Mégane

N.T. 3177A

XA0B - XA0W - XA04

SPECIAL NOTES FOR VEHICLES FITTED WITH THE K4M 700 AND K4J 750 ENGINES

For the sections not dealt with in this Technical Note, refer to MR 312.

77 11 204 291 **FEBRUARY 1999** **Edition Anglaise**

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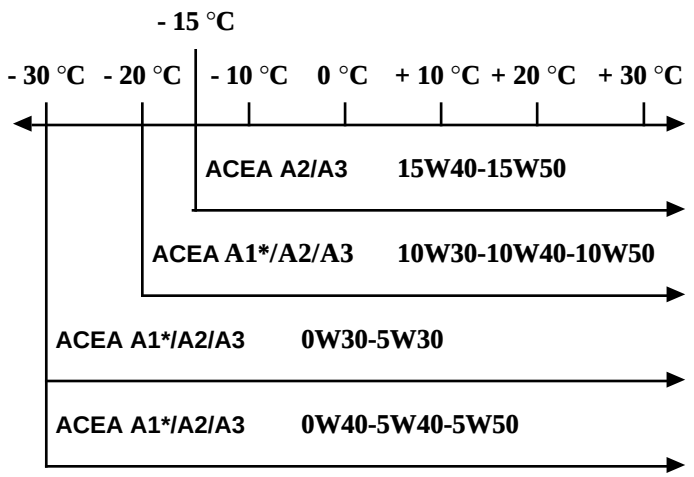
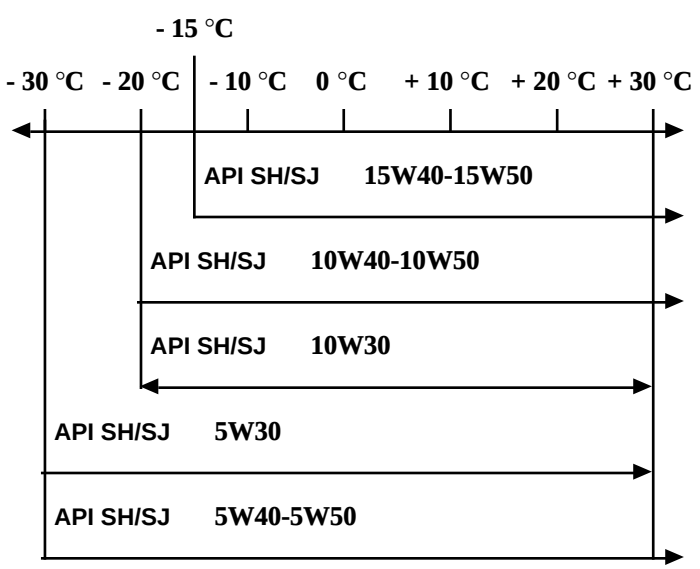
<tr><th>Components</th><th>Capacity in litres (approx) *</th><th>Grade</th></tr>
<tr><td>Petrol engine (oil)</td><td>For oil change</td><td>E.E.C. countries and Turkey
PETROL
 

ACEA standard A1-98
* Oil for fuel economy</td></tr>
<tr><td>K4M
K4J</td><td>3.9
4.15 (1)</td><td>Other countries
When lubricants specified for E.E.C. countries are not available, the following specifications must be taken into consideration:
PETROL
 

Oil for fuel economy:
API SJ-IL SAC GF2 standard</td></tr>
</table>

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

Components	Capacity in litres	Grade	Special notes
JB3 gearbox	3.4	All countries: TRANSELF TRX 75 W 80 W (API GL5 or MIL-L 2105 G or D standards)	
K4M K4J cooling circuit	7.9	Glacéol RX (type D)	Protection down to - 20 °C ± 2 °C for hot, temperate or cold climates. Protection down to - 37 °C ± 2 °C for extreme cold climates.

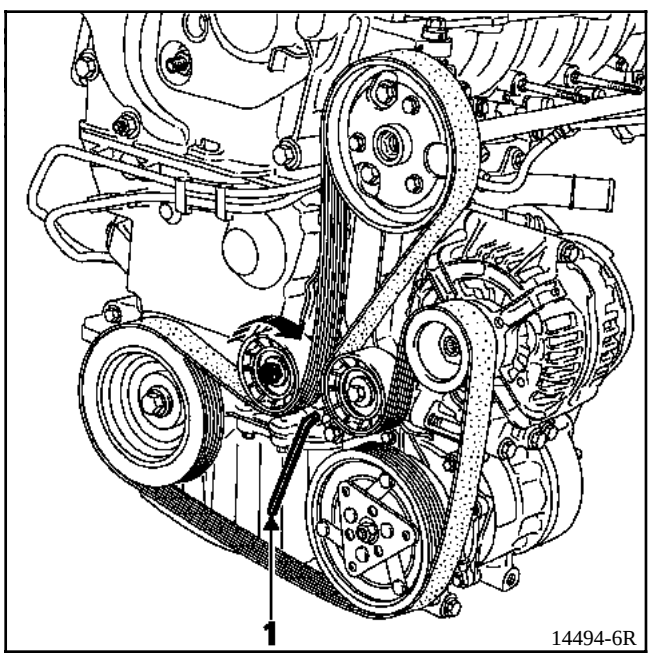
REMOVAL

Place the vehicle on a two post lift.

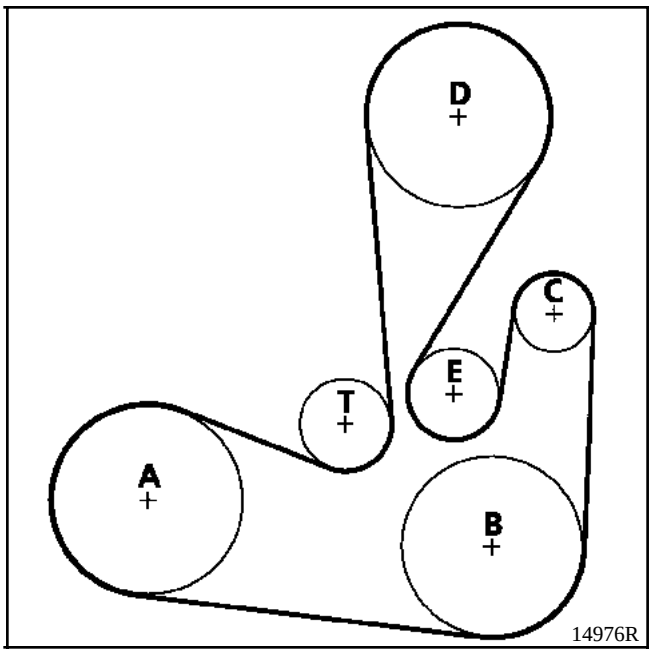
Disconnect the battery (under the passenger seat for Scenic).

Remove the front right hand mudguard.

Turn the automatic tensioner for the belt in the direction indicated below using a **13 mm open wrench**. Secure the pulley using a **6 mm allen key (1)**.



ALTERNATOR, POWER ASSISTED STEERING AND AIR CONDITIONING



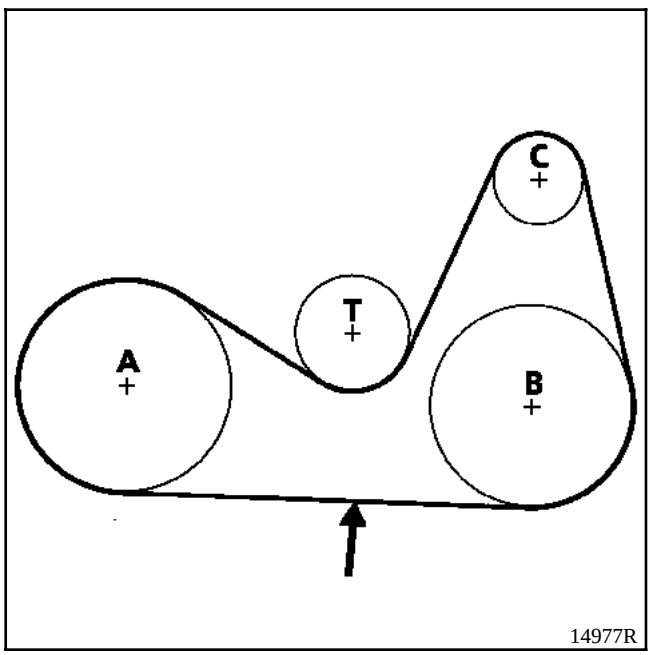
A Crankshaft
B Air conditioning compressor
C Alternator
D Power assisted steering pump
E Pulley
T Automatic tension wheel

REFITTING

Refitting is the reverse of removal.

SPECIAL TOOLING REQUIRED		
Mot.	**1273**	**Tool for checking belt tension**

ALTERNATOR AND POWER ASSISTED STEERING

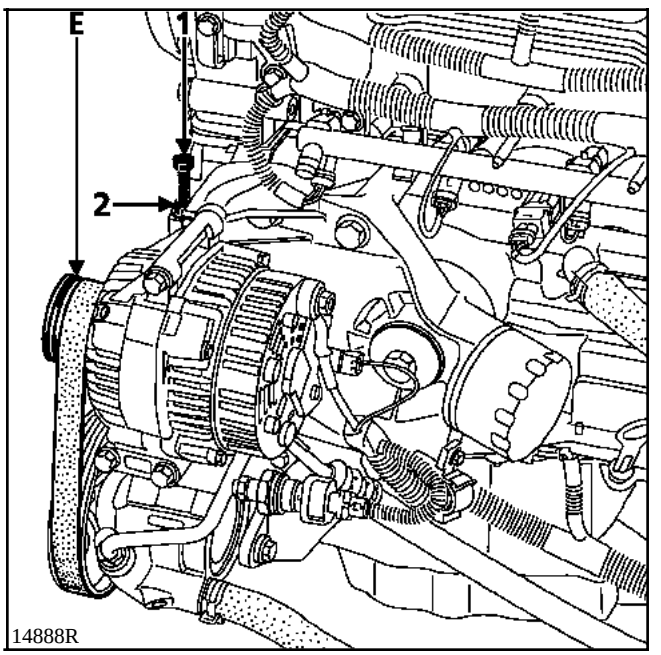


Belt tensioning is carried out using bolt (1) (having slackened the two mounting bolts for the tensioner) then tighten the nut (2).

Tension (US = SEEM unit)	Multi-toothed power assisted steering belt
Fitting	108 ± 6
Minimum for operation	60

A Crankshaft
B Power assisted steering pump
C Alternator
T Tension wheel

→ Tension checking point



NOTE : the accessories belt has five teeth whilst the alternator, PAS pump and crankshaft pulleys have six; it is therefore essential to ensure that the tooth at the end of the pulleys (E) remains "free" when refitting the belt.

Procedure for tensioning the timing belt

SPECIAL TOOLING REQUIRED		
Mot.	**799 -01**	**Tool for immobilising sprockets for toothed timing belt**
Mot.	**1368**	**Tool for tightening the timing pulley**
Mot.	**1489**	**TDC pin**
Mot.	**1490**	**Tool for immobilising camshaft pulleys**
Mot.	**1496**	**Tool for setting camshafts**
EQUIPMENT REQUIRED		
Angular tightening wrench		

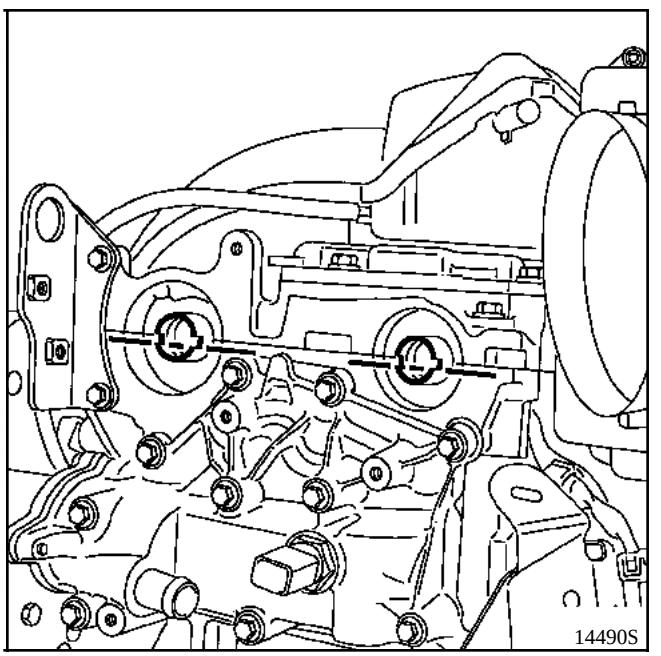
There are two distinct procedures for setting the timing.

The first procedure applies when replacing any components in the timing area which does not require slackening of one or more camshaft pulleys.

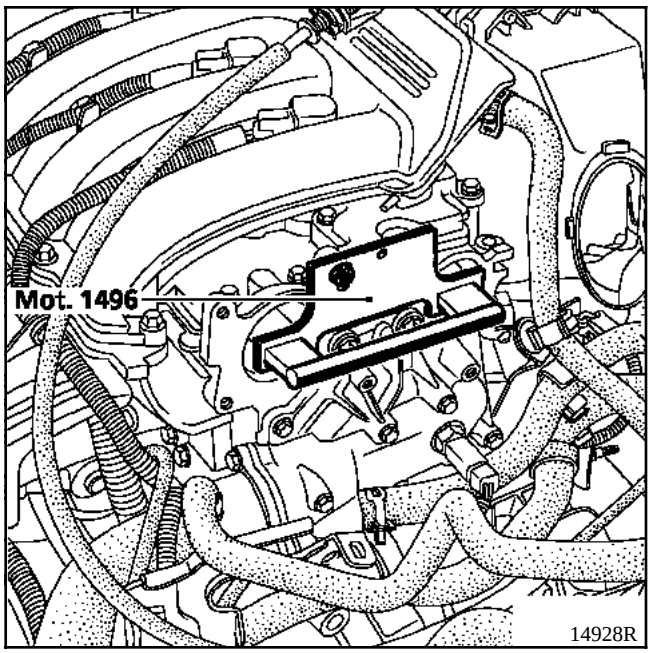
Setting the timing

IMPORTANT: all oil must be removed from the head of the crankshaft, the timing sprocket bore and the pressure surfaces of the crankshaft pulley to avoid slip between the timing belt and the crankshaft which could cause damage to the engine.

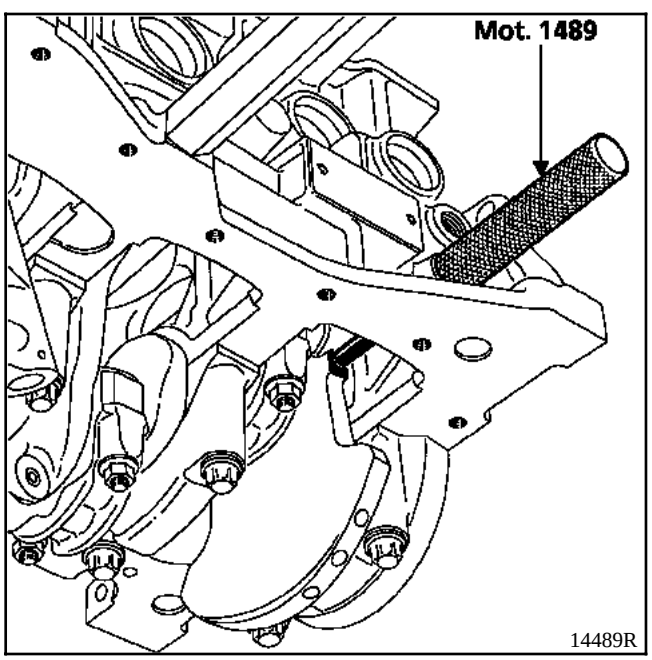
Position the camshaft grooves using **Mot. 799-01** as indicated on the diagram below.

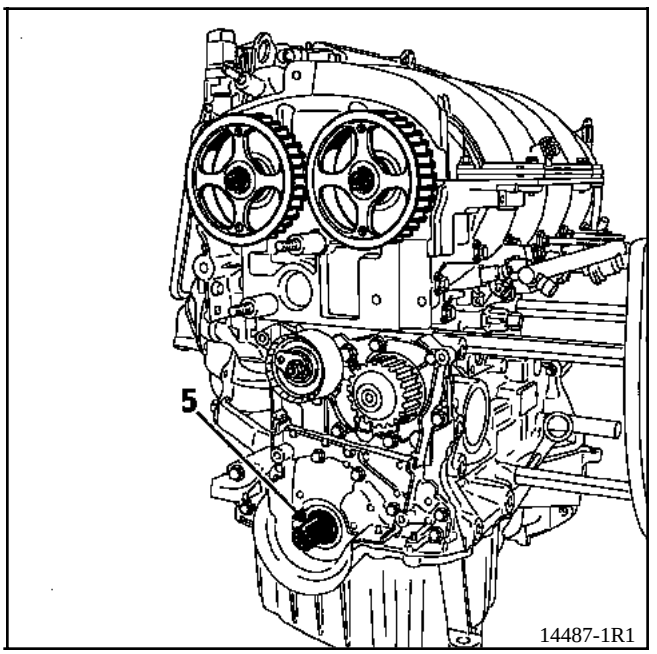


Position tool **Mot. 1496** and fix it to the end of the camshafts.



Check that the crankshaft is resting against the TDC pin **Mot. 1489** (crankshaft groove (5) to the top).

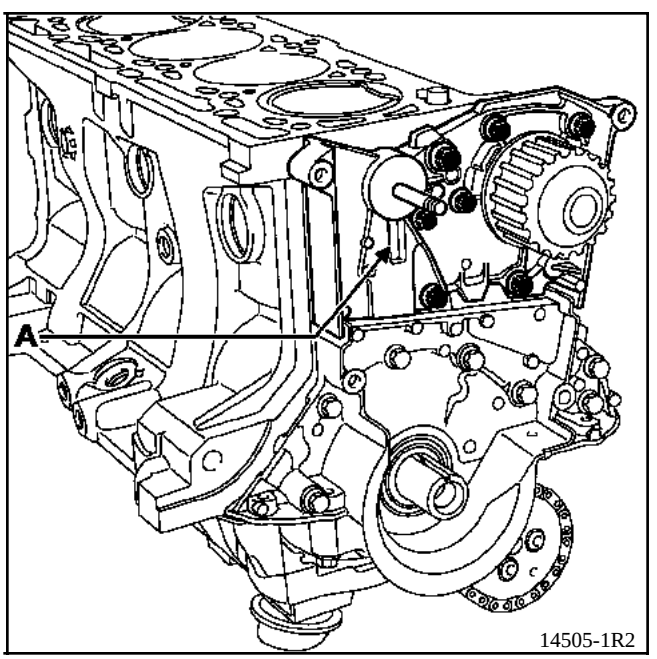




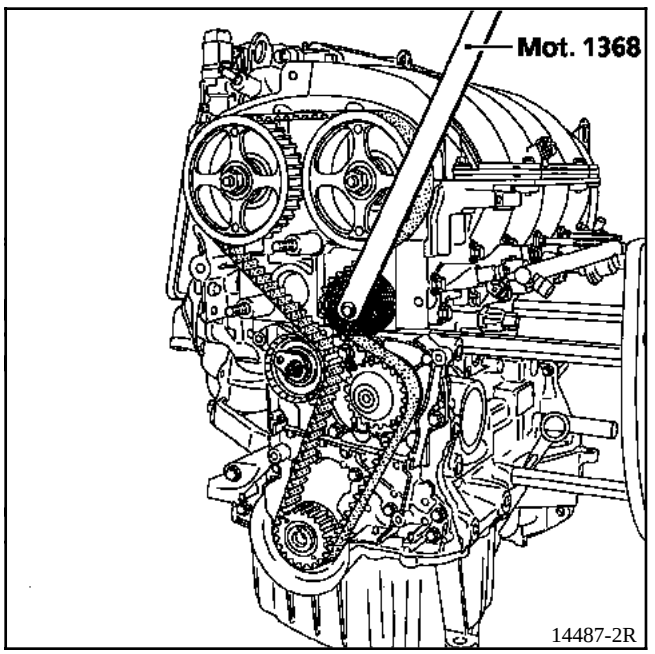
Fitting the belt

When replacing the timing belt, the tension wheel and the timing pulley must be changed.

When refitting the tension wheel, ensure that the wheel lug is correctly positioned in the groove (A).



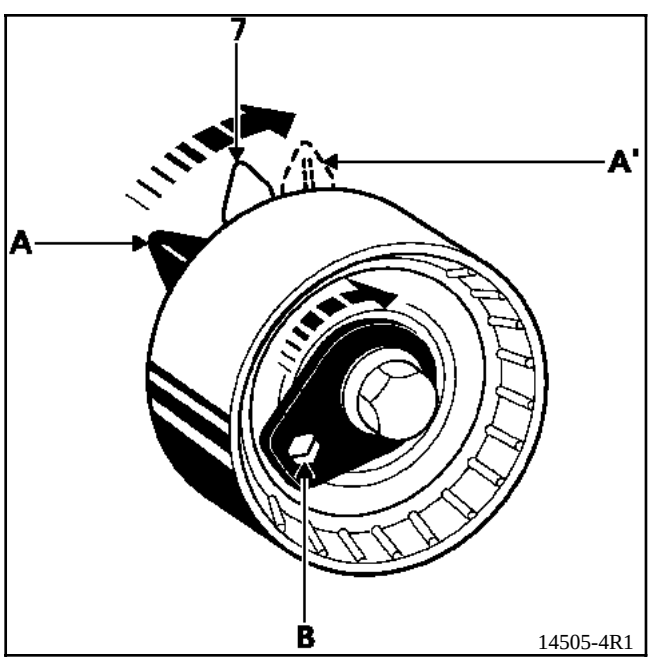
Refit:
- the timing belt,
- the pulley by tightening the mounting bolt using **Mot. 1368** (to a torque of **4.5 daN.m**, value given for information only),



Belt tension

Move the mobile index (A') of the tension wheel **7** to **8 mm** past the fixed index (7), using **6 mm** allen key (at B).

NOTE: position (A) corresponds to the mobile index at rest.



Pre-tighten the tension wheel nut to a torque of **0.7 daN.m**.

Refit the crankshaft accessories pulley by adjusting the bolt without touching the pulley (play of **2** to **3 mm** between the bolt and the pulley).

NOTE:
- the crankshaft accessories pulley bolt can be reused if its length below the head does not exceed **49.1 mm** (if this is not the case, change it),
- do not lubricate the new bolt. However, if a bolt is being reused, it MUST be lubricated.

Tighten the crankshaft pulley bolt to a torque of **2 daN.m** then to an angle of **135**° ± **15**° (crankshaft touching the Top Dead Centre pin).

Remove **Mot. 1496**, the camshaft immobiliser and **Mot. 1489**, the TDC pin.

Turn the crankshaft clockwise twice (timing side), before the end of the two revolutions, screw pin **Mot. 1489** into the cylinder block and slowly and without jerky movements, adjust the crankshaft until it touches the pin.

Remove the TDC pin.

Slacken the tension wheel nut by a maximum of one revolution, using a **6 mm** allen key to hold it.

Align the mobile index with the fixed index and tighten the nut to a torque of **2.7 daN.m**.

Checking the setting and tension

Checking the tension

Turn the crankshaft clockwise twice (timing side), before the end of the two revolutions, screw pin **Mot. 1489** into the cylinder block and slowly and without jerky movements, adjust the crankshaft until it touches the pin.

Remove the TDC pin.

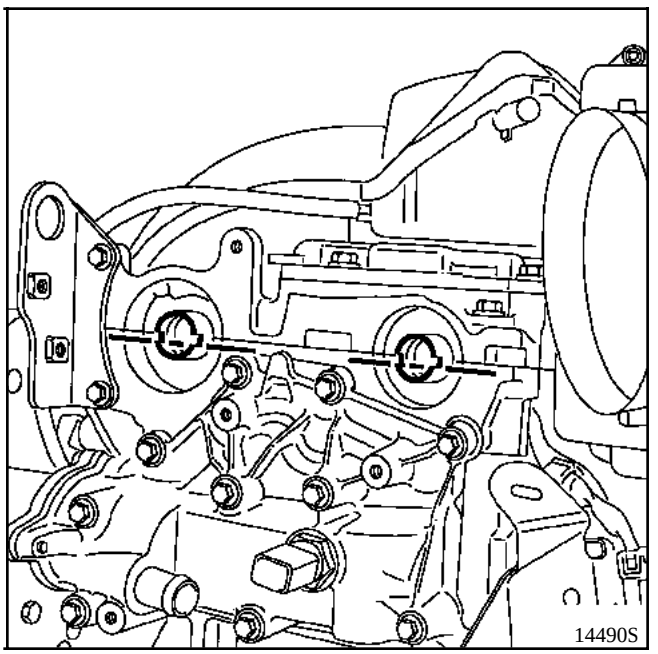
Check that the pulleys indices are aligned. If they are not, carry out the procedure for tensioning again.

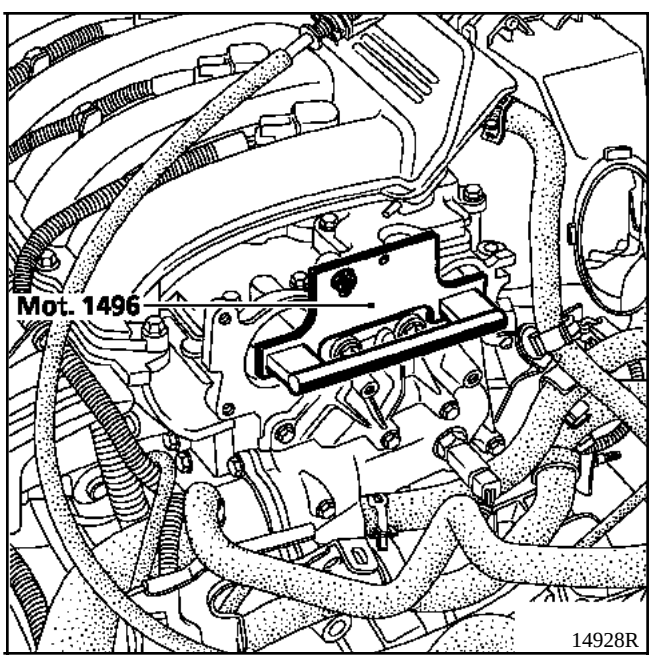
Checking the setting

Ensure that the tension wheel indices are correctly positioned before checking the setting of the timing.

Screw pin **Mot. 1489** into the cylinder block then slowly and without jerky movements, adjust the crankshaft until it touches the pin.

Fit (without forcing) tool **Mot. 1496** for setting the camshafts (the camshaft grooves must be horizontal). **If the tool does not engage, the timing must be reset and the tension adjusted.**



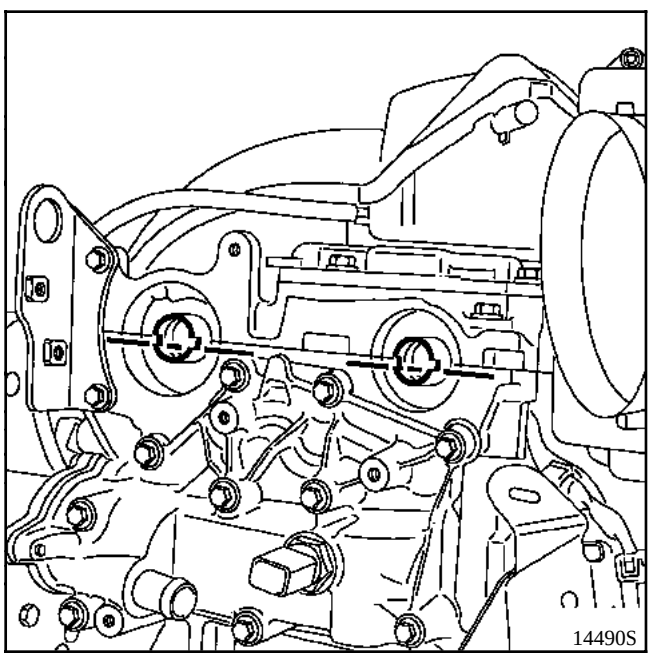


The second procedure applies when changing any components which require one or more of the timing camshaft pulleys to be slackened.

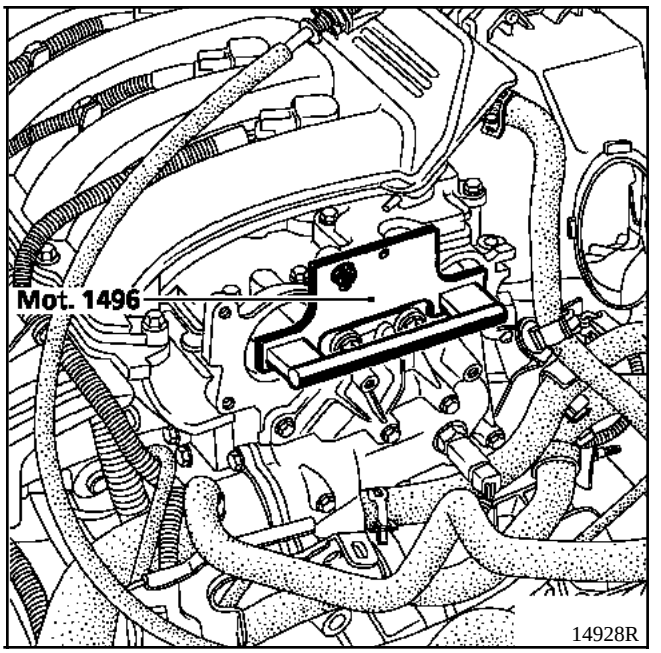
Setting the timing

IMPORTANT: all oil must be removed from the head of the crankshaft and the timing sprocket bore, the pressure surfaces of the crankshaft pulley and the camshaft ends (timing side) and the camshaft pulley bores to avoid slip between the timing belt, the crankshaft and the camshaft pulleys which could cause damage to the engine.

Position the camshaft grooves as indicated in the diagram below by tightening respectively the two old camshaft sprocket nuts onto the studs at the ends of the camshafts.


14490S

Fit tool **Mot. 1496** to the end of the camshafts.

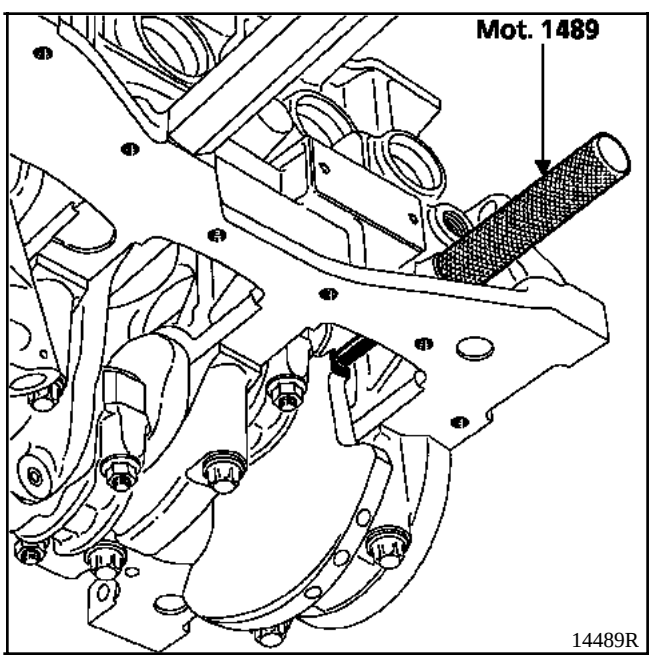


14928R

Fit the camshaft pulleys in place by pre-tightening the new nuts (**without locking the nuts, play of 0.5 to 1 mm between nut and pulley**).

NOTE : the camshaft nuts MUST be replaced.

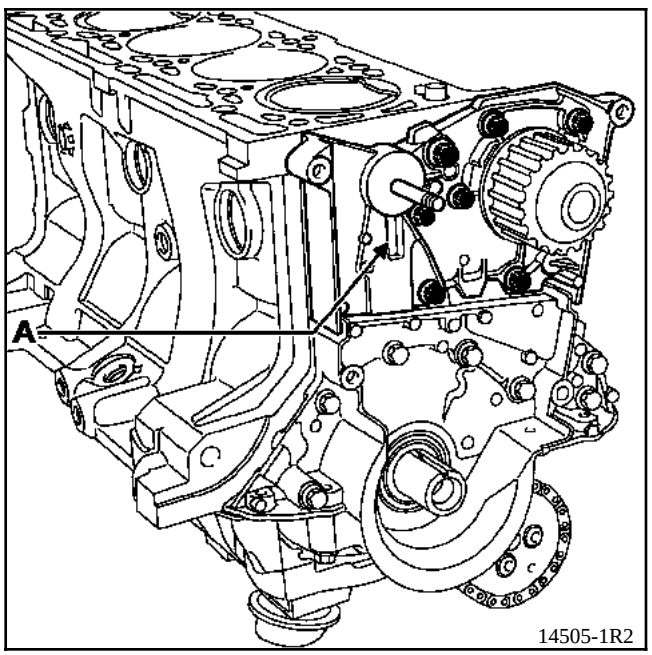
Check that the crankshaft is touching the TDC pin (crankshaft groove (5) to the top).



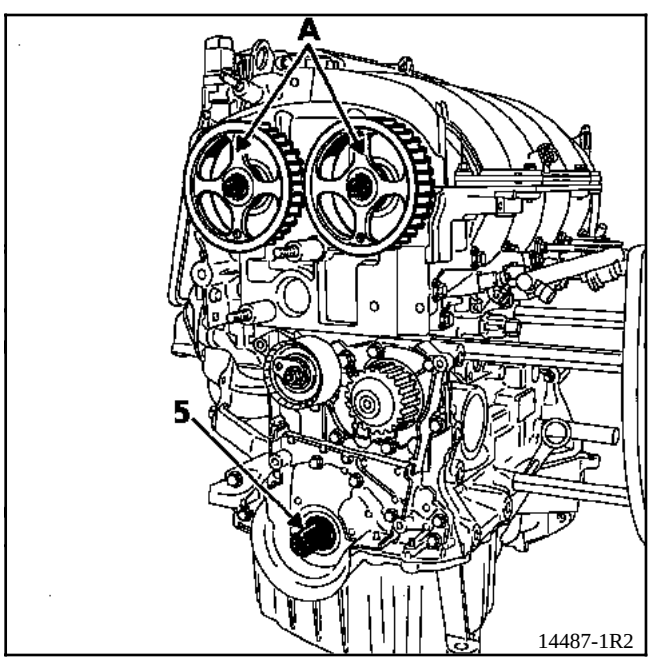
14489R

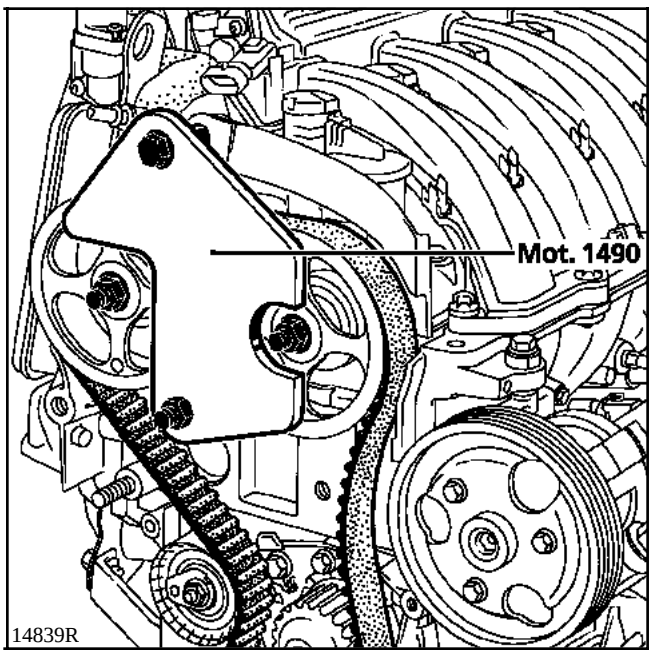
When changing a timing belt, the tension wheels and timing pulley must be changed.

When refitting the tension wheel, ensure that the wheel lug is correctly positioned in the groove (A).

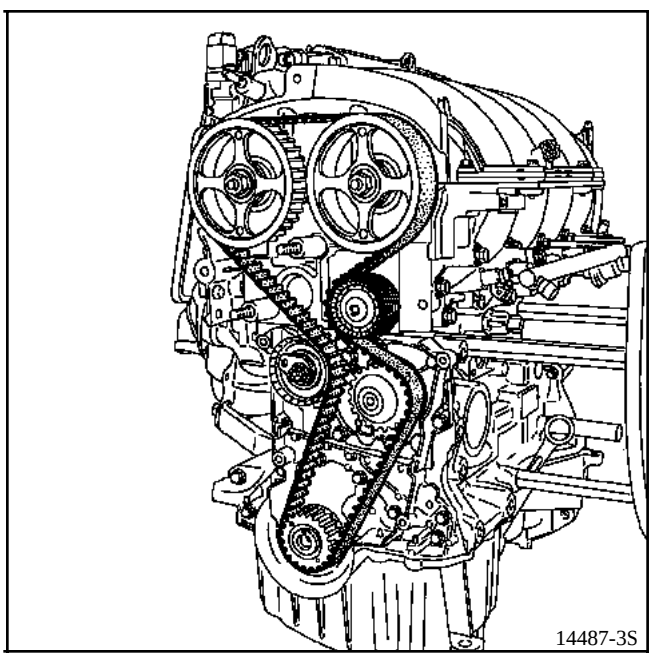


Position the **Renault** logo engraved on the camshaft pulley spokes vertically upright (A), fit the timing belt onto the camshaft pulleys then fit the tool for immobilising the camshaft pulleys **Mot. 1490** (use the timing cover mountings to secure tool **Mot. 1490**).





Refit the pulley by tightening the mounting bolt using **Mot. 1368** (to a torque of **4.5 daN.m,** value given for information only).



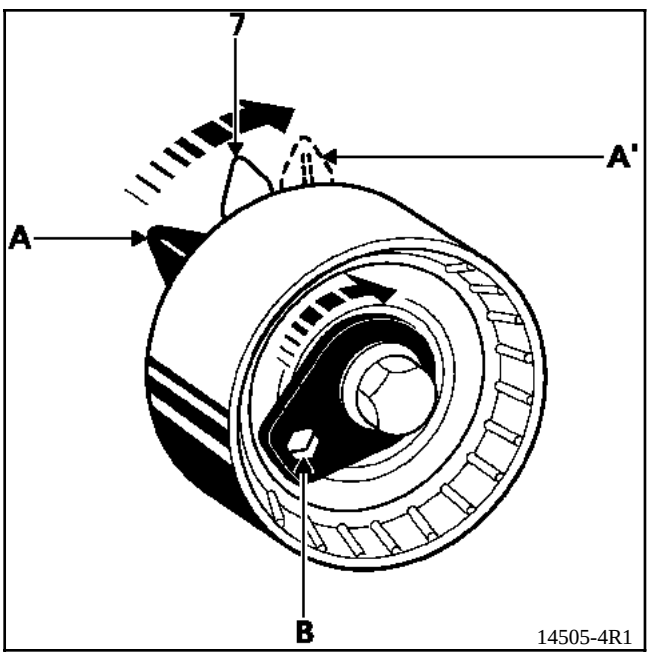
Fit the crankshaft accessories pulley by pre-tightening the bolt (**without locking the bolt, play of 2 to 3 mm between the bolt and the pulley**).

Tensioning the belt

Check that there is always play of 0.5 to 1 mm between nuts and camshaft pulleys.

Move the mobile index (A') of the tension wheel **7** to **8 mm** past the fixed index (7) using a **6 mm** allen key (at B).

NOTE: position (A) corresponds to the mobile index at rest.



Pre-tighten the tension wheel nut to a torque of **0.7 daN.m**.

Remove the tool for immobilising the camshaft pulleys **Mot. 1490**.

Rotate the timing six times by the exhaust camshaft pulley using **Mot. 799-01**.

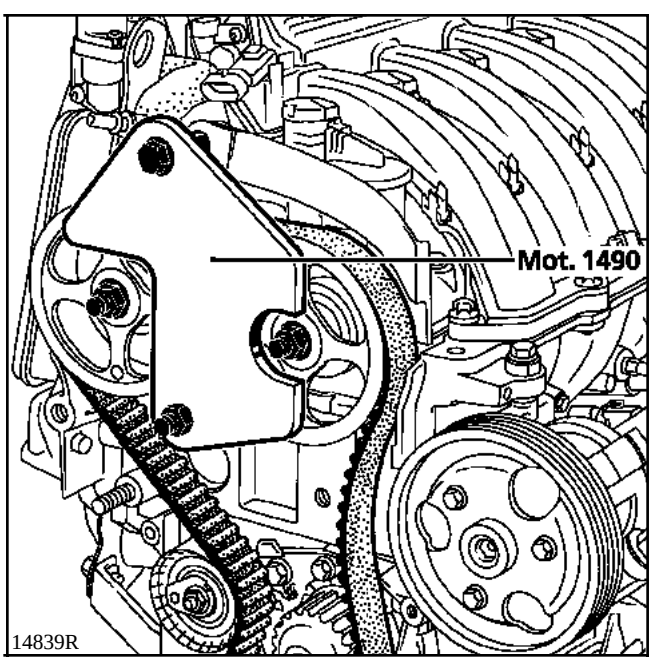
Slacken the tension wheel nut by a maximum of one rotation using a **6 mm** allen key to hold it.

Align the mobile index (A') with the fixed index (7) and tighten the nut to a torque of **2.7 daN.m**.

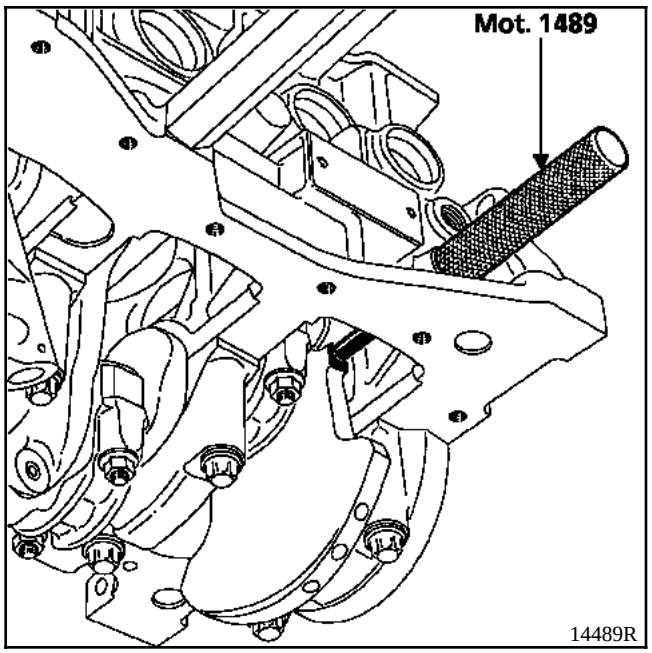
Remove the crankshaft pulley to fit the lower timing cover (without the mounting bolts), then refit the crankshaft pulley.

NOTE:
- the crankshaft accessories pulley bolt can be reused if its length under the head does not exceed **49.1 mm** (if this is not the case, change it),
- do not lubricate the new bolt. However, if a bolt is reused, it must be lubricated.

Fit tool **Mot. 1490** for immobilising the camshaft pulleys, if necessary using tool **Mot. 799-01**.



Check that the crankshaft is touching the pin **Mot. 1489**.



Tighten the crankshaft accessories pulley bolt to a torque of **2 daN.m**, then to an angle of **135°** ± **15°** (crankshaft touching the TDC pin).

Tighten the inlet camshaft pulley nut to a torque of **3 daN.m** then to an angle of **84°**.

Tighten the exhaust camshaft pulley nut to a torque of **3 daN.m** then to an angle of **84°**.

Remove **Mot. 1496** for setting the camshafts, **Mot. 1490**, the tool for immobilising the camshaft pulleys and **Mot. 1489,** the TDC pin.

Checking the setting and tension

Checking the tension

Turn the crankshaft clockwise twice (timing side), before the end of the two revolutions, screw pin **Mot. 1489** into the cylinder block and slowly, without jerky movements, adjust the crankshaft until it touches the pin.

Remove the TDC pin.

Check that the pulley indices are aligned, if not, carry out the tensioning procedure again. Slacken the tension wheel nut by a maximum of one revolution using a **6 mm** allen key to hold it.

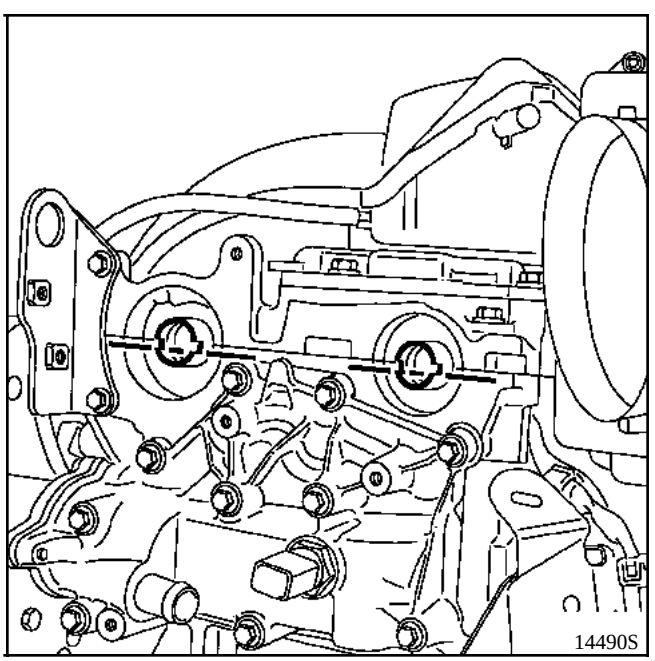
Align the mobile index with the fixed index and tighten the nut to a torque of **2.7 daN.m**.

Checking the setting

Ensure that the tension wheel index is correctly positioned before checking the setting of the timing.

Screw pin **Mot. 1489** into the cylinder block then position and hold the crankshaft so it touches the pin.

Fit (without forcing) **Mot. 1496**, the tool for setting the camshaft pulleys (the camshaft grooves must be horizontal).
If the tool does not engage, the timing must be reset and the tension adjusted.



METHOD FOR TIGHTENING THE CYLINDER HEAD

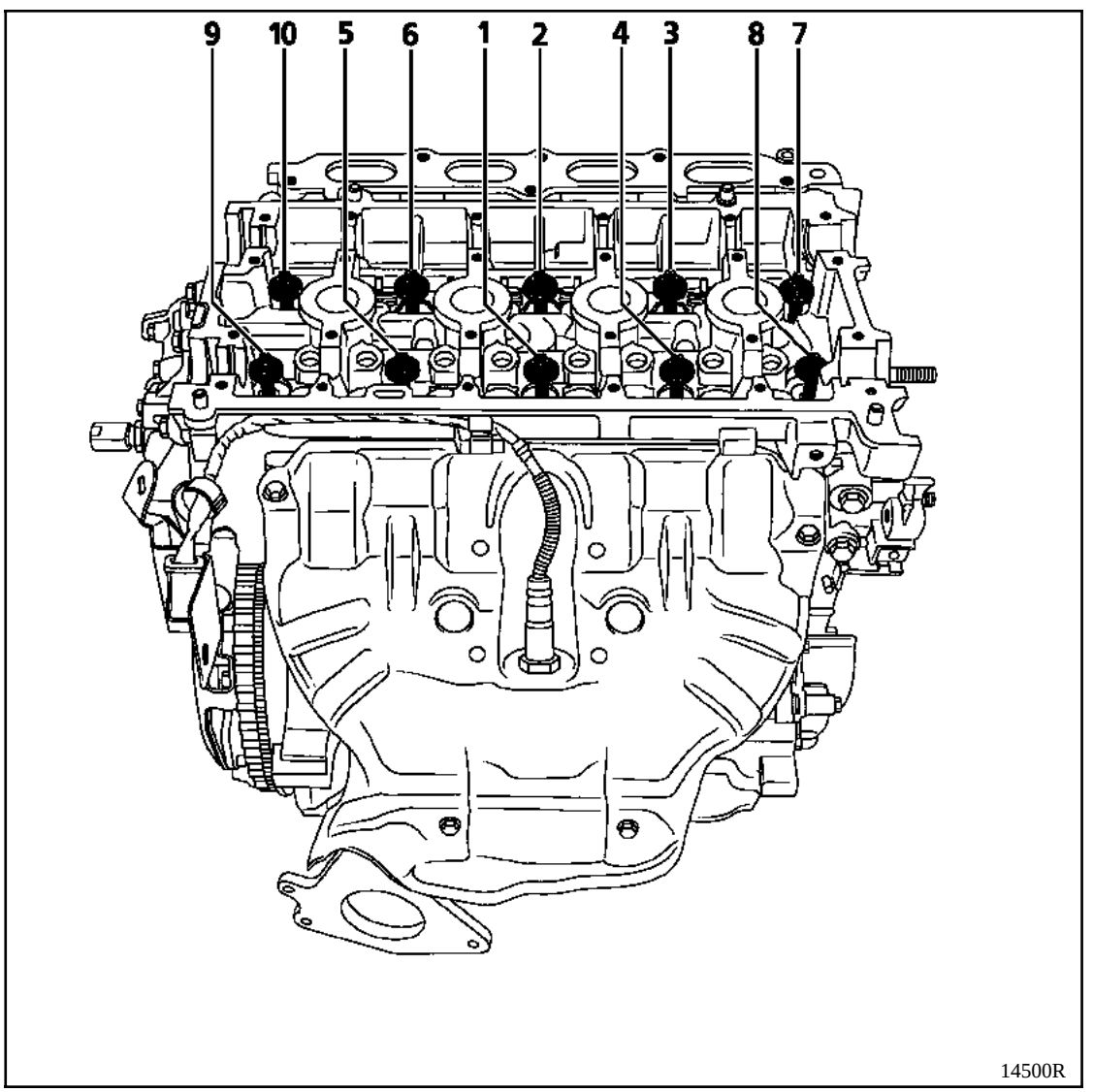
Bolts may be reused if the length below the head does not exceed 117.7 mm (otherwise change all the bolts).

Method for tightening the cylinder head

REMINDER: to obtain correct tightening of the bolts, use a syringe to remove any oil which may be in the cylinder head mounting holes.

Do not lubricate new bolts. However, if bolts are being reused, they must be lubricated.

Tighten all bolts to **2 daN.m** in the order indicated below.



Check that all bolts are tightened to a torque of **2 daN.m** then angle tighten (bolt by bolt) to **240**° ± **6**°.

Do not retighten the cylinder head bolts after this procedure has been applied.

Vehicle type	Engine	Gearbox	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Ratio
XA0B XA04	K4M 700	JB	1 598	79.5	80.5	10 / 1
XA0W	K4J 750	JB	1 390	79.5	70	10 / 1

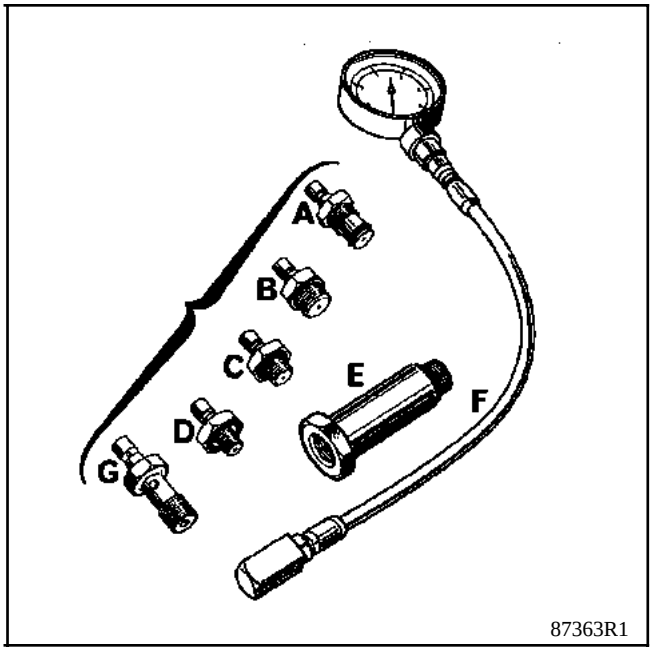
Section to consult: **Mot. K4M**.

SPECIAL TOOLING REQUIRED
Mot. 836 -05 Oil pressure measuring kit
EQUIPMENT REQUIRED
22 mm long socket or tube wrench

CHECKING

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

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



USE

B + F

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

Oil pressure

Idle	**1 bar**
3 000 rpm	**3 bars**

SPECIAL TOOLING REQUIRED	
Elé. 1294-01	Tool for removing windscreen wiper arm
Mot. 1040-01	Dummy sub-frame for removal-refitting of the engine and transmission assembly
Mot. 1159	Tool for holding the engine on the sub-frame
Mot. 1233-01	Threaded rods for lowering the sub-frame
Mot. 1448	Hose clip pliers with extension
EQUIPMENT REQUIRED	
Engine support tool	

TIGHTENING TORQUES (in daN.m)	
Sub-frame front mounting bolt	6.2
Sub-frame rear mounting bolt	10.5
Front right hand suspended engine mounting cover mounting bolt on engine	6.2
Front right hand suspended engine mounting cover mounting nut	4.4
Mounting nut for the rubber pad on the front left hand side member support	6.2
Shock absorber base mounting bolts	18
Brake caliper mounting bolts	4
Steering shaft yoke mounting bolt	3
Wheel bolt	9
Three point bracket nuts	2
Sub-frame - side member tie-rod bolts	3

REMOVAL

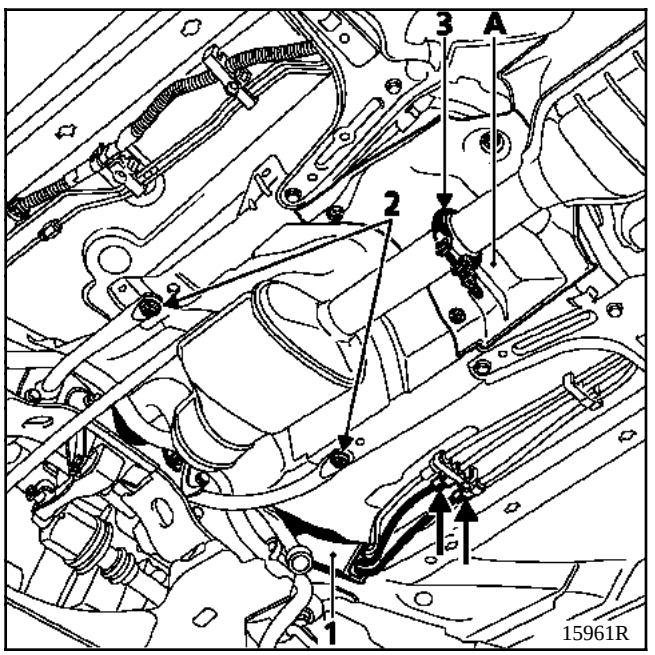
Place the vehicle on a two post lift.

Remove the battery (under the passenger seat for Scenic).

Remove the engine undertray.

Drain:
- the cooling circuit via the lower radiator hose,
- the gearbox and the engine (if necessary),
- the air conditioning circuit (if fitted) using a filling station.

Remove:
- the front wheels and the mud guards,
- the sub-frame / body tie rods,
- the track rod ends,
- the brake calipers (and the **ABS** sensors if fitted) and attach them to the suspension springs,
- the shock absorber base bolts,
- the heat shield (A) and the gearbox control,
- the protective plate (1) and release the fuel pipes,
- the fuel supply and return pipes,
- the tie-rod mountings (2),
- clip (3) for the catalytic converter and attach it to the body,



- the horn,
- the two PAS pipe mountings on the right hand side of the sub-frame,
- the steering shaft yoke nut and eccentric bolt after pushing the protector back.

SPECIAL NOTES FOR VEHICLES EQUIPPED WITH A DRIVER'S AIR BAG

IMPORTANT

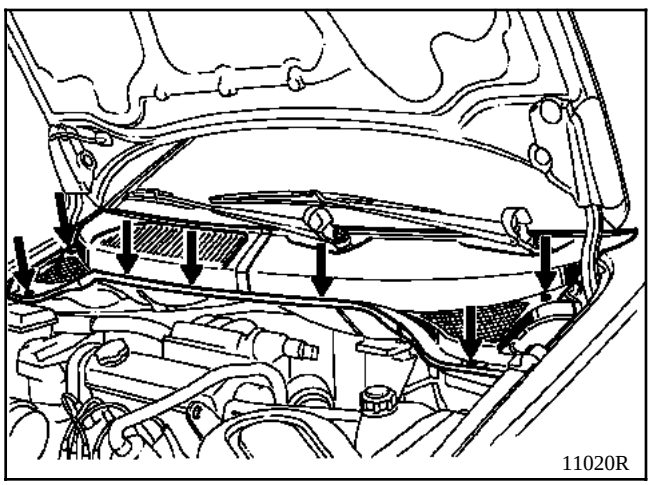
To prevent all risk of damage to the rotary switch under the steering wheel, please observe the following notes:
- **Before uncoupling the steering column and the steering rack, the steering wheel MUST be immobilised with the wheels straight for the entire operation using a "steering wheel immobilising tool".**
- **If there is any doubt regarding the correct centring of the rotary switch, the steering wheel must be removed so that the centring method described in the section "Air bag" can be applied.**

REMINDER: in this case, only qualified, trained personnel can carry out the operation.

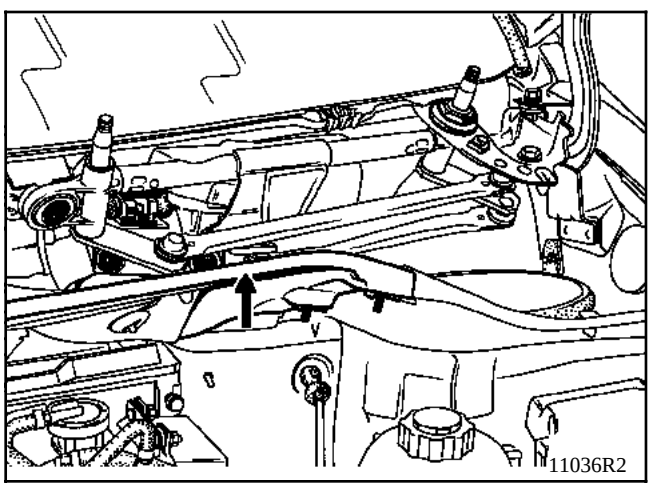
Remove:
- the front bumper,
- the air resonator.

Special notes for Scenic

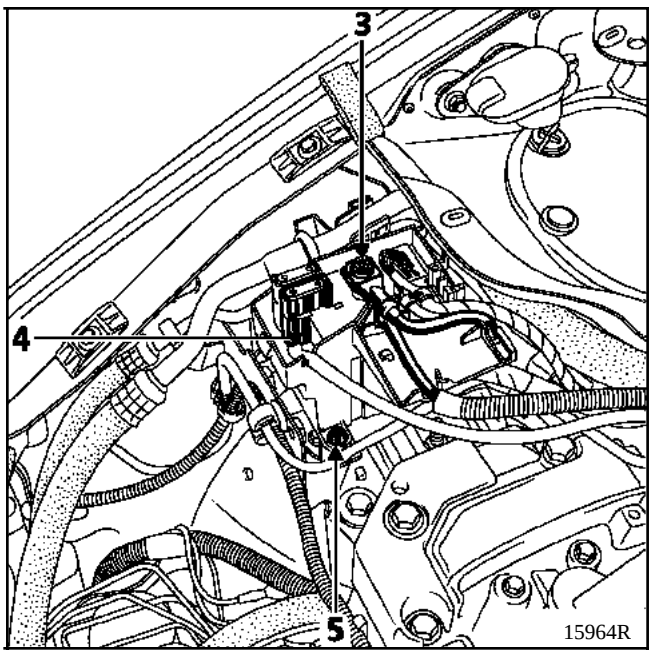
Remove:
- the windscreen wiper arms - tool **Elé. 1294-01**,
- the scuttle panel grilles ,



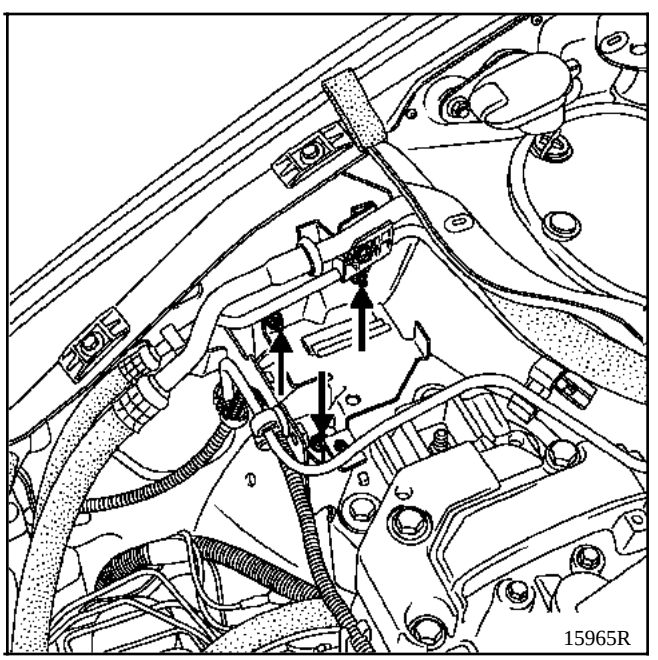
- the plenum chamber closure panel,



- the shock absorber turret protectors,
- the starter motor feed at (3) and the fuse holder (4),
- the mounting bolt (5) and move the terminal unit to one side,



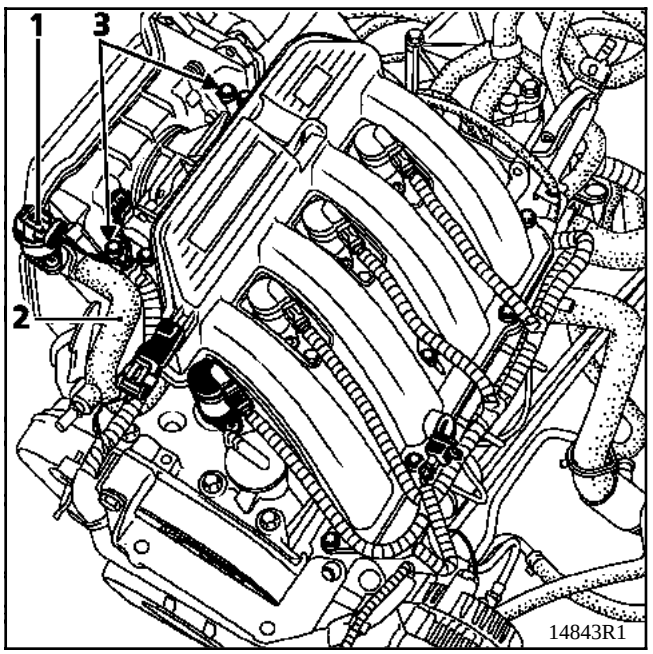
- the terminal unit mounting,



All Types

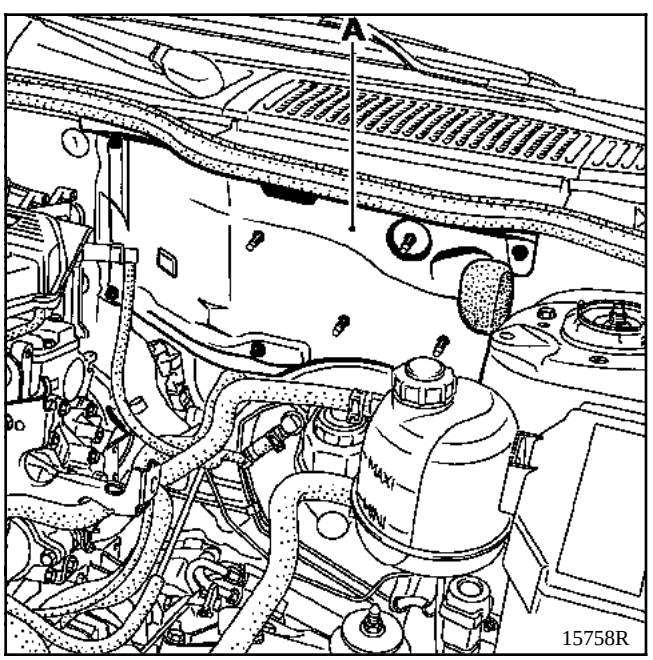
Remove:
- the accelerator and clutch cables,
- the brake servo vacuum pipe (manifold end),
- the air filter unit mounting bolts (3).

Disconnect connector (1) and the pipe (2).



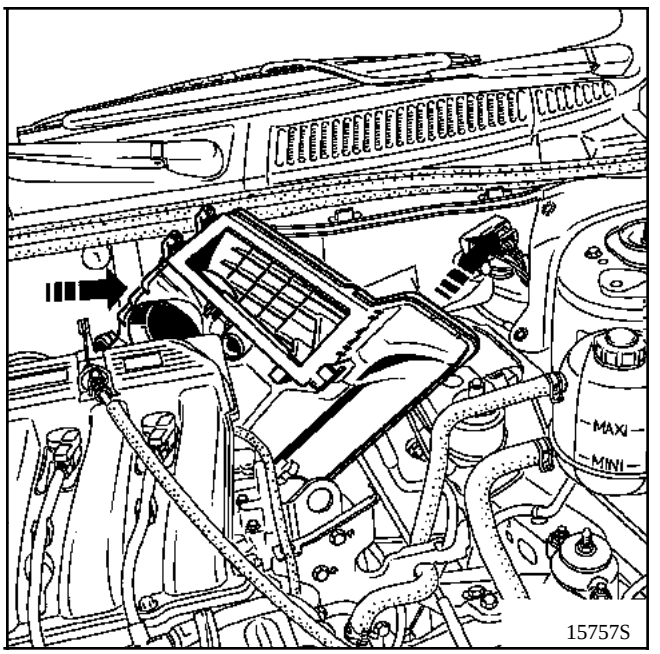
Special notes for Scenic

Remove:
- the air filter,
- the soundproofing, then panel (A).



All Types

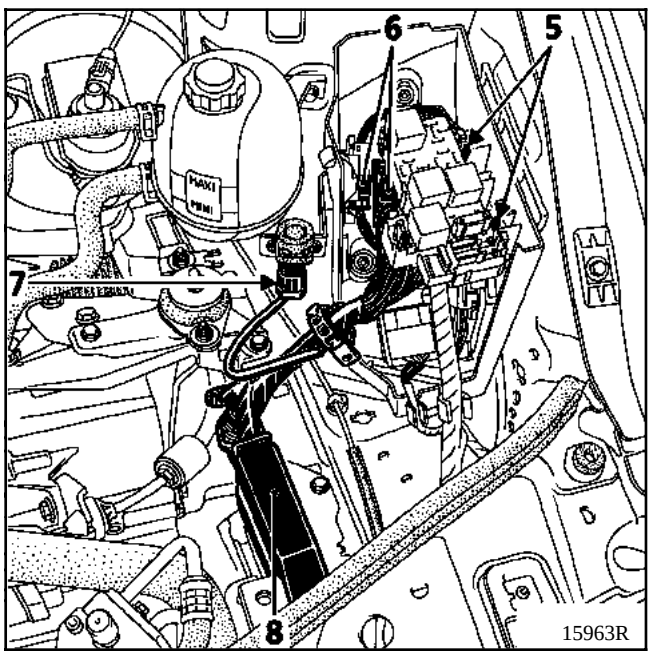
Remove the air filter unit as shown below.



NOTE : take care with the vacuum outlet from the inlet manifold to the braking amplifier. If this outlet is broken, the manifold must be replaced.

Disconnect the pipe and the connector on the canister.

Remove:
- the hoses on the heating radiator,
- the expansion bottle mountings and move it to one side,
- the catalytic converter mountings on the manifold and move it to one side,
- the relay board (5) and disconnect the connectors (6), (7) and (8).

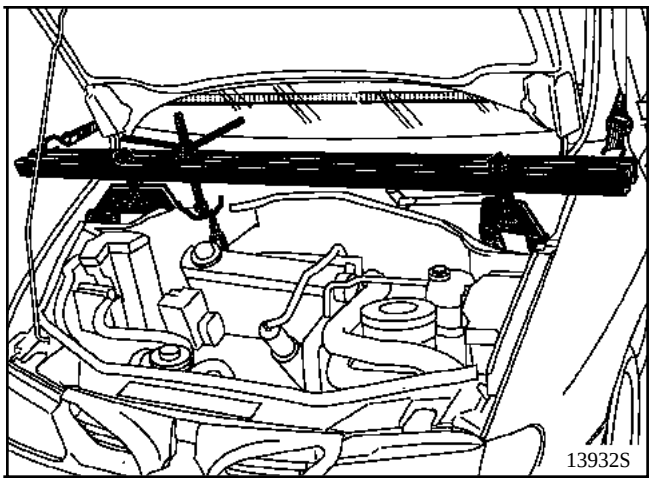


- the earth strap on the bulkhead,
- the **air conditioning** pipe mountings (if fitted) on the compressor and the dehydration canister.

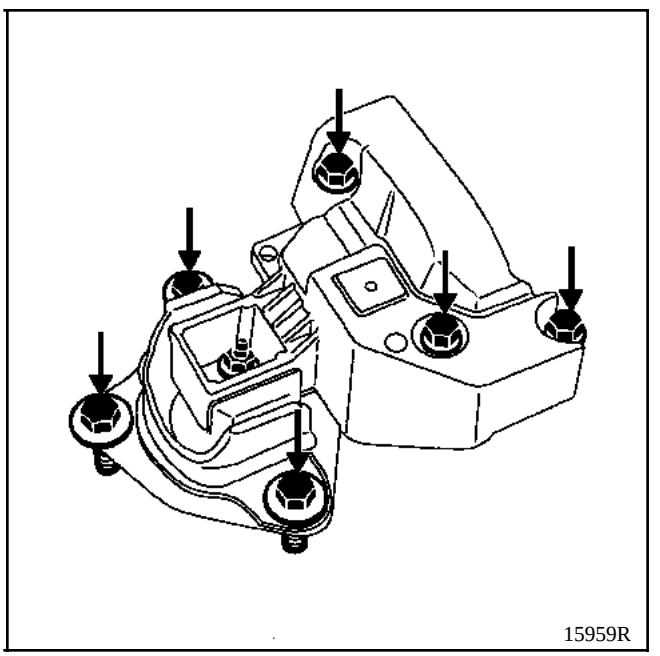
NOTE: the pipes and the expansion valve must be plugged to prevent humidity entering the circuit.

Fit the engine support tool, checking that the strap is correctly located.

Special note for positioning the tool for Scenic

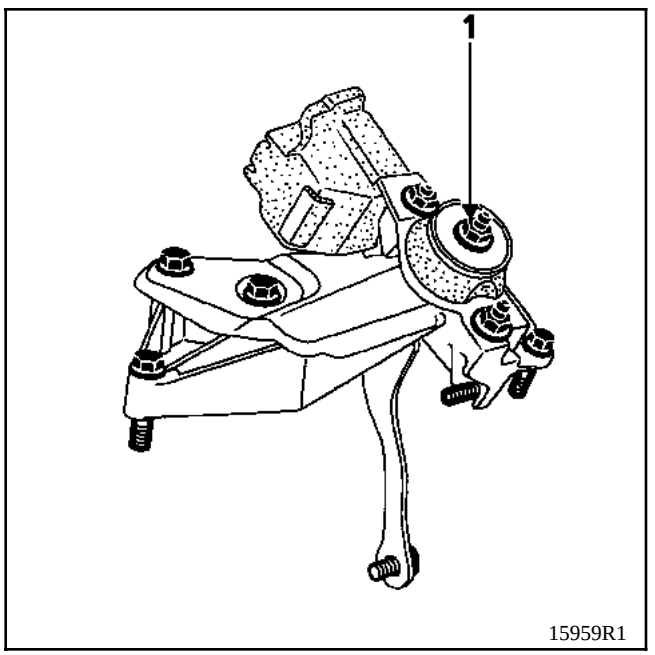


Remove the suspended engine mounting cover.

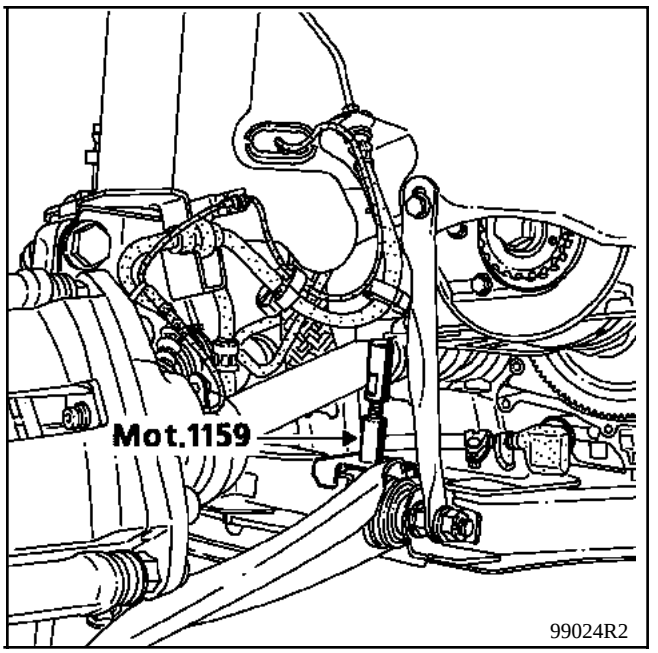


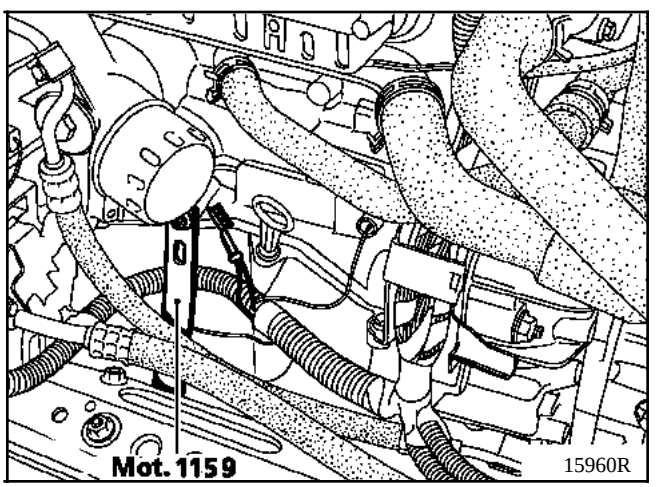
Fit a block between the gearbox and the sub-frame.

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

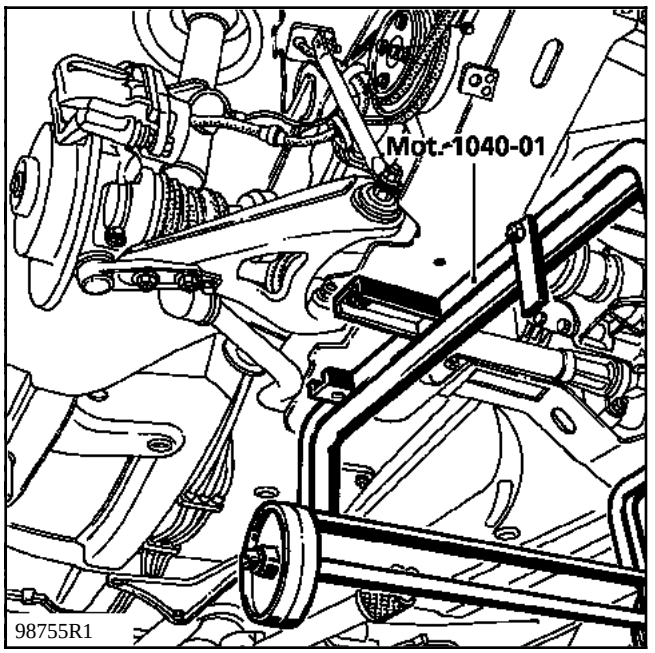


Fit the two **Mot. 1159** as shown below.





Secure tool **Mot. 1040-01** under the sub-frame.



Lower the lift until the tool touches the ground.

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

When starting to raise the body, take care to remove the catalytic converter and extract the radiator from its upper mountings (then rest it on the sub-frame).

NOTE: for an operation requiring separation of the engine - gearbox - sub-frame assembly, take care to mark the position of **Mot. 1159** on the sub-frame.

REFITTING

Two threaded rods **Mot. 1233-01** can be used to make it easier to align the sub-frame with the body by positioning them in the two front mountings of the sub-frame on the body.

Take care to replace the catalytic converter when lowering the body onto the engine and transmission assembly.

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

Refitting is the reverse of removal.

Correctly fit the heat shields.

Fit the caliper mounting bolts using **Loctite FRENBLOC** and torque tighten them.

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

Carry out the following operations:
- fill the engine and gearbox with oil (if necessary),
- fill and bleed the cooling circuit (see section **19** "**Filling and bleeding**").

Fill the air conditioning circuit using the filling station (if fitted).

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

TIGHTENING TORQUES (in daN.m)	
Sub-frame front mounting bolt	**6.2**
Sub-frame rear mounting bolt	**10.5**
Sump bolt	**1.4**
Steering shaft yoke mounting bolt	**3**
Engine tie-bar bolt	**6.2**
Wheel bolt	**9**
Sub-frame - side member tie-rod bolt	**3**

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

Remove the engine undertray.

Drain the engine.

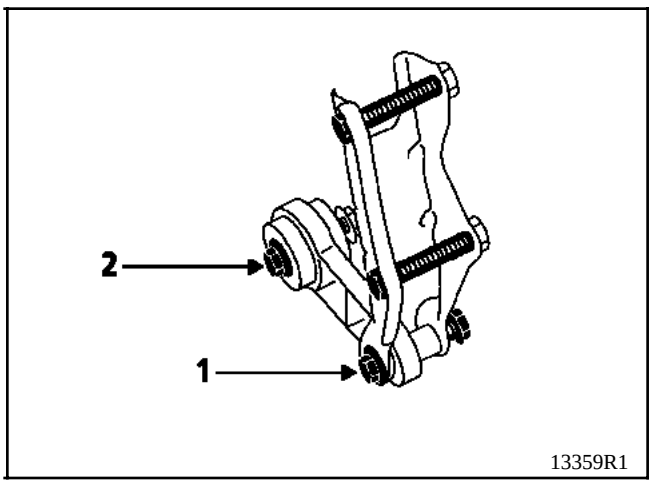
Remove:
- the front wheels and the right hand mud guard, together with the lower clip for the left hand mud guard,
- the steering shaft yoke nut and eccentric bolt after pushing the protector back,

IMPORTANT

To prevent all risk of damage to the rotary switch under the steering wheel, please observe the following notes:
- **Before uncoupling the steering column and the steering rack, the steering wheel MUST be immobilised with the wheels straight for the entire operation using a "steering wheel immobilising tool".**
- **If there is any doubt regarding the correct centring of the rotary switch, the steering wheel must be removed so that the centring method described in the section "Air bag" can be applied.**

REMINDER: in this case, only qualified, trained personnel can carry out the operation.

Remove:
- the lower ball joint mountings and those for the track rod ends,
- the sub-frame - body tie-rods,
- the gear control at the gearbox end,
- the horn,
- bolt (1) and slacken the engine tie bar bolt (2) without removing it,

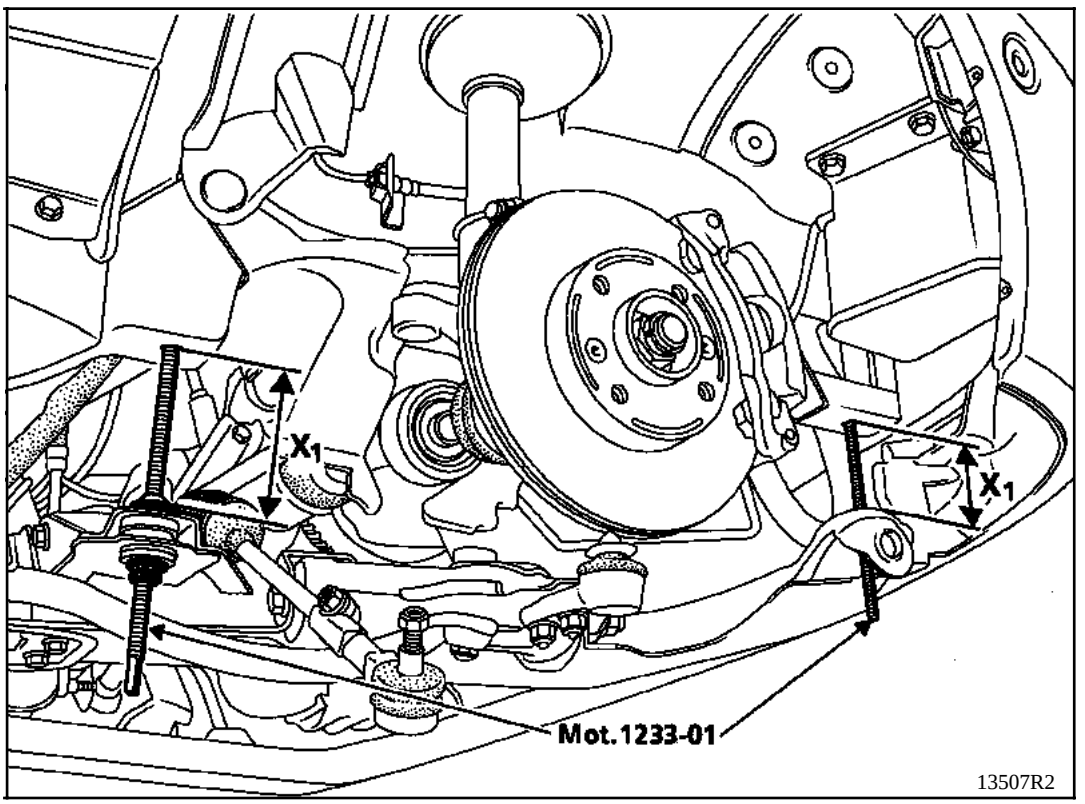


13359R1

- the lower bumper mountings,

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

Gradually lower the sub-frame using threaded rods **Mot. 1233-01** until dimension X_1 **= 9 cm** is reached, approximately.

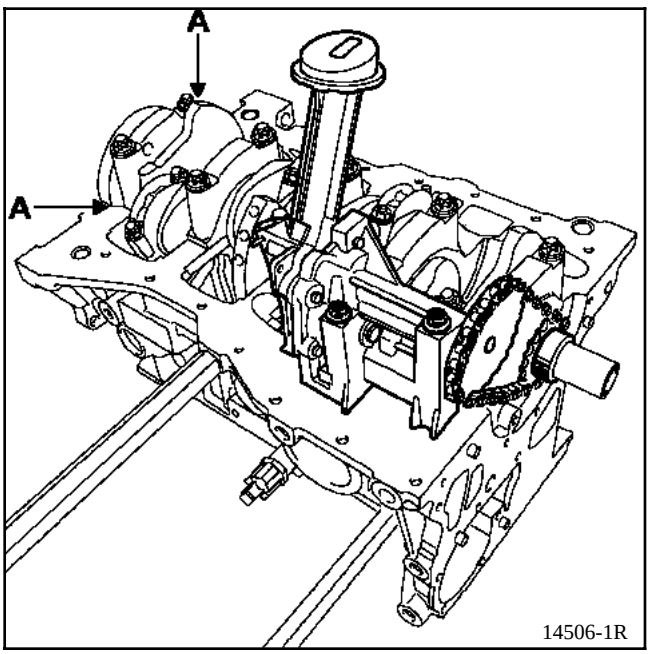


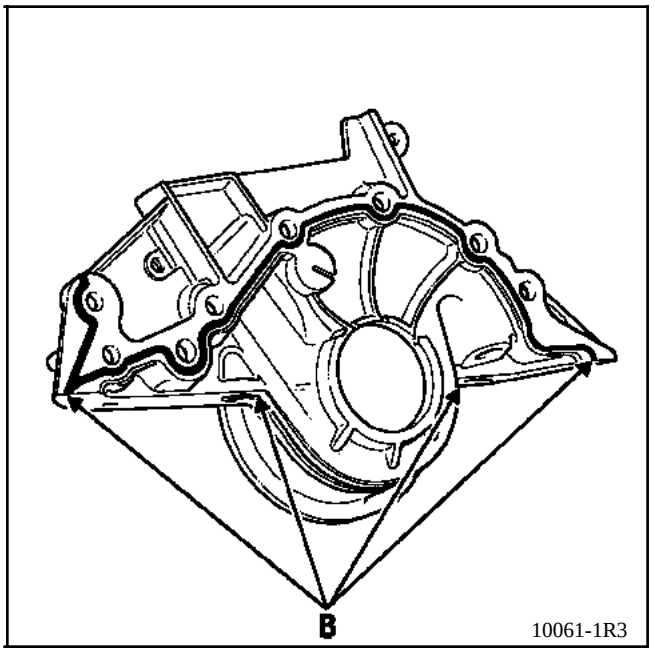
Release the wiring loom from the sub-frame (left hand side).

Remove:
- the dipstick,
- the wiring loom mounting on the sump and the mounting for the PAS pipe under the gearbox,
- the sump.

REFITTING

Apply **RHODORSEAL 5661** at (A) on each side of bearing N° 1 and at (B) on the crankshaft closure cover.





Refit the sump using a new gasket and pretighten it to a torque of **0.8 daN.m,** then tighten in a spiral pattern to a torque of **1.4 daN.m**.

REMOVAL

Place the vehicle on a two post lift.

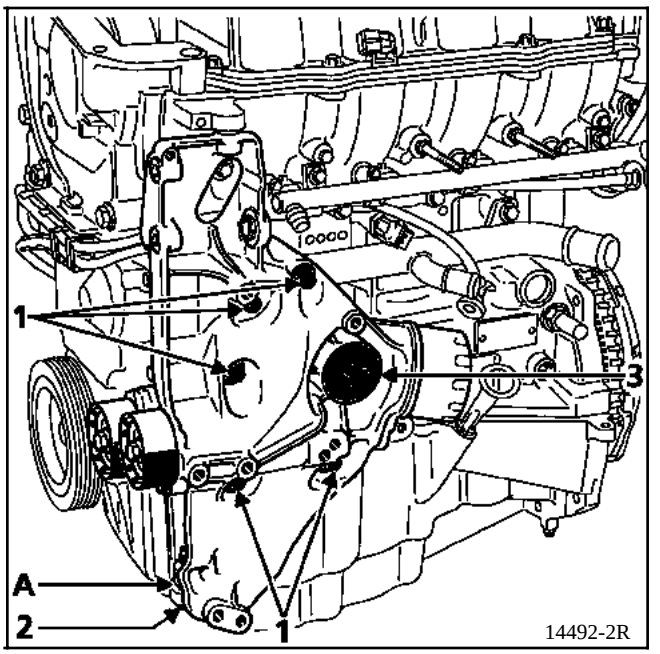
Disconnect the battery (under the passenger seat for Scenic).

Remove:
- the alternator (see **section 16** "**Alternator**"),
- the injector gallery protector (with AC),
- the injector gallery mountings and move it to one side (with AC),
- the PAS pipe mounting bolt on the multipurpose mounting,
- the PAS pulley (without AC),
- the PAS pump mountings, disconnect the pressostat connector on the PAS pipe and move the assembly to one side,
- the air conditioning compressor mountings (if fitted) and move it to one side,
- the multipurpose mounting.

REFITTING

Refit the multipurpose mounting (check that it is touching the sump (at A) before tightening it) then torque tighten the bolts (see the table below).

Order of tightening	Tightening torque
1	**5.3 daN.m**
2	**2.1 daN.m**
3	**11 daN.m**



For refitting the accessories belt, refer to section **07** "**Accessories belt tension**".

Refitting is the reverse of removal

SPECIAL TOOLING REQUIRED		
Elé.	**1294 -01**	**Tool for removing windscreen wiper arm**
Mot.	**799 -01**	**Tool for immobilising sprockets for toothed timing belt**
Mot.	**1273**	**Tool for checking belt tension**
Mot.	**1368**	**Tool for tightening timing pulley**
Mot.	**1487**	**Tool for fitting inlet camshaft sealing plug**
Mot.	**1488**	**Tool for fitting exhaust camshaft sealing plug**
Mot.	**1489**	**Top Dead Centre pin**
Mot.	**1490**	**Tool for immobilising camshaft pulleys**
Mot.	**1496**	**Tool for setting camshafts**
EQUIPMENT REQUIRED		
Engine support tool **Angular tightening wrench**		

TIGHTENING TORQUES (in daN.m and/or °)	
Wheel bolts	**9**
Pulley bolt	**4.5**
Crankshaft pulley bolt	**2 + 135° ± 15°**
Tension wheel nut	**2.7**
Mounting bolt on engine for front right suspended engine mounting cover	**6.2**
Mounting bolt for front right suspended engine mounting movement limiter	**6.2**
Engine tie bar bolts	**6.2**

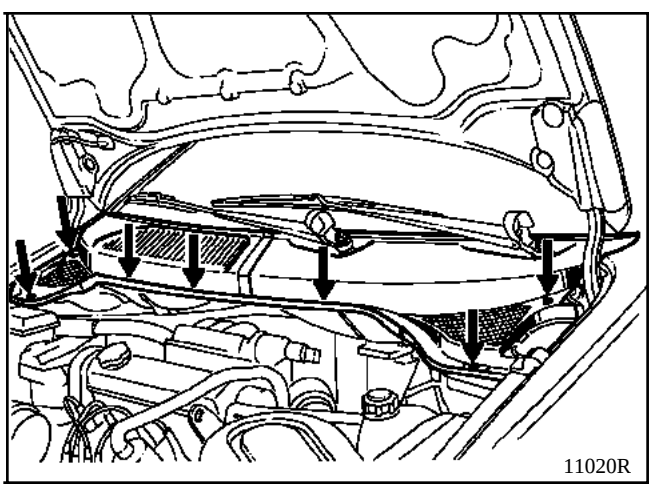
REMOVAL

Place the vehicle on a two post lift.

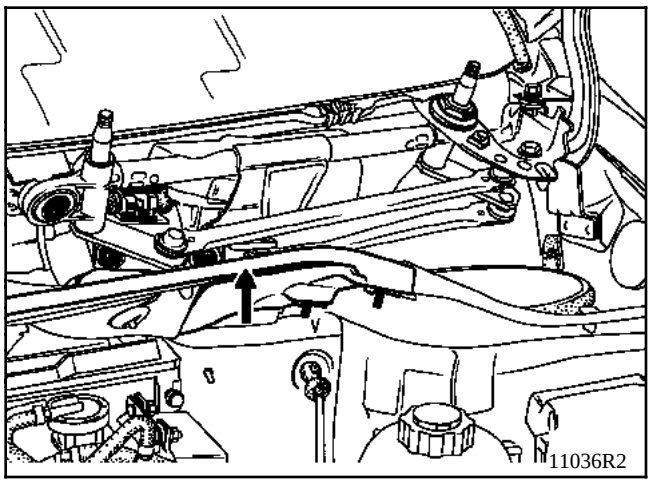
Disconnect the battery (under the passenger seat for Scenic).

Special notes for Scenic

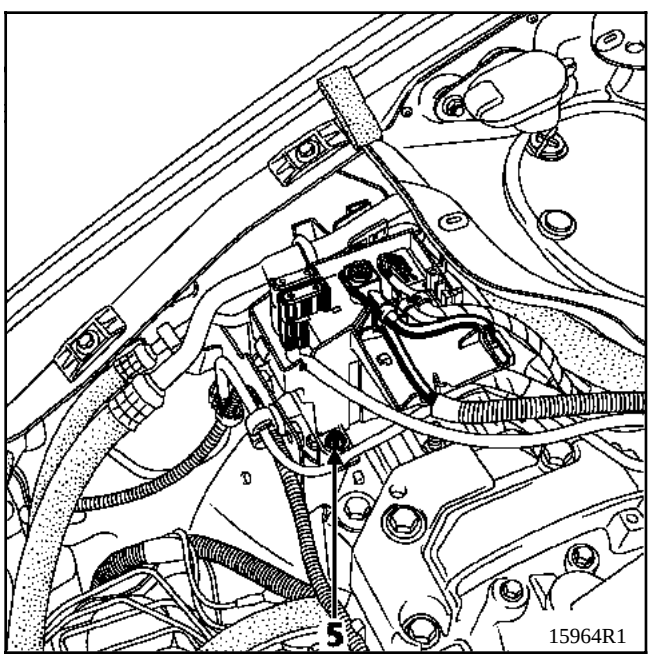
Remove:
- the front right hand wheel and the mud guard,
- the windscreen wiper arms - tool **Elé. 1294-01**,
- the scuttle panel grilles ,



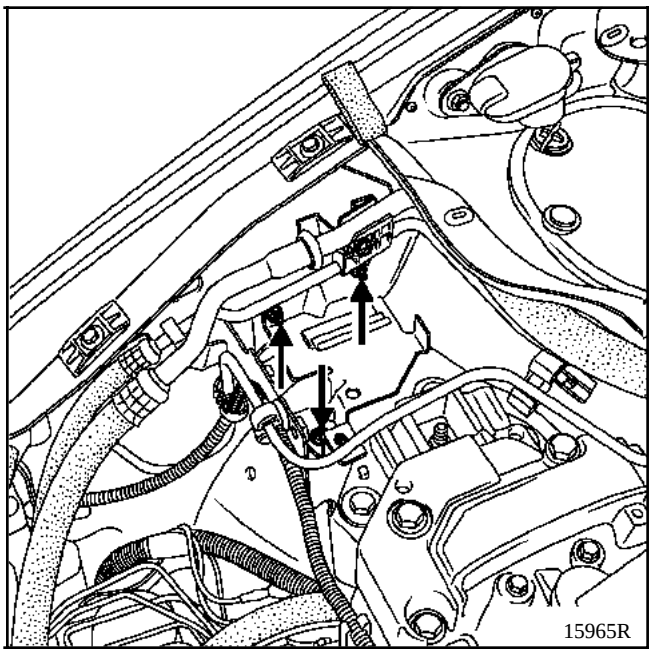
- the plenum chamber closure panel,



- the shock absorber turret protectors,
- the mounting bolt (5) for the terminal unit and move the terminal unit assembly to one side,

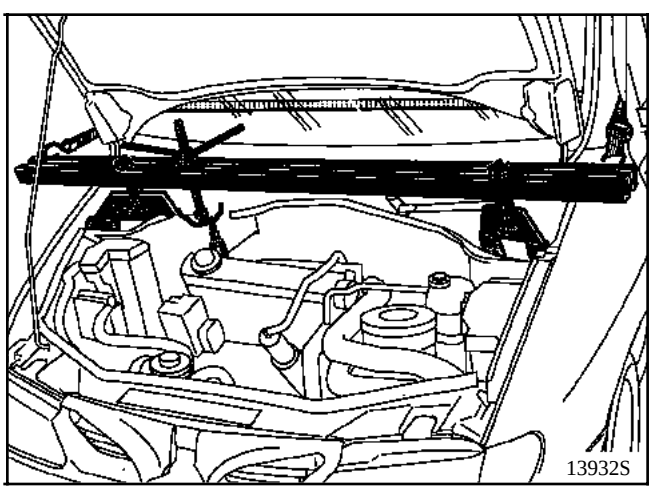


- the terminal unit mounting,

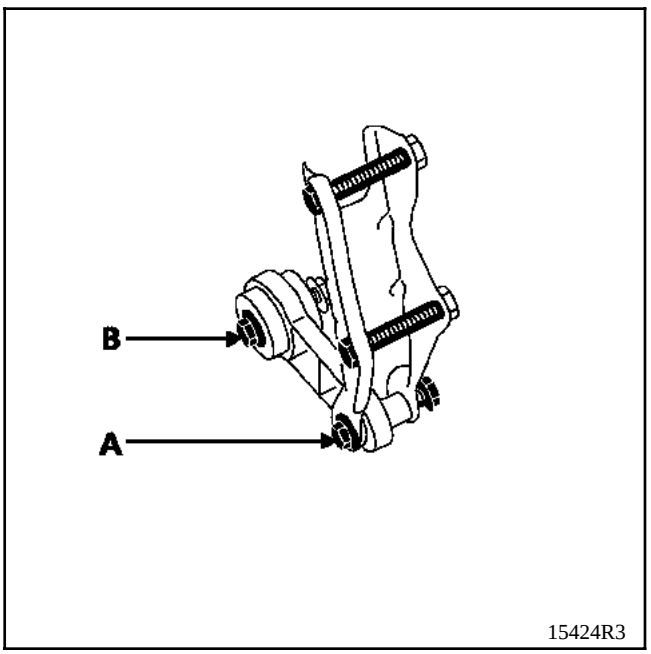


All types
Fit the engine support tool, checking that the strap is correctly located.

(Special note for positioning the tool for Scenic)



Remove:
- the suspended engine mounting cover and the movement limiter,
- bolt (A) and slacken bolt (B) for the engine tie bar,

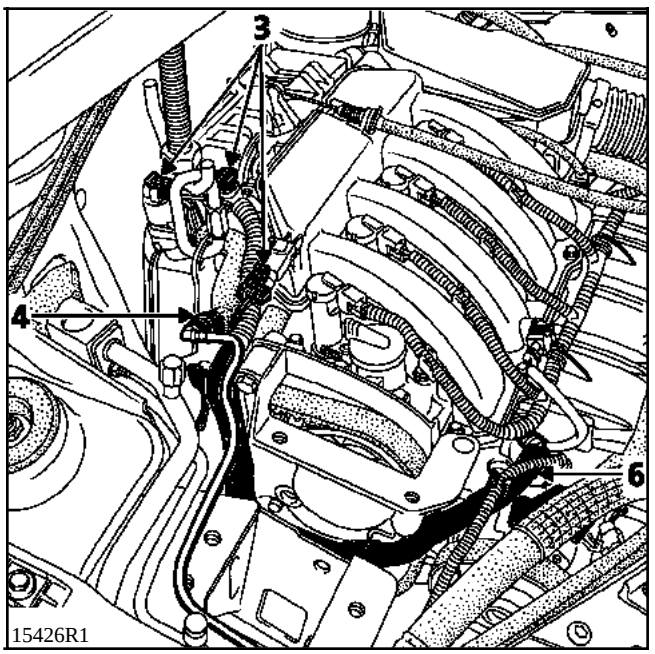


- the accessories belt (see section **07** "**Accessories belt tension**").

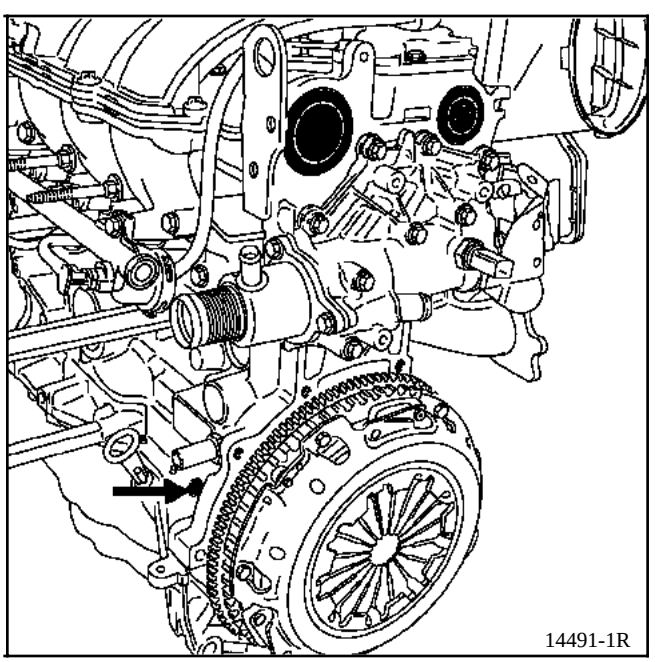
Disconnect the connectors (3) and the pipe (4).

Remove the wiring loom mounting bolt at (6).

Unclip:
- the wiring loom on the upper timing cover and move the assembly to one side,
- the fuel pipes on the lower timing cover.

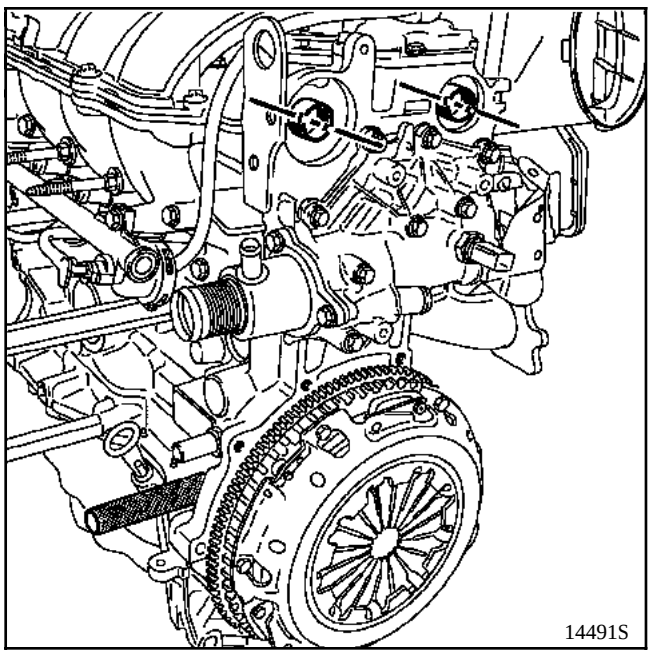


Remove:
- the air resonator,
- the camshaft sealing plugs by piercing the centre of the plug with a screwdriver,
- the **TDC** pin plug.

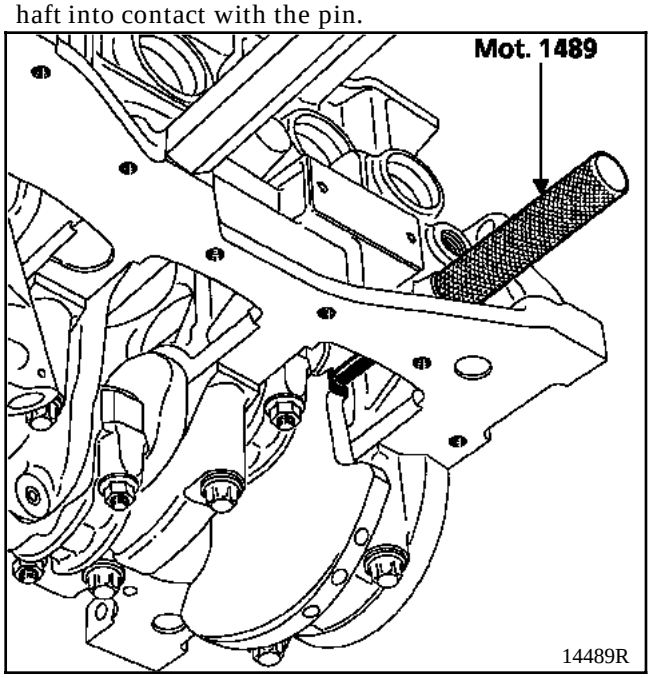


Setting the timing

Position the camshaft grooves towards the bottom as indicated in the diagram below.

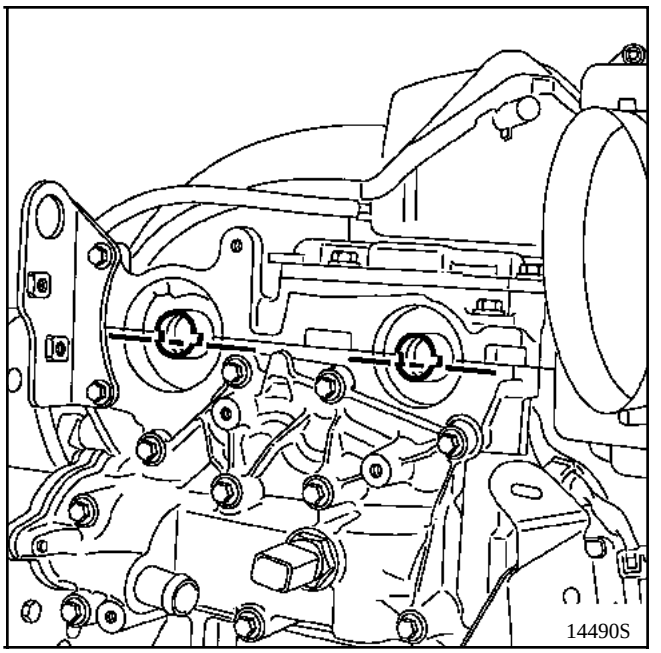

14491S

Insert the Top Dead Centre pin **Mot. 1489** then rotate the engine clockwise (timing side) to slowly and without jerky movements, bring the crankshaft into contact with the pin.

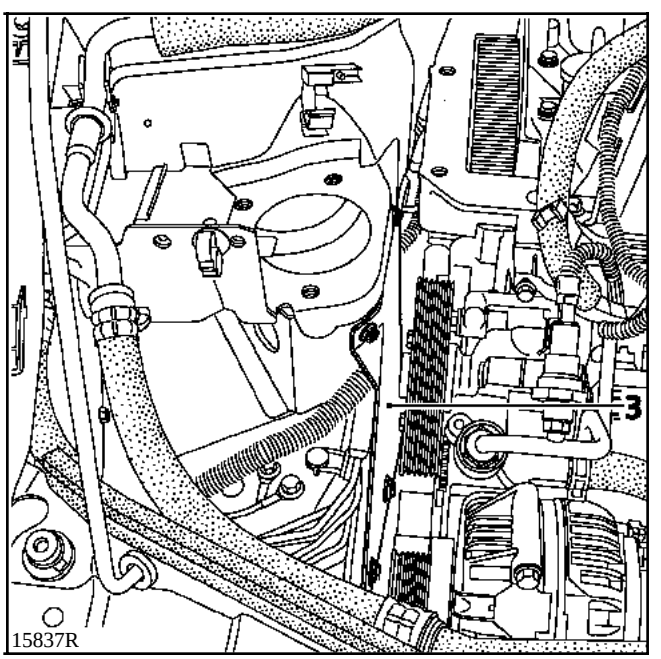


14489R

Check that the position of the camshaft grooves is identical to that in the diagram below.

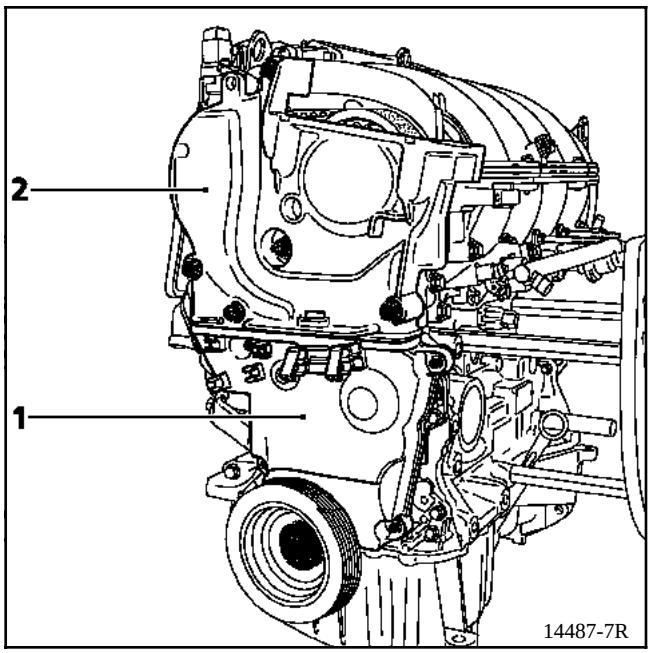

14490S

Remove:
- the crankshaft pulley by immobilising the flywheel using a screwdriver,
- plate (3) on the side member,



15837R

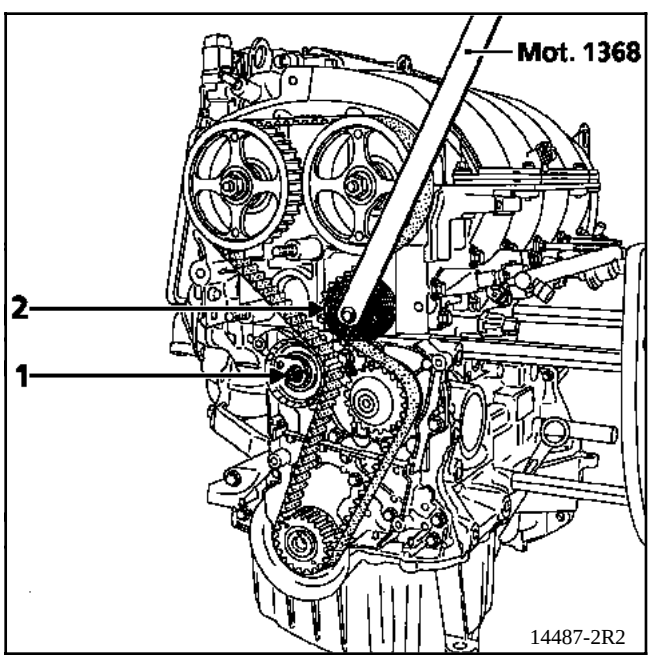
- the lower timing cover (1),
- the upper cover (2).



Slacken the timing belt by slackening the tension wheel nut (1).

NOTE: as the crankshaft sprocket is not keyed in place, ensure that it does not fall when the timing belt is being removed.

To remove the timing belt, remove the pulley (2) using **Mot. 1368** or a 50 torx elbow wrench.

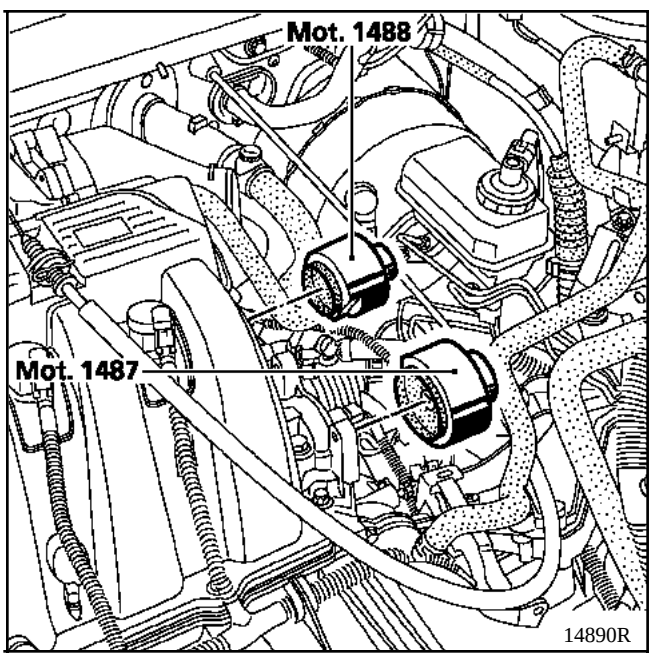


IMPORTANT: all oil must be removed from the head of the crankshaft and the timing sprocket bore and the pressure surfaces of the crankshaft pulley to prevent slip between the timing and the crankshaft which could cause damage to the engine.

REFITTING

When changing the timing belt, the tension wheel and the timing pulley must be changed.

Refit:
- the timing belt (the method described in section **07** "**Procedure for tensioning the timing belt**" MUST be observed),
- the accessories belt (see section **07** "**Procedure for tensioning the accessories belt**),
- the new sealing plugs :
  - for the inlet camshaft **(Mot. 1487)**,
  - for the exhaust camshaft **(Mot. 1488)**,



- the right hand suspended engine mounting and the engine tie bar, tightening them to the recommended torque of **6.2 daN.m.**

SPECIAL TOOLING REQUIRED		
Elé.	1294 -01	Tool for removing windscreen wiper arm
Mot.	799 -01	Tool for immobilising sprockets for toothed timing belt
Mot.	1273	Tool for checking belt tension
Mot.	1311 -06	Tool for removing the fuel pipe
Mot.	1368	Tool for tightening timing pulley
Mot.	1448	Hose clip pliers with extension
Mot.	1487	Tool for fitting inlet camshaft sealing plug
Mot.	1488	Tool for fitting exhaust camshaft sealing plug
Mot.	1489	Top Dead Centre pin
Mot.	1490	Tool for immobilising camshaft pulleys
Mot.	1491	Tool for fitting camshaft seals
Mot.	1496	Tool for setting camshafts

EQUIPMENT REQUIRED
Engine support tool
Angular tightening wrench

TIGHTENING TORQUES (in daN.m and/or °)	
Wheel bolts	9
Pulley bolt	4.5
Accessories pulley bolt	2 + 135° ± 15°
Tension wheel nut	2.7
Camshaft pulley nuts	3 + 84°
Cylinder head cover bolts	1.2
Oil decanter bolt	1.3

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

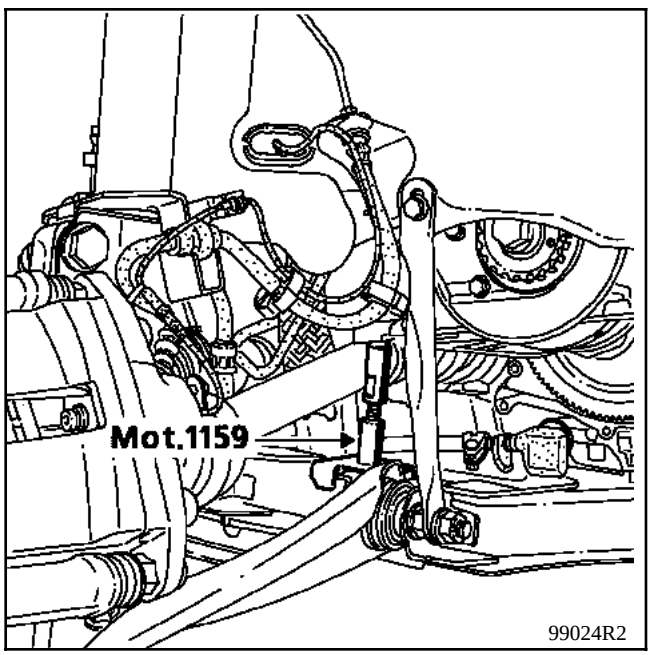
Remove the undertray below the left hand side of the engine.

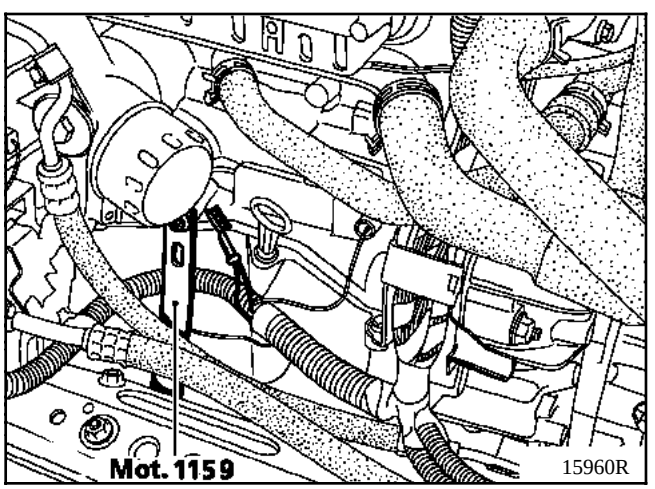
Drain the cooling circuit (via the lower radiator hose).

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

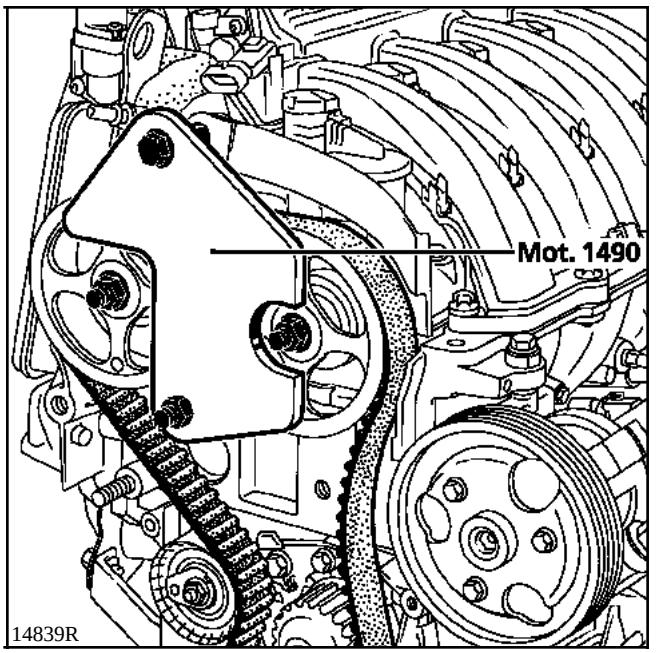
Unclip the PAS reservoir from its mounting and move it to one side.

Fit the two tools **Mot. 1159** as shown below then remove the engine support tool.

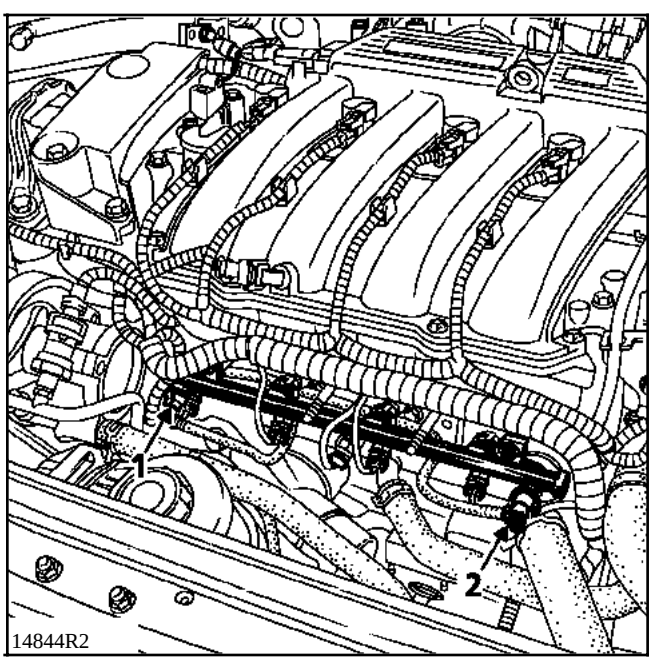




Remove:
- the accelerator cable,
- the injector gallery protector,
- the camshaft pulleys using **Mot. 1490** (use the timing cover mountings to secure **Mot. 1490**).

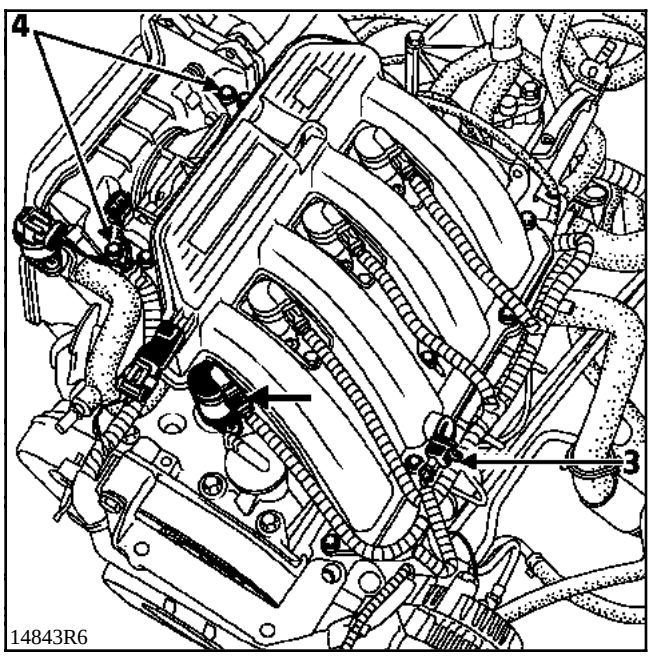


- the fuel supply and return pipes (1) and (2) (if fitted) using **Mot. 1311-06 and** move them to one side **(take care to protect the alternator)**.



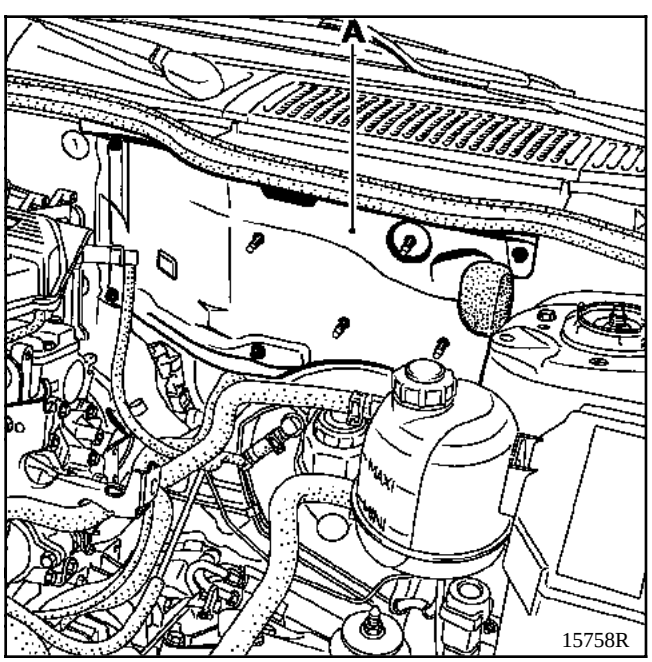
Disconnect:
- connector (3) and the coil and injector connectors,
- the brake servo vacuum pipe (manifold end),
- the pressostat connector on the PAS pipe.

Remove the air filter unit mounting bolts (4).



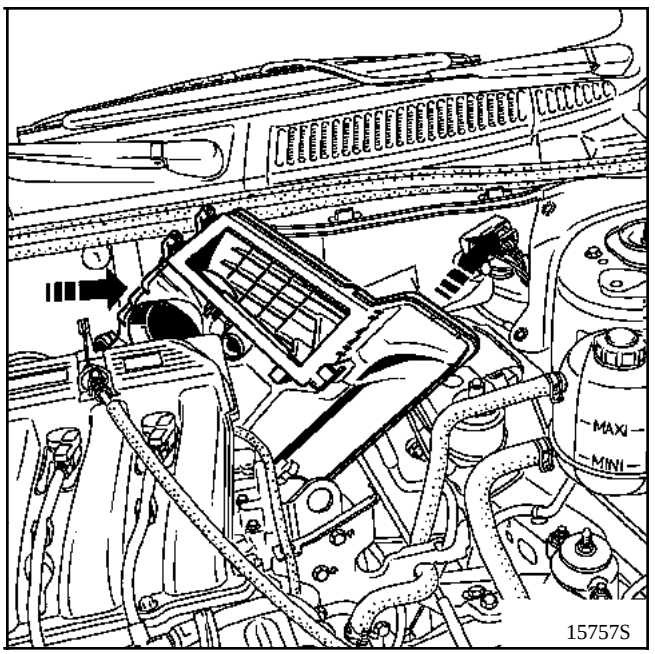
Special notes for Scenic

Remove:
- the air filter,
- the soundproofing, then panel (A).

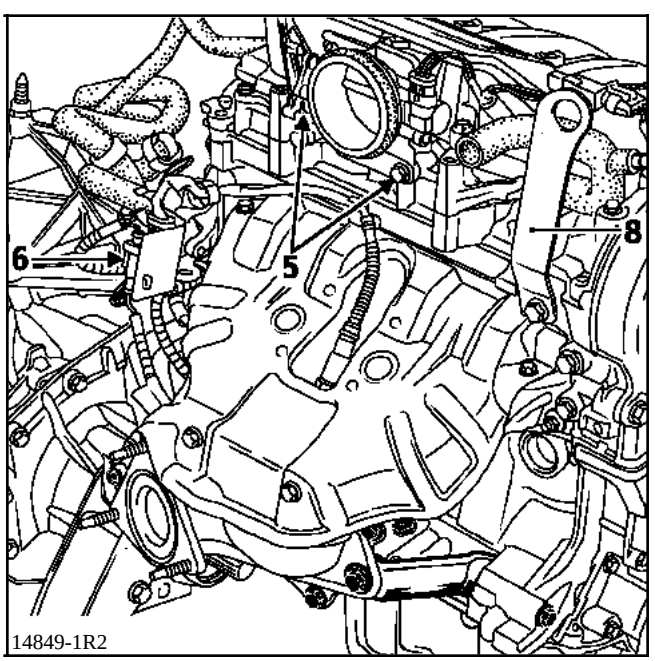


All Types

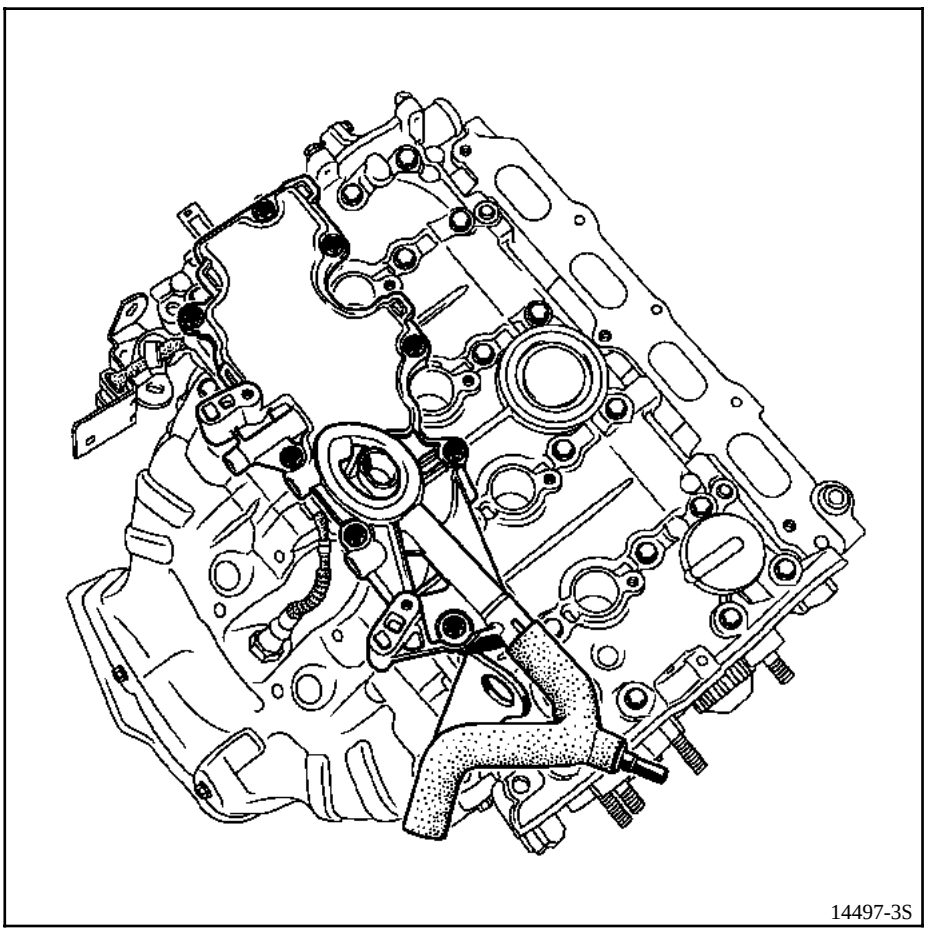
Remove the air filter unit as shown below.



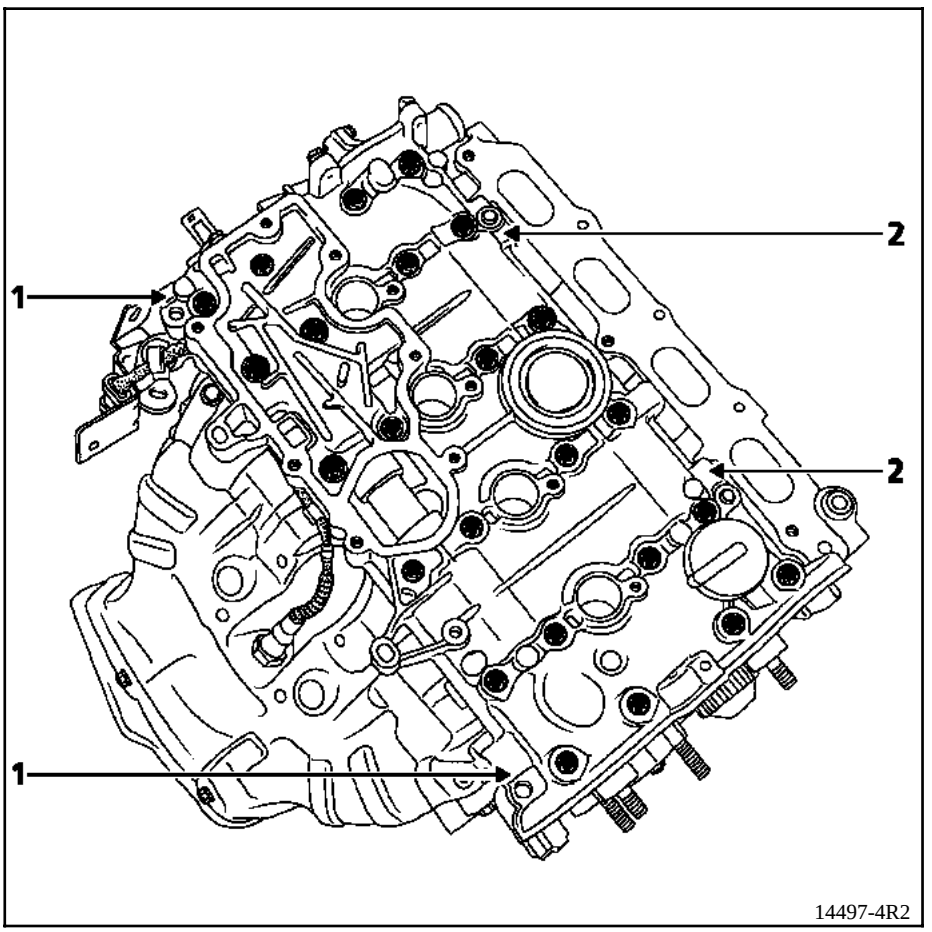
Remove:
- the catalytic converter mountings, release it from the exhaust manifold and attach it to the exhaust pipe,
- the strut on the exhaust manifold,
- the throttle body(5),
- the connector (6) for the oxygen sensor,
- the lifting bracket (8),



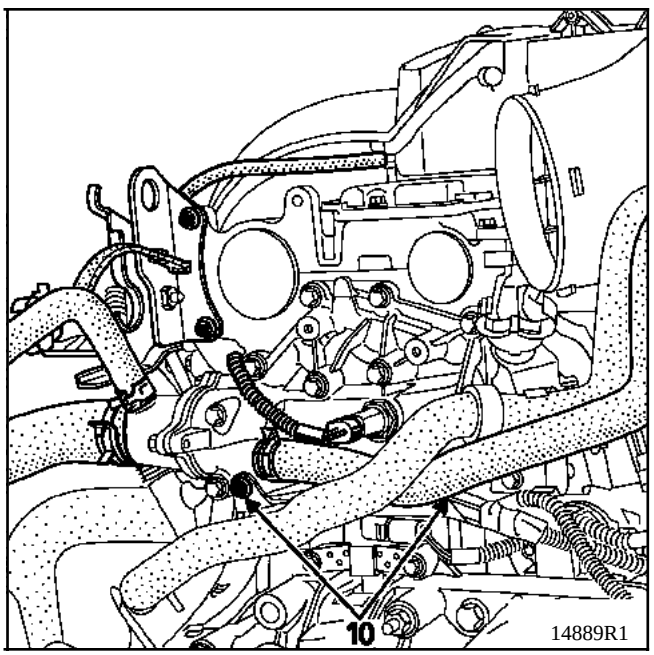
- the air distributor,
- the coils,
- the oil decanter,



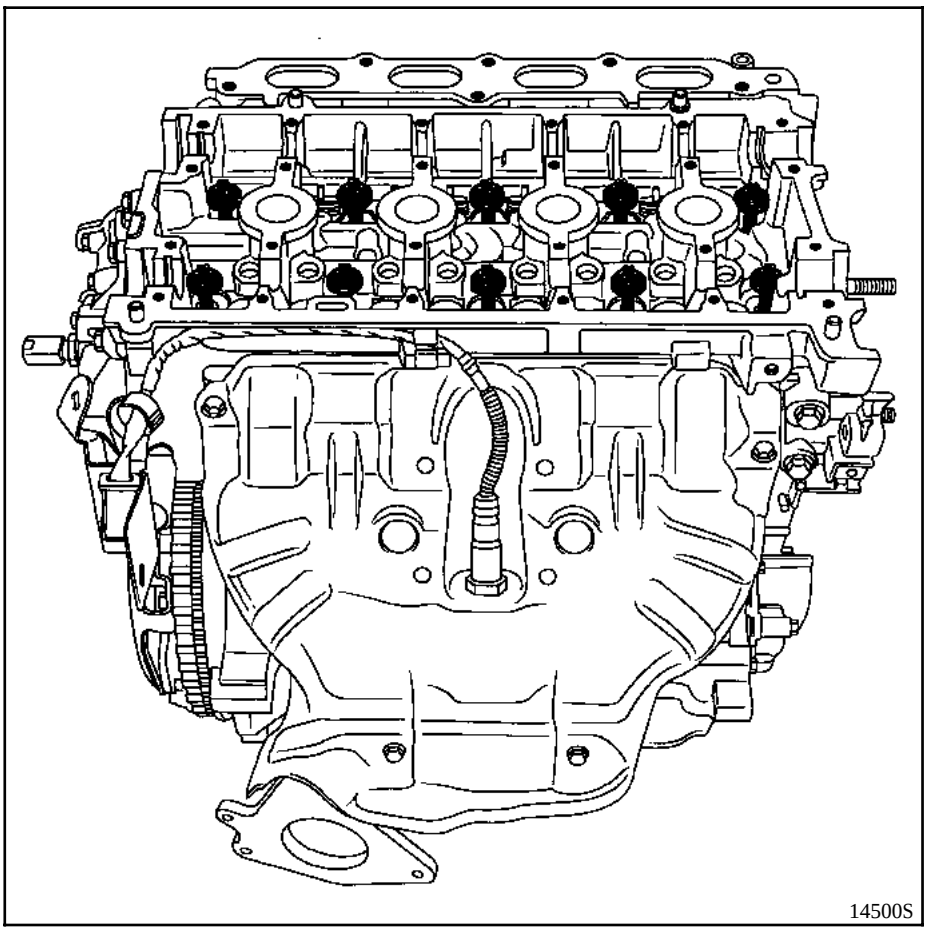
- the lifting bracket at the flywheel end,
- the cylinder head cover bolts then loosen it vertically by tapping on the "**lugs**" at (1) using a copper hammer and lever it using a screwdriver at (2) (cover the screwdriver to prevent damage to the aluminium surfaces),



- the camshafts and the valve rockers,
- the hoses on the cylinder head coolant outlet and the coolant temperature sensor connector,
- the wiring loom mountings at (10),



- the cylinder head.



CLEANING

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

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

Apply the product to the area to be cleaned; wait for approximately 10 minutes, then remove it with a wooden spatula.

Gloves should be worn during this operation.

Remember that this operation should be carried out with extreme care to avoid the risk of foreign bodies being introduced into the oilways bringing oil under pressure to the rocker shaft (oilways are located in both the cylinder head and the cylinder block).

CHECKING THE GASKET FACE

Use a straight edge and a set of shims to check for gasket face deformation.

Maximum bow **0.05 mm.**

The cylinder head may not be re-ground.

Check the cylinder head to see if there are any cracks.

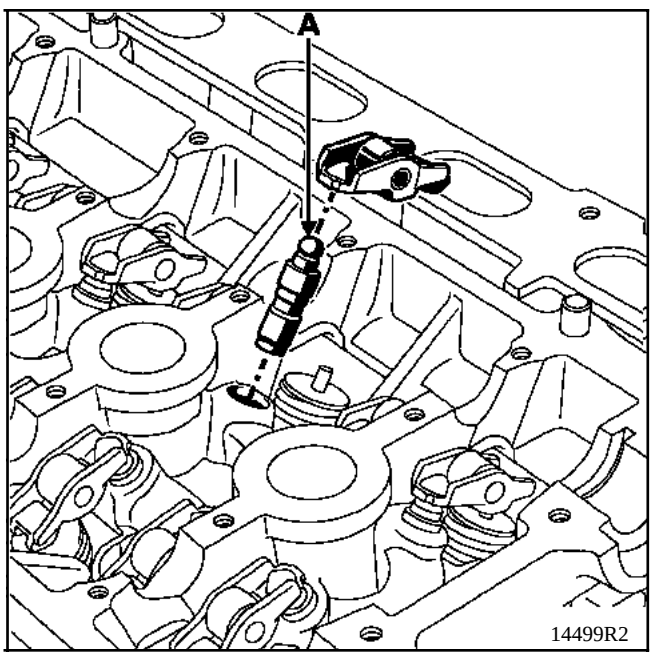
REFITTING

Set the pistons at half height to prevent contact with the valves when refitting the camshafts.

Fit the cylinder head gasket then the cylinder head.

Check the bolts then tighten the cylinder head (see section 07 "Tightening the cylinder head").

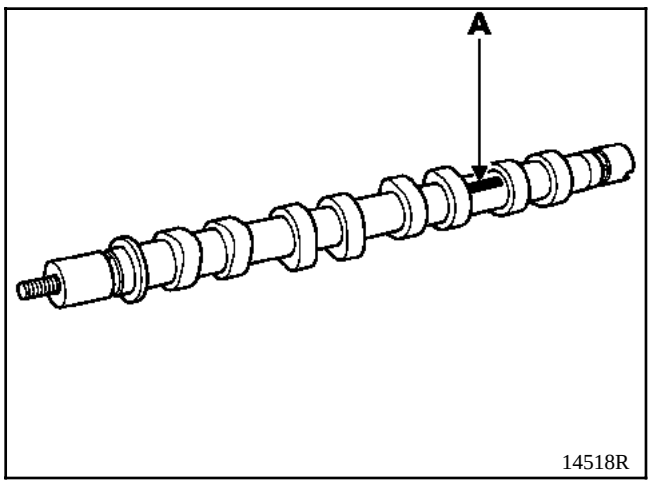
When removing - refitting the cylinder head, the hydraulic tappets must be reprimed as they may have drained if they have been left for too long a time.
To check whether they need to be reprimed, press on the top of the stop at (A) with a thumb. If the stop piston goes down, immerse it in a container of diesel, then refit them.



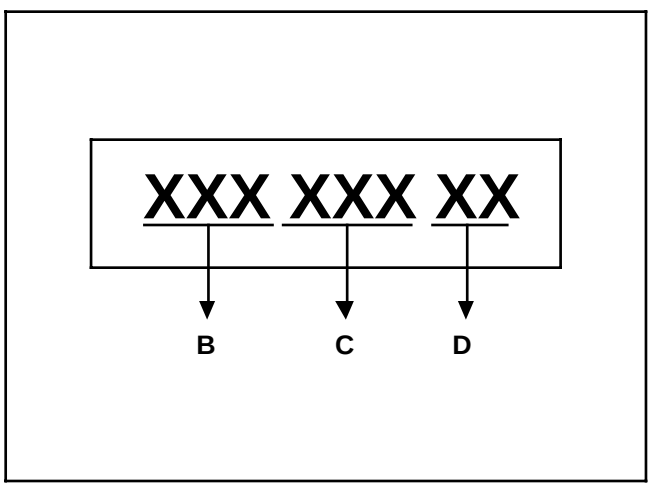
Refit:
- the valve rockers,
- the camshafts after oiling the bearings.

IMPORTANT: do not put oil on the cylinder head cover gasket face.

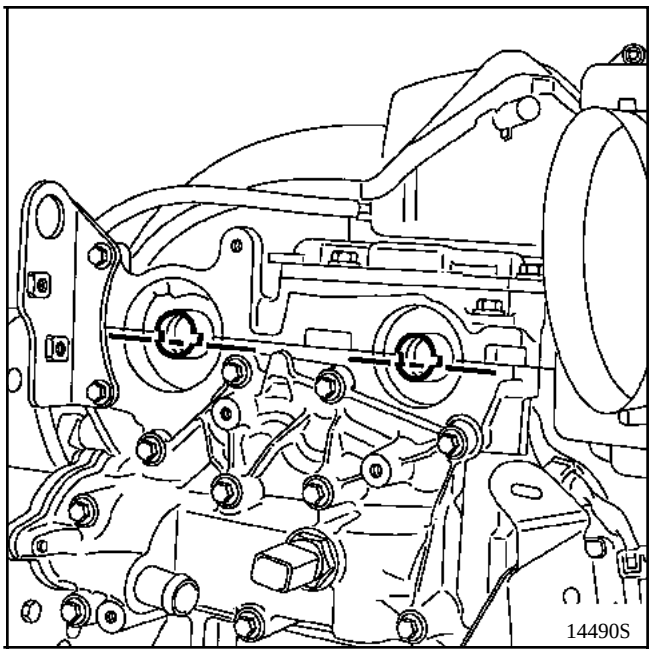
NOTE: the camshafts can be identified by mark (A).



Details of marking:
- marks (B) and (C) are for the supplier only,
- mark (D) is for identifying the camshafts:
  AM = Inlet
  EM = Exhaust

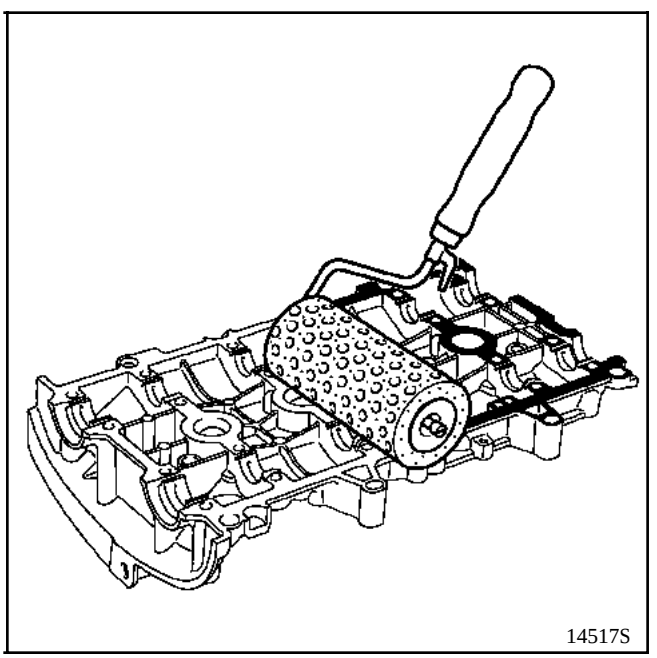


Position the camshaft grooves as indicated in the diagram below.



NOTE : the gasket faces must be clean, dry and free of grease (avoid finger marks).

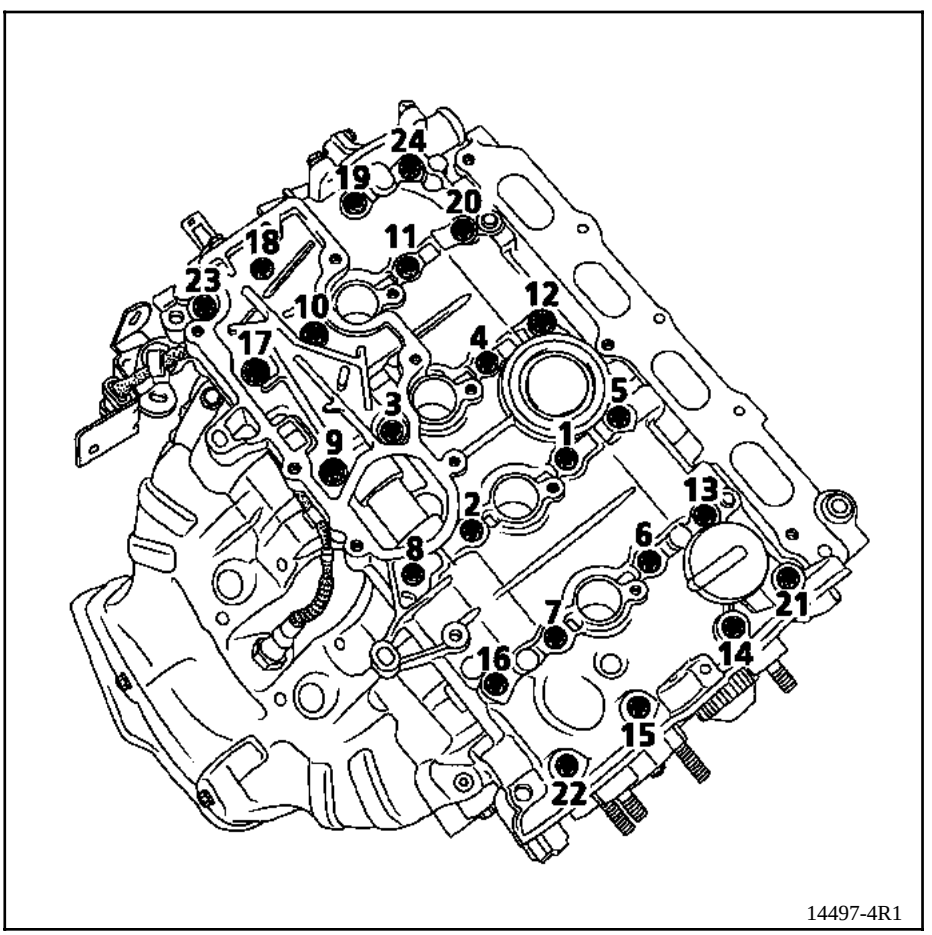
Use a roller to apply **Loctite 518** to the gasket face of the cylinder head cover until it is **reddish** in colour.



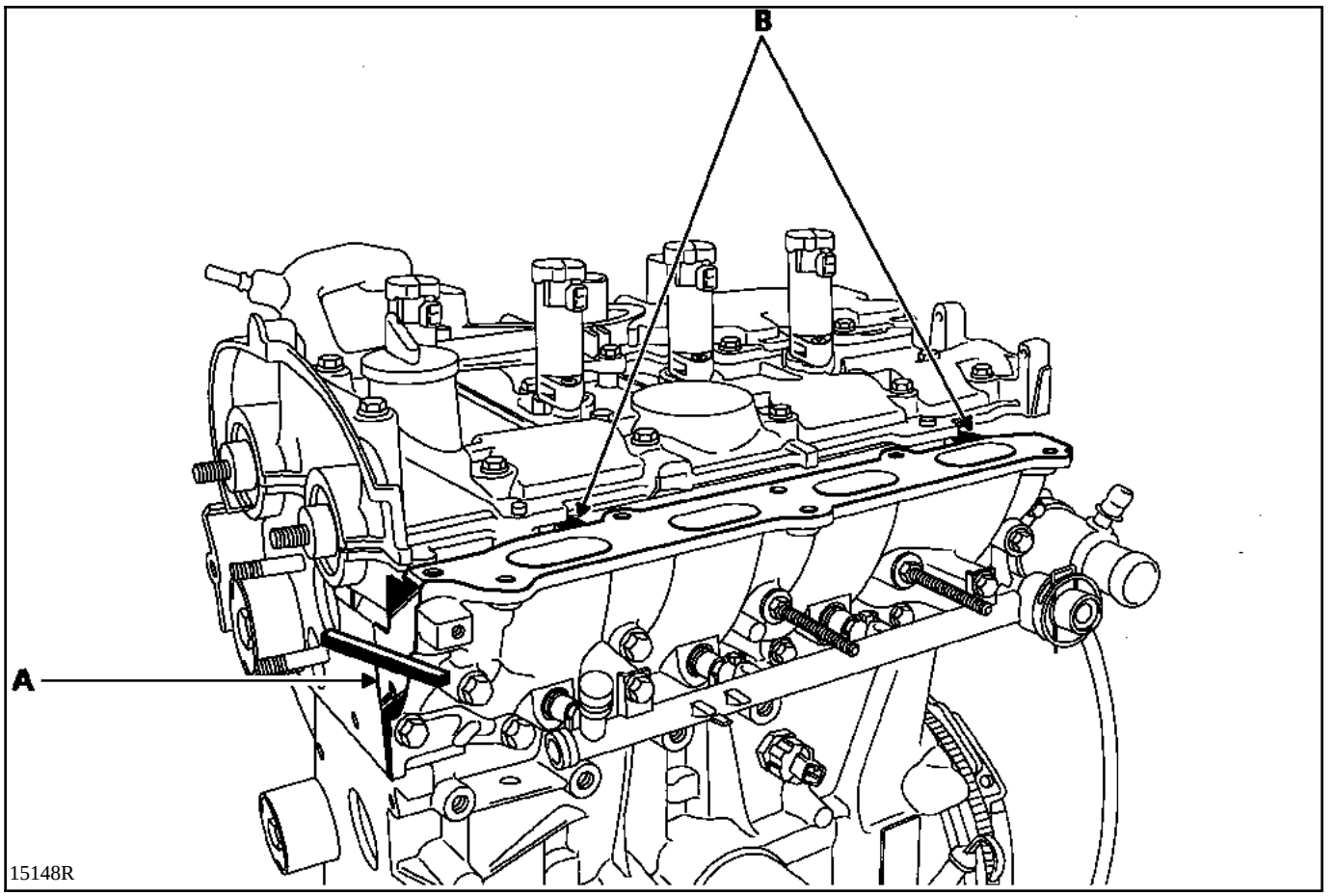
Refit the cylinder head cover and torque tighten it.

Tightening method

Fitting	Bolt tightening order	Bolt slackening order	Tightening torque (in daN.m)
Operation n° 1	22-23-20-13	-	0.8
Operation n° 2	1 to 12 14 to 19 21 and 24	-	1.2
Operation n° 3	-	22-23-20-13	-
Operation n° 4	22-23-20-13	-	1.2



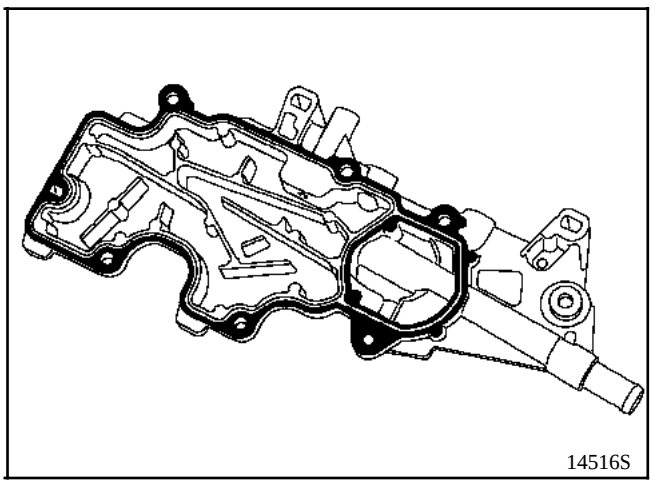
- **Check :**
  - **that the exhaust heat shield is correctly positioned between the oxygen sensor and the manifold (to prevent a chimney effect which could destroy the upstream sensor connections),**
  - **the alignment (A) between the lower inlet distributor unit and the cylinder head (timing side), ensuring that the tabs (B) are in contact with those on the cylinder head cover**



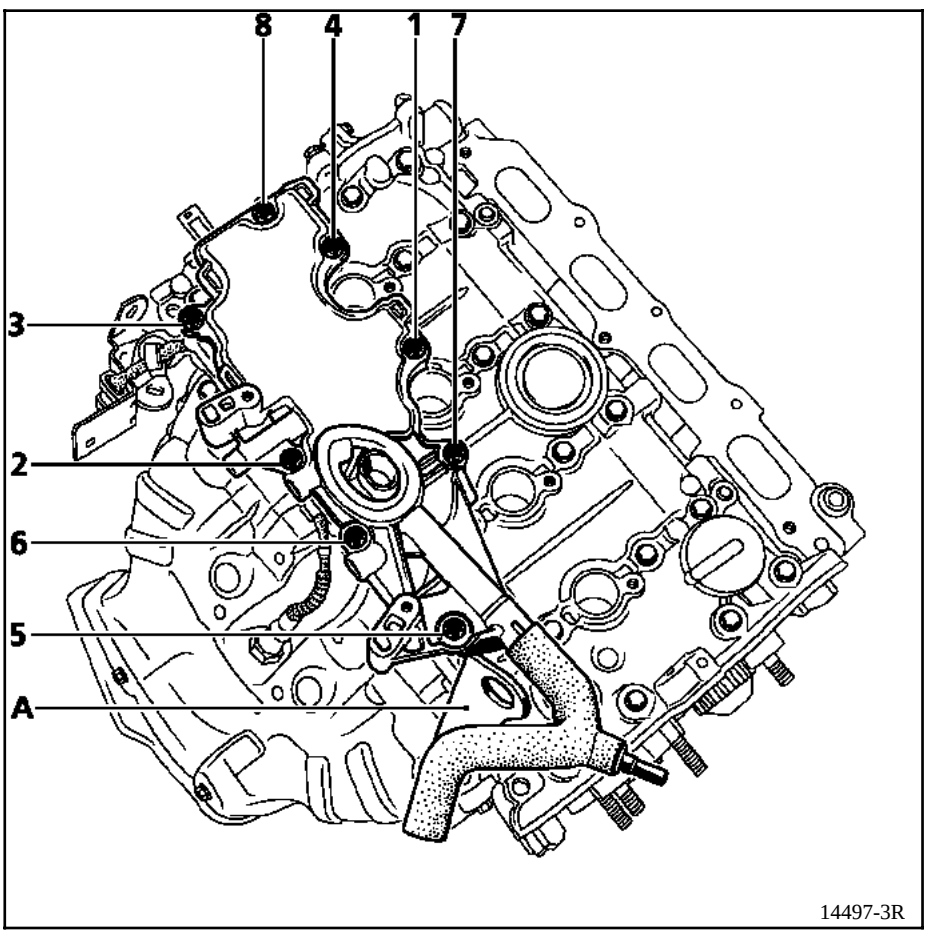
The lower inlet distributor is tightened to a torque of **2.1 daN.m**.

NOTE : the gasket faces must be clean, dry and free of grease (avoid finger marks).

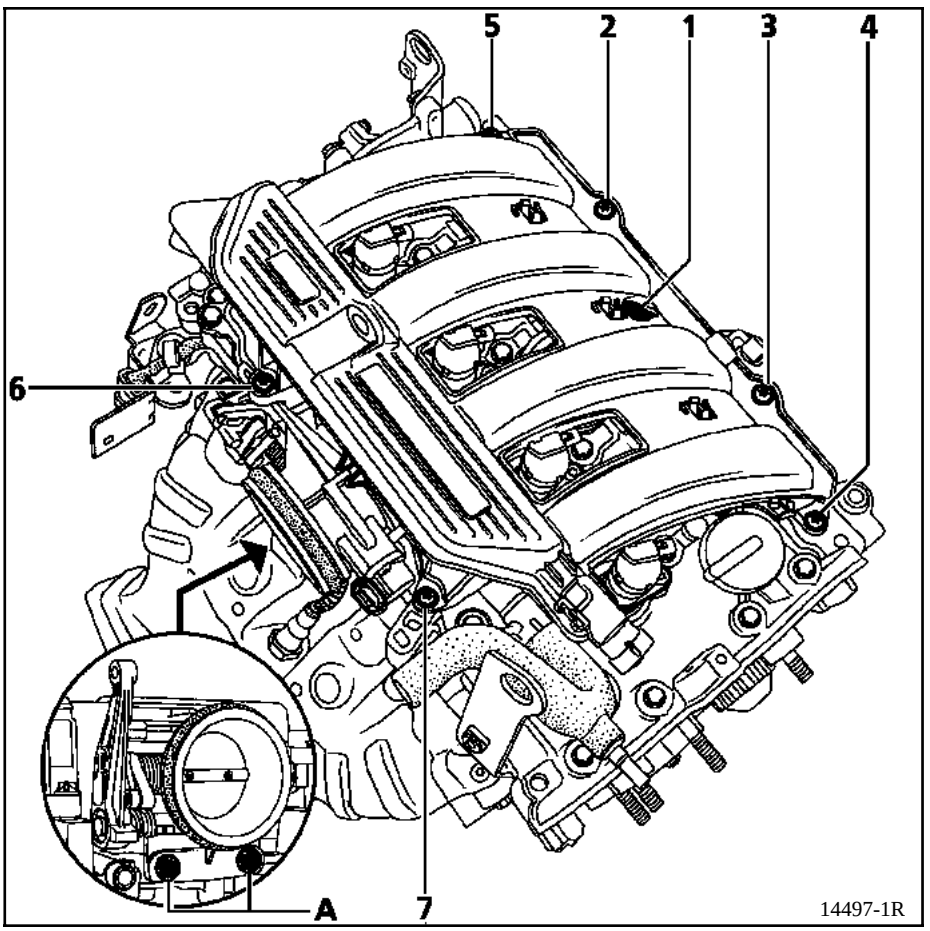
Use a roller to apply **Loctite 518** to the gasket face of the oil decanter until it is **reddish** in colour.



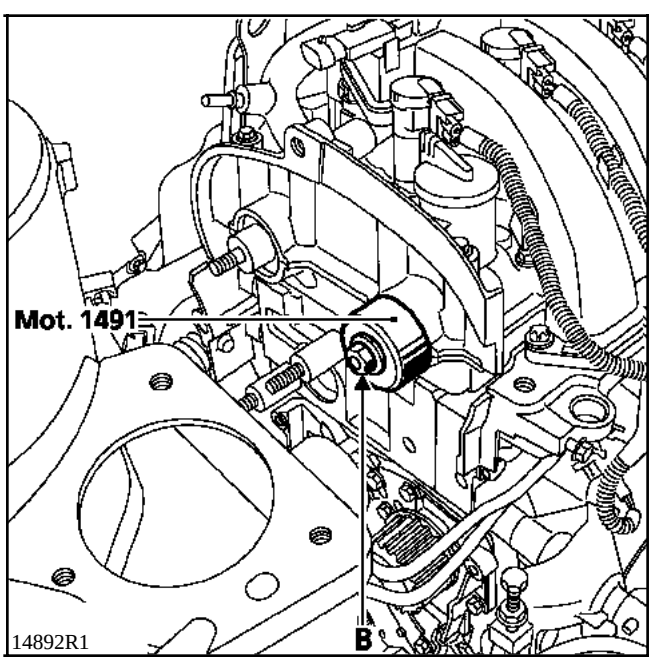
Refit the oil decanter and tighten it to a torque of **1.3 daN.m** in the recommended order.



Refit:
- the coils, tightening them to a torque of **1.3 daN.m,**
- the inlet distributor (fitted with new seals), tightening it to a torque of **0.9 daN.m** and in the recommended order,



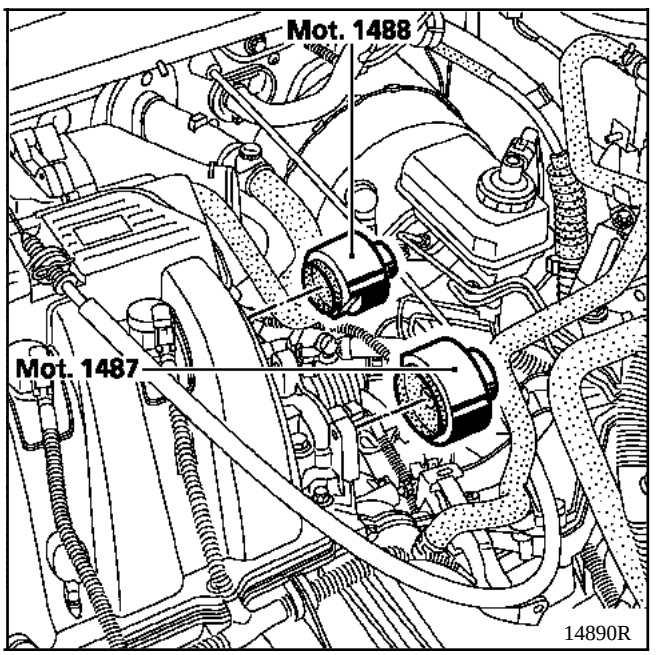
- the throttle body, tightening the bolts (A) to a torque of **1.3 daN.m**,
- the air filter unit, tightening the bolts to a torque of **0.9 daN.m**,
- the camshaft seals using **Mot. 1491** (use the old nuts (B)).



Setting the timing

IMPORTANT:all oil must be removed from the head of the crankshaft, the timing sprocket bore, the pressure faces of the crankshaft pulley, the ends of the camshafts (timing end) and the camshaft sprocket bores to prevent slip between the timing, the crankshaft and the camshaft pulleys which could cause damage to the engine.

Refit:
- the timing belt (the method described in section **07** "**Procedure for tensioning the timing belt**" MUST be observed),
- the accessories belt (see section **07** "**Accessories belt tension**"),
- the new sealing plugs :
  - for the inlet camshaft **(Mot. 1487)**,
  - for the exhaust camshaft **(Mot. 1488)**,



- the right hand suspended engine mounting and the engine tie bar, tightening them to the recommended torque (see section **19** "**Suspended engine mountings**").

Refitting is the reverse of removal.

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

Vehicle	Gear box	Engine								Type of injection
		Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Ratio	Catalytic converter	Depollution standard	
XA0B XA04	JB	K4M	700	79.5	80.5	1598	10 / 1	◊ C75 ◊ C79	EU 96	Multipoint sequential Static ignition
XA0W	JB	K4J	750	79.5	70	1390	10 / 1	◊ C109 ◊ C79	EU 96	Multipoint sequential Static ignition

Temperature in °C	0	20	40	80	90
CTN type air sensor Type CTN resistance in Ohms	5290 to 6490	2400 to 2600	1070 to 1270	-	-
CTN type coolant sensor Type CTN resistance in Ohms	-	3060 to 4045	1315 to 1600	300 to 370	210 to 270

Checks made at idle speed*					Fuel*** (Minimum octane rating)
Speed (rpm)	Emission of pollutants**				
	CO (%) (1)	C02 (%)	HC (ppm)	Lambda (λ)	
750 ± 50	0.5 maximum	14.5 minimum	100 maximum	0.97 < λ < 1.03	Super unleaded (OR 95)

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

* For a coolant temperature greater than **80 °C** and after the engine has been stabilised at **2 500 rpm** for approximately **30 seconds**.

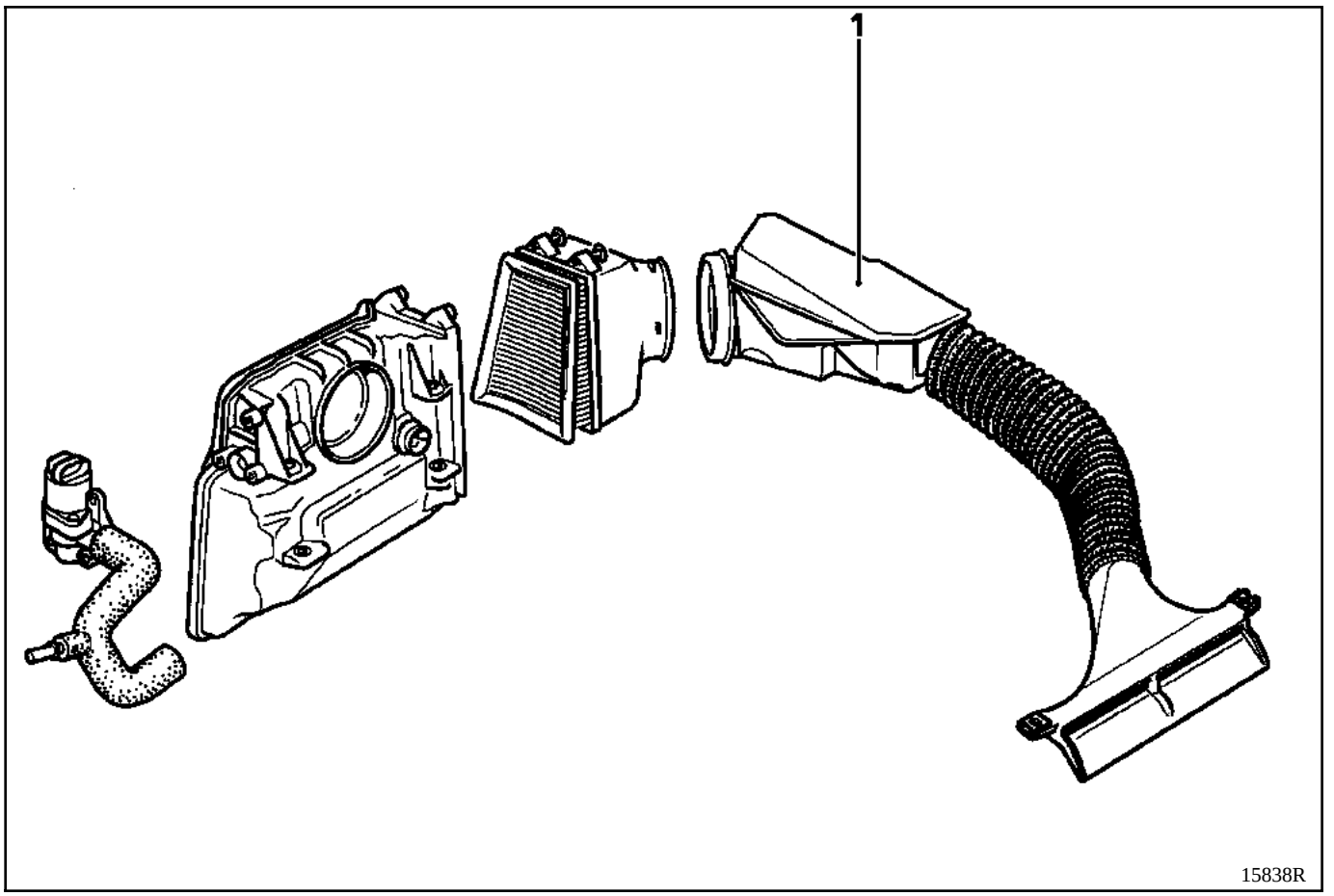
** For the legislative values, refer to the specifications for individual countries.

*** Compatible with **OR 91** unleaded fuel.

<table>
<tr><th>DESCRIPTION</th><th>MAKE/TYPE</th><th>SPECIAL NOTES</th></tr>
<tr><td>Computer</td><td>SIEMENS "SIRIUS"</td><td>90 tracks</td></tr>
<tr><td>Injection</td><td>-</td><td>Sequential multipoint</td></tr>
<tr><td>Ignition</td><td>-</td><td>Static with four coils</td></tr>
<tr><td>Stepping motor + support</td><td>MAGNETI MARELLI</td><td>Resistance : 53 ± 5 Ω at ambient temperature</td></tr>
<tr><td>Throttle potentiometer</td><td>CTS</td><td>Integrated in the throttle body
Track resistance: 1 200 ± 240 Ω
Slide contact resistance < 1 050 Ω
<table>
<tr><th>Track</th><th>No load</th><th>Full load</th></tr>
<tr><td>A - B
A - C
B - C</td><td>1 250 Ω
1 245 Ω
2 230 Ω</td><td>1 250 Ω
2 230 Ω
1 245 Ω</td></tr>
</table></td></tr>
<tr><td>Magnetic sensor
(TDC and engine speed)</td><td>ELECTRIFIL
or
SIEMENS</td><td>Integrated connector
Resistance = 200 to 270 Ω</td></tr>
<tr><td>Canister solenoid valve</td><td>SAGEM</td><td>Integrated in the canister
Resistance : 26 ± 4 Ω at 23 °C</td></tr>
<tr><td>Injector</td><td>WEBER</td><td>Resistance : 14.5 Ω
Rate of flow: 0.7 cm³ / min maximum</td></tr>
<tr><td>Air sensor</td><td>JAEGER</td><td>CTN (see table on previous page)
Resistance : 2 500 Ω at 20 °C</td></tr>
<tr><td>Coolant sensor</td><td>JAEGER</td><td>CTN (see table on previous page)
Resistance : 3 500 Ω at 20 °C</td></tr>
<tr><td>Pressure sensor</td><td>DELCO ELECTRONICS</td><td>Piezo electric type
Change the seal whenever this is removed</td></tr>
<tr><td>Pinking sensor</td><td>SAGEM</td><td>Piezo electric type
Tightening torque: 2 daN.m</td></tr>
<tr><td>Upstream oxygen sensor</td><td>BOSCH</td><td>Tracks 80 (earth) and 45 (computer signal)
Heating resistance
R = 9 Ω at ambient temperature
Rich mixture = 840 mV ± 70
Lean mixture = 20 mV ± 50</td></tr>
</table>

DESCRIPTION	MAKE/TYPE	SPECIAL NOTES
Ignition coils	NIPPONDENSO	Pencil-type coil. One per cylinder. Primary resistance: **0.5 Ω ± 0.02** Secondary resistance: **7 500 Ω ± 1 100**
Plugs	BOSCH RFC 50LZ2E	**6 ± 1.5 kΩ** Tightening : **2.5 to 3 daN.m**
Inlet manifold pressure **K4M 700**	-	At idle speed: **320 ± 40 mb**
Inlet manifold pressure **K4J 750**	-	At idle speed: **360 ± 40 mb**
Exhaust counter pressure **K4M 700**	-	1 500 rpm: before pre-catalytic converter 30, after pre-cat. converter 23 3 000 rpm: 108, 84 4 500 rpm: 211, 153 5 500 rpm: 321, 266
Exhaust counter pressure **K4J 750**	-	1 500 rpm: before pre-catalytic converter 20, after pre-cat. converter 27 3 000 rpm: 90, 88 4 500 rpm: 230, 198 5 500 rpm: 306, 269
Submerged fuel pump	BOSCH WALBRO	Flow : **60** to **80 litres/hour**
Pressure regulator	-	Regulated pressure Circuit with return: **3 ± 0.2 bars** Circuit without return: **3.5 ± 0.2 bars**
Fuel filter	-	Fixed to the front of the fuel tank

The inlet circuit is equipped with an air resonator (1) allowing certain pressure waves to be absorbed and inlet noise to be reduced.

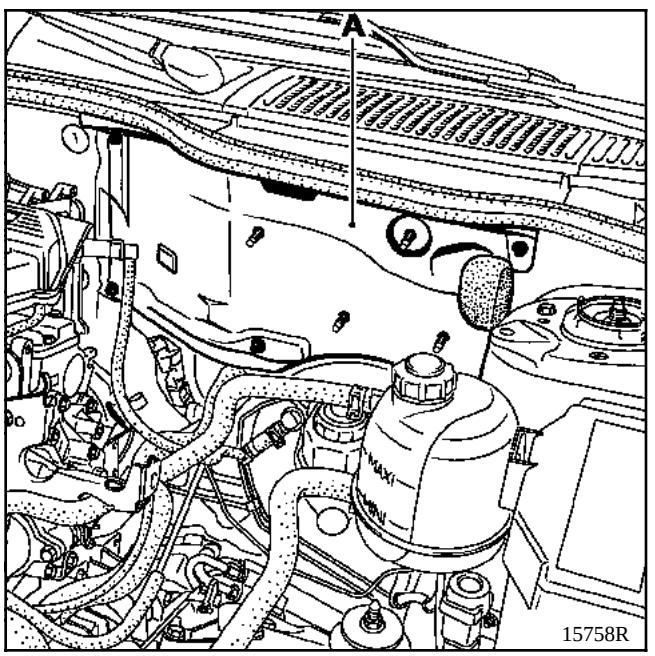


TIGHTENING TORQUE (in daN.m)	
Air filter unit bolt	**0.9**

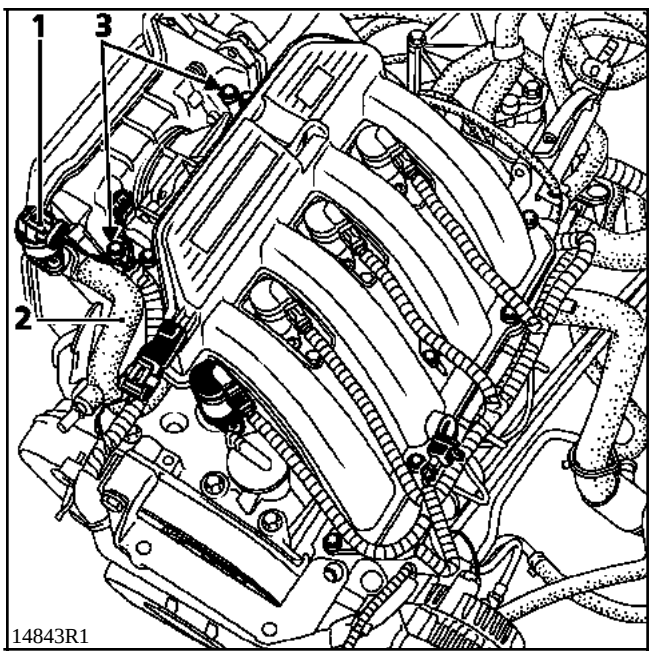
REMOVAL

Disconnect:
- the battery,
- the brake servo vacuum pipe (manifold side),
- the actuator (1),
- the fuel vapour rebreathing pipe (2).

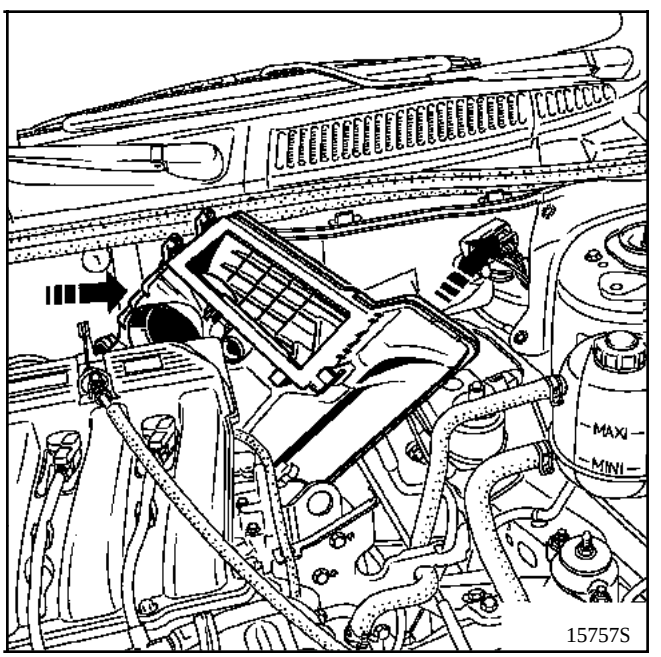
Remove:
- the scuttle panel heat shield,
- the air filter,
- the scuttle panel plate (A),



- the air resonator,
- the air filter unit mounting bolts (3).



Move the air unit to the right to remove it. The air unit may go between the windscreen aperture, the engine and the braking amplifier.



REFITTING

Refitting is the reverse of removal.

Refit the heat shield correctly.

NOTE: be careful of the vacuum outlet from the exhaust manifold to the braking amplifier. The inlet manifold will have to be changed if this outlet is broken.

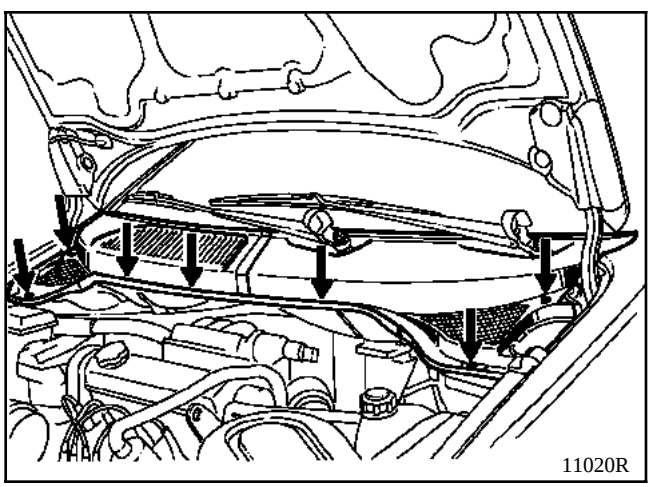
SPECIAL TOOLING REQUIRED		
Elé.	**1294 -01**	**Tool for removing windscreen wiper arm**

TIGHTENING TORQUES (in daN.m)	
Air filter unit bolt	**0.9**

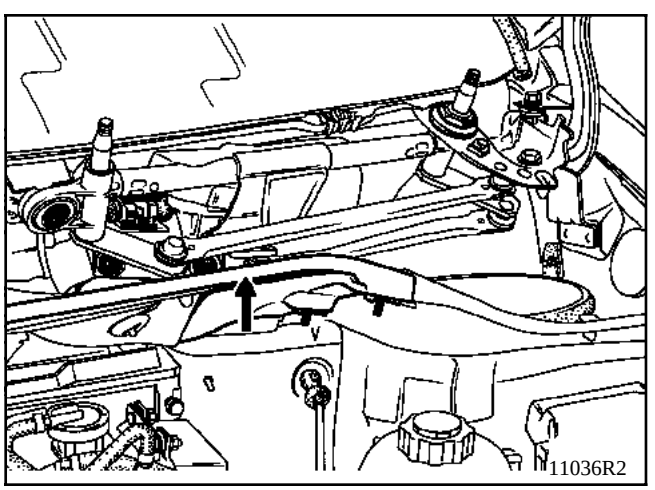
REMOVAL

Disconnect the battery under the passenger seat.

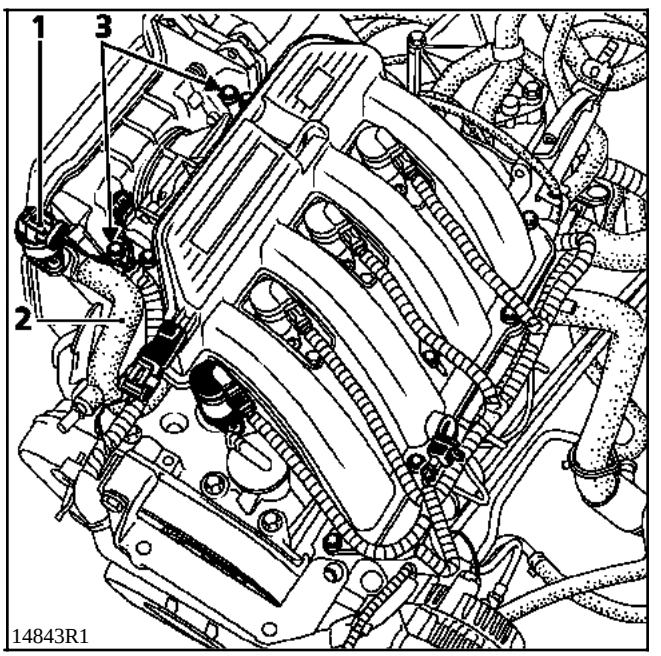
Remove:
- the windscreen wiper arms - tool **Elé. 1294-01**,
- the scuttle panel plate,



- the bulkhead plate,



- the air resonator,
- the brake servo vacuum pipe (manifold side),
- the air filter unit mounting bolts (3).



Disconnect:
- the actuator (1),
- the fuel vapour rebreathing pipe (2).

Move the air unit to the right to remove it. The air unit may go between the windscreen aperture, the engine and the braking amplifier.

REFITTING

Refitting is the reverse of removal.

NOTE: be careful of the vacuum outlet from the exhaust manifold to the braking amplifier. The inlet manifold will have to be changed if this outlet is broken.

TIGHTENING TORQUES (in daN.m)	
Throttle body	**1.3**
Air filter unit	**0.9**

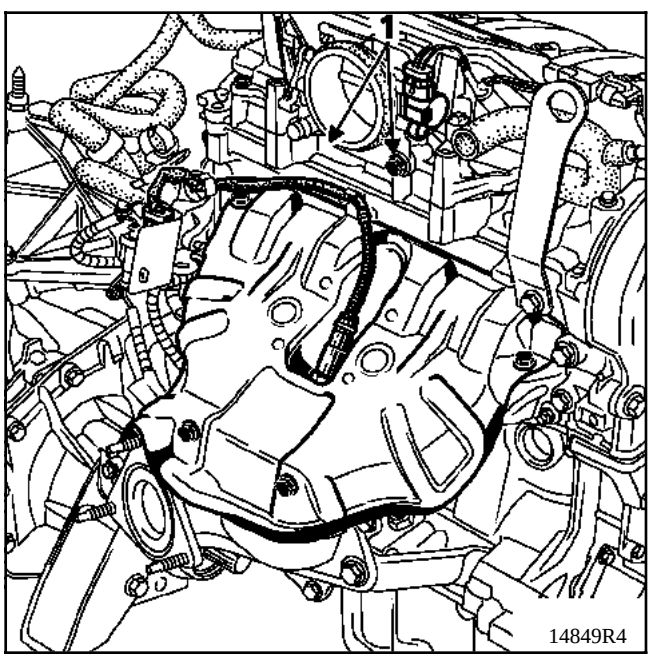
REMOVING THE THROTTLE BODY

Disconnect the battery (under the passenger seat for Scenic).

Remove the air filter unit (see section **12** Fuel mixture "**Air filter unit**").

Disconnect :
- the accelerator cable,
- the throttle potentiometer.

Remove the two throttle body mounting bolts (1).



REFITTING

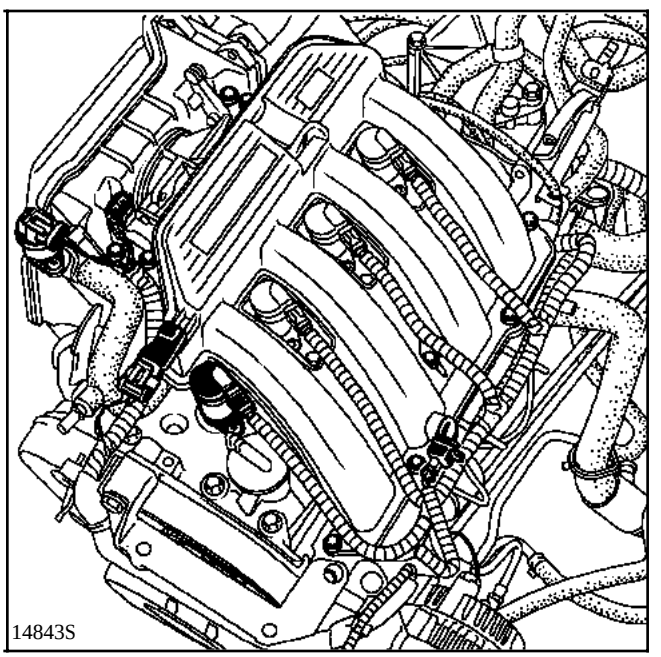
Refitting is the reverse of removal.

Change the seal each time the throttle body is removed.

Use lubricant if necessary to make it easier to fit.

REMOVING THE IDLE ACTUATOR

Remove:
- the stepping motor connector,
- the gas circulation pipe,
- the three mounting bolts.



Refitting is the reverse of removal. Observe the tightening torques for the three mounting bolts. Ensure that the O-ring seal is in good condition and that it is correctly fitted.

TIGHTENING TORQUES (in daN.m)	
Inlet manifold bolt	**1**
Air filter unit bolt	**0.9**
Throttle body bolt	**1.3**

REMOVAL

Disconnect the battery (under the passenger seat for Scenic).

Remove the air filter unit (see section **12** Fuel mixture "**Air filter unit**").

Disconnect:
- the throttle potentiometer,
- the pressure sensor,
- the pencil-type coils,
- the air temperature sensor,
- the accelerator cable.

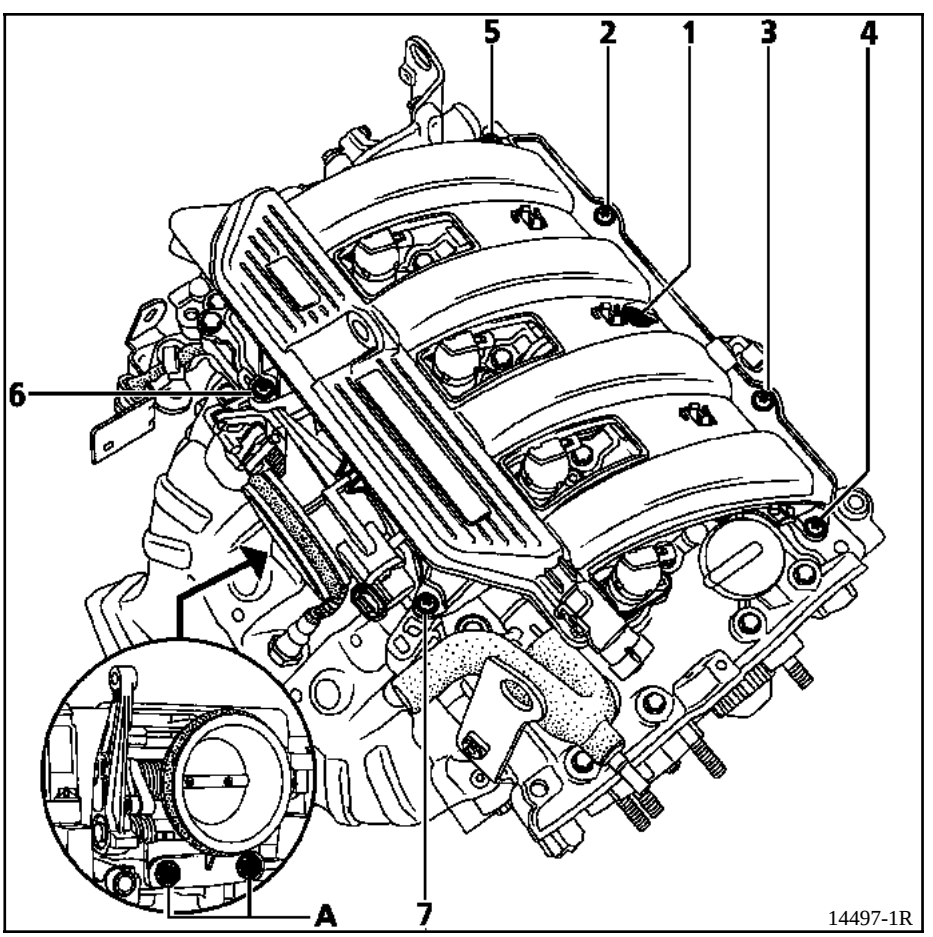
Remove:
- the two throttle body mounting bolts (A),
- the inlet manifold bolts.

REFITTING

Refitting is the reverse of removal.

NOTE: observe the recommended tightening order and torques for the inlet manifold and throttle body bolts.

If necessary, replace the manifold and throttle body gaskets.



TIGHTENING TORQUE (in daN.m)	
Injector mounting shim	**2.1**
Gallery bolts	**0.9**
Inlet manifold bolt	**1**

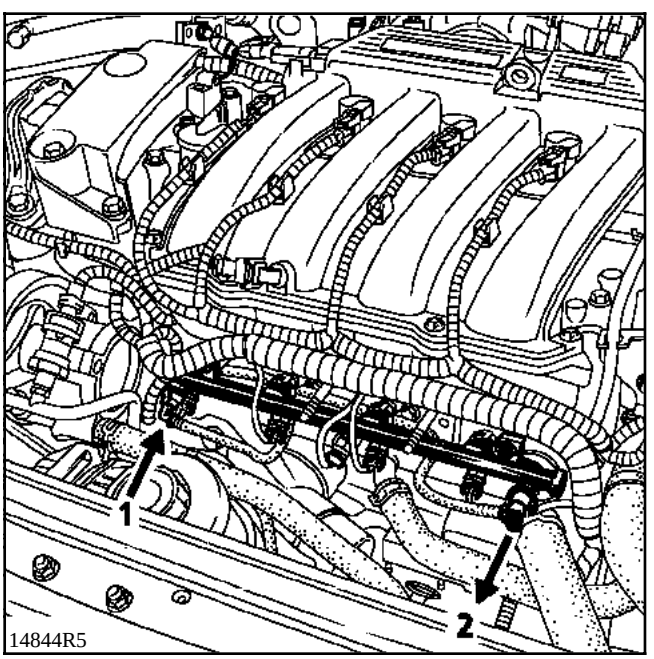
Method for removing the injector mounting shim

REMOVAL

Disconnect the battery (under the passenger seat for Scenic).

Remove:
- the inlet manifold (see section **12** Fuel mixture "**Inlet manifold**"),
- the injector gallery protective cover.
- the injection wiring loom clip.

Disconnect:
- the fuel supply and return pipes (1) and (2) or the fuel supply pipe depending on version,
- the regulator vacuum pipe (depending on version),
- the injectors.



14844R5

Remove the front right hand mud guard.

Clamp the accessories belt automatic tension wheel.

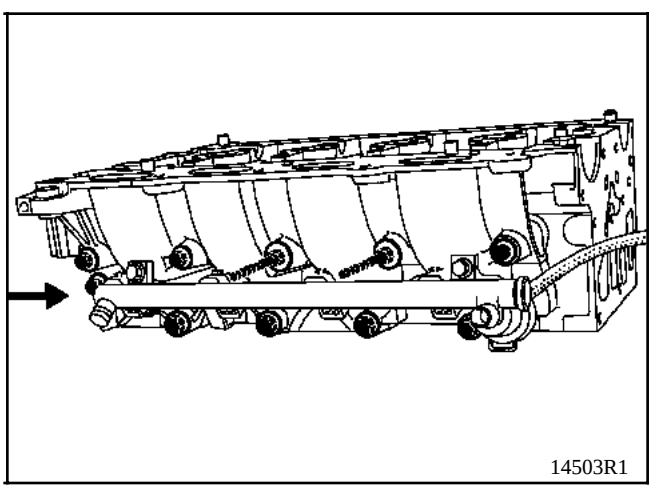
Remove the belt.

IMPORTANT: never refit a belt once it has been removed. Replace it. Refer to the method in section **07** "**Accessories belt tension**".

Remove:
- the power assisted steering pump pulley,
- the three power assisted steering pump mounting bolts.

Move the power assisted steering pump to one side without removing the pipes.

Remove the mounting bolts and the injector mounting shim.


14503R1

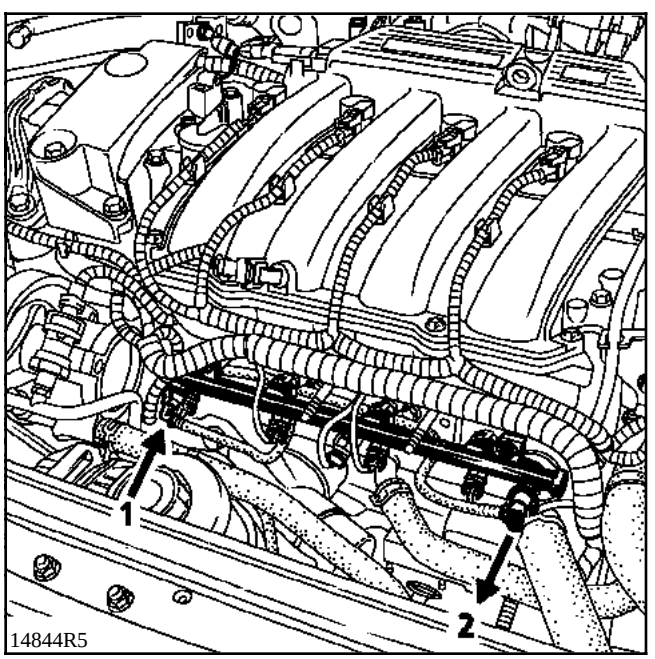
TIGHTENING TORQUE (in daN.m)	
Injector mounting shim	**2.1**
Gallery bolts	**0.9**
Inlet manifold bolt	**1**

REMOVAL

Disconnect the battery (under the driver's seat for Scenic).

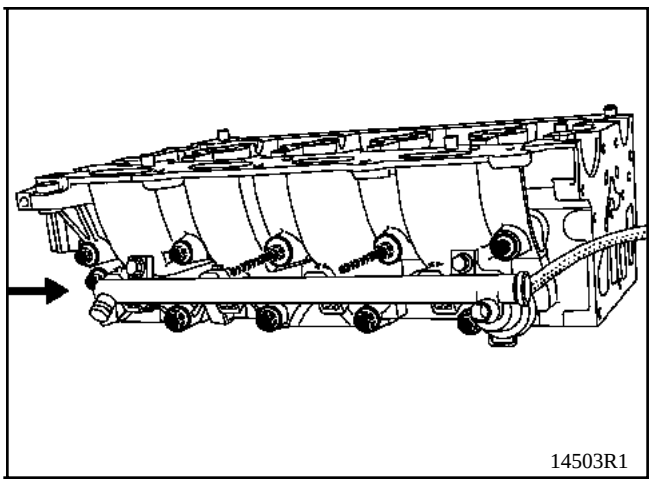
Remove:
- the inlet manifold (see section **12** Fuel mixture "**Inlet manifold**"),
- the injector gallery protective cover.
- the injection wiring loom clip.

Disconnect:
- the fuel supply and return pipes (1) and (2) or the fuel supply pipe depending on version,
- the regulator vacuum pipe (depending on version),
- the injectors.



14844R5

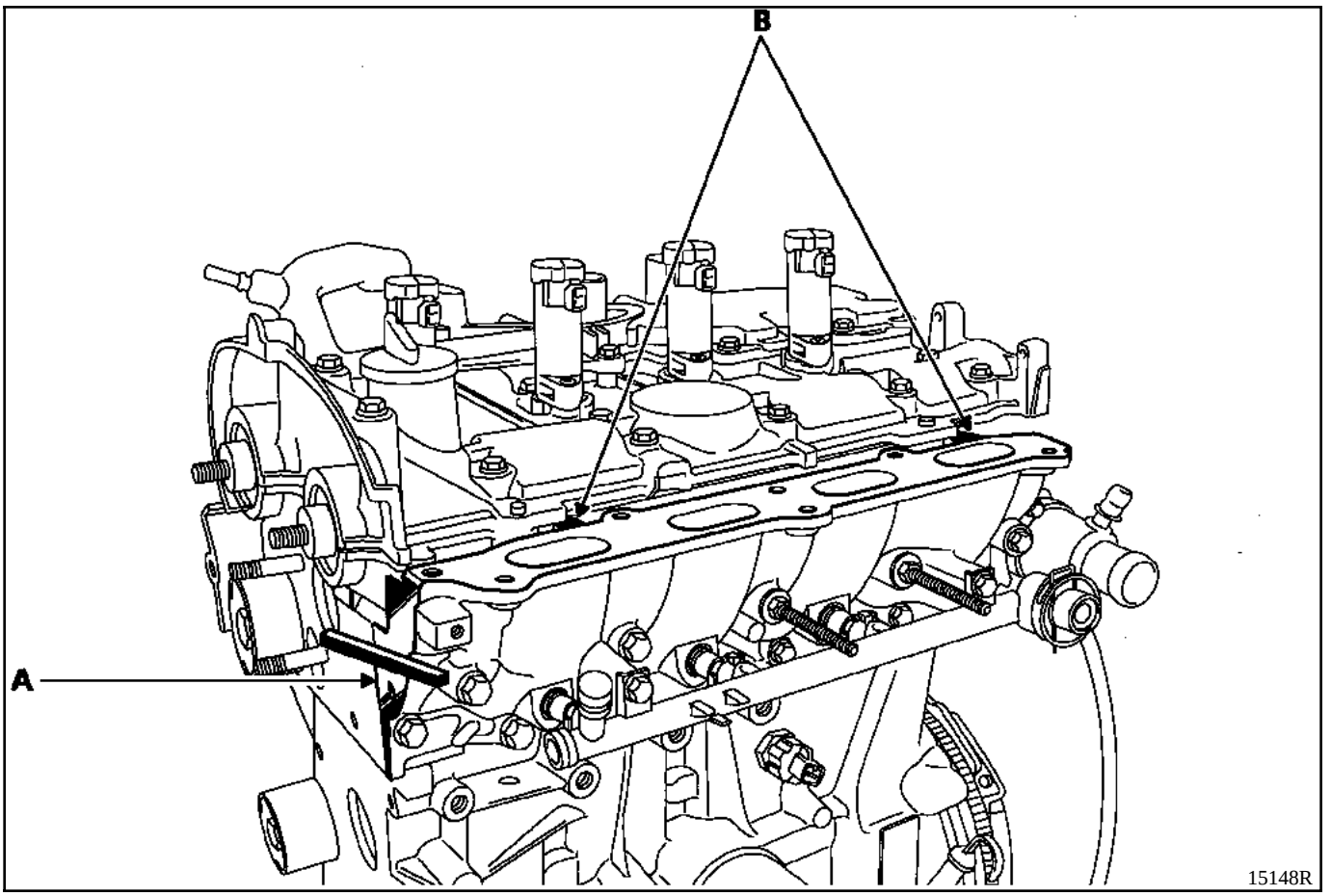
Remove the mounting bolts and the injector mounting shim.


14503R1

REFITTING

Change the seal.

Check the alignment (at A) between the lower inlet distributor and the cylinder head, ensuring that the distributor is touching (at B) the cylinder head cover.



Refitting is the reverse of removal.

Observe the recommended tightening torques for the shim mounting nuts and bolts.

Change the accessories belt if it was removed. To do this, refer to **section 07** "**Accessories belt tension**".

SPECIAL TOOLING REQUIRED	
Mot. 1495	**Tool for removal and refitting of oxygen sensor**

TIGHTENING TORQUES (in daN.m)	
Oxygen sensor	**4.5**
Manifold nuts	**1.8**
Nuts for the three point bracket	**2**
Heat shield bolts	**1**

REMOVAL

NOTE :depending on the vehicle version, it may or may not be fitted with a pre-catalytic converter and a downstream oxygen sensor. The removal method below is identical in both cases.

Place the vehicle on a two post lift.

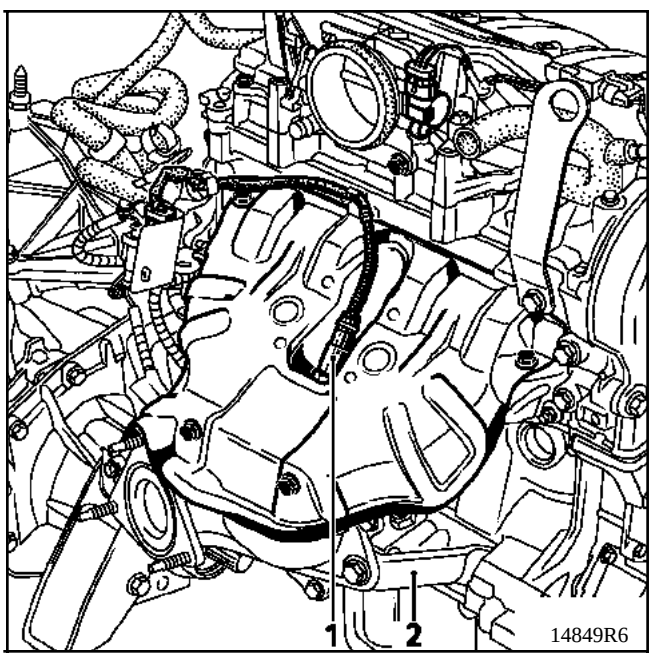
Disconnect the battery (under the passenger seat for Scenic).

Remove the air filter unit (see section **12** Fuel mixture "**Air filter unit**").

Disconnect and remove the oxygen sensor (1) using **Mot. 1495**.

Remove the upper exhaust manifold heat shield.

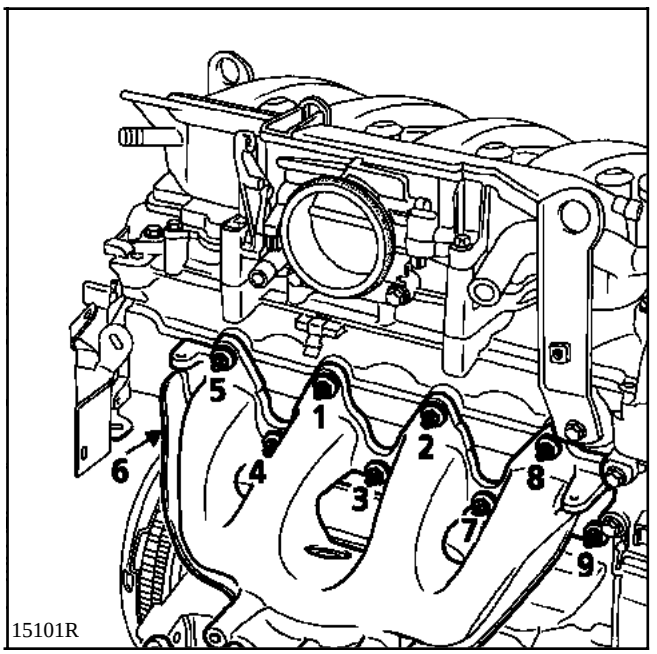
Release the exhaust downpipe.



Move the catalytic converter back, without removing it.

Position a block on the sub-frame to support the catalytic converter and to prevent damage to the hose which would necessitate its replacement.

Remove the strut (2) (see previous page) between the exhaust manifold and the cylinder block.



REFITTING

Refitting is the reverse of removal.

NOTE: check that the heat shield is correctly positioned between the oxygen sensor and the manifold (to prevent a chimney effect which would lead to destruction of the oxygen sensor connections).

Change the gaskets for the manifold and the three point mounting.

Also change the mounting nuts.

Observe the correct tightening order and tightening torque for the manifold mounting nuts.

IMPORTANT: if a heat shield is damaged, it MUST be changed to prevent any risk of fire.

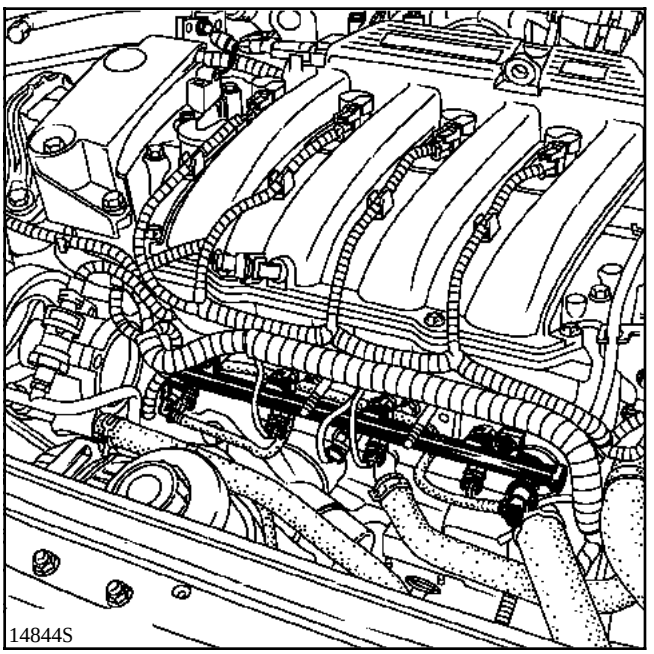
TIGHTENING TORQUE (in daN.m)	
Injector gallery bolts	**0.9**

The injectors are secured to the injector gallery using clips.

Some engines are fitted with an injector gallery without a fuel return to the fuel tank. In this case, the pressure regulator is located on the fuel pump / sender unit assembly.

REMOVAL

IMPORTANT: when removing the injectors, be careful of the amount of fuel which is in the gallery and connectors. Protect sensitive components.


14844S

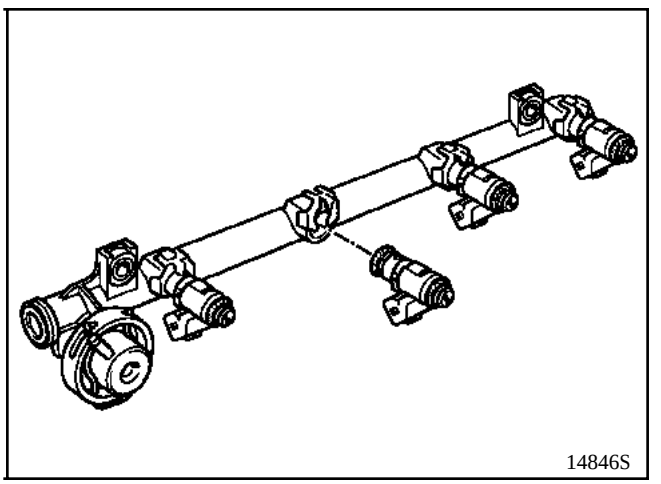
Disconnect the battery (under the driver's seat for Scenic).

Remove:
- the cover protecting the gallery,
- the fuel supply and return pipe unions on the gallery without clamping the pipes (depending on version),
- the pressure regulator vacuum pipe (depending on version),
- the gallery mounting bolts,
- the injector connectors,
- the injector clips.

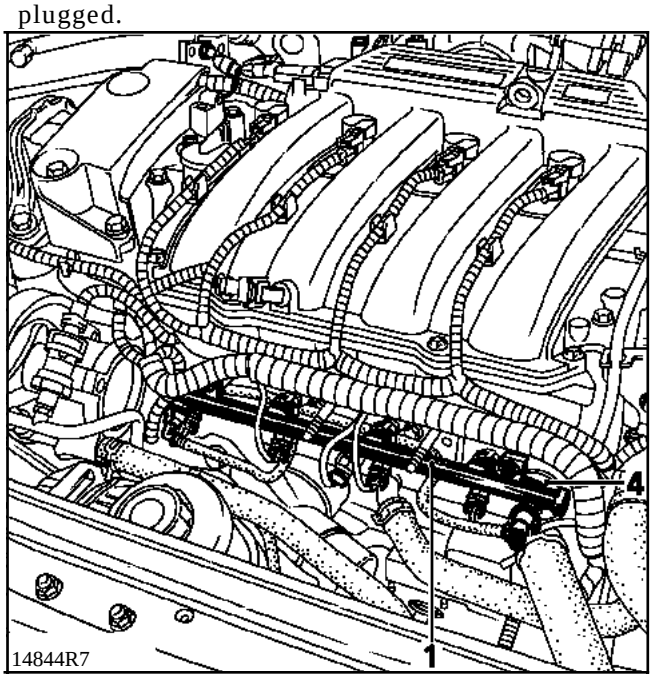
REFITTING

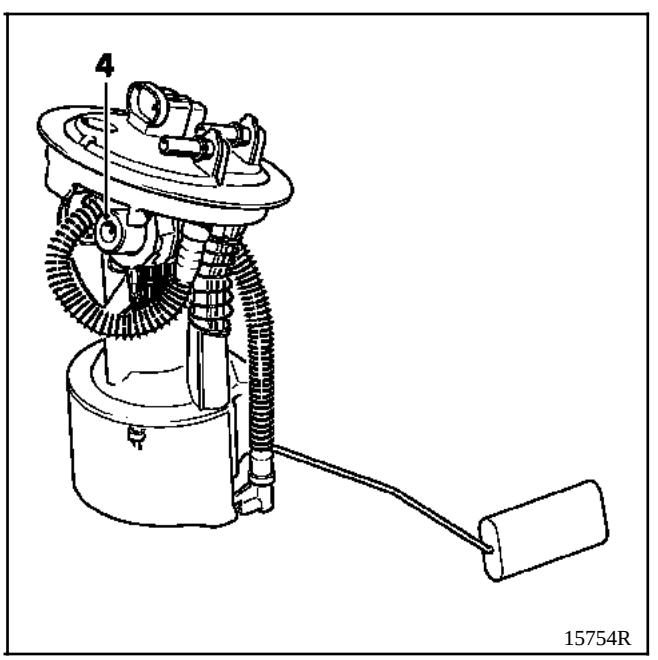
The injector O-ring seals must be changed.

Observe the tightening torques for the gallery bolts.


14846S

Depending on the vehicle version, the regulator (4) may be located in the engine compartment at the end of the injector gallery (1) or in the fuel tank, on the pump / sender unit assembly. In this case, the end of the gallery, the return union to the fuel tank and the regulator mounting are plugged.





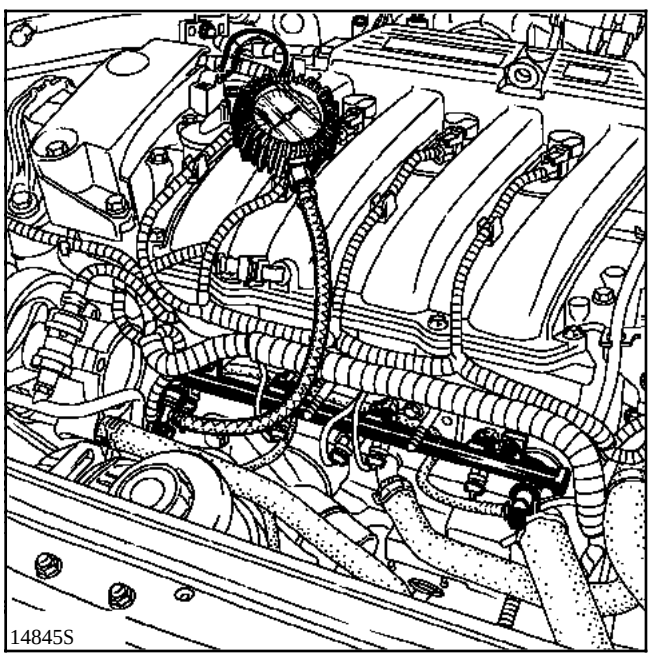
In the case where the regulator is located on the pump / sender unit assembly, refer to the method "**Section 19 : Fuel tank pump and sender unit**".

CHECKING THE FUEL SUPPLY PRESSURE

SPECIAL TOOLING REQUIRED	
Mot. 1311 -01	**Fuel pressure test kit**
Mot. 1311 -02	**with pressure gauge**
Mot. 1311 -04	**and sockets**
Mot. 1311 -05	

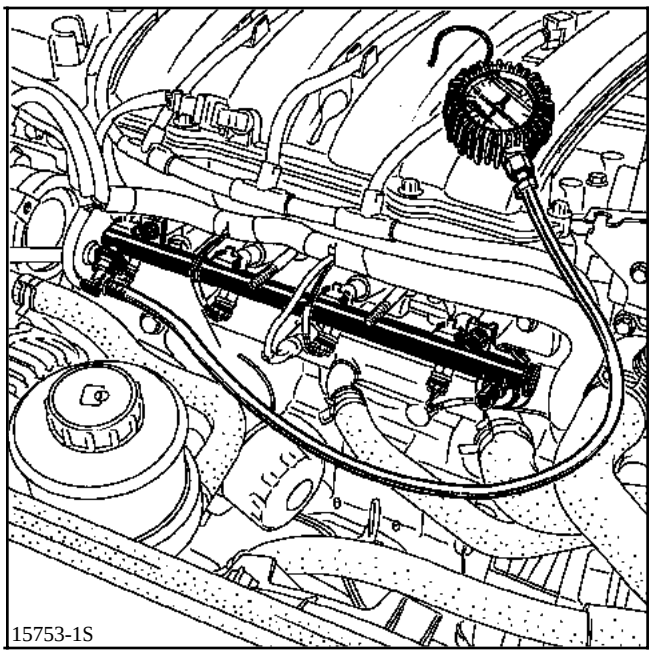
IMPORTANT: be careful of the amount of fuel which is in the pipes. Protect sensitive components.

Disconnect the fuel supply pipe and fit the "**T**" with the pressure gauge in its place.


14845S

Start the engine to operate the fuel pump.

Note the pressure on the pressure gauge.


15753-1S

Pressure read:

vehicle with return	**3 ± 0.2 bars**
vehicle without return	**3.5 ± 0.2 bars**

For vehicles with fuel return (regulator on the gallery), use a vacuum pump to apply a vacuum to the regulator. A drop in fuel pressure should be noted.

Vehicles with fuel circuits without a return (regulator on the pump / sender unit assembly) operate with a constant fuel pressure.

NOTE : it may take several seconds for the correct pressure in the injector gallery to be noted.

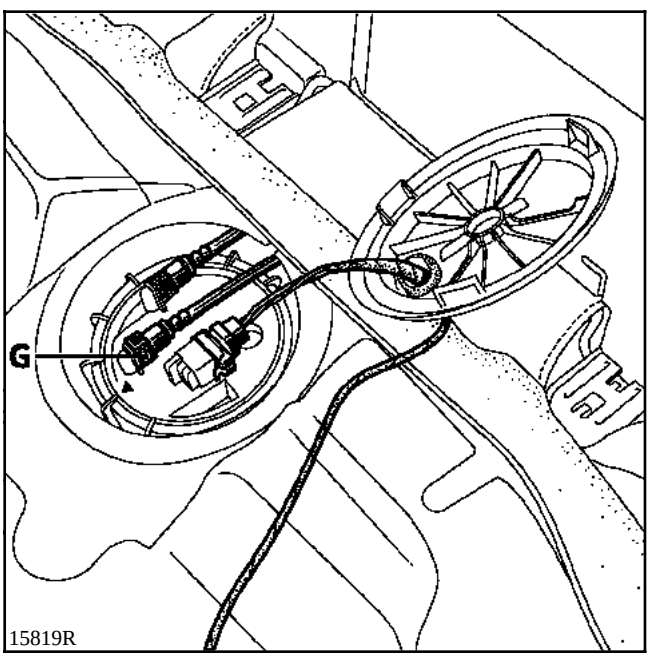
CHECKING THE FUEL PUMP FLOW

EQUIPMENT REQUIRED
2 000 ml measuring cylinder

IMPORTANT: be careful of the amount of fuel which is in the pipes. Protect sensitive components.

Vehicles without a fuel return to the fuel tank

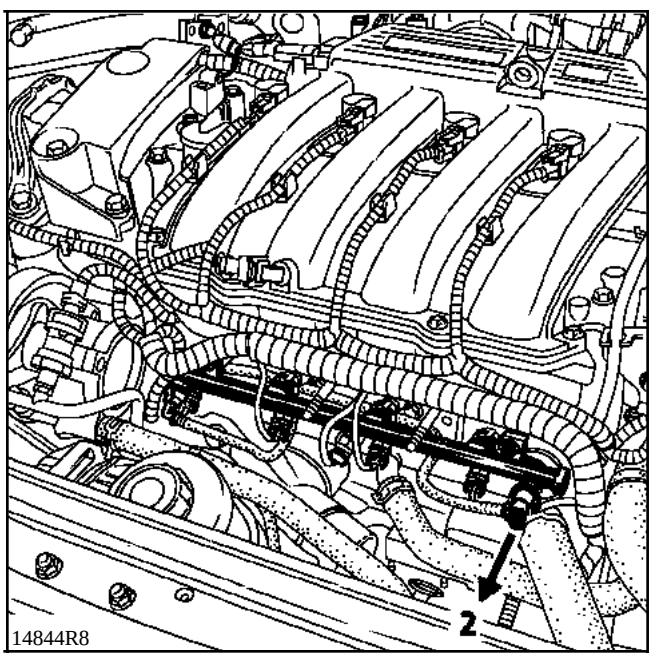
Disconnect pipe (G) on the sender unit / fuel pump / filter / fuel pressure regulator assembly.



Fit a pipe to empty the pump into a measuring cylinder.

Vehicles with a fuel return to the fuel tank

Disconnect the fuel return pipe (2) on the injector gallery and empty it into a measuring cylinder.



Run the pump using a fault finding tool or by shunting the fuel pump relay (see corresponding wiring diagram).

Note the pump flow.

Flow noted: **60 to 80 litres/ hour**.

OPERATING PRINCIPLE

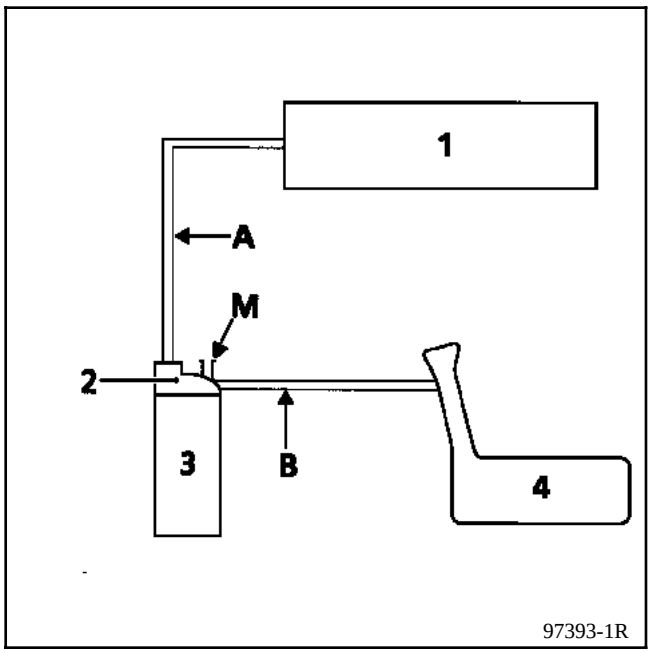
The anti-percolation system is controlled directly by the injection computer.

Coolant temperature information is taken from the injection coolant temperature sensor**.**

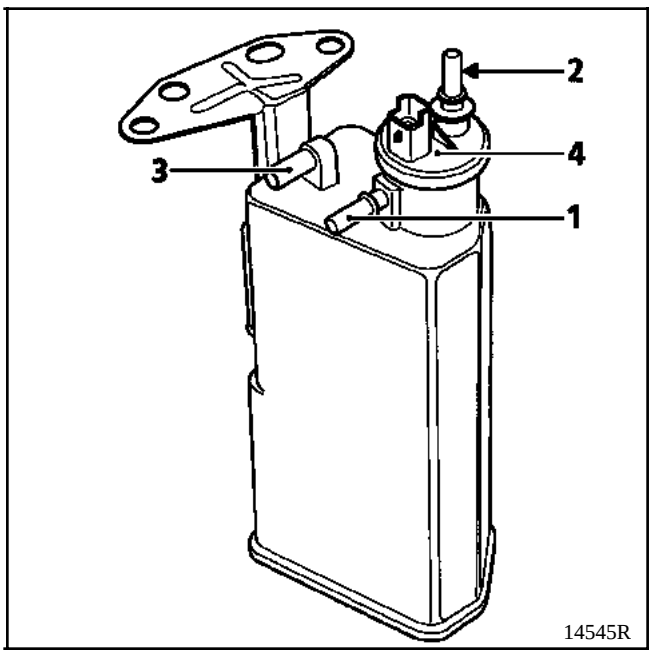
After the ignition is switched off, the injection computer goes into monitoring mode. If the engine coolant temperature exceeds the threshold of 103 °C during the five minutes after the engine stops, the slow speed relay for the engine cooling fan is fed.

If the temperature falls below **100** °**C**, the **engine cooling fan** relay is cut (the engine cooling fan can not operate for longer than 12 minutes).

CIRCUIT OPERATING DIAGRAM



1 Inlet manifold
2 Recycling solenoid valve
3 Fuel vapour absorber with solenoid valve
4 Fuel tank
M Breather



1 Rebreathing of fuel vapour from the fuel tank (quick release connector)
2 Rebreathing of fuel vapour to the engine
3 Fuel tank canister breather
4 Canister solenoid valve

IMPORTANT: under normal operating conditions, the breather should not be blocked. No pipes are to be connected here.

OPERATING PRINCIPLE

The fuel tank breathes through the fuel vapour absorber (canister).

Fuel vapour is retained by the active carbon in the absorber (canister).

The fuel vapours contained in the canister are eliminated and burned by the engine.

To do this, a pipe connects the canister and the inlet manifold. A solenoid valve is located on the canister to authorise bleeding of the canister.

The operating principle for the solenoid valve is to give a variable passage diameter (depending on the **RCO** signal sent by the injection computer).

The variation in the selection of passage diameter for the fuel vapour in the solenoid valve results from the balance between the magnetic field created by the feed to the coil and the force of the return spring ensuring the valve remains closed.

CONDITIONS FOR BLEEDING THE CANISTER

The canister bleed solenoid valve is controlled by **track 4** of the computer when :
- the coolant temperature is greater than **60 °C**,
- the air temperature is greater than **10 °C**,
- the engine is not at idle speed,
- a given load threshold is reached,
- the throttle potentiometer is not in the No Load position.

The cyclical opening ratio for the canister bleed solenoid valve may be seen using the fault finding tool with reference to the "RCO canister bleed solenoid valve" parameter.

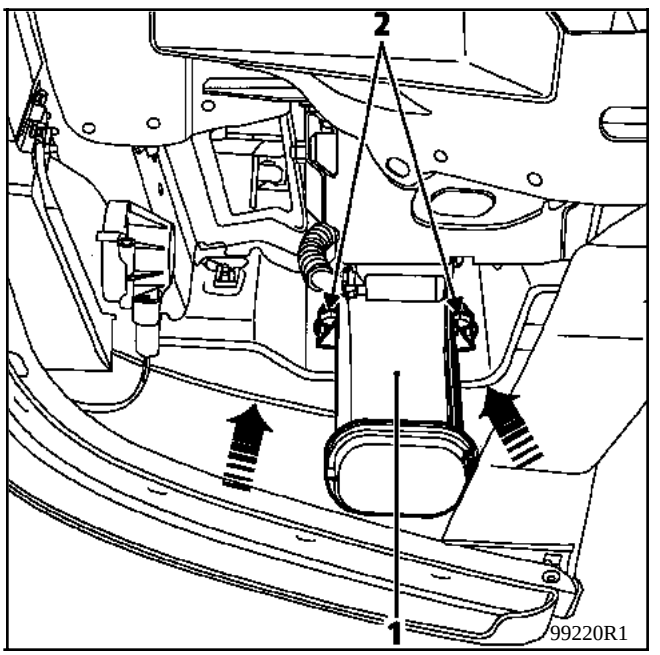
The solenoid valve is closed for a value which is less than **0.7 %**.

REMOVING THE ABSORBER

The absorber (1) is located in the front right hand wheel arch.

Disconnect:
- the vapour supply pipe from the fuel tank and the pipe which circulates towards the manifold.
- the solenoid valve control connector.

Remove:
- the mud guard and wheel arch.
- the mounting bolts (2).

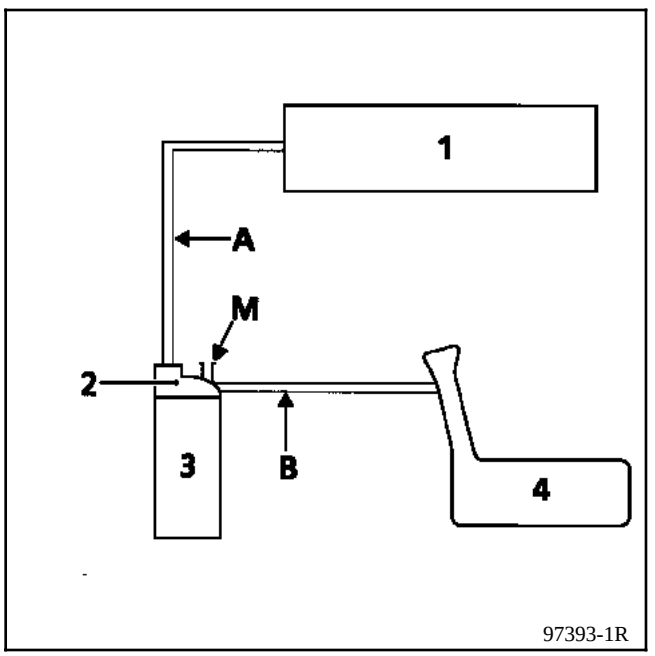


CHECKING THE OPERATION OF THE CANISTER BLEED VALVE

A malfunction in the system could cause the idle speed to be unstable or the engine to stall.

Check the circuit conforms (see operating diagrams).

Check the condition of the pipes up to the fuel tank.



1 Inlet manifold
2 Integrated canister bleed solenoid valve
3 Canister (with solenoid valve)
4 Fuel tank
M Breather

Check :
- at idle speed,
- by plugging the circuit (B) on the canister from the fuel tank,
- by connecting a pressure gauge (**- 3 / + 3 bars**) (**Mot. 1311-01**) on the canister breather outlet (M),

that there is no vacuum (in the same way, check that the command value on the fault finding tool for the parameter: "RCO canister bleed solenoid valve" remains at a minimum of **X ≤ 0.7 %**).

Is there a vacuum?

YES Ignition off, use a vacuum pump to apply a vacuum of **500 mbars** to the solenoid valve at (A). This should not vary by more than **10 mbars** in **30 seconds**.

Does the pressure vary ?

YES The solenoid valve is faulty, replace the canister solenoid valve assembly.

NO There is an electrical fault, check the circuit.

NO Under bleeding conditions (see conditions for bleeding), there should be an increase in the vacuum (at the same time there should be an increase in the parameter value on the fault finding tool).

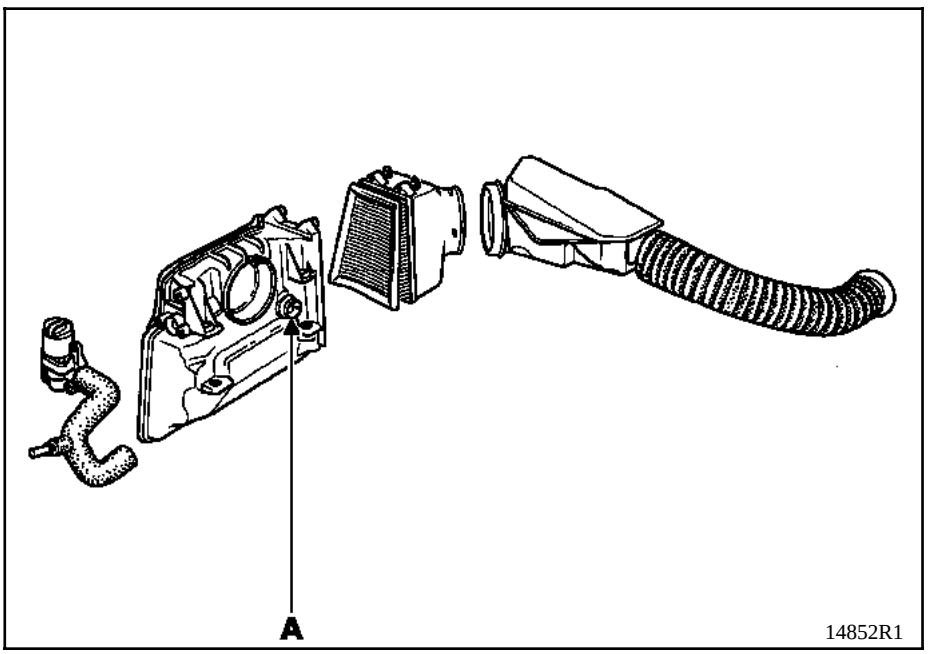
CHECKING THE FUEL TANK / CANISTER CONNECTION

This connection may be checked by :
- lifting the rear right hand wheel using a jack,
- removing the fuel tank filler cap,
- connecting a vacuum pump to the pipe (B).

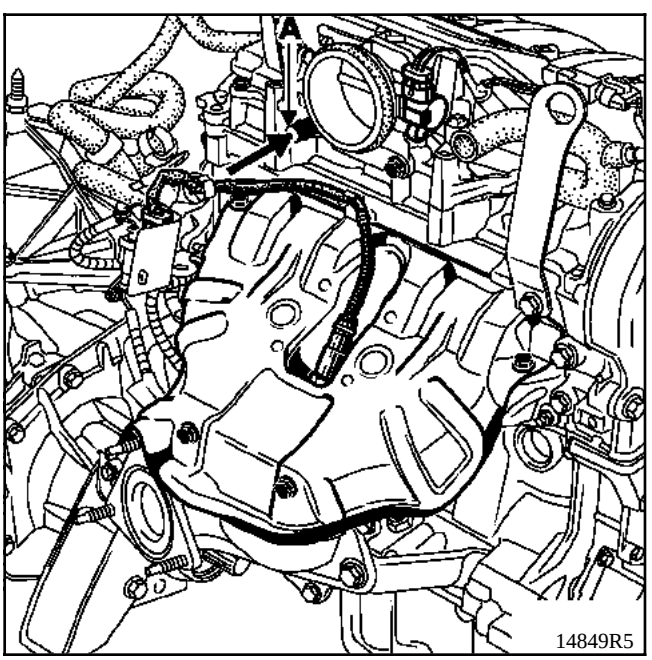
The system is correct if a vacuum cannot be maintained on the pipe.

PRESENTATION OF COMPONENTS

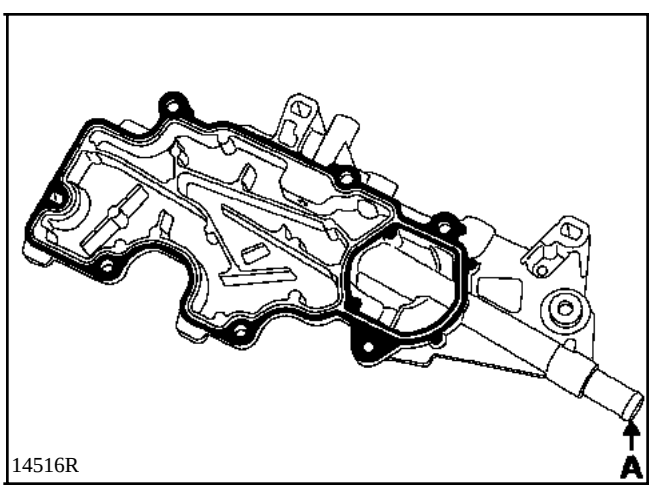
Oil vapour intake (A).



Oil vapour outlet (A).



Oil vapour recuperation plate located on the cylinder head cover.



For removal, refer to **section 11** "**Top and front of engine**".

CHECKING

To guarantee correct operation of the antipollution system, the oil vapour rebreathing circuit must be clean and in good condition.

IDENTIFICATION

Vehicle	Engine	Alternator	Current
XA0B XA04	K4M 700	VALEO A 11VI94 BOSCH 0120 416 253 (CA) BOSCH 0124 415 007	75 A 98 A 110 A
XA0W	K4J 750		

CHECKING

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

Rpm	75 Amps	98 Amps	110 Amps
2 000	68 A	63 A	94 A
3 000	71 A	86 A	105 A
4 000	72 A	95 A	108 A

SPECIAL TOOLING REQUIRED	
Mot. 1273	**Tool for checking belt tension**

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

Remove:
- the front right wheel and the mud guard,
- the accessories belt (see section **07** "**Accessories belt tension**"),

Unclip the PAS reservoir from the fan assembly and move it to one side.

Remove the alternator.

REFITTING

Refitting is the reverse of removal.

Refer to section **07** "**Accessories belt tension**" for the tensioning procedure.

IDENTIFICATION

Vehicle	Engine	Starter motor
XA0B XA04	K4M 700	VALEO D7E6
XA0W	K4J 750	

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

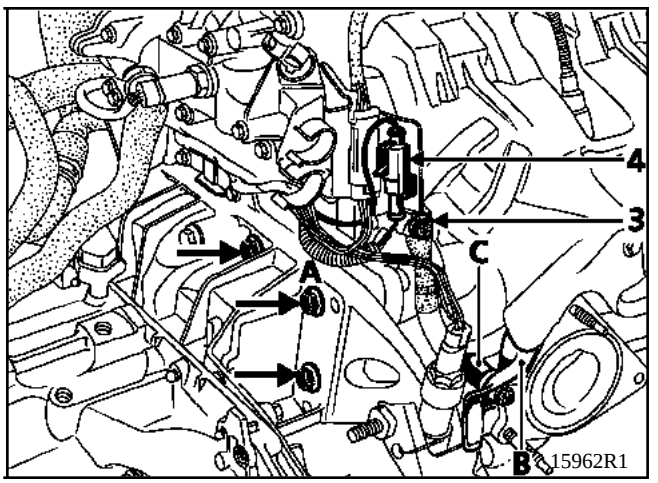
Remove the front right hand wheel and the engine undertray.

Right hand side of vehicle

Remove:
- the track rod end using tool **T.Av. 476**,
- the upper shock absorber base mounting bolt and slacken the lower bolt.

Tilt the stub axle carrier and detach the driveshaft.

Remove:
- the air resonator,
- the nut (3) for the starter motor feed wire and disconnect the solenoid connector (4),
- the heat shield (B) and slacken the lower mounting for the strut (C),
- the oil level sensor,
- the starter motor mounting bolts and take it out from below.



REFITTING

Refitting is the reverse of removal.

Check that the centring dowel is in position (at A).

Correctly refit the heat shields.

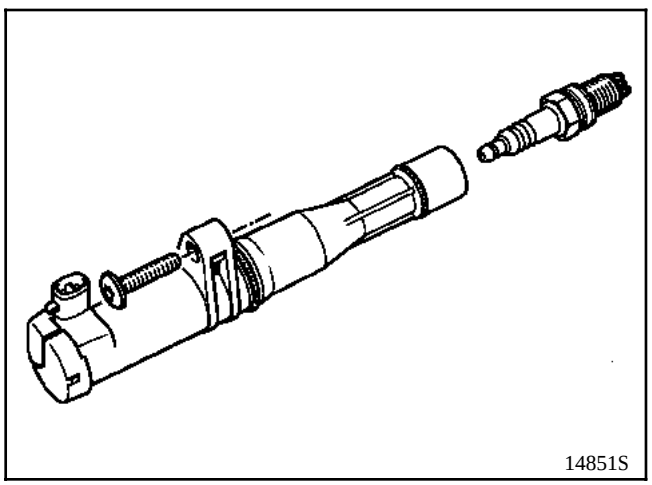
TIGHTENING TORQUES (in daN.m)	
Ignition coil bolts	**1.5**
Plugs	**2.5 to 3**

DESCRIPTION

Static ignition is a system which allows the amount of energy available to the spark plugs to be increased as there is nothing between the plug and the coil.

This system also allows all moving components for the ignition to be suppressed.

The power module is integrated in the injection computer. The ignition therefore uses the same sensors as the injection.



There are four ignition coils and they are mounted directly on the plug by a bolt on the cylinder head cover.

The coils are fed in series, two at a time, by **tracks 1 and 32** of the injection computer :
- **track 1** for cylinders **2 and 3**,
- **track 32** for cylinders **1 and 4**.

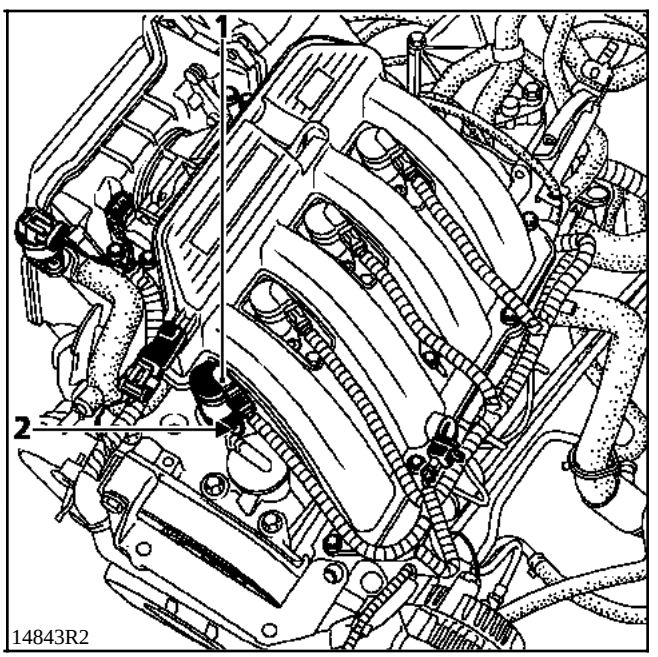
REMOVING A COIL

Disconnect the battery (under the driver's seat for Scenic).

Disconnect the ignition coils.

IMPORTANT: be careful not to damage the connectors (1); if this happens, change them.

Remove the coil mounting bolts (2).



REFITTING

Refitting is the reverse of removal. Replace the coil O-ring seals if necessary.

SPECIAL NOTES ON THE K4M 700 and K4J 750 ENGINE MULTIPOINT INJECTION

- **90 track SIEMENS** "**SIRIUS 32**" computer which controls the injection and the ignition.

- Multipoint injection operating in sequential mode without cylinder and camshaft position marking sensor. Because of this, timing is carried out logically, based on the TDC sensor.

- Static ignition with four plugs controlled two by two in series.

- Injection warning light on the instrument panel not operational.

- Special precautions relating to the engine immobiliser.
  Adaptation of a second generation type engine immobiliser for which there is a special method for changing the computer.

- Idle speeds
  - nominal idle speed ..... **750 rpm**

- Idle speed correction depending on:
  - air conditioning,
  - heated windscreen,
  - electrical balance,
  - battery voltage.

- Maximum speeds
  - maximum speed when coolant temperature is less than **60 °C** ..... **5800 rpm**
  - maximum speed for **T > 60 °C** ..... **6500 rpm**

- Canister bleed solenoid valve controlled by the cyclical opening ratio (**RCO**) depending on the engine speed and operating conditions.

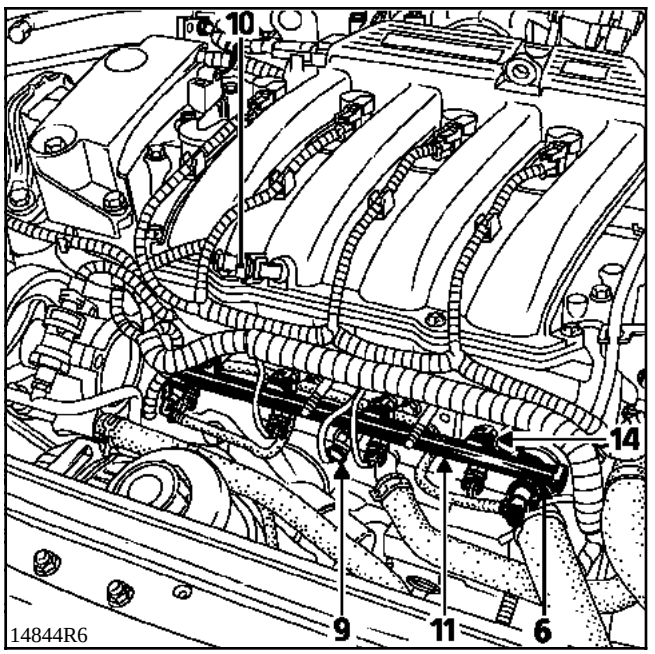
- Automatic configuration for AC operation via an exchange of signals between the computers. However, it is impossible to de-configure it (even using the after sales fault finding tool).

- Control of engine cooling fan assembly and of the coolant temperature warning light on the instrument panel by the injection computer (centralised coolant temperature management).

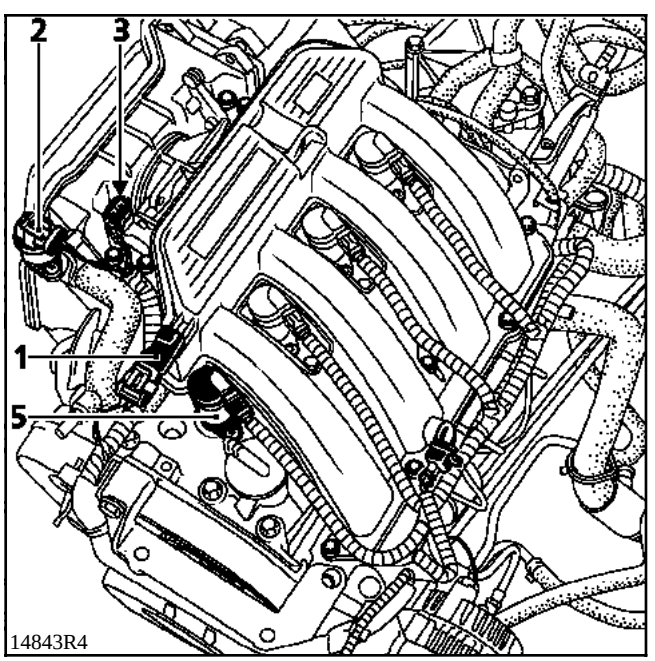
- Two types of fuel circuit possible:
  - circuit without return to fuel tank (the regulator is integral in the pump / sender unit assembly),
  - with return to fuel tank .

  The computers are specific and are not interchangeable.

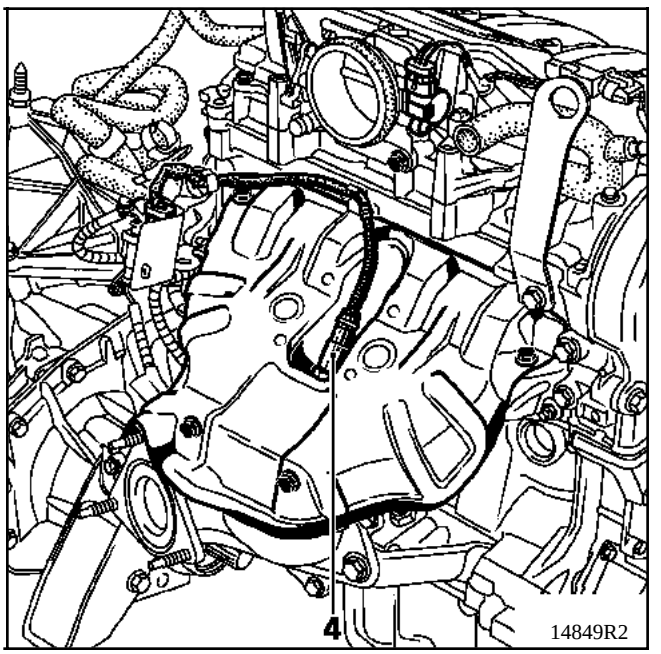
9 Pinking sensor
11 Injector gallery with pressure regulator (6) (circuit with return)
14 Injector

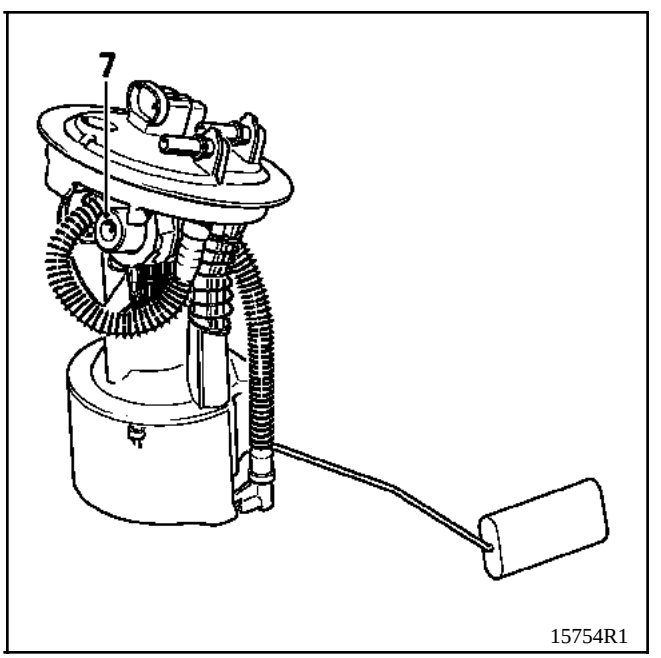


2 Idle actuator
10 Air temperature sensor
5 Ignition coil



3 Throttle position potentiometer
1 Pressure sensor
4 Oxygen sensor
7 Fuel pressure regulator (circuit without return)





PRESENTATION

The **K4M 700 and K4J 750 engines** are equipped with a sequential-type injection system.

In normal operation, fuel is injected cylinder by cylinder when they are at the beginning of the inlet phase.

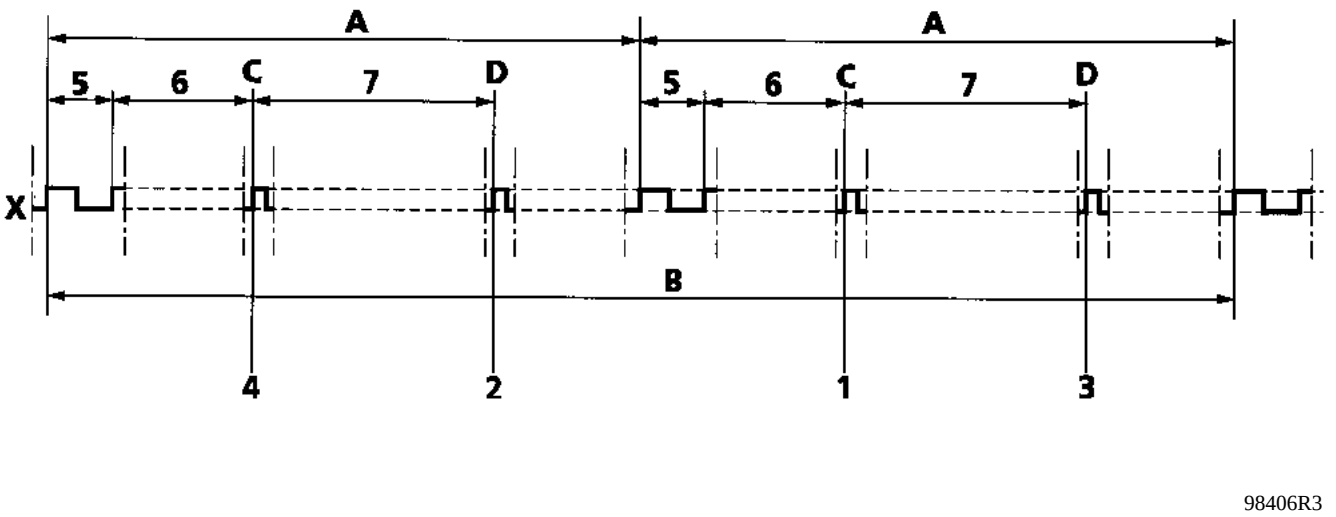
To do this, it is necessary that:
- each injector is controlled independently by the computer (injector n° **1** engine flywheel side),
- the computer knows which cylinder is at the inlet phase.

To determine to cylinder is at the inlet phase, the computer uses a single sensor, the **TDC** sensor (and engine speed) which can indicate that:
- cylinders **1** and **4** are at Top Dead Centre,
- cylinders **2** and **3** are at Top Dead Centre.

To determine on which of the two cylinders it should inject, the computer uses two strategies:
- each time the engine stops, it remembers which injector it was controlling. Each time the engine is started again, it uses this cylinder as its reference point.
- if the reference cylinder is not correct, the computer carries out a software check.

When the ignition is switched off, the idle speed regulation stepping motor command is maintained for a minimum of 10 seconds, so that systematic programming of the "bottom stop" is carried out. This period is called "resetting".

If the computer is changed, it must be programmed during a road test under normal operating conditions and the idle speed stepping motor must be reset.



A 1 turn of the crankshaft
B 1 turn of the camshaft

C Top Dead Centre 1-4
D Top Dead Centre 2-3

1 Cylinder 1 at inlet phase
2 Cylinder 2 at inlet phase
3 Cylinder 3 at inlet phase
4 Cylinder 4 at inlet phase

5 long tooth
6 84° or 14 teeth
7 30 teeth

X Engine flywheel target.

NOTE: all values are expressed in TDC degrees.

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

REPLACING AN INJECTION COMPUTER

The injection computers are supplied uncoded, but are all capable of being programmed with a code.

After changing one, it has to be programmed with the vehicle code then checked to see whether the engine immobiliser function is operational.

To do this, switch the ignition on for a few seconds then switch it off again. Ignition off, the immobiliser function should be ensured after approximately 10 seconds (the red immobiliser warning light flashes).

IMPORTANT:

With this immobiliser system, the computer retains its immobiliser code for life.

This system also has no security code.

Consequently, it is forbidden to carry out tests using another computer borrowed from stores or from another vehicle which would then have to be returned.

These computers cannot be decoded.

THE COMPRESSOR IS OF THE VARIABLE CAPACITY TYPE

INJECTION COMPUTER/AC COMPUTER CONNECTION

The injection computer is connected to the **AC** computer by two wires:
- one injection computer wire to the **AC** computer, track **10**. Only compressor operation authorisation or prevention information is transmitted on this wire.
- one wire from the **AC** computer to the injection computer, track **23**. This is a power consumed information signal.

When the **AC** switch is pressed, the **AC** computer requests compressor operation.
The injection computer authorises or prevents operation of the compressor clutch and imposes a modified idle speed.

PROGRAMMING FOR COMPRESSOR OPERATION

During certain operating phases, the injection computer prevents operation of the compressor.

Starting the engine

The compressor is prevented from operating for **10 seconds** after the engine has been started.

Return of performance and acceleration

If the throttle potentiometer position is greater than 15 %, and if the engine speed is greater than 800 rpm, and if the vehicle speed is less than 2.5 mph (4 km / h) and if first gear or reverse are selected, the compressor clutch is disengaged for a maximum of 7 seconds.
It engages again if the engine speed reaches 1900 rpm or if the vehicle speed reaches 8.75 mph (14 km / h) or if 2nd, 3rd, 4th or 5th gears are engaged.

Stalling protection (only for K4J)

If the engine speed is less than 610 rpm, compressor operation is cut. It is started again if the engine speed exceeds 1380 rpm.

Return of performance

If the engine speed is greater than 2016 rpm, and if the vehicle speed is less than 2.5 mph (4 km / h) (K4J) or 10 mph (16 km / h) (K4M), and if the throttle potentiometer is greater than 50 % and if first gear or reverse gear are selected, the compressor clutch is disengaged for a maximum of 5 seconds.

It engages again if the vehicle speed reaches 8 mph (13 km / h) or if another gear is engaged.

Thermal protection

The compressor does not operate when the coolant temperature is greater than **115 °C**.

Over-revving protection

The compressor is prevented from operating if engine speed is greater than **6 500 rpm.**

POWER ASSISTED STEERING PRESSOSTAT - INJECTION COMPUTER CONNECTION

The injection computer receives information from the power assisted steering pressostat (displayed on the fault finding tool). This depends on the pressure in the hydraulic circuit and the fluidity of the power assisted steering fluid. The higher the pressure, the more energy is consumed by the power assisted steering pump.

The injection computer does not modify the engine's idle speed. It uses the information to anticipate loss of speed.

CORRECTION DEPENDING ON BATTERY VOLTAGE AND ELECTRICAL BALANCE

The aim of this correction is to compensate for the drop in voltage due to the operation of a consumer when the battery has a low charge. To do this, the idle speed is increased, thereby allowing the alternator rotation to be increased and, as a result, the battery voltage.

The lower the voltage, the greater the correction. Speed correction is therefore variable. It begins when voltage is less than **12.8 volts**. Correction starts from idle speed and may reach a maximum of 900 rpm.

IDLE SPEED CORRECTION DEPENDING ON HEATED WINDSCREEN INFORMATION

If the heated windscreen if selected, the computer receives + 12 V (can be seen using the fault finding tool) on track **88**.

If the coolant temperature is less than 50 °C, the idle speed is set to **850 rpm.**

NOTE: after cold starting and a long period of operation at idle speed, a rapid drop in speed of **80 rpm** can be noted. This drop in speed is due to the progressive closure of the idle valve.

PRINCIPLE

Under normal, warm operating conditions, the **RCO** idle speed value varies between a high value and a low value to obtain the nominal idle speed.

It may be that the **RCO** idle speed value is nearer the higher or lower value under different operating conditions (running in, engine contamination...).

Adaptive correction for the **RCO** allows for compensations to be made for slow variations in the engine's air requirement.

This correction is only effective if the coolant temperature is greater than **75 °C**, **20 seconds** after the engine is started and if the engine is in the nominal idle speed regulation phase.

RCO IDLE SPEED AND ADAPTIVE CORRECTION VALUES

PARAMETER	K4M 700 - K4J 750 engines
Nominal idle speed	X = 750 rpm
RCO idle speed	6 % ≤ X ≤ 22 %
RCO adaptive idle speed	Threshold: - minimum : - 4 % - maximum : + 4 %

Each time the engine is stopped, the computer resets the stepping motor by positioning it at the lower stop.

INTERPRETATION OF THESE PARAMETERS

If there is excess air (air leak, throttle stop incorrectly set...), the idle speed increases, the **RCO** idle speed value decreases to return to nominal idle speed; the **RCO** idle speed adaptive value decreases to recentre the operation of idle speed correction.

If there is a lack of air (contamination, etc.), the strategy is reversed, the **RCO** idle speed value increases and the adaptive correction also increases, to recentre the operation of idle speed regulation.

IMPORTANT: after the computer memory is erased the engine MUST be started then stopped to allow resetting of the potentiometer. Start the engine again and allow it to run at idle speed so that adaptive correction can reset itself.

SENSOR HEATING

The oxygen sensor is heated by the computer as soon as the engine is started.

Sensor heating is stopped:
- if vehicle speed is greater than **90.63 mph** (145 km / h), (value given for information only),
- depending on engine load.

UPSTREAM SENSOR VOLTAGE

Parameter reading: "upstream sensor voltage" on the fault finding tool: the value read represents the voltage sent to the computer by the oxygen sensor upstream from the catalytic converter. It is expressed in millivolts.
When the engine is in loop mode, the voltage should fluctuate rapidly between two values:
- **100 mV** ± **100** for a lean mixture,
- **700 mV** ± **100** for a rich mixture.

The smaller the difference between minimum and maximum, the less accurate the sensor information (this difference is generally at least **500 mV**).

NOTE: if the difference is small, check the sensor heating.

RICHNESS CORRECTION

The value read on the fault finding tool under the "richness correction" parameter represents the average of the richness corrections made by the computer depending on the richness of the burnt mixture as detected by the oxygen sensor located upstream from the catalytic converter (the oxygen sensor actually analyses the oxygen content of the exhaust gases).

The correction value has a centre point of **128** and thresholds of **0** and **255**:
- value lower than **128**: request for fuel mixture to be made leaner,
- value greater than **128**: request for mixture to be made richer.

ENTRY INTO RICHNESS REGULATION MODE

The entry into richness regulation mode is effective after a timed starting period if the coolant temperature is greater than **10 °C** in the No Load position and if the upstream sensor is ready (warm enough).

The timed starting period depends on the coolant temperature:
- at **20 °C**, the period is between **18 and 72 seconds**,
- at **60 °C**, the period is between **20 and 80 seconds.**

If richness regulation has not yet started, the parameter value is **128**.

Non-loop phase

When richness regulation is occurring, the operating phases during which the computer ignores the voltage supplied by the sensor, are:
- in Full Load position: = variable and greater than **128**,
- sharp acceleration: = variable and greater than **128**,
- when decelerating with No Load position information (injection cut-out): **= 128**,
- if there is an oxygen sensor fault: **= 128**.

DEFECT MODE IN THE EVENT OF AN OXYGEN SENSOR FAULT

When the voltage supplied by the oxygen sensor is incorrect (varying little or not at all) during richness regulation, the computer will only enter defect mode if the fault has been recognised as present for **10 seconds**. Only in this instance will the fault be memorised. In this case, the parameter: "richness correction" is **128**.

If an oxygen sensor fault is detected and the fault has already been memorised, the system goes directly to the open loop phase.

PRINCIPLE

In the loop mode (see section **17** "**Richness regulation**"), richness regulation corrects the injection timing to give fuel metering as close as possible to a richness of **1**. The correction value is close to **128**, with thresholds of **0** and **255**.

However, variations may affect the components of the injection system causing the correction to alter towards **0** or **255**, to obtain richness **1**.

Adaptive correction allows the injection mapping to be adjusted to recentre the richness regulation to **128** and ensure a constant correction authority to make it richer or leaner.

Adaptive correction of richness regulation has two parts:
- adaptive correction mainly for average and high engine loads (parameter: operating adaptive richness),
- adaptive correction mainly for idle speed and low engine loads (parameter: idle speed adaptive richness).

Adaptive corrections use **128** as an average value after initialisation (memory erasure) and have threshold values:

PARAMETER	K4M 700 - K4J 750 engines
Operating adaptive richness	$64 \leq X \leq 160$
Idle adaptive richness	$64 \leq X \leq 160$

Adaptive correction only takes place when the engine is warm, in the loop phase and when the manifold pressure is at a certain level.

The engine has to have operated in loop mode over several pressure zones before the adaptive correction will begin to compensate for variations in engine richness operation.

Following initialisation of the computer (return to **128** of richness adaptive values), a special road test must be carried out.

ROAD TEST

Conditions:
- engine warm (coolant temperature **> 80 °C**),
- do not exceed an engine speed of **4000 rpm**.

For this test, it is recommended to begin at a relatively low engine speed, in 3rd or 4th gear, accelerating gradually, **to stabilise the desired pressure for 10 seconds in each operating zone** (see table).

Pressure zones to be covered during the test
Parameter: computer pressure on fault finding tool

	Range n° 1 (mbars)	Range n° 2 (mbars)	Range n° 3 (mbars)	Range n° 4 (mbars)	Range n° 5 (mbars)
K4M 700 K4J 750	260 ---------- 457	---------- 535	---------- 613	---------- 691	-------- 813
	Average 358	Average 496	Average 574	Average 652	Average 752

Following this test, the corrections will be operational.

The idle speed adaptive richness parameter varies more significantly for idle speeds and low loads and the adaptive richness parameter for average and high loads, but both are operational over all manifold pressure ranges.

The test should be followed by a normal, varied drive, covering **3 to 6 miles** (5 to 10 km).

After the test, read the richness adaptive values. Initially at **128**, they should have changed. If not, repeat the test, taking care to observe the test conditions.

INTERPRETATION OF VALUES COLLECTED AFTER A ROAD TEST

If there is a lack of fuel (injectors contaminated, fuel pressure and flow too low, ...), richness regulation increases to obtain a richness as close as possible to **1** and adaptive richness corrections increase until richness correction begins to fluctuate around **128**.

If there is excess fuel, the strategy is reversed: richness regulation decreases and adaptive correction also decreases to recentre richness correction around **128**.

NOTE: the analysis which can be made regarding idle adaptive richness remains difficult as this correction mainly operates for idle speed and low loads and is also very sensitive.

Therefore, hasty conclusions should not be drawn from these parameters, rather the position of the operating adaptive value should be analysed.

The information supplied by these two parameters gives an idea of the richness for engine operation and may therefore be used as a guide for fault finding. So that these can be useful for fault finding, conclusions can only be drawn from their value if they are at the minimum or maximum correction threshold and if both parameters have drifted in the same direction.

IMPORTANT: adaptive richness values should only be used and analysed following a customer complaint, an operating fault and if they are at the threshold value with offsetting of the parameter : richness correction varying above 175 or below 80).

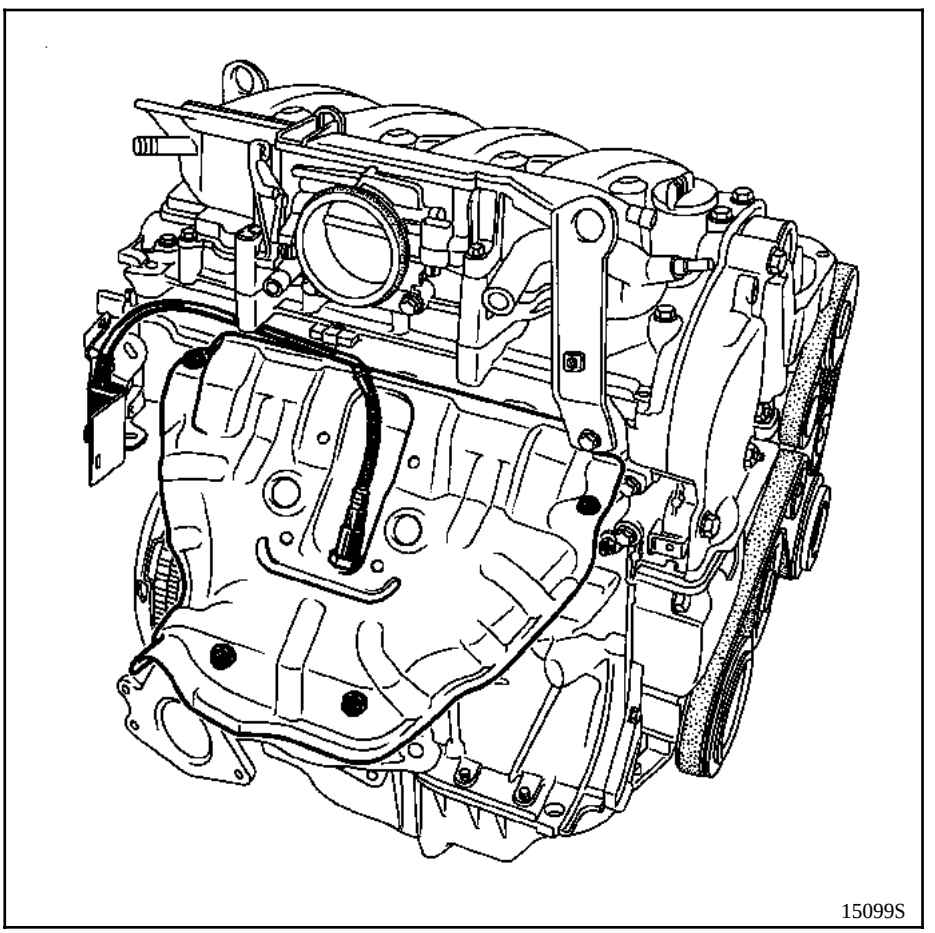
SPECIAL TOOLING REQUIRED	
Mot. 1495	**Socket for removing and refitting oxygen sensor**

TIGHTENING TORQUE (in daN.m)	
Oxygen sensor	**4.5**

REMOVING THE UPSTREAM OXYGEN SENSOR

Disconnect the battery (under the driver's seat for Scenic).

Remove the air filter unit (see section **12** Fuel mixture "**Air filter unit**").



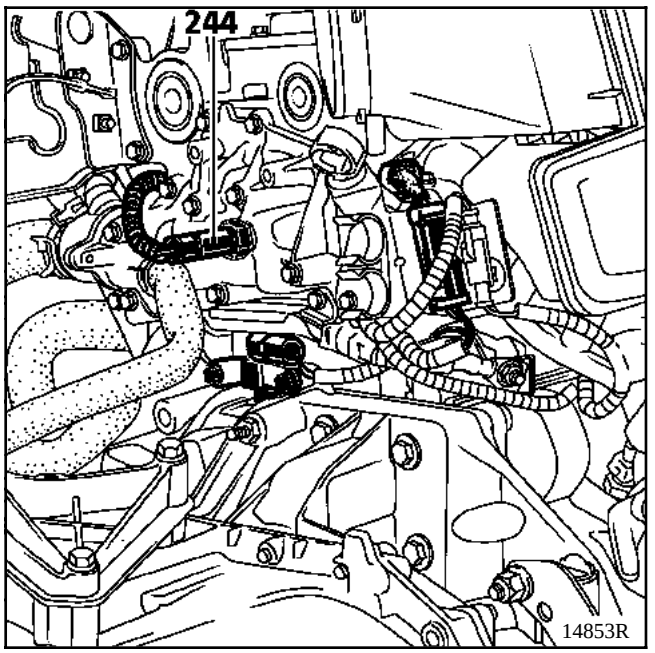
Disconnect and remove the oxygen sensor using **Mot. 1495**.

REFITTING

Refitting is the reverse of removal.

NOTE : check that the heat shield is correctly positioned between the oxygen sensor and the manifold (to prevent a chimney effect which would destroy the oxygen sensor connector).

GCTE



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

This system is equipped with a single coolant temperature sensor for the injection, the fan and the temperature warning light on the instrument panel.

Operation

Sensor **244** allows:
- indication of the coolant temperature on the instrument panel,
- the injection computer to be informed of the engine coolant temperature.

Depending on engine coolant temperature, the injection computer manages:
- the injection system,
- the fan relays,
  - the **engine cooling fan** is controlled at slow speed if coolant temperature exceeds **99 °C** and stops when the temperature becomes less than **95 °C**,
  - the **engine cooling fan** is controlled at fast speed if coolant temperature exceeds **102 °C** and stops when the temperature becomes less than **99 °C**,
  - the **engine cooling fan** may be controlled at slow speed for the anti-percolation device and at slow or fast speed for the AC.
- the temperature warning light.

COOLANT TEMPERATURE WARNING LIGHT

The warning light is controlled by the injection computer if the coolant temperature exceeds **118 °C**.

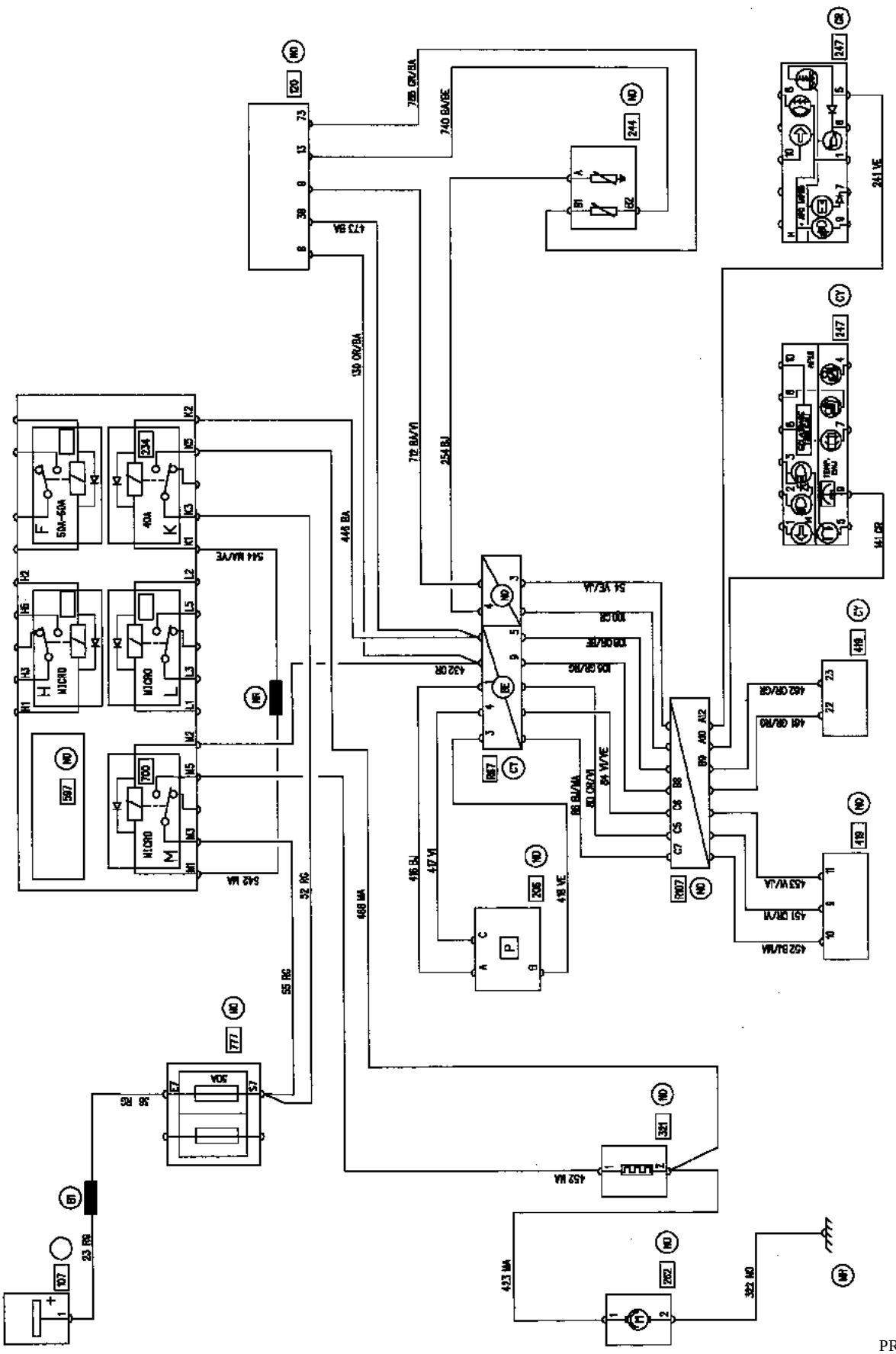
KEY TO COMPONENTS

120 Injection computer
206 AC pressostat
234 Fast speed fan assembly relay
244 Coolant temperature sensor
247 Instrument panel warning light and gauge
262 Engine cooling fan assembly (GMV)
321 Fan assembly resistance
419 AC control unit
700 Slow speed fan assembly relay

Specifications of the coolant temperature sensor

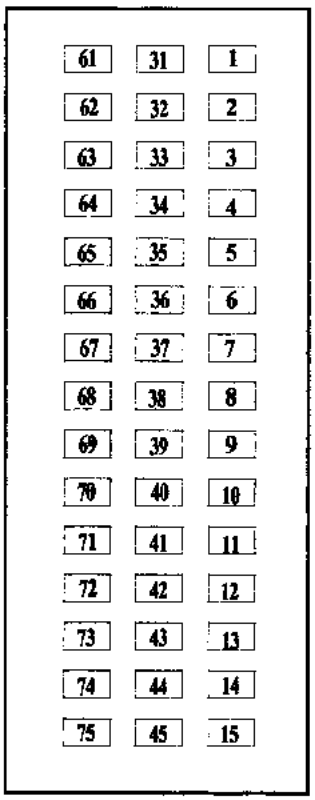
Temperature in °C (± 1°)	**20**	**40**	**80**	**90**
Coolant temperature sensor Type CTN Resistance in Ohms	3 060 to 4 045	1 315 to 1 600	270 to 300	210 to 270

Operating wiring diagram

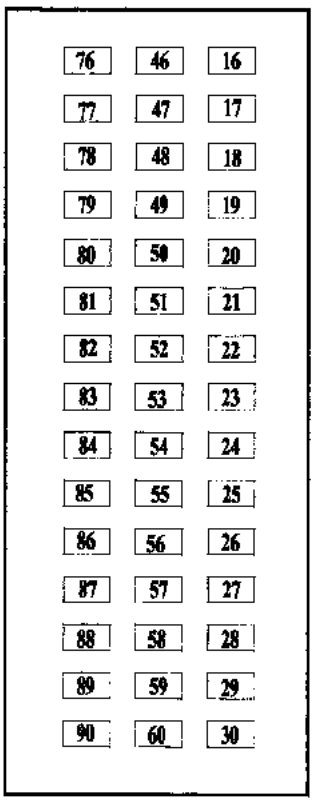


PRO15242

ALLOCATION OF INPUTS AND OUTPUTS FOR THE INJECTION COMPUTER



1	- - > - -	COIL CONTROL
3	- - - - -	EARTH
4	- - > - -	CANISTER SOLENOID VALVE CONTROL
8	- - > - -	FAN ASSEMBLY RELAY CONTROL (SLOW SPEED)
9	- - > - -	COOLANT TEMPERATURE WARNING LIGHT
10	- - > - -	AC COMPRESSOR CONTROL
11	- - > - -	ADAC OUTPUT
12	- - > - -	IDLE SPEED REGULATOR CONTROL
13	- - < - -	COOLANT TEMPERATURE INPUT
15	- - - - -	PRESSURE SENSOR EARTH
32	- - > - -	COIL CONTROL
33	- - - - -	EARTH
38	- - > - -	FAN ASSEMBLY RELAY CONTROL (FAST SPEED)
39	- - > - -	ACTUATOR RELAY CONTROL
41	- - > - -	IDLE SPEED REGULATOR CONTROL
42	- - > - -	IDLE SPEED REGULATOR CONTROL
43	- - < - -	THROTTLE POTENTIOMETER SIGNAL
45	- - < - -	UPSTREAM OXYGEN SENSOR SIGNAL
63	- - > - -	UPSTREAM OXYGEN SENSOR HEATING CONTROL
66	- - - - -	POSITIVE AFTER RELAY FEED
68	- - > - -	FUEL PUMP RELAY CONTROL
70	- - > - -	ENGINE SPEED INFORMATION
72	- - > - -	IDLE SPEED REGULATOR CONTROL
73	- - - - -	COOLANT TEMPERATURE SENSOR EARTH
74	- - - - -	THROTTLE POTENTIOMETER SUPPLY
75	- - - - -	THROTTLE POTENTIOMETER EARTH



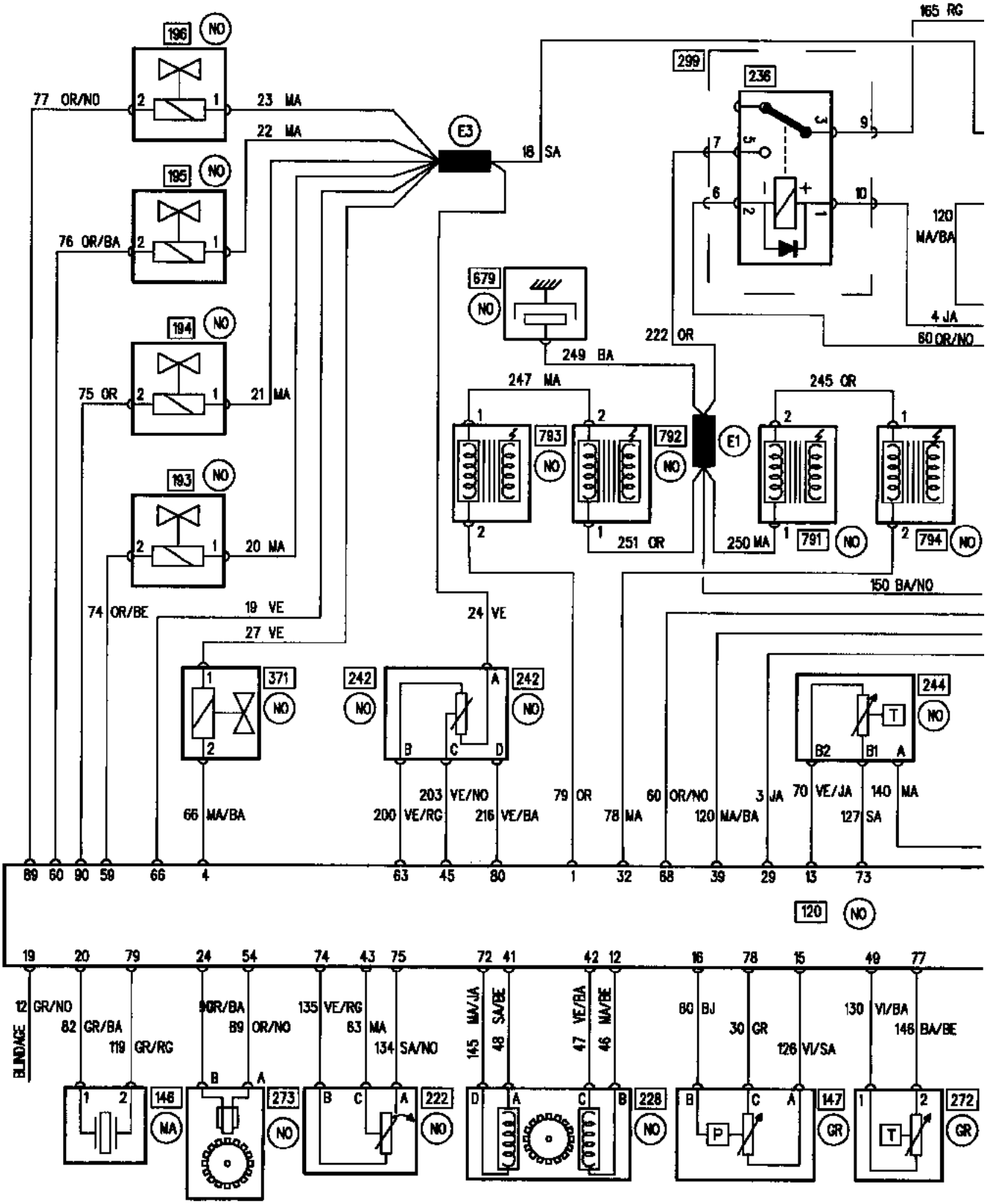
16	- - < - -	PRESSURE SENSOR SIGNAL
19	- - - - -	PINKING SENSOR SCREENING
20	- - < - -	PINKING SENSOR SIGNAL
23	- - < - -	CONSUMED POWER INFORMATION (AC COMPRESSOR)
24	- - < - -	ENGINE SPEED SENSOR SIGNAL
26	- <> -	FAULT FINDING
28	- - - - -	EARTH
29	- - - - -	POSITIVE AFTER IGNITION FEED
30	- - - - -	POSITIVE BEFORE IGNITION FEED
49	- - < - -	AIR TEMPERATURE SENSOR INPUT
53	- - < - -	VEHICLE SPEED
54	- - < - -	ENGINE SPEED SENSOR SIGNAL
56	- <> -	FAULT FINDING
58	- - < - -	ENGINE IMMOBILISER INPUT
59	- - > - -	INJECTOR CONTROL 1
60	- - > - -	INJECTOR CONTROL 3
77	- - - - -	AIR TEMPERATURE SENSOR EARTH
78	- - - - -	PRESSURE SENSOR SUPPLY
79	- - - - -	PINKING SENSOR EARTH
80	- - - - -	UPSTREAM OXYGEN SENSOR EARTH
85	- - < - -	PAS PRESSOSTAT
89	- - > - -	INJECTOR CONTROL 4
90	- - > - -	INJECTOR CONTROL 2

- - < - - **INPUT**
- - > - - **OUTPUT**

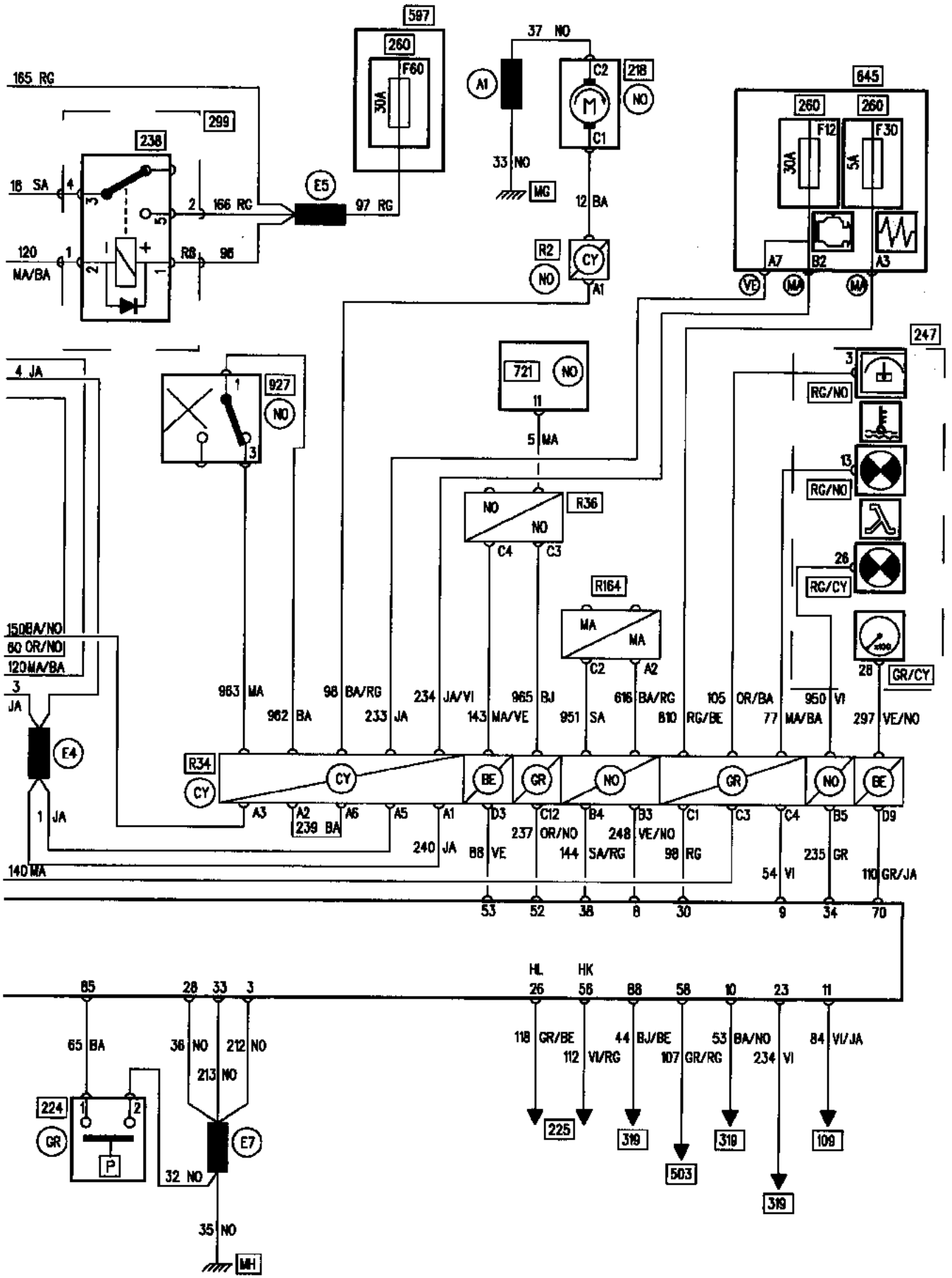
PRO15097

KEY TO COMPONENTS

109	Computer
120	Injection computer
146	Pinking sensor
147	Temperature sensor
193, 194	
195, 196	Injectors
218	Fuel pump
222	Throttle potentiometer
224	Power assisted steering pressostat
225	Diagnostic socket
228	Idle speed regulator
236, 238	Control relay
242	Oxygen sensor
244	Coolant temperature sensor
247	Instrument panel
272	Air temperature sensor
273	Speed threshold sensor
299	Relay board
319	AC control panel
371	Canister solenoid valve
503	Electronic decoder unit
645	Passenger compartment UCE
679	Anti-interference condenser
791, 792	
793, 794	Ignition coils
721	ABS computer assembly
927	Impact sensor


196 NO
195 NO
194 NO
193 NO
77 OR/NO
23 MA
22 MA
76 OR/BA
75 OR
21 MA
20 MA
74 OR/BE
19 VE
27 VE
E3
18 SA
165 RG
299
236
120 MA/BA
4 JA
60 OR/NO
679 NO
222 OR
249 BA
247 MA
245 OR
793 NO
792 NO
E1
791 NO
794 NO
251 OR
250 MA
150 BA/NO
24 VE
371 NO
242 NO
242 NO
244 NO
66 MA/BA
200 VE/RG
203 VE/NO
216 VE/BA
79 OR
78 MA
60 OR/NO
120 MA/BA
3 JA
70 VE/JA
140 MA
127 SA
89 60 90 58 66 4 63 45 80 1 32 68 39 29 13 73
120 NO
19 20 79 24 54 74 43 75 72 41 42 12 16 78 15 49 77
12 GR/NO
82 GR/BA
119 GR/RG
90 GR/BA
89 OR/NO
135 VE/RG
83 MA
134 SA/NO
145 MA/JA
48 SA/BE
47 VE/BA
46 MA/BE
80 BJ
30 GR
126 VI/SA
130 VI/BA
148 BA/BE
BLINDAGE
146 MA
273 NO
222 NO
228 NO
147 GR
272 GR

PRO15846G


597
260
F60
30A
165 RG
299
238
18 SA
166 RG
E5
97 RG
120 MA/BA
RB
96
37 NO
A1
C2
218
NO
C1
33 NO
MG
12 BA
R2
NO
CY
A1
645
260
260
F12
F30
30A
5A
A7
B2
A3
VE
MA
MA
247
3
RG/NO
13
RG/NO
26
RG/CY
28
GR/CY
721
NO
11
5 MA
927
NO
1
3
4 JA
R36
NO
NO
C4
C3
R164
MA
MA
C2
A2
150 BA/NO
60 OR/NO
120 MA/BA
3
JA
E4
1 JA
140 MA
963 MA
962 BA
98 BA/RG
233 JA
234 JA/VI
143 MA/VE
965 BJ
951 SA
616 BA/RG
810 RG/BE
105 OR/BA
77 MA/BA
950 VI
297 VE/NO
R34
CY
CY
BE
GR
NO
GR
NO
BE
A3
A2
239 BA
A6
A5
A1
D3
C12
B4
B3
C1
C3
C4
B5
D9
240 JA
88 VE
237 OR/NO
144 SA/RG
248 VE/NO
98 RG
54 VI
235 GR
110 GR/JA
53
52
38
8
30
9
34
70
HL
HK
85
28
33
3
26
56
88
58
10
23
11
65 BA
36 NO
212 NO
213 NO
118 GR/BE
112 VI/RG
44 BJ/BE
107 GR/RG
53 BA/NO
234 VI
84 VI/JA
224
1
2
GR
P
E7
32 NO
35 NO
MH
225
319
503
319
319
109

PRO15846D

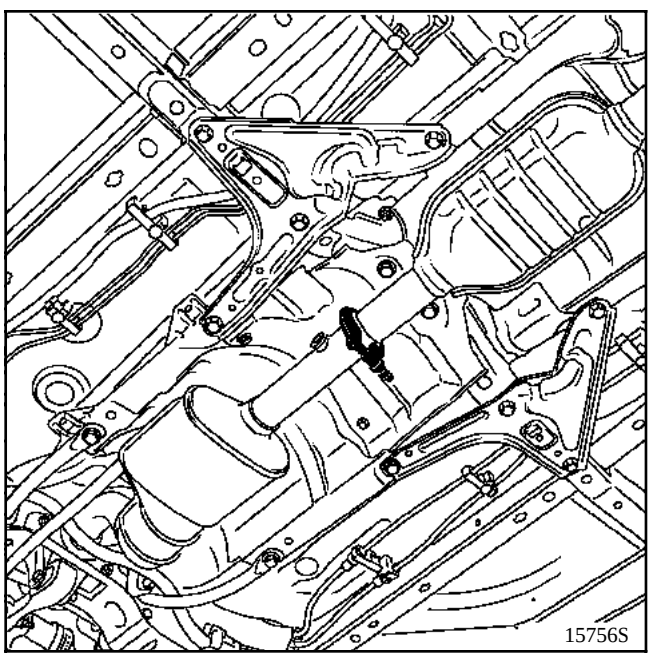
TIGHTENING TORQUES (in daN.m)	
Three point bracket nuts	**2**

REMOVAL

Disconnect the battery.

Remove the air filter unit (see section **12 Fuel mixture** "**Air filter unit**").

Place the vehicle on a two post lift.



Release the catalytic converter from the silencer pipe.

Remove the heat shields protecting the body.

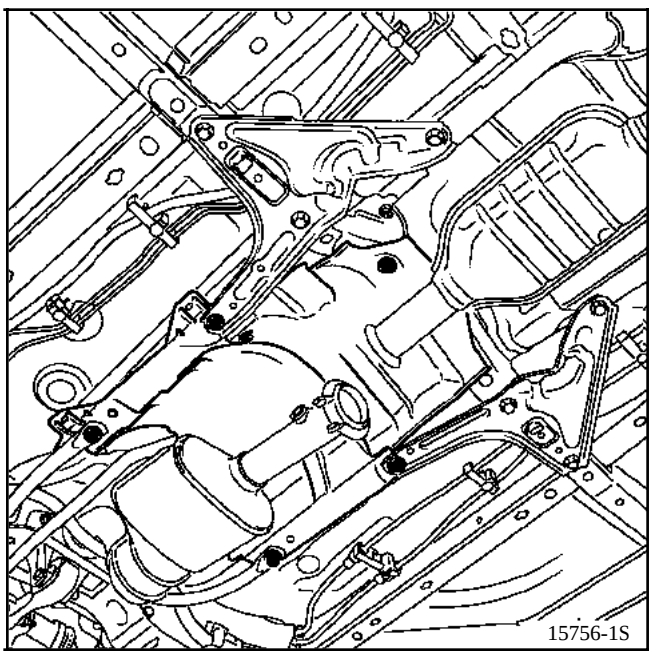
Release the exhaust downpipe.

Remove the catalytic converter. To make it easier to pass it between the sub-frame and the body, lower the body a few millimetres (see method described below).

REFITTING

Replace the three point bracket seal and the exhaust clip.

Observe the tightening torques for the exhaust downpipe.



IMPORTANT: renew any damaged heat shields to avoid the risk of a fire.

TIGHTENING TORQUES (in daN.m)	
Engine tie bar bolt	**6.2**
Steering shaft yoke mounting bolt	**3**
Engine sub-frame bolt	
- front, diameter 10	**6.2**
- rear, diameter 12	**10.5**
Three point bracket nut	**2**
Sub-frame - side member tie rod bolt	**3**

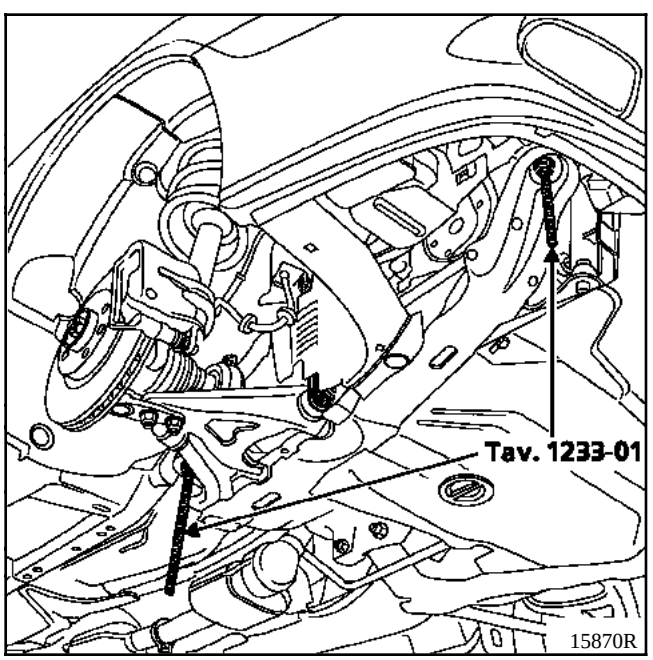
Disconnect the battery under the driver's seat and place the vehicle on a two post lift.

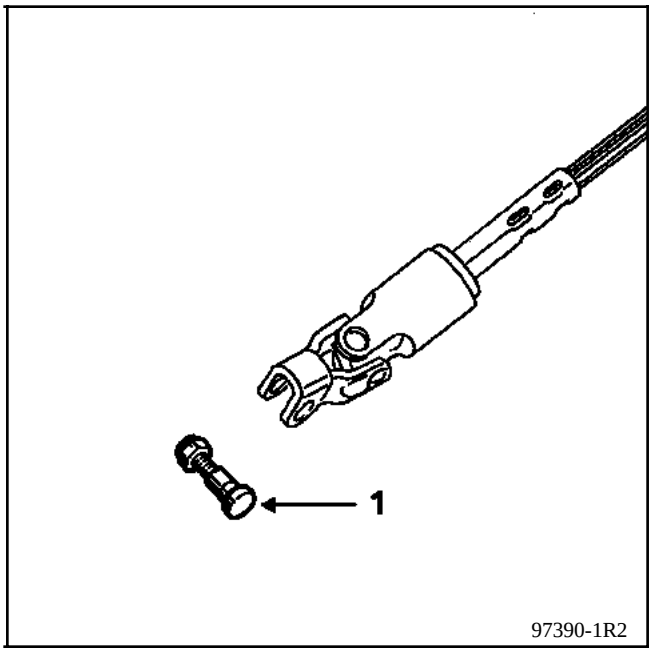
Fit a steering wheel locking tool.

Remove the air filter unit (see section **12 Fuel mixture** "**Air filter unit**").

Slacken the catalytic converter / exhaust manifold mountings.

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





Remove:
- the sub-frame tie rod bolts,
- the steering shaft yoke nut and eccentric bolt ,
- the engine tie bar.

Disconnect the oxygen sensor located downstream from the catalytic converter if one is fitted to the vehicle.

Lower the sub-frame by **20 mm** at the front and **40 mm** at the rear.

Remove the exhaust pipe mounting clip.

Remove the catalytic converter mounting nuts and remove it, taking care to avoid damaging the heat shields.

REFITTING

Refitting is the reverse of removal.

IMPORTANT: renew any damaged heat shields to avoid the risk of a fire.

SPECIAL TOOLING REQUIRED	
Mot. 1397	**Universal wrench for removing sender unit nut**

IMPORTANT :
During all operations on the fuel tank or on the fuel supply circuit:
- **do not smoke and keep all incandescent objects away from the working area,**
- **take precautions to protect against fuel splashes due to the residual pressure in the pipes.**

REMOVAL

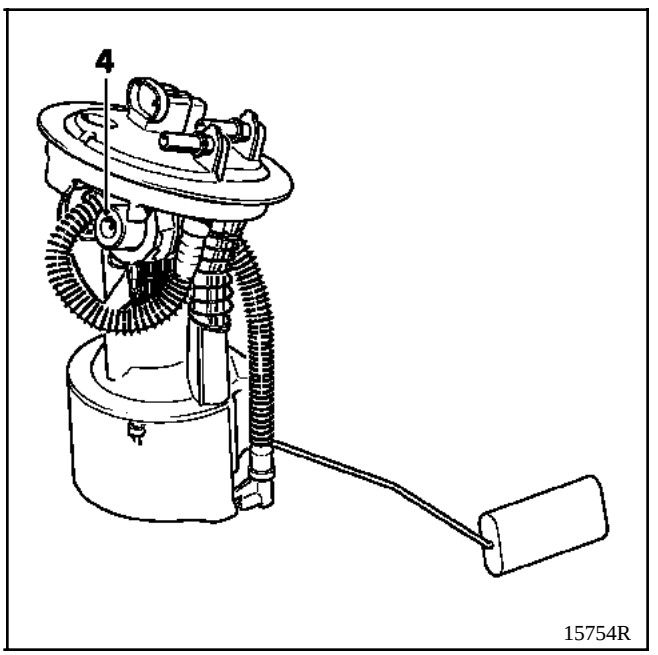
The fuel tank does not need to be removed to remove the pump and sender unit assembly. It can be reached via an access cover in the vehicle. To do this:
- disconnect the battery (under the driver's seat for Scenic),
- remove the access cover,
- disconnect the connector,
- disconnect the fuel supply and tank return pipes .

Remove the mounting nut using tool **Mot. 1397** (release the nut, remove the tool, unscrew the nut by hand then remove it).

Carefully remove the pump and sender unit assembly which contains the pressure regulator (depending on version).

NOTE : screw the nut back onto the fuel tank as soon as possible, even if the pump and sender unit is not refitted, to avoid any deformation.

Do not leave the nut off for more than a quarter of an hour.



NOTE : for vehicles operating without a pipe returning fuel from the engine to the tank, the pressure regulator (4) is located on the pump and sender unit assembly. It cannot be removed.

REFITTING

The O ring must be replaced.

Coolant circulates continuously in the heater matrix, assisting with engine cooling.

FILLING

The bleed screw on the cylinder head coolant outlet unit MUST be opened.

Fill the circuit through the expansion bottle opening.

Close the bleed screw as soon as the coolant comes out in a continuous jet.

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

Adjust the level by overflow for approximately **4 minutes**.

Close the reservoir.

BLEEDING

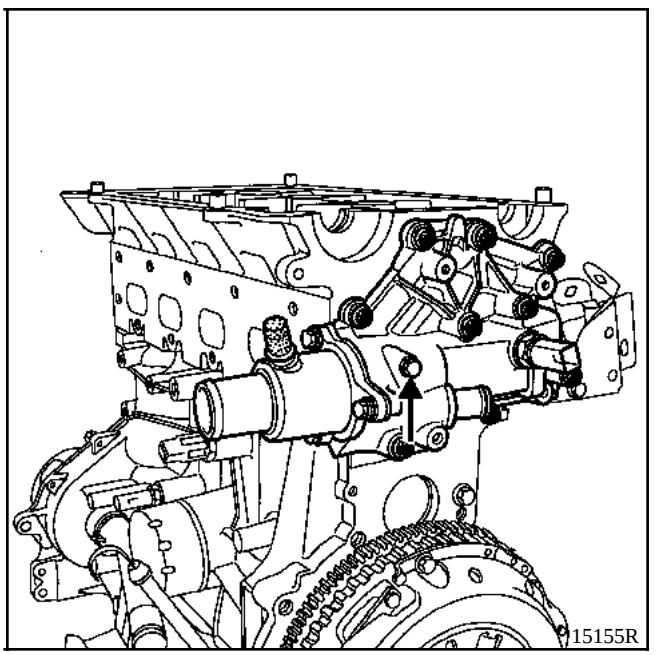
Let the engine run for **20 minutes** at **2 500 rpm**, until the engine cooling fan(s) operate(s) (time required for automatic degassing).

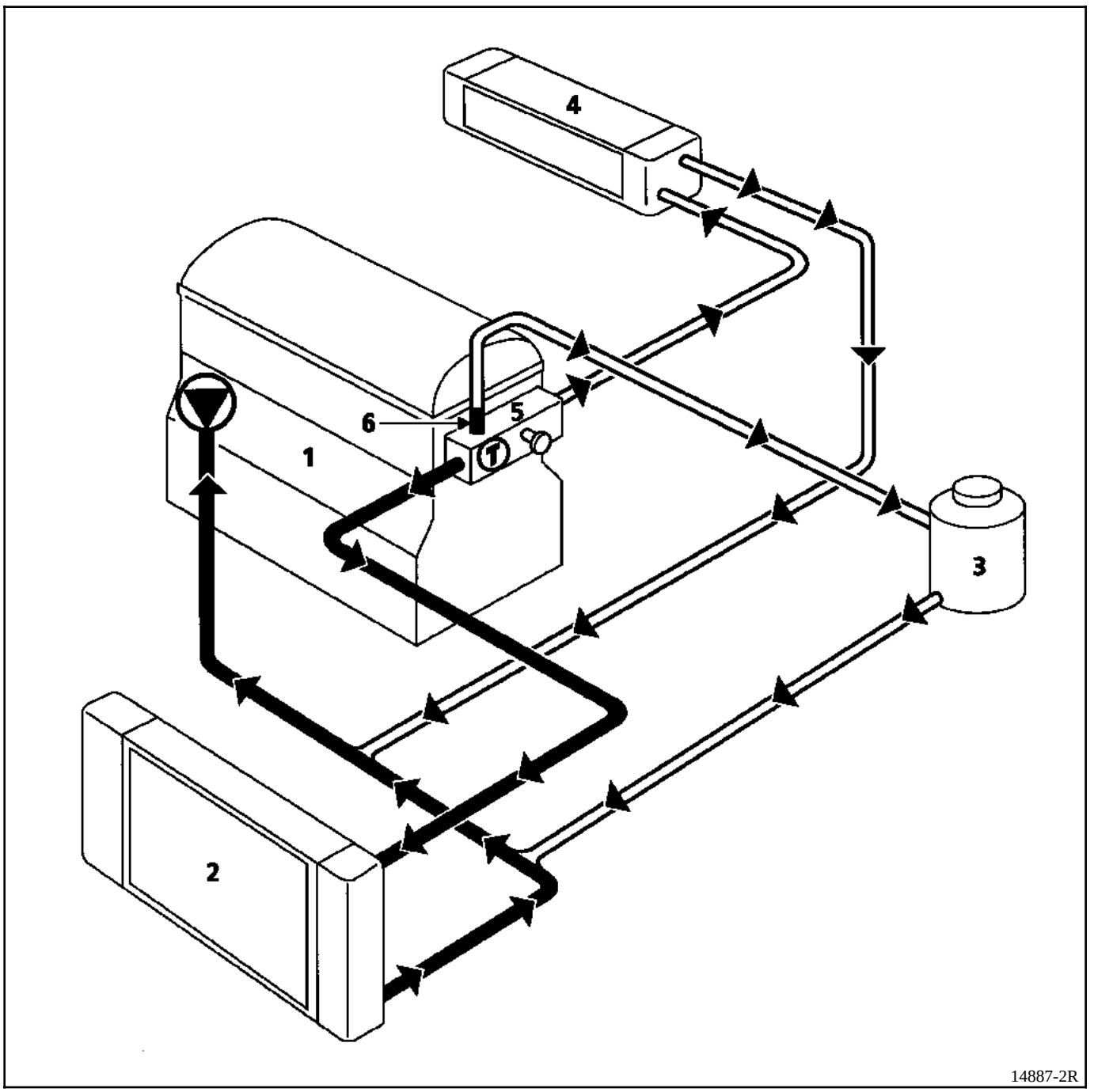
Check whether the fluid level is close to the "**Maximum**" mark.

DO NOT OPEN THE BLEED SCREW WHEN THE ENGINE IS RUNNING

RETIGHTEN THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM

Location of the bleed screw on the coolant unit





1 Engine
2 Radiator
3 "Hot" bottle with degassing after thermostat
4 Heater matrix
5 Thermostat mounting
6 3 mm diameter restriction

Water pump

Thermostat

Bleed valve

The rating value for the expansion bottle valve is **1.2 bar** (brown).

SPECIAL TOOLING REQUIRED	
Mot. 1448	**Hose clip pliers with extension**

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

Remove the engine undertray.

Drain the cooling circuit from the lower radiator hose.

Disconnect the fan assembly connections.

Special notes for Scenic with AC

Remove:
- the two direction indicators,
- the radiator half grilles,
- the upper cross member.

All types

Remove:
- the air resonator,
- the dehydration canister mountings (if AC is fitted) on the fan assembly.

Unclip:
- the AC pipes on the fan assembly, move them towards the engine and attach them (for Scenic with AC),
- the PAS reservoir on the fan assembly and move it to one side.

Remove:
- the fan mountings on the radiator and remove it,
- the radiator mountings on the condenser (if AC is fitted) or on the air deflector (version without AC) and remove it.

REFITTING

Refitting is the reverse of removal.

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

NOTE : ensure that the fins on the radiator and condenser (if fitted) are not damaged during removal and refitting. Protect them if necessary.

SPECIAL TOOLING REQUIRED	
Mot. 1448	**Hose clip pliers with extension**

TIGHTENING TORQUES (in daN.m)		
Water pump bolt	**M6**	**1**
	M8	**2.2**

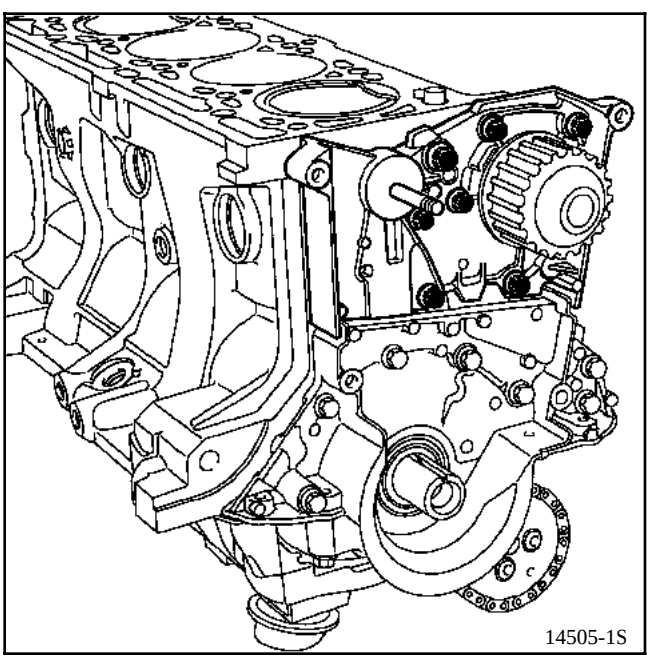
REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

Drain the cooling circuit via the lower radiator hose.

Remove:
- the timing belt (see section **11** "**Timing belt**"),
- the tension wheel for the timing,
- the water pump.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Cleaning

It is very important not to scratch the sealing surfaces.

Use **Décapjoint** to dissolve any part of the seal which remains adhered.

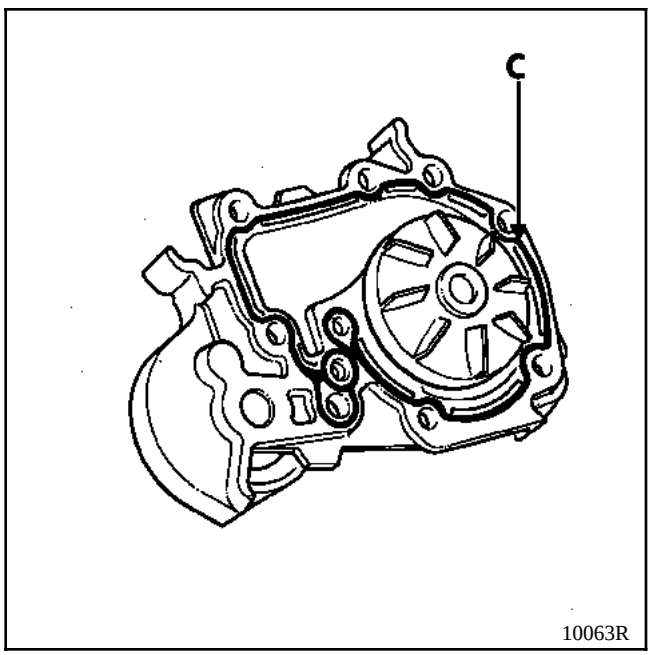
Apply the product to the section to be cleaned ; wait for approximately ten minutes, then remove using a wooden spatula.

Gloves should be worn during the operation.

Do not drop any of the product onto the paintwork.

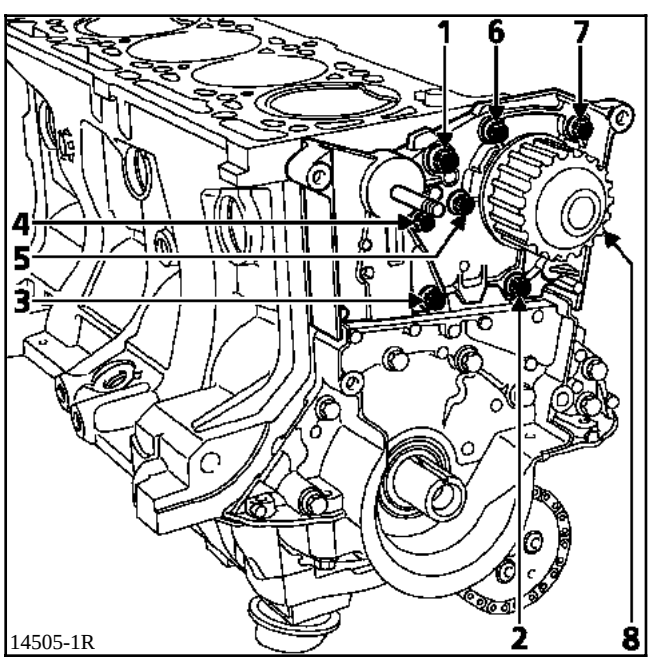
REFITTING

Refit the water pump, sealing it with **Loctite 518**, the bead (C) should be **0.6** to **1 mm** wide and should be applied according to the diagram below.

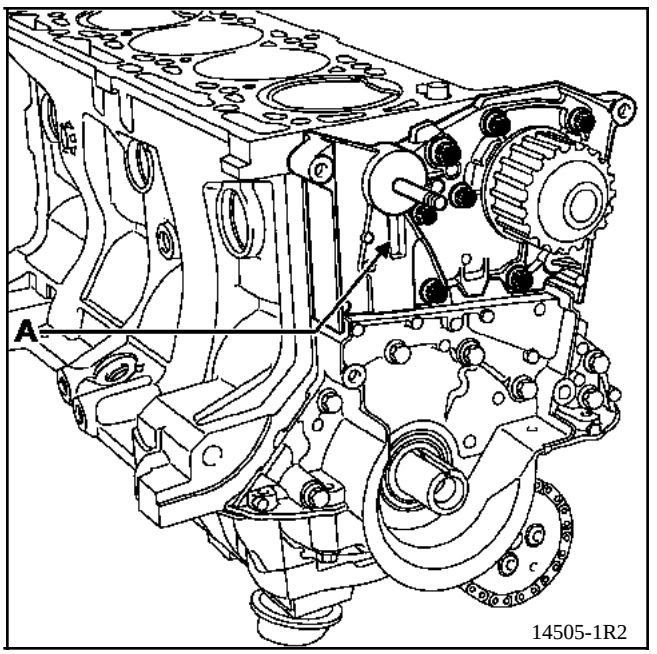


Pretighten bolts **M6 and M8** to **0.8 daN.m** then tighten **M6 bolts** to **1.1 daN.m** and **M8 bolts** to **2.2 daN.m** in the recommended order.

NOTE: put 1 to 2 drops of **Loctite FRENETANCH** on bolts **1 and 4** of the water pump.



Refit:
- the timing belt tension wheel, by correctly positioning the wheel lug in the groove (A),



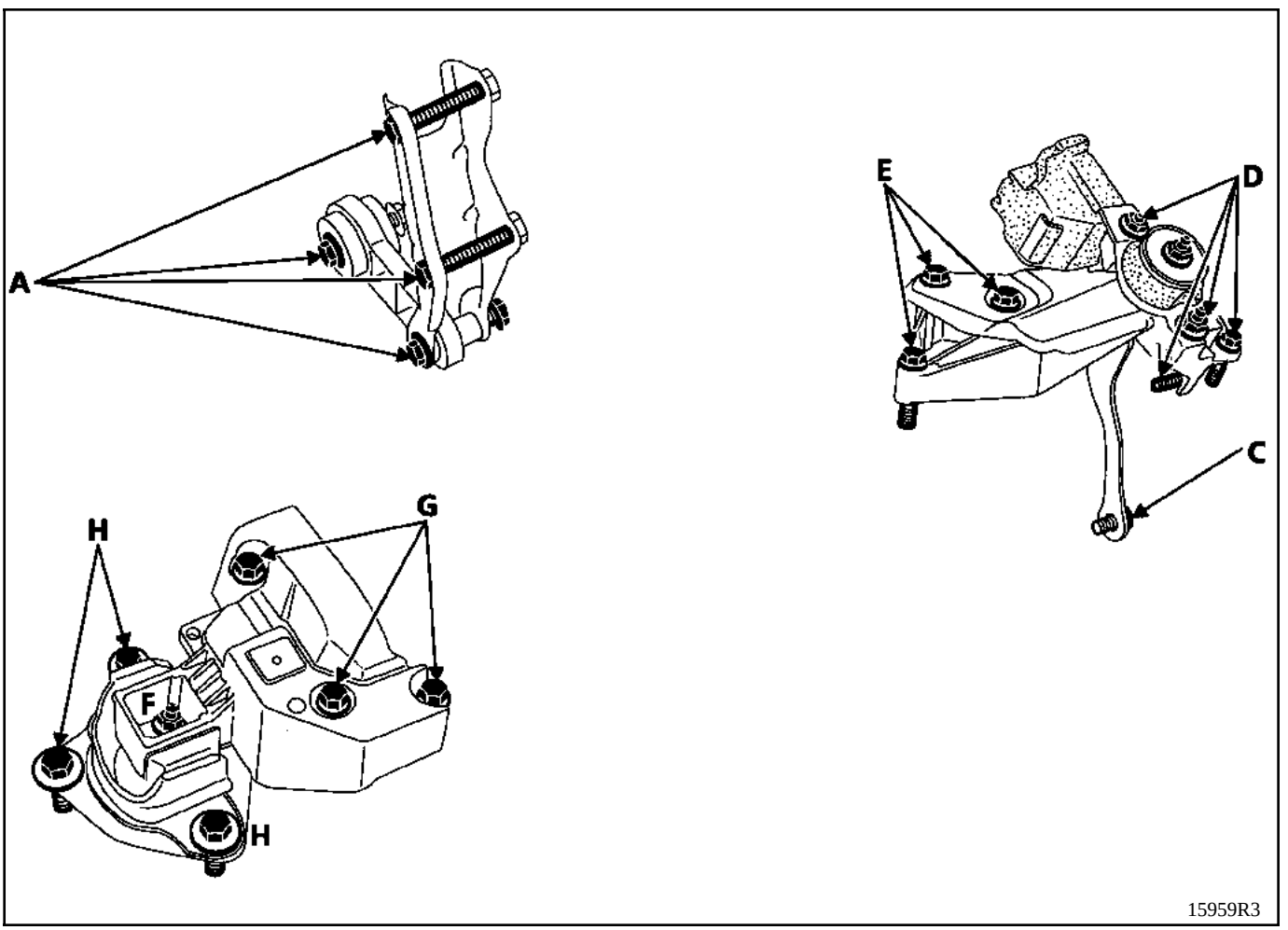
- the timing belt (the methods described in **section 07** "**Tensioning procedure - Timing belt**" and in **section 11** "**Timing belt**" must be observed).

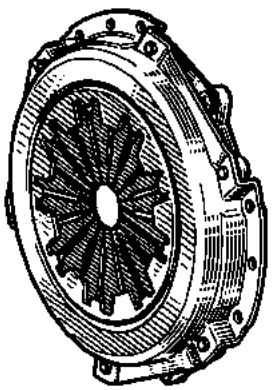
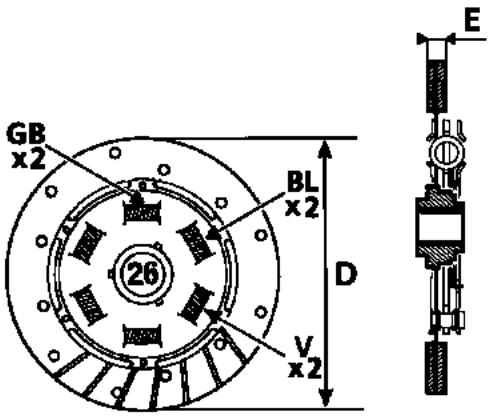
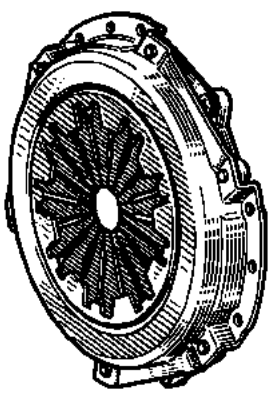
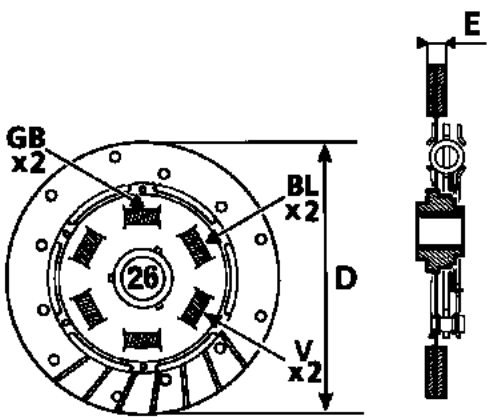
Fill and bleed the cooling circuit (see section **19** "**Filling - Bleeding**").

TIGHTENING TORQUE (daN.m)

A	6.2
B	6.2
C	4.4
D	2.1

E	4.4
F	4.4
G	6.2
H	6.2



VEHICLE TYPE	ENGINE TYPE	MECHANISM	DISC
XA0W	K4J	 85873S **200 CPO 3500**	**26 splines** GB : Grey Blue D = 200 mm BL : Blue Lilac E = 6.8 mm V : Green  90693R13 76906R
XA0B XA04	K4M	 85873S **215 CPOV 4000**	**26 splines** GB : Grey Blue D = 200 mm BL : Blue Lilac E = 6.8 mm V : Green  90693R13 76906R

Single disc clutch operating dry with cable control.

Clutch thrust bearing under constant pressure.

REPLACEMENT (after removal of the gearbox)

SPECIAL TOOLING REQUIRED	
Mot. 582	
or	**Locking sector**
Mot. 582-01	

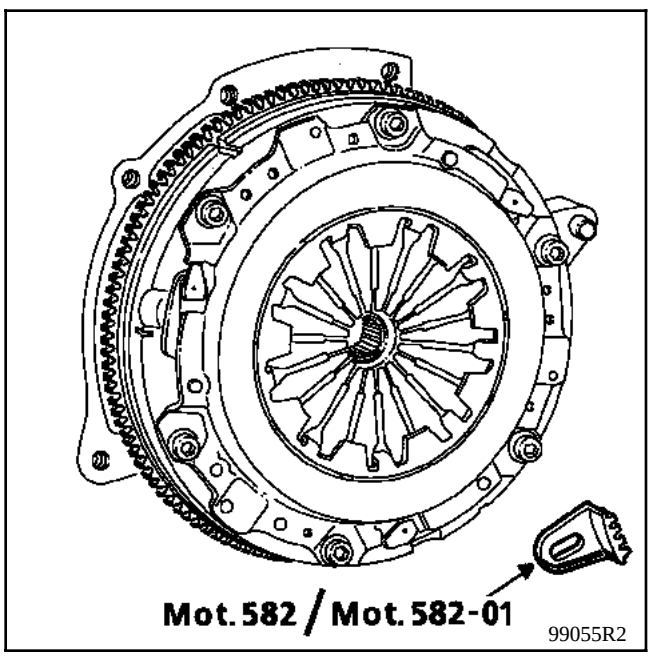
TIGHTENING TORQUE (in daN.m)	
Mechanism mounting bolt	**1.8**

REMOVAL

Fit the locking sector **Mot. 582** or **Mot. 582-01**.

Remove the mechanism mounting bolt and remove the friction disc.

Check and change the faulty components.

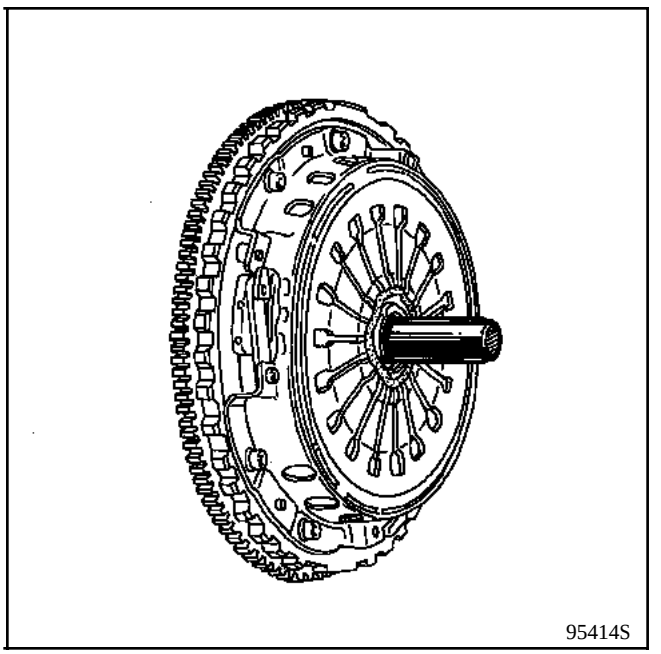


REFITTING

Clean the clutch shaft splines and refit the assembly **without lubricant**.

Fit the disc (hub offset on gearbox side).

Centre it using the tool supplied with the spare part kit.



Gradually tighten in a star pattern then torque tighten the mechanism mounting bolts.

Remove the locking sector **Mot. 582** or **Mot. 582-01**.

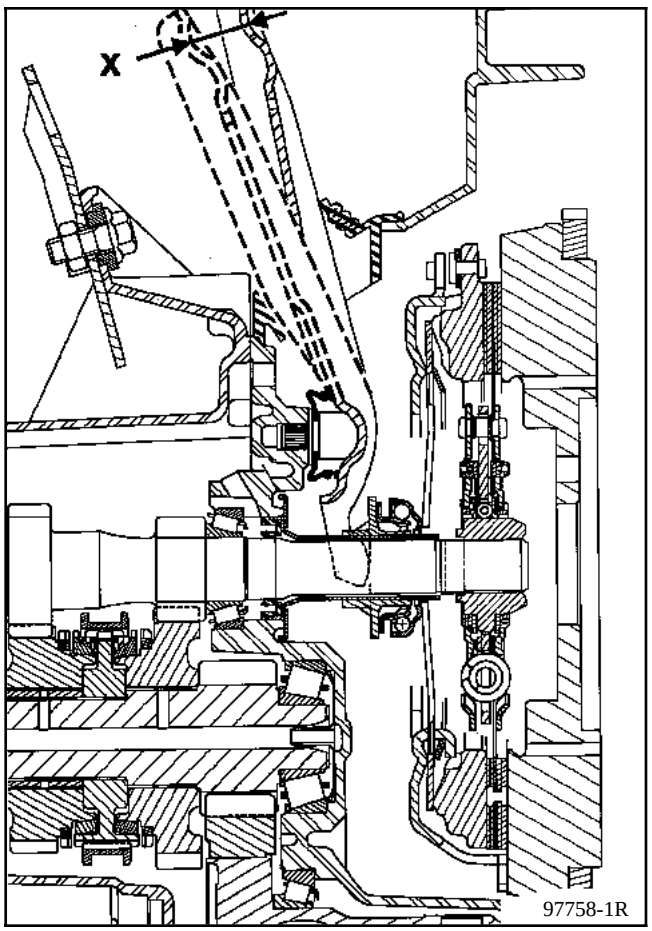
Coat the following with **MOLYKOTE BR2**:
- the guide tube,
- the fork pads.

After refitting the gearbox, place the cable on the clutch fork, reset the notched sector and check the operation of the wear compensation.

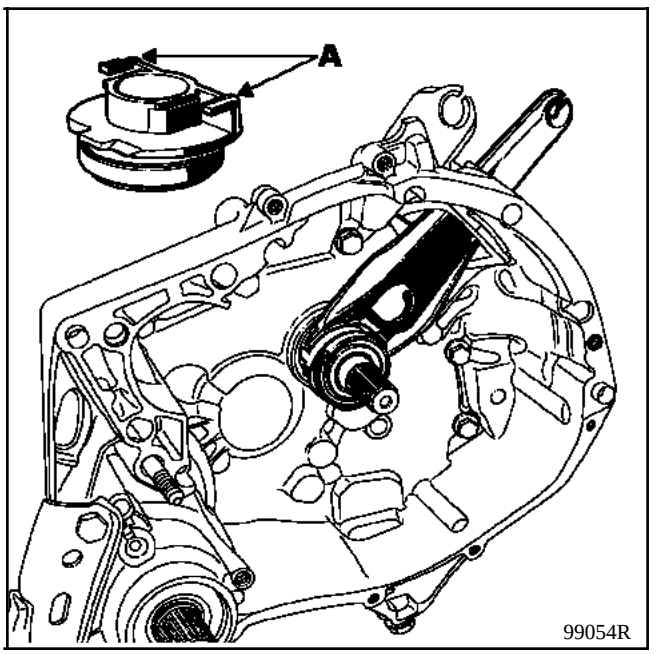
Check clutch travel.

Fork travel should be:

X = 27 to **30.5 mm**

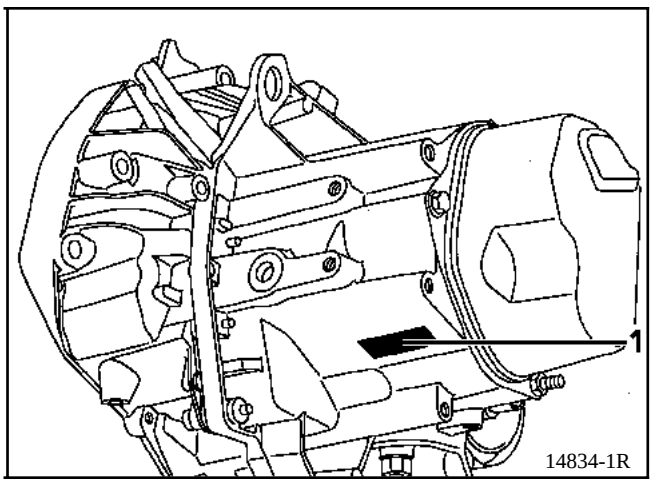


NOTE: when an operation does not require removal of the gearbox or after it is fitted, **DO NOT LIFT** the fork as it may become detached from the notch (A) of the thrust bearing.



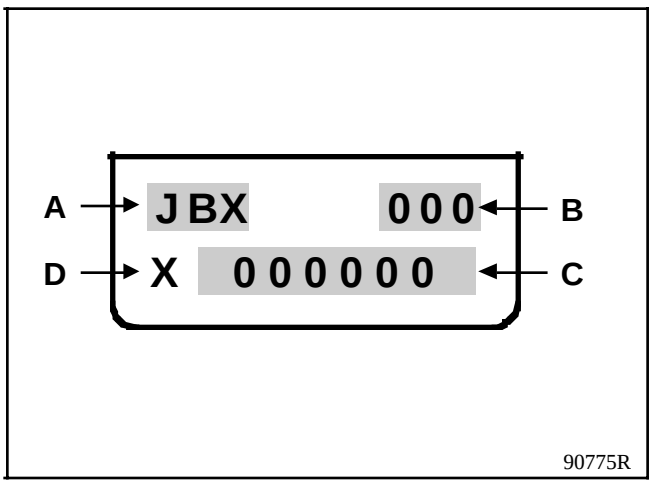
"**MEGANE**" vehicles with **K4M** and **K4J** engines are fitted with **JB** type manual gearboxes.

Workshop Repair Manual "**B.V. JB/JC**" deals with the complete repair of this component.



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

A Type of gearbox
B Gearbox suffix
C Fabrication number
D Factory of manufacture



JB1									
Suffix	**Vehicle**	**Differential ratio**	**Speedo drive gear**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Reverse**
186	BA0W EA0W DA0W LA0W	15 / 61	21 / 19	11 / 37	22 / 41	28 / 37	34 / 35	39 / 31	11 / 39
946	BA0W EA0W DA0W LA0W		-						

JB3									
Suffix	**Vehicle**	**Differential ratio**	**Speedo drive gear**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Reverse**
110	BA0W KA0W LA0W	14 / 59	22 / 18	11 / 41	21 / 43	28 / 39	34 / 35	39 / 32	11 / 39
183	JA0B JA04			11 / 37	22 / 41	28 / 37			
189	BAM4 LAM4		21 / 18				30 / 29	39 / 31	
193	BAM4 LAM4							41 / 31	
199	BA0B BA04 DA0B DA04 EA0B EA04 KA0B KA04 LA0B LA04	15 / 61						39 / 32	
902	JA0W	14 / 59	22 / 18	11 / 41	21 / 43	28 / 39	34 / 35		
912	JAM4	14 / 63		11 / 37	22 / 41	28 / 37		39 / 31	
916	JA0B JA04	14 / 59						39 / 32	
917	JA0W			11 / 41	21 / 43	28 / 39			
918	JAM4	14 / 63		11 / 37	22 / 41	28 / 37		39 / 31	
919	BA0W KA0W LA0W	14 / 59	-	11 / 41	21 / 43	28 / 39		39 / 32	
928	BA0B BA04 DA0B DA04 EA0B EA04 KA0B KA04 LA0B LA04	15 / 61		11 / 37	22 / 41	28 / 37			
933	JA0B JA04	14 / 59							
934	JA0W			11 / 41	21 / 43	28 / 39			
936	JA0B JA04			11 / 37	22 / 41	28 / 37			

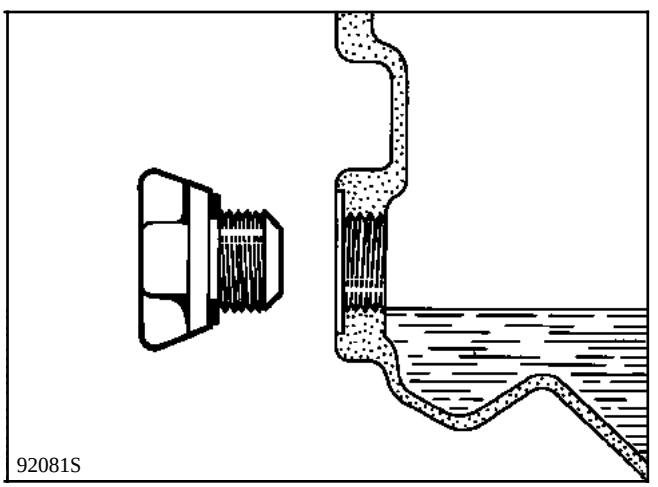
NOTE : JB1 946 and **JB3 919, 928, 933, 934** and **936** gearboxes have no speedometer.

CAPACITY (in litres)

5 speed gearbox	
JB1/JB3	3.4 litres

Viscosity grade
TRX 75W 80W

CHECKING THE LEVEL



Fill to the level of the opening.

TYPE	PACKAGING	PART NUMBER	COMPONENT
MOLYKOTE BR2	1 kg tin	77 01 421 145	Right hand sunwheel splines Fork pivot Thrust pad guide Fork pads } Clutch
LOCTITE 518	24 ml syringe	77 01 421 162	Housing assembly face
RHODORSEAL 5661	100 g tube	77 01 404 452	Threaded plugs and switches Bearing plugs Ends of the roll pins on driveshafts
LOCTITE FRENBLOC (locking and sealing resin)	24 cc bottle	77 01 394 071	Primary and secondary shaft nuts Fixed gear and hub for 5th gear Differential lock drive stud

Components to be systematically replaced

Once they have been removed :
- lip seals,
- O ring seals,
- clutch thrust bearing guide tubes,
- secondary and differential shaft nuts,
- the speedo gear and its shaft,
- the speedo crown gear,
- the roll pins,
- the rings under the gears.

SPECIAL TOOLING REQUIRED		
Elé.	1294 -01	Tool for removing windscreen wiper arm
Mot.	1040 -01	Dummy sub-frame for removal-refitting of the engine and transmission assembly
T.Av.	476	Ball joint extractor

EQUIPMENT REQUIRED
Engine support tool Component jack

TIGHTENING TORQUES (in daN.m)	
Drain plug	2.2
Wheel bolts	9
Brake caliper mounting bolts	4
Track rod end nut	3.5
Driveshaft gaiter mounting bolts	2.5
Lower ball joint mounting bolt	6.5
Shock absorber base bolt	18
Sub-frame - side member tie-rod bolts	3
Gearbox control link mounting bolt	2.8
Engine tie bar bolt	6.2
Steering box mounting bolt	5
Steering shaft yoke mounting bolt	3
Sub-frame front mounting bolt	6.2
Sub-frame rear mounting bolt	10.5
Gearbox support upper mounting bolt	6.2
Bolts at edge of gearbox and starter motor	3

REMOVAL

Place the vehicle on a two post lift.

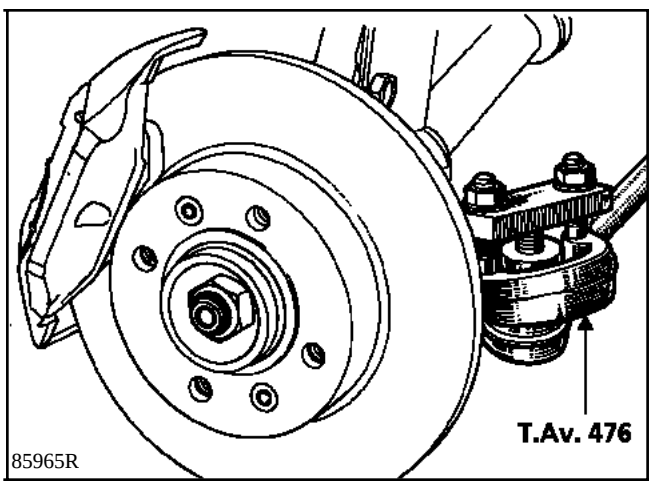
Remove the battery (under the driver's seat for Scenic).

Remove:
- the front wheels,
- the engine undertray.

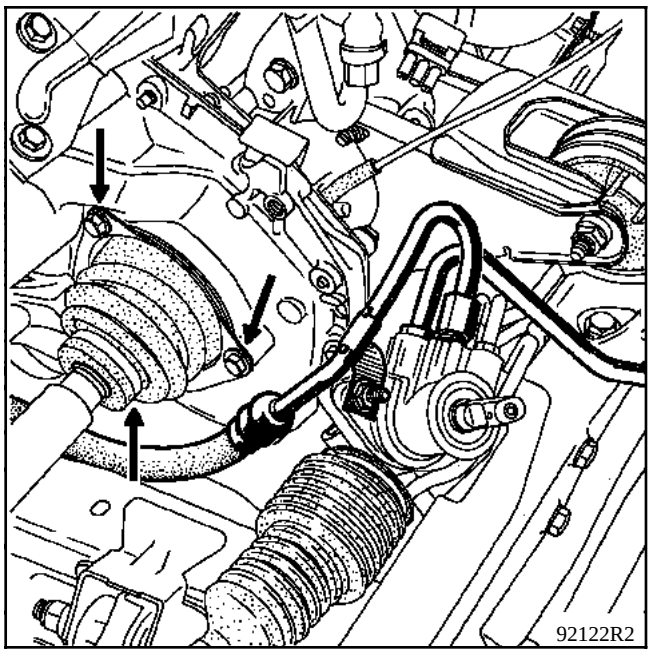
Drain the gearbox.

Left hand side of the vehicle

Remove:
- the wheel arch protector,
- the brake caliper and attach it to the suspension spring,
- the ABS sensor,
- the track rod end using tool **T.Av. 476**,



- the three mounting bolts for the driveshaft gaiter,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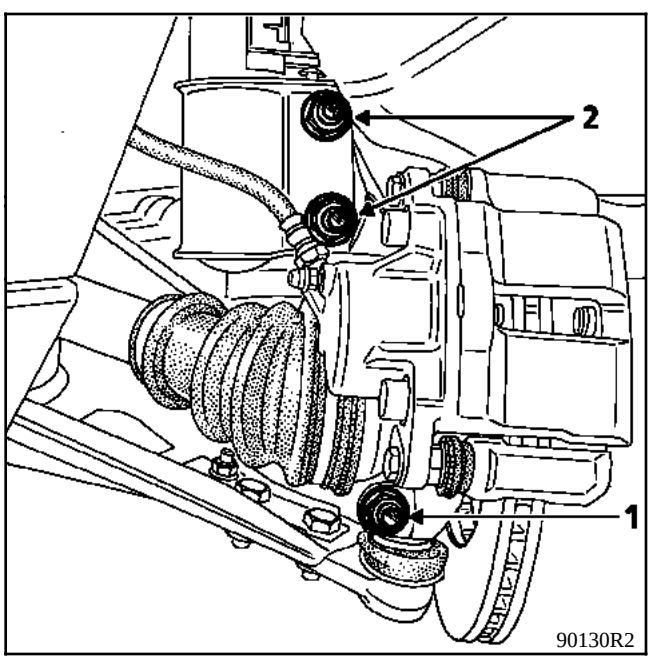
- mounting (1) for the lower ball joint,
- the two shock absorber base bolts (2),
- the left hand driveshaft.



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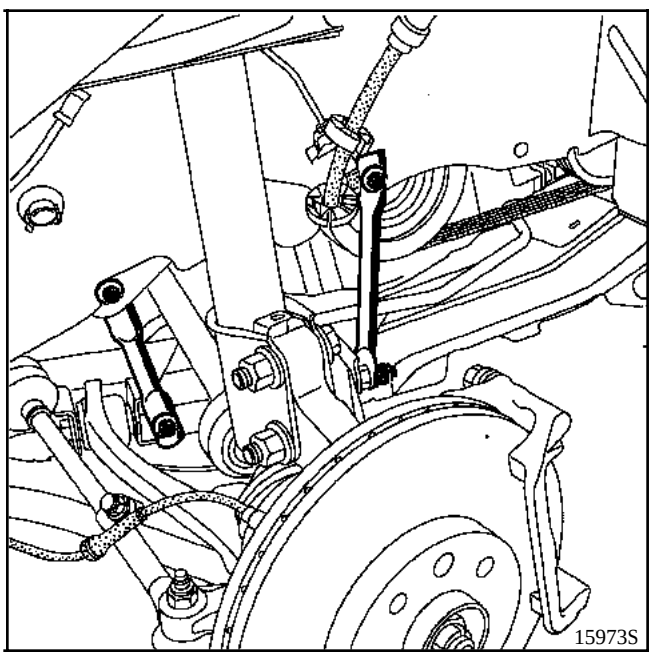
Right hand side of the vehicle

Remove:
- the wheel arch protector,
- the brake caliper and attach it to the suspension spring,
- the ABS sensor,
- the track rod end using tool **T.Av. 476**,
- the mounting for the lower ball joint,
- the two shock absorber base bolts,
- the driveshaft - stub axle carrier assembly, disconnecting it from the lower ball joint.

Check that the driveshaft rollers do not come out by hand.
If they do, check on refitting that the needle bearings have not fallen into the gearbox.

Remove the two sub-frame - body tie rods on each side of the vehicle.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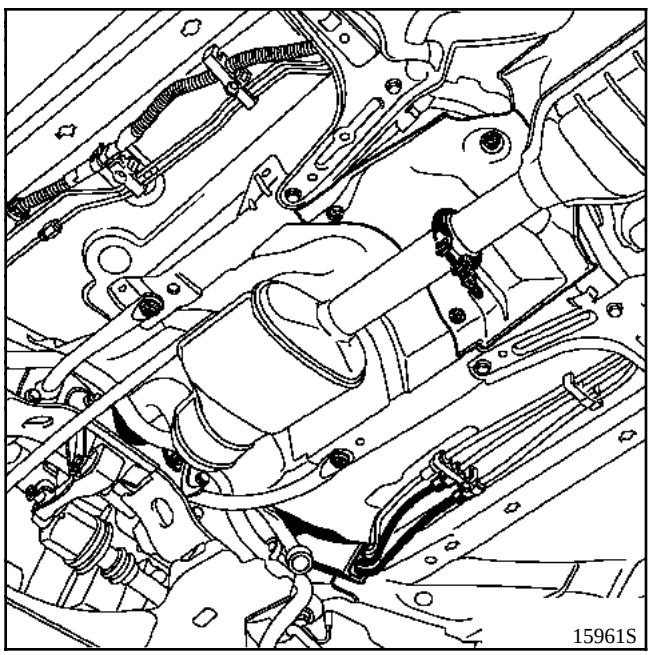
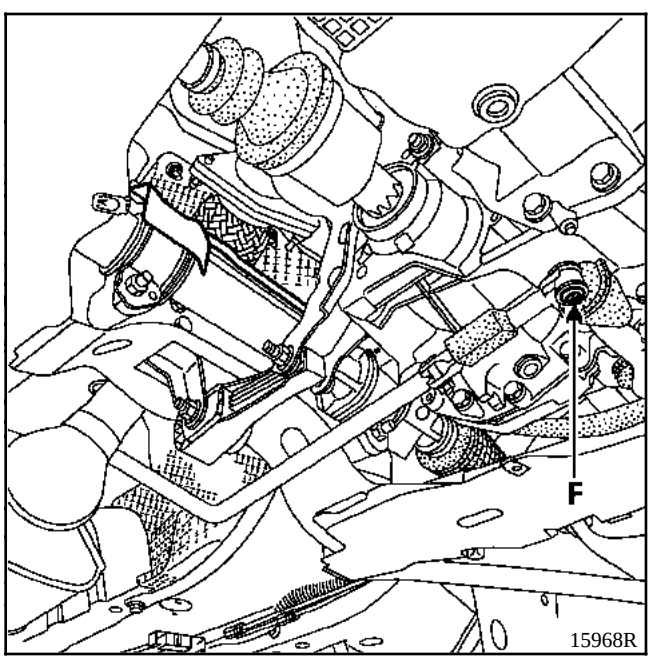
Release the wiring loom from the sub-frame on the left hand side.

Remove:
- the mountings for the power assisted steering pipe on the right hand side of the sub-frame and behind the steering box,
- the heat shield under the gear lever,

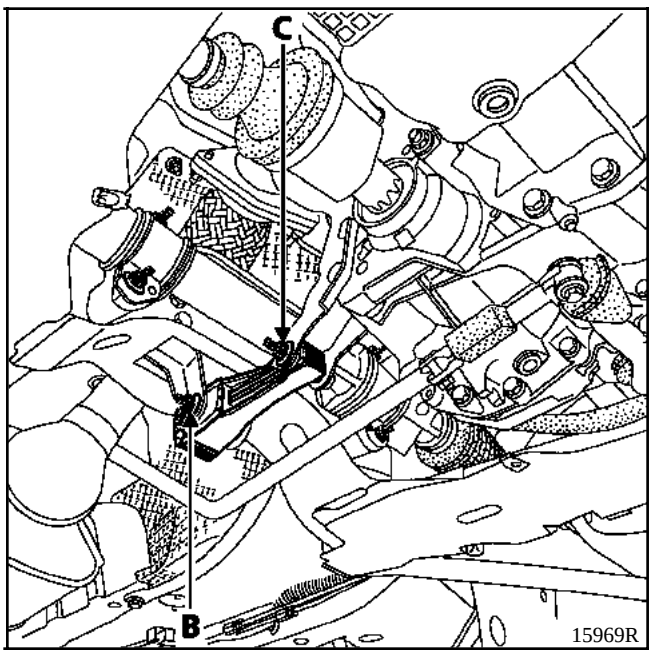


- the return spring and the gear control linkage on the lever (depending on version),
- the gear control mounting, bolt (F).

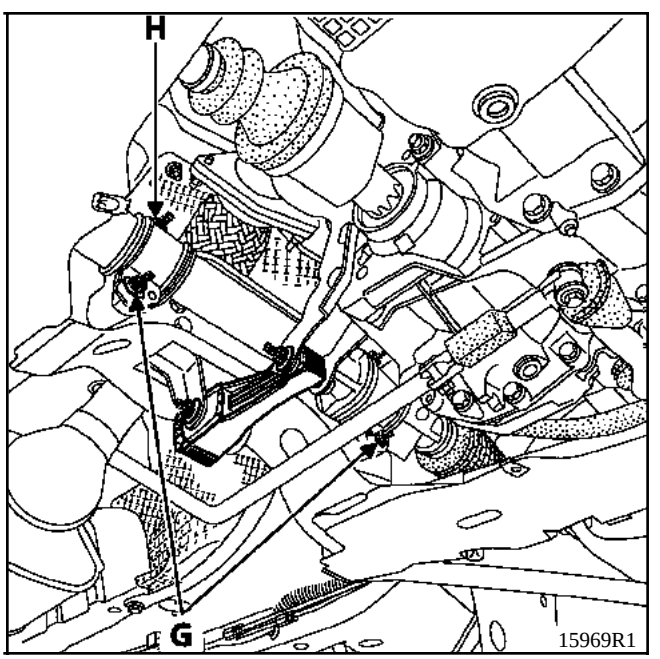


Remove the gear control linkage.

Slacken but do not remove bolt (B) then remove bolt (C) mounting the suspended engine mounting link.

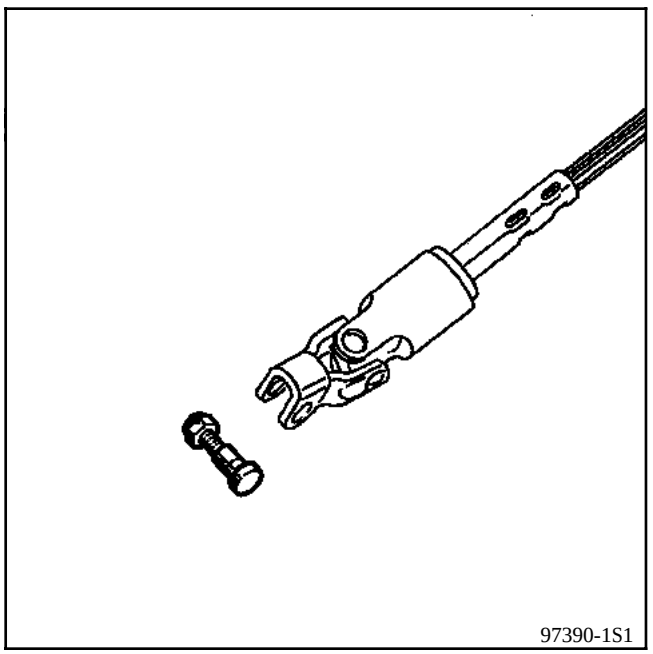


Remove:
- the heat shield on the steering box (two nuts),
- the two lower mountings (G) for the steering box,
- the upper right mounting (H) for the steering box.

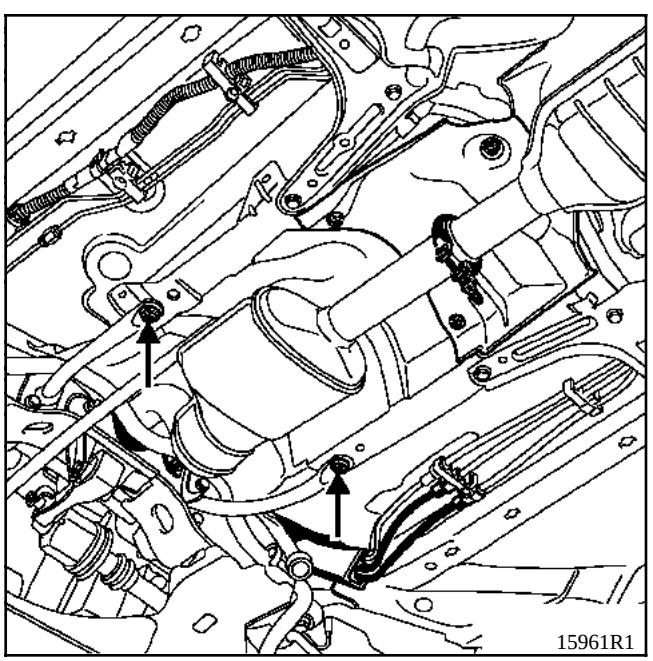


Immobilise the steering wheel.

Remove:
- the mounting bolt between the steering column and the steering box,

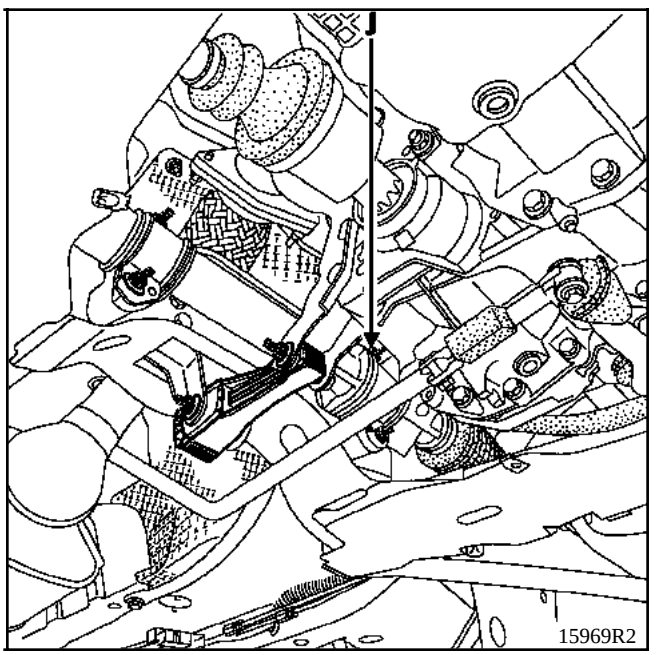


- the horn,
- the mountings on the body for the two rear body - sub-frame tie rods.



Slacken the four mountings for the sub-frame and fit the dummy sub-frame for removing and refitting the engine and transmission assembly.

Move the sub-frame sufficiently to the side then remove the upper left hand mounting (J) of the steering box.



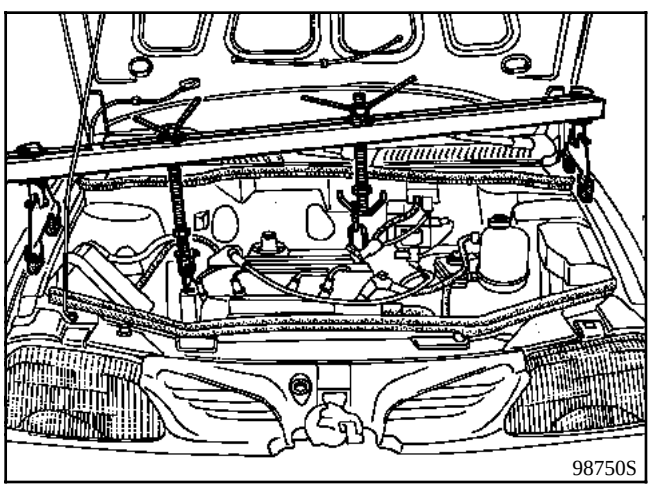
Attach the steering box to the body.

Carefully lift the vehicle and release the sub-frame.

Disconnect:
- the reversing lights switch,
- the speedometer switch.

Remove the air resonator.

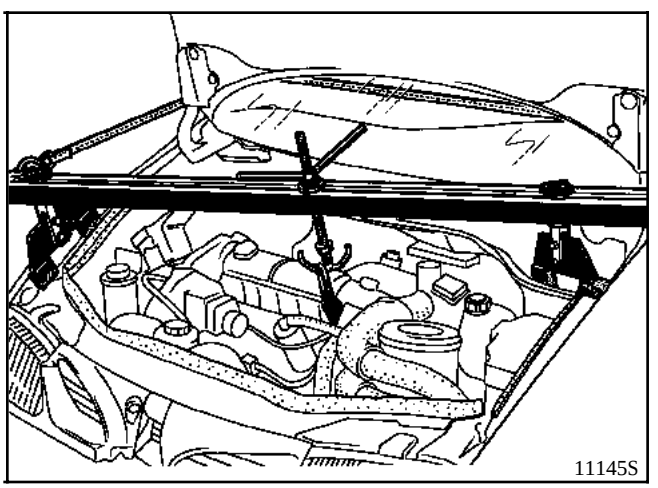
Fit the engine support tool and strap it into position.


98750S

Special notes for Scenic

Remove:
- the windscreen wiper arms,
- the scuttle panel seal,
- the two scuttle panel grilles,
- the sealing cover on the front left hand shock absorber turret.

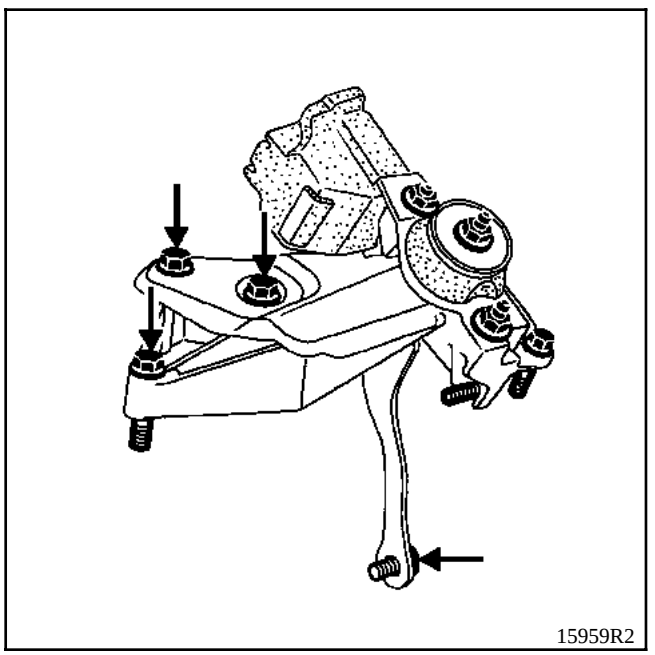
Fit the engine support tool and strap it into position.


11145S

All Types

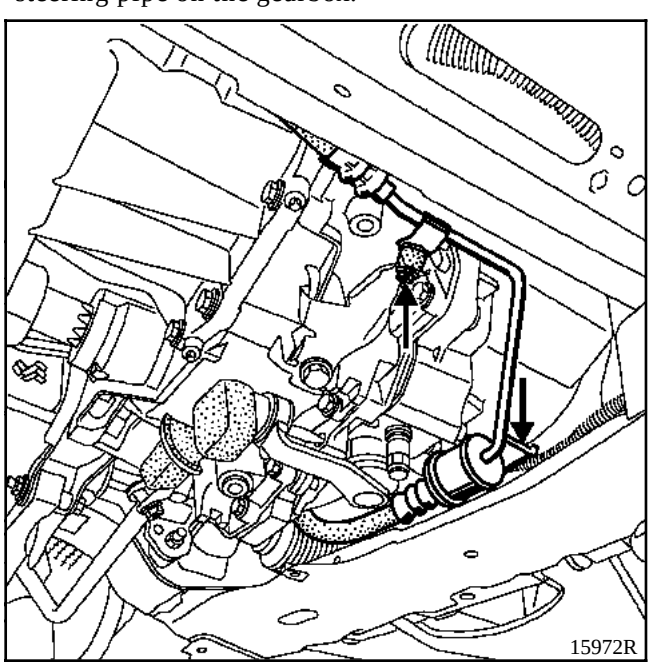
Release the clutch cable.

Remove:
- the flywheel sensor,
- the three starter motor mounting bolts,
- the two upper bolts at the edge of the gearbox,
- the four mounting bolts on the gearbox support.

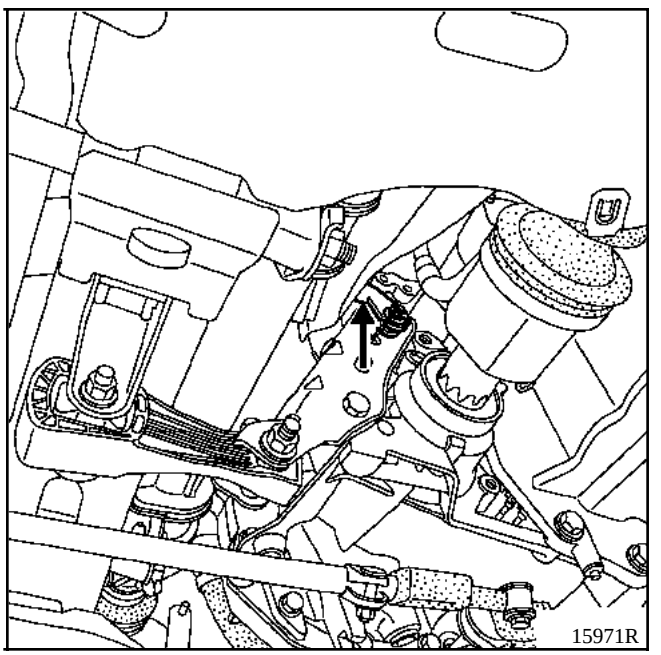


Lower the engine / gearbox assembly.

Remove the mountings for the power assisted steering pipe on the gearbox.



Secure the steering box on the right hand side of the vehicle so that the power assisted steering pipe does not interfere with the removal of the gearbox.
Remove the strut between the exhaust pipe and the rear support.



Fit the component jack.

Move the starter motor to one side.

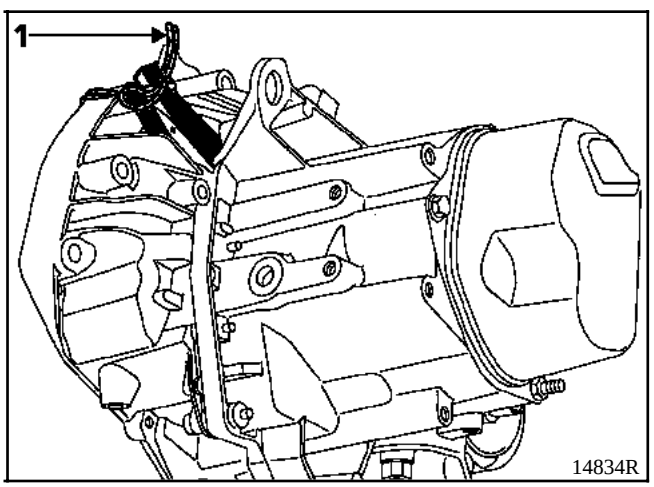
Remove:
- the four lower mounting bolts at the edge of the gearbox,
- the two gearbox mounting nuts,
- the gearbox.

REFITTING

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

Ensure the engine / gearbox centring rings are present and correctly positioned.

NOTE : when refitting the gearbox, hold the clutch control fork using string (1) to prevent it coming off its ball joint (located on the clutch bell-housing).



Refitting is the reverse of removal.

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

Place the vehicle on a two post lift.

REMOVAL

Disconnect the battery (under the driver's seat for Scenic).

Remove:
- the engine undertray,
- the accessories belt (see section 07),
- the pulley.

Place the hose clamp pliers **Mot. 453-01** on the supply pipe (low pressure).

Disconnect the supply and high pressure pipes and be prepared for the **PAS** fluid which will flow out.

Remove the three pump mounting bolts and remove the pump.

REFITTING

Refitting is the reverse of removal - observe the correct belt tension (see section 07).

Fill and bleed the circuit by moving the wheels from lock to lock.

NOTE : replacement of the hub is carried out with the pump on the bench, using the tooling described in the following pages.

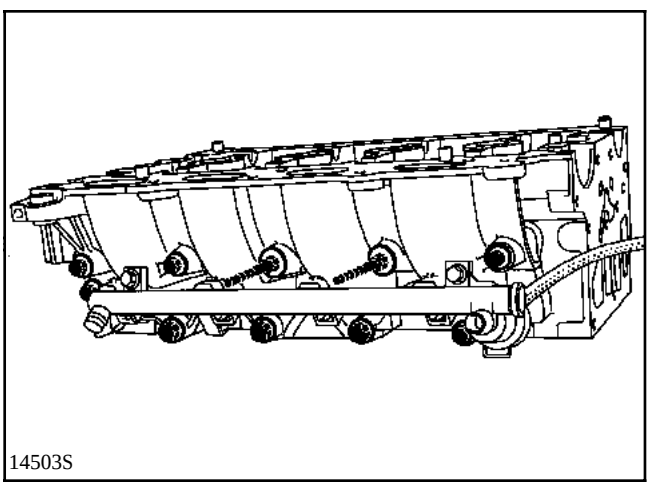
SPECIAL TOOLING REQUIRED		
Mot.	**453 -01**	**Hose clamp pliers**

Place the vehicle on a two post lift.

REMOVAL

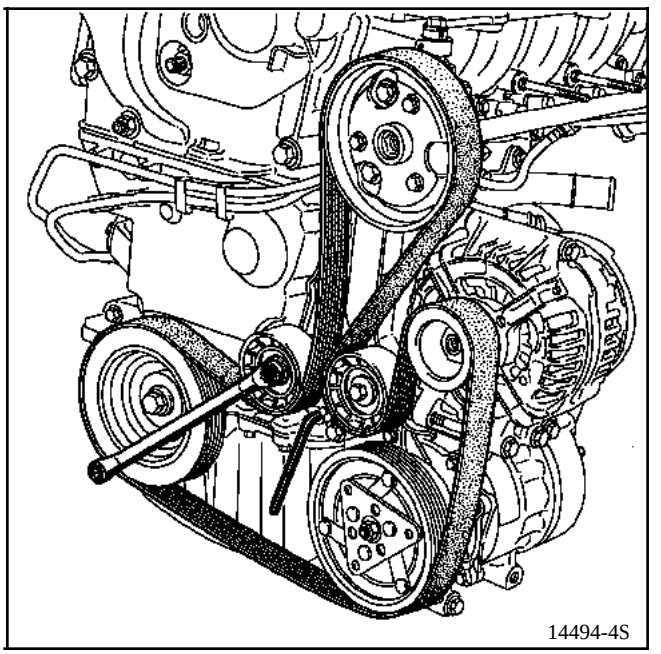
Disconnect the battery (under the driver's seat for Scenic).

Remove:
- the two mounting bolts (T30) for the PAS reservoir and place it on one side,
- the injector holder shim (two nuts),



14503S

- the accessories belt using a hexagonal wrench to lock the tension wheel after tilting it.



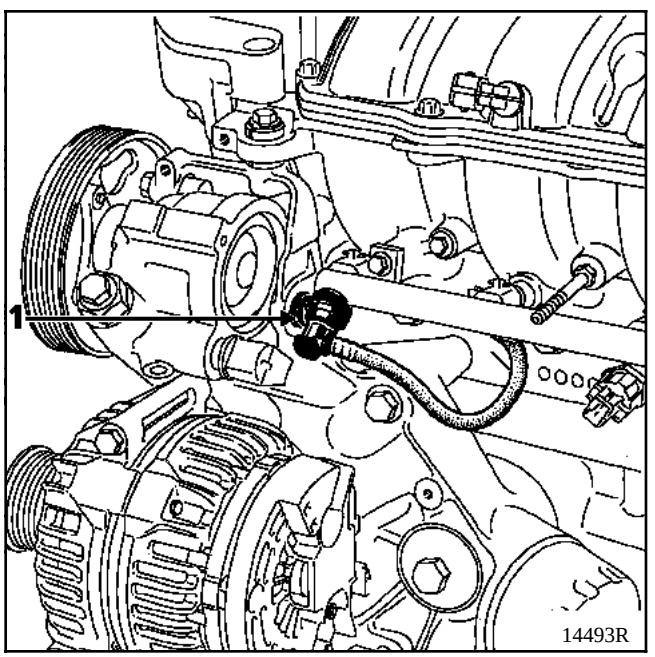
14494-4S

Place the hose clamp pliers **Mot. 453-01** on the supply pipe (low pressure).

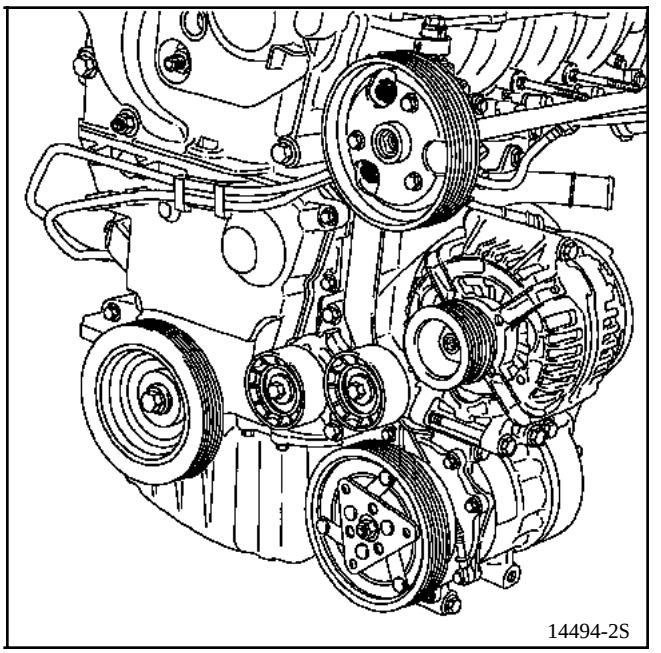
Disconnect the supply and high pressure pipes and be prepared for the **PAS** fluid which will flow out.

IMPORTANT: as the alternator is located below the pump, it will have to be protected from the **PAS** fluid which will flow out.

Disconnect the fuel supply pipe from the injector gallery which will allow the torx bolt (1) (**T40**) mounting the pump to be removed.



Remove the pump completely (three bolts).



REFITTING

Refitting is the reverse of removal.

Fill and bleed the circuit by moving the wheels from lock to lock.

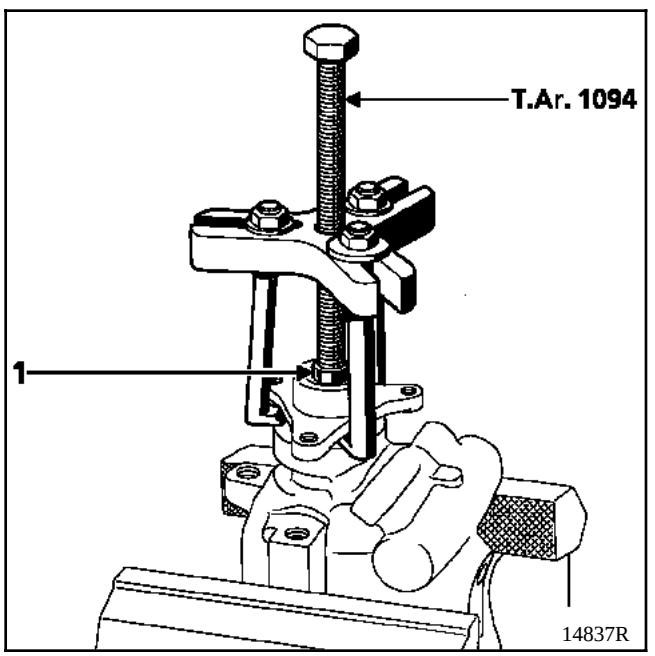
NOTE : replacement of the hub is carried out with the pump on the bench, using the tooling described in the following pages.

SPECIAL TOOLING REQUIRED		
Dir.	**1083 -01**	**Tool for refitting pulley**
T.Ar.	**1094**	**Differential bearing extractor**

REPLACING THE HUB

Place the pump on a work bench, in a vice.

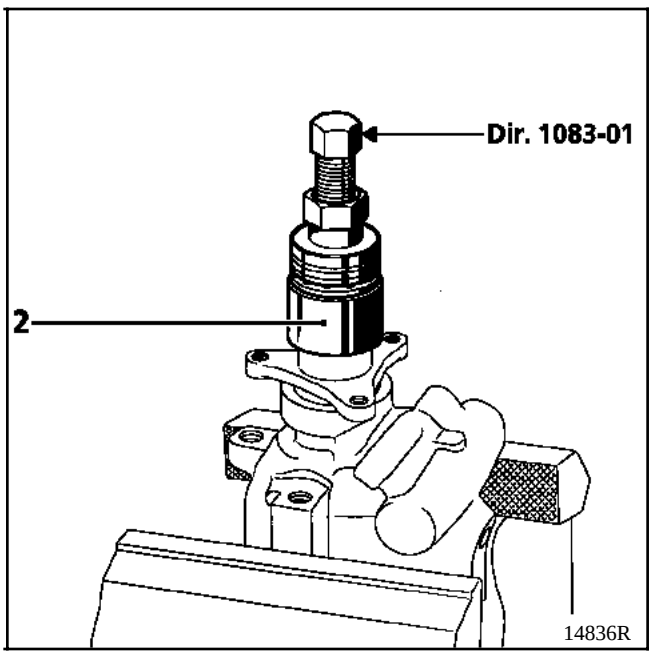
Fit tool **T.Ar. 1094** and extract the hub.



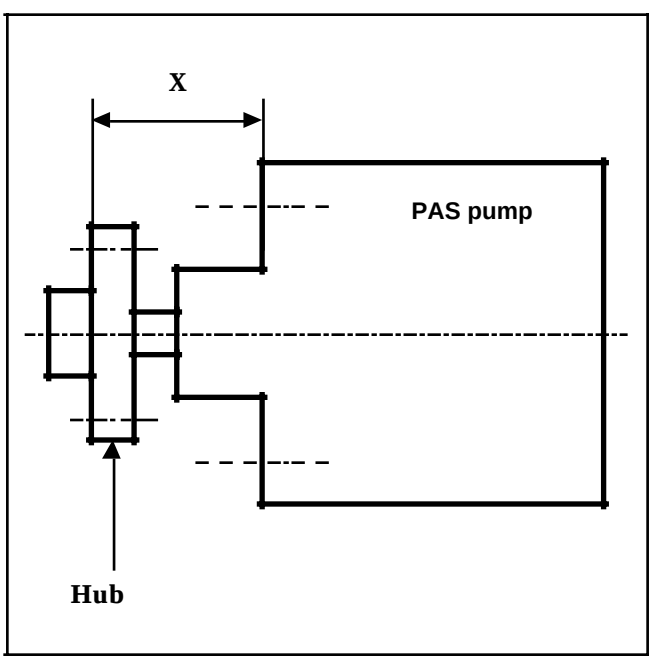
NOTE: insert a bolt (1) between the pump shaft and the pushrod of tool **T.Ar. 1094**.

Fit the hub (new) and press it into place using tool **Dir. 1083-01**. First coat it with multipurpose lubricant to make refitting easier.

NOTE: between tool **Dir. 1083-01** and the hub, insert a shim (2) which is approximately **25 mm**.



Observe the hub fitting dimension:
X = 34.3 ± 0.2 mm.



CONSUMABLES

- DELPHI HARRISON V5 compressor oil :
  PLANETELF PAG 488 : 220 ± 15 cm^3
  (order from ELF).

- Refrigerant fluid:
  R134a : 750 ± 30 g

- Compressor :
  DELPHI HARRISON V5

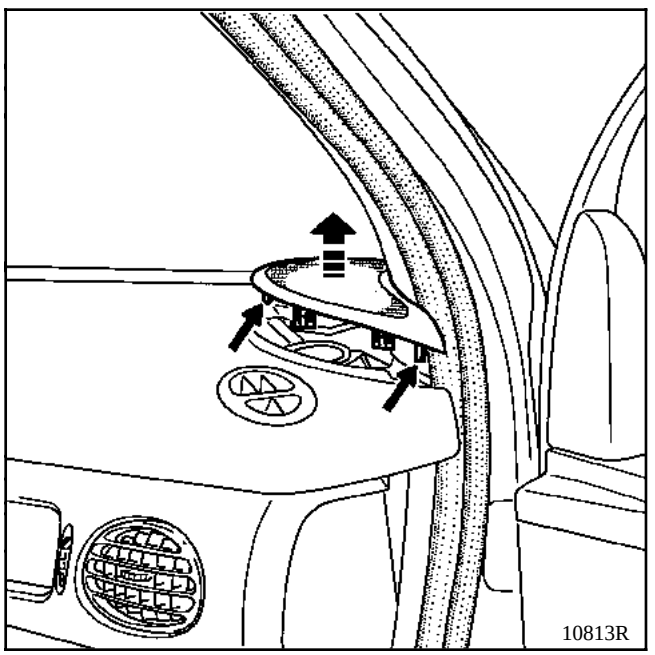
AIR RECYCLING MICROMOTOR

REMOVAL

Disconnect the battery under the driver's seat.

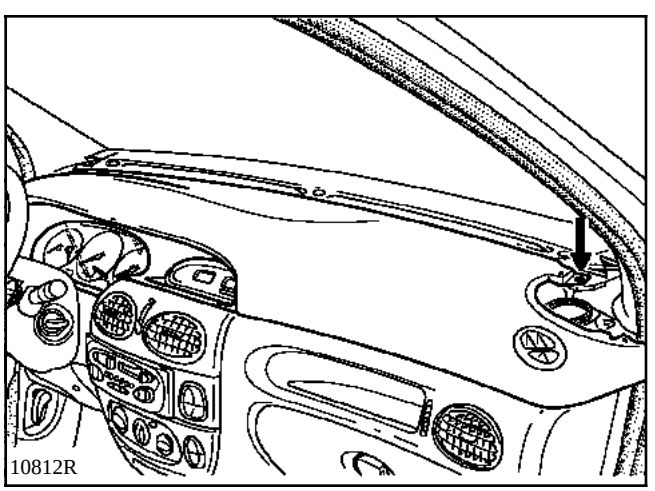
Unclip the speaker grilles and release the centring devices.

Pull the grilles towards the rear of the vehicle to release them from their locations.

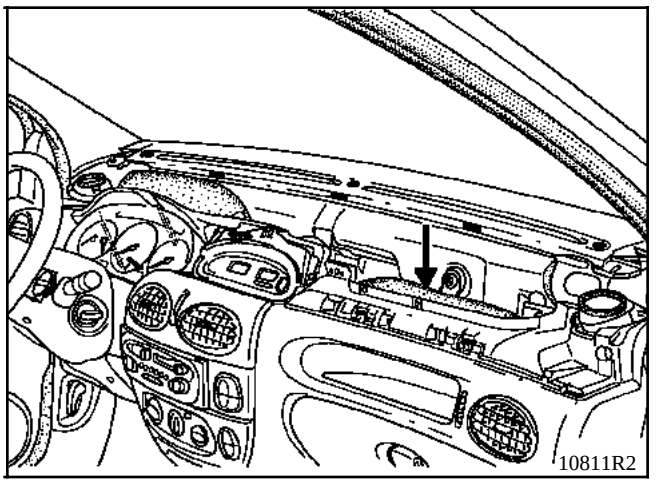


Remove the upper mounting bolts.

Unclip the trim by lifting it by hand then pull the assembly towards you to release the three retaining brackets.



Remove the front right hand vent duct.



Disconnect the micromotor connector then remove its two mounting bolts.

REFITTING

Position the flap and the micromotor in the external air position.

Engage the micromotor gear on the flap gear and secure the micromotor. Once the micromotor is refitted, the flap seal should seal effectively on the fan unit.

Check the operation of the micromotor and the correct position of the recycling flap.

Refitting is then the reverse of removal.

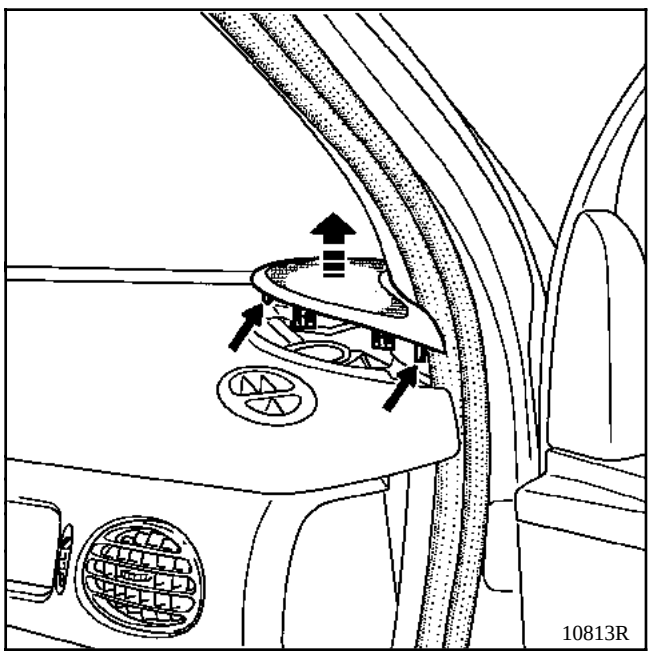
RESISTANCE UNIT

REMOVAL

Disconnect the battery under the driver's seat.

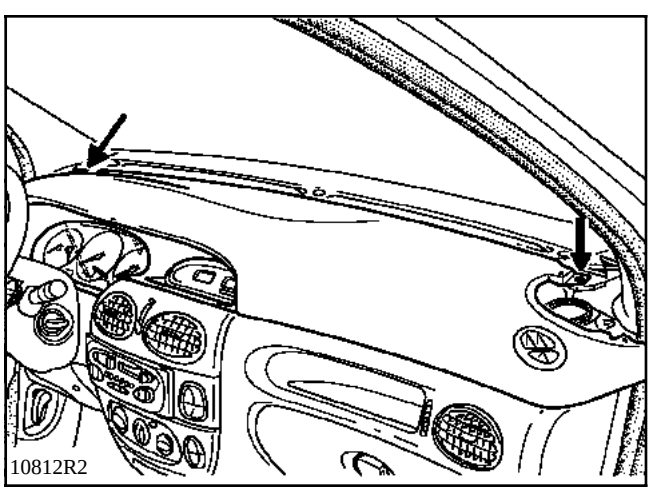
Unclip the speaker grilles and release the centring devices.

Pull the grilles towards the rear of the vehicle to release them from their locations.

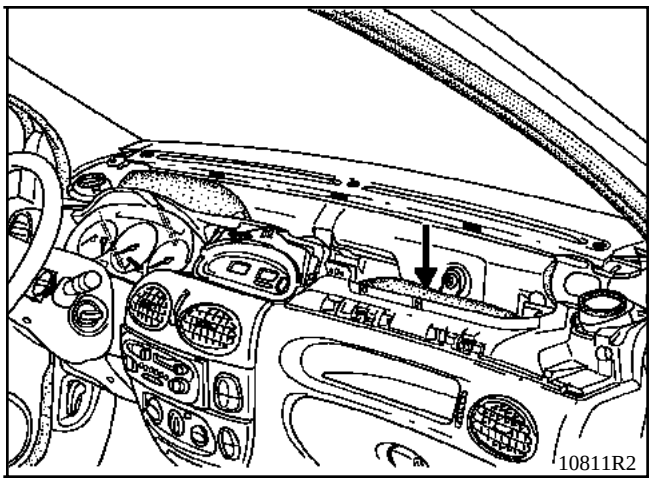


Remove the upper mounting bolts.

Unclip the trim by lifting it by hand then pull the assembly towards you to release the three retaining brackets.



Remove:
- the front right hand vent duct,



- the insulating foam under the fan.

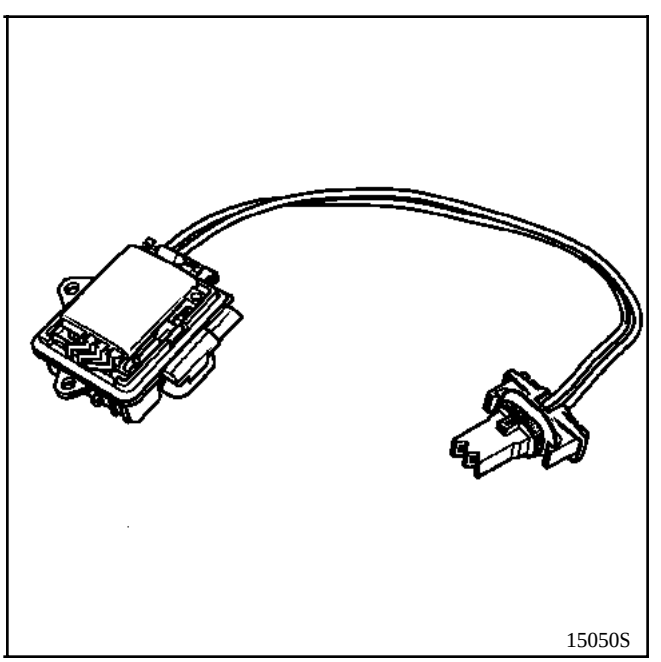
Disconnect:
- the connector on the engine cooling fan,
- the two connectors on the resistance unit.

Remove the resistance unit mounting bolt, then remove the unit.

REFITTING

Refitting is the reverse of removal.

NOTE : if the resistance unit has to be replaced, check the fan rotates freely, otherwise replace it.



SPECIAL TOOLING REQUIRED	
Mot. 1410	**Set of tooling for releasing refrigerant fluid pipe unions**

TIGHTENING TORQUES (in daN.m)	
Expansion valve bolt on evaporator	**0.6**
Connecting pipe mounting bolt on expansion valve	**0.8**
Expansion valve connecting pipe mounting bolt on dehydration canister	**0.8**
Connecting pipe mounting nut on condenser	**0.8**
Condenser connecting pipe mounting bolt on compressor	**0.8**
Expansion valve connecting pipe mounting bolt on compressor	**0.8**
Compressor mounting bolt	**2.1**
Circuit pressure sensor	**0.8**

REMOVAL

Drain the circuit of **R134a** refrigerant using a filling station.

Disconnect the battery (under the driver's seat for Scenic).

Remove:
- the wheel arch protector,
- the accessories belt.

Move the power assisted steering reservoir to one side.

Disconnect the alternator.

Remove the alternator (three bolts).

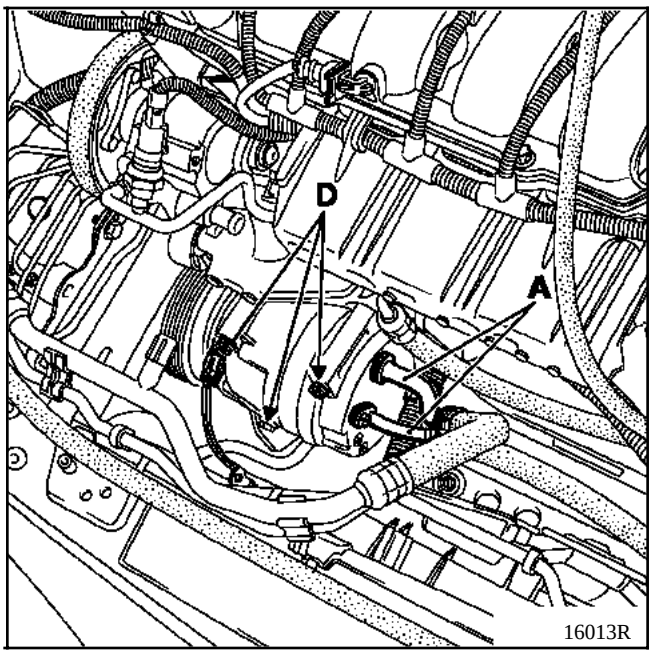
Disconnect the compressor clutch.

Release the wiring loom from the compressor.

Remove the two R134a connecting pipes (A) on the compressor.

Fit plugs to prevent humidity entering.

Remove the compressor from above (three bolts (D)).



REFITTING

Check the condition of seals and lubricate them.

If the compressor is changed, it is supplied full of oil.

Refitting is the reverse of removal.

Pump out, then fill the circuit with **R134a** using the filling station.

IMPORTANT
When changing the compressor, it is essential to ensure that it has the correct oil level.

REMOVAL

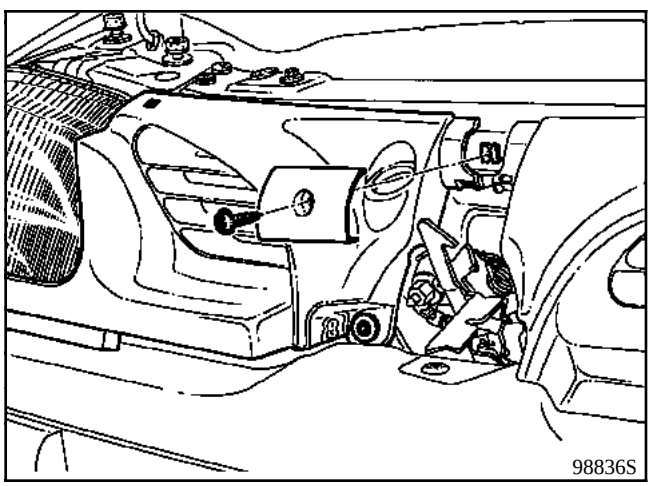
Drain the circuit of **R134a** refrigerant using a filling station.

Disconnect the battery (under the driver's seat for Scenic).

Remove the air resonator.

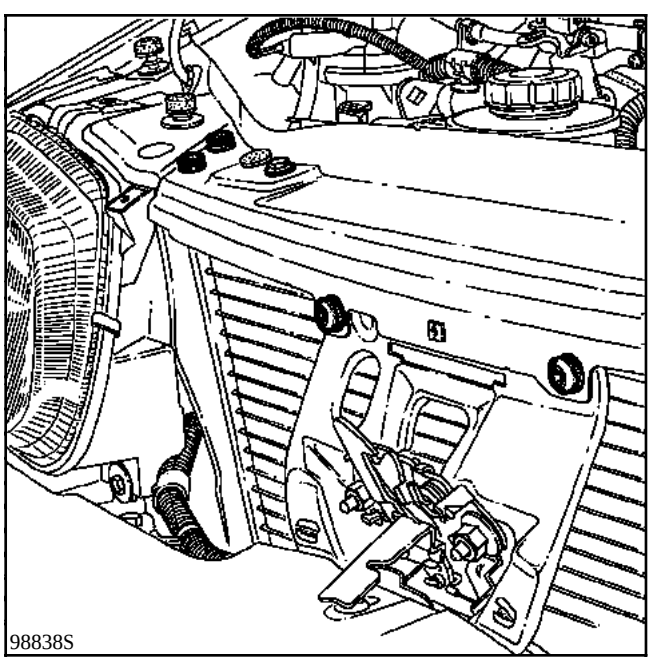
Special note for Scenic

Remove the two radiator half grilles.



All Types

Remove the six mounting bolts for the upper cross member.

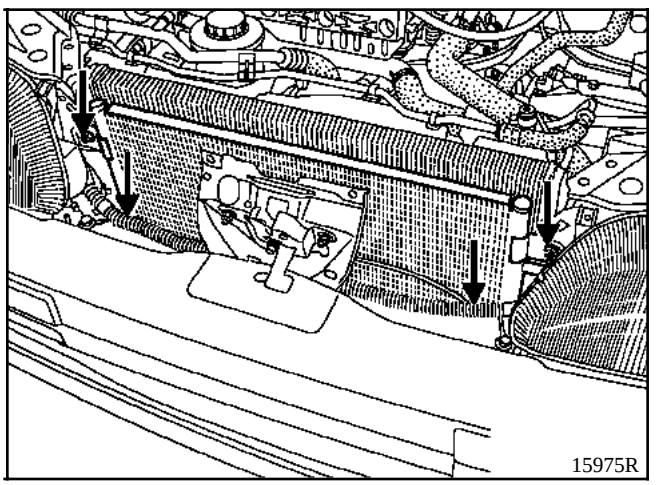


Remove the nut mounting the connecting pipes on the condenser.

Fit plugs to prevent humidity entering.

Lift the cooling assembly and move it as far back as possible.

Remove the four condenser mounting bolts on the radiator and remove it carefully.



REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with **R134a** using the filling station.

IMPORTANT

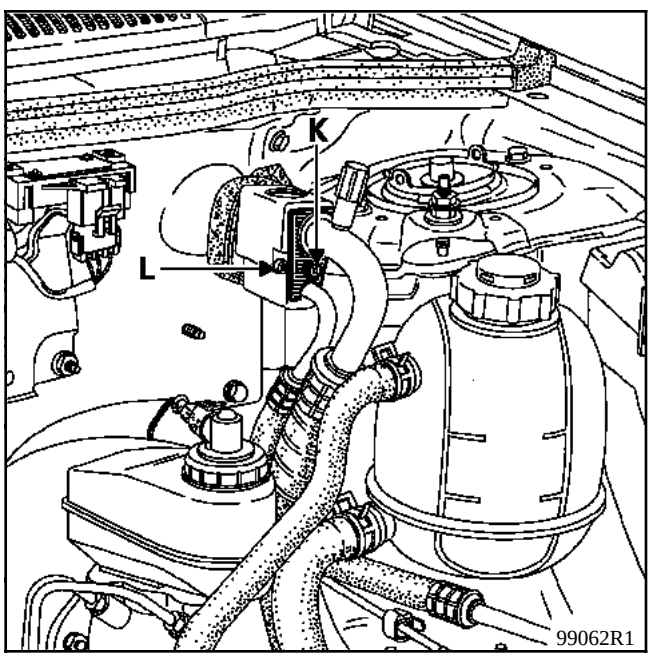
When changing the condenser, add **30 ml** of oil into the circuit.

REPLACEMENT

Drain the circuit of **R134a** refrigerant using a filling station.

Disconnect the battery (under the driver's seat for Scenic).

Remove:
- bolt (K) retaining the connecting pipes,
- the two bolts (L) retaining the expansion valve on the evaporator



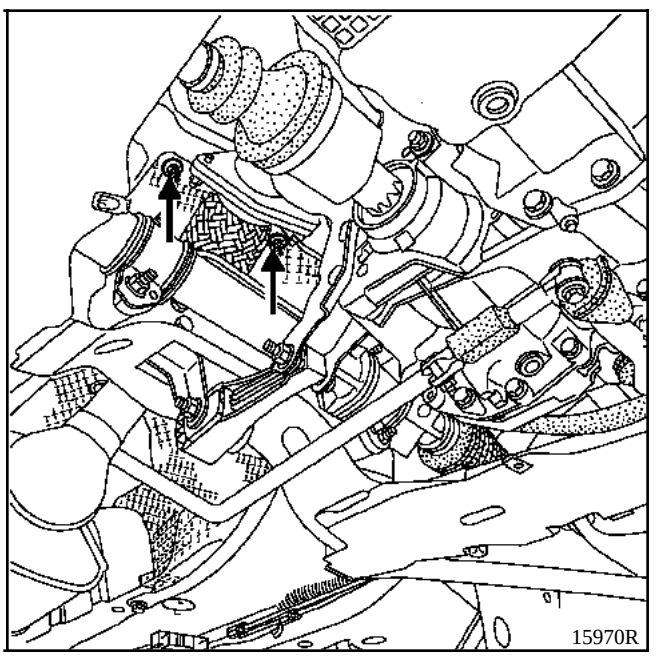
Fit plugs to prevent humidity entering.

Special note for Scenic

Place the vehicle on a two post lift.

From below

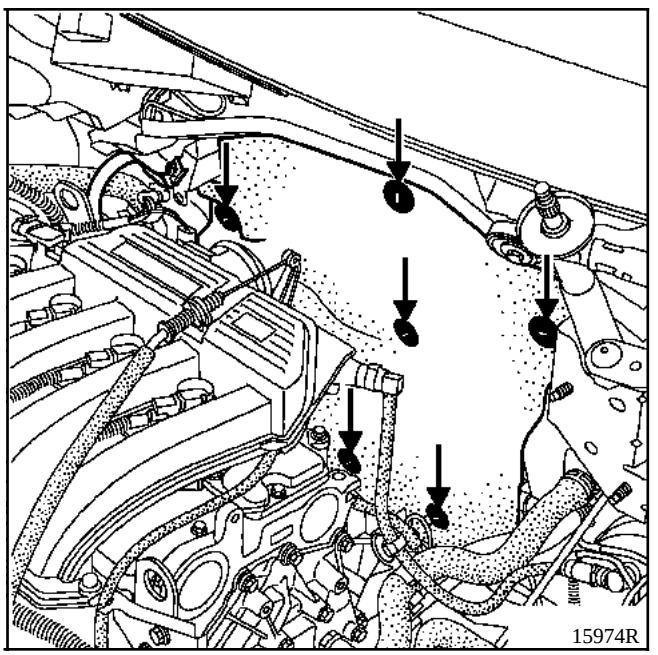
Remove the two mountings for the bulkhead absorber on the heat shield.



From above

Remove:

- the air resonator,
- the air filter unit,
- the earth strap between the engine and the body,
- the clips mounting the absorber on the bulkhead and remove it,



- the connecting pipes retaining bolt,
- the two bolts retaining the expansion valve on the evaporator.

REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with **R134a** using the filling station.

REMOVAL

Drain the circuit of **R134a** refrigerant using a filling station.

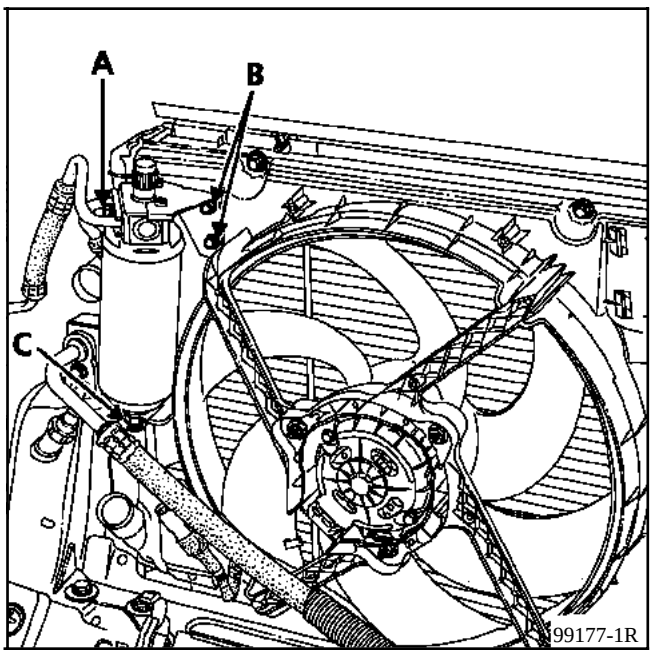
Disconnect the battery (under the driver's seat for Scenic).

Remove the mounting bolt (A) for the pipes on the dehydration canister.

Fit plugs to prevent humidity entering.

Slacken nut (C) under the dehydration canister.

Remove the two dehydration canister mounting bolts (B).



REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with **R134a** using the filling station.

IMPORTANT
When changing the dehydration canister, add **15 ml** oil to the circuit.

Disconnect the battery (under the driver's seat for Scenic).

Drain the circuit of **R134a** refrigerant using a filling station.

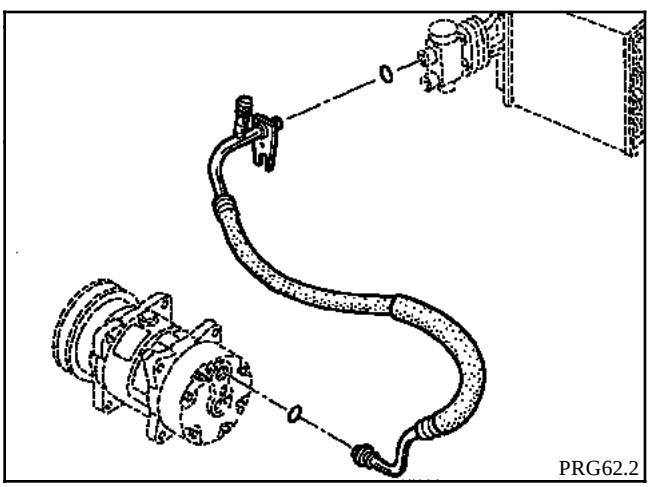
LOW PRESSURE PIPE

REMOVAL

Remove:
- the retaining bolt for the connecting pipes on the expansion valve,
- the mounting bolt for the low pressure pipe on the compressor.

Fit plugs to prevent humidity entering.

Remove the pipe.


PRG62.2

REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with R134a using the filling station.

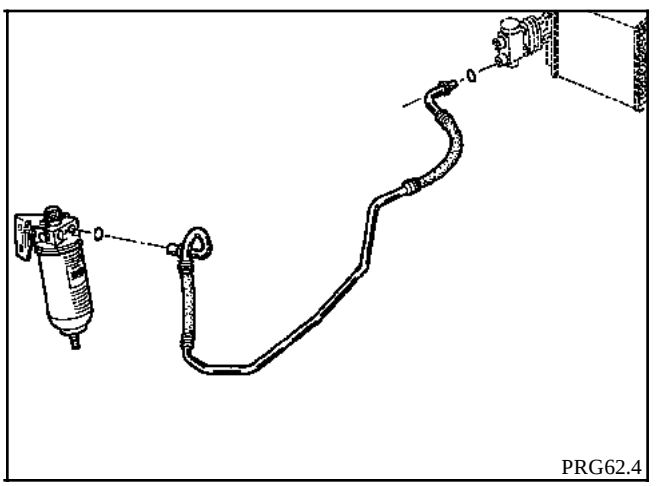
IMPORTANT
When changing a pipe, add 10 ml of oil to the circuit or if a pipe bursts (rapid leak), add 100 ml.

HIGH PRESSURE PIPE BETWEEN THE EXPANSION VALVE AND THE DEHYDRATION CANISTER

REMOVAL

Remove:
- the retaining bolt for the connecting pipes,
- the mounting bolt for the pipes on the dehydration canister.

Fit plugs to prevent humidity entering.


PRG62.4

Unclip the pipe from the body then remove it.

REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with R134a using the filling station.

IMPORTANT
When changing a pipe, add 10 ml of oil to the circuit or if a pipe bursts (rapid leak), add 100 ml.

Special notes for Scenic

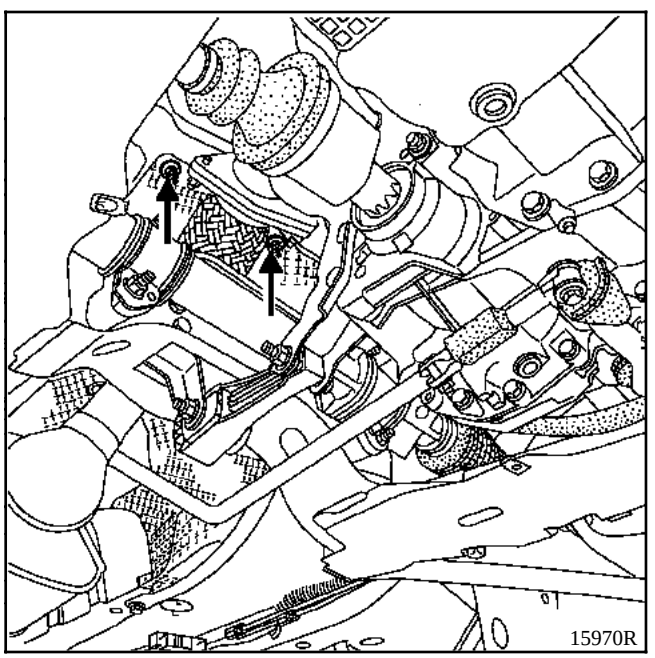
ASSEMBLY OF LOW PRESSURE PIPES BETWEEN THE EXPANSION VALVE AND QUICK RELEASE UNION AND HIGH PRESSURE PIPE BETWEEN EXPANSION VALVE AND DEHYDRATION CANISTER

Place the vehicle on a two post lift.

Disconnect the battery (under the driver's seat for Scenic).

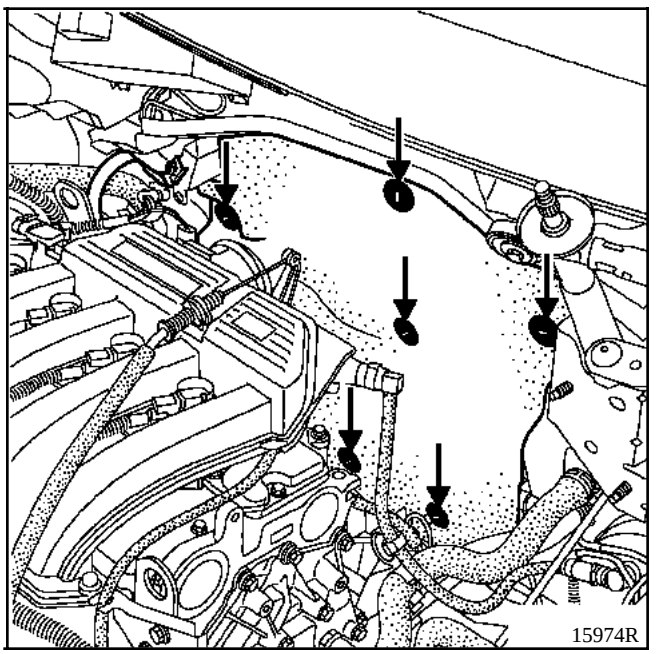
From below

Remove the two mountings for the bulkhead absorber on the heat shield.

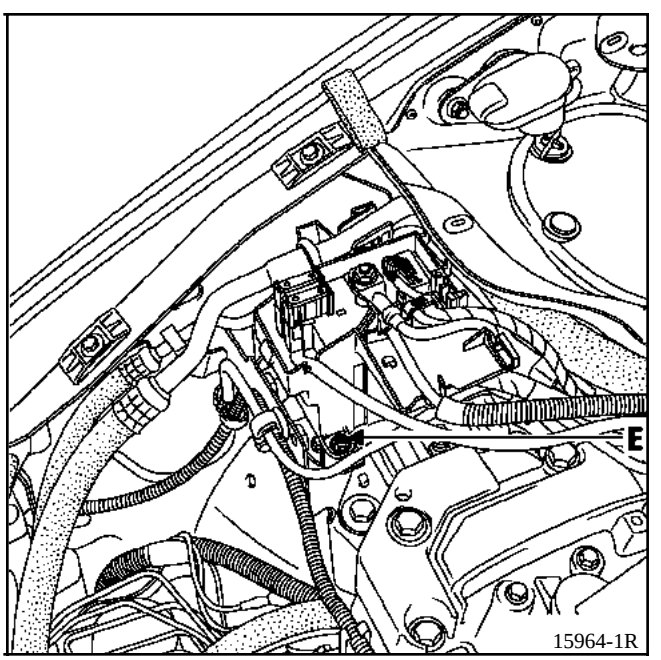


From above

Remove:
- the air resonator,
- the air filter unit,
- the earth strap between the engine and the body,
- the clips mounting the absorber on the bulkhead and remove it,



- bolt (E).



Release the terminal unit towards the engine.

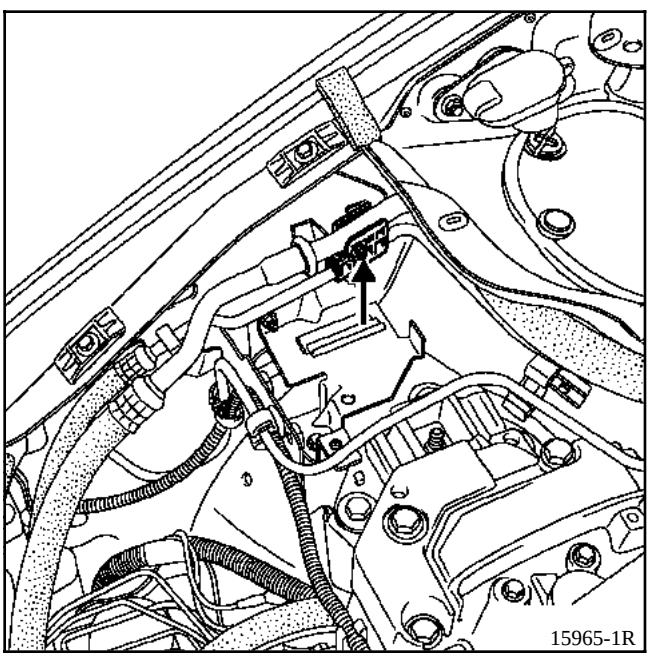
Remove the retaining bolt for the connecting pipes on the expansion valve.

Release the pipe at the quick release union using tool **Mot. 1410**.

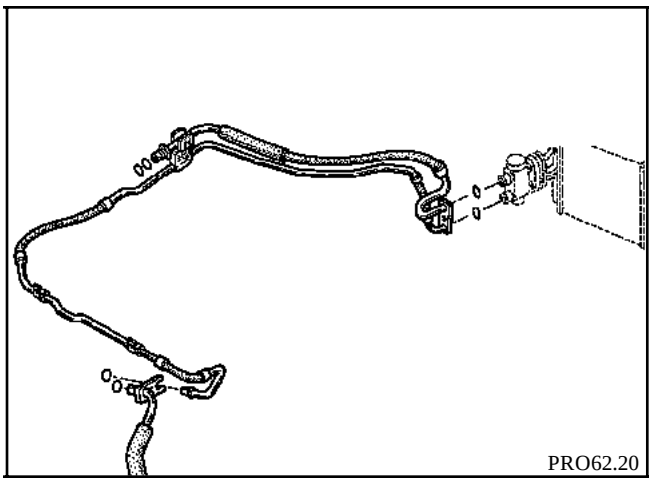
Remove the mounting bolt for the pipes on the dehydration canister.

Fit plugs to prevent humidity entering.

Remove the retaining clip for the two pipes on the body (one nut).



Remove the assembly of low pressure pipes between the expansion valve and the quick release union and the high pressure pipe between the expansion valve and the dehydration canister.



REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with R134a using the filling station.

IMPORTANT
When changing a pipe, add 10 ml of oil to the circuit or if a pipe bursts (rapid leak), add 100 ml.

LOW PRESSURE PIPE BETWEEN QUICK RELEASE UNION AND COMPRESSOR (Scenic)

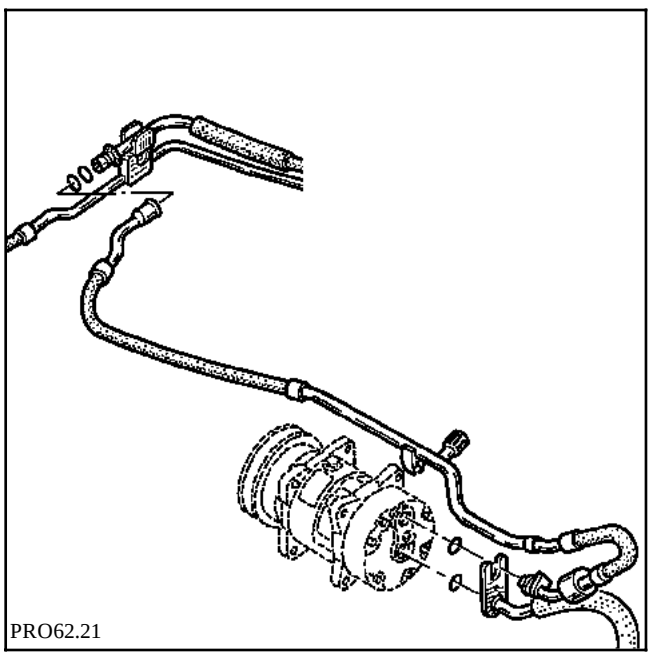
Drain the circuit of **R134a** refrigerant using a filling station.

Disconnect the battery (under the driver's seat for Scenic).

Remove the mounting bolt for the low pressure pipe on the compressor.

Release the pipe at the quick release union using tool **Mot. 1410**.

Fit plugs to prevent humidity entering.


PRO62.21

REFITTING

Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with R134a using the filling station.

IMPORTANT
When changing a pipe, add 10 ml of oil to the circuit or if a pipe bursts (rapid leak), add 100 ml.

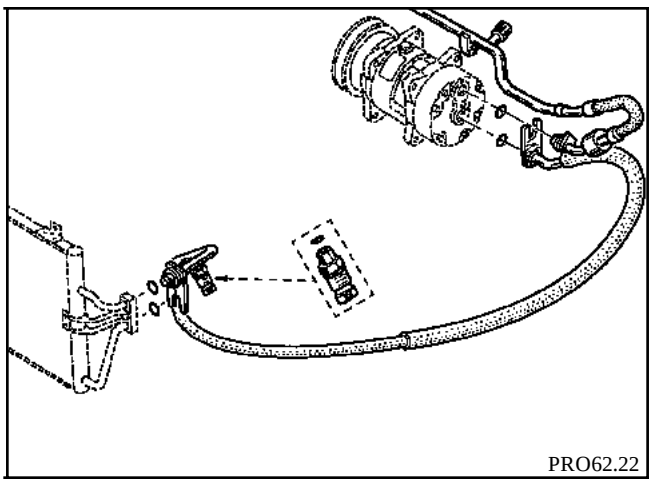
HIGH PRESSURE PIPE BETWEEN COMPRESSOR AND CONDENSER

Drain the circuit of **R134a** refrigerant using a filling station.

Disconnect the battery (under the driver's seat for Scenic).

Remove the nut mounting the connecting pipes on the condenser.

Disconnect the pipe on the compressor and remove it.


PRO62.22

REFITTING

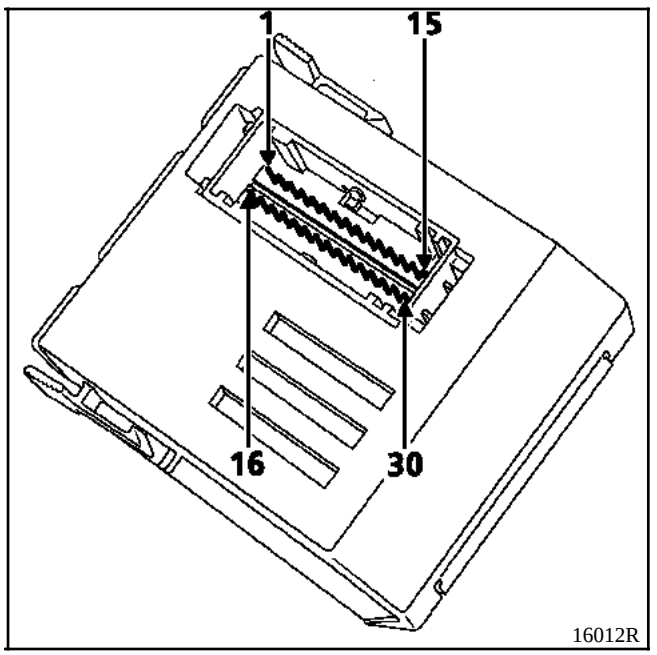
Check the condition of seals and lubricate them.

Refitting is the reverse of removal.

Pump out, then fill the circuit with R134a using the filling station.

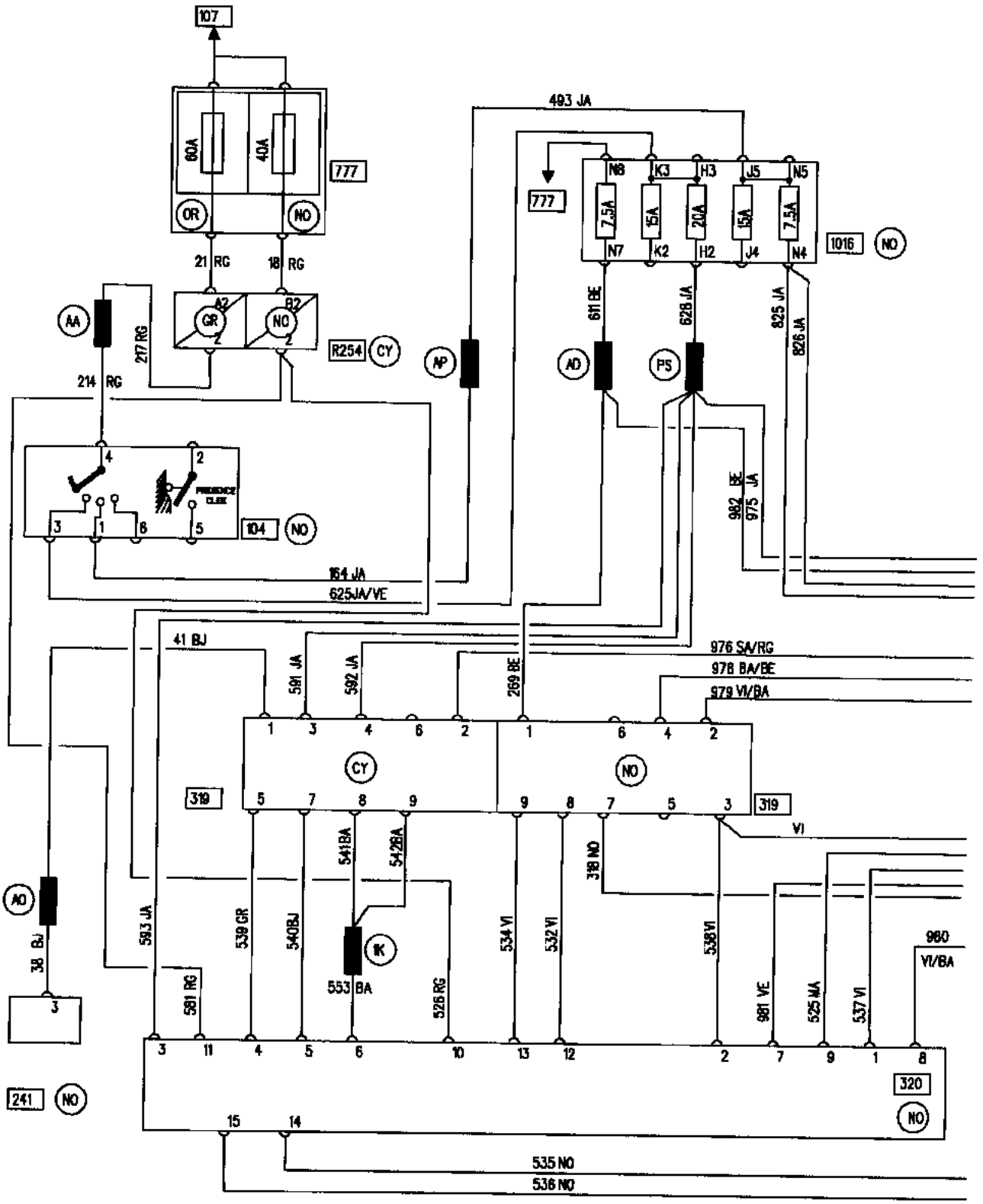
IMPORTANT
When changing a pipe, add 10 ml of oil to the circuit or if a pipe bursts (rapid leak), add 100 ml.

The air conditioning computer is located in the passenger compartment, behind the dashboard between the bulkhead and the air distribution unit. It is reached from the driver's side, under the dashboard.

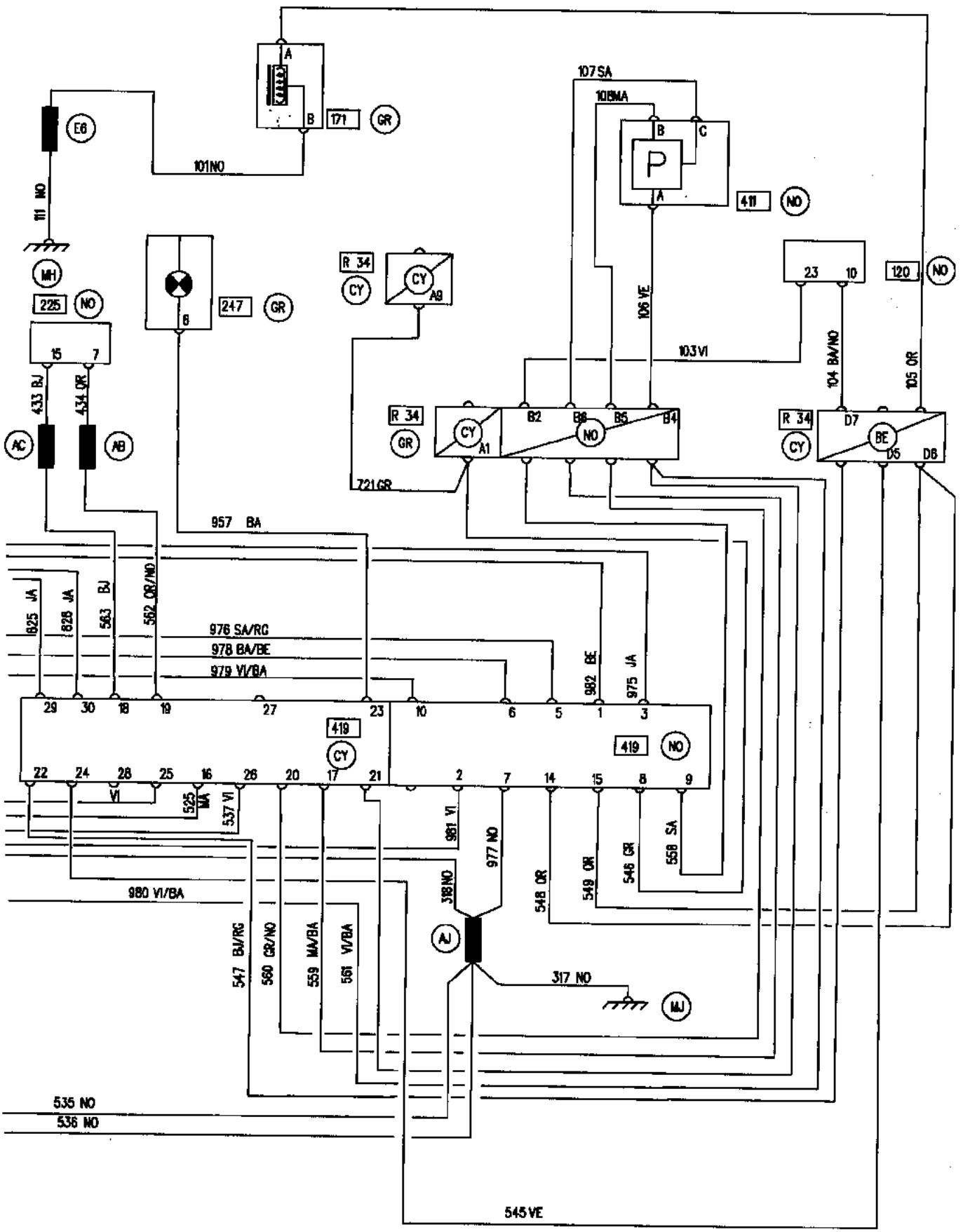


30 track connector

Track	Description
1	+ side lights
2	+ AC evaporator sensor (Scenic RH drive)
3	+ 12 V accessories feed (heating fuse)
4	Not used
5	Recycling on / off
6	AC operation information
7	AC computer earth
8	AC / AT cut-out information
9	Air conditioning power absorbed (PA) information
10	AC operating warning light
11	Not used
12	Not used
13	Not used
14	Compressor clutch control
15	Compressor clutch control
16	Fan speed information
17	AC pressure sensor signal
18	Information for diagnostic line L
19	Information for diagnostic line K
20	+ AC pressure sensor
21	- AC pressure sensor
22	AC / injection cut-out information
23	TDC information
24	AC-CYCLE information
25	+ recycling control
26	- recycling control
27	Not used
28	Not used
29	+ 12 V after ignition (fuse F20)
30	+ 12 V after ignition (fuse F20)


107
60A
40A
777
OR
NO
21 RG
18 RG
A2
B2
GR
NO
R254
CY
AA
217 RG
214 RG
4
2
3
1
6
5
104
NO
493 JA
777
N8
K3
H3
J5
N5
7.5A
15A
20A
15A
7.5A
N7
K2
H2
J4
N4
1016
NO
611 BE
628 JA
825 JA
826 JA
AP
AD
PS
982 BE
975 JA
164 JA
625 JA/VE
41 BJ
591 JA
592 JA
269 BE
976 SA/RG
978 BA/BE
979 VI/BA
1
3
4
6
2
1
6
4
2
CY
NO
319
5
7
8
9
9
8
7
5
3
319
VI
541 BA
542 BA
318 NO
AD
38 BJ
3
583 JA
539 GR
540 BJ
1K
553 BA
581 RG
526 RG
534 VI
532 VI
538 VI
981 VE
525 MA
537 VI
980
VI/BA
3
11
4
5
6
10
13
12
2
7
9
1
8
320
NO
241
NO
15
14
535 NO
536 NO

PRO16075G


A
B
171
GR
E6
101 NO
111 NO
MH
225
NO
B
247
GR
15
7
433 BJ
434 OR
AC
AB
R 34
CY
CY
A9
721 GR
107 SA
108 MA
B
C
P
A
411
NO
106 VE
103 VI
23
10
120
NO
104 BA/NO
105 OR
R 34
CY
B2
B6
B5
B4
NO
A1
R 34
GR
R 34
CY
D7
BE
D5
D6
957 BA
976 SA/RG
978 BA/BE
979 VI/BA
625 JA
626 JA
563 BJ
562 OR/NO
982 BE
975 JA
29
30
18
19
27
23
10
6
5
1
3
419
CY
419
NO
22
24
28
25
16
26
20
17
21
2
7
14
15
8
9
VI
525 MA
537 VI
981 VI
977 NO
558 SA
546 GR
549 OR
548 OR
980 VI/BA
318 NO
AJ
317 NO
MJ
547 BJ/RG
560 GR/NO
559 MA/BA
561 VI/BA
535 NO
536 NO
545 VE

PRO16075D

KEY

104	Ignition switch
107	Battery
120	Injection computer
171	Air conditioning clutch
225	Diagnostic socket
241	Lighting rheostat
247	Instrument panel
319	Air conditioning control panel
320	Basic and AC fan unit
411	AC pressostat
419	AC computer
777	Power supply fuse board
1016	Passenger compartment fuse box
R34	Engine / Dashboard
R254	Dashboard / Scuttle panel
MH	Engine electrical earth
MJ	Front right hand pillar electrical earth