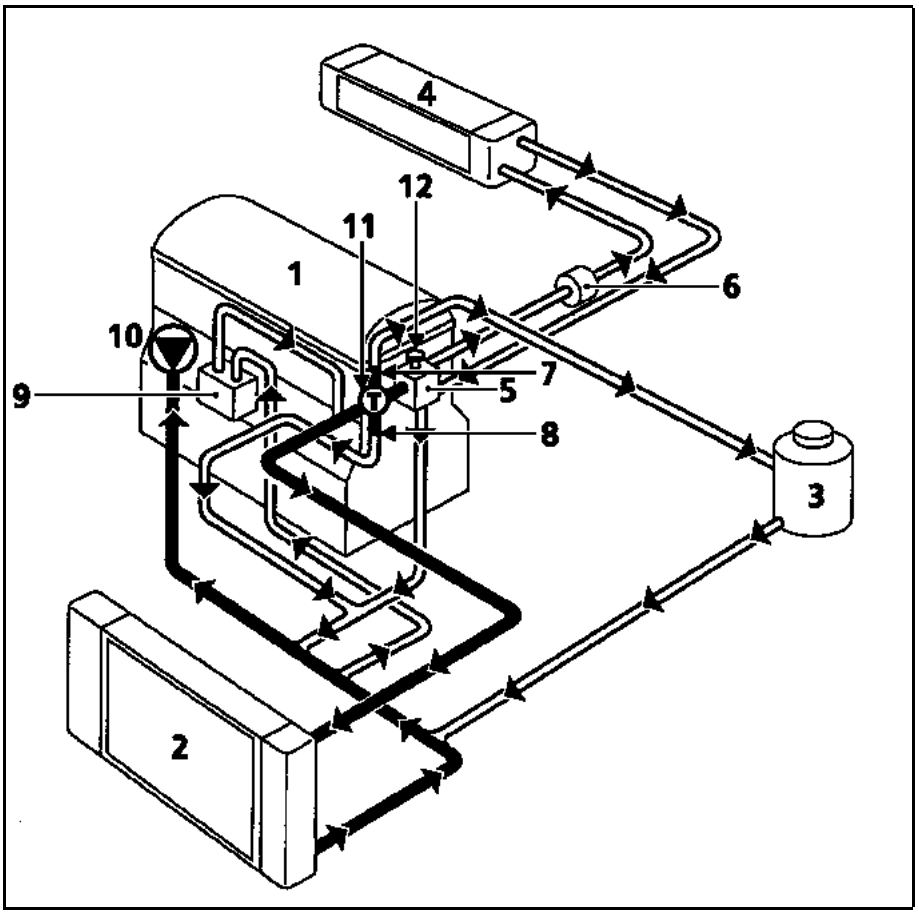
BLEEDING

Let the engine run for **20 minutes** at **2500 rpm,** until the engine cooling fan operates (time required for automatic degassing).

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

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

REFIT THE EXPANSION BOTTLE CAP WHILE THE ENGINE IS WARM.



1 Engine
2 Radiator
3 "Hot" container with degassing after thermostat
4 Heater matrix
5 Thermostat mounting
6 Thermoplunger mounting (if fitted)
7 3 mm ∅ restriction
8 6 mm ∅ restriction
9 Oil/water exchanger
10 Water pump
11 Thermostat
12 Bleed screw

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

SPECIAL TOOLING REQUIRED	
Mot. 453 -01	Hose clamp pliers set
Mot. 1202	Hose clip pliers
Mot. 1448	Long nose pliers for hose clips

TIGHTENING TORQUES (in daN.m)	
Thermal plungers	2

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove the engine undertray.

Position the hose clips at the inlet and outlet of the thermal plunger mounting unit (plugs).

Disconnect the hoses on this unit.

Remove the mounting bolt for the thermal plunger support unit as well as the supply wires and remove the unit.

REFITTING

The plugs are tightened in the usual fashion.

Refitting is the reverse of removal.

Top up the coolant and bleed the cooling circuit (see section **19 "Filling - bleeding"**).

SPECIAL TOOLING REQUIRED	
Mot. 1202 -01 Mot. 1202 -02	Hose clip pliers
Mot. 1448	Long nose pliers for hose clips

REMOVAL

Put the vehicle on a two post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the cooling circuit through the lower radiator hose.

Disconnect the wiring of the fan unit.

Unclip the power steering reservoir and remove it.

Remove:
– the upper cross member,
– the upper radiator mountings,
– the upper hoses on the radiator,
– the inlet manifold-air exchanger duct,
– the fan unit mountings on the radiator and remove the fan,
– the radiator mountings on the condenser and remove the radiator.

REFITTING

Refitting is the reverse of removal.

Fill and bleed the cooling circuit (see section **19 "Filling and bleeding").**

NOTE: ensure that the fins of the radiator or of the condenser (if fitted) are not damaged when removing-refitting, and protect them if necessary.

SPECIAL TOOLING REQUIRED	
Mot. 1202 -01	Hose clip pliers
Mot. 1202 -02	
Mot. 1448	Long nose pliers for hose clips

TIGHTENING TORQUES (in daN.m)	
Water pump bolts	1.7

REMOVAL

Put the vehicle on a two post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the cooling circuit through the lower radiator hose.

Unclip the diesel filter and remove it.

Remove:
– the front right wheel along with the mudguard,
– the style cover,
– the accessories belt (see Section **07** "**Accessories belt tension**"),
– the coolant pump and power assisted steering pump pulleys,
– the water pump.

Cleaning

It is very important not to scratch the gasket faces.

Use the **Décapjoint** product to dissolve any part of the gasket which remains attached.

Wear gloves whilst carrying out the following operation.
– Apply the product to the parts to be cleaned; wait about ten minutes, then remove it using a wooden spatula.

Do not allow this agent to drip on to the paintwork.

REFITTING

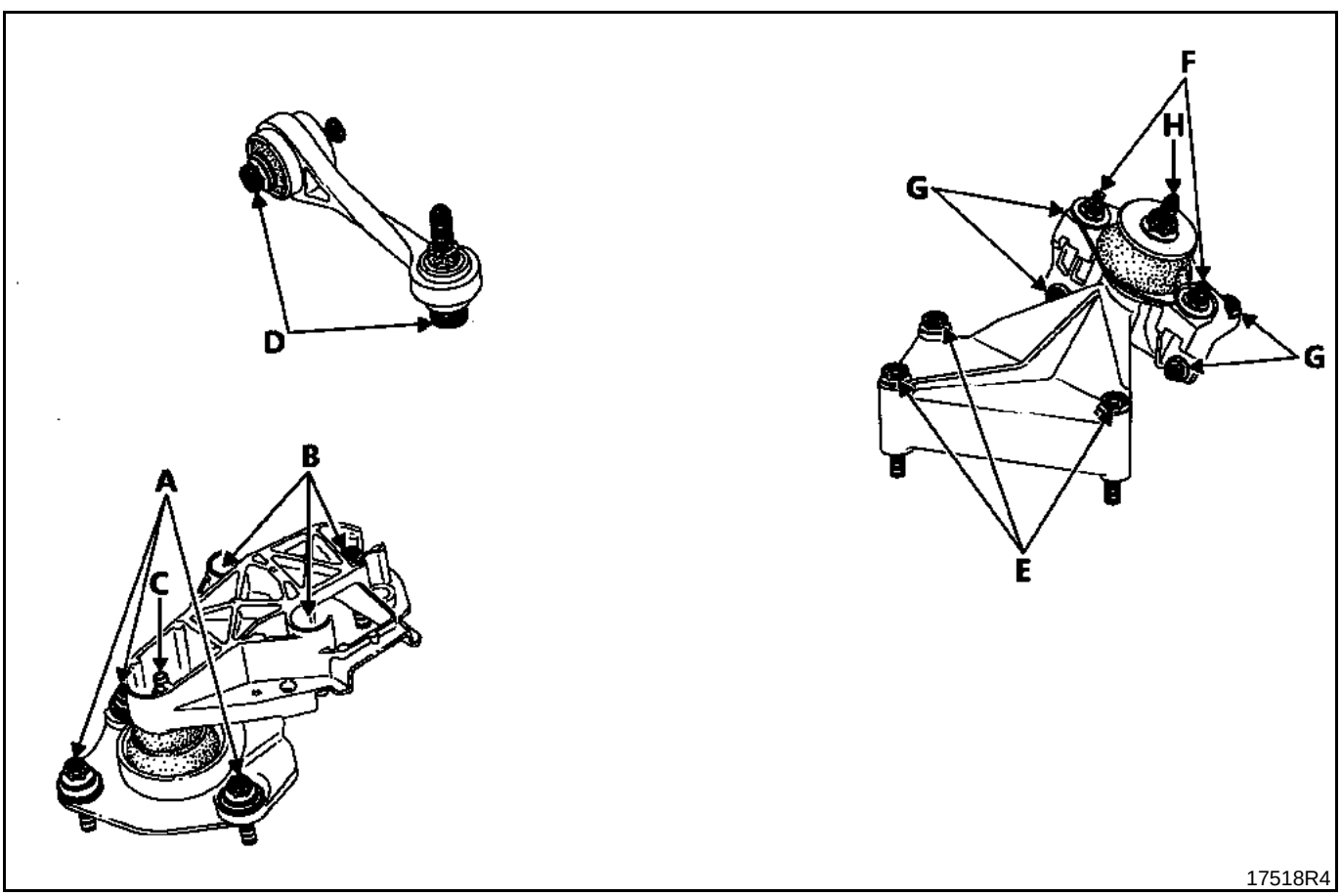
Refit:
– the water pump (fitted with a new gasket), tightening the bolts to a torque of **1.7 daN.m**,
– the accessories belt and tension it (see section **07** "**Accessories belt tension**").

Fill and bleed the cooling circuit, (see section **19** "**Filling and Bleeding"**).

TIGHTENING TORQUE (daN.m)

A	6.2
B	6.2
C	4.4
D	6.2

E	4.4
F	2.1
G	2.1
H	6.2



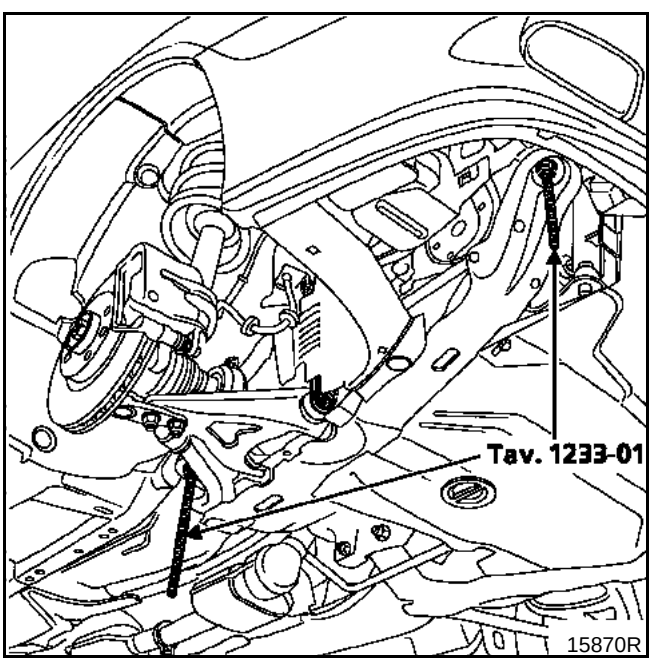
TIGHTENING TORQUES (in daN.m)	
Engine tie bar bolt	**6.2**
Steering shaft yoke bolts	**3**
Engine sub-frame bolts	
– **front ∅ 10**	**6.2**
– **rear ∅ 12**	**10.5**
Three point flange nuts	**2**
Sub-frame - side member tie rod bolts	**3**

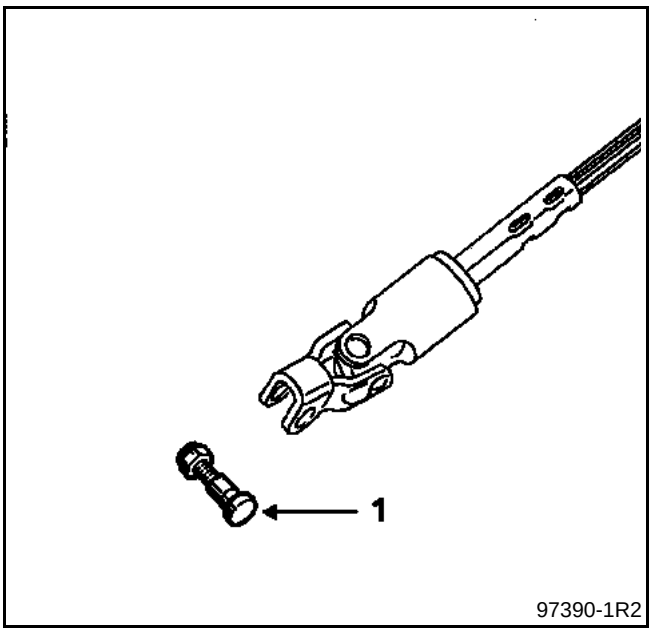
Disconnect the battery and put the vehicle on a two post lift.

Fit a flywheel immobiliser.

Loosen the catalytic converter/precatalytic converter mountings.

Fit tool **Tav. 1233-01** replacing the bolts of the sub-frame one by one.





Remove:
– the bolts of the sub-frame tie-rods,
– the nut and eccentric bolt of the steering shaft yoke (1),
– the torque reaction arm.

Lower the sub-frame to a height of **40 mm** at the front and **60 mm** at the rear.

Remove the exhaust mounting clip.

Remove the mounting nuts of the catalytic converter and remove it, taking care not to damage the heat shields.

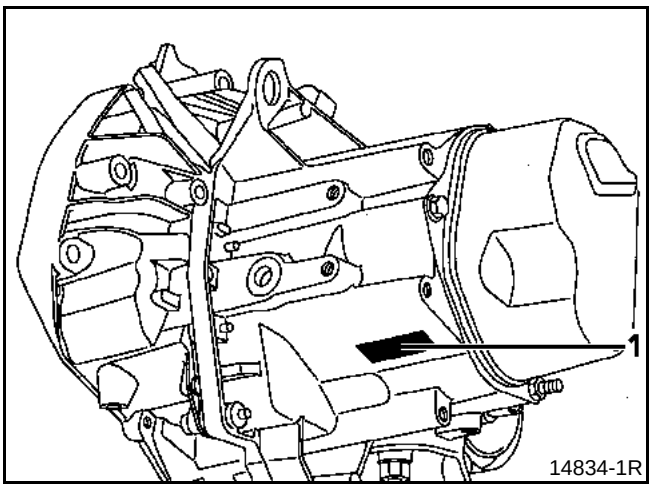
REFITTING

Proceed in the reverse order from removal.

WARNING: all damaged heat shields must be replaced to prevent the risk of fire.

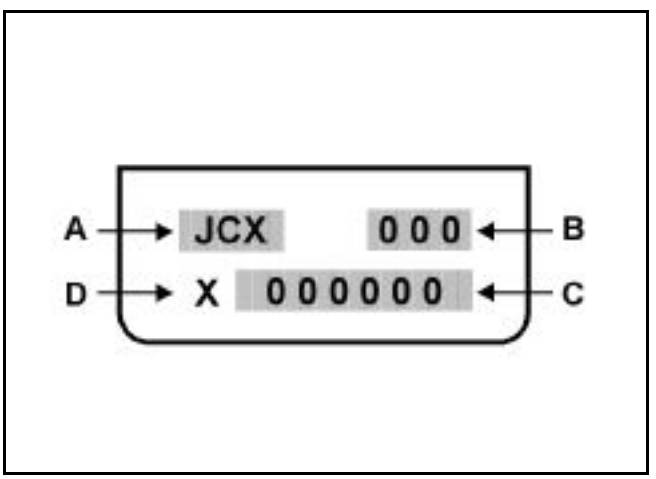
"**SCENIC**" vehicles, **F9Q high pressure** engines, are equipped with **JC5** manual gearboxes.

The Workshop Repair Manual "**JB gearbox. JC**" deals with the complete repair of this component.



A mark (1), located on the gearbox casing, indicates:

A Type of gearbox
B Gearbox index
C Manufacturing number
D Factory of manufacture



Ratios

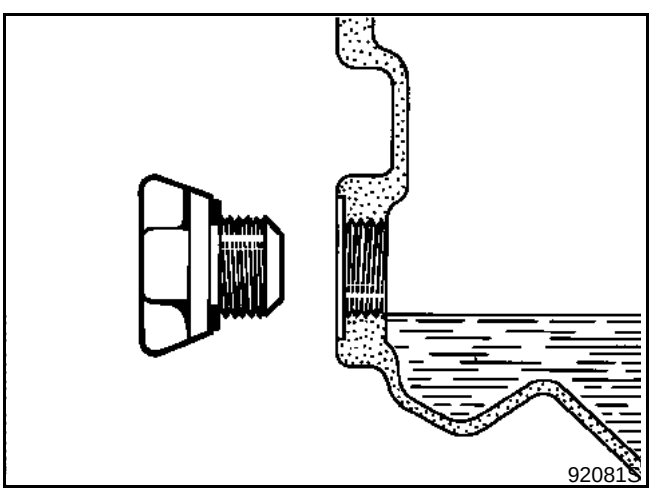
JC5								
Index	**Type**	**Differential ratio**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Reverse gear**
113	JA05	15 -- 56	11 -- 41	21 -- 43	28 -- 37	35 -- 34	42 -- 31	11 -- 39

CAPACITY (in litres)

5 gear box	
JC5	3.1

Viscosity grade
TRX 75W 80W

CHECKING THE LEVEL



Filling is by overflow

CONSUMABLES

– Oil for **DELPHI HARRISON** compressor:
PLANETELF PAG 488: 220 cm^3 ± 15
(to be ordered from **ELF**).

– Refrigerant:
R134a: 780 g ± 35 (Mégane)
R134a: 680 g ± 35 (Scénic)

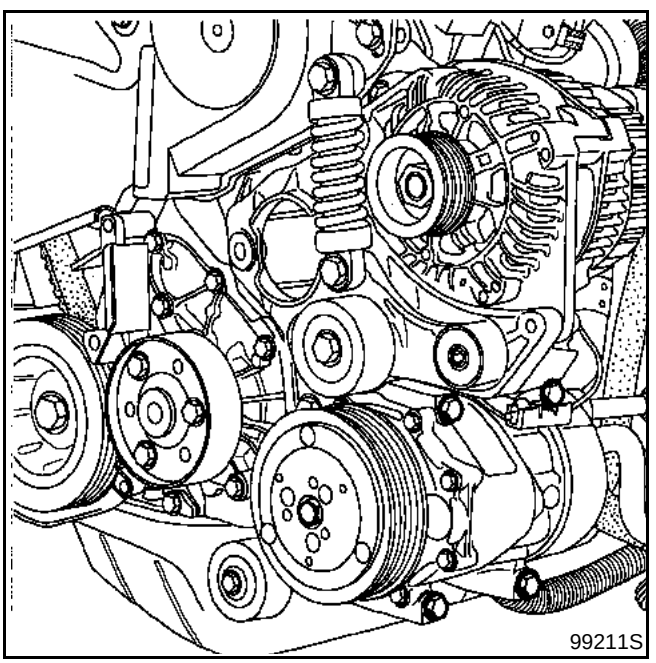
– Compressor:
DELPHI HARRISON V5

REMOVAL

Drain the R134a refrigerant circuit (refer to the procedure described in the "Air conditioning" manual).

Disconnect the battery.

Remove:
– the cooling assembly (see section 19),
– the alternator (see section 16),
– the R134a refrigerant pipes retaining bolt,
– the four compressor mounting bolts.


99211S

REFITTING

Refitting is the reverse of removal.

Tighten the R134a refrigerant pipes retaining bolt on the compressor to **3 daN.m**.

Fill the R134a refrigerant circuit using the filling equipment.

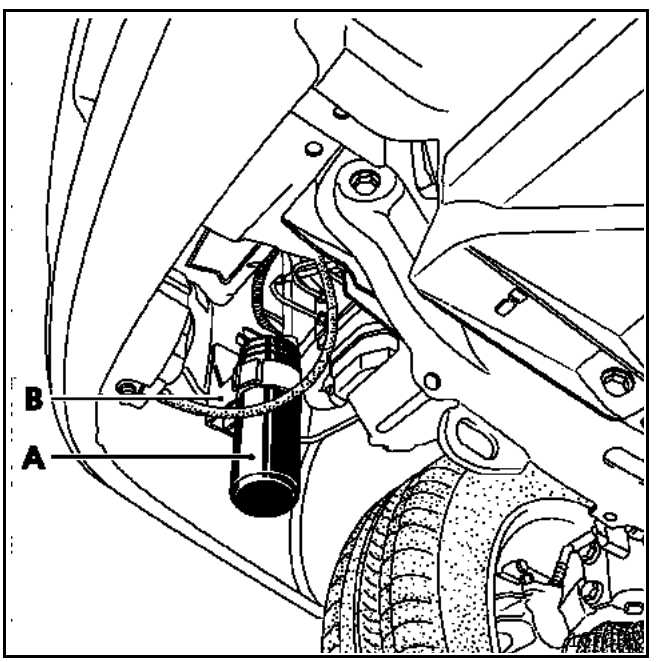
IMPORTANT:
When replacing the existing compressor with a new compressor, it is essential to drain some of the oil from the new compressor, so that the amount of oil in the new compressor corresponds to the amount of oil drained from the oil compressor.

Oil drained new compressor	**=**	**Oil in the new compressor**	**-**	**Oil remaining in the old compressor**

REMOVAL

Drain the R134a refrigerant circuit using the filling equipment (refer to the procedure described in the **"Air Conditioning"** manual).

Remove:
– the right hand mudguard,
– the mounting bolts which secure the pipes to the dehydration canister,
– the two mounting bolts of the dehydration canister (B).



Fit plugs to every hole to prevent any penetration by moisture into the components.

REFITTING

Refitting is the reverse of removal.

Oil the threads with **P.A.G. SP 10** oil and check that the seals are in good condition.

Create a vacuum then fill the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air conditioning**" manual).

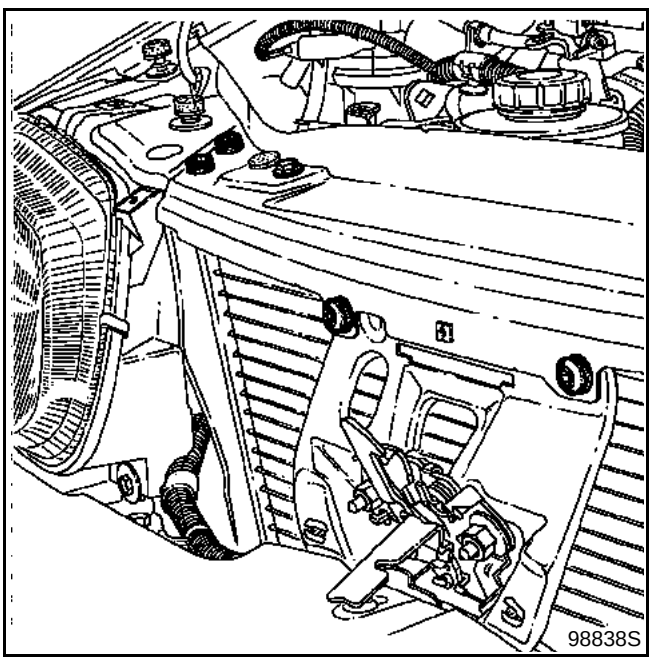
When changing the dehydration canister, add **15 ml** of **P.A.G. SP 10** oil to the compressor.

REMOVAL

Place the vehicle on a lift.

Drain the **R134a** refrigerant circuit (refer to the procedure described in the "**Air conditioning**" manual).

Remove:
– the six mounting bolts of the upper cross member,



– the two lower mounting bolts of the condenser on the fan unit, then the two upper bolts,
– the mounting bolts of the pipes on the condenser.

Fit plugs to prevent any moisture penetration.

Remove the condenser.

TIGHTENING TORQUES (in daN.m)	
Pressure relief valve retaining bolt	**0.6**
Pipe retaining bolt	**0.8**

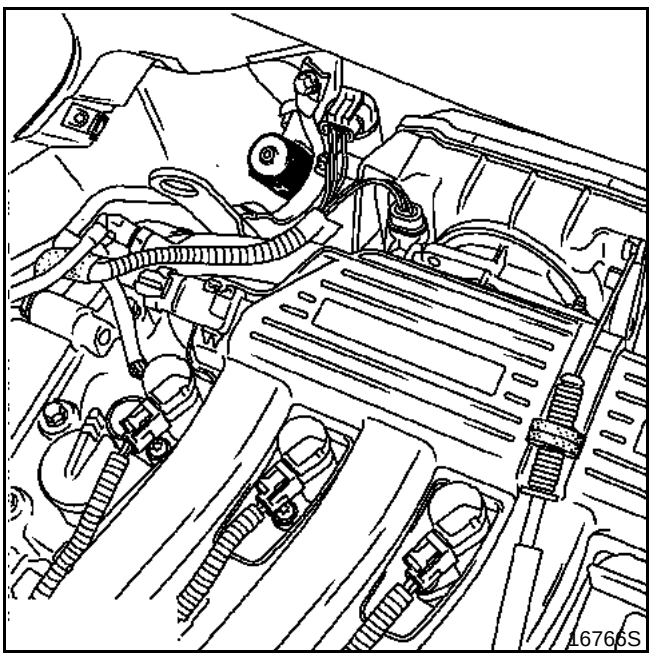
REPLACEMENT

Drain the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

Remove the right hand cowl vent grille.

Slacken the left hand cowl vent grille.

Remove:
– the scuttle,
– the retaining bolt of the connection pipe, using a **5 mm** Allen key
– the two retaining bolts of the pressure relief valve on the evaporator using a **4 mm** Allen key.



On refitting, ensure that the pipe seals are in good condition.

Create a vacuum then fill the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air conditioning**" manual).

Disconnect the battery.

Drain the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

LOW PRESSURE PIPE

REMOVAL

Remove the right hand cowl vent grille.

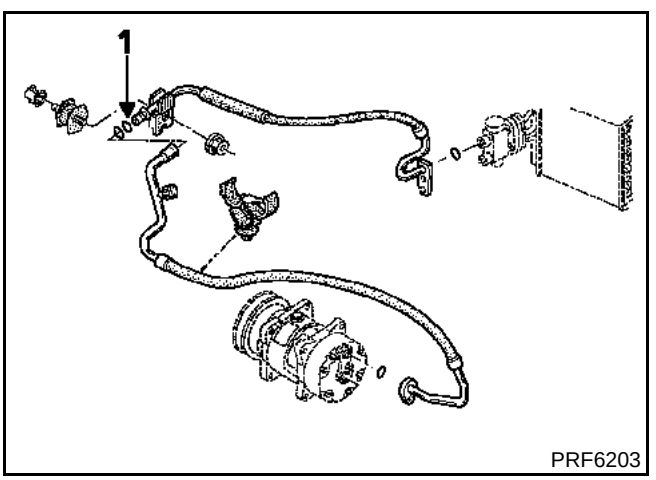
Slacken the left hand cowl vent grille.

Remove:
– the scuttle,
– the mounting bolt on the pressure relief valve,
– the mounting bolt on the compressor.

Fit plugs to prevent any moisture penetration.

Remove the low pressure hose.

The low pressure circuit can be partially dismantled by unclipping the click-fit connector (1).



PRF6203

REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.

HIGH PRESSURE PIPE BETWEEN THE COMPRESSOR AND THE CONDENSER

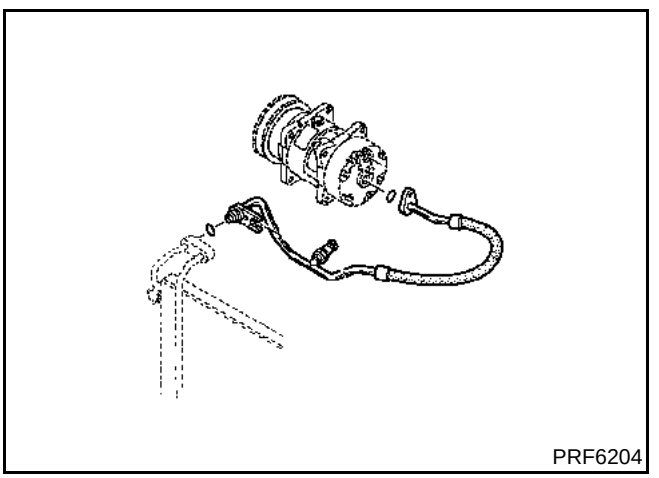
REMOVAL

Remove:
– the mounting bolt on the compressor,
– the mounting bolt on the condenser.

Disconnect the tri-function pressure switch.

Remove the high pressure hose.

Fit plugs to prevent any moisture penetration.


PRF6204

REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.

Disconnect the battery.

Drain the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

HIGH PRESSURE PIPE BETWEEN THE DEHYDRATION CANISTER AND THE PRESSURE REDUCING VALVE

REMOVAL

Remove the right hand cowl vent grille.

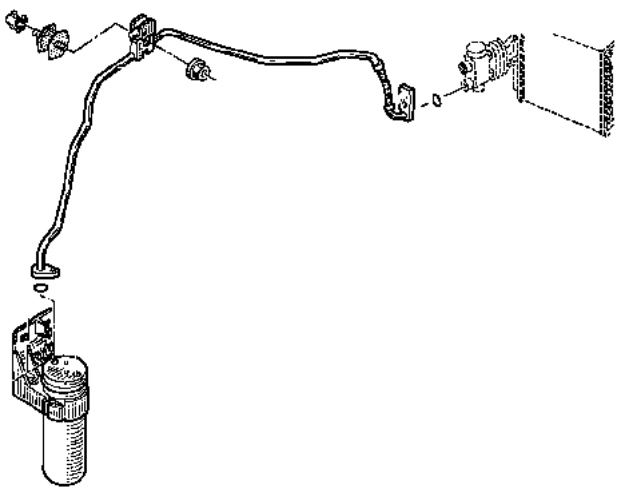
Slacken the left hand cowl vent grille.

Remove the scuttle,

Detach the pipe from its mountings.

Remove the high pressure hose.

Fit plugs to prevent any moisture penetration.



PRF6205

REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add **10 ml of PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.

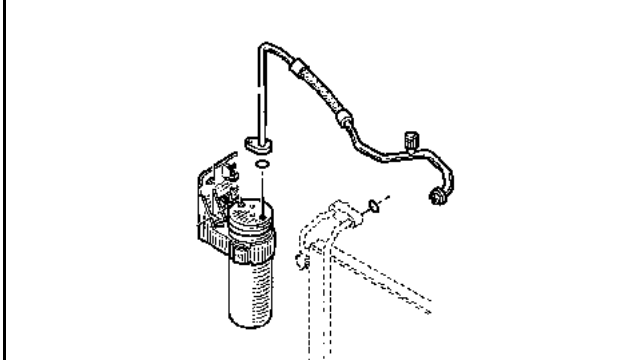
HIGH PRESSURE PIPE BETWEEN THE DEHYDRATION CANISTER AND THE CONDENSER

REMOVAL

Remove:
– the mounting bolt on the dehydration canister,
– the mounting bolt on the condenser.

Fit plugs to prevent any moisture penetration.

Remove the high pressure hose.



PRF6206

REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.