Espace

N.T. 3107A

JE0 N

SPECIAL NOTES FOR ESPACE VEHICLES EQUIPPED WITH THE F4R ENGINE

For the sections not dealt with in this Technical Note, refer to M.R. 315.

77 11 202 921 **OCTOBER 1998** **Edition Anglaise**

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

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

Contents

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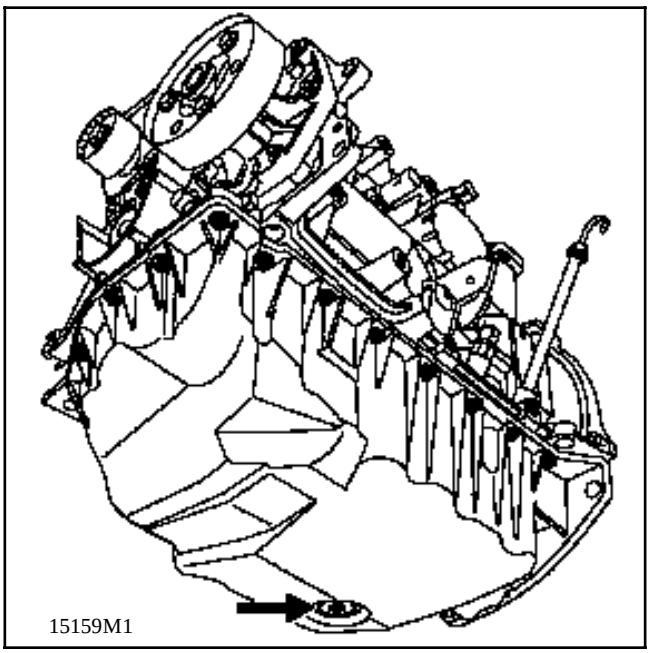
SPECIAL TOOLING REQUIRED
Engine drain spanner

DRAINING

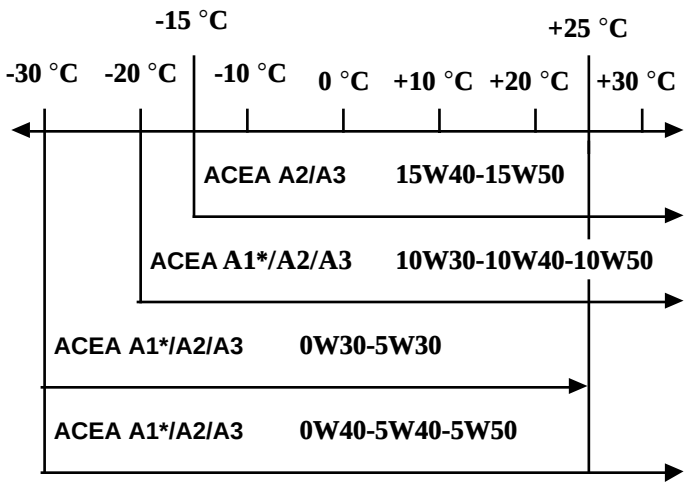
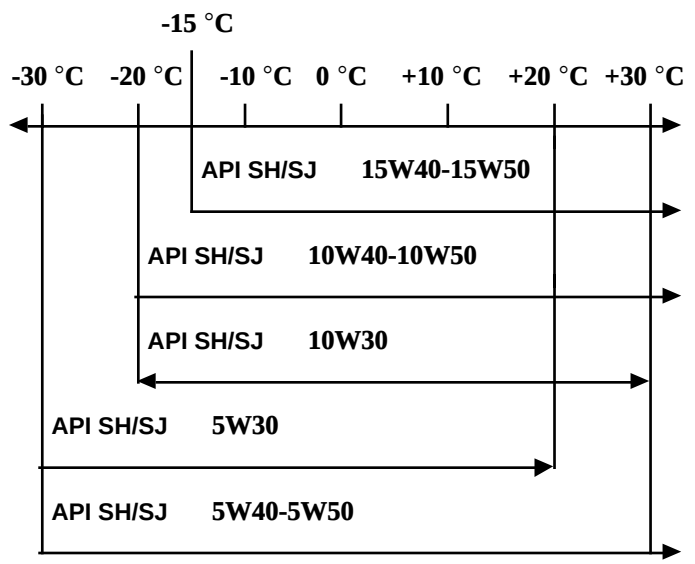


Oil capacity : refer to section **07**.

<table>
<tr><th>Components</th><th>Capacity in litres (approx) *</th><th>Grade</th></tr>
<tr><td rowspan="2">Petrol engine (oil)

F4R</td><td>For oil change

5

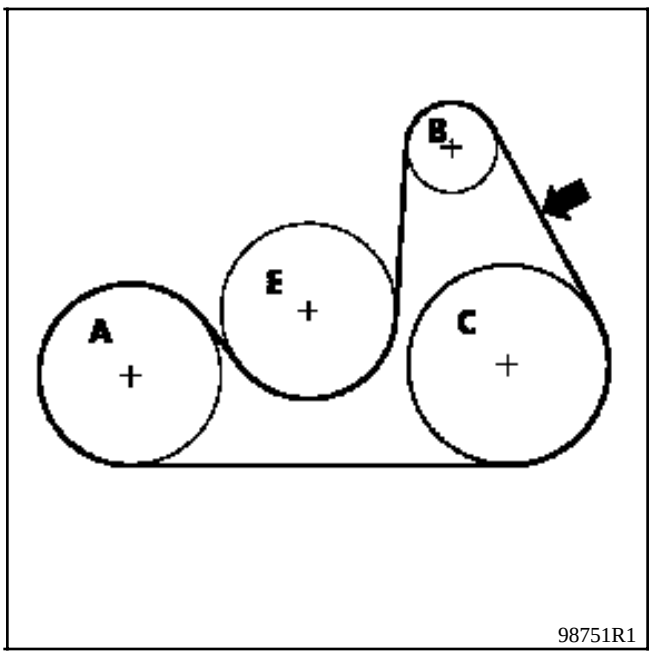
5.3 (1)</td><td>E.E.C. countries
 
</td></tr>
<tr><td>Other countries
 
</td></tr>
<tr><td>Gearbox JC5</td><td>3.1</td><td>Tranself TRX 75W 80W</td></tr>
</table>

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

Components	Capacity in litres	Grade	Special notes
F4R cooling circuit	approximately 7L	(type D) Only add coolant	Protection down to - 35 °C ± 2 °C for all countries

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

ALTERNATOR AND POWER ASSISTED STEERING



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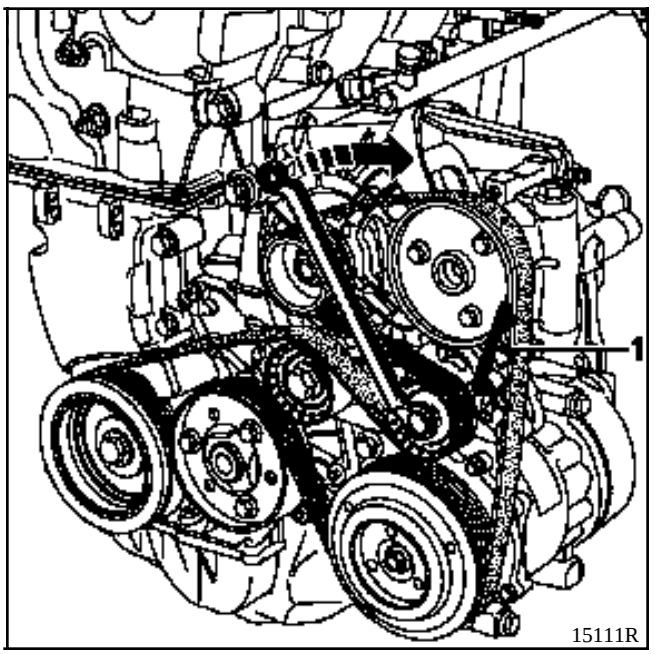
Tension (US = SEEM unit)	**Multi-toothed power assisted steering belt**
Fitting	108 ± 6
Minimum for operation	60

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

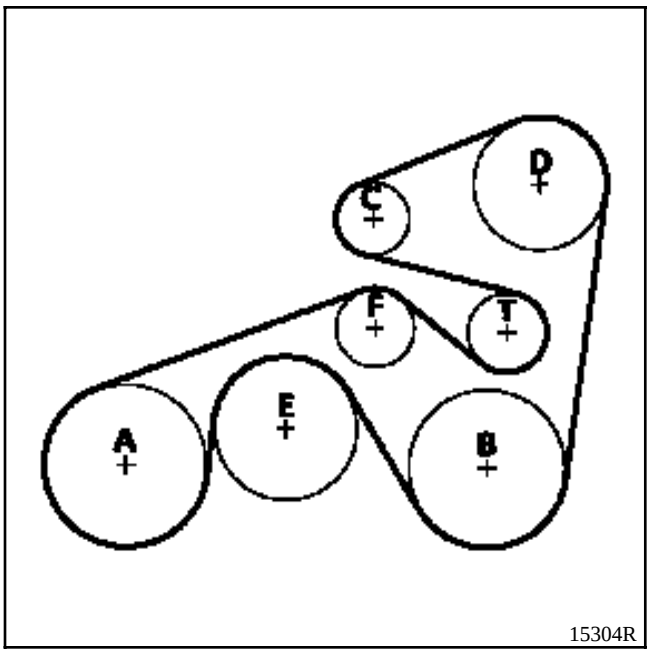
→ Tension checking point

NOTE : the accessories belt has five teeth whilst the crankshaft pulleys have six ; it is therefore essential to ensure that the tooth at the end of the pulleys (timing side) remains "free".

To remove the belt, turn the automatic tensioner for the belt in the direction indicated below using a **13 mm offset ring wrench.** Secure the pulley using a **6 mm allen key (1)**.

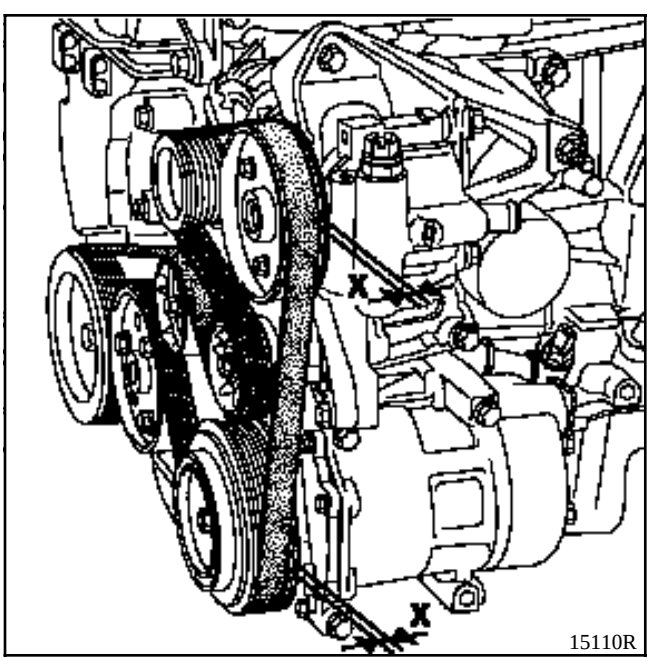


ALTERNATOR, POWER ASSISTED STEERING AND AIR CONDITIONING



A Crankshaft
B Air conditioning compressor
C Alternator
D Power assisted steering pump
E Water pump
F Pulley
T Automatic tensioner

When refitting the belt, make sure that tooth (X) at the end of the pulleys (timing side) remains "free".



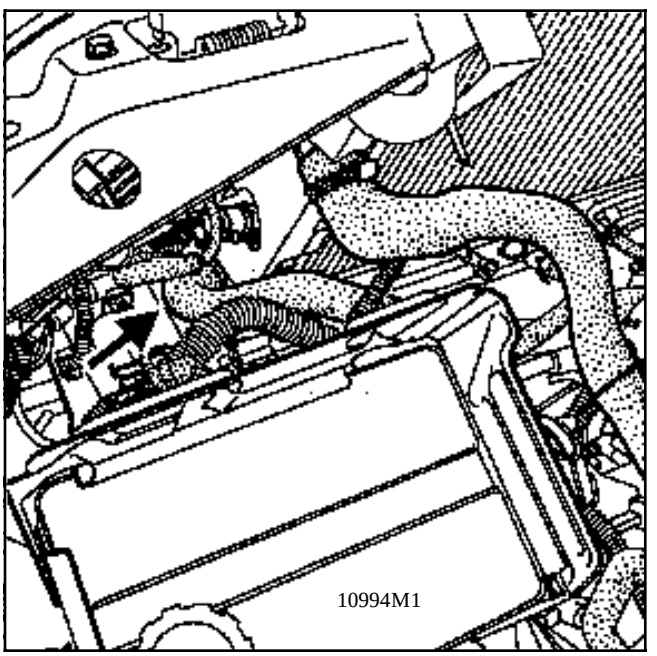
Vehicle type	Engine	Gearbox	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Ratio
JE0 N	F4R 700	JC5	1998	82.7	93	9.8 / 1

Section to consult: **Mot. F4**

SPECIAL TOOLING REQUIRED		
Mot.	1202	Hose clip pliers
Mot.	1282 -01	Removal spanner for the steering rack high pressure union
Mot.	1282 -02	Removal spanner for the steering rack low pressure union
Mot.	1390	Universal support
Mot.	1410	High pressure union removal tool for A/C circuit
T. Av.	476	Ball joint extractor

EQUIPMENT REQUIRED
Ball joint separator

TIGHTENING TORQUES (in daN.m)	
Brake caliper mounting bolts	3.5
Shock absorber base mounting bolts	20
Lower ball joint nut	6.5
Driveshaft gaiter mounting bolt	2.5
Track rod end nut	4
Engine tie bar bolts	5
Suspended engine mounting bolt on right hand side member	6.2
Suspended engine mounting bolt on gearbox	6
Suspended engine mounting rubber pad upper mounting nut on the front left hand side member	6.7
Front right hand suspended engine mounting cover mounting bolt on engine	6.2
Front right suspended engine mounting movement limiter mounting bolt	6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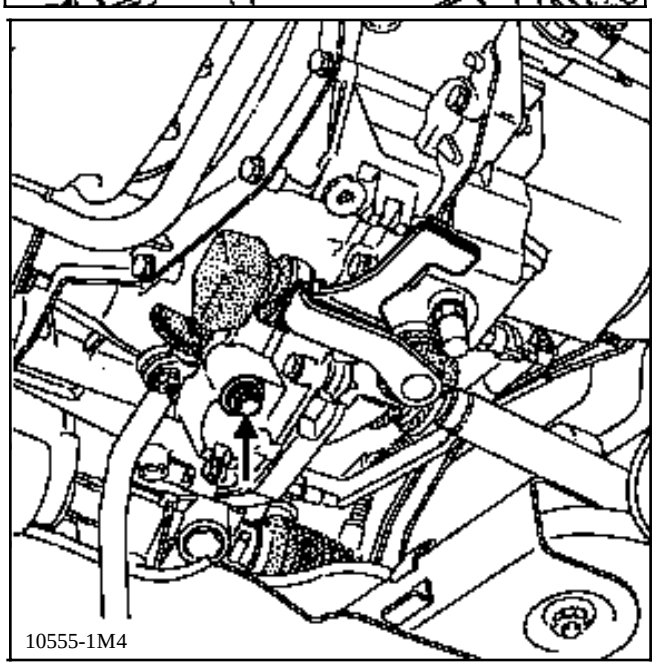
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REMOVAL

Place the vehicle on a two post lift.

Remove the battery

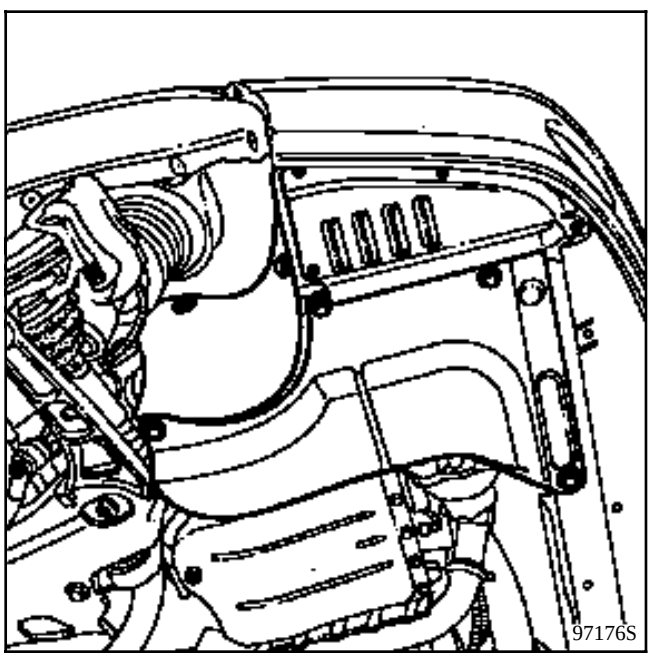
Drain :
- the cooling circuit via the lower radiator hose,
- the gearbox (refit the plug with a new seal)

Drain the air conditioning circuit. (see "air conditioning" section)

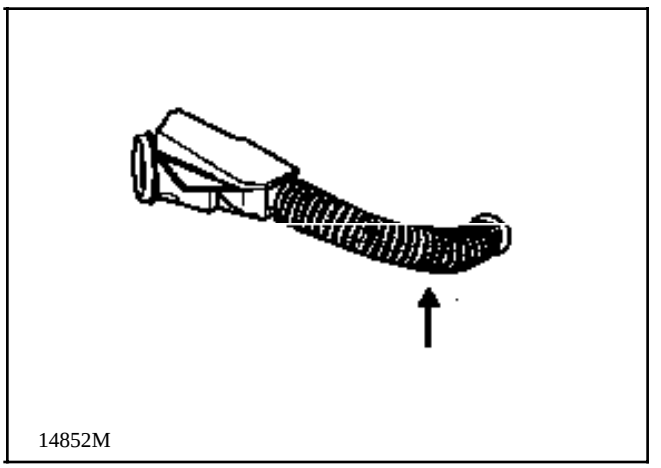
Remove the mounting for the air conditioning circuit pipes from the right hand suspended engine mounting pad.

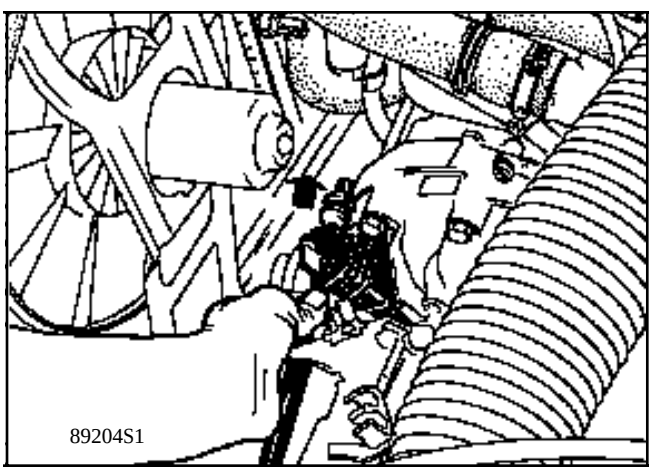
Disconnect :
- the main electric wiring from the engine connection unit,
- the air conditioning circuit unions on the compressor (take care to plug the pipes).

Remove:
- the front wheels,
- the right and left mudguards.

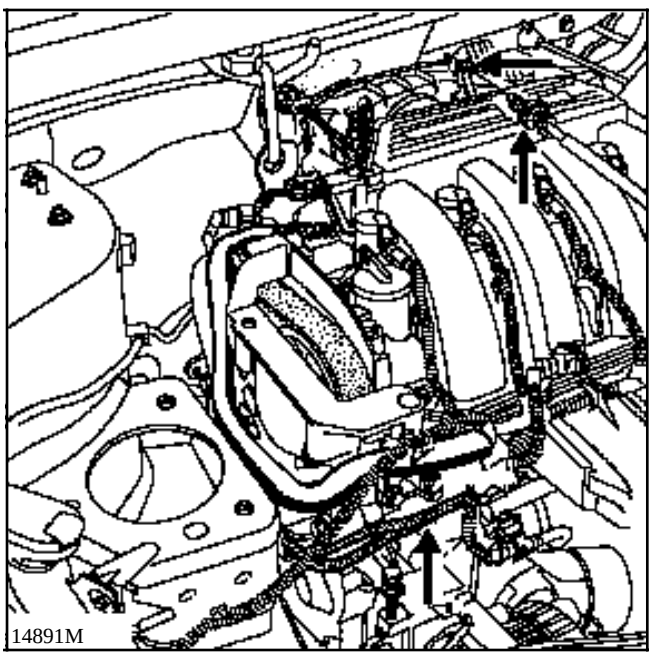


- the right and left driveshafts, (see **MR 315 section 29 " Removing - Refitting Driveshafts**"),
- the air filter resonator,
- the pipe on the cruise control LDA,
- the vacuum pipe on the brake servo,
- the gearbox control cable.





Disconnect:
- the upper hose on the radiator,
- the heater matrix hoses where they join the engine,
- the expansion bottle hoses,
- the power assisted steering reservoir and move it to one side,
- the fuel supply and return pipes,
- the accelerator cable.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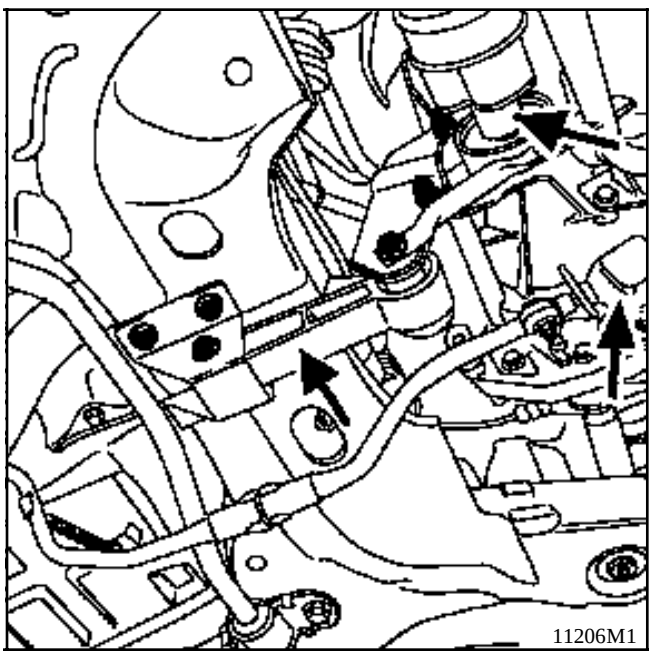
Remove the engine tie bar.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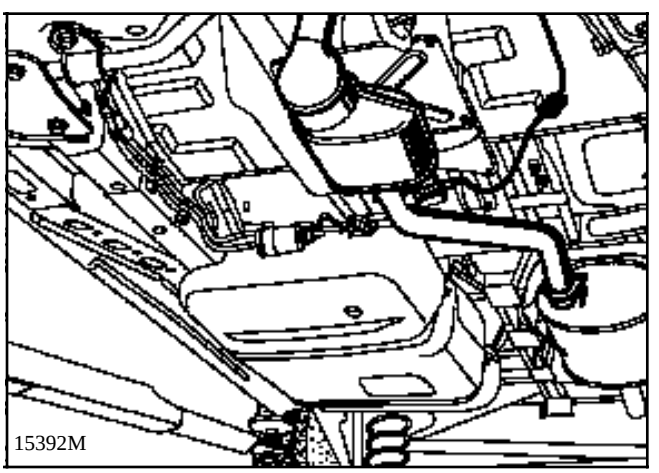
Disconnect the reversing lights switch and fold back the wiring onto the engine.

Remove:
- the gearbox earth strap,
- the exhaust downpipe connected to the catalytic converter,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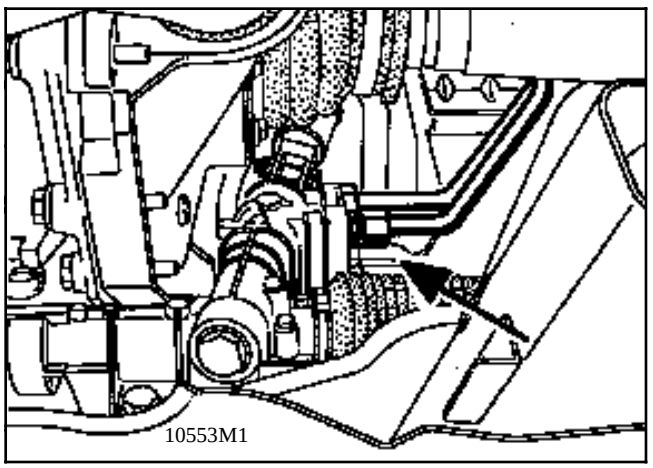
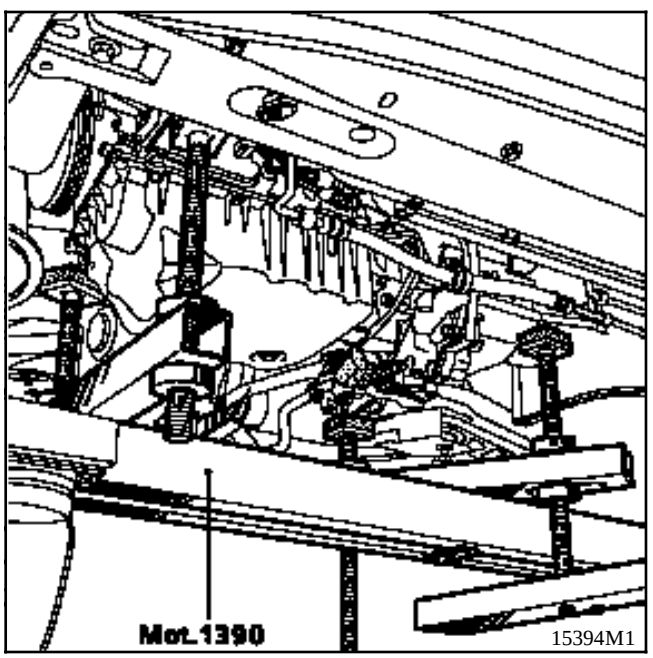
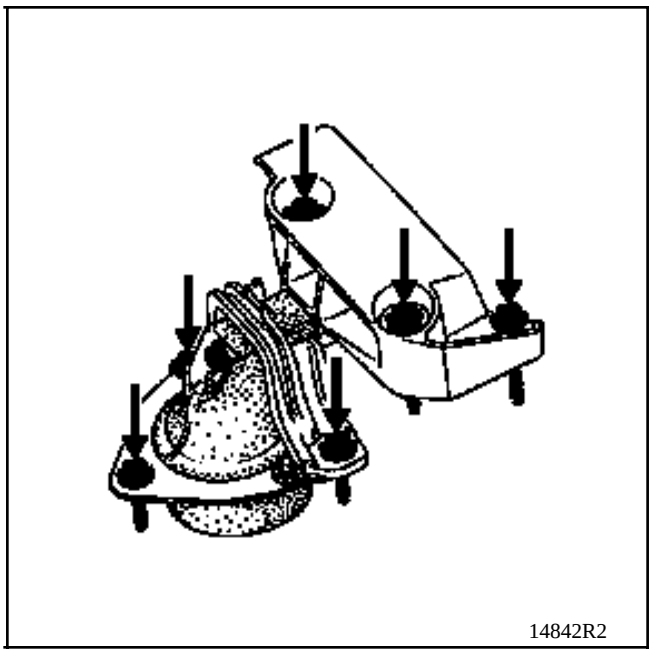
- the power assisted steering unions on the steering rack. (use tool **Dir. 1282-01** and **1282-02**).



Use tool **Mot.1390** under the engine and transmission assembly. (two man operation)

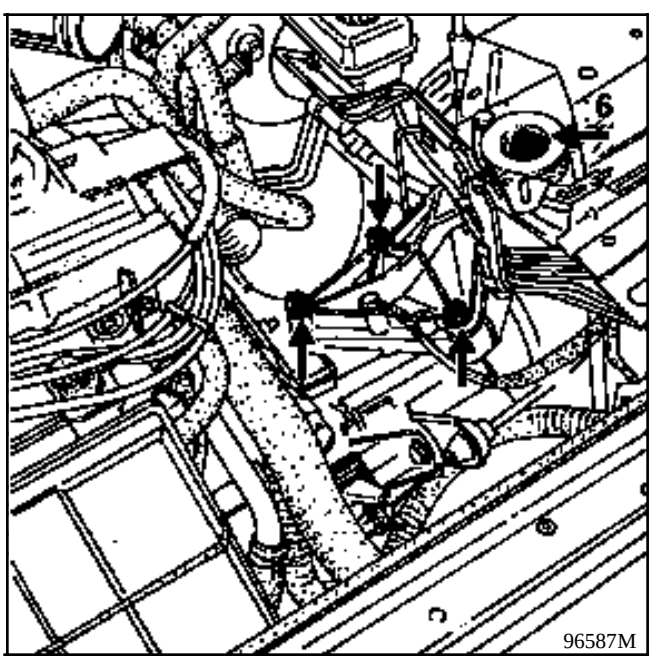


Remove the suspended engine mounting cover.



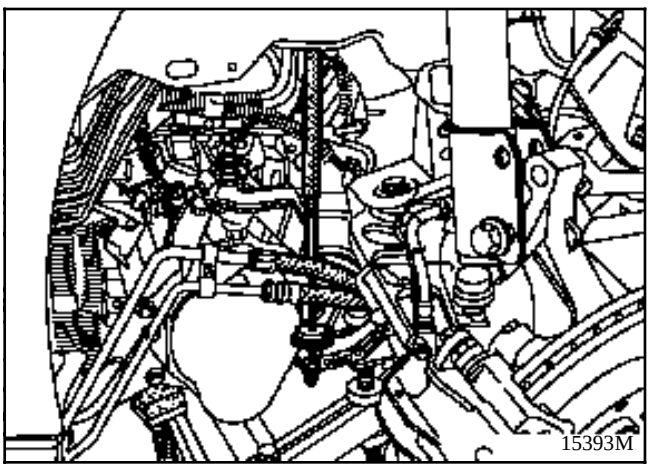
Remove:

- the gearbox support bolts, then using a copper hammer, tap to release the stud (6) from the rubber pad ,
- the mounting bolts and extract the suspended engine mounting .



Lift the vehicle in relation to the engine and transmission assembly (two man operation).

IMPORTANT take care to ensure that the power assisted steering pipes, the clutch cable and the edge of the engine sub-frame which could jam when the engine is lowered.



REFITTING -special notes

Reposition the engine in its compartment by engaging the automatic transmission command with the same precautions as on removal .

Refit the suspended engine mountings and proceed in the opposite order to removal.

Carry out:
- filling the gearbox with oil (see **Section 05** "**Filling transmission with oil** "),
- filling the engine with oil, if necessary,
- filling and bleeding the cooling circuit (see **Section 19** " **filling - bleeding**"),
- filling and bleeding the power assisted steering circuit (approx 0.8l),
- filling the air conditioning circuit (if installed), new refrigerant R134a,
  quantity: **745 ±25 grammes**
- accelerator cable adjustment.

Fit the caliper mounting bolts with **Loctite FRENBLOC** and tighten them to the correct torque.

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

Tighten to the correct tightening torques.

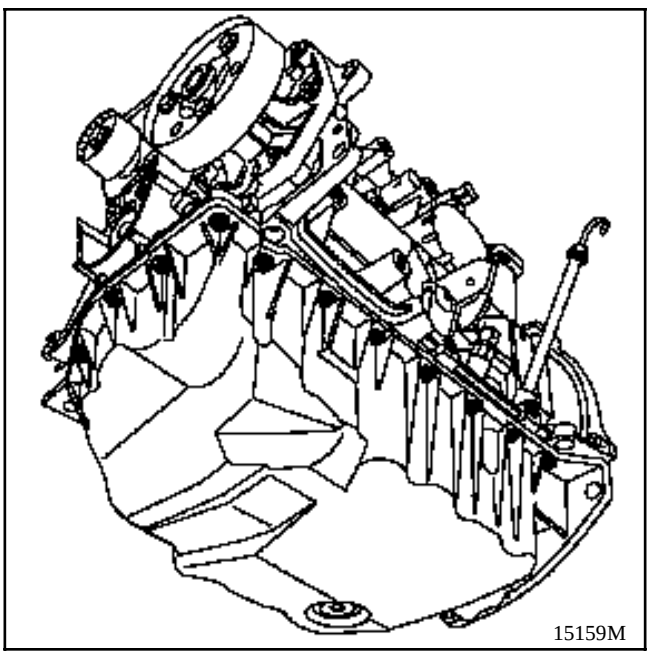
The removal - refitting of the sump does not present any particular difficulty.

Reassembly: fit the rubber seal on the sealing face of the sump.

Position the sump by tightening the bolts by hand; next refit the 4 mounting bolts on the clutch housing by also tightening them by hand.

Tighten in a spiral pattern starting from the centre of the sump.
Tightening torque : **1.2 to 1.5 daN.m**

Next tighten the mounting bolts on the clutch housing.
Tightening torque: **3 daN.m**



NOTE : the seal is not repairable.

Vehicle	Gear-box	Engine							Depollution standard
		Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Ratio	Catalytic converter	
JE0 N	JC5	F4R	700	82.7	93	1998	9.8 / 1	◊ C 79 C 106	EU 96

Engine		Checks made at idle speed*					Fuel*** (Minimum octane rating)
		Speed (rpm)	Emission of pollutants**				
Type	Suffix		CO (%) (1)	CO_2 (%)	HC (rpm)	Lambda (λ)	
F4R	700	750±50	0.5 maximum	14.5 minimum	100 maximum	0.97<to<1.03	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**. Carry out a test after returning to idle speed

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

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

Air temperature sensor					
Temperature in °C (± 1°)	**0**	**20**	**40**	**80**	**90**
Type CTN Resistance in Ohms	5500 to 6500	2000 to 3000	1000 to 1500	-	-
Coolant temperature sensor					
Temperature in °C (± 1°)	**40**	**60**	**90**	**115**	
For instrument panel (A) Resistance in Ohms	1150 to 1350	515 to 600	186 to 206	87 to 100	
Temperature in °C (± 1°)	**-10**	**+25**	**80**	**110**	**130**
For computer (B1 / B2) Resistance in Ohms	12330 to 12590	2140 to 2365	274 to 290	112 to 118	66.5 to 69.5

DESCRIPTION	MAKE/TYPE	SPECIAL NOTES
Computer	SIEMENS "SIRIUS"	90 tracks
Injection	_	Regulated sequential multipoint "SIRIUS"
Ignition	NIPPONDENSO	Static with 4 pencil-type coils on the spark plugs First power module integrated in the computer One pinking sensor Tightening torque **2 daN.m** Firing order : 1 - 4 - 3 - 2
TDC sensor	SIEMENS	Resistance : 200 to 270 Ω
Spark plugs	BOSCH FR7 LDC	Spark plug gap: 1.0 mm (adjustable) Tightening : 2.5 daN.m
Fuel filter		Fixed to the front of the fuel tank under the vehicle. Replace during major service
Supply pump	WALBRO	Submerged in the fuel tank. Pump capacity: 80 l/h minimum under regulated pressure of 3 bars and voltage of 12 Volts
Pressure regulator	BOSCH	Regulated pressure Under zero vacuum : 3 ± 0.2 bars Under vacuum of 500 mbars : 2.5 ± 0.2 bars
Pulse damper	BOSCH	
Electromagnetic injector	WEBER	Voltage: 12 Volts Resistance : 14.5 Ω
Throttle body	SOLEX	
Throttle potentiometer	CTS	**Resistance**

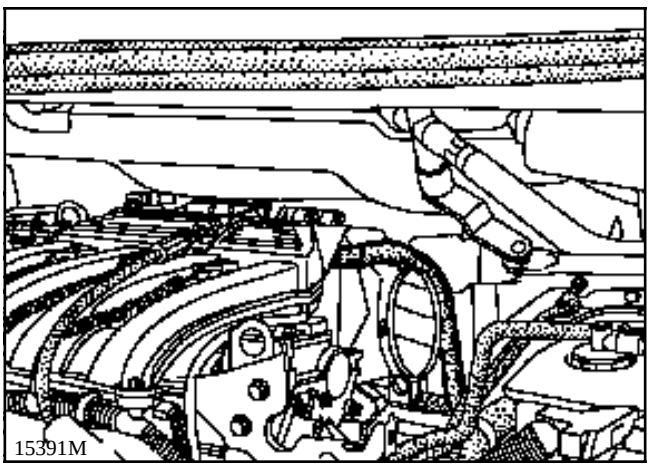
track	No load(Ω)	Full load(Ω)
A-B	1250	1250
A-C	1245	2230
B-C	2230	1245

DESCRIPTION	MAKE/TYPE	SPECIAL NOTES
Idle speed regulation solenoid valve	MAGNETI MARELLI	7700100946
Fuel vapour rebreathing canister Solenoid valve	SAGEM	Voltage: 12 volts (RCO command) Resistance : 26 ± 4 Ω to 23 °C
Heated oxygen sensor	77 00 105 557 suffix B BOSCH LSW 24 WS	Rich mixture = 840 mvolts ± 70 Lean mixture= 20 mvolts ± 50 Heating resistance R= 9 Ω at ambient temperature Tightening torque : 4 to 5 daN.m
Fault finding (Described in specific Technical Note)	FICHE n° 47 CODE D13 ISO SELECTOR S8	Throttle potentiometer : At idle speed 0≤ #08 ≤ 1000 Full load #17 ≥ 77 R.C.O.idle speed 20 ≤ #12 ≤ 40 Adaptive R.C.O.idle speed - 12.5 ≤ #21 ≤ +12.5 Adaptive operating richness 0.75 ≤ #30 ≤ 1.25 Adaptive idle speed richness - 1 ≤ #31 ≤ 1

TIGHTENING TORQUES (in daN.m)	
Air filter cover bolts	**0.9**

REMOVING THE AIR FILTER CARTRIDGE

Disconnect:
- the battery,
- the brake servo vacuum pipe.



Remove the inlet resonator.

Remove the two upper mounting bolts from the air filter cover and tilt the cover to release it from the lower lugs.

REFITTING

Position the cover as close as possible to the correct position in relation to the air filter so that the centring lug is correctly positioned ; the rubber on the cartridge prevents the two parts sliding over each other when they are touching.

SPECIAL TOOLING REQUIRED		
Mot.	**1390**	**Universal support**

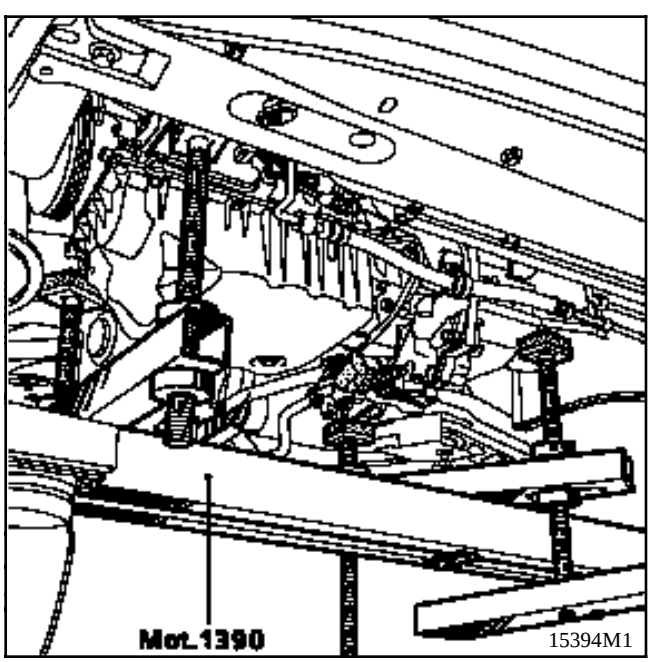
TIGHTENING TORQUES (in daN.m)	
Throttle body mounting bolts on inlet manifold	**1.3**
Air filter cover bolts	**0.9**
Movement limiter mounting bolts	**6.2**
Left hand suspended engine mounting pad mounting nut	**7**
Right hand suspended engine mounting bolt + movement limiter	**6.2**

REMOVAL

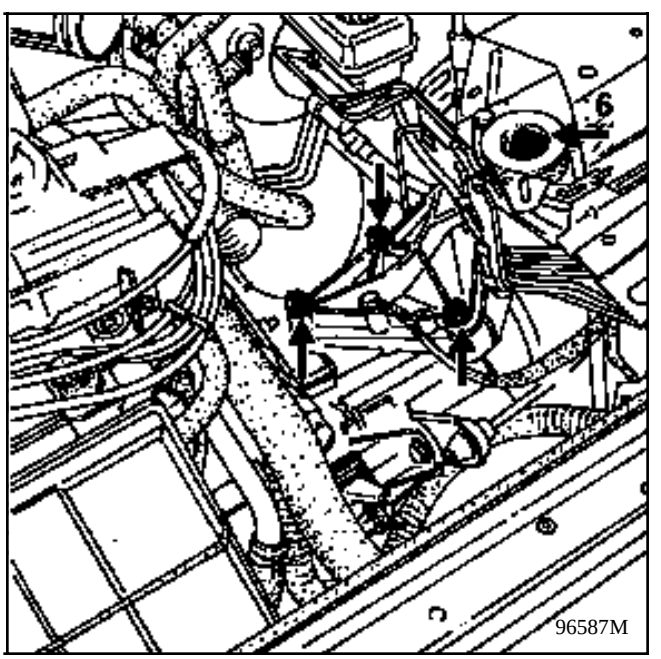
Put the vehicle on a two post lift.

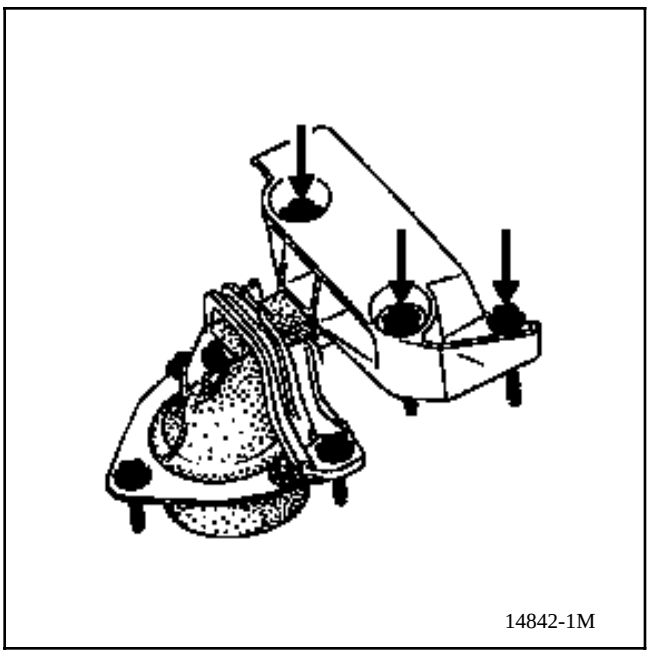
Disconnect:
- the battery,
- the accelerator cable,
- the throttle body connector.

Put engine and transmission assembly on support **Mot. 1390.**



Remove:
- left hand suspended engine mounting pad mounting nut (6) ,
- the movement limiter and the right hand mounting pad.





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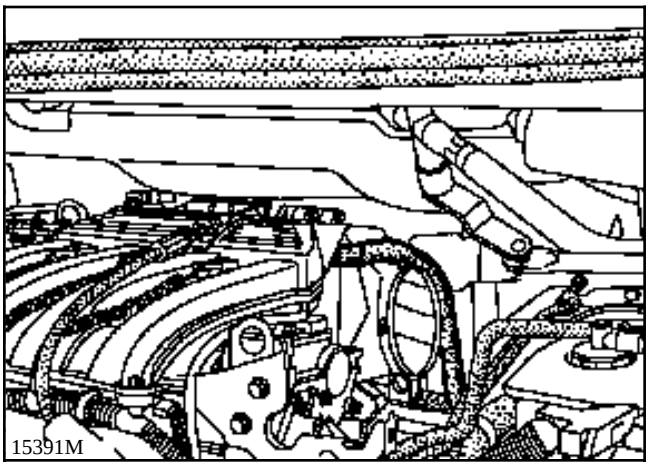
Lower the engine and transmission assembly slightly by raising the lift, stopping the lift when the driveshafts touch the subframe.

Remove:
- the inlet resonator,



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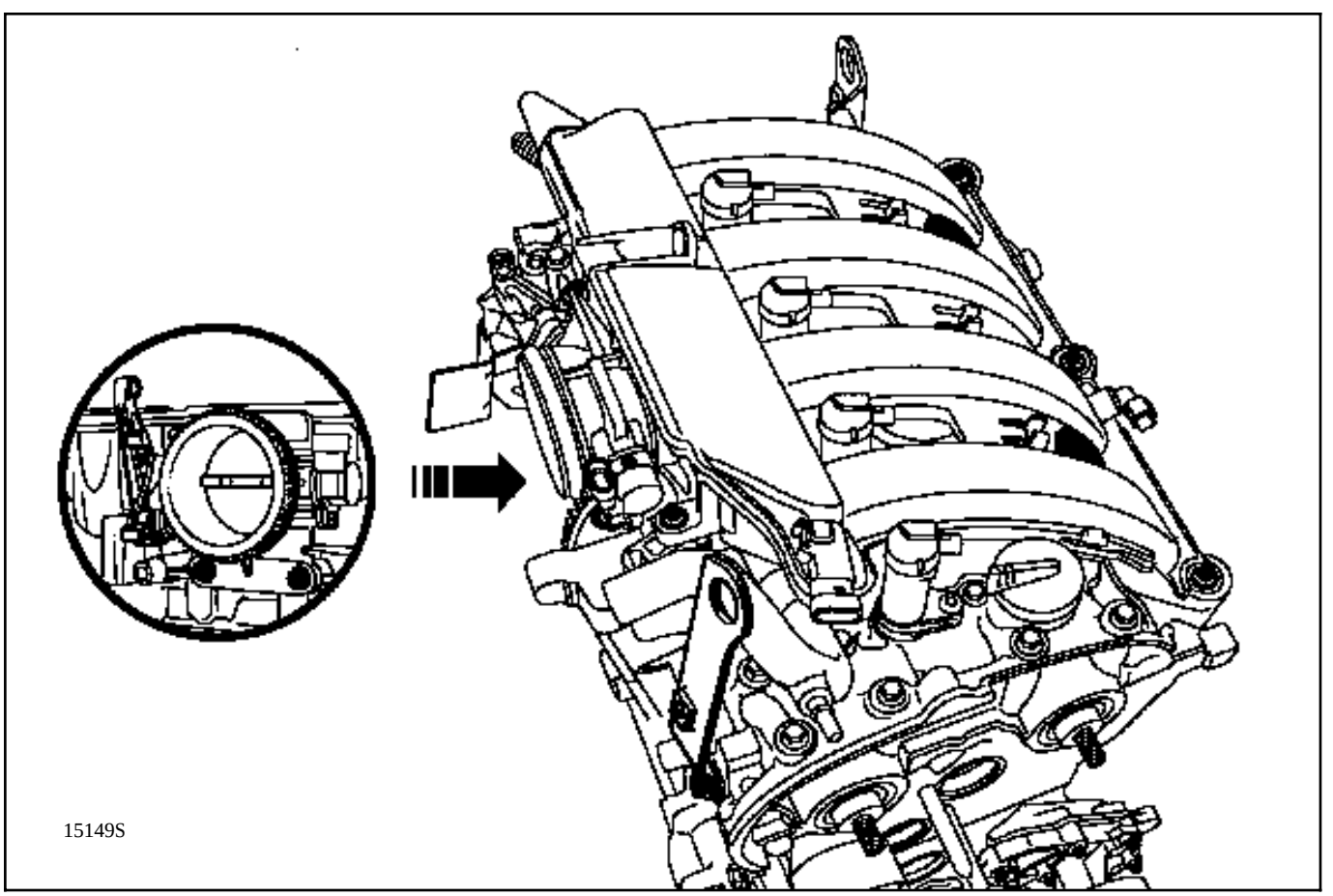
- the bolts which hold the inlet unit and push it towards the rear without trying to extract it,
- the bolts which hold the throttle body on the cylinder head cover,
- the throttle body.

REFITTING

Refitting is the reverse of removal.
Replace the throttle body seal after each removal and grease it to make refitting easier.



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TIGHTENING TORQUES (in daN.m)	
Manifold mounting bolt	**2**
Distributor mounting	**2.5**

REMOVAL

The throttle body must be removed first to enable the removal-refitting of the inlet manifold. (See relevant section)

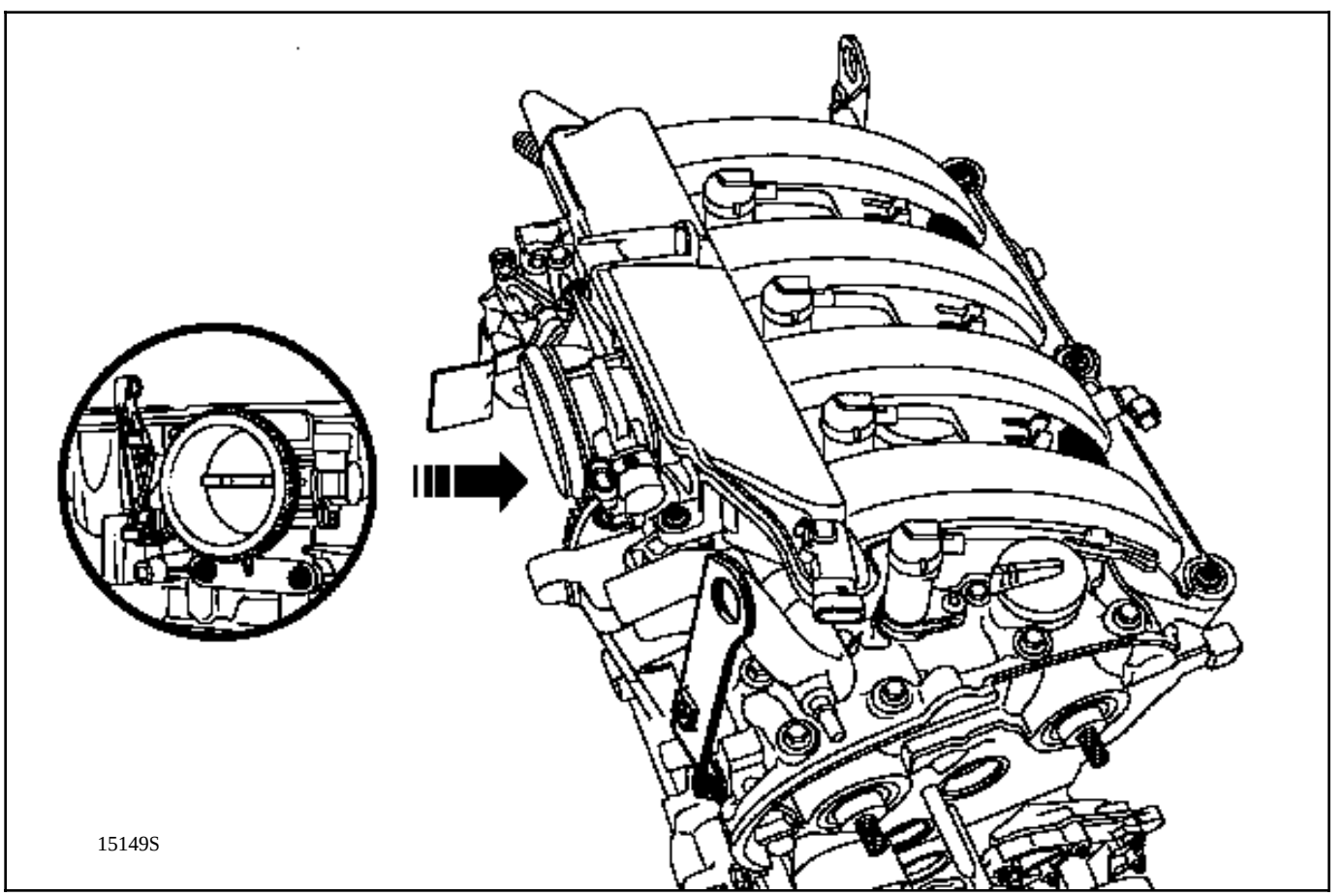
Disconnect:
- the coil wires,
- the oil vapour rebreathing pipe,
- the temperature sensor connector,
- the pipe connected to the fuel pressure regulator,
- the braking amplifier pipe .

Remove:
- the coils,
- the bolts fixing the inlet manifold to the cylinder head cover, then tilt it towards the top and towards the front.

REFITTING

Refitting is the reverse of removal.

Check the presence and the condition of the seals on the distributor pipes and on the cylinder head cover.



TIGHTENING TORQUES (in daN.m)	
Upstream oxygen sensor	**4 .5**
Manifold mounting nuts	**1.8**
Heat shield mounting bolts	**1**

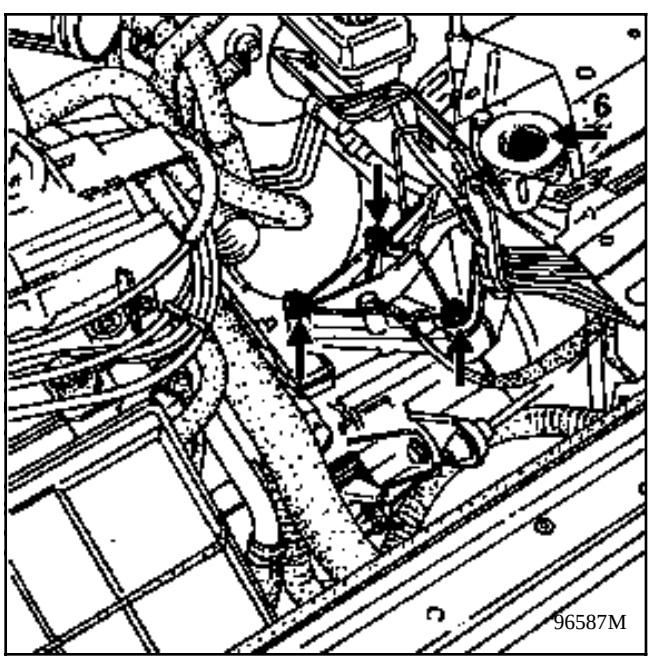
REMOVAL

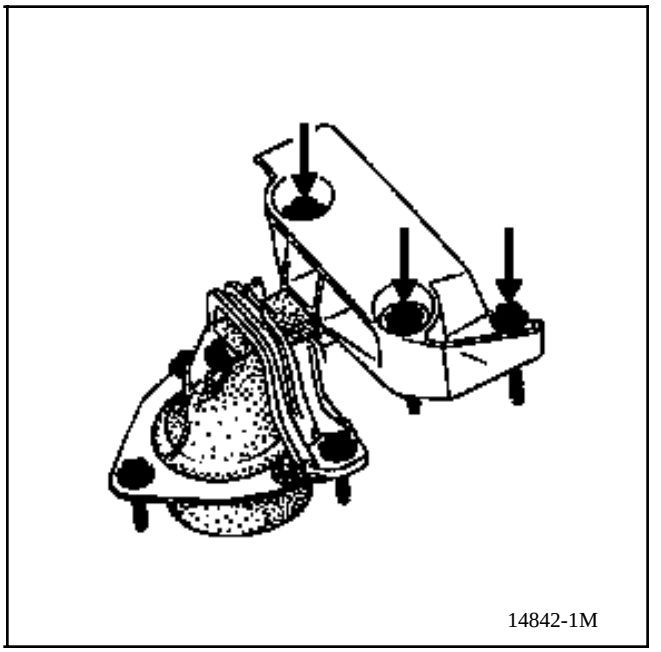
Place the vehicle on a two post lift.

Disconnect the battery.

Put the engine and transmission assembly on the universal support **Mot. 1390** prepared beforehand (see **Section 10** "**Removal-Refitting the engine and transmission assembly**")

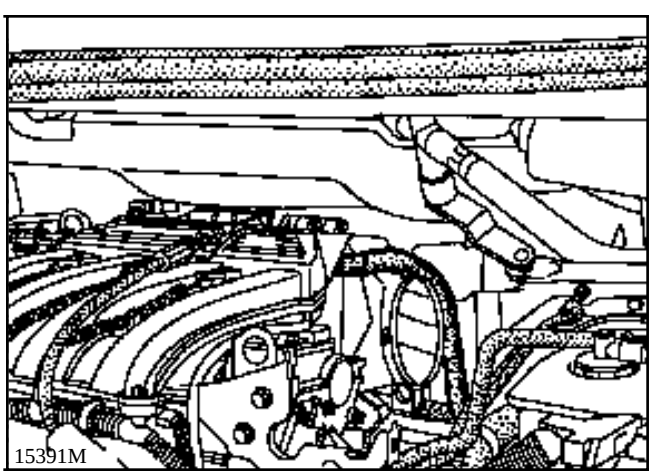
Remove:
- the left hand suspended engine mounting pad mounting nut (6),
- the movement limiter and the right hand mounting pad,
- the resonator.



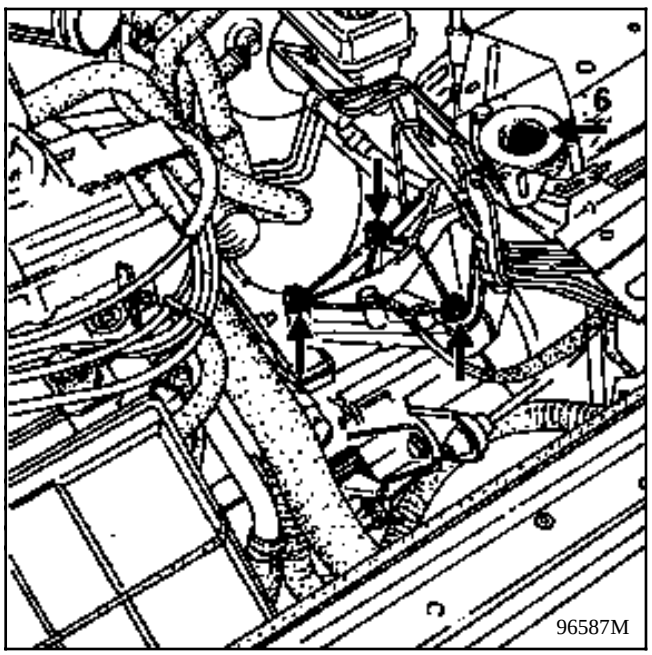


Lower the engine and transmission assembly slightly by raising the lift, stopping the lift when the driveshafts touch the subframe.

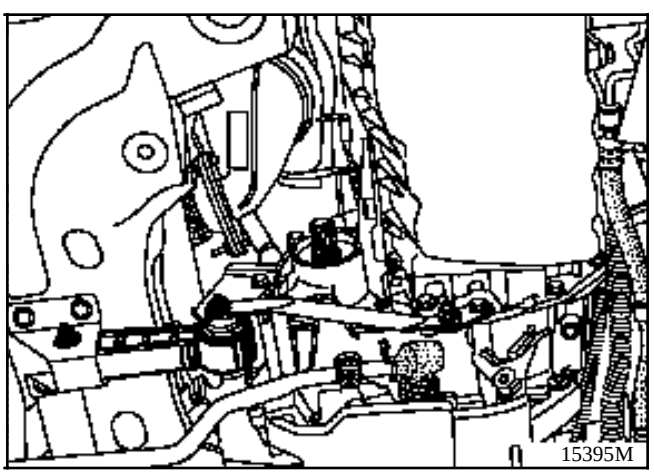
Remove:
- the inlet resonator,
- the air filter cartridge cover,
- the bolts which hold the inlet unit and push it towards the rear and to the left to extract it.



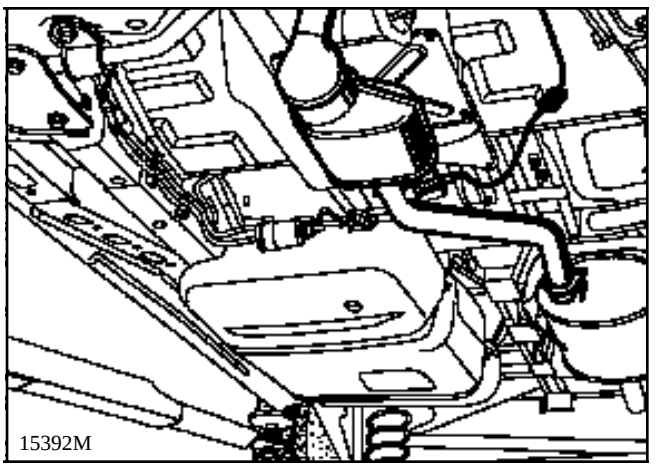
Disconnect and remove the oxygen sensor using tool **Mot. 1495.**



Release the exhaust downpipe.



Remove the catalytic converter .



Remove:
- the exhaust heat shield
- the exhaust manifold.

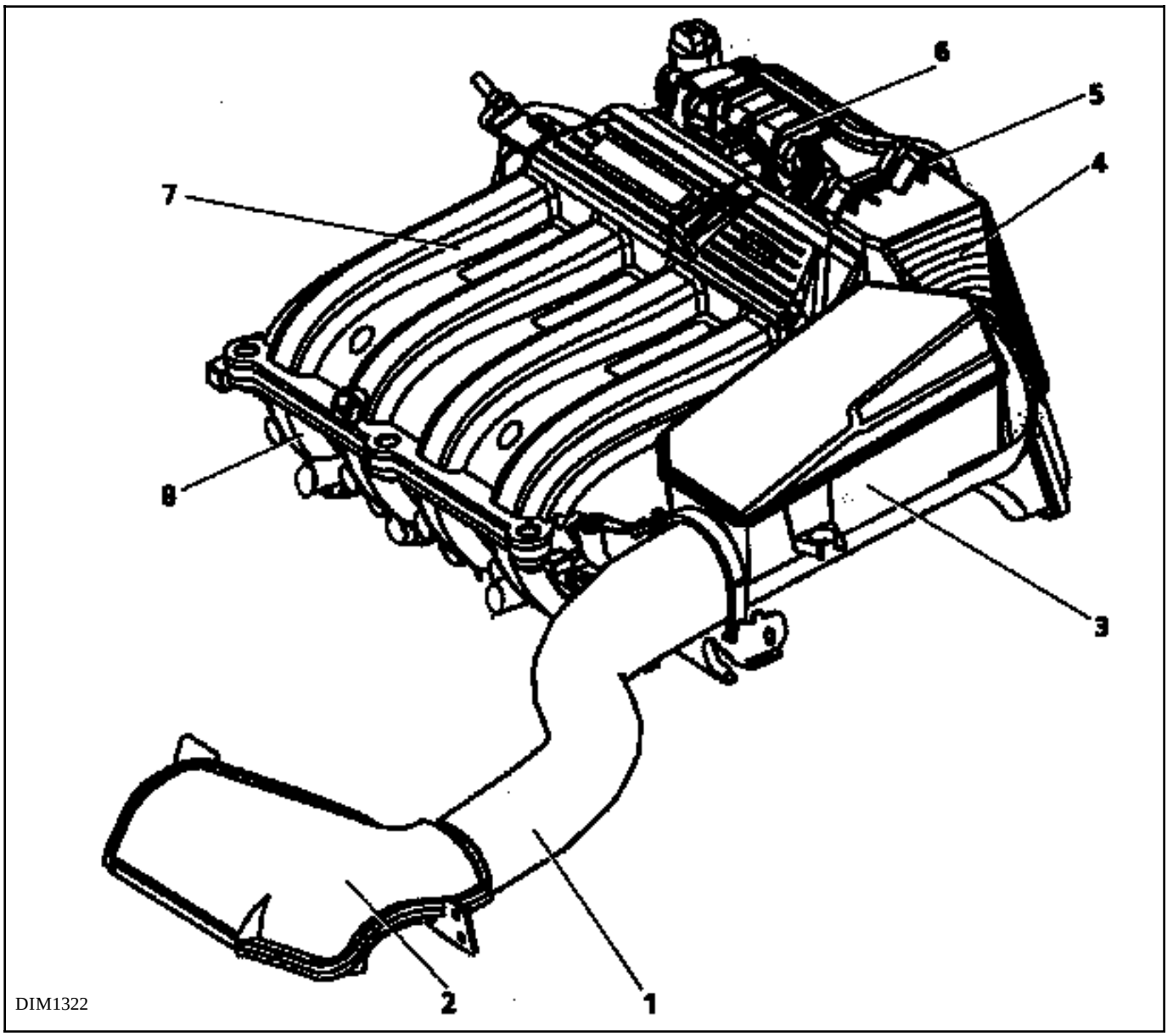
Release the manifold from the underneath, by moving the engine towards the front, and by pivoting the manifold towards the right.

REFITTING

Refitting is the reverse of removal.

Change the gasket between the cylinder head and the exhaust pipe.

INLET CIRCUIT



1 Air intake pipe
2 Inlet scoop
3 Resonator
4 Air filter cartridge cover
5 Air filter unit cover mounting bolt
6 Air filter unit
7 Inlet manifold
8 Inlet distributor

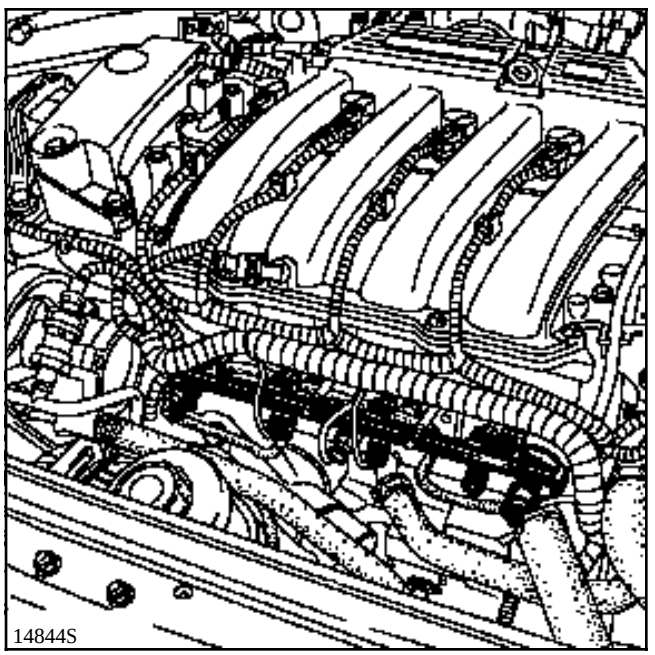
TIGHTENING TORQUE (in daN.m)	
Injector gallery bolts	**0,9**

The injectors mounted on the F4R engine are of WEBER make.
They are clipped on the injector gallery.

REMOVAL

Disconnect the battery.

IMPORTANT : when removing the injectors, be careful of the amount of fuel which is in the gallery and unions. Protect the alternator.

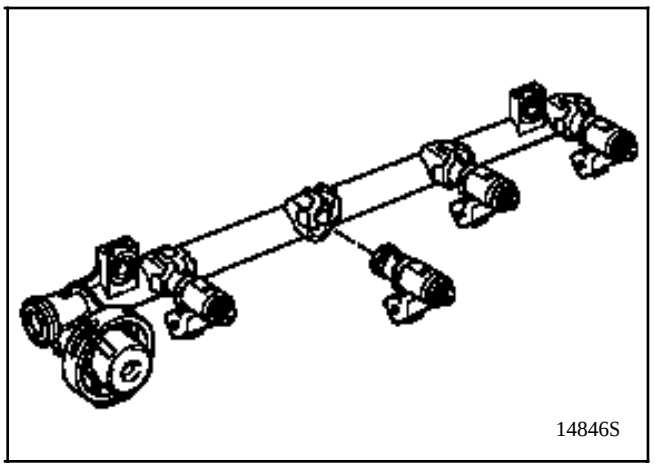

14844S

Remove :
- the gallery protection pad,
- the fuel inlet and return unions from the gallery without clamping the pipes,
- the vacuum pipe for the pressure regulator,
- the mounting bolts of the gallery pipe,
- the injector connectors,
- the injector clips

REFITTING

The injector seals must be changed.

Observe the tightening torque for the gallery bolts.

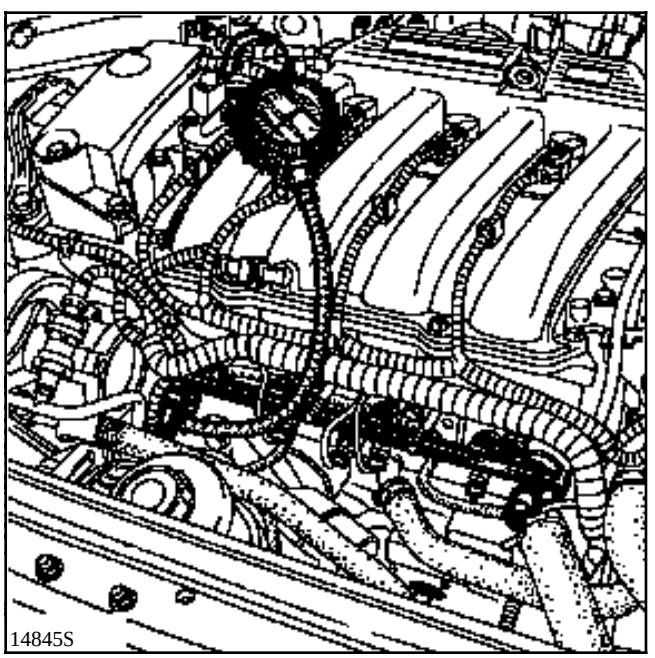

14846S

CHECKING THE FUEL SUPPLY PRESSURE AND THE PUMP FLOW

SPECIAL TOOLING REQUIRED	
Mot. 1311-01 and Mot. 1311-02	**Fuel pressure test kit with pressure gauge and sockets**
Mot. 1311-04	**Pressure measuring sockets**
EQUIPMENT REQUIRED	
2 000 ml measuring cylinder	

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

Disconnect the fuel return pipe. Fit a pipe which flows into a measuring cylinder.


14845S

Turn the pump over by activating the starter motor.

Note the pressure and the quantity of fuel in the cylinder.

When a vacuum is applied to the pressure regulator using a vacuum pump, there is a drop in the fuel supply pressure.

Pressure read : **3 bars ± 0.3**

Minimum calculated flow : **1.3 litre/minute**

Checking the pump safety valve.

Supply the fuel pump while blocking the fuel return outlet. The pressure gauge reading should stabilise around **5 bars**.

POWER ASSISTED STEERING PUMP

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

TIGHTENING TORQUES (in daN.m)	
Pump mounting bolt on support	**5**
Pump pulley bolt	**1.5**

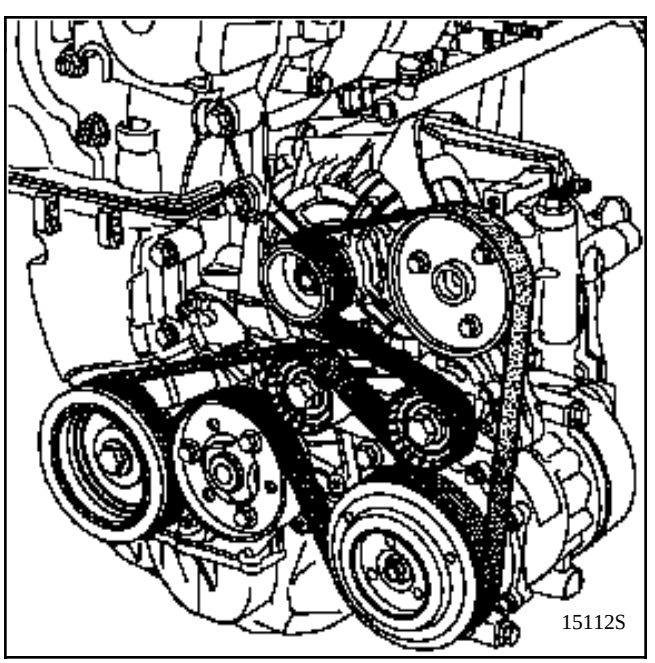
REMOVAL

Put the vehicle on a lift.

Disconnect the battery.

Slacken the power assisted steering pump pulley (3 bolts).

Remove the accessories belt (see **Section 07** "**Accessories belt Removal -Refitting**"),

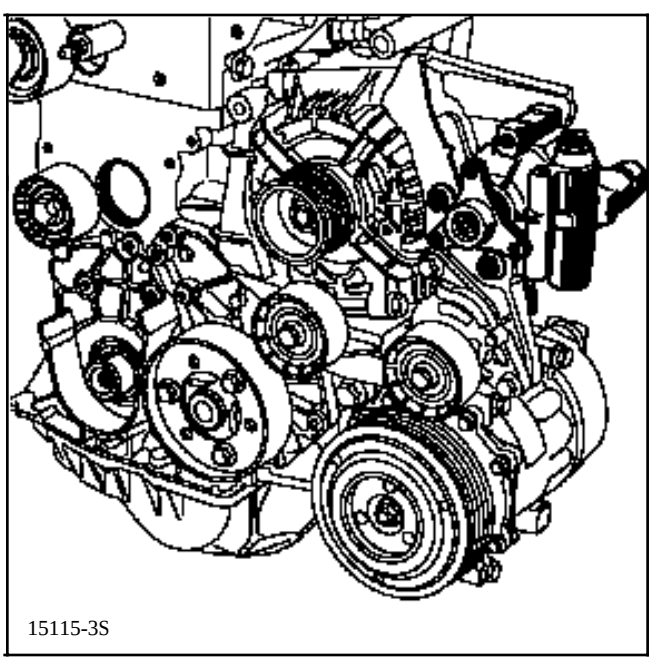


Remove the power assisted steering pump pulley.

Fit pliers **Mot. 453-01** on the low pressure pipe coming out of the reservoir, disconnect it at the pump and disconnect the high pressure pipe trying not to spill too much oil .

Plug the openings.

Remove the power assisted steering pump mounting bolts and release it.



NOTE : During this operation the power assisted steering fluid will run out ; protect the alternator.

REFITTING

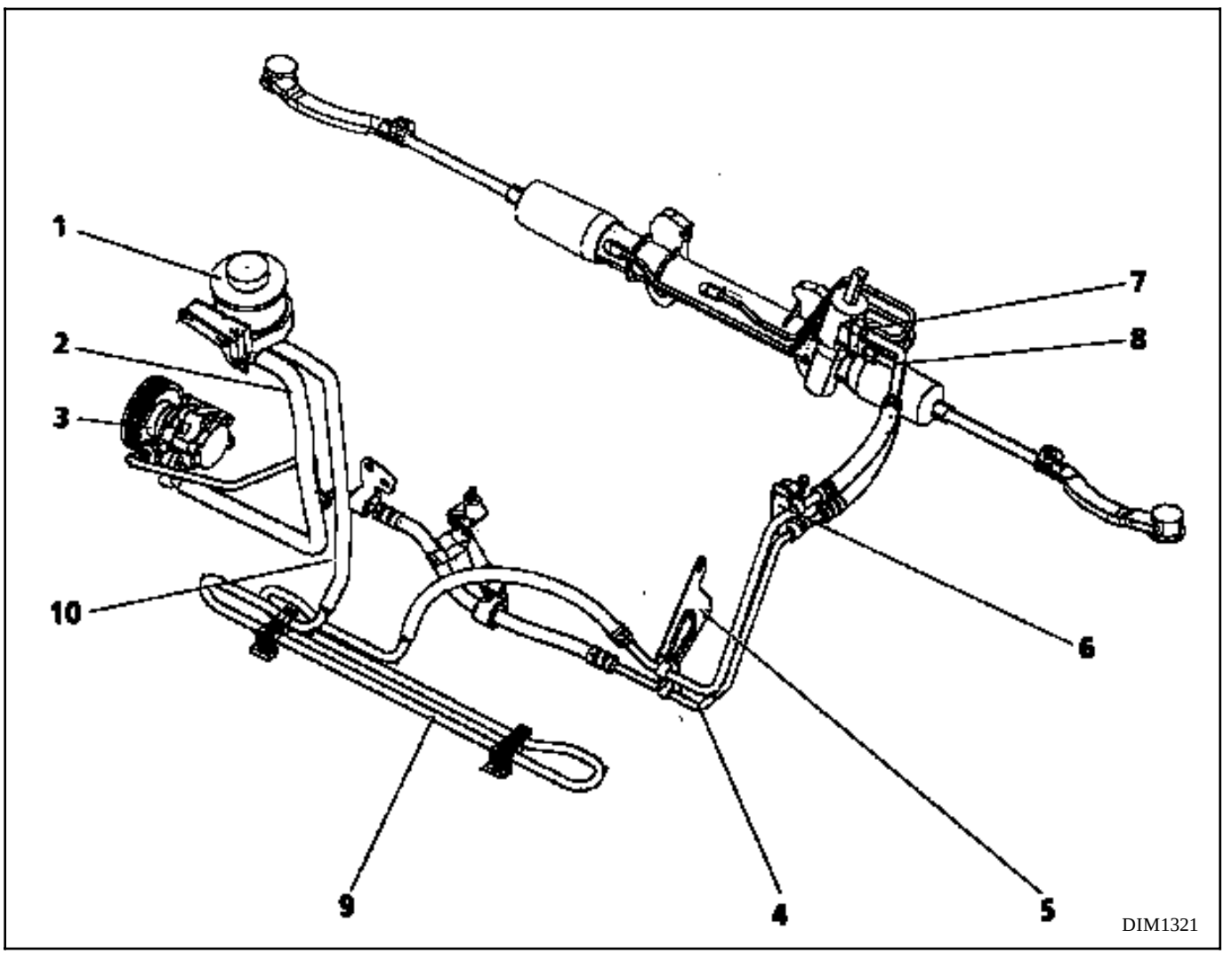
Refitting is the reverse of removal. Observe the tightening torques.

Refit the accessories belt as described in section 11.

NOTE : in A / C version, the tension of the accessories belt is automatically set by a dynamic tension wheel.

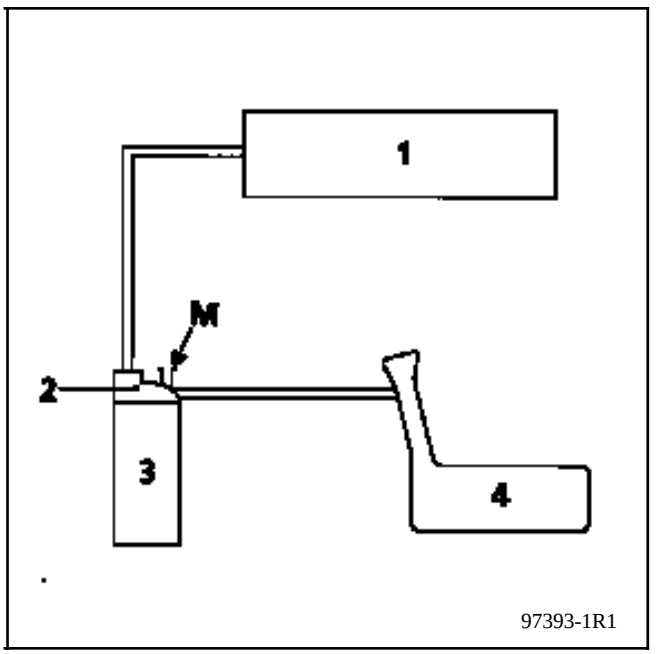
Top up the level and bleed the circuit.

DIAGRAM OF THE POWER ASSISTED STEERING PIPES

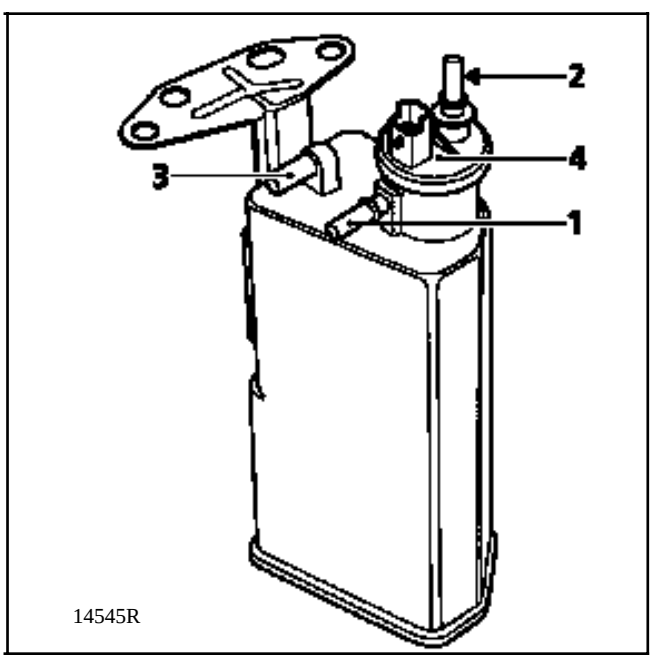


1 Power assisted steering fluid reservoir
2 Pipe between the reservoir and the power assisted steering pump.
3 Power assisted steering pump
4 Pipe between the power assisted steering pump and the steering rack valve
5 High pressure and low pressure pipes support bracket at the front of the transmission
6 High pressure and low pressure pipes support bracket at the rear of the transmission
7 Steering rack valve
8 Return valve / exchanger pipe
9 Exchanger
10 Pipe between return exchanger and reservoir

CIRCUIT OPERATING DIAGRAM



1 Inlet manifold
2 Solenoid valve integrated into the canister
3 Canister
4 Fuel tank
M Breather (pipe opening into right hand side member)



1 Fuel vapour rebreathing coming from the tank
2 Fuel vapour rebreathing going towards the inlet manifold
3 Fuel tank breather
4 Canister solenoid valve

OPERATING PRINCIPLE

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

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

So that the fuel vapours contained in the canister, do not evaporate into the atmosphere when the fuel tank cap is removed, a valve isolates the canister from the tank when the cap is removed.

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.

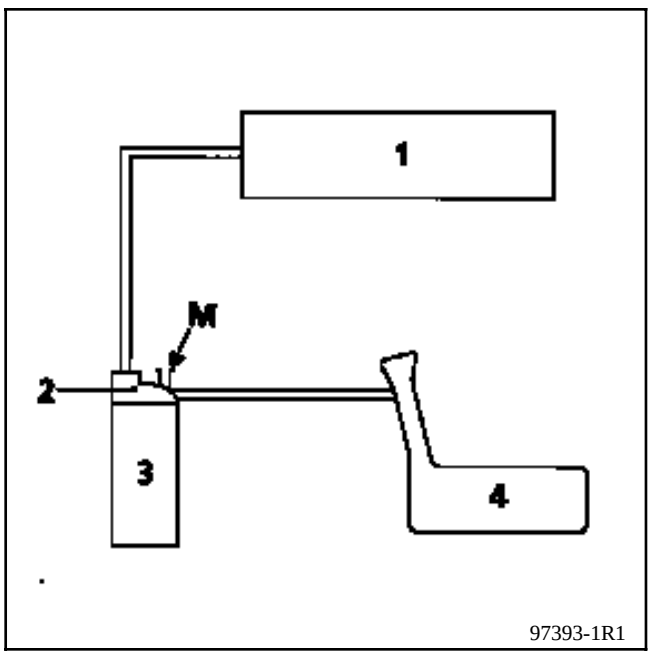
The operating principle for the solenoid valve is to give a variable passage diameter (depending on the **RCO** signal sent by the injection computer).

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 Solenoid valve integrated into the canister
3 Canister
4 Fuel tank
M Breather (pipe opening into right hand side member)

Check at idle speed, by connecting a pressure gauge(**- 3 ; +3 bars**) (**Mot. 1311-01**) to outlet (M), that there is no vacuum (in the same way, check the command value read by the **XR25** in #23 remains minimal X = 1.5 %). **Is there a vacuum ?**

YES Ignition off , disconnect and plug the inlet for fuel vapour from the tank (4), use a vacuum pump to apply a vacuum of **500 mbars** at (M). This must not vary by more than **10 mbars** in **30 seconds**.
Does the pressure vary ?

YES The solenoid valve is faulty, change it. To eliminate any pieces of active carbon, blow into the pipe connecting the solenoid valve to the canister

NO There is an electrical fault, check the circuit.

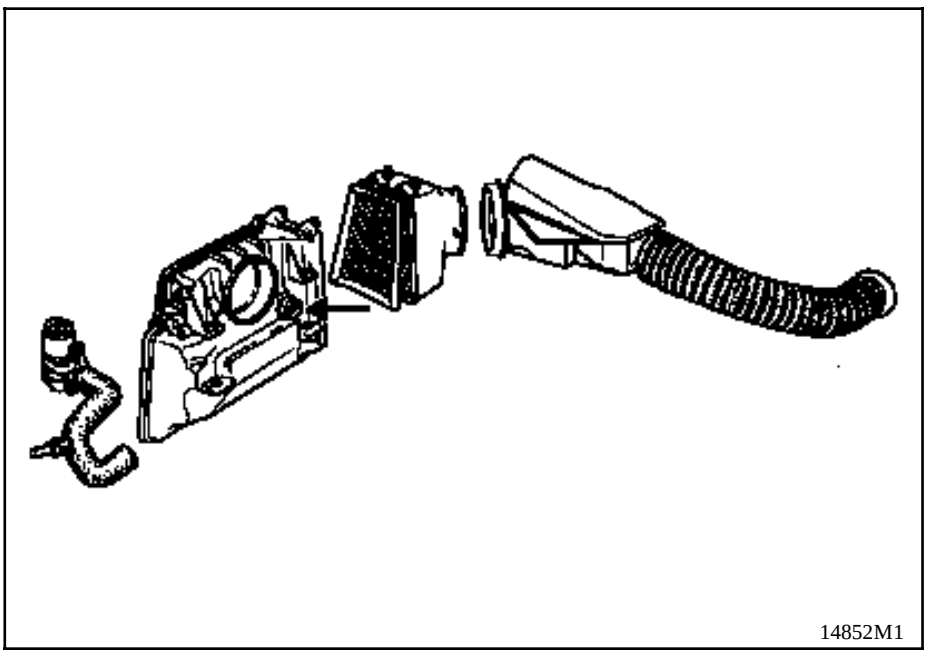
NO Under bleeding conditions(apart from when idling and engine warm), there should be an increase in vacuum (at the same time there should be an increase in value of#23 on the XR25).

Also check the pipework of the fuel tank breather. After having removed the fuel tank cap, use a vacuum pump to apply a slight vacuum to the pipe at (M). The fact that a vacuum may be applied to this pipe shows that the valve to stop overfilling is sealed.

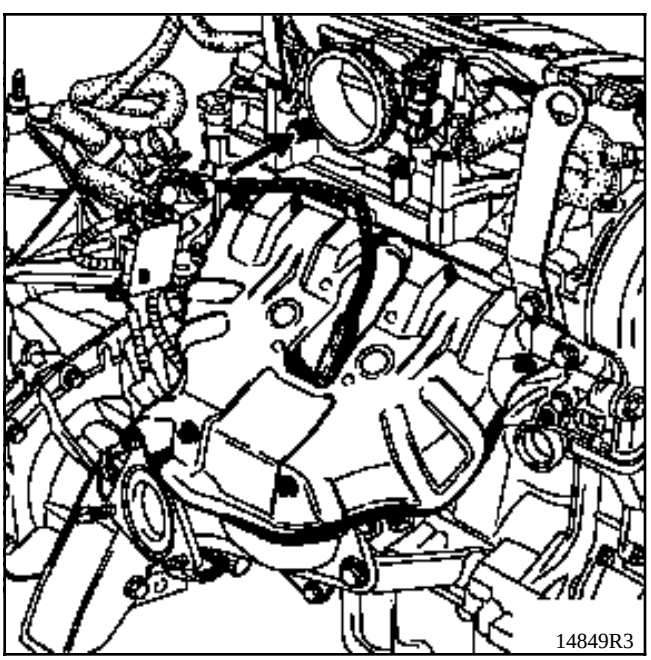
However, as soon as the cap is in position, the vacuum must quickly disappear showing that the pipe is not blocked and that there is good communication with the internal degassing volumes in the fuel tank.

PRESENTATION OF COMPONENTS

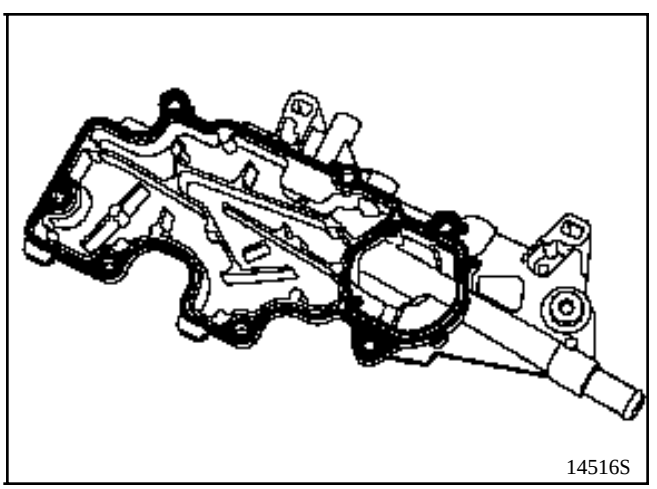
Oil vapour rebreathing opening.



Oil vapour outlet.



Oil vapour recuperation plate located on the cylinder head cover.



For removal, refer to section **Engine F4**.

IDENTIFICATION

VEHICLE	ENGINE	ALTERNATOR	CURRENT
JE0 N	F4R	Valéo A 11 VI (NC) BOSCH KCB2 (AC)	75 A 110A

REMOVAL

Place the vehicle on a two post lift.

Disconnect the battery and the electrical connections of the alternator.

Remove:
- the engine undertray under the right hand side of the engine,
- the accessories belt (see method in **Section 11 - Accessories belt**),
- the alternator.

REFITTING

Refitting is the reverse of removal.

IDENTIFICATION

VEHICLE	ENGINE	STARTER MOTOR
JE0 N	F4R	BOSCH

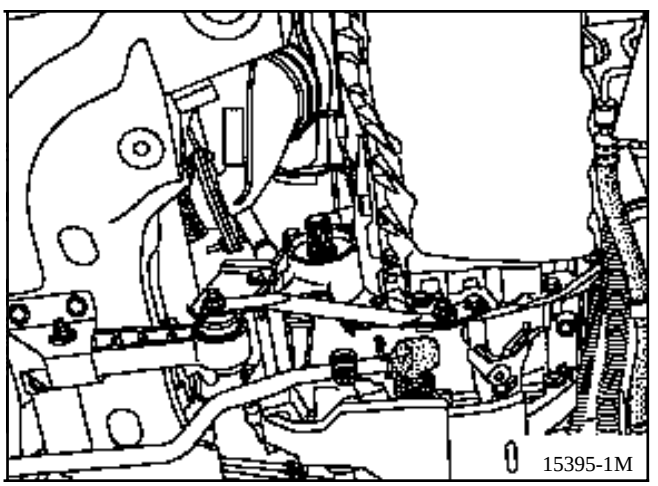
REMOVAL

Disconnect the battery

Remove:
- the inlet resonator,
- the pre catalytic converter shield ,
- the right hand driveshaft (see **MR 315 Section** "**Driveshafts**").

Disconnect the starter motor supply.

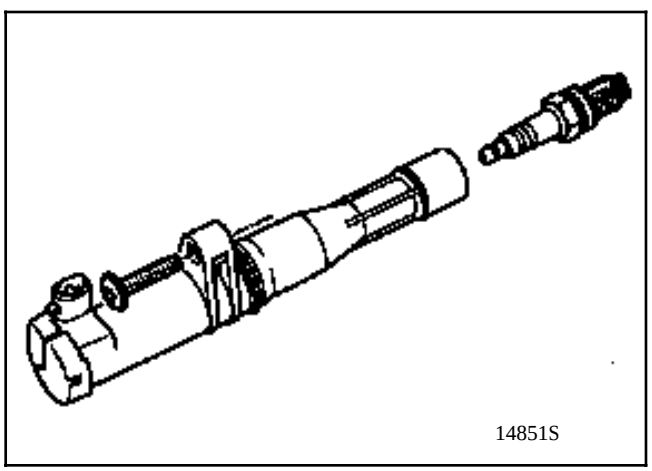
Remove the 3 starter motor mounting bolts, and the starter motor.



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.

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

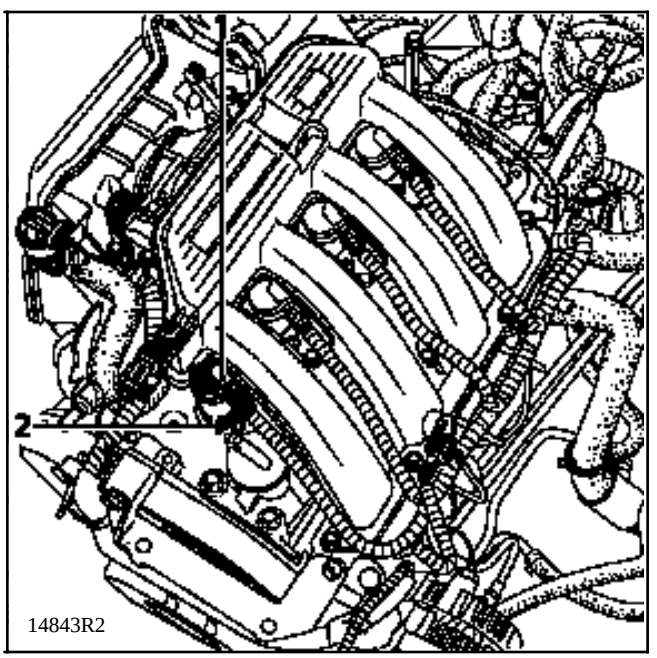
Disconnect the battery.

Disconnect the ignition coils.

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

Remove the coil mounting bolts (2).

Tilt the coils carefully forward to extract them.



REFITTING

Refitting is the reverse of removal.

NOTE : The coils must be removed before the spark plugs can be removed

SPECIAL NOTES ON THE F4R MULTIPOINT INJECTION

- **90 track SIEMENS** "**SIRIUS 32**" computer which controls the injection and the ignition.
- Use of the XR25 after sales fault finding tool with cassette no. 18 and fiche no. 65
- Multipoint injection operating in sequential mode without cylinder and camshaft position marking 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 ±30 rpm**
- Idle speed correction depending on:
  - air conditioning,
  - electrical balance,
  - battery voltage.
- Maximum speeds
  - maximum speed when coolant temperature is less than 75° . . . . . **5 900 rpm**.
  - maximum speed for T **> 75**° . . . . . **6 500 rpm**
- Canister bleed solenoid valve controlled by the cyclical opening ratio (**RCO**) depending on the engine speed and operating conditions.
- Use of two oxygen sensors located upstream and downstream from the catalytic converter (Euro 2000 standard).
- Automatic configuration for AC operation via an exchange of signals between the computers. However, it is impossible to deconfigure it
- Control of engine cooling fan assembly and of the coolant temperature warning light on the instrument panel by the injection computer

DESCRIPTION

The **F4R engine** is fitted with a sequential type of injection

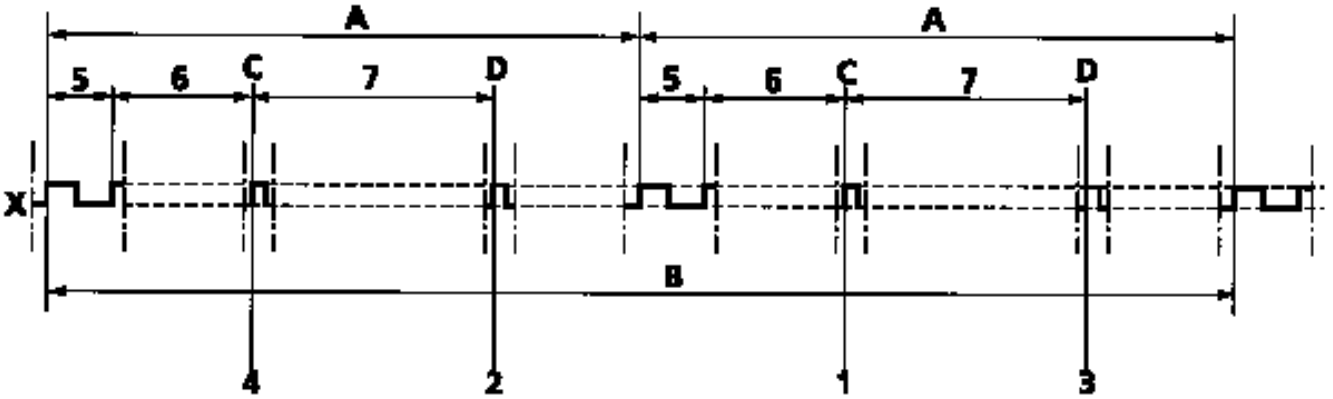
During normal operation, the fuel injection is carried out cylinder after cylinder when they are at the start of the inlet phase.

For that, it is important that :
- each injector is independently controlled by the computer (injector n° **1** on the engine flywheel side),
- the computer knows which cylinder is in the inlet phase.

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

To determine into which of the 2 cylinders it must inject, the computer uses 2 strategies :
- each time the engine is stopped it memorises which injector was operated. When the engine is restarted, it starts with this reference cylinder.
- if the reference cylinder is wrong, the computer carries out a logical test

Whenever the computer is changed, programming during a road test lasting for a minimum of **25 minutes must be carried out** under normal operation, 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 Top Dead Centre degrees.

This vehicle is equipped with a second generation engine immobiliser system.

CHANGING THE INJECTION COMPUTER

Computers are supplied uncoded. 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.

CHECKING THE ENGINE IMMOBILISER FUNCTION

Remove the key from the ignition switch. After 10 seconds the red engine immobiliser tell-tale light should flash

It is not possible to borrow an injection computer from stores for testing, in fact, it would be impossible to erase the code which has been programmed into it.

THE COMPRESSOR IS OF THE FIXED 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 **46**. This is an air conditioning operation 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.(**900 rpm± 30**) .

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.

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 **6000 rpm.**

OPERATION

Under normal warm operating conditions , the idling **RCO** value for **# 12** varies between a high value and a low value to obtain the nominal idle speed.

It may be that, following variations in operating conditions (running in, engine contaminated...), the idling **RCO** value is close to the high values or the low values.

The adaptive correction (**# 21**) on the idling **RCO** (**# 12**) allows the slow variations in the engine's air requirement to be compensated for.

This correction is only effective if the coolant temperature is greater than **80 °C**, **20 seconds** after starting the engine and if it is in the nominal idle speed regulation phase.

IDLE RCO VALUES AND ADAPTIVE CORRECTION

	Engine K4M 720
Nominal idle speed (**#06**)	X = 750 rpm. ± 30
Idling RCO (**#12**)	6 % ≤ X ≤ 22 %
Adaptive idling (**#21**)	Stop: - minimum : - 8 % - maximum : + 8 %

Every time the engine stops, the computer readjusts the stepping motor setting it against the low stop.

INTERPRETATION OF THESE GATES

When there is too much air (air leak, incorrectly adjusted throttle stop...), the idle speed increases, the idle **RCO** value for **# 12** decreases in order to return to the nominal idle speed ; the adaptive correction value of the idle **RCO** for **# 21** decreases in order to recentre idle regulation operation .

When there is a shortage of air (contamination, etc.), the opposite may be said, the idle **RCO** for **# 12** increases and the adaptive correction for **# 21** also increases, in order to recentre idle regulation operation .

IMPORTANT : it is important that, after erasing the computer memory, the engine is started then switched off, to allow the potentiometer to be adjusted. Restart it and let it run at idle speed so that the adaptive correction can be readjusted .

POWER ASSISTED STEERING PRESSOSTAT - INJECTION COMPUTER CONNECTION

The injection computer receives information from the power assisted steering pressostat on track **85** (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 modifies the engine's idle speed by **400 rpm**. It uses the information to anticipate loss of engine speed.

ELECTRICAL 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 **12.7 Volts**. Correction starts at idle speed and can reach a maximum of **900 rpm.**

F4R " Euro 2000" engines using the "**SIRIUS 32**" computer are equipped with two oxygen sensors known as the upstream sensor and downstream sensor.

These two sensors have different part numbers and cannot be interchanged under any circumstances.

F4R "Euro 96" engines operate with a single upstream sensor.

SENSOR HEATING

The sensors are heated by the computer:
- from starting for the upstream sensor.
- after a certain length of mapping operation depending on engine TDC and coolant temperature outside No Load conditions for the downstream sensor.

Sensor heating is stopped:
- if vehicle speed is greater than **87.5 mph (140 km/h)**, (value given for information only),
- depending on engine load and speed (only for the upstream sensor).

UPSTREAM SENSOR VOLTAGE

Reading**# 05** on **XR25** : 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,
- **800 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 **500mV**).

DOWNSTREAM SENSOR VOLTAGE(Only on EURO 2000 version)

Reading**# 10** on **XR25** : the value read represents the voltage supplied to the computer by the oxygen sensor downstream from the catalytic converter. It is expressed in millivolts.

The function of this sensor is to identify catalytic converter faults and carry out a second, more accurate check of the richness (slow regulation loop). This function is activated only after a certain period of engine warm operation.

When the engine is in loop mode, at a stable speed, the voltage should vary around 600 mV ±100 :
When decelerating, the voltage should be less than 200 mV.

Ignore the voltage reading on the fault finding kit at idle speed.

RICHNESS CORRECTION #35

The value read on **# 35** on **XR25** 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 or Full Load position.

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, # **35** = **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: # **35** = variable and greater than 128,
- sharp acceleration : # **35** = variable and greater than 128,
- when decelerating with No Load position information (injection cut-out) : # **35 = 128**,
- if there is an oxygen sensor fault : # **35 = 128**.

DEFECT MODE IN THE EVENT OF AN OXYGEN SENSOR FAULT

When the voltage supplied by the oxygen sensor is incorrect(# **05** varying little or not at all) during richness regulation, the computer will only enter defect mode (# **35 = 128**)if the fault has been recognised as present for **10 seconds**. Only in this instance will the fault be memorised.

If an oxygen sensor fault is detected and the fault has already been memorised, the system goes directly to the open loop phase(# **35 = 128**).

ROAD TEST

Conditions:
- engine warm (coolant temperature **> 80 °C**),
- do not exceed an engine speed of **4 600 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(reading# 01)

	Range n° 1 (mbars)	Range n° 2 (mbars)	Range n° 3 (mbars)	Range n° 4 (mbars)	Range n° 5 (mbars)
F4R 700	250 ---------- 399 ---------- 517 ---------- 635 ---------- 753 ---------- 873				
	Average 325	Average 458	Average 576	Average 694	Average 813

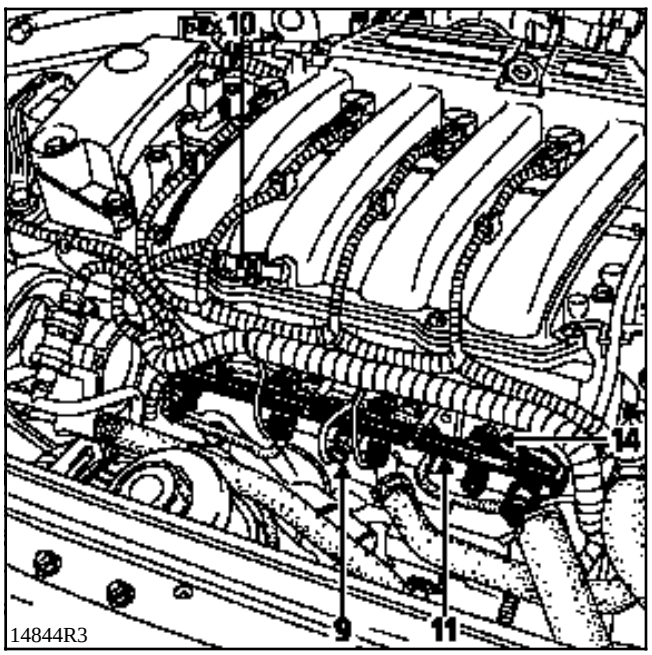
Following this test, the corrections will be operational.

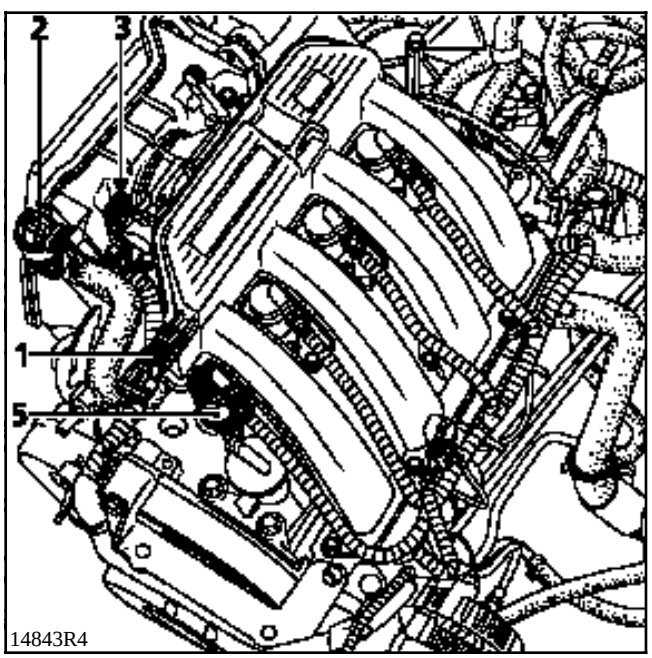
The**# 31** varies more significantly for idle speeds and low loads and the**# 30** for average and high loads, but both are operational over all manifold pressure ranges.

The test should be followed by a normal, varied drive, covering 3.1 to 6.2 miles (**5** to **10 kilometres)**.

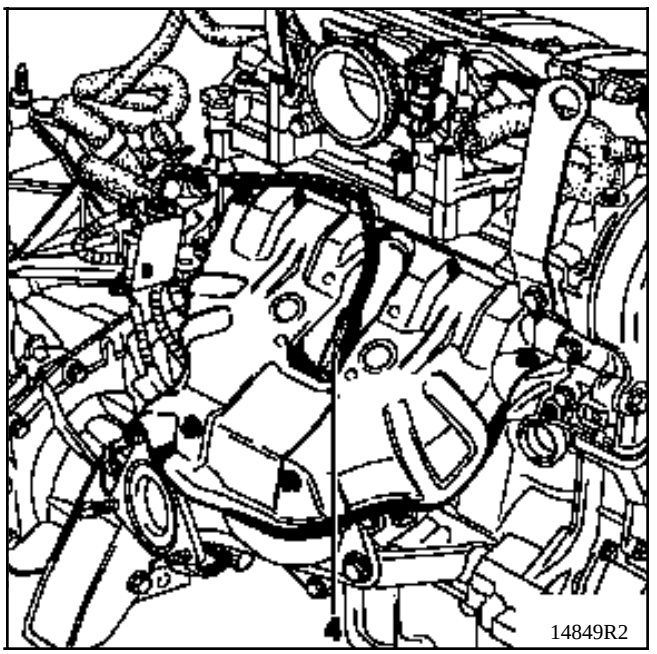
After the test, read the values for **# 30** and**# 31**. Initially at **128**, they should have changed. If not, repeat the test, taking care to observe the test conditions.

9 Pinking sensor
11 Injector gallery
14 Injector





2 Idle speed stepping motor
10 Air temperature sensor
5 Ignition coil



3 Throttle position potentiometer
1 Pressure sensor
4 Upstream oxygen sensor

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

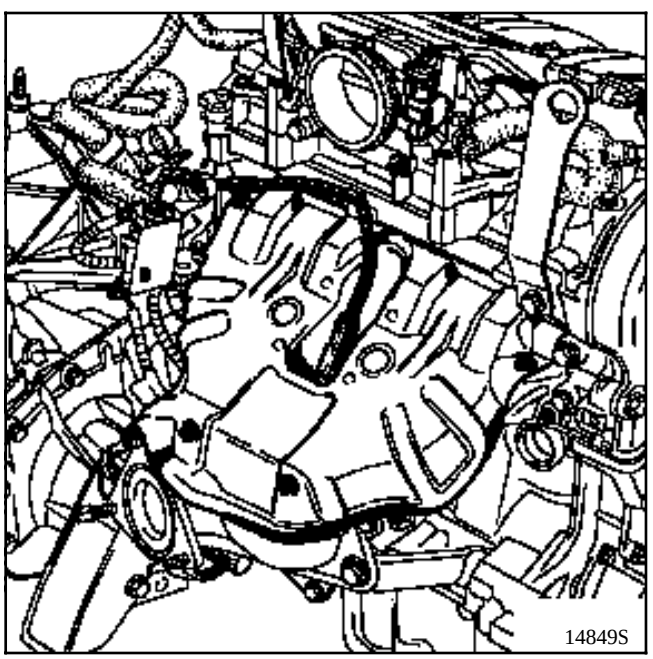
TIGHTENING TORQUE(in daN.m)	
Oxygen sensors	**4.5**

IMPORTANT: the two oxygen sensors are different and are therefore not interchangeable.

REMOVING THE UPSTREAM OXYGEN SENSOR

Disconnect the battery.

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



Disconnect and remove the oxygen sensor using **Mot. 1495**.
An extension and a universal joint must be used to access the sensor.

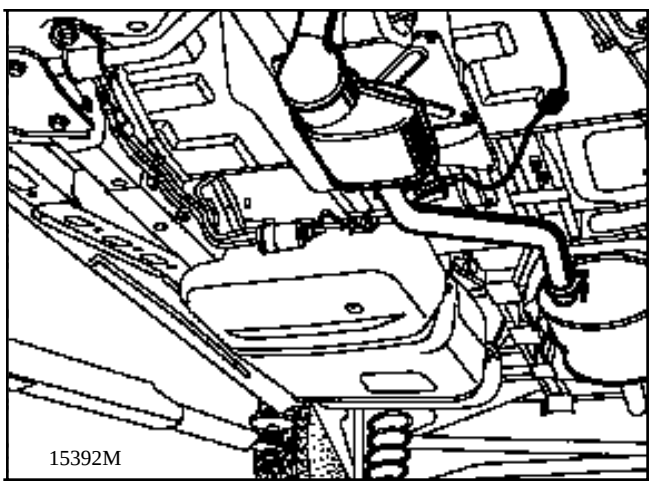
REFITTING

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).

REMOVING THE DOWNSTREAM SENSOR (EURO 2000 only)

Place the vehicle on a two post lift.



Disconnect and remove the oxygen sensor using an open wrench.

REFITTING

Refitting is the reverse of removal.

SETTING UP DIALOGUE BETWEEN THE FAULT FINDING TOOL AND THE COMPUTER

- Connect the fault finding tool to the diagnostic socket.
- Select the vehicle.
- Select INJECTION.

COMPUTER IDENTIFICATION

The computer is identified by (parameter window):

COMPUTER PART NUMBER	**77 00 XXX XXX**
VDIAG NUMBER	**08**

ERASING THE MEMORY (ignition on)

Following an operation on the injection system, the computer memory can be erased.

There are three types of erasure (erase command):

- ERASURE OF MEMORISED FAULTS
- ERASURE OF O.B.D FAULTS
- ERASURE OF PROGRAMMING

DESCRIPTION OF FAULT FINDING PHASES

FAULT CHECKING

This stage is the essential starting point before carrying out any operation on the vehicle.

1 - Order of priority

Electrical faults must be dealt with first, then the O.B.D. electrical faults then continue fault finding for O.B.D. operating faults (Oxygen sensor operating fault, Catalytic converter operating fault, Polluting misfiring, Destructive misfiring, Fuel circuit operating fault).
It should be noted that there must be no electrical fault present or memorised before dealing with O.B.D. operating faults.
Other priorities are dealt with in the "NOTES" section of the fault finding for the fault concerned.

2 - Fault

a) Non O.B.D. fault present :

Deal with the fault in accordance with the steps indicated in the "INTERPRETATION OF FAULTS" section.

b) O.B.D. fault present :

Follow the instructions in the "NOTES" section for the fault concerned.

If the fault is confirmed by the "NOTES" section:

The fault is present again. In this case, deal with the fault.

If the fault is not confirmed by the "NOTES" section:

Carry out the basic checks. To do this, check:
- the electrical lines corresponding to the fault,
- the connectors for these lines (rust, bent pins, ...),
- the resistance of the component which has been detected as being faulty,
- the cleanliness of the wires (insulation melted or cut, friction, ...).

c) O.B.D. or non O.B.D. memorised fault :

Note the faults displayed.
Follow the instructions in the "NOTES" section for the fault concerned.

If the fault is confirmed by the "NOTES" section:

The fault is present again. In this case, deal with the fault.

If the fault is not confirmed by the "NOTES" section:

Carry out the basic checks. To do this, check:
- the electrical lines corresponding to the fault,
- the connectors for these lines (rust, bent pins, ...),
- the resistance of the component which has been detected as being faulty,
- the cleanliness of the wires (insulation melted or cut, friction, ...).

3 - No faults:

If no faults are indicated by the fault finding tool, carry out a conformity check. This may help to locate a fault.

CHECKING CONFORMITY

The aim of the conformity check is to check the status and parameters which display no fault on the fault finding tool when they are outside the tolerance limits. As a result this phase allows :

- Faults to be diagnosed without a fault display, which may correspond to a customer complaint**.**

- To check that the injection is operating correctly and to ensure that there is no risk of a fault reappearing shortly after repair.

Therefore, there is status and parameter fault finding in this section, in their test conditions.

If a status does not function normally or a parameter is outside the tolerance range, you must consult the corresponding fault finding page.

CORRECT CHECK USING THE FAULT FINDING TOOL

If the check using the fault finding tool is correct, but the customer complaint is still present, the problem must be dealt with through the customer complaint.

Dealing with the customer complaint

This section uses fault charts which give a series of possible causes for a fault.

These lines of enquiry are only to be used in the following circumstances:
- No fault appears on the fault finding tool.
- No anomaly is detected during the conformity check.
- The vehicle is not operating correctly.

NO COMMUNICATION	NO COMMUNICATION WITH THE COMPUTER

NOTES	None

Try the fault finding tool on another vehicle.

Check:
- the connection between the fault finding tool and the diagnostic socket (cable in good condition),
- the injection, engine and passenger compartment fuses.

Repair if necessary.

Check for the presence of **+ 12 V** on **track 16** and **earth** on **track 5** of the diagnostic socket.

Repair if necessary.

Connect the bornier in place of the computer and check the **insulation, the continuity and that there is no interference resistance on line**:

Computer 28 → Earth
Computer 33 → Earth
Computer 3 → Earth
Computer 56 → 7 Diagnostic socket
Computer 26 → 15 Diagnostic socket
Computer 29 → Fuse F38
Computer 30 → Fuse F49

Repair

AFTER REPAIR	None

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FAULT PRESENT	COMPUTER 1.dEF = Computer fault 2.dEF = Saved memory zone fault 3.dEF = Engine immobiliser memory zone fault
NOTES	None
1.dEF	Computer incorrect or faulty. Change the computer.
2.dEF **3.dEF**	**Do not change the computer immediately.** Carry out the following procedure: - Switch the ignition on and enter into dialogue with the computer. - Erase the computer memory. - Switch off the ignition and wait for the loss of dialogue with the computer. - Switch the ignition on, enter into dialogue with the computer. If the computer fault is still present, carry out this procedure again. If the computer fault is still present after the fifth attempt to erase it, change the injection computer.
AFTER REPAIR	Erase the memorised faults

JSI041.0

FAULT PRESENT or MEMORISED	FEED 1.dEF = +12V after actuator relay feed fault 2.dEF = +12V after ignition feed fault

NOTES	**Conditions for fault detection by the computer:** Switch off the ignition and wait for the loss of dialogue. Switch the ignition on, enter into dialogue. **Condition for carrying out fault finding:** The fault is present.

1.dEF	Check **the condition of the battery and vehicle earths**. Repair if necessary.
	Check **the connection and condition of the actuator relay connector.** Change the connector if necessary.
	With the ignition switched on, check for **12 V on track 3 of the actuator relay.** Repair the line up to the fuse.
	Disconnect the clip on track 5 of the relay carrier. With the ignition switched on, check for **12 V on track 5 of the actuator relay.** Change the relay if this is not the case.
	Check **the insulation and continuity of the line:** **Computer 66 → 5 Actuator relay** Repair if necessary.
	Disconnect each of the components in turn (injector, canister bleed solenoid valve, ...) using these 12 Volts to determine which of these is faulty. Change the faulty component.
2.dEF	This fault is not active as it creates a loss of dialogue.

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT	ACTUATOR RELAY CONTROL CIRCUIT CC0 = Open circuit or short circuit to earth of computer line 39 CC1 = Short circuit to 12 V of computer line 39

NOTES	**Conditions for fault detection by the computer:** Switch the ignition on and wait for the loss of dialogue. Switch the ignition on, enter into dialogue. **Condition for carrying out fault finding:** The fault is present. **NOTE:** This fault takes priority. It must be dealt with before those which follow.

Check **the condition of the battery and vehicle earths.**
Repair if necessary.

Check **the connection and condition of the actuator relay connector.**
Change the connector if necessary.

Check for **12 V on track 1 of the actuator relay.**
Repair the line up to the fuse.

Check the coil of the actuator relay.
Change the actuator relay if necessary.

Check **the insulation and continuity of the line:**

Computer 39 ⟶ 2 Actuator relay

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.

IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT

FUEL PUMP RELAY CONTROL CIRCUIT

CO0 = Open circuit or short circuit to earth of computer line 68
CC1 = Short circuit to 12 V of computer line 68
O.B.D. = O.B.D. fault : Fuel pump relay

NOTES

Conditions for fault detection by the computer:
1/ Switch off the ignition and wait for the loss of dialogue. Switch the ignition on, enter into dialogue.
2/ If O.B.D. fault, run the engine.

Condition for carrying out fault finding:
The fault is present.

NOTE: This fault takes priority. It must be dealt with before those which follow.

CO0
CC1

Check **the connection and condition of the fuel pump relay connector.**
Change the connector if necessary.

With the ignition switched on, check for **+12 V on track 1 of the fuel pump relay.**
Repair if necessary.

Check **the insulation and continuity of the line:**

Computer 68 → 2 Fuel pump relay

Repair if necessary.

Check the fuel pump relay coil.
Change the fuel pump relay if necessary.

The fault is still not resolved! The injection computer must be changed.

IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

The fault is not actually present (otherwise there would be CO0 or CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO0 and CC1".

AFTER REPAIR

After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out.
Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	CYLINDER 1 INJECTOR CIRCUIT CC1 = Short circuit to 12 V of computer line 59 (injector control) CC0 = Short circuit to earth of computer line 59 (injector control) CO = Open circuit of computer line 59 (injector control) O.B.D. = O.B.D. fault : Cylinder 1 injector
NOTES	**Conditions for fault detection by the computer:** Run the engine. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with CO or CC0 or CC1. 3/ The fault is memorised but became present with CO or CC0 or CC1.

CC1
CC0
CO

NOTES	If the fault is memorised but became present with CO or CC0 or CC1 then deal with this fault finding.

Check the **resistance of injector 1.**
Change the injector if necessary.

When the ignition is switched on, check for **12 V** on track **1 of injector 1.**
If necessary, repair the **line up to the actuator relay**.

Connect the bornier in place of the computer and check **the insulation and continuity of the line:**

Computer 59 → 2 Injector 1

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.

IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

NOTES	If the fault is present with O.B.D. but became present with CO or CC0 or CC1, then consult "CO, CC0, CC1"

The fault is not actually present (otherwise there would be CO or CC0 or CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO and CC0 and CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	CYLINDER 2 INJECTOR CIRCUIT CC1 = Short circuit to 12 V of computer line 90 (injector control) CC0 = Short circuit to earth of computer line 90 (injector control) CO = Open circuit of computer line 90 (injector control) O.B.D. = O.B.D. fault : Cylinder 2 injector
NOTES	**Conditions for fault detection by the computer:** Run the engine. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with CO or CC0 or CC1. 3/ The fault is memorised but became present with CO or CC0 or CC1.

CC1
CC0
CO

NOTES	If the fault is memorised but became present with CO or CC0 or CC1 then deal with this fault finding.

Check the **resistance of injector 2.**
Change the injector if necessary.

When the ignition is switched on, check for **12 V** on track **1 of injector 2.**
If necessary, repair the **line up to the actuator relay**.

Connect the bornier in place of the computer and check **the insulation and continuity of the line:**

Computer 90 ⟶ 2 Injector 2

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.

IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

NOTES	If the fault is present with O.B.D. but became present with CO or CC0 or CC1, then consult "CO, CC0, CC1"

The fault is not actually present (otherwise there would be CO or CC0 or CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO and CC0 and CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	CYLINDER 3 INJECTOR CIRCUIT CC1 = Short circuit to 12 V of computer line 60 (injector control) CC0 = Short circuit to earth of computer line 60 (injector control) CO = Open circuit of computer line 60 (injector control) O.B.D. = O.B.D. fault : Cylinder 3 injector
NOTES	**Conditions for fault detection by the computer:** Run the engine. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with CO or CC0 or CC1. 3/ The fault is memorised but became present with CO or CC0 or CC1.

CC1
CC0
CO

NOTES	If the fault is memorised but became present with CO or CC0 or CC1 then deal with this fault finding.

Check the **resistance of injector 3.**
Change the injector if necessary.

When the ignition is switched on, check for **12 V** on track **1 of injector 3.**
If necessary, repair the **line up to the actuator relay**.

Connect the bornier in place of the computer and check **the insulation and continuity of the line:**

Computer 60 ⟶ 2 Injector 3

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

NOTES	If the fault is present with O.B.D. but became present with CO or CC0 or CC1, then consult "CO, CC0, CC1"

The fault is not actually present (otherwise there would be CO or CC0 or CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO and CC0 and CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED

CYLINDER 4 INJECTOR CIRCUIT

CC1 = Short circuit to 12 V of computer line 89 (injector control)
CC0 = Short circuit to earth of computer line 89 (injector control)
CO = Open circuit of computer line 89 (injector control)
O.B.D. = O.B.D. fault : Cylinder 4 injector

NOTES

Conditions for fault detection by the computer:
Run the engine.
Condition for carrying out fault finding:
1/ The fault is present.
2/ The fault is present with O.B.D. but became present with CO or CC0 or CC1.
3/ The fault is memorised but became present with CO or CC0 or CC1.

CC1
CC0
CO

NOTES

If the fault is memorised but became present with CO or CC0 or CC1 then deal with this fault finding.

Check the **resistance of injector 4.**
Change the injector if necessary.

When the ignition is switched on, check for **12 V** on track **1 of injector 4.**
If necessary, repair the **line up to the actuator relay**.

Connect the bornier in place of the computer and check the insulation and continuity of the line :

Computer 89 ⟶ 2 Injector 4

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

NOTES

If the fault is present with O.B.D. but became present with CO or CC0 or CC1, then consult "CO, CC0, CC1"

The fault is not actually present (otherwise there would be CO or CC0 or CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO and CC0 and CC1".

AFTER REPAIR

After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out.
Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	IGNITION COIL 1-4 CIRCUIT CC1 = Short circuit to 12 V of computer line 32 CO0 = Open circuit or short circuit to earth of computer line 32 O.B.D. = O.B.D. fault : Ignition coil 1-4

NOTES	**Conditions for fault detection by the computer:** Run the engine or set to starter speed for 10 seconds. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with CO0 or CC1. 3/ The fault is memorised but became present with CO0 or CC1.

CC1
CO0

NOTES	If the fault is memorised but became present with CO0 or CC1 then deal with this fault finding.

Check the **cleanliness of the anti-interference condenser.**
Check the **resistance of the coil** for cylinder 1 then 4. Change the coil if necessary.
Check the **connection between coil 1 on track 2 and coil 4 on track 1** Repair if necessary.
Check for **+ after fuel pump relay feed** on track 1 of coil 1. Repair if necessary.
Connect the bornier in place of the computer and check the insulation and continuity of the line : **Computer 32 ⟶ 2 Cylinder coil 4** Repair if necessary.
Check: - The connection and condition of the fuel pump relay connector. - With the ignition switched on, for +12 V on track 1 of the fuel pump relay. - The line on track 68 from the computer to line 2 of the fuel pump relay. - The fuel pump relay coil. Repair if necessary.
The fault is still not resolved! The injection computer must be changed. **IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.**

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with CO0 or CC1, then consult "CO0, CC1"
		The fault is not actually present (otherwise there would be CO0 or CC1) but it has been detected several times. The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer). For this check, you must refer to the method for "CO0 and CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	IGNITION COIL 2-3 CIRCUIT CC1 = Short circuit to 12V of computer line 1 CO0 = Open circuit or short circuit to earth of computer line 1 O.B.D. = O.B.D. fault : Ignition coil 2-3

NOTES	**Conditions for fault detection by the computer:** Run the engine or set to starter speed for 10 seconds. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with CO0 or CC1. 3/ The fault is memorised but became present with CO0 or CC1.

CC1
CO0

NOTES	If the fault is memorised but became present with CO0 or CC1 then deal with this fault finding.

Check the **cleanliness of the anti-interference condenser.**
Check the **resistance of the coil** for cylinder 2 then 3. Change the coil if necessary.
Check the connection between coil **2 on track 2 and coil 3 on track 1**. Repair if necessary.
Check for **+ after fuel pump relay feed** on track 1 for coil 2. Repair if necessary.
Connect the bornier in place of the computer and check the insulation and continuity of the line : **Computer 1 → 2 Cylinder coil 3** Repair if necessary.
Check: - The connection and condition of the fuel pump relay connector. - With the ignition switched on, check for +12 V on track 1 of the fuel pump relay. - The line on track 68 from the computer to line 2 on the fuel pump relay. - The fuel pump relay coil. Repair if necessary.
The fault is still not resolved! The injection computer must be changed. **IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.**

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with CO0 or CC1, then consult "CO0, CC1"
		The fault is not actually present (otherwise there would be CO0 or CC1) but it has been detected several times. The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer). For this check, you must refer to the method for "CO0 and CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	FLYWHEEL SIGNAL INFORMATION 1 dEF = Engine flywheel target fault 2 dEF = No flywheel signal 1 O.B.D. = O.B.D. fault : Engine flywheel target 2 O.B.D. = O.B.D. fault : No flywheel signal
NOTES	The pressure sensor must not be faulty when this fault finding is carried out. **Conditions for fault detection by the computer:** 1/ Switch off the ignition and wait for the loss of dialogue with the computer. Enter into dialogue with the computer and erase the memorised faults. 2/ Activate the starter motor for 10 seconds or run the engine at idle speed. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with 1 dEF or 2 dEF. 3/ The fault is memorised but became present with 1 dEF or 2 dEF.

1 dEF
2 dEF

NOTES	If the fault is memorised but became present with 1 dEF or 2 dEF then deal with this fault finding.

Check the **connection and condition of the target sensor connector**.
Change the connector if necessary.

Check the resistance of the target sensor.
Change the sensor if necessary.

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line:**

Computer 54 → A Target sensor
Computer 24 → B Target sensor

Repair if necessary.

If 1 dEF, then check the condition of the engine flywheel.

If the fault persists, change the sensor.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

1 O.B.D. **2 O.B.D.**	***NOTES***	If the fault is present with 1 O.B.D. or 2 O.B.D. but became present with 1 dEF or 2 dEF, then consult "1 dEF, 2 dEF"

The fault is not actually present (otherwise there would be 1 dEF or 2 dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "1 dEF, 2 dEF".

AFTER REPAIR	After repair, the fault may become 1 O.B.D. or 2 O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT	ENGINE IMMOBILISER Electrical fault on the coded line.

NOTES	None

Check the **connection and condition of the coded line connectors** on track 58 of the injection computer. Change the faulty connector if necessary.
Connect the bornier in place of the computer and check **the insulation and the continuity of the coded line** on track 58 of the injection computer. Repair if necessary.
If the fault persists, consult the engine immobiliser fault finding.

AFTER REPAIR	Erase the memorised faults. Deal with any other faults.

JSI041.0

FAULT PRESENT	ENGINE IMMOBILISER CODE NOT PROGRAMMED

NOTES	None

This fault indicates that the computer has not been programmed with the code or that the code has been deliberately erased from the injection computer.

If necessary, refer to the engine immobiliser method.

AFTER REPAIR	None.

JSI041.0

FAULT PRESENT or MEMORISED	PRESSURE SENSOR CIRCUIT dEF = Manifold pressure fault O.B.D. = O.B.D. fault : Manifold pressure

NOTES	**Conditions for fault detection by the computer:** 1/ Switch off the ignition and wait for the loss of dialogue with the computer. Enter into dialogue with the computer. 2/ Increase the engine speed to more than 608 rpm for a minimum of 10 seconds. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

If the fault is only present when the engine is running, check the coherence of the throttle position parameter in the no load and full load positions.
Press the accelerator pedal gently (from no load to full load) and check that the throttle position increases regularly.
If this is not the case, the information is not correct. Deal with the fault finding for this parameter.

Check **the condition of the pressure sensor connector**.
Change the connector if necessary.

Check that the pressure sensor is **pneumatically connected.**

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line:**

Computer 16 → B Pressure sensor
Computer 15 → A Pressure sensor
Computer 78 → C Pressure sensor

Repair if necessary.

If the fault persists, change the sensor.

The fault is still not resolved! The injection computer must be changed.

IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF".

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT	IDLE SPEED REGULATION CIRCUIT dEF = Idle speed regulation fault O.B.D. = O.B.D. fault : Idle speed regulation fault

NOTES	**Conditions for fault detection by the computer:** Switch on the ignition. **Condition for carrying out fault finding:** The fault is present.

dEF

Check the **connection and condition** of the idle speed regulation stepping motor connector.
Change the connector if necessary.

Check **the resistance of the idle speed regulation stepping motor.**
Change the valve if necessary.

Check **the insulation, continuity and that there is no interference resistance on line** :

Computer	**12**	→	**B Idle speed regulation stepping motor**
Computer	**41**	→	**A Idle speed regulation stepping motor**
Computer	**42**	→	**C Idle speed regulation stepping motor**
Computer	**72**	→	**D Idle speed regulation stepping motor**

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	THROTTLE POTENTIOMETER CIRCUIT dEF = Throttle position fault O.B.D. = O.B.D. fault : Throttle position

NOTES	**Conditions for fault detection by the computer:** 1/ Leave the vehicle with the ignition switched on for 10 seconds in the no load position. 2/ Gently vary the throttle potentiometer from no load to full load. 3/ Remain at full load for 10 seconds. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the throttle potentiometer connector.
Change the connector if necessary.

Check the **resistance of the throttle potentiometer** (the resistance is **zero or equal to infinity** in the event of a clear fault).
Check that the resistance of the potentiometer is correctly following its curve, by moving the throttle from no load to full load.
Check that the throttle moves the potentiometer.
Repair or change the throttle potentiometer if necessary.

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line:**

Computer 75 → A Throttle potentiometer
Computer 74 → B Throttle potentiometer
Computer 43 → C Throttle potentiometer

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	COOLANT TEMPERATURE SENSOR CIRCUIT dEF = Coolant temperature fault O.B.D. = O.B.D. fault : Coolant temperature

NOTES	**Conditions for fault detection by the computer:** **1/ Switch on the ignition.** **2/ If the fault is only memorised, run the engine (1 operation of the engine cooling fan assembly).** **Condition for carrying out fault finding:** **1/ The fault is present.** **2/ The fault is present with O.B.D. but became present with dEF.** **3/ The fault is memorised but it became present with dEF.**

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the coolant temperature sensor connector.
Change the connector if necessary.

Check that the **resistance of the coolant temperature sensor** is **not zero or equal to infinity** (sensor fault).
Change the coolant temperature sensor if necessary.

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line:**

Computer 73 ⟶ B1 Coolant temperature sensor
Computer 13 ⟶ B2 Coolant temperature sensor

Repair if necessary.

Check the **resistance of the sensor at different temperatures.**
Change the sensor if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF".

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	AIR TEMPERATURE SENSOR CIRCUIT dEF = Air temperature fault O.B.D. = O.B.D. fault : Air temperature

NOTES	**Conditions for fault detection by the computer:** 1/ Switch on the ignition. 2/ If the fault is only memorised, run the engine (1 operation of the engine cooling fan assembly). **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the air temperature sensor connector.
Change the connector if necessary.

Check that the resistance of the air temperature sensor is **not zero or equal to infinity** (sensor fault).
Change the air temperature sensor if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and that there is no interference resistance** on line:

Computer	**77**	→	**2**	**Air temperature sensor**
Computer	**49**	→	**1**	**Air temperature sensor**

Repair if necessary.

Check the **resistance of the sensor at different temperatures.**
Change the sensor if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT	CANISTER BLEED SOLENOID VALVE CIRCUIT CC1 = Short circuit to 12 V of computer line 4 CC0 = Short circuit to earth of computer line 4 CO = Open circuit of computer line 4 O.B.D. = O.B.D. fault : Canister bleed
NOTES	**Conditions for fault detection by the computer:** Switch on the ignition. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF.

CO
CC0
CC1

NOTES	None

Check the **connection and condition of the canister bleed connector.**
Change the connector if necessary.

Check the **resistance of the canister bleed valve.**
Change the valve if necessary.

With the ignition switched on, check for **12 V on the canister bleed valve.**
Repair if necessary.

Connect the bornier in place of the computer and check **the insulation and continuity of the line:**

Computer 4 ⟶ B Canister bleed valve

Repair if necessary.

Change the canister bleed valve.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with CO or CC0 or CC1, then consult "CO, CC0, CC1"

The fault is not actually present (otherwise there would be CO, CC0, CC1) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CO, CC0, CC1".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	UPSTREAM OXYGEN SENSOR CIRCUIT dEF = Oxygen sensor signal fault O.B.D. = O.B.D. fault : Oxygen sensor signal

NOTES	**Conditions for fault detection by the computer:** 1/ Switch on the ignition. 2/ Run the engine, wait until richness regulation is active and wait 5 minutes. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the oxygen sensor connector. Change the connector if necessary.
Check that there is **no air leak.**
If the vehicle is frequently driven in urban areas, **decontaminate the oxygen sensor.**
With the ignition switched on, check for **+12 V (after actuator relay feed) on track A of the oxygen sensor.** Repair if necessary.
Connect the bornier in place of the computer and check the insulation, continuity and that there is no interference resistance on line: **Computer 45 → C Oxygen sensor** **Computer 80 → D Oxygen sensor** Repair if necessary.
If the fault persists, change the oxygen sensor.
The fault is still not resolved! The injection computer must be changed. **IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.**

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED

UPSTREAM OXYGEN SENSOR HEATING CIRCUIT

CC1 = Short circuit to 12 V of computer line 63 (sensor heating control)
CC0 = Short circuit to earth of computer line 63 (sensor heating control)
CO = Open circuit of computer line 63 (sensor heating control)
dEF = Heating power fault
1 O.B.D. = O.B.D. fault : Oxygen sensor heating
2 O.B.D. = O.B.D. fault : Heating power

NOTES

Conditions for fault detection by the computer:
Run the engine.
Condition for carrying out fault finding:
1/ The fault is present.
2/ The fault is present with 1 O.B.D. or 2 O.B.D. but became present with CO or CC0 or CC1 or dEF.
3/ The fault is memorised but it became present with CO or CC0 or CC1 or dEF.

CC1
CC0
CO
dEF

NOTES

If the fault is memorised but became present with CC1, CC0, CO or dEF then deal with this fault finding.

Check the **connection and condition** of the oxygen sensor connector.
Change the connector if necessary.

Check the oxygen sensor **heating resistance**.
Change the oxygen sensor if necessary.

Check for **12 Volts on track A of the oxygen sensor.**
Repair the electrical line up to the actuator relay.

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line:**

Computer 63 ⟶ B Oxygen sensor

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR

After repair, the fault may become 1 O.B.D. or 2 O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out.
Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

1 O.B.D. **2 O.B.D.**	***NOTES***	If the fault is present with 1 O.B.D. or 2 O.B.D. but became present with CC1, CC0, CO or dEF, then consult "CC1, CC0, CO, dEF"

The fault is not actually present (otherwise there would be CC1, CC0, CO or dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CC1, CC0, CO, dEF".

AFTER REPAIR	After repair, the fault may become 1 O.B.D. or 2 O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	DOWNSTREAM OXYGEN SENSOR CIRCUIT dEF = Oxygen sensor signal fault O.B.D. = O.B.D. fault : Oxygen sensor signal

NOTES	**Conditions for fault detection by the computer:** 1/ Switch on the ignition. 2/ Carry out a road test after the engine cooling fan has operated for at least 2 minutes. You must not be in no load position during the test. 3/ Continue the road test on a slope under no load conditions (deceleration phase). **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the oxygen sensor connector.
Change the connector if necessary.

Check that there is **not an air leak.**

If the vehicle is frequently driven in urban areas, **decontaminate the oxygen sensor**.

With the ignition switched on, check for **+12 V (after actuator relay feed) on track A of the oxygen sensor.**
Repair if necessary.

Connect the bornier in place of the computer and check the insulation, continuity and that there is no interference resistance on line:

Computer 44 → C Oxygen sensor
Computer 76 → D Oxygen sensor

Repair if necessary.

If the fault persists, change the oxygen sensor.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

O.B.D.	***NOTES***	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	DOWNSTREAM OXYGEN SENSOR HEATING CIRCUIT CC1 = Short circuit to 12 V of computer line 65 (sensor heating control) CC0 = Short circuit to earth of computer line 65 (sensor heating control) CO = Open circuit of computer line 65 (sensor heating control) dEF = Heating power fault 1 O.B.D. = O.B.D. fault : Oxygen sensor heating 2 O.B.D. = O.B.D. fault : Heating power

NOTES	**Conditions for fault detection by the computer:** Switch on the ignition, run the engine and wait for the engine cooling fan assembly to operate then accelerate gently for one minute. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with 1 O.B.D. or 2 O.B.D. but became present with CO or CC0 or CC1 or dEF. 3/ The fault is memorised but it became present with CO or CC0 or CC1 or dEF.

CC1
CC0
CO
dEF

NOTES	If the fault is memorised but became present with CC1, CC0, CO or dEF then deal with this fault finding.

Check the connection and condition of the oxygen sensor connector.
Change the connector if necessary.

Check the oxygen sensor **heating resistance**.
Change the oxygen sensor if necessary.

Check for **12 Volts on track A of the oxygen sensor.**
Repair the electrical line up to the actuator relay.

Connect the bornier in place of the computer and check the insulation and continuity of the line:

Computer 65 ⟶ B Oxygen sensor

Repair if necessary.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

AFTER REPAIR	After repair, the fault may become 1 O.B.D. or 2 O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

CONT	

1 O.B.D. **2 O.B.D.**	***NOTES***	If the fault is present with 1 O.B.D. or 2 O.B.D. but became present with CC1, CC0, CO or dEF, then consult "CC1, CC0, CO, dEF"

The fault is not actually present (otherwise there would be CC1, CC0, CO or dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "CC1, CC0, CO, dEF".

AFTER REPAIR	After repair, the fault may become 1 O.B.D. or 2 O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	PINKING SENSOR CIRCUIT dEF = Pinking signal fault O.B.D. = O.B.D. fault : Pinking signal

NOTES	**Conditions for fault detection by the computer:** Carry out a road test with warm engine and high engine speed. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the **connection and condition** of the pinking sensor connector.
Change the connector if necessary.

Check the **tightness of the pinking sensor** on the engine block.
Repair if necessary.

Connect the bornier in place of the computer and check the insulation, continuity and that there is no interference resistance on line:

Computer	**20**	→	**1**	**Pinking sensor**
Computer	**79**	→	**2**	**Pinking sensor**
Computer	**19**	→		**Pinking sensor screening**

Repair if necessary.

The fault persists! Change the pinking sensor.

The fault is still not resolved! The injection computer must be changed.
IMPORTANT: The damage to the computer is probably due to an electrical shock. The cause of the damage must be found before a new computer is fitted.

O.B.D.

NOTES	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	VEHICLE SPEED INFORMATION dEF = Vehicle speed fault O.B.D. = O.B.D. fault : Vehicle speed

NOTES	The ABS MUST NOT BE faulty when this fault finding is carried out. **Conditions for fault detection by the computer:** 1/ Carry out a test whilst monitoring vehicle speed. 2/ Continue the road test on a hill at constant speed. 3/ Continue the road test, driving on a slope, in the no load position. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is present with O.B.D. but became present with dEF. 3/ The fault is memorised but it became present with dEF.

dEF

NOTES	If the fault is memorised but became present with dEF then deal with this fault finding.

Check the connection and condition of the vehicle speed line connector.
Change the connector if necessary.

Connect the bornier in place of the computer and check **the insulation, continuity and that there is no interference resistance on line 53 of the computer.**
Repair if necessary.

O.B.D.

NOTES	If the fault is present with O.B.D. but became present with dEF, then consult "dEF"

The fault is not actually present (otherwise there would be dEF) but it has been detected several times.
The circuit must therefore be checked without changing the components which are not clearly identified as being faulty (there is therefore no need to change the computer).
For this check, you must refer to the method for "dEF".

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	INJECTION ----> AC CONNECTION

NOTES	None

Ignore this fault as it is not active on this vehicle

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	AIR CONDITIONING CC1 = Short circuit to 12 V CC0 = Short circuit to earth CO = Open circuit
NOTES	None

Ignore this fault as it is not active on this vehicle

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	CAMSHAFT OFFSET DEVICE CC1 = Short circuit to 12 V CC0 = Short circuit to earth CO = Open circuit
NOTES	None

Ignore this fault as it is not active on this vehicle

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	COOLANT TEMPERATURE OVERHEATING WARNING LIGHT CIRCUIT CC0 = Open circuit or short circuit to earth, computer line 9 CC1 = Short circuit to 12 V, computer line 9

NOTES	**Conditions for fault detection by the computer:** Run the engine at a speed greater than 1500 rpm for 10 seconds. **Condition for carrying out fault finding:** 1/ The fault is present. 2/ The fault is memorised but it became present during the test.

Instrument panel E1:
Check **the condition of the warning light** (if it does not illuminate).
Replace it if necessary
Check **the insulation and continuity between track 13** of the yellow 26 track connector (B) of the passenger compartment connection unit **and track 5** of the blue 12 track connector (A) of the instrument panel **then the insulation and continuity of the line between track 26** of the yellow 26 track connector (B) of the passenger compartment connection unit **and track 6** of the blue 12 track connector (A) of the instrument panel
Repair
Connect the bornier and **check the insulation and continuity** of track **9** of the computer
Repair

Instrument panel E2 and E3 :
Check **the insulation and continuity of the line between line 13** of the yellow 26 track connector (B)of the passenger compartment connection unit **and track 5** of the blue 12 track connector (A) of the instrument panel **then the line between track 26** of the yellow 26 track connector (B) of the passenger compartment connection unit **and track 6** of the blue 12 track connector (A) of the instrument panel
Repair
Connect the bornier and **check the insulation and continuity** of track **9** of the computer
Repair

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	MILWARNING LIGHT CIRCUIT (O.B.D.) CC0 = Open circuit or short circuit to earth CC1 = Short circuit to 12 V O.B.D. = O.B.D. fault : MIL warning light (O.B.D.) (only with a memorised fault)
NOTES	None

Ignore this fault as it is not active on this vehicle.

AFTER REPAIR	After repair, the fault may become O.B.D., in which case, ignore it. It must be erased before the conformity check is carried out. Erase the memorised faults.Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	SLOW SPEED FAN ASSEMBLY CIRCUIT CC1 = Short circuit to 12 V CC0 = Short circuit to earth CO = Open circuit
NOTES	None

Ignore this fault as it is not active on this vehicle

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	FAST SPEED FAN ASSEMBLY CIRCUIT CC1 = Short circuit to 12 V CC0 = Short circuit to earth CO = Open circuit
NOTES	None

Ignore this fault as it is not active on this vehicle

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	WHEEL SPEED SENSOR CIRCUIT DEF = Wheel speed sensor fault O.B.D. = O.B.D. fault : Wheel speed sensor
NOTES	None

Ignore this fault as there are no wheel speed sensors on this vehicle.

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	INJECTION ----> AT CONNECTION None
NOTES	None

Ignore this fault as this vehicle does not have AT.

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT or MEMORISED	MIL (O.B.D.) ----> TCM CONNECTION None

NOTES	None

Ignore this fault as this vehicle does not have AT.

AFTER REPAIR	Erase the memorised faults. Use the command to confirm the repair. Deal with any other faults.

JSI041.0

FAULT PRESENT	O.B.D. OXYGEN SENSOR FAULT FINDING : IN PROGRESS Indicates that this fault finding is being carried

NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

FAULT PRESENT	O.B.D. OXYGEN SENSOR FAULT FINDING : CARRIED OUT Indicates that this fault finding has just finished.

NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

FAULT PRESENT or MEMORISED	OXYGEN SENSOR OPERATING FAULT Indicates incoherence of the information received by the upstream oxygen sensor.

NOTES	None

Check that the **exhaust pipe does not have an air leak.**
If the vehicle is frequently driven in urban areas, **decontaminate the oxygen sensor.**
Check the **connection and condition** of the oxygen sensor connector. Change the connector if necessary.
Check the **oxygen sensor heating resistance**. Change the oxygen sensor if necessary.
With the ignition switched on, check for +12 V (after actuator relay feed) on track A of the oxygen sensor Repair if necessary.
Connect the bornier in place of the computer and check the insulation, continuity and that there is no interference resistance on line: **Computer 45 ⟶ C Oxygen sensor** **Computer 80 ⟶ D Oxygen sensor** Repair if necessary..
Connect the bornier in place of the computer and check the insulation, continuity and that there is no interference resistance on line: **Computer 63 ⟶ B Oxygen sensor** Repair if necessary..
The fault persists! Change the oxygen sensor.

AFTER REPAIR	Note the other operating faults. Erase the O.B.D. faults. Deal with any other faults.

JSI041.0

PRESENT or MEMORISED	OXYGEN SENSOR REPAIR VALIDATION BON = Repair validated 1 dEF = Road test condition not observed 2 dEF = Fault present detected
NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

PRESENT	O.B.D. CATALYTIC CONVERTER FAULT FINDING : IN PROGRESS Indicates that this fault finding is being carried out
NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

PRESENT	O.B.D. CATALYTIC CONVERTER FAULT FINDING: CARRIED OUT Indicates that this fault finding has just finished
NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

FAULT PRESENT or MEMORISED	CATALYTIC CONVERTER OPERATING FAULT Indicates incoherence of the information received by the upstream oxygen sensor

NOTES	None

Check that the **exhaust pipe does not have an air leak.**
Repair if necessary..

Visually check the condition of the catalytic converter. Deformation may explain why it is malfunctioning.

Visually check that there has not been a thermal shock. Cold water hitting a hot catalytic converter may damage it.

Check that the oil and coolant consumption is not excessive. Ask the customer if he has used an additive or other product of this type. This type of product can pollute the catalytic converter and in the long or short term, render it ineffective.

Check whether there has been misfiring. This can damage the catalytic converter.

If the cause of the damage has been found, the catalytic converter may be changed. If the catalytic converter is changed without finding the cause, there is a risk that the new catalytic converter will be damaged very quickly.

AFTER REPAIR	Note the other operating faults. Erase the O.B.D. faults. Deal with any other faults.

PRESENT or MEMORISED	CATALYTIC CONVERTER REPAIR VALIDATION BON = Repair validated 1 dEF = Road test condition not observed 2 dEF = Fault present detected
NOTES	This information can only be used during a specific road test which cannot be carried out in after sales.

Ignore this information.

AFTER REPAIR	None

JSI041.0

PRESENT	O.B.D. MISFIRING FAULT FINDING : IN PROGRESS Indicates that this fault finding is being carried out

NOTES	There should be no present or memorised electrical fault. Carry out engine target programming (see section 17 "Conditions for fault finding")

Erase the memorised faults and the O.B.D. fault.
The following conditions must be met to activate this fault finding and check that the system has been repaired correctly:
- There must be no more electrical faults on the vehicle.
- Engine target programming must have been carried out.
- The engine must be warm (75 °C).
- The vehicle must be running at idle speed with all consumers operating for 11 minutes.

If no "misfiring" fault becomes present, the repair is correct.

If a "misfiring" fault is present, deal with the fault.

AFTER REPAIR	None

JSI041.0

FAULT **PRESENT**	POLLUTING MISFIRING DESTRUCTIVE MISFIRING 1 dEF = Misfiring during last driving period 2 dEF = Misfiring confirmed

NOTES	Misfiring on cylinder 1 Misfiring on cylinder 2 Misfiring on cylinder 3 Misfiring on cylinder 4 Gives information on the nature and location of the fault

Connect the OPTIMA 5800 station and start the ignition test. Follow the instructions and change the necessary components.
Connect the OPTIMA 5800 station and start the compression test. Follow the instructions and change the necessary components.
Connect the OPTIMA 5800 station and check the engine target. Repair if necessary.
If nothing faulty has been found, there must be a fault on the fuel circuit. The following must therefore be checked: - The fuel filter. - The fuel flow and pressure. - The condition of the fuel pump. - The cleanliness of the fuel tank. - The condition of the injectors. Repair the fuel circuit.

AFTER REPAIR	Note the other operating faults. Erase the O.B.D. faults. Deal with any other faults.

JSI041.0

PRESENT	MISFIRING ON CYLINDER 1 MISFIRING ON CYLINDER 2 MISFIRING ON CYLINDER 3 MISFIRING ON CYLINDER 4

NOTES	It should be noted that in rare cases, the information from the faulty cylinder is not exact. Because of this, the computer may declare cylinder 1 faulty even though this cylinder is not the cause. This cylinder must be checked first but if everything is correct, the other cylinders must be checked. This information should only be used if polluting or destructive misfiring occurs.

One cylinder is declared faulty	The fault is probably due to a component which can only act on one cylinder: - Fault on an injector. - Fault with a plug. - Fault on the high voltage cable ...
Cylinders 1 and 4 or Cylinders 2 and 3 are declared faulty	The fault is probably due to a component which can only act on these pairs of cylinders: - Fault on the coil, high voltage side. - Fault on the coil, control side ...
Four cylinders are declared faulty	The fault is probably due to a component which can only act on all cylinders: - Fuel filter fault. - Fuel pump fault. - Fuel type fault ...

AFTER REPAIR	None

JSI041.0

FAULT PRESENT	O.B.D. FUEL CIRCUIT FAULT FINDING : IN PROGRESS

NOTES	None

Ignore this information, as this function is not active

AFTER REPAIR	None

JSI041.0

FAULT PRESENT	FUEL CIRCUIT OPERATING FAULT
NOTES	None

Ignore this information, as this function is not active

AFTER REPAIR	None

JSI041.0

NOTES	Engine stopped, ignition on.

Order	Function	Descriptions	Display and notes	Fault finding
		Status window		
1	Battery voltage	**Status**: + After ignition computer feed **Parameter**: Computer feed voltage	**ACTIVE** 11.8 < X < 13.2 V	**If there is a fault, consult the fault finding for this parameter**
2	Computer configuration	**Status**: Air conditioning connection **Status**: Computer configured with AT **Status**: PAS pressostat connection **Status**: Heated windscreen connection **Status**: Computer configured without wheel speed sensor **Status**: Wheel speed sensor from the ABS **Status**: Reluctance type wheel speed sensor **Status**: Magneto resistive type wheel speed sensor **Status**: Configured with engine immobiliser	**ACTIVE** **(if it is an option)** **INACTIVE** **ACTIVE** **(if it is an option)** **ACTIVE** **(if it is an option)** **ACTIVE** **INACTIVE** **INACTIVE** **INACTIVE** **ACTIVE**	**None**
		Status: Speed sensor connection	**ACTIVE**	**If there is a fault, consult the fault finding for this status**
3	Engine immobiliser	**Status**: Engine immobiliser	**INACTIVE**	**If there is a fault, consult the fault finding for this status**

NOTES	Engine stopped, ignition on.

Order	Function	Descriptions	Display and notes	Fault finding
4	Throttle position potentiometer	**Status**: Throttle position: no load	**ACTIVE**	
		Parameter: Throttle position	0 < X < 47	
		Parameter: No load position programming value	0 < X < 47	
		Accelerator pedal lightly pressed down		**If there is a fault, consult the fault finding for these parameters**
		Status: Throttle position: no load	**INACTIVE**	
		Status: Throttle position: full load	**INACTIVE**	
		Status: Throttle position: full load	**ACTIVE**	
		Parameter: Throttle position	170 < X < 255	
Parameter window				
5	Coolant temperature sensor	**Parameter**: Coolant temperature	X = Engine temperature ± 5 °C	**If there is a fault, consult the fault finding for this parameter**
6	Air temperature sensor	**Parameter**: Air temperature	X = Temperature under the bonnet± 5 °C	**If there is a fault, consult the fault finding for this parameter**
7	Pressure sensor	**Parameter**: Manifold pressure	X = Atmospheric pressure	**If there is a fault, consult the fault finding for these parameters**
		Parameter: Atmospheric pressure	X = Atmospheric pressure	

NOTES	Engine stopped, ignition on.

Order	Function	Descriptions	Display and notes	Fault finding
		Command window		
8	Fuel pump	**Command** : Fuel pump	The fuel pump should be heard to operate	**If there is a fault, consult the fault finding for this command**
9	Engine cooling fan assembly	**Command** : Engine cooling fan assembly, slow speed **Command**: engine cooling fan assembly, fast speed (only if AC)	The engine cooling fan should be heard to operate at slow speed The engine cooling fan should be heard to operate at fast speed	**If there is a fault, consult the fault finding for this command** **If there is a fault, consult the fault finding for this command**
10	Idle speed regulation valve	**Command** : Idle speed regulation valve	Place your hand on top to feel whether it is operating	**If there is a fault, consult the fault finding for the idle speed regulation warning light circuit fault : DEF**
11	Canister bleed solenoid valve	**Command** : Canister bleed	The canister bleed solenoid valve should operate	**If there is a fault, consult the fault finding for the canister bleed solenoid valve circuit fault : CO**
12	Air conditioning	AC selected on the control panel. **Command:** AC compressor	The compressor should engage	**If there is a fault, consult the fault finding for air conditioning statuses**

NOTES	Carry out the actions below with the engine warm, at idle speed, no consumers

Order	Function	Descriptions	Display and notes	Fault finding
Status window				
1	Battery voltage	**Status**: + After ignition computer feed **Parameter:** Computer feed voltage If **parameter:** Computer feed voltage Then **parameter:** Engine speed	**ACTIVE** 13 < X < 14.5 V X < 12.8 V 750 < X < 910 rpm.	**If there is a fault, consult the fault finding for this parameter**
2	Fuel pump control	**Status**: Fuel pump relay control	**ACTIVE**	**None**
3	Actuator control	**Status**: Actuator relay control	**ACTIVE**	**None**
4	Flywheel signal	**Status**: Flywheel signal	**ACTIVE**	**If there is a fault, consult the fault finding for the flywheel signal information fault : 2 DEF**
5	Cylinder n° 1 recognition	**Status**: Cylinder 1 recognition	**ACTIVE**	**If there is a fault, consult section 17 "Conditions for fault finding"**

NOTES	Carry out the actions below with the engine warm, at idle speed, no consumers

Order	Function	Descriptions	Display and notes	Fault finding
6	Oxygen sensor heating	**Status**: Upstream oxygen sensor heating **Status**: Downstream oxygen sensor heating	**ACTIVE** **ACTIVE**	(see operating conditions)
7	Throttle potentiometer	**Status**: Throttle position: no load	**ACTIVE**	**If there is a fault, consult the fault finding for the parameter**
8	Idle speed regulation	**Status**: Idle speed regulation **Parameter**: Engine speed **Parameter**: Idle speed difference **Parameter:** RCO idle **Parameter:** Adaptive RCO idle	**ACTIVE** 725 < X < 775 rpm. - 25< X <+25 rpm. 6 % < X < 22 % - 8 % < X < 8 %	**If there is a fault, consult the fault finding for this status**
Parameter window				
9	Pressure circuit	**Parameter:** Manifold pressure **Parameter:** Atmospheric pressure	280 < X < 360 mb X = Atmospheric pressure	**If there is a fault, consult the fault finding for these parameters**

NOTES	Carry out the actions below with the engine warm, at idle speed, no consumers

Order	Function	Descriptions	Display and notes	Fault finding
10	Pinking circuit	**Parameter**: Pinking signal	20 < X < 100	**If there is a fault, consult the fault finding for this parameter**
Status window				
11	Richness regulation	**Status**: Richness regulation **Parameter:** Upstream oxygen sensor voltage **Parameter:** Richness correction	**ACTIVE** 20 < X < 840 mV 0 < X < 255 Average value 128	**If there is a fault, consult the fault finding for this status**

NOTES	Carry out the actions below with the engine warm, at idle speed, no consumers

Order	Function	Descriptions	Display and notes	Fault finding
12	Air conditioning (if it is an option) (AC selected)	**Status**: Air conditioning requested	**ACTIVE** Illuminated if AC requests compressor operation	**If there is a fault, consult the fault finding for these statuses**
		Status: Fast idle	**ACTIVE** Illuminated if fast idle is active	
		Status: Air conditioning compressor	**ACTIVE** Illuminated if the injection authorises compressor operation	
		Parameter: Engine speed	850 < X < 910 rpm.	
		Parameter: Power consumed by the AC compressor	250 < X < 5000 W	
		Status: Air conditioning requested	**INACTIVE**	**None**
		Status: Fast idle	**ACTIVE**	
		Status: Air conditioning compressor	**INACTIVE** if the injection does not authorise compressor operation	
		Parameter: Engine speed	850 < X < 910 rpm	
		Parameter: Power absorbed by AC compressor	X < 250 W	
		Status: Engine cooling fan assembly, slow speed	The engine cooling fan should operate at slow speed	**None**

NOTES	Carry out the actions below with the engine warm, at idle speed, no consumers

Order	Function	Descriptions	Display and notes	Fault finding
13	Power assisted steering pressostat	Turn the wheels to full lock **Status**: Power assisted steering pressostat	**ACTIVE**	**If there is a fault, consult the fault finding for this status**
14	Canister bleed	**Status**: Canister bleed **Parameter:** RCO canister bleed	**INACTIVE** X < 1.5 % Canister bleed is forbidden. The solenoid valve remains closed.	**None**
15	Engine cooling fan	**Status**: Engine cooling fan assembly, slow speed **Parameter:** Coolant temperature **Status**: Engine cooling fan, fast speed (only if equipped with AC) **Parameter:** Coolant temperature	**ACTIVE** The engine cooling fan should operate when the engine coolant temperature exceeds 99 °C **ACTIVE** The engine cooling fan should operate when the engine coolant temperature exceeds 102 °C	**None**
16	EGR	**Parameter**: Order to open the EGR valve	**0** **Vehicle not equipped with the EGR device**	**None**

NOTES	Carry out the actions below during a road test

Order	Function	Descriptions	Display and notes	Fault finding
		Status window		
1	Canister bleed	**Status**: Purge Canister **Parameter**: RCO canister bleed	**ACTIVE** Canister bleed is authorised X > 1.5 % and variable	**None**
2	Camshaft offset device	**Status**: Camshaft control	**ACTIVE**	**None**
		Parameter window		
3	Vehicle speed	**Parameter**: vehicle speed	X = speed read on speedometer in km / h	**If there is a fault, consult the fault finding for this parameter**
4	Pinking sensor	Vehicle under load **Parameter:** Pinking signal **Parameter:** Pinking correction	 X is variable and not zero 0 < X < 7° Crankshaft	**If there is a fault, consult the fault finding for this parameter**
5	Downstream oxygen sensor	**Parameter**: Downstream oxygen sensor voltage operating under full load decelerating after full load **Parameter:** Downstream sensor activity	Ignore the voltage at idle speed. Consult the section concerned. The sensor indicates rich X increases after a short response time The sensor indicates lean. X falls after a short response time	**None**

NOTES	Carry out the actions below during a road test

Order	Function	Descriptions	Display and notes	Fault finding
6	Adaptive richness	After programming **Parameter:** Adaptive richness operation **Parameter:** Adaptive idle richness	 82 < X < 224 32 < X < 224	**If there is a fault, consult the fault finding for these parameters**
7	Pollutant emission	2500 rpm after driving At idle speed, wait for stabilisation	CO < 0.3 % CO2 > 13.5 % O2 < 0.8 % HC < 100 ppm 0.97 < 1 < 1.03 CO < 0.5 % HC < 100 rpm 0.97 < 1 < 1.03	**If there is a fault, consult the Anti-pollution Technical Note**

STATUS	SPEED SENSOR CONNECTION

NOTES	No fault should be present or memorised

The injection computer must have just been changed or the vehicle has never been driven at a speed greater than 25 mph (40 km / h).
This bargraph MUST be illuminated before the vehicle is returned to the customer.
To illuminate the bargraph, carry out a road test (you must drive at a speed greater than 25 mph (40 km / h)).
If the bargraph does not illuminate, consult the fault finding for the vehicle speed parameter.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

STATUS	ENGINE IMMOBILISER

NOTES	No fault should be present or memorised

Check whether the engine immobiliser is faulty. If the engine immobiliser is faulty, repair the fault before carrying out this fault finding.
Check **the insulation and continuity** of the wiring for **track 58** of the injection computer.
If the fault is not resolved, consult the engine immobiliser fault finding.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

STATUS	IDLE SPEED REGULATION

NOTES	No fault should be present or memorised

Check the **resistance of the idle speed regulation stepping motor.**
Change the idle speed regulation valve if necessary.

Check the **insulation and continuity** of line:

Computer	**12**	→	**B**	**Idle speed regulation motor**
Computer	**41**	→	**A**	**Idle speed regulation motor**
Computer	**42**	→	**C**	**Idle speed regulation motor**
Computer	**72**	→	**D**	**Idle speed regulation motor**

Repair if necessary and continue the fault finding in accordance with the idle speed difference.

Idle speed difference < minimum threshold	NOTES	The speed is too low

- Check the operation of richness regulation.
- Clean the air supply circuit (throttle body, idle speed regulation motor) as it is probably contaminated.
- Check the engine oil level (too high => splashing).
- Check and ensure that the fuel pressure is correct (fuel pressure too low).
- Using the OPTIMA 5800 station, check the engine compression.
- Check the valve clearances and the setting of the timing.
- Check the ignition.
- Check the injectors.

If all these points are correct, change the idle speed regulation motor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

CONT	

Idle speed difference > minimum threshold	***NOTES***	The speed is too high

- Check the engine oil level.
- Check that the pressure sensor is operating correctly.
- Check the cleanliness of the pipes connected to the manifold.
- Check the pneumatically controlled solenoid valves .
- Check the manifold gaskets.
- Check the throttle body seals.
- Check the sealing of the brake servo.
- Check for the restrictions in the oil vapour rebreathing circuit.
- Check the fuel pressure.
- Check the valve clearances and the setting of the timing.

If all these points are correct, change the idle speed regulation motor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

STATUS	RICHNESS REGULATION

NOTES	No fault should be present or memorised

Check the **connection and condition of the upstream oxygen sensor connector**.
Repair if necessary.

Check for **12 V** at the upstream oxygen sensor.
Check the **insulation and continuity** of line:

Computer 45 ⟶ **C Oxygen sensor**
Computer 80 ⟶ **D Oxygen sensor**

Repair if necessary.

Check the ignition.
Check the sealing of the canister bleed (a leak considerably disrupts the richness).
Check the sealing of the exhaust pipe.
Check the sealing of the inlet manifold.
If the vehicle is only driven in urban areas, the sensor may be contaminated (try to drive under full load conditions).
Check the fuel pressure.
If the idle speed is unstable, check the valve clearances and the timing.
Check the injectors (flow and shape of jet).
If necessary, change the oxygen sensor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

STATUS	AIR CONDITIONING REQUEST AIR CONDITIONING COMPRESSOR

NOTES	No fault should be present or memorised

The computer does not register the request for air conditioning	Check **the insulation and continuity of the line on track 46** of the injection computer. Repair if necessary.
	If the fault persists, check the air conditioning fault finding.
The compressor clutch does not operate	Check the **Air Conditioning relay** 474 contained in passenger connection unit BII. Refer to relevant section (Check section 62 of Technical Note NT 3028A). Repair if necessary.
	If the fault persists, refer to the air conditioning fault finding.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

STATUS	POWER ASSISTED STEERING PRESSOSTAT

NOTES	No fault should be present or memorised

Check that the **power assisted steering is operating correctly** (oil level, ...).
Check that the **PAS pressostat is correctly connected**.
Check **the insulation and continuity** of line :

Injection computer 85 → 1 PAS pressostat
PAS pressostat 2 → Earth

Repair if necessary.

If all these points are correct, change the PAS pressostat.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	COMPUTER SUPPLY VOLTAGE

NOTES	No fault should be present or memorised No consumers

Ignition on

If voltage < Minimum, the battery is flat: Check the charging circuit to find the origin of this fault.
If voltage >Maximum, the battery may have excess charge: Check that the charging voltage is correct with and without consumers.

At idle speed

If voltage < Minimum, the battery voltage is too low: Check the charging circuit to find the origin of this fault.
If voltage >Maximum, the battery voltage is too high: The alternator regulator is faulty. Solve this fault and check the electrolyte level in the battery.

NOTE:
The check of the battery and the charging circuit can be carried out using the OPTIMA 5800 station (the battery does not need to be disconnected for this, which allows the computer memories to be retained).

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	THROTTLE POSITION VALUE OF NO LOAD POSITION PROGRAMMING

NOTES	No fault should be present or memorised Ignition on or engine running

Programming at threshold or non-detection of no load or non-detection of full load	Check that the **mechanical stop for the potentiometer has not been modified.** Check the accelerator control (rubbing against an obstacle ...). Check the **throttle potentiometer resistance.** Change the throttle potentiometer if necessary. Check the **insulation, continuity and that there is no interference resistance** on line: **Computer 43 → C Throttle potentiometer** **Computer 74 → B Throttle potentiometer** **Computer 75 → A Throttle potentiometer** Repair if necessary.

The throttle position is fixed	Check the **resistance of the throttle potentiometer** by moving the throttle. If the resistance varies, check the **electrical lines for the sensor.** If the resistance does not vary, check that the sensor is mechanically connected to the throttle. If necessary, change the sensor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	COOLANT TEMPERATURE

NOTES	No fault should be present or memorised

If the value read is inconsistent, check that the sensor is correctly following the calibration curve "resistance depending on temperature".
Change the sensor if it drifts (**NOTE**: a drifting sensor is often the result of an electrical shock).

Check **the insulation, continuity and that there is no interference resistance** on electrical line:

Computer 13 ⟶ **B2 Coolant temperature sensor**
Computer 73 ⟶ **B1 Coolant temperature sensor**

Repair.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	AIR TEMPERATURE

NOTES	No fault should be present or memorised

If the value read is inconsistent, check that the sensor is correctly following the calibration curve "resistance depending on temperature".
Change the sensor if it drifts (**NOTE**: a drifting sensor is often the result of an electrical shock).

Check **the insulation, continuity and that there is no interference resistance** on electrical line:

Computer	**49**	→	**1**	**Air temperature sensor**
Computer	**77**	→	**2**	**Air temperature sensor**

Repair.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	MANIFOLD PRESSURE ATMOSPHERIC PRESSURE

NOTES	No fault should be present or memorised

Manifold pressure not consistent, ignition on **Manifold pressure < Minimum at idle speed** **Atmospheric pressure not consistent**	Check the insulation, continuity and that there is no interference resistance on line: **Computer 15 → A Pressure sensor** **Computer 16 → B Pressure sensor** **Computer 78 → C Pressure sensor** Repair if necessary. If all these points are correct, change the sensor.

Manifold pressure > Maximum at idle speed	Check: - Sealing of the pipe between the manifold and the sensor. - Valve clearance. - The canister bleed which should be closed at idle speed. - The compression of the cylinders using the OPTIMA 5800 station. If all these points are correct, change the sensor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	PINKING SIGNAL

NOTES	No fault should be present or memorised

The pinking sensor should send a signal which is not zero, to prove that it registers the mechanical vibrations of the engine.
If the signal is zero:
- Check that the **sensor is correctly screwed in**.
- Check **the insulation and continuity of the wiring**:

Computer	**20**	→	**1**	**Pinking sensor**
Computer	**79**	→	**2**	**Pinking sensor**
Computer	**19**	→		**Pinking sensor screening**

If necessary, change the sensor.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	VEHICLE SPEED

NOTES	No fault should be present or memorised Check using a road test

Check the **insulation, continuity and that there is no interference resistance** on line:

Computer 53 ⟶ B1 Dynamic speed sensor

NOTE: Check the various functions which use this information.

Repair.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

PARAMETER	ADAPTIVE RICHNESS OPERATING ADAPTIVE IDLE RICHNESS

NOTES	No fault should be present or memorised Carry out programming

Ensure **the sealing of the canister bleed.**

Erase the computer memory.
Warm, in idle regulation, observe these parameters.
- **If one of these parameters goes to the MAXIMUM threshold, there is not enough fuel.**
- **If one of these parameters goes to the MINIMUM threshold, there is too much fuel.**

Ensure the hygiene, cleanliness and correct operation of the:
- Filter.
- Fuel pump.
- Fuel circuit.
- Fuel tank.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

COMMAND	FUEL PUMP

NOTES	No fault should be present or memorised

Check that the **impact sensor is correctly engaged.**
Engage the impact sensor if necessary.

While the **computer is controlling the fuel pump**, check for **12 V on track 3 of the impact sensor connector.**
If there is not 12 V, repair the line from track 1 of the impact sensor to track 5 of the fuel pump relay

Check the **continuity between tracks 1 and 3 of the impact sensor.**
If there is not continuity, change the impact sensor.

Check the cleanliness and the presence of **earth on track 4 of the fuel pump.**

Check **the insulation and continuity** of the wiring:

Impact sensor 1 ⟶ 2 Fuel pump

Repair if necessary.

The fault persists! Change the fuel pump.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

COMMAND	SLOW SPEED ENGINE COOLING FAN ASSEMBLY FAST SPEED ENGINE COOLING FAN ASSEMBLY

NOTES	No fault should be present or memorised

The engine cooling fan does not operate at slow speed	Check **the insulation and continuity of line 8.** Repair if necessary.
	The fault persists. Use the wiring diagram to check: - The fan relay and fan feed. - The cleanliness of the fan assembly earth. - The condition of the fan assembly relay. - The condition of the fan assembly resistance. - The condition of the fan assembly. Repair if necessary.

The engine cooling fan does not operate at fast speed	Check **the insulation and continuity of line 38.** Repair if necessary.
	The fault persists. Use the wiring diagram to check: - The fan relay and fan feed. - The cleanliness of the fan assembly earth. - The condition of the fan assembly relay. - The condition of the fan assembly. Repair if necessary.

AFTER REPAIR	Repeat the conformity check from the beginning.

JSI041.0

NOTES	Only consult this customer complaint after a complete check using the fault finding tool.

STARTING PROBLEMS	Chart 1
IDLE PROBLEMS	Chart 2
PROBLEMS WHEN DRIVING	Chart 3

Chart 1	STARTING PROBLEMS

NOTES	Only consult this customer complaint after a complete check using the fault finding tool.

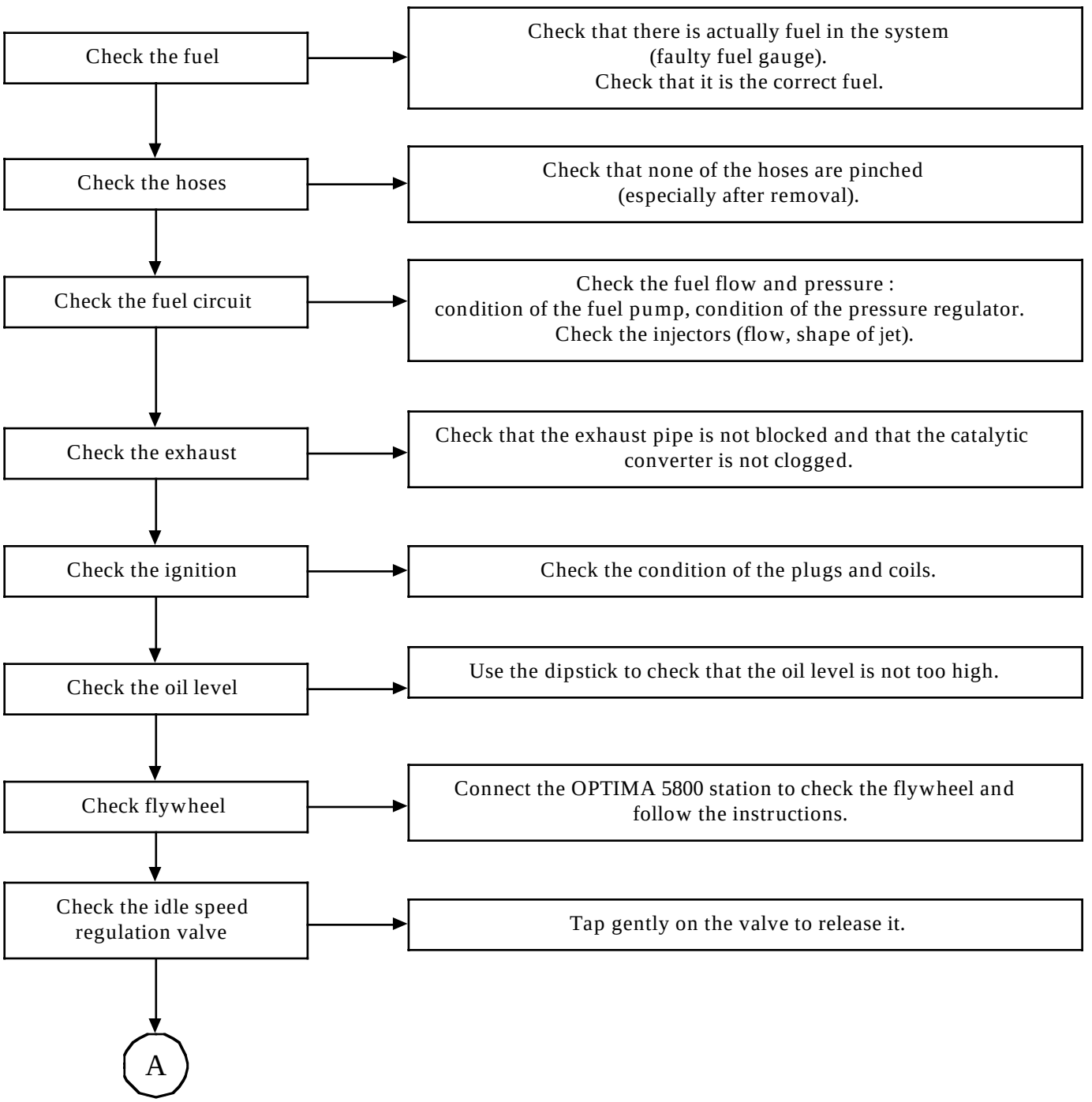
Check the fuel	Check that there is actually fuel in the system (faulty fuel gauge). Check that it is the correct fuel.
Check the hoses	Check that none of the hoses are pinched (especially after removal).
Check the fuel circuit	Check the fuel flow and pressure: condition of the fuel pump, condition of the pressure regulator. Check the injectors (flow, shape of jet).
Check the exhaust	Check that the exhaust pipe is not blocked and that the catalytic converter is not clogged.
Check the ignition	Check the condition of the plugs and coils.
Check the canister bleed	Disconnect the pipe which connects the canister bleed solenoid valve to the inlet manifold. Block the pipe so there is no air leak. If there is no more disruption, the canister bleed is the cause.
Check engine compressions	Connect the OPTIMA 5800 station to test compressions and follow the instructions.
Check flywheel	Connect the OPTIMA 5800 station to check the flywheel and follow the instructions.
Check the idle speed regulation valve	Tap gently on the valve to release it.

AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

JSI041.0

Chart 2	IDLE PROBLEMS

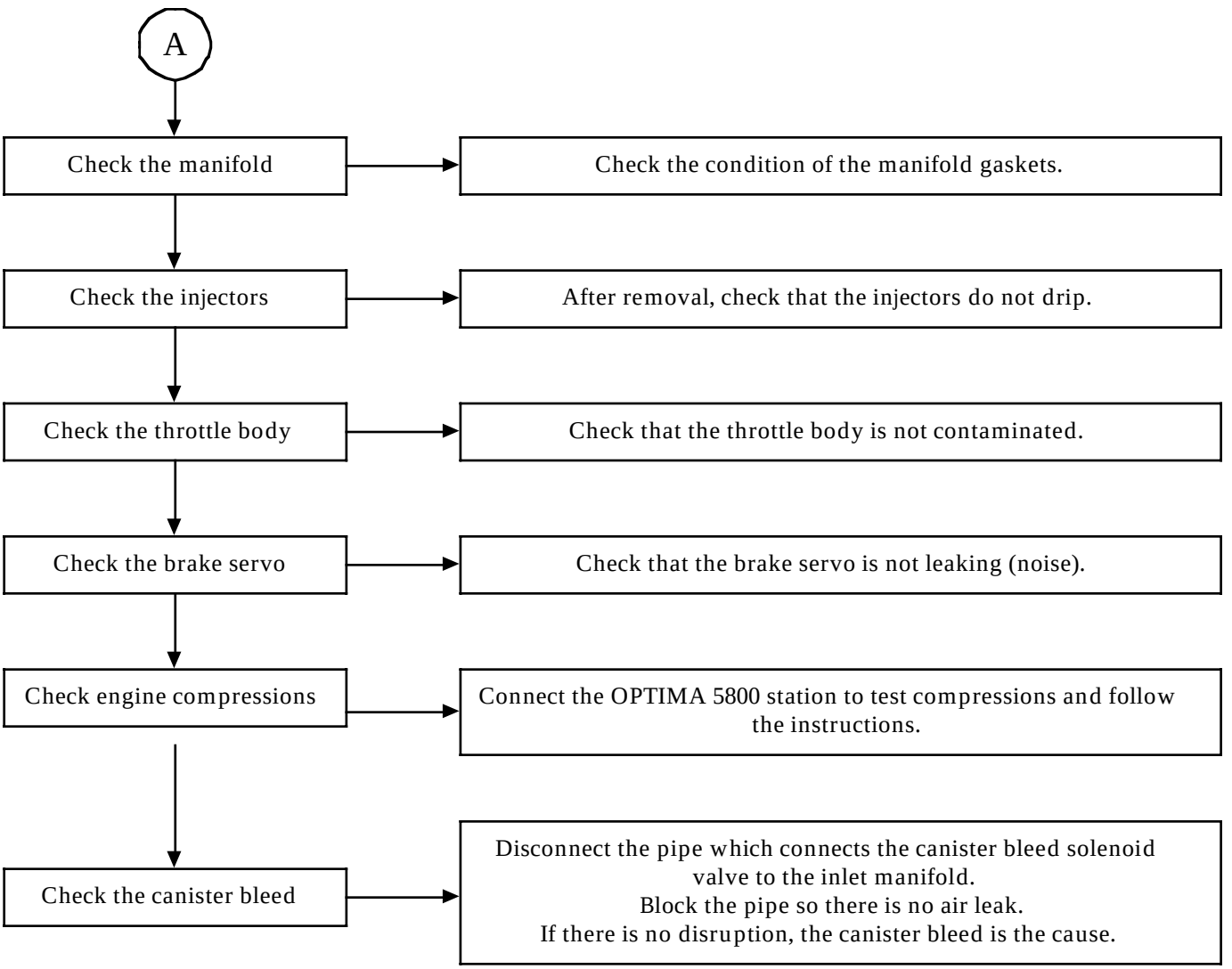
NOTES	Only consult this customer complaint after a complete check using the fault finding tool.



AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

JSI041.0

Chart 2 CONT	
NOTES	Only consult this customer complaint after a complete check using the fault finding tool.



AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

JSI041.0

Chart 3	PROBLEMS WHEN DRIVING

NOTES	Only consult this customer complaint after a complete check using the fault finding tool.

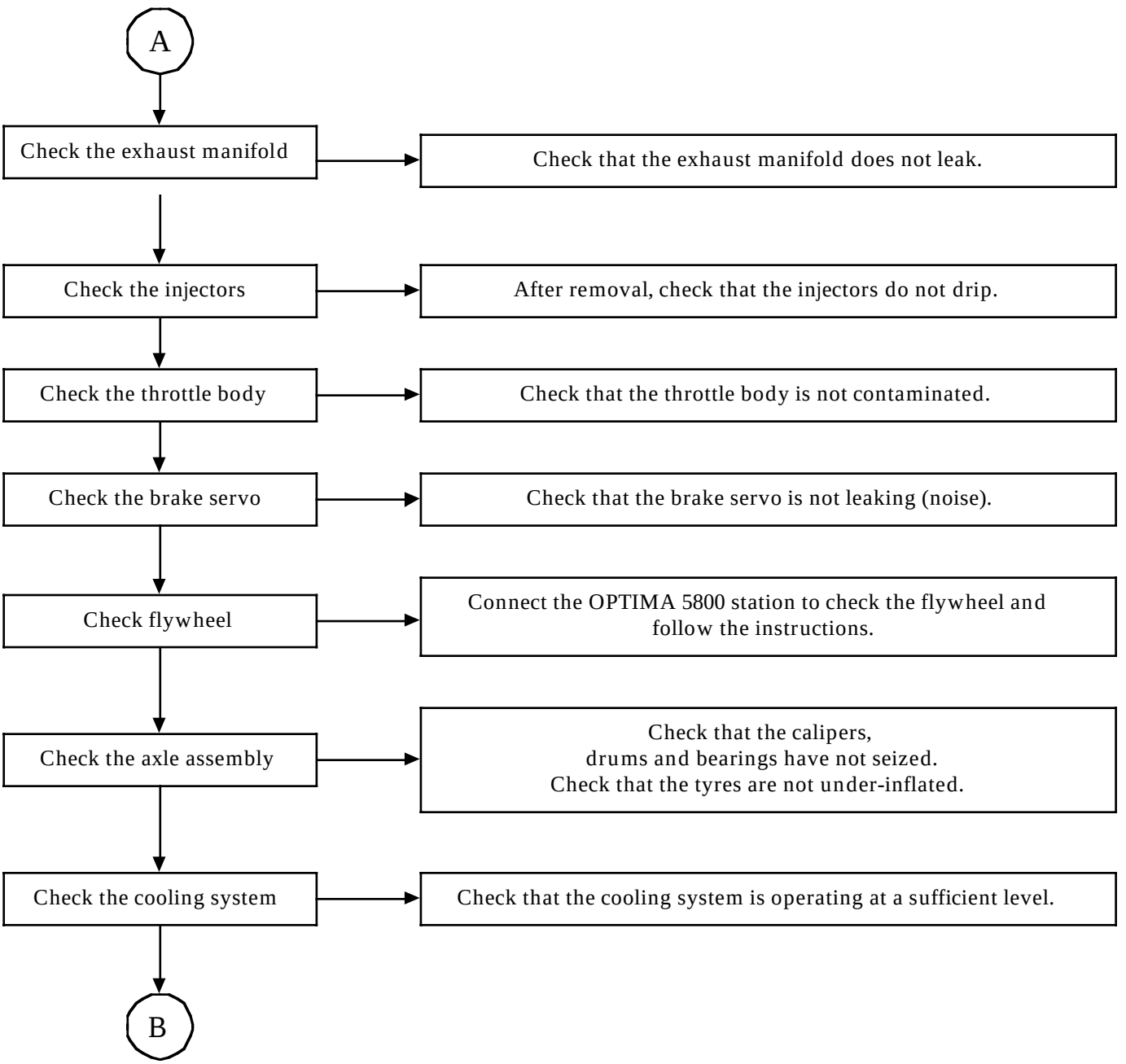
Check the air filter	Check that the air filter is not damaged.
Check the fuel	Check that there is actually fuel in the system (faulty fuel gauge). Check that it is the correct fuel.
Check the hoses	Check that none of the hoses are pinched (especially after removal).
Check the fuel circuit	Check the fuel flow and pressure : condition of the fuel pump, condition of the pressure regulator. Check the injectors (flow, shape of jet).
Check the exhaust	Check that the exhaust pipe is not blocked and that the catalytic converter is not clogged.
Check the ignition	Check the condition of the plugs and coils.
Check the oil level	Use the dipstick to check that the oil level is not too high.
Check the inlet manifold	Check the condition of the manifold gaskets.

A

AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

JSI041.0

Chart 3 CONT	
NOTES	Only consult this customer complaint after a complete check using the fault finding tool.



AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

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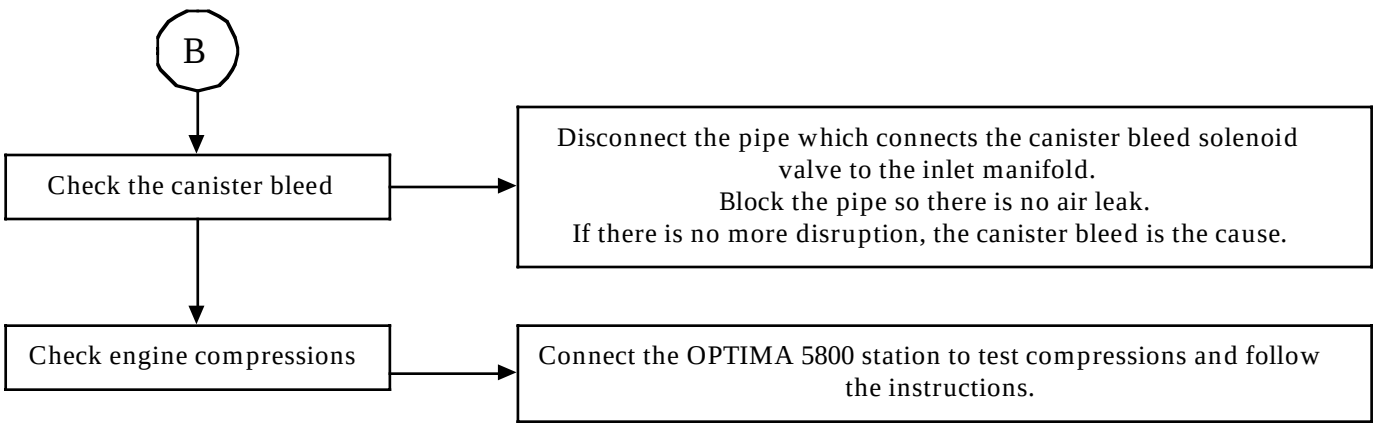
Chart 3 CONT	

NOTES	Only consult this customer complaint after a complete check using the fault finding tool.



AFTER REPAIR	Erase the memorised and O.B.D. faults. If there are no longer any faults on the vehicle, erase programming.

JSI041.0

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

FILLING

Open the bleed screws on the heater hose and the engine outlet hose.

Fill the circuit through the expansion bottle opening.

Close the bleed screws 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 fans operate (time required for automatic degassing).

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

DO NOT OPEN THE BLEED SCREW OR SCREWS WHEN THE ENGINE IS RUNNING

TIGHTEN THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM

REMOVAL

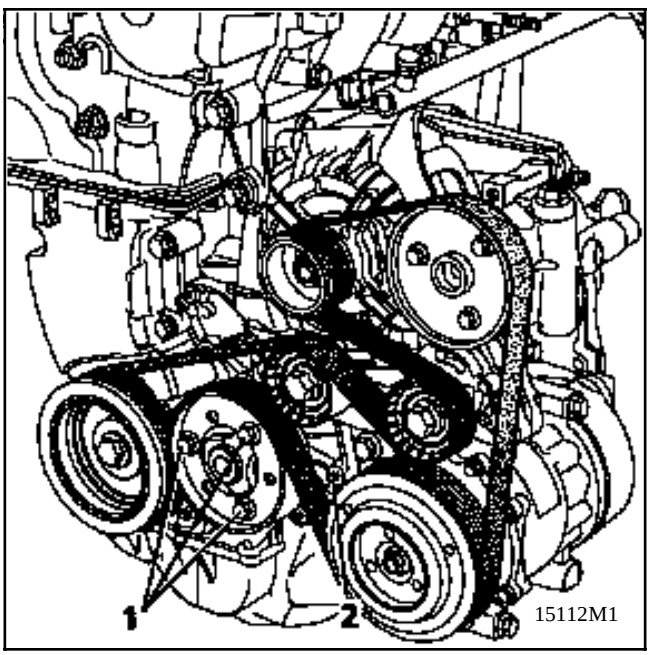
Put the vehicle on a lift.

Disconnect the battery.

Take off the front right hand wheel and its wheel arch protector.

Drain the cooling circuit by disconnecting the lower radiator hose.

Release the 3 water pump pulley mounting bolts (1).



Remove:

- the accessories belt (see method described in **section 07 - Accessories belt**),
- the water pump pulley,
- the water pump mounting bolts (2).

Remove the water pump and clean the sealing face.

Refitting is the reverse of removal

SPECIAL TOOLING REQUIRED	
Mot. 1390	**Universal support**
T.Av. 476	**Ball joint extractor**

EQUIPMENT REQUIRED
Ball joint separator
Axle stand type engine support
Component jack
Safety straps for two post lift

TIGHTENING TORQUES (in daN.m)	
Drain plug	**2.2**
Brake caliper bolts	**3.5**
Driveshaft gaiter bolts	**2.4**
Lower ball joint nut	**6.5**
Shock absorber base bolt M16 X 200	**20**
Engine tie bar bolt	**5.5**
Clutch protective plate bolt	**2.4**
Bolts at edge of gearbox and starter motor	**5**
Front left hand suspended engine mounting nut on side member	**7**
Suspended engine mounting bolts on gearbox	**6**
Rear central mounting bolts	**5.5**
Gearbox filling plug	**0.17**
Wheel bolts	**10**

Place the vehicle on a two post lift and attach the pads or safety straps.

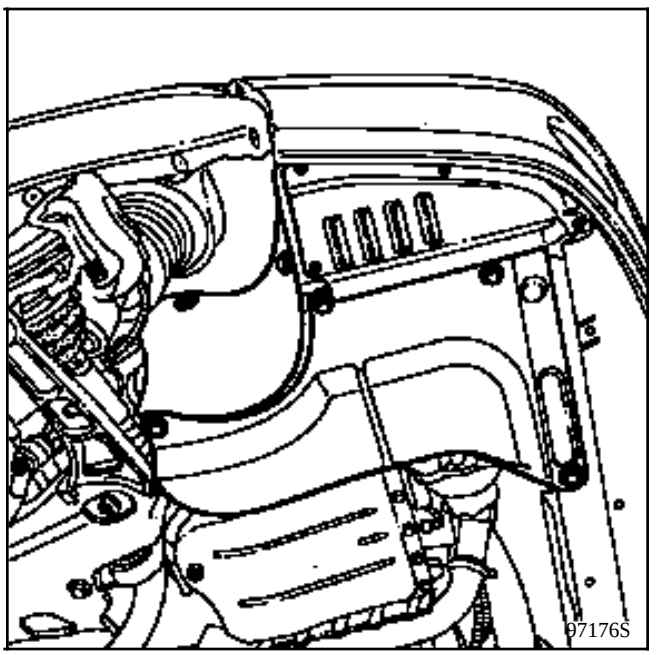
Disconnect the battery.

Remove the front wheels

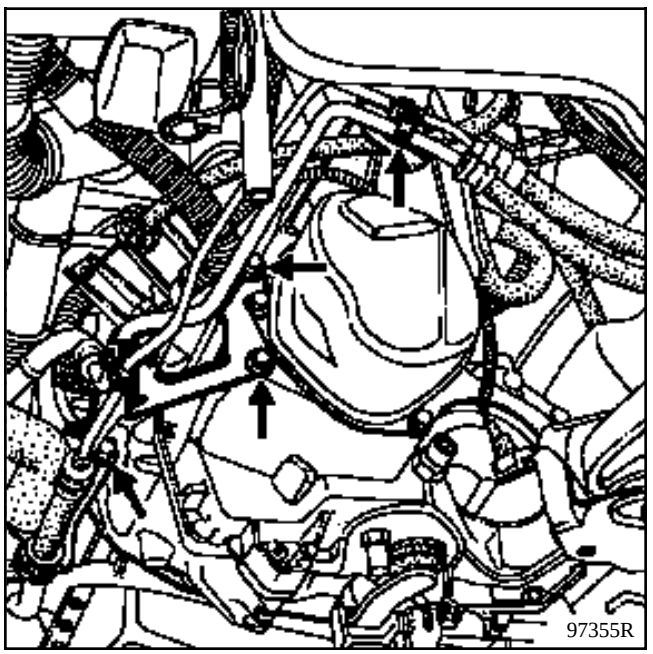
Drain the gearbox.

Refit the drain plug with a new seal.

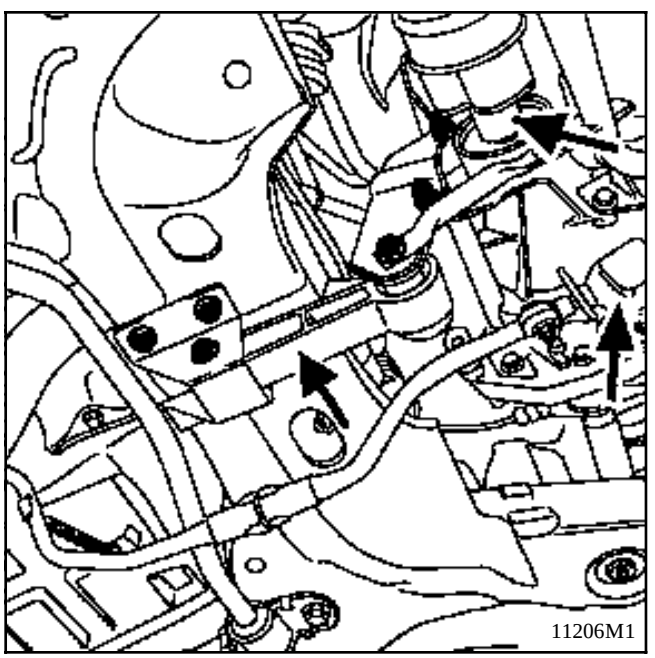
Remove:
- the engine undertray,
- the front right and left hand wheel arch end protectors,
- the wheel arch protectors.



- the power assisted steering hose mounting clips on the engine,
- the power assisted steering pipes mounting bracket on the gearbox,

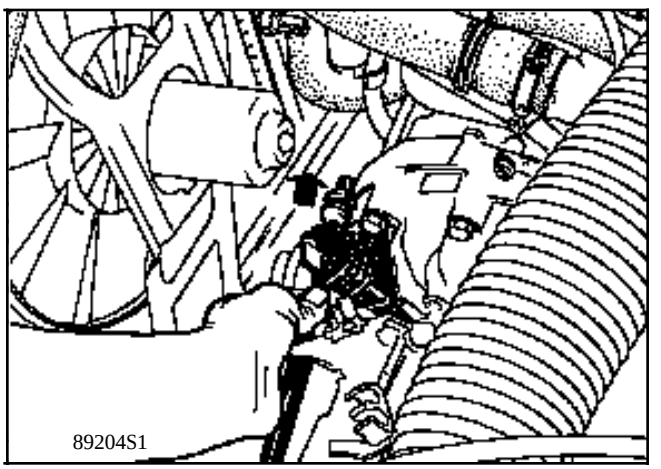


- the gearbox earth strap mounting bolt,
- the engine tie bar,
- the electric wiring retaining clip on the gearbox,



- the power assisted steering hose mounting clips on the engine
- the power assisted steering pipes mounting bracket on the geabox,
- the earth strap on the gearbox side,
- the inlet resonator (from above).

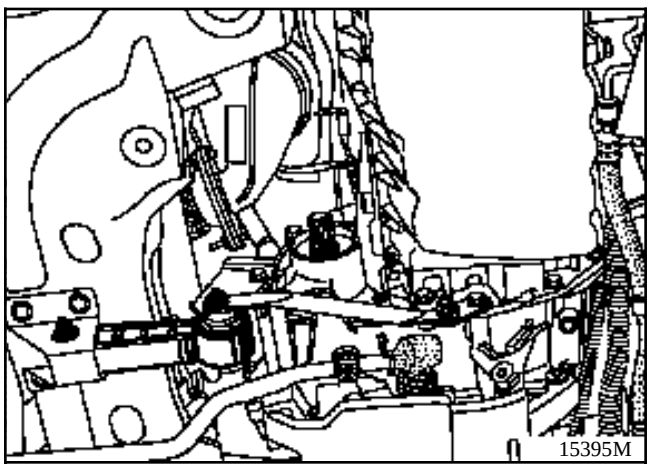
Disconnect:
- the clutch cable,



- the reversing light switch,
- the starter motor wires,
- the gear control (move the gaiter to one side),
- the speedometer cable.

Attach the gearbox control to a suspension arm to prevent it from touching the ground when the lift is lowered.

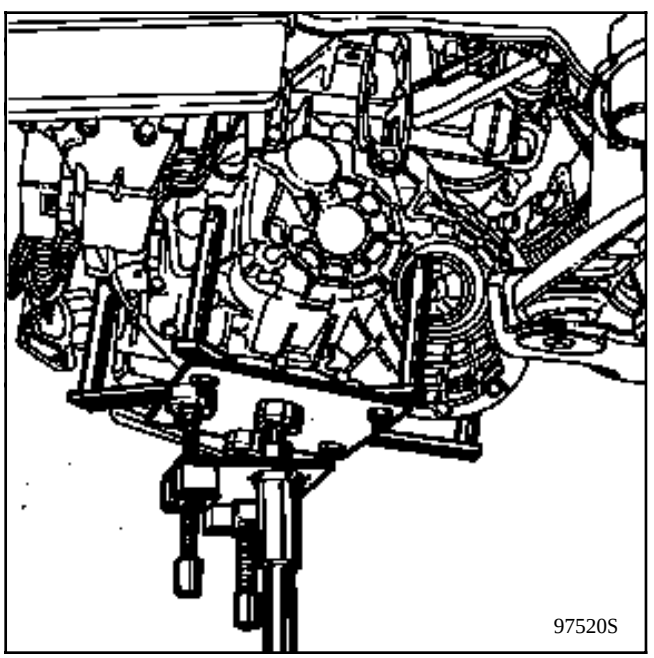
Remove:
- the exhaust outlet pipe
- the starter motor mounting bolts (without removing it) and put it between the engine and the exhaust manifold.



- the TDC sensor,
- the upper bolts from the edge of the gearbox and the starter motor.

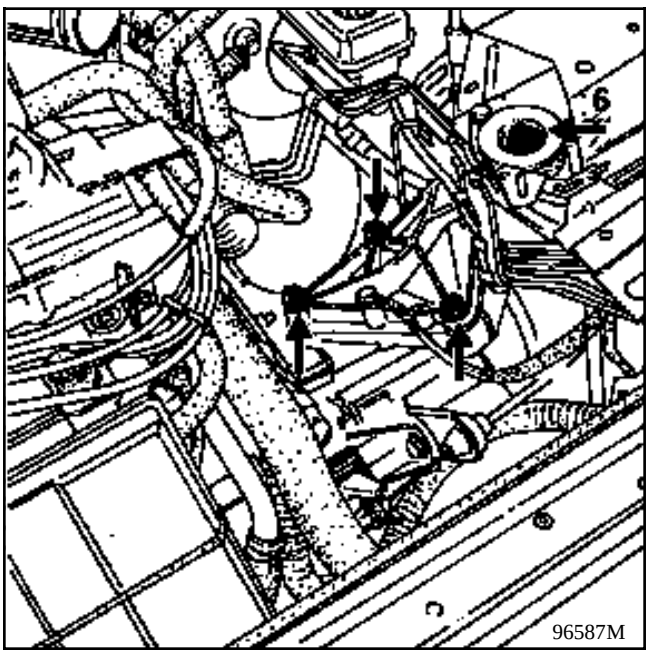
Take the weight off the engine by using a strut or a component jack under the sump.

Use a component jack under the transmission.



Remove the 3 bolts marked on the gearbox support (do not remove the nut marked (6)).

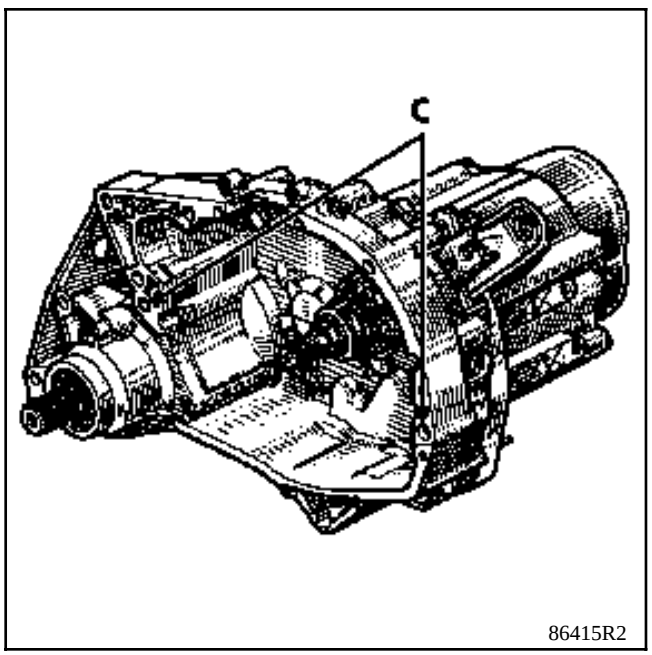
Slightly tilt the engine and transmission assembly by raising the vehicle (or by lowering the support if it is a progressive system).



Disconnect the gearbox from the engine and lower it using a component jack, if necessary by adjusting the engine support.

REFITTING (special notes)

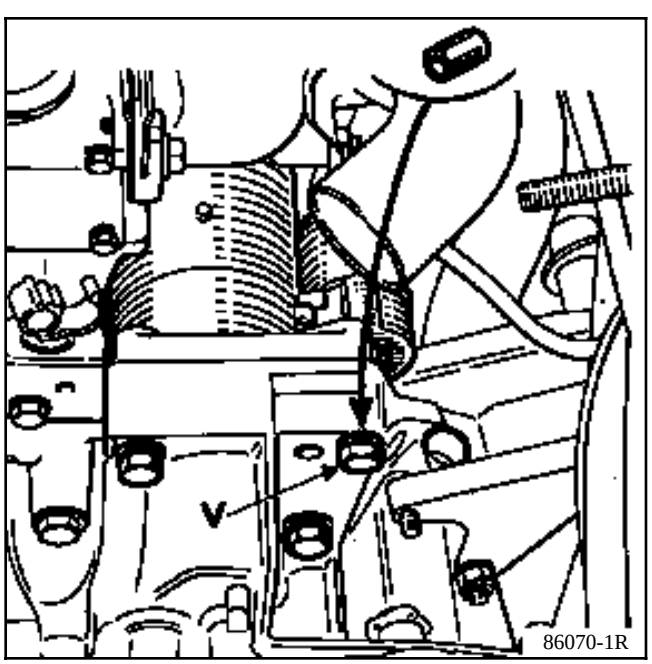
Make sure the engine - gearbox centring rings are present at (C).



Refit the gearbox.

Make sure the centring rings are refitted correctly on the engine side.

IMPORTANT: Correctly fit bolt (V) and the starter motor centring dowel.

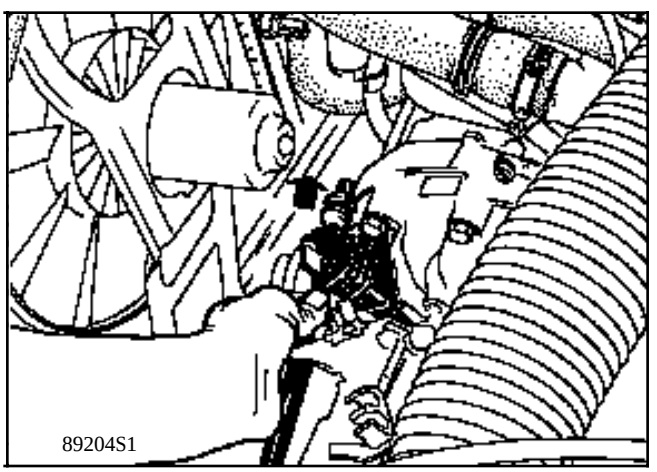


Use the component jack to reposition the engine and transmission assembly in order to refit the front left hand engine mounting.

Refitting is the reverse of removal.

Pull on the cable at the clutch fork on the gear-box.

The cable must have a minimum of **3 cm** of slack



These checks allow the correct operation of the clutch wear automatic compensation system to be checked.

Tighten the nuts and bolts to the recommended torque

Fill the gearbox.