Vehicle type	Engine	Manual gear box	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Ratio
X063	C3G	JB1	1239	74	72	9,2

Engine repair manuals for reference : Fascicule MOT. C.

When removing the engine, the engine - gear box assembly must be removed.

SPECIAL TOOLING REQUIRED	
Mot. 1014	Pressure gauge

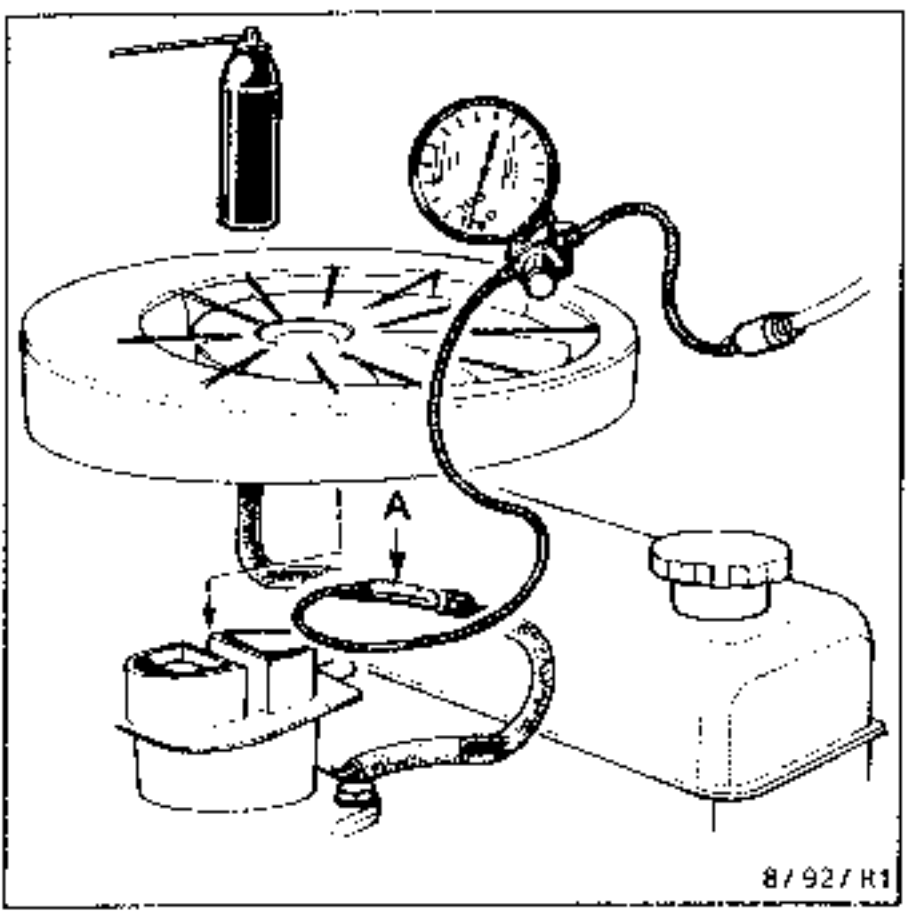
CONSUMABLES	
Gas leak detector product	77 11 143 071

Detecting external oil leaks is made easier by putting the oil in the engine under pressure and spraying a "gas leak detector product" onto the area where the leak is thought to be.

CONNECTION

On the oil vapour rebreathing circuit : (allows checking of the engine volume which is not under oil pressure).

Connection example :



Pressure gauge **Mot. 1014** used with socket end (A) for connection to the oil vapour rebreathing circuit.

METHOD :

NEVER ALLOW THE PRESSURE TO EXCEED 80 MILLIBARS.

If this pressure is exceeded, the lip seals invert.

Unscrew the pressure gauge **Mot. 1014** release valve screw completely before connection to the rebreathing circuit.

Increase the pressure slowly to **80 millibars** and check :

- sealing at the filler plug and the dipstick,
- any air leaks in the air inlet circuit (rebreathing circuit not plugged).

Spray the leak detector product in large quantities over the suspected area and look for the formation of soapy bubbles.

NOTE :

In certain cases, surrounding components may have to be removed.
Example : engine flywheel protective plate.

This operation may also be carried out on the engine when it has been removed from the vehicle.

If this operation is carried out after a repair, wait fro the sealing paste to harden, and test for a short period only to avoid pushing the sealing paste out.

CHECKING METHOD

An engine may consume **1 litre** every **1 000 km** (625 miles).

Check there is no external oil leak.

To ensure the test is accurate, certain conditions must be observed when draining the engine oil :

- the engine must be warm,

- the dipstick and filler plug must be removed.

Drain the oil from the engine, letting it drip out for at least **15 minutes**.

Refit the drain plug and "seal" it (spot of paint covering the plug and sump) so that you can check at a later date whether the plug has been removed.

Use a measuring cylinder to check the amount of oil required to fill the engine.

C3G engine : 3 litres

Refit the filling plug and seal it.

Ask the driver to return the vehicle after completing **1 000 km (625 miles)** having noted the oil level using the dipstick at regular intervals.

When the vehicle is returned, check the filling plug and drain plug have not been tampered with..

The same conditions must be observed as before:

- the engine must be warm,

- the dipstick and filler plug must be removed.

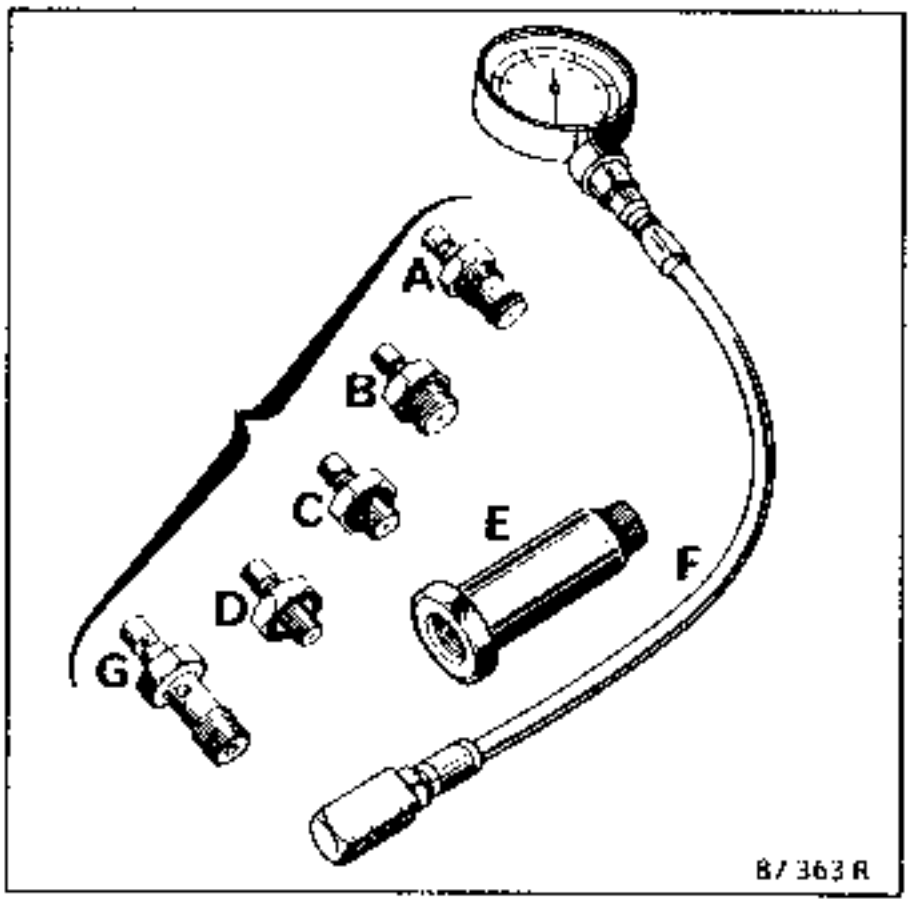
Drain the oil and use the measuring cylinder to check how much oil is collected.

Calculate the oil consumption in litres for **1 000 km** if the distance covered is different.

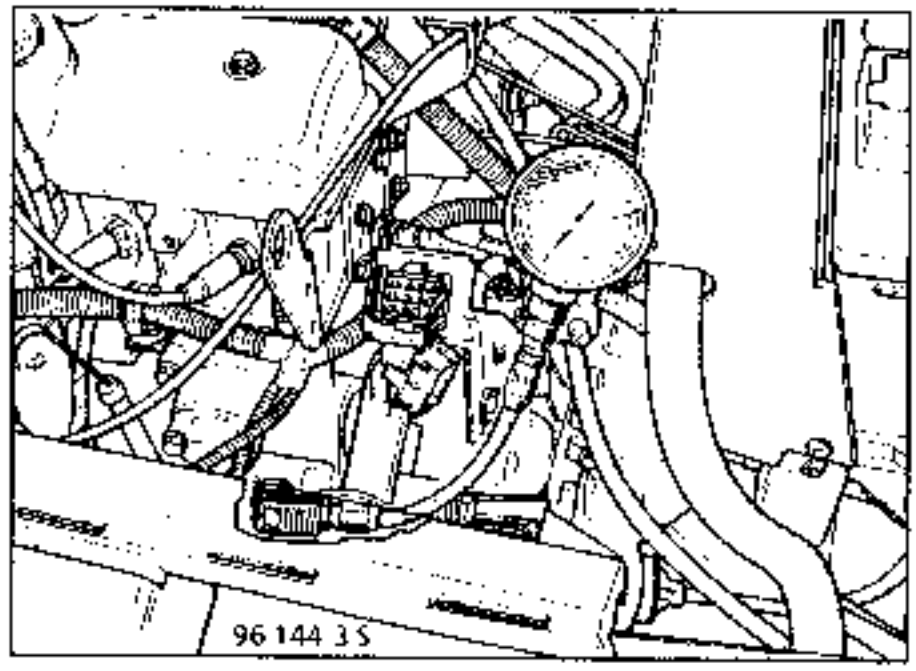
CHECKING

SPECIAL TOOLING REQUIRED		
Mot.	836 -05	Oil pressure measuring kit
Mot.	836 -06	Complete set of unions

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



USE:
- **C3G Engine E + C + F**



Checking:

Min oil pressure at **80°C** :		
– at idle speed	0,7	bar min
– at 4 000 rpm.	3,5	bars min

SPECIAL TOOLING REQUIRED		
B. Vi.	31 -01	Roll pin punch
T.Av.	476	Ball joint extractor
Mot.	1202	Rubber collar clamp

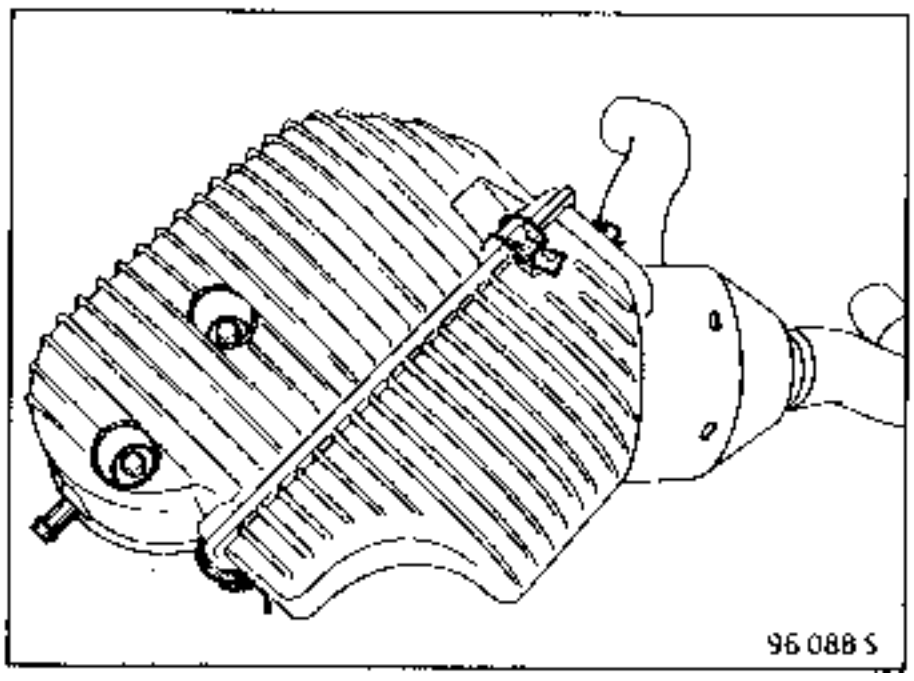
TIGHTENING TORQUES (in daN.m)	
Brake caliper mounting bolt	10
Shock absorber base mounting bolt	11
Track rod end	3,5
Lower ball joint nut	6,5
Driveshaft gaiter mounting bolt	2,5
Wheel bolts	9
Engine mounting to rear strut bolts	9,5
Front rubber mountings to side members bolts	6

REMOVAL

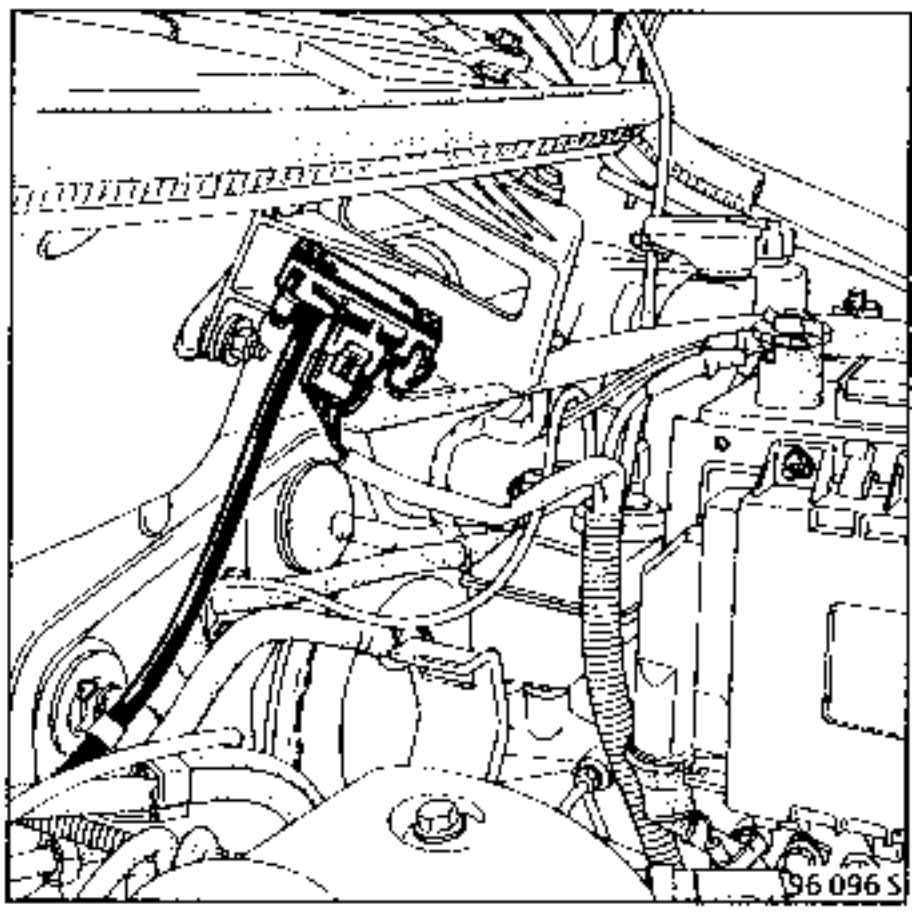
Put the vehicle on a 2 post lift

Disconnect the battery.

Remove the air filter assembly.

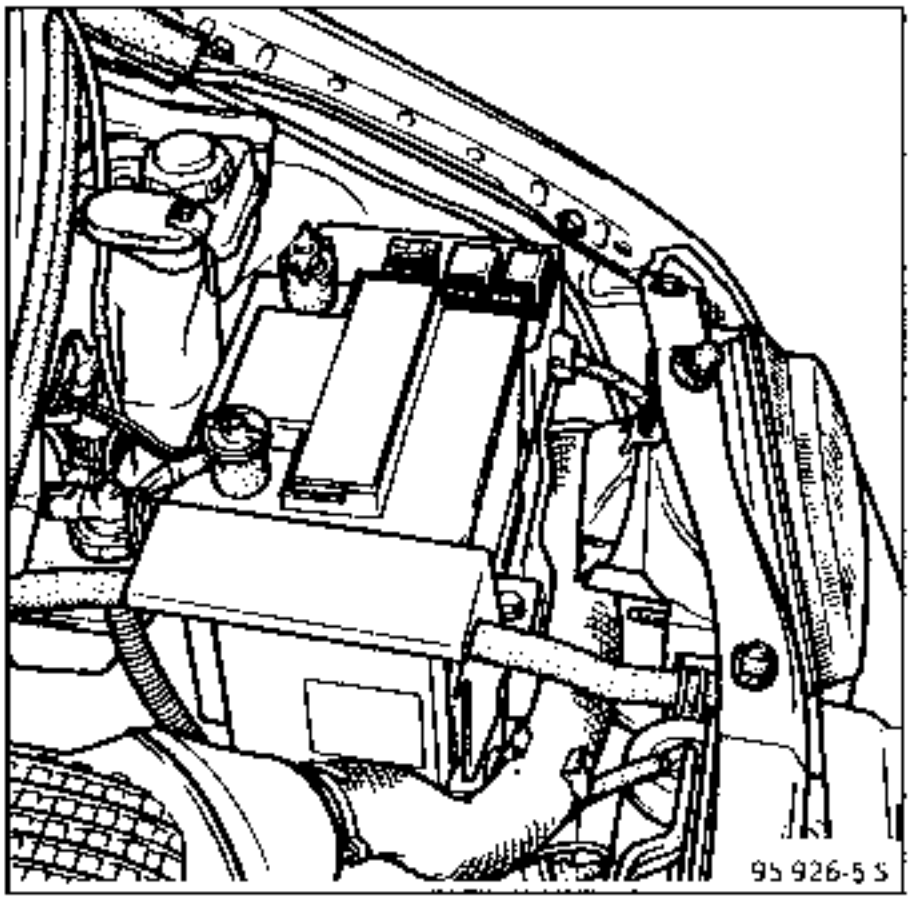


- Disconnect the absolute pressure sensor connector and pipe.



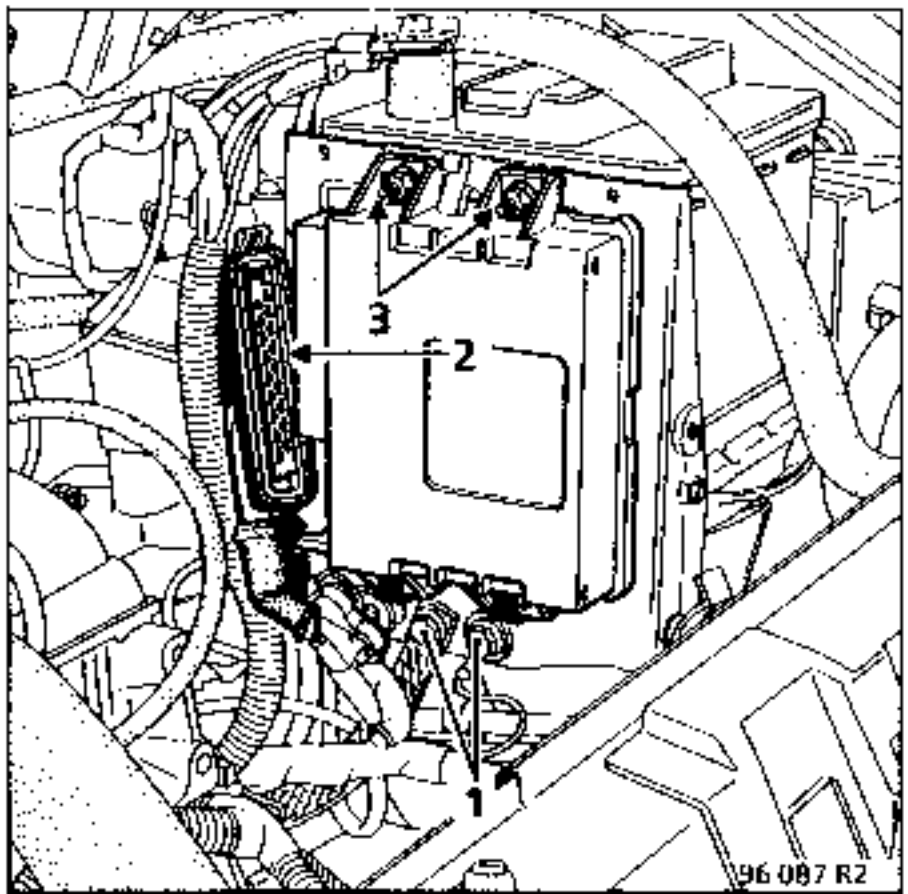
Disconnect:
- the master vac pipe,
- the oxygen sensor connector,
- the clutch cable,
- the accelerator cable,
- the coil HT cable and connector,
- the fuel pipes on the throttle body.

Disconnect the engine connector in the connection unit next to the battery.



Remove:
- the two injection relays and use a small screwdriver to unclip and remove the relay plate,
- the injection computer (3)

Disconnect:
- the connector (2),
- the two earth straps under the computer at (1).



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

Drain the gear box.

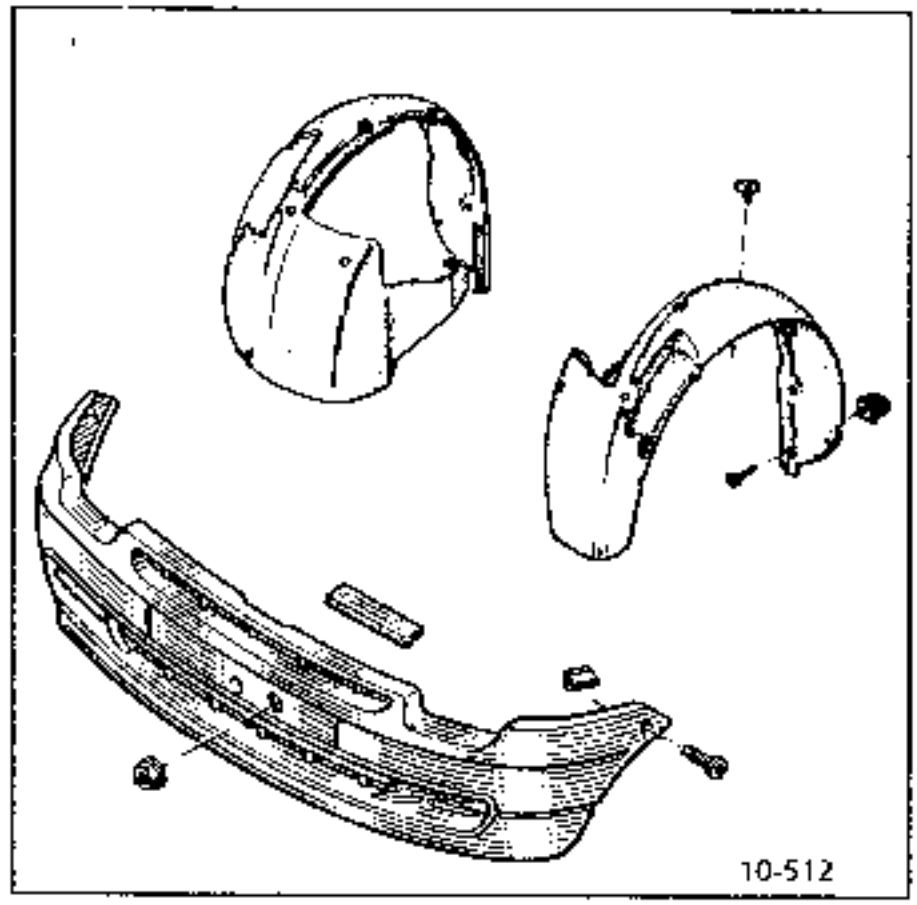
Release the gear selection control from the gear box side.

Remove the exhaust flange.

Disconnect the exhaust and attach it to the body with the gear selection control.

Drain the cooling circuit from the cylinder block screw, timing side.

Remove:
- the heating hoses from the water pump,
- the hose from the expansion bottle on the radiator,
- the bumper and wing protectors.



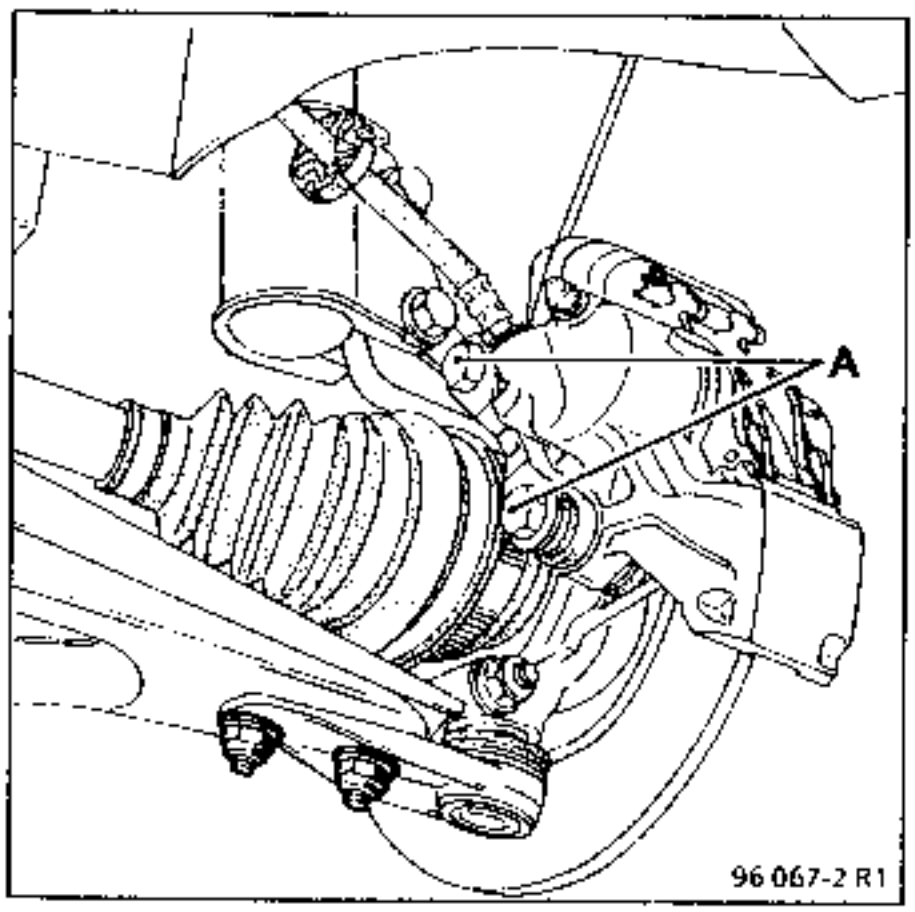
Remove:
- the headlights,
- the front right hand side indicator repeater,
- the earth bolt.

Disconnect the wiring.

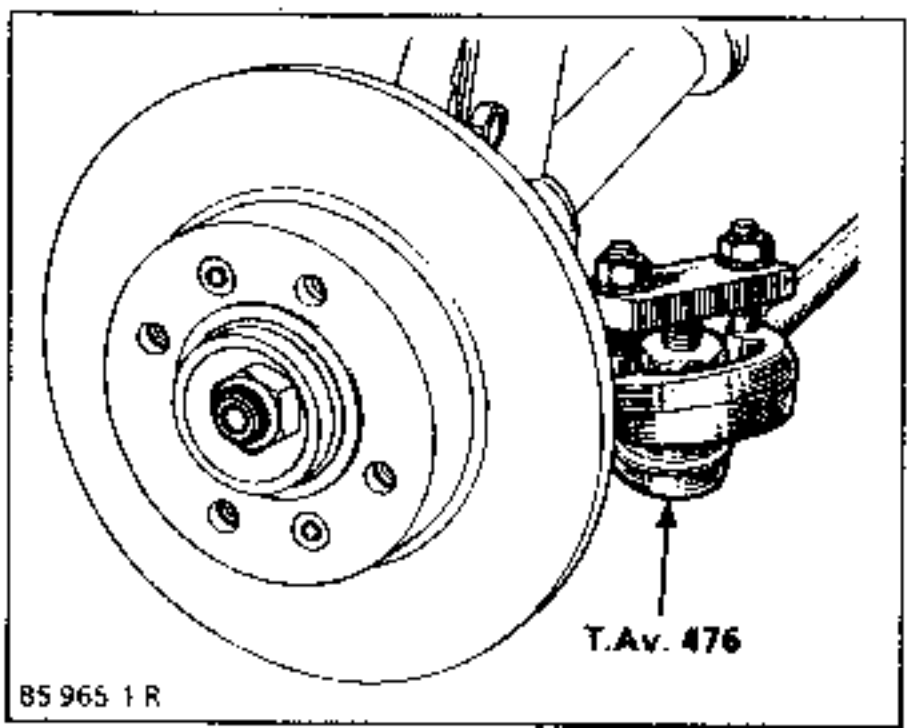
Remove the bonnet lock and disconnect the cable.

Left hand side

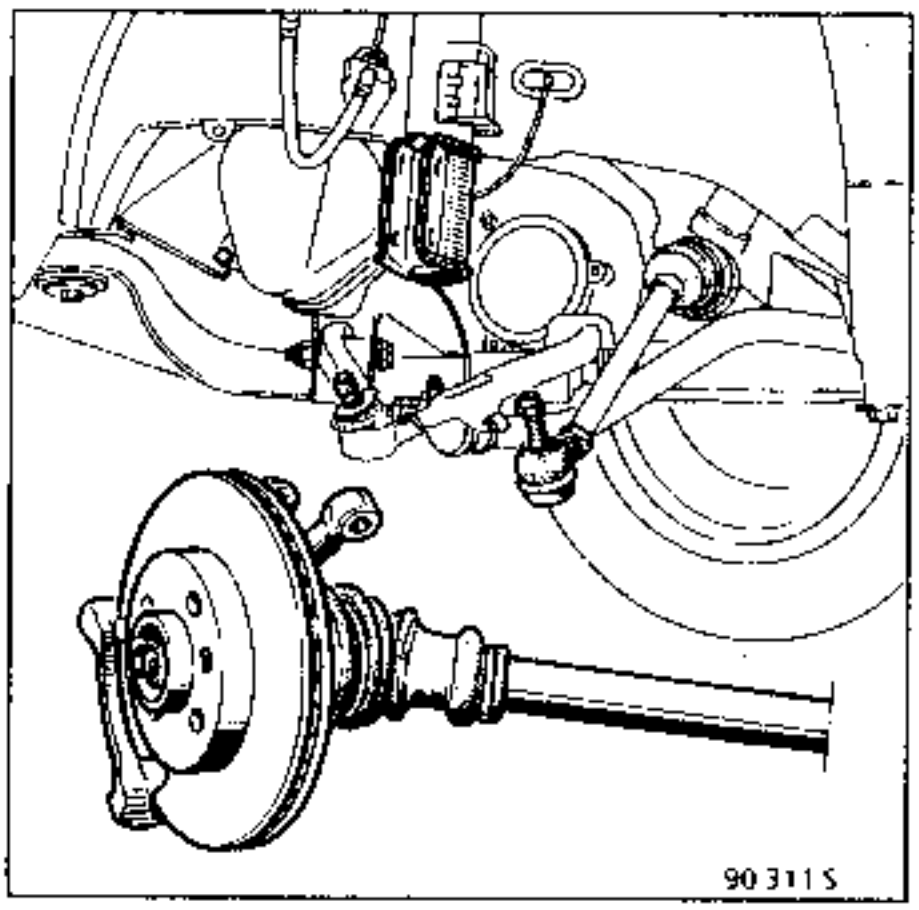
Remove:
- the front left hand brake caliper bolt (A) suspend the caliper from the body.



- the track rod end using extractor **T. Av. 476,**

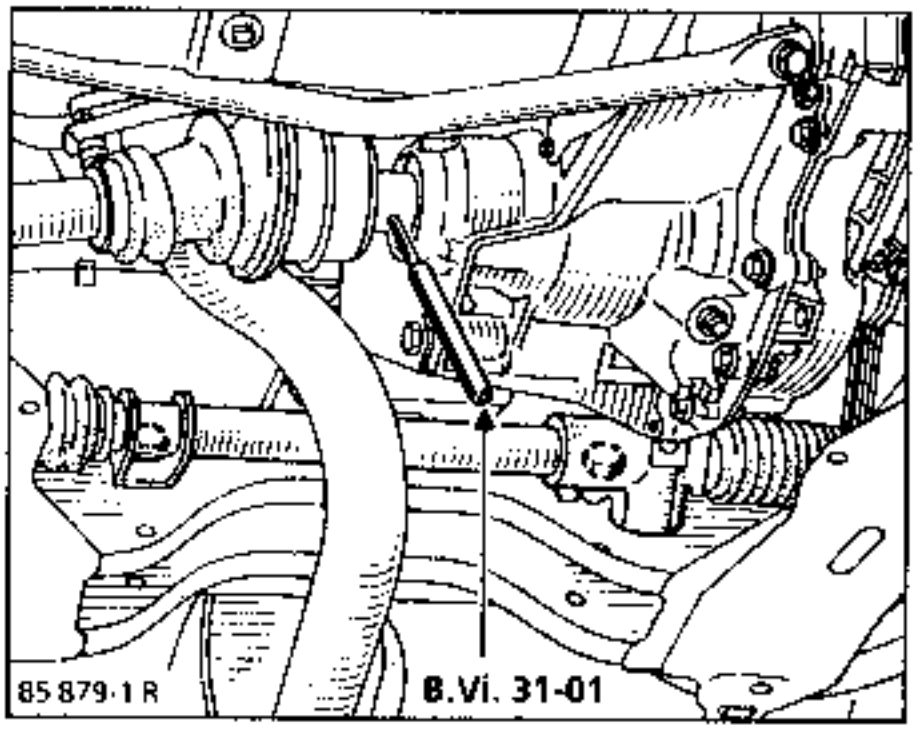


- the three gaiter bolts,
- the shock absorber base bolts and the lower ball joint,
- the stub axle carrier and driveshaft assembly, protecting the spider.

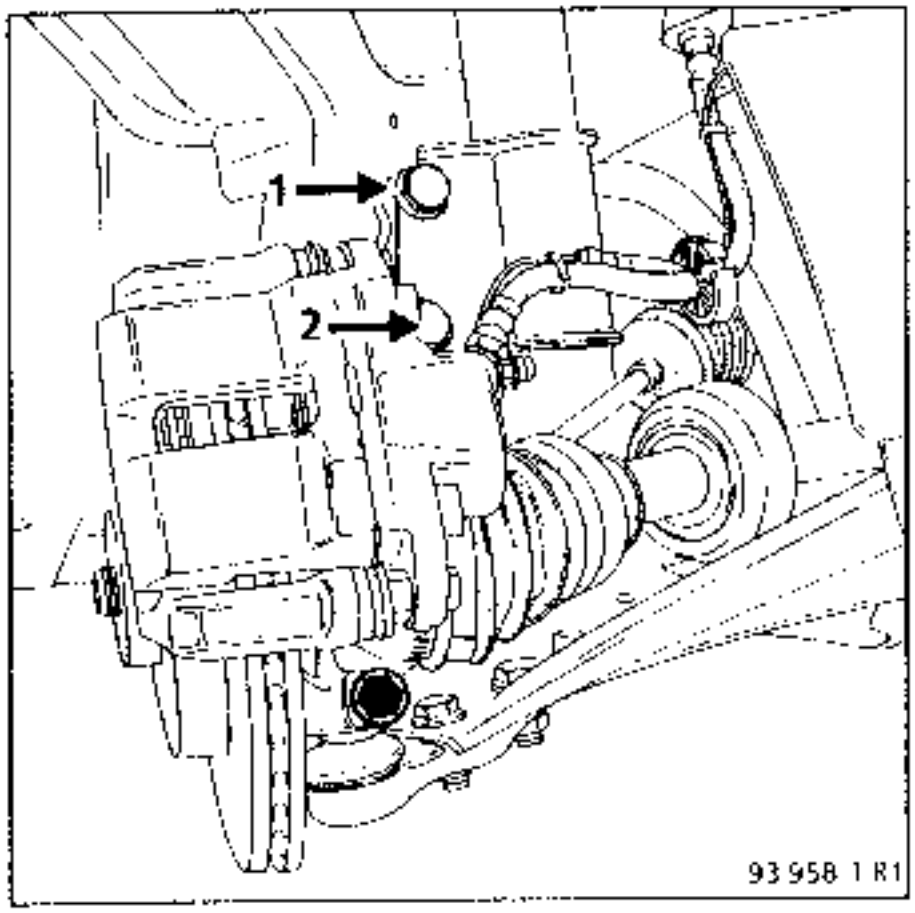


Right hand side

Remove:
- the driveshaft roll pin using punches **B.Vi. 31-01**



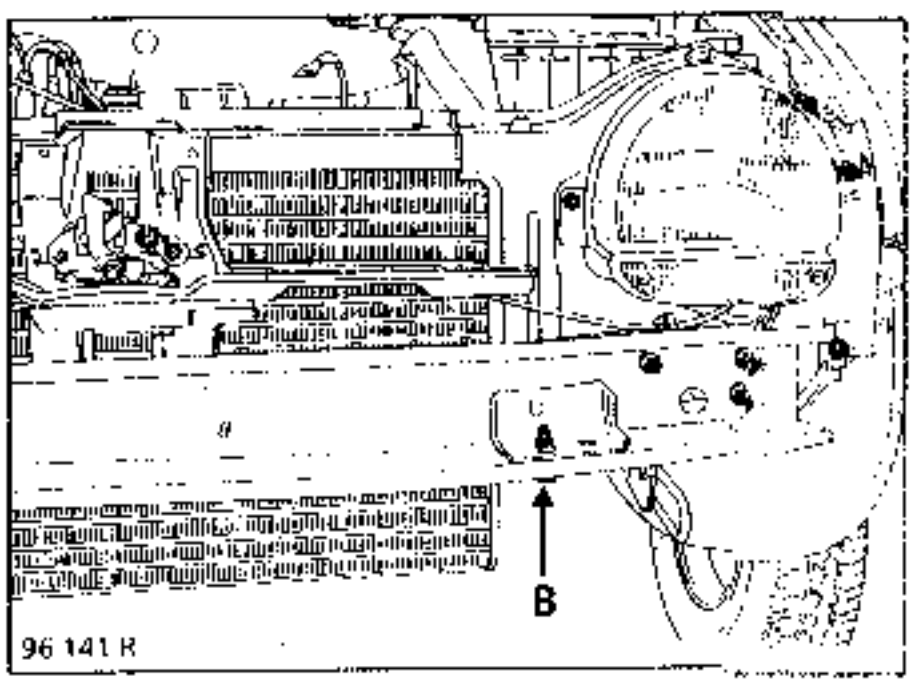
Remove:
- the front right hand brake caliper and suspend it from the body,
- the upper bolt (1) and loosen bolt (2)



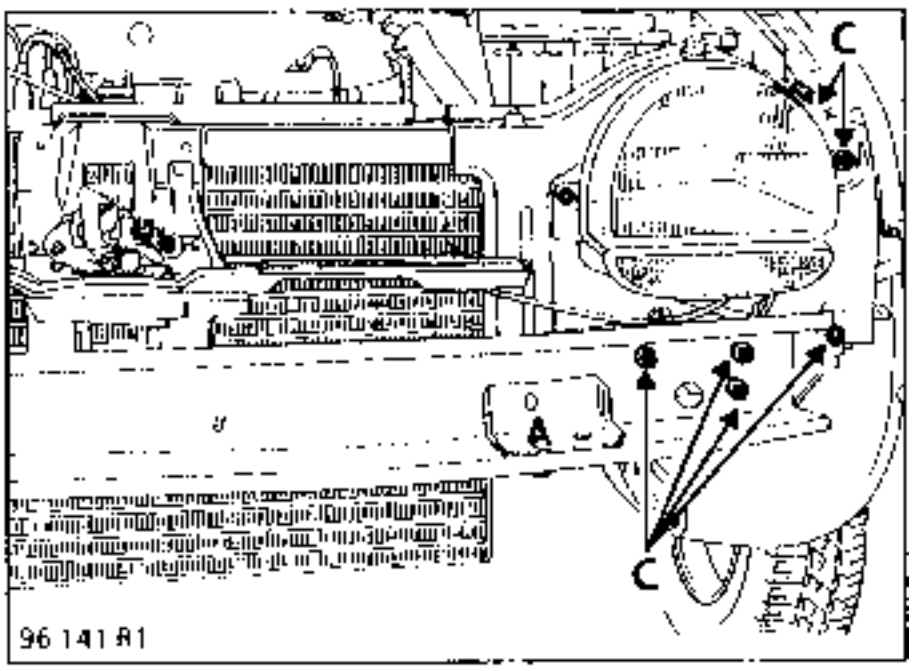
Tilt the stub axle carrier and remove the driveshaft.

Disconnect the canister pipes
(Mot. 1265)

Remove:
- the radiator mountings at (B) and remove the radiator.



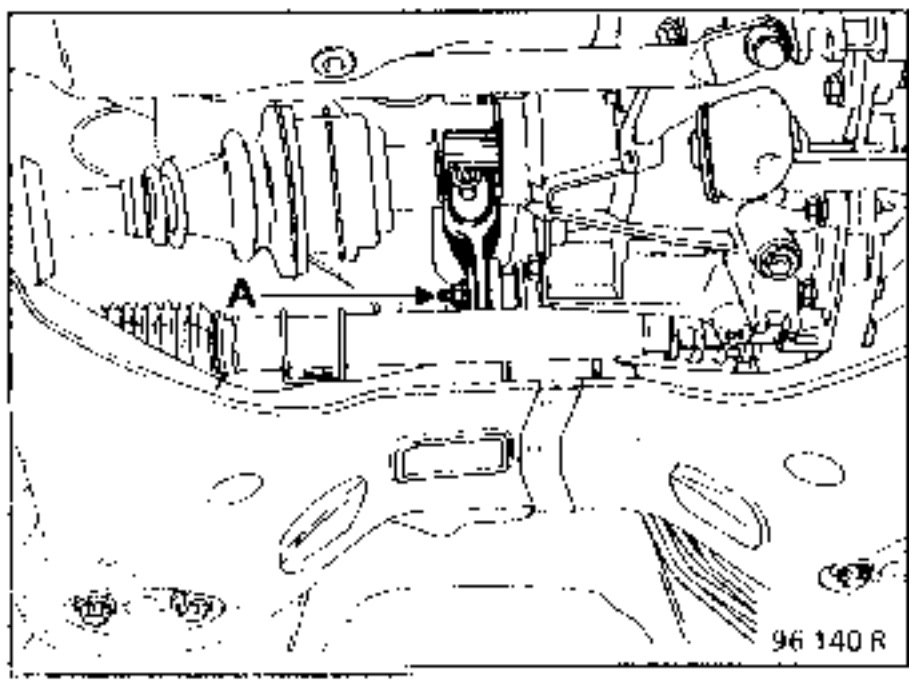
- the headlight support plate (C),



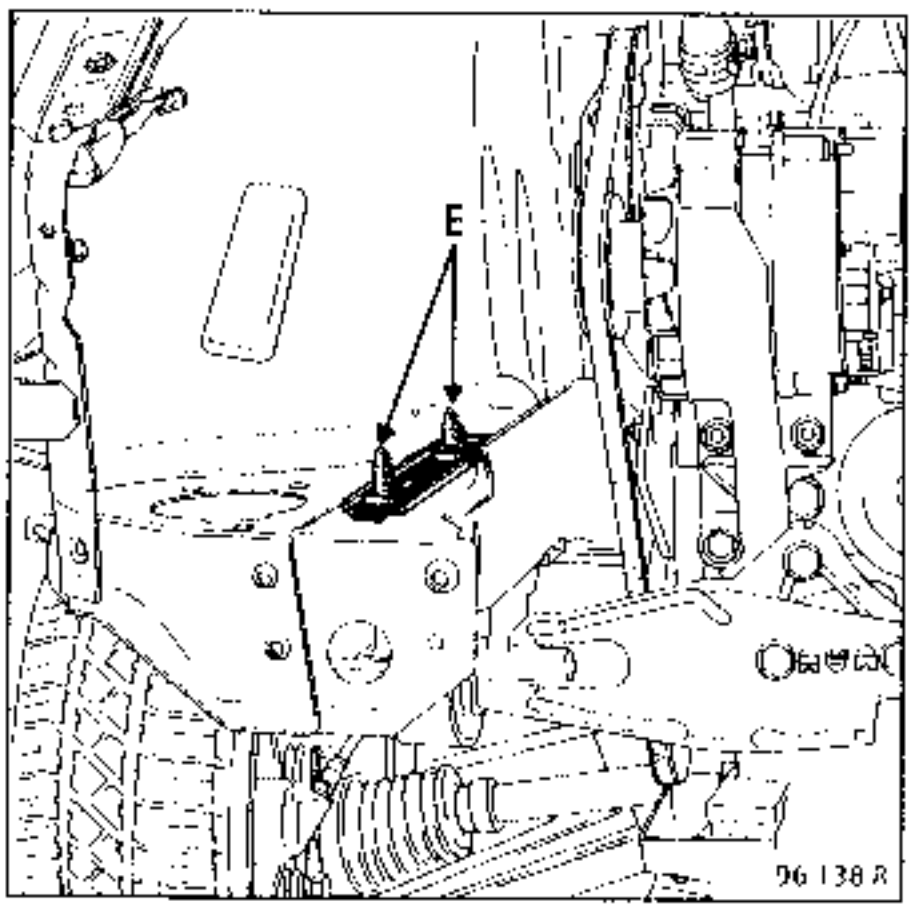
At this stage in the removal operation, the engine - gear box assembly is resting on two points of rotation (engine and gear box mountings).

Attach a workshop crane with the load distributor.

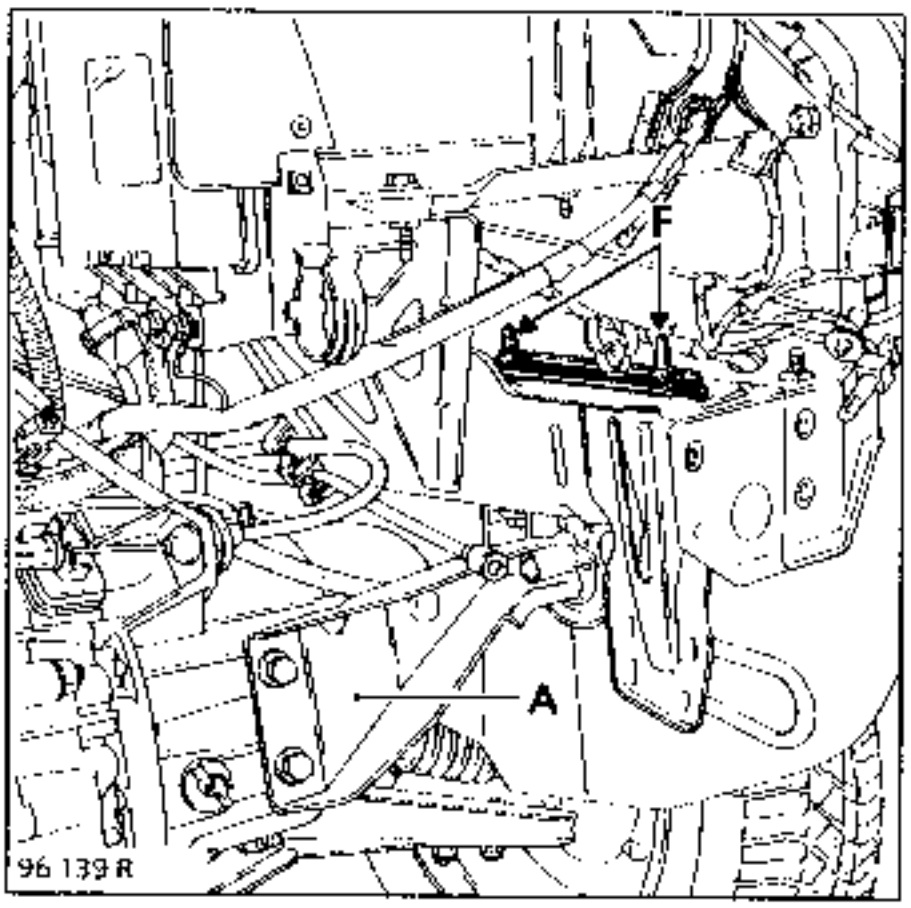
Remove the rear gear box mounting at (A).



Remove:
- the engine mountings at (E) .



- the mountings at (F), gear box side



Remove the engine - gear box assembly

Remove support (A).

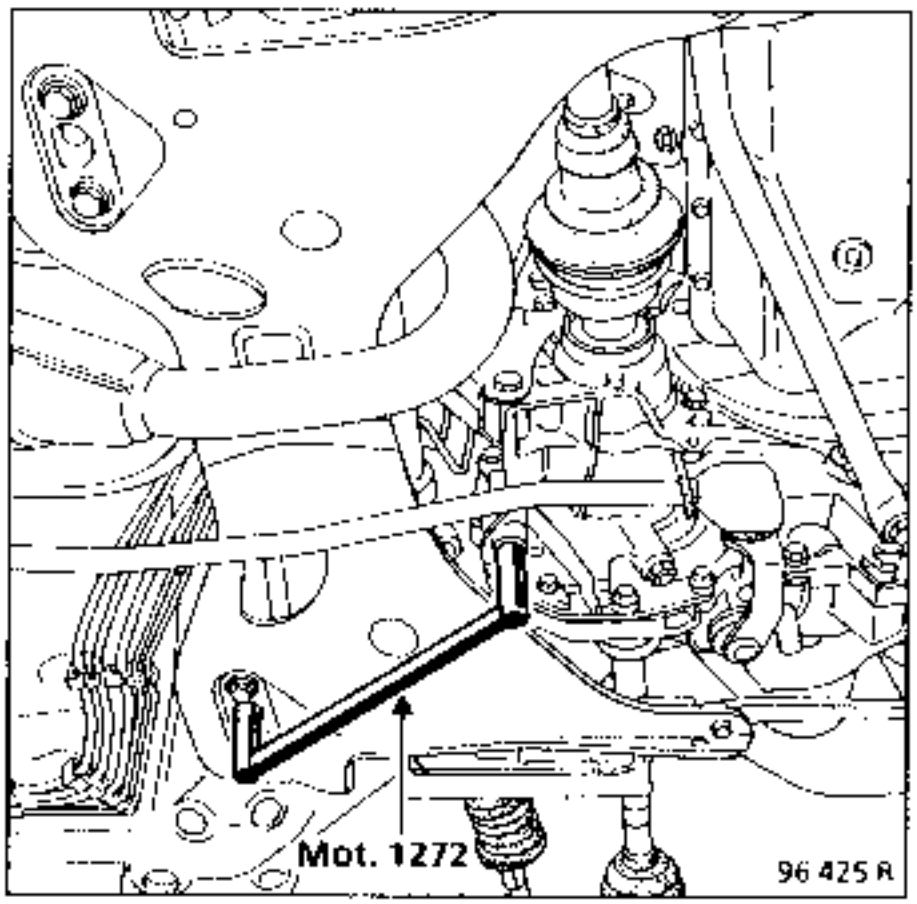
REFITTING - Special notes

We draw your attention to the importance of correct positioning of the engine - gear box assembly in the engine compartment.

Position the engine and gear box assembly in the engine compartment but do not compress the engine mountings.

Fit the bolt in the rear engine mounting.

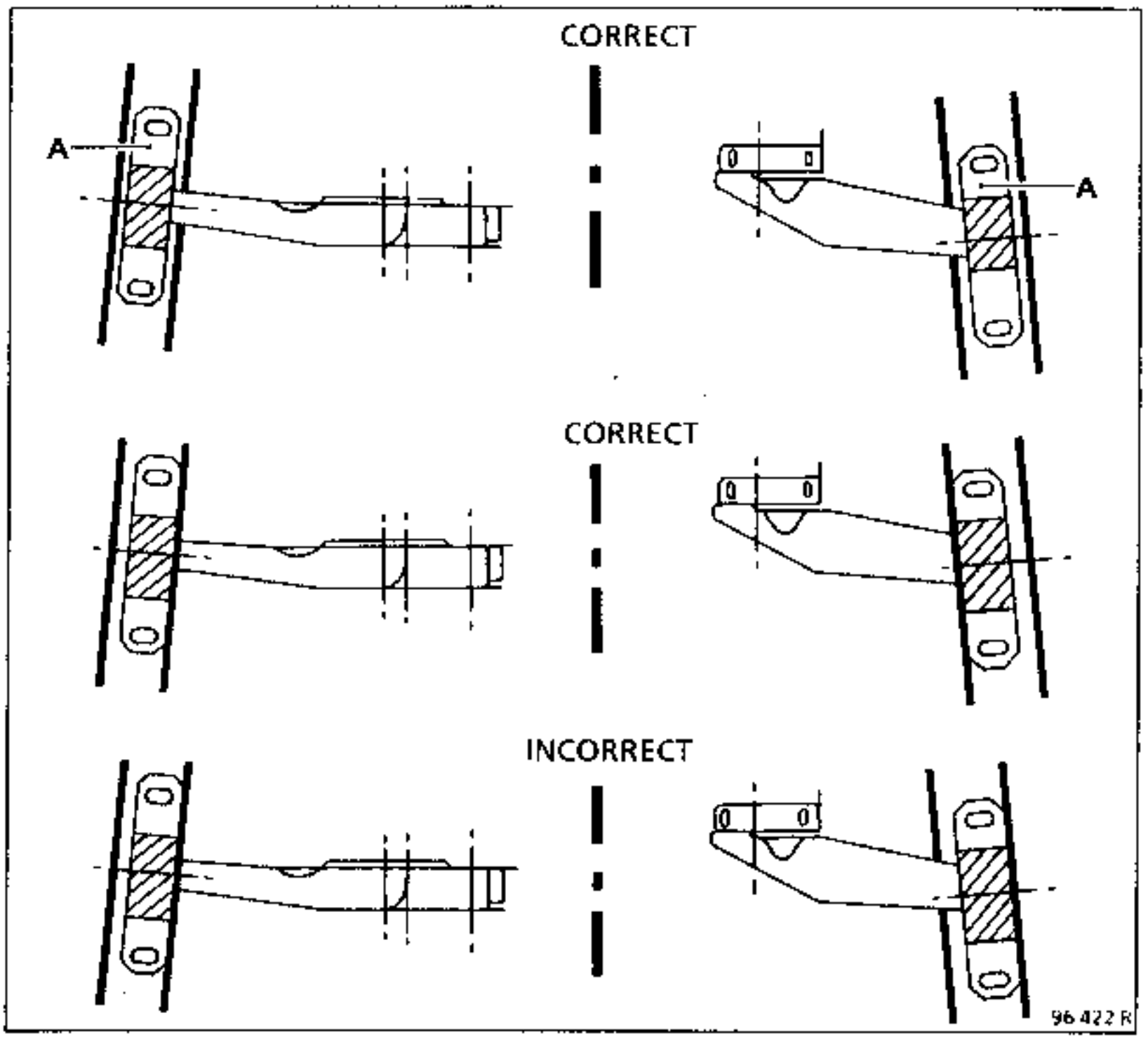
Using tool **Mot. 1272** position the engine - gear box assembly in relation to the guide hole in the left hand side of the rear engine mounting and the clutch housing guide hole.



FRONT RUBBER MOUNTING PADS

Support the engine - gear box assembly so that the upper surface (A) just touches the bottom of the side member

Ensure the engine is correctly centred in the front section by comparing the positions of sections (A) on the left and right hand side members



Torque tighten the rear mounting pad.

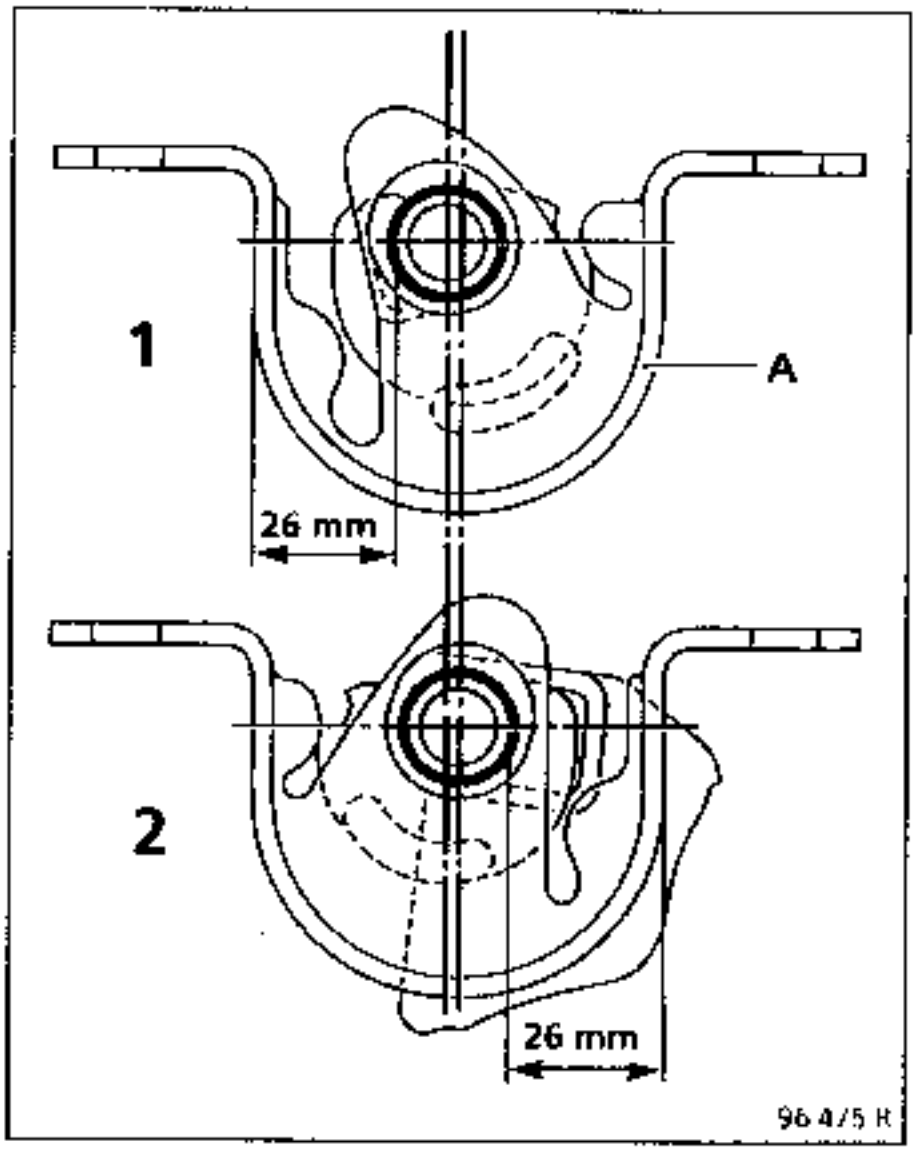
CHECKING

In order to check the engine and gear box assembly is correctly positioned, measure the two dimensions indicated with the engine no longer supported by the engine supports

If this measurement is not correct (**26 mm ± 1**), mark the actual position on the side member.

If the measurement is less than 25 mm, loosen the front support in question and push on section (A) to move it back. Retighten. Check the measurement again and repeat the operation if necessary.

If the measurement is over 27 mm, carry out the same operation, but move section (A) forwards.



1 Front right hand engine mounting
2 Front left hand engine mounting

Tighten the 4 bolts to the recommended torque ensuring that parts (A) are not moved during the tightening operation and that they remain parallel to the vertical face of the side member.

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

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

Apply **CAF 4/60 THIXO** to the drive shaft roll pin holes.

Adjust the accelerator cable.

Fill:
- the gear box with oil,
- the cooling circuit with coolant and bleed the circuit (see section 19).

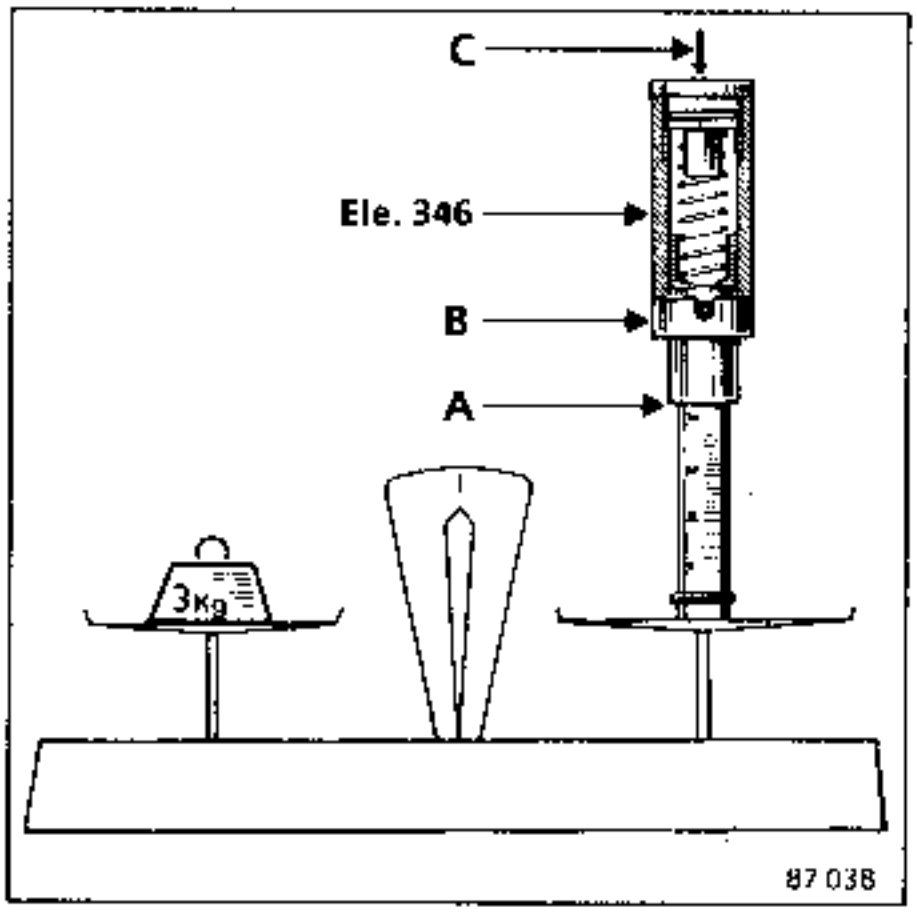
SPECIAL TOOLING REQUIRED		
Elé.	346-04	Belt tension tester
Elé.	346-05	Belt tension testing bar
B. Vi.	906	Force measuring tool

CALIBRATION OF TOOL Elé. 346

Two methods :

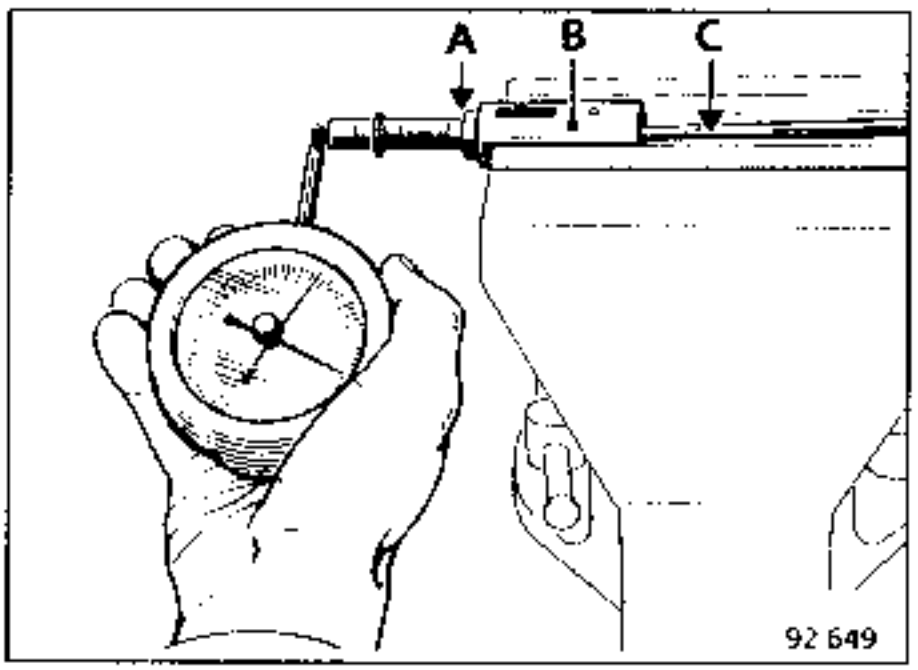
The calibration of tool Elé. **346** must be checked before it is used for the first time (new tool) and periodically thereafter.

1st method:



Apply a force of **3 daN** (**3 kg** weight) to the tool. Shoulder (A) should touch the body of the spring section (B), otherwise turn screw (C) to increase or decrease the tool setting.

2nd method:



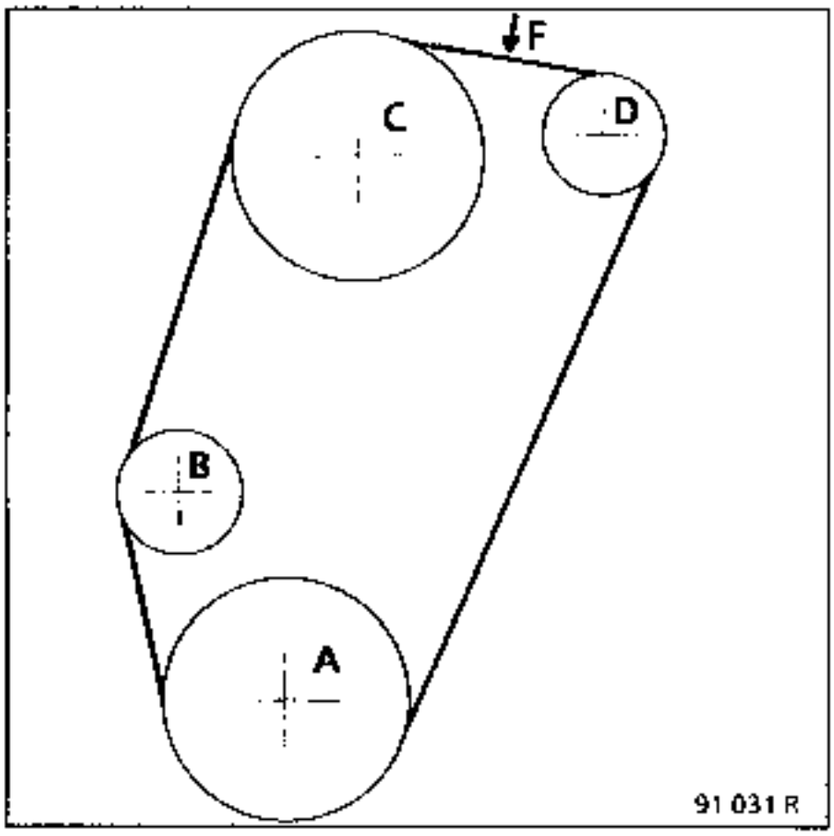
Fit tool Elé. **346** into a vice having remove the plug. Push the cylindrical section of the tool **B. Vi. 906** against the sliding section. Shoulder (A) should touch the body of the spring section (B) when the needle indicates **3 daN**, otherwise turn screw (C) to increase or decrease the tool setting.

CHECKING TENSION

C ENGINE FITTING

Flexing movement (F) : **2 ± 0,5**

Check new belt after **10 minutes** rotation.



A Crankshaft pulley
B Tensioner wheel
C Water pump pulley
D Alternator pulley

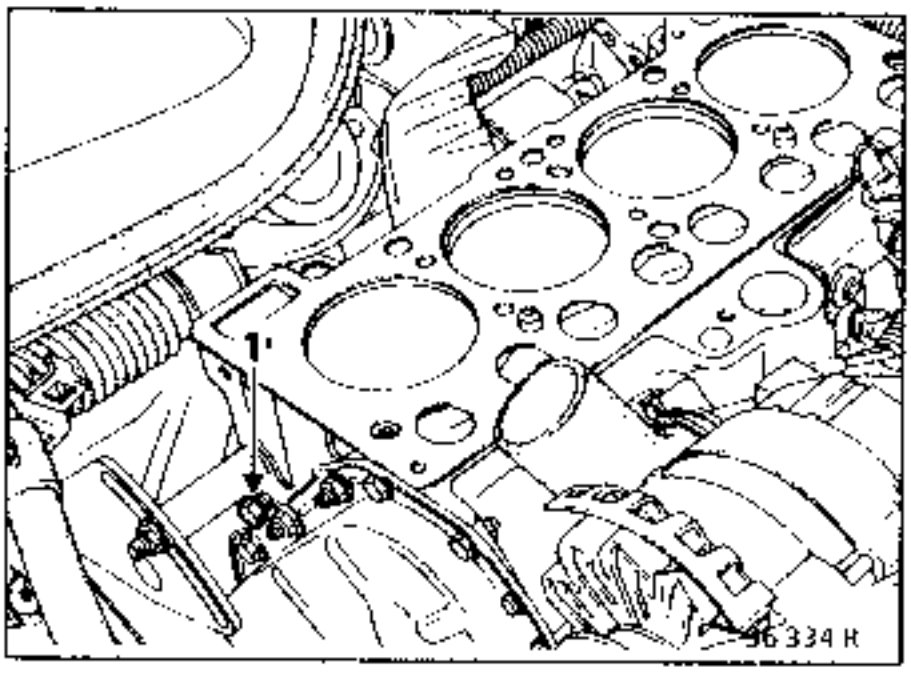
SPECIAL TOOLING REQUIRED		
Mot.	104	Pins for centring the gasket on the cylinder head
Mot.	521-01	Liner sleeve retainer and compression plate
Mot.	591-04	Angular wrench for tightening cylinder head bolts
Mot.	591-02	Magnetic pipe for head bolt angular wrench
Mot.	1 202	Collar pliers

TIGHTENING TORQUES (in daN.m)	
Cooling circuit drain plug	1,2
Tension wheel bolt	4,2
Tension wheel nut	2

Disconnect the battery.

Remove:
- the air filter,
- the fuel pipes,
- the wiring on the throttle body,
- the alternator drive belt,
- the exhaust down pipe mountings,
- the distributor.

Drain the cooling circuit from the drain plug (1) in the cylinder block.

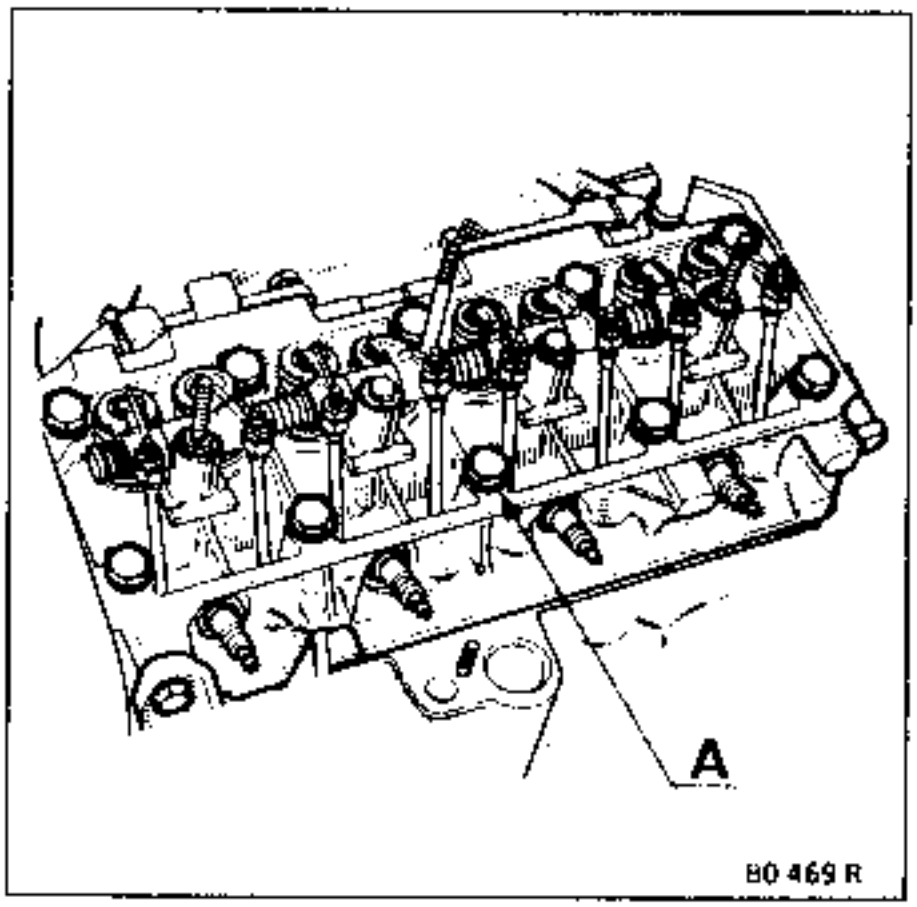


Remove:
- the upper radiator hose,
- the rocker box cover,
- the rocker push rods,
- the cylinder head bolts except for bolt (A).

The cylinder head centring pins located under the central bolt (A) on the timing side.

Leave this bolt until the cylinder head is to be removed

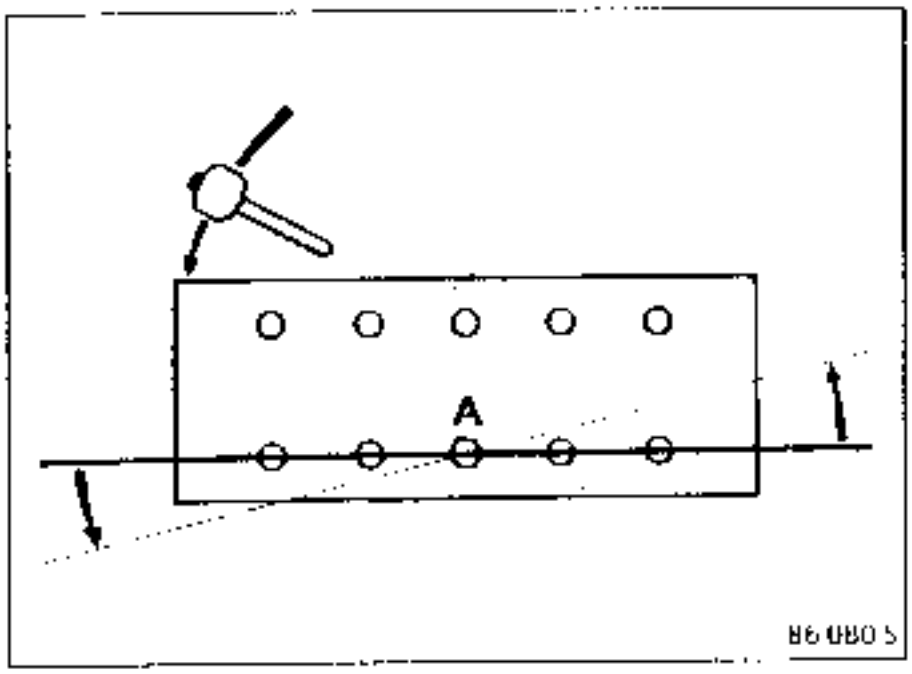
Remove the other bolts.



Since the cylinder head gasket is stuck to the cylinder head, the cylinder block and the liners, it is very important not to lift the cylinder head which would separate the liners from their bases and lead to the ingress of foreign bodies.

The cylinder head must be rotated around the centring pin (cylinder head mounting bolt left in place) to release the gasket from the cylinder block.

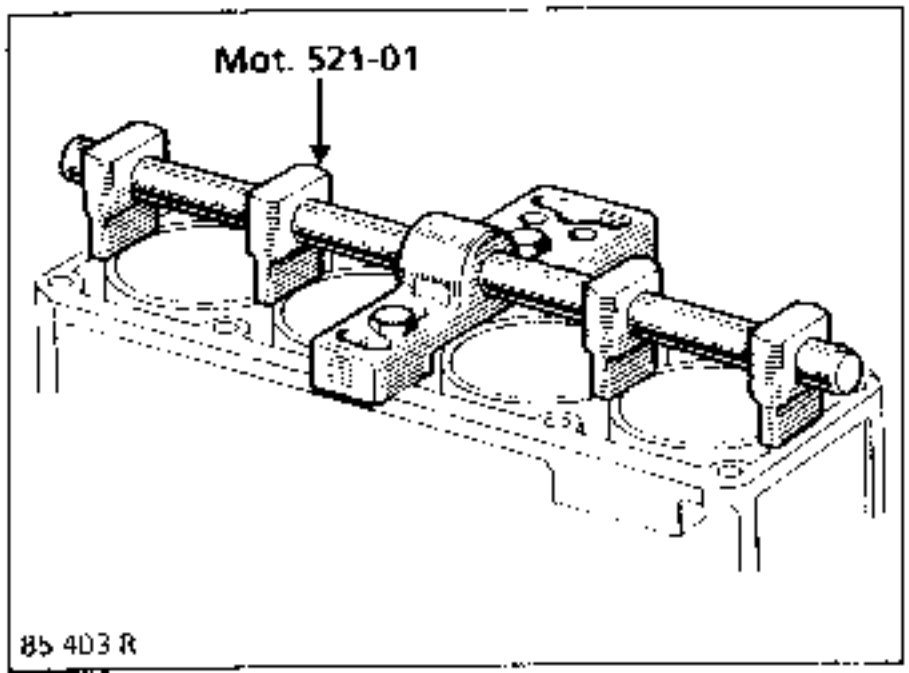
Release the cylinder block by tapping the ends with a hammer in a horizontal rotation direction .



Remove the mounting bolt (A).

Remove the cylinder head.

Fit the liner retaining tool **Mot. 521-01**



CLEANING

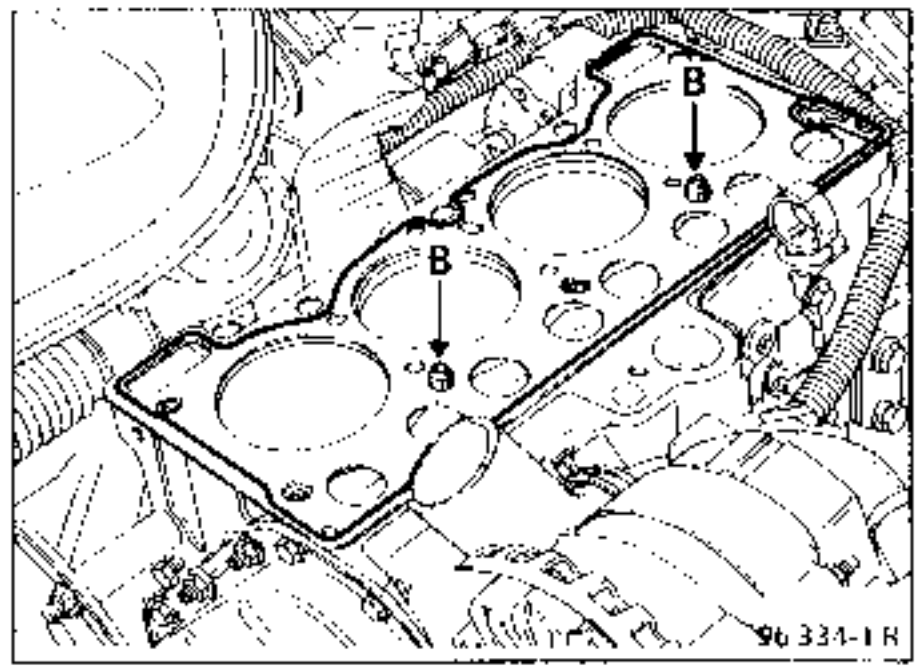
It is very important not to scratch the sealing surfaces of parts in aluminium.

Use a **Décap joint** seal removing product to dissolve any part of the seal which is still stuck to the metal

Apply the product to the areas to be cleaned: wait for approximately 10 minutes then remove the waste with a wooden spatula.

REFITTING

Fit the cylinder head centring pins **Mot. 104** at (B)



Refit the cylinder head.

METHOD FOR TIGHTENING THE CYLINDER HEAD

This operation should be done when the engine is cold, after replacing the cylinder head, and should not be carried out later.

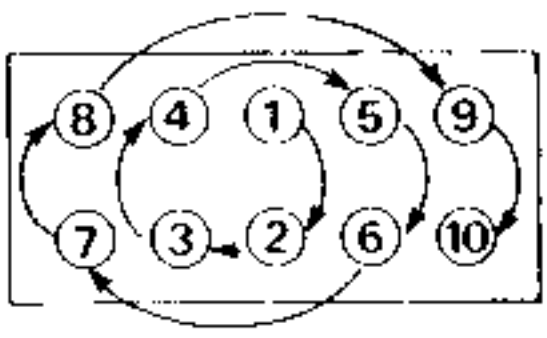
Reminder:

In order to ensure the bolts are tightened correctly, remove any oil in the cylinder head mounting holes using a syringe

Use engine oil to grease the threads and under the heads of the mounting bolts.

Tighten in the recommended order :

1st tightening : **2 daN.m**
Wait **3 minutes** minimum, to allow the gasket to settle.



81 528-1 5

Final tightening:

1) loosen the bolt marked 1 (all the other bolts remain tight),

2) torque tighten the bolt marked 1 to **2 daN.m ± 0,3** (all the other bolts remain tight)

3) Angle tighten the bolt to **90° ± 4°** (all the other bolts remain tight)

PROCEED IN THE SAME MANNER FOR THE REMAINING BOLTS MARKED 2 TO 10, IN ASCENDING NUMERICAL ORDER.

Adjust the rockers (mm)

Inlet 0,15
Exhaust 0,20

Refitting is then the reverse of removal.

Fill and bleed the cooling circuit

MISTURA - CARBURAÇÃO
Generalidades

12

CARACTERÍSTICAS E VALORES DE AFINAÇÃO

Veiculo	Motor						Caixa de velocidades	Tipo de injecção
	Tipo	Índice	Diâmetro (mm)	Curso (mm)	Cilindrada (cm^3)	Taxa		
X 063	C3G	700	74	72	1239	9,2/1	BM	Monoponto Magnéti Marelli

Motor	Controlo do ralenti		Combustível	
	Regime (rpm)	Riqueza (CO)	Particularidade	Índice de Octano (mínimo)
C 3G 700	700 ± 50*	VC: 0,3 máx. VL: 0,5 máx.	Gasolina sem chumbo	I.O. 91

* Para uma temperatura de água compreendida entre 80 e 100°C.
VC: valor de controlo
VL: valor legislativo

Tipo de alimentação	Injecção monoponto regulada
Bomba de alimentação imersa, colocada no depósito Tipo: Jaeger	Tensão: 12 volts Pressão: 1, 05 ± 0,05 bars Débito: 50 l/h mínimo
Filtro de gasolina fixo à frente do depósito, sob o veículo	Substituição todos os 50.000 km
Caixa de borboleta monoponto	SOLEX: Ø 32 mm
Regulador de pressão integrado na caixa de borboleta	Pressão: 1,05 ± 0,05 bars (sem afinação)
Injector electromagnético	Tensão: 12 volts Resistência: 1,8 Ω aproximadamente
Motor passo a passo de regulação de ralenti	Sem afinação. Controlo com XR25#12: 2 a 10% em regulação ralenti
Potenciómetro de posição da borboleta	Controlo com XR25#17 Em regulação de ralenti: 9 a 41 Borboleta aberta a fundo: 168 a 235

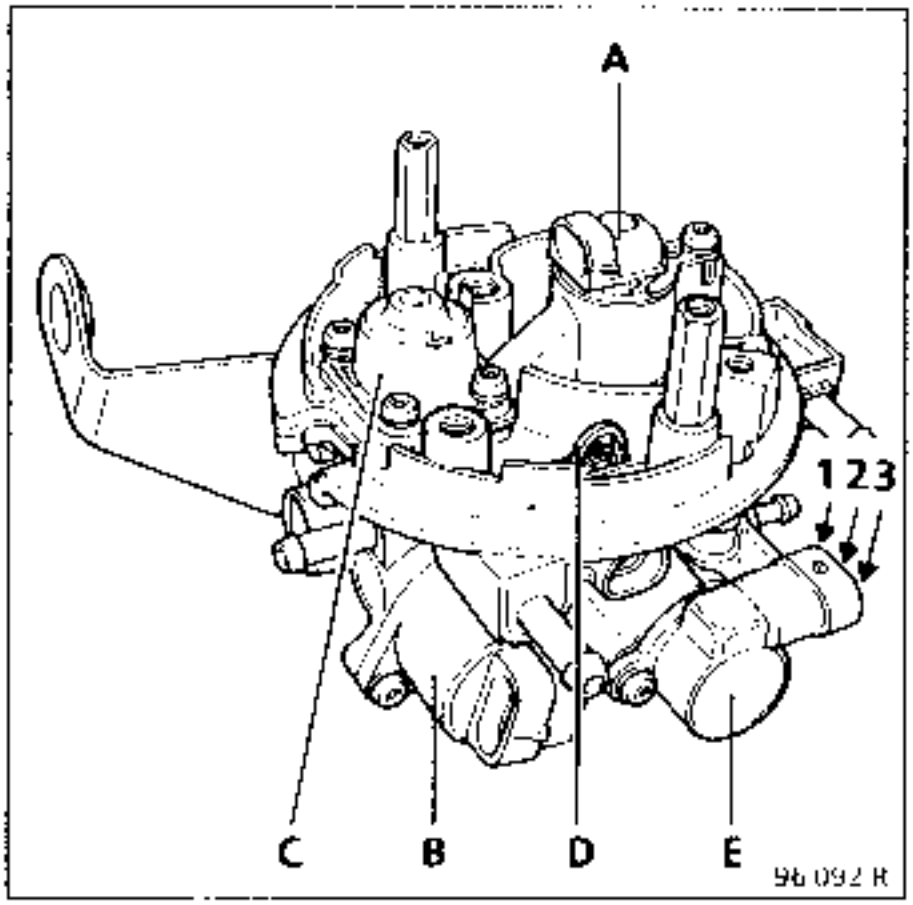
SPECIFICATIONS AND ADJUSTMENT VALUES

Computer	Magneti Marelli N°	Homologation N°	R.N.U R N''
Magnéti Marelli in engine compartment	16085 - 024	77 00 856 784	77 00 864 461

Temperature in °C	0 ± 1	20 ± 1	40 ± 1	80 ± 1	90 ± 1
Air temperature sensor Type - CTN M Marelli Resistance in Ω	8770 to 10720	3370 to 4120	1440 to 1760	– –	– –
Coolant temperature sensor Type - CTN Siemens. Resistance in Ω	– –	3060 to 4045	1315 to 1600	300 to 370	210 to 270

AC Rochester oxygen sensor	at 370°C - Rich mixture : ≥ 800 mV - >Poor mixture : 0 to 200 mV
Catalytic converter (under floor)	◇ C26
Paper cartridge air filter Thermostat control from 26 to 36 °C	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system : Canister	CAN 13
Ignition	Advance and power circuit integral in injection computer - Ignition coil - External advance correction
Plugs	BOSCH W9DC NGK BP5ES2 Gap: 0,9 ± 0,05 mm (adjustable)

SYSTEM COMPONENTS



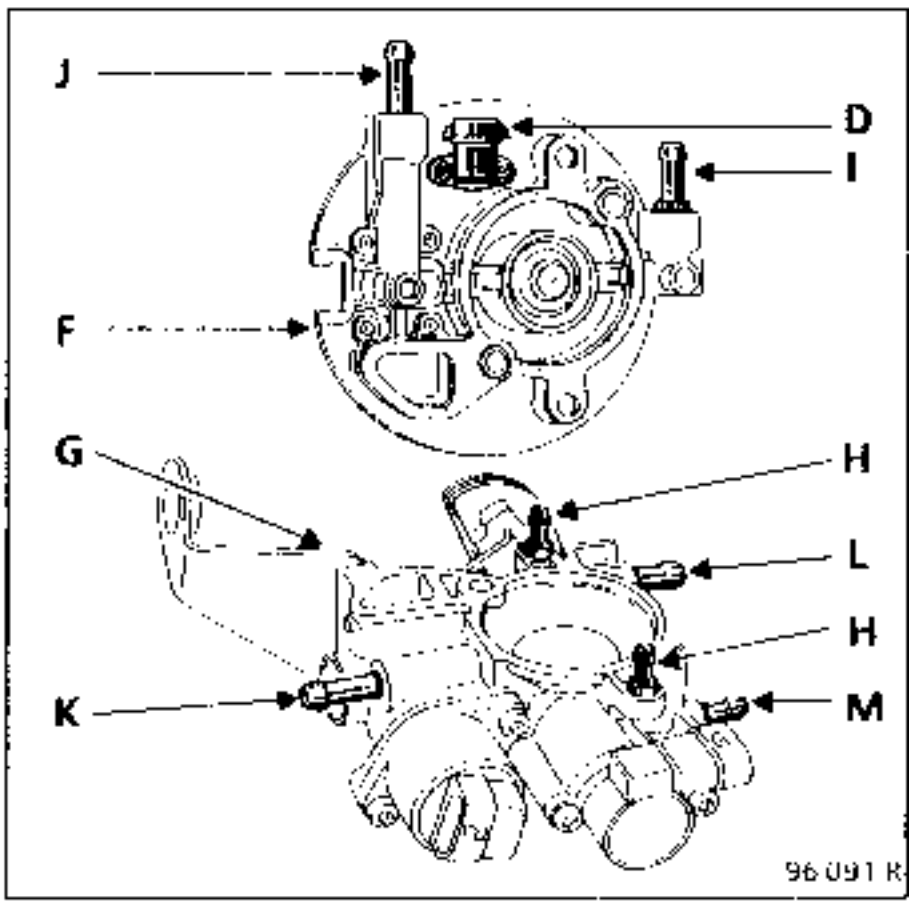
A : Injector

B : Idle speed regulation stepping motor

C : Fuel pressure regulator

D : Air temperature sensor

E : Throttle position potentiometer
1 : Signal output
2 : Feed
3 : Earth



F : Fuel section - injector body

G : Air section - throttle body

H : Connections joining the two sections

I : Fuel inlet

J : Fuel return

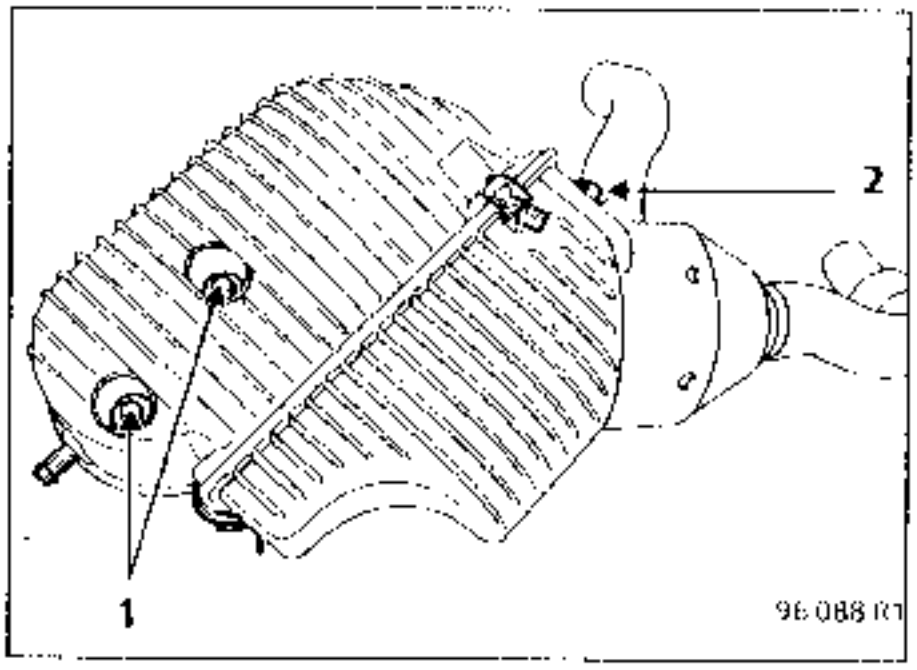
K : Hot water circulation

L : Hot water circulation

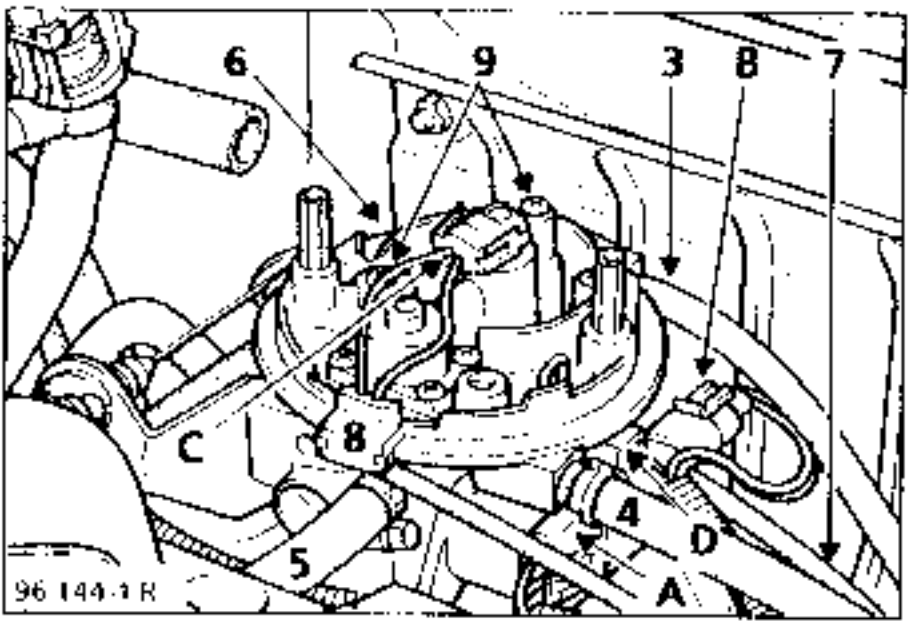
M : Canister bleed

THROTTLE BODY REMOVAL - REFITTING

Remove:



- the air filter, undoing the two bolts (1) and clip (2).



Disconnect:

- the fuel supply pipes (3) and return pipes (4).
- the water pipes (5) and (6)
- the fuel vapour recirculation pipe (7)
- the accelerator control cable
- connectors A and B.
- connector C and the wire channel (8)
- the air temperature sensor connector (D) (the connector is identical to that for the injector)

Remove the two bolts (9) and remove the throttle body.

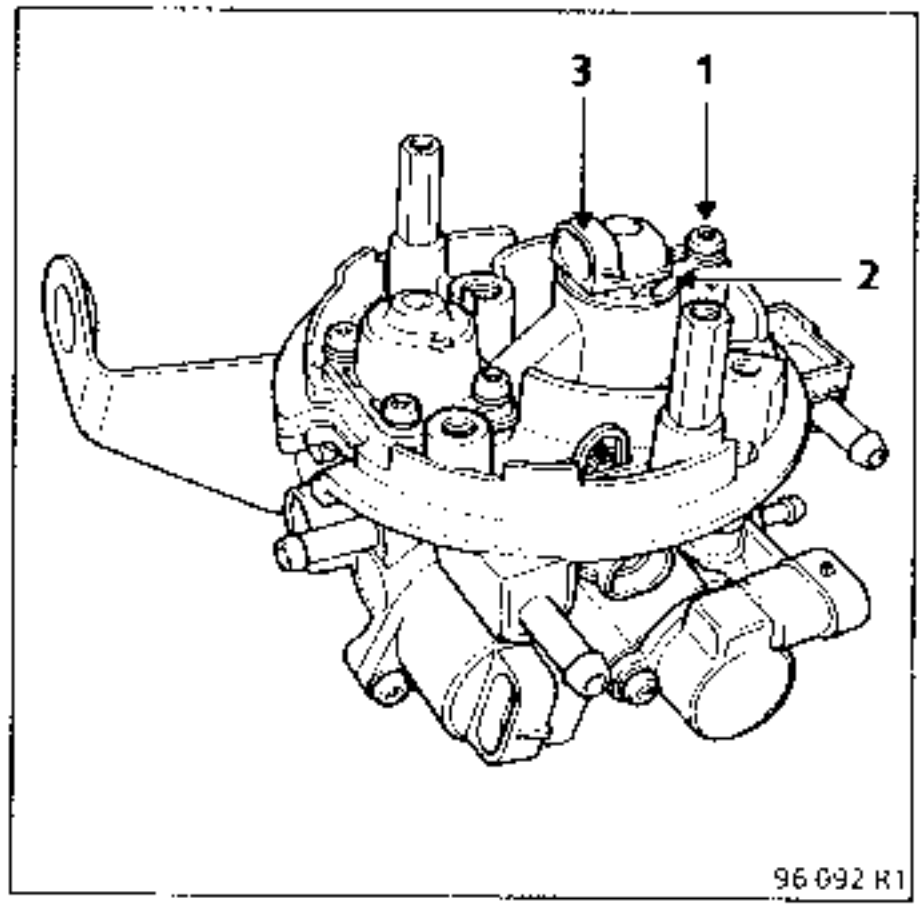
When refitting :

- check the riser joint between the throttle body and the inlet manifold is flat, replace it if necessary.
- reconnect the various pipes and ensure the connectors are correctly connected.

Note : the water pipe collar bolt (5) must be positioned at the bottom (see diagram) so the injector wiring is not damaged.

REMOVAL AND REFITTING OF VARIOUS COMPONENTS ON THE THROTTLE BODY.

INJECTOR REMOVAL - REFITTING



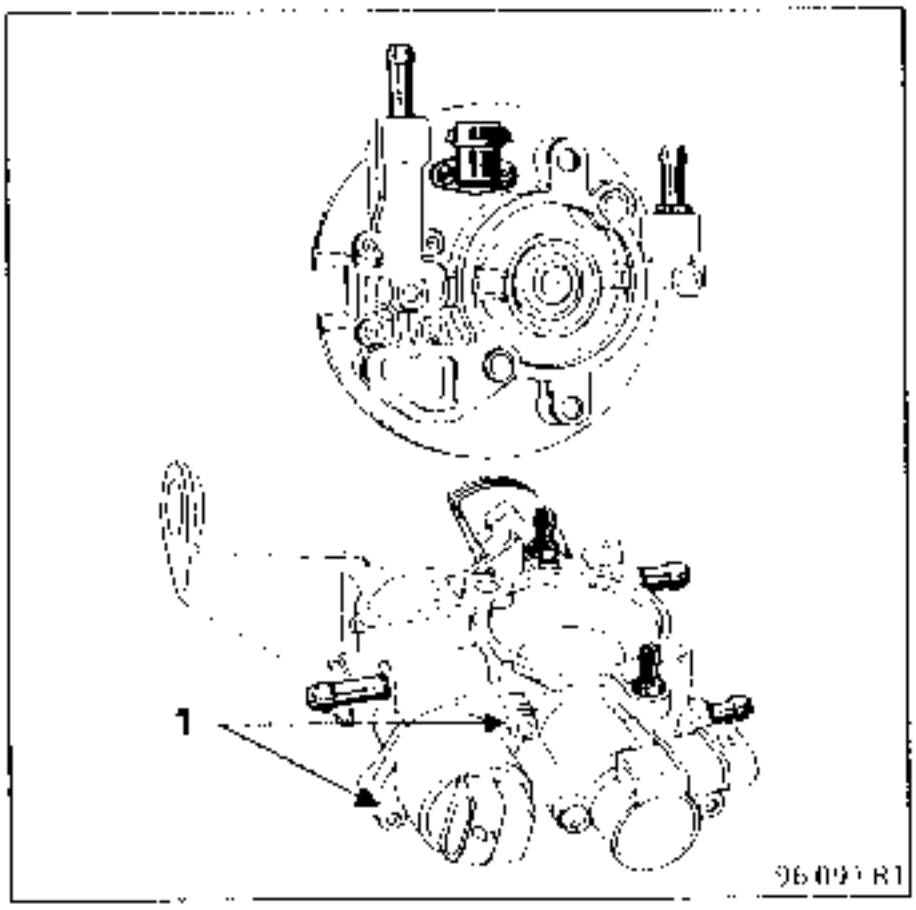
Completely remove the air filter.
Disconnect the injector connector.
Remove bolt (1) and mounting bracket (2).
Remove the injector from its position.
Check that the small diameter O ring is retained, from the lower section of the injector position and check the sealing face of the seals (use a mirror)

When refitting :
Replace the O rings and lubricate them (silicon free lubricant).
Ensure bolt (1) is correctly tightened and the connector is correctly fastened.

Note : When the injector is replaced, the new component is supplied with new O rings.

IMPORTANT : Never connect the injector directly to a 12V source as it may be damaged.

IDLE SPEED REGULATION STEPPING MOTOR REMOVAL - REFITTING



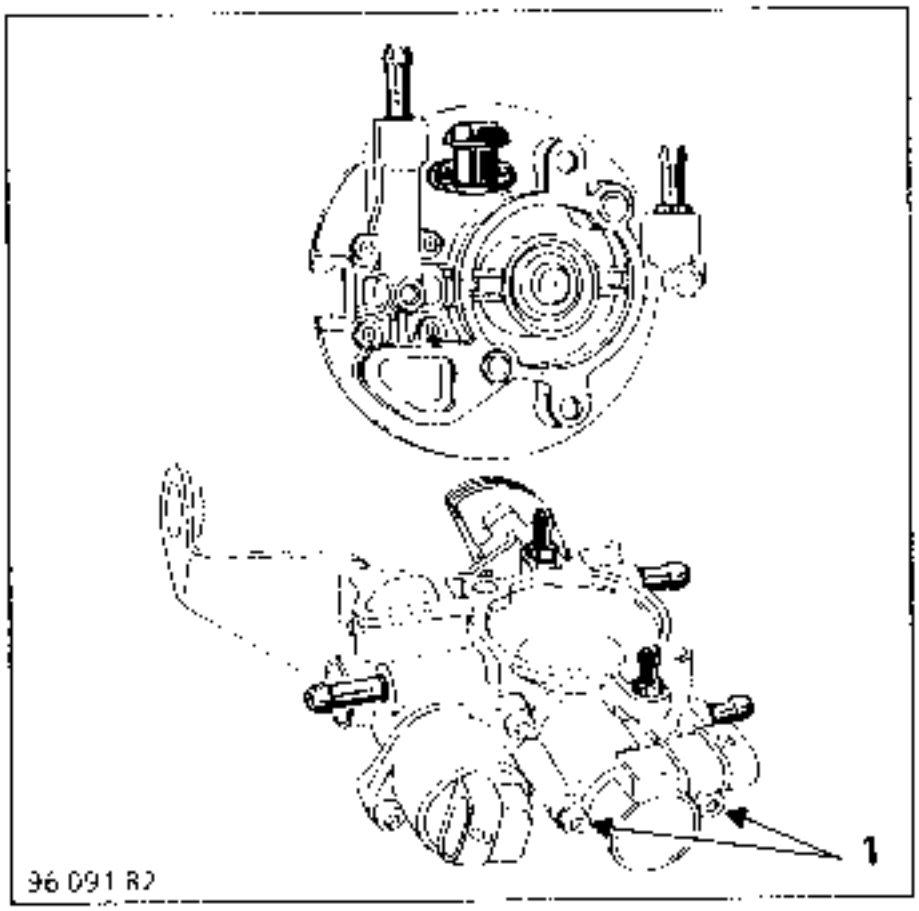
Completely remove the air filter.
Disconnect the idle speed regulation stepping motor connector.
Remove the two motor mounting bolts (1) and remove the motor

When refitting:
Replace the O ring and lubricate it.
Ensure the connector is correctly refitted.

Note : When replacing the stepping motor, the new component is supplied with new O rings and mounting bolts.

Important :
Before starting the engine when the stepping motor has just been replaced turn the ignition on and enter code GO** on the XR25 to cancel the old values for the previous stepping motor
Turn the ignition off and the motor should position itself ready for the next time the engine is started.
Start the engine and check the operation of the idle speed regulation stepping motor using code #12.

THROTTLE POSITION POTENTIOMETER REMOVAL - REFITTING



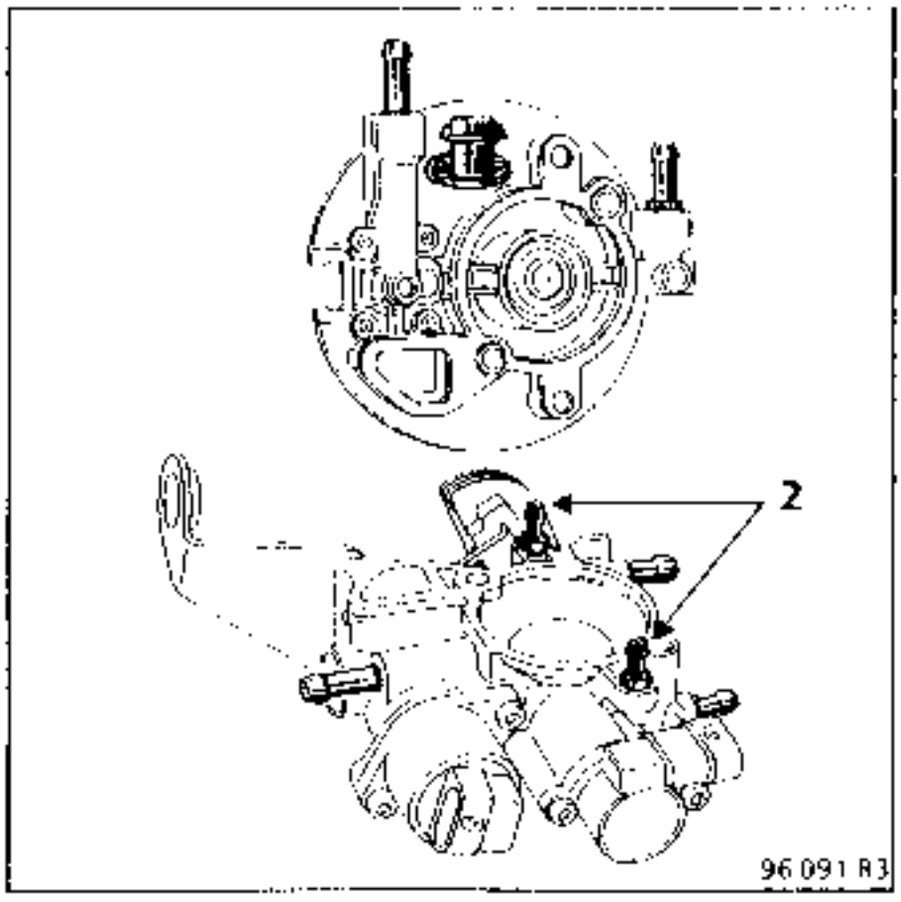
Remove the air filter.
Disconnect the throttle position potentiometer connector.
Remove the two potentiometer mounting bolts (1) and remove the potentiometer.

When refitting:
Check the potentiometer connector is correctly positioned and reconnected.

Note: This potentiometer cannot be adjusted. New bolts are supplied with a new component

Note : After replacing the throttle position potentiometer turn the ignition on and check the operation of the potentiometer using code #17 on the XR25, and also check that the no load and full load positions are recognised.
Erase the memory using GO**

AIR TEMPERATURE SENSOR REMOVAL - REFITTING

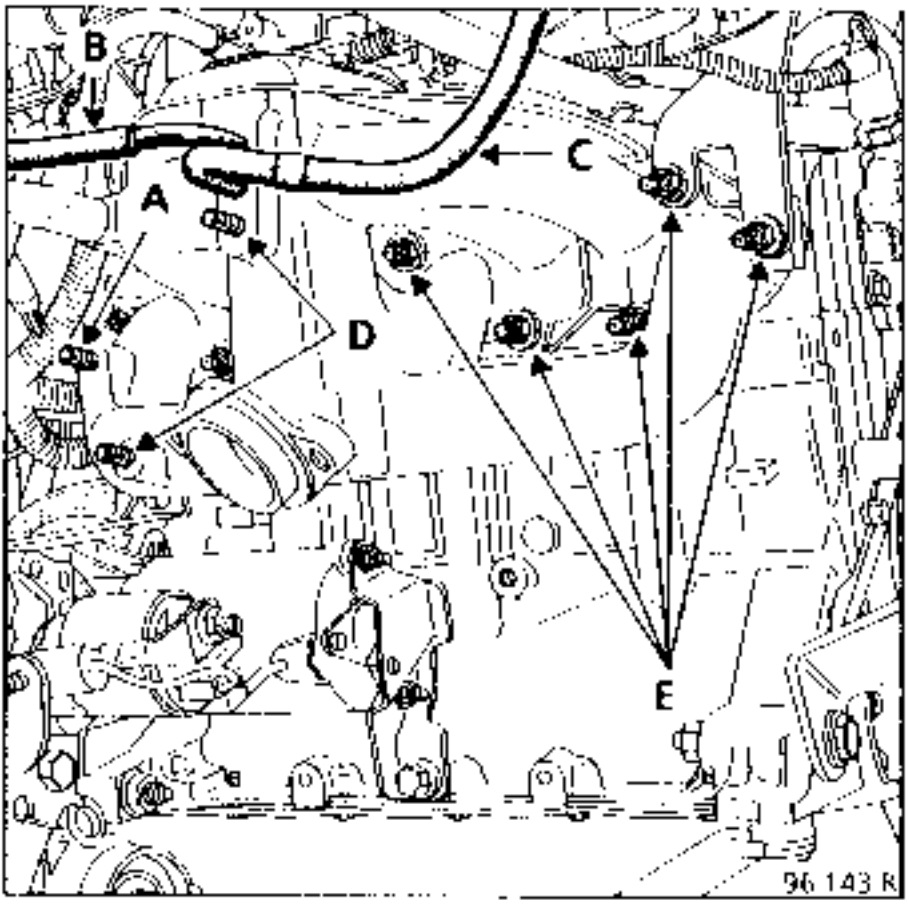


Remove the throttle body completely
Separate the air and fuel sections (tighten pins (2) using thin nosed pliers).
Remove the two sensor mounting bolts and remove the sensor

When refitting:
Visually check the riser joint and the two seals between the two sections of the throttle body. Replace them if necessary
Check that the riser joint between the throttle body and the inlet manifold is flat.
Connect the various pipe connections and ensure all connectors are correctly connected

Note : After replacing the air temperature sensor turn the ignition on and use the XR25 to enter code GO** to erase the memory

MANIFOLD REMOVAL - REFITTING



Remove:
- the air filter
- the throttle body
- the two mounting nuts holding the deflector plate under the throttle body and remove the throttle body.
- the fuel pipe support bracket (nut on stud) (A).
- the vacuum pipes to the absolute pressure sensor (B) and the master vac (C)

Release the electrical connections and pipes which pass over the manifold towards the gear box (the ignition coil and engine coolant temperature sensor connectors must be disconnected).

Remove the hot air inlet cone (nuts on stud) (D))

Disconnect the oxygen sensor

Remove:
- the exhaust downpipe.
- the manifold mounting nuts (E) and remove the manifold.

When refitting:

Replace the manifold gasket and position the crimped side on the side of the cylinder block.

Check and replace if necessary :
- the riser joint between the throttle body and the manifold.
  the sealing ring on the exhaust downpipe
- the seal on the deflector plate (when this is replaced it is supplied with the plate).

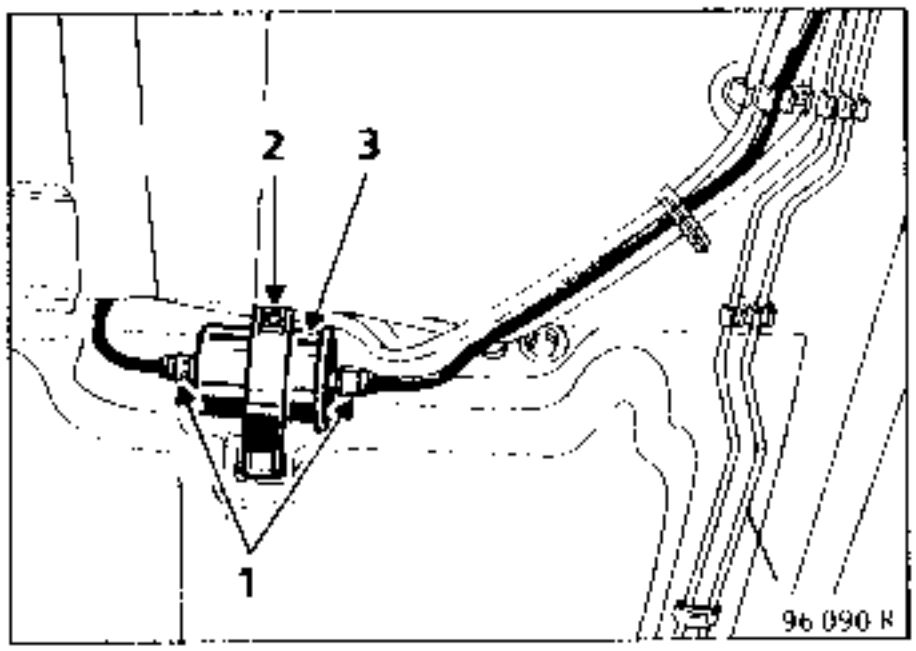
Refitting is then the reverse of removal.

Ensure :
- the electrical wiring and pipes are correctly routed
- all connectors and collars are correctly refitted

REPLACEMENT

The fuel filter should be replaced every 50000 km (30 000miles).

SPECIAL TOOLING REQUIRED	
Mot. 1265	Pliers

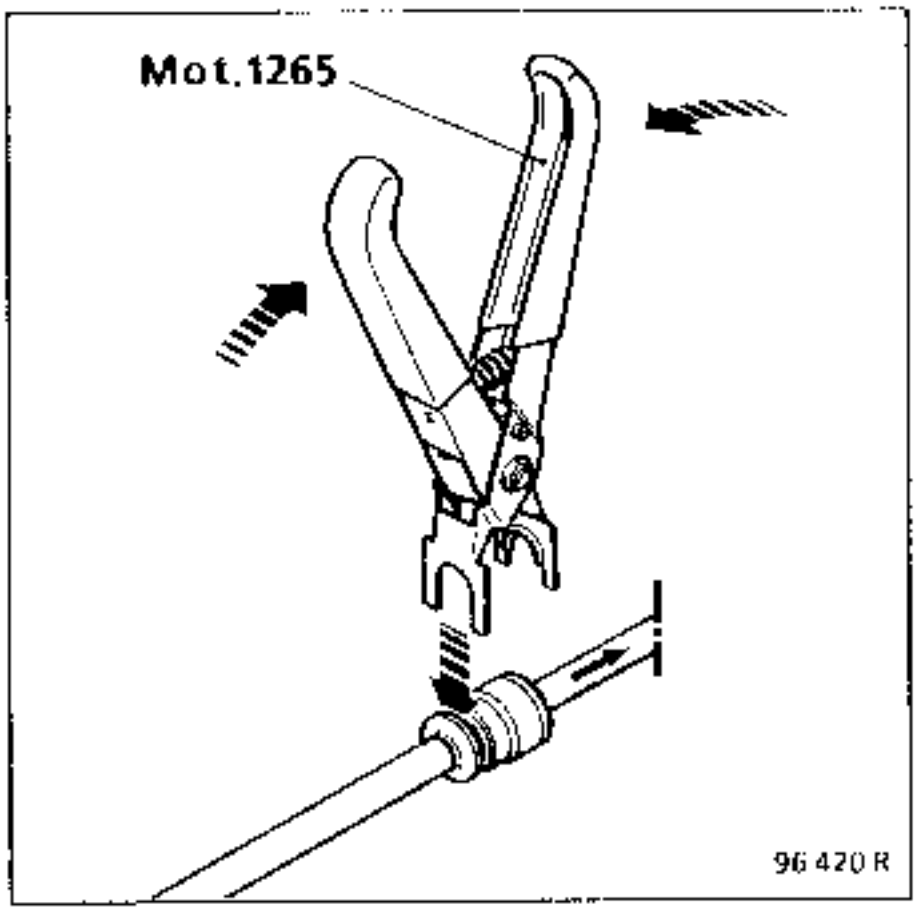


The fuel filter is located under the vehicle in front of the fuel tank. It is mounted to the body by a bracket.
Fuel will run out when the filter is removed,**(do not clamp the pipes as this may damage them).**
Disconnect pipes (1) using tool **Mot. 1265.** (see diagram opposite for how to position the tool on the pipe)
Remove bolt (2) and remove the fuel filter (3)
When refitting, ensure the fuel is flowing the right way through the filter (arrow marked on the filter body)
Reconnect the pipes by hand. (it is not necessary to use the pliers **Mot. 1265)**

Ensure the unions are correctly fastened (two O rings)

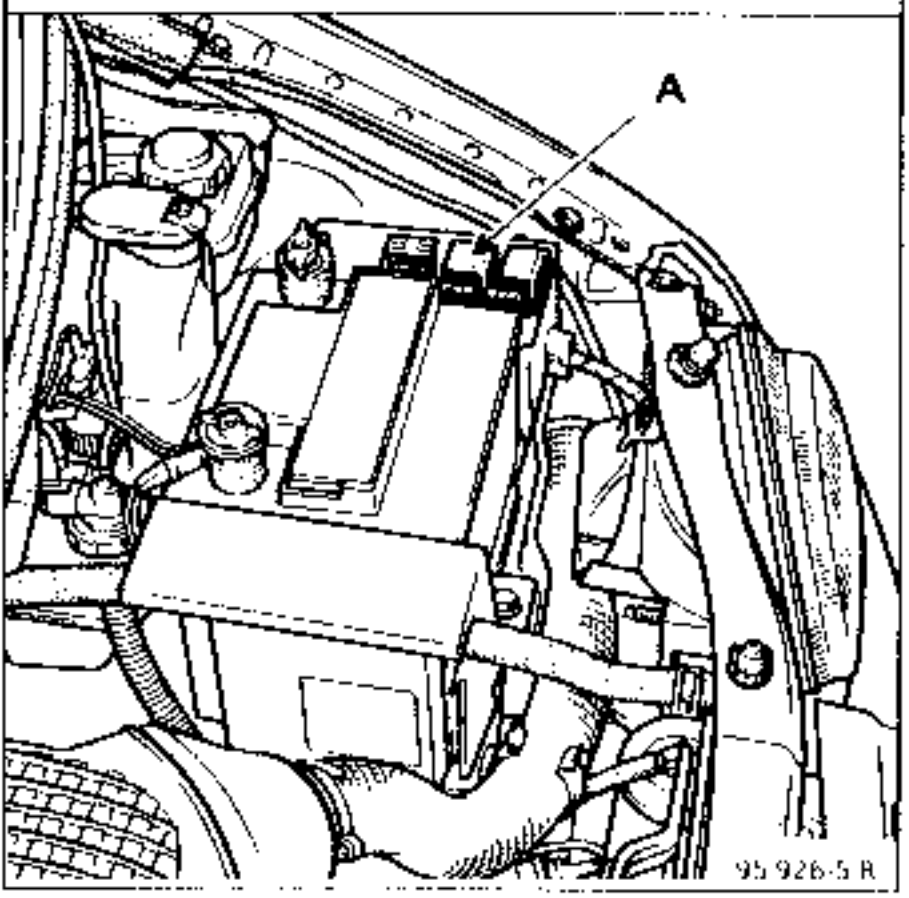
Note : The pipes (1) cannot be disconnected without using pliers **Mot. 1265.**

Positioning the clamp.

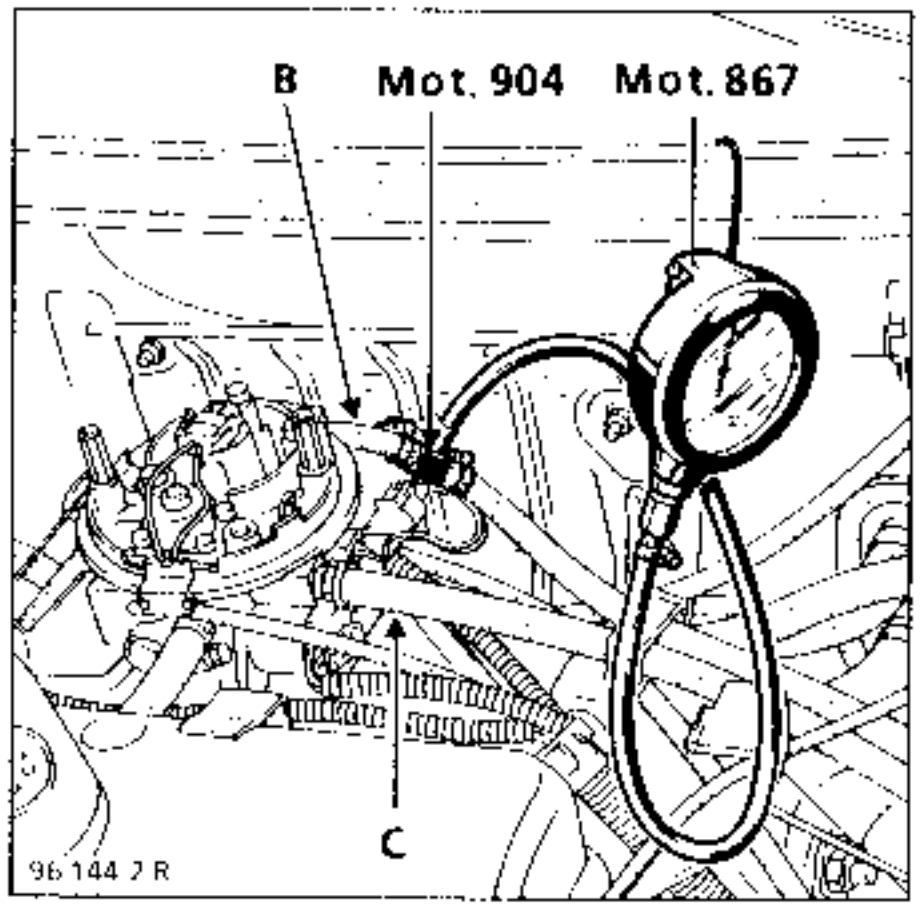


CHECKING THE SUPPLY PRESSURE AND FLOW FOR THE FUEL PUMP

SPECIAL TOOLING REQUIRED	
Mot. 843	0·6 bar pressure gauge
MoL. 867	-1 + 2 bar pressure gauge
Mot. 904	T union for measuring pressure
1 2000 ml measuring cylinder	



Measurements may be made with the engine running at idle speed or stationary, by shunting terminals 3 and 5 (large wires) on the fuel pump relay (A).



Remove the air filter
Disconnect the fuel inlet pipe (B)
Fit the T union **Mot. 904** and connect it to the -1, + 2 bar pressure gauge **Mot 867.**
Disconnect the return pipe (C) and replace it with a length of hose leading into a 2000 ml measuring cylinder
Run the fuel pump for one minute, then measure the pressure and amount of fuel in the measuring cylinder :

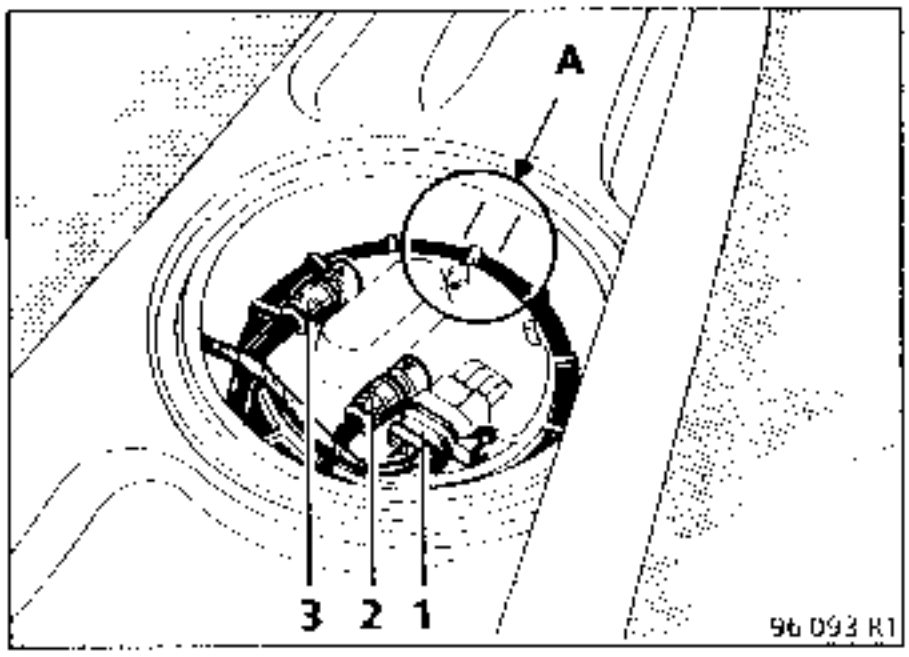
Pressure : 1,05 ± 0,05 bars
Flow : 0,83 l/min minimum.

ATTENTION :
If the flow is low, check the pump feed voltage (drop in flow of 10% for a voltage drop of 1 volt).

Note :
The operation of the fuel pump safety valve can be checked. To do this use the 0-6bar pressure gauge **Mot. 843** in place of the gauge used beforehand. Run the fuel pump, clamp the return pipe (C) for a short moment, and the pressure should be between 2,5 and 4,7 bar

IMPORTANT :
Never smoke or bring heat sources into the working area when working on the fuel tank or fuel supply circuit.

REMOVAL - REFITTING OF THE PUMP - GAUGE ASSEMBLY



The pump - gauge assembly may be removed directly through the flap under the rear bench seat. To do this :
- Disconnect the battery
- Tip the seat forwards.
- Lift the carpet and remove the plug.

Disconnect:
- the connector (1).
- the fuel supply pipe (2) and the return pipe (3) using the special pliers **Mot. 1265** (see diagram opposite for how to position the pliers)

Remove:
- the mounting nut using tool **Mot. 1264**.
  the pump - gauge assembly.

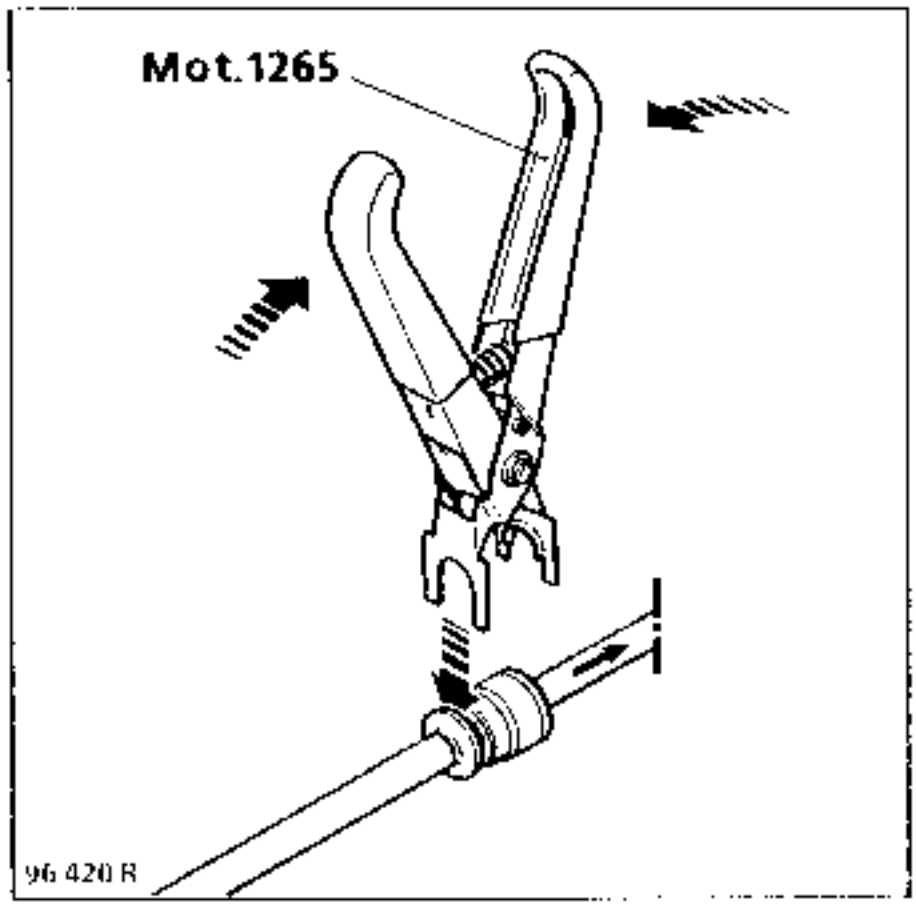
When refitting :
- check the seal is in good condition or replace it.
- refit the seal on the fuel tank before refitting the assembly.
- position the pump - gauge assembly (see reference mark A)
- torque tighten to **6 daN.m** max

Note :
- Pliers **Mot. 1265** do not need to be used to reconnect the pipes

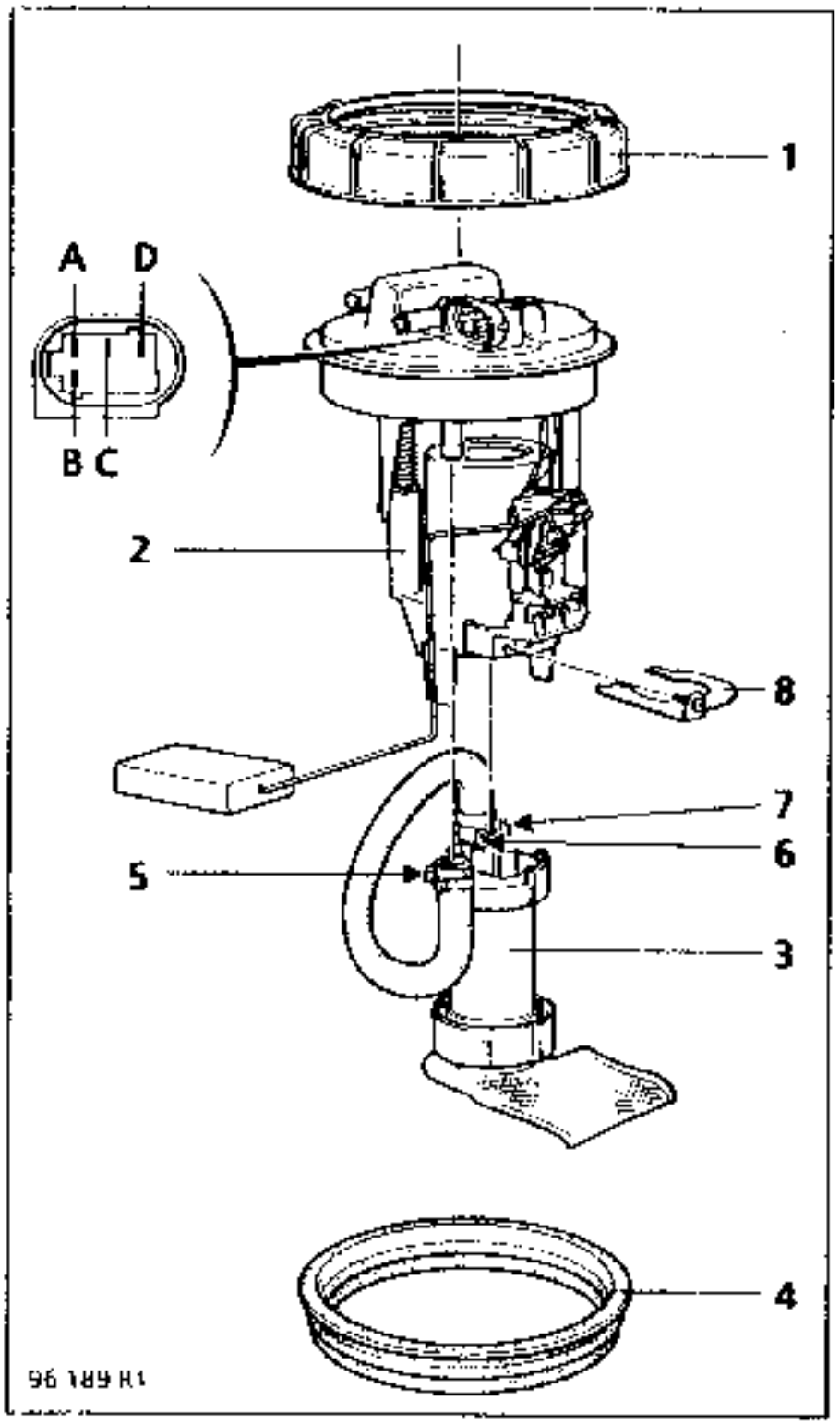
- Ensure the unions are correctly reconnected (two O rings)

IMPORTANT :
Fuel will run out when the pipes are disconnected - protect the surrounding area (residual pressure).
The pipes cannot be disconnected without using pliers **Mot. 1265.**

Position ing the pliers Mot. 1265



REMOVAL - REFITTING OF THE PUMP



1 Mounting nut
2 Fuel gauge
3 Fuel pump
4 Seal
A : + fuel pump
B : – fuel pump
C and D : fuel gauge info

Remove the pump - gauge assembly.
Loosen collar (5) and remove the fuel pipe.
Disconnect the pump feed wires (6) and (7).
Remove the mounting bracket (8).
Separate the pump from the gauge.

When refitting:
Check the condition of the seal (4), replace it if necessary.
Ensure the feed wires are correctly connected (polarity).
Replace collar (5) and ensure it is correctly tightened.

CHECKS TO BE CARRIED OUT BEFORE THE ANTI-POLLUTION TEST

Ensure:
- the ignition system is operating correctly (correct type plugs, correctly set, HT leads correctly connected and in good condition).
- the injection system is operating correctly (correct supply, check conformity with XR25)
- conformity and sealing of exhaust line

Obtain information of the vehicle's history if possible (run out of fuel, lack of power, use of incorrect fuel type)

ANTI-POLLUTION STANDARDS TEST

Let the vehicle warm up until the engine cooling fan has operated twice.
Connect a correctly calibrated four gas analyser to the exhaust pipe
Keep the engine speed at 2500 rpm for 30 seconds and read off the pollutant values.

CO $\leq$ 0,3 %
CO^2 $\geq$ 14,5 %
HC $\leq$ 100 ppm
0,97 $\leq \lambda \leq$ 1,03

Note : $\lambda = \frac{1}{\text{richness}}$

$\lambda > 1 \rightarrow$ poor mixture
$\lambda < 1 \Rightarrow$ rich mixture

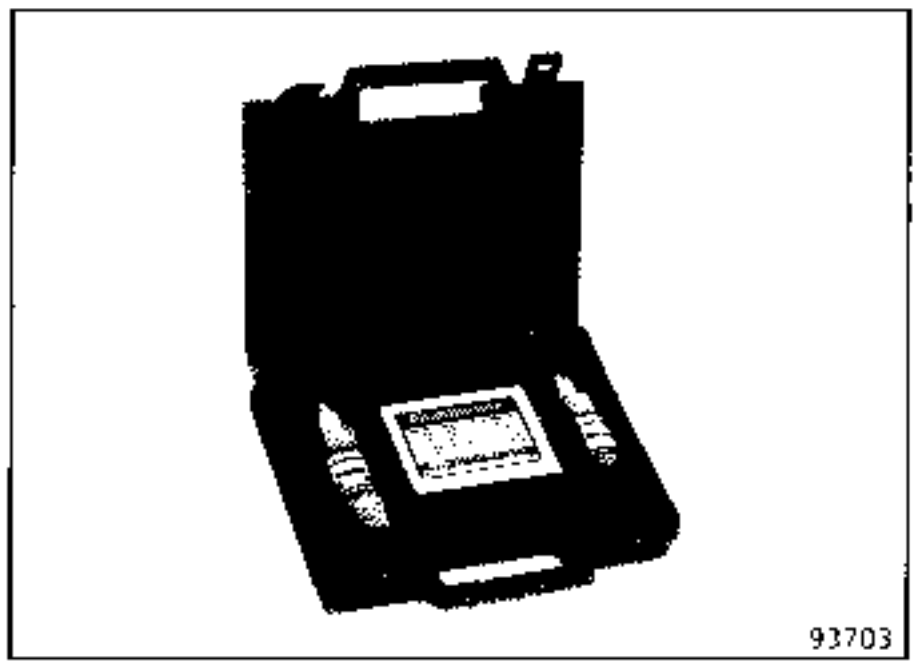
If these values are correct after the test, the anti-pollution system is operating correctly
otherwise additional test must be carried out
- check the condition of the engine (condition of the oil, valve clearances, timing, etc...)
- check the oxygen sensor is operating correctly (ch. 17).
- test for the presence of lead (see below)

If the test for lead is positive, wait until the vehicle has used two or three full tanks of unleaded fuel before replacing the oxygen sensor.
If, after all these test have been carried out, the values are still incorrect, replace the catalytic converter.

The Nauder lead testing kit is required for this test.

For further information, please contact your After Sales Head Office.

Part numbers : - Complete kit : T900
- 40 test papers : T900/1



METHOD

Detecting lead at the exhaust

a - Test conditions :
- Engine stationary.
- Exhaust pipes hot but not burning.
- Do not test when the temperature is below 0°C.

b - If necessary use a soft cloth to clean the inside of the exhaust pipe so any soot deposits are removed.

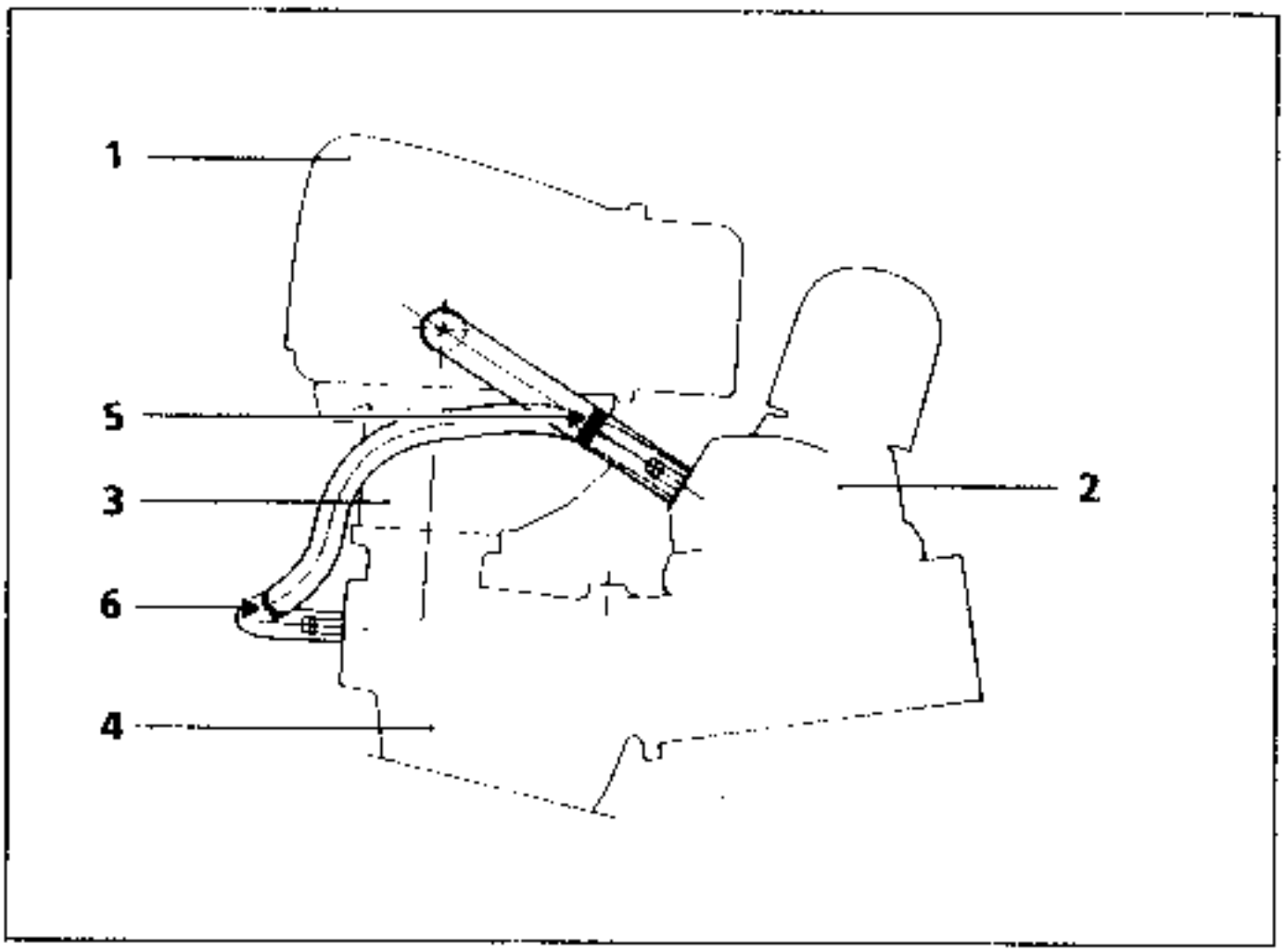
c - Wearing the gloves, take a test paper and moisten it slightly with distilled water (the paper is not effective if it is too wet).

d - Press the damp paper onto the cleaned exhaust pipe immediately and hold it there firmly for about a minute

e - Remove the test paper and allow to dry. The test paper will turn red or pink if lead is present.

ATTENTION : The test for lead should only be carried out on the exhaust pipe, not on the oxygen sensor.

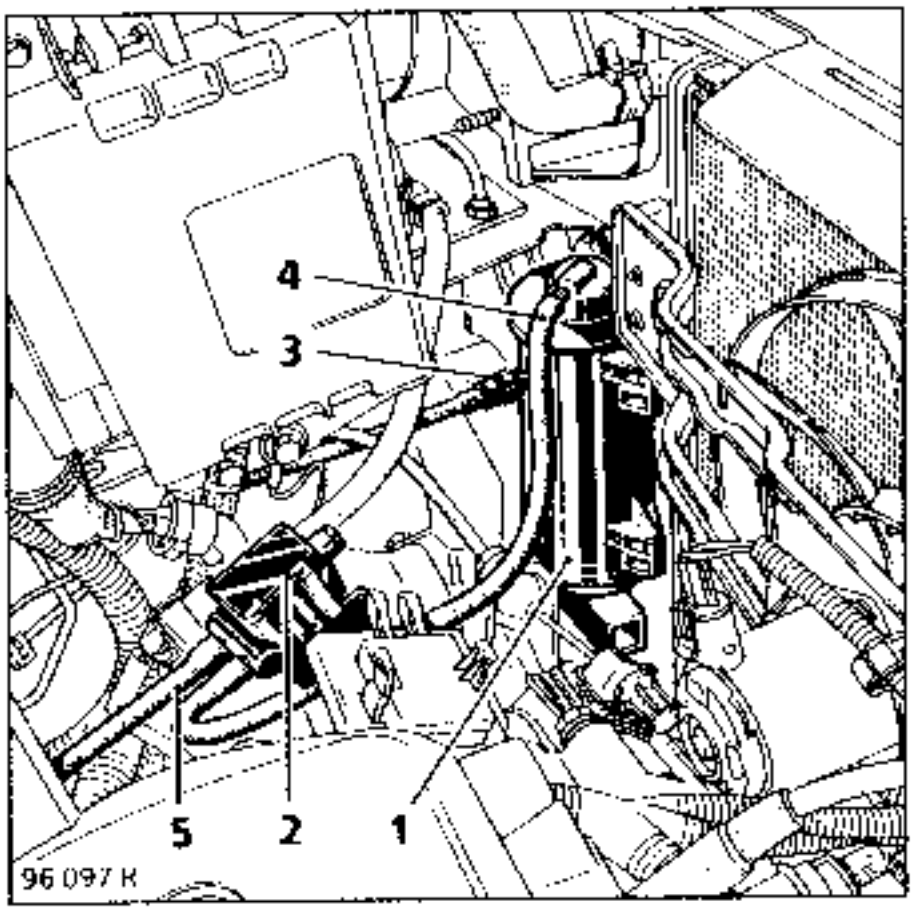
OPERATIONAL DIAGRAM



1 Air filter
2 Rocker box cover
3 Throttle body
4 Inlet manifold
5 **Ø 6,5 mm** nozzle upstream of throttle.
6 **Ø 1,3 mm** nozzle downstream of throttle

Testing:
To ensure the anti-pollution system operates correctly the vapour rebreathing circuit must be kept clean and in good condition. Check the nozzles are present and in good condition.

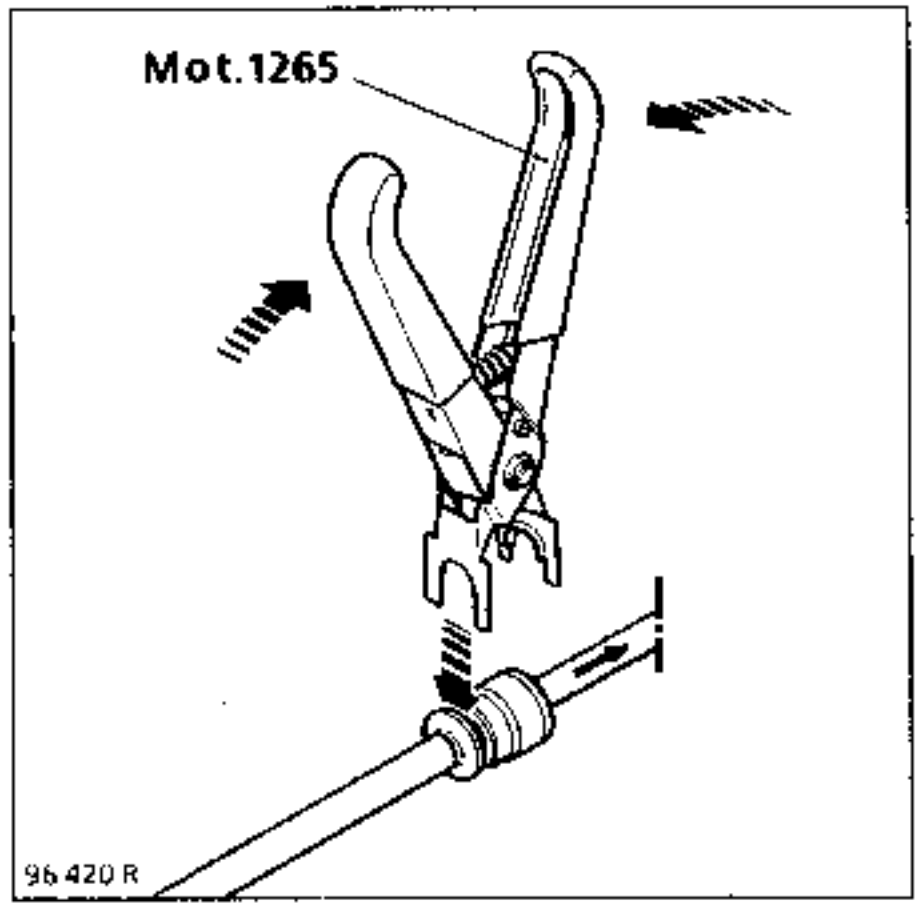
OPERATING PRINCIPLE



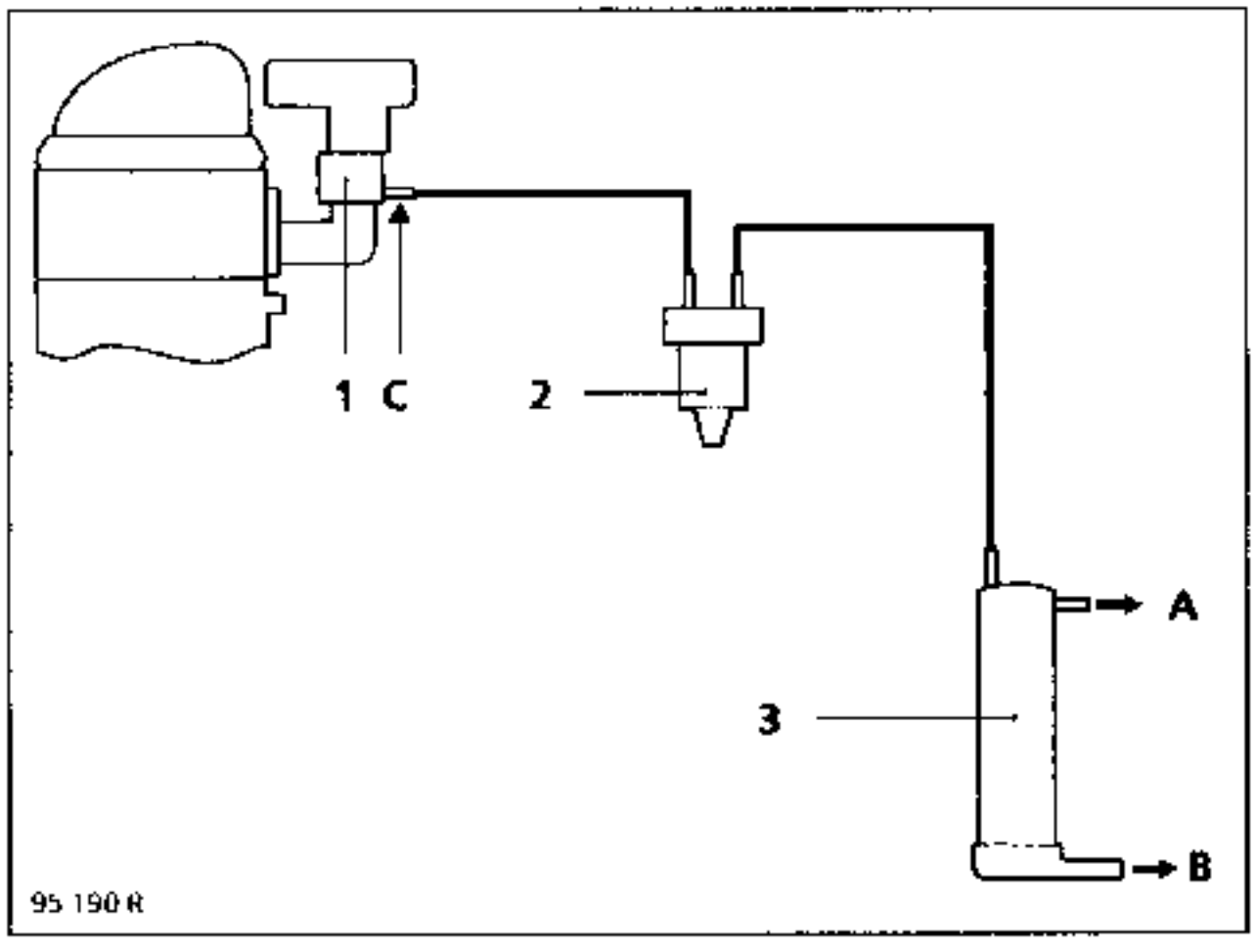
The fuel tank is vented through the fuel vapour absorber (or canister) (1) through pipe (3).
The active carbon in the canister retains the fuel vapours as they pass through.
Under certain engine operating conditions (engine speed, pressure temperature), the computer determines the cyclical opening ratio (RCO) for the canister bleed solenoid valve (2)
The solenoid valve allows the amount of fuel vapour recycled by the canister (via pipe (4)) and directed to the inlet manifold (via pipe (5)) to be varied
The variation in the section through which the fuel vapour passes is caused by the balance between the magnetic field created by feed to the coil and the force on the return spring which closes the valve.

Note :
When removing the canister use pliers **Mot. 1265** to disconnect pipe (3).

When reconnecting pipe (3) ensure the union is correctly connected (two O rings).



OPERATIONAL DIAGRAM OF THE CIRCUIT



1 Throttle body
2 Canister bleed control solenoid valve
3 Fuel vapour absorber (or canister)
A Pipe from fuel tank for fuel vapour recycling
B Vent.
C Take-off upstream of throttle.

IDENTIFICATION

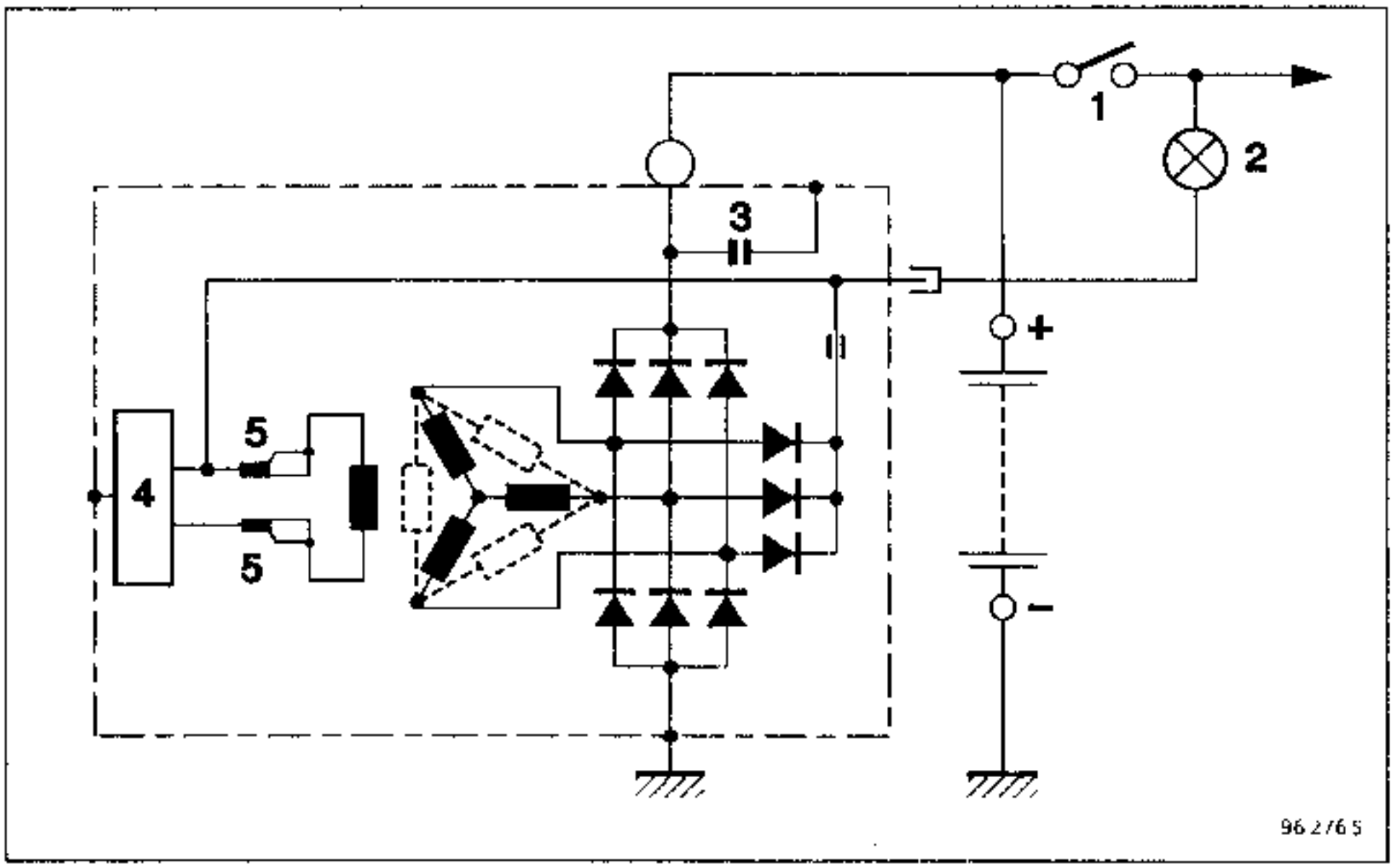
VEHICLE	ENGINE	ALTERNATOR	CURRENT
C063	C3G	MAGNETI MARELLI CG33211.70	60 A

CHECKING

After letting the engine warm up for 15 minutes at 13,5 Volts

rpm	current
1 500	10 A
3 000	50 A
6 000	60 A

DIAGRAM



1 Ignition switch
2 3 W warning light bulb
3 Condenser
4 Voltage regulator
5 Brush

OPERATION - FAULT FINDING

This vehicle is fitted with an alternator with integral regulator. The warning light has the following functions:

- when the ignition is switched on, the light illuminates
- when the engine is started the light extinguishes,
- if the light illuminates while the engine is running, there is a charging fault.

LOOKING FOR FAULTS

The warning light does not illuminate when the ignition is switched on.

Check:
- all electrical connections are good.
- the bulb has not blown. (Earth terminal **L** (having disconnected it) ; the bulb should illuminate).

The warning light illuminates when the engine is running.

This indicates a charging fault which could be caused by :

- the alternator drive belt being broken or the charging wiring being cut,
- internal alternator deterioration (rotor, stator, diodes or brush),
- a regulator fault,
- excess voltage.

The customer complains of a lack of charge and the warning light is operating correctly.

If the regulated voltage is less than **13,5 V**, check the alternator. The fault could be caused by :

- a diode which has been damaged,
- a phase which is cut,
- coked or worn tracks.

Checking the voltage

Connect a voltmeter across the battery terminals and read the battery voltage.

Start the engine and increase the engine speed until the needle registers a stable regulated voltage.

This voltage should be between **13,5 V** and **14,8 V**

Connect as many consumers as possible, the regulated voltage should be between **13,5 V** and **14,8 V**.

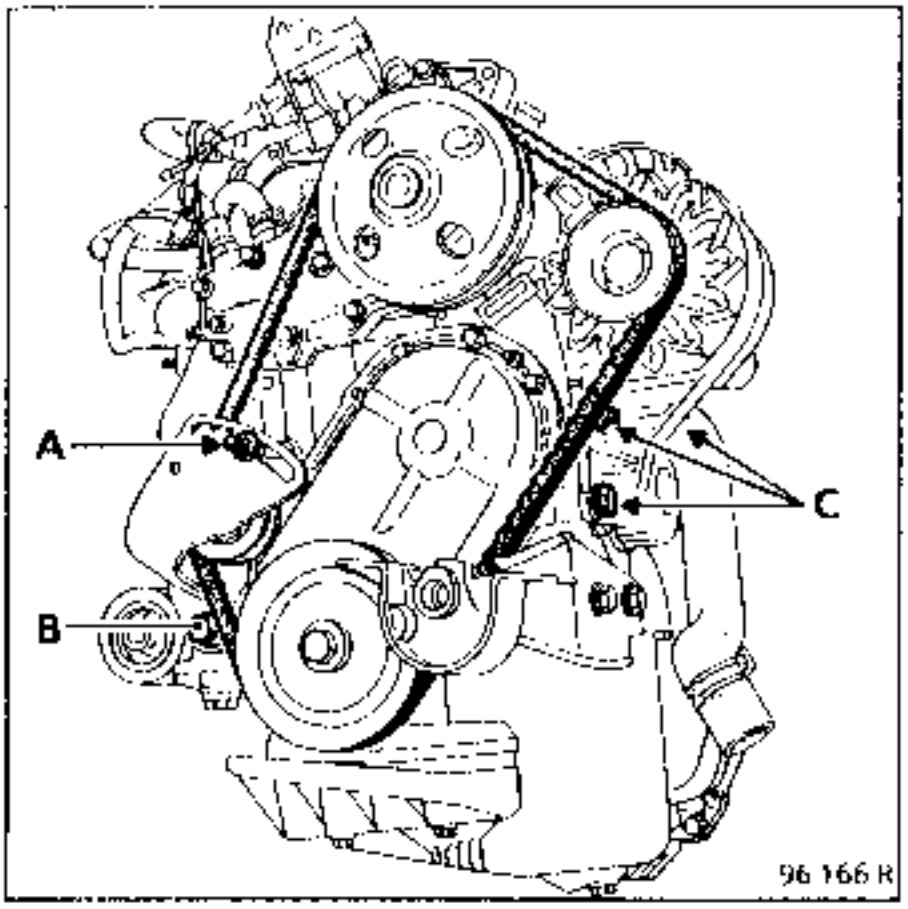
ATTENTION : ***if arc welding work is to be carried out on the vehicle, the battery and regulator must be disconnected.***

REMOVAL - REFITTING

Do not use a screwdriver to remove the drive belt as it is made of synthetic fibres and may be damaged

Disconnect the battery

REMOVAL



Undo tensioner bolt (A) to slacken the belt.

Loosen the nut on the tensioner mounting (B) and release the belt.

Disconnect the electrical connections.

Remove the 3 alternator mountings (C) (2 nuts and 1 bolt).

Remove the alternator

REFITTING

Refitting is the reverse of removal Ensure the drive belt is adjusted to the correct tension.

IDENTIFICATION

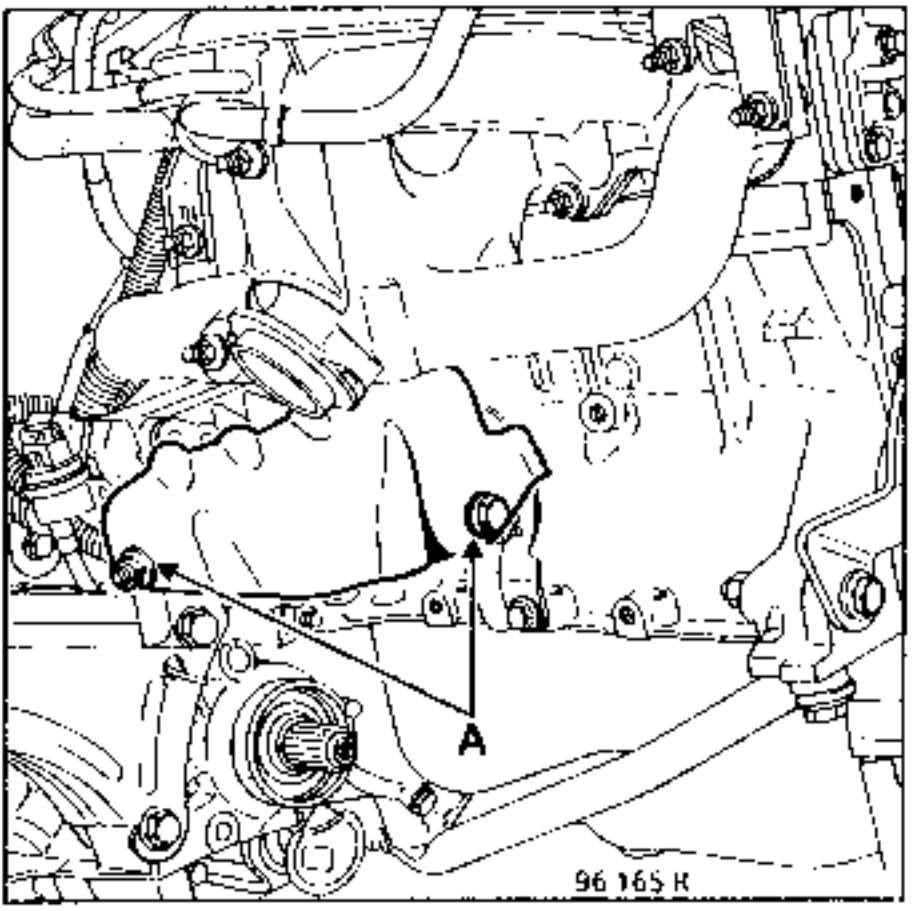
VEHICLE	ENGINE	STARTER
C063	C3G	BOSCH 000 111 2025

REMOVAL - REFITTING

Vehicle on a lift, disconnect the battery.

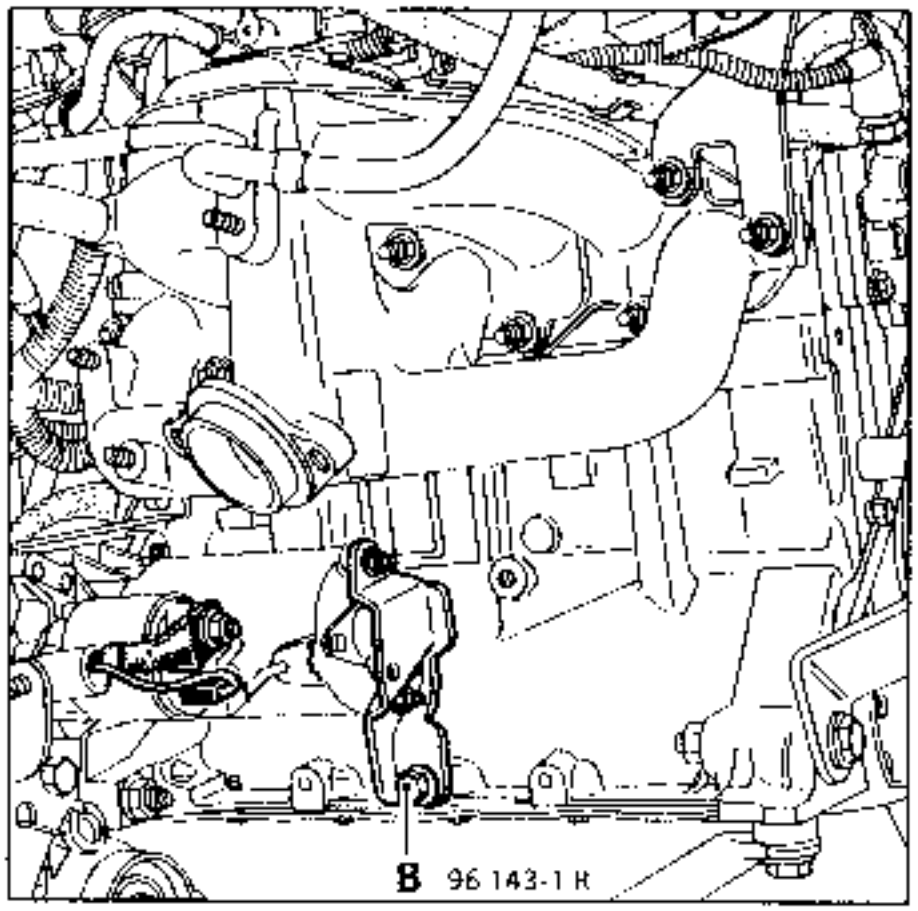
Remove the engine undertray.

REMOVAL



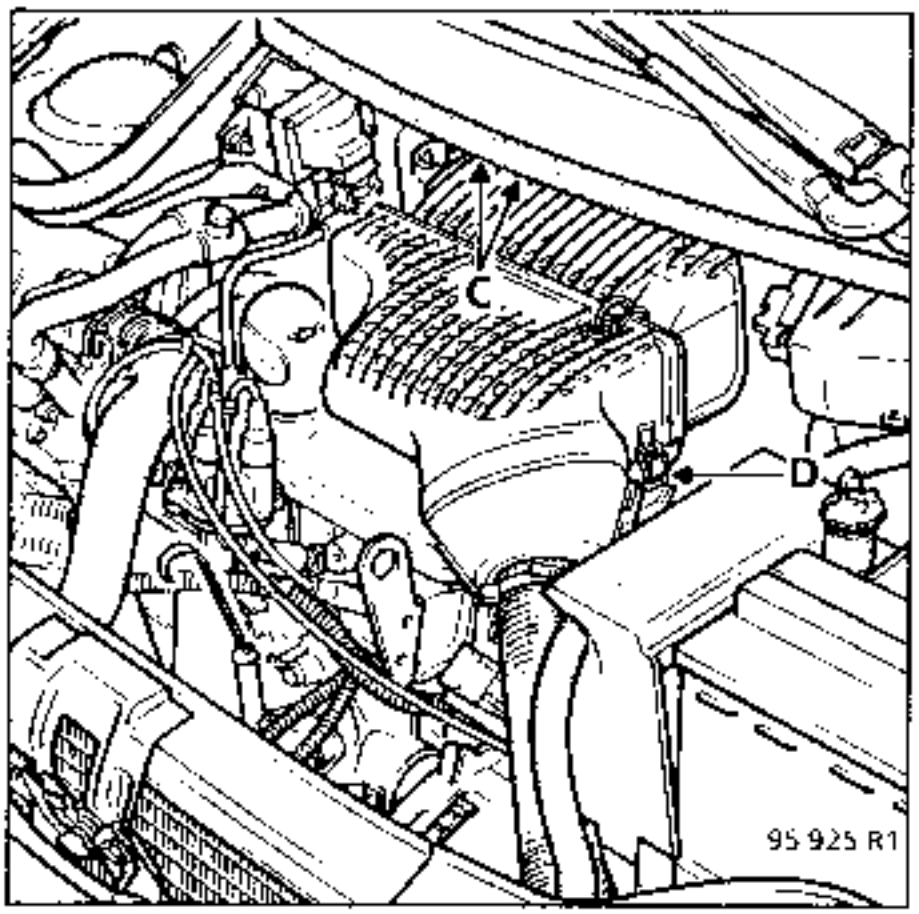
From below the vehicle:

- remove the 2 mountings (A) for the starter protective plate (1 bolt and 1 nut),
- release the protective plate and remove it,
- disconnect the starter electrical connections,
- loosen the mounting bolt (B) for the starter retaining bracket at the rear of the starter, but leave the bolt in position.



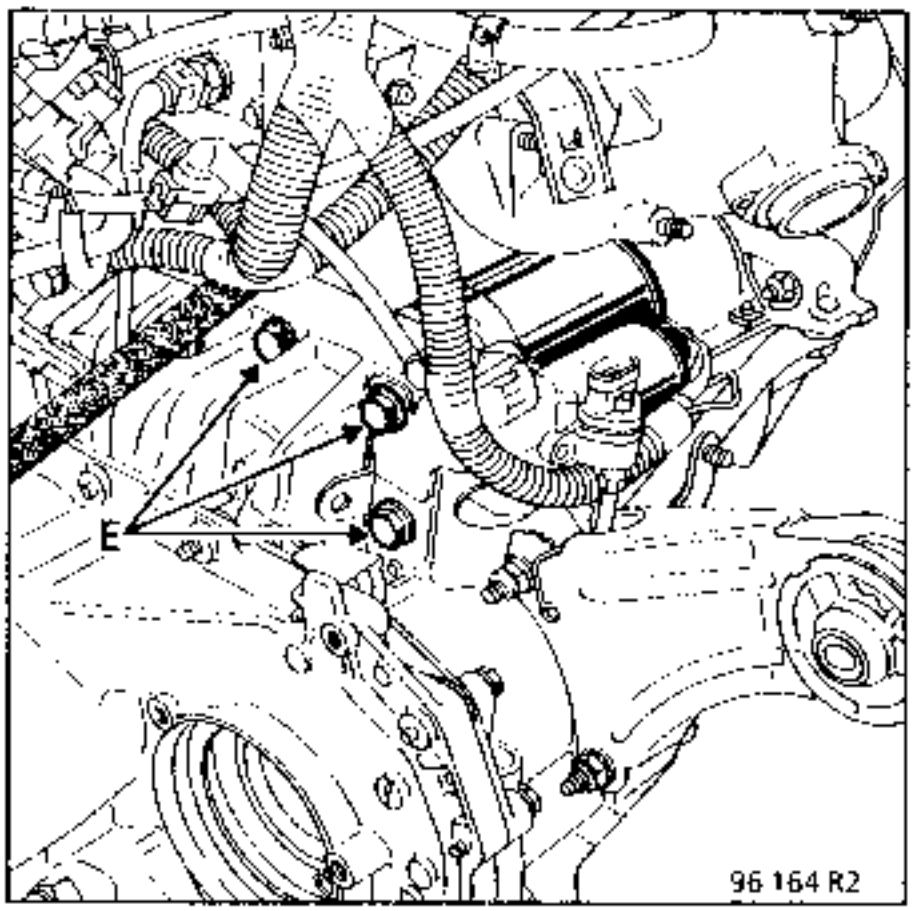
From above :

- remove the air filter - 2 bolts (C) and one clip (D).



Remove the air filter only after disconnecting the oil vapour rebreathing pipe.

– Separate the pipes and wires to reach the three starter mounting bolts (E) and remove them



From below the vehicle :

– remove mounting bolt (B) from the retaining bracket,

– remove the starter.

REFITTING

From below the vehicle :

– reposition the starter using bolt (B) in the starter retaining bracket.

From above:

– replace the 3 mounting bolts (E) and tighten them.

From below the vehicle :

– reconnect all connections,

– tighten bolt (B),

– refit the starter protective plate.

From above:

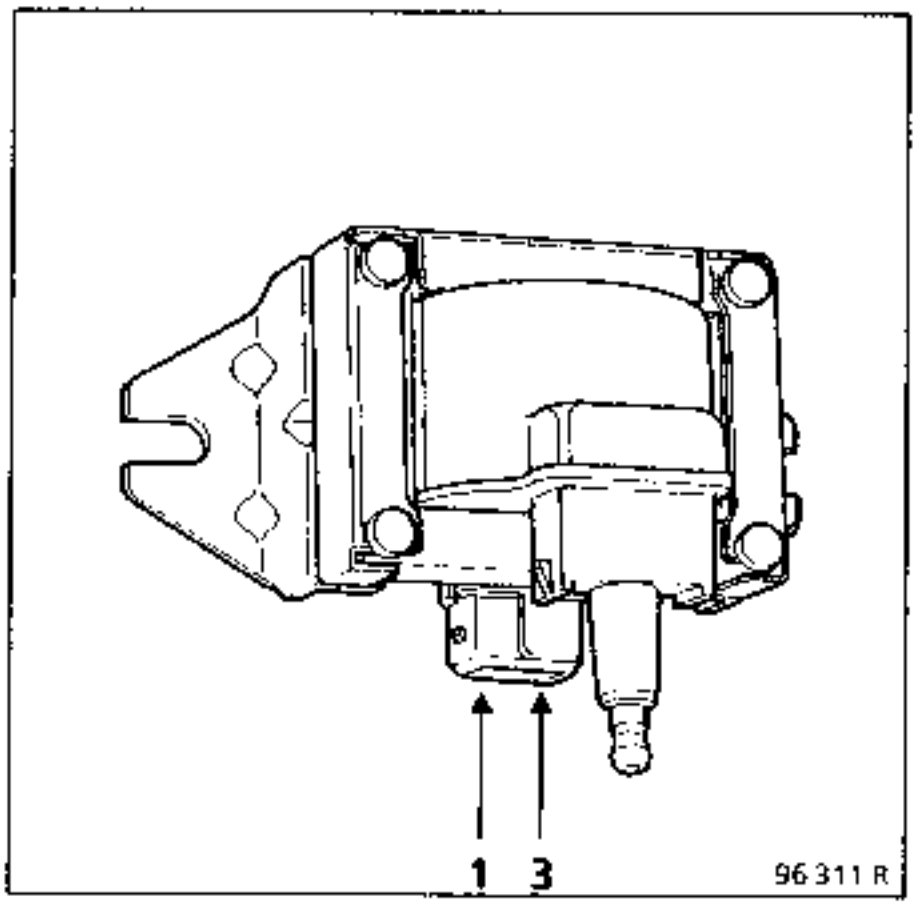
– reconnect the battery,

– try the starter,

– refit the air filter.

Replace the engine undertray.

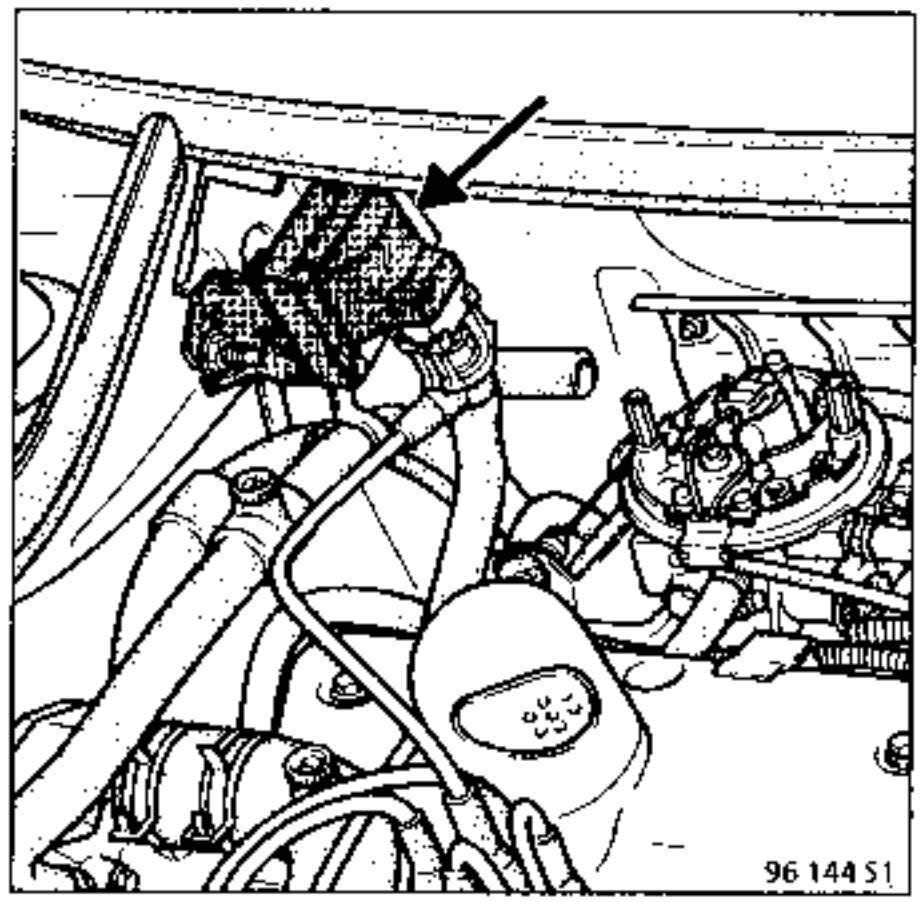
The ignition advance function and the ignition power circuit are integral to the injection computer which sends the control signal to the ignition coil.



Connection

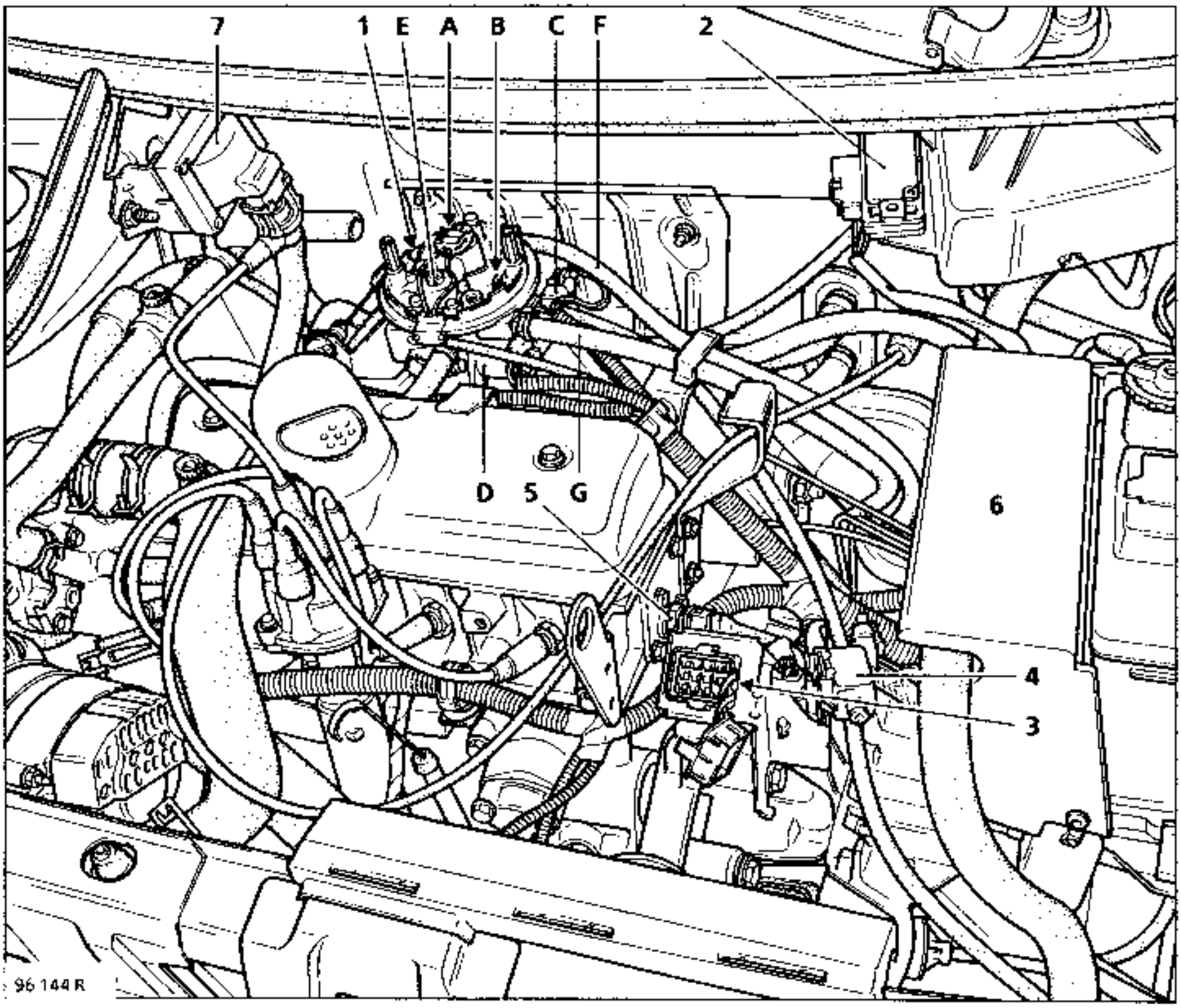
Track	Allocation
1	Not used
2	Feed via pump relay
3	Ignition coil control

LOCATION



Fault finding

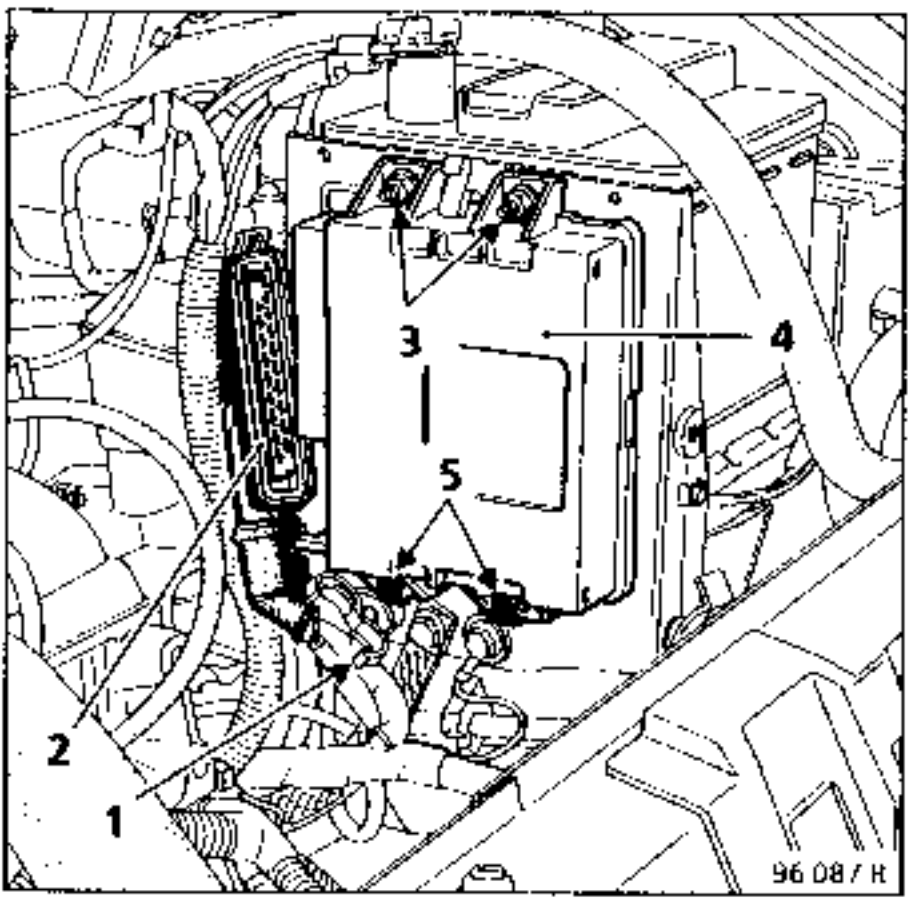
The line between the ignition coil and the injection computer can be diagnosed using the XR25. (See fault finding with XR25.)



1 : Throttle body
- A : Injector
- B : Air temperature sensor
- C : Throttle position potentiometer
- D : Idle speed regulation stepping motor
- E : Fuel pressure regulator
- F : Fuel supply
- G : Fuel return

2 : Absolute pressure sensor
3 : Diagnostic socket
4 : Canister bleed solenoid
5 : Coolant temperature sensor
6 : Injection computer (under plastic cover)
7 : Ignition coil

REMOVAL - REFITTING OF THE COMPUTER

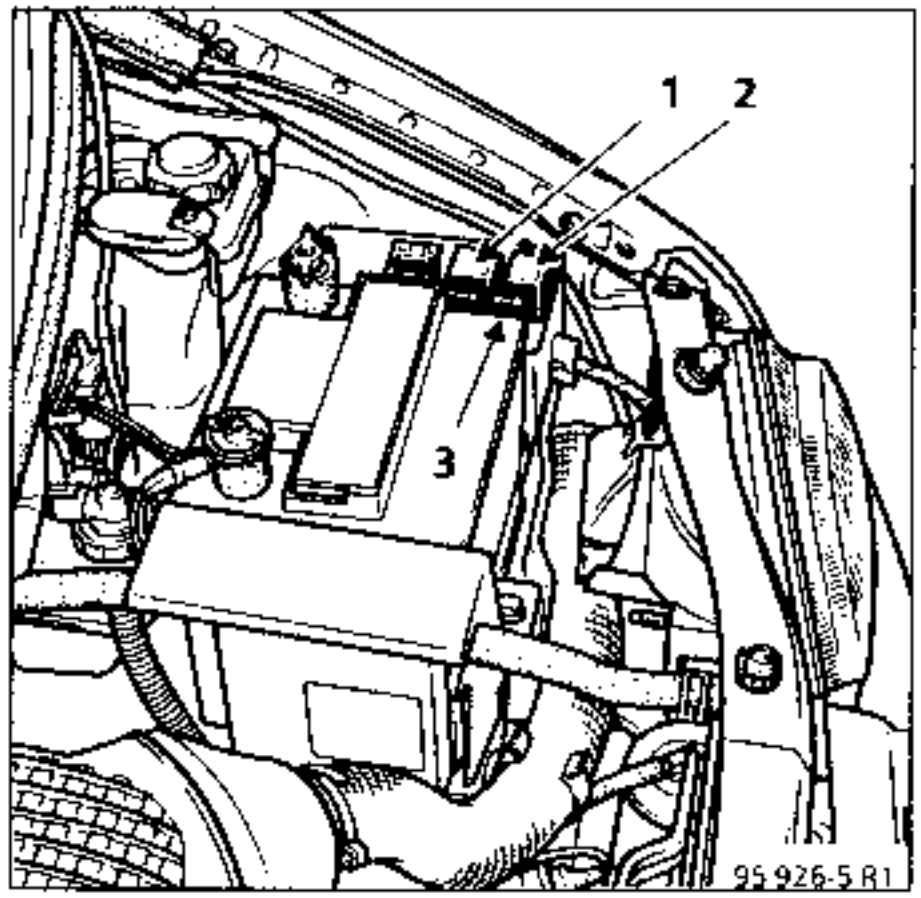


The computer is located in the engine compartment near the battery. To remove the computer, it is not necessary to remove the plastic protective cover.

- Disconnect the battery
- Remove the wiring from the clip (1).
- Remove the two nuts (3) and release the computer (4). The computer is mounted by two clips at the bottom (5).
- Disconnect the connector (2).

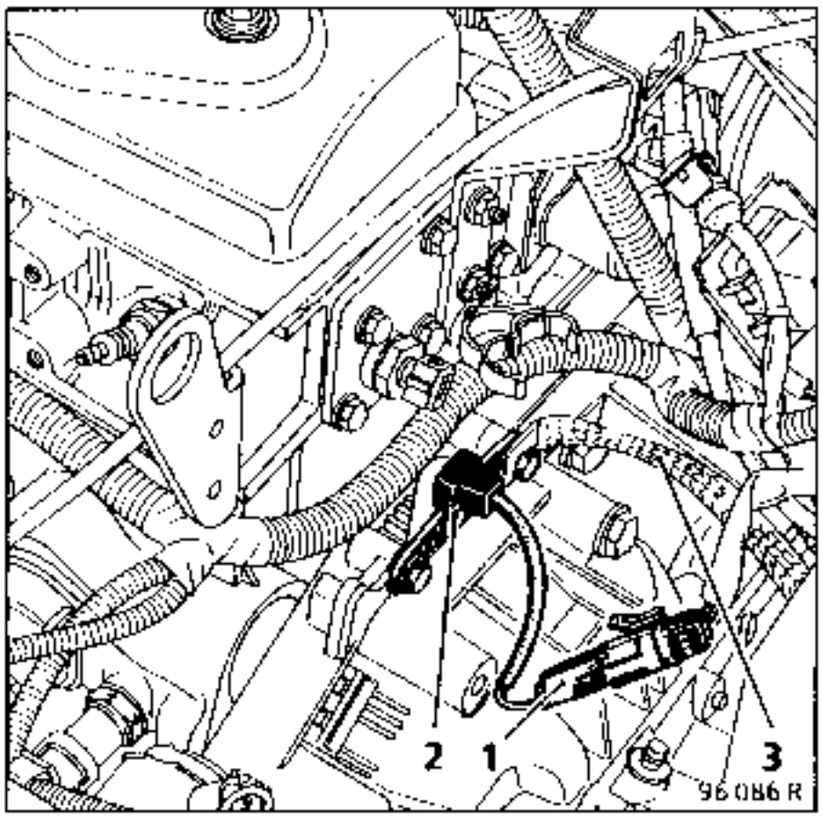
When refitting, check the connector is correctly refitted (2).

LOCATION OF RELAYS



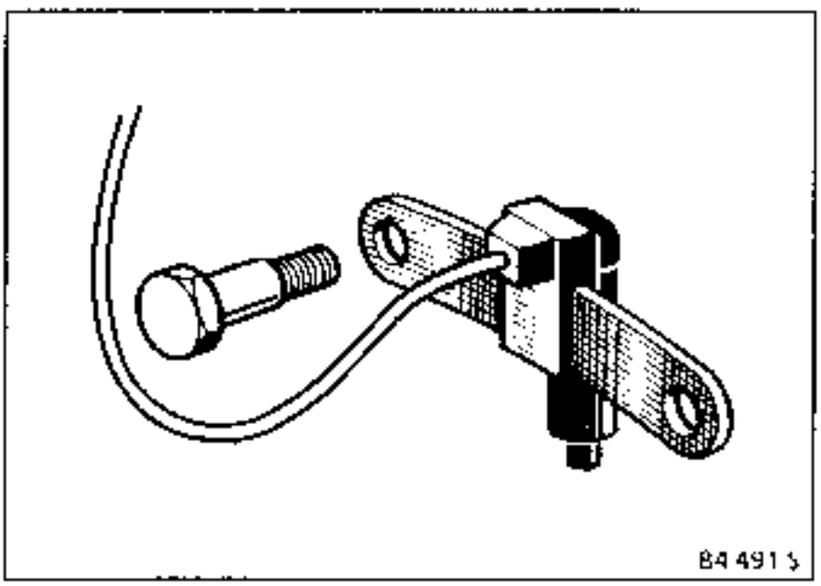
1 : Fuel pump control relay
2 : Locking relay.
3 : Injection power circuit protection relay

REMOVAL - REFITTING



Release the connector (1) from its mounting and disconnect it.
Remove the TDC sensor mounting bolts (2) and remove the sensor.

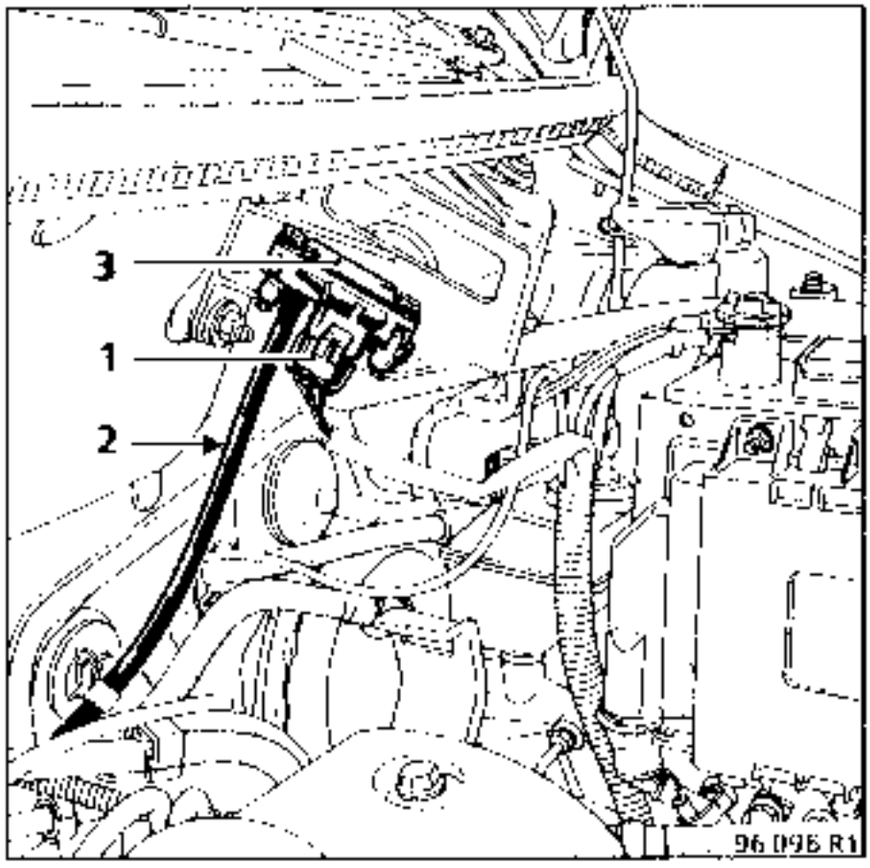
When refitting:
Fit the sensor using shouldered bolts and washers. (Do not forget the earth strap (3)).
Replace the connector correctly and ensure it is correctly clipped.



NOTE : The engine flywheel has a 58 tooth target (60 minus 2)

The absolute pressure sensor is mounted on the windscreen wiper motor mounting.

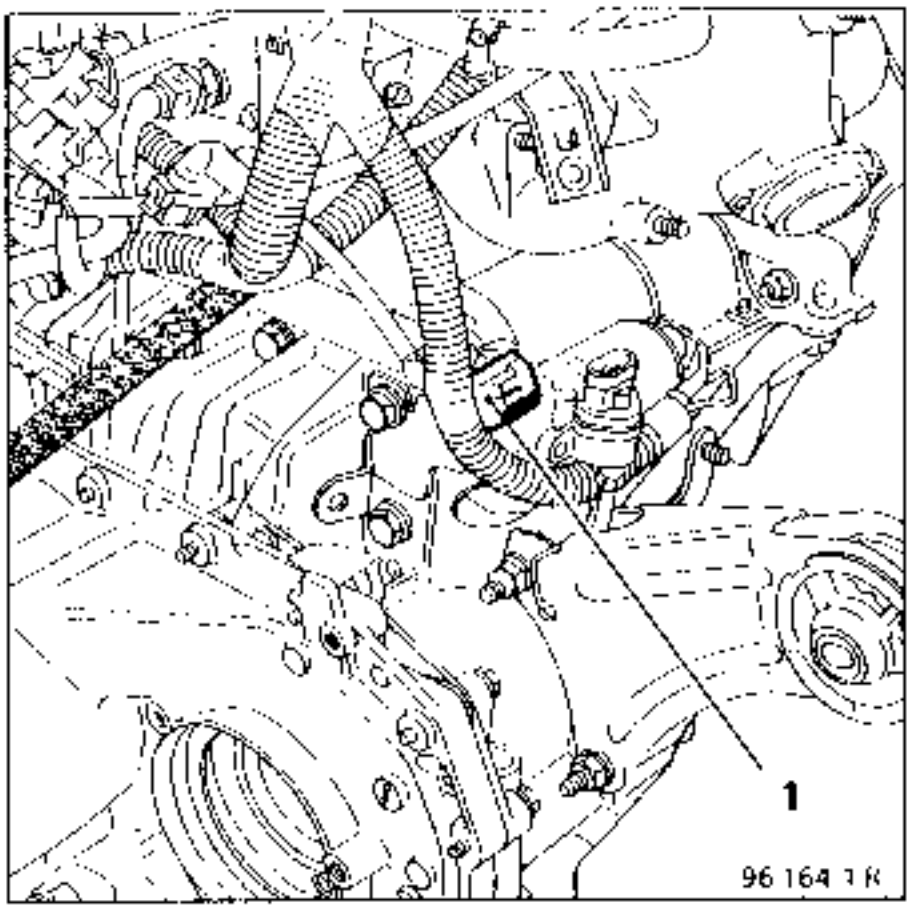
REPLACEMENT



Disconnect the connector (1) and the vacuum pipe (2)
Release the pressure sensor (3) which is clipped onto the mounting.

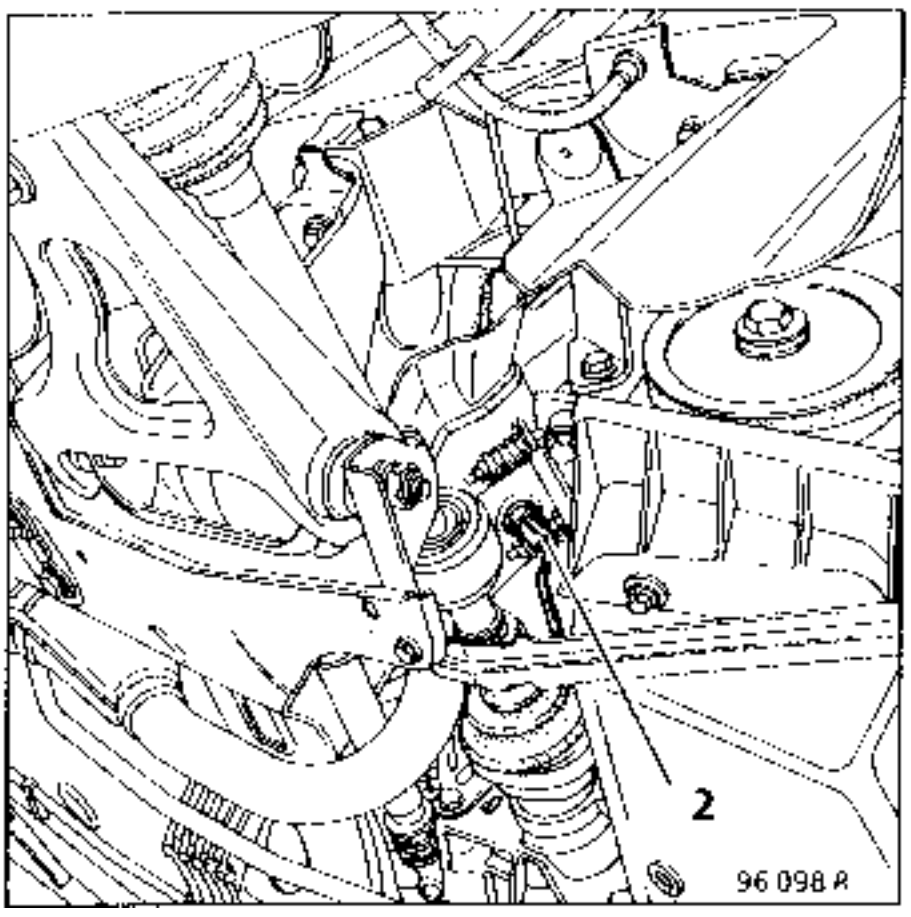
When refitting, ensure the connector is correctly clipped into position.

REMOVAL - REFITTING



Disconnect the sensor wiring (connector 1).

Unscrew the sensor (2). Do not let it drop



When refitting:

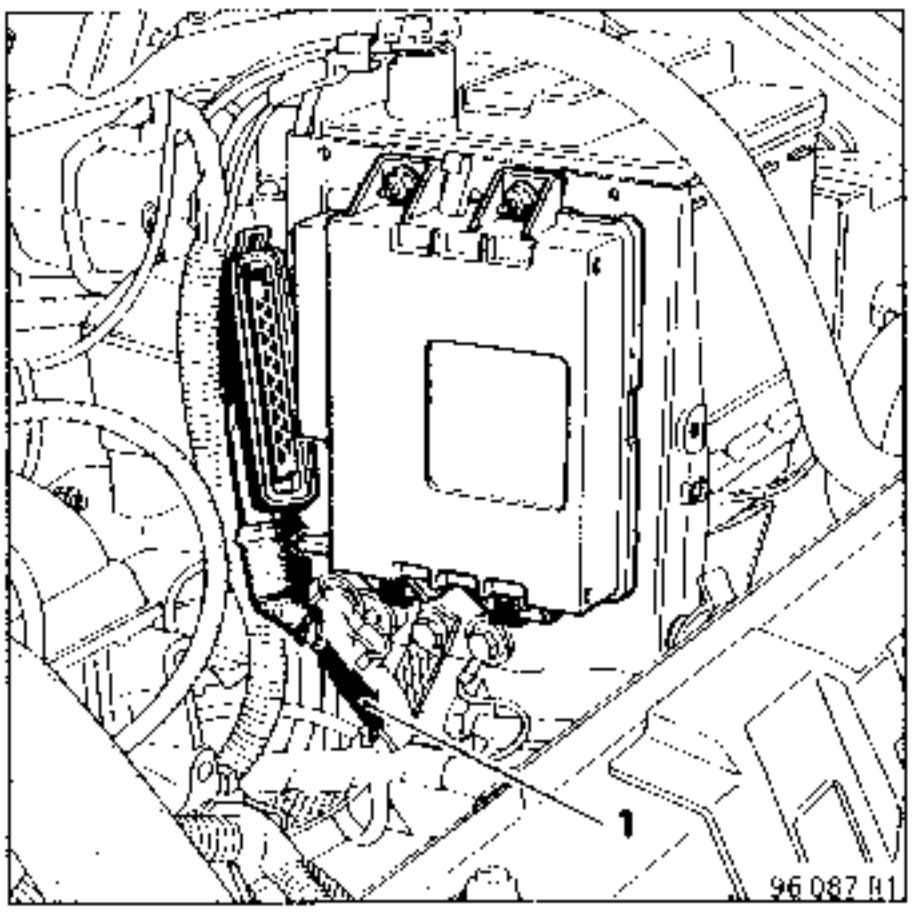
Torque tighten the sensor to 3 daN.m.
Check the wiring is correctly positioned and the connector is correctly re clipped.

Note:
The wiring may not be spliced or soldered. If it is broken, replace the sensor.

ADVANCE RETARD DEVICE

Although the vehicle is not fitted with pinking sensor, the ignition advance may still be adjusted
If the engine is pinking a 3 degree retard of the advance setting may be made.
This correction is not applicable for the complete engine operating range, but only for a manifold pressure of above 850 millibars (close to full load)
To make this correction, disconnect connector (1) and connect track n° 8 on the computer to earth.

Location



Procedure :
To activate the correction (engine stopped) :
- Disconnect the connector (1).
- Turn the ignition on
- Connect the XR25 and enter code D13.

Left hand bargraph on line 20 is illuminated
The correction is active.

To de-activate the correction (engine stopped) :
- Reconnect connector (1).
- Turn the ignition on.
- Connect the XR25 and enter code D13.

Left hand bargraph on line 20 is extinguished.
The correction is de-activated

In both cases, enter the diagnostics end code G13* before disconnecting the XR25.

Note:
Before activating the advance correction, check the pinking is not due to incorrect :
- fuel
- plugs
- inlet circuit (thermostatic element).
- engine cooling or fouling.

Type	Engine	Bosch	NGK	Adjustment in (mm) ± 0,05
C 063	C3G 700	W9DC (1)	BP 5 ESZ (1)	0,9

(1) Plug with seal: tightening torque **2,5 to 3 daN.m**

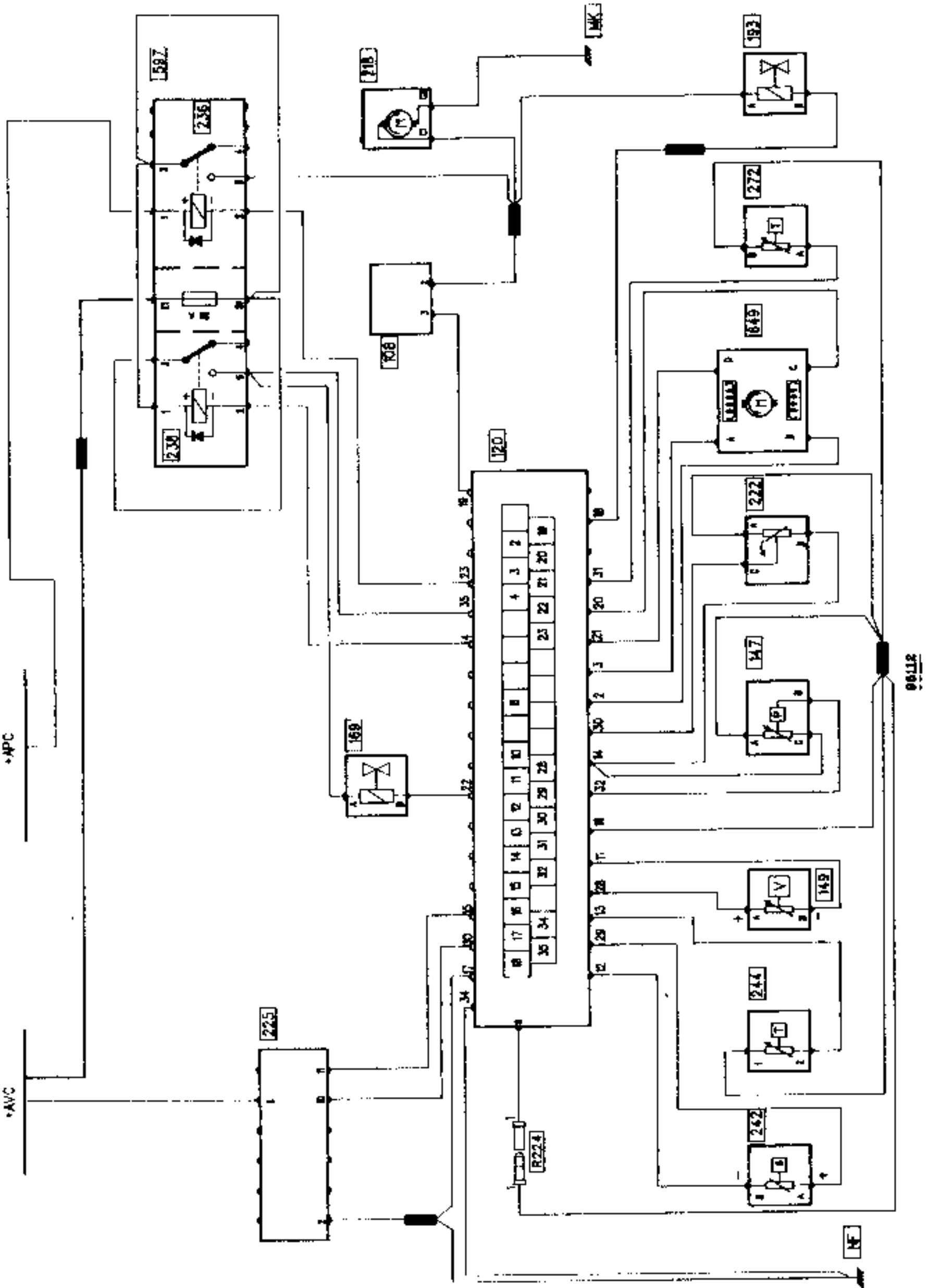
ATTENTION : Use the correct type of plug specified; the thermal suffix is not the only factor in their selection.

Fault finding using the XR25

KEY

108 : Ignition coil
120 : Injection computer
147 : Absolute pressure sensor
149 : TDC sensor
169 : Canister bleed solenoid
193 : Injector.
218 : Fuel pump
222 : Throttle position potentiometer.
225 : Diagnostic socket.
236 : Fuel pump relay.
238 : Injection locking relay.
242 : Oxygen sensor.
244 : Coolant temperature sensor
272 : Air temperature sensor
597 : Engine fuse box.
649 : Idle speed adjustment stepping motor
R224 : Earth connection - advance correction adjustment
MK : Electric earth - FLH pillar
NF : Engine electronic earth.

OPERATIONAL WIRING DIAGRAM



MAGNETI - MARELLI NEW FAULT FINDING FICHE

11 N° 23 CARD IDENTIFICATION: READ ON DISPLAY → 5. Ind

1		COMPUTER	CODE PRESENT	
2		CONNECTION FAIL COMP ---> COIL ✱02	ANTI-THEFT LOCK CIRCUIT	
3		INVERSE FLYWHEEL DATA	FLYWHEEL SIGNAL FAULT	
4		FUEL PUMP CIRCUIT RELAY	INJECTOR SHORT CIRCUIT	
5		IDLE REG MOTOR CIRCUIT	AIR TEMP SENSOR CIRCUIT	
6			COOLANT TEMP SENSOR CIRCUIT	
7			CANISTER CIRC ✱27	
8		OXYGEN SENSOR SHORT CIRCUIT	PRESSURE SENSOR CIRCUIT	
9		ADAC CIRCUIT	VEHICLE SPEED SENSOR CIRCUIT	
10		THROTTLE VALVE POT CIRCUIT	PINKING SENSOR CIRCUIT	

CODE D13 (S8)

INJECTION MAGNETI MARELLI

MEMORY DEL. G 0 ✱✱
END OF TEST G 1 3 ✱

11	PG ◄	THROTTLE POSITION	► PL	
	ILLUMINATED PG		ILLUMINATED	
12				
13		ANTI- THEFT active	Memory Fault ✱33	
14		Flywheel sensor signal (Eng. running)		
15		PUMP ACTIVE (engine running)		
16		IDLE REG active	CANISTER PURGE active	
17		SELECTION ▼ AIR CONDITIONING REQUEST	AIR COND FAULT	
18			AUTHORISATION	
19			RICHNESS REG active	
20		RETARD ADVANCE request	MEMORY XR 25 0	

ADDITIONAL CHECKS : ✱ . .

01	Pressure	mb
02	Coolant temp	°C
03	Air temp	°C
04	Computer feed	V
05	Oxygen sensor	V
06	Engine speed	rpm
12	RCO idle	%
13	Pinking signal	
14	Speed diff	rpm
15	Pinking corr.	d°
16	Atm pressure	mb
17	Throttle pot	
18	Veh speed	Km/h
30	Operating rich corr	
31	Idle rich corr	
35	Richness corr	

COMMAND MODE : G . ✱

TESTS

10	Fuel pump
14	Idle reg
16	Canister
21	Warn light

ADJUSTMENT CORRECTION

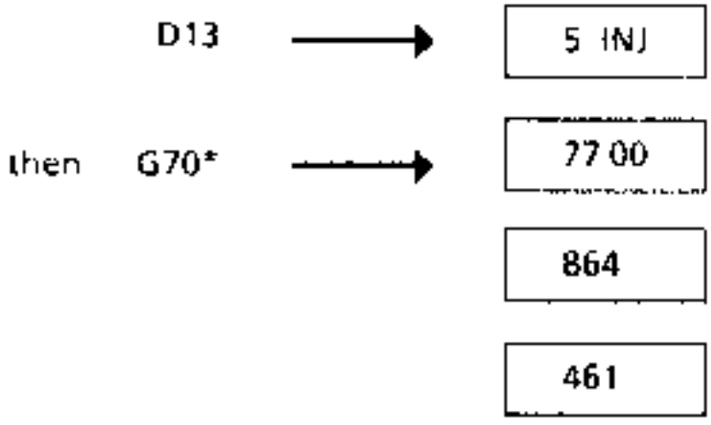
83	Increase idle
84	Decrease idle

70	PART No

ANG

When fault finding on Magnéti-Marelli injection systems, use cassette N° 11, place the ISO selector on S8 and use the fault finding fiche shown above (N° 23).
The computer is identified by directly reading the part number of the component. This is done after entering D13, by entering code G 70*.

The part number is displayed on the central screen in three stages. Each stage is displayed for approximately two seconds and the whole display is repeated twice.



Erasing the memory (GO)**

Following operations on the injection system, the computer memory can be erased using code GO**.(ISO selector on position 58).
No other computer is affected by this operation.

Note:
When using the XR25, before turning the ignition off or disconnecting the diagnostic socket, enter code G 13* to leave the injection fault finding mode.

Note : The memory can only be erased when the ignition is on (The memory cannot be erased when the engine is running)
The various G..* modes have no effect on the vehicle.

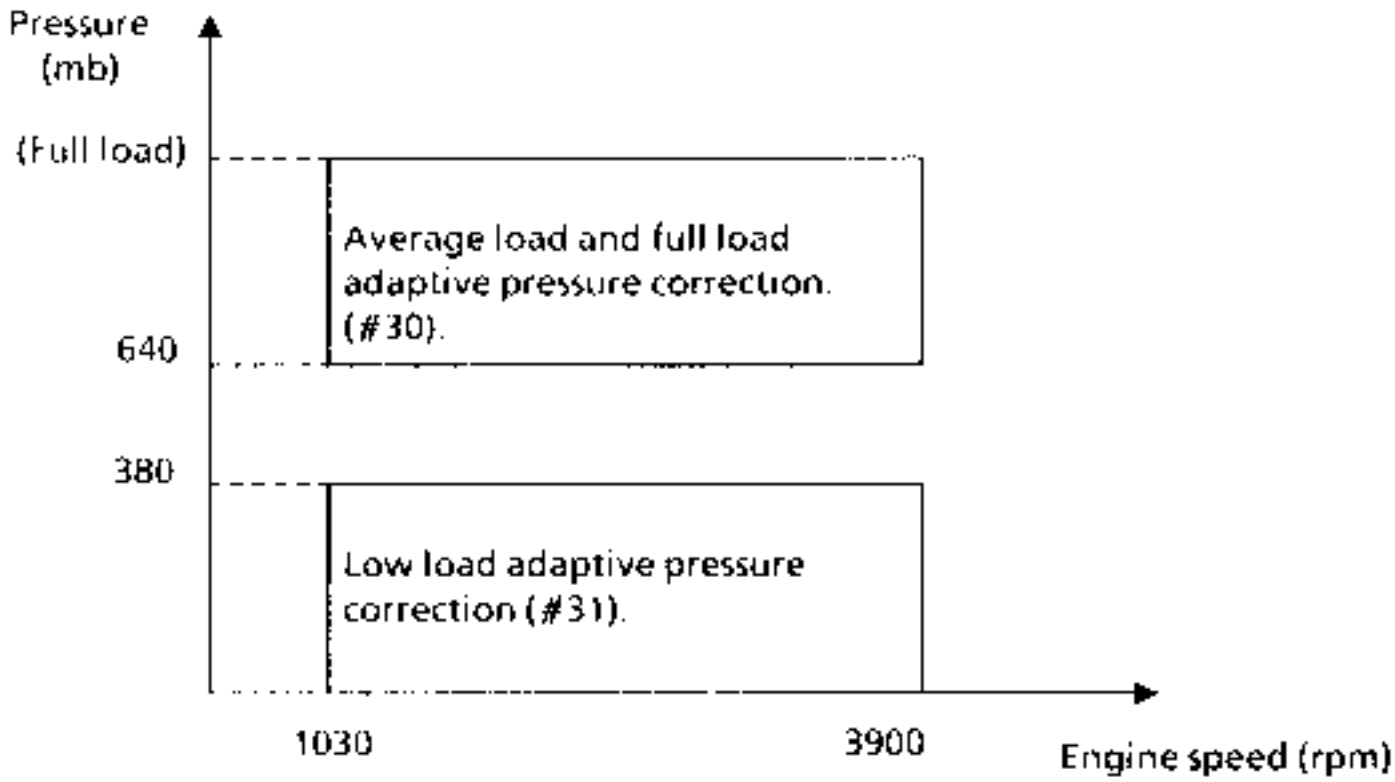
ACCESS TO COMPUTER INFORMATION USING THE # KEY.

# key	Tests carried out	Units
01	Manifold pressure	Millibars
02	Coolant temperature	Degrees
03	Air temperature	Degrees
04	Feed voltage	Volts
05	Oxygen sensor voltage	Volts
06	Engine speed	Rpm
12	RCO Idle speed adjustment stepping motor	%
14	Engine speed offset	Rpm
16	Atmospheric pressure correction	Millibars
17	Throttle position potentiometer value	No units
18	Vehicle speed	Km/h
30	Average load and full load adaptive pressure	No units
31	Low load adaptive pressure	No units
35	Richness correction	No units

Adaptive richness correction (#30 and 31)

These adaptive corrections are used to re-centre the richness correction (#35) to about 128, following diverse engine operation.
This optimises engine performance in the non-loop phase (oxygen sensor not operational).

Operating range



These corrections may only be made when the coolant temperature is equal to or above 75°C.

NOTE : These factors may only be analysed when one of these values is at the maximum or minimum threshold and when the engine is operating incorrectly. When the memory is erased, any corrections which may have been made previously are cancelled (#30 = #31 = 0).

	Min. value	Max. value
#30	- 37	105
#31	– 14	30

BARGRAPH FUNCTIONS

Bargraph normally illuminated, engine stopped and ignition on.

Bargraph illuminated when component is operated (condition bargraph).

Bargraph which may illuminate if there is a fault :
- fixed: fault present
: flashing: temporary fault.

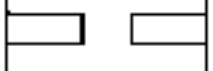
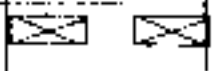
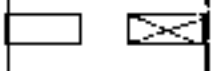
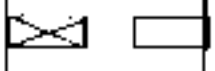
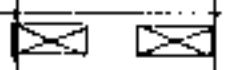
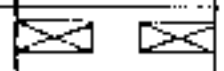
Bargraph does not operate for this vehicle type

PRESENTATION OF VARIOUS BARGRAPHS:

1		Bargraph illuminated : - on LH side : incorrect computer or internal problem. - on RH side : shows XR25 is receiving and reading the signals from the computer
2		Bargraph illuminated, shows a fault on the ignition coil - computer line ; the fault is stored (Diagnosis of CO, CC + CC –)
3		Bargraph illuminated : - on LH side : shows steering wheel sensor connections are inverted - on RH side . shows cyclical fault (target fault)
4		Bargraph illuminated : - on LH side : CC + on fuel pump relay line, computer. The fault is stored. - on RH side : Injector short circuit The fault is stored
5		Bargraph illuminated : - on LH side : short circuit idle speed adjustment stepping motor; the fault has been stored (diagnosis of CC + , CC – , CC coil). - on RH side : fault on air temperature sensor line ; air temperature takes default value of 33°C. The fault is stored. (Diagnosis of CO, CC – or CC +)
6		Bargraph illuminated shows a fault on the coolant temperature sensor line. The default value 90 °C is used if there is a fault. The fault is stored (Diagnosis of CO, CC – or CC +)
7		Bargraph illuminated shows a fault on the canister bleed solenoid line. The fault is stored. (Diagnosis of CO, CC – or CC +)

CO : Open circuit
CC + : short circuit to +
CC – : short circuit to earth

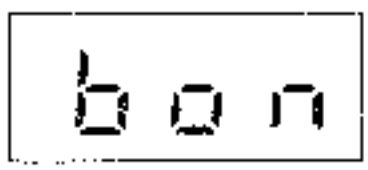
PRESENTATION OF VARIOUS BARGRAPHS (cont)

8		Bargraph illuminated: · on LH side . short circuit on oxygen sensor line. The sensor voltage (value under # 05) tends to 0 and the value of # 35 is 128 The fault is not stored. · on RH side : Presence of fault in absolute pressure sensor or its wiring. The manifold pressure value under # 01 takes a fixed value or a value assigned by mapping, depending on the throttle angle and the engine speed. The fault is not stored.
9		Not used for this vehicle type
10		Bargraph illuminated shows a fault in the throttle position potentiometer or its wiring. The default value under # 17 is 128 (or 64 for a CO or CC on the computer line (track 14)-potentiometer, engine stopped). The fault is stored. (Diagnosis of CO, CC + or CC)
11		Bargraph illuminated : - on LH side : throttle full load position info. (or full throttle) on RH side : throttle no load position info.
13		Bargraph illuminated shows a fault in the locking relay line, computer track 4. When this bargraph is illuminated, all other faults are masked The fault is stored.
14		Engine flywheel sensor signal. This bargraph should extinguish when the starter is activated
15		Fuel pump active info
16		Bargraph illuminated : - on LH side : Idle speed regulation stepping motor active info (only illuminated for no load). - on RH side : info which cannot be used for this vehicle
17		Not used currently
18		Not used currently
19		Richness regulation active info (#05 and #35 are variable)
20		Bargraph illuminated : - on RH side : memorised · on LH side . advance correction effective.

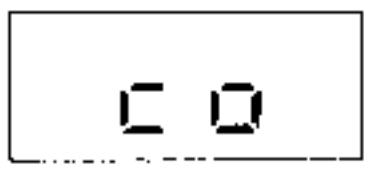
Special notes for certain bargraphs

Bargraphs 2L, 7R 13R have complementary tests : *02,* and *33. These tests are used to direct fault finding:

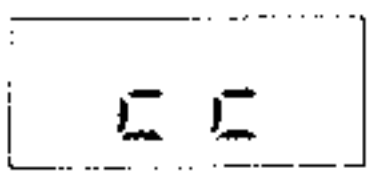
*02



: No fault on computer - ignition coil line

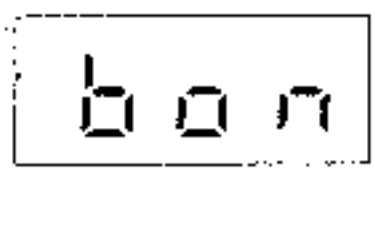


: Open circuit or short circuit to earth

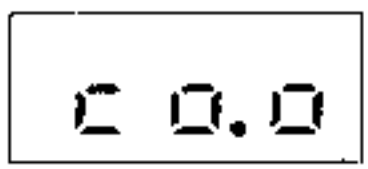


: Short circuit to + battery

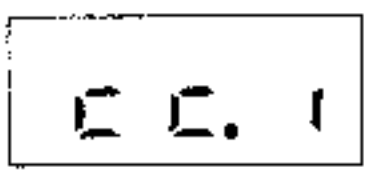
*27



: No fault with canister bleed solenoid or its wiring

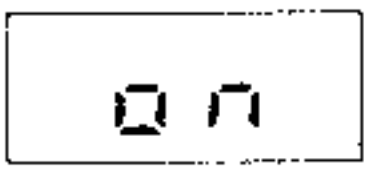


: Open circuit or short circuit to earth detected

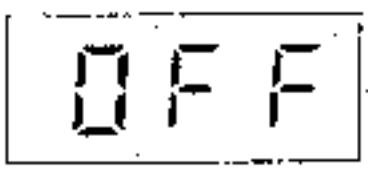


: Short circuit to + battery detected

*33



: No fault on locking relay computer track 4.



: Fault on locking relay computer track 4 line. All other faults which may have been stored before are masked.

: All stored faults erased (after entering GO**).

CHECKING CONFORMITY

Engine cold, ignition on :

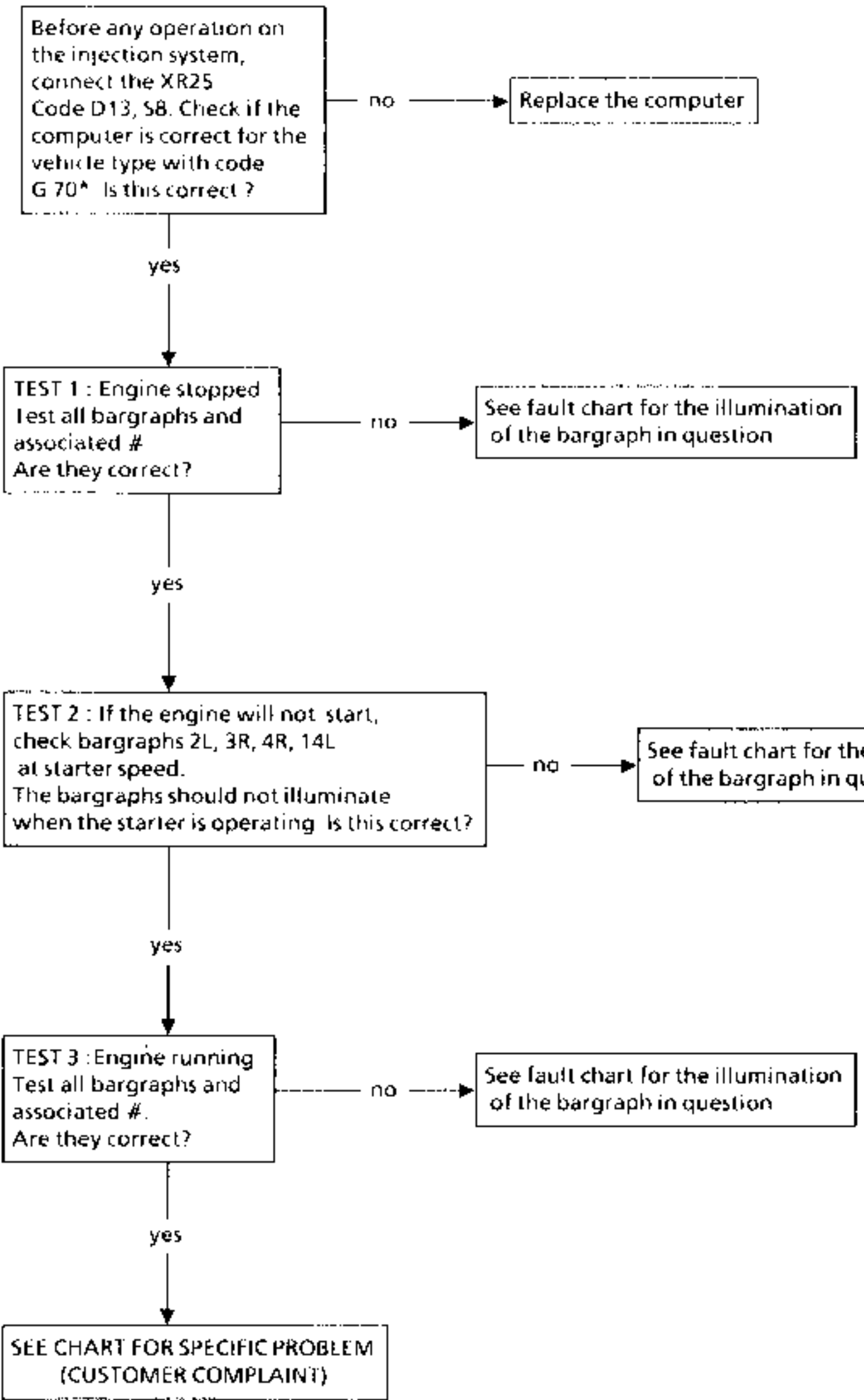
Functions to check	Line no.	Bargraph display	XR25 code	Central display - notes
Diagnostic signals received			D13	5. InJ
Computer correct			G70*	First 7 700 then 864 then 461 The part number is repeated twice
Interpretation of bargraphs normally illuminated	L1 L11 L14			Code present Recognition of no load positron TDC signal missing (should extinguish when starter activated).
Absolute pressure sensor	L8		# 01	The value read should equal atmospheric pressure (between 900 and 1023 mb)
Coolant temperature sensor	L6		# 02	The value read should equal ambient temperature ± 5°C
Air temperature sensor	L5		# 03	The value read should equal ambient temperature. ± 5°C
Battery voltage			# 04	The voltage should be between 11 V and 13 V (Without electrical consumers)
Throttle position potentiometer, no load	L11		# 17	The value read should be between 9 and 41
Throttle position potentiometer, full load	L11		# 17	The value read should be between 168 and 235

CHECKING CONFORMITY

Engine warm at idle speed, after one operation of the engine cooling fan.

Functions to check	Line no.	Bargraph display	XR25 code	Central display - notes
Idle speed			# 06	The idle speed should be 700 ± 50 rpm with no consumers connected
Idle speed regulation stepping motor	L16		# 12	The value read should be between 2 and 10 % with no consumers connected
Richness regulation active (at idle speed after the engine has stabilised at 2500 rpm for more than 3 minutes)	L19		# 05 # 35	The value varies around 0,475 V. The value read should be between 93 and 163.

XR25 CHECK ON THE INJECTION SYSTEM BEFORE ANY OPERATION IS CARRIED OUT



BARGRAPH 1 LH SIDE ILLUMINATED
Computer fault

Incorrect computer type. Replace the computer.

BARGRAPH 2 LH SIDE ILLUMINATED
Ignition coil circuit

Bargraph illuminates only when starter is activated : t< 5s

*02 on XR25 read :
CO = Open circuit or short circuit to earth on computer track 19.
CC = Short circuit to + 12 V on computer track 19.

OPEN CIRCUIT OR SHORT CIRCUIT TO EARTH

Check the connections on the ignition coil.
Repair if necessary
Does the fault persist?
— no → Correct
yes ↓

Using the XR25 as a pulse detector, check that when the starter is activated track 3 for the ignition coil registers pulses. Are there pulses ?
— no → Connect bornier MS 1048 in place of the computer and check the wiring continuity and insulation from earth between track 3 on the ignition coil and track 19 on the computer (bornier). Repair if necessary. Does the fault persist?

yes ↓ Replace the ignition coil

yes ↓ Replace the computer

no ↓ Correct

SHORT CIRCUIT TO + 12 VOLTS

Bargraph permanently illuminated.
Disconnect the ignition coil connector and erase the stored fault and retest Do you read CC in *02 ?
— no → Replace the ignition coil
yes ↓

Turn the ignition off, disconnect the battery and 35 track computer connector. Check the wiring is insulated between tracks 2 and 3 of the ignition coil connector.
Is this correct?
— no → Repair the wiring
yes ↓

Replace the computer

NOTE : A short circuit to earth on track 19 blows the 25 A fuse (engine side)

BARGRAPH 3 LH SIDE ILLUMINATED
Steering wheel sensor circuit

Steering wheel sensor connections inverted Check sensor connections Vehicle will not start.

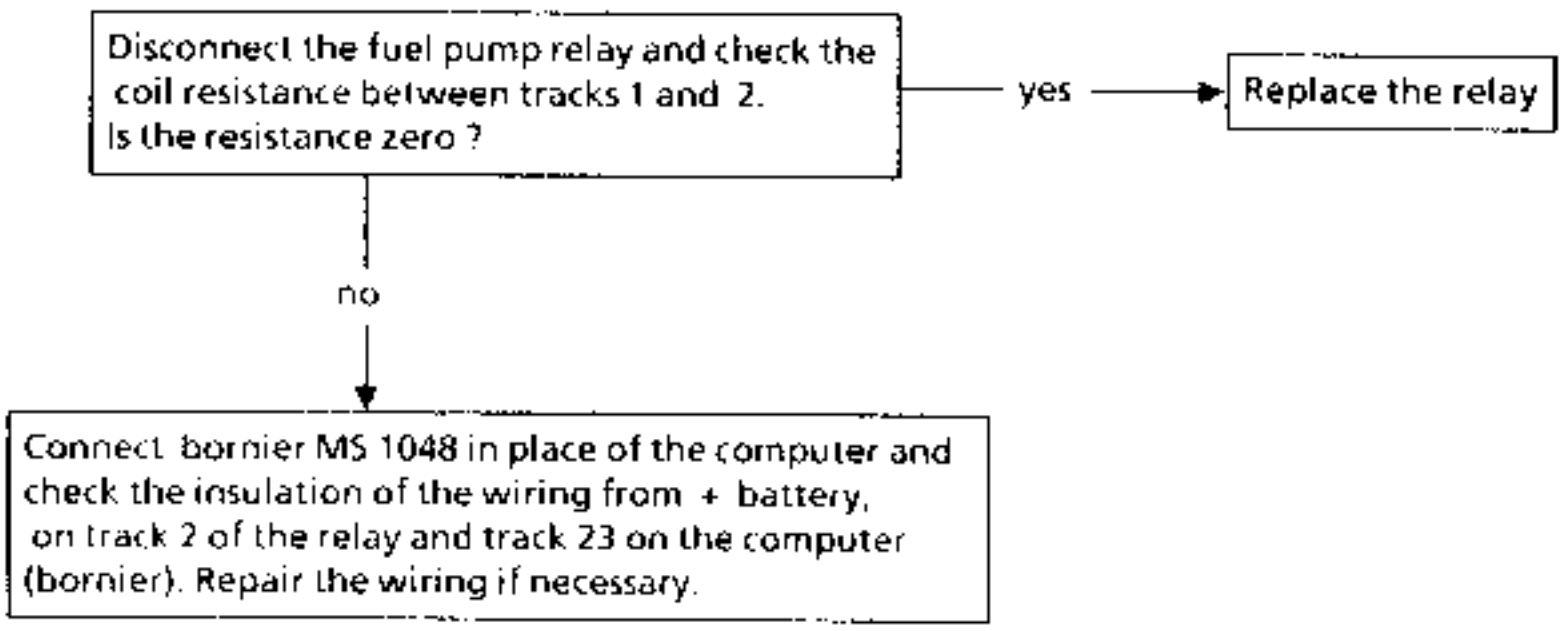
BARGRAPH 3 RH SIDE ILLUMINATED
Steering wheel sensor

Cyclical fault

There is :
- a target fault (more serious for AT)
- an air gap fault for the steering wheel sensor.
- a micro cut in the steering wheel sensor circuit.

BARGRAPH 4 LH SIDE ILLUMINATED
Fuel pump relay

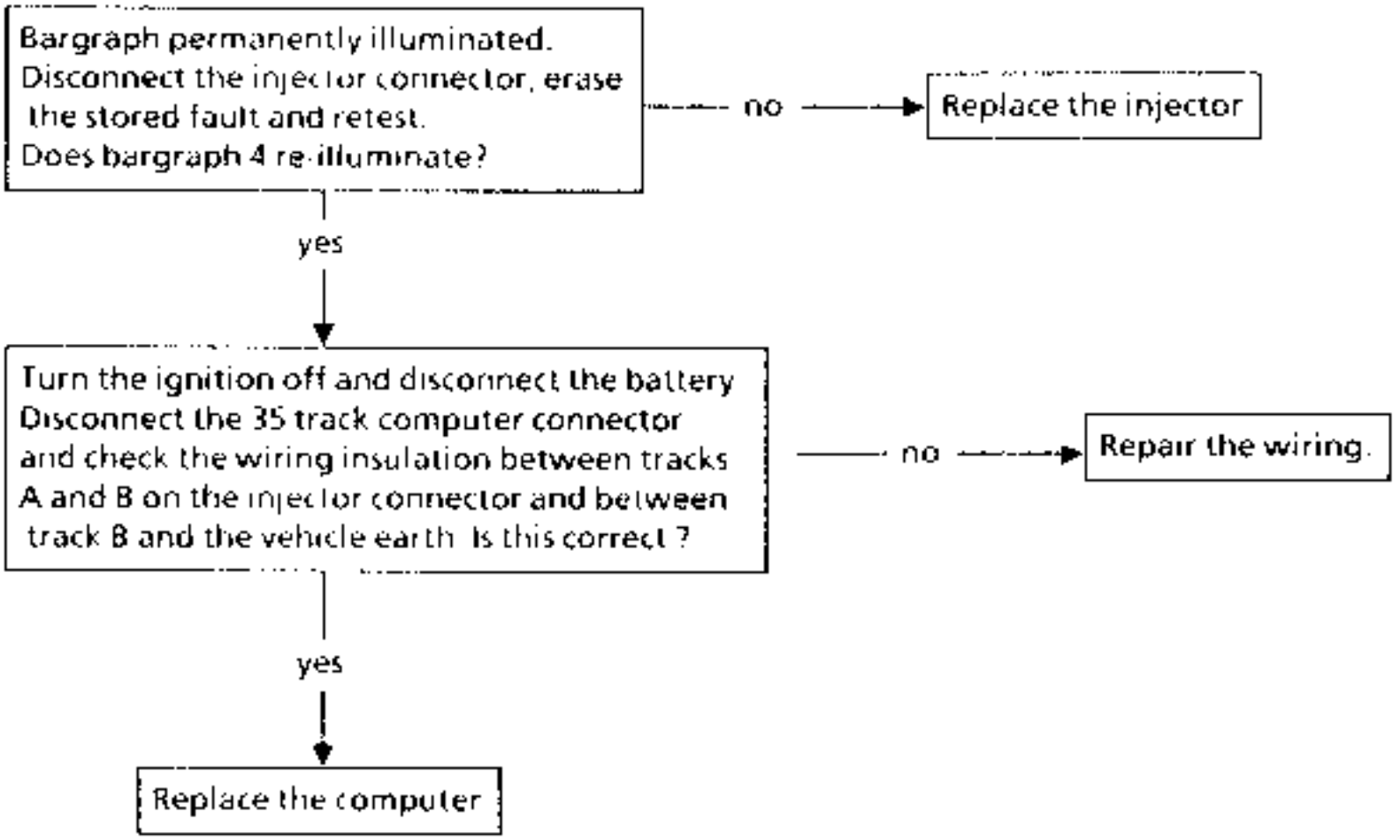
Short circuit to + 12 Volts on line 23 on computer.
Bargraph illuminated when starter activated..
Bargraph 2 LH side (ignition coil) is also illuminated
and * 02 = CO.



NOTE : An open circuit and a short circuit on computer line 23 prevent dialogue with the computer and functioning of the injection test

BARGRAPH 4 RH SIDE ILLUMINATED
Injector short circuit

When the starter is activated the bargraph illuminates for approximately 5 seconds

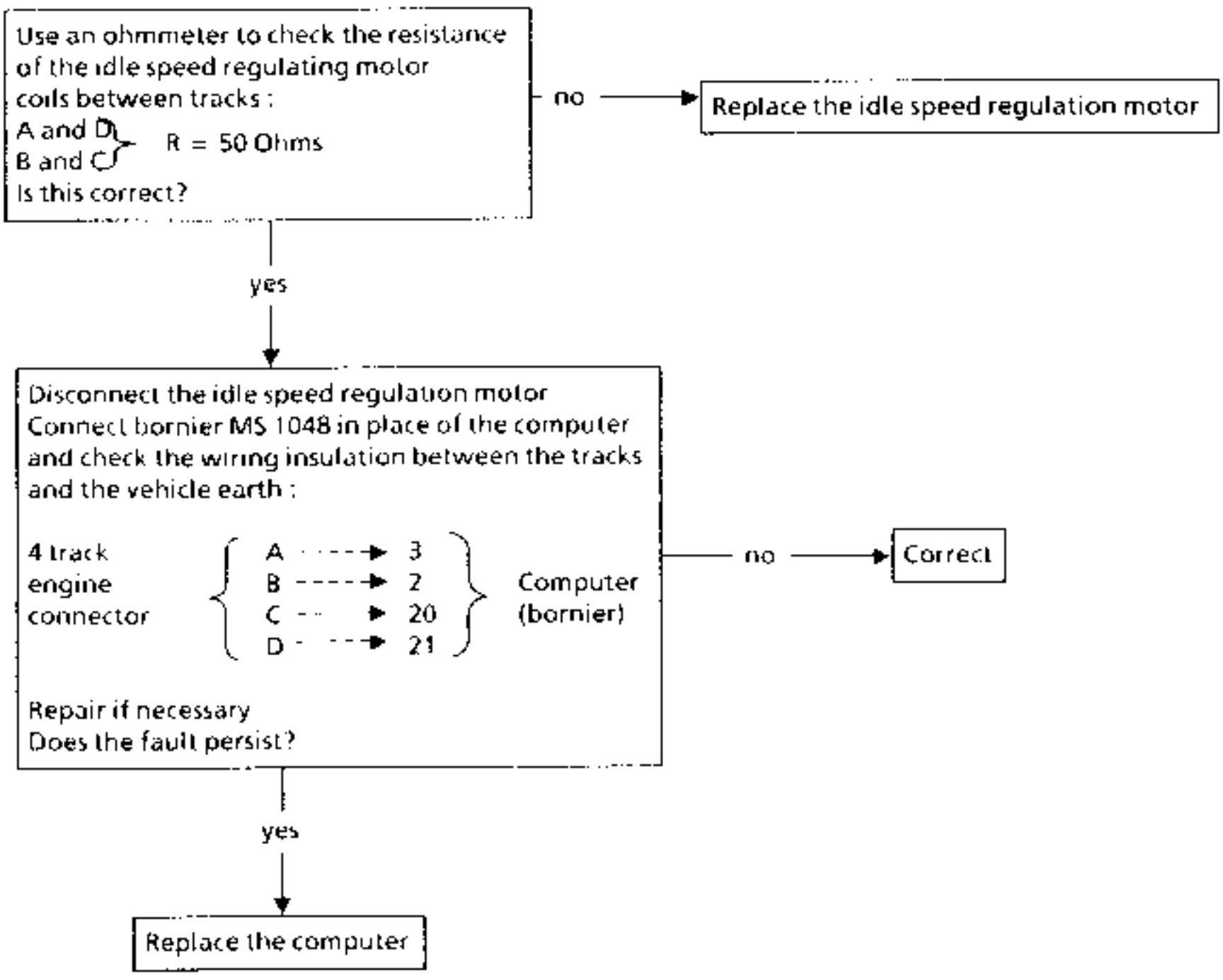


NOTE : An open circuit on 1 of the 2 injector wires or the connector being disconnected will not cause bargraph 4 RH side to illuminate.

BARGRAPH 5 LH SIDE ILLUMINATED
Idle speed regulation motor circuit

Short circuit to earth and short circuit to + on one of the 4 coil wires, (line 2,3, 20 or 21 on the computer)
Coil short circuit (A and D or B and C)

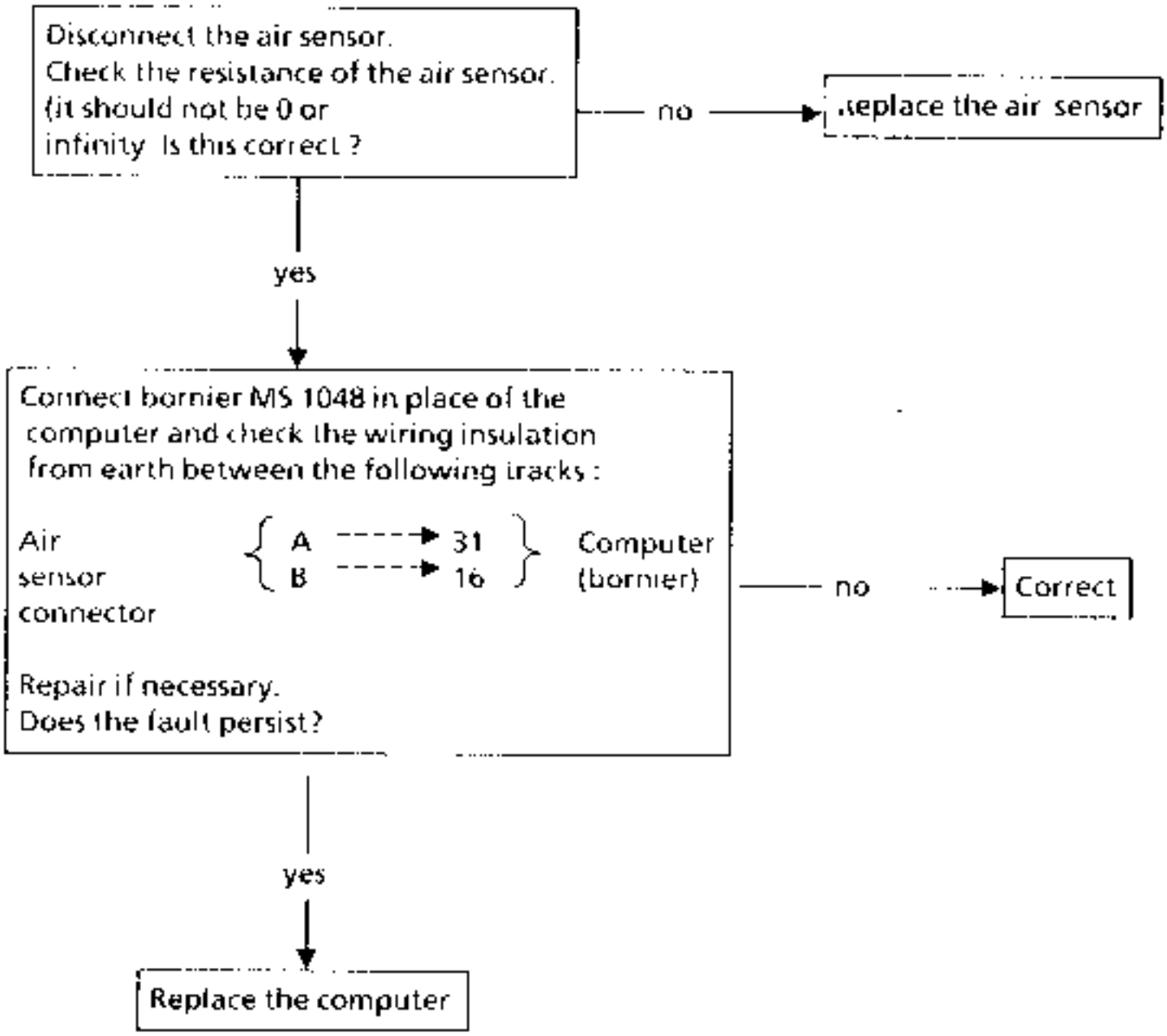
#12 = value fixed under acceleration



NOTE : An open circuit on one of the 4 motor wires or the connector being disconnected will not cause the bargraph top illuminate but the value of # 12 is fixed under acceleration.

BARGRAPH 5 RH SIDE ILLUMINATED
Air sensor

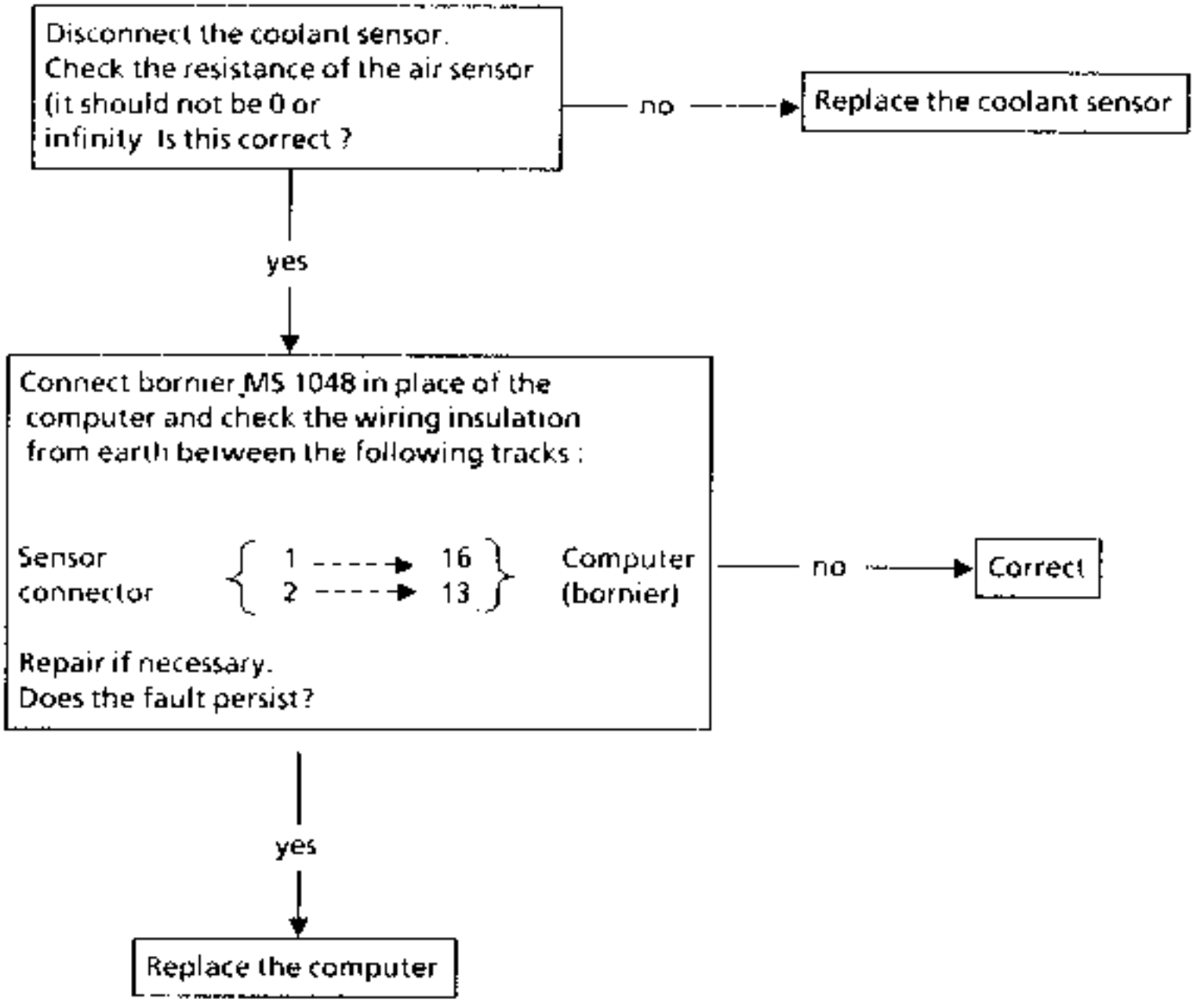
Open circuit on computer lines 16 and 31.
Short circuit to earth on computer line 31.
#03 = 33



NOTE : If bargraphs 6 RH side and 10 LH side are also illuminated there is an open circuit on the common earth wire between splice NA and computer line 16.

BARGRAPH 6 RH SIDE ILLUMINATED
Coolant sensor

Open circuit on computer lines 13 and 16
Short circuit to earth on computer line 13
#02 = 90

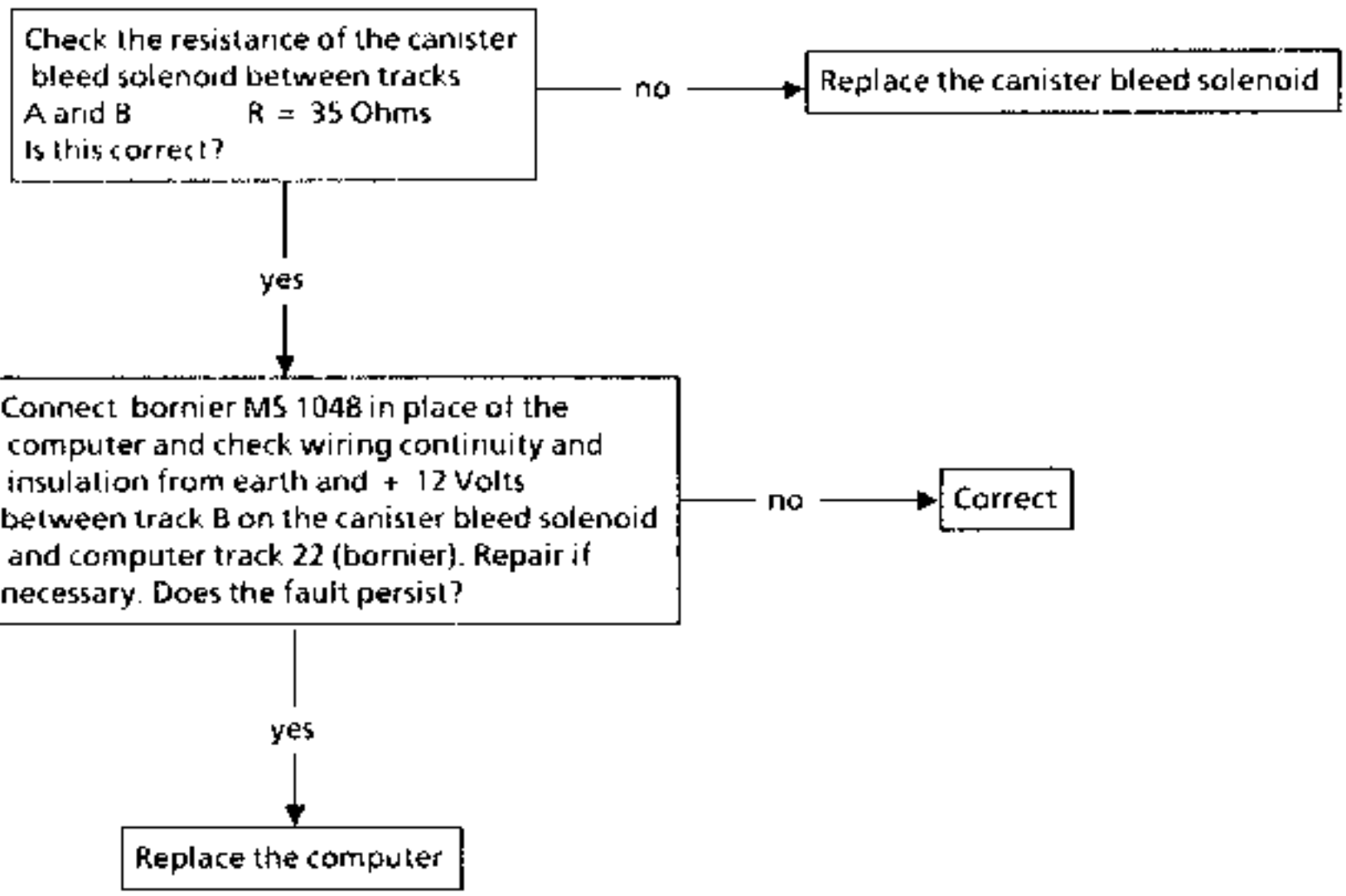


NOTE : If bargraphs 5 RH side and 10 LH side are also illuminated there is an open circuit on the common earth wire between splice NA and computer line 16.

BARGRAPH 7 RH SIDE ILLUMINATED
Canister circuit

Open circuit
Short circuit to earth
Short circuit to + 12 Volts
} on computer line 22

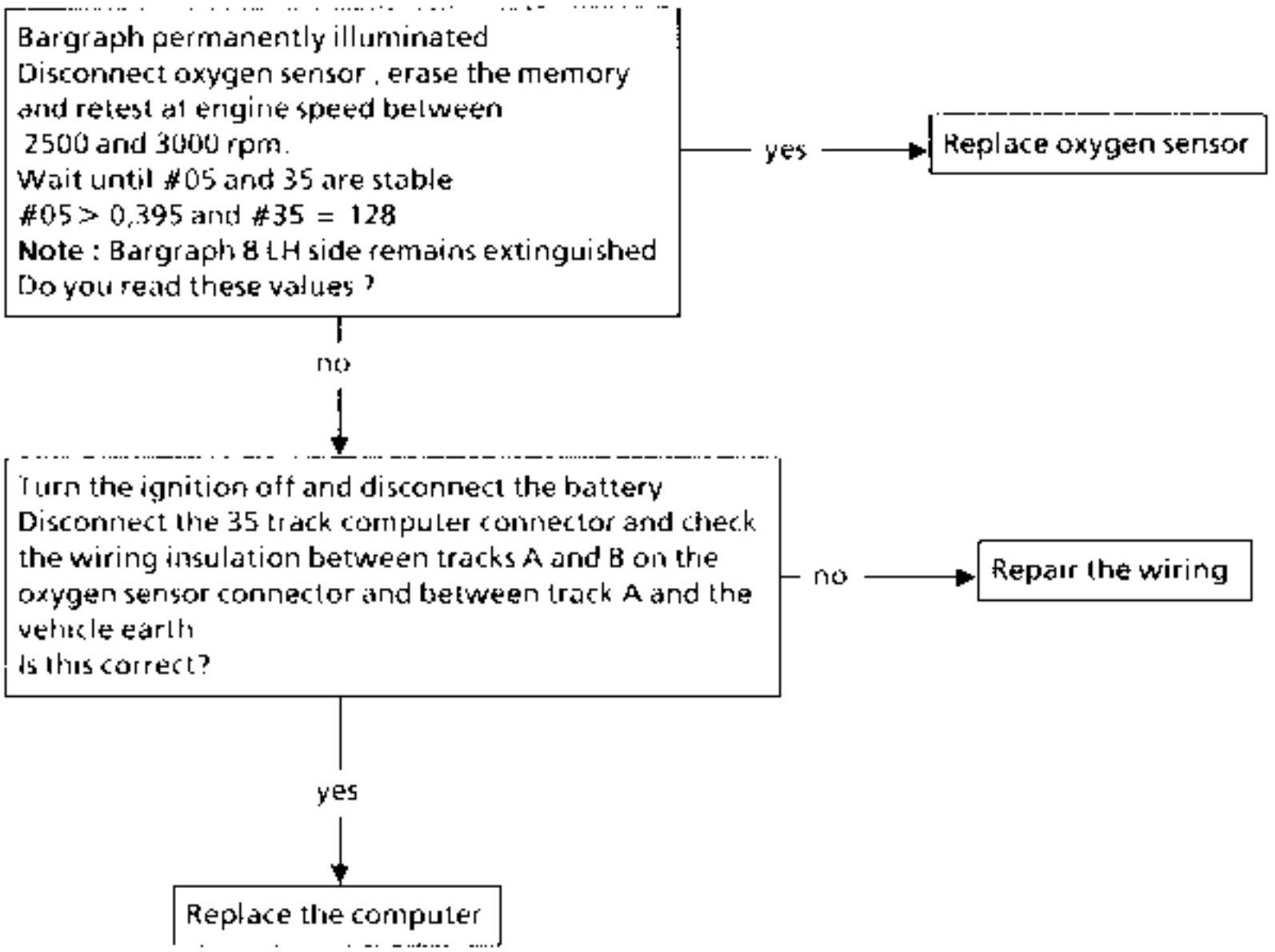
*27 on XR25 read :
CO.0 = open circuit or short circuit to earth
CC.1 = short circuit to + battery



BARGRAPH 8 LH SIDE ILLUMINATED
Oxygen sensor

Short circuit for sensor between lines 12 and 29 on the computer
Short circuit to earth on computer line 29

05 < 0,1 V
35 = 128

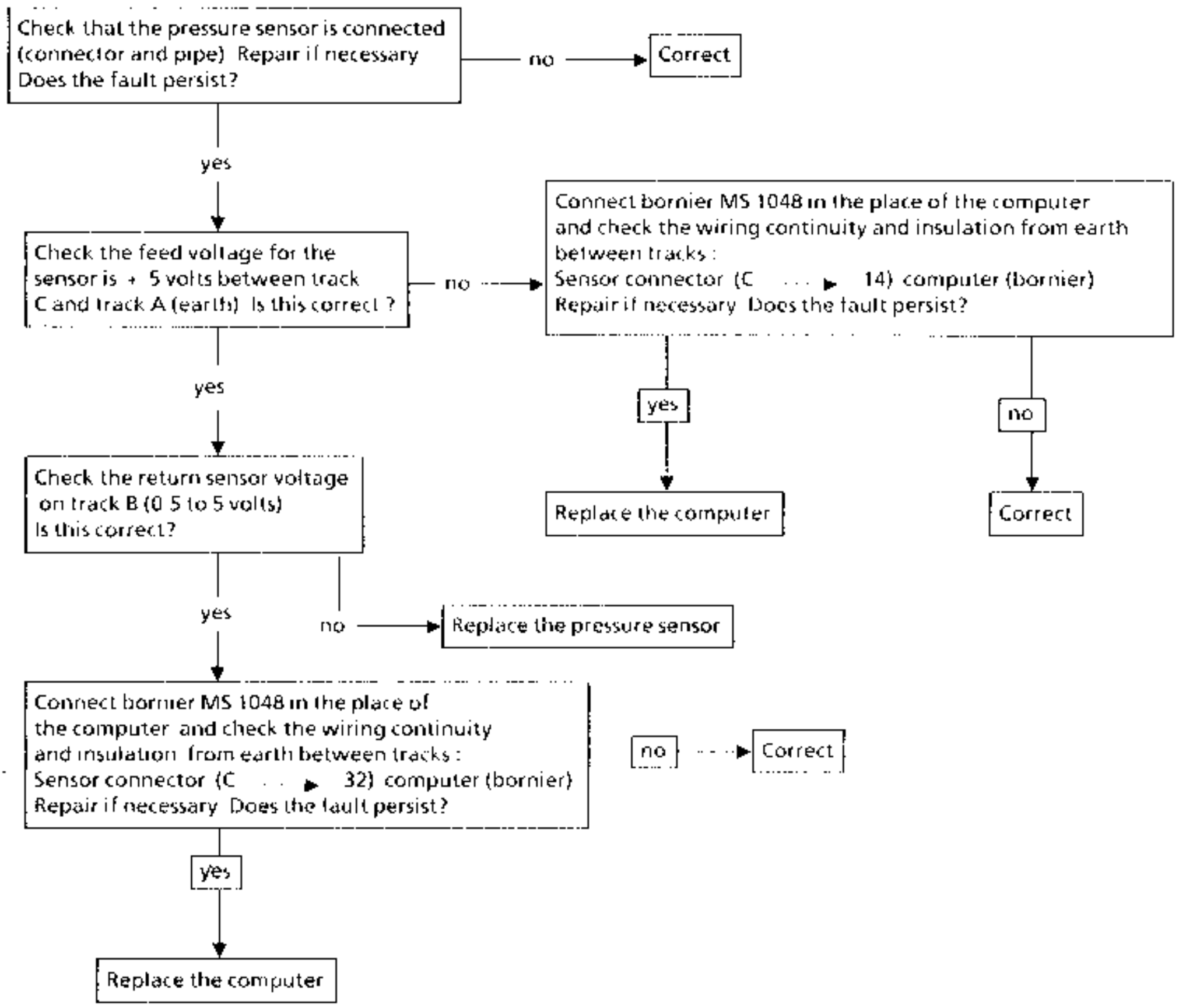


Note : An open circuit on lines 12 and 29 or the oxygen sensor connector being disconnected will not cause bargraph 8 LH side to illuminate but # 05 and 35 take fixed values:
05 > 0,395
35 = 128

BARGRAPH 8 RH SIDE ILLUMINATED
Absolute pressure sensor

Open circuit or short circuit to earth on computer lines 14 and 32.

01 = variable and dependent on throttle opening or fixed with a value which is not zero.



Note : An open circuit on line 16 or a short circuit on lines 16 and 32 will not cause bargraph 8 RH side to .Illuminate and # 01 is equal to 1020.

BARGRAPH 10 LH SIDE ILLUMINATED
Throttle potentiometer circuit

Open circuit on computer lines 14, 16 and 30.
Short circuit to earth on computer lines 14 and 30
Potentiometer short circuit between tracks 14 and 30

#17 = 128 or 64

Use an ohmmeter to check the potentiometer resistance between tracks :
A and B R > 1200 Ohms
Is this correct?

no → Replace the throttle potentiometer

yes

Use an ohmmeter to check the potentiometer resistance between tracks :
A and C while varying the potentiometer setting to ensure the resistance increases and decreases accordingly.
Is this correct?

no → Replace the throttle potentiometer

yes

Connect bornier MS 1048 in the place of the computer and check the wiring continuity and insulation from earth between tracks

3 track connector	A	16	Computer (bornier)
	B	14	
	C	30	

Repair if necessary
Does the fault persist?

no → Correct

yes

Replace the computer

NOTE : If bargraphs 5 RH side and 6 RH side are also illuminated there is an open circuit on the common earth wire between splice NA and computer line 16

BARGRAPH 11 RH SIDE
No load position

Condition bargraph normally illuminated for no load (PL)

Enter # 17 on the XR25 and check the throttle position potentiometer value for no load. 9 < no load < 41

Erase the memory using G0** on the XR25. Is PL present ?

no

Check if the throttle is against the mechanical stop for no load Is this correct?

no

Adjust the accelerator control

yes

Correct

yes

Replace the throttle position potentiometer Does the fault persist?

yes

no

Correct

Replace the computer

BARGRAPH 11 LH SIDE
Full load position

Bargraph illuminated for throttle opening >70°
Test to be carried out if bargraph is not illuminated for full load (PF)

Enter # 17 on the XR25 and check the throttle position potentiometer value for full opening 168 < full load < 235

Check if the throttle is against the mechanical stop for full load Is this correct?

no

Adjust the accelerator control

yes

Replace the throttle position potentiometer Does the fault persist?

yes

no

Correct

Replace the computer

BARGRAPH 13 RH SIDE ILLUMINATED
Memory fault

*33 on XR25 read :
Bon : after G0**
on . when the bargraph is extinguished
off : when the bargraph is illuminated

This bargraph is normally illuminated after :
- disconnecting the 35 track connector
- cutting battery feed (= 5 min)
- cutting permanent computer feed before ignition (computer line 4 or 25A engine side fuse).

To extinguish this bargraph turn the ignition off (= 10 s), then turn the ignition back on or enter G0** on the XR25 to erase the memory; if the bargraph extinguishes you should read *33 = bon.
Does the bargraph extinguish?

yes → Correct

no

Check there are not micro-cuts in the permanent feed line (AVC) for the computer between track 4 on the computer and track 2 on the protection relay, also check the computer and relay connections and the 25A fuse contacts (engine side). Repair if necessary.
Does the bargraph remain illuminated?

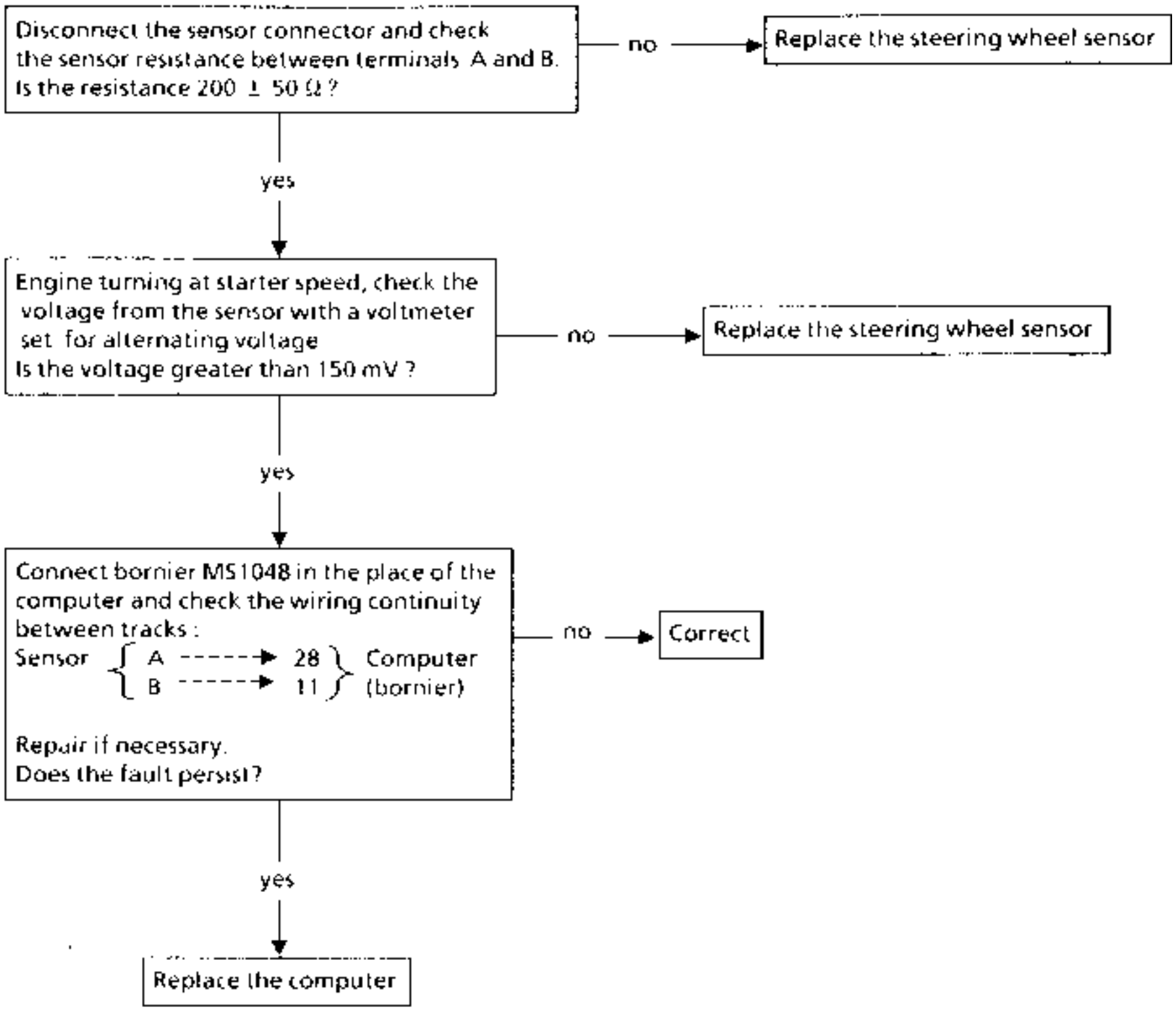
no → Correct

yes

Replace the computer

BARGRAPH 14 LH SIDE ILLUMINATED
Steering wheel sensor circuit

The bargraph does not extinguish when the starter is activated.

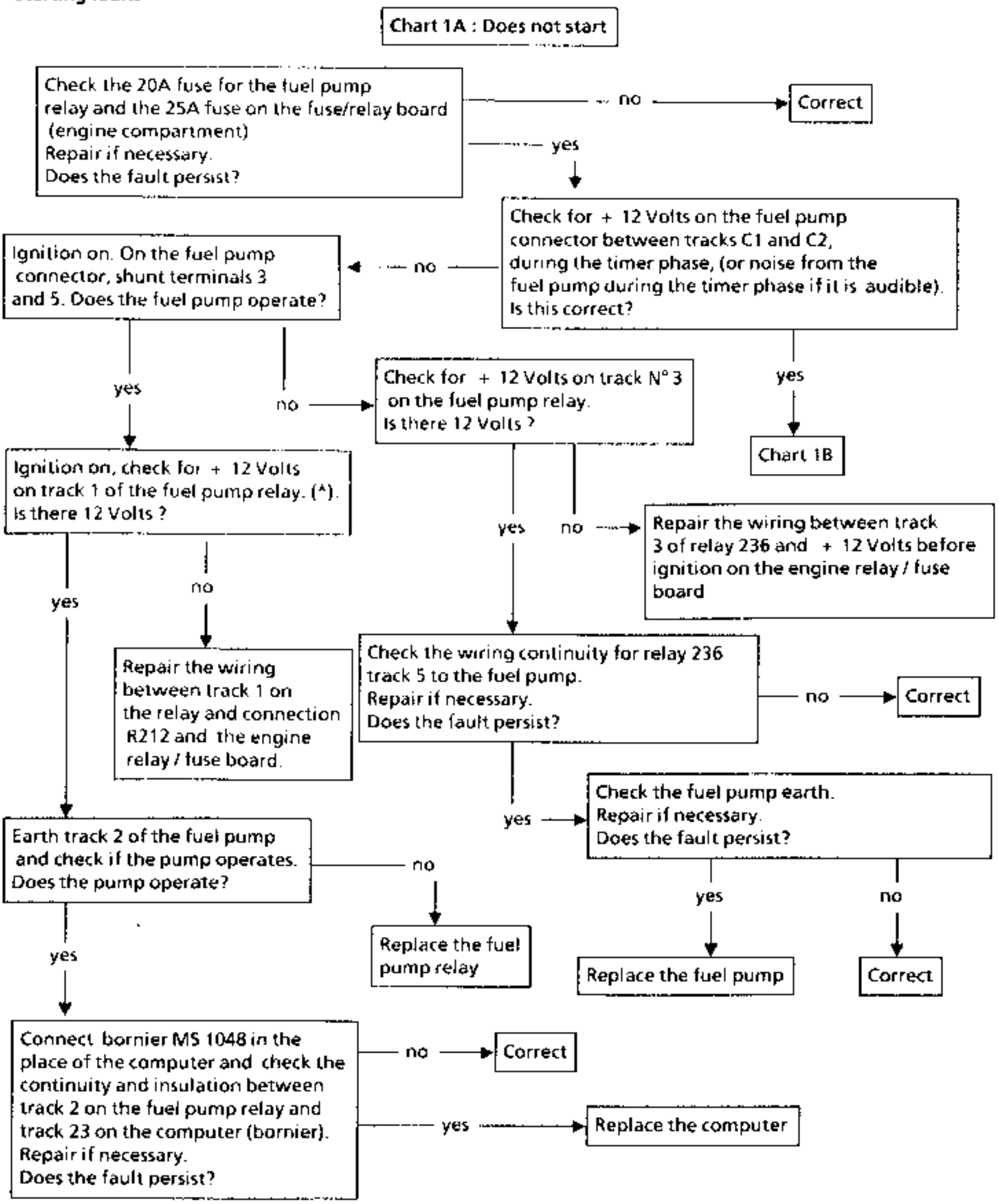


Note : This bargraph may extinguish when the ignition is on after G0**, in this case re-enter D13 or turn the ignition off and on again then enter D13.

CUSTOMER COMPLAINTS

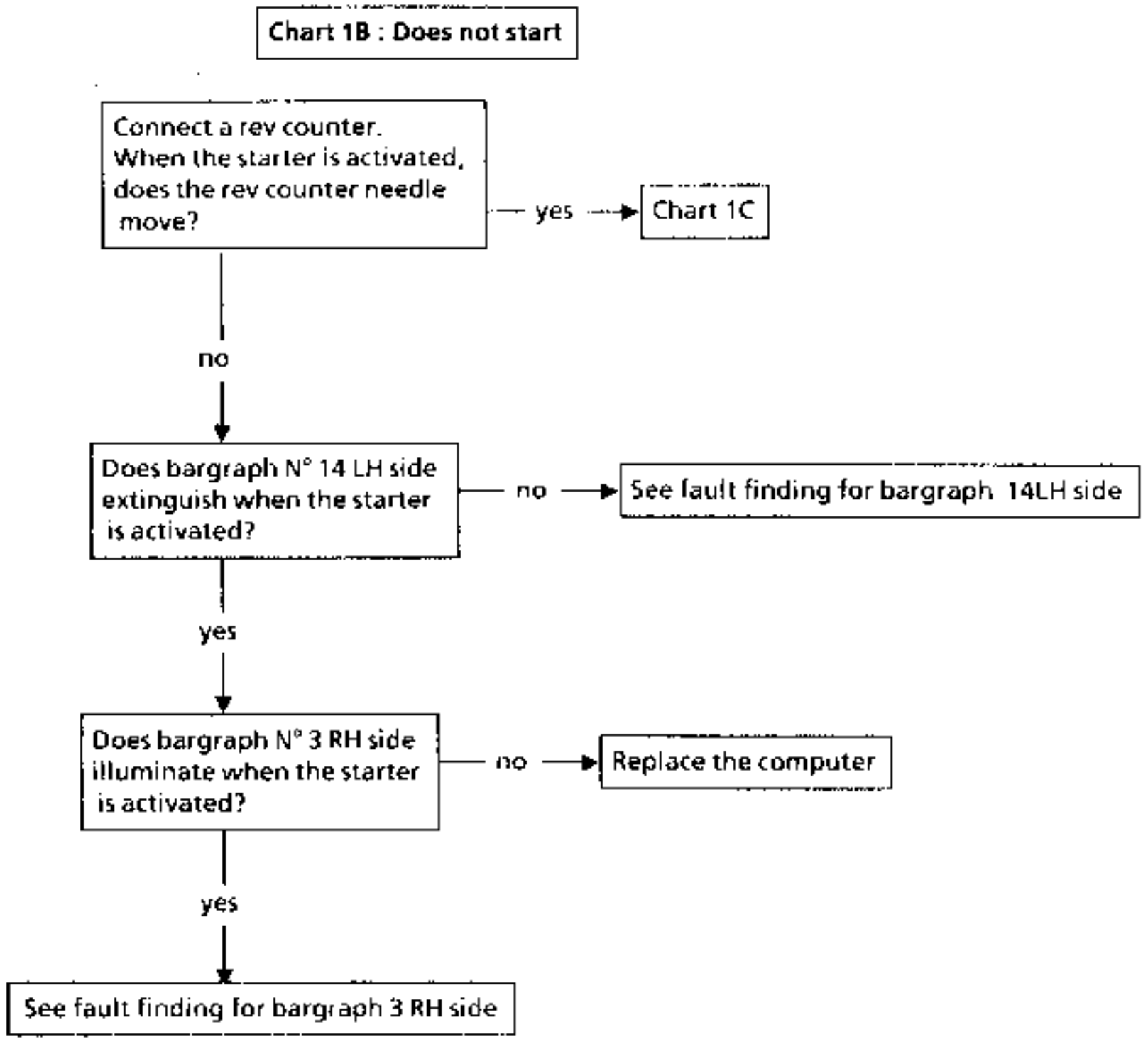
Starting faults	
Does not start	Chart 1A - 1B - 1C
Starts but stalls	Chart 2
Starting takes too long	Chart 3
Idle speed faults	
Too high	Chart 4
Engine speed unstable	Chart 5
Jerky operation	Chart 6
Behaviour while driving	
Lack of performance	Chart 7
Misfires and jerky operation	Chart 8
Smoke - pollution	
Black smoke	Chart 9
Lack of conformity to anti-pollution regulations - CO and or HC too high	Chart 10
Increased fuel consumption	Chart 11
Engine noise	
Pinking	Chart 12

Starting faults



* : An open circuit or a short circuit to earth on computer line 23 prevents dialogue between the computer and the XR2S, and prevents engine testing.
A short circuit to + 12 Volts on computer line 23 illuminates bargraphs 4 LH side and 2 LH side when the starter is activated.

Starting faults



Starting faults

Chart 1C : Does not start

Check the plugs, plug leads, HT circuit.
Replace any faulty parts.
Does the fault persist?

- yes → Remove the air filter and check that when the starter is activated there is fuel from the injector
  Is there a fuel jet?
  - yes → Check the fuel flow and pressure (see Ch. 13)
    Is this correct?
    - yes → There is an engine fault, the injection system is correct.
    - no → Repair the fuel circuit, regulator (injection body), pump, filter, pipes.
      Does the fault persist?
      - yes → There is an engine fault, the injection system is correct.
      - no → Correct
  - no → Does bargraph 4 RH side illuminate when the starter is activated? (Wait approximately 5 seconds)
    - yes → See fault finding for bargraph 4 RH side
    - no → When the ignition is switched on and during the timer phase, check for + 12 Volts on track A of the injector.(*)
      Is this correct?
      - no → Repair the wiring between track A on the injector and the splice in the engine wiring.
      - yes → Disconnect the injector and check the resistance.
        Do you read approximately 1,8 ohm ?
        - no → Replace the injector
        - yes → Connect bornier MS 1048 in place of the injection computer and check the continuity and insulation between the injector and the computer (bornier) track 21. Repair if necessary.
          Does the fault persist?
          - yes → Replace the injection computer
          - no → Correct

(*) Bargraph 4 RH side will not illuminate if there is an open circuit in the injector circuit.

Starting faults

Chart 2 : The engine starts but stalls

Engine at idle speed, check # 12 on the XR25 Value < 2% ?. (1)

yes → Use an ohmmeter to check the coil resistance for the idle speed regulation motor between tracks : A and D) B and C) R = 50 Ohms Is this correct?

no → Replace the idle speed regulation motor

yes → Connect bornier MS 1048 in the place of the computer and check the continuities between the computer connector and the idle regulation motor

Regulation motor 4 track connector	A ----→	3	Computer (bornier)
	B ----→	2	
	C ----→	20	
	D ----→	21	

Repair if necessary. Does the fault persist?

no → Correct

yes → Replace the injection computer

no → See fault finding for bargraph 8 RH side.

Ignition on, engine stopped, on XR25 do you read atmospheric pressure under # 01 ?

yes → Engine running, check # 01 (2) on XR25. Is the value still fixed during acceleration?

yes → See fault finding for bargraph 8 RH side.

no → Check the air inlet circuit (air filter ....) and the exhaust line. Is this correct?

no → Repair the air inlet circuit or exhaust line. Does the fault persist?

no → Correct

yes → Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair pump, pipes, injector, regulator (injection body), filter.

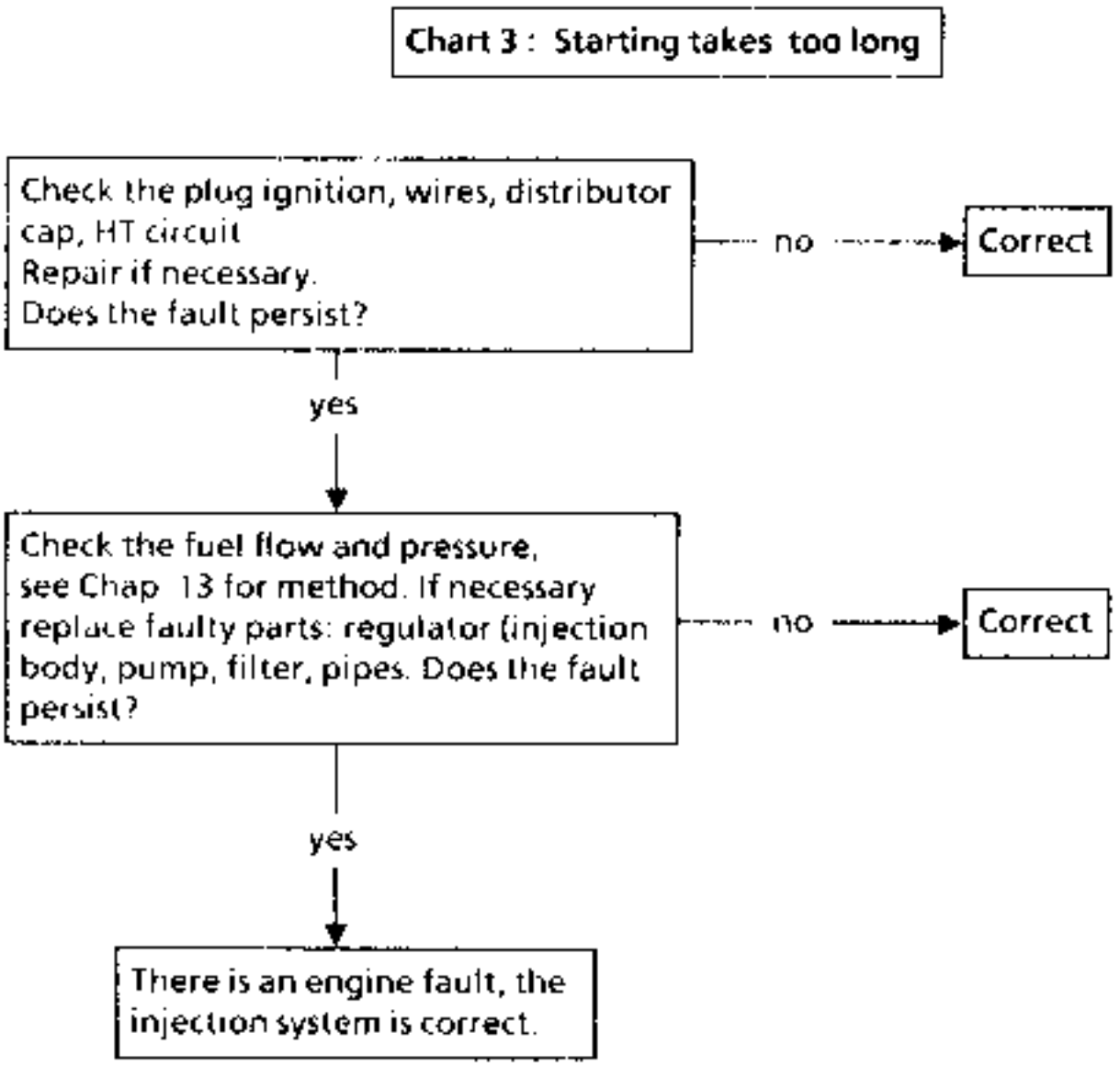
yes → Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair pump, pipes, injector, regulator (injection body), filter.

(1) Bargraph 5 LH side will not illuminate if there is an open circuit on one of the idle speed regulation motor wires or if the idle speed regulation motor connector is disconnected

(2) Bargraph 8 RH side will not illuminate for :

- CO on track 16
- CC between tracks 14 and 32.

Starting faults



Idle speed faults

Chart 4 : Idle speed too high

On XR25 check #12. (*).
Value < 2% ?.

no → Check # 17 for no load.
Is the value between 9 and 41 ?.

no → See fault finding for bargraph 11 RH side

yes

yes

Check the fuel flow and pressure, see Chap. 13 for method If necessary repair pump, filter, pipes, regulator (injection body). Does the fault persist?

no → Correct

yes → There is an engine fault, the injection system is correct.

Look for any air leak on inlet manifold or idle speed regulation motor.
Repair if necessary.
Does the fault persist?

no → Correct

yes

Check for the nozzle in the vapour rebreathing pipes and check the condition of the pipes between the rocker box cover and the inlet manifold. Repair if necessary.
Does the fault persist?

no → Correct

yes

Disconnect the idle speed regulation motor and check the coil resistances between (A and D) and (B and C).
Is it approximately 50 ohms ?

no → Replace the idle speed regulation motor

yes

Connect bornier MS 1048 in place of the computer and check the following continuities:

Idle speed regulation motor connector	A	3	Computer (bornier)
	B	2	
	C	20	
	D	21	

Repair if necessary.
Does the fault persist?

no → Correct

yes

Replace the computer

(*) Bargraph 5 LH side will not illuminate if there is an open circuit on one of the 4 idle speed regulation motor wires or if the idle speed regulation motor connector is disconnected.

Idle speed faults

Chart 5 : Engine speed unstable

Check the plugs, wires, distributor cap, HT circuit.
Repair if necessary
Does the fault persist?

no → Correct

yes ↓

Check the pollutant and Lambda values.
- CO < 0,3 %
- HC ≤ 100 ppm
- CO^2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03

Is this correct?

no → See Chap. 14

yes ↓

Ignition on, engine stopped, on XR25 do you read atmospheric pressure under # 01 ?

no ↓

See fault finding for bargraph 8 RH side

yes ↓

Engine running, check # 01 on XR25.
Is the value fixed during acceleration ? (*)

yes → See fault finding for bargraph 8 RH side

no ↓

Check the canister bleed solenoid is not stuck in the open position, using a vacuum pump connected to the pipe between the solenoid and throttle body Repair if necessary. Does the fault persist?

no → Correct

yes ↓

Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair regulator (injection body) pump, filter, pipes, injector . Does the fault persist?

no → Correct

yes → There is an engine fault, the injection system is correct.

(*) Bargraph 8 RH side will not illuminate for :
- CO on track 16
- CC between tracks 14 and 32.

Idle speed faults

Chart 6 : Jerky operation

When the idle speed is high and the engine does not run smoothly, check for the nozzle in the vapour rebreathing pipes and check the condition of the pipes between the rocker box cover and the inlet manifold. Repair if necessary.
Does the fault persist?

no → Correct

yes ↓

Check the pollutant and Lambda values:
- CO < 0,3 %
- HC ≤ 100 ppm
- CO^2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03.

Is this correct?

no → See Chap. 14

yes ↓

Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair pump, filter, pipes, injector, regulator (injection body).
Does the fault persist?

no → Correct

yes ↓

Check the sealing of the inlet manifold gasket and the canister pneumatic circuit.
Repair if necessary.

Behaviour while driving

Chart 7 : Lack of performance

Check the throttle is opening fully. (visual check that throttle is fully open)
Check the accelerator control adjustment.
Repair if necessary.
Does the fault persist?

no → Correct

yes

Ensure the plugs are correct and in good condition.

no → Correct

yes

Check the air inlet circuit (air filter....) and the exhaust line.
Repair if necessary
Does the fault persist?

no → Correct

yes

Check the pollutant and Lambda values:
- CO < 0,3 %
- HC ≤ 100 ppm
- CO^2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03

Is this correct?

no → See Chap. 14

yes

Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair pump, filter, pipes, injector, regulator (injection body) .
Does the fault persist?

no → Correct

yes

There is an engine fault, the injection system is correct.

Behaviour while driving

Chart 8 : Misfires and jerky operation

Ignition on, engine stopped, on XR25 do you read atmospheric pressure under # 01 ?
- no → See fault finding for bargraph 8 RH side
- yes ↓

Engine running, on XR25 check # 01 (*). Is the value fixed under acceleration?
- yes → See fault finding for bargraph 8 RH side
- no ↓

Check the pollutant and Lambda values:
- CO < 0,3 %
- HC ≤ 100 ppm
- CO^2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03.

Is this correct?
- no → See Chap. 14
- yes ↓

Check the HT cables are clean, the TDC sensor, (possible cause interference). Replace any faulty parts.
Does the fault persist?
- no → Correct
- yes ↓

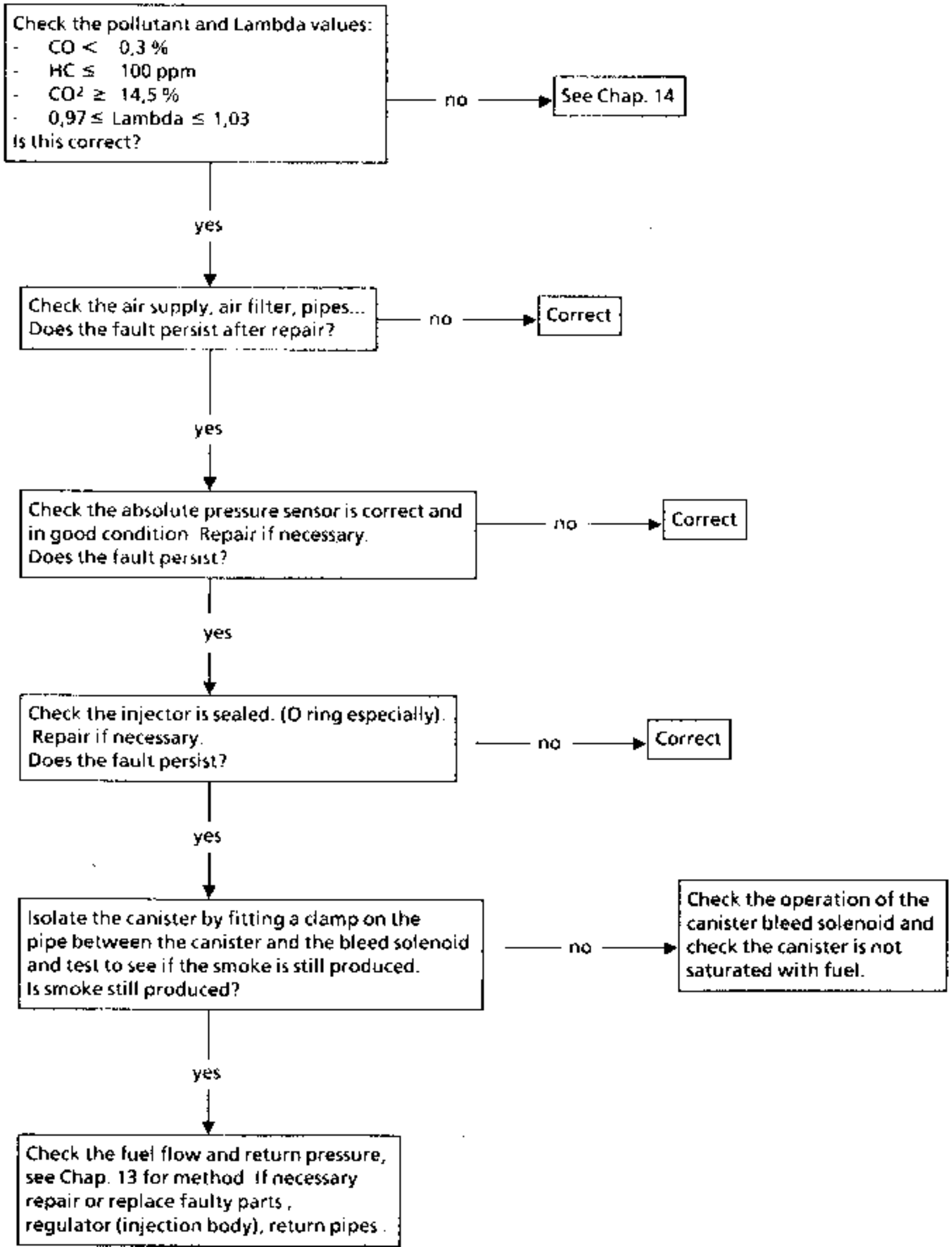
Check the ignition, coil, plugs and connections... Replace any faulty parts.
Does the fault persist?
- no → Correct
- yes ↓

Check the fuel flow and pressure, see Chap. 13 for method. If necessary repair pump, filter, pipes, injector, regulator (injection body) .

(*) Bargraph 8 RH side will not illuminate for :
- CO on track 16
- CC between tracks 14 and 32.

Smoke - Pollution

Chart 9 : Black smoke



Smoke - pollution

Chart 10 : Lack of conformity to anti-pollution regulations
CO and / or HC too high
CO > 0,3 % - HC > 100ppm

On XR25, check # 05, 35.
See Chap. 17. for test (*).
Is this correct?

yes → Check the HT circuit, plugs and wires.

Check the HT circuit, plugs and wires. — no → Correct

Check the HT circuit, plugs and wires. — yes →

Ask the customer if there has been an ignition or starting problem
Has there been a problem?

yes →

Test for lead (see Chap. 14). Before replacing the catalytic converter and oxygen sensor ensure the vehicle uses several tank-fulls of unleaded fuel.

Ask the customer if there has been an ignition or starting problem
Has there been a problem? — no →

There is an engine fault, the injection system is correct.

On XR25, check # 05, 35.
See Chap. 17. for test (*).
Is this correct? — no →

Disconnect the oxygen sensor and shunt the connector. Test at an engine speed of 2500/3000 rpm.
Does bargraph 8 LH side illuminate ?

Disconnect the oxygen sensor and shunt the connector. Test at an engine speed of 2500/3000 rpm.
Does bargraph 8 LH side illuminate ? — yes →

Replace the oxygen sensor

Disconnect the oxygen sensor and shunt the connector. Test at an engine speed of 2500/3000 rpm.
Does bargraph 8 LH side illuminate ? — no →

Connect bornier MS 1048 in place of the computer and check the wiring continuity between tracks:

Oxygen sensor	A ----→	29	Computer (bornier)
	B ----→	12	

Repair if necessary.
Does the fault persist?

Connect bornier MS 1048 in place of the computer and check the wiring continuity between tracks:
Repair if necessary.
Does the fault persist? — yes →

Replace the computer

Connect bornier MS 1048 in place of the computer and check the wiring continuity between tracks:
Repair if necessary.
Does the fault persist? — no → Correct

Note : An open circuit on oxygen sensor lines 12 and 29 will not illuminate bargraph 8 LH side but # 05 and 35 take fixed values :
 # 05 > 0,395
 # 35 = 128.

Chart 11 : Increased fuel consumption

Check tehre is no fuel leak
- no → Correct
- yes ↓

Check the idle speed.
(# 06 on XR25)
Is it correct?
- no → See Chart 4
- yes ↓

Ignition on, engine stopped, on XR25 do you read atmospheric pressure under # 01 ?
- no → See fault finding for bargraph 8 LH side
- yes ↓

Engine running, on XR25 check # 01. (*)
Is the value fixed under acceleration?
- yes → See fault finding for bargraph 8 LH side
- no ↓

Ensure the vehicle conforms to all specifications and is in good condition Repair if necessary. Does the fault persist?
- no → Correct
- yes ↓

Check the pollutant and Lambda values:
- CO < 0,3 %
- HC ≤ 100 ppm
- CO2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03.

Is this correct?
- no → See Chap. 14
- yes → Check the fuel pressure and flow. (see Chap. 13) Is this correct?
  - no → Repair the fuel return circuit or replace the upper section, (injection body) which houses the regulator.
  - yes → There is no longer an injection problem. Check the oil level, the cooling system and the axle assemblies.

(*) Bargraph 8 RH side will not illuminate for :
- CO on track 16
- CC between tracks 14 and 32.

Chart 12 : Noise - pinking

Check the pollutant and Lambda values:
- CO < 0,3 %
- HC ≤ 100 ppm
- CO^2 ≥ 14,5 %
- 0,97 ≤ Lambda ≤ 1,03.

Is this correct?

no → See Chap. 14

yes

Ask the customer what grade of fuel he is using. Is it correct?

no → Remind the customer which grade of fuel he should be using

yes

Check the condition and conformity of the plugs. Replace them if necessary. Does the fault persist?

no → Correct

yes

Check the air inlet ducts and the air filter thermostatically controlled flap Repair if necessary Does the fault persist?

no → Correct

yes

Ignition on, engine stopped, on XR25 do you read atmospheric pressure under # 01 ?

no → See fault finding for bargraph 8 RH side

yes

Engine at idle speed, on XR25 check # 01 (*) Is the value fixed under acceleration?

yes → See fault finding for bargraph 8 RH side

no → Check the engine is not overheating. Repair the cooling circuit, radiator, cooling fan, hoses... Does the fault persist?

yes → If the pinking persists, the ignition advance may be modified by by disconnecting connection R224 to set the advance back by 3°. Does the fault persist?

yes → There is an engine fault, the injection system is correct.

no → Correct

no → Correct

(*) Bargraph 8 RH side will not illuminate for :
- CO on track 16
- CC between tracks 14 and 32.

QUANTITY AND QUALITY OF ANTI-FREEZE

Engine	Quantity (in litres)	Quality	Notes
C3G	5,5	GLACEOL AL (type C) use coolant only	Protection down to- 23 °C for temperate and cold countries Protection down to - 40 °C for extreme cold countries

THERMOSTAT

Engine type	Starts opening (in °C)	Fully open (in °C)	Travel (in mm)
C3G	89	101	7,5

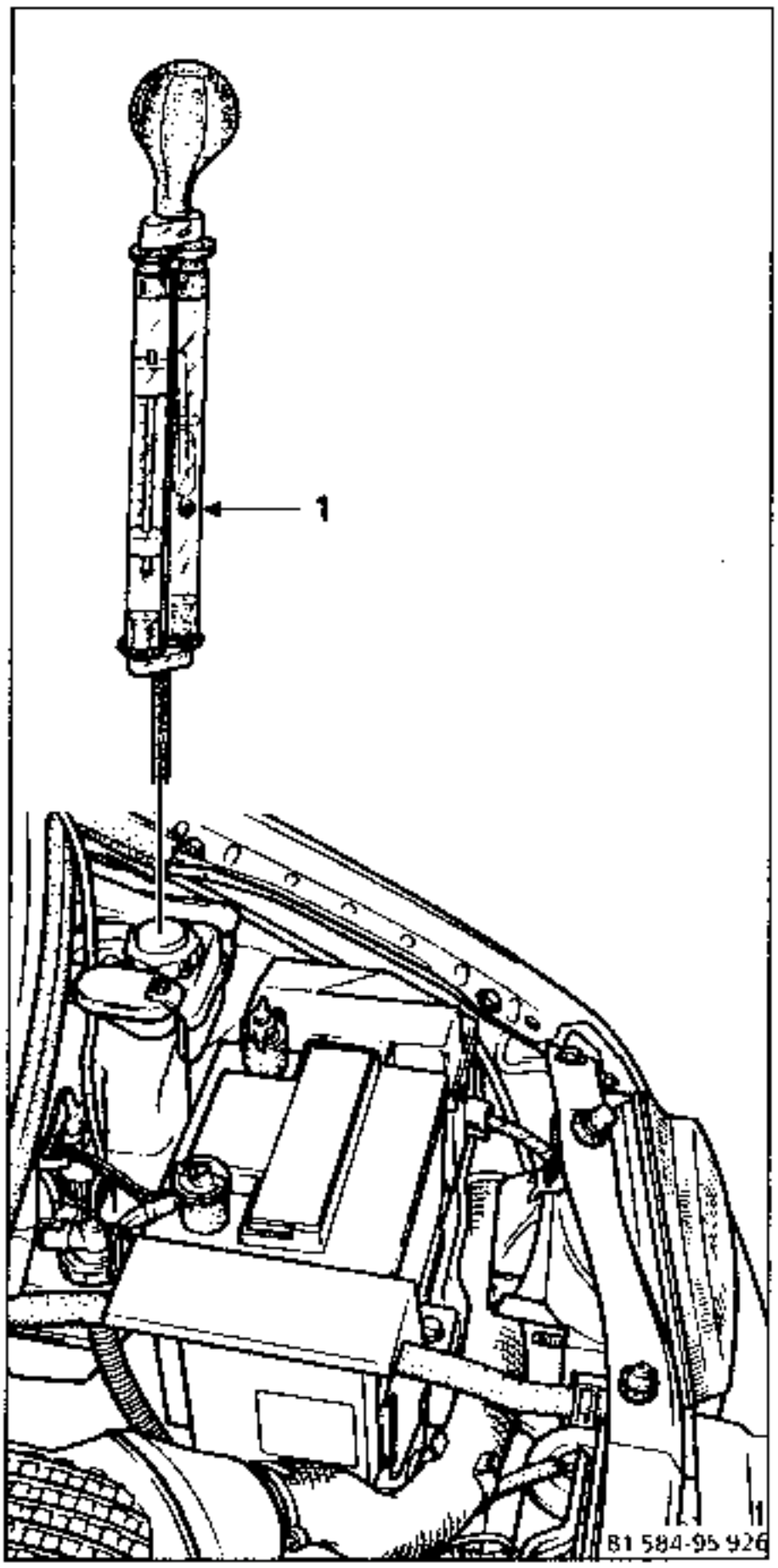
ANTI-FREEZE CONCENTRATION

Density gauge

Supplier:
- FACOM
  6 et 8, rue Gustave Eiffel-BP 99
  91423 MORANGIS

DENSITY GAUGE 778A (1)

Take up some coolant so that the liquid covers the base of the thermometer and allows the density gauge to float freely.



Check that the density gauge:

Is not jammed against the upper lip of the tube (too much liquid).

Is not stuck against the side of the tube - if necessary, tap lightly to free the gauge

Read:
- the temperature of the liquid,
- the density of the liquid.

Refer to the correction table below to determine the effective degree of protection of the coolant.

THERMOMETER READING !	DENSITY READING 3	5	10	15	20	30	40	DEGREES CENTIGRADE BELOW 0°
10	0	0	5	8	11	14	18	
20	1	2	6	10	14	18	24	
30	2	3	8	12	17	24	33	
40	3	5	10	15	20	30	40	
50	4	7	12	18	24	35		
60	6	9	15	22	28	40		
70	8	12	18	25	32			
80	10	14	22	32	37			

CORRECTED PROTECTION IN DEGREES

EXAMPLE { Thermometer reading : 60 } PROTECTION
EXAMPLE { Density gauge reading : 10 } to MINUS 15°C

Refractory gauge

Supplier:
- CEPAC
  Contact your After Sales Head Office for further information.

Take a sample of liquid from the expansion bottle.

Read off the protection value on the refraction gauge.

Hot, temperate cold countries:

Protection - **23 °C** (**35 %** anti-freeze mixture).

Extreme cold countries :

Protection - **40 ° C** (**50 %** anti-freeze mixture).

Protection is reduced when the concentration exceeds **60 %** anti-freeze.

The degrees of protection in the table are valid for a coolant temperature of 40 °C.

Use the tables below

For vehicles with **6** litres coolant capacity, for a protection read at - **15 °C**.

To exceed protection to - **23 °C**, replace **0,7** litre of coolant from the circuit with **0,7** litre of pure anti-freeze.

To exceed protection to - **40 °C**, replace **1,9** litre of coolant from the circuit with **1,9** litre of pure anti-freeze.

PURE ANTI-FREEZE TO BE ADDED

- 23 °C
Hot, temperate and cold countries

Protection at 40 °C (coolant temperature)		Circuit capacity (litres) 5	6	7	8	9
- 5 °C	*	1,3	1,6	1,8	2,1	2,4
- 10 °C	*	1,0	1,1	1,3	1,5	1,7
- 15 °C	*	0,6	0,7	0,9	1,0	1,1
- 20 °C	*	0,2	0,2	0,2	0,3	0,3

- 40 °C
Extreme cold countries

Protection at 40 °C (coolant temperature)		Circuit capacity (litres) 5	6	7	8	9
- 5 °C	*	2,2	2,6	3,1	3,5	3,6
- 10 °C	*	1,9	2,3	2,7	3,0	3,4
- 15 °C	*	1,6	1,9	2,2	2,6	3,0
- 20 °C	*	1,3	1,6	1,8	2,0	2,3
- 25 °C	*	1,0	1,2	1,4	1,7	1,9
- 30 °C	*	0,9	1,0	1,2	1,4	1,5
- 35 °C	*	0,5	0,5	0,6	0,7	0,8

* = Volume of liquid to be replaced by Glaceol AL TYPE C anti-freeze in order to obtain protection down to -40 °C

ALUMINIUM RADIATORS

Certain vehicles are fitted with aluminium section radiators.

Rinsing

Never rinse these components or the cooling circuit with caustic soda or alkaline products (light alloy sections may corrode and cause leaks).

Storage

These radiators may be stored with no special precautions for a **maximum of 48 hours** after removal.

After this period the brazing flux particles which enter the radiator during manufacture and the dichlorate chemicals from the coolant previously in the radiator cause oxidation of the aluminium radiator components when in contact with the air, causing leaks

If a radiator is to be removed for **more than 48 hours**:

- **RINSE WITH COPIOUS AMOUNTS OF WATER,** BLOW OUT with compressed air then PLUG all openings, or

- Keep the radiator full of coolant if possible.

Anti-freeze

Aluminium radiators require special anti-freeze.

AL type C anti-freeze which is marketed by the Renault Network meets the requirements set by our Design Office for:

- neutral reactivity with various cast aluminium components,

- alkalinity specifications adapted for light alloys,

- **special additives which give efficient protection against acidic combustion products both for Diesel and Petrol engines**

- concentration ensuring protection and good operation at all temperatures

There is no heater matrix valve

The coolant is continuously circulated in the heater matrix, contributing to engine cooling.

FILLING

Check the drain plug/s are tight

Open the bleed screw/s.

Fill the circuit through the expansion bottle .

Unclip the hose from the top of the computer and position it below the expansion bottle.

Close the bleed screw/s as soon as liquid runs out in a continuous jet.

Start the engine (1 500 rpm)

Adjust the overflow level for 4 minutes approximately.

Close the bottle

BLEEDING

Let the engine run for **10 minutes** at **1 500 rpm**, until the engine cooling fan operates. (time required for automatic de-gassing).

Check the coolant level is near the "**Max**" mark.

NEVER OPEN THE BLEED SCREW/S WHEN THE ENGINE IS RUNNING..

REPLACE THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM.

SPECIAL TOOLING REQUIRED		
M.S.	554-05	Kit for testing cooling circuit sealing
M.S.	554-01	Adapter for M.S. 554-05
M.S.	554-06	Adapter for M.S. 554-05

1 - Testing the sealing of the circuit

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

Connect this to tool **M.S. 554-05**.

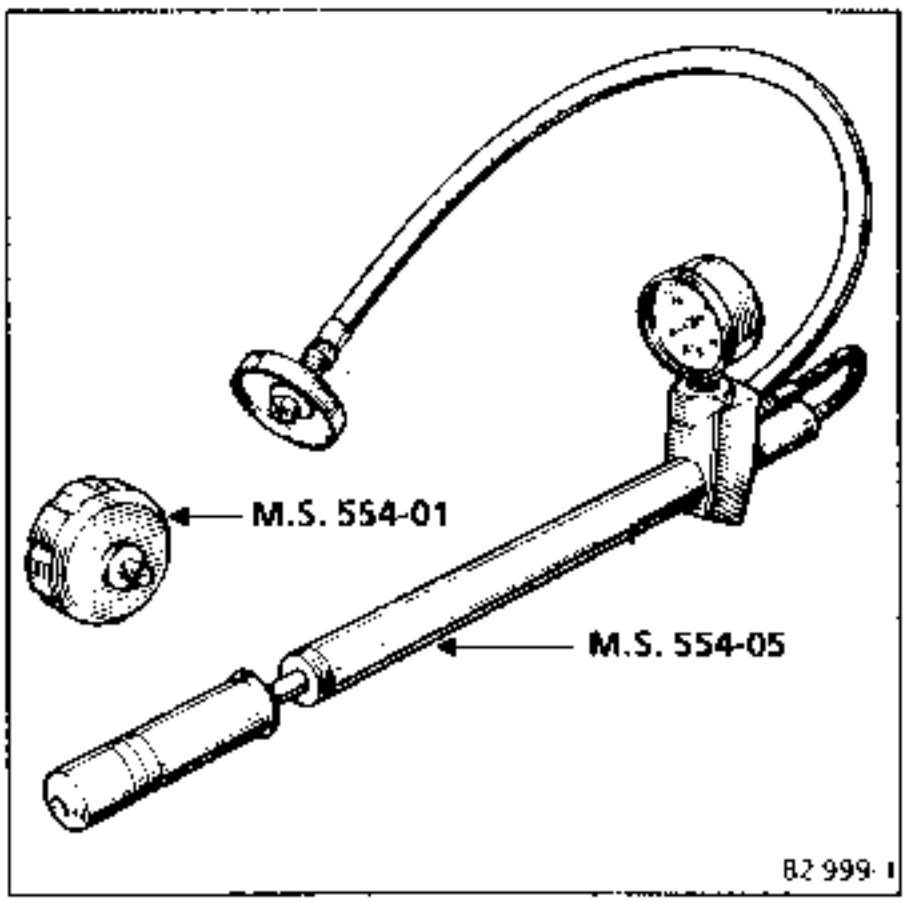
Let the engine warm up then stop it.

Pump to put the circuit under pressure.

Stop pumping at **0,1 bar** less than the vale is rated.

The pressure should not drop, otherwise look for the leak.

Slowly unscrew the union of tool **M.S. 554-05** to decompress the cooling circuit, then remove tool **M.S. 554-01** and refit the expansion bottle valve with a new seal



2 - Checking the rating of the valve.

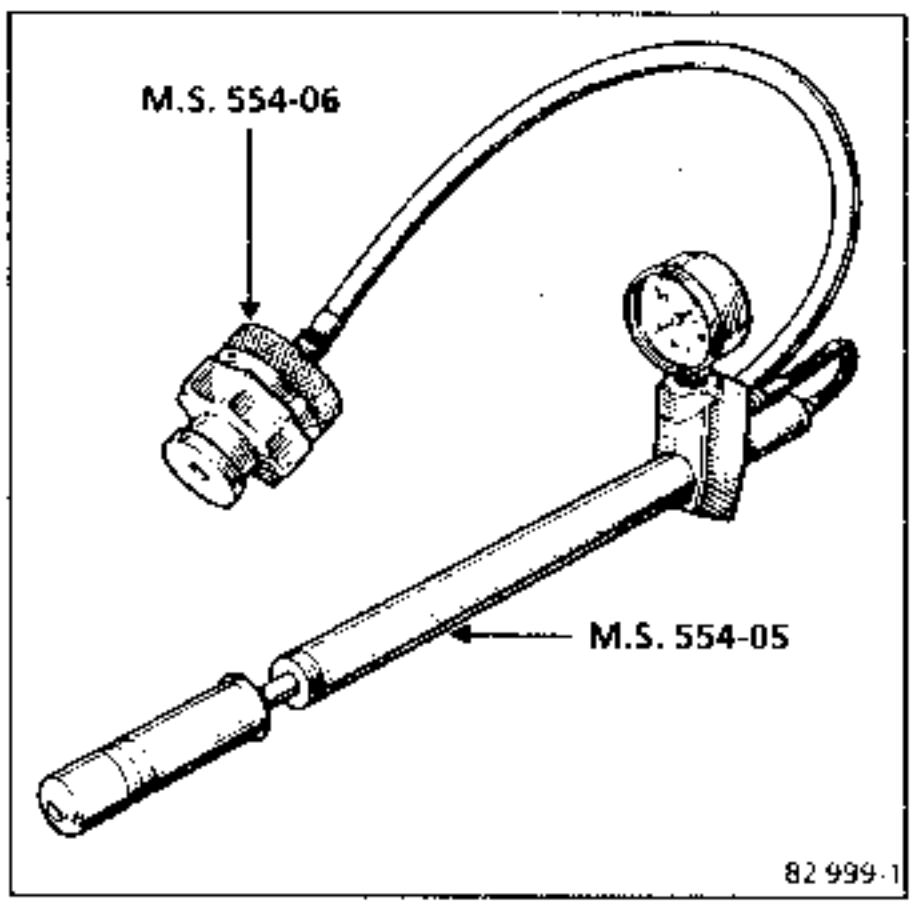
If liquid passes through the expansion bottle valve,the valve must be replaced.

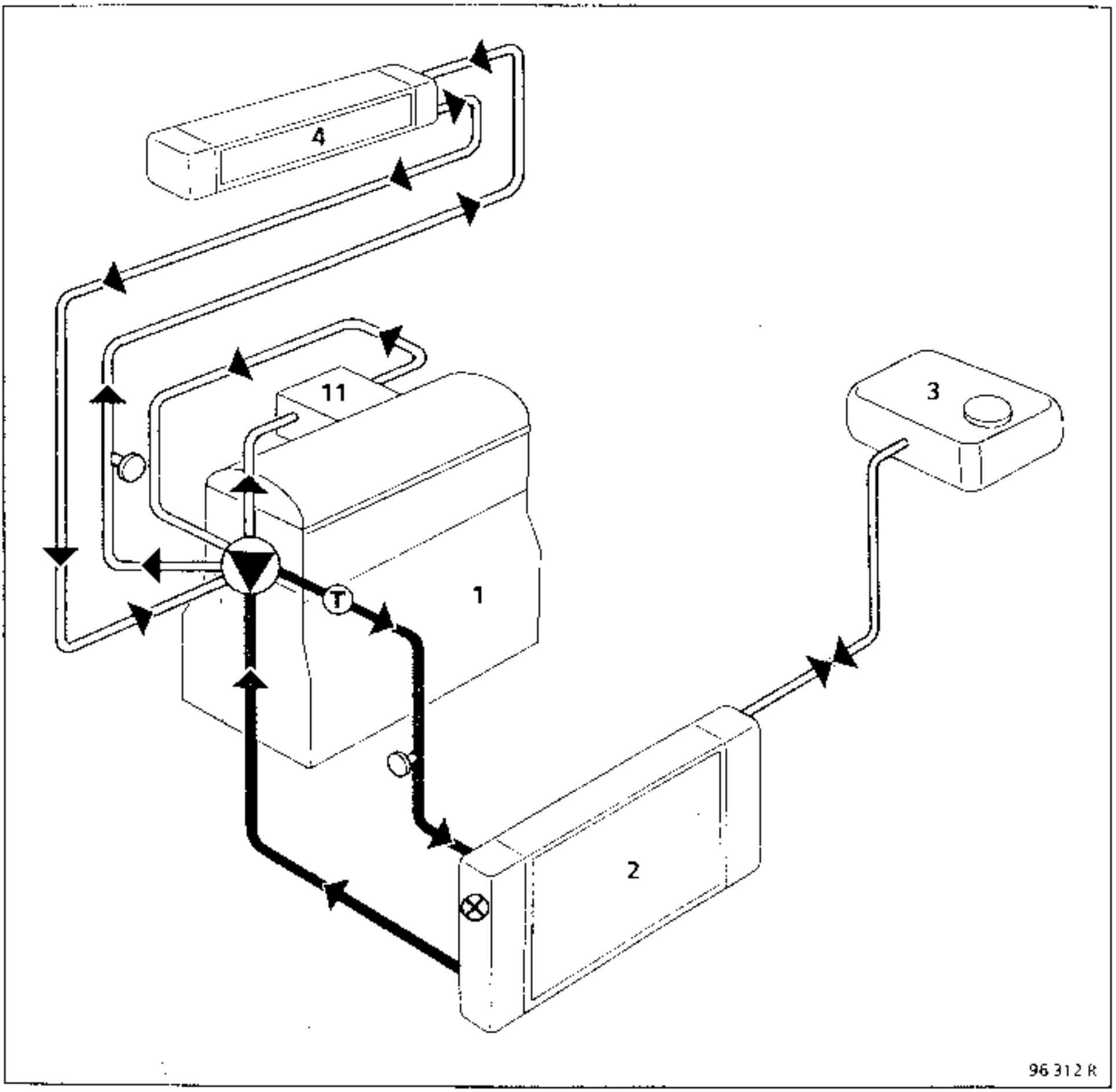
On pump **M.S. 554-05** fit tool **M.S. 554-06** and fit the assembly on the valve to be checked.

Increase the pressure which should stabilise at the valve rating pressure with a test tolerance of ± **0,1 bar**.

Valve rating :

Brown colour plastic valve **1,2 bar**.





1 Engine
2 Radiator
3 Cold bottle
4 Heater matrix
11 Throttle body

Water pump

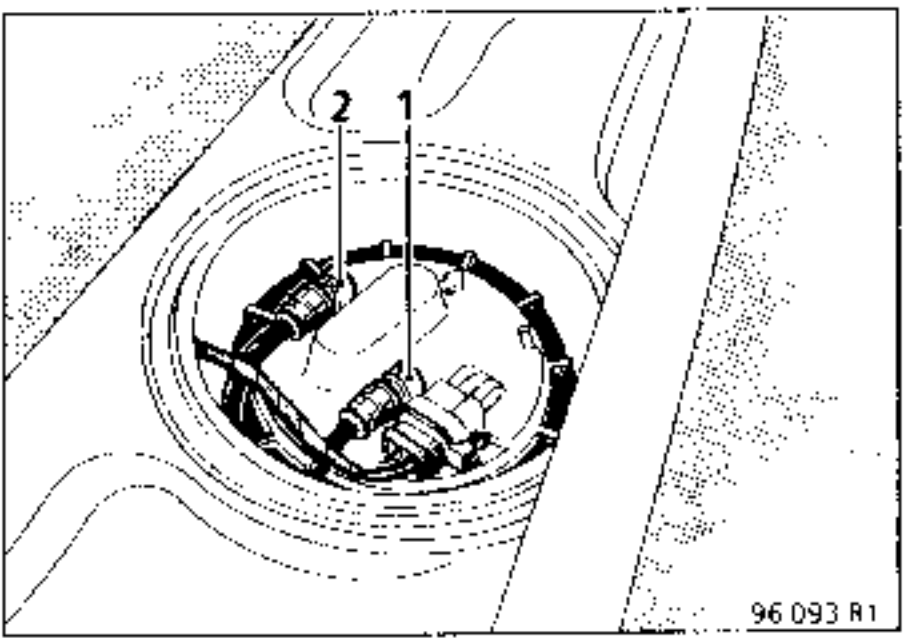
T Thermostat

Bleed screws

Temperature switch

IMPORTANT : Whenever work is carried out on the fuel tank or fuel supply circuit, never smoke and keep all heat sources away from the working area

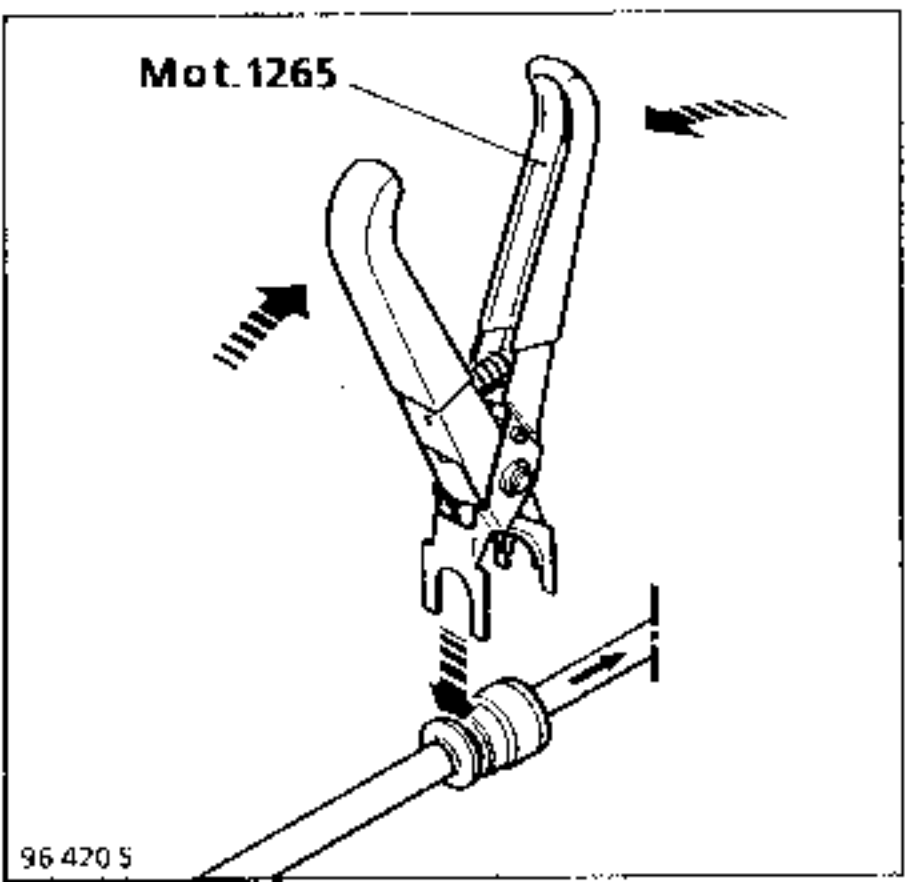
DRAINING THE FUEL TANK



Tilt the rear bench seat forward

Lift the carpet and remove the plug.

Disconnect the fuel supply pipes (1) and return pipes (2) using a special set of pliers **Mot. 1 265** (see diagram)

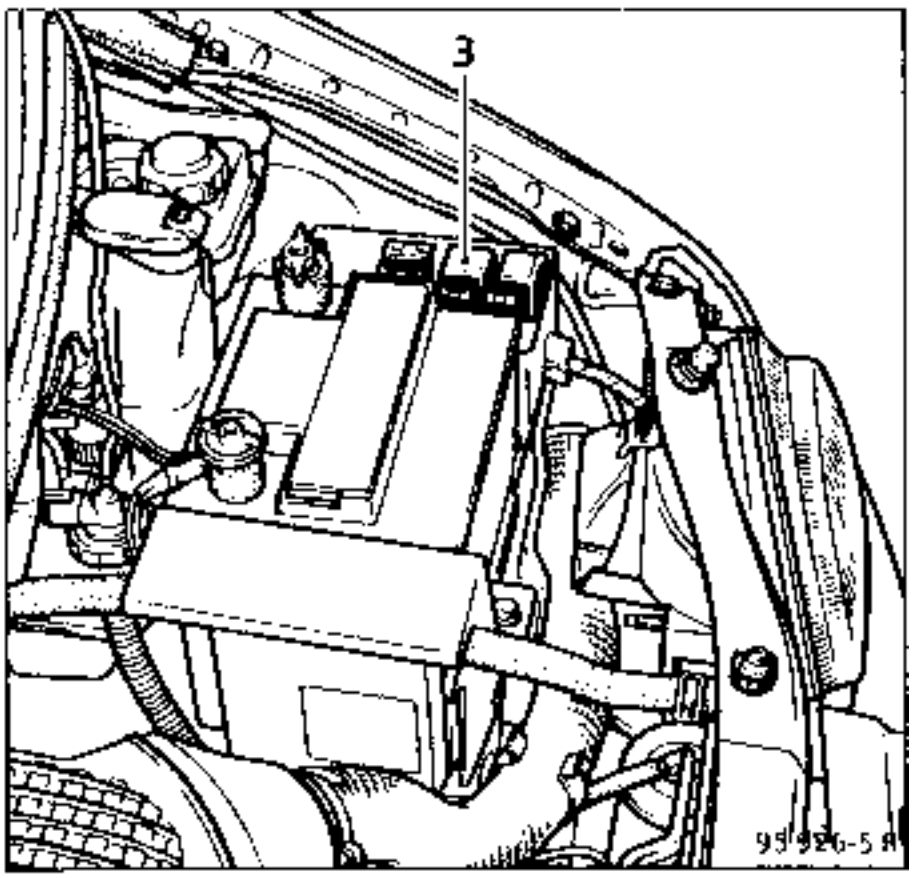


Fit a hose onto the fuel pump outlet (1) (hose must be long enough to fit into a container)

Disconnect the fuel pump relay (3).

To operate the pump, shunt between tracks (3) and (5).

When the fuel is being pumped out intermittently, replace the relay having removed the shunt.



NOTE : up to 11 litres of fuel may remain in the fuel tank after this operation (this is due to the shape of the fuel tank).

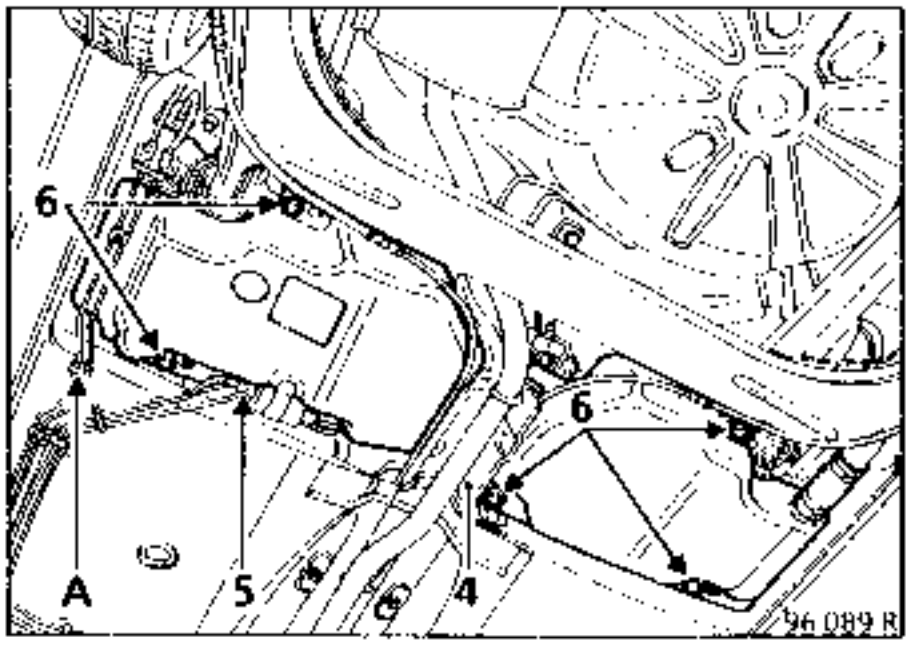
REMOVING - REFITTING THE FUEL TANK

Drain the fuel tank.

Disconnect the battery

Disconnect the connector from the pump - gauge assembly and the fuel return pipe.

Remove:
- the rear right hand wheel,
- the rear bumper,
- the heat shield (4),
- the silencer.



Disconnect the pipe (5) from the fuel filter using pliers **Mot. 1 265.**

Loosen the handbrake adjustment control to release the cables.

Unhook the brake pipes at (A)

Remove the filler neck mounting bolt

Position a jack under the fuel tank.

Remove the five fuel tank mounting bolts (6)

Lower the fuel tank by about 10 centimetres then tilt to the right to remove the brake pipes.

Disconnect the fuel vapour recirculation pipe using pliers **Mot. 1 265** (union by the filler neck), and remove this pipe from the tank.

Lower the fuel tank completely.

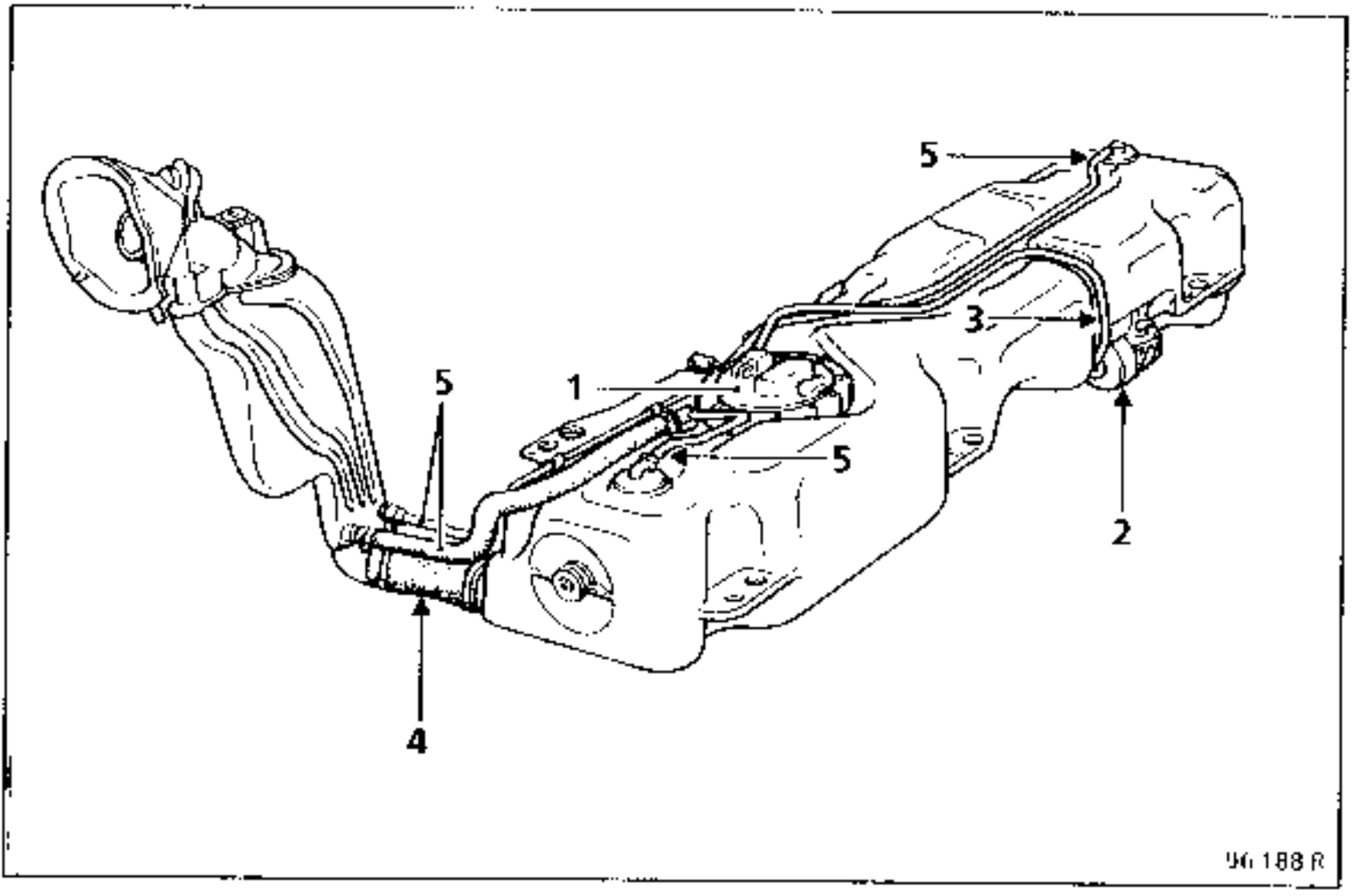
When refitting ensure :

- the fuel vapour recirculation pipe and the fuel supply pipes are refitted onto the fuel tank correctly

- the pump - gauge connector is not crushed.

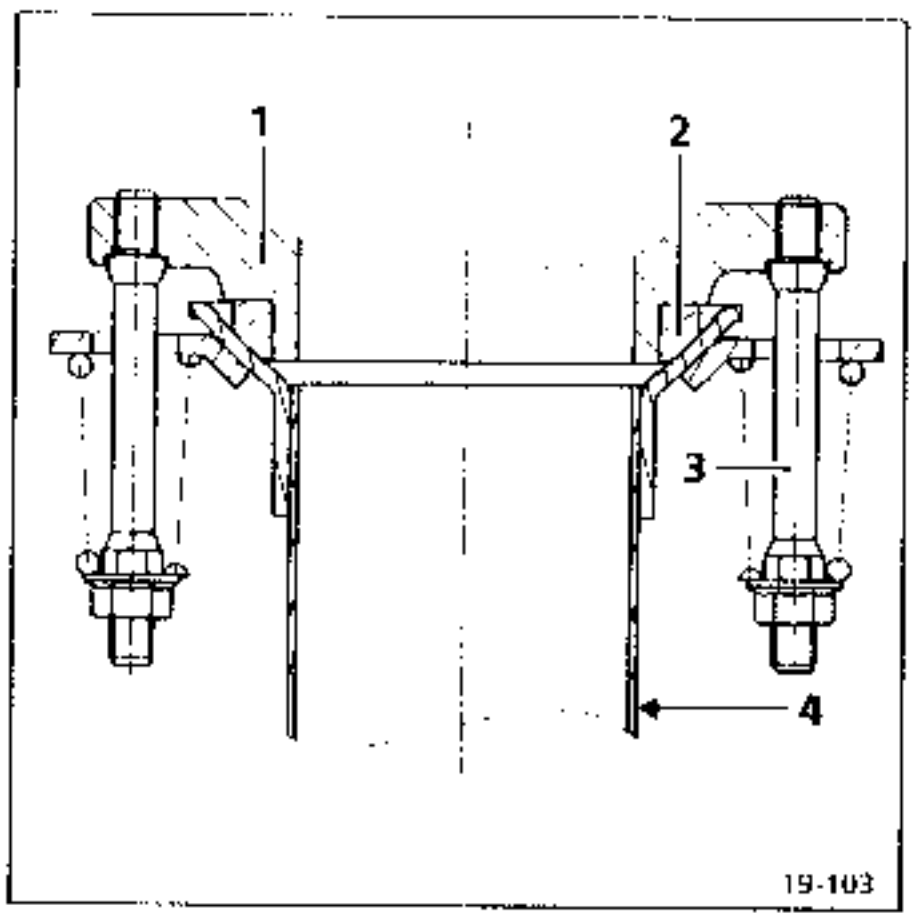
Adjust the handbrake

FUEL TANK ASSEMBLY



1 Pump - gauge assembly
2 Fuel filter
3 Fuel supply pipe
4 Filler neck - tank connection
5 Fuel vapour recirculation pipes

BALL JOINT CONNECTION AND SEALING WITH "METEX" RING



1 Exhaust manifold
2 "Metex" ring
3 Studs
4 Exhaust downpipe

Studs (3) on the exhaust downpipe are fitted with stops to determine the tension of the springs Tighten until they reach the stop.

A "Metex" friction ring (2) is used to seal the joint.

IMPORTANT :

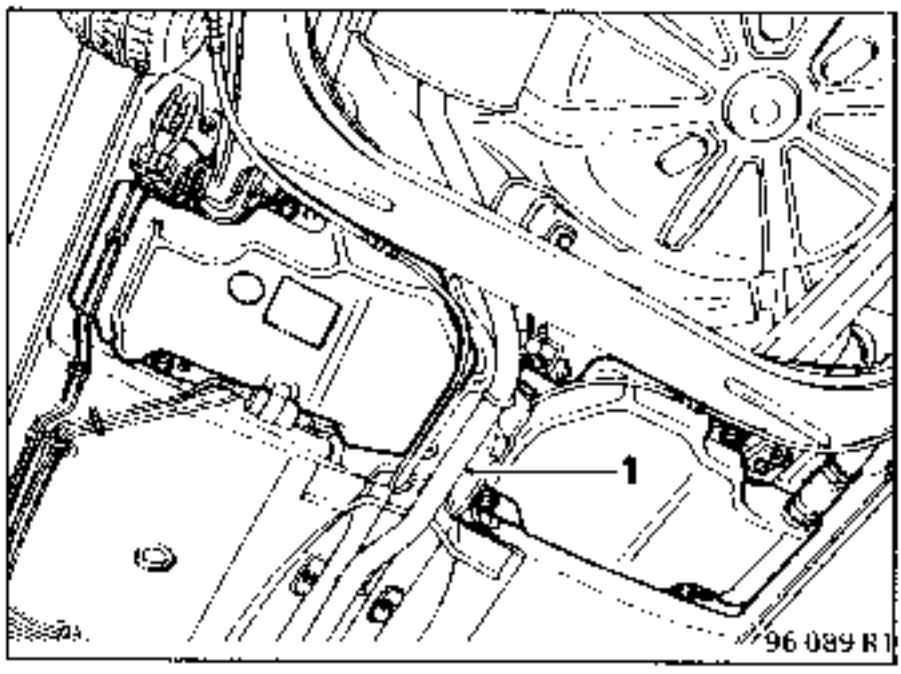
The sealing between the manifold gasket surface and the catalytic converter must be perfect.

When replacing the catalytic converter, check the condition of the "Metex" ring (2) and replace it if necessary.

During removal and refitting, the catalytic converter should not be subjected to mechanical shocks, which, if repeated, could damage the converter.

REMOVAL - REFITTING

Remove
- the rear bumper (it is held in position by four bolts and two nuts),
- the heat shield (1) under the fuel tank,



- the collar connecting the catalytic converter to the silencer,
- the various rubber mountings ensuring the silencer is mounted securely to the underside of the body.

Remove the silencer towards the rear of the vehicle.

When refitting the silencer refit the various components in the reverse order to when they were removed

Check the heat shield is correctly refitted.

NOISE IN THE EXHAUST LINE

The vehicle must be tested to determine the location of the noise (if necessary with the customer). The noise should then be reproduced when stationary. To do this, accelerate sharply to cover a wide range of engine speeds and resonances.

Having reproduced the fault :

- ensure the exhaust line is not touching the body,
- check the alignment, conformity and condition of the exhaust assembly,
- try to eliminate the noise noted by tightening the exhaust line section or heat shields at fault.

If the noise is coming from the catalytic converter, remove it and test as follows:

- visual examination inside the envelope (internal section melted),
- aural examination after shaking the component (internal section broken or foreign body inside).

If the internal section has melted the cause must be determined (see chapter 14 : test to be carried out before anti-pollution tests) and check that catalytic converter particles have not blocked the exhaust system further down.

Only if one of the faults mentioned above is found, replace the converter.

IMPORTANT NOTE : never park or run the engine in an area where combustible material could touch the exhaust line which can become extremely hot.

These materials may ignite under certain conditions